

# MAINTENANCE MANUAL

W/ILLUSTRATED PARTS CATALOG



## FM/AM-1200S/A COMMUNICATIONS SERVICE MONITOR



# **WARNING:**

## **HIGH VOLTAGE EQUIPMENT**

**THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.**

## **RESCUE OF SHOCK VICTIMS**

- 1. DO NOT ATTEMPT TO PULL OR GRAB THE VICTIM**
- 2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.**
- 3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PUSH, PULL OR LIFT THE VICTIM TO SAFETY USING A WOODEN POLE, A ROPE OR SOME OTHER DRY INSULATING MATERIAL.**

## **FIRST AID**

- 1. AS SOON AS VICTIM IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE VICTIM A SHORT DISTANCE AWAY FROM SHOCK HAZARD.**
- 2. SEND FOR DOCTOR AND/OR AMBULANCE.**
- 3. KEEP VICTIM WARM, QUIET AND FLAT ON HIS/HER BACK.**
- 4. IF BREATHING HAS STOPPED , ADMINISTER ARTIFICIAL RESUSCITATION. STOP ALL SERIOUS BLEEDING.**

### **CAUTION**

INTEGRATED CIRCUITS AND SOLID STATE DEVICES SUCH AS MOS FET'S, ESPECIALLY CMOS TYPES, ARE SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGES RECEIVED FROM IMPROPER HANDLING, THE USE OF UNGROUNDED TOOLS, AND IMPROPER STORAGE AND PACKAGING. ANY MAINTENANCE TO THIS UNIT MUST BE PERFORMED WITH THE FOLLOWING PRECAUTIONS:

1. BEFORE USING IN A CIRCUIT, KEEP ALL LEADS SHORTED TOGETHER EITHER BY THE USE OF VENDOR-SUPPLIED SHORTING SPRINGS OR BY INSERTING LEADS INTO A CONDUCTIVE MATERIAL.
2. WHEN REMOVING DEVICES FROM THEIR CONTAINERS, GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.
3. TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.
4. DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.
5. PC BOARD, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAG.

### **NOTE**

Remove any built-in power source, such as a battery, before laying PC Boards on conductive mat or storing in conductive bag.

6. PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGED IN A CONDUCTIVE BAG AND PLACED IN A WELL-CUSHIONED SHIPPING BOX.

THE USE OF SIGNAL GENERATORS FOR MAINTENANCE AND OTHER ACTIVITIES CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE TO COMMUNICATION RECEIVERS, WHICH CAN CAUSE DISRUPTION AND INTERFERENCE TO COMMUNICATION SERVICE OUT TO A DISTANCE OF SEVERAL MILES.

USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION WHICH RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND SHOULD TAKE NECESSARY PRECAUTIONS TO AVOID POTENTIAL COMMUNICATION INTERFERENCE PROBLEMS.

## LIST OF EFFECTIVE PAGES

The manual pages listed below which are affected by a current change or revision, are so identified by a revision number and an asterisk.

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# PREFACE

## SCOPE

This manual contains maintenance instructions for the FM/AM-1200S and FM/AM-1200A Communications Service Monitors. The information in this manual will enable the technician to:

1. Service, test, repair or replace any major assembly or module within the test set.
2. Maintain the operating condition of the set to expected performance standards.
3. Understand the principles of operation as they relate to the overall operation of the set as well as to individual circuits.

## APPLICABILITY

All information contained in this manual applies to both the FM/AM-1200S and FM/AM-1200A models, except where otherwise noted. For reasons of brevity, whenever text information is applicable to both models, the units are referenced as "FM/AM-1200S/A" (instead of FM/AM-1200S and FM/AM-1200A separately).

## ORGANIZATION

The contents of this manual are divided into seven major sections:

### SECTION 1 - INTRODUCTION

Provides a brief description of the electrical and mechanical configuration of the FM/AM-1200S/A, intended to familiarize the technician with the overall structure of the set.

### SECTION 2 - THEORY OF OPERATION

Describes the FM/AM-1200S/A circuit theory on three levels of complexity, a simplified overview, a functional theory of interactive modules, and a detailed theory of each module. Appropriate block diagrams accompany each discussion.

### SECTION 3 - PERFORMANCE EVALUATION

Contains "covers on" functional checkout procedures for evaluating the performance of the FM/AM-1200S/A in each of its modes of operation and major functions.

### SECTION 4 - CALIBRATION

Contains step-by-step calibration procedures for use at normal calibration intervals or after making repairs or replacements.

## SECTION 5 - PREVENTIVE MAINTENANCE

Contains routine instructions for cleaning and inspection of the FM/AM-1200S/A.

## SECTION 6 - PC BOARD ASSEMBLIES/CIRCUIT SCHEMATICS

Contains component layout drawings for all mechanical assemblies, PC Board assemblies, interconnect diagrams, circuit schematics, waveforms and charts reflecting voltage levels keyed to test points.

## SECTION 7 - ILLUSTRATED PARTS CATALOG

Contains information for identification, requisition and issuance of replacement parts for the FM/AM-1200S and FM/AM-1200A Communications Service monitor.

## APPENDICES

Contains useful supplementary maintenance and operational data.



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# SECTION 1 - INTRODUCTION

## 1-1 GENERAL

This section provides a brief description of the internal electrical and mechanical configurations of the FM/AM-1200S/A, and will familiarize the technician with the overall structure of the set. FM/AM-1200S/A specifications are in Appendix A.

## 1-2 DIFFERENCES BETWEEN MODELS

The FM/AM-1200S is identical to the FM/AM-1200A with the following exceptions:

1. The FM/AM-1200S contains a Spectrum Analyzer consisting of the Analyzer RF, Analyzer IF and Analyzer Log Amplifier Modules.
2. The Scope Control PC Board in the FM/AM-1200S is different from the one installed in the FM/AM-1200A.
3. The graticule overlay on the FM/AM-1200S is marked with a dBm scale, while the overlay on the FM/AM-1200A is not.

## 1-3 ELECTRICAL DESCRIPTION

The FM/AM-1200S/A is a processor controlled, digitally synthesized FM/AM/SSB receiver and generator, with an integral oscilloscope/spectrum analyzer. The receiver is a triple conversion superheterodyne receiver capable of receiving signals from 250 kHz to 999.9999 MHz. The signal generator is capable of producing modulated or unmodulated RF signals from 250 kHz to 999.9999 MHz. A function generator will produce six functions with ranges from 10 Hz up to 10 kHz and one function up to 30 kHz. A duplex generator can produce a signal up to  $\pm 49.99$  MHz from the received frequency. The oscilloscope and spectrum analyzer on the FM/AM-1200S utilize a common CRT. Bandwidth of the oscilloscope is DC to 1 MHz and the dynamic range of the spectrum analyzer on the FM/AM-1200S is from -30 dBm to -100 dBm.

### 1-3-1 FUNCTIONAL CONSTRUCTION

Individual modules which make up each function are listed below.

1. Power Supply  
Line Supply Assembly  
Inverter Assembly  
Battery Charger PC Board
2. Reference Frequencies  
Frequency Standard PC Board  
Standard or Optional TCXO or Optional Oven Oscillator  
Digital Module



3. Processor

Processor PC Board  
Interface I/O PC Board  
DVM I/O PC Board  
Display PC Board  
Keyboard

4. Frequency Synthesizer

High Loop Assembly  
Dual VCO Assembly  
1120 MHz Low Pass Filter  
High/Low Pass Filter  
Low Loop Assembly

5. Receive/Generate

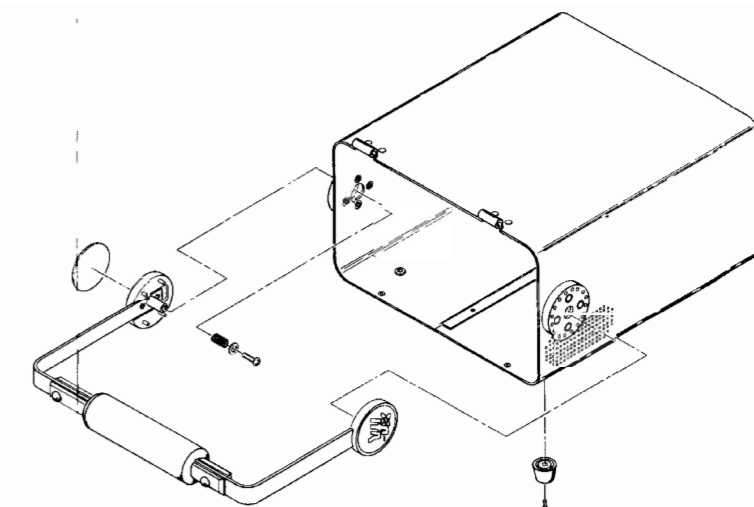
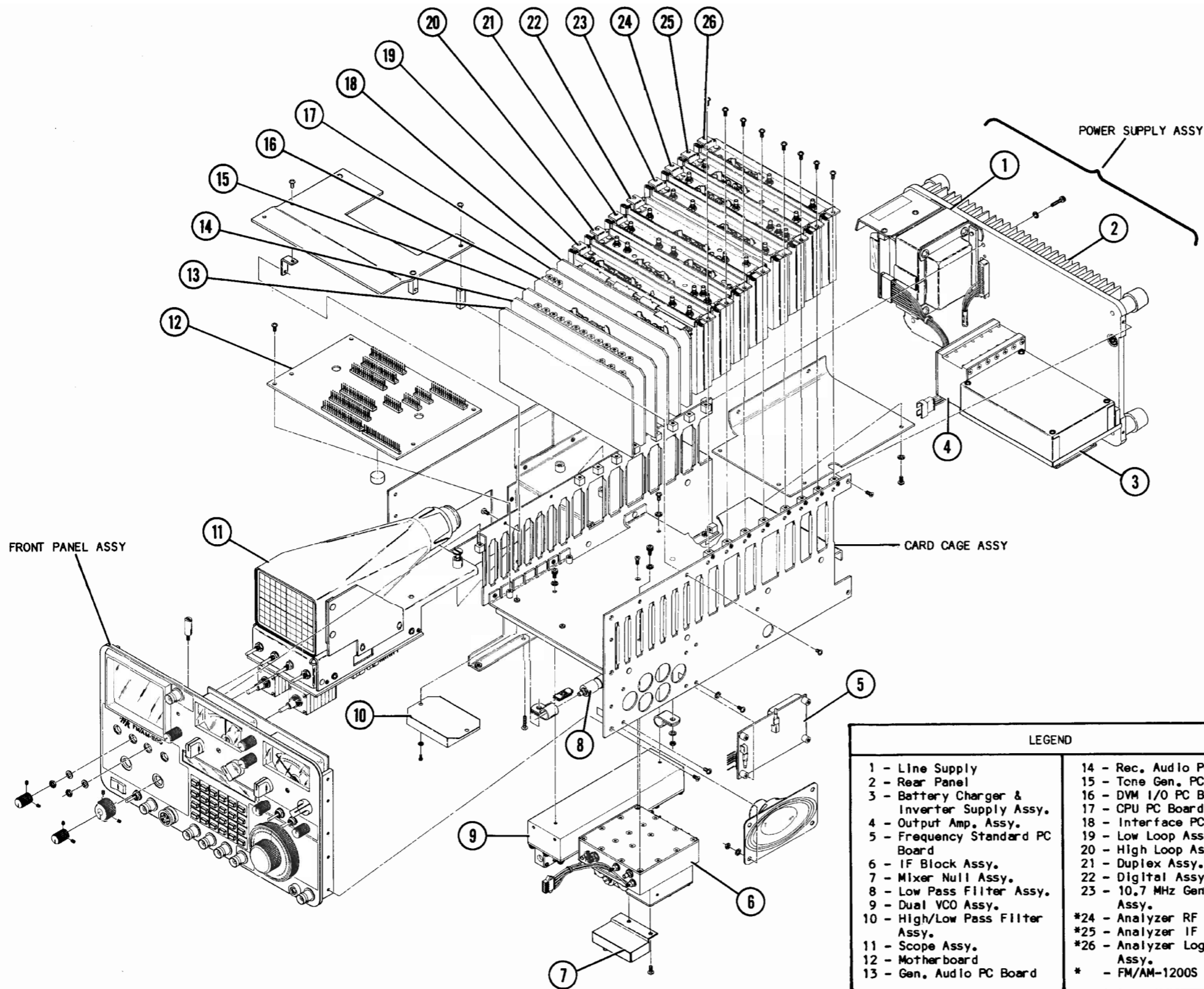
Output Amplifier Assembly  
IF Module Assembly  
Frequency Synthesizer Function  
10.7 MHz Gen/Rec Assembly  
Receive Audio PC Board  
Generate Audio PC Board  
Duplex Generator Assembly  
Function Generator  
Front Panel Monitoring Displays

6. Oscilloscope/Spectrum Analyzer

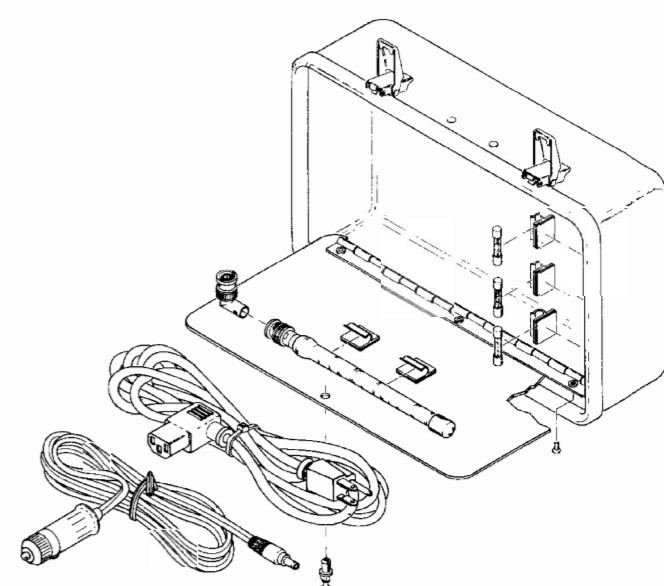
CRT Assembly  
Scope Control PC Board  
Scope Power Supply PC Board  
Analyzer RF Assembly (FM/AM-1200S only)  
Analyzer IF Assembly (FM/AM-1200S only)  
Analyzer Log Amplifier Assembly (FM/AM-1200S only)

## 1-4 MECHANICAL DESCRIPTION

Figure 1-1 is an "exploded" composite view of the FM/AM-1200S/A, identifying and locating its major assemblies. Front and rear panel controls, connectors and indicators are identified in Figure 1-2. This illustration foldout is to provide ready identification of references when performing testing or calibration of the FM/AM-1200S/A.



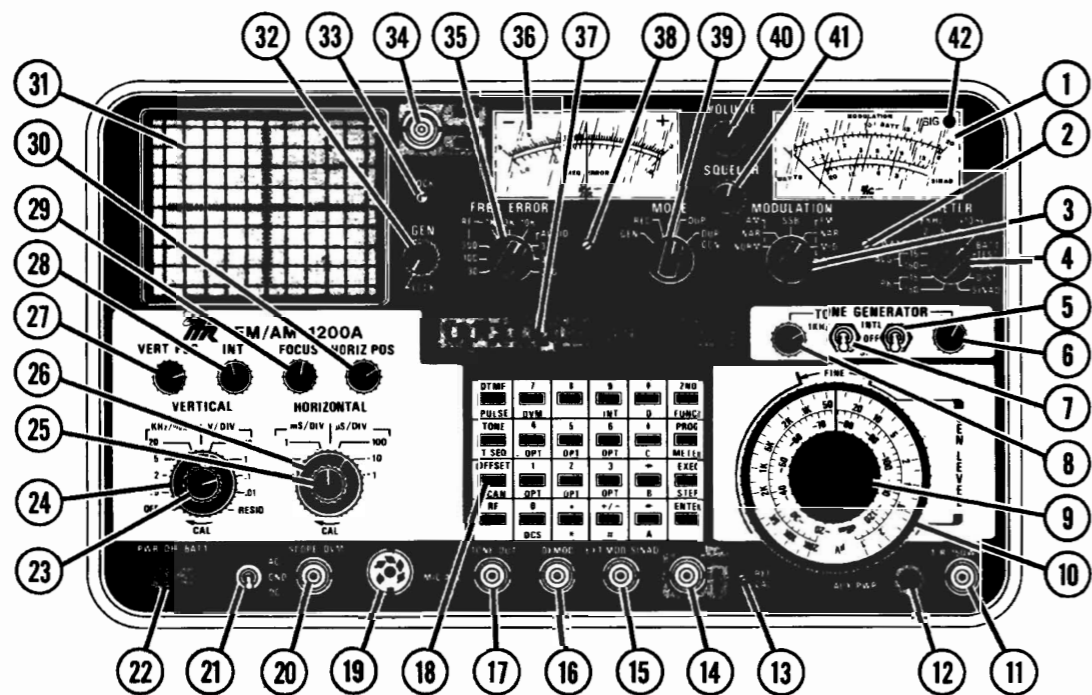
CASE ASSEMBLY



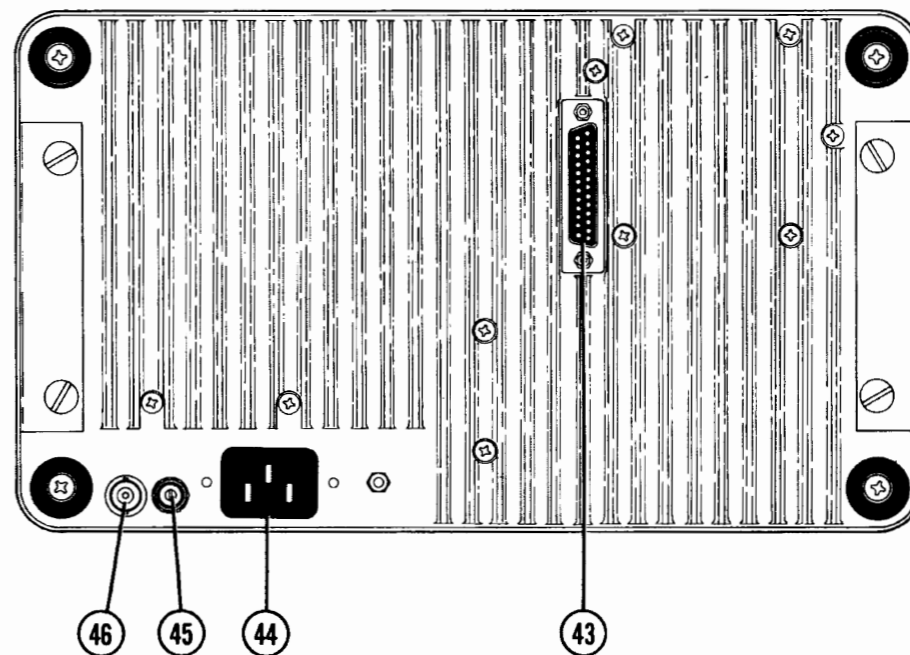
LID ASSEMBLY

LEGEND	
1 - Line Supply	14 - Rec. Audio PC Board
2 - Rear Panel	15 - Tone Gen. PC Board
3 - Battery Charger & Inverter Supply Assy.	16 - DVM I/O PC Board
4 - Output Amp. Assy.	17 - CPU PC Board
5 - Frequency Standard PC Board	18 - Interface PC Board
6 - IF Block Assy.	19 - Low Loop Assy.
7 - Mixer Null Assy.	20 - High Loop Assy.
8 - Low Pass Filter Assy.	21 - Duplex Assy.
9 - Dual VCO Assy.	22 - Digital Assy.
10 - High/Low Pass Filter Assy.	23 - 10.7 MHz Gen/Rec Assy.
11 - Scope Assy.	*24 - Analyzer RF Assy.
12 - Motherboard	*25 - Analyzer IF Assy.
13 - Gen. Audio PC Board	*26 - Analyzer Log Amp Assy.
	* - FM/AM-1200S only

Figure 1-1 FM/AM-1200S/A Composite (Module Identification)



- |   |   |
|---|---|
| 1. MODULATION METER                               | 23. Scope VERTICAL Attenuator Vernier Control |
| 2. Modulation Meter Zero Adjustment               | 24. VERTICAL Attenuator Selector Control      |
| 3. MODULATION Select Control                      | 25. Scope HORIZONTAL Sweep Vernier Control    |
| 4. Modulation METER Control                       | 26. HORIZONTAL Sweep Selector Control         |
| 5. VAR Tone Selector Switch                       | 27. VERT POS Control                          |
| 6. VAR Tone Level Control                         | 28. INT Control                               |
| 7. 1 kHz Tone Selector Switch                     | 29. FOCUS Control                             |
| 8. 1 kHz Tone Level Control                       | 30. HORIZ POS Control                         |
| 9. RF Level Attenuator Control                    | 31. CRT Display                               |
| 10. RF Level Attenuator Vernier Control           | 32. GEN/LOCK Control                          |
| 11. T/R Connector                                 | 33. LOCK Lamp                                 |
| 12. AUX POWER Connector (Option 05 Gen. Amp only) | 34. ANT Connector                             |
| 13. REF CAL Adjustment                            | 35. FREQ ERROR Meter Range Selector Control   |
| 14. DUPLEX Output Connector                       | 36. FREQ ERROR Meter                          |
| 15. EXT MOD/SINAD Connector                       | 37. VFD (Vacuum Fluorescent Display)          |
| 16. DEMOD Connector                               | 38. FREQ ERROR Meter Zero Adjustment          |
| 17. TONE OUT Connector                            | 39. MODE Selector Control                     |
| 18. Keyboard                                      | 40. VOLUME Control                            |
| 19. MIC/ACC Connector                             | 41. SQUELCH Control                           |
| 20. SCOPE/DVM Connector                           | 42. SIG Indicator Lamp                        |
| 21. AC/GND/DC Switch (Scope)                      |   |
| 22. PWR/OFF/BATT Switch                           |   |



- |                              |                                  |
|------------------------------|----------------------------------|
| 43. RS-232 Connector         | 45. DC Power Input Connector     |
| 44. AC Power Input Connector | 46. External Reference Connector |

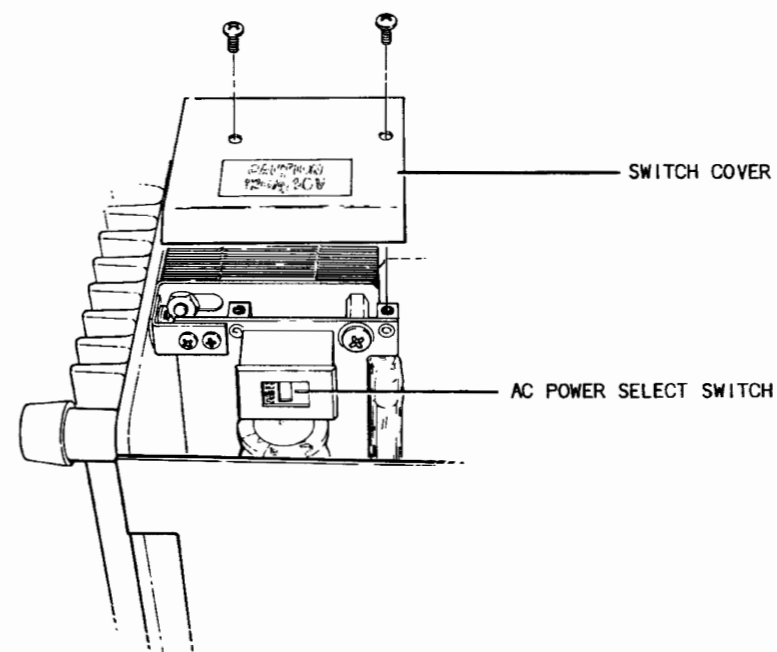


Figure 1-2 Description of Controls, Connectors & Indicators

# SECTION 2 - THEORY OF OPERATION

## 2-1 GENERAL

This section contains three levels of Theory of Operation and is organized as follows:

### 1. SYSTEM THEORY OF OPERATION

Paragraph 2-2 provides a simplified description of signal flow through the FM/AM-1200S/A, for both receiver and signal generator operation. This description is based on the System Block Diagram shown in Figure 2-1. In addition, a brief overview of the oscilloscope and spectrum analyzer is covered within this paragraph.

### 2. FUNCTIONAL THEORY OF OPERATION

Paragraph 2-3 provides a description of the major functional groupings in the FM/AM-1200S/A. This description is based on the functional block diagrams for each grouping.

### 3. MODULE THEORY OF OPERATION

Paragraph 2-4 provides detailed theory of operation for each module and/or assembly contained in the FM/AM-1200S/A. All discussions are based on the accompanying block diagrams for each module.

## 2-2 SYSTEM THEORY OF OPERATION

The FM/AM-1200S/A is a processor controlled, digitally synthesized FM/AM/SSB receiver and generator, with an integral oscilloscope/spectrum analyzer. The receiver is a triple conversion superheterodyne receiver capable of receiving signals from 250 kHz to 999.9999 MHz. The signal generator is capable of producing modulated or unmodulated RF signals from 250 kHz to 999.9999 MHz. Tone configurations available to modulate the generator are Ramp, Triangle, Square, Sine, DTMF, Pulse and DCS. A duplex generator can produce a signal up to  $\pm 49.99$  MHz from the received frequency. The oscilloscope and spectrum analyzer (installed in the FM/AM-1200S only) utilize a common CRT. Bandwidth of the oscilloscope is DC to 1 MHz and the dynamic range of the spectrum analyzer is from -30 dBm to -100 dBm.

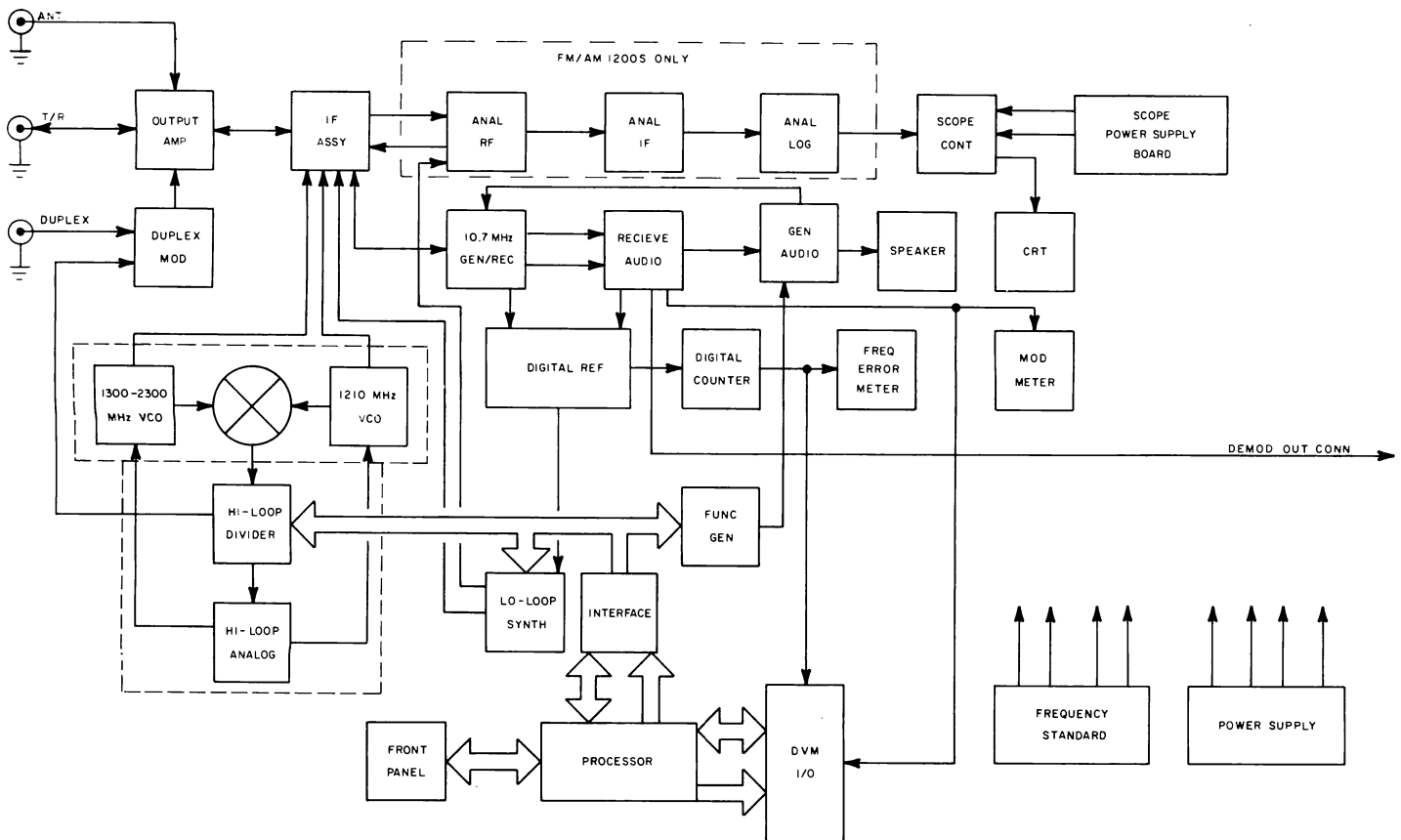


Figure 2-1 System Block Diagram

In the receive mode of operation, the input frequency is converted to 10.7 MHz in the IF Block Assy. The IF signal is filtered and sent to the FREQ ERROR Meter and demod circuits. This demodulated audio signal is then applied to the DEMOD Connector, to the Speaker through an audio amplifier, to the MODULATION Meter through a scaling circuit.

In the generate mode of operation, the 10.7 MHz Rec/Gen Module provides a frequency of 10.7 MHz, which can be either frequency or amplitude modulated. This signal is converted to the selected RF, amplified, then applied to the T/R Connector through a selectable attenuator.

In the duplex mode, a separate signal generator produces an RF signal at a selected offset frequency of  $\pm 49.99$  MHz. This offset frequency is then applied directly to the DUPLEX Connector and through a fixed attenuator to the T/R Connector.

The FM/AM-1200S/A function generator produces a ramp, triangle or square wave at frequencies between 10 Hz and 10 kHz, and a sinewave up to 30 kHz. The function generator also produces a DCS and a Pulse Signal. The DVM I/O Board generates a DTMF signal. The selected signal (waveform) is applied to the TONE OUT Connector. This signal can also be used to modulate the 10.7 MHz IF or can be applied directly to the Speaker. An additional square wave is also generated, for use as a reference, during audio frequency error measurements. In addition, a fixed 1 kHz sinewave is generated in the Digital Module and applied to the TONE OUT Connector, and can be used to modulate the 10.7 MHz IF, or can be applied to the Speaker.

The FM/AM-1200S/A Oscilloscope is a single trace, 1 MHz unit which can be used to monitor demod audio, generate audio or external signals applied at the SCOPE/DVM Connector. The Spectrum Analyzer (in the FM/AM-1200S only) can be used to monitor generated or received signals. Received signal levels can be monitored from -30 dBm to -100 dBm.

## 2-3 FUNCTIONAL THEORY OF OPERATION

### 2-3-1 PROCESSOR OPERATION

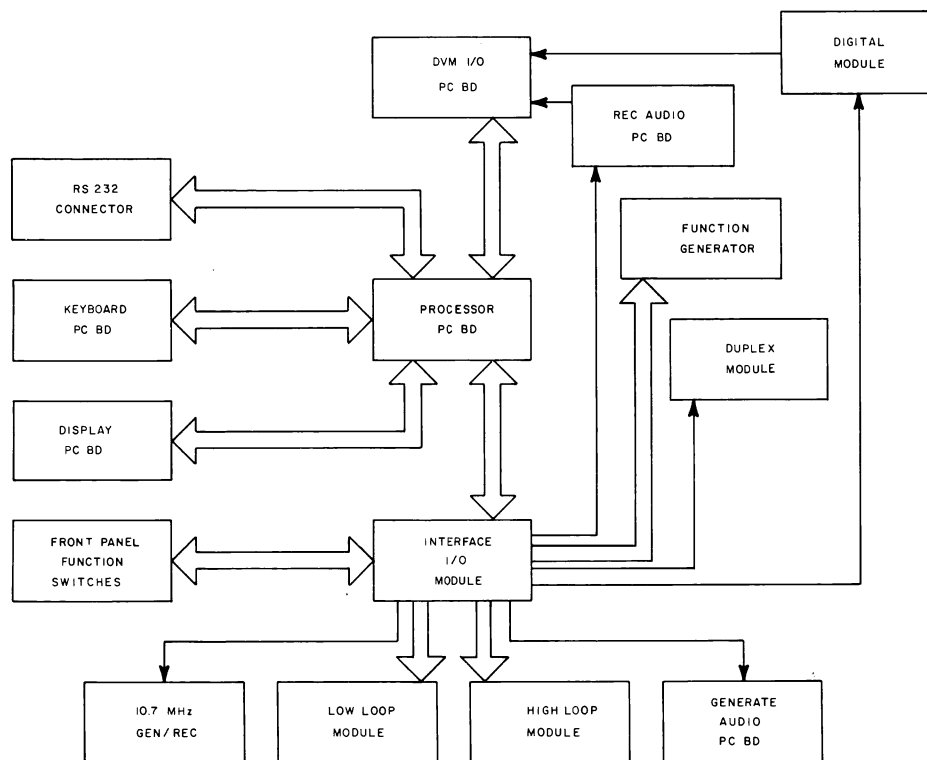


Figure 2-2 Processor Functional Block Diagram

The processor, through the Interface PC Board, transfers all data within the FM/AM-1200S/A over an internal data bus. It communicates directly with the Interface PC Board, Keyboard, VFD, DVM I/O PC Board and RS-232 Connector. The Interface PC Board communicates directly with the High

Loop Module, Low Loop Module, Function Generator PC Board, Duplex Module, Generate Audio PC Board, 10.7 MHz Gen/Rec Module, Digital Module, Receive Audio PC board, and front panel.

The processor contains two routines. The first routine is called the front panel routine which receives from the front panel, all data from the keyboard and control settings, processes this data and outputs the data to the hardware latches on the Interface PC Board to the other modules. The second routine of the processor is the RS-232 routine. The data flows exactly the same as in the first routine except all control inputs come through the RS-232 Connector.

### 2-3-2 RECEIVER SECTION OPERATION

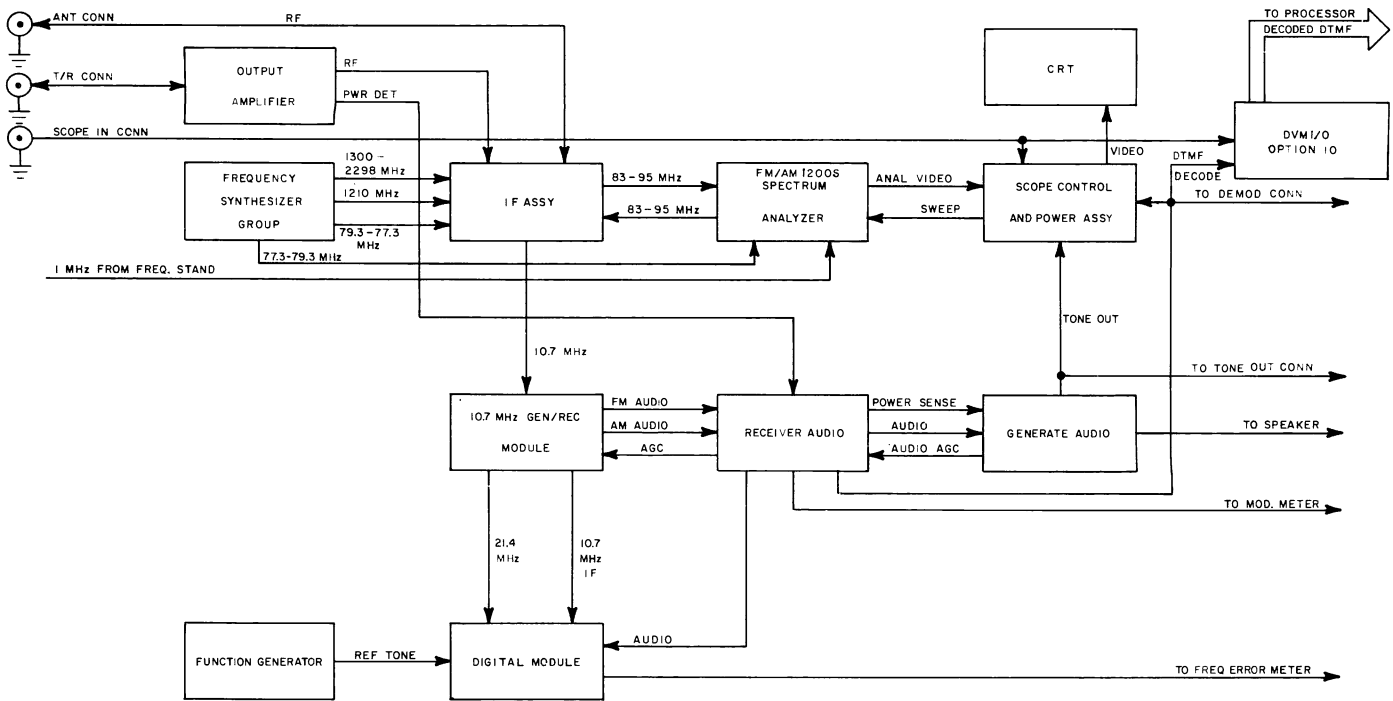


Figure 2-3 Receiver Functional Block Diagram

RF signals are received through either the ANT Connector or T/R Connector. Off-The-Air signals are received at the ANT Connector, whereas a transmitter under test is connected directly to the T/R Connector. The signal received at the T/R Connector is attenuated 80 dB and applied to an antenna relay in the IF Block Assembly. Off-The-Air signals received at the ANT Connector are fed through a static protect circuit, RF gain stage and then to the antenna relay.

The signal received at the ANT connector is coupled through the antenna relay (which is normally energized) to the 1000 MHz Low Pass Filter in the IF Block Assembly. If a signal of 100 mW or greater is received at the T/R Connector, the relay is de-energized and the signal from the T/R Connector is coupled to the 1000 MHz low pass filter.

Whichever received signal source is selected, the received RF is converted twice in the IF Block Assy by two local oscillators in the dual VCO from the Frequency Synthesizer Group. In the FM/AM-1200S, this converted signal (83-95 MHz) is fed to the Spectrum Analyzer for display. In both the FM/AM-1200S and the FM/AM-1200A, the signal is fed back to the IF module where it is down-converted to 10.7 MHz by a local oscillator signal from the Low Loop Synthesizer. The 10.7 MHz signal is fed to the 10.7 MHz Gen/Rec Module where it is bandpass filtered and demodulated. The 10.7 MHz Gen/Rec Module has an AM and an FM detector. The AM detector produces a DC level (AGC) proportional to the level of the 10.7 MHz IF input. When an AM signal is present, the demod audio signal will ride on this DC level. The FM detector sends a 10.7 MHz signal which is sent to the Digital module for frequency error measurements. When an FM signal is present, the FM detector also produces a demod audio signal. The demodulated audio signal out of the 10.7 MHz Gen/Rec Module is fed to the Receive Audio PC Board where it is amplified and audio bandpass filtered. The Receive Audio PC Board output is fed to the Generate Audio PC Board, front panel DEMOD Connector, Oscilloscope, front panel MODULATION Meter and Digital Module. The output from the Generate Audio PC Board is fed through an audio amplifier to the Speaker. The audio signal fed to the Digital Module is compared with a reference tone from the Function Generator to produce the audio error signal which is fed to the FREQUENCY ERROR Meter. If the Option 03 DVM I/O PC Board is installed, AC or DC voltages present at the SCOPE/DVM Connector, and DTMF in the demodulated audio signal can be decoded and displayed on the Vacuum Fluorescent Display (VFD).

### 2-3-3 GENERATOR SECTION OPERATION

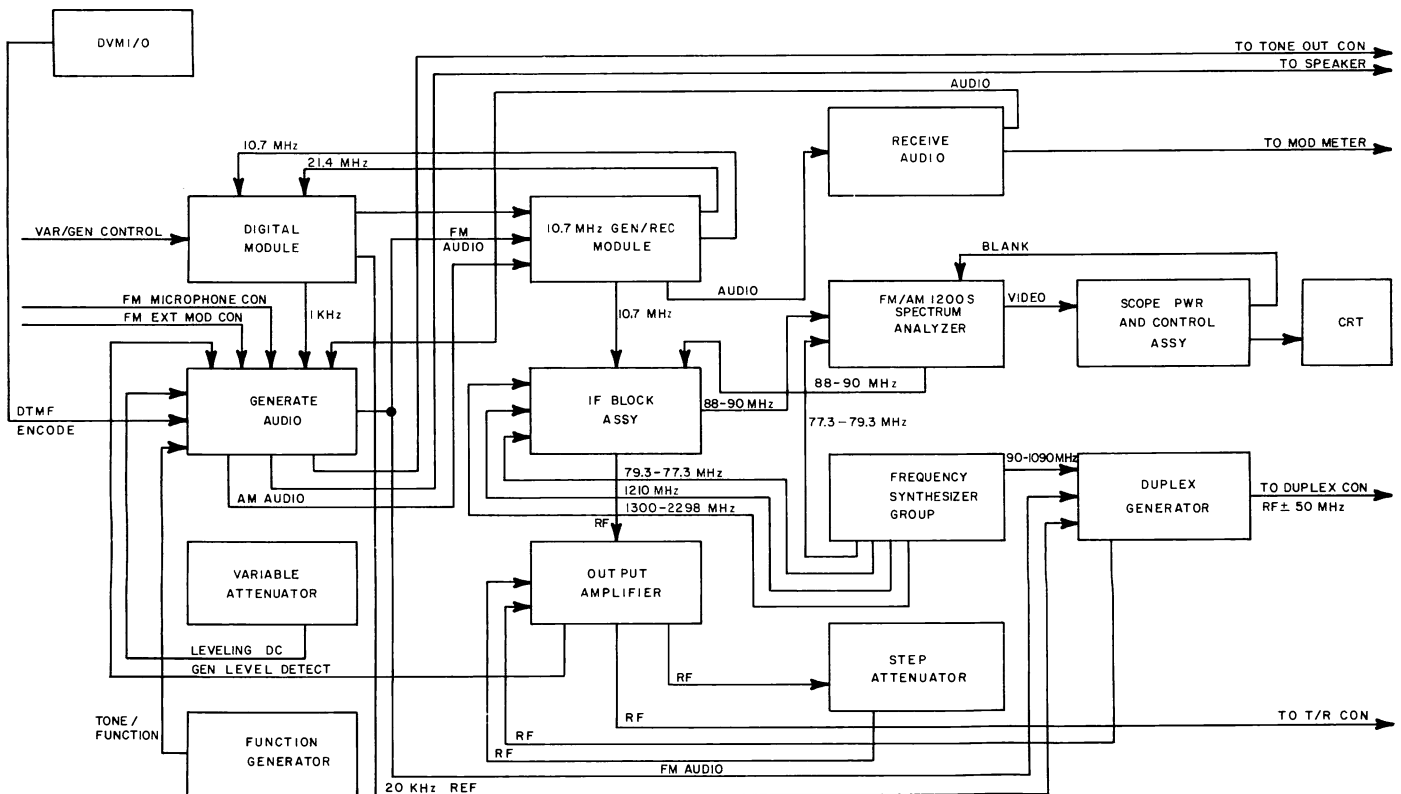


Figure 2-4 Generator Functional Block Diagram



In the generate mode, a 21.4 MHz VCO circuit in the 10.7 MHz Gen/Rec Module produces a 21.4 MHz signal. This signal is phase locked to the 10 MHz Frequency Standard by a phase lock loop in the Digital Module. The 21.4 MHz signal is divided by 2, to produce a 10.7 MHz IF, which passes through a leveler/modulator circuit for level control, then to the IF Block Assembly.

The 10.7 MHz IF is then mixed with the low loop synthesizer signal (77.3001 - 79.300 MHz) to produce an 88-90 MHz IF which is fed through an 89 MHz bandpass filter and amplified. At this point the 88-90 MHz IF is fed to the Analyzer RF Module for analyzer display, and to the second mixer in the IF Block Assembly. The second mixer mixes the 88-90 MHz IF with the 1210 MHz signal from the High Loop Synthesizer Module to produce a 1298-1300 MHz IF. This signal is amplified, filtered and fed to the third mixer. The third mixer mixes the 1298-1300 MHz IF with the 1300-2298 MHz signal from the High Loop Synthesizer Module to produce the selected RF signal. This signal is fed to a 1000 MHz low pass filter, then out of the IF Block Assembly to the Output Amplifier Assembly.

In the Output Amplifier, the RF signal is amplified, then its level is sampled to produce a level control signal to the leveler/modulator in the Generate Audio Module. Thus, the leveler/modulator circuit adjusts the level of the 21.4 MHz generator output sufficiently to vary 0-11 dB at the Output Amplifier. The RF signal then goes to a 10 dB step attenuator for operator generator level selection, then back to the Output Amplifier, where it is attenuated an additional 20 dB. The signal is then routed to the T/R Jack and to the Unit Under Test.

To modulate the carrier, internal signals from the Digital Module (1 kHz sinewave), Function Generator, DVM I/O (DTMF), and external signals from the MIC/ACC and EXT MOD Jacks are combined in the leveler/modulator circuit of the Generate Audio Module. For frequency modulation, the output from the Generate Audio PC board varies the 21.4 MHz generator frequency. For amplitude modulation, the combined audio signal is fed to the fine attenuator. The output of the fine attenuator is summed with the control voltage from the output amplifier on the generate audio PC board. This signal is fed to the 10.7 MHz GEN/REC Module where it controls the RF output level and AM modulates the 10.7 MHz signal.

The Duplex Generator receives a 20 kHz reference frequency from the Digital Module and a 90-1088 MHz signal representing the selected RF from the High Loop Module in the Frequency Synthesizer. According to the frequency offset selected, the generator frequency is up to 49.99 MHz above or below the selected RF. One output is through the DUPLEX Jack on the Front Panel at -60 dBm. A second output is to the Output Amplifier, where it is attenuated 20 dB, then out through the T/R Jack.

## 2-3-4 FREQUENCY SYNTHESIS OPERATION

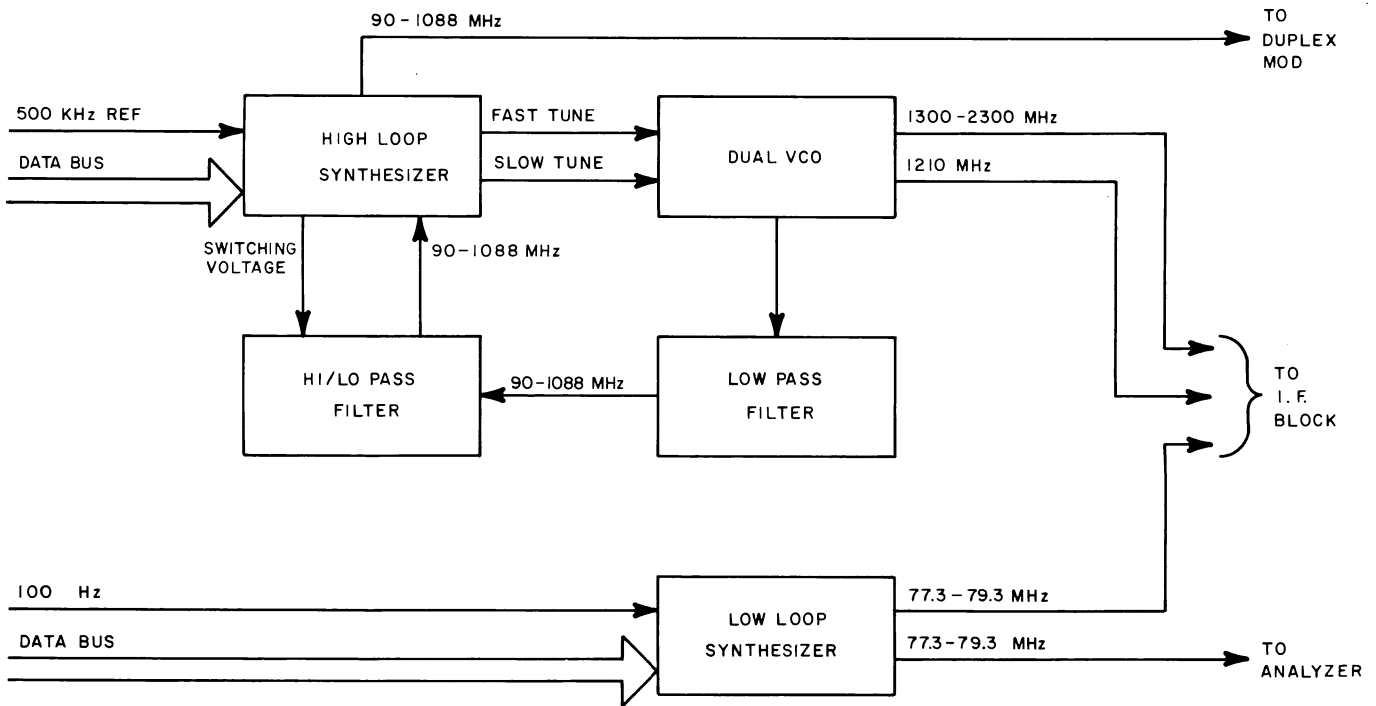


Figure 2-5 Frequency Synthesis Functional Block Diagram

The Frequency Synthesis Group consists of the High Loop Synthesizer, Low Loop Synthesizer, Low Pass Filter and Hi/Low Pass Filter. The Low Loop Synthesizer generates a 77.3-79.3 MHz signal that is selectable in 100 Hz steps. This signal is fed to both the IF Block Assy and Analyzer RF Module. The High Loop Synthesizer generates two DC voltages which control two separate oscillators in the Dual VCO Module. One oscillator operates at 1300-2300 MHz, while the other operates at 1210 MHz. Both the 1210 MHz and 1300-2300 MHz signals are fed to the IF Block Assy in addition to being mixed within the module to produce a 90-1088 MHz signal which is fed, through the Low Pass and Hi/Low Filters to the High Loop Module where it is divided down and compared with a 500 kHz reference signal received from the Frequency Standard PC Board. The 90-1090 MHz signal is also sent from the High Loop Synthesizer Module to the Duplex Module.

## 2-3-5 REFERENCE FREQUENCY OPERATION

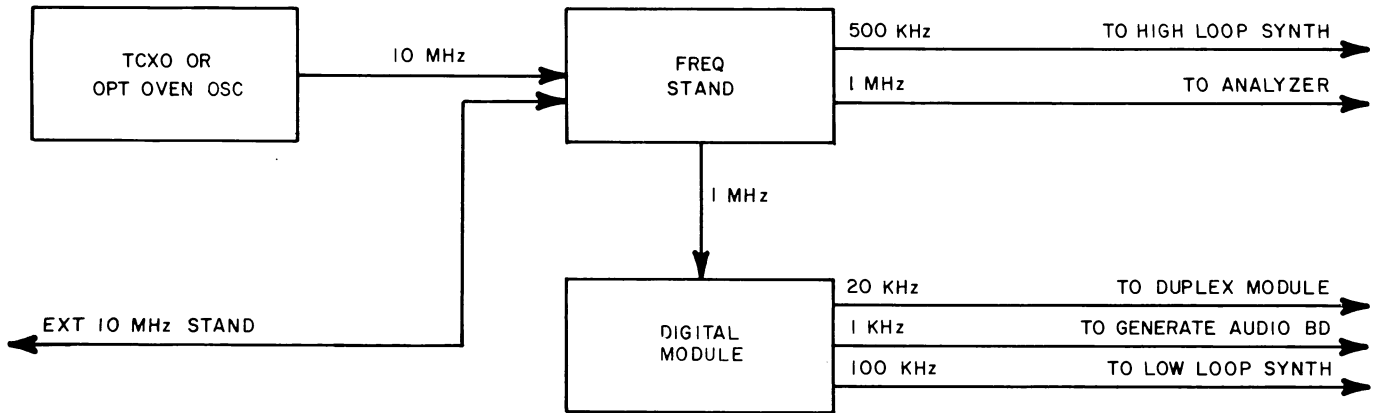


Figure 2-6 Reference Frequency Functional Block Diagram

The FM/AM-1200S/A uses 10 MHz as the primary standard frequency. A TCXO (Temperature Compensated Crystal Oscillator) or an optional oven oscillator normally produces this frequency. An external 10 MHz standard can also be used in place of the TCXO. The Frequency Standard divides the 10 MHz to 1 MHz which is sent to the Digital Module and Analyzer RF Module, and to 500 kHz which is fed to the High Loop Synthesizer Module. The Digital Module further divides the 1 MHz signal to 20 kHz which is fed to the Duplex Module, to 1 kHz sine wave which is sent to the Generate Audio PC Board and to 100 Hz which is fed to the Low Loop Synthesizer Module.

## 2-3-6 OSCILLOSCOPE/SPECTRUM ANALYZER OPERATION

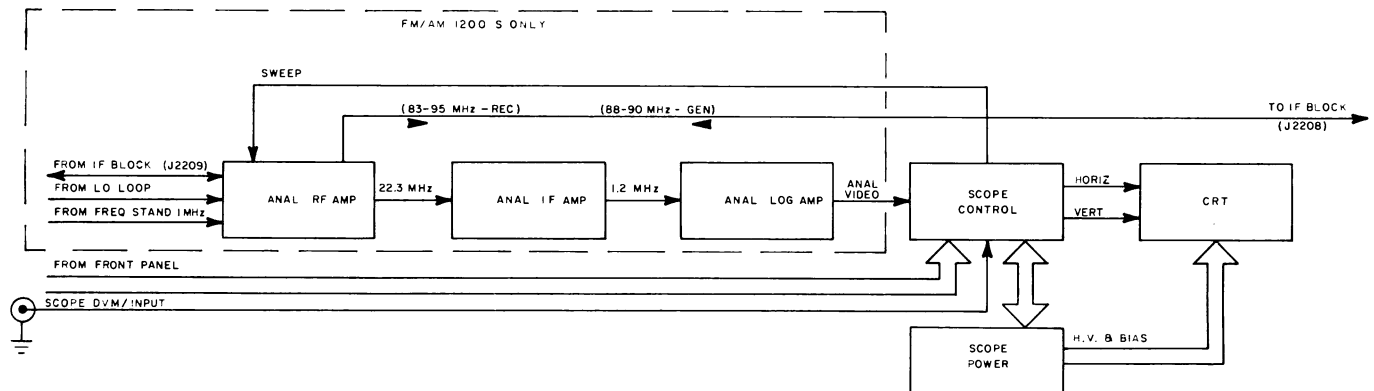


Figure 2-7 Oscilloscope/Spectrum Analyzer Functional Block Diagram

During analyzer operation, an 83-95 MHz signal is sent from the IF Block Assy to the Analyzer RF Module where it is mixed with a sweep oscillator, centered at 111.3 MHz, producing a 22.3 MHz signal which is fed to the Analyzer IF Module. The 22.3 MHz signal is mixed with a 33 MHz signal in the Analyzer IF Module, producing a 10.7 MHz signal. This signal is then filtered and mixed with a 9.5 MHz signal, producing a 1.2 MHz signal which is fed to the Analyzer Log Amp Module. In the Analyzer Log Amp Module, the amplitude of the 1.2 MHz signal is converted from a logarithmic value to a linear value, AM detected, and fed to the Scope Control PC Board for presentation on the Scope (CRT).

The Scope Power PC Board supplies all voltages necessary to bias the CRT. It also supplies the voltages for horizontal and vertical deflection to the Scope Control PC Board. The Scope Control PC Board receives signals from the Front Panel (Tones, Demod, Residual Distortion and SCOPE Connector). The signal selected for display is attenuated, sent to the vertical deflection amplifier and to a triggering circuit. Sweep speed is selected and sent to the horizontal deflection amplifier. The horizontal and vertical deflection signals are sent from the Scope Control PC Board to the CRT for display. The sweep signal is sent to the Analyzer RF Module to control the sweep oscillator.

## **2-4 DETAILED THEORY OF OPERATION**

The theory of operation for each module contained within the FM/AM-1200S/A is discussed, in detail, in the following paragraphs. In addition to the detailed block diagrams, which are included with each topic, reference should be made to the appropriate schematic or interconnect drawing contained in Section 7.

### **2-4-1 POWER SUPPLY MODULE (FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448)**

The Power Supply System consists of three major components:

Line Supply Assembly - which is an AC to DC converter containing a power transformer, voltage select switch, bridge rectifier and filter.

Inverter Supply PC Board - which is a DC to DC converter utilizing a duty cycle regulator, transformer and rectifier and filter circuits which furnish the various voltages utilized throughout the test set.

Battery Charger PC Board - which is mounted on the Power Supply Assy, contains the battery charger circuit and selects the power source for the Inverter Supply PC board.

When the optional oven oscillator frequency standard is installed, an oven supply voltage regulator is also included on the Battery Charger PC Board.

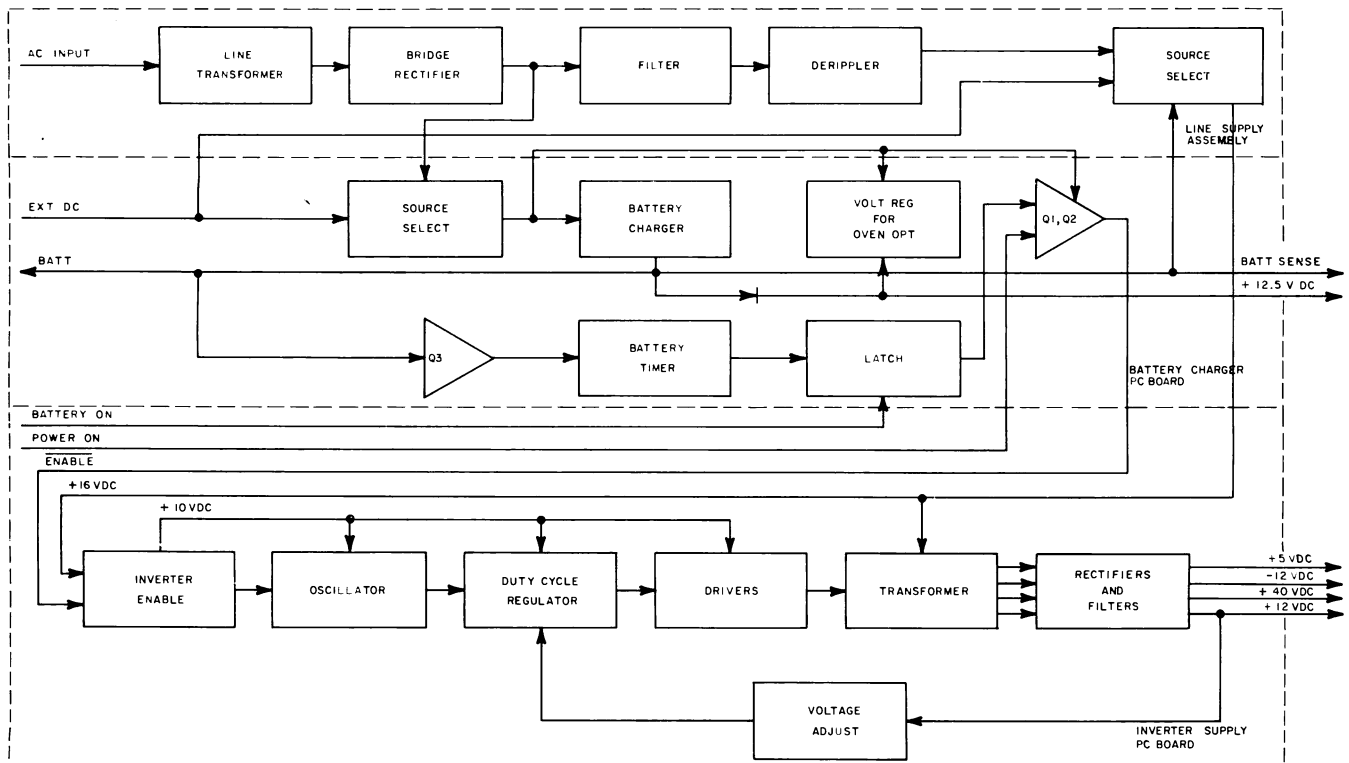


Figure 2-8 Power Supply Module Block Diagram

A. LINE SUPPLY ASSY

The AC Power Input Connector on the rear panel is connected to the Line Supply Assy through J1701. Power is supplied to T1701 through F1701 and SW1701. T1701 has two primary windings which are connected in parallel when 115 VAC is selected by SW1701, or in series if 230 VAC is selected. The secondary winding of T1701 is connected to full wave rectifier, BR1701, which is mounted on the rear panel heat sink. Unregulated voltage from BR1701 is applied to the Battery Charger PC Board for charging the battery, operating the inverter on/off switching, provides oven supply voltage for the optional oven oscillator and raw DC filter circuit.

Q4601, C1701, C1702 and R1701 supply the unregulated, filtered +16 VDC to the Battery Charger PC Board.

B. BATTERY CHARGER PC BOARD

External DC power, unregulated, filtered +16 VDC from the Line Supply Assy and the battery are all independently applied to the Battery Charger PC Board through J1601. All three sources are compared by diodes CR1601, CR1602 and CR1603 respectively, and the highest voltage source (Ext. DC or AC) is applied through fuse F1601 to the Inverter Supply PC Board. The external DC and unfiltered +16 VDC from the

Line Supply Assy are applied through CR1605 and CR1606 to the battery charger circuit, inverter enable circuit and, if installed, the optional oven oscillator voltage regulator.

The battery charger circuit consists of adjustable regulator U1601, R1601 thru R1604 and C1601. R1602, R1603 and trimpot R1604 form a voltage divider to adjust the output voltage to 14.4 VDC and R1601 provides a minimum load to regulator U1601. Anytime AC power or external DC power greater than 13 VDC is applied to the test set, the battery charger circuit will charge the battery. The position of the PWR/OFF/BATT Switch does not affect the charging circuit.

Q1601, Q1602, Q1604 and associated components make up the inverter enable circuit. When AC or DC power is applied, and the PWR/OFF/BATT Switch is in the OFF position, Q1601 does not conduct. However, with the PWR/OFF/BATT Switch in the PWR position, Q1601 will conduct, turning on Q1602 to pull down on the inverter enable line, causing Q1501 on the Inverter Supply PC Board to conduct. If external AC power is interrupted, diodes CR1602 and CR1603 switch the inverter supply to the battery, while capacitors C1701 and C1702 in the Line Supply Assy keep Q1601 and Q1602 turned on for approximately 10 seconds while they discharge. As the voltage drops, the base to emitter voltage difference on Q1601 decreases until it is shut off. This, in turn, shuts off Q1604, driving the voltage to the base of Q1601 higher to prevent oscillation.

The battery enable circuit consists of flip-flop U1602B and related components. When the PWR/OFF/BATT Switch is depressed in the batt position, C1604 is allowed to charge through R1610, clocking U1602B to high Q, which turns on Q1602 and, subsequently, the Inverter Supply PC Board. Depressing the PWR/OFF/BATT Switch a second time clocks U1602B to low Q condition. If U1602B is not clocked the second time, approximately ten minutes later, a timer circuit will reset U1602B to a low Q condition.

Programmable timer U1603 starts counting as soon as the Inverter Supply PC Board supplies +12 VDC to the Battery Charger PC Board, regardless of the selected power source. A terminal count is set by highs on pins 9 through 12 and the on-chip oscillator frequency is established by R1617, R1618 and C1607 to allow approximately 10 minutes of battery operation. At this time, U1603 provides a high output to reset U1602B to a low Q condition to terminate battery operation.

A low battery cutoff circuit stops battery operation if the battery voltage drops below approximately +11.4 VDC. +12 VDC is applied to the emitter of transistor Q1603 while the battery voltage is applied to its base. When the battery voltage drops to approximately 11.4 VDC, Q1603 turns on, applying +12 VDC to the SET pin of U1603. This sets the timer to terminal count, providing a high output to reset

U1602B. Q of U1602B then goes low, terminating battery operation.

### C. INVERTER SUPPLY PC BOARD

The Inverter supply PC Board contains a duty cycle regulator, transformer and rectifier circuits which produce the regulated +12VDC, +5VDC, +40VDC and -12VDC which are distributed throughout the test set. The inverter supply voltage from the Battery Charger PC Board is +12VDC to +30VDC, depending upon the source.

When the test set is turned on, the low enable line pulls down on the bases of Q1501 and Q1505. Q1501 conducts, allowing +10VDC, set by Zener diode CR1503, to supply power to op amps U1501, U1502 and U1503 and through a voltage divider consisting of R1503 and R1504, to the non-inverting input of U1501. Simultaneously, Q1505 is turned off, allowing U1501 to produce a trapezoidal waveform at TP2 with a frequency approximately 45 KHz which is applied to the non-inverting input of U1502.

Zener diode CR1505 applies 6.9 VDC to a voltage divider consisting of R1506 and R1521 which, in turn, supply approximately 5.4 VDC to the inverting input of U1503 which is configured as an integrator. A sample voltage from the +12 VDC secondary winding of T1501, after being rectified by CR1508 and C1510, passes through a voltage divider, consisting of R1510, R1511 and trimpot R3901 for calibration is applied to the non-inverting input of U1503. U1503, pin 3 is fed by a voltage divider consisting of R1510, R1511 and R3901. When pin 3 is below the level of pin 2, pin 6 integrates towards 0V, pulling U1502, pin 2 lower. This allows the trapezoidal waveform on pin 3 to increase the duty cycle square wave on U1502, pin 6 increasing energy to T1501. This condition will increase the 12V output, increasing voltage to U1503, pin 3. When the voltage on U1503, pin 3 is higher than the voltage on pin 2 and pin 6, U1503 starts integrating towards 10 VDC, pulling pin 2 higher. This shortens the duty cycle of the square wave at TP3, decreasing energy to T1501, thus reducing the 12 VDC output.

U1502 compares the waveform at TP2 with the reference level from U1503, and produces a square wave whose duty cycle decreases as the reference level increases. R1514 and R1508 set a minimum reference level to maintain a maximum duty cycle of 50%. The high output from U1502 turns on Q1502, applying voltage to the gates of Q1504 and Q1506. Q1504 and Q1506 conduct, pulling current through the primary winding of T1. When U1502 output goes low, Q1502 is turned off, blocking voltage to Q1504 and Q1506, and Q1503 is turned on. This then turns off Q1504 and Q1506. The result of this action is to build, then collapse the magnetic field from the primary winding of T1501 proportional to the duty cycle of U1502.

The power induced by the primary winding of T1501 into the secondary windings is proportional to the amount the magnetic field has developed during the duty cycle of U1502. Because the test set loads on the +5 VDC, +40 VDC and -12 VDC supplies are constant, these three track the +12 VDC supply. As the load on the +12 VDC supply varies, as with the use of the Oscilloscope or Spectrum Analyzer, integrator U1503 detects the effect on the +12 VDC supply line and raises or lowers the duty cycle reference level at U1502 accordingly. Increasing the load on the +12 VDC supply increases the duty cycle, which increases the transfer of power from the primary winding of T1501 to the secondary windings.

The AC voltages from the secondary windings are half-wave rectified by individual diodes. The +40 VDC supply is RC filtered; the other supplies are LC filtered.

2-4-1a POWER SUPPLY MODULE (FM/AM-1200S S/N 4491 AND ON AND FM/AM-1200A S/N 1449 AND ON)

The Power Supply System consists of three major components:

Line Supply PC Board - which is an AC to DC converter containing a power transformer, bridge rectifier, filter and derippler.

Inverter Supply PC Board - which is a DC to DC converter utilizing a 50 kHz oscillator, duty cycle regulator, transformer and rectifier and filter circuits which furnish the  $\pm 12$  VDC and +40 VDC, and a multivibrator, filter and voltage regulator for the +5V.

Battery Charger PC Board - which is mounted on the Power Supply Assy, contains the battery charger circuit low-battery cut-off and selects the power source for the Inverter Supply PC Board.



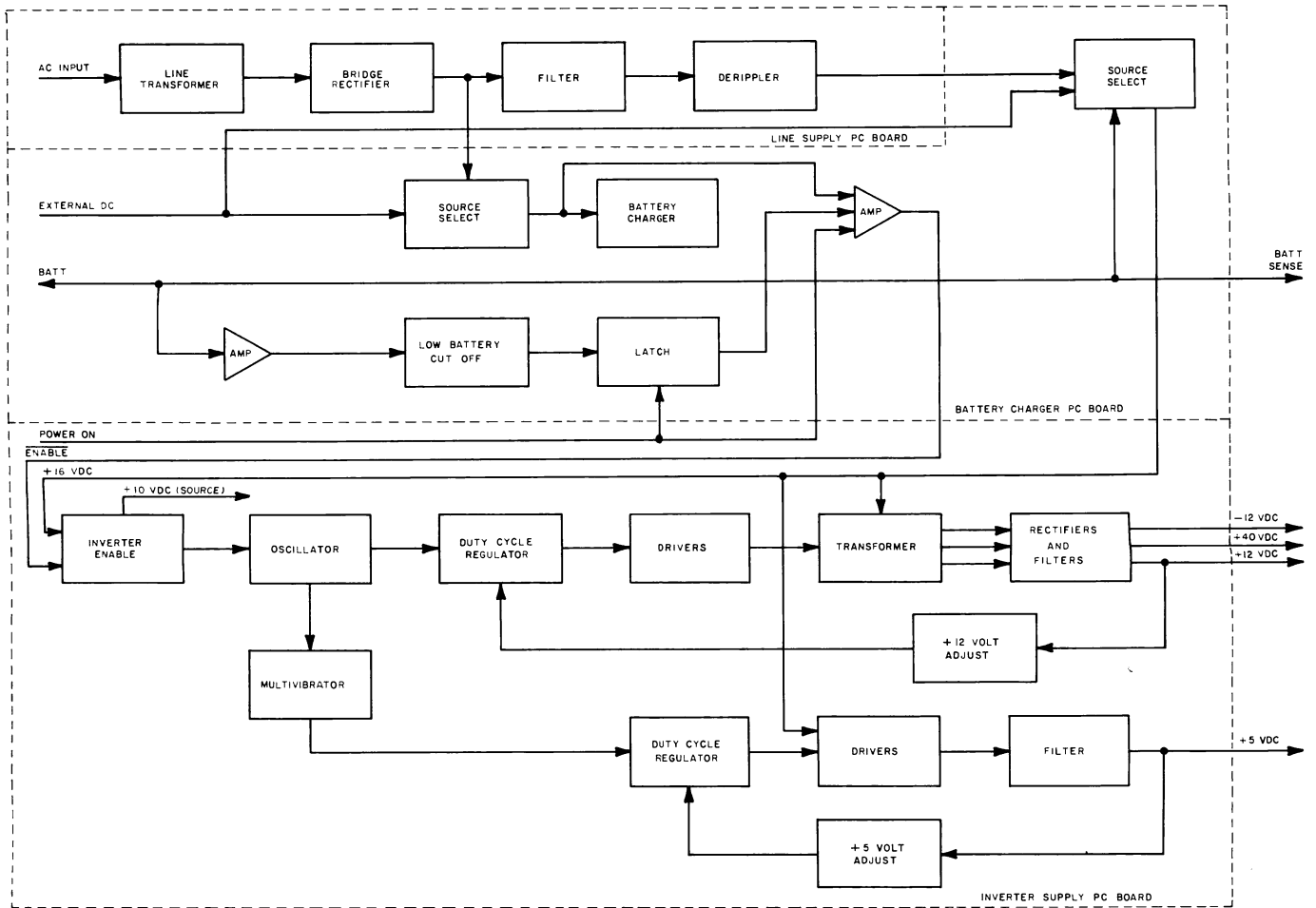


Figure 2-8a Power Supply Module Block Diagram

A. LINE SUPPLY PC BOARD

The AC Power Input Connector on the rear panel is connected to the Line Supply Assy through J1701. Power is supplied to T1701 through F1701 and SW1701. T1701 has two primary windings which are connected in parallel when 115 VAC is selected by SW1701, or in series if 230 VAC is selected. The secondary winding of T1701 is connected to full wave rectifier, BR1701, which is mounted on the rear panel heat sink. C1701 and C1702 filter and deripple the +16 VDC (nominal). Unregulated voltage from BR1701 is applied to the Battery Charger PC Board for charging the battery, operating the inverter on/off switching.

Derippled voltage from Q4601 is applied through the Battery Charger PC Board to the Inverter Supply PC Board.

## B. BATTERY CHARGER PC BOARD

External DC power, filtered +16 VDC from the Line Supply Assy and the battery are all independently applied to the Battery Charger PC Board through J1601. All three sources are compared by diodes CR1601, CR1602 and CR1603 respectively, and the highest voltage source (Ext. DC or AC) is applied through fuse F1601 to the Inverter Supply PC Board. The external DC and unfiltered +16 VDC from the Line Supply Assy are applied through CR1605 and CR1606 to the battery charger circuit and inverter enable circuit.

The battery charger circuit consists of adjustable regulator U1601, R1601 thru R1604 and C1601. R1602, R1603 and trimpot R1604 form a voltage divider to adjust the output voltage to 14.4 VDC and R1601 provides a minimum load to regulator U1601. Anytime AC or DC power in excess of the battery level is applied to the test set, the battery charger circuit will charge the battery. The position of the POWER ON/OFF Switch does not affect the charging circuit.

Q1601, Q1602, Q1604 and associated components make up the inverter enable circuit. When AC or DC power is applied, and the POWER ON/OFF Switch is in the OFF position, Q1601 does not conduct. However, with the POWER ON/OFF Switch in the ON position, Q1601 will conduct, turning on Q1602 to pull down on the inverter enable line, causing Q1501 on the Inverter Supply PC Board to conduct. If external AC power is interrupted, diodes CR1602 and CR1603 switch the inverter supply to the battery, when the charge on capacitors C1701 and C1702 in the Line Supply Assy drop below the battery voltage. As the voltage drops, the base to emitter voltage difference on Q1601 decreases until it is shut off. This, in turn, shuts off Q1604, driving the voltage to the base of Q1601 higher to prevent oscillation.

The battery enable circuit consists of flip-flop U1602B and related components. When the POWER ON/OFF Switch is depressed in the ON position, C1604 is allowed to charge through R1610, clocking U1602B to high Q, which turns on Q1602 enabling the Inverter Supply PC Board.

A low battery cutoff circuit stops battery operation if the battery voltage drops below approximately +11.4 VDC. +12 VDC is applied to the emitter of transistor Q1603 while the battery voltage is applied to its base. When the battery voltage drops to approximately 11.4 VDC, Q1603 turns on, applying +12 VDC to the SET pin of U1603. This sets the timer to terminal count, providing a high output to reset U1602B. Q of U1602B then goes low, terminating operation.

### C. INVERTER SUPPLY PC BOARD

The Inverter Supply PC Board contains a duty cycle regulator transformer and rectifier circuits which produce the regulated +12VDC, +40VDC and -12VDC which are distributed throughout the test set. The inverter supply voltage from the Battery Charger PC Board is +12VDC to +30VDC, depending upon the source.

When the test set is turned on, the low enable line pulls down on the base of Q1501. Q1501 conducts, allowing +10 VDC set by Zener diode CR1504, to supply power to op amps U1501, U1502, U1503, U1505, U1506 and U1507 and through a voltage divider using R1505 and R1506, to the non-inverting input of U1501. Simultaneously, Q1502 is turned off, allowing U1501 to produce a sawtooth output at approximately 45 KHz which is applied to the non-inverting input of U1502.

Zener diode CR1506 applies a 6.9 VDC reference to the inverting input of U1503 which is configured as an integrator. A sample voltage from the +12 VDC secondary winding of T1501, after being rectified by CR1511 and filtered by L1502 and C1509 passes through a voltage divider, consisting of R1518, R1519 and trimpot R1520 for calibration and is applied to the non-inverting input of U1503. As power is applied to the primary winding of T1501, C1509 becomes charged through CR1511. U1503 compares the voltage at C1509 with the reference set by CR1506 to produce a reference level for U1502.

U1502 compares the oscillator output level with the reference level from U1503, and produces a pulsed output whose duty cycle decreases as the reference level increases. R1510 sets a minimum reference level to maintain a maximum duty cycle of 50%. The high output from U1502 turns on Q1503, applying voltage to the gate of Q1505. Q1505 conducts, pulling current through the primary winding of T1501. When U1502 output goes low, Q1503 is turned off, and Q1504 is turned on. This then turns off Q1505. The result of this action is to build, then collapse the magnetic field from the primary winding of T1501 proportional to the duty cycle of U1502.

The power induced by the primary winding of T1501 into the secondary windings is proportional to the amount the magnetic field has developed during the duty cycle of U1502. Because the test set loads on the +40 VDC and -12 VDC supplies, these two track the +12 VDC supply. As the load on the +12 VDC supply varies, as with the use of the Oscilloscope or Spectrum Analyzer, integrator U1503 detects the effect on the +12 VDC supply line and raises or lowers the duty cycle reference level at U1502 accordingly. Increasing the load on the +12 VDC supply increases the duty cycle, which increases the transfer of power from the primary winding of T1501 to the secondary windings.

The AC voltages from the secondary windings are half-wave rectified by individual diodes. The +40 VDC supply is RC filtered; the other supplies are LC filtered.

The +5 VDC is produced by toggling Q1508 and Q1510, which charges C1514. L1507 dampens the spikes produced as Q1508 and Q1510 are turned on and off. CR1513 is a damper diode which suppresses spikes induced by L1507. The duty cycle is controlled by the interaction of multivibrator U1505, comparator U1506, integrator U1507, and transistors Q1506, Q1507, and Q1509.

A ramp voltage is generated at pin 3 of U1506 by charging C1513 through R1524. When pin 10 of U1505 is low, C1513 is discharged. When pin 10 goes high, C1513 is charged, creating a ramp voltage. U1505 is triggered by the 50 kHz oscillator, U1501, such that, the +5V regulator and the +12V regulator alternately pull on the supply line. By alternating in this manner, ripple current is decreased on the supply line.

Integrator U1507 compares the charge on C1514 with a fixed D.C. reference set by CR1506, to produce a reference level for comparator U1506. U1506 sets the duty cycle for the +5V regulator. When Q1509 is off, FET's Q1508 and Q1510 are held off by Q1506. When Q1509 is on the FET's are turned on through Q1507.

2-4-2 PROCESSOR PC BOARD (FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448)

The Processor PC Board contains a microcontroller (CPU) U101, system ROM U107, option ROM U108, RAM U109, latch U103, decoder U105, converters U110 and U111, buffers U102, U104 and U106, and associated components.

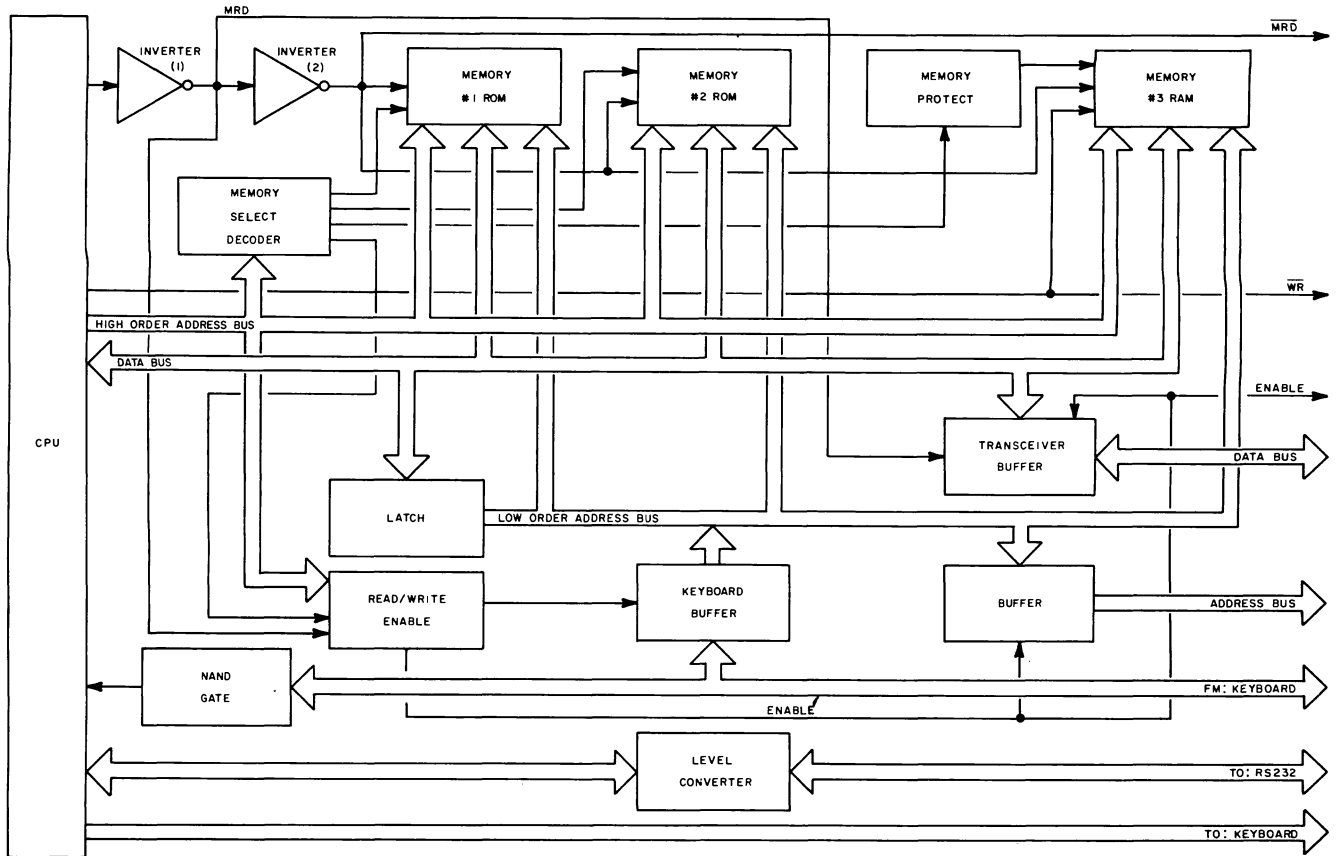


Figure 2-9 Processor PC Board Block Diagram

The CPU has four 8-bit parallel ports, of which three are used to address the three buses in the FM/AM-1200S/A. Port 0 functions as a data bus and the low order address bus which is buffered through latch U103. The low order address bus is for addressing the peripheral components. Port 2 is the high order address bus and is used for addressing memory. Bits 0 thru 3 of Port 1 are devoted to the Keyboard PC Board, bits 4 and 5 of Port 1 provide data and clock signals to the Display PC Board and bits 6 and 7 of Port 1 provide the RTS (Ready-To-Send) and CTS (Clear-To-Send) control signals to the RS-232 Connector. Port 3, the fourth port, serves as special function port and is used as follows:

BIT NO.	FUNCTION
0	RXD (Serial Input Port)
1	TXD (Serial Output Port)
2	$\overline{\text{INT0}}$ (External Interrupt)
3	$\overline{\text{INT1}}$ (External Interrupt)
4	TO (Timer/Counter 0 External Input)
5	T1 (Timer/Counter 1 External Input)
6	$\overline{\text{WR}}$ (External Data Memory Writer Strobe)
7	$\overline{\text{RD}}$ (External Data Memory Read Strobe)

Table 2-1 Port 3 Pin-Out Table

Y101 is an 11.059 MHz crystal for the on-chip oscillator in U101. U110 converts the TTL data from U101 to +12 VDC and -12 VDC required by the RS-232. U111 converts the +12 VDC and -12 VDC from the RS-232 to TTL data required by the CPU, U101. U103 is the address latch for the low eight bits of the address line and U105 is a decoder/demultiplexer used to address the peripheral components.

ROM U107 contains all the main operating functions such as RF controls, tone control and tone sequences. ROM U108, when addressed, calls up a new set of vectors and any options contained in ROM can then be addressed through the keyboard.

The memory protect circuit, consisting of Q101 thru Q104, and associated components is a voltage comparator which detects when voltage is removed from the test set. A backup +3V Lithium Battery (BT101), which is part of the memory protect circuit, is placed in line with RAM U109, so when power is removed, the memory contents in RAM will be retained. This is accomplished by placing +3 VDC on pin 28 of U109.

In the keyboard circuit, bits 0 thru 3 of Port 1 from U101 are the row lines for the keyboard and are driven low by the CPU. The column lines for the keyboard (pins 1, 2, 3, 5, 7, 9 of J103) are held high by +5 VDC through RN101 and monitored by NAND/AND gate U114. When a button on the keyboard is depressed, one of the column lines will be driven low, detected by U114, causing it to change states, generating an interrupt in the CPU. During this interrupt routine, the row lines are driven low one at a time. As each row line is driven low, the column lines are read by the CPU through buffer U104. After all four row lines have been strobed and all column lines read, the CPU determines which button was depressed and enters a routine for that button. If more than one button is depressed, no action is taken by the CPU.

2-4-2a PROCESSOR PC BOARD (FM/AM-1200S S/N 4491 AND ON, AND FM/AM-1200A S/N 1449 AND ON)

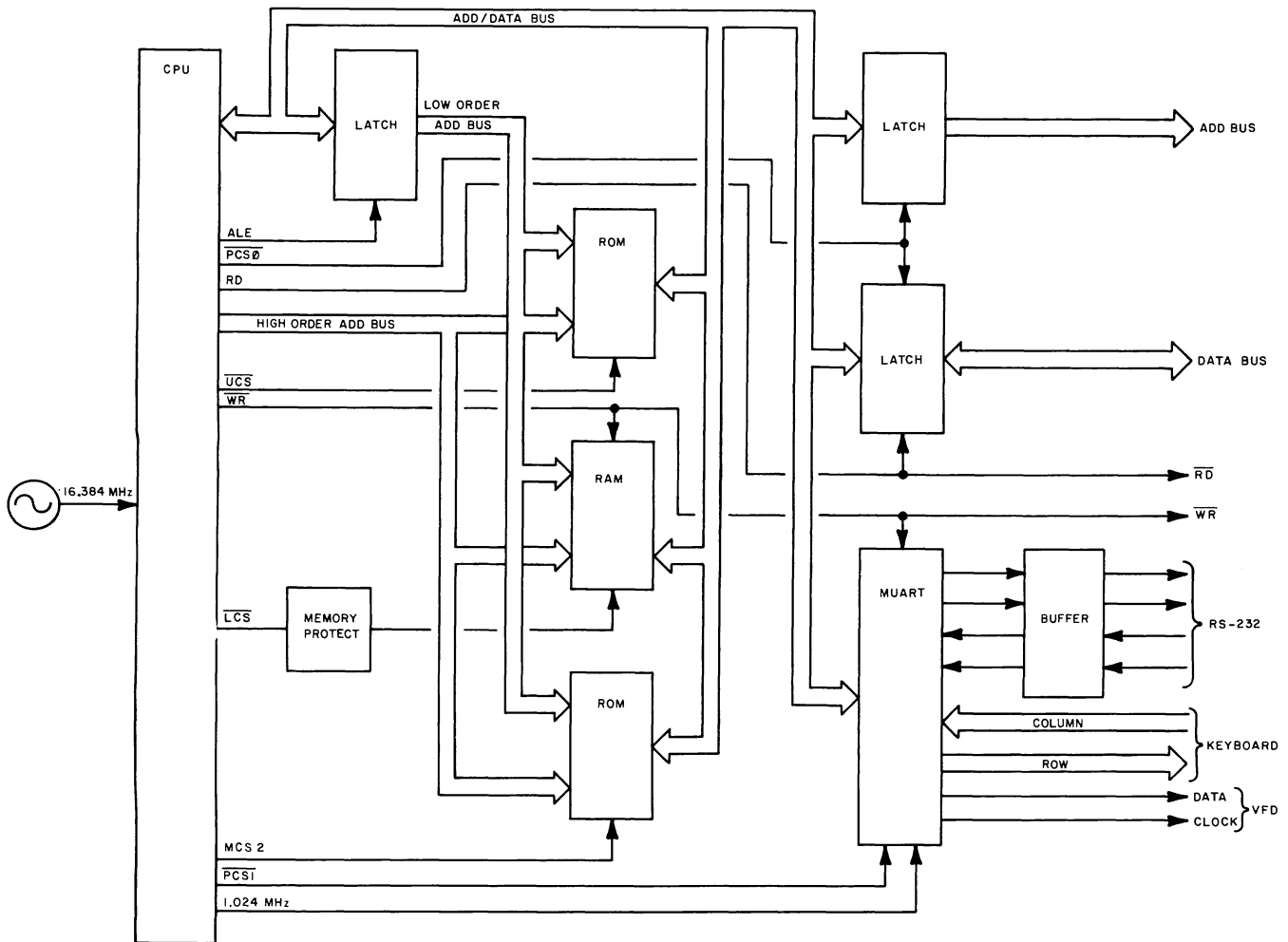


Figure 2-9a Processor PC Board Block Diagram

The Processor PC Board contains an 80188 microprocessor U67001, system ROM U67003 and U67004, RAM U67005, MUART (Multifunction Universal Asynchronous Receiver Transmitter) U67008, latch U67007, Octal Transceiver U67006, RS-232 Transceiver U67009, buffer U67002 and associated components.

The microprocessor is an eight-bit processor with a 16-bit internal architecture and onboard peripherals (e.g., onboard timers). The address/data bus is latched by U67002 to provide low order addresses to the onboard memory, latched by U67007 to address peripherals on the Interface PC Board, and used directly to transfer data between memory, the MUART, Data Transceiver U67006 and the microprocessor. All chip select lines originate in the CPU.

Y67001 is a 16.384 MHz crystal for the on-chip oscillator in U67001. A 1.024 MHz clock (timer 0) is sent to the MUART as a timebase for the timers and UART functions. ROMs U67003 and U67004 contain all the main operating functions such as RF controls, tone control and tone sequences.

The memory protect circuit, consisting of Q67001 thru Q67004, and associated components is a voltage comparator which detects when power is turned off. A backup +3V Lithium Battery (BT67001), which is part of the memory protect circuit, is placed in line with RAM U67005, so when power is removed, the memory contents in RAM will be retained. This is accomplished by placing +3 VDC on pin 28 of U67005.

In the keyboard circuit, bits 0 thru 3 of Port 2 from U67008 are the row lines for the keyboard and are driven low. The column lines for the keyboard are held high by +5 VDC through RN67003 and monitored by NAND/AND gate U67010. When a button on the keyboard is depressed, one of the column lines will be driven low, detected by U67010, causing it to change states, generating an interrupt. During this interrupt routine, the row lines are driven low one at a time. As each row line is driven low, the column lines are read by the CPU. After all four row lines have been strobed and all column lines read, the CPU determines which button was depressed and enters a routine for that button. If more than one button is depressed, no action is taken by the CPU.

The MUART also functions as a parallel/serial converter to transfer data between the CPU and the RS-232. U67009, a dual RS-232 transmitter/receiver, contains level translators which convert TTL levels to  $\pm 9$  VDC. The MUART is also used to send serial data and clock to the Vacuum Fluorescent Display Controller.



### 2-4-3 INTERFACE PC BOARD

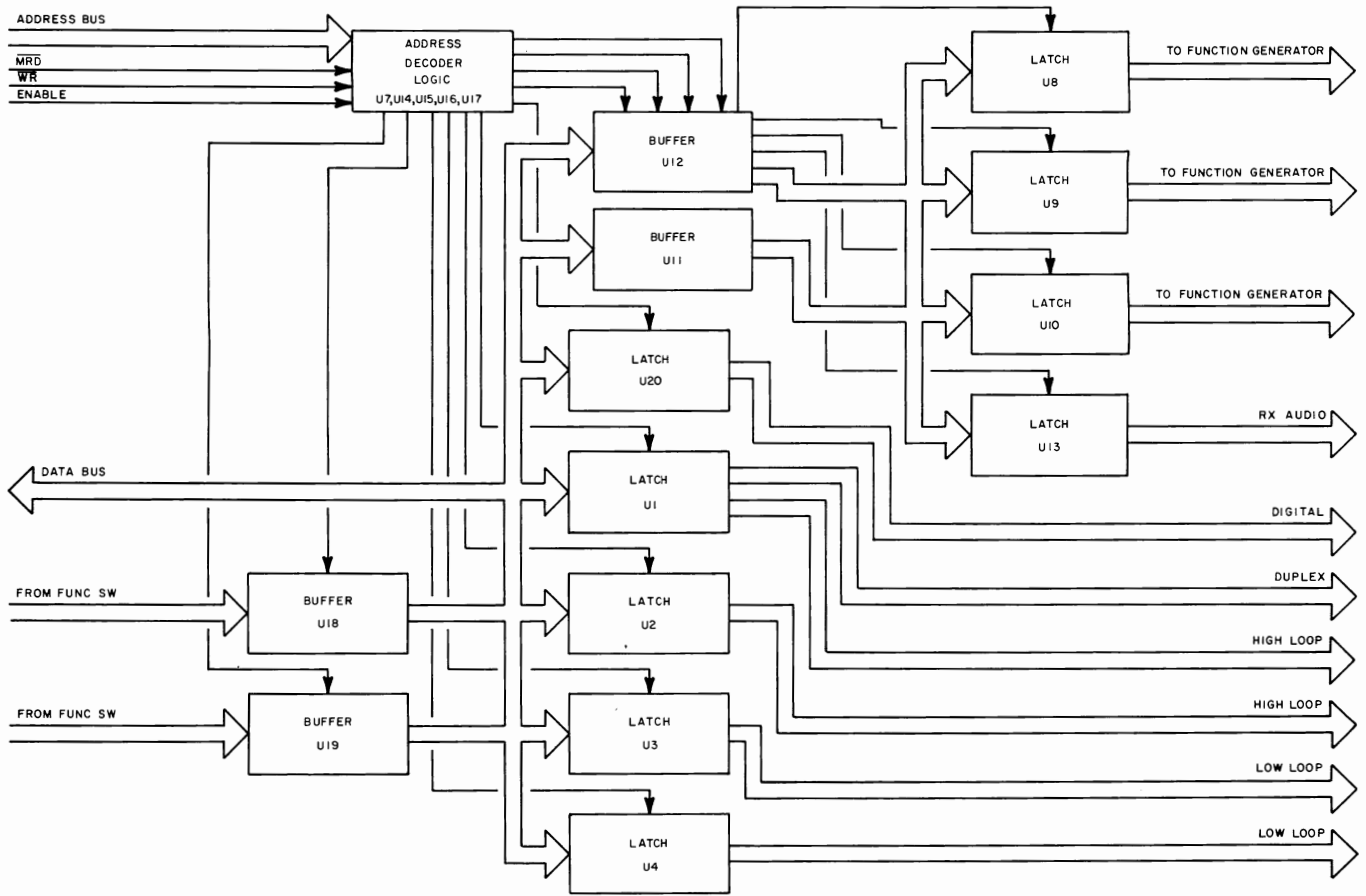


Figure 2-10 Interface PC Board Block Diagram

The Interface PC Board latches all data from the Processor PC Board to the following: Function Generator, High Loop Assy, Low Loop Assy, Receive Audio PC Board, Digital Module, and the Duplex Module. Data from the Function Switch PC Board is buffered on the Interface PC Board before being sent to the processor.

The address decoder (U1007, U1014, U1015, U1016 and U1017) decodes the 8-bit address bus and the 3-control lines (MRD, WR, Enable) to set the latches or read the buffers.

## 2-4-4 DVM I/O PC BOARD

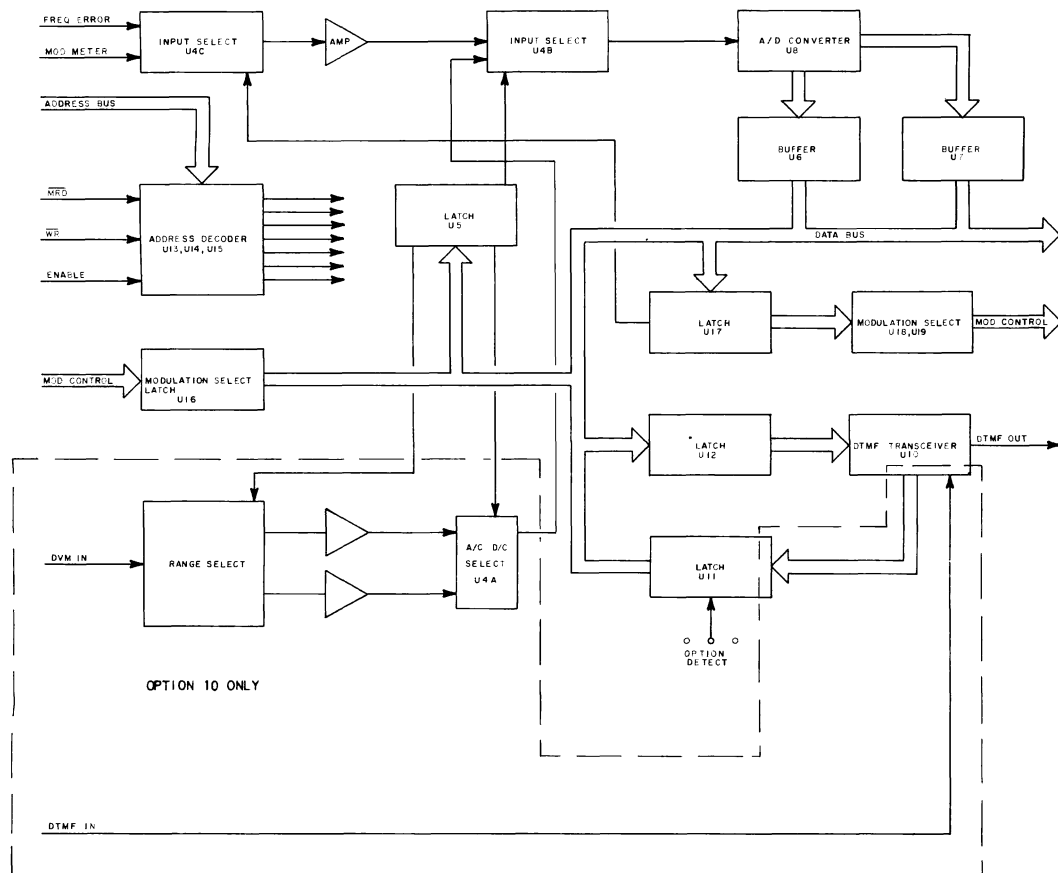


Figure 2-11 DVM I/O PC Board Block Diagram

### A. Standard DVM I/O PC Board

Frequency error and modulation monitor signals are routed to the meter input select chip U3004C. Signal selection is made when the address decoder (U3013, U3014 and U3015) clocks the  $D_0$  data bit through latch U3017. If  $D_0$  is low, frequency error is switched to op amp U3009. If  $D_0$  is high, modulation monitor is switched to the op amp. Latch U3005 controls U3004B depending upon whether  $D_3$  is high or low. When  $D_3$  is high, the selected signal from the op amp will be sent to the A/D converter (U3008) to be digitized. The digitized signal is then latched through U3006 and U3007 and sent to the Processor PC Board to be displayed on the VFD.

Signals reflecting the setting of the MODULATION Select Control on the front panel are latched through U3016 to the processor. Signals controlling the setting of the MODULATION Select Control (as in RS-232 operation) are latched through U3017, U3018 and U3019 and sent to the 10.7 MHz Gen/Rec Module, the Receive Audio Module, and the Generate Audio Module.

When the processor selects a DTMF encoding operation the necessary bits will be latched into U3012 and sent to U3010, a DTMF transceiver. From the transceiver, the encoded DTMF is sent to the Generate Audio module for output.

#### B. Optional DVM I/O PC Board (Option 10)

When the optional DVM I/O PC Board is installed the same circuitry is present as described for the standard DVM I/O PC Board, plus there is also an auto-ranging voltmeter circuit and a DTMF decoder circuit.

J3003 is an input from the SCOPE/DVM Connector on the front panel. RN3001 is a voltage divider network, the output of which is selected through relays K3001, K3002 and K3003. The processor latches the relay control lines through U3005 and automatically selects the necessary control line. Both the AC and DC voltages are read, with the AC voltage being presented to pin 5 of U3004A and the DC voltage being presented to pin 3 of U3004A. The processor, through latch U3005, selects which voltage is to be digitized, depending on user operation of the keyboard (+/- key). The selected voltage is switched through U3004B when the user selects DVM operation. The selected voltage is then digitized and displayed on the VFD.

The DTMF decoder circuit uses U3010, the DTMF transceiver, to decode the demod audio received from the Receive Audio Module. The decoded data is latched into U3011 to be sent to the processor and then to be displayed on the VFD.

#### 2-4-5 FREQUENCY STANDARD PC BOARD

The Frequency Standard uses a voltage controlled, Temperature Compensated Crystal Oscillator (TCXO) to furnish a constant 10 MHz reference frequency. When desired, an external 10 MHz reference signal can be used by connecting the signal source to the External Reference Connector on the rear panel of the test set. A bi-quinary ripple counter divides the 10 MHz signal to a 500 kHz signal which is fed to the High Loop Module, and to a 1 MHz signal which is fed to both the Digital Module and, on the FM/AM-1200S, to the Spectrum Analyzer RF Module.

A level detect circuit determines when an external 10 MHz reference signal of sufficient amplitude is present on the External Reference Connector and responds by deactivating the TCXO and couples the external 10 MHz reference signal to the frequency divider.

The internal 10 MHz reference signal produced by the TCXO is also fed back to the rear panel External Reference Connector, which can be used during calibration.

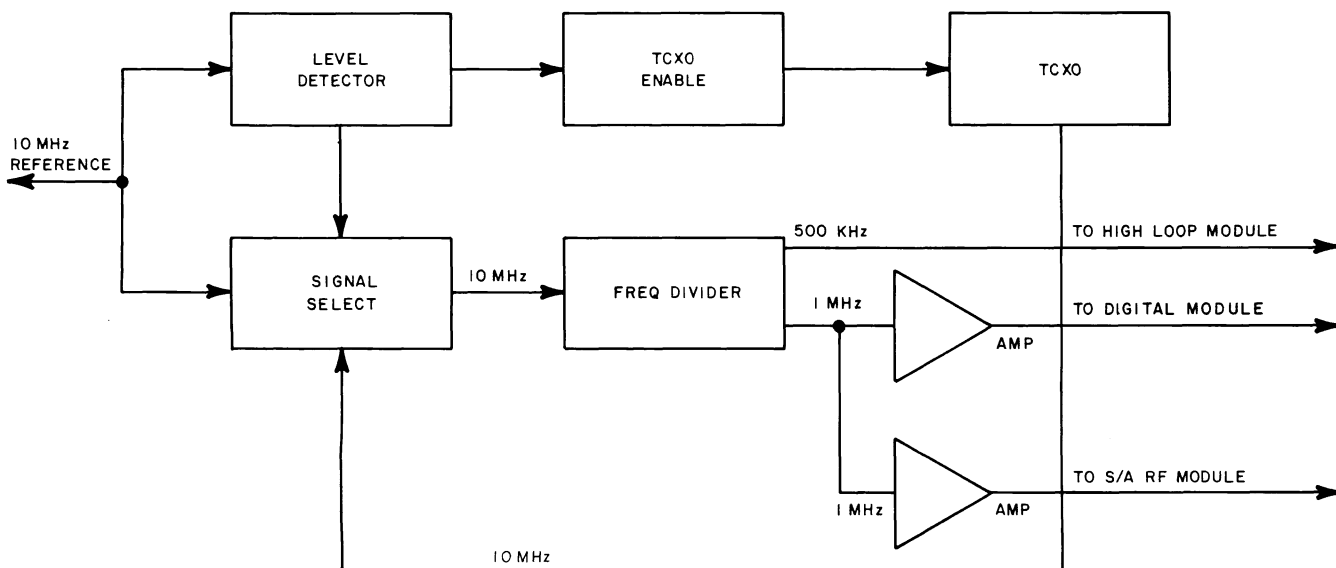


Figure 2-12 Frequency Standard PC Board Block Diagram

When an external 10 MHz reference signal exceeding 5 V p-p is applied through the External Reference Connector to NAND gate U2802, a level detector, consisting of op amp U2801 and associated components, produces a constant high, turning off Q2801 and interrupting power to the TCXO. The high output of U2801 is also fed to U2802, passing the external 10 MHz reference signal to the frequency divider circuit.

The internal 10 MHz reference signal from the TCXO is applied to pin 9 of NAND gate U2802. The gated output from U2802, pin 6 is fed to U2803 and through R2807 to the External Reference Connector.

The level detector in the signal select circuit controls the base voltage to transistor Q2801, which, in turn, controls the +12 VDC to the TCXO. R3501 on the front panel allows fine adjustment of the operating frequency to calibrate the TCXO. The TCXO coarse adjustment is within the TCXO Assy mounted on the Frequency Standard PC Board.

The frequency divider circuit consists of dual counter U2803, two buffer transistors, Q2802 and Q2803, and associated components. The 10 MHz input is divided by 10 in the first counter and applied to the base of both transistors. Q2802 supplies a 1 MHz reference frequency to the Digital Module through P402 and Q2803 supplies 1 MHz to the Spectrum Analyzer (in the FM/AM-1200S) through P404. The output of the first counter is further divided to 500 kHz and sent to the High Loop Module through P4001.

## 2-4-6 DIGITAL MODULE

The Digital Module contains 2 PC Boards, the Digital Reference PC Board and the Digital Counter PC Board. The Digital Reference PC Board receives a 1 MHz signal from the Frequency Standard and divides it down for use throughout the FM/AM-1200S/A.

SIGNAL	DESTINATION	USE
20 kHz	Duplex Module	REF Freq
10 kHz	Digital Counter PCB	Time Base*
1 kHz	Digital Counter PCB	Time Base*
1 kHz	Digital REF	REF Freq for 21.4 MHz OSC
1 kHz Sine	Front Panel	Fixed Tone
100 Hz	Low Loop Assy	REF Freq
100 Hz	Digital Counter	Time Base*
10 Hz	Digital Counter	Time Base*

\* These signals are used in the Digital Counter PC Board for FREQ Error Measurements.

The Digital Reference PC Board also contains a 1 kHz sine wave filter, phase lock loop for the 21.4 MHz oscillator on the 10.7 MHz Gen/Rec Module, and tone multipliers for audio error measurements.

The Digital Counter PC Board contains all logic and counters for FREQ Error Measurements.

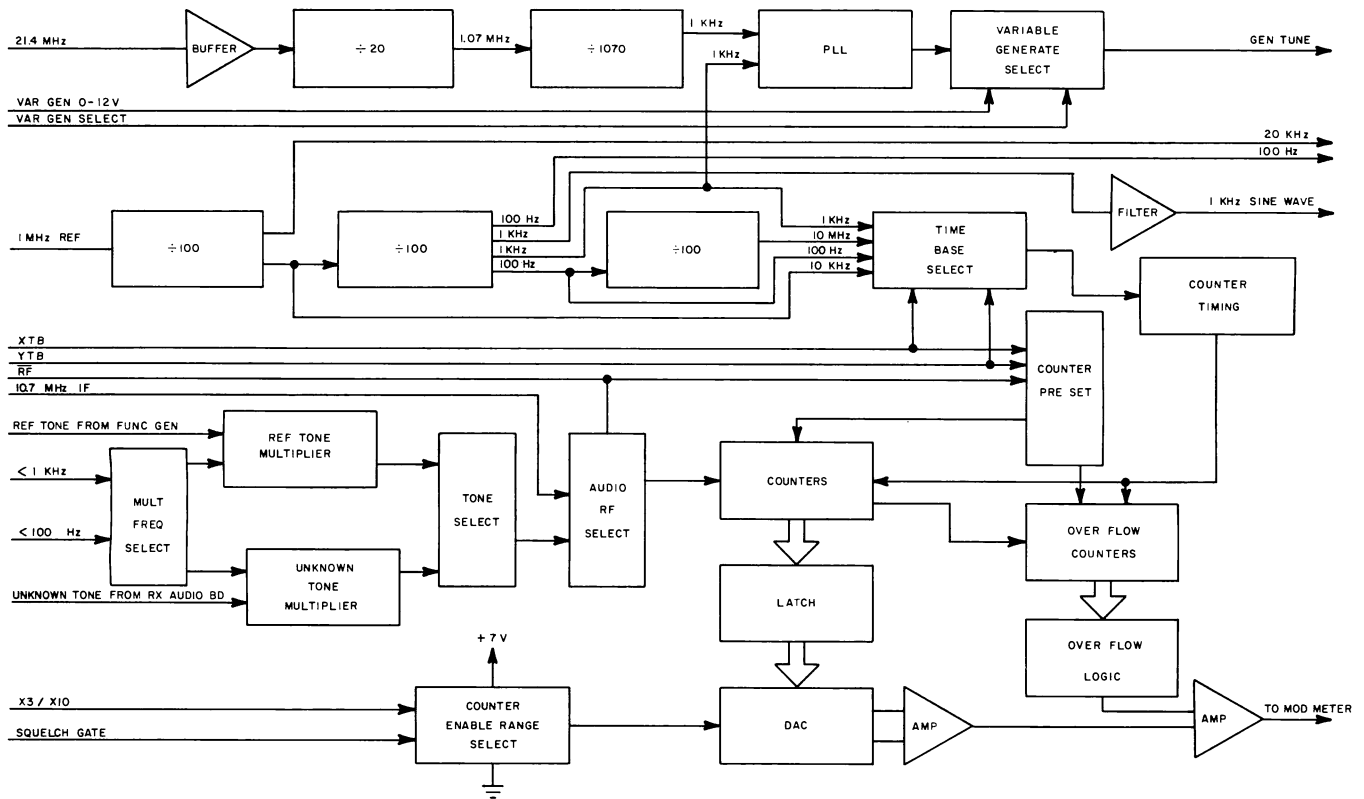


Figure 2-13 Digital Module Block Diagram

A. DIVIDERS

The 1 MHz signal enters the module at J4503 and is first divided by U4505 to produce 20 kHz (duplex REF Freq) and 10 kHz which is fed to U4506. U4506 divides the 10 kHz down to 1 kHz and 100 Hz. The 100 Hz is fed to U4507 where it is divided down to 10 Hz.

The 10 kHz, 1 kHz, 100 Hz, and 10 Hz are fed to multiplexer U4508 for time base selection for the digital counter. Selection of the time base is made by two control lines (XTB, YTB) from the Interface PC Board.

YTB	XTB	TIME BASE
LOW	LOW	10 Hz
LOW	HIGH	100 Hz
HIGH	LOW	1 kHz
HIGH	HIGH	10 kHz

## B. PLL (PHASE LOCK LOOP)

The 21.4 MHz signal from the 10.7 MHz Gen/Rec Module, enters the Digital Module at J4502. First the signal is inverted by Q4501, then divided by 20 in U4501. This 1.07 MHz signal is fed to U4502 and divided by 1070 to produce a 1 kHz signal. This 1 kHz signal is fed to U4503, a phase lock loop, and compared with the 1 kHz REF signal from divider U4506 to produce a steering voltage for the 21.4 MHz Oscillator on the 10.7 MHz Gen/Rec Module. This steering voltage is fed to the analog multiplexer circuit, U4504. A variable DC voltage is also sent to U4504 from the front panel GEN/LOCK Control. When the variable GEN/LOCK Control is in the detent position, the VAR GEN enable line is low, which selects the steering voltage from the PLL chip, U4503 and passes this signal to the Gen Tune line. When the variable GEN/LOCK Control is out of detent, the VAR GEN enable line is high, which selects the DC voltage from the Front Panel Variable GEN/LOCK Control and passes it to the Gen Tune Line.

## C. TONE MULTIPLIERS

Because the audio frequencies are too low for counting to the required accuracy within the available time base periods, both the reference and unknown frequencies are multiplied by a factor of 100 by separate phase locked loop circuits. The incoming tones are applied to the reference signal pin of the appropriate PLL (Phase Locked Loop) (U4510 for the unknown, U4512 for the reference). The VCO output from the PLL is divided by 100 by a counter (U4511 for the unknown, U4513 for the reference) and applied to the comparator pin of the PLL. The output of each loop is then applied to U4518. To inhibit the loop functions during the RF mode, Q4502 allows a +12V potential to inhibit operation of U4510 and U4512. When the audio mode is selected, the high mode select signal turns on Q4502, grounding the +12 potential, allowing U4510 and U4512 to operate.

## D. SINEWAVE FILTER

A 1 kHz squarewave signal from the time base divider is filtered by a three-stage active filter consisting of op amps U4514 and U4515, and related components. The output of the filter is a 6 Vp-p sinewave supplied to the Generate Audio Module, through the front panel select switch and tone control, as the fixed tone signal.

## E. PRESET LOGIC

Quad NOR gate U4414, quad NAND gate U4416 and hex inverter U4417 form a logic network to preset the counter system for a 1, 10 or 100 multiplier, according to the position of the FREQ ERROR Meter Control ( $\overline{X3/X10}$  selection is in the meter driver circuit). These presets are loaded into the counters

during the 15  $\mu$ S output pulse from U4413B (for audio frequencies, the preset count is zero).

#### F. SIGNAL SELECT CIRCUIT

Multiplexer U4401A couples the IF carrier from the 10.7 MHz Gen/Rec Module directly to the counter system when an RF position is selected on the FREQ ERROR Meter Range Control. When an audio position is selected, the Q output of U4412B first selects the reference frequency from the Variable Tone Generator, then the unknown audio frequency from the Receive Audio Module. The selected signal is then coupled by U4401A to the counter circuit.

#### G. COUNTER TIMING CIRCUIT

The timing circuit consists of decade counter U4411, dual D-type flip-flop U4412, multiplexer U4401B, inverter U4421E and dual one-shot multi-vibrator U4413. The input to the timing circuit is the selected time base frequency from multiplexer U4508. One output operates audio select multiplexer U4413 in the signal select circuit; other outputs control the counter circuit.

U4411 receives and counts the time base pulses. Starting with a high Q state of U4412A, when pin 2 of U4411 (representing binary 8) goes high, U4411 clocks U4412A to low Q. This produces a high output from U4421E, which clocks U4412B, and, simultaneously, provides a spike through C4413. The spike preloads a count of seven into U4411, overriding its count and pulling pin 2 back low. The next time base pulse causes pin 2 to again go high, clocking U4412A back to high Q. Pin 2 stays high for one more count, then goes low for the next eight counts. With the following pulse, the cycle repeats.

The high Q from U4412A inhibits the counter system for one time base period and is available to U4401B. When the  $\bar{Q}$  output of U4412B is high, it is also available to U4401B. With the FREQ ERROR Meter Range Control in an RF position, U4401B selects the  $\bar{Q}$  from U4412A; in an AUDIO position, it selects the  $\bar{Q}$  from U4412B. The leading edge of the signal, as  $\bar{Q}$  goes high, clocks U4413A, producing, as its output, a 15  $\mu$ S low Q. As U4413A output  $\bar{Q}$  returns high, it is applied to the counter circuit latch components and it clocks U4413B. U4413B now produces two 15  $\mu$ S pulses--a high  $\bar{Q}$  and a low  $\bar{Q}$ . These signals reset the counter system and U4412B. In the audio mode, U4412B has already been clocked to high  $\bar{Q}$ ; however, in the RF mode, it has just been clocked to a high  $\bar{Q}$ , and is now, just a few microseconds later, clocked back to high  $\bar{Q}$ . The counter system counts upward when U4412B Q is low and downward when Q is high. This allows the counters to count upward on the audio reference frequency while Q is low, then downward on the unknown audio frequency while Q is high (while in the audio mode), but allows them, when in the RF mode, to only count upward.



## H. COUNTER CIRCUIT

The counter circuit contains binary counters U4402 through U4406, dual D-type flip-flop U4407, latch U4408 and related gates and inverters. U4402 and U4403, the two least significant digit counters, furnish the meter deflection count, while U4404, U4405 and U4406 are overrange counters. If any terminal count in the latter is not zero, the meter will be pegged.

The selected frequency is applied to U4402 through U4401A. During loading,  $\bar{Q}$  of U4412A and U4412B are high, which inhibit U4402 and U4403. When U4412A is clocked by U4411, successively clocking U4412B and U4422 is clocked by the 10.7 MHz IF, the counters are allowed to count upward from preset values for a period of 10 time base pulses. The binary counts from U4402 and U4403 are applied to latch U4408 to drive the meter. Any non-zero count from U4404, U4405 or U4406 is applied through gates U4410, U4415B, U4420C and U4420D to either U4407A (if U4406, Pin 2 is low) or U4407B (if U4406, Pin 2 is high).

When the tenth time base pulse arrives, U4412A is clocked to a high Q state. In the RF mode, this inhibits the counter chain and initiates the end-of-count process. In the audio mode, it inhibits the counter chain while U4412B sets the counters to count down and changes the signal from the reference to the unknown frequency. The counters then count downward for the next ten time base pulses, then U4412A is again clocked to a high  $\bar{Q}$  state. Now the end-of-count process is initiated for the audio mode.

The end-of-count process starts when U4413A is clocked by either U4412A or U4412B, and its  $\bar{Q}$  output goes low for 15  $\mu$ S. As  $\bar{Q}$  goes high, U4408 is clocked, latching the count from U4402 and U4403 to DAC U4409. Simultaneously, U4407A and U4407B are clocked, and if any output from U4404, U4405 or U4406 is high, resulting from a frequency error that exceeds meter capacity, U4407A or U4407B will apply a high potential to the meter driver circuit. As  $\bar{Q}$  of U4413A returns high, it also clocks U4413B, resulting in a 15  $\mu$ S pulse output in which Q goes high and  $\bar{Q}$  goes low to preload the counters from the logic network. Exclusive NOR gates U4418C and U4418, and inverters U4421C and U4421D prevent unwanted clocking of U4403, U4404, U4405 and U4406 during loading. With the next time base pulse, U4412A is clocked to high Q, low  $\bar{Q}$ , and the counting process repeats.

Inverter U4421A applies a high to the clear-direct pins of U4407A and U4407B when the RF signal is insufficient to break squelch, which prevents any possibility of overrange meter deflection.

## I. METER DRIVER CIRCUIT

The meter driver circuit contains 8-bit DAC U4409, dual OP amp U4419, multiplexers U4504A and U4504C, and associated components.

When U4408 is clocked, it transfers the final count from U4402 and U4403 to the DAC. The two current outputs from U4409 are applied to op amp U4419, which is configured as a current-to-voltage converter. Trimpot R4407 allows calibrating the input level to U4419 to produce a zero output voltage when a count of 128 is applied to U4409. The output voltage of U4419 is positive or negative, depending upon which output from U4409 draws the higher current. U4419 inverts the output of U4409 and provides a 10:1 gain to drive the meter and provide for the digital readout. When the frequency error exceeds meter capacity, either U4407A or U4407B applies a high to the corresponding input of U4419B to peg the meter.

The reference voltage for the DAC is established by R4508 and trimpot R4510 for the X10 scale of the Frequency Error Meter, and by trimpot R4509 for the X3 scale. Multiplexer U4504B selects the scale, depending upon the setting of the FREQUENCY ERROR Meter Range Control. When the carrier signal level is insufficient to break squelch, multiplexer U4504C couples the input of U4504B to ground. When the signal breaks squelch, U4504C then applies +6.9V to U4504B.

## 2-4-7 FUNCTION GENERATOR PC BOARD

The function generator produces six different tone configurations (sinewave, ramp, triangle, square, DCS and pulse), a separate squarewave for audio error measurements, and three separate lines which indicate generated tone range (<100 Hz, <400 Hz and <1 kHz).

The tone output is fed to the front panel VAR Tone Selector Switch for use as either a modulation source on the Generate Audio PC Board or to the internal speaker for aural monitoring. The <100 Hz and <1 kHz signals are fed to the Digital Module, and the <400 Hz signal is fed to the Receive Audio PC Board.

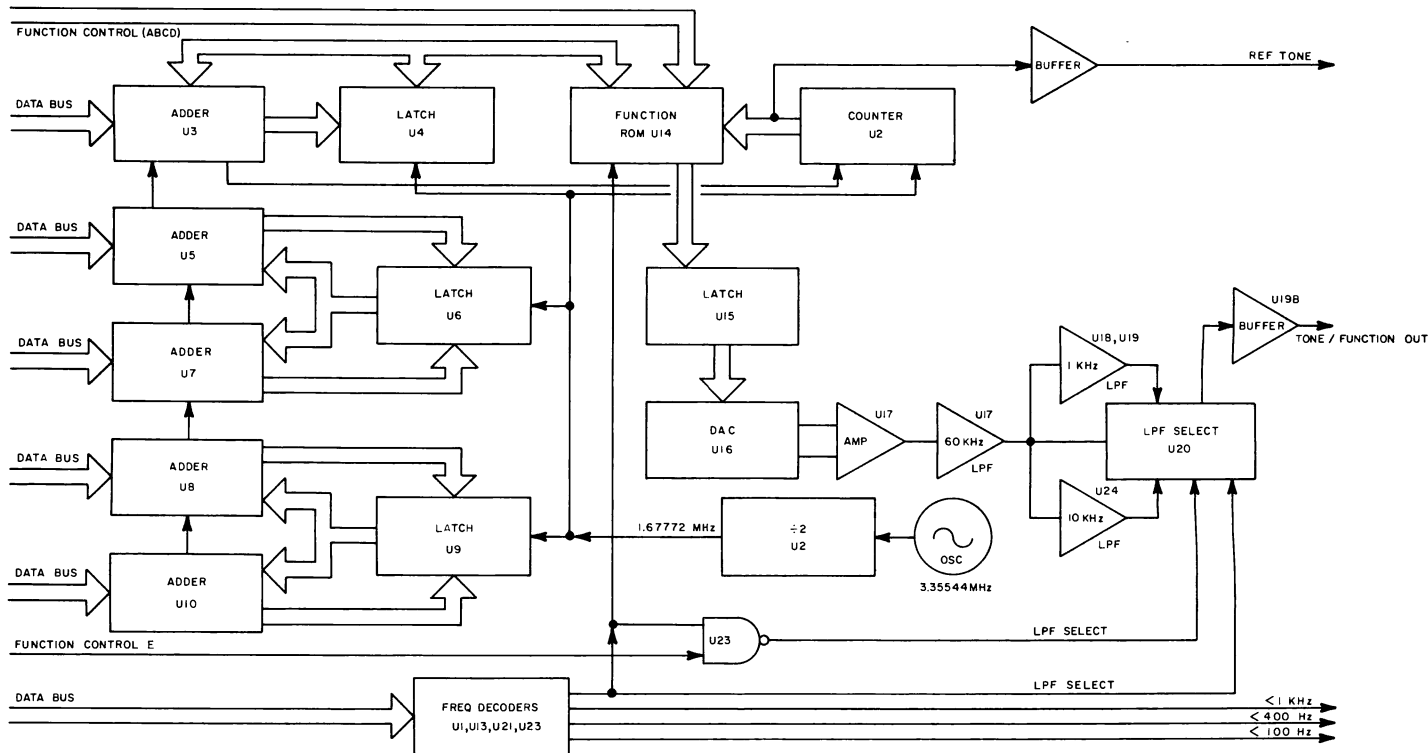


Figure 2-14 Function Generator PC Board Block Diagram

#### A. OSCILLATOR CIRCUIT

The reference oscillator contains 3.35544 MHz crystal Y3101, Q3102, trimcap C3110, and associated components. Q3101 buffers the signal, which then clocks binary counter U3102A. U3102A divides the frequency to 1.67772 MHz to clock the latches in the adder system.

#### B. ADDER SYSTEM

The adder system contains 4-bit binary adders U3103, U3105, U3107, U3108 and U3110, latches U3104, U3106 and U3109, and counter U3102B. One counter and one-half of a latch form a loop in which the data from the CPU and any carry-in from another adder are added to the output data from the latch, with the sum becoming the input to the latch. When the latch is clocked by the oscillator, the sum becomes a new latch output, which creates a new sum for the adder. The carry-out is chained to the next adder, and the process continued until the carry-out from U3103 is applied to U3102B. The 4-bit output data from U3102B and the three most significant bits from U3104 provide 128 binary codes which are applied to addresses 1 through 7 of ROM U3114. The most significant bit from U3102B is also applied to the bases of Q3103 and Q3104. These transistors produce a +12V squarewave at the selected frequency to provide the reference tone to the audio frequency counter in the Digital Module.

### C. ROM/DAC CIRCUIT

ROM U3114 is programmed to produce binary codes to synthesize sine, square, ramp and triangle waveforms at a frequency selected through the CPU. The CPU will control these codes to also produce digitally controlled squelch (DCS) and IMTS pulse signals when these functions are selected. Addresses 7 through 11 of the ROM select the waveform to be synthesized, and addresses 0 through 6, providing 128 distinct timing codes, determine the relative phase position in the waveform cycle. From this information, the ROM produces an 8-bit output code corresponding to the amplitude required for the selected waveform at the particular phase position. Latch U3115, which is an 8-bit flip-flop, stores this code. When the oscillator clocks the adder system, it also clocks U3115. This latches the stored code from the ROM to DAC U3116 while simultaneously the adder system advances ROM addresses 0 through 6 to the next phase position, producing a new ROM output code. The coded input to U3116 turns on selected voltage dividers in the DAC, drawing a corresponding current. R3102 and R3103 are load resistors for the two current outputs from the DAC and with the resistors in the DAC, function as voltage dividers for op amp U3117A. U3117A compares the two voltage levels and produces a single output. R3103, being tied to ground, establishes symmetry to ground for the output signal. The resulting output from U3117A is an instantaneous voltage level corresponding to the amplitude required for the selected waveform at that particular phase position. As the oscillator continues clocking the adder system and the latch, the output voltage continues to change, describing the waveform throughout its cycle.

The signal from the ROM/DAC circuit passes through a two-stage 60 kHz low pass filter consisting of U3117B, U3118A, and associated components. The signal is then sent to a 10 kHz low pass filter, 1 kHz low pass filter and multiplexer U3120. The 10 kHz low pass filter is a two-stage filter consisting of U3124A and U3124B and associated components. The 1 kHz low pass filter is a two-stage filter consisting of U3118B and U3119A and associated components. The output of all three filters are fed to multiplexer U3120 for selection. The selected signal is then fed to U3119B, which buffers the signal, then to pin 9 of P3102 and out to the front panel.

Function	Filter
Sinewave and DCS	
Less than 819.2 Hz	1 kHz
819.2 thru 13106.2 Hz	10 kHz
13106.2 Hz or Greater	60 kHz
Squarewave, Ramp, Triangle	
Less than 819.2 Hz	10 kHz
819.2 Hz or Greater	60 kHz
PULSE	10 kHz

Table 2-2 Tone/Filter Selection for Function Generator

#### D. FREQUENCY RANGE LOGIC

Because certain switching functions occur in the low pass filter circuit and Receive Audio and Digital Modules resulting from frequency selections, a logic network provides the appropriate data. This circuit consists of 4-input NOR gates U3111A, U3111B, and U3113B, 8-input OR/NOR gate U3121, and NAND gates U3123A and U3123B. The NOR gates read the binary when all corresponding code lines are low.

U3121 reads all code lines for 409.6 Hz and above, and when all are low, supplies a low output to U3101A and a high to the Receive Audio Module. If any code line goes high in response to a frequency selection, the outputs are reversed.

U3101A reads the code lines for 102.4 Hz, 204.8 Hz, 409.6 Hz and the non-inverting output from U3121. When all of these lines are low (selected frequency is below 102.4), the output from U3101A to the Digital Module is high.

When the output of U3113B is low (indicating a frequency of 13,106.2 Hz or greater), it pulls down on the control line to U3120A through CR3103. This output also provides one input to U3123B.

U3101B reads the code lines for 819.2 Hz, 1638.4 Hz, 3276.8 Hz, and 6553.6 Hz. It provides the second input to U3123B.

When both input lines to U3123B are high (i.e., the selected frequency is below 819.2 Hz), the output from U3123A is high. This output goes to the Digital Module and to U3123D in the low pass filter circuit.

#### 2-4-8 GENERATE AUDIO MODULE

The Generate Audio Module receives audio signals from any or all of five sources: (1) 1 kHz fixed tone from the Digital Module; (2) a variable tone from the Function Generator; (3) through the MIC/ACC Jack; (4) through the EXT MOD Jack on the Front Panel or (5) DTMF from the DVM I/O Board. These signals are combined and amplified, with a tap from the output going to the TONE OUT Jack. For FM modulation, the signal is sent directly to the 10.7 MHz GEN/REC Module 21.4 MHz VCO tuning line. For AM modulation, the signal is routed through an AM modulator/leveler, which consists of two amplifiers and the GEN LEVEL FINE Vernier Control, and then to the 10.7 MHz GEN/REC Module.

The operating mode (Generate or Receive) of other modules is determined by an operating mode circuit in the Generate Audio Module. In the Generate Mode, a GEN command (+12 VDC signal) performs the following functions: (1) it enables the generate amplifiers in the IF Module and Output Amplifier; (2) in the 10.7 MHz GEN/REC Module, it enables the frequency divider and inhibits the receive-enable multiplexer; and (3) in the Receive Audio Module, it enables the Modulation Meter multiplexer in the deviation/percent modulation mode. In the Receive mode, an REC command (+12 VDC signal) enables the receive amplifiers in the IF Module, and an ANT ENABLE command (+12 VDC signal) energizes the Antenna Enable Relay, coupling the signal between the Antenna Jack and the IF Module. If the set is operating in the Generate Mode and a signal exceeding 100 mW is received at the T/R Jack, it will automatically switch to the Receive mode, but the Antenna Enable Relay will not be energized. Also, with the set in the Receive mode, depressing the microphone Press-To-Talk Key automatically switches the set to the Generate mode and de-energizes the Antenna Enable Relay to route the generated signal from the IF block through the output amp.

The phase lock indicator circuit consists of four logic NAND gates (two of which function as an oscillator), a transistor in the Generate Audio Module, related grounding circuits in the High Loop and Low Loop Synthesizers, and the GEN/LOCK Control on the Front Panel. When the appropriate frequency in each Synthesizer is equal to and in phase with its reference, neither grounding circuit conducts and the voltages applied to the inputs of the first gate in the indicator logic circuit are high. When neither input to the gate is grounded, the transistor supplies 5V power to the LED on the Front Panel, indicating a phase-locked condition. If one or both inputs to the gate is grounded, or the GEN/LOCK Control is out of detent, the LED flashes, indicating an unlocked condition.

Audio signals from the Receive Audio Module low pass filters are also routed to the Generate Audio Module for DCS (Digitally Coded Squelch) decoding and SINAD/Distortion Analysis switching.

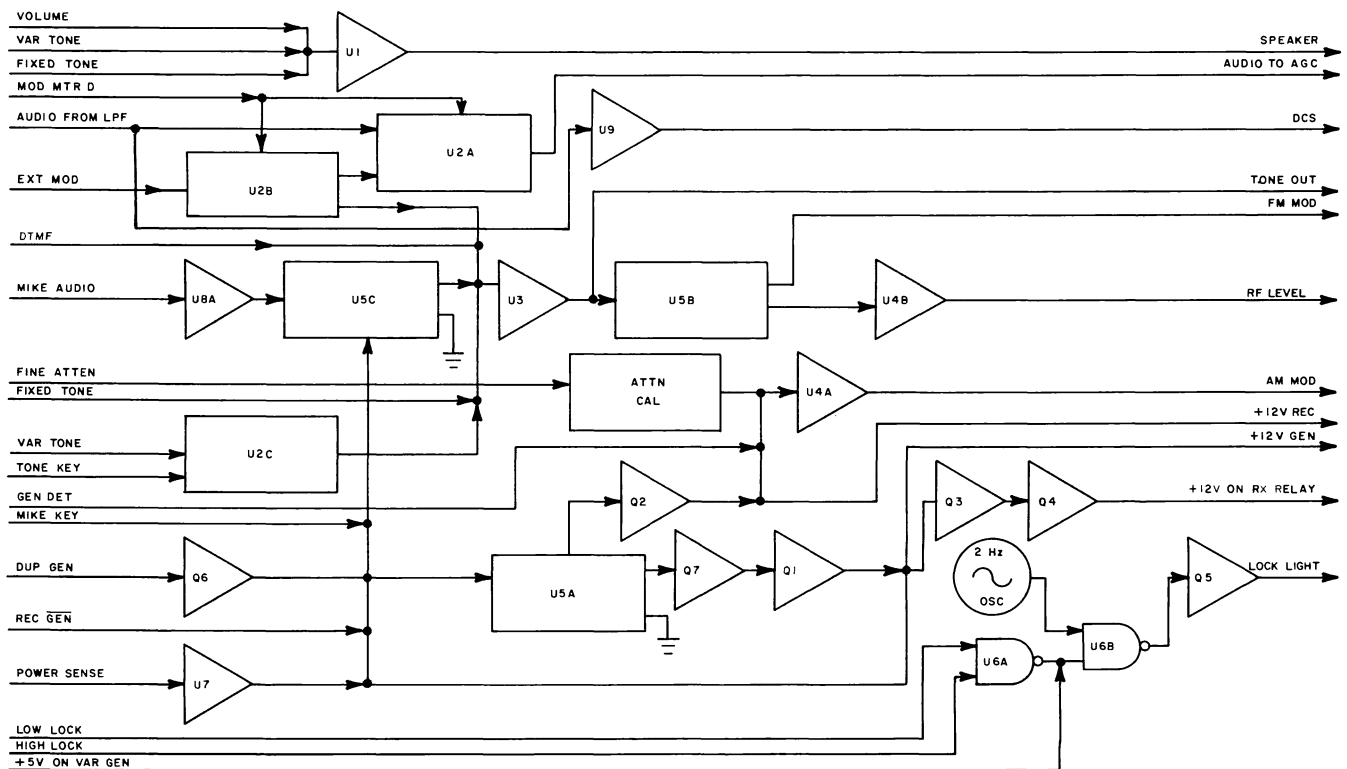


Figure 2-15 Generate Audio Module Block diagram

#### A. SPEAKER AMPLIFIER CIRCUIT

The demodulated audio from the Receive Audio Module, 1 kHz fixed toned from the Digital Module, and the tone from the Function Generator are combined in the Generate Audio Module and fed to audio amp U3201. U3201 amplifies the combined signals and sends it to the Speaker.

#### B. OPERATING MODE CIRCUIT

Transistor Q3201, which is a current limited transistor, supplies the generate enable voltage; Q3202 supplies the receive enable voltage; and Q3204, supplies the voltage to energize the antenna relay. The voltage applied at pin 11 of multiplexer U3205 controls these transistors. Op amp U3207 also controls Q3203 and Q3204.

When pin 11 of U3205 is low (generate or duplex generate mode is selected or microphone Press-To-Talk Key is depressed), pin 12 conducts through pin 14 to ground, turning on Q3207 and, subsequently, Q3201. This applies +12V to enable the generate function and to the base of Q3203. Q3203 is turned off, which turns off Q3204, and interrupts power to the antenna relay. The de-energized relay then conducts the RF signal from the IF Module to the Output Amplifier Module.

When pin 11 of U3205C is high, (receive mode is selected), pin 13 conducts through pin 14 to ground, turning on Q3202. Q3202 applies +12V to enable the receiver functions and to drive the AM modulator/leveler circuits to maximum attenuation of the signal generator VCO output in the 10.7 MHz Gen/Rec Module.

The power monitor in the Receive Audio Module furnishes a positive voltage to pin 3 of op amp U3207. This voltage level is proportional to the strength of any RF signal received at the T/R Connector. With no voltage applied to pin 3, the output at pin 6 is low, pulling down the bias voltage on Q3203, turning on Q3204 and energizing the antenna relay. This couples the ANTENNA Connector into the IF Block. If an RF signal exceeding 100 mW is applied at the T/R Connector, the voltage on pin 3 of U3207 goes higher than on pin 2, and the output at pin 6 goes high. Q3203 and Q3204 are turned off, the antenna relay is de-energized, and the received signal from the T/R Connector is coupled into the IF Block. The high output from pin 6 of U3207 is also applied to pin 11 of U3205C. This will cause U3205C to switch to receive mode if generate is selected, but will not override duplex generator or the microphone key.

When Duplex Generate Mode is selected, a high turns on transistor Q3206, which pulls down on pin 11 of U3205C, selecting the generate mode regardless of any signal applied at the T/R Connector.

### C. AUDIO SWITCHING CIRCUIT

All audio signals supplied to the Generate Audio Module for modulation are combined and applied to pin 6 of op amp U3203B. The 1 kHz fixed tone and the DTMF tone go directly to the amplifier. Signals from the microphone, Function Generator, and any signal applied thru the EXT MOD/SINAD Connector first go through switching circuits. The microphone Press-To-Talk Key pulls down on pin 9 of multiplexer U3205B, coupling the microphone audio signal at pin 4 to pin 5, then to the amplifier. The Function Generator signal at pin 3 of multiplexer U3202C is normally coupled to pin 4, then to the amplifier. When pin 9 of U3202B is pulled low, the Function Generator signal is interrupted.

The output from pin 1 of U3203A goes to the TONE OUT Connector on the Front Panel and to pin 15 of demultiplexer U3205A. When FM is selected, on the MODE Selector Control on the Front Panel, pin 10 of U3205A is low, and the signal at pin 15 is applied through pin 2 to the 10.7 MHz Gen/Rec Module. Selecting an AM mode applies a high to pin 10, coupling the signal on pin 15 to pin 1 and applying it to pin 6 of modulator/leveler op amp U3204B.



#### D. MODULATION CIRCUIT

The output of op amp U3204B (pin 7) goes to the Generate Level FINE Vernier Control on the Front Panel. Trimpot R3246 calibrates the control for -12 dB attenuation. From the potentiometer wiper, the signal returns to trimpots R3224 and R3227 for calibration. From R3224, the signal is applied to pin 2 of op amp U3204A and applied to the AM modulator circuit in the 10.7 MHz Gen/Rec Module. The generate level signal from the Output Amplifier is summed with the modulating signal at pin 2 of op amp U3204A, providing a positive offset proportional to the RF level detected by the Output Amplifier. Accordingly, this biases the output of op amp U3204A and increases attenuation in the AM modulator circuit of the 10.7 MHz Gen/Rec Module until the RF level, at the level detector in the Output Amplifier, is 0 dBm. When the FM/AM-1200 is in the Receive or Duplex mode, the +12V output from transistor Q3202 is summed with any modulation signal applied to pin 2 of op amp U3204A. This voltage drives the output at pin 1 to -12V, which drives the AM modulator circuit to maximum attenuation and blanks out the generator VCO signal in the 10.7 MHz Gen/Rec Module.

#### E. PHASE LOCK INDICATOR CIRCUIT

Two NAND gates U3206C and U3206D, resistors R3242 and R3243, and capacitor C3218 form a 2 Hz oscillator. The oscillator output from U3206D pin 11 is applied to pin 5 of U3206B.

As long as approximately +5 VDC is applied to pins 1 and 2 of U3206A, the output on pin 3 remains low. If either the High Loop or Low Loop is not phase-locked to the appropriate reference frequency, one of the inputs goes low, and pin 3 goes high. While pin 3 is low and the GEN/LOCK Control is in LOCK, the input to pin 6 is a constant low, making the output at pin 4 a constant high. When the input to pin 6 is high, the oscillating input to pin 5 causes the output at pin 4 to oscillate. The high output from pin 4 turns on transistor Q3205 to supply +5 VDC, either steady or pulsing according to the high or low state of pin 4 of U3206, to the LOCK Lamp LED on the Front Panel.

#### F. DCS CIRCUIT

The LPF audio signal is routed to the DCS decoder U3209. If DCS is present in the received audio signal, U3209A will detect it and U3209B will send the signal to the Interface PC Board.



#### A. RECEIVE ENABLE/INHIBIT CIRCUIT

The 10.7 MHz IF signal from the IF Module first enters the receive circuit through J4302, diode CR4301 and tuned filter FL4301 to the bandpass amplifier. Resistor R4384 loads the circuit to prevent oscillation. A positive bias normally turns on CR4301. However, in the Generate mode, +12V is applied to the base of transistor Q4307. Q4307 grounds the bias voltage, turning off CR4301. Capacitor C4308 couples a sample of the generated signal into the receiver circuitry for monitoring.

#### B. BANDPASS AMPLIFIER CIRCUIT

The output from pin 3 of FL4301 is applied to the gate (pin 3) of FET Q4301. Filter FL4302 tunes the drain (pin 1) of Q4301 for the best AM envelope. The signal is then applied to the gate (pin 3) of FET Q4302. Filter FL4303 tunes the drain (pin 1) of Q4302 to 10.7 MHz. From FL4303, the signal is split and applied to three essentially identical bandpass filters.

Each filter consists of, in signal flow order, a blocking diode, a crystal filter, a transistor amplifier, a second crystal filter, and a second blocking diode. Diodes CR4308 and CR4312, 200 kHz crystal filters YFL4305 and YFL4306, RF transistor Q4310, and associated circuitry form the FM WIDE and FM MID filter; diodes CR4302 and CR4303, 15 kHz crystal filters YFL4301 and YFL4302, RF transistor Q4308, and related components form the FM NAR and AM NORM filter. The AM NAR and SSB filter consists of diodes CR4305 and CR4306, 6 kHz crystal filters YFL4303 and YFL4304, RF transistor Q4309, and affiliated components. To select one filter, a +12 VDC bias is applied to the two diodes and the collector of the transistor by the Front Panel MODE Selector Control, allowing the signal from FL4303 to reach pin 1 of the first crystal filter. The other two filters are then reverse biased with -5V to prevent conduction. The filter output at pin 3 is applied to the base of the transistor, producing the input to pin 1 of the second crystal filter. The output of the second filter at pin 3 then passes through the second diode of filter FL4304. From FL4304, the signal is coupled by capacitor C4319 to the gate of FET Q4311. The drain of Q4311 is applied through filter FL4305 to the AM and FM demodulator circuits.

Transistors Q4303 and Q4304 control the gain of FETs Q4301, Q4302 and Q4311. As long as the AGC voltage from the Receive Audio Module signal control circuit is positive, the FETs apply maximum gain to the IF signal. As the AGC voltage becomes increasingly negative, Q4303 and Q4304 pull down proportionately on the voltage applied to the input gates of the three FET's, thus reducing their gain.

### C. AM DEMODULATOR CIRCUIT

The output from pin 2 of FL4305 is AC coupled through capacitor C4328 to the base of RF transistor Q4312. When the SSB mode is selected a 10.7 MHz BFO signal from the signal generator is also injected through inductors L4308 and L4309 and capacitors C4328, C4329 and C4331 to the base of Q4312. Q4312 and associated components amplify the signal, which is coupled through tuned filter FL4307 to an AM detector consisting of diode CR4304 and capacitor C4327. A bias voltage, supplied through resistor R4374, capacitor C4330, diode CR4315, and FL4307, keeps CR4304 turned on sufficiently to demodulate the signal linearly. The demodulated audio signal, applied to pin 5 of op amp U4303, is buffered by U4303 and associated components. The output at pin 7 is filtered by choke L4305 and capacitor C4344, then routed to the Receive Audio Module.

### D. FM DEMODULATOR CIRCUIT

The output from pin 4 of FL4305 is AC coupled through capacitor C4377 to the base of RF transistor Q4313. Q4313, limiting diodes CR4317 and CR4318, and associated components form a limiting amplifier which strips off any AM and amplifies the remaining signal. The signal is then applied to pin 4 of U4302. U4302 is an IF amplifier with quadrature detector.

Resistor R4378, choke L4320, and capacitors C4341, C4342 and C4380 form a tuned circuit for the detector. One output from pin 1 of U4302 is the demodulated FM audio. The IF carrier, at 10.7 MHz, is routed from pin 9 to the Digital Module through J4303.

### E. SIGNAL GENERATOR

FET Q4305 and related timing components produce a frequency of 21.4 MHz. As the tuning voltage is varied by the Variable GEN Control on the Front Panel, the oscillator frequency varies a minimum of 10 kHz above and below 21.4 MHz. Variable choke L4312 adjusts the frequency to 21.4 MHz at 4.80 VDC, which is mid range of the GEN Control travel. Diode CR10 is an AGC for the oscillator. After filtering by capacitor C4362, inductor L4319 and resistor R4362, the signal is buffered by transistor Q4306, then AC coupled through capacitor C4357 to J4304, and routed to the Digital Module for phase locking to the Frequency Standard. The Digital Module then produces the tuning voltage for phase locking the oscillator, or switches the variable generator tuning voltage to the oscillator when the GEN Control is out of the LOCK detent. In the FM mode, the modulating voltage from the Generate Audio Module is applied through pin 16 of J4301 to varactor CR4309.

The output signal from the VCO circuit at Q4306 is applied to pins 3 and 11 of dual flip-flop U4301. When SSB is selected, +12 VDC applied at pin 1 of U4301A allows the 21.4 MHz signal at pin 3 to clock the flip-flop, which produces a 10.7 MHz output at pin 5 (Q). Trimpot R4351 permits adjustment of the output (BFO) level. The signal is then applied to the AM demodulator circuit. When the generate function is selected, +12 VDC is applied to pin 13 of U4313. This allows the 21.4 MHz signal at pin 11 to clock the other flip-flop, producing a 10.7 MHz output at pin 9 (Q).

#### F. AM MODULATOR/LEVELER CIRCUIT

A filter consisting of capacitor C4368 and C4369, and choke L4314 shapes the square wave from pin 9 of U4301 into a sine wave. Diodes CR4313 and CR4314, chokes L4315 and L4316, capacitor C4370 and resistors R4352 and R4353 form a voltage controlled attenuator. The modulating/leveling voltage from the Generate Audio Module biases the diodes, varying the attenuation of the 10.7 MHz signal accordingly. From the modulator/leveler circuit, the 10.7 MHz signal is routed through J4302 to the IF Module.

#### 2-4-10 HIGH LOOP MODULE

The Dual VCO difference frequency of 90-1088 MHz is divided by a number programmed by the RF selection, and the result is compared to the 500 kHz reference frequency from the Frequency Standard. A control circuit then steers the 1300-2298 MHz VCO to the frequency corresponding to the RF selection. Also, a second, rapid response control circuit steers the frequency of the 1210 MHz VCO to cancel noise produced by the 1300-2298 MHz VCO.

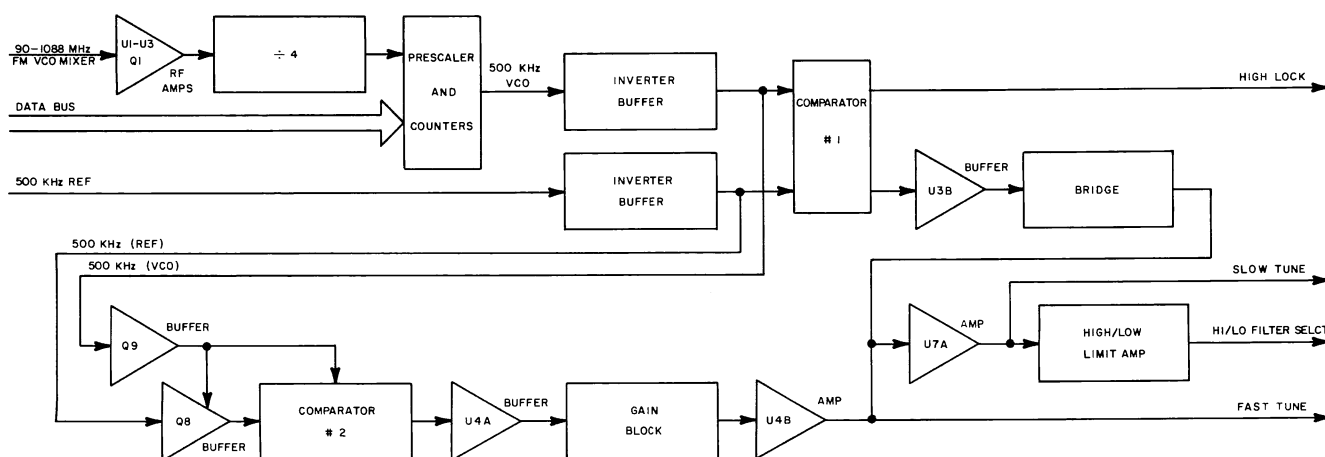


Figure 2-17 High Loop Module Block Diagram

## A. SIGNAL AMPLIFIER

The 90-1088 MHz signal, produced in the dual VCO, is amplified by op amps U4101 thru U4103 and RF transistor Q4101. Capacitors C4108, C4111, C4114, C4121 and C4123 provide DC isolation of the inputs and outputs of the amplifiers, while RF chokes L4101 thru L4103 and associated capacitors prevent crosstalk through the power supply. L4104, C4124 and C4127 provide RF isolation of the amplifier circuit from the +12V power source. The amplified signal is applied to the programmable divider network and the Duplex Generator Module.

## B. PROGRAMMABLE DIVIDER NETWORK

The programmable divider network divides the 90-1088 MHz signal by a selected number between 180 and 2176 to produce a 500 kHz output. It consists of prescalers U4104, and U4107, programmed counters U4105, U4106 and U4109, quad NOR gate U4108, dual flip-flop U4110, and associated resistors, capacitors and diodes.

BCD coding, initiated by the keyboard RF selection, loads the counter as follows: 2, 4 and 8 MHz sets U4105; 10, 20, 40 and 80 MHz sets U4106; and 100, 200, 400 and 800 MHz sets U4109.

The 90-1088 MHz signal from Q4101 is received by ÷4 counter U4104. U4104's output is then applied to ÷5/÷6 prescaler U4107, which clocks the three counters and U4110B. While a count is loaded into U4105, the output of U4108B is low, allowing U4107 to divide by six. When U4105 counts down to zero, U4108B goes high, and U4107 divides by five for the remainder of the counting period. U4108B, pin 5 also pulls up on pin 10 of U4105, stopping U4105 from counting until the next load cycle. U4107 will be forced to ÷5 during load operation as U4107, pin 2 is pulled high. U4105, U4106 and U4109 are programmed as down counters. When U4109 reaches zero count, the next clock pulse will bring pin 3 of U4109 high, clocking U4110. This brings pin 13 of U4108 low. When U4106 reaches count 7, pin 3 of U4106 will also go low bringing U4108, pin 9 low. As count 3 is reached, pin 20 of U4106 goes low. Pins 4 and 5 of U4108 are now both low, forcing pin 2 of U4108 high.

The next clock pulse (count 2) will clock U4110B, bringing Q (pin 15) high and  $\bar{Q}$  (pin 14) low. U4110B  $\bar{Q}$  loads counters U4105, U4106 and U4109. U4110B Q resets U4110A bringing  $\bar{Q}$  high. This forces the Q input to U4110 low. The next clock pulse (count 1) will remove the load condition from U4105, U4106 and U4109, allowing them to count normally. It takes nine clock pulses from U4107 after U4109 reaches zero to reset the system. Pins 4 and 5 of U4107 take the ECL outputs of U4110A, pin 3 and U4110B, pin 15 and convert them to a TTL output at pin 7 of U4107. U4107, pin 7 should be 500 kHz.

### C. FREQUENCY COMPARATOR CIRCUIT

The frequency comparator circuit compares the output frequency from the programmable divider network to a 500 kHz reference from the Frequency Standard. If the two squarewave signals are not synchronized, the comparator circuit produces an out-of-lock indication and an integrator provides steering voltage to the 1300-2298 MHz VCO integrator circuit.

The reference frequency is applied to the clock at U4002B and the controlled frequency to the clock of U4002A. U4002 is a dual, negative edge triggered flip-flop. Depending upon the phase relationship of the two signals, the flip-flops vary the voltage on C4006, the input to op amp U4003B, to produce a correction voltage. When the signals are in phase, R4019 and R4021 set the input voltage at approximately +2.5V, resulting in a correction voltage of approximately zero.

From reset of U4002,  $Q_A$  and  $Q_B$  are low, causing NAND gate U4018 output (to the reset of both flip-flop) to be high.  $\overline{Q_A}$  and  $\overline{Q_B}$  are high, causing the output of U4001D to be low. If both flip-flops are clocked simultaneously, U4001B instantly resets U4002A and U4002B, and capacitors C4005 and C4006 prevent any instantaneous systems responses. However, if one signal leads the other, the outputs of U4002A and U4002B will be opposites for the period of time one leads the other. This causes the output of U4001D to go high and allows the voltage applied to U4003B to be raised or lowered accordingly through CR4005 or CR4004.

With the output of U4001D high, Q4007 conducts, thus illuminating LED CR4106 on the divider board. It also pulls down on pin 2 of U3206A in the phase lock indicator circuit in the Generate Audio Module, causing the LOCK Lamp LED on the Front Panel to flash.

When the voltage on pin 5 of U4003B deviates from normal, the output voltage varies directly from zero. This voltage is then applied to a bridge consisting of diodes CR4008, CR4009, CR4010 and CR4011. Any positive or negative voltage from U4003B, exceeding two diode gaps from zero, is applied to the 1300-2298 MHz VCO integrator circuit to correct its frequency. The effect of the bridge is to delay shifting the 1300-2298 MHz VCO for detailed noise while allowing the 1210 MHz oscillator to make the necessary shift to cancel the noise.

#### D. 1300-2298 MHz VCO CONTROL CIRCUIT

An integrator circuit containing Q4012 and op amp U4007A controls the voltage level applied to the 1300-2298 MHz VCO. Op amps U4008A and U4008B, with trimpots R4060 and R4061, set the high and low voltage limits, thus establishing the low and high frequency limits at approximately 1275 and 2300 MHz respectively. Op amp U4007B, calibrated by trimpot R4065, establishes the switching frequency of the High/Low Pass Filter, and supplies either +12V or -12V as required.

#### E. PHASE COMPARATOR

The phase comparator circuit contains two sample and hold circuits to compare the phase relationship of the program-mable divider output signal to the 500 kHz reference signal, and an integrator circuit to supply a correction signal.

In the first sample and hold circuit, the reference signal is buffered by Q4002, then applied to the emitter of Q4001 and the collector of Q4003. The controlled signal is applied to the base of Q4005, which applies a corresponding sampling pulse to the bases of Q4001 and Q4003. For the duration of this pulse, if the reference signal is high, Q4003 conducts and charges C4002; if the reference is low, Q4003 conducts, and discharges C4002. The net charge held by C4002 is proportional to the phase relationship of the two signals.

The voltage at C4002 is buffered and inverted by Q4004 and Q4008, then applied to the source of Q4011. The sampling pulse from Q4005 is coupled by a delay network consisting of Q4006 and Q4009. When the gate of Q4011 goes high, the voltage at the source is coupled to the drain and held by C4010. Q4010 supplies a pulse 180° out of phase with the gate pulse to Q4011. This pulse is calibrated by trimpot R4032 and coupled to C4010 to null 500 kHz transition noise. The voltage level at C4010 is applied to op amp U4004A. The gain of U4004 is such that when the two signals are synchronized, its output level is zero volts.



## F. 1210 MHz VCO CONTROL CIRCUIT

In order for the phase comparator to make corrections over the entire span of the 1300-2298 MHz VCO, the control signal from U4004A must vary considerably. To maintain an adequate response of the 1210 MHz VCO, the gain of op amp U4004B is controlled by the RF selection. Switches U4005A, U4005B, U4005C, U4006A, U4006B and U4006C, enabled by frequency select control lines (40, 80, 100, 200, 400 and 800 MHz), select various resistances which, in conjunction with R4044 and trimpot R4045, establish the correct gain for U4005B. The output of U4005B is filtered, then routed to the 1210 MHz VCO in the Dual VCO. An attenuated control signal is also applied through R4046, to the 1300-2298 MHz VCO control circuit to coordinate frequency changes required to phase lock the programmable divider output frequency to the 500 kHz reference signal.

### 2-4-11 DUAL VCO MODULE

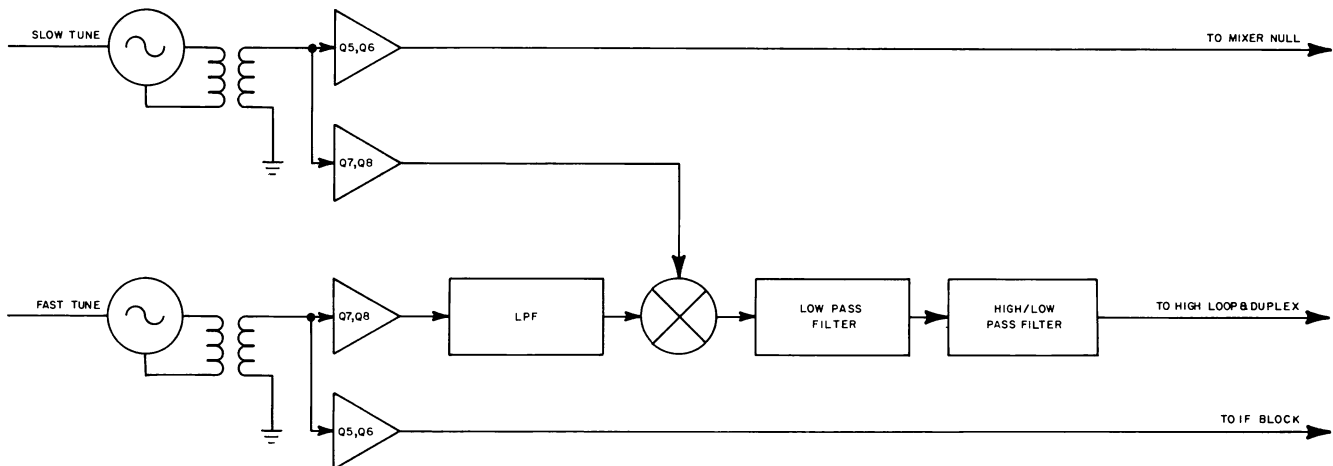


Figure 2-18 Dual VCO Module Block Diagram

The following theory of operation is provided to explain the interaction of the Dual VCO with other modules. It is not intended to provide sufficient theory for testing or repairing individual circuits within the module.

### **CAUTION**

THE DUAL VCO IS NOT FIELD REPAIRABLE AND SHOULD BE RETURNED TO THE MANUFACTURER IF TESTS INDICATE THE MODULE IS FAULTY. ATTEMPTS TO REPAIR THE MODULE WITHOUT SPECIALIZED EQUIPMENT AND KNOWLEDGE CAN DRASTICALLY ALTER ITS CHARACTERISTICS AND CAUSE THE MODULE TO BE UNSERVICEABLE WHEN IT COULD OTHERWISE BE REPAIRED AT THE FACTORY.

The Dual VCO Module produces two of the three local oscillator frequencies required by the IF Module. These two frequencies are also mixed and their difference frequency is used by the High Loop Module in controlling the Dual VCO, and by the Duplex Module to produce the offset frequency when operating in the Duplex Mode.

The first VCO frequency is varied between 1300 MHz and 2298 MHz in 2 MHz increments by the High Loop in response to the megahertz portion of the RF selection (RF selection within each of the 2 MHz increments controls the Low Loop frequency). The second VCO frequency is tuned to 1210 MHz, but is inversely frequency modulated to cancel noise produced by the first VCO.

The two frequencies are mixed in the Dual VCO, with the mixed frequency being filtered by two external filters and applied to the High Loop Module, then to the Duplex Generate Module. The High Loop compares the difference frequency (90 MHz to 1088 MHz) to a standard frequency and produces the tuning voltage for the 1300-2298 MHz VCO and the frequency modulating voltage for the 1210 MHz VCO. The tuned VCO outputs are then applied to the IF Module.

#### 2-4-12 1120 MHz LOW PASS FILTER

The 1120 MHz Low Pass Filter is a tubular, in-line filter tuned to attenuate all frequencies above 1120 MHz by at least 40 dB. This allows only the 90-1088 MHz difference frequency from the 1300-2298 MHz VCO and 1210 MHz VCO in the Dual VCO Module to reach the High/Low Pass Filter. The filter is tuned and sealed at the factory and is not field repairable.

#### 2-4-13 HIGH/LOW PASS FILTER

The High/Low Pass Filter prevents harmonics of lower frequencies (which may pass through the 1120 MHz low pass filter) from interfering with the High Loop frequency comparator. The 90-1088 MHz signal from the 1120 MHz Low Pass Filter is received at J602. Depending upon whether the 10 VDC control signal from the High Loop is negative or positive, applied at FL601, diode switches route the signal through either a 450 MHz high pass filter or a 520 MHz low pass filter, respectively. The actual crossover frequency, established in the High Loop, varies from set to set, and is marked on the outside of each module calibrated at the factory.

#### 2-4-14 LOW LOOP MODULE (FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448)

A VCO in the Low Loop Synthesizer produces a frequency of 79.3 to 77.3001 MHz. The VCO signal is buffered, then split three ways. One output is applied to the Spectrum Analyzer, a second supplies the IF Module, and the third is used for VCO frequency correction. A divider network, programmed by the microprocessor, divides the VCO frequency by 793,000 to 773,001. A phase/frequency detector compares the resulting frequency with a 100 Hz reference from the Digital Module, and produces a steering voltage for the VCO.

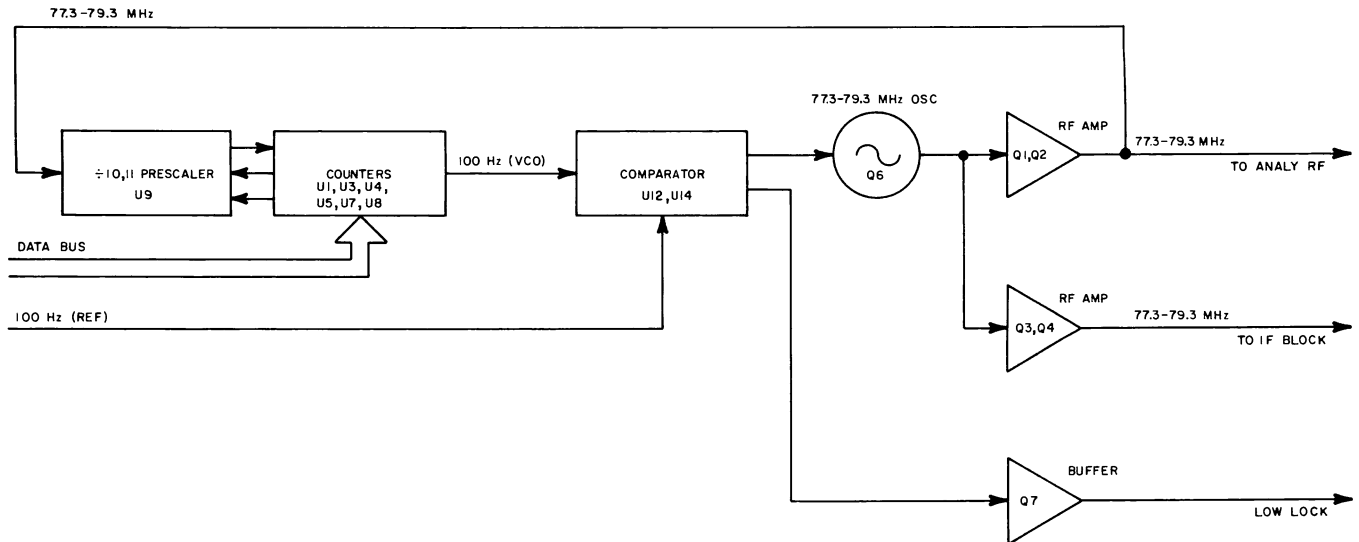


Figure 2-19 Low Loop Module Block Diagram

#### A. VCO CIRCUIT

The Low Loop output of 79.3 to 77.3001 MHz is produced by voltage controlled oscillator Q4206. Variable inductor L4203 provides calibration adjustment. Inductor L4202 and capacitor C4212 decouple the oscillator from the power supply circuitry. Oscillator tuning bandwidth is established by capacitors C4213, C4214 and C4217, inductor L4203, and diode CR4203. Diode CR4202, resistor R4217, and capacitor C4215 control the amplitude.

#### B. BUFFER AMPLIFIERS

The VCO output is buffered by transistor Q4205, then applied to the programmable divider network and two independent buffers. One second stage buffer, consisting of transistors Q4203 and Q4204, feeds the third mixer of the IF Module. The other second stage buffer, which uses transistors Q4201 and Q4202, furnishes a reference signal to the programmable divider network, and through J4203 to the analyzer RF module.

#### C. PROGRAMMABLE DIVIDER NETWORK

The programmable divider network consists of a  $\div 10/\div 11$  prescaler U4209, dividers U4201, U4203 thru U4205, U4207 and U4208. Dual flip-flop U4202, U4206, U4210 and U4211, and related components. The divider network divides the VCO frequency by a number preset by the processor. The output of the divider network (nominally 100 Hz) is fed to the phase/frequency detector circuit.

## D. PHASE/FREQUENCY DETECTOR

The output from the divider network clocks flip-flop U4212A and the 100 Hz reference clocks U4212B. The corresponding Q outputs of the flip-flops are connected to pins 12 and 13 respectively of NAND gate U4213D, with the gate output from pin 11 applied to reset both flip-flops. The Q output of U4212A charges capacitor C4224 through diode CR4204. The  $\bar{Q}$  output from U4212B discharges C4224 through CR4205. Thus, if the two input frequencies are in phase, the charge on capacitor C4224 stays constant. However, if the inputs are not in phase, the charge on C4224 is a DC correction voltage to pin 6 of op amp U4214B. U4214B and associated components form an integrator to supply the VCO steering voltage.

## E. PHASE LOCK INDICATOR

Both  $\bar{Q}$  outputs from pins 13 and 8 of U4212 are applied to pins 9 and 10 respectively, of NAND gate U4213C. When the divider output frequency at pin 1 of U4212A is not in phase with the reference frequency at pin 5 of U4212B, pin 8 of U4212B goes high, turning on transistor Q4207. Q4207 then grounds LED CR4207 to indicate the Low Loop is not phase-locked, and pulls down pin 1 of the phase lock indicator gate, U4211A, on the Generate Audio Module, causing the Front Panel LOCK Lamp to flash.

2-4-14a FAST LOW LOOP MODULE (FM/AM-1200S S/N 4491 AND ON AND FM/AM-1200A S/N 1449 AND ON)

The Fast Low Loop Module produces a frequency of 77.3 to 79.3 MHz. This VCO signal is applied to the Spectrum Analyzer and the third LO Mixer in the IF Module.

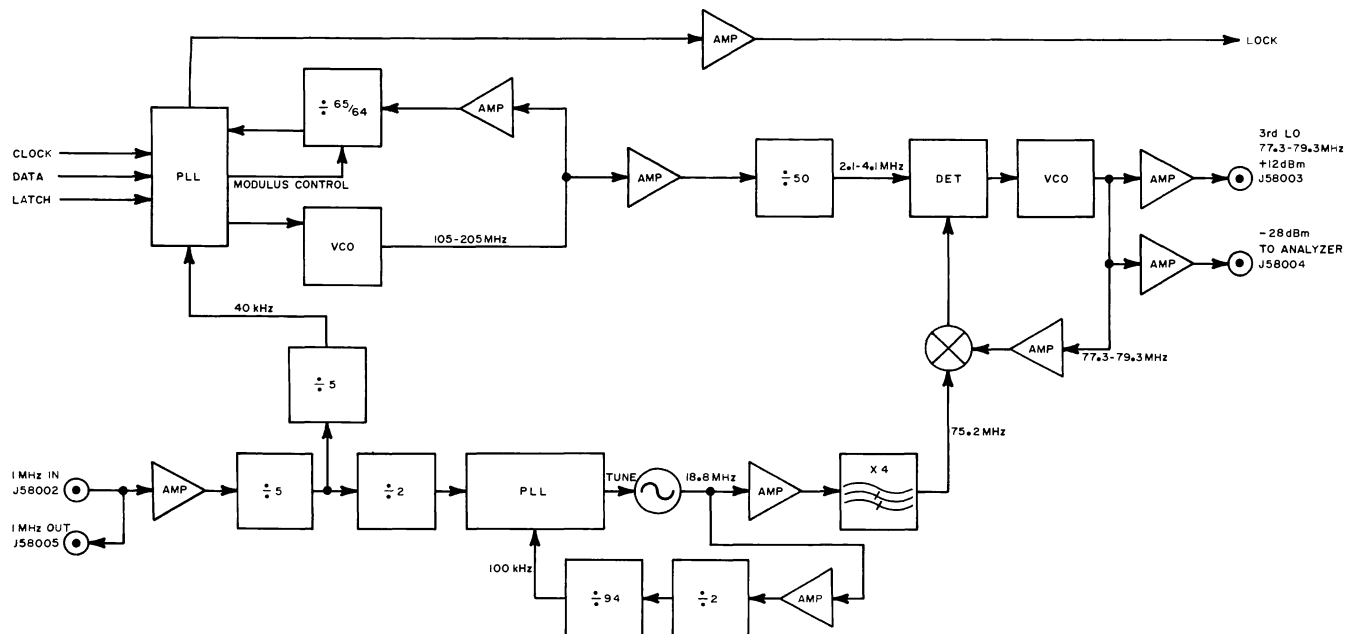


Figure 2-19a Fast Low Loop Module Block Diagram

#### A. REFERENCE DIVIDER CIRCUIT

A 1 MHz reference, from the frequency standard, enters at J58002 and is output at J58005. A 1 MHz sample is sent through transistor Q57012 to U57016A where it is divided by 5. The 200 kHz is then sent to dividers U57016B and U57016C. U57016C divides the 200 kHz by 2 and feeds the signal to U57012 in the 18.8 MHz Phase Lock Loop. The 200 kHz sent to U57016B is divided by 5 and used as reference to the 105-205 MHz Phase Lock Loop.

#### B. 105-205 MHz VCO CIRCUIT

The 40 kHz from U57016B is sent to U57006 Phase Lock Loop and used as a reference. This reference frequency is compared to a 40 kHz input fed to U57006 from a  $\div 64/\div 65$  prescaler, U57008. The serial data bus provides clock, data and latch inputs to U57006. The output from U57006 is fed through Phase Detector U57007A, B, D circuitry to phase-lock the 105-205 MHz VCO. Output from Phase Detector U57007A, B, D determines the charge on capacitor C57048. U57009 and associated components form an integrator to supply the VCO steering voltage. The VCO circuit then feeds a 105-205 MHz back to a Dual Modulus prescaler, U57008 and to U57001 in the 77.3-79.3 MHz Phase Lock Loop.

#### C. 18.8 MHz Oscillator

Phase Detector U57012 receives a 100 kHz fixed frequency from U57016C and 100 kHz signal from U57017. U57012 compares the two 100 kHz signals and sends a DC correction voltage from pin 13 to the 18.8 MHz Oscillator Circuitry. The 18.8 MHz Oscillator circuitry is made up of crystal oscillator Y57001, varactor CR57006, and associated components. An 18.8 MHz signal is fed in two directions. After amplification by Q57016, the 18.8 MHz goes through a Bandpass Filter tuned to the fourth harmonic, producing 75.2 MHz to MXR57001. The additional 18.8 MHz is amplified by Q57014 and sent to a  $\div 2$  chip, U57016D. The 9.4 MHz from pin 13 on U57016D is fed through U57017 divided by 94, producing the 100 kHz entering U57012 at pin 3.

#### D. 77.3-79.3 MHz VCO

The 75.2 MHz sent to MXR57001 is mixed with 77.3-79.3 MHz from the 77.3 - 79.3 MHz VCO. This produces a difference output of 2.1 to 4.1 MHz. This signal is applied to a Phase Detector made up of U57004, U57003 and related components. A 105-205 MHz signal is input to pin 15 of U57001 a  $\div 10$  prescaler, then to U57002 to be divided by 5. The resulting 2.1-4.1 MHz is also sent to the Phase Detector and the two inputs are compared. The output of the Phase Detector circuitry will be kept constant by the DC correction voltage on capacitor C57012. Output from C57012 is fed through Op Amp U57005 to the VCO circuitry. The VCO circuitry is made up of FET Q57002, varactor CR57003 and associated components. After passing through the VCO circuitry, the 77.3-79.3 MHz signal is applied through buffer amplifiers Q57004 and Q57005 to J58003 and J58004 respectively and to MXR57001.

#### 2-4-15 MIXER NULL ASSEMBLY

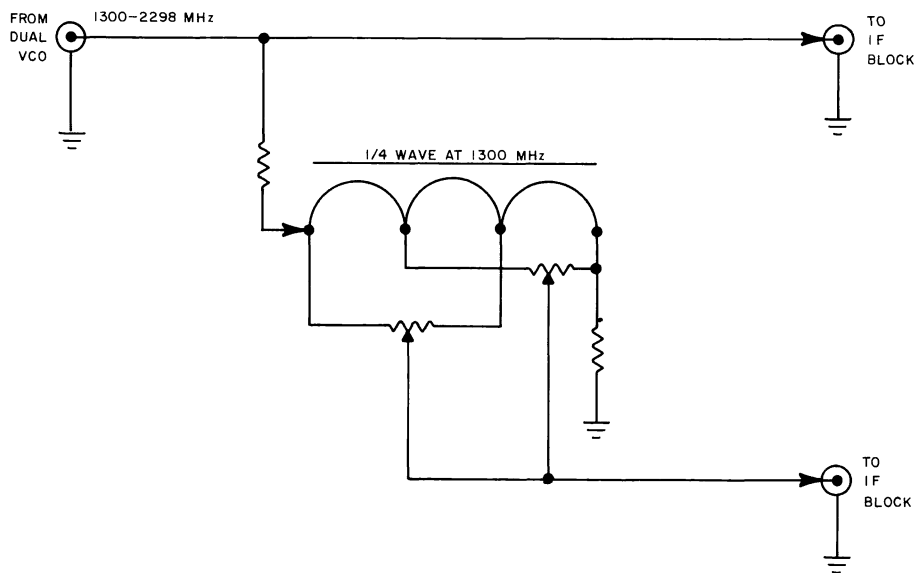


Figure 2-20 Mixer Null Assembly Block Diagram

The Mixer Null Assembly receives the 1300-2298 MHz signal from the Dual VCO Module, where it is teed, with one signal being fed directly to the first mixer in the IF Module, and the other being routed to a phase shift circuit, whose output is 180° out of phase with the first mixer. Trimpot R9402 selects an amplitude of the 1300 MHz signal between the 0° and 180° points and Trimpot R9403 selects the signal amplitude between the 90° and 270° points. The two selected signal amplitudes are combined and fed to the IF Module where it is combined with the output of MXR9402. The level of this signal, as set by R9402 and R9403, reduces the LO feed through level at the IF frequency of 1300 MHz.

### 2-4-16 IF BLOCK ASSEMBLY

The function of the IF Module, in the Receive Mode, is to select the signal source, then convert the selected RF to 10.7 MHz IF and reject all other frequencies. In the Generate Mode, the IF Module converts the generated 10.7 MHz IF to the selected RF and directs the signal to the Output Amplifier. One low pass and two bandpass filters, three mixers, two amplifiers, and signals from three local oscillators accomplish this conversion. A separate Null Mixer Assembly is installed to reduce the level of the zero pulse.

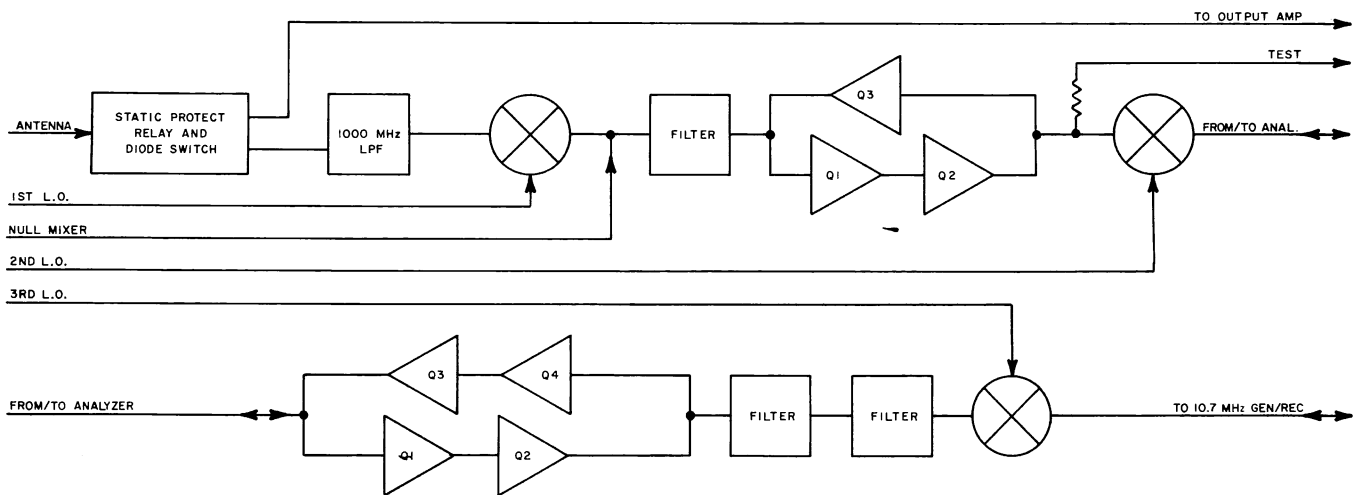


Figure 2-21 IF Block Assembly Block Diagram

## A. RECEIVE MODE

An RF signal from the antenna, received at J2201, first passes through static protect and diode switch circuits. R3801, CR3801 and CR3802 form the static protect and R3803, R3802, C3801, C3802, CR3803 through C3806, L3801 and L3802 form the diode switch. When the +12V antenna enable command is applied to the antenna enable circuit, the two resistors maintain a forward bias on the diodes to conduct the RF signal, while the two capacitors isolate the DC from the RF circuits and the two inductors isolate the RF from the power supply circuits. Prior to S/N 1468, the signal from the diode switch is applied to antenna enable relay K3801. On SN 1468 and after, a constant gain amplifier is installed prior to relay K3801. The amplifier circuit consists of Q3801, C3803, C3804, and R3805 through R3808. The +12V antenna enable command activates the amplifier only when the antenna is selected.

The command also energizes the antenna enable relay, coupling the antenna circuit into the first IF mixer circuit. However, if the Receive Mode is selected and a signal is applied to the T/R Connector which exceeds 100 mW, power detector and switching circuitry interrupts the antenna enable command, switching the relay to couple the signal from the T/R Connector to the mixer circuit.

Low pass microstrip filter FL2211 limits the RF to less than 1000 MHz. MXR2202 then mixes the received signal with the 1300-2298 MHz signal from the Dual VCO. The mixer output is then combined with the noise cancellation signal from the Null Mixer Assembly. A 20 MHz bandpass filter at 1299 MHz, which consists of three tuned cavities in Z2201, passes only the difference frequency. Q2401, Q2402 and associated circuitry form a 1300 MHz amplifier which is enabled by the +12V receive command when the Receive or Duplex mode is selected. MXR2201 then mixes this difference frequency with the 1210 MHz signal from the Dual VCO. In the FM/AM-1200S, the mixed signal is routed to the Spectrum Analyzer RF Module and then returned to J2208. In the FM/AM-1200A, the mixed signal is jumpered directly to J2208.

The mixer signal is amplified by Q2203, Q2204 and related components, then filtered by FL2201, FL2202, FL2203, FL2301 and FL2302 to 88-90 MHz. MXR2301 then mixes the signal with the 79.3000 -77.3001 MHz signal from the Low Loop Module. The resulting signal is then applied to the 10.7 MHz Gen/Rec Module.





## A. RECEIVE AND DUPLEX MODES

All signals received through the T/R Connector are attenuated 20 dB by RN5101. The signal is then teed, with one signal going to the power detector circuit, consisting of CR5108, C5124, trimcap C5127, L5107, R5128, R5129, R5134 and R5147. The detector circuit converts this signal to a DC voltage level corresponding to the signal power, and supplies the result to the Receive Audio Module. The other signal is further attenuated by a series of voltage dividers using R5135 through R5146, and coupled by relay K5101, through J5101, to the IF Module.

## B. GENERATE MODE

In the Generate mode, +12V energizes mode relay K5101 and enables the generate amplifier and level detector circuits. The relay couples the RF signal from the IF Module to the amplifier circuit. Two amplifiers, U5101 and U5102, amplify the signal and apply it to the base of RF transistor Q5101 which, in turn, controls the base of RF transistor Q5103. Q5102 is a bias transistor to adjust the base current of Q5103 to achieve a constant collector current in Q5103. The signal level at this point is nominally 0 dB. From the collector of Q5103, the signal is coupled through J5103 to the GEN LEVEL Step Attenuator and through CR5102 to the generate level detector circuit.

The Step Attenuator, while not a physical part of the Output Amplifier Module, is electrically an integral component. It attenuates the generated signal from 0-100 dB in 10 dB steps, allowing operator control of the signal level. (Vernier control from +1 to -11 dB is achieved by varying the signal level in the Gen/Audio Module.) From the Step Attenuator, the signal is returned to the Output Amplifier, where RN1501 attenuates it an additional 20 dB. The signal is then routed to the T/R Connector.

CR5102 and C5116 form a level detector which senses the level from Q1503. Amplifier U5103 then sends an analog DC signal to the Generate Audio PC Board. The AM modulation circuit uses this signal to adjust the modulator/leveler attenuator in the 10.7 MHz Gen/Rec Module, thereby affecting the level of the generated signal which is ultimately applied to the Output Amplifier. Trimpot R5114 allows calibration of the output from U5103 as necessary, to obtain a level of 0 dB at J1503.

## 2-4-18 DUPLEX MODULE

To produce the duplex RF signal, the Duplex Module uses two local oscillators. The frequency offset command, received from the processor, adjusts one VCO frequency through the phase lock circuit. The modulated FM audio signal from the 10.7 MHz Gen/Rec Module modulates the other VCO frequency. The two output frequencies are mixed, with the difference frequency being mixed with the Dual VCO difference frequency. The final frequency is an FM signal at the selected RF plus or minus the selected offset frequency.

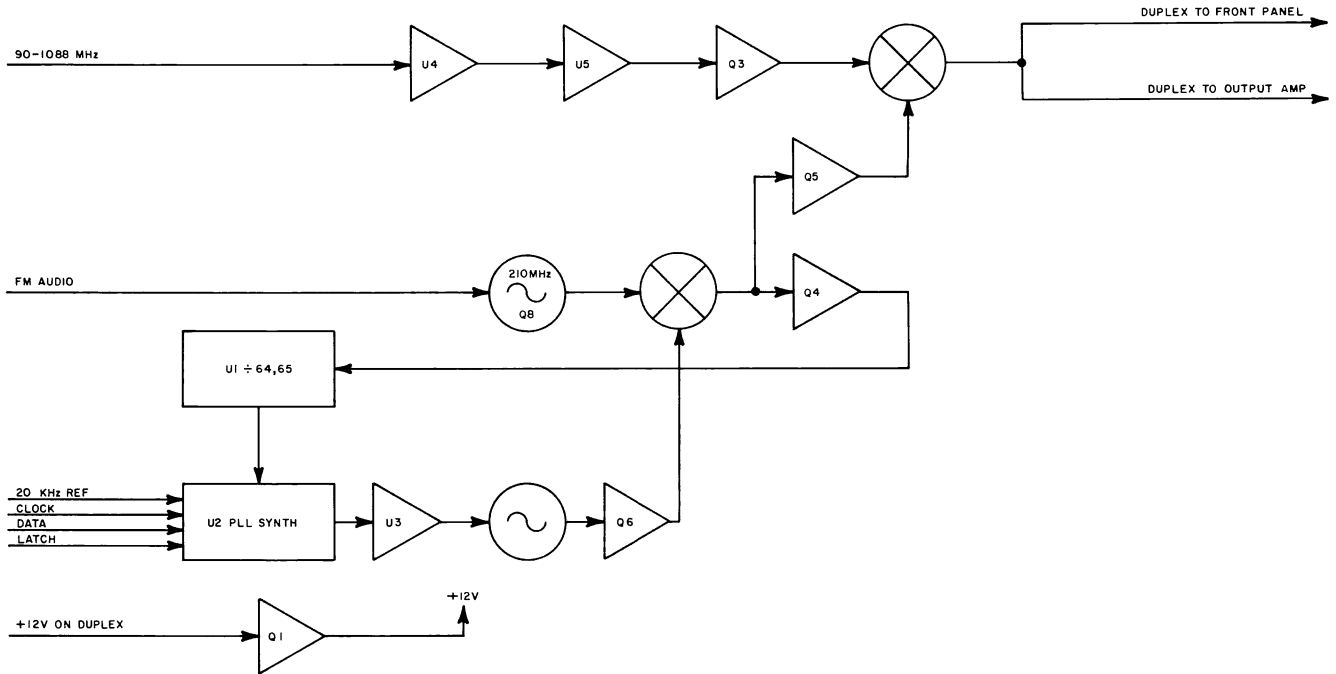


Figure 2-23 Duplex Module Block Diagram

### A. SUBREGULATOR

The +12V VDC from the Power Supply is subregulated on the Duplex PC Board to operate the oscillators and phase lock network. Zener diode CR1205 establishes the reference voltage for op amp U1206A. The output of U1206A is applied to the base of transistor Q1502. The collector voltage from Q1502 is sampled by U1506A through a voltage divider consisting of trimpot R1251 and resistors R1552 and R1553. Thus, U1506A changes its output as necessary for Q1502 to hold the collector voltage at the level required to balance the voltages at the input pins of U1206A.

## B. 250-350 MHz OSCILLATOR

The oscillator operating voltage is applied through RF choke L1212 to FETs Q1207 and Q1209. Varactor CR1202 and inductor L1211 form a tank circuit. The tuning voltage from the phase lock integrator U1203B, isolated through R1246 and L1215, establishes the frequency of the oscillator. Diode CR1204, installed between the source and the gate of the two parallel FETs, provides AGC for the oscillator. The output signal passes through RF choke L1210, and is coupled by C1258 to the base of Q1206. Q1206 amplifies the signal to approximately +7 dBm, then C1257 couples the signal to the LO port of MXR1202.

## C. 210 MHz OSCILLATOR

The oscillator operating power of +11 VDC is supplied through R1222. Variable RF choke L1209 tunes FET Q1208 to 210 MHz. The modulated FM audio signal from the 10.7 MHz Gen/Rec Module is applied to varactor CR1201 to modulate the frequency of the oscillator. Diode CR1203, between the source and the drain of Q1208, provides AGC for the oscillator. RF choke L1208 provides circuit isolation, and L1207, L1213, C1242, C1243 and C1276 form a low pass filter. R1228 and R1229 form an impedance matching pad for the RF port of MXR1202.

## D. OFFSET MIXER AND FILTER

Mixer MXR1202 combines the frequencies from the 210 MHz VCO and the 250-350 MHz VCO. The combined signal is then filtered by a 150 MHz low pass filter to pass only the difference frequency of 40-140 MHz. The filter consists of L1205, L1206, L1214, C1250, C1251, C1252 and C1277. From the mixer, the signal is applied to the phase lock circuit and the duplex mixer circuit.

## E. PHASE LOCK CIRCUIT

The 40-140 MHz signal from the offset mixer and filter is coupled through C1249 to transistor Q1204. The amplified signal is coupled through C1248 to dual modulus prescaler U1201. As long as pin 1 is low, U1201 divides by 65; when the control line from U1202 pin 8 to U1201 pin 1 is high, U1201 divides by 64. The output frequency from U1201 is applied to the frequency input pin of U1202.

U1202 is a serial input PLL frequency synthesizer that divides the input frequency by a programmed number from the processor, compares the result with the 20 kHz reference from the Digital Module, and produces two VCO steering voltages. When the offset signal is at the selected frequency, both control voltages from pins 3 and 4 of U1202, are high. One pin will be low, depending upon phase relationship, when the offset frequency is not phase-locked to the reference frequency.

Both control voltages from U1202 are applied to an integrator consisting of op amp U1203B and associated components. R1216 with C1228, and R1217 with C1227 are differentiating circuits to shape the square wave control signals into basically sawtooth waves. R1220, C1229 and C1264 from the output of U1203B to pin 6, and R1221, C1226 and C1274 from pin 5 to ground, slow the phase lock response sufficiently to prevent cancellation of FM applied to the 210 MHz oscillator. The output of the phase lock circuit at pin 7 of U1203B is applied to the tuning circuit of the 250-350 MHz oscillator.

#### F. DUPLEX MIXER CIRCUIT

The 40-140 MHz offset signal, received from the offset mixer and filter, is amplified by Q1205. The output level is then calibrated by trimpot R1230 and applied to the IF port of MXR1201. The 90-1088 MHz signal from the High Loop is amplified by op amps U1204 and U1205 and transistor Q1203, and applied to the LO port of MXR1201. Power for the amplifiers is supplied by Q1201 when DUPLEX is selected on the MODE Control. The output from the RF port of MXR1201 is attenuated to -30 dBm for the Output Amplifier by R1209, R1210, R1213, and to -60 dBm for the DUPLEX Connector by R1208, R1209, R1211, R1212 and R1214.

#### 2-4-19 RECEIVE AUDIO PC BOARD

An AGC circuit samples the AM audio level received from the 10.7 MHz Gen/Rec Module. It produces the control voltage for the AGC amplifiers in the 10.7 MHz Gen/Rec Module and supplies the comparative signal to break squelch. Either FM or AM audio, as selected by the MODE Control, passes through the squelch gate multiplexer to three low pass filters (80 kHz, 8 kHz and 250 Hz), then to filter select multiplexers.

One multiplexer selects either the 80 kHz or 8 kHz filter for signal routing. The signal then passes through a range select circuit to the meter function circuit. The range select and meter function circuits are controlled by the METER Control. The signal is then supplied to the Modulation Meter and the Digital Display.

The second multiplexer selects either the 8 kHz or 250 Hz filter output, which is fed to the audio/sinad switching circuit on the Generate Audio Module. When either SINAD or DIST is selected on the METER Control, any signal applied through the EXT MOD/SINAD Connector is switched into the audio circuit, disconnecting the internal audio signal. The selected signal is then returned to the Receive Audio Module. An AGC circuit controls the signal level and feeds into the Digital Module for frequency counting, and to the SINAD/Distortion circuit. The signal is then coupled through the meter function circuit for display on the Modulation Meter and on the Digital Display.

The DC signal from the Output Amplifier, is applied to a power monitor circuit. When the signal exceeds a threshold, the power monitor sends a signal to the operating mode circuit in the Generate Audio Module. The power monitor also applies the signal to the meter function circuit. When the METER Control is set for average power readings, the output of the meter function circuit is routed through an averaging circuit, then applied to the Modulation Meter and Digital Display; when peak power is selected, the averaging circuit is bypassed.

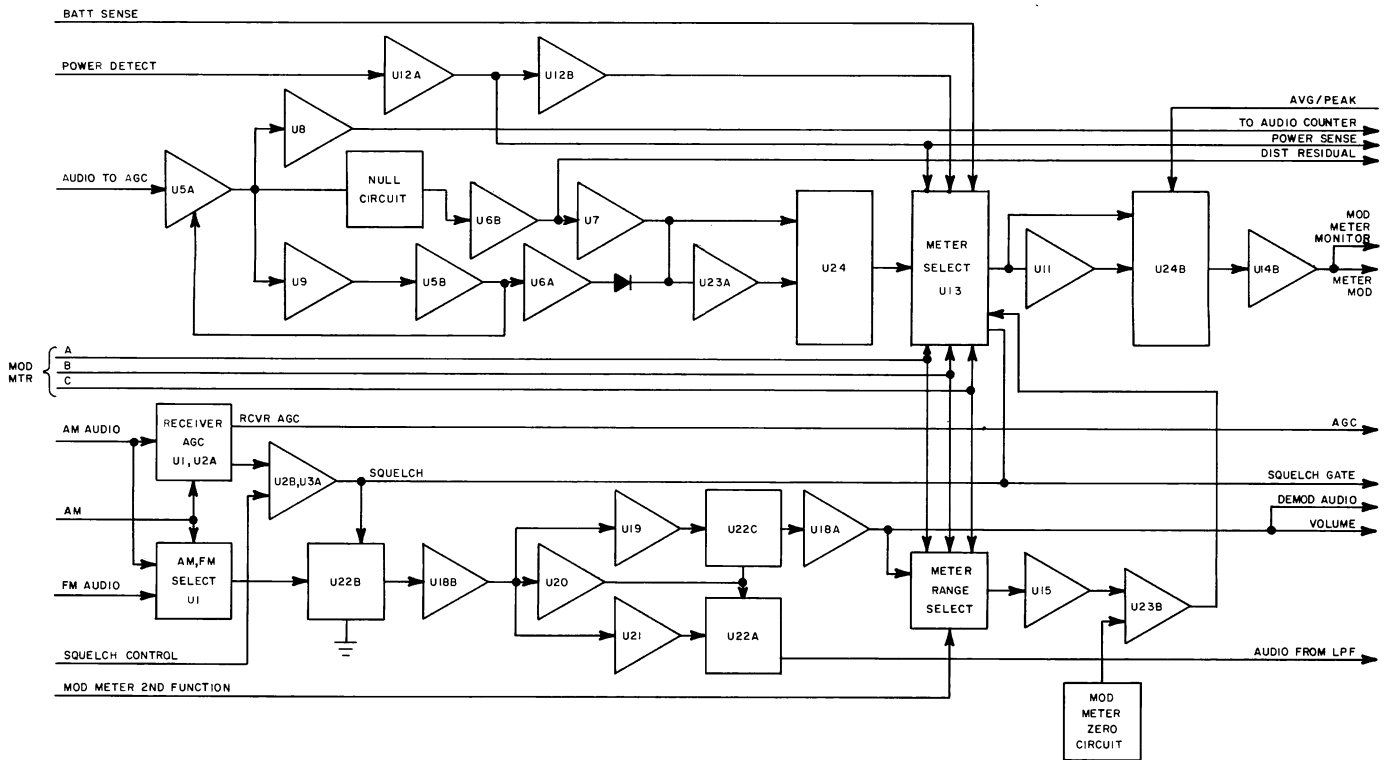


Figure 2-24 Receive Audio PC Board Block Diagram

## A. SIGNAL CONTROL CIRCUIT

The AM audio signal received from the 10.7 MHz Gen/Rec Module represents the carrier amplitude for FM, carrier amplitude plus audio modulation for AM, and generator VCO amplitude plus audio modulation for SSB. This signal is applied through R3302 to op amp U3302A, whose reference level is set at approximately 1.8 VDC by R3305 and R3307. When SSB is selected, multiplexer U3301B couples R3306 and CR3301 in parallel with R3302. When AM or SSB is selected, multiplexer U3301C couples C3304 in parallel with C3301. Thus, the slew rate for U3302A is set by R3302 and C3301 for FM, R3302, C3301 and C3304 for AM, and R3302, R3306, C3301 and C3304 for SSB. This allows U3302A to respond to the carrier amplitude but not to audio modulation.

If the amplitude of the signal reaching U3302A is below the reference level, the output is a positive high, which is applied to the AGC amplifiers in the 10.7 MHz Gen/Rec Module, for maximum amplification of the RF signal. This results in an increased level to U3302A. When the signal equals the reference level, the output becomes negative, reducing the amplification by the AGC amplifiers. The stronger the received RF, the less amplification is required, thus the more negative the output of U3302A becomes. AGC amplification is now at its minimum.

CR3302 allows the negative output of U3302A to be applied to op amp U3303A, which buffers and inverts the signal. The output of U3303A goes to meter function multiplexer U3313 and to op amp U3302B. The reference voltage for U3302B is set by the SQUELCH Control. When the applied signal level exceeds the reference, U3302B supplies a high which enables multiplexer U3322B and is also routed to the Digital Module.

The FM and AM audio signals are applied through trimpots R3383 and R3379 respectively to multiplexer U3301A. The control voltage to U3301A is high when AM or SSB is selected on the MODE Control. The selected audio signal is then coupled through U3322B, when squelch is broken, to buffer U3318B. From U3318B, the signal is applied to three low pass filters.

## B. LOW PASS FILTERS

The three low pass filters are identical except for R-C values. The low pass filters are two-stage R-C circuits with buffering following each stage to provide isolation. The 80 kHz filter consists of resistors R3385 through R3388, capacitors C3315 through C3318, and op amps U3319A and U3319B. The output from U3319A is applied to multiplexer U3322C. Resistors R3389 through R3392, capacitors C3319 through C3322 and op amps U3320A and U3320B form the 8 kHz filter. Its output is applied to U3322A and U3322C. The 250 Hz filter uses resistors R3393 through R3396, capacitors C3323 through C3326 and op amps U3321A and U3321B. The output from U3321A is applied to U3322A.

The signal from U3322A is routed to the Generate Audio Module. When a frequency of 409.6 Hz or less is selected on the Variable Tone Generator, U3322A switches to the 250 Hz filter. The signal from U3320 is coupled through U3322C to buffer U3318A. When FM WIDE is selected, the signal from the 80 kHz filter U3319A is selected by U3322C.

## C. RANGE SELECT CIRCUIT

The audio signal from the low pass filter selected by multiplexer U3322C is buffered by op amp U3318A. From U3318A, the signal goes through the VOLUME Control to the speaker amplifier in the Generate Audio Module; through R3398 to the DEMOD Connector; through R3399 to range select multiplexer U3316 for the 2kHz/X10% range; and through a voltage divider consisting of R3400, R3401, R3404 and R3432 for additional ranges. The 6 kHz/60% range taps between R3400 and R3401 and goes directly to U3316. For 20kHz/X10%, the signal is tapped between R3401 and R3404, and goes to multiplexer U3324C. The 6kHz/X10% range taps between R33104 and R33132, and also goes to U3324C. U3324C normally couples the 20kHz/X10% level to U3316; however, when the 6kHz/X10% position is selected on the METER Control, a corresponding high command signal enables U3324C to select the 6kHz/X10% level.

The output of U3316 is coupled through buffer U3314A to a peak detector consisting of dual op amp U3315A and U3315B and associated components. The output from U3315B is a negative DC voltage equal to the peak voltage of the selected test signal, which is applied to the inverting side of op amp U3323B.



U3310, R3368 thru R3371 and R3421 thru R3424 make up a selectable voltage divider for zero reference levels during modulation measurements. U3310 selects one of four pots (R3368 thru R3371) to supply the voltage divider (R3421 thru R3424). U3317 selects the appropriate voltage for the desired modulation range. The selected level is then applied to the non-inverting input of U3323B. The output of U3323B, then, is a positive DC level proportioned, at selected ratios, to the audio signal level received at the Receive Audio Module.

#### D. AGC CIRCUIT

The signal from the audio/SINAD switching circuit in the Generate Audio Module is AC coupled by C3329, through opto isolator U3304 to op amp U3305A. The output of U3305A goes three places: to the sinad/distortion circuit; to op amp U3308 where it is amplified, inverted and routed to the audio counter in the Digital Module; and through C3310 to op amp U3309A.

Op amps U3309A and U3309B, with associated components, form a peak detector. The signal is applied to the inverting input of U3309A. CR3307 couples the positive component to the non-inverting input of U3309B, and CR3308 couples the negative component to the inverting input. The output from U3309B is a positive DC voltage equal to the peak voltage of the input signal.

R3326 applies -12 VDC to the inverting input of op amp U3305B, whose positive output is applied to the sinad/distortion circuit and to the LED in opto-isolator U3304. As the LED increases in brilliance, the resistance in U3304 decreases, decreasing attenuation of the test signal, and resulting in greater gain through U3305A. The positive DC level from U3309B is summed with the -12 VDC at R3326, reducing the negative DC level applied to U3305B. U3305B output decreases, reducing the brilliance of the LED in U3304, which in turn increases its resistance, ultimately decreasing the gain at U3305A. C3305 establishes the slew rate of U3305B, while CR3306 limits its output to 0.6 VDC in the event the test signal level exceeds the AGC controllable level.

#### E. SINAD/DISTORTION CIRCUIT

The signal received from op amp U3305A passes through an RC notch filter consisting of C3306, C3307, C3327, C3328, R3317, R3319, R3321, R3322, R3323, trimpots R3318 and R3320, and buffer op amp U3306. The filter is tuned to reject only a frequency of 1000 Hz ( $\pm 1$  Hz at -50 dB). From U3306B, the signal is routed to the Oscilloscope for video presentation, and to a peak detector for meter display. The peak detector consists of op amps U3307A and U3307B and associated components. The signal enters the inverting input of U3307A. The positive component of its output is coupled through CR3310 to the non-inverting input U3307A and the negative component is coupled through CR3311 to the inverting input. The output of U3307B, a positive DC voltage proportional to the signal level from the notch filter, is calibrated by trimpot R3350. It is then applied to the low-enabled input of multiplexer U3324A and through op amp U3323A for input of U3324A. From U3324A, the signal is applied to multiplexer U3313.

The input to the sinad/distortion circuit from op amp U3305A is applied to the non-inverting input of comparator op amp U3306A, whose reference voltage is supplied through voltage divider resistors R3342 and R3343. If the test signal level at opto-isolator U3304 is insufficient to reduce the output of U3305B to approximately 9 volts or less, U3306A combines a high positive DC level with the output of the peak detector to peg the meter.

#### F. POWER MONITOR

The DC voltage from the power detector in the Output Amplifier is applied to op amp U3312. When no signal is present from the Output Amplifier, R3345 applies a negative bias to U3312B. The negative reference voltage from R3355 is applied to the inverting input of U3312B, with trimpot R3354 used to calibrate the hysteresis. CR3313 limits the output to a positive level. The output from U3312B is fed the operating mode circuit in the Generate Audio Module, and the power monitoring circuits in the Receive Audio Module. R3360, R3361 and trimpot R3362 furnish the 150W power range to multiplexer U3313. For the 15W power range, the signal is amplified by op amp U3312A, then is divided by R3366, R3367 and trimpot R3365, and applied to U3313.

#### G. METER FUNCTION CIRCUIT

All signals displayed on the Modulation Meter are routed to multiplexer U3313. The output of U3313 is then applied directly to the low-enabled pin of multiplexer U3324B and through an averaging circuit, consisting of op amp U3311 and associated components, to the high-enabled point of U3324B. From U3324B, the signal is buffered by op amp U3314B, then goes to the Modulation Meter and to the DVM I/O PC Board.

## 2-4-20 ANALYZER RF MODULE (FM/AM-1200S ONLY)

The IF signal received from the IF module passes through a bandpass filter, is mixed with the output of a sweep oscillator, and is again filtered to 22.3 MHz. Between sweeps, the oscillator output is mixed with the output frequency of the Low Loop Module, and the difference frequency is phase locked to a 1 MHz reference from the Frequency Standard. This establishes a center frequency for the sweep which changes according to the Low Loop Frequency. The sweep control voltage then causes the oscillator to sweep from below to above its center frequency. An onboard subregulator circuit provides +11 V, -11 V and +6.9 V.

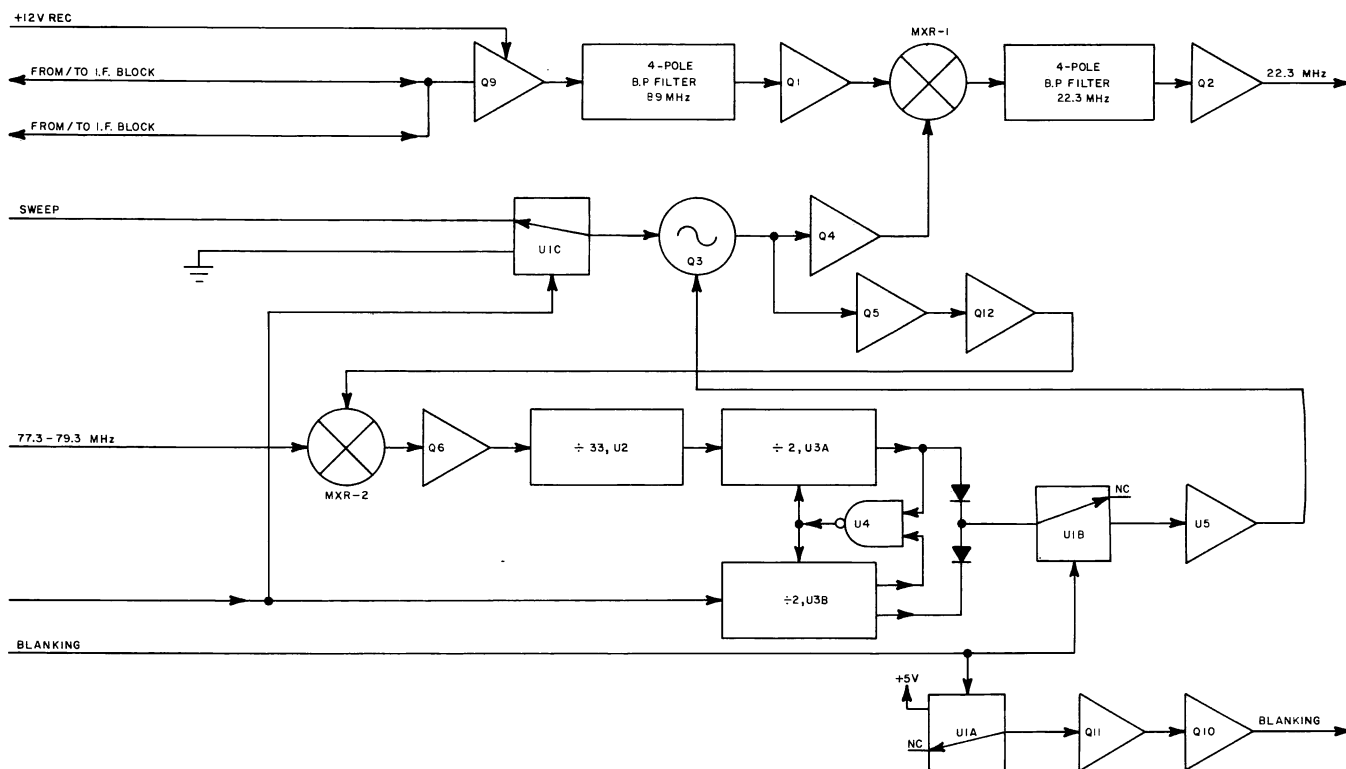


Figure 2-25 Analyzer RF Module Block Diagram

### A. SUBREGULATOR CIRCUIT

The +11V subregulator consists of emitter-follower Q407, op amp U406, +6.9 V reference zener diode CR406, and a voltage divider using R441, R442 and trimpot R443 to sample the collector voltage of Q407 for comparison to the reference.

The -11V subregulator, which is similar to the +11V subregulator, consists of op amp U407, emitter-follower Q408 and a voltage divider using R439, R440 and trimpot R451. U407 uses +11 V as a reference, and the supply is -12V.

Zener diode CR401 and resistor R410 reduce the regulated +11V to +6.9V for the sweep oscillator and phase-lock circuits. Zener diode CR407 and resistor R463 reduce the +12V supply to +5V.

## B. SWEEP OSCILLATOR CIRCUIT

FET Q403 is tuned by variable inductor L415 and varactor CR402 to oscillate at a center frequency of 110.3 to 112.3 MHz. The phase lock circuit control voltage applied to CR402 varies the center frequency according to the Low Loop output frequency when an analyzer blanking signal is applied. When the blanking signal is removed, multiplexer U401C applies the sweep control voltage to the tuning circuit. This voltage, which is a ramp starting negative and progressing to equally positive, pulls the frequency below center, then drives it equally above center. The next blanking signal opens the sweep control line and snaps the oscillator back to center frequency. The output level of Q403 is controlled by CR403. The signal is then filtered by L416, C423 and R421, coupled through C424 and C430 to buffers Q404 and Q405 respectively. From Q404, the signal is applied to IF Mixer MXR401; from Q405, the signal is further buffered by Q412, then applied to MXR402 in the phase/frequency comparator circuit.

## C. PHASE/FREQUENCY COMPARATOR CIRCUIT

MXR402 mixes the output of the sweep oscillator with the 79.3 to 77.3 MHz output from the Low Loop. A low pass filter consisting of L418, L419, C434, C435 and C436 then passes the difference frequency to a tuned amplifier, Q406. A tank circuit consisting of L421 and C450, tunes the collector at Q406 to 33 MHz, which is the difference between the sweep oscillator center frequency of 112.3 to 110.3 MHz and the Low Loop frequency of 79.3 to 77.3 MHz. Prescaler U402 is programmed to divide by 33, producing a 1 MHz output. The 1 MHz output from prescaler U402 clocks flip-flop U403A and the 1 MHz reference clocks U403B. The corresponding Q outputs of the flip-flops are connected to pins 9 and 10 of NAND gate U404C, with the gate output from pin 8 applied to reset both flip-flops. The Q output of U403A charges capacitor C443 through diode CR404. The  $\bar{Q}$  output from U403B discharges C443 through CR405. Thus, if the two input frequencies are in phase, the charge on capacitor C443 stays constant. However, if the inputs are not in phase, the charge on C443 is a DC correction voltage to pin 4 of multiplexer U401B. During analyzer blanking, multiplexer U401B couples the voltage level at C443 to op amp U405. U405, C444 and associated components form a sample-and-hold integrator circuit for tuning the center frequency of the oscillator. During blanking, the only tuning voltage is from U405, which is applied to varactor CR402. During sweep, U405 receives no input from the phase comparator, so C444 stores and holds the previous level. This allows U405 to continue, during the sweep, to furnish the same voltage as during the preceding blanking period, causing CR402 to hold this level as the center frequency level while the sweep voltage varies the frequency during the sweep period. During the next blanking period, U405 resets the center frequency control voltage and returns the oscillator to that frequency, and the charge level of C444 is adjusted accordingly for the next sweep.

#### D. IF MIXER CIRCUIT

In the generate mode the 89 MHz signal from the IF Module enters at J406 and is attenuated by R454 to prevent overdriving the analyzer display. In the receive mode, +12V from the Generate Audio Module turns on Q409, which allows the 83-95 MHz signal to bypass R454. In either mode, the signal is then coupled to a 4-pole, 12 MHz bandpass filter, consisting of FL401 thru FL404 and associated components. The signal is then amplified by Q401, and mixed with the sweep oscillator signal in MXR401. A 22.3 MHz IF bandpass filter, consisting of FL405 thru FL408 and associated components, then passes only the 22.3 MHz signal. From the 22.3 MHz IF bandpass filter, the signal is amplified by Q402, then coupled to the Analyzer IF Module through J1.

#### E. OSCILLATOR BLANKING CIRCUIT

Power for the 33 MHz oscillator in the Analyzer IF Module is supplied through Q410 for control purposes. When the analyzer blanking signal is applied at pin 12 of J402, it enables multiplexer U401A, applying +5V to Q411. This turns on Q411, which pulls down on the base of Q410, shutting off the oscillator power.

#### 2-4-21 ANALYZER IF MODULE (FM/AM-1200S ONLY)

The Analyzer IF Module mixes the 22.3 MHz signal from the Analyzer RF Module with 33 MHz from a local oscillator to produce a 10.7 MHz IF. The signal is then filtered to a 3 kHz or 300 Hz bandwidth for narrow dispersion selections before being mixed with a 9.5 MHz signal from a second local oscillator. A low pass filter then passes the 1.2 MHz difference frequency for amplification which is applied to the Analyzer Log Amp Module.



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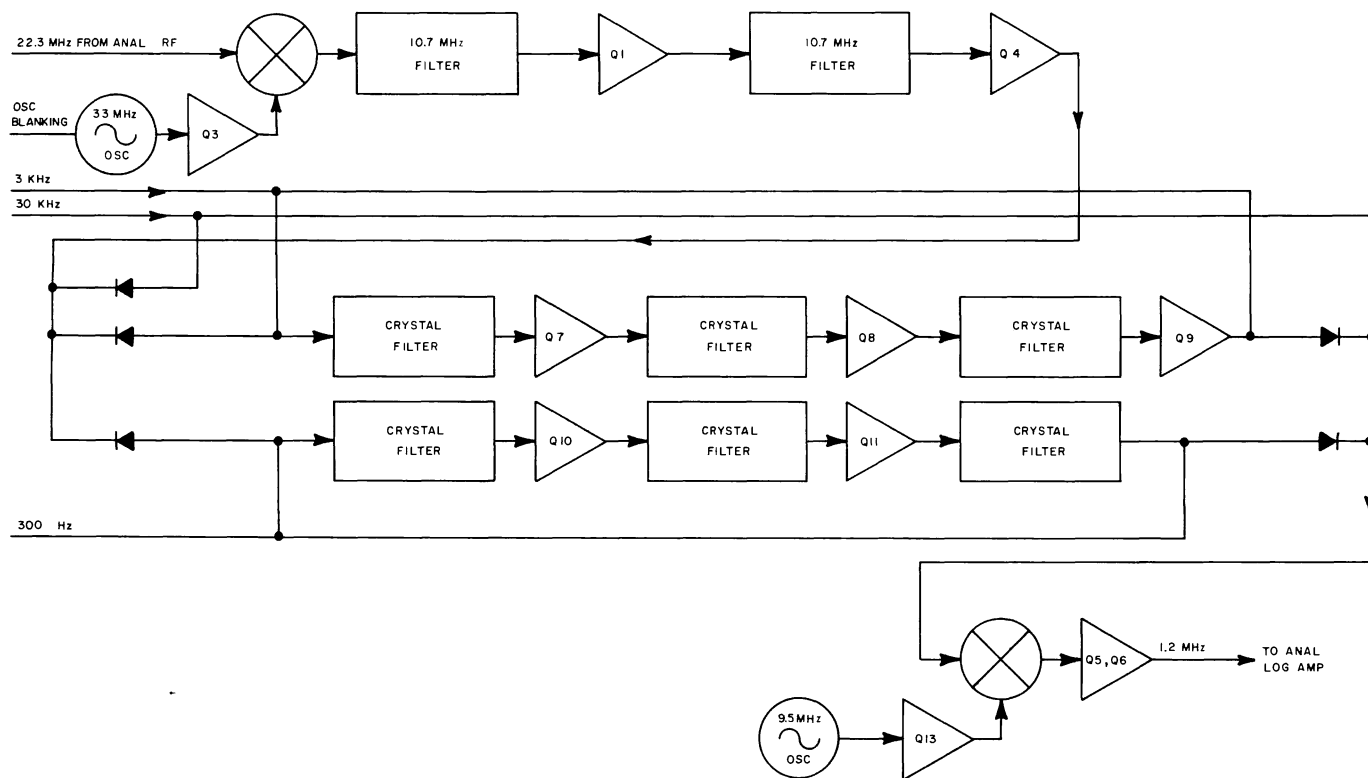


Figure 2-26 Analyzer IF Module Block Diagram

A. 33 MHz OSCILLATOR

The 33 MHz oscillator contains Q502, 33 MHz crystal Y501 and associated components. +12 volts from Q410 in the Analyzer RF Module is applied to the 33 MHz oscillator. As Y501 oscillates at its resonant frequency, the signal is amplified by Q502. The pulses produced at the emitter of Q502 are applied to the base of Q503. Q503 then buffers the 33 MHz for MXR501. When blanking occurs, the oscillator power is interrupted, which disables the 33 MHz oscillator.

B. 10.7 MHz MIXER CIRCUIT

A low pass filter consisting of C575, C579, and L517, filters any induced RF from the VCO in the Analyzer RF Module from the 22.3 MHz IF. MXR501 then combines the 22.3 MHz IF with the 33 MHz level oscillator output producing the 10.7 MHz IF. The 10.7 MHz IF then passes through a 4-pole, 600 kHz band-pass filter consisting of FL501 thru FL504, is amplified by Q501, then filtered by a second 4-pole, 600 kHz bandpass filter consisting of FL505 thru FL508.

### C. BANDWIDTH FILTER CIRCUIT

When a dispersion range of 50 kHz or greater per division is selected on the HORIZONTAL Sweep Control, +12 V is applied to forward bias CR504 and CR507, coupling the 10.7 MHz IF from Q504 directly to MXR502. CR505, CR506, CR508 and CR509 are reverse biased to isolate the 300 Hz and 3 kHz filters. 30 kHz bandwidth filtering for these dispersion selections is in the Analyzer Log Amplifier Module.

For dispersion selections of 5 kHz, 10 kHz and 20 kHz per division, +12 V is applied to forward bias CR506 and CR508 and reverse bias CR504, CR505, CR507 and CR509, directing the signal through the 3 kHz filter. The three-stage filter circuit contains three crystals, YFL501, YFL502 and YFL503, each with two trimcaps for signal amplitude and shape, followed by amplifying transistors, Q507, Q508 and Q509, respectively. Trimpot R543 adjusts the total gain of the three transistors to compensate for filter losses.

When the HORIZONTAL Sweep Control is in the 1 kHz or 2 kHz per division dispersion position, +12 V forward biases CR505 and CR509 and reverse biases CR504, CR506, CR507 and CR508 to direct the signal through the 300 Hz filter. This circuit contains six matched crystals, YFL504 through YFL509, in three paired stages. A fixed amplifier, using Q510, follows the first stage and an adjustable amplifier, using Q511 and trimpot R559, follows the second stage. Total gain from the amplifiers is adjusted to compensate for filter losses.

### D. 9.5 MHz OSCILLATOR CIRCUIT

Y511 is a 9.5 MHz crystal which controls the base voltage of Q512. The signal produced, is amplified by Q513 and coupled through C553 to MXR502.

### E. 1.2 MHz MIXER CIRCUIT

MXR502 combines the 10.7 MHz IF signal with the 9.5 MHz signal. A low pass filter consisting of C536, C544 and L512 passes only the 1.2 MHz difference frequency. The signal is then amplified by Q505 and Q506 to 30 dB above the level received at the Antenna or T/R Jack, and coupled through C522 and J503 to the Analyzer Log Amp Module.

## 2-4-22 ANALYZER LOG AMPLIFIER MODULE (FM/AM-1200S ONLY)

The logarithmic amplifier (log amp) converts the nonlinear amplitude of the swept IF signal into a linear output for the analyzer vertical drive. In addition to containing the log amplifier, this module also contains the 30 kHz bandpass filter due to space limitations in the Analyzer IF Module.

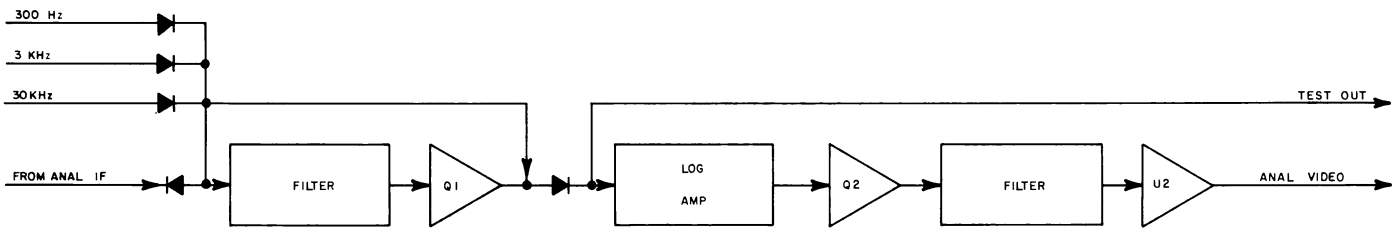


Figure 2-27 Analyzer Log Amp Block Diagram

A. 30 kHz BANDPASS FILTER CIRCUIT

When any analyzer dispersion range is selected on the HORIZONTAL Sweep Control, +12 V forward biases CR804 and CR807 and reverse biases CR805 and CR806. This directs the 1.2 MHz IF through a 6-pole, 30 kHz bandpass filter, consisting of FL801 thru FL806, and an amplifier to restore filter loss. Trimpot R809 calibrates the gain produced by Q801. J803 is a test port for the IF signal, which should be 10 dB above the received signal level.

B. LOG AMP CIRCUIT

The log amp circuit contains log amp IC U801, transformer T801 and two tuned amplifier stages. The 1.2 MHz IF is applied directly to U801, through trimpot R812, to the base of Q804 in the first amplifier stage. Trimpot R818 sets the gain of Q804 which, in turn, drives Q803. Q803 is tuned to 1.2 MHz by L810 and C834, with its output level limited by CR809 and CR810 to one diode gap above and below ground. This level is applied to U801 and to the base of Q805 in the second amplifier stage. The second stage, consisting of Q805, Q806 and associated components, is identical to the first stage, and is applied only to U801. All three trimpots in this circuit interact with the trimpots in the analyzer vertical drive circuit.

The output of U801 consists of two summations, linearly representing the logarithmic inputs. Each summation contains two outputs,  $Y$ ,  $\bar{Y}$  and  $Z$ ,  $\bar{Z}$  which are equal in amplitude but opposite in polarity. The  $Y$  and  $Z$  outputs are applied to one terminal of the primary of T801 and the  $\bar{Y}$  and  $\bar{Z}$  outputs are applied to the other terminal. T801 blocks the DC potential, couples the linearized output to the analyzer vertical drive circuit, and isolates the drive circuit from the log amp circuit.



### C. ANALYZER VERTICAL DRIVE CIRCUIT

Emitter-follower Q802 is biased by +5.1 V, which passes through the secondary winding of T801. This allows the output from the log amp, U801, to be coupled with the bias for Q802. The gain of Q802 is set by R821 and thermistor TR801. L808 and C824 tune the amplifier to 1.2 MHz. DC blocking capacitor C825 couples the RF signal to a rectifier/detector circuit.

+5.1 VDC is applied to the rectifier/detector circuit through a voltage divider consisting of R828, CR815 and trimpot R832 to adjust the base line level. The positive component of the signal pulse passes through AM detector CR814 to charge C828, which is discharged through R833 and trimpots R830 and R832. The circuit is tuned with L809, C826 and C827.

The reference level for op amp U802B is calibrated with R829 and trimpot R831. The output level from the rectifier/detector circuit, which is calibrated by R830, is applied to U802B for amplification. From U802B, the signal is routed through J801, pin 1 to the Scope Control Module.

All trimpots in the analyzer vertical drive and log amp circuits are interactive.

### 2-4-23 SCOPE POWER AND CONTROL ASSEMBLY

#### 2-4-23-1(a) SCOPE CONTROL PC BOARD (FM/AM-1200S ONLY)

The Oscilloscope Control Board controls the sweep rate and the horizontal and vertical deflection for the Oscilloscope and Spectrum Analyzer functions. For the Oscilloscope function, it contains the sweep trigger and the vertical drive circuits. The analyzer sweep circuit also provides calibration adjustments for centering and dispersion. All mode and range selections are achieved by two ganged, rotary switches mounted on the Oscilloscope Control Board and extending through the Front Panel.

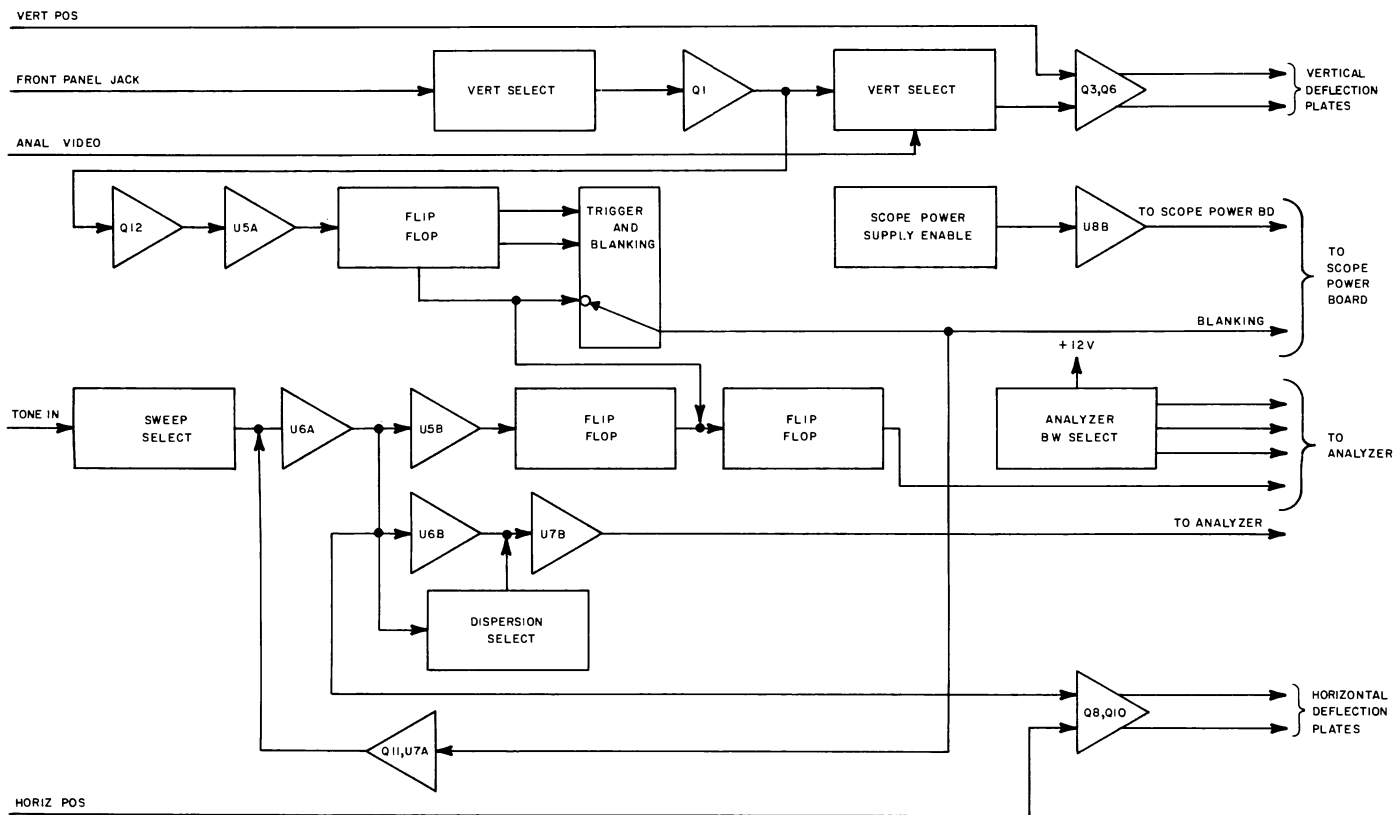


Figure 2-28(a) Scope Control PC Board Block Diagram (FM/AM-1200S Only)

A. SCOPE ENABLE CIRCUIT

Op amp U208B functions as a comparator to provide a high output to the Oscilloscope Power Supply Board when SW201 (VERTICAL Attenuator Selector) is in the "OFF" position. In any other position, SW201 allows +12 V to be applied to pin 6 of U208B, exceeding the reference voltage of +7 V at pin 5, which allows the Oscilloscope Power Supply to operate. In the "OFF" position, SW201 grounds the +12 V control.

B. HORIZONTAL DRIVE CIRCUIT

The sweep rate is set by a switch, consisting of Q211 and op amp U207A, a ramp generator using a constant current source, Q202 and associated components, and one capacitor, either C218, C219, C220, C221 or C228 as selected by SW202. When Q211 is turned on, op amp U207A pulls the ramp voltage to -0.5 V; when it is turned off, the ramp voltage increases at the rate determined by the selected capacitor and the constant current drawn through Q208. Buffer U206A applies this ramp signal to the horizontal deflection circuit, the analyzer sweep divider circuit, and op amp U205B. U205B is

configured as a comparator, which is calibrated by R244, R245 and R293 to trigger when the output of U206A reaches +0.5 V. When U205B sets flip-flop U203B, the high Q output performs four functions. First, it supplies the reset trigger for U209A to reset the trigger function. Second, it charges C217 in the free-run timer until the timer resets U203B, pulling Q low. Third, it supplies a high through multiplexer U204 to blank the Oscilloscope and, simultaneously, turns on Q211, terminating the sweep. When the free-run timer resets U203B, blanking signal ends and Q211 turns off, allowing the next sweep to commence. Fourth, it clocks flip-flop U203A to blank the Spectrum Analyzer until its blanking timer, consisting of R297 and C233, resets U203A. As R248 (Sweep Vernier Control) is rotated CCW the base voltage of Q202 increases. This increase in base voltage decreases the current flow through Q202, slowing the sweep rate. R248 is bypassed by U202B when in analyzer operation.

When SW202 (Horizontal Sweep Selector) is in the "TONE" position, Q202 is coupled to R250 to provide a constant current. Any tone applied to the modulator circuit of the Generate Audio Module is then applied to the sweep generator circuit and its amplitude generates the horizontal component of the trace. SW202 also switches U204 to the Tone mode, which applies -7 V to the oscilloscope blanking circuit in the Oscilloscope Power Supply to prevent blanking, and to the base of Q211, keeping it turned off.

### C. HORIZONTAL DEFLECTION CIRCUIT

The horizontal deflection circuit consists of a buffer amplifier and a differential amplifier. The sweep signal from buffer U206A is applied to buffer U208A. R271 allows calibrating the gain of U208A so the trace will sweep exactly the width of the screen. The output of U208A biases Q209 in the differential amplifier. The horizontal position reference signal, as established with the front panel HORIZ POS Control, is applied to the base of Q208. Q210 and associated components form a constant current source drawing equally on Q208 and Q209. As the bias voltages differ between Q208 and Q209, the current flow through them varies inversely, causing the horizontal deflection plate voltages to vary proportionately to the difference in the bias voltages.

When SW202 is not in a mS/DIV position (Oscilloscope operation), U202C routes the horizontal position control signal through a voltage divider to attenuate the effect of the control.

#### D. INPUT ATTENUATION CIRCUIT

An external signal applied through the SCOPE Connector, routed through the AC-DC Switch, is applied to pin C of SW201. Demodulated audio signals from the Receive Audio Module are applied through R201 to pin B and to a voltage divider consisting of R202 and R203. The signal level is divided by four through the voltage divider and applied to pin A of SW201. Depending upon the Front Panel selection of SW201, the signal applied at pin A, B or C is coupled to the appropriate input attenuator at pin D, E or F.

The  $\times 1$  circuit connects pins C and D of SW201, providing no attenuation. C202 and R281 provide input impedance for the Oscilloscope. The  $\times 10$  circuit consists of C203, C204, R205 and R206, and connects pins C and E of SW201. The  $\times 100$  and  $\times 1000$  is a ladder circuit consisting of C201, C205, C206, R207, R208 and R209. The circuit connects pin K to pin M to divide by 100, and pin L to pin M to divide by 1000. All attenuators provide approximately 17 pF capacitance and 1 M ohm resistance for Oscilloscope input impedance.

The distortion residual from the Receive Audio Module is applied through a 10:1 voltage divider consisting of R210 and R211 to pin N of SW201.

#### E. OSCILLOSCOPE VERTICAL DRIVE CIRCUIT

From SW201 pin M, the selected signal is passed across a limiter consisting of CR201 and CR202, then applied to the gate of FET Q201A. Q201 is a dual FET manufactured on the same substrate. Q201A is a current follower while Q201B is a constant current source calibrated by R215. As the input signal amplitude varies, changing the current flow through Q201A accordingly, the current flow through R216 and R217 varies as to maintain a constant current through Q201B. The signal which is received from the attenuators in the form of voltage is converted to current through R216 and R217 by Q201A, Q201B and related components. The signal is attenuated approximately 4 dB, and applied to the vertical deflection preamp, U201A. The gain of U201A calibrated by R221, is approximately +24 dB, making the net gain of the circuit approximately +20 dB.

## F. VERTICAL DEFLECTION CIRCUIT

Vertical deflection is accomplished with a differential amplifier consisting of discrete transistors Q203 through Q207, and related components. A vertical position reference signal, between -12 VDC and +12 VDC as established with the Front Panel VERT POS Control, is applied to the base of Q206. SW202 (HORIZONTAL Sweep Selector) applies a signal from the vertical drive circuit of either the Oscilloscope or Spectrum Analyzer to the base of Q205. Q207 and associated components form a constant current source drawing current through the two amplifiers Q203/Q205 and Q204/Q206. As the bias voltages differ between Q205 and Q206, the current flow through them varies inversely, causing the vertical deflection plate voltages to vary proportionately to the difference in the bias voltages.

When SW202 is not in a mS/DIV position, switch U202A routes the vertical position control signal through a voltage divider to attenuate the effect of the control.

## G. SCOPE TRIGGER CIRCUIT

The signal from the oscilloscope drive circuit is buffered by Q212, with C231 and C232 removing any DC component, leaving only the AC components referenced to ground potential. This signal is applied to pin 3 of op amp U205A. U205A functions as a Schmitt trigger and provides a high output for the positive portions of the signal. U205A clocks D-type flip-flop U209A with the leading edge of the pulse, providing a positive only, non-selectable trigger. The high  $\bar{Q}$  output from U209A charges C216 and switches multiplexer U204 to couple the  $\bar{Q}$  output to its output at pin 3. This turns off Q211 and allows the sweep to commence. When the sweep is finished and U205B sets U203B, the high Q from U203B resets U209B. The next trigger pulse from U205A again sets U409A, and the cycle repeats. C216 holds U204 in the trigger mode for at least one-half second to provide the ability to trigger on low frequencies or partial waveforms. If no trigger is received during this period, U204 will revert to the free-run mode.

## H. ANALYZER SWEEP CIRCUIT

The output from U206A to the analyzer sweep circuit is amplified by op amp U206B and U207B to an output from -7 V to +7 VDC with SW202 in the 1 MHz/DIV position. R260 allows calibration of this output. For other dispersion positions, SW202 provides a ground path through one of three voltage dividers for U206B, and through one of two voltage dividers for U207B. R298 provides a DC offset voltage to be summed with the sweep signal before routing it to the Analyzer RF Module.

2-4-23-1(b) SCOPE CONTROL PC BOARD (FM/AM-1200A ONLY)

The Oscilloscope Control Board controls the sweep rate and the horizontal and vertical deflection for the oscilloscope functions. All mode and range selections are achieved by two ganged, rotary switches mounted on the Oscilloscope Control Board and extending through the Front Panel.

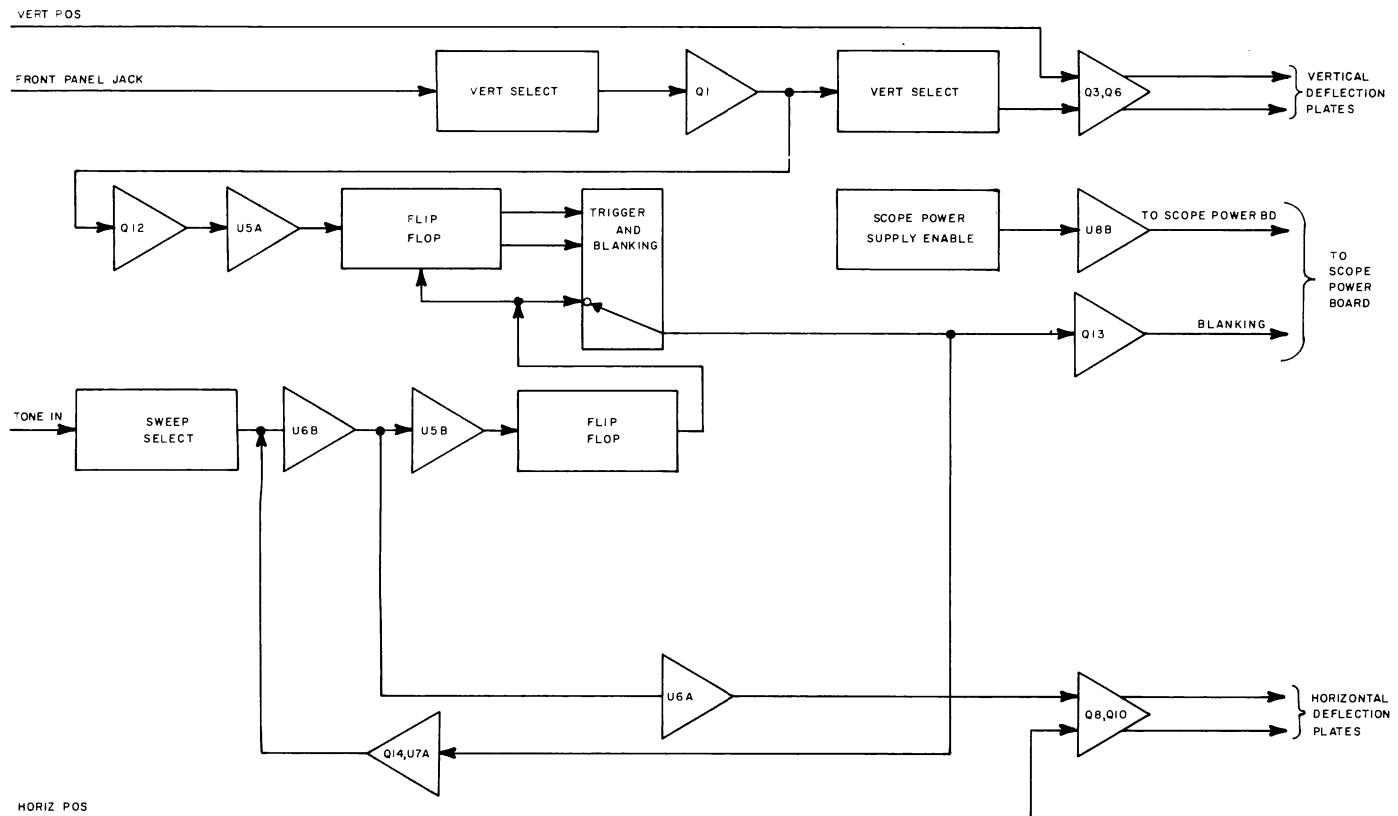


Figure 2-28(b) Scope Control PC Board Block Diagram (FM/AM-1200A Only)

A. SCOPE ENABLE CIRCUIT

Op amp U208B functions as a comparator to provide a high output to the Oscilloscope Power Supply Board when SW201 (VERTICAL Attenuator Selector) is in the "OFF" position. In any other position, SW201 allows +12 V to be applied to pin 2 of U208A, exceeding the reference voltage of +7 V at pin 3, which allows the Oscilloscope Power Supply to operate. In the "OFF" position, SW201 grounds the +12 V control.

### 3. HORIZONTAL DRIVE CIRCUIT

The sweep rate is set by a switch, consisting of Q214 and op amp U207A, a ramp generator using a constant current source, Q202 and associated components, and one capacitor, either C218, C219, C220, C221 or C222 as selected by SW202. When Q214 is turned on, op amp U207A pulls the ramp voltage to -0.5 V; when it is turned off, the ramp voltage increases at the rate determined by the selected capacitor and the constant current drawn through Q202. Buffer U206B applies this ramp signal to the horizontal deflection circuit and op amp U205B. U205B is configured as a comparator, which is calibrated by R244, R245 and R293 to trigger when the output of U206A reaches +0.5 V. When U205B sets flip-flop U203B, the high Q output performs three functions. First, it supplies the reset trigger for U203A to reset the trigger function. Second, it charges C217 in the free-run timer until the timer resets U203B, pulling Q low. Third, it supplies a high through multiplexer U204 through fet Q2013 to blank the Oscilloscope and, simultaneously, turns on Q214, terminating the sweep. When the free-run timer resets U203B, the blanking signal ends and Q214 turns off, allowing the next sweep to commence. As R248 (Sweep Vernier Control) is rotated CCW the base voltage of Q202 increases. This increase in base voltage decreases the current flow through Q202, slowing the sweep rate.

When SW202 (Horizontal Sweep Selector) is in the "TONE" position, Q202 is coupled to R250 to provide a constant current. Any tone applied to the modulator circuit of the Generate Audio Module is then applied to the sweep generator circuit and its amplitude generates the horizontal component of the trace. SW202 also switches U204 to the Tone mode, which applies -7 V to the oscilloscope blanking circuit in the Oscilloscope Power Supply to prevent blanking, and to the base of Q214, keeping it turned off.

### C. HORIZONTAL DEFLECTION CIRCUIT

The horizontal deflection circuit consists of a buffer amplifier and a differential amplifier. The sweep signal from buffer U206B is applied to buffer U206A. R271 allows calibrating the gain of U206A so the trace will sweep exactly the width of the screen. The output of U206A biases Q209 in the differential amplifier. The horizontal position reference signal, as established with the front panel HORIZ POS Control, is applied to the base of Q208. Q210 and associated components form a constant current source drawing equally on Q208 and Q209. As the bias voltages differ between Q208 and Q209, the current flow through them varies inversely, causing the horizontal deflection plate voltages to vary proportional to the difference in the bias voltages.

#### D. INPUT ATTENUATION CIRCUIT

An external signal applied through the SCOPE/DVM Connector, routed through the AC-DC Switch, is applied to pin C of SW201. Demodulated audio signals from the Receive Audio Module are applied through R201 to pin B and to a voltage divider consisting of R202 and R203. The signal level is divided by four through the voltage divider and applied to pin A of SW201. Depending upon the Front Panel selection of SW201, the signal applied at pin A, B or C is coupled to the appropriate input attenuator at pin D, E or F.

The #1 circuit connects pins C and D of SW201, providing no attenuation. C202 and R281 provide input impedance for the Oscilloscope. The X10 circuit consists of C203, C204, R205 and R206, and connects pins C and E of SW201. The X100 and X1000 is a ladder circuit consisting of C201, C205, C206, R207, R208 and R209. The circuit connects pin K to pin M to divide by 100, and pin L to pin M to divide by 1000. All attenuators provide approximately 17 pF capacitance and 1 M ohm resistance for Oscilloscope input impedance.

The residual distortion from the Receive Audio Module is applied through a 10:1 voltage divider consisting of R210 and R211 to pin N of SW201.

#### E. OSCILLOSCOPE VERTICAL DRIVE CIRCUIT

From SW201 pin M, the selected signal is passed across a limiter consisting of CR201 and CR202, then applied to the gate of FET Q201A. Q201 is a dual FET manufactured on the same substrate. Q201A is a current follower while Q201B is a constant current source calibrated by R215. As the input signal amplitude varies, changing the current flow through Q201A accordingly, the current flow through R216 and R217 varies to maintain a constant current through Q201B. The signal which is received from the attenuators in the form of voltage is converted to current through R216 and R217 by Q201A, Q201B and related components. The signal is attenuated approximately 4 dB, and applied to the vertical deflection preamp, U201A. The gain of U201A calibrated by R221, is approximately +24 dB, making the net gain of the circuit approximately +20 dB.



## F. VERTICAL DEFLECTION CIRCUIT

Vertical deflection is accomplished with a differential amplifier consisting of discrete transistors Q203 through Q207, and related components. A vertical position reference signal, between -12 VDC and +12 VDC as established with the Front Panel VERT POS Control, is applied to the base of Q206. SW202 (HORIZONTAL Sweep Selector) applies a signal from the vertical drive circuit of the Oscilloscope to the base of Q205. Q207 and associated components form a constant current source drawing current through the two amplifiers Q203/Q205 and Q204/Q206. As the bias voltages differ between Q205 and Q206, the current flow through them varies inversely, causing the vertical deflection plate voltages to vary proportional to the difference in the bias voltages.

## G. SCOPE TRIGGER CIRCUIT

The signal from the oscilloscope drive circuit is buffered by Q212, with C231 and C232 removing any DC component, leaving only the AC components referenced to ground potential. This signal is applied to pin 3 of op amp U205A. U205A functions as a Schmitt trigger and provides a high output for the positive portions of the signal. U205A clocks D-type flip-flop U203A with the leading edge of the pulse, providing a positive only, non-selectable trigger. The high  $\bar{Q}$  output from U203A charges C216 and switches multiplexer U204 to couple the  $\bar{Q}$  output to its output at pin 3. This turns off Q214 and allows the sweep to commence. When the sweep is finished and U205B sets U203B, the high Q from U203B resets U203A. The next trigger pulse from U205A again sets U203A, and the cycle repeats. C216 holds U204 in the trigger mode for at least one-half second to provide the ability to trigger on low frequencies or partial waveforms. If no trigger is received during this period, U204 will revert to the free-run mode.

## 2-4-23-2 SCOPE POWER SUPPLY PC BOARD

The only power required by the CRT Power PC Board is +12 VDC, supplied through the Oscilloscope Control Board. An oscillator, controlled by a scope enable command, produces timing squarewaves to power the transformer circuit. The transformer supplies all voltages required by the CRT.

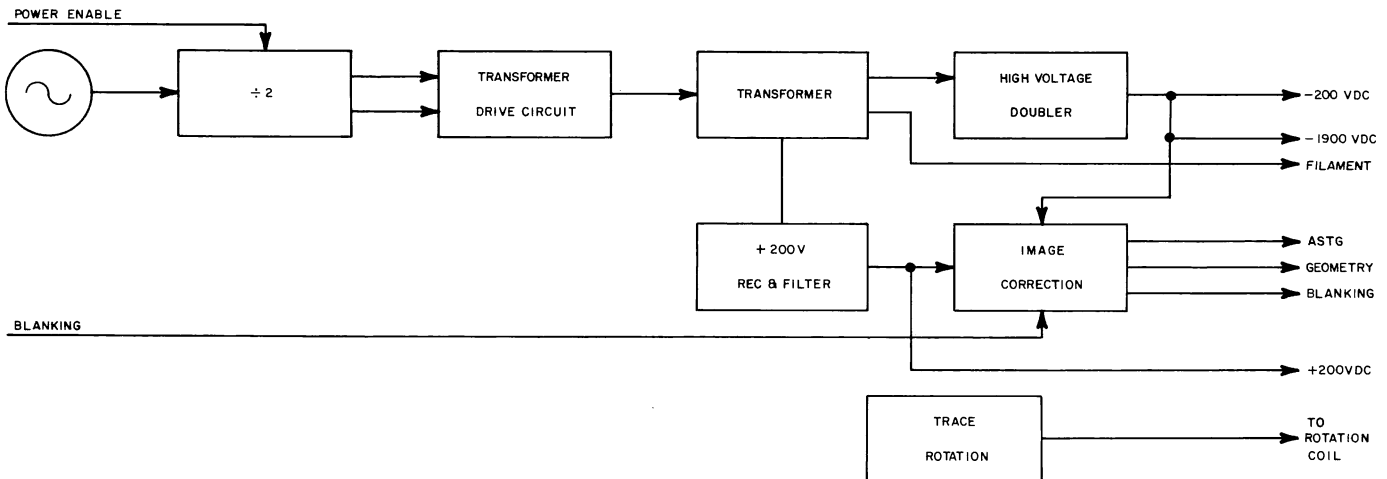


Figure 2-29 Scope Power Supply PC Board Block Diagram

### A. OSCILLATOR OUTPUT CIRCUIT

A 90 kHz oscillator is formed by NOR gates U301A and U301B, which clock J-K flip-flops U302A and U302B simultaneously. With +12 VDC applied to the J and K inputs of U302A, the Q and  $\bar{Q}$  outputs alternate between high and low. Q of U302A provides the J and K inputs to U302B. Since U302B changes state only when J and K are high (U302A Q is high), its frequency is half that of U302A. Only with U302A Q and U302B  $\bar{Q}$  both low, NOR gate U301D provides a high to the transformer circuit. Likewise, when U302A  $\bar{Q}$  and U302B Q are both low, U301C provides a high to the transformer circuit.

When the VERTICAL Attenuator Selector on the Front Panel is in the "OFF" position, the Oscilloscope Control Board supplies a high command to the reset terminal, pin 4, of U302A to inhibit the oscillator circuit output to the Transformer circuit.

## B. TRANSFORMER CIRCUIT

Power is supplied through a filter consisting of C304, C305 and toroid L301 to the center tap of the primary winding of transformer T301. R325 normally grounds the gate of FET Q305. When U301D output goes high, Q301 applies power to the gate of Q305. Q305 grounds one end of the primary winding. Similarly, U301C controls Q303, which supplies the gate voltage to FET Q306. When Q303 is off, R324 grounds the gate of Q306. Q306 grounds the opposite end of the primary winding. The effective power applied to the primary winding of T301 is then 24 VAC.

The high voltage secondary winding produces 1000 VAC. This is rectified and doubled by CR301 and CR302, C306 and C307. The resulting -2000 VDC is then applied to the CRT grid and to a voltage divider consisting of fixed resistors R307, R311, R313, R314 and R315 and potentiometers, R308 and R312. R308 provides -1900 VDC for the cathode (intensity) and R312 provides -1500 V for the focus of the beam. The secondary winding provides 6.3 VAC for the CRT filament. This 6.3 VAC is riding a -1900 VDC offset.

The middle voltage secondary winding output is rectified by CR303 through CR306, and filtered by R310 and C309 through C312 to supply +200 VDC to the image correction circuit, and to the Oscilloscope Control Board for horizontal and vertical deflection.

## C. IMAGE CORRECTION CIRCUIT

The +200 VDC from the transformer circuit is reduced to approximately +100 VDC, set by trimpot R316 for calibration of CRT astigmatism (vertical component of the beam). Q308 is an emitter-follower which furnishes approximately +100 VDC for the CRT geometry (horizontal component of the beam). R317 calibrates the base voltage of Q308.

## D. DISPLAY BLANKING CIRCUIT

While the display trace is displayed on the CRT screen, Q309 applies the display blanking to the geometry supply from Q308. When the trace is not displayed (i.e., during retrace), the beam is shifted off the screen without suppressing its intensity. During the blanking command from the Oscilloscope Control Board, Q307 conducts, pulling down on the emitter of Q309 and simultaneously applying voltage to its base. This turns off Q309, allowing the voltage on the display blanking and the base of Q309 to drop to approximately +10.8 VDC. When the blanking command is removed, Q307 turns off, allowing the display blanking line to float. Q307 simultaneously removes the base voltage to Q309, allowing it to conduct. This snaps the display blanking line back to its original level and returns the beam to the CRT screen.

## E. ROTATION CIRCUIT

R322 applies a 0-12 VDC level to the rotation coil of the CRT to align the trace with the horizontal axis of the screen graticule. If the range of R322 is insufficient to fully align the trace, rotation of connector P/J301 by 180° will reverse the polarity of the coil. The trace can then be aligned using R322.

## 2-4-24 KEYBOARD

The keyboard is a 4 x 6 Matrix PC Board with 24 independent momentary pushbutton switches. Two buses (4-bit and 6-bit) connect the CPU to the keyboard. The CPU forces all 4 lines of the 4-bit bus low simultaneously. When a key is depressed, an interrupt is generated which causes the CPU to strobe the 4-bit bus lines. This low will be detected by one of the lines on the 6-bit bus, to determine which key is depressed.

## 2-4-25 DISPLAY PC BOARD

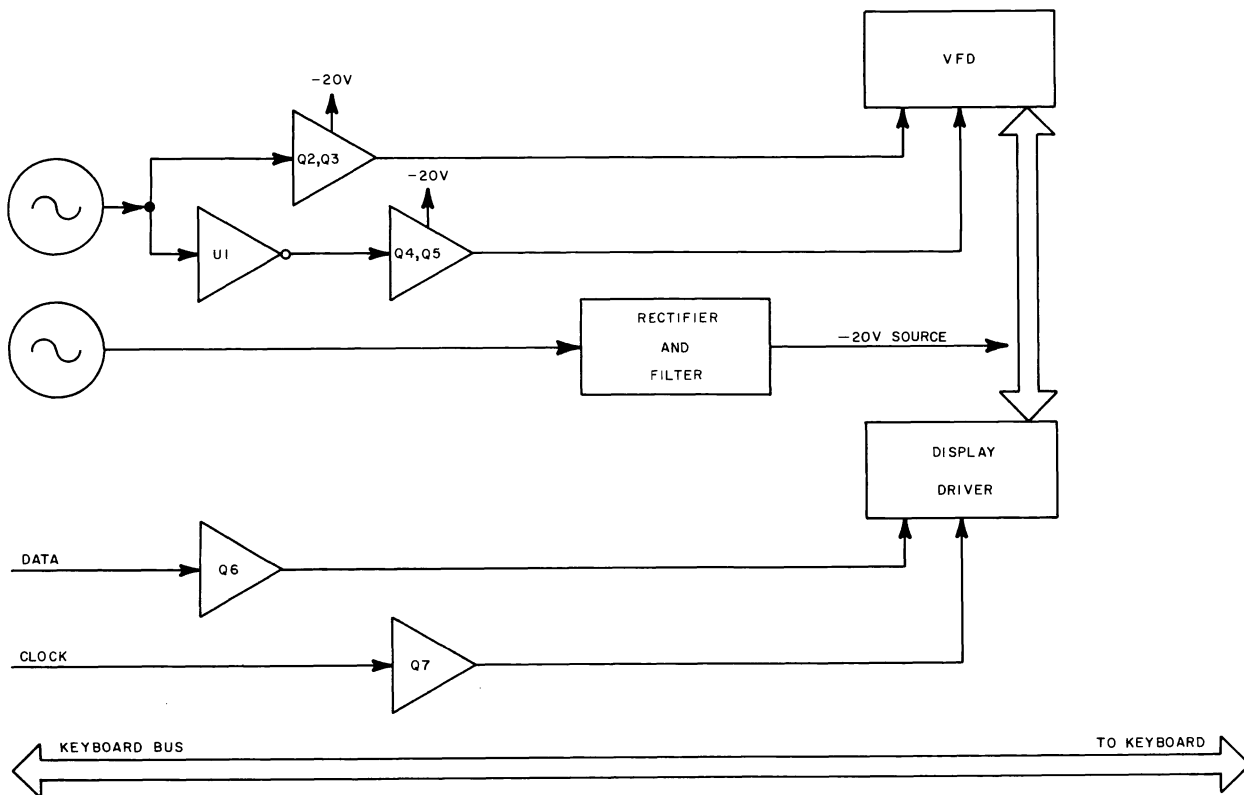


Figure 2-30 Display PC Board Block Diagram

A 16-character vacuum fluorescent display (VFD), DS1401, and its driver, U1403, are installed on the Display Board, which is mounted on the Front Panel. The Keyboard is also assembled with the Display Board.

Power to operate the VFD and the driver chip is furnished by an onboard power supply which converts -12 VDC to -3 VDC and -20 VDC. An oscillator switches these two voltages across the two power pins of DS1401 to produce approximately 30 VAC. Timer U1402 is connected between -12 VDC and ground. R1411, R1412 and C1409 establish the RC time constant for a stable operation, producing -12 V pulses. C1410 couples the pulses to -12 VDC supplied through CR1401, to produce -12 V pulses riding on -12 VDC. C1411 filters this supply to approximately -20 VDC. R1404, R1405, C1405 and inverters U1401E and U1401F form an oscillator which drives switching transistors Q1402 and Q1403 through inverter U1401A and transistors Q1404 and Q1405 through U1401C and U1401D. Q1401 regulates the -20 VDC to -3 VDC, which is applied to the collectors of Q1402 and Q1404, with -20 VDC being applied to the collectors of Q1403 and Q1405. As the inverter switches the transistors on and off, -3 VDC and -20 VDC (minus losses) are alternately switched between pins 1 and 37 of DS1401. This produces the effect of -15 VAC to DS1401.

A clock signal from the CPU is supplied to U1403 through level converting transistor Q1407. Data is furnished through level converting transistor Q1406. When U1403 is clocked, it shifts existing data one place to the left and presents the new data in the just vacated right hand position.

#### 2-4-26 FUNCTION SWITCH PC BOARD

The Function Switch PC Board contains the front panel meters, squelch and volume controls, tone select and level controls, and four rotary switches for selecting meter function, mode, freq error range, and modulation. All switching lines are routed through the motherboard and all can be processor controlled. This board also contains the LOCK Lamp and the SIG Indicator Lamp, which indicate respectively that the RF system is locked on frequency and that the input signal is greater than the squelch level.

# SECTION 3 - PERFORMANCE EVALUATION

## 3-1 GENERAL

This section contains step-by-step test procedures for assessing the performance of the FM/AM-1200S/A. These procedures should be relied upon as the first step in the troubleshooting/maintenance process, when the operating condition of the set is in question. All procedures contained in this section are performed using the FM/AM-1200S/A front and rear panel controls, indicators and connectors and does not require the removal of the exterior case.

The test procedures contain several common headings which are defined below:

3-2-1 Test procedure number.

PERFORMANCE  
EVALUATION: Name of test procedure to be performed.

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: List of any special accessory test equipment required to complete the test procedure.

INITIAL  
CONTROL SETTINGS: Initial FM/AM-1200S/A front and rear panel control settings required to begin the test procedure. (Refer to Figure 1-2 on foldout page in Section 1 for front and rear panel control identification.)

### 3-1-1 PRE-OPERATIONAL CONSIDERATIONS

For maximum benefit of all operating procedures herein, it is strongly recommended that personnel:

1. Thoroughly read and understand all steps of procedure to be performed, prior to its completion.
2. Be familiar with the circuit or unit under test so some idea is perceived as to the power, frequency and waveform to be expected at each test point. This knowledge will aid personnel in performing the test procedure in a logical and efficient manner.

### 3-1-2 TEST EQUIPMENT REQUIREMENTS

Appendix B at the rear of this manual contains a comprehensive list of test equipment suitable for performing any of the procedures in this manual. Any other equipment meeting the specifications listed in the appendix, may be substituted in place of the recommended models.

**NOTE**

For certain procedures in this manual, the equipment listed in Appendix B may exceed the minimum required specifications.

3-1-3 CORRECTIVE MAINTENANCE PROCEDURES

The performance checks in this section will aid the operator/technician in determining whether the FM/AM-1200S/A is functioning properly or if a failure condition exists. A failure condition will normally be reflected as either a calibration error or a malfunction. A calibration error is defined as a measurement or reading (relating to the unit being tested) that is not within prescribed tolerance. In this condition, the set may outwardly appear to be functioning properly, despite the presence of a calibration error. A malfunction denotes a defective condition where a signal may be totally absent, grossly out of tolerance or where the unit itself (or any part thereof) is obviously not working properly.

In event a failure condition or calibration error is confirmed, the technician should take appropriate corrective action to return the set to its normal operating condition.

## 3-2 PERFORMANCE EVALUATION

### 3-2-1 RECEIVE MODE PERFORMANCE EVALUATION

#### SPECIAL ACCESSORY

EQUIPMENT REQUIRED: (See Appendix B for Test Equipment Requirements)

- 1 Signal Generator
- 1 3-ft Coax Cable with BNC/BNC Connectors

INITIAL CONTROL SETTINGS: See Figure 1-2

CONTROL	SETTING
3 MODULATION Select Control	"FM NAR" Position
4 MODULATION Meter Control	"6 kHz/% x 10" Position
22 PWR/OFF/BATT Switch	"PWR" Position
26 HORIZONTAL Sweep Selector Control	"1 MHz/DIV" Position (on FM/AM-1200S)
35 FREQ ERROR Meter Range Selector Control	"RF 10K" Position
39 MODE Selector Control	"REC" Position
41 SQUELCH Control	Fully ccw Position

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Adjust Signal Generator to 25.50 MHz, modulated with a 1 kHz tone at 5 kHz deviation, at a level of -40 dBm output.   |
| 2.   | Connect Signal Generator to ANTENNA Connector (34).   |
| 3.   | Using Keyboard (18), select "RF 025.5000" MHz and "2nd Function -Meter". Verify the FREQ ERROR Meter (36) and VFD (37) show "0" frequency error and, on the FM/AM-1200S, the Analyzer shows a -40 dBm signal level. |
| 4.   | Verify modulation readings on the MODULATION Meter (1) and VFD (37) as follows:   |

CONTROL SETTING			FM/AM-1200S/A DISPLAY	
SIGNAL GENERATOR MODULATION	MODULATION SELECTOR (3)	METER RANGE SELECTOR (4)	MODULATION METER (1)	VFD (37)
5K FM	FM NAR	6	5	MD 5.XXX
5K FM	FM MID	6	5	MD 5.XXX
5K FM	FM WIDE	6	5	MD 5.XXX
30% AM	AM NAR	6	3	MD 3.XXX
30% AM	AM NORM	6	3	MD 3.XXX

5. Disconnect Signal Generator. Set MODULATION Select Control (3) to "FM NAR" position and adjust SQUELCH Control (41) to just silence receiver.



## STEP

## PROCEDURE

6. Adjust the Signal Generator for no modulation and reconnect it to the ANTENNA Connector (34).
7. Select the following frequencies on the FM/AM-1200S/A and the Signal Generator and verify receiver sensitivity is -101 dB or greater.
 

255.5000 MHz	855.5000 MHz
455.5000 MHz	999.9999 MHz
8. Disconnect the Signal Generator. Select RF 151.0000 MHz on Keyboard (18) and METER Range Selector Control (4) to "WATTS - PK 15" Position.
9. Rotate SQUELCH Control (41) cw just enough to squelch the receiver.
10. Adjust RF Signal Generator for a signal of 151.0000 MHz at -90 dBm. Connect Generator to the ANTENNA Connector (34) of FM/AM-1200S/A. Verify signal breaks squelch.
11. Decrease the Signal Generator output sufficiently to squelch the receiver, then increase the level until it just breaks squelch. Note this level. (The level should be less than -101 dBm.)
12. To verify adjacent channel rejection (ACR), reduce the signal level to squelch the receiver, then increase the level until it just breaks squelch at each of the following frequencies and bandwidths. The level noted in Step 11 must be at least 40 dB below the levels obtained in this step.

SIGNAL GENERATOR FREQUENCY (MHz)	FM/AM-1200S/A FREQUENCY (RF-MHz)	MODULATION SELECTOR	ACR
151.0270	151.0000	FM NAR	40 dB down
151.3000	151.0000	FM MID	40 dB down
151.0120	151.0000	AM NAR	40 dB down

13. Disconnect Signal Generator. Set MODULATION Select Control (3) to "SSB" position, select RF 000.0010 MHz on the Keyboard (18), then rotate VOLUME Control (40) cw as required to verify a tone of approximately 1 kHz is audible from the Speaker.
14. Set the FM/AM-1200S/A controls as follows:

CONTROLS	INITIAL SETTINGS
3 MODULATION Select Control	"FM NAR" Position
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
8 1 kHz Tone Level Control	Fully ccw Position
18 Keyboard	"10.000 MHz"

## STEP

## PROCEDURE

15. Connect coax cable between ANT Connector (34) and External Reference Connector (45).
16. Verify FREQ ERROR Meter reads zero.
17. Using Keyboard (18) and FREQ ERROR Range Selector Control (35) select each meter range/frequency combination in Table 3-1, in order given, and make the corresponding verifications.

FREQ ERROR Meter Range Selector Control (35) Setting	Selected Frequency	FREQ ERROR Meter (36) Indication	Tolerance
RF 10K	RF 010.0100 MHz RF 009.9900 MHz RF 009.9870 MHz	-1.00 +1.00 Pegged +	$\pm .03\%$ $\pm .03\%$
RF 1K	RF 009.9970 MHz RF 009.9990 MHz	Pegged + +1.00	$\pm .03\%$
RF 100	RF 009.9999 MHz	+1.00	$\pm .03\%$
RF 3K	RF 010.0030 MHz RF 009.9970 MHz	-3.0 +3.0	$\pm .09\%$ $\pm .09\%$
RF 300	RF 009.9997 MHz	+3.0	$\pm .09\%$
RF 30	RF 010.0000 MHz	0	$\pm .09\%$

Table 3-1 Frequency Error Verification Chart (RF)

18. Set FM/AM-1200S/A controls as follows:

CONTROLS	INITIAL SETTINGS
7 1 kHz Tone Selector Switch	"ON" Position
8 1 kHz Tone Level Control	"5 kHz" Deviation
39 Mode Selector Control	"Gen" Position

## STEP

## PROCEDURE

19. Using Keyboard (18) and Freq Range Selector Control (35), select each meter range/frequency combination in Table 3-2, in order given, and make corresponding verifications.

FREQ ERROR METER Range Selector Control (35) Setting	Selected Frequency	FREQ ERROR Meter (36) Indication	Tolerance
AUDIO 300	TONE 01000.0 SINE	0	0
	TONE 01300.0 SINE	-3.0	±.09%
	TONE 00700.0 SINE	+3.0	±0.9%
AUDIO 30	TONE 01030.0 SINE	-3.0	±.09%
	TONE 00970.0 SINE	+3.0	±.09%
AUDIO 3	TONE 01003.0 SINE	-3.0	±.09%
	TONE 00997.0 SINE	+3.0	±.09%

Table 3-2 Frequency Error Meter Verification Chart (Audio)

20. Remove coax cable and disconnect test equipment.

### 3-2-2 GENERATE MODE PERFORMANCE EVALUATION

#### SPECIAL ACCESSORY

EQUIPMENT REQUIRED: (See Appendix B for Test Equipment Requirements)

- 1 Spectrum Analyzer
- 1 Function Generator
- 1 Microwattmeter
- 1 Modulation Meter
- 1 Frequency Counter

#### INITIAL CONTROL SETTINGS:

	CONTROL	SETTING
3	MODULATION Select Control	"FM WIDE" Position
4	MODULATION Meter Control	"6 KHz/% x 10" Position
5	VAR Tone Selector Switch	"OFF" Position
6	VAR Tone Level Control	Fully ccw Position
7	1 kHz Tone Selector Switch	"OFF" Position
8	1 kHz Tone Level Control	Fully ccw Position
9	RF Level Attenuator Control	Fully ccw Position
10	RF Level Attenuator Vernier Control	"-30 dBm" Position
22	PWR/OFF/BATT Switch	"PWR" Position
32	GEN/LOCK Control	"Lock" Position
39	MODE Selector Control	"GEN" Position

#### STEP

#### PROCEDURE

1. Connect Frequency Counter to T/R connector (11).
2. Using Keyboard (18), select each of the frequencies in Table 3-3 and verify frequency accuracy with the Frequency Counter.

FREQUENCY (MHz)	FREQUENCY TOLERANCE (Hz)		
	STD TCXO (.5 PPM)	OPT TCXO (.2 PPM)	OPT OVEN (.05 PPM)
000.5000	±.25	±.10	±.025
002.5000	±1.25	±.50	±.125
012.5000	±6.25	±2.50	±.625
042.5000	±21.25	±8.50	±2.125
142.5000	±71.25	±28.50	±7.125
342.5000	±171.25	±68.50	±17.125
642.5000	±321.25	±128.50	±32.125
999.9999	±500.00	±200.00	±50.000

Table 3-3 Generate Frequency Accuracy

3. Disconnect the Frequency Counter and connect Spectrum Analyzer to T/R Connector (11). Select each of the frequencies in Table 3-3 and verify the tolerance is ±2.5 dB for the output level at -30 dBm and -110 dBm.

## STEP

## PROCEDURE

4. Select "RF 500.0000" MHz on the Keyboard (18). Rotate the RF LEVEL Attenuator Vernier Control (10) through its entire range and verify the output level shifts at least 11 dB.
5. Connect Spectrum Analyzer to the DUPLEX Connector (14).
6. Select "DUP" on the MODE Selector (39), and "RF 150.0000" on the Keyboard (18).
7. Using the Keyboard (18), select each of the following offset frequencies and verify the correct output frequency and level as shown in Table 3-4.

OFFSET FREQUENCY (MHz)	DUPLEX FREQUENCY (MHz)	OUTPUT LEVEL
+1.0000	151.0000	-60 dBm ( $\pm 10$ dB)
-2.0000	148.0000	-60 dBm ( $\pm 10$ dB)
+5.5000	155.5000	-60 dBm ( $\pm 10$ dB)
-10.0000	140.0000	-60 dBm ( $\pm 10$ dB)
+15.5500	165.5500	-60 dBm ( $\pm 10$ dB)
-20.0000	130.0000	-60 dBm ( $\pm 10$ dB)
+35.0000	185.0000	-60 dBm ( $\pm 10$ dB)
-49.9900	100.0100	-60 dBm ( $\pm 10$ dB)

8. Connect Spectrum Analyzer to T/R Connector (11) and verify the output level is -80 dBm ( $\pm 5$  dB).
9. Disconnect all test equipment.

# SECTION 4 - CALIBRATION

## 4-1 GENERAL

This section contains calibration procedures for the following FM/AM-1200S/A front panel indicators and internal modules:

CALIBRATION PROCEDURE	CALIBRATION PROCEDURE TITLE	PAGE NO
4-2-1	Mechanical Zero of Meters.....	4-7
4-2-2	Power Supply Calibration (FM/AM-1200S thru SN 4490 and FM/AM-1200A thru S/N 1448).....	4-9
4-2-2(a)	Power Supply Calibration (FM/AM-1200S S/N 4491 and ON and FM/AM-1200A S/N 1449 and ON).....	4-10
4-2-3	Frequency Standard Calibration.....	4-11
4-2-4	Function Generator Calibration.....	4-13
4-2-5	High and Low Loop Calibration.....	4-15
4-2-6	Digital Module Calibration.....	4-21
4-2-7	Modulation Meter Calibration.....	4-23
4-2-8	Generate Signal Calibration.....	4-29
4-2-9	DVM I/O Calibration.....	4-33
4-2-10	Oscilloscope/Analyzer Calibration (FM/AM-1200S Only).....	4-35
4-2-11	Oscilloscope Calibration (FM/AM-1200A Only).....	4-41

These procedures should be performed as a result of one or more of the following conditions:

1. If, during the course of normal operation, the FM/AM-1200S/A fails to meet the performance specifications as provided in "SECTION 3 - PERFORMANCE EVALUATION".
2. If a module is found to be defective and requires significant repair or replacement.
3. If the recommended annual calibration is due.

### 4-1-1 SAFETY PRECAUTIONS

As with any piece of electronic equipment, extreme caution should be taken when troubleshooting "live" circuits. When performing the calibration procedures in this section, be sure to observe the following precautions:

#### **WARNING**

AS LONG AS THE BATTERY IS INSTALLED OR EXTERNAL AC OR DC POWER IS APPLIED, A 12 VDC POTENTIAL EXISTS AT VARIOUS POINTS ON REAR PANEL, REGARDLESS OF THE FRONT PANEL POWER SWITCH POSITION.

## **WARNING**

WHEN WORKING WITH "LIVE" CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND YOUR BACK TO AVOID SERIOUS SHOCK HAZARD.

REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE TROUBLESHOOTING AND/OR REPAIRING LIVE CIRCUITS.

FOR ADDED INSULATION, PLACE RUBBER BENCH MAT UNDER ALL POWERED BENCH EQUIPMENT, AS WELL AS A RUBBER FLOOR MAT BENEATH TECHNICIAN'S CHAIR.

HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

### 4-1-2 DISASSEMBLY REQUIREMENTS

To perform any of the calibration procedures contained in this section (with the exception of 4-2-1, Mechanical Zero of Meters), the exterior case must be removed from the FM/AM-1200S/A. The only modules which must be removed and disassembled specifically for calibration are the three Spectrum Analyzer Modules.

### 4-1-3 TEST EQUIPMENT REQUIREMENTS

A list of test equipment required to perform each calibration procedure is provided with the procedure. The minimum equipment specifications which can meet the requirements for the procedure are listed in Appendix B.

### 4-1-4 CONTROLS AND CALIBRATION POINTS

The various front and rear panel controls, connectors and indicators specified in the calibration procedures are followed by an item number. Figure 1-2 shows the location of each of these items. Calibration points for the Spectrum Analyzer Module are shown on the individual PC Board drawings in Section 7. All other calibration points are identified in Figure 4-5.

### 4-1-5 UPON COMPLETION OF CALIBRATION PROCEDURES

The procedures contained in this section are complete for the system specifically addressed, and upon completion of a given procedure, the entire calibration procedure may be terminated. Control settings, operating commands, and test equipment connections do not carry over from one procedure to another, and are not assumed at the start of any procedure. Always disconnect all test equipment and reconnect any cables, harnesses, etc., (which may have been disconnected or removed while conducting a procedure) upon its completion.

## **4-2 CALIBRATION PROCEDURES**

Before making any calibration adjustments, always observe the signal measurement. If the measurement is within the tolerances given, do not proceed with that specific adjustment. (The only time an adjustment is required for a measurement that is within tolerance is when a subsequent interactive adjustment is insufficient and the procedure explicitly requires repeating previous steps.) Normally, when an adjustment is required, the technician should attempt to obtain a precise measurement, and not be satisfied with an adjustment that is just within tolerance.



IF THIS MODULE IS REPAIRED OR REPLACED	THEN THE FOLLOWING CALIBRATION PROCEDURES MUST BE PERFORMED										
	MECHANICAL MEASUREMENTS (4-2-1)	POWER SUPPLY (4-2-2)	FREQUENCY STANDARD (4-2-3)	FUNCTION GENERATOR (4-2-4)	HIGH LOOP LOW LOOP (4-2-5)	DIGITAL MODULE (4-2-6)	MODULATION METER (4-2-7)	SIGNAL GENERATE (4-2-8)	DVM (4-2-9)	OSCILLOSCOPE ANALYZER FM/AM-I200S ONLY (4-2-10)	OSCILLOSCOPE FM/AM-I200A ONLY (4-2-11)
POWER SUPPLY	1	•	1	1	1	1	1	1	1	1	1
FREQUENCY STANDARD PC BD.			•		1	1	1		1	1	
OUTPUT AMPLIFIER MODULE						1	•				
IF MODULE						1	•		•	•	
DUAL VCO MODULE					•		•		1	1	
1120 MHz LOW PASS FILTER					•	1	1				
HIGH/LOW PASS FILTER					•	1	1				
HIGH LOOP MODULE					•	•	•		1	1	
LOW LOOP MODULE					•	1	•		1	1	
10.7 MHz GEN/REC MODULE						•	•				
RECEIVE AUDIO PC BD.						1	•	•	2		
GENERATE AUDIO PC BD.				1			•				
FUNCTION GENERATOR PC BD.				•		1	1				
DIGITAL MODULE				1		•	•	•			
DUPLEX GENERATOR							3				
O'SCOPE CONTROL PC BD.									•	•	
CRT POWER SUPPLY PC BD.									•	•	
ANALYZER RF MODULE									•		
ANALYZER IF MODULE									•		
ANALYZER LOG AMP MODULE									•		

LEGEND	
•	CALIBRATION REQUIRED
1	CALIBRATION REQUIRED ONLY IF MODULE FAILS PERFORMANCE EVALUATION.
2	COMPLETE STEPS 29 THRU 31 IN CALIBRATION PROCEDURE 4-2-10.
3	COMPLETE STEPS 17 THRU 21 IN CALIBRATION PROCEDURE 4-2-8.

Figure 4-1 Module Replacement & Alignment Requirements

#### 4-2-1 MECHANICAL ZERO OF METERS

PREREQUISITES: None

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: 1 Small Slotted Screwdriver

INITIAL CONTROL  
SETTINGS: See Figure 1-2

	CONTROL	INITIAL SETTINGS
3	Modulation Meter Zero Adjustment	As is
22	PWR/OFF/BATT Switch	"OFF" (Battery Power Off)
38	Frequency Error Meter Zero Adjustment	As is

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Set FM/AM-1200S/A in an upright position, resting on rear panel.  |
| 2.   | Adjust Modulation Meter Zero Adjustment (3) as required to position the MODULATION Meter (1) needle directly over the "0" on the meter scale. Gently tap on meter face plate to ensure that the needle is not sticking and that it settles to "0".  |
| 3.   | Adjust Frequency Error Meter Zero Adjustment (38) as required to position the FREQ ERROR Meter (36) needle directly over the "0" on the meter scale. Gently tap on meter face plate to ensure that the needle is not sticking and that it settles to "0".                                     |
| 4.   | Check all knobs on front panel for the following: <ul style="list-style-type: none"><li>a. Correct alignment to front panel.</li><li>b. Correct range stops.</li><li>c. Knobs are securely tightened to control shafts.</li><li>d. Knobs are close to front panel, but do not bind.</li></ul> |

4-2-2 POWER SUPPLY CALIBRATION (FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448)

PREREQUISITES: None

SPECIAL ACCESSORY EQUIPMENT REQ'D: (See Appendix B for Test Equipment Requirements)  
 1 Non-Conductive Tuning Tool  
 1 Digital Multimeter  
 1 Battery Load Simulator (Ref. Appendix D)

INITIAL CONTROL SETTINGS: See Figure 1-2

CONTROL	INITIAL SETTINGS
22 PWR/OFF/BATT Switch	"OFF" (Battery Off) Position

CALIBRATION POINTS: See Figure 4-5

- | STEP | PROCEDURE  |
|------|--|
| 1.   | With external power disconnected, remove test set from its case.   |
| 2.   | Connect test set to appropriate AC line supply, then place test set on its Rear Panel (Front Panel facing up). Place PWR/OFF/BATT Switch (22) in "PWR" position. |
| 3.   | On the Battery Charger PC Board, verify the voltage between E3 and ground (E1) is a minimum of +14 VDC.  |
| 4.   | Verify voltage at E7 is +12 VDC ( $\pm 0.1V$ ). Adjust R3901 (+12V ADJ), as needed, to bring the voltage into tolerance.   |
| 5.   | Verify the following voltages are within tolerance:  |

TEST POINT	VOLTAGE
E4	+5.1 VDC ( $\pm 0.2V$ )
E5	-12 VDC ( $\pm 0.5V$ )
E6	+40 to +50 VDC

**NOTE**

Adjust R3901, as needed, to bring any of the above listed voltages into tolerance.

- |    |  |
|----|--|
| 6. | Disconnect the battery and connect a Battery Load Simulator across the pins of J1702. Set Battery Load Simulator for 300 mAmps.                              |
| 7. | Verify the voltage across the Battery Load Simulator is +14.4 VDC ( $\pm 0.1V$ ). Adjust R1604 (CHARGE ADJ), as needed, to bring the voltage into tolerance. |
| 8. | Disconnect all test equipment.   |

4-2-2a POWER SUPPLY CALIBRATION (FM/AM-1200S S/N 4491 and ON and FM/AM-1200A S/N 1448 and ON)

PREREQUISITES: None

SPECIAL ACCESSORY EQUIPMENT REQ'D: (See Appendix B for Test Equipment Requirements)  
 1 Non-Conductive Tuning Tool  
 1 Digital Multimeter  
 1 Battery Load Simulator (Ref. Appendix D)

INITIAL CONTROL SETTINGS: See Figure 1-2

CONTROL	INITIAL SETTINGS
22 PWR/OFF/BATT Switch	"OFF" (Battery Off) Position

CALIBRATION POINTS: See Figure 4-5

STEP PROCEDURE

1. With external power disconnected, remove test set from its case.
2. Connect test set to appropriate AC line supply, then place test set on its Rear Panel (Front Panel facing up). Place PWR/OFF/BATT Switch (22) in "PWR" position.
3. On the Battery Charger PC Board, verify the voltage between FL3903 and ground (FL3901) is a minimum of +14 VDC.
4. Verify voltage at FL3907 is +12 VDC ( $\pm .1V$ ). Adjust R1520 (+12V ADJ), as needed, to bring the voltage into tolerance.
5. Verify the following voltages are within tolerance:

TEST POINT	VOLTAGE
FL3904	+5.1 VDC ( $\pm .2V$ )
FL3905	-12 VDC ( $\pm .5V$ )
FL3906	+40 to +50 VDC

**NOTE**

Adjust R1520, as needed, to bring the voltage into tolerance for FL3905 and FL3906. Adjust R1537 as needed, to bring the voltage into tolerance for FL3904.

6. Disconnect the battery and connect a Battery Load Simulator across the pins of J1702. Set Battery Load Simulator for 300 mAmps.

STEP

PROCEDURE

7. Verify the voltage across the Battery Load Simulator is +14.4 VDC ( $\pm .1V$ ). Adjust R1604 (CHARGE ADJ), as needed, to bring the voltage into tolerance. Repeat steps 6 and 7 as necessary.
8. Disconnect all test equipment.

### 4-2-3 FREQUENCY STANDARD CALIBRATION

PREREQUISITES: Power Supply Calibration Procedure 4-2-2

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: (See Appendix B for Test Equipment Requirements)  
1 Non-Conductive Tuning Tool  
1 Digital Multimeter  
1 Frequency Counter

INITIAL CONTROL  
SETTINGS: See Figure 1-2

CONTROL	INITIAL SETTINGS
22 PWR/OFF/BATT Switch	"PWR" Position

CALIBRATION POINTS: See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | After a 15-minute warmup period (30-minutes for Opt-02), connect frequency counter to the 10 MHz External Reference Connector (45) and a digital voltmeter to pin 2 (wiper) of R3501, REF CAL potentiometer (13).   |
| 2.   | Verify frequency is 10 MHz ( $\pm 1$ Hz) and voltage is +5.5 VDC ( $\pm 2.0$ V) (+2.5 VDC ( $\pm 1.0$ V) if oven oscillator is installed). Adjust R3501, if necessary, to obtain the correct frequency. If the correct frequency cannot be obtained within the voltage tolerance, proceed with Steps 3 through 5. |
| 3.   | Reset voltage at pin 2 of R3501 to +5.5 VDC for TCXO or +2.5 VDC for oven oscillator.   |
| 4.   | Remove adjustment access screw from the TCXO or oven oscillator. Adjust the oscillator to obtain a frequency of 10 MHz $\pm 5$ Hz ( $\pm 1$ Hz if possible). Replace adjustment access screw.   |
| 5.   | If further fine adjustment is required, adjust R3501 as required to obtain a frequency of 10 MHz ( $\pm 1$ Hz).   |
| 6.   | Disconnect all test equipment.  |

#### 4-2-4 FUNCTION GENERATOR CALIBRATION

PREREQUISITES: Power Supply Calibration Procedure 4-2-2  
Frequency Standard Calibration Procedure 4-2-3

SPECIAL ACCESSORY  
EQUIPMENT REQ'D: (See Appendix B for Test Equipment Requirements)  
1 Non-Conductive Tuning Tool  
1 Frequency Counter  
1 Distortion Analyzer  
1 Digital Multimeter  
1 Tone Generator Extender Board  
1 150 $\Omega$  1/2 W Resistor

INITIAL CONTROL  
SETTINGS: See Figure 1-2

CONTROL	INITIAL SETTINGS
5 VAR Tone Selector Switch	"OFF" Position
6 VAR Tone Level Control	Fully ccw Position
7 1 kHz Tone Selector Switch	"OFF" Position
8 1 kHz Tone Level Control	Fully ccw Position
22 PWR/OFF/BATT Switch	"PWR" Position
39 MODE Selector	"REC" Position
40 VOLUME Control	Fully ccw Position
41 SQUELCH Control	Fully ccw Position

CALIBRATION POINTS: See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Connect 150 $\Omega$ 1/2 W resistor across TONE OUT Connector (17) on Front Panel. Connect Digital Multimeter and Distortion Meter across the resistor. |
| 2.   | Set 1 kHz Tone Selector Switch (7) in "INTL" position and rotate 1 kHz Tone Level Control (8) to obtain 2.5 VRMS. Verify distortion is less than 0.5%.  |
| 3.   | Set 1 kHz Tone Selector Switch (7) in "OFF" position and VAR Tone Selector Switch (5) in "INTL" position.   |
| 4.   | Using Keyboard (18), select TONE, 5000.0 Hz SINE.   |
| 5.   | Adjust VAR Tone Level Control (6) to obtain 2.5 VRMS.   |
| 6.   | Connect Frequency Counter to TONE OUT Connector (17) and verify frequency is 5000.0 Hz ( $\pm 0.5$ Hz). If frequency is within tolerance, omit Step 7.  |

## STEP

## PROCEDURE

7. If frequency at Step 6 is not within tolerance, set the PWR/OFF/BATT Switch (22) to the "OFF" position and proceed as follows:
  - a. Remove the Function Generator PC Board and install Extender Cable in its place, then install the Function Generator PC Board on the Extender Cable.
  - b. Set PWR/OFF/BATT Switch (22) to "PWR" position.
  - c. Verify test set is in the TONE mode, producing a 5000.0 Hz sinewave at 2.5 VRMS across the 150 $\Omega$  resistor.
  - d. With the Frequency Counter connected to the TONE OUT Connector (17), adjust C3110 on the Function Generator PC Board to obtain a frequency of 5000.0 Hz ( $\pm 0.5$  Hz).
8. With the Distortion Analyzer connected across the 150 $\Omega$  resistor, verify distortion is less than 0.7%.
9. Using Keyboard (18), select TONE, 1000.0 Hz SINE.
10. Verify the signal level is 2.5 VRMS. Adjust VAR Tone Level Control (6), if necessary, to obtain desired reading.
11. Verify distortion is less than 0.7%.
12. Disconnect Distortion Analyzer.
13. Set the FM/AM-1200S/A controls as follows:

## CONTROLS

## SETTING

3	Modulation Select Control	"FM MID" Position
5	VAR Tone Selector Switch	"INTL" Position
6	VAR Tone Level Control	"4 kHz" Deviation
24	VERTICAL Attenuator Selector Control	"2 kHz/Div" Position
26	HORIZONTAL Sweep Selector Control	".1 mS/Div" Position (FM/AM-1200S) "100 $\mu$ S/DIV" Position (FM/AM-1200A)
39	MODE Selector Control	"GEN" Position

14. Using Keyboard (18), verify Sine, Ramp, Square and Triangle waveforms are displayed on both VFD (37) and CRT (31).





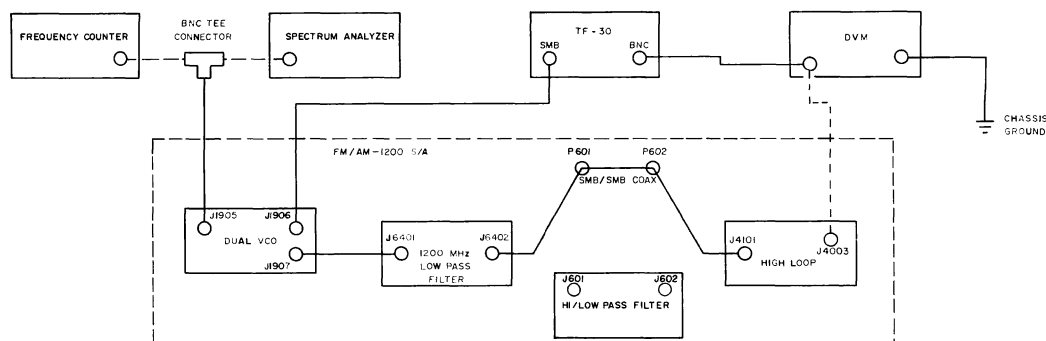


Figure 4-2 High Loop Calibration Set-up

4. Connect Test Equipment as shown in Figure 4-2.
5. Select RF 299.0000 on the FM/AM-1200S/A Keyboard (18).
6. Adjust the TF-30 to obtain the following VCO frequencies and record the corresponding DC voltages:
  - a. 2330 MHz
  - b. 1275 MHz
7. Disconnect the DVM from the TF-30 and connect it to J4003 on the High Loop.
8. With the VCO tuned below 1598 MHz, verify the DC voltage of J4003 corresponds with the voltage recorded in step 6.a. (2330 MHz). Adjust R4061 (HIGH LIMIT) on the High Loop module, if necessary, to obtain the correct voltage.
9. With the VCO tuned above 1800 MHz, verify the DC voltage at J4003 corresponds with the voltage recorded in step 6.b. (1275 MHz). Adjust R4060 (LOW LIMIT) on the High Loop module, if necessary, to obtain the correct voltage.
10. Verify the VCO output level at J1905 is +5 to +12 dBm.
11. Disconnect all test equipment and reconnect P/J1906 and P/J4003. Verify the PHASE LOCK Indicator on the High Loop is not illuminated.
12. Connect DVM to FL601 on the Hi/Low pass filter.
13. Using the Keyboard (18), select RF 450.0000 MHz. Verify DVM displays approximately +10 VDC.

## STEP

## PROCEDURE

14. Using the Keyboard (18), slew the frequency upward in 10 MHz increments until the DVM reading switches from approximately +10 VDC to approximately -10 VDC. Verify switching occurs between 450 and 490 MHz as indicated on the Front Panel Display (37). Record the switching frequency. If switching occurs within this range, omit steps 15 through 17. If not, proceed as follows.
15. Select RF 490.0000 MHz on the Keyboard (18). Verify DVM indicates approximately -10 VDC. If necessary, rotate R4065 (HI/LO PASS FILTER) on the High Loop module ccw until this reading is obtained.
16. Repeat steps 13 and 14 to verify switching from -10 VDC to +10 VDC now occurs between 450 and 490 MHz. If necessary, repeat steps 15 through 17, slightly altering R4065 each time.
17. Using SMB Tee Connector, connect Spectrum Analyzer to J4101. Reconnect P/J601 and P/J602. Verify Hi/Low Pass Filter output is -35 dBm or greater at the frequencies listed below:

SELECTED FREQUENCY	ANALYZER CENTER FREQUENCY
RF 200.000 MHz	290 MHz
RF 800.000 MHz	890 MHz

Disconnect Spectrum Analyzer and reconnect P/J4101.

18. Connect Spectrum Analyzer to J1902 on the Dual VCO. Verify the output is 1210 MHz at +5 to +12 dBm. (Ref. Figure 4-3)
19. Using Keyboard (18), select RF 998.0000 MHz.
20. With Spectrum Analyzer set at 500 KHz/division at 1210 MHz, adjust R4032 (NULL ADJ) on the High Loop module for the lowest level of sidebands. Disconnect Spectrum Analyzer and reconnect P/J1902.

## STEP

## PROCEDURE

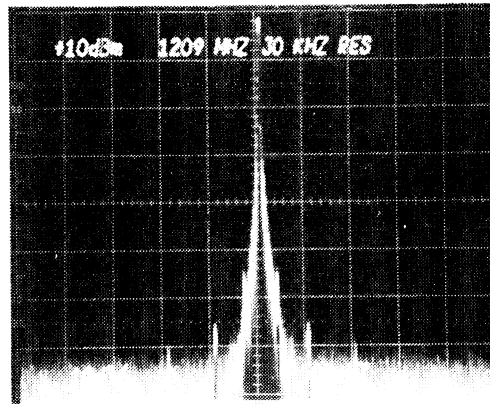


Figure 4-3 DUAL VCO 1210 MHz Output

21. Connect Spectrum Analyzer to J4103 on the High Loop. Verify output level is -20 dBm ( $\pm 5$  dB) at 1088 MHz. (Ref. Figure 4-4)
22. Using Keyboard (18) select RF 050.0000 MHz. With Spectrum Analyzer set at 10 kHz/division and 140 MHz, center frequency, verify the High Loop output level is -20 dBm ( $\pm 5$  dB).

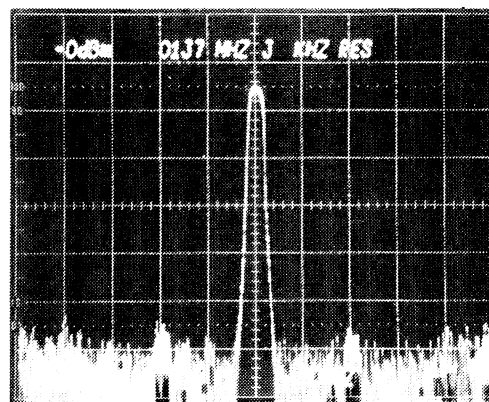


Figure 4-4 DUAL VCO 90 MHz to 1080 MHz Output

23. Adjust R4045 (GAIN ADJ) on the High Loop module as necessary to obtain flat sidebands.

## STEP

## PROCEDURE

24. Using Keyboard (18), select the following frequencies and verify the noise floor level rises no more than 6 dB on the sidebands. Perform Steps 19 through 23 only if this level is not obtained.

SELECTED FREQUENCY	ANALYZER CENTER FREQUENCY
RF 250.0000 MHz	340 MHz
RF 450.0000 MHz	540 MHz
RF 850.0000 MHz	940 MHz

25. Disconnect Spectrum Analyzer and connect Frequency Counter to J4103.
26. Verify digit operation on frequency counter with FM/AM-1200S/A frequency selection as shown below:

FM/AM-1200S/A Frequency	DUAL VCO Output Frequency (J4103)
666.0000 MHz	756 MHz
998.0000 MHz	1088 MHz

LOW LOOP CALIBRATION (FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448)

27. Using keyboard, set FM/AM-1200S/A frequency to "RF 101.0000 MHz".
28. Connect Frequency Counter to J4203 and Digital Voltmeter to TP4201. (Both connecting points are located on the Low Loop Module).
29. Verify voltage at TP4201 is 4.5 VDC ( $\pm 0.5$  V) and frequency at J4203 is 78.30000 MHz.
30. Adjust C4203, as necessary, for proper voltage.
31. Disconnect test equipment.

## STEP

## PROCEDURE

FAST LOW LOOP CALIBRATION (FM/AM-1200S S/N 4491 AND ON AND FM/AM-1200A S/N 1449 AND ON)

32. Set Spectrum Analyzer to measure 75.2 MHz and connect probe to pin 1 of MXR-1.
33. Tune L57006 and L57007 to maximize 75.2 MHz signal. Disconnect Spectrum Analyzer.
34. Verify voltage at TP57003 is between 1 VDC and 4 VDC.

## STEP

## PROCEDURE

35. Using keyboard, set FM/AM-1200S/A frequency to "RF 100.0000 MHz".
36. Connect Frequency Counter to collector of Q57009 and Digital Voltmeter to TP57002.
37. Verify voltage at TP57002 is 8.0 VDC ( $\pm 0.25$  V) and frequency at Q57009 is 205.0000 MHz.
38. Adjust L57005, as necessary, for proper voltage.
39. Connect Frequency Counter to J58004 and Digital Voltmeter to TP57001.
40. Verify voltage at TP57001 is 9.0 VDC ( $\pm 0.25$  V) and frequency at J58004 is 79.30000 MHz.
41. Adjust L58001, as necessary, for proper voltage.
42. Connect Frequency Counter to J58003. Using keyboard select frequency and verify frequency as follows:

<u>Frequency Setting</u>	<u>Frequency Counter</u>
000.1000	79.2000 MHz
000.3000	79.0000 MHz
001.1234	78.1766 MHz
001.5678	77.7322 MHz
001.9999	77.3001 MHz

**NOTE**

Lock Indicator should remain extinguished for all settings.

43. Disconnect test equipment.

## 4-2-6 DIGITAL MODULE CALIBRATION

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                             Power Supply Calibration Procedure 4-2-2  
                             Frequency Standard Calibration Procedure 4-2-3

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        1 Non-Conductive Tuning Tool  
                             1 2 to 3 Foot Coax Cable with BNC/BNC Connector

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	INITIAL SETTINGS
5 VAR Tone Switch	"OFF" Position
7 1 kHz Tone Switch	"OFF" Position
22 PWR/OFF/BATT	"PWR" Position
35 FREQ ERROR Selector	"10 kHz" Position
39 MODE Selector	"REC" Position
40 VOLUME Control	Fully ccw Position
41 SQUELCH Control	Fully ccw Position

CALIBRATION POINTS:    See Figure 4-5

- | STEP | PROCEDURE  |
|------|--|
| 1.   | Select RF 10.0000 MHz on keyboard (180).   |
| 2.   | Connect the coax cable to the ANT Connector (34) and the 10 MHz External Reference Connector (45).   |
| 3.   | Verify Frequency Error Meter (36) reads "0". Adjust R4407 (ZERO) on the Digital module, if necessary, to position the needle directly over the "0" point.                                  |
| 4.   | Select RF 10.0100 MHz on the Keyboard (18).  |
| 5.   | Verify Frequency Error Meter (36) reads full scale negative deflection (-1 on the upper scale). Adjust R4510 (x10 CAL) on the Digital module, if necessary, to obtain the current reading. |
| 6.   | Select RF 10.0030 MHz on the Keyboard (18).  |
| 7.   | Rotate FREQ ERROR Meter Selector (35) to the 3K position.  |
| 8.   | Verify Frequency Error Meter (36) reads full scale negative deflection (-3 on the upper scale). Adjust R4509 (x3 CAL) on the Digital module, if necessary, to obtain the correct reading.  |
| 9.   | Disconnect all test equipment.   |

#### 4-2-7 MODULATION METER CALIBRATION.

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                             Power Supply Calibration Procedure 4-2-2  
                             Frequency Standard Calibration Procedure 4-2-3

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        (See Appendix B for Test Equipment Requirements)  
                             1 Non-Conductive Tuning Tool  
                             1 RF Signal Generator with Attenuator  
                             1 Oscilloscope  
                             1 Distortion Analyzer  
                             1 Digital Multimeter  
                             1 Modulation Meter  
                             1 5 Watt Transmitter  
                             1 30 Watt Transmitter

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	SETTING
3 MODULATION Select Control	"FM NAR" Position
4 Modulation METER Control	"AVG 15" Position
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
9 GEN LEVEL Vernier	Fully ccw Position
10 GEN LEVEL Attenuator	"-20 dBm" Position
18 Keyboard	"RF 120.2 MHz" Position
22 PWR/OFF/BATT Switch	"PWR" Position
39 MODE Selector	"GEN" Position

CALIBRATION POINTS:    See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Verify modulation reads zero on MODULATION METER (1). Adjust R3354 (POWER ZERO) on the Receive Audio PC Board, as necessary, to obtain zero reading.  |
| 2.   | Connect 5 Watt Transmitter to T/R Connector (11). Key Transmitter and verify MODULATION METER (1) reads 5 W Avg (see Specifications in Appendix A). Adjust R3365 (15W CAL) on the Receive Audio PC Board, as necessary, to obtain correct reading. Disconnect Transmitter.    |
| 3.   | Place Modulation METER Control (4) to "AVG 150" Position.   |
| 4.   | Connect 30 Watt Transmitter to T/R Connector (11). Key Transmitter and verify Modulation METER (1) reads 30 W Avg (see Specifications in Appendix A). Adjust R3362 (150W CAL) on the Receive Audio PC Board, as necessary, to obtain correct reading. Disconnect Transmitter. |
| 5.   | Place Modulation METER Control to "BATT" Position.  |



## STEP

## PROCEDURE

6. Connect Multimeter to J1601, Pin 5 on Battery Charger PC Board. Verify reading on MODULATION METER (1) is the same as the Multimeter. Adjust R3303 (BATT CAL) on the Receive Audio PC Board, as necessary to obtain correct reading.
7. Place MODULATION Select Control (3) to "FM NAR" Position and Modulation METER Control (4) to "2 kHz" Position.
8. Verify MODULATION METER (1) on FM/AM-1200S/A indicates zero. Adjust R3368 (FM GEN ZERO) on the Receive Audio PC Board, if necessary, to position the needle directly over the zero division mark.
9. Set the FM/AM-1200S/A controls as follows:

## CONTROL

## SETTING

3	MODULATION Select Control	"AM NORM" Position
4	Modulation METER Control	"6 kHz/%X10" Position
5	VAR Tone Selector Switch	"OFF" Position
7	1 kHz Tone Selector Switch	"INTL" Position

10. Connect a Modulation Meter to the T/R Connector (11). Adjust 1 kHz Tone Level Control (8) for a reading of 50% AM on external Modulation Meter. Adjust R3436 (GEN AM% CAL) on the Recive Audio PC Board, if necessary, for a reading of 50% AM on the MODULATION METER (1).
11. Set 1 kHz Tone Selector Switch (7) to "OFF" Position. Disconnect external Modulation Meter.
12. Set MODE Selector Control (39) to "REC" Position.
13. Adjust RF Signal Generator to produce an unmodulated signal of 120.2 MHz at -50 dBm, then connect it to the FM/AM-1200S/A ANT Connector (34).
14. Calibrate the modulation function of the MODULATION METER (1) as follows. Refer to Table 4-1, Test Sequences 1 through 9.
  - a. For each test sequence, set RF Signal Generator as shown in Table 4-1.
  - b. Set FM/AM-1200S/A as shown in Table 4-1 and verify the reading is within tolerance. Adjust the specified trimpot as required to obtain the correct reading.

## STEP

## PROCEDURE

15. Verify FM/AM-1200S/A demodulation distortion as follows. Refer to Table 4-1, Test Sequences 10 through 12.
- Using Coax "Tee", connect Digital Multimeter to DEMOD Connector (16) of FM/AM-1200S/A.
  - For each test sequence, set RF Signal Generator as shown in Table 4-1.
  - Set FM/AM-1200S/A as shown in Table 4-1.
  - Connect Distortion Meter to DEMOD Connector (16) of FM/AM-1200S/A, using the Coax Tee, and measure distortion. The observed distortion, should be less than the maximum given in Table 4-1 for the appropriate test sequence.
16. Disconnect the RF Signal Generator.
17. Set the FM/AM-1200S/A controls as follows:

CONTROL	SETTING
4 METER Selector	"DIST" Position
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"INTL" Position
8 1 kHz Level Control	Fully cw Position
39 MODE Selector	"REC" Position

18. Connect coax cable from Tee on TONE OUT Connector (17) to EXT MOD/SINAD Connector (15).
19. Verify MODULATION Meter (1) indicates minimum distortion (distortion must be less than or equal to 5%). Adjust R3318 (NULL No. 2) and R3320 (NULL No. 1) on the Receive Audio PC Board as necessary to obtain maximum deflection.
20. Adjust 1 kHz Tone Level Control (8) for 1.999 VRMS on Digital Multimeter.
21. Set 1 kHz Tone Selector Switch (7) in "OFF" position and VAR Tone Selector Switch (5) in "INTL" position. Using Keyboard (18) select a variable tone of 1800 Hz Sinewave.
22. Adjust the VAR Tone Level Control (6) for .199 VRMS on Digital Multimeter.
23. Place 1 kHz Tone Selector Switch (7) to "INTL" Position and Modulation METER Control (4) to "DIST" Position. Verify MODULATION METER (1) displays 10% distortion. Adjust R3350 (SINAD CAL) on the Receive Audio PC Board, as necessary to obtain correct reading.

STEP

PROCEDURE

24. Place 1 kHz Tone Selector Switch (7) to "OFF" Position and adjust VAR Tone Level Control (6) for .500 VRMS on Digital Multimeter.
25. Place 1 kHz Tone Selector Switch (7) to "INTL" Position and Modulation Meter Control (4) to "SINAD" Position. Verify MODULATION METER (1) reads 12 dB SINAD.
26. Disconnect all test equipment.

RF SIGNAL GENERATOR		FM/AM-1200S/A									
TEST SEQ NO.	MOD MODE	TONE FREQ	MOD DEV/%	MODULATION SELECTOR SETTING	METER SELECTIVE SETTING kHz/%x10	METER READING TOL. ±	ADJUST	DEMOD OUTPUT LEVEL VP-P	FM/AM-1200S/A DISTORTION LESS SIGNAL GENERATOR DISTORTION	REMARKS	
1	FM	1K	0	FM NAR	2	0	R3369				
2	FM	1K	0	FM WIDE	2	0	R3380				
3	FM	1K	5K	FM NAR	6	±.43 kHz	R3383				
4	Repeat Test Sequences 1, 2 and 3 as required to obtain proper readings										
5	FM	1K	1.5K	FM NAR	2	1.5 ±.135 kHz	None			Sequences 1, 2 and 3 are interactive	
6	FM	1K	50K	FM MID	60	±4.3 kHz	None			Verify Only	
7	AM	1K	0	AM NORM	2	0	R3371			Verify Only	
8	AM	1K	80%	AM NORM	20	±10% AM	R3379				
9	Repeat Test Sequences 7 and 8 as required to obtain proper readings										
10	FM	1K	5K	FM NAR	6			.85	<3%	Sequences 7 and 8 are interactive	
11	FM	1K	20K	FM MID	60			8.5	<2%	Verify Only	
12	AM	1K	80%	AM NORM	20			1.12	<4%	Verify Only	

Table 4-1 Modulation Meter Calibration Requirements

## 4-2-8 GENERATE SIGNAL CALIBRATION

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                             Power Supply Calibration Procedure 4-2-2  
                             Frequency Standard Calibration Procedure 4-2-3  
                             Function Generator Calibration Procedure 4-2-4  
                             High Loop Calibration Procedure 4-2-5  
                             Digital Calibration Procedure 4-2-6

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        (See Appendix B for Test Equipment Requirements)  
                             1 Non-Conductive Tuning Tool  
                             1 Microphone  
                             1 Function Generator  
                             1 Power Meter  
                             1 Oscilloscope  
                             1 Spectrum Analyzer  
                             1 Modulation Meter

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	INITIAL SETTINGS
3 MODULATION Select Control	"AM NORM" Position
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
9 GEN LEVEL Attenuator	"-20 dBm" Position
10 GEN LEVEL Vernier	Fully ccw Position
22 PWR/OFF/BATT Switch	"PWR" Position
32 GEN/LOCK Control	"LOCK" Position
39 MODE Selector	"GEN" Position

CALIBRATION POINTS:    See Figure 4-5

STEP	PROCEDURE
1.	Using keyboard (18), enter "RF 120.0000" MHz.
2.	Connect Spectrum Analyzer to T/R Connector (11).
3.	Vary GEN LEVEL Vernier Control (10) smoothly throughout its full range and verify the output level observed on the Spectrum Analyzer tracks.
4.	Connect Modulation Meter to T/R Connector (11). Set RF Level Attenuator Control (9) fully "CCW" and 1 kHz Tone Level Control (8) for 50% AM modulation on MODULATION METER (1). Set RF Level Attenuator Vernier Control (10) fully clockwise and verify AM modulation on MODULATION METER (1) over range reads 50% modulation ( $\pm 5\%$ ). Adjust R5114 (BALANCE), as necessary, through the access hole in the Output Amplifier Module, to obtain the desired reading.

## STEP

## PROCEDURE

5. Disconnect Modulation Meter and connect Power Meter to T/R Connector (11).
6. Using only the GEN LEVEL Vernier Control (10), make the following output level settings and verify the output levels on the Power Meter are within  $\pm 0.5$  dB. If necessary, make the corresponding adjustments, listed below, to obtain the correct level. Repeat these three adjustments on the Generate Audio PC Board, as necessary, until all are within tolerance.

Setting	Adjustment
a. -31 dBm	R3224 (+1 CAL)
b. -42 dBm	R3246 (-12 CAL)
c. -37 dBm	R3227 (-7 CAL)

7. Rotate GEN LEVEL Vernier Control (10) to -31 dBm. Select the following RF frequencies on the Keyboard (18) and verify the corresponding Power Meter readings are -31 dBm ( $\pm 2.5$  dB).
 

200 MHz	500 MHz	800 MHz	1 MHz
300 MHz	600 MHz	900 MHz	10 MHz
400 MHz	700 MHz	999 MHz	100 MHz
8. Connect Function Generator to EXT MOD/SINAD Connector (15).
9. Adjust Function Generator output for a 1 kHz tone at .5 VRMS. Verify MODULATION Meter (1) shows 50% ( $\pm 15\%$ ).
10. Set MODULATION Select Control (3) to "FM MID" Position and MODULATION Meter Control (4) to "20 kHzx10" Position.
11. Adjust Function Generator output to 1.5 VRMS at 1 kHz. Verify MODULATION METER (1) displays 15 kHz ( $\pm 4.5$  kHz). Disconnect Function Generator from EXT MOD/SINAD Connector (15).
12. Connect Microphone to MIC/ACC Connector (19). Speak into Microphone and verify that MODULATION Meter (1) peaks no greater than 6 kHz deviation.
13. Set MODULATION Meter Control (4) to "6 kHz/%x10" Position. Select DTMF function by depressing DTMF/PULSE key. While holding down the number "5" key, adjust R3260 (DTMF LEVEL ADJ) on the Generate Audio PC Board for an indicated 3.5 kHz deviation on MODULATION Meter (1).
14. Rotate the GEN/LOCK Control (32) out of the detent. Verify the LOCK Lamp (33) flashes and the FREQ ERROR Meter (36) indicates a minimum error of -10 kHz.

## STEP

## PROCEDURE

15. Rotate the GEN/LOCK Control (32) fully cw and verify the FREQ ERROR Meter (36) indicates a minimum error of +10 kHz.
16. Rotate the GEN/LOCK Control (32) fully ccw into "LOCK" position. Verify the LOCK Light (33) becomes steady.
17. Set Spectrum Analyzer to 20 MHz/Div and connect to T/R Connector (11). Verify non-harmonic frequencies are a minimum of 40 dBc at the following frequencies:

600 MHz	700 MHz	470 MHz	120 MHz
---------	---------	---------	---------
18. Rotate MODE Selector (39) to "DUP" position.
19. Verify +11 VDC is present on collector of Q1202. Adjust, as necessary, R1251 for proper level.
20. Using Keyboard (18) select RF 070.0000 MHz, set OFFSET to 00.0 and verify Spectrum Analyzer indicates -80 dBm ( $\pm 5$  dB).
21. Connect Spectrum Analyzer to DUPLEX Connector (14) and verify output level is -60 dBm ( $\pm 10$  dB). Adjust, as necessary, R1230 for proper level.
22. Connect Frequency Counter to DUPLEX Output Connector (14) and verify 70.000 MHz signal is present. Adjust, as necessary, L1209 for proper frequency.
23. Using BNC to BNC Coax Cable, connect DUPLEX Output Connector (14) to ANT Connector (34). Set MODE Selector Control (39) to "DUP GEN" Position and 1 kHz Tone Selector Switch (7) to "INTL" Position. Adjust 1 kHz Tone Level Control (8) for 5 kHz deviation on MODULATION METER (1).
24. Set MODE Selector Control (39) to "DUP" Position and verify 5 kHz deviation is displayed on MODULATION METER (1). Adjust R1224 (FM DEV CAL) on the Duplex module, as necessary, to obtain desired deviation.

**NOTE**

Repeat this procedure until 5 kHz deviation is obtained on both scales.

25. Disconnect all test equipment.

## 4-2-9 JVM I/O BOARD CALIBRATION

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                          Power Supply Calibration Procedure 4-2-2  
                          Frequency Standard Calibration Procedure 4-2-3  
                          Function Generator Calibration Procedure 4-2-4  
                          High Loop Calibration Procedure 4-2-5  
                          Digital Module Calibration Procedure 4-2-6

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        (See Appendix B for Test Equipment Requirements)

1 Variable Power Supply (Option 10 only)  
1 Digital Voltmeter (Option 10 only)

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	INITIAL SETTINGS
2 MODULATION SELECTOR	"FM NAR" Position
4 METER Range Selector	"2 kHz/%X10" Position
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
22 PWR/OFF/BATT Switch	"PWR" Position
35 FREQ ERROR Selector	"RF 10K" Position
39 MODE Selector	"GEN" Position
41 SQUELCH Control	Fully ccw Position

CALIBRATION POINTS:    See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Using the Keyboard (18) select RF 151.0000 MHz and 2ND FUNCTION METER.  |
| 2.   | Adjust R3032 (OFFSET) on DVM I/O PC Board, as required, for a reading of "MD 00.00" on VFD (37).  |
| 3.   | Place Modulation METER Control (4) to "6 kHz/%x10" Position and 1 kHz Tone Selector Switch to "INTL" Position. Adjust 1 kHz Tone Level Control (8) for 5 kHz deviation on MODULATION METER (1). |
| 4.   | Verify the VFD (37) reads "MD 5.00" $\pm$ .60. Adjust R3039 (MOD METER CAL) on DVM I/O PC Board, as required, for the correct display.  |
| 5.   | Set MODE Selector Control (39) to "REC" Position and using Keyboard select "RF 9.9950 MHz" on VFD (37).   |
| 6.   | Connect BNC to BNC Coax Cable between ANT Connector (34) and External Reference Connector (45).   |



## STEP

## PROCEDURE

7. Verify VFD (37) reads "FE + 05.00" ( $\pm .30$ ). Adjust R3035 (FREQ METER CAL) on DVM I/O PC Board, as required, to obtain the proper reading.
8. Place FREQ ERROR Meter Range Selector Control (35) to "3 kHz" Position and verify VFD (37) displays between "3.07 and 3.10". Adjust, as required, R3033 (INPUT GAIN) on DVM I/O PC Board for correct reading on VFD (37).

## OPTION 10 DVM I/O PC Board Only

1. Connect Variable Power Supply and DVM, using tee, to SCOPE/DVM Connector.
2. Set Variable Power Supply to 0 VDC as read on external DVM.
3. Using Keyboard (18), select DVM function and DC scale.
4. Adjust R3016 (ZERO ADJ) on DVM I/O PC Board so that DVM reading on FM/AM-1200S/A is the same as external DVM.
5. Set Variable Power Supply to 1.30 VDC as read on DVM. Adjust R3020 (DC CAL) on DVM I/O PC Board so that DVM reading on FM/AM-1200S/A is the same as external DVM.
6. Set Variable Power Supply to 5 VDC as read on DVM. Verify DVM reading on FM/AM-1200S/A is the same as external DVM.
7. Repeat procedure in step 6 with external DVM set at 20 VDC.
8. Set Variable Power Supply to 1.30 VRMS @ 1 kHz. Change FM/AM-1200S/A range to AC. Adjust R3008 (AC CAL) on DVM I/O PC Board so that DVM reading on FM/AM-1200S/A is the same as external DVM.
9. Disconnect all test equipment.

## 4-2-10 OSCILLOSCOPE/ANALYZER CALIBRATION (FM/AM-1200S ONLY)

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                             Power Supply Calibration Procedure 4-2-2  
                             Frequency Standard Calibration Procedure 4-2-3  
                             Function Generator Calibration Procedure 4-2-4  
                             High Loop Calibration Procedure 4-2-5  
                             Digital Module Calibration Procedure 4-2-6  
                             Modulation Meter Calibration Procedure 4-2-7

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        (See Appendix B for Test Equipment Requirements)  
                             1 Non-Conductive Tuning Tool  
                             1 Digital Multimeter  
                             1 RF Signal Generator  
                             1 DC Power Supply  
                             1 Coax Cable, BNC to BNC

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	INITIAL SETTINGS
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
23 VERTICAL Vernier Control	"CAL" Position
24 VERTICAL Selector Control	"1 V/DIV" Position
25 HORIZONTAL Vernier Control	"CAL" Position
26 HORIZONTAL Selector Control	"TONE" Position
22 PWR/OFF/BATT Switch	"PWR" Position
27 VERT POS Control	Midrange Position
28 INT Control	Midrange Position
29 FOCUS Control	Midrange Position
30 HORIZ POS Control	Midrange Position
39 MODE Selector Control	"GEN" Position

CALIBRATION POINTS:    See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Verify trace on CRT is a SHARP ROUND DOT. Adjust, as required, Geometry Control, R317 and Astigmatism Control, R316 on Scope Power PC Board for a sharp round dot.                        |
| 2.   | Using INT Control (28) and FOCUS Control (29), verify intensity and focus of trace can be properly adjusted. Alternately adjust R317 and R316, if necessary, for proper control of trace. |
| 3.   | Set VERTICAL Vernier Control (23) to fully CCW Position.  |
| 4.   | Rotate the HORIZONTAL Selector Control (26) to ".1 mS/DIV". Verify the trace is parallel to the horizontal lines on the CRT (31). Adjust R322 on Scope Power PC Board, as required, to    |

## STEP

## PROCEDURE

correct any nonparallel condition. If this adjustment cannot correct the nonparallel condition, reverse P301 on the Scope Power PC Board and readjust R322.

5. Position VERT POS Control (27) so that 0 V is present at J203, pin 4. Then adjust R294 on Scope Control PC Board, as required, to properly position trace over major horizontal axis.
6. Rotate the VERTICAL Vernier Control (23) fully cw and verify the trace does not move. Adjust R215 (BAL) on Scope Control PC Board, as necessary, for proper trace operation.
7. Select RF 151.0000 MHz on the Keyboard (18). Rotate the MODE Selector Control (39) to "GEN" and the HORIZONTAL Selector Control (26) to "1 MHz/DIV".
8. Using HORIZ POS Control (30), center signal over major vertical axis.
9. Verify baseline is visible on CRT (31). Adjust R218 (ANAL VERT GAIN CAL) on Scope Control PC Board, as required, until baseline is visible on CRT (31).
10. Verify trace extends 1 minor division past the left edge of the CRT (31). Adjust R271 (HORIZ SIZE) on Scope Control PC Board, as required, for correct trace position.
11. Verify the trace extends 1 minor division past the right edge of the CRT (31). Adjust R293 on Scope Control PC Board, as required, for correct trace position.
12. Repeat Steps 10 and 11 as required for proper trace positioning on CRT (31).
13. Rotate MODE Selector Control (39) to "REC" position.
14. Adjust RF Signal Generator for 151.0000 MHz at -50 dBm, with no modulation. Connect Generator to ANTENNA Connector (34) and verify the signal displayed on the CRT (31) is centered on the vertical center line.
15. Adjust Signal Generator to 147.0000 MHz and verify signal is 4 divisions to the left of center on the CRT (31). Adjust Generator to 155.0000 MHz and verify signal is 4 divisions to the right of center. Adjust R260 on Scope Control PC Board, as required, for proper dispersion.
16. Place MODE Selector Control (39) to "GEN" Position and HORIZONTAL Sweep Selector Control (26) to 1 kHz/DIV Position. Adjust R298 on Scope Control PC Board, as required, to center signal over major vertical axis.

## STEP

## PROCEDURE

17. Disconnect the Signal Generator and set the FM/AM-1200S controls as follows:

	CONTROL	SETTING
23	VERTICAL Vernier Control	"CAL" Position
24	VERTICAL Selector Control	"1V/DIV" Position
25	HORIZONTAL Vernier Control	"CAL" Position
26	HORIZONTAL Selector Control	".01 mS/DIV" Position
39	MODE Selector Control	"REC" Position
21	AC/GND/DC Switch	"DC" Position

18. Verify trace is centered over major horizontal axis.
19. Connect Power Supply to SCOPE Connector (20) and apply +4 VDC. Verify trace moves up 4 divisions. Adjust R221 (GAIN CAL) on Scope Control PC Board, as required, for correct deflection.
20. Rotate VERTICAL Vernier Control (23) fully ccw and verify the trace shows approximately 0.4 V.
21. Set Scope VERTICAL Vernier Control (23) to "CAL" Position.
22. Set AC/GND/DC Switch (21) to "AC" position and verify the trace returns to the center line.
23. Set AC/GND/DC Switch (21) to "GND" position and verify the trace does not move.
24. Disconnect the Power Supply and couple the TONE OUT Connector (17) to the SCOPE Connector (20) with a coax cable.
25. Set the FM/AM-1200S controls as follows:

	CONTROL	SETTING
5	VAR Tone Selector Switch	"INTL" Position
6	VAR Tone Level Control	Midrange Position
21	AC/GND/DC Switch	"DC" Position
25	Scope HORIZONTAL Sweep Vernier Control	"CAL" Position
26	HORIZONTAL Sweep Selector Control	"1 mS/DIV" Position

26. Using Keyboard, select "TONE 1000.0 TRIANGLE". Adjust HORIZ POS Control to position first positive peak of signal on leftmost major vertical graticule. Verify each positive peak of the triangle waveform is positioned over each major vertical graticule. Adjust R247 (SWP CAL) on the Scope Control PC Board, if necessary.

## STEP

## PROCEDURE

27. Rotate the HORIZONTAL Selector Control (26) to each of the following positions and select the corresponding triangle wave-form frequencies with the Keyboard (18). At each selection, verify the CRT (31) shows one cycle per division.

HORIZONTAL SELECTOR	TONE FREQUENCY
a. 10 mS	100 Hz ( $\pm 10\%$ )
b. 1 mS	1,000 Hz ( $\pm 10\%$ )
c. .1 mS	10,000 Hz ( $\pm 10\%$ )

28. With the FM/AM-1200S set from Step 27.c., rotate the HORIZONTAL Vernier Control (25) fully ccw and verify a minimum of 10 cycles per division on the CRT (31). Return the HORIZONTAL Vernier Control (25) to the "CAL" (fully cw) position.
29. Set the FM/AM-1200S Controls as follows:

CONTROL	SETTING
2 MODULATION Select Control	"NAR" Position
4 MODULATION Meter Control	"6 kHz/%x10" Position
5 VAR Tone Selector switch	"OFF" Position
7 1 kHz Tone Selector Switch	"INTL" Position
18 Keyboard	"RF 121.0000 MHz" Position
23 VERTICAL Vernier Control	"CAL" Position
24 VERTICAL Selector Control	"2 kHz/%x10" Position
25 HORIZONTAL Vernier Control	"CAL" Position
26 HORIZONTAL Selector Control	"1 mS/DIV" Position
39 MODE Selector Control	"GEN" Position

30. Adjust the 1 kHz Tone Level Control (8) for 4 kHz deviation on the MODULATION Meter (1).
31. Verify the signal displayed on the CRT (31) is 2 divisions peak to peak. Adjust R201 (DEMODO CAL) on Scope Control PC Board, as required, for correct display.
32. Place PWR/OFF/BATT Switch (22) to "OFF" Position, remove coax cable from TONE OUT Connector (17) to SCOPE Connector (20) and connect Signal Generator to ANT Connector (34).
33. Remove Analyzer Log Amp Assembly and apply power to test set.
34. Using VERT POS Control (27) center trace over major horizontal axis.

## STEP

## PROCEDURE

35. Place 1 kHz Tone Selector Switch (7) to "OFF" Position, VERTICAL Attenuator Selector Control (24) to "1V/Div" Position and Horizontal Sweep Selector Control (26) to "1 MHz/Div" Position.
36. Using HORIZ POS Control (30) center signal over major vertical axis.
37. Place MODE Selector Control (39) to "REC" Position and set Signal Generator to 121.000 MHz @ -40 dBm.
38. Verify CRT (31) displays a signal level of -40 dBm. Adjust R830 (GAIN) and R831 (REF LVL) on Analyzer Log Amp PC Board alternately for desired signal level.
39. Adjust R832 (BASE LINE) to set bottom of the baseline noise floor level at -110 dBm on CRT (31) scale.
40. Repeat steps 38 and 39 until the peak signal level is set at -40 dBm and noise floor level is set at -110 dBm on CRT (31).

**NOTE**

If signal level and baseline noise floor cannot be obtained in Step 29, adjust R218 (ANAL VERT GAIN CAL) on Scope Control PC Board to obtain desired levels.

41. Set Signal Generator to -70 dBm. Adjust R818 (AMP 1 GAIN) on Analyzer Log Amp PC Board for a signal level of -70 dBm on CRT (31).
42. Set Signal Generator to -90 dBm. Adjust R824 (AMP 2 GAIN) on Analyzer Log Amp PC Board for a signal level of -90 dBm CRT (31).
43. Set Signal Generator to -30 dBm. Adjust R812 (LOG LINEARITY) on Analyzer Log Amp PC Board for a signal level of -30 dBm on CRT (31).
44. Repeat Steps 38 thru 43, as necessary to obtain required levels.
45. Set Signal Generator to -40 dBm. Verify signal level is -40 dBm on CRT. Adjust R522 (IF GAIN) on Analyzer IF PC Board, as required, to obtain desired level.

**NOTE**

If it is necessary to adjust R543 and/or R559 in the following steps, remove the Analyzer IF PC Board from its "can" and move the Analyzer Log Amp module forward one slot. Then reconnect all coaxes and the ribbon cable. Be sure to insulate the exposed board.

STEP

PROCEDURE

46. Rotate HORIZONTAL Sweep Selector Control (26) to "20 kHz/Div" Position and verify signal level is -40 dBm on CRT (31). Adjust R543 (3 kHz LVL ADJ) on Analyzer IF PC Board, as required, to obtain desired level.
47. Place HORIZONTAL Sweep Selector Control (26) to "1 kHz/Div" Position and verify signal level on CRT (31) is -40 dBm. Adjust R559 (300 Hz LVL ADJ) on Analyzer IF PC Board, as necessary, to obtain desired level.
48. Disconnect test equipment, replace Analyzer Log Amp assembly and FM/AM-1200S cover.

## 4-2-11 OSCILLOSCOPE CALIBRATION (FM/AM-1200A ONLY)

PREREQUISITES:            Meter Zero Calibration Procedure 4-2-1  
                             Power Supply Calibration Procedure 4-2-2  
                             Frequency Standard Calibration Procedure 4-2-3  
                             Function Generator Calibration Procedure 4-2-4  
                             High Loop Calibration Procedure 4-2-5  
                             Digital Module Calibration Procedure 4-2-6  
                             Modulation Meter Calibration Procedure 4-2-7

SPECIAL ACCESSORY  
EQUIPMENT REQ'D:        (See Appendix B for Test Equipment Requirements)  
                             1 Non-Conductive Tuning Tool  
                             1 Digital Multimeter  
                             1 RF Signal Generator  
                             1 Function Generator  
                             1 DC Power Supply  
                             1 Coax Cable, BNC to BNC

INITIAL CONTROL  
SETTINGS:                See Figure 1-2

CONTROL	SETTING
5 VAR Tone Selector Switch	"OFF" Position
7 1 kHz Tone Selector Switch	"OFF" Position
23 VERTICAL Vernier Control	"CAL" Position
24 VERTICAL Selector Control	"1 V/DIV" Position
25 HORIZONTAL Vernier Control	"CAL" Position
26 HORIZONTAL Selector Control	"TONE" Position
22 PWR/OFF/BATT Switch	"PWR" Position
27 VERT POS Control	Midrange Position
28 INT Control	Midrange Position
29 FOCUS Control	Midrange Position
30 HORIZ POS Control	Midrange Position
39 MODE Selector Control	"GEN" Position

CALIBRATION POINTS:    See Figure 4-5

- | STEP | PROCEDURE   |
|------|---|
| 1.   | Verify trace on CRT is a SHARP ROUND DOT. Adjust, as required, Geometry Control, R317 and Astigmatism Control, R316 on Scope Power PC Board for a sharp round dot.                        |
| 2.   | Using INT Control (28) and FOCUS Control (29), verify intensity and focus of trace can be properly adjusted. Alternately adjust R317 and R316, if necessary, for proper control of trace. |
| 3.   | Set VERTICAL Vernier Control (23) to fully CCW Position.  |



## STEP

## PROCEDURE

4. Rotate the HORIZONTAL Selector Control (26) to "100  $\mu$ S/DIV". Verify the trace is parallel to the horizontal lines on the CRT (31). Adjust R322 on Scope Power PC Board, as required, to correct any nonparallel condition. If this adjustment cannot correct the nonparallel condition, reverse P301 on the Scope Power PC Board and readjust R322.
5. Adjust VERT POS Control (27) to properly position trace over major horizontal axis.
6. Rotate the VERTICAL Vernier Control (23) fully cw and verify the trace does not move. Adjust R215 (BAL) on Scope Control PC Board, as necessary, for proper trace operation.
7. Repeat Steps 5 and 6, as required, if adjustment was made.
8. Verify trace extends 1 minor division past the left edge of the CRT (31). Adjust R271 (HORIZ SIZE) on Scope Control PC Board, as required, for correct trace position.
9. Verify the trace extends 1 minor division past the right edge of the CRT (31). Adjust R293 on Scope Control PC Board, as required, for correct trace position.
10. Repeat Steps 8 and 9 as required for proper trace positioning on CRT (31).
11. Set the FM/AM-1200A controls as follows:

CONTROL	SETTING
23 VERTICAL Vernier Control	"CAL" Position
24 VERTICAL Selector Control	"1V/DIV" Position
25 HORIZONTAL Vernier Control	"CAL" Position
26 HORIZONTAL Selector Control	"10 $\mu$ S/DIV" Position
39 MODE Selector Control	"REC" Position
21 AC/GND/DC Switch	"DC" Position

12. Verify trace is centered over major horizontal axis.
13. Connect Power Supply to SCOPE/DVM Connector (20) and apply +4 VDC. Verify trace moves up 4 divisions. Adjust R221 (GAIN CAL) on Scope Control PC Board, as required, for correct deflection.
14. Repeat Steps 12 and 13, as required, if adjustment was made.
15. Rotate VERTICAL Vernier Control (23) fully ccw and verify the trace shows approximately 0.4 V.
16. Set VERTICAL Vernier Control (25) to "CAL" Position.

## STEP

## PROCEDURE

17. Set AC/GND/DC Switch (21) to "AC" position and verify the trace returns to the center line.
18. Set AC/GND/DC Switch (21) to "GND" position and verify the trace does not move.
19. Disconnect the Power Supply and couple the TONE OUT Connector (17) to the SCOPE/DVM Connector (20) with a coax cable.
20. Set the FM/AM-1200A controls as follows:

## CONTROL

## SETTING

21	AC/GND/DC Switch	"DC" Position
26	HORIZONTAL Sweep Selector Control	"1 mS/DIV" Position

21. Connect Function Generator to SCOPE/DVM Connector (15). Set output to 1000 Hz. Adjust HORIZ POS Control to position first positive peak of signal on leftmost major vertical graticule. Verify each positive peak of the triangle waveform is positioned over each major vertical graticule. Adjust R247 (SWP CAL) on the Scope Control PC Board if necessary.
22. Rotate the HORIZONTAL Selector Control (26) to each of the following positions and select the corresponding frequency on Function Generator. At each selection, verify the CRT (31) shows one cycle per division.

HORIZONTAL SELECTOR	FUNCTION GENERATOR FREQUENCY
a. 10 mS	100 Hz ( $\pm 10\%$ )
b. 1 mS	1,000 Hz ( $\pm 10\%$ )
c. 100 $\mu$ S	10,000 Hz ( $\pm 10\%$ )
d. 10 nS	100,000 Hz ( $\pm 10\%$ )
e. 1 nS	1,000,000 Hz ( $\pm 10\%$ )

23. With the FM/AM-1200A set as in Step 20.c., rotate the HORIZONTAL Vernier Control (25) fully ccw and verify a minimum of 10 cycles per division on the CRT (31). Return the HORIZONTAL Vernier Control (25) to the "CAL" (fully cw) position.

## STEP

## PROCEDURE

24. Set the FM/AM-1200A Controls as follows:

	CONTROL	SETTING
	2 MODULATION Select Control	"FM NAR" Position
	4 MODULATION Meter Control	"6 kHz/%x10" Position
	5 VAR Tone Selector switch	"OFF" Position
	7 1 kHz Tone Selector Switch	"INTL" Position
	18 Keyboard	"RF 121.0000 MHz" Position
	23 VERTICAL Vernier Control	"CAL" Position
	24 VERTICAL Selector Control	"2 kHz/%x10" Position
	25 HORIZONTAL Vernier Control	"CAL" Position
	26 HORIZONTAL Selector Control	"1 mS/DIV" Position
	39 MODE Selector Control	"GEN" Position

25. Adjust the 1 kHz Tone Level Control (8) for 4 kHz deviation on the MODULATION Meter (1).

26. Verify the signal displayed on the CRT (31) is 2 divisions peak to peak. Adjust R201 (DEMODO CAL) on the Scope Control PC Board, as required, for correct display.

27. Disconnect test equipment.

# SECTION 5 - PREVENTIVE MAINTENANCE

## 5-1 GENERAL

Preventive maintenance on FM/AM-1200S/A test sets consists primarily of cleaning and visual inspection of internal/external components. External cleaning of the test set is recommended as often as necessary, depending on the environmental conditions to which the set is exposed. Internal cleaning should be performed on a more limited basis, preferably when the set is in a disassembled state for routine calibration, troubleshooting and/or repair. Test set disassembly for the sole purpose of internal cleaning is not recommended.

### 5-1-1 EXTERNAL CLEANING

1. Clean front panel and case with a soft lint-free cloth moistened with rubbing alcohol.
2. To remove tar or oil from outside case, safety solvent may be used.

#### **CAUTION**

DO NOT ALLOW SAFETY SOLVENT TO CONTACT FRONT PANEL CONTROL AREA. SOLVENT CAN CAUSE DAMAGE TO FRONT PANEL CONTROLS, MARKINGS ETC.

### 5-1-2 INTERNAL CLEANING AND INSPECTION

#### **NOTE**

The following procedures require external case to be removed from test set.

#### **CAUTION**

DELIBERATE MOVING (HOWEVER SLIGHT) OF DISCRETE COMPONENTS ON CIRCUIT BOARDS, ETC. SHOULD BE AVOIDED.

DO NOT OPEN INTERNAL MODULES FOR SOLE PURPOSES OF CLEANING.

1. Remove dust with hand-controlled dry air jet of 15 psi ( $1.054 \text{ kg/cm}^2$ ) and wipe internal chassis parts and frame with soft lint-free cloth moistened with alcohol.

1. (Continued)

**WARNING**

DO NOT USE COMPRESSED AIR IN EXCESS OF 15 PSI. USE EXTREME CARE WHEN USING COMPRESSED AIR IN THE VICINITY OF CRT, IN ORDER TO MINIMIZE POSSIBILITY OF CRT IMPLOSION. OBSERVE FOLLOWING PRECAUTIONS:

- a. REMOVE ANY LARGE DIRT/DUST PARTICLES FROM CRT MANUALLY, AS OPPOSED TO USING COMPRESSED AIR.
- b. DO NOT USE COMPRESSED AIR IN A DIRTY, CLUTTERED ENVIRONMENT. REMOVE ANY DEBRIS OR SMALL OBJECTS IN THE IMMEDIATE WORK AREA THAT MAY BECOME AIRBORNE DUE TO PRESSURIZED AIRFLOW.
- c. IF POSSIBLE, USE AN AIR HOSE NOZZLE EQUIPPED WITH A SPRING LOADED ON/OFF VALVE, AS OPPOSED TO ONE THAT REMAINS OPEN OR CLOSED CONTINUOUSLY.
- d. MAKE SURE COMPRESSED AIR HOSE IS FILTERED, TO PREVENT POSSIBLE OIL OR WATER DROPLETS FROM STRIKING CRT AT HIGH SPEEDS.

2. Inspect CHASSIS for:

- a. Tightness of subassemblies and chassis mounted connectors.
- b. Corrosion or damage to metal surfaces.

3. Inspect CAPACITORS for:

- a. Loose mounting, deformities or obvious physical damage.
- b. Leakage or corrosion around leads.

4. Inspect CONNECTORS for:

- a. Loose or broken parts, cracked insulation and bad contacts.  
DO NOT disassemble connectors needlessly within test set.

5. Inspect POTENTIOMETER CONTROLS for:

- a. Free rotation. If rotation feels rough, check control with an ohmmeter.

6. Inspect readily accessible PRINTED CIRCUIT BOARDS for:

- a. Corrosion or damage to connectors.

6. (Continued)
  - b. Damage to all mounted components including crystals and I.C.'s.
  - c. Accumulation of dirt, dust or other foreign material.
7. Inspect RESISTORS for:
  - a. Cracked, broken, charred or blistered bodies.
  - b. Loose or corroded solder connections.
8. Inspect SEMICONDUCTORS for:
  - a. Cracked, broken, charred or discolored bodies.
  - b. Seals around leads being in place and in good condition.
9. Inspect TOGGLE SWITCHES for:
  - a. Loose levers or terminals and switch body contact to frame.
  - b. Bent or loose line switch contacts.
10. Inspect TRANSFORMER for:
  - a. Signs of excessive heating.
  - b. Broken or charred insulation and loose mounting hardware.
11. Inspect WIRING for:
  - a. Broken or loose ends and connections.
  - b. Proper dress relative to other chassis parts.

**NOTE**

All laced wiring should be tight with ends securely tied.

# SECTION 6 - PC BOARDS AND SCHEMATICS

## 6-1 GENERAL

This section contains component layout drawings for all PC Board assemblies, interconnect diagrams, circuit schematics, waveforms and charts reflecting voltage levels keyed to test points. These drawings are sequenced in the order they are discussed in Section 2 (Theory of Operation). An alphabetical index of all drawings for each module is contained in paragraph 6-3.

## 6-2 HOW TO USE SCHEMATICS

To trace coaxial cable conductors from one schematic to another follow the procedures outlined in paragraph 6-2-1, and to trace conductors for multiple pin connectors refer to paragraph 6-2-2.

### 6-2-1 Coaxial Cables

- a. Locate desired module on Coaxial Cable Interconnect Drawing.
- b. Locate desired coaxial cable on Interconnect Drawing. (Connectors are identified by reference designators.)
- c. Follow coaxial cable on Interconnect Drawing to locate opposite end of conductor. Note cable reference designator and module of cables destination.
- d. Locate schematic of desired module on index of circuit schematics in paragraph 6-3.
- e. Locate reference designator of coaxial connector and continue tracing circuit.

### 6-2-2 Multiple Pin Connectors

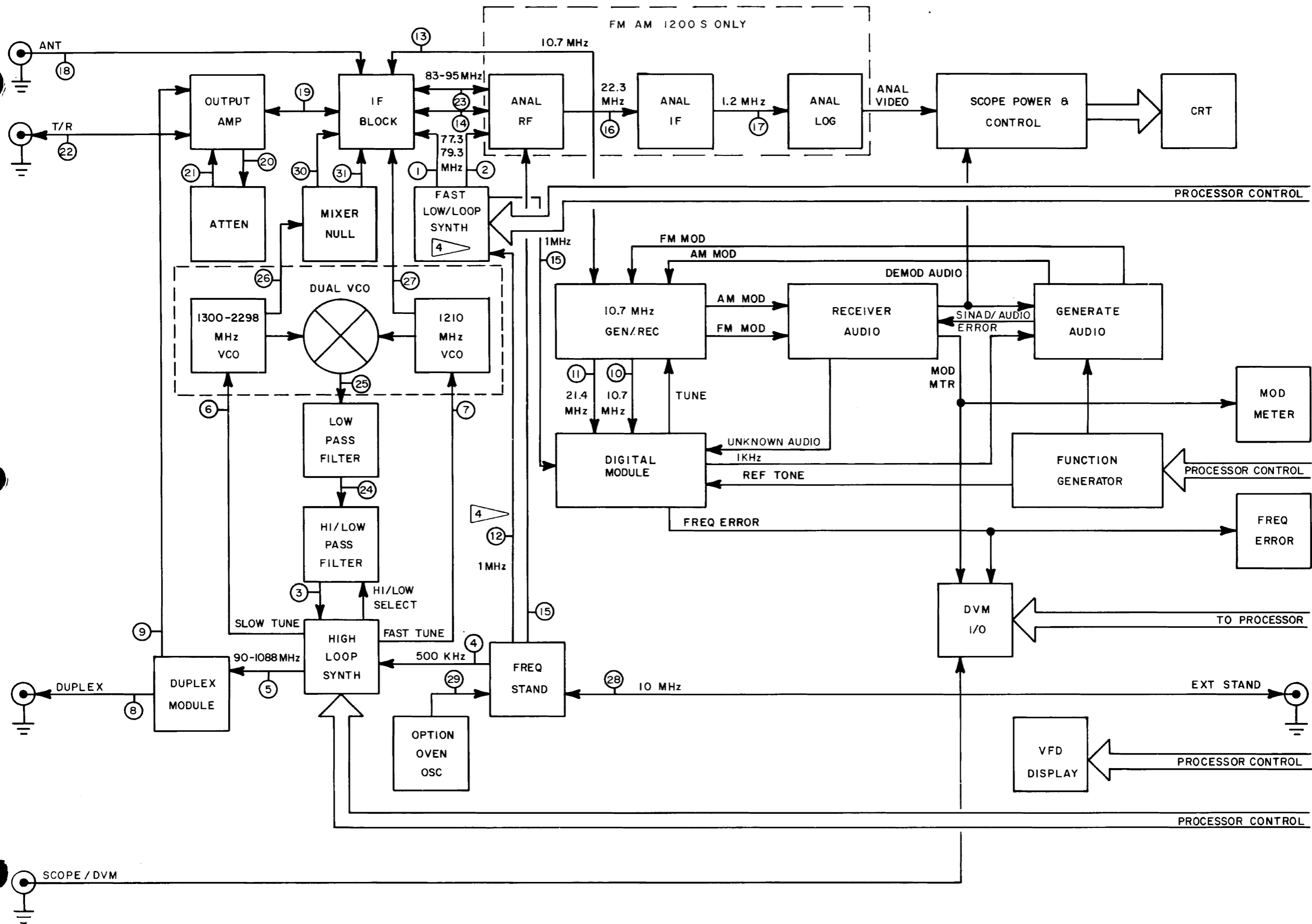
- a. Locate desired module on Interconnect drawing.
- b. Locate desired multiple pin connector on Interconnect Drawing. Note reference designator of the mating connector.
- c. Note module or wire harness on which the connector is mounted or grouped.
- d. Locate schematic of desired module on index of circuit schematics in paragraph 6-3.
- e. Using module schematic, locate reference designator of connector and corresponding pin number. Continue tracing circuit.

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SIGNAL SOURCE			SIGNAL DESTINATION		RECEIVE MODE		GENERATE MODE		DUPLEX MODE	
COAX NO.	CONNECTOR NO.	MODULE	CONNECTOR NO.	MODULE	LEVEL	FREQ/SIGNAL	LEVEL	FREQ/SIGNAL	LEVEL	FREQ/SIGNAL
1	J4202	LOW LOOP	J2203	IF BLOCK	+5 TO +12 dBm	77.3-79.3 MHz	+5 TO +12 dBm	77.3-79.3 MHz	+5 TO +12 dBm	77.3-79.3 MHz
2	J4203	LOW LOOP	J403	ANALYZER RF	-20 TO -40 dBm	77.3-79.3 MHz	-20 TO -40 dBm	77.3-79.3 MHz	-20 TO -40 dBm	77.3-79.3 MHz
3	J602	HI/LOW FILTER	J4101	HIGH LOOP	-28 dBm TO -34 dBm	90-1088 MHz	-28 dBm TO -34 dBm	90-1088 MHz	-28 dBm TO -34 dBm	90-1088 MHz
4	E2807	FREQ STANDARD	J4001	HIGH LOOP	4 V P-P ( $\pm 5$ V)	500 kHz	4 V P-P ( $\pm 5$ V)	500 kHz	4 V P-P ( $\pm 5$ V)	500 kHz
5	J4103	HIGH LOOP	J1201	DUPLEX	-20 TO -30 dBm	90-1088 MHz	-20 TO -30 dBm	90-1088 MHz	-20 TO -30 dBm	90-1088 MHz
6	J4003	HIGH LOOP	J1906	DUAL VCO (1ST LO)	D.C.	0-35 VDC	D.C.	0-35 VDC	0-35 VDC	DC
7	J4002	HIGH LOOP	J1903	DUAL VCO (2ND LO)	D.C.	0 VDC	D.C.	0 VDC	0 VDC	DC
8	J1203	DUPLEX	J3513	DUPLEX CONNECTOR					-60 dBm	OFFSET GEN FREQ
9	J1204	DUPLEX	J5105	OUTPUT AMPLIFIER					-30 dBm	OFFSET GEN FREQ
10	J4303	10.7 MHz GEN/REC	J4401	DIGITAL	120 mV P-P ( $\pm 10$ mV)	10.7 MHz	120 mV P-P ( $\pm 10$ mV)	10.7 MHz	120 mV P-P ( $\pm 10$ mV)	10.7 MHz
11	J4304	10.7 MHz GEN/REC	J4502	DIGITAL	2.2 V P-P ( $\pm 2$ mV)	21.4 MHz	2.2 V P-P ( $\pm 2$ V)	21.4 MHz	2.2 V P-P ( $\pm 2$ V)	21.4 MHz
12	E2806	FREQ STANDARD	J58002	FAST LOW LOOP	4.0 V P-P ( $\pm 5$ V)	1 MHz	4.0 V P-P ( $\pm 5$ V)	1 MHz	4.0 V P-P ( $\pm 5$ V)	1 MHz
13	J2202	IF BLOCK	J4302	10.7 MHz GEN/REC	INPUT $\pm 2$ dBm	10.7 MHz	-15 TO -20 dBm	10.7 MHz	INPUT $\pm 2$ dBm	10.7 MHz
14	J405	ANALYZER RF	J2208	IF BLOCK	INPUT	83-95 MHz	-28 dBm TO -32 dBm	88-90 MHz	INPUT	83-95 MHz
15	E2809	FREQ STANDARD	J404	ANALYZER RF	1.5 V P-P ( $\pm 2$ V)	1 MHz	1.5 V P-P ( $\pm 2$ V)	1 MHz	1.5 V P-P ( $\pm 2$ V)	1 MHz
16	J401	ANALYZER RF	J502	ANALYZER IF	0 TO 5 dBc	22.3 MHz	-45 TO -60 dBc	22.3 MHz	0 TO 5 dBc	22.3 MHz
17	J503	ANALYZER IF	J802	ANALYZER LOG AMP	30 dBc	1.2 MHz	30 dBc	1.2 MHz	30 dBc	1.2 MHz
18	J3512	ANT CONNECTOR	J2201	IF BLOCK	INPUT	RF			INPUT	RF
19	J2202	IF BLOCK	J1501	OUTPUT AMPLIFIER			-20 dBm ( $\pm 5$ dB)	RF		
20	J5103	OUTPUT AMPLIFIER	AT3501-J1	ATTENUATOR			W/FINE ATTN CCW 0 dBm ( $\pm 1$ dB)	RF		
21	AT3501-J2	ATTENUATOR	J5102	OUTPUT AMPLIFIER			20 dB ABOVE SELECTED LEVEL	RF		
22	J3514	T/R CONNECTOR	J5104	OUTPUT AMPLIFIER			-20 TO -127 dBm	RF	-80 dBm	RF
23	J2209	IF BLOCK	J406	ANALYZER RF	INPUT	83-95 MHz	-28 dBm TO -32 dBm	88-90 MHz	INPUT	83-95 MHz
24	J6402	LOW PASS FILTER	J601	HI/LOW FILTER	-25 dBm TO -30 dBm	90-1088 MHz	-25 dBm TO -30 dBm	90-1088 MHz	-25 dBm TO -3 dBm	90-1088 MHz
25	J1907	DUAL VCO	J6401	LOW PASS FILTER	-22 dBm TO -28 dBm	90-1088 MHz	-22 dBm TO -28 dBm	90-1088 MHz	-22 dBm TO -28 dBm	90-1088 MHz
26	J1905	DUAL VCO	J9301	MIXER NULL	+5 TO +12 dBm	1300-2298 MHz	+5 TO +12 dBm	1300-2298 MHz	+5 TO +12 dBm	1300-2298 MHz
27	J1902	DUAL VCO	J2207	IF BLOCK	+5 TO +12 dBm	1210 MHz	+5 TO +12 dBm	1210 MHz	+5 TO +12 dBm	1210 MHz
28	E2805	FREQ STANDARD	J4603	EXT REF CONNECTOR	130 mV P-P ( $\pm 10$ mV)	10 MHz	130 mV P-P ( $\pm 10$ mV)	10 MHz	130 mV P-P ( $\pm 10$ mV)	10 MHz
29	J3602	OPT OVEN OSC	E2808	FREQ STANDARD	1.5 V P-P ( $\pm 2$ V)	10 MHz	1.5 V P-P ( $\pm 2$ V)	10 MHz	1.5 V P-P ( $\pm 2$ V)	10 MHz
30	J9302	MIXER NULL	J2205	IF BLOCK	+5 TO +12 dBm	1300-2298 MHz	+5 TO +12 dBm	1300-2298 MHz	+5 TO +12 dBm	1300-2298 MHz
31	J9303	MIXER NULL	J2210	IF BLOCK		1300-2298 MHz		1300-2298 MHz		
34	J58005	FAST LOW LOOP	J4503	DIGITAL	4.0 V P-P ( $\pm 5$ V)	1 MHz	4.0 V P-P ( $\pm 5$ V)	1 MHz	4.0 V P-P ( $\pm 5$ V)	1 MHz

NOTES:

1 FM/AM-1200S ONLY

2 FM/AM-1200A: SIGNAL DESTINATION IS J2208 ON IF BLOCK ASSEMBLY

3 FM/AM-1200S: SIGNAL SOURCE IS J2209 ON IF BLOCK ASSEMBLY

4 COAX NO. 12 SIGNAL DESTINATION IS J4503 OF THE DIGITAL MODULE FOR FM/AM-1200S S/N 3300 THRU 4490 AND FM/AM-1200A S/N 1250 THRU 1448.

5 COAX NO. 34 IS APPLICABLE TO FM/AM-1200S S/N 4491 AND ON, AND FM/AM-1200A S/N 1449 AND ON.

Figure 6-1 FM/AM-1200S/A System Block Diagram With Coax Numbers and Signal Flow Data

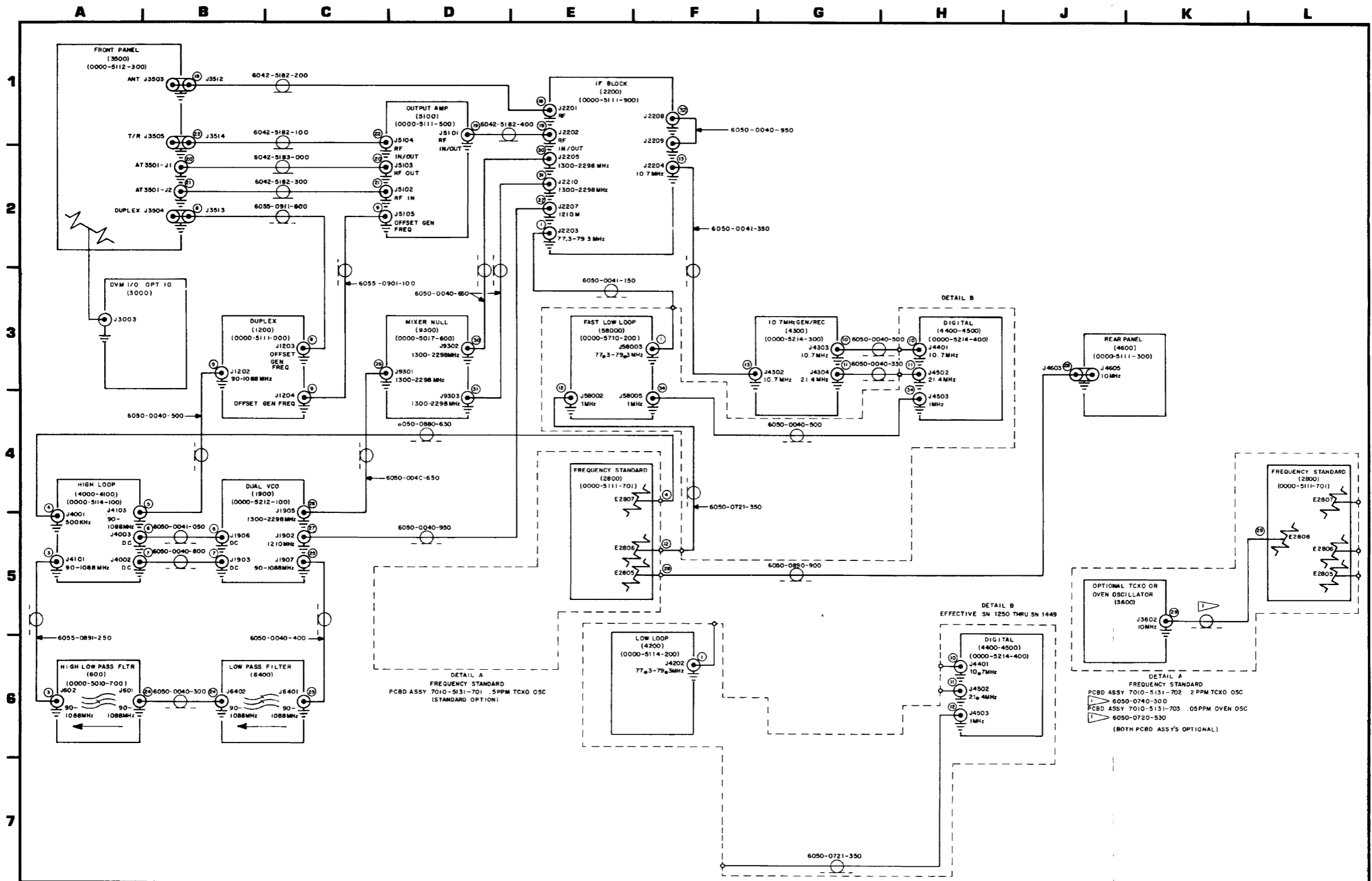


Figure 6-2 Coaxial Cable Interconnect Diagram (FM/M-1200A)  
(0000-5511-800-C)

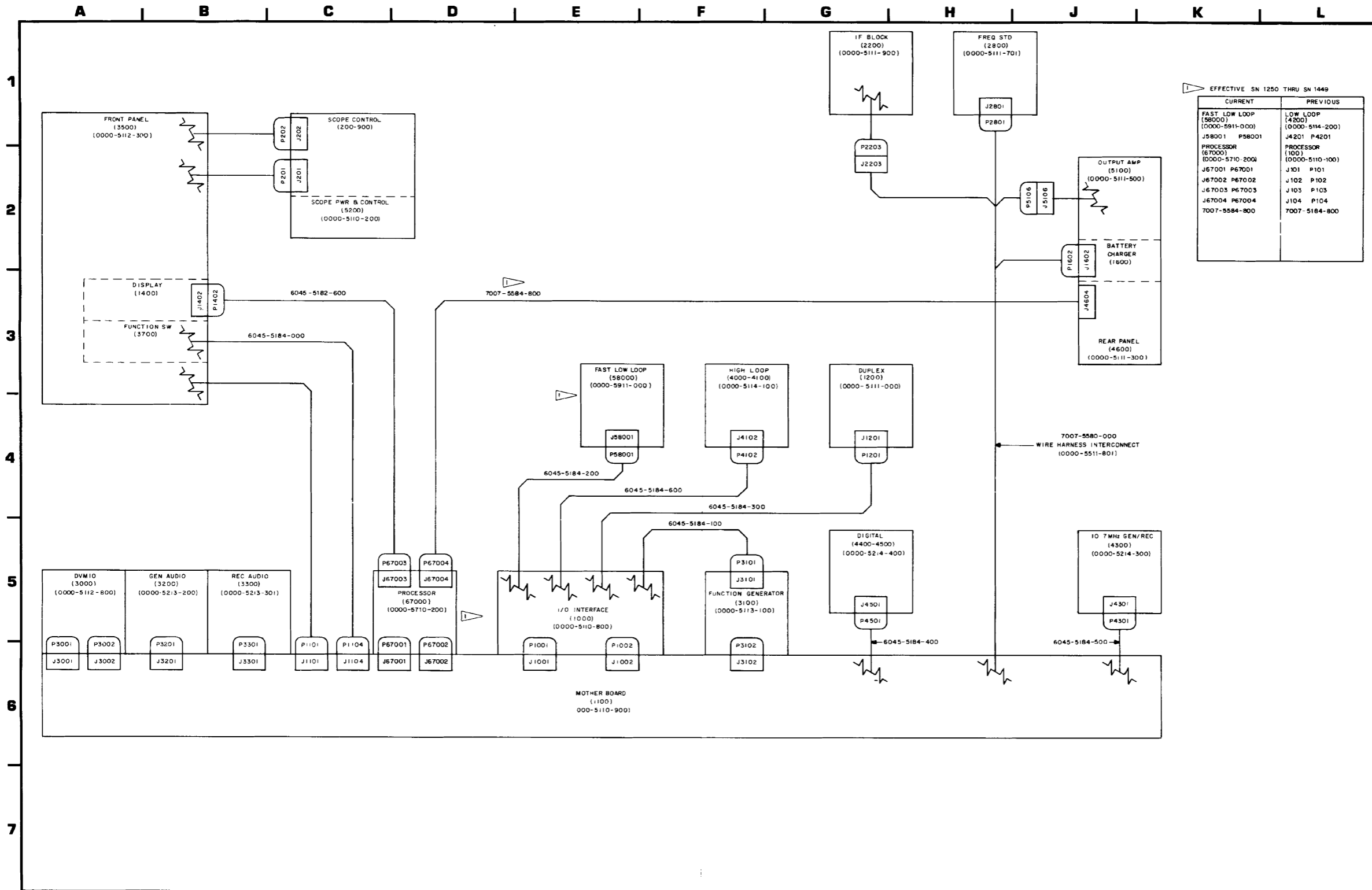
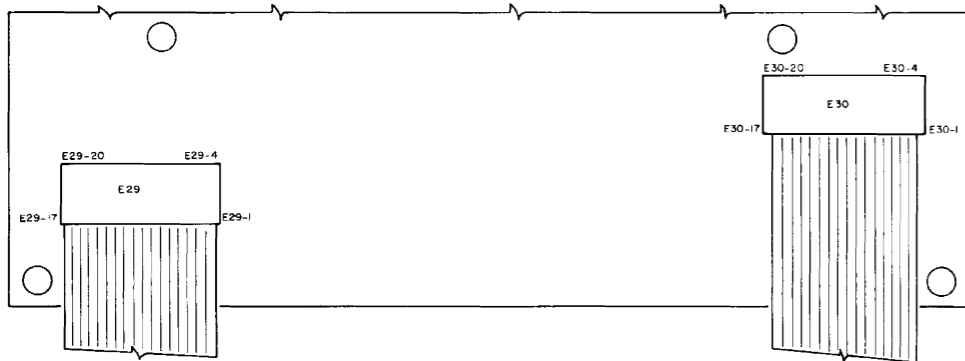
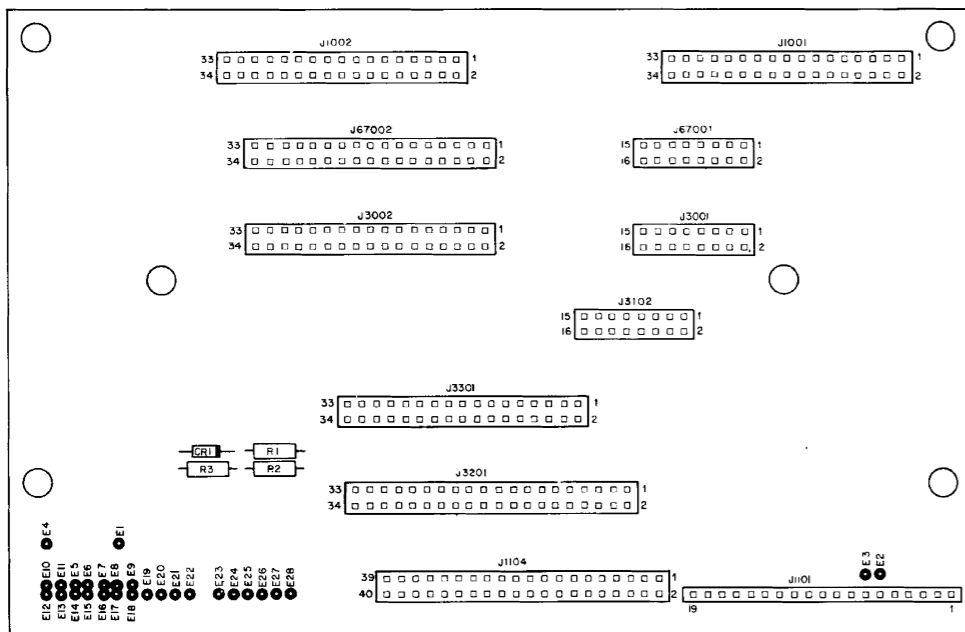
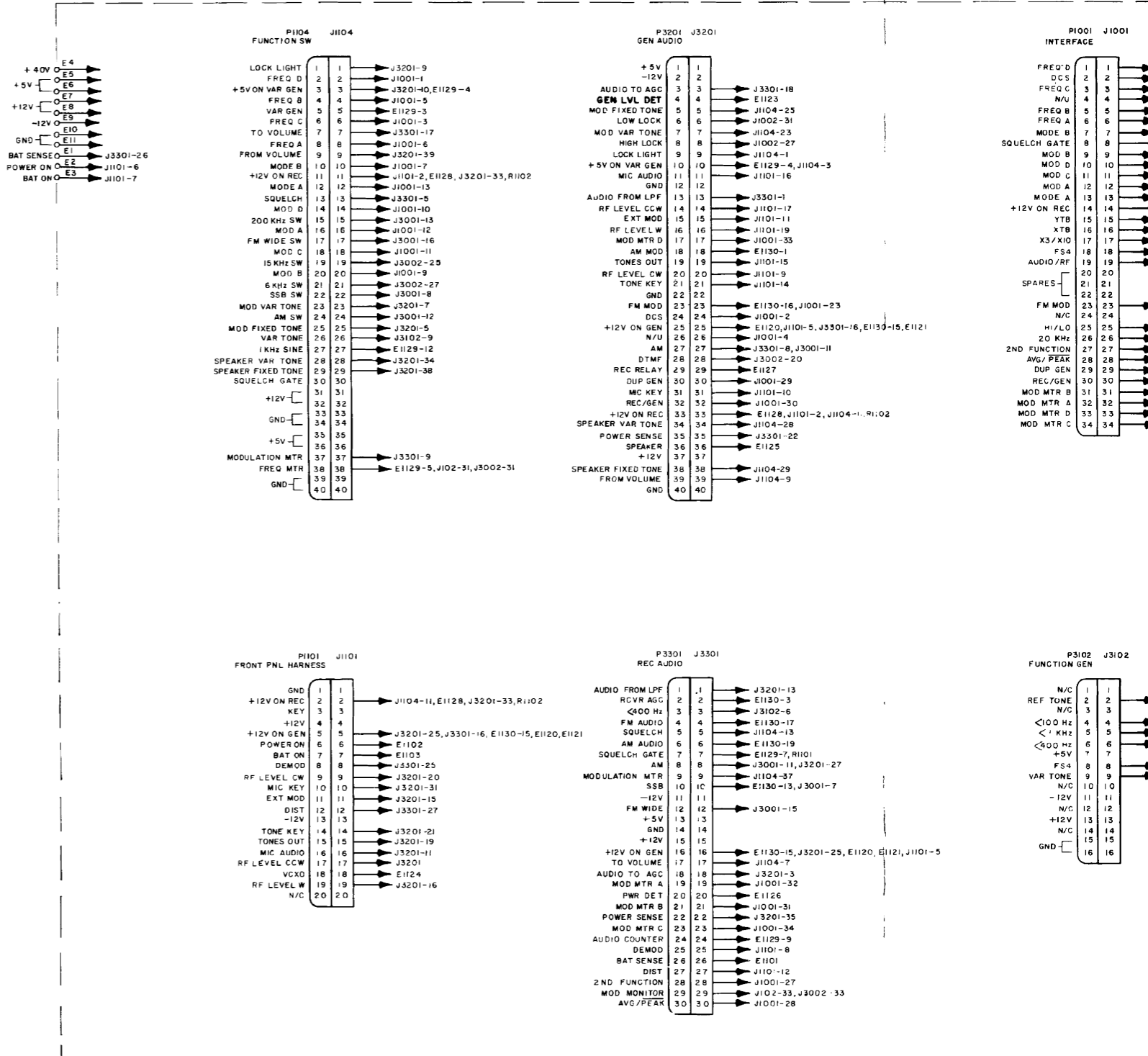


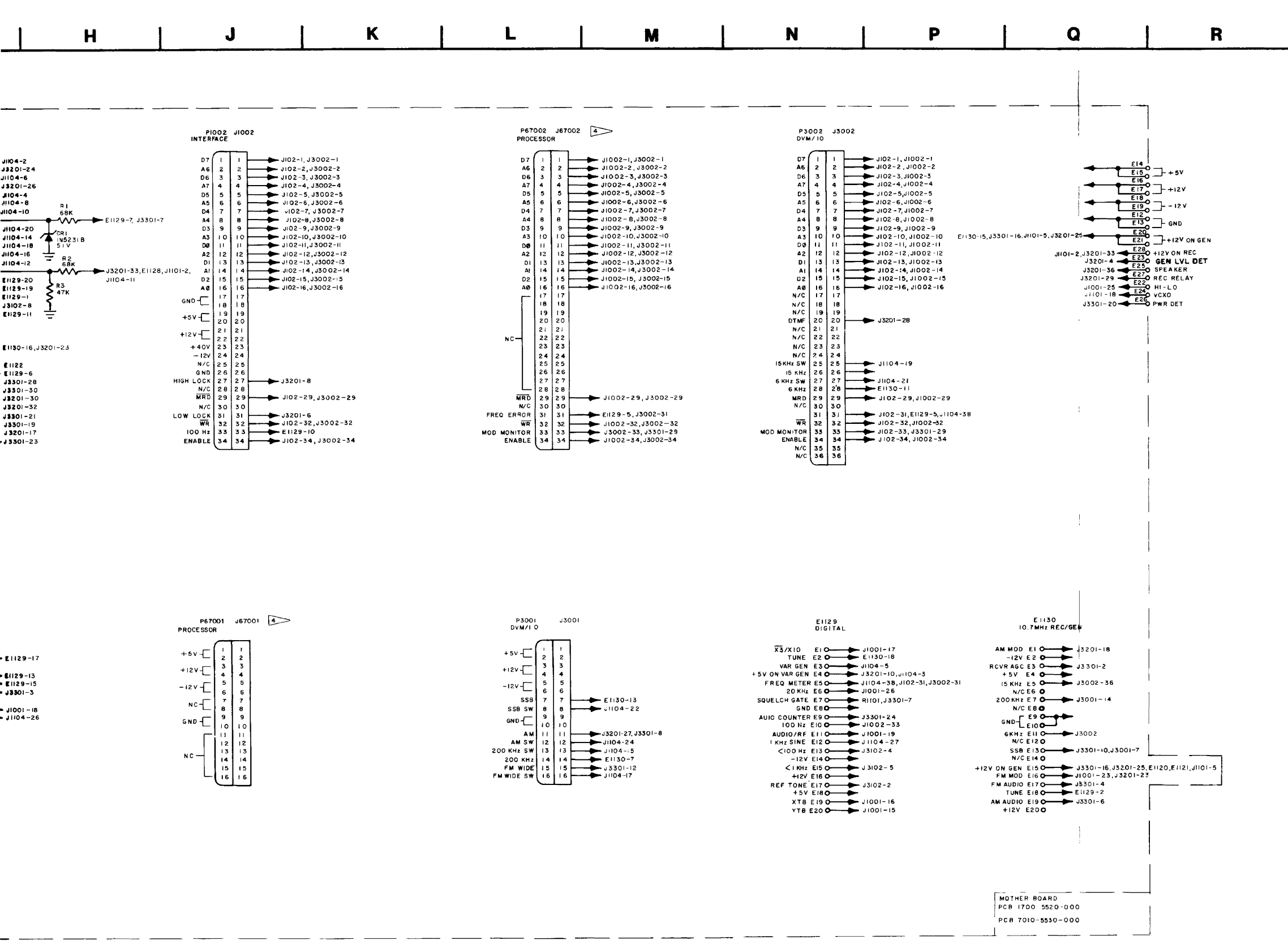
Figure 6-3 Ribbon Cable Interconnect Diagram (FM/M-1200A) (0000-5511-800-C)

1  
2  
3  
4  
5  
6  
7



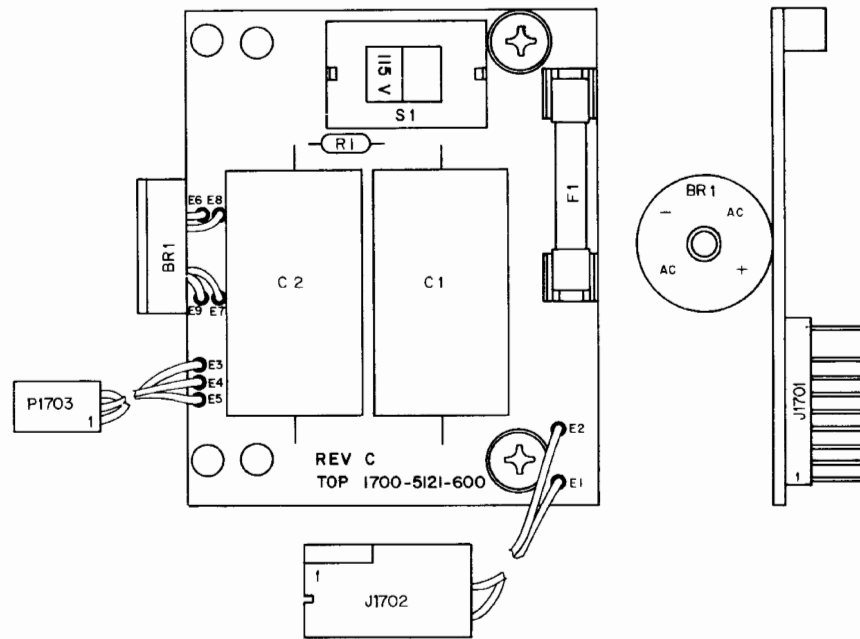
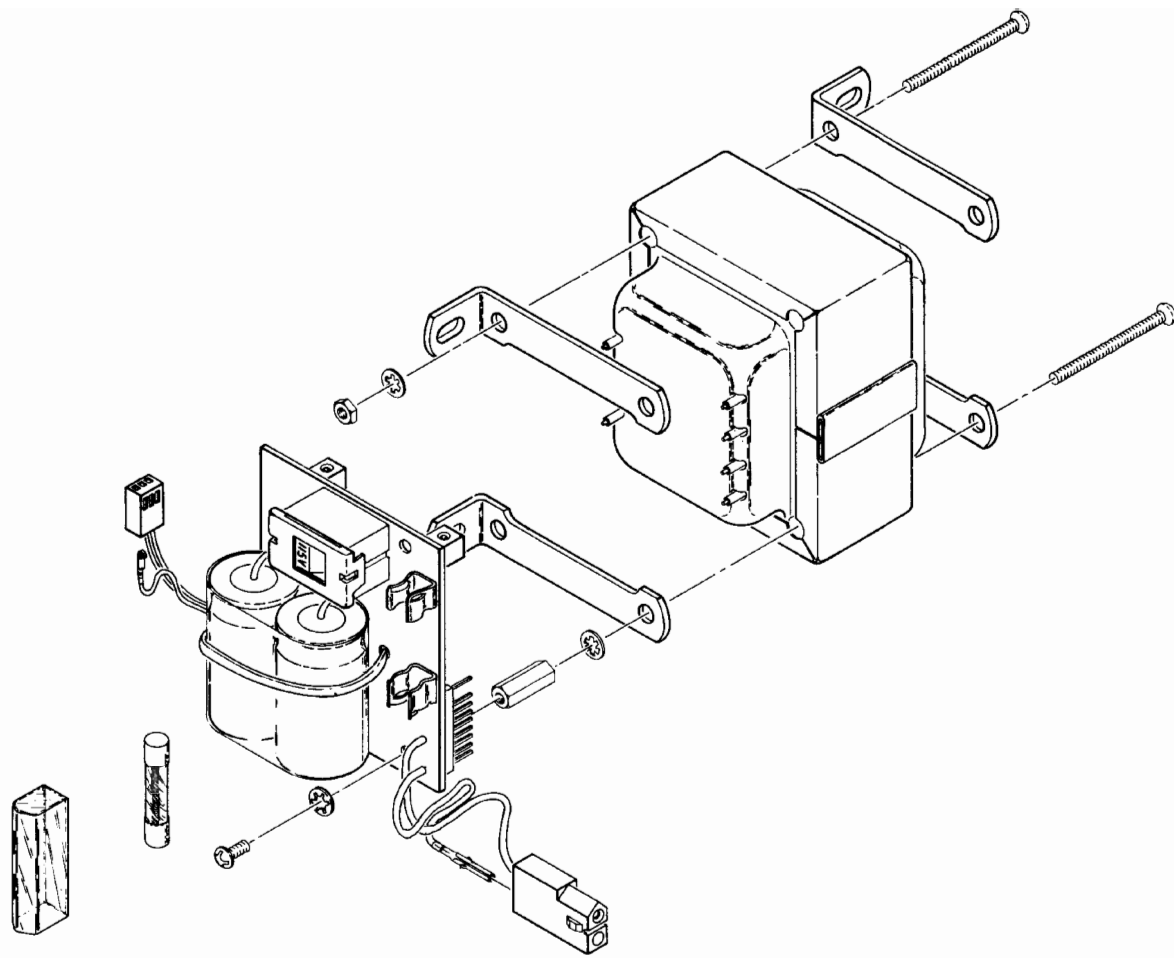
Motherboard PC Board (Rev B-1)



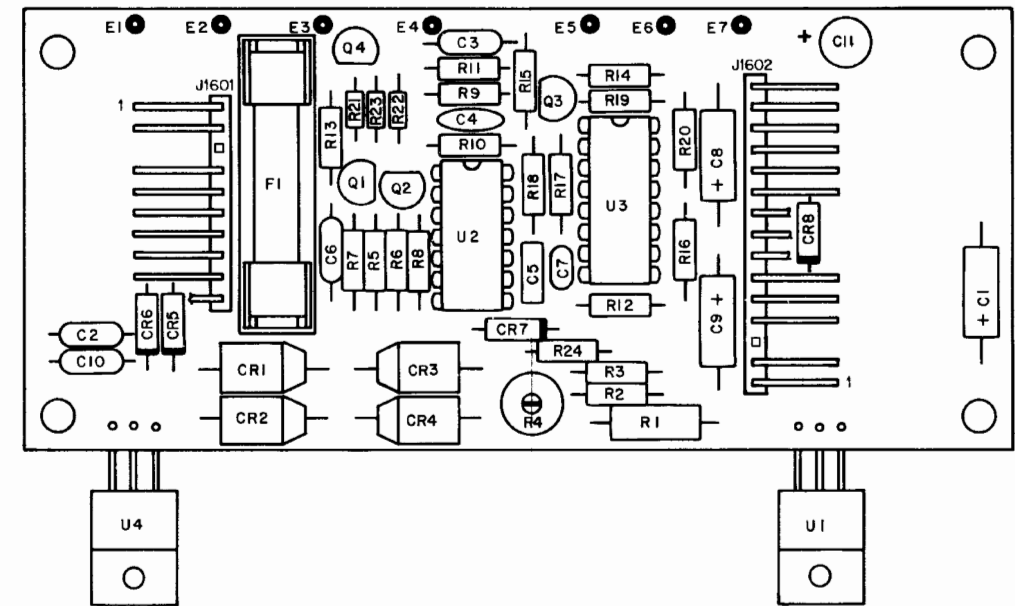


- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 1100 (E.G., R1 IS R1101).
  2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  4. EFFECTIVE ON: FM/AM-1200S THRU S/N 4490 AND F/M-1200A THRU S/N 1448, J67002 IS J102 AND J67001 IS J101.

Figure 6-8 Motherboard PC Board Assembly (0000-5510-000-C)

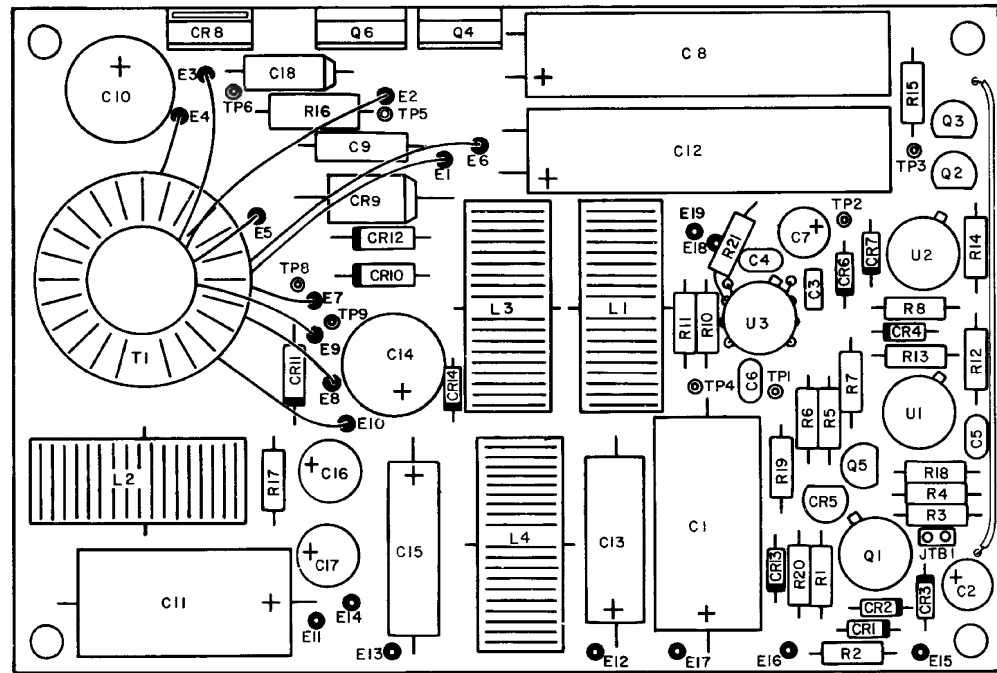


Line Supply PC Board Assembly (Rev D)



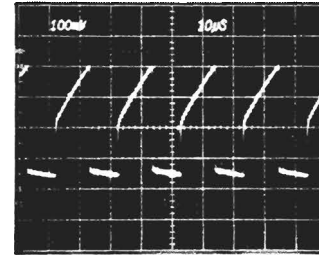
Battery Charger PC Board (Rev G-8)



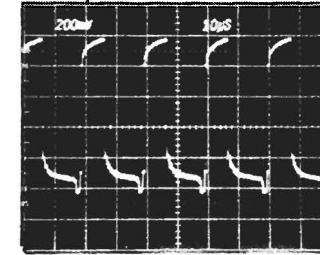


Inverter Supply PC Board (Rev F-5)

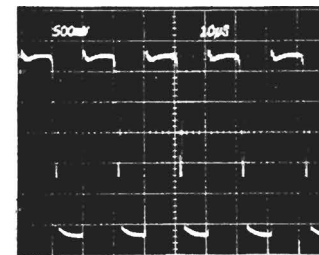
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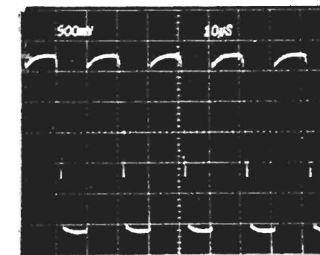
2



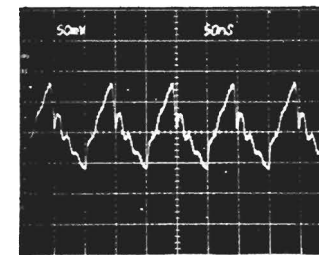
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4



5

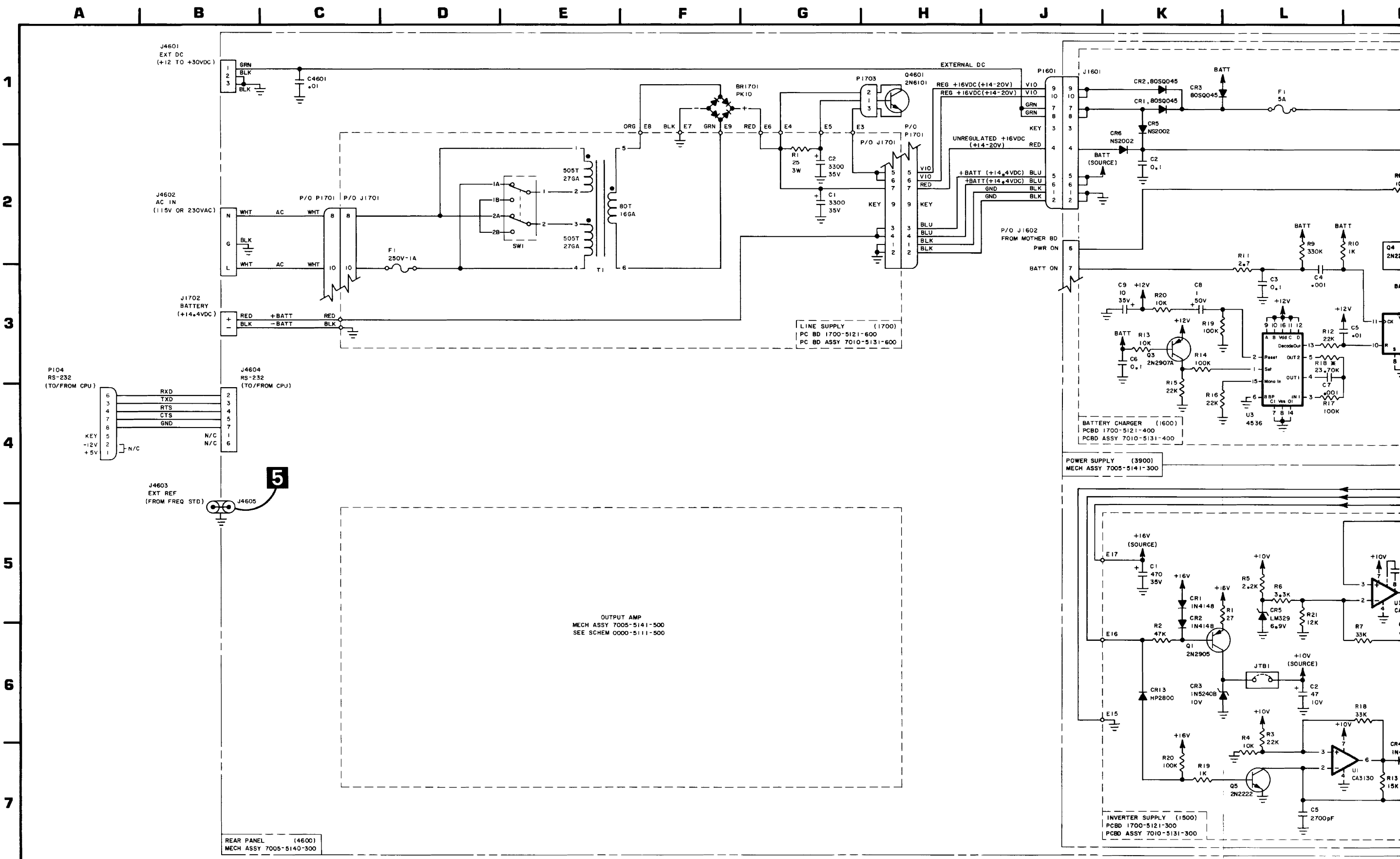


X1 PROBE

NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz, WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X10 PROBE.

FM/AM-1200S thru S/N 4490  
FM/AM-1200A thru S/N 1448

Figure 6-9 Power Supply Module (Sheet 1 of 2)  
(0000-5111-300-F2)  
(0000-5111-400-G1)  
(0000-5111-600-G2)



REAR PANEL (4600)  
MECH ASSY 7005-5140-300

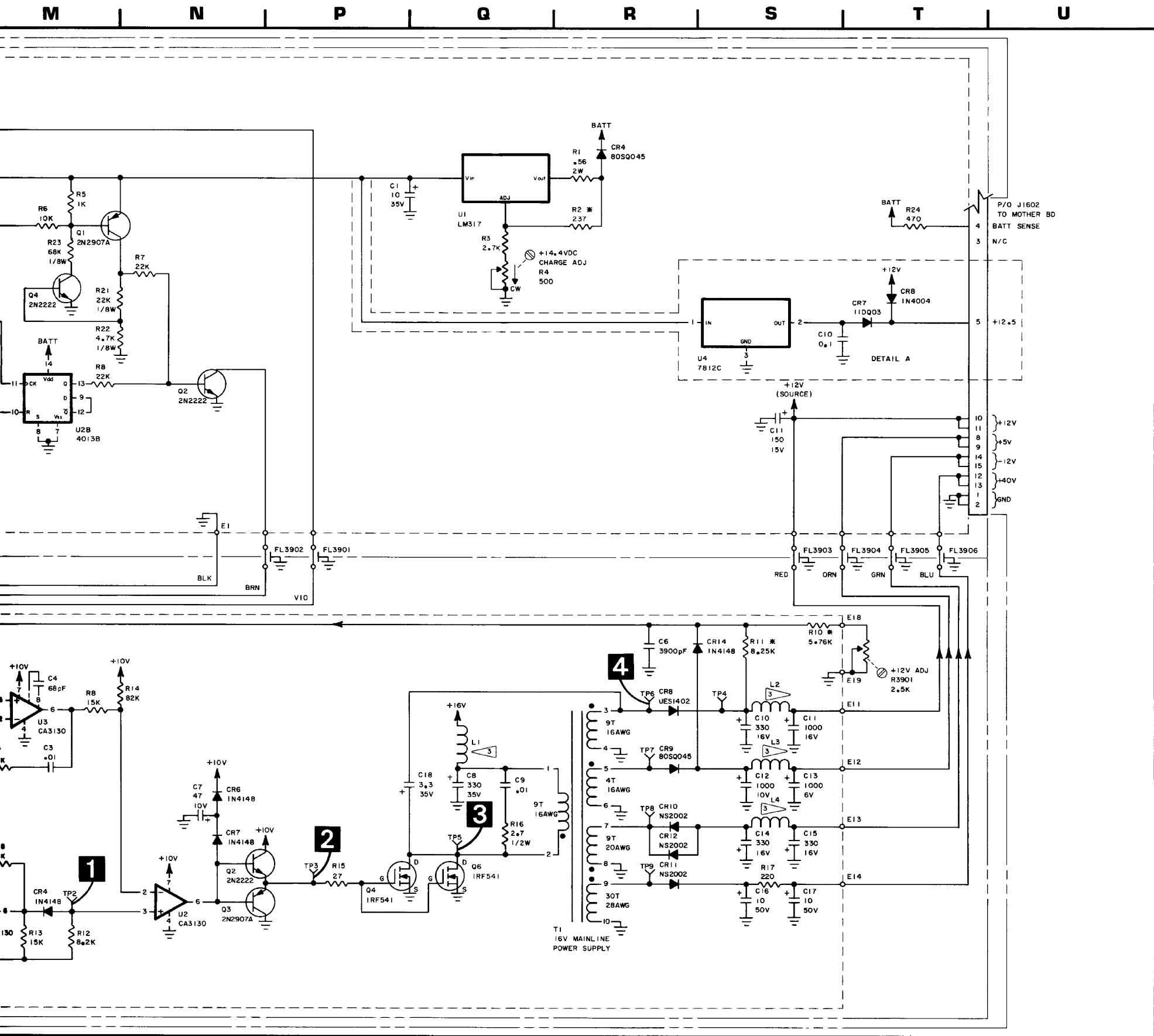
LINE SUPPLY (1700)  
PC BD 1700-5121-600  
PC BD ASSY 7010-5131-600

BATTERY CHARGER (1600)  
PCB 1700-5121-400  
PCB ASSY 7010-5131-400

POWER SUPPLY (3900)  
MECH ASSY 7005-5141-300

OUTPUT AMP  
MECH ASSY 7005-5141-500  
SEE SCHEM 0000-5111-500

INVERTER SUPPLY (1500)  
PCB 1700-5121-300  
PCB ASSY 7010-5131-300



STANDARDS:  
(UNLESS OTHERWISE NOTED)

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:

- A. 1500 (INVERTER SUPPLY PC BOARD).
- B. 1600 (BATTERY CHARGER PC BOARD).
- C. 1700 (LINE SUPPLY PC BOARD).
- D. 3900 (POWER SUPPLY MECH ASSY).
- E. 4600 (REAR PANEL MECH ASSY).
- F. (E.G., R1 IS R1501, ETC.)

2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE. PRECISION RESISTORS (1%) ARE DESIGNATED BY AN ASTERISK (\*).

3. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.

4. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS.

NOTES: (INVERTER SUPPLY PC BOARD)

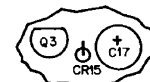
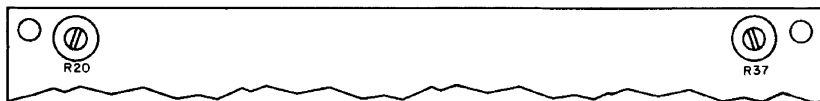
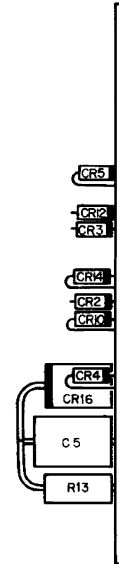
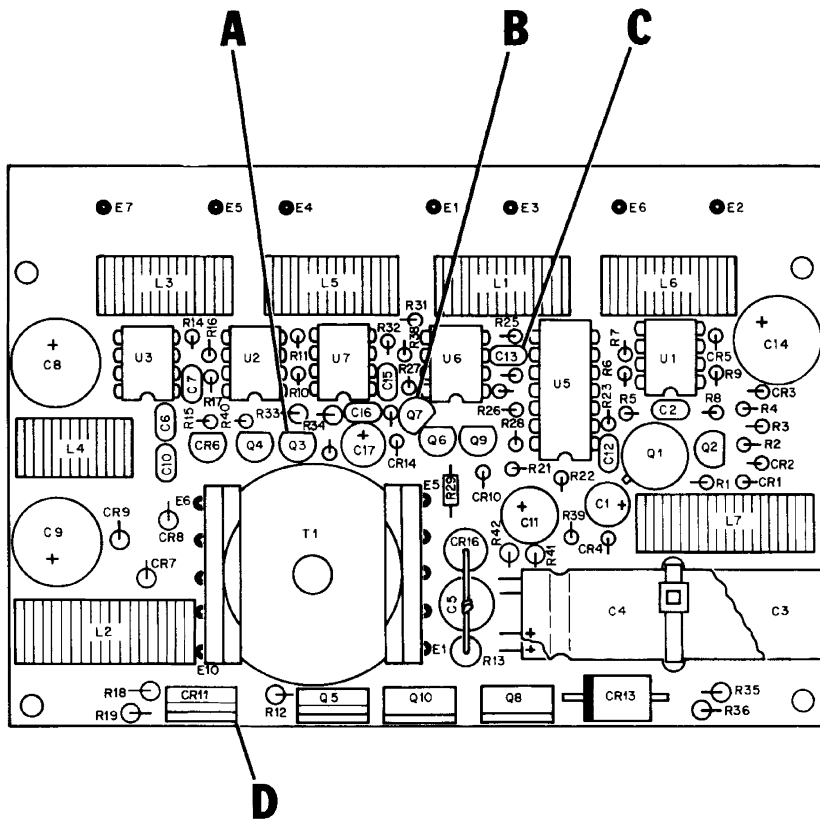
- 1. NOT USED.
- 2. NOT USED.
- 3. L1 THRU L4 ARE 30 TURNS OF 18 GA WIRE.

NOTES: (BATTERY CHARGER PC BOARD)

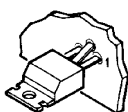
- 1. NOT USED.
- 2. NOT USED.
- 3. DETAIL A EFFECTIVE WITH OVEN OSCILLATOR (.05 PPM) OPTION ONLY.

FM/AM-1200S thru S/N 4490  
FM/AM-1200A thru S/N 1448

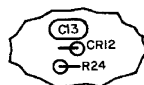
Figure 6-9 Power Supply Module (Sheet 2 of 2)  
(0000-5111-300-F2)  
(0000-5111-400-G1)  
(0000-5111-600-C2)



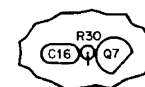
DETAIL A



DETAIL D

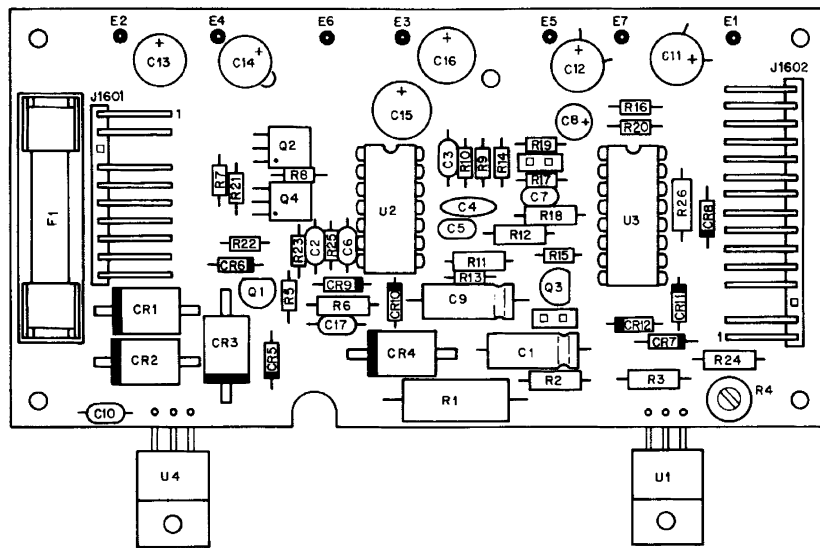


DETAIL C

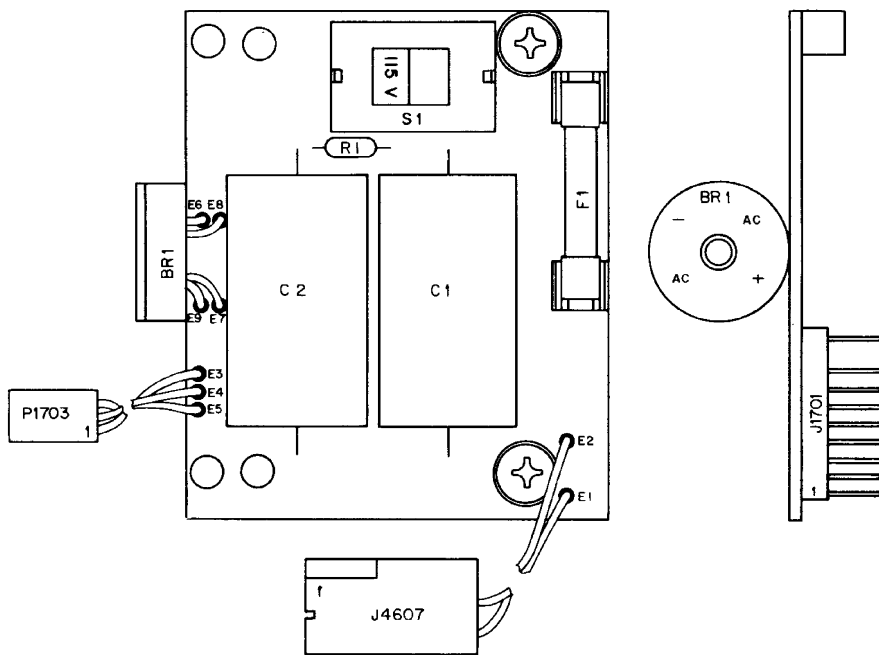


DETAIL B

Inverter Supply PC Board (Rev C2)



Battery Charger PC Board (Rev C7)

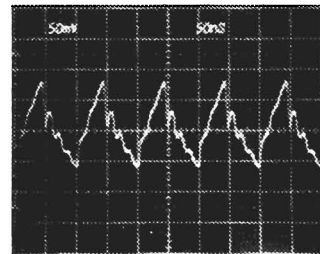


Line Supply PC Board (Rev D3)

FM/AM-1200S S/N 4491 and ON  
 FM/AM-1200A S/N 1449 and ON

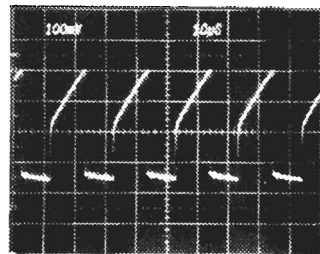
Figure 6-9a Power Supply Module (Sheet 1 of 2)  
 (0000-5110-600-D3)  
 (0000-6113-800-C6)  
 (0000-6113-900-C1)

1

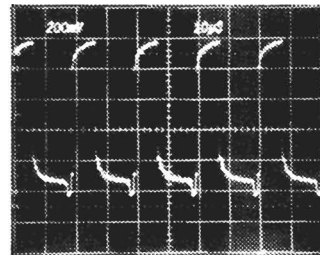


X1 PROBE

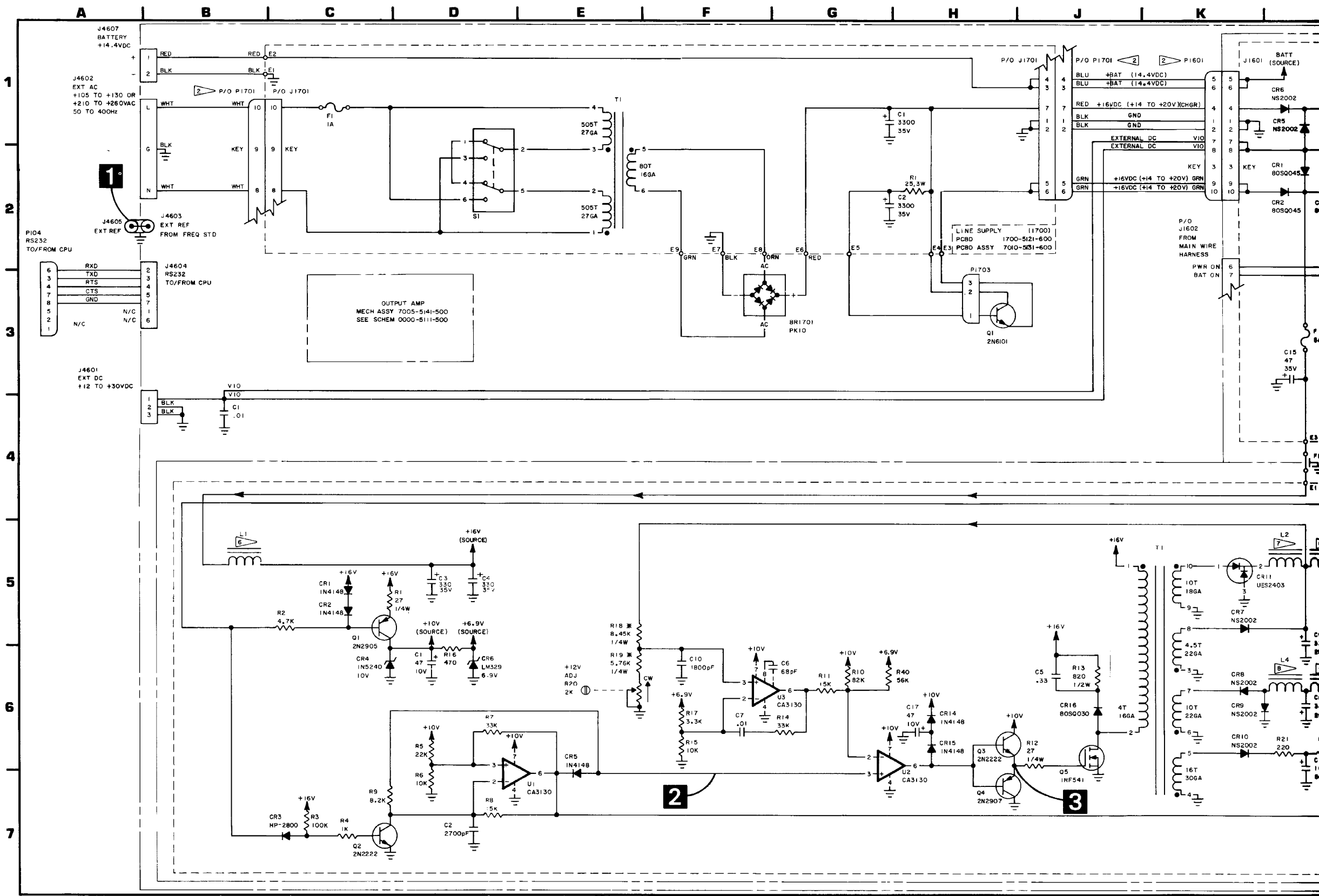
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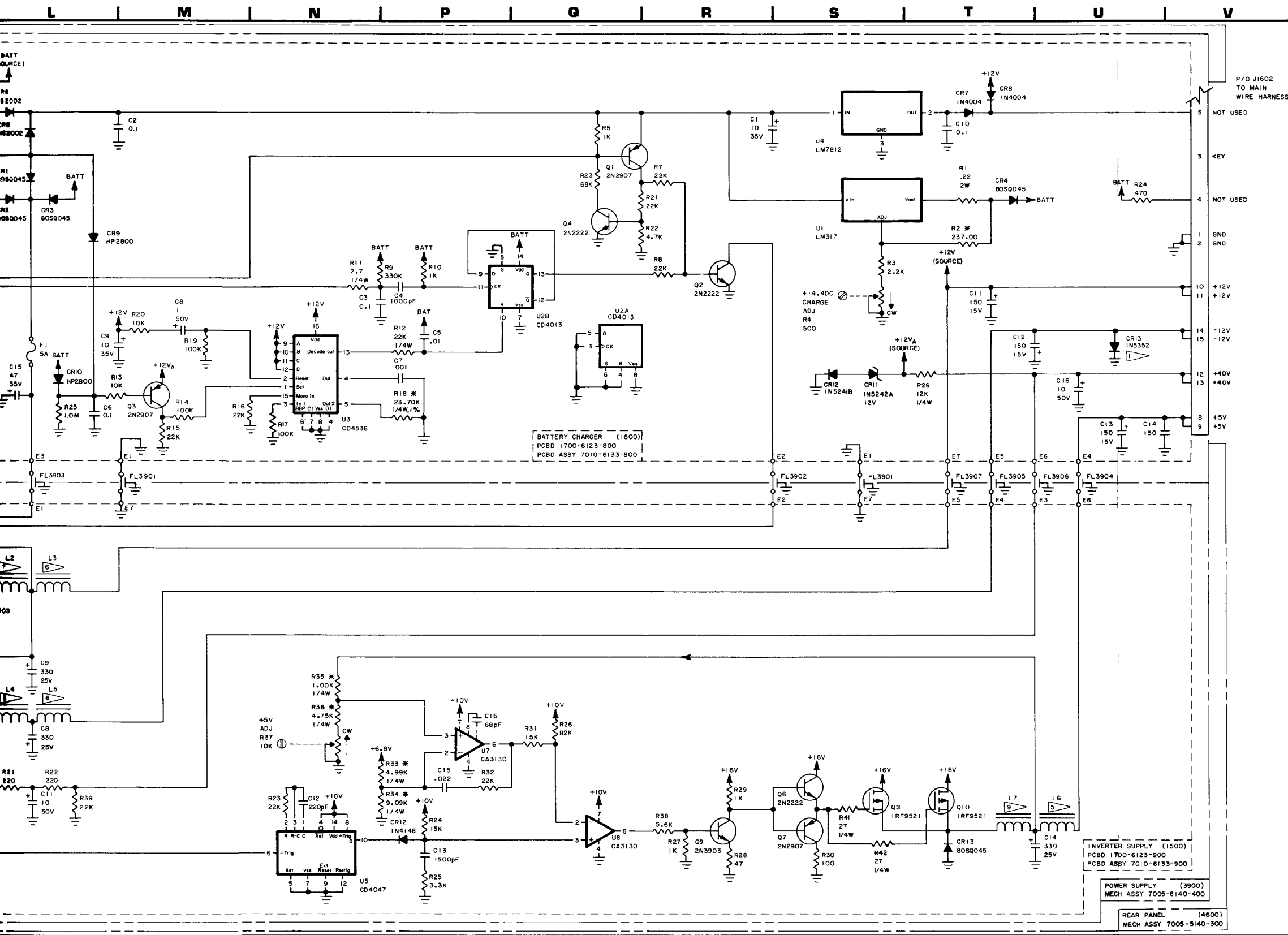
3



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz, WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X10 PROBE.



1  
2  
3  
4  
5  
6  
7



STANDARDS:  
(UNLESS OTHERWISE NOTED)

- ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:  
 A. 1500 (INVERTER SUPPLY PC BOARD).  
 B. 1600 (BATTERY CHARGER PC BOARD).  
 C. 1700 (LINE SUPPLY PC BOARD).  
 D. 3900 (POWER SUPPLY MECH ASSY).  
 E. 4600 (REAR PANEL MECH ASSY).  
 F. (E.G., R1 IS R1501, ETC.)
- ALL RESISTORS ARE 1/4 W, 5% TOLERANCE. PRECISION RESISTORS (1%) ARE DESIGNATED BY AN ASTERISK (\*).
- ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS.
- ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS.
- ALL RESISTORS ARE EXPRESSED IN OHMS.

NOTES: (INVERTER SUPPLY PC BOARD)

- NOT USED.
- NOT USED.
- NOT USED.
- NOT USED.
- NOT USED.
- L1, L3, L5 AND L6 ARE 30 TURN 20 AWG TORROID INDUCTORS.
- L2 IS A 40 TURN 18 AWG TORROID INDUCTOR.
- L4 IS A 100 TURN 24 AWG TORROID INDUCTOR.
- L7 IS A 30 TURN 18 AWG TORROID INDUCTOR.

NOTES: (REAR PANEL MECH ASSY)

- NOT USED.
- P1601 AND P1701 ARE PART OF THE REAR PANEL WIRE HARNESS 7005-5140-301.

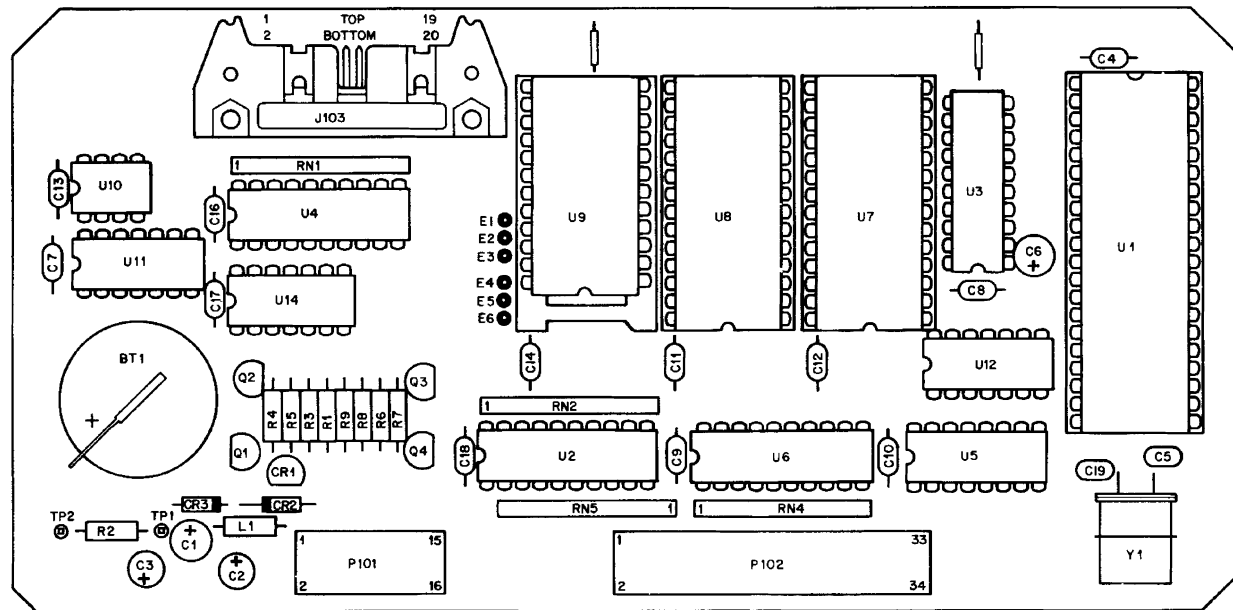
NOTES: (BATTERY CHARGER)

- EFFECTIVE FM/AM-1200S S/N 4626 & ON. FM/AM-1200A S/N 1458 & ON.

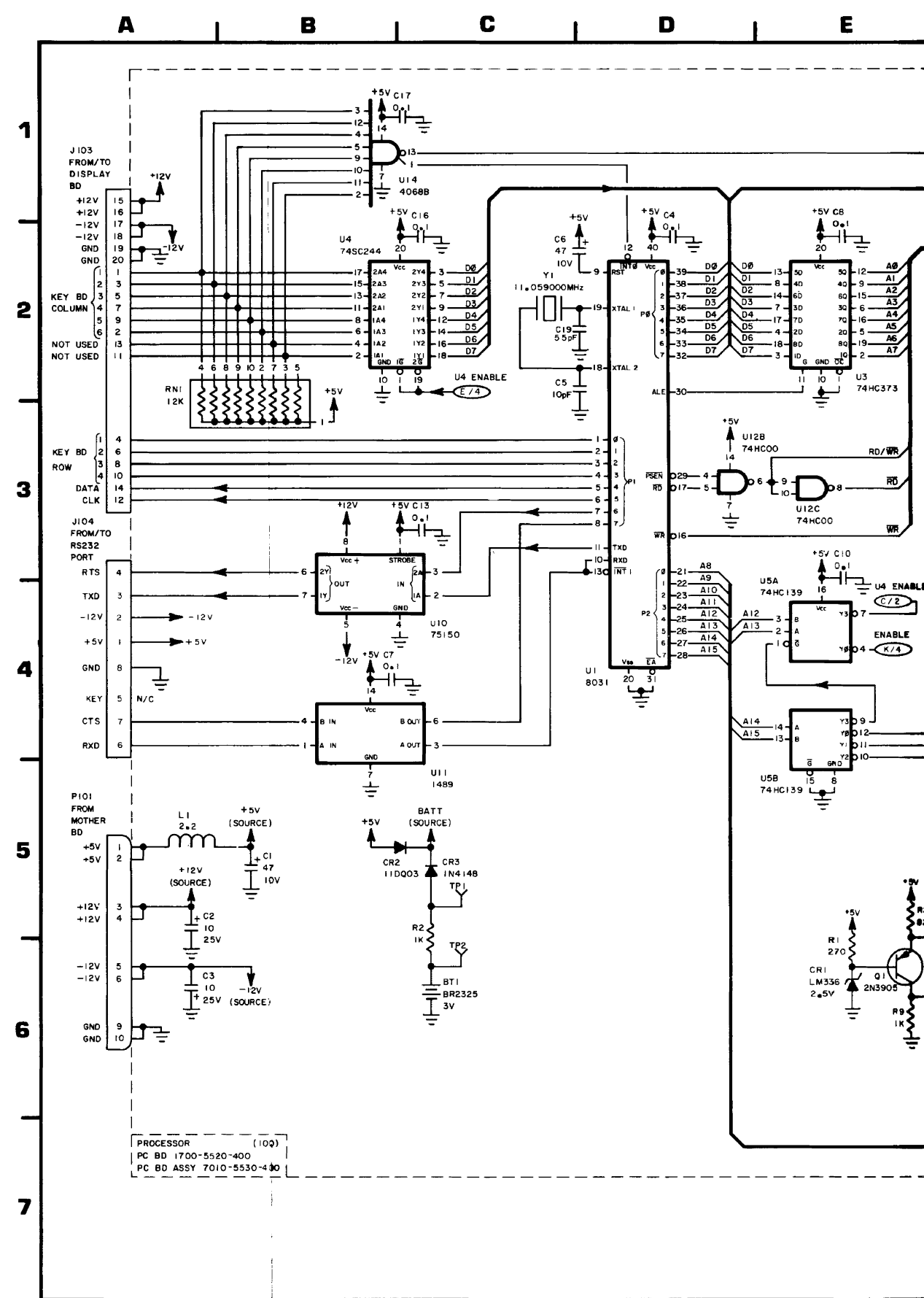
FM/AM-1200S S/N 4491 and ON  
FM/AM-1200A S/N 1449 and ON

Figure 6-9a Power Supply Module (Sheet 2 of 2)  
(0000-5110-600-D3)  
(0000-6113-800-C6)  
(0000-6113-900-C1)

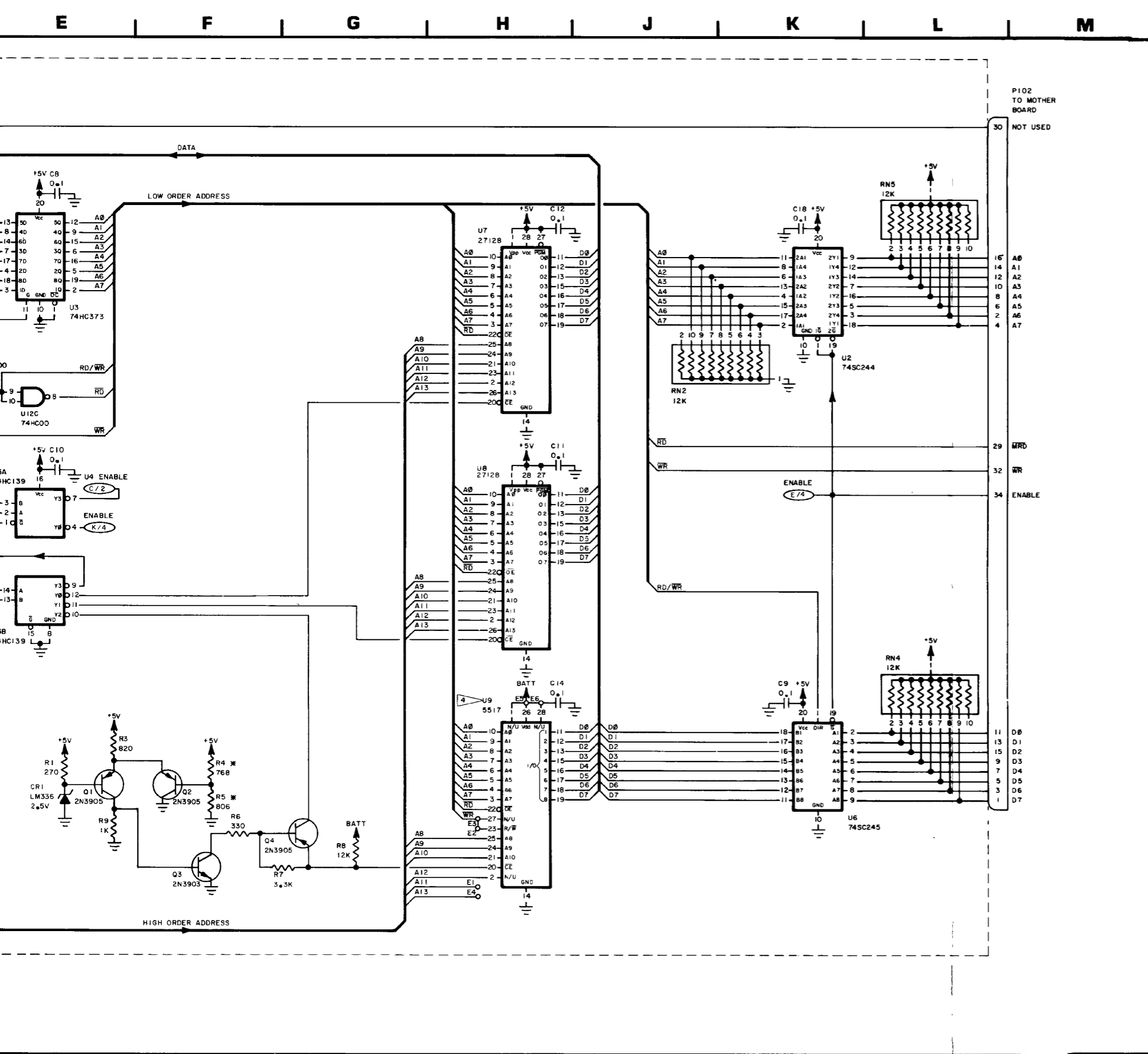




Processor PC Board (Rev A-3)



PROCESSOR (100)  
 PC BD 1700-5520-400  
 PC BD ASSY 7010-5530-400

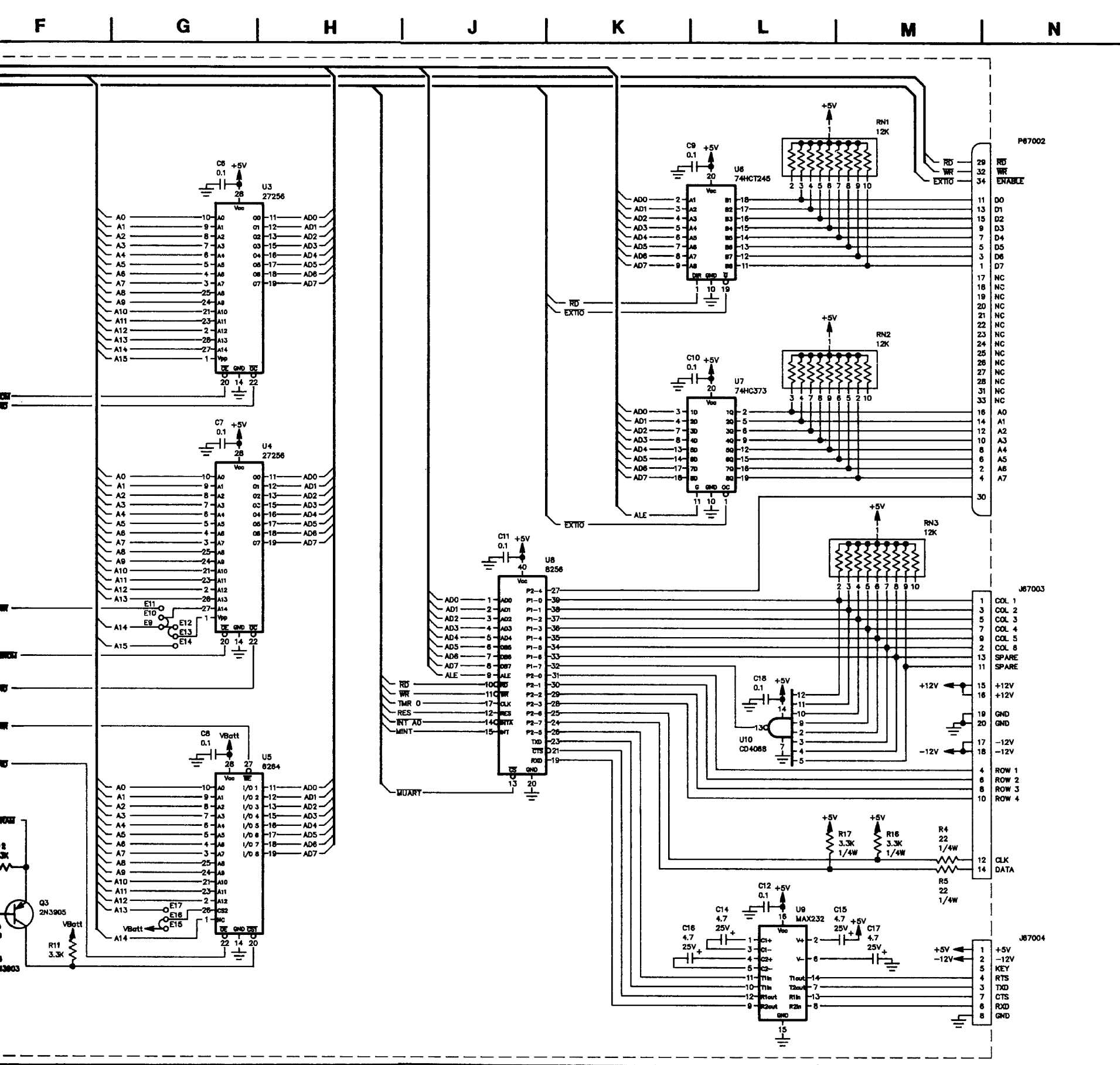


- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 100 (E.G., R1 IS R101).
  2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED. PRECISION RESISTORS (1%) ARE DESIGNATED BY AN ASTERISK (\*).
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  4. U9 IS A 24 PIN IC INSTALLED IN A 28 PIN SOCKET. THE PIN NUMBERS INDICATED ARE RELATIVE TO THE SOCKET AND NOT THE IC. THEREFORE, PIN 3 IS PIN 1 OF THE IC.
  5. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
  6. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

FM/AM-1200S thru S/N 4490  
 FM/AM-1200A thru S/N 1448

Figure 6-10 Processor PC Board Assembly (0000-5510-400-A1)





STANDARDS:  
(UNLESS OTHERWISE NOTED)

1. ALL REF NOS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES: 67000.
2. ALL RESISTORS ARE 1/8 W, 5% TOLERANCE.
3. ALL RESISTANCE IS EXPRESSED IN OHMS.
4. ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS.
5. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS.

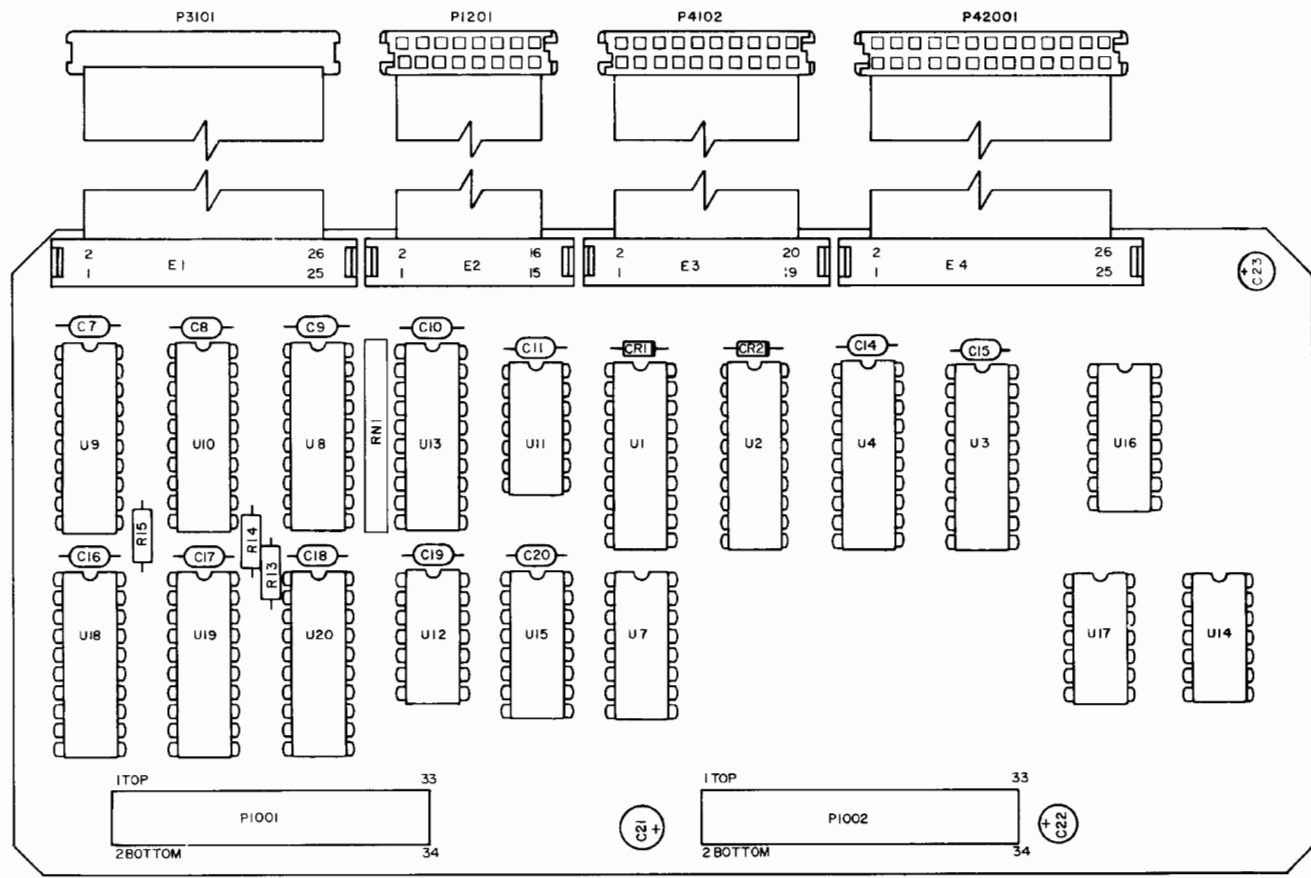
FM/AM-1200S S/N 4491 and ON  
FM/AM-1200A S/N 1449 and ON

Figure 6-10a Processor PC Board Assembly  
(0000-5730-200-A1)

MODULATION METER CONTROL (P1001)										
MOD METER CONTROL POSITION	INPUT				OUTPUT					
	MOD MTR A PIN 12	MOD MTR B PIN 9	MOD MTR C PIN 11	MOD MTR D PIN 10	MOD MTR A PIN 32	MOD MTR B PIN 31	MOD MTR C PIN 34	MOD MTR D PIN 33	AVG/PK PIN 28	2ND FUNC PIN 27
WP	150	0	0	0	0	1	1	0	0	0
	15	1	0	0	1	0	1	0	0	0
WA	150	0	1	0	0	1	1	0	1	0
	15	1	1	0	1	0	1	0	1	0
kHz/ %X10	2	0	0	1	0	0	1	0	0	0
	6	1	0	1	0	1	0	0	0	0
	20	0	1	1	0	0	1	0	0	0
60	1	1	1	0	0	1	0	0	0	1
BATT	0	0	0	1	0	0	0	0	0	0
SIG	1	0	0	1	1	0	0	0	0	0
DIST	0	1	0	1	1	1	1	1	1	1
SINAD	1	1	0	1	1	1	1	1	1	0
		1 = +5 VDC			0 = 0 VDC			1 = +12 VDC		0 = 0 VDC

FREQ ERROR METER CONTROL (P1001)										
FREQ ERROR METER POSITION	INPUT				OUTPUT					
	FREQ SW A PIN 6	FREQ SW B PIN 5	FREQ SW C PIN 3	FREQ SW D PIN 1	XTR PIN 16	YTB PIN 15	X1/X3 PIN 17	AUDIO/RF PIN 19		
RF	30	0	0	0	0	0	0	0	0	
	100	1	0	0	0	0	0	1	0	
	300	0	1	0	0	1	0	0	0	
	1K	1	1	0	0	1	0	1	0	
AUDIO	3	0	1	1	0	1	0	0	1	
	30	1	1	1	0	0	1	0	1	
	300	0	0	0	1	1	1	0	1	
		1 = +5 VDC			0 = 0 VDC			1 = +5 VDC		0 = 0 VDC

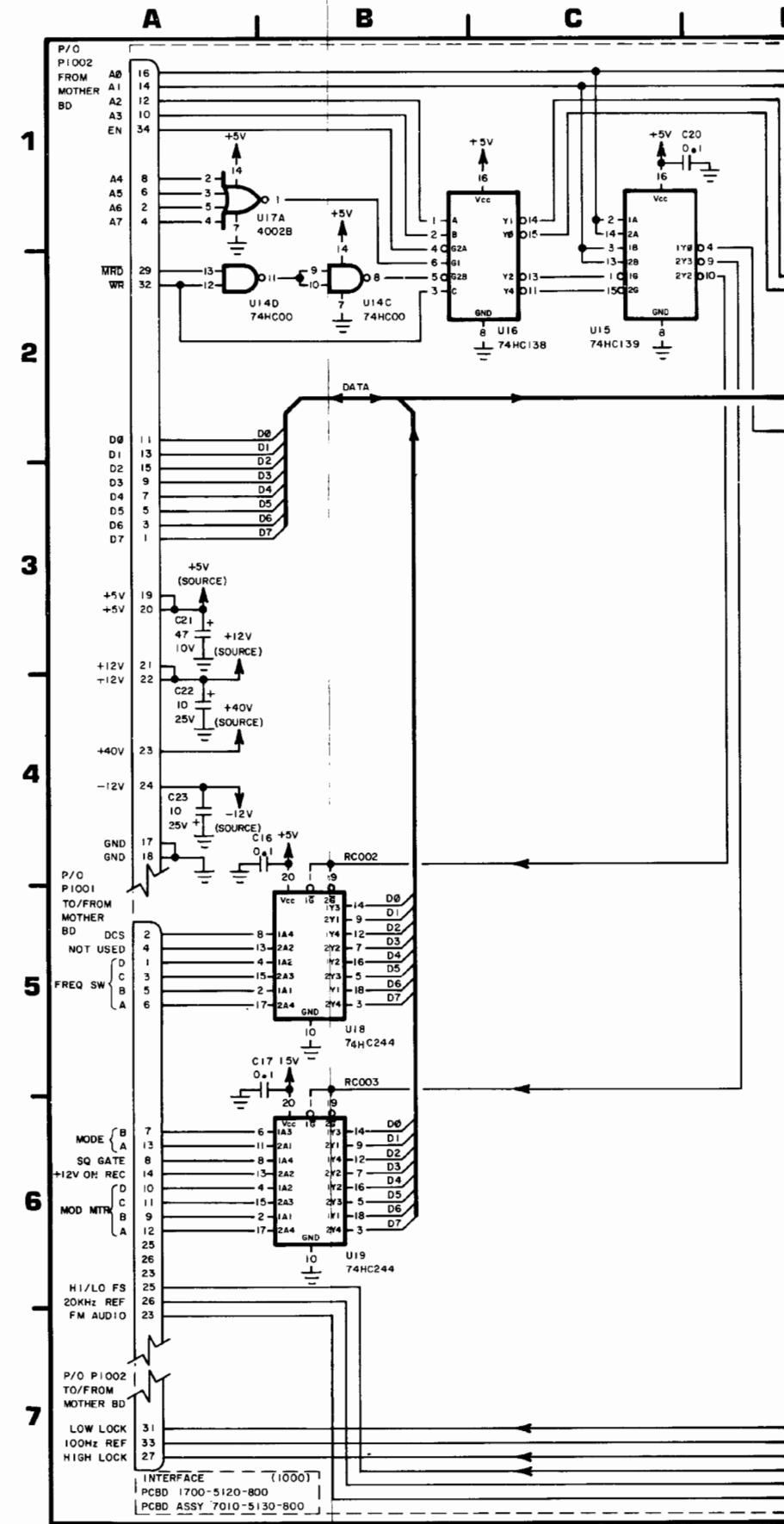
MODE CONTROL SWITCH						
MODE CONTROL POSITION	P1001 INPUT		P1001 OUTPUT		E1002-6 OUTPUT	
	MODE A PIN 13	MODE B PIN 7	REC/GEN PIN 30	DUP GEN PIN 29		
GEN	0	0	0	0	1	
REC	1	0	1	0	1	
DUP	0	1	1	0	0	
DUP/GEN	1	1	0	1*	1	
		1 = +5 VDC			0 = 0 VDC	* = +5 VDC

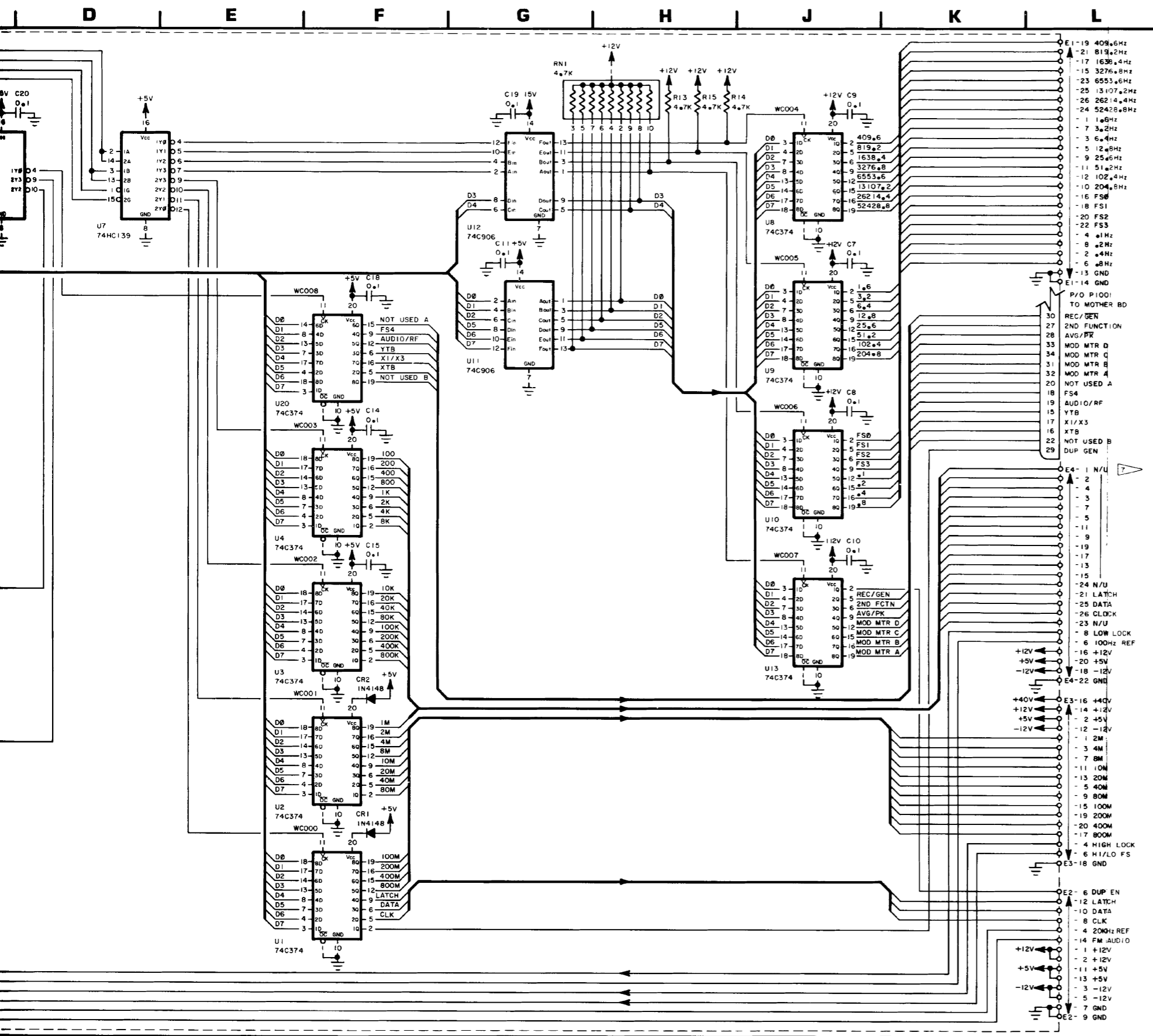


Interface PC Board (Rev J-3)

NOTE:

- EFFECTIVE ON: FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448, P42001 IS P4201.



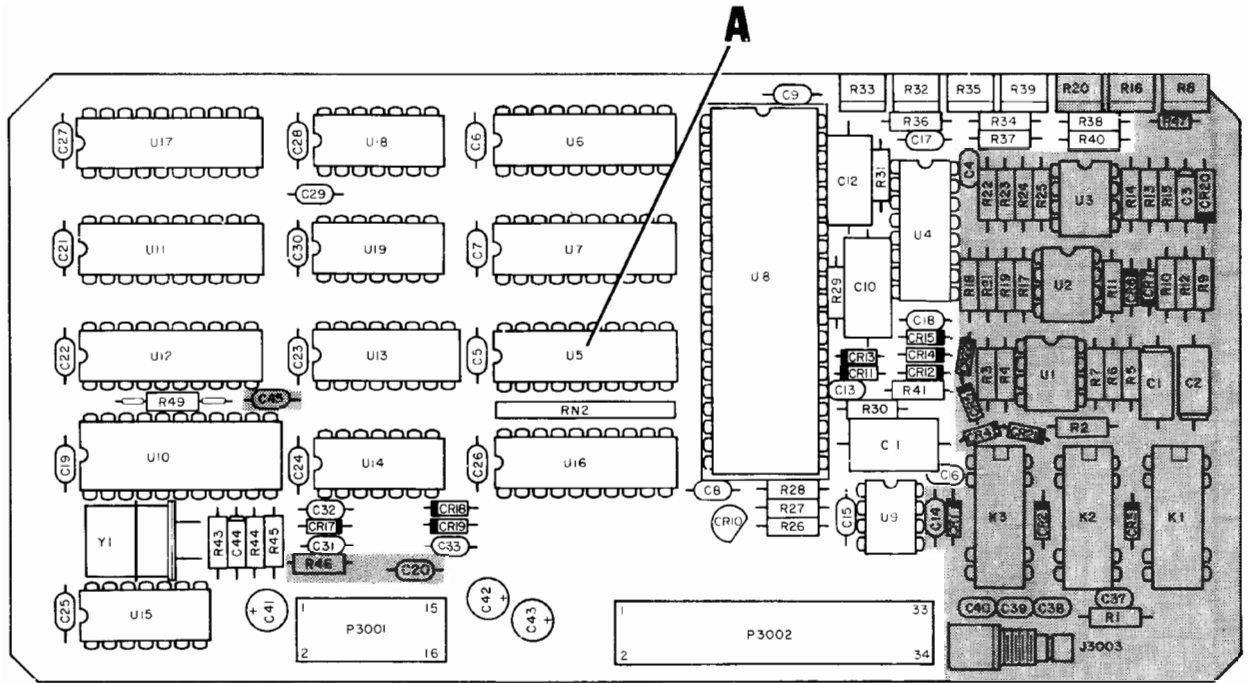


E1-19	409.6Hz
-21	819.2Hz
-17	1638.4Hz
-15	3276.8Hz
-23	6553.6Hz
-25	13107.2Hz
-26	26214.4Hz
-24	52428.8Hz
-1	1.0Hz
-7	3.2Hz
-3	6.4Hz
-5	12.8Hz
-9	25.6Hz
-11	51.2Hz
-12	102.4Hz
-10	204.8Hz
-16	FS0
-18	FS1
-20	FS2
-22	FS3
-4	1Hz
-8	2Hz
-2	4Hz
-6	8Hz
-13	GND
E1-14	GND
30	P/O P1001 TO MOTHER BD
27	REC/GEN
28	2ND FUNCTION
29	AVG/PK
33	MOD MTR D
34	MOD MTR C
31	MOD MTR B
32	MOD MTR A
20	NOT USED A
18	FS4
19	AUDIO/RF
15	YTB
17	X1/X3
16	XTB
22	NOT USED B
29	DUP GEN
E4-1	N/U
-2	-
-4	-
-3	-
-7	-
-5	-
-11	-
-9	-
-19	-
-17	-
-13	-
-15	-
-24	N/U
-21	LATCH
-25	DATA
-26	CLOCK
-23	N/U
-8	LOW LOCK
-6	100Hz REF
-16	+12V
-20	+5V
-18	-12V
E4-22	GND
E3-16	+40V
-14	+12V
-2	+5V
-12	-12V
-1	2M
-3	4M
-7	8M
-11	16M
-13	20M
-5	40M
-9	80M
-15	100M
-19	200M
-20	400M
-17	800M
-4	HIGH LOCK
-6	H1/LO FS
E3-18	GND
E2-6	DUP EN
-12	LATCH
-10	DATA
-8	CLK
-4	200Hz REF
-14	FM AUDIO
-1	+12V
-2	+12V
-11	+5V
-13	+5V
-3	-12V
-5	-12V
-7	GND
E2-9	GND

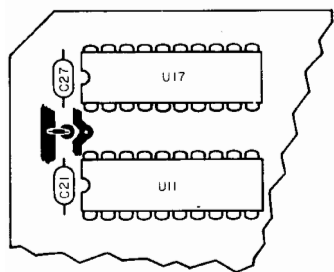
- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 1000 (E.G., R1 IS R1001).
  2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  4. ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS UNLESS OTHERWISE NOTED.
  5. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.
  6. NOT USED.
  7. EFFECTIVE ON: FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448,  

E4-1	100
-2	200
-4	400
-3	800
-7	1K
-5	2K
-11	4K
-9	8K
-19	10K
-17	20K
-13	40K
-15	80K
-24	100K
-21	200K
-25	400K
-26	800K
-23	1M

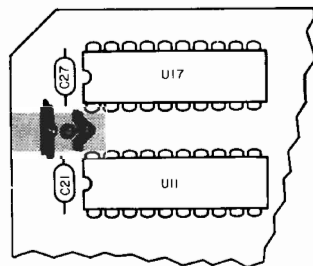
Figure 6-11 Interface PC Board Assembly (0000-5110-800-J2)



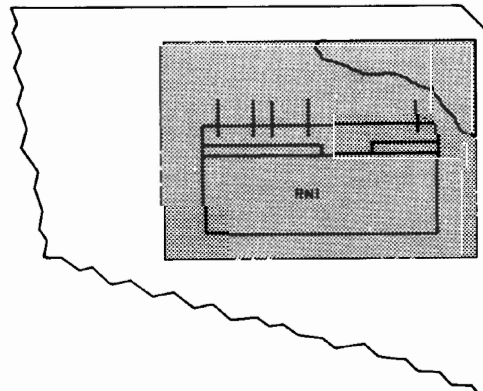
DVM I/O PC Board (Incl Option 10) (Rev D-1)



JUMPER LOCATION FOR  
STANDARD DVM I/O PC BOARD

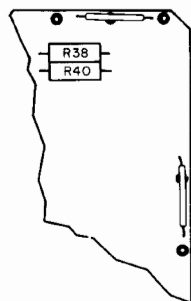


JUMPER LOCATION FOR OPTION  
10 DVM I/O PC BOARD

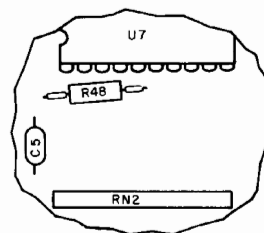


NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 3000 (E.G., R1 IS R3001).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.



BOTTOM VIEW  
(STANDARD OPTION)



DETAIL **A**  
(STANDARD OPTION)

NOTE: SHADED AREAS FOR OPTION 10  
DVM I/O ONLY

Figure 6-12 DVM I/O PC Board Assembly (Incl Option 10)  
(Sheet 1 of 2)  
(0000-5510-100-E4)





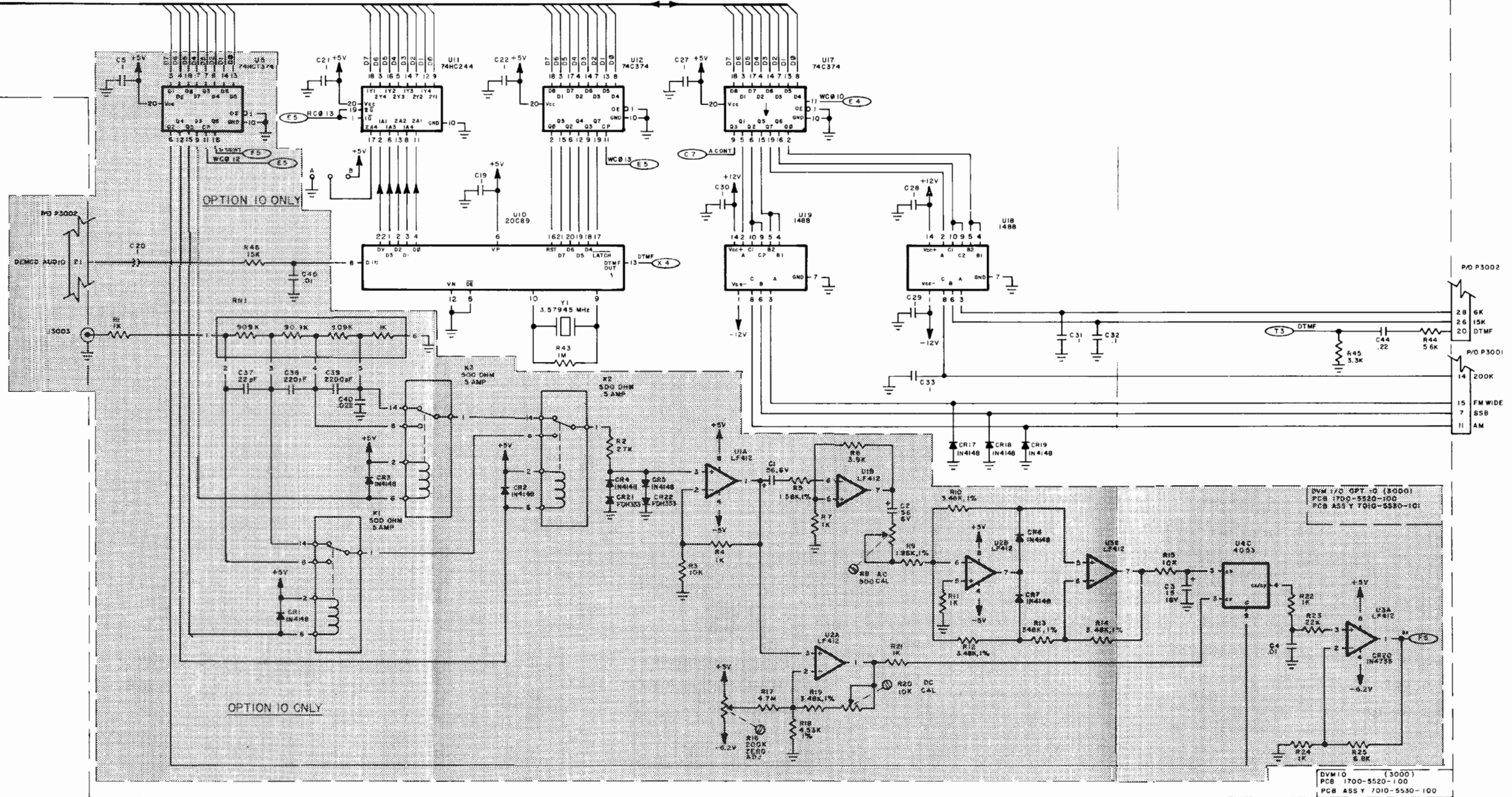
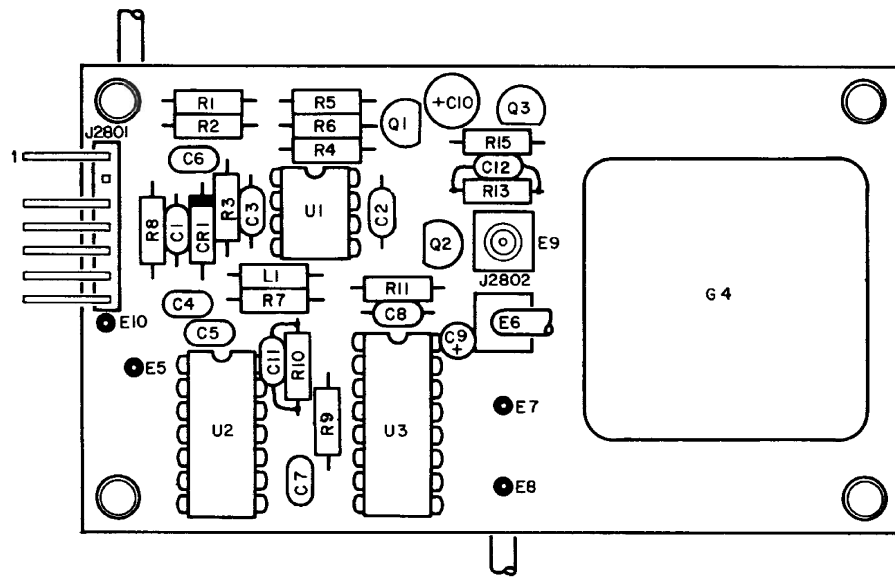
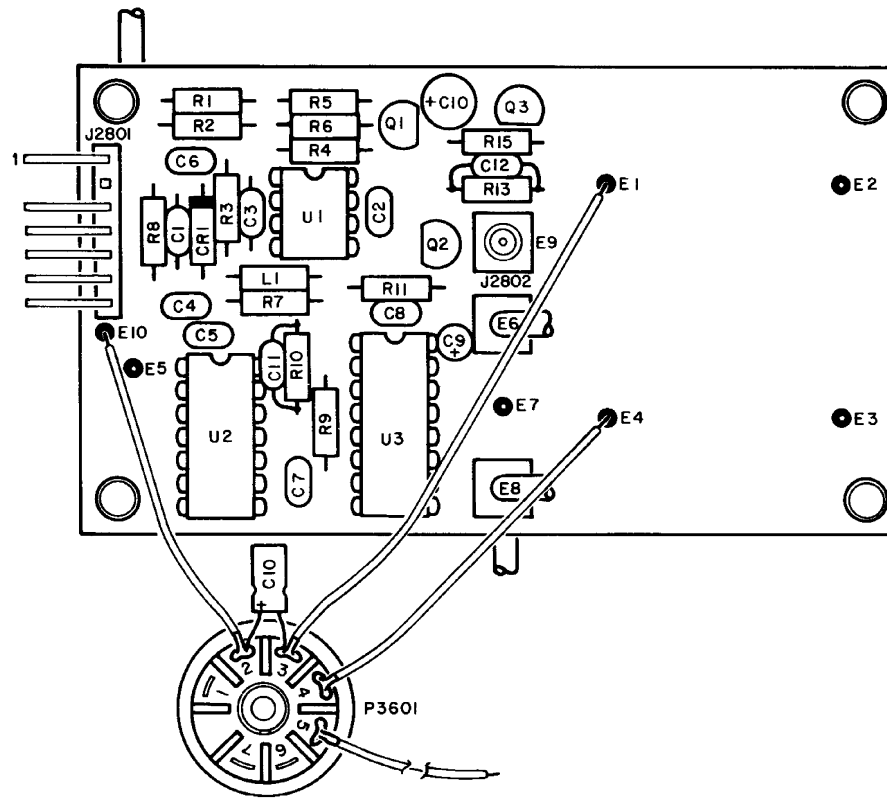


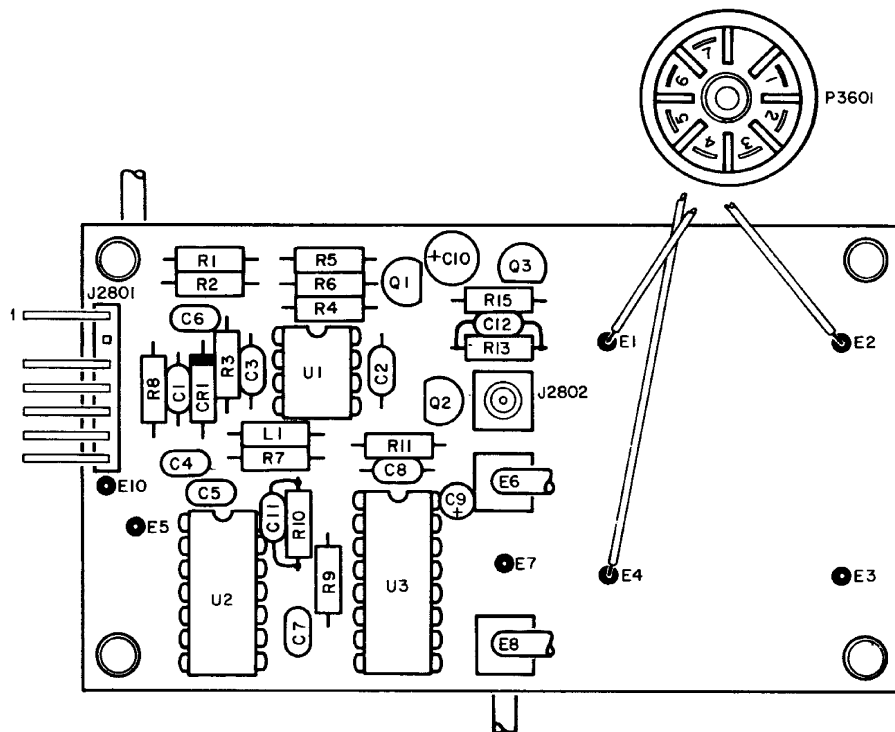
Figure 6-12 DVM I/O PC Board Assembly (Incl Option 10)  
 (Sheet 2 of 2)  
 (0000-5510-100-E4)



STANDARD OPTION (.5 PPM TXCO)



OPTION 02 (.05 PPM TXCO)

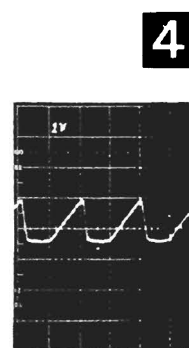
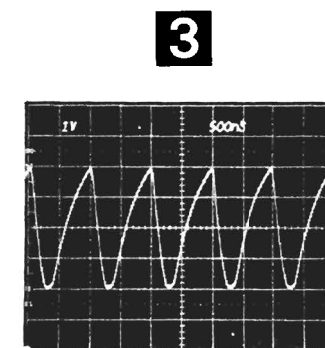
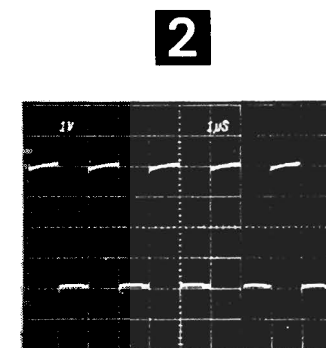
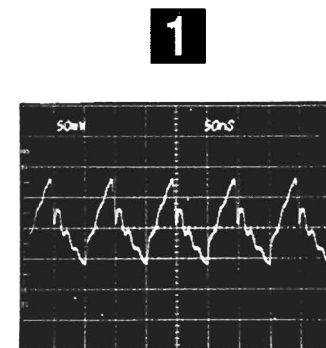
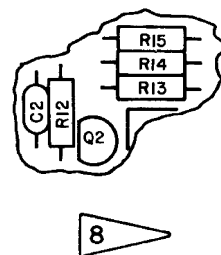


OPTION 01 (.2 PPM TXCO)

Frequency Standard PC Board (Rev E1)

NOTES:

1. ALL REFERENCE NUMBERS CARRY AN ASSEMBLY DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 2800 AND 3600 (E.G. R2801, ETC.)
2. ONLY ONE (1) OSCILLATOR IS INSTALLED PER ASSY.
  - A. INSTALLED W/.05 PPM OSC ONLY.
  - B. INSTALLED W/.2 PPM OSC ONLY.
  - C. INSTALLED W/.5 PPM OSC ONLY.
3. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
4. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
5. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
6. ALL INDUCTANCE IS EXPRESSED IN MILLIHENRYS UNLESS OTHERWISE NOTED.
7. EFFECTIVE ON: FM/AM-1200S THRU S/N 1448, COM P58002 IS P4503.
8. EFFECTIVE ON: FM/AM-1200S THRU S/N 1420; R11 AND R15 10K, C11 AND C12 WERE NOT USED, R12 AND R13 4.7K, WERE USED. R1 WAS CONNECTED FROM BASE TO GROUND, R14 CONNECTED FROM Q3 TO GROUND.



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X1 PROBE.

RY AN ASSIGNED  
SCHEMATIC  
600 (E.G., R1

S INSTALLED

OSC ONLY.  
C ONLY.  
C ONLY.

5% TOLERANCE

ED IN OHMS

SED IN MICRO-  
OTED.

ED IN MICRO-  
OTED.

S THRU S/N  
M/AM-1200A  
448, CONNECTOR  
P4503.

S THRU SN 4114  
1200A THRU SN  
AND R15 WERE  
ND C12 WERE  
R12 AND R14,  
USED. R12  
TED FROM Q2  
OUND, R14 WAS  
FROM Q3 BASE

4

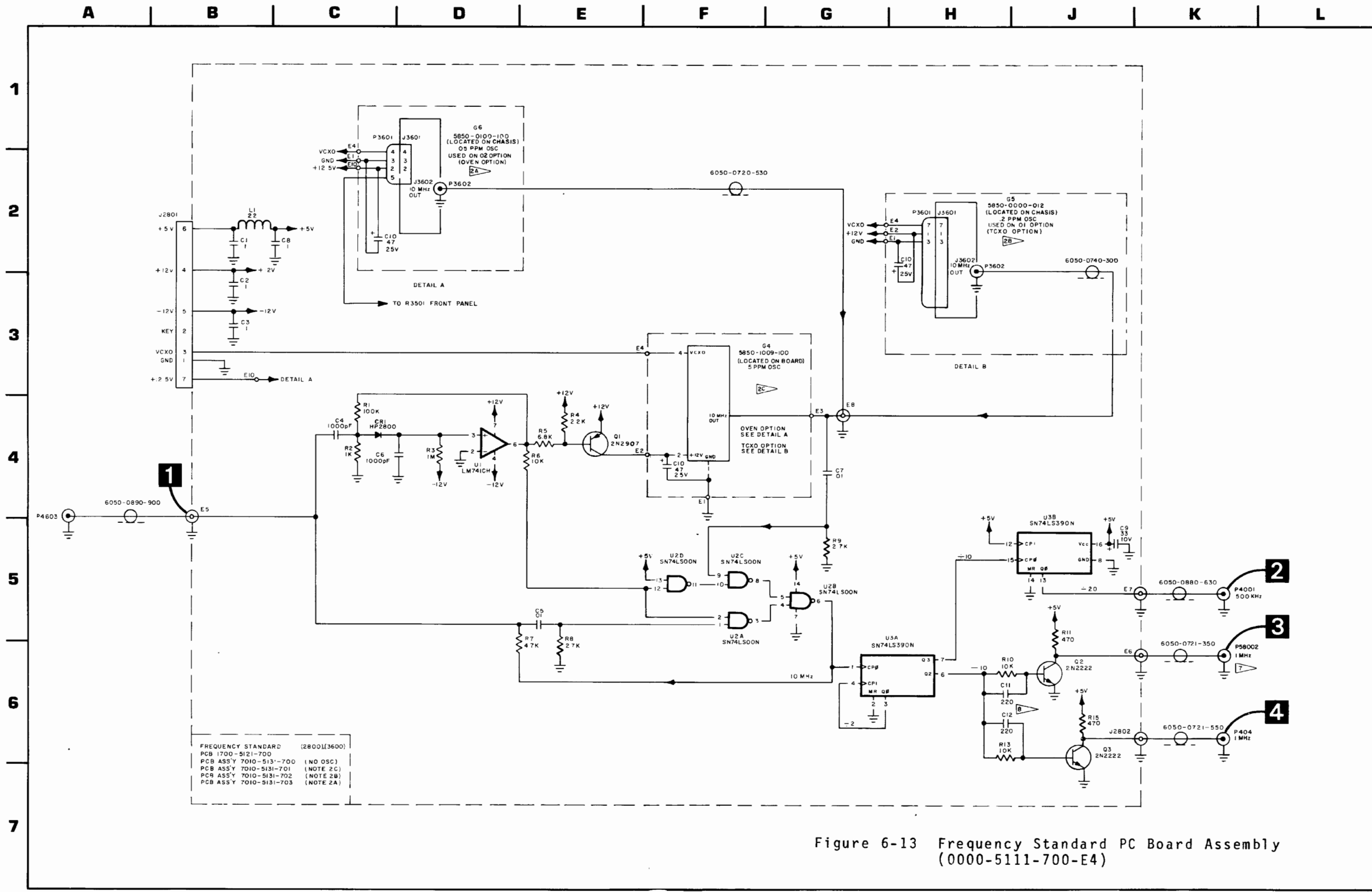
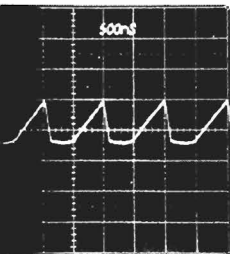
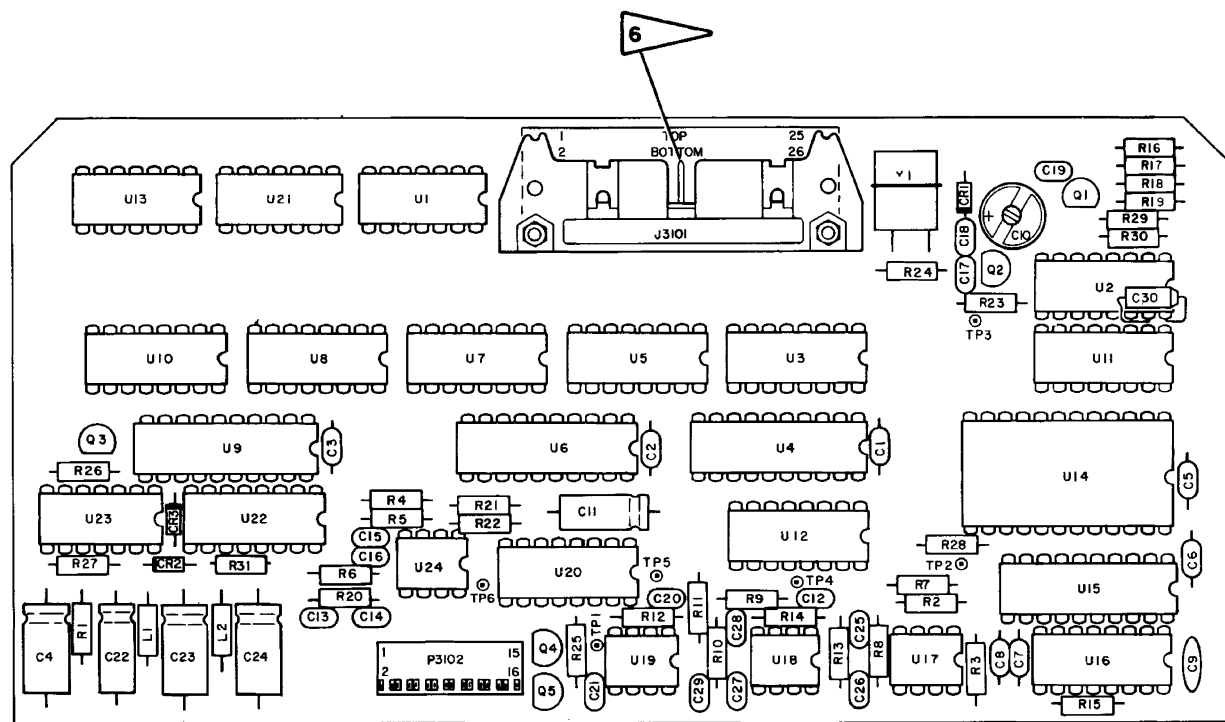


Figure 6-13 Frequency Standard PC Board Assembly (0000-5111-700-E4)

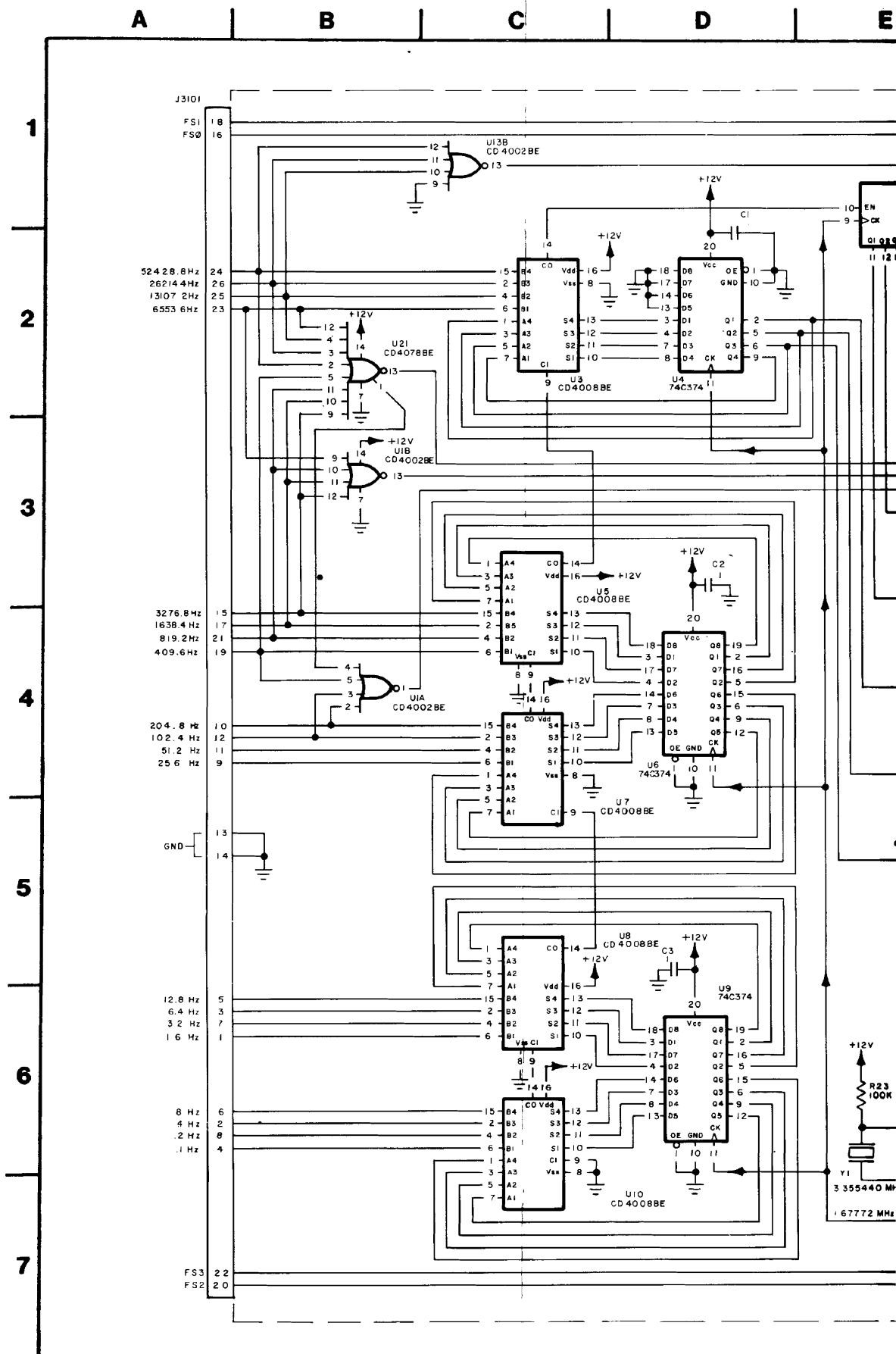
P3102 PIN #	IDENTIFIER	REMARKS
4	<100 Hz	HIGH (+12 VDC) WHEN SELECTED TONE IS LESS THAN 102.4 Hz
6	<400 Hz	HIGH (+12 VDC) WHEN SELECTED TONE IS LESS THAN 409.6 Hz
5	< 1 kHz	HIGH (+12 VDC) WHEN SELECTED TONE IS LESS THAN 819.2 Hz

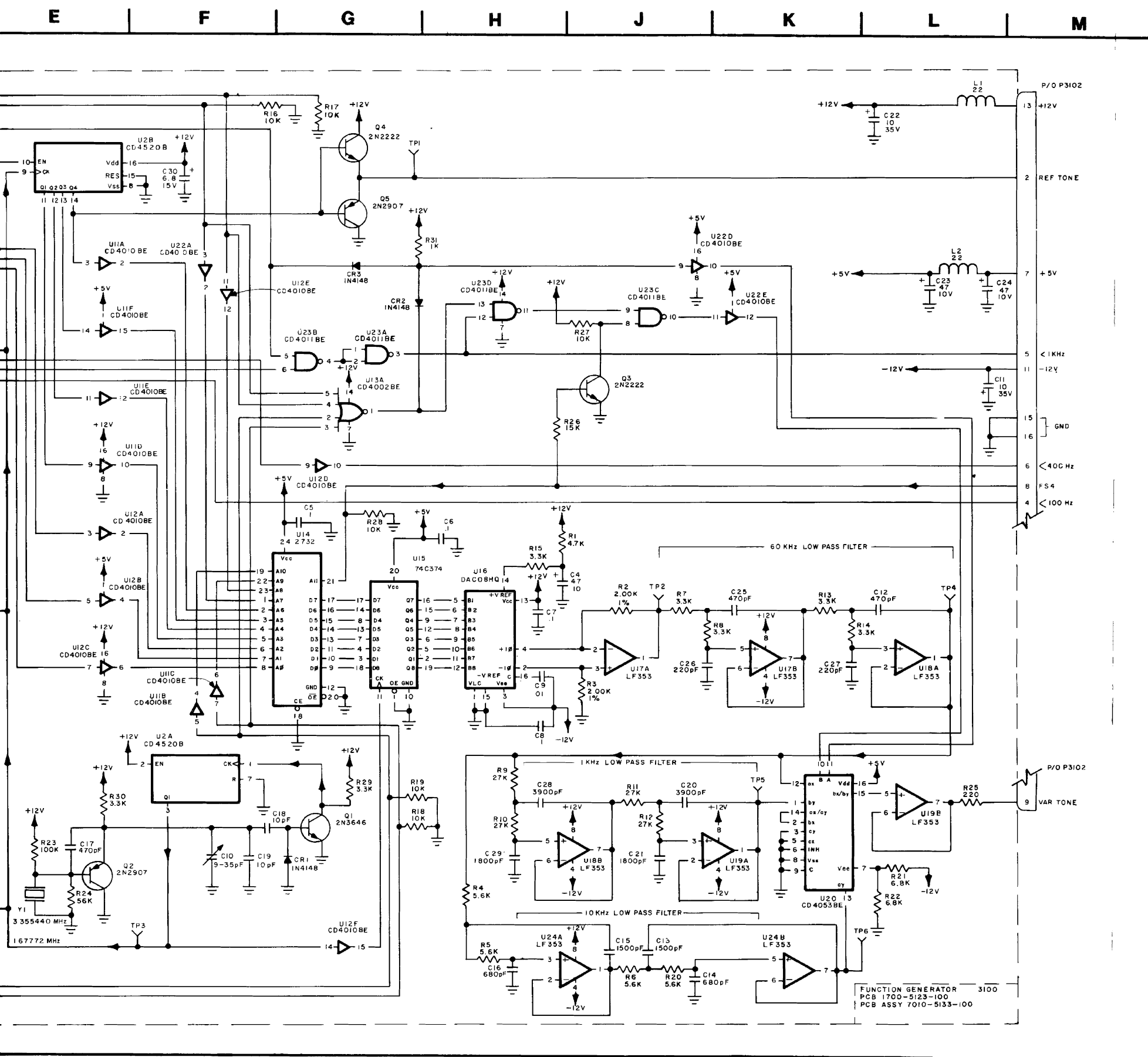
FUNCTION	FUNCTION SELECT CONTROL LINES				
	A	B	C	D	E
SINE	0	0	0	0	0
SQUARE	1	0	0	0	0
RAMP	0	1	0	0	0
TRIANGLE	1	1	0	0	0
PULSE	0	0	0	0	0
DCS	0	0	0	1	1

FUNCTION SELECTED	FILTER USED
SINEWAVE AND DCS	
<819.2 Hz	1 kHz
819.2 THRU 13106.2 Hz	10 kHz
$\geq 13106.2$ Hz	60 kHz
SQUARE, RAMP, AND TRIANGLE	
<819.2 Hz	10 kHz
$\geq 819.2$ Hz	60 kHz
PULSE	10 kHz



Function Generator PC Board (Rev B-4)

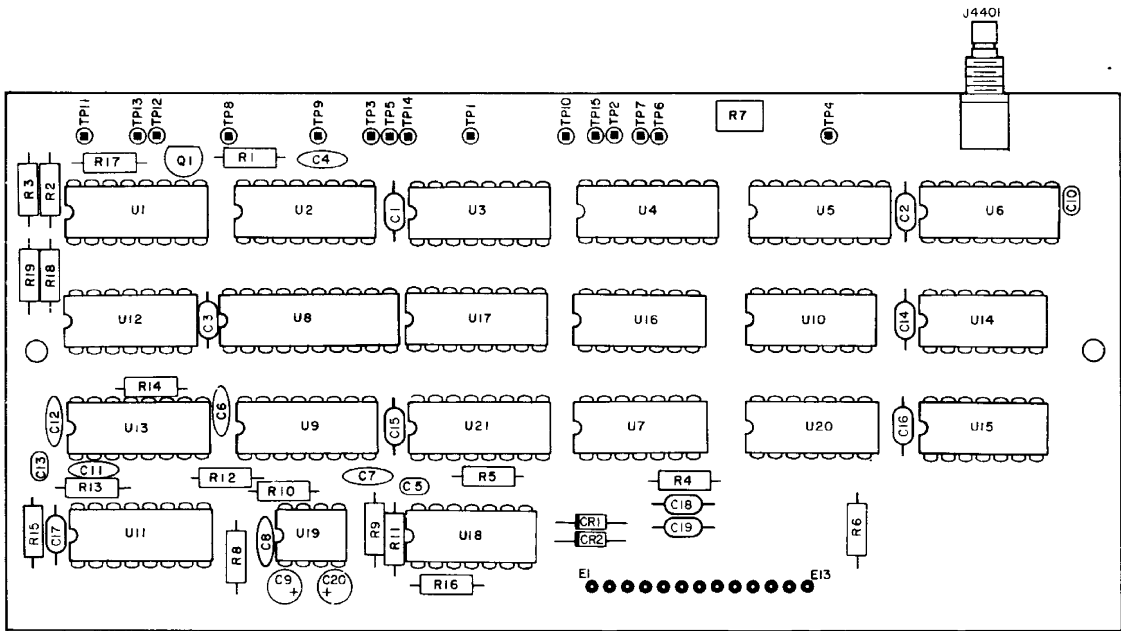




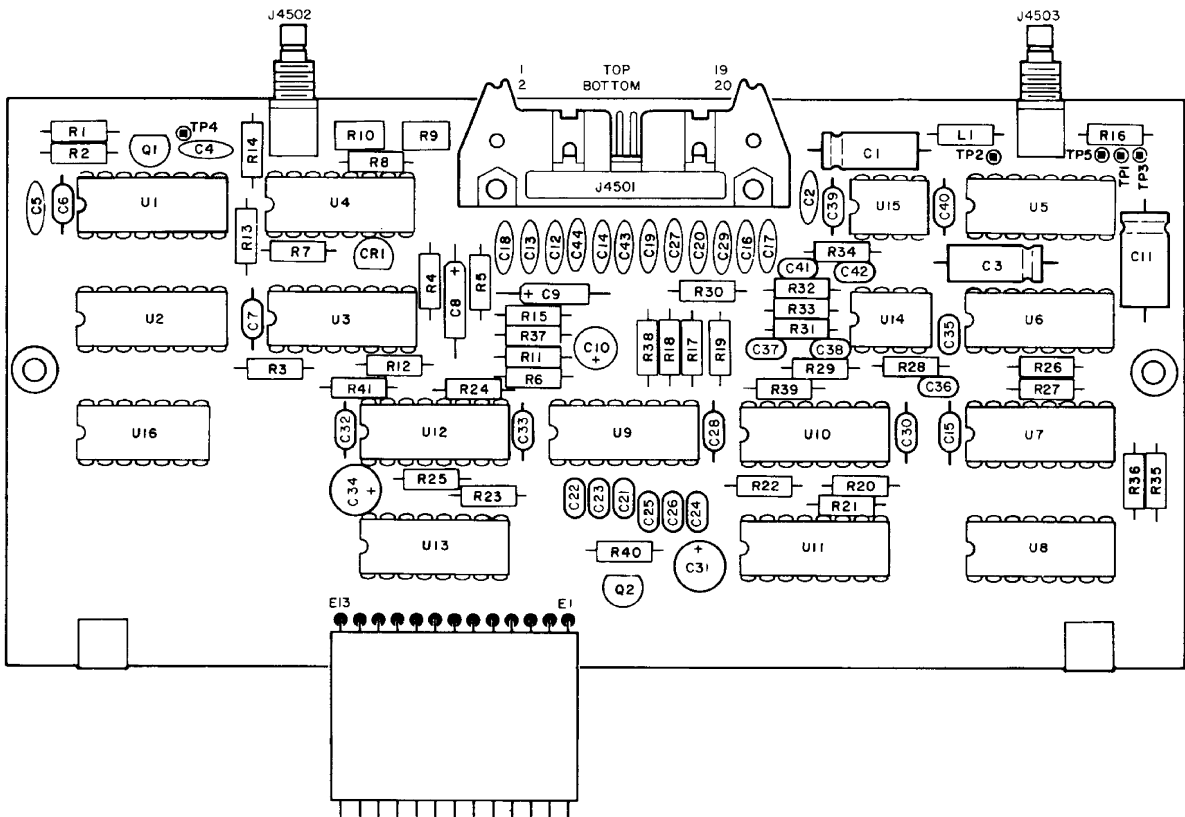
NOTES:

1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 3100. (E.G., R1 IS R3101).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.
6. APPLY TWO STRIPS OF MYLAR TAPE (1/4" WIDE X 1 3/4" LONG).

Figure 6-14 Function Generator PC Board Assembly (0000-5113-100-C)



Digital Counter PC Board (Rev B-1)



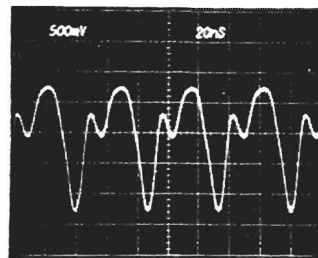
Digital Reference PC Board (Rev F-3)

FREQ ERROR SELECT CODING										
J4501		S3702 FREQ ERROR METER RANGE POSITION								
		RF						AUDIO		
PIN #	IDENTIFIER	30	100	300	1K	3K	10K	3	30	300
1	X3/X10	0	1	0	1	0	1	0	0	0
11	AUDIO/RF	0	0	0	0	0	0	1	1	1
19	XTB	0	0	1	1	0	0	1	0	1
20	YTB	0	0	0	0	1	1	0	1	1
TIME BASE		10 Hz	100 Hz	1 kHz		100 Hz	1 kHz	10 kHz		

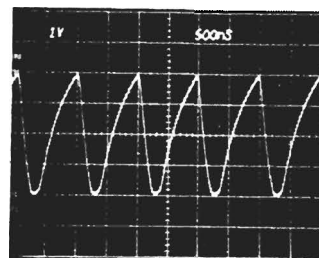
J4501 PIN #2 (GEN TUNE) IS TYPICALLY +5.0 VDC

TEST POINTS	RF SETTINGS					
	30	100	300	1K	3K	10K
TP4401	0	0	1	1	0	0
TP4402	1	1	1	1	1	1
TP4403	0	0	0	0	1	1
TP4404	1	1	1	1	0	0
TP4405	1	1	0	0	0	0
TP4406	1	1	0	0	1	1
TP4407	0	0	1	1	1	1

1



2



3



FIGURE 6-15

NOTES:

- ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:
  - 4400 (DIGITAL COUNTER PC BOARD).
  - 4500 (DIGITAL REFERENCE PC BOARD).
  - (E.G., R1 IS R4401, ETC.).
- ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
- ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
- ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS UNLESS OTHERWISE NOTED.
- ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.

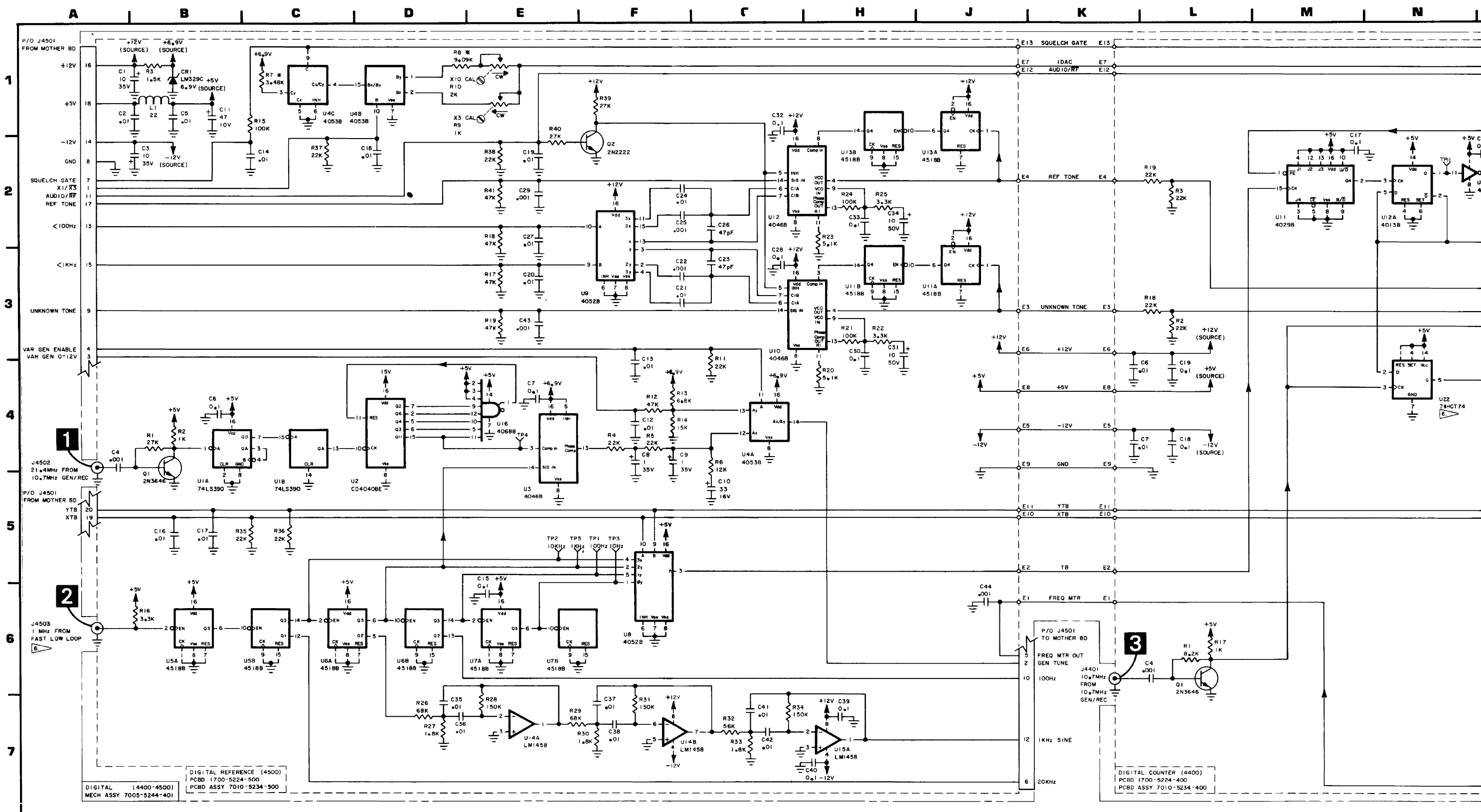
6. EFFECTIVE ON: FM/AM-1200S THRU S/N 4490 AND FM/AM-1200A THRU S/N 1448.

- J4503 IS 1 MHz FROM FREQ STD.
- U22 IS NOT USED.
- U2, PIN 4 IS CONNECTED TO U12A, PIN 2.

NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X1 PROBE.

Figure 6-15 Digital Module (Sheet 1 of 2)  
(0000-5214-400-C1)  
(0000-5214-500-D)



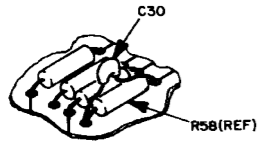


DIGITAL [4400-4500]  
MECH ASSY 7005-5244-401

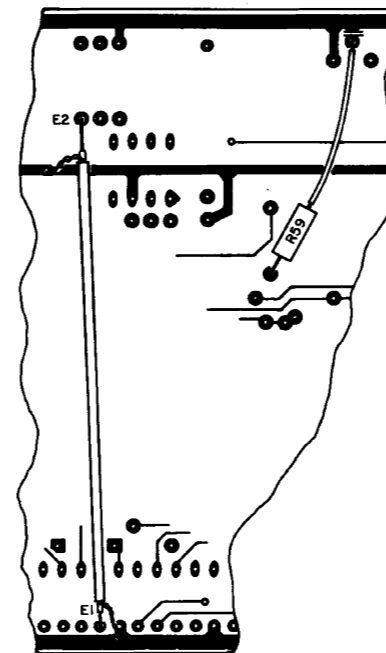
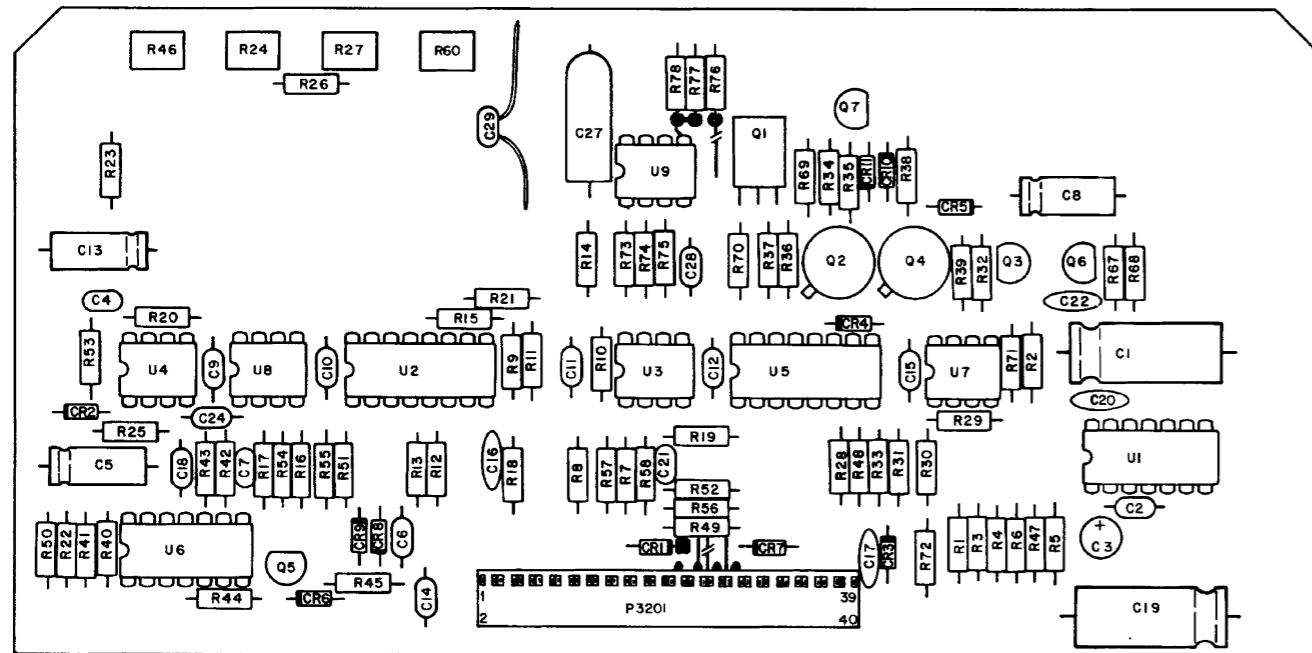
DIGITAL REFERENCE (4500)  
PCBD 1700-5224-500  
PCBD ASSY 7010-5234-500

DIGITAL COUNTER (4400)  
PCBD 1700-5224-400  
PCBD ASSY 7010-5234-400

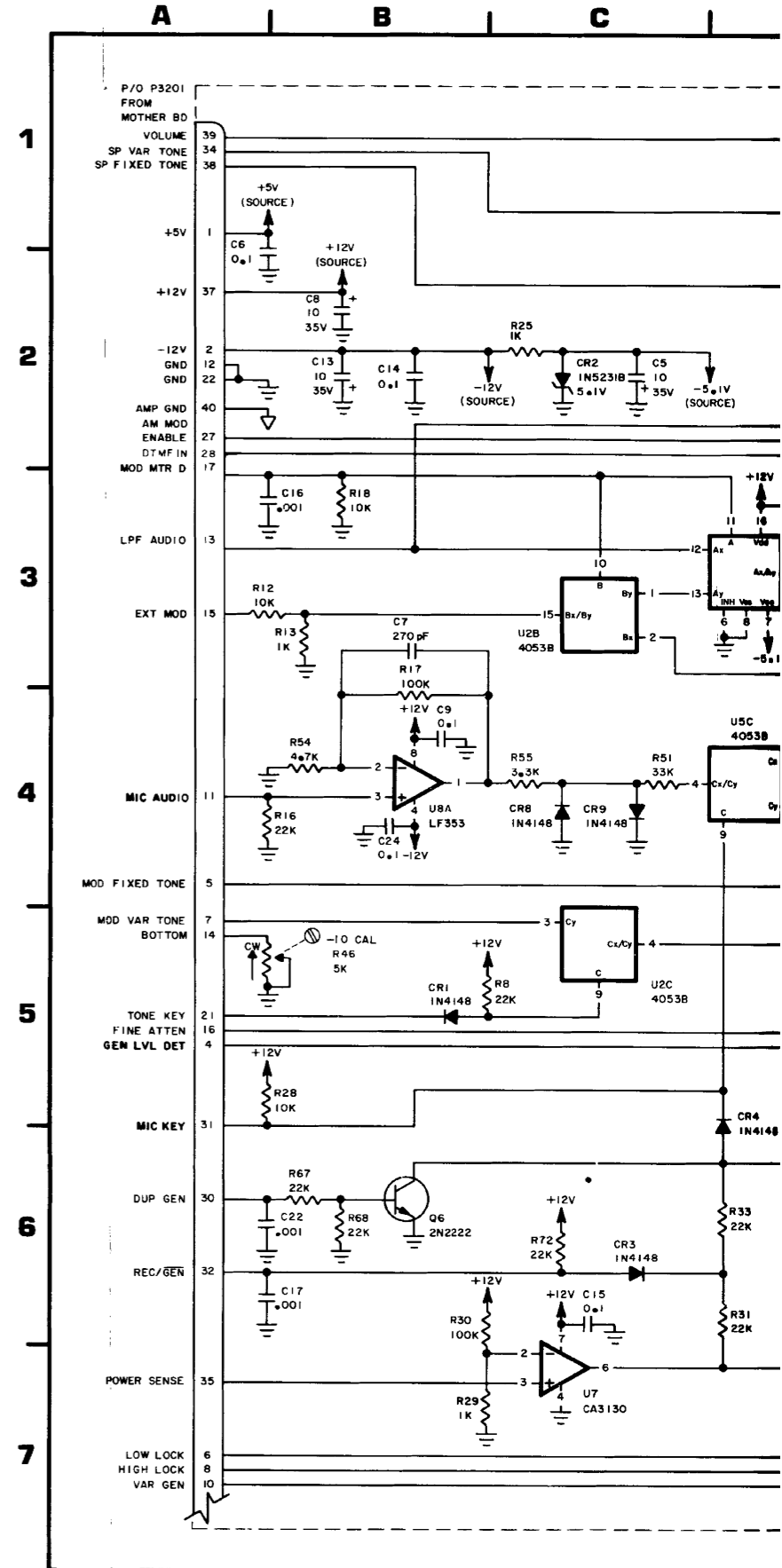


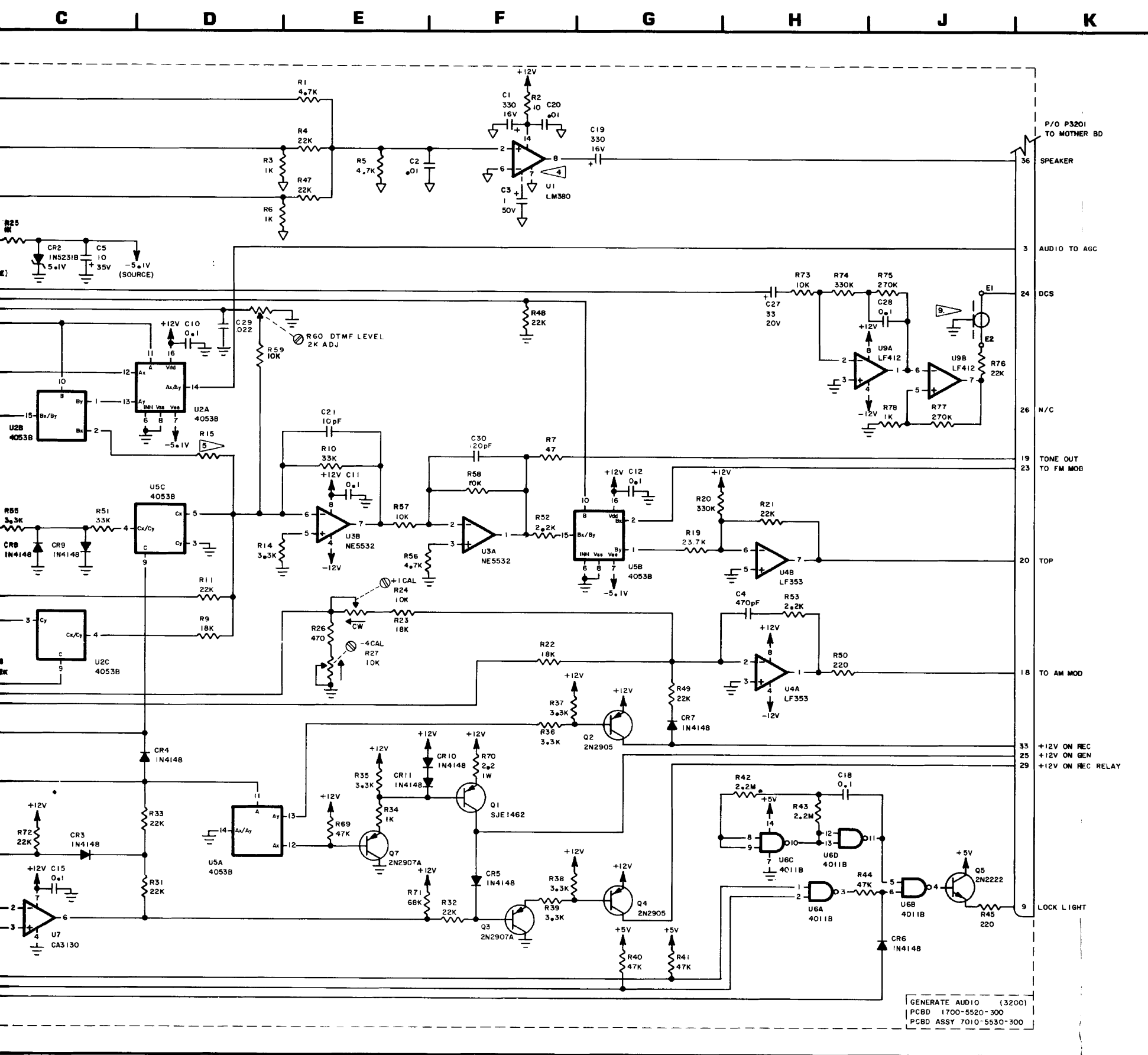


P3201		REMARKS
PIN	IDENTIFIER	
4	GEN LVL DET	POSITIVE D.C. VOLTAGE PROPORTIONAL TO R.F. DETECTED IN THE OUTPUT AMP
6	LOW LOCK	+5 VDC WHEN LOW LOOP IS PHASE LOCKED
8	HIGH LOCK	+5 VDC WHEN HIGH LOOP IS PHASE LOCKED
17	MOD MTR D	+12 VDC WHEN MODULATION METER CONTROL IS IN DIST OR SINAD
21	TONE KEY	GROUND ON THIS LINE, WHEN IN GEN MODE, DISABLES FUNCTION GENERATOR OUTPUT
27	AM	+12 VDC WHEN MODULATION SELECT CONTROL IS IN AM NORM, AM NAR, AND SSB
31	MIKE KEY	GROUND WHEN MICROPHONE PTT SWITCH IS DEPRESSED
35	POWER SENSE	POSITIVE DC VOLTAGE PROPORTIONAL TO THE STRENGTH OF ANY RF RECEIVED AT THE T/R CONN



Generate Audio PC Board (Rev A-3)





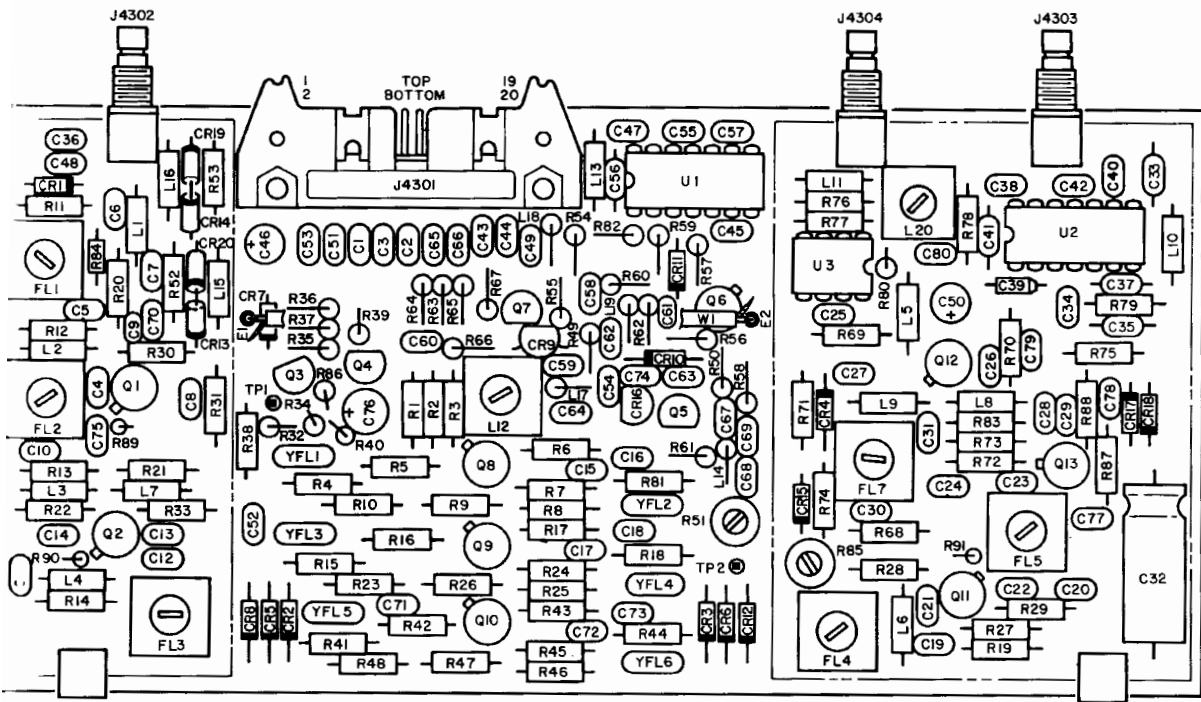
1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 3200 (E.G., R1 IS R3201).
2. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
3. NOT USED.
4. PINS 3, 4, 5, 10, 11 AND 12 ARE GROUNDED FOR HEAT DISSIPATION.
5. R15 IS SELECTED AT TEST (SAT). NOMINAL IS 5.6 K. RANGE IS 2.7 K TO 8.2 K.
6. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
7. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
8. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.
9. COAX BETWEEN R76 AND P3201-24 WAS ADDED AT SERIALS:

1200A - 1440  
1200S - 4391

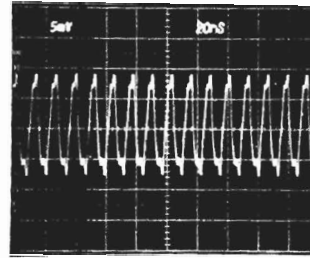
Figure 6-16 Generate Audio Module (0000-5510-300-A2)

NOTES:

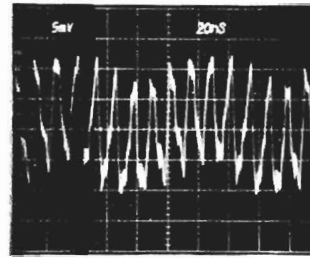
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 4300 (E.G., R1 IS R4301).
2. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
3. R38 IS SELECTED AT TEST (SAT). NOMINAL IS 6.8 K. RANGE IS 4.7 K TO 15 K.
4. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
5. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
6. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.



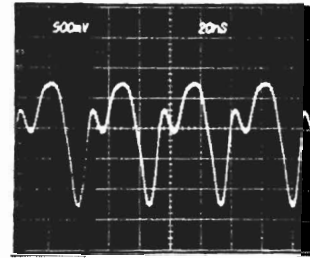
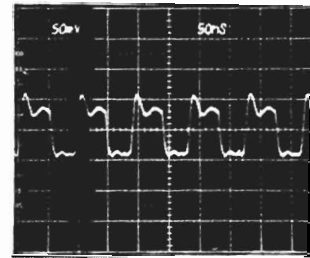
10.7 MHz Gen/Rec PC Board (Rev U-1)



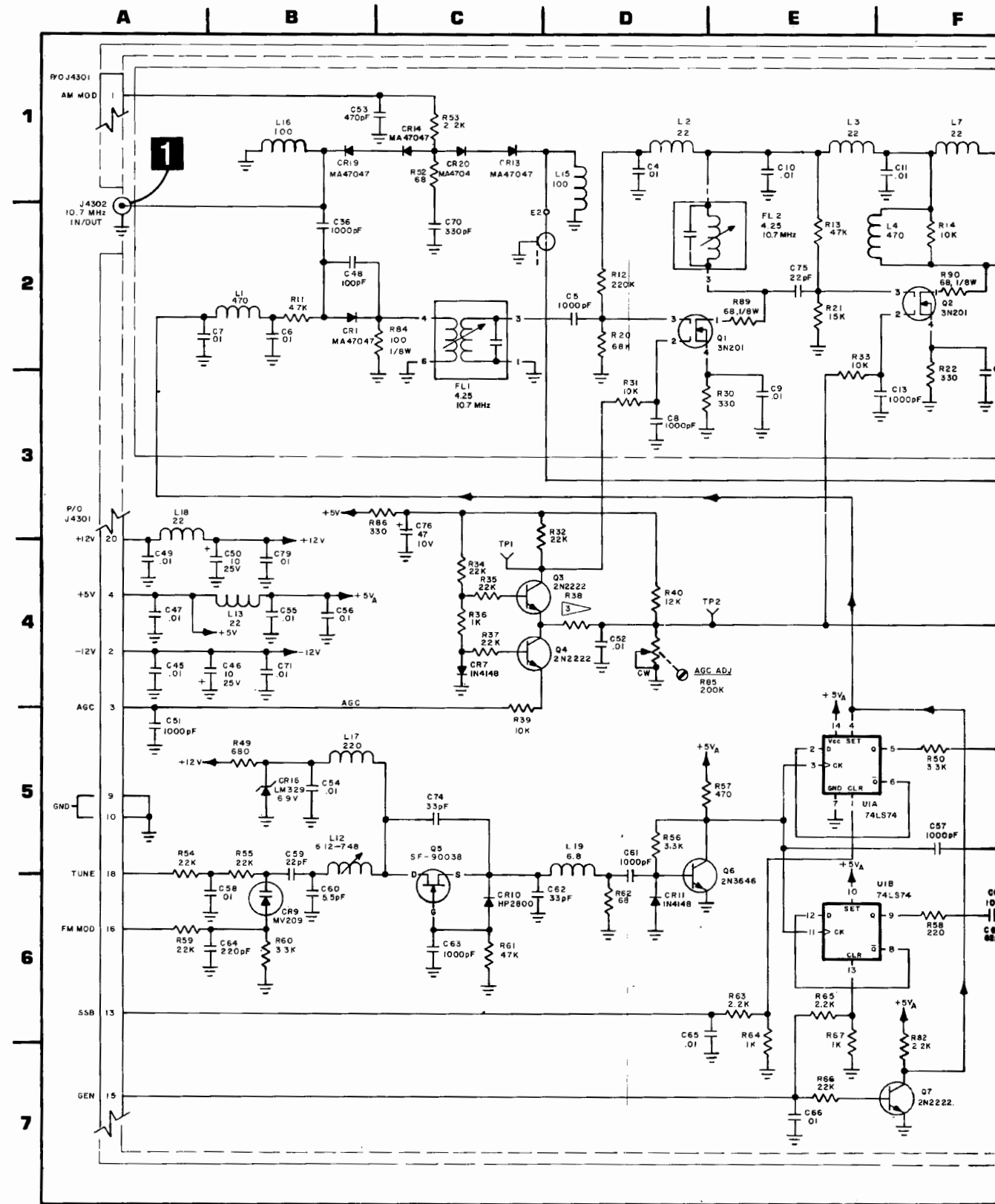
REC MODE  
NO SIGNAL PRESENT



INPUT @ ANT.  
(150.2 MHz @ -50 dB)



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X1 PROBE.



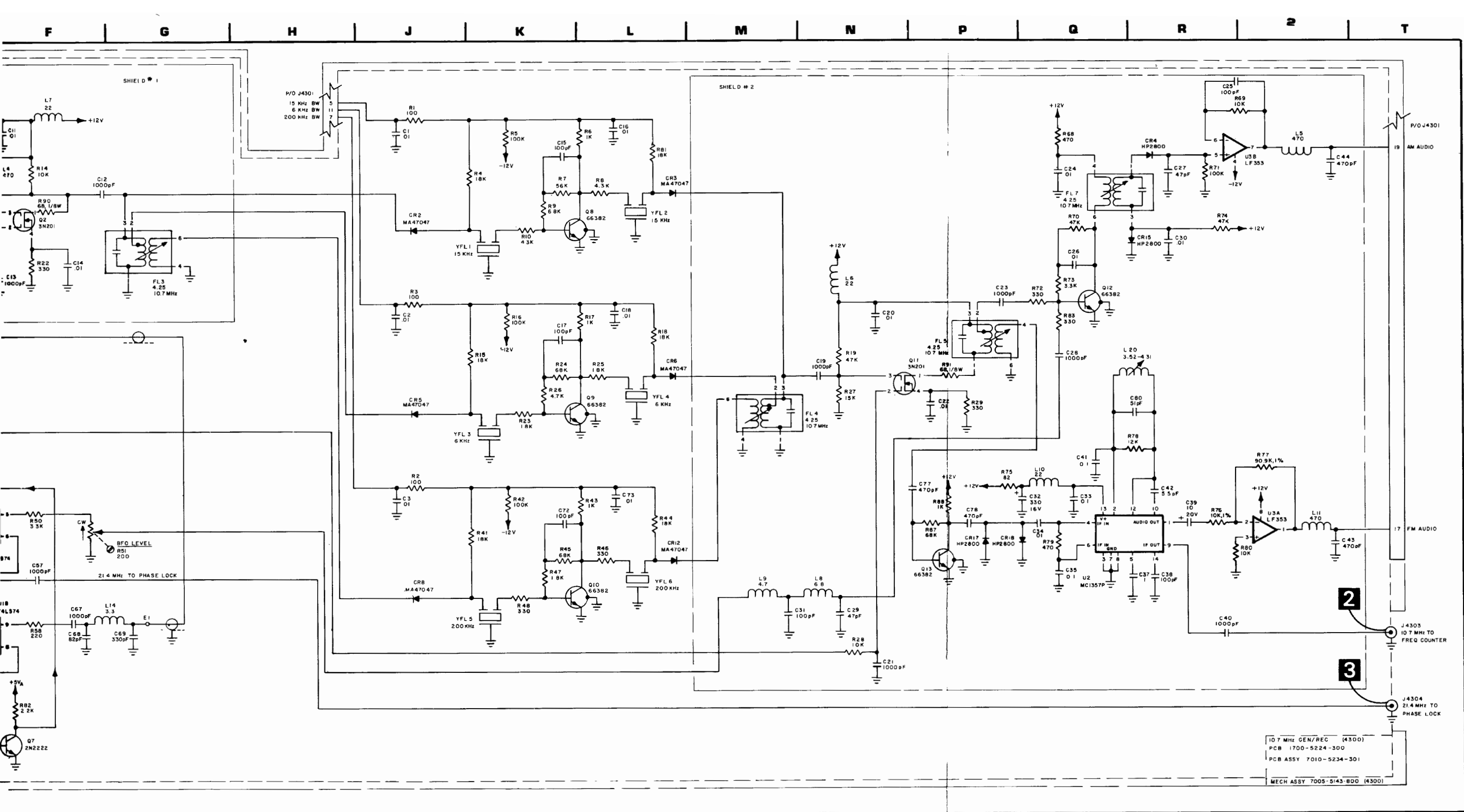
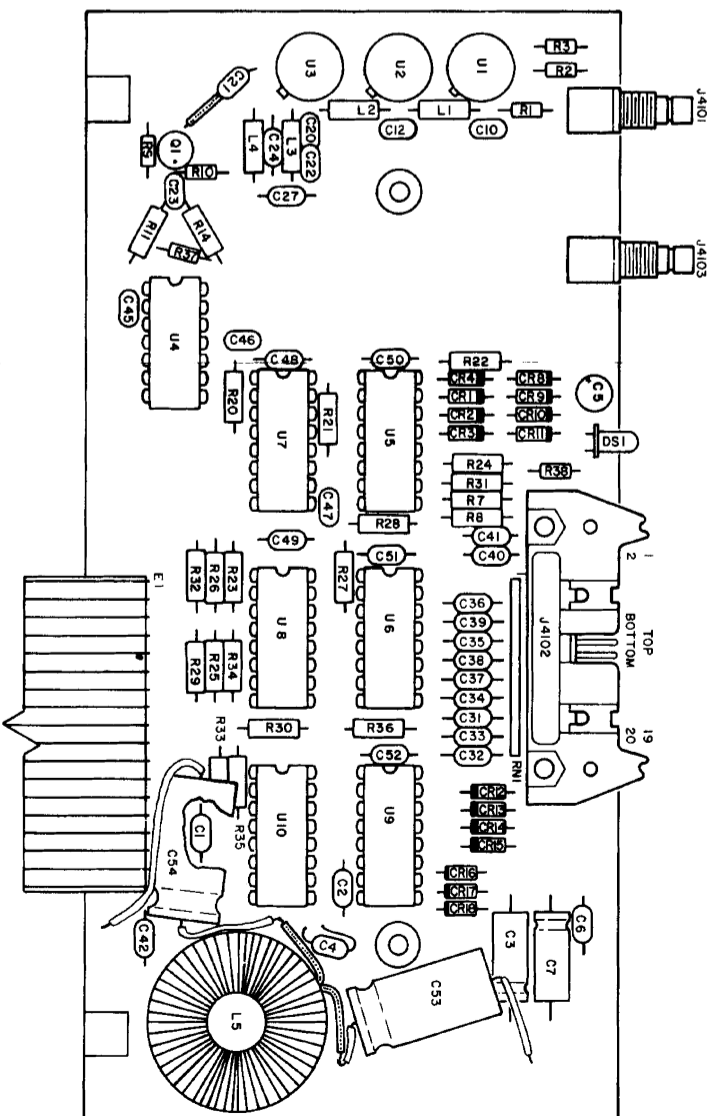
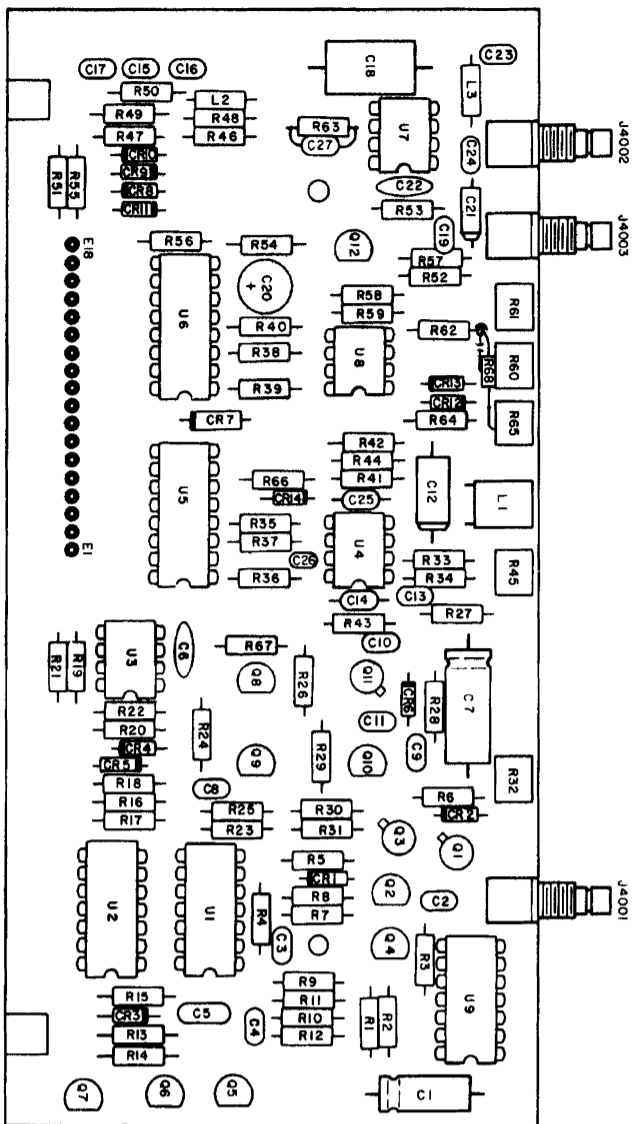
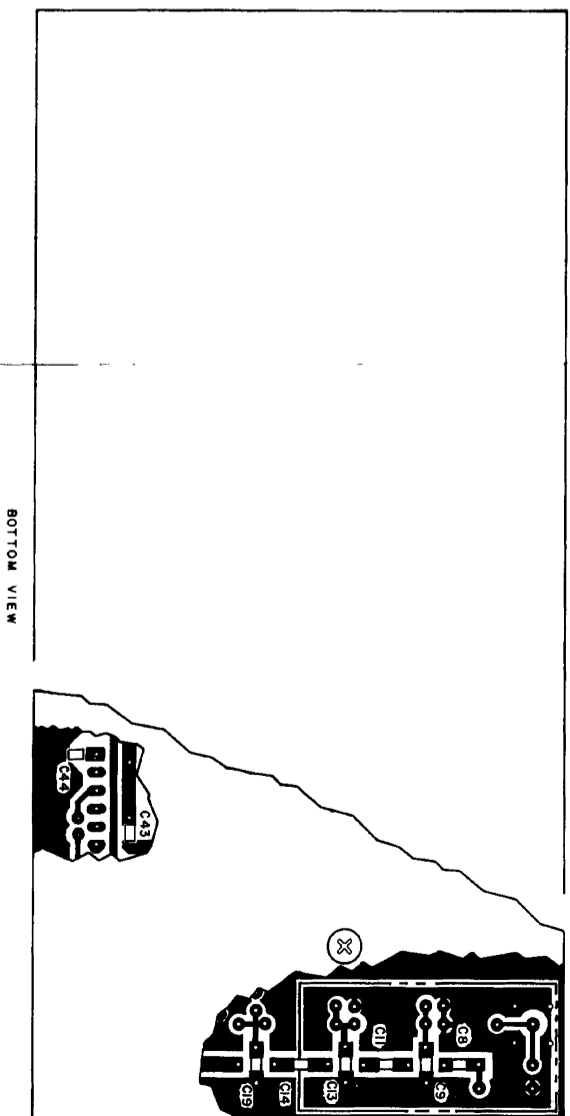
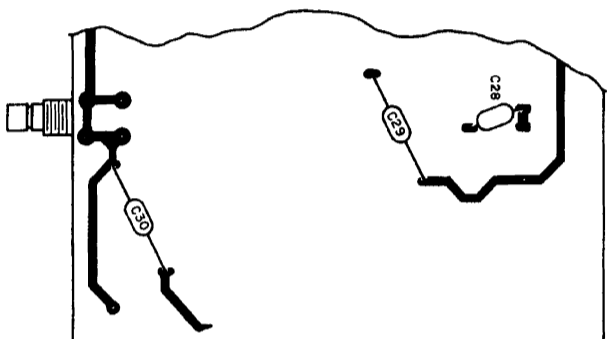


Figure 6-17 10.7 MHz Gen/Rec Module  
(0000-5113-800-E)

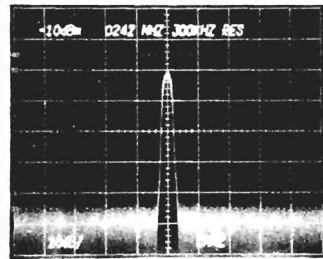


High Loop Analog PC Board (Rev D7)

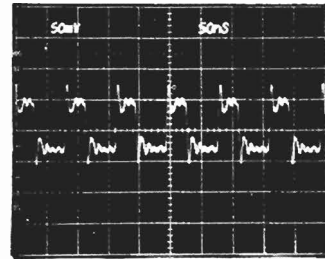
High Loop Divider PC Board (Rev E8)



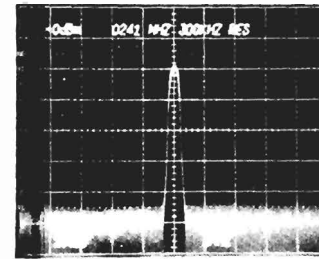
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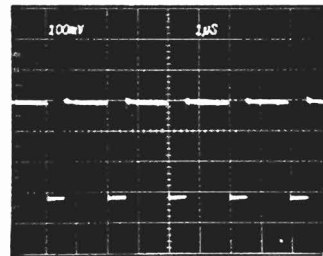
2



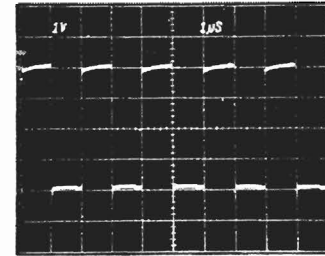
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4

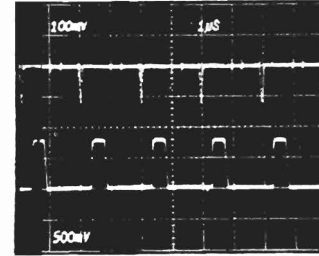


5



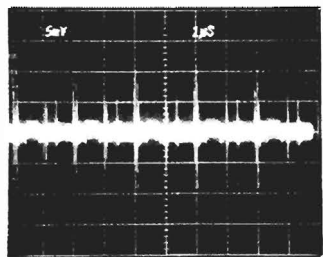
X1 PROBE

6



TOP TRACE Q11, PIN S  
BOTTOM TRACE Q11, PIN G

7



NOTE: UNLESS OTHERWISE STATED, ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X10 PROBE.

NOTES:

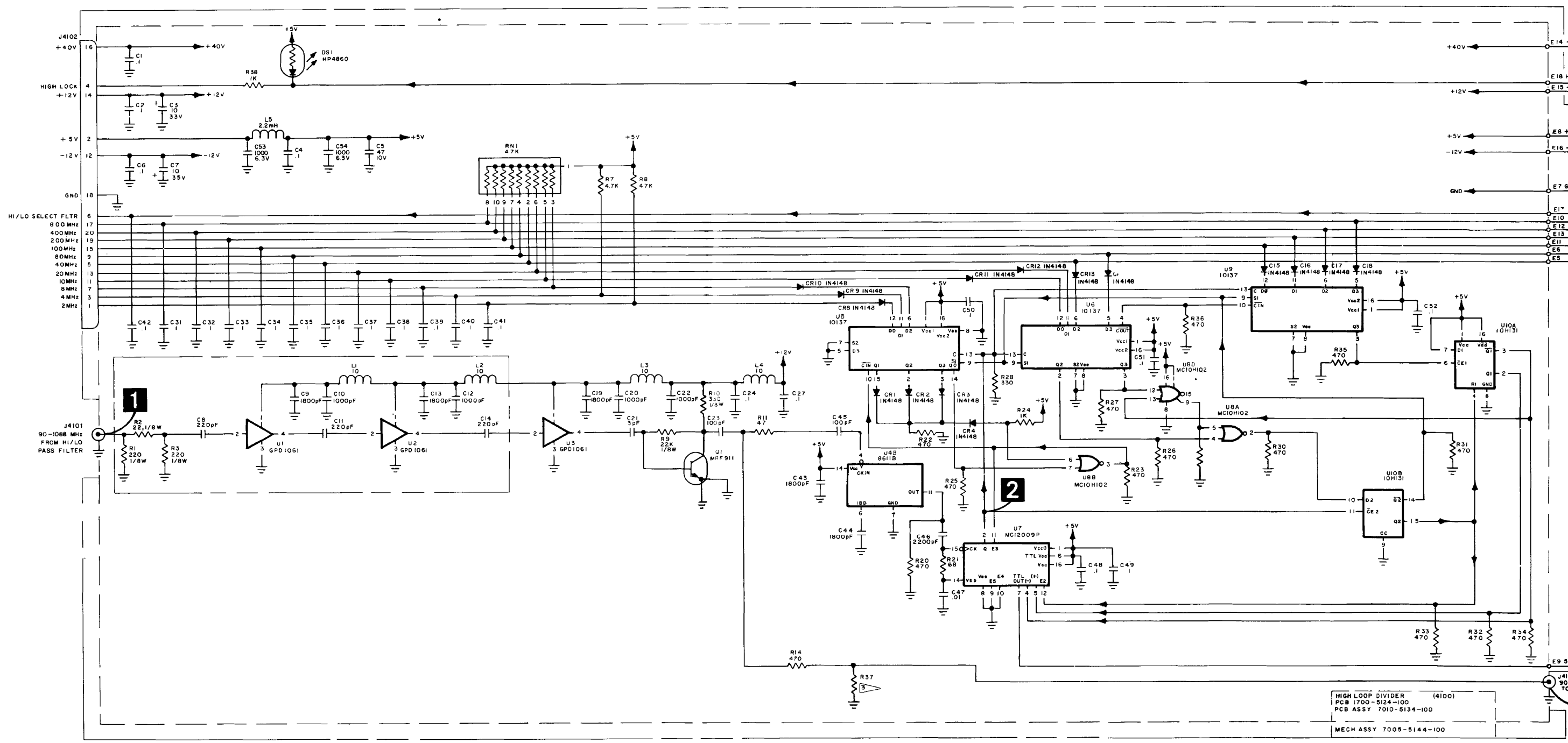
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:
  - A. 4000 (HIGH LOOP ANALOG PC BOARD).
  - B. 4100 (HIGH LOOP DIVIDER PC BOARD).
  - C. (E.G., R1 IS R4001, ETC.).
2. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
3. R4137 IS SELECTED AT TEST (SAT). NOMINAL IS 33 OHMS. RANGE IS 22 OHMS TO 56 OHMS.
4. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
5. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
6. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Figure 6-18 High Loop Module (Sheet 1 of 2)  
(0000-5114-100-E4)  
(0000-5114-000-D7)



A B C D E F G H J K L M N

1  
2  
3  
4  
5  
6  
7



HIGH LOOP DIVIDER (4100)  
 PCB 1700-5124-100  
 PCB ASSY 7010-5134-100  
 MECH ASSY 7005-5144-100

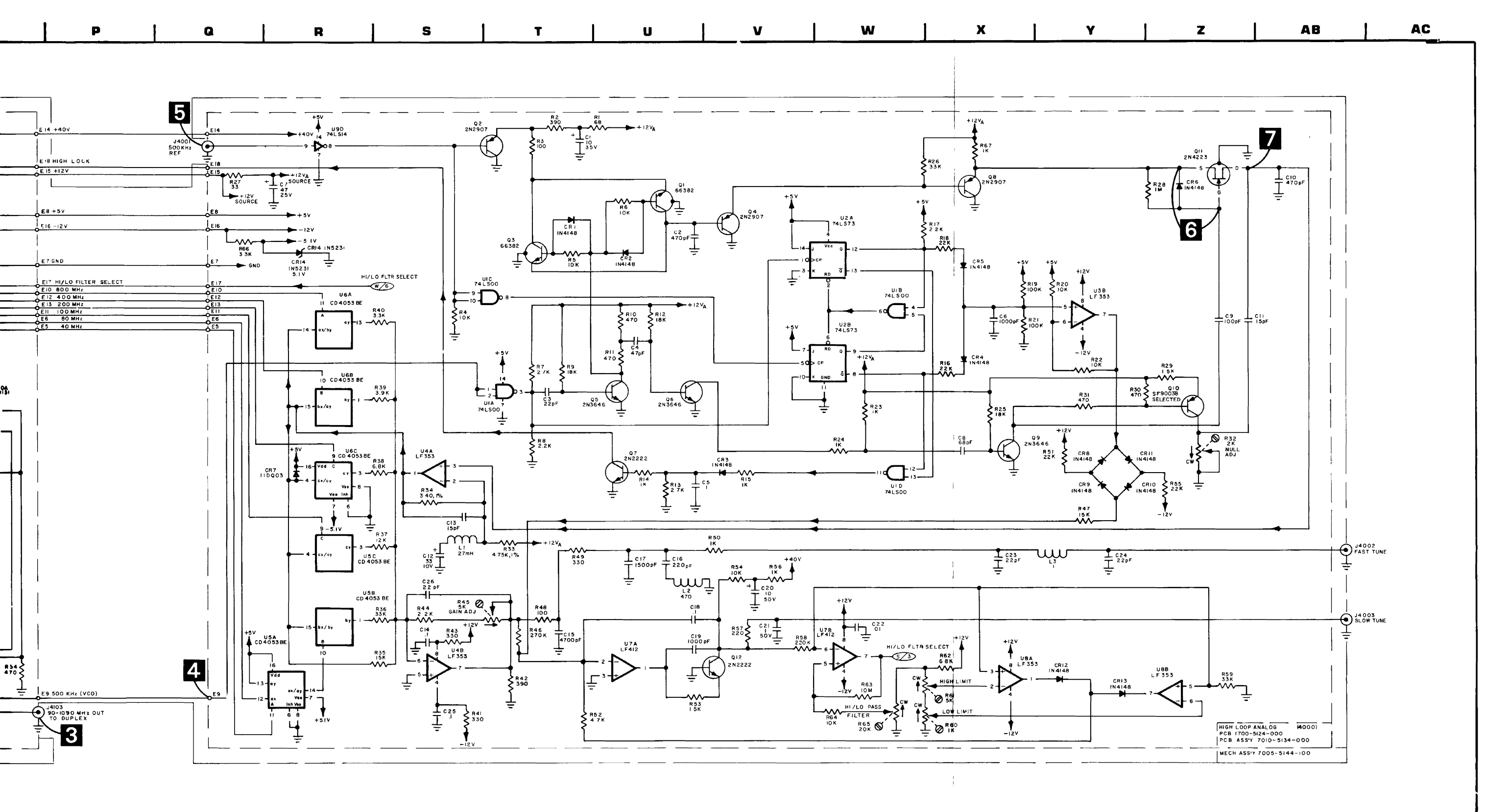
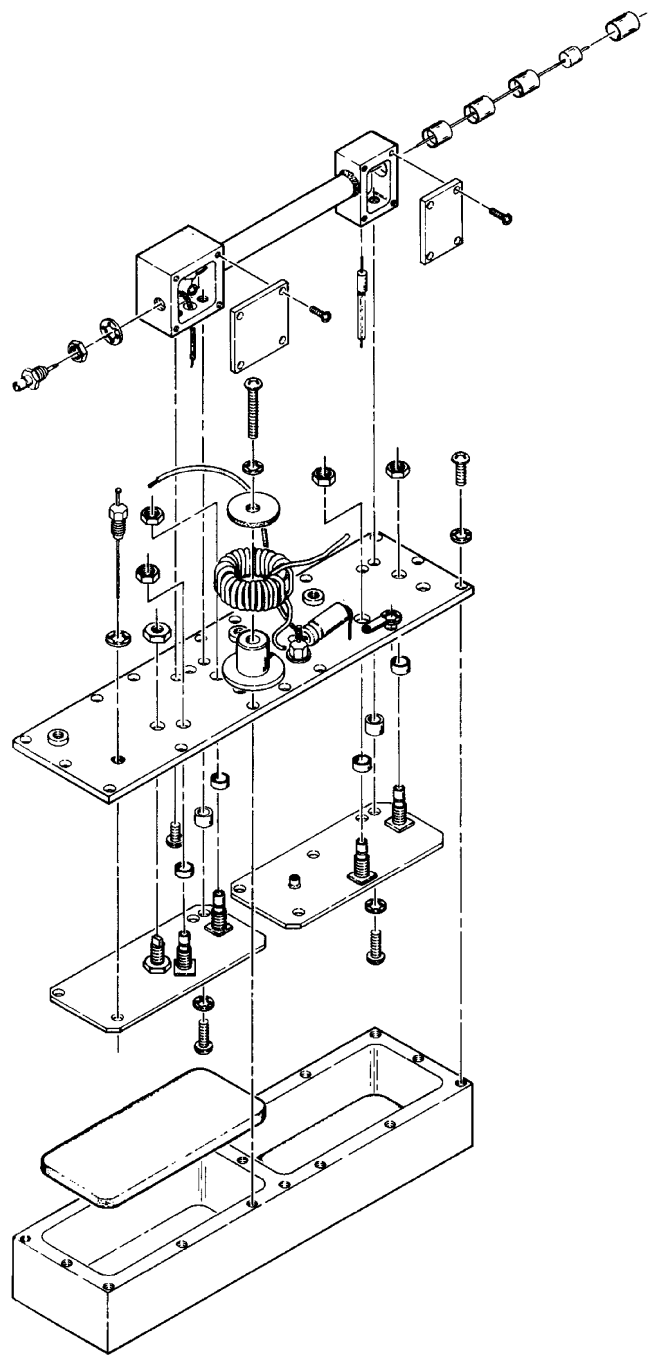
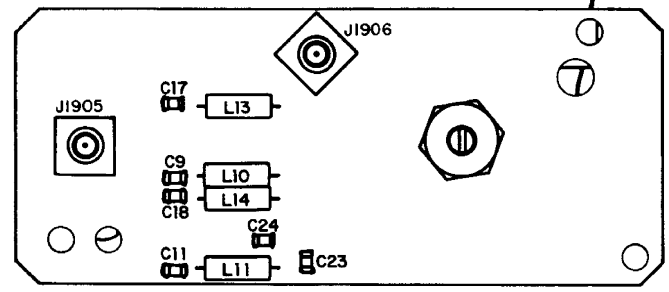
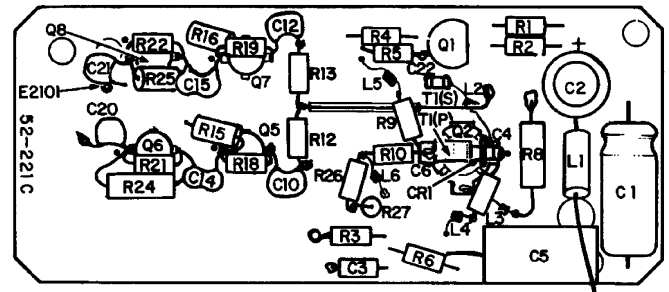


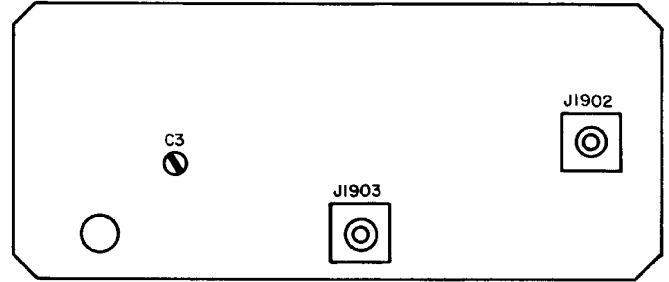
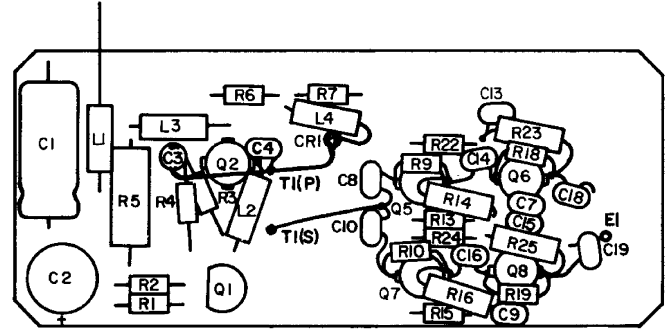
Figure 6-18 High Loop Module (Sheet 2 of 2)  
 (0000-5114-100-E4)  
 (0000-5114-000-D7)



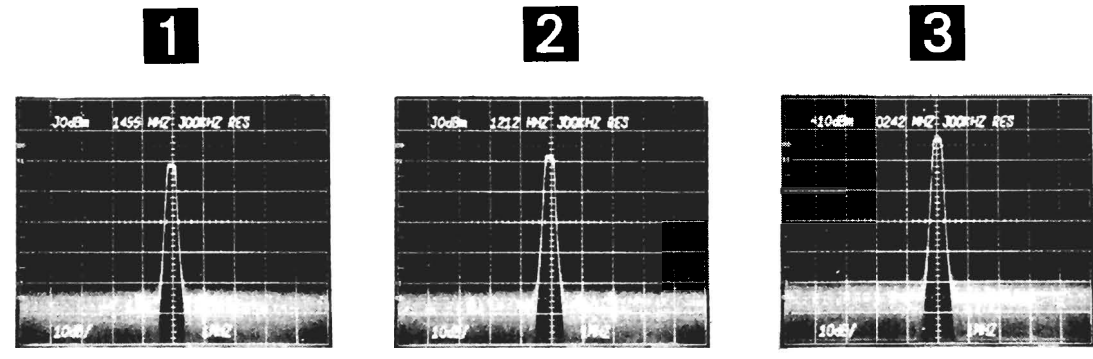
Dual VCO Assembly (Rev K)



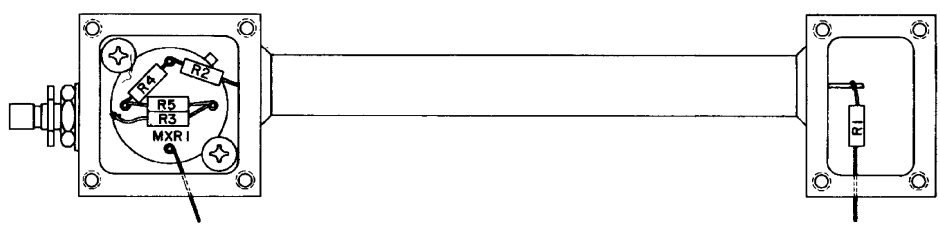
1300-2300 MHz VCO PC Board (Rev T-2)



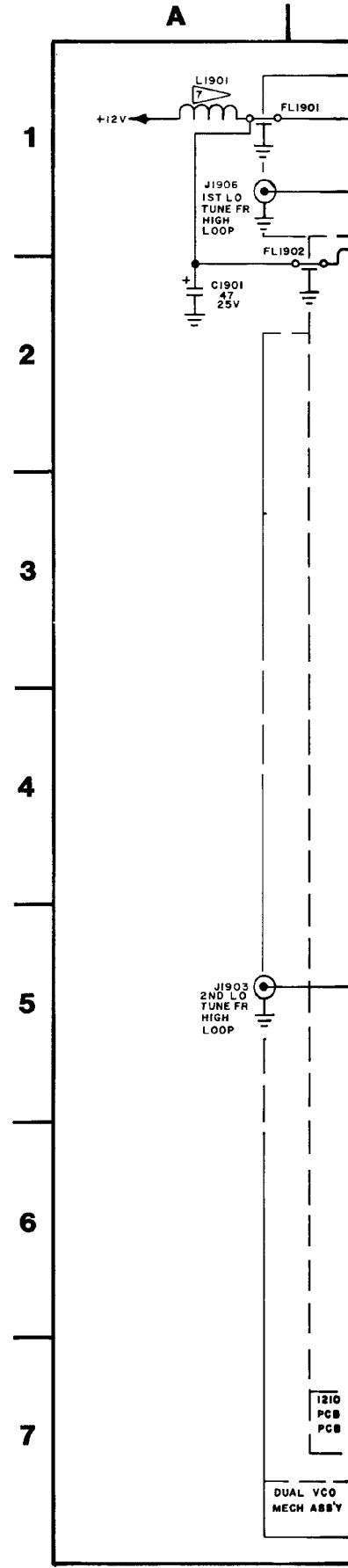
1210 MHz PC Board (Rev J)



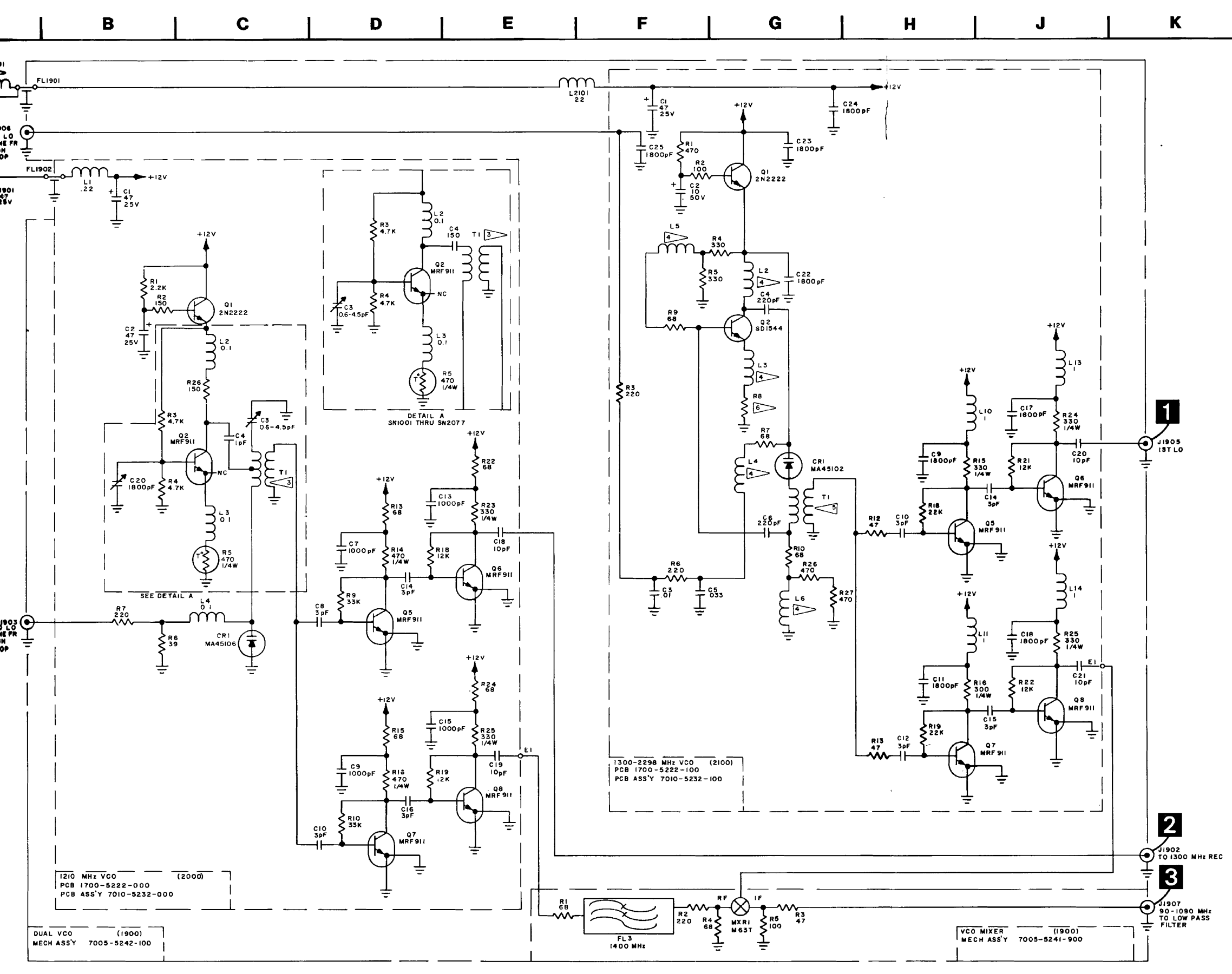
NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz IN RECEIVE MODE WITH NO INPUT SIGNAL.



VCO Mixer Assembly (Rev C)

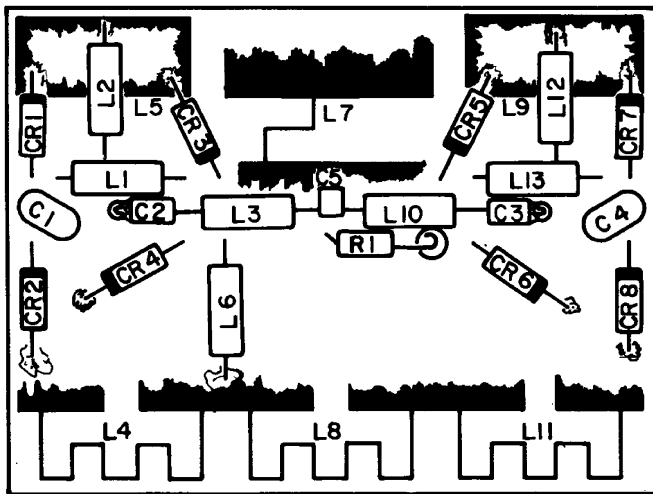


1210 PCB PCB  
DUAL VCO MECH ASSY



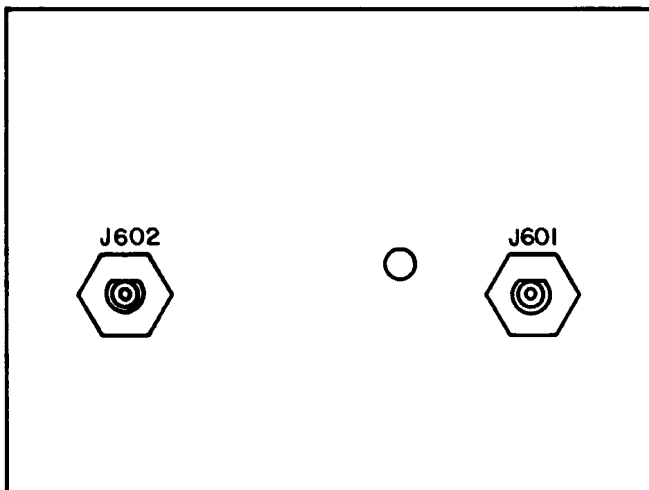
- NOTES:
- ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:
    - A. 1900 (VCO MIXER PC BOARD).
    - B. 2000 (1210 MHz VCO PC BOARD).
    - C. 2100 (1300-2298 MHz VCO PC BOARD).
    - D. (E.G., R1 IS R1901, ETC.).
  - ALL RESISTORS ARE 1/8 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  - PRIMARY (T2001) IS FORMED BY LEAD OF C2004 PLACED 0.38 INCHES FROM SECONDARY. SECONDARY T2001 IS FORMED BY 22 GA WIRE 0.8 IN. LONG.
  - 10 TURNS, 38 GA WIRE 0.014 IN. DIA.
  - PRIMARY T2101 IS FORMED BY LEAD OF C2106 SOLDERED TO CR2101, LENGTH SELECTED AT TEST (SAT). SECONDARY T2101 IS 22 GA WIRE BENT TO WITHIN 0.4 IN. OF BOARD SURFACE THEN BACK TO WITHIN 0.2 IN. OF PRIMARY.
  - R2108 IS SELECTED AT TEST (SAT). NOMINAL IS 180Ω. RANGE IS 47Ω TO 220Ω.
  - TORRIOD 18 GA, 30 TURNS.
  - ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  - ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
  - ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Figure 6-19 Dual VCO Module (0000-5212-100-N)

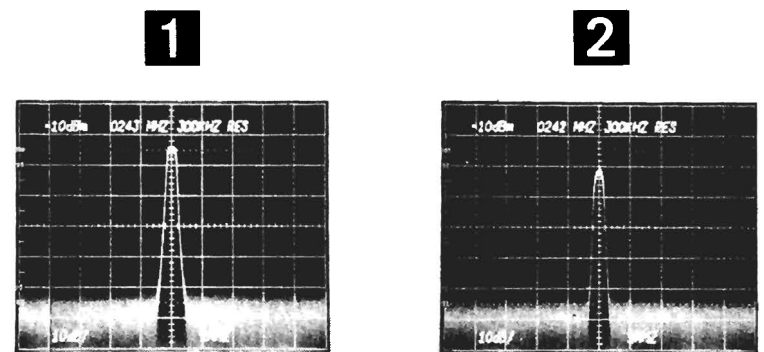


NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 600 AND 700 (E.G., C1 IS C701).
2. ALL RESISTORS ARE 1/8 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.
6. ALL SHADED AREAS INDICATE MICRO-STRIPPING.
7. L4, L5, L7, L8, L9, AND L11 ARE PRINTED CIRCUIT COMPONENTS.



High/Low Pass Filter PC Board (Rev B-4)



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz IN RECEIVE MODE WITH NO INPUT SIGNAL.

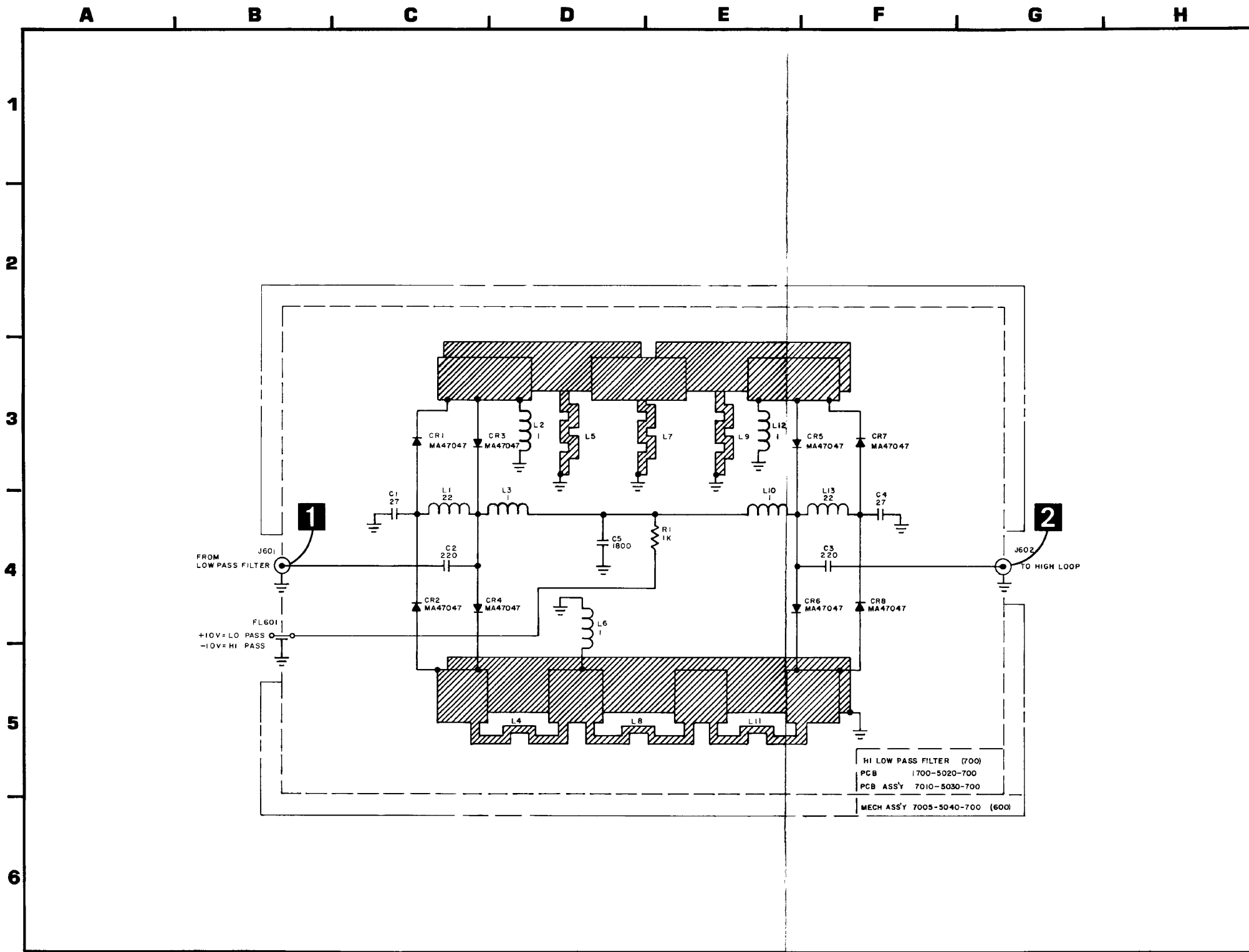
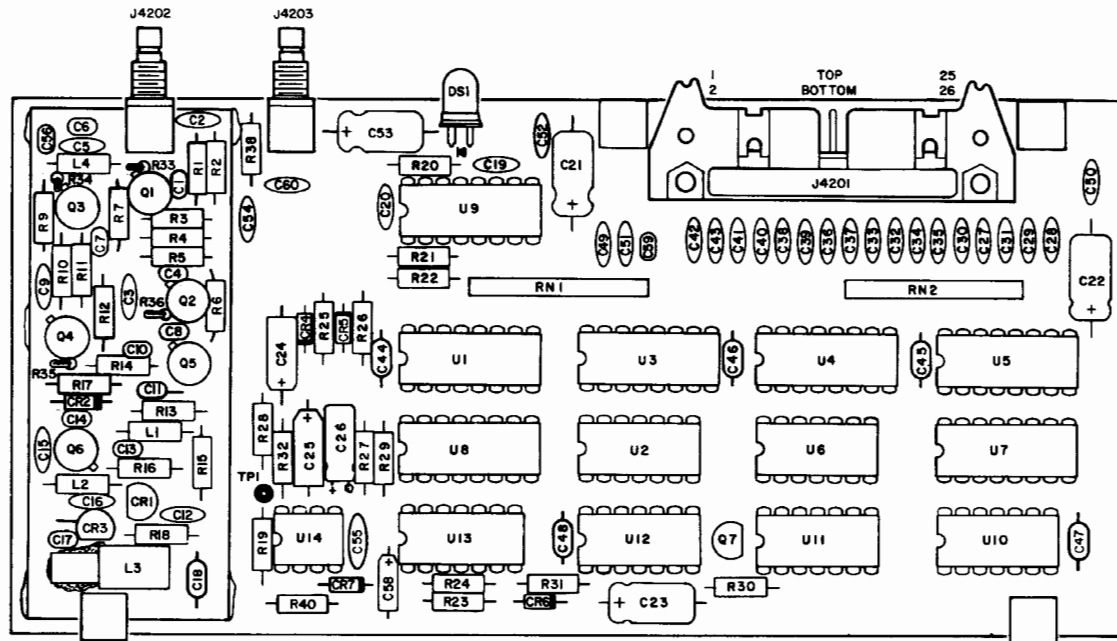
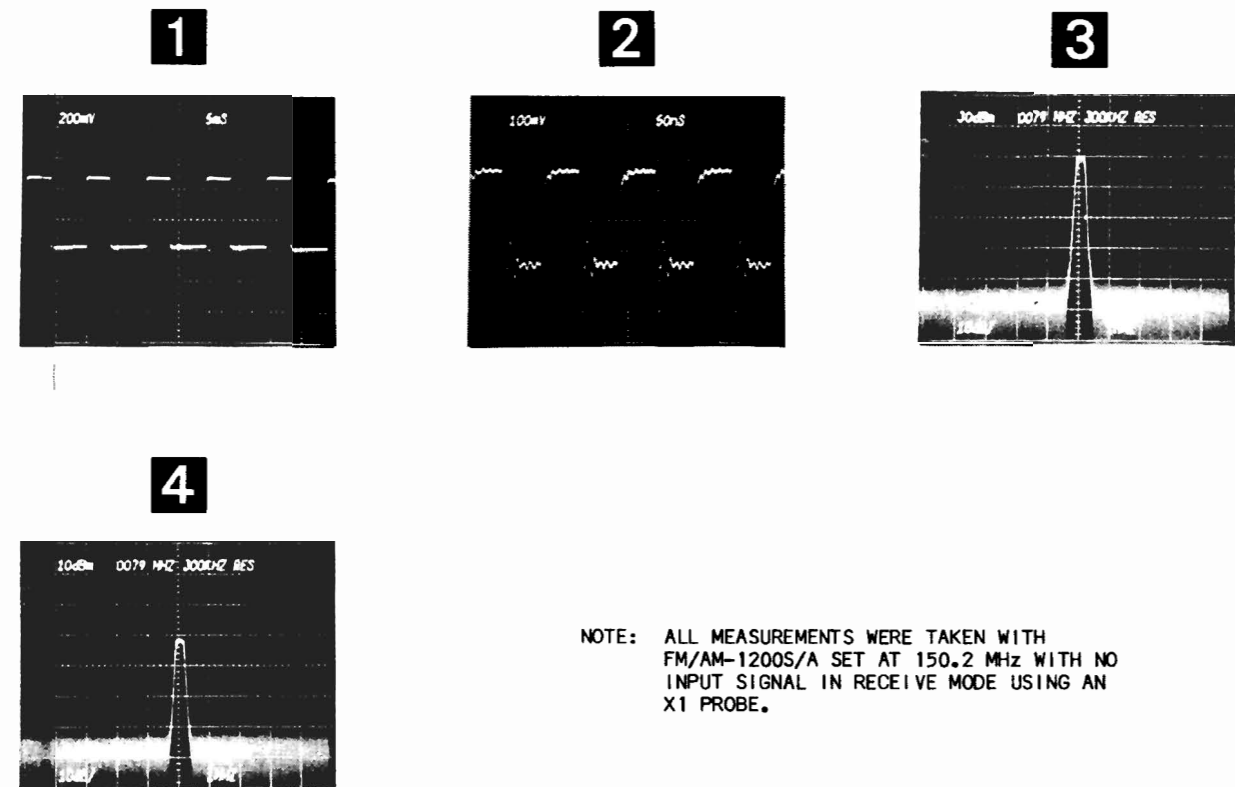


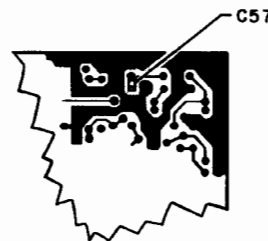
Figure 6-20 High/Low Pass Filter Assembly  
(0000-5010-700-B)



FM/AM 1200S/A FREQ SETTING	LOW LOOP OUTPUT FREQ	TUNE VOLTAGE TP 4201
0.0000	79.30000	6.00 VDC ± .5 V
1.0000	78.30000	4.50 VDC ± .5 V
1.9999	77.30010	3.00 VDC ± .5 V



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X1 PROBE.



Low Loop Synthesizer PC Board (Rev R-1)

FM/AM-1200S thru S/N 4490  
FM/AM-1200A thru S/N 1448

Figure 6-21 Low Loop Module (Sheet 1 of 2)  
(0000-5214-200-H)

A B C D E F G H J K L M

1

2

3

4

5

6

7

P/OJ4201

23 1MHz

26 800 KHz

25 400 KHz

21 200 KHz

24 100 KHz

15 80 KHz

13 40 KHz

17 20 KHz

19 10 KHz

9 8 KHz

11 4 KHz

5 2 KHz

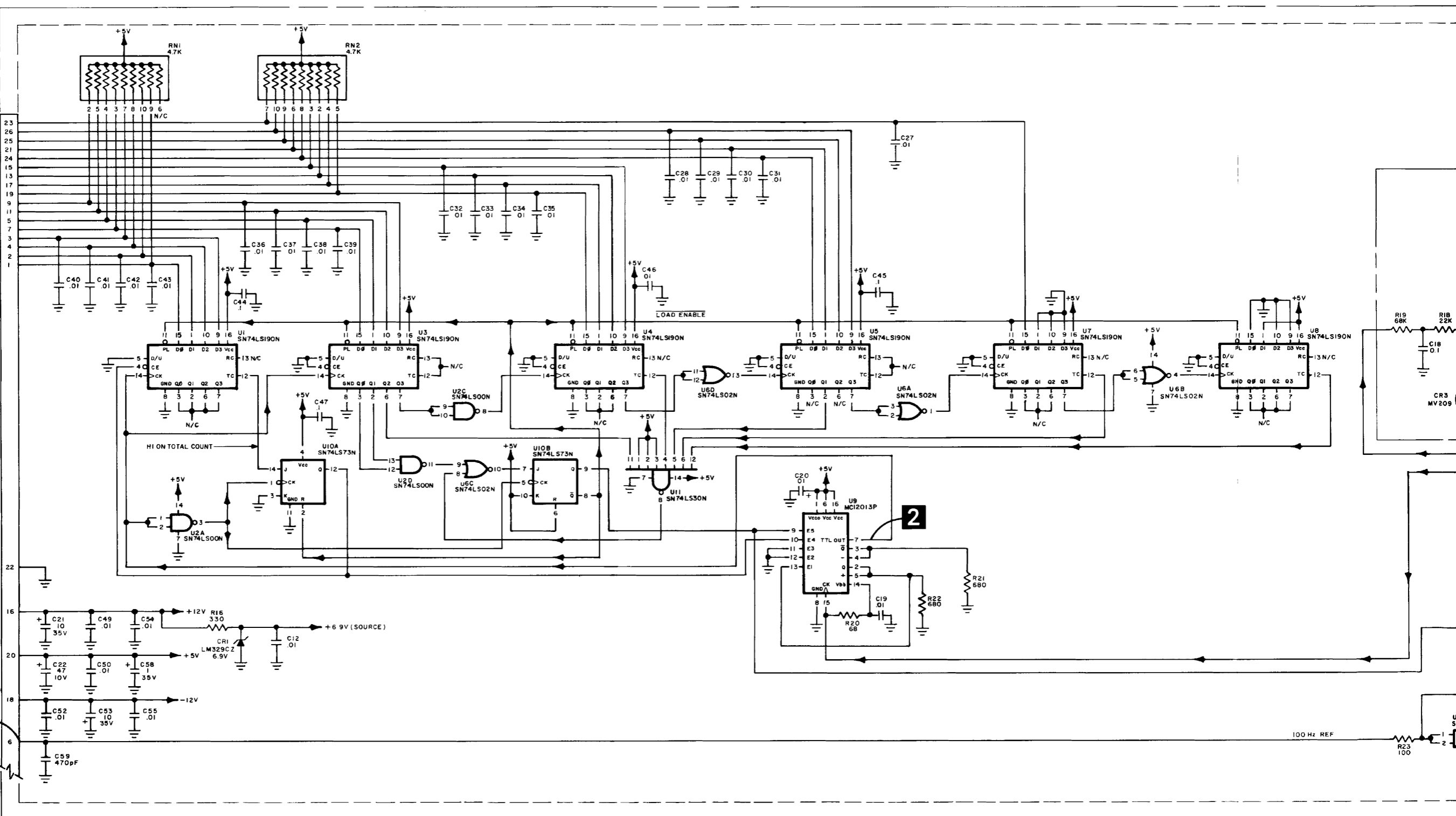
7 1 KHz

3 0.8 KHz

4 0.4 KHz

2 0.2 KHz

1 0.1 KHz



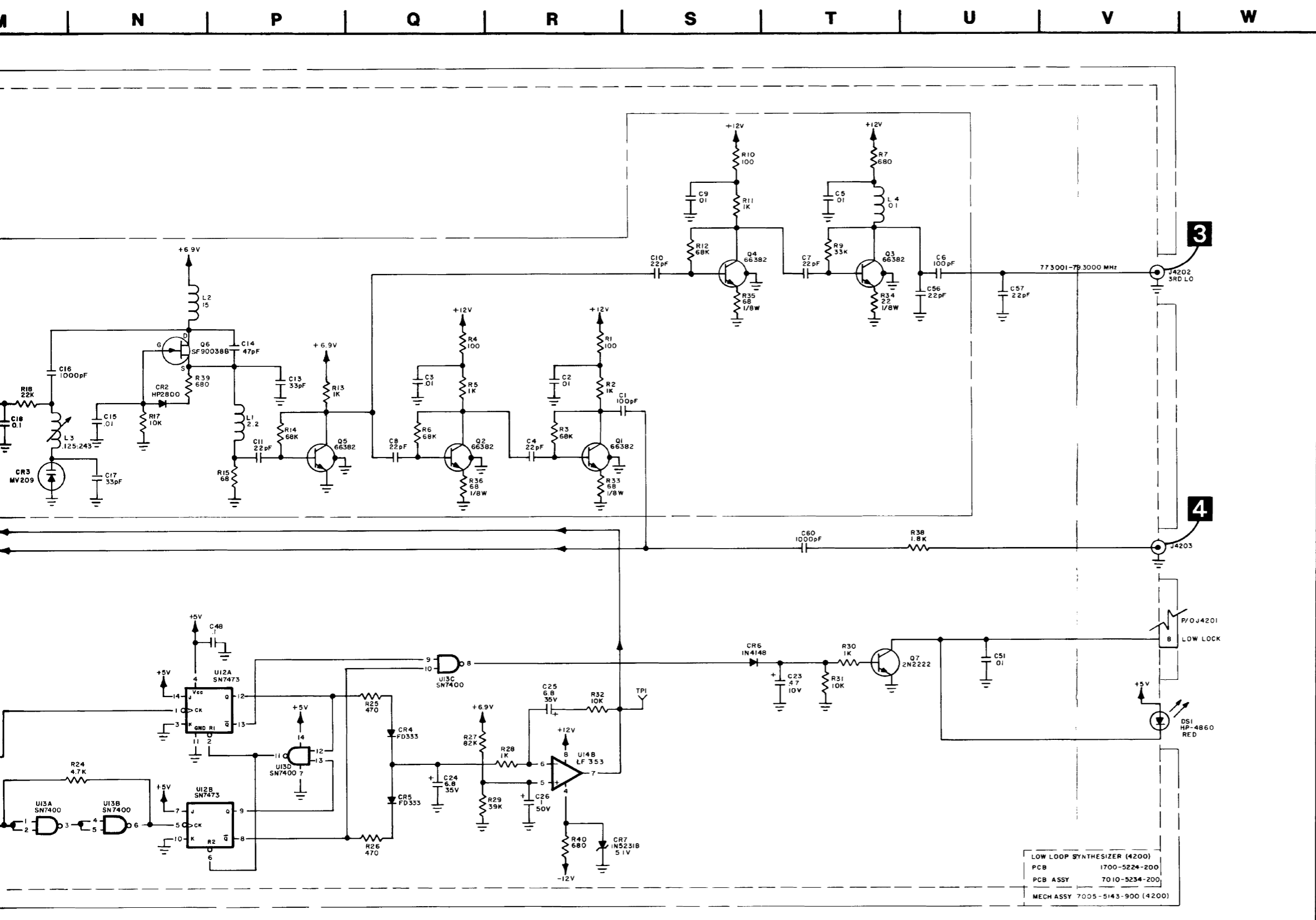
1

2

U15A SN7400

100 Hz REF



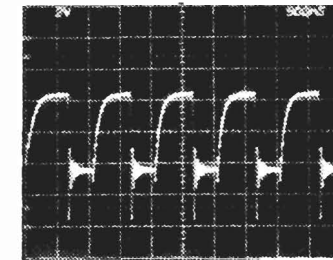
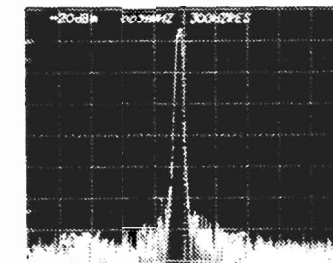
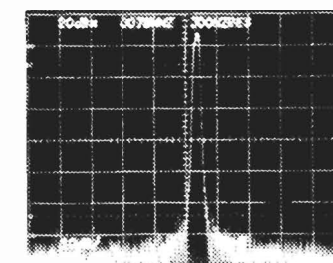


NOTES:

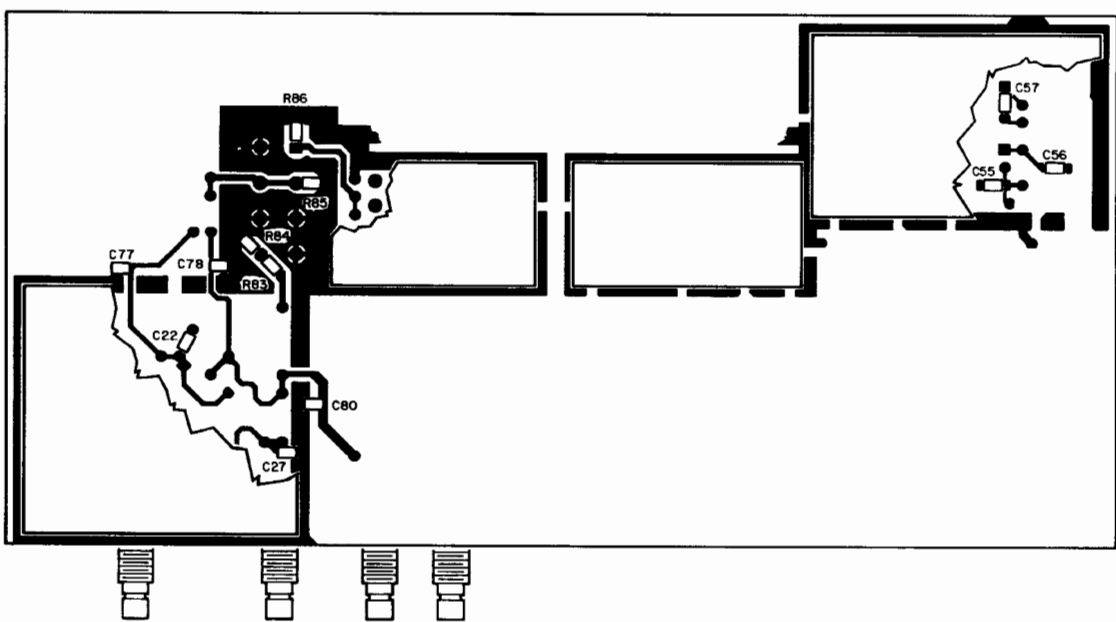
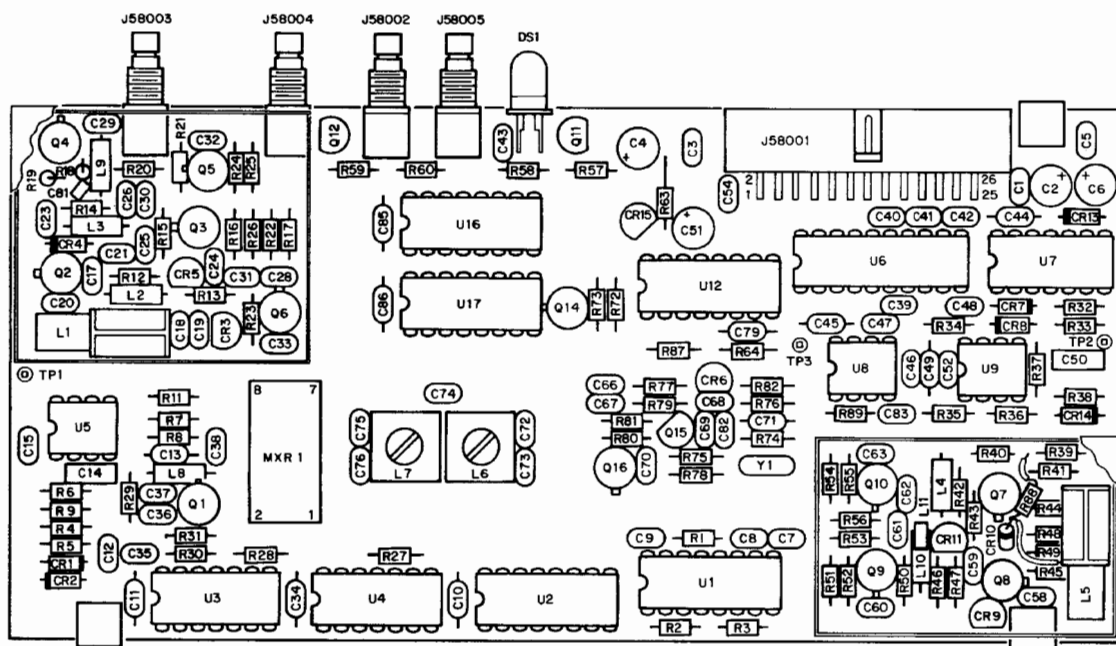
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 4200 (E.G., R1 IS R4201).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

FM/AM-1200S thru S/N 4490  
 FM/AM-1200A thru S/N 1448

Figure 6-21 Low Loop Module (Sheet 2 of 2)  
 (0000-5214-200-H)

**1****2****3**

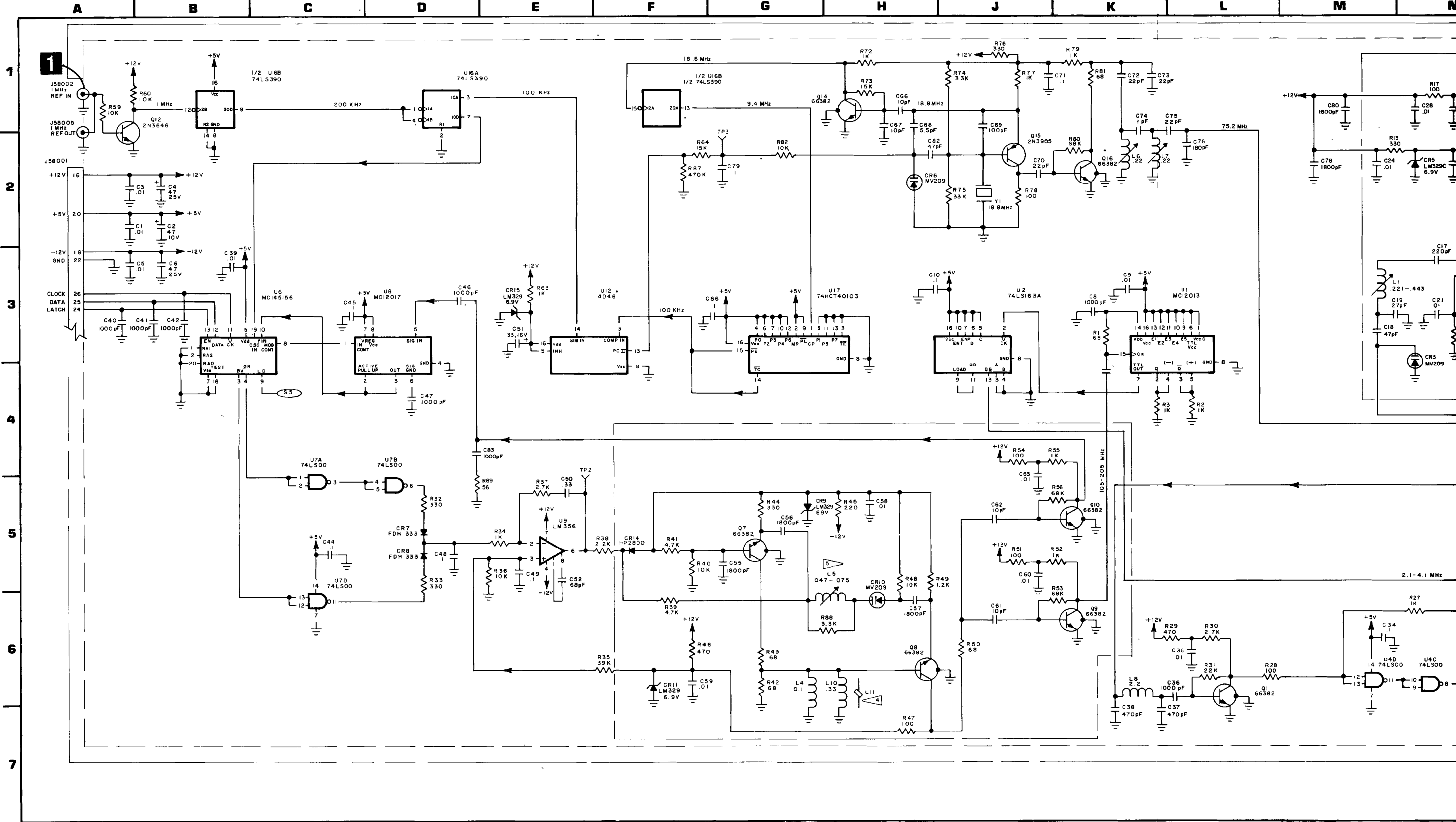
NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz, WITH NO INPUT SIGNAL IN RECEIVE MODE USING AN X1 PROBE.

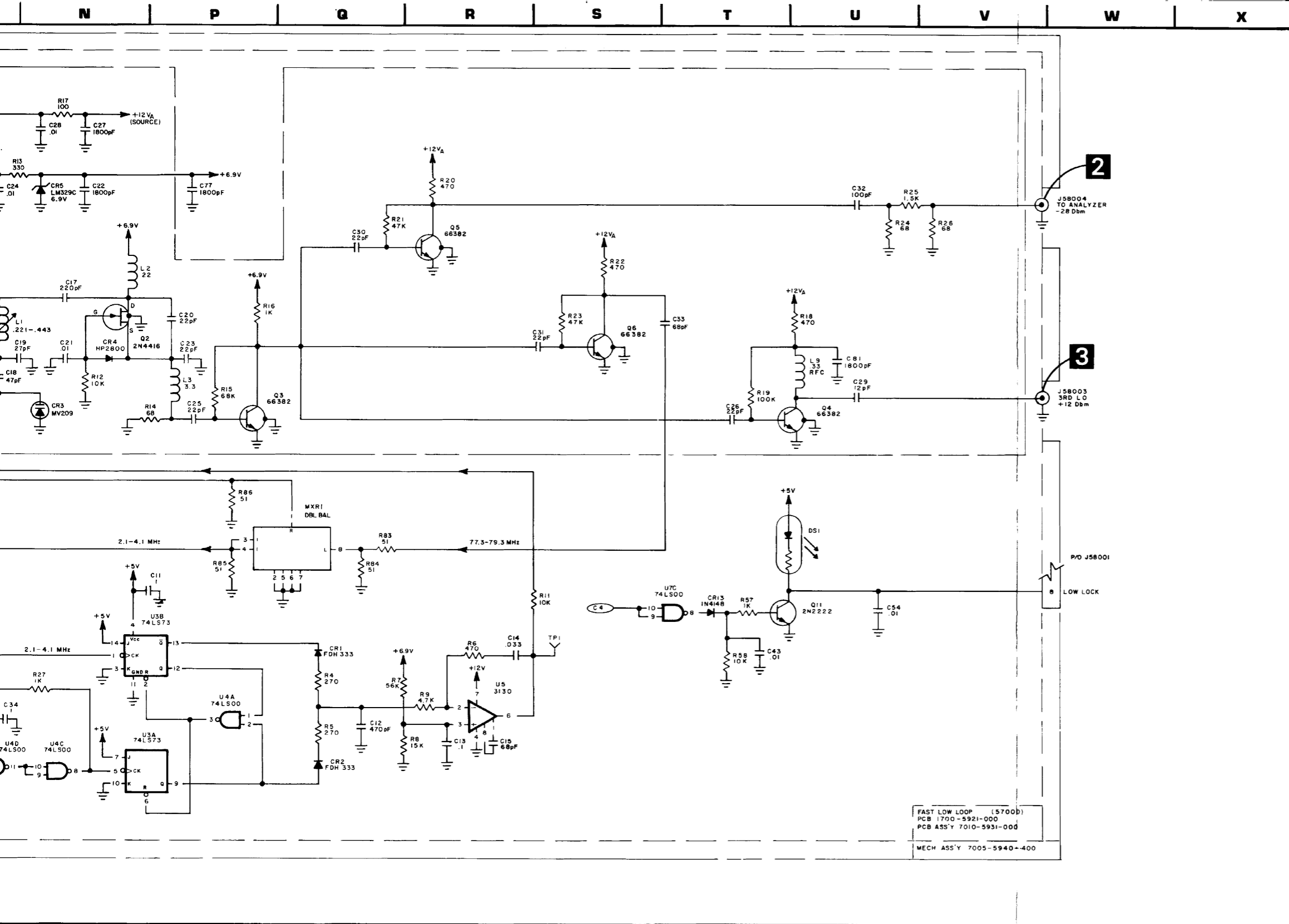


Fast Low Loop PC Board (Rev D)

FM/AM-1200S S/N 4491 and ON  
FM/AM-1200A S/N 1449 and ON

Figure 6-21a Fast Low Loop Module (Sheet 1 of 2)  
(0000-5911-000-C)



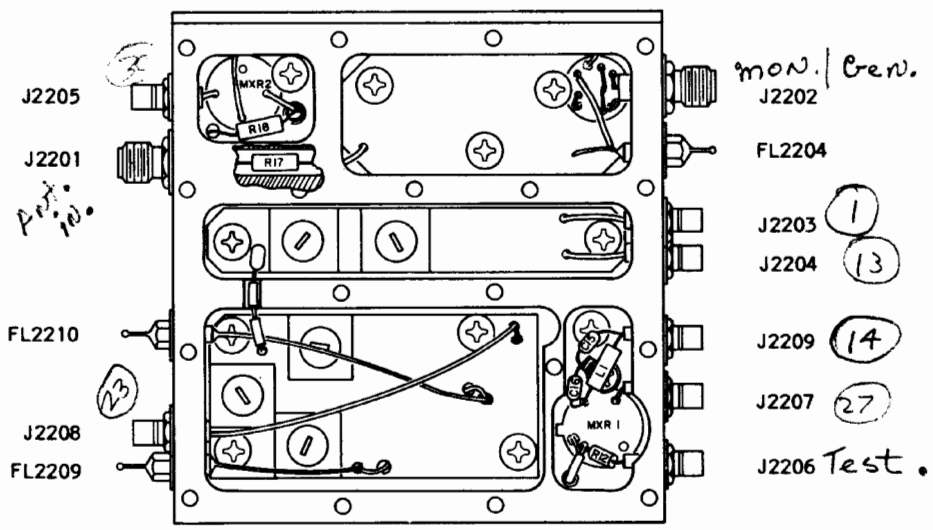


- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 57000 (E.G., R1 IS R57001, ETC.).
  2. ALL RESISTORS ARE 1/8 W, 5% TOLERANCE.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  4. FERRITE BEAD IS LOCATED ADJACENT TO L10 TO "DE-Q" THE RF CIRCUIT AND PREVENT SELF-OSCILLATION.
  5. TUNE L5 TO 205 MHz WITH 8.0 V AT TP2.
  6. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
  7. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.

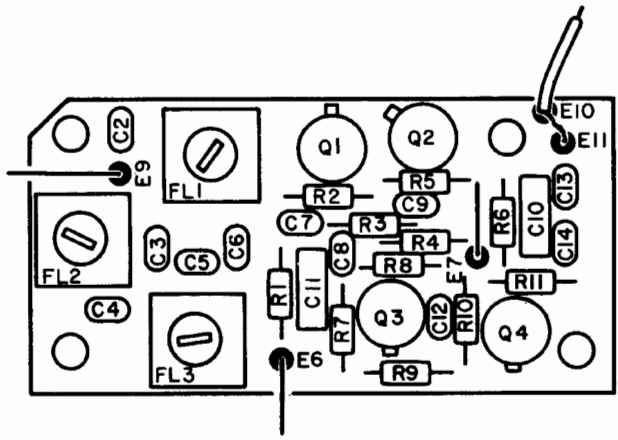
FAST LOW LOOP (57000)  
 PCB 1700-5921-000  
 PCB ASS'Y 7010-5931-000  
 MECH ASS'Y 7005-5940-400

FM/AM-1200S S/N 4491 and ON  
 FM/AM-1200A S/N 1449 and ON

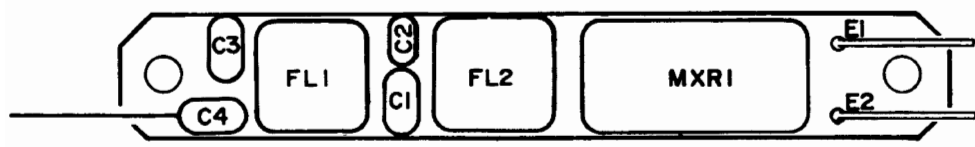
Figure 6-21a Fast Low Loop Module (Sheet 2 of 2)  
 (0000-5911-000-C)



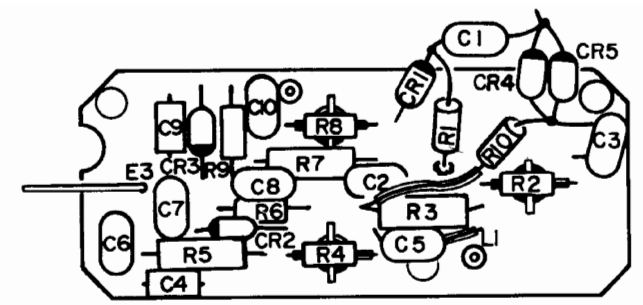
IF Block Enclosure (Rev M)



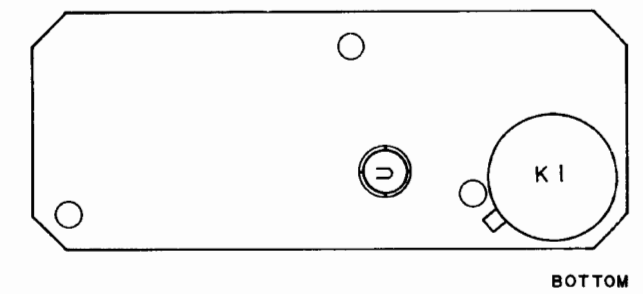
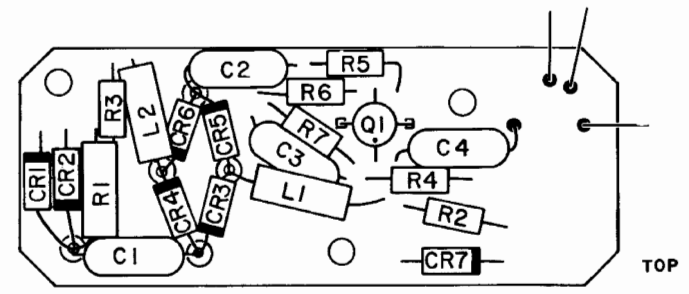
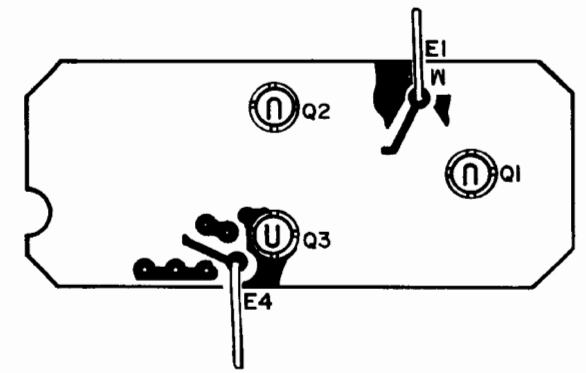
IF Amp PC Board (Rev C-6)



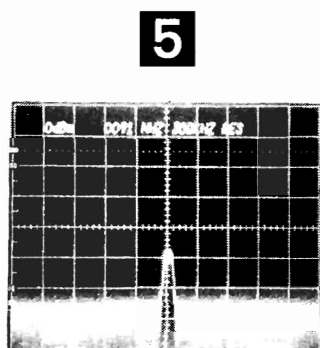
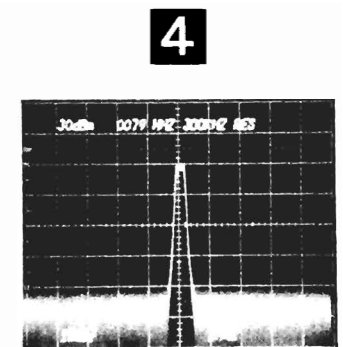
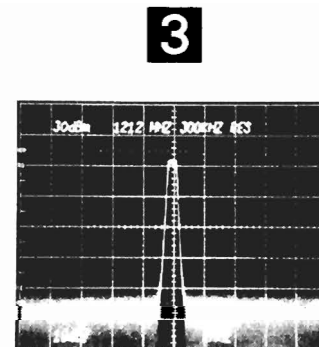
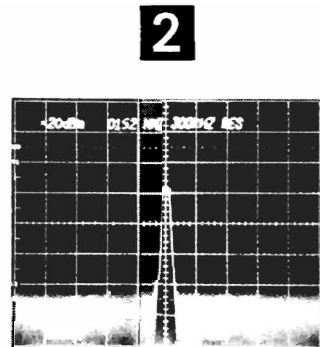
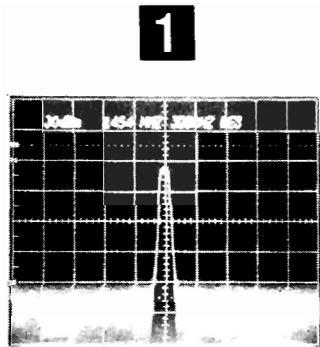
IF Mixer PC Board (Rev B)



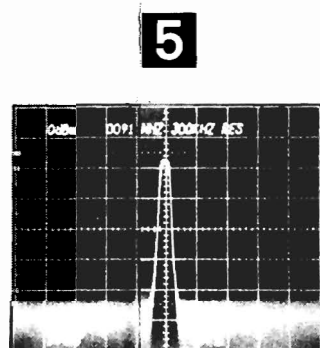
1300 MHz Amp PC Board (Rev B-4)



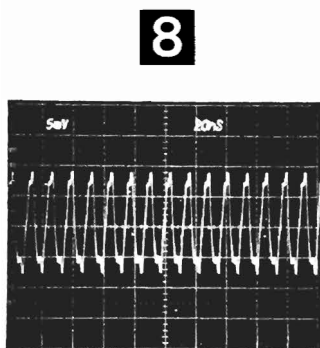
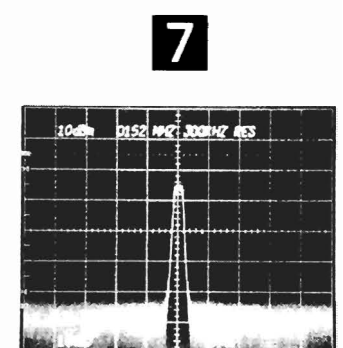
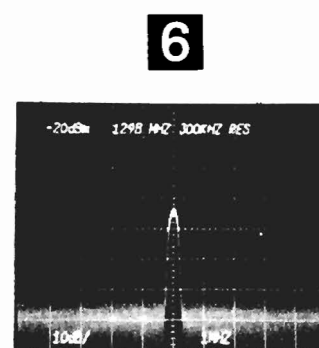
IF Voltage Protect PC Board (Rev B-2)



REC. MODE



GEN MODE



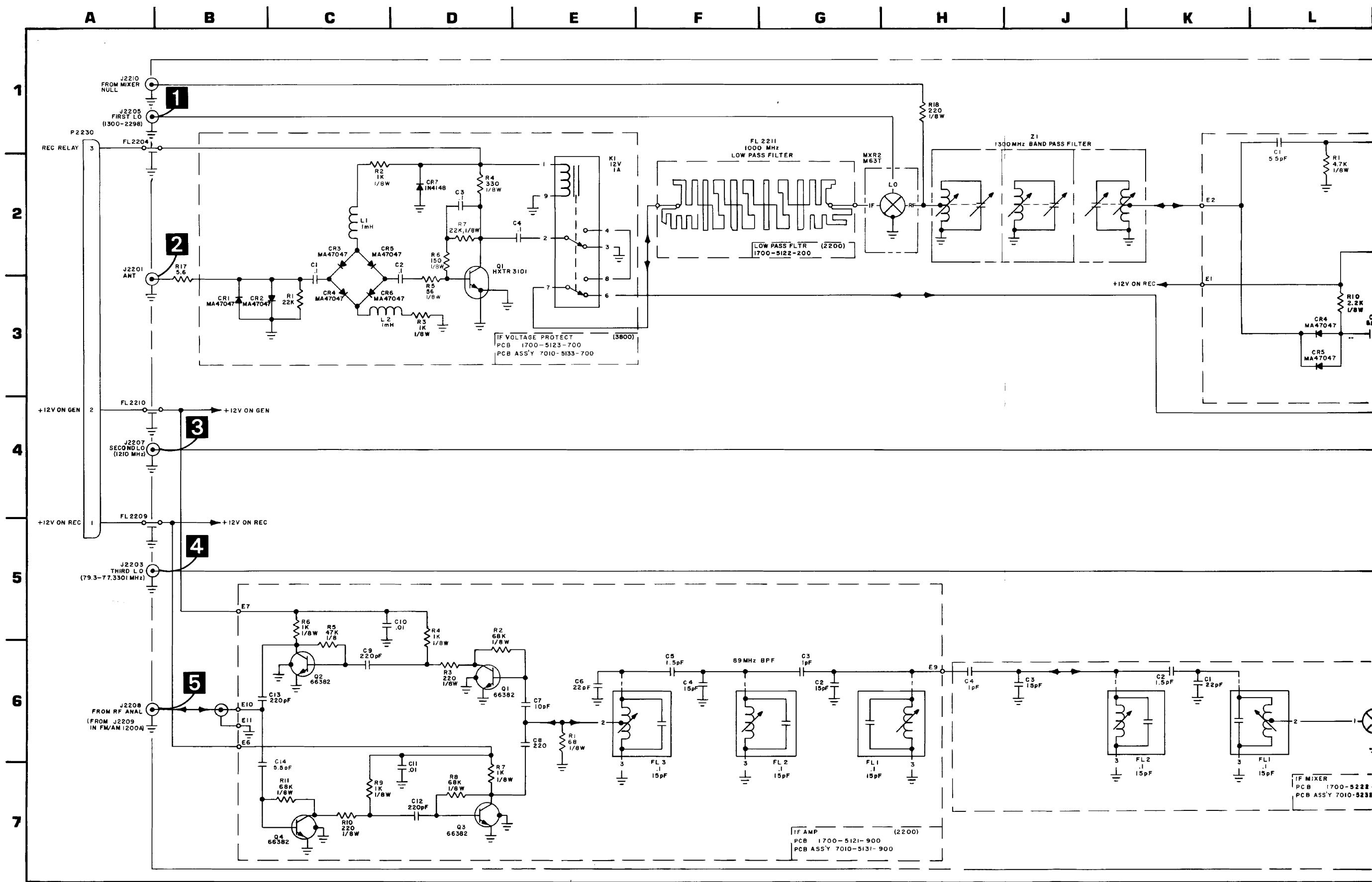
REC MODE  
NO SIGNAL PRESENT



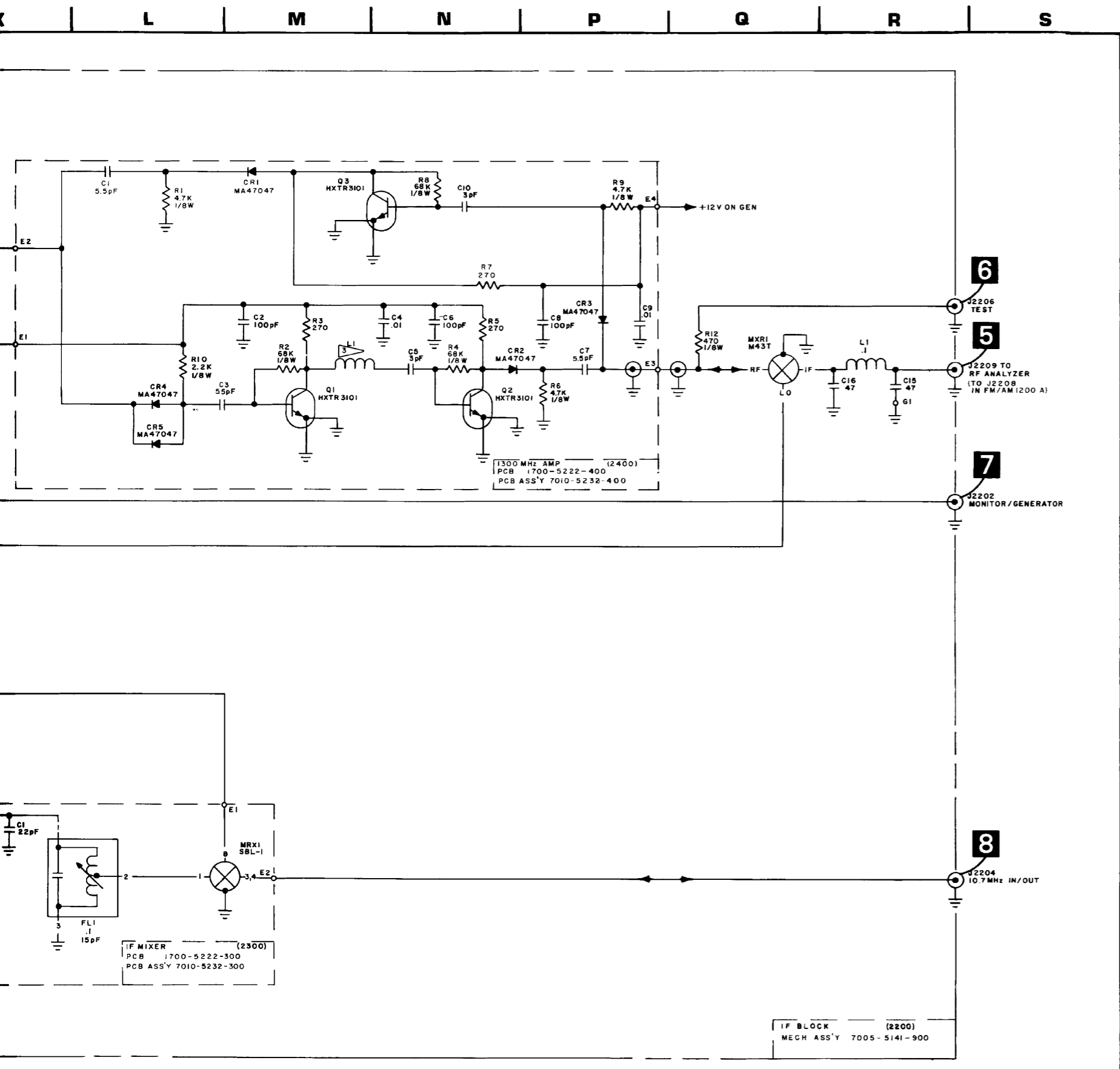
REC MODE  
INPUT AT ANT  
(150.2 MHz @ -50 dB)

NOTE: UNLESS OTHERWISE STATED, ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE.

Figure 6-22 IF Block Assembly (Sheet 1 of 2)  
(0000-5111-900-H)



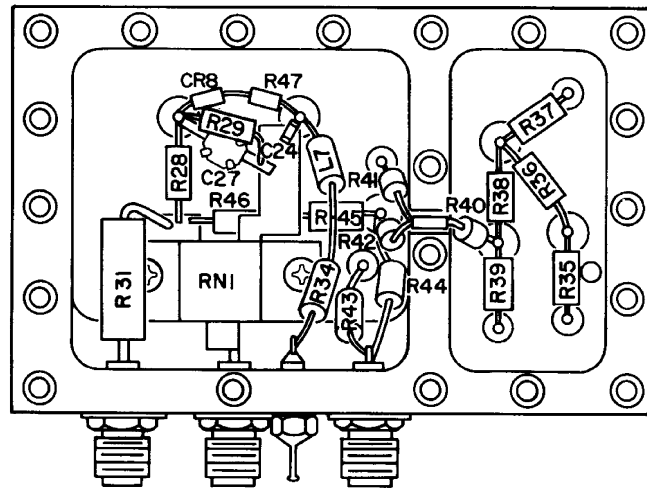




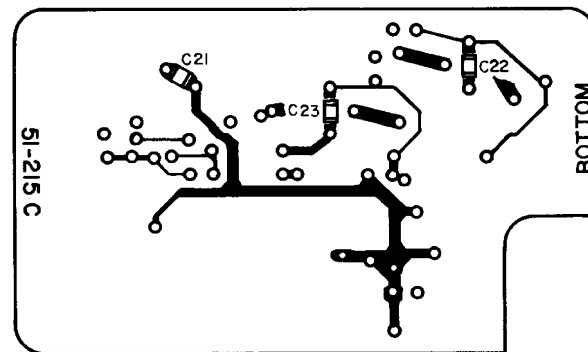
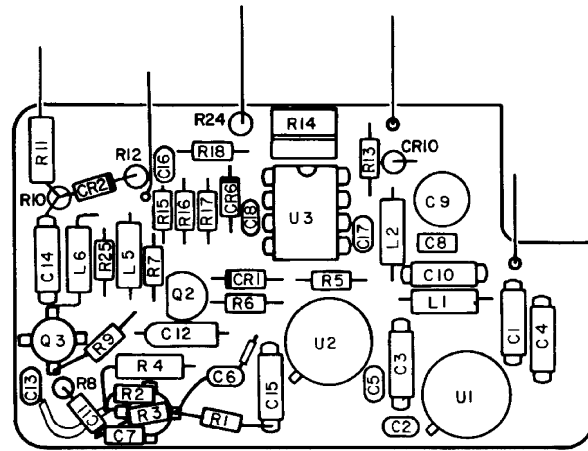
NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:  
 A. 2200 (IF BLOCK ASS'Y).  
 B. 2300 (IF MIXER PC BOARD).  
 C. 2400 (1300 MHz AMP PC BOARD).  
 D. 3800 (IF VOLTAGE PROTECT PC BOARD).  
 E. (E.G., R1 IS R2201, ETC.).
2. ALL RESISTORS ARE 1/4 W, 10% TOLERANCE UNLESS OTHERWISE NOTED.
3. L2401 IS FORMED FROM LEAD OF C2405, .2" LONG.
4. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
5. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
6. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Figure 6-22 IF Block Assembly (Sheet 2 of 2) (0000-5111-900-H)

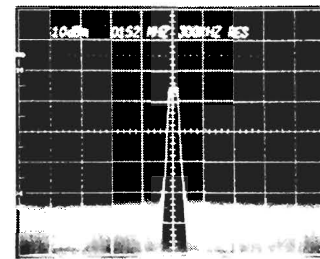


Output Amplifier Block Enclosure (Rev L)



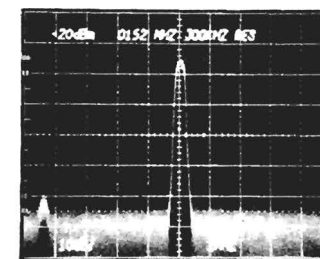
Output Amplifier PC Board (Rev C-5)

1



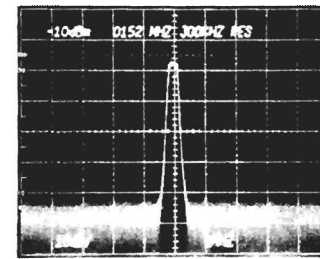
GEN MODE ONLY

2

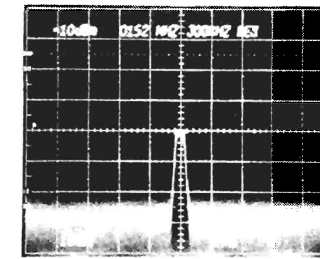


DUPLEX MODE ONLY  
(150.2 MHz WITH +2 MHz OFFSET)

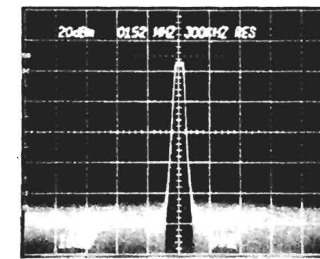
3



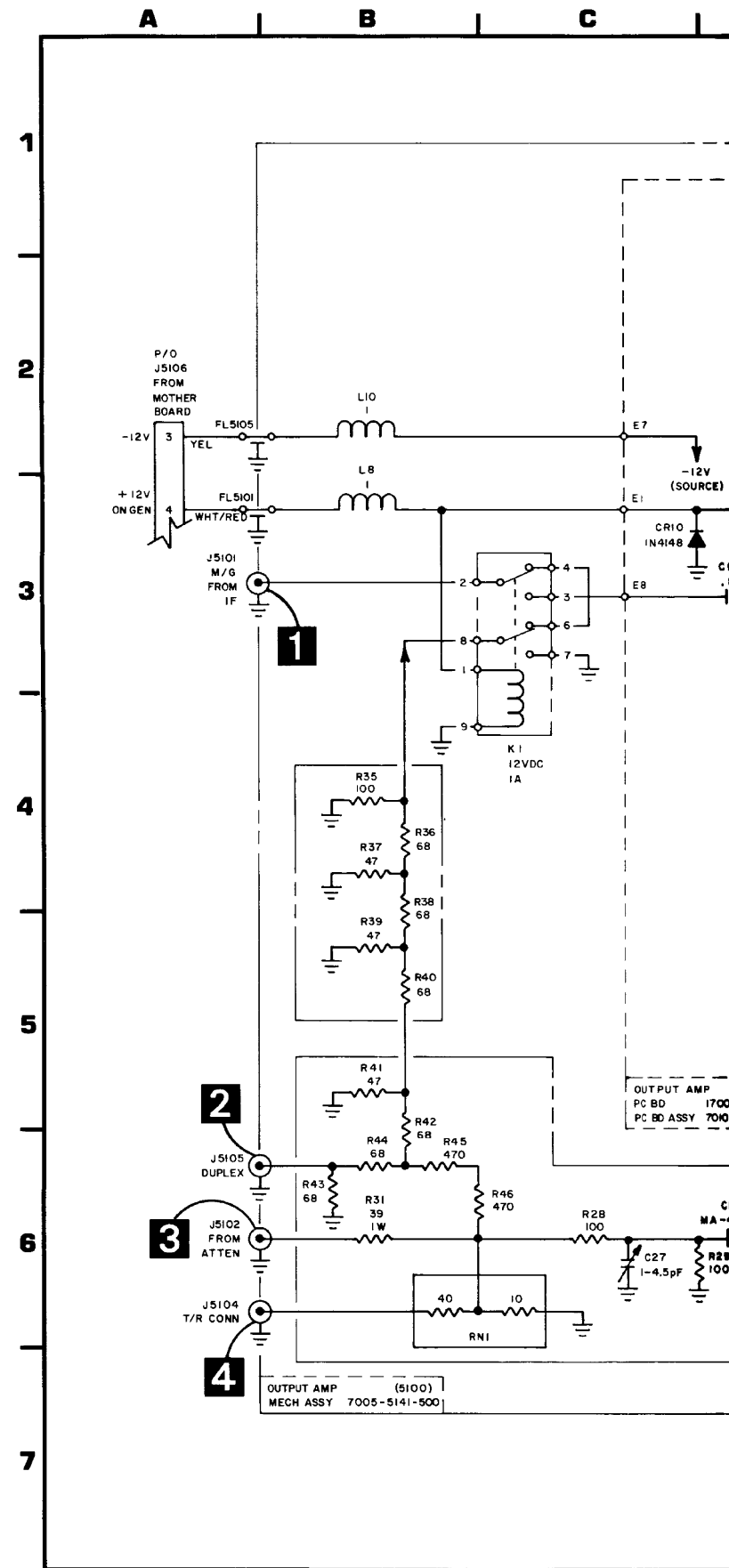
4

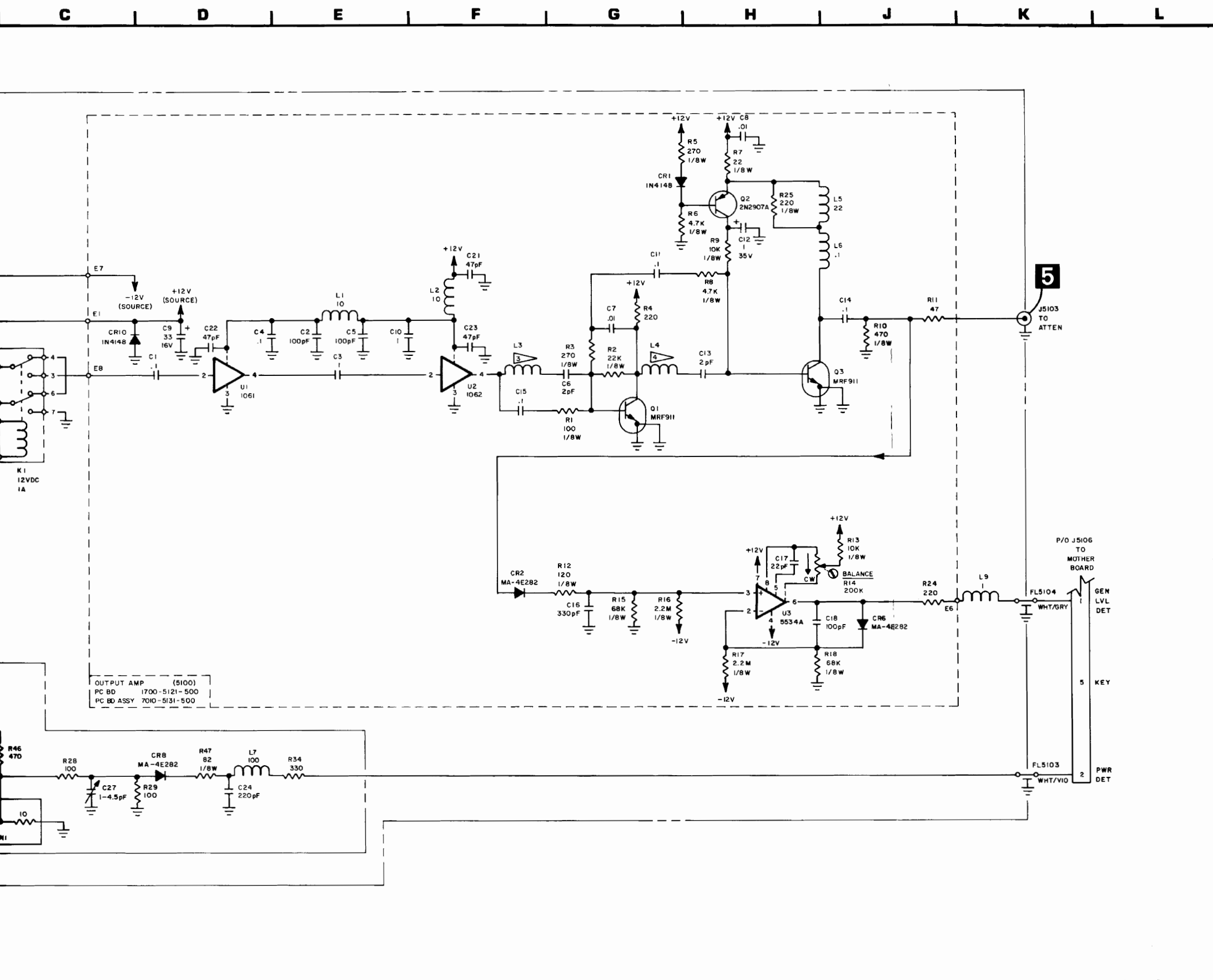


5



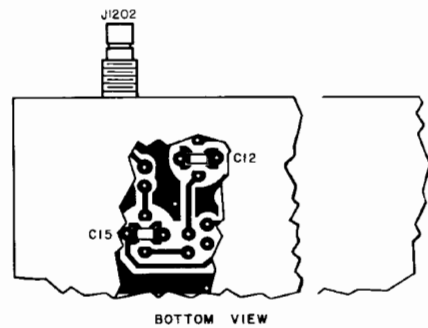
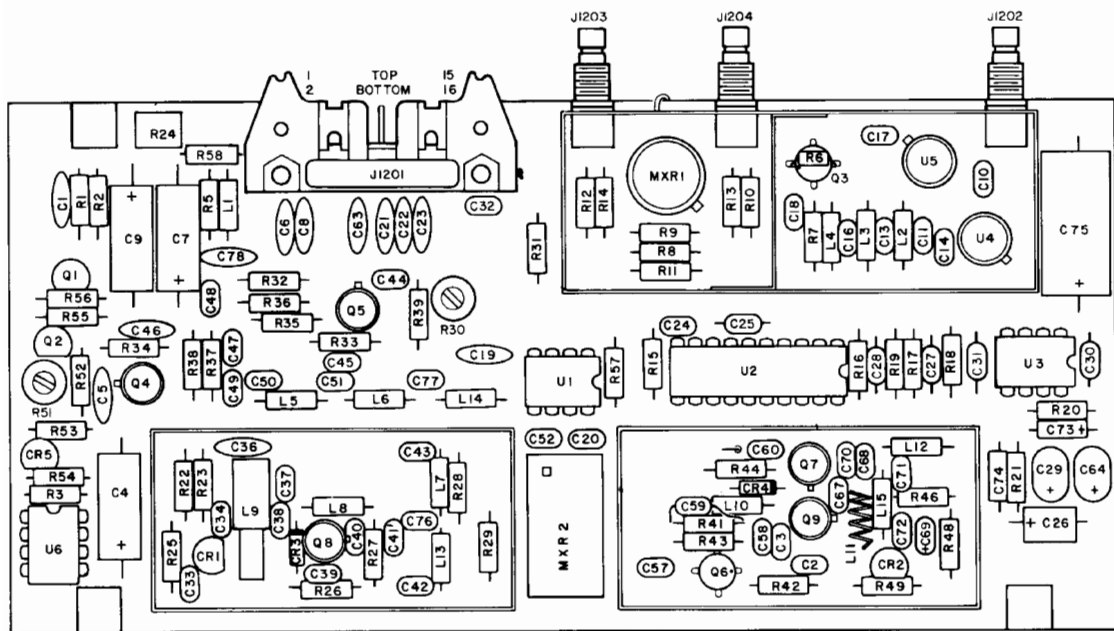
NOTE: UNLESS OTHERWISE NOTED, ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A IN GEN OR DUP GEN MODE AT A FREQUENCY OF 150.2 MHz @ -50 dBm WITH A +2 MHz OFFSET.





- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 5100 (E.G., R1 IS R5101).
  2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. L3 IS FORMED BY THE LEAD OF C5106 CUT TO A LENGTH OF .4 INCHES.
  4. L4 IS FORMED BY THE LEAD OF C5113 CUT TO A LENGTH OF .4 INCHES.
  5. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  6. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
  7. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Figure 6-23 Output Amplifier Module (0000-5111-500-C5)

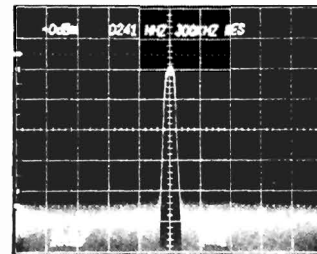


Duplex PC Board (Rev G-3)

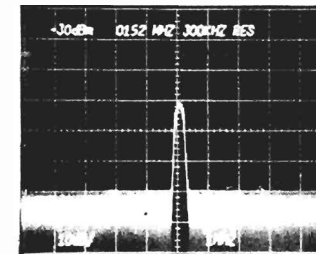
NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 1200 (E.G., R1 IS R1201).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED. PRECISION RESISTORS (1%) ARE DESIGNATED BY AN ASTERISK (\*).
3. L11 IS FORMED BY A 2.4" LENGTH OF 24 GA WIRE WRAPPED 4 TURNS WITH A .125" ID.
4. R8 IS SELECTED AT TEST (SAT). NOMINAL IS 1.8 K. RANGE IS 820 TO 2.7 K.
5. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
6. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
7. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

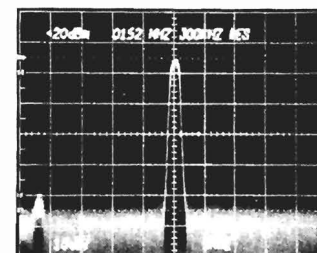
1



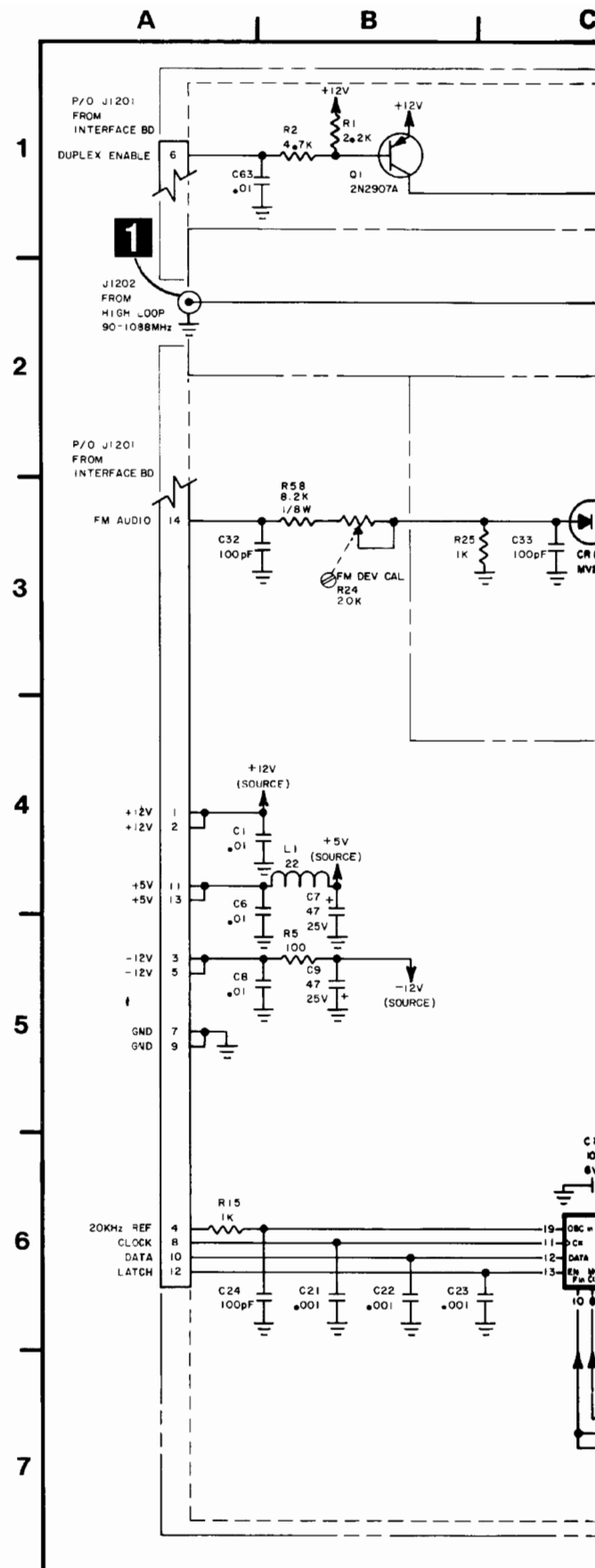
2



3



NOTE: ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A IN DUPLEX MODE AT A FREQUENCY OF 150.2 MHz WITH +2 MHz OFFSET.



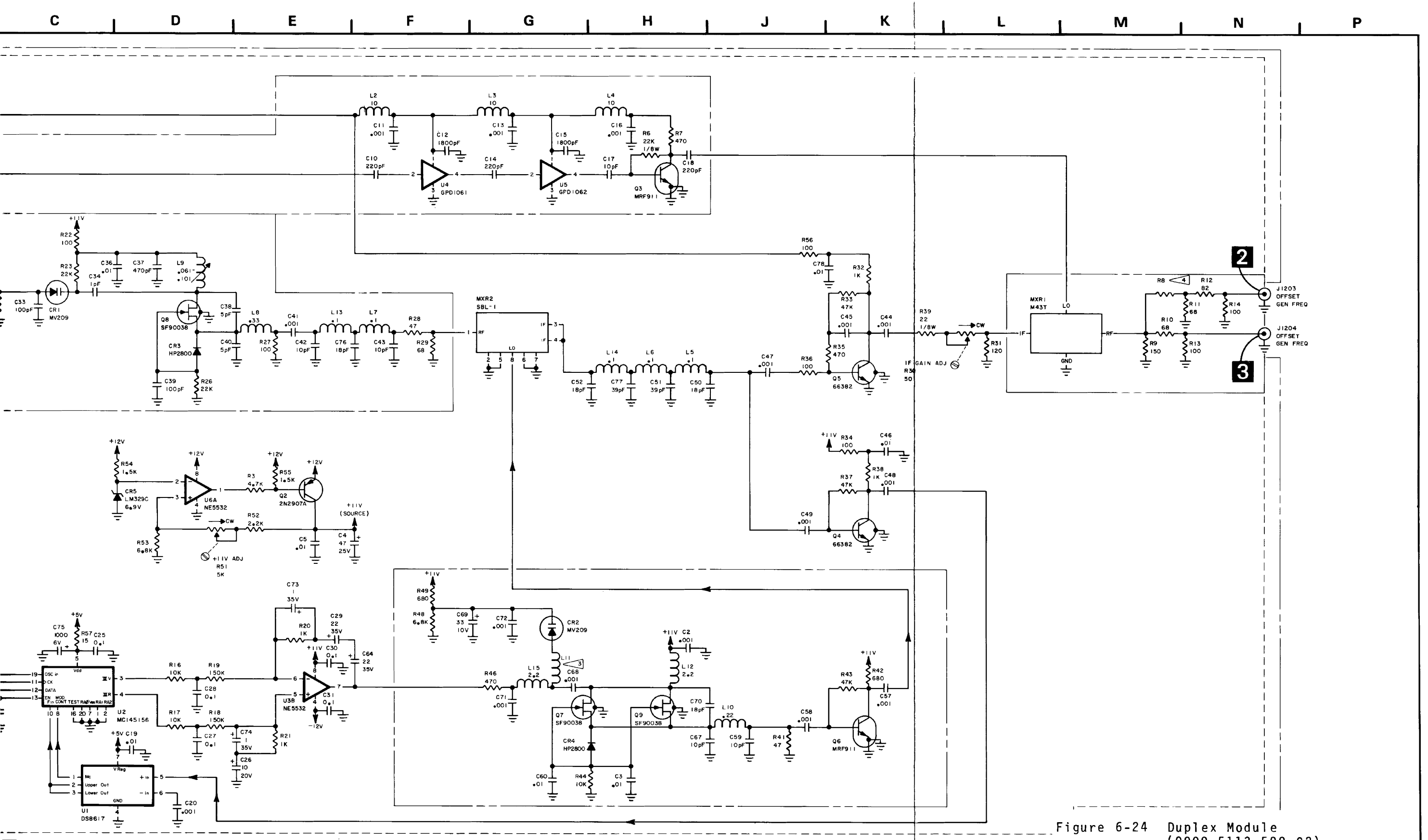
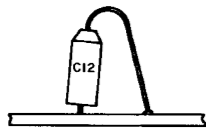
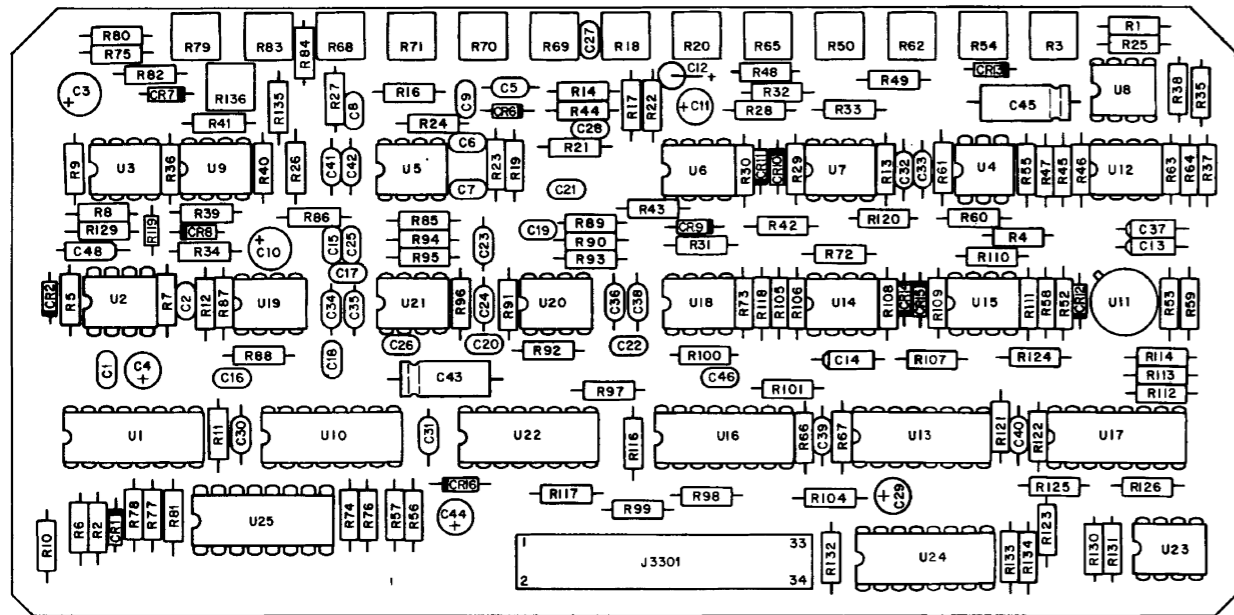


Figure 6-24 Duplex Module  
(0000-5113-500-G2)



**NOTES:**

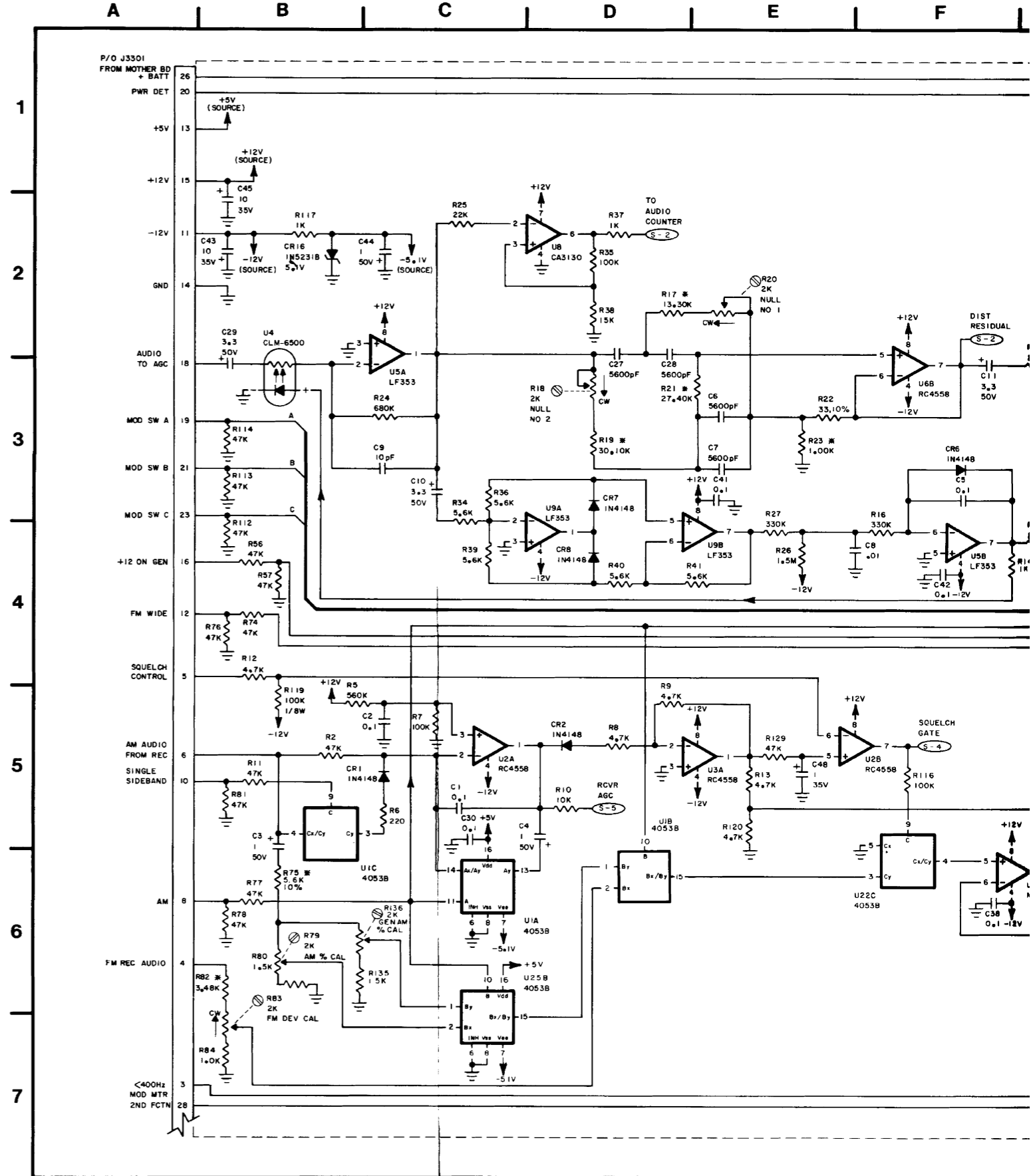
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 3300 AND 3400 (E.G., R1 IS R3301 AND R101 IS R3401).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED. \*DENOTES 1% PRECISION RESISTORS.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Receive Audio PC Board (Rev E-6)

METER SELECT CODING													
S3704 MODULATION METER CONTROL POSITION													
J3301		kHz/10		BATT	SIG	DIST	SINAD	WP		WA			
PIN #	IDENTIFIER	2	6	20	60				150	15	150	15	
19	MOD MTR A	0	1	0	0	0	1	1	1	0	1	0	1
21	MOD MTR B	0	1	1	1	0	0	1	1	1	0	1	0
23	MOD MTR C	1	0	0	0	0	0	1	1	1	1	1	1
28	2ND FUNCT	0	0	0	1	0	0	1	0	0	0	0	0
30	AVG/PEAK	0	0	0	0	0	0	1	1	0	0	1	1

1 = +12 VDC      0 = 0 VDC

J3301	REMARKS
PIN 3	+5 VDC WHEN FUNCTION GENERATOR IS SET ON ANY TONE BELOW 409.6 Hz
PIN 8	+12 VDC ON SSB AND ALL AM MODES
PIN 12	+12 VDC ON FM WIDE ONLY



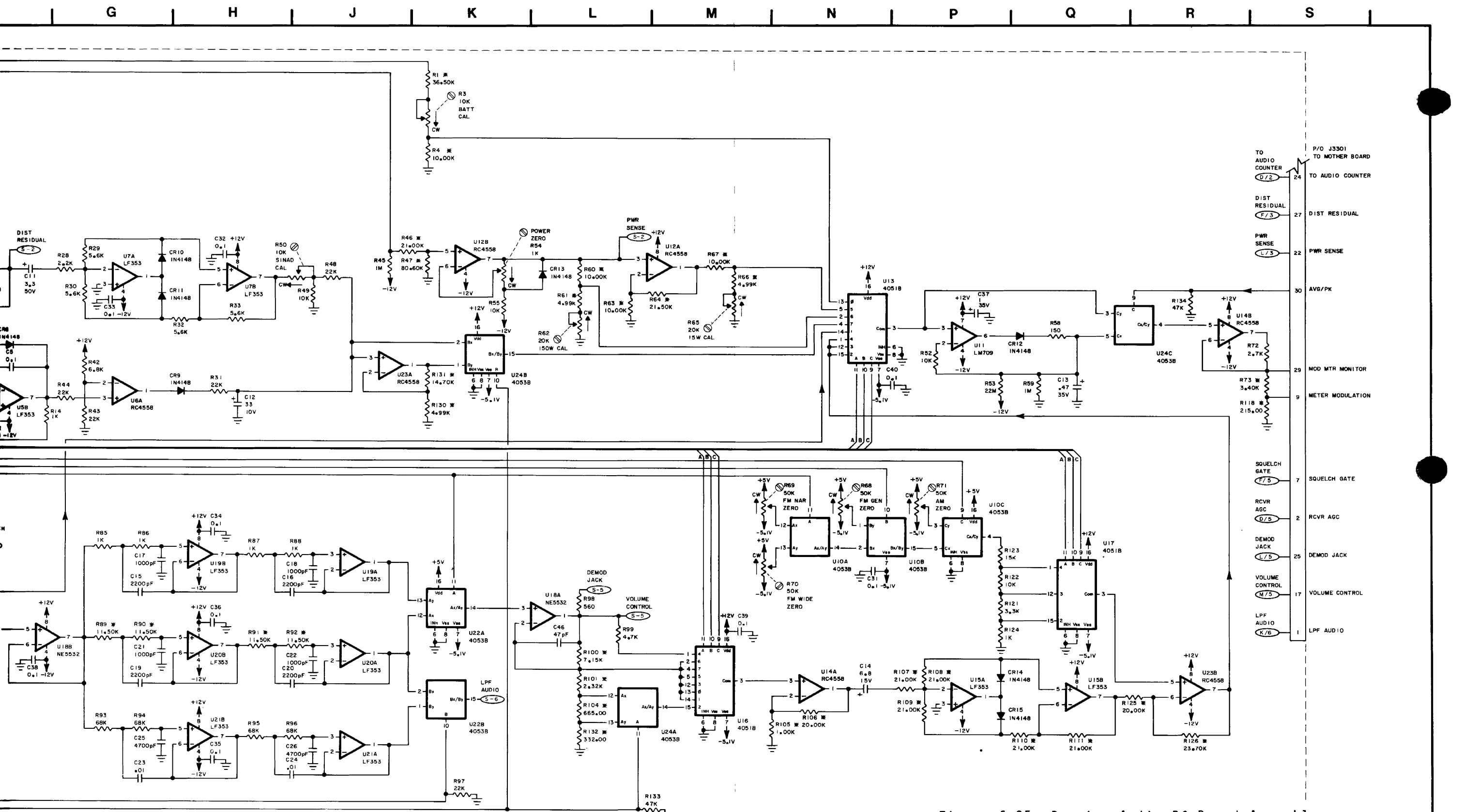
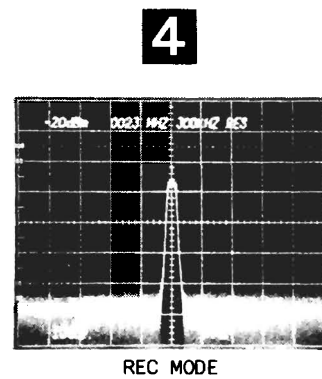
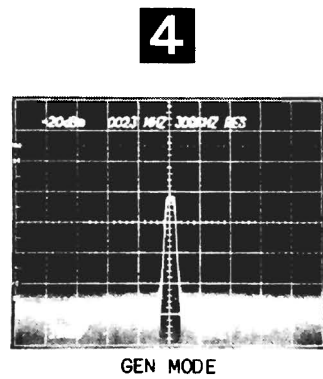
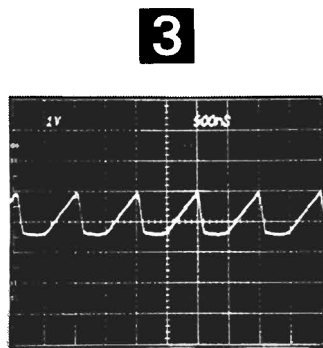
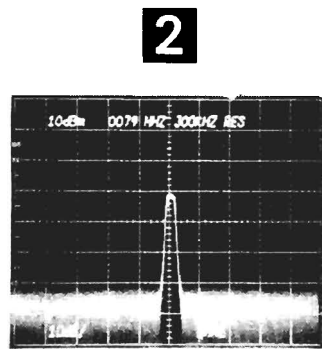
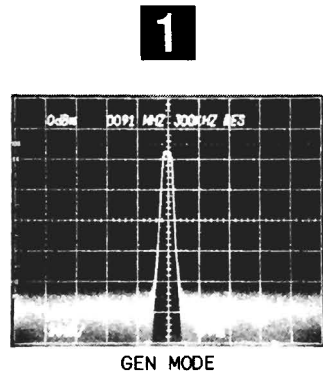
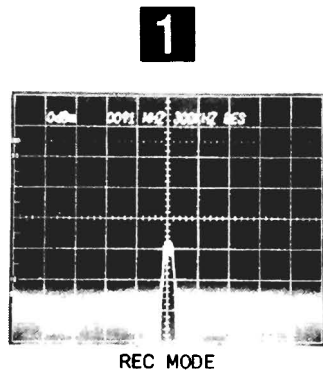


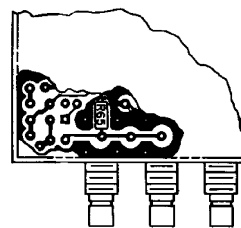
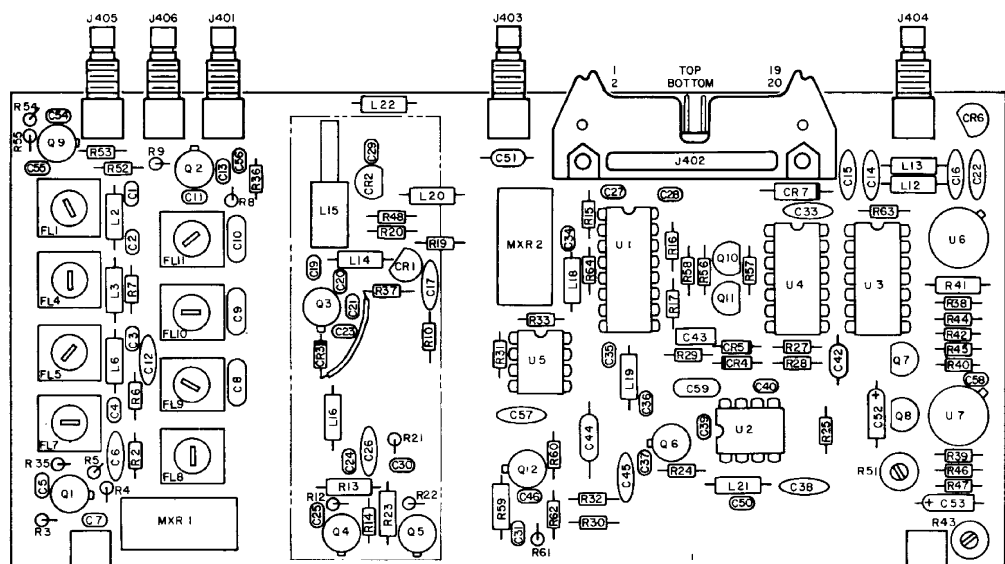
Figure 6-25 Receive Audio PC Board Assembly (0000-5213-301-F2)



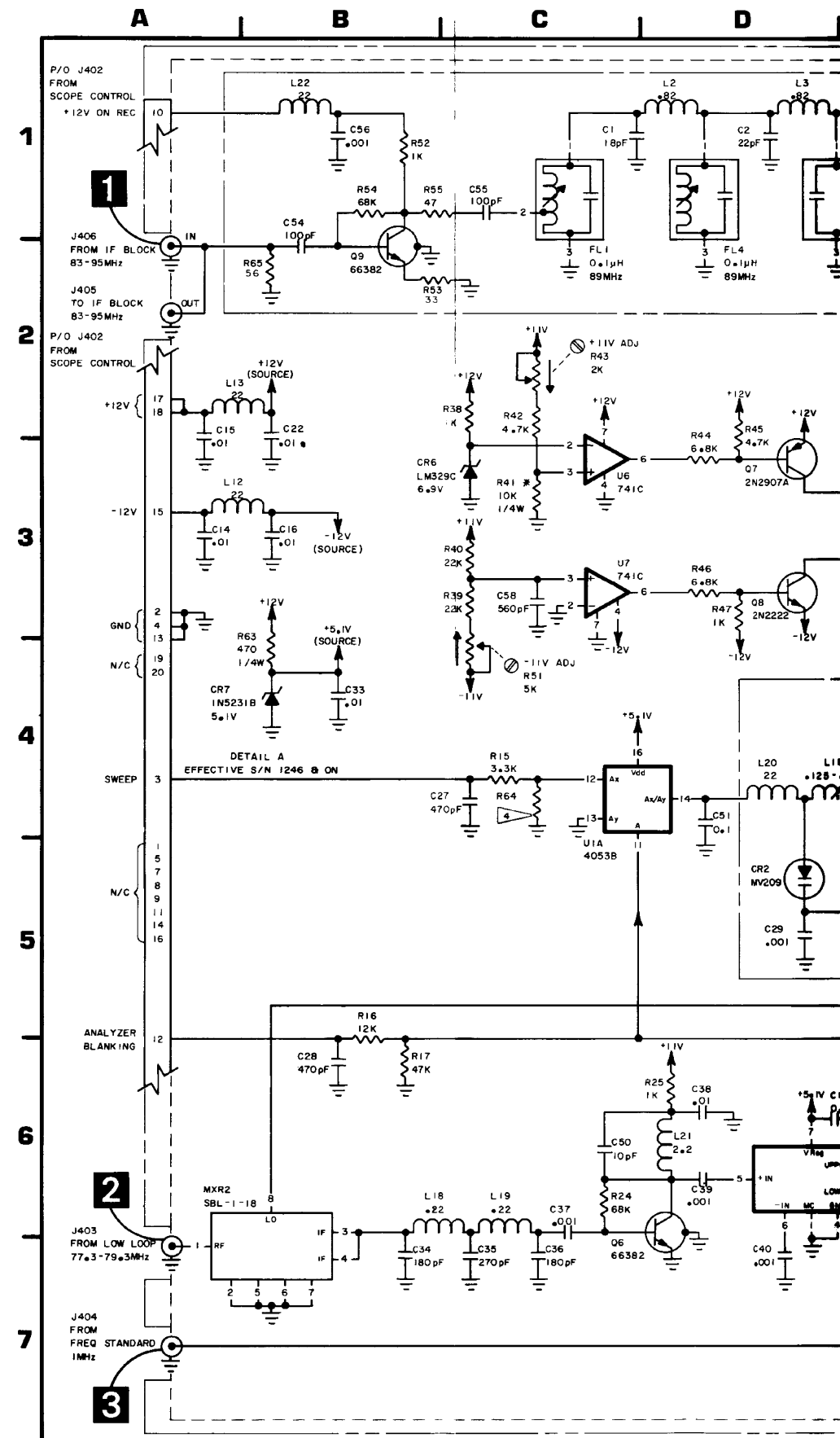
NOTE: UNLESS OTHERWISE STATED, ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE.

HORIZONTAL SWEEP SELECTOR POSITION	PIN #																					
	5	7	9																			
1 kHz/DIV	1	0	0																			
2 kHz/DIV	1	0	0																			
5 kHz/DIV	0	1	0																			
10 kHz/DIV	0	1	0																			
20 kHz/DIV	0	0	50 kHz/DIV	0	0	1	.1 MHz/DIV	0	0	1	.2 MHz/DIV	0	0	1	.5 MHz/DIV	0	0	1	1 MHz/DIV	0	0	1
50 kHz/DIV	0	0	1																			
.1 MHz/DIV	0	0	1																			
.2 MHz/DIV	0	0	1																			
.5 MHz/DIV	0	0	1																			
1 MHz/DIV	0	0	1																			

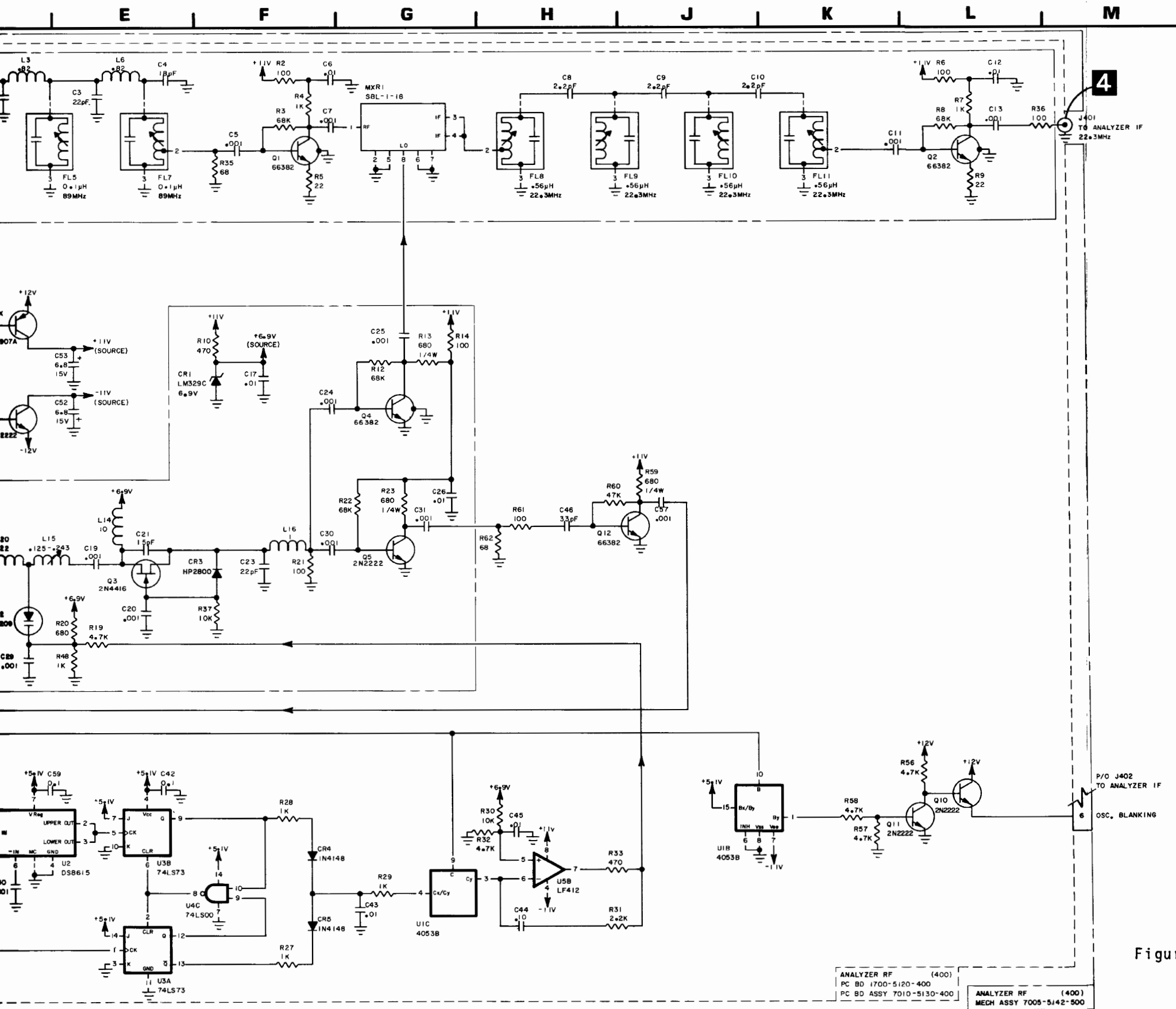
1 = +12 VDC    0 = 0 VDC



Analyzer RF PC Board (Rev G-1)





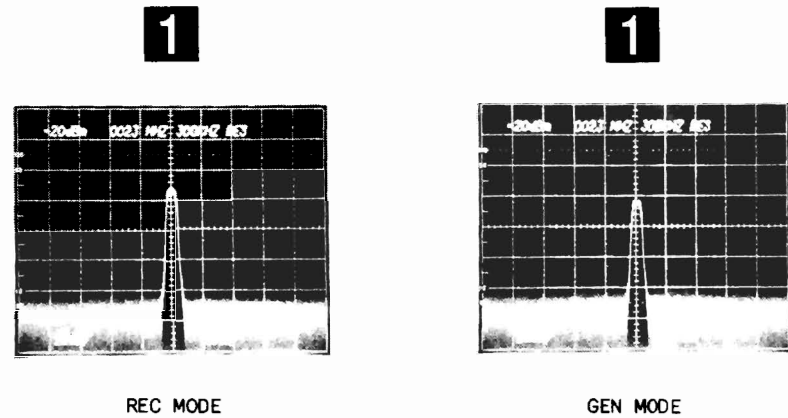


- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 400 (E.G., R1 IS R401).
  2. ALL RESISTORS ARE 1/8 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
  4. R64 IS SELECTED AT TEST (SAT). NOMINAL IS 1.2 K. RANGE IS 1.0 K TO 2.2 K.
  5. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
  6. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

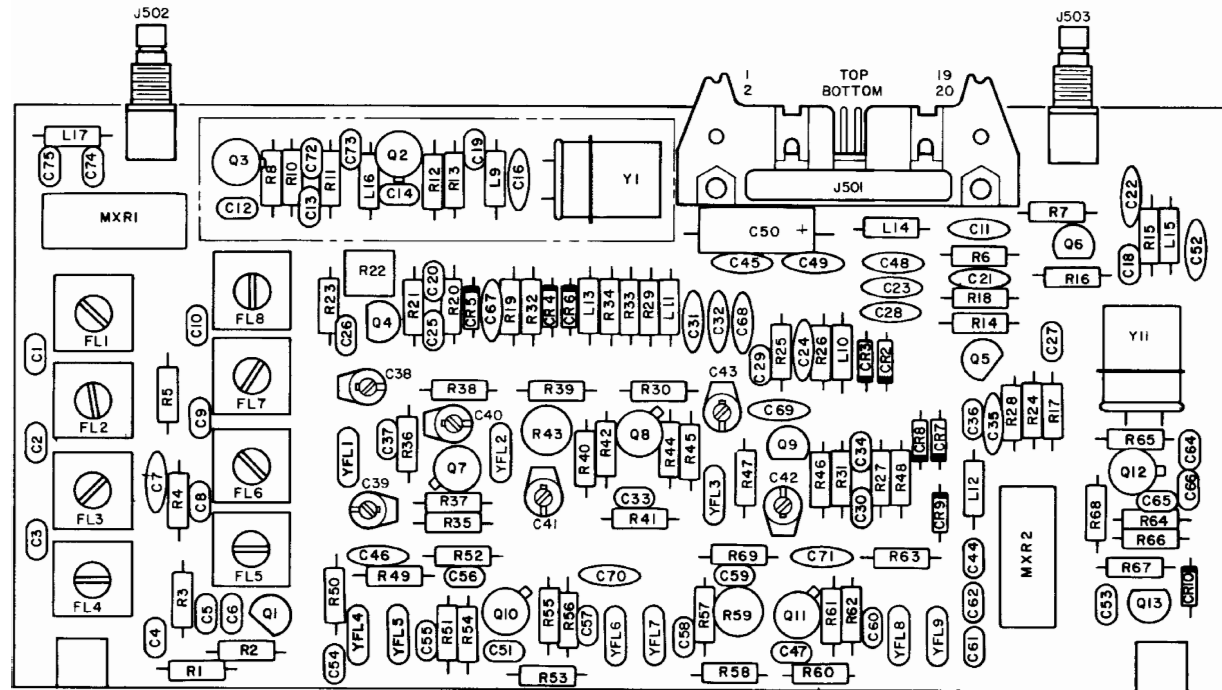
Figure 6-26 Analyzer RF Module (FM/AM-1200S Only)  
(0000-5112-500-G1)

ANALYZER RF (400)  
PC BD 1700-5120-400  
PC BD ASSY 7010-5130-400

ANALYZER RF (400)  
MECH ASSY 7005-5142-500



NOTE: UNLESS OTHERWISE STATED, ALL MEASUREMENTS WERE TAKEN WITH FM/AM-1200S/A SET AT 150.2 MHz WITH NO INPUT SIGNAL IN RECEIVE MODE.

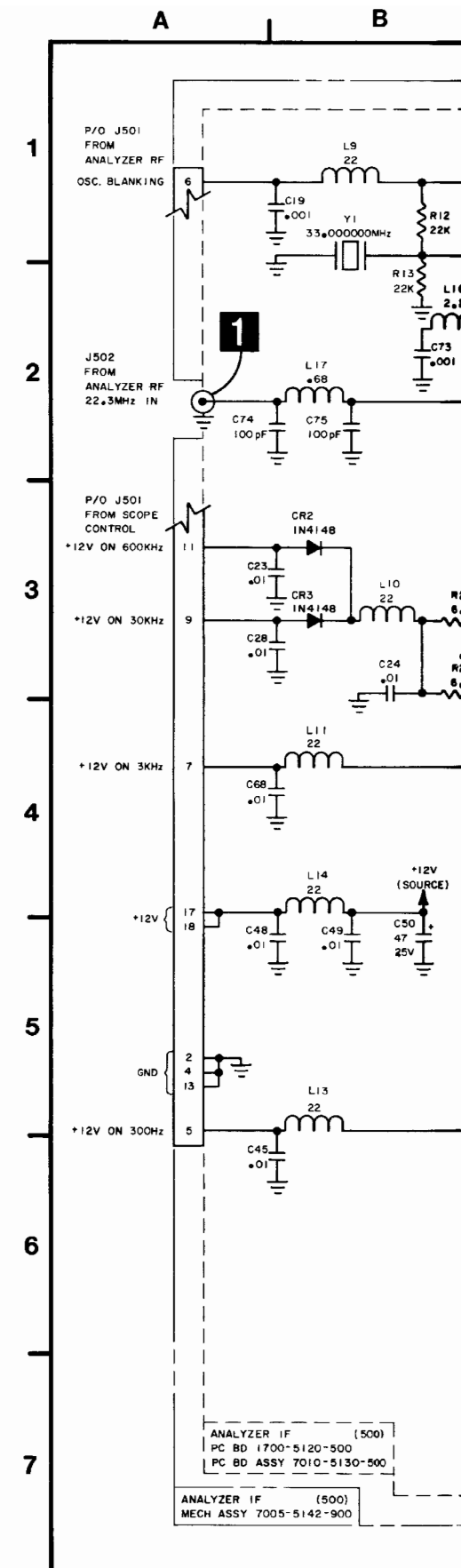


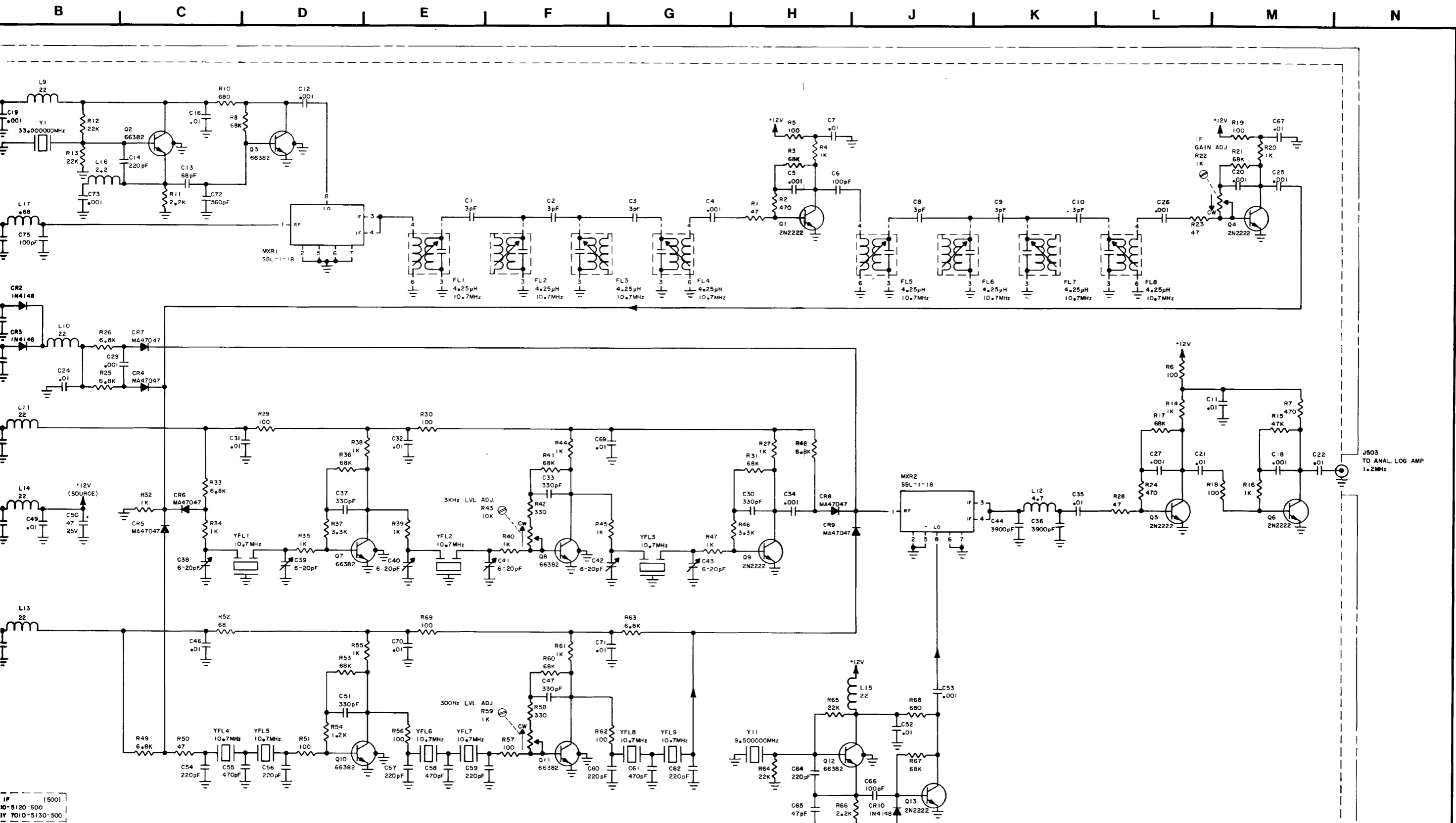
Analyzer IF PC Board (Rev D-8)

NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 500 (E.G., R1 IS R501).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

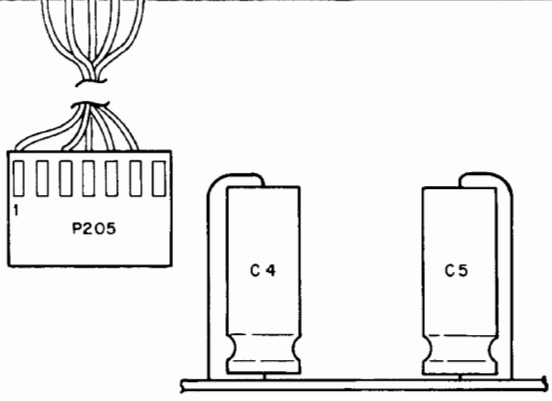
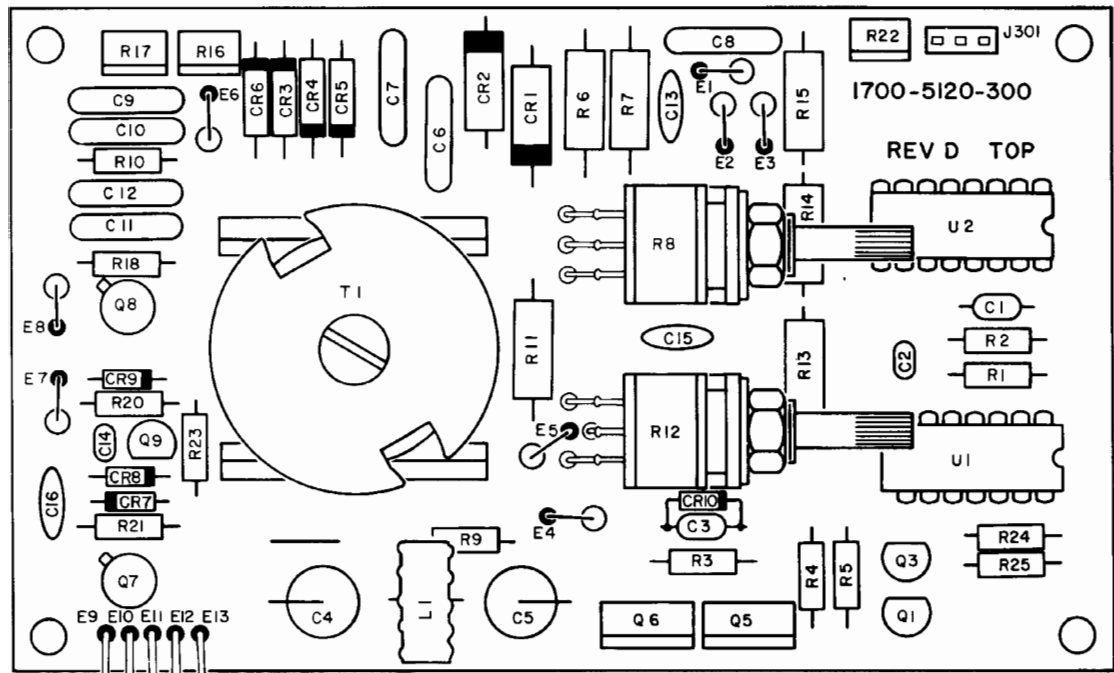
HORIZONTAL SWEEP SELECTOR POSITION	PIN #		
	5	7	9
1 kHz/DIV	1	0	0
2 kHz/DIV	1	0	0
5 kHz/DIV	0	1	0
10 kHz/DIV	0	1	0
20 kHz/DIV	0	1	0
50 kHz/DIV	0	0	1
.1 MHz/DIV	0	0	1
.2 MHz/DIV	0	0	1
.5 MHz/DIV	0	0	1
1 MHz/DIV	0	0	1
1 = +12 VDC 0 = 0 VDC			



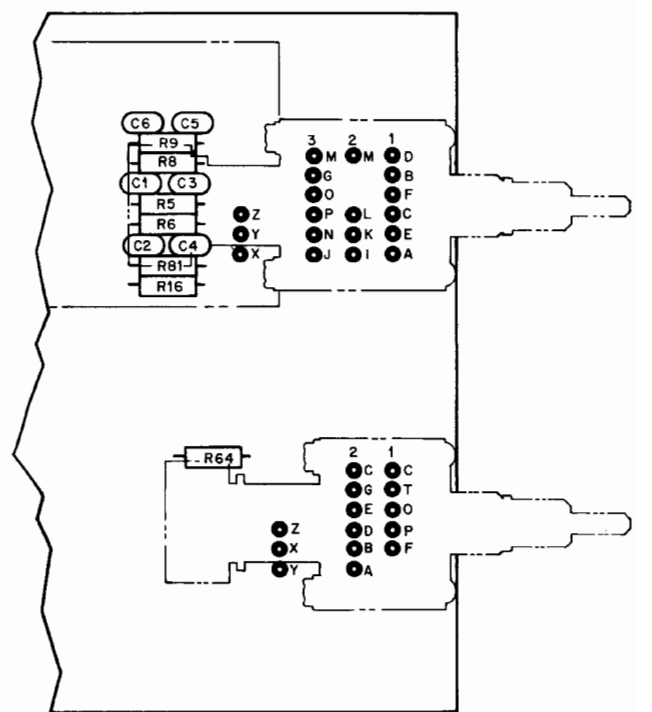
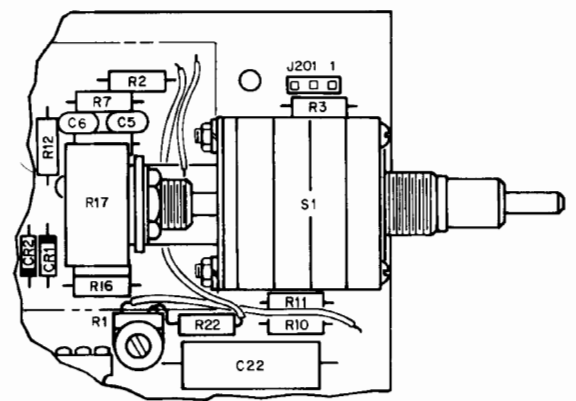
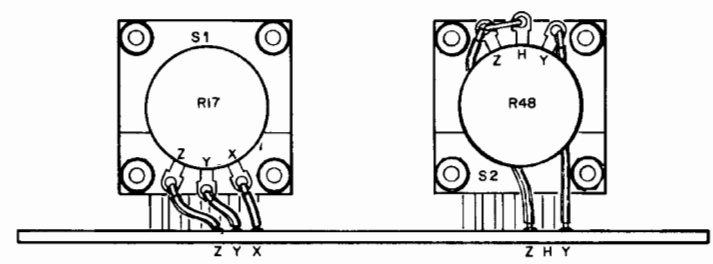
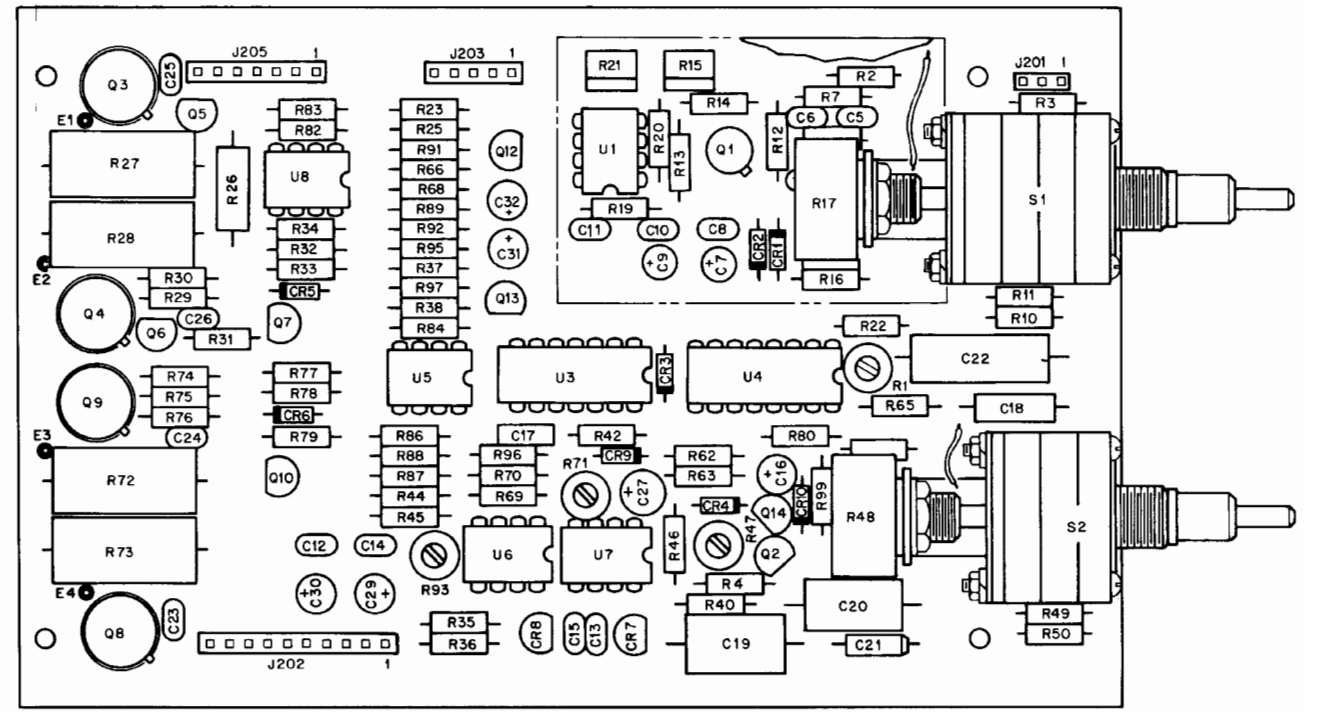


IF (500)  
 10-5120-500  
 11 7010-5130-500  
 (500)  
 18-5142-900

Figure 6-27 Analyzer IF Module (FM/AM-1200S Only)  
 (0000-5112-900-D4)



Scope Power PC Board (Rev D-9)

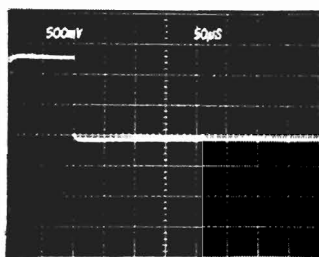


Scope Control PC Board (Rev E-1)

1



2

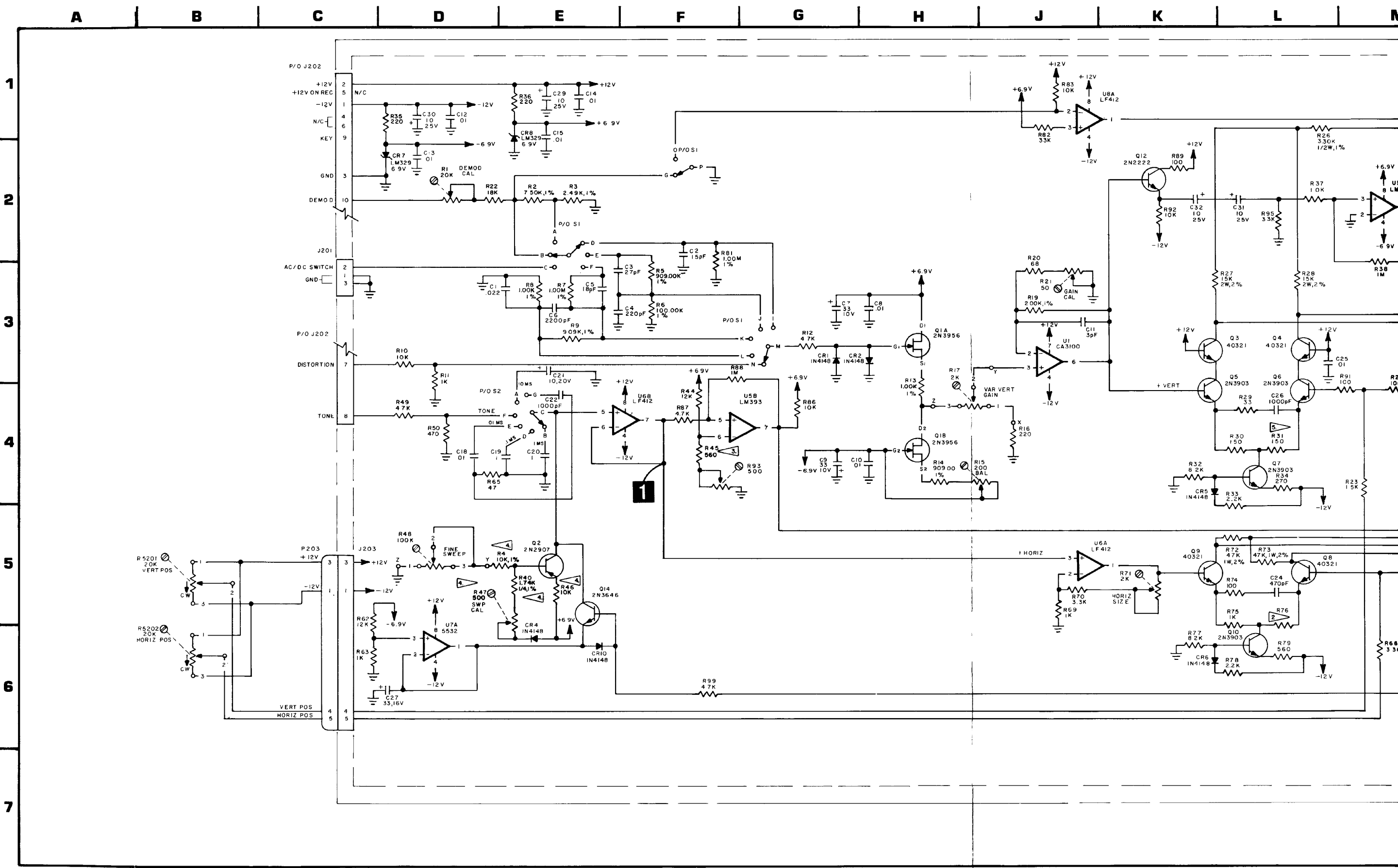


NOTE: ALL MEASUREMENTS WERE TAKEN WITH NO SIGNAL PRESENT. FM/AM-1200A SETTINGS: 10 µS/DIV, SQUELCH FULLY CW.

VERTICAL ATTENUATOR SELECTOR CONTROL (S201) TRUTH TABLE				
VERTICAL ATTENUATOR SELECTOR POSITION		PINS SHORTED		
		SECTION 1	SECTION 2	SECTION 3
kHz/\$X10	OFF			P-0
	.5	D-B	M-I	
	.2	D-A	M-I	
	5	B-E		M-J
	20	E-A		M-J
V/DIV	10	F-C	M-L	P-G
	1	F-C	M-K	P-G
	.1	C-E		M-J P-G
	.01	D-C	M-I	P-G
RESID				M-N P-G

HORIZONTAL SWEEP SELECTOR CONTROL (S202) TRUTH TABLE			
HORIZONTAL SWEEP SELECTOR POSITION		PINS SHORTED	
		SECTION 1	SECTION 2
		TONE	
		C-F, T-P	
mS/DIV	10	T-0	C-A
	1	T-0	C-B
µS/DIV	100	T-0	C-D
	10	T-0	C-E
	1	T-0	C-G

Figure 6-28 Scope Power and Control Assembly (FM/AM-1200A) (Sheet 1 of 3) (0000-5110-300-D2) (0000-5510-200-D1)



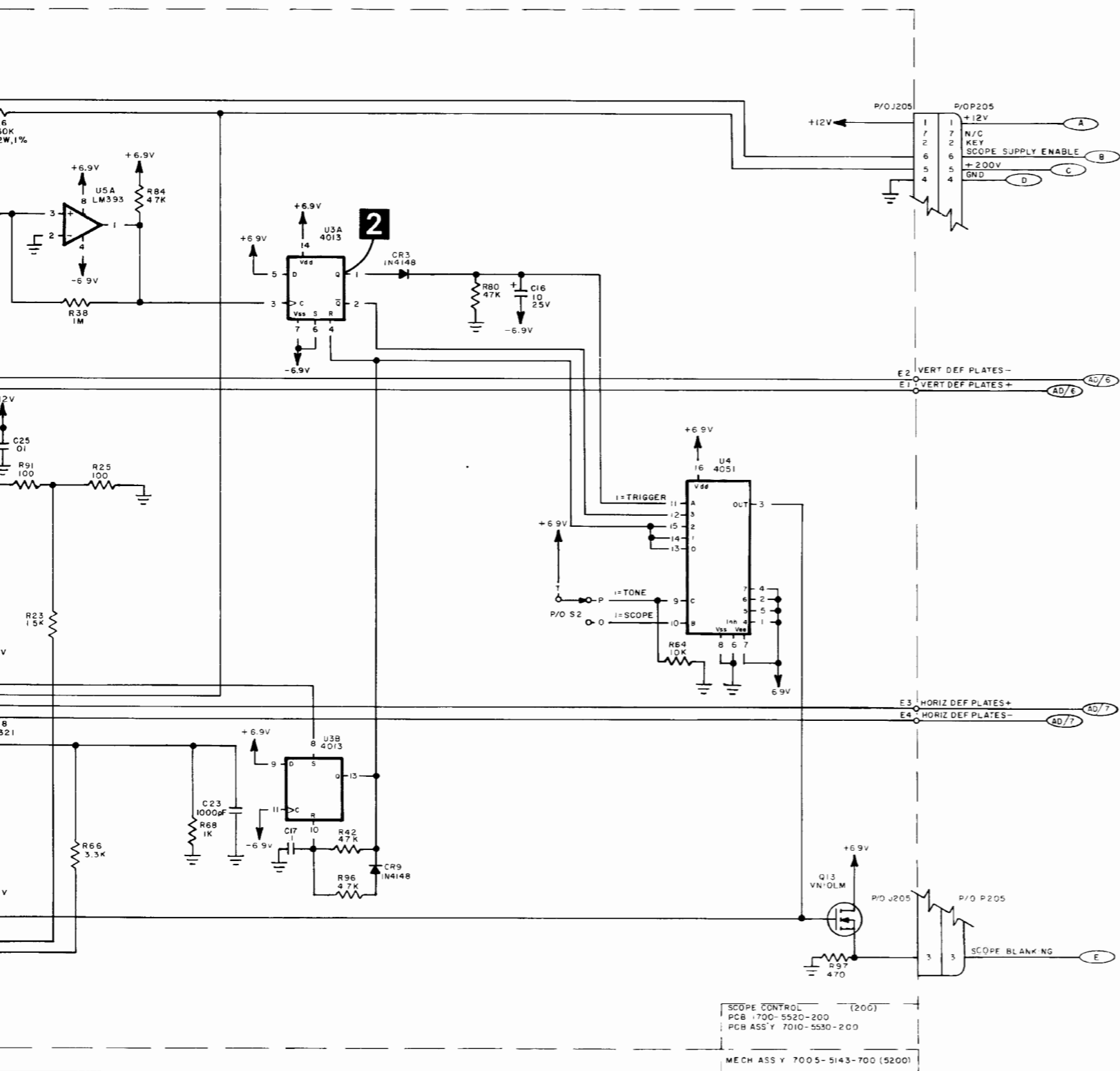


Figure 6-28 Scope Power and Control Assembly  
 (FM/AM-1200A)  
 (Sheet 2 of 3)  
 (0000-5110-300-D2)  
 (0000-5510-200-D1)

T

U

V

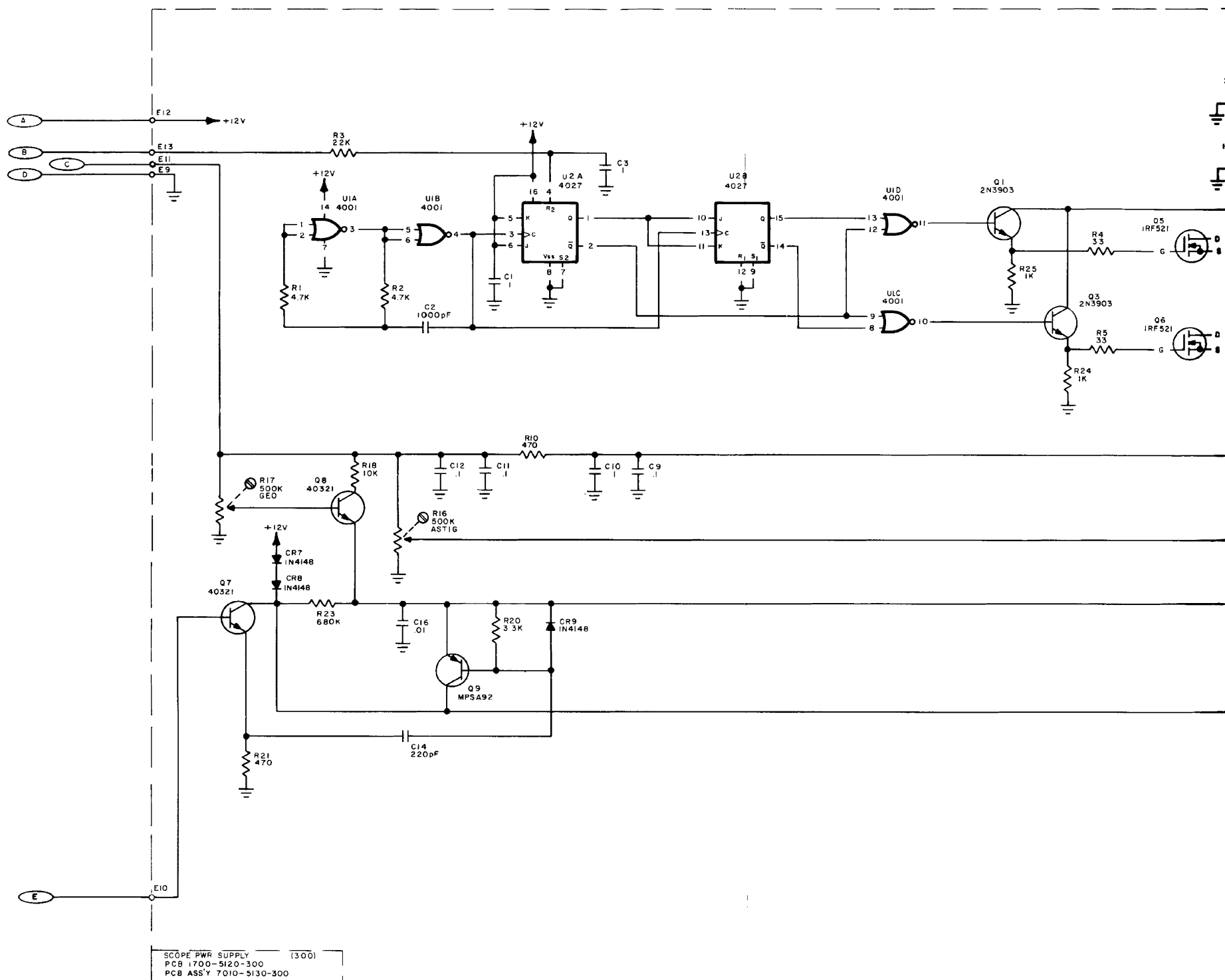
W

X

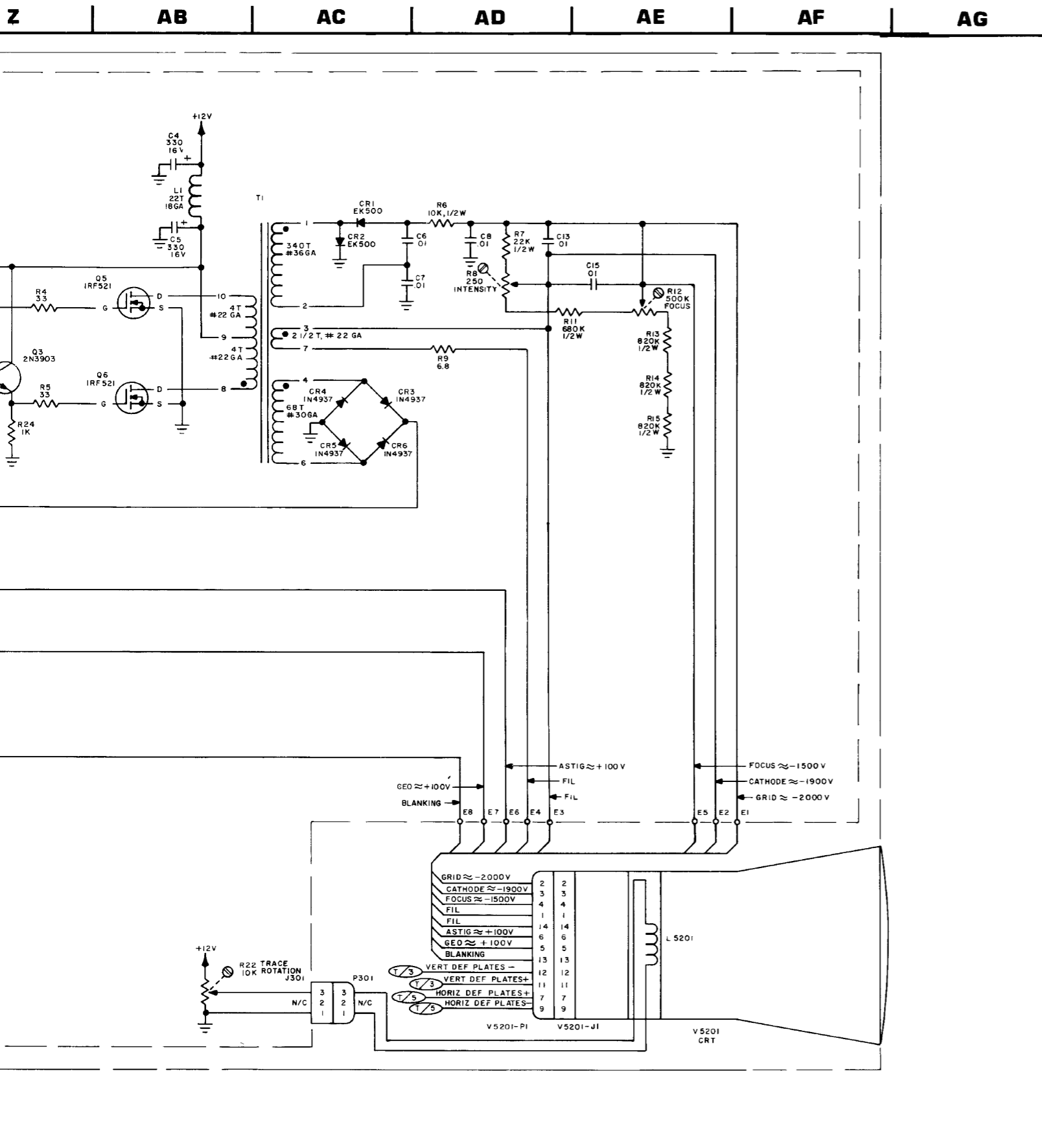
Y

Z

A







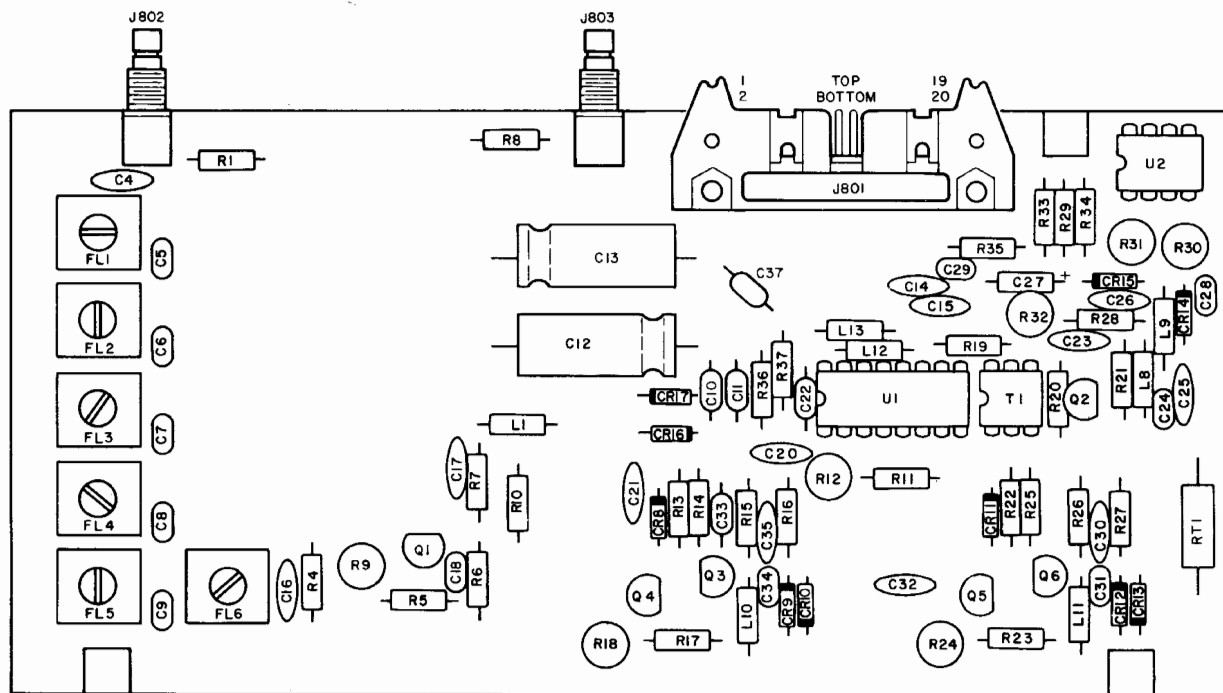
**NOTES:**

1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:
  - A. 200, 900 (SCOPE CONTROL PC BOARD).
  - B. 300 (SCOPE POWER SUPPLY PC BOARD).
  - C. 5200 (MECHANICAL ASSY).
  - D. (E.G., R1 IS R201, ETC.)
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.

**NOTES: (SCOPE CONTROL PC BOARD)**

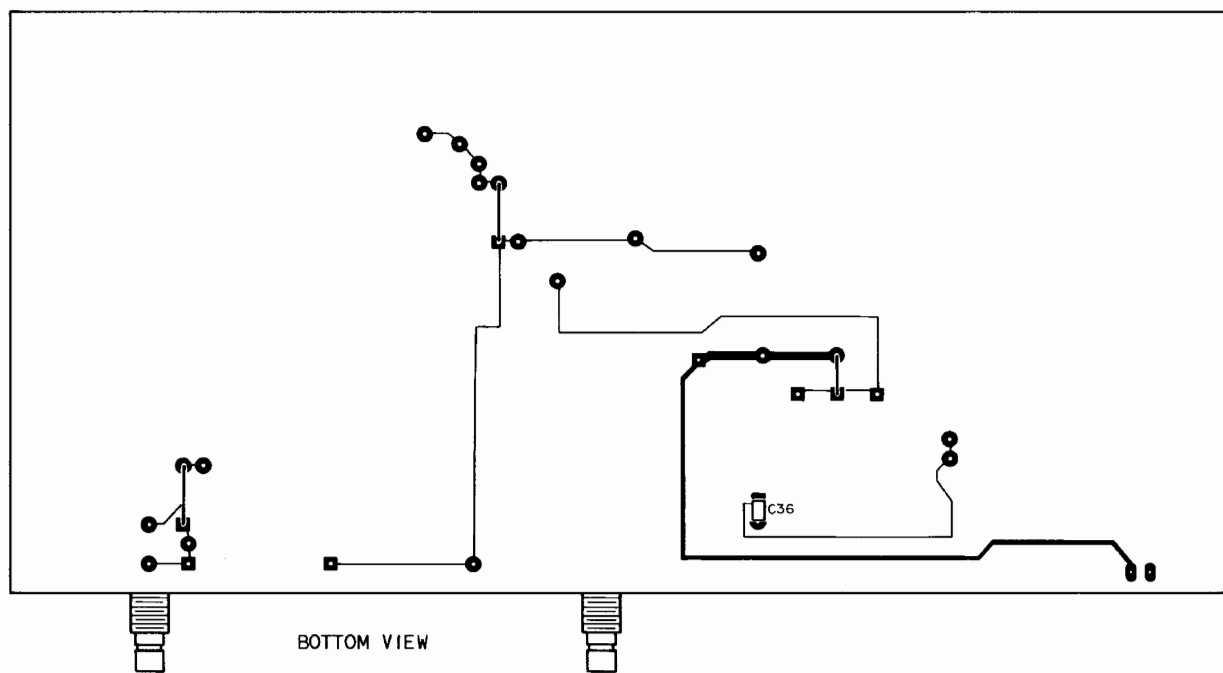
1. NOT USED.
2. R76 IS SELECTED AT TEST (SAT). NOMINAL IS 1 K. RANGE IS 800Ω TO 1.2 K.
3. PRIOR TO S/N 1421, R45 WAS 820 OHM.
4. PRIOR TO S/N 1459:
  - R4 WAS 10K 5%
  - R40 WAS 200 OHM
  - R46 WAS 2.7K OHM
  - R47 WAS 1K OHM
5. R31 IS SELECTED AT TEST (SAT). NOMINAL IS 1K, RANGE IS 47 TO 200.
6. R76 IS SELECTED AT TEST (SAT). NOMINAL IS 820, RANGE 560 TO 1.2 K.

Figure 6-28 Scope Power and Control Assembly (FM/AM-1200A) (Sheet 3 of 3) (0000-5110-300-D2) (0000-5510-200-D1)

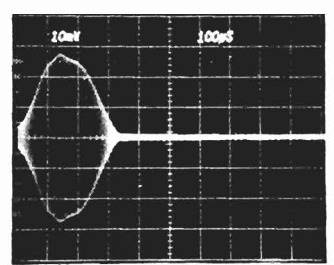


HORIZONTAL SWEEP SELECTOR POSITION	PIN #		
	5	7	9
1 kHz/DIV	1	0	0
2 kHz/DIV	1	0	0
5 kHz/DIV	0	1	0
10 kHz/DIV	0	1	0
20 kHz/DIV	0	1	0
50 kHz/DIV	0	0	1
.1 MHz/DIV	0	0	1
.2 MHz/DIV	0	0	1
.5 MHz/DIV	0	0	1
1 MHz/DIV	0	0	1

1 = +12 VDC    0 = 0 VDC

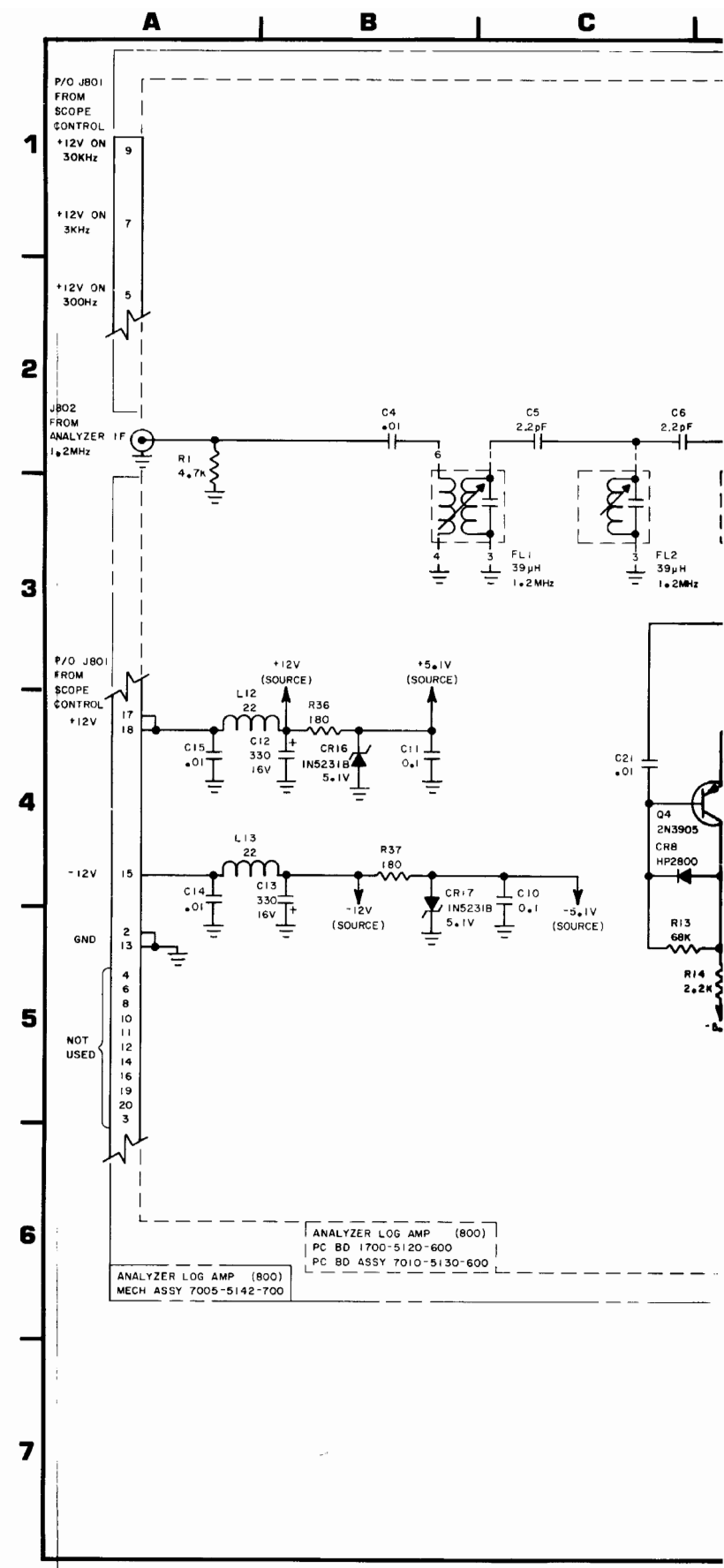


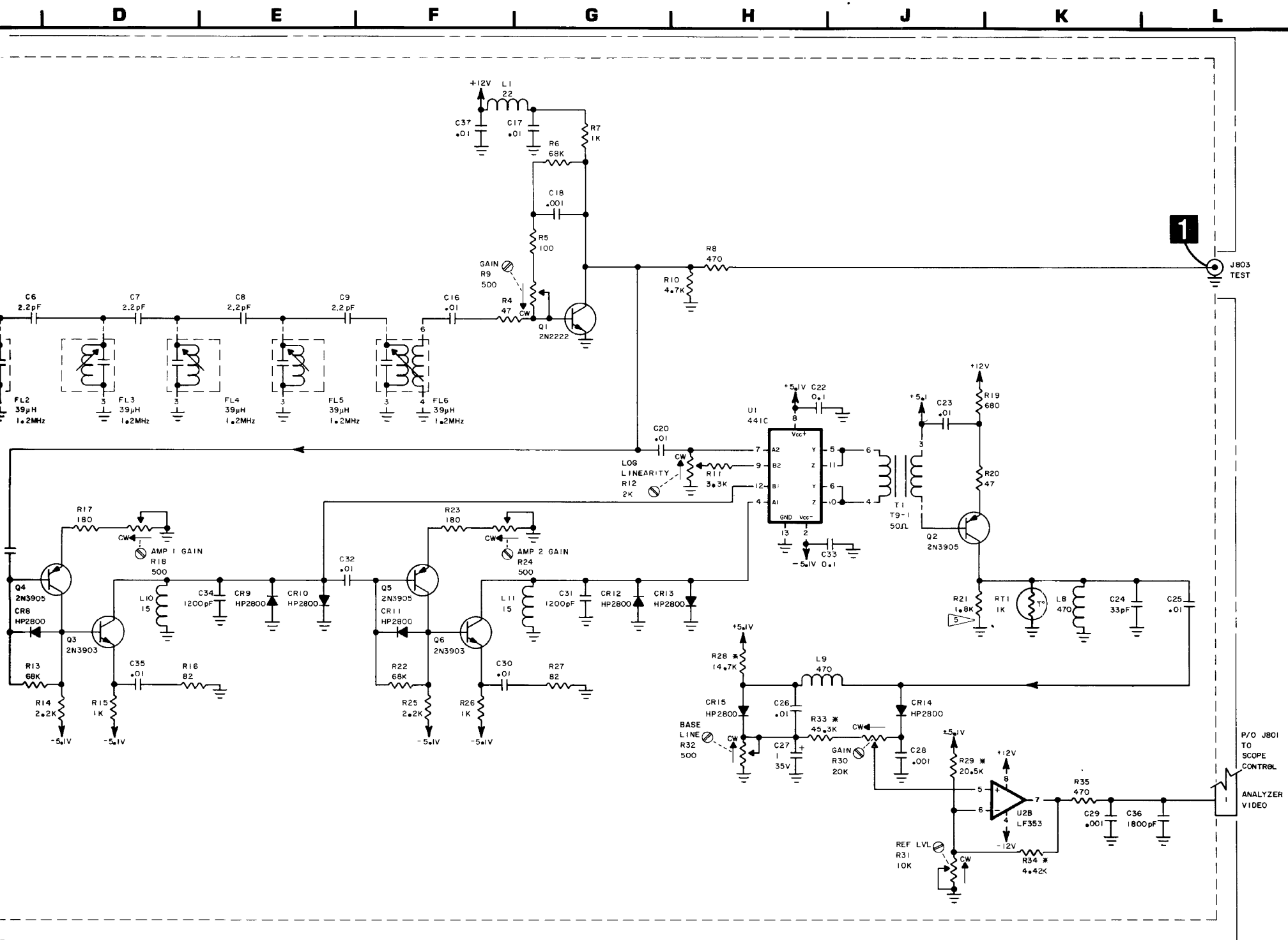
1



NOTE: MEASUREMENT WAS TAKEN WITH AN INPUT AT THE ANTENNA OF 150.2 MHz @ -50 dBm USING AN X10 PROBE. FM/AM-1200S/A SETTING IS 1 MHz/DIV.

Analyzer Log Amplifier PC Board (Rev C)

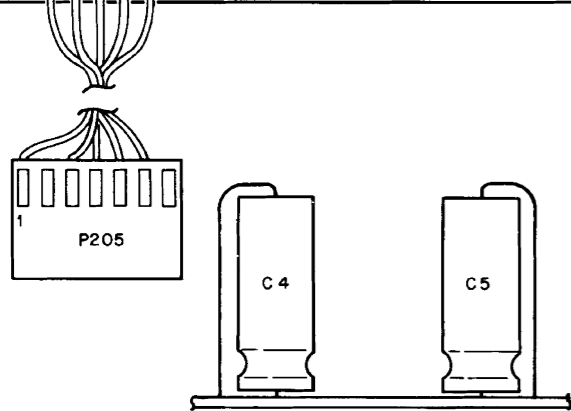
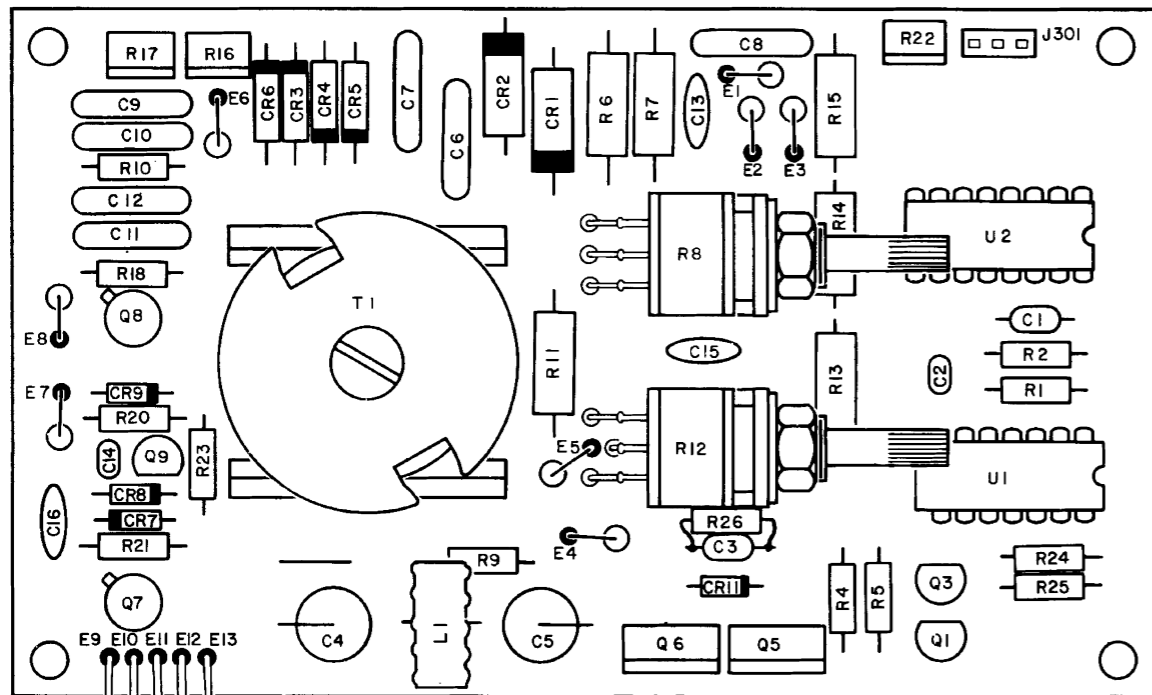




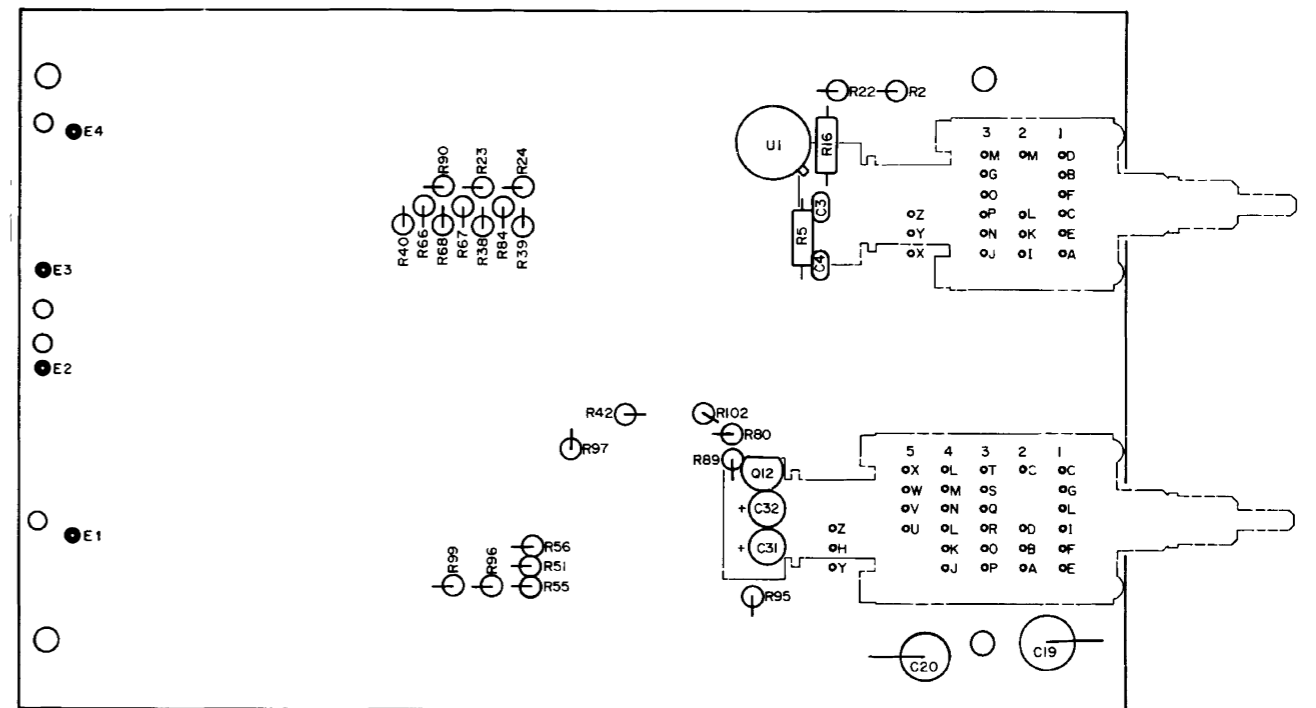
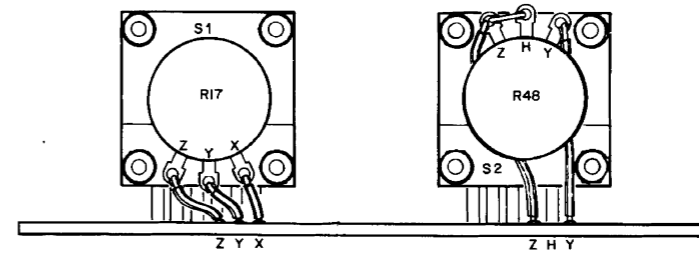
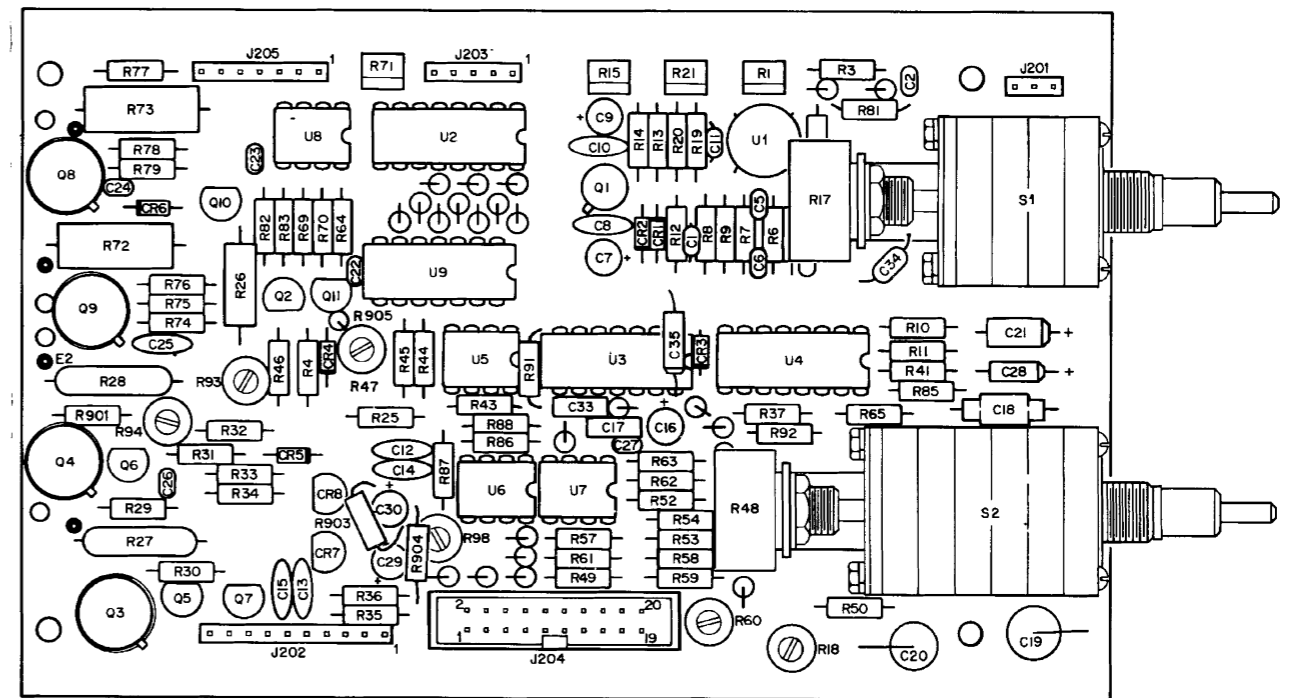
NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 800 (E.G., R1 IS R801).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED. PRECISION RESISTORS (1%) ARE DESIGNATED BY AN ASTERISK (\*).
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. NOT USED
5. R21 IS SELECT AT TEST (SAT). NOMINAL IS 1.8 K. RANGE IS 1.0 K TO 3.3 K.
6. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
7. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.

Figure 6-29 Analyzer Log Amplifier Module  
(FM/AM-1200S)  
(0000-5110-600-C)

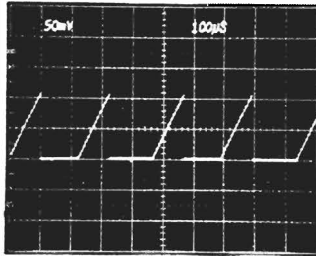


Scope Power PC Board (Rev E-2)

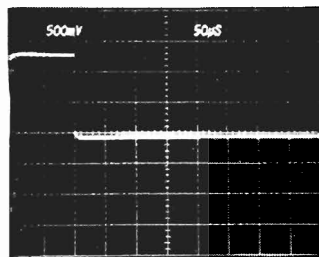


Scope Control PC Board (Rev G-3)

1



2



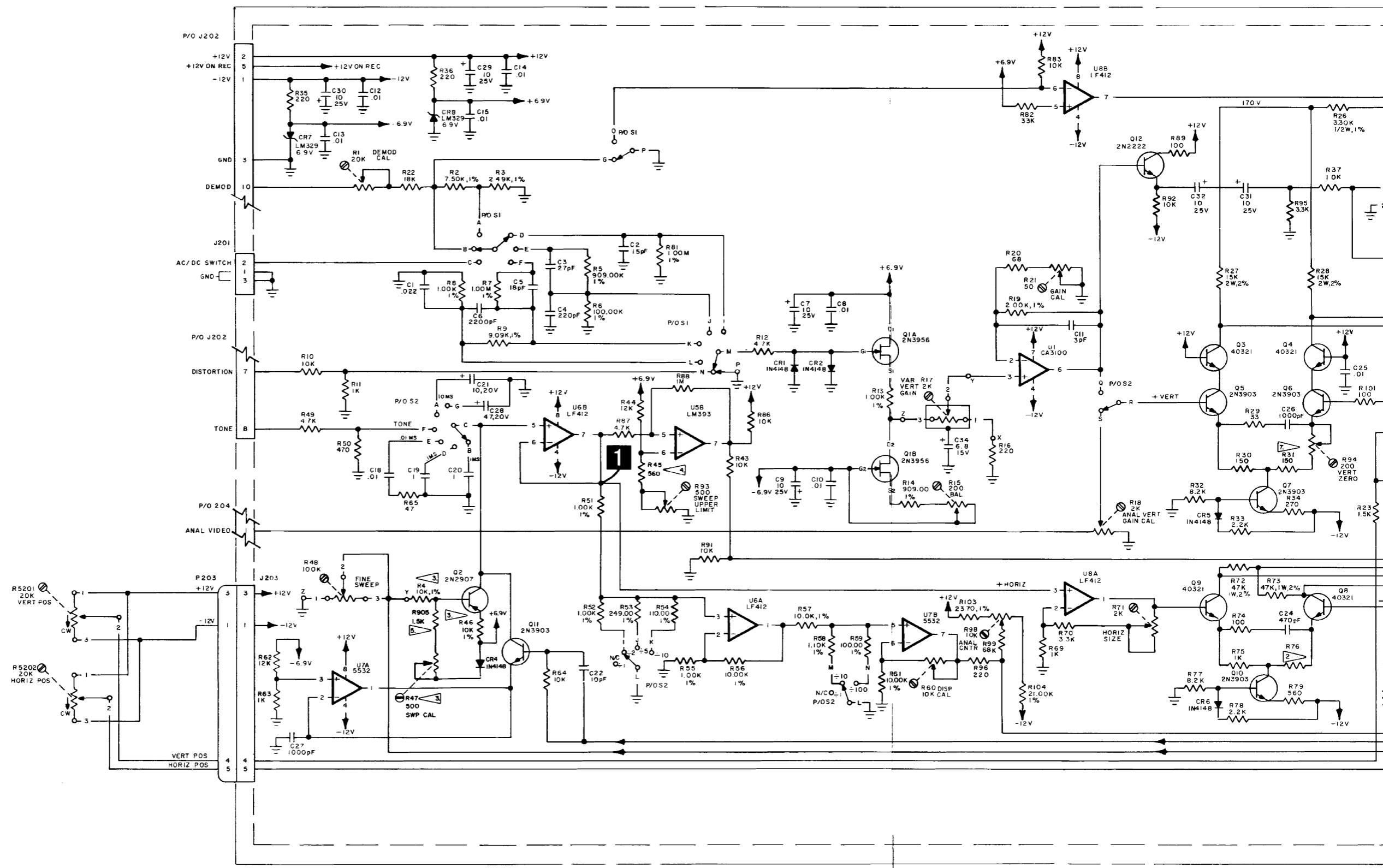
NOTE: ALL MEASUREMENTS WERE TAKEN WITH NO SIGNAL PRESENT. FM/AM-1200S SETTINGS: .01 mS/DIV, SQUELCH FULLY CW.

VERTICAL ATTENUATOR SELECTOR CONTROL (S201) TRUTH TABLE				
VERTICAL ATTENUATOR SELECTOR POSITION		PINS SHORTED		
		SECTION 1	SECTION 2	SECTION 3
kHz/ $\times$ 10	OFF			P-O
	.5	D-B	M-I	
	.2	D-A	M-I	
	5	B-E		M-J
V/DIV	20	E-A		M-J
	10	F-C	M-L	P-G
	1	F-C	M-K	P-G
	.1	C-E		M-J P-G
	.01	D-C	M-I	P-G
RESID				M-N P-G

HORIZONTAL SWEEP SELECTOR CONTROL (S202) TRUTH TABLE						
HORIZONTAL SWEEP SELECTOR POSITION		PINS SHORTED				
		SECTION 1	SECTION 2	SECTION 3	SECTION 4*	SECTION 5
TONE		C-F		T-P, R-Q		
mS/DIV	10		C-A	T-O, R-Q		
	1		C-B	T-O, R-Q		
	.1		C-D	T-O, R-Q		
	.01	C-E		T-O, R-Q		
MHz/DIV	1	C-G		R-S		U-V
	.5	C-G, L-I		R-S		U-V
	.2	C-G		R-S	L-J	U-V
	.1	C-G		R-S	L-K	U-V
kHz/DIV	50	C-G, L-I		R-S	L-M	U-V
	20	C-G		R-S	L-J, L-M	U-W
	10	C-G		R-S	L-K, L-M	U-W
	5	C-G, L-I		R-S	L-N	U-W
	2		C-A	R-S	L-J, L-N	U-X
	1		C-A	R-S	L-K, L-N	U-X

\* - SECTION 4 CONTAINS TWO "L" PINS WHICH ARE TIED TO GROUND

Figure 6-30 Scope Power and Control Assembly  
(FM/AM-1200S)  
(Sheet 1 of 3)  
(0000-5110-300-D2)  
(0000-5110-200-G1)



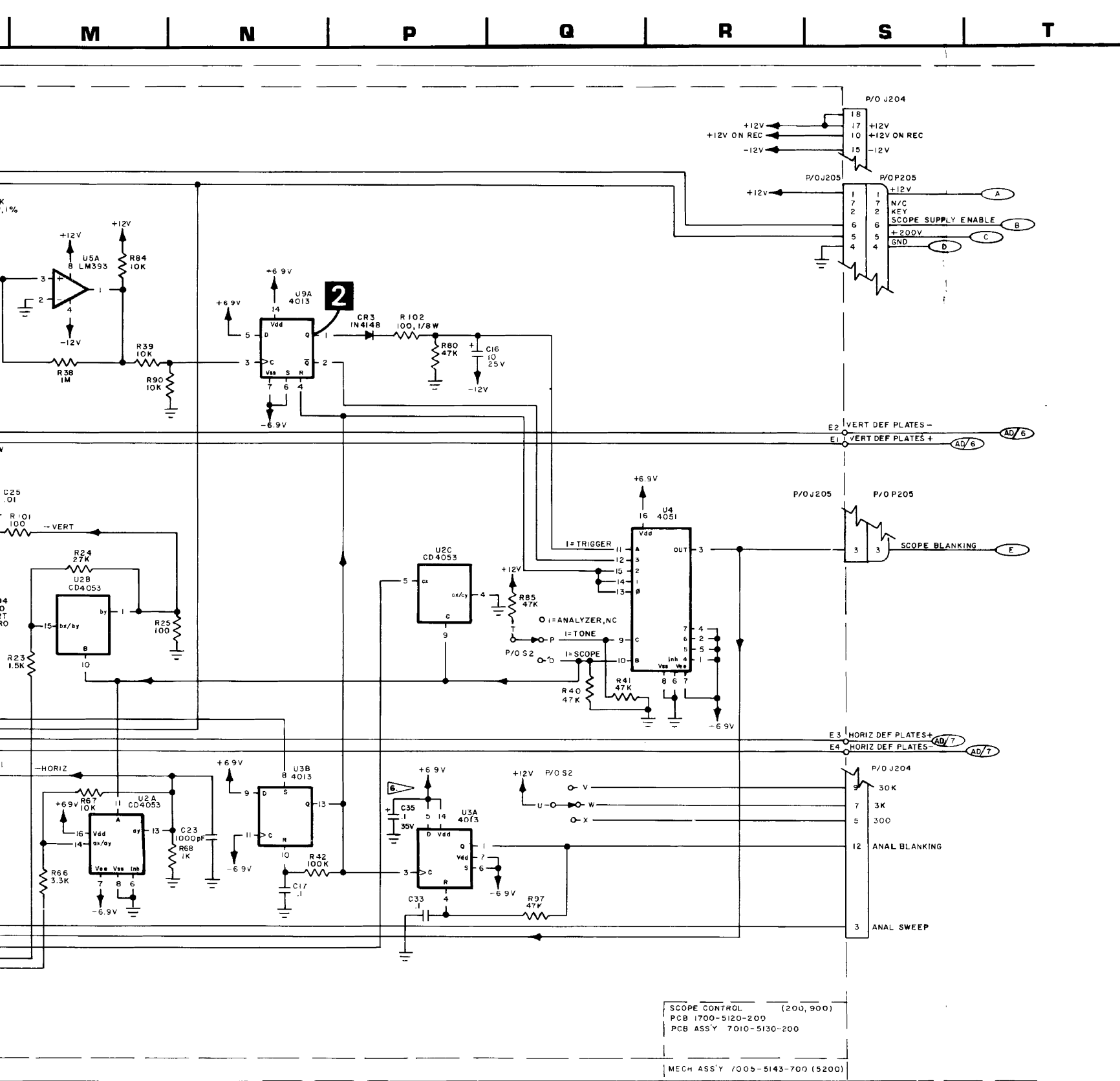
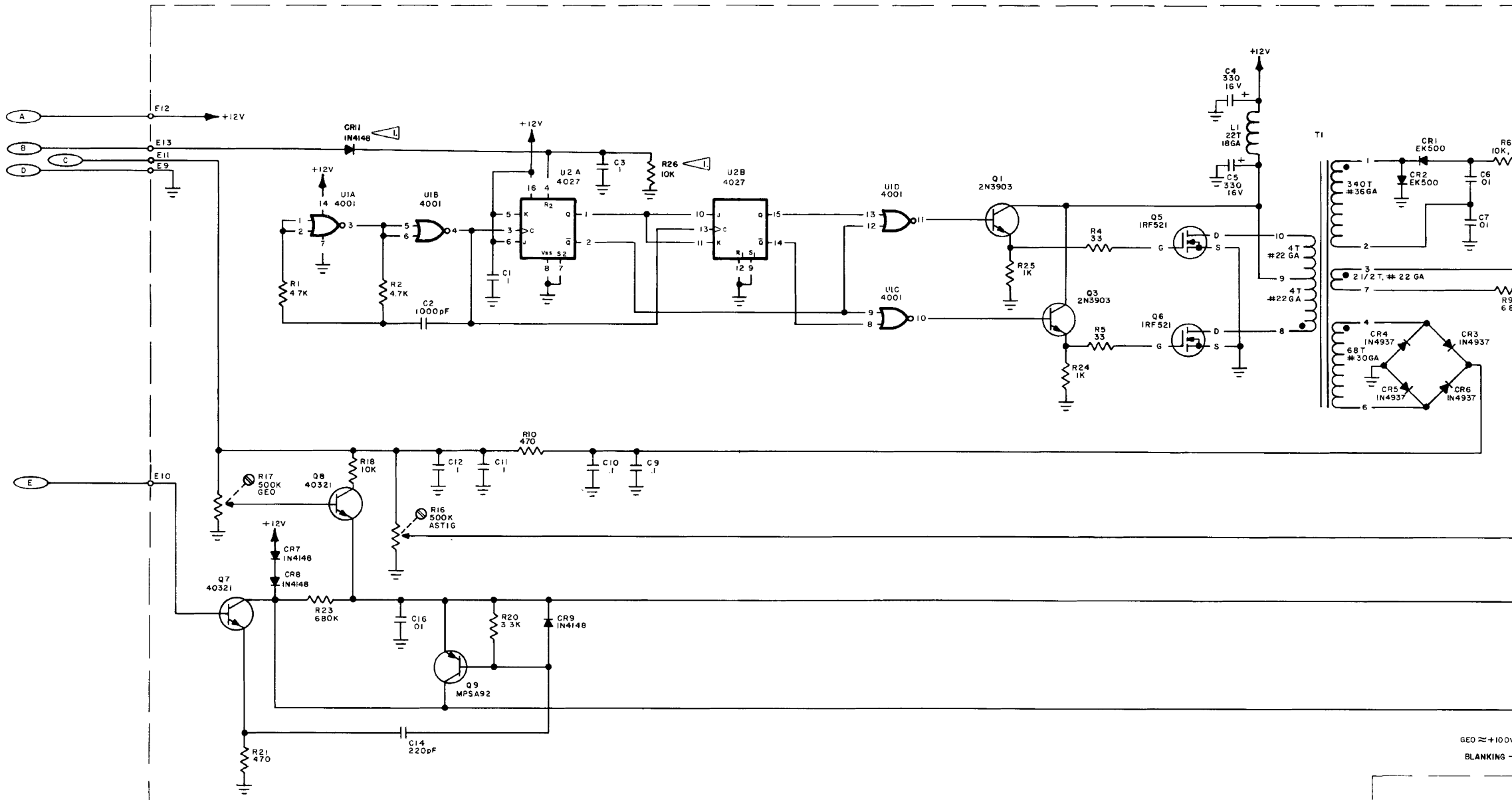
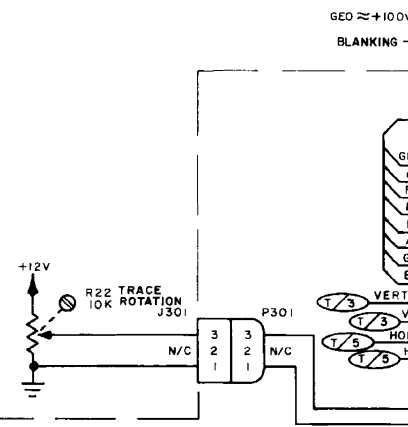


Figure 6-30 Scope Power and Control Assembly  
 (FM/AM-1200S)  
 (Sheet 2 of 3)  
 (0000-5110-300-D2)  
 (0000-5110-200-G1)

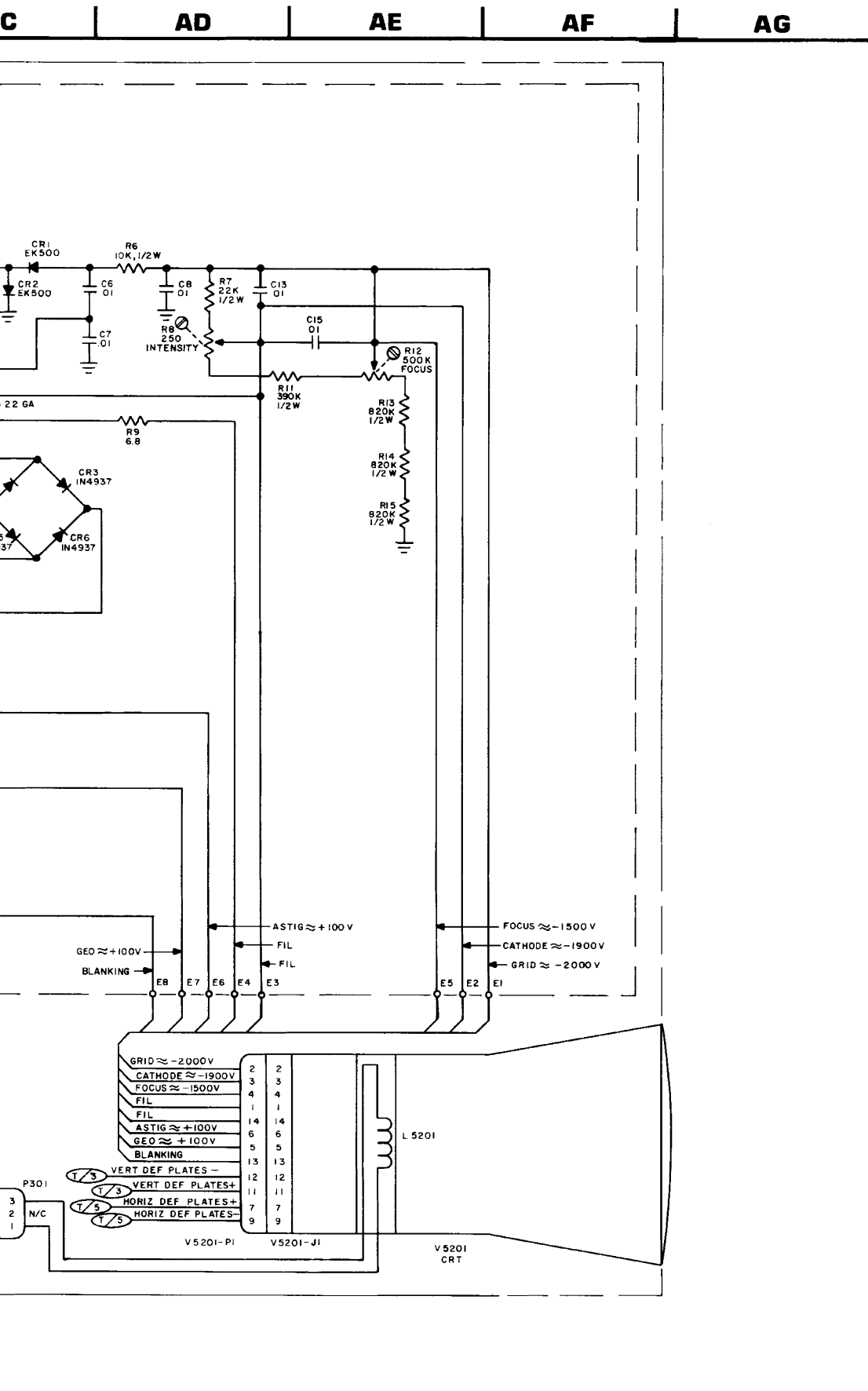


SCOPE PWR SUPPLY (300)  
 PCB 1700-5120-300  
 PCB ASSY 7010-5130-300



GEO ≈ +10.0V  
 BLANKING →





**STANDARDS:**

1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES:
  - A. 200, 900 (SCOPE CONTROL PC BOARD).
  - B. 300 (SCOPE POWER SUPPLY PC BOARD).
  - C. 5200 (MECHANICAL ASSY).
  - D. (E.G., R1 IS R201, ETC.)
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICRO-FARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICRO-HENRYS UNLESS OTHERWISE NOTED.

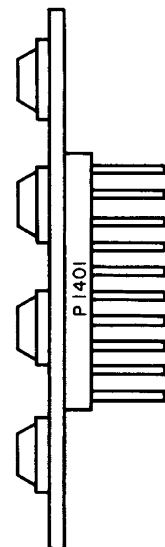
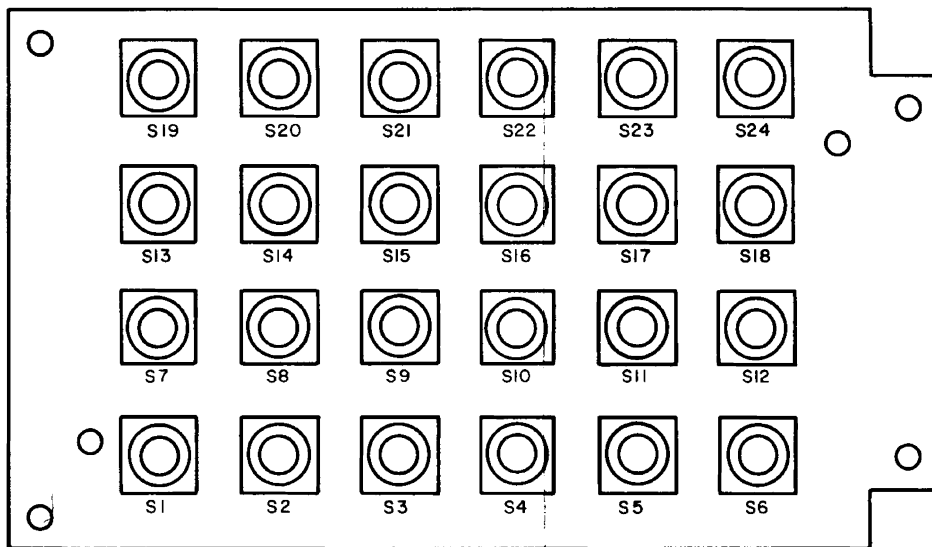
**NOTES: (SCOPE CONTROL PC BOARD)**

1. NOT USED.
2. R76 IS SELECTED AT TEST (SAT). NOMINAL IS 1 K. RANGE IS 800Ω to 1.2 K.
3. PRIOR TO S/N 4256:  
R4 WAS 10K, 5%  
R46 WAS 2.7K  
R47 WAS 1K
4. R45 WAS 820 OHM PRIOR TO S/N 4003.
5. R905 WAS ADDED AT S/N 4256 CHANGED FROM 1.74K AT S/N 4424.
6. C35 WAS ADDED AT S/N 3838.
7. R31 IS SELECT AT TEST (SAT). NOMINAL IS 150 OHMS. RANGE IS 47 TO 200 OHMS.

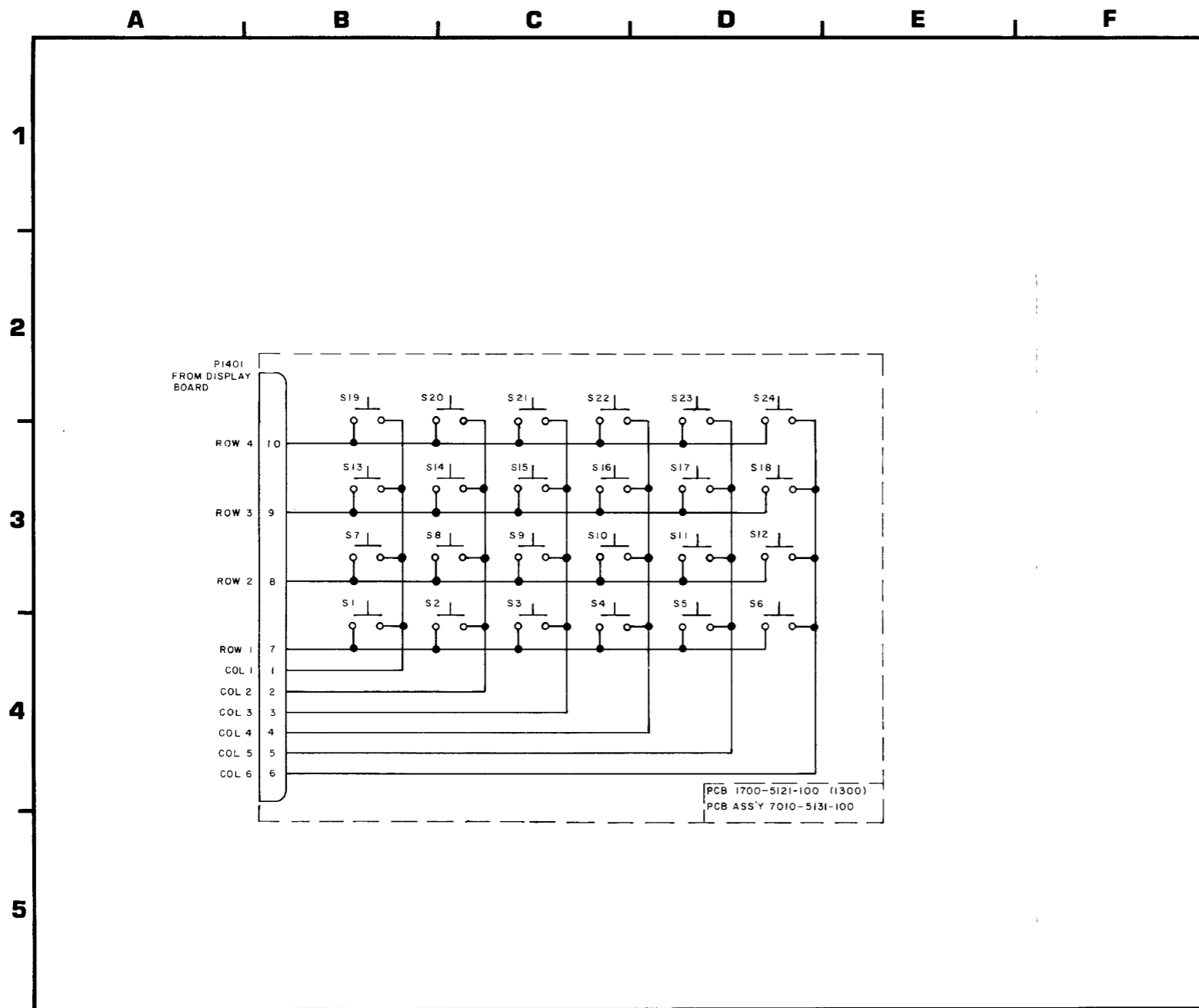
**NOTES: (SCOPE POWER)**

1. PRIOR TO S/N 4279 CR11 WAS R3, 22K. R26 WAS CR10, IN4148.

Figure 6-30 Scope Power and Control Assembly  
 (FM/AM-1200S)  
 (Sheet 3 of 3)  
 (0000-5110-300-D2)  
 (0000-5110-200-G1)



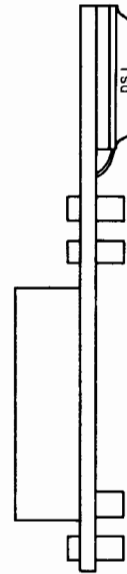
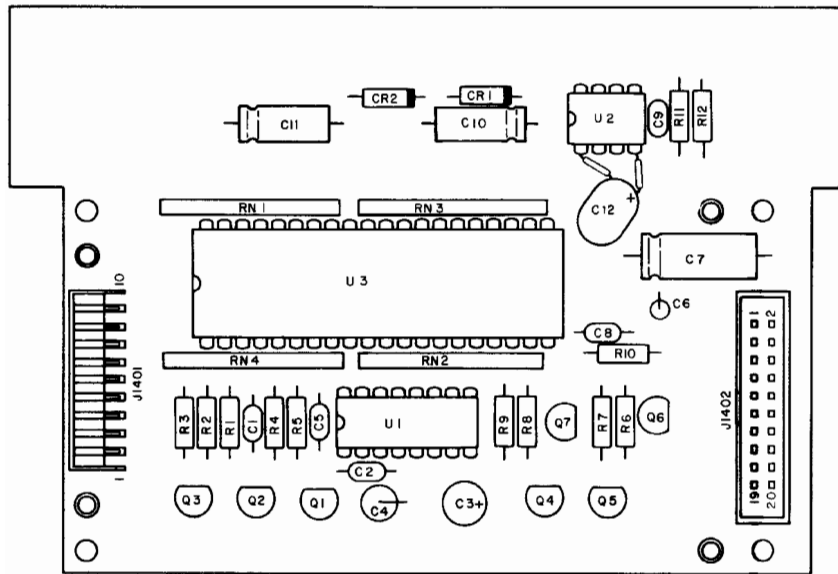
Keyboard PC Board (Rev A-5)



NOTES:

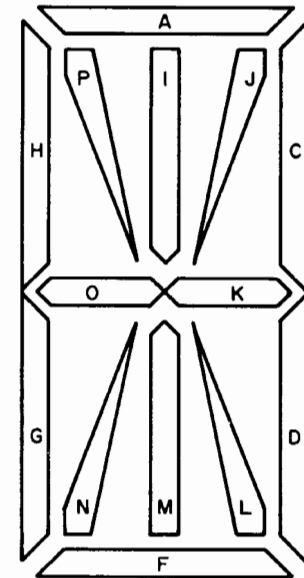
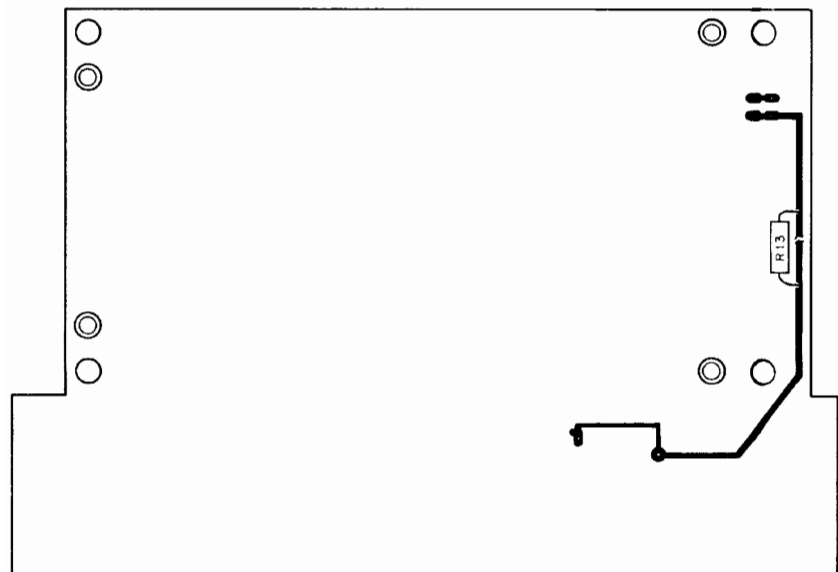
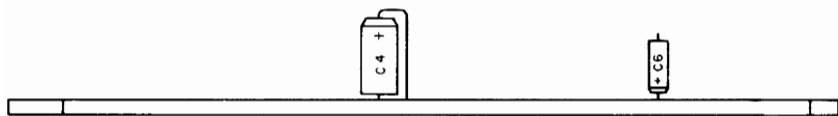
1. ALL REFERENCE NUMBERS CARRY AN ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 1300 (E.G., S1 IS S1301).

Figure 6-31 Keyboard Assembly  
(000-5111-100-A1)



NOTES:

1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 1400 (E.G., R1 IS R1401).
2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.
4. ALL CAPACITANCE IS EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.
5. ALL INDUCTANCE IS EXPRESSED IN MICROHENRYS UNLESS OTHERWISE NOTED.



VFD DISPLAY WITH SEGMENT LOCATIONS IDENTIFIED (A THRU P)

Display PC Board (Rev D7)

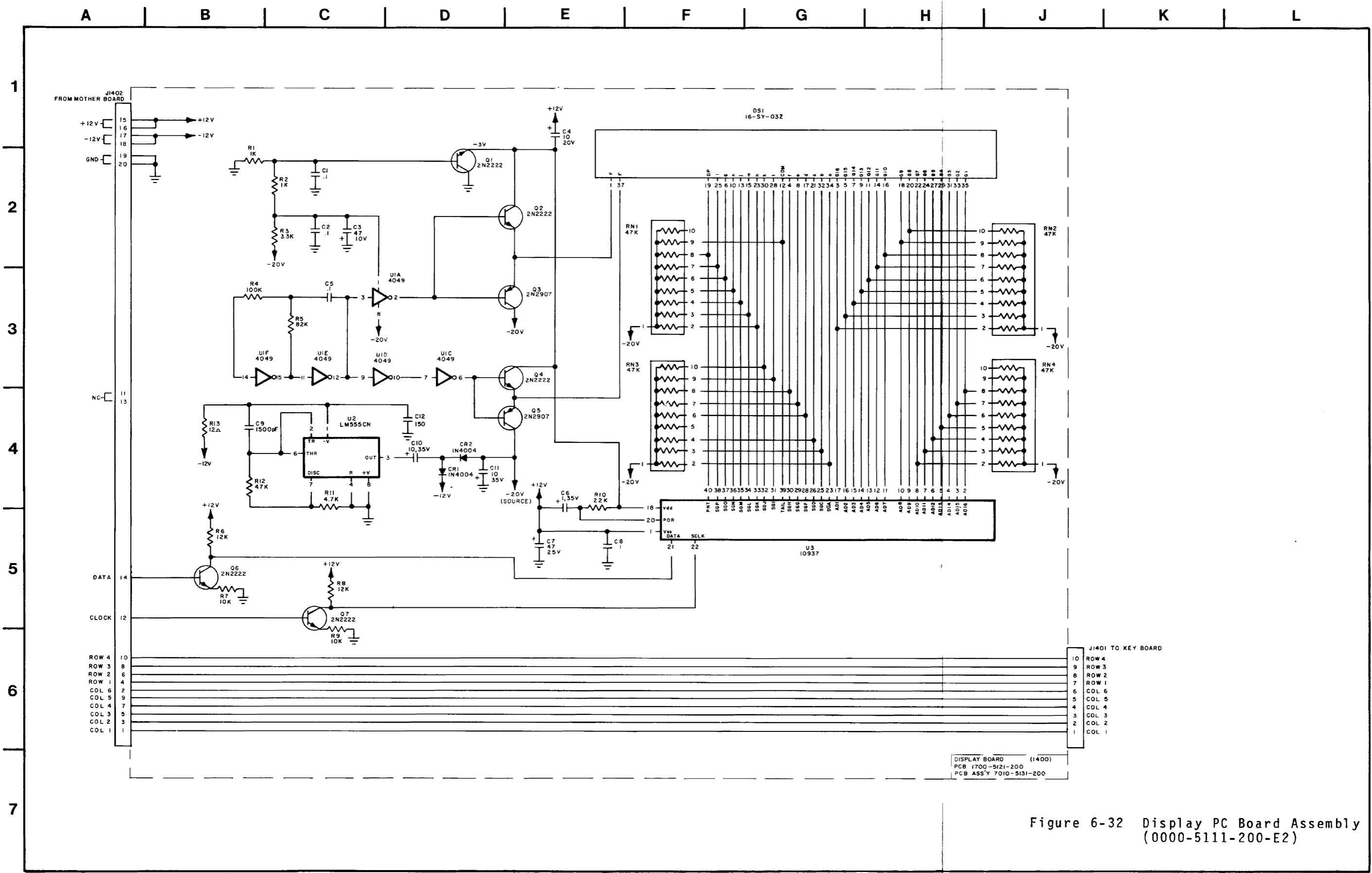
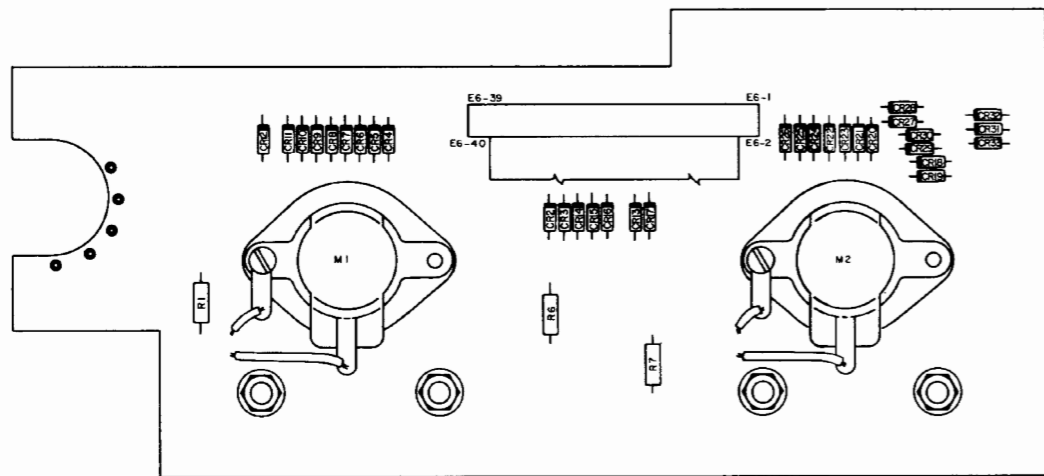
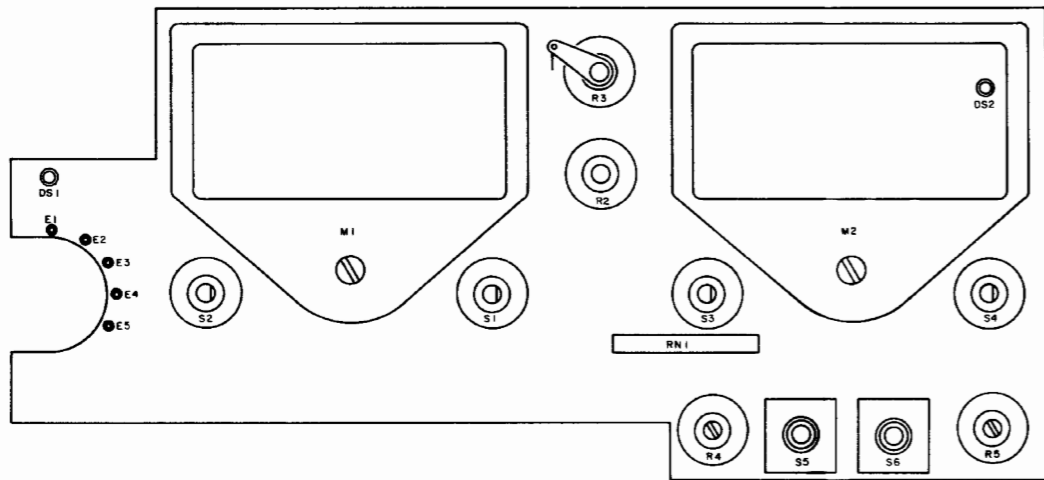


Figure 6-32 Display PC Board Assembly (0000-5111-200-E2)



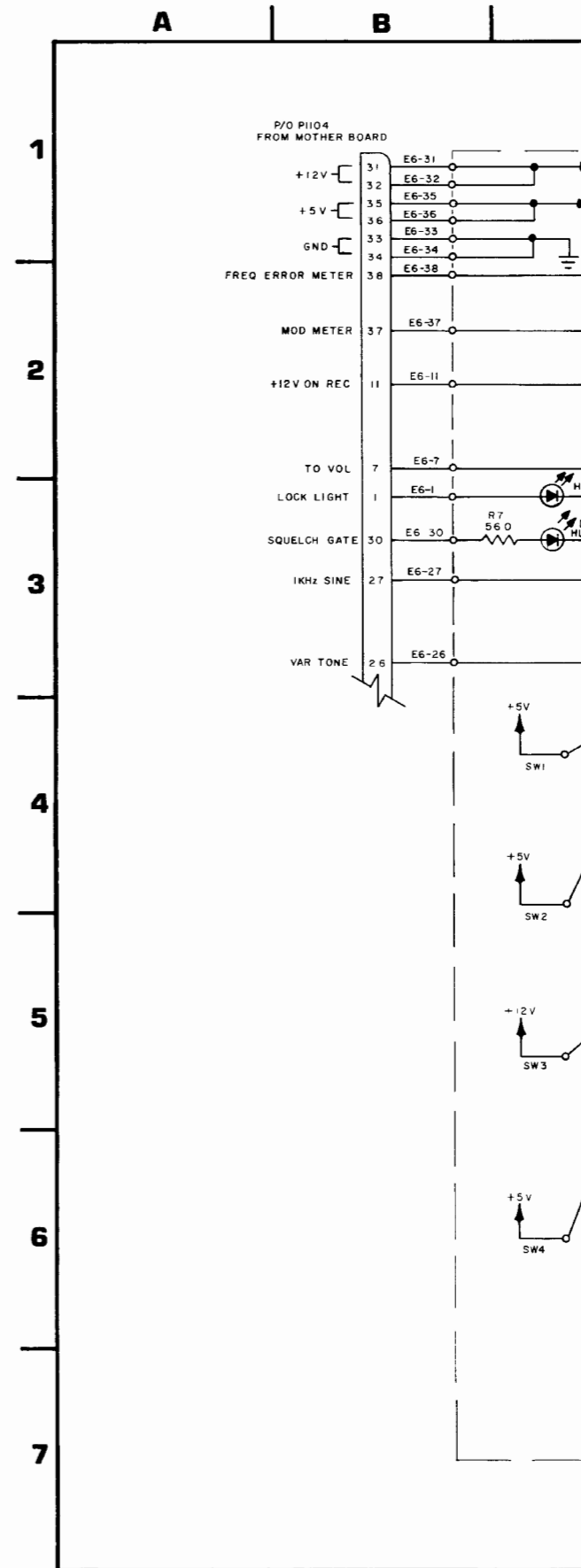
Function Switch PC Board (Rev B-2)

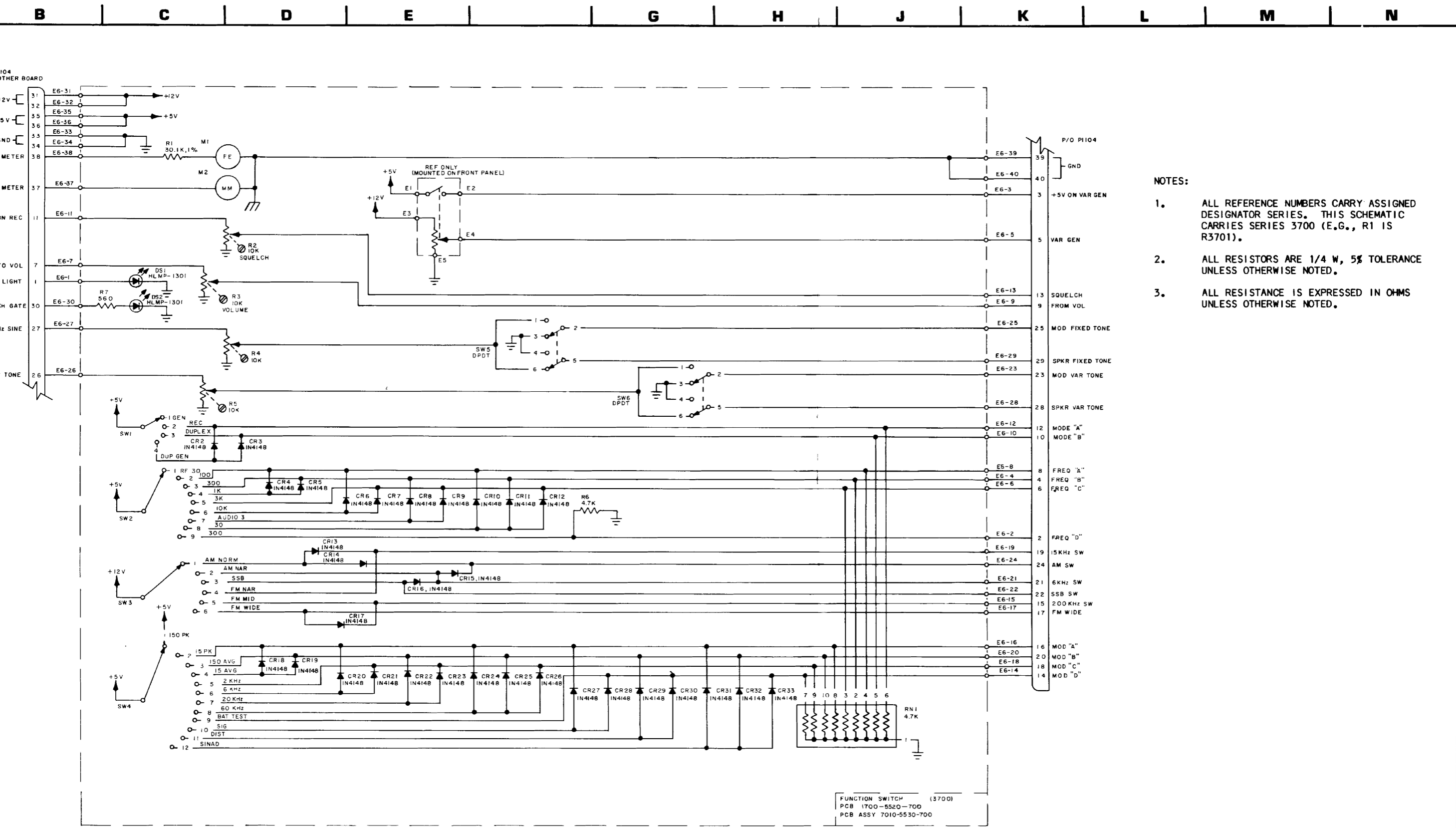
S3701 MODE SELECTOR CONTROL		
POSITION	CONTROL LINES	
	MODE A	MODE B
GEN	0	0
REC	1	0
DUP	0	1
DUP/GEN	1	1
1 = +5 VDC    0 = 0 VDC		

S3703 MODULATION SELECT CONTROL						
POSITION	CONTROL LINES					
	AM	SSB	FM WIDE	6K	15K	200K
AM NORM	1	0	0	0	1	0
AM NAR	1	0	0	1	0	0
SSB	1	1	0	1	0	0
FM NAR	0	0	0	0	1	0
FM MID	0	0	0	0	0	1
FM WIDE	1	0	1	0	0	1
1 = +12 VDC    0 = 0 VDC						

S3702 FREQ ERROR METER RANGE SELECTOR CONTROL				
POSITION	CONTROL LINES			
	FREQ MTR A	FREQ MTR B	FREQ MTR C	FREQ MTR D
30	0	0	0	0
100	1	0	0	0
300	0	1	0	0
1K	1	1	0	0
3K	0	0	1	0
10K	1	0	1	0
AUDIO				
3	0	1	1	0
30	1	1	1	0
300	0	0	0	1
1 = +5 VDC    0 = 0 VDC				

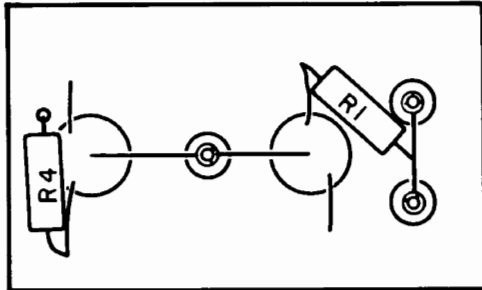
S3704 MODULATION METER CONTROL				
POSITION	CONTROL LINES			
	MOD MTR A	MOD MTR B	MOD MTR C	MOD MTR D
WP 150	0	0	0	0
WP 15	1	0	0	0
WA 150	0	1	0	0
WA 15	1	1	0	0
2 kHz/ $\sqrt{X10}$	0	0	1	0
6 kHz/ $\sqrt{X10}$	1	0	1	0
20 kHz/ $\sqrt{X10}$	0	1	1	0
60 kHz/ $\sqrt{X10}$	1	1	1	0
BATT	0	0	0	1
SIG	1	0	0	1
DIST	0	1	0	1
SINAD	1	1	0	1
1 = +5 VDC    0 = 0 VDC				



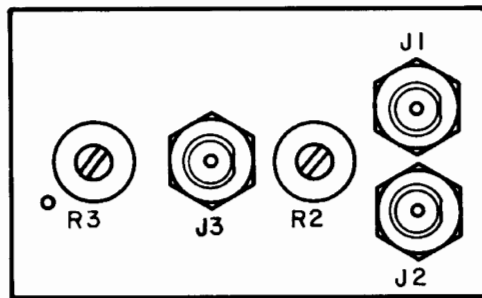


- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES 3700 (E.G., R1 IS R3701).
  2. ALL RESISTORS ARE 1/4 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.

Figure 6-33 Function Switch PC Board Assembly (0000-5510-700-B2)



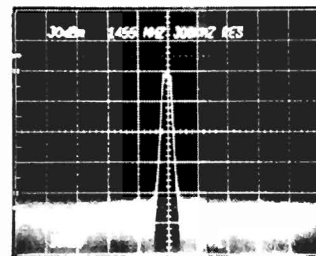
TOP VIEW



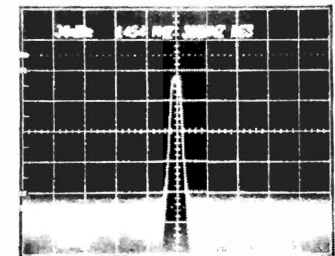
BOTTOM VIEW

Mixer Null PC Board (Rev A-1)

1

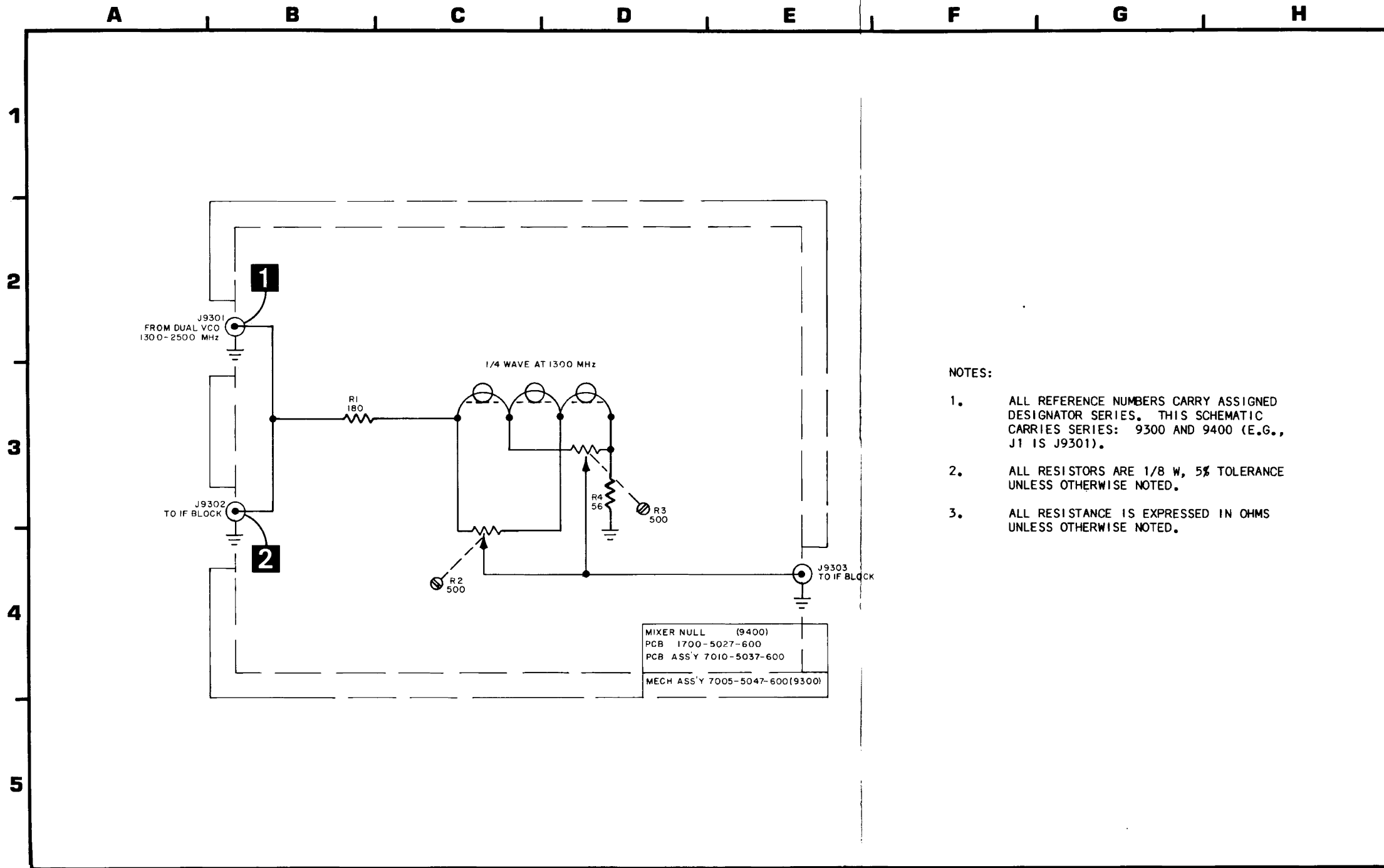


2



NOTE: MEASUREMENTS WERE TAKEN IN  
GEN MODE AT A FREQUENCY OF  
150.2 MHz.





- NOTES:
1. ALL REFERENCE NUMBERS CARRY ASSIGNED DESIGNATOR SERIES. THIS SCHEMATIC CARRIES SERIES: 9300 AND 9400 (E.G., J1 IS J9301).
  2. ALL RESISTORS ARE 1/8 W, 5% TOLERANCE UNLESS OTHERWISE NOTED.
  3. ALL RESISTANCE IS EXPRESSED IN OHMS UNLESS OTHERWISE NOTED.

Figure 6-34 Mixer Null Assembly  
(0000-5016-600-A)



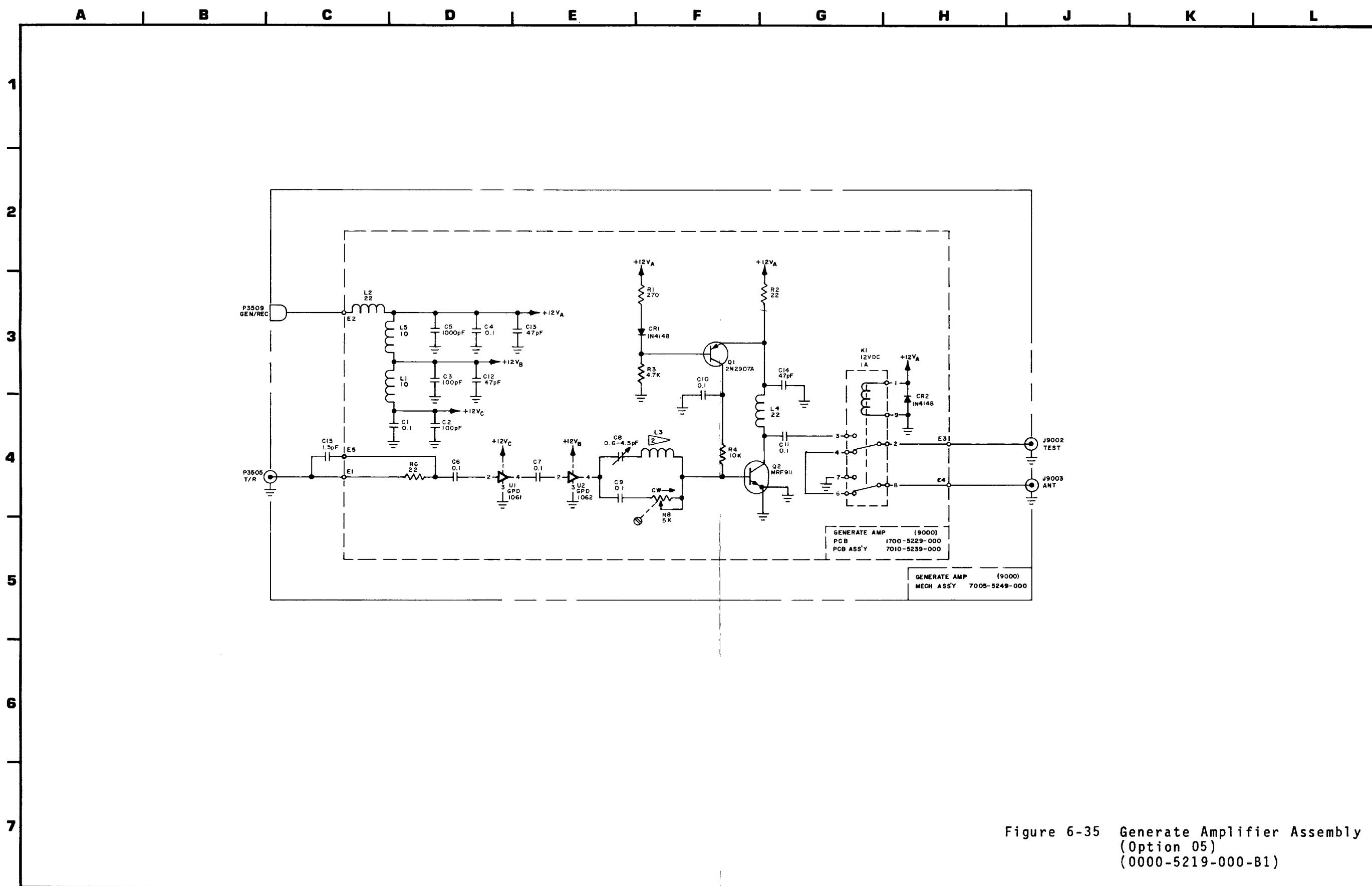


Figure 6-35 Generate Amplifier Assembly  
 (Option 05)  
 (0000-5219-000-B1)



**INTRODUCTION**

# ILLUSTRATED PARTS CATALOG

## GENERAL

The purpose of this Illustrated Parts Catalog is for identification, requisition and issuance of replacement parts for the FM/AM-1200S and FM/AM-1200A Communication Service Monitor. Parts listed in this catalog meet critical equipment design specification requirements. For parts replacement, use only parts specified by this catalog.

Any differences between the FM/AM-1200S and FM/AM-1200A will be denoted by the effectivity column. If no reference is made to either the FM/AM-1200S or FM/AM-1200A, then it should be assumed as applicable to both.

Applicable beginning serial numbers are as follows:

MODEL	SERIAL NUMBER
FM/AM-1200S	S/N 3300
FM/AM-1200A	S/N 1250

This catalog provides a breakdown of each assembly to the component level, while using a basic indenture system to identify both subassembly and next higher assembly components, as well as attaching hardware. A sample parts list page below illustrates this system.

 **ILLUSTRATED PARTS CATALOG** FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
51-		7005-5540-300		REAR PANEL ASSEMBLY			REF
		SEE FIG 52		SEE FIG 13 FOR NHA			
	1			LINE SUPPLY PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
	2	2804-0750-006		SCREW (6-32 X 3/4 PPHM)	UNK016		1
	3	2850-0000-002		NUT (6-32)	UNK016		1
	4	2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		1
	5	2804-0500-006		SCREW (6-32 X 1/2 PPHM)	UNK015		4
	6	1400-5157-000		BAR, MTG			2
				---*---			
	7	1414-5150-601		COVER, LINE SUPPLY			1
				ATTACHING PARTS			
	8	2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				---*---			
	Q4601	4811-0000-005		TRANSISTOR (JAN2N6101)	02735		1
				ATTACHING PARTS			
	9	2803-0375-050		SCREW (4-40 X 3/8 SPHM)	UNK015		1
	10	2850-0000-008		NUT (4-40)	UNK015		1
	11	2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		1
	12	4835-0000-103		INSULATOR (DF103B)	02735		1
				---*---			
	13	7005-5140-301		WIRE HARNESS ASSY, REAR PANEL			1
	P1601	2115-0000-013		CONNECTOR, WAFER (22-01-2101)	27264		1
		2114-0000-023		CONTACT, CONN 22-30 GA (08-56-0110)	27264		18
		2127-9900-100		KEY, POLARIZING CONN (15-04-9209)	27264		2
	P1701	2115-0000-013		CONNECTOR, WAFER (22-01-2101)	27264		1
		SEE FIG 1		WIRE, 7S 20 GA			A/R
		SEE FIG 1		WIRE, 7S 22 GA			A/R
		SEE FIG 1		TY-RAP 4"			A/R
		SEE FIG 1		TUBING 5/16 CLR			A/R
	16	SEE FIG 53		OUTPUT AMP ASSEMBLY			1
				ATTACHING PARTS			
	17	2804-0438-006		SCREW (6-32 X 7/16 PPHM)	UNK015		2
	18	2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		2
				---*---			
	19	SEE FIG 55		POWER SUPPLY ASSEMBLY			1
				ATTACHING PARTS			
	20	2804-0438-006		SCREW (6-32 X 7/16 PPHM)	UNK015		2
	21	2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		2
				---*---			
	22	7007-5580-800		CABLE ASSY, RS232			1
				ATTACHING PARTS			
	23	2850-7601-301		SCREW, SPECIAL 4-40 (76-0013-1)	UNK019		2
	24	2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		2
				---*---			



## HOW TO USE

This catalog is compiled of two indices to aid the user in locating parts.

### NUMERICAL INDEX

To locate the illustration for a part if the part number is known, refer to the Numerical Index and find the part number. Turn to the Parts List and find the first figure and item number indicated in the Numerical Index for that part. If this figure shows the part in a section or module other than the one desired, refer to the other figure numbers listed in the Numerical Index.

### CROSS REFERENCE INDEX

To locate a part number if the assembly in which the part is used is known, refer to the Cross Reference Index to identify the figure number and page number of the illustration that will show the breakdown of the assembly. Locate the part and its item number on the illustration and find the applicable item number on the parts list to determine its part number and description.

### ASSEMBLY VS SUBASSEMBLY

The first line of text under indenture 1 of the page heading is the assembly being broken down in the designated figure. Any item listed under indenture 2 is a sub-assembly or component of the preceding item listed under indenture 1. Any item listed under indenture 3 is a subassembly or component of the preceding subassembly listed under indenture 2 and so on.

### ATTACHING HARDWARE

All attaching hardware for a particular part is listed under the "Attaching Parts" designation, which in turn appears directly below the parent part. The last item making up the attaching parts group precedes the symbol "----\*----".

#### NOTE

The quantity listed for the attaching parts is the quantity required to attach only one of the parent parts.

When a parent part is supplied with any or all of its mounting hardware, the designation "INCL MTG HARDWARE" will be listed adjacent to the parent part. Any additional attaching hardware required beyond the supplied mounting hardware, will be listed separately below the parent part.

### PROCEDURE FOR ORDERING PARTS

When ordering parts, the model and serial number of your set must accompany parts order. The parts order itself must contain the IFR part number and description of the part(s) being ordered. DO NOT order parts by item numbers or reference designators; these numbers are provided as a convenience to user for correlating parts between the illustrations and the parts lists.

#### NOTE

The Parts Lists indicate full reference designator series (e.g., R1201); the illustrations indicate only abbreviated reference designators (e.g., R1).

Direct all parts orders to:

Customer Service  
IFR Systems, Inc.  
10200 West York Street  
Wichita, Kansas 67215 U.S.A.  
TEL (316) 522-4981/TWX: 910-741-6952



## MANUFACTURER IDENTIFICATION

- |        |   |        |  |
|--------|---|--------|--|
| UNK001 | Berg Electronics<br>30303 Aurora Rd.<br>Cleveland, OH 44139                                 | UNK015 | Midwest Fasteners<br>2238 S. Mead<br>Wichita, KS 67211   |
| UNK002 | Braemar<br>11950 12th Ave.<br>S. Burnsville, MN 55337                                       | UNK016 | Pilgrim Screw<br>P.O. Box 5544<br>Arlington, TX 76011  |
| UNK003 | Lambda<br>Mail Stop 244<br>6950 Winchester<br>Dallas, TX 75231                              | UNK017 | AJB<br>Japan Branch<br>Sugaya Bldg., 2nd Floor<br>703 Yon Bancho<br>Chiyoda-Ku, Tokyo 102, JAPAN |
| UNK004 | Little Fuse<br>800 East N.W. Hwy.<br>Des Plaines, IL 60016                                  | UNK018 | Hunte Wilde<br>2835 Overpass Rd.<br>Tampa, FL 33619  |
| UNK005 | Lowen<br>1500 N. Halstead<br>Hutchinson, KS 67501   | UNK019 | All Metal<br>519 W. Wrightwood Ave.<br>Elmhurst, IL 60126  |
| UNK006 | National Transformer<br>100 S. Minnesota<br>Cape Girardeau, MO 63701                        | UNK020 | J. S. Terminal<br>1380 Brummel Ave.<br>Elk Grove Village, IL 60007                               |
| UNK007 | Radio, Inc.<br>2930 E. Harry<br>Wichita, KS 67211   | UNK021 | Finnigan Electronics<br>P.O. Box 1082<br>St. Charles, MO 63303                                   |
| UNK008 | Royal Vista Plastics, Inc.<br>12528 E. 60th St., South<br>P.O. Box 45651<br>Tulsa, OK 74145 | UNK022 | S. P. America<br>1181 N. 4th St.<br>San Jose, CA 95112   |
| UNK009 | SGS-Ates Semiconductor<br>1000 E. Bell Rd.<br>Phoenix, AZ 85022                             | UNK023 | Winfred M. Berg, Inc.<br>499 Ocean Ave., East<br>Rockaway, NY 11518                              |
| UNK010 | Stancor Products<br>131 Godfrey St.<br>Logansport, IN 46947                                 | UNK024 | Cord Corp.<br>177 Cantiagu Rock Rd.<br>Westbury, NY 11590  |
| UNK011 | Toko America, Inc.<br>5520 W. Touhy Ave.<br>Skokie, IL 60077                                | UNK025 | Oscillatek Corp.<br>620 N. Lindenwood Drive<br>Olathe, KS 66062                                  |
| UNK012 | VRN International<br>P.O. Box 44000<br>St. Petersburg, FL 33743                             | UNK026 | Midwest Aircraft Supply<br>2234 S. Mead<br>Wichita, KS 67211                                     |
| UNK013 | Electronics Devices, Inc.<br>21 Gray Oaks<br>Yonkers, NY 10710                              | UNK027 | Atlantic India Rubber Co.<br>571 W. Polk St.<br>Chicago, IL 60607                                |
| UNK014 | Rodestein<br>c/o Deltron<br>416 N.E. 68th<br>Gladstone, MO 64118                            | 00443  | Waveline Inc.<br>160 Passaic<br>P.O. Box 718<br>West Caldwell, NJ 07706                          |



## MANUFACTURER IDENTIFICATION

- |       |  |       |  |
|-------|--|-------|--|
| 00629 | EBY Sales Co., Inc. of New York<br>148-05 Archer Avenue<br>Jamaica, NY 11435   | 05791 | Lyn-Tron, Inc.<br>3150 Damon Way<br>Burbank, CA 91505  |
| 00779 | Amp, Inc.<br>P.O. Box 3608<br>Harrisburg, PA 17105   | 06518 | Regency Electronics<br>7707 Records St.<br>Indianapolis, IN 46226  |
| 01295 | Texas Instruments, Inc.<br>Semiconductor Group<br>13500 N. Central Expressway<br>P.O. Box 225012, M/S 49<br>Dallas, TX 75265 | 06776 | Robinson Nugent, Inc.<br>800 E. 8th St.<br>P.O. Box 1208<br>New Albany, IN 47150   |
| 02111 | Spectrol Electronics Corp.<br>Sub of Carrier Corp.<br>17070 E. Gala Ave.<br>P.O. Box 1220<br>City of Industry, CA 91749      | 06915 | Richo Plastic Co.<br>5825 N. Tripp Ave.<br>Chicago, IL 60646   |
| 02289 | Hi-G Co.<br>Sub of Nytronics, Inc.<br>101 Locust St.<br>Hartford, CT 06114   | 07109 | Oaktron Industries, Inc.<br>704 30th Street<br>Monroe, WI 53566  |
| 02735 | RCA Corp.<br>Solid State Division<br>Route 202<br>Somerville, NJ 08876   | 09353 | C and K Components, Inc.<br>15 Riverdale Ave.<br>Newton, MA 02158  |
| 03508 | General Electric Co.<br>Semiconductor Products Dept.<br>W. Genesee St.<br>Auburn, NY 10321                                   | 09922 | Burndy Corp.<br>Richard Ave.<br>Norwalk, CT 06856  |
| 03911 | Clairex Electronics<br>Div. of Clairex Corp.<br>560 S. Third Ave.<br>Mt. Vernon, NY 10050                                    | 12020 | Ovenaire<br>Div. of Electronic Technologies, Inc.<br>706 Forrest St.<br>P.O. Box 1528<br>Charlottesville, VA 22901                                 |
| 04423 | Telonic Berkeley, Inc.<br>2825 Laguna Canyon Rd.<br>P.O. Box 277<br>Laguna Beach, CA 92652                                   | 12467 | Fairchild Camera and Instrument Corp.<br>Fairchild Industrial Products Division<br>Sub. of Schlumberger Ltd.<br>75 Mall Drive<br>Commack, NY 11725 |
| 04713 | Motorola, Inc.<br>Semiconductor Products Sector<br>5005 E. McDowell Rd.<br>Phoenix, AZ 85008                                 | 12515 | Teledyne Thermatics<br>A Teledyne Inc., Co.<br>Hwy. 301 S.<br>P.O. Box 909<br>Elm City, NC 27822   |
| 05245 | Corcom, Inc.<br>1600 Winchester Rd.<br>Libertyville, IL 60048  | 12598 | RLC Electronics, Inc.<br>83 Radio Circle<br>Mt. Kisco, NY 10549  |
| 05254 | Coast Magnetics<br>Coast Coil Division<br>5333 W. Washington Blvd.<br>Los Angeles, CA 90016                                  | 12697 | Clarostat Mfg. Co., Inc.<br>Lower Washington St.<br>Dover, NH 03820  |
|       |  | 12969 | Unitrode Corp.<br>580 Pleasant St.<br>Watertown, MA 02172  |





## MANUFACTURER IDENTIFICATION

- |       |  |       |   |
|-------|--|-------|---|
| 13013 | Thermalloy Co., Inc.<br>2021 W. Valley View Lane<br>P.O. Box 810839<br>Dallas, TX 75381  | 16327 | Dayton Electric Mfg. Co.<br>5959 W. Howard St.<br>Chicago, IL 60648   |
| 13499 | Rockwell Int. Corp.<br>Commercial Electronics Operations<br>400 Collins Rd., N.E.<br>Cedar Rapids, IA 52498                          | 16339 | Photo Chemical Products of<br>California, Inc.<br>18031 Susana Rd.<br>Rancho Dominguez, CA 90221                  |
| 13556 | TRW Cylindrical Connector<br>Division of TRW, Inc.<br>8821 Science Center Drive<br>Minneapolis, MN 55428                             | 16733 | Cablewave Systems, Inc.<br>60 Dodge Ave.<br>North Haven, CT 06473   |
| 13664 | Workman Electronic Products, Inc.<br>75 Packinghouse Rd.<br>P.O. Box 3828<br>Sarasota, FL 33578                                      | 17856 | Siliconix, Inc.<br>2201 Laurelwood Rd.<br>Santa Clara, CA 95054   |
| 13848 | Johnson EF Co.<br>Comco/Communications Co. Division<br>7811 Coral Way, Suite 106<br>Miami, FL 33155                                  | 18324 | Signetics Corp.<br>Military Products Division<br>4130 S. Market Court<br>Sacramento, CA 95834                     |
| 14482 | Watkins-Johnson Co.<br>3333 Hillview Ave.<br>Palo Alto, CA 94304   | 18677 | Scanbe Mfg. Co.<br>Division of Zero Corp.<br>3445 Fletcher Ave.<br>El Monte, CA 91731                             |
| 14655 | Cornell-Dubilier Electronics<br>Division of Federal Pacific Electric Co.<br>Gov't. Contracts Dept.<br>150 Ave. L<br>Newark, NJ 07101 | 19505 | Applied Engineering Products<br>1475 Whalley Ave.<br>P.O. Box A-D<br>New Haven, CT 06525                          |
| 15542 | Mini-Circuits Laboratory<br>Division of Scientific Components Corp.<br>2625 E. 14th St.<br>Brooklyn, NY 11235                        | 19647 | Caddock Electronics, Inc.<br>1717 Chicago Ave.<br>Riverside, CA 92507   |
| 15819 | Sinclair & Rush, Inc.<br>6916 S. Broadway<br>St. Louis, MO 63111   | 20932 | Illinois Tool Works, Inc.<br>Emcon Division<br>11620 Sorrento Valley Rd.<br>P.O. Box 81542<br>San Diego, CA 92121 |
| 15912 | T and B/Ansley Corp.<br>Sub. of Thomas and Betts Corp.<br>4371 Valley Blvd.<br>Los Angeles, CA 90031                                 | 21604 | Buckeye Stamping Co.<br>555 Marion Rd.<br>Columbus, OH 43207  |
| 16237 | Connector Corp.<br>6025 N. Keystone Ave.<br>Chicago, IL 60646  | 21847 | TRW Microwave, Inc.<br>Sub. of TRW, Inc.<br>825 Stewart Dr.<br>Sunnyvale, CA 94086                                |
| 16299 | Corning Glass Works<br>3900 Electronics Drive<br>Raleigh, NC 27604   | 23042 | Texscan Instruments<br>Division of Texscan Corp.<br>3169 N. Shadeland Ave.<br>Indianapolis, IN 46226              |
|       |  | 23880 | Stanford Applied Engineering, Inc.<br>340 Martin Ave.<br>Santa Clara, CA 95050                                    |



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- |       |  |       |  |
|-------|--|-------|--|
| 23936 | Pamotor Division<br>William J. Purdy Co.<br>770 Airport Blvd.<br>Burlingame, CA 94010                                  | 32039 | Zeus Industrial Products, Inc.<br>Ft. Thompsom St.<br>P.O. Box 298<br>Raritan, NJ 08869                  |
| 24444 | General Semiconductor Industries, Inc.<br>Sub. of Square D Co.<br>2001 W. 10th Pl.<br>P.O. Box 3078<br>Tempe, AZ 85281 | 32252 | Olektron Corp.<br>61 Sutton Rd.<br>Webster, MA 01570   |
| 24539 | Avantek, Inc.<br>3175 Bowers Ave.<br>Santa Clara, CA 95051   | 32293 | Intersil, Inc.<br>Sub. of General Electric Co.<br>10710 N. Tantau Ave.<br>Cupertino, CA 95014            |
| 25146 | Wichita Wire Products Co., Inc.<br>630 Pennsylvania<br>P.O. Box 670<br>Wichita, KS 67201                               | 32694 | TRW Optoelectronics<br>Sub. of TRW, Inc.<br>1225 Tappan Circle<br>Carrollton, TX 75006                   |
| 25706 | Daburn Electronics and Cable Corp.<br>70 Oak St.<br>Norwood, NJ 07648  | 33005 | Jewell Electronic Instruments<br>Grenier Field<br>P.O. Box 4038<br>Manchester, NH 03108                  |
| 26806 | American Zettler, Inc.<br>16881 Hale Ave.<br>Irvine, CA 92714  | 33095 | Spectrum Control, Inc.<br>2185 W. Eighth St.<br>Erie, PA 16505   |
| 27014 | National Semiconductor Corp.<br>2900 Semiconductor Dr.<br>Santa Clara, CA 95051  | 33096 | Colorado Crystal Corp.<br>2303 W. 8th St.<br>Loveland, CO 80537  |
| 27264 | Molex, Inc.<br>2222 Wellington Court<br>Lisle, IL 60532  | 33297 | NEC Electronics USA, Inc.<br>Electronic Arrays Div.<br>550 E. Middlefield Rd.<br>Mountain View, CA 94043 |
| 27735 | F-Dyne Electronics<br>449 Howard Ave.<br>Bridgeport, CT 06605  | 33497 | Precision Winding, Inc.<br>109 S. Knight St.<br>Wichita, KS 67213  |
| 29454 | Johanson Dielectrics, Inc.<br>2210 Screenland Dr.<br>P.O. Box 6465<br>Burbank, CA 91505                                | 34335 | Advanced Micro Devices<br>901 Thompson Pl.<br>Sunnyvale, CA 94086  |
| 29990 | American Technical Ceramics (AMT)<br>One Norden Lane<br>Huntington Station, NY 11746                                   | 34639 | Intel Corp.<br>3065 Bowers Corp.<br>Santa Clara, CA 95051  |
| 31223 | Micro Plastics, Inc.<br>20821 Dearborn St.<br>Chatsworth, CA 91311   | 34848 | Hartwell Special Products<br>950 S. Ritchfield Rd.<br>Placentia, CA 92670                                |
| 31433 | Union Carbide Corp.<br>Electronics Division<br>Hwy. 276, S.E.<br>P.O. Box 5928<br>Greenville, SC 29606                 | 36665 | Mitel Corp.<br>350 Leggett Dr.<br>P.O. Box 13089<br>Kanata, Ontario CANADA K2K1X3                        |



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- |       |  |       |   |
|-------|--|-------|---|
| 44655 | Ohmite Mfg. Co.<br>3601 W. Howard St.<br>Skokie, IL 60076  | 54236 | Ann Arbor Terminals, Inc.<br>6175 Jackson Rd.<br>Ann Arbor, MI 48103  |
| 50101 | Frequency Sources, Inc.<br>GHZ Division, Sub. of Loral Corp.<br>16 Maple Rd.<br>South Chelmsford, MA 01824 | 54453 | Sullins Electronics Corp.<br>801 E. Mission Rd.<br>P.O. Box 757<br>San Marcos, CA 92069                       |
| 50157 | Midwest Components, Inc.<br>1981 Port City Blvd.<br>P.O. Box 787<br>Muskegon, MI 49443                     | 54893 | Hewlett-Packard Co.<br>Microwave Semiconductor Division<br>350 W. Trimble Rd.<br>San Jose, CA 95131           |
| 51167 | Aries Electronics, Inc.<br>62 Trenton Ave.<br>P.O. Box 130<br>Frenchtown, NJ 08825                         | 54962 | K-W Mfg. Co.<br>919 Eighth St.<br>Prague, OK 74864  |
| 51190 | IFR, Inc.<br>Sub. of Regency Electronics<br>10200 W. York<br>Wichita, KS 67215                             | 54987 | Eaton Corp.<br>Microwave Product Division<br>Semiconductor Devices<br>935 Benicia Ave.<br>Sunnyvale, CA 94086 |
| 51640 | Analog Devices, Inc.<br>Microelectronics Division<br>829 Woburn St.<br>Wilmington, MA 01887                | 54988 | Addington Laboratories, Inc.<br>Cable and Connector Division<br>680 W. Maude Ave.                             |
| 51705 | IC0/Rally<br>2575 E. Bayshore Rd.<br>P.O. Box 10104<br>Palo Alto, CA 94303                                 | 55322 | Samtec, Inc.<br>810 Progress Blvd.<br>P.O. Box 1147<br>New Albany, IN 47150                                   |
| 52318 | Rubicon Co.<br>Philadelphia, PA  | 55442 | Opto 22<br>15461 Springdale St.<br>Huntington Beach, CA 92649   |
| 52648 | Plessey Semiconductors<br>1641 Kaiser Ave.<br>Irvine, CA 92714   | 55647 | Centurion Industries, Inc.<br>329 Lynnway<br>Lynn, MA 01901   |
| 52769 | Sprague-Goodman Electronics, Inc.<br>134 Fulton Ave.<br>Garden City Park, NY 11040                         | 55936 | Industrial Bearing Sales, Inc.<br>52 9th St.<br>Oakland, CA 94607   |
| 52865 | Fastener Sales Co.<br>3228 Collinsworth<br>Forth Worth, TX 76107   | 56187 | Sokol Crystal Products<br>121 Water St.<br>P.O. Box 249<br>Mineral Point, WI 53565                            |
| 53217 | Technical Wire Products, Inc.<br>DBA Tecknit, Inc.<br>320 N. Nopal St.<br>Santa Barbara, CA 93103          | 56216 | KW Engineering, Inc.<br>4565 Ruffner St.<br>San Diego, CA 92111   |
| 53421 | Tyton Corp.<br>7930 N. Faulkner Rd.<br>P.O. Box 23055<br>Milwaukee, WI 53223                               | 56402 | Standex Electronics<br>Paul Smith Co., Div. of Standex<br>4538 Camberwell Rd.<br>Cincinnati, OH 45209         |



## MANUFACTURER IDENTIFICATION

- |       |  |       |   |
|-------|--|-------|---|
| 56623 | Babcock Electro-Mechanical, Inc.<br>3535 Harbor Blvd.<br>Costa Mesa, CA 92626  | 61593 | Texscan MSI Corp.<br>Div. of Texscan Corp.<br>3855 South 500 W., Suite S<br>Salt Lake City, UT 84115  |
| 56708 | Zilog, Inc.<br>1315 Dell Ave.<br>Campbell, CA 95008  | 61637 | Union Carbide Corp.<br>Old Ridgebury Rd.<br>Danbury, CT 06817   |
| 56777 | SGS Tool Co.<br>54 S. Main St.<br>Monroe Falls, OH 44262   | 62462 | Capar Components Corp.<br>25 Dubon Court<br>Farmingdale, NY 11735   |
| 57137 | Trim-Lok, Inc.<br>7220 E. Compton Blvd.<br>Paramount, CA 90723   | 63974 | Sylvania Lighting Equipment<br>Division of GTE Products Corp.<br>21 Penn St.<br>Fall River, MA 02724  |
| 57771 | Stimpson Co., Inc.<br>900 Sylvan Ave.<br>Bayport, NY 11705   | 64541 | Centurion International<br>P.O. Box 82846<br>Lincoln, NE 68501  |
| 57924 | Bourns, Inc.<br>Networks Division<br>12155 Magnolia Avenue<br>Riverside, CA 92503  | 64950 | Silicon Systems, Inc.<br>14351 Myford Rd.<br>Tustin, CA 92680   |
| 58135 | Acrian, Inc.<br>10131 Bubbb Rd.<br>Cupertino, CA 95014   | 71279 | Midland-Ross Corp.<br>Cambion Division<br>One Alewife Place<br>Cambridge, MA 02140  |
| 58999 | Sierracin/Power Systems<br>20500 Plummer St.<br>Chatsworth, CA 91311   | 71400 | Bussmann<br>Division of McGraw-Edison Co.<br>114 Old State Rd.<br>P.O. Box 14460<br>St. Louis, MO 63178   |
| 59277 | Magnum Microwave Corp.<br>1080 E. Duane Ave., Suite D<br>Sunnyvale, CA 94086   | 71468 | ITT Cannon<br>Electric Division of International<br>Telephone and Telegraph Corp.<br>10550 Talbert Ave.<br>P.O. Box 8040<br>Fountain Valley, CA 92708 |
| 59492 | K & L Quartztek<br>Div. of K & L Microwave, Inc.<br>Subsidiary of Dover Corp.<br>20th South 48th Avenue<br>Phoenix, AZ 85043 | 71643 | CHR Industries, Inc.<br>An Armco Co.<br>407 East St.<br>New Haven, CT 06509   |
| 59993 | International Rectifier<br>Semiconductor Division<br>233 Kansas St.<br>El Segundo, CA 90245                                  | 71950 | Centralab, Inc.<br>North American Phillips Co.<br>Hwy. 20, West<br>P.O. Box 858<br>Fort Dodge, IA 50501   |
| 60583 | Narda Microwave Corp.<br>Western Operations, Sacramento Facility<br>11101 Trade Center Dr.<br>Rancho Cordova, CA 95670       |       |   |
| 61271 | Fukitsu Microelectronics, Inc.<br>2985 Kifer Rd.<br>Santa Clara, CA 95051  |       |   |



## MANUFACTURER IDENTIFICATION

- |       |  |       |  |
|-------|--|-------|--|
| 72982 | Murata Erie North America, Inc.<br>Erie Operations<br>645 W. 11th St.<br>Erie, PA 16512  | 90201 | Mallory Capacitor Co.<br>Sub. of Emhart Industries, Inc.<br>4760 Kentucky Ave.<br>P.O. Box 372<br>Indianapolis, IN 46206 |
| 75037 | Minnesota Mining and Mfg. Co.<br>Electro Products Division<br>3M Center<br>St. Paul, MN 55101                                      | 91506 | Augat, Inc.<br>33 Perry Avenue<br>P.O. Box 799<br>Attleboro, MA 02703  |
| 76385 | Minor Rubber Co., Inc.<br>49 Ackerman St.<br>Bloomfield, NJ 07003  | 92194 | Alpha Wire Corp.<br>711 Lidgerwood Avenue<br>Elizabeth, NJ 07207   |
| 77542 | Ray-O-Vac Corp.<br>101 E. Washington Ave.<br>Madison, WI 53703   | 92219 | Waldom Electronics, Inc.<br>4301 W. 69th St.<br>Chicago, IL 60629  |
| 79963 | Zierick Mfg. Co.<br>Radio Circle Mt.<br>Kisco, NY 10549  | 93459 | Weinschel Engineering Co.<br>1 Weinschel Lane<br>Gaithersburg, MD 20877  |
| 81073 | Grayhill, Inc.<br>561 Millgrove Ave.<br>P.O. Box 10373<br>La Grange, IL 60525  | 94696 | Magnecraft Electric Co.<br>5575 N. Lynch Ave.<br>Chicago, IL 60630   |
| 81349 | Military Specifications<br>Promulgated by Military Dept./Agencies<br>Under Authority of Defense<br>Standardization Manual 4120 3-M | 95086 | Technitrol, Inc.<br>Transformer Division<br>1952 E. Allegheny Ave.<br>Philadelphia, PA 19134                             |
| 82104 | Standard Gribbsby, Inc.<br>920 Rathbone Ave.<br>Aurora, IL 60507   | 96341 | Microwave Associates, Inc.<br>Sub. of M/A-COM, Inc.<br>Northwest Industrial Park South Ave.<br>Burlington, MA 01803      |
| 82389 | Switchcraft, Inc.<br>Sub. of Raytheon Co.<br>5555 N. Elstron Avenue<br>Chicao, IL 60630  | 97525 | EECO, Inc.<br>1601 E. Chestnut Ave.<br>Santa Ana, CA 92701   |
| 83330 | Kulka Smith, Inc.<br>A North American Phillips Co.<br>1913 Atlantic Avenue<br>Manasquan, NJ 08736                                  | 98291 | Sealectro Corp.<br>225 Hoyt<br>Mamaroneck, NY 10544  |
| 86928 | Seastrom Mfg. Co., Inc.<br>701 Sonora Ave.<br>Glendale, CA 91201   | 98668 | Bunker Ramo-Eltra Corp.<br>Amphenol Division<br>2315 S. Queen St.<br>York, PA 17401                                      |
| 88245 | Winchester Electronics Litton Systems<br>Useco Division<br>13536 Saticoy St.<br>Van Nuys, CA 91409                                 | 99800 | American Precision Industries, Inc.<br>Delevan Division<br>270 Quaker Rd.<br>East Aurora, NY 14052                       |



## LIST OF ABBREVIATIONS

The following is a list of abbreviations and symbols commonly used throughout this parts catalog:

A	- Ampere	FLTPK	- Flat Pack
A-D/D-A	- Analog to Digital/Digital to Analog	FREQ	- Frequency
A/H	- Ampere Hour	FRT	- Front
A/R	- As Required	GA	- Gauge
ADJ	- Adjust	GND	- Ground
AL	- Aluminum	GPIB	- General Purpose Interface Bus
AMP	- Amplifier	HH	- Hex Head
ASSY	- Assembly	HS	- Heat Shrink
ATTEN	- Attenuator	HY	- Circulator
AUX	- Auxiliary	I/O	- Input/Output
BCD	- Binary Coded Decimal	IC	- Integrated Circuit
BD	- Board	ID	- Inside Diameter
BFR	- Buffer	IF	- Intermediate Frequency
BM-G	- Type B, Medium Grade	INCL	- Includes
BR	- Brass	INT	- Internal or Interface
C	- Center	INTF	- Interface
CAP	- Capacitor	K	- Kiloohm
CER	- Ceramic	kHz	- Kilohertz
CH	- Channel	KV	- Kilovolt
CIRC	- Circular	KW	- Kilowatt
CLR	- Clear	LG, L	- Long
COL	- Column	LOG	- Logarithmic
COM	- Compression	LWR	- Lower
COMM	- Communication	M	- Megohms
COND	- Conductor	M/S	- Master/Slave
CONN	- Connector	MF	- Metalized Foil
CONT	- Control	MHZ	- Megahertz
CP	- Coupler	MIC	- Microphone
CPRSN	- Compression	MON	- Monitor
CPU	- Central Processing Unit	MPC	- Metalized Polycarbonate
CRT	- Cathode Ray Tube	MPLXR	- Multiplexer
D	- Diameter	MTG	- Mounting
D/A	- Digital/Analog	MULTI	- Multiplier
dB	- Decibel	MYL	- Mylar
DCCR	- Decoder	NAT	- Natural
DEC	- Decade	NHA	- Next Higher Assembly
DEMOD	- Demodulated	NO	- Number
DET	- Detector	NP	- Non-procurable
DMPLXR	- Demultiplexer	NYL	- Nylon
DPDT	- Double Pole Double Throw	OD	- Outside Diameter
DPST	- Double Pole Single Throw	OSC	- Oscillator
DRVR	- Driver	P	- Pin
DVM	- Digital Voltmeter	PC	- Polycarbonate
ELECT	- Electrolytic	PC Bd	- Printed Circuit Board
ENCL	- Enclosure	pF	- Picofarad
FIG	- Figure		
FLEX	- Flexible		



## LIST OF ABBREVIATIONS

PFHM	- Phillips Flat Head Machine (Screw)	VAR	- Variable
PHEN	- Phenolic	VCO	- Voltage Controlled Oscillator
PNL	- Panel	VDC	- Volts Direct Current
POS	- Position	VOLT REG	- Voltage Regulator
POT	- Potentiometer (Variable Resistor)	XCVR	- Transceiver
PPHM	- Phillips Pan Head Machine (Screw)	XFMR	- Transformer
PRF	- Pulse Repetition Frequency	XMTR	- Transmitter
PRGM	- Program	XTAL	- Crystal
PWR	- Power	$\mu$ F	- Microfarad
QTY	- Quantity	$\mu$ H	- Microhenry
R/A	- Right Angle		
RCVR	- Receiver		
REC	- Receive		
RECT	- Rectifier		
REF	- Reference		
REF DES	- Reference Designator		
REG	- Regulator		
RES	- Resistor		
RF	- Radio Frequency		
RTNR	- Retainer		
S	- Strand		
S BAR	- Schottky Barrier		
S/A	- Spectrum Analyzer		
SFHM	- Socket Flat Head Machine (Screw)		
SHC	- Socket Head Cap (Screw)		
SHS	- Socket Head Set (Screw)		
SIG	- Signal		
SM	- Silver Mica		
SN	- Serial Number		
SP	- Speaker		
SPDT	- Single Pole Double Throw		
SPST	- Single Pole Single Throw		
SQ	- Square		
SSB	- Single Side Band		
STR	- Straight		
SW	- Switch		
SWD	- Switched		
SYNC	- Synchronized		
T	- Turn		
TANT	- Tantalum		
TERMN	- Termination		
TFL, TFE	- Teflon		
THK, TH	- Thick		
TRANS	- Transistor		
TW	- Thumbwheel		
U/D	- Up/Down		
UNIV	- Universal		
UNK	- Unknown		
UPR	- Upper		
V	- Volt		
VAC	- Volts Alternating Current		

## WIRE COLOR ABBREVIATIONS

BLK	- Black
BRN	- Brown
RED	- Red
ORN	- Orange
YEL	- Yellow
GRN	- Green
BLU	- Blue
VIO	- Violet
GRY	- Gray
WHT	- White



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**PARTS LISTING**





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
1-			BULK ITEMS LISTING										
1		1050-0000-070								WIRE, BUS 16 GA (295)	92194		REF
2		1050-0000-073								WIRE, BUS 22 GA (298)	92194		A/R
3		1050-0000-074								WIRE, BUS 24 GA (299)	92194		A/R
4		1050-0000-075								WIRE, BUS 26 GA (299/1)	92194		A/R
5		1050-0000-114								LACING CORD, NYLON #3 (LTN-2, SIZE 3, TYPE 1)	51705		A/R
6		1050-0000-170								TAPE, FOAM 3/4" (4432)	75037		A/R
7		1050-5003-100								TAPE, FOAM 3/4" (4516)	75037		A/R
8		1051-5201-025								TAPE, MYLAR 1/4" (M54)	71643		A/R
9		2400-0000-002								TRIM, BLK (62-3/32-B-7)	57137		A/R
10		6001-0000-001								WIRE (TFE, 18 GA, 7S, BLK)	12515		A/R
11		6001-0000-002								WIRE (TFE, 18 GA, 7S, BRN)	12515		A/R
12		6001-0000-003								WIRE (TFE, 18 GA, 7S, RED)	12515		A/R
13		6001-0000-004								WIRE (TFE, 18 GA, 7S, ORN)	12515		A/R
14		6001-0000-005								WIRE (TFE, 18 GA, 7S, YEL)	12515		A/R
15		6001-0000-008								WIRE (TFE, 18 GA, 7S, VIO)	12515		A/R
16		6001-5000-001								WIRE (TFE, 20 GA, 7S, BLK)	12515		A/R
17		6001-5000-003								WIRE (TFE, 20 GA, 7S, RED)	12515		A/R
18		6001-5000-004								WIRE (TFE, 20 GA, 7S, ORN)	12515		A/R
19		6001-5000-006								WIRE (TFE, 20 GA, 7S, GRN)	12515		A/R
20		6001-5000-007								WIRE (TFE, 20 GA, 7S, BLU)	12515		A/R
21		6001-5000-008								WIRE (TFE, 20 GA, 7S, VIO)	12515		A/R
22		6002-0000-001								WIRE (TFE, 22 GA, 7S, BLK)	12515		A/R
23		6002-0000-002								WIRE (TFE, 22 GA, 7S, BRN)	12515		A/R
24		6002-0000-003								WIRE (TFE, 22 GA, 7S, RED)	12515		A/R
25		6002-0000-004								WIRE (TFE, 22 GA, 7S, ORN)	12515		A/R
26		6002-0000-005								WIRE (TFE, 22 GA, 7S, YEL)	12515		A/R
27		6002-0000-006								WIRE (TFE, 22 GA, 7S, GRN)	12515		A/R
28		6002-0000-007								WIRE (TFE, 22 GA, 7S, BLU)	12515		A/R
29		6002-0000-009								WIRE (TFE, 22 GA, 7S, GRY)	12515		A/R
30		6002-0000-010								WIRE (TFE, 22 GA, 7S, WHT)	12515		A/R
31		6002-0000-013								WIRE (TFE, 22 GA, 7S, WHT/RED)	12515		A/R
32		6002-0000-014								WIRE (TFE, 22 GA, 7S, WHT/ORN)	12515		A/R
33		6003-0000-001								WIRE (TFE, 26 GA, 7S, BLK)	12515		A/R
34		6003-0000-002								WIRE (TFE, 26 GA, 7S, BRN)	12515		A/R
35		6003-0000-003								WIRE (TFE, 26 GA, 7S, RED)	12515		A/R
36		6003-0000-004								WIRE (TFE, 26 GA, 7S, ORN)	12515		A/R
37		6003-0000-005								WIRE (TFE, 26 GA, 7S, YEL)	12515		A/R
38		6003-0000-006								WIRE (TFE, 26 GA, 7S, GRN)	12515		A/R
39		6003-0000-007								WIRE (TFE, 26 GA, 7S, BLU)	12515		A/R
40		6003-0000-008								WIRE (TFE, 26 GA, 7S, VIO)	12515		A/R
41		6003-0000-009								WIRE (TFE, 26 GA, 7S, GRY)	12515		A/R
42		6003-0000-010								WIRE (TFE, 26 GA, 7S, WHT)	12515		A/R
43		6003-0000-011								WIRE (TFE, 26 GA, 7S, WHT/BLK)	12515		A/R
44		6003-0000-012								WIRE (TFE, 26 GA, 7S, WHT/BRN)	12515		A/R
45		6003-0000-013								WIRE (TFE, 26 GA, 7S, WHT/RED)	12515		A/R
46		6003-0000-014								WIRE (TFE, 26 GA, 7S, WHT/ORN)	12515		A/R
47		6003-0000-016								WIRE (TFE, 26 GA, 7S, WHT/GRN)	12515		A/R
48		6003-0000-017								WIRE (TFE, 26 GA, 7S, WHT/BLU)	12515		A/R
49		6003-0000-018								WIRE (TFE, 26 GA, 7S, WHT/VIO)	12515		A/R
50		6003-0000-019								WIRE (TFE, 26 GA, 7S, WHT/GRY)	12515		A/R
51		6004-6005-400								TY-RAP 4" (T18R)	53421		A/R
52		6004-6005-550								TY-RAP 5.5" (T18I)	53421		A/R
53		6009-0001-000								FLEXSTRIP 18 COND (FSN-21A-180)	15912		A/R
54		6009-0212-010								FLEXSTRIP 12 COND (FSN-21A-12)	15912		A/R

CONTINUED ON NEXT PAGE



# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
1- 55		6010-0125-100								TUBING, HS (FIT 221-1/8 CLR)	92194		A/R
56		6010-0125-200								TUBING, HS (FIT 221-1/8 BLK)	92194		A/R
57		6010-0094-200								TUBING, HS (FIT 221-3/32 BLK)	92194		A/R
58		6010-0188-200								TUBING, HS (FIT 221-3/16 BLK)	92194		A/R
59		6011-0018-001								TUBING, TFL (#26 TFE-TW-NAT)	32039		A/R
60		6011-0022-001								TUBING, TFL (#24 TFE-TW-NAT)	32039		A/R
61		6011-0027-001								TUBING, TFL (#22 TFE-TW-NAT)	32039		A/R
62		6011-0053-001								TUBING, TFL (#16 TFE-TW-NAT)	32039		A/R
63		6012-0106-100								TUBING, PVC 10 GA, CLR (PVC 105-10)	32039		A/R
64		6012-0313-110								TUBING, PVC 5/16 CLR, (PVC 105-5/16 CLR)	32039		A/R
65		8060-0000-151								ROD, NYLON (1/8" RD NYLON BAR)	UNK026		A/R

NOTE: THIS LISTING IS COMPILED TO PROVIDE PART NUMBERS OF COMMONLY USED BULK ITEMS. THIS FIGURE IS NOT ILLUSTRATED. ITEM NUMBERS ARE PROVIDED FOR LOCATION OF LINE ON WHICH THE PART NUMBER APPEARS.



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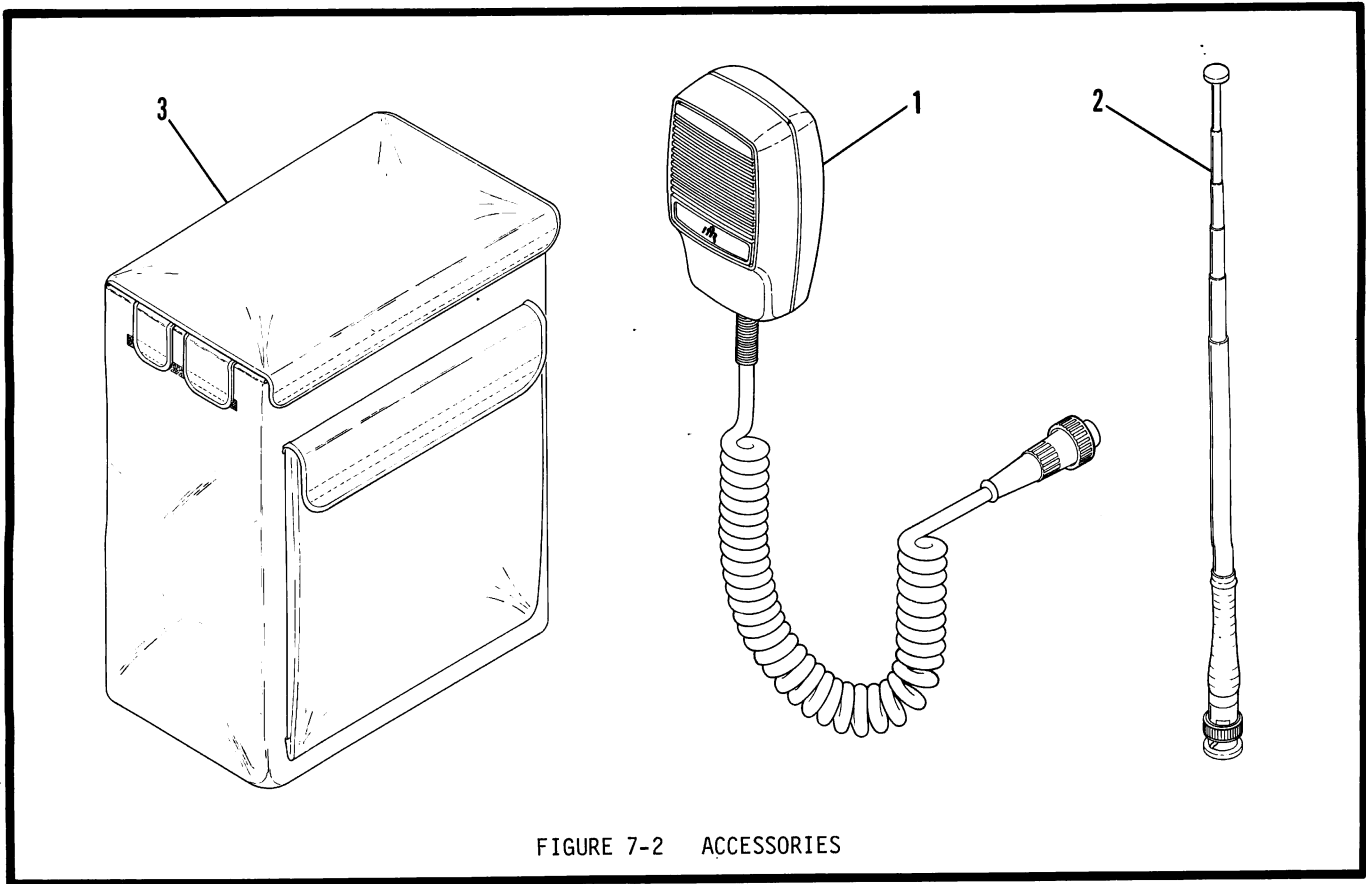


FIGURE 7-2 ACCESSORIES

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
2-			ACCESSORIES										REF
1		1205-0100-101								MICROPHONE (OPTION -06) (1205-0100-100)	UNK024		1
2		1201-0909-900								ANTENNA, TELESCOPIC (OPTION -07) (09-0099)	55647		1
		SEE FIG 3								GENERATE AMP ASSEMBLY (OPTION -05)			1
3		1412-0005-002								CARRYING CASE, NYLON (OPTION -09)			1



# ILLUSTRATED PARTS CATALOG

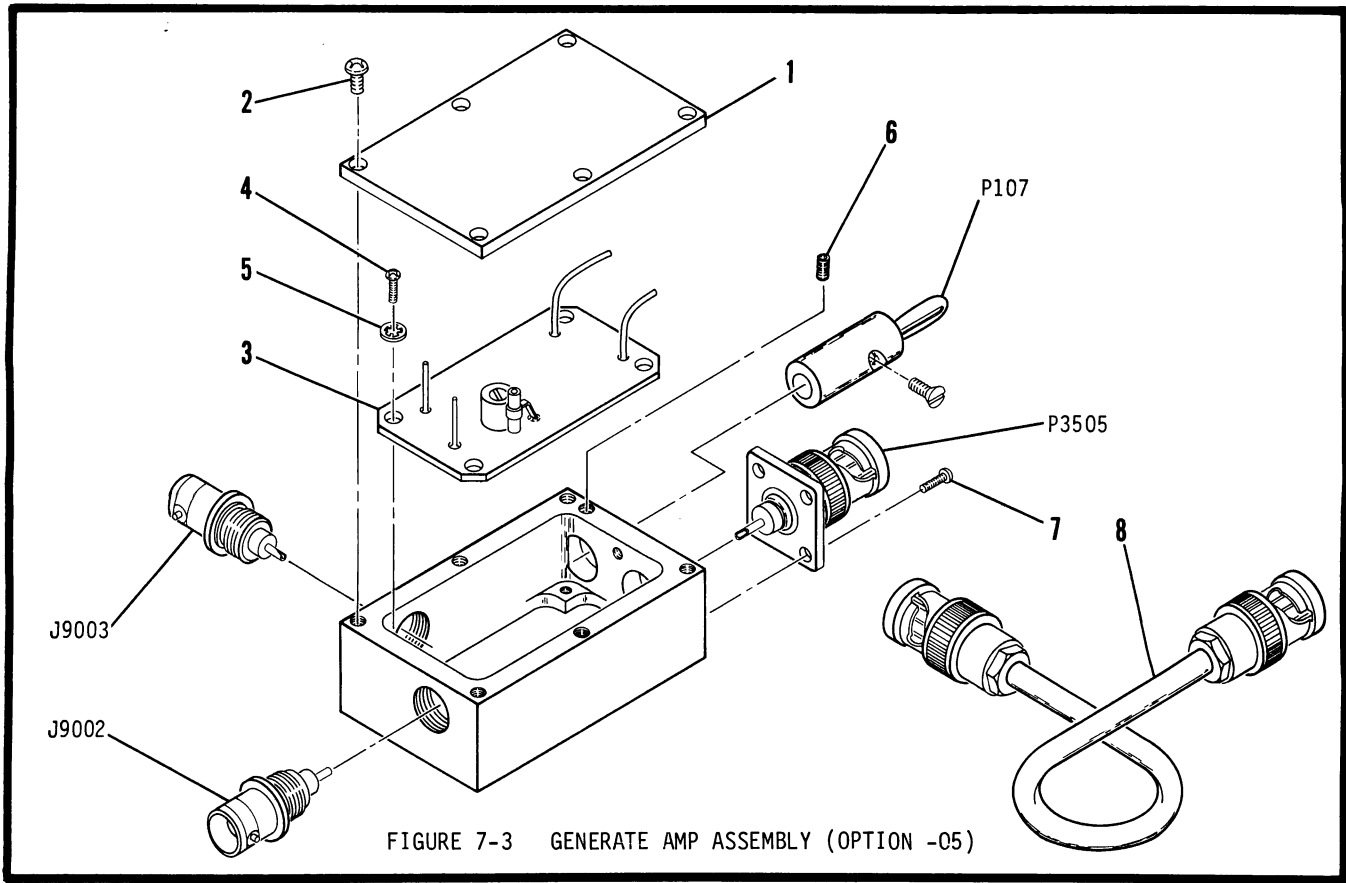


FIGURE 7-3 GENERATE AMP ASSEMBLY (OPTION -05)

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
3-		7005-5249-000		GENERATE AMP ASSEMBLY (OPTION -05) SEE			REF
				FIG 13 FOR NHA			
1		1414-5255-100		COVER			1
				ATTACHING PARTS			
2		2803-0188-012		SCREW (4-40 X 3/16 PPHM)	UNK015		6
				---*---			
3		SEE FIG 4		GENERATE AMP PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
4		2801-0250-006		SCREW (2-56 X 1/4 PPHM)	UNK015		4
5		2840-0000-004		WASHER, LOCK (#2 INT TOOTH LOCKWASH)	UNK015		4
				---*---			
	J9002	2113-0000-020		CONNECTOR, BNC (UG1094/U)	98668		1
	J9003	2113-0000-020		CONNECTOR, BNC (UG1094/U)	98668		1
	P107	2161-1755-012		CONNECTOR, BANANA JACK RED (204-102)	83330		1
				ATTACHING PARTS			
6		2803-0125-001		SCREW (4-40 X 1/8 SHS)	UNK015		1
				---*---			
	P3505	2113-0000-019		CONNECTOR, BNC (UG1104A/U)	98668		1
				ATTACHING PARTS			
7		2801-0250-006		SCREW (2-56 X 1/4 PPHM)	UNK015		4
				---*---			
8		6052-0701-200		CABLE ASSY, COAX			1
		SEE FIG 1		WIRE, BUS 22 GA			A/R
		SEE FIG 1		TUBING, TFL 22 GA, NAT			A/R

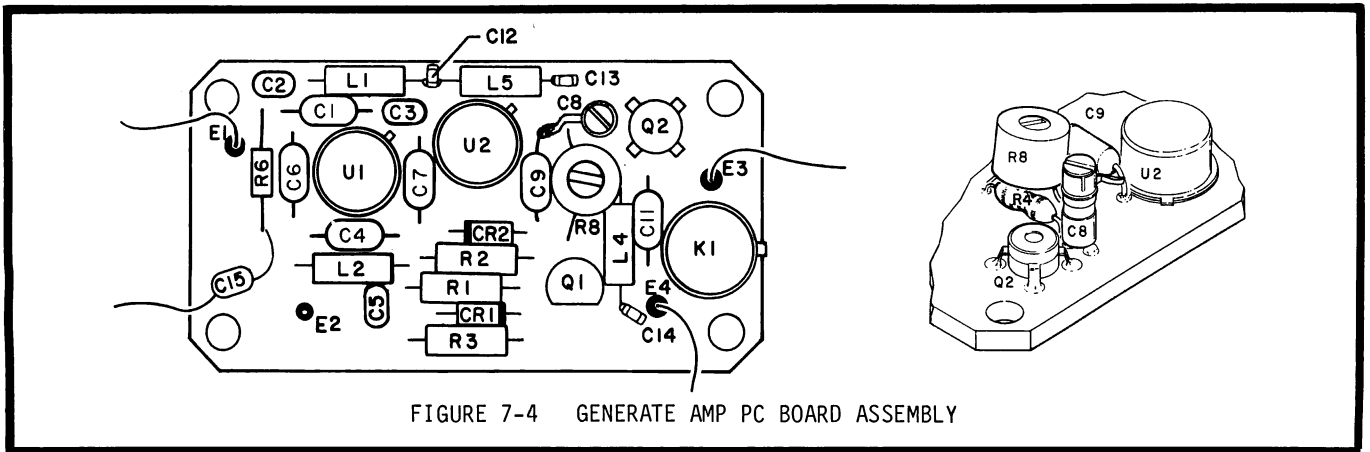


FIGURE 7-4 GENERATE AMP PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
4-		7010-5239-000	GENERATE AMP PC BOARD ASSEMBLY							SEE			REF
			FIG 3 FOR NHA										
		C9001	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9002	CAPACITOR							100 pF, 200 V (C320C101J2G5CA)	61637		1
		C9003	CAPACITOR							100 pF, 200 V (C320C101J2G5CA)	61637		1
		C9004	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9005	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637		1
		C9006	CAPACITOR							100 pF, 200 V (C320C101J2G5CA)	61637		1
		C9007	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9008	CAPACITOR, VAR							.6 - 4.5 pF, 500 V (27273)	29454		1
		C9009	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9010	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9011	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
		C9012	CAPACITOR							47 pF, 50 V (CC0805COG470K100VPB)	16299		1
		C9013	CAPACITOR							47 pF, 50 V (CC0805COG470K100VPB)	16299		1
		C9014	CAPACITOR							47 pF, 50 V (CC0805COG470K100VPB)	16299		1
		C9015	CAPACITOR							1.5 pF, 200 V (C312C159D2G5CA)	61637		1
		CR9001	DIODE, SIGNAL							(JAN1N4148)	81349		1
		CR9002	DIODE, SIGNAL							(JAN1N4148)	81349		1
		K9001	RELAY, DPDT							12 VDC, 1 A (CSW12)	02289		1
		L9001	INDUCTOR							10 $\mu$ H, 3.7 OHM (1025-44)	99800		1
		L9002	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
		L9004	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
		L9005	INDUCTOR							10 $\mu$ H, 3.7 OHM (1025-44)	99800		1
		Q9001	TRANSISTOR							(JAN2N2907A)	81349		1
		Q9002	TRANSISTOR							(SRF3114)	04713		1
		R9001	RESISTOR							5%, 1/4 W, 270 OHM (RLR07C271JR)	81349		1
		R9002	RESISTOR							5%, 1/4 W, 22 OHM (RLR07C220JR)	81349		1
		R9003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
		R9004	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
		R9006	RESISTOR							5%, 1/8 W, 330 OHM (RLR05C331JR)	81349		1
		R9008	RESISTOR, VAR							5 K (62-1-1-502)	02111		1
		U9001	IC, CASCADE AMP							(GPD1061)	24539		1
		U9002	IC, CASCADE AMP							(GPD1062)	24539		1
			WIRE, BUS							22 GA			A/R

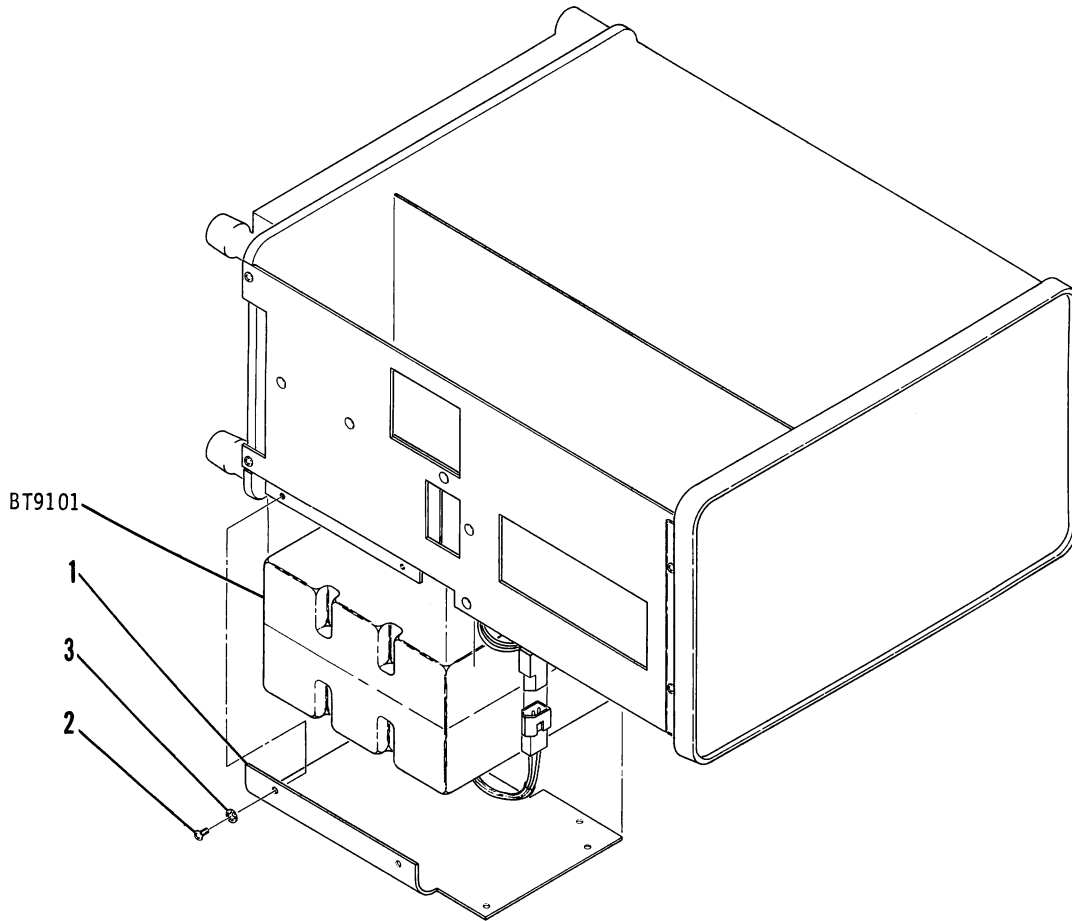


FIGURE 7-5 BATTERY ASSEMBLY (OPTION -04)

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
5-	BT9101	7005-7624-500		BATTERY ASSEMBLY (OPTION -04)			REF
1		SEE FIG 13		COVER, BATTERY			1
2		SEE FIG 13		ATTACHING PARTS			
				SCREW (4-40 X 1/4 PPHM)	UNK015		6
3		SEE FIG 13		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		6
				-----*			



# ILLUSTRATED PARTS CATALOG

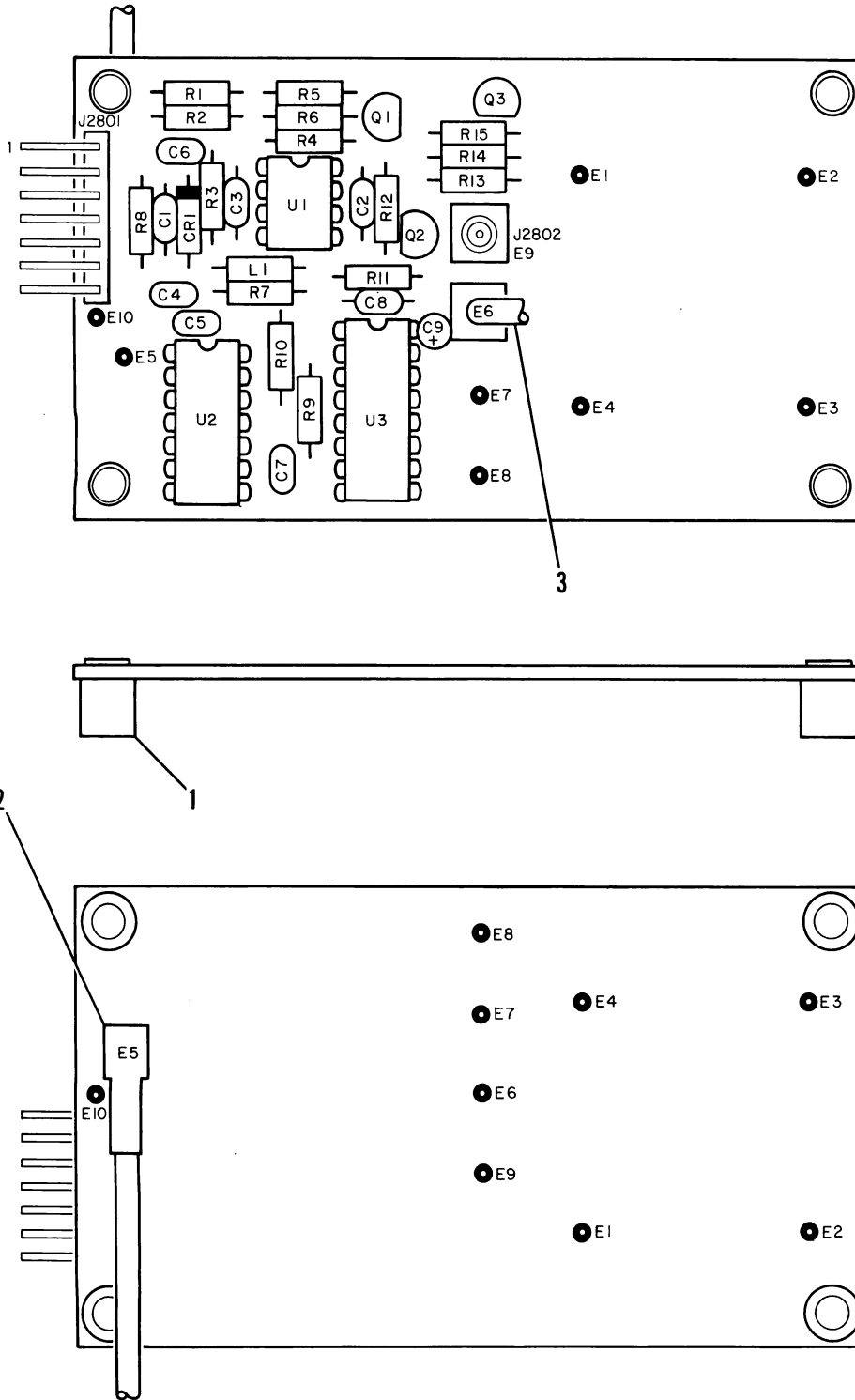


FIGURE 7-6 FREQUENCY STANDARD PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
6-		7010-5131-700*	FREQUENCY STANDARD PC BOARD ASSEMBLY							SEE					
			FIG 7, 8 AND 9 FOR NHA												
1		2800-0003-110	SPACER							4-40 (BR6911-B-0.250-31)	05791			4	
2		6050-0890-950	CABLE ASSY, COAX							FLEX				1	
3		6050-0721-350	CABLE ASSY, COAX							FLEX				1	
	J2801	2115-1002-007	CONNECTOR, WAFER (22-05-2071)								27264			1	
	J2802	2200-2010-400	CONNECTOR, SMB (2009-7511-000)								19505			1	
	C2801	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982			1	
	C2802	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982			1	
	C2803	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982			1	
	C2804	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637			1	
	C2805	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)	61637			1	
	C2806	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637			1	
	C2807	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)	61637			1	
	C2808	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982			1	
	C2809	1508-0336-023	CAPACITOR							33 $\mu$ F, 10 V (T350F336K010AS)	31433			1	
	CR2801	4816-0000-001	DIODE, S-BAR (5082-2800)								54893			1	
	L2801	1801-0022-001	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800			1	
	Q2801	4805-0000-001	TRANSISTOR (JAN2N2907A)								81349			1	
	Q2802	4805-0000-001	TRANSISTOR (JAN2N2907A)								81349			1	
	Q2803	4805-0000-001	TRANSISTOR (JAN2N2907A)								81349			1	
	R2801	4702-0104-003	RESISTOR							5%, 1/4 W, 100 K (RLR07C104JR)	81349			1	
	R2802	4702-0102-003	RESISTOR							5%, 1/4 W, 1 K (RLR07C102JR)	81349			1	
	R2803	4702-0105-003	RESISTOR							5%, 1/4 W, 1 M (RLR07C105JR)	81349			1	
	R2804	4702-0222-003	RESISTOR							5%, 1/4 W, 2.2 K (RLR07C222JR)	81349			1	
	R2805	4702-0682-003	RESISTOR							5%, 1/4 W, 6.8 K (RLR07C682JR)	81349			1	
	R2806	4702-0103-003	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349			1	
	R2807	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)	81349			1	
	R2808	4702-0272-003	RESISTOR							5%, 1/4 W, 2.7 K (RLR07C272JR)	81349			1	
	R2809	4702-0272-003	RESISTOR							5%, 1/4 W, 2.7 K (RLR07C272JR)	81349			1	
	R2810	4702-0103-003	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349			1	
	R2811	4702-0103-003	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349			1	
	R2812	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)	81349			1	
	R2813	4702-0103-003	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349			1	
	R2814	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)	81349			1	
	R2815	4702-0103-003	RESISTOR							5%, 1/4 W, 10 K (RLR07C103JR)	81349			1	
	U2801	3130-0000-025	IC, OP AMP (LM741CH)								27014			1	
	U2802	3131-0000-044	IC, QUAD 2-INPUT NAND (SN74LS00N)								01295			1	
	U2803	3211-3390-000	IC, DUAL DECADE COUNTER (SN74LS390N)								01295			1	

NOTE: \* NOT AVAILABLE AS A STAND ALONE  
PC BOARD ASSEMBLY.  
MUST BE COORDINATED WITH:  
7010-5131-701,  
7010-5131-702 OR  
7010-5131-703



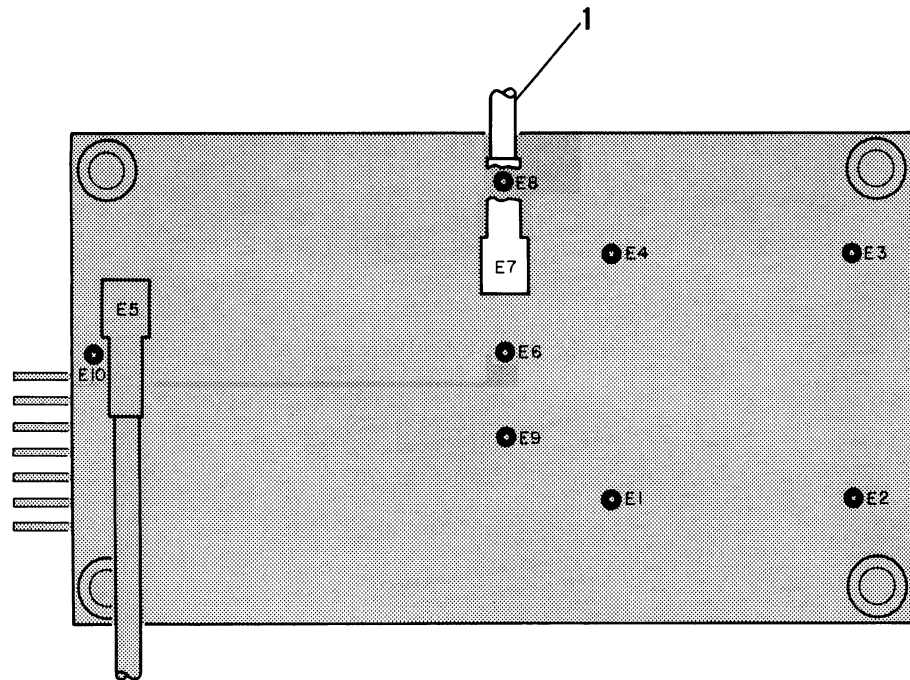
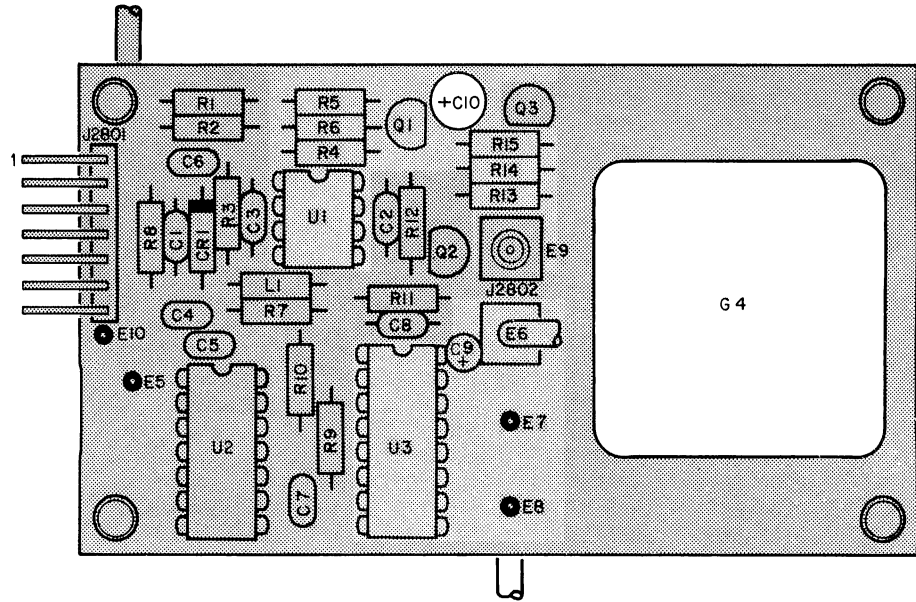


FIGURE 7-7 FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .5 PPM OSCILLATOR



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
7-		7010-5131-701								FREQUENCY STANDARD PC BOARD ASSEMBLY W/.5 PPM OSCILLATOR SEE FIG 13 FOR NHA			REF
1		6050-0880-630								CABLE ASSY, COAX FLEX			1
	C2810	1580-4700-220								CAPACITOR 47 $\mu$ F, 25 V (25TWMS47M)	52318		1
	G2804	5850-1009-100								OSCILLATOR, TCXO 10 MHz, +12 VDC, .5 PPM (2010-2)	UNK025		1
		7010-5131-700								FREQUENCY STANDARD PC BOARD ASSEMBLY SEE FIG 6 FOR DETAILS			NP

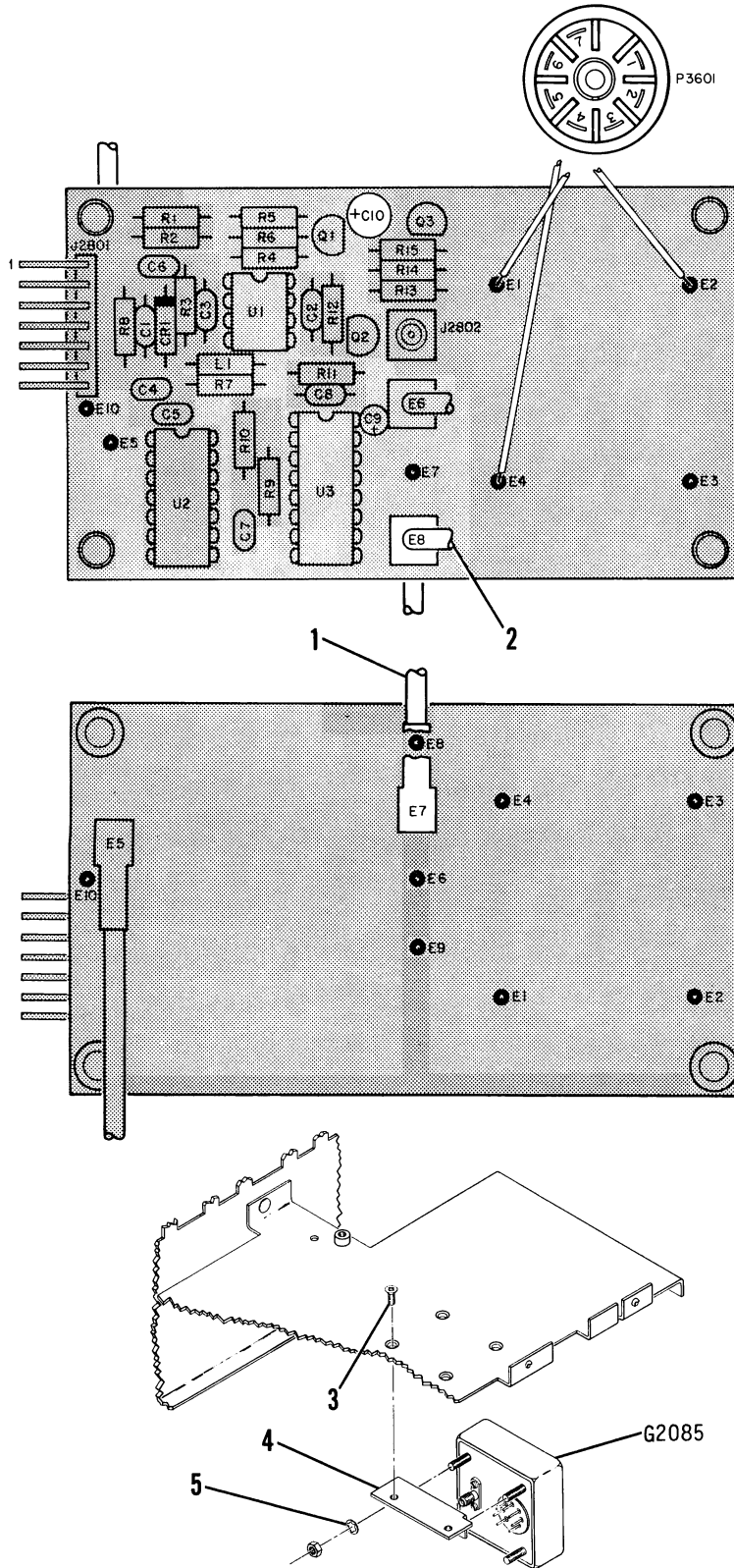


FIGURE 7-8 FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .2 PPM OSCILLATOR (OPTION -01)



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
8-		7010-5131-702	FREQUENCY STANDARD PC BOARD ASSEMBLY W/.2 PPM										REF	
			OSCILLATOR (OPTION -01) SEE FIG 13 FOR NHA											
1		6050-0880-630	CABLE ASSY, COAX FLEX											1
2		6050-0720-530	CABLE ASSY, COAX FLEX											1
	P3601	2125-0000-003	CONNECTOR, CIRCULAR (8578)								00629			1
	C2810	1580-4700-220	CAPACITOR 47 $\mu$ F, 25 V (25TWMS47M)								52318			1
	G2805	5850-0000-012	OSCILLATOR, TCXO 10 MHz, +11 VDC, .2 PPM								UNK025			1
			(2352) INCL MTG HARDWARE											
			ATTACHING PARTS											
3		2803-0250-003	SCREW (4-40 X 1/4 PFHM)								UNK015			1
4		1400-5157-500	BRACKET											1
5		2840-0000-001	WASHER, LOCK (#6 INT TOOTH LOCKWASH)								UNK015			1
			---*---											
		7010-5131-700	FREQUENCY STANDARD PC BOARD ASSEMBLY							SEE				NP
			FIG 6 FOR DETAILS											
	SEE FIG 1		WIRE, 7S 22 GA											A/R
	SEE FIG 1		LACING CORD, NYLON SIZE 3											A/R
	SEE FIG 1		TUBING, HS 1/8 BLK											A/R



# ILLUSTRATED PARTS CATALOG

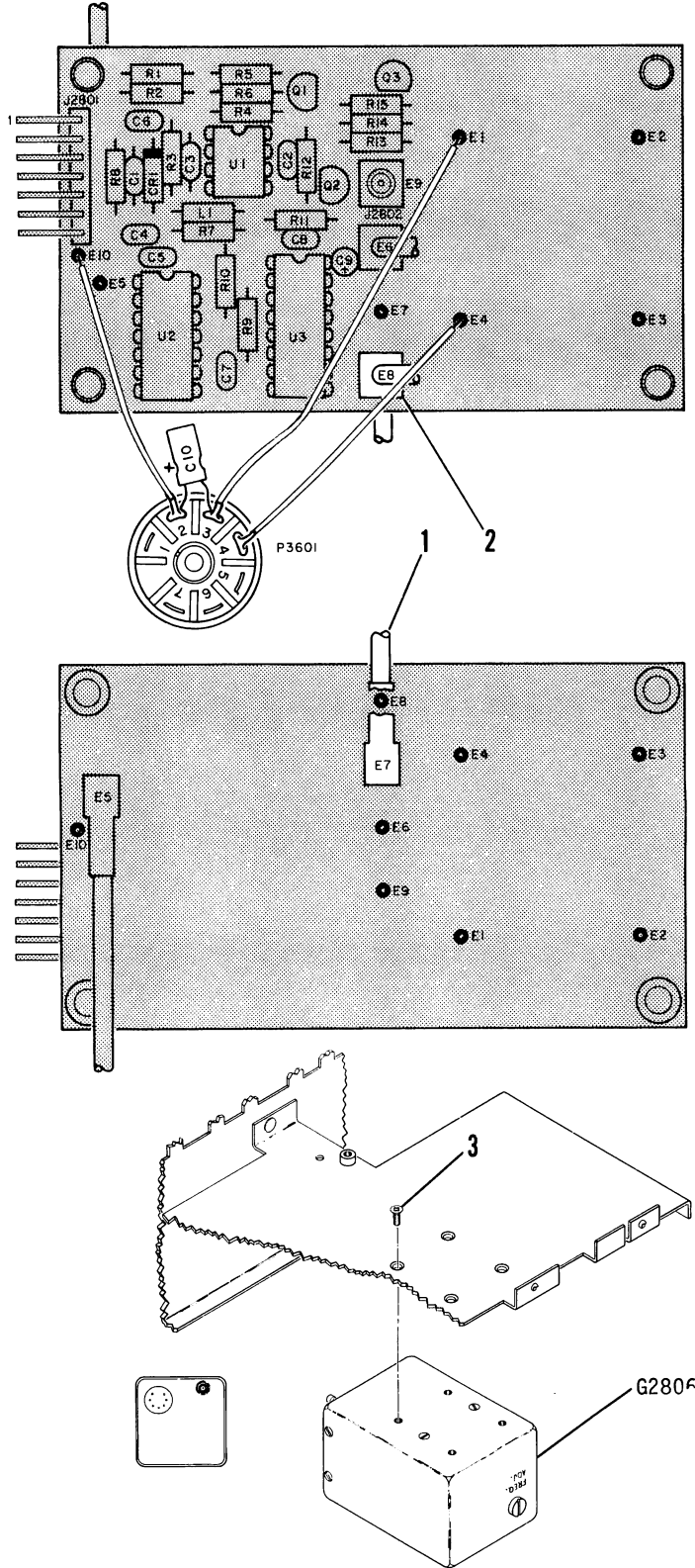


FIGURE 7-9 FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .05 PPM OSCILLATOR (OPTION -02)

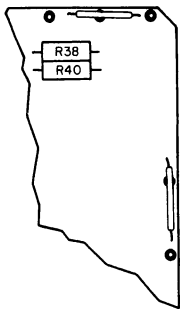
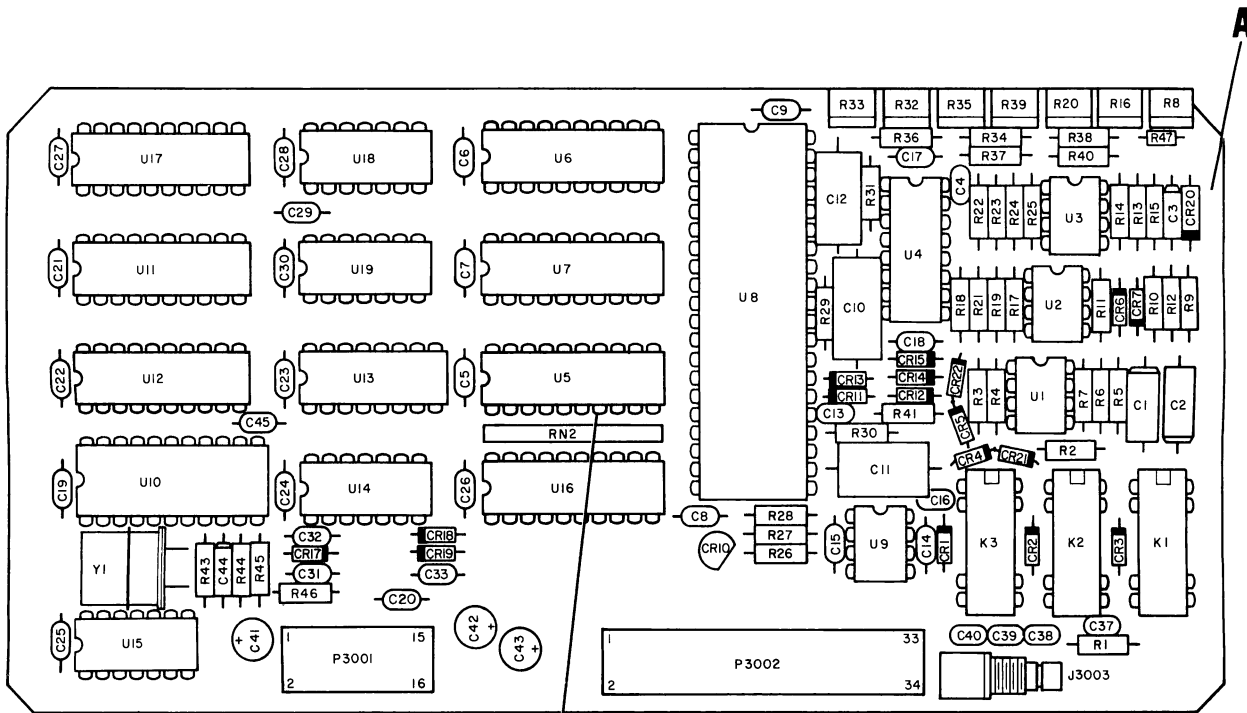


# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

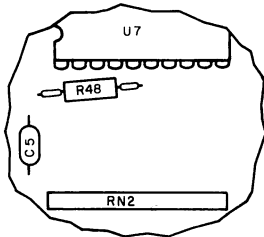
FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
9-		7010-5131-703	FREQUENCY STANDARD PC BOARD ASSEMBLY W/.05 PPM OSCILLATOR (OPTION -02) SEE FIG 13 FOR NHA										REF	
1		6050-0880-630	CABLE ASSY, COAX FLEX										1	
2		6050-0720-530	CABLE ASSY, COAX FLEX										1	
	P3601	2125-0000-003	CONNECTOR, CIRCULAR (8578)										00629	1
	C2810	1580-4700-220	CAPACITOR 47 $\mu$ F, 25 V (25TWMS47M)										52318	1
	G2806	5850-0100-100	OSCILLATOR, TCXO 10 MHz, +12.6 VDC .05 PPM (OSC49-35)										12020	1
			ATTACHING PARTS											
3		2803-0313-003	SCREW (4-40 X 5/16 PFHM)										UNK015	4
			----*----											
		7010-5131-700	FREQUENCY STANDARD PC BOARD ASSEMBLY SEE FIG 6 FOR DETAILS										NP	
		SEE FIG 1	WIRE, 7S 22 GA										A/R	
		SEE FIG 1	LACING CORD, NYLON SIZE 3										A/R	
		SEE FIG 1	TUBING, HS 1/8 BLK										A/R	



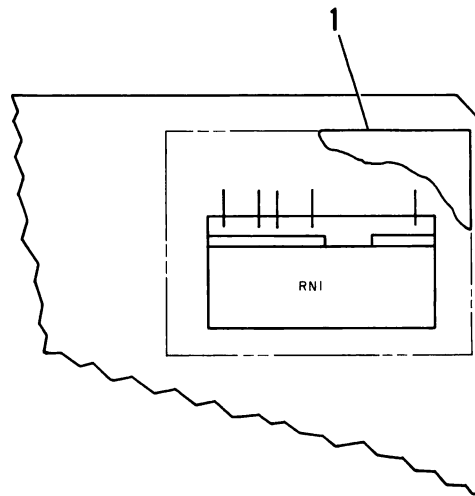
# ILLUSTRATED PARTS CATALOG



DETAIL A



DETAIL B



REV D TO E  
7010-5530-100 ASSY ONLY

FIGURE 7-10 D.V.M./I.O. PC BOARD ASSEMBLY (INCL OPTION -10)



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
10-		7010-5530-100		D.V.M./I.O. PC BOARD ASSEMBLY			REF
10-		7010-5530-101		D.V.M./I.O. PC BOARD ASSEMBLY (OPTION -10)			REF
				SEE FIG 13 FOR NHA			
1		2508-5550-600*		SHIELD			1
	J3003	2200-2094-200*		CONNECTOR, SMB (2110-7511-000)	19505		1
	P3001	2129-0186-116		CONNECTOR, HEADER (86063-9)	00779		1
	P3002	2129-0186-134		CONNECTOR, HEADER (1-86063-3)	00779		1
	C3001	1507-0566-024*		CAPACITOR 56 $\mu$ F, 6 V (T322D566M006AS)	31433		1
	C3002	1507-0566-024*		CAPACITOR 56 $\mu$ F, 6 V (T322D566M006AS)	31433		1
	C3003	1508-0156-016*		CAPACITOR 15 $\mu$ F, 16 V (T350E156M016AS)	31433		1
	C3004	1506-0103-017*		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	31433		1
	C3005	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3006	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3007	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3008	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3009	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3010	1502-0473-010		CAPACITOR .047 $\mu$ F, 50 V (PC12.047-50-5)	27735		1
	C3011	1502-0104-010		CAPACITOR .1 $\mu$ F, 50 V (PC12.1-50-5)	27735		1
	C3012	1502-0105-007		CAPACITOR 1 $\mu$ F, 50 V (MPC13-1-50-5)	27735		1
	C3013	1506-0150-017		CAPACITOR 15 pF, 200 V (C320C150J2G5CA)	61637		1
	C3014	1521-0000-008*		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3015	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3016	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1
	C3017	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3018	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3019	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3020	1521-0000-008*		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3021	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3022	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3023	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3024	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3025	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3026	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3027	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3028	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3029	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3030	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3031	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3032	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3033	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3037	1506-0220-017*		CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C3038	1506-0221-017*		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C3039	1506-0222-017*		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)	61637		1
	C3040	1625-2230-100*		CAPACITOR .022 $\mu$ F, 25 V (C340C223J2G5CA)	61637		1
	C3041	1580-4702-105		CAPACITOR 47 $\mu$ F, 25 V (CLE47MF10V)	62462		1
	C3042	1580-4700-220		CAPACITOR 47 $\mu$ F, 25 V (25TWMS47M)	52318		1
	C3043	1580-4700-220		CAPACITOR 47 $\mu$ F, 25 V (25TWMS47M)	52318		1
	C3044	1507-0105-018		CAPACITOR 1 $\mu$ F, 35 V (T322B105M035AS)	31433		1
	C3045	1506-0103-017		CAPACITOR .01 $\mu$ F, 50 V (C052K103K1X5CA)	61637		1
	CR3001	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3002	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3003	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3004	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3005	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3006	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3007	4815-0000-003*		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3010	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR3011	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3012	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3013	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3014	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3015	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
10-	CR3017	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3018	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3019	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3020	4901-4735-000*								DIODE, ZENER 6.2 V (JAN1N4735)	81349		1
	CR3021	4815-0000-003*								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3022	4815-0000-003*								DIODE, SIGNAL (JAN1N4148)	81349		1
	K3001	4501-0000-013*								RELAY, SPDT 4 VAC, 250 A (W172DIP-251)	94696		1
	K3002	4501-0000-013*								RELAY, SPDT 4 VAC, 250 A (W172DPI-251)	94696		1
	K3003	4501-0000-013*								RELAY, SPDT 4 VAC, 250 A (W172DIP-251)	94696		1
	R3001	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3002	4702-0273-003*								RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)	81349		1
	R3003	4702-0103-003*								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R3004	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3005	4706-1581-001*								RESISTOR 1%, 1/4 W, 1.58 K (RLR07C1581FR)	81349		1
	R3006	4702-0392-003*								RESISTOR 5%, 1/4 W, 3.9 K (RLR07C392JR)	81349		1
	R3007	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3008	4753-0501-002*								RESISTOR, VAR 500 OHM (62-2-1-501)	02111		1
	R3009	4706-1961-001*								RESISTOR 1%, 1/4 W, 1.96 K (RLR07C1961FR)	81349		1
	R3010	4706-3481-001*								RESISTOR 1%, 1/4 W, 3.48 K (RLR07C3481FR)	81349		1
	R3011	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3012	4706-3481-001*								RESISTOR 1%, 1/4 W, 3.48 K (RLR07C3481FR)	81349		1
	R3013	4706-3481-001*								RESISTOR 1%, 1/4 W, 3.48 K (RLR07C3481FR)	81349		1
	R3014	4706-3481-001*								RESISTOR 1%, 1/4 W, 3.48 K (RLR07C3481FR)	81349		1
	R3015	4702-0103-003*								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R3016	4753-0204-002*								RESISTOR, VAR 200 K (62-2-1-204)	02111		1
	R3017	4702-0475-003*								RESISTOR 5%, 1/4 W, 4.7 M (RLR07C475JR)	81349		1
	R3018	4706-4531-001*								RESISTOR 1%, 1/4 W, 4.53 K (RLR07C4531FR)	81349		1
	R3019	4706-3481-001*								RESISTOR 1%, 1/4 W, 3.48 K (RLR07C3481FR)	81349		1
	R3020	4753-0103-002*								RESISTOR, VAR 10 K (62-2-1-103)	02111		1
	R3021	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3022	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3023	4702-0223-003*								RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R3024	4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3025	4702-0682-003*								RESISTOR 5%, 1/4 W, 6.8 K (RLR07C682JR)	81349		1
	R3026	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R3027	4706-4991-001								RESISTOR 1%, 1/4 W, 4.99 K (RLR07C4991FR)	81349		1
	R3028	4706-2001-001								RESISTOR 1%, 1/4 W, 2.00 K (RLR07C2001FR)	81349		1
	R3029	4706-2003-001								RESISTOR 1%, 1/4 W, 200.00 K (RLR07C2003FR)	81349		1
	R3030	4702-0104-003								RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)	81349		1
	R3031	4702-0822-003								RESISTOR 5%, 1/4 W, 8.2 K (RLR07C822JR)	81349		1
	R3032	4756-2510-400								RESISTOR, VAR 100 K (62-2-1-104)	02111		1
	R3033	4753-0502-002								RESISTOR, VAR 5 K (62-2-1-502)	02111		1
	R3034	4702-0333-003								RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
	R3035	4753-0103-002								RESISTOR, VAR 10 K (62-2-1-103)	02111		1
	R3036	4706-4022-001								RESISTOR 1%, 1/4 W, 40.20 K (RLR07C4022FR)	81349		1
	R3037	4706-2492-001								RESISTOR 1%, 1/4 W, 24.90 K (RLR07C2492FR)	81349		1
	R3038	4702-0333-003								RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
	R3039	4753-0103-002								RESISTOR, VAR 10 K (62-2-1-103)	02111		1
	R3040	4706-1472-001								RESISTOR 1%, 1/4 W, 14.70 K (RLR07C1472FR)	81349		1
	R3041	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R3043	4702-0105-003								RESISTOR 5%, 1/4 W, 1 M (RLR07C105JR)	81349		1
	R3044	4702-0562-003								RESISTOR 5%, 1/4 W, 5.6 K (RLR07C562JR)	81349		1
	R3045	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1
	R3046	4702-0153-003*								RESISTOR 5%, 1/4 W, 15 K (RLR07C153JR)	81349		1
	R3047	4701-0471-003*								RESISTOR 5%, 1/8 W, 470 OHM (RLR05C471JR)	81349		1
	R3048	4702-0472-003@								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	RN3001	4696-0100-100*								RESISTOR, NETWORK PRECISION, 5-P (1776-542)	19647		1
	RN3002	4690-0947-200								RESISTOR, NETWORK 4.7 K, 10-P (4310R-101-472)	57924		1
	U3001	3135-0000-054*								IC, OP AMP (LF412CN)	27014		1
	U3002	3135-0000-054*								IC, OP AMP (LF412CN)	27014		1
	U3003	3135-0000-054*								IC, OP AMP (LF412CN)	27014		1
	U3004	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3005	3214-7374-000*								IC, OCTAL D FLIP-FLOP (MM74C374)	27014		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
10-	U3006	3214-9244-000	IC,	OCTAL	BFR/DRVR/RCVR	(MM74HC244)					27014		1	
	U3007	3214-9244-000	IC,	OCTAL	BFR/DRVR/RCVR	(MM74HC244)					27014		1	
	U3008	3229-7109-000	IC,	A/D	CONVERTER	(ICL7109CPL)					32293		1	
	U3009	3221-0001-100	IC,	J-FET	OP AMP	(LF356BN)					27014		1	
	U3010	3228-0005-000	IC,	DTMF	XCVR	(20C89CP)					64950		1	
	U3011	3214-9244-000	IC,	OCTAL	BFR/DRVR/RCVR	(MM74HC244)					27104		1	
	U3012	3214-7374-000	IC,	OCTAL	D FLIP-FLOP	(MM74C374)					27014		1	
	U3013	3214-9138-000	IC,	DCCR/MPLXR	(MM74HC138)						27014		1	
	U3014	3131-0000-044	IC,	QUAD	2-INPUT NAND	(SN74LS00N)					01295		1	
	U3015	3131-0000-025	IC,	TRIPLE	3-INPUT NOR	(SN74LS27N)					01295		1	
	U3016	3214-9244-000	IC,	OCTAL	BFR/DRVR/RCVR	(MM74HC244)					27014		1	
	U3017	3214-7374-000	IC,	OCTAL	D FLIP-FLOP	(MM74HC374)					27014		1	
	U3018	3134-0000-021	IC,	QUAD	LINE DRVR	(MC1488F)					18324		1	
	U3019	3134-0000-021	IC,	QUAD	LINE DRVR	(MC1488F)					18324		1	
	Y3001	2363-0095-000	CRYSTAL	(3.579545	MHz	P/NE357)					72982		1	
		SEE FIG 1	WIRE, BUS	22	GA								A/R	
		SEE FIG 1**	WIRE, BUS	26	GA								A/R	
	SEE FIG 1**	TUBING, TFL	26	GA, NAT								A/R		

NOTE: \* THESE COMPONENTS REQUIRED FOR 7010-5530-101 ASSY ONLY

@ THESE COMPONENTS REQUIRED FOR 7010-5530-100 ASSY ONLY

\*\* REFER TO MAINTENANCE SECTION FOR JUMPER LOCATION

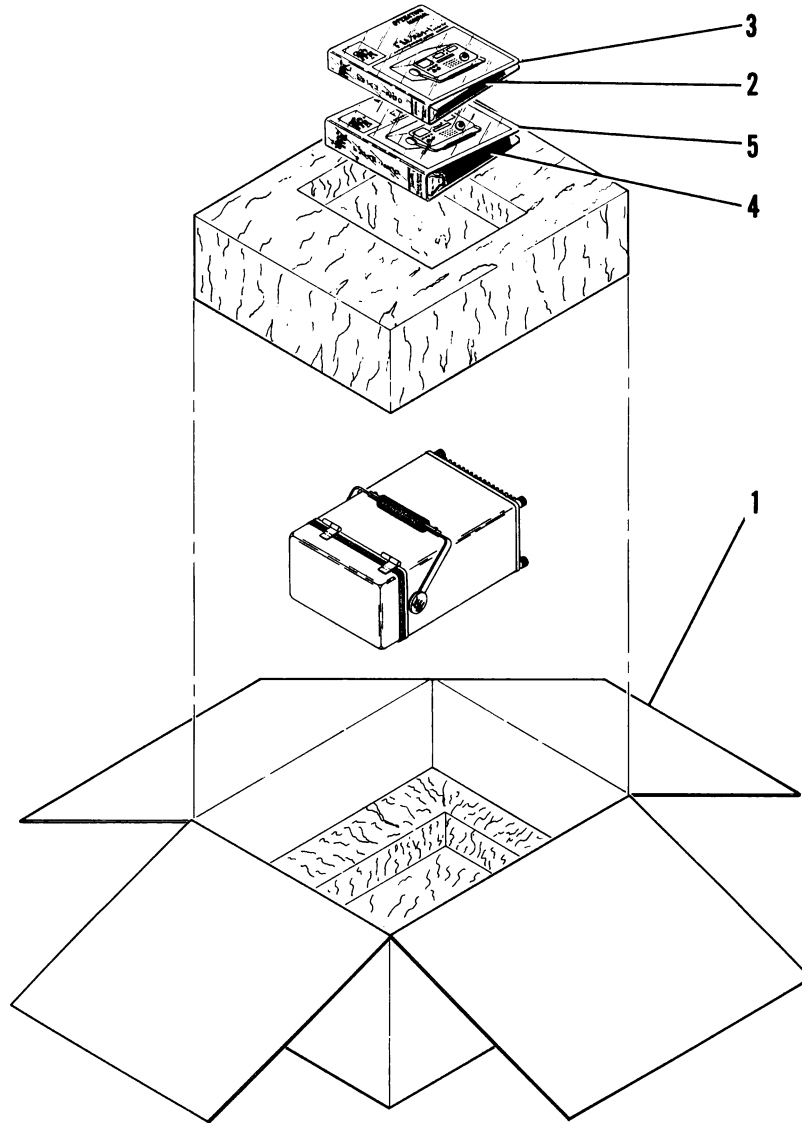


FIGURE 7-11 SHIPPING KIT

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
11-		9901-5502-000	SHIPPING KIT											REF
1		1000-1000-201	CARTON, SHIPPING							W/FOAM PADS				1
2		1002-5501-000	TEXT, OPERATION							FM/AM-1200S/A				1
3		1003-0001-500	BINDER											1
4		1002-5501-100	TEXT, MAINTENANCE/IPC							FM/AM-1200S/A				1
5		1003-0002-000	BINDER											1
		SEE FIG 12	FM/AM-1200S/A DECALS											REF



# ILLUSTRATED PARTS CATALOG

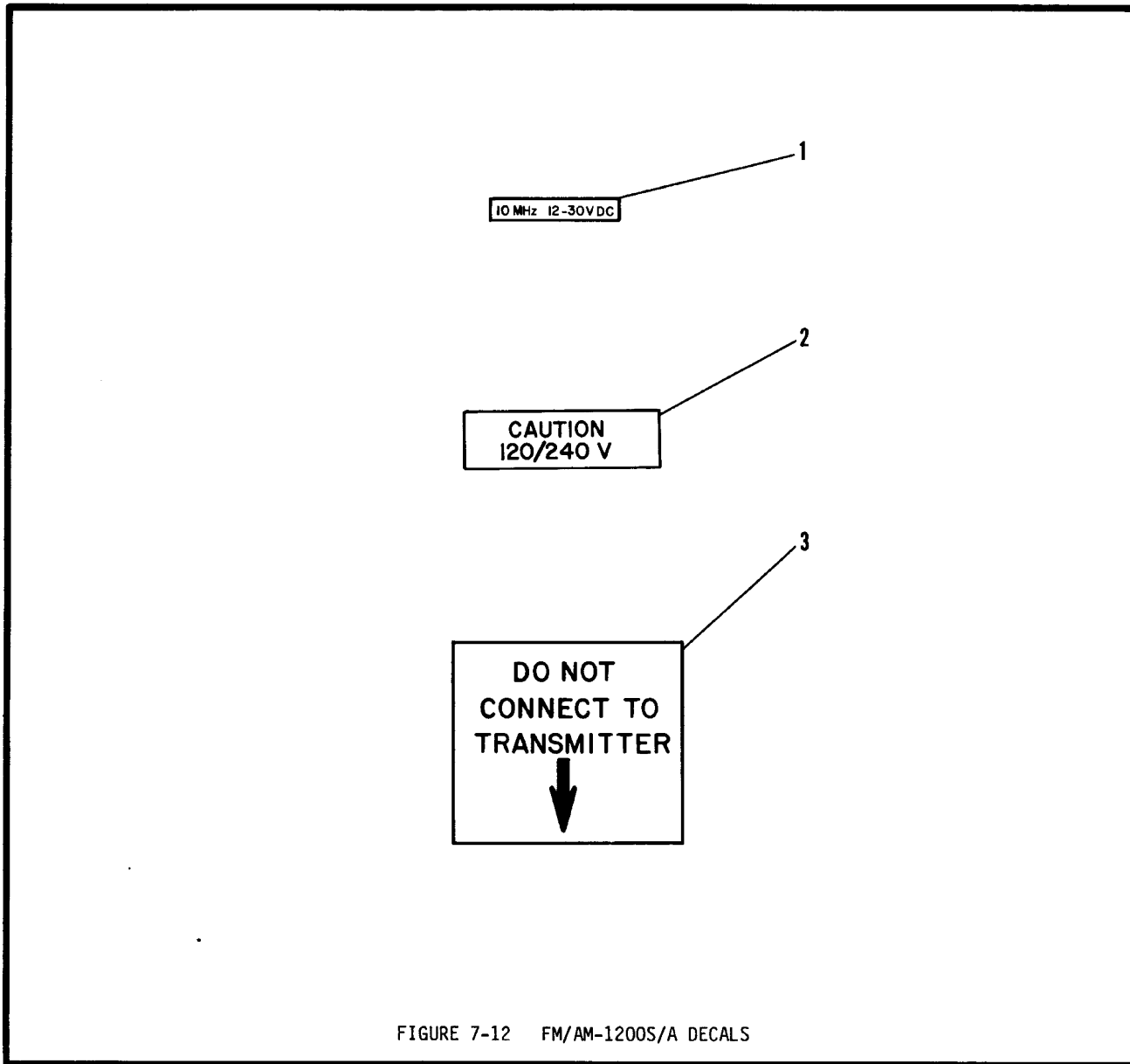


FIGURE 7-12 FM/AM-1200S/A DECALS

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
12-										FM/AM-1200S/A DECALS			REF
	1	2400-5157-300								LABEL, 10 MHz			1
	2	2400-8002-000								LABEL, CAUTION 120/240 V			1
	3	2400-2396-600								LABEL, DO NOT CONNECT			1

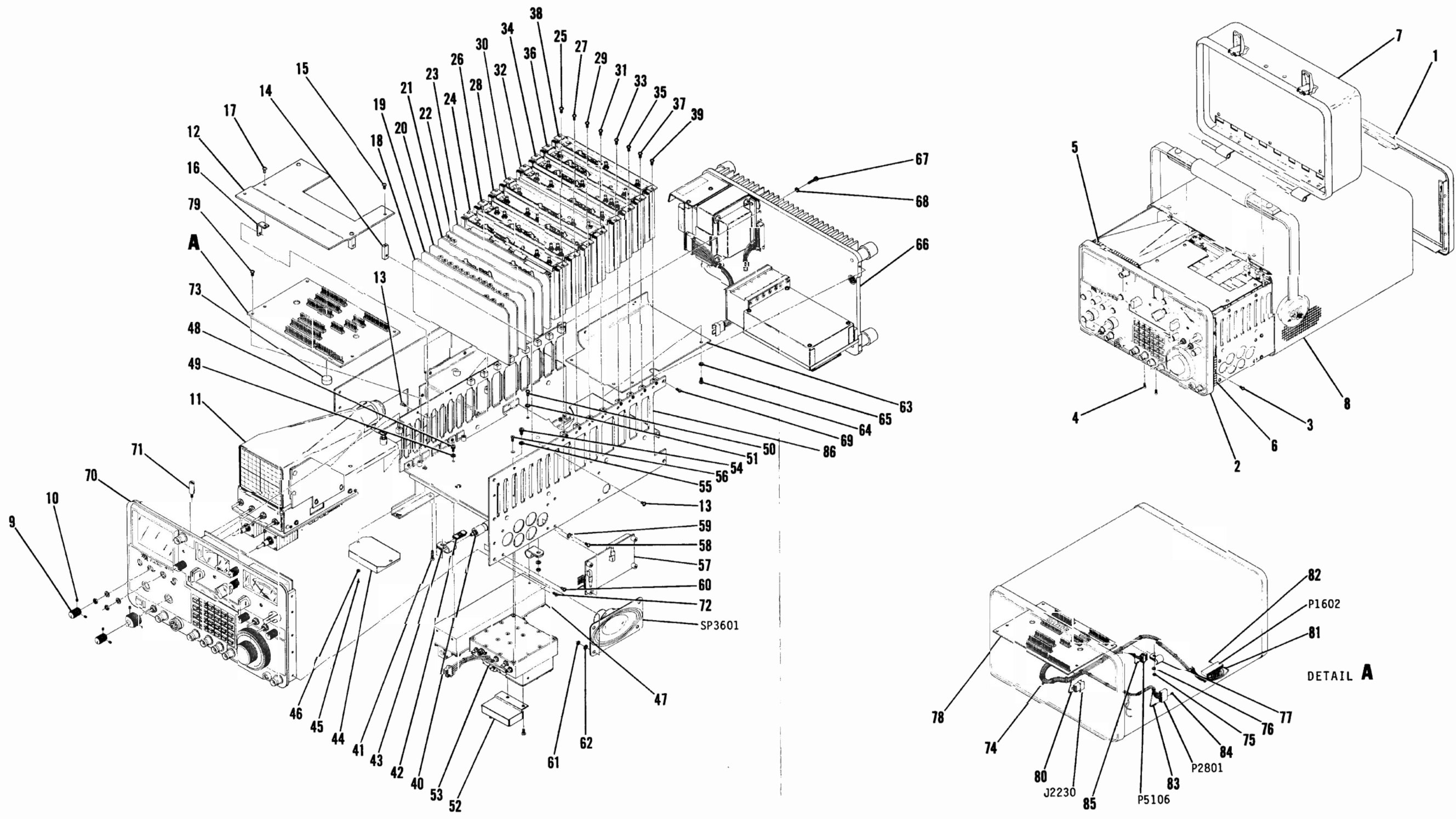


FIGURE 7-13 COMPOSITE ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
13-				COMPOSITE ASSEMBLY, FM/AM-1200S/A			NP
1		2406-5383-200		BEZEL, REAR			1
2		2406-5383-100		BEZEL, FRONT			1
				ATTACHING PARTS			
3		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		5
4		2803-0250-003		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			
5		2845-5161-200		GROUNDING SHIM, TOP			1
6		2845-5161-400		GROUNDING SHIM, SIDE			2
		2845-5161-300		GROUNDING SHIM, BOTTOM			1
7		SEE FIG 14		LID ASSEMBLY			1
8		SEE FIG 15		CASE ASSEMBLY			1
9		SEE FIG 16		KNOB			4
				ATTACHING PARTS			
10		SEE FIG 16		SCREW (4-40 x 1/8 SHS)	UNK015		2
				----*----			
11		SEE FIG 16		SCOPE POWER AND CONTROL ASSEMBLY		A	1
		6045-5182-700		CABLE ASSY, RIBBON ANALYZER - SCOPE		A	1
		SEE FIG 16		SCOPE POWER AND CONTROL ASSEMBLY		B	1
12		4503-5160-600		RETAINER PLATE, PC BOARD			1
				ATTACHING PARTS			
13		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		4
				----*----			
14		1400-5160-800		BRACKET, RETAINER PLATE			2
				ATTACHING PARTS			
15		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		1
				----*----			
16		1400-5160-700		ANGLE, RETAINER PLATE	UNK015		2
				ATTACHING PARTS			
17		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		1
				----*----			
18		SEE FIG 20		GENERATE AUDIO PC BOARD ASSEMBLY			1
19		SEE FIG 21		RECEIVE AUDIO PC BOARD ASSEMBLY			1
20		SEE FIG 22		FUNCTION GENERATOR PC BOARD ASSEMBLY			1
21		SEE FIG 10		DVM/IO PC BOARD ASSEMBLY			1
		SEE FIG 10		DVM/IO PC BOARD ASSEMBLY (OPTION -10)			REF
22		SEE FIG 23		PROCESSOR PC BOARD ASSEMBLY		C	1
22		SEE FIG 23A		CPU PC BOARD ASSEMBLY		D	1
		6045-5182-600		CABLE ASSY, RIBBON KEYBOARD - CPU			1
23		SEE FIG 24		INTERFACE PC BOARD ASSEMBLY			1
24		SEE FIG 25		LOW LOOP ASSEMBLY		C	1
24		SEE FIG 25A		FAST LOW LOOP ASSEMBLY		D	1
				ATTACHING PARTS			
25		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			
26		SEE FIG 27		HIGH LOOP ASSEMBLY			1
				ATTACHING PARTS			
27		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			
28		SEE FIG 30		DUPLEX ASSEMBLY			1
				ATTACHING PARTS			
29		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			
30		SEE FIG 32		DIGITAL ASSEMBLY			1
				ATTACHING PARTS			
31		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			
32		SEE FIG 35		10.7 MHz GENERATE/RECEIVE ASSEMBLY			1
				ATTACHING PARTS			
33		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				----*----			

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
13- 34		SEE FIG 37		ANALYZER RF ASSEMBLY ATTACHING PARTS		A	1
35		2803-0250-006		SCREW (4-40 X 1/4 PPHM) ----*----	UNK015		2
36		SEE FIG 39		ANALYZER IF ASSEMBLY ATTACHING PARTS		A	1
37		2803-0250-006		SCREW (4-40 X 1/4 PPHM) ----*----	UNK015		2
38		SEE FIG 41		ANALYZER LOG AMP ASSEMBLY ATTACHING PARTS		A	1
39		2803-0250-006		SCREW (4-40 X 1/4 PPHM) ----*----	UNK015		2
40		7005-5241-800		LOW PASS FILTER ASSEMBLY ATTACHING PARTS			1
41		2804-0500-006		SCREW (6-32 X 1/2 PPHM)	UNK015		2
42		2850-0000-000		NUT, CLIP 6-32 (C8093-632-4)	UNK015		2
43		2109-0000-005		CLAMP, CABLE (CLE 3/8) ----*----	51705		2
44		SEE FIG 43		HIGH-LOW PASS FILTER ASSEMBLY ATTACHING PARTS			1
45		2801-0250-006		SCREW (2-56 X 1/4 PPHM)	UNK015		2
46		2840-0000-004		WASHER, LOCK (#2 INT TOOTH LOCKWASH) ----*----	UNK015		2
47		7005-5144-000		DUAL VCO ASSEMBLY ATTACHING PARTS			1
48		2803-0250-002		SCREW (4-40 X 1/4 SHC)	UNK015		1
49		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		1
50		2803-0250-002		SCREW (4-40 X 1/4)	UNK015		1
51		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH) ----*----	UNK015		1
	C1901	1580-4700-215		CAPACITOR 47 $\mu$ F, 25 V (25TT47MS)	52318		1
	L1901	1800-5051-400		INDUCTOR 30 TURN, 18 GA (6700057)	33497		1
52		SEE FIG 45		MIXER NULL ASSEMBLY			1
53		SEE FIG 46		IF ASSEMBLY ATTACHING PARTS			1
54		2803-0250-002		SCREW (4-40 X 1/4 SHC)	UNK015		1
55		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		1
56		2803-0250-003		SCREW (4-40 X 1/4 PPHM) ----*----	UNK015		1
57		SEE FIG 7		FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .5 PPM OSCILLATOR			1
		SEE FIG 8		FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .2 PPM OSCILLATOR (OPTION -01)			REF
		SEE FIG 9		FREQUENCY STANDARD PC BOARD ASSEMBLY WITH .05 PPM OSCILLATOR (OPTION -02) ATTACHING PARTS			REF
58		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		4
59		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH) ----*----	UNK015		4
	SP3601	5950-0002-000		SPEAKER (2X38A8) ATTACHING PARTS	07109		1
60		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		4
61		2850-0000-020		NUT 4-40 (NAS671-C4)	81349		4
62		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH) ----*----	UNK015		4

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
13- 63		1414-5150-300								COVER, BATTERY ATTACHING PARTS			1
64		2803-0250-006								SCREW (4-40 X 1/4 PPHM)	UNK015		6
65		2840-0000-003								WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		6
										---*---			
66		SEE FIG 51								REAR PANEL ASSEMBLY ATTACHING PARTS			1
67		2803-0500-002								SCREW (4-40 X 1/2 SHC)	UNK015		2
68		2840-0000-003								WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		2
69		2803-0250-003								SCREW (4-40 X 1/4 PFHM)	UNK015		4
										---*---			
70		SEE FIG 58								FRONT PANEL ASSEMBLY ATTACHING PARTS			1
71		2850-7601-308								SCREW, SPECIAL 4-40			1
72		2803-0250-003								SCREW (4-40 x 1/4 PFHM)	UNK015		7
										---*---			
73		2517-5158-300								PAD, RUBBER			1
74		7007-5580-000								CHASSIS WIRE HARNESS ASSY ATTACHING PARTS			1
75		2850-0000-020								NUT 4-40 (NAS671-C4)	81349		1
76		2840-0000-008								WASHER, FLAT (AN960-C4)	81349		1
77		2109-0000-005								CLAMP, CABLE (CLE-3/8)	51705		1
										---*---			
78		SEE FIG 62								MOTHERBOARD PC BOARD ASSEMBLY ATTACHING PARTS			1
79		2803-0250-006								SCREW (4-40 X 1/4 PPHM)	UNK015		4
										---*---			
80	J2230	2115-9001-005								CONNECTOR, LOCKING (SMR-05V-B)	UNK020		1
		2114-9001-001								CONTACT CONN 22-26 GA (SYM-001T-0.6)	UNK020		3
	P1602	2115-0000-014								CONNECTOR, HEADER (22-01-2151)	27264		1
81		2114-0000-022								CONTACT, CONN 22-30 GA (08-55-0101)	27264		12
82		2127-9900-100								KEY, POLARIZING CONN (15-04-9209)	27264		1
	P2801	2115-0001-007								CONNECTOR, WAFER (22-01-2071)	27264		1
83		2114-0000-022								CONTACT, CONN 22-30 GA (08-55-0101)	27264		6
84		2127-9900-100								KEY, POLARIZING CONN (15-04-9209)	27264		1
	P5106	2115-9002-005								CONNECTOR, LOCKING (SMP-05V-B)	UNK020		1
85		2114-9002-001								CONTACT, CONN 22-26 GA (SHF-001T-0.8SS)	UNK020		4
		SEE FIG 1								TY-RAP 4"			A/R
		SEE FIG 1								WIRE, 7S 20 GA			A/R
		SEE FIG 1								WIRE, 7S 22 GA			A/R
		SEE FIG 1								WIRE, 7S 26 GA			1
86		6500-5182-802								CHASSIS ASSY			1
		6042-5182-100								CABLE ASSY, COAX SEMI-RIGID			1
		6042-5182-200								CABLE ASSY, COAX SEMI-RIGID			1
		6042-5182-300								CABLE ASSY, COAX SEMI-RIGID			1
		6042-5182-400								CABLE ASSY, COAX SEMI-RIGID			1
		6042-5183-000								CABLE ASSY, COAX SEMI-RIGID			1
		6050-0041-150								CABLE ASSY, COAX FLEX			1
		6050-0040-620								CABLE ASSY, COAX FLEX		A	1
		6055-0841-250								CABLE ASSY, COAX FLEX			1
		6050-0040-500								CABLE ASSY, COAX FLEX			2
		6050-0041-050								CABLE ASSY, COAX FLEX			1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
13-		6050-0040-800								CABLE ASSY, COAX			1
		6050-0040-330								CABLE ASSY, COAX			1
		6050-0041-350								CABLE ASSY, COAX			1
		6050-0041-920								CABLE ASSY, COAX		A	1
		6050-0040-600								CABLE ASSY, COAX		A	1
		6050-0040-250								CABLE ASSY, COAX		A	1
		6050-0401-600								CABLE ASSY, COAX		A	1
		6050-0042-120								CABLE ASSY, COAX		A	1
		6050-0040-300								CABLE ASSY, COAX		A	1
		6050-0040-400								CABLE ASSY, COAX			1
		6050-0040-650								CABLE ASSY, COAX			3
		6050-0040-950								CABLE ASSY, COAX			1
		6050-0040-950								CABLE ASSY, COAX			1
		6055-0911-600								CABLE ASSY, TRIAX		B	1
		6055-0901-100								CABLE ASSY, TRIAX			1
		SEE FIG 1								TY-RAP 4"			1
		SEE FIG 5								BATTERY ASSEMBLY (OPTION -04)			A/R
		SEE FIG 2								GENERATE AMP ASSEMBLY (OPTION -05)			REF
		SEE FIG 2								MICROPHONE (OPTION -06)			REF
		SEE FIG 2								ANTENNA, TELESCOPIC (OPTION -07)			REF
		SEE FIG 2								CARRYING CASE, NYLON (OPTION -09)			REF

A---FM/AM-1200S  
 B---FM/AM-1200A  
 C---FM/AM-1200A, SN 1250 THRU SN 1449  
 FM/AM-1200S, SN 3300 THRU SN 4491  
 D---FM/AM-1200A, SN 1450 & ON  
 FM/AM-1200S, SN 4492 & ON

### RF CABLE APPLICATION CHART

TAG NO	REF DES	PART NO	EFF
1	J4202	J2203	
2	J4203	J403	
3	J4101	J602	
5	J4103	J1202	
6	J4003	J1906	
7	J4002	J1903	
8	J1203	J3504	
9	J1204	J5105	
10	J4401	J4303	
11	J4502	J4304	
13	J4302	J2204	
14	J405	J2208	
15	J404	J2802	
16	J401	J502	
17	J503	J802	
18	J3503	J2201	
19	J5101	J2202	
20	J5103	AT3501-J1	
21	J5102	AT3501-J2	
22	J5104	J3505	
23	J406	J2209	
24	J601	J6402	
25	J6401	J1907	
26	J1905	J9301	
27	J1902	J2207	
30	J9302	J2205	
31	J9303	J2210	
32	J2208	J2209	

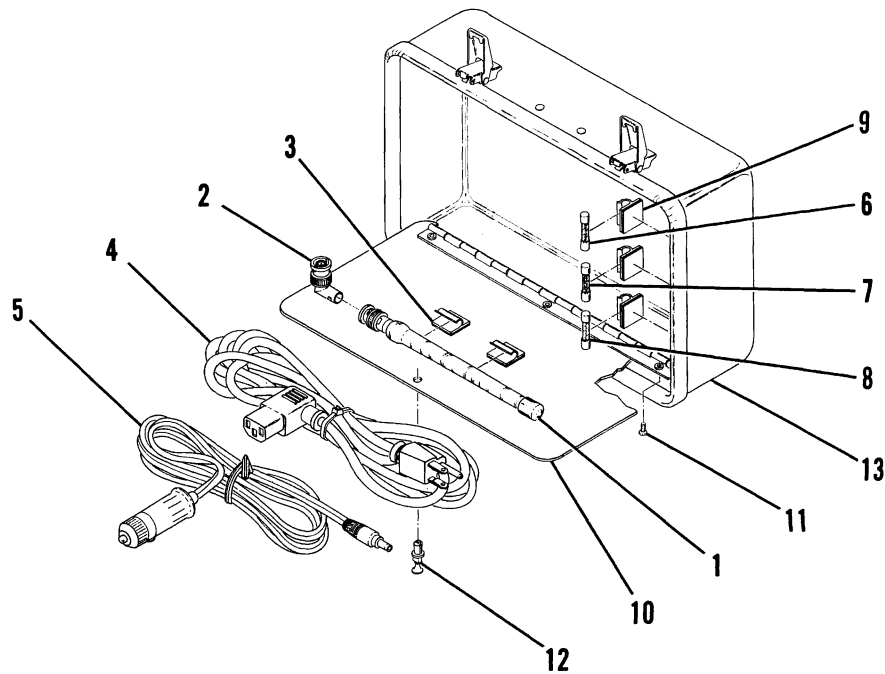


FIGURE 7-14 LID ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
14-		7005-5141-000	LID ASSEMBLY							SEE FIG 13 FOR NHA			REF
1		1201-7616-500	ANTENNA, FLEX (76-0165)								55647		1
2		2113-0000-013	CONNECTOR, BNC							ADAPTER (UG306/U)	98668		1
3		2111-0002-500	CLIP 1/2 D (670 1/2)								25706		2
4		6041-0001-001	CABLE ASSY, AC (P2720)								82839		1
5		6041-5082-700	CABLE ASSY, DC										1
6		5106-0000-003	FUSE, SLO BLO							1 A, 250 V (MDL-1 FUSE)	71400		1
7		5106-0000-015	FUSE, FAST BLO							.125 A, 250 V (AGC1/8A)	71400		1
8		5106-4505-000	FUSE, SLO BLO							5A, 250 V (313005)	UNK004		1
9		2111-0000-002	CLIP 1/4 D (670-1/4)								25706		3
10		4503-5151-300	PANEL, RETAINER							ATTACHING PARTS			
11		2803-0188-006	SCREW (4-40 X 3/16 PPHM)								UNK015		3
			---*---										
12		2850-8502-000	FASTENER (HN4-2-2-1)								34848		1
13		1412-5184-700	LID MINOR ASSY										1
		SEE FIG 1	TRIM, BLK										A/R



# ILLUSTRATED PARTS CATALOG

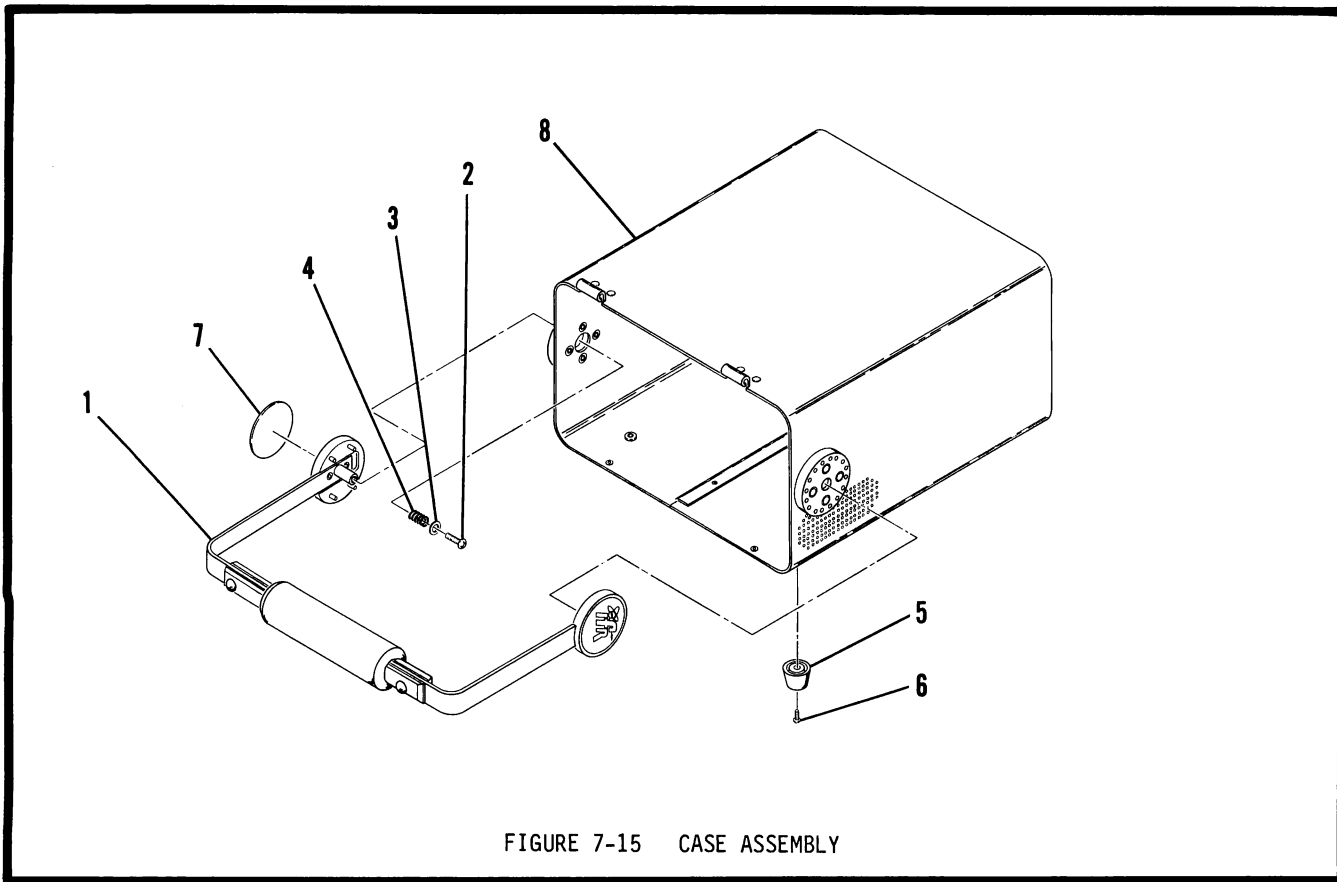


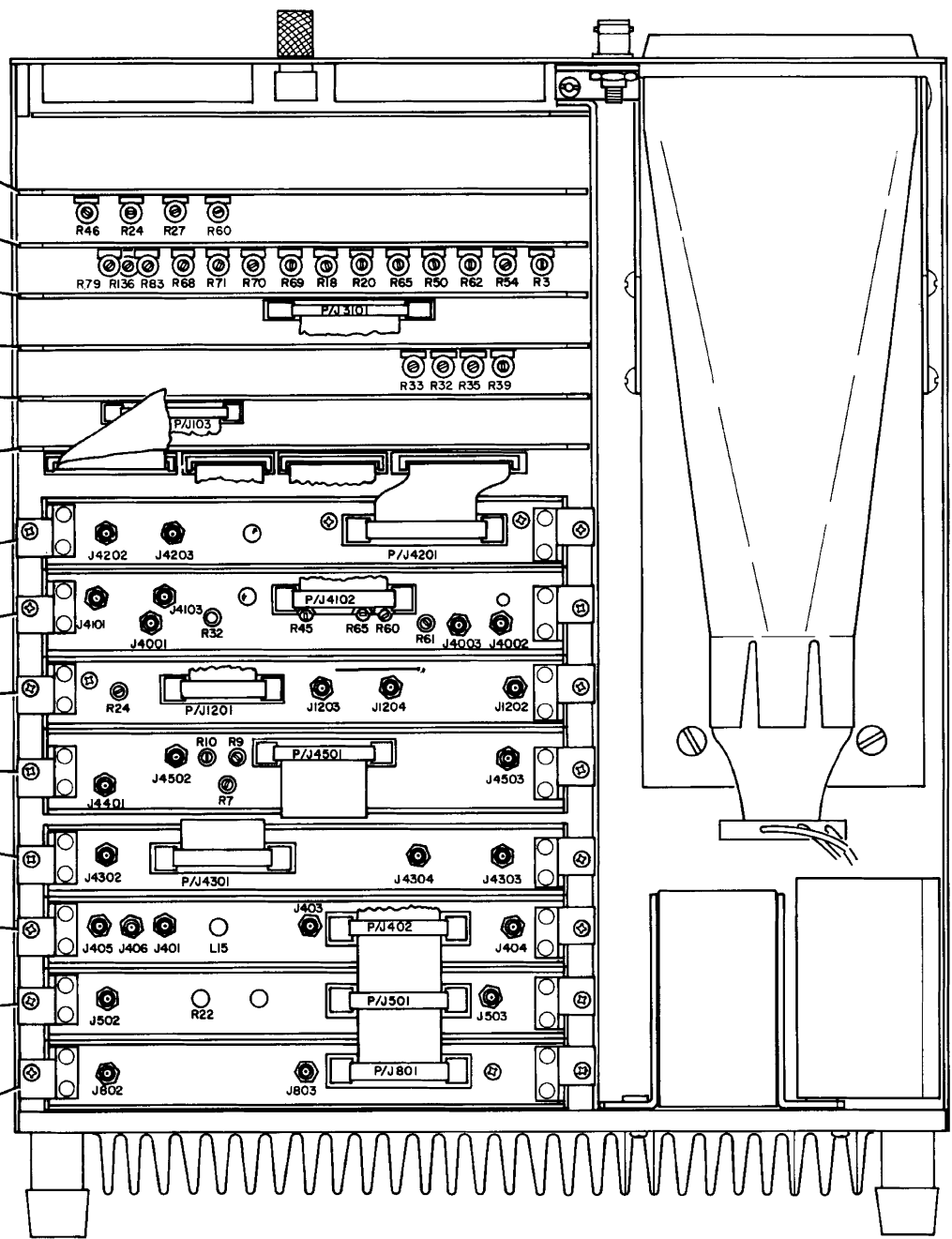
FIGURE 7-15 CASE ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
15-		7005-5141-200								CASE ASSEMBLY			REF
1		6500-5150-900								HANDLE ASSY			1
										ATTACHING PARTS			
2		2805-0625-020								SCREW (8-32 X 5/18 PTHM)	UNK015		2
3		2840-0000-025								WASHER, FLAT (#10)	UNK015		2
4		2106-0000-012								SPRING (LC026E-1)	25146		2
										-----*			
5		1421-0000-500								FOOT, CONICAL (PP40013)	21604		4
										ATTACHING PARTS			
6		2804-0313-006								SCREW (6-32 X 5/16 PPHM)	UNK015		1
										-----*			
7		2400-7636-400								DECAL, LOGO			2
8		1412-5180-700								CASE MINOR ASSY			1

R33 R32 R35 R39 R20 R16 R8

DVM I/O PC BOARD (OPTION 10)

- GENERATE AUDIO PC BOARD
- RECEIVE AUDIO PC BOARD
- FUNCTION GENERATOR PC BOARD
- STANDARD DVM I/O
- PROCESSOR PC BOARD
- INTERFACE PC BOARD
- LOW LOOP MODULE
- HIGH LOOP MODULE
- DUPLEX MODULE
- DIGITAL MODULE
- 10.7 MHz GEN/REC MODULE
- ANALYZER RF MODULE (FM/AM-1200S)
- ANALYZER IF MODULE (FM/AM-1200S)
- ANALYZER LOG AMP MODULE (FM/AM-1200S)



TOP VIEW





# ILLUSTRATED PARTS CATALOG

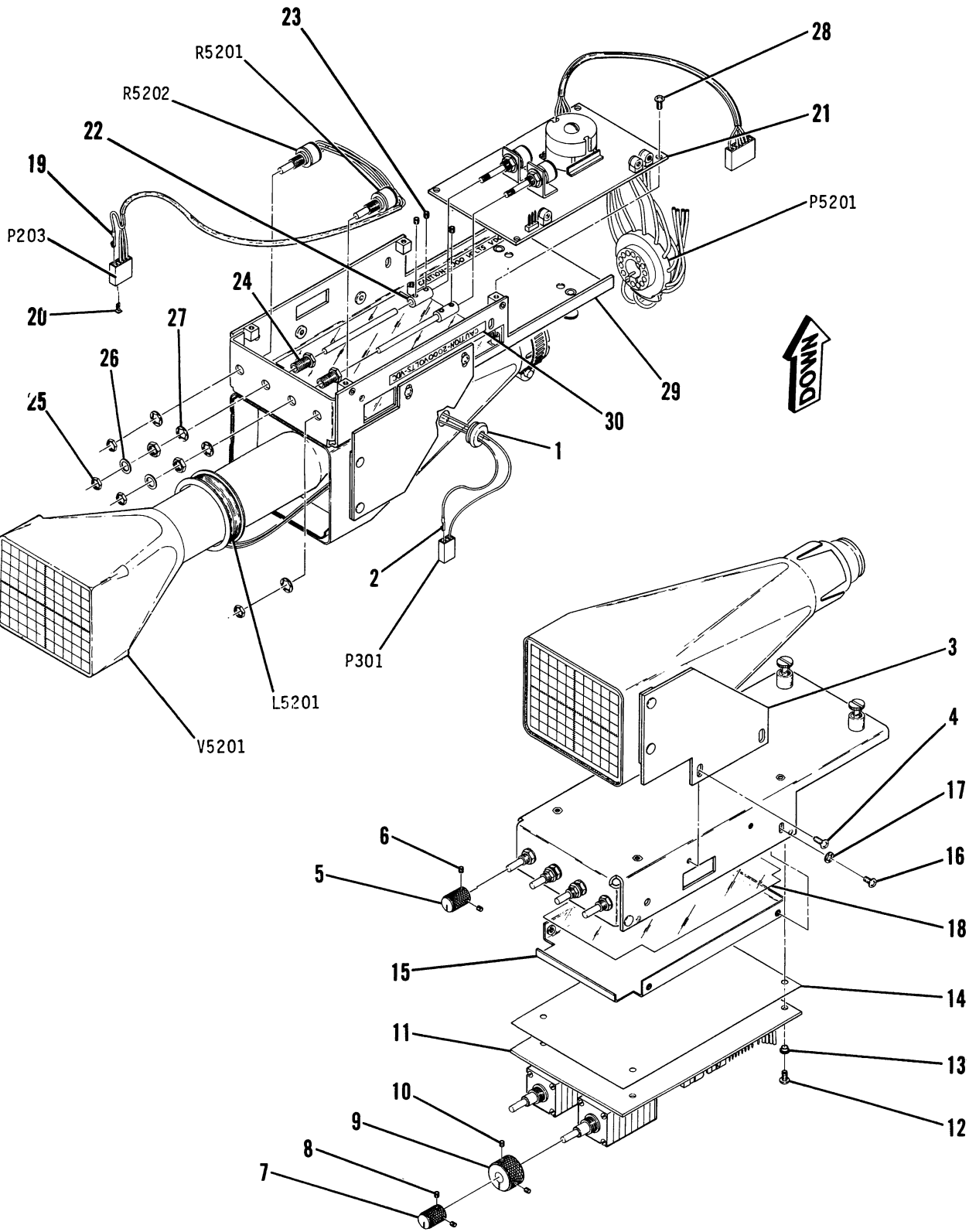


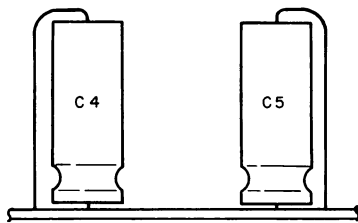
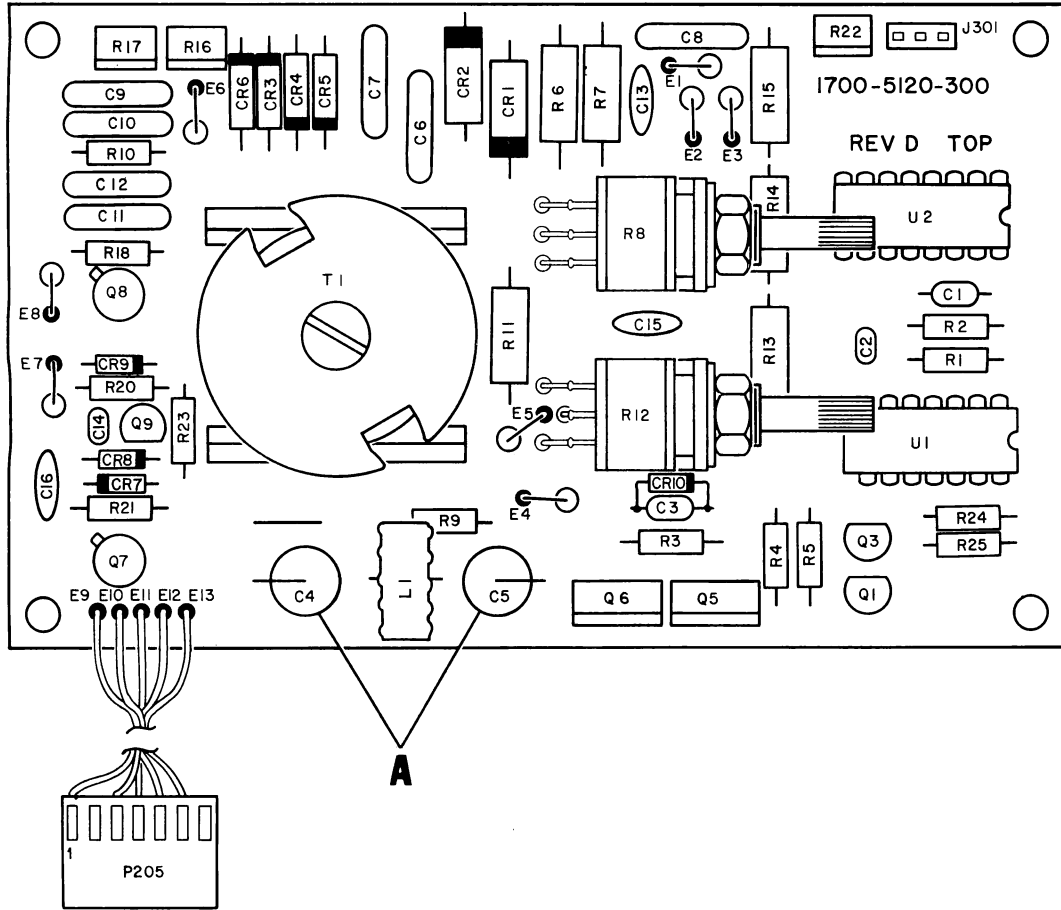
FIGURE 7-16 SCOPE POWER AND CONTROL ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
16-		7005-5143-700		SCOPE POWER & CONTROL ASSEMBLY		A	REF
16-		7005-5540-100		SCOPE POWER & CONTROL ASSEMBLY		B	REF
	P5201	3101-3953-100		SOCKET, CRT (545-244)	16237		1
1		2831-0001-000		GROMMET	83330		1
	P301	2115-0001-003		CONNECTOR, WAFER (22-01-2031)	27264		1
2		2114-0000-022		CONTACT, CONN 22-30 GA (08-55-0101)	27264		2
	V5201	3910-0953-100		TUBE, CATHODE RAY (95AB31)	UNK017		1
	L5201	1800-5054-004		COIL, CRT TRACE (6700060)	33497		1
3		2508-5160-201		SHIELD ASSY, CRT			1
				ATTACHING PARTS			
4		2803-0250-006		SCREW (4-40 X 1/4 PPHM)		UNK015	4
				---*---			
5		2402-0921-900		KNOB			4
				ATTACHING PARTS			
6		2803-0125-001		SCREW (4-40 X 1/8 SHS)		UNK015	2
				---*---			
7		2402-0965-900		KNOB			2
				ATTACHING PARTS			
8		2803-0125-001		SCREW (4-40 x 1/8 SHS)		UNK015	2
				---*---			
9		2402-5150-800		KNOB			2
				ATTACHING PARTS			
10		2803-0125-001		SCREW (4-40 X 1/8 SHS)		UNK015	2
				---*---			
11		SEE FIG 18		SCOPE CONTROL PC BOARD ASSEMBLY		A	1
		SEE FIG 19		SCOPE CONTROL PC BOARD ASSEMBLY		B	1
				ATTACHING PARTS			
12		2803-0250-006		SCREW (4-40 x 1/4 PPHM)		UNK015	4
13		2840-5053-500		WASHER, SPECIAL (5607-45)		86928	4
				---*---			
14		3107-5155-500		INSULATOR, MYLAR		A	1
15		2508-5185-300		SHIELD, PC BOARD			1
				ATTACHING PARTS			
16		2803-0250-006		SCREW (4-40 X 1/4 PPHM)		UNK015	4
17		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)		UNK015	4
				---*---			
18		3107-5155-400		INSULATOR, MYLAR			2
	R5201	4751-0203-003		RESISTOR, VAR 20 K			1
	R5202	4751-0203-003		RESISTOR, VAR 20 K			1
	P203	2115-0001-005		CONNECTOR, WAFER (22-01-2051)	27264		1
19		2114-0000-022		CONTACT, CONN 22-30 GA (08-55-0101)	27264		4
20		2127-9900-100		KEY, POLARIZING CONN (15-04-9209)	27264		1
21		SEE FIG 17		SCOPE POWER PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
22		2405-5163-700		COLLAR			1
23		2803-0094-001		SCREW (4-40 X 3/32 SHS)		UNK015	4
24		2518-5173-700		BEARING PANEL (184) INCL MTG HARDWARE	83330		2
25		2850-0000-046		NUT 1/4 - 32 (019-971-03)	12697		2
26		2840-0003-001		WASHER, FLAT (.363 OD)		UNK015	2
27		2840-0000-037		WASHER, LOCK (#4 INT TOOTH LOCKWASH)		UNK015	2
28		2803-0250-006		SCREW (4-40 X 1/4 PPHM)		UNK015	4
				---*---			
29		1415-5159-900		ENCLOSURE			1
30		2400-8009-000		DECAL, CAUTION			2
		SEE FIG 1		TY-RAP 5.5"			A/R
		SEE FIG 1		TAPE, FOAM 3/4"			A/R
		SEE FIG 1		ROD, NYLON 1/8" D			A/R
		SEE FIG 1		TUBING, TFL 26 GA, NAT			A/R
		SEE FIG 1		WIRE, 7S 26 GA			A/R

A---FM/AM-1200S  
B---FM/AM-1200A



DETAIL A

FIGURE 7-17 SCOPE POWER PC BOARD ASSEMBLY





# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

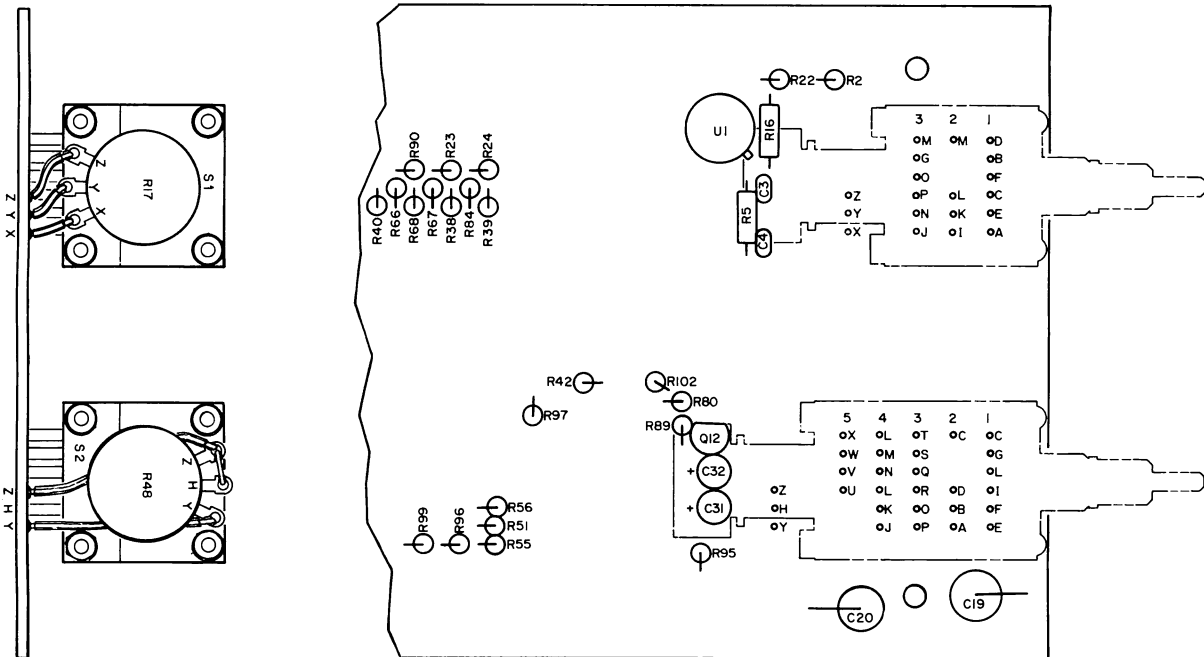
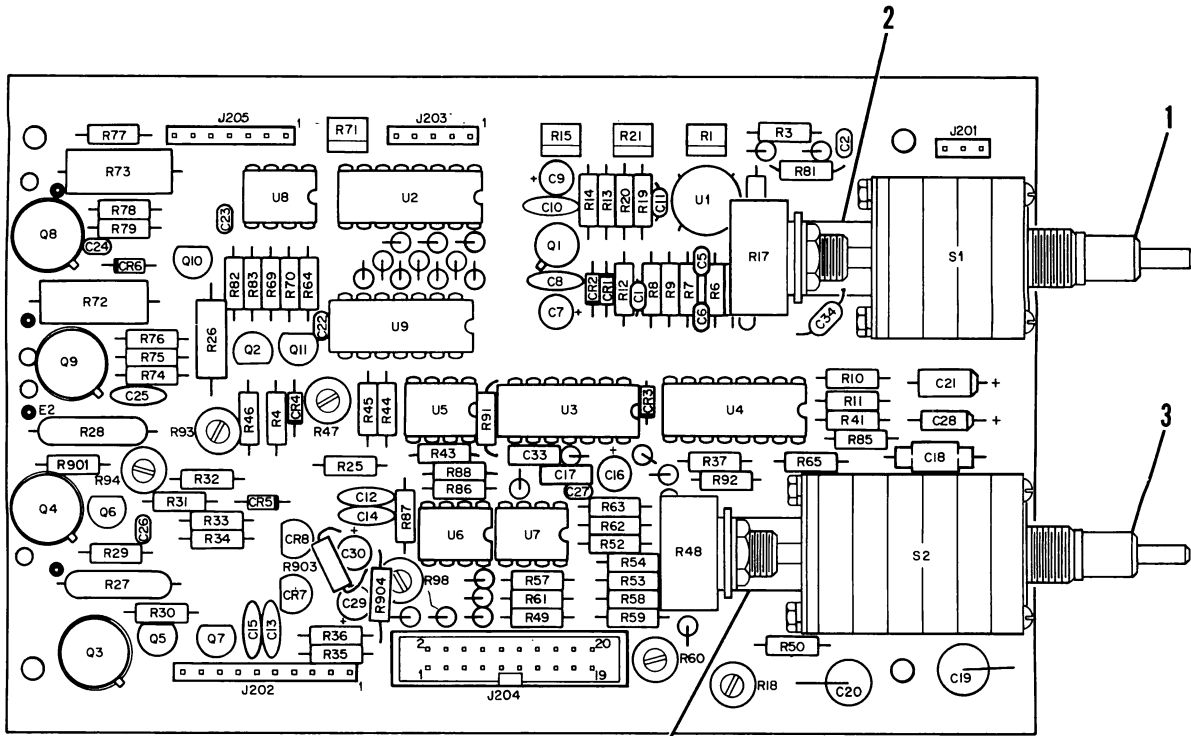
FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
17-		7010-5130-300	SCOPE POWER PC BOARD ASSEMBLY							SEE			REF
			FIG 16 FOR NHA										
	J301	2115-1001-003	CONNECTOR, WAFER (22-03-2031)								27264		1
	P205	2115-0001-007	CONNECTOR, WAFER (22-01-2071)								27264		1
		2127-9900-100	KEY, POLARIZING CONN (15-04-9209)								27264		1
		2114-0000-022	CONTACT, CONN 22-30 GA (08-55-0101)								27264		5
	C301	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C302	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C303	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C304	1580-3310-150	CAPACITOR 330 μF, 16 V (16TT330MS)								52318		1
	C305	1580-3310-150	CAPACITOR 330 μF, 16 V (16TT330MS)								52318		1
	C306	1501-0103-003	CAPACITOR .01 μF, 3000 V (DD30-103)								71950		1
	C307	1501-0103-003	CAPACITOR .01 μF, 3000 V (DD30-103)								71950		1
	C308	1501-0103-003	CAPACITOR .01 μF, 3000 V (DD30-103)								71950		1
	C309	1501-0104-500	CAPACITOR .10 μF, 500 V (DD104)								71950		1
	C310	1501-0104-500	CAPACITOR .10 μF, 500 V (DD104)								71950		1
	C311	1501-0104-500	CAPACITOR .10 μF, 500 V (DD104)								71950		1
	C312	1501-0104-500	CAPACITOR .10 μF, 500 V (DD104)								71950		1
	C313	1501-0103-001	CAPACITOR .01 μF, 1000 V (DD103)								71950		1
	C314	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)								61637		1
	C315	1501-0103-001	CAPACITOR .01 μF, 1000 V (DD103)								71950		1
	C316	1501-0103-001	CAPACITOR .01 μF, 1000 V (DD103)								71950		1
	CR301	4821-0000-001	DIODE, RECT (EK500)								UNK013		1
	CR302	4821-0000-001	DIODE, RECT (EK500)								UNK013		1
	CR303	4901-4937-000	DIODE, RECT (JAN1N4937)								81349		1
	CR304	4901-4937-000	DIODE, RECT (JAN1N4937)								81349		1
	CR305	4901-4937-000	DIODE, RECT (JAN1N4937)								81349		1
	CR306	4901-4937-000	DIODE, RECT (JAN1N4937)								81349		1
	CR307	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR308	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR309	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR310	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	L301	1800-5284-300	INDUCTOR 22 TURN, 18 GA (6700055)								33497		1
	Q301	4807-0000-001	TRANSISTOR (JAN2N3903-18)								81349		1
	Q303	4807-0000-001	TRANSISTOR (JAN2N3903-18)								81349		1
	Q305	5050-2452-100	TRANSISTOR (IRF521)								17856		1
	Q306	5050-2452-100	TRANSISTOR (IRF521)								17856		1
	Q307	4809-0000-003	TRANSISTOR (40321)								02735		1
	Q308	4809-0000-003	TRANSISTOR (40321)								02735		1
	Q309	5020-1009-200	TRANSISTOR (MPSA92)								04713		1
	R301	4702-0472-003	RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)								81349		1
	R302	4702-0472-003	RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)								81349		1
	R303	4702-0223-003	RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)								81349		1
	R304	4702-0330-003	RESISTOR 5%, 1/4 W, 33 OHM (RLR07C330JR)								81349		1
	R305	4702-0330-003	RESISTOR 5%, 1/4 W, 33 OHM (RLR07C330JR)								81349		1
	R306	4703-0103-003	RESISTOR 5%, 1/2 W, 10 K (RLR20C103JR)								81349		1
	R307	4703-0223-003	RESISTOR 5%, 1/2 W, 22 K (RLR20C223JR)								81349		1
	R308	4759-0000-021	RESISTOR, VAR 250 K (CM42299)								12697		1
	R309	4702-0689-003	RESISTOR 5%, 1/4 W, 6.8 OHM (RLR07C689JR)								81349		1
	R310	4702-0471-003	RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)								81349		1
	R311	4703-0684-003	RESISTOR 5%, 1/2 W, 680 K (RLR20C684JR)								81349		1
	R312	4759-0000-022	RESISTOR, VAR 500 K (CM42300)								12697		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
17-	R313	4703-0824-003	RESISTOR	5%	1/2 W,	820 K	(RLR20C824JR)				81349		1
	R314	4703-0824-003	RESISTOR	5%	1/2 W,	820 K	(RLR20C824JR)				81349		1
	R315	4703-0824-003	RESISTOR	5%	1/2 W,	820 K	(RLR20C824JR)				81349		1
	R316	4753-0504-002	RESISTOR, VAR		500 K	(62-2-1-504)					02111		1
	R317	4753-0504-002	RESISTOR, VAR		500 K	(62-2-1-504)					02111		1
	R318	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R320	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R321	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R322	4753-0103-002	RESISTOR, VAR		10 K	(62-2-1-103)					02111		1
	R323	4702-0684-003	RESISTOR	5%	1/4 W,	680 K	(RLR07C684JR)				81349		1
	R324	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R325	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	T301	5604-5150-100	TRANSFORMER		(6700053)						33497		1
	U301	3133-0000-001	IC, QUAD 2-INPUT NOR		(CD4001BE)						02735		1
	U302	3133-0000-004	IC, DUAL JK FLIP-FLOP		(CD4027BE)						02735		1



FM/AM-1200S

FIGURE 7-18 SCOPE CONTROL PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
18-		7010-5130-200		SCOPE CONTROL PC BOARD ASSEMBLY SEE FIG 16 FOR NHA		A	REF
1	R217	7005-5144-300 4780-6302-351		SWITCH ASSY VERTICAL SCOPE RESISTOR, VAR 2 K (381X-2K-S)	12697		1 1
2		1400-5158-200		ATTACHING PARTS BRACKET ---*---			1
3	S201 R248	5111-2001-022 7005-5144-200 4780-6310-451		SWITCH, ROTARY (MM-P/REL-12-3) SWITCH ASSY HORIZONTAL SCOPE RESISTOR, VAR 100 K (381-100K-S)	82104 12697		1 1 1
4		1400-5158-200		ATTACHING PARTS BRACKET ---*---			1
	S202	5111-2001-011		SWITCH, ROTARY (MM-P/REL-24-5)	82104		1
	J201	2115-1001-003		CONNECTOR, WAFER (22-03-2031)	27264		1
	J202	2115-0000-016		CONNECTOR, WAFER (22-03-2101)	27264		1
	J203	2115-1001-005		CONNECTOR, HEADER (22-03-2051)	27264		1
	J204	2129-1001-020		CONNECTOR, HEADER (3592-6002)	75037		1
	J205	2115-1001-007		CONNECTOR, HEADER (22-03-2071)	27264		1
	C201	1625-2230-100		CAPACITOR .022 $\mu$ F, 25 V (C340C223J2G5CA)	61637		1
	C202	1506-0150-017		CAPACITOR 15 pF, 200 V (C320C150J2G5CA)	61637		1
	C203	1506-0270-017		CAPACITOR 27 pF, 200 V (C320C270J2G5CA)	61637		1
	C204	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C205	1506-0180-017		CAPACITOR 18 pF, 200 V (C320C180J2G5CA)	61637		1
	C206	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)	61637		1
	C207	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C208	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C209	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C210	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C211	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110C0G3R3C100V)	72982		1
	C212	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C213	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C214	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C215	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C216	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C217	1642-1040-400		CAPACITOR .1 $\mu$ F, 63 V (MKT1817-410-06-5)	UNK014		1
	C218	1502-0103-010		CAPACITOR .01 $\mu$ F, 50 V (PC12.01-50-2)	27735		1
	C219	1502-0104-010		CAPACITOR .1 $\mu$ F, 50 V (PC12.1-50-5)	27735		1
	C220	1502-0105-007		CAPACITOR 1 $\mu$ F, 50 V (MPC13-1-50-5)	27735		1
	C221	1507-0106-021		CAPACITOR 10 $\mu$ F, 20 V (T322C106M020AS)	31433		1
	C222	1506-0100-017		CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C223	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C224	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C225	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C226	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C227	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C228	1507-0475-021		CAPACITOR 4.7 $\mu$ F, 20 V (T322B475M020AS)	31433		1
	C229	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C230	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C231	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C232	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C233	1642-1040-400		CAPACITOR .1 $\mu$ F, 63 V (MKT1817-410-06-5)	UNK014		1
	C234	1507-0685-020		CAPACITOR 6.8 $\mu$ F, 15 V (T322B685M015AS)	31433		1
	CR201	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR202	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR203	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR204	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR205	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR206	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR207	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR208	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	Q201	4802-0000-005		TRANSISTOR (JAN2N3956)	81349		1
	Q202	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1

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FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
18-	Q203	4809-0000-003		TRANSISTOR (40321)		02735	1
	Q204	4809-0000-003		TRANSISTOR (40321)		02735	1
	Q205	4807-0000-001		TRANSISTOR (JAN2N3903-18)		81349	1
	Q206	4807-0000-001		TRANSISTOR (JAN2N3903-18)		81349	1
	Q207	4807-0000-001		TRANSISTOR (JAN2N3903-18)		81349	1
	Q208	4809-0000-003		TRANSISTOR (40321)		02735	1
	Q209	4809-0000-003		TRANSISTOR (40321)		02735	1
	Q210	4807-0000-001		TRANSISTOR (JAN2N3903-18)		81349	1
	Q211	4807-0000-001		TRANSISTOR (JAN2N3903-18)		81349	1
	Q212	4801-0000-001		TRANSISTOR (JAN2N2222)		81349	1
	R201	4753-0203-002		RESISTOR, VAR 20 K (62-2-1-203)		02111	1
	R202	4706-7501-001		RESISTOR 1%, 1/4 W, 7.50 K (RLR07C7501FR)		81349	1
	R203	4706-2491-001		RESISTOR 1%, 1/4 W, 2.49 K (RLR07C2491FR)		81349	1
	R204	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)		81349	1
	R205	4706-9093-001		RESISTOR 1%, 1/4 W, 909.00 K (RLR07C9093FR)		81349	1
	R206	4706-1003-001		RESISTOR 1%, 1/4 W, 100.00 K (RLR07C1003FR)		81349	1
	R207	4706-1004-001		RESISTOR 1%, 1/4 W, 1.00 M (RLR07C1004FR)		81349	1
	R208	4706-1001-001		RESISTOR 1%, 1/4 W, 1.00 K (RLR07C1001FR)		81349	1
	R209	4706-9091-001		RESISTOR 1%, 1/4 W, 9.09 K (RLR07C9091FR)		81349	1
	R210	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)		81349	1
	R211	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)		81349	1
	R212	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)		81349	1
	R213	4706-1001-001		RESISTOR 1%, 1/4 W, 1.00 K (RLR07C1001FR)		81349	1
	R214	4706-9090-001		RESISTOR 1%, 1/4 W, 909.00 OHM (RLR07C9090FR)		81349	1
	R215	4753-0201-002		RESISTOR, VAR 200 OHM (62-2-1-201)		02111	1
	R216	4702-0221-003		RESISTOR 5%, 1/4 W, 220 OHM (RLR07C221JR)		81349	1
	R218	4752-0202-002		RESISTOR, VAR 2 K (62-1-1-202)		02111	1
	R219	4706-2001-001		RESISTOR 1%, 1/4 W, 2.00 K (RLR07C2001FR)		81349	1
	R220	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)		81349	1
	R221	4753-0500-002		RESISTOR, VAR 50 OHM (62-2-1-500)		02111	1
	R222	4702-0183-003		RESISTOR 5%, 1/4 W, 18 K (RLR07C183JR)		81349	1
	R223	4702-0152-003		RESISTOR 5%, 1/4 W, 1.5 K (RLR07C152JR)		81349	1
	R224	4702-0273-003		RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)		81349	1
	R225	4702-0101-003		RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)		81349	1
	R226	4711-3301-001		RESISTOR 1%, 1/2 W, 3.30 K (RLR20C3301FR)		81349	1
	R227	4713-1502-001		RESISTOR 2%, 2 W, 15 K (RLR42C1502GR)		81349	1
	R228	4713-1502-001		RESISTOR 2%, 2 W, 15 K (RLR42C1502GR)		81349	1
	R229	4702-0330-003		RESISTOR 5%, 1/4 W, 33 OHM (RLR07C330JR)		81349	1
	R230	4702-0151-003		RESISTOR 5%, 1/4 W, 150 OHM (RLR07C151JR)		81349	1
	R231	4702-0101-003		RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)		81349	1
	R232	4702-0822-003		RESISTOR 5%, 1/4 W, 8.2 K (RLR07C822JR)		81349	1
	R233	4702-0222-003		RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)		81349	1
	R234	4702-0271-003		RESISTOR 5%, 1/4 W, 270 OHM (RLR07C271JR)		81349	1
	R235	4702-0221-003		RESISTOR 5%, 1/4 W, 220 OHM (RLR07C221JR)		81349	1
	R236	4702-0221-003		RESISTOR 5%, 1/4 W, 220 OHM (RLR07C221JR)		81349	1
	R237	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)		81349	1
	R238	4702-0105-003		RESISTOR 5%, 1/4 W, 1 M (RLR07C105JR)		81349	1
	R239	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)		81349	1
	R240	4702-0473-003		RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)		81349	1
	R241	4702-0473-003		RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)		81349	1
	R242	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)		81349	1
	R243	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)		81349	1
	R244	4702-0123-003		RESISTOR 5%, 1/4 W, 12 K (RLR07C123JR)		81349	1
	R245	4702-0821-003		RESISTOR 5%, 1/4 W, 820 OHM (RLR07C821JR)		81349	1
	R246	4702-0272-003		RESISTOR 5%, 1/4 W, 2.7 K (RLR07C272JR)		81349	1
	R247	4756-3010-200		RESISTOR, VAR 1 K (3339H-1-102)		57924	1
	R249	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)		81349	1
	R250	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)		81349	1
	R251	4706-1001-001		RESISTOR 1%, 1/4 W, 1.00 K (RLR07C1001FR)		81349	1
	R252	4706-1001-001		RESISTOR 1%, 1/4 W, 1.00 K (RLR07C1001FR)		81349	1
	R253	4706-2490-001		RESISTOR 1%, 1/4 W, 249.00 OHM (RLR07C2490FR)		81349	1
	R254	4706-1100-001		RESISTOR 1%, 1/4 W, 110.00 OHM (RLR07C1100FR)		81349	1
	R255	4706-1001-001		RESISTOR 1%, 1/4 W, 1.00 K (RLR07C1001FR)		81349	1

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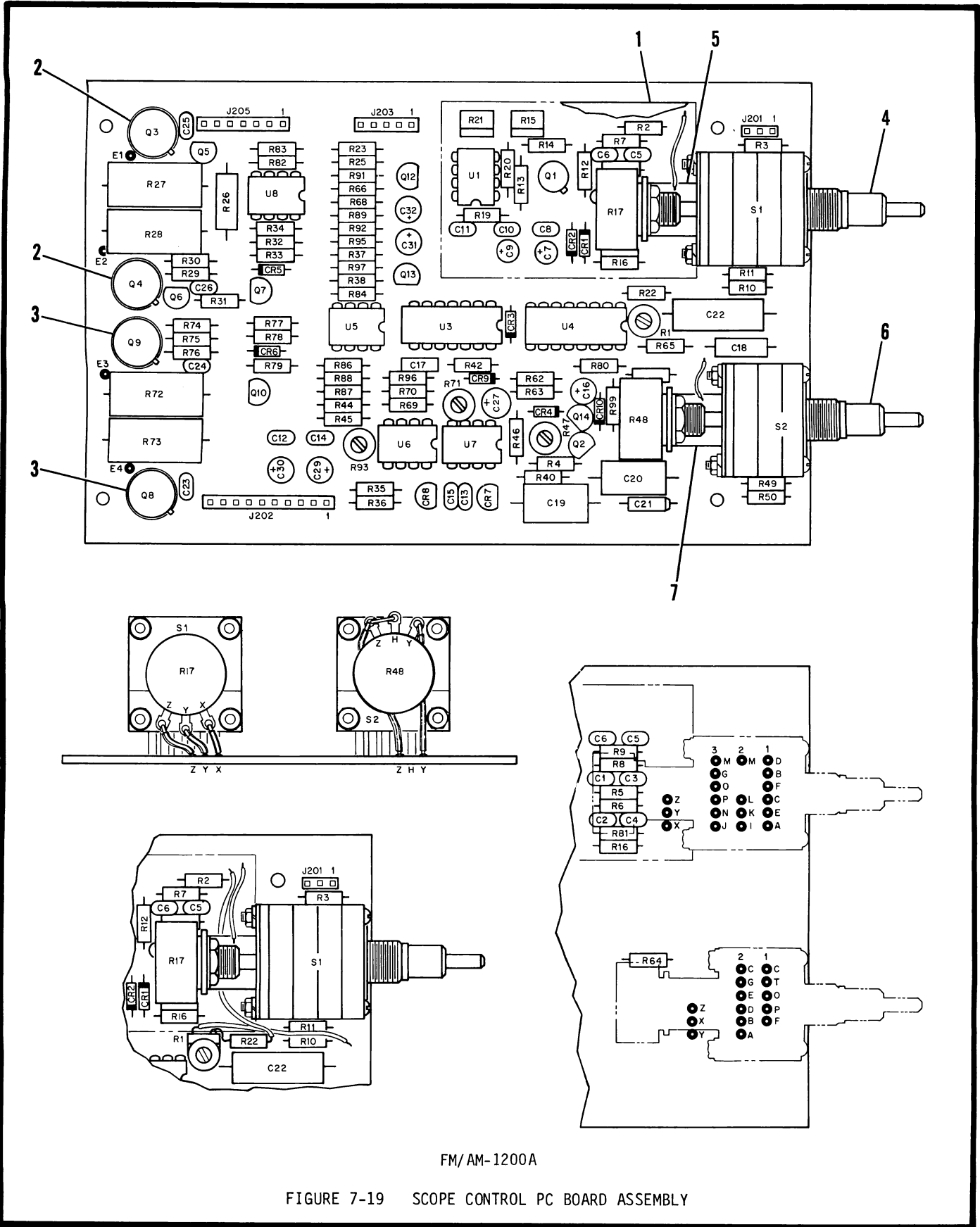
# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
18-	R256	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R257	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R258	4706-1101-001	RESISTOR	1%	1/4 W,	1.10 K	(RLR07C1101FR)				81349		1
	R259	4706-1000-001	RESISTOR	1%	1/4 W,	100.00 OHM	(RLR07C1000FR)				81349		1
	R260	4752-0103-002	RESISTOR, VAR			10 K	(62-2-1-103)				02111		1
	R261	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R262	4702-0123-003	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		1
	R263	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R264	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R265	4702-0470-003	RESISTOR	5%	1/4 W,	47 OHM	(RLR07C470JR)				81349		1
	R266	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R267	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R268	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R269	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R270	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R271	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R272	4712-4702-001	RESISTOR	2%	1 W,	47 K	(RLR32C4702GR)				81349		1
	R273	4712-4702-001	RESISTOR	2%	1 W,	47 K	(RLR32C4702GR)				81349		1
	R274	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R275	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R276	4702-0102-003*	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
		4702-0821-003*	RESISTOR	5%	1/4 W,	820 OHM	(RLR07C821JR)				81349		A/R
		4702-0112-003*	RESISTOR	5%	1/4 W,	1.1 K	(RLR07C112JR)				81349		A/R
		4702-0122-003*	RESISTOR	5%	1/4 W,	1.2 K	(RLR07C122JR)				81349		A/R
	R277	4702-0822-003	RESISTOR	5%	1/4 W,	8.2 K	(RLR07C822JR)				81349		1
	R278	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R279	4702-0561-003	RESISTOR	5%	1/4 W,	560 OHM	(RLR07C561JR)				81349		1
	R280	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R281	4706-1004-001	RESISTOR	1%	1/4 W,	1.00 M	(RLR07C1004FR)				81349		1
	R282	4702-0333-003	RESISTOR	5%	1/4 W,	33 K	(RLR07C333JR)				81349		1
	R283	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R284	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R285	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R286	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R287	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R288	4702-0105-003	RESISTOR	5%	1/4 W,	1 M	(RLR07C105JR)				81349		1
	R289	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R290	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R291	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R292	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R293	4752-0501-002	RESISTOR, VAR			500 OHM	(62-1-1-501)				02111		1
	R294	4752-0201-002	RESISTOR, VAR			200 OHM	(62-1-1-201)				02111		1
	R295	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R296	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R297	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R298	4752-0103-002	RESISTOR, VAR			10 K	(62-1-1-103)				02111		1
	R299	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R901	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R902	4701-0101-003	RESISTOR	5%	1/8 W,	100 OHM	(RLR05C101JR)				81349		1
	R903	4706-2372-001	RESISTOR	1%	1/4 W,	23.70 K	(RLR07C2372FR)				81349		1
	R904	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	U201	3133-0000-015	IC, WIDE BAND OP AMP			(CA3100T)					02735		1
	U202	3133-0000-023	IC, MPLXR/DMPLXR			(CD4053BE)					02735		1
	U203	3214-4013-100	IC, DUAL D FLIP-FLOP			(CD4013BE)					02735		1
	U204	3214-4051-100	IC, ANALOG MPLXR			(CD4051BE)					02735		1
	U205	3223-0003-000	IC, DUAL VOLT COMPARATOR			(LM393N)					27014		1
	U206	3135-0000-054	IC, OP AMP			(LF412N)					27014		1
	U207	3221-0006-000	IC, DUAL LOW NOISE OP AMP			(NE5532N)					18324		1
	U208	3135-0000-054	IC, OP AMP			(LF412CN)					27014		1
	U209	3214-4013-100	IC, DUAL D FLIP-FLOP			(CD4013BE)					02735		1

NOTE: \* SELECTED AT TEST (SAT)  
 NOMINAL VALUE = 1 K  
 SELECT RANGE = 820 OHM THRU 1.2 K  
 A---FM/AM-1200S



# ILLUSTRATED PARTS CATALOG



FM/AM-1200A

FIGURE 7-19 SCOPE CONTROL PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
19-		7010-5530-200		SCOPE CONTROL PC BOARD ASSEMBLY SEE FIG 16 FOR NHA		A	REF
1		2508-5550-400		SHIELD			1
	J201	2115-1001-003		CONNECTOR, WAFER (22-03-2031)	27264		1
	J202	2115-0000-016		CONNECTOR, WAFER (22-03-2101)	27264		1
	J203	2115-1001-005		CONNECTOR, WAFER (22-03-2051)	27264		1
	J205	2115-1001-007		CONNECTOR, WAFER (22-03-2071)	27264		1
	C201	1625-2230-100		CAPACITOR .022 $\mu$ F, 25 V (C340C223J2G5CA)	61637		1
	C202	1506-0150-017		CAPACITOR 15 pF, 200 V (C320C150J2G5CA)	61637		1
	C203	1506-0270-017		CAPACITOR 27 pF, 200 V (C320C270J2G5CA)	61637		1
	C204	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C205	1506-0180-017		CAPACITOR 18 pF, 200 V (C320C180J2G5CA)	61637		1
	C206	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)	61637		1
	C207	1507-0336-023		CAPACITOR 33 $\mu$ F, 10 V (T322D336M010AS)	31433		1
	C208	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C209	1507-0336-023		CAPACITOR 33 $\mu$ F, 10 V (T322D336M010AS)	31433		1
	C210	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C211	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110COG3R3C100V)	72982		1
	C212	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C213	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C214	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C215	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C216	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C217	1642-1040-400		CAPACITOR .1 $\mu$ F, 63 V (MKT1817-410-06-5)	UNK014		1
	C218	1502-0103-010		CAPACITOR .01 $\mu$ F, 50 V (PC12.01-50-2)	27735		1
	C219	1502-0104-010		CAPACITOR .1 $\mu$ F, 50 V (PC12.1-50-5)	27735		1
	C220	1502-0105-007		CAPACITOR 1 $\mu$ F, 50 V (MPC13-1-50-5)	27735		1
	C221	1507-0106-121		CAPACITOR 10 $\mu$ F, 20 V (T322C106J020AS)	31433		1
	C222	1502-0102-008		CAPACITOR .001 $\mu$ F, 100 V (PE31-3-1-001-100-5)	27735		1
	C223	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C224	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C225	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C226	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C227	1605-3360-475		CAPACITOR 33 $\mu$ F, 16 V (T350H336M016AS)	31433		1
	C229	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C230	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C231	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	C232	1580-1000-200		CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1
	CR201	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR202	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR203	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR204	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR205	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR206	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR207	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR208	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR209	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR210	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	Q201	4802-0000-005		TRANSISTOR (JAN2N3956)	81349		1
	Q202	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	Q203	4809-0000-003		TRANSISTOR (40321)	02735		1
	Q204	4809-0000-003		TRANSISTOR (40321)	02735		1
2		4835-0000-012		INSULATOR, TRANSISTOR (511-038)	92219		2
	Q205	4807-0000-001		TRANSISTOR (JAN2N3903-18)	81349		1
	Q206	4807-0000-001		TRANSISTOR (JAN2N3903-18)	81349		1
	Q207	4807-0000-001		TRANSISTOR (JAN2N3903-18)	81349		1
	Q208	4809-0000-003		TRANSISTOR (40321)	02735		1
	Q209	4809-0000-003		TRANSISTOR (40321)	02735		1
3		4835-0000-012		INSULATOR, TRANSISTOR (511-038)	92219		2
	Q210	4807-0000-001		TRANSISTOR (JAN2N3903-18)	81349		1
	Q212	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1
	Q213	5050-2401-100		TRANSISTOR (VN10LM)	17856		1
	Q214	4805-0000-003		TRANSISTOR (JAN2N3646)	17856		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
19-	R201	4753-0203-002	RESISTOR,	VAR	20 K	(62-2-1-203)					02111	B	1
	R201	4752-0203-002	RESISTOR,	VAR	20 K	(62-1-1-203)					02111	C	1
	R202	4706-7501-001	RESISTOR		1%, 1/4 W,	7.50 K (RLR07C7501FR)					81349		1
	R203	4706-2491-001	RESISTOR		1%, 1/4 W,	2.49 K (RLR07C2491FR)					81349		1
	R204	4702-0103-003	RESISTOR		5%, 1/4 W,	10 K (RLR07C103JR)					81349		1
	R205	4706-9093-001	RESISTOR		1%, 1/4 W,	909.00 K (RLR07C9093FR)					81349		1
	R206	4706-1003-001	RESISTOR		1%, 1/4 W,	100.00 K (RLR07C1003FR)					81349		1
	R207	4706-1004-001	RESISTOR		1%, 1/4 W,	1.00 M (RLR07C1004FR)					81349		1
	R208	4706-1001-001	RESISTOR		1%, 1/4 W,	1.00 K (RLR07C1001FR)					81349		1
	R209	4706-9091-001	RESISTOR		1%, 1/4 W,	9.09 K (RLR07C9091FR)					81349		1
	R210	4702-0103-003	RESISTOR		5%, 1/4 W,	10 K (RLR07C103JR)					81349		1
	R211	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R212	4702-0472-003	RESISTOR		5%, 1/4 W,	4.7 K (RLR07C472JR)					81349		1
	R213	4706-1001-001	RESISTOR		1%, 1/4 W,	1.00 K (RLR07C1001FR)					81349		1
	R214	4706-9090-001	RESISTOR		1%, 1/4 W,	909.00 OHM (RLR07C9090FR)					81349		1
	R215	4753-0201-002	RESISTOR,	VAR	200 OHM	(62-2-1-201)					02111		1
	R216	4702-0221-003	RESISTOR		5%, 1/4 W,	220 OHM (RLR07C221JR)					81349		1
	R219	4706-2001-001	RESISTOR		1%, 1/4 W,	2.00 K (RLR07C2001FR)					81349		1
	R220	4702-0680-003	RESISTOR		5%, 1/4 W,	68 OHM (RLR07C680JR)					81349		1
	R221	4753-0500-002	RESISTOR,	VAR	50 OHM	(62-2-1-500)					02111		1
	R222	4702-0183-003	RESISTOR		5%, 1/4 W,	18 K (RLR07C183JR)					81349		1
	R223	4702-0152-003	RESISTOR		5%, 1/4 W,	1.5 K (RLR07C152JR)					81349		1
	R225	4702-0101-003	RESISTOR		5%, 1/4 W,	100 OHM (RLR07C101JR)					81349		1
	R226	4711-3301-001	RESISTOR		1%, 1/2 W,	3.30 K (RLR20C3301FR)					81349		1
	R227	4713-1502-001	RESISTOR		2%, 2 W,	15 K (RLR42C1502FR)					81349		1
	R228	4713-1502-001	RESISTOR		2%, 2 W,	15 K (RLR42C1502FR)					81349		1
	R229	4702-0330-003	RESISTOR		5%, 1/4 W,	33 OHM (RLR07C330JR)					81349		1
	R230	4702-0151-003	RESISTOR		5%, 1/4 W,	150 OHM (RLR07C151JR)					81349		1
	R231	4702-0151-003	RESISTOR		5%, 1/4 W,	150 OHM (RLR07C151JR)					81349		1
	R232	4702-0822-003	RESISTOR		5%, 1/4 W,	8.2 K (RLR07C822JR)					81349		1
	R233	4702-0222-003	RESISTOR		5%, 1/4 W,	2.2 K (RLR07C222JR)					81349		1
	R234	4702-0271-003	RESISTOR		5%, 1/4 W,	270 OHM (RLR07C271JR)					81349		1
	R235	4702-0221-003	RESISTOR		5%, 1/4 W,	220 OHM (RLR07C221JR)					81349		1
	R236	4702-0221-003	RESISTOR		5%, 1/4 W,	220 OHM (RLR07C221JR)					81349		1
	R237	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R238	4702-0105-003	RESISTOR		5%, 1/4 W,	1 M (RLR07C105JR)					81349		1
	R240	4706-2000-001	RESISTOR		1%, 1/4 W,	200.00 OHM (RLR07C2000FR)					81349		1
	R242	4702-0473-003	RESISTOR		5%, 1/4 W,	47 K (RLR07C473JR)					81349		1
	R244	4702-0123-003	RESISTOR		5%, 1/4 W,	12 K (RLR07C123JR)					81349		1
	R245	4702-0821-003	RESISTOR		5%, 1/4 W,	820 OHM (RLR07C821JR)					81349		1
	R246	4702-0272-003	RESISTOR		5%, 1/4 W,	2.7 K (RLR07C272JR)					81349		1
	R247	4756-3010-200	RESISTOR,	VAR	1 K	(3339H-1-102)					57924		1
	R249	4702-0472-003	RESISTOR		5%, 1/4 W,	4.7 K (RLR07C472JR)					81349		1
	R250	4702-0471-003	RESISTOR		5%, 1/4 W,	470 OHM (RLR07C471JR)					81349		1
	R262	4702-0123-003	RESISTOR		5%, 1/4 W,	12 K (RLR07C123JR)					81349		1
	R263	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R264	4702-0103-003	RESISTOR		5%, 1/4 W,	10 K (RLR07C103JR)					81349		1
	R265	4702-0470-003	RESISTOR		5%, 1/4 W,	47 OHM (RLR07C470JR)					81349		1
	R266	4702-0332-003	RESISTOR		5%, 1/4 W,	3.3 K (RLR07C332JR)					81349		1
	R268	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R269	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R270	4702-0332-003	RESISTOR		5%, 1/4 W,	3.3 K (RLR07C332JR)					81349		1
	R271	4752-0202-002	RESISTOR,	VAR	2 K	(62-1-1-202)					02111		1
	R272	4712-4702-001	RESISTOR		2%, 1 W,	47 K (RLR32C4702GR)					81349		1
	R273	4712-4702-001	RESISTOR		2%, 1 W,	47 K (RLR32C4702GR)					81349		1
	R274	4702-0101-003	RESISTOR		5%, 1/4 W,	100 OHM (RLR07C101JR)					81349		1
	R275	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R276	4702-0102-003	RESISTOR		5%, 1/4 W,	1 K (RLR07C102JR)					81349		1
	R277	4702-0822-003	RESISTOR		5%, 1/4 W,	8.2 K (RLR07C822JR)					81349		1
	R278	4702-0222-003	RESISTOR		5%, 1/4 W,	2.2 K (RLR07C222JR)					81349		1
	R279	4702-0561-003	RESISTOR		5%, 1/4 W,	560 OHM (RLR07C561JR)					81349		1
	R280	4702-0473-003	RESISTOR		5%, 1/4 W,	47 K (RLR07C473JR)					81349		1
	R281	4706-1004-001	RESISTOR		1%, 1/4 W,	1.00 M (RLR07C1004FR)					81349		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
19-	R282	4702-0333-003	RESISTOR	5%	1/4 W,	33 K	(RLR07C333JR)				81349		1	
	R283	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1	
	R284	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1	
	R286	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1	
	R287	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1	
	R288	4702-0105-003	RESISTOR	5%	1/4 W,	1 M	(RLR07C105JR)				81349		1	
	R289	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1	
	R291	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1	
	R292	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1	
	R293	4752-0501-002	RESISTOR, VAR			500 OHM	(62-1-1-501)				02111		1	
	R295	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1	
	R296	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1	
	R297	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1	
	R299	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1	
	4		7005-5144-300	SWITCH ASSY				VERTICAL SCOPE						1
		R217	4780-6302-351	RESISTOR, VAR			2 K	(381X-2K-S)				12697		1
	5		1400-5158-200	ATTACHING PARTS										
				BRACKET										1
	6	S201	5111-2001-022	SWITCH, ROTARY				(MM-P/REL-12-3)				82104		1
		7005-5541-000	SWITCH ASSY				HORIZONTAL SCOPE						1	
R248		4780-6310-452	RESISTOR, VAR			100 K							1	
7		1400-5158-200	ATTACHING PARTS											
			BRACKET										1	
			SWITCH, ROTARY										1	
	S202	5111-2001-200	IC, WIDE BAND OP AMP				(CA3100T)				02735		1	
	U201	3133-0000-015	IC, DUAL D FLIP-FLOP				(CD4013BE)				02735		1	
	U203	3214-4013-100	IC, ANALOG MPLXR				(CD4051BE)				02735		1	
	U204	3214-4051-100	IC, DUAL VOLT COMPARATOR				(LM393N)				27014		1	
	U205	3223-0003-000	IC, OP AMP				(LF412CN)				27014		1	
	U206	3135-0000-054	IC, DUAL LOW NOISE OP AMP				(NE5532N)				18324		1	
	U207	3221-0006-000	IC, OP AMP				(LF412CN)				27014		1	
	U208	3135-0000-054	IC, OP AMP				(LF412CN)				27014		1	

A---FM/AM-1200A  
 B---FM/AM-1200A S/N 1250 THRU S/N 1289  
 C---FM/AM-1200A S/N 1290 & ON

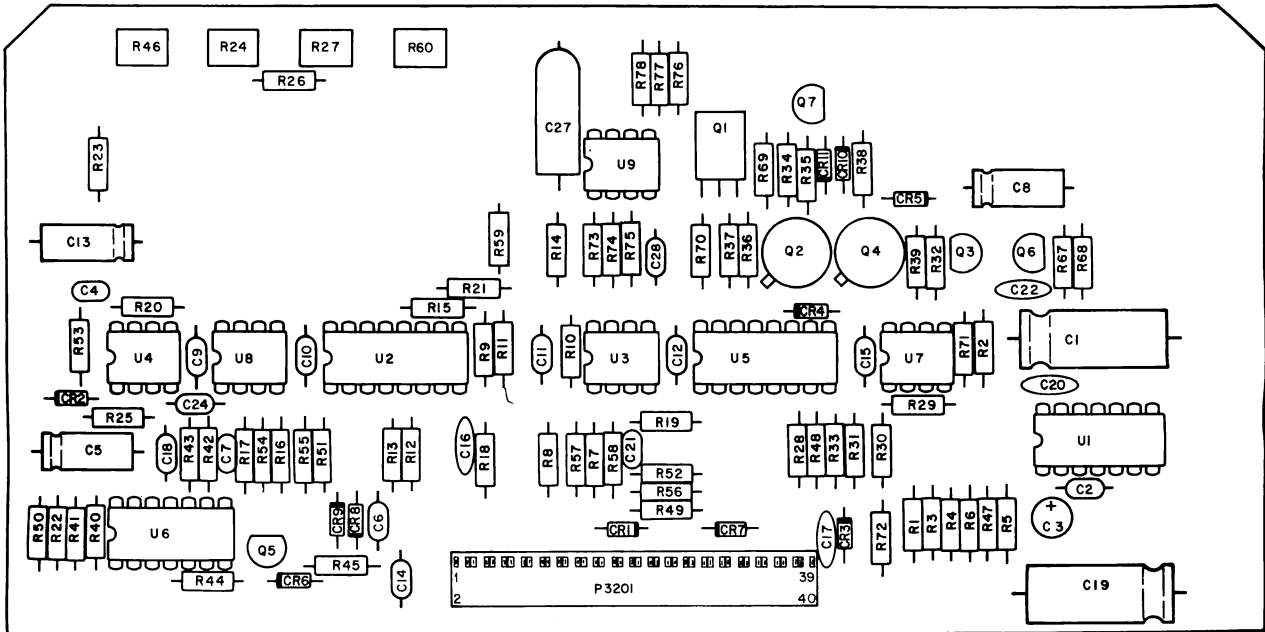


FIGURE 7-20 GENERATE AUDIO PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
20-		7010-5530-300		GENERATE AUDIO PC BOARD ASSEMBLY SEE FIG 13 FOR NHA			REF
	P3201	2129-0186-140		CONNECTOR, HEADER (65000-026)	UNK001		1
	C3201	1580-3310-150		CAPACITOR 330 $\mu$ F, 16 V (16TT330MS)	52318		1
	C3202	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C3203	1580-1092-450		CAPACITOR 1 $\mu$ F, 50 V (50TW1L)	52318		1
	C3204	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C3205	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C3206	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3207	1506-0271-017		CAPACITOR 270 pF, 200 V (C320C271J2G5CA)	72982		1
	C3208	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C3209	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3210	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3211	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3212	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3213	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C3214	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3215	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3216	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C3217	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C3218	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3219	1580-3310-150		CAPACITOR 330 $\mu$ F, 16 V (16TT330MS)	52318		1
	C3220	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C3221	1506-0100-017		CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C3222	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C3224	1521-0000-008		CAPACITOR .10 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C3227	1507-0336-021		CAPACITOR 33 $\mu$ F, 20 V (T322E336M020AS)	31433		1
	C3228	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	CR3201	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3202	4818-0000-003		DIODE, ZENER 5.1 V (JAN1N5231B)	81349		1
	CR3203	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3204	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3205	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3206	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3207	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3208	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3209	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3210	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3211	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	Q3201	4811-0000-002		TRANSISTOR (SJE1462)	04713		1
	Q3202	4801-0000-004		TRANSISTOR (JAN2N2905)	81349		1
	Q3203	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	Q3204	4801-0000-004		TRANSISTOR (JAN2N2905)	81349		1
	Q3205	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1
	Q3206	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1
	Q3207	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	R3201	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R3202	4702-0100-003		RESISTOR 5%, 1/4 W, 10 OHM (RLR07C100JR)	81349		1
	R3203	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3204	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R3205	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R3206	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3207	4702-0470-003		RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R3208	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R3209	4702-0183-003		RESISTOR 5%, 1/4 W, 18 K (RLR07C183JR)	81349		1
	R3210	4702-0333-003		RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
	R3211	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R3212	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R3213	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R3214	4702-0332-003		RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1
	R3215	4702-0272-003		RESISTOR 5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		1
	R2316	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R2317	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)	81349		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
20-	R2318	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3219	4702-0273-003	RESISTOR	5%	1/4 W,	27 K	(RLR07C273JR)				81349		1
	R3220	4702-0334-003	RESISTOR	5%	1/4 W,	330 K	(RLR07C334JR)				81349		1
	R3221	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3222	4702-0183-003	RESISTOR	5%	1/4 W,	18 K	(RLR07C183JR)				81349		1
	R3223	4702-0183-003	RESISTOR	5%	1/4 W,	18 K	(RLR07C183JR)				81349		1
	R3224	4753-1030-002	RESISTOR, VAR			10 K	(62-2-1-103)				02111		1
	R3225	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3226	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R3227	4753-0103-002	RESISTOR, VAR			10 K	(62-2-1-103)				02111		1
	R3228	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3229	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3230	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R3231	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3232	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3233	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3234	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3235	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3236	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3237	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3238	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3239	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3240	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3241	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3242	4702-0225-003	RESISTOR	5%	1/4 W,	2.2 M	(RLR07C225JR)				81349		1
	R3243	4702-0225-003	RESISTOR	5%	1/4 W,	2.2 M	(RLR07C225JR)				81349		1
	R3244	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3245	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R3246	4753-0502-002	RESISTOR, VAR			5 K,	(62-2-1-502)				02111		1
	R3247	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3248	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3249	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3250	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R3251	4702-0333-003	RESISTOR	5%	1/4 W,	33 K	(RLR07C333JR)				81349		1
	R3252	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R3253	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R3254	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3255	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3256	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3257	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3258	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3259	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R3260	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R3267	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3268	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3269	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3270	4702-0229-002	RESISTOR	5%	1 W,	2.2 OHM	(RLR32C229JR)				81349		1
	R3271	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R3272	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3273	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3274	4702-0334-003	RESISTOR	5%	1/4 W,	330 K	(RLR07C334JR)				81349		1
	R3275	4702-0274-003	RESISTOR	5%	1/4 W,	270 K	(RLR07C274JR)				81349		1
	R3276	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3277	4702-0274-003	RESISTOR	5%	1/4 W,	270 K	(RLR07C274JR)				81349		1
	R3278	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1

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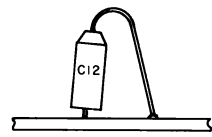
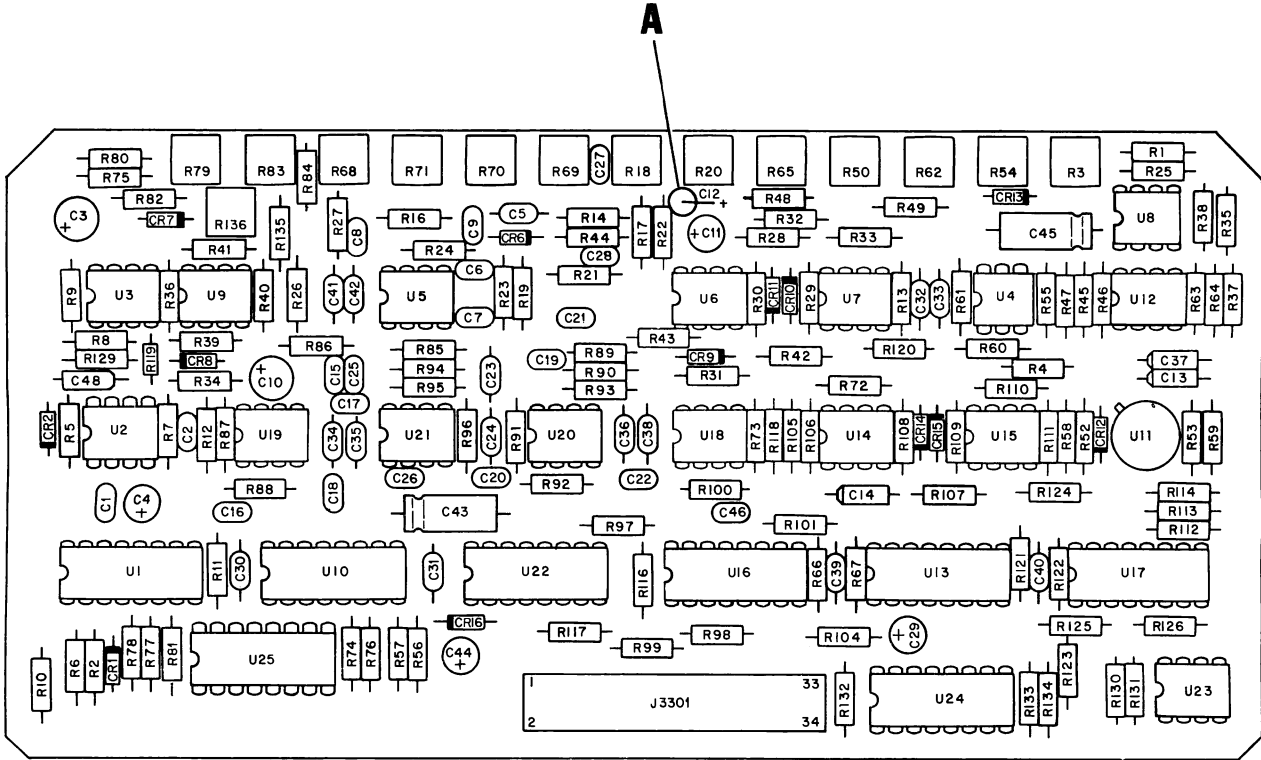


# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
20-	U3201	3135-0000-010								IC, POWER AUDIO AMP (LM380N)	27014		1
	U3202	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3203	3221-0006-000								IC, DUAL LOW NOISE OP AMP (NE5532N)	18324		1
	U3204	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3205	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3206	3133-0000-011								IC, QUAD 2-INPUT NAND (CD4011BE)	02735		1
	U3207	3133-0000-024								IC, BIMOS OP AMP (CA3130E)	02735		1
	U3208	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3209	3135-0000-054								IC, OP AMP (LF412CN)	27014		1



# ILLUSTRATED PARTS CATALOG



DETAIL A

FIGURE 7-21 RECEIVE AUDIO PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY	REF
21-		7010-5233-301		RECEIVE AUDIO PC BOARD ASSEMBLY SEE				
				FIG 13 FOR NHA				
	J3301	2129-0186-134		CONNECTOR, HEADER (1-86063-3)		00779		1
	C3301	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3302	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3303	1580-1092-450		CAPACITOR 1 $\mu$ F, 50 V (50TW1L)		52318		1
	C3304	1580-1092-450		CAPACITOR 1 $\mu$ F, 50 V (50TW1L)		52318		1
	C3305	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3306	1506-0562-017		CAPACITOR 5600 pF, 100 V (C320C562J2G5CA)		61637		1
	C3307	1506-0562-017		CAPACITOR 5600 pF, 100 V (C320C562J2G5CA)		61637		1
	C3308	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)		61637		1
	C3309	1506-0100-017		CAPACITOR 10 pF, 200 V (C320C100J2G5CA)		61637		1
	C3310	1580-3392-450		CAPACITOR 3.3 $\mu$ F, 50 V (50TW3R)		52318		1
	C3311	1580-3392-450		CAPACITOR 3.3 $\mu$ F, 50 V (50TW3R)		52318		1
	C3312	1507-0336-023		CAPACITOR 33 $\mu$ F, 10 V (T322D336M010AS)		31433		1
	C3313	1507-0474-018		CAPACITOR .47 $\mu$ F, 35 V (T322A474M035AS)		31433		1
	C3314	1507-0685-020		CAPACITOR 6.8 $\mu$ F, 15 V (T322B685M015AS)		31433		1
	C3315	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)		61637		1
	C3316	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)		61637		1
	C3317	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)		61637		1
	C3318	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)		61637		1
	C3319	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)		61637		1
	C3320	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)		61637		1
	C3321	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)		61637		1
	C3322	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)		61637		1
	C3323	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)		61637		1
	C3324	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)		61637		1
	C3325	1506-0472-017		CAPACITOR 4700 pF, 100 V (C320C472J2G5CA)		61637		1
	C3326	1506-0472-017		CAPACITOR 4700 pF, 100 V (C320C472J2G5CA)		61637		1
	C3327	1506-0562-017		CAPACITOR 5600 pF, 100 V (C320C562J2G5CA)		61637		1
	C3328	1506-0562-017		CAPACITOR 5600 pF, 100 V (C320C562J2G5CA)		61637		1
	C3329	1580-3392-450		CAPACITOR 3.3 $\mu$ F, 50 V (50TW3R)		52318		1
	C3330	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3331	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3332	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3333	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3334	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3335	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3336	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3337	1507-0105-018		CAPACITOR 1 $\mu$ F, 35 V (T322B105M035AS)		31433		1
	C3338	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3339	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3340	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3341	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3342	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982		1
	C3343	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)		52318		1
	C3344	1580-1092-450		CAPACITOR 1 $\mu$ F, 50 V (50TW1L)		52318		1
	C3345	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)		52318		1
	C3346	1506-0470-017		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)		61637		1
	C3348	1507-0105-018		CAPACITOR 1 $\mu$ F, 35 V (T322B105M035AS)		31433		1
	CR3301	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3302	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3306	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3307	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3308	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3309	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3310	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3311	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3312	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3313	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3314	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3315	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1
	CR3316	4815-0000-003		DIODE, SIGNAL (JAN1N4148)		81349		1

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# ILLUSTRATED PARTS CATALOG

FIG-

ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
21-	R3301	4706-3652-001	RESISTOR	1%	1/4 W,	36.50 K	(RLR07C3652FR)				81349		1
	R3302	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3303	4753-0103-002	RESISTOR, VAR			10 K	(62-2-1-103)				02111		1
	R3304	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R3305	4702-0564-003	RESISTOR	5%	1/4 W,	560 K	(RLR07C564JR)				81349		1
	R3306	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R3307	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R3308	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3309	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3310	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3311	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3312	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3313	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3314	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3316	4702-0334-003	RESISTOR	5%	1/4 W,	330 K	(RLR07C334JR)				81349		1
	R3317	4706-1332-001	RESISTOR	1%	1/4 W,	13.30 K	(RLR07C1332FR)				81349		1
	R3318	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R3319	4706-3012-001	RESISTOR	1%	1/4 W,	30.10 K	(RLR07C3012FR)				81349		1
	R3320	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R3321	4706-2742-001	RESISTOR	1%	1/4 W,	27.40 K	(RLR07C2742FR)				81349		1
	R3322	4702-0330-003	RESISTOR	5%	1/4 W,	33 OHM	(RLR07C330JR)				81349		1
	R3323	4706-1001-001	RESISTOR	1%	1/4 W,	1.00 K	(RLR07C1001FR)				81349		1
	R3324	4702-0684-003	RESISTOR	5%	1/4 W,	680 K	(RLR07C684JR)				81349		1
	R3325	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3326	4702-0155-003	RESISTOR	5%	1/4 W,	1.5 M	(RLR07C155JR)				81349		1
	R3327	4702-0334-003	RESISTOR	5%	1/4 W,	330 K	(RLR07C334JR)				81349		1
	R3328	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R3329	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3330	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3331	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3332	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3333	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3334	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3335	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R3336	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3337	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3338	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R3339	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3340	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3341	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3342	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R3343	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3344	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3345	4702-0105-003	RESISTOR	5%	1/4 W,	1 M	(RLR07C105JR)				81349		1
	R3346	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3347	4706-8062-001	RESISTOR	1%	1/4 W,	80.60 K	(RLR07C8062FR)				81349		1
	R3348	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3349	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3350	4753-0103-002	RESISTOR, VAR			10 K	(62-2-1-103)				02111		1
	R3352	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3353	4702-0226-003	RESISTOR	5%	1/4 W,	22 M	(RLR07C226JR)				81349		1
	R3354	4753-0102-002	RESISTOR, VAR			1 K	(62-2-1-102)				02111		1
	R3355	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3356	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3357	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3358	4702-0151-003	RESISTOR	5%	1/4 W,	150 OHM	(RLR07C151JR)				81349		1
	R3359	4702-0105-003	RESISTOR	5%	1/4 W,	1 M	(RLR07C105JR)				81349		1
	R3360	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R3361	4706-4991-001	RESISTOR	1%	1/4 W,	4.99 K	(RLR07C4991FR)				81349		1
	R3362	4753-0203-002	RESISTOR, VAR			20 K	(62-2-1-203)				02111		1
	R3363	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R3364	4706-2152-001	RESISTOR	1%	1/4 W,	21.50 K	(RLR07C2152FR)				81349		1
	R3365	4753-0203-002	RESISTOR, VAR			20 K	(62-2-1-203)				02111		1

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# ILLUSTRATED PARTS CATALOG

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
21-	R3366	4706-4991-001	RESISTOR	1%	1/4 W,	4.99 K	(RLR07C4991FR)				81349		1
	R3367	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R3368	4753-0503-002	RESISTOR, VAR			50 K	(62-2-1-503)				02111		1
	R3369	4753-0503-002	RESISTOR, VAR			50 K	(62-2-1-503)				02111		1
	R3370	4753-0503-002	RESISTOR, VAR			50 K	(62-2-1-503)				02111		1
	R3371	4753-0503-002	RESISTOR, VAR			50 K	(62-2-1-503)				02111		1
	R3372	4702-0272-003	RESISTOR	5%	1/4 W,	2.7 K	(RLR07C272JR)				81349		1
	R3373	4706-3401-001	RESISTOR	1%	1/4 W,	3.40 K	(RLR07C3401FR)				81349		1
	R3374	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3375	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3376	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3377	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3378	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3379	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R3380	4702-0152-003	RESISTOR	5%	1/4 W,	1.5 K	(RLR07C152JR)				81349		1
	R3381	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3382	4706-3481-001	RESISTOR	1%	1/4 W,	3.48 K	(RLR07C3481FR)				81349		1
	R3383	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R3384	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3385	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3386	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3387	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3388	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3389	4706-1152-001	RESISTOR	1%	1/4 W,	11.50 K	(RLR07C1152FR)				81349		1
	R3390	4706-1152-001	RESISTOR	1%	1/4 W,	11.50 K	(RLR07C1152FR)				81349		1
	R3391	4706-1152-001	RESISTOR	1%	1/4 W,	11.50 K	(RLR07C1152FR)				81349		1
	R3392	4706-1152-001	RESISTOR	1%	1/4 W,	11.50 K	(RLR07C1152FR)				81349		1
	R3393	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R3394	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R3395	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R3396	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R3397	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R3398	4702-0561-003	RESISTOR	5%	1/4 W,	560 OHM	(RLR07C561JR)				81349		1
	R3399	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3400	4706-7151-001	RESISTOR	1%	1/4 W,	7.15 K	(RLR07C7151FR)				81349		1
	R3401	4706-2321-001	RESISTOR	1%	1/4 W,	2.32 K	(RLR07C2321FR)				81349		1
	R3404	4706-6650-001	RESISTOR	1%	1/4 W,	665.00 OHM	(RLR07C6650FR)				81349		1
	R3405	4706-1001-001	RESISTOR	1%	1/4 W,	1.00 K	(RLR07C1001FR)				81349		1
	R3406	4706-2002-001	RESISTOR	1%	1/4 W,	20.00 K	(RLR07C2002FR)				81349		1
	R3407	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3408	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3409	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3410	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3411	4706-2102-001	RESISTOR	1%	1/4 W,	21.00 K	(RLR07C2102FR)				81349		1
	R3412	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3413	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3414	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3416	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R3417	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3418	4706-2150-001	RESISTOR	1%	1/4 W,	215.00 OHM	(RLR07C2150FR)				81349		1
	R3419	4701-0104-003	RESISTOR	5%	1/8 W,	100 K	(RLR05C104JR)				81349		1
	R3420	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R3421	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3422	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3423	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R3424	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R3425	4706-2002-001	RESISTOR	1%	1/4 W,	20.00 K	(RLR07C2002FR)				81349		1
	R3426	4706-2372-001	RESISTOR	1%	1/4 W,	23.70 K	(RLR07C2372FR)				81349		1
	R3429	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R3430	4706-4991-001	RESISTOR	1%	1/4 W,	4.99 K	(RLR07C4991FR)				81349		1
	R3431	4706-1472-001	RESISTOR	1%	1/4 W,	14.70 K	(RLR07C1472FR)				81349		1
	R3432	4706-3320-001	RESISTOR	1%	1/4 W,	332.00 OHM	(RLR07C3320FR)				81349		1
	R3433	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1

CONTINUED ON NEXT PAGE



# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
21-	R3434	4702-0473-003								RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)	81349		1
	R3435	4702-0152-003								RESISTOR 5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		1
	R3436	4753-0202-002								RESISTOR, VAR 2 K (62-2-1-202)	02111		1
	U3301	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3302	3135-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3303	3135-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3304	3400-9002-000								OPTO ISOLATOR (CLM6500)	03911		1
	U3305	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3306	3135-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3307	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3308	3133-0000-024								IC, BIMOS OP AMP (CA3130E)	02735		1
	U3309	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3310	3133-0000-023								IC, MPLXR/DMPLXR (CD3043BE)	02735		1
	U3311	3130-0000-024								IC, OP AMP (LM709CH)	27014		1
	U3312	4246-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3313	3214-4051-100								IC, ANALOG MPLXR (CD4051BE)	02735		1
	U3314	3135-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3315	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3316	3214-4051-100								IC, ANALOG MPLXR (CD4051BE)	02735		1
	U3317	3214-4051-100								IC, ANALOG MPLXR (CD4051BE)	02735		1
	U3318	3221-0006-000								IC, DUAL LOW NOISE OP AMP (NE5532N)	18324		1
	U3319	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3320	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3321	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U3322	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3323	3135-0000-038								IC, DUAL HI-PERF OP AMP (RC4558P)	01295		1
	U3324	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U3325	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
22-		7010-5133-100	FUNCTION GENERATOR PC BOARD ASSEMBLY							SEE			REF
			FIG 13 FOR NHA										
	J3101	2129-1025-026	CONNECTOR, HEADER (3429-1002)								75037		1
			ATTACHING PARTS										
1		3107-5259-700	INSULATOR, MYLAR										1
2		2850-0000-007	NUT (2-56)								UNK016		2
3		2840-0000-004	WASHER, LOCK (#2 INT TOOTH LOCKWASH)								UNK015		2
		2801-0438-006	SCREW (2-56 X 7/16 PPHM)								UNK015		2
			----*----										
	P3102	2129-0186-116	CONNECTOR, HEADER (86063-9)								00779		1
	C3101	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3102	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3103	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3104	1580-4700-045	CAPACITOR 47 $\mu$ F, 10 V (10TT47MS)								52318		1
	C3105	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3106	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3107	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 v (RPA20Z5U104M50V)								72982		1
	C3108	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)								72982		1
	C3109	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)								71950		1
	C3110	1521-0000-001	CAPACITOR, VAR 9.0-35 pF (EAB538-01109-35PF)								72982		1
	C3111	1580-1000-350	CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)								52318		1
	C3112	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)								61637		1
	C3113	1506-0152-017	CAPACITOR 1500 pF, 100 V (C320C152J2G5CA)								61637		1
	C3114	1506-0681-017	CAPACITOR 680 pF, 200 V (C320C681J2G5CA)								61637		1
	C3115	1506-0152-017	CAPACITOR 1500 pF, 100 V (C320C152J2G5CA)								61637		1
	C3116	1506-0681-017	CAPACITOR 680 pF, 200 V (C320C681J2G5CA)								61637		1
	C3117	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)								61637		1
	C3118	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)								61637		1
	C3119	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)								61637		1
	C3120	1506-0392-017	CAPACITOR 3900 pF, 100 V (C320C392J2G5CA)								61637		1
	C3121	1506-0182-017	CAPACITOR 1800 pF, 100 V (C320C182J2G5CA)								61637		1
	C3122	1580-1000-350	CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)								52318		1
	C3123	1580-4700-045	CAPACITOR 47 $\mu$ F, 10 V (10TT47MS)								52318		1
	C3124	1580-4700-045	CAPACITOR 47 $\mu$ F, 10 V (10TT47MS)								52318		1
	C3125	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)								61637		1
	C3126	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)								61637		1
	C3127	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)								61637		1
	C3128	1506-0392-017	CAPACITOR 3900 pF, 100 V (C320C392J2G5CA)								61637		1
	C3129	1506-0182-017	CAPACITOR 1800 pF, 100 V (C320C182J2G5CA)								61637		1
	C3130	1507-0685-020	CAPACITOR 6.8 $\mu$ F, 15 V (T322B685M015AS)								31433		1
	CR3101	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR3102	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR3103	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	L3101	1801-0022-001	INDUCTOR 22 $\mu$ H, 3.3 OHM (1025-52)								99800		1
	L3102	1801-0022-001	INDUCTOR 22 $\mu$ H, 3.3 OHM (1025-52)								99800		1
	Q3101	4805-0000-003	TRANSISTOR (JAN2N3646)								81349		1
	Q3102	4805-0000-001	TRANSISTOR (JAN2N2907A)								81349		1
	Q3103	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1
	Q3104	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1
	Q3105	4805-0000-001	TRANSISTOR (JAN2N2907A)								81349		1
	R3101	4702-0472-003	RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)								81349		1
	R3102	4706-2001-001	RESISTOR 1%, 1/4 W, 2.00 K (RLR32C2001FR)								81349		1
	R3103	4706-2001-001	RESISTOR 1%, 1/4 W, 2.00 K (RLR32C2001FR)								81349		1
	R3104	4702-0562-003	RESISTOR 5%, 1/4 W, 5.6 K (RLR07C562JR)								81349		1
	R3105	4702-0562-003	RESISTOR 5%, 1/4 W, 5.6 K (RLR07C562JR)								81349		1
	R3106	4702-0562-003	RESISTOR 5%, 1/4 W, 5.6 K (RLR07C562JR)								81349		1
	R3107	4702-0332-003	RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)								81349		1
	R3108	4702-0332-003	RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)								81349		1
	R3109	4702-0273-003	RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)								81349		1
	R3110	4702-0273-003	RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)								81349		1
	R3111	4702-0273-003	RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)								81349		1
	R3112	4702-0273-003	RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)								81349		1
	R3113	4702-0332-003	RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)								81349		1

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# ILLUSTRATED PARTS CATALOG

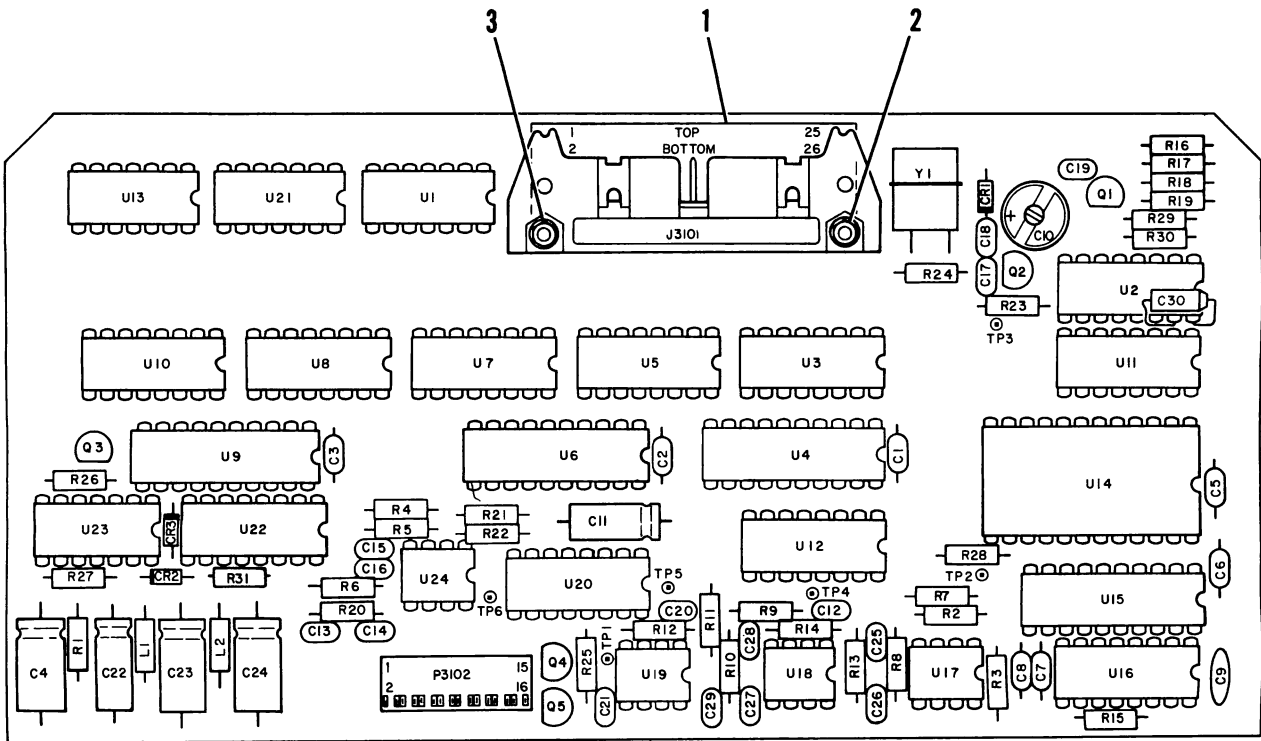


FIGURE 7-22 FUNCTION GENERATOR PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
22-	R3114	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3115	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3116	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3117	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3118	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3119	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3120	4702-0562-003	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		1
	R3121	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R3122	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R3123	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R3124	4702-0563-003	RESISTOR	5%	1/4 W,	56 K	(RLR07C563JR)				81349		1
	R3125	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R3126	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R3127	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3128	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R3129	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3130	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R3131	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	TP3101	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP3102	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP3103	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP3104	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP3105	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP3106	2114-0000-007	POST, GANG	(85931-6)							00779		1
	U3101	3214-4002-100	IC, DUAL 4-INPUT NOR	(CD4002BE)							02735		1
	U3102	3214-5020-100	IC, DUAL UP COUNTER	(CD4520BE)							02735		1
	U3103	3133-0000-021	IC, 4-BIT ADDER	(CD4008BE)							02735		1
	U3104	3214-7374-000	IC, OCTAL D FLIP-FLOP	(MM74C374)							27014		1
	U3105	3133-0000-021	IC, 4-BIT ADDER	(CD4008BE)							02735		1
	U3106	3214-7374-000	IC, OCTAL D FLIP-FLOP	(MM74C374)							27014		1
	U3107	3133-0000-021	IC, 4-BIT ADDER	(CD4008BE)							02735		1
	U3108	3133-0000-021	IC, 4-BIT ADDER	(CD4008BE)							02735		1
	U3109	3214-7374-000	IC, OCTAL D FLIP-FLOP	(MM74C374)							27014		1
	U3110	3133-0000-021	IC, 4-BIT ADDER	(CD4008BE)							02735		1
	U3111	3214-4010-100	IC, HEX BFR/CONVERTER	(CD4010BE)							02735		1
	U3112	3214-4010-100	IC, HEX BFR/CONVERTER	(CD4010BE)							02735		1
	U3113	3214-4002-100	IC, DUAL 4-INPUT NOR	(CD4002BE)							02735		1
	U3114	3263-2320-000*	IC, EPROM	NON-PROGRAMMED (2732)							34335		1
	U3115	3214-7374-000	IC, OCTAL D FLIP-FLOP	(MM74C374)							27014		1
	U3116	3135-0000-052	IC, D/A CONVERTER	(DAC0802LCJ)							27014		1
	U3117	3221-0001-000	IC, DUAL J-FET OP AMP	(LF353N)							27014		1
	U3118	3221-0001-000	IC, DUAL J-FET OP AMP	(LF353N)							27014		1
	U3119	3221-0001-000	IC, DUAL J-FET OP AMP	(LF353N)							27014		1
	U3120	3133-0000-023	IC, MPLXR/DMPLXR	(CD4053BE)							02735		1
	U3121	3133-0000-022	IC, 8-INPUT NOR/OR	(CD4078BE)							02735		1
	U3122	3214-4010-100	IC, HEX BFR/CONVERTER	(CD4010BE)							02735		1
	U3123	3133-0000-011	IC, QUAD 2-INPUT NAND	(CD4011BE)							02735		1
	U3124	3221-0001-000	IC, DUAL J-FET OP AMP	(LF353N)							27014		1
	Y3101	2363-0090-000	CRYSTAL	3.355440 MHz	(3.35544 MHz)						54962		1

NOTE: \* CONSULT IFR CUSTOMER SERVICE FOR APPLICABLE PROGRAMMING



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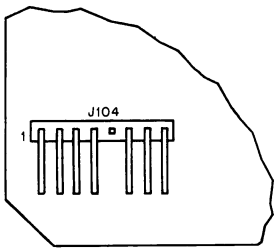
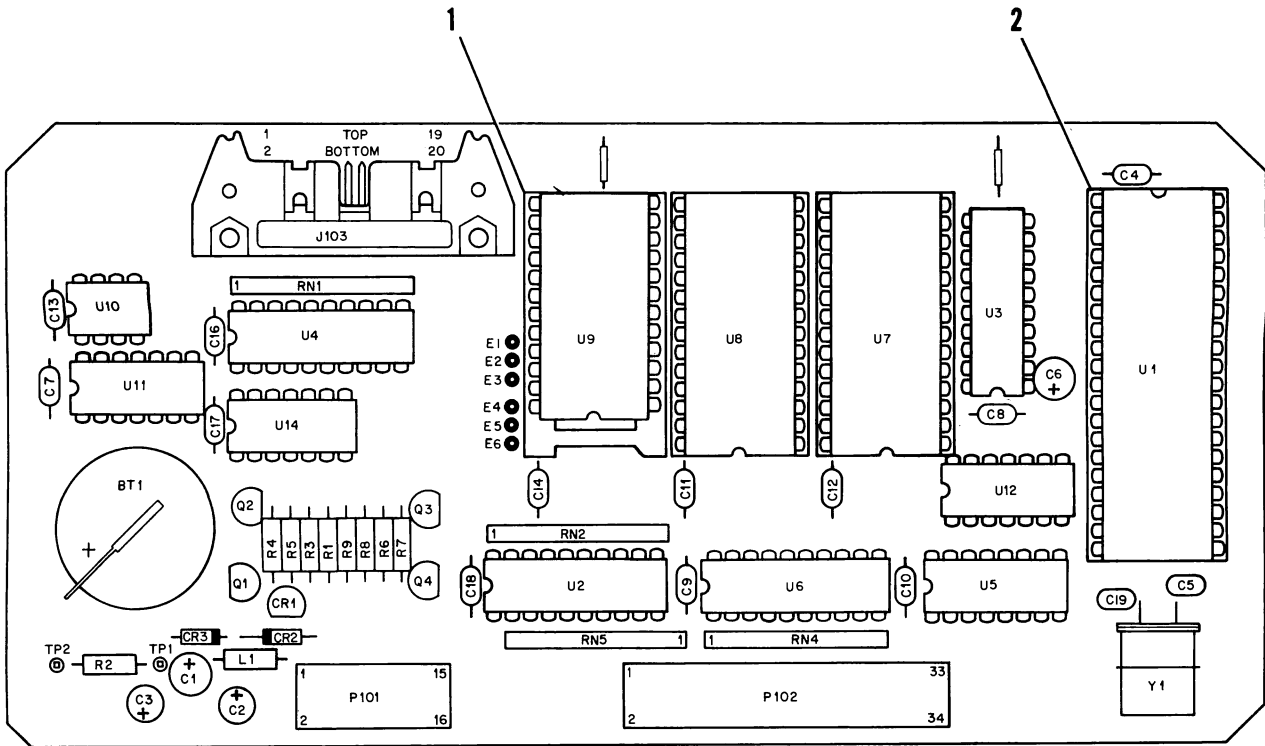


FIGURE 7-23 PROCESSOR PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
23-		7010-5530-400								PROCESSOR PC BOARD ASSEMBLY				SEE FIG 13 FOR NHA	
1		3101-0000-021								SOCKET, DIP (ICN-286-S46)	06776		3		
2		3101-0000-008								SOCKET, DIP (ICN-406-S4-G)	06776		1		
	J103	2129-1025-020								CONNECTOR, HEADER (3428-1002)	75037		1		
	J104	2115-1002-008								CONNECTOR, WAFER (22-05-2081)	27264		1		
	P101	2129-0186-116								CONNECTOR, HEADER (86063-9)	00779		1		
	P102	2129-0186-134								CONNECTOR, HEADER (1-86063-3)	00779		1		
	BT101	4000-9232-501								BATTERY 160 mA (BR2325-P2B)	59778		1		
	C101	1580-4702-105								CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)	62462		1		
	C102	1580-1000-200								CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1		
	C103	1580-1000-200								CAPACITOR 10 $\mu$ F, 25 V (25MS7-10)	52318		1		
	C104	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C105	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1		
	C106	1580-4702-105								CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)	62462		1		
	C107	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C108	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C109	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C110	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C111	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C112	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C113	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C114	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C116	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C117	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C118	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1		
	C119	1506-0050-017								CAPACITOR 5.5 pF, 100 V (RPE110COG5R5C100V)	72982		1		
	CR101	3225-0001-000								IC, VOLTAGE REF +2.5 V/-2.5 V (LM336BZ-2.5V)	18324		1		
	CR102	4920-5151-300								DIODE, RECT (11DQ03)	59993		1		
	CR103	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1		
	L101	1801-0229-001								INDUCTOR 2.2 $\mu$ H, .4 OHM (1025-28)	99800		1		
	Q101	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1		
	Q102	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1		
	Q103	4807-0000-001								TRANSISTOR (JAN2N3903-18)	81349		1		
	Q104	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1		
	R101	4702-0271-003								RESISTOR 5%, 1/4 W, 270 OHM (RLR07C271JR)	81349		1		
	R102	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1		
	R103	4702-0821-003								RESISTOR 5%, 1/4 W, 820 OHM (RLR07C821JR)	81349		1		
	R104	4706-7680-001								RESISTOR 1%, 1/4 W, 768.00 OHM (RLR07C7680FR)	81349		1		
	R105	4706-8060-001								RESISTOR 1%, 1/4 W, 806.00 OHM (RLR07C8060FR)	81349		1		
	R106	4702-0331-003								RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1		
	R107	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1		
	R108	4702-0123-003								RESISTOR 5%, 1/4 W, 12 K (RLR07C123JR)	81349		1		
	R109	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1		
	RN101	4690-0912-300								RESISTOR, NETWORK 12 K, 10-P (4310R-101-123)	57924		1		
	RN102	4690-0912-300								RESISTOR, NETWORK 12 K, 10-P (4310R-101-123)	57924		1		
	RN104	4690-0912-300								RESISTOR, NETWORK 12 K, 10-P (4310R-101-123)	57924		1		
	RN105	4690-0912-300								RESISTOR, NETWORK 12 K, 10-P (4310R-101-123)	57924		1		
	TP101	2114-0000-007								POST, GANG (85931-6)	00779		1		
	TP102	2114-0000-007								POST, GANG (85931-6)	00779		1		
	U101	3271-0803-100								IC, 8-BIT CPU (P8031AH)	34639		1		
	U102	3214-8244-000								IC, OCTAL BFR/DRVR/RCVR (MD74HCT244)	52648		1		
	U103	3214-9373-000								IC, OCTAL D-TYPE LATCH (MM74HC373)	27014		1		
	U104	3214-8244-000								IC, OCTAL BFR/DRVR/RCVR (MD74HCT244)	52648		1		
	U105	3214-9139-000								IC, CMOS DCDR (MM74HC139N)	27014		1		
	U106	3214-8245-000								IC, OCTAL BUS XCVR (MD74HCT245)	52648		1		

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
23-	U107	3271-2712-800*	IC,	EPROM	NON-PROGRAMMED	(MBM27128-25Z)					61271		1
	U108	3271-2712-800*	IC,	EPROM	NON-PROGRAMMED	(MBM27128-25Z)					61271		1
	U109	3260-1551-700	IC,	CMOS RAM	(TC5517APL)						UNK009		1
	U110	3250-1001-000	IC,	DUAL LINE DRVR	(DS75150N-8)						27014		1
	U111	3250-2003-000	IC,	QUAD LINE RCVR	(MC1489AP)						04713		1
	U112	3214-9000-000	IC,	CMOS 2-INPUT NAND	(MM74HC00N)						27014		1
	U114	3133-0000-010	IC,	8-INPUT NAND	(CD4068BE)						02735		1
	Y101	2363-0097-000	CRYSTAL		11.059000 MHz (11.059 MHz)						54962		1
		SEE FIG 1	TUBING,	TFL	26 GA,	NAT							A/R
		SEE FIG 1	WIRE,	BUS	26 GA								A/R
		SEE FIG 1	TAPE,	MYLAR	1/4"								A/R

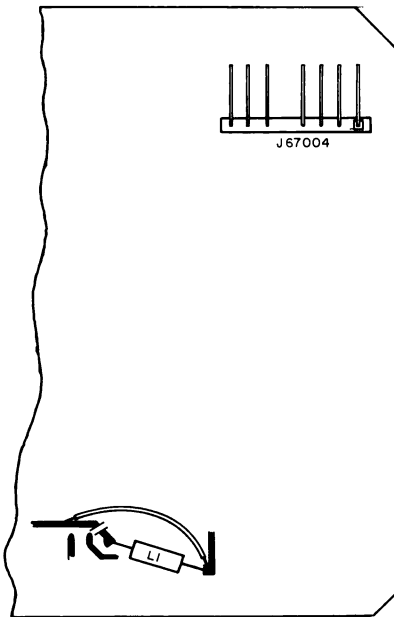
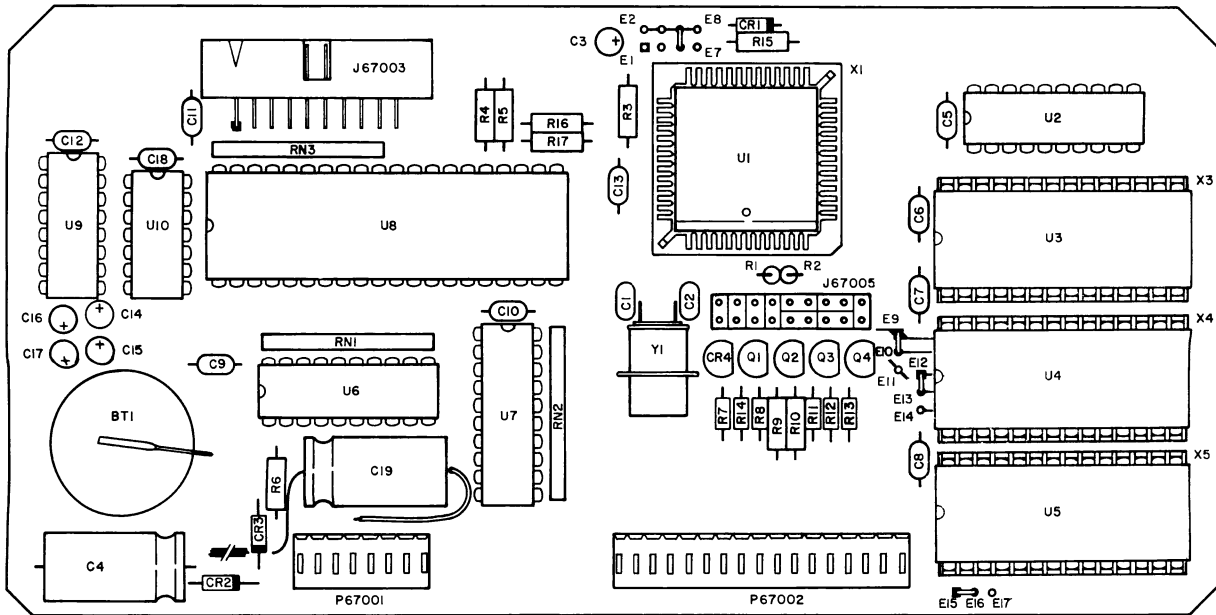
NOTE: \* CONSULT IFR CUSTOMER SERVICE FOR APPLICABLE PROGRAMMING



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
23A-		7010-5730-200	CPU PC BOARD ASSEMBLY							SEE FIG 13 FOR NHA			REF
	J67003	2129-1003-020	CONNECTOR, HEADER (609-2007)								15912		1
	J67004	2115-1002-008	CONNECTOR, HEADER (22-05-2081)								27264		1
	J67005	2115-0000-063	CONNECTOR, WAFER (102944-9)								00779		1
	P67001	2129-0186-116	CONNECTOR, HEADER (86063-9)								00779		1
	P67002	2129-0186-134	CONNECTOR, HEADER (1-86063-3)								00779		1
	BT67001	4000-9232-501	BATTERY 3 VDC, 160 mA (BR2325P2B)								77542		1
	C67001	1506-0270-017	CAPACITOR 27 pF, 200 V (C320C270J2G5CA)								61637		1
	C67002	1506-0270-017	CAPACITOR 27 pF, 200 V (C320C270J2G5CA)								61637		1
	C67003	1580-4792-305	CAPACITOR 4.7 μF, 25 V (GLE4.7MF35V)								62462		1
	C67004	1580-1020-049	CAPACITOR 1000 μF, 6 V (6R3TT1000MS)								52318		1
	C67005	1521-0000-008	CAPACITOR .1 μF, 50 V (CAC03Z5U104M50A)								16299		1

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BOTTOM

FIGURE 7-23A CPU PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
23A-	C67006	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67007	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67008	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67009	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67010	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67011	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67012	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67013	1627-2240-450								CAPACITOR .22 $\mu$ F, 50 V (CAC04Z5U224Z050A)	16299		1
	C67014	1580-4792-305								CAPACITOR 4.7 $\mu$ F, 25 V (CLE4.7MF35V)	62462		1
	C67015	1580-4792-305								CAPACITOR 4.7 $\mu$ F, 25 V (CLE4.7MF35V)	62462		1
	C67016	1580-4792-305								CAPACITOR 4.7 $\mu$ F, 25 V (CLE4.7MF35V)	62462		1
	C67017	1580-4792-305								CAPACITOR 4.7 $\mu$ F, 25 V (CLE4.7MF35V)	62462		1
	C67018	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C67019	1580-1020-049								CAPACITOR 1000 $\mu$ F, 6 V (6R3TT1000MS)	52318		1
	CR67001	4815-0000-003								DIODE, SIGNAL (1N4148)	71468		1
	CR67002	4920-5151-300								DIODE, RECT (11DQ03)	59993		1
	CR67003	4920-5151-300								DIODE, RECT (11DQ03)	59993		1
	CR67004	3225-0001-000								IC, VOLTAGE REF DIODE (LM336BZ2.5V)	27014		1
	L67001	1801-0109-003								INDUCTOR 1 $\mu$ H (LAL04T1ROM)	UNK042		1
	Q67001	4807-0000-002								TRANSISTOR (2N3905-18)	27014		1
	Q67002	4807-0000-002								TRANSISTOR (2N3905-18)	27014		1
	Q67003	4807-0000-002								TRANSISTOR (2N3905-18)	27014		1
	Q67004	4807-0000-001								TRANSISTOR (2N3903-18)	27014		1
	R67001	4701-0220-003								RESISTOR 5%, 1/8 W, 22 $\Omega$ (CF1/8 22 5%)	59124		1
	R67002	4701-0220-003								RESISTOR 5%, 1/8 W, 22 $\Omega$ (CF1/8 22 5%)	59124		1
	R67003	4702-0220-003								RESISTOR 5%, 1/4 W, 22 $\Omega$ (CF1/4 22 5%)	59124		1
	R67004	4702-0220-003								RESISTOR 5%, 1/4 W, 22 $\Omega$ (CF1/4 22 5%)	59124		1
	R67005	4702-0220-003								RESISTOR 5%, 1/4 W, 22 $\Omega$ (CF1/4 22 5%)	59124		1
	R67006	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (CF1/4 1.0K 5%)	59124		1
	R67007	4701-0271-003								RESISTOR 5%, 1/8 W, 270 $\Omega$ (CF1/8 270 5%)	59124		1
	R67008	4701-0821-003								RESISTOR 5%, 1/8 W, 820 $\Omega$ (CF1/8 820 5%)	59124		1
	R67009	4706-7680-001								RESISTOR 1%, 1/4 W, 768.00 $\Omega$ (MF55E 768 F)	59124		1
	R67010	4706-8060-001								RESISTOR 1%, 1/4 W, 806.00 $\Omega$ (MF55E 806 F)	59124		1
	R67011	4701-0332-003								RESISTOR 5%, 1/8 W, 3.3 K (CF1/8 3.3K 5%)	59124		1
	R67012	4701-0332-003								RESISTOR 5%, 1/8 W, 3.3 K (CF1/8 3.3K 5%)	59124		1
	R67013	4701-0331-003								RESISTOR 5%, 1/8 W, 330 $\Omega$ (CF1/8 330 5%)	59124		1
	R67014	4701-0102-003								RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R67015	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (CF1/4 3.3K 5%)	59124		1
	R67016	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (CF1/4 3.3K 5%)	59124		1
	R67017	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (CF1/4 3.3K 5%)	59124		1
	RN67001	4690-0912-300								RESISTOR, NETWORK 10-P, 12 K (4310R101-123)	57924		1
	RN67002	4690-0912-300								RESISTOR, NETWORK 10-P, 12 K (4310R101-123)	57924		1
	RN67003	4690-0912-300								RESISTOR, NETWORK 10-P, 12 K (4310R101-123)	57924		1
	U67001	3135-0000-068								IC, 8-BIT MICROPROCESSOR (80188-10)	34639		1
	U67002	3214-9373-000								IC, OCTAL D-TYPE LATCH (TC74HC373P)	61802		1
	U67003	3271-2725-600								IC, 32K X 8-BIT EPROM (D27256)	34639		1
	U67004	3271-2725-600								IC, 32K X 8-BIT EPROM (D27256)	34639		1
	U67005	3260-1004-000								IC, STATIC RAM (HM6264LP12)	UNK017		1
	U67006	3214-8245-000								IC, OCTAL BUS XCVR (74HCT245)	52648		1
	U67007	3214-9373-000								IC, OCTAL D-TYPE LATCH (TC74HC373P)	61802		1
	U67008	3135-0000-067								IC, MUART (8256AH)	34639		1
	U67009	3223-0005-000								IC, RS232 XCVR (MAX232EPE)	UNK041		1
	U67010	3133-0000-010								IC, 8-INPUT NAND (CD4068BE)	02735		1
	X67001	3101-0000-031								SOCKET, CHIP CARRIER (821574-1)	00779		1
	X67003	3101-0000-029								SOCKET, DIP (ICB286S8TG)	06776		1
	X67004	3101-0000-029								SOCKET, DIP (ICB286S8TG)	06776		1
	X67005	3101-0000-029								SOCKET, DIP (ICB286S8TG)	06776		1
	Y67001	2363-0113-000								CRYSTAL 16.384000 MHz			1
		SEE FIG 1								WIRE, BUS 26 GA			A/R
		SEE FIG 1								WIRE, 7S 22 GA			A/R
		SEE FIG 1								TUBING, TFL 26 GA, NAT			A/R

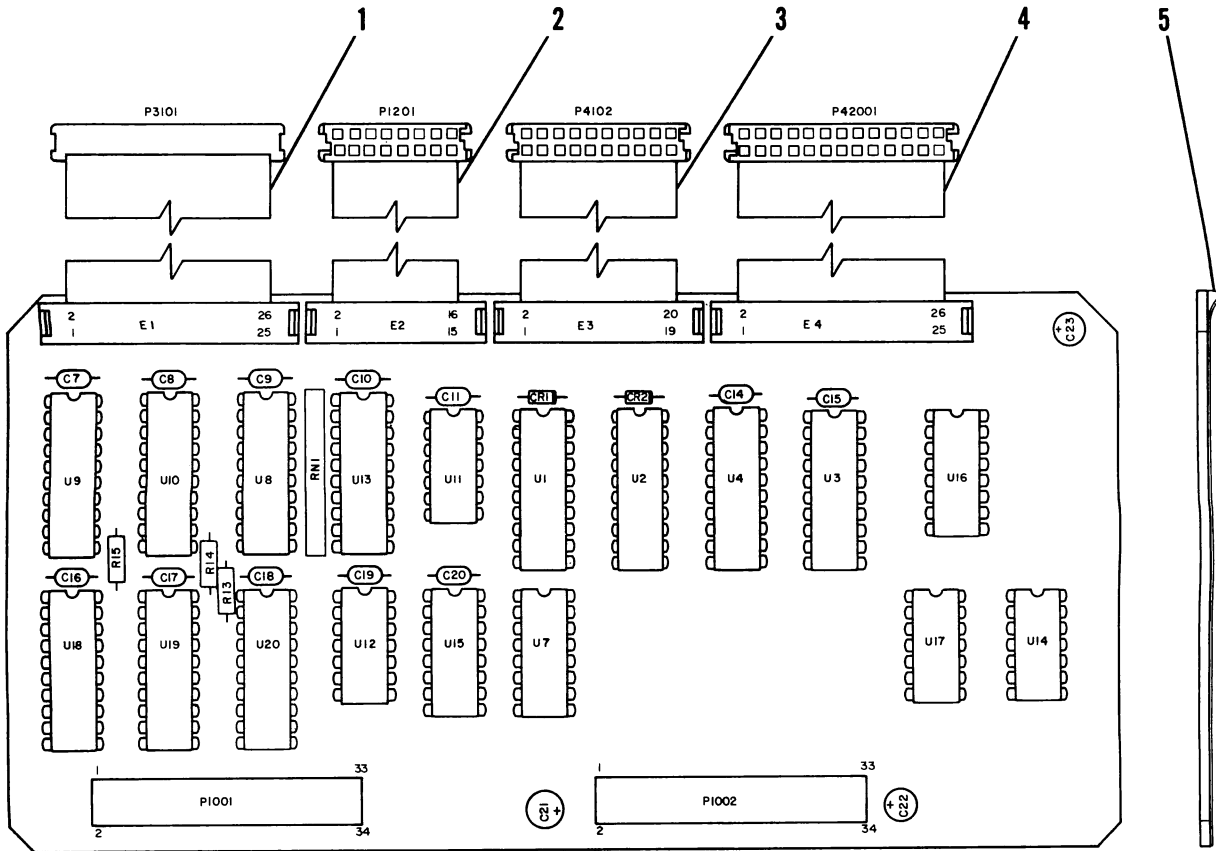


FIGURE 7-24 INTERFACE PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
24-		7010-5130-800	INTERFACE PC BOARD ASSEMBLY							SEE FIG 13 FOR NHA					REF
1		6045-5184-100	CABLE ASSY, RIBBON							FUNCTION GENERATOR					1
2		6045-5184-300	CABLE ASSY, RIBBON							DUPLEX					1
3		6045-5184-600	CABLE ASSY, RIBBON							HIGH LOOP					1
4		6045-5184-200	CABLE ASSY, RIBBON							LOW LOOP					1
5		3107-5180-800	INSULATOR, MYLAR												1
	P1001	2129-0186-134	CONNECTOR, HEADER (1-86063-3)									00779			1
	P1002	2129-0186-134	CONNECTOR, HEADER (1-86063-3)									00779			1
	C1007	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1008	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1009	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1010	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1011	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1014	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1015	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1016	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1017	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1018	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1019	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1020	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)		72982			1
	C1021	1580-4702-105	CAPACITOR							47 $\mu$ F, 10 V (CLE47MF10V)		62462			1
	C1022	1580-1000-200	CAPACITOR							10 $\mu$ F, 25 V (25MS7-10)		52318			1
	C1023	1580-1000-200	CAPACITOR							10 $\mu$ F, 25 V (25MS7-10)		52318			1
	R1013	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)		81349			1
	R1014	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)		81349			1
	R1015	4702-0472-003	RESISTOR							5%, 1/4 W, 4.7 K (RLR07C472JR)		81349			1
	RN1001	4690-0947-200	RESISTOR, NETWORK							4.7 K, 10-P (4310R-101-472)		57924			1
	U1001	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1002	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1003	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1004	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1007	3214-9139-000	IC, CMOS DCDR (MM74HC139N)									27014			1
	U1008	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1009	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1010	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1011	3214-7906-000	IC, HEX BFR (MM74C906N)									27014			1
	U1012	3214-7906-000	IC, HEX BFR (MM74C906N)									27014			1
	U1013	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1
	U1014	3214-9000-000	IC, CMOS 2-INPUT NAND (MM74HC00N)									27014			1
	U1015	3214-9139-000	IC, CMOS DCDR (MM74HC139N)									27014			1
	U1016	3214-9138-000	IC, DCDR/MPLXR (MM74HC138)									27014			1
	U1017	3214-4002-100	IC, DUAL 4-INPUT NOR (CD4002BE)									02735			1
	U1018	3214-9244-000	IC, OCTAL BFR/DRV/R/RCVR (MM74HC244)									27014			1
	U1019	3214-9244-000	IC, OCTAL BFR/DRV/R/RCVR (MM74HC244)									27014			1
	U1020	3214-7374-000	IC, OCTAL D FLIP-FLOP (MM74C374)									27014			1

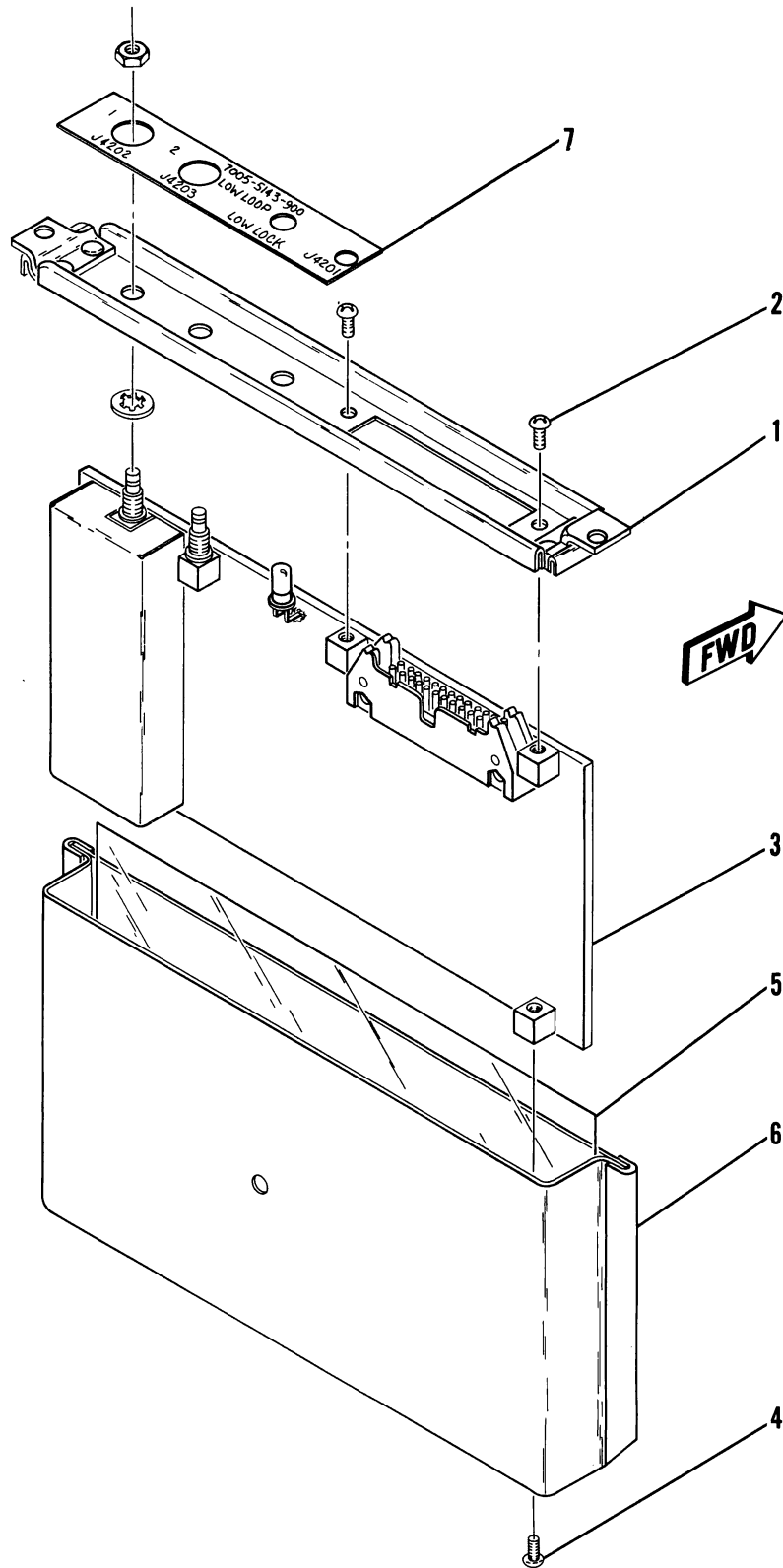


FIGURE 7-25 LOW LOOP ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
25-		7005-5143-900								LOW LOOP ASSEMBLY			REF
1		1414-5181-800								COVER			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
3		SEE FIG 26								LOW LOOP PC BOARD ASSEMBLY			1
										ATTACHING PARTS			
4		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
5		3107-5252-800								INSULATOR, MYLAR			1
6		1415-5183-600								ENCLOSURE			1
7		2400-5153-500								LABEL, LOW LOOP			1



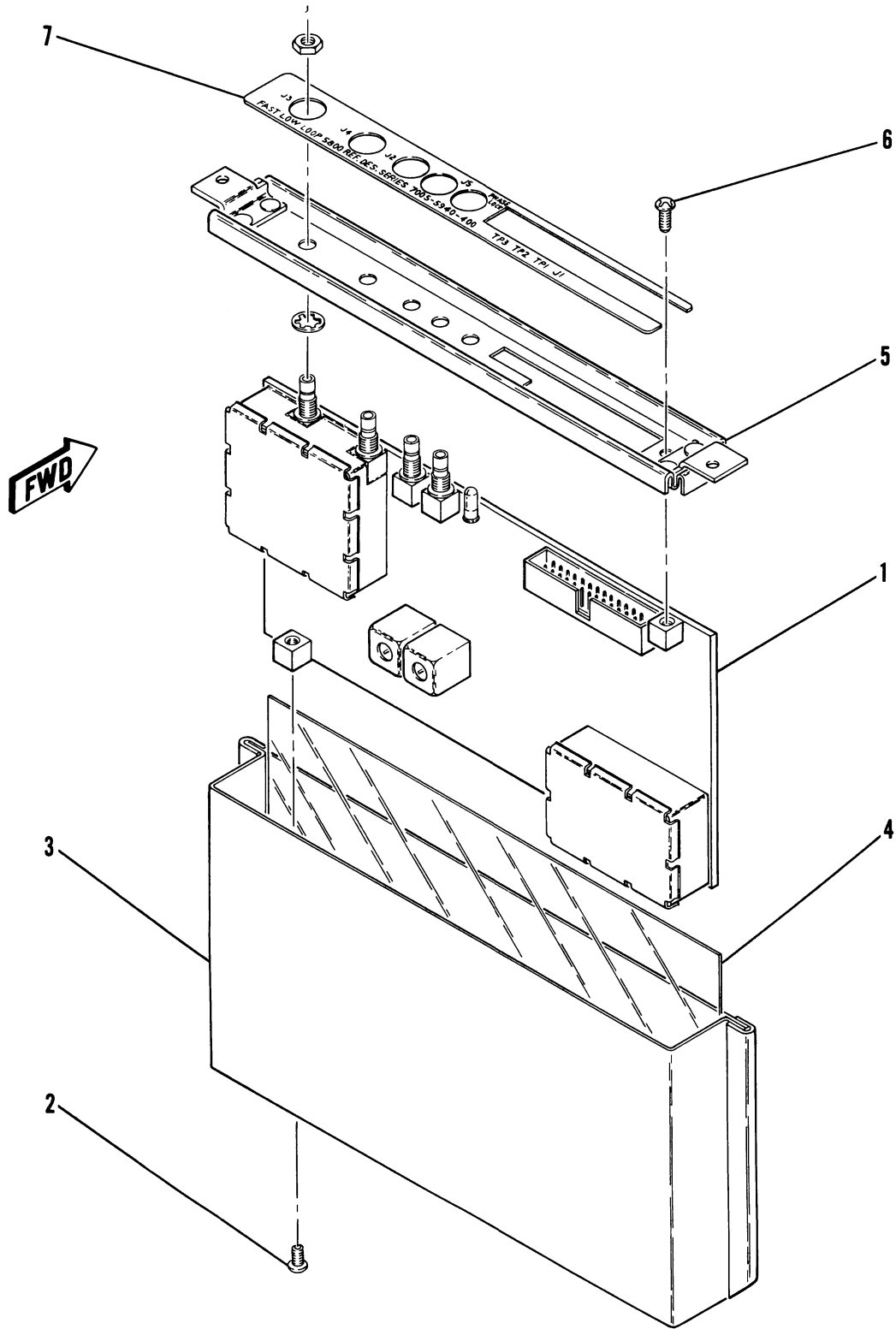
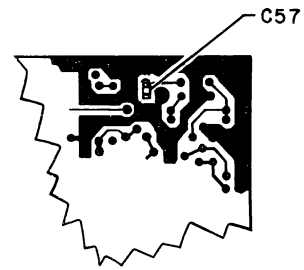
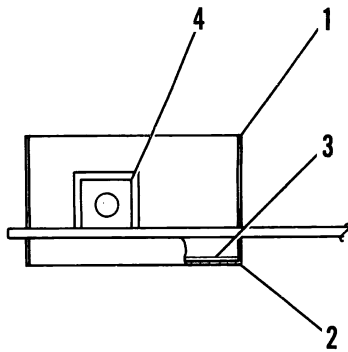
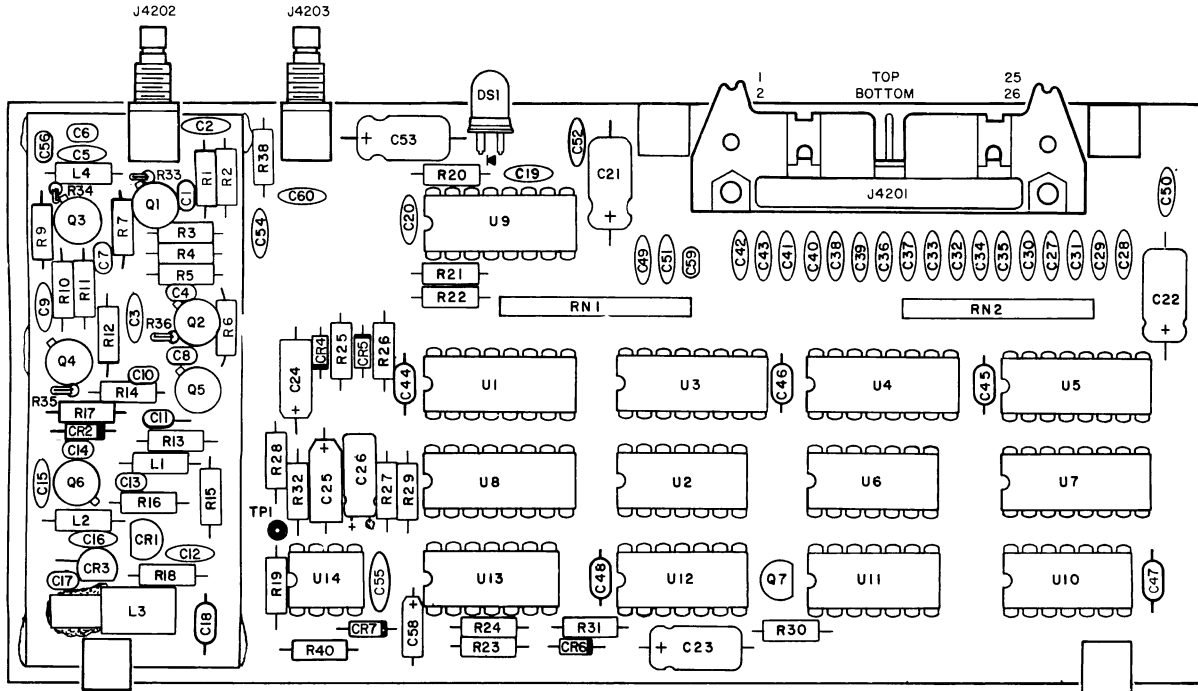


FIGURE 7-26A FAST LOW LOOP ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
25A-		7005-5940-400								FAST LOW LOOP ASSEMBLY			REF
1		SEE FIG 26								SEE FIG 13 FOR NHA FAST LOW LOOP PC BOARD ASSEMBLY INCL MTG HARDWARE ATTACHING PARTS			1
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM) ---*---	UNK015		2
3		1415-5183-600								ENCLOSURE ASSY, CAN			1
4		3107-5252-800								INSULATOR			1
5		1414-5980-300								COVER, ENCLOSURE ATTACHING PARTS			1
6		2803-0188-006								SCREW (4-40 X 3/16 PPHM) ---*---	UNK015		1
7		2400-5952-400								LABEL, IDENT			1



BOTTOM

FIGURE 7-26 LOW LOOP PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
26-		7010-5234-200	LOW LOOP PC BOARD ASSEMBLY							SEE FIG 25 FOR NHA			REF
1		2508-5254-400	SHIELD, TOP										1
2		2508-5158-100	SHIELD, BOTTOM										1
3		3107-5156-003	INSULATOR, MYLAR										1
4		2100-0000-100	NUT, SWAGE 4-40 (2040B)								83330		4
	J4201	2129-1025-026	CONNECTOR, HEADER (3429-1002)								75037		1
	J4202	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J4203	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	C4201	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)								61637		1
	C4202	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4203	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4204	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C4205	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4206	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)								61637		1
	C4207	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C4208	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C4209	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4210	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C4211	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C4212	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4213	1506-0330-017	CAPACITOR 33 pF, 200 V (C320C330J2G5CA)								61637		1
	C4214	1506-0470-107	CAPACITOR 47 pF, 200 V (C320C470J2G5CA)								61637		1
	C4215	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4216	1501-0102-001	CAPACITOR 1000 pF, 600 V (CE102)								71950		1
	C4217	1506-0330-017	CAPACITOR 33 pF, 200 V (C320C330J2G5CA)								61637		1
	C4218	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4219	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4220	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4221	1580-1000-350	CAPACITOR 10 μF, 35 V (35TT10MS)								52318		1
	C4222	1580-4700-045	CAPACITOR 47 μF, 10 V (10TT47MS)								52318		1
	C4223	1580-4700-045	CAPACITOR 47 μF, 10 V (10TT47MS)								52318		1
	C4224	1507-0685-018	CAPACITOR 6.8 μF, 35 V (T322D685M035AS)								31433		1
	C4225	1507-0685-018	CAPACITOR 6.8 μF, 35 V (T322D685M035AS)								31433		1
	C4226	1580-1092-450	CAPACITOR 1 μF, 50 V (50TWIL)								52318		1
	C4227	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4228	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4229	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4230	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4231	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4232	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4233	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4234	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4235	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4236	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4237	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4238	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4239	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4240	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4241	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4242	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4243	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4244	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4245	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4246	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4247	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4248	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C4249	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4250	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4251	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4252	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4253	1580-1000-350	CAPACITOR 10 μF, 35 V (35TT10MS)								52318		1
	C4254	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C4255	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
26-	C4256	1506-0220-017								CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C4257	1620-2200-500								CAPACITOR 22 pF, 100 V (02E220KCN)	12969		1
	C4258	1507-0105-018								CAPACITOR 1 μF, 35 V (T322B105M035AS)	31433		1
	C4259	1506-0471-017								CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C4260	1501-0102-001								CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	CR4201	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR4202	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR4203	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR4204	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR4205	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR4206	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4207	4818-0000-003								DIODE, ZENER 5.1 V (JAN1N5231B)	81349		1
	DS4201	4816-0000-002								LED RED (5082-4860)	54893		1
	L4201	1801-0229-001								INDUCTOR 2.2 μH, .4 OHM (1025-28)	99800		1
	L4202	1801-0015-001								INDUCTOR 15 μH, 2.8 OHM (1025-48)	99800		1
	L4203	1804-0000-013								INDUCTOR, VAR .125-.243 μH (1804-0000-013)	56402		1
	L4204	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	Q4201	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q4202	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q4203	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q4204	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q4205	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q4206	5050-2601-000								TRANSISTOR, FET SELECTED			1
	Q4207	4801-0000-001								TRANSISTOR (JAN2N2222)	81349		1
	R4201	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R4202	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4203	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R4204	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R4205	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4206	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R4207	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	R4209	4702-0333-003								RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
	R4210	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R4211	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4212	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R4213	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4214	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R4215	4702-0680-003								RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R4216	4702-0331-003								RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
	R4217	4702-0103-003								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R4218	4702-0223-003								RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4219	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R4220	4702-0680-003								RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R4221	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	R4222	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	R4223	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R4224	4702-0472-003								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R4225	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4226	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4227	4702-0823-003								RESISTOR 5%, 1/4 W, 82 K (RLR07C823JR)	81349		1
	R4228	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4229	4702-0393-003								RESISTOR 5%, 1/4 W, 39 K (RLR07C393JR)	81349		1
	R4230	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4231	4702-0103-003								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R4232	4702-0103-003								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R4233	4701-0680-003								RESISTOR 5%, 1/8 W, 68 OHM (RLR05C680JR)	81349		1
	R4234	4701-0220-003								RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		1
	R4235	4701-0680-003								RESISTOR 5%, 1/8 W, 68 OHM (RLR05C680JR)	81349		1
	R4236	4701-0680-003								RESISTOR 5%, 1/8 W, 68 OHM (RLR05C680JR)	81349		1
	R4238	4702-0182-003								RESISTOR 5%, 1/4 W, 1.8 K (RLR07C182JR)	81349		1
	R4240	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	RN4201	4690-0947-200								RESISTOR, NETWORK 4.7 K, 10-P (4310R-101-472)	57924		1
	RN4202	4690-0947-200								RESISTOR, NETWORK 4.7 K, 10-P (4310R-101-472)	57924		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
26-	TP4201	2114-0000-007								POST, GANG (85931-6)	00779		1
	U4201	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4202	3131-0000-044								IC, QUAD 2-INPUT NAND (SN74LS00N)	01295		1
	U4203	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4204	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4205	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4206	3131-0000-032								IC, 2-INPUT NOR (SN74LS02N)	01295		1
	U4207	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4208	3131-0000-029								IC, U/D COUNTER (SN74LS190N)	01295		1
	U4209	3134-0000-017								IC, PRESCALER (MC12013P)	04713		1
	U4210	3131-0000-034								IC, DUAL JK FLIP-FLOP (SN74LS73N)	01295		1
	U4211	3131-0000-027								IC, 8-INPUT NAND (SN74LS30N)	01295		1
	U4212	3130-0000-010								IC, DUAL JK FLIP-FLOP (SN7473N)	01295		1
	U4213	3130-0000-001								IC, QUAD 2-INPUT NAND (SN7400N)	01295		1
	U4214	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	01295		1
		SEE FIG 1								TUBING, TFL 22 GA, NAT			A/R
		SEE FIG 1								WIRE, BUS 22 GA			A/R

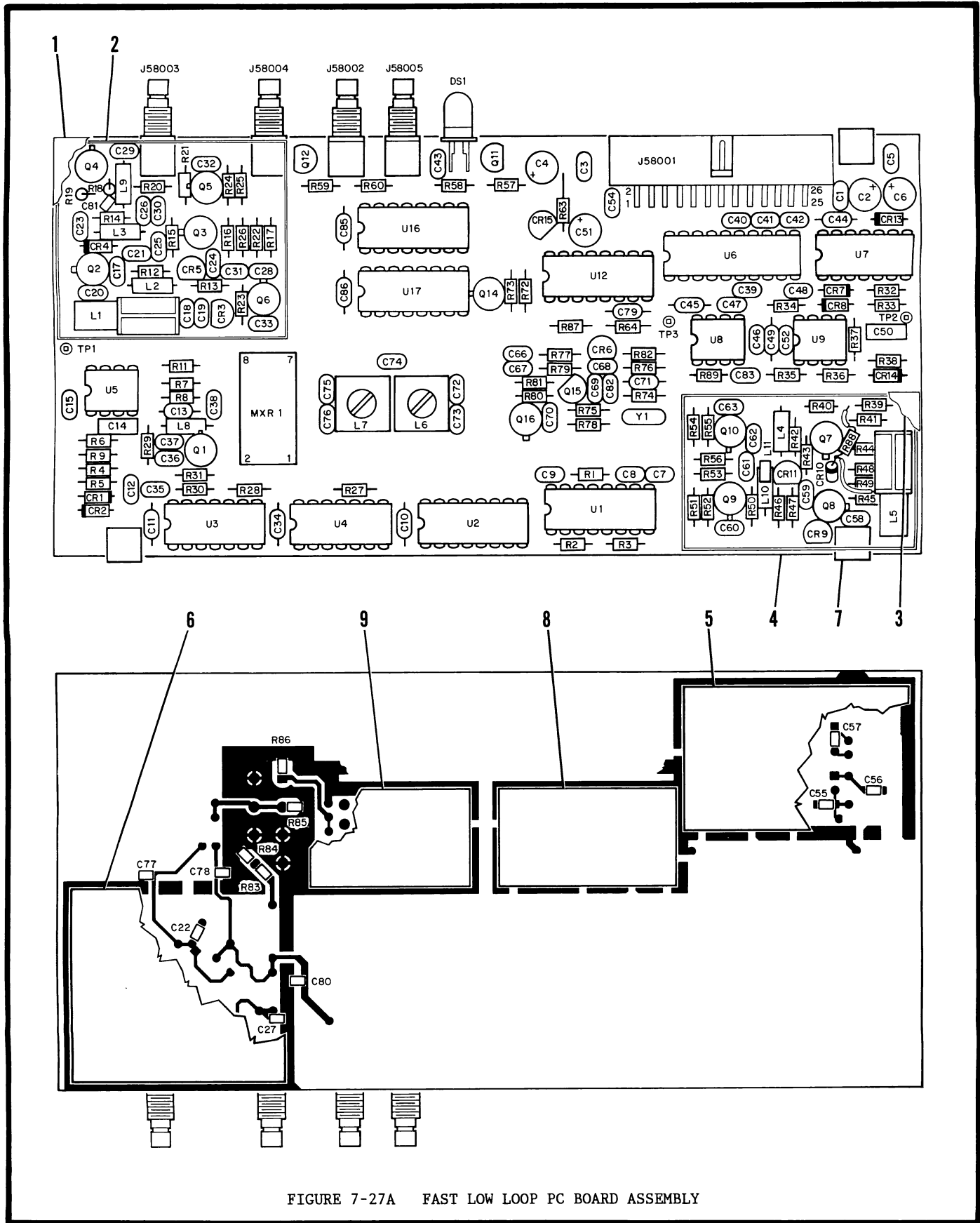


FIGURE 7-27A FAST LOW LOOP PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
26A-		7010-5931-000	FAST LOW LOOP PC BOARD ASSEMBLY							SEE					
			FIG 25A FOR NHA												
1		1414-5952-100	COVER, SHIELD												1
2		2508-5951-900	SHIELD, PC BD												1
3		1414-5952-200	COVER, SHIELD												1
4		2508-5952-000	SHIELD, PC BD												1
5		2508-5951-800	SHIELD, PC BD												1
6		2508-5951-700	SHIELD, PC BD												1
7		2100-0000-100	NUT, SWAGE							4-40 (2040B)		83330			1
8		2508-5953-000	SHIELD, PC BD												1
9		2508-5953-100	SHIELD, PC BD												1
	J58001	2129-1003-026	CONNECTOR, HEADER (609-2607)									15912			1
	J58002	2200-2094-200	CONNECTOR, SMB (2110-7511-000)									19505			1
	J58003	2200-2094-200	CONNECTOR, SMB (2110-7511-000)									19505			1
	J58004	2200-2094-200	CONNECTOR, SMB (2110-7511-000)									19505			1
	J58005	2200-2094-200	CONNECTOR, SMB (2110-7511-000)									19505			1
	C57001	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57002	1580-4702-105	CAPACITOR							47 $\mu$ F, 10 V (CLE47MF10V)		62462			1
	C57003	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57004	1580-4700-220	CAPACITOR							47 $\mu$ F, 25 V (25TWMS47M)		52318			1
	C57005	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57006	1580-4700-220	CAPACITOR							47 $\mu$ F, 25 V (25TWMS47M)		52318			1
	C57007	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57008	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57009	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57010	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57011	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57012	1506-0471-017	CAPACITOR							470 pF, 200 V (C320C471J2G5CA)		61637			1
	C57013	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57014	1502-0333-010	CAPACITOR							.033 UF, 50 V (CK05BX333K)		72982			1
	C57015	1506-0680-017	CAPACITOR							68 pF, 200 V (C320C680J2G5CA)		61637			1
	C57017	1506-0221-017	CAPACITOR							220 pF, 200 V (C320C221J2G5CA)		61637			1
	C57018	1506-0470-017	CAPACITOR							47 pF, 200 V (C320C470J2G5CA)		61637			1
	C57019	1506-0270-017	CAPACITOR							27 pF, 200 V (C320C270J2G5CA)		61637			1
	C57020	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57021	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57022	1523-0000-002	CAPACITOR							1800 pF, 50 V (GR40-1X7R182K50V)		72982			1
	C57023	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57024	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57025	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57026	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57027	1523-0000-002	CAPACITOR							1800 pF, 50 V (GR40-1X7R182K50V)		72982			1
	C57028	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57029	1506-0120-017	CAPACITOR							12 pF, 100 V (RPE110COG120J100V)		72982			1
	C57030	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57031	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)		61637			1
	C57032	1506-0101-017	CAPACITOR							100 pF, 200 V (C320C101J2G5CA)		61637			1
	C57033	1506-0680-017	CAPACITOR							68 pF, 200 V (C320C680J2G5CA)		61637			1
	C57034	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57035	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57036	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57037	1506-0471-017	CAPACITOR							470 pF, 200 V (C320C471J2G5CA)		61637			1
	C57038	1506-0471-017	CAPACITOR							470 pF, 200 V (C320C471J2G5CA)		61637			1
	C57039	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57040	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57041	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57042	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57043	1506-0103-017	CAPACITOR							.01 $\mu$ F, 100 V (C052K103K1X5CA)		61637			1
	C57044	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57045	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (CAC03Z5U104M50A)		16299			1
	C57046	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1
	C57047	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)		61637			1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
26A-	C57048	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C57049	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C57050	1502-0334-010								CAPACITOR .33 $\mu$ F, 50 V (CK06BX334K)	72982		1
	C57051	1605-3360-475								CAPACITOR 33 $\mu$ F, 16 V (T350H336M016AS)	31433		1
	C57052	1506-0680-017								CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1
	C57054	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C57055	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57056	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57057	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57058	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C57059	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C57060	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C57061	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C57062	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C57063	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C57066	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C57067	1506-0680-017								CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1
	C57068	1506-0050-017								CAPACITOR 5.5 pF, 100 V (RPE110C0G5R5C100V)	72982		1
	C57069	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1
	C57070	1506-0220-017								CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C57071	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C57072	1506-0220-017								CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C57073	1506-0220-017								CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C57074	1506-0010-017								CAPACITOR 1 pF, 100 V (RPE110CDG1R0C100V)	72982		1
	C57075	1506-0220-017								CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C57076	1506-0181-017								CAPACITOR 180 pF, 200 V (C320C181J2G5CA)	61637		1
	C57077	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57078	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57079	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C57080	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57081	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C57082	1506-0470-017								CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	C57083	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C57085	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C57086	1521-0000-008								CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	CR57001	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR57002	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR57003	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR57004	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR57005	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR57006	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR57007	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR57008	4831-0000-001								DIODE, SIGNAL (FDH333)	12467		1
	CR57009	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR57010	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR57011	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR57013	4815-0000-003								DIODE, SIGNAL (1N4148)	71468		1
	CR57014	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR57015	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	DS57001	4816-0000-002								LED RED (5082-0280)	54893		1
	L57001	1804-0000-011								INDUCTOR, VAR .221 - .443 $\mu$ H (G6635A)	02113		1
	L57002	1801-0022-001								INDUCTOR 22 $\mu$ H (1025-52)	99800		1
	L57003	1801-0339-001								INDUCTOR 3.3 $\mu$ H (1025-32)	99800		1
	L57004	1801-0108-001								INDUCTOR .1 $\mu$ H (1025-94)	99800		1
	L57005	1804-0000-009								INDUCTOR, VAR .047 - .075 $\mu$ H (G6637A)	02113		1
	L57006	1808-1022-801								INDUCTOR, VAR .22 $\mu$ H			1
	L57007	1808-1022-801								INDUCTOR, VAR .22 $\mu$ H			1
	L57008	1801-0229-001								INDUCTOR 2.2 $\mu$ H (1025-28)	99800		1
	L57009	1801-0338-001								INDUCTOR .33 $\mu$ H (1025-08)	99800		1
	L57010	1801-0338-001								INDUCTOR .33 $\mu$ H (1025-08)	99800		1
	L57011	2750-0150-500								BEAD, FERRITE (57-180)	04850		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
26A-	MXR57001	5250-0100-100		MIXER 1 - 500 MHz (SBL1-18)	15542		1
	Q57001	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57002	4810-0000-001		TRANSISTOR (2N4416)	04713		1
	Q57003	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57004	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57005	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57006	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57007	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57008	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57009	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57010	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57011	4801-0000-001		TRANSISTOR (PN2222)	12467		1
	Q57012	4805-0000-003		TRANSISTOR (MPS3646)	12467		1
	Q57014	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q57015	4807-0000-002		TRANSISTOR (2N3905-18)	27014		1
	Q57016	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	R57001	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57002	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R57003	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R57004	4701-0271-003		RESISTOR 5%, 1/8 W, 270 Ω (CF1/8 270 5%)	59124		1
	R57005	4701-0271-003		RESISTOR 5%, 1/8 W, 270 Ω (CF1/8 270 5%)	59124		1
	R57006	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57007	4701-0563-003		RESISTOR 5%, 1/8 W, 56 K (CF1/8 56K 5%)	59124		1
	R57008	4701-0153-003		RESISTOR 5%, 1/8 W, 15 K (CF1/8 15K 5%)	59124		1
	R57009	4701-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (CF1/8 4.7K 5%)	59124		1
	R57011	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R57012	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R57013	4701-0331-003		RESISTOR 5%, 1/8 W, 330 Ω (CF1/8 330 5%)	59124		1
	R57014	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57015	4701-0683-003		RESISTOR 5%, 1/8 W, 68 K (CF1/8 68K 5%)	59124		1
	R57016	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R57017	4701-0101-003		RESISTOR 5%, 1/8 W, 100 Ω (CF1/8 100 5%)	59124		1
	R57018	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57019	4701-0104-003		RESISTOR 5%, 1/8 W, 100 K (CF1/8 100K 5%)	59124		1
	R57020	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57021	4701-0473-003		RESISTOR 5%, 1/8 W, 47 K (CF1/8 47K 5%)	59124		1
	R57022	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57023	4701-0473-003		RESISTOR 5%, 1/8 W, 47 K (CF1/8 47K 5%)	59124		1
	R57024	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57025	4701-0152-003		RESISTOR 5%, 1/8 W, 1.5 K (CF1/8 1.5K 5%)	59124		1
	R57026	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57027	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R57028	4701-0101-003		RESISTOR 5%, 1/8 W, 100 Ω (CF1/8 100 5%)	59124		1
	R57029	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57030	4701-0272-003		RESISTOR 5%, 1/8 W, 2.7 K (CF1/8 2.7K 5%)	59124		1
	R57031	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1
	R57032	4701-0331-003		RESISTOR 5%, 1/8 W, 330 Ω (CF1/8 330 5%)	59124		1
	R57033	4701-0331-003		RESISTOR 5%, 1/8 W, 330 Ω (CF1/8 330 5%)	59124		1
	R57034	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R57035	4701-0393-003		RESISTOR 5%, 1/8 W, 39 K (CF1/8 39K 5%)	59124		1
	R57036	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R57037	4701-0272-003		RESISTOR 5%, 1/8 W, 2.7 K (CF1/8 2.7K 5%)	59124		1
	R57038	4701-0222-003		RESISTOR 5%, 1/8 W, 2.2 K (CF1/8 2.2K 5%)	59124		1
	R57039	4701-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (CF1/8 4.7K 5%)	59124		1
	R57040	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R57041	4701-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (CF1/8 4.7K 5%)	59124		1
	R57042	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57043	4701-0680-003		RESISTOR 5%, 1/8 W, 68 Ω (CF1/8 68 5%)	59124		1
	R57044	4701-0331-003		RESISTOR 5%, 1/8 W, 330 Ω (CF1/8 330 5%)	59124		1
	R57045	4701-0221-003		RESISTOR 5%, 1/8 W, 220 Ω (CF1/8 220 5%)	59124		1
	R57046	4701-0471-003		RESISTOR 5%, 1/8 W, 470 Ω (CF1/8 470 5%)	59124		1
	R57047	4701-0101-003		RESISTOR 5%, 1/8 W, 100 Ω (CF1/8 100 5%)	59124		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
26A-	R57048	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(CF1/8	10K	5%)	59124		1	
	R57049	4701-0122-003	RESISTOR	5%	1/8 W,	1.2 K	(CF1/8	1.2K	5%)	59124		1	
	R57050	4701-0680-003	RESISTOR	5%	1/8 W,	68 Ω	(CF1/8	68	5%)	59124		1	
	R57051	4701-0101-003	RESISTOR	5%	1/8 W,	100 Ω	(CF1/8	100	5%)	59124		1	
	R57052	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57053	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(CF1/8	68K	5%)	59124		1	
	R57054	4701-0101-003	RESISTOR	5%	1/8 W,	100 Ω	(CF1/8	100	5%)	59124		1	
	R57055	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57056	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(CF1/8	68K	5%)	59124		1	
	R57057	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57058	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(CF1/8	10K	5%)	59124		1	
	R57059	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(CF1/8	10K	5%)	59124		1	
	R57060	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57063	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57064	4701-0153-003	RESISTOR	5%	1/8 W,	15 K	(CF1/8	15K	5%)	59124		1	
	R57072	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57073	4701-0153-003	RESISTOR	5%	1/8 W,	15 K	(CF1/8	15K	5%)	59124		1	
	R57074	4701-0333-003	RESISTOR	5%	1/8 W,	33 K	(CF1/8	33K	5%)	59124		1	
	R57075	4701-0333-003	RESISTOR	5%	1/8 W,	33 K	(CF1/8	33K	5%)	59124		1	
	R57076	4701-0331-003	RESISTOR	5%	1/8 W,	330 Ω	(CF1/8	330	5%)	59124		1	
	R57077	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57078	4701-0101-003	RESISTOR	5%	1/8 W,	100 Ω	(CF1/8	100	5%)	59124		1	
	R57079	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)	59124		1	
	R57080	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(CF1/8	68K	5%)	59124		1	
	R57081	4701-0680-003	RESISTOR	5%	1/8 W,	68 Ω	(CF1/8	68	5%)	59124		1	
	R57082	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(CF1/8	10K	5%)	59124		1	
	R57083	4719-0510-002	RESISTOR	5%	1/8 W,	51 Ω	(RM73B2B519J)			59124		1	
	R57084	4719-0510-002	RESISTOR	5%	1/8 W,	51 Ω	(RM73B2B519J)			59124		1	
	R57085	4719-0510-002	RESISTOR	5%	1/8 W,	51 Ω	(RM73B2B519J)			59124		1	
	R57086	4719-0510-002	RESISTOR	5%	1/8 W,	51 Ω	(RM73B2B519J)			59124		1	
	R57087	4701-0474-003	RESISTOR	5%	1/8 W,	470 K	(CF1/8	470K	5%)	59124		1	
	R57088	4701-0332-003	RESISTOR	5%	1/8 W,	3.3 K	(CF1/8	3.3K	5%)	59124		1	
	R57089	4701-0560-003	RESISTOR	5%	1/8 W,	56 Ω	(CF1/8	56	5%)	59124		1	
	TP57001	2114-0000-007	POST, GANG	(85931-6)						00779		1	
	TP57002	2114-0000-007	POST, GANG	(85931-6)						00779		1	
	TP57003	2114-0000-007	POST, GANG	(85931-6)						00779		1	
	U57001	3134-0000-017	IC, PRESCALER	(MC12013P)						04713		1	
	U57002	3131-0000-013	IC, 4-BIT BIN CNTR	(SN74LS163AN)						01295		1	
	U57003	3131-0000-034	IC, DUAL JK FLIP-FLOP	(SN74LS73N)						01295		1	
	U57004	3131-0000-044	IC, QUAD 2-INPUT NAND	(SN74LS00N)						01295		1	
	U57005	3133-0000-114	IC, OP AMP	(CA3130AE)						02735		1	
	U57006	3228-1451-560	IC, SER INP FREQ SYNTHESIZER	(MC145156P)						04713		1	
	U57007	3131-0000-044	IC, QUAD 2-INPUT NAND	(SN74LS00N)						01295		1	
	U57008	3213-1201-700	IC, MOD PRESCALER	(MC12017P)						04713		1	
	U57009	3221-0001-100	IC, J-FET OP AMP	(LF356BN)						27014		1	
	U57012	3133-0000-005	IC, PHASE-LOCKED LOOP	(CD4046BE)						02735		1	
	U57016	3211-3390-000	IC, DUAL DECADE CNTR	(SN74LS390N)						01295		1	
	U57017	3214-9440-103	IC, COUNTER	(CD74HCT40103E)						02735		1	
	Y57001	2363-0109-000	CRYSTAL	18.800000 MHz								1	
		SEE FIG 1	TUBING, TFL	22 GA, NAT								A/R	

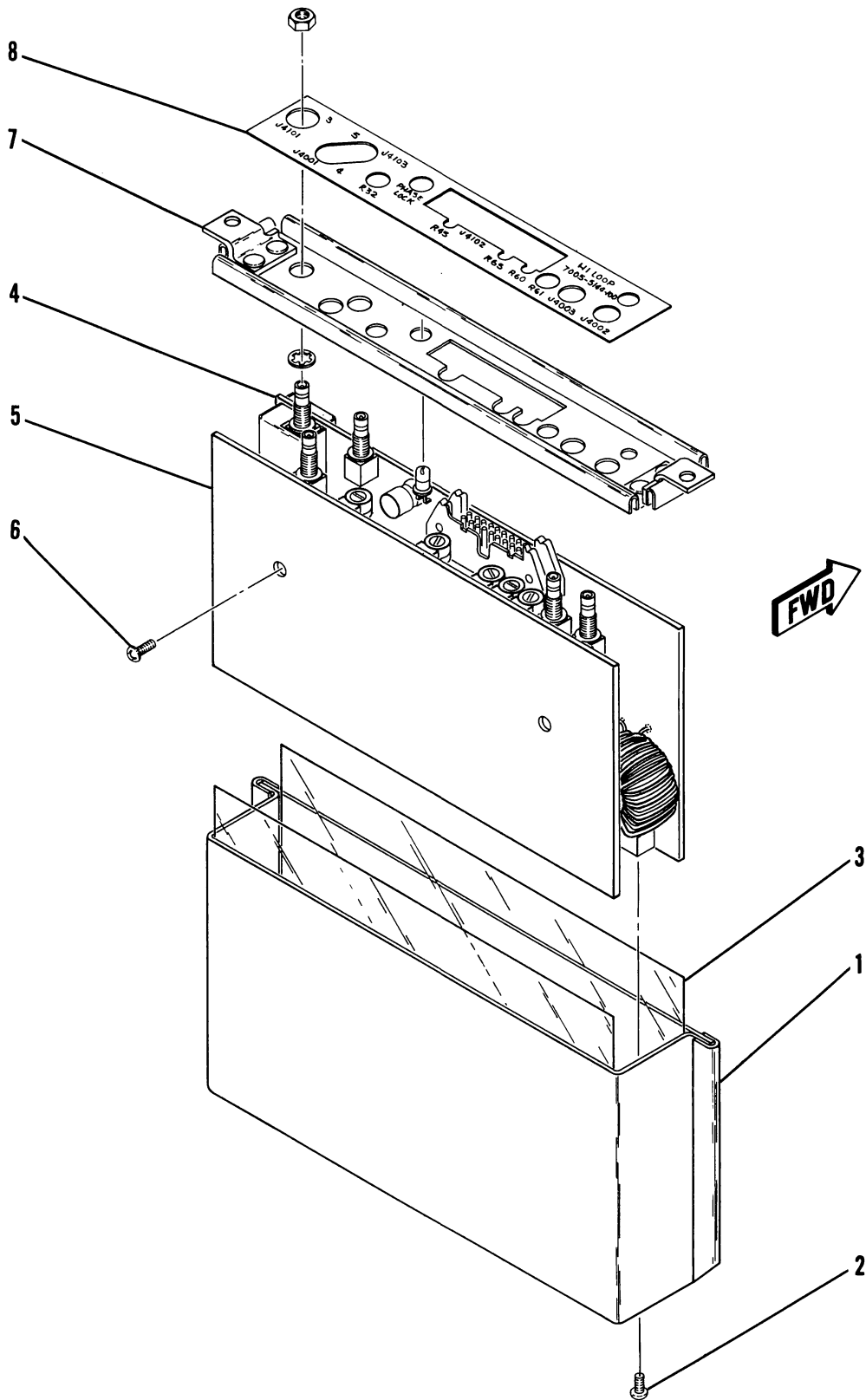
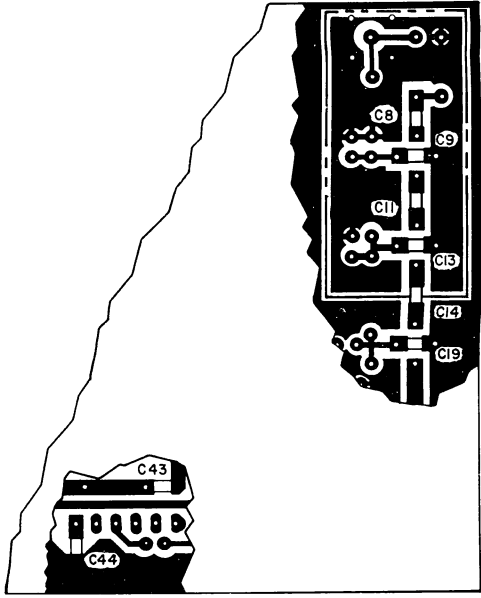
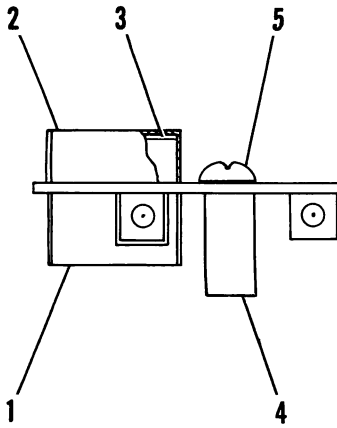


FIGURE 7-27 HIGH LOOP ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
27-		7005-5144-100								HIGH LOOP ASSEMBLY			REF
1		1415-5183-700								SEE FIG 13 FOR NHA ENCLOSURE			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		4
										---*---			
3		3107-5252-800								INSULATOR, MYLAR			2
4		SEE FIG 28								HIGH LOOP DIVIDER PC BOARD ASSEMBLY	INCL		1
										MTG HARDWARE			
5		SEE FIG 29								HIGH LOOP ANALOG PC BOARD ASSEMBLY	INCL		1
										MTG HARDWARE			
										ATTACHING PARTS			
6		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
7		1414-5183-500								COVER			1
8		2400-5153-300								LABEL, HIGH LOOP			1



BOTTOM

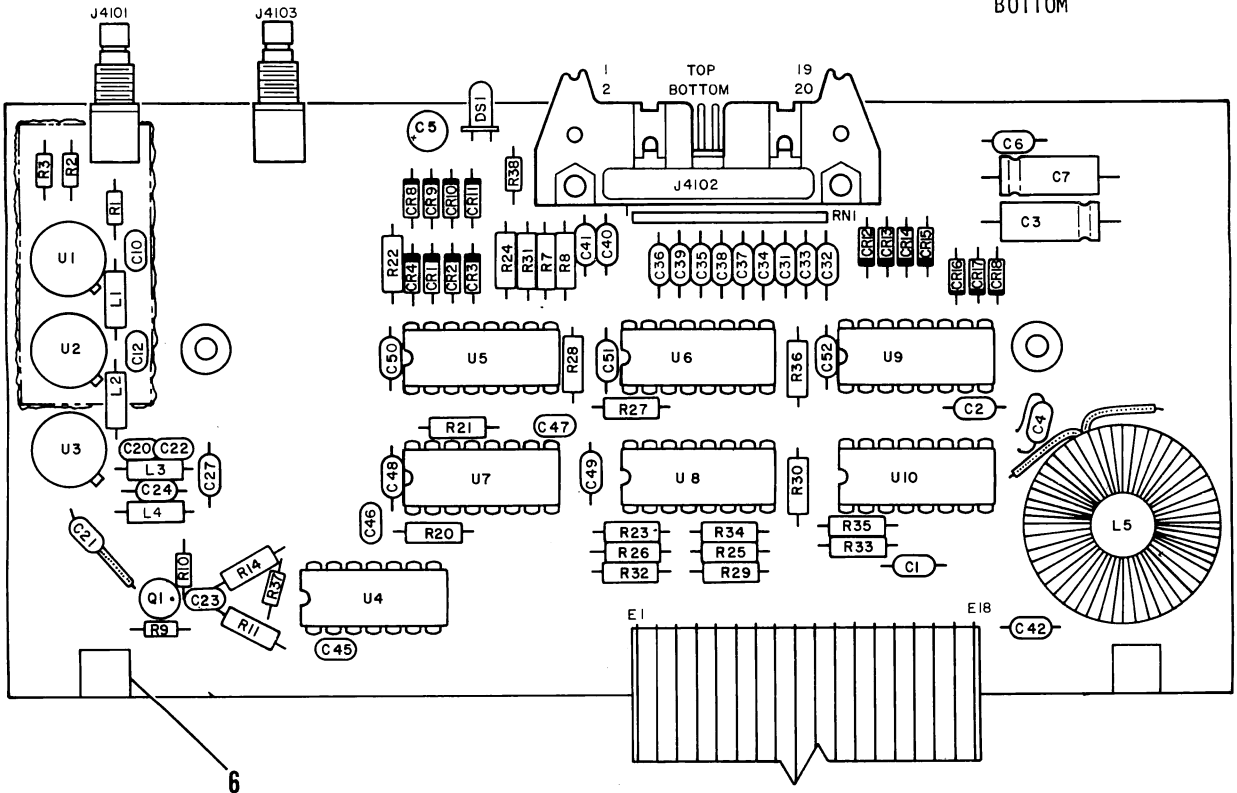


FIGURE 7-28 HIGH LOOP DIVIDER PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
28-		7010-5134-100		HIGH LOOP DIVIDER PC BOARD ASSEMBLY		SEE	REF
				FIG 27 FOR NHA			
1		2508-5153-801		SHIELD, TOP			1
2		2508-5154-900		SHIELD, BOTTOM			1
3		3107-5155-000		INSULATOR, MYLAR			1
4		2800-7600-194		SPACER			2
				ATTACHING PARTS			
5		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		1
				---*---			
6		2100-0000-100		NUT, SWAGE 4-40 (2040B)	83330		2
	J4101	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	J4102	2129-1025-020		CONNECTOR, HEADER (3428-1002)	75037		1
	J4103	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	C4101	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4102	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4103	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C4104	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4105	1580-4702-105		CAPACITOR 47 $\mu$ F, 50 V (CLE47MF10V)	62462		1
	C4106	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4107	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C4108	1620-2210-600		CAPACITOR 220 pF, 200 V (CC0805NP0220K100VSB)	16299		1
	C4109	1523-0000-002		CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C4110	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4111	1620-2210-600		CAPACITOR 220 pF, 200 V (CC0805NP0220K100VSB)	16299		1
	C4112	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4113	1523-0000-002		CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C4114	1620-2210-600		CAPACITOR 220 pF, 200 V (CC0805NP0220K100VSB)	16299		1
	C4119	1523-0000-002		CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C4120	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4121	1506-0030-017		CAPACITOR 3 pF, 100 V (REP110COG3R3C100V)	72982		1
	C4122	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4123	1506-0101-017		CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1
	C4124	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4127	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4131	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4132	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4133	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4134	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4135	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4136	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4137	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4138	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4139	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4140	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4141	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4142	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4143	1523-0000-002		CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C4144	1523-0000-002		CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C4145	1506-0101-017		CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1
	C4146	1506-0222-017		CAPACITOR 2200 pF, 100 V (C320C222J2G5CA)	61637		1
	C4147	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C4148	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4149	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4150	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4151	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4152	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	CR4101	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4102	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4103	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4104	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4108	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4109	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4110	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
28-	CR4111	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4112	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4113	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4114	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4115	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4116	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4117	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4118	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	DS4101	4816-0000-002		LED RED (5082-4860)	54893		1
	L4101	1801-0010-001		INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L4102	1801-0010-001		INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L4103	1801-0010-001		INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L4104	1801-0010-001		INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L4105	1800-5062-200		INDUCTOR 140 TURN, 22 GA (6700061)	33497		1
	Q4101	4803-0000-004		TRANSISTOR (SRF3114)	04713		1
	R4101	4701-0221-003		RESISTOR 5%, 1/8 W, 220 OHM (RLR05C221JR)	81349		1
	R4102	4701-0220-003		RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		1
	R4103	4701-0221-003		RESISTOR 5%, 1/8 W, 220 OHM (RLR05C221JR)	81349		1
	R4107	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R4108	4702-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (RLR05C472JR)	81349		1
	R4109	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (RLR05C223JR)	81349		1
	R4110	4701-0331-003		RESISTOR 5%, 1/8 W, 330 OHM (RLR05C331JR)	81349		1
	R4111	4702-0470-003		RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R4114	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4120	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4121	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R4122	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4123	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4124	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4125	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4126	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4127	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4128	4702-0331-003		RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
	R4129	4702-0331-003		RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
	R4130	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4131	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4132	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4133	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4134	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4135	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4136	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R4137	4701-0330-003*		RESISTOR 5%, 1/8 W, 33 OHM (RLR05C330JR)	81349		1
		4701-0220-003*		RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		A/R
		4701-0270-003*		RESISTOR 5%, 1/8 W, 27 OHM (RLR05C270JR)	81349		A/R
		4701-0390-003*		RESISTOR 5%, 1/8 W, 39 OHM (RLR05C390JR)	81349		A/R
		4701-0470-003*		RESISTOR 5%, 1/8 W, 47 OHM (RLR05C470JR)	81349		A/R
		4701-0560-003*		RESISTOR 5%, 1/8 W, 56 OHM (RLR05C560JR)	81349		A/R
	R4138	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	RN4101	4690-0947-200		RESISTOR, NETWORK 4.7 K, 10-P (4310R-101-472)	57924		1
	U4101	3222-9106-100		IC, CASCADE AMP (GPD1061)	24539		1
	U4102	3222-9106-100		IC, CASCADE AMP (GPD1061)	24539		1
	U4103	3222-9106-100		IC, CASCADE AMP (GPD1061)	24539		1
	U4104	3213-0861-100		IC, 1.3 - 1.5 GHz ÷ 4 (SP8611B)	52648		1
	U4105	3213-0003-000		IC, UNIV DECADE COUNTER (MC10137P)	04713		1
	U4106	3213-0003-000		IC, UNIV DECADE COUNTER (MC10137P)	04713		1
	U4107	3213-1200-900		IC, PRESCALER (MC12009L)	04713		1
	U4108	3213-1010-200		IC, QUAD 2-INPUT NOR (MC10H102P)	04713		1
	U4109	3213-0003-000		IC, UNIV DECADE COUNTER (MC10137P)	04713		1
	U4110	3134-0000-109		IC, DUAL D MS FLIP-FLOP (MC10H131P)	04713		1
		SEE FIG 1		FLEXSTRIP 18 COND			A/R
		SEE FIG 1		TUBING, TFL 22 GA, NAT			A/R



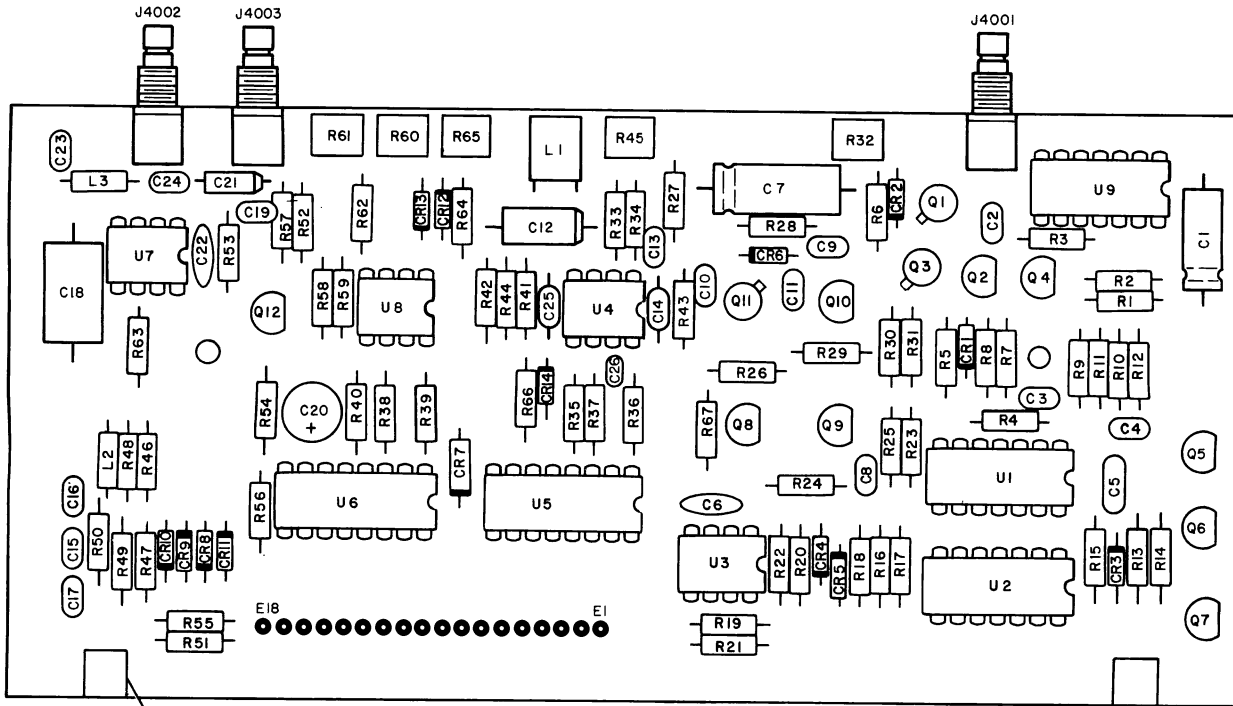


FIGURE 7-29 HIGH LOOP ANALOG PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
29-		7010-5134-000		HIGH LOOP ANALOG PC BOARD ASSEMBLY			REF
				FIG 27 FOR NHA			
1		2100-0000-100		NUT, SWAGE 4-40 (2040B)	83330		2
	J4001	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	J4002	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	J4003	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	C4001	1580-1000-350		CAPACITOR 10 μF, 35 V (35TT10MS)	52318		1
	C4002	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C4003	1506-0220-017		CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C4004	1506-0470-107		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	C4005	1521-0000-008		CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1
	C4006	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4007	1580-4700-215		CAPACITOR 47 μF, 25 V (25TT47MS)	52318		1
	C4008	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1
	C4009	1506-0101-017		CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1
	C4010	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C4011	1506-0150-017		CAPACITOR 15 pF, 200 V (C320C150J2G5CA)	61637		1
	C4012	1507-0336-023		CAPACITOR 33 μF, 10 V (T322D336M010AS)	31433		1
	C4013	1506-0150-017		CAPACITOR 15 pF, 200 V (C320C150J2G5CA)	61637		1
	C4014	1521-0000-008		CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1
	C4015	1506-0472-017		CAPACITOR 4700 pF, 100 V (C320C472J2G5CA)	61637		1
	C4016	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C4017	1506-0152-017		CAPACITOR 1500 pF, 100 V (C320C152J2G5CA)	61637		1
	C4018	1502-0104-010		CAPACITOR .1 μF, 50 V (PC12.1-50-5)	27735		1
	C4019	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4020	1580-1002-460		CAPACITOR 10 μF, 50 V (50TW10L)	52318		1
	C4021	1600-1050-925		CAPACITOR 1 μF, 50 V (T322B105M050AS)	31433		1
	C4022	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C4023	1506-0220-017		CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C4024	1506-0220-017		CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	C4025	1506-0000-008		CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1
	C4026	1506-0220-017		CAPACITOR 22 pF, 200 V (C320C220J2G5CA)	61637		1
	CR4001	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4002	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4003	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4004	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4005	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4006	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4007	4920-5151-300		DIODE, RECT (11DQ03)	59993		1
	CR4008	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4009	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4010	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4011	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4012	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4013	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4014	4818-0000-003		DIODE, ZENER 5.1 V (JAN1N5231B)	81349		1
	L4001	1803-0027-001		INDUCTOR 27 mH, 245 OHM (2534-58)	99800		1
	L4002	1801-0471-001		INDUCTOR 470 μH, 42 OHM (1025-84)	99800		1
	L4003	1801-0108-001		INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	Q4001	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q4002	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	Q4003	4809-0000-005		TRANSISTOR (66382)	UNK009		1
	Q4004	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	Q4005	4805-0000-003		TRANSISTOR (JAN2N3646)	81349		1
	Q4006	4805-0000-003		TRANSISTOR (JAN2N3646)	81349		1
	Q4007	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1
	Q4008	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1
	Q4009	4805-0000-003		TRANSISTOR (JAN2N3646)	81349		1
	Q4010	4807-0000-002		TRANSISTOR (JAN2N3905)	81349		1
	Q4011	4808-0000-001		TRANSISTOR (JAN2N4223)	81349		1
	Q4012	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1

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# ILLUSTRATED PARTS CATALOG

FIG-  
ITEM NO 1 2 3 4 5 6 7

ITEM NO	REF DES	PART NO	DESCRIPTION	FSCM	EFF	QTY
29-						
R4001		4702-0680-003	5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
R4002		4702-0391-003	5%, 1/4 W, 390 OHM (RLR07C391JR)	81349		1
R4003		4702-0101-003	5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
R4004		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4005		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4006		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4007		4702-0272-003	5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		1
R4008		4702-0222-003	5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
R4009		4702-0183-003	5%, 1/4 W, 18 K (RLR07C183JR)	81349		1
R4010		4702-0471-003	5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
R4011		4702-0471-003	5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
R4012		4702-0183-003	5%, 1/4 W, 18 K (RLR07C183JR)	81349		1
R4013		4702-0272-003	5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		1
R4014		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4015		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4016		4702-0223-003	5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
R4017		4702-0222-003	5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
R4018		4702-0223-003	5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
R4019		4702-0104-003	5%, 1/4 W, 100 K (RLR07C104JR)	81349		1
R4020		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4021		4702-0104-003	5%, 1/4 W, 100 K (RLR07C104JR)	81349		1
R4022		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4023		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4024		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4025		4702-0183-003	5%, 1/4 W, 18 K (RLR07C183JR)	81349		1
R4026		4702-0333-003	5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
R4027		4702-0330-003	5%, 1/4 W, 33 OHM (RLR07C330JR)	81349		1
R4028		4702-0105-003	5%, 1/4 W, 1 M (RLR07C105JR)	81349		1
R4029		4702-0152-003	5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		1
R4030		4702-0471-003	5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
R4031		4702-0471-003	5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
R4032		4753-0202-002	VAR 2 K (62-2-1-202)	02111		1
R4033		4706-4751-001	1%, 1/4 W, 4.75 K (RLR07C4751FR)	81349		1
R4034		4706-3401-001	1%, 1/4 W, 3.40 K (RLR07C3401FR)	81349		1
R4035		4702-0153-003	5%, 1/4 W, 15 K (RLR07C153JR)	81349		1
R4036		4702-0333-003	5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
R4037		4702-0123-003	5%, 1/4 W, 12 K (RLR07C123JR)	81349		1
R4038		4702-0682-003	5%, 1/4 W, 6.8 K (RLR07C682JR)	81349		1
R4039		4702-0392-003	5%, 1/4 W, 3.9 K (RLR07C392JR)	81349		1
R4040		4702-0332-003	5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1
R4041		4702-0331-003	5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
R4042		4702-0391-003	5%, 1/4 W, 390 OHM (RLR07C391JR)	81349		1
R4043		4702-0331-003	5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
R4044		4702-0222-003	5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
R4045		4753-0502-002	VAR 5 K (62-2-1-502)	02111		1
R4046		4702-0274-003	5%, 1/4 W, 270 K (RLR07C274JR)	81349		1
R4047		4702-0153-003	5%, 1/4 W, 15 K (RLR07C153JR)	81349		1
R4048		4702-0101-003	5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
R4049		4702-0331-003	5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
R4050		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4051		4702-0223-003	5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
R4052		4702-0472-003	5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
R4053		4702-0152-003	5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		1
R4054		4702-0103-003	5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
R4055		4702-0223-003	5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
R4056		4702-0102-003	5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
R4057		4702-0221-003	5%, 1/4 W, 220 OHM (RLR07C221JR)	81349		1
R4058		4702-0224-003	5%, 1/4 W, 220 K (RLR07C224JR)	81349		1
R4059		4702-0333-003	5%, 1/4 W, 33 K (RLR07C333JR)	81349		1
R4060		4753-0102-002	VAR 1 K (62-2-1-102)	02111		1
R4061		4753-0502-002	VAR 5 K (62-2-1-502)	02111		1
R4062		4702-0682-003	5%, 1/4 W, 6.8 K (RLR07C682JR)	81349		1
R4063		4702-0106-003	5%, 1/4 W, 10 M (RLR07C106JR)	81349		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
29-	R4064	4702-0103-003								RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1
	R4065	4753-0203-002								RESISTOR, VAR 20 K (62-2-1-203)	02111		1
	R4066	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1
	R4067	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	U4001	3131-0000-044								IC, QUAD 2-INPUT NAND (SN74LS00N)	01295		1
	U4002	3131-0000-034								IC, DUAL JK FLIP-FLOP (SN74LS73N)	01295		1
	U4003	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U4004	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U4005	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U4006	3133-0000-023								IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U4007	3135-0000-054								IC, OP AMP (LF412CN)	27104		1
	U4008	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
	U4009	3211-3014-000								IC, SCHMITT-TRIGGER (SN74LS14N)	01295		1



# ILLUSTRATED PARTS CATALOG

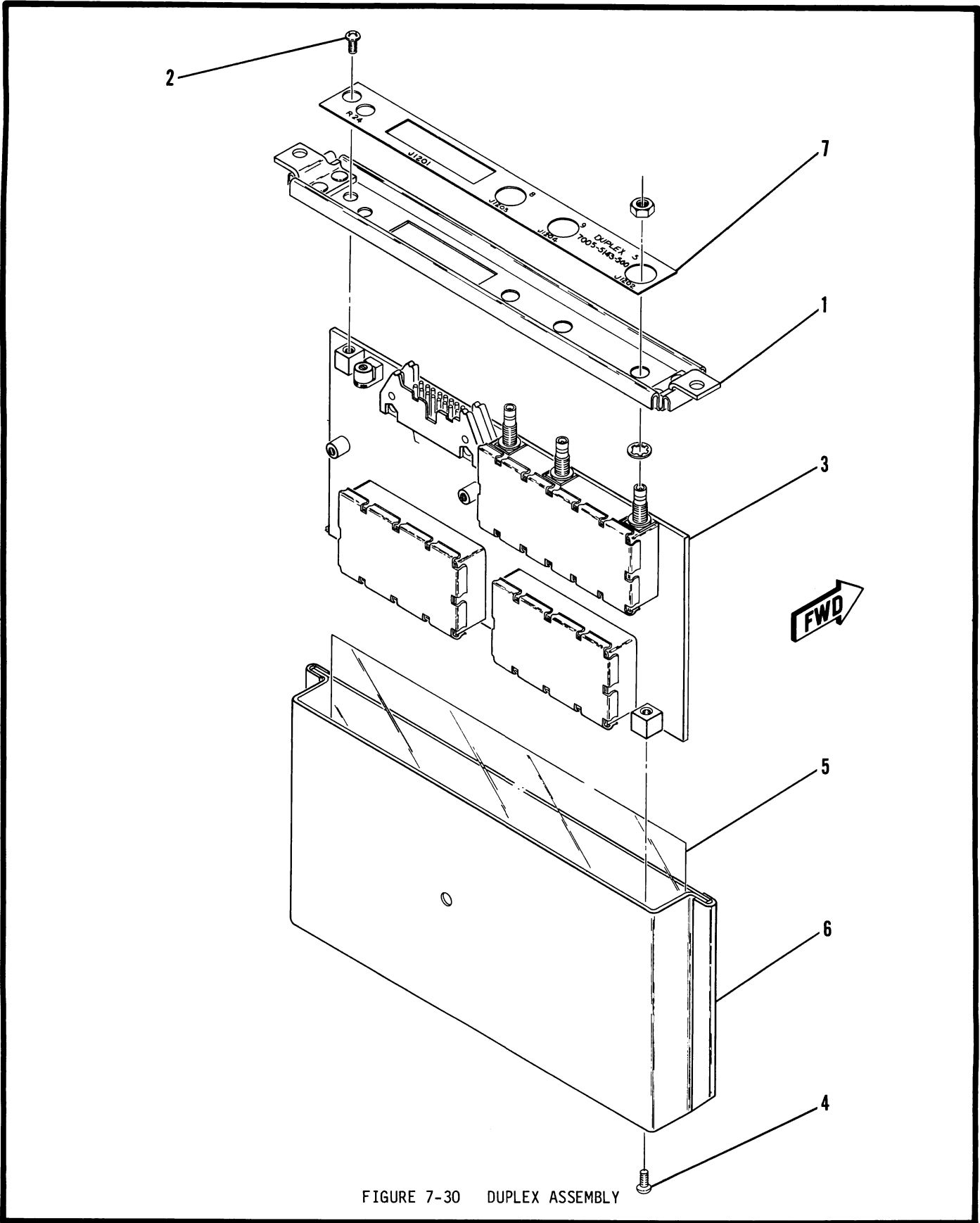


FIGURE 7-30 DUPLEX ASSEMBLY



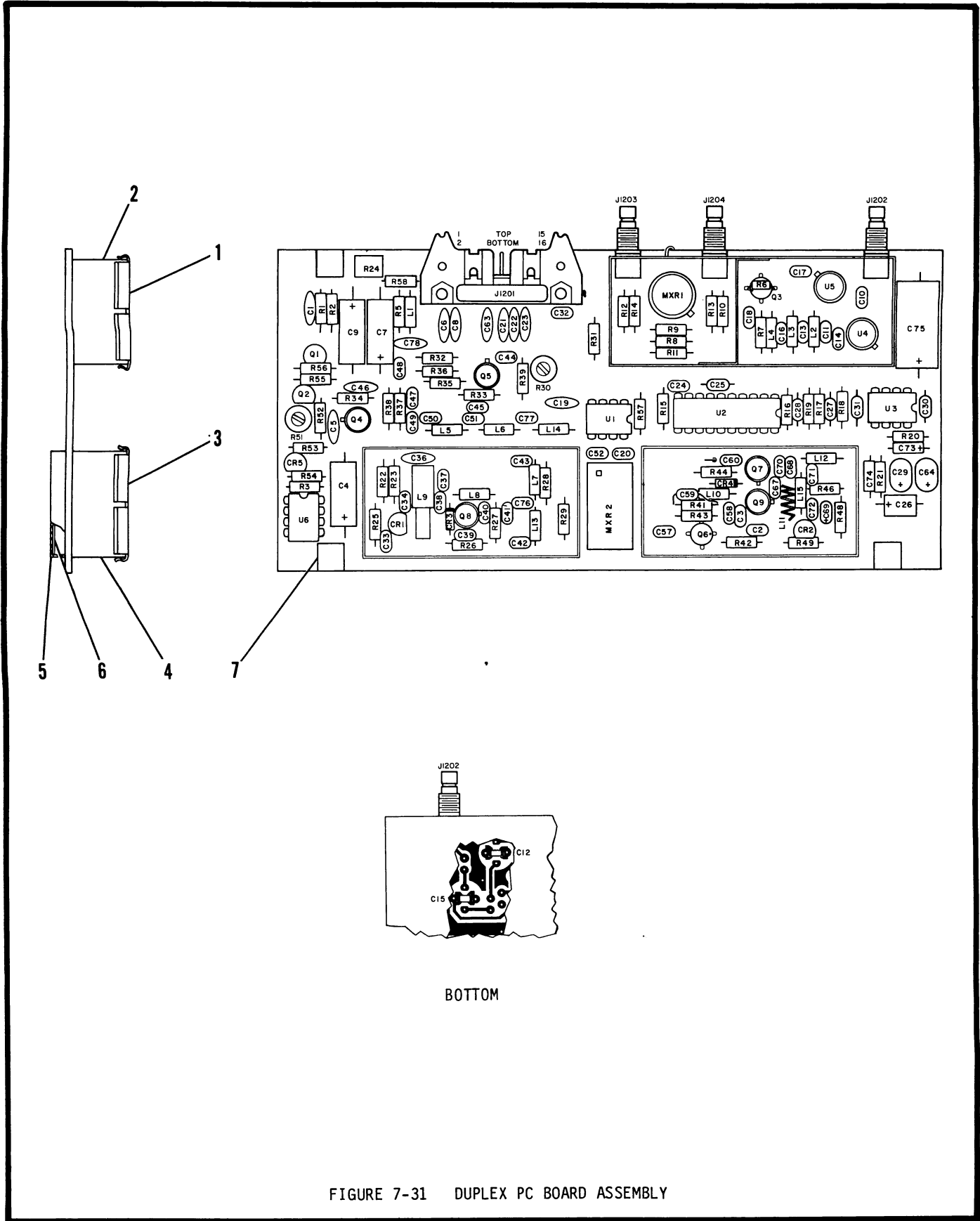
# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
30-		7005-5143-500								DUPLEX ASSEMBLY			REF
1		1414-5183-400								COVER			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		1
										-----*			
3		SEE FIG 31								DUPLEX PC BOARD ASSEMBLY		INCL MTG HARDWARE	1
										ATTACHING PARTS			
4		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										-----*			
5		3107-5252-800								INSULATOR, MYLAR			1
6		1415-5183-600								ENCLOSURE			1
7		2400-5153-200								LABEL, DUPLEX			1



# ILLUSTRATED PARTS CATALOG





# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
31-		7010-5131-000	DUPLX PC BOARD ASSEMBLY							SEE FIG 30 FOR NHA			REF	
1		1414-5154-100	COVER										1	
2		1415-5154-600	ENCLOSURE										1	
3		1414-5154-200	COVER, OSCILLATOR										1	
4		1415-5154-300	ENCLOSURE										1	
5		2508-5154-400	SHIELD										1	
6		3107-5154-500	INSULATOR, MYLAR										1	
7		2100-0000-100	NUT, SWAGE 4-40 (2040B)								83330		2	
	J1201	2129-1025-016	CONNECTOR, HEADER (3408-5002)										75037	1
	J1202	2200-2094-200	CONNECTOR, SMB (2110-7511-000)										19505	1
	J1203	2200-2094-200	CONNECTOR, SMB (2110-7511-000)										19505	1
	J1204	2200-2094-200	CONNECTOR, SMB (2110-7511-000)										19505	1
	C1201	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1202	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1203	1506-0103-017	CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)										61637	1
	C1204	1580-4700-215	CAPACITOR 47 $\mu$ F, 25 V (25TT47MS)										52318	1
	C1205	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1206	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1207	1580-4700-215	CAPACITOR 47 $\mu$ F, 25 V (25TT47MS)										52318	1
	C1208	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1209	1580-4700-215	CAPACITOR 47 $\mu$ F, 25 V (25TT47MS)										52318	1
	C1210	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)										61637	1
	C1211	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1212	1523-0000-002	CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)										72982	1
	C1213	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1214	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)										61637	1
	C1215	1523-0000-002	CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)										72982	1
	C1216	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1217	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)										61637	1
	C1218	1506-0221-017	CAPACITOR 220 pF, 200 V (C320C221J2G5CA)										61637	1
	C1219	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1220	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1221	1501-0102-001	CAPACITOR 1000 pF, 600 V (CE102)										71950	1
	C1222	1501-0102-001	CAPACITOR 1000 pF, 600 V (CE102)										71950	1
	C1223	1501-0102-001	CAPACITOR 1000 pF, 600 V (CE102)										71950	1
	C1224	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)										61637	1
	C1225	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)										72982	1
	C1226	1507-0106-021	CAPACITOR 10 $\mu$ F, 20 V (T322C106M020AS)										31433	1
	C1227	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)										72982	1
	C1228	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)										72982	1
	C1229	1508-0226-018	CAPACITOR 22 $\mu$ F, 35 V (T368C226M035AS)										31433	1
	C1230	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)										72982	1
	C1231	1521-0000-008	CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)										72982	1
	C1232	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)										61637	1
	C1233	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)										61637	1
	C1234	1506-0010-017	CAPACITOR 1 pF, 100 V (RPE110CDG1ROC100V)										72982	1
	C1236	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1237	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)										61637	1
	C1238	1506-0050-017	CAPACITOR 5.5 pF, 100 V (RPE110COG5R5C100V)										72982	1
	C1239	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)										61637	1
	C1240	1506-0050-017	CAPACITOR 5.5 pF, 100 V (RPE110COG5R5C100V)										72982	1
	C1241	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1242	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)										61637	1
	C1243	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)										61637	1
	C1244	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1245	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1246	1501-0103-005	CAPACITOR .01 $\mu$ F, 50 V (UK50-103)										71950	1
	C1247	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1248	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1249	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)										61637	1
	C1250	1506-0180-017	CAPACITOR 18 pF, 200 V (C320C180J2G5CA)										61637	1
	C1251	1506-0390-017	CAPACITOR 39 pF, 200 V (C320C390J2G5CA)										61637	1
	C1252	1506-0180-017	CAPACITOR 18 pF, 200 V (C320C180J2G5CA)										61637	1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
31-	C1257	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1258	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1259	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C1260	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1
	C1263	1501-0103-005								CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C1264	1508-0226-018								CAPACITOR 22 μF, 35 V (T368C226M035AS)	31433		1
	C1267	1506-0100-017								CAPACITOR 10 pF, 200 V (C320C100J2G5CA)	61637		1
	C1268	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1269	1508-0336-023								CAPACITOR 33 μF, 10 V (T350F336K010AS)	31433		1
	C1270	1506-0180-017								CAPACITOR 18 pF, 200 V (C320C180J2G5CA)	61637		1
	C1271	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1272	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1273	1507-0105-118								CAPACITOR 1 μF, 35 V (T322B105J035AS)	31433		1
	C1274	1507-0105-118								CAPACITOR 1 μF, 35 V (T322B105J035AS)	31433		1
	C1275	1580-1020-049								CAPACITOR 1000 μF, 6 V (6R3TT100OMS)	52318		1
	C1276	1506-0180-017								CAPACITOR 18 pF, 200 V (C320C180J2G5CA)	61637		1
	C1277	1506-0390-017								CAPACITOR 39 pF, 200 V (C320C390J2G5CA)	61637		1
	C1278	1501-0103-005								CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	CR1201	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR1202	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR1203	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR1204	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR1205	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	L1201	1801-0022-001								INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	L1202	1801-0010-001								INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L1203	1801-0010-001								INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L1204	1801-0010-001								INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L1205	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	L1206	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	L1207	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	L1208	1801-0338-001								INDUCTOR .33 μH, 2 OHM (1025-08)	99800		1
	L1209	1804-0000-010								INDUCTOR, VAR .061 - .101 μH (1804-0000-010)	56402		1
	L1210	1801-0228-001								INDUCTOR .22 μH, .14 OHM (1025-04)	99800		1
	L1211	SEE FIG 1								WIRE, BUS 24 GA			A/R
	L1212	1801-0229-001								INDUCTOR 2.2 μH, .4 OHM (1025-28)	99800		1
	L1213	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	L1214	1801-0108-001								INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	L1215	1801-0229-001								INDUCTOR 2.2 μH, .4 OHM (1025-28)	99800		1
	MXR1201	5250-0804-300								MIXER, FLTPK 5 - 1000 MHz (M43T)	59277		1
	MXR1202	5250-0100-100								MIXER, FLTPK 1 - 500 MHz (SBL-1-18)	15542		1
	Q1201	4805-0000-001								TRANSISTOR (JAN2N2907A)	81349		1
	Q1202	4805-0000-001								TRANSISTOR (JAN2N2907A)	81349		1
	Q1203	4803-0000-004								TRANSISTOR (SRF3114)	04713		1
	Q1204	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q1205	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q1206	4803-0000-004								TRANSISTOR (SRF3114)	04713		1
	Q1207	4810-0000-001								TRANSISTOR (JAN2N4416)	81349		1
	Q1208	5050-2601-000								TRANSISTOR, FET SELECTED			1
	Q1209	4810-0000-001								TRANSISTOR (JAN2N4416)	81349		1
	R1201	4702-0222-003								RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
	R1202	4702-0472-003								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R1203	4702-0472-003								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R1205	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R1206	4701-0223-003								RESISTOR 5%, 1/8 W, 22 K (RLR05C223JR)	81349		1
	R1207	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R1208	4702-0182-003*								RESISTOR 5%, 1/4 W, 1.8 K (RLR07C182JR)	81349		1
		4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		A/R
		4702-0821-003*								RESISTOR 5%, 1/4 W, 820 OHM (RLR07C821JR)	81349		A/R
		4702-0112-003*								RESISTOR 5%, 1/4 W, 1.1 K (RLR07C112JR)	81349		A/R
		4702-0122-003*								RESISTOR 5%, 1/4 W, 1.2 K (RLR07C122JR)	81349		A/R
		4702-0152-003*								RESISTOR 5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		A/R
		4702-0222-003*								RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		A/R
		4702-0272-003*								RESISTOR 5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		A/R

CONTINUED ON NEXT PAGE



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
31-	R1209	4702-0151-003	RESISTOR	5%	1/4 W,	150 OHM	(RLR07C151JR)				81349		1
	R1210	4702-0680-003	RESISTOR	5%	1/4 W,	68 OHM	(RLR07C680JR)				81349		1
	R1211	4702-0680-003	RESISTOR	5%	1/4 W,	68 OHM	(RLR07C680JR)				81349		1
	R1212	4702-0820-003	RESISTOR	5%	1/4 W,	82 OHM	(RLR07C820JR)				81349		1
	R1213	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1214	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1215	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1216	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R1217	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R1218	4702-0154-003	RESISTOR	5%	1/4 W,	150 K	(RLR07C154JR)				81349		1
	R1219	4702-0154-003	RESISTOR	5%	1/4 W,	150 K	(RLR07C154JR)				81349		1
	R1220	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1221	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1222	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1223	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R1224	4753-0203-002	RESISTOR, VAR			20 K	(62-2-1-203)				02111		1
	R1225	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1226	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R1227	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1228	4702-0470-003	RESISTOR	5%	1/4 W,	47 OHM	(RLR07C470JR)				81349		1
	R1229	4702-0680-003	RESISTOR	5%	1/4 W,	68 OHM	(RLR07C680JR)				81349		1
	R1230	4756-2450-000	RESISTOR, VAR			50 OHM	(62-1-1-500)				02111		1
	R1231	4702-0121-003	RESISTOR	5%	1/4 W,	120 OHM	(RLR07C121JR)				81349		1
	R1232	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1233	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R1234	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1235	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R1236	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1237	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R1238	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1239	4701-0220-003	RESISTOR	5%	1/8 W,	22 OHM	(RLR05C220JR)				81349		1
	R1241	4702-0470-003	RESISTOR	5%	1/4 W,	47 OHM	(RLR07C470JR)				81349		1
	R1242	4702-0681-003	RESISTOR	5%	1/4 W,	680 OHM	(RLR07C681JR)				81349		1
	R1243	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R1244	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R1246	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R1248	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R1249	4702-0681-003	RESISTOR	5%	1/4 W,	680 OHM	(RLR07C681JR)				81349		1
	R1251	4752-0502-002	RESISTOR, VAR			5 K	(62-1-1-502)				02111		1
	R1252	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R1253	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R1254	4702-0152-003	RESISTOR	5%	1/4 W,	1.5 K	(RLR07C152JR)				81349		1
	R1255	4702-0152-003	RESISTOR	5%	1/4 W,	1.5 K	(RLR07C152JR)				81349		1
	R1256	4702-0101-003	RESISTOR	5%	1/4 W,	100 OHM	(RLR07C101JR)				81349		1
	R1257	4702-0150-003	RESISTOR	5%	1/4 W,	15 OHM	(RLR07C150JR)				81349		1
	R1258	4702-0822-003	RESISTOR	5%	1/4 W,	8.2 K	(RLR07C822JR)				81349		1
	U1201	3213-1201-700	IC, LP 2-MODULUS PRESCALER				(DS8617N-4)				27014		1
	U1202	3228-1451-560	IC, PLL FREQ SYNTHESIZER				(MC145156P)				04713		1
	U1203	3221-0006-000	IC, DUAL LOW NOISE OP AMP				(NE5532N)				18324		1
	U1204	3222-9106-100	IC, CASCADE AMP				(GPD1061)				24539		1
	U1205	3222-9106-100	IC, CASCADE AMP				(GPD1061)				24539		1
	U1206	3221-0006-000	IC, DUAL LOW NOISE OP AMP				(NE5532N)				18324		1

NOTE: \* SELECTED AT TEST (SAT)  
 NOMINAL VALUE = 1.8 K  
 SELECT RANGE = 820 OHM THRU 2.7 K



# ILLUSTRATED PARTS CATALOG

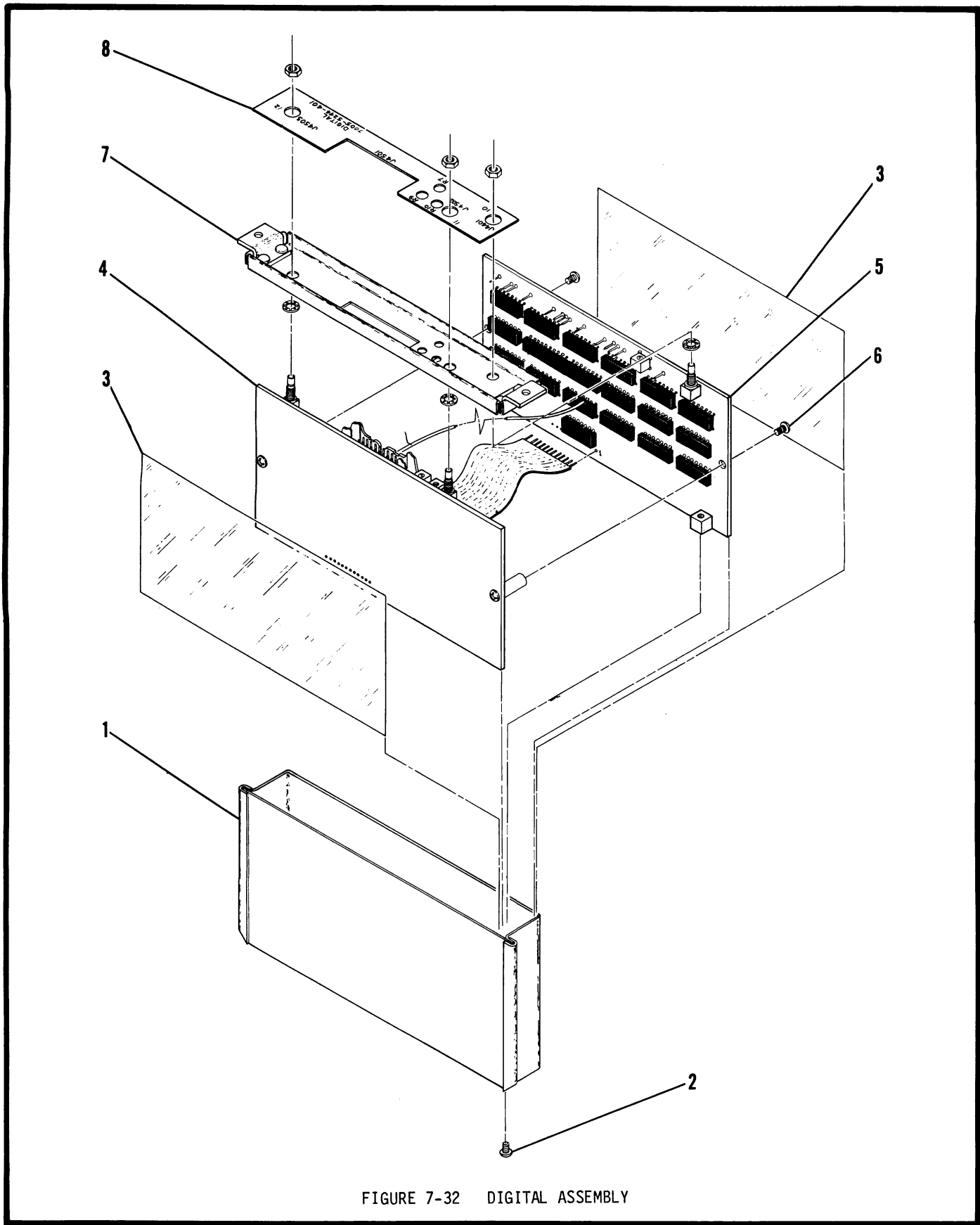
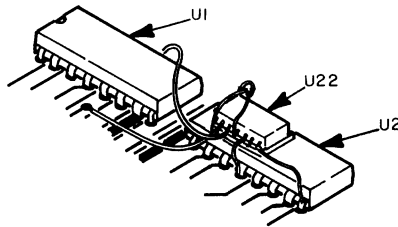
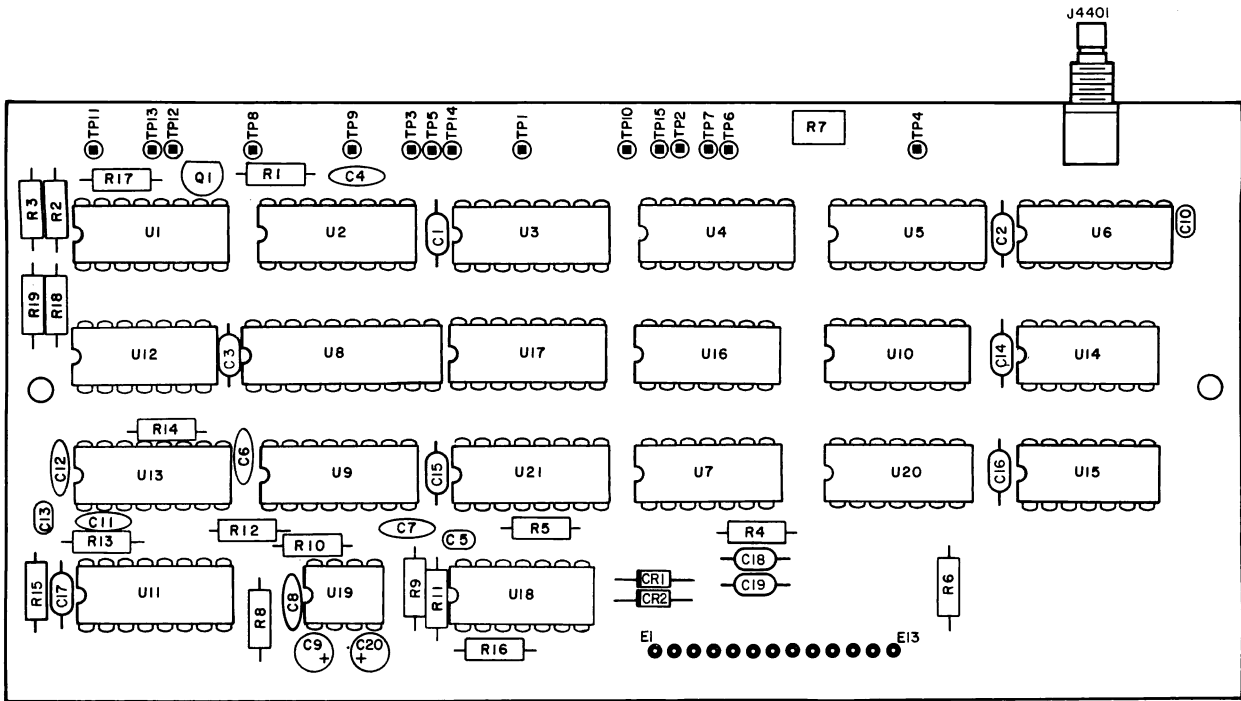


FIGURE 7-32 DIGITAL ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
32-		7005-5244-401								DIGITAL ASSEMBLY			REF
1		1415-5280-000								SEE FIG 13 FOR NHA ENCLOSURE			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
3		3107-5252-800								INSULATOR, MYLAR			2
4		SEE FIG 33								DIGITAL COUNTER PC BOARD ASSEMBLY	INCL MTG		1
										HARDWARE			
5		SEE FIG 34								DIGITAL REFERENCE PC BOARD ASSEMBLY	INCL MTG		1
										HARDWARE			
										ATTACHING PARTS			
6		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
7		1414-5282-400								COVER			1
8		2400-5154-000								LABEL, DIGITAL			1



U22 IS INSTALLED AS SHOWN FOR SERIALS:  
 FM/AM 1200A: SN1450 & ON  
 FM/AM 1200S: SN4492 & ON

FIGURE 7-33 DIGITAL COUNTER PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
33-		7010-5234-400		DIGITAL COUNTER PC BOARD ASSEMBLY SEE			REF
				FIG 32 FOR NHA			
	J4401	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	C4401	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4402	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4403	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104m50V)	72982		1
	C4404	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4405	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C4406	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4407	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4408	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 v (UK50-103)	71950		1
	C4409	1580-3392-450		CAPACITOR 3.3 $\mu$ F, 50 V (50TW3R)	52318		1
	C4410	1506-0121-017		CAPACITOR 120 pF, 200 V (C320C121J2G5CA)	61637		1
	C4411	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4412	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4413	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C4414	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4415	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4416	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4417	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4418	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4419	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4420	1580-3392-450		CAPACITOR 3.3 $\mu$ F, 50 V (50TW3R)	52318		1
	CR4401	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR4402	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	Q4401	4805-0000-003		TRANSISTOR (JAN2N3646)	81349		1
	R4401	4702-0822-003		RESISTOR 5%, 1/4 W, 8.2 K (RLR07C822JR)	81349		1
	R4402	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4403	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4404	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4405	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4406	4702-0105-003		RESISTOR 5%, 1/4 W, 1 M (RLR07C105JR)	81349		1
	R4407	4753-0503-002		RESISTOR, VAR 50 K (62-2-1-503)	02111		1
	R4408	4706-2001-001		RESISTOR 1%, 1/4 W, 2.00 K (RLR07C2001FR)	81349		1
	R4409	4706-1003-001		RESISTOR 1%, 1/4 W, 100.00 K (RLR07C1003FR)	81349		1
	R4410	4706-1002-001		RESISTOR 1%, 1/4 W, 10.00 K (RLR07C1002FR)	81349		1
	R4411	4706-1002-001		RESISTOR 1%, 1/4 W, 10.00 K (RLR07C1002FR)	81349		1
	R4412	4706-2001-001		RESISTOR 1%, 1/4 W, 2.00 K (RLR07C2001FR)	81349		1
	R4413	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4414	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4415	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4416	4702-0221-003		RESISTOR 5%, 1/4 W, 220 OHM (RLR07C221JR)	81349		1
	R4417	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4418	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4419	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	TP4401	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4402	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4403	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4404	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4405	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4406	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4407	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4408	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4409	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4410	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4411	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4412	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4413	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4414	2114-0000-007		POST, GANG (85931-6)	00779		1
	TP4415	2114-0000-007		POST, GANG (85931-6)	00779		1
	U4401	3133-0000-023		IC, MPLXR/DMPLXR (CD4053BE)	02735		1
	U4402	3131-0000-030		IC, U/D COUNTER (SN74LS191N)	01295		1
	U4403	3133-0000-012		IC, U/D COUNTER (CD4029BE)	02735		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
33-	U4404	3133-0000-012								IC, U/D COUNTER (CD4029BE)	02735		1
	U4405	3133-0000-012								IC, U/D COUNTER (CD4029BE)	02735		1
	U4406	3133-0000-012								IC, U/D COUNTER (CD4029BE)	02735		1
	U4407	3214-4013-100								IC, DUAL D FLIP-FLOP (CD4013BE)	02735		1
	U4408	3214-7374-000								IC, OCTAL D FLIP-FLOP (MM74C374)	27C14		1
	U4409	3135-0000-052								IC, D/A CONVERTER (DAC0802LCJ)	27014		1
	U4410	3133-0000-022								IC, 8-INPUT NOR/OR (CD4078BE)	02735		1
	U4411	3133-0000-012								IC, U/D COUNTER (CD4029BE)	02735		1
	U4412	3214-4013-100								IC, DUAL D FLIP-FLOP (CD4013BE)	02735		1
	U4413	3214-4098-100								IC, DUAL MULTIVIBRATOR (CD4098BE)	02735		1
	U4414	3133-0000-001								IC, QUAD 2-INPUT NOR (CD4001BE)	02735		1
	U4415	3214-4002-100								IC, DUAL 4-INPUT NOR (CD4002BE)	02735		1
	U4416	3133-0000-011								IC, QUAD 2-INPUT NAND (CD4011BE)	02735		1
	U4417	3133-0000-006								IC, HEX BFR/CONVERTER (CD4049UBE)	02735		1
	U4418	3133-0000-008								IC, QUAD EXCLUSIVE NOR (CD4077BE)	02735		1
	U4419	3134-0000-003								IC, DUAL HI-PERF OP AMP (LM1458N)	27014		1
	U4420	3133-0000-001								IC, QUAD 2-INPUT NOR (CD4001BE)	02735		1
	U4421	3133-0000-006								IC, HEX BFR/CONVERTER (CD4049UBE)	02735		1
	U4422	3214-9474-001								IC, DUAL D FLIP-FLOP (74HCT74D)	18324	A	1

A---FM/AM-1200A, SN 1450 & ON  
FM/AM-1200S, SN 4492 & ON



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
34-		7010-5234-500		DIGITAL REFERENCE PC BOARD ASSEMBLY			REF
				FIG 32 FOR NHA			
1		2800-7600-194		SPACER			2
				ATTACHING PARTS			
2		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		1
				---*---			
3		2100-0000-100		NUT, SWAGE 4-40 (2040B)	83330		2
	J4501	2129-1025-020		CONNECTOR, HEADER (3428-1002)	75037		1
	J4502	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	J4503	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	C4501	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C4502	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4503	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C4504	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4505	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 v (UK50-103)	71950		1
	C4506	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4507	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4508	1507-0105-018		CAPACITOR 1 $\mu$ F, 35 V (T322B105M035AS)	31433		1
	C4509	1507-0105-018		CAPACITOR 1 $\mu$ F, 35 V (T322B105M035AS)	31433		1
	C4510	1605-3360-475		CAPACITOR 33 $\mu$ F, 16 V (T350H336M016AS)	31433		1
	C4511	1580-4700-045		CAPACITOR 47 $\mu$ F, 10 V (10TT47MS)	52318		1
	C4512	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4513	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4514	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4515	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4516	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4517	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4518	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4519	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4520	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4521	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C4522	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4523	1506-0470-017		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	C4524	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C4525	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C4526	1506-0470-017		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	C4527	1501-0103-005		CAPACITOR .01 $\mu$ F, 50 V (UK50-103)	71950		1
	C4528	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4529	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4530	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4531	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)	52318		1
	C4532	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4533	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4534	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)	52318		1
	C4535	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4536	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4537	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4538	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4539	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4540	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C4541	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4542	1506-0103-016		CAPACITOR .01 $\mu$ F, 50 V (C062C103J5G5CA)	61637		1
	C4543	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C4544	1501-0102-001		CAPACITOR 1000 pF, 600 v (CE102)	71950		1
	CR501	4818-0000-015		DIODE, ZENER 6.9 V (LM329C2)	27014		1
	LR501	1801-0022-001		INDUCTOR 22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
	Q4501	4805-0000-003		TRANSISTOR (JAN2N3646)	81349		1
	Q4502	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1
	R4501	4702-0273-003		RESISTOR 5%, 1/4 W, 27 K (RLR07C273JR)	81349		1
	R4502	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R4503	4702-0152-003		RESISTOR 5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		1
	R4504	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1
	R4505	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1

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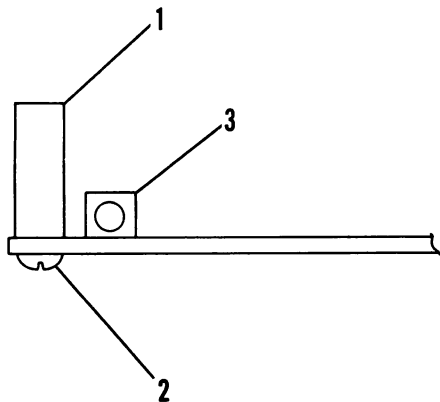
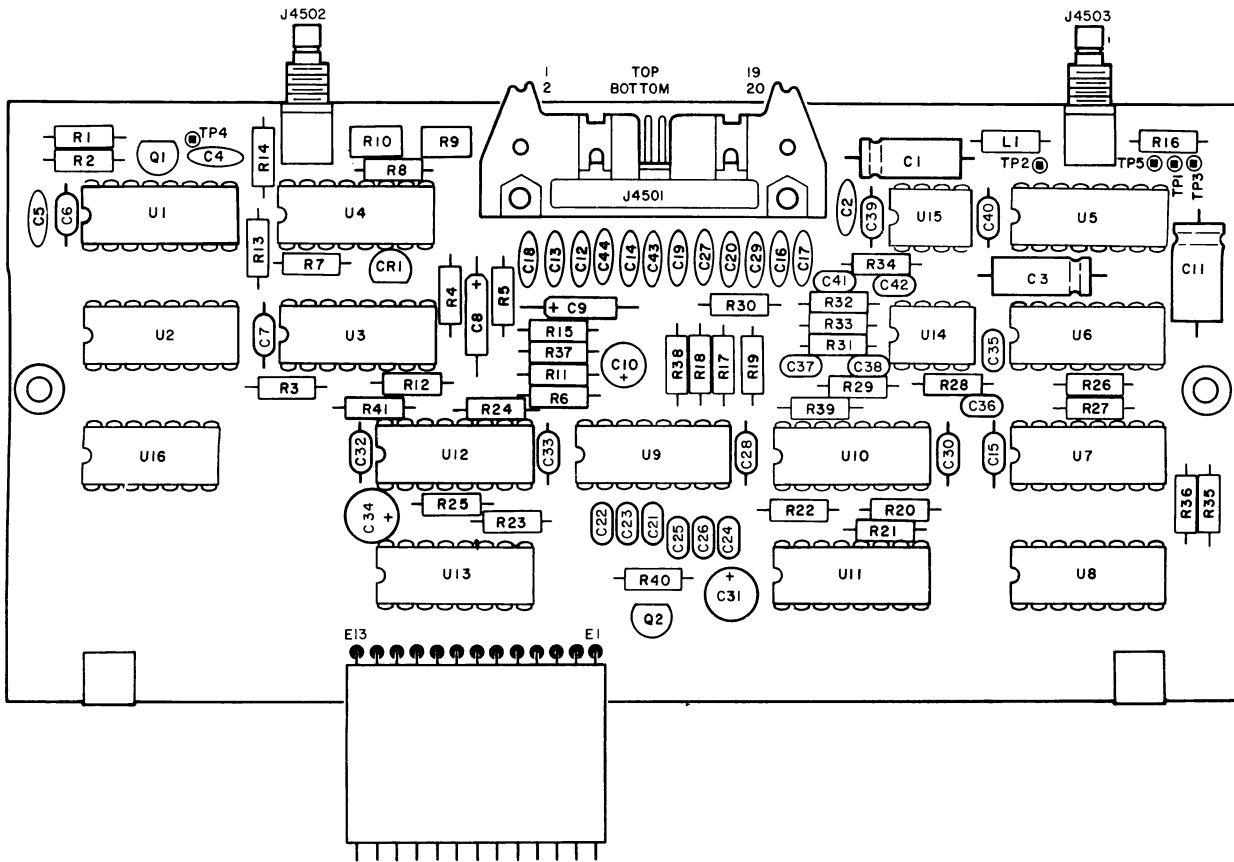


FIGURE 7-34 DIGITAL REFERENCE PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
34-	R4506	4702-0123-003	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		1
	R4507	4706-3481-001	RESISTOR	1%	1/4 W,	3.48 K	(RLR07C3481FR)				81349		1
	R4508	4706-9091-001	RESISTOR	1%	1/4 W,	9.09 K	(RLR07C9091FR)				81349		1
	R4509	4753-0102-002	RESISTOR, VAR			1 K	(62-2-1-102)				02111		1
	R4510	4753-0202-002	RESISTOR, VAR			2 K	(62-2-1-202)				02111		1
	R4511	4702-0223-003	RESISTOR	5%	1/4 W,	27 K	(RLR07C223JR)				81349		1
	R4512	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4513	4702-0682-003	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
	R4514	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R4515	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R4516	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4517	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4518	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4519	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4520	4702-0512-002	RESISTOR	5%	1/4 W,	5.1 K	(RLR07C512JR)				81349		1
	R4521	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R4522	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4523	4702-0512-002	RESISTOR	5%	1/4 W,	5.1 K	(RLR07C512JR)				81349		1
	R4524	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R4525	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4526	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R4527	4702-0182-003	RESISTOR	5%	1/4 W,	1.8 K	(RLR07C182JR)				81349		1
	R4528	4702-0154-003	RESISTOR	5%	1/4 W,	150 K	(RLR07C154JR)				81349		1
	R4529	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R4530	4702-0182-003	RESISTOR	5%	1/4 W,	1.8 K	(RLR07C182JR)				81349		1
	R4531	4702-0154-003	RESISTOR	5%	1/4 W,	150 K	(RLR07C154JR)				81349		1
	R4532	4702-0563-003	RESISTOR	5%	1/4 W,	56 K	(RLR07C563JR)				81349		1
	R4533	4702-0182-003	RESISTOR	5%	1/4 W,	1.8 K	(RLR07C182JR)				81349		1
	R4534	4702-0154-003	RESISTOR	5%	1/4 W,	150 K	(RLR07C154JR)				81349		1
	R4535	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4536	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4537	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4538	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4539	4702-0273-003	RESISTOR	5%	1/4 W,	27 K	(RLR07C273JR)				81349		1
	R4540	4702-0273-003	RESISTOR	5%	1/4 W,	27 K	(RLR07C273JR)				81349		1
	R4541	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	TP4501	2114-0000-007	POST, GANG			(85931-6)					00779		1
	TP4502	2114-0000-007	POST, GANG			(85931-6)					00779		1
	TP4503	2114-0000-007	POST, GANG			(85931-6)					00779		1
	TP4504	2114-0000-007	POST, GANG			(85931-6)					00779		1
	TP4505	2114-0000-007	POST, GANG			(85931-6)					00779		1
	U4501	3211-3390-000	IC, DUAL DECADE COUNTER			(SN74LS390N)					01295		1
	U4502	3214-4040-101	IC, 12-STAGE COUNTER, 5 MHz			(HEF4040BCN)					18324		1
	U4503	3133-0000-005	IC, PHASE LOCK LOOP			(CD4046BE)					02735		1
	U4504	3133-0000-023	IC, MPLXR/DMPLXR			(CD4053BE)					02735		1
	U4505	3214-5018-100	IC, DUAL UP COUNTER			(MC14518BCP)					04713		1
	U4506	3214-5018-100	IC, DUAL UP COUNTER			(MC14518BCP)					04713		1
	U4507	3214-5018-100	IC, DUAL UP COUNTER			(MC14518BCP)					04713		1
	U4508	3214-4052-100	IC, ANALOG MPLXR			(CD4052BE)					00779		1
	U4509	3214-4052-100	IC, ANALOG MPLXR			(CD4052BE)					00779		1
	U4510	3133-0000-005	IC, PHASE LOCK LOOP			(CD4046BE)					02735		1
	U4511	3214-5018-100	IC, DUAL UP COUNTER			(MC14518BCP)					04713		1
	U4512	3133-0000-005	IC, PHASE LOCK LOOP			(CD4046BE)					02735		1
	U4513	3214-5018-100	IC, DUAL UP COUNTER			(MC14518BCP)					04713		1
	U4514	3134-0000-003	IC, DUAL HI-PERF OP AMP			(LM1458N)					27014		1
	U4515	3134-0000-003	IC, DUAL HI-PERF OP AMP			(LM1458N)					27014		1
	U4516	3133-0000-010	IC, 8-INPUT NAND			(CD4068BE)					02735		1
		SEE FIG 1	FLEXSTRIP			12-COND							A/R

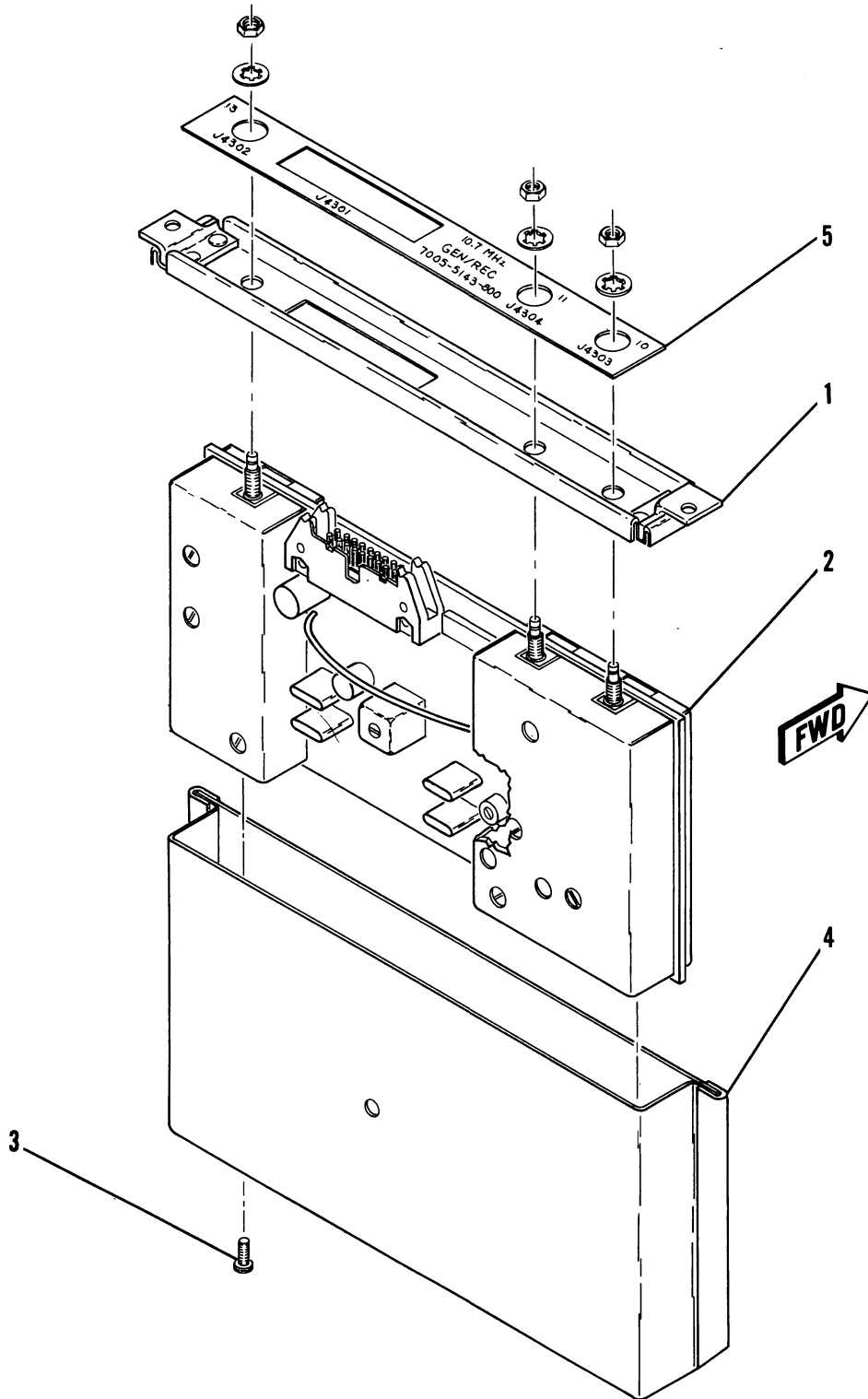


FIGURE 7-35 10.7 MHz GENERATE/RECEIVE ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
35-		7005-5143-800	10.7	MHZ	GENERATE/RECEIVE	ASSEMBLY	SEE						REF
										FIG 13 FOR NHA			
1		1414-5181-900								COVER			1
2		SEE FIG 36								10.7 MHZ GENERATE/RECEIVE PC BOARD ASSEMBLY			1
										INCL MTG HARDWARE			
										ATTACHING PARTS			
3		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
4		1415-5183-601								ENCLOSURE			1
5		2400-5153-400								LABEL, GENERATE/RECEIVE			1

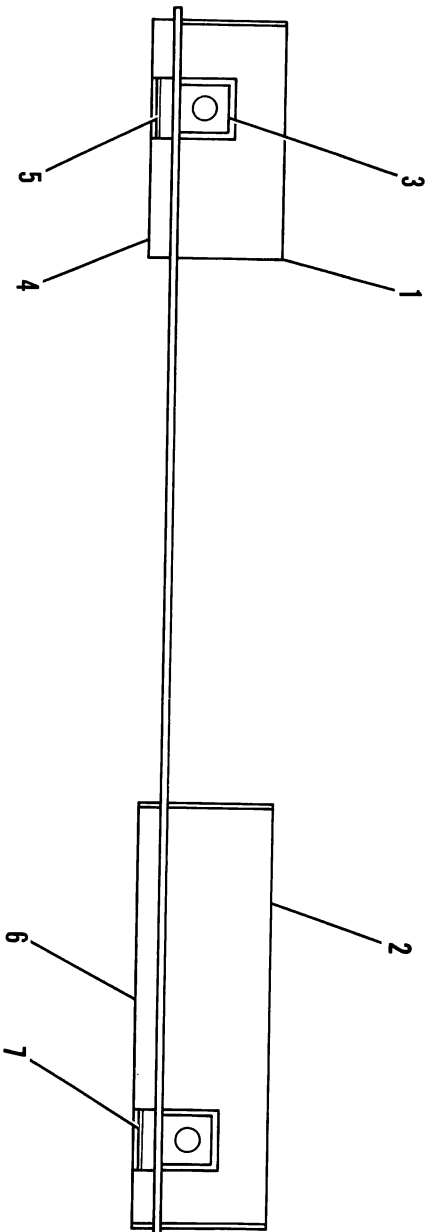
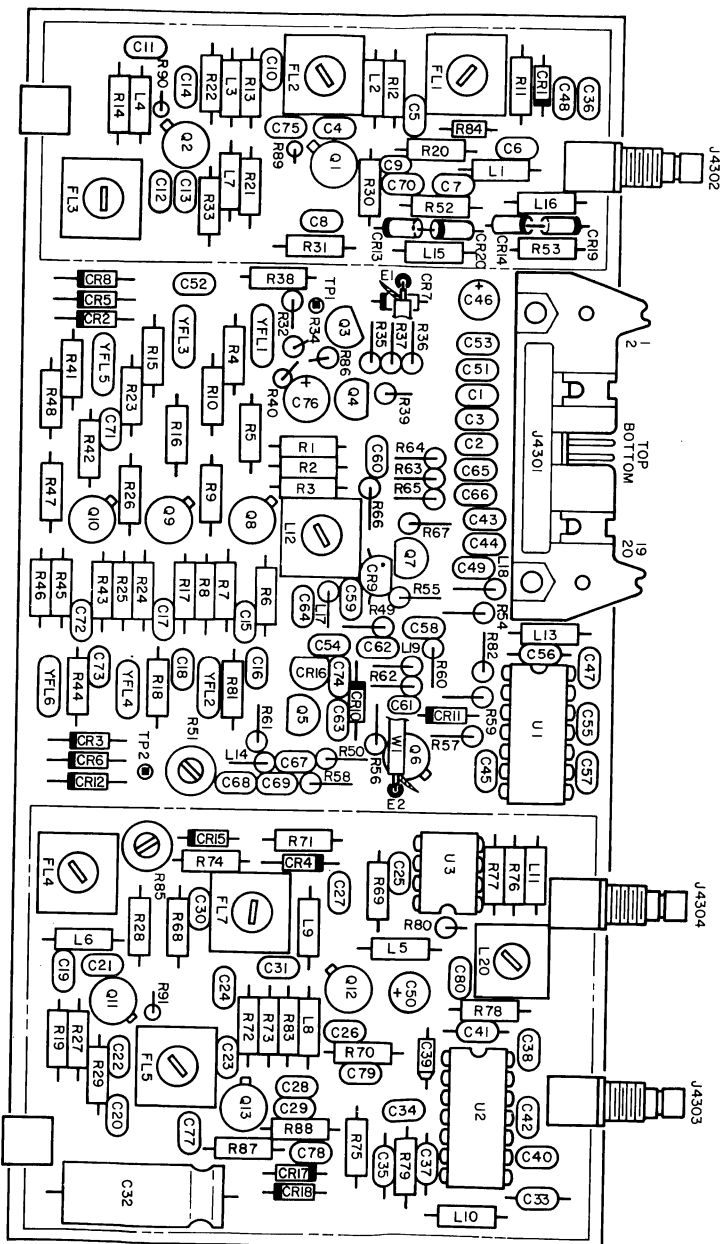


FIGURE 7-36 10.7 MHz GENERATE/RECEIVE PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
36-		7010-5234-301	10.7 GENERATE/RECEIVE PC BOARD ASSEMBLY							SEE					
			FIG 35 FOR NHA												
1		2508-5255-201								SHIELD, TOP LH			1		
2		2508-5255-300								SHIELD, TOP RH			1		
3		2100-0000-100								NUT, SWAGE 4-40 (2040B)	83330		2		
4		2508-5157-200								SHIELD, BOTTOM LH			1		
5		3107-5156-603								INSULATOR, MYLAR			1		
6		2508-5157-100								SHIELD, BOTTOM RH			1		
7		3107-5156-604								INSULATOR, MYLAR			1		
	J4301	2129-1025-020								CONNECTOR, HEADER (3428-1002)	75037		1		
	J4302	2200-2094-200								CONNECTOR, SMB (2110-7511-000)	19505		1		
	J4303	2200-2094-200								CONNECTOR, SMB (2110-7511-000)	19505		1		
	J4304	2200-2094-200								CONNECTOR, SMB (2110-7511-000)	19505		1		
	C4301	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4302	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4304	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4305	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4306	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4307	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4308	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4309	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4310	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4311	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4312	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4313	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4314	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4315	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1		
	C4316	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4317	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1		
	C4318	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4319	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4320	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4321	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4322	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4323	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4324	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4325	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1		
	C4326	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4327	1506-0470-017								CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1		
	C4328	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4329	1506-0470-017								CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1		
	C4330	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4331	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1		
	C4332	1580-3310-150								CAPACITOR 330 μF, 16 V (16TT330MS)	52318		1		
	C4333	1521-0000-008								CAPACITOR .10 μF, 50 V (RPA20Z5U104M50V)	72982		1		
	C4334	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4335	1521-0000-008								CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1		
	C4336	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4337	1521-0000-008								CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1		
	C4338	1506-0101-017								CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1		
	C4339	1507-0106-121								CAPACITOR 10 μF, 20 V (T322C106J020AS)	31433		1		
	C4340	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1		
	C4341	1521-0000-008								CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1		
	C4342	1506-0050-017								CAPACITOR 5.5 pF, 100 V (RPE110COG5R5C100V)	72982		1		
	C4343	1506-0471-017								CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1		
	C4344	1506-0471-017								CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1		
	C4345	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		
	C4346	1580-1000-200								CAPACITOR 10 μF, 25 V (25M57-10)	52318		1		
	C4347	1506-0103-017								CAPACITOR .01 μF, 100 V (C052K103K1X5CA)	61637		1		

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
36-	C4348	1506-0101-017**	CAPACITOR	100	pF,	200	V	(C320C101J2G5CA)			61637		1
		1506-0100-017**	CAPACITOR	10	pF,	200	V	(C320C100J2G5CA)			61637		A/R
		1506-0150-017**	CAPACITOR	15	pF,	200	V	(C320C150J2G5CA)			61637		A/R
		1506-0180-017**	CAPACITOR	18	pF,	200	V	(C320C180J2G5CA)			61637		A/R
		1506-0220-017**	CAPACITOR	22	pF,	200	V	(C320G220J2G5CA)			61637		A/R
		1506-0270-017**	CAPACITOR	27	pF,	200	V	(C320G270J2G5CA)			61637		A/R
		1506-0330-017**	CAPACITOR	33	pF,	200	V	(C320G330J2G5CA)			61637		A/R
		1506-0390-017**	CAPACITOR	39	pF,	200	V	(C320C390J2G5CA)			61637		A/R
		1506-0470-017**	CAPACITOR	47	pF,	200	V	(C320C470J2G5CA)			61637		A/R
		1506-0560-017**	CAPACITOR	56	pF,	200	V	(C320C560J2G5CA)			61637		A/R
		1506-0680-017**	CAPACITOR	68	pF,	200	V	(C320C680J2G5CA)			61637		A/R
		1506-0820-017**	CAPACITOR	82	pF,	200	V	(C320C820J2G5CA)			61637		A/R
	C4349	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4350	1580-1000-200	CAPACITOR	10	μF,	25	V	(25MS7-10)			52318		1
	C4351	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C4352	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4353	1506-0471-017	CAPACITOR	470	pF,	200	V	(C320C471J2G5CA)			61637		1
	C4354	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4355	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4356	1521-0000-008	CAPACITOR	.1	μF,	50	V	(RPA20Z5U104M50V)			72982		1
	C4357	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C4358	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4359	1506-0220-017	CAPACITOR	22	pF,	200	V	(C320C220J2G5CA)			61637		1
	C4360	1506-0050-017	CAPACITOR	5.5	pF,	100	V	(RPE110C0G5R5C100V)			72982		1
	C4361	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C4362	1501-0330-001	CAPACITOR	33	pF,	1000	V	(DD330)			71950		1
	C4363	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C4364	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C4365	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4366	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4367	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C4368	1506-0820-017	CAPACITOR	82	pF,	200	V	(C320C820J2G5CA)			61637		1
	C4369	1506-0331-017	CAPACITOR	330	pF,	200	V	(C320C331J2G5CA)			61637		1
	C4370	1506-0331-017	CAPACITOR	330	pF,	200	V	(C320C331J2G5CA)			61637		1
	C4371	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4372	1506-0101-017	CAPACITOR	100	pF,	200	V	(C320C101J2G5CA)			61637		1
	C4373	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4374	1506-0330-017	CAPACITOR	33	pF,	200	V	(C320C330J2G5CA)			61637		1
	C4375	1506-0220-017	CAPACITOR	22	pF,	200	V	(C320C220J2G5CA)			61637		1
	C4376	1580-4702-105	CAPACITOR	47	μF,	10	V	(CLE47MF10V)			62462		1
	C4377	1506-0471-017	CAPACITOR	470	pF,	200	V	(C320C471J2G5CA)			61637		1
	C4378	1506-0471-017	CAPACITOR	470	pF,	200	V	(C320C471J2G5CA)			61637		1
	C4379	1506-0103-017	CAPACITOR	.01	μF,	100	V	(C052K103K1X5CA)			61637		1
	C4380	1620-5100-500	CAPACITOR	51	pF,	100	V	(C0805C510J1GAH)			61637		1
	CR4301	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4302	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4303	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4304	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR4305	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4306	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4307	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR4308	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4309	4930-0100-200	DIODE, VARACTOR (MV209)								96341		1
	CR4310	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR4311	4815-0000-003	DIODE, SIGNAL (JAN1N4148)								81349		1
	CR4312	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4313	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4314	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	CR4315	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR4316	4818-0000-015	DIODE, ZENER 6.9 V (LM329CZ)								27014		1
	CR4317	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR4318	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR4319	4828-0000-002	DIODE, PIN (MA47047)								96341		1

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FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
36-	CR4320	4828-0000-002	DIODE, PIN (MA47047)								96341		1
	FL4301	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	FL4302	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	FL4303	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	FL4304	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	FL4305	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	FL4307	1800-7625-100	INDUCTOR 4.25 μH (154AC-470052N3)								UNK011		1
	L4301	1801-0471-001	INDUCTOR 470 μH, 47 OHM (1025-84)								99800		1
	L4302	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4303	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4304	1801-0471-001	INDUCTOR 470 μH, 42 OHM (1025-84)								99800		1
	L4305	1801-0471-001	INDUCTOR 470 μH, 42 OHM (1025-84)								99800		1
	L4306	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4307	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4308	1801-0689-001	INDUCTOR 6.8 μH, 2 OHM (1025-40)								99800		1
	L4309	1801-0479-001	INDUCTOR 4.7 μH, 1.2 OHM (1025-36)								99800		1
	L4310	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4311	1801-0471-001	INDUCTOR 470 μH, 42 OHM (1025-84)								99800		1
	L4312	1808-0011-023	INDUCTOR, VAR 6.12 - 7.48 μH (558-7107-23-00-0)								71279		1
	L4313	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4314	1801-0339-001	INDUCTOR 3.3 μH, .85 OHM (1025-32)								99800		1
	L4315	1801-0101-001	INDUCTOR 100 μH, 8 OHM (1025-68)								99800		1
	L4316	1801-0101-001	INDUCTOR 100 μH, 8 OHM (1025-68)								99800		1
	L4317	1801-0221-001	INDUCTOR 220 μH, 21 OHM (1025-76)								99800		1
	L4318	1801-0022-001	INDUCTOR 22 μH, 3.3 OHM (1025-52)								99800		1
	L4319	1801-0689-001	INDUCTOR 6.8 μH, 2 OHM (1025-40)								99800		1
	L4320	1808-0000-003	INDUCTOR, VAR 3.52 - 4.31 μH (556-7105-20-00-0)								71279		1
	Q4301	4813-0000-001	TRANSISTOR (JAN3N201)								81349		1
	Q4302	4813-0000-001	TRANSISTOR (JAN3N201)								81349		1
	Q4303	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1
	Q4304	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1
	Q4305	4810-0000-001	TRANSISTOR (JAN2N4416)								81349		1
	Q4306	4805-0000-003	TRANSISTOR (JAN2N3646)								81349		1
	Q4307	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1
	Q4308	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q4309	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q4310	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q4311	4813-0000-001	TRANSISTOR (JAN3N201)								81349		1
	Q4312	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q4313	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	R4301	4702-0101-003	RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)								81349		1
	R4302	4702-0101-003	RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)								81349		1
	R4303	4702-0101-003	RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)								81349		1
	R4304	4702-0183-003	RESISTOR 5%, 1/4 W, 18 K (RLR07C183JR)								81349		1
	R4305	4702-0104-003	RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)								81349		1
	R4306	4702-0102-003	RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)								81349		1
	R4307	4702-0563-003	RESISTOR 5%, 1/4 W, 56 K (RLR07C563JR)								81349		1
	R4308	4702-0432-002	RESISTOR 5%, 1/4 W, 4.3 K (RLR07C432JR)								81349		1
	R4309	4702-0682-003	RESISTOR 5%, 1/4 W, 6.8 K (RLR07C682JR)								81349		1
	R4310	4702-0432-002	RESISTOR 5%, 1/4 W, 4.3 K (RLR07C432JR)								81349		1
	R4311	4702-0472-003	RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)								81349		1
	R4312	4702-0224-003	RESISTOR 5%, 1/4 W, 220 K (RLR07C224JR)								81349		1
	R4313	4702-0473-003	RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)								81349		1
	R4314	4702-0103-003	RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)								81349		1
	R4315	4702-0183-003	RESISTOR 5%, 1/4 W, 18 K (RLR07C183JR)								81349		1
	R4316	4702-0104-003	RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)								81349		1
	R4317	4702-0102-003	RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)								81349		1
	R4318	4702-0183-003	RESISTOR 5%, 1/4 W, 18 K (RLR07C183JR)								81349		1
	R4319	4702-0473-003	RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)								81349		1
	R4320	4702-0683-003	RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)								81349		1
	R4321	4702-0153-003	RESISTOR 5%, 1/4 W, 15 K (RLR07C153JR)								81349		1
	R4322	4702-0331-003	RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)								81349		1
	R4323	4702-0182-003	RESISTOR 5%, 1/4 W, 1.8 K (RLR07C182JR)								81349		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
36-	R4324	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R4325	4702-0182-003	RESISTOR	5%	1/4 W,	1.8 K	(RLR07C182JR)				81349		1
	R4326	4702-0472-003	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		1
	R4327	4702-0153-003	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		1
	R4328	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4329	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4330	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4331	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4332	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4333	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4334	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4335	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4336	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R4337	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4338	4702-0682-003*	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		1
		4702-0432-002*	RESISTOR	5%	1/4 W,	4.3 K	(RLR07C432JR)				81349		A/R
		4702-0472-003*	RESISTOR	5%	1/4 W,	4.7 K	(RLR07C472JR)				81349		A/R
		4702-0512-002*	RESISTOR	5%	1/4 W,	5.1 K	(RLR07C512JR)				81349		A/R
		4702-0562-003*	RESISTOR	5%	1/4 W,	5.6 K	(RLR07C562JR)				81349		A/R
		4702-0682-003*	RESISTOR	5%	1/4 W,	6.8 K	(RLR07C682JR)				81349		A/R
		4702-0752-002*	RESISTOR	5%	1/4 W,	7.5 K	(RLR07C752JR)				81349		A/R
		4702-0822-003*	RESISTOR	5%	1/4 W,	8.2 K	(RLR07C822JR)				81349		A/R
		4702-0103-003*	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		A/R
		4702-0113-002*	RESISTOR	5%	1/4 W,	11 K	(RLR07C113JR)				81349		A/R
		4702-0123-003*	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		A/R
		4702-0153-003*	RESISTOR	5%	1/4 W,	15 K	(RLR07C153JR)				81349		A/R
	R4339	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4340	4702-0123-003	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		1
	R4341	4702-0183-003	RESISTOR	5%	1/4 W,	18 K	(RLR07C183JR)				81349		1
	R4342	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R4343	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R4344	4702-0183-003	RESISTOR	5%	1/4 W,	18 K	(RLR07C183JR)				81349		1
	R4345	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R4346	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4347	4702-0182-003	RESISTOR	5%	1/4 W,	1.8 K	(RLR07C182JR)				81349		1
	R4348	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4349	4702-0681-003	RESISTOR	5%	1/4 W,	680 OHM	(RLR07C681JR)				81349		1
	R4350	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4351	4752-0201-002	RESISTOR, VAR			200 OHM	(62-1-1-201)				02111		1
	R4352	4702-0680-003	RESISTOR	5%	1/4 W,	68 OHM	(RLR07C680JR)				81349		1
	R4353	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R4354	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4355	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4356	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4357	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R4358	4702-0221-003	RESISTOR	5%	1/4 W,	220 OHM	(RLR07C221JR)				81349		1
	R4359	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4360	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4361	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4362	4702-0680-003	RESISTOR	5%	1/4 W,	68 OHM	(RLR07C680JR)				81349		1
	R4363	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R4364	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R4365	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R4366	4702-0223-003	RESISTOR	5%	1/4 W,	22 K	(RLR07C223JR)				81349		1
	R4367	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R4368	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R4369	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4370	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4371	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R4372	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4373	4702-0332-003	RESISTOR	5%	1/4 W,	3.3 K	(RLR07C332JR)				81349		1
	R4374	4702-0473-003	RESISTOR	5%	1/4 W,	47 K	(RLR07C473JR)				81349		1
	R4375	4702-0820-003	RESISTOR	5%	1/4 W,	82 OHM	(RLR07C820JR)				81349		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
36-	R4376	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R4377	4706-9092-001	RESISTOR	1%	1/4 W,	90.90 K	(RLR07C9092FR)				81349		1
	R4378	4702-0123-003	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		1
	R4379	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R4380	4702-0103-003	RESISTOR	5%	1/4 W,	10 K	(RLR07C103JR)				81349		1
	R4381	4702-0183-003	RESISTOR	5%	1/4 W,	18 K	(RLR07C183JR)				81349		1
	R4382	4702-0222-003	RESISTOR	5%	1/4 W,	2.2 K	(RLR07C222JR)				81349		1
	R4383	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4384	4701-0101-003	RESISTOR	5%	1/8 W,	100 OHM	(RLR05C101JR)				81349		1
	R4385	4752-0204-002	RESISTOR, VAR			200 K	(62-1-1-204)				02111		1
	R4386	4702-0331-003	RESISTOR	5%	1/4 W,	330 OHM	(RLR07C331JR)				81349		1
	R4387	4702-0683-003	RESISTOR	5%	1/4 W,	68 K	(RLR07C683JR)				81349		1
	R4388	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R4389	4701-0680-003	RESISTOR	5%	1/8 W,	68 OHM	(RLR05C680JR)				81349		1
	R4390	4701-0680-003	RESISTOR	5%	1/8 W,	68 OHM	(RLR05C680JR)				81349		1
	R4391	4701-0680-003	RESISTOR	5%	1/8 W,	68 OHM	(RLR05C680JR)				81349		1
	TP4301	2114-0000-007	POST, GANG			(85931-6)					00779		1
	TP4302	2114-0000-007	POST, GANG			(85931-6)					00779		1
	U4301	3131-0000-038	IC, DUAL D			FLIP-FLOP	(SN74LS74AN)				01295		1
	U4302	3222-4135-700	IC, IF AMP			(MC1357P)					04713		1
	U4303	3221-0001-000	IC, DUAL J-FET			OP AMP	(LF353N)				27014		1
	YFL4301	2302-0107-150	FILTER, CRYSTAL			(07780-001)					56187		1
	YFL4302	2302-0107-150	FILTER, CRYSTAL			(07780-001)					56187		1
	YFL4303	2302-0107-060	FILTER, CRYSTAL			(07800-001)					56187		1
	YFL4304	2302-0107-060	FILTER, CRYSTAL			(07800-001)					56187		1
	YFL4305	5801-0107-200	FILTER, CRYSTAL			(MS2-A)					72982		1
	YFL4306	5801-0107-200	FILTER, CRYSTAL			(MS2-A)					72982		1

NOTE: \* SELECTED AT TEST (SAT)  
 NOMINAL VALUE = 6.8 K  
 SELECT RANGE = 4.3 K THRU 15 K

\*\* SELECTED AT TEST (SAT)  
 NOMINAL VALUE = 100 pF  
 SELECT RANGE = 10 pF THRU 100 pF

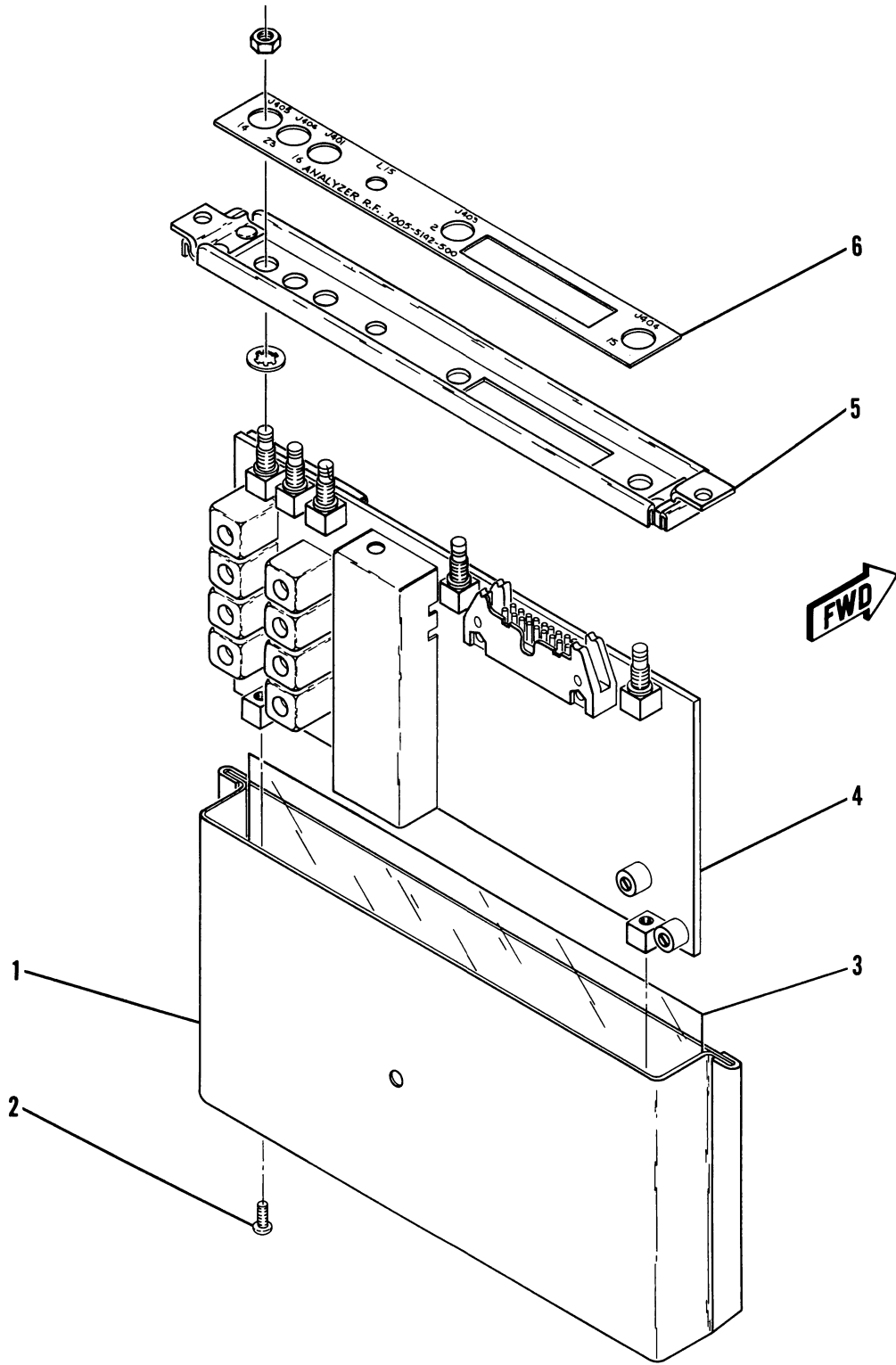


FIGURE 7-37 ANALYZER RF ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
37-		7005-5142-500								ANALYZER RF ASSEMBLY		A	REF
1		1415-5183-600								ENCLOSURE			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										-----*			
3		3107-5252-800								INSULATOR, MYLAR			1
4		SEE FIG 38								ANALYZER RF PC BOARD ASSEMBLY	INCL		1
										MTG HARDWARE			
5		1414-5183-100								COVER			1
6		2400-5152-900								LABEL, ANALYZER RF			1

A---FM/AM-1200S



# ILLUSTRATED PARTS CATALOG

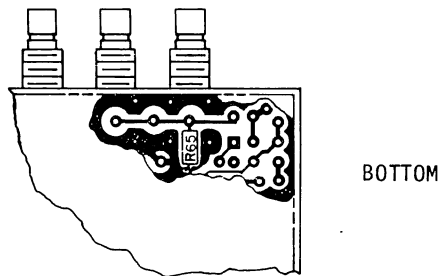
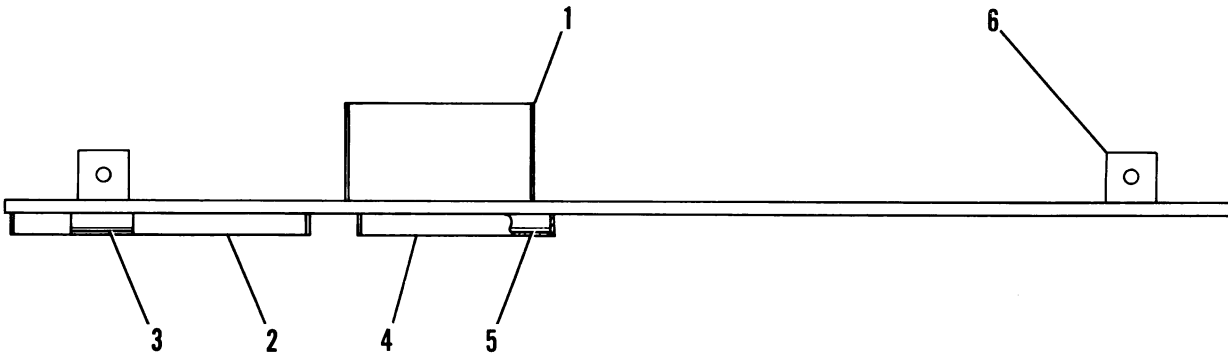
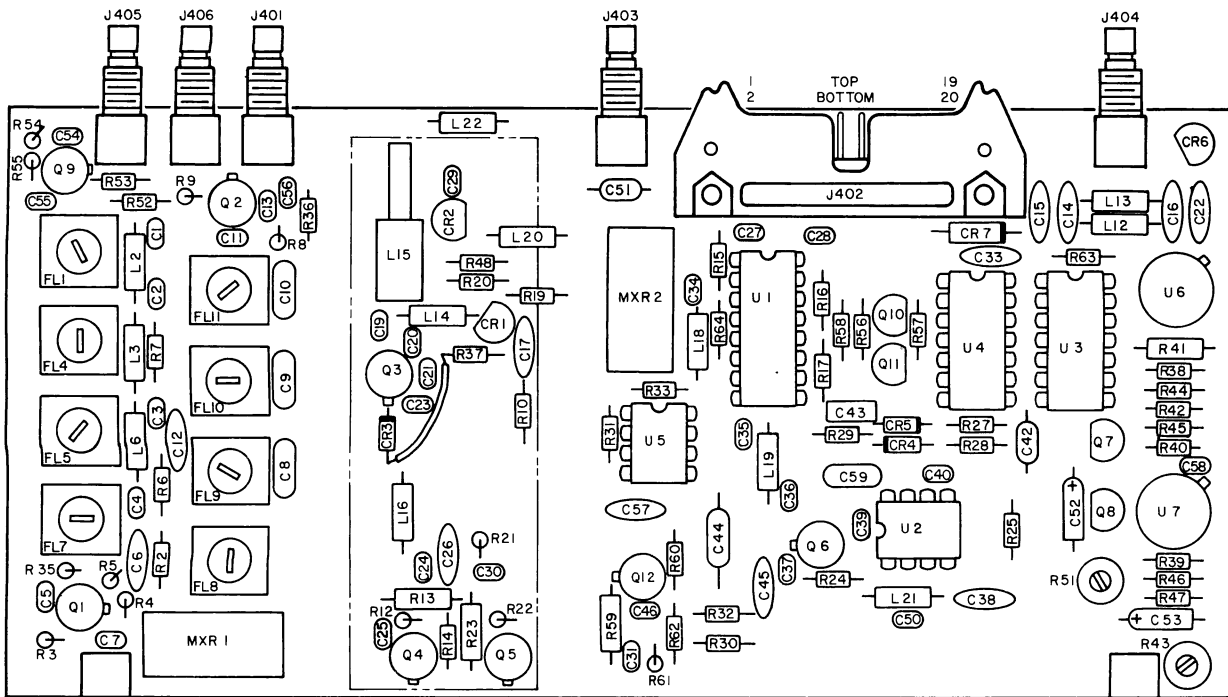


FIGURE 7-38 ANALYZER RF PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
38-		7010-5130-400	ANALYZER RF PC BOARD ASSEMBLY							SEE		A	REF
			FIG 37 FOR NHA										
1		2508-5156-900	SHIELD, TOP										1
2		2508-5156-700	SHIELD, BOTTOM										1
3		3107-5156-602	INSULATOR, MYLAR										1
4		2508-5156-800	SHIELD, BOTTOM										1
5		3107-5156-601	INSULATOR, MYLAR										1
6		2100-0000-100	NUT, SWAGE 4-40 (2040B)								83330		1
	J401	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J402	2129-1025-020	CONNECTOR, HEADER (3428-1002)								75037		1
	J403	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J404	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J405	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J406	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	C401	1506-0180-017	CAPACITOR 18 pF, 200 V (C320C180J2G5CA)								61637		1
	C402	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C403	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C404	1506-0180-017	CAPACITOR 18 pF, 200 V (C320C180J2G5CA)								61637		1
	C405	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C406	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C407	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C408	1506-0020-017	CAPACITOR 2.2 pF, 100 V (REP110COG2R2C100V)								72982		1
	C409	1506-0020-017	CAPACITOR 2.2 pF, 100 V (RPE110COG2R2C100V)								72982		1
	C410	1506-0020-017	CAPACITOR 2.2 pF, 100 V (REP110COG2R2C100V)								72982		1
	C411	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C412	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C413	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C414	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C415	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C416	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C417	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C419	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C420	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C421	1506-0150-017	CAPACITOR 15 pF, 200 V (C320C150J2G5CA)								61637		1
	C422	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C423	1506-0220-017	CAPACITOR 22 pF, 200 V (C320C220J2G5CA)								61637		1
	C424	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C425	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C426	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C427	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)								61637		1
	C428	1506-0471-017	CAPACITOR 470 pF, 200 V (C320C471J2G5CA)								61637		1
	C429	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C430	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C431	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C433	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C434	1506-0181-017	CAPACITOR 180 pF, 200 V (C320C181J2G5CA)								61637		1
	C435	1506-0271-017	CAPACITOR 270 pF, 200 V (C320C271J2G5CA)								61637		1
	C436	1506-0181-017	CAPACITOR 180 pF, 200 V (C320C181J2G5CA)								61637		1
	C437	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C438	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C439	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C440	1506-0102-017	CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)								61637		1
	C442	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C443	1506-0103-017	CAPACITOR .01 μF, 100 V (C052K103K1X5CA)								61637		1
	C444	1502-0104-010	CAPACITOR .1 μF, 50 V (PC12.1-50-5)								27735		1
	C445	1501-0103-005	CAPACITOR .01 μF, 50 V (UK50-103)								71950		1
	C446	1506-0330-017	CAPACITOR 33 pF, 200 V (C320C330J2G5CA)								61637		1
	C450	1506-0100-017	CAPACITOR 10 pF, 200 V (C320C100J2G5CA)								61637		1
	C451	1521-0000-008	CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)								72982		1
	C452	1507-0685-020	CAPACITOR 6.8 μF, 15 V (T332B685M015AS)								31433		1
	C453	1507-0685-020	CAPACITOR 6.8 μF, 15 V (T332B685M015AS)								31433		1
	C454	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)								61637		1
	C455	1506-0101-017	CAPACITOR 100 pF, 200 V (C320C101J2G5CA)								61637		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
38-	C456	1506-0102-017								CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C457	1501-0102-001								CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C458	1506-0561-017								CAPACITOR 560 pF, 200 V (C320C561J2G5CA)	61637		1
	C459	1521-0000-008								CAPACITOR .1 μF, 50 V (RPA20Z5U104M50V)	72982		1
	CR401	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR402	4930-0100-200								DIODE, VARACTOR (MV209)	04713		1
	CR403	4816-0000-001								DIODE, S-BAR (5082-2800)	54893		1
	CR404	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR405	4815-0000-003								DIODE, SIGNAL (JAN1N4148)	81349		1
	CR406	4818-0000-015								DIODE, ZENER 6.9 V (LM329CZ)	27014		1
	CR407	4818-0000-003								DIODE, ZENER 5.1 V (JAN1N5231B)	81349		1
	FL401	1800-7624-900								INDUCTOR, VAR .1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL404	1800-7624-900								INDUCTOR, VAR .1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL405	1800-7624-900								INDUCTOR, VAR .1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL407	1800-7624-900								INDUCTOR, VAR .1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL408	1800-7636-000								INDUCTOR, VAR .56 μH, 82 pF (KXC-K7190HU)	UNK011		1
	FL409	1800-7636-000								INDUCTOR, VAR .56 μH, 82 pF (KXC-K7190HU)	UNK011		1
	FL410	1800-7637-000								INDUCTOR, VAR .56 μH, 82 pF (KXC-K7190HU)	UNK011		1
	FL411	1800-7636-000								INDUCTOR, VAR .56 μH, 82 pF (KXC-K7190HU)	UNK011		1
	L402	1801-0828-001								INDUCTOR .82 μH, .85 OHM (1025-18)	99800		1
	L403	1801-0828-001								INDUCTOR .82 μH, .85 OHM (1025-18)	99800		1
	L406	1801-0828-001								INDUCTOR .82 μH, .85 OHM (1025-18)	99800		1
	L412	1801-0022-001								INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	L413	1801-0022-001								INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	L414	1801-0010-001								INDUCTOR 10 μH, 3.7 OHM (1025-44)	99800		1
	L415	1804-0000-013								INDUCTOR, VAR .125 - .243 μH (1804-0000-013)	56402		1
	L416	1801-0109-001								INDUCTOR 1 μH, 1 OHM (1025-20)	99800		1
	L418	1801-0228-001								INDUCTOR .22 μH, .14 OHM (1025-04)	99800		1
	L419	1801-0228-001								INDUCTOR .22 μH, .14 OHM (1025-04)	99800		1
	L420	1801-0022-001								INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	L421	1801-0229-001								INDUCTOR 2.2 μH, .4 OHM (1025-28)	99800		1
	L422	1801-0022-001								INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	MXR401	5250-0100-100								MIXER, FLTPK 1 - 500 MHz (SBL-1-18)	15542		1
	MXR402	5250-0100-100								MIXER, FLTPK 1 - 500 MHz (SBL-1-18)	15542		1
	Q401	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q402	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q403	4810-0000-001								TRANSISTOR (JAN2N4416)	81349		1
	Q404	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q405	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q406	4801-0000-001								TRANSISTOR (JAN2N2222)	81349		1
	Q407	4805-0000-001								TRANSISTOR (JAN2N2907A)	81349		1
	Q408	4801-0000-001								TRANSISTOR (JAN2N2222)	81349		1
	Q409	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	Q410	4801-0000-001								TRANSISTOR (JAN2N2222)	81349		1
	Q411	4801-0000-001								TRANSISTOR (JAN2N2222)	81349		1
	Q412	4809-0000-005								TRANSISTOR (66382)	UNK009		1
	R402	4701-0101-003								RESISTOR 5%, 1/8 W, 100 OHM (RLR05C101JR)	81349		1
	R403	4701-0683-003								RESISTOR 5%, 1/8 W, 68 K (RLR05C683JR)	81349		1
	R404	4701-0102-003								RESISTOR 5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R405	4702-0220-003								RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		1
	R406	4701-0101-003								RESISTOR 5%, 1/8 W, 100 OHM (RLR05C101JR)	81349		1
	R407	4701-0102-003								RESISTOR 5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R408	4701-0220-003								RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		1
	R409	4701-0220-003								RESISTOR 5%, 1/8 W, 22 OHM (RLR05C220JR)	81349		1
	R410	4701-0471-003								RESISTOR 5%, 1/8 W, 470 OHM (RLR05C471JR)	81349		1
	R412	4701-0683-003								RESISTOR 5%, 1/8 W, 68 K (RLR05C683JR)	81349		1
	R413	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	R414	4701-0101-003								RESISTOR 5%, 1/8 W, 100 OHM (RLR05C101JR)	81349		1
	R415	4701-0332-003								RESISTOR 5%, 1/8 W, 3.3 K (RLR05C332JR)	81349		1
	R416	4701-0123-003								RESISTOR 5%, 1/8 W, 12 K (RLR05C123JR)	81349		1
	R417	4701-0473-003								RESISTOR 5%, 1/8 W, 47 K (RLR05C473JR)	81349		1
	R419	4701-0472-003								RESISTOR 5%, 1/8 W, 4.7 K (RLR05C472JR)	81349		1
	R420	4701-0681-003								RESISTOR 5%, 1/8 W, 680 OHM (RLR05C681JR)	81349		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
38-	R421	4701-0101-003	RESISTOR	5%	1/8 W,	100 OHM	(RLR05C101JR)				81349		1
	R422	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(RLR05C683JR)				81349		1
	R423	4702-0681-003	RESISTOR	5%	1/4 W,	680 OHM	(RLR07C681JR)				81349		1
	R424	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(RLR05C683JR)				81349		1
	R425	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R427	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R428	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R429	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R430	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(RLR05C103JR)				81349		1
	R431	4701-0222-003	RESISTOR	5%	1/8 W,	2.2 K	(RLR05C222JR)				81349		1
	R432	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R433	4701-0471-003	RESISTOR	5%	1/8 W,	470 OHM	(RLR05C471JR)				81349		1
	R435	4701-0680-003	RESISTOR	5%	1/8 W,	68 OHM	(RLR05C680JR)				81349		1
	R436	4701-0101-003	RESISTOR	5%	1/8 W,	100 OHM	(RLR05C101JR)				81349		1
	R437	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(RLR05C103JR)				81349		1
	R438	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R439	4701-0223-003	RESISTOR	5%	1/8 W,	22 K	(RLR05C223JR)				81349		1
	R440	4701-0223-003	RESISTOR	5%	1/8 W,	22 K	(RLR05C223JR)				81349		1
	R441	4706-1002-001	RESISTOR	1%	1/4 W,	10.00 K	(RLR07C1002FR)				81349		1
	R442	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R443	4752-0202-002	RESISTOR, VAR			2 K	(62-1-1-202)				02111		1
	R444	4701-0682-003	RESISTOR	5%	1/8 W,	6.8 K	(RLR05C682JR)				81349		1
	R445	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R446	4701-0682-003	RESISTOR	5%	1/8 W,	6.8 K	(RLR05C683JR)				81349		1
	R447	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R448	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R451	4752-0502-002	RESISTOR, VAR			5 K	(62-1-1-502)				02111		1
	R452	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		1
	R453	4701-0330-003	RESISTOR	5%	1/8 W,	33 OHM	(RLR05C330JR)				81349		1
	R454	4701-0683-003	RESISTOR	5%	1/8 W,	68 K	(RLR05C683JR)				81349		1
	R455	4701-0470-003	RESISTOR	5%	1/8 W,	47 OHM	(RLR05C470JR)				81349		1
	R456	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R457	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R458	4701-0472-003	RESISTOR	5%	1/8 W,	4.7 K	(RLR05C472JR)				81349		1
	R459	4702-0681-003	RESISTOR	5%	1/4 W,	680 OHM	(RLR07C681JR)				81349		1
	R460	4701-0473-003	RESISTOR	5%	1/8 W,	47 K	(RLR05C473JR)				81349		1
	R461	4701-0101-003	RESISTOR	5%	1/8 W,	100 OHM	(RLR05C101JR)				81349		1
	R462	4701-0680-003	RESISTOR	5%	1/8 W,	68 OHM	(RLR05C680JR)				81349		1
	R463	4702-0471-003	RESISTOR	5%	1/4 W,	470 OHM	(RLR07C471JR)				81349		1
	R464	4701-0122-003*	RESISTOR	5%	1/8 W,	1.2 K	(RLR05C122JR)				81349		1
		4701-0102-003*	RESISTOR	5%	1/8 W,	1 K	(RLR05C102JR)				81349		A/R
		4701-0152-003*	RESISTOR	5%	1/8 W,	1.5 K	(RLR05C152JR)				81349		A/R
		4701-0182-003*	RESISTOR	5%	1/8 W,	1.8 K	(RLR05C182JR)				81349		A/R
		4701-0222-003*	RESISTOR	5%	1/8 W,	2.2 K	(RLR05C222JR)				81349		A/R
	R465	4701-0560-003	RESISTOR	5%	1/8 W,	56 OHM	(RLR05C560JR)				81349		1
	U401	3133-0000-023	IC, MPLXR/DMPLXR				(CD4053BE)				02735		1
	U402	3213-1201-500	IC, LP 2-MODULUS PRESCALER				(DS8615N-4)				27014		1
	U403	3131-0000-034	IC, DUAL JK FLIP-FLOP				(SN74LS73N)				01295		1
	U404	3131-0000-044	IC, QUAD 2-INPUT NAND				(SN74LS00N)				01295		1
	U405	3135-0000-054	IC, OP AMP				(LF412CN)				27014		1
	U406	3130-0000-025	IC, OP AMP				(LM741CH)				27014		1
	U407	3130-0000-025	IC, OP AMP				(LM741CH)				27014		1
		SEE FIG 1	WIRE, BUS				26 GA						A/R
		SEE FIG 1	TUBING, TFL				26 GA, NAT						A/R

NOTE: \* SELECTED AT TEST (SAT)  
 NOMINAL VALUE = 1.2 K  
 SELECT RANGE = 1 K THRU 2.2 K

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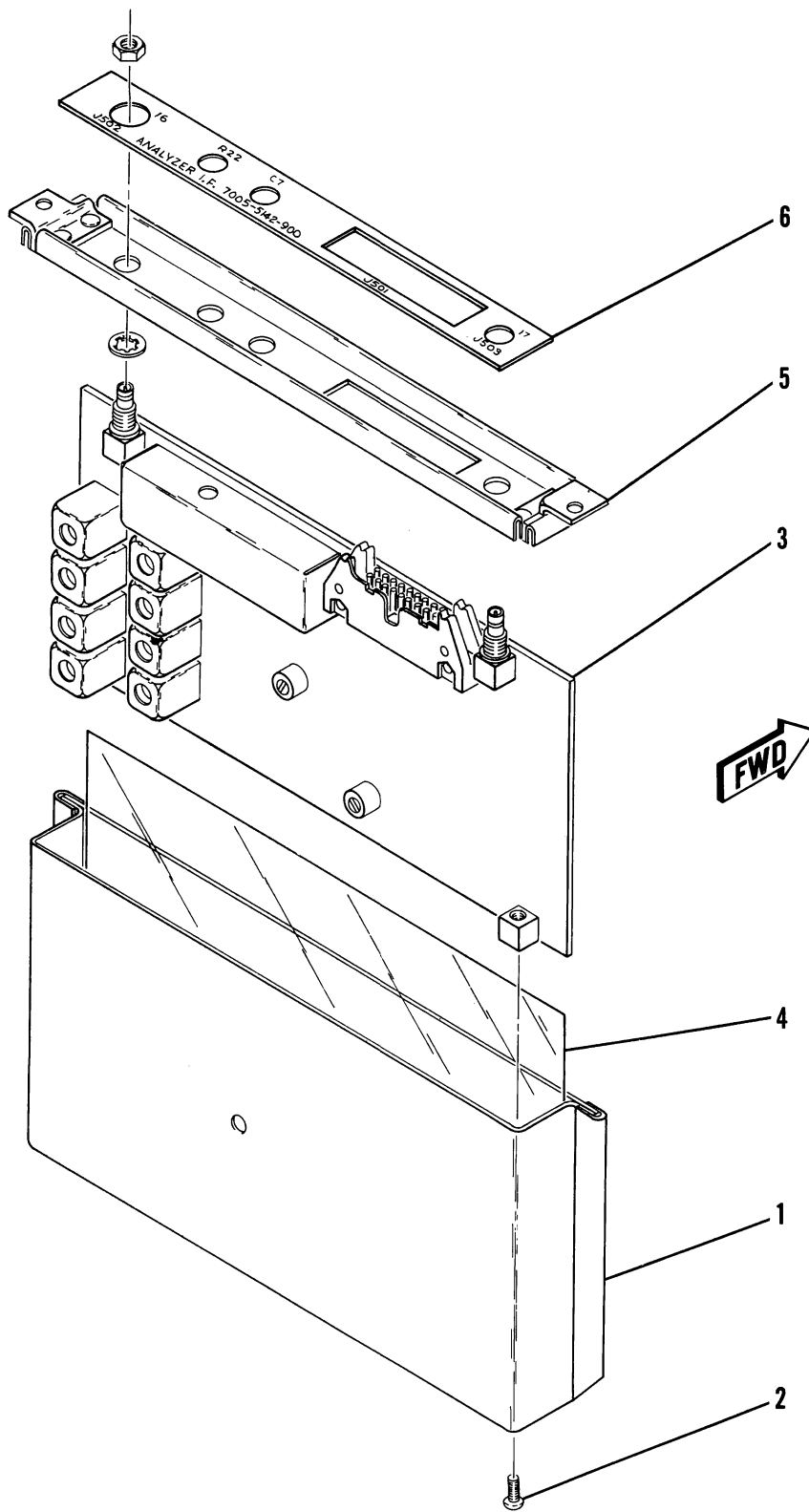


FIGURE 7-39 ANALYZER IF ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
39-		7005-5142-900								ANALYZER IF ASSEMBLY		A	REF
1		1415-5183-600								ENCLOSURE			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
3		SEE FIG 40								ANALYZER IF PC BOARD ASSEMBLY		INCL	1
										MTG HARDWARE			
4		3107-5252-800								INSULATOR, MYLAR			1
5		1414-5183-200								COVER			1
6		2400-5153-000								LABEL, SPECTRUM ANALYZER IF			1

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# ILLUSTRATED PARTS CATALOG

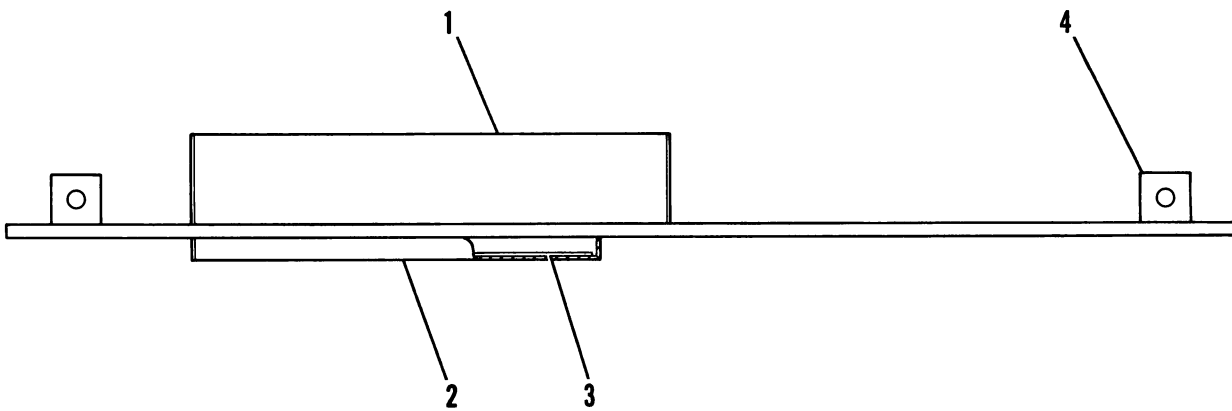
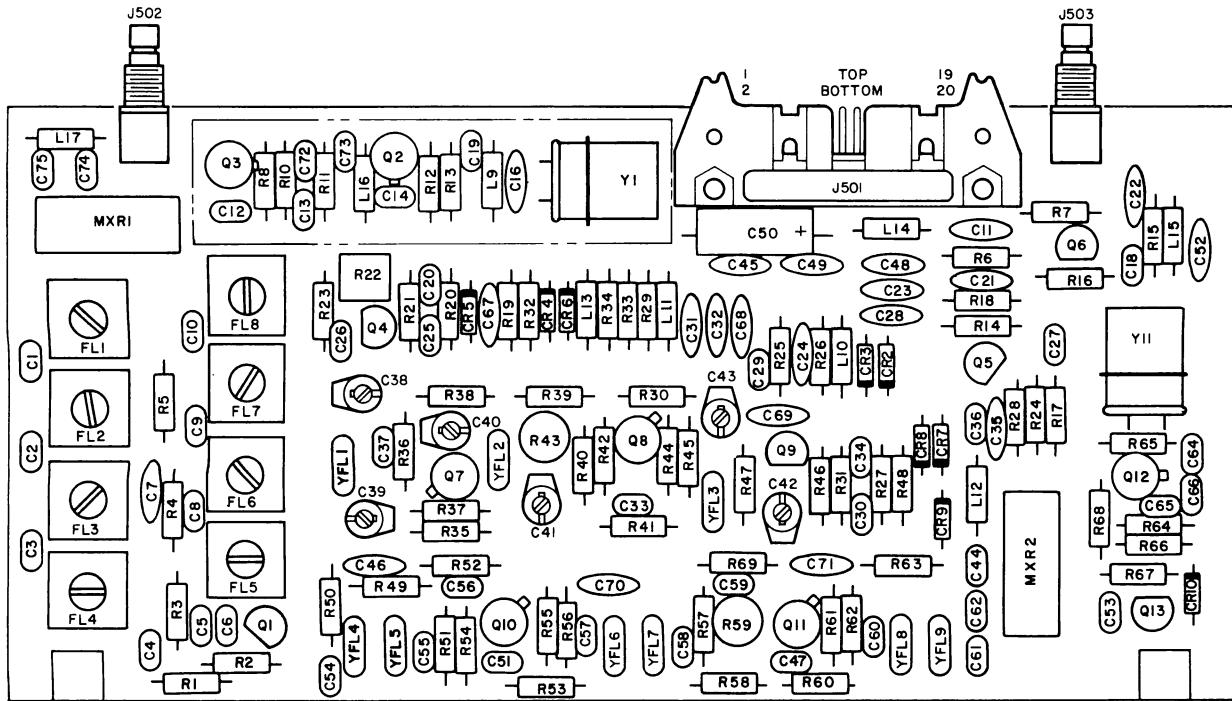


FIGURE 7-40 ANALYZER IF PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
40-		7010-5130-500		ANALYZER IF PC BOARD ASSEMBLY FIG 39 FOR NHA		SEE	A REF
1		2508-5156-500		SHIELD, TOP			1
2		2508-5156-400		SHIELD, BOTTOM			1
3		3107-5156-600		INSULATOR, MYLAR			1
4		2100-0000-100		NUT, SWAGE 4-40 (2040B)	83330		1
	J501	2129-1025-020		CONNECTOR, HEADER (3428-1002)	75037		1
	J502	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	J503	2200-2094-200		CONNECTOR, SMB (2110-7511-000)	19505		1
	C501	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110COG3R3C100V)	72982		1
	C502	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110COG3R3C100V)	72982		1
	C503	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110COG3R3C100V)	72982		1
	C504	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C505	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C506	1506-0101-017		CAPACITOR 100 pF, 200 V (C320C101J2G5CA)	61637		1
	C507	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C508	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110C03R3C100V)	72982		1
	C509	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110C03R3C100V)	72982		1
	C510	1506-0030-017		CAPACITOR 3 pF, 100 V (RPE110C03R3C100V)	72982		1
	C511	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C512	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C513	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1
	C514	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C516	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C518	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C519	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C520	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C521	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C522	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C523	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C524	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C525	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C526	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C527	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C528	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C529	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C530	1506-0331-017		CAPACITOR 330 pF, 200 V (C320C331J2G5CA)	61637		1
	C531	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C532	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C533	1506-0331-017		CAPACITOR 330 pF, 200 V (C320C331J2G5CA)	61637		1
	C534	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C535	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C536	1506-0392-017		CAPACITOR 3900 pF, 100 V (C320C392J2G5CA)	61637		1
	C537	1506-0331-017		CAPACITOR 330 pF, 200 V (C320C331J2G5CA)	61637		1
	C538	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C539	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C540	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C541	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C542	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C543	1517-3295-303		CAPACITOR, VAR 6-20 pF (DV6PS254)	72982		1
	C544	1506-0392-017		CAPACITOR 3900 pF, 100 V (C320C392J2G5CA)	61637		1
	C545	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C546	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C547	1506-0331-017		CAPACITOR 330 pF, 200 V (C320C331J2G5CA)	61637		1
	C548	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C549	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C550	1580-4700-215		CAPACITOR 47 μF, 25 V (25TT47MS)	52318		1
	C551	1506-0331-017		CAPACITOR 330 pF, 200 V (C320C331J2G5CA)	61637		1
	C552	1501-0103-005		CAPACITOR .01 μF, 50 V (UK50-103)	71950		1
	C553	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C554	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1
	C555	1506-0471-017		CAPACITOR 470 pF, 200 V (C320C471J2G5CA)	61637		1
	C556	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
40-	C557	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C558	1506-0471-017	CAPACITOR	470	pF,	200	V	(C320C471J2G5CA)			61637		1
	C559	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C560	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C561	1506-0471-017	CAPACITOR	470	pF,	200	V	(C320C471J2G5CA)			61637		1
	C562	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C564	1506-0221-017	CAPACITOR	220	pF,	200	V	(C320C221J2G5CA)			61637		1
	C565	1506-0470-017	CAPACITOR	47	pF,	200	V	(C320C470J2G5CA)			61637		1
	C566	1506-0101-017	CAPACITOR	100	pF,	200	V	(C320C101J2G5CA)			61637		1
	C567	1501-0103-005	CAPACITOR	.01	μF,	50	V	(UK50-103)			71950		1
	C568	1501-0103-005	CAPACITOR	.01	μF,	50	V	(UK50-103)			71950		1
	C569	1501-0103-005	CAPACITOR	.01	μF,	50	V	(UK50-103)			71950		1
	C570	1501-0103-005	CAPACITOR	.01	μF,	50	V	(UK50-103)			71950		1
	C571	1501-0103-005	CAPACITOR	.01	μF,	50	V	(UK50-103)			71950		1
	C572	1506-0561-017	CAPACITOR	560	pF,	200	V	(C320C561J2G5CA)			61637		1
	C573	1506-0102-017	CAPACITOR	1000	pF,	100	V	(C320C102J2G5CA)			61637		1
	C574	1506-0101-017	CAPACITOR	100	pF,	200	V	(C320C101J2G5CA)			61637		1
	C575	1506-0101-017	CAPACITOR	100	pF,	200	V	(C320C101J2G5CA)			61637		1
	CR502	4815-0000-003	DIODE, SIGNAL	(JAN1N4148)							81349		1
	CR503	4815-0000-003	DIODE, SIGNAL	(JAN1N4148)							81349		1
	CR504	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR505	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR506	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR507	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR508	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR509	4828-0000-002	DIODE, PIN	(MA47047)							96341		1
	CR510	4815-0000-003	DIODE, SIGNAL	(JAN1N4148)							81349		1
	FL501	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL502	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL503	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL504	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL505	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL506	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL507	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	FL508	1801-7625-100	INDUCTOR	4.25	μH	(154AC-470052N3)					UNK011		1
	L509	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L510	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L511	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L512	1801-0479-001	INDUCTOR	4.7	μH,	1.2	OHM	(1025-36)			99800		1
	L513	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L514	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L515	1801-0022-001	INDUCTOR	22	μH,	3.3	OHM	(1025-52)			99800		1
	L516	1801-0229-001	INDUCTOR	2.2	μH,	.4	OHM	(1025-28)			99800		1
	L517	1801-0688-001	INDUCTOR	.68	μH,	.6	OHM	(1025-16)			99800		1
	MXR501	5250-0100-100	MIXER, FLTPK	1	-	500	MHz	(SBL-1-18)			15542		1
	MXR502	5250-0100-100	MIXER, FLTPK	1	-	500	MHz	(SBL-1-18)			15542		1
	Q501	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	Q502	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q503	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q504	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	Q505	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	Q506	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	Q507	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q508	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q509	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	Q510	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q511	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q512	4809-0000-005	TRANSISTOR	(66382)							UNK009		1
	Q513	4801-0000-001	TRANSISTOR	(JAN2N2222)							81349		1
	R501	4702-0470-003	RESISTOR	5%	, 1/4	W,	47	OHM	(RLR07C470JR)		81349		1
	R502	4702-0471-003	RESISTOR	5%	, 1/4	W,	470	OHM	(RLR07C471JR)		81349		1
	R503	4702-0683-003	RESISTOR	5%	, 1/4	W,	68	K	(RLR07C683JR)		81349		1
	R504	4702-0102-003	RESISTOR	5%	, 1/4	W,	1	K	(RLR07C102JR)		81349		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
40-	R505	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R506	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R507	4702-0471-003	RESISTOR	5%	1/4	W,	470	OHM	(RLR07C471JR)	81349		1	
	R508	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R510	4702-0681-003	RESISTOR	5%	1/4	W,	680	OHM	(RLR07C681JR)	81349		1	
	R511	4702-0222-003	RESISTOR	5%	1/4	W,	2.2	K	(RLR07C222JR)	81349		1	
	R512	4702-0223-003	RESISTOR	5%	1/4	W,	22	K	(RLR07C223JR)	81349		1	
	R513	4702-0223-003	RESISTOR	5%	1/4	W,	22	K	(RLR07C223JR)	81349		1	
	R514	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R515	4702-0473-003	RESISTOR	5%	1/4	W,	47	K	(RLR07C473JR)	81349		1	
	R516	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R517	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R518	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R519	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R520	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R521	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R522	4753-0102-002	RESISTOR, VAR				1	K	(62-2-1-102)	02111		1	
	R523	4702-0470-003	RESISTOR	5%	1/4	W,	47	OHM	(RLR07C470JR)	81349		1	
	R524	4702-0471-003	RESISTOR	5%	1/4	W,	470	OHM	(RLR07C471JR)	81349		1	
	R525	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R526	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R527	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R528	4702-0470-003	RESISTOR	5%	1/4	W,	47	OHM	(RLR07C470JR)	81349		1	
	R529	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R530	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R531	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R532	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R533	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R534	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R535	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R536	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R537	4702-0332-003	RESISTOR	5%	1/4	W,	3.3	K	(RLR07C332JR)	81349		1	
	R538	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R539	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R540	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R541	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R542	4702-0331-003	RESISTOR	5%	1/4	W,	330	OHM	(RLR07C331JR)	81349		1	
	R543	4702-0103-002	RESISTOR, VAR				10	K	(62-1-1-103)	02111		1	
	R544	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R545	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R546	4702-0332-003	RESISTOR	5%	1/4	W,	3.3	K	(RLR07C332JR)	81349		1	
	R547	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R548	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R549	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R550	4702-0470-003	RESISTOR	5%	1/4	W,	47	OHM	(RLR07C470JR)	81349		1	
	R551	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R552	4702-0680-003	RESISTOR	5%	1/4	W,	68	OHM	(RLR07C680JR)	81349		1	
	R553	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R554	4702-0122-003	RESISTOR	5%	1/4	W,	1.2	K	(RLR07C122JR)	81349		1	
	R555	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R556	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R557	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R558	4702-0331-003	RESISTOR	5%	1/4	W,	330	OHM	(RLR07C331JR)	81349		1	
	R559	4752-0102-002	RESISTOR, VAR				1	K	(62-1-1-102)	02111		1	
	R560	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R561	4702-0102-003	RESISTOR	5%	1/4	W,	1	K	(RLR07C102JR)	81349		1	
	R562	4702-0101-003	RESISTOR	5%	1/4	W,	100	OHM	(RLR07C101JR)	81349		1	
	R563	4702-0682-003	RESISTOR	5%	1/4	W,	6.8	K	(RLR07C682JR)	81349		1	
	R564	4702-0223-003	RESISTOR	5%	1/4	W,	22	K	(RLR07C223JR)	81349		1	
	R565	4702-0223-003	RESISTOR	5%	1/4	W,	22	K	(RLR07C223JR)	81349		1	
	R566	4702-0222-003	RESISTOR	5%	1/4	W,	2.2	K	(RLR07C222JR)	81349		1	
	R567	4702-0683-003	RESISTOR	5%	1/4	W,	68	K	(RLR07C683JR)	81349		1	
	R568	4702-0681-003	RESISTOR	5%	1/4	W,	680	OHM	(RLR07C681JR)	81349		1	

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
40-	R569	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	Y501	2363-0101-000								CRYSTAL (33.000000 MHz)	54962		1
	Y511	2363-0087-000								CRYSTAL (9.500000 MHz)	54962		1
	YFL501	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL502	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL503	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL504	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL505	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL506	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL507	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL508	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
	YFL509	2302-0107-030								FILTER, CRYSTAL (07820-001)	56187		1
		SEE FIG 1								WIRE, BUS 26 GA			A/R

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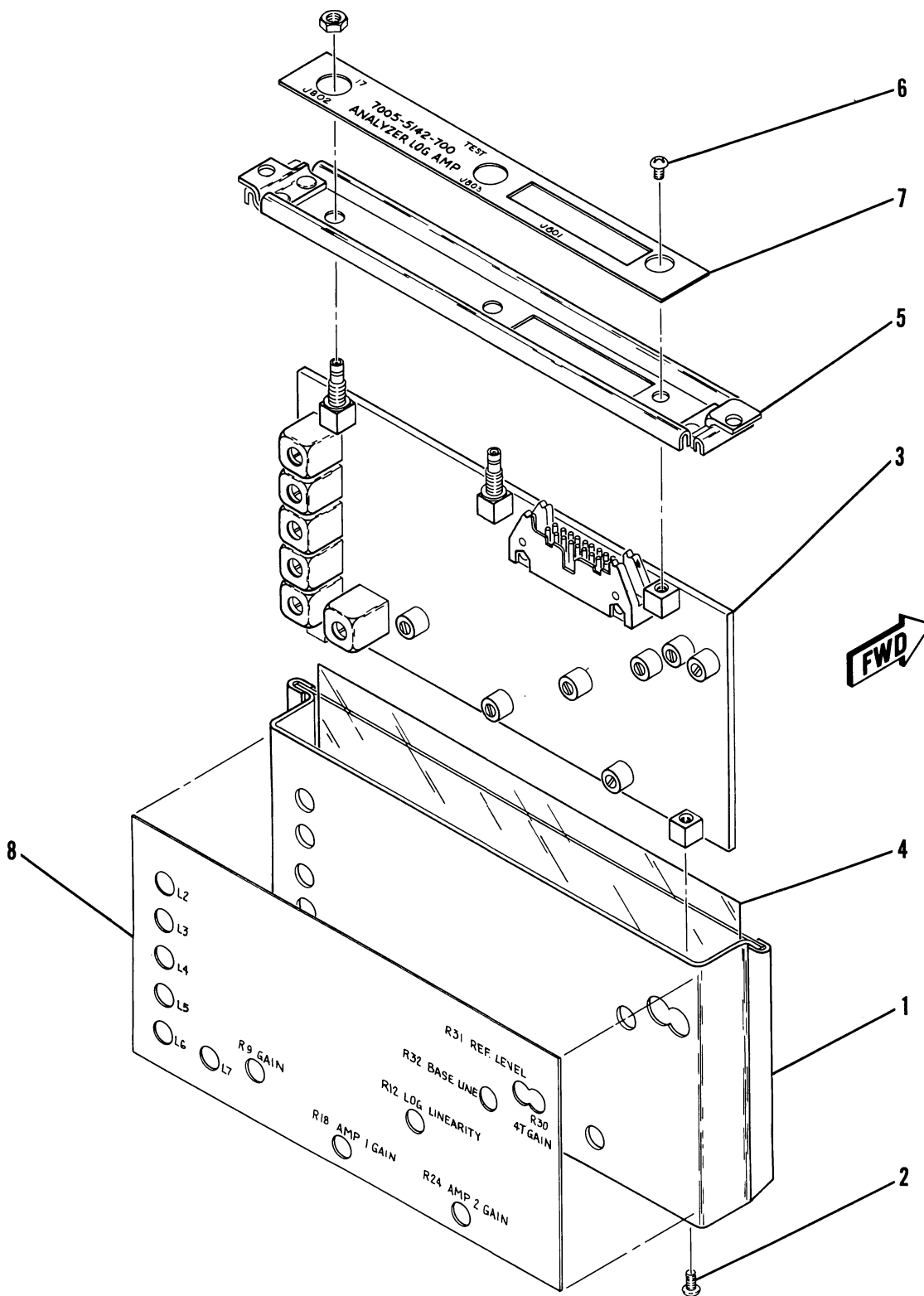


FIGURE 7-41 ANALYZER LOG AMP ASSEMBLY





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
41-		7005-5142-700								ANALYZER LOG AMP ASSEMBLY		A	REF
1		1415-5183-602								ENCLOSURE			1
										ATTACHING PARTS			
2		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		2
										---*---			
3		SEE FIG 42								ANALYZER LOG AMP PC BOARD ASSEMBLY	INCL		1
										MTG HARDWARE			
4		3107-5252-800								INSULATOR, MYLAR			1
5		1414-5183-300								COVER			1
										ATTACHING PARTS			
6		2803-0188-006								SCREW (4-40 X 3/16 PPHM)	UNK015		1
										---*---			
7		2400-5153-100								LABEL, ANALYZER LOG AMP			1
8		2400-5158-000								LABEL, ANALYZER LOG AMP			1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
42-		7010-5130-600	ANALYZER LOG AMP PC BOARD ASSEMBLY							SEE		A	REF
			FIG 41 FOR NHA										
1		2100-0000-100	NUT, SWAGE							4-40 (2040B)	83330		1
	J801	2129-1025-020	CONNECTOR, HEADER (3428-1002)								75037		1
	J802	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	J803	2200-2094-200	CONNECTOR, SMB (2110-7511-000)								19505		1
	C804	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C805	1506-0020-017	CAPACITOR							2.2 pF, 100 V (RPE110COG2R2C100V)	72982		1
	C806	1506-0020-017	CAPACITOR							2.2 pF, 100 V (RPE110COG2R2C100V)	72982		1
	C807	1506-0020-017	CAPACITOR							2.2 pF, 100 V (RPE110COG2R2C100V)	72982		1
	C808	1506-0020-017	CAPACITOR							2.2 pF, 100 V (RPE110COG2R2C100V)	72982		1
	C809	1506-0020-017	CAPACITOR							2.2 pF, 100 V (RPE110COG2R2C100V)	72982		1
	C810	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C811	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C812	1580-3310-150	CAPACITOR							330 $\mu$ F, 16 V (16TT330MS)	52318		1
	C813	1580-3310-150	CAPACITOR							330 $\mu$ F, 16 V (16TT330MS)	52318		1
	C814	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C815	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C816	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C817	1501-0103-003	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C818	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C820	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C821	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C822	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C823	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C824	1506-0330-017	CAPACITOR							33 pF, 200 V (C320C330J2G5CA)	61637		1
	C825	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C826	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C827	1507-0105-018	CAPACITOR							1 $\mu$ F, 35 V (T322B105M035AS)	31433		1
	C828	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C829	1506-0102-017	CAPACITOR							1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C830	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C831	1506-0122-017	CAPACITOR							1200 pF, 100 V (C320C122J2G5CA)	61637		1
	C832	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C833	1521-0000-008	CAPACITOR							.1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1
	C834	1506-0122-017	CAPACITOR							1200 pF, 100 V (C320C122J2G5CA)	61637		1
	C835	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	C836	1523-0000-002	CAPACITOR							1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	C837	1501-0103-005	CAPACITOR							.01 $\mu$ F, 50 V (UK50-103)	71950		1
	CR808	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR809	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR810	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR811	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR812	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR813	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR814	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR815	4816-0000-001	DIODE, S-BAR (5082-2800)								54893		1
	CR816	4818-0000-003	DIODE, ZENER							5.1 V (JAN1N5231B)	81349		1
	CR817	4818-0000-003	DIODE, ZENER							5.1 V (JAN1N5231B)	81349		1
	FL801	1800-7636-100	INDUCTOR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	FL802	1800-7636-100	INDUCTOR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	FL803	1800-7636-100	INDUCOTR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	FL804	1800-7636-100	INDUCTOR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	FL805	1800-7636-100	INDUCTOR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	FL806	1800-7636-100	INDUCTOR							39 $\mu$ H, 430 pF (RWE-A9120A0)	UNK011		1
	L801	1801-0022-001	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
	L808	1801-0471-001	INDUCTOR							470 $\mu$ H, 42 OHM (1025-84)	99800		1
	L809	1801-0471-001	INDUCTOR							470 $\mu$ H, 42 OHM (1025-84)	99800		1
	L810	1801-0015-001	INDUCTOR							15 $\mu$ H, 2.8 OHM (1025-48)	99800		1
	L811	1801-0015-001	INDUCTOR							15 $\mu$ H, 2.8 OHM (1025-48)	99800		1
	L812	1801-0022-001	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
	L813	1801-0022-001	INDUCTOR							22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
	Q801	4801-0000-001	TRANSISTOR (JAN2N2222)								81349		1

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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
42-	Q802	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1
	Q803	4708-0000-001								TRANSISTOR (JAN2N3903-18)	81349		1
	Q804	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1
	Q805	4807-0000-002								TRANSISTOR (JAN2N3905)	81349		1
	Q806	4807-0000-001								TRANSISTOR (JAN2N3903-18)	81349		1
	R801	4702-0472-003								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R804	4702-0470-003								RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R805	4702-0101-003								RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R806	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R807	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R808	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R809	4702-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R810	4702-0472-003								RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R811	4702-0332-003								RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		1
	R812	4752-0202-002								RESISTOR, VAR 2 K (62-1-1-202)	02111		1
	R813	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R814	4702-0222-003								RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
	R815	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R816	4702-0820-003								RESISTOR 5%, 1/4 W, 82 OHM (RLR07C820JR)	81349		1
	R817	4702-0181-003								RESISTOR 5%, 1/4 W, 180 OHM (RLR07C181JR)	81349		1
	R818	4752-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R819	4702-0681-003								RESISTOR 5%, 1/4 W, 680 OHM (RLR07C681JR)	81349		1
	R820	4702-0470-003								RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R821	4702-0182-003*								RESISTOR 5%, 1/4 W, 1.8 K (RLR07C182JR)	81349		1
		4702-0102-003*								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		A/R
		4702-0112-003*								RESISTOR 5%, 1/4 W, 1.1 K (RLR07C112JR)	81349		A/R
		4702-0122-003*								RESISTOR 5%, 1/4 W, 1.2 K (RLR07C122JR)	81349		A/R
		4702-0152-003*								RESISTOR 5%, 1/4 W, 1.5 K (RLR07C152JR)	81349		A/R
		4702-0222-003*								RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		A/R
		4702-0272-003*								RESISTOR 5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		A/R
		4702-0332-003*								RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)	81349		A/R
	R822	4702-0683-003								RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)	81349		1
	R823	4702-0181-003								RESISTOR 5%, 1/4 W, 180 OHM (RLR07C181JR)	81349		1
	R824	4752-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R825	4702-0222-003								RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)	81349		1
	R826	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1
	R827	4702-0820-003								RESISTOR 5%, 1/4 W, 82 OHM (RLR07C820JR)	81349		1
	R828	4706-1472-001								RESISTOR 1%, 1/4 W, 14.70 K (RLR07C1472FR)	81349		1
	R829	4706-2052-001								RESISTOR 1%, 1/4 W, 20.50 K (RLR07C2052FR)	81349		1
	R830	4752-0203-002								RESISTOR, VAR 20 K (62-1-1-203)	02111		1
	R831	4752-0103-002								RESISTOR, VAR 10 K (62-1-1-103)	02111		1
	R832	4752-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R833	4706-4532-001								RESISTOR 1%, 1/4 W, 45.30 K (RLR07C4532FR)	81349		1
	R834	4706-4421-001								RESISTOR 1%, 1/4 W, 4.42 K (RLR07C4421FR)	81349		1
	R835	4702-0471-003								RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R836	4702-0181-003								RESISTOR 5%, 1/4 W, 180 OHM (RLR07C181JR)	81349		1
	R837	4702-0181-003								RESISTOR 5%, 1/4 W, 180 OHM (RLR07C181JR)	81349		1
	RT801	4704-0102-010								THERMISTOR (TM1/4102K)	12969		1
	T801	5604-0000-004								TRANSFORMER (T9-1)	15542		1
	U801	3135-0000-055								IC, LOG AMP (TL441)	01295		1
	U802	3221-0001-000								IC, DUAL J-FET OP AMP (LF353N)	27014		1
		SEE FIG 1								WIRE, BUS 26 GA	27014		A/R

NOTE: \* SELECTED AT TEST (SAT)  
 NOMINAL RANGE = 1.8 K  
 SELECT RANGE = 1 K THRU 3.3 K

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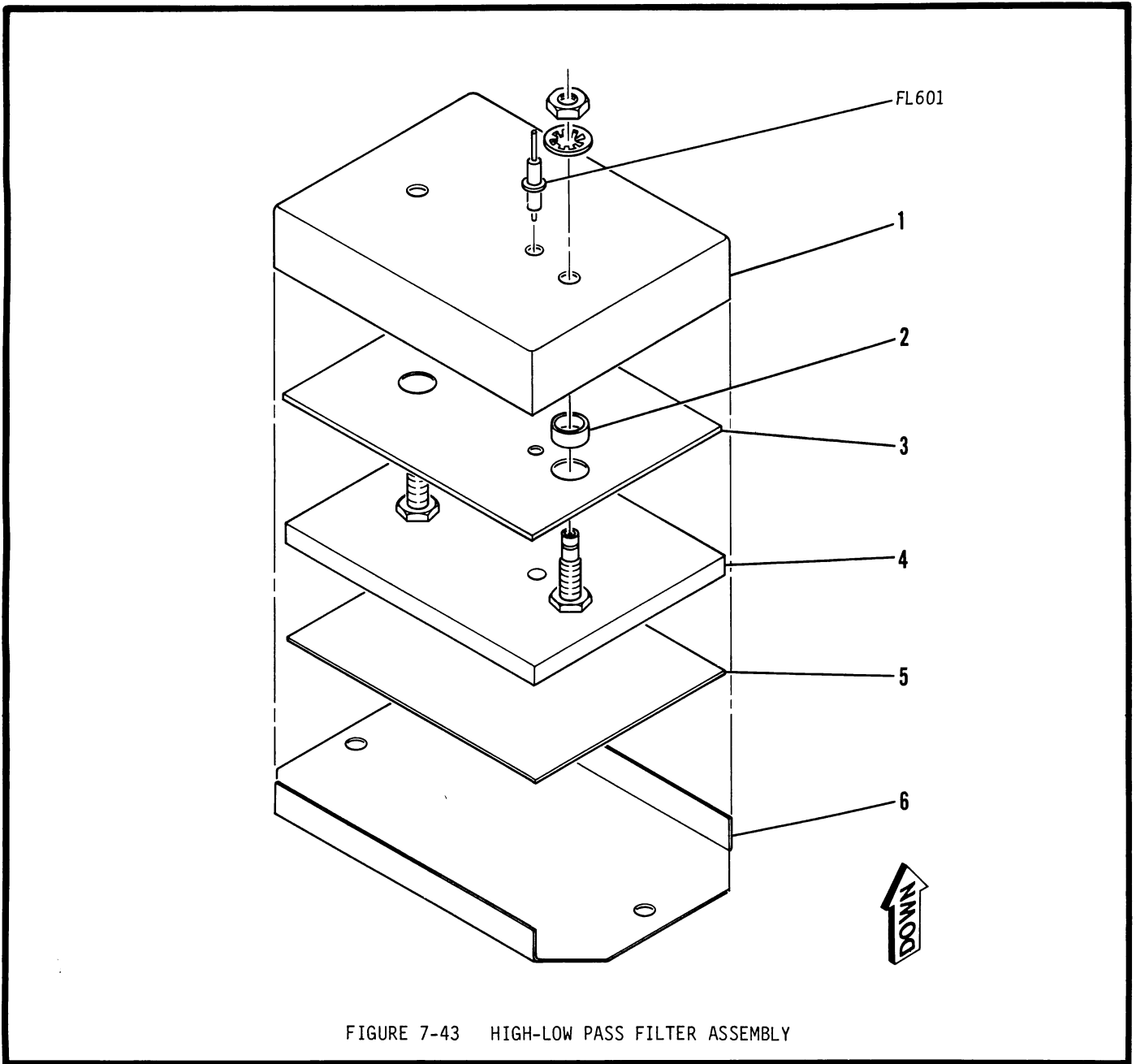


FIGURE 7-43 HIGH-LOW PASS FILTER ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	DESCRIPTION	FSCM	EFF	QTY
43-		7005-5040-700	HIGH-LOW PASS FILTER ASSEMBLY						SEE			REF
	FL601	5801-0000-012	FIG 13 FOR NHA									
1		1414-5055-900	FILTER, FEEDTHRU						1500 pF (1251-001)	72982		1
2		2800-7600-181	COVER									1
3		3107-5056-100	SPACER									2
4		3107-5056-100	INSULATOR, UPPER									1
5		SEE FIG 44	HIGH-LOW PASS FILTER PC BOARD ASSEMBLY									1
6		3107-5056-000	INSULATOR, LOWER									1
		1408-5055-800	BASE									1

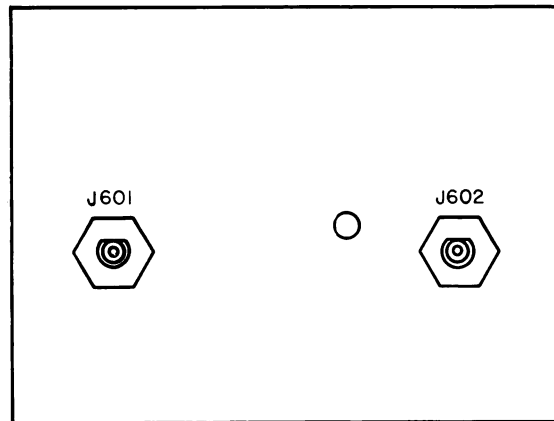
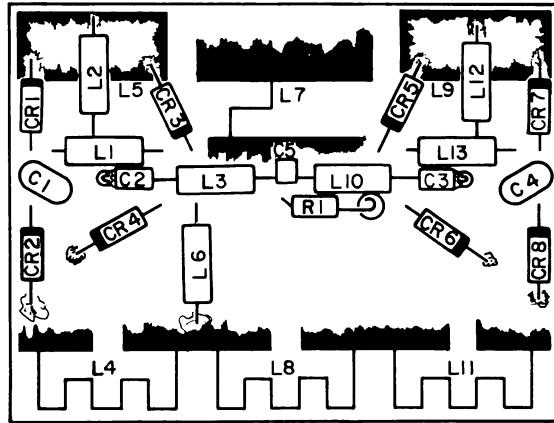


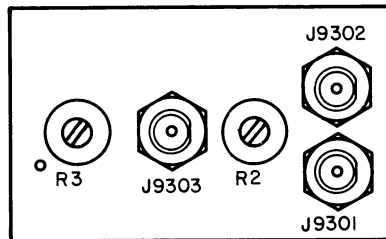
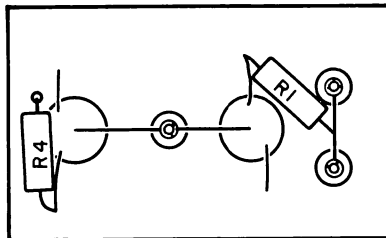
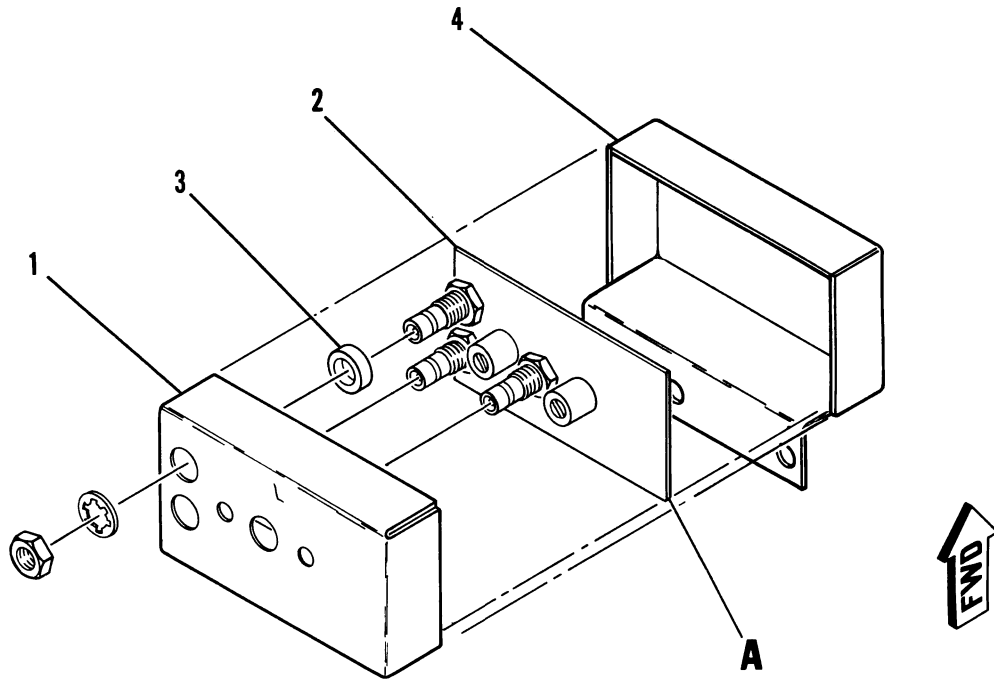
FIGURE 7-44 HIGH-LOW PASS FILTER PC BOARD ASSEMBLY



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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
44-		7010-5030-700								HIGH-LOW PASS FILTER PC BOARD ASSEMBLY	SEE		REF
										FIG 43 FOR NHA			
	J601	2123-0000-036								CONNECTOR, SMB (51-043-0000-91)	98291		1
	J602	2123-0000-036								CONNECTOR, SMB (51-043-0000-91)	98291		1
	C701	1506-0270-017								CAPACITOR 27 pF, 200 V (C320C270J2G5CA)	61637		1
	C702	1620-2210-600								CAPACITOR 220 pF, 200 V (2D221KCN)	12969		1
	C703	1620-2210-600								CAPACITOR 220 pF, 200 V (2D221KCN)	12969		1
	C704	1506-0270-017								CAPACITOR 27 pF, 200 V (C320C270J2G5CA)	61637		1
	C705	1523-0000-002								CAPACITOR 1800 pF, 50 V (GR40-1X7R182K50V)	72982		1
	CR701	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR702	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR703	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR704	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR705	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR706	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR707	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	CR708	4828-0000-002								DIODE, PIN (MA47047)	72982		1
	L701	1801-0022-001								INDUCTOR 22 $\mu$ H, 3.3 OHM (1025-52)	99800		1
	L702	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	L703	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	L706	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	L710	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	L712	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	L713	1801-0109-001								INDUCTOR 1 $\mu$ H (1025-20)	99800		1
	R701	4702-0102-003								RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1



DETAIL **A**

FIGURE 7-45 MIXER NULL ASSEMBLY





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
45-		7005-5540-400								MIXER NULL ASSEMBLY			REF
	1	1415-5550-200								ENCLOSURE			1
	2	7010-5037-600								MIXER NULL PC BOARD ASSEMBLY			1
	3	2800-7600-181								ATTACHING PARTS SPACER			3
										---*---			
	J9301	2123-0000-036								CONNECTOR, SMB (51-043-0000-91)	98291		1
	J9302	2123-0000-036								CONNECTOR, SMB (51-043-0000-91)	98291		1
	J9303	2123-0000-036								CONNECTOR, SMB (51-043-0000-91)	98291		1
	R9401	4701-0181-003								RESISTOR 5%, 1/8 W, 180 OHM (RLR05C181JR)	81349		1
	R9402	4752-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R9403	4752-0501-002								RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1
	R9404	4701-0560-003								RESISTOR 5%, 1/8 W, 56 OHM (RLR05C560JR)	81349		1
4		2506-5550-300								ENCLOSURE			1



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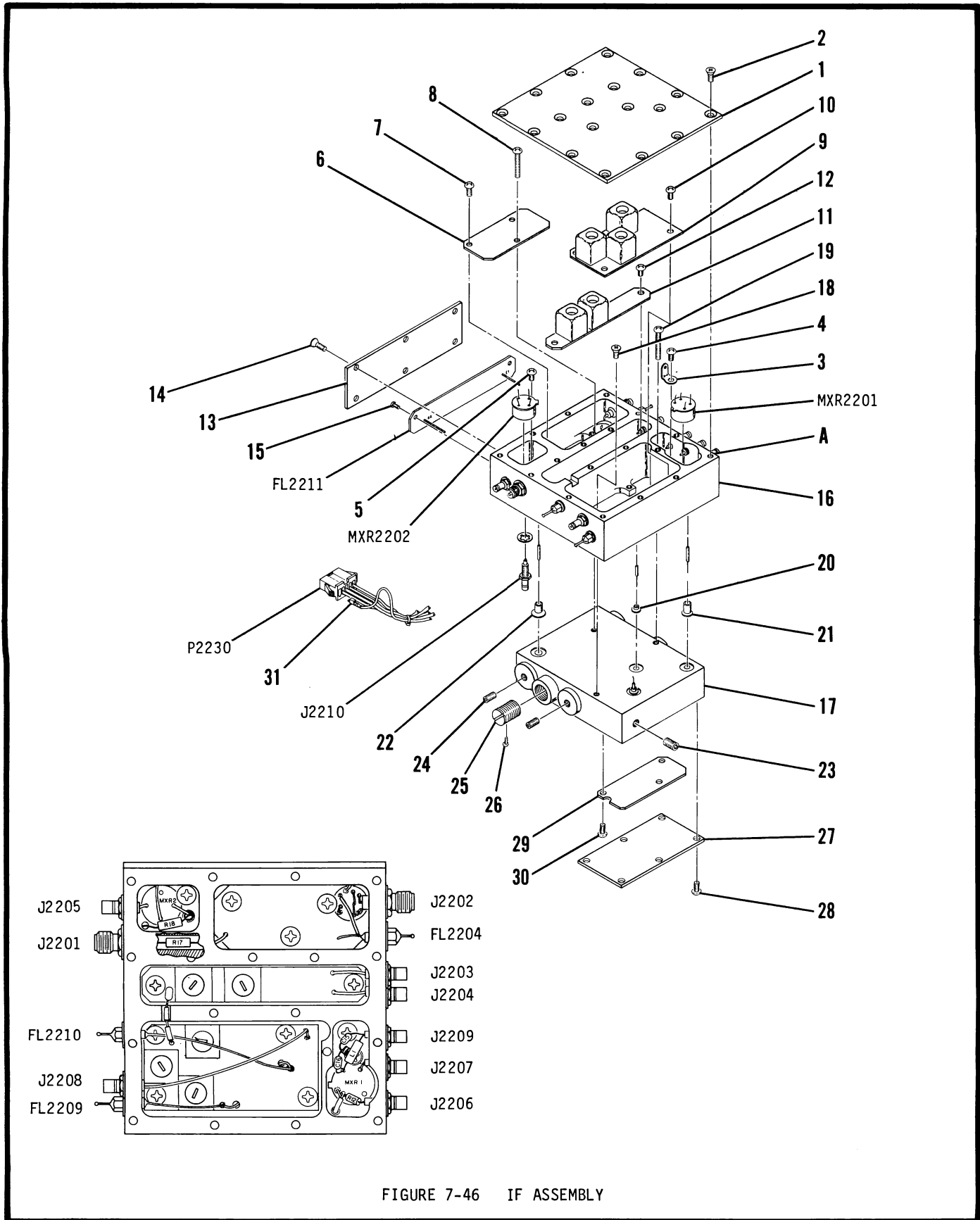


FIGURE 7-46 IF ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
46-		7005-5141-900		IF ASSEMBLY SEE FIG 13 FOR NHA			REF
1		1414-5152-300		COVER, IF BLOCK			1
				ATTACHING PARTS			
2		2803-0188-003		SCREW (4-40 X 3/16 PFHM)	UNK015		16
				---*---			
	J2201	2123-0000-030		CONNECTOR, SMA (9422-9113-000)	19505		1
	J2202	2123-0000-030		CONNECTOR, SMA (9422-9113-000)	19505		1
	J2203	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2204	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2205	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2206	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2207	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2208	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2209	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	J2210	2123-0000-038		CONNECTOR, SMB (2019-7511-000)	19505		1
	C2215	1506-0470-017		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	C2216	1506-0470-017		CAPACITOR 47 pF, 200 V (C320C470J2G5CA)	61637		1
	FL2204	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	FL2209	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	FL2210	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
3		2850-0000-015		LUG, GND 4-40 (1488-4)	83330		1
				ATTACHING PARTS			
4		2803-0125-006		SCREW (4-40 X 1/8 PPHM)	UNK015		1
				---*---			
	L2201	1801-0108-001		INDUCTOR .1 μH, .08 OHM (1025-94)	99800		1
	MXR2201	5250-0804-301		MIXER, FLTPK 700 - 1500 MHz (M43T1)	59277		1
	MXR2202	5250-0806-300		MIXER, FLTPK 1.0 - 2.0 GHz (M63T)	59277		1
				ATTACHING PARTS			
5		2803-0125-006		SCREW (4-40 X 1/8 PPHM)	UNK015		1
				---*---			
	R2212	4701-0471-003		RESISTOR 5%, 1/8 W, 470 OHM (RLR05C471JR)	81349		1
	R2217	4702-0569-003		RESISTOR 5%, 1/4 W, 5.6 OHM (RLR07C569JR)	81349		1
	R2218	4701-0221-003		RESISTOR 5%, 1/8 W, 220 OHM (RLR05C221JR)	81349		1
6		SEE FIG 47		IF VOLTAGE PROTECT PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
7		2803-0125-006		SCREW (4-40 X 1/8 PPHM)	UNK015		1
8		2803-0563-006		SCREW (4-40 X 9/16 PPHM)	UNK015		1
				---*---			
9		SEE FIG 48		IF AMP PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
10		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		4
				---*---			
11		SEE FIG 50		IF MIXER PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
12		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		2
				---*---			
13		1414-5152-300		COVER, LOW PASS FILTER			1
				ATTACHING PARTS			
14		2803-0188-003		SCREW (4-40 X 3/16 PFHM)	UNK015		6
				---*---			
	FL2211	1700-5122-200		1000 MHz LOW PASS FILTER			1
				ATTACHING PARTS			
15		2801-0125-006		SCREW (2-56 X 1/8 PPHM)	UNK015		2
				---*---			
16		1415-5152-301		ENCLOSURE, IF BLOCK			1
17		1415-5152-000		ENCLOSURE, FILTER BLOCK			1
				ATTACHING PARTS			
18		2803-0188-003		SCREW (4-40 X 3/16 PFHM)	UNK015		1
19		2803-0625-006		SCREW (4-40 X 5/8 PPHM)	UNK015		1
				---*---			
20		2820-0000-003		EYELET (GS-3-3)	57771		2
21		2820-0001-017		EYELET (GS-4-7)	57771		1
		6042-0000-005		CABLE, COAX FLEX (RG178B/U)	UNK021		1

CONTINUED ON NEXT PAGE



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FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
46- 22		2820-0001-005								EYELET (GS-5-7)	57771		1
23		2805-0125-001								SCREW (8-32 X 1/8 SHS)	UNK015		1
24		2803-0250-001								SCREW (4-40 X 1/4 SHS)	UNK015		2
25		2806-5060-500								SLUG, TUNING			3
26		2803-0375-050								SCREW, NYLON (4-40 x 3/8 SPHM)	UNK015		3
27		1414-5254-900								COVER, 1300 MHz AMP ATTACHING PARTS			1
28		2803-0188-006								SCREW (4-40 x 3/16 PPHM) ---*---	UNK015		6
29		SEE FIG 49								1300 MHz AMP PC BOARD ASSEMBLY ATTACHING PARTS			1
30		2803-0188-006								SCREW (4-40 X 3/16 PPHM) ---*---	UNK015		3
31	P2230	2115-9002-005								CONNECTOR, LOCKING (SMP-05V-B)	UNK020		1
		2114-9002-001								CONTACT, CONN 20-26 GA (SHF-001T-0.8SS)	UNK020		5
		SEE FIG 1								WIRE, 7S 26 GA			A/R
		SEE FIG 1								WIRE, BUS 24 GA			A/R
		SEE FIG 1								TUBING, TFL 24 GA, NAT			A/R
		SEE FIG 1								WIRE, BUS 16 GA			A/R
		SEE FIG 1								TUBING, TFL 16 GA, NAT			A/R
		SEE FIG 1							WIRE, BUS 22 GA			A/R	

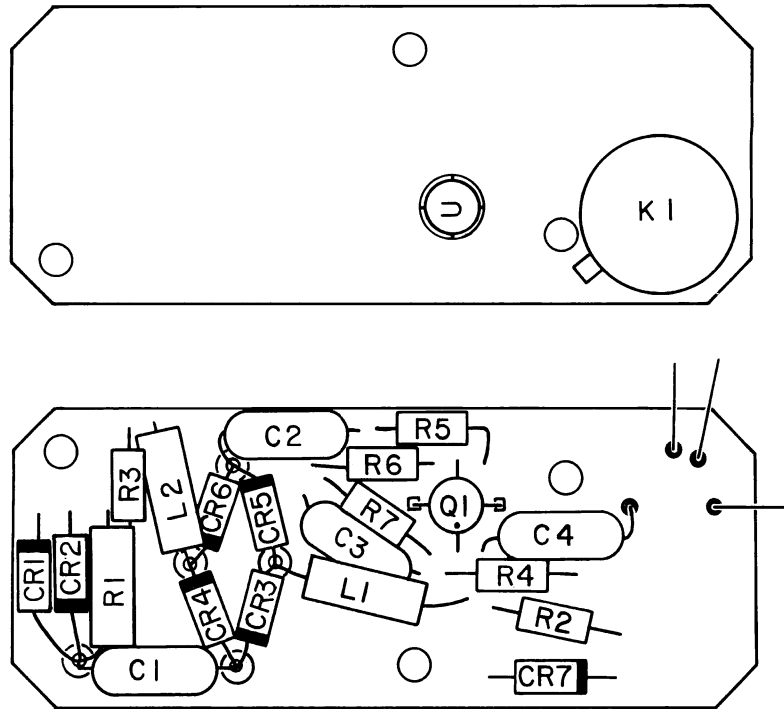


FIGURE 7-47 IF VOLTAGE PROTECT PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
47-		7010-5133-700	IF VOLTAGE PROTECT PC BOARD ASSEMBLY							SEE			REF
			FIG 46 FOR NHA										
	C3801	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1
	C3802	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1
	C3803	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1
	C3804	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1
	CR3801	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3802	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3803	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3804	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3805	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3806	4828-0000-002	DIODE, PIN		(MA47047)						96341		1
	CR3807	4815-0000-003	DIODE, SIGNAL		(JAN1N4148)						81349		1
	K3801	4501-0000-011	RELAY, DPDT		12	VDC,	1	A	(C5W12)		02289		1
	L3801	1801-0102-001	INDUCTOR		1	mH,	72	OHM	(1025-92)		99800		1
	L3802	1801-0102-001	INDUCTOR		1	mH,	72	OHM	(1025-92)		99800		1
	Q3801	5010-0203-100	TRANSISTOR		(HXTR3101)						54893		1
	R3801	4702-0223-003	RESISTOR		5%,	1/4	W,	22	K	(RLR07C223JR)	81349		1
	R3802	4701-0102-003	RESISTOR		5%,	1/8	W,	1	K	(RLR05C102JR)	81349		1
	R3803	4701-0102-003	RESISTOR		5%,	1/8	W,	1	K	(RLR05C102JR)	81349		1
	R3804	4701-0331-003	RESISTOR		5%,	1/8	W,	330	OHM	(RLR05C331JR)	81349		1
	R3805	4701-0560-003	RESISTOR		5%,	1/8	W,	56	OHM	(RLR05C560JR)	81349		1
	R3806	4701-0151-003	RESISTOR		5%,	1/8	W,	150	OHM	(RLR05C151JR)	81349		1
	R3807	4701-0223-003	RESISTOR		5%,	1/8	W,	22	K	(RLR05C223JR)	81349		1



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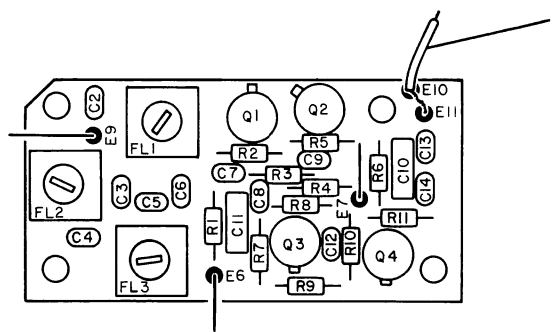


FIGURE 7-48 IF AMP PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
48- 1		7010-5131-900	IF AMP PC BOARD ASSEMBLY							SEE FIG 46 FOR NHA			REF
		6042-0000-005	CABLE ASSY, COAX							FLEX (RG178B/U)	UNK021		1
	C2202	1506-0150-017	CAPACITOR							15 pF, 200 V (C320C150J2G5CA)	61637		1
	C2203	1506-0010-017	CAPACITOR							1 pF, 100 V (RPE110CDG1ROC100V)	72982		1
	C2204	1506-0150-017	CAPACITOR							15 pF, 200 V (C320C150J2G5CA)	61637		1
	C2205	1506-0159-017	CAPACITOR							1.5 pF, 200 V (C312C159D2G5CA)	61637		1
	C2206	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)	61637		1
	C2207	1506-0100-017	CAPACITOR							10 pF, 200 V (C320C100J2G5CA)	61637		1
	C2208	1506-0221-017	CAPACITOR							220 pF, 200 V (C320C221J2G5CA)	61637		1
	C2209	1506-0221-017	CAPACITOR							220 pF, 200 V (C320C221J2G5CA)	61637		1
	C2210	1506-0103-017	CAPACITOR							.01 μF, 100 V (C052K103K1X5CA)	61637		1
	C2211	1506-0103-017	CAPACITOR							.01 μF, 100 V (C052K103K1X5CA)	61637		1
	C2212	1506-0221-017	CAPACITOR							220 pF, 200 V (C320C221J2G5CA)	61637		1
	C2213	1506-0221-017	CAPACITOR							220 pF, 200 V (C320C221J2G5CA)	61637		1
	C2214	1506-0050-017	CAPACITOR							5.5 pF, 100 V (RPE110COG5R5C100V)	72982		1
	FL2201	1800-7624-900	INDUCTOR, VAR							.1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL2202	1800-7624-900	INDUCTOR, VAR							.1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL2203	1800-7624-900	INDUCTOR, VAR							.1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	Q2201	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q2202	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q2203	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	Q2204	4809-0000-005	TRANSISTOR (66382)								UNK009		1
	R2201	4701-0680-003	RESISTOR							5%, 1/8 W, 68 OHM (RLR05C680JR)	81349		1
	R2202	4701-0683-003	RESISTOR							5%, 1/8 W, 68 K (RLR05C683JR)	81349		1
	R2203	4701-0221-003	RESISTOR							5%, 1/8 W, 220 OHM (RLR05C221JR)	81349		1
	R2204	4701-0102-003	RESISTOR							5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R2205	4701-0473-003	RESISTOR							5%, 1/8 W, 47 K (RLR05C473JR)	81349		1
	R2206	4701-0102-003	RESISTOR							5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R2207	4701-0102-003	RESISTOR							5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R2208	4701-0683-003	RESISTOR							5%, 1/8 W, 68 K (RLR05C683JR)	81349		1
	R2209	4701-0102-003	RESISTOR							5%, 1/8 W, 1 K (RLR05C102JR)	81349		1
	R2210	4701-0221-003	RESISTOR							5%, 1/8 W, 220 OHM (RLR05C221JR)	81349		1
	R2211	4701-0683-003	RESISTOR							5%, 1/8 W, 68 K (RLR05C683JR)	81349		1
		SEE FIG 1	WIRE, BUS							22 GA			A/R



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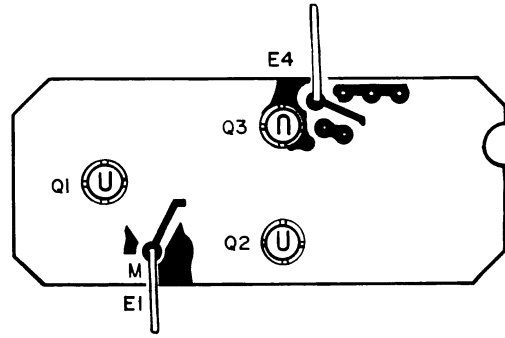
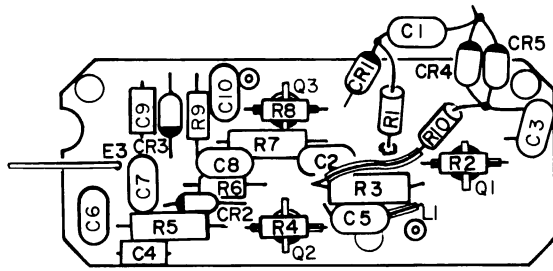


FIGURE 7-49 1300 MHz AMP PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
49-		7010-5232-400	1300 MHz AMP PC BD ASSEMBLY							SEE			REF
			FIG 46 FOR NHA										
		C2401	1506-0050-017	CAPACITOR	5.5 pF, 100 V (RPE110C0G5R5C100V)						72982		1
		C2402	1506-0101-017	CAPACITOR	100 pF, 200 V (C320C101J2G5CA)						61637		1
		C2403	1506-0050-017	CAPACITOR	5.5 pF, 100 V (RPE110C0G5R5C100V)						72982		1
		C2404	1506-0103-017	CAPACITOR	.01 μF, 100 V (C052K103K1X5CA)						61637		1
		C2405	1506-0030-017	CAPACITOR	3 pF, 100 V (RP110C0G3R3C100V)						72982		1
		C2406	1506-0101-017	CAPACITOR	100 pF, 200 V (C320C101J2G5CA)						61637		1
		C2407	1506-0050-017	CAPACITOR	5.5 pF, 100 V (RPE110C0G5R5C100V)						72982		1
		C2408	1506-0101-017	CAPACITOR	100 pF, 200 V (C320C101J2G5CA)						61637		1
		C2409	1506-0103-017	CAPACITOR	.01 μF, 100 V (C052K103K1X5CA)						61637		1
		C2410	1506-0030-017	CAPACITOR	3 pF, 100 V (REP1110C0G3R3C100V)						72982		1
		CR2401	4828-0000-002	DIODE, PIN (MA47047)							96341		1
		CR2402	4828-0000-002	DIODE, PIN (MA47047)							96341		1
		CR2403	4828-0000-002	DIODE, PIN (MA47047)							96341		1
		CR2404	4828-0000-002	DIODE, PIN (MA47047)							96341		1
		CR2405	4828-0000-002	DIODE, PIN (MA47047)							96341		1
		Q2401	5010-0203-100	TRANSISTOR (HXTR3101)							54893		1
		Q2402	5010-0203-100	TRANSISTOR (HXTR3101)							54893		1
		Q2403	5010-0203-100	TRANSISTOR (HXTR3101)							54893		1
		R2401	4701-0472-003	RESISTOR	5%, 1/8 W, 4.7 K (RLR05C472JR)						81349		1
		R2402	4701-0683-003	RESISTOR	5%, 1/8 W, 68 K (RLR05C683JR)						81349		1
		R2403	4702-0271-003	RESISTOR	5%, 1/4 W, 270 OHM (RLR07C271JR)						81349		1
		R2404	4701-0683-003	RESISTOR	5%, 1/8 W, 68 K (RLR05C683JR)						81349		1
		R2405	4702-0271-003	RESISTOR	5%, 1/4 W, 270 OHM (RLR07C271JR)						81349		1
		R2406	4701-0472-003	RESISTOR	5%, 1/8 W, 4.7 K (RLR05C472JR)						81349		1
		R2407	4702-0271-003	RESISTOR	5%, 1/4 W, 270 OHM (RLR07C271JR)						81349		1
		R2408	4701-0683-003	RESISTOR	5%, 1/8 W, 68 K (RLR05C683JR)						81349		1
		R2409	4701-0472-003	RESISTOR	5%, 1/8 W, 4.7 K (RLR05C472JR)						81349		1
		R2410	4701-0222-003	RESISTOR	5%, 1/8 W, 2.2 K (RLR05C222JR)						81349		1
			SEE FIG 1	TUBING, TFL	26 GA, NAT								A/R
			SEE FIG 1	WIRE, BUS	22 GA								A/R



# ILLUSTRATED PARTS CATALOG

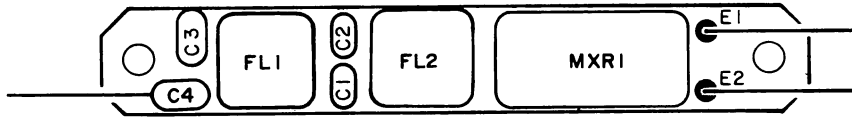


FIGURE 7-50 IF MIXER PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
50-		7010-5232-300	IF MIXER PC BOARD ASSEMBLY							SEE FIG 46 FOR NHA			REF
	C2301	1506-0220-017	CAPACITOR							22 pF, 200 V (C320C220J2G5CA)	61637		1
	C2302	1506-0159-017	CAPACITOR							1.5 pF, 200 V (C312C159D2G5CA)	61637		1
	C2303	1506-0150-017	CAPACITOR							15 pF, 200 V (C320C150J2G5CA)	61637		1
	C2304	1506-0010-017	CAPACITOR							1 pF, 100 V (RPE110CDG1ROC100V)	72982		1
	FL2301	1800-7624-900	INDUCTOR, VAR							.1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	FL2302	1800-7624-900	INDUCTOR, VAR							.1 μH, 15 pF (KEC-K2483HU)	UNK011		1
	MXR2301	5250-0100-100	MIXER, FLTPK							1 - 500 MHz (SBL-1-18)	15542		1
		SEE FIG 1	WIRE, BUS							22 GA			A/R





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
51-		7005-5540-300		REAR PANEL ASSEMBLY			REF
1		SEE FIG 52		SEE FIG 13 FOR NHA LINE SUPPLY PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
2		2804-0750-006		SCREW (6-32 X 3/4 PPHM)	UNK016		1
3		2850-0000-002		NUT (6-32)	UNK016		1
4		2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		1
5		2804-0500-006		SCREW (6-32 X 1/2 PPHM)	UNK015		4
6		1400-5157-000		BAR, MTG			2
				---*---			
7		1414-5150-601		COVER, LINE SUPPLY			1
				ATTACHING PARTS			
8		2803-0250-006		SCREW (4-40 X 1/4 PPHM)	UNK015		2
				---*---			
	Q4601	4811-0000-005		TRANSISTOR (JAN2N6101)	02735		1
				ATTACHING PARTS			
9		2803-0375-050		SCREW (4-40 X 3/8 SPHM)	UNK015		1
10		2850-0000-008		NUT (4-40)	UNK015		1
11		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		1
12		4835-0000-103		INSULATOR (DF103B)	02735		1
				---*---			
13		7005-5140-301		WIRE HARNESS ASSY, REAR PANEL			1
	P1601	2115-0000-013		CONNECTOR, WAFER (22-01-2101)	27264		1
14		2114-0000-023		CONTACT, CONN 22-30 GA (08-56-0110)	27264		18
15		2127-9900-100		KEY, POLARIZING CONN (15-04-9209)	27264		2
	P1701	2115-0000-013		CONNECTOR, WAFER (22-01-2101)	27264		1
		SEE FIG 1		WIRE, 7S 20 GA			A/R
		SEE FIG 1		WIRE, 7S 22 GA			A/R
		SEE FIG 1		TY-RAP 4"			A/R
		SEE FIG 1		TUBING 5/16 CLR			A/R
16		SEE FIG 53		OUTPUT AMP ASSEMBLY			1
				ATTACHING PARTS			
17		2804-0438-006		SCREW (6-32 X 7/16 PPHM)	UNK015		2
18		2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		2
				---*---			
19		SEE FIG 55		POWER SUPPLY ASSEMBLY		A	1
19		SEE FIG 55A		POWER SUPPLY ASSEMBLY		B	1
				ATTACHING PARTS			
20		2804-0438-006		SCREW (6-32 X 7/16 PPHM)	UNK015		2
21		2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH)	UNK015		2
				---*---			
22		7007-5580-800		CABLE ASSY, RS-232			1
				ATTACHING PARTS			
23		2850-7601-301		SCREW, SPECIAL 4-40 (76-0013-1)	UNK019		2
24		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		2
				---*---			
25		1421-0018-000		FOOT, RUBBER (#18W)	UNK027		4
				ATTACHING PARTS			
26		2805-1250-006		SCREW (8-32 X 1 1/4 PPHM)	UNK015		1
27		2800-5257-300		SPACER			1
				---*---			
	J4603/ J4605	2200-0410-100		CONNECTOR, BNC (5526-2501-001)	19505		1
				ATTACHING PARTS			
28		2840-0125-001		SCREW (6-32 X 1/8 SHS)	UNK015		1
				---*---			
	J4602	2220-1020-100		CONNECTOR, AC POWER (EAC-301)	82389		1
				ATTACHING PARTS			
29		2804-0313-006		SCREW (6-32 X 5/16 PPHM)	UNK015		2
				---*---			

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
51-	J4601	2200-9900-100								CONNECTOR, EXT DC POWER (712A) INC MTG HARDWARE	82389		1
30	C4601	1506-0103-017								CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
		2850-0000-026								LUG, GND #6 (1413-6)	83330		2
31		2804-0250-006								ATTACHING PARTS SCREW (6-32 X 1/4 PPHM)	UNK015		1
32		5400-5180-901								HEATSINK			1
33		SEE FIG 1								TUBING, HS 3/16 BLK			A/R
		SEE FIG 12								DECAL, CAUTION			1

A---FM/AM-1200A, SN 1250 THRU SN 1449  
 FM/AM-1200S, SN 3300 THRU SN 4491  
 B---FM/AM-1200A, SN 1450 & ON  
 FM/AM-1200S, SN 4492 & ON



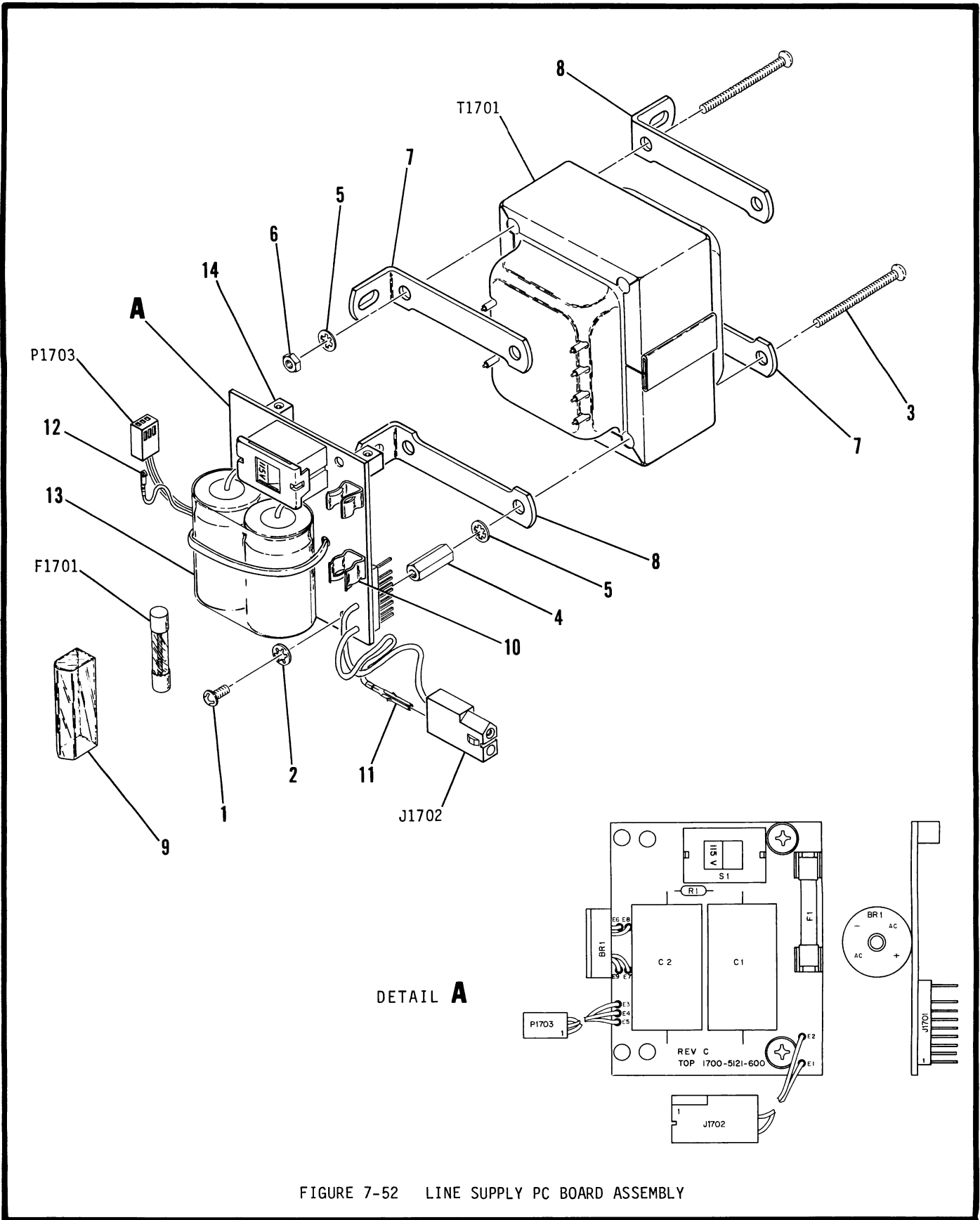


FIGURE 7-52 LINE SUPPLY PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	
52-		7010-5131-600	LINE SUPPLY PC BOARD ASSEMBLY							SEE				REF
	T1701	5604-5152-403	FIG 51 FOR NHA TRANSFORMER, SHIELDED (6700085)								33497			1
			ATTACHING PARTS											
1		2805-0250-006	SCREW (8-32 X 1/4 PPHM)								UNK015			2
2		2840-0000-002	WASHER, LOCK (#8 INT TOOTH LOCKWASH)								UNK016			2
			----*----											
3		2805-1750-006	SCREW (8-32 X 1 3/4 PPHM)								UNK015			4
4		2800-7636-501	NUT, SPECIAL 8-32											2
5		2840-0000-002	WASHER, LOCK (#8 INT TOOTH LOCKWASH)								UNK016			4
6		2850-0000-005	NUT (8-32)								UNK016			2
7		1400-5155-502	BRACKET											2
8		1400-5155-501	BRACKET											2
9		5105-0002-000	COVER, FUSE (840836)								06915			1
	F1701	5106-0000-003	FUSE, SLO BLO 1 A, 250 V (MDL-1 FUSE)								71400			1
10		5105-0005-000	HOLDER, FUSE (926)								79963			2
	J1701	2115-0000-057	CONNECTOR, WAFER (22-11-2101)								27264			1
	J1702	2115-0000-007	CONNECTOR, POLARIZED (03-09-1022)								27264			1
11		2114-0000-020	CONTACT, CONN 14-20 GA (02-09-1103)								27264			2
	P1703	2115-0001-003	CONNECTOR, WAFER (22-01-2031)								27264			1
12		2114-0000-022	CONTACT, CONN 22-30 GA (08-55-0101)								27264			3
	BR1701	4823-0000-001	RECTIFIER, BRIDGE 100 V, 10 A (PK-10)								UNK013			1
	C1701	1580-3322-210	CAPACITOR 3300 µF, 35 V (35TT3300MS)								52318			1
	C1702	1580-3322-210	CAPACITOR 3300 µF, 35 V (35TT3300MS)								52318			1
13		3107-5156-605	INSULATOR, MYLAR											1
	R1701	4707-0250-002	RESISTOR 5%, 3 W, 25 OHM (43J25R)								44655			1
	S1701	5135-2026-100	SWITCH, SLIDE (EPS2-PC1)								82389			1
14		2100-0000-100	NUT, SWAGE 4-40 (2040B)								83330			2
		SEE FIG 1	WIRE, 7S 18 GA											A/R
		SEE FIG 1	WIRE, 7S 20 GA											A/R
		SEE FIG 1	WIRE, 7S 22 GA											A/R
		SEE FIG 1	TY-RAP 5.5"											A/R

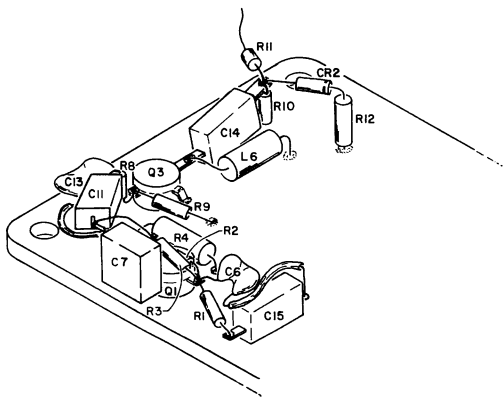
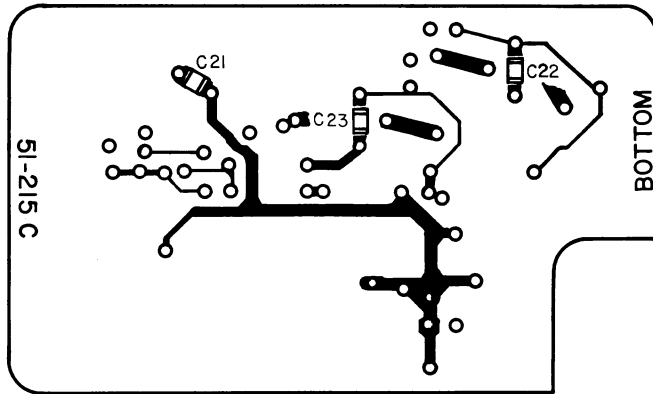
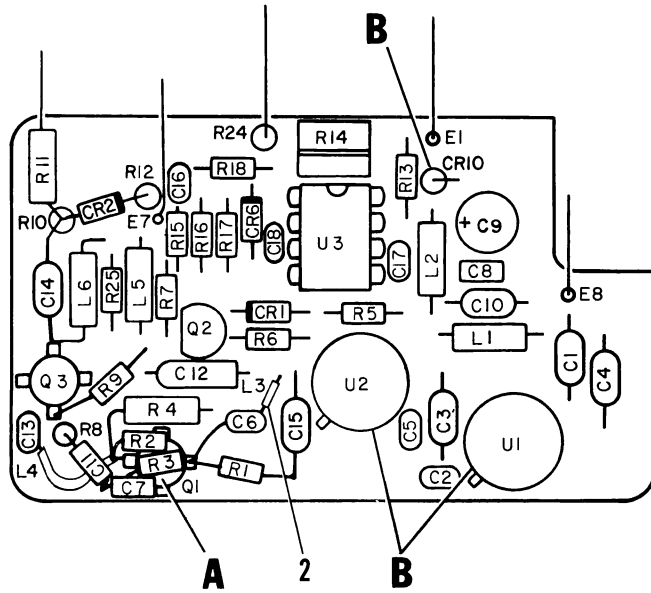




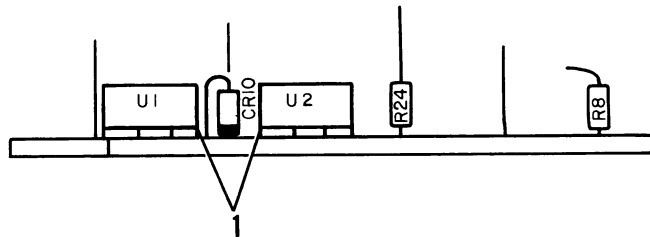
# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
53-		7005-5141-500		OUTPUT AMP ASSEMBLY			REF
1		1414-5152-400		COVER			1
				ATTACHING PARTS			
2		2803-0250-003		SCREW (4-40 x 1/4 PFHM)	UNK015		20
				----*----			
	C5124	1620-2210-600		CAPACITOR 220 pF, 200 V (CC0805NP0220K100VSB)	16299		1
	C5127	1550-0100-510		CAPACITOR, VAR 1.0-4.5 pF (9410-0)	29454		1
	CR5108	4915-0500-100		DIODE, S-BAR (MA4E282)	96341		1
	L5107	1801-0101-001		INDUCTOR 100 μH, 8 OHM (1025-68)	99800		1
	R5128	4702-0101-003		RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R5129	4702-0101-003		RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R5131	4704-0390-003		RESISTOR 5%, 1 W, 39 OHM (RLR32C390JR)	81349		1
	R5134	4702-0331-003		RESISTOR 5%, 1/4 W, 330 OHM (RLR07C331JR)	81349		1
	R5135	4702-0101-003		RESISTOR 5%, 1/4 W, 100 OHM (RLR07C101JR)	81349		1
	R5136	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5137	4702-0470-003		RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R5138	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5139	4702-0470-003		RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R5140	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5141	4702-0470-003		RESISTOR 5%, 1/4 W, 47 OHM (RLR07C470JR)	81349		1
	R5142	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5143	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5144	4702-0680-003		RESISTOR 5%, 1/4 W, 68 OHM (RLR07C680JR)	81349		1
	R5145	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R5146	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1
	R5147	4701-0820-003		RESISTOR 5%, 1/4 W, 82 OHM (RLR07C820JR)	81349		1
	RN5101	5650-0500-100		RESISTOR, NETWORK 50 OHM (CR1060)	58135		1
3		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		2
4		2519-5155-100		SHIM, BRASS			1
	FL5103	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	J5102	2123-0000-030		CONNECTOR, SMA (50-645-0000-89)	98291		1
	J5104	2123-0000-030		CONNECTOR, SMA (50-645-0000-89)	98291		1
	J5105	2123-0000-030		CONNECTOR, SMA (50-645-0000-89)	98291		1
5		2804-7600-208		WASHER (.380 D AL)	UNK015		3
6		1414-5152-500		COVER			1
				ATTACHING PARTS			
7		2803-0250-003		SCREW (4-40 X 1/4 PFHM)	UNK015		21
				----*----			
8		SEE FIG 54		OUTPUT AMP PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
9		2803-0188-006		SCREW (4-40 X 3/16 PPHM)	UNK015		7
				----*----			
	K5101	4501-0000-011		RELAY, DPDT 12 VDC, 1 A (CSW12)	02289		1
				ATTACHING PARTS			
10		2803-0125-006		SCREW (4-40 X 1/8 PPHM)	UNK015		1
				----*----			
	J5101	2123-0000-030		CONNECTOR, SMA (50-645-0000-89)	98291		1
	J5103	2123-0000-030		CONNECTOR, SMA (50-645-0000-89)	98291		1
11		2840-7600-208		WASHER (.380 D AL)	UNK015		2
	FL5101	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	FL5104	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	FL5105	5801-0000-006		FILTER, FEEDTHRU 1500 pF (1250-003)	72982		1
	L5108	1801-0109-001		INDUCTOR 1 μH, 1 OHM (1025-20)	99800		1
	L5109	1801-0109-001		INDUCTOR 1 μH, 1 OHM (1025-20)	99800		1
	L5110	1801-0109-001		INDUCTOR 1 μH, 1 OHM (1025-20)	99800		1
12		2809-0188-006		SCREW (10-32 X 3/16 PPHM)	UNK015		1
13		1415-5152-600		ENCLOSURE			1
	J5106	2115-9001-005		CONNECTOR, LOCKING (SMR-05V-B)	UNK020		1
14		2114-9001-001		CONTACT, CONN 22-26 GA (SM Y-001T-0.6)	UNK020		4
		SEE FIG 1		WIRE, 7S 26 GA			A/R
		SEE FIG 1		WIRE, BUS 22 GA			A/R
		SEE FIG 1		TUBING, TFL 22 GA, NAT			A/R



DETAIL A



DETAIL B

FIGURE 7-54 OUTPUT AMP PC BOARD ASSEMBLY





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
54-		7010-5131-500	OUTPUT AMP PC BOARD ASSEMBLY							SEE					REF
			FIG 53 FOR NHA												
	C5101	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5102	1506-0101-017	CAPACITOR		100	pF,	200	V	(C320C101J2G5CA)		61637		1		
	C5103	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5104	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5105	1506-0101-017	CAPACITOR		100	pF,	200	V	(C320C101J2G5CA)		61637		1		
	C5106	1506-0020-017	CAPACITOR		2.2	pF,	100	V	(REP110COG2R2C100V)		72982		1		
	C5107	1506-0103-017	CAPACITOR		.01	μF,	100	V	(C052K103K1X5CA)		61637		1		
	C5108	1506-0103-017	CAPACITOR		.01	μF,	100	V	(C052K103K1X5CA)		61637		1		
	C5109	1605-3360-475	CAPACITOR		33	μF,	16	V	(T350H336M016AS)		31433		1		
	C5110	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5111	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5112	1507-0105-018	CAPACITOR		1	μF,	35	V	(T322B105M035AS)		31433		1		
	C5113	1506-0020-017	CAPACITOR		2.2	pF,	100	V	(RPE110COG2R2C100V)		72982		1		
	C5114	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5115	1521-0000-008	CAPACITOR		.1	μF,	50	V	(RPA20Z5U104M50V)		72982		1		
	C5116	1506-0331-017	CAPACITOR		330	pF,	200	V	(C320C331J2G5CA)		61637		1		
	C5117	1506-0220-017	CAPACITOR		22	pF,	200	V	(C320C220J2G5CA)		61637		1		
	C5118	1506-0101-017	CAPACITOR		100	pF,	200	V	(C320C101J2G5CA)		61637		1		
	C5121	1523-0000-004	CAPACITOR		47	pF,	50	V	(CC0805COG470K100VPB)		16299		1		
	C5122	1523-0000-004	CAPACITOR		47	pF,	50	V	(CC0805COG470K100VPB)		16299		1		
	C5123	1523-0000-004	CAPACITOR		47	pF,	50	V	(CC0805COG470K100VPB)		16299		1		
	CR5101	4815-0000-003	DIODE, SIGNAL		(JAN1N4148)						81349		1		
	CR5102	4915-0500-100	DIODE, S-BAR		(MA4E282)						96341		1		
	CR5106	4915-0500-100	DIODE, S-BAR		(MA4E282)						96341		1		
	CR5110	4815-0000-003	DIODE, SIGNAL		(JAN1N4148)						81349		1		
	L5101	1801-0010-001	INDUCTOR		10	μH,	3.7	OHM	(1025-44)		99800		1		
	L5102	1801-0010-001	INDUCTOR		10	μH,	3.7	OHM	(1025-44)		99800		1		
	L5105	1801-0022-001	INDUCTOR		22	μH,	3.3	OHM	(1025-52)		99800		1		
	L5106	1801-0108-001	INDUCTOR		.1	μH,	.08	OHM	(1025-94)		99800		1		
	Q5101	4803-0000-004	TRANSISTOR		(SRF3114)						04713		1		
	Q5102	4805-0000-001	TRANSISTOR		(JAN2N2907A)						81349		1		
	Q5103	4803-0000-004	TRANSISTOR		(SRF3114)						04713		1		
	R5101	4701-0101-003	RESISTOR		5%	1/8	W,	100	OHM (RLR05C101JR)		81349		1		
	R5102	4701-0223-003	RESISTOR		5%	1/8	W,	22	K (RLR05C223JR)		81349		1		
	R5103	4701-0271-003	RESISTOR		5%	1/8	W,	270	OHM (RLR05C271JR)		81349		1		
	R5104	4702-0221-003	RESISTOR		5%	1/4	W,	220	OHM (RLR05C221JR)		81349		1		
	R5105	4701-0271-003	RESISTOR		5%	1/8	W,	270	OHM (RLR05C271JR)		81349		1		
	R5106	4701-0472-003	RESISTOR		5%	1/8	W,	4.7	K (RLR05C472JR)		81349		1		
	R5107	4701-0220-003	RESISTOR		5%	1/8	W,	22	OHM (RLR05C220JR)		81349		1		
	R5108	4701-0472-003	RESISTOR		5%	1/8	W,	4.7	K (RLR05C472JR)		81349		1		
	R5109	4701-0103-003	RESISTOR		5%	1/8	W,	10	K (RLR05C103JR)		81349		1		
	R5110	4701-0471-003	RESISTOR		5%	1/8	W,	470	OHM (RLR05C471JR)		81349		1		
	R5111	4702-0470-003	RESISTOR		5%	1/4	W,	47	OHM (RLR07C470JR)		81349		1		
	R5112	4701-0121-003	RESISTOR		5%	1/8	W,	120	OHM (RLR05C121JR)		81349		1		
	R5113	4701-0103-003	RESISTOR		5%	1/8	W,	10	K (RLR05C103JR)		81349		1		
	R5114	4753-0204-002	RESISTOR, VAR					200	K (62-2-1-204)		02111		1		
	R5115	4701-0683-003	RESISTOR		5%	1/8	W,	68	K (RLR05C683JR)		81349		1		
	R5116	4701-0225-003	RESISTOR		5%	1/8	W,	2.2	M (RLR05C225JR)		81349		1		
	R5117	4701-0225-003	RESISTOR		5%	1/8	W,	2.2	M (RLR05C225JR)		81349		1		
	R5118	4701-0683-003	RESISTOR		5%	1/8	W,	68	K (RLR05C683JR)		81349		1		
	R5124	4702-0221-003	RESISTOR		5%	1/4	W,	220	OHM (RLR07C221JR)		81349		1		
	R5125	4701-0221-003	RESISTOR		5%	1/8	W,	220	OHM (RLR05C221JR)		81349		1		
	U5101	3222-9106-100	IC, CASCADE AMP		(GPD1061)						24539		1		
	U5102	3222-9106-200	IC, CASCADE AMP		(GPD1062)						24539		1		
	U5103	3221-0003-000	IC, LOW NOISE OP AMP		(NE5534A)						18324		1		
1		3107-0205-000	INSULATOR, IC		(43-05-1)						13013		1		
		SEE FIG 1	WIRE, BUS		22			GA						A/R	
2		SEE FIG 1	TUBING, TFL		26			GA NAT						A/R	

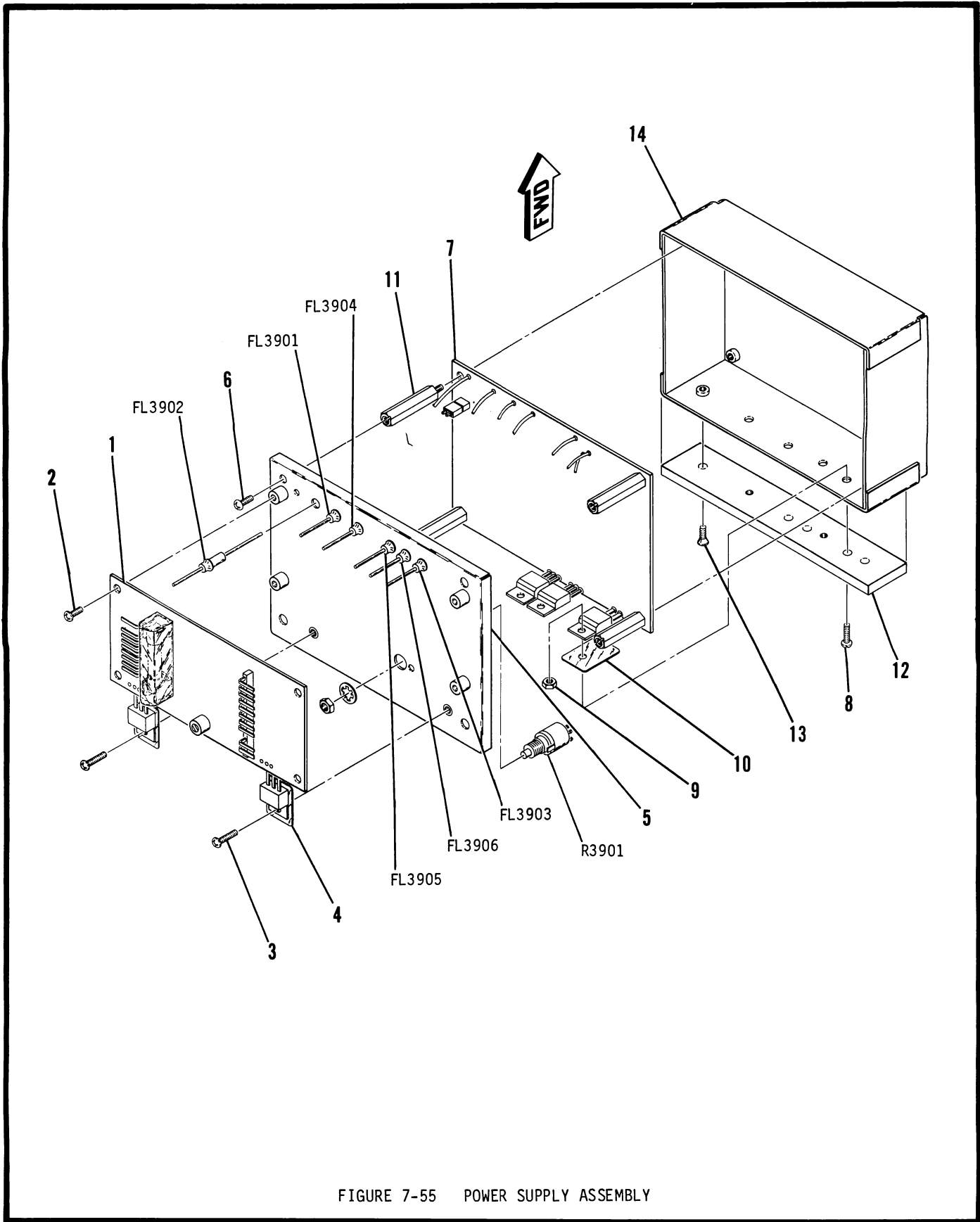


FIGURE 7-55 POWER SUPPLY ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
55-		7005-5141-300	POWER SUPPLY ASSEMBLY							SEE FIG 51 FOR NHA			REF
1		SEE FIG 56	BATTERY CHARGER PC BOARD ASSEMBLY										1
			ATTACHING PARTS										
2		2803-0250-006	SCREW (4-40 X 1/4 PPHM)								UNK015		4
3		2803-0375-050	SCREW (4-40 X 3/8 SPHM)								UNK015		2
4		4835-0000-103	INSULATOR (DF103B)								02735		2
			---*---										
5		1414-5183-900	COVER, POWER SUPPLY										1
			ATTACHING PARTS										
6		2803-0250-006	SCREW (4-40 X 1/4 PPHM)								UNK015		4
			---*---										
	FL3901	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	FL3902	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	FL3903	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	FL3904	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	FL3905	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	FL3906	5801-0000-013	FILTER, FEEDTHRU							3000 pF (51-708-001)	33095		1
	R3901	4750-7616-801	RESISTOR, VAR							2.5 K, INCL MTG HARDWARE			1
7		SEE FIG 57	INVERTER SUPPLY PC BOARD ASSEMBLY										1
			ATTACHING PARTS										
8		2803-0375-050	SCREW (4-40 X 3/8 SPHM)								UNK015		3
9		2850-0000-008	NUT (4-40)								UNK016		3
10		4835-0000-103	INSULATOR, IC										3
11		2800-5154-700	SPACER, SLOTTED							4-40			4
			---*---										
12		5400-5153-601	HEATSINK										1
			ATTACHING PARTS										
13		2803-0250-003	SCREW (4-40 X 1/4 PPHM)								UNK015		2
			---*---										
14		1415-5183-801	ENCLOSURE										1
		SEE FIG 1	WIRE, 7S							18 GA			A/R
		SEE FIG 1	WIRE, 7S							22 GA			A/R

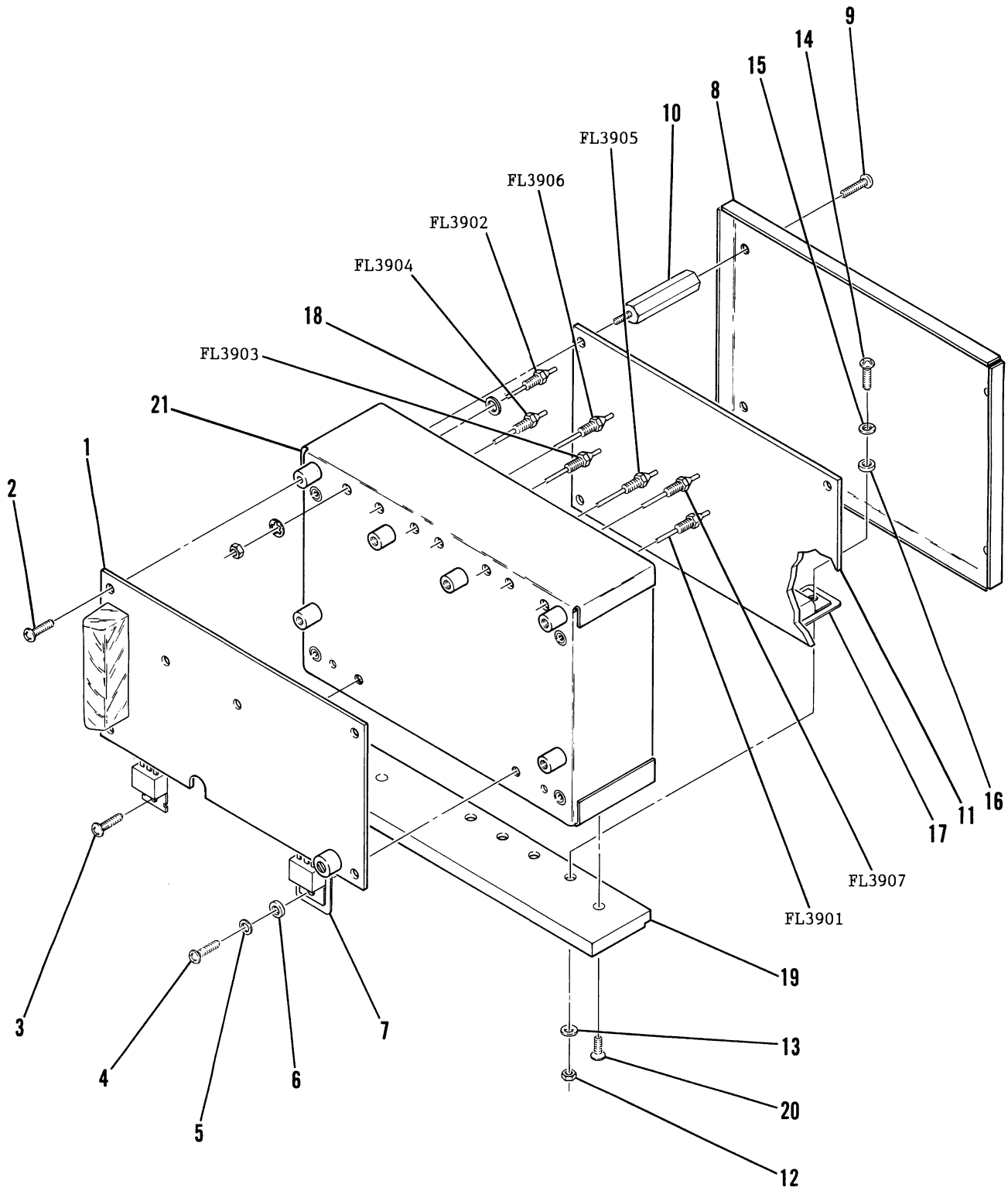


FIGURE 7-55A POWER SUPPLY ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
55A-		7005-6140-400	POWER SUPPLY ASSEMBLY							SEE FIG 51 FOR NHA					
1		SEE FIG 56	BATTERY CHARGER PC BOARD ASSEMBLY												1
			ATTACHING PARTS												
2		2803-0313-006	SCREW (4-40 X 5/16 PPHM)								UNK015				6
3		2803-0188-006	SCREW (4-40 X 3/16 PPHM)								UNK015				1
4		2803-0250-006	SCREW (4-40 X 1/4 PPHM)								UNK015				1
5		2840-0000-012	WASHER, LOCK (#4 SPLIT WASHER)								UNK015				1
6		2840-6153-500	WASHER, SHOULDER (7721-7PPS)								13013				1
			----*----												
7		4835-0000-103	INSULATOR (DF103B)								02735				1
8		1414-6150-300	COVER, ENCLOSURE												1
			ATTACHING PARTS												
9		2803-0313-006	SCREW (4-40 X 5/16 PPHM)								UNK015				4
			----*----												
10		2800-5154-700	SCREW, SPECIAL							4-40					4
11		SEE FIG 57	INVERTER SUPPLY PC BOARD ASSEMBLY												1
			ATTACHING PARTS												
12		2850-0000-020	NUT							4-40 (NAS671C4)		UNK016			4
13		2840-0000-012	WASHER, LOCK (#4 SPLIT WASHER)								UNK015				4
14		2803-0313-006	SCREW (4-40 X 5/16 PPHM)								UNK015				4
15		2840-0000-009	WASHER, FLAT (#4 FLAT WASHER)								UNK015				4
16		2840-6153-500	WASHER, SHOULDER (7721-7PPS)								13013				4
17		4835-0000-103	INSULATOR (DF103B)								02735				4
			----*----												
FL3901		5801-0000-006	FILTER, FEEDTHRU							1500 pF					1
			INCL MTG HARDWARE (1250-003)								72982				
FL3902		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
FL3903		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
FL3904		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
FL3905		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
FL3906		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
FL3907		5801-0000-006	FILTER, FEEDTHRU							1500 pF		72982			1
			INCL MTG HARDWARE (1250-003)								72982				
18		2840-0000-046	WASHER, FLAT												7
19		5400-6150-100	HEATSINK, POWER SUPPLY												1
			ATTACHING PARTS												
20		2803-0313-003	SCREW (4-40 X 5/16 PPHM)								UNK015				2
			----*----												
21		1415-6150-200	ENCLOSURE ASSY												1

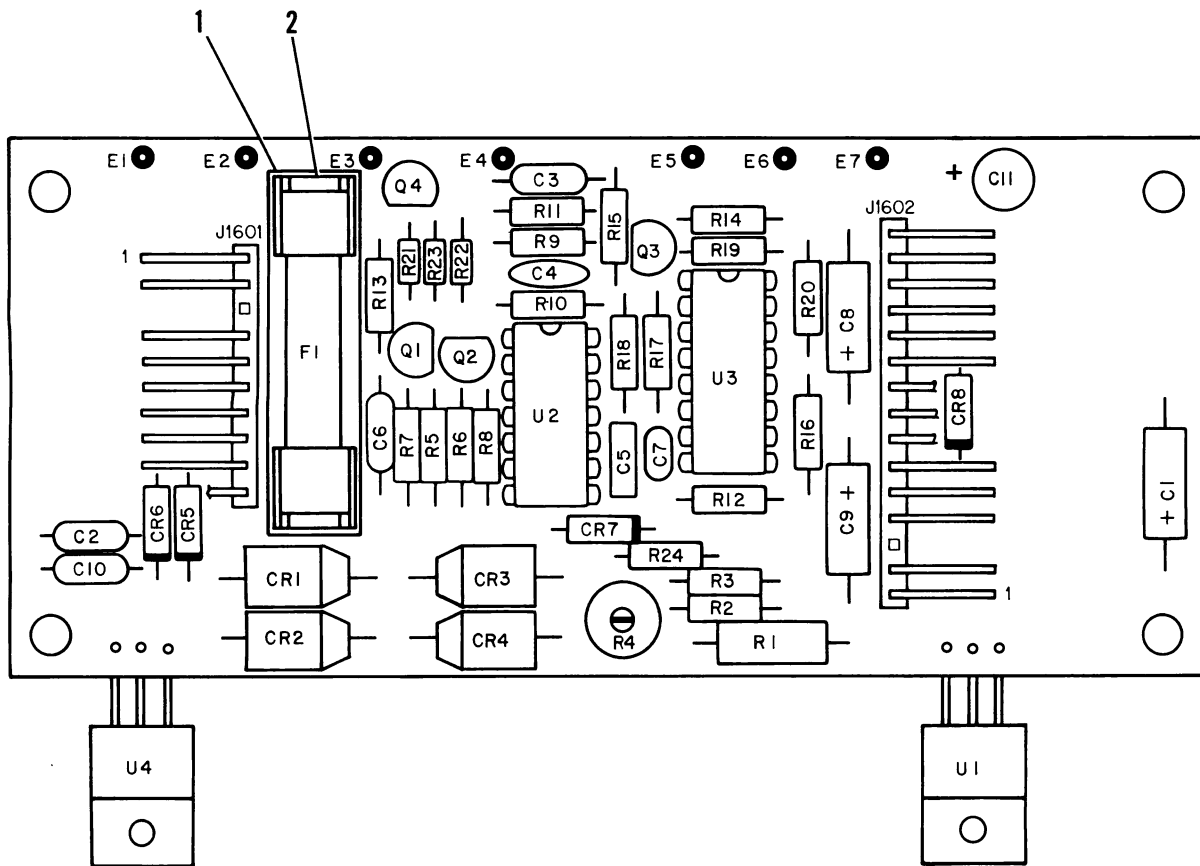
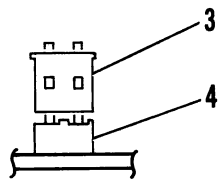
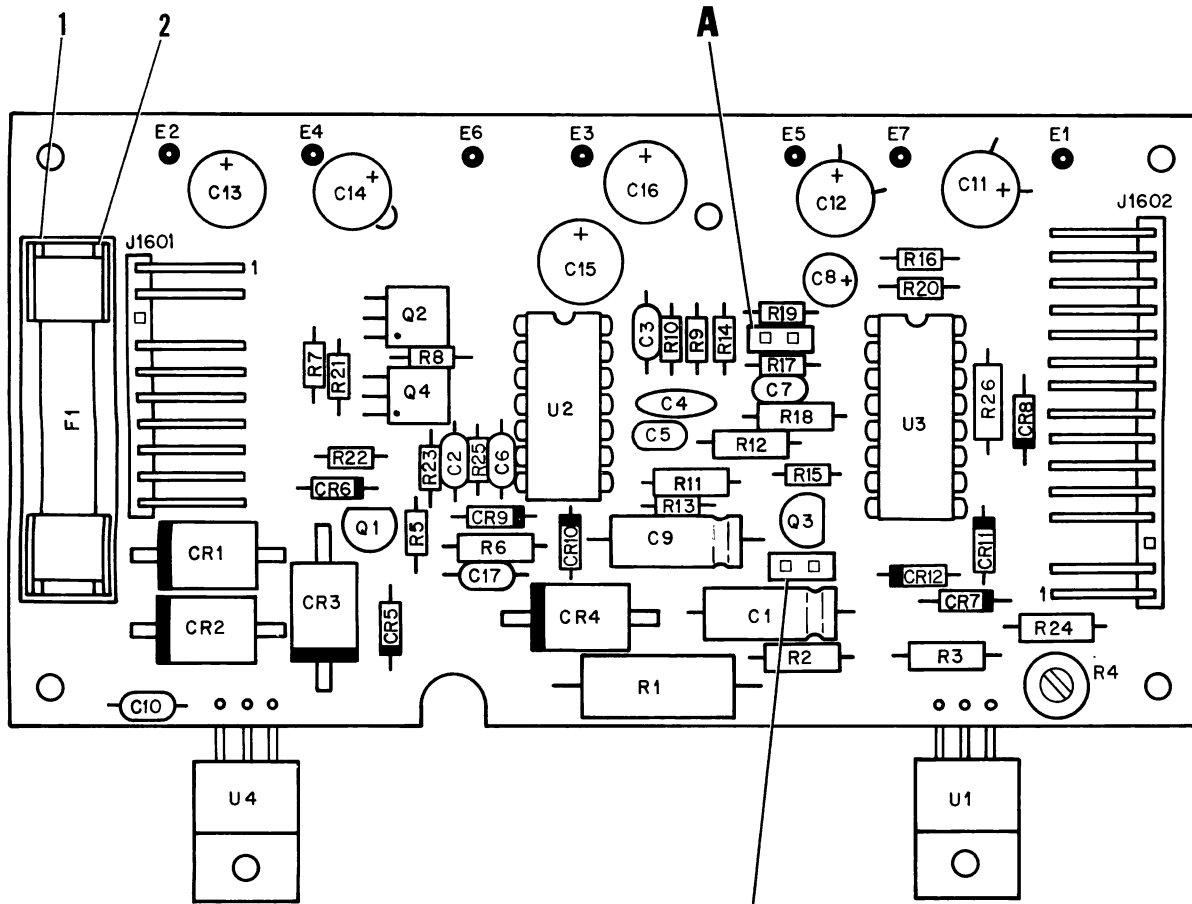


FIGURE 7-56 BATTERY CHARGER PC BOARD ASSEMBLY



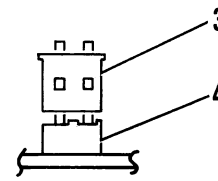
# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY	REF
56-		7010-5131-400		BATTERY CHARGER PC BOARD ASSEMBLY SEE				
				FIG 55 FOR NHA				
	J1601	2115-0000-120		CONNECTOR, WAFER (22-12-2101)	27264		1	
	J1602	2115-1002-115		CONNECTOR, WAFER (22-12-2151)	27264		1	
	C1601	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1	
	C1602	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1	
	C1603	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1	
	C1604	1521-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1	
	C1605	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1	
	C1606	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1	
	C1607	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1	
	C1608	1580-1090-500		CAPACITOR 1 $\mu$ F, 50 V (50TT1MS)	52318		1	
	C1609	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1	
	C1610	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)	72982		1	
	C1611	1508-0157-020		CAPACITOR 150 $\mu$ F, 15 V (T354M157M016AS)	31433		1	
	CR1601	4920-5158-450		DIODE, RECT (80SQ045)	59993		1	
	CR1602	4920-5158-450		DIODE, RECT (80SQ045)	59993		1	
	CR1603	4920-5158-450		DIODE, RECT (80SQ045)	59993		1	
	CR1604	4920-5158-450		DIODE, RECT (80SQ045)	59993		1	
	CR1605	4818-0000-017		DIODE, RECT (MR852)	04713		1	
	CR1606	4818-0000-017		DIODE, RECT (MR852)	04713		1	
	CR1607	4920-5151-300		DIODE, RECT (11DQ03)	59993		1	
	CR1608	4815-0000-002		DIODE, RECT (JAN1N4004)	81349		1	
	F1601	5106-4505-000		FUSE, SLO BLO 5 A, 250 V (313005)	UNK004		1	
		5105-0002-000		COVER, FUSE (840836)	06915		1	
1		5105-0005-000		HOLDER, FUSE (926)	79963		2	
2								
	Q1601	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1	
	Q1602	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1	
	Q1603	4805-0000-001		TRANSISTOR (JAN2N2907A)	81349		1	
	Q1604	4801-0000-001		TRANSISTOR (JAN2N2222)	81349		1	
	R1601	4705-0568-003		RESISTOR 10%, 2 W, .56 OHM (BWH.56OHM2W10%)	21847		1	
	R1602	4706-2370-001		RESISTOR 1%, 1/4 W, 237.00 OHM (RLR07C2370FR)	81349		1	
	R1603	4702-0272-003		RESISTOR 5%, 1/4 W, 2.7 K (RLR07C272JR)	81349		1	
	R1604	4752-0501-002		RESISTOR, VAR 500 OHM (62-1-1-501)	02111		1	
	R1605	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1	
	R1606	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1	
	R1607	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1	
	R1608	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1	
	R1609	4702-0334-003		RESISTOR 5%, 1/4 W, 330 K (RLR07C334JR)	81349		1	
	R1610	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)	81349		1	
	R1611	4702-0279-003		RESISTOR 5%, 1/4 W, 2.7 OHM (RLR07C279JR)	81349		1	
	R6012	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1	
	R6013	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1	
	R6014	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)	81349		1	
	R6015	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1	
	R6016	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)	81349		1	
	R6017	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)	81349		1	
	R6018	4706-2372-001		RESISTOR 1%, 1/4 W, 23.70 K (RLR07C2372FR)	81349		1	
	R6019	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)	81349		1	
	R6020	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)	81349		1	
	R6021	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (RLR05C223JR)	81349		1	
	R6022	4701-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (RLR05C472JR)	81349		1	
	R6023	4701-0683-003		RESISTOR 5%, 1/8 W, 68 K (RLR05C683JR)	81349		1	
	R6024	4702-0471-003		RESISTOR 5%, 1/4 W, 470 OHM (RLR07C471JR)	81349		1	
	U1601	3224-0004-000		IC, REGULATOR 1.5 A, 1.2 - 37 V (LM317T)	27014		1	
	U1602	3214-4013-100		IC, DUAL D FLIP-FLOP (CD4013BE)	02735		1	
	U1603	3214-5036-100		IC, PROGRAMMABLE TIMER (CD4536BE)	02735		1	
	U1604	3224-0078-120		IC, REGULATOR 1.5 A, 12 V ( $\mu$ A7812U7)	12467		1	



JTB1604

DETAIL **A**



JTB1603

DETAIL **B**

FIGURE 7-56A BATTERY CHARGER PC BOARD ASSEMBLY





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

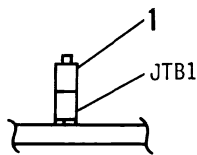
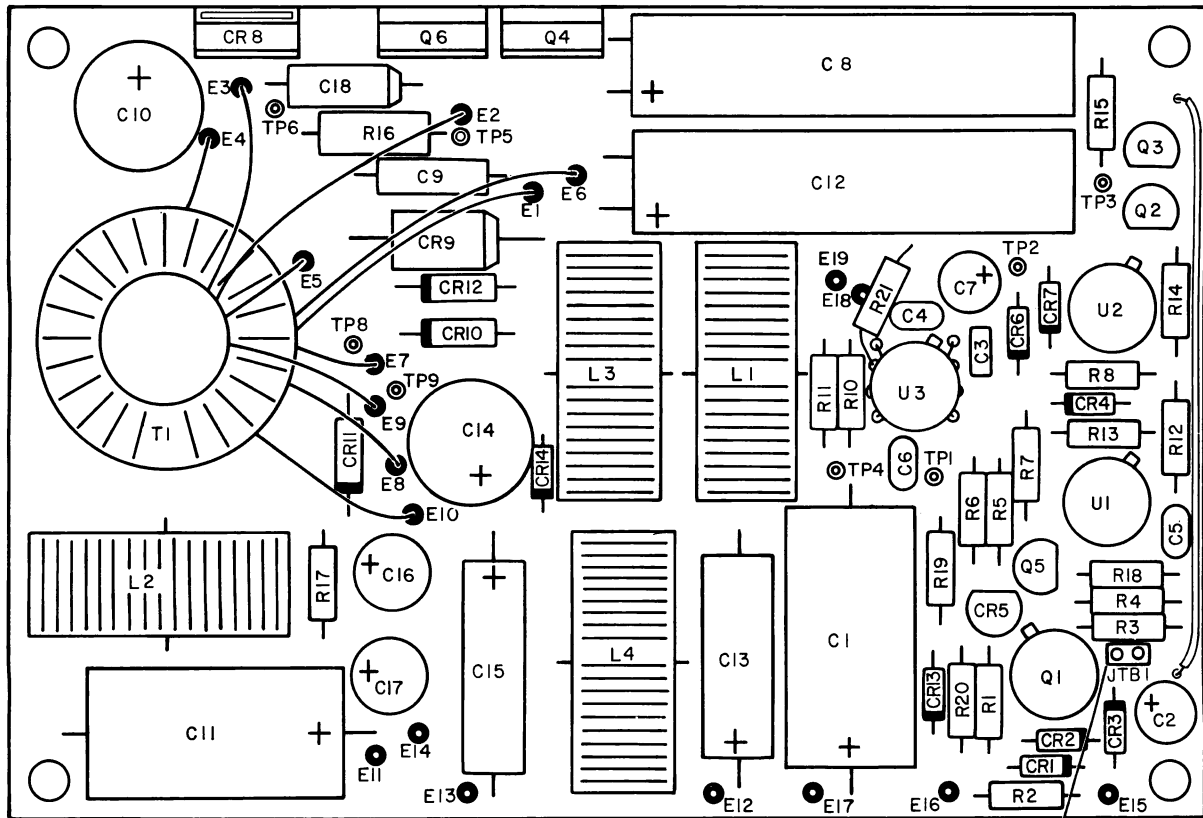
FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
56A-		7010-6133-800		BATTERY CHARGER PC BOARD ASSEMBLY SEE			REF
				FIG 55A FOR NHA			
1		5105-0002-000		COVER, FUSE (840836)	06915		1
	F1601	5106-4505-000		FUSE, SLO BLO 5 A, 250 V (313005)	UNK004		1
2		5105-0005-000		HOLDER, FUSE (926)	79963		2
3		2132-0004-000		BLOCK, JUMPER (SHC1002-001010BOT)	75037		2
4		2115-1001-006		CONNECTOR, WAFER (22-03-2061)	27264		1
	J1601	2115-0000-120		CONNECTOR, WAFER (22-12-2101)	27264		1
	J1602	2115-1002-115		CONNECTOR, WAFER (22-12-2151)	27264		1
	C1601	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C1602	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C1603	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C1604	1501-0102-001		CAPACITOR 1000 pF, 600 V (CE102)	71950		1
	C1605	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1
	C1606	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C1607	1506-0102-017		CAPACITOR 1000 pF, 100 V (C320C102J2G5CA)	61637		1
	C1608	1580-1092-450		CAPACITOR 1 $\mu$ F, 50 V (50TW1L)	52318		1
	C1609	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)	52318		1
	C1610	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (CAC03Z5U104M50A)	16299		1
	C1611	1508-0157-020		CAPACITOR 150 $\mu$ F, 15 V (T354M157M016AS)	31433		1
	C1612	1508-0157-020		CAPACITOR 150 $\mu$ F, 15 V (T354M157M016AS)	31433		1
	C1613	1508-0157-020		CAPACITOR 150 $\mu$ F, 15 V (T354M157M016AS)	31433		1
	C1614	1508-0157-020		CAPACITOR 150 $\mu$ F, 15 V (T354M157M016AS)	31433		1
	C1615	1508-0476-018		CAPACITOR 47 $\mu$ F, 35 V (T354M476M035AS)	31433		1
	C1616	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)	52318		1
	CR1601	4920-5158-450		DIODE, RECT (80SQ045)	59993		1
	CR1602	4920-5158-450		DIODE, RECT (80SQ045)	59993		1
	CR1603	4920-5158-450		DIODE, RECT (80SQ045)	59993		1
	CR1604	4920-5158-450		DIODE, RECT (80SQ045)	59993		1
	CR1605	4815-0000-004		DIODE, RECT (1N5059)	03508		1
	CR1606	4815-0000-004		DIODE, RECT (1N5059)	03508		1
	CR1607	4815-0000-002		DIODE, RECT (1N4004)	04713		1
	CR1608	4815-0000-002		DIODE, RECT (1N4004)	04713		1
	CR1609	4816-0000-001		DIODE, S-BAR (5082-2800)	54893		1
	CR1610	4816-0000-001		DIODE, S-BAR (5082-2800)	54893		1
	CR1611	4901-0000-001		DIODE, ZENER 11 V (1N5241B)	04713		1
	CR1612	4816-0000-001		DIODE, S-BAR (5082-2800)	54893		1
	Q1601	4805-0000-001		TRANSISTOR (PN2907A)	12467		1
	Q1602	4801-0000-001		TRANSISTOR (PN2222)	12467		1
	Q1603	4805-0000-001		TRANSISTOR (PN2907A)	12467		1
	Q1604	4801-0000-001		TRANSISTOR (PN2222)	12467		1
	R1601	4705-0568-003		RESISTOR 10%, 2 W, .56 $\Omega$ (BWH.56 OHM 2W 10%)	13556		1
	R1602	4706-2370-001		RESISTOR 1%, 1/4 W, 237.00 $\Omega$ (MF55E 237.0 F)	59124		1
	R1603	4702-0222-003		RESISTOR 5%, 1/4 W, 2.2 K (CF1/4 2.2K 5%)	59124		1
	R1604	4752-0501-002		RESISTOR, VAR 500 $\Omega$ (62-1-1-501)	02111		1
	R1605	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R1606	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R1607	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1
	R1608	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1
	R1609	4701-0334-003		RESISTOR 5%, 1/8 W, 330 K (CF1/8 330K 5%)	59124		1
	R1610	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1
	R1611	4702-0279-003		RESISTOR 5%, 1/4 W, 2.7 $\Omega$ (CF1/4 2.7 5%)	59124		1
	R1612	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (CF1/4 22K 5%)	59124		1
	R1613	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R1614	4701-0104-003		RESISTOR 5%, 1/8 W, 100 K (CF1/8 100K 5%)	59124		1
	R1615	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1
	R1616	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1
	R1617	4701-0104-003		RESISTOR 5%, 1/8 W, 100 K (CF1/8 100K 5%)	59124		1
	R1618	4706-2372-001		RESISTOR 1%, 1/4 W, 23.70 K (MF55E 23.7K F)	59124		1
	R1619	4701-0104-003		RESISTOR 5%, 1/8 W, 100 K (CF1/8 100K 5%)	59124		1
	R1620	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1
	R1621	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1

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# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7							DESCRIPTION	FSCM	EFF QTY
56A-	R1622	4701-0472-003								RESISTOR 5%, 1/8 W, 4.7 K (CF1/8 4.7K 5%)	59124	1
	R1623	4701-0683-003								RESISTOR 5%, 1/8 W, 68 K (CF1/8 68K 5%)	59124	1
	R1624	4702-0471-003								RESISTOR 5%, 1/4 W, 470 Ω (CF1/4 470 5%)	59124	1
	R1625	4701-0105-003								RESISTOR 5%, 1/8 W, 1 M (CF1/8 1.0 5%)	59124	1
	R1626	4702-0123-003								RESISTOR 5%, 1/4 W, 12 K (CF1/4 12K 5%)	59124	1
	U1601	3224-0004-000								IC, REGULATOR (LM317T)	27014	1
	U1602	3214-4013-100								IC, DUAL D FLIP-FLOP (CD4013BE)	02735	1
	U1603	3214-5036-100								IC, PROGRAMMABLE TIMER (CD4536BE)	02735	1
	U1604	3224-0078-120								IC, REGULATOR (UA7812UC)	12467	1



DETAIL A

FIGURE 7-57 INVERTER SUPPLY PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

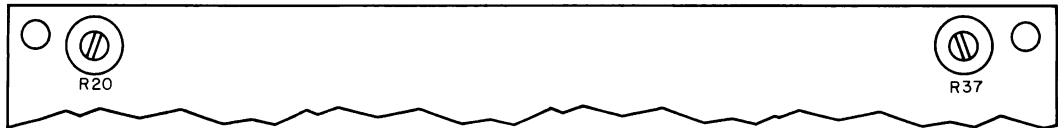
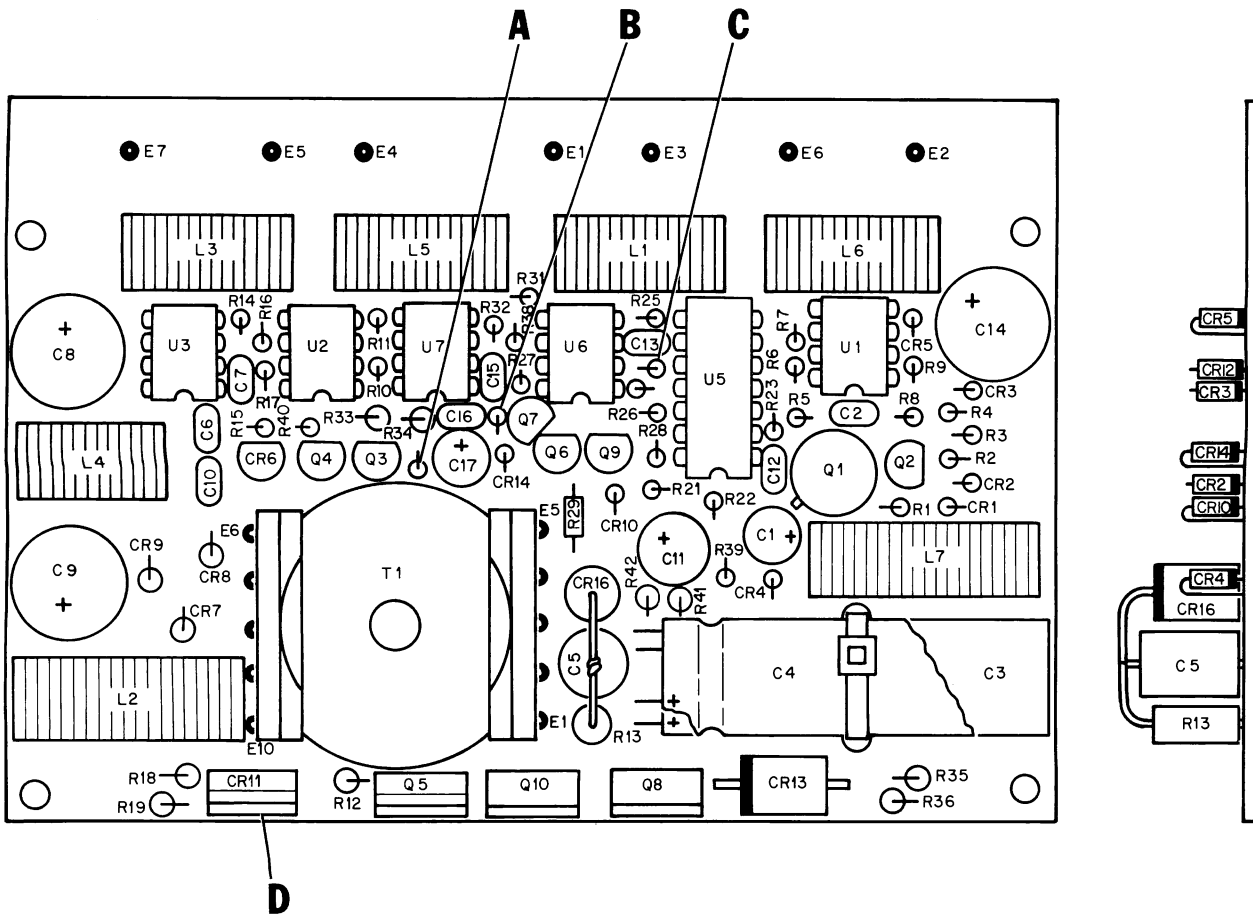
FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY	REF
57-		7010-5131-300		INVERTER SUPPLY PC BOARD ASSEMBLY SEE FIG 55 FOR NHA				
1	JTB1	2115-1001-003		CONNECTOR, WAFER (22-03-2031)			27264	1
		2132-0004-000		BLOCK, JUMPER (MSC-230-B-1-G)			55322	1
	C1501	1580-4710-356		CAPACITOR 470 $\mu$ F, 35 V (35TT470MS)			52318	1
	C1502	1580-4702-105		CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)			62462	1
	C1503	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)			61637	1
	C1504	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)			61637	1
	C1505	1506-0272-017		CAPACITOR 2700 pF, 100 V (C320C272J2G5CA)			61637	1
	C1506	1506-0392-017		CAPACITOR 3900 pF, 100 V (C320C392J2G5CA)			61637	1
	C1507	1580-4702-105		CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)			62462	1
	C1508	1580-3310-360		CAPACITOR 330 $\mu$ F, 35 V (35R1X330)			52318	1
	C1509	1502-0103-010		CAPACITOR .01 $\mu$ F, 50 V (PC12.01-50-2)			27735	1
	C1510	1500-3312-215		CAPACITOR 330 $\mu$ F, 16 V (16R1X330)			52318	1
	C1511	1580-1020-158		CAPACITOR 1000 $\mu$ F, 16 V (16TT1000MS)			52318	1
	C1512	1580-1022-155		CAPACITOR 1000 $\mu$ F, 10 V (10R1X1000)			52318	1
	C1513	1580-1020-049		CAPACITOR 1000 $\mu$ F, 6 V (6R3TT1000MS)			52318	1
	C1514	1580-3312-215		CAPACITOR 330 $\mu$ F, 16 V (16R1X330)			52318	1
	C1515	1580-3310-150		CAPACITOR 330 $\mu$ F, 16 V (16TT330MS)			52318	1
	C1516	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)			52318	1
	C1517	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)			52318	1
	C1518	1507-0335-018		CAPACITOR 3.3 $\mu$ F, 35 V (T322C335M035AS)			31433	1
	CR1501	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	CR1502	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	CR1503	4818-0000-001		DIODE, ZENER 10 V (JAN1N5240B)			81349	1
	CR1504	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	CR1505	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)			27014	1
	CR1506	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	CR1507	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	CR1508	4822-6008-100		DIODE, RECT (UES1402)			12969	1
	CR1509	4920-5158-450		DIODE, RECT (80SQ045)			59993	1
	CR1510	4818-0000-017		DIODE, RECT (MR852)			04713	1
	CR1511	4818-0000-017		DIODE, RECT (MR852)			04713	1
	CR1512	4818-0000-017		DIODE, RECT (MR852)			04713	1
	CR1513	4816-0000-001		DIODE, S-BAR (5082-2800)			54893	1
	CR1514	4815-0000-003		DIODE, SIGNAL (JAN1N4148)			81349	1
	L1501	1800-5051-400		INDUCTOR 30 TURN, 18 GA (6700057)			33497	1
	L1502	1800-5051-400		INDUCTOR 30 TURN, 18 GA (6700057)			33497	1
	L1503	1800-5051-400		INDUCTOR 30 TURN, 18 GA (6700057)			33497	1
	L1504	1800-5051-400		INDUCTOR 30 TURN, 18 GA (6700057)			33497	1
	Q1501	4801-0000-004		TRANSISTOR (JAN2N2905)			81349	1
	Q1502	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1503	4805-0000-001		TRANSISTOR (JAN2N2907A)			81349	1
	Q1504	5050-2454-100		TRANSISTOR (IRF541)			59993	1
	Q1505	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1506	5050-2454-100		TRANSISTOR (IRF541)			59993	1
	R1501	4702-0270-003		RESISTOR 5%, 1/4 W, 27 OHM (RLR07C270JR)			81349	1
	R1502	4702-0473-003		RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)			81349	1
	R1503	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)			81349	1
	R1504	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)			81349	1
	R1505	4702-0222-003		RESISTOR 5%, 1/4 W, 2.2 K (RLR07C222JR)			81349	1
	R1506	4702-0332-003		RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)			81349	1
	R1507	4702-0333-003		RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)			81349	1
	R1508	4702-0153-003		RESISTOR 5%, 1/4 W, 15 K (RLR07C153JR)			81349	1
	R1510	4706-5761-001		RESISTOR 1%, 1/4 W, 5.76 K (RLR07C5761FR)			81349	1
	R1511	4706-8251-001		RESISTOR 1%, 1/4 W, 8.25 K (RLR07C8251FR)			81349	1
	R1512	4702-0822-003		RESISTOR 5%, 1/4 W, 8.2 K (RLR07C822JR)			81349	1
	R1513	4702-0153-003		RESISTOR 5%, 1/4 W, 15 K (RLR07C153JR)			81349	1
	R1514	4702-0823-003		RESISTOR 5%, 1/4 W, 82 K (RLR07C823JR)			81349	1
	R1515	4702-0270-003		RESISTOR 5%, 1/4 W, 27 OHM (RLR07C270JR)			81349	1
	R1516	4703-0279-003		RESISTOR 5%, 1/2 W, 2.7 OHM (RLR20C279JR)			81349	1
	R1517	4702-0221-003		RESISTOR 5%, 1/4 W, 220 OHM (RLR07C221JR)			81349	1
	R1518	4702-0333-003		RESISTOR 5%, 1/4 W, 33 K (RLR07C333JR)			81349	1

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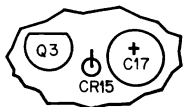


# ILLUSTRATED PARTS CATALOG

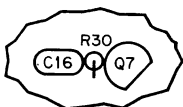
FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
57-	R1519	4702-0102-003	RESISTOR	5%	1/4 W,	1 K	(RLR07C102JR)				81349		1
	R1520	4702-0104-003	RESISTOR	5%	1/4 W,	100 K	(RLR07C104JR)				81349		1
	R1521	4702-0123-003	RESISTOR	5%	1/4 W,	12 K	(RLR07C123JR)				81349		1
	T1501	5604-5153-700	TRANSFORMER	(6700044)							33497		1
	TP1501	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1502	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1503	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1504	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1505	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1506	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1508	2114-0000-007	POST, GANG	(85931-6)							00779		1
	TP1509	2114-0000-007	POST, GANG	(85931-6)							00779		1
	U1501	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1502	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1503	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
		SEE FIG 1	WIRE, 7S	22 GA									A/R
		SEE FIG 1	WIRE, 7S	26 GA									A/R
		SEE FIG 1	TUBING, TFL	26 GA, NAT									A/R



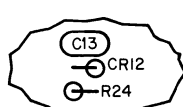
BOTTOM



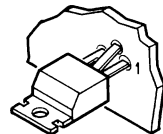
DETAIL A



DETAIL B



DETAIL C



DETAIL D

FIGURE 7-57A INVERTER SUPPLY PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY	REF
57A-		7010-6133-900		INVERTER SUPPLY PC BOARD ASSEMBLY SEE FIG 55A FOR NHA				
	C1501	1580-4702-105		CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)	62462		1	1
	C1502	1506-0272-017		CAPACITOR 2700 pF, 100 V (C320C272J2G5CA)	61637		1	1
	C1503	1580-3310-360		CAPACITOR 330 $\mu$ F, 35 V (35R1X330)	52318		1	1
	C1504	1580-3310-360		CAPACITOR 330 $\mu$ F, 35 V (35R1X330)	52318		1	1
	C1505	1502-0334-012		CAPACITOR .33 $\mu$ F, 50 V (MPC13.33-50-5)	27735		1	1
	C1506	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1	1
	C1507	1506-0103-017		CAPACITOR .01 $\mu$ F, 100 V (C052K103K1X5CA)	61637		1	1
	C1508	1580-3310-025		CAPACITOR 330 $\mu$ F, 25 V (UPA1E33IMPH)	55680		1	1
	C1509	1580-3310-025		CAPACITOR 330 $\mu$ F, 25 V (UPA1E33IMPH)	55680		1	1
	C1510	1506-0182-017		CAPACITOR 1800 pF, 100 V (C320C182J2G5CA)	61637		1	1
	C1511	1580-1002-460		CAPACITOR 10 $\mu$ F, 50 V (50TW10L)	52318		1	1
	C1512	1506-0221-017		CAPACITOR 220 pF, 200 V (C320C221J2G5CA)	61637		1	1
	C1513	1506-0152-017		CAPACITOR 1500 pF, 100 V (C320C152J2G5CA)	61637		1	1
	C1514	1580-3310-025		CAPACITOR 330 $\mu$ F, 25 V (UPA1E33IMPH)	55680		1	1
	C1515	1625-2230-100		CAPACITOR .022 $\mu$ F, 25 V (C340C223J2G5CA)	61637		1	1
	C1516	1506-0680-017		CAPACITOR 68 pF, 200 V (C320C680J2G5CA)	61637		1	1
	C1517	1580-4702-105		CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)	62462		1	1
	CR1501	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1502	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1503	4816-0000-001		DIODE, S-BAR (5082-2800)	54893		1	1
	CR1504	4818-0000-001		DIODE, ZENER 10 V (1N5240B)	71468		1	1
	CR1505	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1506	4818-0000-015		DIODE, ZENER 6.9 V (LM329CZ)	27014		1	1
	CR1507	4818-0000-017		DIODE, RECT (RGP20D)	14936		1	1
	CR1508	4818-0000-017		DIODE, RECT (RGP20D)	14936		1	1
	CR1509	4818-0000-017		DIODE, RECT (RGP20D)	14936		1	1
	CR1510	4818-0000-017		DIODE, RECT (RGP20D)	14936		1	1
	CR1511	4822-6010-150		DIODE, RECT 150 V, 16 A (UES2403)	12969		1	1
	CR1512	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1513	4920-5158-450		DIODE, RECT (80SQ045)	59993		1	1
	CR1514	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1515	4815-0000-003		DIODE, SIGNAL (1N4148)	71468		1	1
	CR1516	4920-5158-300		DIODE, RECT (IR80SQ030)	59993		1	1
	L1501	1800-5354-900		INDUCTOR 30 TURN, #20 MAGNET			1	1
	L1502	1800-5354-800		INDUCTOR 40 TURN, #18 MAGNET			1	1
	L1503	1800-5354-900		INDUCTOR 30 TURN, #20 MAGNET			1	1
	L1504	1800-5355-000		INDUCTOR 100 TURN, #24 MAGNET			1	1
	L1505	1800-5354-900		INDUCTOR 30 TURN, #20 MAGNET			1	1
	L1506	1800-5354-900		INDUCTOR 30 TURN, #20 MAGNET			1	1
	L1507	1800-5061-400		INDUCTOR 30 TURN, 18 GA			1	1
	Q1501	4801-0000-004		TRANSISTOR (2N2905)	04713		1	1
	Q1502	4801-0000-001		TRANSISTOR (PN2222)	12467		1	1
	Q1503	4801-0000-001		TRANSISTOR (PN2222)	12467		1	1
	Q1504	4805-0000-001		TRANSISTOR (PN2907A)	12467		1	1
	Q1505	5050-2454-100		TRANSISTOR (IRF541)	59993		1	1
	Q1506	4801-0000-001		TRANSISTOR (PN2222)	12467		1	1
	Q1507	4805-0000-001		TRANSISTOR (PN2907A)	12467		1	1
	Q1508	5050-2952-100		TRANSISTOR (IRF9521)	59993		1	1
	Q1509	4807-0000-001		TRANSISTOR (2N3903-18)	27014		1	1
	Q1510	5050-2952-100		TRANSISTOR (IRF9521)	59993		1	1
	R1501	4702-0270-003		RESISTOR 5%, 1/4 W, 27 $\Omega$ (CF1/4 27 5%)	59124		1	1
	R1502	4701-0472-003		RESISTOR 5%, 1/8 W, 4.7 K (CF1/8 4.7K 5%)	59124		1	1
	R1503	4701-0104-003		RESISTOR 5%, 1/8 W, 100 K (CF1/8 100K 5%)	59124		1	1
	R1504	4701-0102-003		RESISTOR 5%, 1/8 W, 1 K (CF1/8 1.0K 5%)	59124		1	1
	R1505	4701-0223-003		RESISTOR 5%, 1/8 W, 22 K (CF1/8 22K 5%)	59124		1	1
	R1506	4701-0103-003		RESISTOR 5%, 1/8 W, 10 K (CF1/8 10K 5%)	59124		1	1
	R1507	4701-0333-003		RESISTOR 5%, 1/8 W, 33 K (CF1/8 33K 5%)	59124		1	1
	R1508	4701-0153-003		RESISTOR 5%, 1/8 W, 15 K (CF1/8 15K 5%)	59124		1	1
	R1509	4701-0822-003		RESISTOR 5%, 1/8 W, 8.2 K (CF1/8 8.2K 5%)	59124		1	1
	R1510	4701-0823-003		RESISTOR 5%, 1/8 W, 82 K (CF1/8 82K 5%)	59124		1	1

CONTINUED ON NEXT PAGE



# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
57A-	R1511	4701-0153-003	RESISTOR	5%	1/8 W,	15 K	(CF1/8	15K	5%)		59124		1
	R1512	4702-0270-003	RESISTOR	5%	1/4 W,	27 Ω	(CF1/4	27	5%)		59124		1
	R1513	4703-0821-003	RESISTOR	5%	1/2 W,	820 Ω	(EB8215)				01121		1
	R1514	4701-0333-003	RESISTOR	5%	1/8 W,	33 K	(CF1/8	33K	5%)		59124		1
	R1515	4701-0103-003	RESISTOR	5%	1/8 W,	10 K	(CF1/8	10K	5%)		59124		1
	R1516	4701-0471-003	RESISTOR	5%	1/8 W,	470 Ω	(CF1/8	470	5%)		59124		1
	R1517	4701-0332-003	RESISTOR	5%	1/8 W,	3.3 K	(CF1/8	3.3K	5%)		59124		1
	R1518	4706-8451-001	RESISTOR	1%	1/4 W,	8.45 K	(MF55E	8.45K	F)		59124		1
	R1519	4706-5761-001	RESISTOR	1%	1/4 W,	5.76 K	(MF55E	5.76K	F)		59124		1
	R1520	4752-0202-002	RESISTOR, VAR			2 K	(62-1-1-202)				02111		1
	R1521	4701-0221-003	RESISTOR	5%	1/8 W,	220 Ω	(CF1/8	220	5%)		59124		1
	R1522	4701-0221-003	RESISTOR	5%	1/8 W,	220 Ω	(CF1/8	220	5%)		59124		1
	R1523	4701-0223-003	RESISTOR	5%	1/8 W,	22 K	(CF1/8	22K	5%)		59124		1
	R1524	4701-0153-003	RESISTOR	5%	1/8 W,	15 K	(CF1/8	15K	5%)		59124		1
	R1525	4701-0332-003	RESISTOR	5%	1/8 W,	3.3 K	(CF1/8	3.3K	5%)		59124		1
	R1526	4701-0823-003	RESISTOR	5%	1/8 W,	82 K	(CF1/8	82K	5%)		59124		1
	R1527	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)		59124		1
	R1528	4701-0470-003	RESISTOR	5%	1/8 W,	47 Ω	(CF1/8	47	5%)		59124		1
	R1529	4701-0102-003	RESISTOR	5%	1/8 W,	1 K	(CF1/8	1.0K	5%)		59124		1
	R1530	4701-0101-003	RESISTOR	5%	1/8 W,	100 Ω	(CF1/8	100	5%)		59124		1
	R1531	4701-0153-003	RESISTOR	5%	1/8 W,	15 K	(CF1/8	15K	5%)		59124		1
	R1532	4701-0223-003	RESISTOR	5%	1/8 W,	22 K	(CF1/8	22K	5%)		59124		1
	R1533	4706-4991-001	RESISTOR	1%	1/4 W,	4.99 K	(MF55E	4.99K	F)		59124		1
	R1534	4706-9091-001	RESISTOR	1%	1/4 W,	9.09 K	(MF55E	9.09K	F)		59124		1
	R1535	4706-1001-001	RESISTOR	1%	1/4 W,	1.00 K	(MF55E	1.00K	F)		59124		1
	R1536	4706-4751-001	RESISTOR	1%	1/4 W,	4.75 K	(MF55E	4.75K	F)		59124		1
	R1537	4752-0103-002	RESISTOR, VAR			10 K	(62-1-1-103)				02111		1
	R1538	4701-0562-003	RESISTOR	5%	1/8 W,	5.6 K	(CF1/8	5.6K	5%)		59124		1
	R1539	4701-0223-003	RESISTOR	5%	1/8 W,	22 K	(CF1/8	22K	5%)		59124		1
	R1540	4701-0563-003	RESISTOR	5%	1/8 W,	56 K	(CF1/8	56K	5%)		59124		1
	R1541	4702-0270-003	RESISTOR	5%	1/4 W,	27 Ω	(CF1/4	27	5%)		59124		1
	R1542	4702-0270-003	RESISTOR	5%	1/4 W,	27 Ω	(CF1/4	27	5%)		59124		1
	T1501	5604-5355-101	TRANSFORMER										1
	U1501	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1502	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1503	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1505	3133-0000-016	IC, ASTABLE MULTIVIBRATOR	(CD4047BE)							02735		1
	U1506	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
	U1507	3133-0000-024	IC, BIMOS OP AMP	(CA3130E)							02735		1
		SEE FIG 1	TY-RAP	5.5									A/R





# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
58-		7005-5540-200		FRONT PANEL ASSEMBLY		B	REF
58-		7005-6140-200		FRONT PANEL ASSEMBLY		A	REF
1		SEE FIG 61		FUNCTION SWITCH PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
	S3503/ R3504	4750-7618-000		RESISTOR, VAR 10 K (381NS-10K-S) INCL	12697		1
				MTG HARDWARE			
2		2840-0003-001		WASHER, FLAT (.3630D)	UNK015		11
3		2800-3065-300		SPACER			5
4		2850-0000-081		NUT (7807)	09353		2
5		2402-0921-900		KNOB			5
6		2402-0005-603		KNOB			4
7		2803-0125-001		SCREW (4-40 X 1/8 SHS)	UNK015		18
				---*---			
8		SEE FIG 60		DISPLAY PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
9		2803-0500-006		SCREW (4-40 X 1/2 PPHM)	UNK015		4
10		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		3
11		2850-0000-014		LUG GND (1411-4)	83330		1
				---*---			
12		SEE FIG 59		KEYBOARD PC BOARD ASSEMBLY			1
				ATTACHING PARTS			
13		2801-0188-006		SCREW (2-56 X 3/16 PPHM)	UNK015		4
				---*---			
14		2402-5053-001		PUSHBUTTON			24
15		3900-5161-000		LENS, DISPLAY			1
	J3503/ J3512	2200-0410-100		CONNECTOR, BULKHEAD (5526-2501-001) INCL	19505		1
				MTG HARDWARE			
				ATTACHING PARTS			
16		1400-5150-501		BRACKET			1
				---*---			
	J3506	2113-0000-018		CONNECTOR, BNC (UG1094A/U) INCL MTG HARDWARE	98668		1
		2840-0000-042		WASHER, BNC (.430 D, .375 ID, .020 TH)	UNK015		1
17		2850-1180-100		LUG, GND 3/8 (814-3/8)	79963		1
	J3507	2113-0000-018		CONNECTOR, BNC (UG1094A/U) INCL MTG HARDWARE	98668		1
		2840-0000-042		WASHER, BNC (.430 D, .375 ID, .020 TH)	UNK015		1
	L3502	1801-0022-001		INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
	J3508	2113-0000-018		CONNECTOR, BNC (UG1094A/U) INCL MTG HARDWARE	98668		1
		2840-0000-042		WASHER, BNC (.430 D, .375 ID, .020 TH)	UNK015		1
	L3503	1801-0022-001		INDUCTOR 22 μH, 3.3 OHM (1025-52)	99800		1
18		1400-5181-000		BRACKET			1
	J3504/ J3513	2200-0410-100		CONNECTOR, BULKHEAD (5526-2501-001) INCL	19505		1
				MTG HARDWARE			
19		1400-5064-400		BRACKET			1
	R3501	4750-7616-800		RESISTOR, VAR 10 K (RV6NAYS103A) INCL	12697		1
				MTG HARDWARE			
				ATTACHING PARTS			
20		2850-0000-046		NUT 1/4 - 32 (019-971-03)	12697		1
				---*---			
21		2402-5251-600		KNOB			1
				ATTACHING PARTS			
22		2803-0125-001		SCREW (4-40 X 1/8 SHS)	UNK015		2
				---*---			
23		2401-5252-601		DIAL, ATTENUATOR			1
				ATTACHING PARTS			
24		2801-0125-006		SCREW (2-56 X 1/8 PPHM)	UNK015		2
				---*---			
25		2401-5252-401		DIAL, INNER			1
				ATTACHING PARTS			
26		2801-0125-003		SCREW (2-56 X 1/8 PPHM)	UNK015		2
				---*---			

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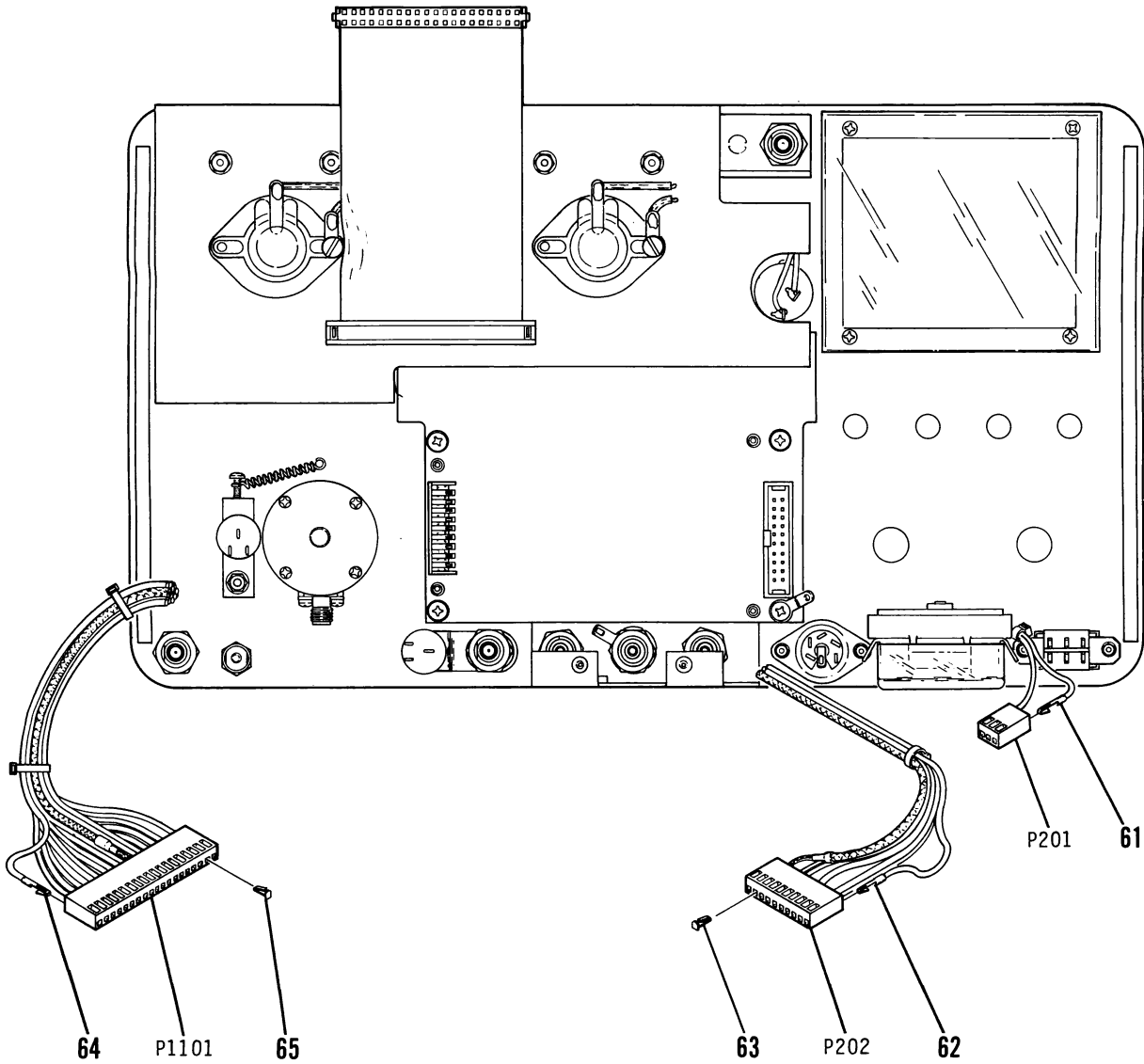


FIGURE 7-58 FRONT PANEL ASSEMBLY (SHEET 1 OF 2)





# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
58- 27		2402-5252-201		KNOB, FINE ADJ ATTACHING PARTS			1
28		2801-0188-006		SCREW (2-56 X 3/16 PPHM) ----*----	UNK015		2
29		2510-5252-500		HUB, DIAL ATTACHING PARTS			1
30		2803-0125-001		SCREW (4-40 X 1/8 SHS) ----*----	UNK015		2
31		2521-9615-001		GEAR, SPUR			1
32		2840-2625-100		WASHER, TFL (1.25 OD)	UNK015		1
	AT3501	2901-7333-000		ATTENUATOR, VAR 0-100 dB (8120S-129) ATTACHING PARTS	04423		1
33		2804-0250-003		SCREW (6-32 X 1/4 PFHM) ----*----	UNK015		4
34		2106-8141-060		SPRING (.014 MW .125 OD .63 L) ATTACHING PARTS	25146		1
35		2803-0500-006		SCREW (4-40 x 1/2 PPHM) ----*----	UNK015		1
36		1400-5252-100		BRACKET ATTACHING PARTS			1
37		2850-0000-008		NUT (4-40)	UNK015		1
38		2840-0000-003		WASHER, LOCK (#4 INT TOOTH LOCKWASH)	UNK015		1
39		2840-0000-008		WASHER, FLAT (AN960-C4)	81349		1
40		2800-7600-116		SPACER ----*----			1
	R3502	4751-0103-007		RESISTOR, VAR 10 K			1
41		2521-9602-500		GEAR, SPUR (P96A7-25) INCL MTG HARDWARE	UNK023		1
	S3501	5114-0000-007		SWITCH, ROCKER (7207J1-03) INCL MTG HARDWARE ATTACHING PARTS	09353		1
42		2850-0000-012		NUT 2-56 (NAS671-C2)	81349		2
43		2840-0000-004		WASHER, LOCK (#2 INT TOOTH LOCKWASH) ----*----	UNK015		2
	S3502	5114-0000-002		SWITCH, TOGGLE (7103SYZQ) INCL MTG HARDWARE ATTACHING PARTS	09353		1
44		2850-0000-081		NUT 1/4 - 40 (7807)	09353		1
45		2840-0003-001		WASHER, FLAT (.363 OD) ----*----	UNK015		1
	J3501	2113-0000-018		CONNECTOR, BNC (UG1094A/U) INCL MTG HARDWARE	98668		1
		2840-0000-042		WASHER, BNC (.43 OD, 3.75 ID, .020 TH)	UNK015		1
	C3501	1503-0104-009		CAPACITOR .1 $\mu$ F, 200 V (PE11.1-200-5)	27735		1
46		2850-1180-100		LUG, GND 3/8 (814 - 3/8)	79963		1
	R3503	4702-0106-003		RESISTOR 5%, 1/4 W, 10 M (RLR07C106JR)	81349		1
47		1400-5184-900		BRACKET			1
48		5106-0000-012		HOLDER, FUSE (357001) ATTACHING PARTS	UNK004		1
49		2804-0313-006		SCREW (6-32 X 5/16 PPHM)	UNK015		1
50		2840-0000-001		WASHER, LOCK (#6 INT TOOTH LOCKWASH) ----*----	UNK015		1
	F3501	5106-0000-015		FUSE, FAST BLO 1.25 A, 250 V (312.125)	UNK004		1
51		5105-0002-000		COVER, FUSE (840836)	06915		1
	J3502	2217-9910-100		CONNECTOR, MICROPHONE (2105-0000-023) ATTACHING PARTS	06518		1
52		2850-0000-012		NUT 2-56 (NAS671-C2)	81349		2
53		2840-0000-004		WASHER, LOCK (#2 INT TOOTH LOCKWASH) ----*----	UNK015		2
	J3505/ J3514	2200-0410-100		CONNECTOR, BULKHEAD (5526-2501-001) INCL MTG HARDWARE	19505		1
	J3509	2160-9016-602		CONNECTOR, BANANA JACK RED (1499-102)	83330		1

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# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
58- 54		2406-5050-000								BEZEL, SCOPE			1
										ATTACHING PARTS			
		3900-5550-101								FILTER LENS, SCOPE		B	1
		3900-5053-901								FILTER LENS, SCOPE		A	1
		2801-0250-003								SCREW (2-56 X 1/4 PFHM)	UNK015		4
										-----*			
		2403-5550-000								LABEL, FRONT PANEL		B	1
		2403-6150-000								LABEL, FRONT PANEL		A	1
		2100-5150-400								BRACKET, FRONT PANEL MTG			1
										ATTACHING PARTS			
		2803-0250-003								SCREW (4-40 x 1/4 PFHM)	UNK015		4
										-----*			
		1405-5181-100								FRONT PANEL MINOR ASSY			1
	P201	2115-0001-003								CONNECTOR, WAFER (22-01-2031)	27264		1
		2114-0000-022								CONTACT, CONN 22-30 GA (08-55-0101)	27264		2
	P202	2115-0000-013								CONNECTOR, WAFER (22-01-2101)	27264		1
		2114-0000-022								CONTACT, CONN 22-30 GA (08-55-0101)	27264		8
		2127-9900-100								KEY, POLARIZING CONN (15-04-9209)	27264		1
	P1101	2115-0000-022								CONNECTOR, WAFER (22-01-2191)	27264		1
		2114-0000-022								CONTACT, CONN 22-30 GA (08-55-0101)	27264		18
		2127-9900-100								KEY, POLARIZING CONN (15-04-9209)	27264		1
		SEE FIG 1								CABLE, COAX FLEX			A/R
		SEE FIG 1								WIRE, 7S 22 GA			A/R
		SEE FIG 1								WIRE, 7S 26 GA			A/R
		SEE FIG 1								TUBING, HS 1/8, CLR			A/R
		SEE FIG 1								TAPE, FOAM 1/4"			A/R

A---FM/AM-1200S  
B---FM/AM-1200A

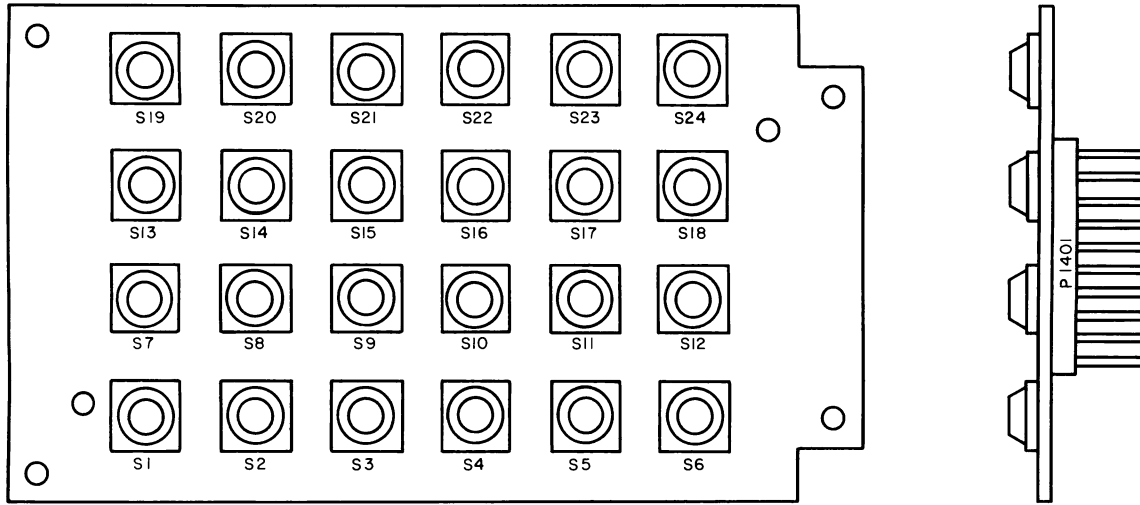


FIGURE 7-59 KEYBOARD PC BOARD ASSEMBLY

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
59-		7010-5131-100	KEYBOARD PC BOARD ASSEMBLY							SEE FIG 58 FOR NHA					REF
	P1401	2115-0000-016	CONNECTOR, WAFER (22-03-2101)								27264			1	
	S1301	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1302	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1303	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1304	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1305	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1306	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1307	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1308	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1309	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1310	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1311	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1312	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1313	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1314	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1315	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1316	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1317	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1318	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1319	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1320	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1321	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1322	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1323	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	
	S1324	5136-0001-000	SWITCH, MEMBRANE (BM-G)								UNK022			1	

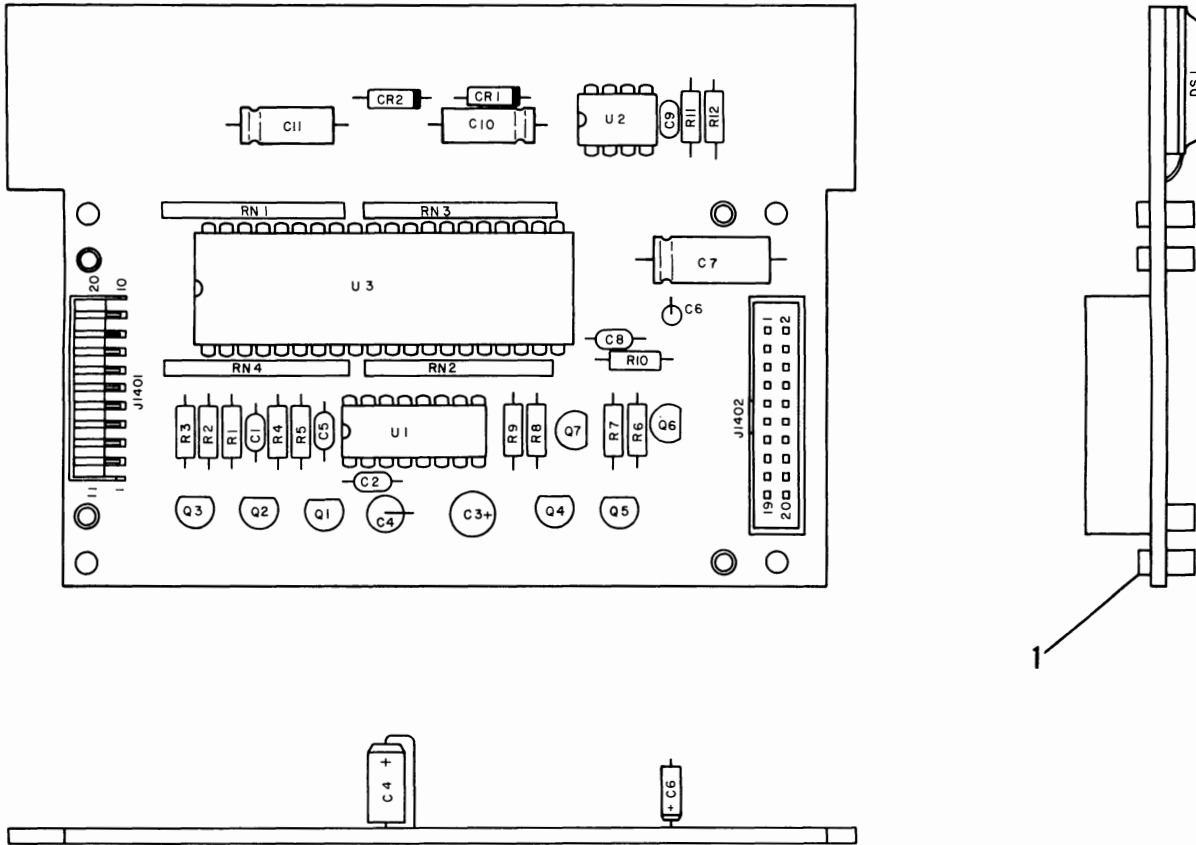


FIGURE 7-60 DISPLAY PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY	REF
60-		7010-5131-200		DISPLAY PC BOARD ASSEMBLY				SEE FIG 58 FOR NHA
1		2800-0000-004		SPACER 2-56 (350-2188-17-07)			71279	4
	J1401	2115-2013-110		CONNECTOR, WAFER (22-17-2102)			27264	1
	J1402	2129-1001-020		CONNECTOR, HEADER (3592-6002)			75037	1
	C1401	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)			72982	1
	C1402	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)			72982	1
	C1403	1580-4702-105		CAPACITOR 47 $\mu$ F, 10 V (CLE47MF10V)			62462	1
	C1404	1507-0106-121		CAPACITOR 10 $\mu$ F, 20 V (T322C106J020AS)			31433	1
	C1405	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)			72982	1
	C1406	1507-0105-118		CAPACITOR 1 $\mu$ F, 35 V (T322B105J035AS)			31433	1
	C1407	1580-4700-215		CAPACITOR 47 $\mu$ F, 25 V (25TT47MS)			52318	1
	C1408	1521-0000-008		CAPACITOR .1 $\mu$ F, 50 V (RPA20Z5U104M50V)			72982	1
	C1409	1506-0152-017		CAPACITOR 1500 pF, 100 V (C320C152J2G5CA)			61637	1
	C1410	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)			52318	1
	C1411	1580-1000-350		CAPACITOR 10 $\mu$ F, 35 V (35TT10MS)			52318	1
	CR1401	4815-0000-002		DIODE, RECT (JAN1N4004)			81349	1
	CR1402	4815-0000-002		DIODE, RECT (JAN1N4004)			81349	1
	DS1401	4600-6000-160		DISPLAY (FIP16A5R)			33297	1
	Q1401	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1402	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1403	4805-0000-001		TRANSISTOR (JAN2N2907A)			81349	1
	Q1404	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1405	4805-0000-001		TRANSISTOR (JAN2N2907A)			81349	1
	Q1406	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	Q1407	4801-0000-001		TRANSISTOR (JAN2N2222)			81349	1
	R1401	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)			81349	1
	R1402	4702-0102-003		RESISTOR 5%, 1/4 W, 1 K (RLR07C102JR)			81349	1
	R1403	4702-0332-003		RESISTOR 5%, 1/4 W, 3.3 K (RLR07C332JR)			81349	1
	R1404	4702-0104-003		RESISTOR 5%, 1/4 W, 100 K (RLR07C104JR)			81349	1
	R1405	4702-0823-003		RESISTOR 5%, 1/4 W, 82 K (RLR07C823JR)			81349	1
	R1406	4702-0123-003		RESISTOR 5%, 1/4 W, 12 K (RLR07C123JR)			81349	1
	R1407	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)			81349	1
	R1408	4702-0123-003		RESISTOR 5%, 1/4 W, 12 K (RLR07C123JR)			81349	1
	R1409	4702-0103-003		RESISTOR 5%, 1/4 W, 10 K (RLR07C103JR)			81349	1
	R1410	4702-0223-003		RESISTOR 5%, 1/4 W, 22 K (RLR07C223JR)			81349	1
	R1411	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)			81349	1
	R1412	4702-0473-003		RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)			81349	1
	RN1401	4690-0947-300		RESISTOR, NETWORK 47 K, 10-P (4310R-101-473)			57924	1
	RN1402	4690-0947-300		RESISTOR, NETWORK 47 K, 10-P (4310R-101-473)			57924	1
	RN1403	4690-0947-300		RESISTOR, NETWORK 47 K, 10-P (4310R-101-473)			57924	1
	RN1404	4690-0947-300		RESISTOR, NETWORK (4310R-101-473)			57924	1
	U1401	3133-0000-006		IC, HEX BFR/CONVERTER (CD4049UBE)			02735	1
	U1402	3226-0004-000		IC, TIMER (LM555CN)			27014	1
	U1403	3250-1937-000		IC, ALPHA DISPLAY DRVR (10937-40)			13499	1



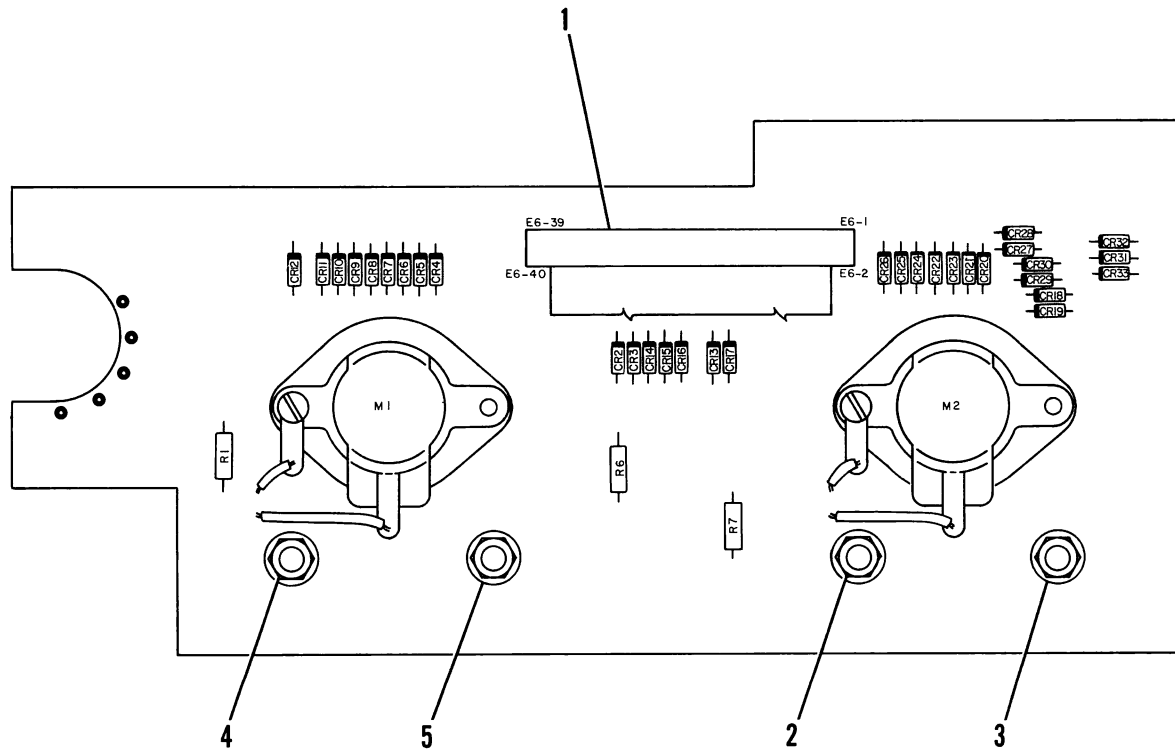
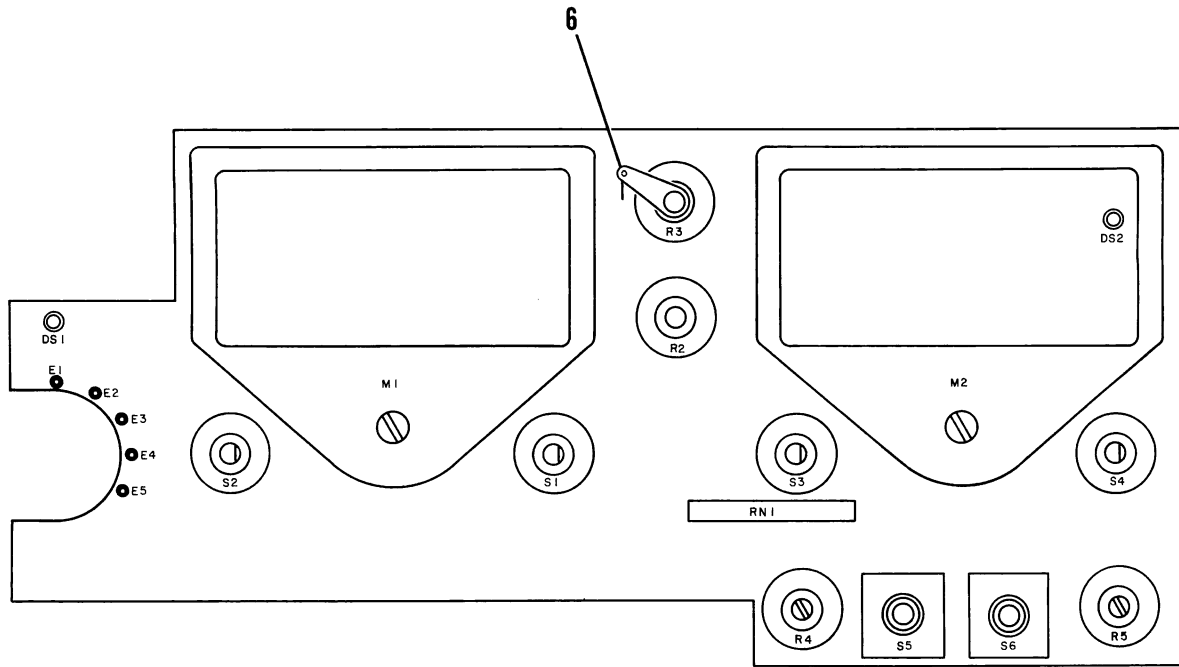


FIGURE 7-61 FUNCTION SWITCH PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG

FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1 2 3 4 5 6 7	DESCRIPTION	FSCM	EFF	QTY
61-		7010-5530-700		FUNCTION SWITCH PC BOARD ASSEMBLY SEE			REF
				FIG 58 FOR NHA			
1		6045-5184-000		CABLE ASSY, RIBBON FUNCTION SWITCH			1
	CR3702	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3703	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3704	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3705	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3706	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3707	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3708	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3709	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3710	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3711	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3712	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3713	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3714	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3715	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3716	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3717	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3718	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3719	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3720	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3721	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3722	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3723	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3724	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3725	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3726	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3727	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3728	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3729	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3730	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3731	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3732	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	CR3733	4815-0000-003		DIODE, SIGNAL (JAN1N4148)	81349		1
	D53701	4818-0000-020		LED RED (HLMP1301)	54893		1
	D53702	4818-0000-022		LED GRN (HLMP1523)	54893		1
	M3701	2900-0090-602		METER, FREQ ERROR (082005-016)	33005		1
				ATTACHING PARTS			
2		2850-0000-008		NUT (4-40)	UNK016		4
3		2840-0000-008		WASHER, FLAT (AN960-C4)	81349		4
				----*----			
	M3702	2900-0090-304		METER, MODULATION			1
				ATTACHING PARTS			
4		2850-0000-008		NUT (4-40)	UNK016		4
5		2840-0000-008		WASHER, FLAT (AN960-C4)	81349		4
				----*----			
	R3701	4706-3012-001		RESISTOR 1%, 1/4 W, 30.10 K (RLR07C3012FR)	81349		1
	R3702	4751-0103-020		RESISTOR, VAR 10 K			1
	R3703	4751-0103-010		RESISTOR, VAR 10 K			1
6		2850-0000-044		LUG, GND 1/4 (1410-14)	83330		1
	R3704	4751-0103-010		RESISTOR, VAR 10 K			1
	R3705	4751-0103-010		RESISTOR, VAR 10 K			1
	R3706	4702-0472-003		RESISTOR 5%, 1/4 W, 4.7 K (RLR07C472JR)	81349		1
	R3707	4702-0561-003		RESISTOR 5%, 1/4 W, 560 OHM (RLR07C561JR)	81349		1
	RN3701	4690-0947-200		RESISTOR, NETWORK 4.7 K, 10-P (4310R-101-472)	57924		1

CONTINUED ON NEXT PAGE



# ILLUSTRATED PARTS CATALOG

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY
61-	S3701	5111-5021-312								SWITCH, ROTARY (55DP30-01-1AJN) INCL MTG HARDWARE	81073		1
	S3702	5111-5021-312								SWITCH, ROTARY (55DP30-01-1AJN) INCL MTG HARDWARE	81073		1
	S3703	5111-5021-312								SWITCH, ROTARY (55DP30-01-1AJN) INCL MTG HARDWARE	81073		1
	S3704	5111-5021-312								SWITCH, ROTARY (55DP30-01-1AJN) INCL MTG HARDWARE	81073		1
	S3705	5121-6012-000								SWITCH, TOGGLE (7211SYCQ) INCL MTG HARDWARE	09353		1
	S3706	5121-6012-000								SWITCH, TOGGLE (7211SYCQ) INCL MTG HARDWARE	09353		1
		SEE FIG 1								WIRE, BUS 16 GA			A/R
		SEE FIG 1								WIRE, BUS 26 GA			A/R
		SEE FIG 1								TUBING, TFL 26 GA, NAT			A/R

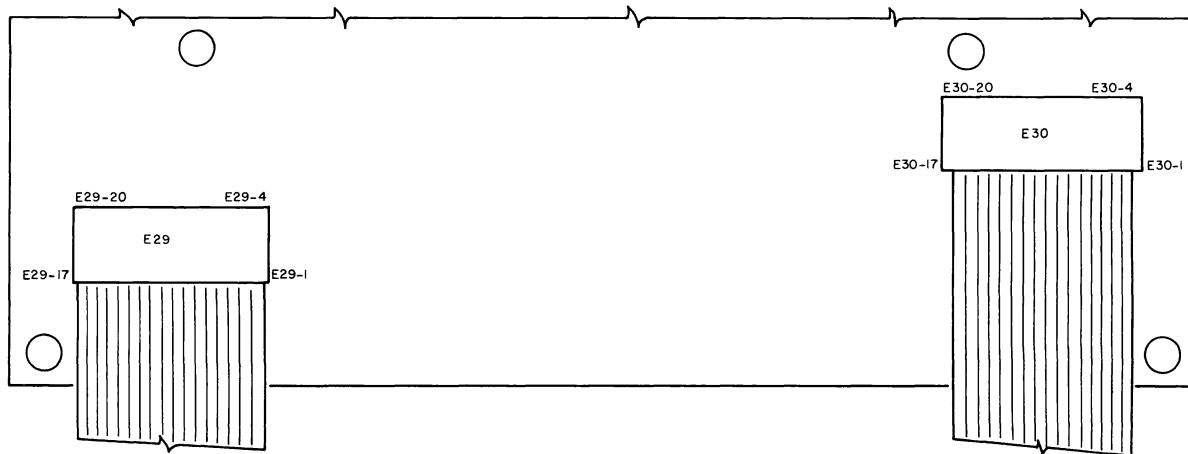
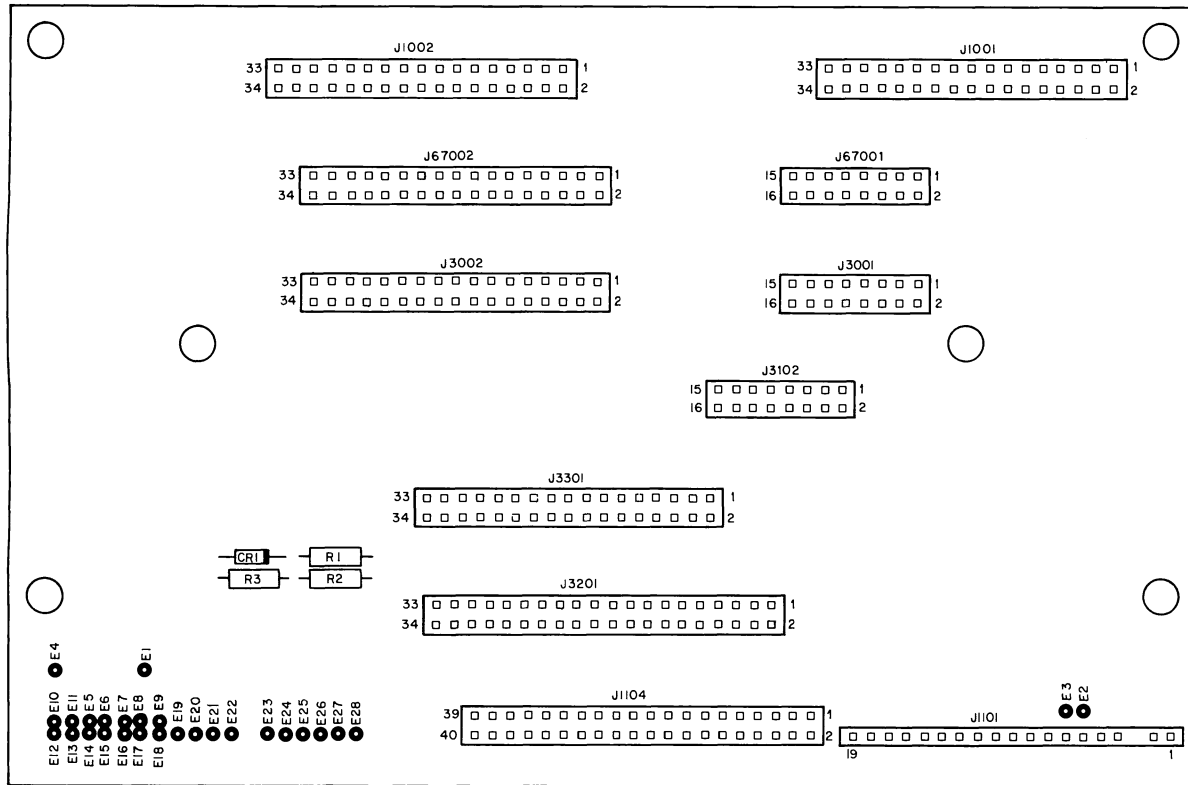


FIGURE 7-62 MOTHERBOARD PC BOARD ASSEMBLY



# ILLUSTRATED PARTS CATALOG FM/AM-1200S/A

FIG- ITEM NO	REF DES	PART NO	1	2	3	4	5	6	7	DESCRIPTION	FSCM	EFF	QTY	REF	
62-		7010-5530-000	MOTHERBOARD PC BOARD ASSEMBLY							SEE					
			FIG 13 FOR NHA												
	J101	2129-1087-016	CONNECTOR, WAFER (87227-8)								00779	A		1	
	J67001	2129-1087-016	CONNECTOR, WAFER (87227-8)								00779	B		1	
	J102	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779	A		1	
	J67002	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779	B		1	
	J1001	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779			1	
	J1002	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779			1	
	J1101	2115-1001-004	CONNECTOR, WAFER (22-03-2191)								27264			1	
	J1104	2129-1087-040	CONNECTOR, WAFER (65805-140)								UNK001			1	
	J3001	2129-1087-016	CONNECTOR, WAFER (87227-8)								00779			1	
	J3002	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779			1	
	J3101	2129-1087-016	CONNECTOR, WAFER (87227-8)								00779			1	
	J3201	2129-1087-040	CONNECTOR, WAFER (65805-140)								UNK001			1	
	J3301	2129-1087-034	CONNECTOR, WAFER (1-87227-7)								00779			1	
	CR1101	4818-0000-003	DIODE, ZENER 5.1 V (JAN1N231B)								81349			1	
	E1129	6045-5184-400	CABLE ASSY, RIBBON DIGITAL											1	
	E1130	6045-5184-500	CABLE ASSY, RIBBON RCV AUDIO											1	
	R1101	4702-0683-003	RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)								81349			1	
	R1102	4702-0683-003	RESISTOR 5%, 1/4 W, 68 K (RLR07C683JR)								81349			1	
	R1103	4702-0473-003	RESISTOR 5%, 1/4 W, 47 K (RLR07C473JR)								81349			1	

A---FM/AM-1200A, SN 1250 THRU SN 1449  
 FM/AM-1200S, SN 3300 THRU SN 4491  
 B---FM/AM-1200A, SN 1450 & ON  
 FM/AM-1200S, SN 4492 & ON



**NUMERICAL INDEX**



## NUMERICAL INDEX

PART NUMBER	FIG-ITEM	REF DES	PART NUMBER	FIG-ITEM	REF DES	PART NUMBER	FIG-ITEM	REF DES
1000-1000-201	11-	1	1415-5154-600	31-	2	1501-0103-005	26-	C4231
1002-5501-000	11-	2	1415-5159-900	16-	29	1501-0103-005	26-	C4232
1002-5501-100	11-	4	1415-5183-600	25-	6	1501-0103-005	26-	C4233
1003-0001-500	11-	3	1415-5183-600	30-	6	1501-0103-005	26-	C4234
1003-0002-000	11-	5	1415-5183-600	37-	1	1501-0103-005	26-	C4235
1050-0000-070	1-	1	1415-5183-600	39-	1	1501-0103-005	26-	C4236
1050-0000-073	1-	2	1415-5183-601	35-	4	1501-0103-005	26-	C4237
1050-0000-074	1-	3	1415-5183-602	41-	1	1501-0103-005	26-	C4238
1050-0000-075	1-	4	1415-5183-700	27-	1	1501-0103-005	26-	C4239
1050-0000-114	1-	5	1415-5183-801	55-	14	1501-0103-005	26-	C4240
1050-0000-170	1-	6	1415-5280-000	32-	1	1501-0103-005	26-	C4241
1050-5003-100	1-	7	1415-5550-200	45-	1	1501-0103-005	26-	C4242
1051-5201-025	1-	8	1421-0000-500	15-	5	1501-0103-005	26-	C4243
1201-0909-900	2-	2	1421-0018-000	51-	25	1501-0103-005	26-	C4249
1201-7616-500	14-	1	1500-3312-215	57-		1501-0103-005	26-	C4250
1205-0100-101	2-	1	1501-0102-001	20-	C3216	1501-0103-005	26-	C4251
1400-5064-400	58-	19	1501-0102-001	20-	C3217	1501-0103-005	26-	C4252
1400-5150-501	58-	16	1501-0102-001	20-	C3222	1501-0103-005	26-	C4254
1400-5155-501	52-	8	1501-0102-001	26-	C4216	1501-0103-005	26-	C4255
1400-5155-502	52-	7	1501-0102-001	26-	C4260	1501-0103-005	29-	C4022
1400-5157-000	51-	6	1501-0102-001	29-	C4006	1501-0103-005	31-	C1201
1400-5157-500	8-	4	1501-0102-001	31-	C1221	1501-0103-005	31-	C1205
1400-5158-200	18-	2	1501-0102-001	31-	C1222	1501-0103-005	31-	C1206
1400-5158-200	18-	4	1501-0102-001	31-	C1223	1501-0103-005	31-	C1208
1400-5158-200	19-	5	1501-0102-001	33-	C4404	1501-0103-005	31-	C1219
1400-5158-200	19-	7	1501-0102-001	33-	C4411	1501-0103-005	31-	C1236
1400-5160-700	13-	16	1501-0102-001	33-	C4412	1501-0103-005	31-	C1246
1400-5160-800	13-	14	1501-0102-001	34-	C4504	1501-0103-005	31-	C1263
1400-5181-000	58-	18	1501-0102-001	34-	C4529	1501-0103-005	31-	C1278
1400-5184-900	58-	47	1501-0102-001	34-	C4543	1501-0103-005	33-	C4406
1400-5252-100	58-	36	1501-0102-001	34-	C4544	1501-0103-005	33-	C4407
1405-5181-100	58-	60	1501-0102-001	38-	C457	1501-0103-005	33-	C4408
1408-5055-800	43-	6	1501-0103-001	17-	C313	1501-0103-005	34-	C4502
1412-0005-002	2-	3	1501-0103-001	17-	C315	1501-0103-005	34-	C4505
1412-5180-700	15-	8	1501-0103-001	17-	C316	1501-0103-005	34-	C4512
1412-5184-700	14-	13	1501-0103-003	17-	C306	1501-0103-005	34-	C4513
1414-5055-900	43-	1	1501-0103-003	17-	C307	1501-0103-005	34-	C4514
1414-5150-300	13-	63	1501-0103-003	17-	C308	1501-0103-005	34-	C4516
1414-5150-601	51-	7	1501-0103-003	42-	C817	1501-0103-005	34-	C4517
1414-5152-300	46-	1	1501-0103-005	18-	C208	1501-0103-005	34-	C4518
1414-5152-300	46-	13	1501-0103-005	18-	C210	1501-0103-005	34-	C4519
1414-5152-400	53-	1	1501-0103-005	18-	C212	1501-0103-005	34-	C4520
1414-5152-500	53-	6	1501-0103-005	18-	C213	1501-0103-005	34-	C4527
1414-5154-100	31-	1	1501-0103-005	18-	C214	1501-0103-005	38-	C406
1414-5154-200	31-	3	1501-0103-005	18-	C215	1501-0103-005	38-	C412
1414-5181-800	25-	1	1501-0103-005	18-	C225	1501-0103-005	38-	C414
1414-5181-900	35-	1	1501-0103-005	20-	C3220	1501-0103-005	38-	C415
1414-5183-100	37-	5	1501-0103-005	22-	C3109	1501-0103-005	38-	C416
1414-5183-200	39-	5	1501-0103-005	26-	C4202	1501-0103-005	38-	C417
1414-5183-300	41-	5	1501-0103-005	26-	C4203	1501-0103-005	38-	C422
1414-5183-400	30-	1	1501-0103-005	26-	C4205	1501-0103-005	38-	C426
1414-5183-500	27-	7	1501-0103-005	26-	C4209	1501-0103-005	38-	C433
1414-5183-900	55-	5	1501-0103-005	26-	C4212	1501-0103-005	38-	C438
1414-5254-900	46-	27	1501-0103-005	26-	C4215	1501-0103-005	38-	C445
1414-5255-100	3-	1	1501-0103-005	26-	C4219	1501-0103-005	40-	C507
1414-5282-400	32-	7	1501-0103-005	26-	C4220	1501-0103-005	40-	C511
1415-5152-000	46-	17	1501-0103-005	26-	C4227	1501-0103-005	40-	C516
1415-5152-301	46-	16	1501-0103-005	26-	C4228	1501-0103-005	40-	C521
1415-5152-600	53-	13	1501-0103-005	26-	C4229	1501-0103-005	40-	C522
1415-5154-300	31-	4	1501-0103-005	26-	C4230	1501-0103-005	40-	C523



## NUMERICAL INDEX

PART NUMBER	FIG - ITEM	REF DES	PART NUMBER	FIG - ITEM	REF DES	PART NUMBER	FIG - ITEM	REF DES
1501-0103-005	40-	C524	1506-0020-017	54-	C5113	1506-0101-017	49-	C2406
1501-0103-005	40-	C528	1506-0030-017	18-	C211	1506-0101-017	49-	C2408
1501-0103-005	40-	C531	1506-0030-017	19-	C211	1506-0101-017	54-	C5102
1501-0103-005	40-	C532	1506-0030-017	28-	C4121	1506-0101-017	54-	C5105
1501-0103-005	40-	C535	1506-0030-017	40-	C501	1506-0101-017	54-	C5118
1501-0103-005	40-	C545	1506-0030-017	40-	C502	1506-0101-017	36-	C4348
1501-0103-005	40-	C546	1506-0030-017	40-	C503	1506-0102-017	4-	C9005
1501-0103-005	40-	C548	1506-0030-017	40-	C508	1506-0102-017	6-	C2804
1501-0103-005	40-	C549	1506-0030-017	40-	C509	1506-0102-017	6-	C2806
1501-0103-005	40-	C552	1506-0030-017	40-	C510	1506-0102-017	17-	C302
1501-0103-005	40-	C567	1506-0030-017	49-	C2405	1506-0102-017	18-	C223
1501-0103-005	40-	C568	1506-0030-017	49-	C2410	1506-0102-017	18-	C226
1501-0103-005	40-	C569	1506-0050-017	23-	C119	1506-0102-017	18-	C227
1501-0103-005	40-	C570	1506-0050-017	31-	C1238	1506-0102-017	19-	C223
1501-0103-005	40-	C571	1506-0050-017	31-	C1240	1506-0102-017	19-	C226
1501-0103-005	42-	C804	1506-0050-017	36-	C4342	1506-0102-017	21-	C3317
1501-0103-005	42-	C814	1506-0050-017	36-	C4360	1506-0102-017	21-	C3318
1501-0103-005	42-	C815	1506-0050-017	48-	C2214	1506-0102-017	21-	C3321
1501-0103-005	42-	C816	1506-0050-017	49-	C2401	1506-0102-017	21-	C3322
1501-0103-005	42-	C820	1506-0050-017	49-	C2403	1506-0102-017	28-	C4110
1501-0103-005	42-	C821	1506-0050-017	49-	C2407	1506-0102-017	28-	C4112
1501-0103-005	42-	C823	1506-0100-017	18-	C222	1506-0102-017	28-	C4120
1501-0103-005	42-	C825	1506-0100-017	20-	C3221	1506-0102-017	28-	C4122
1501-0103-005	42-	C826	1506-0100-017	21-	C3309	1506-0102-017	29-	C4019
1501-0103-005	42-	C830	1506-0100-017	22-	C3118	1506-0102-017	31-	C1202
1501-0103-005	42-	C832	1506-0100-017	22-	C3119	1506-0102-017	31-	C1211
1501-0103-005	42-	C835	1506-0100-017	23-	C105	1506-0102-017	31-	C1213
1501-0103-005	42-	C837	1506-0100-017	31-	C1217	1506-0102-017	31-	C1216
1501-0104-500	17-	C309	1506-0100-017	31-	C1242	1506-0102-017	31-	C1220
1501-0104-500	17-	C310	1506-0100-017	31-	C1243	1506-0102-017	31-	C1241
1501-0104-500	17-	C311	1506-0100-017	31-	C1259	1506-0102-017	31-	C1244
1501-0104-500	17-	C312	1506-0100-017	31-	C1267	1506-0102-017	31-	C1245
1501-0330-001	36-	C4362	1506-0100-017	38-	C450	1506-0102-017	31-	C1247
1502-0102-008	19-	C222	1506-0100-017	48-	C2207	1506-0102-017	31-	C1248
1502-0103-010	18-	C218	1506-0100-017	36-		1506-0102-017	31-	C1249
1502-0103-010	19-	C218	1506-0101-017	4-	C9002	1506-0102-017	31-	C1257
1502-0103-010	57-	C1509	1506-0101-017	4-	C9003	1506-0102-017	31-	C1258
1502-0104-010	10-	C3011	1506-0101-017	4-	C9006	1506-0102-017	31-	C1268
1502-0104-010	18-	C219	1506-0101-017	26-	C4201	1506-0102-017	31-	C1271
1502-0104-010	19-	C219	1506-0101-017	26-	C4206	1506-0102-017	31-	C1272
1502-0104-010	29-	C4018	1506-0101-017	28-	C4123	1506-0102-017	34-	C4522
1502-0104-010	38-	C444	1506-0101-017	28-	C4145	1506-0102-017	34-	C4525
1502-0105-007	10-	C3012	1506-0101-017	29-	C4009	1506-0102-017	36-	C4305
1502-0105-007	18-	C220	1506-0101-017	31-	C1224	1506-0102-017	36-	C4308
1502-0105-007	19-	C220	1506-0101-017	31-	C1232	1506-0102-017	36-	C4312
1502-0473-010	10-	C3010	1506-0101-017	31-	C1233	1506-0102-017	36-	C4313
1503-0104-009	58-	C3501	1506-0101-017	31-	C1239	1506-0102-017	36-	C4319
1506-0000-008	29-	C4025	1506-0101-017	36-	C4315	1506-0102-017	36-	C4321
1506-0010-017	31-	C1234	1506-0101-017	36-	C4317	1506-0102-017	36-	C4323
1506-0010-017	48-	C2203	1506-0101-017	36-	C4325	1506-0102-017	36-	C4328
1506-0010-017	50-	C2304	1506-0101-017	36-	C4331	1506-0102-017	36-	C4336
1506-0020-017	38-	C408	1506-0101-017	36-	C4338	1506-0102-017	36-	C4340
1506-0020-017	38-	C409	1506-0101-017	36-	C4372	1506-0102-017	36-	C4351
1506-0020-017	38-	C410	1506-0101-017	38-	C454	1506-0102-017	36-	C4357
1506-0020-017	42-	C805	1506-0101-017	38-	C455	1506-0102-017	36-	C4361
1506-0020-017	42-	C806	1506-0101-017	40-	C506	1506-0102-017	36-	C4363
1506-0020-017	42-	C807	1506-0101-017	40-	C566	1506-0102-017	36-	C4367
1506-0020-017	42-	C808	1506-0101-017	40-	C574	1506-0102-017	38-	C405
1506-0020-017	42-	C809	1506-0101-017	40-	C575	1506-0102-017	38-	C407
1506-0020-017	54-	C5106	1506-0101-017	49-	C2402	1506-0102-017	38-	C411





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1506-0102-017	38-	C420	1506-0103-017	36-	C4316	1506-0181-017	38-	C434
1506-0102-017	38-	C424	1506-0103-017	36-	C4318	1506-0181-017	38-	C436
1506-0102-017	38-	C425	1506-0103-017	36-	C4320	1506-0182-017	22-	C3121
1506-0102-017	38-	C429	1506-0103-017	36-	C4322	1506-0182-017	22-	C3129
1506-0102-017	38-	C430	1506-0103-017	36-	C4324	1506-0220-017	26-	C4204
1506-0102-017	38-	C431	1506-0103-017	36-	C4326	1506-0220-017	26-	C4207
1506-0102-017	38-	C437	1506-0103-017	36-	C4330	1506-0220-017	26-	C4208
1506-0102-017	38-	C439	1506-0103-017	36-	C4334	1506-0220-017	26-	C4210
1506-0102-017	38-	C440	1506-0103-017	36-	C4345	1506-0220-017	26-	C4211
1506-0102-017	38-	C456	1506-0103-017	36-	C4347	1506-0220-017	26-	C4256
1506-0102-017	40-	C504	1506-0103-017	36-	C4349	1506-0220-017	29-	C4003
1506-0102-017	40-	C505	1506-0103-017	36-	C4352	1506-0220-017	29-	C4023
1506-0102-017	40-	C512	1506-0103-017	36-	C4354	1506-0220-017	29-	C4024
1506-0102-017	40-	C518	1506-0103-017	36-	C4355	1506-0220-017	29-	C4026
1506-0102-017	40-	C519	1506-0103-017	36-	C4358	1506-0220-017	36-	C4359
1506-0102-017	40-	C520	1506-0103-017	36-	C4365	1506-0220-017	36-	C4375
1506-0102-017	40-	C525	1506-0103-017	36-	C4366	1506-0220-017	38-	C402
1506-0102-017	40-	C526	1506-0103-017	36-	C4371	1506-0220-017	38-	C403
1506-0102-017	40-	C527	1506-0103-017	36-	C4373	1506-0220-017	38-	C423
1506-0102-017	40-	C529	1506-0103-017	36-	C4379	1506-0220-017	48-	C2206
1506-0102-017	40-	C534	1506-0103-017	38-	C443	1506-0220-017	50-	C2301
1506-0102-017	40-	C553	1506-0103-017	48-	C2210	1506-0220-017	54-	C5117
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1506-0102-017	42-	C818	1506-0103-017	49-	C2404	1506-0220-017	36-	
1506-0102-017	42-	C828	1506-0103-017	49-	C2409	1506-0221-017	17-	C314
1506-0102-017	42-	C829	1506-0103-017	51-	C4601	1506-0221-017	18-	C204
1506-0102-017	56-	C1607	1506-0103-017	54-	C5107	1506-0221-017	19-	C204
1506-0103-016	34-	C4535	1506-0103-017	54-	C5108	1506-0221-017	22-	C3126
1506-0103-016	34-	C4536	1506-0103-017	56-	C1605	1506-0221-017	22-	C3127
1506-0103-016	34-	C4537	1506-0103-017	57-	C1503	1506-0221-017	29-	C4016
1506-0103-016	34-	C4538	1506-0103-017	10-	C3004	1506-0221-017	31-	C1210
1506-0103-016	34-	C4541	1506-0121-017	33-	C4410	1506-0221-017	31-	C1214
1506-0103-016	34-	C4542	1506-0122-017	42-	C831	1506-0221-017	31-	C1218
1506-0103-017	6-	C2805	1506-0122-017	42-	C834	1506-0221-017	36-	C4364
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1506-0103-017	19-	C208	1506-0150-017	18-	C202	1506-0221-017	40-	C554
1506-0103-017	19-	C210	1506-0150-017	19-	C202	1506-0221-017	40-	C556
1506-0103-017	19-	C212	1506-0150-017	29-	C4011	1506-0221-017	40-	C557
1506-0103-017	19-	C213	1506-0150-017	29-	C4013	1506-0221-017	40-	C559
1506-0103-017	19-	C214	1506-0150-017	38-	C421	1506-0221-017	40-	C560
1506-0103-017	19-	C215	1506-0150-017	48-	C2202	1506-0221-017	40-	C562
1506-0103-017	19-	C225	1506-0150-017	48-	C2204	1506-0221-017	40-	C564
1506-0103-017	20-	C3202	1506-0150-017	50-	C2303	1506-0221-017	48-	C2208
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1506-0103-017	21-	C3323	1506-0152-017	22-	C3113	1506-0221-017	48-	C2212
1506-0103-017	21-	C3324	1506-0152-017	22-	C3115	1506-0221-017	48-	C2213
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1506-0103-017	31-	C1203	1506-0152-017	60-	C1409	1506-0222-017	18-	C206
1506-0103-017	31-	C1260	1506-0159-017	4-	C9015	1506-0222-017	19-	C206
1506-0103-017	34-	C4521	1506-0159-017	48-	C2205	1506-0222-017	21-	C3315
1506-0103-017	34-	C4524	1506-0159-017	50-	C2302	1506-0222-017	21-	C3316
1506-0103-017	36-	C4301	1506-0180-017	18-	C205	1506-0222-017	21-	C3319
1506-0103-017	36-	C4302	1506-0180-017	19-	C205	1506-0222-017	21-	C3320
1506-0103-017	36-	C4304	1506-0180-017	31-	C1250	1506-0222-017	28-	C4146
1506-0103-017	36-	C4306	1506-0180-017	31-	C1252	1506-0222-017	10-	C3039
1506-0103-017	36-	C4307	1506-0180-017	31-	C1270	1506-0270-017	18-	C203
1506-0103-017	36-	C4309	1506-0180-017	31-	C1276	1506-0270-017	19-	C203
1506-0103-017	36-	C4310	1506-0180-017	38-	C401	1506-0270-017	44-	C701



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1506-0271-017	20-	C3207	1506-0472-017	29-	C4015	1517-3295-303	40-	C542
1506-0271-017	38-	C435	1506-0560-017	36-		1517-3295-303	40-	C543
1506-0272-017	57-	C1505	1506-0561-017	38-	C458	1521-0000-001	22-	C3110
1506-0330-017	26-	C4213	1506-0561-017	40-	C572	1521-0000-004	4-	C9008
1506-0330-017	26-	C4217	1506-0562-017	21-	C3306	1521-0000-008	4-	C9001
1506-0330-017	36-	C4374	1506-0562-017	21-	C3307	1521-0000-008	4-	C9004
1506-0330-017	38-	C446	1506-0562-017	21-	C3327	1521-0000-008	4-	C9007
1506-0330-017	42-	C824	1506-0562-017	21-	C3328	1521-0000-008	4-	C9009
1506-0330-017	36-		1506-0680-017	10-	C3016	1521-0000-008	4-	C9010
1506-0331-017	36-	C4369	1506-0680-017	29-	C4008	1521-0000-008	4-	C9011
1506-0331-017	36-	C4370	1506-0680-017	40-	C513	1521-0000-008	6-	C2801
1506-0331-017	40-	C530	1506-0680-017	57-	C1504	1521-0000-008	6-	C2802
1506-0331-017	40-	C533	1506-0680-017	36-		1521-0000-008	6-	C2803
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1506-0331-017	40-	C547	1506-0681-017	22-	C3116	1521-0000-008	10-	C3005
1506-0331-017	40-	C551	1506-0820-017	36-	C4368	1521-0000-008	10-	C3006
1506-0331-017	54-	C5116	1506-0820-017	36-		1521-0000-008	10-	C3007
1506-0390-017	31-	C1251	1507-0105-018	10-	C3044	1521-0000-008	10-	C3008
1506-0390-017	31-	C1277	1507-0105-018	21-	C3337	1521-0000-008	10-	C3009
1506-0390-017	36-		1507-0105-018	21-	C3348	1521-0000-008	10-	C3015
1506-0392-017	22-	C3120	1507-0105-018	26-	C4258	1521-0000-008	10-	C3017
1506-0392-017	22-	C3128	1507-0105-018	34-	C4508	1521-0000-008	10-	C3018
1506-0392-017	40-	C536	1507-0105-018	34-	C4509	1521-0000-008	10-	C3019
1506-0392-017	40-	C544	1507-0105-018	42-	C827	1521-0000-008	10-	C3021
1506-0392-017	57-	C1506	1507-0105-018	54-	C5112	1521-0000-008	10-	C3022
1506-0470-017	21-	C3346	1507-0105-118	31-	C1273	1521-0000-008	10-	C3023
1506-0470-017	34-	C4523	1507-0105-118	31-	C1274	1521-0000-008	10-	C3024
1506-0470-017	34-	C4526	1507-0105-118	60-	C1406	1521-0000-008	10-	C3025
1506-0470-017	36-	C4327	1507-0106-021	18-	C221	1521-0000-008	10-	C3026
1506-0470-017	36-	C4329	1507-0106-021	31-	C1226	1521-0000-008	10-	C3027
1506-0470-017	40-	C565	1507-0106-121	19-	C221	1521-0000-008	10-	C3028
1506-0470-017	46-	C2215	1507-0106-121	36-	C4339	1521-0000-008	10-	C3029
1506-0470-017	46-	C2216	1507-0106-121	60-	C1404	1521-0000-008	10-	C3030
1506-0470-017	36-		1507-0335-018	57-	C1518	1521-0000-008	10-	C3031
1506-0470-107	26-	C4214	1507-0336-021	20-	C3227	1521-0000-008	10-	C3032
1506-0470-107	29-	C4004	1507-0336-023	19-	C207	1521-0000-008	10-	C3033
1506-0471-017	18-	C224	1507-0336-023	19-	C209	1521-0000-008	10-	C3045
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1506-0471-017	22-	C3117	1507-0475-021	18-	C228	1521-0000-008	20-	C3209
1506-0471-017	22-	C3125	1507-0566-024	10-	C3001	1521-0000-008	20-	C3210
1506-0471-017	26-	C4259	1507-0566-024	10-	C3002	1521-0000-008	20-	C3211
1506-0471-017	29-	C4002	1507-0685-018	26-	C4224	1521-0000-008	20-	C3212
1506-0471-017	29-	C4010	1507-0685-018	26-	C4225	1521-0000-008	20-	C3214
1506-0471-017	31-	C1237	1507-0685-020	18-	C234	1521-0000-008	20-	C3215
1506-0471-017	33-	C4405	1507-0685-020	21-	C3314	1521-0000-008	20-	C3218
1506-0471-017	33-	C4413	1507-0685-020	22-	C3130	1521-0000-008	20-	C3224
1506-0471-017	36-	C4343	1507-0685-020	38-	C452	1521-0000-008	20-	C3228
1506-0471-017	36-	C4344	1507-0685-020	38-	C453	1521-0000-008	21-	C3301
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1506-0471-017	36-	C4377	1508-0157-020	56-	C1611	1521-0000-008	21-	C3305
1506-0471-017	36-	C4378	1508-0226-018	31-	C1229	1521-0000-008	21-	C3330
1506-0471-017	38-	C427	1508-0226-018	31-	C1264	1521-0000-008	21-	C3331
1506-0471-017	38-	C428	1508-0336-023	6-	C2809	1521-0000-008	21-	C3332
1506-0471-017	40-	C555	1508-0336-023	31-	C1269	1521-0000-008	21-	C3333
1506-0471-017	40-	C558	1517-3295-303	40-	C538	1521-0000-008	21-	C3334
1506-0471-017	40-	C561	1517-3295-303	40-	C539	1521-0000-008	21-	C3335



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1521-0000-008	21-	C3339	1521-0000-008	28-	C4149	1521-0000-008	10-	C3014
1521-0000-008	21-	C3340	1521-0000-008	28-	C4150	1521-0000-008	10-	C3020
1521-0000-008	21-	C3341	1521-0000-008	28-	C4151	1521-0102-001	56-	C1604
1521-0000-008	21-	C3342	1521-0000-008	28-	C4152	1523-0000-002	28-	C4109
1521-0000-008	22-	C3101	1521-0000-008	29-	C4005	1523-0000-002	28-	C4113
1521-0000-008	22-	C3102	1521-0000-008	29-	C4014	1523-0000-002	28-	C4119
1521-0000-008	22-	C3103	1521-0000-008	31-	C1225	1523-0000-002	28-	C4143
1521-0000-008	22-	C3105	1521-0000-008	31-	C1227	1523-0000-002	28-	C4144
1521-0000-008	22-	C3106	1521-0000-008	31-	C1228	1523-0000-002	31-	C1212
1521-0000-008	22-	C3107	1521-0000-008	31-	C1230	1523-0000-002	31-	C1215
1521-0000-008	22-	C3108	1521-0000-008	31-	C1231	1523-0000-002	42-	C836
1521-0000-008	23-	C104	1521-0000-008	33-	C4401	1523-0000-002	44-	C705
1521-0000-008	23-	C107	1521-0000-008	33-	C4402	1523-0000-004	4-	C9012
1521-0000-008	23-	C108	1521-0000-008	33-	C4403	1523-0000-004	4-	C9013
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1521-0000-008	23-	C111	1521-0000-008	33-	C4416	1523-0000-004	54-	C5122
1521-0000-008	23-	C112	1521-0000-008	33-	C4417	1523-0000-004	54-	C5123
1521-0000-008	23-	C113	1521-0000-008	33-	C4418	1550-0100-510	53-	C5127
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1521-0000-008	23-	C116	1521-0000-008	34-	C4506	1580-1000-200	18-	C209
1521-0000-008	23-	C117	1521-0000-008	34-	C4507	1580-1000-200	18-	C216
1521-0000-008	23-	C118	1521-0000-008	34-	C4515	1580-1000-200	18-	C229
1521-0000-008	24-	C1007	1521-0000-008	34-	C4528	1580-1000-200	18-	C230
1521-0000-008	24-	C1008	1521-0000-008	34-	C4530	1580-1000-200	18-	C231
1521-0000-008	24-	C1009	1521-0000-008	34-	C4532	1580-1000-200	18-	C232
1521-0000-008	24-	C1010	1521-0000-008	34-	C4533	1580-1000-200	19-	C216
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1521-0000-008	24-	C1014	1521-0000-008	34-	C4540	1580-1000-200	19-	C230
1521-0000-008	24-	C1015	1521-0000-008	36-	C4333	1580-1000-200	19-	C231
1521-0000-008	24-	C1016	1521-0000-008	36-	C4335	1580-1000-200	19-	C232
1521-0000-008	24-	C1017	1521-0000-008	36-	C4337	1580-1000-200	23-	C102
1521-0000-008	24-	C1018	1521-0000-008	36-	C4341	1580-1000-200	23-	C103
1521-0000-008	24-	C1019	1521-0000-008	36-	C4356	1580-1000-200	24-	C1022
1521-0000-008	24-	C1020	1521-0000-008	38-	C442	1580-1000-200	24-	C1023
1521-0000-008	26-	C4218	1521-0000-008	38-	C451	1580-1000-200	36-	C4346
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1521-0000-008	26-	C4246	1521-0000-008	42-	C811	1580-1000-350	20-	C3208
1521-0000-008	26-	C4247	1521-0000-008	42-	C822	1580-1000-350	20-	C3213
1521-0000-008	26-	C4248	1521-0000-008	42-	C833	1580-1000-350	21-	C3343
1521-0000-008	28-	C4101	1521-0000-008	47-	C3801	1580-1000-350	21-	C3345
1521-0000-008	28-	C4102	1521-0000-008	47-	C3802	1580-1000-350	22-	C3111
1521-0000-008	28-	C4104	1521-0000-008	47-	C3803	1580-1000-350	22-	C3122
1521-0000-008	28-	C4106	1521-0000-008	47-	C3804	1580-1000-350	26-	C4221
1521-0000-008	28-	C4124	1521-0000-008	54-	C5101	1580-1000-350	26-	C4253
1521-0000-008	28-	C4127	1521-0000-008	54-	C5103	1580-1000-350	28-	C4103
1521-0000-008	28-	C4131	1521-0000-008	54-	C5104	1580-1000-350	28-	C4107
1521-0000-008	28-	C4132	1521-0000-008	54-	C5110	1580-1000-350	29-	C4001
1521-0000-008	28-	C4133	1521-0000-008	54-	C5111	1580-1000-350	34-	C4501
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1521-0000-008	28-	C4135	1521-0000-008	54-	C5115	1580-1000-350	56-	C1601
1521-0000-008	28-	C4136	1521-0000-008	56-	C1602	1580-1000-350	56-	C1609
1521-0000-008	28-	C4137	1521-0000-008	56-	C1603	1580-1000-350	60-	C1410
1521-0000-008	28-	C4138	1521-0000-008	56-	C1606	1580-1000-350	60-	C1411
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1521-0000-008	28-	C4141	1521-0000-008	60-	C1402	1580-1002-460	34-	C4534



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1580-1020-049	31-	C1275	1620-2210-600	28-	C4114	1801-0022-001	4-	L9002
1580-1020-049	57-	C1513	1620-2210-600	44-	C702	1801-0022-001	4-	L9004
1580-1020-158	57-	C1511	1620-2210-600	44-	C703	1801-0022-001	6-	L2801
1580-1022-155	57-	C1512	1620-2210-600	53-	C5124	1801-0022-001	22-	L3101
1580-1090-500	56-	C1608	1620-5100-500	36-	C4380	1801-0022-001	22-	L3102
1580-1092-450	20-	C3203	1625-2230-100	18-	C201	1801-0022-001	31-	L1201
1580-1092-450	21-	C3303	1625-2230-100	19-	C201	1801-0022-001	34-	LR501
1580-1092-450	21-	C3304	1625-2230-100	10-	C3040	1801-0022-001	36-	L4302
1580-1092-450	21-	C3344	1642-1040-400	18-	C217	1801-0022-001	36-	L4303
1580-1092-450	26-	C4226	1642-1040-400	18-	C233	1801-0022-001	36-	L4306
1580-3310-150	17-	C304	1642-1040-400	19-	C217	1801-0022-001	36-	L4307
1580-3310-150	17-	C305	1700-5122-200	46-	FL2211	1801-0022-001	36-	L4310
1580-3310-150	20-	C3201	1800-5051-400	13-	L1901	1801-0022-001	36-	L4313
1580-3310-150	20-	C3219	1800-5051-400	57-	L1501	1801-0022-001	36-	L4318
1580-3310-150	36-	C4332	1800-5051-400	57-	L1502	1801-0022-001	38-	L412
1580-3310-150	42-	C812	1800-5051-400	57-	L1503	1801-0022-001	38-	L413
1580-3310-150	42-	C813	1800-5051-400	57-	L1504	1801-0022-001	38-	L420
1580-3310-150	57-	C1515	1800-5054-004	16-	L5201	1801-0022-001	38-	L422
1580-3310-360	57-	C1508	1800-5062-200	28-	L4105	1801-0022-001	40-	L509
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1580-3322-210	52-	C1702	1800-7624-900	38-	FL404	1801-0022-001	40-	L513
1580-3392-450	21-	C3310	1800-7624-900	38-	FL405	1801-0022-001	40-	L514
1580-3392-450	21-	C3311	1800-7624-900	38-	FL407	1801-0022-001	40-	L515
1580-3392-450	21-	C3329	1800-7624-900	48-	FL2201	1801-0022-001	42-	L801
1580-3392-450	33-	C4409	1800-7624-900	48-	FL2202	1801-0022-001	42-	L812
1580-3392-450	33-	C4420	1800-7624-900	48-	FL2203	1801-0022-001	42-	L813
1580-4700-045	22-	C3104	1800-7624-900	50-	FL2301	1801-0022-001	44-	L701
1580-4700-045	22-	C3123	1800-7624-900	50-	FL2302	1801-0022-001	54-	L5105
1580-4700-045	22-	C3124	1800-7625-100	36-	FL4301	1801-0022-001	58-	L3502
1580-4700-045	26-	C4222	1800-7625-100	36-	FL4302	1801-0022-001	58-	L3503
1580-4700-045	26-	C4223	1800-7625-100	36-	FL4303	1801-0101-001	36-	L4315
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1580-4700-215	31-	C1209	1800-7636-000	38-	FL411	1801-0108-001	29-	L4003
1580-4700-215	40-	C550	1800-7636-100	42-	FL801	1801-0108-001	31-	L1205
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1580-4700-220	6-	C2810	1800-7636-100	42-	FL803	1801-0108-001	31-	L1207
1580-4700-220	10-	C3042	1800-7636-100	42-	FL804	1801-0108-001	31-	L1213
1580-4700-220	10-	C3043	1800-7636-100	42-	FL805	1801-0108-001	31-	L1214
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1580-4702-105	23-	C101	1800-7637-000	38-	FL410	1801-0108-001	54-	L5106
1580-4702-105	23-	C106	1801-0010-001	4-	L9001	1801-0109-001	38-	L416
1580-4702-105	24-	C1021	1801-0010-001	4-	L9005	1801-0109-001	44-	L702
1580-4702-105	28-	C4105	1801-0010-001	28-	L4101	1801-0109-001	44-	L703
1580-4702-105	36-	C4376	1801-0010-001	28-	L4102	1801-0109-001	44-	L706
1580-4702-105	57-	C1502	1801-0010-001	28-	L4103	1801-0109-001	44-	L710
1580-4702-105	57-	C1507	1801-0010-001	28-	L4104	1801-0109-001	44-	L712
1580-4702-105	60-	C1403	1801-0010-001	31-	L1202	1801-0109-001	44-	L713
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1801-0229-001	31-	L1212	2114-0000-007	22-	TP3101	2115-0000-016	19-	J202
1801-0229-001	31-	L1215	2114-0000-007	22-	TP3102	2115-0000-016	59-	P1401
1801-0229-001	38-	L421	2114-0000-007	22-	TP3103	2115-0000-022	58-	P1101
1801-0229-001	40-	L516	2114-0000-007	22-	TP3104	2115-0000-057	52-	J1701
1801-0338-001	31-	L1208	2114-0000-007	22-	TP3105	2115-0000-120	56-	J1601
1801-0339-001	36-	L4314	2114-0000-007	22-	TP3106	2115-0001-003	16-	P301
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1801-0471-001	36-	L4301	2114-0000-007	23-	TP102	2115-0001-003	58-	P201
1801-0471-001	36-	L4304	2114-0000-007	26-	TP4201	2115-0001-005	16-	P203
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1801-0471-001	42-	L808	2114-0000-007	33-	TP4403	2115-1001-003	17-	J301
1801-0471-001	42-	L809	2114-0000-007	33-	TP4404	2115-1001-003	18-	J201
1801-0479-001	36-	L4309	2114-0000-007	33-	TP4405	2115-1001-003	19-	J201
1801-0479-001	40-	L512	2114-0000-007	33-	TP4406	2115-1001-003	57-	JTB1
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1801-0689-001	36-	L4319	2114-0000-007	33-	TP4409	2115-1001-005	19-	J203
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1801-0828-001	38-	L403	2114-0000-007	33-	TP4411	2115-1001-007	19-	J205
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4706-2001-001	22-	R3103	4706-9091-001	19-	R209	4753-0103-002	21-	R3350
4706-2001-001	33-	R4408	4706-9091-001	34-	R4508	4753-0103-002	10-	R3020
4706-2001-001	33-	R4412	4706-9092-001	36-	R4377	4753-0201-002	18-	R215
4706-2002-001	21-	R3406	4706-9093-001	18-	R205	4753-0201-002	19-	R215
4706-2002-001	21-	R3425	4706-9093-001	19-	R205	4753-0202-002	18-	R271
4706-2003-001	10-	R3029	4707-0250-002	52-	R1701	4753-0202-002	20-	R3260
4706-2052-001	42-	R829	4708-0000-001	42-	Q803	4753-0202-002	21-	R3318
4706-2102-001	18-	R904	4711-3301-001	18-	R226	4753-0202-002	21-	R3320
4706-2102-001	21-	R3346	4711-3301-001	19-	R226	4753-0202-002	21-	R3379
4706-2102-001	21-	R3407	4712-4702-001	18-	R272	4753-0202-002	21-	R3383
4706-2102-001	21-	R3408	4712-4702-001	18-	R273	4753-0202-002	21-	R3436
4706-2102-001	21-	R3409	4712-4702-001	19-	R272	4753-0202-002	29-	R4032
4706-2102-001	21-	R3410	4712-4702-001	19-	R273	4753-0202-002	34-	R4510
4706-2102-001	21-	R3411	4713-1502-001	18-	R227	4753-0203-002	18-	R201
4706-2150-001	21-	R3418	4713-1502-001	18-	R228	4753-0203-002	19-	R201
4706-2152-001	21-	R3364	4713-1502-001	19-	R227	4753-0203-002	21-	R3362
4706-2321-001	21-	R3401	4713-1502-001	19-	R228	4753-0203-002	21-	R3365



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4753-0203-002	31-	R1224	4801-0000-001	60-	Q1407	4807-0000-002	42-	Q804
4753-0204-002	54-	R5114	4801-0000-004	20-	Q3202	4807-0000-002	42-	Q805
4753-0204-002	10-	R3016	4801-0000-004	20-	Q3204	4808-0000-001	29-	Q4011
4753-0500-002	18-	R221	4801-0000-004	57-	Q1501	4809-0000-003	17-	Q307
4753-0500-002	19-	R221	4802-0000-005	18-	Q201	4809-0000-003	17-	Q308
4753-0501-002	10-	R3008	4802-0000-005	19-	Q201	4809-0000-003	18-	Q203
4753-0502-002	10-	R3033	4803-0000-004	4-	Q9002	4809-0000-003	18-	Q204
4753-0502-002	20-	R3246	4803-0000-004	28-	Q4101	4809-0000-003	18-	Q208
4753-0502-002	29-	R4045	4803-0000-004	31-	Q1203	4809-0000-003	18-	Q209
4753-0502-002	29-	R4061	4803-0000-004	31-	Q1206	4809-0000-003	19-	Q203
4753-0503-002	21-	R3368	4803-0000-004	54-	Q5101	4809-0000-003	19-	Q204
4753-0503-002	21-	R3369	4803-0000-004	54-	Q5103	4809-0000-003	19-	Q208
4753-0503-002	21-	R3370	4805-0000-001	4-	Q9001	4809-0000-003	19-	Q209
4753-0503-002	21-	R3371	4805-0000-001	6-	Q2801	4809-0000-005	26-	Q4201
4753-0503-002	33-	R4407	4805-0000-001	6-	Q2802	4809-0000-005	26-	Q4202
4753-0504-002	17-	R316	4805-0000-001	6-	Q2803	4809-0000-005	26-	Q4203
4753-0504-002	17-	R317	4805-0000-001	18-	Q202	4809-0000-005	26-	Q4204
4753-1030-002	20-	R3224	4805-0000-001	19-	Q202	4809-0000-005	26-	Q4205
4756-2450-000	31-	R1230	4805-0000-001	20-	Q3203	4809-0000-005	29-	Q4001
4756-2510-400	10-	R3032	4805-0000-001	20-	Q3207	4809-0000-005	29-	Q4003
4756-3010-200	18-	R247	4805-0000-001	22-	Q3102	4809-0000-005	31-	Q1204
4756-3010-200	19-	R247	4805-0000-001	22-	Q3105	4809-0000-005	31-	Q1205
4759-0000-021	17-	R308	4805-0000-001	29-	Q4002	4809-0000-005	36-	Q4308
4759-0000-022	17-	R312	4805-0000-001	29-	Q4004	4809-0000-005	36-	Q4309
4780-6302-351	18-	R217	4805-0000-001	29-	Q4008	4809-0000-005	36-	Q4310
4780-6302-351	19-	R217	4805-0000-001	31-	Q1201	4809-0000-005	36-	Q4312
4780-6310-451	18-	R248	4805-0000-001	31-	Q1202	4809-0000-005	36-	Q4313
4780-6310-452	19-	R248	4805-0000-001	38-	Q407	4809-0000-005	38-	Q401
4801-0000-001	18-	Q212	4805-0000-001	54-	Q5102	4809-0000-005	38-	Q402
4801-0000-001	19-	Q212	4805-0000-001	56-	Q1601	4809-0000-005	38-	Q404
4801-0000-001	20-	Q3205	4805-0000-001	56-	Q1603	4809-0000-005	38-	Q405
4801-0000-001	20-	Q3206	4805-0000-001	57-	Q1503	4809-0000-005	38-	Q409
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4801-0000-001	22-	Q3104	4805-0000-001	60-	Q1405	4809-0000-005	40-	Q502
4801-0000-001	26-	Q4207	4805-0000-003	19-	Q214	4809-0000-005	40-	Q503
4801-0000-001	29-	Q4007	4805-0000-003	22-	Q3101	4809-0000-005	40-	Q507
4801-0000-001	29-	Q4012	4805-0000-003	29-	Q4005	4809-0000-005	40-	Q508
4801-0000-001	34-	Q4502	4805-0000-003	29-	Q4006	4809-0000-005	40-	Q510
4801-0000-001	36-	Q4303	4805-0000-003	29-	Q4009	4809-0000-005	40-	Q511
4801-0000-001	36-	Q4304	4805-0000-003	33-	Q4401	4809-0000-005	40-	Q512
4801-0000-001	36-	Q4307	4805-0000-003	34-	Q4501	4809-0000-005	48-	Q2201
4801-0000-001	38-	Q406	4805-0000-003	36-	Q4306	4809-0000-005	48-	Q2202
4801-0000-001	38-	Q408	4807-0000-001	17-	Q301	4809-0000-005	48-	Q2203
4801-0000-001	38-	Q410	4807-0000-001	17-	Q303	4809-0000-005	48-	Q2204
4801-0000-001	38-	Q411	4807-0000-001	18-	Q205	4810-0000-001	31-	Q1207
4801-0000-001	40-	Q501	4807-0000-001	18-	Q206	4810-0000-001	31-	Q1209
4801-0000-001	40-	Q504	4807-0000-001	18-	Q207	4810-0000-001	36-	Q4305
4801-0000-001	40-	Q505	4807-0000-001	18-	Q210	4810-0000-001	38-	Q403
4801-0000-001	40-	Q506	4807-0000-001	18-	Q211	4811-0000-002	20-	Q3201
4801-0000-001	40-	Q509	4807-0000-001	19-	Q205	4811-0000-005	51-	Q4601
4801-0000-001	40-	Q513	4807-0000-001	19-	Q206	4813-0000-001	36-	Q4301
4801-0000-001	42-	Q801	4807-0000-001	19-	Q207	4813-0000-001	36-	Q4302
4801-0000-001	56-	Q1602	4807-0000-001	19-	Q210	4813-0000-001	36-	Q4311
4801-0000-001	56-	Q1604	4807-0000-001	23-	Q103	4815-0000-002	56-	CR1608
4801-0000-001	57-	Q1502	4807-0000-001	42-	Q806	4815-0000-002	60-	CR1401
4801-0000-001	57-	Q1505	4807-0000-002	23-	Q101	4815-0000-002	60-	CR1402
4801-0000-001	60-	Q1401	4807-0000-002	23-	Q102	4815-0000-003	4-	CR9001
4801-0000-001	60-	Q1402	4807-0000-002	23-	Q104	4815-0000-003	4-	CR9002
4801-0000-001	60-	Q1404	4807-0000-002	29-	Q4010	4815-0000-003	10-	CR3011





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PART NUMBER	FIG-ITEM	REF DES	PART NUMBER	FIG-ITEM	REF DES	PART NUMBER	FIG-ITEM	REF DES
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4815-0000-003	10-	CR3014	4815-0000-003	61-	CR3726	4815-0000-003	28-	CR4113
4815-0000-003	10-	CR3015	4815-0000-003	61-	CR3727	4815-0000-003	28-	CR4114
4815-0000-003	10-	CR3017	4815-0000-003	61-	CR3728	4815-0000-003	28-	CR4115
4815-0000-003	10-	CR3018	4815-0000-003	61-	CR3729	4815-0000-003	28-	CR4116
4815-0000-003	10-	CR3019	4815-0000-003	61-	CR3730	4815-0000-003	28-	CR4117
4815-0000-003	17-	CR307	4815-0000-003	61-	CR3731	4815-0000-003	28-	CR4118
4815-0000-003	17-	CR308	4815-0000-003	61-	CR3732	4815-0000-003	29-	CR4001
4815-0000-003	17-	CR309	4815-0000-003	61-	CR3733	4815-0000-003	29-	CR4002
4815-0000-003	17-	CR310	4815-0000-003	10-	CR3001	4815-0000-003	29-	CR4003
4815-0000-003	18-	CR201	4815-0000-003	10-	CR3002	4815-0000-003	29-	CR4004
4815-0000-003	18-	CR202	4815-0000-003	10-	CR3003	4815-0000-003	29-	CR4005
4815-0000-003	18-	CR203	4815-0000-003	10-	CR3004	4815-0000-003	29-	CR4006
4815-0000-003	18-	CR204	4815-0000-003	10-	CR3005	4815-0000-003	29-	CR4008
4815-0000-003	18-	CR205	4815-0000-003	10-	CR3006	4815-0000-003	29-	CR4009
4815-0000-003	18-	CR206	4815-0000-003	10-	CR3007	4815-0000-003	29-	CR4010
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4815-0000-003	19-	CR202	4815-0000-003	10-	CR3022	4815-0000-003	29-	CR4012
4815-0000-003	19-	CR203	4816-0000-001	6-	CR2801	4815-0000-003	29-	CR4013
4815-0000-003	19-	CR204	4816-0000-001	26-	CR4202	4815-0000-003	33-	CR4401
4815-0000-003	19-	CR205	4816-0000-001	31-	CR1203	4815-0000-003	33-	CR4402
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4815-0000-003	20-	CR3201	4816-0000-001	36-	CR4315	4815-0000-003	38-	CR405
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4815-0000-003	21-	CR3302	4816-0000-001	42-	CR815	4815-0000-003	57-	CR1507
4815-0000-003	21-	CR3306	4816-0000-001	57-	CR1513	4815-0000-003	57-	CR1514
4815-0000-003	21-	CR3307	4816-0000-002	26-	DS4201	4815-0000-003	61-	CR3702
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4815-0000-003	21-	CR3309	4818-0000-001	57-	CR1503	4815-0000-003	61-	CR3704
4815-0000-003	21-	CR3310	4818-0000-003	20-	CR3202	4815-0000-003	61-	CR3705
4815-0000-003	21-	CR3311	4818-0000-003	26-	CR4207	4815-0000-003	61-	CR3706
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4815-0000-003	21-	CR3314	4818-0000-003	42-	CR816	4815-0000-003	61-	CR3709
4815-0000-003	21-	CR3315	4818-0000-003	42-	CR817	4815-0000-003	61-	CR3710
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4815-0000-003	23-	CR103	4818-0000-015	19-	CR207	4815-0000-003	61-	CR3715
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4815-0000-003	28-	CR4101	4818-0000-015	26-	CR4201	4815-0000-003	61-	CR3717
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4815-0000-003	28-	CR4103	4818-0000-015	34-	CR501	4815-0000-003	61-	CR3719
4815-0000-003	28-	CR4104	4818-0000-015	36-	CR4316	4815-0000-003	61-	CR3720
4815-0000-003	28-	CR4108	4818-0000-015	38-	CR401	4815-0000-003	61-	CR3721
4815-0000-003	28-	CR4109	4818-0000-015	38-	CR406	4815-0000-003	61-	CR3722
4815-0000-003	28-	CR4110	4818-0000-015	57-	CR1505	4815-0000-003	61-	CR3723



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4818-0000-017	57-	CR1510	4920-5151-300	23-	CR102	5136-0001-000	59-	S1311
4818-0000-017	57-	CR1511	4920-5151-300	29-	CR4007	5136-0001-000	59-	S1312
4818-0000-017	57-	CR1512	4920-5151-300	56-	CR1607	5136-0001-000	59-	S1313
4818-0000-020	61-	D53701	4920-5158-450	56-	CR1601	5136-0001-000	59-	S1314
4818-0000-022	61-	D53702	4920-5158-450	56-	CR1602	5136-0001-000	59-	S1315
4821-0000-001	17-	CR301	4920-5158-450	56-	CR1603	5136-0001-000	59-	S1316
4821-0000-001	17-	CR302	4920-5158-450	56-	CR1604	5136-0001-000	59-	S1317
4822-6008-100	57-	CR1508	4920-5158-450	57-	CR1509	5136-0001-000	59-	S1318
4823-0000-001	52-	BR1701	4930-0100-200	26-	CR4203	5136-0001-000	59-	S1319
4828-0000-002	36-	CR4301	4930-0100-200	31-	CR1201	5136-0001-000	59-	S1320
4828-0000-002	36-	CR4302	4930-0100-200	31-	CR1202	5136-0001-000	59-	S1321
4828-0000-002	36-	CR4303	4930-0100-200	36-	CR4309	5136-0001-000	59-	S1322
4828-0000-002	36-	CR4305	4930-0100-200	38-	CR402	5136-0001-000	59-	S1323
4828-0000-002	36-	CR4306	5010-0203-100	47-	Q3801	5136-0001-000	59-	S1324
4828-0000-002	36-	CR4308	5010-0203-100	49-	Q2401	5250-0100-100	31-	MXR1202
4828-0000-002	36-	CR4312	5010-0203-100	49-	Q2402	5250-0100-100	38-	MXR401
4828-0000-002	36-	CR4313	5010-0203-100	49-	Q2403	5250-0100-100	38-	MXR402
4828-0000-002	36-	CR4314	5020-1009-200	17-	Q309	5250-0100-100	40-	MXR501
4828-0000-002	36-	CR4319	5050-2401-100	19-	Q213	5250-0100-100	40-	MXR502
4828-0000-002	36-	CR4320	5050-2452-100	17-	Q305	5250-0100-100	50-	MXR2301
4828-0000-002	40-	CR504	5050-2452-100	17-	Q306	5250-0804-300	31-	MXR1201
4828-0000-002	40-	CR505	5050-2454-100	57-	Q1504	5250-0804-301	46-	MXR2201
4828-0000-002	40-	CR506	5050-2454-100	57-	Q1506	5250-0806-300	46-	MXR2202
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4828-0000-002	40-	CR508	5050-2601-000	31-	Q1208	5400-5180-901	51- 32	
4828-0000-002	40-	CR509	5105-0002-000	52- 9		5604-0000-004	42-	T801
4828-0000-002	44-	CR701	5105-0002-000	56- 1		5604-5150-100	17-	T301
4828-0000-002	44-	CR702	5105-0002-000	58- 51		5604-5152-403	52-	T1701
4828-0000-002	44-	CR703	5105-0005-000	52- 10		5604-5153-700	57-	T1501
4828-0000-002	44-	CR704	5105-0005-000	56- 2		5650-0500-100	53-	RN5101
4828-0000-002	44-	CR705	5106-0000-003	14- 6		5801-0000-006	46-	FL2204
4828-0000-002	44-	CR706	5106-0000-003	52- 1	F1701	5801-0000-006	46-	FL2209
4828-0000-002	44-	CR707	5106-0000-012	58- 48		5801-0000-006	46-	FL2210
4828-0000-002	44-	CR708	5106-0000-015	14- 7		5801-0000-006	53-	FL5101
4828-0000-002	47-	CR3801	5106-0000-015	58- 1	F3501	5801-0000-006	53-	FL5103
4828-0000-002	47-	CR3802	5106-4505-000	14- 8		5801-0000-006	53-	FL5104
4828-0000-002	47-	CR3803	5106-4505-000	56- 1	F1601	5801-0000-006	53-	FL5105
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4828-0000-002	47-	CR3805	5111-2001-022	18- 1	S201	5801-0000-013	55-	FL3901
4828-0000-002	47-	CR3806	5111-2001-022	19- 1	S201	5801-0000-013	55-	FL3902
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4828-0000-002	49-	CR2403	5111-5021-312	61- 1	S3702	5801-0000-013	55-	FL3905
4828-0000-002	49-	CR2404	5111-5021-312	61- 1	S3703	5801-0000-013	55-	FL3906
4828-0000-002	49-	CR2405	5111-5021-312	61- 1	S3704	5801-0107-200	36-	YFL4305
4831-0000-001	26-	CR4204	5114-0000-002	58- 1	S3502	5801-0107-200	36-	YFL4306
4831-0000-001	26-	CR4205	5114-0000-007	58- 1	S3501	5850-0000-012	8-	G2805
4835-0000-012	19- 2		5121-6012-000	61- 1	S3705	5850-0100-100	9-	G2806
4835-0000-012	19- 3		5121-6012-000	61- 1	S3706	5850-1009-100	7-	G2804
4835-0000-103	51- 12		5135-2026-100	52- 1	S1701	5950-0002-000	13-	SP3601
4835-0000-103	55- 10		5136-0001-000	59- 1	S1301	6001-0000-001	1- 10	
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4901-4937-000	17-	CR303	5136-0001-000	59- 1	S1304	6001-0000-004	1- 13	
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6001-5000-006	1- 19		6045-5184-300	24- 2		7005-5541-000	19- 6	
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6042-5182-300	13-		7005-5144-300	19- 4				
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6045-5182-700	13-		7005-5540-100	16-				
6045-5184-000	61- 1		7005-5540-200	58-				
6045-5184-100	24- 1		7005-5540-300	51-				

## CERTIFICATION

IFR, Inc., certifies that this instrument has been thoroughly tested and inspected and found to meet currently published specifications at the time of shipment from the factory. Test Data Sheets, containing factory measured calibration parameters, will be retained for a period of 1 year from date of delivery, at which time factory calibration expires. Copies are available upon request from IFR Customer Service Department for a nominal reproduction fee.

Certified calibration, including a Statement of Compliance issued by IFR Metrology Lab to certify that calibration is directly traceable to the National Bureau of Standards to the extent allowed by the NBS, is also available through IFR Customer Service Department. All requests for certified calibration must be accompanied by a purchase order.



## GENERAL INFORMATION

### WARRANTY INFORMATION CARDS

Warranty registration cards are completed and mailed to factory by owner's authorized IFR Distributor, within ten (10) days after retail sale. Owner will be mailed a copy of warranty card, to be retained for personal records.

### SHIPPING PROCEDURES

Retain all original shipping cartons for possible future use, in event test instrument is to be returned to factory for calibration and/or repair. Use of containers other than originals, could cause equipment damage which would not be repairable under warranty and could result in warranty of set being voided. Damaged original IFR shipping cartons will be replaced at no charge to customer.

When returning units to factory for calibration, service or repair, please include antennas and attenuation pads. Return of power cords is not necessary.

Units will be returned to customers utilizing same conveyances by which received when possible.

### CERTIFIED CALIBRATION COSTS

Periodic certified calibration, traceable to National Bureau of Standards (as required by FAA and FCC regulations) is not covered by IFR Warranty. Calibration fees\* are listed below:

Instrument Model	Cost	Instrument Model	Cost
A7550	\$275.00	FM/AM-1500	\$400.00
A8000	\$300.00	I-1402	\$300.00
ATC-600	\$250.00	L-1000	\$115.00
ATC-600A	\$250.00	MDL-111A	\$ 75.00
ATC-1200	\$299.00	MLS-800	\$300.00
ATC-1200Y3	\$299.00	MM-100	\$ 75.00
ATC-1400	\$400.00	MM-100E	\$ 75.00
ATC-1400A	\$400.00	NAV-401L	\$250.00
COMM-760	\$200.00	NAV-402AP	\$300.00
CS-360D	\$200.00	NAV-750	\$245.00
FM/AM-500	\$200.00	NAV-750A	\$255.00
FM/AM-500A	\$200.00	NAV-750B	\$255.00
FM/AM-1000A	\$275.00	NAV-750BR	\$275.00
FM/AM-1000S	\$300.00	RD-300	\$300.00
FM/AM-1100A	\$275.00	RD-301	\$400.00
FM/AM-1100S	\$300.00	RDX/RDC-3000	\$300.00
FM/AM-1200	\$300.00	RDX/RDC-7708	\$400.00
FM/AM-1200A	\$275.00	S-1403	\$300.00
FM/AM-1200S	\$300.00	T-1200SR	\$300.00
		T-1200SRA	\$300.00
		T-1401	\$300.00

MISCELLANEOUS FEES\*

A \$10.00 minimum billing charge exists for non-warranty parts. Parts sent to customers will be insured only if IFR cost of contents exceeds \$50.00. Warranty on batteries in portable units is 90 days.

CUSTOMER SERVICE INFORMATION

For calibration scheduling or service related information, contact IFR Customer Service Dept. at following :

IFR Systems, Inc., Customer Service Dept.  
10200 West York Street, Wichita, Kansas 67215      Tel. (800)-835-2350

\* Prices and availabilities subject to change without notice.

Bill Baker, Director-Product Service  
Ken Lewis, Manager-Quality Assurance

SEPTEMBER 22, 1987

## LIMITED WARRANTY AND SERVICE INSTRUCTIONS

### LIMITED WARRANTY.

1. IFR, Inc., warrants that each new instrument manufactured by it is free from defects in material or workmanship under normal use and service for a period of two years from the shipping date. (NOTE: 90 day warranty on battery pack). Each instrument is functionally tested immediately prior to shipment. If, upon examination by IFR, the instrument is determined to be defective in workmanship or material, IFR will, subject to the conditions set forth below, either repair the defective part or replace it with a new part on a pro rata basis. IFR shall not be liable for any delay or failure to furnish a replacement part resulting directly or indirectly from any governmental restriction, priority or allocation or any other governmental regulatory order or action, nor shall IFR be liable for damages by reason of the failure of the instrument to perform properly or for any consequential damages. The warranty does not apply to any instrument that has been subject to negligence, accident, shipping damage, misuse or improper installation or operation, or that in any way has been tampered with, altered or repaired by any person other than an authorized IFR service organization or any employee thereof, or to any instrument whose serial number has been altered, defaced or removed, or to any instrument purchased within, and thereafter removed beyond, the continental limits of the United States. Annual recalibration is not included in warranty.
2. All sales are FOB IFR Factory, Wichita, Kansas. IFR will assume responsibility for freight charges on all legitimate warranty claims filed within thirty (30) days from the original shipping date. Warranty claims filed between thirty (30) and ninety (90) days after original shipping date can be forwarded to IFR freight collect and will be returned to customer freight collect. All freight on warranty claims after ninety (90) days will be paid by the customer.
3. This warranty shall, at IFR's option, become void if the equipment ownership is changed, unless the prior owner or the proposed owner obtains IFR approval of continuation of the warranty prior to the change of ownership.
4. This warranty is in lieu of all other warranties, expressed or implied, and no one is authorized to assume any liability on behalf of IFR or impose any obligation upon it in connection with the sale of any instrument, other than as stated above.

CHANGES IN SPECIFICATIONS.

1. The right is reserved to change the published specifications of the equipment at any time and to furnish merchandise in accordance with current specifications without incurring any liability to modify equipment previously sold, or to supply new equipment in accordance with earlier specifications except under the classification of special apparatus.

SERVICE.

1. When requesting service, the originator shall give IFR information concerning the nature of the failure and the manner in which the equipment was used when the failure occurred. Type, model, and serial number should also be provided.
2. Do not return any products to the factory without first receiving authorization from the factory Customer Service Department.

CONTACT:

IFR, Inc.  
10200 W. York Street  
Wichita, Kansas 67215 USA

ATTN: Customer Service Department

PHONE: (800) 835-2350 (Customer Service Only)

TWX: 910-741-6952

3. Unless otherwise specifically requested, packaging for a return shipment shall be in the original container and packaging material. If the original container and material are not available, information as to suitable packaging techniques will be provided by the IFR Customer Service Department.
4. Returned material claimed defective, but found to meet all previously applicable specifications, will be subject to a minimum evaluation charge consisting of the labor charges involved in the status determination of the material.
5. Returned material not accompanied by statement of claimed defects may be returned at the originator's expense.
6. Any departure from the above instructions without specific factory authorization can be considered a breach of warranty, and all expenses incurred as a result will be billed to the originator.



# APPENDICES

## APPENDIX A - FM/AM-1200S/A SPECIFICATIONS

### A-1 RF SIGNAL GENERATOR

Frequency Range:	250 kHz to 999.9999 MHz in 100 Hz increments.
Frequency Accuracy:	$\pm 5$ Hz + Master Oscillator (S/N thru 4490 for FM/AM-1200S, S/N thru 1448 for FM/AM-1200A). See Master Oscillator for FM/AM-1200S S/N 4491 and after (S/N 1449 and after for FM/AM-1200A).
Residual FM:	<100 Hz RMS (300 Hz to 3 kHz Bandwidth)
Harmonics:	2nd Harmonic $\leq -30$ dBc 3rd Harmonic $\leq -45$ dBc
Non-Harmonics & Spurious: (at offset from selected frequency)	$\pm 10$ kHz to $\pm 1.5$ MHz: $\leq 30$ dBc in band, $\pm 1.5$ MHz to band end: $\leq -55$ dBc
RF Output Power:	-127 dBm to -20 dBm (10 dB steps with 11 dB range vernier) into 50 Ohms.
RF Output Accuracy:	$\pm 2.5$ dB
Variable Generate:	When in the "locked" position, the generator is phase-locked to the master oscillator. When switched from the "locked" position, the generator may be varied $\pm 10$ kHz.
Internal Modulation:	
Deviation Range:	0 to 50 kHz (with 1 kHz tone).
% AM Range:	0 to 90% (with 1 kHz tone).
External Modulation:	
Frequency Response:	FM: 2 Hz to 30 kHz (DC when in variable generate). AM: 10 Hz to 10 kHz (30% maximum modulation above 5 kHz).
Modulation Sensitivity:	FM: .1 VRMS/kHz (-0 to +30%) AM: .01 VRMS/% (-0 to +30%)
Distortion: (at 1 kHz sine)	FM: <1% to 20 kHz deviation AM: <10% to 60% modulation
Input Impedance:	600 Ohms nominal

## A-2 DUPLEX GENERATOR

Frequency Range:  $\pm 49.99$  MHz from receive frequency in 10 kHz steps.

Frequency Resolution: 2.5 kHz

Frequency Accuracy: (See Master Oscillator)

Output Level:

Duplex Port: -60 dBm  $\pm 10$  dB fixed level into 50 ohm.

Input Protection: 0.25 WATT (maximum without damage)

Transmission Port: -80 dBm  $\pm 10$  dB fixed level

## A-3 RECEIVE/MONITOR

Frequency Range: 100 kHz to 999.9999 MHz in 100 Hz increments.

Sensitivity: 2  $\mu$ V (1 MHz to 1000 MHz, FM narrow).

Selectivity (at 3 dB):

<u>MODE</u>	<u>RECEIVER BANDWIDTH</u>	<u>AUDIO BANDWIDTH</u>
FM WIDE	200 kHz	80 kHz
FM MID	200 kHz	8 kHz
FM NAR	15 kHz	8 kHz
SSB	6 kHz	8 kHz
AM NAR	6 kHz	8 kHz
AM NORM	15 kHz	8 kHz

Adjacent Channel Rejection:

<u>RECEIVER BANDWIDTH</u>	<u>GREATER THAN 40 dB DOWN</u>
200 kHz	$\pm 300$ kHz
15 kHz	$\pm 27$ kHz
6 kHz	$\pm 15$ kHz

Demodulation Output:

Impedance: 600 Ohms

Output Level: (Into an open circuit):  
FM: 60 mVRMS/1 kHz (nominal)  
AM: 5 mVRMS/% (nominal)

Receiver Antenna:  
Input Protection: 0.25 WATT (maximum without damage)

#### **A-4 POWER METER**

Range: 0 to 15 and 0 to 150 WATTS peak or average responding.

Accuracy: 1 to 600 MHz  $\pm 7\%$  of reading  $\pm 3\%$  of full scale. 600 to 1000 MHz  $\pm 20\%$  of reading  $\pm 3\%$  of full scale.

Input Power: 50 WATTS continuous  
>50 to 150 WATTS, one minute "ON", five minutes "OFF".

#### **A-5 FREQUENCY ERROR METER**

RF Accuracy:  $\pm$ Master Oscillator  
 $\pm 3\%$  of full scale

RF Ranges:  $\pm 10$  kHz,  $\pm 3$  kHz,  $\pm 1$  kHz,  
 $\pm 300$  Hz,  $\pm 100$  Hz,  $\pm 30$  Hz full scale

Audio Counter:

Frequency Range: 10 Hz to 12 kHz

Accuracy:  $\pm 0.01\%$   $\pm 3\%$  of full scale

Ranges:  $\pm 300$  Hz,  $\pm 30$  Hz,  $\pm 3$  Hz full scale

#### **A-6 MODULATION METER**

FM Deviation:

Accuracy:  $\pm 5\%$  of reading,  
 $\pm 3\%$  of full scale for a 1 kHz tone.

Ranges: 2 kHz, 6 kHz, 20 kHz, 60 kHz full scale.

AM% Modulation:

Accuracy:  $\pm 5\%$  of reading.  
 $\pm 3\%$  of full scale for a 1 kHz tone.

Ranges: 60%, 200% full scale.

## **A-7 SINAD DISTORTION METER**

Sinad: 3 to 20 dB at 1 kHz.  
Accuracy:  $\pm 1$  dB at 12 dB SINAD.  
Input Level: 0.25 VRMS to 2 VRMS (10 VRMS maximum SINAD).  
Distortion Range: 0 to 20% at 1 kHz.  
Accuracy:  $\pm 1\%$  at 10% distortion.  
Input Level: 0.25 VRMS to 2 VRMS  
10 VRMS maximum.  
Impedance: 10K Ohm Nominal

## **A-8 FUNCTION GENERATOR**

Functions: SINE, SQUARE, RAMP, TRIANGLE, DTMF, TONE  
SEQ AND DCS.  
Tone Accuracy:  
Fixed: (Same as Master Oscillator)  
Variable:  $\pm 0.01\%$   
Tone Distortion: (At 2.5 VRMS output)  
Fixed:  $< 0.5\%$   
Variable (SINE):  $< 2\%$  (10 Hz to 100 Hz)  
 $< 0.7\%$  TYPICAL (100 Hz to 30 kHz).  
Tone Output Level: Variable to 2.5 VRMS minimum, either tone  
into 150 Ohm load.  
Frequency Range:  
(Variable): 10 Hz to 30 kHz in 0.1 Hz increments.  
DTMF ENCODE:  
Deviation: 3.5 kHz Fixed ( $\pm 500$  Hz)  
Mark Time: 50 mSec Minimum  
Space Time: 50 mSec Minimum  
DTMF Decode (Optional): See Digital Voltmeter

## **A-9 OSCILLOSCOPE**

Display Size: 2 inches X 2½ inches.

Vertical Bandwidth: DC to 1 MHz (at 3 dB Bandwidth)

External Vertical:

Input Ranges: 10 mV, 100 mV, 1 V, 10 V, per division.

Horizontal Sweep:

Rate: FM/AM-1200A - 10 mSec, 1 mSec, 100 µSec,  
10 µSec per division.  
1 µSec per division.

FM/AM-1200S - 10 mSec, 1 mSec, 100 µSec,  
10 µSec per division.

## **A-10 DIGITAL VOLTMETER (Optional)**

AC Volts:

Frequency Range: 45 Hz to 10 kHz

Voltage Range: 0 to 100 VRMS,

Accuracy: ±10% ±2 Counts

DC Volts:

Voltage Range: 0 to ±100 VDC

Accuracy: ±10% ±2 Counts

## **A-11 MASTER OSCILLATOR**

Standard TCXO:

Accuracy: 0.5 PPM (0.50° C)

Aging: 1 PPM per year

Optional TCXO: (Option 01)

Accuracy: 0.2 PPM (0-50° C)

Aging: 0.5 PPM per year

Optional Oven Oscillator: (Option 02)

Accuracy: 0.05 PPM (0-50° C)

Aging: 0.25 PPM per year

## A-12 GENERATE AMPLIFIER (Optional)

Gain: 30 ±2 dB typical, 250 kHz to 1000 MHz  
Test Set Output with  
Amplifier Installed: Variable to +10 dBm, FM, CW  
Variable to +4 dBm, AM

## A-13 GENERAL CHARACTERISTICS

Temperature Range: 0 to 50° C

## A-14 POWER REQUIREMENTS

Line: 105 - 130/210 - 260 VAC  
50 - 400 Hz at 60 WATTS typical.  
Ext. DC: 12 - 30 VDC nominal, 3.5 AMPS at 12 V  
typical, 1.5 AMPS at 28 V typical

## A-15 SPECTRUM ANALYZER (FM/AM-1200S Only)

Log Scale: Within ±2 dB linearity from -30 dBm to  
-90 dBm indication.

Dynamic Range: 70 dB (from display reading of -30 to  
-100).

Modes:	<u>SCAN WIDTH</u>	<u>BANDWIDTH</u>
	1 MHz/DIV	30 kHz
	500 kHz/DIV	30 kHz
	200 kHz/DIV	30 kHz
	100 kHz/DIV	30 kHz
	50 kHz/DIV	30 kHz
	20 kHz/DIV	3 kHz
	10 kHz/DIV	3 kHz
	5 kHz/DIV	3 kHz
	2 kHz/DIV	300 Hz
	1 kHz/DIV	300 Hz

## **A-12 GENERATE AMPLIFIER (Optional)**

Gain: 30  $\pm$ 2 dB typical, 250 kHz to 1000 MHz

Test Set Output with  
Amplifier Installed: Variable to +10 dBm, FM, CW  
Variable to +4 dBm, AM

## **A-13 DIGITAL VOLTMETER/DTMF DECODE (Optional)**

AC Volts:

Frequency Range: 45 Hz to 10 kHz

Voltage Range: 0 to 100 VRMS

Accuracy:  $\pm$ 10%

DC Volts:

Voltage Range: 0 to  $\pm$ 100 V

Accuracy:  $\pm$ 10%

DTMF DECODE:

Deviation: 1 kHz Minimum

Mark Time: 50 mSec Minimum

Space Time: 50 mSec Minimum

Sensitivity: 20 dBm FM Quieting

## **A-14 GENERAL CHARACTERISTICS**

Dimensions: 13.06" wide, 7.30" high, 17.50" deep  
(33.2 cm wide, 18.5 cm high, 44.5 cm deep)

Weight: 32 lbs. (14.5 kg) (without options)

Temperature Range: 0 to 50° C

## **A-15 POWER REQUIREMENTS**

Line: 105 - 130/210 - 260 VAC  
50 - 400 Hz at 60 WATTS typical.

Ext. DC: 12 - 30 VDC nominal, 3.5 AMPS at 12 V  
typical, 1.5 AMPS at 28 V typical

## APPENDIX B - TEST EQUIPMENT REQUIREMENTS

### B-1 GENERAL

This appendix contains a list of test equipment suitable for performing all of the maintenance procedures contained in this manual. Any other equipment meeting the specifications listed in this appendix may be substituted in place of the recommended models. It should be noted that the equipment listed in this appendix may exceed the minimum required specifications for some of the procedures contained in this manual.

### B-2 RECOMMENDED TEST EQUIPMENT

TYPE	MANUFACTURER & MODEL	SPECIFICATIONS
Oscilloscope	Tektronix 465B	DC to 100 MHz 5 mV/div vertical trace 2 nS/div sweep rate Dual Trace
Spectrum Analyzer	Tektronix 7613 Frame  Tektronix 7L13/U Spectrum Analyzer	Variable Persistence Storage Oscilloscope  Frequency Range: 1 kHz to 2.5 GHz Resolution Bandwidth: 30 Hz to 3 MHz
Tracking Generator	Tektronix TM503 Frame  Tektronix TR502 Tracking Generator	Three-wide Mainframe  Frequency Range: 100 kHz to 1.8 GHz Output Level: 0 dBm, $\pm 0.5$ dB Power Range: 0 to -59 dBm in 10 and 1 dB steps
Frequency Counter	Fluke Model 7220A	Frequency Range: 5 Hz to 1300 MHz
Digital Multimeter	Fluke Model 8010A	3½ digit, $\pm 0.1\%$ basic DC accuracy
Distortion Analyzer	Sound Technology Model 1700B	Frequency Range: 10 Hz to 110 kHz Accuracy: .002% distortion AC Voltage Accuracy: 2%



TYPE	MANUFACTURER & MODEL	SPECIFICATIONS
Function Generator	Wavetek 182A	Frequency Range: .004 Hz to 4 MHz Functions: Sine, Triangle & Square High Level Output: 20 Vp-p (10 Vp-p into 50Ω)
Signal Generator	Hewlett Packard 8640B	Frequency Range: 1 to 1000 MHz Resolution: 0.1 to 100 Hz Accuracy: $2 \times 10^{-6}$ RF Output: +20 to -130 dBm
Modulation Meter	Boonton Model 82AD	Frequency Range: 10 MHz to 1.2 GHz Accuracy: FM: $\pm 2\%$ of reading from 30 Hz to 100 kHz Accuracy: AM: $\pm 2\%$ of reading from 10 Hz to 90% AM and 5% of reading below 10% and above 90%; from 30 Hz to 100 kHz Resolution: 0.1% of full scale for FM and AM
RF Power Source	MCL 15122 Main Frame 6048 Oscillator Module	Frequency Range: 50 to 200 MHz Power Range: 0 to 65 W

TYPE	MANUFACTURER & MODEL	SPECIFICATIONS
RF Power Meter with Power Detector	Boonton RF Microwatt- meter Model 42 BD	Frequency Range: 200 kHz to 18 GHz Power Range: 1.0 nW to 10 mW Accuracy: $\pm 0.25\%$ fs $\pm 0.15$ dB >10 nW
	Boonton Power Sensor Model 41-4A	Frequency Range: 200 kHz to 7 GHz Power Range: 1 nW to 10 mW Accuracy: $\pm 0.3$ dB >10 nW
Power Supply	B&K 1601	Regulation: .1% or 1 mV Ripple: 5 mV Voltage Range: 0-50 VDC @ 0-2 A

# APPENDIX C - TABLE OF USER I/O PORTS/CONNECTOR PIN-OUT TABLES

## C-1 TABLE OF I/O PORTS

CONNECTOR NAME	CONNECTOR TYPE	SIGNAL INPUT/OUTPUT	SIGNAL TYPE
T/R	BNC	Input/Output	RF
AUX PWR	Banana Jack	Output	+12 VDC
DUPLEX Output	BNC	Output	RF
EXT MOD/SINAD	BNC	Input/Output	Audio
DEMOD	BNC	Output	Audio
TONE OUT	BNC	Output	Audio
MIC/ACC	5 Pin Microphone Connector	Input/Output	See Pin Out
SCOPE/DVM	BNC	Input	DC to 1 MHz; AC or DC
ANT	BNC	Input	RF
RS-232	25 Pin, Type D	Input/Output	See Pin Out
External Reference	BNC	Input/Output	10 MHz RF

## C-2 PIN OUT TABLE FOR MIC/ACC CONNECTOR

MIC/ACC CONNECTOR PIN ASSIGNMENTS			
Pin No.	Signal Name	Signal Type	Input/Output
1	+12 VDC	DC Voltage	1/8 AMP Fused Output
2	Chassis GND		
3	Mic Key	Switched	GND for Generate
4	Mic Audio	Audio	Input
5	Tone Key	Switched	GND to Remove Variable Tone

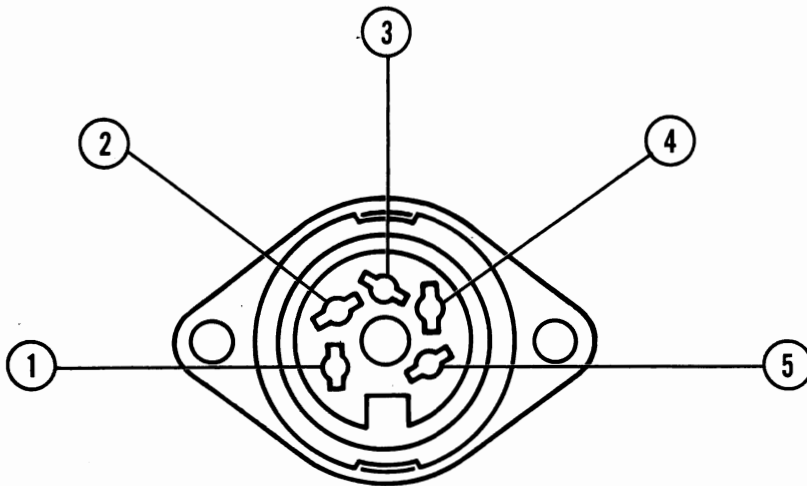


Figure C-1 - MIC/ACC Connector Pin Identification (Front View)

### C-3 PIN-OUT TABLE FOR RS-232 CONNECTOR

RS-232 CONNECTOR PIN ASSIGNMENTS		
(The FM/AM-1200S/A is used as a terminal.)		
Pin No.	Input/Output	Remarks
2 (RXD)	← Commands	
3 (TXD)	Info →	
4 (RTS)	→	If low, FM/AM-1200S/A can receive command. If high FM/AM-1200S/A is busy.
5 (CTS)	←	If low, terminal is not ready to receive. If not used, it must be tied high.
7 (Common Ground)		
1, 6 and 8 thru 25 not used		

#### FM/AM-1200S/A PROTOCOL

No Parity

Must Be Half Duplex

Must Be Upper Case

8 Data Bits Per Character

Bit 8 Must Be Zero (Most Significant Bit)

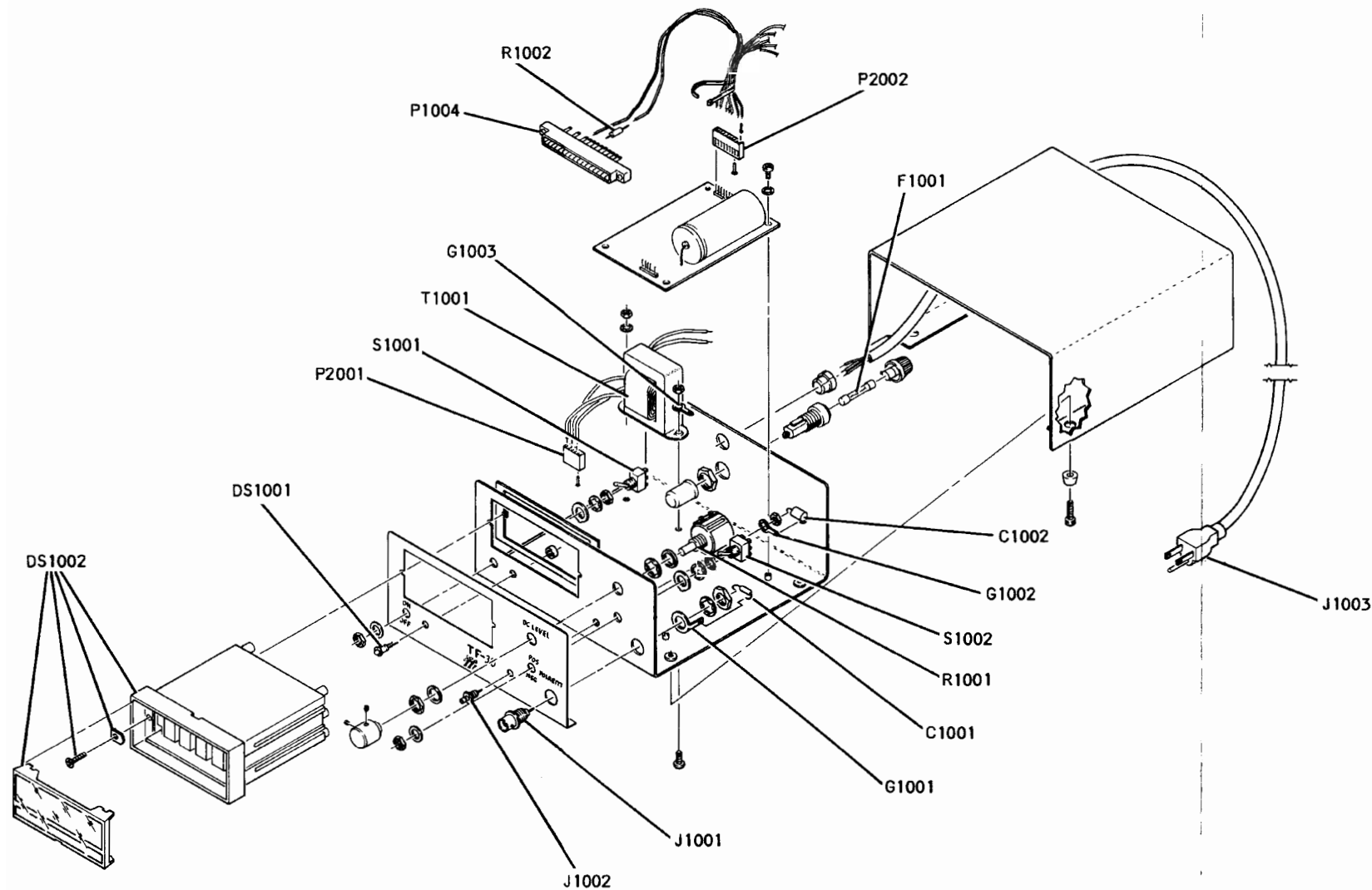
1 Stop Bit (End Of Character)

High Level = -12V

Low Level = +12V



D-3 TF-30 TUNE FIXTURE



REF DES	DESCRIPTION	IFR PART NO.	QTY
	TUNE FIXTURE ASSEMBLY		
J1001	CONNECTOR, BNC	2113-0000-020	1
J1002	CONNECTOR, SMB	2123-0000-038	1
J1003	CABLE ASSY, AC POWER	6041-0000-001	1
P1004	CONNECTOR, CARD EDGE	2122-0000-018	1
P2001	CONNECTOR, WAFER	2115-0000-006	1
P2002	CONNECTOR, WAFER	2115-0000-013	1
C1001	CAPACITOR .10 $\mu$ F, 50 V	1521-0000-008	1
C1002	CAPACITOR .15 $\mu$ F, 50 V	1646-1540-098	1
DS1001	LED GRN	4950-0300-200	1
DS1002	DISPLAY, DIGITAL VOLTMETER	4600-0000-006	1
F1001	FUSE, FAST BLO 1 A, 250 V		1
G1001	LUG, GND 3/8"	2850-0000-025	1
G1002	LUG, GND 3/8"	2850-0000-041	1
G1003	LUG, GND #4 INT TOOTH	2850-0000-014	1
R1001	RESISTOR, VAR 10 K	4770-8810-300	1
R1002	RESISTOR 5%, 1/4 W, 1 K	4702-0102-003	1
S1001	SWITCH, TOGGLE	5114-0000-001	1
S1002	SWITCH, TOGGLE	5114-0000-004	1
T1001	TRANSFORMER	5604-0000-002	1
J2001	TUNE FIXTURE, PC BD	7010-9806-900	1
J2002	CONNECTOR, WAFER	2115-1001-006	1
C2001	CONNECTOR, WAFER	2115-0000-016	1
C2001	CAPACITOR 400 $\mu$ F, 180 V	1580-4010-800	1
C2002	CAPACITOR 10 $\mu$ F, 35 V	1580-1000-350	1
C2003	CAPACITOR 1000 $\mu$ F, 35 V	1580-1020-358	1
C2004	CAPACITOR 1 $\mu$ F, 35 V	1507-0105-118	1
C2005	CAPACITOR 1 $\mu$ F, 50 V	1502-0105-007	1
CR2001	DIODE, RECT 1N4004	4815-0000-002	1
CR2002	DIODE, RECT 1N4004	4815-0000-002	1
CR2003	DIODE, SIGNAL 1N4148	4815-0000-003	1
CR2004	DIODE, SIGNAL 1N4148	4815-0000-003	1
CR2005	DIODE, ZENER 10 V	4818-0000-001	1
CR2006	DIODE, ZENER 6.9 V	4818-0000-015	1
Q2001	TRANSISTOR 2N2905	4801-0000-004	1
Q2002	TRANSISTOR 2M2405	4801-0000-002	1
R2001	RESISTOR 5%, 1/4 W, 470 OHM	4702-0471-003	1
R2002	RESISTOR 5%, 1/4 W, 47 OHM	4702-0470-003	1
R2003	RESISTOR 5%, 1/4 W, 470 OHM	4702-0471-003	1
R2004	RESISTOR 5%, 1/4 W, 22 K	4702-0223-003	1
R2005	RESISTOR 5%, 1/4 W, 5.6 K	4702-0562-003	1
R2006	RESISTOR, VAR 2 K	4752-0202-002	1
R2007	RESISTOR 5%, 1/4 W, 1 K	4702-0102-003	1
R2008	RESISTOR 5%, 1/4 W, 330 OHM	4702-0331-003	1
R2009	RESISTOR 5%, 1/4 W, 3.3 K	4702-0332-003	1
R2010	RESISTOR 5%, 1/4 W, 100 OHM	4702-0101-003	1
R2011	RESISTOR 1%, 1/4 W, 100.00 OHM	4706-1003-001	1
R2012	RESISTOR 1%, 1/4 W, 909.00 OHM	4706-9090-001	1
R2013	RESISTOR, VAR 200 OHM	4752-0201-002	1
U2001	IC, DUAL J-FET OP AMP LF412	3135-0000-054	1
U2002	IC, REGULATOR 78M12C	5750-0000-010	1
	WIRE, BUS 22 GA	1050-0000-073	1

Figure D-2 TF-30 Tune Fixture Assembly (Sheet 1 of 2)





## APPENDIX E - dBm TO MICROVOLT CONVERSION CHART

dBm	μV	dBm	μV	dBm	μV
0	224,000	-47	1,000	-94	4.47
-1	200,000	-48	891	-95	3.99
-2	178,000	-49	795	-96	3.55
-3	159,000	-50	709	-97	3.17
-4	141,000	-51	633	-98	2.82
-5	126,000	-52	563	-99	2.52
-6	112,000	-53	501	-100	2.24
-7	100,000	-54	447	-101	2.00
-8	89,100	-55	399	-102	1.78
-9	79,500	-56	355	-103	1.59
-10	70,900	-57	317	-104	1.41
-11	63,300	-58	282	-105	1.26
-12	56,300	-59	252	-106	1.12
-13	50,100	-60	224	-107	1.00
-14	44,700	-61	200	-108	0.891
-15	39,900	-62	178	-109	0.795
-16	35,500	-63	159	-110	0.709
-17	31,700	-64	141	-111	0.633
-18	28,200	-65	126	-112	0.563
-19	25,200	-66	112	-113	0.501
-20	22,400	-67	100	-114	0.447
-21	20,000	-68	89.1	-115	0.399
-22	17,800	-69	79.5	-116	0.355
-23	15,900	-70	70.9	-117	0.317
-24	14,100	-71	63.3	-118	0.282
-25	12,600	-72	56.3	-119	0.252
-26	11,200	-73	50.1	-120	0.224
-27	10,000	-74	44.7	-121	0.200
-28	8,900	-75	39.9	-122	0.178
-29	7,950	-76	35.5	-123	0.159
-30	7,090	-77	31.7	-124	0.141
-31	6,330	-78	28.2	-125	0.126
-32	5,630	-79	25.2	-126	0.112
-33	5,010	-80	22.4	-127	0.100
-34	4,470	-81	20.0	-128	0.0891
-35	3,990	-82	17.8	-129	0.0795
-36	3,550	-83	15.9	-130	0.0709
-37	3,170	-84	14.1	-131	0.0633
-38	2,820	-85	12.6	-132	0.0563
-39	2,520	-86	11.2	-133	0.0501
-40	2,240	-87	10.0	-134	0.0447
-41	2,000	-88	8.91	-135	0.0399
-42	1,780	-89	7.95	-136	0.0355
-43	1,590	-90	7.09	-137	0.0317
-44	1,410	-91	6.33	-138	0.0282
-45	1,260	-92	5.63	-139	0.0252
-46	1,120	-93	5.01	-140	0.0224

## APPENDIX F - REPACKING FOR SHIPMENT

### F-1 SHIPPING INFORMATION

IFR test sets returned to factory for calibration, service or repair must be repackaged and shipped subject to the following conditions:

Do not return any products to factory without first receiving authorization from IFR Customer Service Department.

CONTACT:

Customer Service Dept.  
IFR, Inc.  
10200 West York Street  
Wichita, Kansas 67215

Telephone: (800)-835-2350  
TWX: 910-741-6952

All test sets must be tagged with:

- a. Owner's identification and address.
- b. Nature of service or repair required.
- c. Model No.
- d. Serial No.

Sets must be repackaged in original shipping containers using IFR packing molds. If original shipping containers and materials are not available, contact IFR Customer Service Dept. for shipping instructions.

All freight costs on non-warranty shipments are assumed by customer. (See "Warranty Packet" for freight charge policy on warranty claims.)

### F-2 REPACKING PROCEDURE (Reference - Figure F-1)

1. Make sure bottom packing mold is seated on floor of shipping container.
2. Carefully wrap test set with polyethylene sheeting to protect finish.
3. Place test set into shipping container, making sure set is securely seated in bottom packing mold.
4. Place top packing mold over top of set and press down until mold rests solidly on bottom packing mold.
5. Close shipping container lids and seal with shipping tape or an industrial stapler. Tie all sides of container with break resistant rope, twine or equivalent.

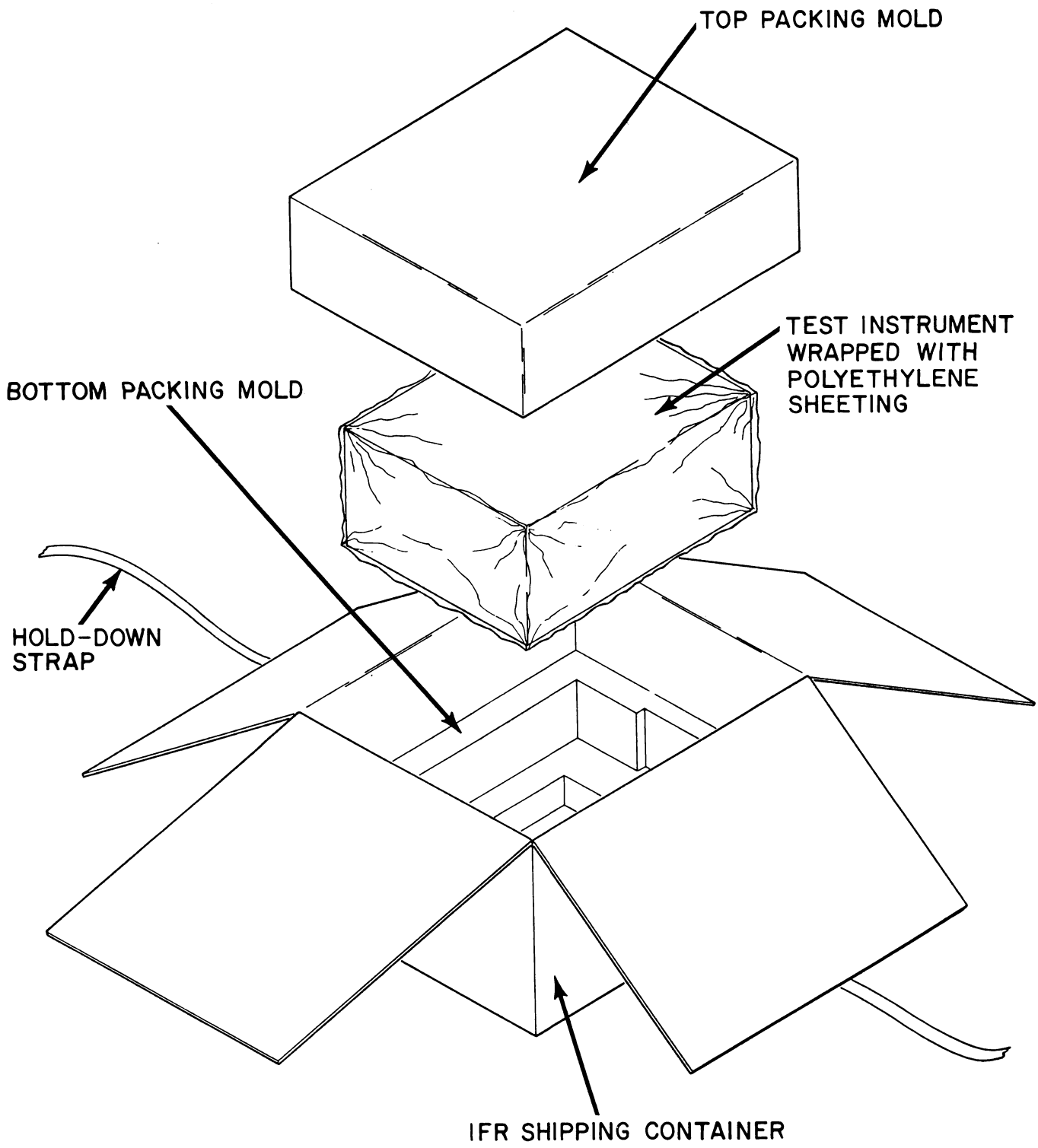


Figure F-1 Repacking for Shipment

## APPENDIX G - ABBREVIATIONS & SYMBOLS

### G-1 GENERAL

Defined below are various abbreviations and symbols which are commonly used throughout the FM/AM-1200S/A Maintenance Manual text.

### G-2 GENERAL ABBREVIATIONS

A	- Ampere
AC or ac	- Alternating Current
Adj	- Adjustment
AGC	- Automatic Gain Control
AM	- Amplitude Modulation
Amp	- Ampere
ANALY DISP.	- Analyzer Dispersion
Assy	- Assembly
BATT	- Battery
BCD	- Binary Coded Decimal
BFO	- Beat Frequency Oscillator
°C	- Degrees Celsius
CAL	- Calibration
ccw	- Counterclockwise
CRT	- Cathode Ray Tube
cw	- Clockwise
CW	- Carrier Wave
DAC	- Digital to Analog Converter
dB	- decibels
dBc	- decibels above or below carrier level
dBm	- decibels above (or below) 1 milliwatt
DC or dc	- Direct Current
DCR	- Duty Cycle Regulator
DEFLEC AMP	- Deflection Amplifier
DEMODO	- Demodulation, demodulate or demodulated
DEV	- Deviation
DMM	- Digital Multimeter
DVM	- Digital Voltmeter
ECL	- Emitter Coupled Logic
EXT ACC	- External Accessory
EXT MOD	- External Modulation
EXT DC	- External Direct Current
°F	- Degrees Fahrenheit
FET	- Field Effect Transistor
FILT	- Filter
FM	- Frequency Modulation
FREQ	- Frequency
GEN	- Generate
GHz	- Gigahertz
GND	- Ground
HI LVL	- High Level
HORIZ	- Horizontal

Hz	- Hertz
IC	- Intergated Circuit
IF	- Intermediate Frequency
INT MOD	- Internal Modulation
IPC	- Illustrated Parts Catalog
Kg/cm <sup>3</sup>	- Kilogram per cubic centimeter
kHz	- kilohertz
L/H	- Left-hand
LOG LIN	- Logarithmic Linearity
LO	- Local Oscillator
mA	- Milliamperes
MAX DISP	- Maximum Dispersion
Mech	- Mechanical
MHz	- Megahertz
MOD	- Modulation
MON	- Monitor
MTR	- Meter
μs	- microsecond
μV	- microvolt
ms or mSec	- millisecond
mV	- millivolt
mW	- milliwatt
MULT	- Multiplier
NC	- Not Connected
N/A	- Not Applicable
NORM	- Normal
OSC	- Oscillator
para	- paragraph
PC Bd	- Printed Circuit Board
PLL	- Phase Lock Loop
Preamp	- Preamplifier
psi	- pounds per square inch
PWR	- Power
PWR MON	- Power Monitor
RCVR	- Receiver
REF	- Reference
RF	- Radio Frequency
R/H	- Right-hand
RMS	- Root Mean Square
ROM	- Read Only Memory
sec	- Seconds
Scope Dev	- Oscilloscope Deviation
SIG	- Signal
SSB	- Single Sideband
SW	- Switch
TCXO	- Temperature Compensated Crystal Oscillator
TRANS	- Transmitter or Transceiver
TTL	- Transistor Transistor Logic
V	- Volts
Vp	- Volts Peak

Vp-p	- Volts Peak-to-Peak
VAC	- Volts Alternating Current
VCO	- Voltage Controlled Oscillator
VDC	- Volts Direct Current
VHF	- Very High Frequency
VOL	- Volume
VRMS	- Volts Root Mean Square
VSWR	- Voltage Standing Wave Ratio
W	- Watts
XMTR	- Transmitter
XTAL	- Crystal

### **G-3 ABBREVIATIONS FOR REFERENCE DESIGNATORS**

BR	- Bridge Rectifier
C	- Capacitor
CR	- Diode
DS	- Display Lamps
E	- Terminal
FL	- Feed-thru Filter
G	- Ground
J	- Connector (Fixed)
K	- Relay
L	- Inductor
M	- Meter
MX	- Mixer
P	- Connector (Movable)
Q	- Transistor
R	- Resistor
SW	- Switch
T	- Transformer
TU	- Tuning Pole
U	- Integrated Circuit
VR	- Voltage Regulator
Y	- Crystal
YFL	- Crystal Filter



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## APPENDIX H - OPTIONAL GENERATE AMPLIFIER (OPTION 05)

### H-1 GENERAL

The Generate Amplifier is a 30 dB amplifier intended to increase the output level of a generated signal above the normal maximum level by the service monitor. It is not designed to receive any signal directly from a Unit Under Test (UUT); however, if properly installed, it can be used to transmit and receive signals "off the air", using the antenna.

#### CAUTION

DO NOT TRANSMIT FROM A UUT DIRECTLY INTO THE GENERATE AMPLIFIER, OR THROUGH AN EXTERNAL ATTENUATOR. DAMAGE TO THE GENERATE AMPLIFIER AND/OR THE SERVICE MONITOR WILL RESULT.

### H-2 INSTALLATION

Insert the banana plug on the Generate Amplifier into the AUX PWR Jack on the Front Panel of the Service Monitor and connect the BNC connector to the T/R Jack.

For Direct Connection To UUT:

Connect coax cable between the UUT Test Jack on the Generate Amplifier and the Microphone Jack or other audio input on the UUT.

For Radio Installation Checkout:

#### WARNING

THIS TEST MUST BE PERFORMED WITH THE SERVICE MONITOR AND UUT INSIDE A SHIELDED AREA TO PREVENT UNRESTRICTED RADIATION OF RF SIGNALS.

Connect coax between Antenna Jack on the Front Panel of the Service Monitor and the Antenna Jack on the Generate Amplifier. Connect accessory antenna to the UUT Test Jack on the Generate Amplifier.

### H-3 OPERATION

Refer to FM/AM-1200S/A Operation Manual, Section 4 and perform the procedures for generating and receiving RF signals.

