

IC-202

2 METER BAND
SSB TRANSCEIVER

INSTRUCTION
MANUAL



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SECTION I SPECIFICATONS

GENERAL:

Number of Semi Conductors	Transistor	19
	FET	7
	IC	7
	Diodes	33
Frequency Coverage	144.00 - 145.00 MHz	
Frequency Stability	$\pm 200\text{Hz/HR @ }25^{\circ}\text{C}$	
Modulation Type	(A3J), (A1)	
Antenna Impedance	50 ohms unbalanced	
Power Supply	DC 13.8V $\pm 15\%$	
Current Drain	Negative Ground	
	Transmitting	
	A3J	Approx. 540mA
	A1	Approx. 750mA
	Receiving	
	at Max. Audio Output	
	Approx.	250mA
	with no signal	
	Approx.	90mA
	Dial Light	
	Approx.	40mA
Dimension	183mm X 61mm X 162 (H x W x D)	
Net Weight	2.0Kgs including batteries	

TRANSMITTER:

Frequencies	144.00–145.00 MHz 2 Crystals built-in for 144.00–144.40 MHz. Each Crystal for continuous coverage of 200 KHz. Two spare crystal sockets. Connection with external VFO available.	
Modulation Type	A3J (USB) and A1	
RF Output Power	A3J	3W (PEP)
	A1	3W
Carrier Suppression	Better than 40 dB	
Opposite Side Band Suppression	Better than 40 dB/1KHz	
Spurious Radiation	Better than -60 dB	
Modulation System	Balanced Modulation	
SSB Producing System	Filter Type	
Microphone Impedance	600 ohms	

RECEIVER:

Frequencies	Same as Transmitter	
Modulation Type	A3J (USB) and A1	
Receiving System	Single Super Heterodyne	
Intermediate Frequency	10.7 MHz	
Sensitivity	0.5 μV at (S + N)/N 10 dB or better	
Spurious Sensitivity	Better than -60 dB	
Selectivity	± 1.2 KHz or better at -6 dB ± 2.4 KHz or better at -60 dB	
Audio Output	More than 1W	
Audio Output Impedance	8 ohms	

SECTION II INTRODUCTION

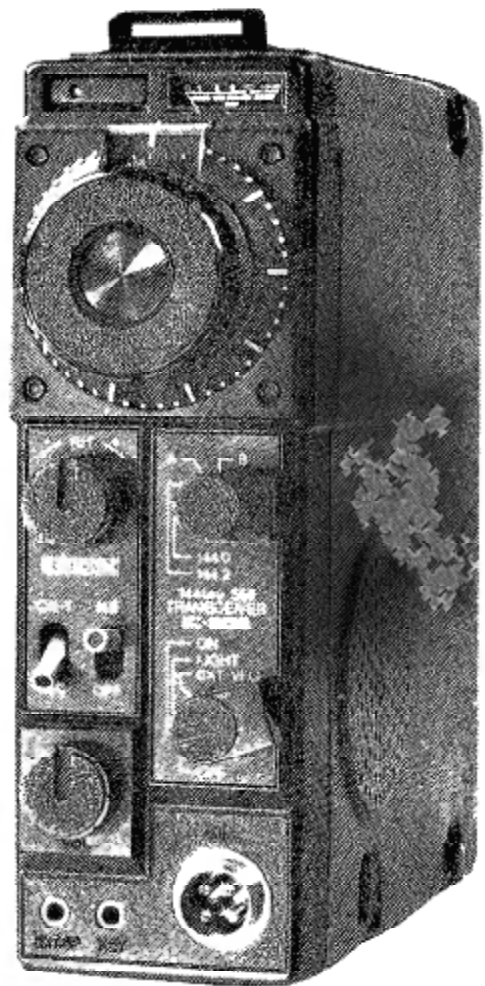
Congratulations on the purchase of the IC-202, portable 2 meter SSB transceiver. The IC-202 was designed to be operatable anywhere like most portables, but we also includes features like a very effective noise blanker, RIT, S & RF meter, and a full 3 watts output. Two built-in crystals in the stable VXO allow operation between 144.0 and 144.4 MHz. If you wish to expand the range of the IC 202, we have also provided 2 spare crystal sockets for your convenience. With a slight retuning of the IC-202, and installation of a special crystal, you may also work through Oscar.

The aluminum diecast frame provides a very strong yet light housing for the 2 circuit boards, and the aluminum sides snap off easily if service is ever necessary or to change the batteries.

The IC-202 operates on 9 inexpensive C cell batteries, or on an external 13.8V DC source. We recommend the IC-3PS which not only provides power for the IC-202, but also doubles as a stand and holder for the IC-20L 10 watt linear amplifier.

You can use the built-in whip antenna for portable use or another antenna connects to the external antenna connector on the back of the IC-202.

We are sure that you will have years of lasting enjoyment from your IC-202, manufactured by the leader in communication equipment:
Inoue Communication Equipment Corporation.



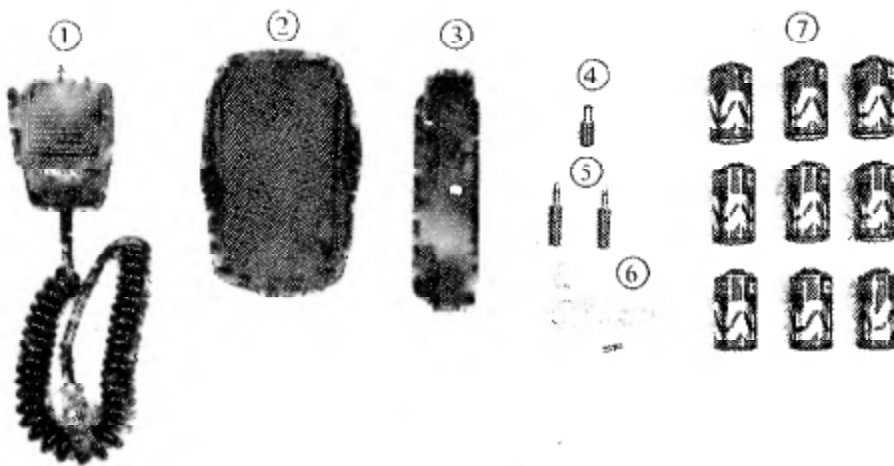
The IC-202 is a precision built, high performance SSB 2 meter transceiver that you can operate anywhere. It's small size and light weight make it the perfect portable, but we haven't forgotten things like a very effective noise blanker, RIT, S & RF meter, and other features that you need for enjoyable operation.

The frame is one peice of die-cast alluminum, and the alluminum sides are quickly removable if service is ever necessary. Your IC-202 operates from either the 9 batteries installed in the side or an external 13.8V power source such as the IC-3PS.

SECTION III ACCESSORIES

Various accessories are packed with your transceiver. Be sure not to overlook anything. Also it's a good idea to keep packing cartons in case of moving or return for service is necessary. If you find you are missing any accessories, contact the dealer you purchased your transceiver from, or your ICOM distributor.

- | | | | |
|-----------------------|---|-----------------------|---|
| 1. Dynamic Microphone | 1 | 5. Ext. Speaker Plug | 1 |
| 2. Microphone Case | 1 | 6. Earphone | 1 |
| 3. Shoulder Strap | 1 | 7. Dry Cells Type "C" | 9 |
| 4. Power Supply Plug | 1 | | |

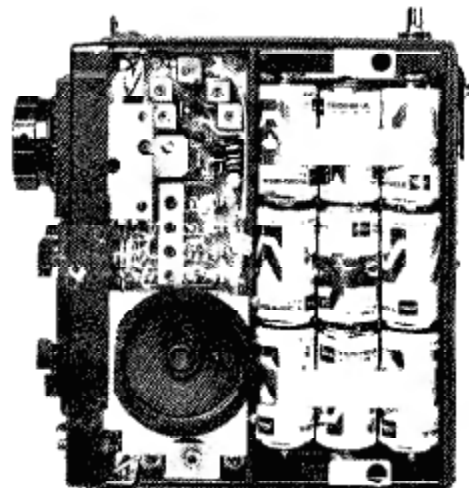


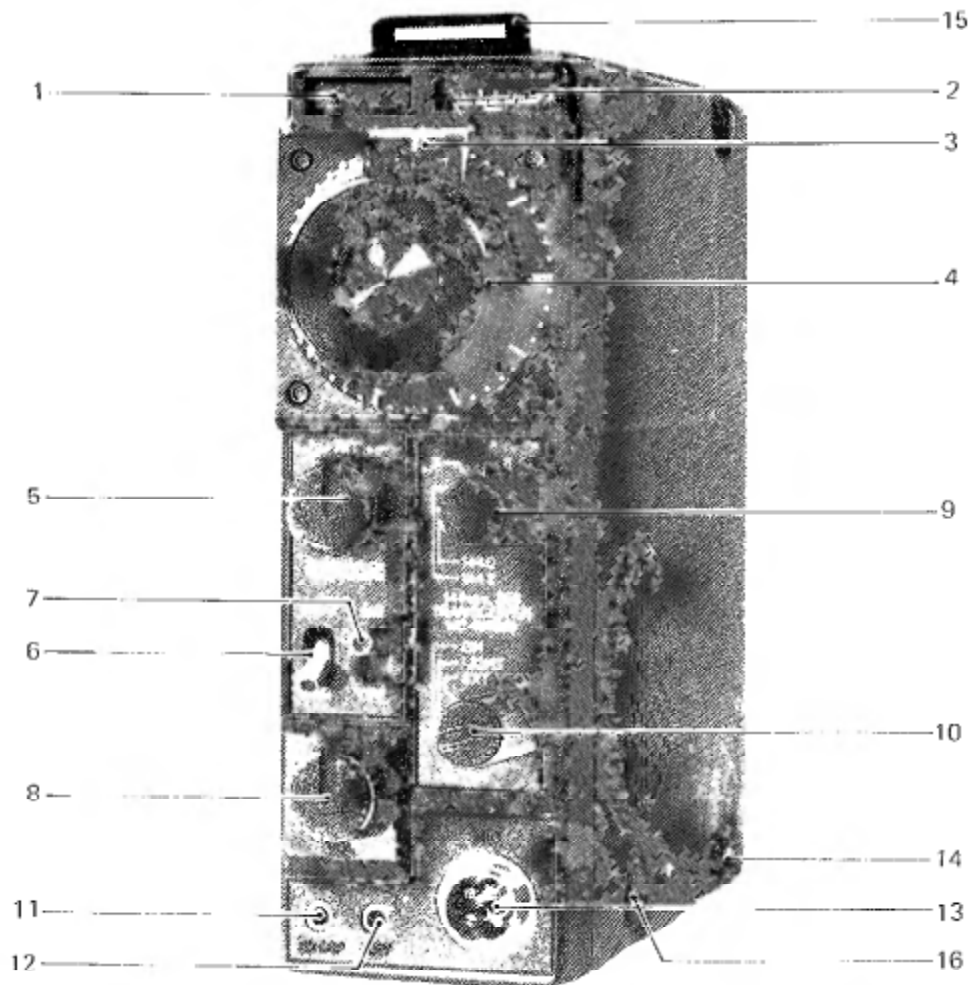
SECTION IV PRE-OPERATION

Battery installation

Place the function switch in the off position. Remove the side that covers the battery case and speaker. Carefully install the batteries in the manner shown on the bottom of the battery case. Take care in observing correct polarity.

Place the batteries on top of the ribbon so when the batteries need to be removed a simple pull on the ribbon will make removal easier. Place batteries in the center column last. Do not force the batteries in place or replaced. With the batteries properly in place, carefully replace the side cover.



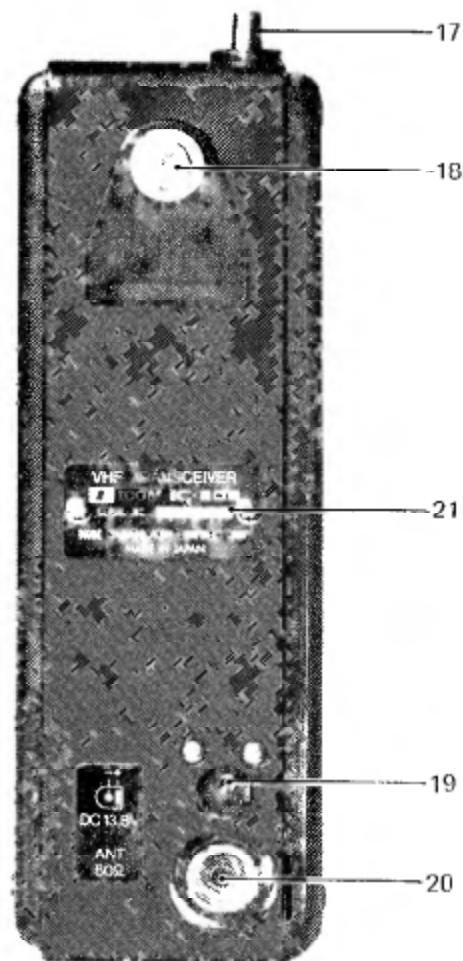


SECTION V DESCRIPTION OF CONTROLS AND CONNECTIONS

1. Power indicator LED
Shows when power is applied to the IC-202.
2. S & RF meter
Indicates the relative signal strength of receive signals and output power of transmitted signals.
3. Dial scale
The dial is divided into 10HZ increments with a total coverage of 200KHz. The operating frequency is read by adding the frequency shown on the dial with that shown on the crystal switch, or in case of the spare crystals, by adding the dial reading to the frequency of the crystal installed.
4. Tuning Knob
Selects the Frequency.

-
5. **RIT**
Independently swings the receiver frequency $\pm 3\text{KHz}$ so that signals that are slightly off frequency may be tuned in clear without affecting the transmitting frequency.
 6. **Mode Switch**
In the **CW-T** position the transmitter will transmit when the **CW** key makes contact. In the **REC** position both **SSB** and **CW** signals can be received. In the **CW-T** position the microphone is removed from the circuit.
 7. **Noise Blank Switch**
In the **NB** position, the noise blanker is put into the circuit and noise pulses will be reduced.
 8. **Volume**
Controls the audio output level.
 9. **Crystal Switch**
Selects the crystal to be used in the **VXO**.
 10. **Function Switch**
Turns the power on and off and in the light position, turns on the meter light. In **EXT VFO** position, the frequency of the **IC-202** can be controlled by an external **VFO**.
 11. **External speaker Jack**
An external speaker can be connected here. The impedance of the speaker should be 8 ohms. With the external speaker connected, the built-in speaker will be disabled.
 12. **Key Jack**
A key for **CW** transmission is connected here.
 13. **Microphone Connector**
A 500 ohm microphone is connected here.
 14. **Snap-Locks**
Convenient snap-locks hold the sides in place. To remove them for any service or to replace the batteries, simply pull out on the center of the snap-locks and the cover can easily be removed. When replacing the covers be sure that you have placed the covers properly in the grooves provided, then push down on the center of the snap-lock. Note: when the sides are placed in the grooves, the snap-lock center must be pulled out.
 15. **Shoulder strap bracket.**
Connect the shoulder strap here for easy carrying.
 16. **External VFO Socket**
Accepts plug from external **VFO**.

17. **Whip antenna**
The built in whip antenna must be fully extended for best operation. Use care when expanding or compressing the antenna.
18. **Microphone Hanger**
When not in use, the mic can be placed here out of the way.
19. **External Power Supply Jack**
Any well regulated power supply with an output of 13.8 volts can be connected here instead of using the batteries installed. Inserting the plug into the jack disables the battery source.
20. **External Antenna receptacle**
An external antenna of 50 ohms impedance can be connected here. If an external antenna is used, the built-in whip should be completely collapsed.
21. **Identification plate**
States model number and serial number.



SECTION VI OPERATION

1. After the batteries have been installed, or the IC-202 connected to an external source, turn the function switch on. If the surrounding light is too dim to see the S & SR meter, turn the switch to the LIGHT position, and the meter will be illuminated.
2. Extend the whip antenna to its full length, or if you wish to use an external antenna, connect the cable to the EXT antenna connector on the back of the IC-202.
3. Connect the microphone to the MIC jack on the front panel.
4. If you wish to use the CW mode of transmission, connect a key to the KEY jack on the front panel. You do not have to disconnect the microphone for CW operation.
5. Place the mode switch in the proper position for the portion of the 2 meter band you wish to operate in, whether it be CW or SSB. If you wish to operate outside of the 144.0-144.4 MHz portion of the band, it will be necessary for you to install an additional crystal in one of the spare crystal sockets provided for this purpose. See page 7 for an explanation of how this is done. Crystals can be ordered from your authorized ICOM authorized distributor or his stocking dealer.

6. Turn the tuning knob until you reach the desired frequency or a signal is heard. Adjust the volume control for a comfortable level of listening. If operating SSB, you may wish to place the Noise Blanking switch in the NB position. This activates the noise blanking circuit which will suppress noise pulses. After selecting the operating frequency, if the receiving signal seems to drift, adjust the RIT control until the signal is again clear. Avoid adjusting the tuning knob for this purpose, as to do so will also change your transmitting frequency.

7. For SSB operation, hold the microphone close to your mouth, push the PTT switch on the microphone, and speak in a clear normal tone of voice.

For CW operation, after connection of your KEY, place the CW-T switch in the CW-T position and the IC-202 will transmit when the KEY contacts are closed. To receive, place the switch back in the REC position.

8. For operation with an External VFO, remove the rubber plug in the side of the IC-202, and insert a suitable plug from the VFO, and place the function switch in the EXT VFO position.

A/B POSITION SPARE CRYSTALS

The IC-202 comes with 2 crystals installed in the VXO for operation between 144.0 – 144.4 with each crystal covering 200KHz. If you wish to work another part of the 145MHz band all that is needed is to install the proper frequency crystal in either the A or B spare crystal socket, tweek it, and your read for operation. Also a crystal can be installed to work the 145.8–146.0 portion of the band if you want to use OSCAR.

INSTRUCTIONS FOR INSTALATION

Crystals 36-1 and 36-2 are already installed in the crystal sockets. These are for 144.2 (36-1) and 144.2–144.4 (36-2). Installing additional crystals in the spare crystal sockets in some positions and/or combinations may cause the output level of the operating crystal to decrease. This is due to absorption of some of the energy by the adjacent crystal.

BE SURE TO FOLLOW THE CHART EXACTLY AS TO POSITION AND COMBINATION OF THE SPARE CRYSTALS TO OBTAIN OPTIMUM PERFORMANCE.

SPARE SOCKET		XTAL NUMBER	COMBINATION			
A	B		3	4	5	6
○	×	3	—	○	×	○
×	○	4	○	—	○	○
○	○	5	×	○	—	×
○	○	6	○	○	×	—

○ = Possible

For other combination of crystals than those listed in the chart, and for crystals for frequencies other than those listed, a slight modification or realignment will probably be required. For communication through OSCAR (145.8–146 MHz) realignment of various parts besides the readjustment of the oscillator frequency will be necessary.

SECTION VII FREQUENCY ADJUSTMENT

Tools needed.

1. Frequency counter capable of measuring in the 133 MHz range
2. Tweaking tool
3. Core driver

1. Connect the frequency counter to J3 of the VXO unit, with the ground connected to J2.
2. Place the RIT in the center position. Set the crystal switch to the position of the crystal to be aligned.
3. Set the tuning dial to "100", and adjust the appropriate coil till the frequency shown in the chart is obtained.
4. Next set the dial to 200 and adjust trimmer A for the proper frequency according to the chart.
5. Set the dial now to "0" and adjust trimmer B for the proper frequency.
6. Repeat the adjustment above till no further adjustment is necessary to get the proper frequencies at all three points.

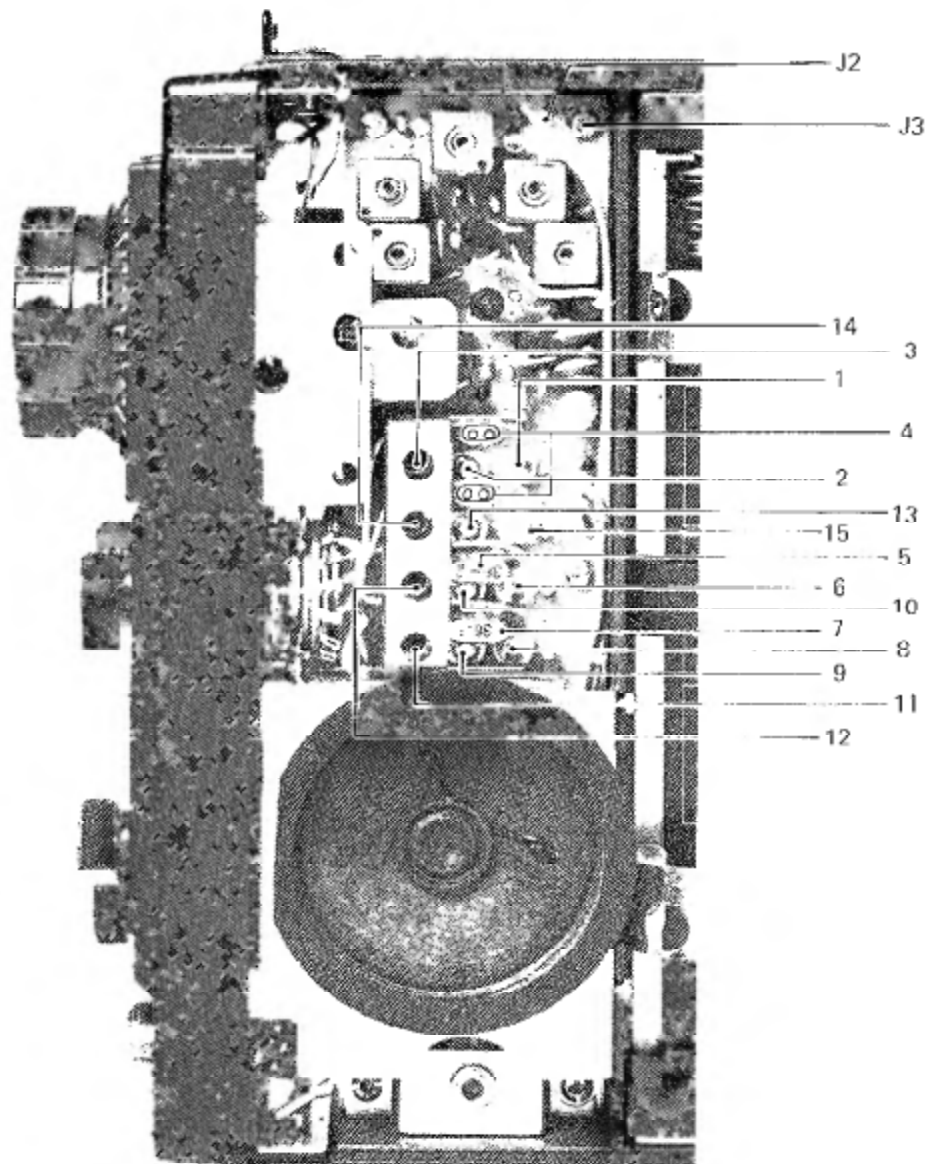
Crystal No.	Dial		
	0	100	200
36-1	133.3015 MHz	133.4015 MHz	133.5015 MHz
36-2	133.5015	133.6015	133.7015
36-3	133.7015	133.8015	133.9015
36-4	133.9015	134.0015	134.1015
36-5	134.1015	134.2015	134.3015
36-6	135.1015	135.2015	134.3015

Xtal No.	Center Freq.	Range	Type	Basic Freq.
36-1	144.100 MHz	144.000-144.200 MHz	HC-18/U	14848.83 KHz*
36-2	144.300	144.200 -144.400	HC-18/U	14871.06
36-3	144.500	144.400 -144.600	HC-25/U	14893.28
36-4	144.700	144.600-144.800	HC-25/U	14915.50
36-5	144.900	144.800 -145.000	HC-25/U	14937.72
36-6	145.900 MHz	145.800-146.000 MHz	HC-25/U	15048.83 KHz**

* Supplied in the transceiver

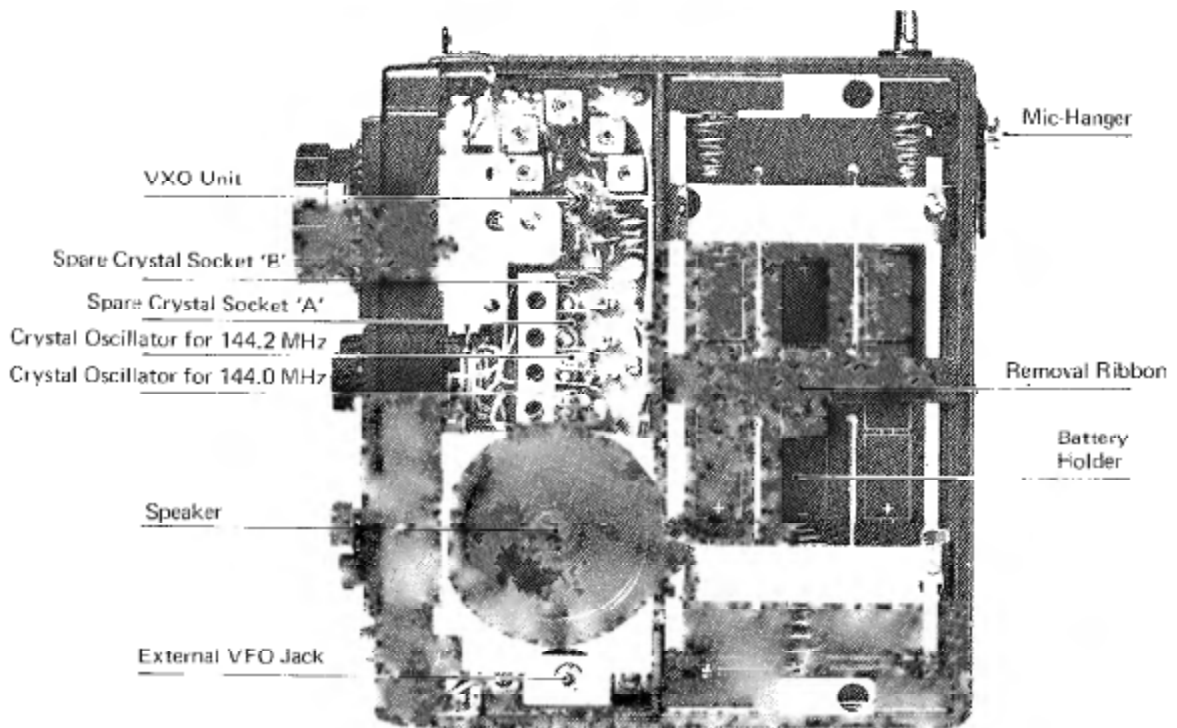
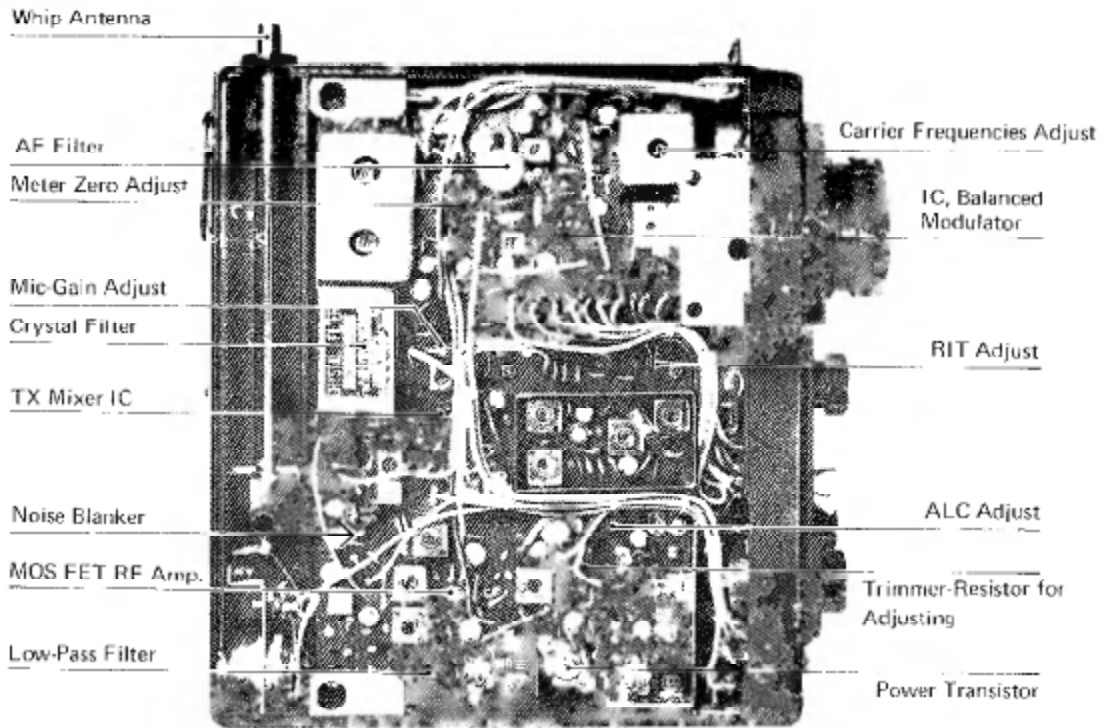
** For OSCAR use.

- Note:
1. CL is 20 PF, with regard to the crystal load capacitance.
 2. The frequency of the crystal oscillator (basic frequency) does not correspond to the oscillation frequency in the circuit.

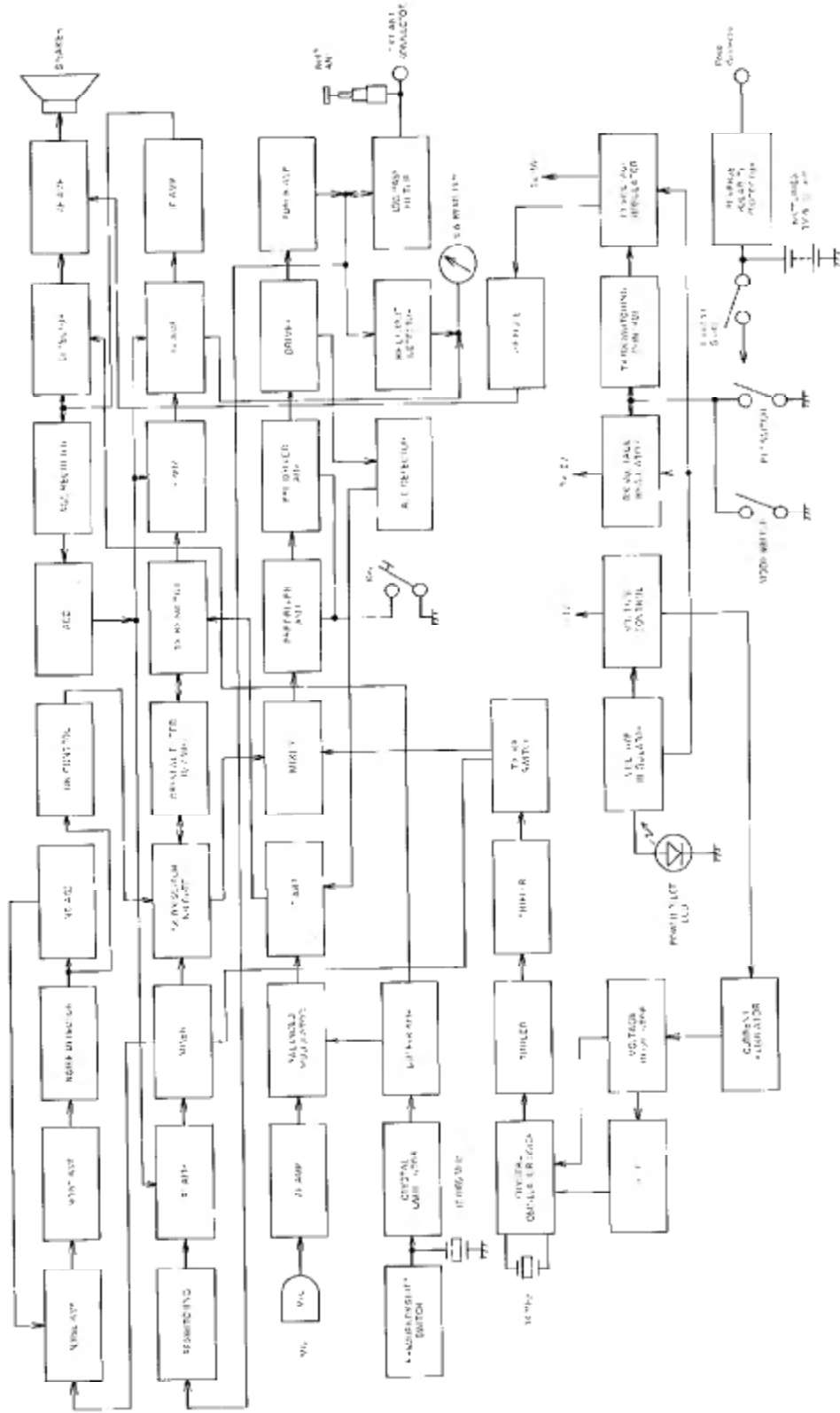


1. Trimmer (b) for the "B" band
2. Trimmer (a) for the "B" band
3. Coil for the "B" socket
4. Additional Crystal Sockets "A" and "B"
5. Crystal for 144.2 MHz band
6. Trimmer (b) for 144.2 MHz band
7. Crystal for 144.0 MHz band
8. Trimmer (b) for 144.0 MHz band
9. Trimmer (a) for 144.0 MHz band
10. Trimmer (a) for 144.2 MHz band
11. Coil for 144.0 MHz band
12. Coil for 144.2 MHz band
13. Trimmer (a) for "A" band
14. Coil for the "A" band
15. Trimmer (b) for the "A" band

SECTION VIII INSIDE VIEW



SECTION IX BLOCK DIAGRAM



VOLTAGE CHART

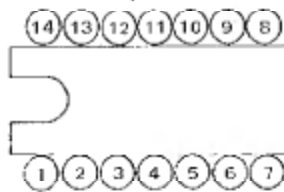
Unit	Q No.	Mode	Transistor			F E T				Remarks
			(B)	(C)	(E)	(G1)	(G2)	(D)	(S)	
Main Unit	Q1	R	8.2	8.9	8.9					
	Q1	T	0	0	0					
	Q2	R				0	4.2	9.0	0.23	
	Q3	R				0		9.0	0.86	
	Q4	R	0	2.1	E					NR-ON
	Q5	R	0	6.7	E					
	Q6	R				0	4.2	8.8	0.35	
	Q7	R				0	5.4	8.8	0.65	
	Q8	R	0.7	0	E					
	Q8	T	0	0	E					CW-T
	Q9	R	5.0	7.0	4.4					
	Q10	R	4.4	7.0	3.8					
	Q11	R	0.05	E	0					
	Q11	T	0.05	E	0					
	Q12	R	9.9	12.2	9.2					
	Q12	T	0	13.0	0					
	Q13	R	0.65	0	E					
	Q13	T	0.23	9.8	E					
	Q14	R	0	13.2	0					
	Q14	T	9.8	11.3	9.2					
	Q15	R	9.3	12.2	8.7					
	Q16	T				0				
	Q17	T				0	4.1	6.4	0.7	
	Q18	R	0	13.2	0			8.8	0.45	
	Q18	T	1.3	12.6	0.6					
	Q19	R	0	13.2	E					
Q19	T	0.72	13.2	E						
Q20	R	0	13.2	E						
Q20	T	0.75	13.2	E						
Q21	R									
Q21	T									
Q22	R	0.67	0	E						
Q22	T	0	3.7	E						
Q23	R	0	4.8	E						
Q23	T	0.67	0	E						
VXO Unit	Q1	R&T	1.8	6.1	1.3					
	Q2	R&T	1.7	7.8	1.3					
	Q3	R&T	1.6	7.7	1.55					
	Q4					6.1	8.7	7.1		

Bottom View



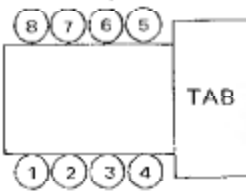
IC 1
IC 3
IC 4

Top View



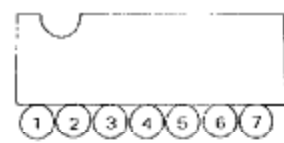
IC 6
IC 7

Top View



IC 2

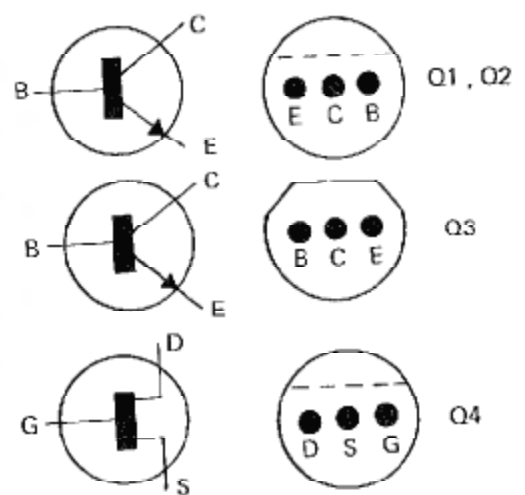
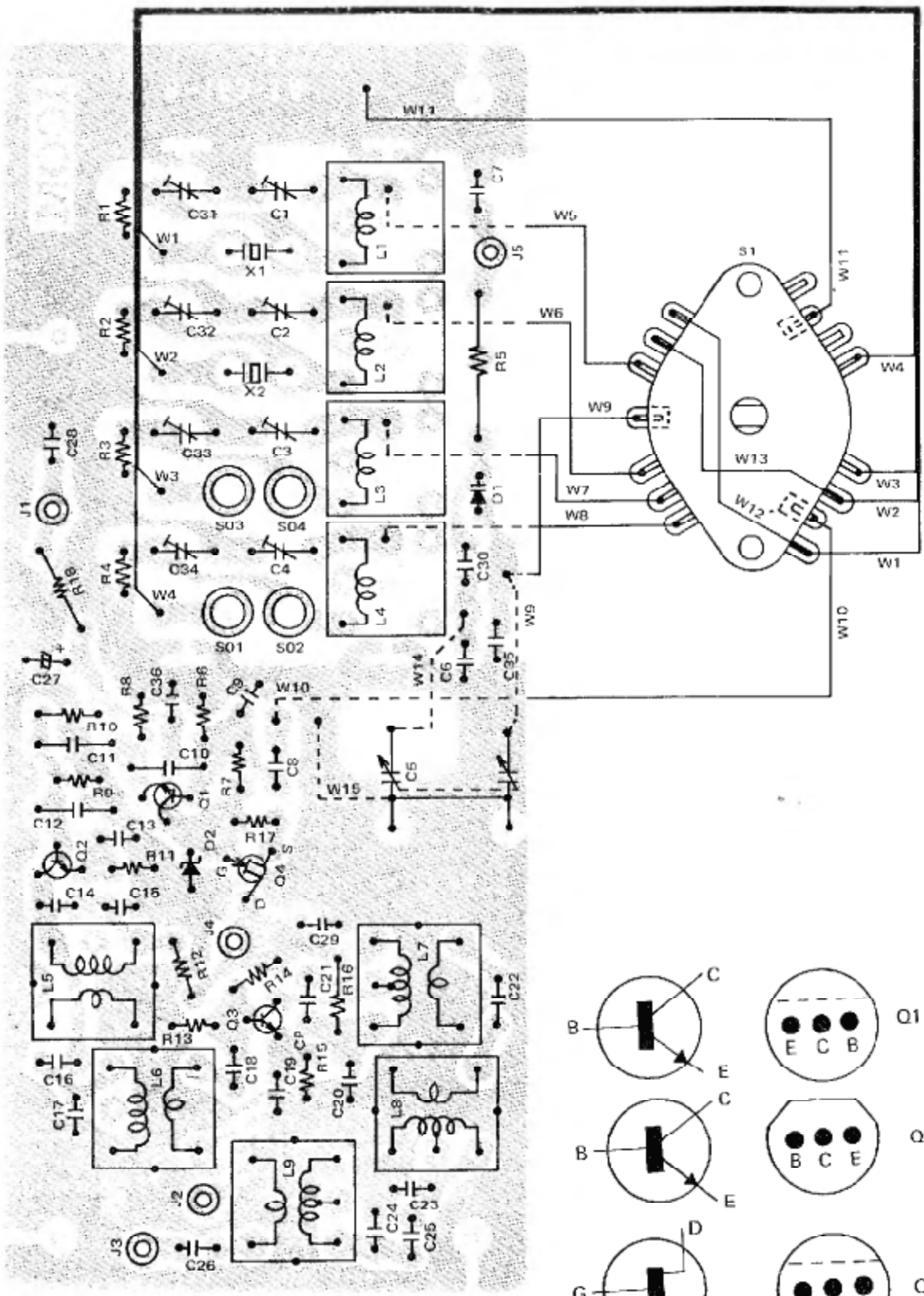
Side View

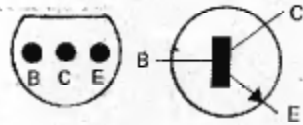
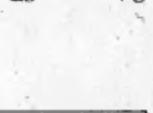
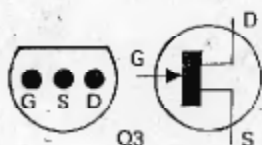
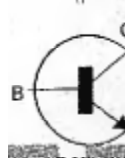
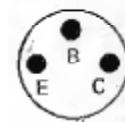
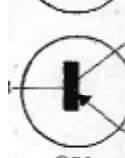
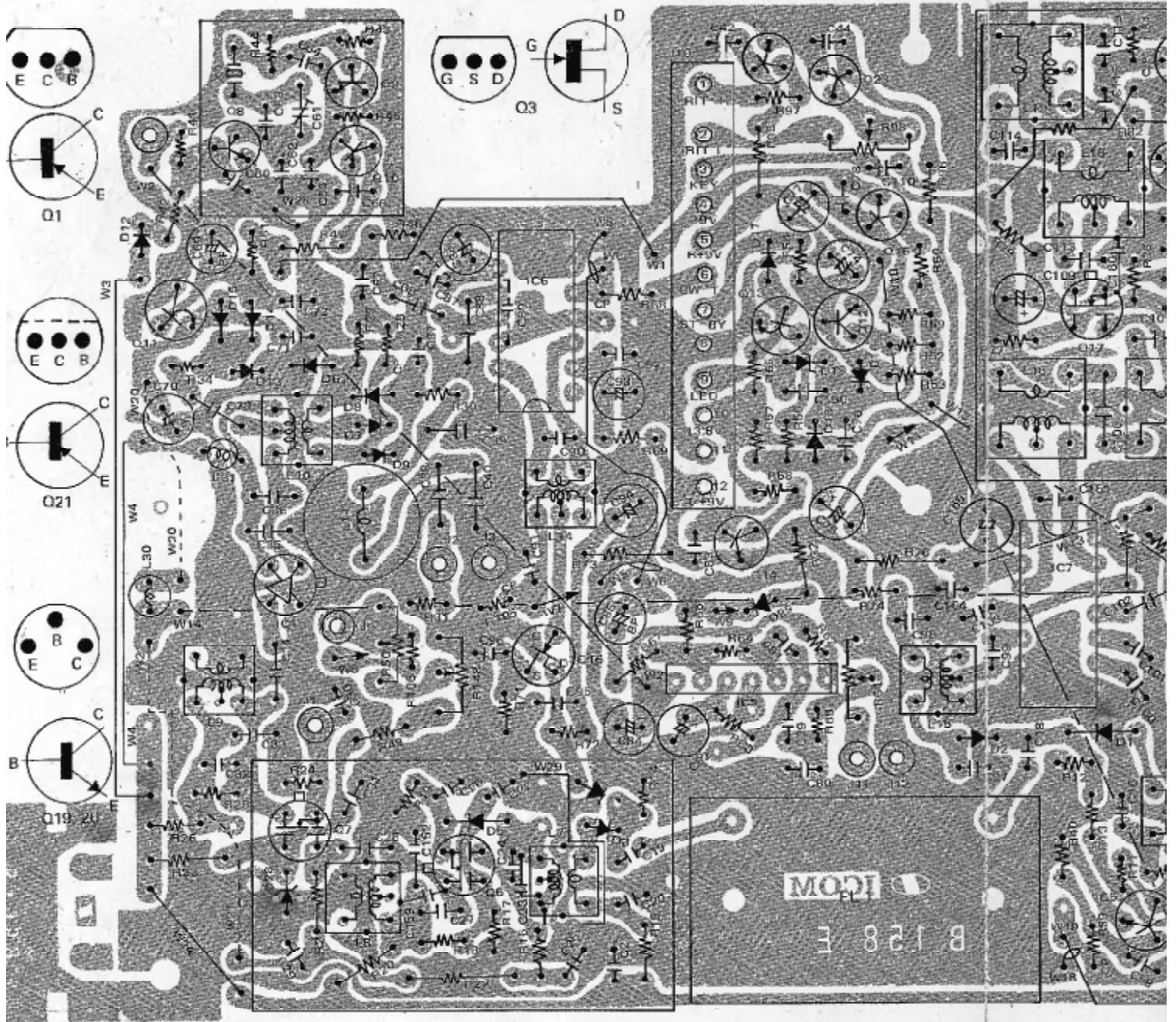


IC 5

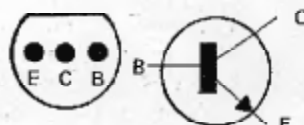
Unit	IC No.	Mode	Pin No.													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Main	IC1	R	9.3	9.3	2.05	E										
	IC2	R	1.4	13.0	12.3	7.3	6.1	13.0	0.21	1.7						
	IC2	T	1.5	13.0	12.8	0	0.55	13.0	0	4.8						
	IC3	R	6.6	9.3	2.05	E										
	IC4	R	9.3	9.3	2.05	E										
	IC5	T	1.8	0.5	0.036	E	0.58	7.5	9.2							
	IC6	T	0	8.8	7.8	4.5	2.9	E	E	E	2.9	4.5	4.5	4.5	7.8	E
IC6	T	0	8.4	6.0	5.5	4.9	E	E	E	4.7	5.4	5.5	5.5	6.0	E	
IC7	T	E	8.8	7.1	6.1	3.9	E	E	E	3.9	6.1	6.1	6.1	6.1	E	

Note: E = Ground

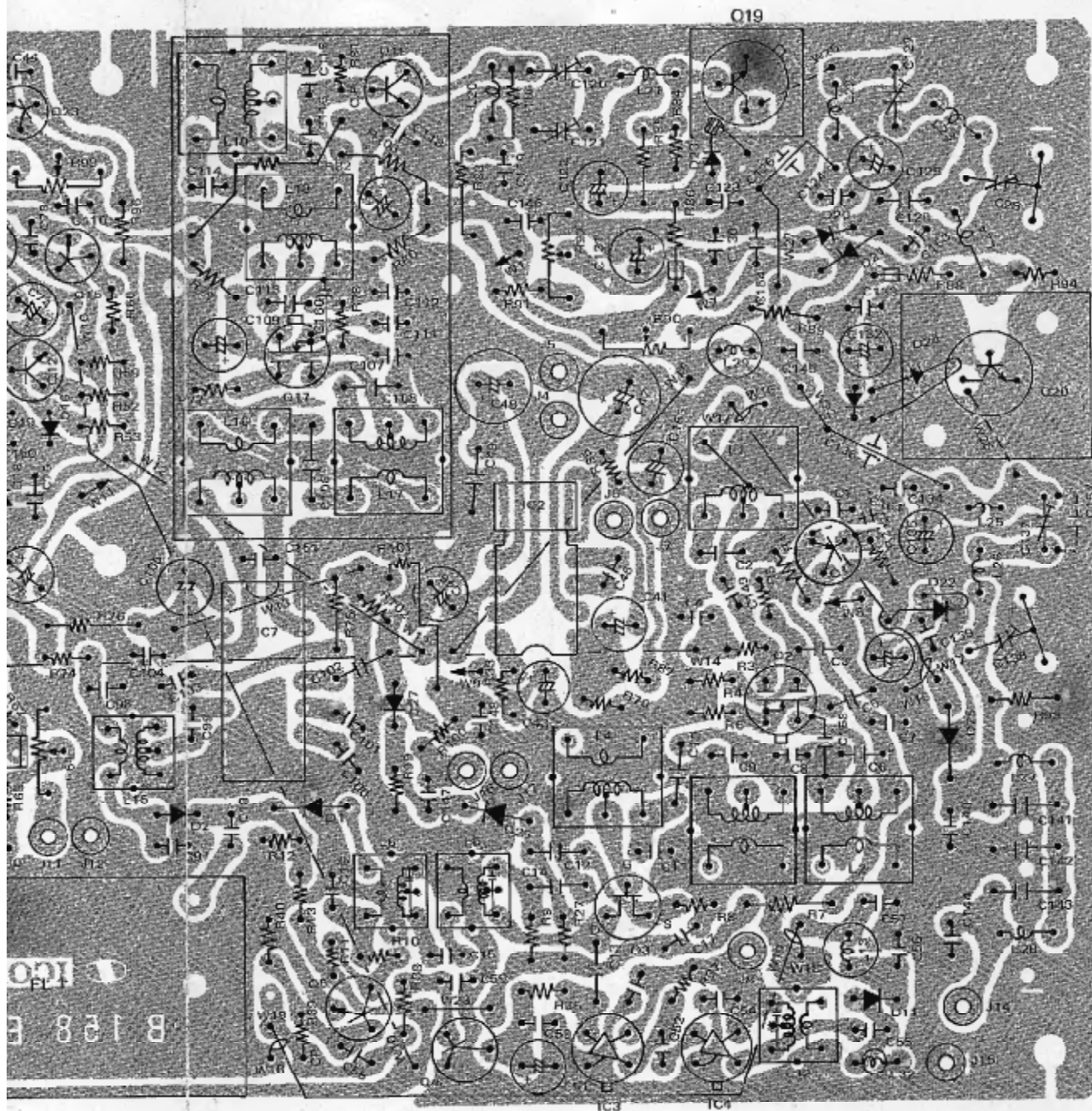




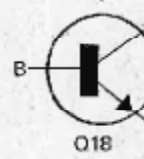
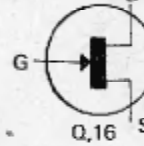
Q12, 14, 15



Q4, 5, 8, 9, 10,
11, 13, 22, 23.



Q2, 6,
7, 17,



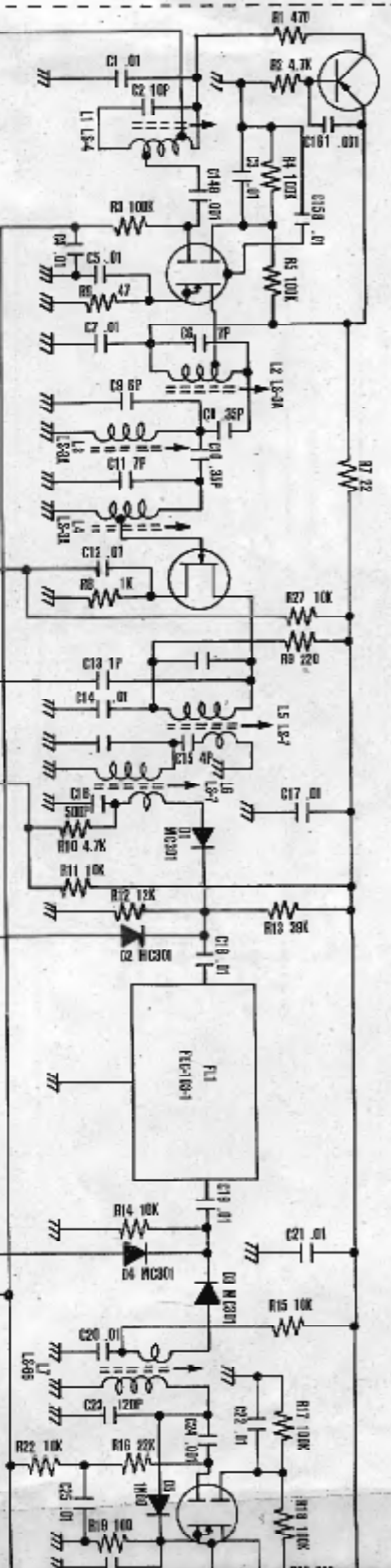
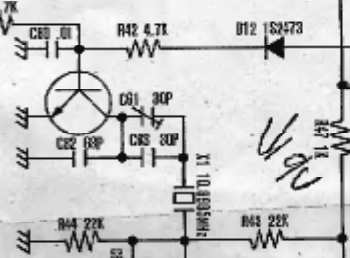
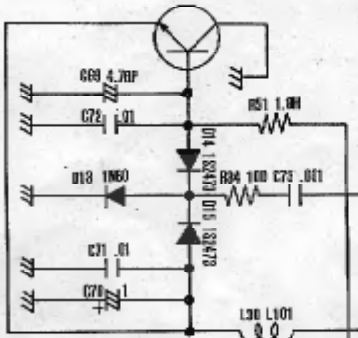
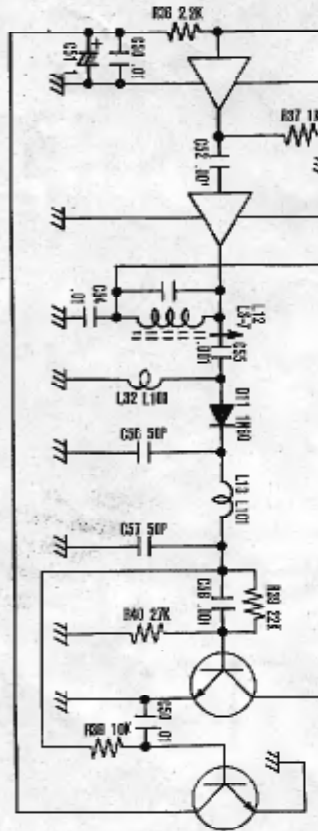
Q18

14, 5, 8, 9, 10,
11, 13, 22, 23,

MAIN U-93

018 28X70

017 88X87



013 LAN221

014 LAN221

015 28X448

016 28X515

017 28X345

018 28X515

013 28X70

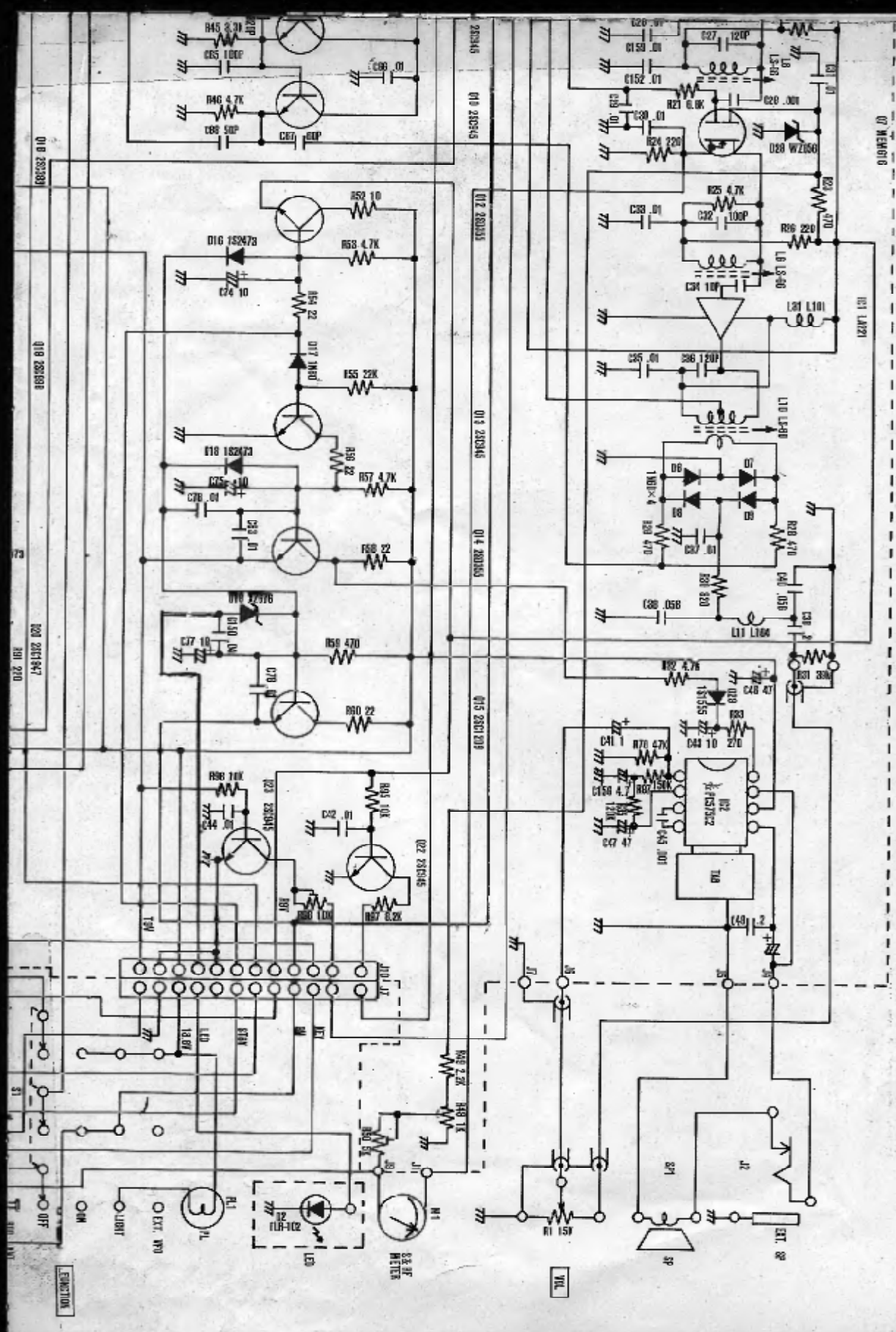
014 MEM018

015 28X418

016 MEM018

017 28X418

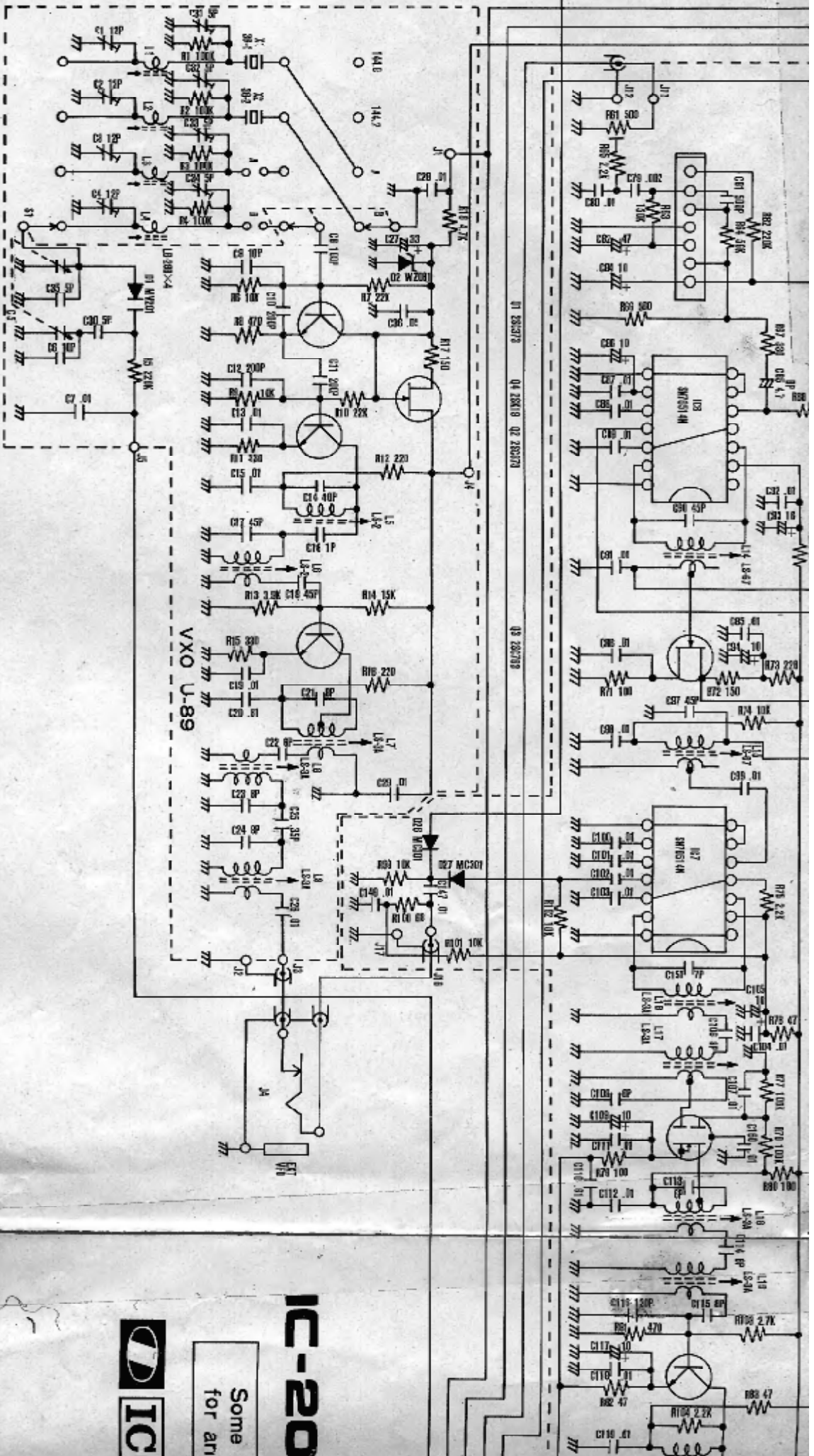
018 MEM018



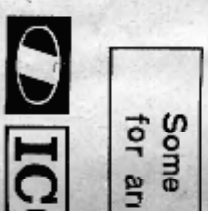
FUNCTION

VOL

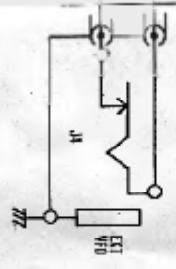
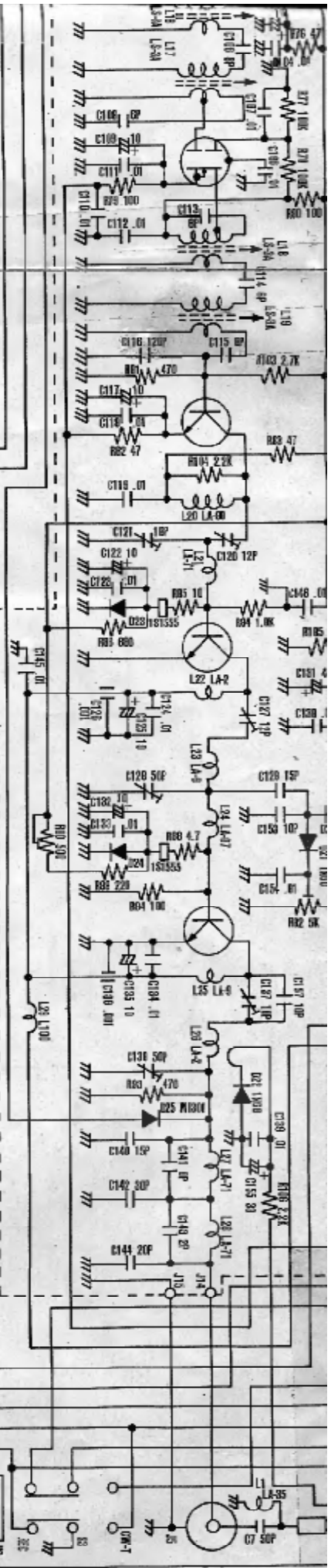
MEMO 10



VXO U-89

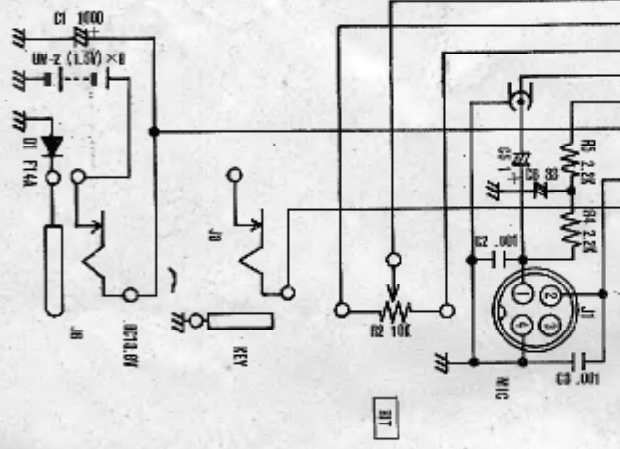
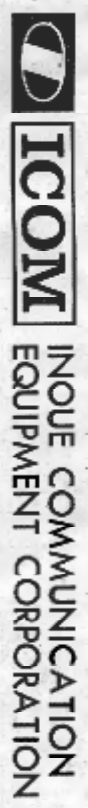


IC-20



IC-202 SCHEMATIC DIAGRAM

Some components subject to change for an improvement without notice.





INOUE COMMUNICATION EQUIPMENT CORPORATION

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OSAKA JAPAN

