

# MAINTENANCE SERVICE MANUAL FT-707



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## FOREWORD

The purpose of this manual is to provide the reader with information critical to the operation and maintenance of the FT-707 transceiver. Technical details are geared for maximum comprehension by technician or owner, rather than the design engineer. To this end, the descriptions have been kept brief while photographs and drawings are utilized liberally.

Use of this manual is entirely at the owner's risk. While we believe the material presented herein to be correct and factual, we assume no liability for damage which may occur when this manual is used as a reference.

The FT-707 has had an enviable service record, and we trust that you will seldom have recourse to this manual. Should reference be necessary, though, we hope and trust that the information presented will be sufficient for your service needs.

Yaesu Musen Company, Ltd  
Tokyo, Japan



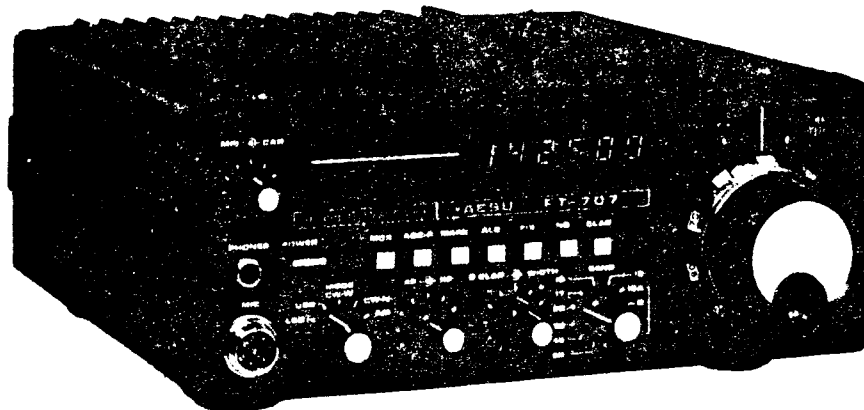
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# YAESU

## ALL SOLID STATE HF SSB TRANSCEIVER

### FT-707



### GENERAL DESCRIPTION

The FT-707 is an all solid state transceiver for the HF amateur bands. Featuring coverage of 80 through 10 meters, the FT-707 is designed for operation on SSB, CW and AM. Nominal power output is 100 watts on SSB and CW, and 50 watts on AM.

The extremely compact size of the FT-707 makes this model particularly well suited for mobile or vacation use. However, the advanced design techniques used in the FT-707 make it competitive with "top of the line" equipment of other manufacturers.

The receiver section includes a new and sophisticated front end, using a Schottky barrier diode ring module and carefully designed gain distribution, for excellent performance in the presence of strong signals. A very-low-noise pre-mix local oscillator circuit is used, which further contributes to optimum receiver performance. Also included in the receiver is Yaesu's famous variable IF bandwidth, using two 8 pole IF filters, allowing continuously variable adjustment of the IF bandwidth, from 300 Hz to 2.4 kHz. Six pole filters of 600 Hz and 350 Hz bandwidth ( $-6$  dB) are available for contest and DX operators, with selection of the SSB filter or CW filter available on the CW mode.

The transmitter side features two rugged bipolar transistors with multiple protection in the final amplifier stage, with bandswitched low pass filter networks providing excellent spectral purity.

Digital plus analog display of the operating frequency is provided. The front panel meter consists of a string of bright discrete LEDs, for easy monitoring of the received signal strength, relative power output, and the transmit ALC level.

Available options for the FT-707 include the FP-707 AC Power Supply, which provides the 13.5 volts DC required by the FT-707. The FP-707 provides outstanding regulation, for many years of trouble-free operation. Also available is the exciting FV-707DM external VFO, which provides twelve memory channels using a sophisticated synthesizer which allows scanning in 10 Hz steps and offset from memory channels. And for matching your antenna system to the 50 ohm impedance requirement of the FT-707, choose the FC-707 Antenna Coupler. All of the above accessories, plus a special mobile mounting bracket, are available from your Yaesu dealer.

## SPECIFICATIONS

## GENERAL

## Frequency coverage:

80 m	3.5–4.0 MHz
40 m	7.0–7.5 MHz
30 m	10.0–10.5 MHz
20 m	14.0–14.5 MHz
17 m	18.0–18.5 MHz
15 m	21.0–21.5 MHz
12 m	24.5–25.0 MHz
10 m	28.0–29.9 MHz

## Modes of operation:

LSB, USB, CW, and AM

## Power requirements:

13.5 volts DC, negative ground

## Current consumption:

DC 1.5 amps receive

DC 20 amps transmit

## Case size:

93 (H) x 240 (W) x 295 (D) mm incl. heat sink

## Weight:

Approx. 6.5 kg

## TRANSMITTER

## Power input:

SSB/CW	240 watts DC
AM	80 watts DC

## Carrier suppression:

Better than 40 dB

## Unwanted sideband suppression:

Better than 50 dB at 14 MHz, 1 kHz mod.

## Spurious emissions:

At least 50 dB down

## Frequency response:

350–2700 Hz (–6 dB)

## Third order distortion products:

At least 31 dB down

## Frequency stability:

Less than 300 Hz drift over 30 minutes at  
10 minute warmup; less than 100 Hz d  
after 30 minute warmup

## RECEIVER

## Sensitivity:

SSB/CW	0.25 $\mu$ V for 10 dB S/N
AM	1.0 $\mu$ V for 10 dB S/N

## Selectivity:

SSB	2.4 kHz (–6 dB); 4.0 kHz (–60 dB)
CW*	0.6 kHz (–6 dB), 1.2 kHz (–60 dB)
CW**	350 Hz (–6 dB), 1.2 kHz (–60 dB)
AM	3.6 kHz (–6 dB), 6.8 kHz (–60 dB)

## Image rejection:

60 dB	(80–12 m)
50 dB	(10 m)

## Audio output impedance..

4–16 ohms

## Audio output:

3 watts @ 4 ohms @ 10% THD

## Variable bandwidth control:

Continuous from 300 Hz to 2.4 kHz (SSB/  
modes only)

## Modulation type:

(SSB) Balanced modulator  
(AM) Amplitude modulation of a low po  
stage

## Antenna output impedance:

50 ohms

## Microphone impedance:

500–600 ohms (low impedance)

\* with optional 600 Hz CW filter

\*\* with optional 350 Hz CW filter

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## SEMICONDUCTORS

## Transistors:

2SA496Y	1
2SA733A-P	2
2SA733A-Q	4
2SA952L	13
2SC380TM-Y	12
2SC535A	1
2SC732TM-GR	1
2SC1583G	2
2SC1589	2
2SC1674L	1
2SC1815GR	3
2SC1815Y	29
2SC1923R	2
2SC1959Y	3
2SC2290	2
2SC2395	2
2SC2407	2
2SD235Y	1
2SD592Q	1
2SD880Y	1
2N4427	1
MPS-A13	1

## Field Effect Transistors:

2SK19TM-GR	5
2SK30A-Y	1
3SK73GR	7
J310	1

## Integrated Circuits (IC):

SN76514N	1
$\mu$ PC2002V	1
$\mu$ PA54H	1
AN6552	1
F4024	1
MSM9520RS	1
TA7612AP	1
78L08	3
$\mu$ PC14305	1
$\mu$ PC14308	1
ND487C2-3R	1

## Germanium Diode:

1N60	26
1S1007	14

## Silicon Diodes:

10D1	14
10D10	4
1S1555	66
1SS53	37

## Schottky Barrier Diode:

1SS16	6
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## Zener Diode:

YZ-033	1
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## Varactor Diodes:

1S2209	1
1S2236	1
FC63	1

## Light Emitting Diodes:

GD4-203SRD	1
TLG205	5
TLR205	2
TLY205	3

## LED Display:

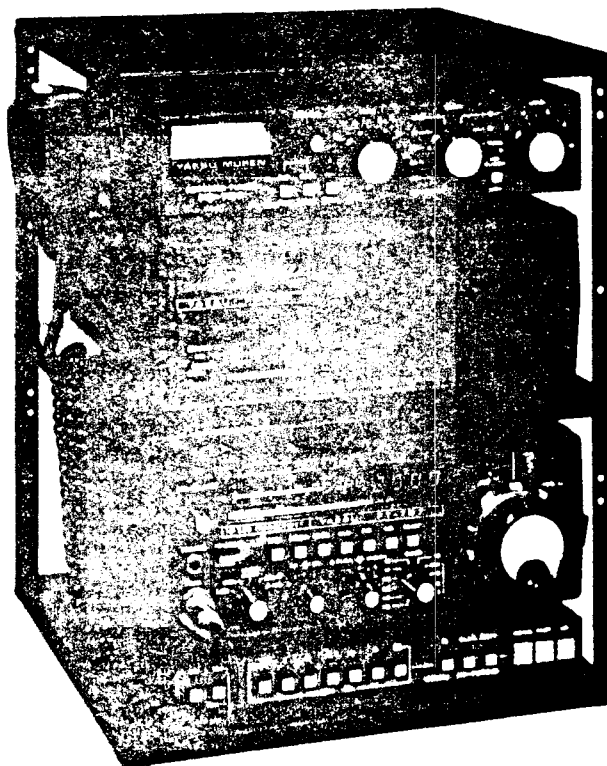
5082-7623	6
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Specifications subject to change without notice.

## ACCESSORIES

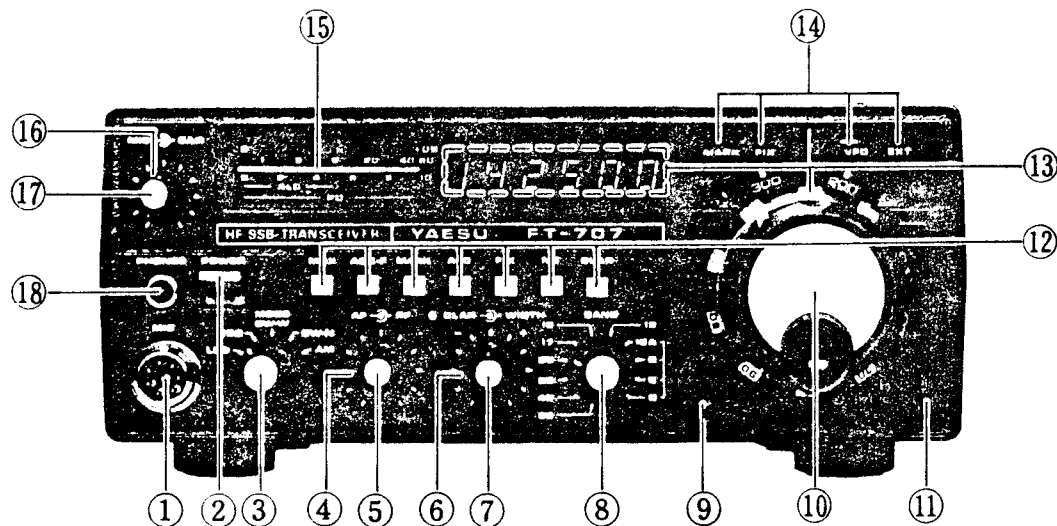
The following accessories are included with your FT-707.

DC Power Cord	1
DC Fuse (20A)	1



FC-707/FP-707/FT-707/FV-707DM/YM-35

## FRONT PANEL CONTROLS AND SWITCHES

**(1) MIC**

The microphone jack accepts the microphone input line, push to talk (PTT) control, and scanner control lines (scanner requires optional FV-707DM).

**(2) POWER**

This is the main power on/off switch for the transceiver.

**(3) MODE**

This switch selects the desired mode: LSB, USB, CW-W (using SSB filters), CW-N (using optional 600 Hz or 350 Hz filter), or AM.

**(4) RF GAIN**

This control varies the gain of the receiver RF and IF stages. Clockwise rotation increases the gain level.

**(5) AF GAIN**

This control varies the gain of the audio amplifier stage. Clockwise rotation increases the AF volume level.

**(6) WIDTH**

The WIDTH control varies the IF passband from 2.4 kHz down to approximately 300 Hz (-6 dB).

**(7) CLAR**

This control allows offset from the VFO frequency of approximately  $\pm 3$  kHz on receive, when the front panel CLAR switch is pushed.

**(8) BAND**

This switch selects the desired band.

**(9) VOX GAIN**

This control varies the sensitivity of the VOX (voice operated T/R control) system.

**(10) MAIN TUNING KNOB**

This knob drives the main tuning variable capacitor, for control of the operating frequency.

**(11) DELAY**

This control provides adjustment of the VOX relay hang time. It may be set for your individual requirements for CW or SSB operation.

**(12) SELECT switches**

**MOX** This switch selects manual activation of the transmitter. Push the switch once to close the PTT circuit, and again to allow receiver recovery.

**AGC F** Push this switch to select fast recovery time for the receiver AGC (Automatic Gain Control) circuitry. When this button is not pushed, slow AGC recovery will be selected.

**MARK** Push this button to activate the crystal calibrator (marker) circuit. The calibrator signal will be heard every 25 kHz.

**ALC** This switch checks the ALC level by the LED meter. When this button is not

pushed, the LED meter indicates TX relative power output (PO).

**FIX** Push this switch to operate on a fixed channel.

**NB** This button activates the noise blanker circuit.

**CLAR** Push this button to activate the receiver offset tuning (clarifier) feature.

**(13) DIAL**

The main tuning dial is calibrated every 50 kHz, with dial skirt markings every 1 kHz, for precise frequency determination.

**(14) INDICATOR LEDs**

These LED indicators provide visual reminders of calibrator, fixed channel (using an optional crystal), VFO, or external VFO operation.

**(15) LEVEL METER**

A string of colored LEDs provides visual indication of the received signal strength, relative power output, and the transmitter ALC level.

**(16) CAR**

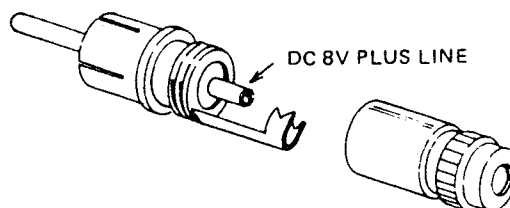
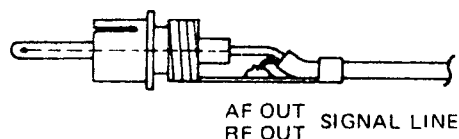
The carrier control adjusts the CW or AM carrier level.

**(17) MIC GAIN**

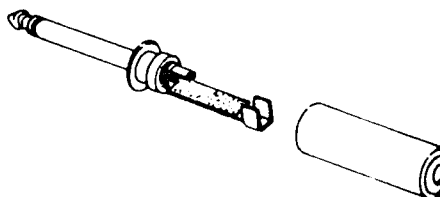
This control varies the gain of the microphone amplifier stage during SSB or AM operation.

**(18) PHONES**

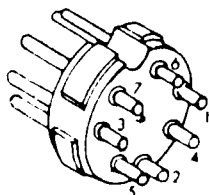
This is a standard phone plug for connection of your station headphones. The impedance is 8 ohms.



Pin plug

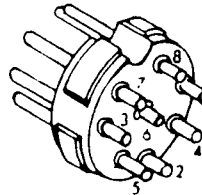


Headphone and external speaker connections



- | PIN No |                 |
|--------|-----------------|
| 1      | FAST CONT (MIC) |
| 2      | DOWN CONT (MIC) |
| 3      | E               |
| 4      | PTT             |
| 5      | UP CONT (MIC)   |
| 6      | TX 13.5V        |
| 7      | PATCH MIC IN    |

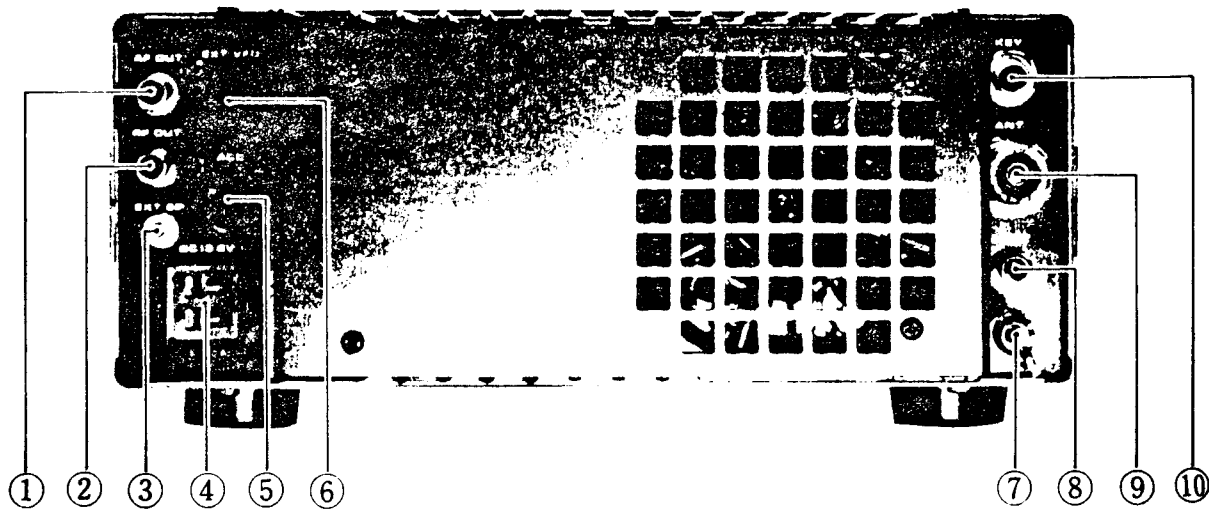
ACC Plug



- | PIN No |            |
|--------|------------|
| 1      | E          |
| 2      | TX 8V      |
| 3      | E          |
| 4      | 8V         |
| 5      | VFO FIX 8V |
| 6      | 13.5V      |
| 7      | EXT VFO IN |
| 8      | MEMORY OUT |

EXT VFO Plug

## REAR PANEL CONNECTIONS



**(1) AF OUT**

This is an audio output jack which provides approximately 200 mV of audio output (before the AF GAIN control) for use with a tape recorder, etc.

**(2) RF OUT**

This is a low level signal frequency output jack for use with a transverter. The output is at 50 ohms impedance, at a level of 220 mV.

**(3) EXT SP**

This is a jack for connection to your station's external speaker. The FT-707 internal speaker will be cut off when a plug is inserted into this jack. The audio output impedance is 8 ohms.

**(4) DC 13.5V**

Connect this jack only to a DC supply of 13.5 volts, negative ground. Never connect AC power directly to this jack.

**(5) ACC**

The accessory plug accepts microphone input and PTT control lines, while providing connections to the output scanning control lines and the transmitter TX 13.5V line.

**(6) EXT VFO**

This jack provides connections to the FV-707DM External VFO.

**(7) GND**

Connect a good earth ground at this point.

**(8) DC 8V**

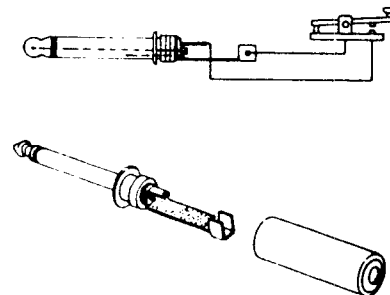
This jack provides an output of 8 volts DC for use with the FC-707 Antenna Coupler. The 8 volt line provides power for the FC-707 panel lamps.

**(9) ANT**

This is a standard UHF connector for connection to the station antenna system.

**(10) KEY**

Connect your CW key at this jack.



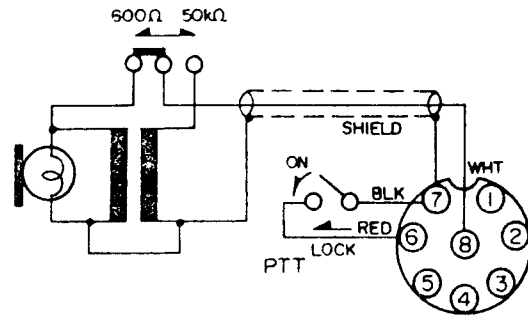
Key plug connections



YM-34



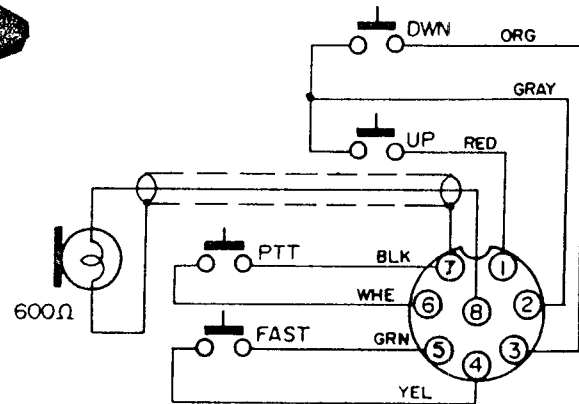
YM-38



YM-34 MICROPHONE CONNECTIONS



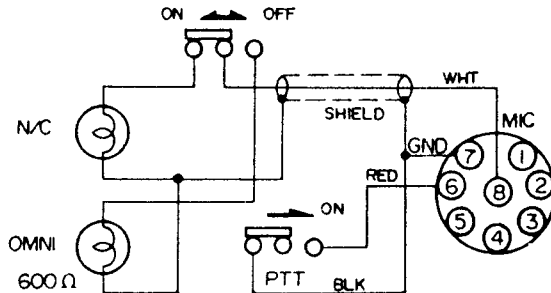
YM-35



YM-35/YM-38 MICROPHONE CONNECTIONS



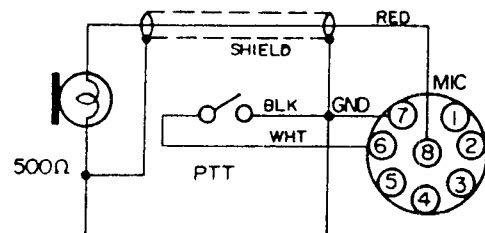
YM-36



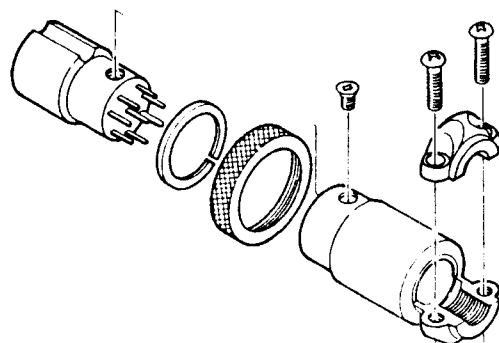
YM-36 MICROPHONE CONNECTIONS



YM-37



YM-37 MICROPHONE CONNECTIONS





# INSTALLATION

## ANTENNA CONSIDERATIONS

The FT-707 is designed for use into a 50 ohm resistive load. While minor deviations from the 50 ohm figure are of no consequence, the automatic final protection (AFP) circuitry will reduce the power output if high SWR conditions are encountered.

However, your FT-707 AFP circuitry and final amplifier components are tolerant of the minor SWR conditions present in many amateur installations. At an SWR of 3:1, for example, 50% of the full rated output power will be obtained.

The Yaesu RSL series of mobile antennas is available from your Yaesu dealer, for mobile installations.

## GROUND CONNECTIONS

This transceiver should be connected to a good earth ground for best performance and safety. Use a heavy, braided wire, less than 10 feet line, for connection to your station ground buss. The ground line should be connected to the transceiver rear panel GND terminal.

## POWER REQUIREMENTS

This transceiver requires a power source of 13.5 volts DC, negative ground, at 20 amps on voice peaks. It is not possible to use this transceiver on 24 volts DC, or on AC voltages of any kind.

### WARNING

Use of this equipment from improper DC voltages, or from AC voltages of any kind, will void the warranty on this equipment.

Please refer to the following sections for details on making power connections for mobile or base station installations.

## FUSE REQUIREMENTS

A 20 amp DC fuse is located in the DC cable for this equipment. When changing fuses, be absolutely certain to use a fuse of the proper rating.

### WARNING

Our warranty does not cover damage caused by use of an improper fuse.

## MOBILE INSTALLATION

The DC cable for mobile installations is included with your transceiver.

For under-dash mounting, a special mobile mounting bracket is available from your Yaesu dealer. This bracket, known as the MMB-2, allows installation of the FT-707 alone, or it may be adjusted to allow installation of the FT-707 and FV-707DM, or the FT-707 and FC-707 (the FC-707 and FV-707 may also be installed together, if desired).

The FT-707 should be mounted where there is adequate space around the heat sink to allow free circulation of air. Allow a space of about 20 cm behind and around the heat sink, and do not position the transceiver directly in the path of the heater ducts.

When making battery connections, it is absolutely essential that the proper polarity of the power cord be observed.

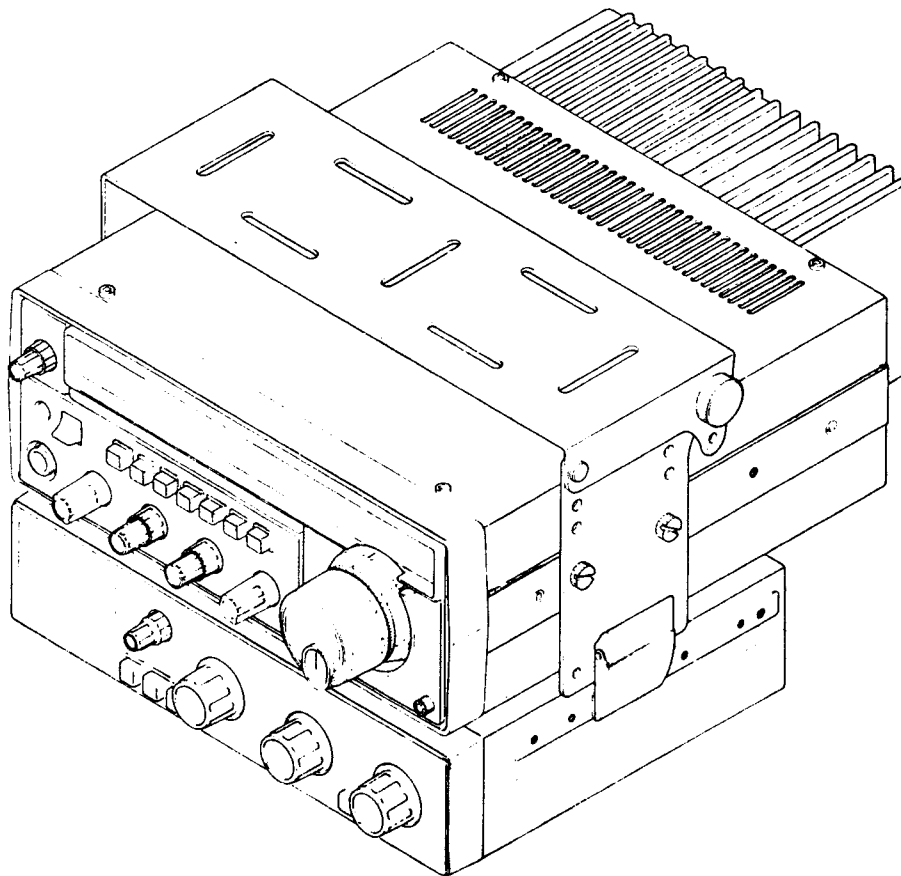
### WARNING

Permanent damage will result if reversed-polarity supply voltage is applied to this transceiver. Our warranty does not cover damage caused by reversed power supply connections.

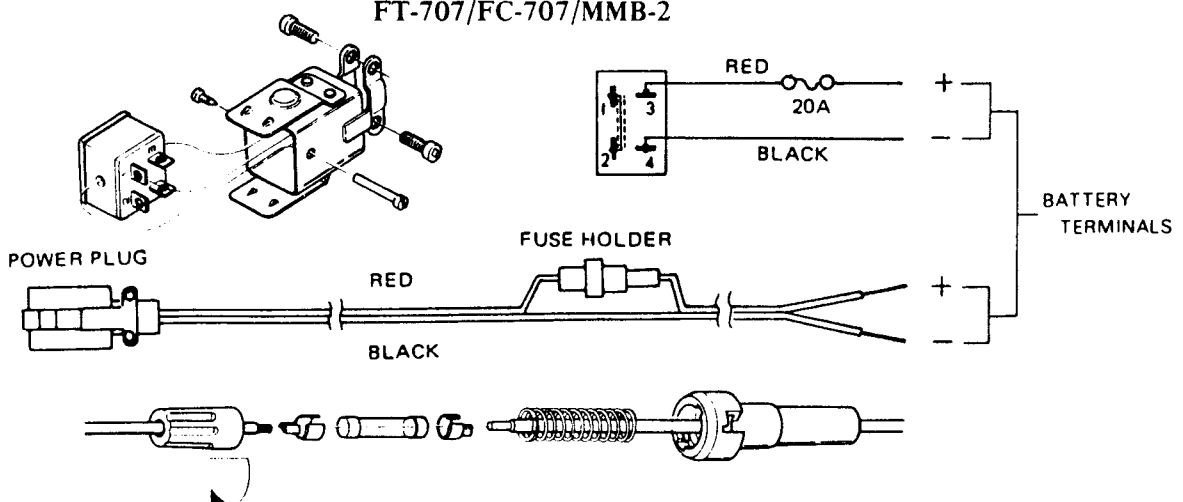
It is recommended that power connections be made directly to the battery instead of to the ignition switch. The battery provides considerable filtering against ignition noise, while connection to the ignition switch can place the FT-707 in a noise-producing circuit. The power lead must be kept as short as possible, and you should keep the lead away from ignition cables as much as possible.

When making battery connections, be certain to connect the RED power cable lead to the POSITIVE (+) battery terminal, and connect the BLACK lead to the NEGATIVE (-) terminal.

Before connecting the DC cable to the transceiver, check the battery voltage with the engine running fast enough to show a charge on the vehicle's ammeter. If the voltage exceeds 15 volts, the automobile voltage regulator should be adjusted, so as to limit the maximum voltage to less than 15 volts. As well, do not operate this transceiver from a power source of less than 12 volts. The transceiver should always be turned off when the car is started, to prevent transients in the automobile electrical system from damaging the transistor circuitry of the FT-707.



FT-707/FC-707/MMB-2



POWER CORD CONNECTIONS

### BASE STATION INSTALLATION

The FP-707 AC Power Supply is expressly designed for the FT-707 transceiver, allowing operation from AC power sources of 100/110/117/200/220/234 volts, 50/60 Hz.

Before attempting operation of the FP-707 from AC mains, check to see that the voltage specification on the rear panel of the power supply matches your local supply voltage. This inspection must be made before applying power to this equipment.

#### WARNING

Operation of the FT-707 directly from AC mains, or operation of the FP-707 from improper supply voltages, or use of an improper fuse in either model, shall void the warranty.

Please refer to the power transformer primary connection chart for details of the proper connections inside the FT-707.

An AC fuse is located on the rear panel of the FP-707. For AC 100/110/117 volts, use only a 6 amp fuse. For 200/220/234 volts AC, use only a 3 amp fuse.

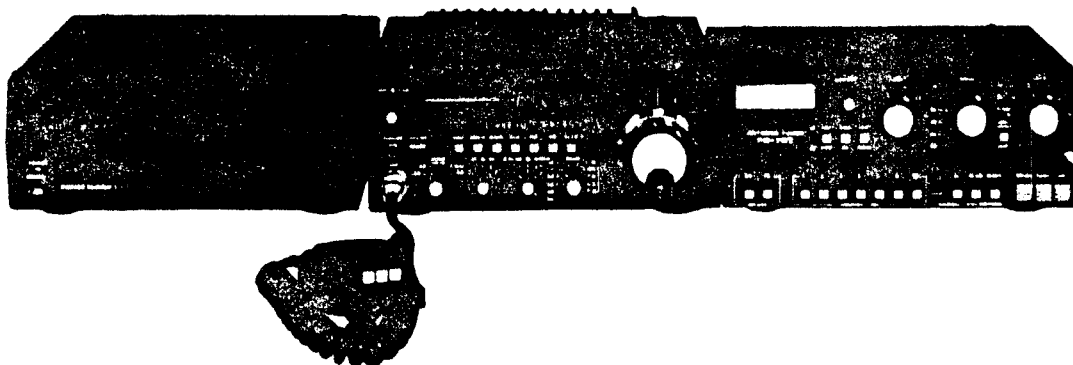
Once the power transformer and fuse inspections have been duly completed, connect the AC cable of the FP-707 to the wall outlet. Insert the DC plug from the FP-707 into the FT-707 DC 13.5V jack on the rear panel of the transceiver.

Connect a 50 ohm antenna or dummy load to the rear panel ANT jack.

Connect your station headphones, if used, to the front panel PHONES jack. Insertion of a plug into this jack automatically cuts off the internal speaker.

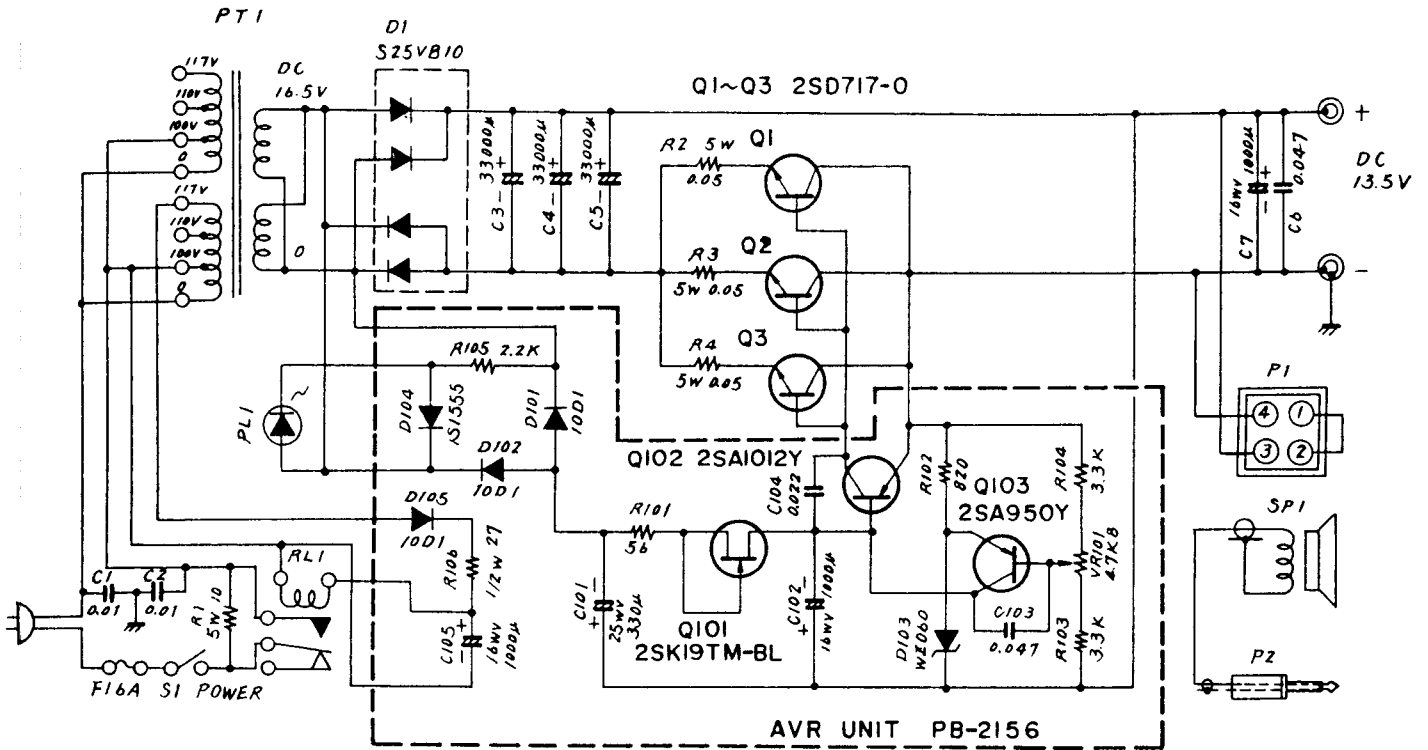
If you are using an external speaker, its plug may be connected to the rear panel SP jack. Insertion of a plug into this jack also cuts off the internal speaker. If headphones are used, insertion of the headphone plug into the front panel jack will cut off the external speaker, as well as the internal speaker.

If you are using a footswitch for PTT control, the lead from the footswitch may be connected to pin 6 of the rear panel ACC jack. Use pin 7 for the common connection.



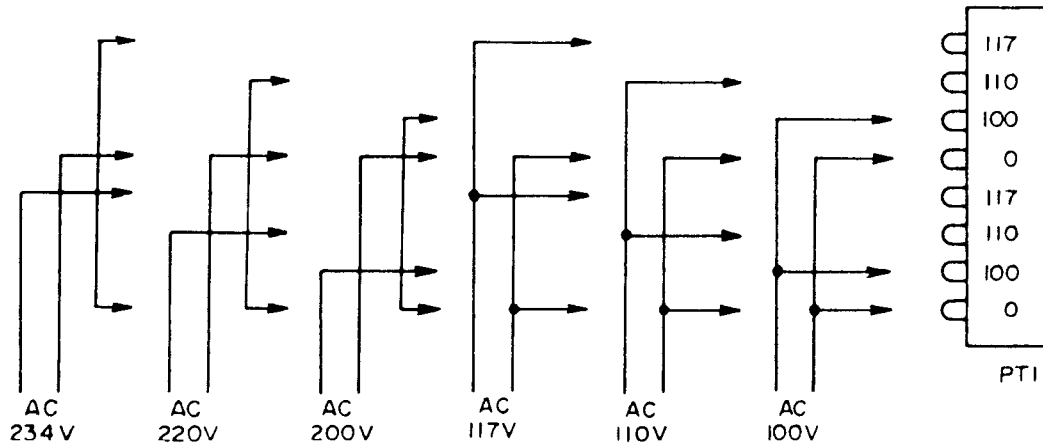
FP-707/FT-707/YM-35/ FC-707/FV-707DM

# POWER SUPPLY FP-707



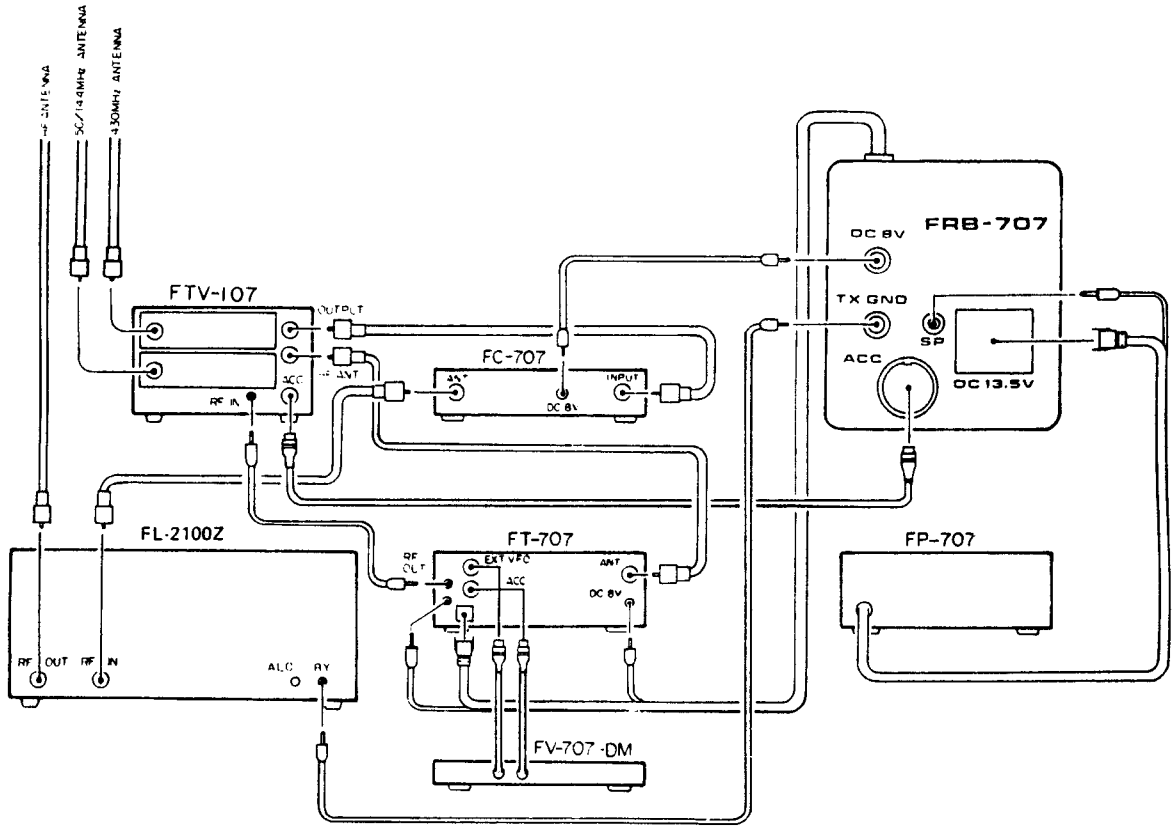
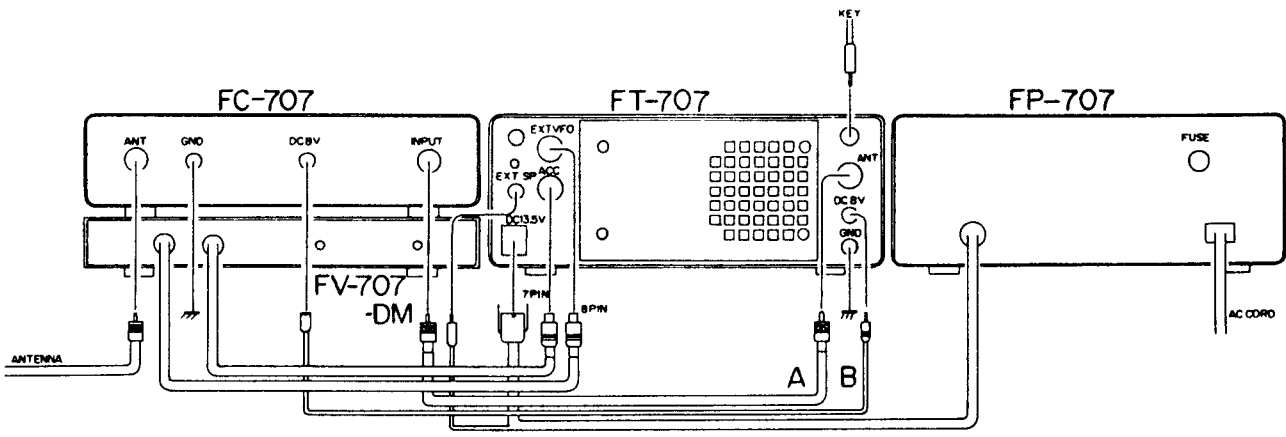
FP-707 CIRCUIT DIAGRAM

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FP-707 POWER TRANSFORMER PRIMARY CONNECTIONS

# INTERCONNECTIONS



## RELAY BOX FRB-707

The FRB-707 Relay Box is designed for the interconnection of the FT-707 with either the FL-2100Z linear amplifier or the FTV-107R transverter. For the connection of the FT-707 series using the FRB-707 Relay Box, please refer to the figure below:

this relay box, whenever the FTV-107R transverter is on.

### FL-2100Z (Not available in USA)

When connecting the FL-2100Z linear amplifier, the TX-GND line should be connected to ground when the FT-707 is transmitting.

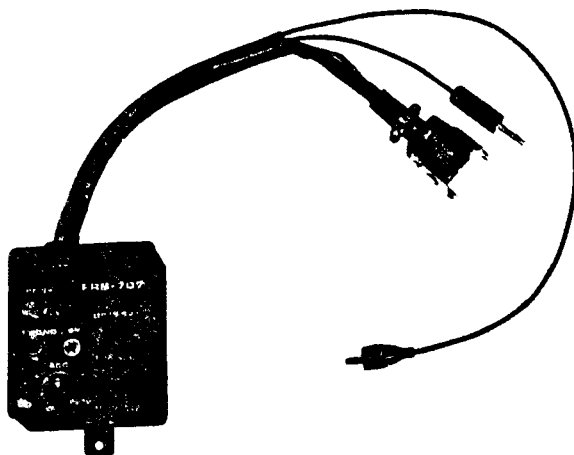
**NOTE:** The FT-707 transceiver does not have an external ALC input terminal. Therefore, carefully adjust the CAR control so as not to exceed 500 mA on the IC meter of the FL-2100Z. For SSB mode, 300 mA is acceptable (at voice peaks, the deflection may be 500 mA). During AM mode, adjust the carrier control so as not to exceed 200 mA. For further details regarding proper operation, please refer to the Instruction Manuals for both the FT-707 and FL-2100Z.

### FTV-107R

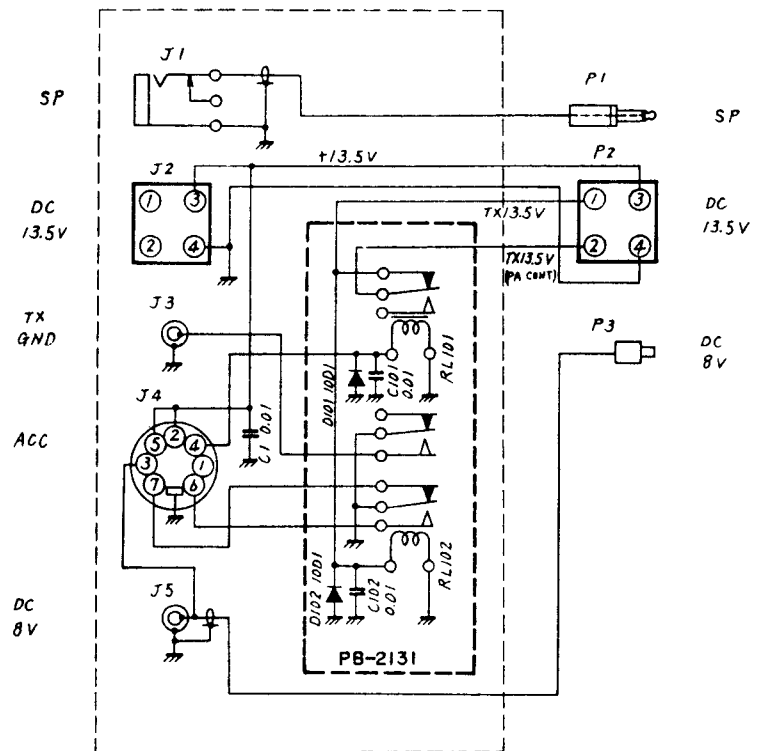
When the FTV-107R is connected to the FT-707 with the FRB-707 Relay box, the TX/RX control line from the transverter is controlled by the relay box, and while the transverter is activated, the power line for the final amplifier in the FT-707 is switched off.

### FC-707 + FTV-107R

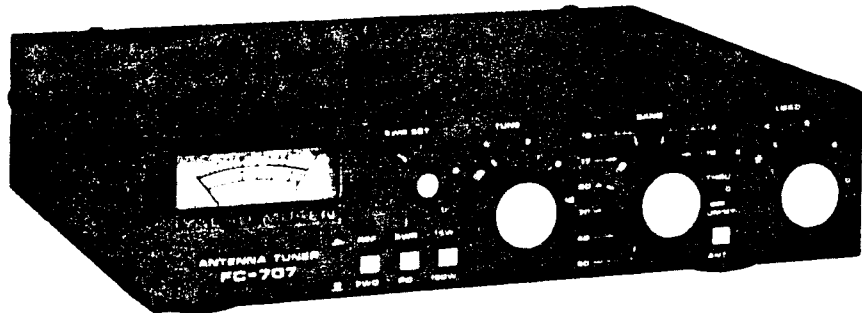
When the FC-707 and FTV-107R are connected to the FT-707, the required +8V is supplied through



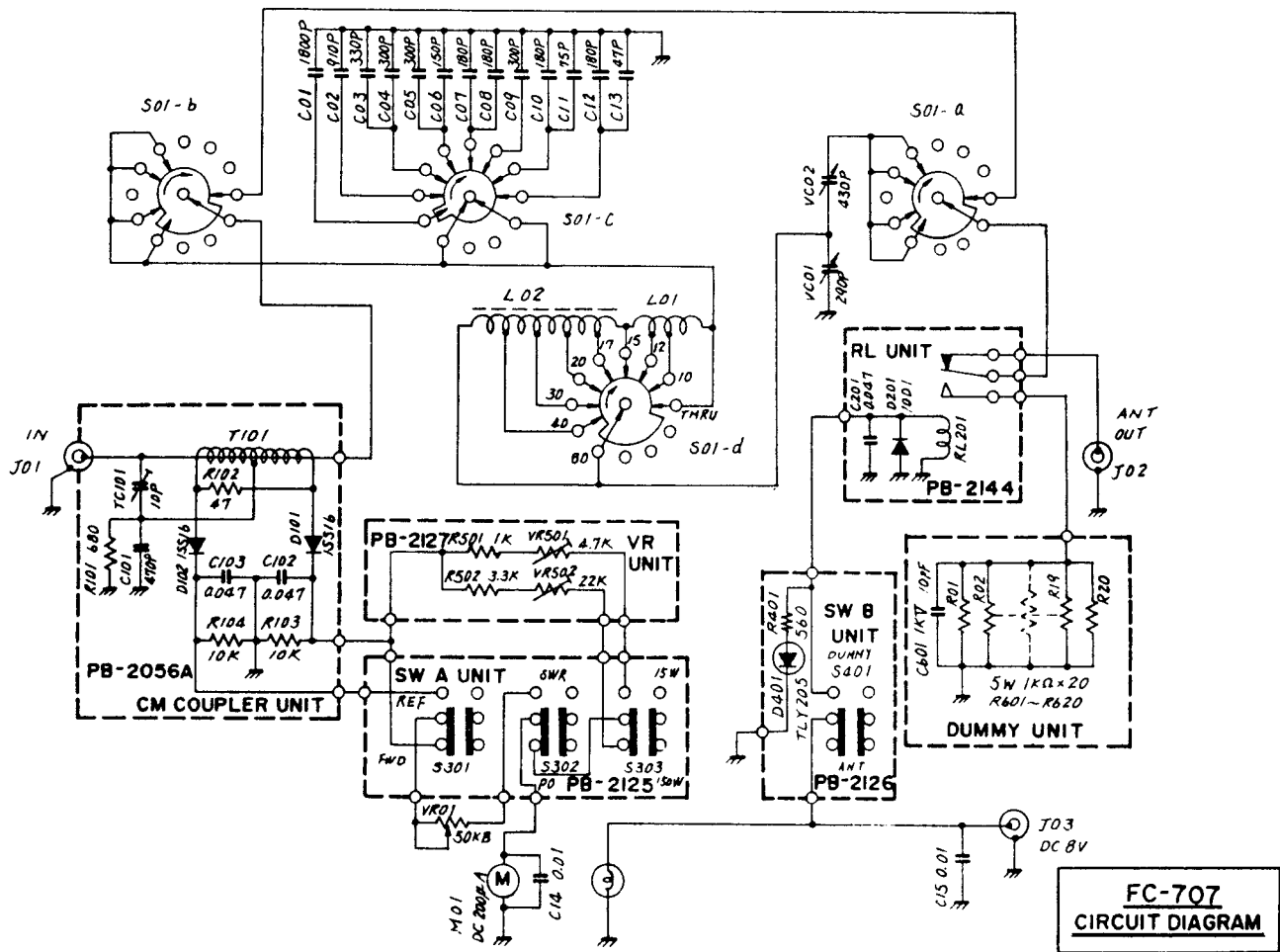
FRB-707



# ANTENNA TUNER FC-707



FC-707



## OPERATION

The all solid state design of the FT-707 means that tuning procedures are minimal. However, care should be exercised in operation to ensure that spurious signals are not generated by an improperly-adjusted transmitter. The following paragraphs will describe the tuning procedure for receiver and transmitter operation.

### INITIAL CHECK

Before turning the transceiver on, confirm once again that all interconnections, power supply voltages, and fuses are correct.

### FREQUENCY DETERMINATION

Frequency display on the FT-707 is by means of digital as well as analog display. The digital display is a true frequency counter, so no recalibration is required when changing bands.

The analog display may be aligned by direct comparison to the digital display. Note that the lower band edge of the 40, 30, 20, 17, 15, and 10 meter A and C bands corresponds to a starting frequency of 000 (e.g. 14.000 MHz) on the dial. On the 80, 12, and 10 meter B and D bands, the lower band edge begins at 500 (e.g. 3.500 MHz).

### RECEIVE OPERATION

(1) Preset the controls and switches as follows:

MODE . . . . . Desired mode  
 AF GAIN . . . . . Adjust subsequently for a comfortable level  
 RF GAIN . . . . . Fully clockwise  
 WIDTH . . . . . 12 o'clock position  
 BAND . . . . . Desired band  
 DIAL . . . . . Desired frequency  
 SELECT switches . . All should be off initially

(2) Be certain that a 50 ohm antenna or dummy load is connected to the antenna jack.

(3) Set the transceiver POWER switch to ON. If you are using the FP-707 AC Power Supply, slip the FP-707 power switch on first, then turn on the transceiver.

(4) Adjust the AF GAIN control for a comfortable volume level. The frequency will be displayed on the digital display, and you may adjust the main dial for the desired operating frequency. Note that all receiver preselector networks are preset for each band, and no adjustment is required for peak performance.

(5) When pulse-type noise is encountered, push the NB (Noise Blanker) switch. While no noise blanker will eliminate all types of noise (such as atmospheric or cosmic noise), the FT-707 noise blanker is a state-of-the-art design which should effectively eliminate most types of automotive ignition noise.

(6) The WIDTH control may be used to adjust the width of the IF passband. In the receiver IF, two 8 pole SSB filters are used. The signal frequency at one of the filters is varied, using a mixing technique that produces no change in the beat tone of the incoming signal.

The WIDTH control is especially useful in eliminating high-pitched "buckshot" on SSB, but it may also be used effectively on CW as well: for example, if the 350 Hz optional CW filter is used, the WIDTH control may be used in the CW-W position to provide an intermediate bandwidth (e.g. 800 Hz). You may then switch between the 800 Hz bandwidth (CW-W) or 350 Hz bandwidth (CW-N) by appropriate setting of the MODE switch.

(7) If the station you are working begins to drift, push the CLAR select switch to activate the clarifier control. You may then follow the drifting signal, up to a maximum of  $\pm 3$  kHz.

### TRANSMITTER OPERATION

The discussion of the operation of the transmitter will be on a mode-by-mode basis.

It is important that an antenna or 50 ohm dummy load be connected to the antenna jack at all times.

Never switch any of the front panel switches (BAND, MODE, SELECT, etc.) while transmitting. It is possible to damage this equipment by ignoring this simple precaution.



## GENERAL

Never transmit "key down" for more than 30 seconds at a time. If you transmit for 30 seconds, we recommend a rest period of at least two minutes before the next transmission. The final amplifier contains a heat sensing protection system, which will reduce the power output if the temperature of the final transistors becomes too high.

### SSB MODE

(1) Preset the controls and switches as follows:

MODE . . . . . Desired mode, LSB or USB  
ALC . . . . . ON (switch pushed)  
MIC GAIN . . . Set to the 10 o'clock position  
CAR . . . . . Fully counterclockwise

- (2) Close the microphone PTT switch.
- (3) Speak in a normal voice into the microphone, and note the reading on the level meter. On voice peaks, the ALC indication should not illuminate any of the yellow LEDs. If the LEDs become consistently illuminated, retard the setting of the MIC GAIN control.
- (4) If you push the ALC switch again, the relative PO meter will be activated. In this case, 5 LEDs should become illuminated on voice peaks.
- (5) Release the PTT switch for receiver recovery.
- (6) For VOX operation, advance the front panel VOX control until your voice activates the transmitter (PTT switch released). You may then adjust the front panel DELAY control to obtain the desired relay hang time. If the speaker output activates the VOX, you may have the VOX control advanced too far. Otherwise, the ANTITRIP control inside the cabinet may require adjustment; see the "Maintenance and Alignment" section of this manual for details.

### CW MODE

- (1) Set the MODE switch to CW-W or CW-N, and set the VOX control fully counterclockwise. Insert your key lead into the rear panel KEY jack.

- (2) Push the front panel MOX switch (or close your footswitch, if used), and close your key. The sidetone will be heard in the speaker. Advance the CAR control until the desired power level is obtained. Maximum power output occurs when 8 LEDs are lit up.
- (3) To adjust the CW semi-break-in circuit, advance the VOX control so that the CW sidetone activates the transmitter when you close your key. Adjust the DELAY control to provide the desired relay hang time.
- (4) For QRP operation, the CAR control will provide adjustment of the power output level, down to 10 watts. An in-line wattmeter may be used for precise power measurement.
- (5) When the 600 Hz or 350 Hz CW filter is installed, set the MODE switch to CW-N (narrow) to select the 6 pole CW filter. When the MODE switch is set to CW-W, the SSB filter will be selected. As noted earlier in this chapter, it is possible to use the WIDTH control to good advantage in providing a variety of bandwidths in the CW-W position.

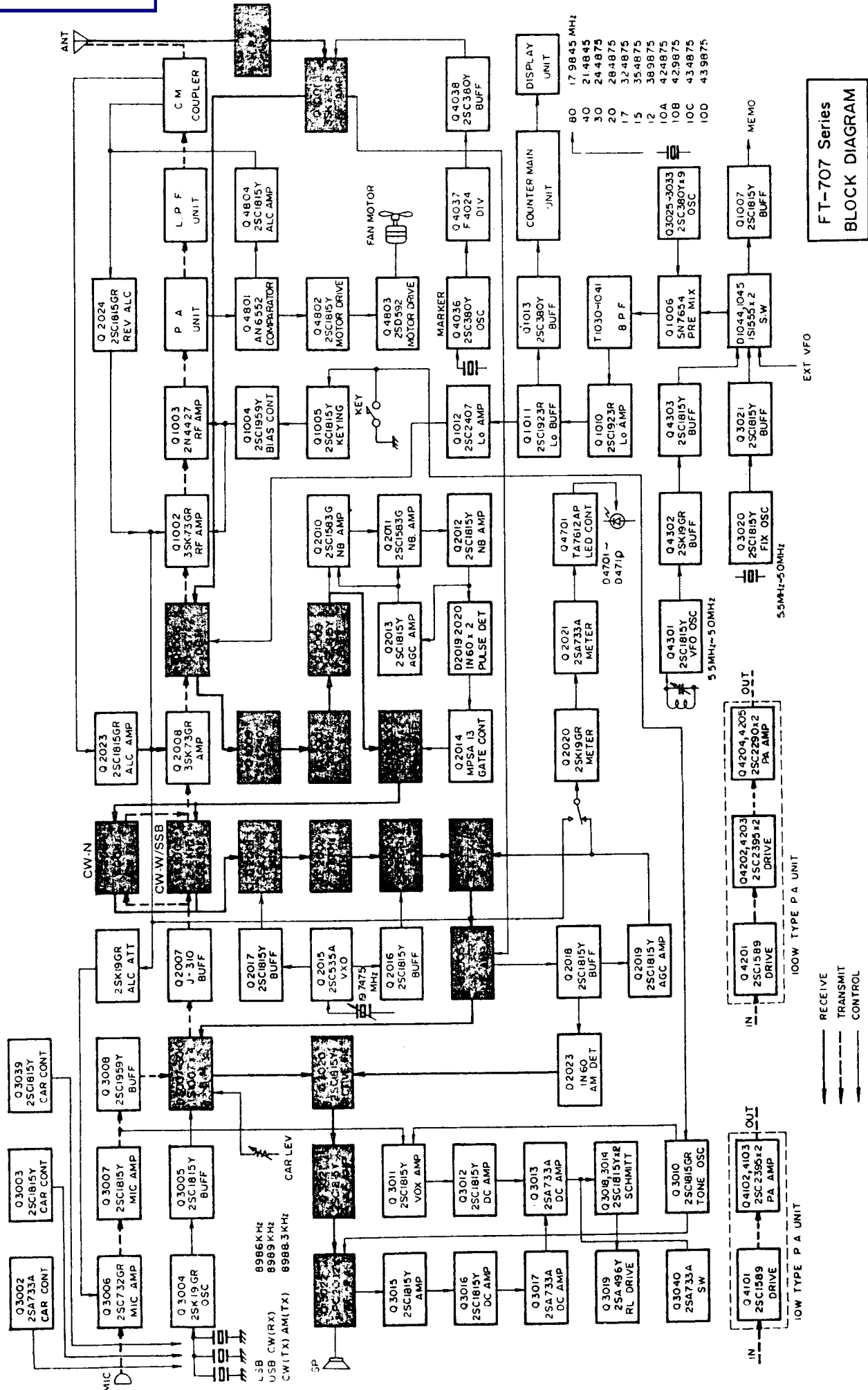
### AM MODE

- (1) Set the MODE switch to AM, the ALC switch OFF, and rotate the MIC GAIN and CAR controls fully counterclockwise.
- (2) Close the PTT switch, and advance the CAR control until 4 LEDs light up.
- (3) Set the ALC switch ON, and speak into the microphone in a normal voice, and advance the MIC GAIN control until the first LED lights up dimly.

## SECTION 2 — TECHNICAL NOTES

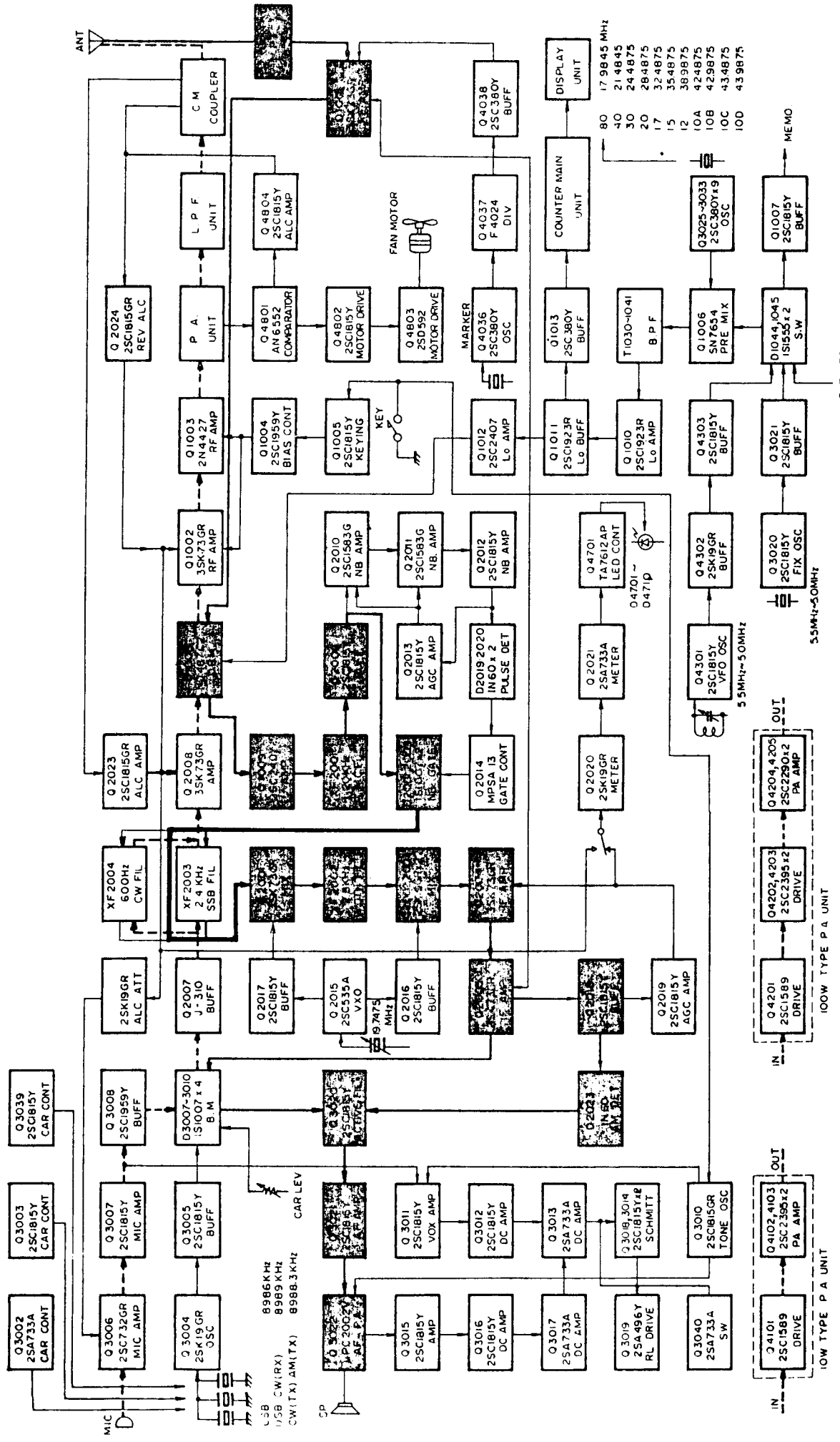
SIGNAL TRACING IN THE FT-707 .....	2-1
RX FREQUENCY RELATIONSHIPS .....	2-6
CRYSTAL DATA .....	2-6
TX CONTROL LINE CIRCUIT .....	2-7
CIRCUIT DESCRIPTION .....	2-8

SSB / CW MODE RX



FT-707 Series  
BLOCK DIAGRAM

AM MODE RX



FT-707 Series  
BLOCK DIAGRAM

RECEIVE  
TRANSMIT  
CONTROL

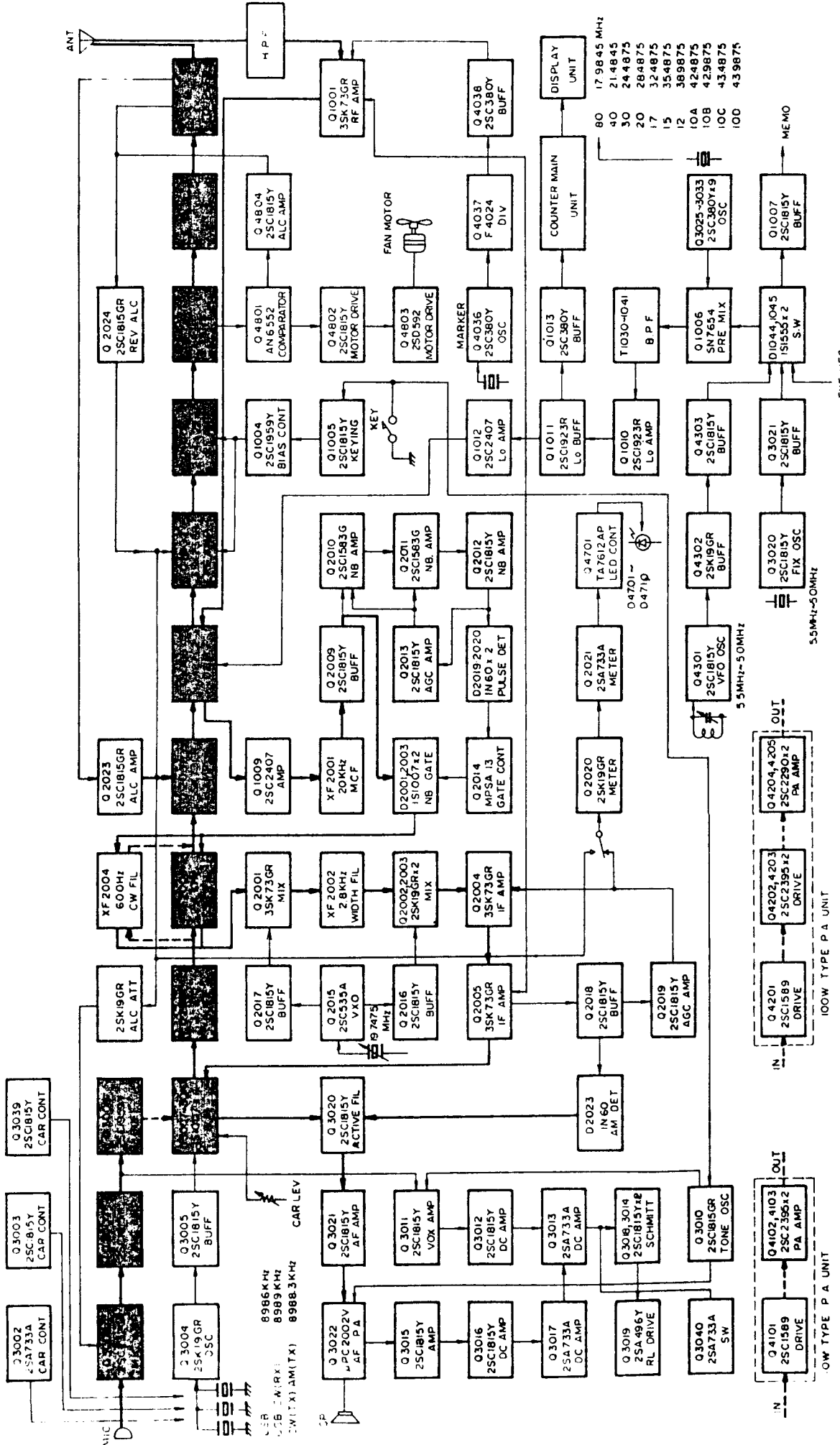
EXT VFO

100W TYPE P A UNIT

100W TYPE P A UNIT

- 80 17 9845 MHz
- 40 21 4845
- 30 24 4875
- 20 28 4875
- 17 32 4875
- 15 35 4875
- 12 38 9875
- 10A 42 4875
- 10B 42 9875
- 10C 43 4875
- 10D 43 9875

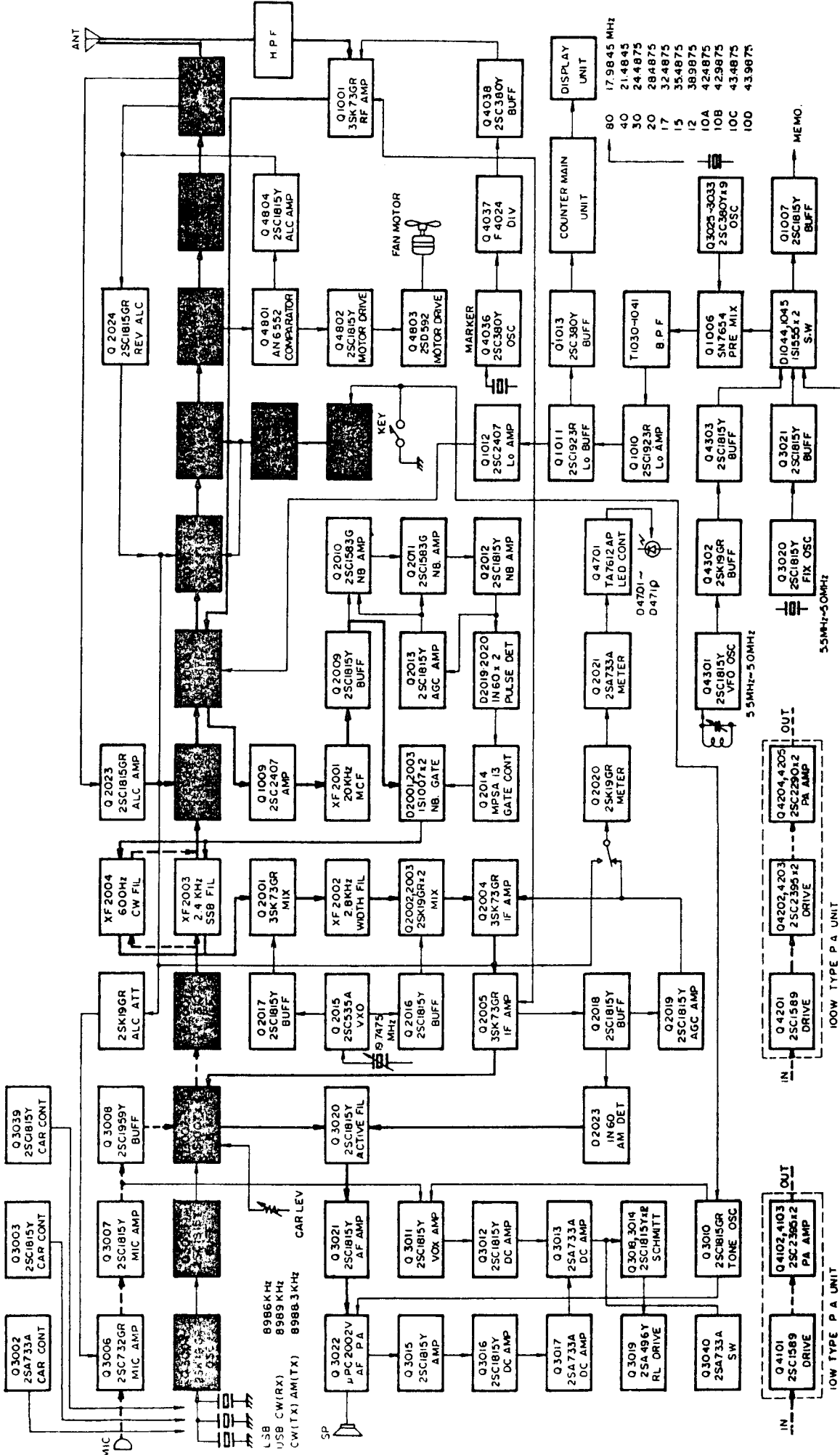
SSB MODE TX



FT-707 Series  
BLOCK DIAGRAM

RECEIVE  
 TRANSMIT  
 CONTROL

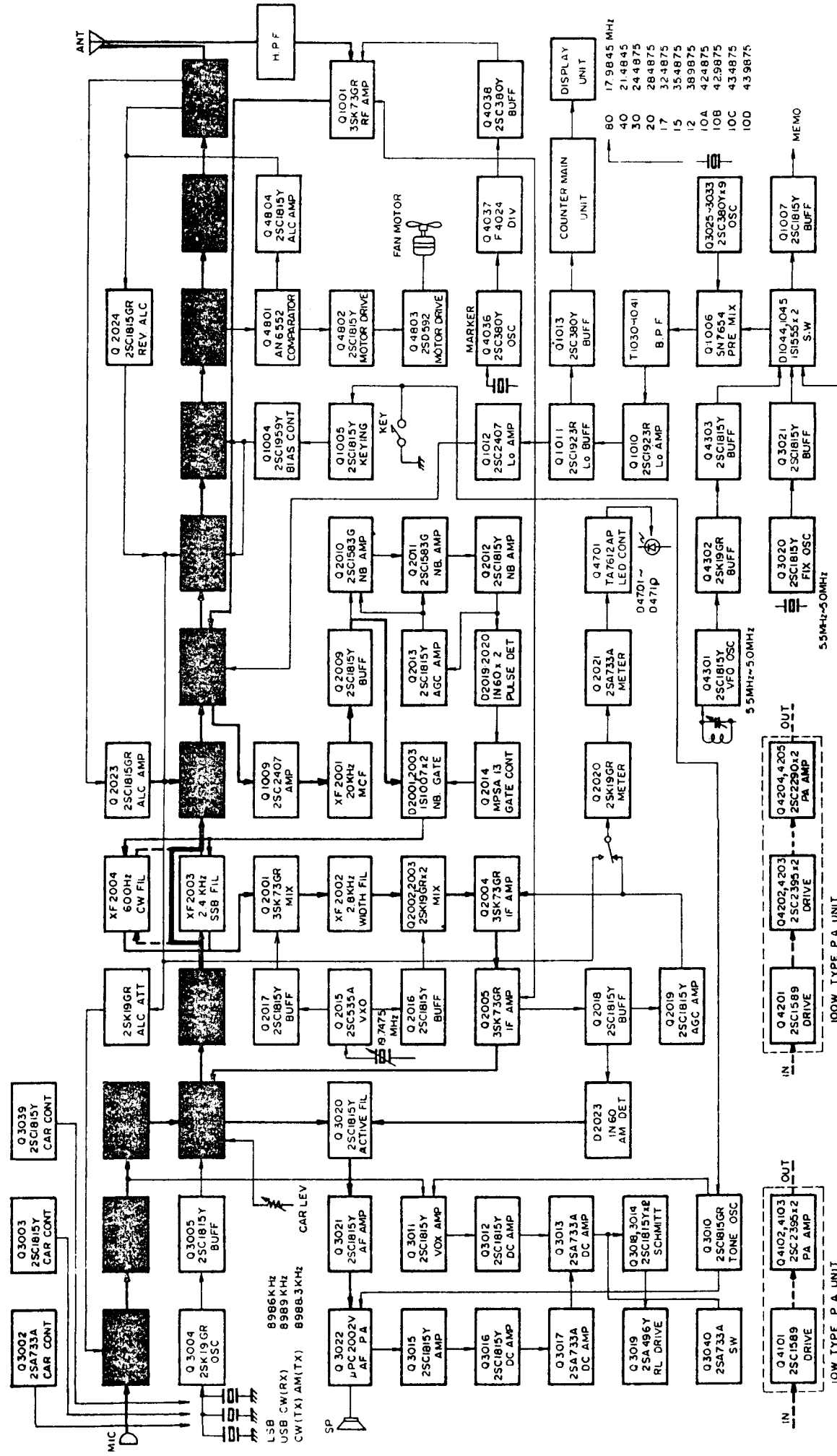
CW MODE TX



FT-707 Series  
BLOCK DIAGRAM

RECEIVE  
TRANSMIT  
CONTROL

AM MODE TX

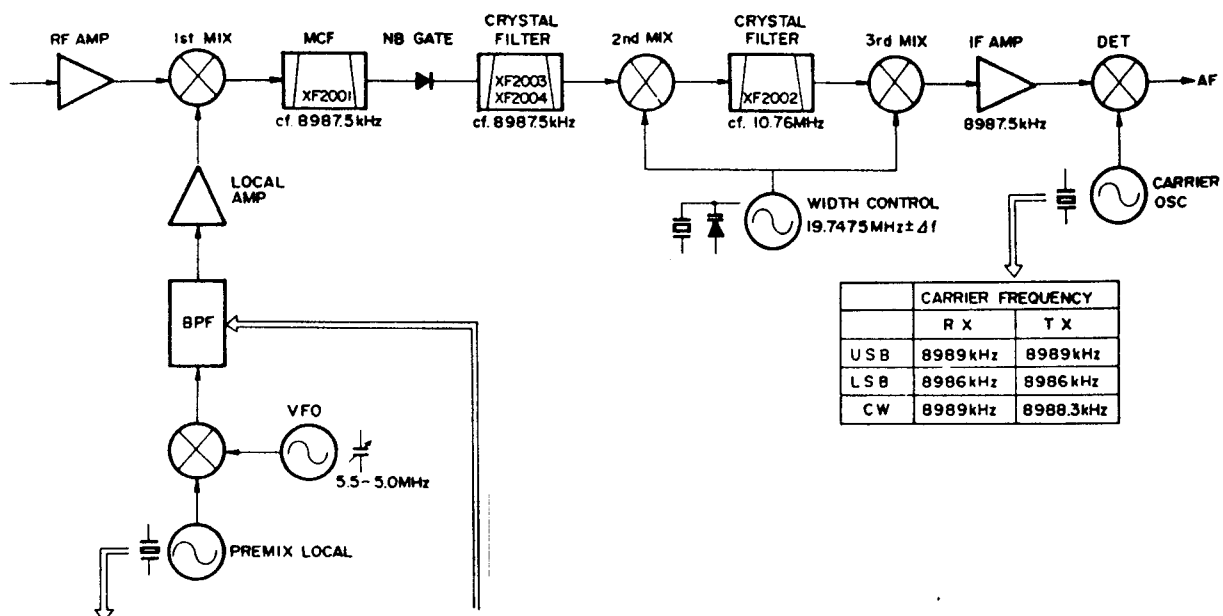


FT-707 Series BLOCK DIAGRAM

EXT VFO

———— RECEIVE  
 - - - - TRANSMIT  
 ······ CONTROL

# RX FREQUENCY RELATIONSHIPS



	CARRIER FREQUENCY	
	R X	T X
USB	8989kHz	8989kHz
LSB	8986kHz	8986kHz
CW	8989kHz	8988.3kHz

BAND	FREQUENCY
80m	17.9845MHz
40m	21.4845MHz
30m	24.4875MHz
20m	28.4875MHz
17m	32.4875MHz
15m	35.4875MHz
12m	38.9875MHz
10mA	42.4875MHz
10mB	42.9875MHz
10mC	43.4875MHz
10mD	43.9875MHz

BAND	RANGE
80m	12.4875 — 12.9875MHz
40m	15.9875 — 16.4875MHz
30m	18.9875 — 19.4875MHz
20m	22.9875 — 23.4875MHz
17m	26.9875 — 27.4875MHz
15m	29.9875 — 30.4875MHz
12m	33.4875 — 33.9875MHz
10m	36.9875 — 38.9875MHz

## CRYSTAL DATA:FT-707

UNIT	FUNCTION	HOLDER	FREQUENCY (kHz)	MODE	LOAD C (pF)	EFFECTIVE RESISTANCE (ohms)	DRIVE LEVEL (mw)
LOCAL	160m	HC-18/U	15984.5	3rd overtone	20	80	2
	80m	"	17984.5	"	"	60	"
	40m	"	21484.5	"	"	45	"
	30m	"	24487.5	"	"	40	"
	20m	"	28487.5	"	"	40	"
	17m	"	32487.5	"	"	40	"
	15m	"	35487.5	"	"	40	"
	12m	"	38987.5	"	"	40	"
	10m(A)	"	42487.5	"	"	40	"
	10m(B)	"	42987.5	"	"	40	"
AF	LSB	"	8986.0	Fundamental	30	35	10
	USB	"	8989.0	"	"	"	"
	CW, AM	"	8988.3	"	"	"	"
FILTER	Width	"	※19747.5	Fundamental	35	15	2
RF	Marker	HC-6/W	3200.0	Fundamental	23	50	5
LSI COUNTER	Clock	HC-18/U	6553.6	Fundamental	30	30	2

\* XCO FREQUENCY: 19743-19753kHz  
Determined by circuit





## CIRCUIT DESCRIPTION

The block diagram and circuit description to follow, will provide you with a better understanding of this transceiver. Please refer to the schematic diagram for specific component details.

## RECEIVER

The RF input signal from the antenna is fed through relay RL<sub>4001</sub> (LPF Unit), lamp fuse F<sub>4801</sub> (FAN MOTOR Unit), and passed through a high-pass filter of  $f_c = 1.7$  MHz on the FAN MOTOR Unit. The signal is then delivered to pin 1 of J<sub>1002</sub> on the RF Unit.

The signal is passed through individual antenna coils for each band and a 9 MHz trap, and amplified by Q<sub>1001</sub> (3SK73GR), a dual gate MOS FET with excellent rejection of cross modulation and intermodulation. The amplified signal is fed through diode switched bandpass filter networks, which protect the mixer from out-of-band signals.

The RF signal is fed to the Schottky barrier diode ring module, Q<sub>1008</sub> (ND487C2-3R), where the RF signal is mixed with a local signal delivered from Q<sub>1012</sub> (2SC2407), resulting in a first IF of 8.9875 MHz. The input and output of the diode ring are protected by 50 ohm attenuators, which stabilize the input and output terminations for optimum intercept characteristics. The IF signal is then amplified by mixer post-amp Q<sub>1009</sub> (2SC2407) and fed to pin 5 of J<sub>1001</sub> for delivery to the IF Unit.

The local signal for the mixer is derived in the following manner: the incoming VFO signal from the VFO Unit is mixed with a crystal controlled local signal from the AF Unit at Q<sub>1006</sub> (SN76514N) and fed through bandpass filter networks for each band, which remove any spurious responses outside of the desired band. The signal is then amplified by Q<sub>1011</sub>, Q<sub>1012</sub> (2SC1923R), and Q<sub>1012</sub> (2SC2407) and fed to the LO port of the diode ring. The premix local signal is generated by Q<sub>3025</sub>–Q<sub>3033</sub> (2SC380TMY), located on the AF Unit.

The 8.9875 MHz IF signal is fed to pin 5 of J<sub>2001</sub>. The signal is passed through XF<sub>2001</sub>, a 20 kHz monolithic crystal filter which provides early protection against IMD while allowing enough bandwidth and delay time to match the noise

blanker gate pulses. The signal then passes through noise blanker diodes D<sub>2001</sub> and D<sub>2003</sub>, which act as a switch driven by noise blanker controller Q<sub>2014</sub> (MPSA13). The IF signal then is fed through the main SSB or CW filter (CW filter optional); on AM, the signal passes around the SSB/CW filter.

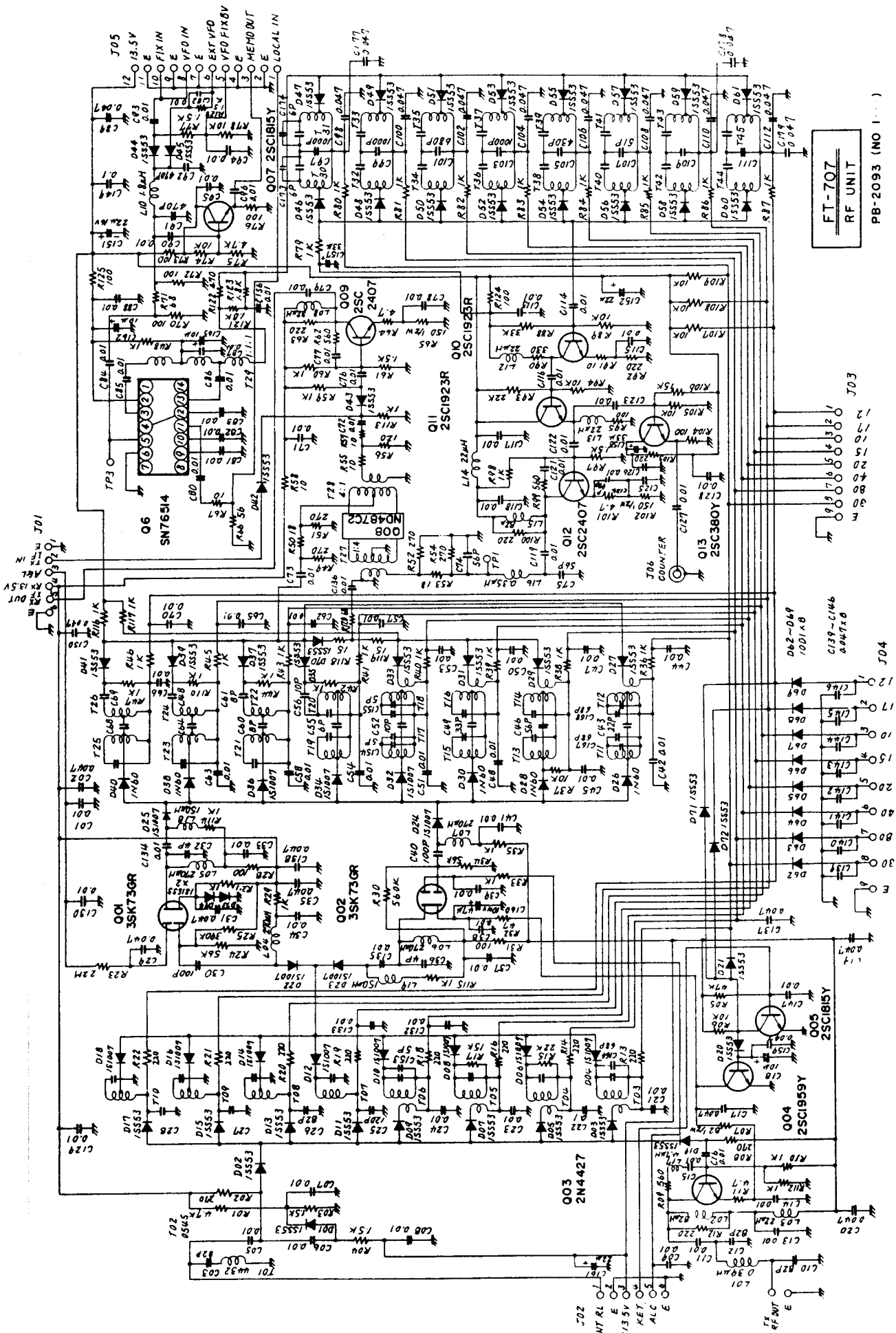
The filtered IF signal is delivered to mixer Q<sub>2001</sub> (3SK73GR), where the 8.9875 MHz IF signal is mixed with a 19.7475 MHz  $\pm\Delta f$  local signal delivered from oscillator Q<sub>2015</sub> (2SC535A) and buffer Q<sub>2016</sub> (2SC1815Y). The resulting 10.76 MHz signal is fed through crystal filter XF<sub>2002</sub>, then fed to mixer Q<sub>2002</sub>/Q<sub>2003</sub> (2SK19GR), where the 10.76 MHz signal is mixed with an identical 19.7475 MHz  $\pm\Delta f$  signal fed from buffer Q<sub>2017</sub> (2SC1815Y), resulting in an 8.9875 MHz signal, the same as the original IF. This process varies the IF across the passband of crystal filter XF<sub>2002</sub>, resulting in continuously variable width of the IF passband with no change in the beat note of the incoming signal.

The IF signal is then amplified by Q<sub>2004</sub> and Q<sub>2005</sub> (3SK73GR), the main IF amplifiers, and delivered to pin 2 of J<sub>2002</sub> for delivery to the AF Unit.

A portion of the output from Q<sub>2005</sub> is fed to buffer Q<sub>2018</sub> (2SC1815Y) and detected by D<sub>2024</sub> and D<sub>2025</sub> (1N60), resulting in a DC voltage. This voltage is amplified by Q<sub>2019</sub> (2SC1815Y) and fed to gate 2 of the RF and IF amplifiers, providing automatic gain control of those stages. The AGC voltage is also amplified by Q<sub>2020</sub> (2SK19GR) and Q<sub>2031</sub> (2SA733A) for delivery to the front panel LED display for indication of the received signal strength.

When the noise blanker is switched on, a portion of the output from Q<sub>2009</sub> is amplified by Q<sub>2010</sub>, Q<sub>2011</sub> (2SC1583G) and Q<sub>2012</sub> (2SC1815Y). When a carrier or noise-free modulated signal is received, the IF signal is rectified by D<sub>2017</sub> and D<sub>2018</sub> (1N60), producing a DC voltage. This DC voltage is amplified by Q<sub>2013</sub> (2SC1815Y), which charges C<sub>2063</sub> for AGC purposes. The AGC voltage is used to control the gain of Q<sub>2010</sub> and Q<sub>2011</sub>.

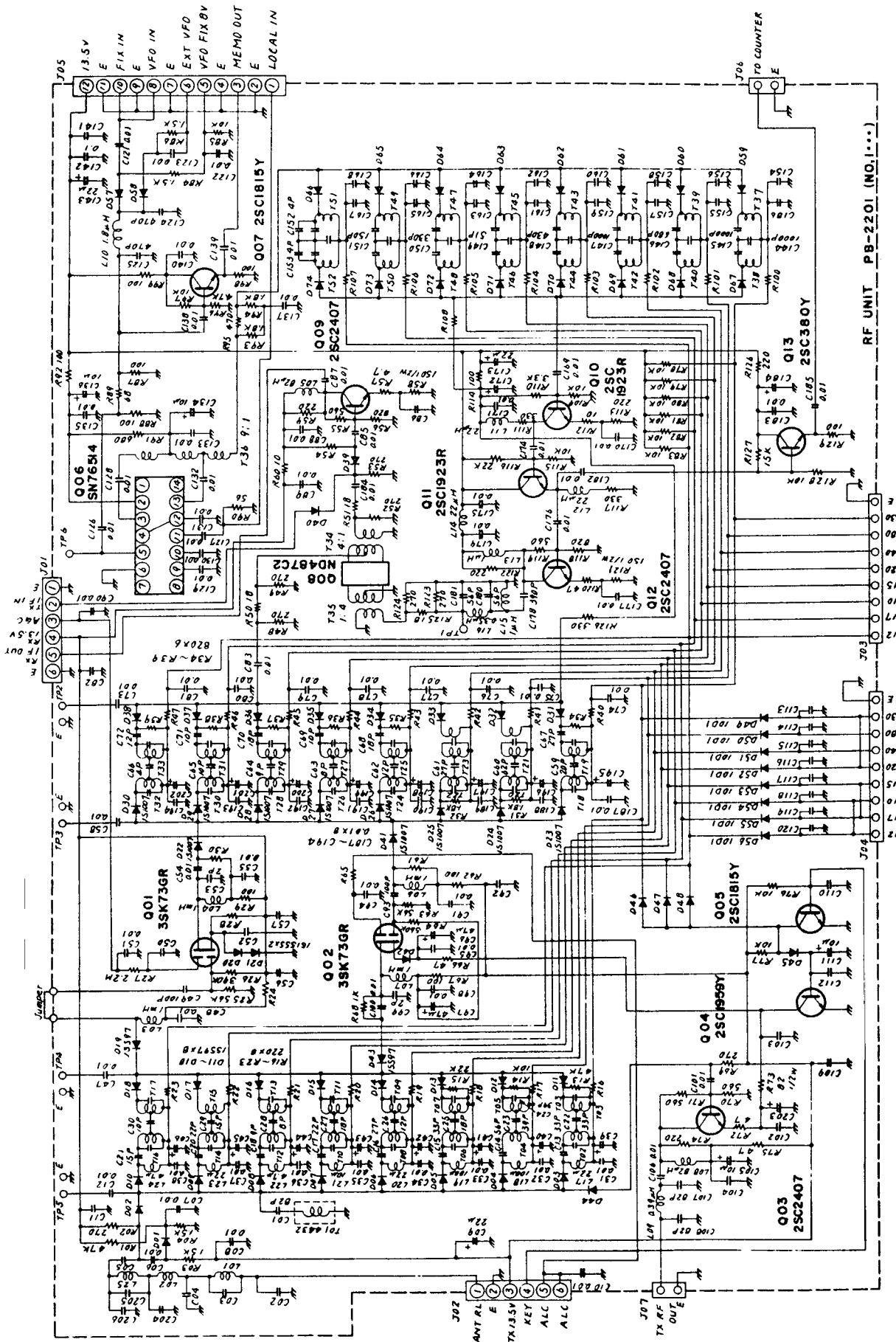
When impulse-type noise is received, D<sub>2019</sub> and D<sub>2020</sub> (1N60) rectify the IF signal, which controls the noise blanker switch, Q<sub>2014</sub>.



FT-707  
RF UNIT

PB-2093 (NO 1...)

Early model

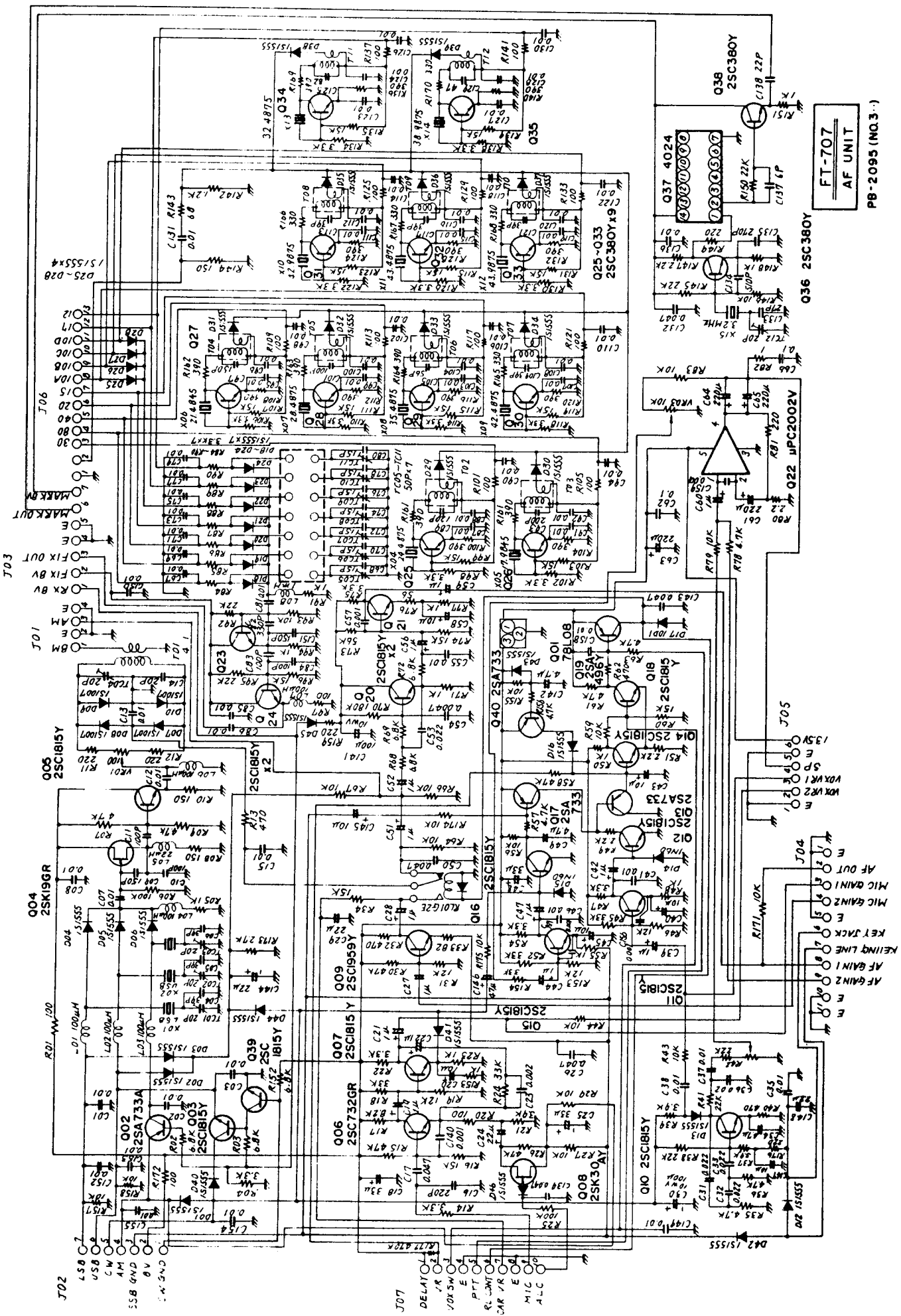


**ET-707**  
**RF UNIT**

After prod. 11

- NOTES
- 1 ALL RESISTORS ARE 1/4W UNLESS OTHERWISE NOTED
  - 2 ALL CAPACITORS ARE 0.047UF UNLESS OTHERWISE NOTED
  - 3 ALL ELECTROLYTIC CAPACITORS ARE 33MF OTHERWISE NOTED
  - 4 ALL DIODES ARE 1SS53 UNLESS OTHERWISE NOTED





FT-707  
AF UNIT

PB-2095 (NO. 3-1)

Noise pulses have a very short duration, but high amplitude. Because of the very short time constant of the  $C_{2063}/R_{2072}$  discharge path, AGC voltage is not induced by these short-duration pulses. Therefore,  $Q_{2010}$  and  $Q_{2011}$  operate at full gain, providing maximum voltage to the base of  $Q_{2014}$ . When a pulse is received, therefore,  $Q_{2014}$  biases  $D_{2001}$  and  $D_{2003}$  to block the signal path momentarily. When a desired signal and a noise pulse are received simultaneously, the blanking action is not impaired, because the relative difference between the desired signal and the noise pulse is still high.

In the AM mode, a portion of the output from  $Q_{2018}$  is detected by  $D_{2023}$  (1N60) and delivered to the AF Unit. Filtering in the AM mode is accomplished by  $XF_{2002}$ .

**AF UNIT (PB-2095)**

The SSB or CW signal at pin 1 of  $J_{3001}$  is fed through  $T_{3001}$  to the diode ring demodulator,  $D_{3007}-D_{3010}$  (1S1007), where the IF signal is converted to audio using the carrier signal supplied by crystal oscillator  $Q_{3004}$  (2SK19GR) and buffer

$Q_{3005}$  (2SC1815Y). The carrier oscillator provides signals at the following frequencies:

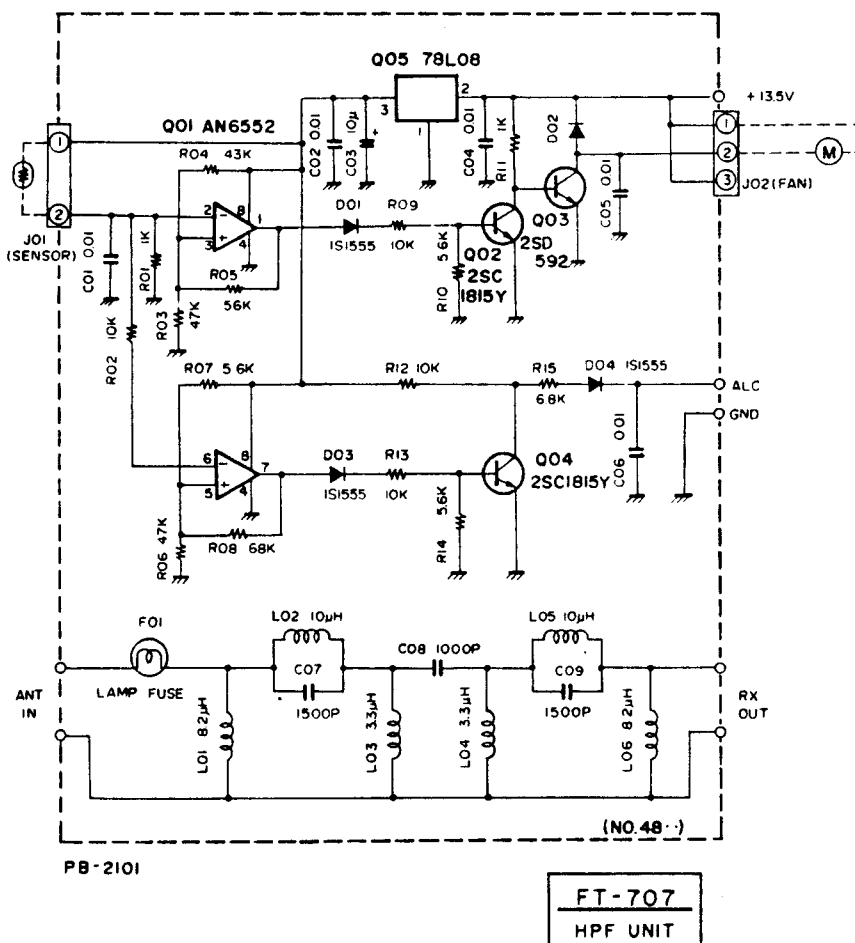
LSB	8986 kHz
USB/CW(RX)	8989 kHz
CW(TX)/AM(TX)	8988.3 kHz

The audio signal is amplified by  $Q_{3020}$  and  $Q_{3021}$  (2SC1815Y) and fed to final AF amplifier  $Q_{3022}$  ( $\mu$ PC2002V), which provides three watts of audio output to the speaker through an output transformerless circuit.

The audio spectrum is shaped by an active low-pass filter at  $Q_{3020}$  of  $f_c = 2.7$  kHz,  $-12$  dB/octave.

**MARKER GENERATOR**

A 25 kHz marker generator is available, for alignment and testing purposes. Marker generator  $Q_{3036}$  (2SC380TMY) provides a basic 3200 kHz signal, which is divided into 25 kHz multiples by  $Q_{3037}$  (F4024), a binary counter. The output signal is fed through buffer  $Q_{3038}$  (2SC380TMY) to the receiver front end.



**FT-707  
HPF UNIT**



TRANSMITTER

The discussion of the signal flow on transmit will be on a mode-by-mode basis.

SSB

The audio input signal from the microphone jack, J<sub>3</sub>, is fed to pin 9 of J<sub>3007</sub> on the AF Unit. The speech signal is amplified by Q<sub>3006</sub> (2SC732GR) and Q<sub>3007</sub> (2SC1815Y) and then fed through the front panel MIC GAIN control, VR<sub>3b</sub>. The signal is then applied through buffer Q<sub>3008</sub> (2SC1959Y) to the ring modulator, D<sub>3007</sub>-D<sub>3010</sub>. Here the audio signal modulates the carrier signal delivered from Q<sub>3005</sub>, resulting in an 8.9875 MHz double-sideband signal. The signal is then fed to pin 1 of J<sub>3001</sub> for delivery to the IF Unit.

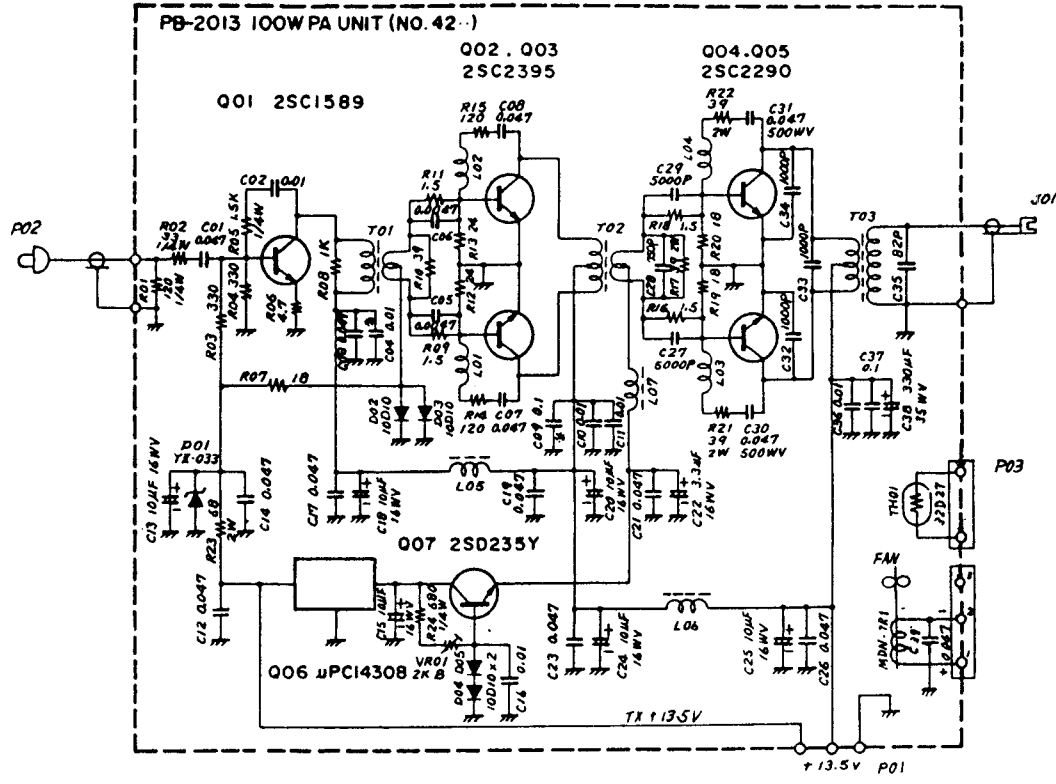
The IF signal appearing at pin 2 of J<sub>2002</sub> is fed through buffer Q<sub>2007</sub> (J310) to the SSB filter, where the unwanted sideband is sliced out. The resulting SSB signal is amplified by Q<sub>2008</sub> (3SK73GR) and delivered to the diode ring mixer, Q<sub>1008</sub>, where the IF signal is mixed with the local signal from the premix circuit. The RF signal is then amplified by Q<sub>1002</sub> (3SK73GR) and Q<sub>1003</sub> (2N4427), and delivered to the PA Unit.

The input signal is amplified by pre-driver Q<sub>4201</sub> (2SC1589) and the push-pull driver stage, Q<sub>4202</sub>/Q<sub>4203</sub> (2SC2395), and amplified further by the push-pull final amplifier, Q<sub>4202</sub>/Q<sub>4205</sub> (2SC2290), which provides approximately 100 watts of RF output. The RF signal is fed through bandswitch low-pass filter networks on the LPF Unit, then delivered, through a directional coupler, to the rear panel antenna jack.

CW

For CW, the 8988.3 kHz carrier signal is generated by Q<sub>3004</sub> and fed through buffer Q<sub>3005</sub> to the ring modulator, which is unbalanced for CW operation by the application of DC 8V through D<sub>3001</sub> (1S1555) and RL<sub>3001</sub>. The signal path is then identical to that of the SSB signal, up to the latter stage of the RF Unit.

The key line is connected to the base of Q<sub>1005</sub> (2SC1815Y). With the key open, Q<sub>1005</sub> is biased ON, turning bias controller Q<sub>1004</sub> (2SC1959Y) OFF. In this case, the emitters of Q<sub>1002</sub> and Q<sub>1003</sub> are open, and no output signal will result. When the key is closed, Q<sub>1004</sub> will be turned ON, and Q<sub>1002</sub> and Q<sub>1003</sub> will be keyed, allowing normal transmission. The key lead is also connected to





sidetone oscillator Q<sub>3010</sub> (2SC1815Y), for monitoring of the code signal during CW operation. The output from Q<sub>3010</sub> is delivered to the final AF amplifier, Q<sub>3022</sub>.

AM

The microphone signal modulates the 8988.3 kHz carrier signal, and the resulting signal is amplified by Q<sub>2007</sub> and passed around the SSB filter. From Q<sub>2008</sub>, the signal path is the same as that on SSB.

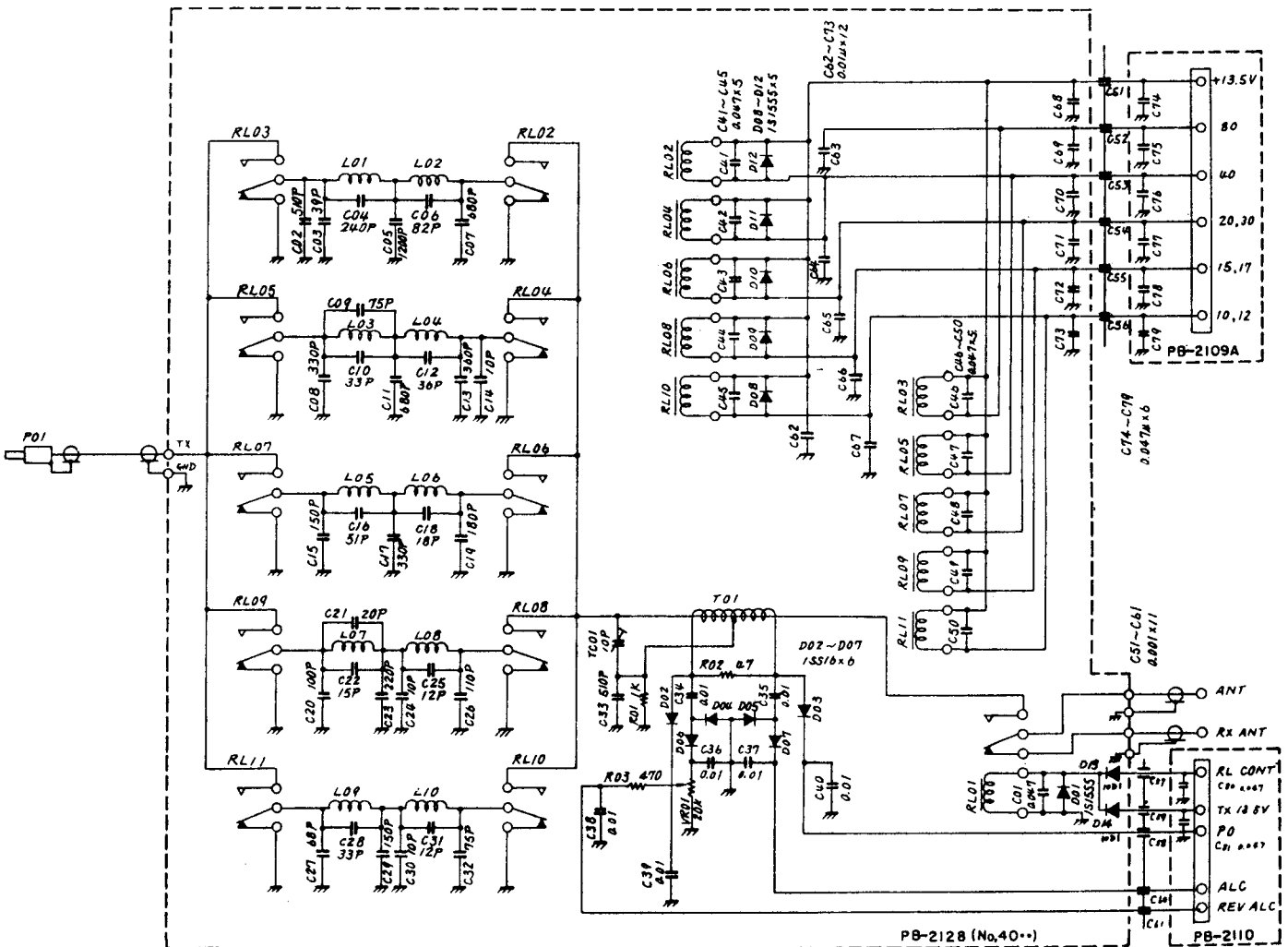
ALC CIRCUIT

A variety of level control systems are included in the FT-707, for protection against overdrive, excess temperature, or high SWR.

At the directional coupler, the output voltage is sensed. When a high SWR condition exists, the voltage is detected by D<sub>4004</sub> and D<sub>4006</sub> (1SS16)

and amplified by Q<sub>2024</sub> (2SC1815Y) and fed to the RF, IF, and AF stages of the transmitter, controlling the gain of those stages. In the case of overdrive, the ALC voltage is detected by D<sub>4005</sub> and D<sub>4007</sub> (1SS16) and amplified by Q<sub>2023</sub> (2SC1815Y) for control of the aforementioned stages.

A thermistor on the final amplifier board provides detection of excess temperature. When the operating temperature of the final transistors rises to an unacceptable figure, control voltage developed at comparator Q<sub>4801</sub> (AN6552) is fed to Q<sub>4802</sub> (2SC1815Y), which drives Q<sub>4803</sub> (2SD592), providing operating voltage for a cooling fan on the amplifier heat sink. Control voltage is also fed from Q<sub>4801</sub> to amplifier Q<sub>4804</sub> (2SC1815Y), and this voltage is delivered to the ALC line to the RF, IF, and AF stages.



# TECHNICAL NOTES

## COMMON CIRCUIT

### VOX circuit

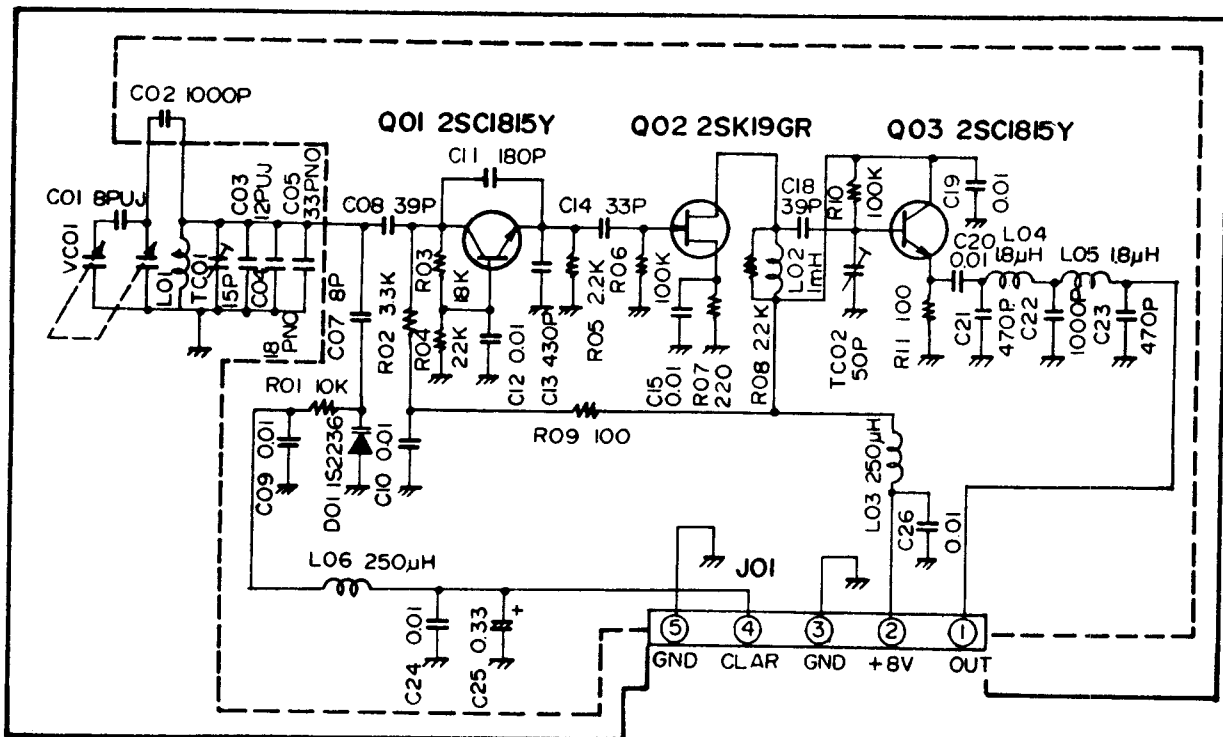
A portion of the microphone input signal is amplified by Q<sub>3011</sub> (2SY1815Y) and detected by D<sub>3014</sub> (1N60), producing a DC voltage. This voltage is amplified by Q<sub>3012</sub> (2SC1815Y) and Q<sub>3013</sub> (2SA733). Q<sub>3013</sub> drives Schmitt trigger Q<sub>3014</sub>/Q<sub>3018</sub> (2SC1815Y); when Q<sub>3018</sub> is driven ON, relay driver Q<sub>3019</sub> (2SA496Y) is turned ON, activating the antenna relay. An RC circuit composed of front panel DELAY control VR<sub>5101</sub> and C<sub>3043</sub> sets the relay hang time by delaying the cutoff of Q<sub>3013</sub> when speech input stops.

A portion of the speaker output is amplified by Q<sub>3015</sub> (2SC1815Y) and detected by D<sub>3015</sub> (1N60). This provides a bucking voltage which is amplified by Q<sub>3016</sub> (2SC1815Y) and Q<sub>3017</sub> (2SA733) and fed to Q<sub>3013</sub>, preventing the speaker output from tripping the VOX circuit.

### VFO UNIT (PB-2097)

VFO oscillator Q<sub>4301</sub> (2SC1815Y) operates in a modified Colpitts configuration, providing a 5.0–5.5 MHz VFO signal. The 500 kHz tuning range is tuned by variable capacitor VC<sub>4301</sub>, which is a two-section capacitor. The sub-blades of VC<sub>4301</sub> provide temperature compensation against frequency change caused by thermal expansion of the main blades. The VFO signal is fed through buffer amplifiers Q<sub>4302</sub> (2SK19GR) and Q<sub>4303</sub> (2SC1815Y), passed through a low-pass filter, and fed, through diode switches D<sub>1044</sub>/D<sub>1045</sub> (1S1555), to the premix IC, Q<sub>1006</sub>.

Varactor diode D<sub>4301</sub> is placed in the oscillator circuit during clarifier operation. In accordance with the tuning of the front panel clarifier control and L<sub>4306</sub>, the capacitance variation induced in D<sub>4301</sub> allows offset from the main dial frequency of ±2.5 kHz.



FT-707  
VFO UNIT

PB-2097(NO.43..)

**PREMIX CIRCUIT (AF UNIT)**

The premix local signal is generated by crystal oscillator  $Q_{3025} - Q_{3033}$  (2SC380TM-Y), the oscillator in use being selected by diode switches  $D_{3029} - D_{3037}$  (1S1555). The output from the oscillator passes through Pin 2 of  $J_{1006}$  and Pin 1 of  $J_{1005}$  in the RF Unit. This signal is fed to Pin 11 of the IC double balanced mixer ( $Q_{1006}$ ).

The 5.0-5.5 MHz VFO signal is fed through Pin 8 of  $J_{1005}$ , to the diode switch selecting either FIX or VFO, and to a low-pass filter. Next, this signal passes to the mixer, where the VFO signal is mixed up with the premix local signal, resulting in the output premix signal, shown in Table 3.

The premix signal is passed through a broadband transformer and a bandswitched bandpass filter, which eliminates spurious signals on the premix output. Selection of the desired filter is performed by the diode switches of  $D_{1046} - D_{1057}$  (1SS53). The filtered signal is then amplified by a three-stage amplifier chain consisting of  $Q_{1010}$ ,  $Q_{1011}$  (2SC1923R), and  $Q_{1012}$  (2SC2407). Finally, the signal is delivered to the double balanced mixer, which provides the TX and RX IF signal.

A portion of the output from  $Q_{1011}$  is amplified by buffer  $Q_{1013}$  (2SC380TM-Y) for delivery to the frequency counter for display purposes.

		XCO Frequency MHz	PREMIX OUT Frequency MHz
80m	$X_{3005}$	17.9845	12.4875-12.9875
40m	$X_{3006}$	21.4845	15.9875-16.4875
30m	$X_{3004}$	24.4875	18.9875-19.4875
20m	$X_{3007}$	28.4875	22.9875-23.4875
17m	$X_{3013}$	32.4875	26.9875-27.4875
15m	$X_{3008}$	35.4875	29.9875-30.4875
12m	$X_{3014}$	38.9875	33.4875-33.9875
10mA	$X_{3009}$	42.4875	36.9875-37.4875
10mB	$X_{3010}$	42.9875	37.4875-37.9875
10mC	$X_{3011}$	43.4875	37.9875-38.4875
10mD	$X_{3012}$	43.9875	38.4875-38.9875

Table 2-1

	Nominal Premix Local Frequency (MHz)	LSB (MHz)	USB (MHz)	CW. AM (MHz)
80m	12.4875-12.9875	12.486-12.986	12.489-12.989	12.4883-12.9883
40m	15.9875-16.4875	15.986-16.486	15.989-16.489	15.9883-16.4883
30m	18.9875-19.4875	18.986-19.486	18.989-19.489	18.9883-19.4883
20m	22.9875-23.4875	22.986-23.486	22.989-23.489	22.9883-23.4883
17m	26.9875-27.4875	26.986-27.486	26.989-27.489	26.9883-27.4883
15m	29.9875-30.4875	29.986-30.486	29.989-30.489	29.9883-30.4883
12m	33.4875-33.9875	33.486-33.986	33.489-33.989	33.4883-33.9883
10mA	36.9875-37.4875	36.986-37.486	36.989-37.489	36.9883-37.4883
10mB	37.4875-37.9875	37.486-37.986	37.489-37.989	37.4883-37.9883
10mC	37.9875-38.4875	37.986-38.486	37.989-38.489	37.9883-38.4883
10mD	38.4875-38.9875	38.486-38.986	38.489-38.989	38.4883-38.9883

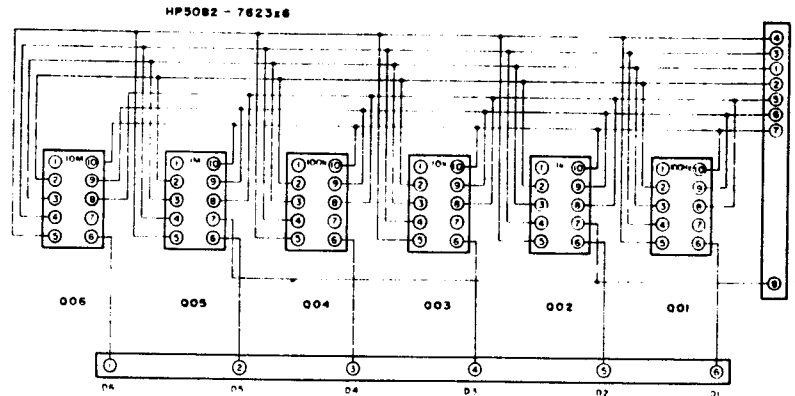
Table 2-2

COUNTER UNIT (PB-2086A)

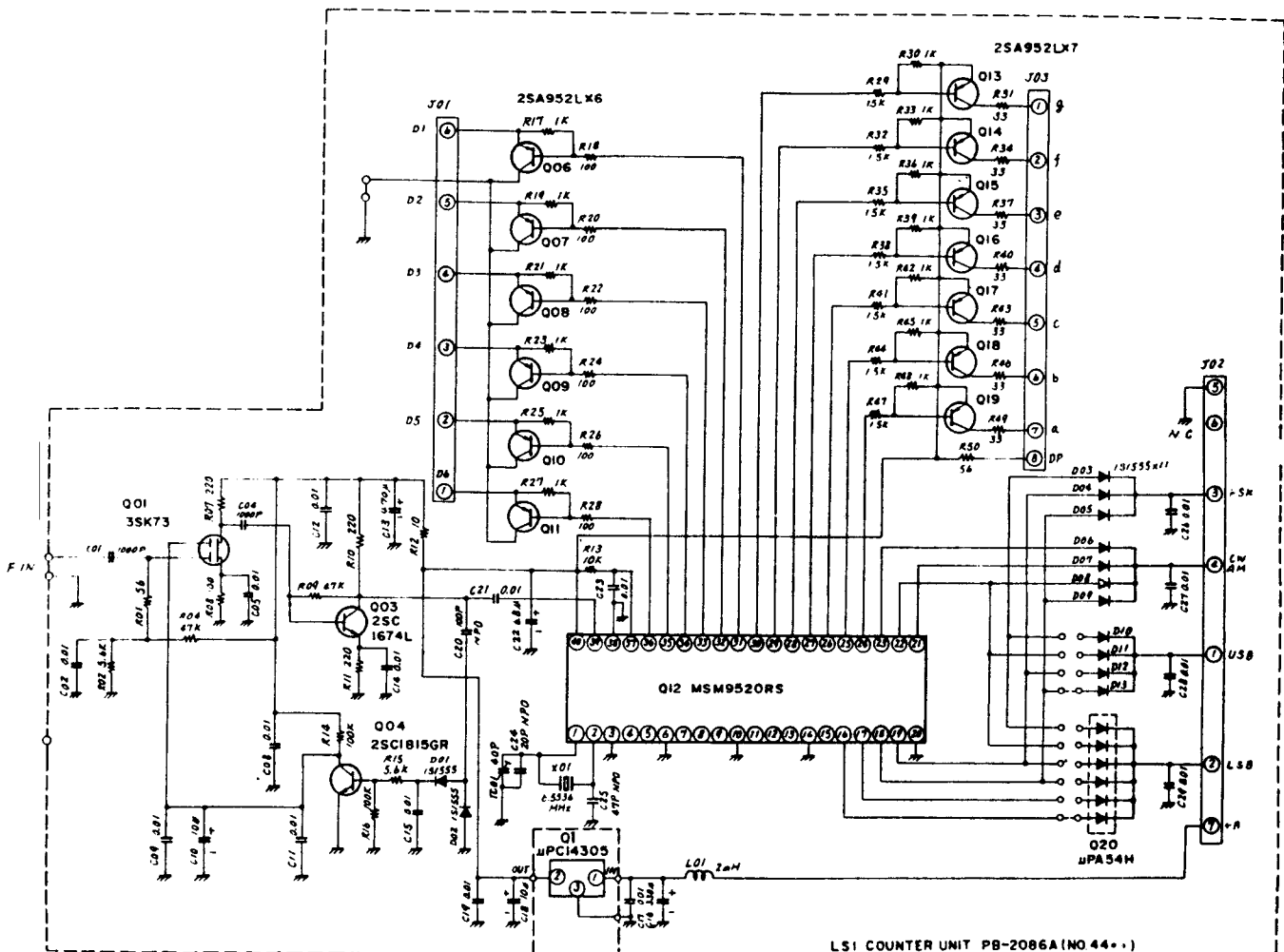
A portion of the local oscillator signal appears at the F IN terminal of the COUNTER Unit, where it is amplified by Q<sub>4401</sub> (3SK73) and Q<sub>4403</sub> (2SC1674L). The signal is then fed to the LSI counter chip, Q<sub>4012</sub> (MSM9520RS). A portion of the output from Q<sub>4403</sub> is detected by D<sub>4401</sub> and D<sub>4402</sub> (1S1555) and amplified by Q<sub>4404</sub>

(2SC1815Y), providing an AGC voltage which keeps the signal input level to the LSI constant by controlling the gain of Q<sub>4401</sub>.

The output from the LSI drives LED digit drivers Q<sub>4406</sub> - Q<sub>4411</sub> (2SA952L) and segment drivers Q<sub>4413</sub> - Q<sub>4419</sub> (2SA952L), which control the digital display light emitting diodes, D<sub>4501</sub> - D<sub>4506</sub> (HP5082-7623).



DISPLAY UNIT PB-2098



LSI COUNTER UNIT PB-2086A (NO 4401)

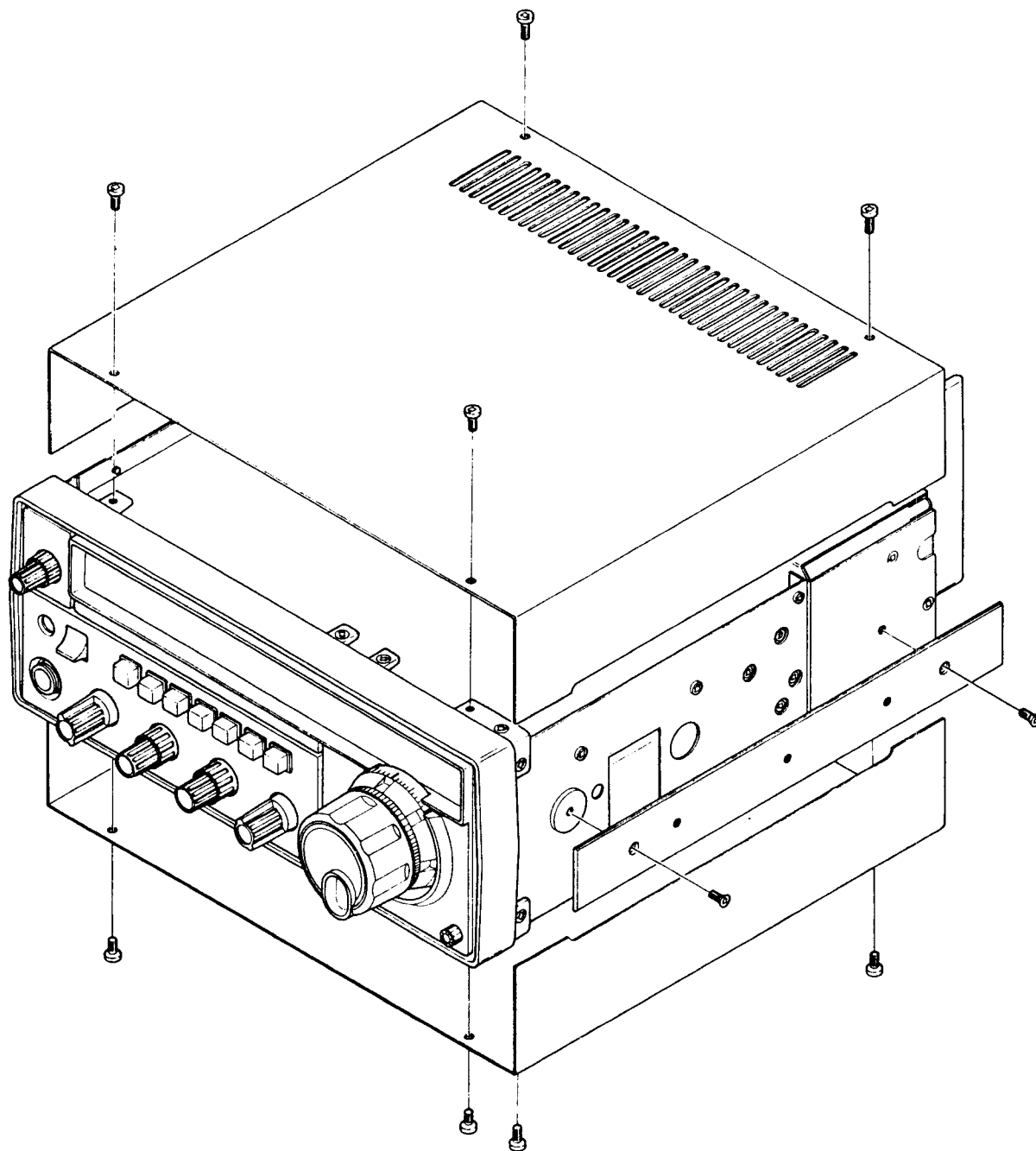
**MEMO**

MEMO

## SECTION 3—SERVICING

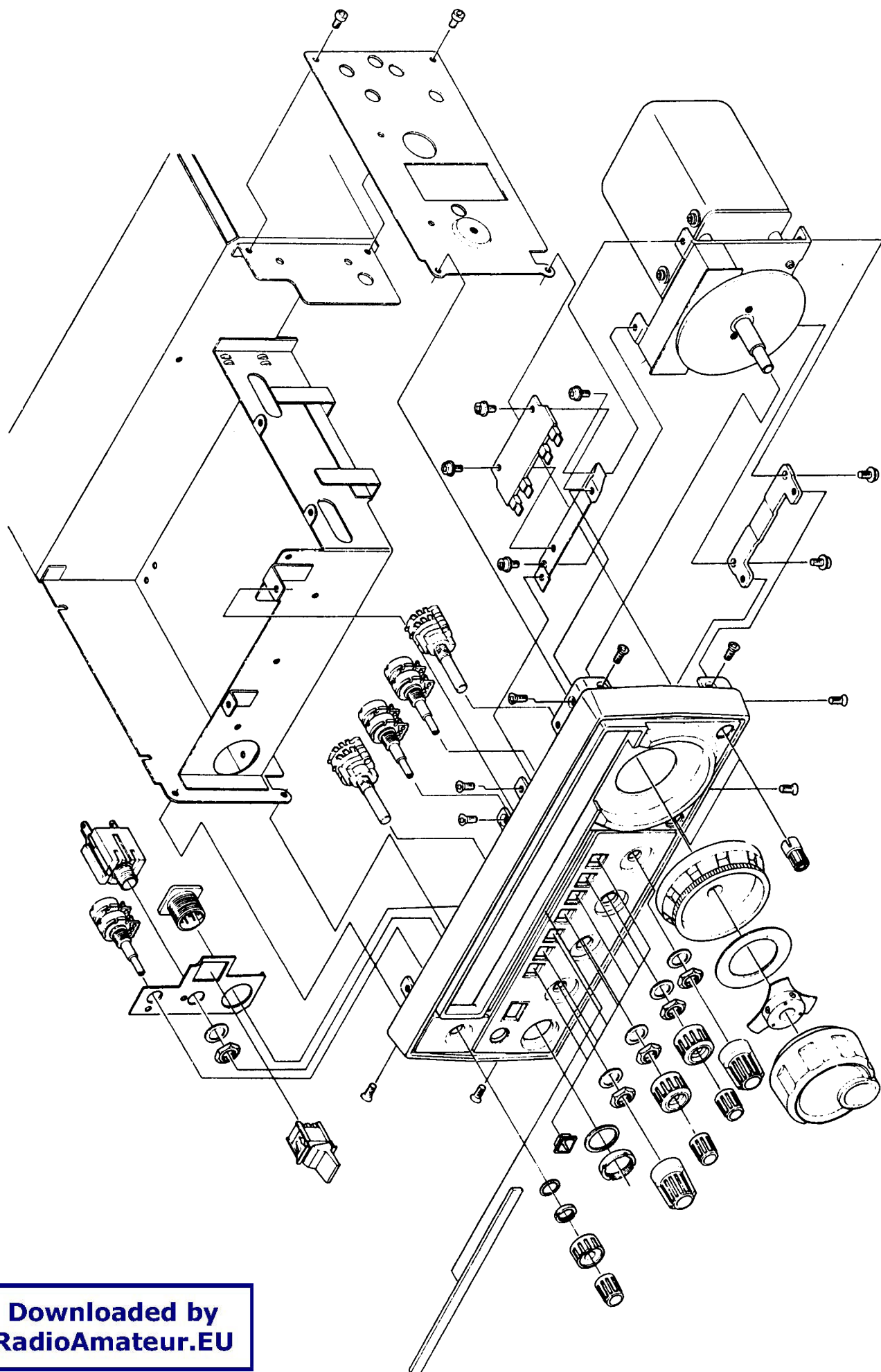
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REAR PANEL REMOVAL .....	3-4
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# OUTER COVER REMOVAL



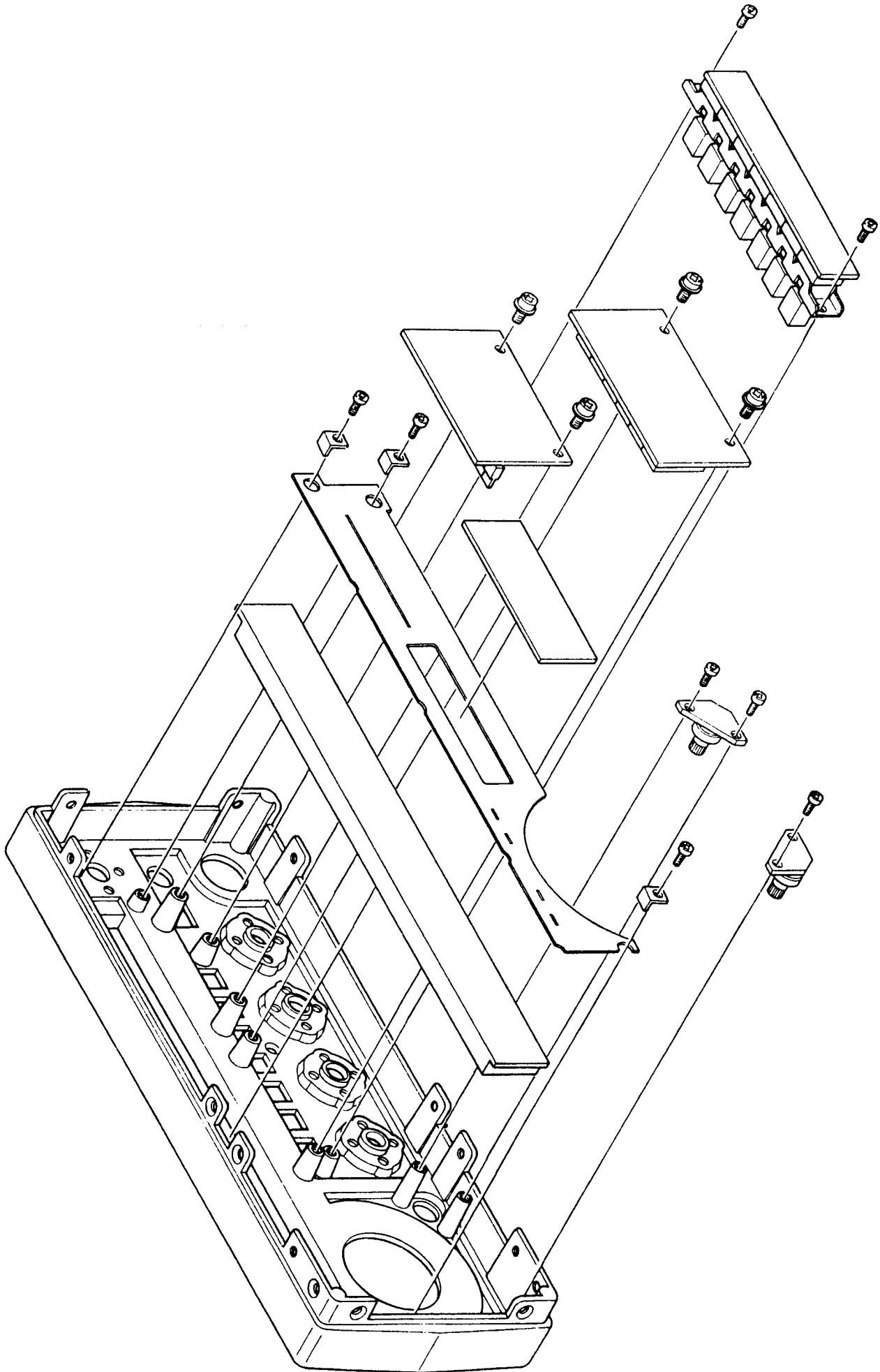


FRONT PANEL REMOVAL(A)

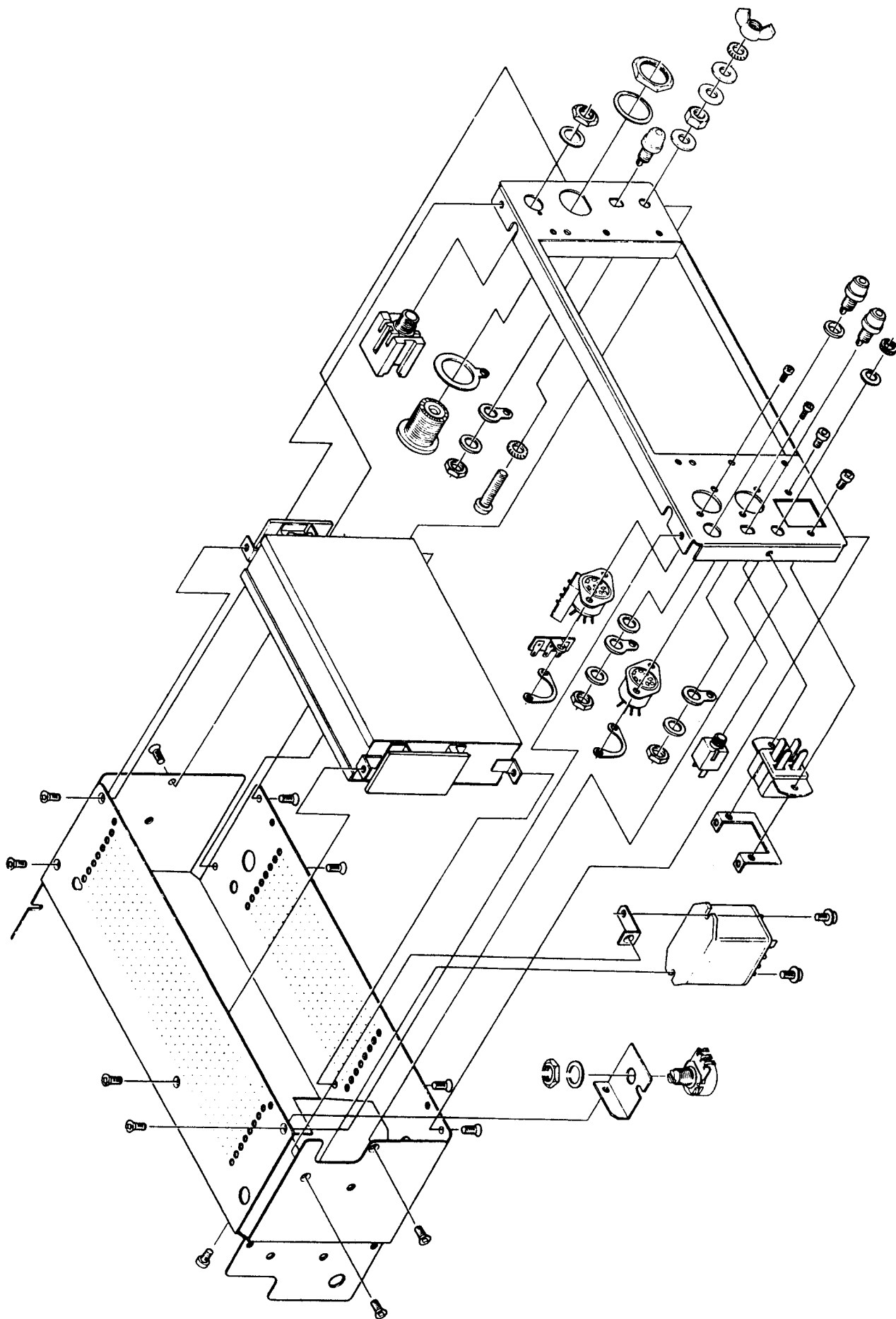


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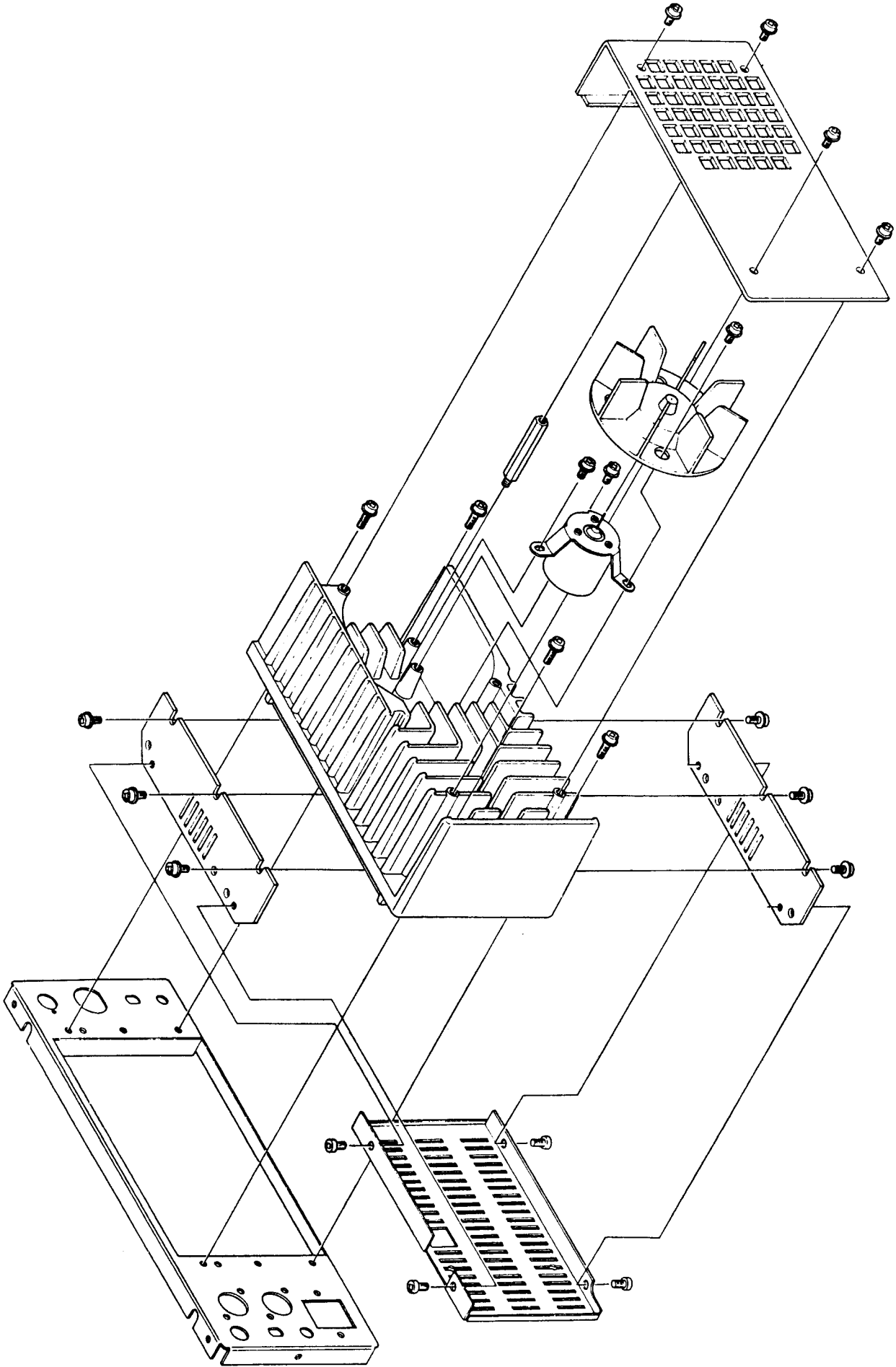
FRONT PANEL REMOVAL (B)



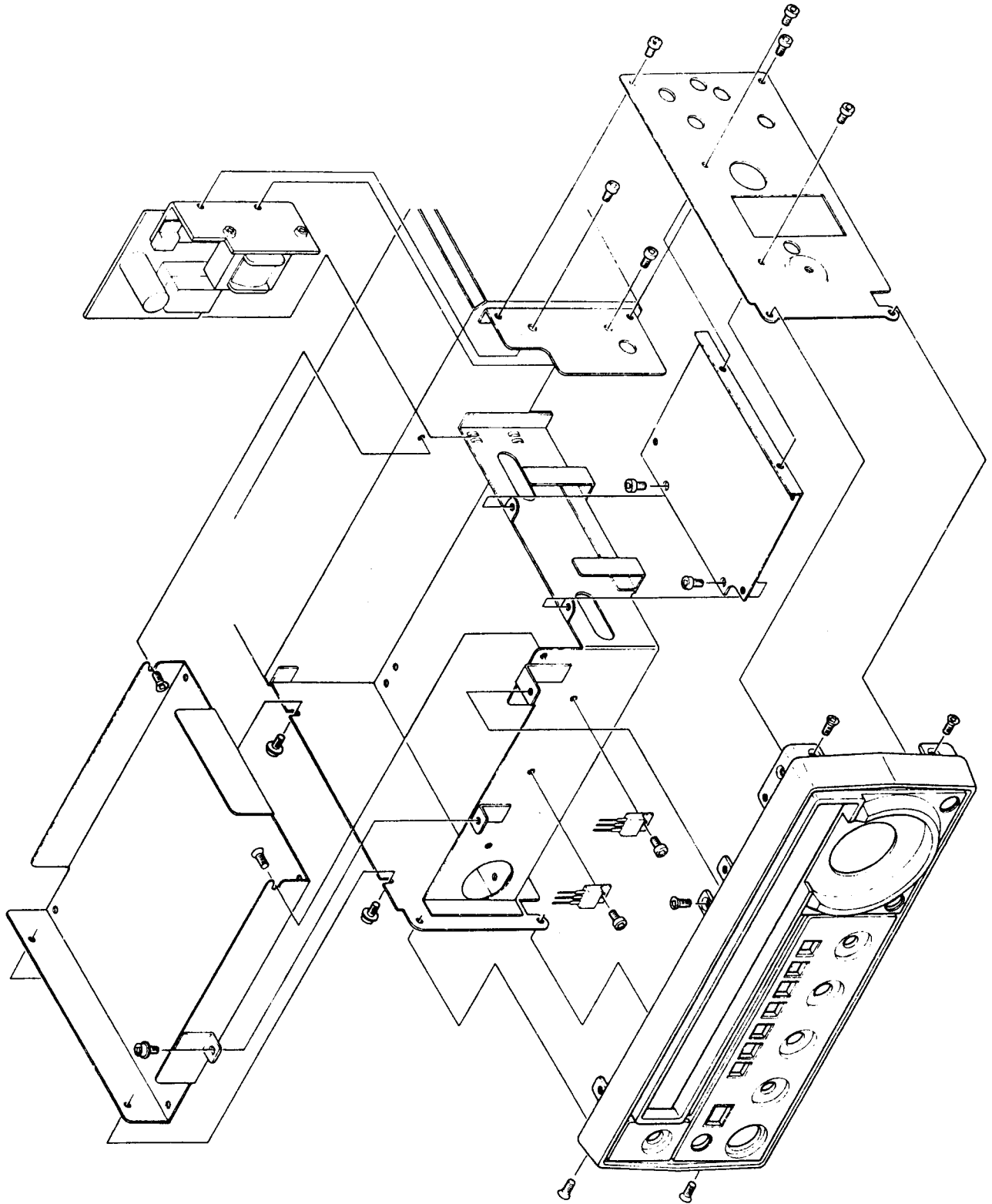
REAR PANEL REMOVAL



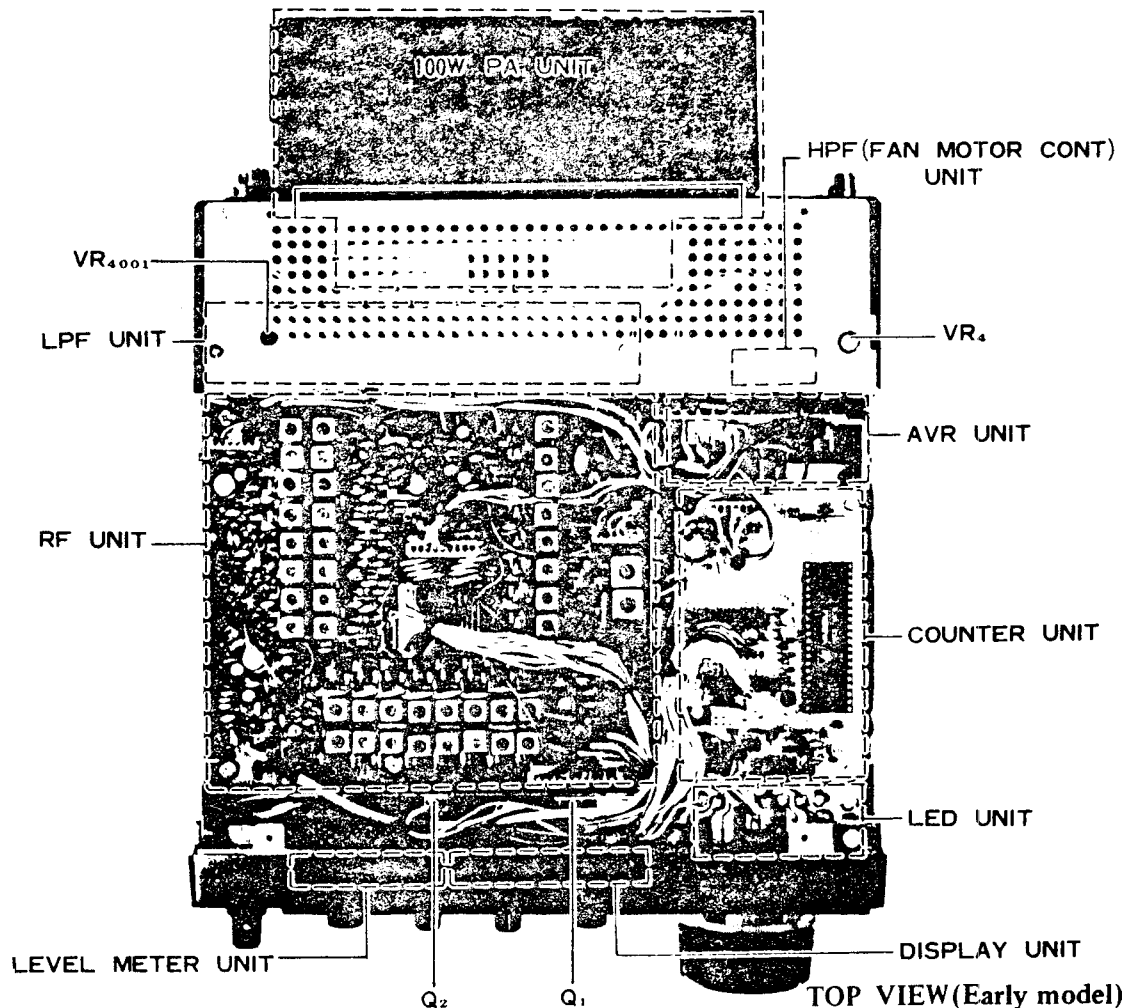
100W PA UNIT REMOVAL



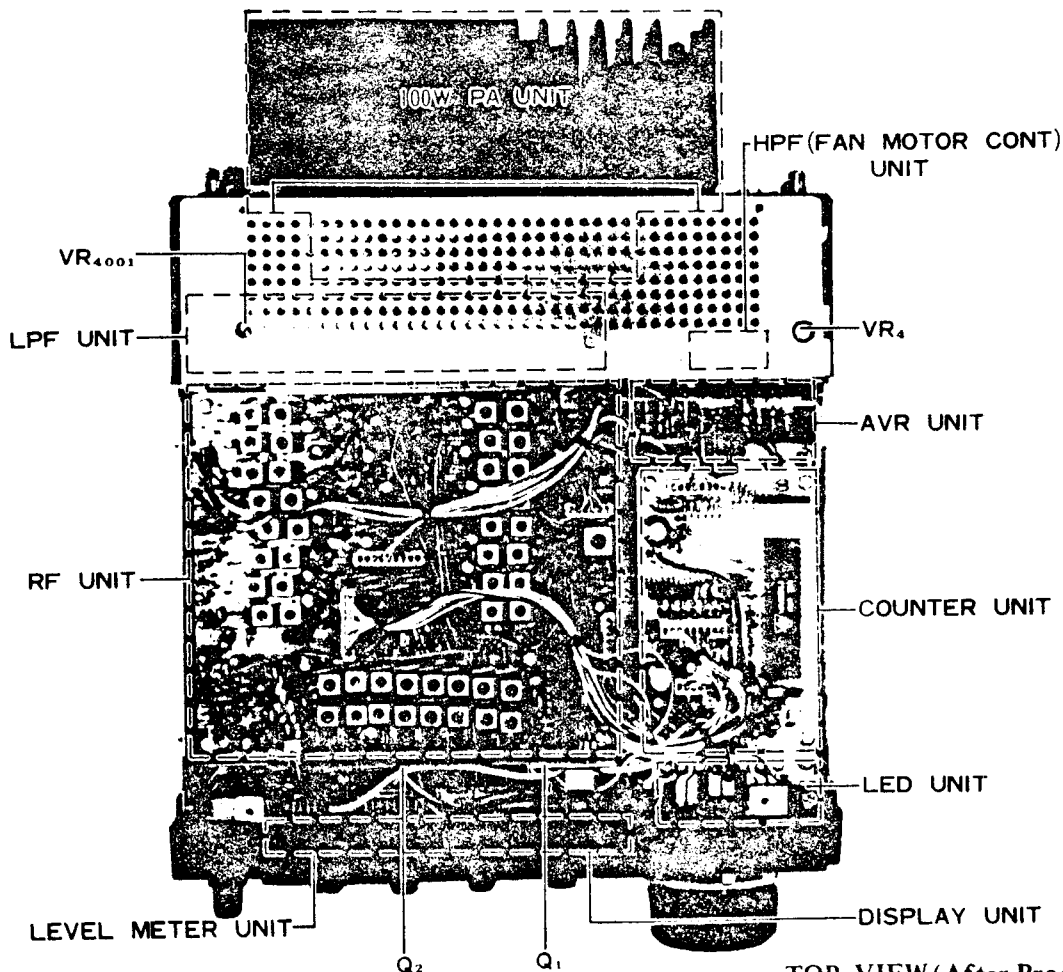
MAIN CHASSIS EXPLODED VIEW



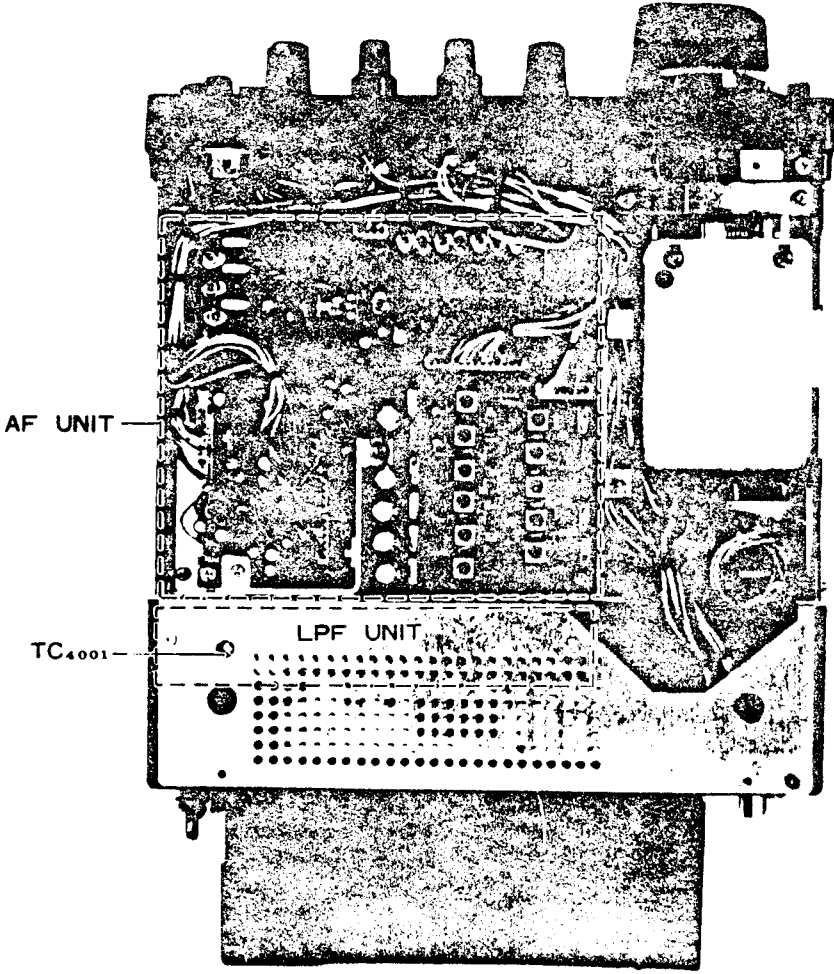
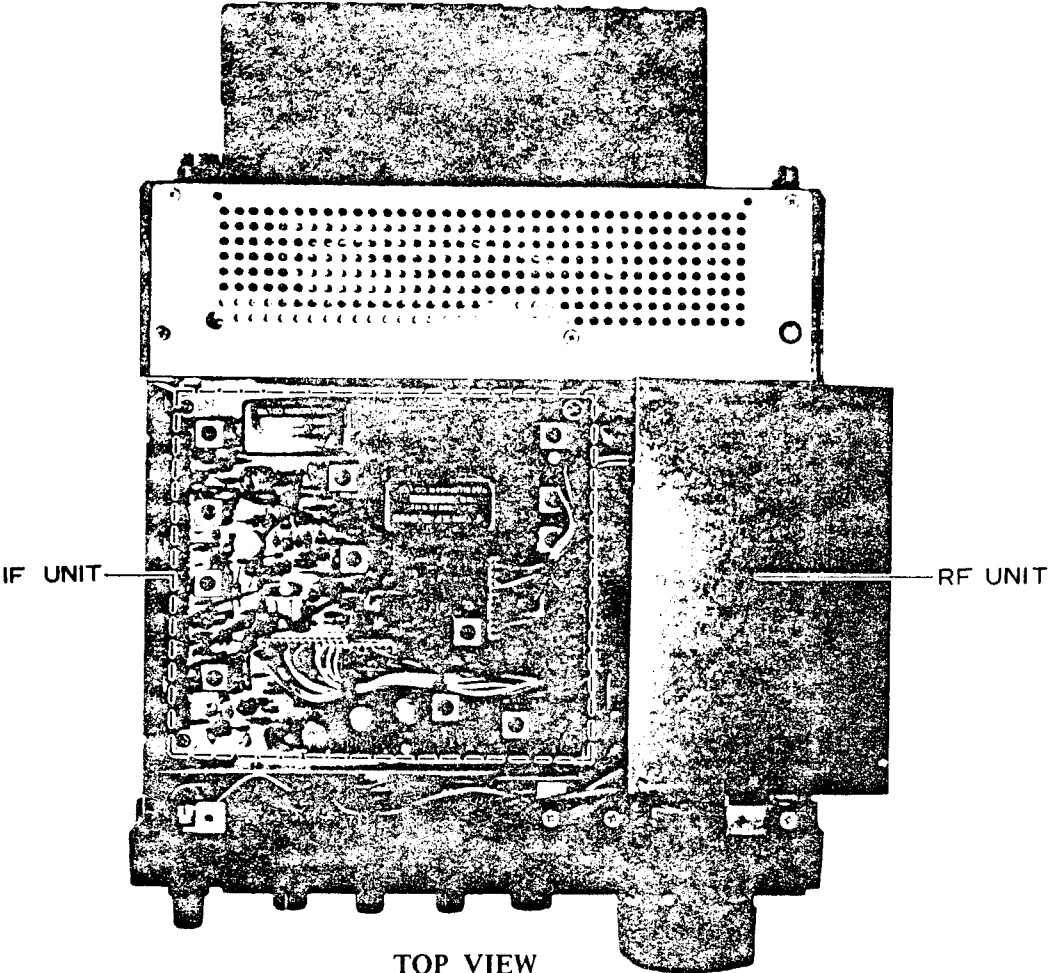
BOARD LAYOUT



TOP VIEW (Early model)



TOP VIEW (After Prod. 11)



## SOLDERING AND DESOLDERING TECHNIQUE

### SOLDERING AND DESOLDERING TECHNIQUE ON PRINTED CIRCUIT BOARDS

The FT-707 circuit boards are tough, but mishandling during soldering can cause circuit traces to "lift." While this does no permanent damage to the board, much servicing trouble can result, because of the tendency for this lifted trace to break. A few simple precautions will keep your circuit boards in A-1 condition.

1. Use only a 12 to 30 watt chisel-tip soldering iron. Yes, some "repairmen" have been known to use small blowtorches on cards.
2. Use only a soldering iron equipped with a three-wire cord, with the tip grounded. Also acceptable is a soldering iron isolated through a transformer. An old soldering iron or gun may have 117 volts on the tip, and will certainly cause more damage than it repairs!
3. USE ONLY 60/40 ROSIN CORE SOLDER. Acid core solder should be thrown away if you find it in your radio shop!
4. Use a solder sucker and solder tape to ensure a professional repair job.
5. If you do lift a trace, don't worry! Read on to find out how to repair traces like a pro.

### NOTES ON USE OF CMOS IC's:

As CMOS devices are extremely sensitive to damage from static electricity, special precautions must be observed.

In storage, use only a non-inductive sponge.

When installing a CMOS IC in a socket, or on a circuit board, be certain that the power is off. In addition, the technician should rest his hand on the chassis as the component is inserted, so as to place his hand at the same level as the chassis (better to discharge small amounts of static electricity through your fingers than through a \$5 IC!).

When soldering a CMOS IC onto a circuit board, use a low wattage iron, and be sure to ground the tip with a clip lead, if the tip is not grounded through a three-wire power cord.

### INSERTION OF PARTS ON CIRCUIT BOARDS

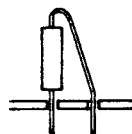
All of the below are acceptable ways of inserting components into circuit board mounting holes.



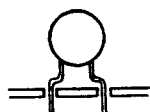
(a) Bend leads slightly



(b) Straight-in mounting



(c) Vertical mounting



(d) Preformed disc ceramic capacitor

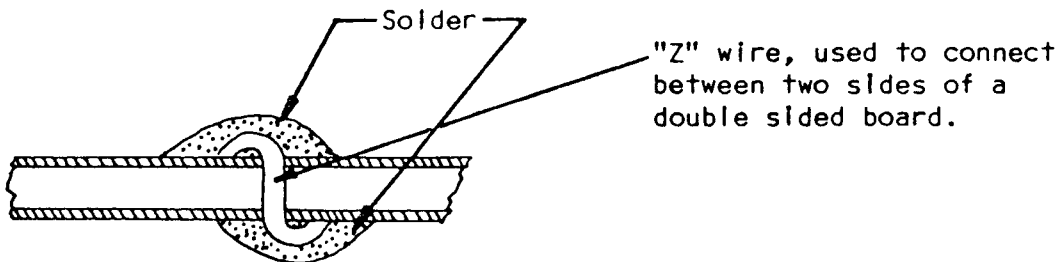
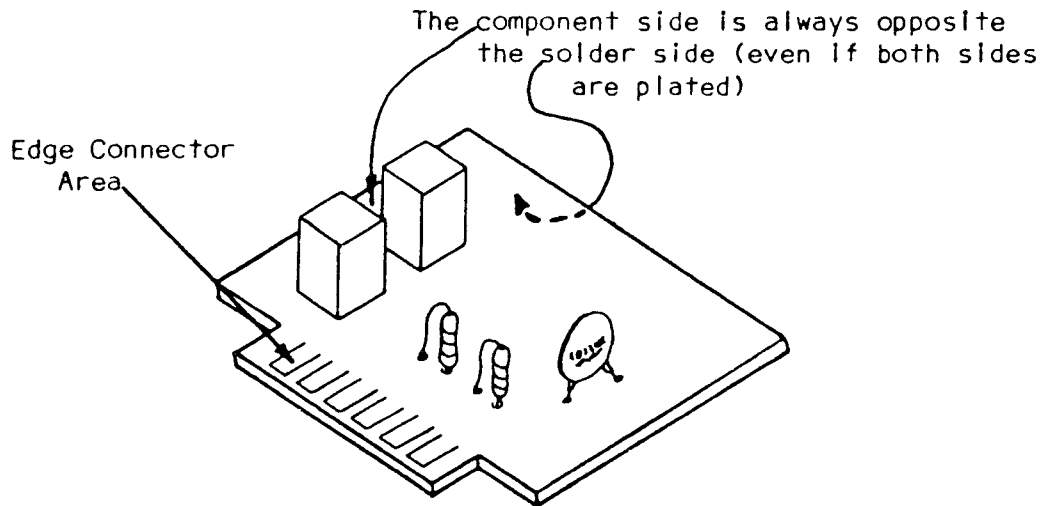
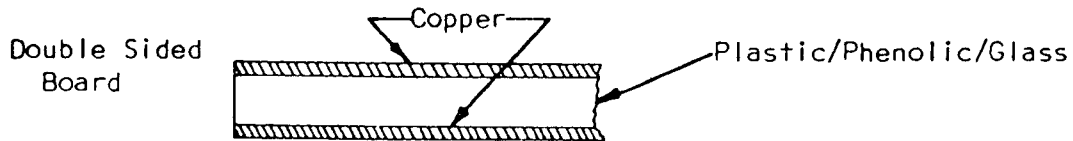
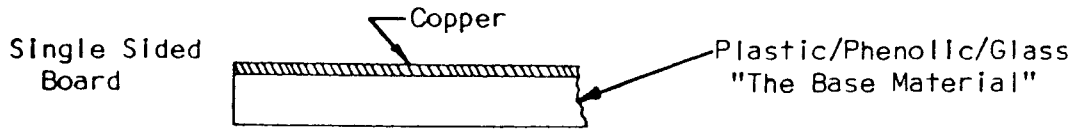


(e) Preformed resistor, diode, etc.



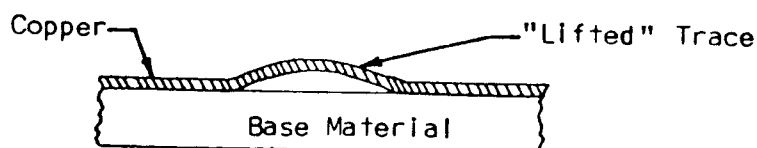
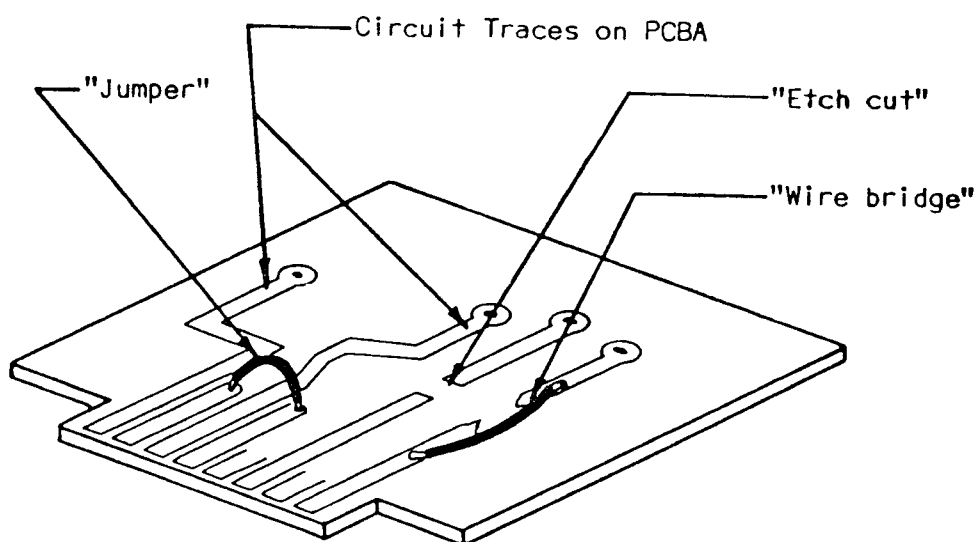
## CIRCUIT TRACE REPAIR

Most of the printed circuit boards used in the FT-707 are single sided boards. However, occasionally a double-sided board is used, in situations where high shielding is required. A comparison of the two types is shown below.

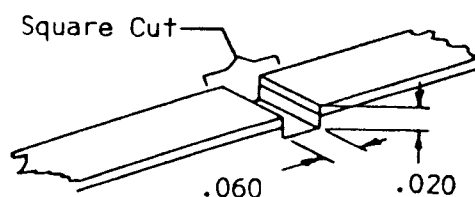


Sometimes, after the design and drafting of a board are completed, a board is produced with an error in it. Though non-technical managers sometimes suffer a stroke at hearing of this situation, it is not unheard of in engineering circles. Thus, should you encounter etch cuts and jumpers on a board, be assured that the modifications were made in the interest of securing optimum performance. Unless you consider your expertise to be superior to that of the design engineer, please leave these mods in place.

However, in service work the occasion does arise when a trace must be cut. Proceed as follows.



If you have previously lifted a trace, make an etch cut on each side of the lifted trace, and install a wire bridge as shown in the drawing.



Coat Cut Area With Eastman 910

**CW FILTER INSTALLATION**

- (1) Refer to Figure 3-1, and remove the top cover of the transceiver.
- (2) Refer to Figure 3-2, and remove the three screws marked "A" in the drawing. Remove the RF Unit.
- (3) Refer to Figure 3-3, and remove the four screws marked "B" restraining the IF Unit. Remove the three connectors of the IF Unit, and remove the board from the transceiver.
- (4) Mount the CW filter in the position shown in Figure 3-4. Cut the two jumpers shown in the drawing when the CW filter is installed.
- (5) Replace the IF Unit and RF Unit into the transceiver. Replace the top cover of the transceiver. Installation is now complete. The CW filter will be selected when the MODE switch is set to CW-N, while the SSB filter will be selected when the MODE switch is set to CW-W.

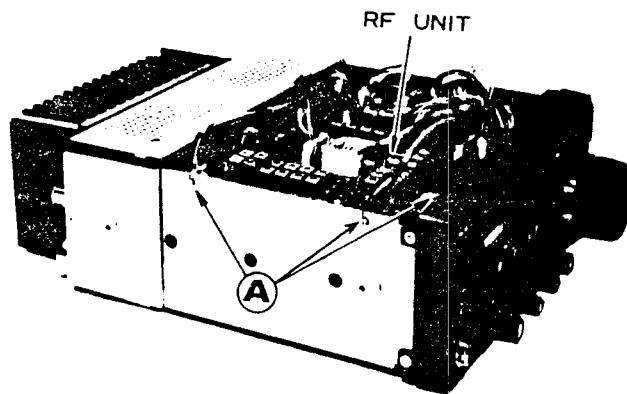


Fig. 2

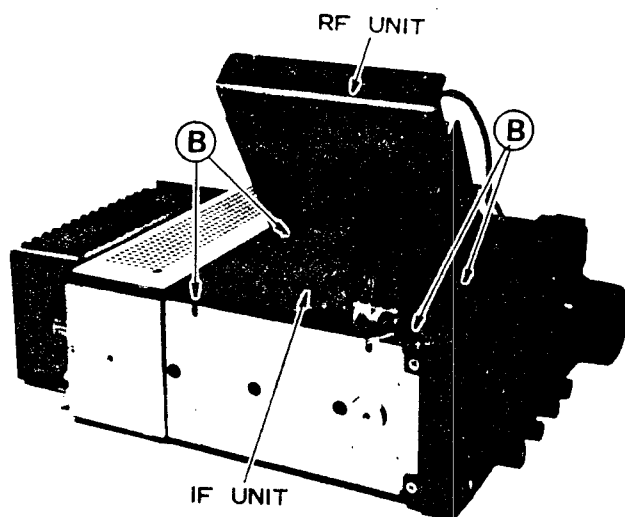


Fig. 3-3

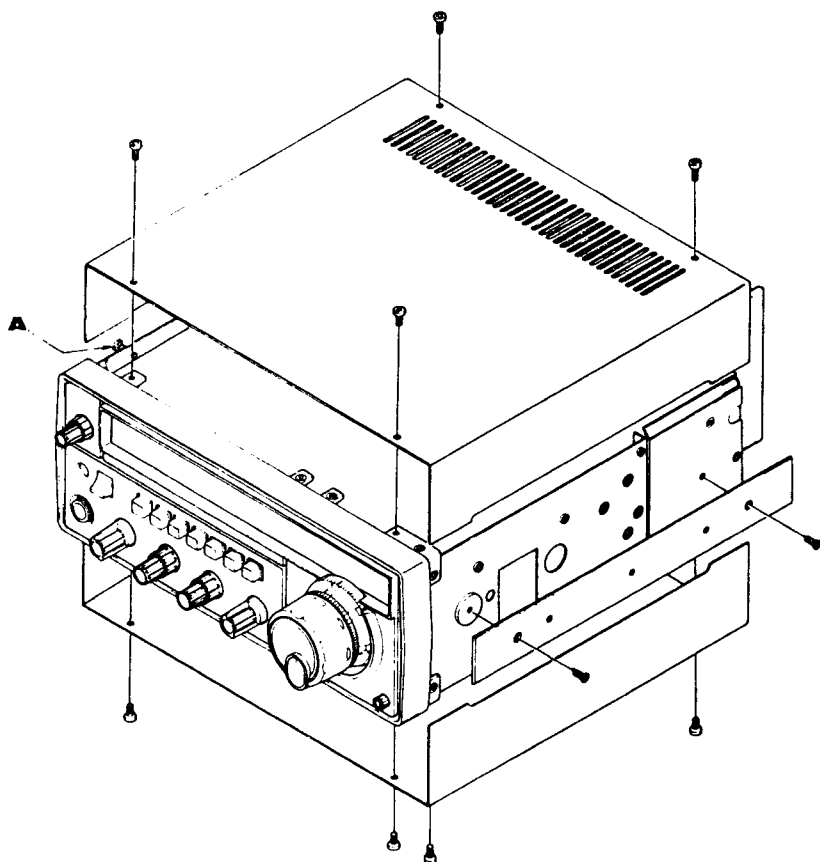


Fig. 3-1

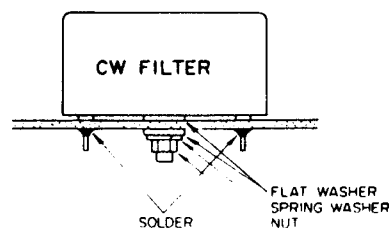
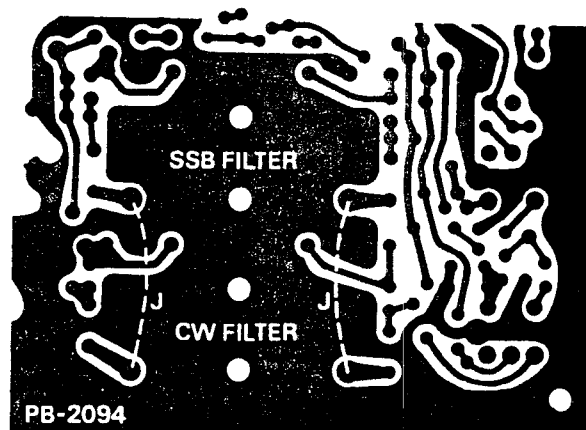


Fig. 3-4

### FIX (CRYSTAL CONTROLLED) OPERATION

Fixed channel operation is possible by using crystals installed in the AF UNIT. The VFO/FIX switch must be placed in the FIX position. There is only one crystal controlled channel available per band with the FT-707. Crystals are optional. (except 30m band)

Crystals must fall within the specifications shown in Table 3-1, and must fall within the operating range 5.5–5.0 MHz. Frequency calculation for the crystals is made from the formula

$$F_x = F_1 - F_0$$

where  $F_x$  is the crystal frequency,

$F_1$  is a constant derived from Table 3-2.

and  $F_0$  is the operating frequency.

For example, let us say it is desired to operate on 7199 kHz LSB. Referring to Table 3-2, we see that for 40 meter LSB,  $F_1$  is 12498.5 kHz. Subtracting  $F_0$  (7199 kHz) from  $F_1$  (12498.5 kHz) yields 5299.5 kHz, the crystal frequency ( $F_x$ ).

For operation on 21420 kHz USB, compute the crystal frequency as follows:

$$F_x = 26498.5 - 21420 = 5078.5 \text{ kHz.}$$

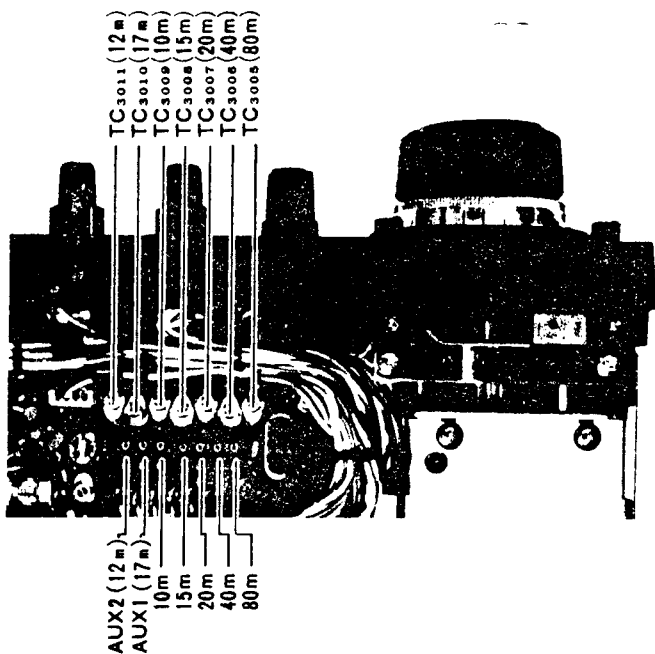
Inspection of the values of  $F_1$  in Table 3-2 will reveal that the 7199 kHz crystal for LSB will work on 14202 kHz, 21202 kHz, etc. Of course, LSB is not normally used on these bands. If the operator switches to USB, the operating frequency will be moved 3 kHz (in this case, to 14199 kHz, 21199 kHz, etc.). If the move is made from LSB to CW, the frequency will move 2.2 kHz down. (to 7196.8, 14199.8, etc.)

To net the crystal on frequency when using the FT-707, use the transceiver digital display to adjust the trimmers for each crystal ( $TC_{3005}$  for 80 m,  $TC_{3006}$  for 40 m, etc.). Be sure that the CLAR switch is turned off during trimmer adjustment.

The optional crystals are available from your Yaesu dealer.

Holder	HC-25/U
Load C	30pF
Effective R	25Ω
Drive level	5mW

Table 3-1



BAND	MODE		
	USB MHz	LSB MHz	AM/CW MHz
80m	8995.5	8998.5	8996.3
40m	12495.5	12498.5	12496.3
※ 30m	15498.5	15501.5	15499.3
20m	19498.5	19501.5	19499.3
17m	23498.5	23501.5	23501.5
15m	26498.5	26501.5	26499.3
12m	29998.5	30001.5	29999.3
10mA	33498.5	33501.5	33499.3
10mB	33998.5	34001.5	33999.3
10mC	34498.5	34501.5	34499.3
10mD	34998.5	35001.5	34999.3

$F_1$  (kHz)  
Table 3-2

## MODIFICATIONS

### S/N IMPROVEMENT ON 80M BAND

Beginning with serial number XX090001, the following modification was performed, in order to improve the S/N ratio on the 80 meter band.

Replace  $C_{2106}$  0.01 $\mu$ F ceramic capacitor with a 0.047 $\mu$ F on the IF unit, PB-2029, as shown in the figure 3-5.

### MODIFICATION TO ELIMINATE "CLICKING" NOISE ON CW

In earlier models of the FT-707 in which CW filters had been installed, a small clicking noise could be heard coming from the receiver whenever the transceiver changed from transmit to receive. The following modification will eliminate this noise.

Replace  $C_{2025}$ , a 1 $\mu$ F electrolytic capacitor with a 3.3 $\mu$ F on the IF unit, PB-2094.

This modification can be adapted to FT-707's with serial numbers below XX10999.

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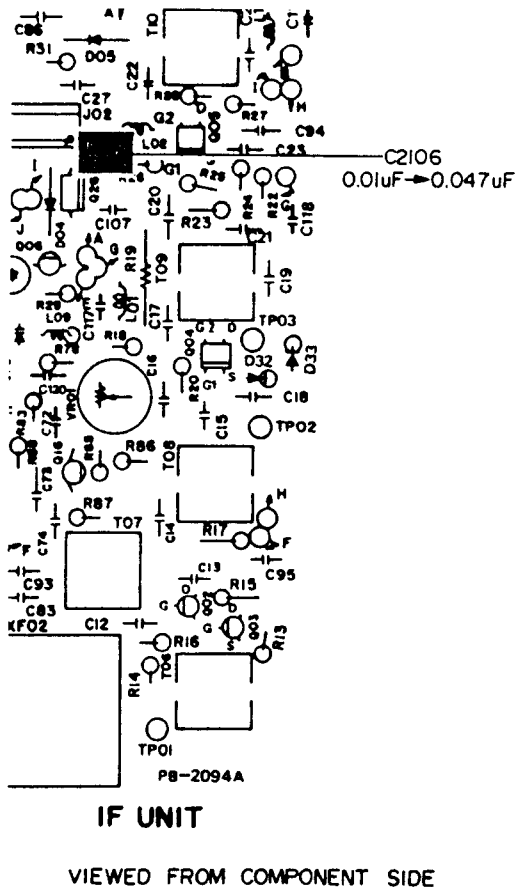


Figure 3-5

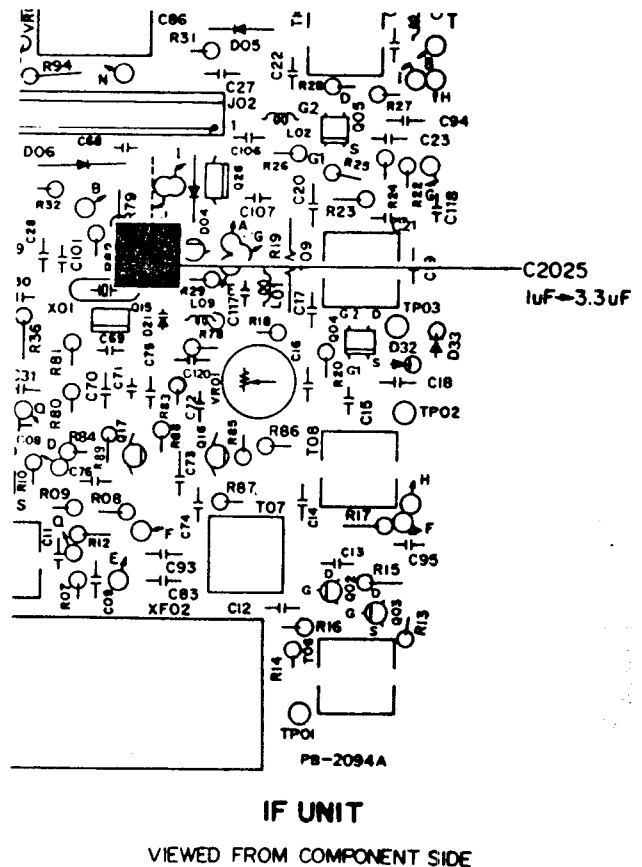
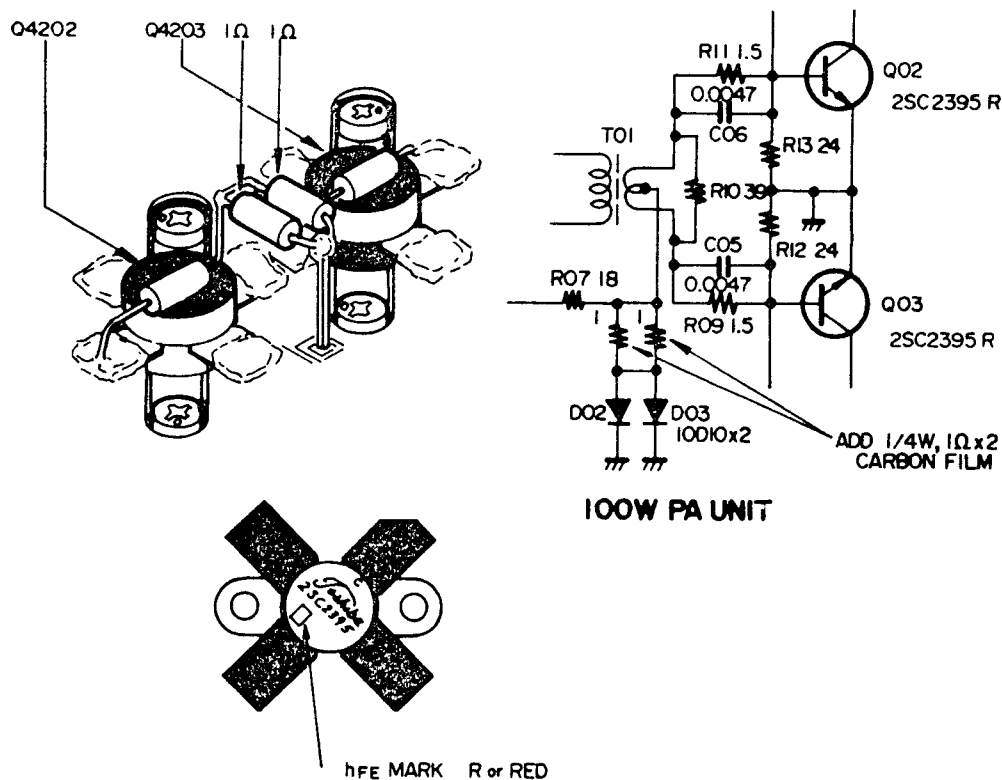


Figure 3-6

**TX IMD DISTORTION IMPROVEMENT**

In some FT-707 transceivers with serial numbers below XX10999, a slight audible distortion occurs on modulation. The problem is caused by a pair of driver transistors, Q<sub>4202</sub> and Q<sub>4203</sub> in the 100W PA unit, in which low Hfe transistors are used. If these transistors are marked with an "R" on the package, as shown in the figure below, the following modification can be adopted.

Install two 1/2W 1 ohm resistors parallel to each other, and in series with D<sub>4202</sub> and D<sub>4203</sub> in the 100W PA Unit.



**hFE CLASSIFICATION**

hFE		MARK	COLOR
MIN	MAX		
20	65	R	RED
55	95	O	RED & BLACK
85	150	Y	BLACK

Figure 3-7



### RECEIVER INPUT CIRCUIT MODIFICATION

This modification will improve the intermodulation distortion performance of the receivers in transceivers with serial numbers below XX079999 and will ensure attenuation of the high-pass filter below 2 MHz.

#### Modification Procedure

Replace  $R_{1013}$ ,  $R_{1014}$ ,  $R_{1016}$  and  $R_{1018} - R_{1022}$  with 220 ohms. (See Figure 3-10)

Replace  $R_{1002}$  and  $R_{1008}$  with 270 ohms. (See Figure 3-10)

Replace  $C_{4807}$  and  $C_{4809}$  with 1500pF. (See Figure 3-11)

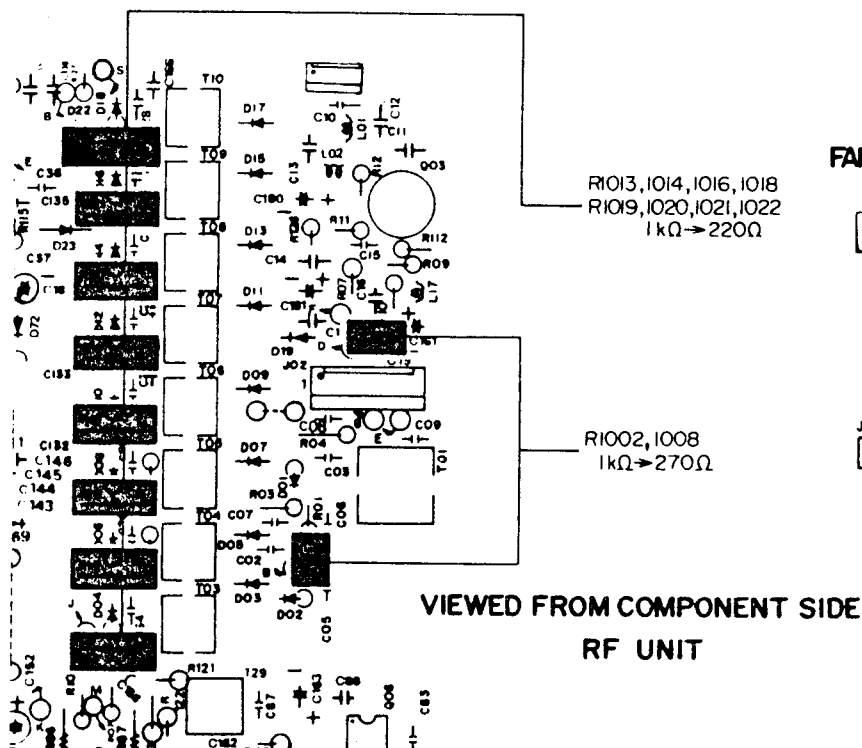


Figure 3-10

#### FAN MOTOR CONTROL UNIT

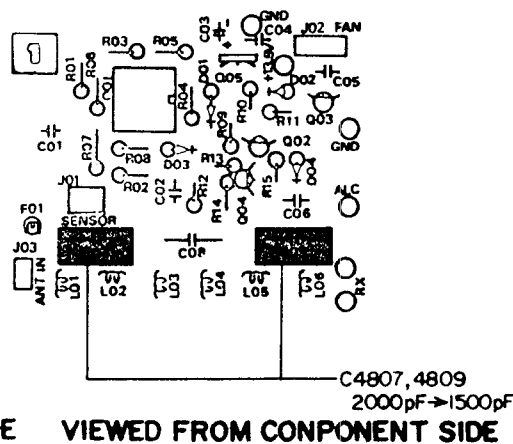


Figure 3-11



# WARC TX MODIFICATION

To enable the FT-707 to transmit on the newly allocated amateur bands, the following modifications are required.

Refer to Figures below. Locate the RF UNIT, and remove diodes D<sub>21</sub>, D<sub>71</sub> and D<sub>72</sub>.

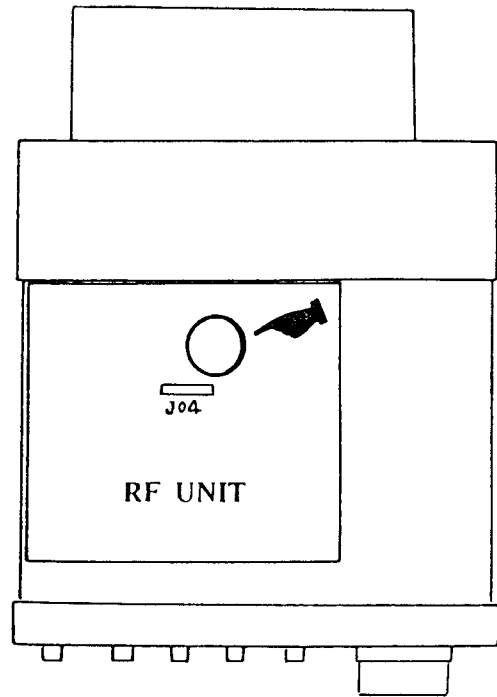


Figure 3-12

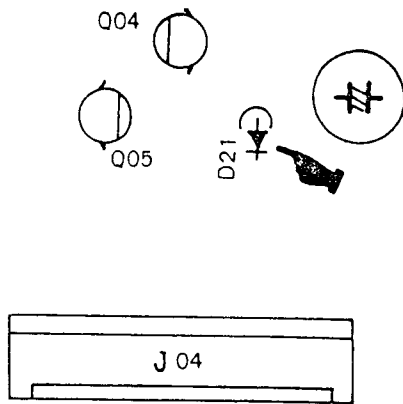
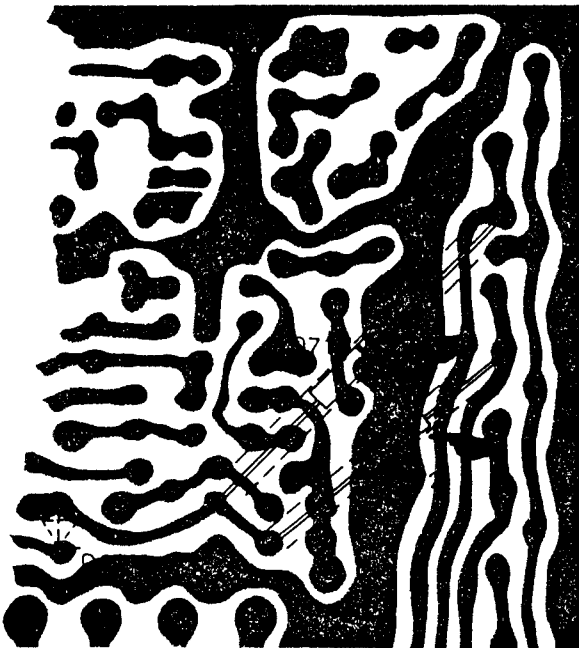
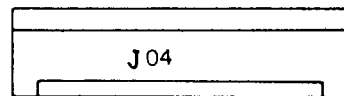
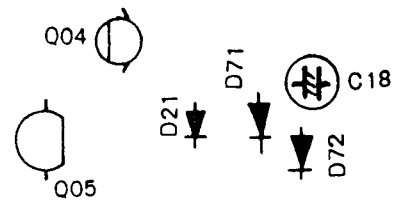


Figure 3-13A



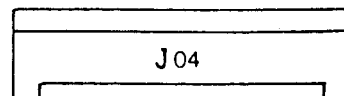
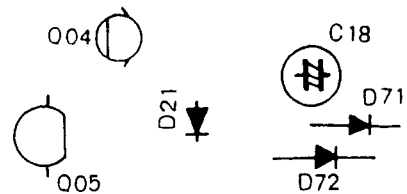
Serial Number  
029999 & Down

Figure 3-13B



Serial Number  
030001-039999

Figure 3-14



Serial Number  
040001 & Up

Figure 3-15

COUNTER UNIT

The carrier points for USB, LSB and CW are preset as follows:

USB = 91.011.0

LSB = 91.014.0

CW or AM = 91.011.7

If for some reason, you wish to change the carrier points for LSB and USB, the counter preset frequency can be changed to within  $\pm 200$  Hz of the desired frequency. Please refer to the Frequency Counter Preset Diode Connection Chart for details. This adjustment is carried out by connecting jumper wires on the counter unit.

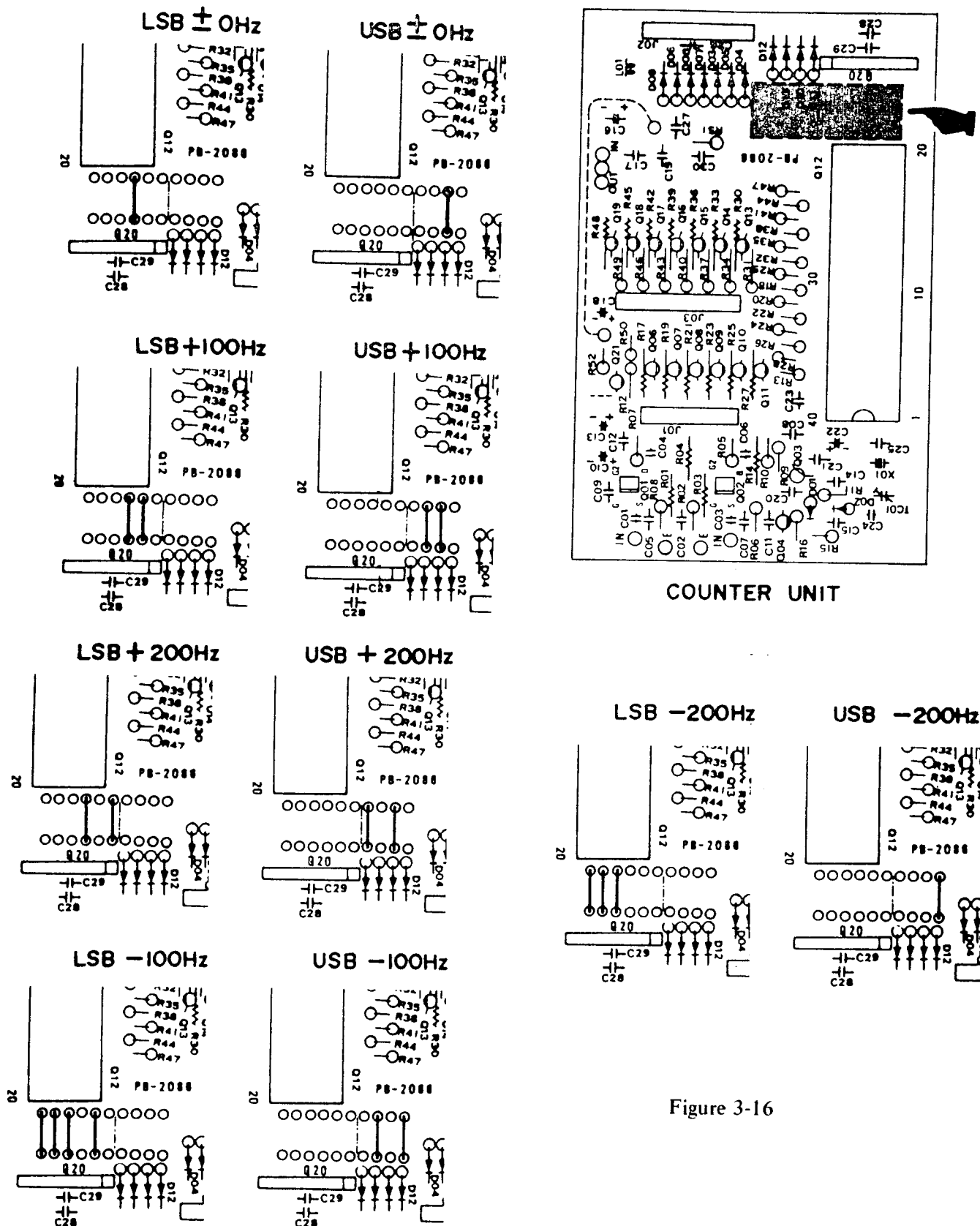


Figure 3-16

MEMO

## MAINTENANCE AND ALIGNMENT

This transceiver has been carefully aligned and tested at the factory. With normal use, it should not require other than the usual attention given to electronic equipment.

Service or replacement of a major component may require substantial adjustment. Under no circumstances, though, should realignment be attempted unless the operation of the transceiver is fully understood, the malfunction has been carefully analyzed, and the fault has definitely been traced to misalignment. Sudden difficulties are almost always caused by component failure, rather than misalignment.

Service must be performed only by experienced personnel, using the proper test equipment.

### EQUIPMENT REQUIRED

- (1) RF Signal Generator: Hewlett-Packard Model 606A or equivalent, with one volt output at 50 ohms, and frequency coverage to 30 MHz.
- (2) Vacuum Tube Voltmeter (VTVM): Hewlett-Packard Model 410B or equivalent, with an RF probe good to 40 MHz.
- (3) Dummy Load: Yaesu Model YP-150Z or equivalent, with 50 ohm non-reactive load impedance, rated to 150 watts average power.
- (4) AF Signal Generator: Hewlett-Packard Model 200 AB or equivalent.
- (5) A general coverage receiver covering 3 to 30 MHz, with a 100 kHz crystal calibrator.
- (6) Frequency Counter: Yaesu Model YC-500 or equivalent, with resolution to 0.01 kHz and frequency coverage to 30 MHz.
- (7) Oscilloscope: Hewlett-Packard Model 1740A or equivalent.

**NOTE REGARDING MEASUREMENT LEVELS**

Where decibel levels are quoted in the following section (e.g. "Apply a 90 dB signal..."), the reference used is 0 dB = 1  $\mu$ V. At 50 ohms, this level is equivalent to -107 dBm.

- d) Now recheck the previous test using your voice to activate the VOX. Do not advance the VOX control nor VR<sub>3003</sub> farther than necessary for proper performance, as confusing results will be obtained if these controls are advanced too far.

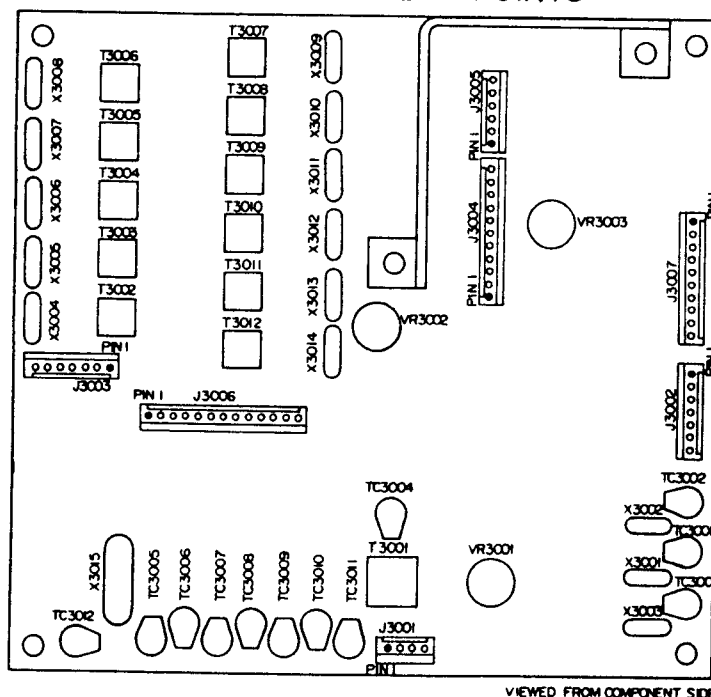
**VOX ADJUSTMENT  
(VOX GAIN/ANTITRIP SETTING)**

- a) Set up the transceiver for reception on any band. Set the AF GAIN control for a comfortable listening level. The MODE switch should be set to LSB or USB.
- b) Without closing the PTT switch, hold the microphone near your mouth, and speak in a normal voice into the microphone. Advance the VOX control until your voice activates the transmitter.
- c) Without closing the PTT switch, hold the microphone near the speaker output. If the speaker audio causes the VOX to trip, adjust VR<sub>3003</sub> (AF Unit) so that the speaker output does not activate the transmitter.

**S-METER ALIGNMENT**

- a) Set the BAND switch to 20, the main tuning dial to 14.250 MHz, and the RF GAIN control fully clockwise.
- b) Connect a signal generator to the antenna jack, and tune its output to the receiver frequency.
- c) With no signal applied from the signal generator, adjust VR<sub>2003</sub> (IF Unit) so that none of the LEDs on the level meter are illuminated. Do not go beyond the threshold point required for complete darkening of the entire line of LEDs.
- d) Now apply a 90 dB signal from the signal generator, and adjust VR<sub>2004</sub> (IF Unit) so that all 10 LEDs are illuminated.

**AF UNIT ALIGNMENT POINTS**



**AF UNIT**

**CW SIDETONE LEVEL ADJUSTMENT**

- a) Adjust VR<sub>3002</sub>, located on the AF Unit, for the desired CW sidetone level.

- b) Set the audio oscillator frequency to 1500 Hz, and its output level to 5 mV. Close the MOX switch, and advance the MIC control to achieve an output power of 60 watts as indicated on the dummy load/wattmeter.

**MARKER ALIGNMENT**

- a) Set the BAND switch to 30, and the MODE switch to AM. Adjust the AF GAIN control for a comfortable listening volume on the standard frequency station.
- b) Push the MARK switch, and listen for evidence of a beat between the marker signal and the standard frequency station. If there is any beat note, adjust TC<sub>3012</sub> (AF Unit) for a zero beat between the calibrator and the standard frequency station.

- c) Without changing any level settings, set the audio oscillator output frequency to 300 Hz, and adjust TC<sub>3001</sub> (AF Unit) for a power output of 15 watts, as indicated on the dummy load/wattmeter.

- d) Set the MODE switch to USB, and repeat the above procedure on USB.

- e) Switch back and forth between USB and LSB. If there is any difference in the pitch of the background receiver noise, adjust the WIDTH control presetting as described below.

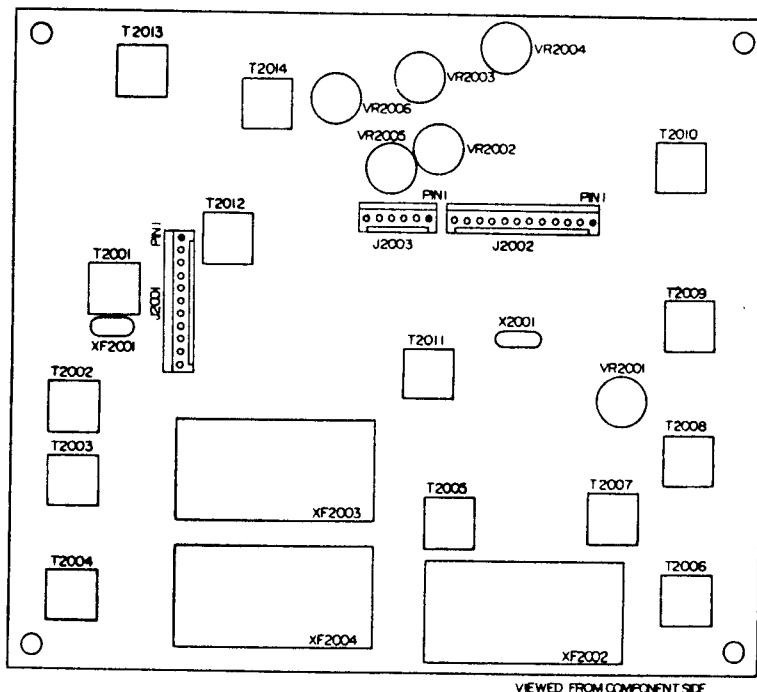
**CARRIER POINT ALIGNMENT**

- a) Set the BAND switch to 20, the main dial to 14.250 MHz, and the MODE switch to LSB. Connect an audio oscillator to the microphone input, pin 8 of the mic jack.

**IF WIDTH ALIGNMENT**

- a) Set the front panel WIDTH control to the 12 o'clock position. Switch between LSB and USB, and adjust VR<sub>2002</sub> (IF Unit) so that the background noise of the receiver is identical on both modes.

**IF UNIT ALIGNMENT POINTS**



**CARRIER BALANCE ADJUSTMENT**

- a) Set the BAND switch to 20, the main dial to 14.250 MHz, and the MODE switch to LSB. Set the MIC control fully counterclockwise, and remove all oscillator or other modulation sources from the mic input.
- b) With an external receiver tuned to the FT-707 transmitting frequency, adjust VR<sub>3001</sub> and TC<sub>3004</sub> (AF Unit) for minimum signal indication on the external receiver with the MOX switch of the FT-707 closed.
- c) Now set the MODE switch to USB, and check the results. Adjust VR<sub>3001</sub> and TC<sub>3004</sub> again, if needed, to assure optimum carrier nulling. Then check the LSB results again. Several passes may be necessary.

**CW CARRIER POINT ALIGNMENT**

- a) Set the BAND switch to 20, the main dial to 14.250 MHz, and the MODE switch to CW.
- b) Lightly couple the probe of a precision frequency counter to the coax cable between the antenna jack and the dummy load. Close the PTT switch, and close the key. Adjust TC<sub>3003</sub> (AF Unit) so that the frequency on the counter is exactly the same as that on the digital display.

**VFO UNIT**

The VFO is very critical in its adjustment. As well, this is not an area which should require servicing. For this reason, we recommend that all cases of VFO repair be referred to a Yaesu service center. Cases of VFO instability or drift can almost always be traced to a fault elsewhere in the system, such as instability in a supply voltage, etc.

From a service standpoint, however, two components are of interest:

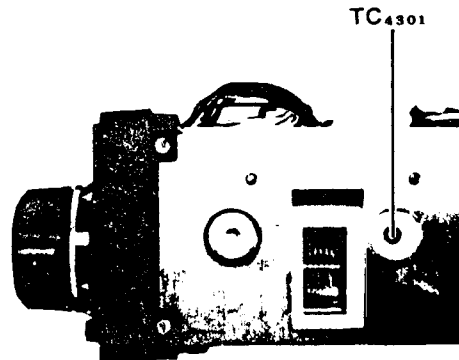
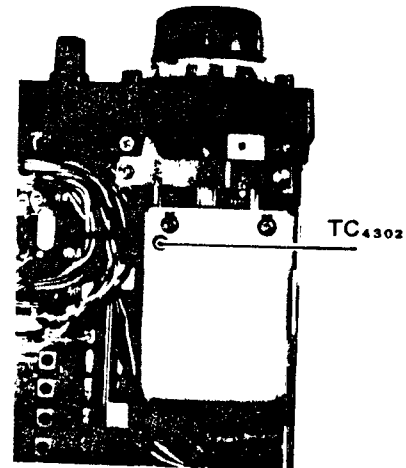
- TC<sub>4301</sub> is the band set trimmer.
- TC<sub>4302</sub> is the VFO output level adjustment trimmer.

To confirm proper VFO injection, connect the RF probe of the VTVM to TP<sub>1003</sub> (RF Unit). Adjust TC<sub>4302</sub> for a reading of 50 mV on the VTVM.

**LOCAL OSCILLATOR CIRCUITS**

**(1) Premix Bandpass Filter Adjustment**

- a) Connect a jumper between TP<sub>1002</sub> and TP<sub>1003</sub> (RF Unit). Connect a sweep generator at that point. Connect the oscilloscope (through a detector) to TP<sub>1001</sub> (RF Unit).
- b) Refer to Table 3-3, and apply sweep on each band shown at the proper frequency. Adjust the cores of the transformers shown in Table 3-3 for the pattern shown in Figure 3-17.
- c) Now connect the RF probe of the VTVM to TP<sub>1001</sub>. Refer to Table 3-4, and adjust the cores shown for each band for a reading of 700 mV on each band.



VFO

BAND	TRANSFORMER	PASS BAND MHz
80m	T <sub>1032</sub> T <sub>1031</sub>	12.5-13.0
40m	T <sub>1034</sub> T <sub>1035</sub>	16.0-16.5
30m	T <sub>1030</sub> T <sub>1031</sub>	19.0-19.5
20m	T <sub>1036</sub> T <sub>1037</sub>	23.0-23.5
17m	T <sub>1042</sub> T <sub>1043</sub>	27.0-27.5
15m	T <sub>1038</sub> T <sub>1039</sub>	30.0-30.5
12m	T <sub>1044</sub> T <sub>1045</sub>	33.5-34
10m	T <sub>1040</sub> T <sub>1041</sub>	37-39

Table 3-3

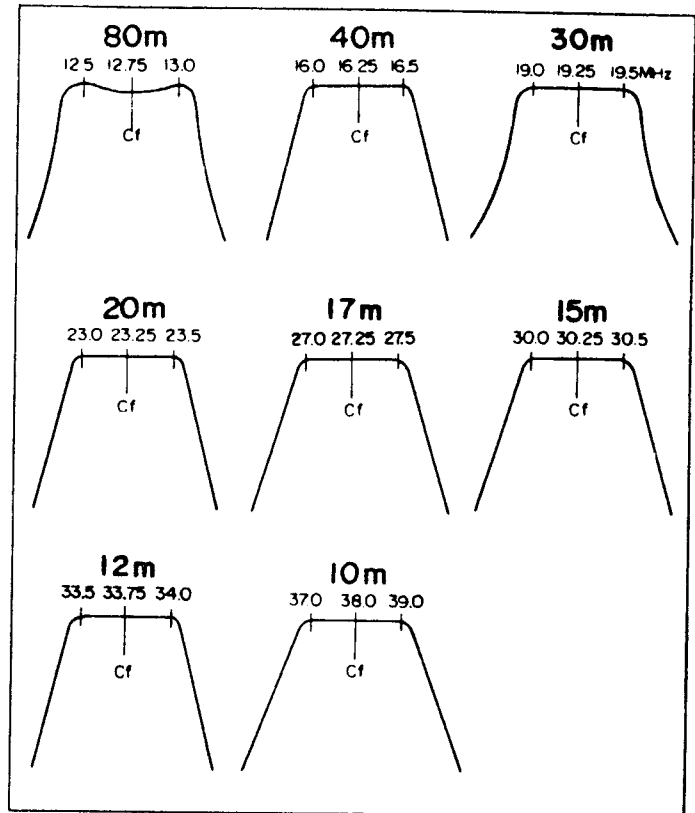
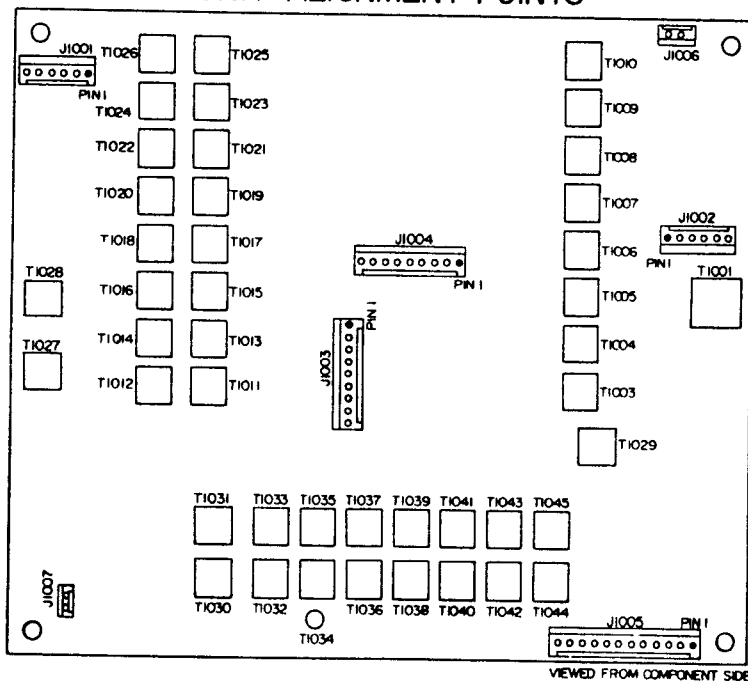


Figure 3-17 PREMIX BANDPASS FILTER

RF UNIT ALIGNMENT POINTS



VIEWED FROM COMPONENT SIDE

RF UNIT



BAND	CRYSTAL	FREQUENCY MHz	OSC OUTPUT TRANSFORMER
80m	X <sub>3005</sub>	17.9845	T <sub>3003</sub>
40m	X <sub>3006</sub>	21.4845	T <sub>3004</sub>
30m	X <sub>3004</sub>	24.4875	T <sub>3002</sub>
20m	X <sub>3007</sub>	28.4875	T <sub>3005</sub>
17m	X <sub>3013</sub>	32.4875	T <sub>3011</sub>
15m	X <sub>3008</sub>	35.4875	T <sub>3006</sub>
12m	X <sub>3014</sub>	38.4875	T <sub>3012</sub>
10mA	X <sub>3009</sub>	42.4875	T <sub>3007</sub>
10mB	X <sub>30010</sub>	42.9875	T <sub>3008</sub>
10mC	X <sub>3011</sub>	43.4875	T <sub>3009</sub>
10mD	X <sub>3012</sub>	43.9875	T <sub>3010</sub>

Table 3-4

BAND	TRANSFORMER	PASS BAND MHz
80m	T <sub>1013</sub> - T <sub>1014</sub>	3.5-4.0
40m	T <sub>1015</sub> - T <sub>1016</sub>	7.0-7.0
30m	T <sub>1011</sub> - T <sub>1012</sub>	10.0-10.5
20m	T <sub>1017</sub> - T <sub>1018</sub>	14.0-14.5
17m	T <sub>1023</sub> - T <sub>1024</sub>	18.0-18.5
15m	T <sub>1019</sub> - T <sub>1020</sub>	21.0-21.5
12m	T <sub>1025</sub> - T <sub>1026</sub>	24.5-25.0
10m	T <sub>1021</sub> - T <sub>1022</sub>	28.0-29.7

Table 3-5

ANTENNA COIL/RF BANDPASS FILTER ALIGNMENT

(1) Antenna Coil Adjustment

- a) For each band to be aligned, set the main tuning dial to the center of the band. For example, on 14 MHz, use 14.250 MHz, and on 10 meters use 29.0 MHz.
- b) Activate the marker generator, and adjust the coils shown below for maximum deflection on the S-meter when tuned to the marker signal.

80	T <sub>1004</sub>
40	T <sub>1005</sub>
30	T <sub>1003</sub>
20	T <sub>1006</sub>
17	T <sub>1009</sub>
15	T <sub>1007</sub>
12	T <sub>1010</sub>
10	T <sub>1008</sub>

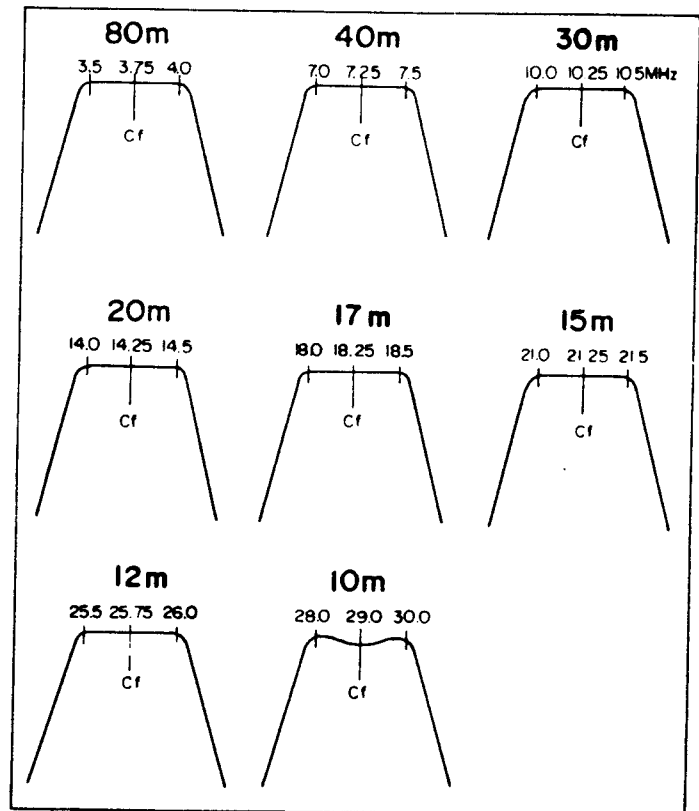
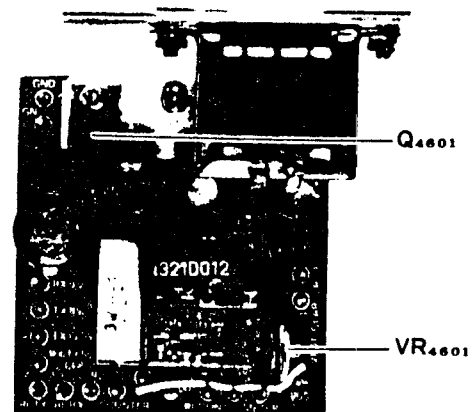


Figure 3-18 RF BANDPASS FILTER

(2) RF Bandpass Filter Adjustment

- a) Connect an RF sweep generator to the antenna jack, and connect your oscilloscope to the lead of R<sub>1050</sub> (RF Unit) as shown in the drawing.
- b) Adjust the transformers shown in Table 3-5 for the pattern shown in Figure 3-18.



AVR UNIT

ANTENNA TRAP COIL ALIGNMENT

- a) Set the BAND switch to 40, and set the main tuning dial to 7.5 MHz. Connect an audio voltmeter to the speaker jack.
- b) Connect a signal generator to the antenna jack, and apply a 100 dB signal at 8.9875 MHz. Adjust T<sub>1001</sub> (RF Unit) for minimum indication on the audio voltmeter.

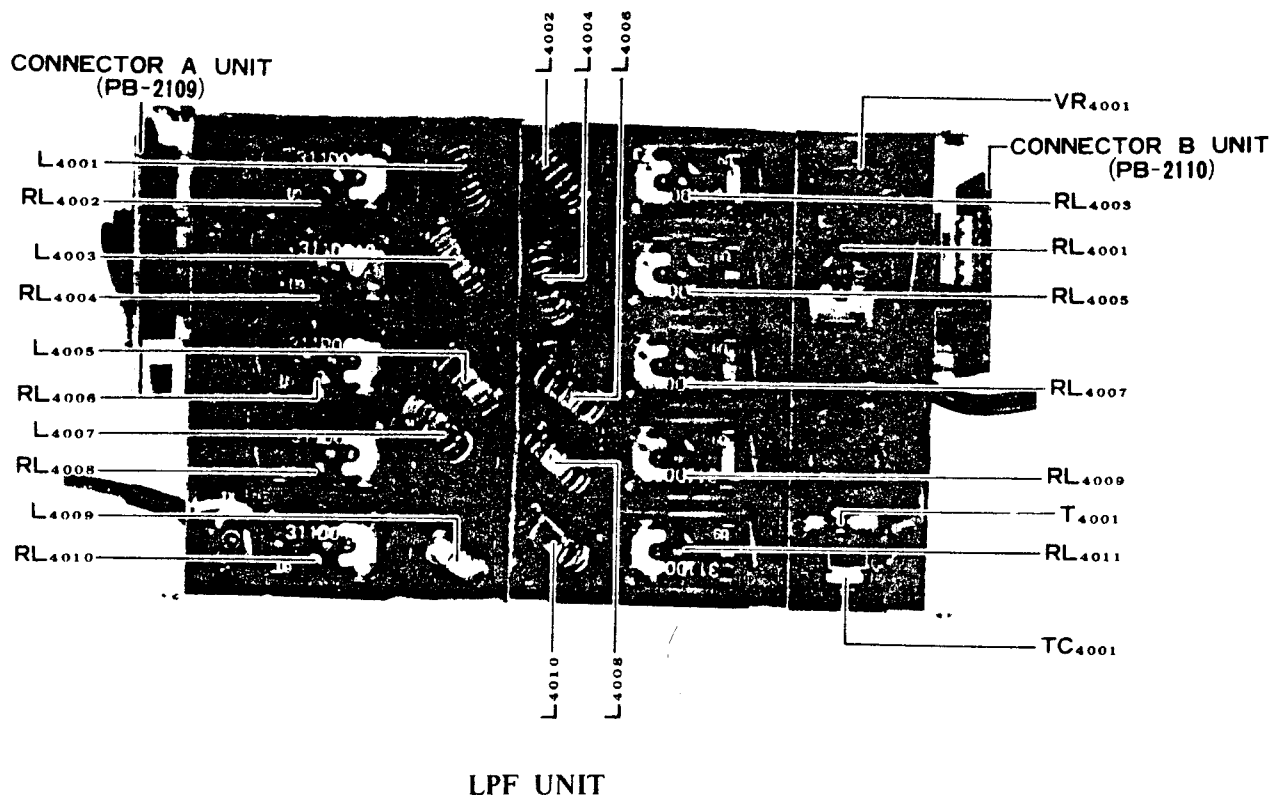
- b) Set the CLAR control to the 12 o'clock position. Push the CLAR switch, and listen for any difference in the beat tone of the incoming signal. If the tone is not exactly the same as with the clarifier OFF, adjust VR<sub>4601</sub> (AVR Unit) for the required coincidence of tones in the ON and OFF conditions.

PO METER SETTING

- a) Set the BAND switch to 20, and the MODE switch to CW. Close the MOX switch and the CW key, and set the transmitter power output to 110 watts, as indicated on the wattmeter.
- b) Adjust VR<sub>4</sub> (main chassis) so that exactly two of the yellow LEDs are illuminated.

CLARIFIER ALIGNMENT

- a) On any band, apply a signal from the signal generator, and tune the receiver to the output from the signal generator. If desired, you may use the marker signal instead of a signal generator. With the clarifier OFF, note the beat tone of the incoming signal, with the MODE switch set to CW

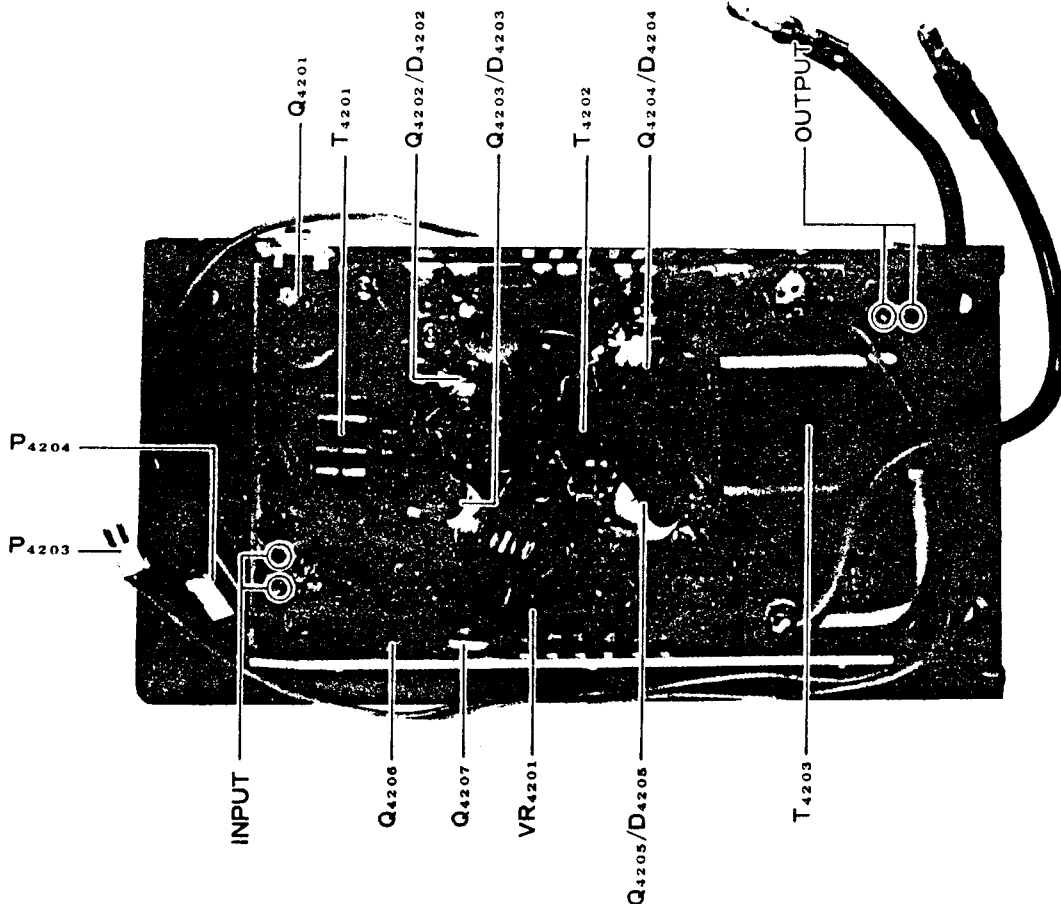


DIRECTIONAL COUPLER BALANCE

- a) Set the BAND switch to 15, and the MODE switch to CW. Connect the MINUS (-) lead of your DC voltmeter to the center post of VR<sub>4001</sub> (connect the positive lead of the voltmeter to ground).
- b) Transmit on CW, and adjust TC<sub>4001</sub> for a minimum indication on the voltmeter.

ALC CIRCUIT ALIGNMENT

- a) Set the MODE switch to CW. On each band, check the maximum power output. Set VR<sub>2005</sub> for a maximum power output of 110 watts. Use a 50 ohm dummy load for this step.
- b) Connect a 17 ohm load to the antenna jack (three 50 ohm dummy loads connected in parallel). Transmit on 20 meter CW, and adjust VR<sub>4001</sub> for a maximum power output of 50 watts as indicated on the wattmeter.



100W PA UNIT

## FAULT IDENTIFICATION AND LOCALIZATION

The process of troubleshooting any electronic equipment is highly individualistic. Fundamentally, though, the process is one of logical elimination.

Begin with a visual inspection of the transceiver, looking for broken, discolored, or charred components. Smell the unit, as transformers smell differently than resistors, etc. If you do find a component that is cooked, remember that another fault may have caused the destruction of the part you have located.

Initially, turn on the receiver, and check out **only** the RX side. Any malfunctions you detect on the receiver side should be repaired before you check out the transmitter. In doing this, you may well cure the entire problem, as much circuitry is shared on TX and RX.

The logical process of fault identification is to determine the missing function (no RX on LSB), then the board at fault (AF UNIT), then the bad circuit (LSB oscillator), then the malfunctioning part (X<sub>3002</sub>).

If, after the receiver inspection is completed, all appears OK, switch to the transmit side, following the same logical procedure (function -- board circuit -- component). Concentrate on those sections unique to the transmit side, as you have already performed a thorough checkout of all receiver and shared circuits. Use only a dummy load. NEVER troubleshoot using an antenna.

In this manual, we will provide troubleshooting advice which leads you directly to suspect components. As there are some 2,200 parts in the FT-707, though, it obviously is impossible for us to trace the path of every possible malfunction in the radio. Therefore, if our tips do not lead to identification of the trouble, the logical elimination process is the way to go.

## TROUBLESHOOTING

### A FUNDAMENTAL ANALYSIS OF THE TROUBLE

The failure may be caused by one of the following:

- 1) Mechanical defect
- 2) Electrical defect
- 3) Others (Murphy's Law, etc.)

#### 1. MECHANICAL DEFECTS

Typical examples of mechanical defects encountered by the technician are:

- a) Damage from shock during transportation (remember the unit was probably subjected both to sea and truck shipment).
- b) Damage caused by vibration in service.
- c) Damage caused by forcing stubborn knobs or switches. This difficulty is usually preceded by one of the two above defects.

#### 2. ELECTRICAL DEFECTS

Typical electrical defects encountered are:

- a) Part(s) failure caused by aging;
- b) Failures caused by improper application of supply voltage or by voltage spikes;
- c) Improper operation (e.g. transistors without load – this usually points to a failure elsewhere, in addition to the damaged transistor or IC).
- d) Loose connections, at the power receptacle, caused by cold solder joints, etc.

#### 3. OTHERS

Among the miscellaneous types of failures or difficulties encountered are:

- a) Antenna troubles – be on the alert for antenna problems when the owner of the just-aligned transceiver complains of difficulty “when I switch to the antenna.”
- b) Poor power source – extremely high or low voltage, insufficient capacity, poor regulation, etc.
- c) Murphy's Law – use of a non-Yaesu microphone with different connections, for example. (See page 1-7.)

RECEIVE MODE

Problem	Condition	Probable Cause(s)
(1) No DC power applied	(a) Fuse OK  (b) Fuse blows	★ Defective power switch ★ Defective D <sub>01</sub> , D <sub>02</sub> ★ Defective RL <sub>01</sub> ★ Loose contact at power jack  ★ Defective power connector J <sub>08</sub> ★ Short at CH <sub>01</sub> ★ +13.5 V line shorted
(2) No reception	(a) S-meter OK, no audio output from speaker  (b) No audio output on some mode LSB USB/CW AM LSB/USB/CW  (c) No audio output, S-meter off scale  (d) AF circuit appears OK, no S-meter deflection	★ Defective speaker ★ Defective EXT SP jack ★ Defective audio circuit around Q <sub>3022</sub> ★ Defective LPF circuit around Q <sub>3020</sub> , Q <sub>3021</sub>  ★ Defective D <sub>3004</sub> , X <sub>3001</sub> ★ Defective D <sub>3005</sub> , X <sub>3002</sub> ★ Defective Q <sub>2018</sub> , D <sub>2023</sub> and associated circuit ★ Defective RL <sub>3001</sub>  ★ Defective RF GAIN control ★ Defective Q <sub>2007</sub> ★ AGC line shorted  ★ Defective T <sub>3001</sub> ★ Defective T <sub>2008</sub> - T <sub>2010</sub> ★ Defective Q <sub>2004</sub> , Q <sub>2005</sub> ★ Defective T <sub>2001</sub> - T <sub>2004</sub> ★ Defective Q <sub>2001</sub> - Q <sub>2003</sub> , Q <sub>2009</sub> ★ Defective D <sub>2001</sub> - D <sub>2003</sub> ★ Defective Q <sub>2014</sub> ★ Defective D <sub>2009</sub> - D <sub>2016</sub> , D <sub>2030</sub> , D <sub>2031</sub> ★ Defective XF <sub>2001</sub> - XF <sub>2004</sub> ★ Detuned or defective T <sub>2001</sub> - T <sub>2010</sub> ★ Defective Q <sub>1008</sub> , Q <sub>1009</sub> ★ No local signal
(3) Partial reception	(a) Poor reception on one or more bands (some bands OK)	★ Low local signal level ★ Check tuning of the bandpass filter T <sub>1003</sub> - T <sub>1026</sub> (*T <sub>1001</sub> - T <sub>1018</sub> ) ★ Bandswitched control line open or shorted

SERVICING

(4) Self-oscillation	(a) OK on transmit	★ TX 13.5 V line shorted to RX 13.5 V line ★ Check TX line at each board, TX/RX switching diodes, and switches
(5) Marker inoperative	(a) RX OK, no marker signal heard	★ Defective MARKER switch ★ Check voltage at pin 14 of Q <sub>3037</sub> ★ Defective X <sub>3015</sub> ★ Defective Q <sub>3036</sub> - Q <sub>3038</sub>

## TRANSMITTER

Problem	Condition	Probable Cause(s)
(1) No power output	(a) No power output	<ul style="list-style-type: none"> <li>★ Loose contact at J<sub>1002</sub></li> <li>★ Loose contact at J<sub>4002</sub></li> <li>★ Defective RL<sub>4001</sub> - RL<sub>4011</sub></li> <li>★ Cold solder joint at band switch</li> <li>★ Defective Q<sub>1002</sub>, Q<sub>1003</sub></li> <li>★ Defective Q<sub>1004</sub>, Q<sub>1005</sub>, and associated circuit</li> <li>★ Defective RX/TX switching diodes on RF Unit PB-2093 (*PB-2201)</li> <li>★ Defective Q<sub>1008</sub></li> <li>★ Low premix local signal level</li> <li>★ Defective Q<sub>2007</sub>, Q<sub>2008</sub></li> </ul>
(2) Poor TX performance	(a) No power output on LSB/USB and no modulation on AM mode	<ul style="list-style-type: none"> <li>★ Defective microphone</li> <li>★ Loose contact at microphone connector</li> <li>★ Defective Q<sub>3006</sub>, Q<sub>3007</sub>, Q<sub>3009</sub></li> <li>★ Defective MIC GAIN control</li> <li>★ Defective RL<sub>3001</sub></li> </ul>
	(b) No power output on LSB only	<ul style="list-style-type: none"> <li>★ Defective D<sub>3004</sub>, X<sub>3001</sub>, TC<sub>3001</sub></li> <li>★ Loose contact at pin 7 of J<sub>3002</sub></li> </ul>
	(c) No power output on USB only	<ul style="list-style-type: none"> <li>★ Defective D<sub>3005</sub>, X<sub>3002</sub>, TC<sub>3002</sub></li> <li>★ Loose contact at pin 6 of J<sub>3002</sub></li> </ul>
	(d) No power output on CW/AM	<ul style="list-style-type: none"> <li>★ Defective Q<sub>3002</sub>, Q<sub>3003</sub>, Q<sub>3039</sub>, and associated circuit</li> <li>★ Defective D<sub>3006</sub>, X<sub>3003</sub>, TC<sub>3003</sub></li> </ul>
	(e) No CW keying	<ul style="list-style-type: none"> <li>★ Defective key jack</li> <li>★ Defective Q<sub>1004</sub>, Q<sub>1005</sub></li> </ul>
(3) No changeover from RX to TX	(a) TX OK in MOX position	<ul style="list-style-type: none"> <li>★ Failure in MIC or PTT line</li> <li>★ Loose MIC jack or plug connection</li> </ul>
	(b) No TX in MOX position	<ul style="list-style-type: none"> <li>★ Defective Q<sub>3019</sub>, Q<sub>3040</sub>, D<sub>3017</sub>, D<sub>3043</sub></li> </ul>
	(c) VOX inoperative	<ul style="list-style-type: none"> <li>★ Defective Q<sub>3015</sub> - Q<sub>3017</sub>, Q<sub>3013</sub></li> <li>★ If no CW semi-break-in, check Q<sub>3010</sub> and associated circuit</li> </ul>
(4) No return to RX from TX		<ul style="list-style-type: none"> <li>★ PTT line grounded</li> <li>★ Defective Q<sub>3019</sub> and associated circuit</li> <li>★ Defective VOX circuit</li> </ul>



## SERVICING

(5) Fuse blows on transmit	(a) OK on RX	<ul style="list-style-type: none"> <li>★ Defective PA unit</li> <li>★ TX 13.5 V line grounded</li> </ul>
(6) Abnormal meter operation	(a) Meter does not deflect at all	<ul style="list-style-type: none"> <li>★ Defective D<sub>4701</sub> --D<sub>4710</sub></li> <li>★ Defective RL<sub>4602</sub></li> <li>★ Defective Q<sub>4701</sub></li> </ul>
	(b) S-meter does not function	<ul style="list-style-type: none"> <li>★ AGC line shorted</li> <li>★ Defective Q<sub>2018</sub> , Q<sub>2019</sub> , Q<sub>2020</sub> , Q<sub>2021</sub></li> </ul>
	(c) ALC meter does not function	<ul style="list-style-type: none"> <li>★ Defective Q<sub>2020</sub> --Q<sub>2025</sub></li> <li>★ Defective D<sub>4002</sub> --D<sub>4007</sub> , T<sub>4001</sub></li> </ul>

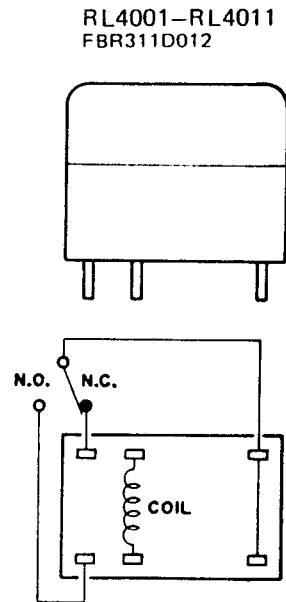
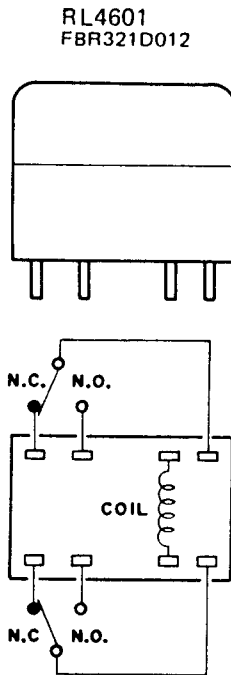
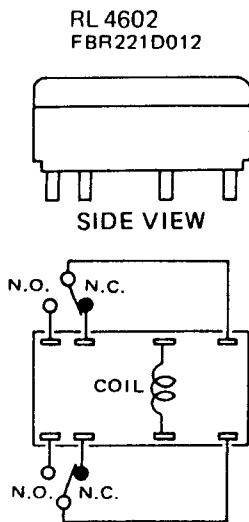
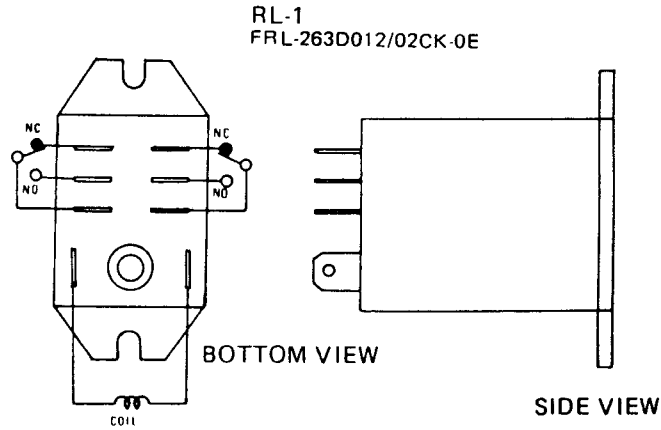
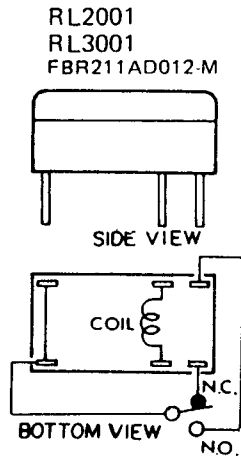
## COMMON CIRCUITS

Problem	Condition	Probable Cause(s)
(1) Local Unit	(a) Crystal oscillator does not oscillate	<ul style="list-style-type: none"> <li>★ Cold solder joint between band switch and J<sub>3006</sub></li> <li>★ Defective Q<sub>3025</sub> - Q<sub>3035</sub></li> <li>★ Defective X<sub>3004</sub> - X<sub>3014</sub></li> <li>★ Defective T<sub>3002</sub> - T<sub>2012</sub></li> <li>★ Defective D<sub>3029</sub> - D<sub>3039</sub></li> </ul>
	(b) No premix local output	<ul style="list-style-type: none"> <li>★ Defective Q<sub>1006</sub></li> <li>★ Detuned or defective premix BPF T<sub>1030</sub> - T<sub>1045</sub> (*T<sub>1037</sub> - T<sub>1052</sub>)</li> <li>★ Defective D<sub>1046</sub> - D<sub>1061</sub> (*D<sub>1059</sub> - D<sub>1074</sub>)</li> <li>★ Defective Q<sub>1010</sub> - Q<sub>1012</sub></li> <li>★ No VFO output</li> </ul>
(2) Counter Unit	(a) Digital display does not work	<ul style="list-style-type: none"> <li>★ Defective voltage regulator Q<sub>01</sub></li> <li>★ Defective display LED</li> <li>★ Defective Q<sub>4406</sub> - Q<sub>4411</sub>, Q<sub>4413</sub> - Q<sub>4419</sub></li> <li>★ Defective Q<sub>4412</sub></li> </ul>
	(b) Display incorrect	<ul style="list-style-type: none"> <li>★ Low premix local signal input</li> <li>★ Defective Q<sub>4401</sub>, Q<sub>4403</sub>, Q<sub>4404</sub></li> <li>★ Defective Q<sub>4412</sub></li> <li>★ Defective Q<sub>1013</sub></li> </ul>
(3) Clarifier	(a) Frequency jumps with clarifier on	★ Defective CLAR control, RL <sub>4602</sub>
	(b) OFF and "0" condition do not coincide in frequency	★ Defective CLAR control, VR <sub>4601</sub> , RL <sub>4602</sub>
	(c) Frequency jumps with clarifier off, OK with clarifier on	★ Defective VR <sub>4601</sub> , RL <sub>4602</sub>

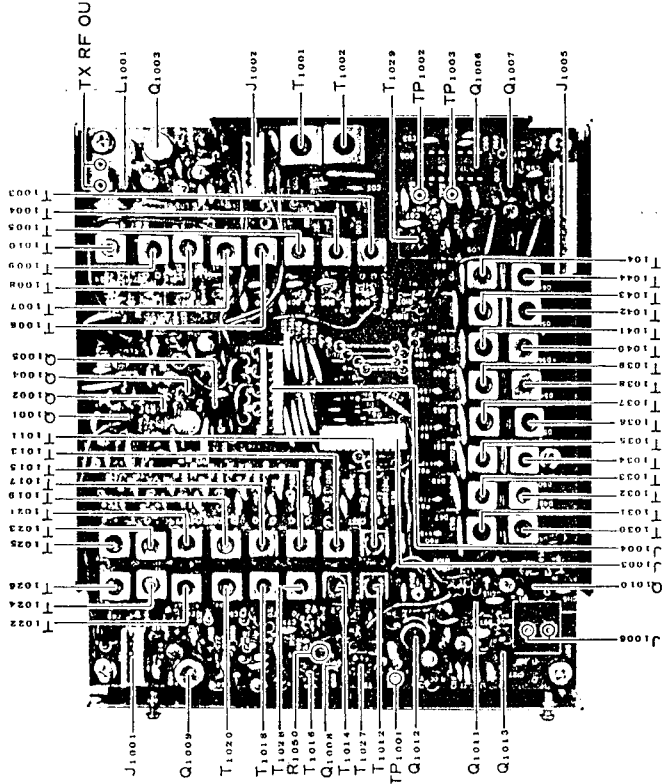
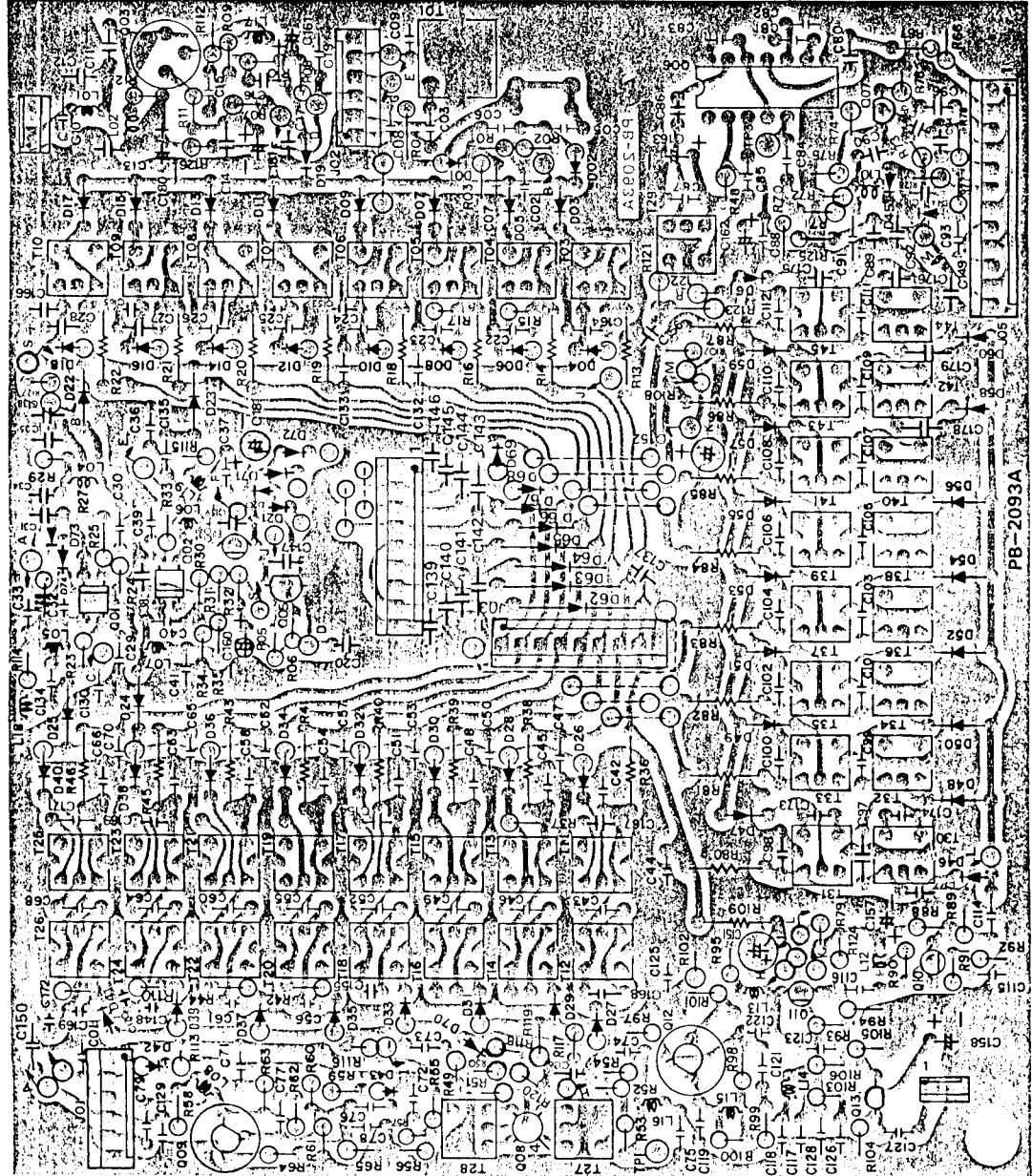
**Downloaded by  
RadioAmateur.EU**

## RELAY CONNECTION INFORMATION

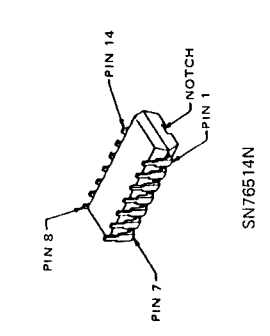
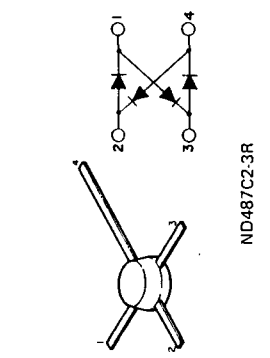
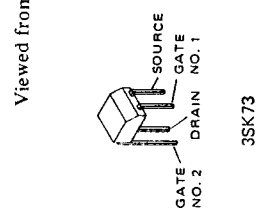
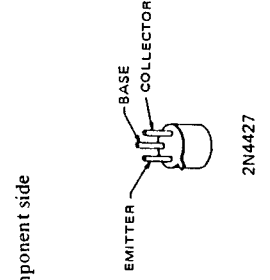
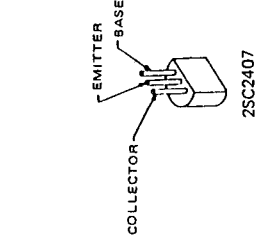
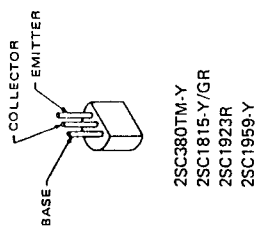
Should the need for replacement of relays become necessary, or if you are trying to verify proper relay operation, the diagrams below should help you.



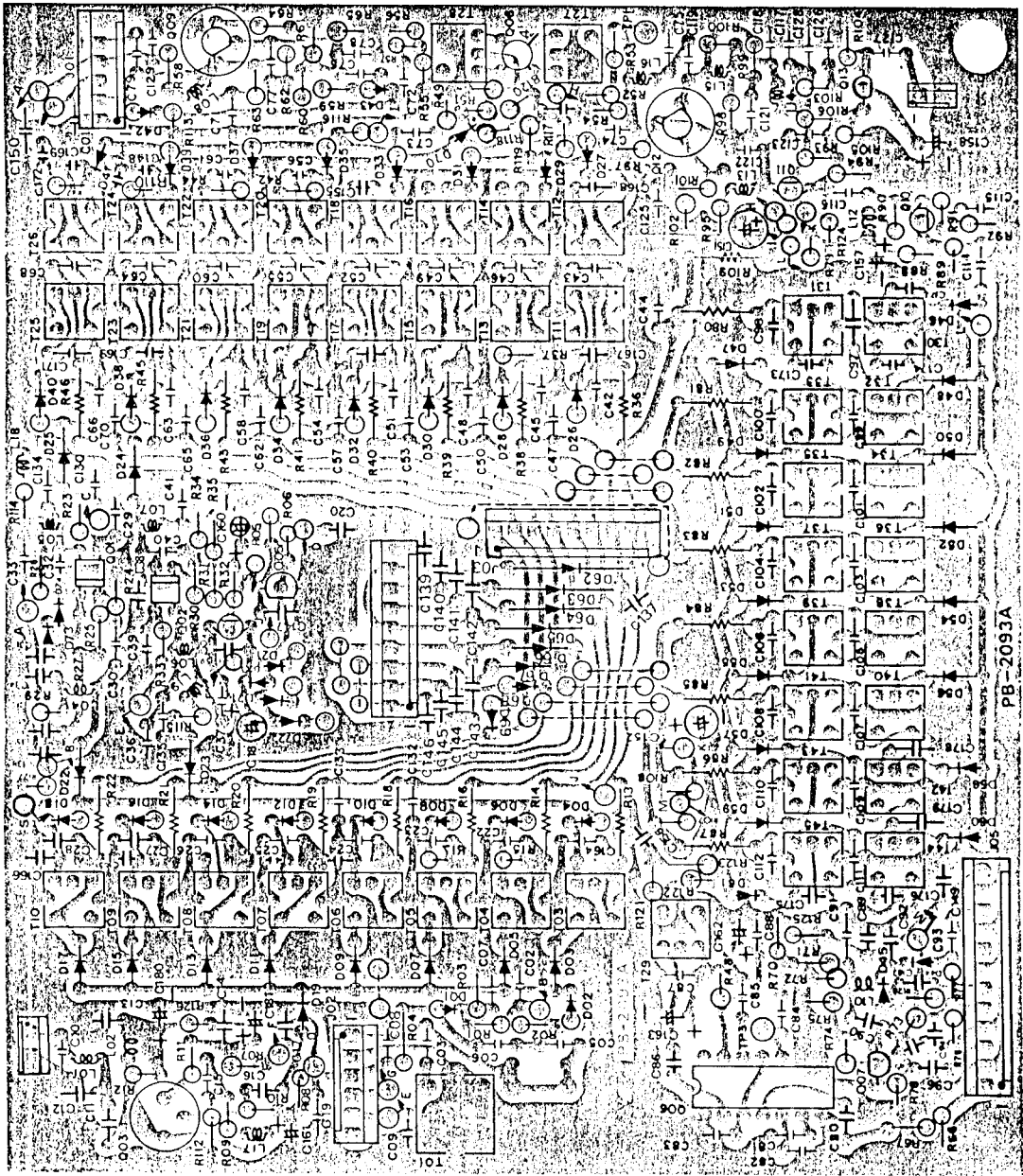
PARTS LAYOUT  
RF UNIT(PB-2093A) Early model



RF UNIT



PARTS LAYOUT  
RF UNIT(PB-2093A) Early model



Viewed from foil side

VOLTAGE CHART  
(DC VOLTS)

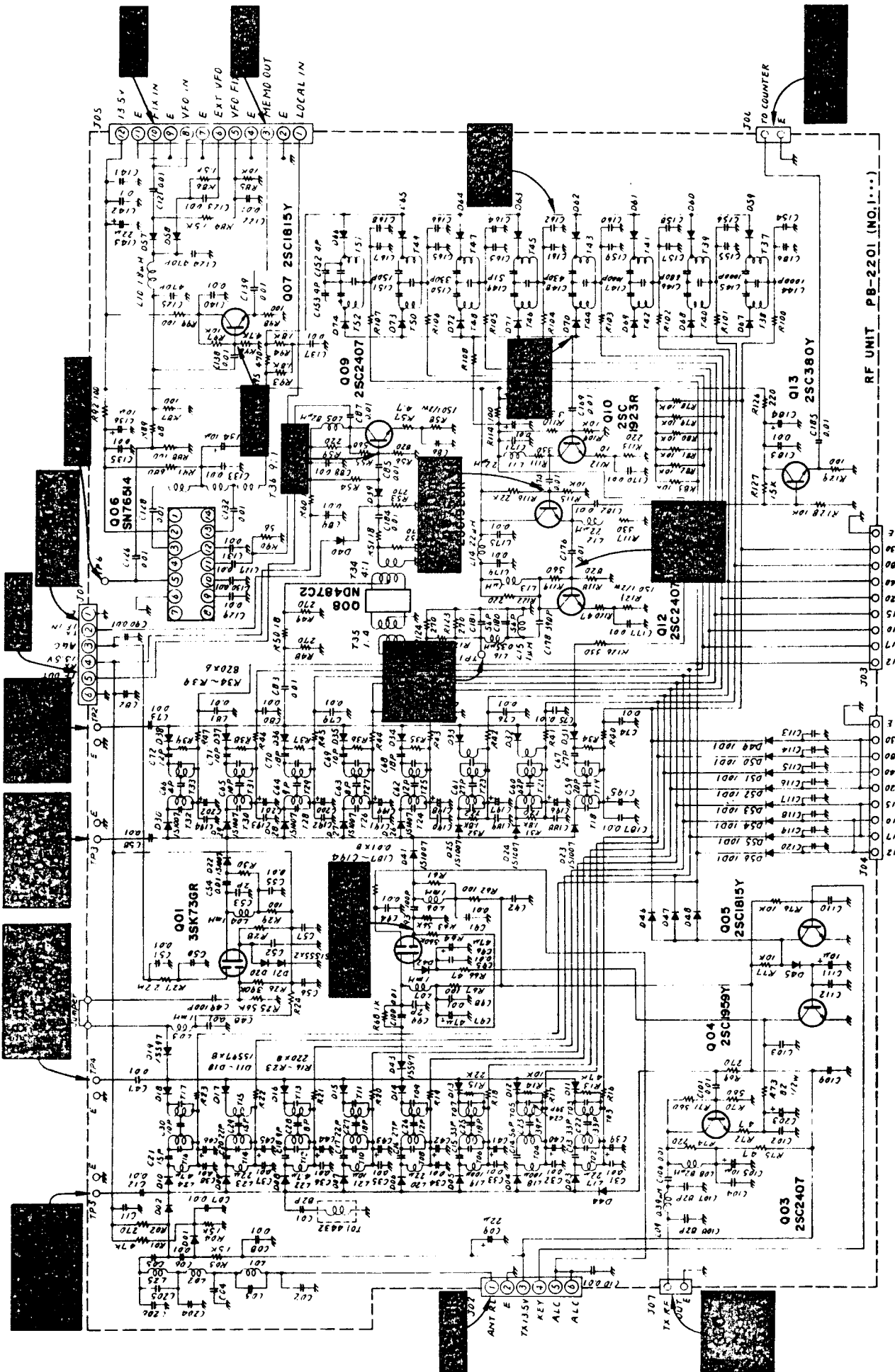
FT-707 RF UNIT (PB-2093)

	E(S)	C(D)	B(G1)	G2)	
Q1001	1.5	11.3	1.6	2.4	R
Q1002	1.3	11.8	1.1	2.2	T
Q1003	5.4	12.7	6.2		T
Q1004	0	0.2	0.7		T
Q1005	0	1.5	0		T
Q1007	2.4	10.8	3.1		R
Q1009	6.5	12.0	7.1		R
Q1010	1.5	10.1	2.2		R
Q1011	1.5	10.3	2.2		R
Q1012	2.8	13.3	3.5		R
Q1013	3.3	6.1	4.0		R

1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Q1006	0	12.3	10.5	6.1	3.9	0	0	3.9	6.1	6.1	6.1	10.4	0	R

20m  
 USB  
 MAX  
 OFF  
 NB  
 SLOW  
 BAND  
 MODE  
 RF GAIN  
 ACC



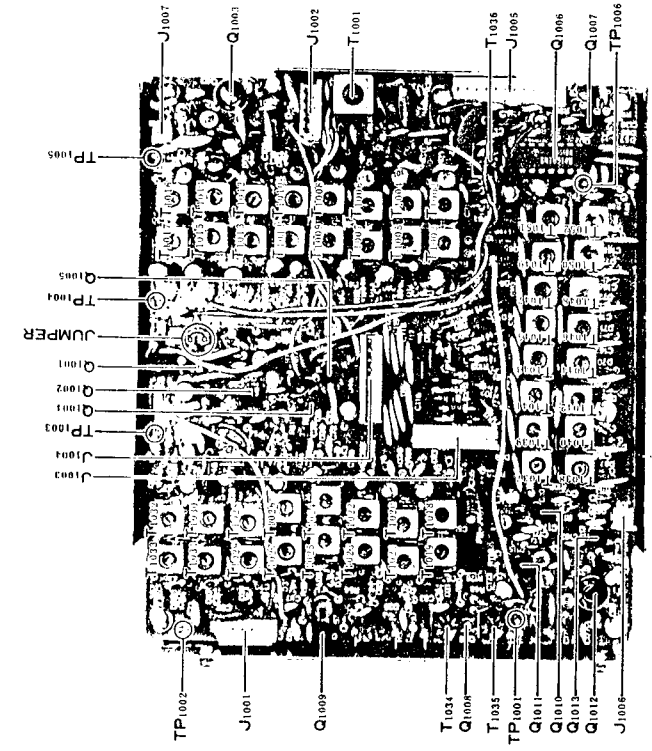
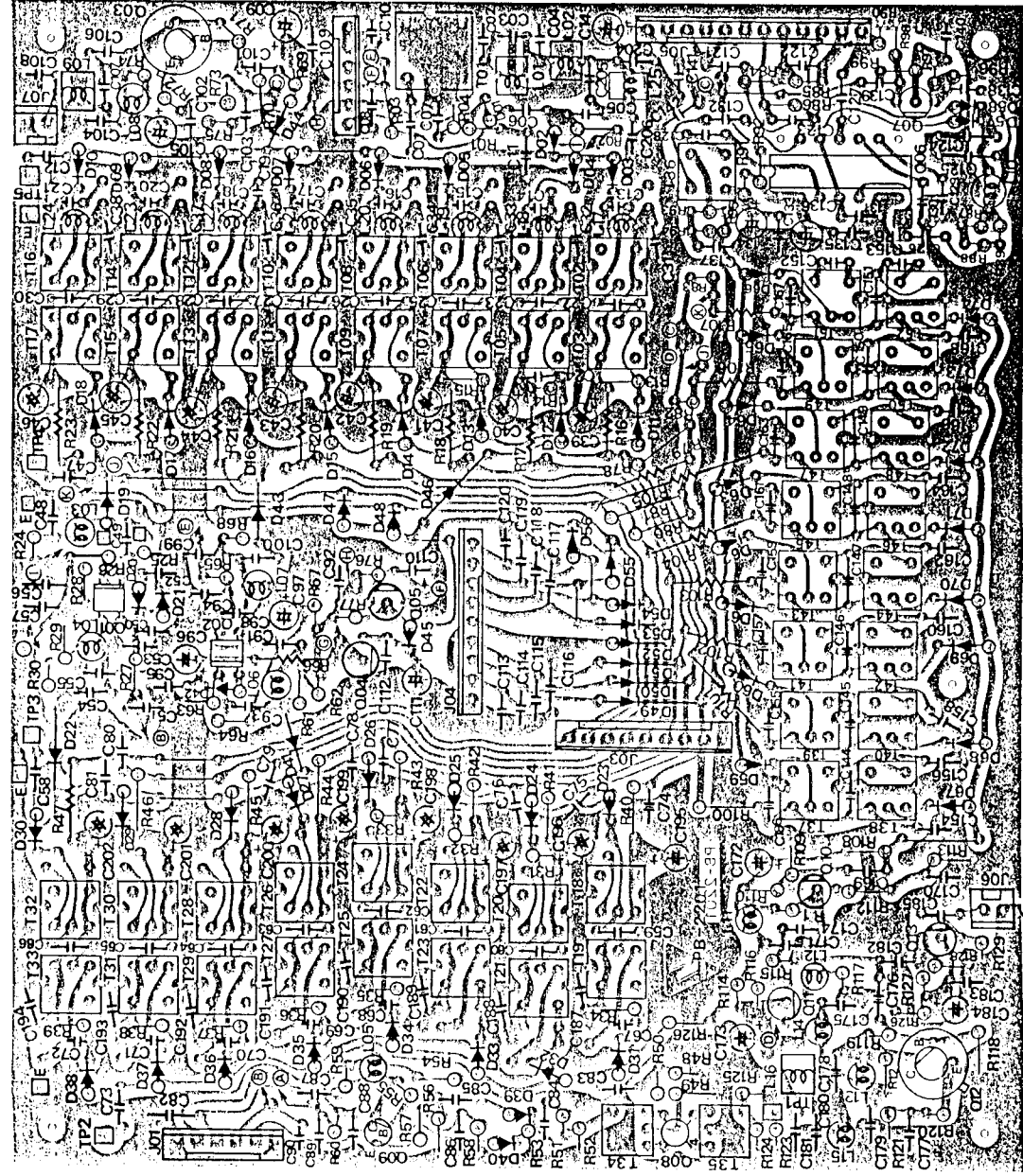


FI-707  
RF UNIT

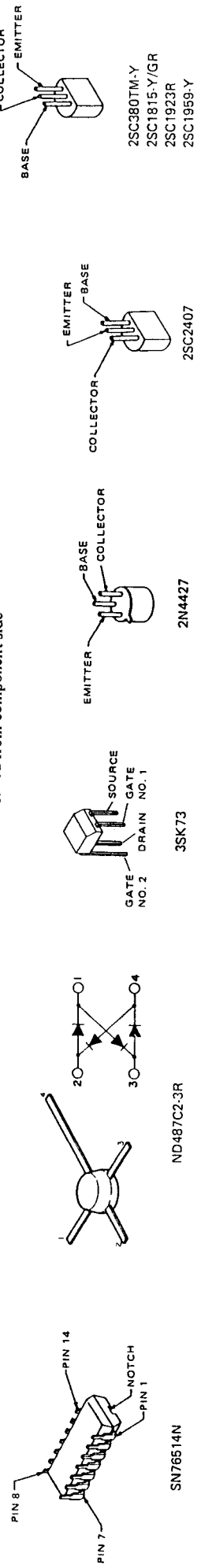
- NOTES
- 1 ALL RESISTORS ARE 1/4W UNLESS OTHERWISE NOTED
  - 2 ALL CAPACITORS ARE 0.047UF UNLESS OTHERWISE NOTED
  - 3 ALL ELECTROLYTIC CAPACITORS ARE 33MF OTHERWISE NOTED
  - 4 ALL DIODES ARE .1S353 UNLESS OTHERWISE NOTED

PARTS LAYOUT

RF UNIT(PB-2201) After prod.11.

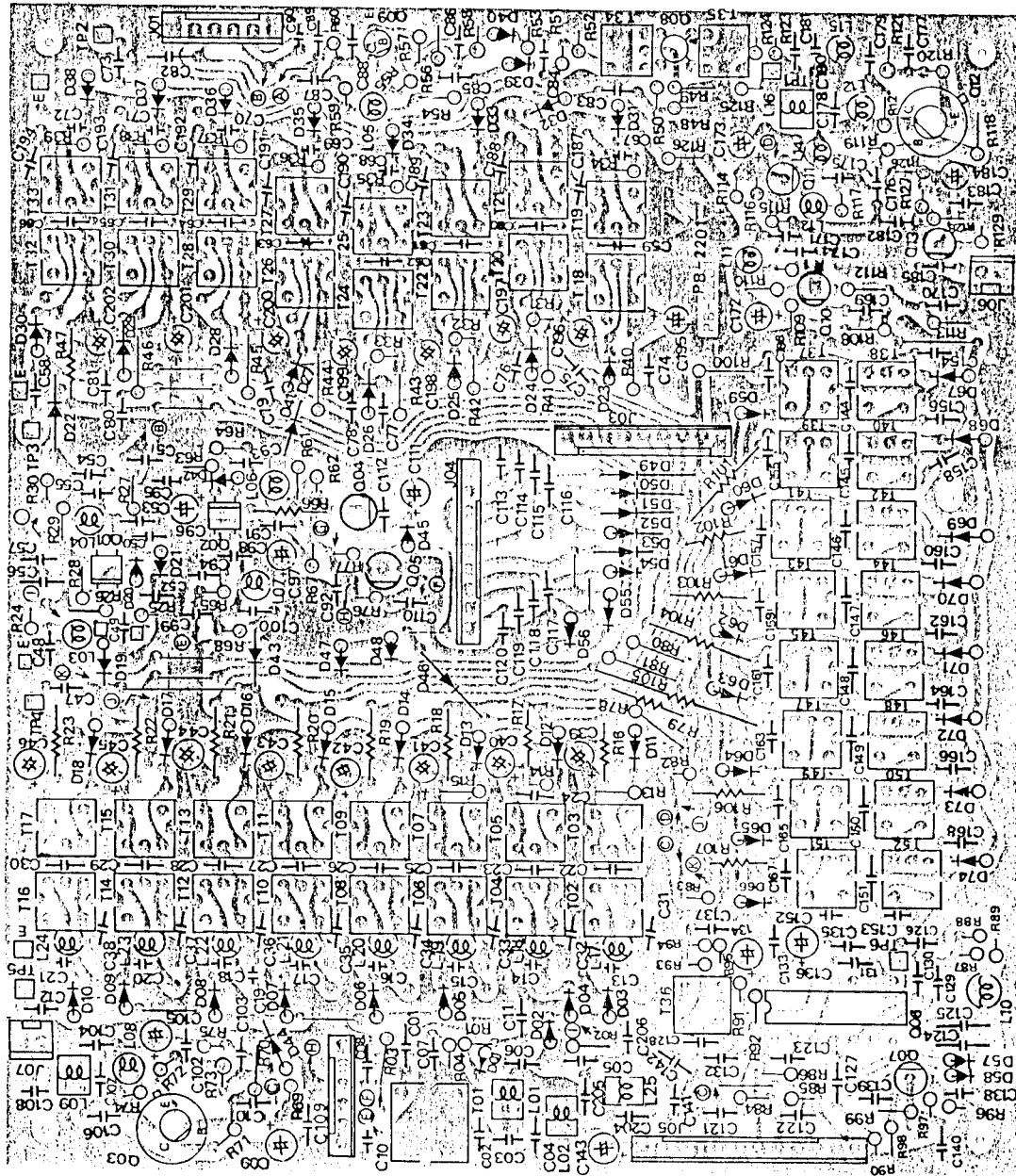


Viewed from component side





PARTS LAYOUT  
RF UNIT(PB-2201) After prod.11.



Viewed from foil side

VOLTAGE CHART  
(DC VOLTS)

FT-707 RF UNIT (PB-2201)

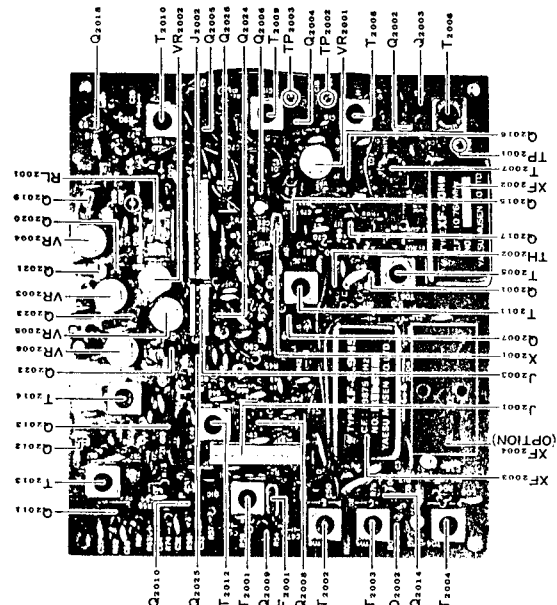
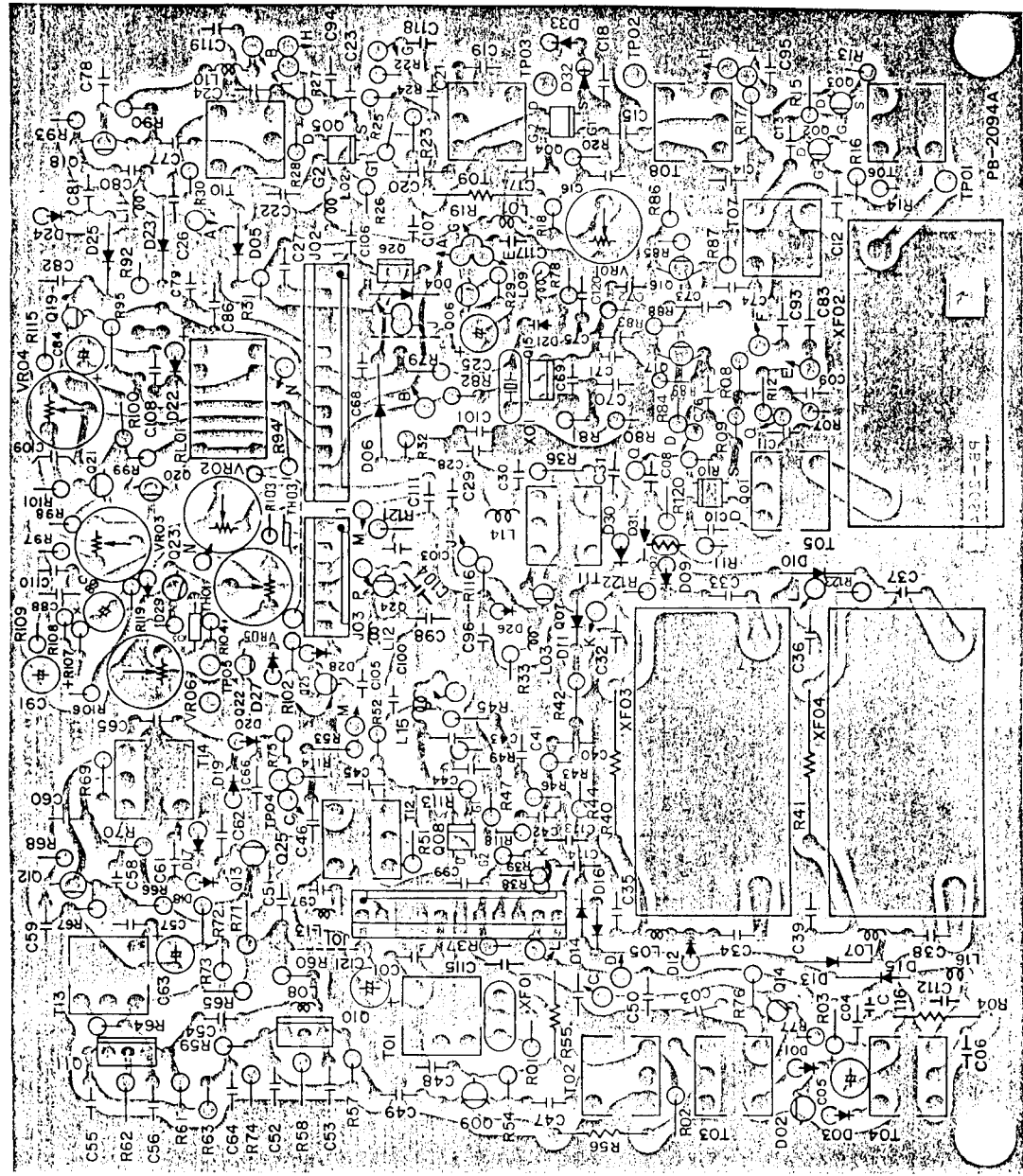
	E(S)	C(D)	B(G1)	G(2)	
Q1001	1.6	11.6	1.5	2.5	R
Q1002	1.2	11.8	1.1	2.2	T
Q1003	5.4	12.7	5.9	-	T
Q1004	0	0.2	0.74	-	T
Q1005	0	1.5	0	-	T
Q1007	2.3	10.8	3.0	-	R
Q1009	6.2	12.0	6.9	-	R
Q1010	1.4	9.9	2.2	-	R
Q1011	2.7	13.4	3.4	-	R
Q1012	7.0	13.3	7.6	-	R
Q1013	2.2	8.5	2.8	-	R

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Q1006	0	12.6	10.6	6.0	3.8	0	0	0	3.8	6.0	6.0	6.0	10.6	0

BAND MODE RF GAIN NB AGC

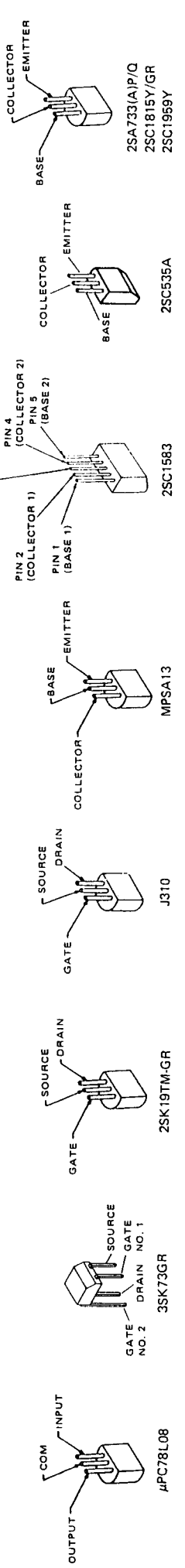
20m  
USB  
MAX  
OFF  
SLOW

**PARTS LAYOUT  
IF UNIT(PB-2094A)**

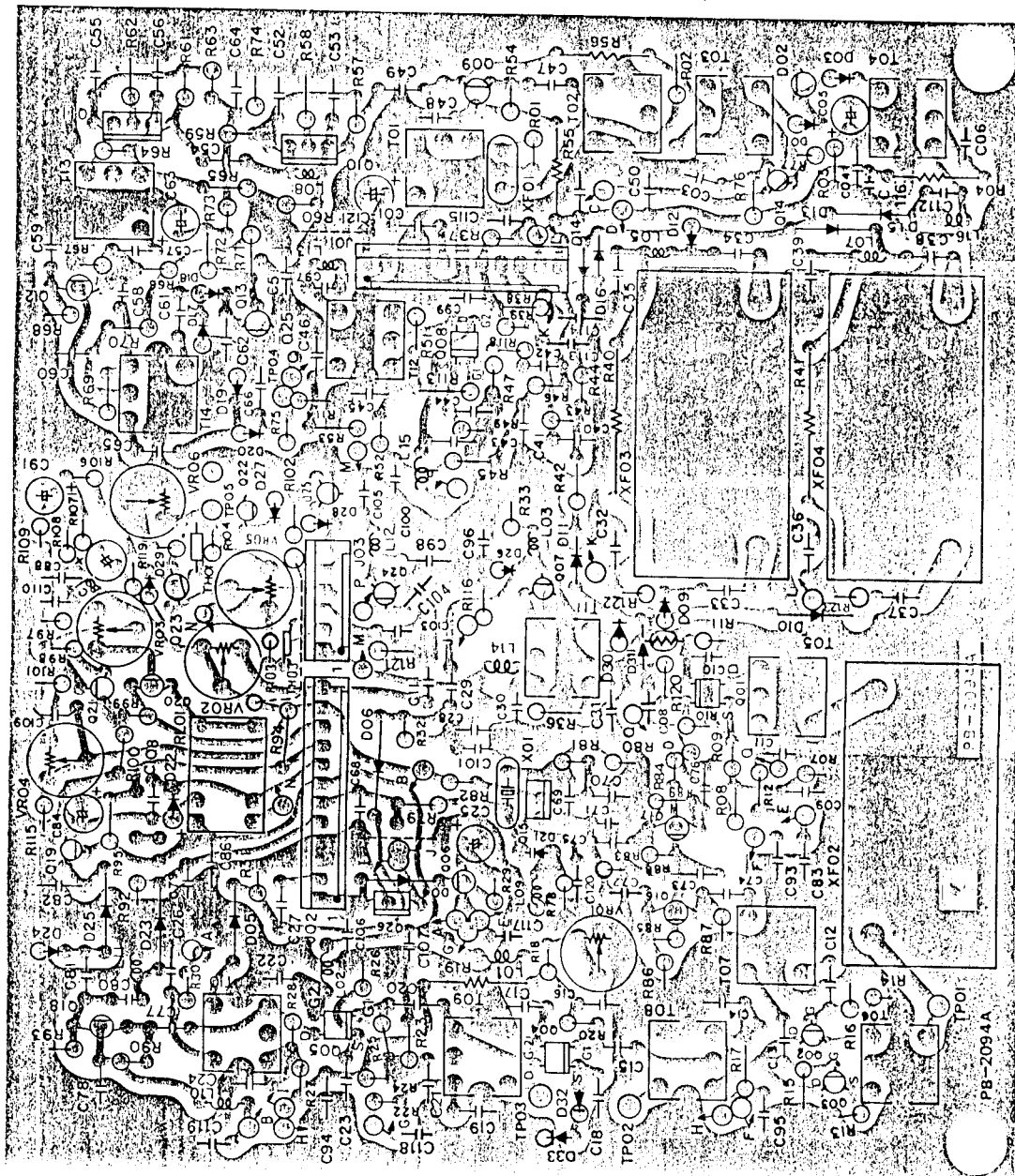


**IF UNIT**

Viewed from component side



**PARTS LAYOUT  
IF UNIT(PB-2094A)**



Viewed from foil side

**VOLTAGE CHART  
(DC VOLTS)**

FT1707 IF UNIT (PB-2094)

	(E(S))	(C(D))	(R(G1))	(G2)	
Q2001	0.4	8.1	0	0.4	R
Q2002	1.5	7.3	0		R
Q2003	1.5	7.3	0		R
Q2004	1.3	7.4	0.9	*4.5	R
Q2005	1.8	7.4	1.6	*4.5	R
Q2006	8.6	12.0	9.3		R
Q2007	1.8	8.0	0		T
Q2008	0.8	7.5	0.7	2.2	T
Q2009	3.0	6.6	3.6		R
Q2012	1.3	8.0	1.9		R
Q2013	0	7.6	0		R (NB: ON)
Q2014	0	4.1	0		R (NB: ON)
Q2015	1.9	7.5	2.9		R
Q2016	1.7	7.0	2.1		R
Q2017	3.6	7.0	4.2		R
Q2018	3.3	8.0	3.9		R
Q2019	0	*4.5	0		R
Q2020	5.2	8.1	2.8		R
Q2021	4.7	0.2	4.2		R
Q2022	0	0/5	0/7/6.1		R/T
Q2023	0	3.5	0		T
Q2024	0	2.2	0		T
Q2025	1.3	0	10.2		T

\* HIGH IMPEDANCE

	E	B1	B2	C1	C2	
Q2010	1.1	1.7	1.1	7.9	7.9	R (NB: ON)
Q2011	1.1	1.7	1.1	7.9	7.9	R (NB: ON)

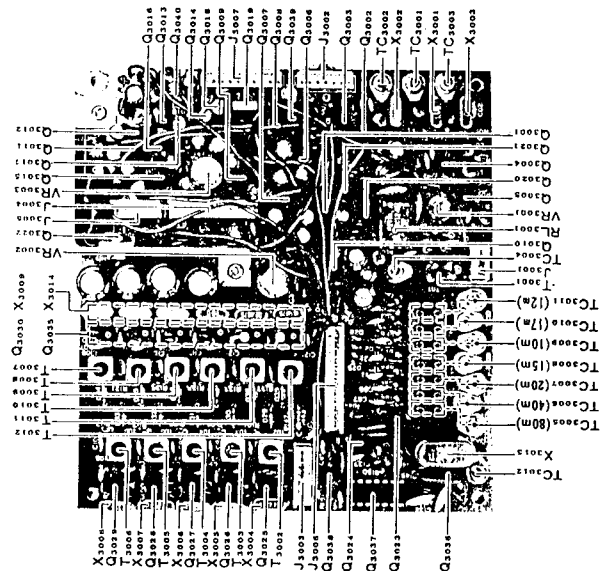
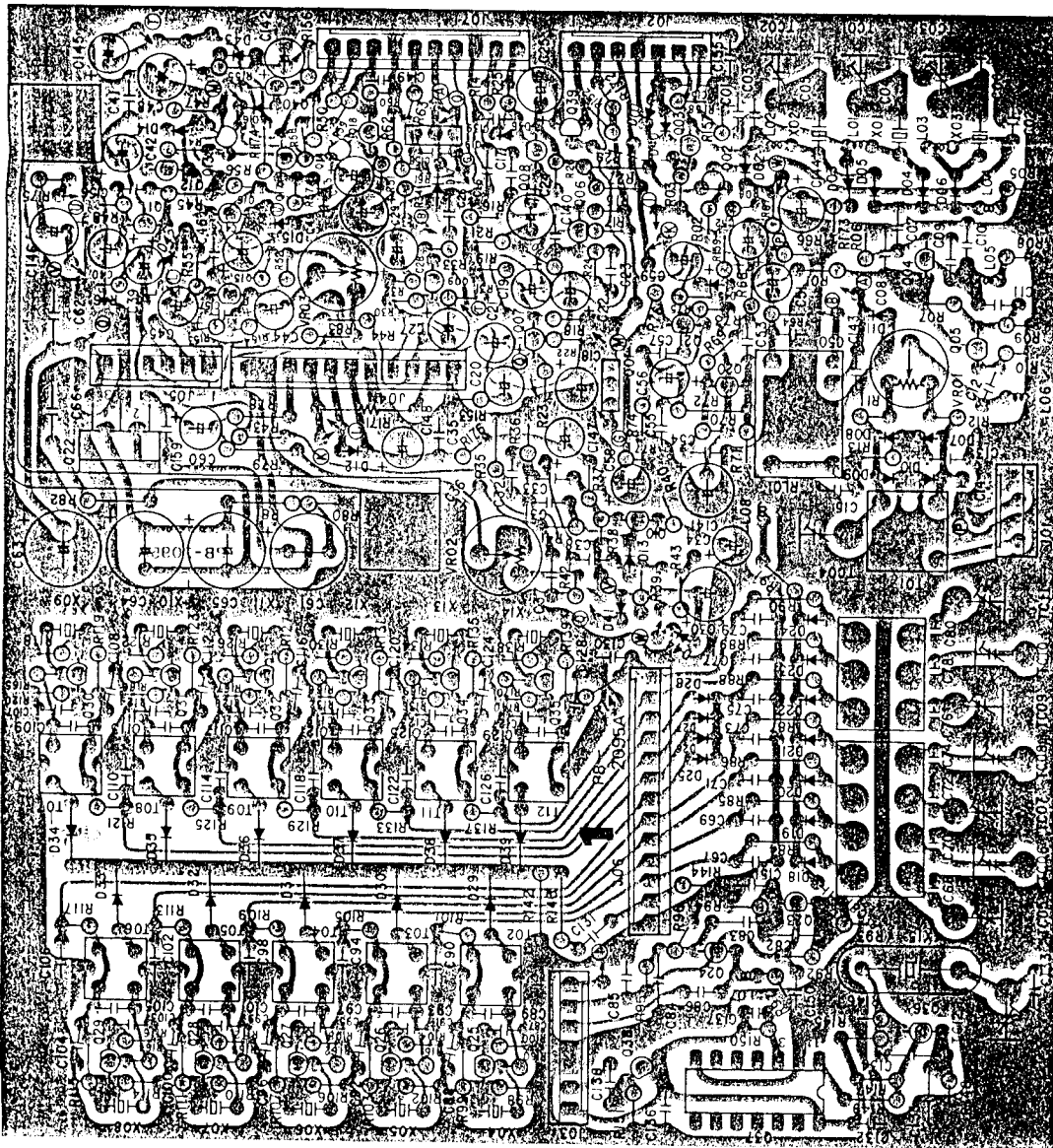
20m  
MODE  
REF GAIN  
NB







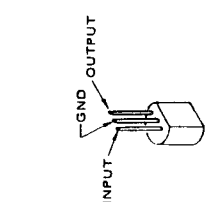
PARTS LAYOUT  
AF UNIT(PB-2095A)



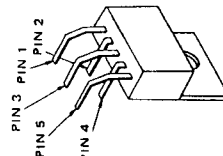
AF UNIT

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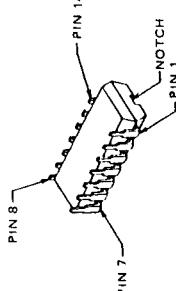
Viewed from component side



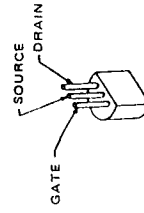
78L05/08



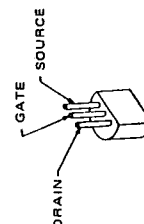
μPC2002V



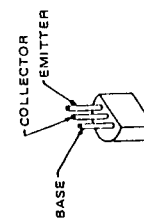
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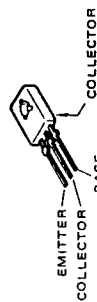
25K19TM-GR/Y



25K30A-Y

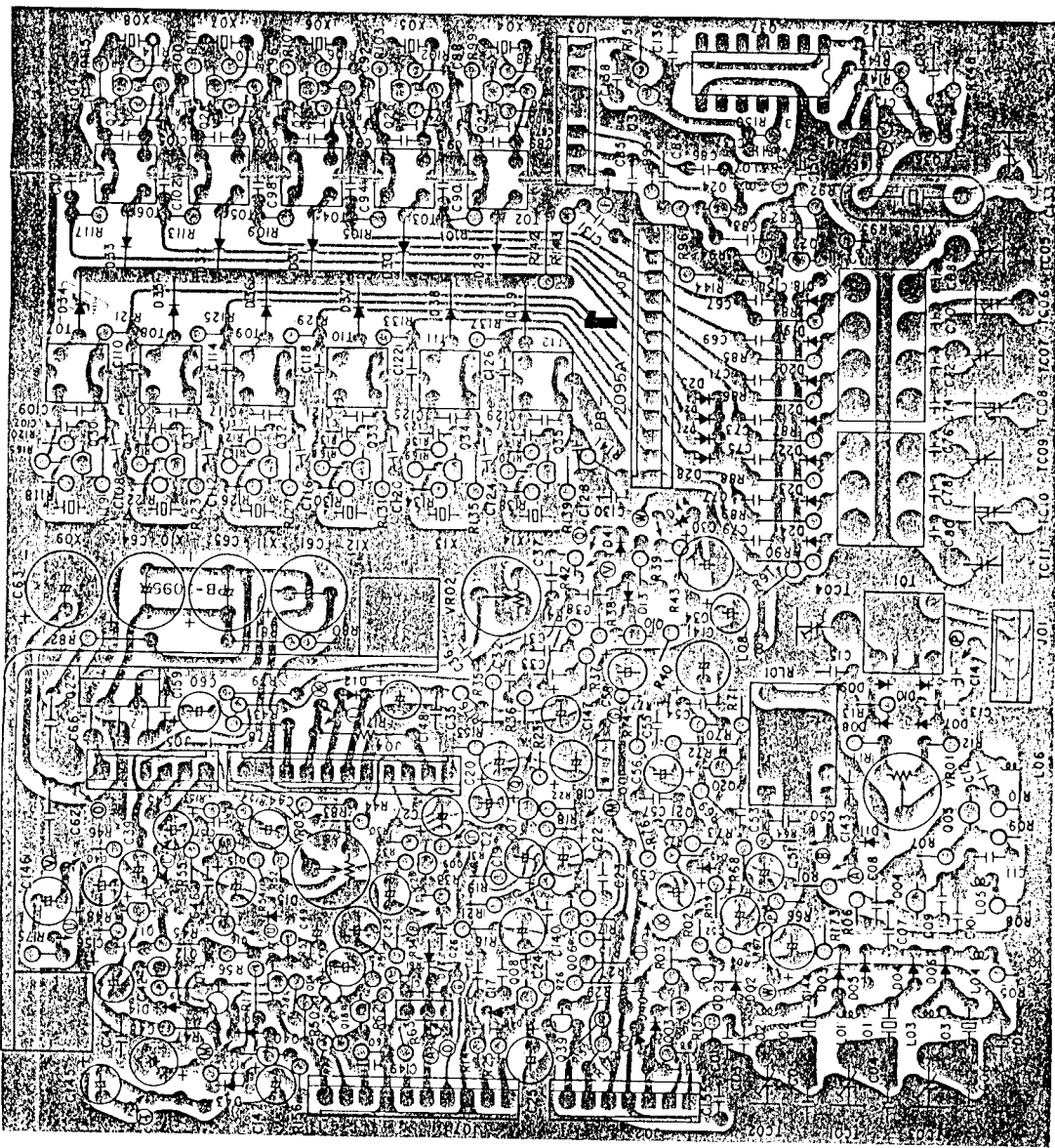


25A733(A)P/Q  
25C380TM-Y  
25C732TM-GR  
25C1815Y/GR  
25C1959Y



25C496

**PARTS LAYOUT  
AF UNIT (PB-2095A)**



Viewed from foil side

**VOLTAGE CHART  
(DC VOLTS)**

**FT1707 AF UNIT (PB-2095)**

	(E5)	(C/D)	(B/G1)	(C2)	
Q3002	6.7	6.7	6.1		T (CW)
Q3003	6.3	6.4	7.0		T (AM)
Q3004	0.7	6.0	0		R (AM)
Q3005	2.1	6.0	2.8		R (CW)
Q3006	1.3	5.1	1.9		R
Q3007	1.4	3.2	2.1		R
Q3008	6.7	6.7	0.2		T
Q3009	0.5	4.8	1.2		T
Q3010	0.8	0.8	1.5		R
Q3011	2.0	3.2	1.4		R
Q3012	0	3.7	0		R
Q3013	5.8	0	3.7		R
Q3014	5.2	5.3	5.8		R
Q3015	1.4	3.2	2.0		R
Q3016	0	8.0	0		R
Q3017	8.0	3.7	8.0		R
Q3018	5.2	14.0	3.2		R
Q3019	14.0	0	14.0		R
Q3020	3.0	6.6	3.6		R
Q3021	0.7	4.2	1.4		R (FIX ON)
Q3023	1.8	8.1	2.4		R
Q3024	1.7	8.1	2.4		R
Q3025- Q3035	1.3	7.2	2.0		R
Q3036	1.7	4.2	2.4		R (MARKER ON)
Q3038	3.2	8.1	3.5		R
Q3039	0	1.5	0		T
Q3040	8.0	0	8.0		T

	IN	OUT
Q3001	14.0	8.0
		R

	1	2	3	4	5
Q3022	0.7	0.7	0	6.6	14.0
					R

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Q3037	4.1	0	0	0	0	0	0	0	0	0	0	0	0	0
														R (MARKER ON)

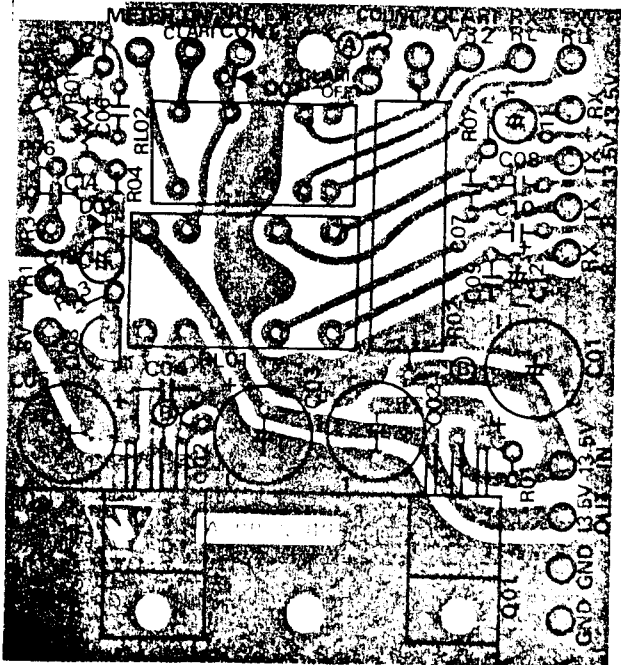
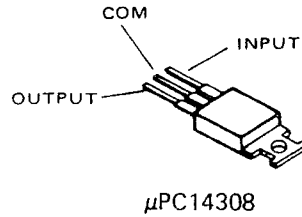
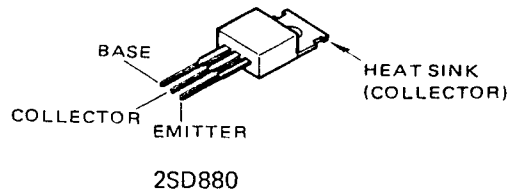
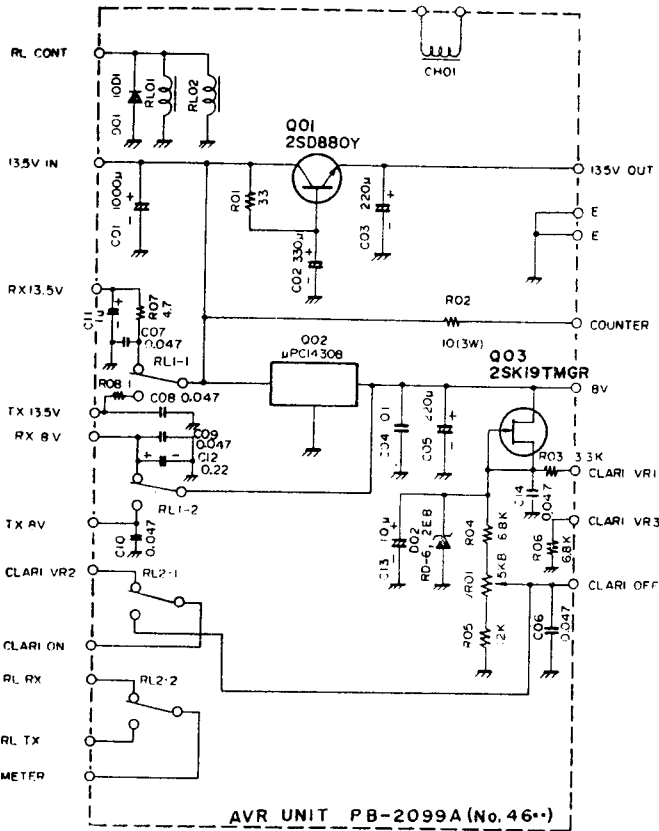
BAND 20m  
MODE USB  
RF GAIN MAX  
NB OFF  
AGC SLOW  
MARK OFF

# AVR UNIT PARTS LAYOUT(PB-2099A)

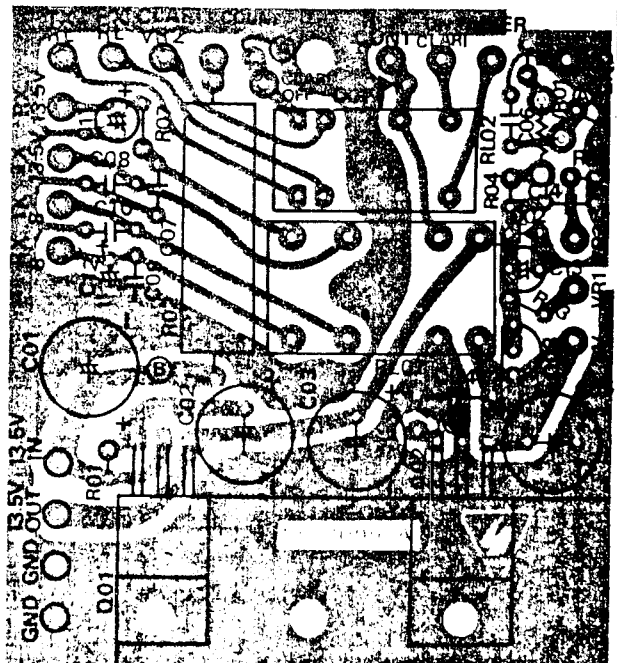
## VOLTAGE CHART (DC VOLTS)

	E(S)	C(D)	B(G)
Q4601	13.3	14.0	13.9
Q4603	6.3	8.0	6.3

	IN	OUT
Q4602	14.0	8.0



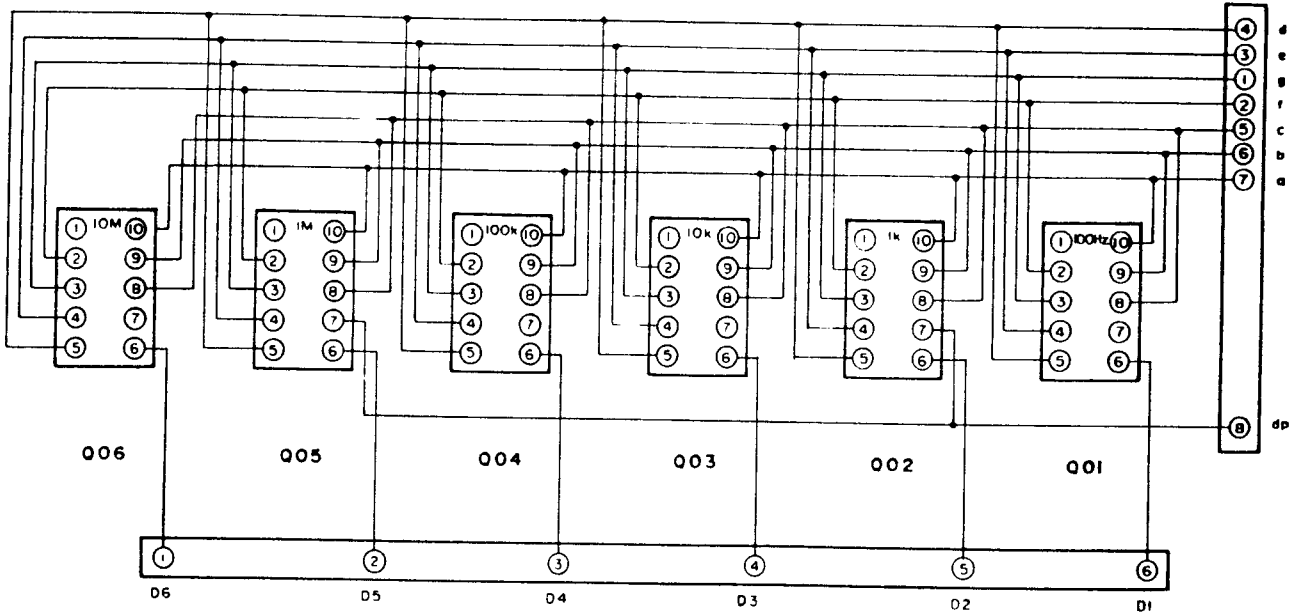
Viewed from component side



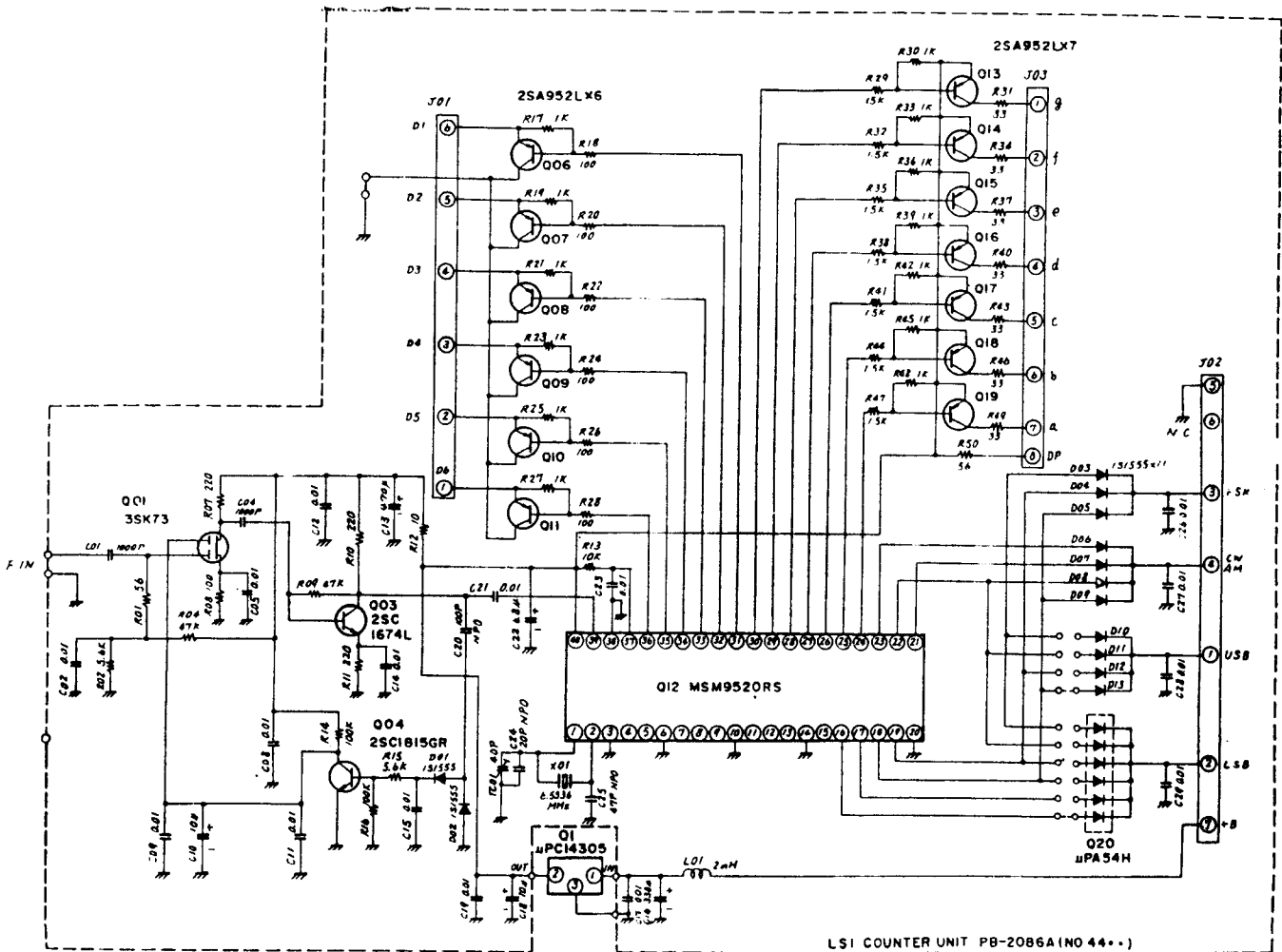
Viewed from foil side



HP5082 - 7623x6



DISPLAY UNIT PB-209B



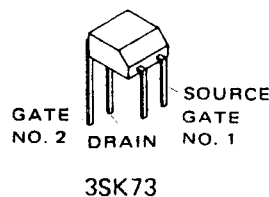
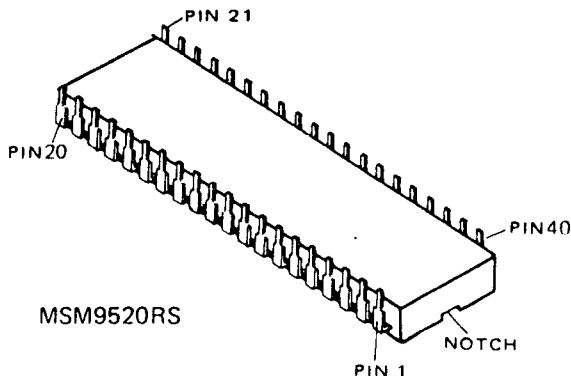
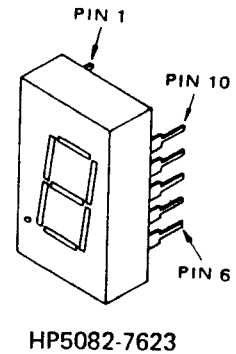
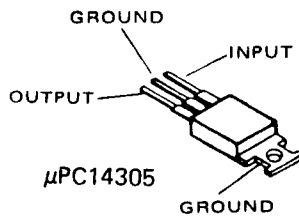
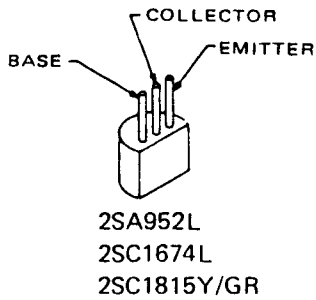
LSI COUNTER UNIT PB-2086A (NO 44..)

# VOLTAGE CHART (DC VOLTS)

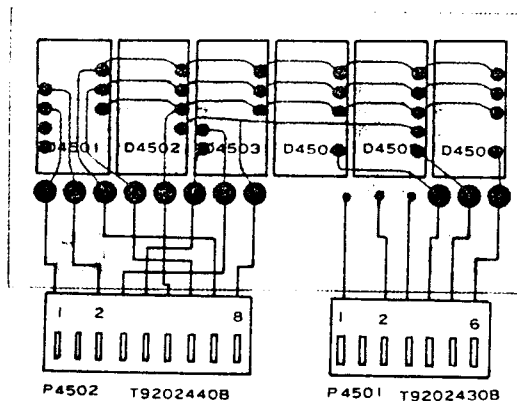
	E (S)		C (D)		B (G1)		G2	
	R	T	R	T	R	T	R	T
Q4401	0.3	—	4.3	—	0.5	—	4.0	—
Q4403	1.0	—	4.0	—	1.7	—	—	—
Q4404	0	—	0.4	—	0.5	—	—	—
Q4406	2.1	—	0	—	2	—	—	—
Q4407	3.4	—	0	—	3.3	—	—	—
Q4408	2.1	—	0	—	2.0	—	—	—
Q4409	2.1	—	0	—	2.0	—	—	—
Q4410	3.4	—	0	—	3.3	—	—	—
Q4411	2.1	—	0	—	2.0	—	—	—
Q4413	5.1	—	2.0	—	4.9	—	—	—
Q4414	5.1	—	4.4	—	4.6	—	—	—
Q4415	5.1	—	4.0	—	4.6	—	—	—
Q4416	5.1	—	4.4	—	4.6	—	—	—
Q4417	5.1	—	4.4	—	4.6	—	—	—
Q4418	5.1	—	4.0	—	4.6	—	—	—
Q4419	5.1	—	4.4	—	4.6	—	—	—

DISPLAY  
5.000.0

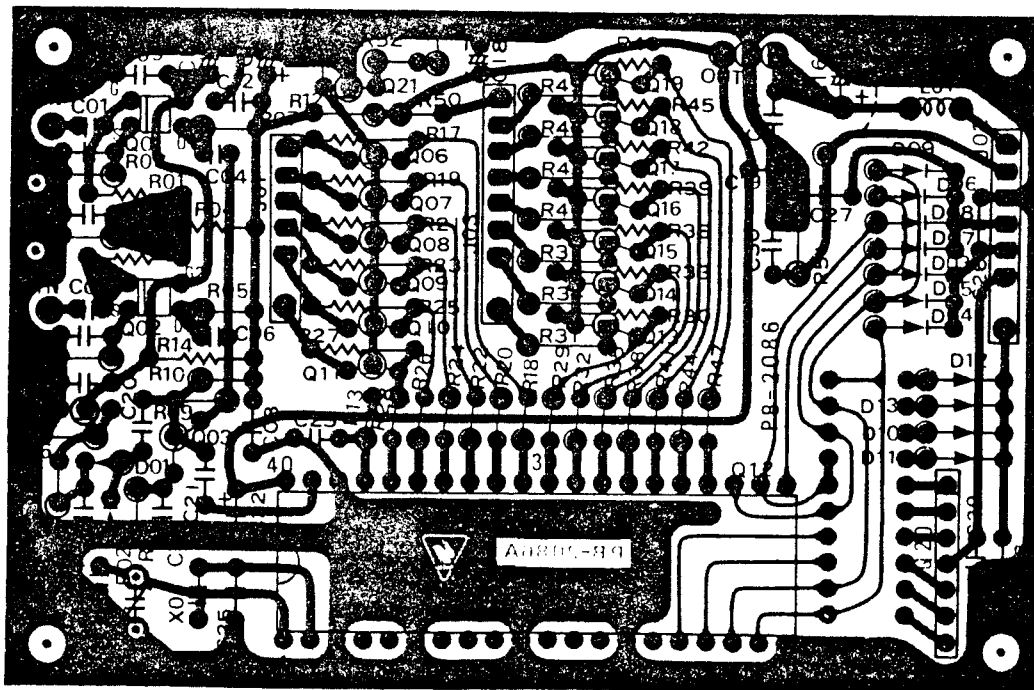
	IN	COM	OUT
Q1	11.2	0	5.0



# COUNTER UNIT PARTS LAYOUT



## MAIN BOARD

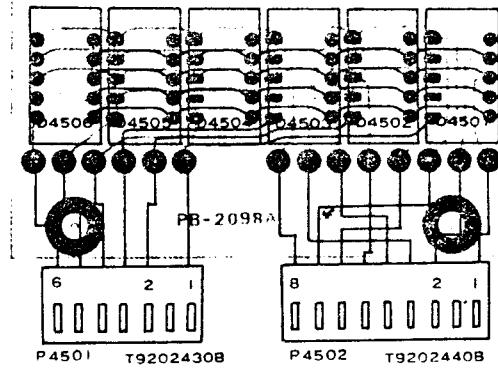


Viewed from component side

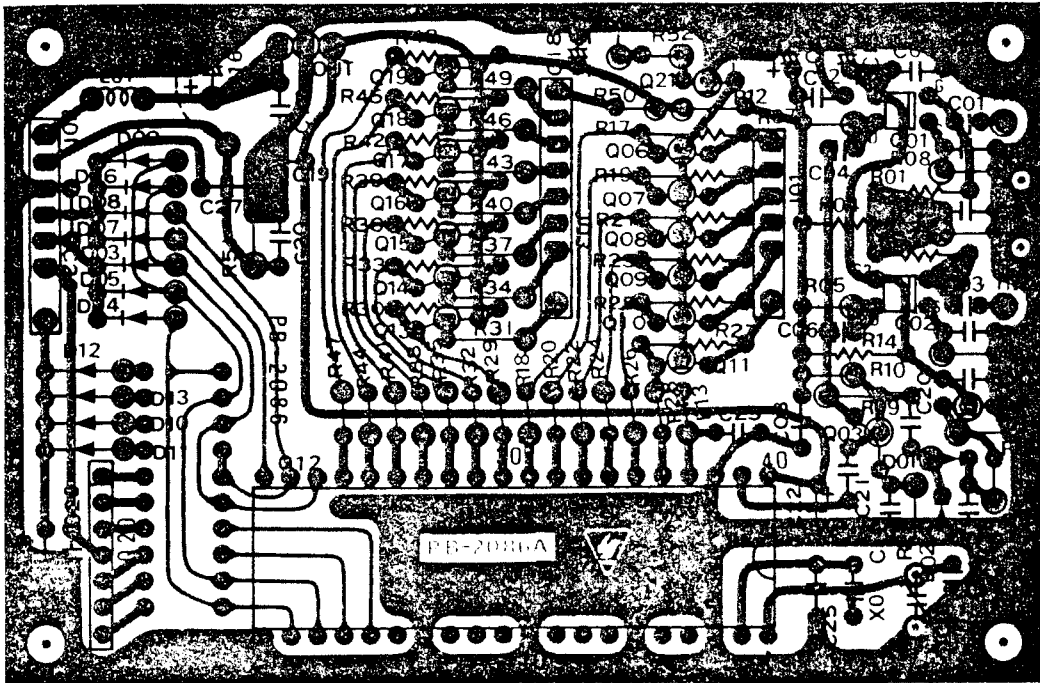
- Not used
- |       |       |
|-------|-------|
| Q4402 | C2303 |
| R2303 | C2306 |
| R2305 | C2307 |
| R2306 |       |

# COUNTER UNIT PARTS LAYOUT

SERVICING

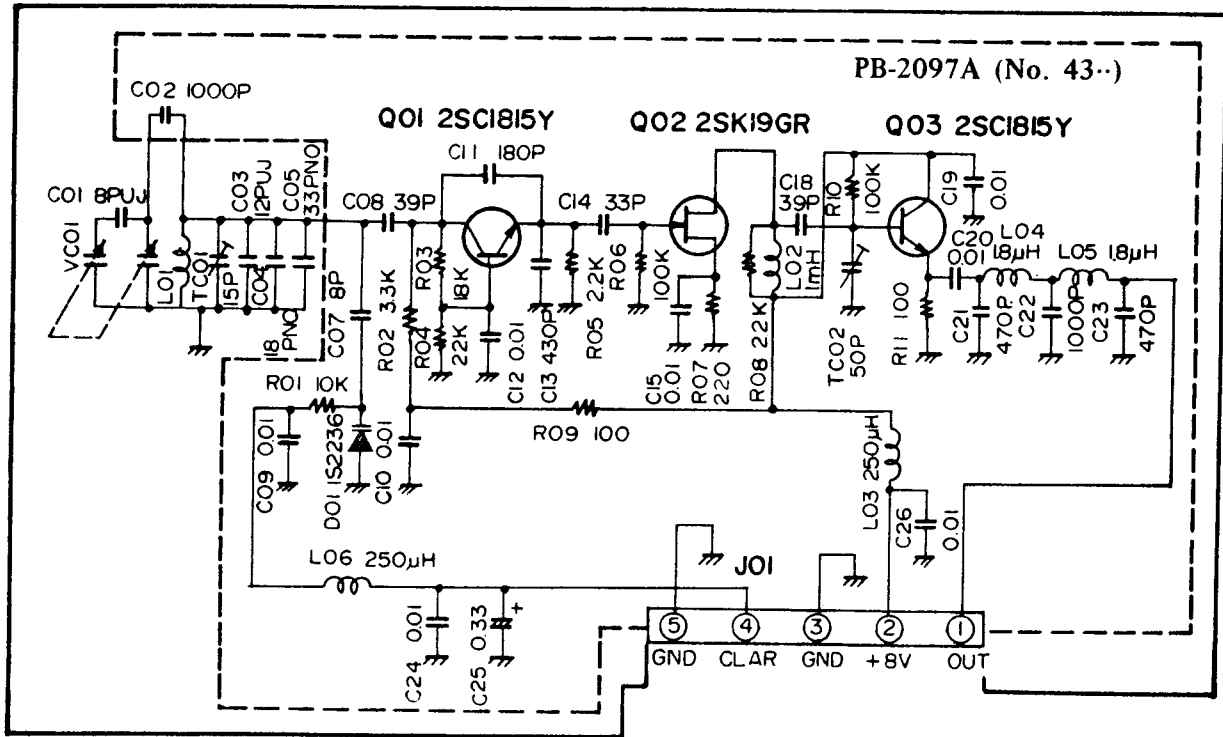


## MAIN BOARD

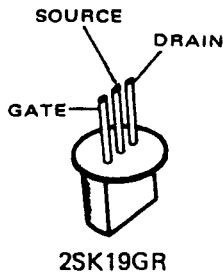


Viewed from foil side

# VFO ASSEMBLY VFO UNIT(PB-2097A)

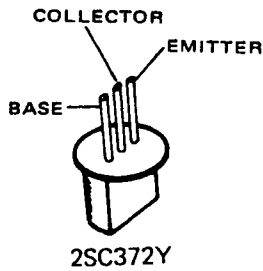


Downloaded by  
RadioAmateur.EU



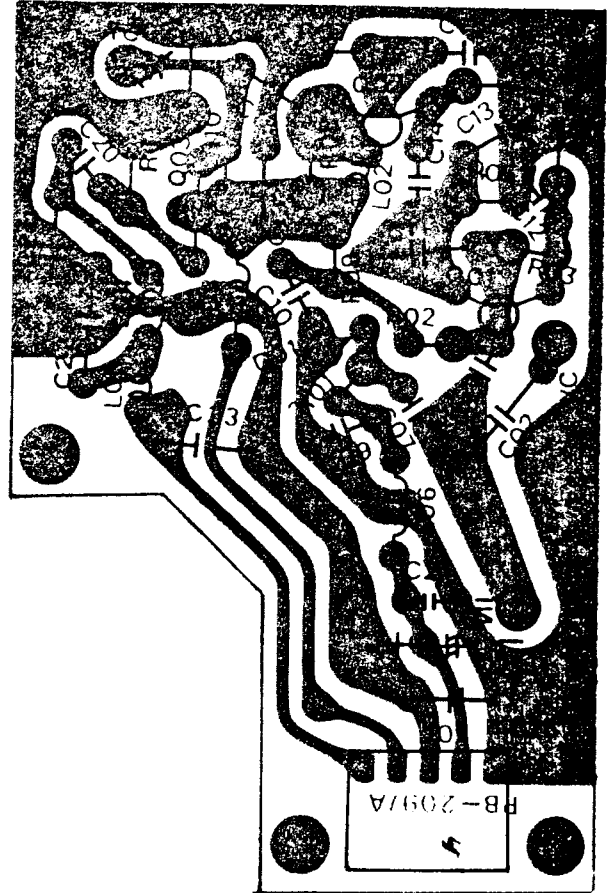
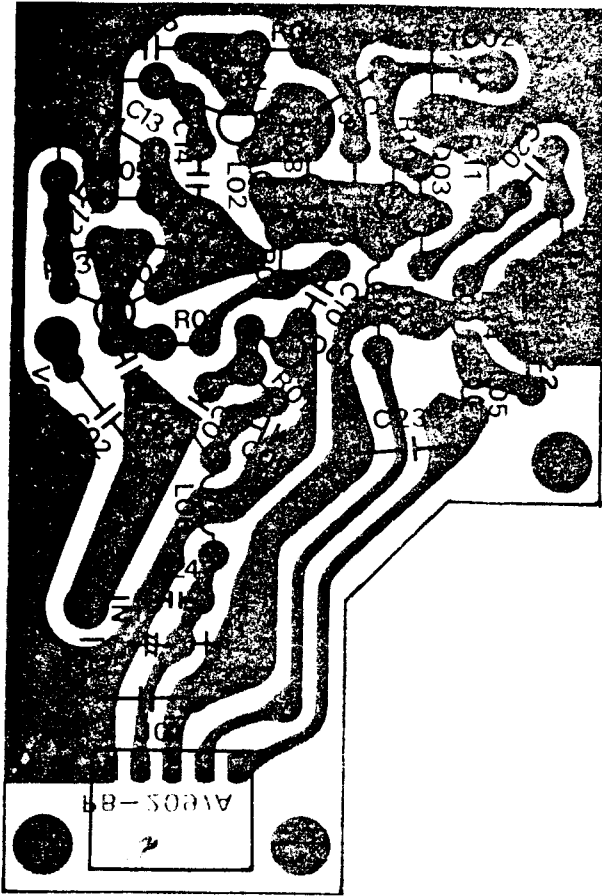
VOLTAGE CHART  
(DC VOLTS)

	E(S)	C(D)	B(G)
Q4301	1.4	3.7	1.9
Q4302	0.9	6.0	0
Q4303	0.9	6.0	1.6

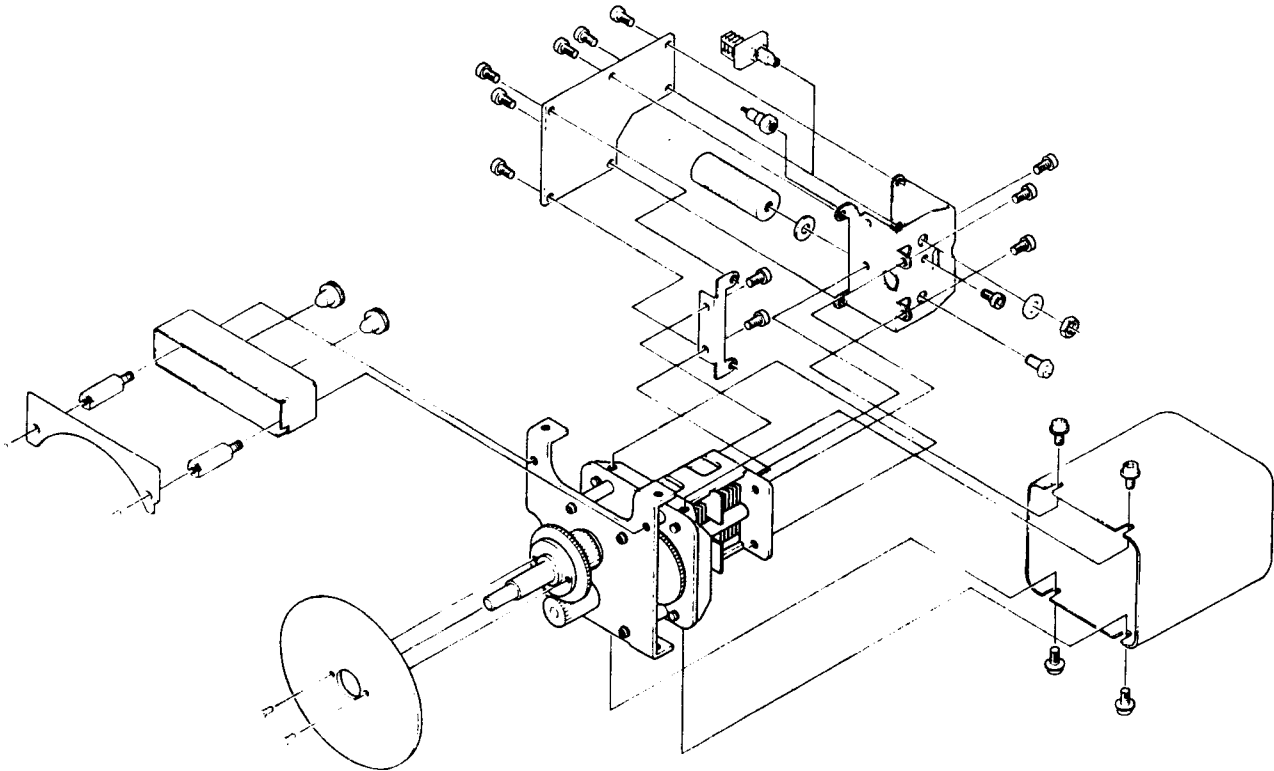


# VFO UNIT PARTS LAYOUT (PB-2097A)

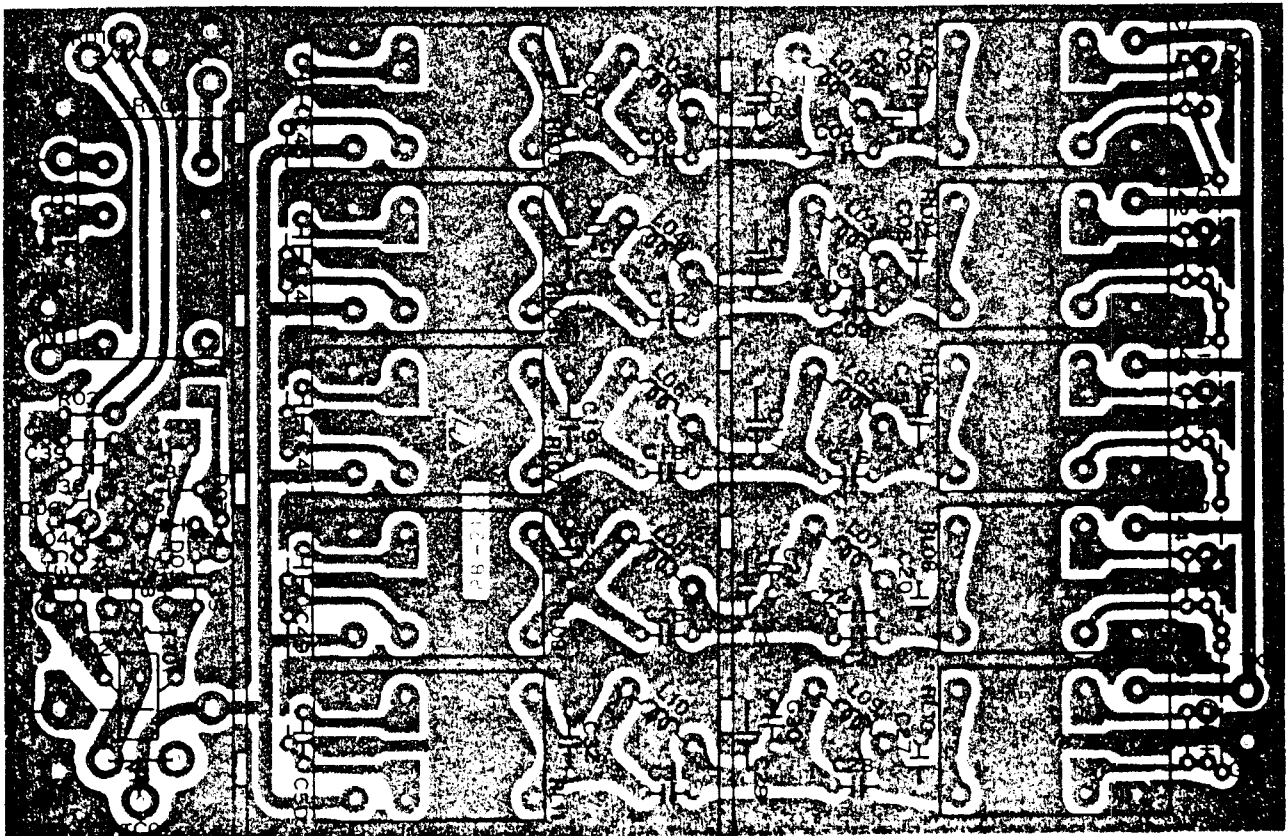
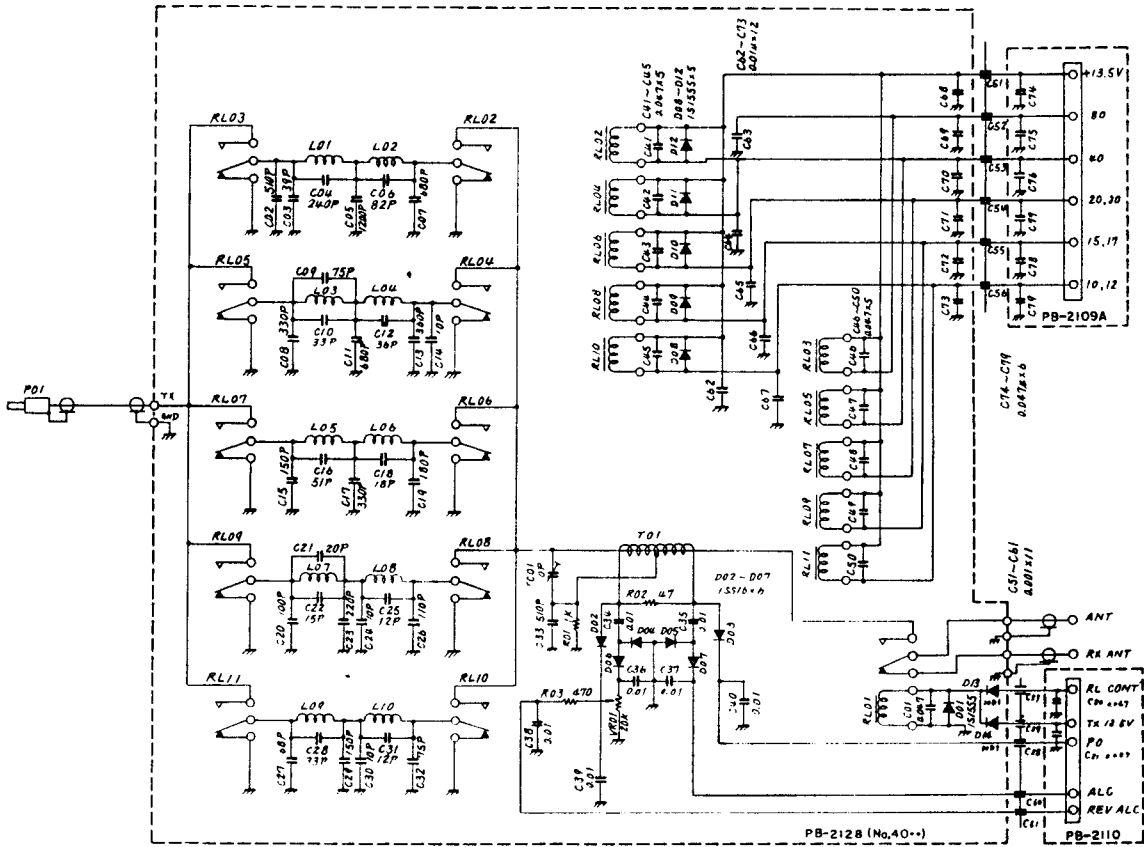
SERVICING



## VFO UNIT EXPLODED VIEW



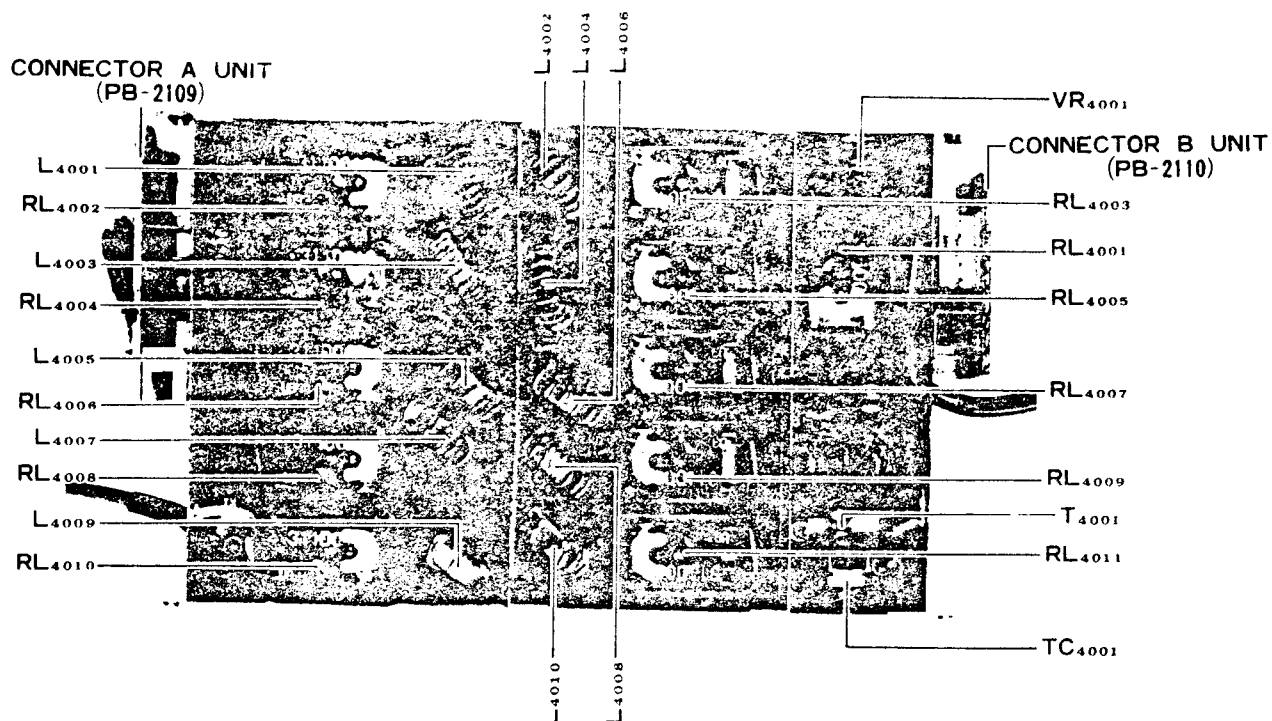
# LPF UNIT PARTS LAYOUT (PB-2128)



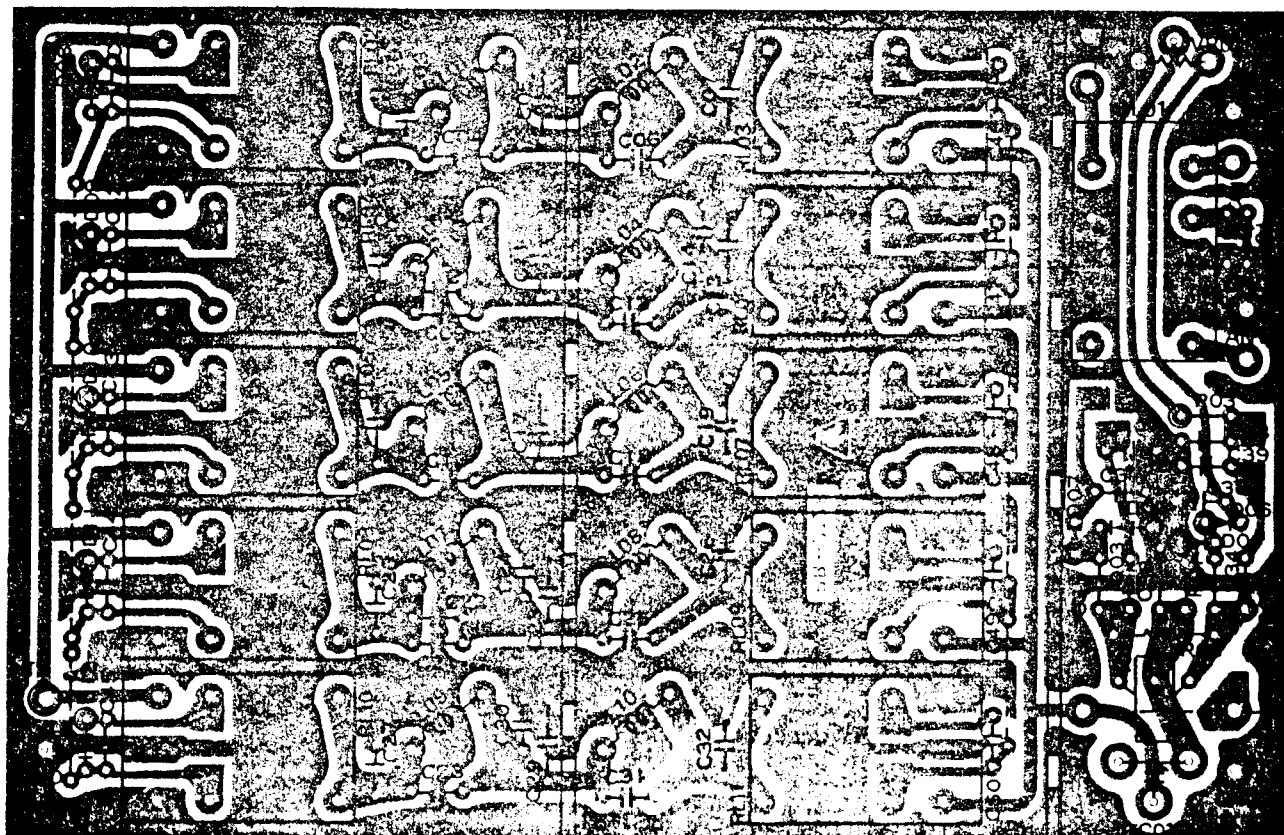
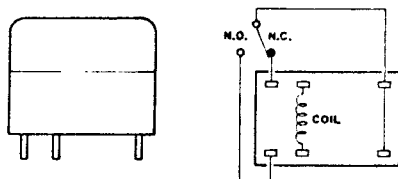
Viewed from foil side

# LPF UNIT MOUNTING DETAIL

SERVICING



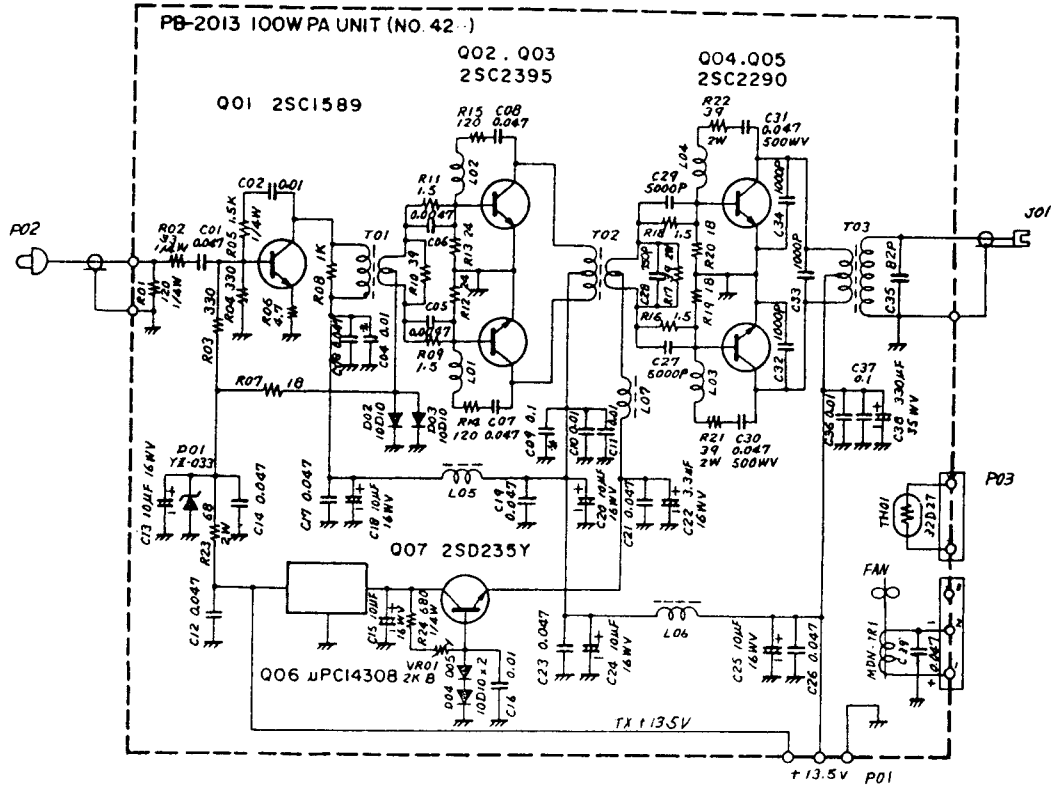
## RELAY CONNECTIONS RL4001-4011 (FBR311D012)



Viewed from component side

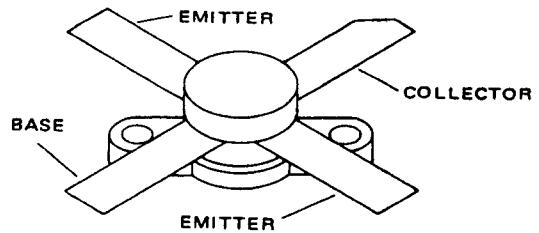


# 100W PA UNIT (PB-2013)

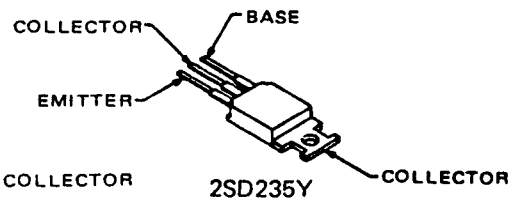
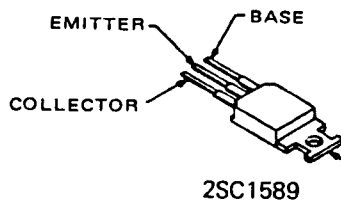
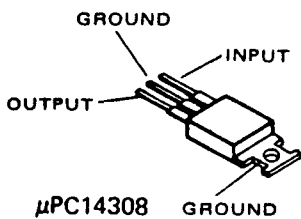


	E	C	B
Q4201	0.5	13.5	1.3
Q4202, 4203	0	13.5	0.7
Q4204, 4205	0	13.5	0.7
Q4207	0.7	8.0	1.3

	IN	COM	OUT
Q4206	13.5	0	8.0

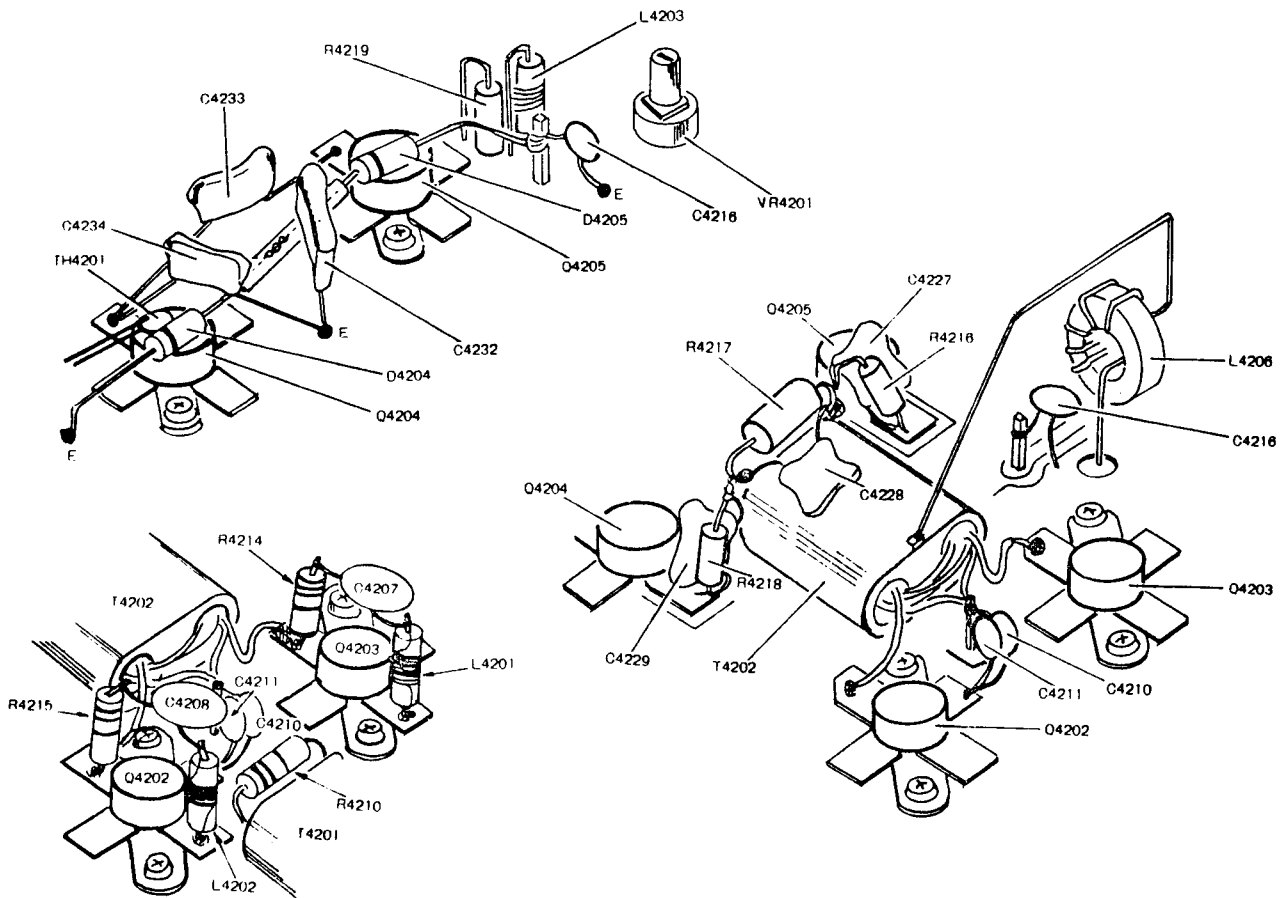
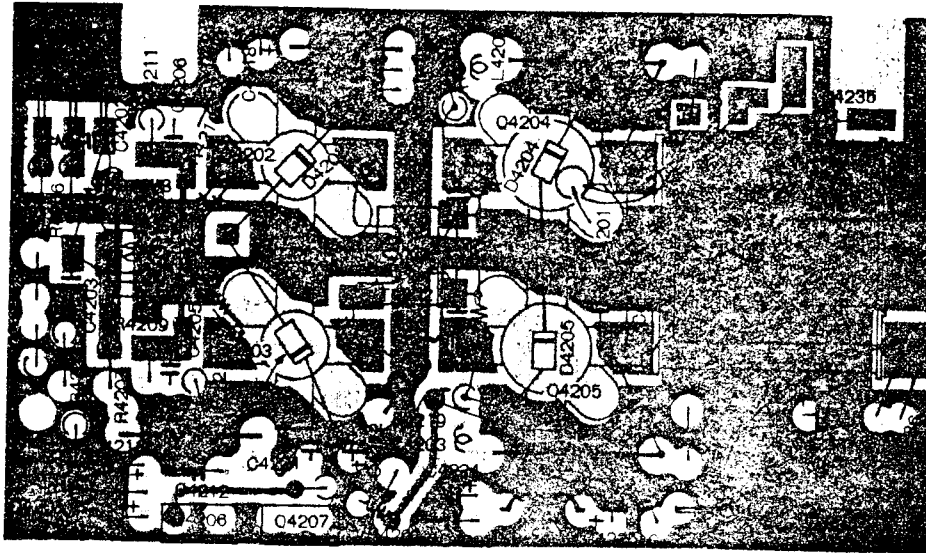


2SC2290  
2SC2395

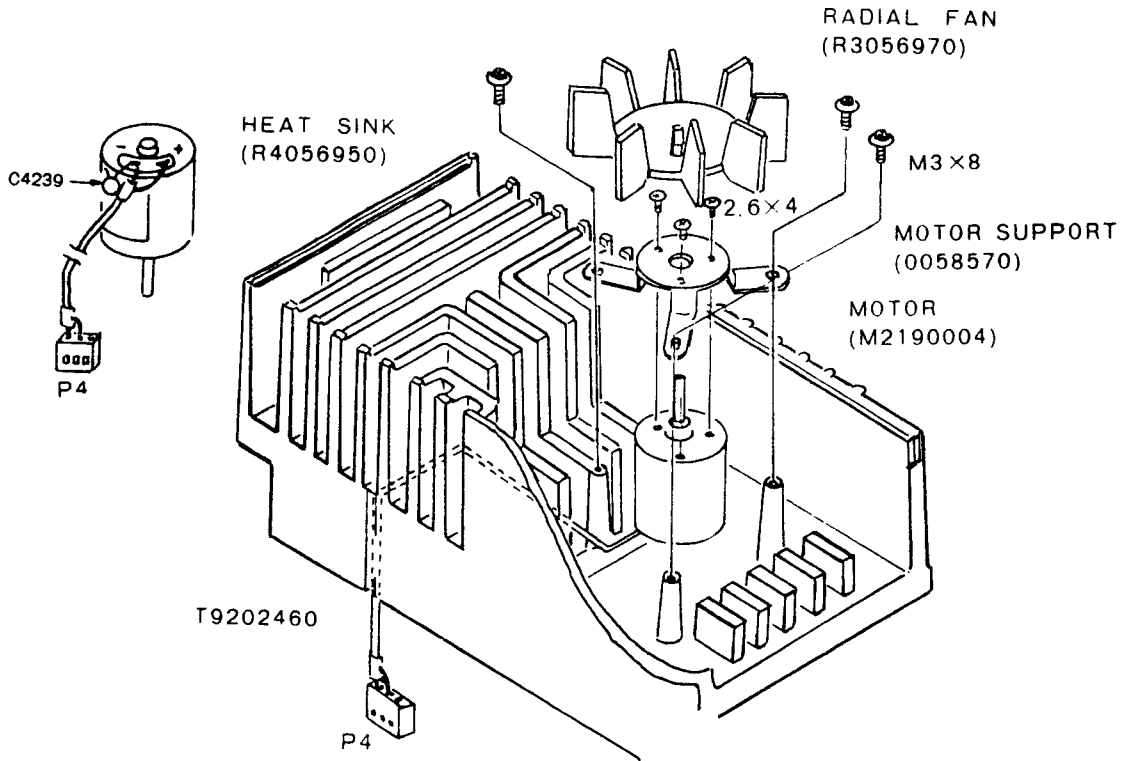
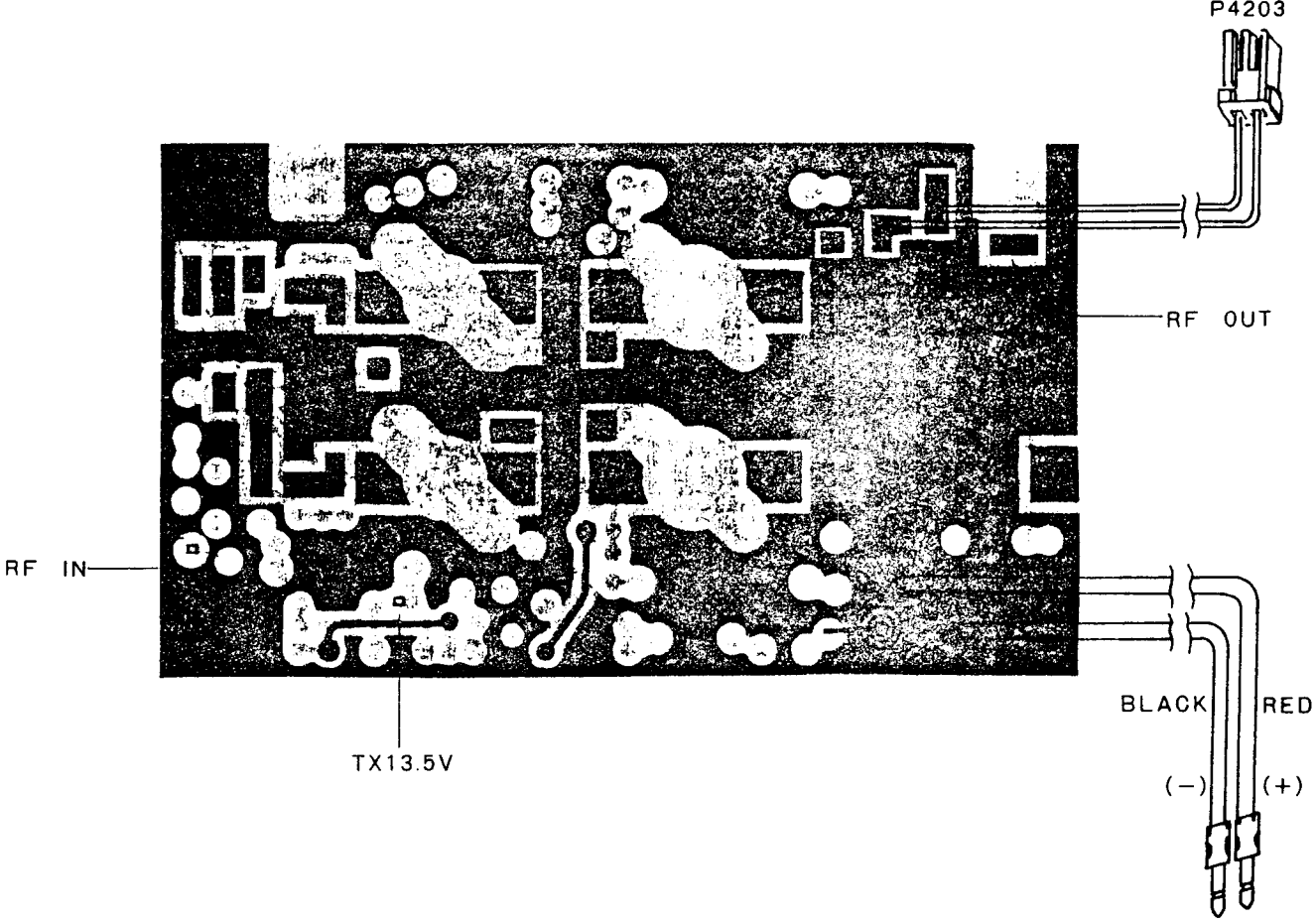


# 100W PA UNIT PARTS LAYOUT

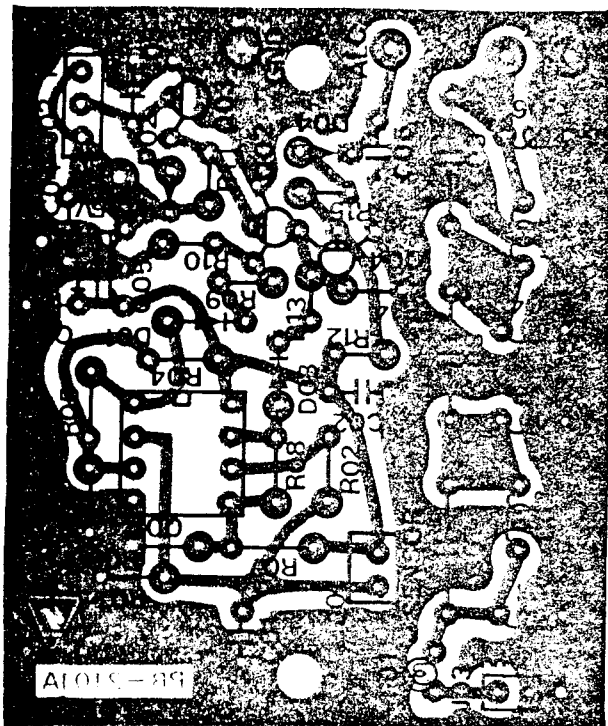
SERVICING



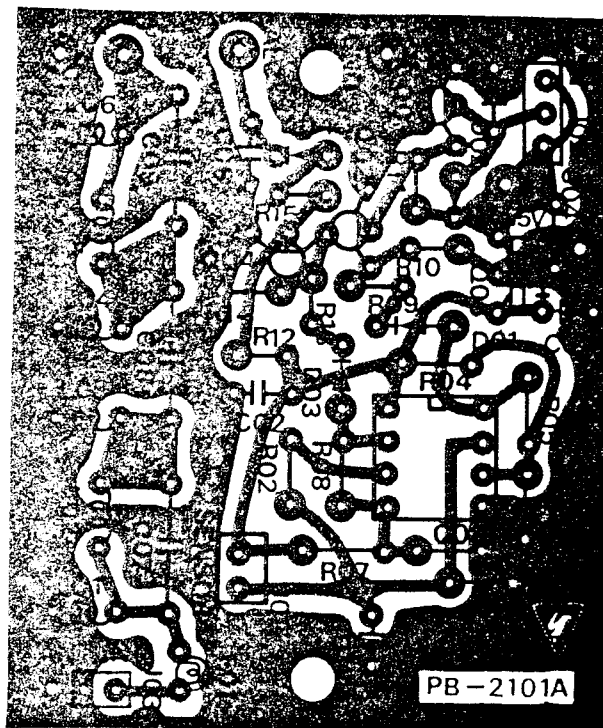
# 100W PA UNIT ASSEMBLY



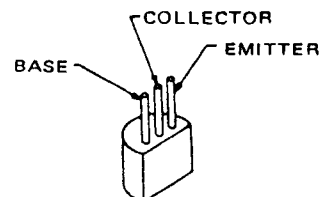
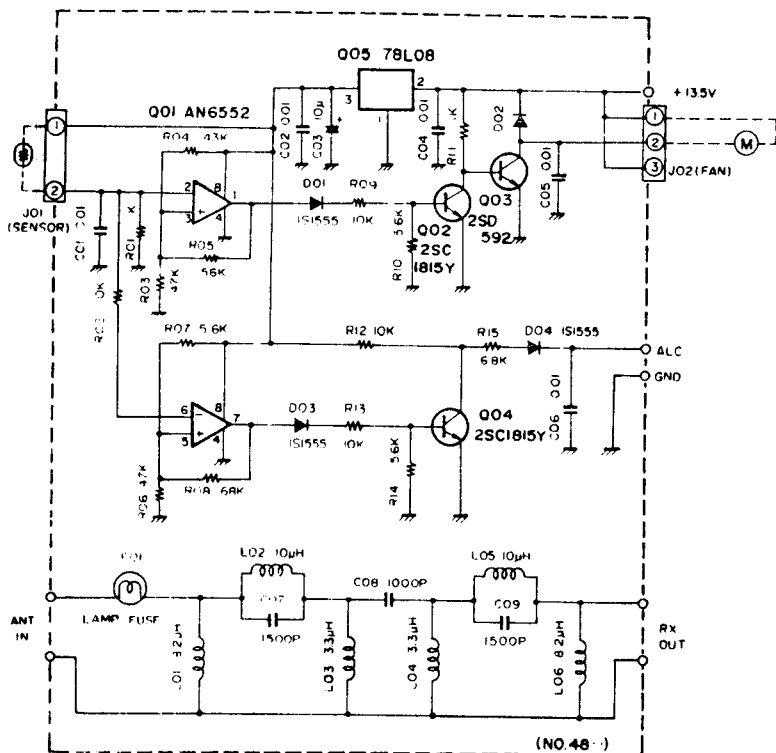
# HPF/FAN MOTOR CONTROL UNIT PARTS LAYOUT (PB-2101)



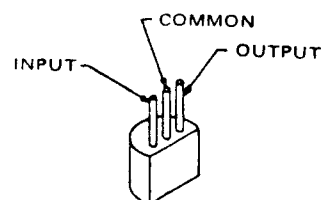
Viewed from component side



Viewed from foil side



2SC1815Y  
2SD592

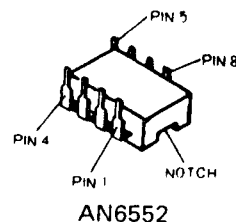


μPC78L05

	1	2	3	4	5	6	7	8
Q4801	1.3	4.9	3.3	0	7.1	4.9	7.1	7.9

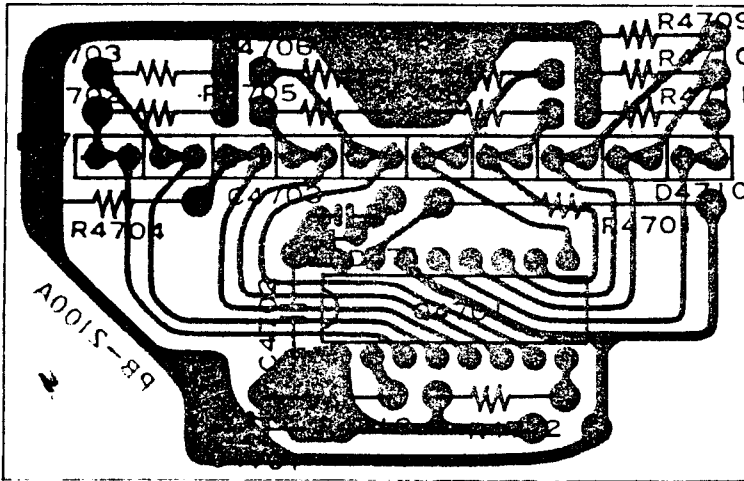
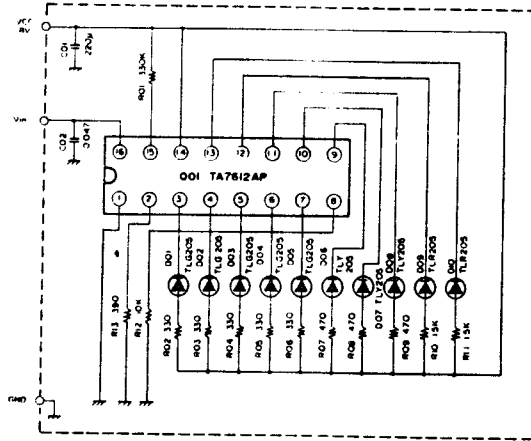
	E	C	B
Q4802	0	0.7	0.3
Q4803	0	0	0.7
Q4804	0	0.6	0.7

	IN	OUT
Q4805	14.2	8.0

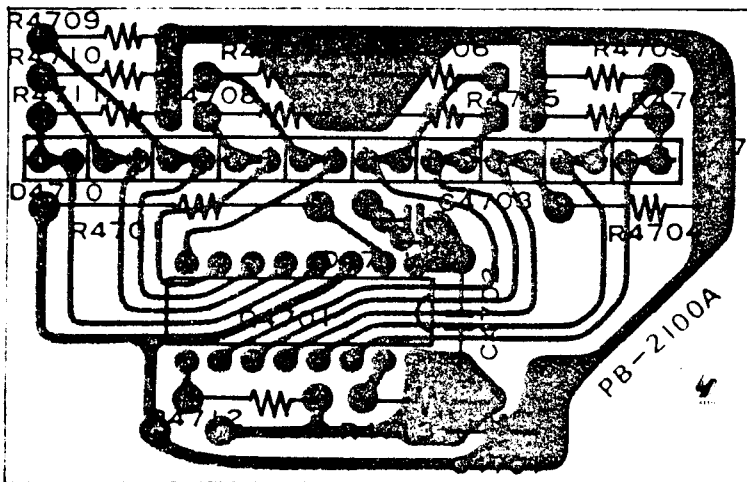
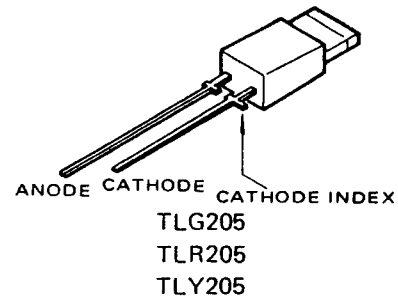


AN6552

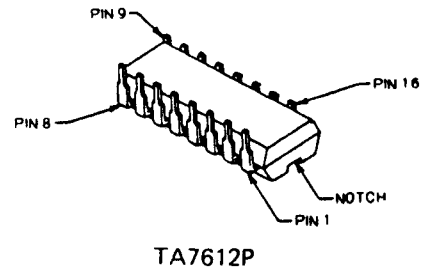
# LEVEL METER(INDICATOR)UNIT PARTS LAYOUT(PB-2100)



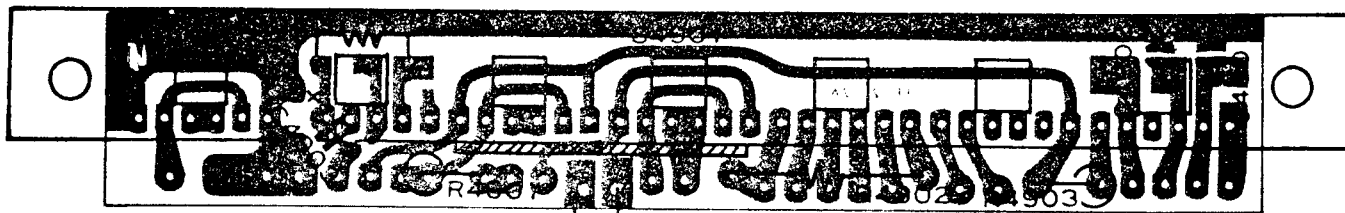
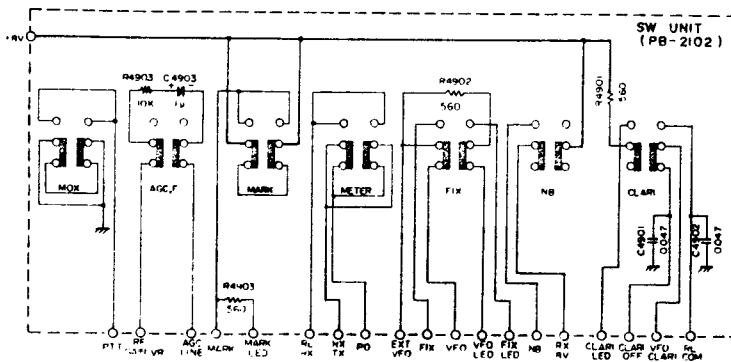
Viewed from component side



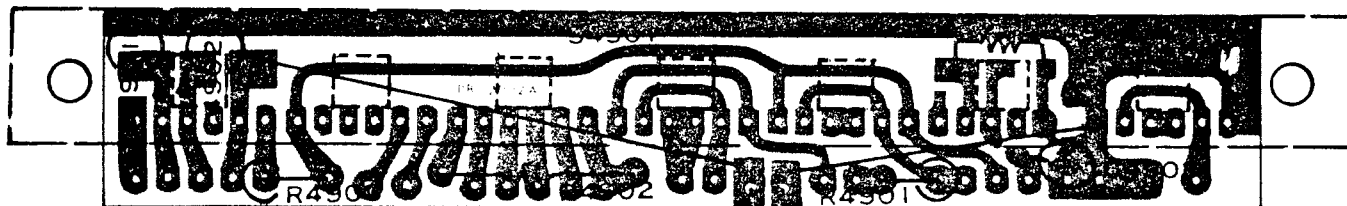
Viewed from foil side



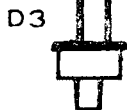
# SW UNIT PARTS LAYOUT(PB-2102)



Viewed from SW side



Viewed from foil side



## VR UNIT A/B (PB-2103A)

VR UNIT B

VR UNIT A

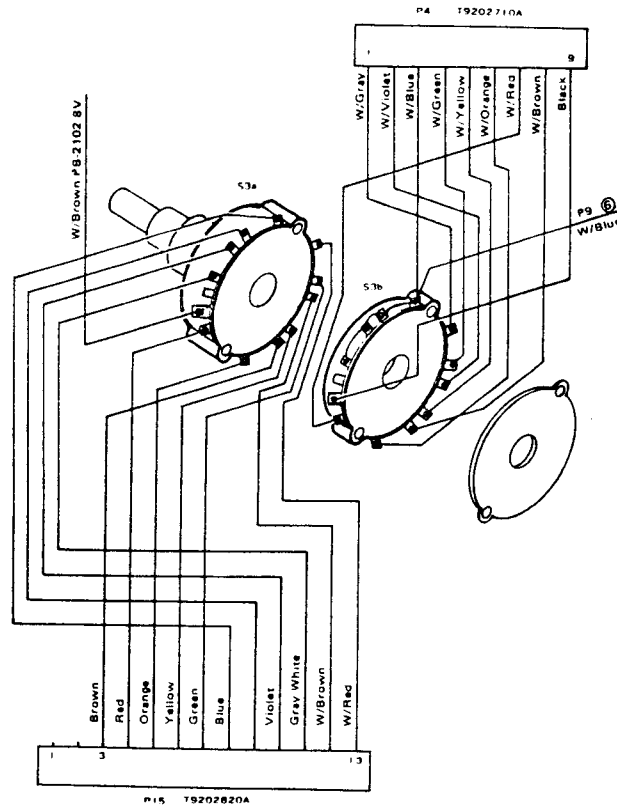


DELAY TIME CONTROL

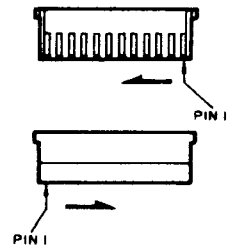
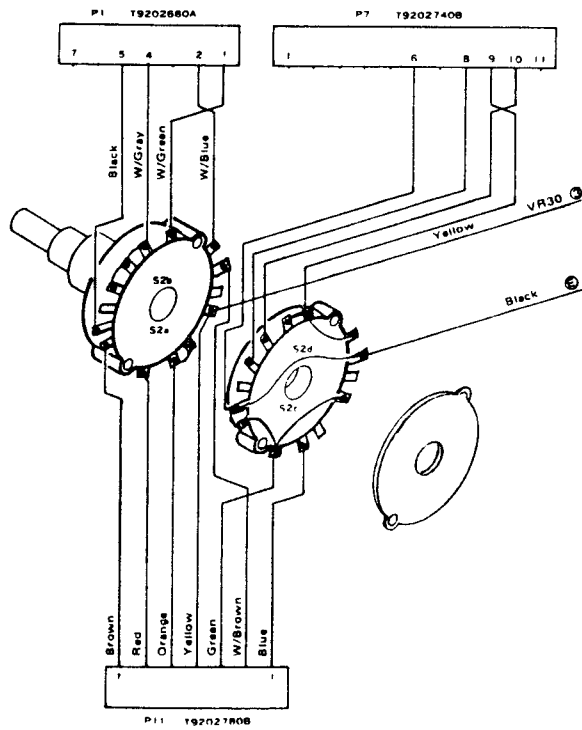
VOX GAIN CONTROL

# SWITCH ASSEMBLIES

## BAND SWITCH ASSEMBLY



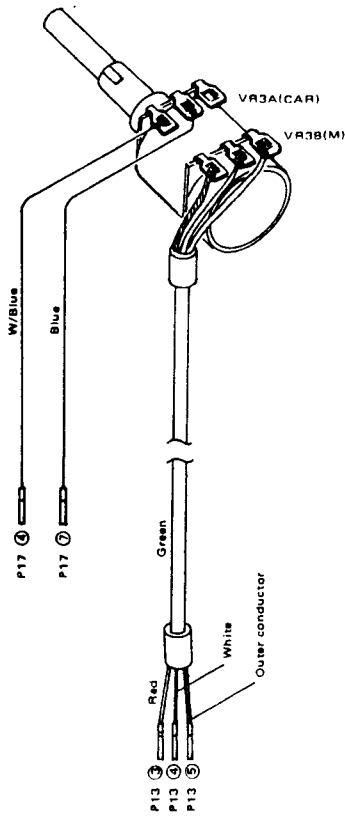
## MODE SWITCH ASSEMBLY



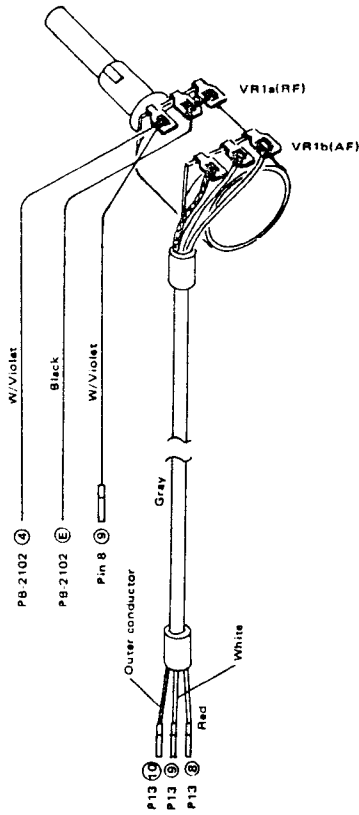
# POTENTIOMETER ASSEMBLIES

SERVICING

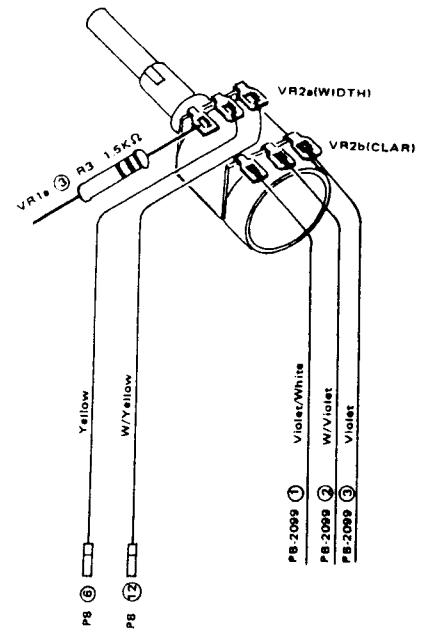
## MIC GAIN/CARRIER CONTROL ASSEMBLY



## RF/AF GAIN CONTROL ASSEMBLY



## CLARIFIER/BAND WIDTH CONTROL ASSEMBLY





MEMO

## SECTION 4—REPAIR PARTS

PARTS LIST AND ORDERING DATA .....	4-1
PARTS LIST .....	4-5



# PARTS LIST

## REPAIR PARTS

MAIN CHASSIS						PLUG	
Symbol No.	Part No.	Description	P1	P1090074			
			P10	P1090153	5047-07A		
		<b>IC</b>	P16,18	P1090154	PI051-04F		
Q1	G1090065	$\mu$ PC14305	P2,3,9,14,19	P1090155	PI051-05F		
Q2	G1090070	$\mu$ PC14308	P11,12	P1090156	PI051-06F		
			P4,5	P1090158	PI051-07F		
		<b>DIODE</b>	P17	P1090159	PI051-09F		
D1,2	G2090001	Si 10D1	P7,13	P1090160	PI051-10F		
D3	G2090142	LED TLR-226	P6,8	P1090161	PI051-11F		
			P15	P1090162	PI051-12F		
		<b>RESISTOR</b>	P21	P1090186	PI091-13F		
R4	J01245560	Carbon film 1/4W TJ 56 $\Omega$			3021-03A		
R8	J01245680	" " " " 68 $\Omega$		S6000060	Speaker terminal		
R7	J01245151	" " " " 150 $\Omega$					
R3	J01245152	" " " " 1.5k $\Omega$					
R6	J10276479	" composition					
		1/2W GK 4.7 $\Omega$					
R1	J10276100	" " " " 10 $\Omega$					
R2	J10276101	" " " " 100 $\Omega$					
				RE UNIT			
			Symbol No.	Part No.	Description		
		<b>POTENTIOMETER</b>	PB-2093B	C0020930	PCB with Components		
VR1	J62800043	DM10A668A-5KB-5KA		F0002093B	Printed Circuit Board		
VR2	J62800044	DM10E572A-5KBX2					
VR3	J62800045	DM10A667A-5KA-5KB			<b>IC, FET &amp; TRANSISTOR</b>		
VR4	J60800069	DM10A624C-20KB	Q1006	G1090062	IC	SN76514N	
			Q1008	G2090135	Diode Quad	ND487C2-3R	
		<b>CAPACITOR</b>	Q1001,1002	G4800730	FET	3SK73GR	
C2	K13170103	Ceramic 50WV 0.01 $\mu$ F	Q1013	G3303800Y	TR	2SC380TM-Y	
C3,4	K13170473	" " 0.047 $\mu$ F	Q1005,1007	G3318150Y	"	2SC1815Y	
C1	K40120338	Electrolytic 25WV 3300 $\mu$ F	Q1010,1011	G3319230R	"	2SC1923R	
			Q1004	G3319590Y	"	2SC1959Y	
			Q1009,1012	G3324070	"	2SC2407	
			Q1003	G3090010	"	2N4427	
		<b>SPEAKER</b>				<b>DIODE</b>	
SP1	M4090027	4 $\Omega$ 3W SS70	D1001-1003, 1005,1007, 1009,1011, 1013,1015, 1017, 1019-1021, 1027,1029, 1031,1033, 1035,1037, 1039,1041, 1042-1061, 1070,1071, 1072	G2090027	Si	1SS53	
		<b>INDUCTOR</b>					
L1	L1190001	250 $\mu$ H					
		<b>CHOKE COIL</b>					
CH1	L2030017	1.7mH					
		<b>RELAY</b>					
RL1	M1090010	FRL-263D012/02CK-0E					
		<b>SWITCH</b>					
S1	N2090024	8H2011 (without Switch Lever)					
S2	N0190014	SRN2045N	D1062-1069	G2090001	Si	10D1	
S3	N0190001	SRN202CN	D1004,1006, 1008,1010, 1012,1014, 1016,1018, 1022-1025, 1032,1034, 1036,1038, 1040	G2010070	GB	1S1007	
	S6000020	SWITCH LEVER, GRAY (for S1)					
		<b>RECEPTACLE</b>					
J1	P1090134	SG7627					
J2	P1090004	SG7814					
J3	P0090158	FM214-8SS					
J4	P1090005	SG8050	D1026,1028, 1030	G2090029	Ge	1N60	
J5	P1090028	MBR06B					
J6	P1090152	D8-703B-11	D1073-1075	G2015550	Si	1S1555	
J7	P1090034	D7-701B-00					
J8	P0090026	QS-1B4M				<b>RESISTOR</b>	
J9,10,11	P1090133	STR-01H	R1011,1064	J00245479	Carbon film 1/4W VJ	4.7 $\Omega$	

REPAIR PARTS

R1101,1126	J00245479	Carbon film	1/4W VJ	4.7Ω	R1024,1034	J00245563	Carbon film	1/4W VJ	56kΩ
R1055,1057, 1058,1067, 1091	J00245100	" "	" "	10Ω	R1025	J00245394	" "	" "	390kΩ
R1118,1119	J00245150	" "	" "	15Ω	R1030	J00245564	" "	" "	560kΩ
R1050,1053	J00245180	" "	" "	18Ω	R1023	J00245225	" "	" "	2.2MΩ
R1032	J00245470	" "	" "	47Ω	C1032,1036, 1171,1172, 1175,1176	K02172040	<b>CAPACITOR</b> Ceramic 50WV NPO 4pF		
R1066	J00245560	" "	" "	56Ω	C1068, 1153,1154	K02172050	" "	" "	5pF
R1071,1120	J00245680	" "	" "	68Ω	C1055,1173, 1174	K02173060	" "	" "	6pF
R1007	J00245820	" "	" "	82Ω	C1166	K02173070	" "	" "	7pF
R1028,1031, 1070,1072, 1073,1076 1104,1124, 1125	J00245101	" "	" "	100Ω	C1060,1061	K02173080	" "	" "	8pF
R1056	J00245121	" "	" "	120Ω	C1064	K02173090	" "	" "	9pF
R1065,1102	110276151	Carbon composition	1/2W "	150Ω	C1056,1069, 1155	K02173100	" "	" "	10pF
R1012,1063, 1092,1100, 1103	J00245221	Carbon film	1/4W VJ	220Ω	C1148	K02175120	" "	" "	12pF
R1013,1014, 1016, 1018 1020, 1021,1022,	J01245221	" "	" TJ	220Ω	C1052,1169, 1170	K02175150	" "	" "	15pF
R1002,1008, 1049,1051, 1052,1054	J00245271	" "	" "	270Ω	C1043,1165	K02179009	" "	" "	22pF
R1090,1095	J00245331	" "	" "	330Ω	C1049	K02175330	" "	" "	33pF
R1122	J00245471	" "	" VJ	470Ω	C1043	K02175390	" "	" "	39pF
R1009,1062,	J00245561	" "	" VJ	560Ω	C1107	K02179016	" "	" "	51pF
R1048	J00245681	" "	" "	680Ω	C1046,1074, 1075	K02175560	" "	" "	56pF
R1010,1027, 1029,1033, 1035,1042, 1044,1047, 1059,1060, 1079,1086, 1087,1098, 1110, 1112 1117	J00245102	" "	" "	1kΩ	C1164,1167, 1168	K02175680	" "	" "	68pF
R1036, 1038 1041, 1043,1045, 1046, 1080 1087,	J01245102	" "	" TJ	1kΩ	C1003,1010, 1012,1026	K02175820	" "	" "	82pF
R1003,1004, 1061,1077, 1097,1099, 1128	J00245152	" "	" VJ	1.5kΩ	C1030,1040	K00175101	" "	" "	SL 100pF
R1121,1123	J00245182	" "	" VJ	1.8kΩ	C1025	K02175121	" "	" "	NPO 120pF
R1001,1075	J00245472	" "	" "	4.7kΩ	C1027	K02179027	" "	" "	270pF
R1005,1006, 1037,1074, 1078,1089, 1094,1105, 1107,1108	J00245103	" "	" "	10kΩ	C1028	K02175151	" "	" "	150pF
R1109	J01245103	" "	" TJ	10kΩ	C1111	K30176151	Dipped mica	" "	150pF
R1017,1106	J00245153	" "	" VJ	15kΩ	C1109	K30176331	" "	" "	330pF
R1015,1093	J00245223	" "	" "	22kΩ	C1119	K30176391	" "	" "	390pF
R1088	J00245333	" "	" "	33kΩ	C1105	K30176431	" "	" "	430pF
	J00245473	" "	" "	47kΩ	C1091,1092, 1184	K30176471	" "	" "	470pF
					C1101	K30176681	" "	" "	680pF
						K30276102	" "	" "	1000pF
					C1097,1099, 1103	K50177102	Mylar	" "	1000pF
					C1001	K50177103	" "	" "	0.01μF
					C1002,1035, 1089	K50177473	" "	" "	0.047μF
					C1005 1009, 1011, 1014- 1016, 1021 1024, 1027,1033, 1034,1037, 1038,1039, 1041,1042, 1044,1045, 1047,1048, 1050,1051, 1053,1054, 1057,1058, 1062,1063, 1065,1066, 1070- 1073, 1076 1088, 1090	K13170103	Ceramic	" "	0.01μF

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C1093-1096, 1113-1118, 1121-1123, 1125-1130, 1132-1136, 1156, 1182	K13170103	Ceramic 50WV 0.01 $\mu$ F	T1040,1041 1042,1043	L0020506	
			T1044,1055	L0020633	
C1013,1017, 1020,1029, 1031,1098, 1100,1102, 1104,1106, 1108,1110, 1112, 1137-1147, 1150,1159, 1177,1178, 1179	K13170473	" " 0.047 $\mu$ F	J1001,1002	P0090134	RECEPTACLE PI051-06M
			J1003,1004	P0090137	PI051-09M
			J1005	P0090140	PI051-12M
				Q5000011	Wrapping terminal C
C1149,	K14179003	" " 0.1 $\mu$ F	Symbol No.	Part No.	Description
C1018,1162, 1163,1180	K40129004	Electrolytic 16WV (16 RE 10) 10 $\mu$ F	PB-2094B	C0020940	PCB with Components
				F0002094B	Printed Circuit Board
C1161	K40129016	" " " 22 $\mu$ F			
C1157,1158, 1181	K40129008	" " " 33 $\mu$ F			FET, IC & TRANSISTOR
			Q2001,2004, 2005,2008	G4800730G	FET 3SK73GR
C1160	K40170105	" " 50WV 1 $\mu$ F	Q2002,2003, 2020	G3090035	" 2SK19TM-GR
C1183	K40170475	Electrolytic 50WV 4.7 $\mu$ F	Q2007	G3090019	" J310
C1151,1152	K70127226	Tantalum 16WV 22 $\mu$ F	Q2021,2025	G3107331P	TR 2SA733A-P
C1019	K19149021	UAT08X473K-L45AE 0.047 $\mu$ F	Q2015	G3305350A	" 2SC535A
			Q2010,2011	G3315830G	" 2SC1583G
		<b>INDUCTOR</b>	Q2023,2024	G3318150G	" 2SC1815GR
L1001	L0020491	LPF Coil	Q2009,2012, 2013, 2016-2019, 2022	G3318150Y	" 2SC1815Y
L1016	L0020625	"			
L1015	L1190005	FL4H-1R0M 1 $\mu$ H			
L1010	L1190007	FL4H1R8M 1.8 $\mu$ H			
L1012	L1190005	FL4H2R2M 2.2 $\mu$ H	Q2006	G3319590Y	" 2SC1959Y
L1017	L1190011	FL4H4R7M 4.7 $\mu$ H	Q2014	G3090005	" MPS-A13
L1013,1014	L1190023	FL5H220K 22 $\mu$ H	Q2026	G1090123	IC 78L08
L1002,1008,	L1190033	FL5H820K 82 $\mu$ H			
L1018,1019	L1190020	FL5H151K 150 $\mu$ H			
L1004 1007	L1190038	FL5H271K 270 $\mu$ H			
			D2017-2020, 2023-2025	G2090029	DIODE Ge 1N60
		<b>TRANSFORMER</b>	D2028	G2090093	Ge 1N270
T1001	L0020178		D2001,2003, 2009-2014	G2010070	Ge (GB) 1S1007
T1003,1006, 1011,1012, 1017,1018	L0020783		D2004,2015, 2016,2027, 2029-2032	G2015550	Si 1S1555
			D2022	G2090001	Si 10D1
T1004,1013, 1014	L0020781		D2005,2006, 2026	G2090027	Si 1SS53
T1005,1015, 1016	L0020782		D2002	G2090040	Varactor FC63
T1007,1009, 1019,1020, 1023,1024	L0020784		D2021	G2022090	" 1S2209
T1008,1010, 1021,1022, 1025,1026	L0020785				
T1027,1028	L0020788A		X2001	H0100433	CRYSTAL HC-18/U 19.7475MHz
T1029	L0020789A				
T1032,1033	L0020501		XF2001	H1100470	CRYSTAL FILTER 8.9875MHz 8.9M20
T1034,1035	L0020502		XF2002	H1102010	10.76MHz XF10GW
T1030,1031, 1036,1037	L0020504		XF2003	H1100860	8.9875MHz XF8.9HS
			XF2004 (OPTION)	H1100880	" XF8.9HC
T1038,1039	L0020505				

# REPAIR PARTS

XF2004 (OPTION)	H1102019	8.9875MHz	XF8.9HCN	R2013,2014, 2054	J01245104	Carbon film	1/4W	TJ	100k $\Omega$
		<b>RESISTOR</b>		R2088,2090	J00245184	"	"	"	VJ 180k $\Omega$
R2077,2105	J00245220	Carbon film	1/4W	VJ	J00245474	"	"	"	470k $\Omega$
R2012,2017, 2022,2027, 2033,2036, 2052,2060, 2065,2070, 2082,2084	J00245101	"	"	"	J00245155	"	"	"	1.5M $\Omega$
		"	"	"	J00245565	"	"	"	5.6M $\Omega$
						<b>POTENTIOMETER</b>			
R2056	J01245101	"	"	"	VR2001,2002, 2005	J51723472	SR19R		4.7k $\Omega$
R2049	J00245151	"	"	"	VR2003,2006	J51723103	"		10k $\Omega$
R2042,2044	J00245181	"	"	"	VR2004	J51723473	"		47k $\Omega$
R2055	J01245221	"	"	"					
R2011,2045, 2083	J00245331	"	"	"					
						<b>THERMISTOR</b>			
R2058,2062, 2047,2087, 2124	J00245471	"	"	"	TH2001,2003	G9090003	D33A		
		"	"	"	TH2002	G9090009	32D27		
R2010,2026, 2116,2125	J00245561	"	"	"					
						<b>CAPACITOR</b>			
R2015,2016, 2043,2046	J00245681	"	"	"	C2058	K00172030	Ceramic	50WV	SL 3pF
R2040,2041	J01245681	"	"	"	C2077	K00173100	"	"	10pF
R2009, 2030-2032, 2047,2053, 2059,2063, 2068,2089, 2093,2099, 2101,2107, 2118	J00245102	"	"	"	C2112	K00175150	"	"	15pF
		"	"	"	C2065,2080, 2122	K00175330	"	"	33pF
R2100	J00245152	"	"	"	C2072,2075	K06175330	"	"	UJ 33pF
R2003,2004, 2057,2076, 2120,2122, 2123	J00245222	"	"	"	C2071	K06175390	"	"	39pF
		"	"	"	C2049	K00175470	"	"	SL 47pF
R2007	J00245272	"	"	"	C2015,2020, 2047,2081, 2097	K00175101	"	"	100pF
R2061,2104	J00245332	"	"	"	C2069	K06175101	"	"	UJ 100pF
R2067	J00245472	"	"	"	C2001,2066, 2082,2098	K00175221	"	"	SL 220pF
R2109	J00245512	"	"	"	C2062	K00175331	"	"	330pF
R2018,2028, 2064,2069, 2071,2106	J00245562	"	"	"	C2043	K10176102	"	"	0.001 $\mu$ F
R2094,2108	J00245682	"	"	"	C2017,2018, 2023	K19149013	"	25WV	0.01 $\mu$ F
R2001,2002, 2020,2025, 2037-2039, 2072,2075, 2078,2086, 2092,2097, 2098,2102, 2113,2115, 2121	J00245103	"	"	"	C2004,2006, 2008,2009, 2012,2013, 2014,2016, 2019,2021, 2022,2024, 2026,2027, 2029-2034, 2036-2038, 2040-2042, 2044,2045, 2046,2048, 2052-2057, 2059-2061, 2064,2068, 2070,2073, 2074,2076, 2078,2092, 2096, 2099-2101, 2103, 2104,2105, 2108-2111, 2113,2116, 2170,2122, 2123	K13170103	"	50WV	0.01 $\mu$ F
R2023,2114	J00245123	"	"	"					
R2051,2066, 2080,2081,	J00245153	"	"	"					
R2074,2085	J00245223	"	"	"					
R2103	J01245223	"	"	"					
R2029	J00245333	"	"	"					
R2008,2024, 2079	J00245473	"	"	"					
R2019	J01245473	"	"	"					
R2073	J00245563	"	"	"	C2079	K13170222	"	"	0.022 $\mu$ F

C2003,2010,2011,2035,2039,2106,2117-2119	K13170473	Ceramic 50WV 0.047 $\mu$ F	Q3002,3013,3017,3040	G31073310	TR	2SA733A-Q
			Q3025-3036,3038	G3303800Y	"	2SC380TM-Y
C2028,2050,2051,2083,2086,2088,2093,2094,2095,2107,2123	K19149021	" 25WV 0.047 $\mu$ F (UAT08X473K-L45AE)	Q3006	G3090032	"	2SC732TM-GR
			Q3003,3005,3007,3010,3011,3012,3014-3016,3018,3020,3021,3023,3024,3039	G3318150Y	"	2SC1815Y
C2063	K40170105	Electrolytic 50WV 1 $\mu$ F				
C2025	K40170335	" 50WV 3.3 $\mu$ F				
C2005,2084,2091	K40120106	" 16WV 10 $\mu$ F	Q3009	G3319590Y	"	2SC1959Y
C2121	K40100336	" 10WV 33 $\mu$ F				
C2089	K70127224	Tantalum 16WV 0.22 $\mu$ F				
						<b>DIODE</b>
			D3014,3015,3048	G2090029	Ge	1N60
			D3001,3012,3042	G2010070	Ge (GB)	1S1007
		<b>INDUCTOR</b>				
L2009	L0020145	VXO 5.2 $\mu$ H	D3017	G2090001	Si	10DI
L2003,2008	L1190023	FL5H-220K 22 $\mu$ H	D3002-3006,3011,3013,3016,3018-3041,3043-3046	G2015550	Si	1S1555
L2014	L1190029	FL5H-470K 47 $\mu$ H				
L2013	L1190030	FL5H-560K 56 $\mu$ H				
L2001,2002,2005,2007,2010,2015	L1190016	FL5H-101K 100 $\mu$ H				
L2011,2016	L1190020	FL5H-151K 150 $\mu$ H	D3007-3010	G2090118	Schottky barrier	1SS97
L2012	L1190017	FL5H-102K 1mH				
						<b>CRYSTAL</b>
			X3001	H0100421	HC-18/U	8.986MHz
		<b>TRANSFORMER</b>	X3002	H0100423	"	8.989MHz
T2001,2003,2004,2010,2012	L0020141	4171	X3003	H0100422	"	8.9883MHz
			X3004	H0101560	"	24.4875MHz
T2002,2008,2009,2011,2013,2014	L0020140	4170	X3005	H0102266	"	17.9845MHz
			X3006	H0102267	"	21.4845MHz
T2005	L0020150	4074	X3007	H0101500	"	28.4875MHz
T2006	L0020460		X3008	H0101510	"	35.4875MHz
T2007	L0020209		X3009	H0101520	"	42.4875MHz
			X3010	H0101530	"	42.9875MHz
			X3011	H0101540	"	43.4875MHz
			X3012	H0101550	"	43.9875MHz
		<b>RELAY</b>	X3013	H0102295	"	32.4875MHz
RL2001	M1190002	FBR211AD012-M	X3014	H0102296	"	38.9875MHz
			X3015	H0102293	HC 14W	3200kHz
		<b>RECEPTACLE</b>				
J2003	P0090134	PI051-06M				<b>CRYSTAL SOCKET</b>
J2001	P0090139	PI051-11M	XS3001	P3090029		4P
J2002	P0090140	PI051-12M	XS3002	P3090042		3P
						<b>RESISTOR</b>
			R3082	J31276010	Wire wound	1/2W 1 $\Omega$
			R3080	J00245229	Carbon film	1/4W VJ 2.2 $\Omega$
			R3076	J00245180	"	" " " " 18 $\Omega$
			R3033	J00245820	"	" " " " VJ 82 $\Omega$
			R3001,3020,3097,3101,3105,3109,3113,3117,3121,3125,3129,3133,3137,3141,3160,3163-3170,3179	J00245101	"	" " " " 100 $\Omega$
<b>PCB UNIT</b>						
Symbol No.	Part No.	Description				
PB-2095B	C0020950	PCB with Components				
	F0002095B	Printed Circuit Board				
		<b>IC, FET &amp; TRANSISTOR</b>				
Q3001	G1090123	IC 78L08				
Q3022	G1090284	" $\mu$ PC2002V				
Q3037	G1090064	" F4024				
Q3004	G3090035	FET 2SK19TM-GR	R3008,3010,3144	J00245151	"	" " " " 150 $\Omega$
Q3008	G3800301Y	" 2SK30A-Y				
Q3019	G3104960Y	TR 2SA496Y	R3011,3012	J00245221	"	" " " " 220 $\Omega$



REPAIR PARTS

R3081,3149, 3159,3176	J00245221	Carbon film 1/4W VJ 220Ω	R3038,3041, 3042,3058, 3092,3095, 3145,3150	J00245223	Carbon film 1/4W VJ 22kΩ
R3161,3162, 3178	J00245331	" " " " 330Ω	R3018,3024, 3045,3052	J00245333	" " " " 33kΩ
R3100,3104, 3108,3112, 3116,3120, 3124,3128, 3132,3136, 3140	J00245391	" " " " 390Ω	R3015,3026, 3030	J00245473	" " " " 47kΩ
R3143	J01245471	" " " TJ 470Ω	R3073	J00245563	" " " " 56kΩ
R3013,3032, 3040,3062, 3153	J00245471	" " " " 470Ω	R3006,3025	J00245104	" " " " 100kΩ
R3005,3023, 3048,3050, 3055,3071, 3077,3091, 3094,3148, 3151,3169	J00245102	" " " " 1kΩ	R3070	J00245184	" " " " 180kΩ
R3142	J01245122	" " " TJ 1.2kΩ	VR3001	J51727101	<b>POTENTIOMETER</b> CR19R 100Ω
R3049,3051, 3147	J00245222	" " " VJ 2.2kΩ	VR3002	J51723103	SR19R 10kΩ
R3173	J00245272	" " " " 2.7kΩ	VR3003	J51723471	470Ω
R3004,3014, 3022,3037, 3047,3054, 3075, 3084-3090, 3098,3102, 3106,3110, 3114,3118, 3122,3126, 3130,3134, 3138,3154	J00245332	" " " " 3.3kΩ	C3137	K00172060	<b>CAPACITOR</b> Ceramic 50WV SL 6pF
R3021,3039	J00245392	" " " " 3.9kΩ	C3068,3070, 3072,3074, 3076,3078, 3080	K02175150	" " "NPO 15pF
R3007,3009, 3035,3036, 3057,3061, 3063,3078, 3156	J00245472	" " " " 4.7kΩ	C3160	K02175180	" " " 18pF
R3002,3003, 3068,3069, 3072,3152	J00245682	" " " " 6.8kΩ	C3014	K02179008	" " " 20pF
R3017	J00245822	" " " " 8.2kΩ	C3138	K00175220	" " SL 22pF
R3027,3029, 3043,3044, 3056,3059, 3064,3066, 3067,3083, 3093,3146, 3155,3157, 3158,3171, 3174,3175, 3079	J00245103	" " " " 10kΩ	C3133	K02179011	" " NPO 27pF
R3019,3031, 3046,3053	J00245123	" " " VJ 12kΩ	C3004-3006, 3109,3113 3117,3121	K02175390	" " " 39pF
R3016,3034, 3060,3074, 3096,3099, 3103,3107, 3111,3115, 3119,3123, 3127,3131, 3135,3139	J00245153	" " " " 15kΩ	C3105	K02175560	" " " 56pF
			C3010,3011, 3093,3101	K02175101	" " " 100pF
			C3129	K02175510	" " " 51pF
			C3125	K02175820	" " " 82pF
			C3089	K02175121	" " NPO 120pF
			C3009,3097	K02175151	" " " 150pF
			C3016	K00175221	" " " 220pF
			C3135	K00175271	" " " 270pF
			C3140,3156, 3157,3159	K12171102	" " " 0.001μF
			C3001-3003, 3007,3008, 3012,3013, 3015,3035, 3067,3069, 3071,3073, 3075,3077, 3079,3081, 3085-3088, 3090-3092, 3094-3096, 3098-3100, 3102-3104, 3016-3108, 3110-3112, 3114, 3116, 3118-3120, 3122,3123, 3124,3115, 3126-3128, 3130,3131, 3136,3149, 3150, 3152-3155, 3158,3161, 3162	K13170103	" " " 0.01μF

C3026,3050, 3132,3143, 3139	K13170473	Ceramic	50WV	0.047 $\mu$ F			<b>RECEPTACLE</b>
					J3001	P0090132	PI051-04M
					J3005	P0090134	PI051-06M
C3083,3084	K30176101	Dipped Mica	"	100pF	J3002,3003	P0090135	PI051-07M
C3151	K30176151	"	"	150pF	J3007	P0090138	PI051-10M
C3082	K30176331	"	"	330pF	J3004	P0090139	PI051-11M
C3115	K30176471	"	"	470pF	J3006	P0090141	PI051-13M
C3134	K30176511	"	"	510pF			
C3057	K50177102	Mylar	"	0.001 $\mu$ F			
C3023	K50177222	"	"	0.0022 $\mu$ F			
C3054	K50177472	"	"	0.0047 $\mu$ F			
C3037,3038, 3041,3046, 3055	K50177103	"	"	0.01 $\mu$ F			
							<b>LPF UNIT</b>
					Symbol No.	Part No.	Description
C3031-3033, 3036,3053	K50177223	"	"	0.022 $\mu$ F		C0021280	LPF UNIT ASSEMBLY
C3017	K50177473	"	"	0.047 $\mu$ F		C9021090	CONNECTOR A BOARD (W/C)
C3062,3066	K50177104	"	"	0.1 $\mu$ F		C9021100	CONNECTOR B BOARD (W/C)
C3019,3021, 3022,3027, 3028,3039, 3042,3044, 3047,3051, 3052,3056, 3059,3060	K40170105	Electrolytic	"	1 $\mu$ F		C9021280	LPF BOARD with components
					PB-2109A	F0002109A	Printed Circuit Board
					PB-2110A	F0002110A	" " "
					PB-2128	F0002128	" " "
							<b>***** LPF BOARD *****</b>
					PB-2128	F0002128	Printed Circuit Board
C3148	K40170225	"	"	2.2 $\mu$ F			
C3034,3049, 3142,3146	K40140475	"	25WV	4.7 $\mu$ F			<b>DIODE</b>
C3020,3040, 3045,3058, 3145,3147	K40120106	"	16WV	10 $\mu$ F	D4001, 4008-4012	G2015550	Si 1S1555
					D4002-4007	G2090038	Schottky barrier 1SS16
					D4013,4014	G2090001	Si 10D1
C3024,3029, 3144	K40120226	"	"	22 $\mu$ F			
							<b>RESISTOR</b>
C3018,3025, 3048	K40120336	"	"	33 $\mu$ F	R4002	J00245470	Carbon film 1/4W VJ 47 $\Omega$
					R4001,4003	J00245471	" " " " 470 $\Omega$
C3030,3141	K40100107	(10RE100)	10WV	100 $\mu$ F		J00245102	" " " " 1k $\Omega$
C3061, 3063-3065	K40120227	"	16WV	220 $\mu$ F			
							<b>POTENTIOMETER</b>
C3043	K70127475	Tantalum	10WV	10 $\mu$ F	VR4001	J50710203	V10K-8-1-2 20k $\Omega$
							<b>CAPACITOR</b>
		<b>TRIMMER CAPACITOR</b>			C4034-4040, 4062-4073	K13170103	Ceramic 50WV 0.01 $\mu$ F
TC3001 3003, 3012	K91000013	ECV1ZW-20x32, 20pF			C4001, 4041-4050, 4074-4081	K13170473	" " 0.047 $\mu$ F
TC3005-3011	K91000016	ECV1ZW-50x32, 50pF					
TC3004	K91000012	ECV1ZW 10x32 10pF					
					C4014,4024, 4030	K30279064	Dipped Mica 500WV 10pF
		<b>INDUCTOR</b>					
L3005	L1190023	FL5H-220K		22 $\mu$ H	C4025,4031	K30279016	" " " 12pF
L3001 3004, 3006,3007	L1190016	FL5H-101K		100 $\mu$ H	C4022	K30279065	" " " 15pF
						K30279118	" " " 18pF
L3008	L1190017	FL5H-102K		1mH	C4018,4021	K30279100	" " " 20pF
					C4010,4028	K30279069	" " " 33pF
					C4012	K30279115	" " " 36pF
					C4003	K30279070	" " " 39pF
		<b>TRANSFORMER</b>			C4016	K30279071	" " " 56pF
T3001	L0020209	4:1			C4027	K30279072	" " " 68pF
T3002, 3004-3012	L0020628				C4009,4032	K30279114	" " " 75pF
					C4006	K30279073	" " " 82pF
T3003	L0020787				C4020	K30279074	" " " 100pF
					C4026	K30279111	" " " 110pF
					C4029	K30279077	" " " 150pF
RL3001	M1190002	FBR211AD012-M			C4015	K30279079	" " " 180pF
					C4019	K30279080	" " " 200pF
					C4023	K30279081	" " " 220pF

# REPAIR PARTS

C4004	K30279082	Dipped Mica	500WV	240pF	C4305	K02179013	Ceramic	50WV NPO	33pF
C4008,4033	K30279085	"	"	330pF					
C4013,4017	K30279086	"	"	360pF					
C4002	K30279089	"	"	510pF	VC4301	K90000024	VARIABLE CAPACITOR		
C4007,4011	K30279113	"	"	680pF					C521R112
C4005	K30279095	"	"	1200pF					
C4051-4061	K21170002	Feed thru	50WV	1000pF	TC4301	K90000001	TRIMMER CAPACITOR		
									TSN-100D15, 15pF
									INDUCTOR
TC1001	K91000019	TRIMMER CAPACITOR			L4301	L0020268			
		ECV1ZW-10x40, 10pF							
									PILOT LAMP
					PL4301,4302	Q1000035			BQ044-22836A
									FET & TRANSISTOR
L4001	L0020615				Q4302	G3090035	FET	2SK19TM-GR	
L4002	L0020616				Q4301,4303	G3318150Y	TR	2SC1815Y	
L4003	L0020617								
L4004	L0020618								DIODE
L4005	L0020854				D4301	G2022360	Varactor	1S2236	
L4006	L0020855								
L4007	L0020621								
L4008	L0020622								
L4009	L0020623								RESISTOR
L4010	L0020624				R4309,4311	J00245101	Carbon film	1/4W VJ	100Ω
					R4307	J00245221	"	"	220Ω
					R4305,4308	J00245222	"	"	2.2kΩ
					R4302	J00245332	"	"	3.3kΩ
T4001	L0020301A	TRANSFORMER			R4301	J00245103	"	"	10kΩ
					R4303	J00245183	"	"	18kΩ
					R4304	J00245223	"	"	22kΩ
RL4001-4011	M1190024	RELAY			R4306,4310	J00245104	"	"	100kΩ
		FBR311D012							
***** CONNECTOR A BOARD *****									
PB-2109	F0002109	Printed Circuit Board							CAPACITOR
					C4327	K02179001	Ceramic	50WV NPO	1pF
					C4307	K02173080	"	"	8pF
J4002	P0090150	CONNECTOR			C4314	K02179013	"	"	33pF
		PI021-06M			C4308,4318	K02175390	"	"	39pF
					C4311	K02179023	"	"	180pF
***** CONNECTOR B BOARD *****									
PB-2110	F0002110	Printed Circuit Board			C4321,4323	K00175471	"	"	SL 470pF
					C4309,4310,	K13170103	"	"	0.01μF
					4312,4315,				
J4001	P0090149	CONNECTOR			4319,4320,				
		PI021-05M			4324,4326				
					C4313	K30176431	Dipped Mica	"	430pF
C4074-4079	K13170473	Ceramic	50WV	0.047μF	C4322,4322	K30209001	"	"	1000pF
					C4325	K70167334	Tantalum	10WV	0.33μF
	Q5000011	Wrapping terminal C							
									TRIMMER CAPACITOR
					TC4302	K91000023	ECV-1ZW 50x40, 50pF		
<b>VFO UNIT</b>									INDUCTOR
Symbol No.	Part No.	Description			L4304,4305	L1190007	FL4H-1R8M, 1.8μH		
		VFO assembly (3540)			L4303,4306	L1190001	250μH		
		VFO chassis			L4302	L1190040	S4 1mH		
PB-2097A	F0002097A	VFO board							
									RECEPTACLE
***** VFO CHASSIS *****					J4301	P0090133	PI021-05M		
									CAPACITOR
C4301	K06173080	Ceramic	50WV UJ	8pF					
C4303	K06175120	"	"	12pF					
C4304	K02175180	"	"	NPO					18pF

COUNTER UNIT 13540			C4417,4419, 4421, 4426-4429	K13170103	Ceramic	50WV NPO 0.01 $\mu$ F
Symbol No.	Part No.	Description				
	C0020861A	COUNTER UNIT ASSEMBLY				
	C9020861A	COUNTER MAIN UNIT	C4423	K50177103	Mylar	0.01 $\mu$ F
	F0002086A	COUNTER MAIN BOARD	C4410,4418	K40120106	Electrolytic	16WV 10 $\mu$ F
			C4416	K40129001	"	16WV 330 $\mu$ F
			C4413	K40109004	"	10WV 470 $\mu$ F
***** COUNTER MAIN BOARD *****			C4422	K71137685	Tantalum	20WV 6.8 $\mu$ F (CC99E1D6R8M)
IC, FET & TRANSISTOR						
Q4412	G1090249	IC MSM9520RS				
Q4420	G1090079	" $\mu$ PA54H				
Q4401	G4800730	FET 3SK73GR				TRIMMER CAPACITOR
Q4406-4411, 4413-4419	G3109520L	TR 2SA952L	TC4401	K91000030	ECV1ZW 40x53, 40pF	
Q4403	G3316740	" 2SC1674L				INDUCTOR
Q4404	G3318150G	" 2SC1815GR	L4401	L2030068	SN Coil	2mH
						RECEPTACLE
		DIODE	J4401	P0090051	5048-06A	
D4401-4413	G20155550	Si 1S1555	J4402	P0090054	5048-07A	
			J4403	P0090037	5048-08A	
		CRYSTAL				
X4401	H0102272	HC-18/U 6.5536MHz				PLUG
			P4403	P1090186	3021-03A	
		RESISTOR				
R4412	J00245100	Carbon film 1/4W VJ 10 $\Omega$	***** DISPLAY BOARD *****			
R4431,4434, 4437,4440, 4443,4446, 4449	J00245330	" " " " 33 $\Omega$		C002098A	PCB with components	
				F0002098A	Printed Circuit Board	
						DISPLAY LED
R4450	J00245560	" " " " 56 $\Omega$	D4501-4506	G2090069	HP5082-7623	
R4401	J01245560	" " " TJ 56 $\Omega$				PLUG
R4408,4418, 4420,4422, 4424,4426, 4428	J00245101	" " " VJ 100 $\Omega$	P4501		5047-06	
			P4502		5047-08	
R4407,4410, 4411	J00245221	" " " " 220 $\Omega$				
R4417,4419, 4421,4423, 4425,4427, 4430,4433, 4436,4439, 4442,4445, 4448	J01245102	" " " TJ 1k $\Omega$	*AVR UNIT*			
			Symbol No.	Part No.	Description	
			PB-2099A	C0020990	PCB with Components	
				F0002099A	Printed Circuit Board	
						IC TRANSISTOR & FET
R4429,4432, 4435,4438, 4441,4444, 4447	J00245152	" " " VJ 1.5k $\Omega$	Q4602	G1090070	IC $\mu$ PC14308	
			Q4601	G3408800	TR 2SD880Y	
			Q4603	G3090035	FET 2SK19TM-GR	
						DIODE
R4402,4415	J00245562	" " " " 5.6k $\Omega$	D4601	G2090001	Si 10D1	
R4413	J00245103	" " " " 10k $\Omega$	D4602	G2090015	Zener RD-6.2EB	
R4409	J00245473	" " " " 47k $\Omega$				
R4404	J01245473	" " " TJ 47k $\Omega$				RESISTOR
R4414,4416	J01245104	" " " " 100k $\Omega$	R4602	J30356100	Wire wound 3W 10 $\Omega$	
			R4607	J00245479	Carbon film 1/4W VJ 4.7 $\Omega$	
		CAPACITOR	R4601	J00245330	Carbon film 1/4W 33 $\Omega$	
C4424	K02179008	Ceramic 50WV NPO 20pF	R4603	J00245332	" " " 3.3k $\Omega$	
C4425	K02175820	" " " " 82pF	R4604,4606	J00245682	" " " 6.8k $\Omega$	
C4420	K02175101	" " " " 100pF	R4605	J00245123	" " " 12k $\Omega$	
C4401,4404	K13170102	" " " " 0.001 $\mu$ F		J00245153	" " " 15k $\Omega$	
C4402,4405, 4408,4409, 4411,4412, 4414,4415.	K13170103	" " " " 0.01 $\mu$ F				POTENTIOMETER
			VR4601	J50710502	V10K8-1-2 5k $\Omega$ B	

# REPAIR PARTS

		CAPACITOR					RESISTOR		
C4606-4610, 4614	K13170473	Ceramic	50WV	0.047 $\mu$ F	R4801,4811	J00245102	Carbon film	1/4W VJ	1k $\Omega$
C4604	K50177104	Mylar	"	0.1 $\mu$ F	R4807,4810, 4814	J00245562	"	"	5.6k $\Omega$
C4605	K40109007	Electrolytic	10WV	220 $\mu$ F	R4815	J00245682	"	"	6.8k $\Omega$
C4603	K40129009	"	16WV	220 $\mu$ F	R4802,4809, 4812,4813	J00245103	"	"	10k $\Omega$
C4602	K40129001	"	"	330 $\mu$ F	R4804	J00245433	"	"	43k $\Omega$
C4601	K40129011	"	"	1000 $\mu$ F	R4803,4806	J00245473	"	"	47k $\Omega$
C4611	K40170105	Electrolytic	50WV	1 $\mu$ F	R4805	J00245563	"	"	56k $\Omega$
C4613	K40120106	"	16WV	10 $\mu$ F	R4808	J00245683	"	"	68k $\Omega$
C4612	K70127224	Tantalum	16WV	0.22 $\mu$ F					
		RELAY					CAPACITOR		
RL4601	M1190023	FBR321D012			C4801,4802, 4805,4806	K13170103	Ceramic	50WV	0.01 $\mu$ F
RL4602	M1190006	FBR221D012			C4803,4804	K70127106	Tantalum	16WV	10 $\mu$ F
					C4808	K30209001	Dipped mica	50WV	1000pF
	Q5000011	Wrapping terminal C			C4807,4809	K30209003	"	"	1500pF
							INDUCTOR		
		<b>INDICATOR UNIT</b>			L4803,4804	L1190080	LB4B3R3J,	3.3 $\mu$ H	
Symbol No.	Part No.	Description			L4801,4806	L1190093	LB4B8R2J,	8.2 $\mu$ H	
PB-2100A	C0021000	PCB with Components			L4802,4805	L1190094	LB4B100J,	10 $\mu$ H	
	F0002100	Printed Circuit Board							
							LAMP FUSE		
		<b>IC</b>			F4801	Q1000010	BQ041-22803A		
Q4701	G1090241	TA7612AP							
							RECEPTACLE		
		<b>DIODE</b>			J4801,4803	P0090120	PI051-02M		
D4701-4705	G2090136	LED	TLC205		J4802	P0090121	PI051-03M		
D4706-4708	G2090134	"	TLY205						
D4709,4710	G2090137	"	TLR205			Q5000011	Wrapping terminal C		
D4711	G2090001	Ge	1N60						
							SW UNIT		
		<b>RESISTOR</b>			Symbol No.	Part No.	Description		
R4702-4706	J01245331	Carbon film	1/4W TJ	330 $\Omega$	PB-2102A	C0021020	PCB with Components		
	J01245391	"	"	390 $\Omega$		F0002102	Printed Circuit Board		
R4707-4709	J01245471	"	"	470 $\Omega$					
R4713	J01245102	"	"	1k $\Omega$					
R4710,4711	J01245152	"	"	1.5k $\Omega$	R4901-4903	J00245561	Carbon film	1/4W VJ	560 $\Omega$
R4712	J01245103	"	"	10k $\Omega$	R4904	J01245103	"	"	10k $\Omega$
R4701	J01245393	"	"	39k $\Omega$					
							CAPACITOR		
		<b>CAPACITOR</b>			C4901,4902	K13170473	Ceramic	50WV	0.047 $\mu$ F
C4702	K13170473	Ceramic	50WV	0.047 $\mu$ F	C4903	K70147105	Tantalum	16WV	1 $\mu$ F
C4701	K40129009	Electrolytic	16WV	220 $\mu$ F					
C4703	K13170102	Ceramic	50WV	0.001 $\mu$ F					
							SWITCH		
					S4901	N4090030	SUT71A		
							VR A UNIT		
		<b>HPF (FAN MOTOR CONTROL) UNIT</b>			Symbol No.	Part No.	Description		
Symbol No.	Part No.	Description			PB-2103A	C0021030	PCB with Components		
PB-2101A	C0021010	PCB with Components				F0002103	Printed Circuit Board		
	F0002101	Printed Circuit Board							
							POTENTIOMETER		
		<b>IC, TRANSISTOR</b>			VR5001	J51734103	CR19D		10k $\Omega$
Q4801	G1090246	IC	AN6552	(VOX GAIN)					
Q4805	G1090123	"	78L08						
Q4802,4804	G3318150Y	TR	2SC1815Y				VR B UNIT		
Q4803	G3405920Q	"	2SD592Q		Symbol No.	Part No.	Description		
					PB-2103A	C0021031	PCB with Components		
						F0002103	Printed Circuit Board		
							POTENTIOMETER		
D4802	G2090001	Si	10D1		VR5101	J51734224	CR19D		220k $\Omega$
D4801,4803, 4804	G2015550	Si	1S1555		(DELAY)				



REPAIR PARTS

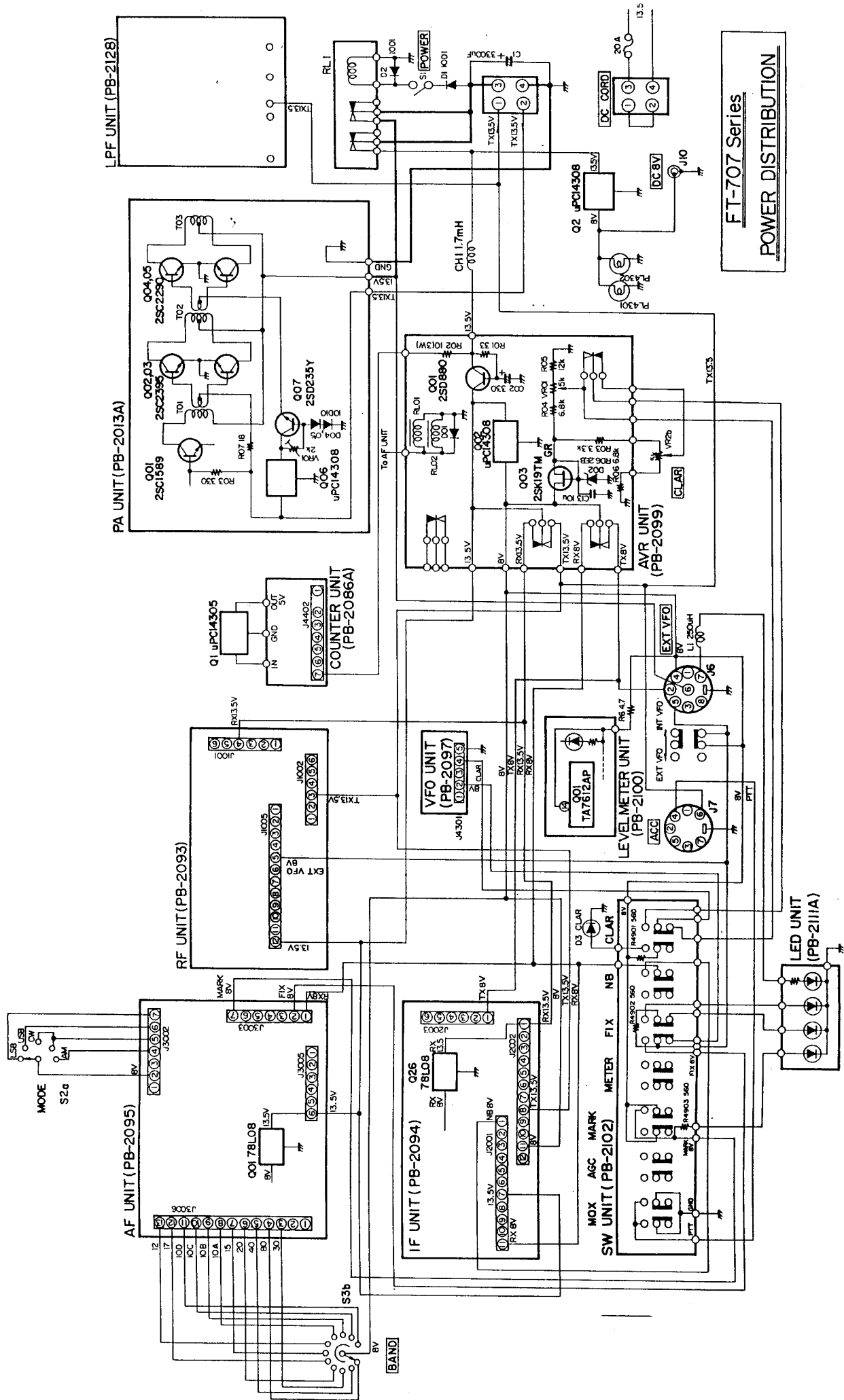
RF UNIT			R1040-1046, 1054,1062, 1065,1068, 1100,1108	J00245102	Carbon film 1/4W VJ 1k $\Omega$
Symbol No.	Parts No.	Description			
PB-2201	F0002201	Printed Circuit Board			
	C0022010	PCB with Components			
		<b>IC, FET &amp; TRANSISTOR</b>	R1047, 1101-1107	J01245102	" " " TJ 1k $\Omega$
Q1006	G1090062	IC SN76514N	R1003,1004, 1084,1086	J00245152	" " " VJ 1.5k $\Omega$
Q1008	G2090135	Diode Quad ND487C2-3R	R1014	J00245332	" " " " 3.3k $\Omega$
Q1001,1002	G4800730G	FET 3SK73GR	R1031,1032, 1093,1094	J00245182	" " " " 1.8k $\Omega$
Q1013	G3303800Y	TR 2SC380TM-Y	R1015,1130	J00245562	" " " " 5.6k $\Omega$
Q1005,1007	G3318150Y	" 2SC1815Y	R1001,1013, 1033,1096	J00245472	" " " " 4.7k $\Omega$
Q1010,1011	G3319230R	" 2SC1923R	R1076,1077, 1080,1083, 1085,1097, 1109,1115, 1128	J00245103	" " " " 10k $\Omega$
Q1004	G3319590Y	" 2SC1959Y	R1078,1079	J01245103	" " " TJ 10k $\Omega$
Q1003,1009, 1012	G3324070	" 2SC2407	R1027	J00245153	" " " VJ 15k $\Omega$
		<b>DIODE</b>	R1116	J00245223	" " " " 22k $\Omega$
D1001-1010, 1039-1040, 1044-1048, 1057-1074	G2090027	Si 1SS53	R1110	J00245333	" " " " 33k $\Omega$
D1020,1021, 1042	G2015550	Si 1S1555	R1025,1063	J00245563	" " " " 56k $\Omega$
D1049-1056	G2090001	Si 10D1	R1026	J00245394	" " " " 390k $\Omega$
D1011-1019, 1043	G2090118	Schottky Barrier 1SS97	R1064	J00245564	" " " " 560k $\Omega$
D1022-1030, 1041	G2010070	Ge(GB) 1S1007	R1027	J00245225	" " " " 2.2M $\Omega$
					<b>CAPACITOR</b>
			C1151	K30176151	Dipped mica 50WV 150pF
			C1150	K30176331	" " " 330pF
		<b>RESISTOR</b>	C1178	K30176391	" " " 390pF
R1057,1072, 1075,1120	J00245479	Carbon film 1/4W VJ 4.7 $\Omega$	C1148	K30176431	" " " 430pF
R1060,1112	J00245100	" " " " 10 $\Omega$	C1124,1125	K30176471	" " " 470pF
R1050,1051, 1125	J00245180	" " " " 18 $\Omega$	C1146	K30176681	" " " 680pF
R1066	J00245470	" " " " 47 $\Omega$	C1053,1099	K02179003	Ceramic " CH2pF
R1090	J00245560	" " " " 56 $\Omega$	C1019,1208	K02179004	" " " CJ 3pF
R1089	J00245680	" " " " 68 $\Omega$	C1066,1152, 1153	K02172040	" " " CH4pF
R1073	J10276820	" composition 1/2W GK 82 $\Omega$	C1028,1063	K02173080	" " " 8pF
R1029,1067, 1087,1088, 1092,1098, 1099,1114, 1129	J00245101	" film 1/4W VJ 100 $\Omega$	C1018,1064	K02173090	" " " 9pF
R1058,1121	J10276151	" composition 1/2W GK 150 $\Omega$	C1030,1065, 1069,1071	K02173100	" " " 10pF
R1016-1023	J01245221	" film 1/4W TJ 220 $\Omega$	C1026,1062, 1072	K02175120	" " " 12pF
R1059,1074, 1113,1122, 1126	J00245221	" " " VJ 220 $\Omega$	C1021,1029	K02175150	" " " 15pF
R1002,1048, 1049,1052, 1053,1069, 1123,1124	J00245271	" " " " 270 $\Omega$	C1025,1027, 1068,1070	K02175180	" " " 18pF
R1111,1117	J00245331	" " " " 330 $\Omega$		K02179008	" " " 20pF
R1095	J00245471	" " " " 470 $\Omega$	C1015-1017, 1020,1025	K02179009	" " " 22pF
R1055,1070, 1071,1119	J00245561	" " " " 560 $\Omega$	C1022,1059	K02179010	" " " 24pF
R1091	J00245681	" " " " 680 $\Omega$	C1024,1061, 1067	K02179011	" " " 27pF
R1034-1039, 1056,1118	J00245821	" " " " 820 $\Omega$	C1013	K02179013	" " " 33pF
R1024,1028, 1030	J00245102	" " " " 1k $\Omega$	C1003,1205	K02175390	" " " 39pF
			C1002,1206	K02175470	" " " 47pF
			C1149	K02179016	" " " 51pF
			C1014,1023, 1180,1181	K02175560	" " " 56pF
			C1060	K02179017	" " " 62pF
			C1001,1107, 1108	K02175820	" " " 82pF
			C1049,1093	K00175101	" " " SL 100pF
			C1004,1204	K02175121	" " " CH 120pF
			C1006-1008	K13170103	" " " 0.01 $\mu$ F

C1010,1012, 1031-1038, 1047,1048, 1051,1054, 1055,1058, 1073-1081, 1083-1085, 1087-1089, 1091,1094, 1095,1098, 1100,1101, 1106, 1121-1123, 1126-1131, 1135, 1137-1140, 1169-1171, 1174-1177, 1179,1182, 1183,1185, 1187-1194	K13170103	Ceramic	50WV	0.01 $\mu$ F	L1006,1007	L1190017	FL5H 102K	1mH
							<b>TRANSFORMER</b>	
					T1001	L0020178		
					T1002,1003, 1018,1019	L0020892		
					T1004,1005	L0020894		
					T1006,1007, 1022,1023	L0020782		
					T1008,1009, 1024,1025	L0020891		
					T1010,1011, 1026,1027	L0020784		
					T1012,1013	L0020893		
					T1014,1015, 1030,1031	L0020890		
					T1016,1017, 1028,1029, 1032,1033	L0020785		
					T1020,1021	L0020781		
C1005,1050, 1052,1057, 1086,1102, 1103,1104, 1109, 1111-1120, 1154-1168, 1186	K13170473	"	"	0.047 $\mu$ F	T1034,1035	L0020788A		
					T1036	L0020789A		
					T1037,1038, 1043,1044	L0020504		
					T1039,1040	L0020501		
					T1041,1042	L0020502		
					T1045,1046, 1049,1050	L0020505		
C1142	K13179007	"	"	0.1 $\mu$ F	T1047,1048	L0020506		
C1144,1145, 1147	K50177102	Mylar	50WV	0.001 $\mu$ F	T1051,1052	L0020633		
C1011	K50177103	"	"	0.01 $\mu$ F				
C1056,1141	K50177473	"	"	0.047 $\mu$ F			<b>RECEPTACLE</b>	
C1082,1092, 1110	K19149021	Semiconductor ceramic (UAT08X473K-L45AE)	25WV	0.047 $\mu$ F	J1001,1002	P0090134	PI051-06M	
C1143,1173	K70127226	Tantalum	16WV	22 $\mu$ F	J1003,1004	P0090137	PI051-09M	
C1097	K40179012	Electrolytic (50RE475)	50WV	4.7 $\mu$ F	J1005	P0090140	PI051-12M	
C1105,1134, 1136	K40129004	"	(16RE106)					
			16WV	10 $\mu$ F		Q5000011	Wrapping terminal C	
C1009	K40129016	"	(16RE226)					
			16WV	22 $\mu$ F				
C1039-1046, 1172,1184, 1195-1203	K40129008	"	(16RE336)					
			16WV	33 $\mu$ F				
C1096	K40109002	"	(10RE476)					
			10WV	47 $\mu$ F				
		<b>INDUCTOR</b>						
L1001,1025	L0020898							
L1002,1009	L0020491							
L1016	L0020625	T25-6						
L1013,1015	L1190005	FL4H 1R0M		1 $\mu$ H				
L1010	L1190007	FL4H 1R8M		1.8 $\mu$ H				
L1011	L1190008	FL4H 2R2M		2.2 $\mu$ H				
L1022,1024 1026,	L1190011	FL4H 4R7K		4.7 $\mu$ H				
L1021	L1190014	FL4H 100K		10 $\mu$ H				
L1012,1014, 1017,1020, 1023	L1190023	FL5H 220K		22 $\mu$ H				
L1005,1008	L1190033	FL5H 820K		82 $\mu$ H				
L1018,1019	L1190016	FL5H 101K		100 $\mu$ H				
L1003,1004	L1190017	FL5H 102K		1mH				

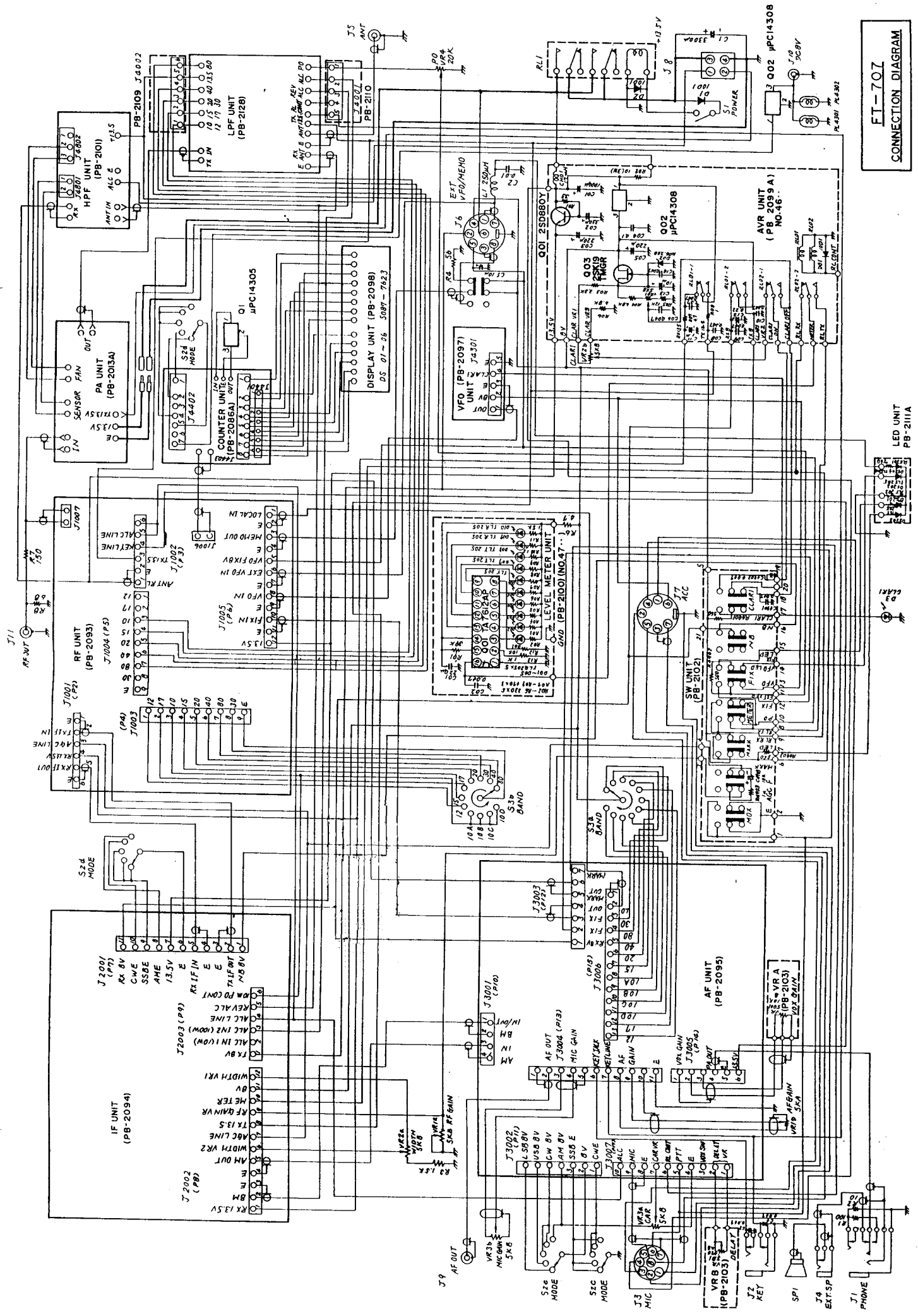


## POWER SUPPLY FP-707

MAIN CHASSIS				*T9013284	3 wire, 2 prong EU plug
Symbol No.	Part No.	Description			
		<b>TRANSISTOR</b>			<b>AC POWER SOCKET</b>
Q1,2,3	G34071700	2SD717-O			*(200V-234V only)
		<b>DIODE</b>		P0090094	PA125
D1	G2090121	Si (Bridge) S25VB10			
		<b>RESISTOR</b>			
R1	J30379002	Cement 5W 10Ω (SQ5L 10Ω)			
R2,3,4	J30379001	Cement 5W 0.05Ω (SQ5L R05)			
		<b>CAPACITOR</b>			
C1,2	K12329001	Ceramic 1.4KVDC 0.01μF (ECK-DAL103PE)			<b>FET, TRANSISTOR</b>
C6	K13170473	" 50WV 0.047μF (DB207YF473Z5L5)	Q101	G3090036	FET 2SK19TM-BL
C7	K40120108	Electrolytic 16WV 1000μF (16RL1000)	Q103	G3109500Y	TR 2SA950-Y
C3,4,5	K43140005	" 25WV 33000μF (25LE33000)	Q102	G3110120Y	" 2SA1012-Y
		<b>POWER TRANSFORMER</b>			<b>DIODE</b>
PT1	L3030081		D101,102,105	G2090001	Si 10D1
		<b>SPEAKER</b>	D104	G2015550	" 1S1555
SP1	M4090048	SE128D-1 4Ω 3W	D103	G2090047	Zener WZ061
		<b>RELAY</b>			<b>RESISTOR</b>
RL1	M1090016	FRL263D012/01CS-OE	R106	J10276270	Carbon composition 1/2W GK 27Ω
		<b>SWITCH</b>	R101	J10245560	" film 1/4W VJ 56Ω
S1	N2090024	8H2011	R102	J10245821	" " " " 820Ω
	S6000026	Switch lever (gray)	R105	J10245222	" " " " 2.2kΩ
		<b>OUTPUT TERMINAL</b>	R103,104	J10245332	" " " " 3.3kΩ
	Q5000008	T203 (red)			<b>POTENTIOMETER</b>
	Q5000009	T203 (black)			CR29R4.7KB 4.7KΩB
		<b>FUSE HOLDER</b>			<b>CAPACITOR</b>
FH1	P2000012	SN2059	C104	K50177223	Mylar 50WV 0.022μF
		<b>FUSE</b>	C103	K50177473	" " " " 0.047μF
F1 (100V-117V)	Q0000012	6A	C101	K40149010	Electrolytic 25WV 330μF (25RE330)
F1 (200V-234V)	Q0000004	3A	C102,105	K40129011	" 16WV 1000μF (16RE1000)
		<b>PILOT LAMP (LED)</b>			
PL1	G2090141	DB20 (Red)			
		<b>TERMINAL BOARD</b>			
	Q6000013	1L5P(S) (2-0-3)			
	Q6000014	1L5P(S) (3-0-2)			
		<b>CONNECTION CORD</b>			
	T9203030				
	P1090042	POWER PLUG QMS-P4FK			
	P0090034	SPEAKER PLUG P2240			
		<b>AC POWER CORD</b>			
	T9000180	2 wire, 2 prong plug			
	T9000482	3 wire, 3 prong plug (UL)			
	*T9013283	3 wire, 3 prong Australian plug			



FI-707 Series  
POWER DISTRIBUTION



**FT-70Z  
CONNECTION DIAGRAM**

