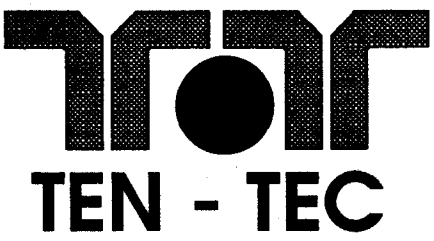

TEN - TEC

OWNER'S MANUAL

PARAGON

MODEL 585

ALL BAND HF
TRANSCEIVER

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INTRODUCTION

The PARAGON is a microprocessor controlled HF transceiver designed for the active, serious amateur. Incorporating the latest digital technology, the PARAGON features direct keypad frequency entry, dual digital VFOs, 62 memories (which store frequency, mode, VFO selection, I-F bandwidth, and a seven digit alphanumeric tag), memory scan (with channel lockout), memory tune via the main tuning knob, and all solid state design including the broadband "no tune" final power amplifier.

The PARAGON covers all amateur bands using CW (with full or semi break-in), SSB (with built-in speech processor), RTTY (true FSK or AFSK), and optional FM.

The general coverage receiver tunes from 100 kHz to 29.999 MHz and includes AM reception.

Chapters 1 and 2 of this manual cover installation and basic operation of the transceiver in order to quickly place the PARAGON into operation. Chapters 3 and 4 provide a more detailed description of the PARAGON's features, controls, and operation. Chapter 5 describes the options available for the PARAGON and how they should be installed. Chapter 6 is the technical reference section and contains detailed circuit descriptions, circuit board pictorials and schematic diagrams.

UNPACKING

Examine your Model 585 PARAGON for signs of shipping damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. Retain all damaged cartons. Liability for shipping damage rests with the carrier.

It is recommended that you keep the shipping carton and fillers in the event that storage, moving or reshipment becomes necessary. An accessory packet, warranty card, and manual are packed with the PARAGON. Make sure that you have not overlooked anything.

SPECIFICATIONS

GENERAL

FREQUENCY RANGE	Receive: 100 kHz to 29.9999 MHz Transmit: Standard Ham Bands 160M — 10M (Note: For operation outside Ham Bands contact factory.)
FREQUENCY CONTROL	Microprocessor controlled digital PLL synthesizer. 10 Hz resolution.
FREQUENCY READOUT	7 digit 10 Hz fluorescent readout.
FREQUENCY STABILITY	Worst case, 1 PPM per degree C. at 29.999MHz.
ANTENNA IMPEDANCE	50Ω unbalanced.
POWER REQUIRED	Receive = approx. 1.5A. Transmit = approx. 20 A. @ 13.8 VDC.
CONSTRUCTION	Rigid aluminum chassis. Extruded aluminum front panel. Textured top and bottom, snap up stainless steel bail.
DIMENSIONS	HWD 5-3/4" x 14-3/4" x 17"—14.6 x 37.4 x 43.2 cm.
NET WEIGHT	16 lbs.—7.25 kg.

TRANSMITTER

MODES	USB, LSB, CW, RTTY (FSK or AFSK), (FM optional).
DC POWER INPUT	Maximum 200 watts @ 14 VDC CW, SSB, (FM). 100% duty cycle for up to 20 minutes. Continuous with auxiliary air cooling.
RF POWER OUTPUT	25 to 100 watts adjustable with front panel RF PWR control.
MICROPHONE INPUT	High/Low impedance. Four pin, front panel connector accepts microphones with 5mV (-62 dB) output. Polarizing voltage is provided for electrets.
T/R SWITCHING	VOX or PTT on SSB. Switchable FAST or SLOW QSK on CW.
CW SIDETONE	Internally generated, adjustable tone and volume independant of AF GAIN control.
SSB GENERATION	9 MHz, 8-pole crystal ladder filter. Balanced modulator.
CARRIER SUPPRESSION	60 dB typical.
UNWANTED SIDEBAND SUPPRESSION	60 dB typical at 1.5 kHz tone.
SPURIOUS OUTPUT	More than 45 dB below peak power output.
METER	Switchable forward power, SWR, collector current, audio processing level.
CW OFFSET	750 Hz automatic.
FSK SHIFT	170 Hz.

RECEIVER

MODES

USB, LSB, CW, FSK/AFSK, AM, (FM optional).

SENSITIVITY

FREQUENCY MHz / MODE	.1 - 1.6	1.6 - 29.999	
SSB, CW, RTTY	.5 µV	.15 µV	10 db S/N @ 2.4 kHz
AM	3.5 µV	1.0 µV	10 db S/N @ 6.0 kHz
(FM)	1.0 µV	.30 µV	12 db SINAD @ 15 kHz

SELECTIVITY

SELECTIVITY / FILTER	-6 dB	-60 dB
STANDARD	2.40 kHz	3.36 kHz
AM	6.00 kHz	11.25 kHz
OPTIONAL	1.80 kHz	2.90 kHz
OPTIONAL	.50 kHz	1.40 kHz
OPTIONAL	.25 kHz	.85 kHz
(FM)	15 kHz	30 kHz

ATTENUATOR

Approx. -20 dB for 1.6 to 29.999 MHz, -10 dB for .1 to 1.6 MHz.

I-F FREQUENCIES

1st = 75 MHz, 2nd = 9.0 MHz, 3rd = 6.3 MHz (FM 3rd = 455 kHz).

RX ANTENNA INPUT

Switchable 50Ω phono jack.

IMAGE REJECTION

> 80 dB.

I-F REJECTION

>70 dB.

NOISE BLANKER

Switchable on/off with adjustable width.

S - METER

Automatically switched on during receive. Calibrated to 50 µV at S9 .

DYNAMIC RANGE

100 dB typical.

3 rd ORDER ICP

+18 dBm

SQUELCH SENSITIVITY

AM, CW, SSB, FSK (1.6 - 29.999 MHz) = Less than 1 µV. Optional FM (1.6 - 29.999 MHz) = Less than .4 µV.

PASS BAND TUNING

± 1.2 kHz.

AUDIO OUTPUT

1.5 watts @ 8Ω with less than 2% distortion.

NOTCH FILTER

250 to 2.2 kHz, 50 dB notch typical.

AUDIO BANDPASS FILTER

4 pole, variable center frequency 220 to 1.7 kHz, 35% bandwidth @ -6 dB. Variable fader control selects filtered or flat audio response.

TONE CONTROL

Variable 15 dB rolloff @ 5 kHz.

CHAPTER 1

INSTALLATION

1-1 INTRODUCTION When setting up the station, provide adequate ventilation for the heat sinks on the transceiver and the power supply. Do not confine the transceiver and power supply to a small volume without forced ventilation to circulate cool air around the heat sinks. Also try to select a location that allows comfortable access to the front panel controls and adequate clearance for rear panel connections.

When operating RTTY, SSTV, FM, or other high-duty modes, it is recommended that a small fan be directed on the heat sink. The sink temperature may reach as high as 200° Fahrenheit, which is still within the rating for the transistors, but certainly hot enough to cause a serious burn if touched.

1-2 FIXED STATION & MOBILE The PARAGON, with conventional antennas, will perform with distinction in any ham shack.

The PARAGON may be used for mobile operation in a car, boat, plane, or other vehicle. It operates directly from a 13.8 volt supply source and is self-contained except for key, microphone, and antenna. If desired, the Model 1140 Circuit Breaker may be installed in series with the +13.8 volt supply line. The circuit breaker will function as both an external on/off switch and an over-current protection device for the PARAGON.

NOTE: If the battery voltage drops below 12 volts, the PARAGON will not operate properly.

The SWR meter is especially useful in setting mobile whip antenna lengths to the operating frequency.

WHEN USING AN ALTERNATOR CHARGED BATTERY, **DO NOT** START AND STOP THE VEHICLE'S ENGINE WITH THE PARAGON TURNED ON. High voltage transients, caused by momentarily open regulator contacts, may cause serious damage to the transceiver circuits.

1-3 POWER SUPPLY Use a 12 to 14 VDC negative ground power source capable of delivering 22 amperes, well regulated. When powering from the Model 960 power supply, interconnect units with the cable attached to the power supply.

When other supplies or a battery are used, pin connections to the power socket are as shown in FIGURE 1-1.

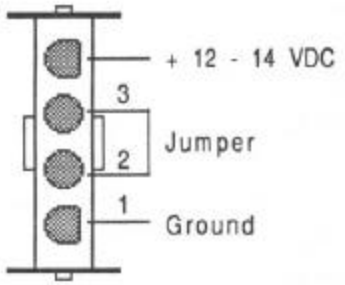


FIGURE 1-1. POWER SUPPLY CONNECTIONS

The front panel POWER switch controls a relay inside the transceiver that switches the high current 13.8 VDC to all circuits except the logic circuits. When using a TEN-TEC

power supply, a wire between pins 2 and 3 enables the primary AC circuit in the power supply when using the supplied cable. The power supply must be turned on BEFORE the PARAGON is turned on. The power supply should be left on at all times and the transceiver turned OFF and ON via the POWER switch in order to retain memories.

If making your own power cable, use number 12 or 14 gauge wire for the plus and minus (GND) leads, with the cable length as short as possible for minimum cable loss.

The PARAGON contains an internal fuse, located in the Lowpass Filter area, under the top shield. If this fuse needs replacing, be sure to use a 25 Amp. Fast Blow.

If additional protection is desired, a Model 1140 Circuit Breaker may be installed in series with the 13.8 VDC supply line.

1-4 ANTENNAS Any antenna presenting 50 to 75 Ω impedance will load satisfactorily. Random length and balanced antennas will require an antenna tuner. Most popular mobile antennas will operate at their resonant frequency without special matching. When they are used as portable antennas, a good ground system or counterpoise should be provided. The PARAGON is designed for use with an unbalanced feed system.

Although improper antennas will not damage the final output transistors, it is suggested that an SWR of 2 to 1 or less be achieved for maximum performance. In cases where the antenna cannot be matched to a better SWR, the PARAGON can be operated at reduced input power by adjusting the RF PWR control. Be sure to readjust the MIC control after reducing the RF PWR level.

1-5 MICROPHONE For SSB operation, plug a low impedance dynamic, or electret microphone into this jack. Amplified microphones can be used if the output level is adjusted to a low enough value to prevent the microphone circuit from overloading. High impedance mics (above 25KΩ) will not work.

1-6 KEY For CW operation, connect a straight key, bug, or electronic keyer to this jack. When using electronic keyers, they should be configured for positive keying, not "grid block" or negative. If configured for negative keying, no damage will occur, but the keying circuit will not operate.

1-7 GROUND In the interest of personal safety and to reduce the possibility of stray RF pickup on interconnecting cables which may cause parasitic oscillations, all station equipment should be well grounded to earth. It is also important to strap all equipment chassis together with short, heavy leads. The strap between the power supply and the transceiver also serves to reduce the voltage drop on the negative lead caused by wire and connector resistance. In mobile installations, connect a ground strap between the rear panel ground lug and the automobile chassis.

1-8 BATTERY BACKUP As long as the PARAGON is connected to a source of 13.8 VDC, the microprocessor and memory RAM circuits will retain all memories, last frequency used, and date & clock information. The front panel POWER switch does not remove power to the logic circuits.

To prevent loss of memory during power failures or while transporting the PARAGON, a backup battery (9 volt alkaline or Ni-Cad) can be installed in the PARAGON.

Refer to PARAGRAPH 5-1.1 for information on removing the top cover. Located in the center of the chassis is the battery holder. A battery clip is included in the packing kit shipped with the PARAGON. With the POWER switch in the ON position, and the PARAGON operating, install the battery in the holder and plug the battery cable into the +9V connector located on the left rear corner of the

large Logic Board. To verify correct installation, turn off the POWER switch and remove the power supply cable. After waiting a minute or two, reconnect the power supply and turn the POWER switch back on. The PARAGON should power up on the same frequency that it was on when you removed power and the clock should not have lost any time. If everything is correct, replace the top cover.

An alkaline battery will provide approximately 150 hours of backup if power is removed, otherwise the battery will last for it's shelf life. If the transceiver is not to be used for long periods of time, it is recommended that the battery be removed to prevent possible corro sion. When using a 9 volt Ni-Cad battery, the power supply should be turned on at least three to four hours per week to keep the battery trickle charged.

CHAPTER 2

CONDENSED OPERATING INSTRUCTIONS

2-1 INTRODUCTION The following instructions will enable the operator to quickly place the PARAGON into operation. Refer to CHAPTER 3 of this manual for more detailed descriptions of the controls and unique functions of the PARAGON.

Refer to CHAPTER 1 for information on connecting power supply, microphone, antenna, and other accessories.

2-2 SELECTING FREQUENCY There are two ways to select frequency, via the keypad and using the main tuning knob. With the keypad, the MHz portion of the frequency is entered first followed by the decimal point. If the frequency is less than 1 MHz, the decimal point is entered first.

After the decimal point, the remaining kHz portion of the frequency is entered and the transceiver will change to the new frequency by pressing the [ENTER] key. Zeros at the end of the frequency, if no more numerals are to follow, do not need to be entered. For whole MHz frequencies, you can simply enter the first one or two digits and then press [ENTER]. The following are examples of different frequencies and how to enter them. If an error is made during the entry procedure, press the [CLEAR] key, and repeat the entry.

Examples:

14.275 MHz:

[1] [4] [.] [2] [7] [5] [ENTER]

21.0 MHz:

[2] [1] [ENTER]

950 kHz:

[.] [9] [5] [ENTER]

2-3 INITIAL FRONT PANEL SETTINGS

Set the front panel controls as follows:

KEYPAD:

Select Mode, press CW,USB or LSB.
Select VFO A, press A/B until annunciator in display indicates "VFO A".
Select 2.4 kHz Bandwidth, press [2.4].

AF ---------- Adjust to suitable audio level
TONE --------- Midway
FADE --------- Max counter-clockwise
BP ---------- Max counter-clockwise
PBT---------- Midway
NOTCH------- Max counter-clockwise
MIC ---------- Max counter-clockwise
RF PWR ------ Max counter-clockwise
RF ---------- Max clockwise
SQL ---------- Max counter-clockwise
METER ------- FWD
NB ---------- OFF
VOX/PTT ---- PTT
QSK ---------- FAST
AGC---------- ON & SLOW
ATTN --------- OFF
PROC --------- OFF

2-4 TRANSMIT

CW --- Press TUNE key on keypad and adjust RF PWR control for desired output power as observed on meter. Press TUNE key again to return to transceive mode.

SSB --- Adjust RF PWR control as described above, then, using PTT, adjust MIC control until ALC LED just lights on voice peaks.

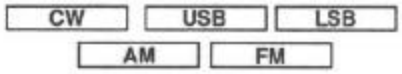
CHAPTER 3

DETAILED OPERATING INSTRUCTIONS

3-1 KEYPAD FUNCTIONS The keypad is used to enter frequency, to select VFO's, Mode, Bandwidth, alphanumeric tag, and to access microprocessor controlled functions. When a key is pressed, a "beep" will be heard from the speaker, indicating key closure. The beep level can be adjusted with the rear panel BEEP/VOICE control.

Some of the keys have two functions with the top functions accessed via the SHIFT key. After completing a multi-key function a double beep will be heard.

3-1.1 SELECTING MODE



Mode selection on the PARAGON is accomplished by pressing the desired mode key on the keypad. The corresponding LED will light indicating the chosen mode. When selecting AM, LSB, or USB modes, a typical crystal filter selection of either 6.0 or 2.4 kHz will automatically be chosen. This can be changed by pressing a different Filter key. See PARAGRAPH 4-1.3 for RTTY operation.

3-1.2 CRYSTAL FILTER SELECTION

These keys select the desired IF bandwidth. In the standard configuration, the 6.0 and 2.4 kHz filters are installed. Optional filters may be installed for 1.8, .5, and .25 kHz. LEDs above the keys indicate the selected bandwidth.

Bandwidth selection is independant of the mode selected except in the optional FM mode. The IF bandwidth is automatically 15 kHz when this mode is selected.

3-1.3 TUNE

This key is used to place the transceiver in the transmit mode, or "key down". It is used when adjusting power output, and for system checks and SWR measurements. Pressing this key a second time returns the transceiver to the receive mode. NOTE: If TUNE is pressed when the transmit frequency is outside the ham bands, nothing will happen.

3-1.4 RECEIVE & TRANSMIT OFFSET

This function allows independent control of the receive and/or transmit frequencies with a range of ± 99.9 kHz. LEDs above the keys indicate the selected function, the OFF. annunciator lights, and the fluorescent display shows the frequency deviation ± in kHz.

In the RX OFFset mode, received stations may be "zeroed in" without affecting the transmit frequency. TX OFFset may be used, for example, to answer a station calling CQ and "listening 2 kHz up".

Only one OFFset function can be used at a time. Pressing the key a second time disables the selected offset function.

3-1.5 DISPLAY

[DISP ➤]

This key selects the time, date,or tag shown on the fluorescent display. Each time the key is pressed the display will toggle from DATE to TIME to TAG and the annunciators above the display will show the selection.

3-1.6 VOICE

[VOICE]

This key is used to activate the optional Model 257 Voice Readout.

3-1.7 SPOT

[SPOT]

This function, which is designed primarily for use in CW mode, allows the operator to listen to the frequency that he is transmitting on. Using this function, the transmitter frequency can be tuned to the incoming received signal by zero-beating with that signal. This is a momentary function and the transceiver will return to the previous receive frequency when the key is released. For best results, select a wide bandwidth filter when using this function.

3-1.8 VFO SELECTION

[A=B] [A/B]

These keys control the operation of the two VFOs. The A/B key toggles between VFO A & VFO B with the annunciators above the display indicating the selected VFO. When the A=B key is pressed, the frequency of the selected (and displayed) VFO is placed in the other undisplayed VFO.

[SPLIT]

The SPLIT key allows the receive and transmit frequencies to be assigned to each VFO. An annunciator above the display indicates that this function is enabled.

To receive on VFO A and transmit on VFO B, select VFO B with the A / B key and select the desired transmit frequency, then select VFO A and select the desired receive frequency. Then press the [SPLIT] key.

To transmit on VFO A and receive on VFO B, select VFO A and select the transmit frequency. Select VFO B and select the receive frequency, then press the [SPLIT] key.

Pressing the SPLIT key a second time disables this function. NOTE: When tuning with the SPLIT mode on, only the displayed VFO is changed!

3-1.9 TUNING RATES

[FAST]

The FAST key,with LED indicator, selects the tuning rate and resolution of the main tuning knob according to the following table.

	Normal	Normal Shifted
CW/USB/LSB/FSK	10 Hz	20 Hz
AM/FM	50 Hz	100 Hz
	Fast	**Fast Shifted**
CW/USB/LSB/FSK	20 Hz	50 Hz
AM/FM	100 Hz	500 Hz

TABLE 3-1. TUNING RATES

In addition, the tuning knob has a speed shift feature which increases the tuning rate automatically when the knob is spun at a fast rate.

3-1.10 TEN Hz DISPLAY

[SHIFT] [10 Hz / MT]

To display the 10 Hz digit of the frequency, press the SHIFT key followed by the MT key. Pressing theSHIFT and MT keys again will extinguish the 10 Hz digit.

3-1.11 TUNING KNOB LOCK

This key and its associated LED is used to lock out the main tuning knob to prevent accidental frequency change. All keyboard functions remain active.

3-1.12 DOWN / UP

These keys are used to quickly move up or down in either 100 kHz or 1 MHz steps. When the FAST tuning function is Off, the step size is 100 kHz. When the FAST tuning is On, the step size is 1 MHz.

When used with the SHIFT key, these keys are used to move up or down to the next amateur band. When the HBD or HBU key is held in there will be a short pause after which the ham bands will rapidly increment or decrement until the key is released.

3-2 MEMORIES

The PARAGON has 62 memory channels (00 to 61) which may be used to store favorite or often used frequencies. Each memory stores frequency, VFO in use, mode, filter selected, and the alphanumeric tag. Memory 00 also supplies the default tag (for example, your call) whenever the TAG is displayed but no memory has been selected.

Whenever a memory function is selected, the MEM annunciator will light.

3-2.1 MEMORY STORE

STO

Example: STO 1 4

To store information in a memory channel, first make sure that the frequency, mode, VFO, and filter selection are correct. Then press the STO key and the desired 2 digit memory channel number. The fluorescent display will show the memory channel selected. The STO function will NOT save the diplayed tag but instead will fill the TAG with blanks. To change the TAG see following instructions for TAG.

STO ENTER

A quick way of storing a memory without having to specify a channel number is to use the STO/ENTER method. The transceiver will automatically choose the next available memory channel. To use this function, press the STO key and then the ENTER key. The display will show the memory number used or if all the memory channels are full, the display will show "FULL".

3-2.2 MEMORY RECALL

RCL

To recall a memory channel,press the RCL key and then the desired 2 digit memory channel number. The display will show the recalled memory. If the tuning knob is adjusted or a frequency entered via the keypad, the transceiver will return to the non-memory mode.

RCL ENTER

To recall the last memory channel stored using STO/ENTER, press the RCL key and then the ENTER key.

3-2.3 TAG

Example: K4FW

The alphanumeric tag can store up to 7 characters of letters and/or numerals. To enter a tag into the display, select the TAG display using

the DISPlay key. Then press ENTER and the display will prompt you with underscores for each character position (_ _ _ _ _ _). Enter the numbers or letters located beneath the other keys on the keypad. If 7 characters are entered, the keypad returns to normal upon completion of the last digit. If less than 7 characters are entered, press theENTER key to complete the process.

If a memory has been recalled and the MEM indicator is on, the tag just entered will be stored automatically in the displayed memory channel. If the MEM indicator is initially off, it will be turned on and you will be prompted to enter the memory channel that the new tag should be stored in. If you enter a memory channel that is empty, the current Frequency, Mode, VFO and Filter information will also be automatically stored in that memory along with the tag. To exit the TAG entry mode at any time press the CLEAR key.

If the tuning knob is adjusted, this part of the display automatically returns to the Default TAG (filled with blanks) or the tag which has been stored in memory channel 00. Using this technique, you can set the Default TAG to be anything you want (your call sign, name, etc.).

3-2.4 MEMORY TUNE

[MT]

When this function is used, the main tuning knob will no longer tune the VFO but will tune through all of the programmed memories, including those that are locked out. The display will show a "T" to the right of the channel number indicating Memory Tune mode.

A locked location will display an "L" (Locked) in front of the memory number. Thus the Memory Tune function also provides a means of determining which memory locations are locked out when using memory scan.

3-2.5 SCRATCH PAD MEMORY

[STO] [STO]

[RCL] [RCL]

The scratch pad memory can be used to temporarily store and recall a single frequency without affecting the main memory locations. All of the information that is stored using the STO method is also stored in the Scratch Pad Memory. With the desired information selected, press the STO key twice. The display will show "SP" indicating that the displayed frequency is in scratch pad memory. The scratch pad memory may be recalled at any time by pressing the RCL key twice.

Each time a new frequency is entered into the scratch pad memory, the previous memorized frequency is erased.

3-2.6 MEMORY SCAN

[MS]

To use the memory scan mode press the MS key. The microprocessor will then scan through all of the programmed memories (except those that are locked out) stopping at each location for a period of time. The scan rate will be determined by the value selected using the RATE function (explained in PARAGRAPH 3-2.7).

To temporarily stop the scan function, press and HOLD the [ENTER] key until scanning stops, then to resume scan press [▼] or [▲] . The receiver will then resume scanning in the direction chosen by the keys. To exit the scan mode press the CLEAR key.

NOTE: In order to use Memory Scan, there must be more than 1 memory channel programmed and/or unlocked. If memory scan is attempted under these conditions the transceiver will appear to be malfunctioning as the keypad and main tuning knob will not respond. Pressing the CLEAR key will return the transceiver to normal.

3-2.7 RATE

SHIFT + RATE MS

The scan RATE is used in the memory scan mode and determines the speed or RATE at which the memory locations are scanned. To program the scan rate press the SHIFT and then the RATE keys. The word RATE and a number from 0 to 9 will appear in the display indicating the scan rate with 9 being the fastest. Press the UP/DOWN keys to select the desired rate and then press the ENTER key.

3-2.8 MEMORY LOCKOUT

ML

The Memory Lockout function causes selected memory locations to be bypassed during Memory Scan. The information in the locked out channel is retained and may be unlocked at any time. To lock out a location, recall the location to be locked out using either the RCL or the MT functions, and press the ML key. If the location to be locked out is already in the display, the recall procedure may be omitted. Then the location may be locked out by just pressing the ML key. If the locked out location is recalled or tuned via Memory Tune, the display will show "L" to the left of the memory channel number indicating that the location is locked out.

3-2.9 MEMORY LOCK CLEAR

MLC

The Memory Lock Clear key is used to unlock a selected memory location. This memory can be selected by using either the MEMORY RECALL function or by using the MEMORY TUNE function.

3-2.10 GLOBAL LOCKOUT

SHIFT + GL STO

TheGlobal Lockout key is used to lock out all of the memory locations. This is useful if you have a lot of programmed memories but only wish to listen to a few select memories by using the Memory Lock Clear key described above.

3-2.11 GLOBAL LOCK CLEAR

SHIFT + GLC RCL

The Global Lock Clear key is used to unlock all of the locked out memory locations.

3-2.12 MEMORY CLEAR

SHIFT + MC ML

This key will clear the currently displayed memory channel, returning it to an unprogrammed state. To select the desired memory you must first use the MEMORY RECALL or MEMORY TUNE functions. MEMORY CLEAR will only clear a recalled memory location. If you wish to clear all memories the best way is to press the RESET switch on the right side of the transceiver.

3-3 CLOCK-CALENDAR & SYSTEM FUNCTIONS The PARAGON has a built-in 24 hour, crystal controlled clock and calendar circuit. As long as power is supplied by the power supply or the internal 9 volt back-up battery (if installed), the clock will keep accurate time. The procedures for setting the clock and date functions are descibed below.

3-3.1 SET

SHIFT + SET MLC

The SET key is used to set the 24 hour clock and date.

3-3.2 CLOCK SET

DISP ➤ (until TIME is displayed)

SHIFT + SET MLC

To set the time in the 24 hour clock, first press the DISP key until TIME is displayed. Next press the SHIFT key, then the SET key and you will be prompted by four underscores for the time entry. Enter the hours and minutes digits as desired. If you enter less than four digits you must press the ENTER key again to exit the SET routine. When you exit via the ENTER key, all unfilled digits will be cleared to zero. The clock will begin running again upon pressing the ENTER key or entering the last of the four digits.

3-3.3 DATE SET

DISP ➤ (until DATE is displayed)

SHIFT SET MLC

To set the date, first press the DISP key until DATE is displayed. Then press the SHIFT key followed by the SET key and the day of the month will be blanked, leaving only the month. Use the UP or DOWN arrow keys to select the correct month, then press ENTER. Now only the day of the month will be displayed. Again use the UP or DOWN arrow keys to select the correct day. When you are finished press the ENTER key.

3-3.4 SYSTEM VERSION NUMBER

SHIFT ENTER

The instructions for the PARAGON microprocessor are contained in an EPROM. Because of this design, updates, improvements and new features may readily be implemented by simply changing the software. By pressing the SHIFT key and then holding down the ENTER key, the TAG display will show the version number for the software in your system. (EXAMPLE: VER 3-2)

3-3.5 SYSTEM RESET SWITCH The RESET switch is accessible through a hole located on the right side of the PARAGON. This switch is connected to the microprocessor and will cause a system reset when pressed. If the PARAGON ever malfunctions and the keypad and/or tuning knob no longer operate properly, pressing the RESET switch will usually correct the problem. **NOTE: Pressing the RESET switch will clear ALL MEMORIES and will also clear the clock and date information.**

FIGURE 3-1. FRONT PANEL DISPLAY

3-4 FRONT PANEL FUNCTIONS The following sections describe the front panel displays and the controls which are not located on the keypad. Refer to FIGURE 3-3 to help locate each control.

3-4.1 DISPLAY AREA As shown in FIGURE 3-1, the vacuum fluorescent display shows the frequency, Rx/Tx Offset, memory status, the date, time, or tag, and other microprocessor controlled functions. The eight annunciators above show the VFO selection, OFFset or MEMory selection, and the DATE, TIME, or TAG selection.

3-4.2 AF GAIN / TONE The AF GAIN control varies the audio output of the transceiver. The TONE control is a low pass type with a rolloff of approximately 15 dB at 5 kHz.

3-4.3 METER & SWITCH In receive mode the meter will automatically read S units when the meter switch is in any position. The S meter will be accurate only when the RF control is fully clockwise. The meter is factory calibrated for a reading of S9 at 50 µV when operating at 15 MHz.

When transmitting, the meter indicates the following:

IC position measures the current drawn by the final amplifier module. Use the scale marked 0 to 20 amperes.

SWR position provides a reading of power reflected from the antenna. When the forward power is 100 watts, the standing wave ratio can be read from the scale marked SWR.

FWD position measures forward power to the antenna. Use the FWD scale marked 0 to 100 watts.

To determine SWR, place meter switch in FWD position, press TUNE and adjust RF PWR control for a reading of 100 watts. Then switch the meter switch to REF and use the scale marked SWR. Press the TUNE key again to return to transceive mode.

PROCESS position displays the level of compression applied to the MIC input when the PROCess control is turned on.

3-4.4 NOISE BLANKER The N.B. switch turns on the blanker circuit. The WIDTH control varies the blanking pulse width.

3-4.5 ATTENUATOR To reduce susceptability to receiver overload in the presence of extremely strong signals, the ATTN switch removes the front end RF amplifier from the receiver circuitry. The effect is a 20 dB reduction in signal level to the first mixer but with more dynamic range and greater sensitivity than would be the case with a simple attenuator. The LED below the switch indicates that the attenuator has been selected.

3-4.6 BPF / FADE This control fades from normally flat audio response to a bandpass filter variable from 220 to 1700 Hz with the BPF control. Various amounts of bandpass effect can be chosen by the degree of clockwise rotation. The filter width is 35% of the selected center frequency at the -6 dB points.

3-4.7 PBT / NOTCH The PBT control adjusts the position of the PBT IF crystal filter in relation to the fixed second IF filter. When the selected filter is wide, i.e. 2.4 or 1.8 kHz, the PBT control essentially becomes a variable bandwidth control. Counter-clockwise rotation shifts the passband towards the low side of the signal when in USB mode, clockwise rotation shifts the passband toward the high side of the signal. When in LSB mode, the above directions are reversed.

The PBT circuit in the PARAGON produces the effect of varying the frequency response of signals passing through the narrow filter, which enables you to separate signals which are close together. On RTTY it can place the narrow filter to pass only the 2295 and 2125 Hz tones for superior rejection of

adjacent signals. The PBT has no effect on the transmitter frequency or bandwidth.

The NOTCH control adjusts the center frequency of the audio notch across the passband. The notch depth is at least 40 dB and will reduce carrier interference by this amount or more. To use the NOTCH, rotate the control slowly until the unwanted signal is reduced. The notch circuit is effectively removed by turning the control fully counter-clockwise.

3-4.8 MIC / RF PWR The RF PWR control varies the amount of power output for all modes. This allows you to set your output power to any value from 25 to 100 Watts. The MIC control varies the amount of audio applied to the transmit balanced modulator.

To set these controls, place the METER switch in the FWD power position and place the transceiver in transmit using the TUNE function. Advance the RF PWR control to the desired power level. The CW level is now set. For SSB operation, continue by placing the transceiver in either the USB or LSB mode and while speaking into the microphone in a normal voice, advance the MIC control until the ALC LED lights on voice peaks. NOTE: The ALC LED will light at all RF PWR settings when operating in CW or TUNE modes.

Increasing the MIC setting over that required to just light the ALC LED will not result in any appreciable increase in power out. However, overdrive will produce SSB, AFSK, or SSTV distortion products.

The PARAGON uses a "current-limit" protection system where the drive level is automatically reduced to prevent the final transistors from drawing more than 20 amperes. If full power output can not be obtained, it is an indication that the antenna is not presenting a 50 Ω impedance. Refer to PARAGRAPH 4-1.4 for more information.

3-4.9 PROC The PROCess switch and control activates the speech processor and determines the processing level. The processor increases the average speech power and allows a greater range of voice levels to attain peak ALC level. An LED below the switch indicates when the processor has been selected.

The processing level will affect the MIC control to some extent. To set the processor, turn it off and adjust the RF PWR and MIC as described above. Turn the PROCess switch on and advance the control until the meter needle moves into the center of the black band (on the PROC scale) on voice peaks. More processing is available by further clockwise rotation of the control, but the MIC control must be reduced to keep the ALC action constant.

Severe distortion, objectionable background noise, and transmitted splatter will occur if the MIC control is not adjusted so that the ALC LED just lights on voice peaks. The processed audio may be monitored to prevent this distortion by using the MONITOR control on the rear panel. The use of headphones is recommended to prevent feedback from the speaker. See PARAGRAPH 3-5.7.

3-4.10 RF / SQL The RF gain control varies the gain of the I-F stages. The AGC is dependent on the setting of this control and therefore the S meter is calibrated only when the RF gain control is fully clockwise.

The SQL control sets the squelch threshold level. The squelch level is determined by the AGC circuits. To adjust the squelch, rotate the control clockwise until the received audio becomes quiet. To turn the squelch function off, rotate the control fully counter-clockwise.

3-4.11 AGC FAST / SLOW & ON / OFF These switches control the automatic gain control (AGC) system. In the FAST position, the recovery time of the AGC system is approximately .2 seconds and in the SLOW position approximately 2 seconds.

The ON/OFF switch defeats the AGC

system. When the AGC is turned OFF, the IF gain is controlled by the RF gain control and the S meter is inoperative.

It is sometimes useful, when extreme QRM is present, to turn the AGC off and control the audio volume with the RF gain control.

3-4.12 VOX/PTT This switch selects either the internal VOX (voice operated transmit) or manual PTT (push-to-talk) circuitry.

3-4.13 QSK FAST / SLOW The QSK switch controls the recovery time of the receiver after transmitting. Place in the FAST position for cw full break-in.

3-4.14 PWR This switch controls the main power to the transceiver via an internal relay which switches the high current 13.8 VDC. Power is connected to the logic circuits at all times.

3-4.15 PHONES This jack is designed to be used with a standard 1/4" plug. Headphones with an impedance of 4 to 16 ohms are recommended. Both the internal speaker and external speaker jacks are disabled when headphones are plugged in. The AF OUT jack is not affected by using the PHONES jack.

3-4.16 MIC The microphone circuit has been designed for high or low impedance microphones with a minimum 5 mV output. Transistorized microphones may also be used, providing their output level is adjusted so that the input stages are not overdriven. The cable, which preferably should provide shielding for all leads, is terminated with a standard 4 pin microphone plug. Failure to shield both microphone and PTT leads may result in RF getting into the audio circuits. Connections to the plug are as shown below in FIGURE 3-2.

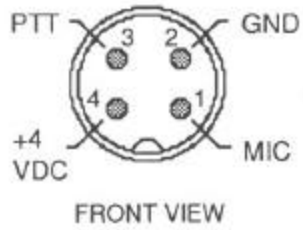


FIGURE 3-2. MIC CONNECTIONS

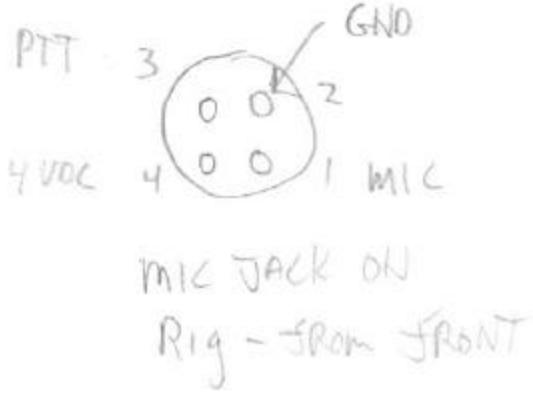


FIGURE 3-3. MODEL 585 FRONT PANEL

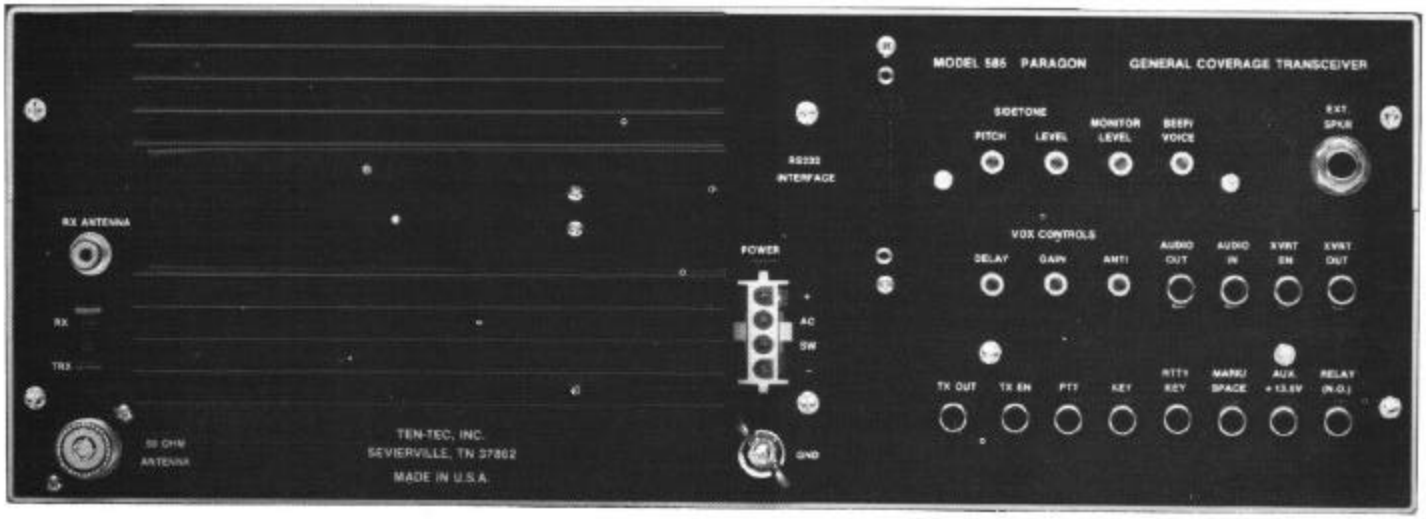


FIGURE 3-4. MODEL 585 REAR PANEL

3-5 REAR PANEL FUNCTIONS The following sections describe the rear panel connectors and controls. Refer to FIGURE 3-4 for the location of each connector or control.

3-5.1 POWER SOCKET This connector is used for the main DC power to the transceiver and for switching the power supply output on and off. Reverse polarity protection is provided via an internal reverse-biased diode and 25 ampere fast blow fuse.

Refer to PARAGRAPH 1-3 for connection details.

3-5.2 GROUND POST Used for the primary transceiver ground. To prevent personal injury, interference and other ground related problems, connect this terminal to a good earth ground using heavy gauge copper braid or wire and make the connection as short as possible.

3-5.3 ANTENNA This connector mates with the standard PL-259 plug for 50Ω coaxial antenna or external linear amplifier connections.

3-5.4 RECEIVE ANTENNA This jack provides a connection directly to the receiver front end at all times. When the RX-TRX switch is in the RX position, the SO-239 Antenna connector is disconnected from the receiver, and a receive-only antenna may be connected to the RX ANTENNA jack. This also permits use of a secondary receiver when the switch is placed in the TRX position and the secondary receiver antenna input is connected to the jack.

3-5.5 CW SIDETONE The LEVEL and PITCH controls adjust the internally generated sidetone during cw transmit. Adjust for desired volume and pitch.

3-5.6 VOX CONTROLS The rear panel GAIN, DELAY, and ANTI VOX controls can be adjusted to suit the individual operator's needs. To adjust, proceed as follows:

1) Adjust the front panel AF GAIN control to a comfortable level.
2) While speaking into the mic at normal level, adjust the GAIN for reliable VOX action.
3) Adjust the DELAY so that T/R switching does not occur between words when speaking into the microphone.
4) Set the ANTI VOX to the point where receiver audio does not trip the VOX circuit at moderate volumes.

3-5.7 SSB MONITOR LEVEL This control permits monitoring the SSB transmit audio thru the audio amplifier circuit of the transceiver. It is useful when adjusting the internal speech processor so that the processed audio has not been adjusted to the point where severe distortion occurs. Also, it is useful for checking AFSK and SSTV signals. Headphone use is recommended when using the SSB Monitor function to prevent feedback from speaker to microphone. During normal SSB operation this control should be left in the full counter-clockwise position.

3-5.8 BEEP / VOICE This control is used to set the level of the keypad "beep" and optional voice outputs. You can turn it off by rotating the control fully counter-clockwise.

3-5.9 KEY The transmitter can be keyed by a ground connection to the high impedance KEY input when the CW mode is selected. This line is compatible with open collector (positive) keyer outputs as well as bugs and straight keys. When the key is closed the antenna is electronically disconnected from the receiver and the receiver stages are disabled.

3-5.10 XVRT EN / XVRT OUT These jacks can be used in conjunction with an exter-

nal transverter for VHF/UHF operation. A closure to ground on the XVRT ENable jack switches the low level transmit carrier (approximately 0 dBm) to the rear panel XVRT OUT jack and disables the PARAGON final output amplifier.

The transverter receive output can be connected to the Receive Antenna jack described above.

3-5.11 AF OUT This jack provides a line level receiver audio output for use with an external RTTY demodulator or tape recorder. Level is not affected by the front panel AF gain control.

3-5.12 TX EN / TX OUT The TX ENable/ TX OUT jacks provide a keying loop for use with some types of external linear amplifiers. For normal operation these jacks are jumpered together. For more information refer to FIGURE 5-7 which shows the connections required for use with the TITAN amplifier.

TX ENable: A closure to ground places the transceiver into transmit mode regardless of mode selected.

TX OUT: Provides a closure to ground thru an open collector transistor to ground whenever the PARAGON is in transmit mode.

3-5.13 PTT This jack is in parallel with the push-to-talk line on the microphone front panel jack. It may be used with an external transmit/receive station switch, foot switch, etc. A closure to ground places the transceiver in transmit mode only in USB, LSB and FM modes.

3-5.14 AUX 13.8 This jack provides 13.8 VDC@ 2 amperes and may be used to power external equipment such as an electronic keyer. The AC power supply used to power the PARAGON must have enough current capacity to power both the transceiver and any accessories conected to the AUX 13.8 jack.

3-5.15 AUDIO IN Low level audio signals (500mV max.) such as an AFSK input, phone patch, etc. can be mixed together into the mic channel through this input. Typical input impedance is 2.2 KΩ.

Caution: Some AFSK equipment will output a signal even when not activated. If this signal is left connected to the AUDIO IN jack, it can interfer with normal SSB operation.

3-5.16 EXT. SPKR A standard 1/4" phone jack for connecting an external speaker. The internal speaker is disconnected whenever this jack is used. Any 4 to 16 ohm speaker may be used.

3-5.17 RELAY This jack provides a normally open relay contact which switches to ground during transmit. Since one side of this connector is grounded, DO NOT use it to switch AC lines.

When operating cw, a drop-out delay is incorporated in the relay circuit. The delay time is factory set to an average value and may be adjusted via a small trimmer poteniometer on the Control Board, located under the cover on the bottom side of the transceiver. There is no delay in the other modes. Setting this control for a longer delay will help reduce the noise caused by the relay during CW keying.

3-5.18 RTTY KEY This jack is in parallel with the KEY jack and can be used to control the PARAGON during RTTY operation. A closure to ground places the transceiver in transmit mode.

3-5.19 MARK / SPACE This is the input for RTTY keying. The RTTY MARK level can be 0 to -15 Vdc. The SPACE should be between +2.5 Vdc and +15 Vdc.

CHAPTER 4

OPERATING HINTS

4-1 INTRODUCTION The following paragraphs provide additional useful information for getting the best performance out of your PARAGON. Also included is TABLE 4-1, which provides trouble-shooting information if you should ever have a problem.

4-1.1 CW In the CW mode, the indicated frequency is the received frequency. To accurately read an incoming signal, therefore, it is necessary to "zero-beat" the signal, not peak it on the S meter. This holds true no matter where the OFFSET controls are set.

When transmitting cw, the actual transmitted frequency is 750 Hz higher than the displayed receive frequency. This is due to the BFO shift necessary to bring the oscillator into the filter passband. To accurately determine the transmitted frequency, add 750 Hz to the receive frequency, or if SPLIT VFO's are used, add 750 Hz to the programmed transmit frequency.

4-1.2 FM The PARAGON will operate transceive ± 5 kHz deviation FM with the optional Model 256 FM Adaptor.

The PBT, Crystal Filter selection keys, Noise Blanker, QSK and AGC switches do not function in this mode.

If split Rx / Tx is desired when operating thru repeaters, program the transmit and receive frequencies in VFO A and VFO B.

Set the MIC control midway, internal limiting circuitry prevents over-deviation in the FM mode, assuming that the microphone used has an output of 5 mV or less.

4-1.3 FSK (RTTY)

SHIFT CW

To enable the FSK mode, press the SHIFT key, then the CW key. All mode LED indicators will go out indicating this mode selection.

Required external equipment are a teletypewriter or keyboard and a demodulator (terminal unit) designed for 170 Hz shift with 2125/2295 Hz tones. Audio for the demodulator may be taken from the AF OUT jack on the rear panel.

The FSK keying should be connected to the MARK / SPACE jack (MARK: 0 to -15Vdc, SPACE: +2.5 to +15 Vdc) and a seperate T/R function is provided on the RTTY KEY jack (ground to transmit).

AFSK operation is also possible by using the AUDIO IN jack on the rear panel or the MIC connector on the front panel.

4-1.4 PROTECTIVE CIRCUITRY & ALC ALC serves three major functions: assures maximum power from the transmitter without critical adjustment of the input drive, prevents the amplifier from being overdriven into the non-linear, distortion-producing area, and serves as a power limiting device which protects the output transistors. It does the first two very well, but the third only partially. To protect the system, the PARAGON uses current limiting circuitry which automatically reduces the drive level if the current demand is

greater than 20 amperes. As an extra measure of protection, the TEN-TEC Model 960 power supply (or the Model 1140 magnetic circuit breaker) has a trip-out feature that prevents currents in excess of 20 amperes.

If the ALC LED lights at power outputs less than 100W, this is an indication that the current limiting circuits are reducing drive. This also occurs if the RF PWR control is turned down. Although the PARAGON will operate satisfactorily under these conditions, an improvement in the antenna system or matching network will provide maximum efficiency.

4-1.5 SOLID-STATE POWER AMPLIFIERS Although transistors and vacuum tubes both can be made to amplify RF power, there are some fundamental differences in how this is accomplished. A better understanding will aid in recognizing correct or incorrect performance.

Misconceptions sometimes arise from incomplete knowledge which results in erroneous conclusions being drawn that the equipment is faulty, erratic, or not performing to specifications. The purpose of the following information is to brief you on solid-state "no-tune" RF amplifiers so that you can knowledgeably approach and correct any apparent improper performance characteristic.

4-1.6 BROADBAND vs RESONANT TANKS Almost all tube circuits use resonant tanks in the plate circuit. The PARAGON uses a broadband system. In class AB operation, these two approaches act similarly without drive being applied. The idle current is relatively low and within the device dissipation rating, even with load impedance variations from open to short circuit.

However, with drive applied, the two act very differently. In the case of tubes, the dissipation within the tube depends on both the tuning of the tank and the load applied. If the tank is resonated and the load is very light, the internal power dissipated is quite small as indicated by the null which reduces plate current almost to the level with no drive. Out of resonance, the plate current, and hence dissipation, increases rapidly and may damage the tube from overheating. In resonance, as the load is increased, the null becomes more shallow at a higher plate current as a result of the power being delivered to the load. As the tank is tuned to resonance, the load impedance which is usually on the order of 50Ω is transformed to a relatively high impedance of several thousand ohms to match the plate circuit impedance. Small load reactive components, either capacitive or inductive, can usually be balanced out in the tank resonating function.

With transistors, drive applied and no load, there is no resonant high impedance to limit the collector current, and so power is poured into the circuit (much as the out-of-resonance tank condition). Since there is no load power, all has to be dissipated in the transistor. So even with no load, the ALC LED may light as the current limiting circuitry is automatically reducing drive level, or the power supply circuit breaker may trip. The broad-band transformer system used with transistors transforms the 50Ω load impedance not higher, but much lower (in the order of 4 or 5 Ω) to match the transistor output impedance. Since this transformation is fixed in design, any reactive component in the load impedance is applied in a transformed way to the collector circuit. Certain reactances at this point, especially inductive, give rise to parasitic oscillation. To correct for this, the antenna impedance should be changed to remove this reactance, or a matching network should be inserted between the antenna and transceiver. It is important to remember that any antenna changes its impedance with frequency, so that one that resonates well at one end of the band may well cause oscillations to activate the current limiting or trip the circuit

breaker on the other end of the band. If entire band operation is desired, especially on the lower bands, the adjustable matching network would be the better choice, rather than to try to make the antenna behave over the entire band on a cut-and-try basis.

A final point to bring out regarding broadband vs tank systems is that there is a limit to the amount of current that you can draw from an emitting filament, and this saturation current will limit the amount of power drawn from the supply. In the case of transistors, where the collector internal impedance is only a fraction of an ohm, extremely high currents can be demanded of the power supply, especially with mismatched loads well below 50 ohms. A fuse is provided in the PARAGON for protection when operating from a power source that is not limited.

4-1.7 SWR - Two Kinds The standing wave ratio is direct measure of the ratio between two impedances, i.e. a SWR of 3 to 1 indicates that one impedance is three times the other. Therefore, the unknown impedance can be either three times as large or three times as small as the known one. If the desired impedance that the transceiver wants to see is 50Ω, an SWR of 3 to 1 on the line may mean a load impedance of either 150 Ω or one of 17 Ω. If it is 150 Ω, the transmitter will act differently than if it is 17 Ω. In the first case, the power demanded from the power supply will be much lower, and not large enough to trip the circuit breaker. In the second case, even though the SWR reads the same, the breaker may repeatedly trip out. The SWR reading gives no indication of reactive components, nor can it separate the resistive from the reactive components. It is calibrated with a pure resistive load and therefore has its greatest accuracy with pure resistive loads. The SWR bridge should be used only as an indicator when attempting to adjust antenna systems to a pure 50 Ω resistive impedance at the transmitter output point.

4-1.8 EFFICIENCY Since transistor amplifiers have a very low value of output impedance, they act more or less as a constant voltage source. That is the RF output voltage tends to remain at a fixed value regardless of the load impedance. Hence, the output power will vary depending on the value of the load, and increases as the load impedance goes down. It can be seen that a 3 to 1 SWR on the low side of 50Ω will ask the amplifier to deliver much more power than a 3 to 1 SWR on the high side. Since the amplifier does have a finite value of output impedance, the amount of power delivered to the load with efficiency will change with load. Unless the load is near the design value, the transistors will heat up unnecessarily without delivering any more power to the antenna.

Recommended Reading: ARRL HANDBOOK

IF YOU HAVE TROUBLE

If the transceiver should fail to operate as normal, use the following chart as an aid in determining the problem. Often the cause of the problem is an overlooked switch/control or a mistake in entering information into the keypad.

SYMPTOM	POSSIBLE CAUSE
Transceiver dead, no meter illumination, no display.	Check power switch on transceiver and power supply. Check power cable. Check supply for correct voltage.
Receiver dead, meter and display on.	Check Squelch, and AF gain controls. Check Phones and Ext. Spkr jacks. Check Crystal Filter keys for selection of bandwidth with option not installed. Check if FM mode selected without option installed. Check RX/TRX switch.
Transmitter dead, meter and display on.	Check frequency for less than 1.75 MHz or for ouside Ham Bands. Check microphone, PTT switch, and microphone cable & connector Check if AM mode selected, or FM mode selected without option installed.
Received signal strength low.	Check ATTN switch and RF gain control.
Main tuning knob will not change frequency.	Check LOCK key and LED. Press CLEAR key.
Main tuning knob will not change frequency, keypad will not respond to input.	Microprocessor may be in process of a selected function routine. Memory Scan mode is selected with less than 2 memory channels programmed and/or unlocked. Press CLEAR key.
No readout, audio present. Readout present, connot enter commands.	Microprocessor may be locked up due to an incorrect keyboard entry or a power supply noise spike. Turn the POWER switch on the PARAGON off and then back on. If this does not clear the problem, the microprocessor will have to be reset. Press the RESET button located on the lower right side of the PARAGON. NOTE: PRESSING THE RESET SWITCH WILL **CLEAR ALL MEMORIES** AND RESET THE TIME AND DATE. Use this approach only as a last resort.
Display flashes message "PLL OUT OF LOCK".	Check several different frequencies on each band. If this message appears only when keying the PARAGON in SPLIT or OFFSET operation, one or more of the VCO's is probably slightly misaligned. If this message occurs on all bands there is something seriously wrong in the PLL synthesizer. In either case, it is recommended that you return the PARAGON to the factory for prompt repair.
When in SSB mode, transmitted audio is heard in speaker or headphones. (Talk-through)	Check SSB MONITOR LEVEL control on rear panel.

TABLE 4-1. TROUBLE SHOOTING CHART

CHAPTER 5

OPTIONS INSTALLATION

5-1 INTRODUCTION The following paragraphs describe how to remove the top and bottom covers of the PARAGON and the basic steps required to install the various optional accessories available for use in the PARAGON. Additional instructions and information may be supplied with each of the options.

5-1.1 REMOVAL OF TOP & BOTTOM COVER To remove the top cover, remove the upper two of the four large Phillips screws located on each side. Slide the top back and out from under the rear lip of the extruded front panel. *Caution:* Speaker wires will limit removal of the top cover. Unplug the speaker connector before completely removing the top cover.

To remove the bottom cover, remove the lower two large Phillips screws located on each side. With the transceiver upside down and the front panel facing forward, slide the bottom cover back and out from underneath the rear lip of the extruded front panel. Next remove the twelve screws securing the bottom shield and carefully remove the shield cover.

5-1.2 "MASS TERM" CONNECTORS

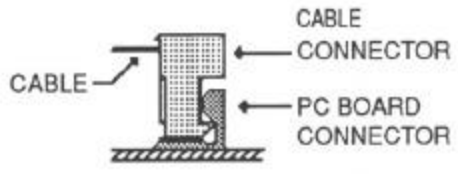


FIGURE 5-1. MASS TERM CONNECTOR

Some of the options require attachment of cables to the options pc board. The "mass term" type connectors have an identification number on the cable connector which matches the same number printed on the top of the pc board. The polarity of the connectors is as shown in the diagram.

5-1.3 CRYSTAL FILTERS

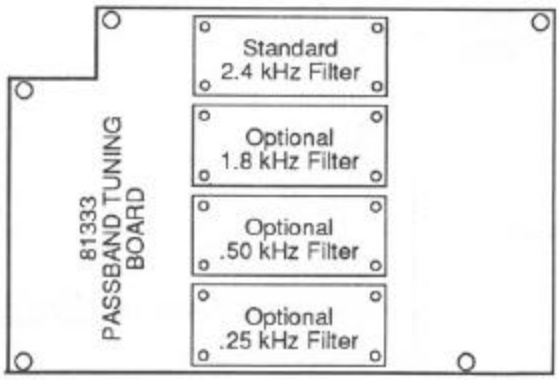


FIGURE 5-2. CRYSTAL FILTER LOCATIONS

There are three optional crystal filters which may be installed in the PARAGON, Model 288 (1.8 kHz), Model 285 (.5 kHz), and Model 282 (.25 kHz). These options plug into the Pass Band Tuning Board located on the bottom side of the transceiver. The inputs and outputs of these boards are the same and therefore they may be installed in either direction.

5-1.4 VOICE READOUT The Voice Readout option, Model 257, announces the displayed frequency whenever the VOICE key is pressed. The Voice Readout pc board

plugs into an edge card connector located on the Logic Board. Refer to FIGURE 5-3 for the location of the Logic Board and the Voice Readout edge card connector.

After installing the Voice Readout, press the VOICE key and adjust the speech level control, located on the Voice Readout pc board, to a suitable level.

For more detailed information on the use of the Voice Readout, refer to the instructions included with the Model 257.

5-1.5 RS232 INTERFACE The RS232 Interface option, Model 258, provides communication between the logic circuits of the PARAGON and an external computer with RS232 capability. All of the keypad functions and the main tuning circuitry can be controlled.

The option package includes a plug-in pc board that contains all of the required driver and interface circuitry, an RS232 connector to be mounted on the rear panel of the transceiver, a connecting cable, and information listing the command codes required to access the microprocessor.

To install the rear panel connector, remove the top cover of the transceiver and remove the two screws & nuts securing the connector cover plate. Using the two screws just removed, attach the RS232 connector to the rear panel. Plug the RS232 Interface Board, with the connecting cable attached, into the edge card connector on the Logic Board. Then plug the other end of the cable into the RS232 rear panel connector board.

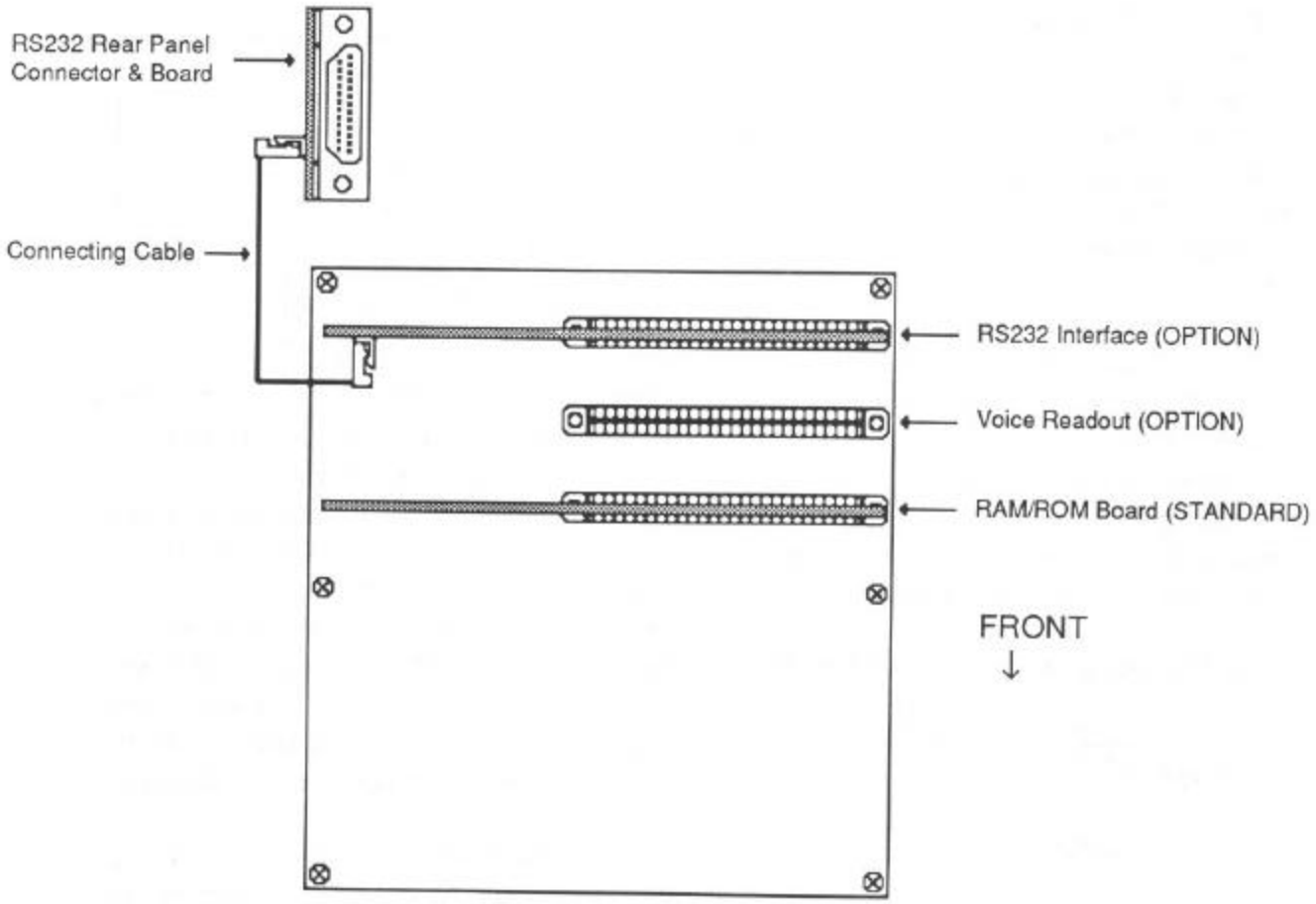


FIGURE 5-3. OPTIONS INSTALLATION DIAGRAM

5-1.6 FM ADAPTOR The optional Model 256 FM Adaptor enabl s the PARAGON to transceive ± 5 kHz deviation FM. For information on operating FM with the PARAGON refer to PARAGRAPH 4-1.2 and to the instructions provided with the adaptor.

To install the FM Adaptor, remove the top cover and locate the synthesizer sub-chassis on the left side of the transceiver (with the front panel facing forward).
There are four mounting posts located on the topside of the sub-chassis where the FM board is mounted with the four screws supplied.

Refer to the detailed mounting and connection instructions provided with the Model 256 for the remaining installation steps.

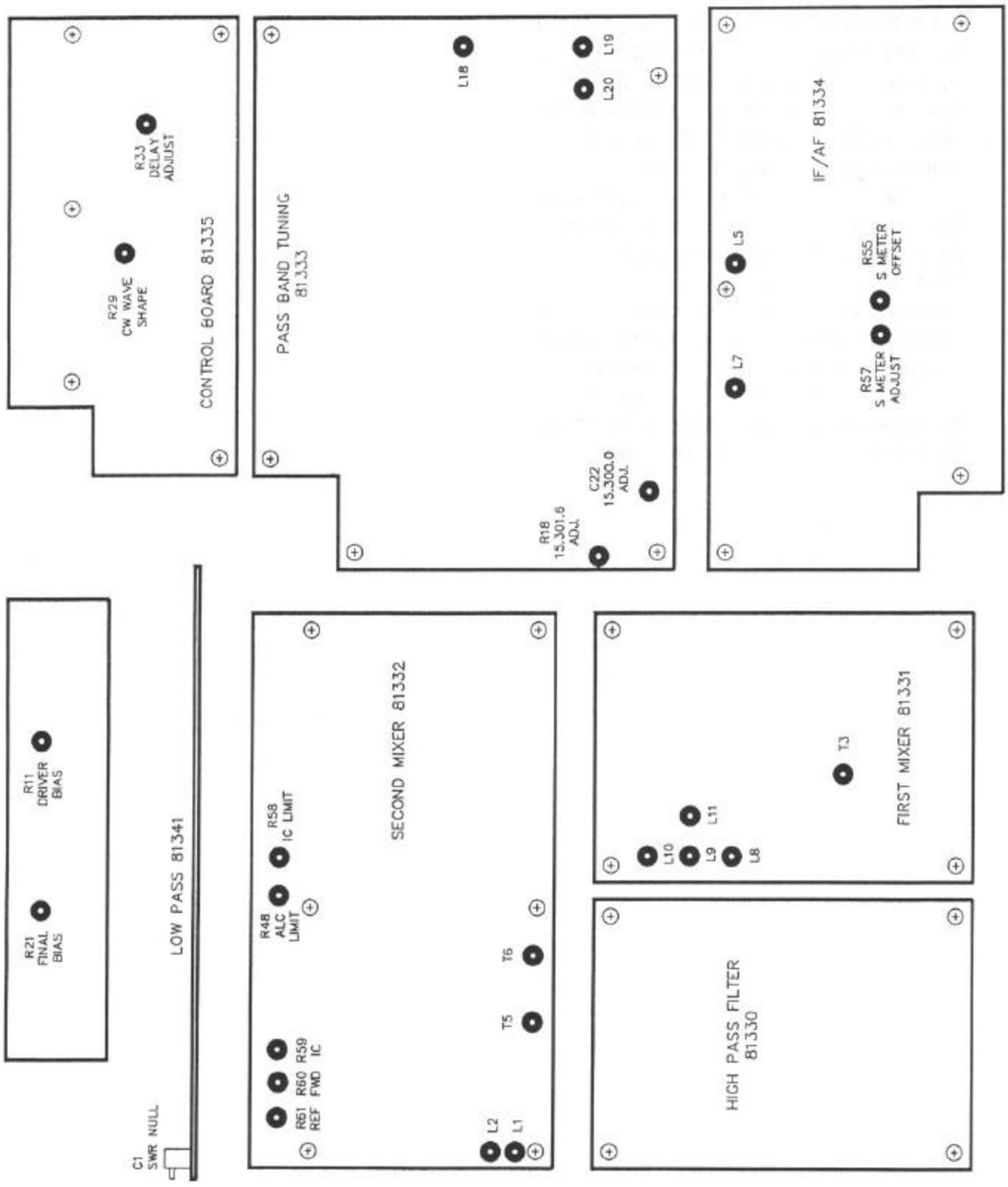


FIGURE 5-4. MODEL 585 ADJUSTMENTS (BOTTOM VIEW)

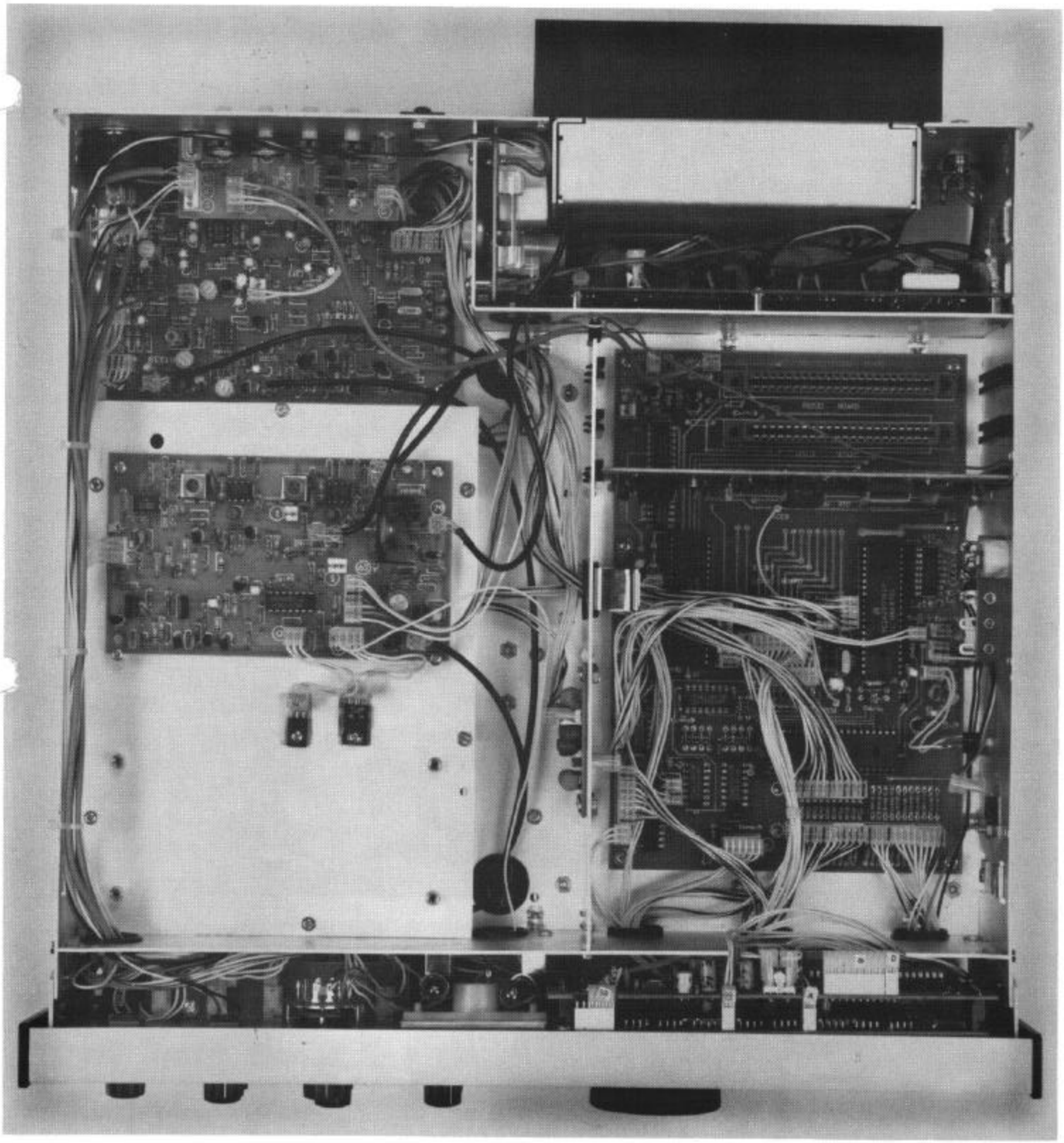


FIGURE 5-5. MODEL 585 TOP VIEW

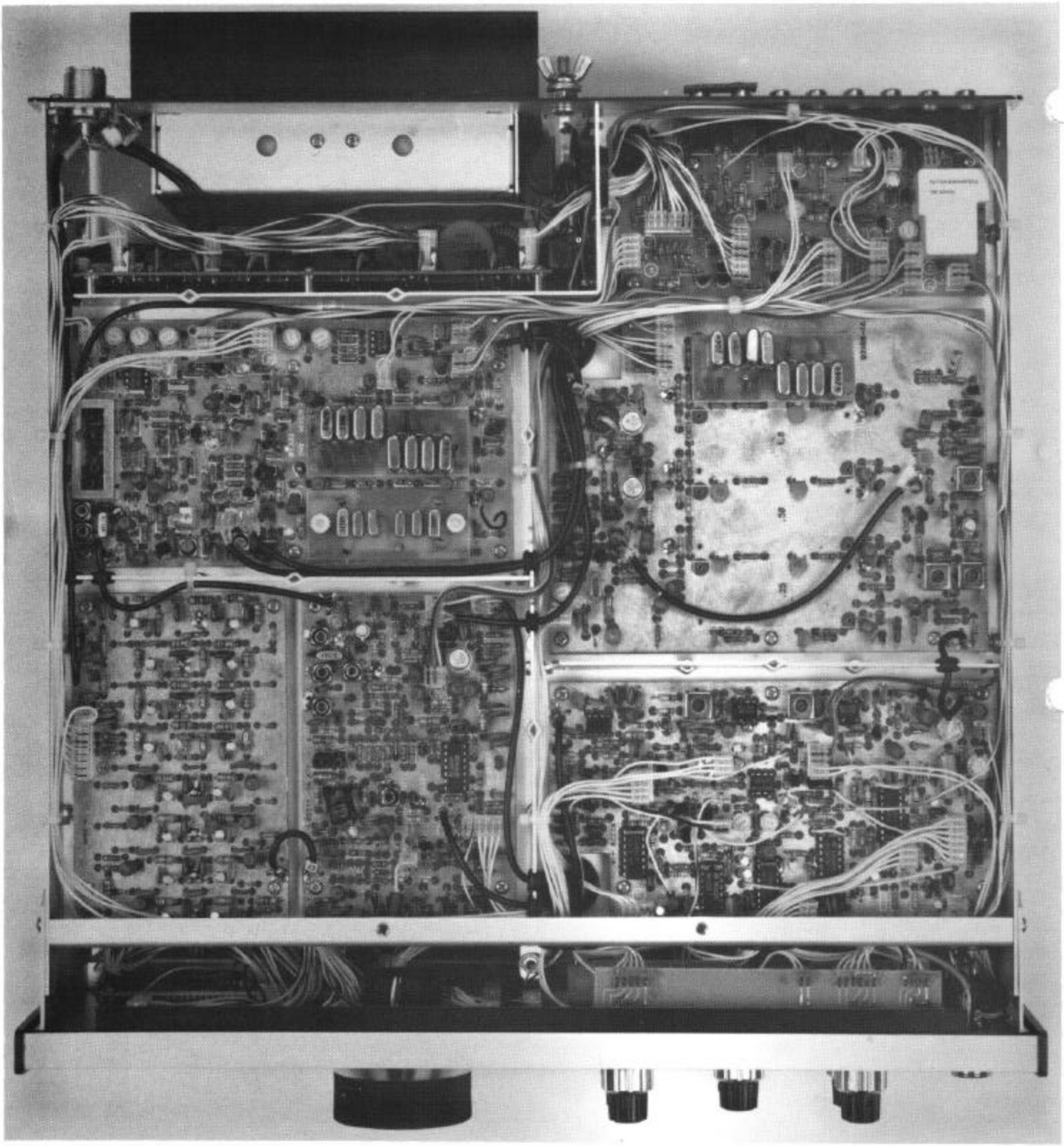


FIGURE 5-6. MODEL 585 BOTTOM VIEW

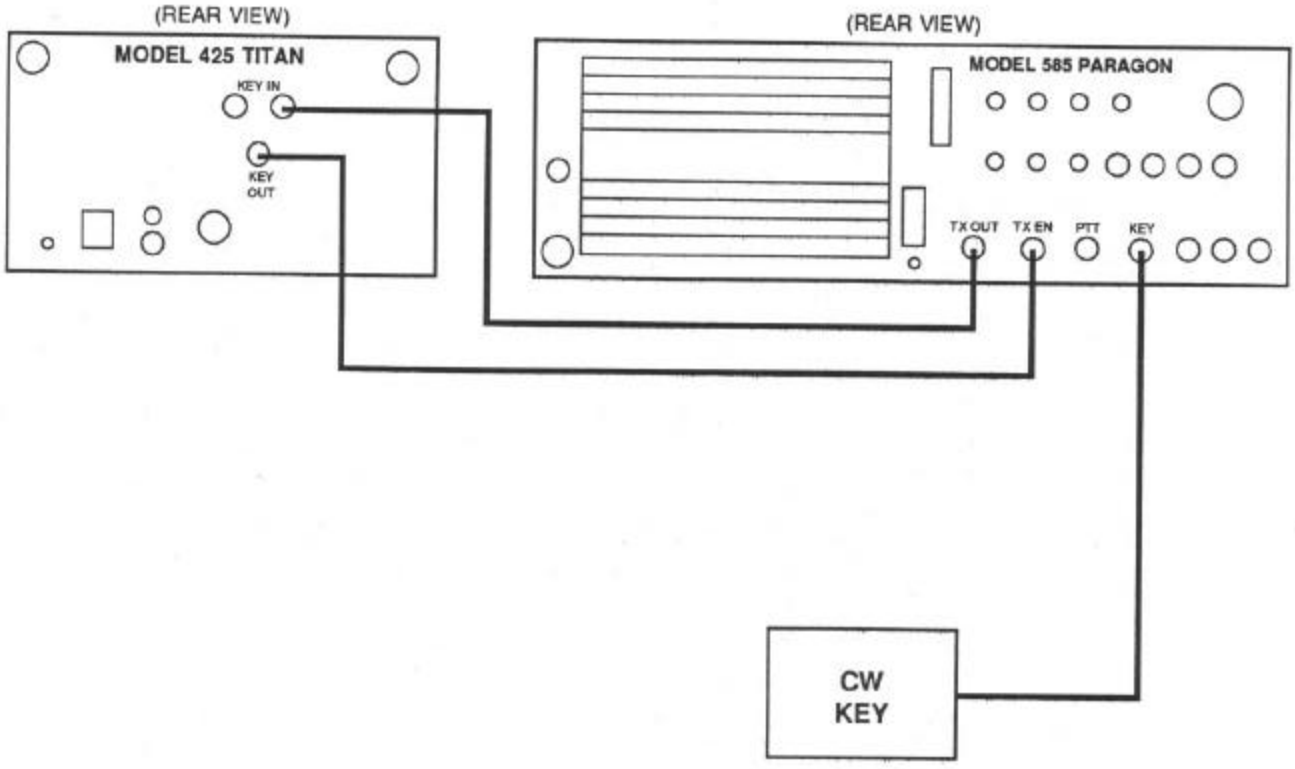


FIGURE 5-7. QSK HOOK-UP WITH TITAN AMPLIFIER