FTR-710A
FTR-2410A
FTR-5410
FM REPEATERS
INSTRUCTION MANUAL

FL-750 50W PA
FL-2450 50W PA
FL-5450 50W PA

INSTRUCTION MANUAL

YAESU MUSEN CO., LTD.
C.P.O. BOX 1500
TOKYO, JAPAN

CONTENTS

YAESU
VHF/UHF FM REPEATERS
FTR-710A, -2410A, -5410

GENERAL DESCRIPTION

The FTR-710A (low VHF), FTR-2410A (medium VHF) and FTR-5410 (UHF) are commercial quality 10-watt FM repeaters designed to provide reliable, continuous-duty two-way communications over a wide range of environmental conditions, from either the AC line or 12V DC source.

Designed for easy installation in a standard 19-inch rack, each repeater utilizes glass-epoxy circuit boards and high grade components in all circuits. Standard circuits include automatic time out and hang up delay timers, plus everything needed for non-repeater operation as a semi- or full duplex transceiver; which makes this an ideal system for dual function (repeater/base) stations.

As is, the low power consumption of these repeaters makes them capable of extended operation from batteries during times of power failure, and automatic switching is provided to shift to the DC supply should the AC source fail. During normal AC operation, the DC power terminals present a constant trickle charge to keep batteries in top condition.

Options include matching 50-watt power amplifiers, a CTCSS decoder/encoder for tone squelch operation, tone burst decoder, DTMF decoder, and telephone interfacing equipment. Cavity duplexers are also available for the FTR-2410A and FTR-5410.

SPECIFICATIONS

GENERAL

Frequency ranges:
(one channel crystal controlled)
68–88 MHz (FTR-710A)
Type A: 68–74 MHz
Type B: 74–81 MHz
Type C: 81–88 MHz
136–174 MHz (FTR-2410A)
Type A: 136–146 MHz
Type B: 146–160 MHz
Type C: 160–174 MHz
400–512 MHz (FTR-5410)
Type A: 400–420 MHz
Type B: 420–430 MHz
Type C: 430–450 MHz
Type D: 450–470 MHz
Type E: 470–490 MHz
Type F: 490–512 MHz

Type of Emission:
16F3

Transmit Activation System:
Carrier controlled

Power Requirements:
AC 100/110/117/200/220/234V
DC 12V (Negative ground)

Input Power:
AC 100VA
DC 48W

Operating Temperature Range:
−30°C to +60°C

Duty Cycle:
Continuous

Case Size:
133(H) x 483(W) x 356(D) mm

Weight:
12 kg. (w/o duplexer); 13.4 kg (w/duplexer; FTR-2410A, 5410)

TRANSMITTER

RF Power Output:
10 watts

Frequency Stability:
±5 ppm

Frequency Multiplication:
x 6 (FTR-710A, -2410A), x 12 (FTR-5410)

Modulation:
Phase modulation (FM)

Maximum Deviation: (4.8 KHz Bessel null f_0 = 2033 Hz. IW3LNC 8/2000)
±5 kHz

Audio Response:
+1, −3 dB/octave pre-emphasis characteristic from 300 Hz to 3000 Hz

Audio Distortion:
Less than 10% (60% deviation at 1 kHz)

FM Noise Ratio:
Better than 45 dB

Spurious Emissions: IW3LNC 8/2000
At least 60 dB below carrier (−62 min.)

RECEIVER

Sensitivity:
Better than 0.5 μV for 12 dB SINAD
Better than 1.0 μV for 20 dB QS

Frequency Stability:
±5 ppm

Adjacent Channel Selectivity:
Better than 80 dB (±25 kHz)

Intermodulation:
Better than −65 dB (±25 kHz, ±50 kHz)

Spurious Response:
Better than −80 dB

Squelch Sensitivity:
0.2 μV

Audio Output:
2 watts at 8 ohms (10% THD)

AF Response:
+1, −3 dB/octave de-emphasis characteristic from 300 Hz to 3000 Hz

DUPLEXER
(Internal; FTR-2410A)

Frequency Range:
148 MHz to 174 MHz

Frequency Separation:
4.5 MHz (min.)

Insertion Loss:
1.2 dB

TX Noise Suppression:
80 dB

RX Isolation at TX:
80 dB

Maximum VSWR:
1.5 : 1

Frequency Stability:
2.5 ppm/° F

ACCESSORIES

Supplied:

AC Power Cord
- 3-wire, 3-prong UL plug (T9013282) 1
- 3-wire, 3-prong Australian plug (T9013283)
- 3-wire, 2-prong EU plug (T9013284)

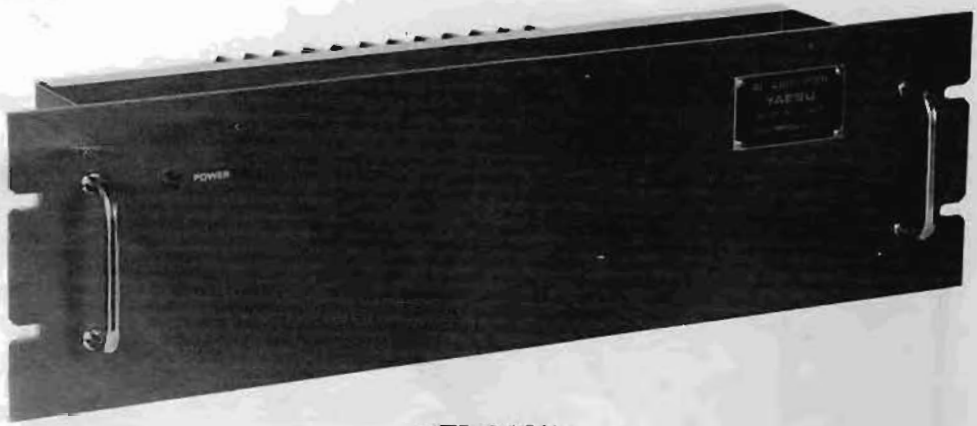
Spare Fuses
- AC 2A (100–117V) (Q0000003) 1
- 1A (200–234V) (Q0000002)
- DC 4A (Q0000006) 1

2-pin Small Plug P-2240 (P0090034) 1

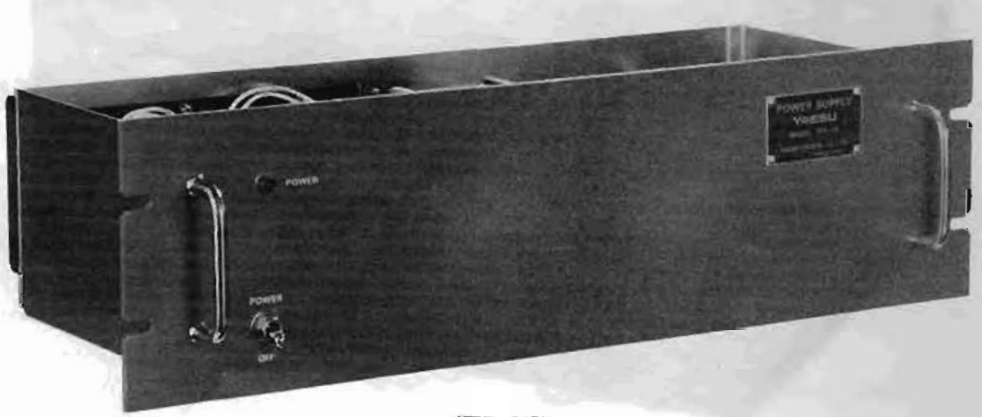
Options:

Tone Burst Unit (FTS-5)	(D3000257)
Tone Squelch Unit (FTS-32R(RPT))	(D3000258)
DTMF Unit	(D3000259)
ID Unit	(D3000260)
Mounting Rack (MR-1A)	(D3000232)
(MR-2A)*	(D3000272)
Duplexer (PD636)*	(D3000274)
(PD506)*	(D3000275)
(PD479)*	(D3000276)
(PD696(A))**	(D3000261)
(PD696(E))**	(D3000232)
50W Power Amplifier (FL-750)***	(A4130000)
(FL-2450)*	(A4110000)
(FL-5450)**	(A4120000)
50W PS Unit (FP-15)	(A6450000)
Microphone (YM-30)	(D1000026)
Blank Panel	(D3000273)

* FTR-2410A, ** FTR-5410,*** FTR-710A

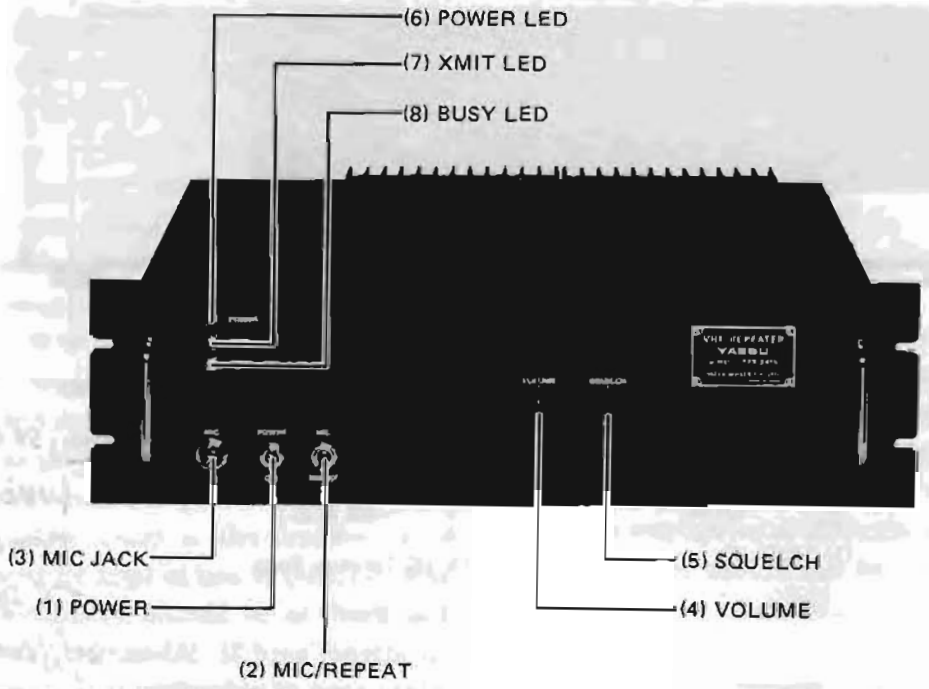


(FL-2450)



(FP-15)

FRONT PANEL CONTROLS AND SWITCHES



(1) POWER

This is the main power switch for the repeater.

(2) MIC/REPEAT

This switch selects the operating function, as a repeater or transceiver. When this switch is in the REPEAT position, the unit functions as a repeater, while in the MIC position, you can speak into the microphone to use it as a transceiver.

(3) MIC Jack

This six-pin connector accepts the microphone input, and provides a standby control line to activate the transmitter when using the transceiver function.

(4) VOLUME

The volume control sets the receiver volume level from the front panel speaker. If desired, this control can be set fully counterclockwise when repeater monitoring is not needed.

(5) SQUELCH

The squelch control silences receiver noise until a signal is received (when using the transceiver or repeater function).

(6) POWER LED

This indicator lamp will glow green whenever AC or DC power is applied, and the POWER switch is on.

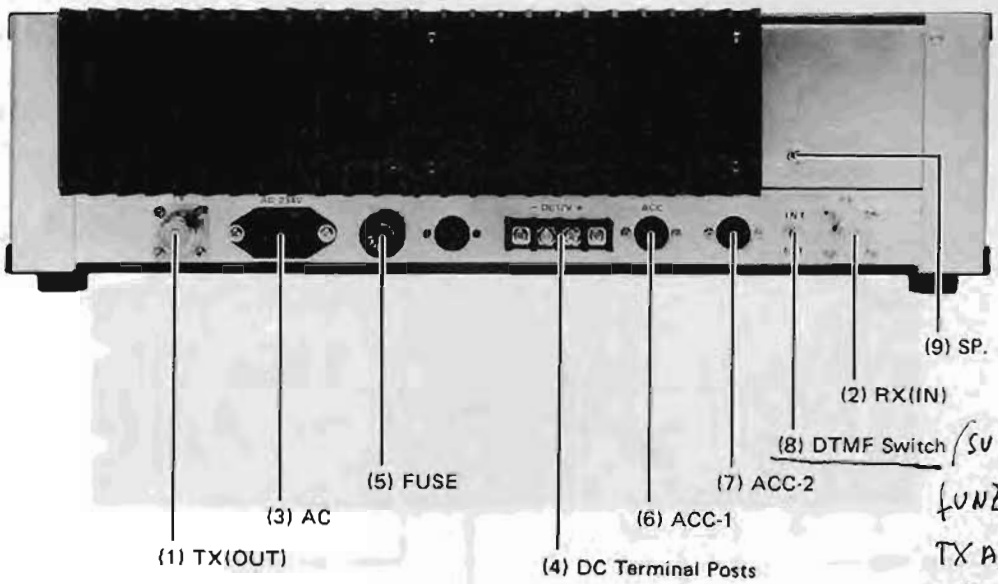
(7) XMIT LED

This red indicator will light up when the transmitter is activated.

(8) BUSY

This indicator will light up when a signal is received (strong enough to break the receiver squelch, as set by the SQUELCH control).

REAR APRON CONNECTIONS



(SU POS. EXT. PER FUNZ. CON codice: TX Acceso 7526 TX spento 7524 30/8/2000 INSLNC (VIA RADIO)

(1) TX (OUT)

This coaxial jack provides the transmitter output signal for connection to the transmitting antenna or TX jack on the duplexer, if used. Impedance requirement is 50 ohms.

(2) RX (IN)

This coaxial jack accepts the receiver input signal from the receiving antenna or RX jack on the duplexer, if used. Impedance requirement is also 50 ohms.

(3) AC

This receptacle accepts the AC power cord, which should be connected through the AC terminal on the MR-1A or MR-2A Mounting Rack to the AC mains supply or wall outlet. The AC line voltage must match that for which the repeater is wired.

(4) DC Terminal Posts

These terminal posts accept 12–15 VDC for operating the repeater from a battery or other DC source. When operating from AC, a small trickle current is present at these terminals to maintain battery charge.

(5) FUSE

A properly rated fuse must be installed here for operation from AC power. For 110–117 VAC operation, use only a 2-amp fuse. For 200–234 VAC operation, use only a 1-amp fuse.

(6) ACC-1

This 7-pin DIN jack provides control signals for an external RF power amplifier, such as the FL-750, FL-2450 or FL-5450.

(7) ACC-2

This 8-pin DIN jack provides control signal connections for an external DTMF controller.

(8) DTMF Switch

Set this switch to the EXT position to control the repeater from an external DTMF controller. Otherwise control is by the internal (optional) DTMF Unit, if installed.

(9) SP

This jack is used to accommodate an external speaker. Inserting the plug into this jack automatically disables the internal speaker.

INSTALLATION

Antenna Considerations

Repeater operation without a duplexer requires that two antennas be installed, one for receiving and one for transmitting, in such a manner that the receiving antenna does not pick up too much energy from the transmitting antenna. There are a number of ways that this may be done, depending on the size of the frequency split between the transmitter and receiver, and on the location available for antenna mounting. If a duplexer is used, a single antenna will suffice for both transmitting and receiving simultaneously.

Regardless of the above choice, it is of paramount importance that the antenna(s) be mounted as high and in the clear as possible, preferably within line-of-sight to all areas where repeater users may be located. Furthermore, losses in the feedline(s) to the antenna(s) must be kept as low as possible. For this reason, the feedline(s) should be as short, and of as high a quality, as possible. If long lengths of feedline are necessary, it is preferable to use coaxial hardline (Heliax) cable to reduce losses, particularly at the higher frequencies.

Of course all antennas used with the repeater should have an impedance of 50 ohms at the operating frequency. When separate receive and transmit antennas are used, high-Q narrowband models may serve to minimize interaction. However, when a single antenna is used with a duplexer, it should be a low-Q wideband type.

NEVER TRANSMIT WITHOUT HAVING A TRANSMITTING ANTENNA CONNECTED TO THE REPEATER.

DC Power Supply Backup

For uninterrupted operation during power failures, a 12V rechargeable lead-acid (automotive) storage battery may be connected to the DC terminal posts on the rear apron of the repeater (RED to "+", BLACK to "–"). While the repeater is operating from the AC source, a slight charging current will then maintain battery charge. In the event of a power outage, the automatic power control circuit will automatically switch the repeater to the backup battery, and operation will not be interrupted.

After operation from the battery, it should be disconnected from the repeater and recharged separately before reconnecting, as the trickle charge is not sufficient for recharging a completely discharged battery.

During transmission while operating from a battery or DC supply, the repeater requires approximately 4 amperes (at 12V).

Equipment Location

While the operating temperature range of the repeater is quite broad, the best location is still one in which the air temperature does not approach the extremes or change rapidly. It is necessary to allow for free air circulation around the heatsinks on the rear apron at all times, and in warm climates the repeater should not be sealed in a small closed room.

The repeater must be protected from wind and rain, and extremes in temperature or humidity may shorten the useful life of the equipment. Therefore, for best reliability and performance, try to locate the repeater in an environment that is also comfortable for humans, if possible.

AC Power Supply Voltage Selection

Each repeater is wired for a particular AC mains voltage between 100 and 234 volts. This is generally identified by a label near the AC jack on the rear apron. If no label is present, or if the voltage on the label is different than the local AC line, check the wiring to the power transformer inside the repeater, and change the connections (and label) if necessary, as shown on the following page.

Changing the transformer wiring also requires changing the fuse in the rear apron holder if the voltage is changed from below 117 to above 200V, or vice-versa. Use a 2-amp fuse for 117V or less, or a 1-amp fuse for 200V or more.

OPERATION

Make sure that all connections are made properly, as described in the preceding Installation section, before operating the repeater.

With the POWER switch OFF, preset the controls as follows;

MIC/REPEAT switch to MIC position.
VOLUME control fully counterclockwise.
SQUELCH control fully counterclockwise.

Connect the microphone (YM-30) to the MIC jack, and connect the AC plug to the wall outlet. Tune the POWER switch ON, the green POWER LED and orange BUSY LED should light up. Adjust the VOLUME control for a comfortable level on the background noise, or incoming signal. When the channel is clear, rotate the SQUELCH control clockwise just until the background noise is reduced. After 2 seconds the noise will completely disappear and the BUSY LED will turn off.

To operate the repeater as a transceiver, just squeeze the PTT switch on the microphone to transmit, and release the switch to receive. Alternatively, full duplex transceiving is possible by setting the SEMI/FULL internal switch (S03) on the COR unit to the FULL position.

For normal repeater operation, set the MIC/REPEAT switch to REPEAT. While the repeater is in operation, it is possible to break in on users by squeezing the PTT switch.

SPECIAL FUNCTIONS AND CONTROL

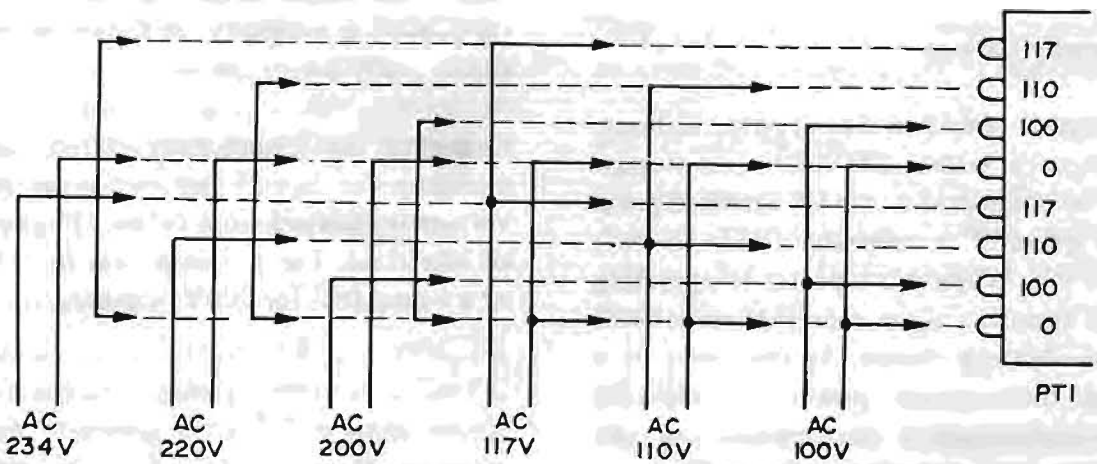
A number of special functions are available as standard accessories and options for repeater operation. Standard functions include a time out timer, and hang up delay timer. These, plus the optional CW ID Unit and DTMF control decoder are described in the following paragraphs.

Time Out Timer

This function measures the amount of time that the repeater is transmitting continuously, and automatically deactivates the transmitter after a preset length of time (set for 3 minutes at the factory). Thus overlong transmissions are automatically interrupted, and users develop the habit of short transmissions. This leads to minimum delays for those stations waiting to use the repeater while it is engaged. Delay times may be set as desired according to the information on pages 44 and 45.

Hang Up Delay Timer

This function holds the transmitter on for a preset length of time (set for 4 seconds at the factory) after a station stops transmitting to the repeater. During this time, another station may call and access the repeater while the repeater transmits continuously (the Time Out Timer will be reset automatically). During the (4 second) hang up delay period, the repeater will transmit the white noise from the receiver at a level 20 dB below the received level. If transmission of the attenuated noise is not desired, it can be removed simply by cutting the jumper wire indicated on page 44.



POWER TRANSFORMER PRIMARY CONNECTIONS

DTMF Control Decoder (Option)

This system allows certain repeater functions to be controlled by certain DTMF tone combinations (control codes) sent to the repeater receiver. The standard decoder circuit allows up to seven different functions to be controlled by two (or three) DTMF tones each, when spaced less than 1.5 seconds apart.

As programmed at the factory, the DTMF control codes each consist of two or three DTMF tone pairs, beginning with either "*" or "#", followed by one or two numbers between 1 and 8, inclusive. Control codes beginning with "*" set the control function, and those beginning with "#" reset the like-numbered function.

Factory-programmed functions and their corresponding DTMF control code key numbers are as follows:

[1] –ALL RESET (must be preceded by [#] only); returns all of the control functions to the RESET condition

[2] –(only used in combination with "3", as follows)

[3][2] –MIC/REPEAT SELECT: duplicates the function of the switch of the same name on the front panel. When the control code [*][3][2] is sent, the MIC (local microphone) mode is SET (activated). [#][3][2] returns the machine to the REPEAT(er) mode (RESET).

[4] –CTCSS OFF: when the tone squelch (CTCSS) option is installed, it is switched off when this code is SET, and on when RESET.

[5] –TRANSMIT DISABLE: when this code is SET, the repeater will not transmit.

[6], [7] and [8] –user programmable (not connected at the factory)

Note:

If all of the control codes required for a specific command are not sent within the allotted time (1.5 seconds maximum between tones), the ALL RESET ([#][1]) command must be sent properly before other commands can be accepted.

CW ID Unit (Option)

When installed in the repeater, this unit will transmit the preprogrammed callsign of the repeater in telegraph code (F2 mode) when the transmitter of the repeater is first activated, and at 10-minute intervals for as long as the repeater is being used. The modulation level of the identifying code is such that it will not interfere with communications. Keying speed can be adjusted by VR_{01} on the ID Unit.

The callsign is programmed in the PROM at the factory, so it must be specified when ordering the CW ID Unit.

INSTALLATION OF OPTIONS

FTS-32R (RPT) Tone Squelch Unit Installation

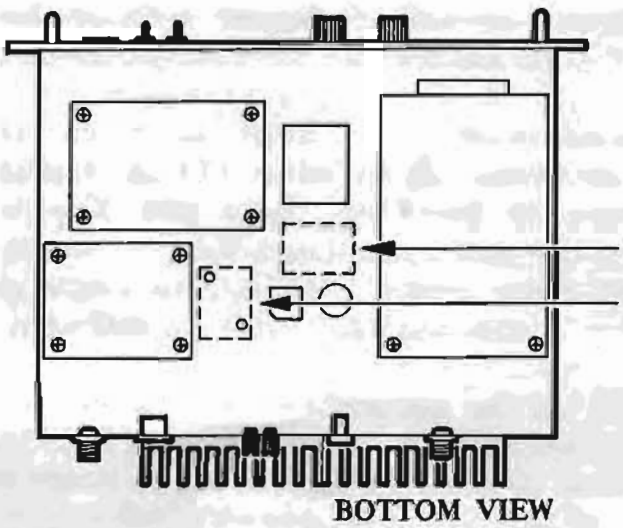
When the Tone Squelch Unit is installed in the repeater, only those incoming signals which include the CTCSS (subaudible) tone preset in the repeater will be retransmitted. Other signals will be heard from the repeater speaker attenuated 20 dB.

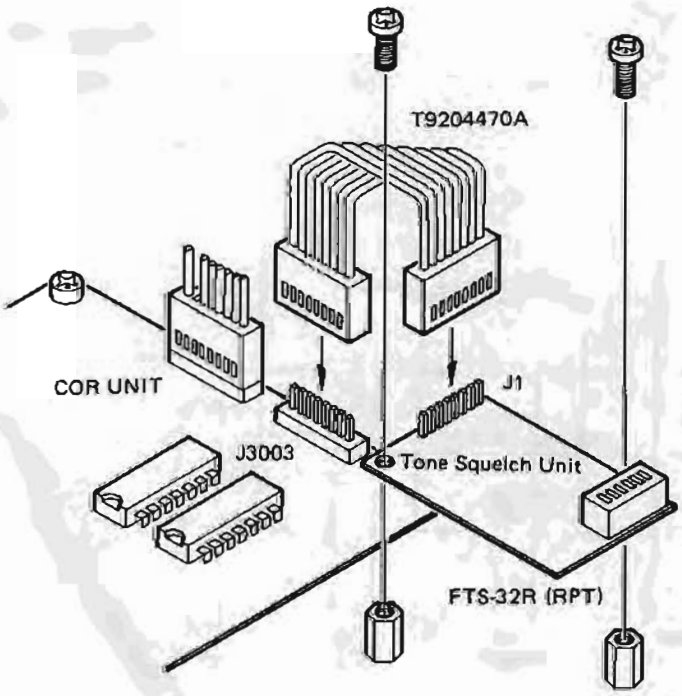
Requires:

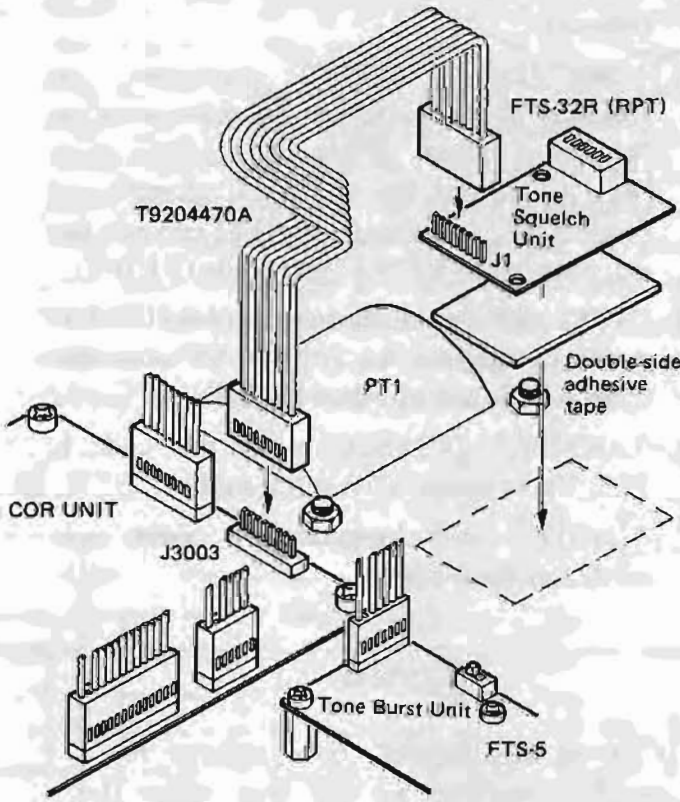
Kit number D3000258, consisting of:
one Tone Squelch Unit assembly
FTS-32R(RPT)
one cable and connector assembly T9204470A
two panhead screws (ASM 2.6x6)

1. Remove the eight screws affixing the bottom cover.
2. Referring to the diagram, mount the Tone-Squelch Unit* using the two screws supplied, noting in particular the location of 8 pin connector (J_1) on the Tone Squelch Unit, which should be nearest the COR Unit.
3. Connect one cable assembly plug to J_1 on the Tone Squelch Unit, and the other cable plug to J_{3003} on the COR Unit. Installation is now complete. Tone programming is shown in the table on the following page.

* If installing the Tone Squelch Unit together with the Tone Burst Unit, mount the Tone Squelch Unit on the Main chassis, as indicated drawing, using the double-sided adhesive tape supplied with the Tone Burst Kit.







Note:

If the Tone Squelch Unit has been installed and is now being removed from the repeater, replace the dummy plug on J_{03}, or jumper pin 1 to pin 2 (on J_{03}).

FTS-32R
DIP SWITCH PROGRAMMING

TONE No.	FREQ. (Hz)	SWITCH NUMBER 1	2	3	4	5	(6)*
1	67.0	0	0	0	0	0	
2	71.9	1	0	0	0	0	
3	74.4	0	1	0	0	0	
4	77.0	1	1	0	0	0	
5	79.7	0	0	1	0	0	
6	82.5	1	0	1	0	0	
7	85.4	0	1	1	0	0	
8	88.5	1	1	1	0	0	
9	91.5	0	0	0	1	0	
10	94.8	1	0	0	1	0	
11	97.4	0	1	0	1	0	
12	100.0	1	1	0	1	0	
13	103.5	0	0	1	1	0	
14	107.2	1	0	1	1	0	
15	110.9	0	1	1	1	0	

TONE No.	FREQ. (Hz)	SWITCH NUMBER 1	2	3	4	5	(6)*
16	114.8	1	1	1	1	0	
17	118.8	0	0	0	0	1	
18	123.0	1	0	0	0	1	
19	127.3	0	1	0	0	1	
20	131.8	1	1	0	0	1	
21	136.5	0	0	1	0	1	
22	141.3	1	0	1	0	1	
23	146.2	0	1	1	0	1	
24	151.4	1	1	1	0	1	
25	156.7	0	0	0	1	1	
26	162.2	1	0	0	1	1	
27	167.9	0	1	0	1	1	
28	173.8	1	1	0	1	1	
29	179.9	0	0	1	1	1	
30	186.2	1	0	1	1	1	
31	192.8	0	1	1	1	1	
32	203.5	1	1	1	1	1	

CLOSED = 0 (ON)
OPEN = 1 (OFF)
*SW(6) = ON (DECODER ON)
= OFF (DECODER OFF)

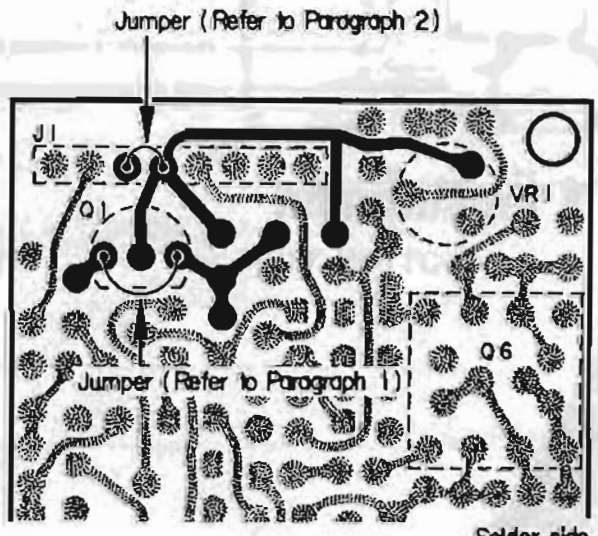
FTS-32R TONE SQUELCH UNIT MODIFICATION FOR INSTALLATION IN YAESU REPEATERS

The FTS-32R may not be installed directly in Yaesu model FTR-710A, FTR-2410A or FTR-5410 Repeaters because of the unique connections provided in these repeaters. Yaesu thus offers the FTS-32R(RPT) Tone Squelch Unit for these repeaters. The FTS-32R may also be modified to an (RPT) version by the following procedure.

1. The FTS-32R is designed for operation with an unregulated supply voltage of 10.8 to 12 VDC, which is applied to an 8V regulator. As the repeaters provide only regulated 8 VDC for the Tone Squelch Unit, the regulator in the FTS-32R must be bypassed by adding a jumper between the input and output leads of type 78L08A regulator Q_1 on the FTS-32R.

2. If the FTS-32R is installed in the repeater without the optional DTMF Unit also being installed, another jumper must be added from pin 5 to pin 6 jack J_1 on the FTS-32R. When the DTMF Unit is installed, this jumper is not necessary.

3. The FTS-32R is not supplied with the necessary connection cable (part no. T9204470A) for repeater installation. This can be ordered separately through Yaesu representatives, or a cable can be made (to connect 8-pin jack J_{3003} on the COR Unit in the repeater with J_1 on the FTS-32R, with all pins corresponding).



FTS-32R

FTS-5 Tone Burst Decoder Installation

When the FTS-5 Tone Burst Decoder Unit is installed in the repeater, the transmitter will only be activated when the received signal begins with a burst tone between 1700 and 1950 Hz (as adjusted on the FTS-5). Other signals will be ignored by the repeater.

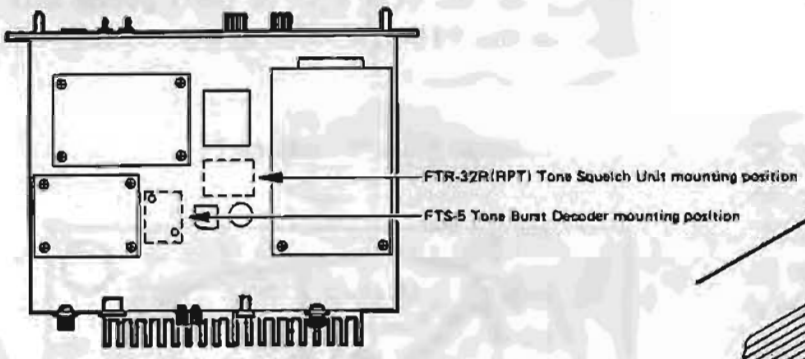
Requires:

Kit number D3000257, consisting of:

one Tone Burst Unit assembly FTS-5
one cable and connector assembly T9204618A
two panhead screws (ASM 2.6x6)
two pcs double-sided adhesive tape*

1. Remove the eight screws affixing the bottom cover.
2. Referring to the diagram, mount the Tone Burst Unit using the two screws supplied, noting in particular the location of 8-pin connector (J_1) on the Tone Burst Unit, which should be nearest the COR Unit.
3. Connect one cable assembly plug to J_1 on the Tone Burst Unit, and the other cable plug to J_{3007} on the COR Unit. Installation is complete.

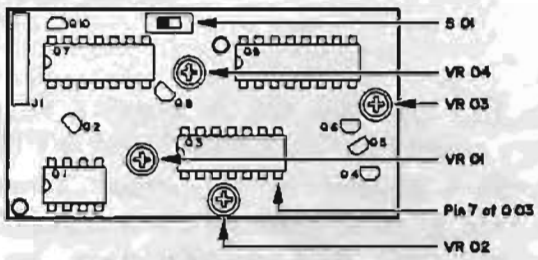
* If also using the Tone Squelch Unit, mount the Tone Squelch Unit on the main chassis, using the double-sided adhesive tape supplied with this kit. Refer to Tone Squelch Installation on page 10.



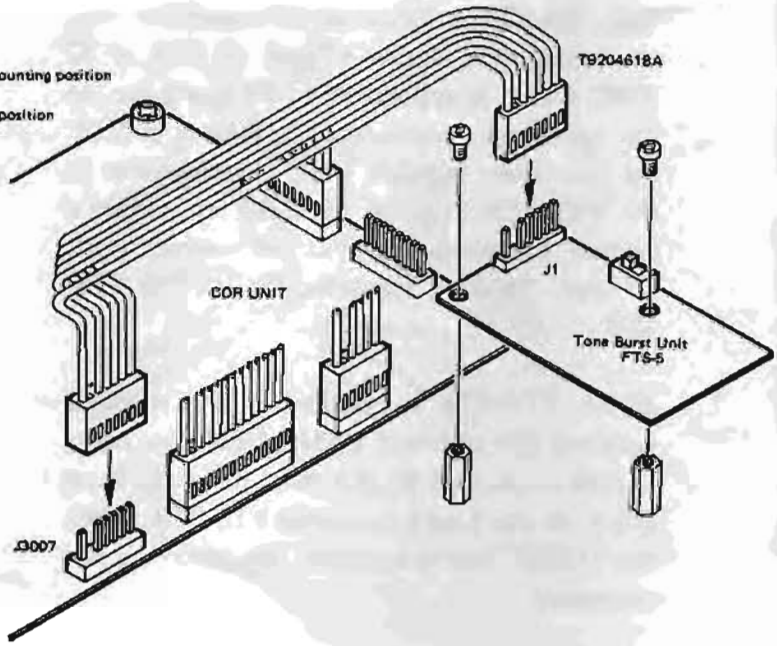
BOTTOM VIEW

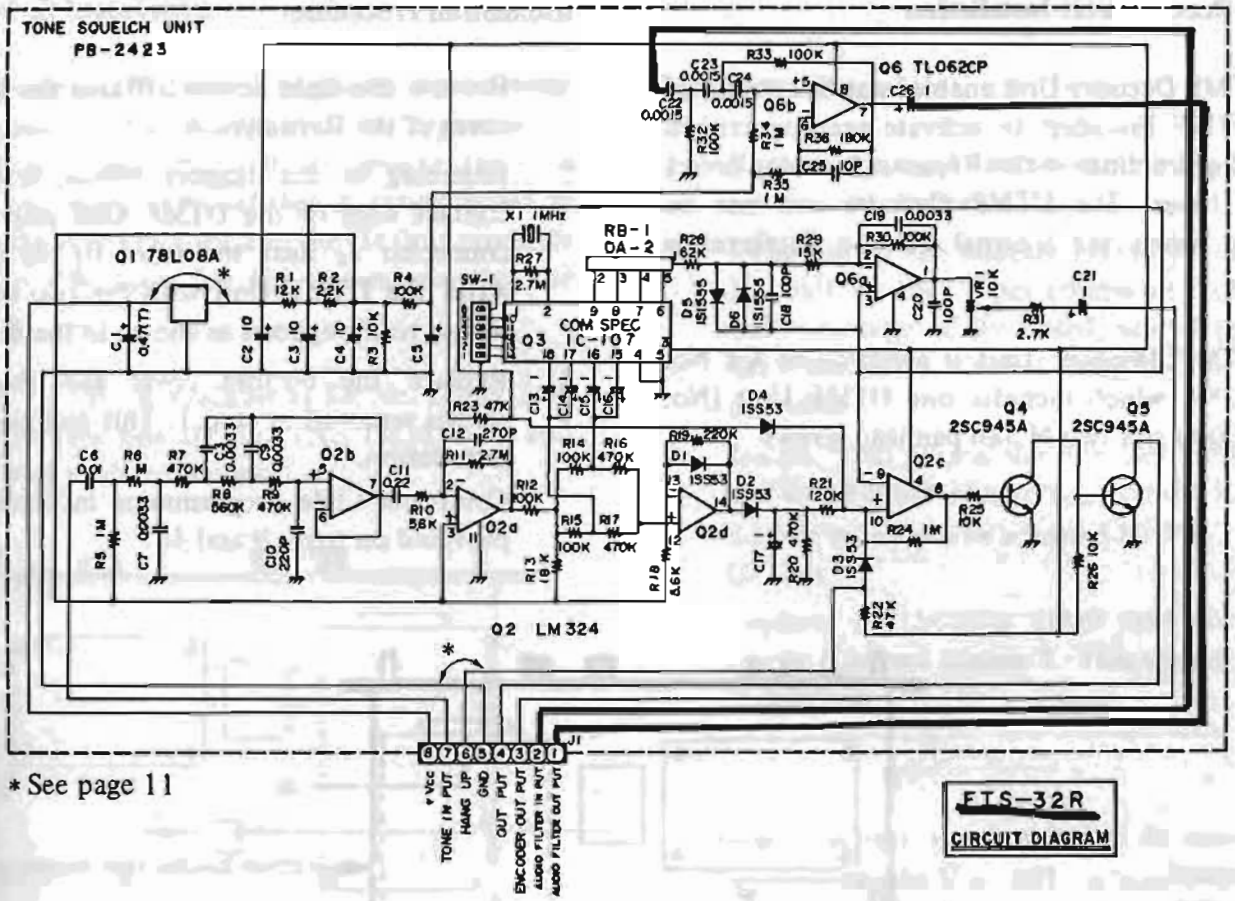
Adjustment

1. Set switch S_{01} on the FTS-5 to the position nearest the adjacent molex connection.
2. Set an audio generator for 80 mV output at the desired Burst Tone frequency, and connect to pin 1 of J_{01}. Also, connect an AF millivoltmeter to pin 7 of Q_{03}, and preset VR_{01} to midrange. Adjust VR_{02} for maximum deflection on the meter.
3. Adjust VR_{01} for 420 mV on the meter.
4. Switch the audio generator output on and off while adjusting VR_{03} for the desired activating tone length (maximum is 1 second). Then adjust VR_{04} for the desired Burst Tone hang up delay, which is the time after which a station drops his carrier and before which a new tone burst is required.
5. Set switch S_{01} to the desired position, for automatic Burst on each transmission, or for manual accessing Burst.



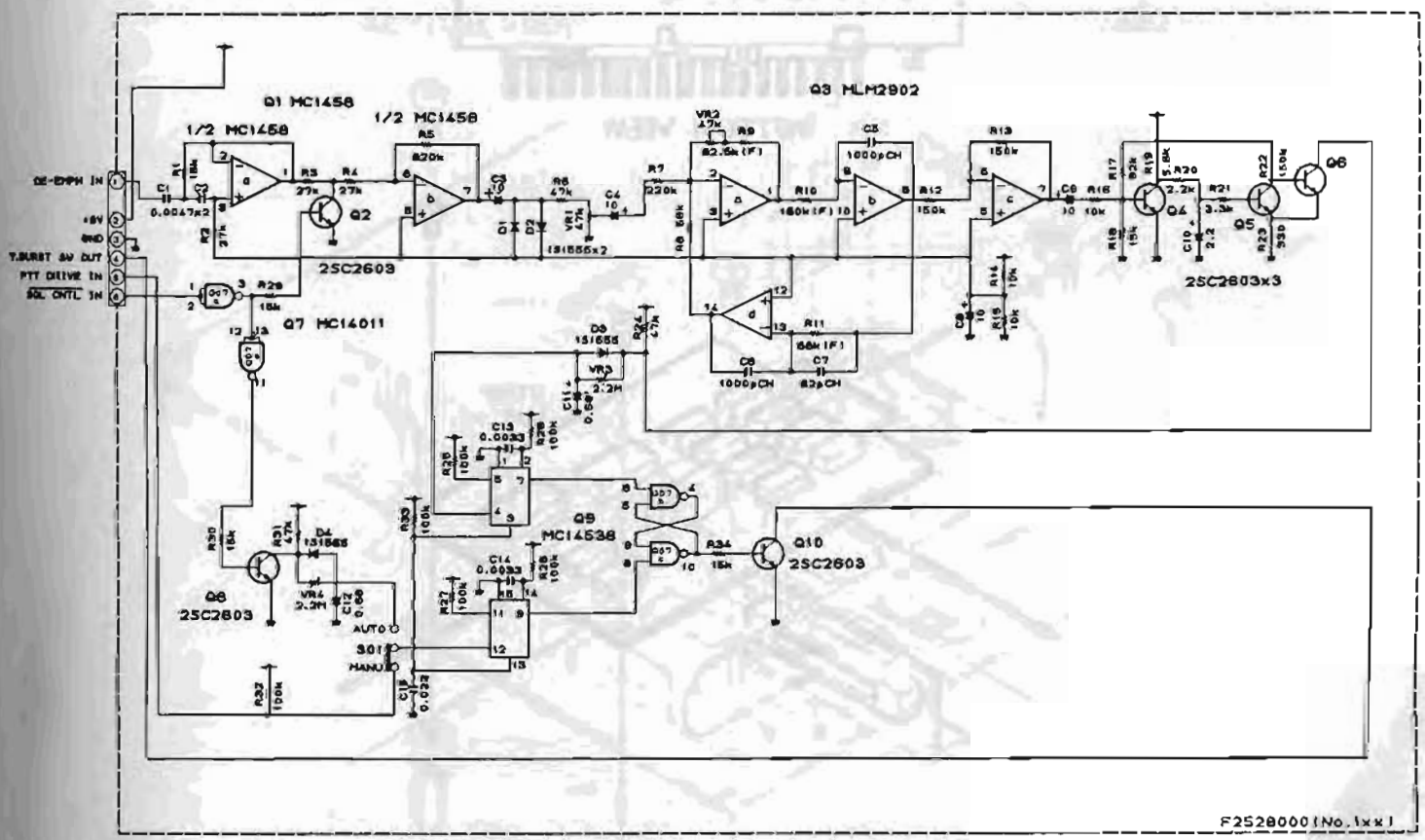
FTS-5 Adjustment Points





* See page 11

FTS-32R
CIRCUIT DIAGRAM



FTS-5
CIRCUIT DIAGRAM

DTMF Decoder Unit Installation

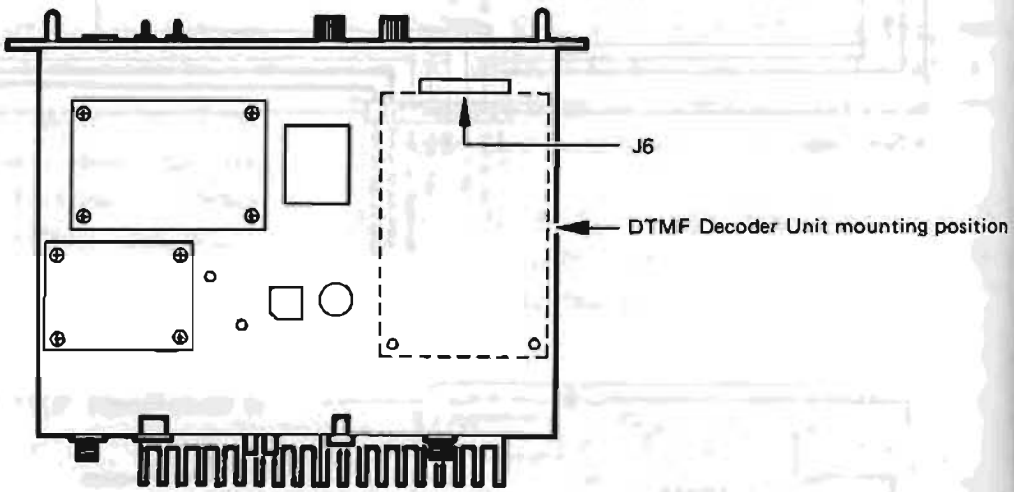
The DTMF Decoder Unit enables stations equipped with DTMF Encoders to activate preprogrammed switching functions in the Repeater by using preset DTMF tones. The DTMF Decoder can not be installed when the internal PD-636 Duplexer is installed.

The DTMF Decoder Unit is available as Kit No. D3000259, which includes one DTMF Unit (No. C024160A) and two M 3x6 panhead screws.

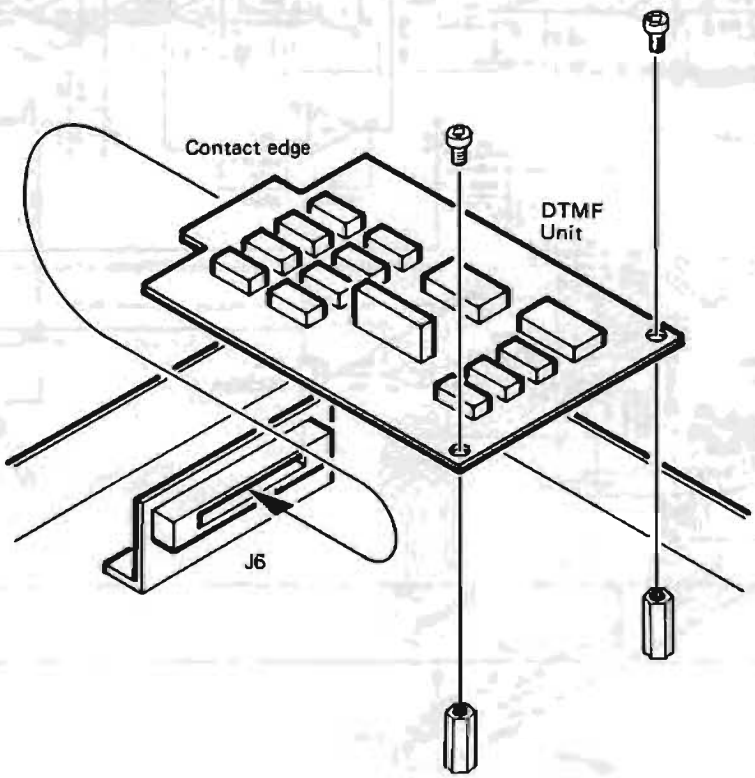
Installation Procedure

1. Remove the eight screws affixing the bottom cover of the Repeater.
2. Referring to the diagram below, insert the contact edge of the DTMF Unit into 14-pin connector J_6 near the front of the chassis. Affix the DTMF Unit with the two supplied screws to the spacers as shown in the diagram.
3. Replace the bottom cover and the eight screws removed in step 1. This completes the installation.

   Command Code programming information is provided on pages 9 and 46.



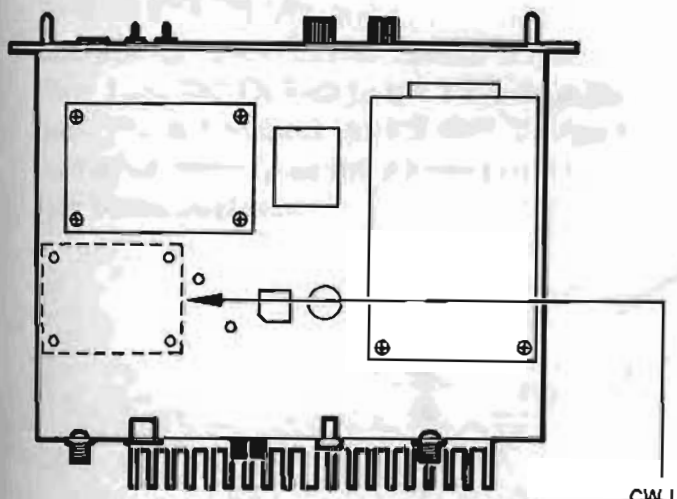
BOTTOM VIEW



CW ID Unit Installation

The automatic CW ID Unit sends the preprogrammed callsign of the Repeater at the beginning of transmission, and then at 10-minute intervals during operation. The callsign is programmed in the PROM at the factory, and the ID Unit produces an audio CW tone for F2 transmission by the Repeater.

The CW ID Unit is available as Kit No. D3000260, which includes one ID Unit (No. C024170A) and four M 3x6 panhead screws.



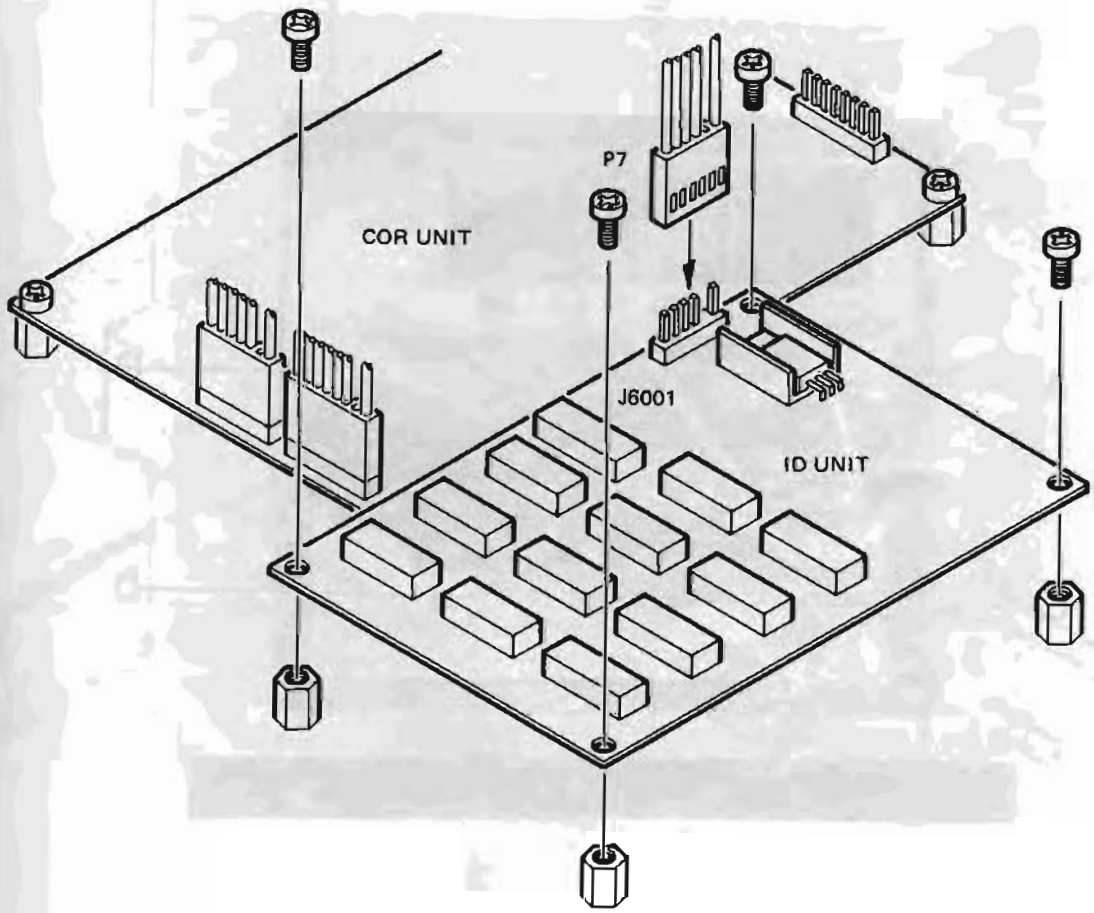
BOTTOM VIEW

Installation Procedure

1. Remove the eight screws affixing the bottom cover of the Repeater.
2. Referring to the diagram below, position the ID Unit so that 5-pin connector J_{6001} is at the front edge of the board, nearest the COR Unit. Mount the ID Unit using the four screws provided.
3. Locate 5-pin plug in the Repeater marked P_7, and connect this plug to J_{6001} on the ID Unit. Keying speed can be adjusted by VR_{01} on the ID Unit.
4. Replace the bottom cover and the eight screws removed in step 1. This completes the installation.

Note:

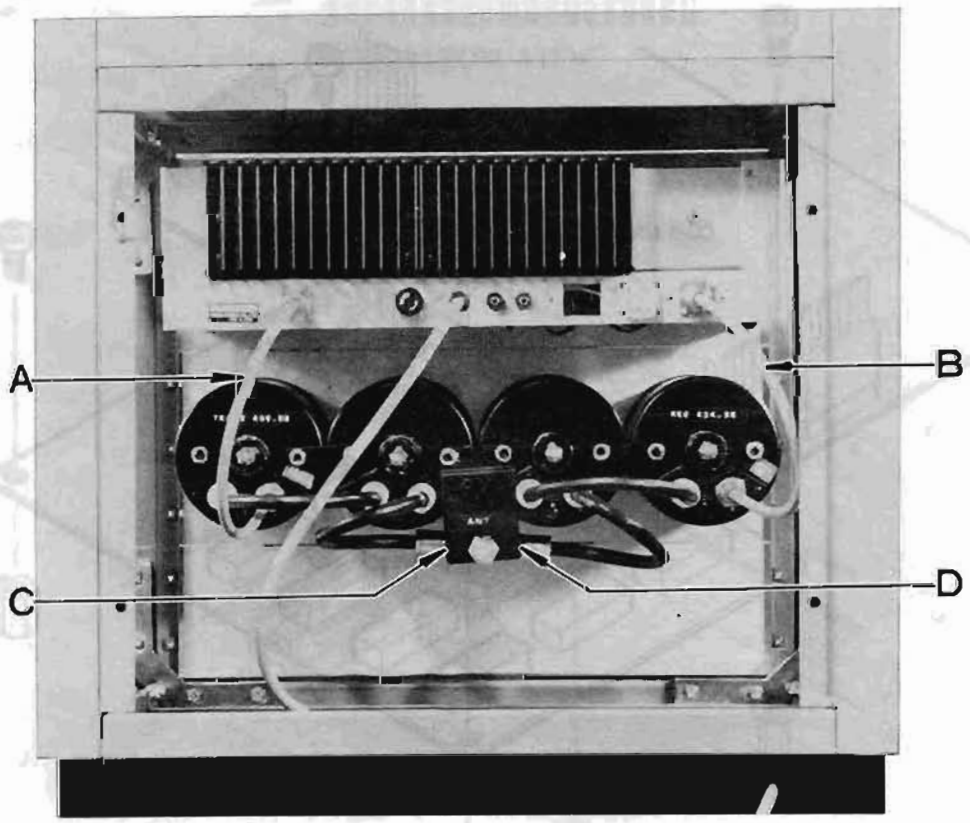
If the PROM is not installed in its socket on the ID Unit, the Unit will cause a continuous audio tone to be transmitted when the Repeater is activated.



External Duplexer Installation

1. Mount the duplexer in the MR-1A or MR-2A mounting rack, using the four screws provided.
2. Referring to the diagram, connect the TX OUTPUT connector from J_3 on the TX Unit to the TX jack on the duplexer, and connect the RX INPUT connector from J_2 on the RX Unit to the RX jack on the duplexer.
3. Connect the TX OUTPUT connector from the duplexer to the jack marked "C" on the duplexer, and connect the RX INPUT connector from the duplexer to the jack marked "D" on the duplexer.

Installation is now complete.

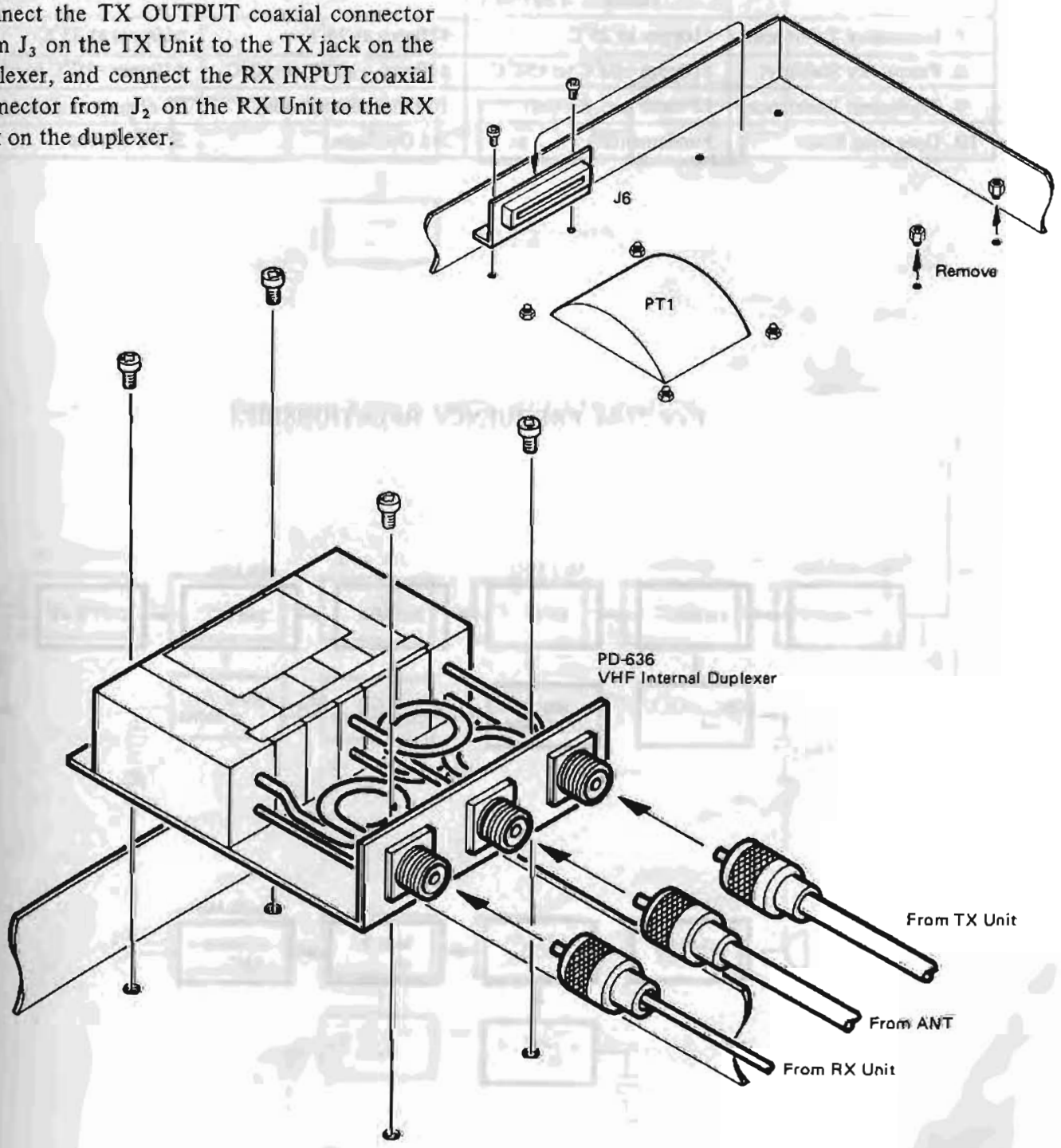


PD-636 VHF Internal Duplexer Installation (FTR-2410A)

The internal duplexer can not be installed when the DTMF Decoder Unit is installed.

1. Remove the eight screws affixing the bottom cover.
2. Move the 14-pin connector (J_6) to the center front position (from the right front edge) as indicated in the drawing.
3. Mount the duplexer unit to the four spacers on the main chassis, using the four screws supplied with the kit.
4. Connect the TX OUTPUT coaxial connector from J_3 on the TX Unit to the TX jack on the duplexer, and connect the RX INPUT coaxial connector from J_2 on the RX Unit to the RX jack on the duplexer.
5. Connect one cable plug to the ANT jack on the duplexer, and the other cable plug to the ANT jack on the inside rear panel.

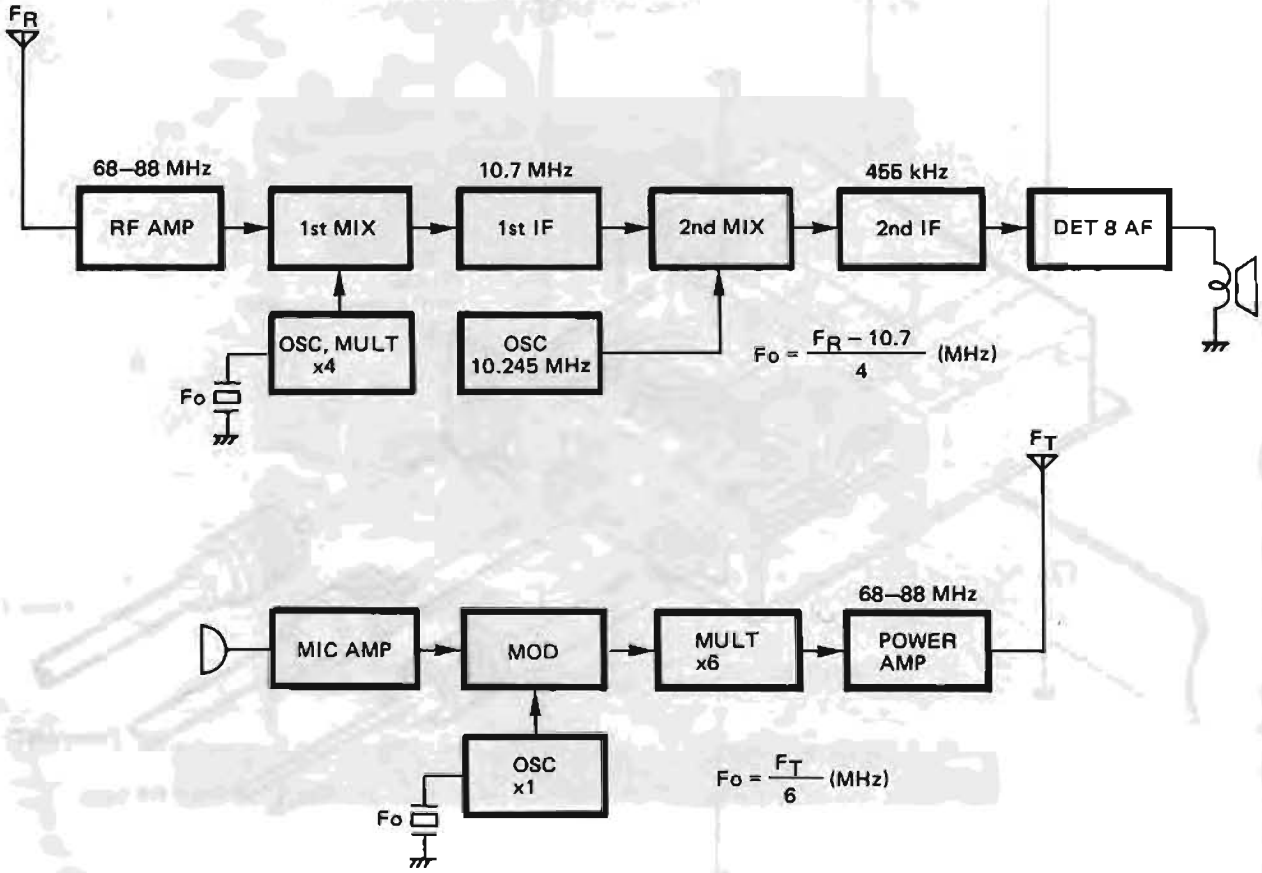
Installation is now complete.



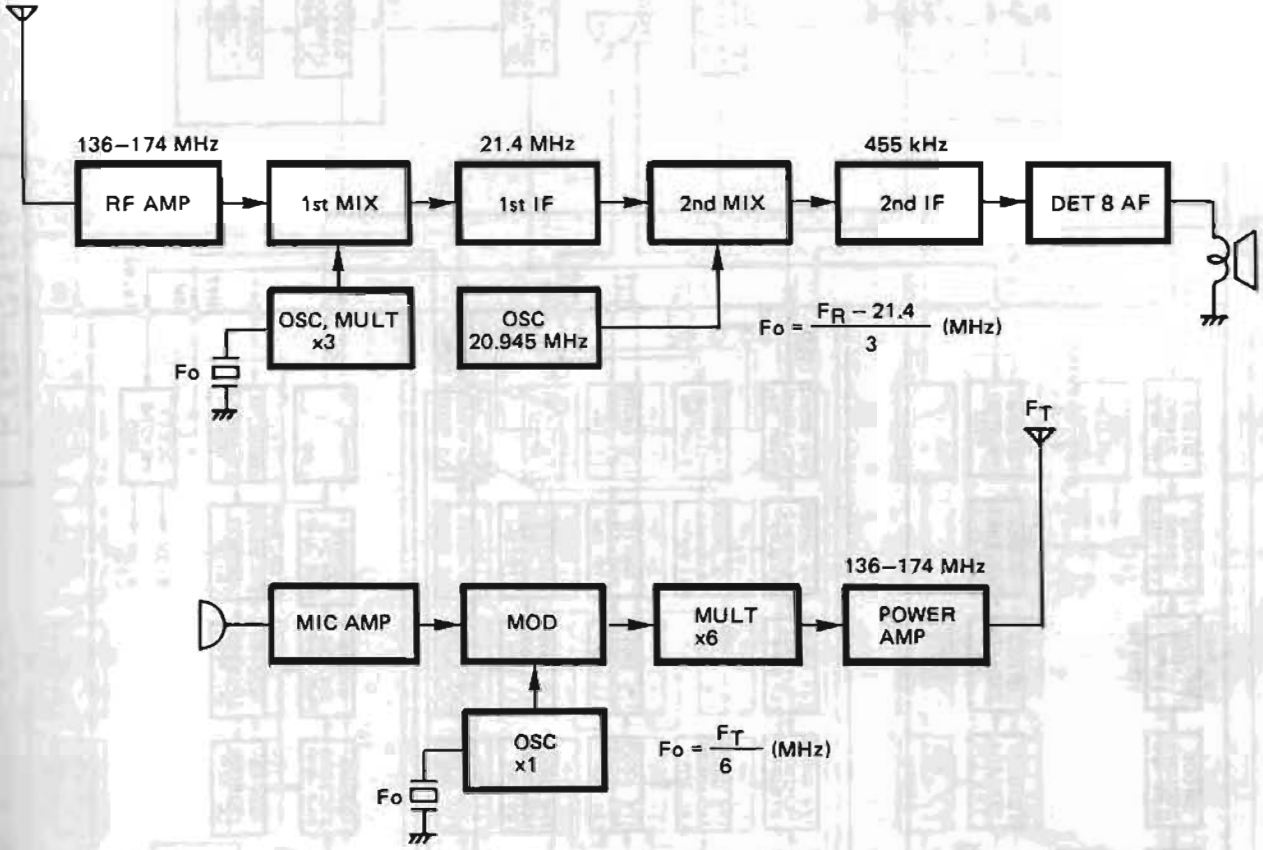
CRYSTAL DATA

	FTR-710A	FTR-2410A	FTR-5410
1. Type of Holder:	HC-25/U	HC-25/U	HC-25/U
2. Channel Frequency:	68MHz – 88MHz	136MHz – 174MHz	400MHz – 512MHz
3. Oscillation Frequency:	TX: CH/6 RX: (CH-10.7)/4	TX: CH/6 RX: (CH-21.4)/3	TX: CH/12 RX: (CH-21.4)/9
4. Load Capacity:	TX: 50pF+60Hz=0 RX: 34.3pF–90Hz=0	45pF	45pF
5. Drive Level:	TS-683/TSM 2mW	TS-683/TSM 2mW	TS-683/TSM 1mW
6. Shunt Capacity:	TX: 12MHz – 4.3pF±0.5 13MHz – 4.5pF±0.5 14MHz – 4.8pF±0.5 RX: 15MHz – 4.5pF±0.5 16MHz – 5.0pF±0.5 17MHz – 4.5pF±0.5 18MHz – 4.8pF±0.5	TX: 5.5pF±0.5 RX: 4.0pF±0.5	7pF
7. Frequency Tolerance:	±10ppm at 25°C	±10ppm at 25°C	±10ppm at 25°C
8. Frequency Stability:	±10ppm –10°C to +50°C	±10ppm –10°C to +50°C	±10ppm –10°C to +50°C
9. Equivalent Resistance:	13 ohms max (Series)	17 ohms max (Series)	70 ohms max (Series)
10. Operation Mode:	Fundamental	3rd Overtone	3rd Overtone

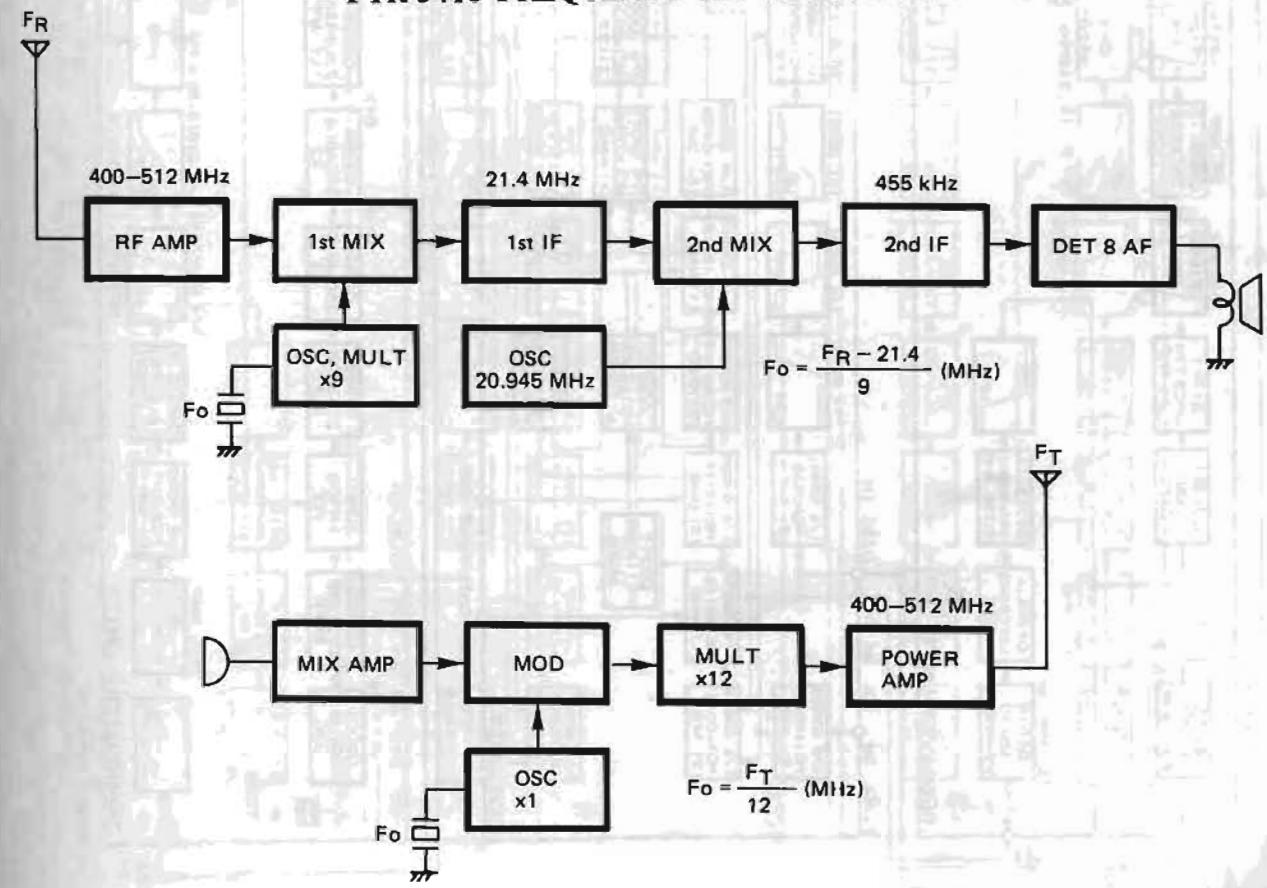
FTR-710A FREQUENCY RELATIONSHIPS

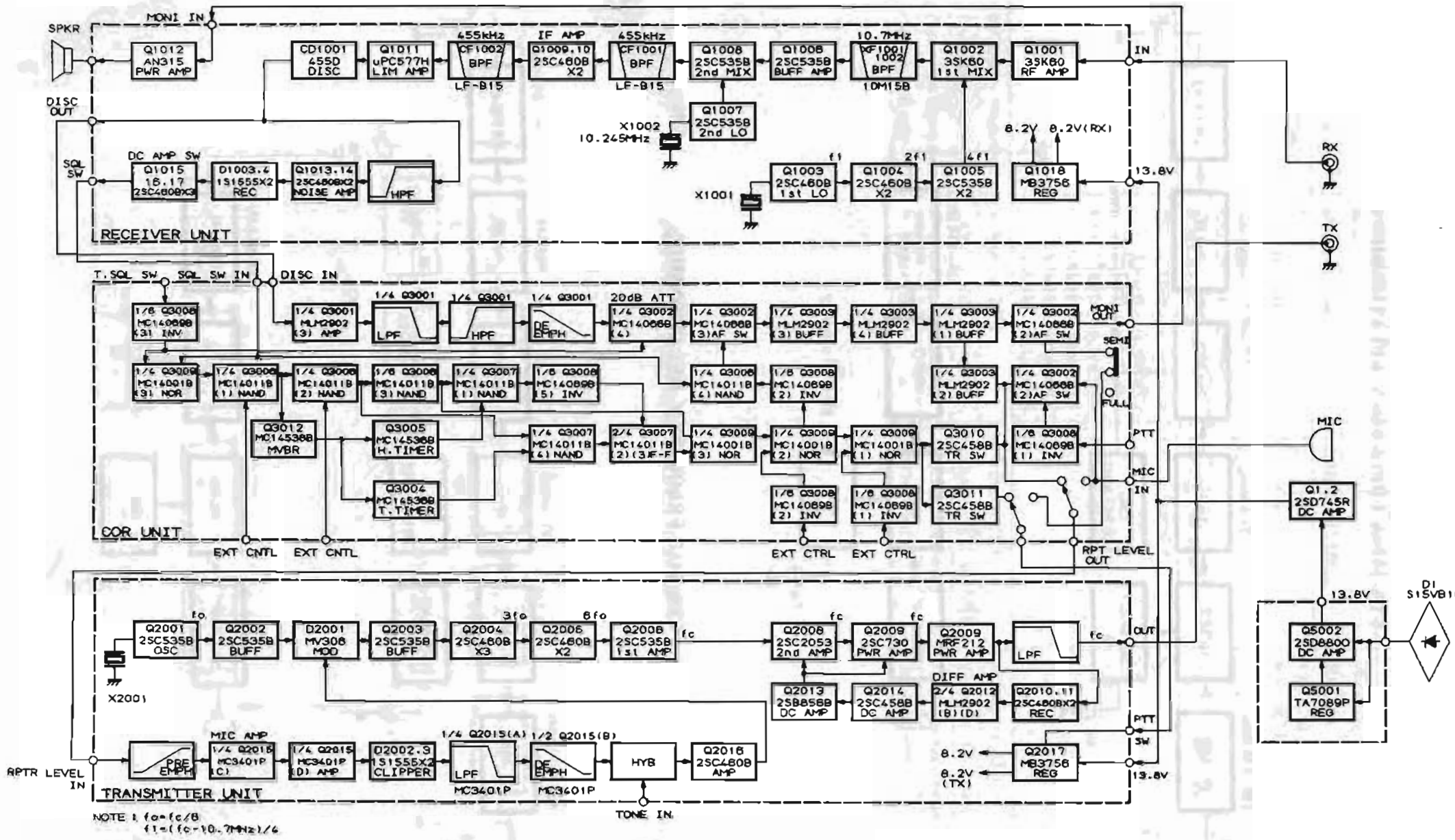


FTR-2410A FREQUENCY RELATIONSHIPS

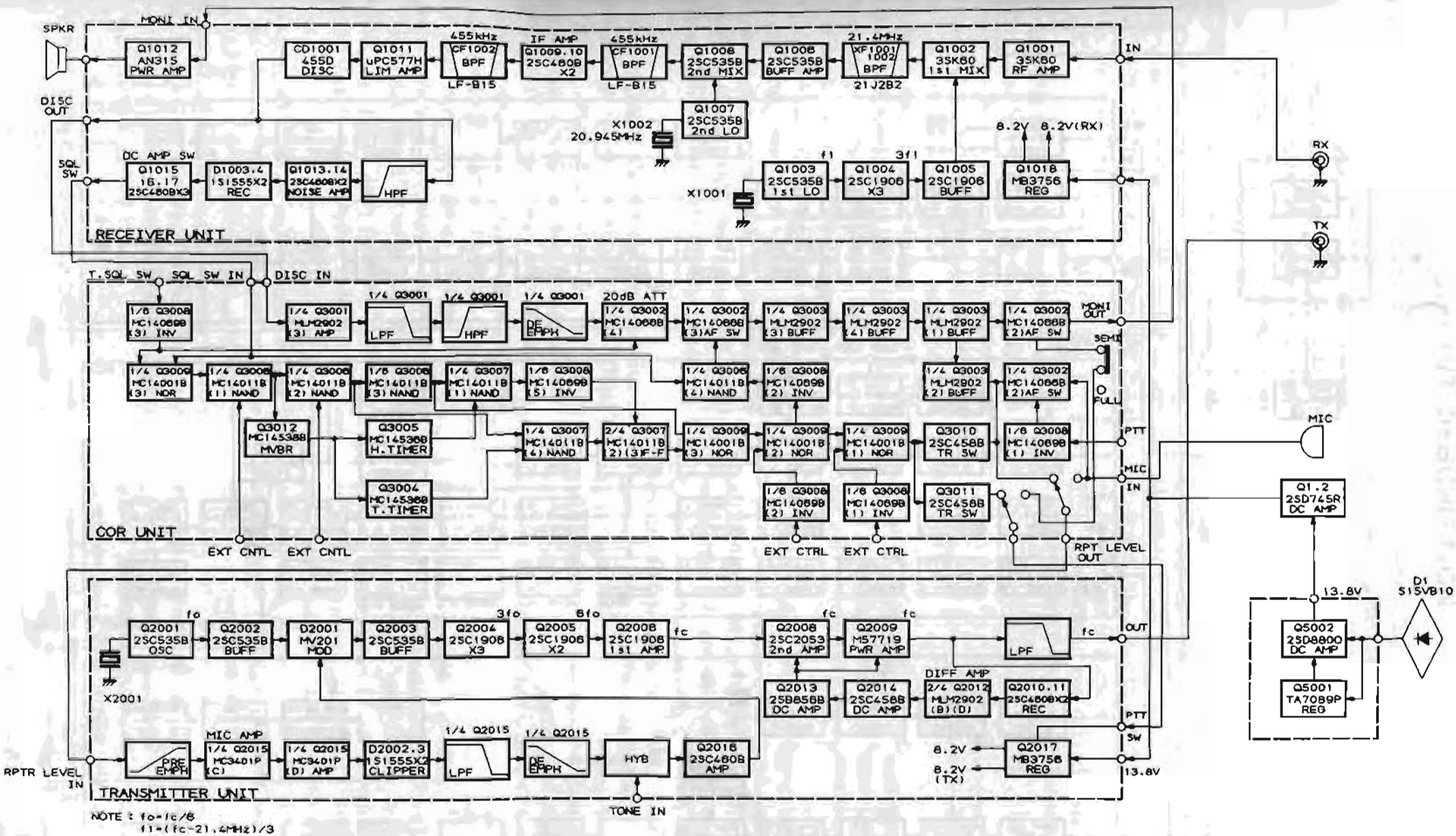


FTR-5410 FREQUENCY RELATIONSHIPS

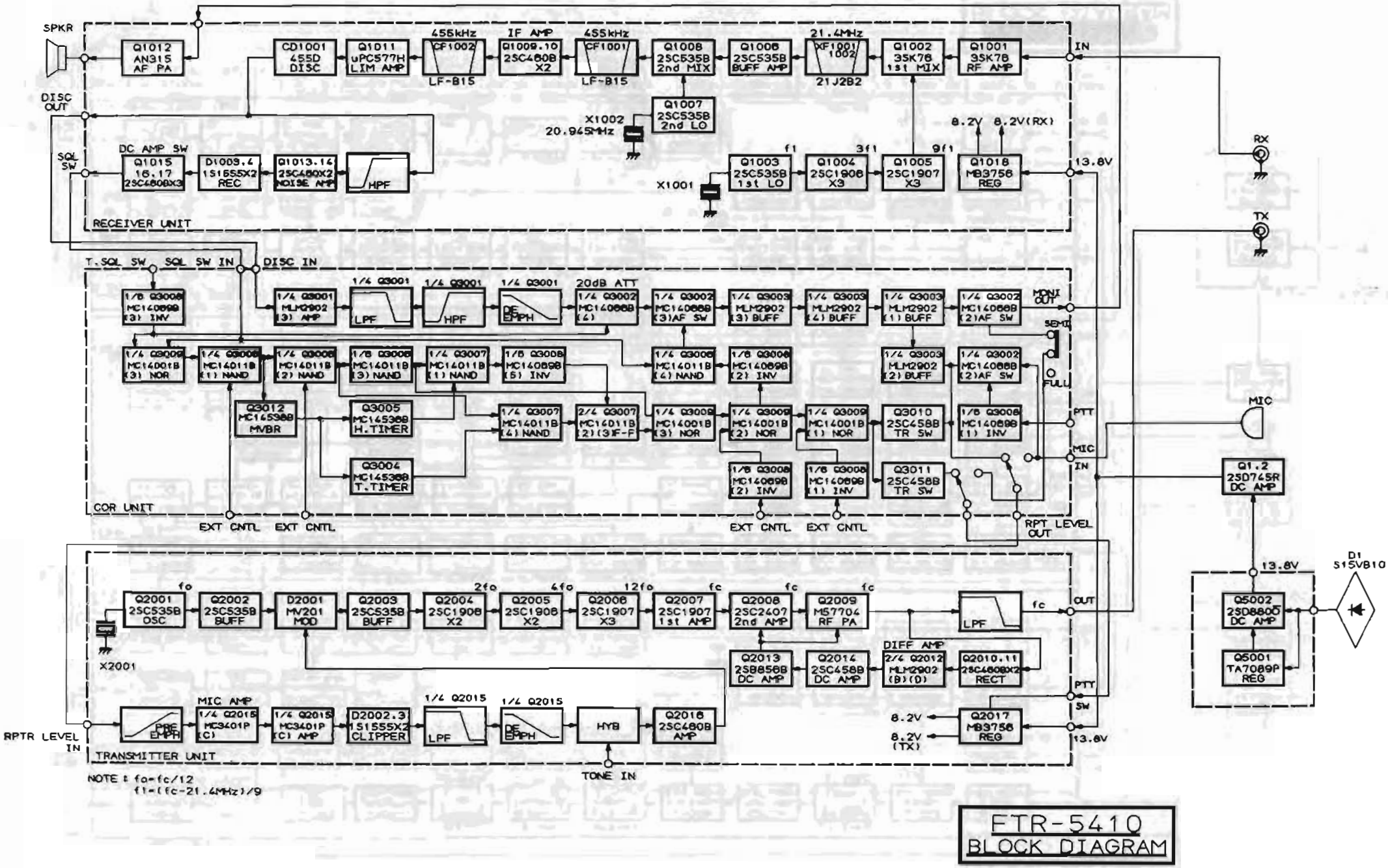




FTR-710A
BLOCK DIAGRAM



FTR-2410A BLOCK DIAGRAM



FTR-5410 BLOCK DIAGRAM

RX Unit

The receiver input signal from J_{1004} is fed through a 2-stage resonator circuit to RF amplifier Q_{1001}, and then through another multi-stage resonator circuit to first mixer Q_{1002}. The resonators protect the early stages of the receiver from overload by the nearby transmit signal, and other strong signals close to the receiving channel. In the FTR-5410, the resonators are helical modules, and Q_{1001} and Q_{1002} are both 3SK76s. In the VHF models, Q_{1001} and Q_{1002} are both 3SK60s.

First local oscillator Q_{1003} is temperature compensated by posistor PTH_{1001}, and its output is multiplied up to the required local frequency at Q_{1004} and Q_{1005} before application to the first mixer. In the FTR-710A, the oscillator is a 2SC460B, the oscillating frequency is $(f_R-10.7)/4$, and Q_{1004} (**2SC460B**) and Q_{1005} (**2SC535B**) are both doublers. In the FTR-2410A, the oscillator is a 2SC535B, the oscillating frequency is $(f_R-21.4)/3$, and Q_{1004} (**2SC1906**) is a tripler, while Q_{1005} (also **2SC1906**) is a buffer. In the FTR-5410, the oscillator is a **2SC535B**, the oscillating frequency is $(f_R-21.4)/9$, and Q_{1004} (**2SC1906**) and Q_{1005} (**2SC1907**) are both triplers.

The resulting first IF signal from the first mixer is passed through monolithic crystal filters XF_{1001} and XF_{1002}, and then amplified by Q_{1006} (**2SC535B**) before being applied to second mixer Q_{1008} (**2SC535B**). Here the first IF signal is heterodyned with the second local signal generated at Q_{1007} (**2SC535B**). In the FTR-710A, the first IF is 10.7 MHz, the crystal filters are type **10M2B2**, and the second local frequency is 10.245 MHz. In the FTR-2410A and FTR-5410, the first IF is 21.4 MHz, the crystal filters are type **21J2B2**, and the second local frequency is 20.945 MHz.

The resulting 455 kHz second IF signal is passed from the second mixer through ceramic filter CF_{1001} (**LF-B15**) and amplified by Q_{1009} and Q_{1010} (both **2SC460B**) before passing through another ceramic filter, CF_{1002} (**LF-B15**). The highly filtered second IF signal is then applied to limiter-amplifier Q_{1011} (**μPC577H**).

The limiting process eliminates amplitude variations in the IF signal, which is then fed to discriminator CD_{1001} (**455D**), where an audio response is produced in accordance with a corresponding frequency shift (modulation) in the IF signal. The audio is delivered via J_{1001} and J_{1003} to the COR Unit.

When no carrier is present in the 455 kHz second IF, high frequency noise is present at the discriminator output, which is amplified by noise amplifiers Q_{1013} and Q_{1014} (**2SC460Bs**), and rectified by D_{1003} and D_{1004} (**1S1555s**). The resulting DC voltage is amplified by Q_{1015}, Q_{1016} and Q_{1017} (**2SC460Bs**), and delivered via J_{1001} and J_{1003} to the COR Unit for squelch switching.

COR Unit

The COR (Carrier Operated Relay) Unit is composed of an audio section, a timer (hang up and time out) section, and a transmit switching section.

The audio output from the discriminator on the RX Unit is delivered to quad opamp Q_{3001} (**MLM2902**), which amplifies, filters and de-emphasizes the receiver audio. This is then gated by the squelch signal delivered from the RX Unit and the tone squelch (switching) signal from the optional Tone Squelch Unit (if installed), at gates three and four of quad analog switch Q_{3002} (**MC14066B**). Gate four provides 20 dB attenuation of the audio when a signal does not contain a compatible CTCSS tone during tone squelch operation.

When passed through gate three of Q_{3002}, the audio is further amplified by three quarters of quad opamp Q_{3003} (**MLM2902**), after which a portion of the audio is fed through gate one of Q_{3002}, controlled by SEMI/FULL switch S_{3003} in series with the PTT line (from the microphone), and delivered back to the RX Unit for final amplification by Q_{1012} (**AN315**) for monitoring in the front panel speaker.

The rest of the audio at the output of the third quarter of Q_{3003} is amplified further by the fourth quarter and fed through VR_{3003} to a normally-closed contact of mic/repeat relay RL_{3001}, which is controlled by the switch of that name on the front panel. The local microphone audio is applied

to the corresponding normally-open contact of RL_{3001}, and also through gate two of Q_{3002} to the normally-closed contact. This gate is operated by the PTT line, to allow the local operator to override the repeater receiver. The audio at this contact arm of RL_{3001} is then delivered to the TX Unit as transmitter audio input.

The timer section of the COR Unit is controlled by the squelch switching signal delivered from the RX Unit and the tone squelch switching signal delivered from the Tone Squelch Unit, if installed. These signals activate multivibrator Q_{3012} (**MC14538B**), which then feeds a pulse train to counters Q_{3004} and Q_{3005} (both **MC14536Bs**). Q_{3004} is programmed by DIP switch S_{3001} to produce the time out pulse after three minutes (this is set at the factory, but can be reprogrammed by the DIP switch to up to 10 minutes). Q_{3005} is programmed by DIP switch S_{3002} to produce the hang up pulse four seconds after the squelch signal disappears (and can also be reprogrammed by the DIP switch).

The transmit switching section of the COR Unit consists of logic gates in Q_{3006} (**MC14011B**), Q_{3007} (**MC14011B**) and Q_{3009} (**MC14001B**), and hex inverter Q_{3008} (**MC14069B**), which gate together the squelch switching and timer functions to control the analog gates in the audio section and transmit inhibit switches Q_{3010} and Q_{3011} (both **2SC458B**). Q_{3010} operates the automatic PTT line (to signal the ID Unit, if installed), and Q_{3011} shuts off 8V regulator Q_{2017} on the TX Unit through the normally-closed contact of RL_{3001}.

TX Unit

The audio signal from the COR Unit is amplified by sections C and D of Q_{2015} (**MC3401P**), and is then coupled through C_{2054} to the instantaneous deviation control (IDC) circuit, composed of D_{2002}, D_{2003} (**1S1555s**) and $R_{2051}-R_{2053}$, where the audio is clipped to prevent over-deviation in the transmitted signal. The signal is then cleaned up by the active lowpass filter network consisting of section A of Q_{2015}, $R_{2054}-R_{2057}$ and $C_{2056}-C_{2058}$. The resulting audio is pre-emphasized by section B of Q_{2015}, and buffered by Q_{2016} (**2SC460B**) before application to phase-modulating varactor D_{2001}.

The carrier is generated by oscillator Q_{2001} (**2SC535B**), and buffered by Q_{2002} (**2SC535B**) before being modulated by the varactor. Once modulated, the carrier is buffered by Q_{2003} (**2SC535B**) before multiplication up to the final transmit channel frequency. In the FTR-710A, the carrier oscillator frequency is around 12 MHz, and Q_{2004} (**2SC460B**) serves as a tripler while Q_{2005} (**2SC460B**) serves as a doubler, and Q_{2006} (**2SC535B**) buffers the 68–88 MHz product. In the FTR-2410A, the carrier oscillator frequency is around 25 MHz, and Q_{2004} (**2SC1906**) serves as a triple while Q_{2005} (**2SC1906**) serves as a doubler, and Q_{2006} (**2SC1906**) buffers the 134–174 MHz product. In the FTR-5410, the carrier oscillator frequency is around 35 MHz, and Q_{2004} and Q_{2005} (**2SC1906s**) each serve as doublers while Q_{2006} (**2SC1907**) serves as a tripler, resulting in a 400–512 MHz product.

In the FTR-710A the RF signal is amplified by Q_{2007} (**2SC2053**) and driver Q_{2008} (**2SC730**) for application to final power amplifier Q_{2009} (**MRF212**), resulting in 10W RF output.

In the FTR-2410A the RF signal from Q_{2006} is amplified by driver Q_{2008} (**2SC2053**) and applied to RF power module Q_{2009} (**M57719**), resulting in 10W RF output.

In the FTR-5410 the RF signal from Q_{2006} is amplified by Q_{2007} (**2SC1907**) and Q_{2008} (**2SC2407**), and applied to RF power module Q_{2009} (**M57704**), resulting in 10W RF output.

The RF output is sampled and rectified by Q_{2010}, Q_{2011}, and the resulting ALC voltage is applied to differential amplifier section D of Q_{2012} (**MLM-2902**), along with bias developed at Q_{2011}. The DC voltage is amplified by section B of Q_{2012}, and then by Q_{2014} (**2SC458B**) and Q_{2013} (**2SB856B**). The ALC voltage is then fed back to the RF amplifiers to control their gain.

In the VHF models, Q_{2010} and Q_{2011} are both **2SC460Bs**, while **2SC535Bs** are used in the FTR-5410. In the FTR-710A, ALC controls the VCC and base bias of Q_{2007} and Q_{2008}, and the bias to final transistor Q_{2009}. In the FTR-2410A and FTR-5410, ALC controls the VCC and base bias of Q_{2008}, and the control input of power module Q_{2009}.

In all models, Q_{2017} **(MB3756)** provides the regulated 8V DC for the early transmitter stages.

Power Supply

The power supply includes the power transformer and bridge rectifier D_1 **(S15VB10)** on the chassis, pass transistors Q_1 and Q_2 **(2SD745R)** on the heatsink, RL Unit PB-2308 and REG Unit PB-2248.

AC power is applied through POWER switch S_1, fuse F_1 and the primary of transformer T_1. The 18 VAC at the secondary is then rectified by D_1, but with a small portion delivered to the REG Unit as an independent supply for regulator IC Q_{4001} **(TA7089P)** after rectification by D_{4001} and D_{4002} (10D1), and filtering by C_{4001}.

The output of D_1 is filtered by C_1, also on the chassis, and the resulting DC is applied to the collectors of Q_1 and Q_2 on the heatsink, Q_{4002} **(2SD880-O)** on the REG Unit, and regulator IC Q_{5001} **(7812H)** on the RL Unit. The control output (pin 14) of regulator Q_{4001} is applied to the base of Q_{4002}, the emitter of which then controls the bases of Q_1 and Q_2. Thus the DC voltage at the emitters of Q_1 and Q_2 is highly regulated. This output voltage is delivered through relay RL_{5001} on the RL Unit (activated by the output of Q_{5001}) to supply the 13.8V bus for the rest of the repeater. A sample of the regulated output from the pass transistors is also delivered back through VR_{4001} on the REG Unit to Q_{4001} for regulating purposes, and to drive the POWER LED on the front panel.

While operating from AC power, regulated 13.8V DC is fed through R_{5001} and D_{5002} **(U05B)**, and then RL_{5001}, POWER switch S_1 and DC fuse F_{5001} to the positive DC supply terminal, providing a trickle charge for a battery that may be connected. If the AC power source is interrupted, the DC current from the battery then flows back through the DC fuse and S_1 to RL_{5001}, which is now switched (when AC fails) to bypass R_{5001} and D_{5002}, and apply full battery voltage directly to the DC supply bus.

ID Unit (Option)

The automatic PTT signal from Q_{3011} on the COR Unit is delivered through RL_{3001} when the repeater is in the normal repeat mode, and is applied to inverter Q_{6010} **(2SC458B)** on the ID Unit. The inverted pulse is then delivered to Q_{6002} **(MC14011B)** to trigger the timer circuit, and to inverter differentiator Q_{6011} **(2SC458B)** before application to the flip-flop gates of Q_{6013} **(SN74LS00)** to trigger the ID READ line.

Q_{6001} **(MC14536B)** and crystal X_{6001} (32.768 kHz) generate a 2-second pulse train, which is passed to Q_{6003} **(MC14566B)** for division by 60 when the PTT line is activated. The resulting 2-minute pulse train is divided by 5 at Q_{6004} **(MC14510B)** to produce a 10-minute pulse, which is buffered by Q_{6012} **(MC14572B)** and applied to the ID READ flip-flop of Q_{6013} along with the initial signal from Q_{6011}. The timer activating function of Q_{6002} is reset after ten minutes, or each time the automatic PTT line closes, to activate the transmitter.

The ID READ command from Q_{6013} activates Q_{6006} **(SN74LS393)**, which also receives an ID SPEED pulse from oscillator Q_{6005} **(MC14069B)**, whose frequency is adjusted by VR_{6001}. Q_{6006} directs Q_{6008} **(SN74LS151)** to read the callsign data stored in PROM Q_{6007} **(SN74S188A)**, which is preprogrammed at the factory. Q_{6014} **(MC-14002B)** and one gate of Q_{6015} **(MC14011B)** sample the data flow and reset the ID READ flip-flop in Q_{6013} when the data has been read.

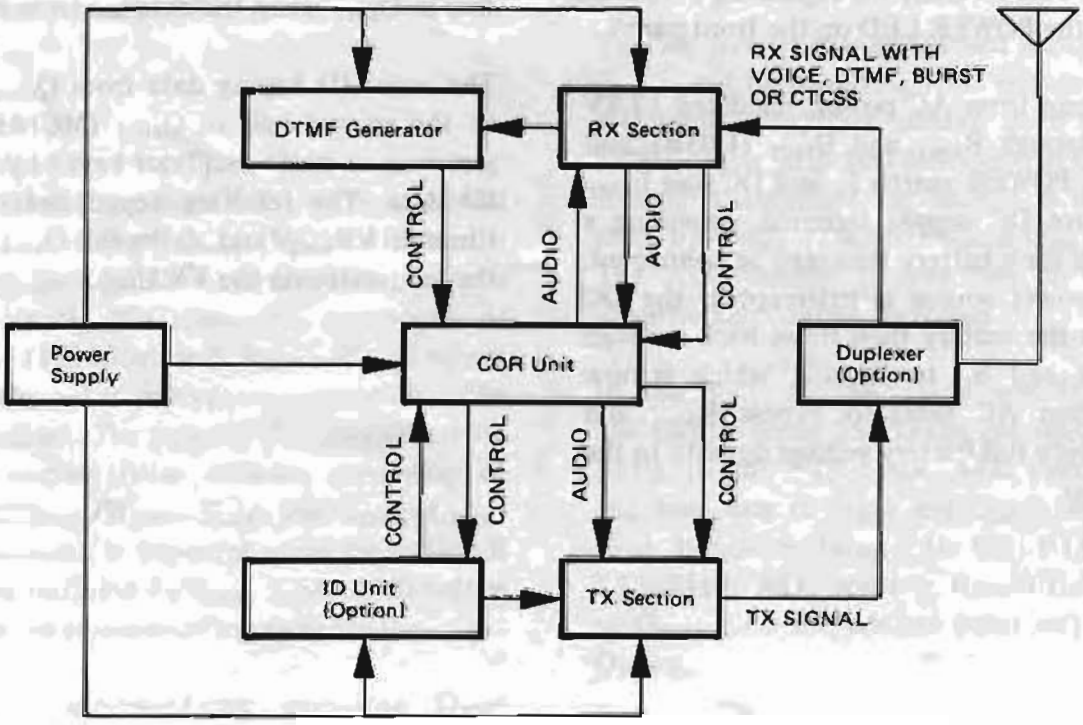
The serial ID keying data from Q_{6008} is delivered to the second half of Q_{6012} **(MC14572B)**, which serves as an audio oscillator keyed by the incoming ID data. The resulting keyed audio tone is fed through VR_{6002} and delivered Q_{2016}, just before the modulator on the TX Unit.

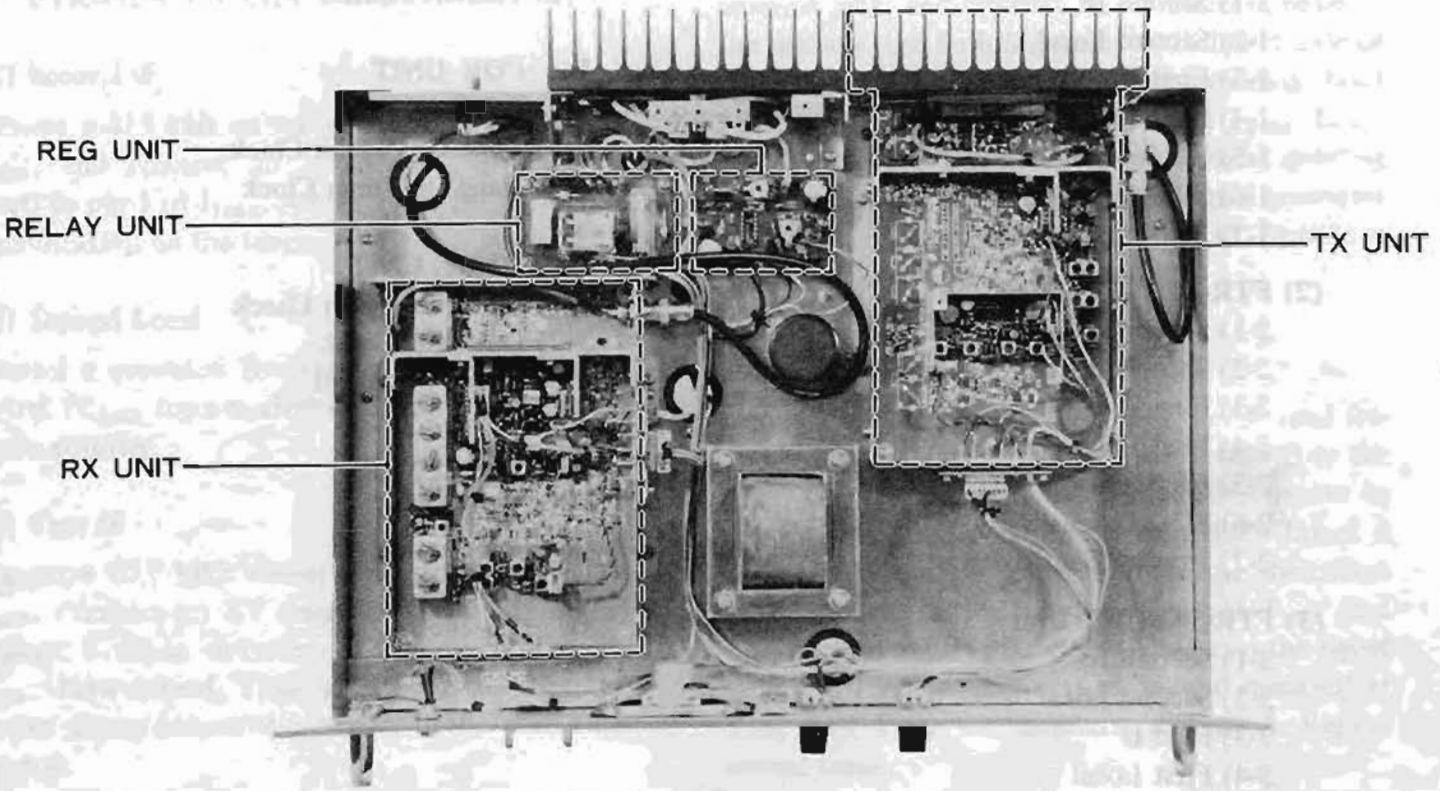
DTMF Unit (Option)

The DTMF decoder unit samples the receiver audio, and detects any DTMF tone codes that may be received for control. These tone codes are translated into switching functions for the rest of the repeater.

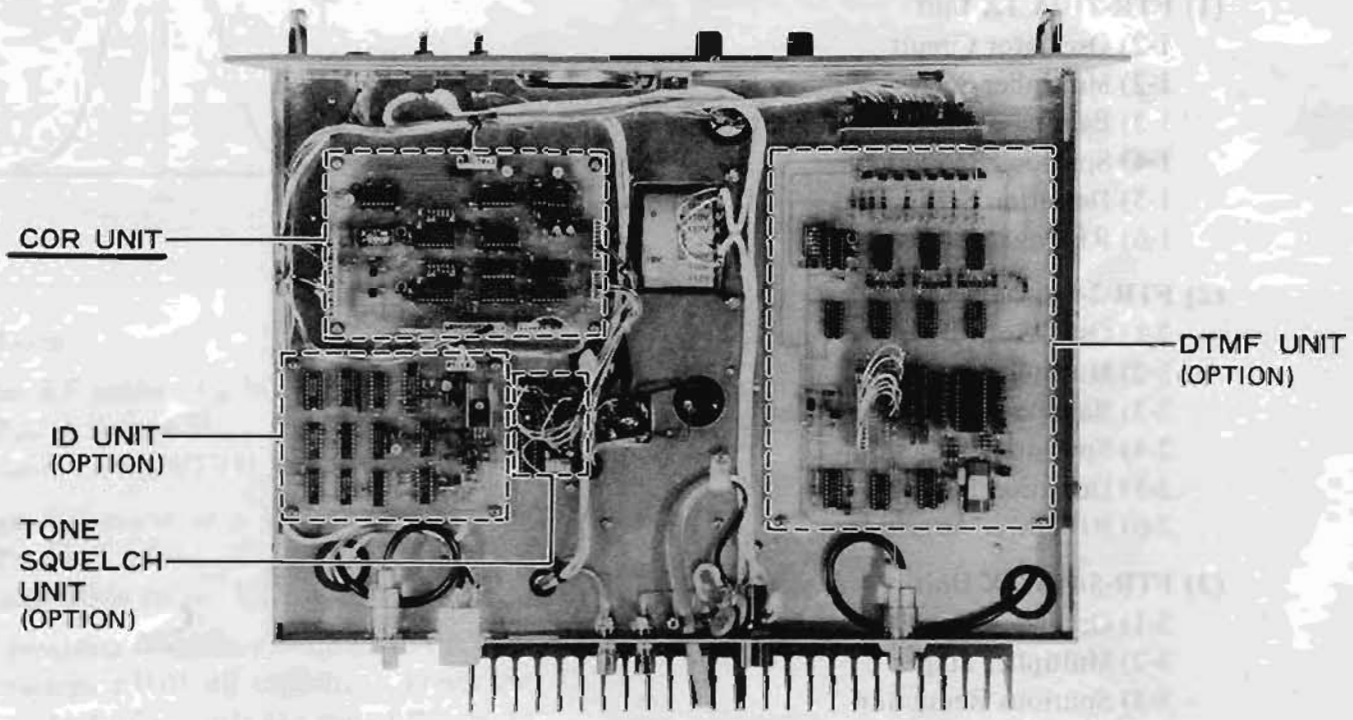
The de-emphasized receiver audio is sampled at the output of the fourth section of Q_{3001} on the COR Unit, just before the squelch gates. This audio is delivered to pin 12 of DTMF decoder Q_{7001} (SSI201) on the DTMF Unit, which responds with a 4-bit BCD output whenever a tone code is received. The BCD output is decoded to 16-bit data and presented at the terminals of P_{7011}. These terminals are then jumpered to J_{7002} in such a manner as to determine the type and sequence of tones required for each control function. AND gates Q_{7004} and Q_{7006}–Q_{7009} (MC14081B), and flip-flops Q_{7003}, Q_{7005} (MC14538B) and Q_{7010}–Q_{7012} (MC14013B) then provide control switching signals from the connections at J_{7002}. The control switching signal lines are buffered by Q_{7014}–Q_{7020} (2SC458B). Q_{7013} (MC14536B) serves as a one-shot multivibrator to set the maximum time spacing between successive DTMF tone codes (set for 1.5 seconds from the factory), and this signal is buffered by Q_{7021} (2SA733) for delivery to the COR Unit.

An independently regulated DC supply is provided for decoder Q_{7001} by Q_{7022} (2SC1209) and zener diode D_{7021}. 8 VDC is provided for the other circuits on the DTMF Unit by Q_{7023} (78L08).





TOP VIEW



BOTTOM VIEW

ALIGNMENT

A. RECEIVER SECTION

(1) FTR-710A RF Unit

1-1) Second IF
1-2) Second Local
1-3) First IF
1-4) First Local
1-5) RF Section
1-6) SINAD Sensitivity
1-7) Squelch Sensitivity

(2) FTR-2410A RX Unit

2-1) Second IF
2-2) Second Local
2-3) First IF
2-4) First Local
2-5) RF Section
2-6) SINAD Sensitivity
2-7) Squelch Sensitivity

(3) FTR-5410 RX Unit

3-1) Second IF
3-2) Second Local
3-3) First IF
3-4) First Local
3-5) RF Section
3-6) SINAD Sensitivity
3-7) Squelch Sensitivity

B. TRANSMITTER SECTION

(1) FTR-710A TX Unit

1-2) Oscillator Circuit
1-2) Multiplier Stages
1-3) Bandpass Filter Adjustment
1-4) Spurious Reduction
1-5) Deviation Setting
1-6) RF Power Adjustment

(2) FTR-2410A TX Unit

2-1) Oscillator Circuit
2-2) Multiplier Stages
2-3) Bandpass Filter Adjustment
2-4) Spurious Reduction
2-5) Deviation Setting
2-6) RF Power Adjustment

(3) FTR-5410 TX Unit

3-1) Oscillator Circuit
3-2) Multiplier Stages
3-3) Spurious Reduction
3-4) Deviation Setting
3-5) RF Power Adjustment

C. POWER SUPPLY

(1) Regulator Output Voltage
(2) Current Limiter

D. COR UNIT

(1) AF Level
(2) Time Out Timer Clock
(3) Hang Up Timer Clock

E. DTMF UNIT

(1) DTMF Decoder Check
(2) One-shot Check
(3) Timer Clock Set

F. DUPLEXER

(1) TX Section
(2) RX Section

G. FL-2450

A. RECEIVER SECTION

(1) FTR-710A RX Unit

1-1) Second IF

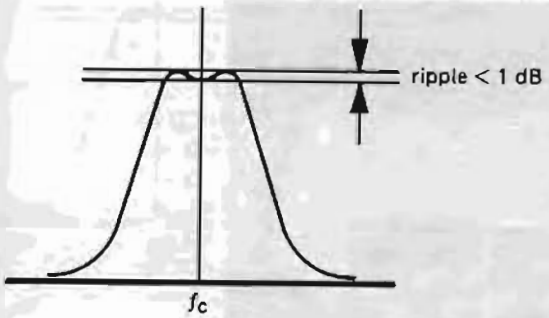
Connect a 455 kHz sweep generator to the base of Q_{1008}, and connect an XY scope (vertical amp input) to pin 1 of J_{1001}. Adjust T_{1007} for maximum p-p indication on the scope.

1-2) Second Local

Connect a precision frequency counter to TP_{1002}. Adjust TC_{1002} for a reading of exactly 10.245 MHz on the counter.

1-3) First IF

Connect a 10.7 MHz sweep generator to gate 2 of Q_{1002}. Connect an XY scope (vertical amp input) through a diode detector, to the secondary of T_{1006}. Now adjust T_{1005} and T_{1006} so that the pattern shown here is obtained, with less than 1 dB of ripple.



1-4) First Local

Connect the RF probe of a VTVM to the base of Q_{1005} (TP_{1001}). Adjust T_{1003} and T_{1004} for maximum indication on the VTVM.

Connect the RF probe of a VTVM to gate 2 of Q_{1002} (TP_{1003}). Adjust L_{1008} and L_{1009} for maximum indication on the VTVM.

Connect a precision frequency counter to the base of Q_{1005} (through a 0.01 μF capacitor). Preset the core of T_{1002} to be flush with the top of the shield can. Now adjust TC_{1001} and T_{1001} for the following frequency:

$$f_{test} = \frac{f\,(\text{RX channel}) - 21.4\ \text{MHz}}{3}$$

1-5) RF Section

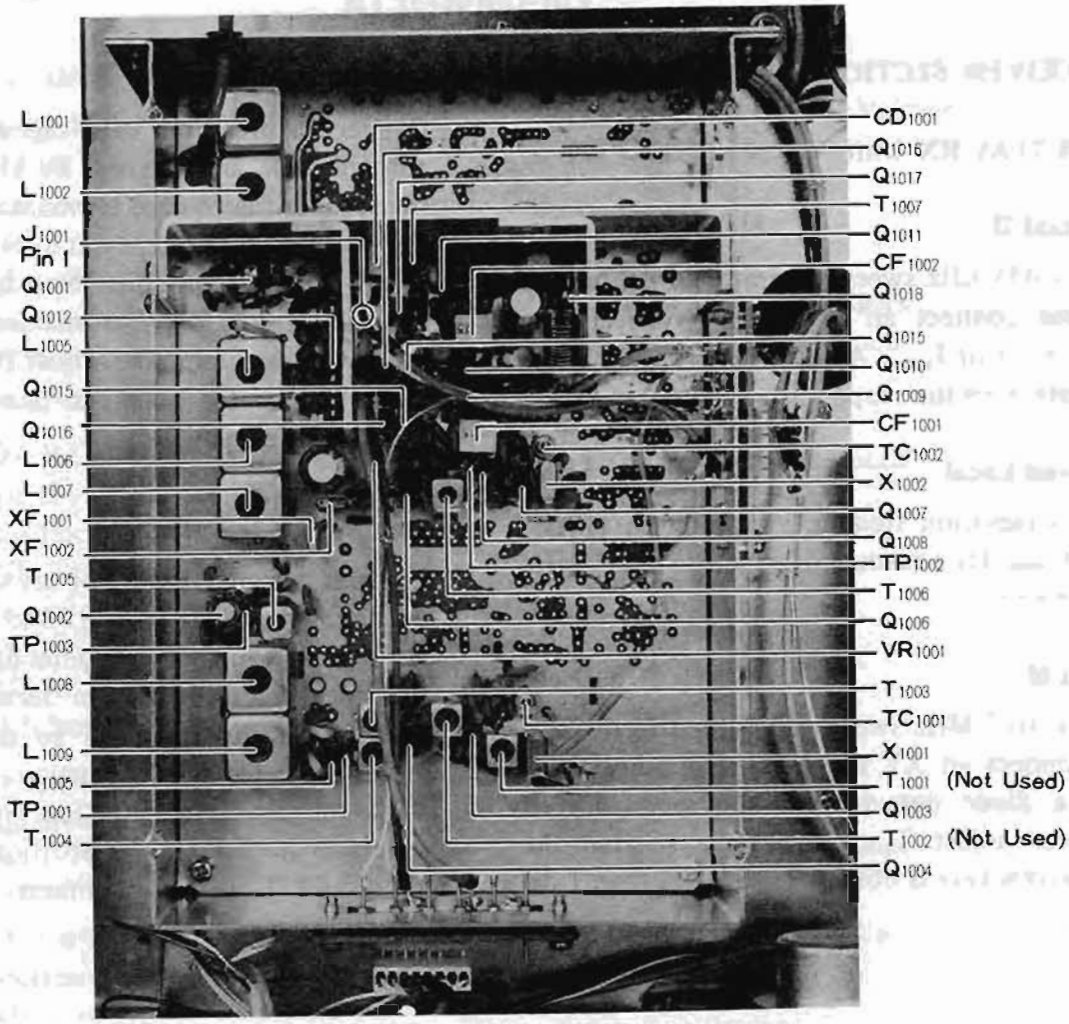
Connect a precision VHF signal generator to the antenna jack, and connect an AF millivoltmeter to the speaker (use 8-ohm termination). Inject a signal on the channel frequency at a level providing about 10 dB of noise quieting. Now adjust L_{1001}, L_{1002}, L_{1005}, L_{1006} and L_{1007} for maximum noise quieting as shown on the meter. Adjust the signal generator level, and meter scale, as needed to provide a meaningful display.

1-6) SINAD Sensitivity

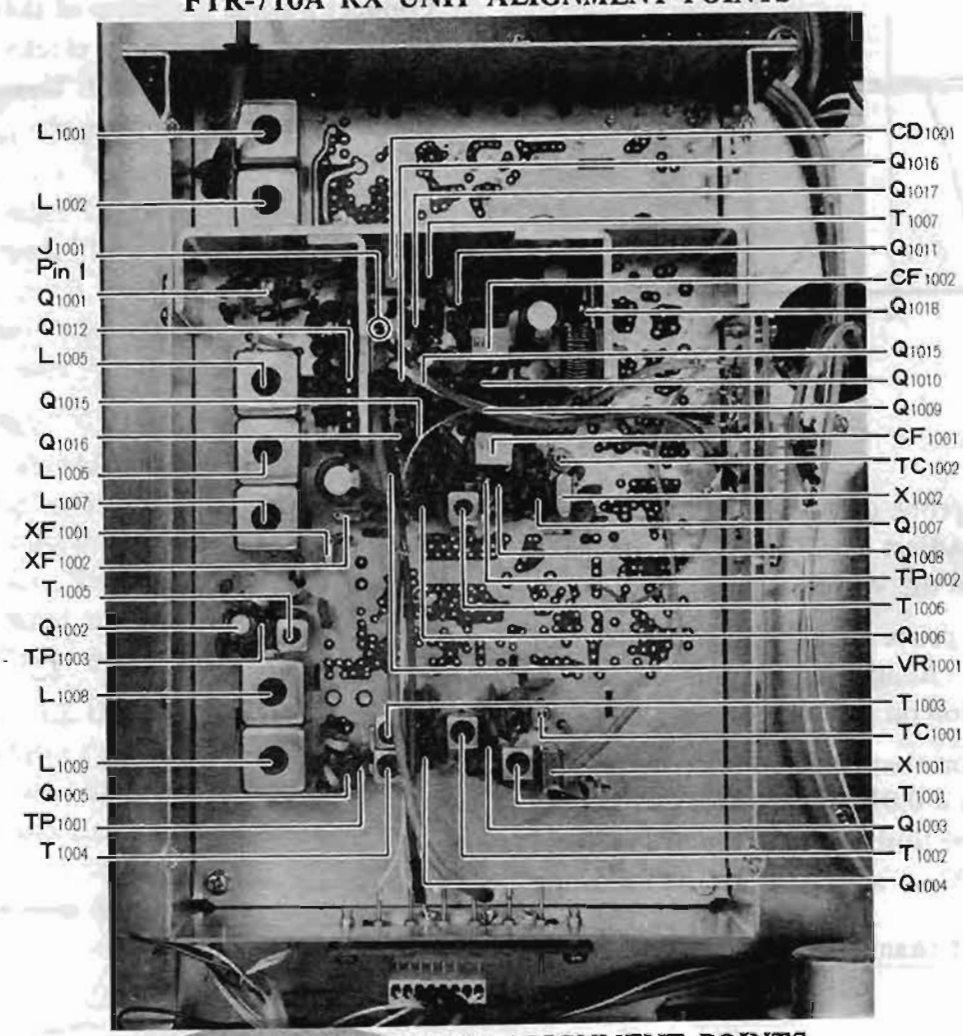
Connect a signal generator set to the channel frequency, with 1 kHz mod @ ±3 kHz deviation to the ANT jack. Connect an audio distortion meter to the speaker, using 8-ohm termination. Inject a signal from the generator so that the distortion meter indicates 25% distortion. Adjust T_{1005} and T_{1006} for minimum distortion. Now reset the signal generator level for 25% distortion, and again adjust T_{1005} and T_{1006} for minimum distortion. Repeat several times.

1-7) Squelch Sensitivity

Connect a signal generator to the antenna jack, and set the SQL control fully clockwise. Apply a 1 μV signal from the generator, and adjust VR_{1001} so that the squelch just opens.



FTR-710A RX UNIT ALIGNMENT POINTS



FTR-2410A RX UNIT ALIGNMENT POINTS

(2) FTR-2410A RX Unit

2-1) Second IF

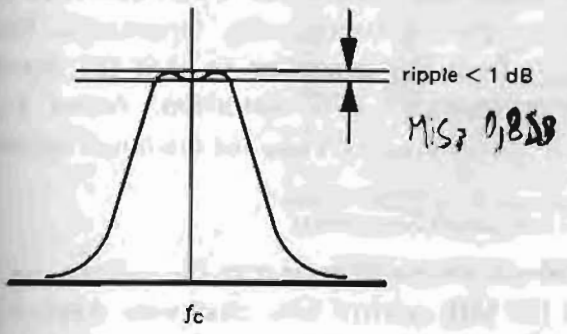
Connect a 455 kHz sweep generator to the base of Q_{1008}, and connect an XY scope (vertical amp input) to pin 1 of J_{1001}. Adjust T_{1007} for maximum p-p indication on the scope.

2-2) Second Local

Connect a precision frequency counter to TP_{1002}. Adjust TC_{1002} for a reading of exactly 20.945 MHz on the counter.

2-3) First IF

Connect a 21.4 MHz sweep generator to gate 2 of Q_{1002}. Connect an XY scope (vertical amp input) through a diode detector, to the secondary of T_{1006}. Now adjust T_{1005} and T_{1006} so that the pattern shown here is obtained, with less than 1 dB of ripple.



2-4) First Local

Connect the RF probe of a VTVM to the base of Q_{1005} (TP_{1001}). Adjust T_{1003} and T_{1004} for maximum indication on the VTVM.

Connect the RF probe of a VTVM to gate 2 of Q_{1002}. Adjust L_{1008} and L_{1009} for maximum indication on the VTVM.

Connect a precision frequency counter to the base of Q_{1005} (through a 0.01 μF capacitor). Preset the core of T_{1002} to be flush with the top of the shield can. Now adjust TC_{1001} and T_{1001} for the following frequency:

$$f_{test} = \frac{f\,(\text{RX channel}) - 21.4\ \text{MHz}}{3}$$

2-5) RF Section

Connect a precision VHF signal generator to the antenna jack, and connect an AF millivoltmeter to the speaker (use 8-ohm termination). Inject a signal on the channel frequency at a level providing about 10 dB of noise quieting. Now adjust L_{1001}, L_{1002}, L_{1005}, L_{1006} and L_{1007} for maximum noise quieting as shown on the meter. Adjust the signal generator level, and meter scale, as needed to provide a meaningful display.

2-6) SINAD Sensitivity

Connect a signal generator set to the channel frequency, with 1 kHz mod @ ±3 kHz deviation to the ANT jack. Connect an audio distortion meter to the speaker, using 8-ohm termination. Inject a signal from the generator so that the distortion meter indicates 25% distortion. Adjust T_{1005} and T_{1006} for minimum distortion. Now reset the signal generator level for 25% distortion, and again adjust T_{1005} and T_{1006} for minimum distortion. Repeat several times.

2-7) Squelch Sensitivity

Connect a signal generator to the antenna jack, and set the SQL control fully clockwise. Apply a 1 μV signal from the generator, and adjust VR_{1001} so that the squelch just opens.

(3) FTR-5410 RX Unit

3-1) Second IF

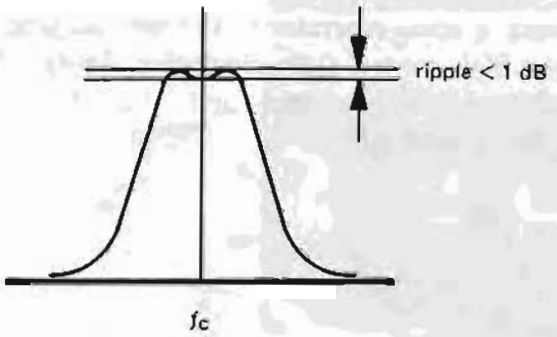
Connect a 455 kHz sweep generator to the base of Q_{1008}, and connect an XY scope (vertical amp input) to pin 1 of J_{1001}. Adjust T_{1007} for maximum p-p indication on the scope.

3-2) Second Local

Connect a precision frequency counter to TP_{1002}. Adjust TC_{1002} for a reading of exactly 20.945 MHz on the counter.

3-3) First IF

Connect a 21.4 MHz sweep generator to gate 2 of Q_{1002}. Connect an XY scope (vertical amp input) through a diode detector, to the secondary of T_{1006}. Now adjust T_{1005} and T_{1006} so that the pattern shown here is obtained, with less than 1 dB of ripple.



3-4) First Local

Connect the RF probe of a VTVM to the base of Q_{1005} (TP_{1001}). Adjust T_{1003} and T_{1004} for maximum indication on the VTVM.

Connect the RF probe of a VTVM to gate 2 of Q_{1002}. Adjust CV_{1003} for maximum indication on the VTVM.

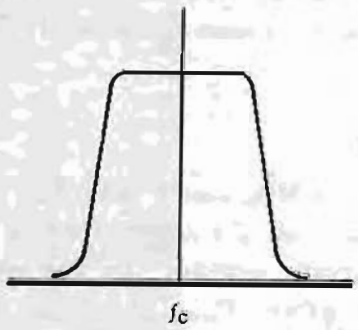
Connect a precision frequency counter to the base of Q_{1005} (through a 0.01 μF capacitor). Adjust TC_{1002} and T_{1001} for the following frequency:

$$f_{test} = \frac{f\,(RX\ channel) - 21.4\ MHz}{3}$$

3-5) RF Section

Connect a tracking generator to the antenna jack, and connect a spectrum analyzer through a 0.5 pF capacitor to gate 1 of Q_{1002}.

Adjust CV_{1001} and CV_{1002} for the passband shown in the following figure.

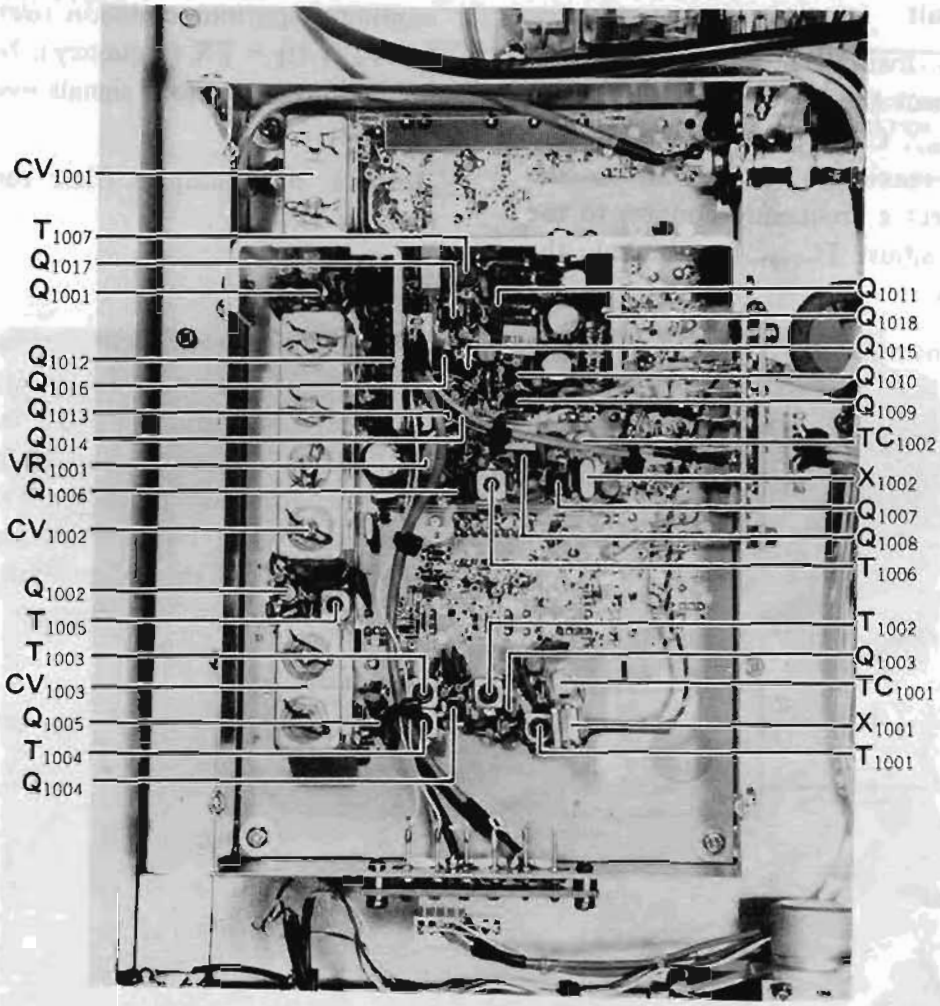


3-6) SINAD Sensitivity

Connect a signal generator set to the channel frequency, with 1 kHz mod @ ±3 kHz deviation to the ANT jack. Connect an audio distortion meter to the speaker, using 8-ohm termination. Inject a signal from the generator so that the distortion meter indicates 25% distortion. Adjust T_{1005} – T_{1007} and CV_{1001} –CV_{1003} for minimum distortion.

3-7) Squelch Sensitivity

Connect a signal generator to the antenna jack, and set the SQL control fully clockwise. Apply a 1 μV signal from the generator, and adjust VR_{1001} so that the squelch just opens.



FTR-5410 RX UNIT ALIGNMENT POINTS

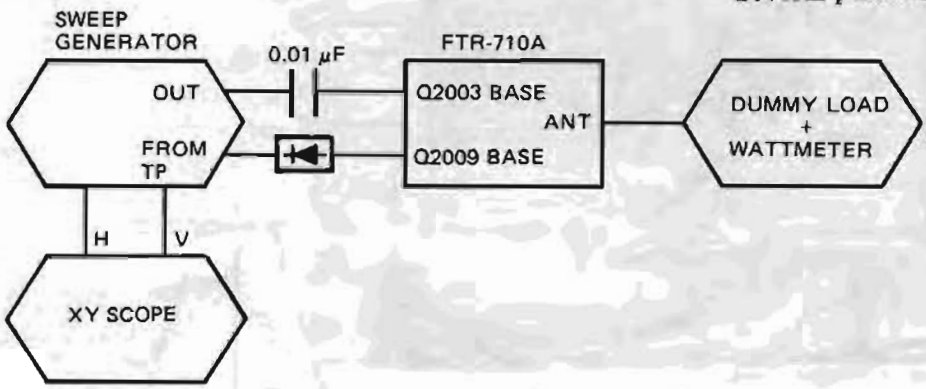
B. TRANSMITTER SECTION

(1) FTR-710A TX Unit

1-1) Oscillator Circuit

Connect a dummy load/VHF wattmeter to the antenna jack. Connect the RF probe of a VTVM to the base of Q_{2003}. Close the PTT switch, and adjust T_{2003} for maximum deflection on the VTVM. Now connect a frequency counter to the base of Q_{2003} and adjust TC_{2001} for precisely the following frequency:

$$f_{test} = \frac{f\ (\text{Transmit channel})}{6}\ \text{MHz}$$



1-2) Multiplier Stages

Leave the dummy load/wattmeter connected to the antenna jack. Turn VR_{2002} fully clockwise. Connect a DC voltmeter between TP_{2002} (negative) and TP_{2007} (positive). Adjust T_{2005} and T_{2006} for maximum indication on the voltmeter. Now connect the meter to TP_{2003} (negative) and adjust T_{2007} and T_{2008} for maximum indication on the meter. Connect the wattmeter to the antenna jack, and adjust T_{2008}, T_{2009}, TC_{2002}, and TC_{2003} to TC_{2008} for maximum indication on the wattmeter.

1-3) Bandpass filters

Assemble the test equipment as shown above. Adjust T_{2006} – T_{2009} and TC_{2002} – TC_{2004} so that the passband illustrated at the right is obtained. Several passes through the alignment procedure may be necessary to achieve the proper bandpass.

1-4) Spurious reduction

Connect a 6 dB hybrid combiner to the antenna jack. Connect a dummy load/wattmeter and a spectrum analyzer to the hybrid. Adjust TC_{2003} for minimum spurious emission over the range 1/2 f_t to 3/2 f_t (f_t = TX frequency). Now adjust TC_{2004} for minimum spurious signals over the range 5/6 f_t to 7/6 f_t.

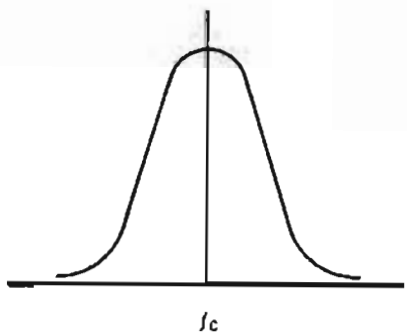
Recheck the bandpass filter tuning after adjustment of TC_{2004}.

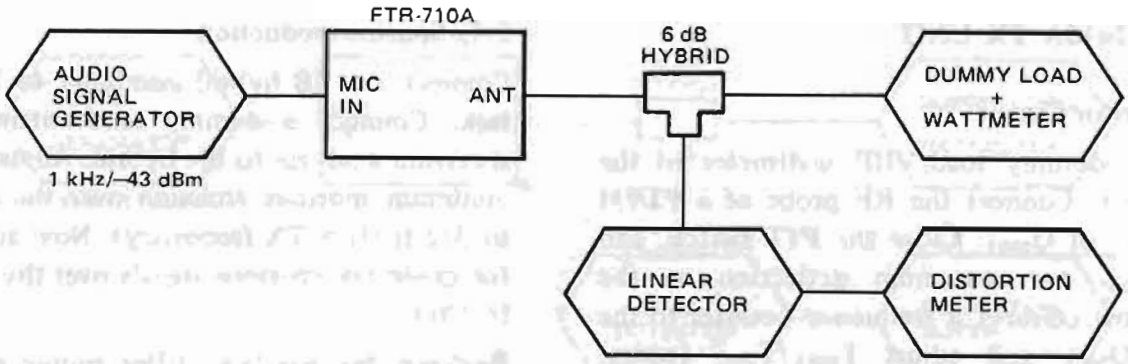
1-5) Deviation

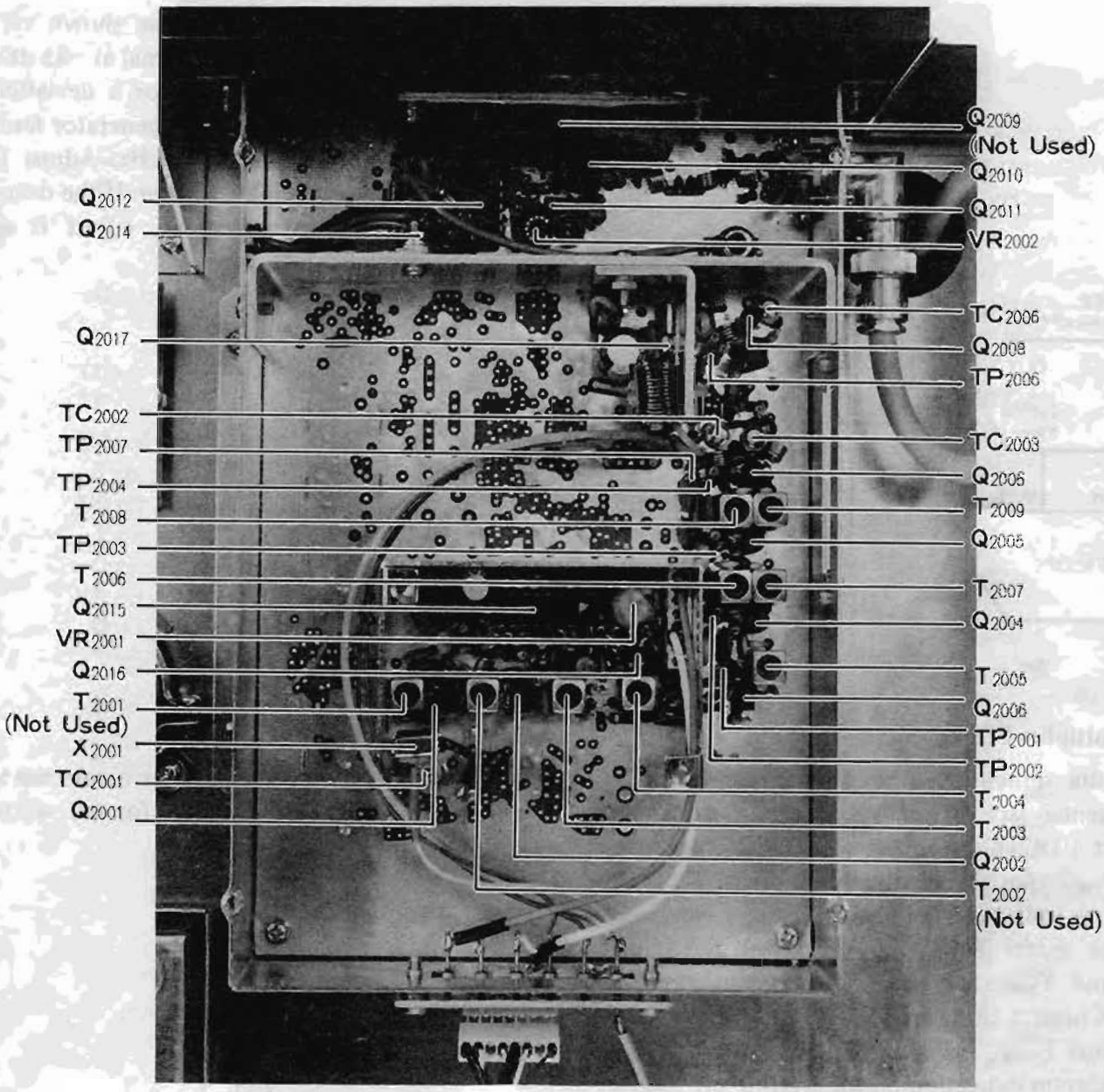
Assemble the test equipment as shown on the following page. Inject a 1 kHz signal at −43 dBm at the mic jack. Adjust VR_{2001} for a deviation of ±4.9 kHz. Now reduce the AF generator level, so that the deviation reaches ±3 kHz. Adjust T_{2003} and T_{2004} for minimum distortion. If the deviation changes during this alignment, adjust it again. Several passes may be necessary.

1-6) RF power

With the dummy load/wattmeter connected to the antenna jack, adjust VR_{2002} for 10 watts RF output.







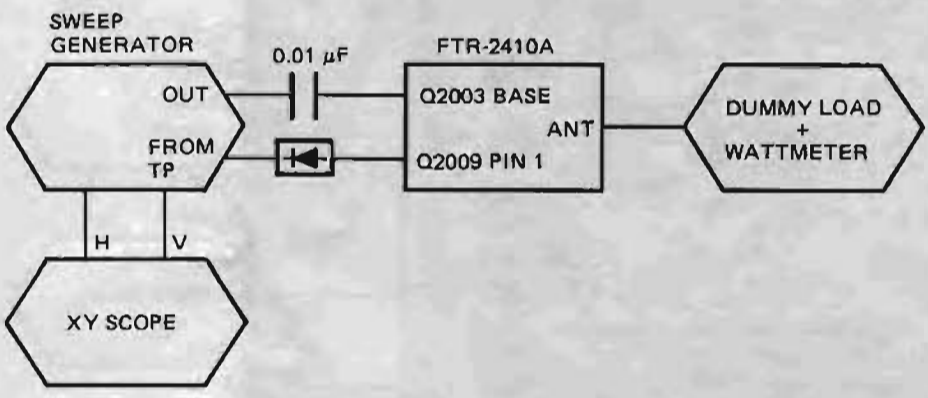
FTR-710A TX UNIT ALIGNMENT POINTS

(2) FTR-2410A TX UNIT

2-1) Oscillator Circuit

Connect a dummy load/VHF wattmeter to the antenna jack. Connect the RF probe of a VTVM to the base of Q_{2003}. Close the PTT switch, and adjust T_{2003} for maximum deflection on the VTVM. Now connect a frequency counter to the base of Q_{2003} and adjust T_{2001}/T_{2002} (coarse tuning) and TC_{2001} for precisely the following frequency:

$$ftest = \frac{f\ (\text{Transmit channel})}{6}\ \text{MHz}$$



2-2) Multiplier Stages

Leave the dummy load/wattmeter connected to the antenna jack. Turn VR_{2002} fully clockwise. Connect a DC voltmeter between TP_{2002} (negative) and TP_{2007} (positive). Adjust T_{2005} and T_{2006} for maximum indication on the voltmeter. Now connect the meter to TP_{2003} (negative) and adjust T_{2007} and T_{2008} for maximum indication on the meter. Connect the wattmeter to the antenna jack, and adjust T_{2008}, T_{2009}, TC_{2002}, TC_{2003} and TC_{2006} for maximum indication on the wattmeter.

2-3) Bandpass filters

Assemble the test equipment as shown above. Adjust T_{2006} – T_{2009} and TC_{2002}, TC_{2003} and TC_{2006} so that the passband illustrated at the right is obtained. Several passes through the alignment procedure may be necessary to achieve the proper bandpass.

2-4) Spurious reduction

Connect a 6 dB hybrid combiner to the antenna jack. Connect a dummy load/wattmeter and a spectrum analyzer to the hybrid. Adjust TC_{2003} for minimum spurious emission over the range 1/2 f_t to 3/2 f_t (f_t = TX frequency). Now adjust TC_{2006} for minimum spurious signals over the range 5/6 f_t to 7/6 f_t.

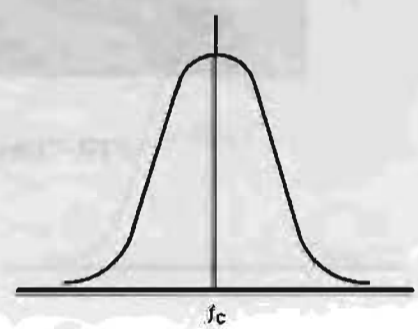
Recheck the bandpass filter tuning after adjustment of TC_{2006}.

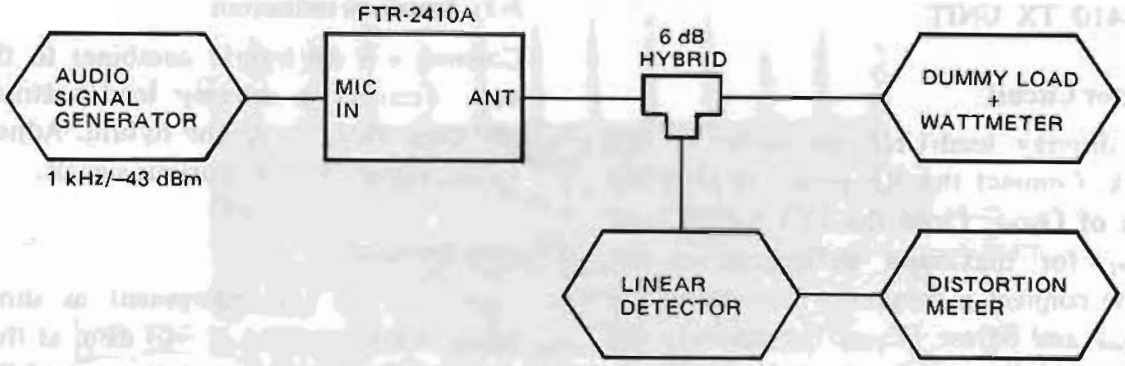
2-5) Deviation

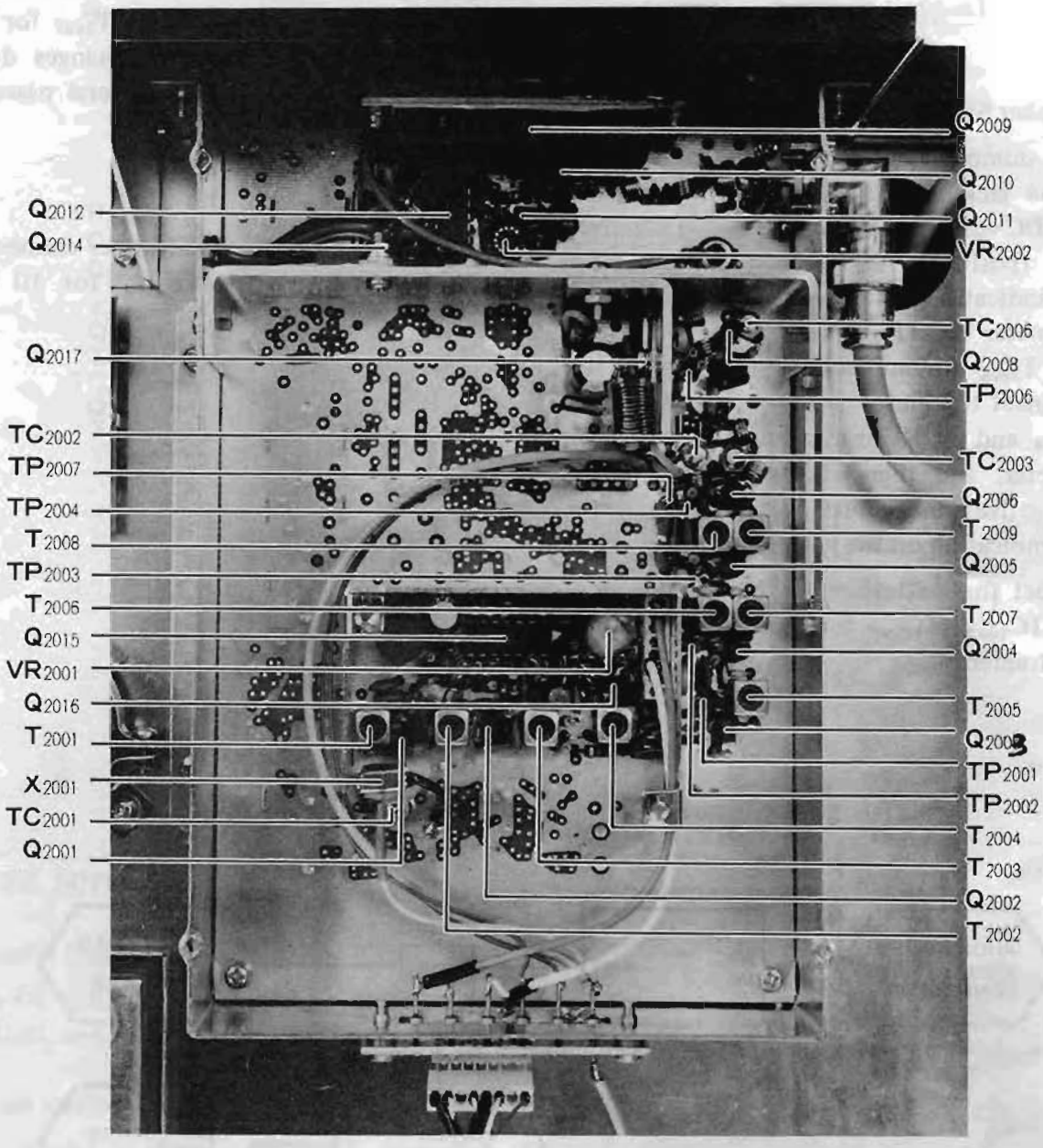
Assemble the test equipment as shown on the following page. Inject a 1 kHz signal at −43 dBm at the mic jack. Adjust VR_{2001} for a deviation of ±4.9 kHz. Now reduce the AF generator level, so that the deviation reaches ±3 kHz. Adjust T_{2003} and T_{2004} for minimum distortion. If the deviation changes during this alignment, adjust it again. Several passes may be necessary.

2-6) RF power

With the dummy load/wattmeter connected to the antenna jack, adjust VR_{2002} for 10 watts RF output.







FTR-2410A TX UNIT ALIGNMENT POINTS

(3) FTR-5410 TX UNIT

3-1) Oscillator Circuit

Connect a dummy load/UHF wattmeter to the antenna jack. Connect the RF probe of a VTVM to the base of Q_{2003}. Close the PTT switch, and adjust T_{2003} for maximum deflection on the VTVM. Now connect a frequency counter to the base of Q_{2003} and adjust TC_{2001} for precisely the following frequency:

$$f_{test} = \frac{f\ (\text{Transmit channel})}{12}\ \text{MHz}$$

3-2) Multiplier Stages

Leave the dummy load/wattmeter connected to the antenna jack. Turn VR_{2002} fully clockwise. Connect a DC voltmeter between TP_{2001} (negative) and TP_{2007} (positive). Adjust T_{2003} and T_{2004} for maximum indication on the voltmeter. Now connect the meter to TP_{2002} (negative) and adjust T_{2007} and T_{2008} for maximum indication on the meter. Connect the meter to TP_{2003} (negative) and adjust T_{2006} and T_{2007} for maximum indication on the voltmeter, and then connect the meter to TP_{2004} (negative) and adjust T_{2008} and T_{2009} for maximum indication on the voltmeter.

Now connect the wattmeter to the antenna jack, and adjust TC_{2002} – TC_{2007} for maximum indication on the wattmeter.

3-3) Spurious reduction

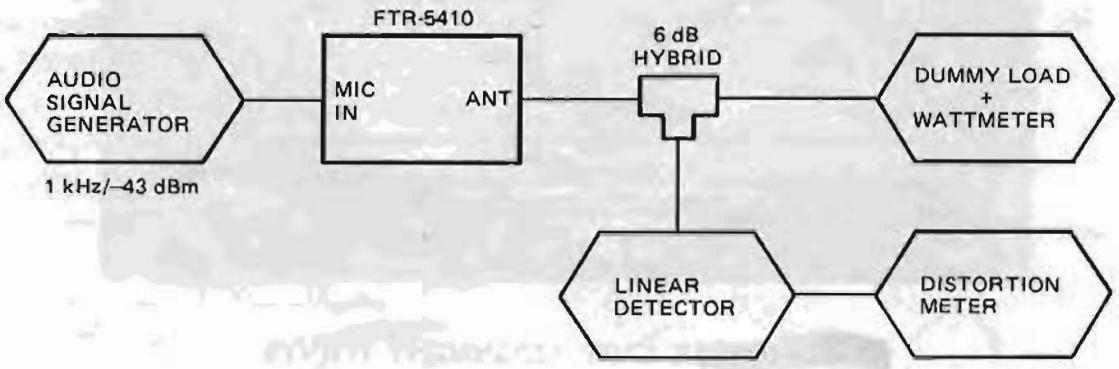
Connect a 6 dB hybrid combiner to the antenna jack. Connect a dummy load/wattmeter and a spectrum analyzer to the hybrid. Adjust TC_{2002} – TC_{2007} for minimum spurious signals.

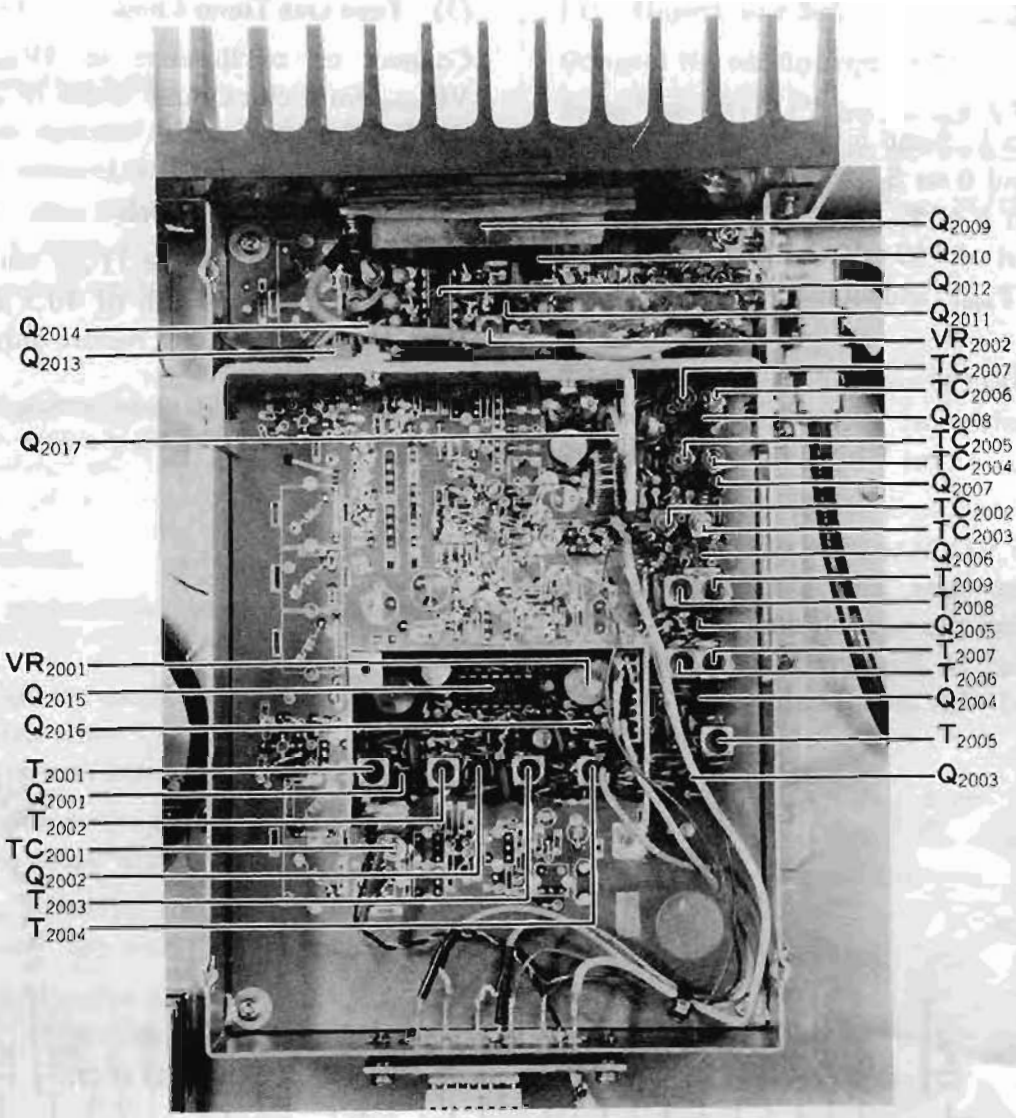
3-4) Deviation

Assemble the test equipment as shown below. Inject a 1 kHz signal at –43 dBm at the mic jack. Adjust VR_{2001} for a deviation of ±4.9 kHz. Now reduce the AF generator level, so that the deviation reaches ±3 kHz. Adjust T_{2003} – T_{2005} for minimum distortion. If the deviation changes during this alignment, adjust it again. Several passes may be necessary.

3-5) RF power

With the dummy load/wattmeter connected to the antenna jack, adjust VR_{2002} for 10 watts RF output.





FTR-5410 TX UNIT ALIGNMENT POINTS

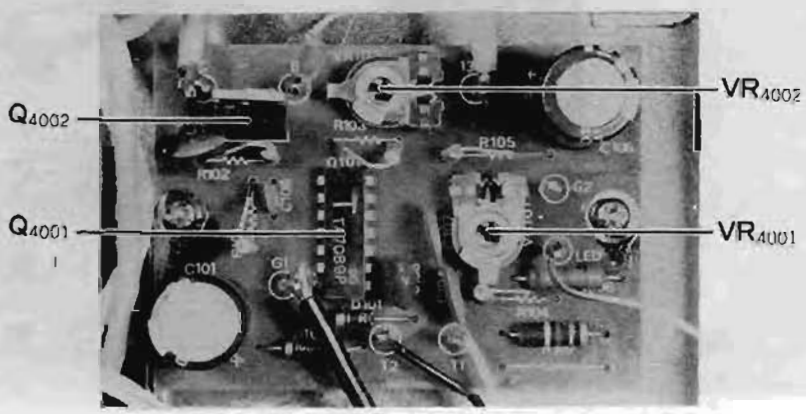
C. POWER SUPPLY

(1) Regulator Output Voltage

Connect a DC voltmeter to the 13.6V terminal on the REG Unit, and adjust VR_{4001} for 13.8V.

(2) Current Limiter

VR_{4002} is aligned at the factory to limit power supply current to 6 amperes, and should not require readjustment. However, if repairs are made to the power supply, and the 13.8V output is not obtainable while transmitting, this potentiometer can be readjusted to correct the voltage drop. Before adjusting VR_{4002}, make sure that the current drawn from the supply does not exceed 6 amps during transmission.



REG UNIT ALIGNMENT POINTS

D. COR UNIT

(1) AF Level

Set DIP switches 1, 5 and 6 on S_{3001} ON, and also switches 4, 5 and 6 on S_{3002} ON. Connect an AF generator to pin 6 of J_{3001} (pin 5 is ground), and set for an output of 150 mV at 1 kHz. Connect an AF VTVM to TP_{3001}, and adjust VR_{3001} for 1.26V on the VTVM.

Preset the SQUELCH control on the front panel so that the squelch just opens, and move the AF VTVM to TP_{3004}. Adjust VR_{3003} for 1.5 mV on the VTVM.

Connect the AF VTVM to pin 8 of Q_{3003}, and with the squelch just open, note the voltage on the meter. Now close the squelch and adjust VR_{3002} so that the voltage on the meter is 20 dB below the voltage measured with the squelch open.

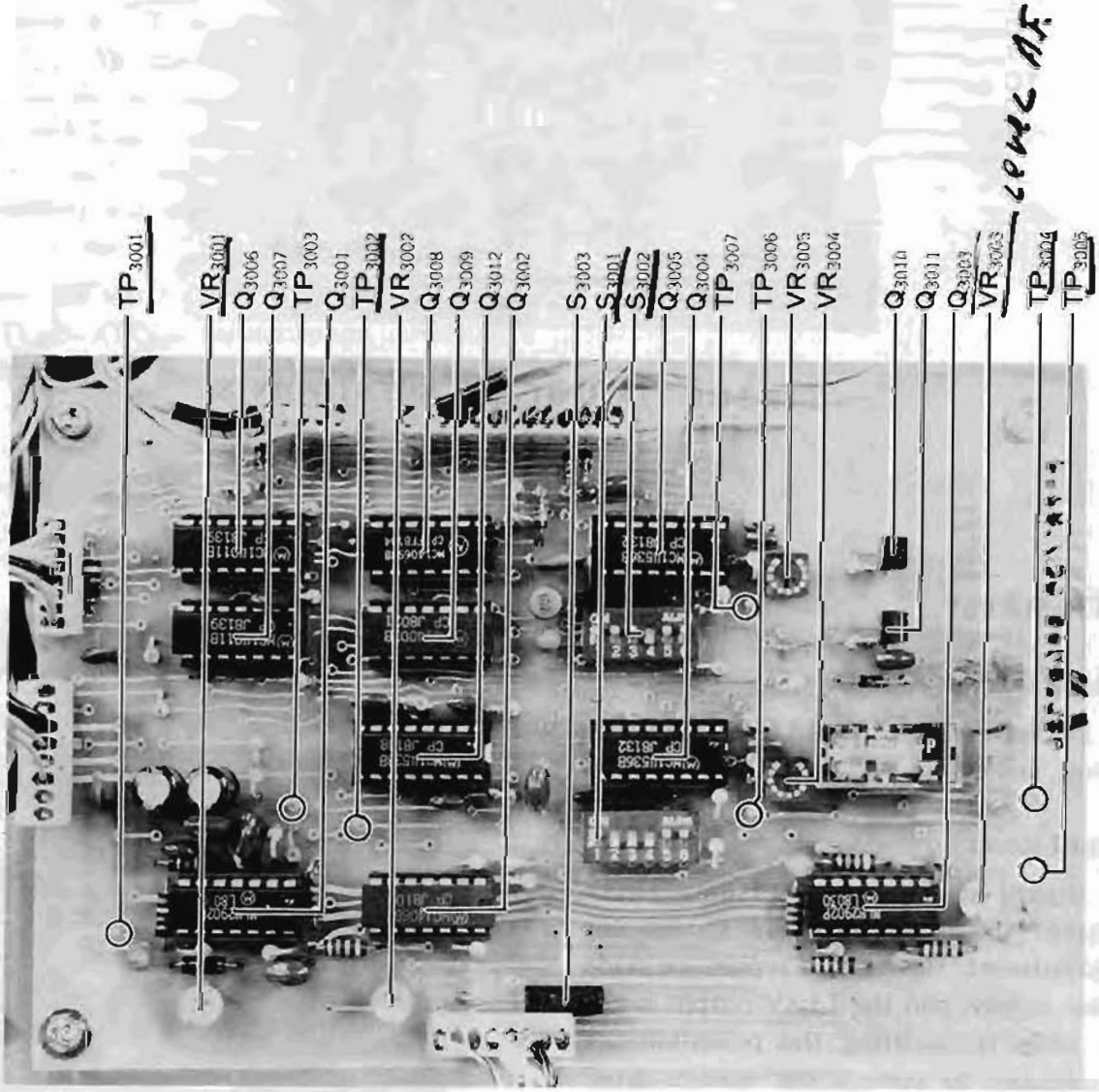
(2) Time Out Timer Clock

Connect an oscilloscope to TP_{3006} and adjust VR_{3004} for a clock pulse width of 21.4 μsec in the REPEAT mode.

(3) Hang Up Timer Clock

Connect the oscilloscope TP_{3007} and adjust VR_{3005} for a clock pulse width of 30.5 μsec during the Hang Up (REPEAT, but receive only) state.

See page 44 for Delay timer setting.



COR UNIT Alignment Points

E. DTMF UNIT

(1) DTMF Decoder check

Connect the oscilloscope to each pin of P_{11}, one at a time, and connect a DTMF test oscillator to pin 13 of the edge connector. Enter the DTMF codes one at a time from the oscillator, while checking each corresponding pin of P_{11} for a pulse.

If a DTMF test oscillator is not available, use a transceiver with a built-in DTMF encoder.

(2) One-shot check

Connect the oscillsocope to pin 6 of Q_{7003} (MC14538B).

Check to see that the oscilloscope indication shifts from low to high when "[*]" is input, and after 1.5 seconds, returns to low.

Connect the oscilloscope to pin 10 of Q_{7003}, and repeat the above check with "[#]".

Connect the oscilloscope to pin 6 of Q_{7005}, and repeat the previous step with "[#]".

Connect the oscilloscope to pin 10 of Q_{7005}, and check codes "[0]" through "[9]" for a 0.5-second high state.

(3) Timer Clock Set

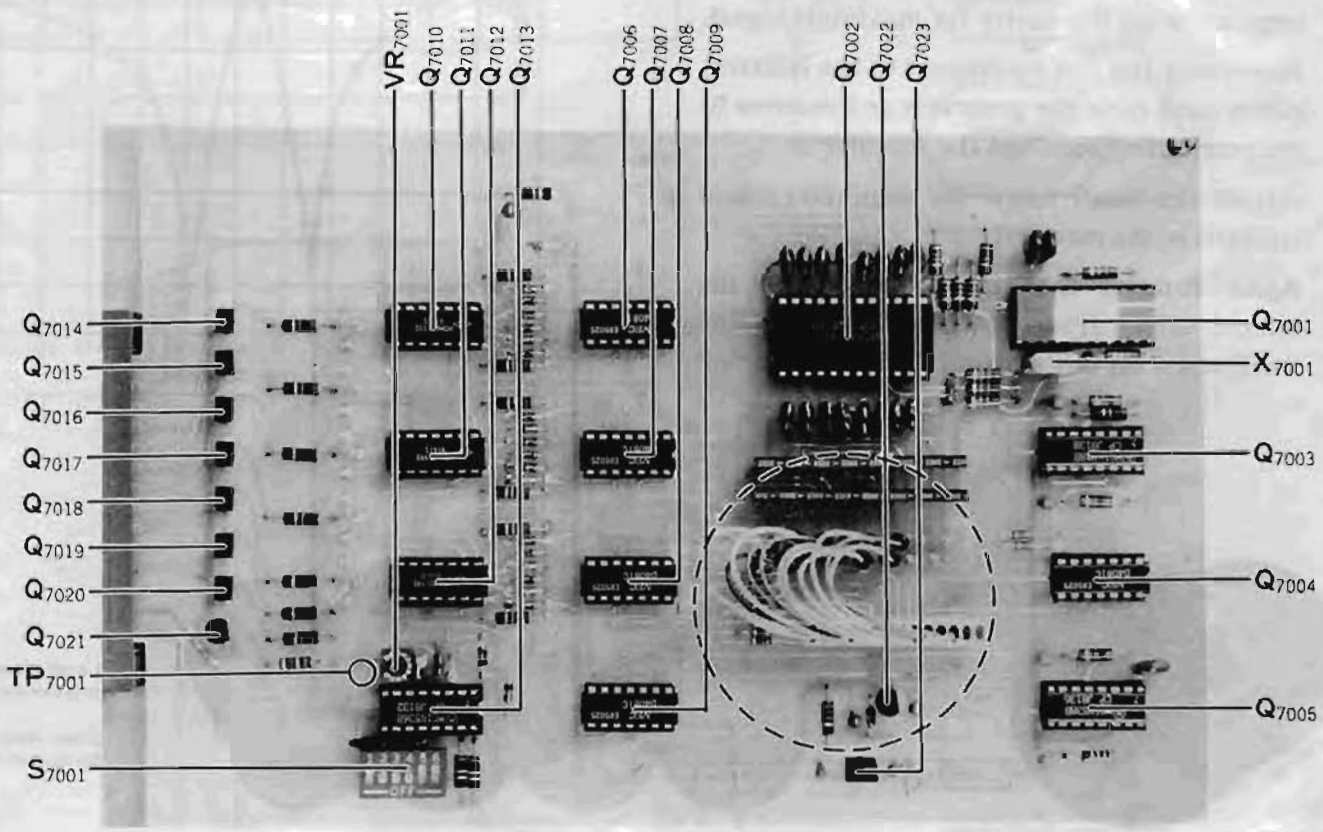
Connect the oscilloscope to TP_{7001} near VR_{7001}.

Press "[*] [3] [2]", and adjust VR_{7001} for a clock pulse width of 42.8 μsec on the scope.

Set the DIP switches on S_{7001} as follows:

1 – ON
2 – OFF
3 – OFF
4 – OFF
5 – ON
6 – ON

See page 46 for DTMF Command Code programming.



DTMF UNIT Alignment Points

F. DUPLEXER

Alignment of the cavity duplexer is determined by the exact operating frequencies of the repeater, and adjustment is critical. If the transmit or receive frequencies are changed, the cavities must be realigned.

The following procedure is intended to apply to those duplexers having round cylindrical cavities, as shown below. Alignment requires at least a stable signal generator and monitor receiver with signal strength indicator, both of which must be tunable to both the transmit and receive frequencies of the repeater. However, a sweep generator is preferable. Do not alter the order of the alignment steps.

(1) TX Section

a) Connect the test equipment to the leftmost cavity as shown below. Tune the signal generator and monitor receiver to the transmit frequency of the repeater.

b) Adjust the large screw for maximum signal in the receiver.

c) Now connect the test equipment to the second cavity from the left, and adjust the large screw on this cavity for maximum signal.

d) Reconnect the test equipment to the leftmost cavity, and tune the generator and receiver to the receive frequency of the repeater.

e) Adjust the small screw for minimum signal strength in the receiver.

f) Again connect the test equipment to the second cavity from the left, and adjust the small screw on this cavity for minimum signal.

(2) RX Section

a) Connect the test equipment to the rightmost cavity as shown below. Tune the signal generator and monitor receiver to the receive frequency of the repeater.

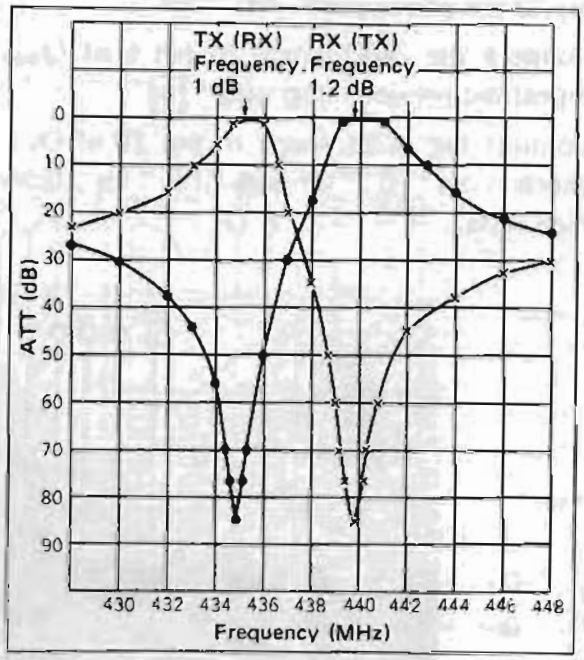
b) Adjust the large screw for maximum signal in the receiver.

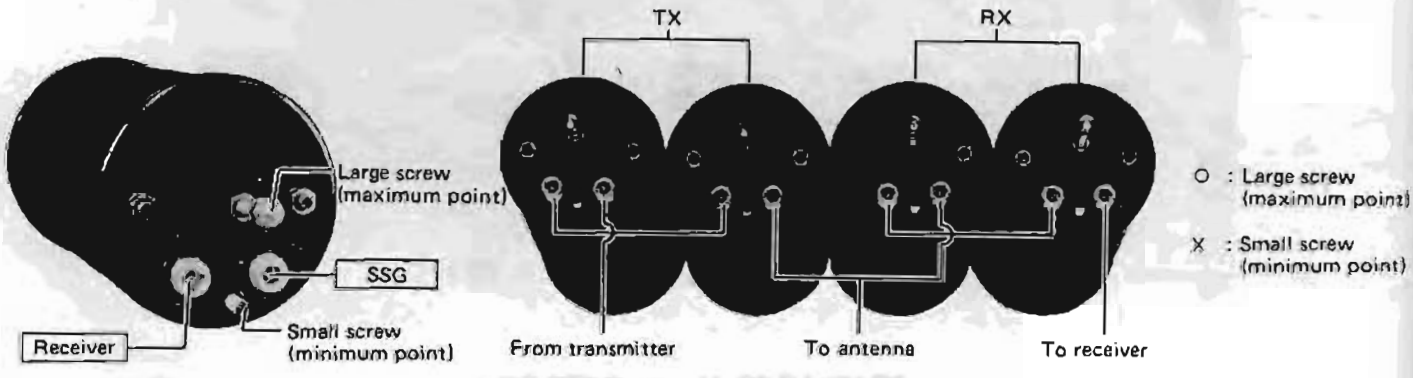
c) Now connect the test equipment to the second cavity from the right, and adjust the large screw on this cavity for maximum signal.

d) Reconnect the test equipment to the rightmost cavity, and tune the generator and receiver to the transmit frequency of the repeater.

e) Adjust the small screw for minimum signal strength in the receiver.

f) Again connect the test equipment to the second cavity from the right, and adjust the small screw on this cavity for minimum signal.





G. FL-2450 AMPLIFIER

1. Remove the four screws indicated by the arrows in the diagram, and remove the front panel slowly, just enough to gain access to the adjustment points without straining the POWER indicator wiring.

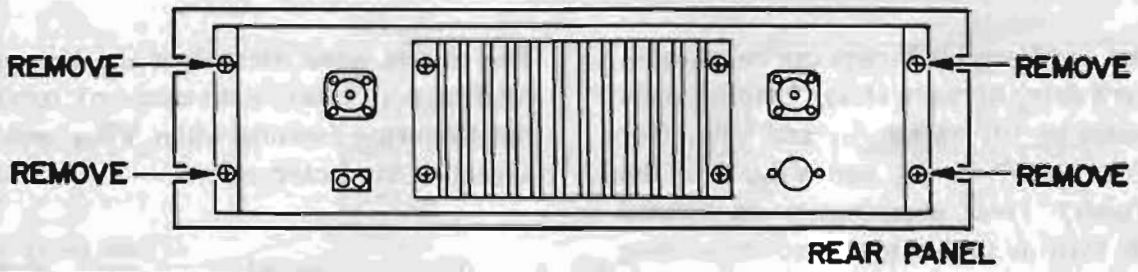
2. Connect the test equipment as indicated below.

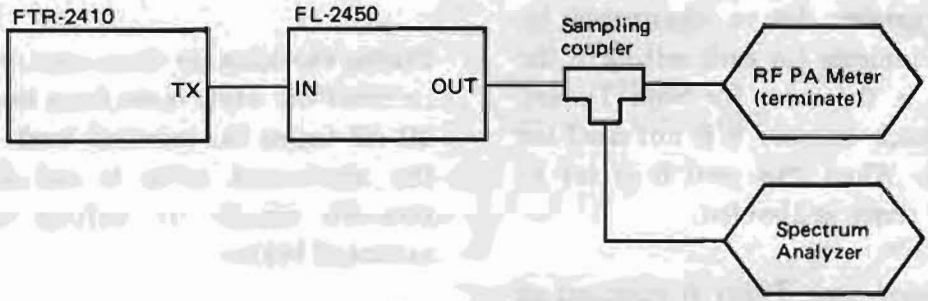
3. In the FTR-2410A, adjust VR_{102} on the TX Unit to the fully clockwise position.

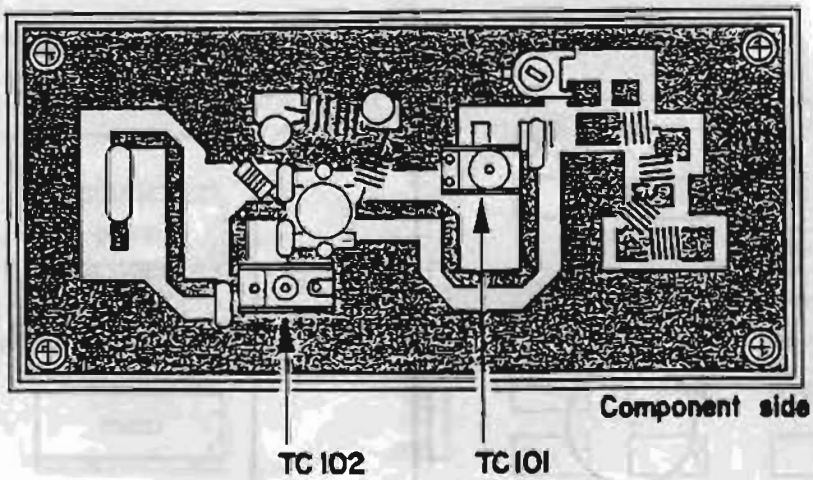
4. Activate the repeater transmitter, and adjust TC_{101} and TC_{102} alternately to provide maximum power output on the wattmeter and minimum spurious on the analyzer, simultaneously.

5. Now adjust VR_{102} again in the FTR-2410A so that the wattmeter indicates 50 watts.

6. Remove the test equipment and replace the front panel and the four screws. This completes the alignment.







FL-2450 ALIGNMENT POINTS

ADJUSTMENTS

This section includes directions for adjustment of the Hang Up and Time Out Delay Timers for periods other than those programmed at the factory, according to the preference of the user. Programming instructions for the optional DTMF Decoder Unit are also provided to allow the user to reprogram the Command Codes for his particular needs, and to make use of the three User Modes for user selected commands. Setting of the optional FTS-5 Tone Burst Unit frequency is not included here, as this information is provided on page 11. Also, CTCSS tone frequency programming for the FTS-32R (RPT) is already provided on page 13, and is not reprinted here.

Delay Timer Setting

The Time Out and Hang Up Timers can be adjusted for any desired delay between about 7 milliseconds and 11 minutes by DIP switch S_{01} and VR_{04} (for the Time Out Timer), or S_{02} and VR_{05} (for the Hang Up Timer). These components are located on the COR Unit as shown in the accompanying figure.

The table on the following page indicates the minimum and maximum delays obtainable by adjusting the potentiometer for each setting of the DIP switches. This is the same for both Timers. Notice that DIP switch number 6 is not used for delay programming. When this switch is set to OFF, the respective timer is disabled.

The potentiometer for each Timer is adjusted at the factory, and the DIP switches preset, so that the Time Out Timer delay is 3 minutes, and the Hang Up Timer delay is 4 seconds. Therefore each may be reset for certain convenient alternate delays by merely resetting the DIP switches. For example, the Hang Up Timer can be reset for 2, 1 or 0.5 seconds by simply moving the DIP switches. No adjustment of the potentiometers is necessary.

If it is necessary to recalibrate the Timers precisely for certain delay times, this can be done by connecting an oscilloscope to TP_{06} (for the Time Out Timer), or TP_{07}. Adjust the Squelch control so that the squelch is open when adjusting the Time Out delay, or closed when adjusting the Hang Up delay.

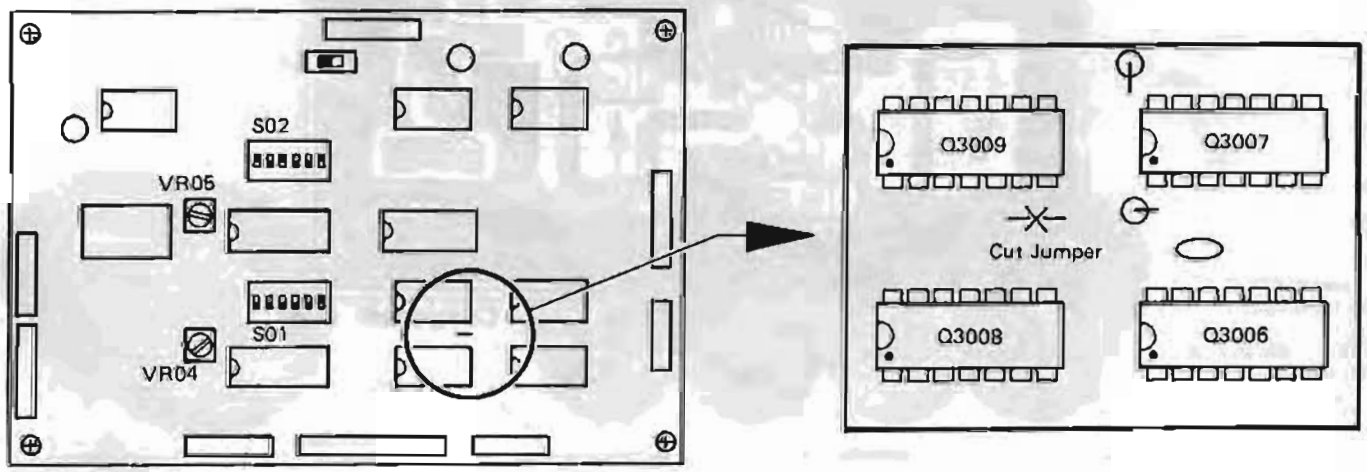
The square wave present at the test point has a total period (risetime-to-risetime) conforming to the following formula when VR_{04} and VR_{05} are aligned at the factory:

$$\text{Waveform period} = \frac{\text{Timer delay x 2}}{\text{Clock dividing ratio}}$$

VR_{04} and VR_{05} may be readjusted as desired.

During the hang up delay period, the repeater will transmit the white noise from the receiver at a level 20 dB below the received level. If transmission of the attenuated noise is not desired, it can be removed simply by cutting the jumper wire indicated below.

Hang up Delay Timer Modification



DELAY TIMER SETTING

DIP Switch	DIVIDING RATIO	Delay Time (Seconds)	
1 2 3 4 5		minimum VR setting	maximum VR setting
O O O O O	512	0.002	0.020
X O O O O	1024	0.015	0.040
O X O O O	2048	0.03	0.081
X X O O O	4096	0.061	0.163
O O X O O	8192	0.123	0.327
X O X O O	16384	0.245	0.655
X X X O O	32768	0.491	1.310
X X X O O	65536	0.983	2.620
O O O X O	131072	1.960	5.240
X O O X O	262144	3.390	10.400
O X O X O	524288	7.860	20.900
X X O X O	1048576	15.600	41.900
O O X X O	2097152	31.400	83 (1'23")
X O X X O	4194304	62 (1'02")	167 (2'47")
O X X X O	8388608	125 (2'05")	335 (5'35")
X X X X O	1677216	251 (4'11")	671 (11'11")

O = ON
X = OFF
DIP Switch (6) ON (O) = TIMER ON
OFF (X) = TIMER OFF

DTMF Command Code Programming

DTMF command code/key relationships are programmed by the connections between the pins of J_{7002} and the terminals on the DTMF Unit labelled with the key functions. Thus to change the command code for a particular function, it is only necessary to change the wire connections to the terminals.

For example, to change the "✱" (SET) and "#" (RESET) functions from the present key codes to the "A" and "B" keys, simply remove the red/white wire (pin 2 of J_{7002}) from the terminal labelled "✱" and reconnect it to the "A" terminal. Also move the black/white wire (pin 3 of J_{7002}) from the "#" terminal to the "B" terminal.

Now, if the rest of the terminals are programmed as from the factory, [A] [4] will deactivate the CTCSS tone decoder (as [✱] [4] did previously), and [B] [4] will reactivate the decoder (as [#] [4] did previously). Other command functions will be affected in the same manner.

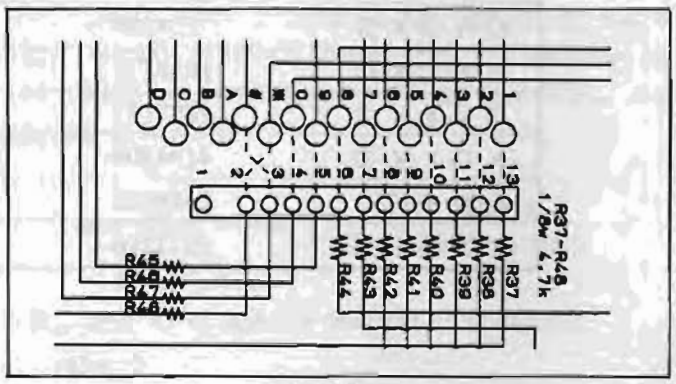
Following are the wire colors corresponding to the pins of J_{7002}, and the command functions of each (as wired at the factory).

J_{7002} pin no.	Wire color	Command function	Key Code (factory set)
2	red/white	Function SET prefix	[✱]
3	black/white	Function RESET prefix	[#]
4	white	no connection	[0]
5	gray	no connection	[9]
6	violet	User Mode 3	[8]
7	blue	User Mode 2	[7]
8	green	User Mode 1	[6]
9	yellow	Transmit disable	[5]
10	orange	CTCSS disable	[4]
11	red	Local MIC mode	[3]
12	brown	Local MIC mode	[2]
13	black	All RESET	[1]

As in the above example, any of these functions (or three user-installed functions) can be programmed to operate from any desired DTMF code pair simply by connecting these wires to the terminals labelled with the desired key symbols.

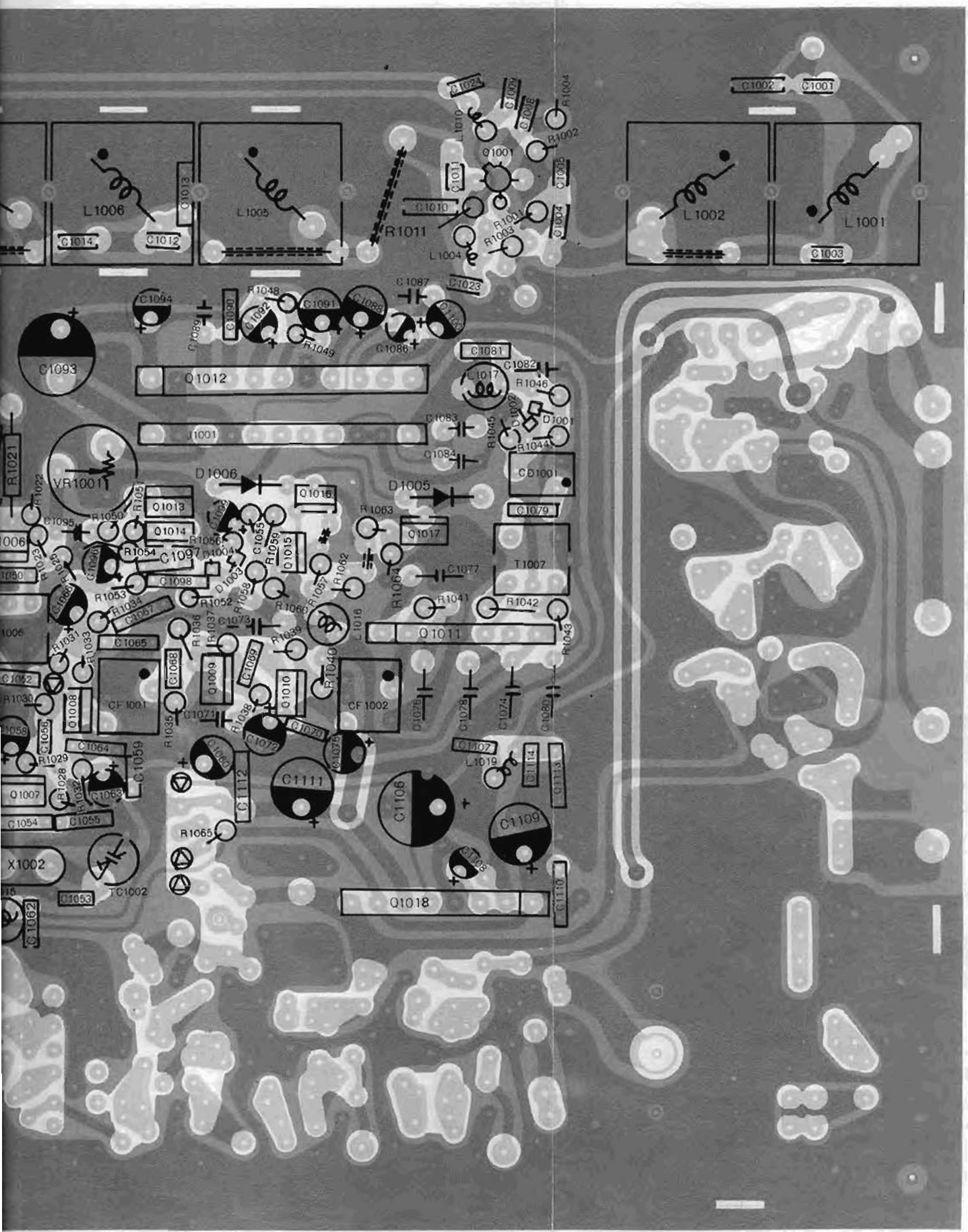
User Modes

Transistors Q_{14}, Q_{15} and Q_{16} are provided for TTL-level switching of user-installed functions, designated User Modes 3, 2 and 1, respectively. Each transistor can be connected so that it is either on or off when the programmed DTMF code is received, by connecting the terminal in line with R_{23}, R_{24} or R_{25} to the upper or lower adjacent terminal (Q and $\overline{Q}$ outputs from the flip-flops). The collectors of Q_{14}, Q_{15} and Q_{16} are connected to the edge connector, so that actual control connection can be made from the COR Unit (PB-2418A).

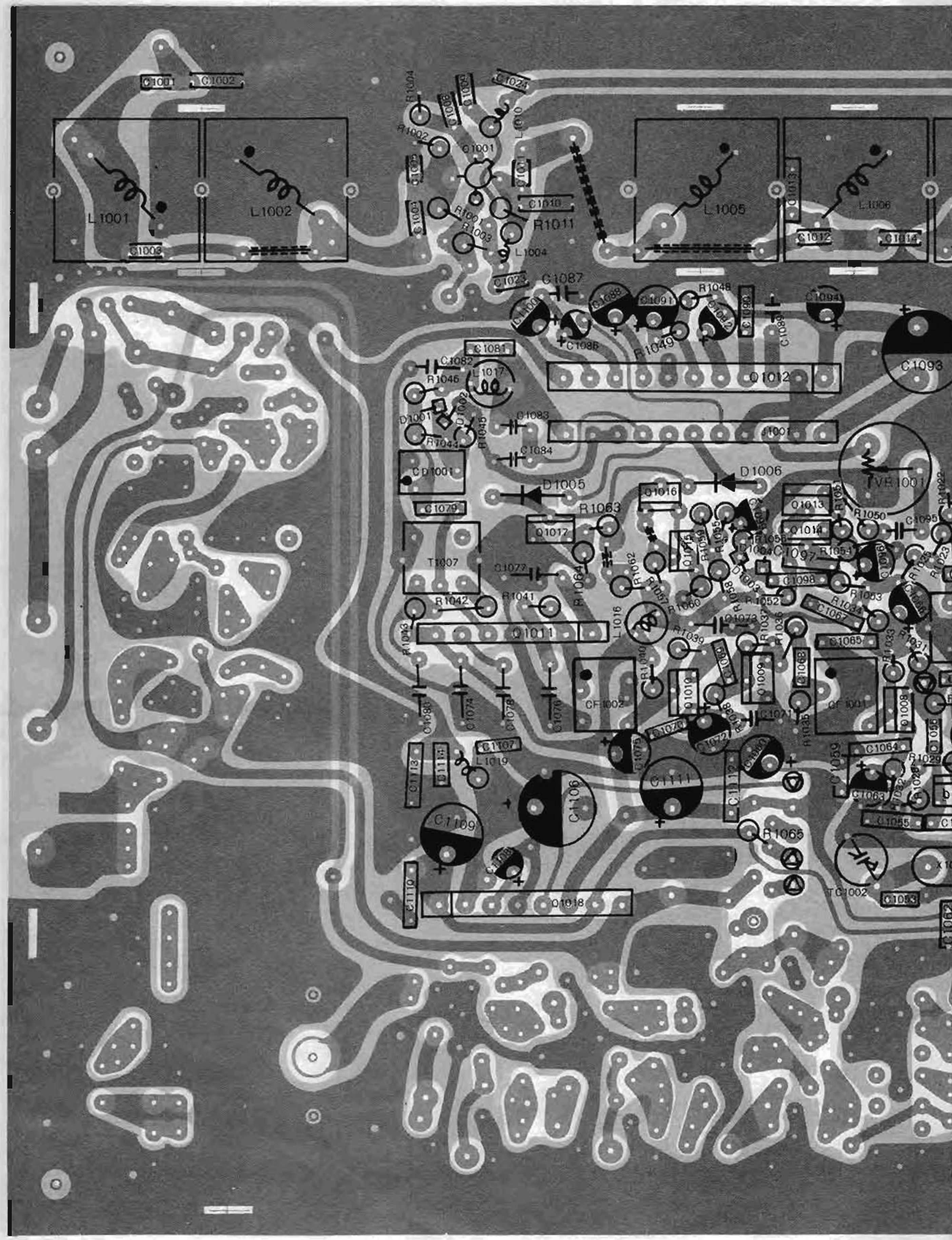



C1017
R1007
C1025
R1008
Q1002
R1005
R1006
L1011
C1019
C1018
R1066
C1009
L1009
L1008
T1005
C1027
C1010
C1015
L1007
C1020
C1026
XF1001
C1049
XF1002
C1093
C1021
C1046
R1020
C1048
L1014
L1013
R1019
Q1005
R1018
C1044
C1045
T1004
T1003
C1038
C1043
C1040
C1039
R1017
C1044
Q1004
R1016
C1041
C1042
R1015
C1037
R1013
T1002
R1014
C1031
C1032
Q1003
R1012
C1033
C1028
R1010
L1012
T1001
C1035
R1011
C1034
X1001
TC1001
C1029
C1051
R1021
R1024
R1022
VR10
C1095
Q1006
C1050
C1066
T1006
R1031
C1052
R1030
Q1008
C1057
C1058
C1056
R1029
R1027
R1028
Q1007
R1026
C1054
X1002
L1015
C1053
C1062
C1061

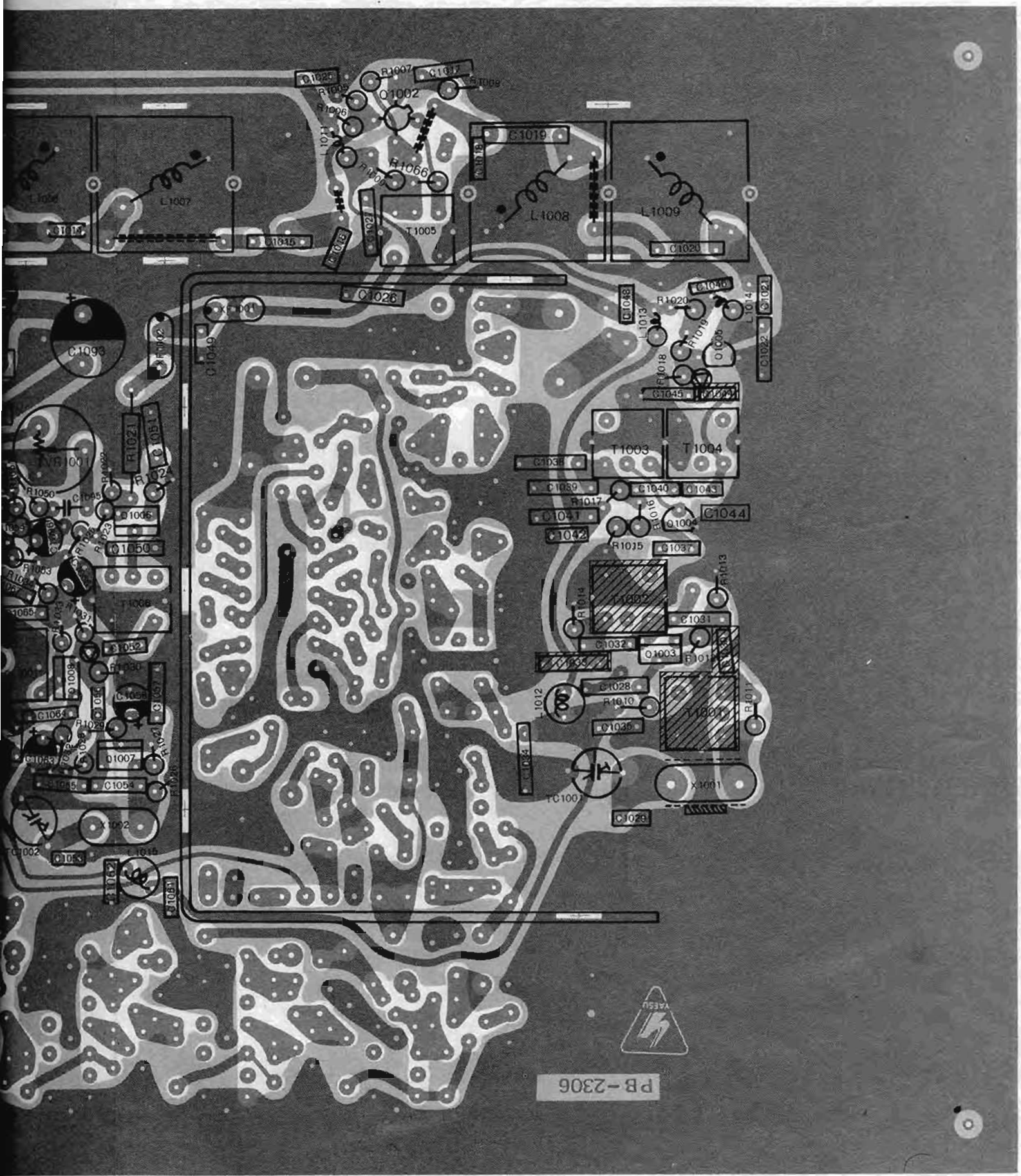
UNIT PARTS LAYOUT



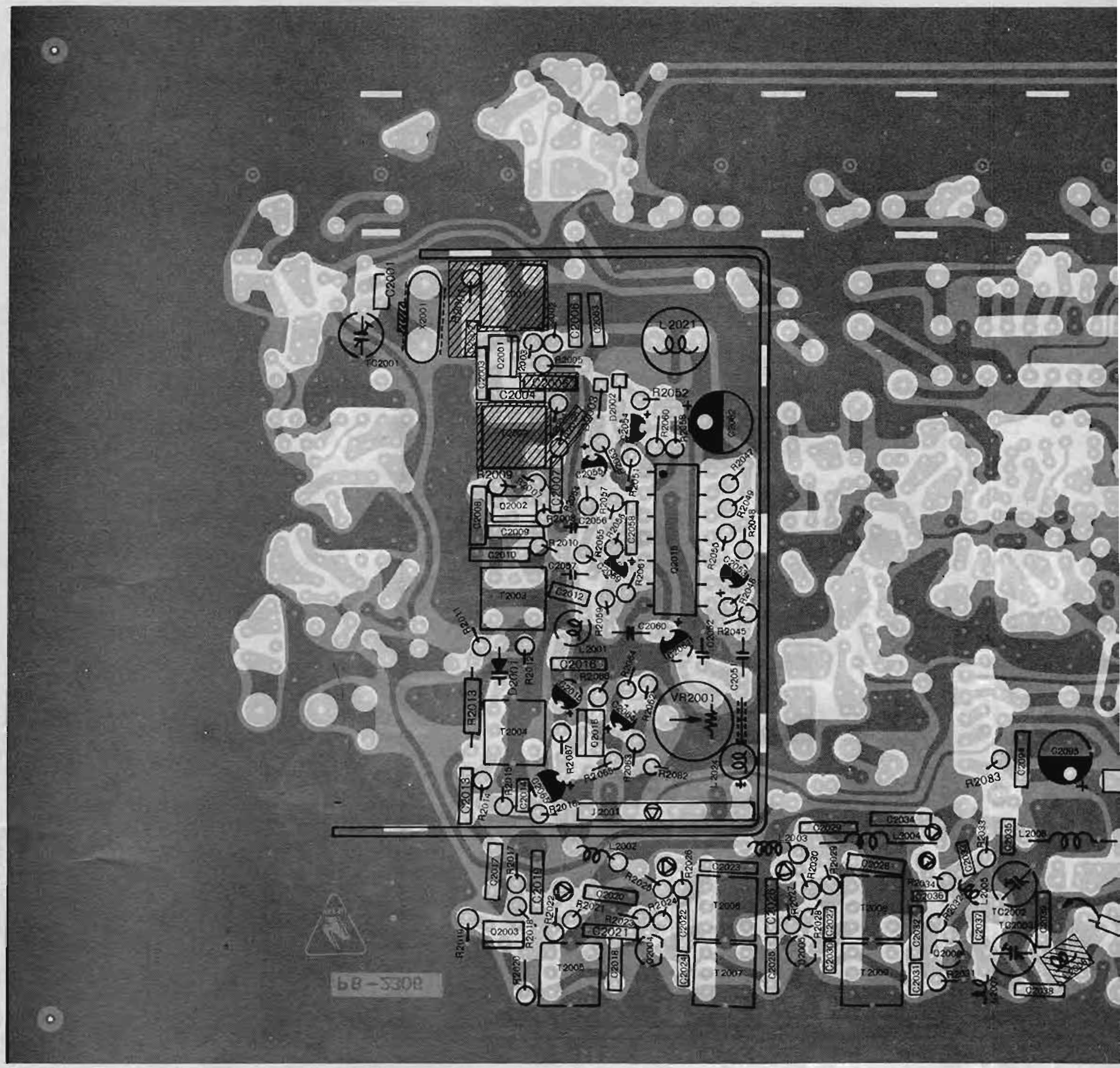
Viewed from component side


C1001
C1002
C1003
L1001
L1002
R1004
R1002
Q1001
C1024
L1010
C1005
C1007
C1011
C1010
R1011
R1003
L1004
C1023
C1087
L1005
L1006
C1013
C1012
C1014
C1100
C1088
C1091
C1086
R1048
R1049
C1090
C1089
C1094
C1093
C1081
C1082
R1045
L1017
D1001
D1002
R1046
C1083
R1044
C1084
Q1012
Q1001
CD1001
D1005
D1006
C1079
R1063
Q1016
Q1017
Q1013
Q1014
VR1001
R1050
C1095
R1054
T1007
C1077
R1064
R1062
C1097
C1098
R1042
R1041
R1053
R1034
C1067
C1065
R1043
Q1011
L1016
R1039
C1073
R1037
R1036
CF1002
CF1001
Q1010
Q1009
C1068
C1071
Q1008
R1035
C1059
C1080
C1074
C1078
C1076
C1075
C1070
C1072
C1060
C1107
L1019
C1113
C1114
C1106
C1111
C1112
C1064
R1029
C1063
C1055
C1109
C1108
R1065
TC1002
C1053
C1110
Q1018
C1062

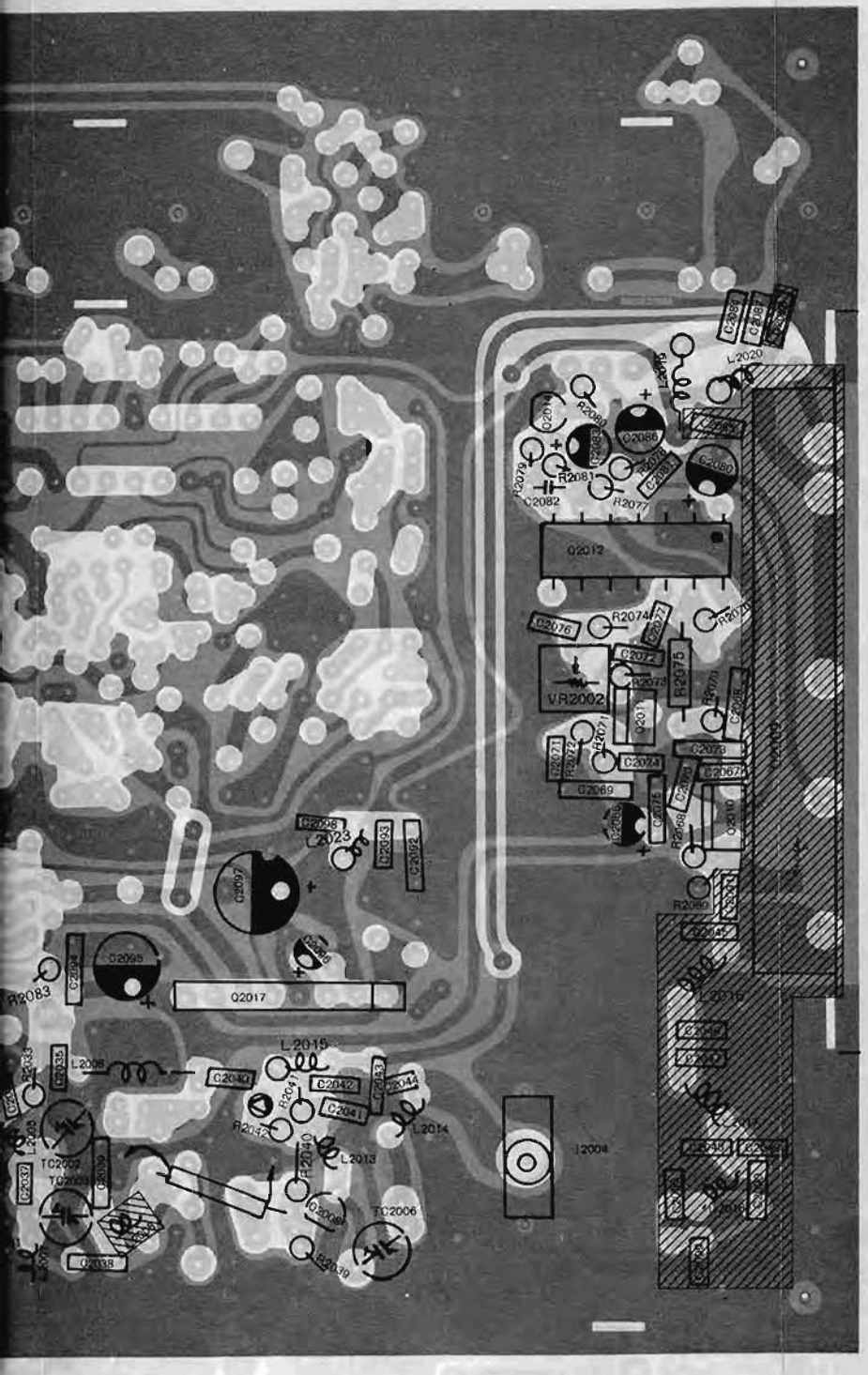
0A RX UNIT PARTS LAYOUT

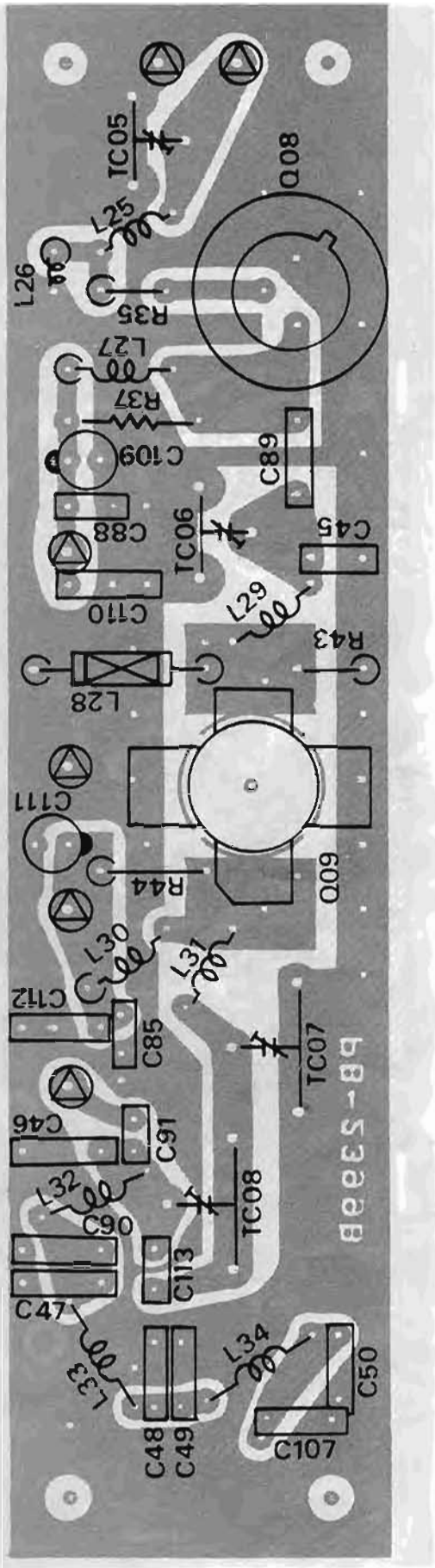


Viewed from solder side

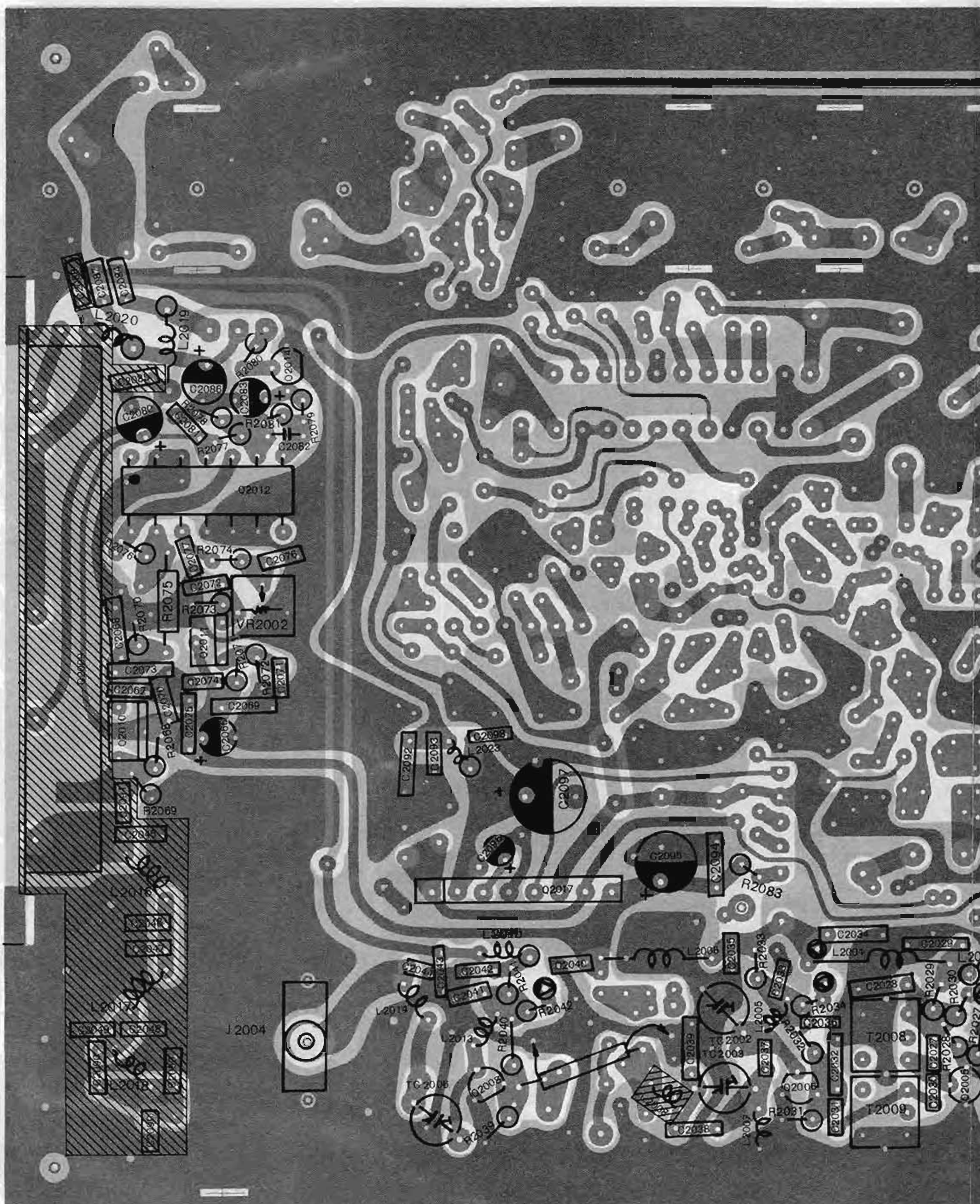

C2001
X2001
TC2001
C2006
C2003
L2021
C2004
R2052
R2009
C2002
C2009
C2010
R2010
C2012
T2003
C2058
R2011
L2001
C2016
C2060
R2045
D2001
R2013
T2004
VR2001
C2013
R2083
J2001
R2082
L2024
L2002
L2003
L2004
C2034
L2006
C2019
C2003
C2020
R2021
R2023
C2021
C2023
T2005
T2006
T2007
T2008
T2009
C2024
C2028
C2038
TC2002
TC2003

X UNIT PARTS LAYOUT

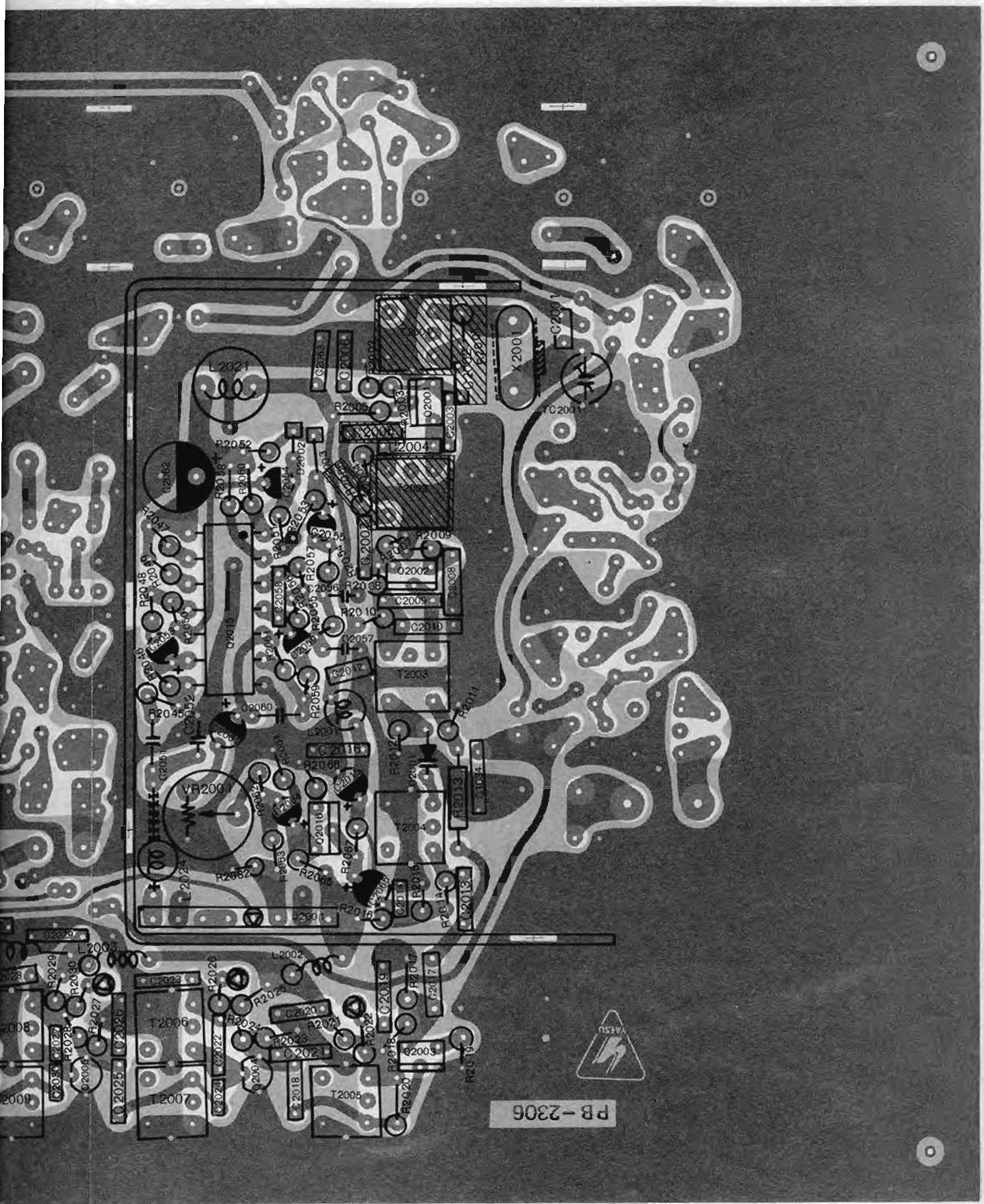




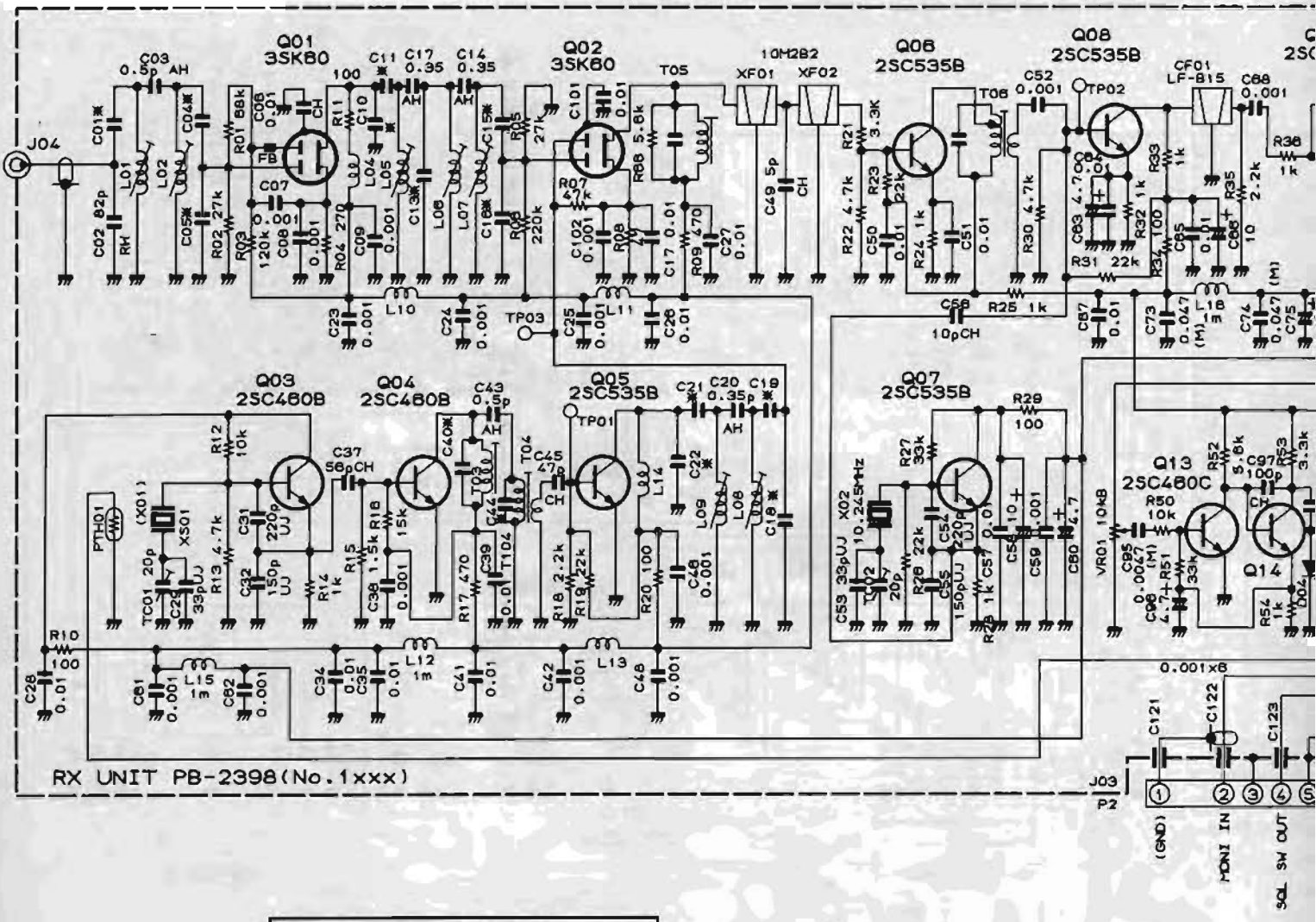
Viewed from component side


L2020
L2019
C2086
C2083
R2080
R2081
R2077
R2079
C2082
Q2014
Q2012
R2074
C2076
R2075
R2073
VR2002
C2073
C2069
C2066
R2069
C2045
L2016
L2017
L2018
J2004
C2092
C2098
C2097
C2095
C2094
R2083
Q2017
L2014
L2013
C2040
C2041
C2042
R2040
R2042
R2039
Q2008
TC2006
L2006
TC2002
TC2003
C2038
C2039
C2037
C2035
L2005
R2033
L2007
R2031
Q2006
C2034
L2004
C2029
C2028
R2029
R2030
T2008
T2009
C2030

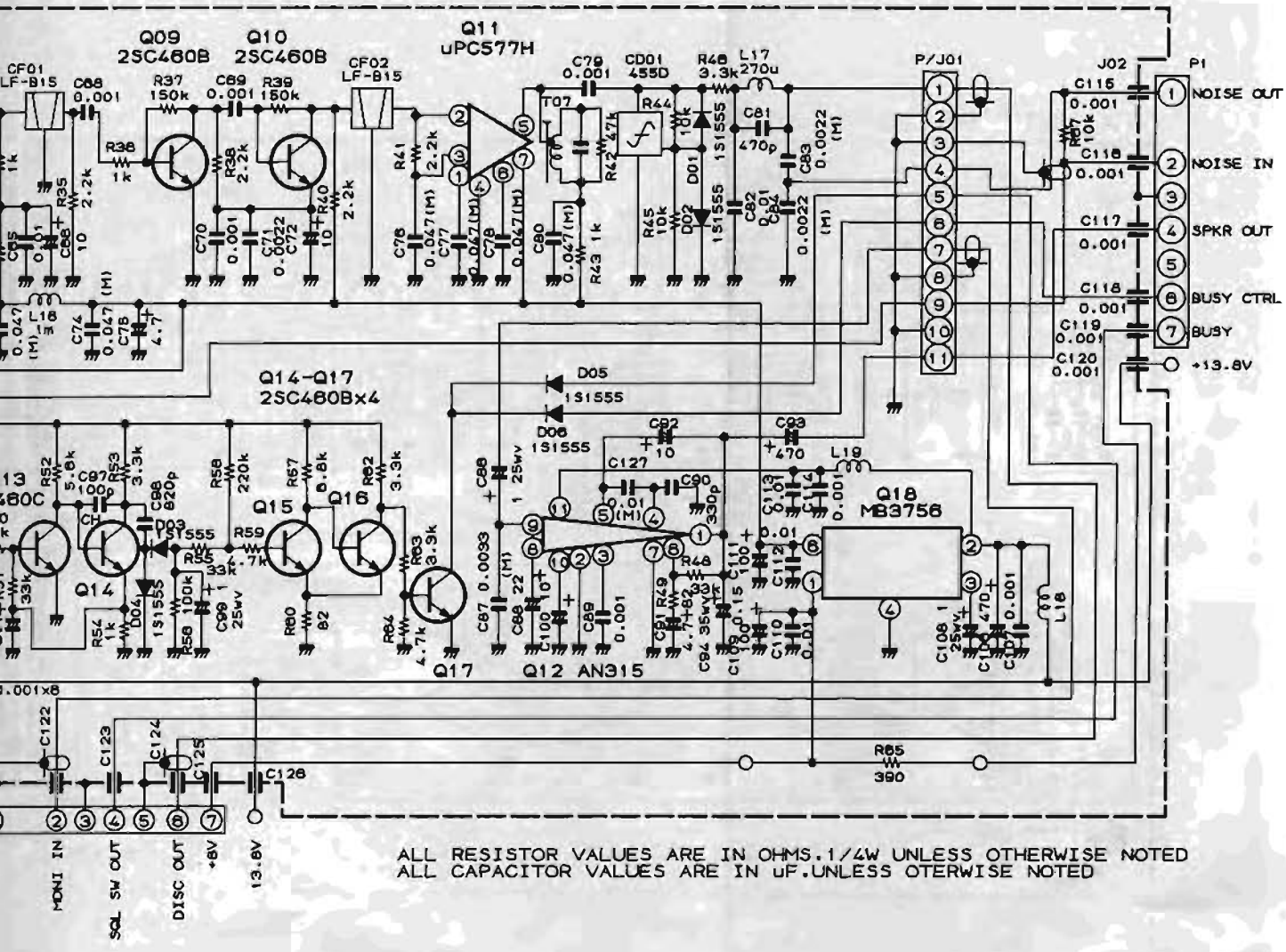
X UNIT PARTS LAYOUT



Viewed from solder side

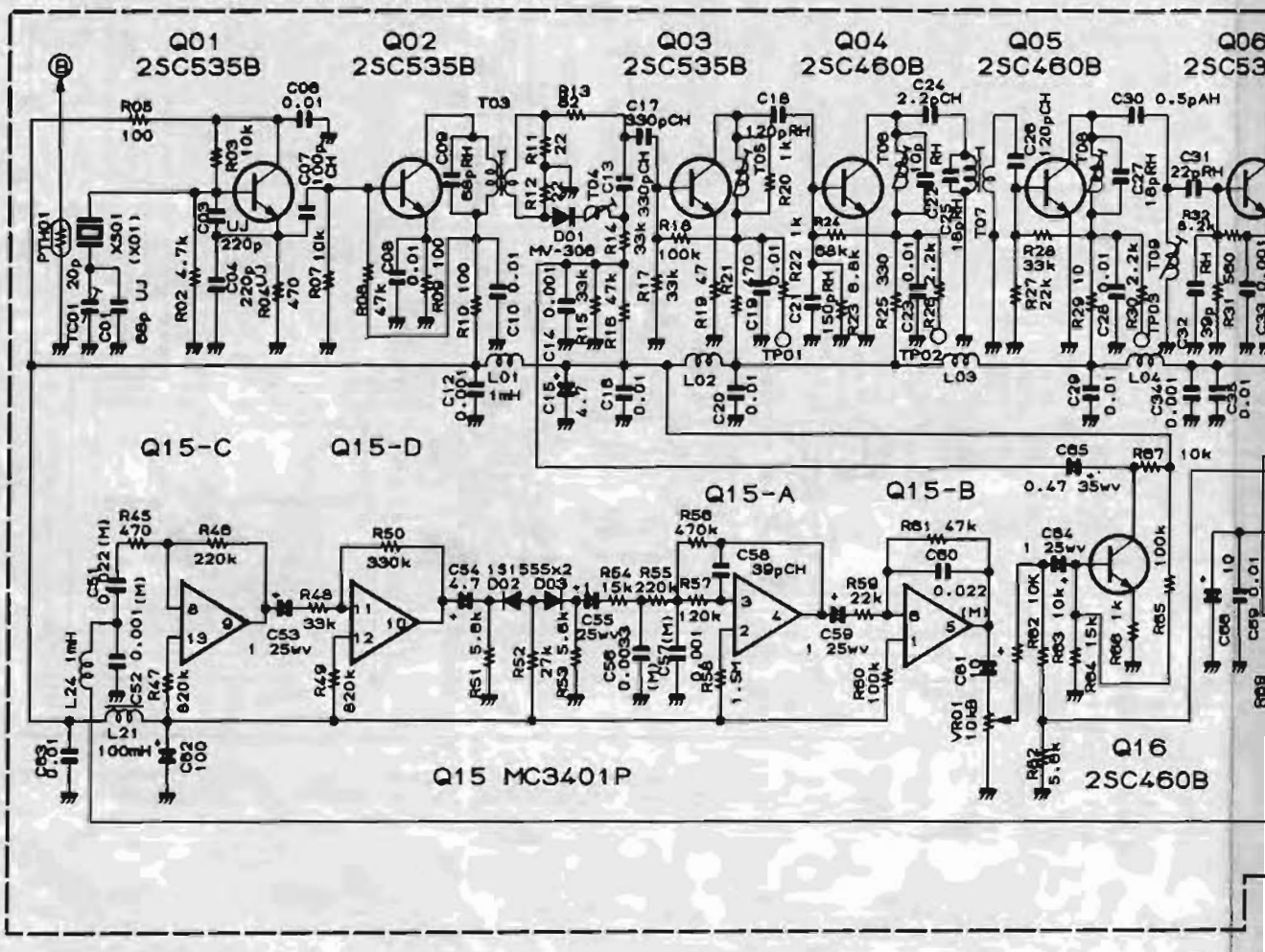


✱COMPONENT TABLE			
PART \ BAND (MHz)	68-74	74-81	81-88
C 01	RH 18pF	RH 15pF	RH 12pF
C 04	RH 68pF	RH 56pF	RH 47pF
C 05	RH 12pF	RH 7pF	RH 4pF
C 10	RH 18pF	RH 15pF	RH 12pF
C 11	RH 39pF	RH 33pF	RH 22pF
C 13	RH 18pF	RH 15pF	RH 12pF
C 15	RH 18pF	RH 15pF	RH 12pF
C 16	RH 68pF	RH 56pF	RH 47pF
C 18	RH 82pF	RH 68pF	RH 18pF
C 19	RH 33pF	RH 27pF	RH 18pF
C 22	RH 82pF	RH 68pF	RH 56pF
C 40	RH 27pF	RH 22pF	RH 15pF
C 44	RH 27pF	RH 22pF	RH 15pF

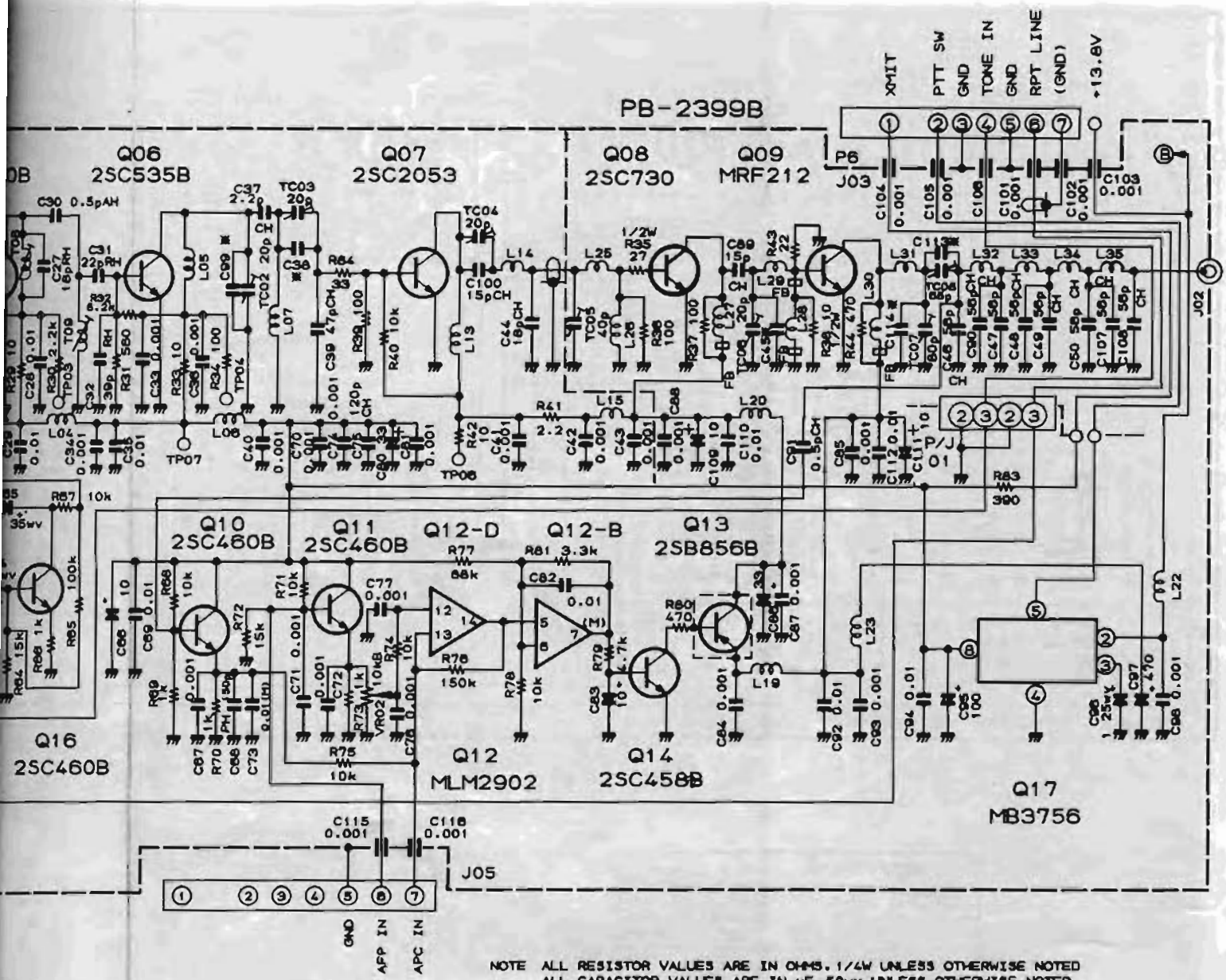


ALL RESISTOR VALUES ARE IN OHMS.1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF.UNLESS OTERWISE NOTED

TX UNIT PB-2306(No.2xxx)

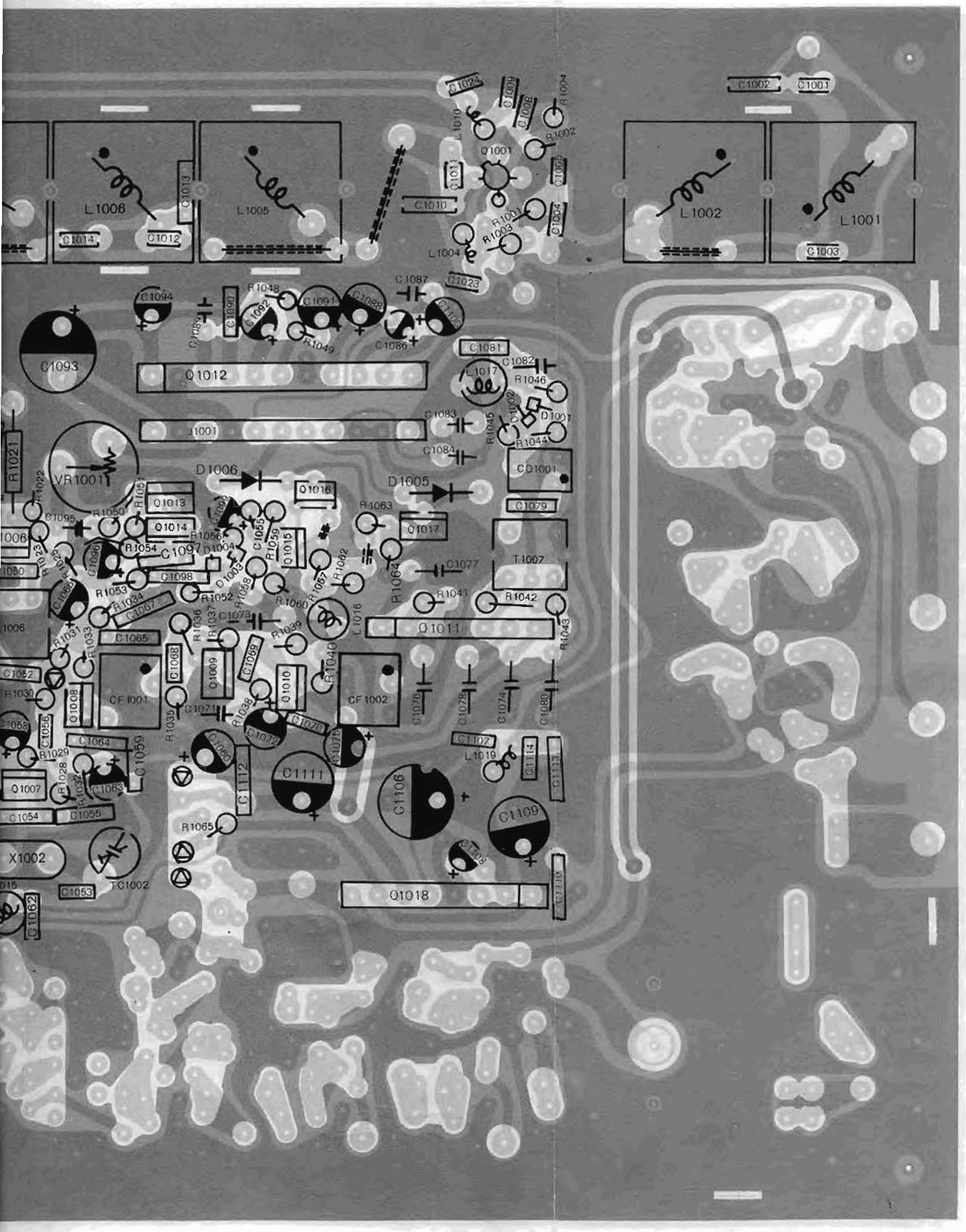


✱ CONPONENT TABLE			
PART \ BAND (MHz)	68-74	74-81	81-88
C 38	CH 47pF	CH 39pF	CH 27pF
C 45	CH 47pF	CH 39pF	CH 27pF
C 99	CH 39pF	CH 27pF	CH 22pF
C113	CH 47pF	CH 39pF	CH 15pF
C114	CH 27pF	CH 15pF	CH 5pF

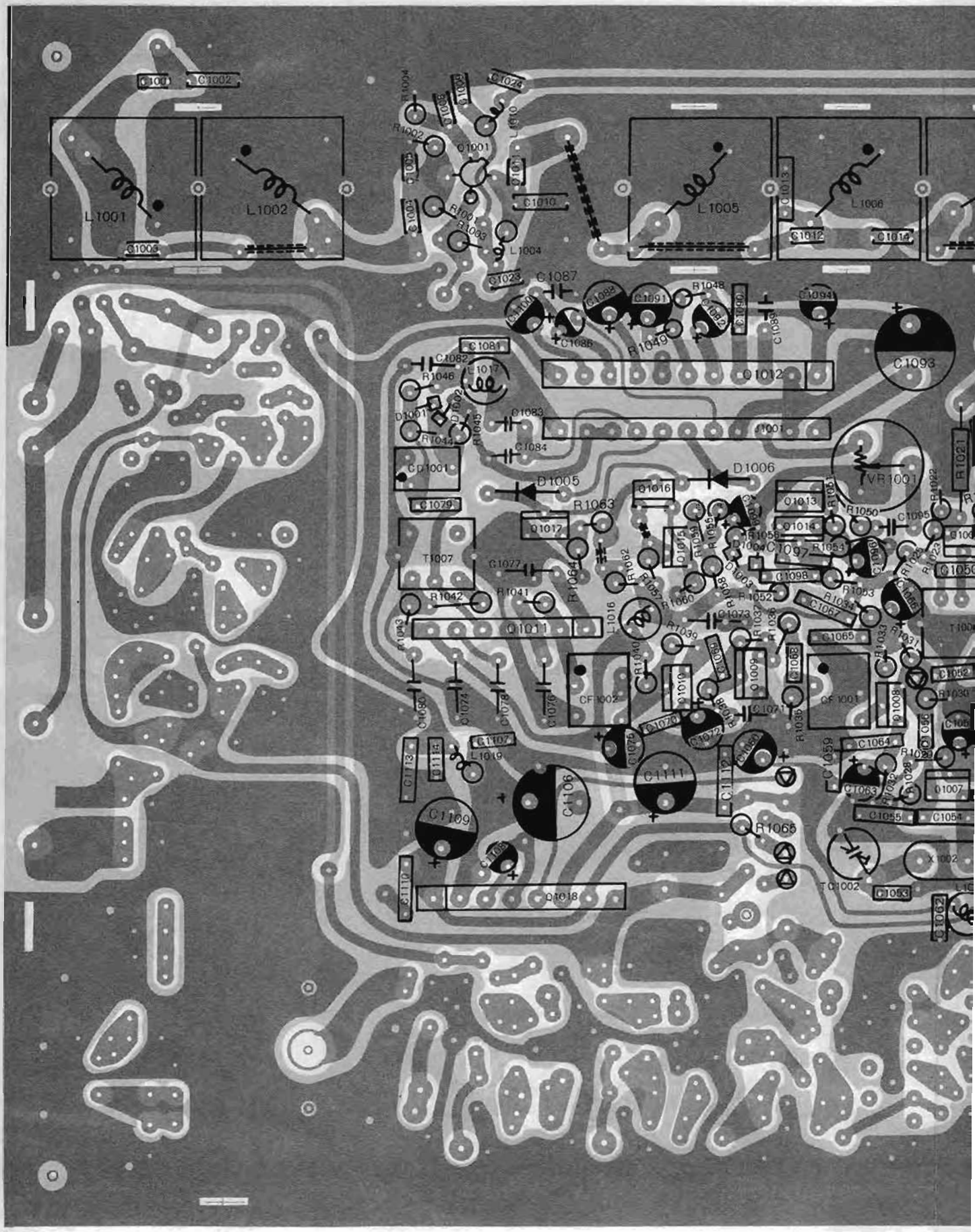


NOTE ALL RESISTOR VALUES ARE IN OHMS. 1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF. 50wv UNLESS OTHERWISE NOTED

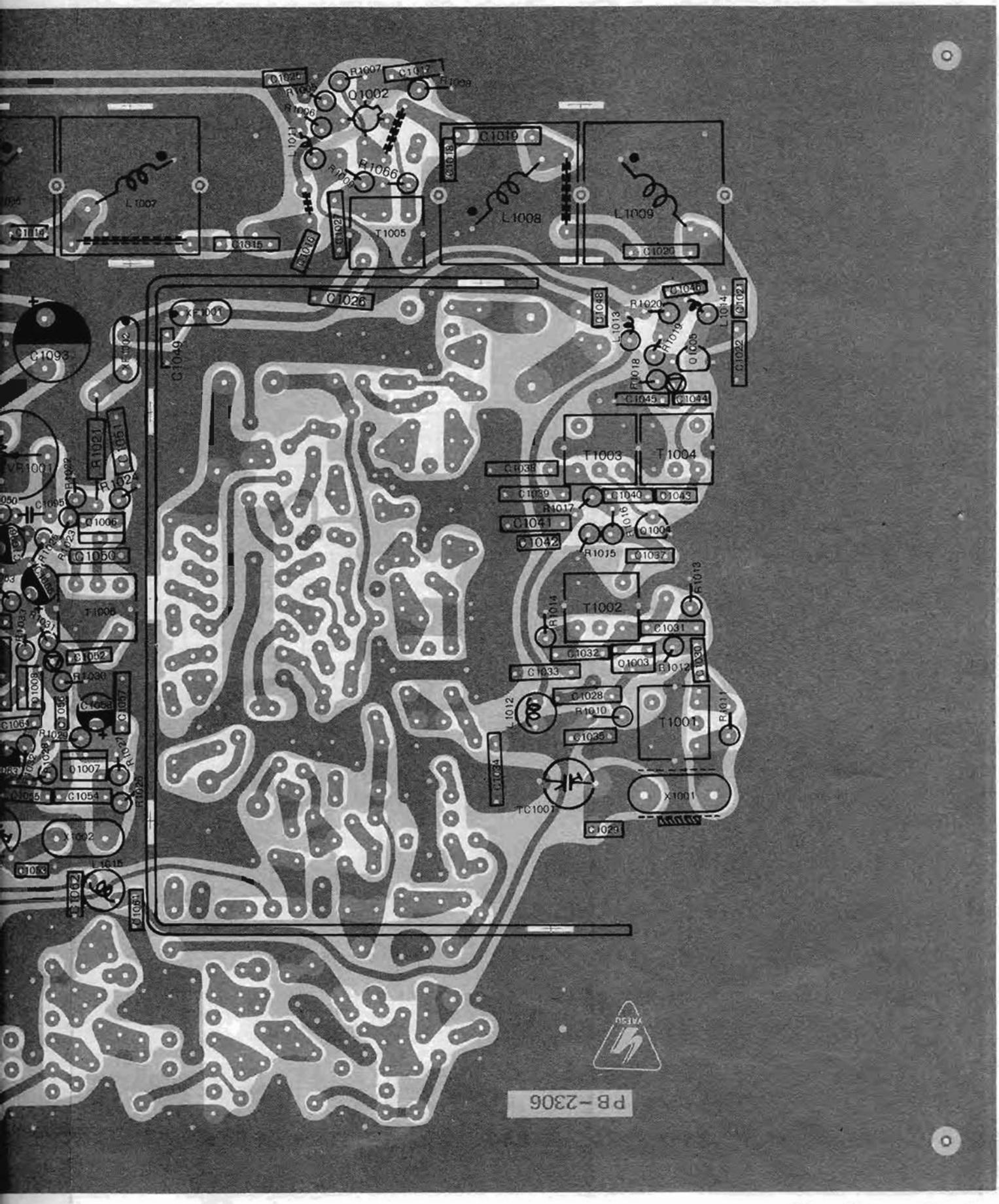

C1017
R1007
R1008
C1025
Q1002
R1005
R1006
L1014
C1019
C1018
R1066
C1009
L1009
L1008
T1005
C1027
C1016
L1007
L1006
C1014
C1020
C1026
XF1001
C1049
XF1002
C1093
C1021
C1046
R1020
L1014
C1048
L1013
C1022
Q1005
R1019
R1018
C1044
C1045
T1004
T1003
C1038
C1043
C1040
C1039
R1017
R1016
Q1004
C1041
C1042
C1037
R1015
C1051
R1021
VR1001
R1024
R1022
C1095
R1050
Q1006
C1050
R1023
R1025
C1096
C1066
R1053
T1006
R1031
R1033
C1052
R1030
C1008
C1057
C1058
C1056
C1064
R1029
R1027
R1028
R1032
C1063
Q1007
C1054
C1055
R1026
X1002
L1015
C1053
C1062
C1061
R1013
T1002
C1031
R1014
C1030
R1012
Q1003
C1032
C1033
R1011
T1001
C1028
R1010
L1012
C1035
C1034
X1001
TC1001
C1029



Viewed from component side


C1001
C1002
L1001
L1002
C1003
C1004
C1005
C1006
C1007
C1008
C1009
C1010
L1003
L1004
C1011
C1012
L1005
L1006
C1013
C1014
C1015
C1016
C1017
C1018
C1019
C1020
C1021
C1022
C1023
C1024
C1025
C1026
C1027
C1028
C1029
C1030
C1031
C1032
C1033
C1034
C1035
C1036
C1037
C1038
C1039
C1040
C1041
C1042
C1043
C1044
C1045
C1046
C1047
C1048
C1049
C1050
C1051
C1052
C1053
C1054
C1055
C1056
C1057
C1058
C1059
C1060
C1061
C1062
C1063
C1064
C1065
C1066
C1067
C1068
C1069
C1070
C1071
C1072
C1073
C1074
C1075
C1076
C1077
C1078
C1079
C1080
C1081
C1082
C1083
C1084
C1085
C1086
C1087
C1088
C1089
C1090
C1091
C1092
C1093
C1094
C1095
C1096
C1097
C1098
C1099
C1100
C1101
C1102
C1103
C1104
C1105
C1106
C1107
C1108
C1109
C1110
C1111
C1112
C1113
C1114
D1001
D1002
D1003
D1004
D1005
D1006
Cp1001
Q1001
Q1002
Q1003
Q1004
Q1005
Q1006
Q1007
Q1008
Q1009
Q1010
Q1011
Q1012
Q1013
Q1014
Q1015
Q1016
Q1017
Q1018
T1001
T1002
T1003
T1004
T1007
CF1001
CF1002
VR1001
X1002
R1001
R1002
R1003
R1004
R1005
R1006
R1007
R1008
R1009
R1010
R1011
R1012
R1013
R1014
R1015
R1016
R1017
R1018
R1019
R1020
R1021
R1022
R1023
R1024
R1025
R1026
R1027
R1028
R1029
R1030
R1031
R1032
R1033
R1034
R1035
R1036
R1037
R1038
R1039
R1040
R1041
R1042
R1043
R1044
R1045
R1046
R1047
R1048
R1049
R1050
R1051
R1052
R1053
R1054
R1055
R1056
R1057
R1058
R1059
R1060
R1061
R1062
R1063
R1064
R1065
R1066
R1067
R1068
R1069
R1070
R1071
R1072
R1073
R1074
R1075
R1076
R1077
R1078
R1079
R1080
R1081
R1082
R1083
R1084
R1085
R1086
R1087
R1088
R1089
R1090
R1091
R1092
R1093
R1094
R1095
R1096
R1097
R1098
R1099
R1100
R1101
R1102
R1103
R1104
R1105
R1106
R1107
R1108
R1109
R1110
R1111
R1112
R1113
R1114

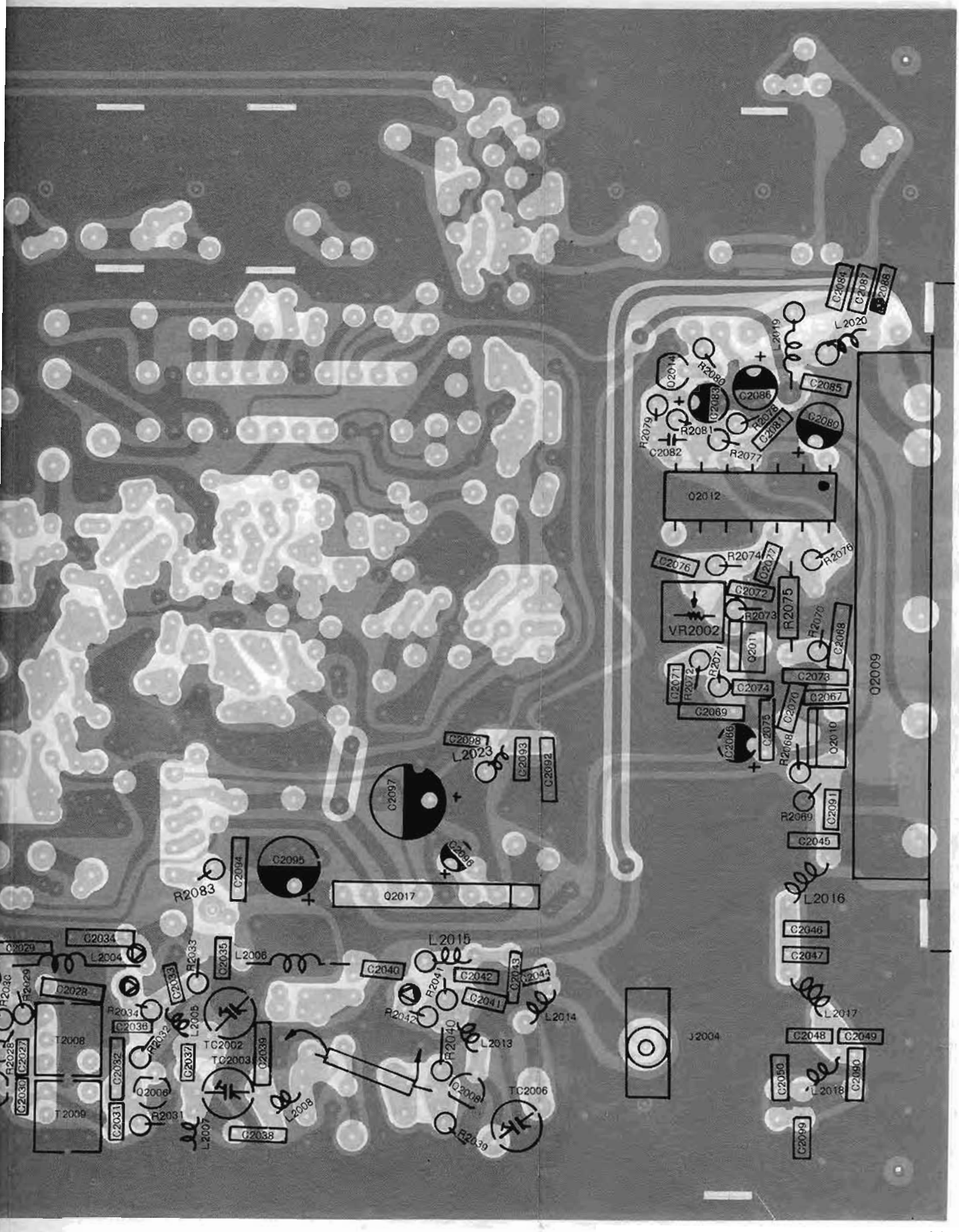
RX UNIT PARTS LAYOUT



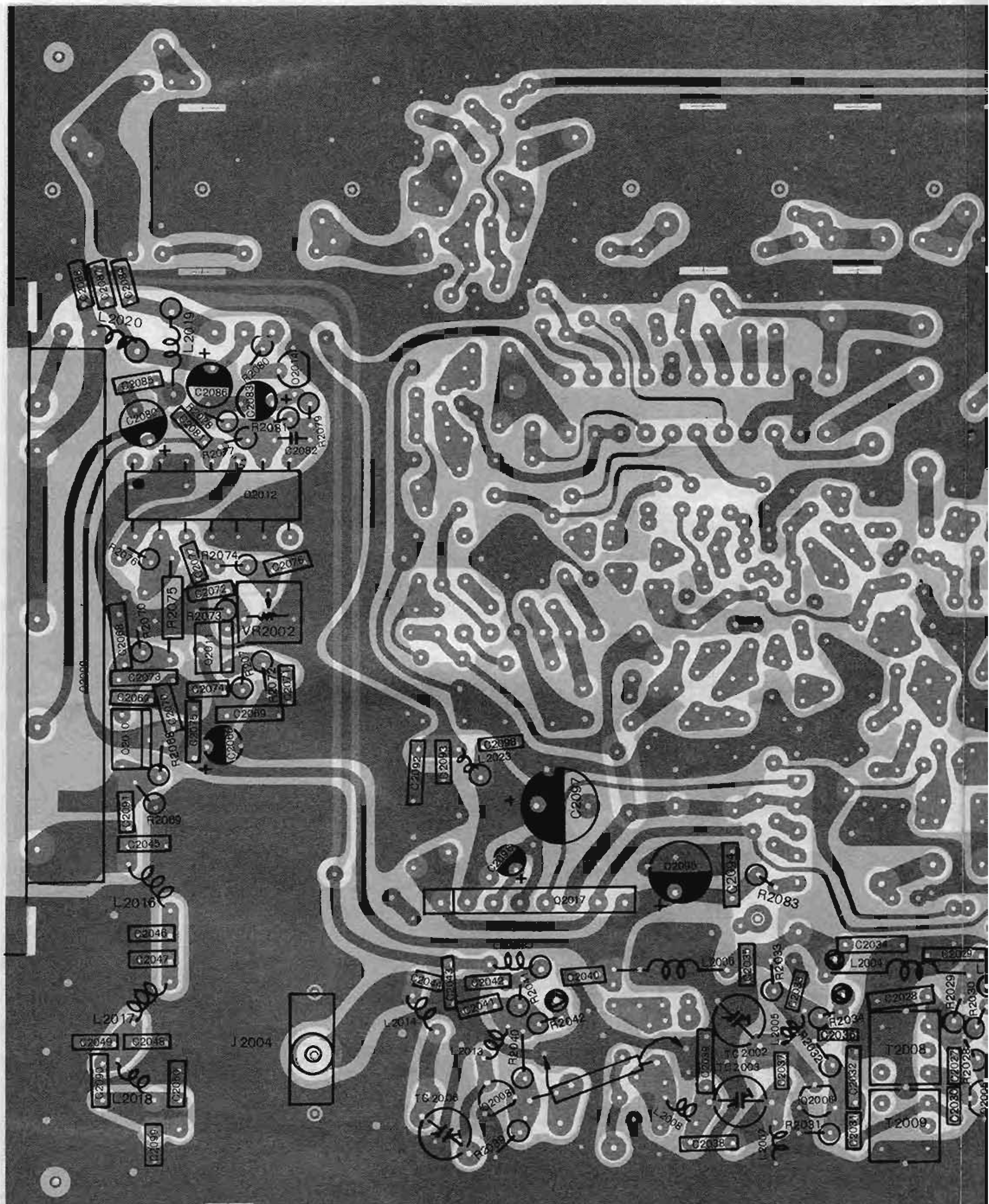
Viewed from solder side


C2001
X2001
R2001
T2001
TC2001
C2002
Q2001
C2003
R2003
R2005
C2006
C2063
L2021
C2004
C2005
T2002
D2003
D2002
R2052
C2054
R2060
R2058
C2062
C2055
R2051
R2047
R2009
Q2002
C2008
C2007
R2008
C2056
R2057
C2058
R2049
R2048
C2009
C2010
R2010
R2055
R2056
C2057
C2059
R2061
Q2015
R2050
C2053
R2046
T2003
C2012
R2011
R2059
L2001
C2060
C2061
C2052
R2045
D2001
R2012
C2016
R2066
R2064
C2051
R2013
VR2001
R2062
C2015
C2064
T2004
Q2016
R2067
R2065
R2063
R2082
L2024
C2013
R2014
R2015
C2014
R2016
J2001
C2029
C2034
L2003
L2004
L2002
C2017
R2017
C2019
R2028
C2023
R2030
R2029
C2028
C2020
R2025
R2024
R2021
R2022
R2023
C2021
R2019
Q2003
R2018
T2006
C2026
R2027
R2026
C2027
T2008
Q2004
C2022
Q2005
C2032
R2020
T2005
C2018
C2024
T2007
C2025
C2030
T2009
C2031

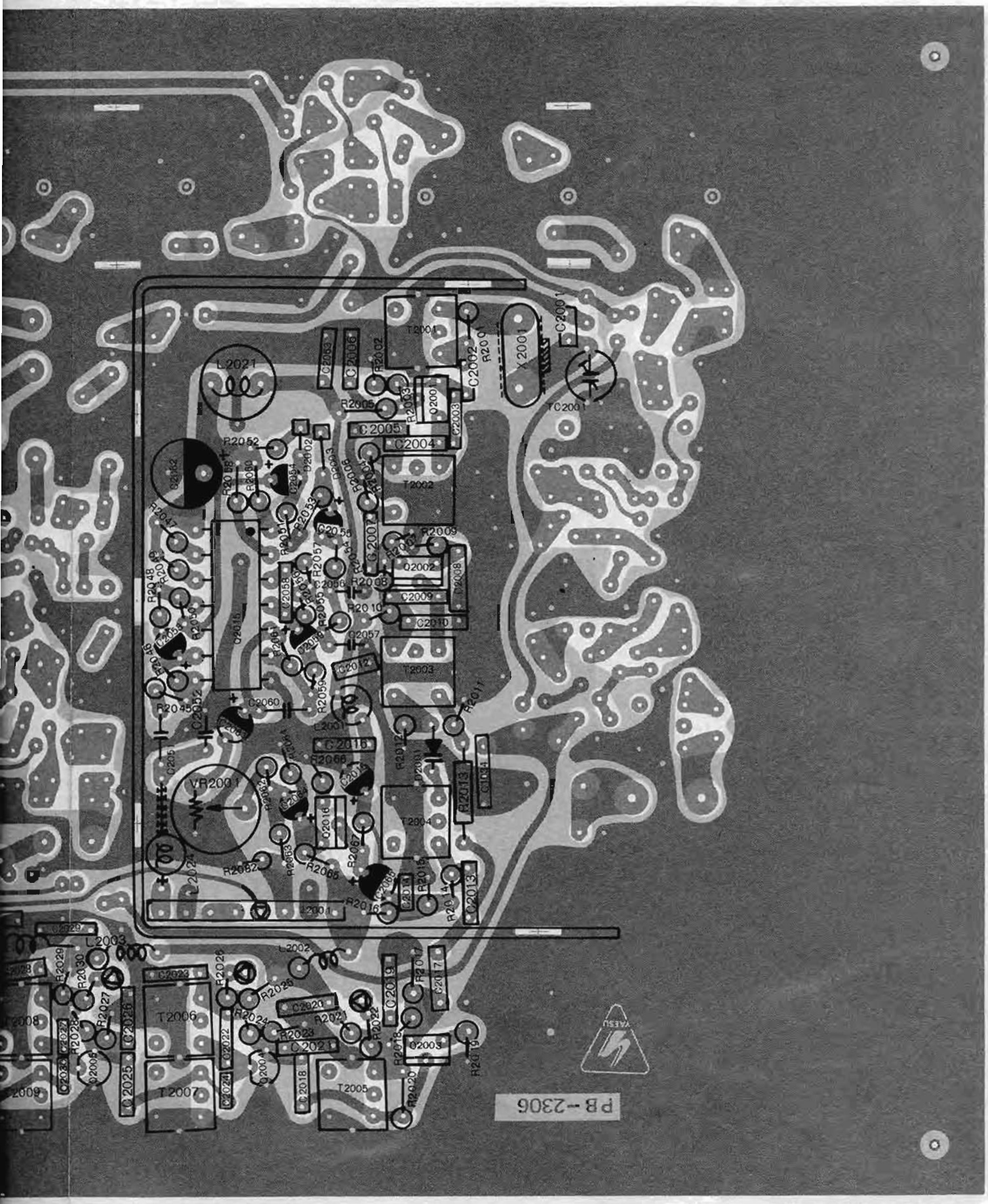
X UNIT PARTS LAYOUT



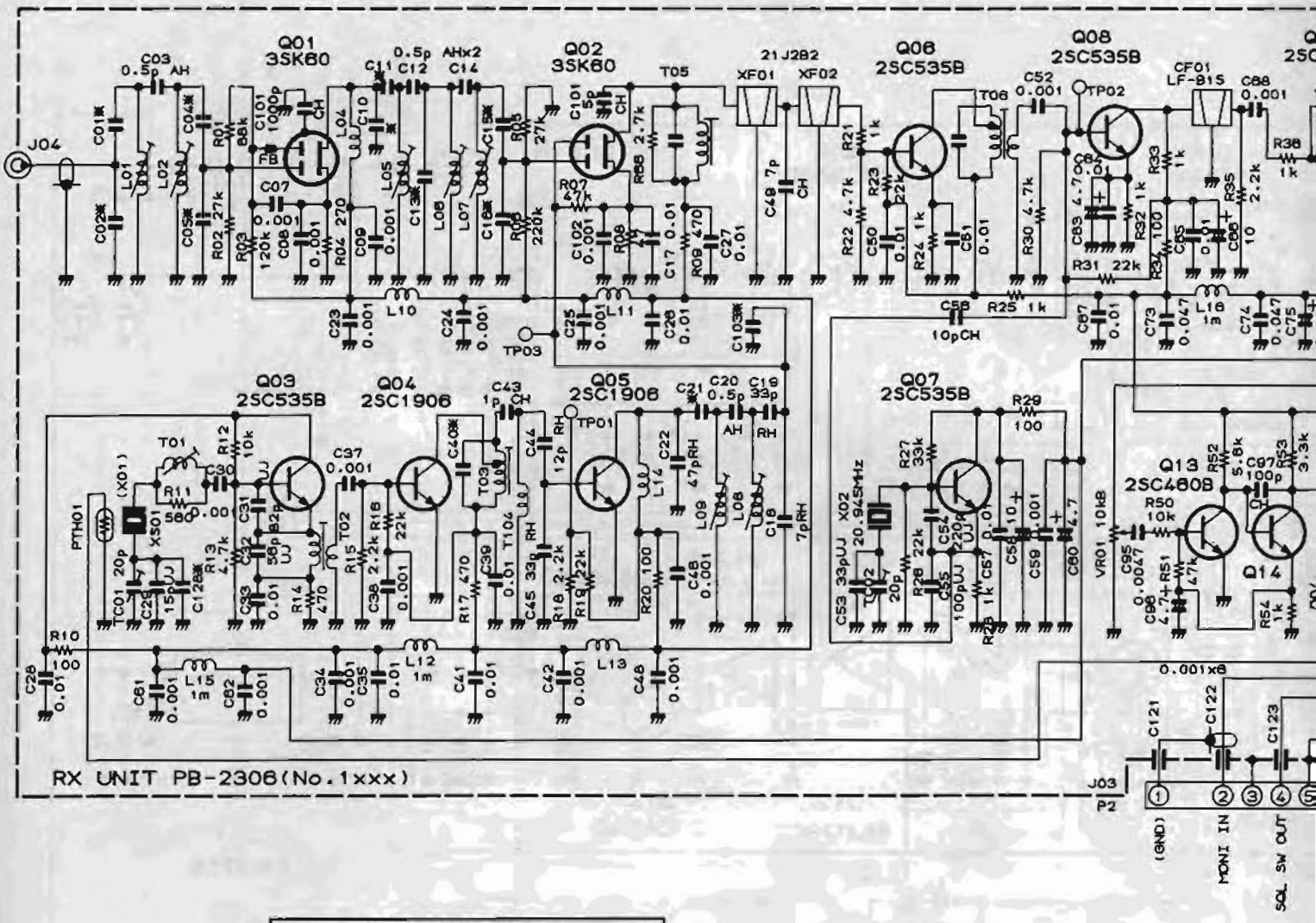
Viewed from component side


L2020
L2019
C2085
C2086
C2083
C2080
R2080
R2081
R2077
C2082
R2079
Q2012
R2076
R2074
C2076
C2072
R2075
R2073
VR2002
R2070
C2073
C2074
C2069
C2066
R2068
C2075
C2092
C2093
L2023
C2097
Q2017
R2083
R2069
C2091
C2045
L2016
C2046
C2047
L2017
C2049
C2048
L2018
J2004
L2014
C2042
C2041
C2040
R2041
R2042
R2040
L2013
TC2006
Q2008
R2039
L2006
C2038
TC2002
TC2003
L2005
R2033
C2037
R2034
C2036
R2032
Q2006
R2031
C2034
L2004
C2029
C2028
T2008
T2009
R2029
C2032
C2031
C2027
C2030

X UNIT PARTS LAYOUT

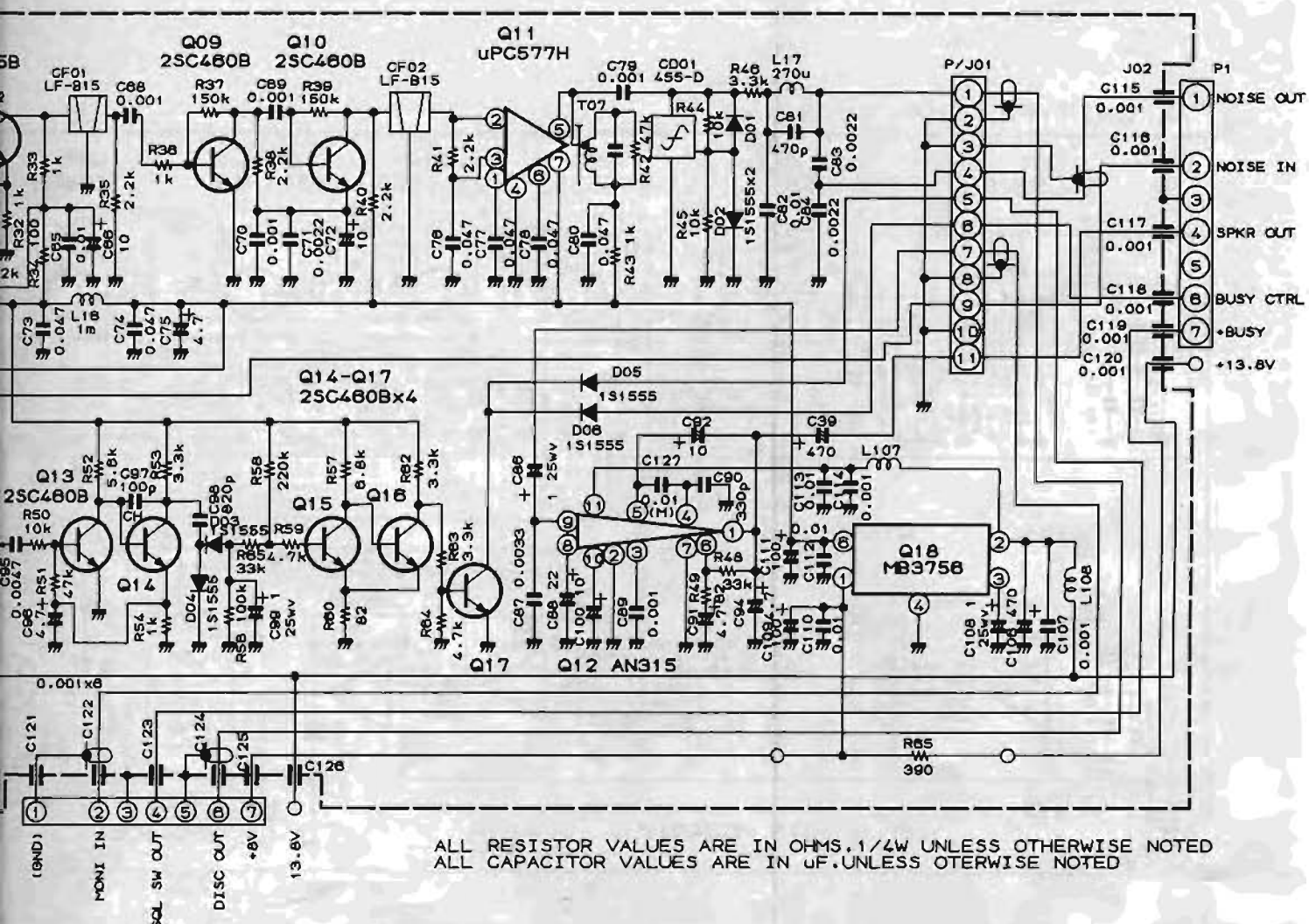


Viewed from solder side



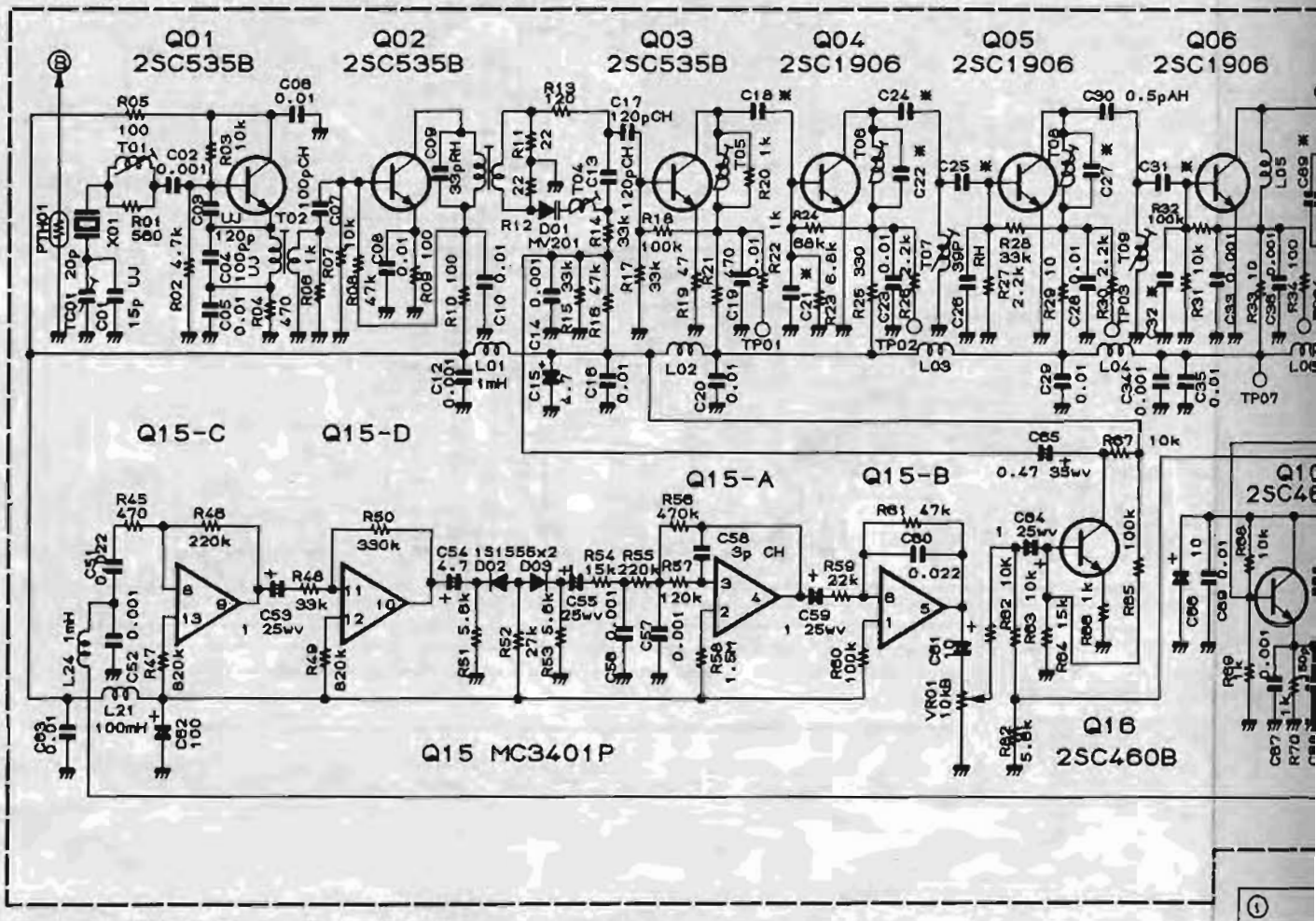
*COMPONENT TABLE

PART \ BAND (MHz)	134-146	146-160	160-174
C 01	RH 10pF	RH 7pF	RH 6pF
C 02	RH 39pF	RH 27pF	RH 22pF
C 04	RH 33pF	RH 33pF	RH 27pF
C 05	CH 5pF	CH 3pF	CH 2pF
C 10	RH 39pF	RH 39pF	RH 33pF
C 11	RH 10pF	RH 7pF	RH 6pF
C 13	RH 12pF	RH 8pF	RH 8pF
C 15	RH 33pF	RH 27pF	RH 22pF
C 16	CH 4pF	CH 1pF	
C 21	RH 22pF	RH 15pF	RH 15pF
C 40	RH 10pF	RH 8pF	RH 8pF
C103	CH 10pF	CH 2pF	
C128	UJ 4pF	UJ 4pF	

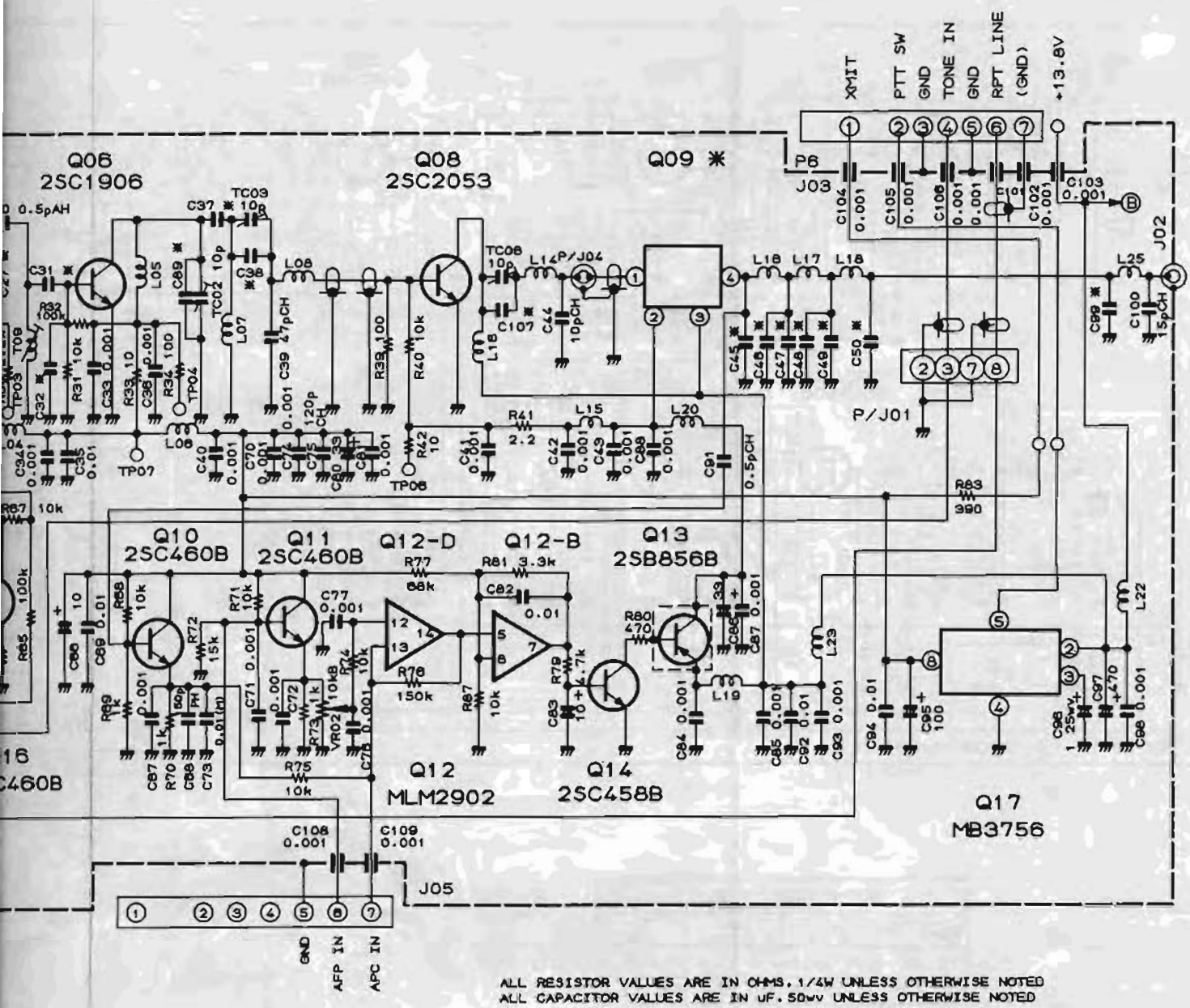


ALL RESISTOR VALUES ARE IN OHMS.1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF.UNLESS OTERWISE NOTED

TX UNIT PB-2306(No.2xxx)



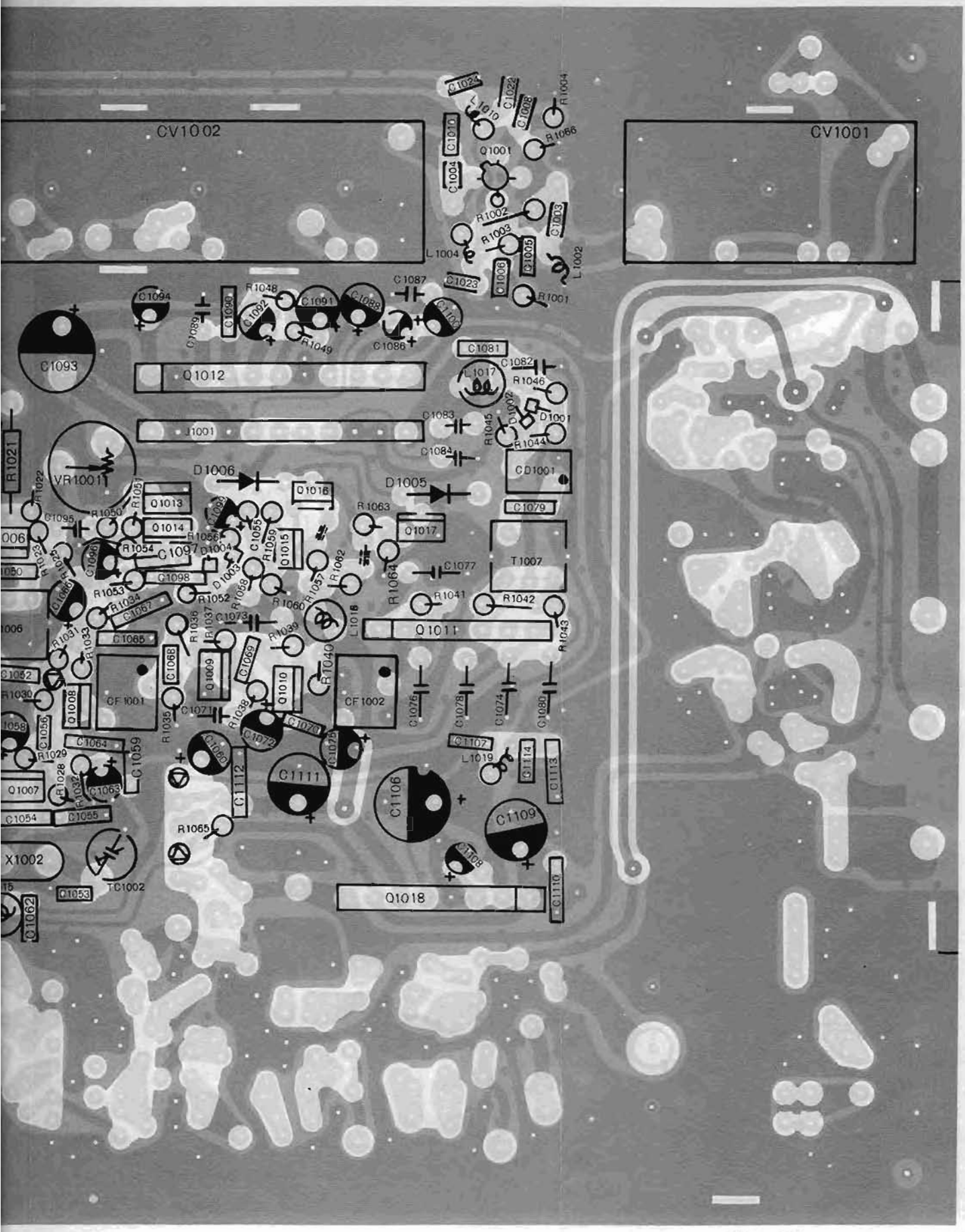
✳ COMPONENT TABLE							
BAND (MHz) / PART	134-146	146-160	160-175	BAND (MHz) / PART	134-146	146-160	160-175
C 18	RH 68pF	RH 56pF	RH 39pF	C 45	CH 10pF	CH 15pF	CH 15pF
C 21	RH 82pF	RH 68pF	RH 47pF	C 46	CH 12pF	CH 15pF	CH 15pF
C 22	RH 18pF	RH 15pF	RH 10pF	C 47	CH 10pF	CH 15pF	CH 15pF
C 24	CH 1pF	CH 1pF	CH0.5pF	C 48	CH 12pF	CH 15pF	CH 15pF
C 25	RH 27pF	RH 15pF	RH 12pF	C 49	CH 10pF	CH 15pF	CH 15pF
C 27	RH 12pF	RH 10pF	RH 8pF	C 50	CH 12pF	CH 15pF	CH 15pF
C 31	RH 12pF	RH 10pF	RH 8pF	C 89	CH 10pF		
C 32	RH 68pF	RH 47pF	RH 39pF	C 99	CH 10pF		
C 37	CH1.5pF	CH 2pF	CH1.5pF	C107	CH 6pF		
C 38	CH 15pF	CH 10pF	CH 10pF	Q 09	M57719L	M57719	M57719



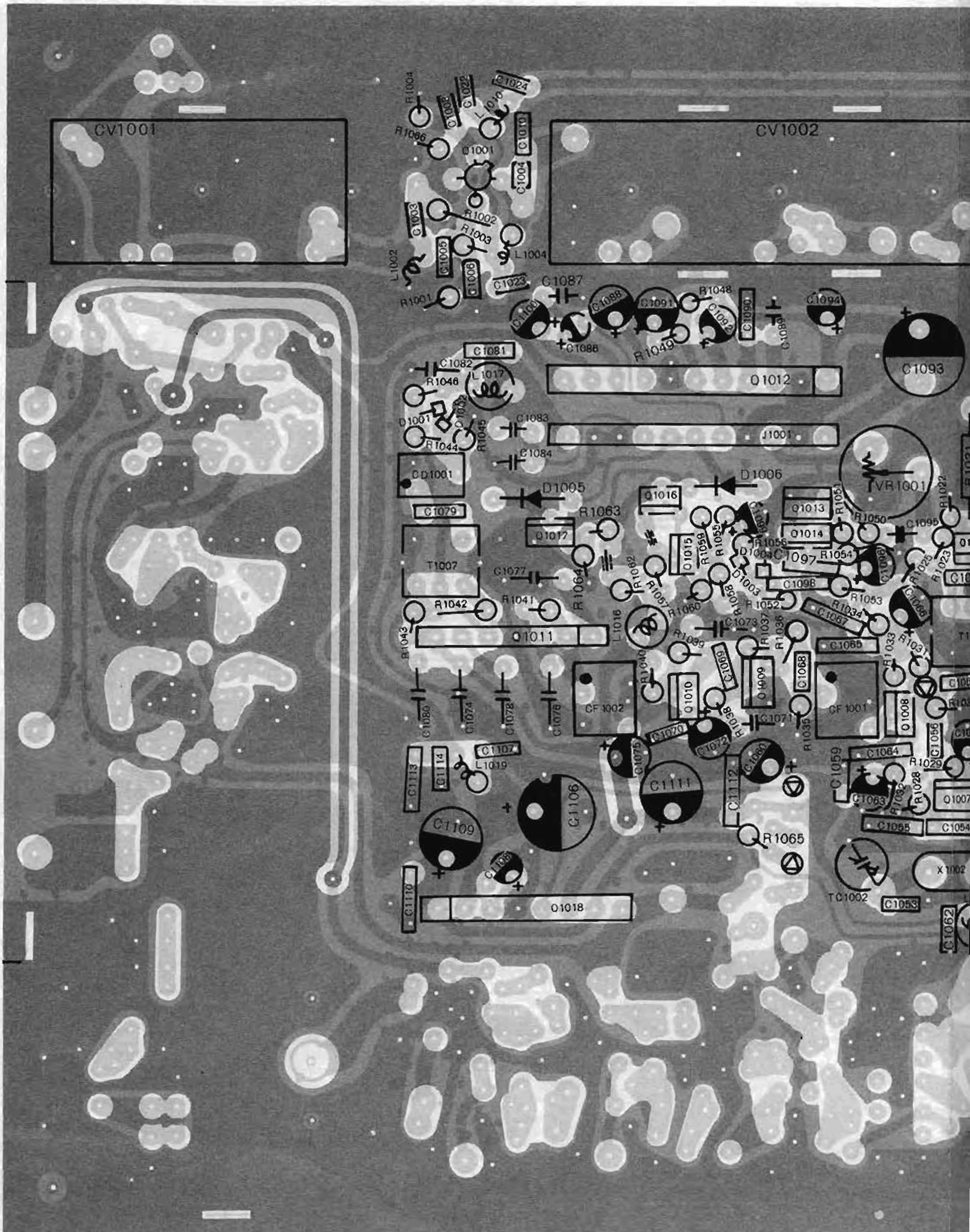
ALL RESISTOR VALUES ARE IN OHMS, 1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF, 50wv UNLESS OTHERWISE NOTED


CV1003
Q1002
T1005
C1026
XF1001
C1093
T1004
T1003
C1038
C1039
C1040
C1041
C1042
C1043
Q1004
Q1005
C1044
C1045
C1046
C1047
C1048
T1002
C1031
Q1003
C1032
C1033
T1001
C1028
C1035
X1001
TC1001
C1029
C1034
C1049
C1051
R1021
Q1006
C1050
T1006
C1052
Q1007
C1054
X1002
C1062
C1061
C1063

X UNIT PARTS LAYOUT



Viewed from component side

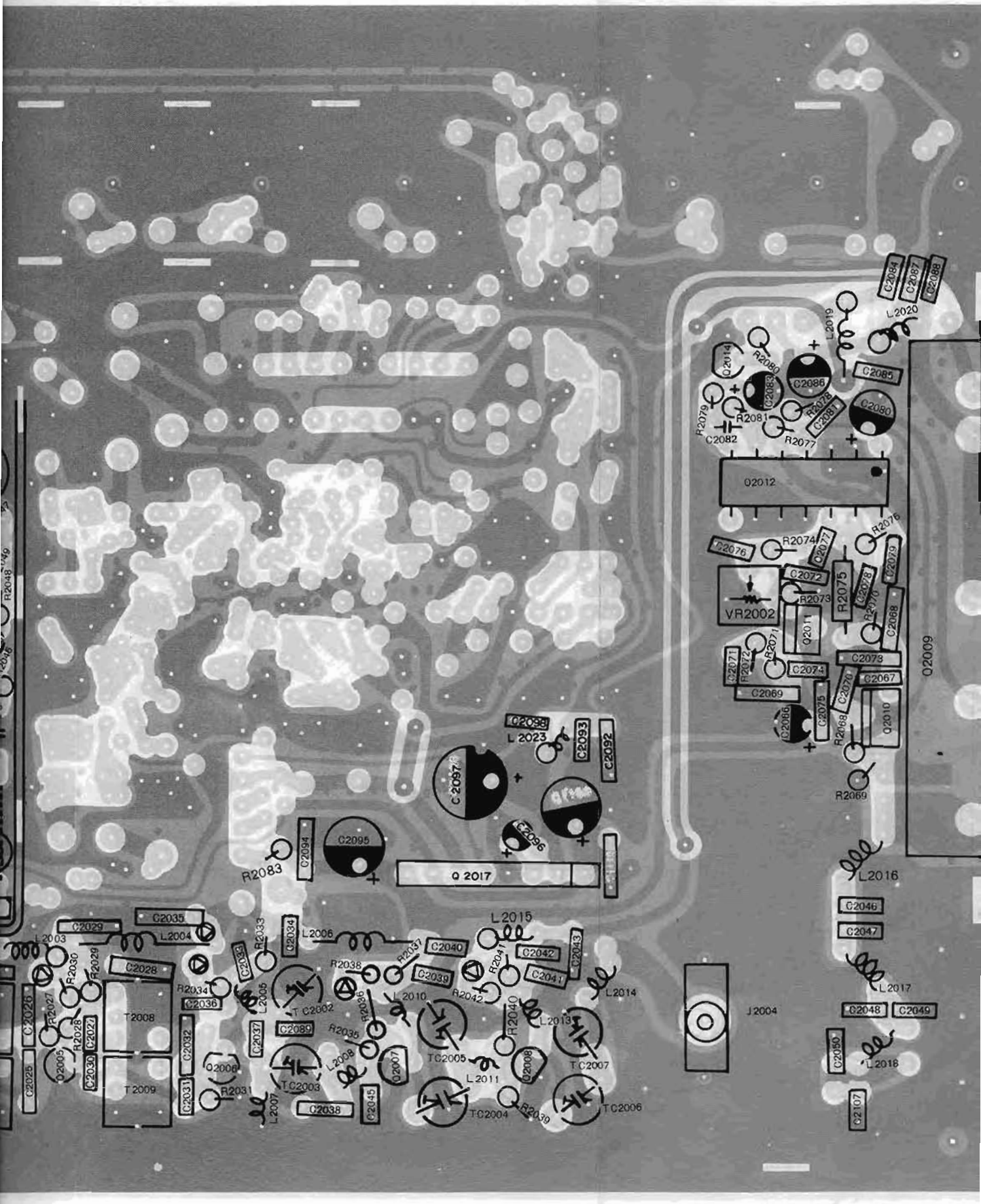

CV1001
CV1002
Q1001
R1001
R1002
R1003
R1004
R1086
C1003
C1004
C1005
C1006
C1008
C1010
C1022
C1023
C1024
L1002
L1004
C1087
C1088
C1091
C1090
C1089
C1094
C1100
C1086
C1092
R1048
R1049
C1093
C1081
C1082
R1046
L1017
Q1012
J1001
D1001
R1044
R1045
C1083
C1084
CD1001
D1005
D1006
VR1001
C1079
Q1016
Q1013
Q1014
Q1017
R1063
R1064
T1007
C1077
R1042
R1041
R1043
Q1011
R1062
R1057
R1058
R1059
R1055
R1056
R1060
R1052
R1051
R1050
R1054
R1053
R1022
R1021
R1023
R1025
C1095
C1096
C1097
C1098
C1067
C1066
R1034
R1033
R1031
C1065
C1073
C1069
C1068
R1036
R1037
R1039
R1040
L1016
Q1015
Q1010
Q1009
Q1008
Q1007
CF1002
CF1001
C1080
C1074
C1078
C1076
C1070
C1071
C1072
C1075
C1060
R1038
R1035
C1064
C1059
C1056
C1063
C1055
C1054
R1029
R1028
R1032
C1107
L1019
C1113
C1114
C1106
C1109
C1111
C1112
C1108
C1110
Q1018
R1065
X1002
TC1002
C1053
C1062

RX UNIT PARTS LAYOUT

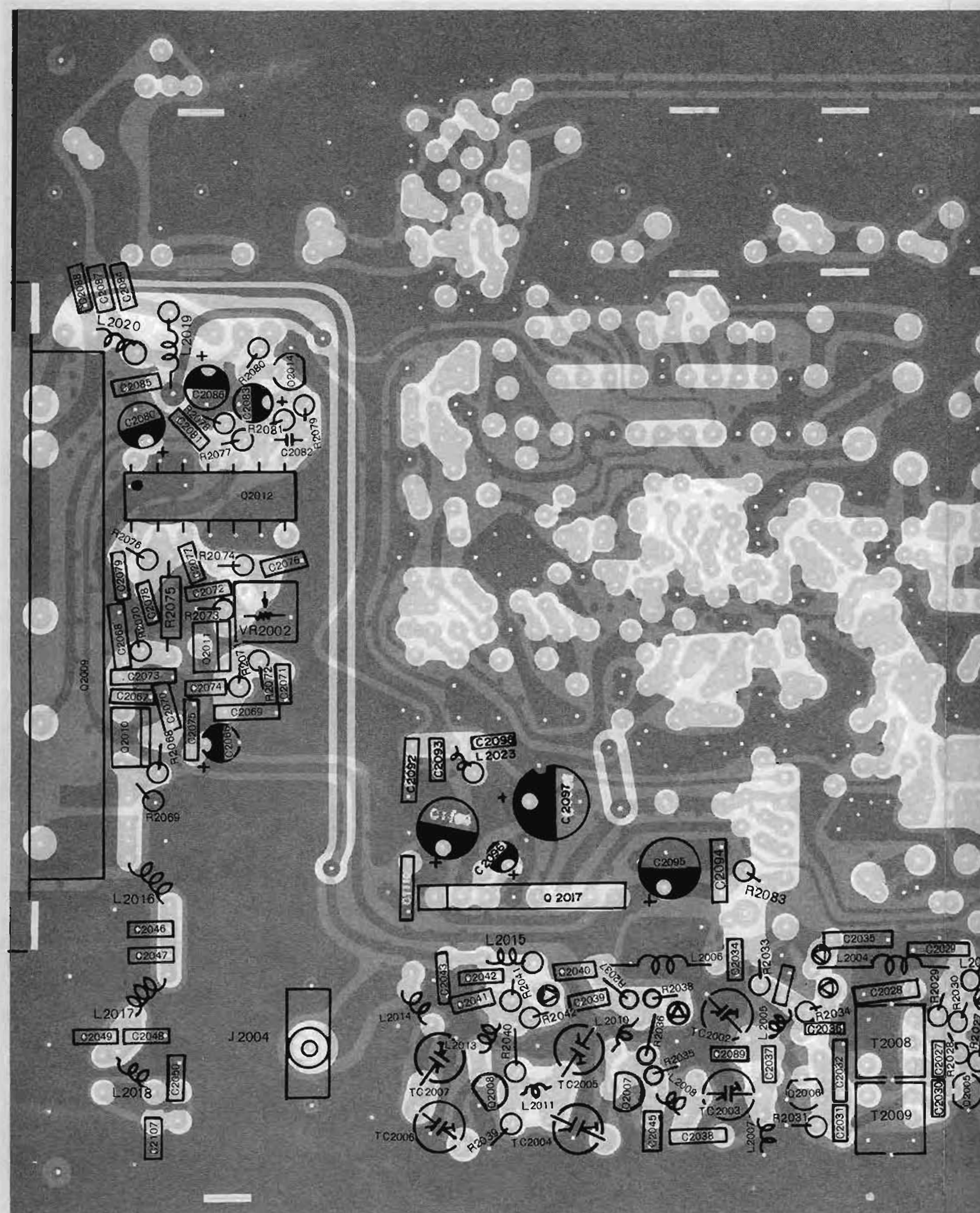
Viewed from solder side


C2001
X2001
TC2001
R2001
T2001
C2002
C2006
C2063
L2021
Q2001
R2003
R2005
C2003
C2005
C2004
D2003
D2002
R2052
C2054
R2060
C2062
T2002
R2006
R2009
Q2002
C2007
C2008
C2009
R2008
C2056
C2055
R2057
R2056
C2058
R2051
Q2015
R2047
R2049
R2048
R2010
C2010
C2057
R2055
R2061
R2050
C2053
R2046
T2003
C2012
R2059
L2001
C2060
C2061
C2052
R2045
C2051
R2011
D2001
R2012
C2016
R2066
R2064
C2015
R2013
VR2001
C2064
R2062
T2094
Q2016
R2067
R2065
R2063
R2082
L2024
C2013
R2015
C2014
R2014
R2016
J2001
L2002
L2003
C2029
C2017
R2017
C2019
R2028
R2025
C2023
R2030
R2029
C2020
R2024
C2022
T2006
C2026
R2027
R2028
C2027
R2019
Q2003
R2018
R2021
R2023
C2021
Q2004
Q2005
R2020
T2005
C2018
C2024
T2007
C2025
C2030

410 TX UNIT PARTS LAYOUT

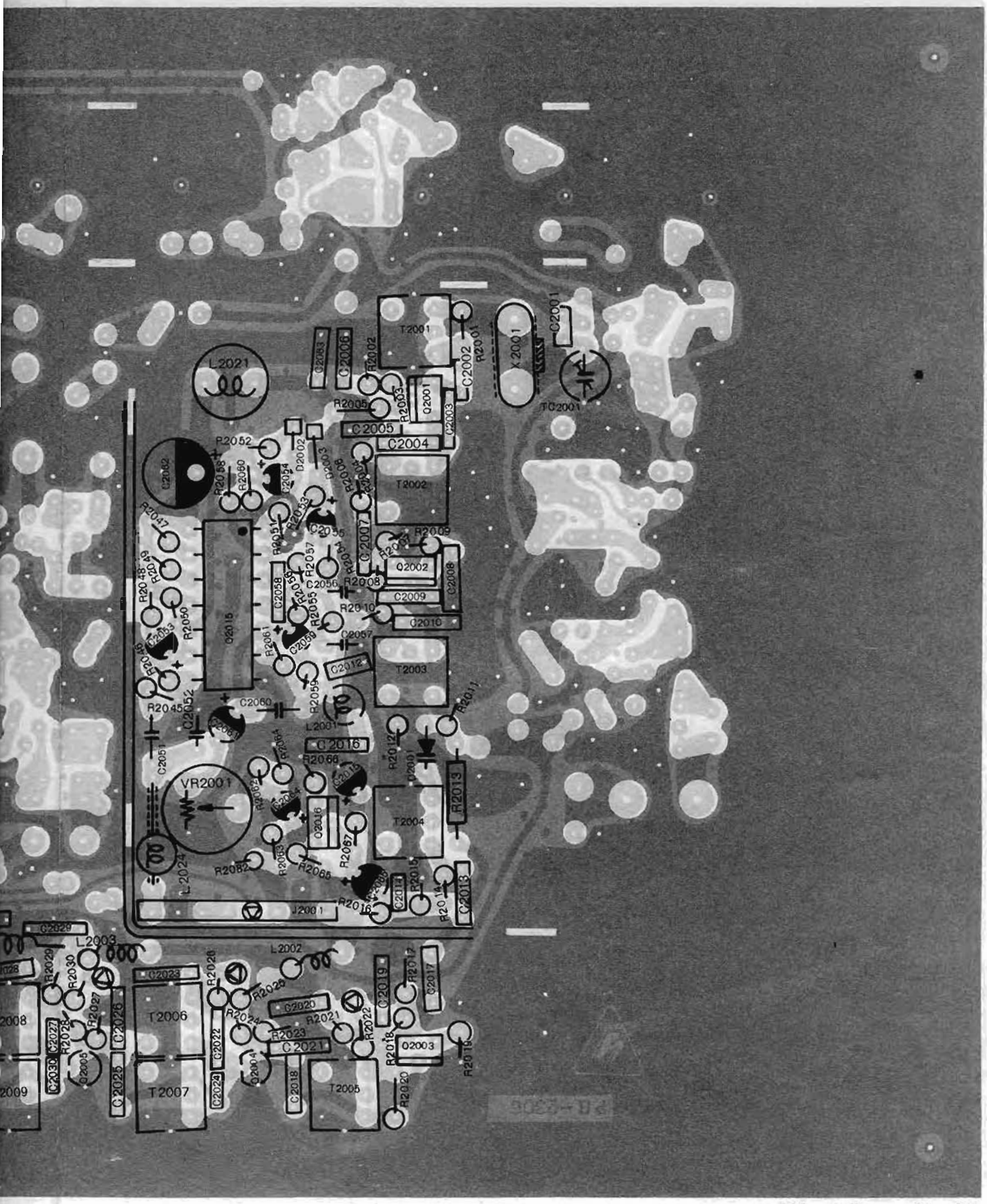


Viewed from component s

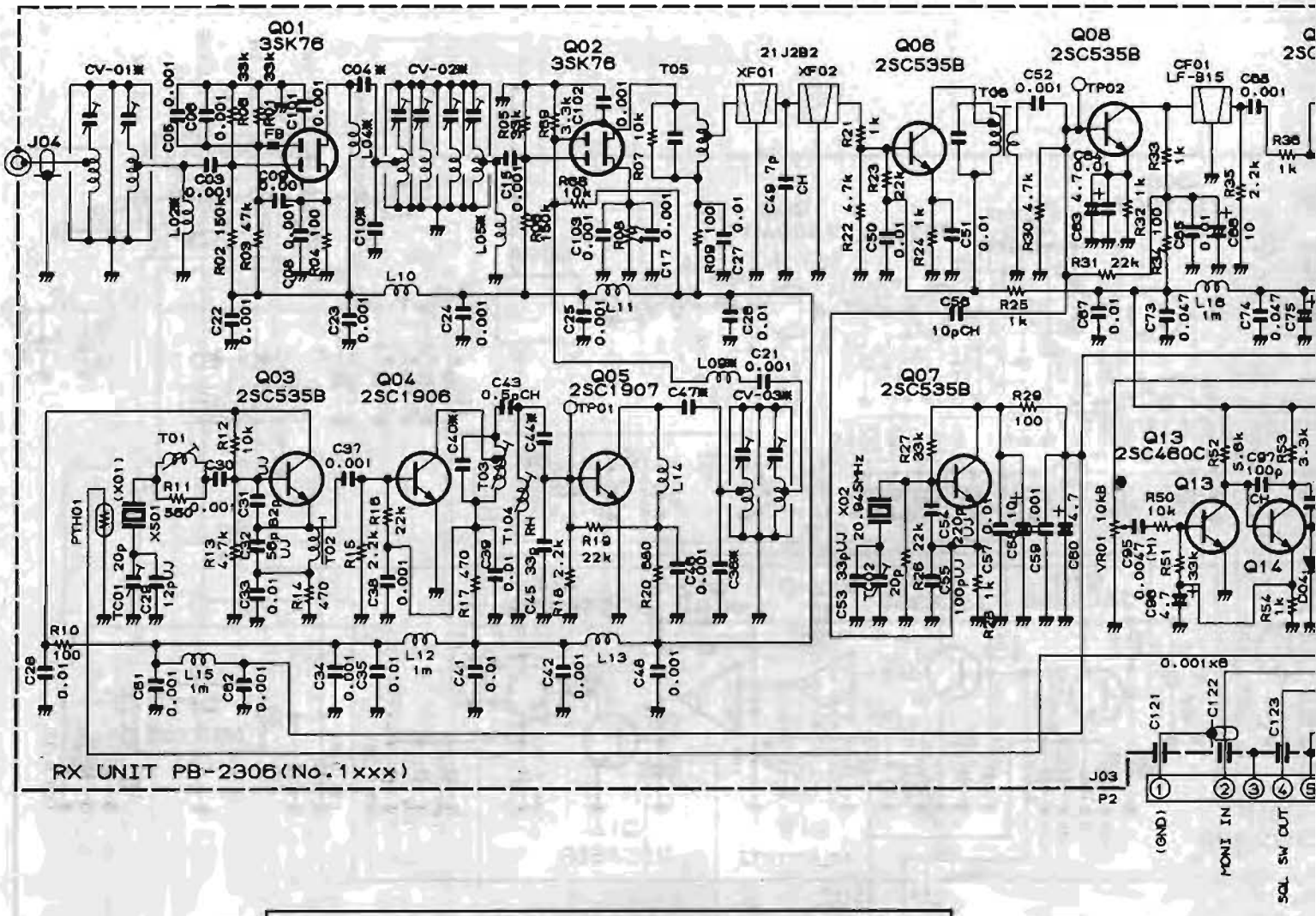


L2020
L2019
C2088
C2087
C2084
C2085
C2086
C2080
C2083
R2080
Q2014
R2078
C2081
R2081
R2079
R2077
C2082
Q2012
R2076
R2074
C2076
C2079
C2077
C2078
R2075
C2072
R2073
VR2002
C2068
R2070
Q2011
R2072
C2071
C2073
C2074
C2067
C2070
C2069
Q2010
R2068
C2075
Q2009
R2069
L2016
C2046
C2047
L2017
C2049
C2048
J2004
L2018
C2050
C2107
C2092
C2093
C2096
L2023
C2097
C2095
C2094
R2083
Q 2017
L2015
C2043
C2042
C2041
R2041
C2040
R2037
L2006
C2034
R2033
C2039
R2038
R2042
L2014
L2013
R2040
L2010
R2036
TC2002
L2005
R2034
C2036
C2035
L2004
C2029
C2028
R2029
R2030
T2008
C2089
R2035
C2037
C2032
C2027
R2028
R2027
TC2007
Q2008
L2011
TC2005
Q2007
L2008
TC2003
Q2006
C2030
T2009
TC2006
R2039
TC2004
C2045
C2038
L2007
R2031
C2031

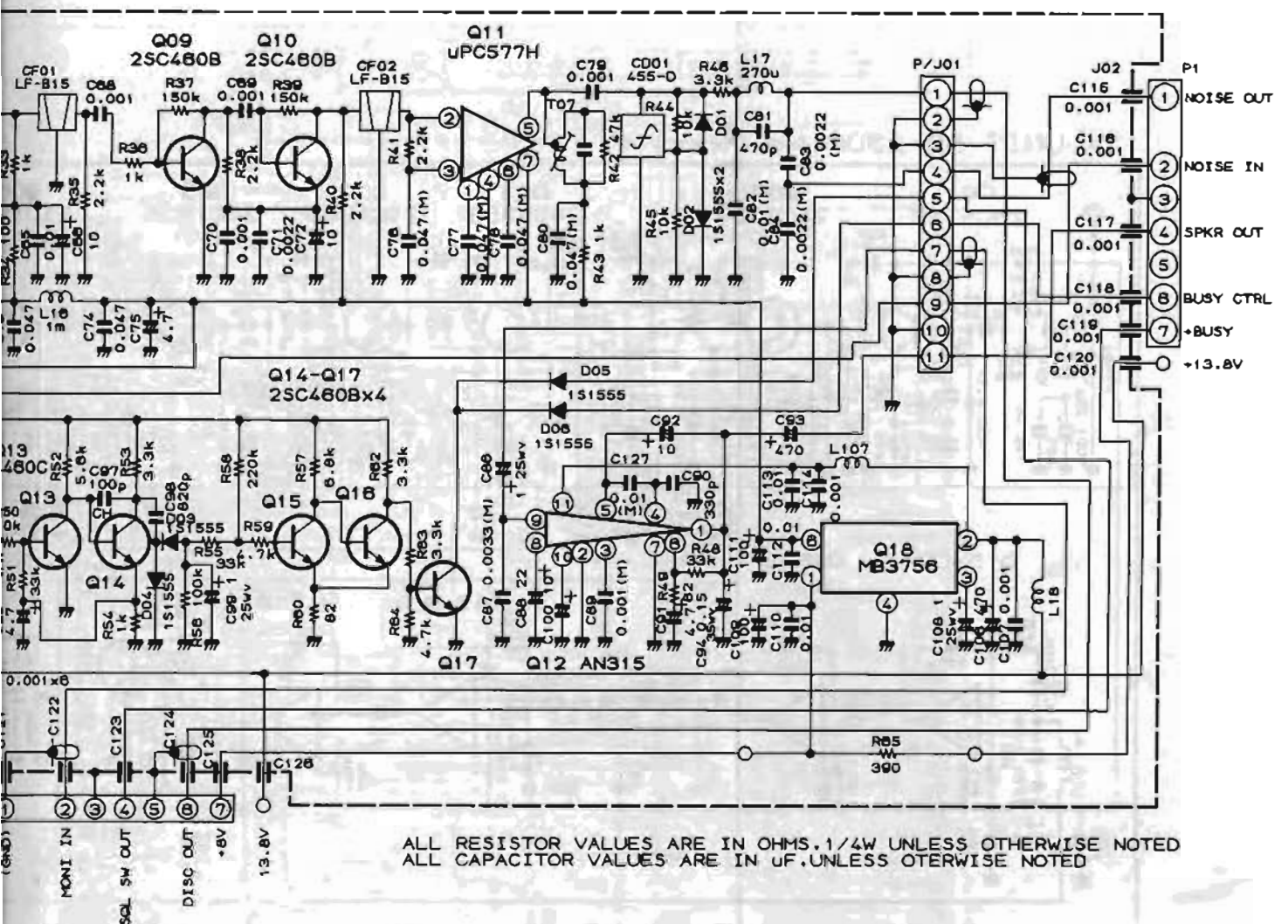
UNIT PARTS LAYOUT



Viewed from solder side

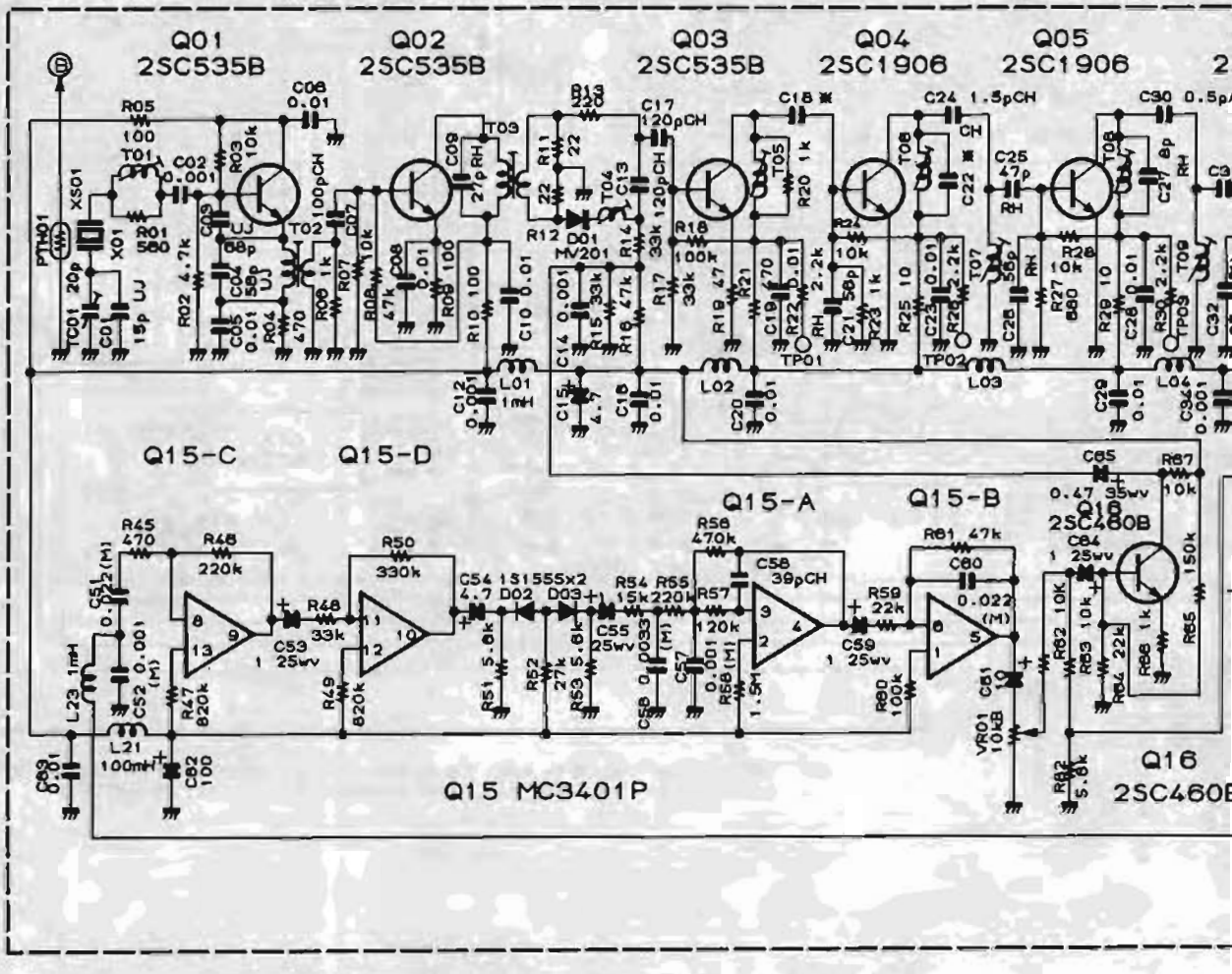


✱COMPONENT TABLE						
PART \ BAND (MHz)	400-420	420-430	430-450	450-470	470-490	490-512
C 04	CH 6pF	CH 6pF	CH 5pF	CH 5pF	CH 6pF	CH 6pF
10	CH 12pF	CH 12pF	CH 12pF	CH 12pF	CH 9pF	CH 9pF
36	CH 12pF	CH 12pF	CH 12pF	CH 12pF	CH 12pF	CH 12pF
40	RH 10pF	RH 10pF	RH 8pF	RH 8pF	RH 6pF	RH 6pF
44	RH 12pF	RH 12pF	RH 12pF	RH 12pF	RH 8pF	RH 8pF
45	RH 33pF	RH 33pF	RH 33pF	RH 33pF	RH 22pF	RH 22pF
47	CH 5pF	CH 5pF	CH 5pF	CH 5pF	CH 4pF	CH 4pF
CV 01	1032A	1031A	1067A	1019A	1027A	1028A
02	1023A	1024A	1051A	1009A	1013A	1014A
03	1033A	1032A	1068A	1018A	1026A	1027A

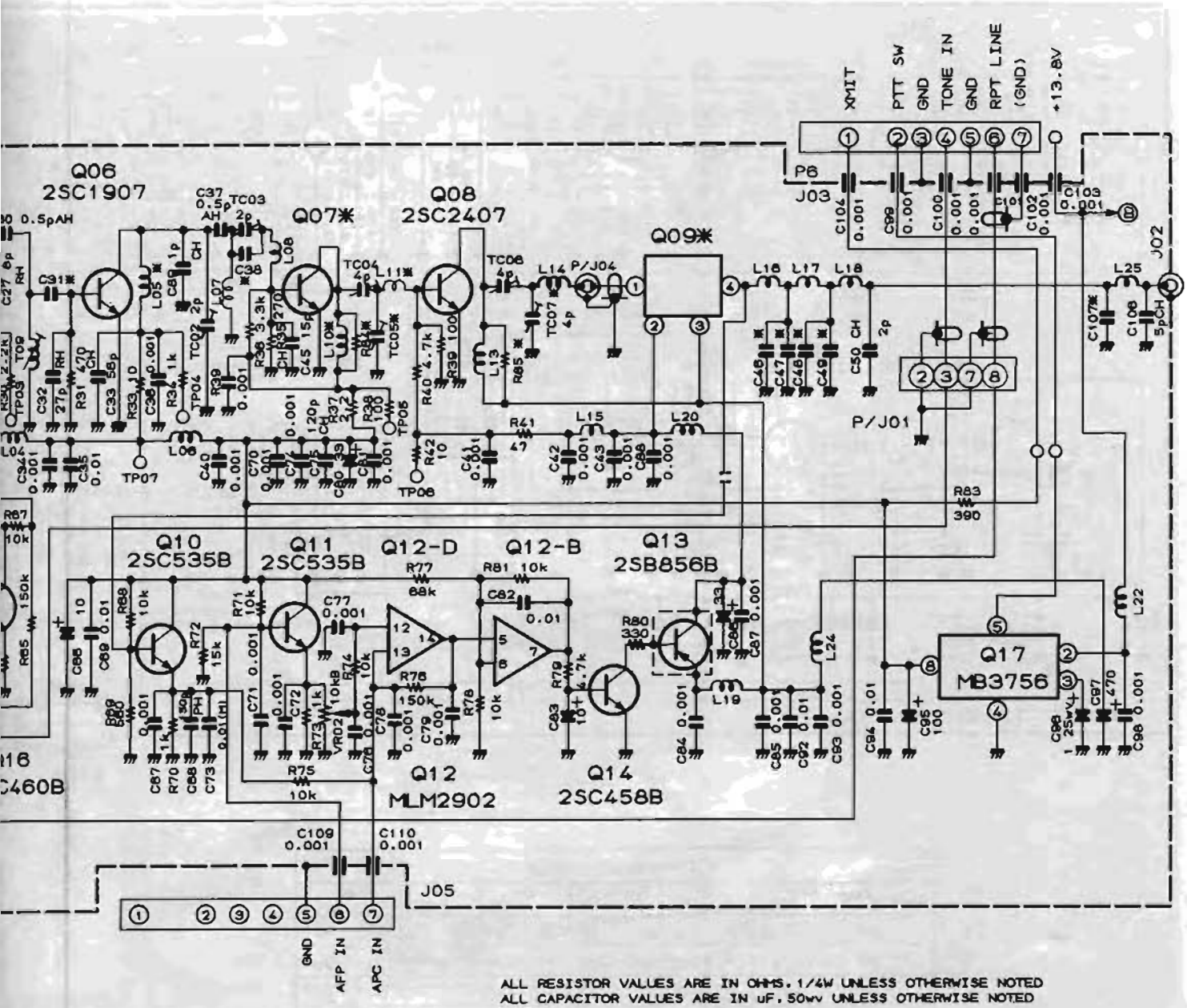


ALL RESISTOR VALUES ARE IN OHMS.1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF.UNLESS OTERWISE NOTED

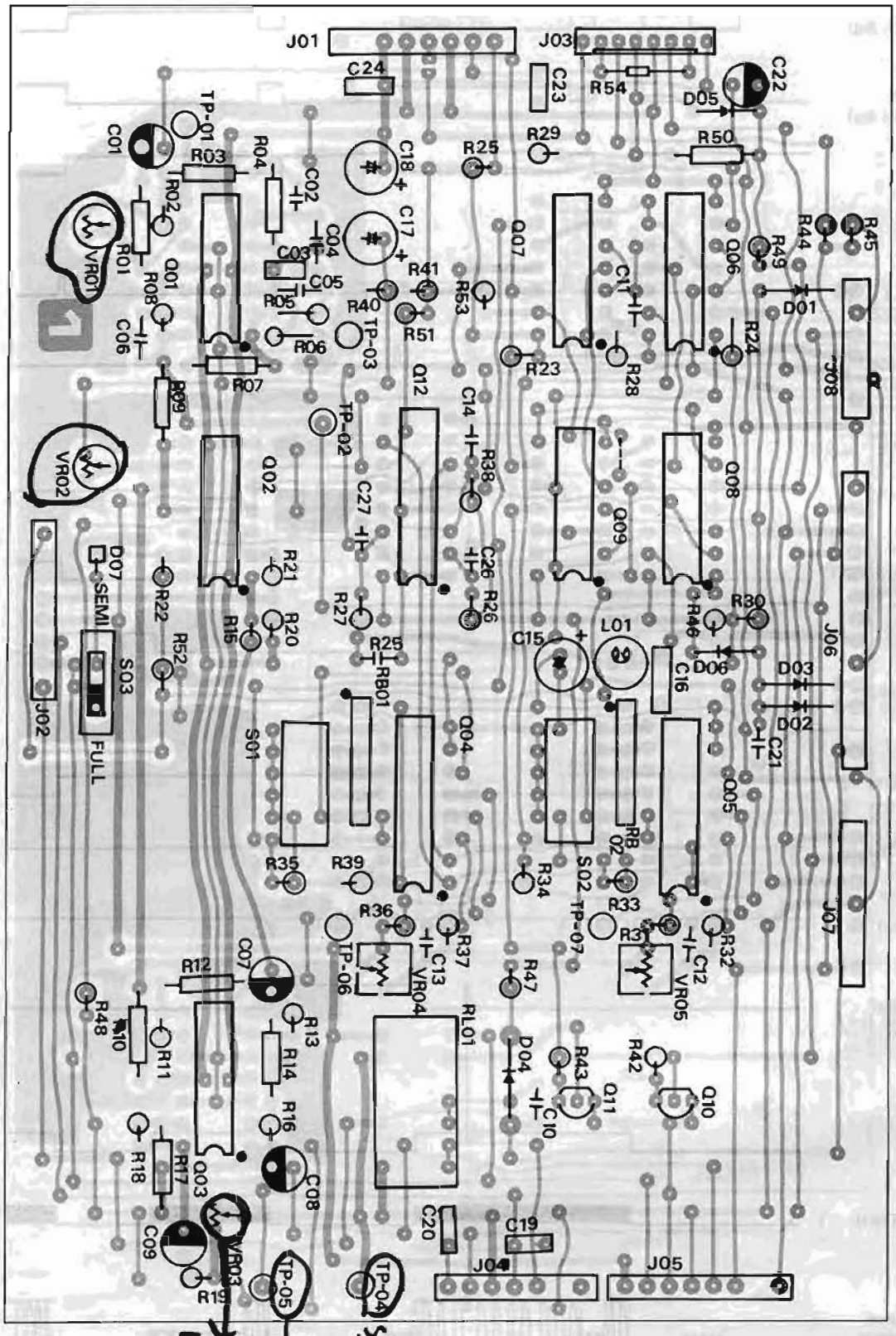
TX UNIT PB-2306(No.2xxx)



✱ CONPONENT TABLE						
PART \ BAND (MHz)	400-420	420-430	430-450	450-470	470-490	490-512
Q 07	2SC1907	2SC1907	2SC1907	2SC1907	2SC1907	2SC2407
Q 09	M57704L	M57704L	M57704M	M57704H	M57704UH	M57704SH
C 18	RH 22pF	RH 22pF	RH 18pF	RH 18pF	RH 18pF	RH 15pF
C 22	RH 39pF	RH 39pF	RH 33pF	RH 33pF	RH 33pF	RH 33pF
C 31	RH 18pF	RH 18pF	RH 12pF	RH 12pF	RH 12pF	RH 12pF
C 38	CH 2pF	CH 2pF	CH 1pF	CH 1pF	CH 1pF	CH 1pF
C 46	CH 5pF	CH 5pF	CH 3pF	CH 3pF	CH 3pF	CH 3pF
C 47	CH 5pF	CH 5pF	CH 3pF	CH 3pF	CH 3pF	CH 3pF
C 48	CH 3pF	CH 3pF	CH 2pF	CH 2pF	CH 1pF	CH 1pF
C 49	CH 3pF	CH 3pF	CH 2pF	CH 2pF	PH 1pF	CH 1pF
C107	CH 3pF	CH 3pF	CH 3pF	CH 3pF	CH 3pF	CH 2pF
TC 05	CH 2pF	CH 2pF	CH 2pF	CH 2pF	CH 4pF	CH 4pF
R 84						100
R 85						470

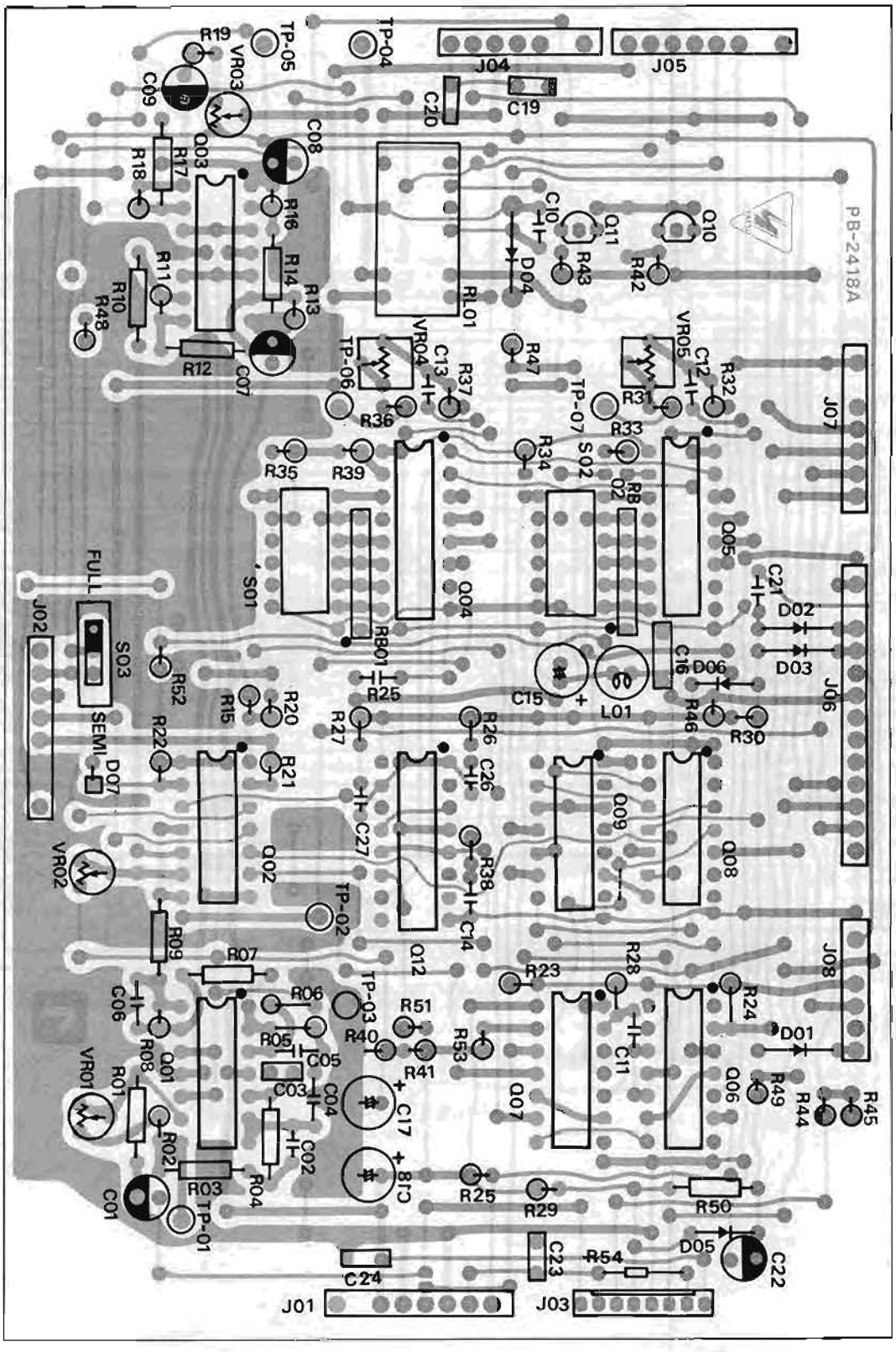


ALL RESISTOR VALUES ARE IN OHMS. 1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF. 50wv UNLESS OTHERWISE NOTED



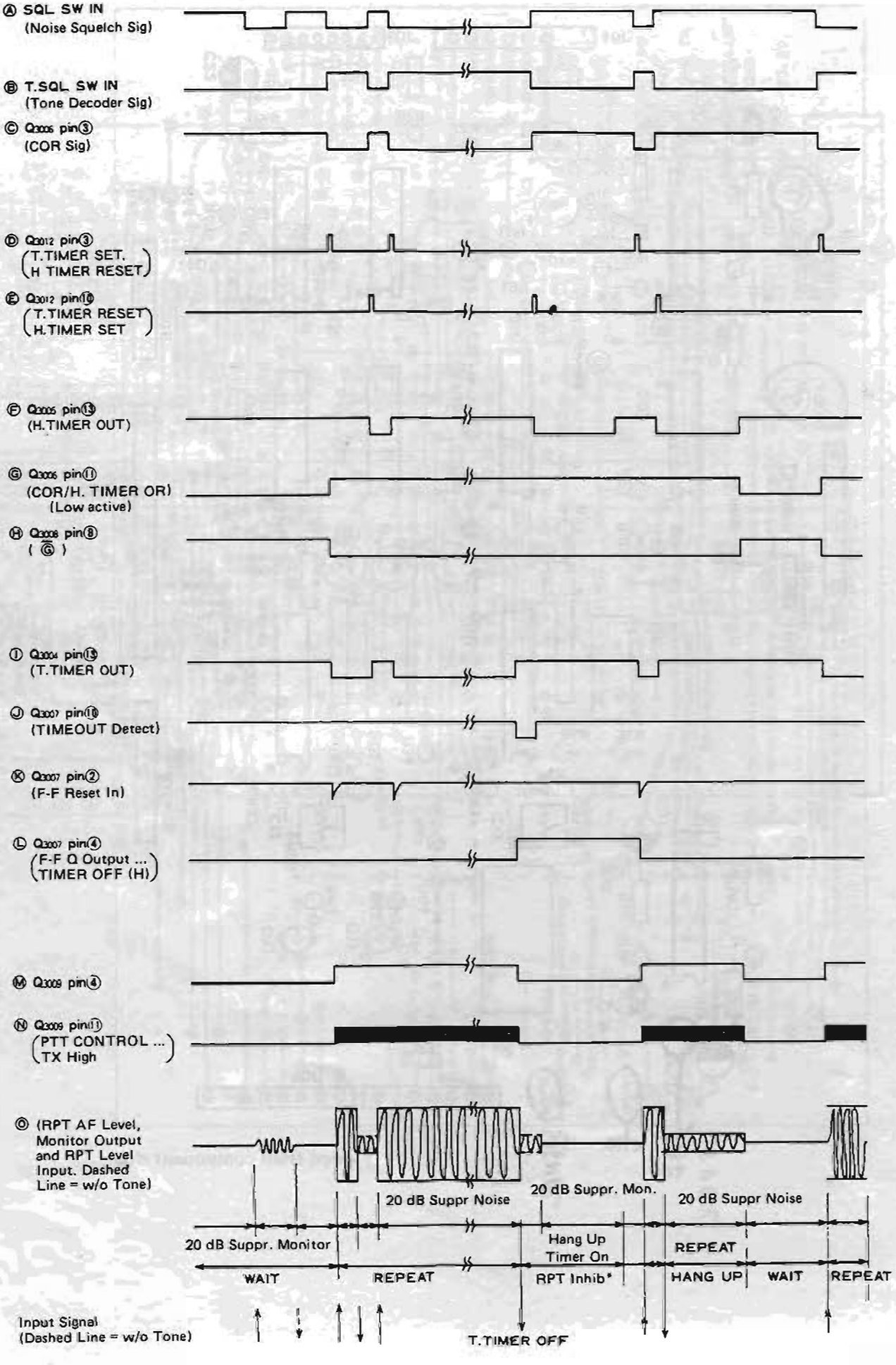
Viewed from component side

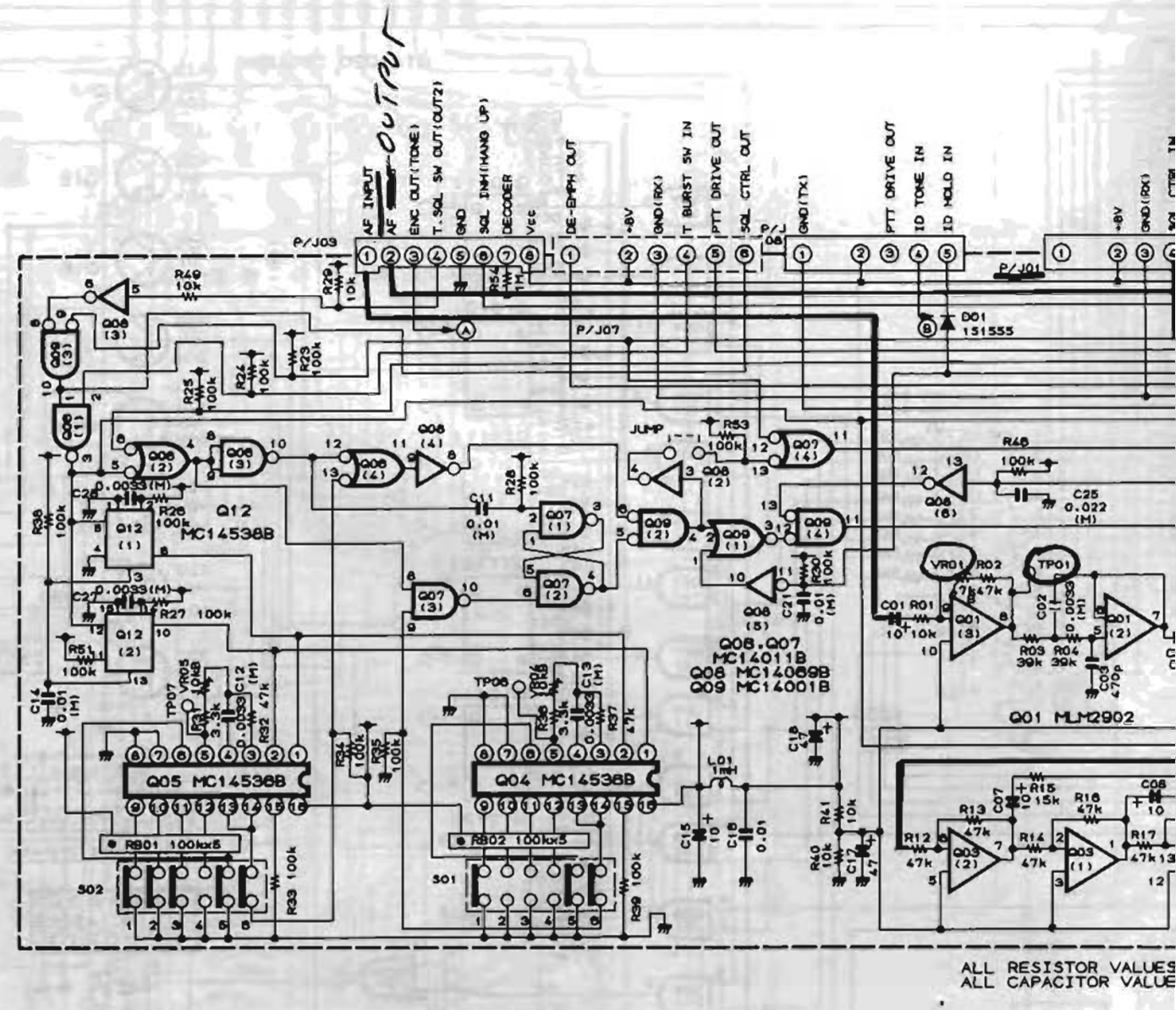
COR UNIT PARTS LAYOUT

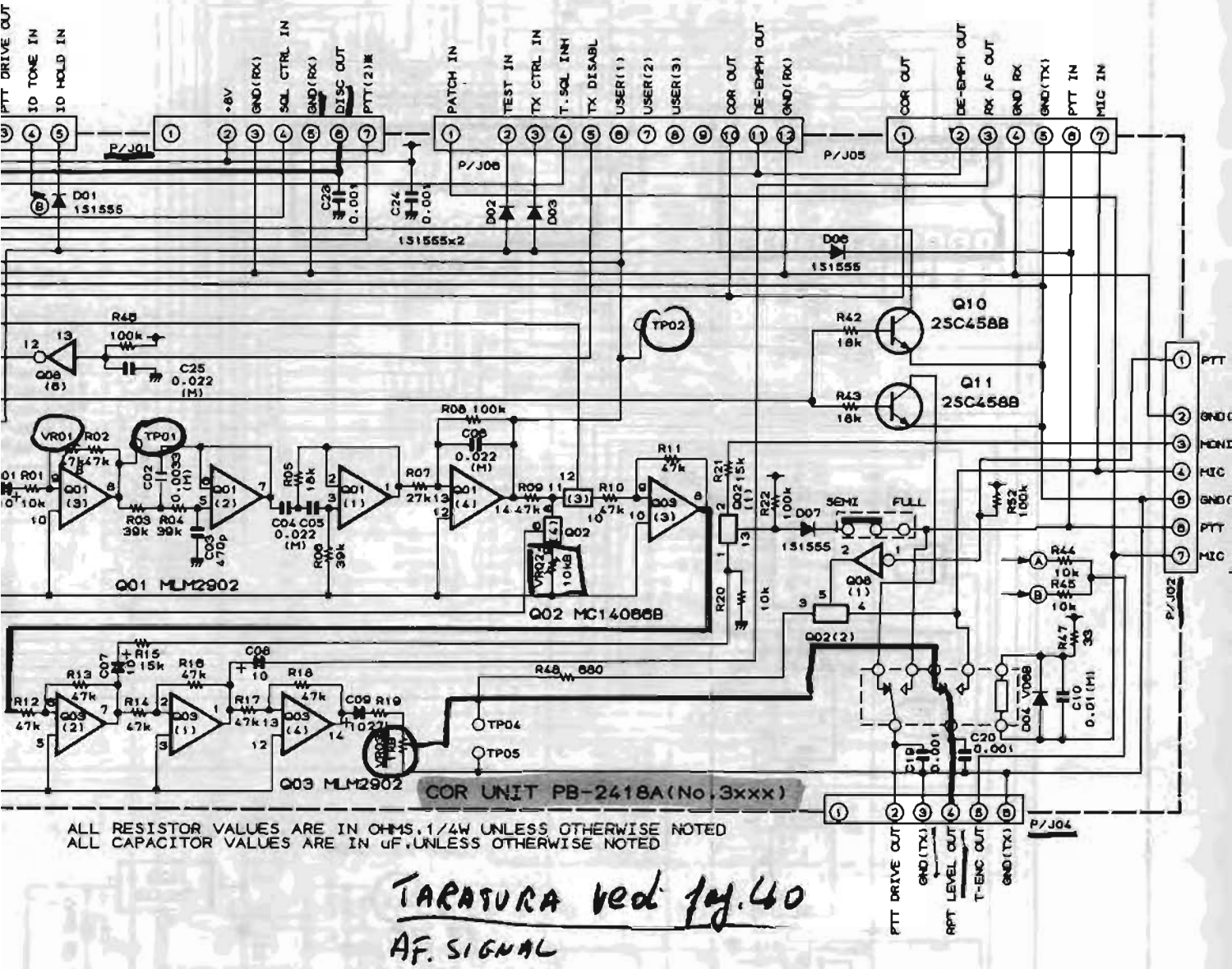


Viewed from solder side

COR TIMING CHART



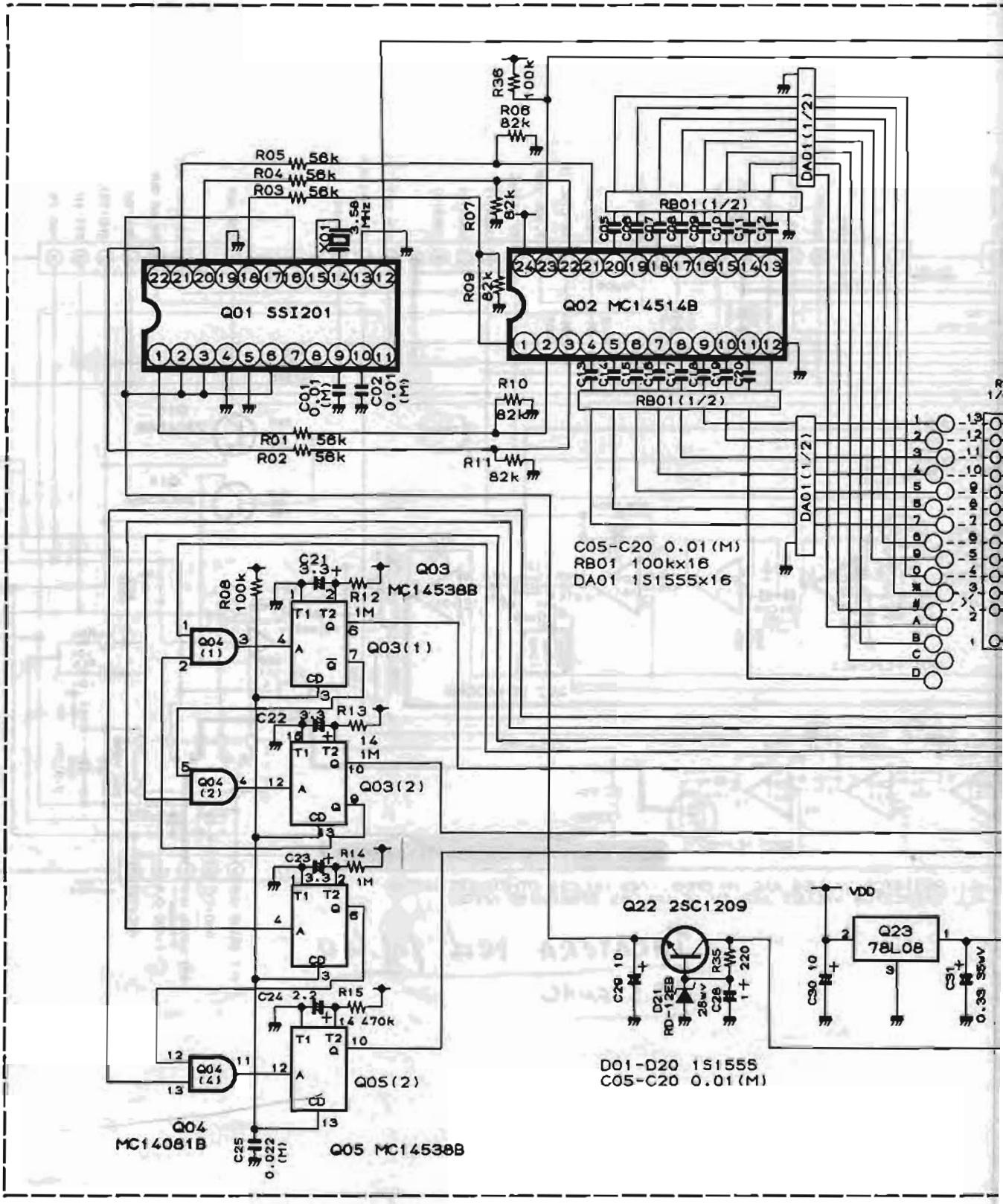

AF INPUT
AF OUTPUT
ENC OUT(TONE)
T.SQL SW OUT(OUT2)
GND
SQL IN(HANG UP)
DECODER
Vcc
DE-EMPH OUT
+8V
GND(RX)
T BURST SW IN
PTT DRIVE OUT
SQL CTRL OUT
GND(TX)
PTT DRIVE OUT
ID TONE IN
ID HOLD IN
P/J09
P/J07
P/J08
P/J01
D01 1S1555
JUMP
Q12 MC14538B
Q05 MC14538B
Q04 MC14538B
Q08,Q07 MC14011B
Q08 MC14069B
Q09 MC14001B
Q01 MLM2902
* R801 100kx5
* R802 100kx5
ALL RESISTOR VALUES
ALL CAPACITOR VALUE

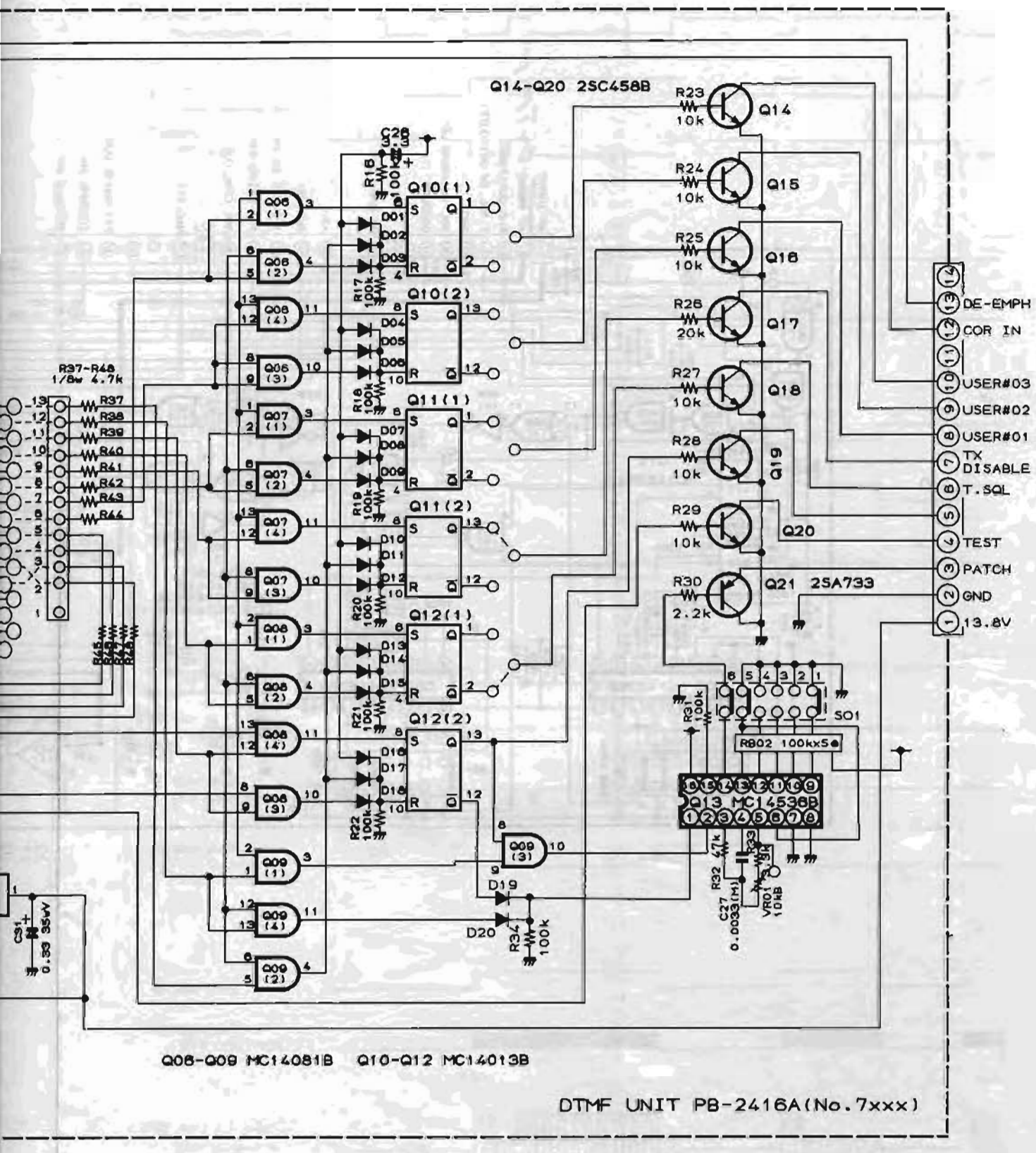


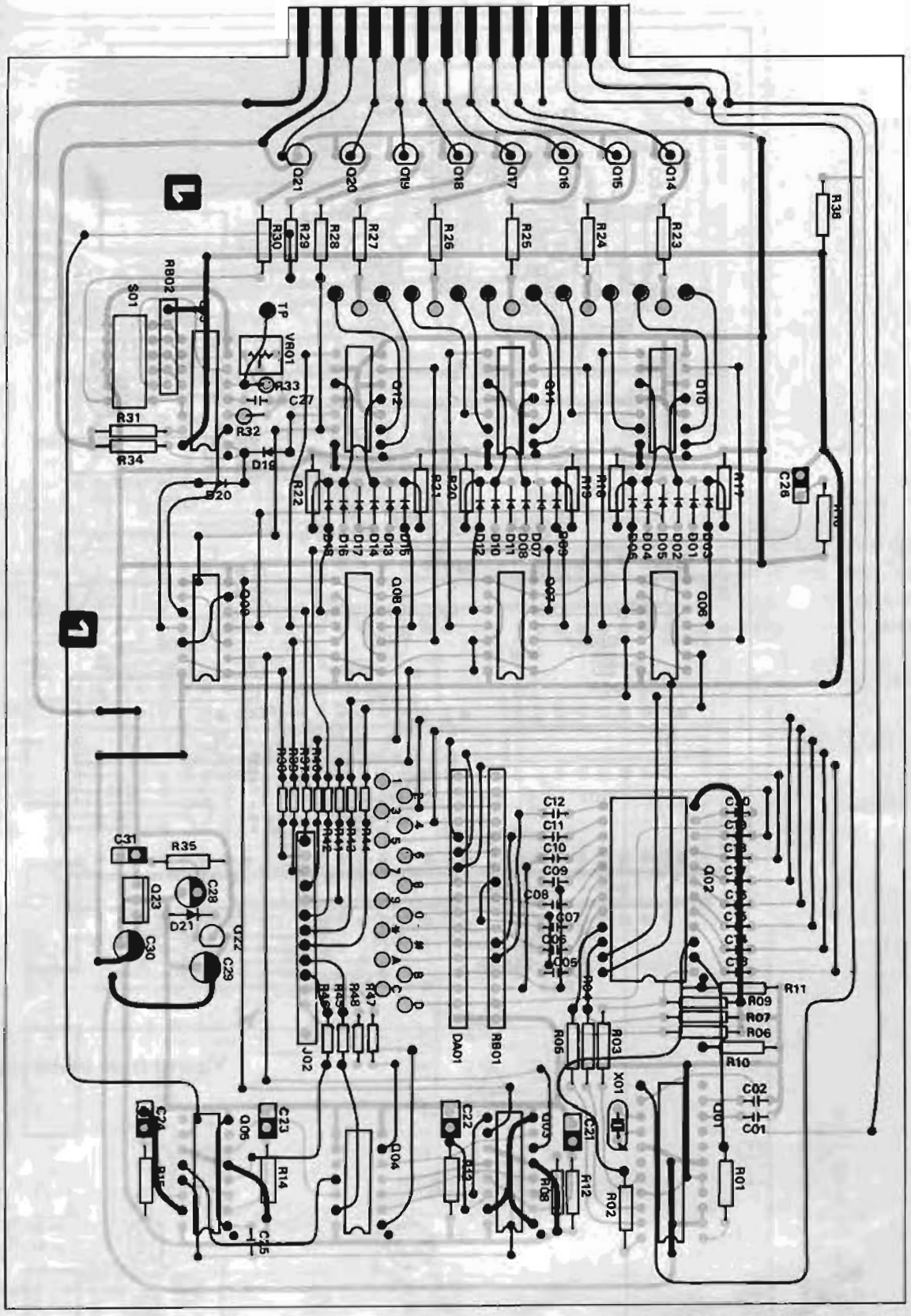
ALL RESISTOR VALUES ARE IN OHMS.1/4W UNLESS OTHERWISE NOTED
ALL CAPACITOR VALUES ARE IN uF.UNLESS OTHERWISE NOTED

TARATURA ved fig.40

AF. SIGNAL

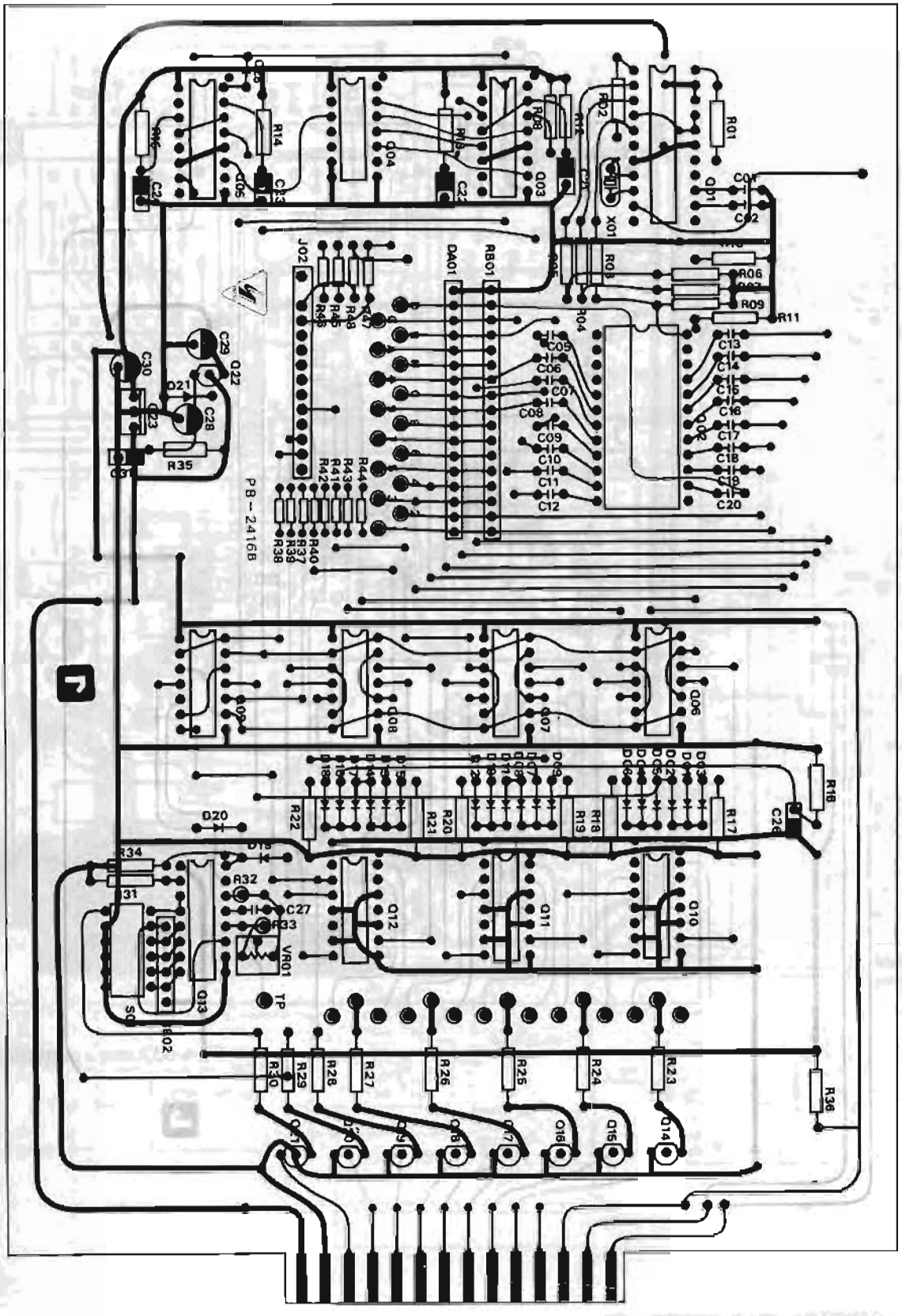

R36 100k
R08 82k
R05 56k
R04 56k
R03 56k
X01 3.58 MHz
R07 82k
R09 82k
Q01 SSI201
Q02 MC14514B
R10 82k
R11 82k
R01 56k
R02 56k
C01 0.01(M)
C02 0.01(M)
RB01(1/2)
DA01(1/2)
C05-C20 0.01(M)
RB01 100kx16
DA01 1S1555x16
C21 3.3
Q03
MC14538B
R08 100k
R12 1M
Q04 (1)
Q03(1)
C22 3.3
R13 1M
Q04 (2)
Q03(2)
C23 3.3
R14 1M
C24 2.2
R15 470k
Q04 (4)
Q05(2)
Q04
MC14081B
C25 0.022(M)
Q05 MC14538B
Q22 2SC1209
C29 10
D21 RD-12EB 28wv
R35 220
C28 1
VDD
Q23 78L08
C30 10
C31 0.33 35wv
D01-D20 1S1555
C05-C20 0.01(M)


Q14-Q20 2SC458B
R23 10k Q14
R24 10k Q15
R25 10k Q16
R26 20k Q17
R27 10k Q18
R28 10k Q19
R29 10k Q20
R30 2.2k Q21 2SA733
DE-EMPH
COR IN
USER#03
USER#02
USER#01
TX DISABLE
T.SQL
TEST
PATCH
GND
13.8V
R37-R44 1/8w 4.7k
Q10(1)
Q10(2)
Q11(1)
Q11(2)
Q12(1)
Q12(2)
Q13 MC14536B
R802 100kx5
SO1
D19
D20
Q08-Q09 MC14081B Q10-Q12 MC14013B
DTMF UNIT PB-2416A(No.7xxx)

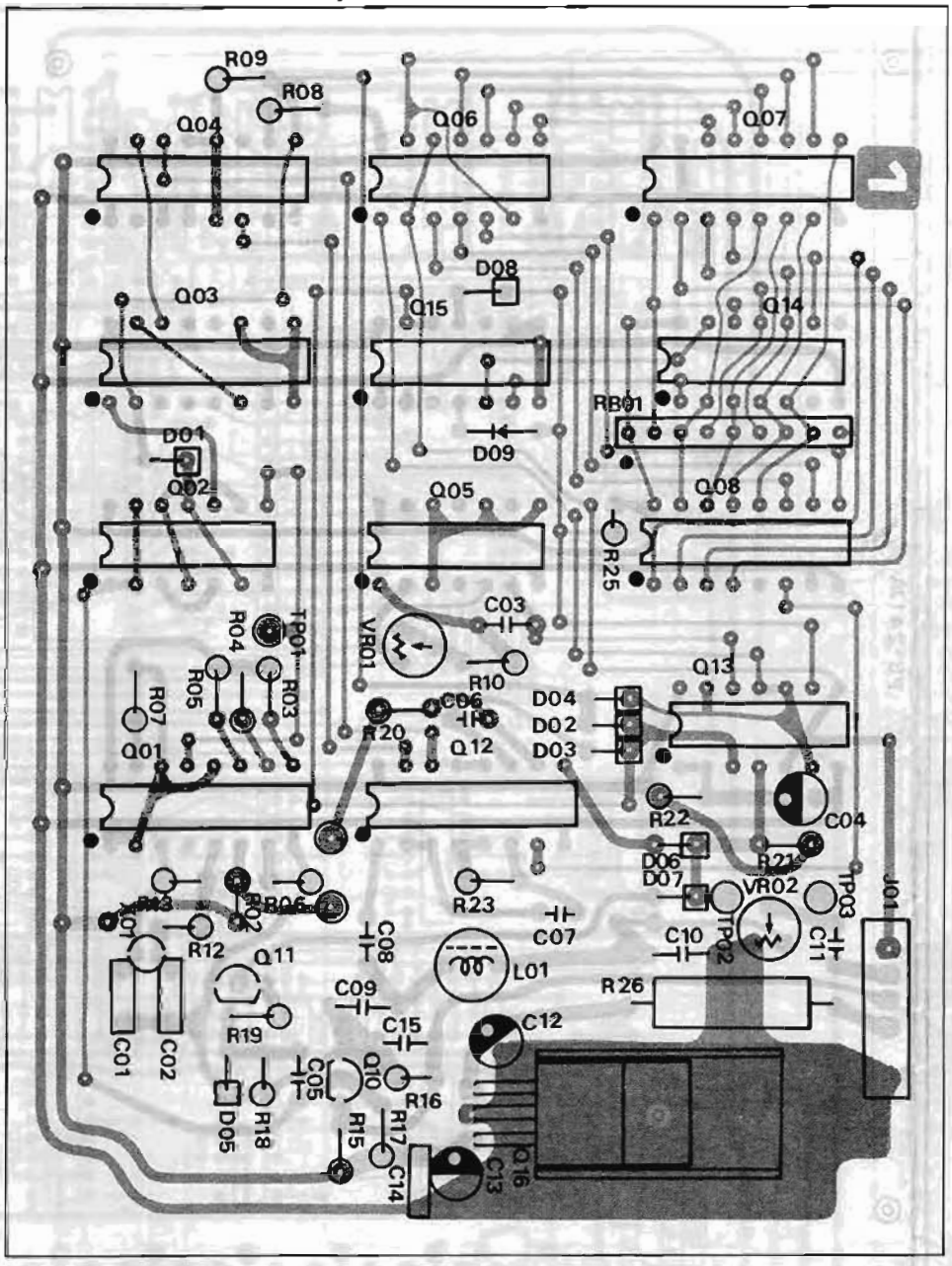


Viewed from component side

DTMF UNIT PARTS LAYOUT

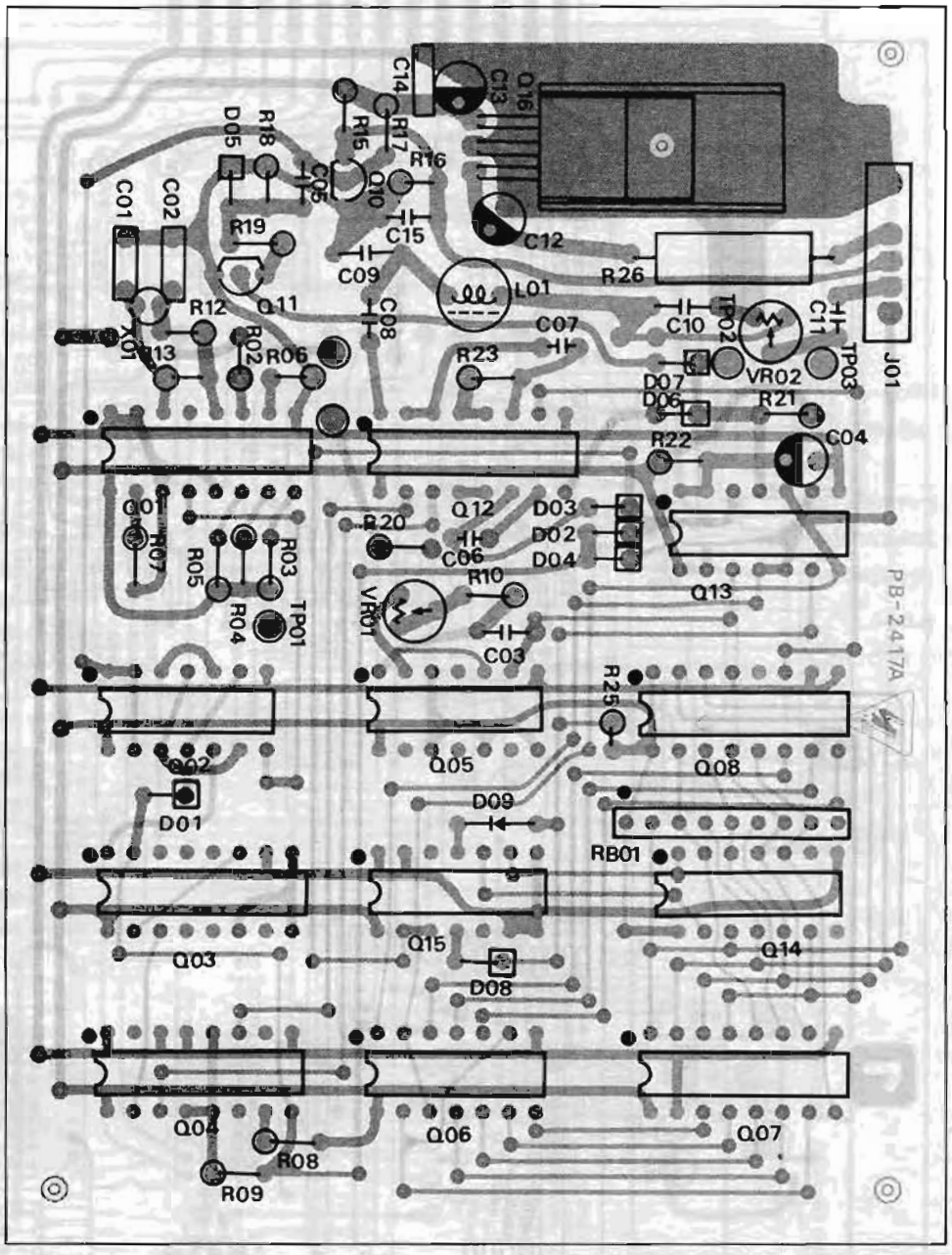


Viewed from solder side

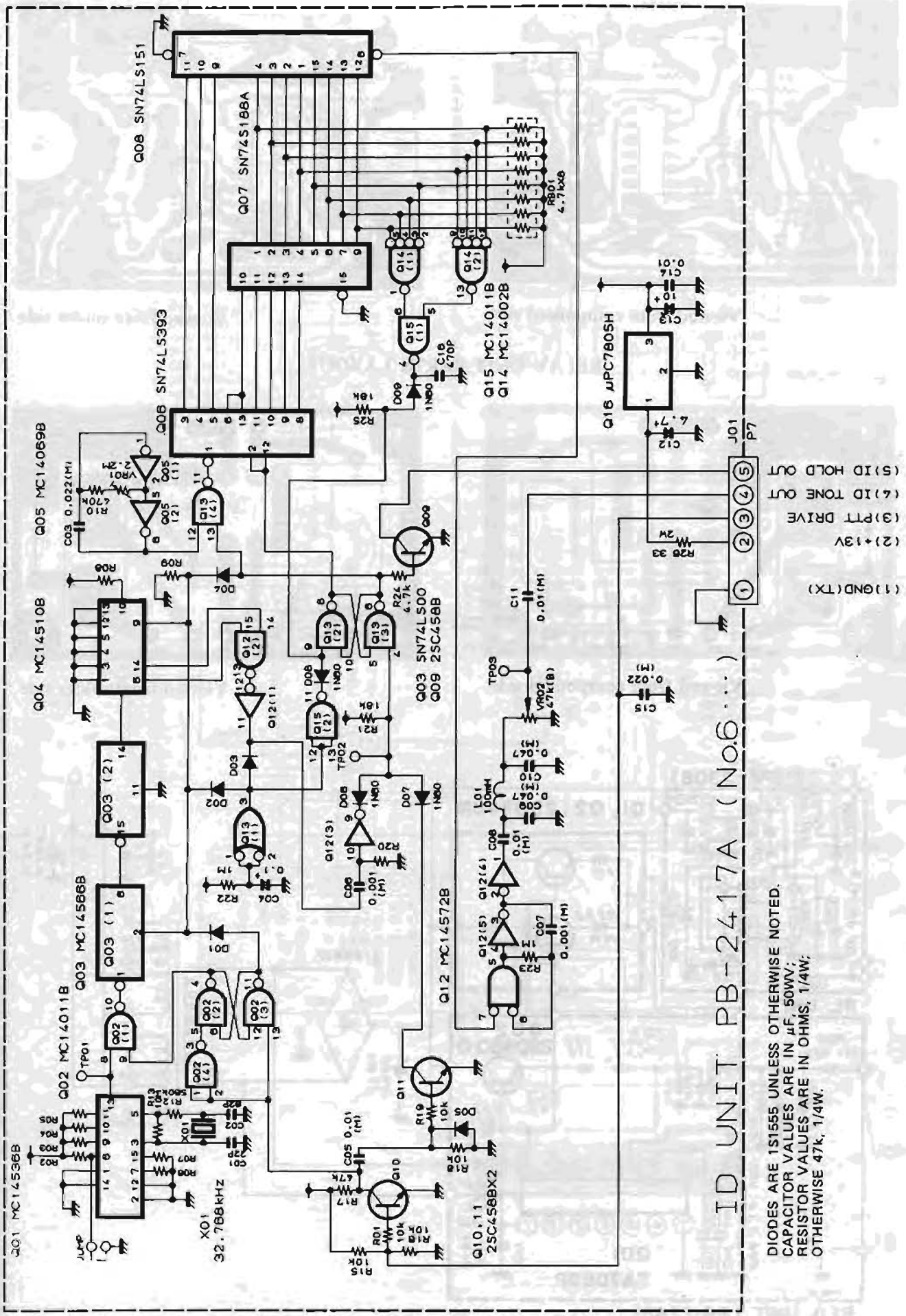


Viewed from component side

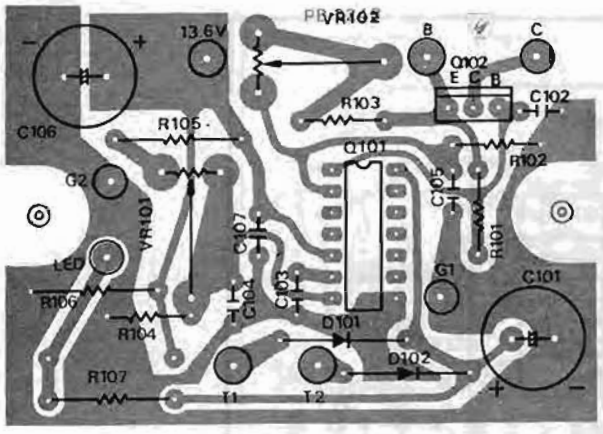
nent side



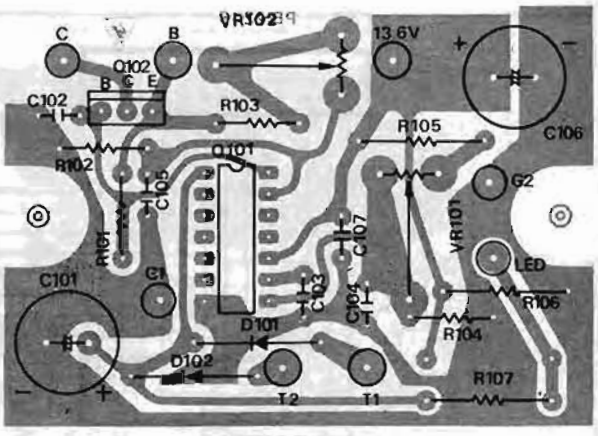
Viewed from solder side


ID UNIT PB-2417A (No.6 ...)
(1)GND(TX)
(2)+13V
(3)PTT DRIVE
(4)ID TONE OUT
(5)ID HOLD OUT
Q01 MC145368
Q02 MC14011B
Q03 MC14586B
Q04 MC145106
Q05 MC14069B
Q06 SN74L5393
Q07 SN74S188A
Q08 SN74LS151
Q09 2SC458B
Q10,11 2SC458BX2
Q12 MC14572B
Q15 MC14011B
Q14 MC14002B
Q16 μPC7805H
X01 32.768kHz
DIODES ARE 1S1555 UNLESS OTHERWISE NOTED.
CAPACITOR VALUES ARE IN μF, 50WV;
RESISTOR VALUES ARE IN OHMS, 1/4W;
OTHERWISE 47k, 1/4W.

REG UNIT PARTS LAYOUT

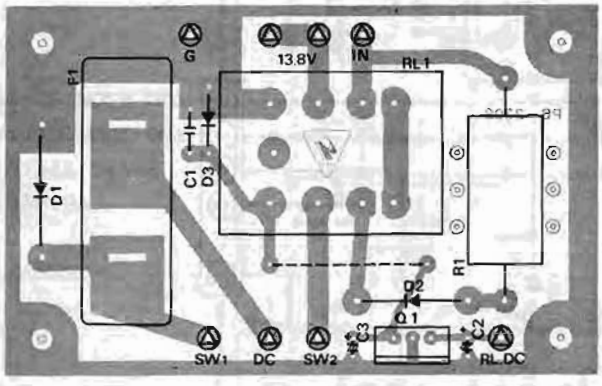


Viewed from component side

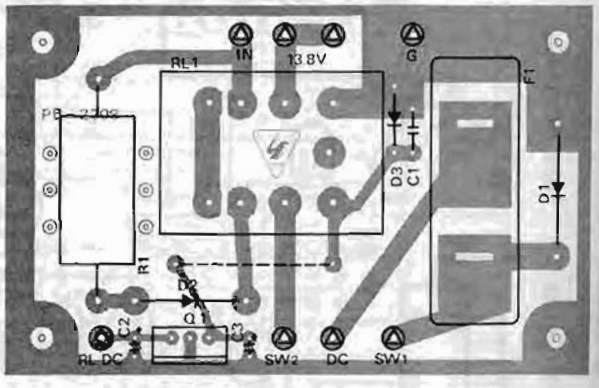


Viewed from solder side

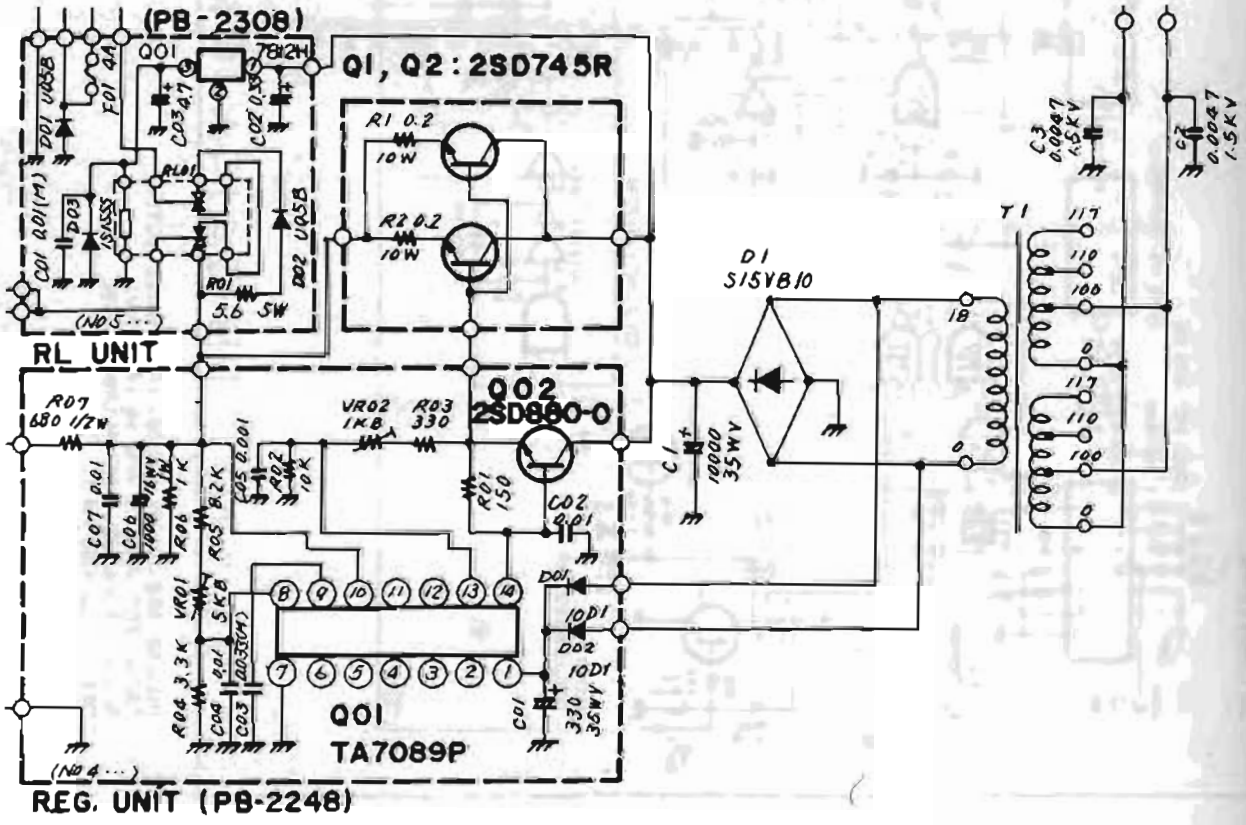
RELAY UNIT PARTS LAYOUT

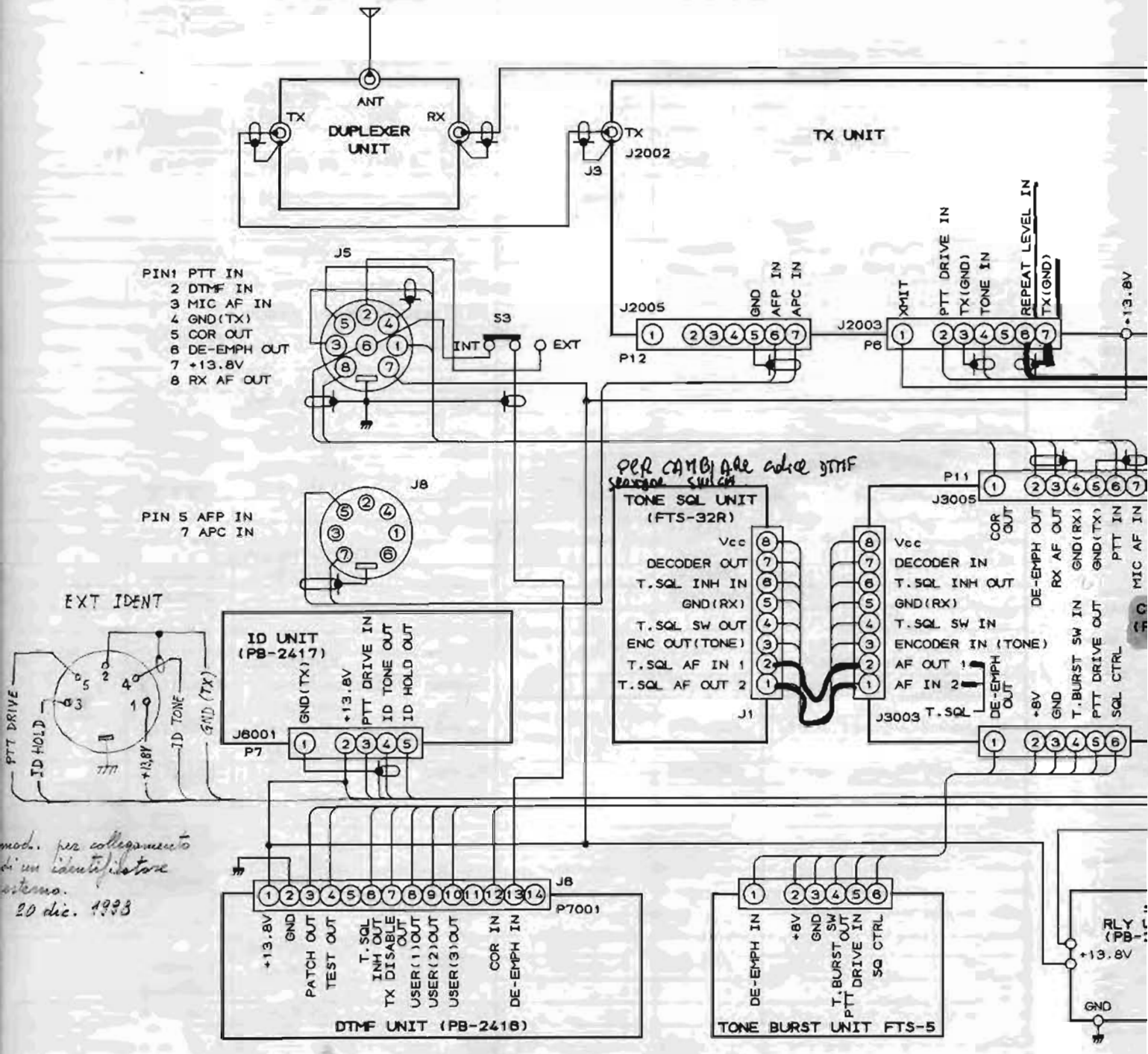


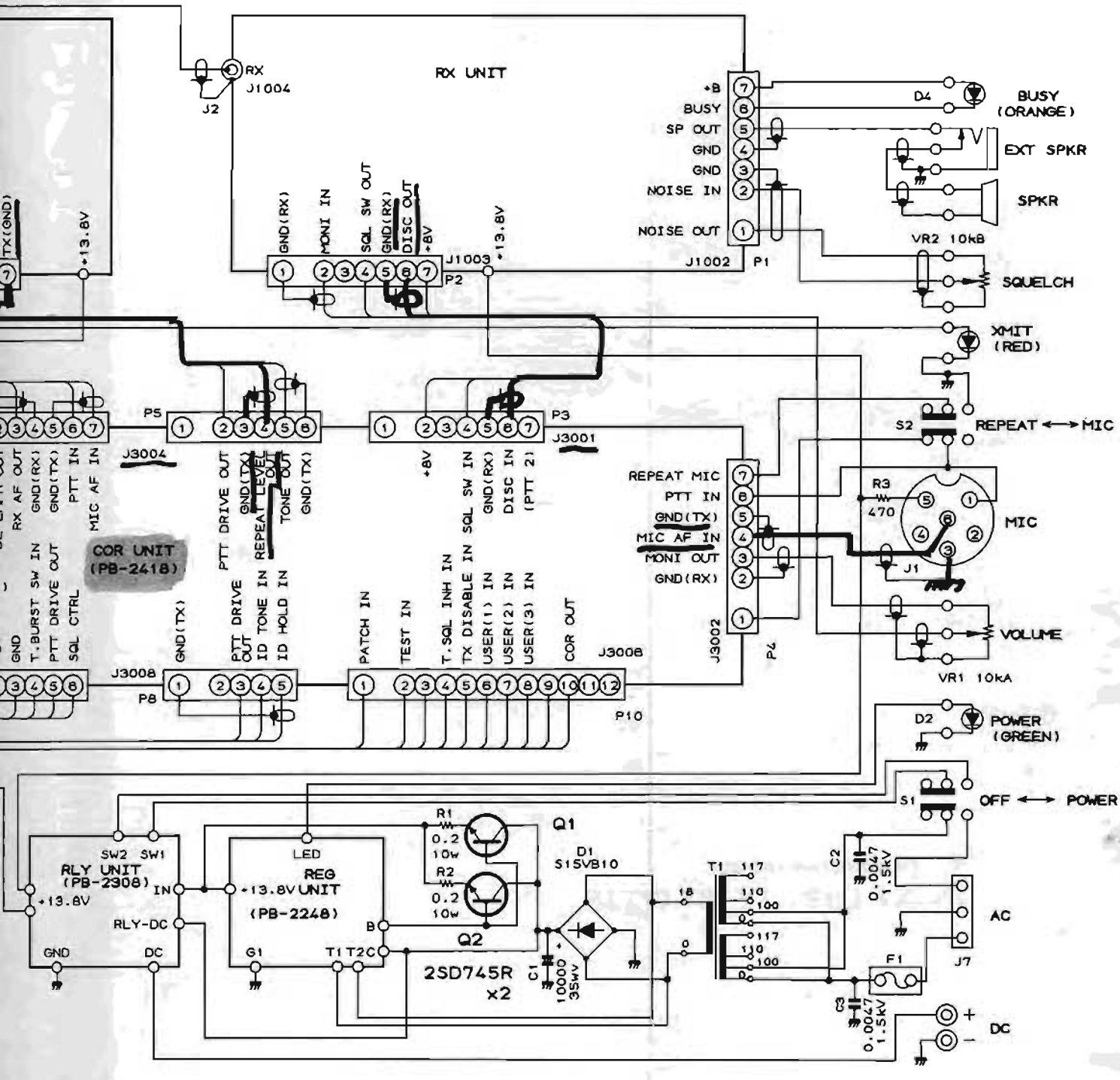
Viewed from component side



Viewed from solder side




ANT
DUPLEXER UNIT
TX
RX
J3
J2002
TX UNIT
PIN1 PTT IN
2 DTMF IN
3 MIC AF IN
4 GND(TX)
5 COR OUT
6 DE-EMPH OUT
7 +13.8V
8 RX AF OUT
J5
S3
INT
EXT
J2005
P12
GND
AFP IN
APC IN
J2003
P8
XMIT
PTT DRIVE IN
TX(GND)
TONE IN
REPEAT LEVEL IN
TX(GND)
+13.8V
per cambiare codice DTMF
session switch
J8
PIN 5 AFP IN
7 APC IN
EXT IDENT
ID UNIT
(PB-2417)
GND(TX)
+13.8V
PTT DRIVE IN
ID TONE OUT
ID HOLD OUT
J8001
P7
PTT DRIVE
ID HOLD
ID TONE
GND (TX)
TONE SQL UNIT
(FTS-32R)
Vcc
DECODER OUT
T.SQL INH IN
GND(RX)
T.SQL SW OUT
ENC OUT(TONE)
T.SQL AF IN 1
T.SQL AF OUT 2
J1
Vcc
DECODER IN
T.SQL INH OUT
GND(RX)
T.SQL SW IN
ENCODER IN (TONE)
AF OUT 1
AF IN 2
J3003
T.SQL
P11
J3005
COR OUT
DE-EMPH OUT
RX AF OUT
GND(RX)
GND(TX)
PTT IN
MIC AF IN
DE-EMPH OUT
+8V
GND
T.BURST SW IN
PTT DRIVE OUT
SQL CTRL
mod. per collegamento di un identificatore esterno.
20 dic. 1993
J6
P7001
+13.8V
GND
PATCH OUT
TEST OUT
T.SQL INH OUT
TX DISABLE OUT
USER(1)OUT
USER(2)OUT
USER(3)OUT
COR IN
DE-EMPH IN
DTMF UNIT (PB-2416)
DE-EMPH IN
+8V
GND
T.BURST SW PTT DRIVE IN
SQ CTRL
TONE BURST UNIT FTS-5
RLY (PB-
+13.8V
GND



REPEATER UNIT
CONNECTION DIAGRAM

MEMO

Per info IN3AHO - Sezione ARI TRENTO since 1934 !

PARTS LIST

MAIN CHASSIS

Symbol No.	Part No.	Description
		TRANSISTOR
Q1	G3407450R	2SD745R
Q2	G3407450R	"
		RESISTOR
R1	J30406029	Cement 10W 0.2Ω
R2	J30406029	" " 0.2Ω
R3	J01245471	Carbon film 1/4W TJ 470Ω
		TERMINAL BOARD
	Q6000030	1L4P (2-0-2)
		POWER TRANSFORMER
T1	L3030093A	
		DIODE
D1	G2090046	S15VB10
D2	G2090203	SDB205BGD
D3	G2090204	SDB205BRD
D4	G2090205	SDB205BAD
		POTENTIOMETER
VR1	J60800084	VM10A10KΩB
VR2	J60800084	"
		CAPACITOR
C1	K43160002	Electrolytic 35WV 10000μF (35L10000)
C2	K12329002	Ceramic disc 1.5KV 0.0047μF (ECKDAL472PE)
C3	K12329002	" " " 0.0047μF (")
		SPEAKER
SP1	M4090049	SM-77KY-2
		SWITCH
S1	N2090028	8B2011
S2	N2090028	"
	N2090021	8A1011
		RECEPTACLE
J1	P0090012	FM146S
J2	P1090265	M-261-PA
J3	P1090265	"
J4	P1090005	SG-8050-01
J6	P4090009	3305-014-611SN
	P1090246	D8-701B-00
	P0090094	PA125
	P1090034	D7-7018-00
		PLUG
P1 (with wire)	T9204327B	
P2 (with wire)	T9204328A	
P4 (")	T9204466	
P6 (")	T9204329C	
		TERMINAL BOARD
	Q6000161	M115A-2A
		FUSE HOLDER
F1	P2000012	SN2059
		FUSE
	Q0000003	2A (100–117VAC)
	Q0000001	1A (200–234VAC)
		TERMINAL POST
	Q5000005	STK-A2
	S5000053	A4 3M
	S5000054	B-7 5M
		CONNECTION CABLE
	T9100950	
	T9100990	
	T9204632	
	T9204633	
	T9204655	
	T9302000A	
		AC POWER CORD
	T9013282	3 wire, 3 prong UL plug
	T9013283	3 wire, 3 prong Australian plug
	T9013284	3 wire, 2 prong EU plug

(FTR-710A) (FTR-2410A) (FTR-5410)

FTR-710A RECEIVER UNIT

Symbol No.	Part No.	Description
PB-2398B	F0002398B	Printed Circuit Board
		PCB with Components (w/o crystal)
	C023980A	68–74MHz 25kHz
	C023980C	74–81MHz "
	C023980E	81–88MHz "
	C023980B	68–74MHz 12.5kHz
	C023980D	74–81MHz "
	C023980F	81–88MHz "
PB-2309	F0002309	Printed Circuit Board (Connector board)
		IC, FET, TRANSISTOR
Q1001	G4800600	3SK60 (FET)
Q1002	G4800600	" (FET)
Q1003	G3304600B	2SC460B (TR)
Q1004	G3304600B	" (TR)
Q1005	G3305350B	2SC535B (TR)
Q1006	G3305350B	" (TR)
Q1007	G3305350B	" (TR)
Q1008	G3305350B	" (TR)
Q1009	G3304600B	2SC460B (TR)
Q1010	G3304600B	" (TR)
Q1011	G1090072	μPC577H (IC)
Q1012	G1090218	AN315 (IC)
Q1013	G3304600C	2SC460C (TR)
Q1014	G3304600B	2SC460B (TR)
Q1015	G3304600B	" (TR)
Q1016	G3304600B	" (TR)
Q1017	G3304600B	" (TR)
Q1018	G1090222	MB3756 (IC)
		DIODE
D1001	G2015550	Si 1S1555
D1002	G2015550	" "
D1003	G2015550	" "
D1004	G2015550	" "
D1005	G2015550	" "
D1006	G2015550	" "
		CRYSTAL
X1001	H0102009	HC-25/U (fR-10.7)/4(MHz)
X1002	H0100720A	HC-18/U 10.245MHz
		CRYSTAL FILTER
XF1001 (25kHz)	H1101960	10M2B2(1/2) PAIR
XF1002 (25kHz)	H1101960	10M2B2(1/2)
XF1001 (12.5kHz)	H1102000	FMT-8B(1/2) PAIR
XF1002 (12.5kHz)	H1102000	FMT-8B(1/2)
		CERAMIC FILTER
CF1001(25kHz)	H3900030	LF-B15
CF1002(25kHz)	H3900030	LF-B15
CF1001(12.5kHz)	H3900140	LF-B8
CF1002(12.5kHz)	H3900140	LF-B8

		CERAMIC DISCRIMINATOR
CD1001	H7900010	455D
		POSISTOR
PTH1001	G9090019	PTH-2928
		RESISTOR
R1001	J02245683	Carbon film 1/4W SJ 68kΩ
R1002	J02245273	" " " " 27kΩ
R1003	J02245124	" " " " 120kΩ
R1004	J02245271	" " " " 270Ω
R1005	J02245273	" " " " 27kΩ
R1006	J02245224	" " " " 220kΩ
R1007	J02245473	" " " " 47kΩ
R1008	J02245470	" " " " 47Ω
R1009	J02245471	" " " " 470Ω
R1010	J02245101	" " " " 100Ω
R1011	J02245101	" " " " 100Ω
R1012	J02245103	" " " " 10kΩ
R1013	J02245472	" " " " 4.7kΩ
R1014	J02245102	" " " " 1kΩ
R1015	J02245152	" " " " 1.5kΩ
R1016	J02245153	" " " " 15kΩ
R1017	J02245471	" " " " 470Ω
R1018	J02245222	" " " " 2.2kΩ
R1019	J02245223	" " " " 22kΩ
R1020	J02245101	" " " " 100Ω
R1021(25kHz)	J10246332	Carbon composition 1/4W GK 3.3kΩ
R1021(12.5kHz)	J10246102	" " " " 1kΩ
R1022	J02245472	Carbon film 1/4W SJ 4.7kΩ
R1023	J02245223	" " " " 22kΩ
R1024	J02245102	" " " " 1kΩ
R1025	J02245102	" " " " 1kΩ
R1026	J02245223	" " " " 22kΩ
R1027	J02245333	" " " " 33kΩ
R1028	J02245102	" " " " 1kΩ
R1029	J02245101	" " " " 100Ω
R1030	J02245472	" " " " 4.7kΩ
R1031	J02245223	" " " " 22kΩ
R1032	J02245102	" " " " 1kΩ
R1033	J02245102	" " " " 1kΩ
R1034	J02245101	" " " " 100Ω
R1035	J02245222	" " " " 2.2kΩ
R1036	J02245102	" " " " 1kΩ
R1037	J02245154	" " " " 150kΩ
R1038	J02245222	" " " " 2.2kΩ
R1039	J02245154	" " " " 150kΩ
R1040	J02245222	" " " " 2.2kΩ
R1041	J02245222	" " " " 2.2kΩ
R1042	J02245473	" " " " 47kΩ
R1043	J02245102	" " " " 1kΩ
R1044	J02245103	" " " " 10kΩ
R1045	J02245103	" " " " 10kΩ
R1046	J02245332	" " " " 3.3kΩ
R1048	J02245333	" " " " 33kΩ
R1049	J02245820	" " " " 82Ω
R1050(25kHz)	J02245103	" " " " 10kΩ
R1050(12.5kHz)		Not used
R1051	J02245333	Carbon film 1/4W SJ 33kΩ
R1052	J02245562	" " " " 5.6kΩ
R1053	J02245332	" " " " 3.3kΩ
R1054	J02245102	" " " " 1kΩ

(FTR-710A)

R1055	J02245333	Carbon film 1/4W SJ 33kΩ
R1056	J02245104	" " " " 100kΩ
R1057	J02245682	" " " " 6.8kΩ
R1058	J02245224	" " " " 220kΩ
R1059	J02245472	" " " " 4.7kΩ
R1060	J02245820	" " " " 82Ω
R1062	J02245332	" " " " 3.3kΩ
R1063	J02245332	" " " " 3.3kΩ
R1064	J02245472	" " " " 4.7kΩ
R1065	J02245391	" " " " 390Ω
R1066(25kHz)	J02245562	" " " " 5.6kΩ
R1066(12.5kHz)	J02245152	" " " " 1.5kΩ
R1067	J10246103	Carbon composition 1/4W GK 10kΩ
		POTENTIOMETER
VR1001	J51723103	H1051A013-10KB
		CAPACITOR
C1002	K05185820	Ceramic Disc 63WV RH 82pF (RD872-2RG-820J)
C1003	K02182059	" " " CH 0.5pF (RD870-1CG-0R5C)
C1006	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1007	K10179014	" " " 0.001μF (CK45B1H102MY)
C1008	K10179014	" " " 0.001μF (")
C1009	K10179014	" " " 0.001μF (")
C1012	K08179003	" " " AH 0.35pF (RAU-04-AK-0R 35C)
C1014	K08179003	" " " " 0.35pF (RAU-04-AK-0R 35C)
C1017	K10179015	" " " 0.01μF (CK45B1H103MY)
C1020	K08179003	" " " AH 0.35pF (RAU-04-AK-0R 35C)
C1023	K10179014	" " " 0.001μF (CK45B1H102MY)
C1024	K10179014	" " " 0.001μF (")
C1025	K10179014	" " " 0.001μF (")
C1026	K10179015	" " " 0.01μF (CK45B1H103MY)
C1027	K10179015	" " " 0.01μF (")
C1028	K10179015	" " " 0.01μF (")
C1029	K06185330	" " 63WV UJ 33pF (RD870-1UJ-330J)
C1031	K06185221	" " " " 220pF (RD873-2UJ-221J)
C1032	K06185151	" " " " 150pF (RD872-2UJ-151J)
C1034	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1035	K10179014	" " " 0.001μF (CK45B1H102MY)
C1037	K02185560	" " 63WV CH 10pF (RD872-2CG-560J)
C1038	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1039	K10179015	" " " 0.01μF (CK45B1H103MY)
C1041	K10179015	" " " 0.01μF (CK45B1H103MY)
C1042	K10179014	" " " 0.001μF (CK45B1H102MY)
C1043	K02182059	" " 63WV CH 0.5pF (RD871-1CG-0R5C)
C1045	K02185470	" " " CH 47pF (RD872-1CG-470J)
C1046	K10179014	" " " 0.001μF (CK45B1H102MY)
C1048	K10179014	" " " 0.001μF (")
C1049(25kHz)	K02182050	" " " CH5pF (RD870-1CG-5R0C)
C1049(12.5kHz)	K02185150	" " " " 15pF (RD870-1CG-150J)
C1050	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1051	K10179015	" " " 0.01μF (")
C1052	K10179014	" " " 0.001μF (CK45B1H102MY)
C1053	K06185330	" " 63WV UJ 33pF (RD870-1UJ-330J)
C1054	K06185221	" " " " 220pF (RD873-2UJ-221J)
C1055	K06185151	" " " " 150pF (RD872-2UJ-151J)
C1056	K02183100	" " " CH 10pF (RD870-1CG-100D)
C1057	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1058	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C1059	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1060	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
C1061	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1062	K10179014	" " " 0.001μF (")
C1063	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
C1064	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C1065	K10179015	" " " 0.01μF (")
C1066	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C1067	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C1068	K10179014	" " " 0.001μF (CK45B1H102MY)
C1069	K10179014	" " " 0.001μF (")
C1070	K10179014	" " " 0.001μF (")
C1071	K50177222	Mylar " 0.0022μF (50F2U222M)

(FTR-710A)

C1072	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C1107	K10179014	Ceramic Disc 50WV 0.001 (CK45B1H102MY)
C1073	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1108	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C1074	K50176473	" " 0.047μF (")	C1109	K40129007	Electrolytic 16WV 100 (16RE100)
C1075	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1110	K10179015	Ceramic Disc 50WV 0.01 (CK45B1H103MY)
C1076	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1111	K40129007	Electrolytic 16WV 100 (16RE100)
C1077	K50176473	" " 0.047μF (")	C1112	K10179015	Ceramic Disc 50WV 0.0 (CK45B1H103MY)
C1078	K50176473	" " 0.047μF (")	C1113	K10179015	" " " 0.0 (")
C1079	K10179014	Ceramic disc " 0.001μF (CK45B1H102MY)	C1114	K10179014	" " " 0.001 (CK45B1H102MY)
C1080	K50176473	Mylar " 0.047μF (MRS-473K)	C1115	K21170002	Feed through " 0.00 (ECKY1H-102WE)
C1081	K10186471	Ceramic Disc 63WV 470pF (RD870-1B-471K)	C1116	K21170002	" " " 0.001 (")
C1082	K50177103	Mylar 50WV 0.01μF (50F2U103M)	C1117	K21170002	" " " 0.001 (")
C1083	K50177222	" " 0.0022μF (50F2U222M)	C1118	K21170002	" " " 0.001 (")
C1084	K50177222	" " 0.0022μF (")	C1119	K21170002	" " " 0.001 (")
C1086	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C1120	K21170002	" " " 0.001 (")
C1087	K 0177332	Mylar 50WV 0.0033μF (50F2U332M)	C1121	K21170002	" " " 0.001 (")
C1088	K70120010	Tantalum 16WV 22μF (499D226X0016GS1)	C1122	K21170002	" " " 0.001 (")
C1089	K50177102	Mylar 50WV 0.001μF (50F2U102M)	C1123	K21170002	" " " 0.001 (")
C1090	K10186331	Ceramic Disc 63WV 330pF (RD870-1B-331K)	C1124	K21170002	" " " 0.001 (")
C1091	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1125	K21170002	" " " 0.001 (")
C1092	K70120002	" " 10μF (489D106X0016C1)	C1126	K21170002	" " " 0.001 (")
C1093	K40129006	Electrolytic " 470μF (16RE470)	C1127	K50177103	Mylar " 0.01 (50F2U103M)
C1094	K70167154	Tantalum 35WV 0.15μF (CS15E1VR15M)			
C1095	K50177472	Mylar 50WV 0.0047μF (50F2U472M)			TRIMMER CAPACITOR
C1096	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	TC1001	K91000029	ECV-1ZW 20x53T 20p
C1097	K02185101	Ceramic Disc 63WV CH 100pF (RD874-2CG-101J)	TC1002	K91000029	" " 20p
C1098	K10185821	" " " " 820pF (RD870-2B-821K)			TRANSFORMER
C1099(25kHz)	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	T1003	L0190011	113KN-6407N
C1099(12.5kHz)	K70140009	" " 2.2μF (489D225X0025B1)	T1004	L0190011	"
C1100	K70120002	" 16WV 10μF (489D106X0016C1)	T1005	L0021162	IFT-471K7-H5
C1101	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)	T1006	L0021162	"
C1102	K10179014	" " " 0.001μF (CK45B1H102MY)	T1007	L0020649	7MC-5896T
C1106	K40129006	Electrolytic 16WV 470μF (16RE470)			INDUCTOR
			L1001	L0190025	
			L1002	L0190025	
			L1004	L1020081A	
			L1005	L0190025	
			L1006	L0190025	
			L1007	L0190025	
			L1008	L0190025	

(FTR-710A)

L1009	L0190025		Q2012	G1090220	MLM2902	(IC)	
L1010	L1020082A		Q2013	G3208560B	2SB856B	(TR)	
L1011	L1020082A		Q2014	G3304580B	2SC458B	(TR)	
L1012	L1190017	FL5H-102K 1mH	Q2015	G1090221	MC3401P	(IC)	
L1013	L1020082A		Q2016	G3304600B	2SC460B	(TR)	
L1014	L1020081A		Q2017	G1090222	MB3576	(IC)	
L1015	L1190017	FL5H-102K 1mH					
L1016	L1190017	FL5H-102K 1mH					
L1017	L1190038	FL5H-271K 270μH			**DIODE**		
L1018	L2030060		D2001	G2090222	Varactor	MV306	
L1019	L1020080A		D2002	G2015550	Si	1S1555	
			D2003	G2015550	"	"	
		CRYSTAL SOCKET					
XS1001	P3090002	S2-101P-00			**CRYSTAL**		
			X2001	H0102010	HC-25/U	fT/6 (MHz)	
		CONNECTOR					
J1001	P0090059	3022-11A			**POSISTOR**		
J1002	P0090091	5049-07A	PTH2001	G9090019	PTH-2928		
J1003	P0090091	5049-07A					
J1004	P0090113	UG625B/U					
P1001	T9204326				**RESISTOR**		
			R2002	J02245472	Carbon film	1/4W SJ	4.7kΩ
			R2003	J02245103	" "	" "	10kΩ
		TP TERMINAL	R2004	J02245471	" "	" "	470Ω
TP1001	Q5000037	TP-H	R2005	J02245101	" "	" "	100Ω
TP1002	Q5000037	"	R2007	J02245103	" "	" "	10kΩ
TP1003	Q5000037	"	R2008	J02245473	" "	" "	47kΩ
			R2009	J02245101	" "	" "	100Ω
			R2010	J02245101	" "	" "	100Ω
		SHIELD CASE	R2011	J02245220	" "	" "	22Ω
	L9190015		R2012	J02245220	" "	" "	22Ω
			R2013	J10246680	" composition	1/4W GK	68Ω
		FERRITE BEADS	R2014	J02245333	" film	" SJ	33kΩ
	L9190001	Ri 3x3x1	R2015	J02245333	" "	" "	33kΩ
			R2016	J02245473	" "	" "	47kΩ
			R2017	J02245333	" "	" "	33kΩ
			R2018	J02245104	" "	" "	100kΩ

FTR-710A TRANSMITTER UNIT

Symbol No.	Part No.	Description	R2019	J02245470	" "	" "	47Ω
PB-2398B	F0002398B	Printed Circuit Board	R2020	J02245102	" "	" "	1kΩ
		P.C.B. with components (w/o Crystal)	R2021	J02245471	" "	" "	470Ω
			R2022	J02245102	" "	" "	1kΩ
			R2023	J02245682	" "	" "	6.8kΩ
	C023981A	68–74MHz w/o PA Board	R2024	J02245683	" "	" "	68kΩ
	C023981B	74–81MHz "	R2025	J02245331	" "	" "	330Ω
	C023981C	81–88MHz "	R2026	J02245222	" "	" "	2.2kΩ
	C023981D	68–74MHz w/PA Board	R2027	J02245222	" "	" "	2.2kΩ
	C023981E	74–81MHz "	R2028	J02245333	" "	" "	33kΩ
	C023981F	81–88MHz "	R2029	J02245100	" "	" "	10Ω
PB-2309	F0002309	Printed Circuit Board (Connector board)	R2030	J02245222	" "	" "	2.2kΩ
			R2031	J02245561	" "	" "	560Ω
			R2032	J00245822	" "	" "	8.2kΩ
			R2033	J02245100	" "	" "	10Ω
		IC, TRANSISTOR	R2034	J02245101	" "	" "	100Ω
Q2001	G3305350B	2SC535B (TR)	R2039	J02245101	" "	" "	100Ω
Q2002	G3305350B	" (TR)	R2040	J02245103	" "	" "	10kΩ
Q2003	G3305350B	" (TR)	R2041	J02245229	" "	" "	2.2Ω
Q2004	G3304600B	2SC460B (TR)	R2042	J02245100	" "	" "	10Ω
Q2005	G3304600B	" (TR)	R2045	J02245471	" "	" "	470Ω
Q2006	G3305350B	2SC535B (TR)	R2046	J02245224	" "	" "	220kΩ
Q2007	G3320530	2SC2053 (TR)	R2047	J02245824	" "	" "	820kΩ
Q2010	G3304600B	2SC460B (TR)	R2048	J02245333	" "	" "	33kΩ
Q2011	G3304600B	" (TR)	R2049	J02245824	" "	" "	820kΩ

(FTR-710A)

R2050	J02245334	Carbon film 1/4W SJ 330kΩ	C2013	K00185331	Ceramic Disc 63WV SL 330pF (RD874-2SL-331J)
R2051	J02245562	" " " " 5.6kΩ			
R2052	J02245273	" " " " 27kΩ	C2014	K10179014	" " 50WV 0.001μF (CK45B1H102MY)
R2053	J02245562	" " " " 5.6kΩ			
R2054	J02245153	" " " " 15kΩ	C2015	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
R2055	J02245224	" " " " 220kΩ			
R2056	J02245474	" " " " 470kΩ	C2016	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
R2057	J02245124	" " " " 120kΩ			
R2058	J02245155	" " " " 1.5MΩ	C2017	K00185331	" " 63WV SL 330pF (RD874-2SL-331J)
R2059	J02245223	" " " " 22kΩ			
R2060	J02245104	" " " " 100kΩ	C2018	K05185121	" " " RH 120pF (RD874-2RG-121J)
R2061	J02245473	" " " " 47kΩ			
R2062	J02245103	" " " " 10kΩ	C2019	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
R2063	J02245103	" " " " 10kΩ			
R2064	J02245153	" " " " 15kΩ	C2020	K10179015	" " " 0.01μF (")
R2065	J02245104	" " " " 100kΩ			
R2066	J02245102	" " " " 1kΩ	C2021	K05185151	" " 63WV RH 150pF (RD874-2RG-151J)
R2067	J02245103	" " " " 10kΩ			
R2068	J02245103	" " " " 10kΩ	C2022	K05183100	" " " " " 10pF (RD870-1RG-100D)
R2069	J02245102	" " " " 1kΩ			
R2070	J02245102	" " " " 1kΩ	C2023	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
R2071	J02245103	" " " " 10kΩ			
R2072	J02245153	" " " " 15kΩ	C2024	K02182020	" " 63WV CH 2pF (RD870-1CG-2R0C)
R2073	J02245102	" " " " 1kΩ			
R2074	J02245103	" " " " 10kΩ	C2025	K05185180	" " " RH 18pF (RD870-1RG-180J)
R2075	J10246103	" composition 1/4W GK 10kΩ	C2026	K02185121	" " " CH 120pF (RD874-2CG-121J)
R2076	J02245154	" film " SJ 150kΩ			
R2077	J02245683	" " " " 68kΩ	C2027	K05185180	" " " RH 18pF (RD870-1RH-180J)
R2078	J02245103	" " " " 10kΩ			
R2079	J02245472	" " " " 4.7kΩ	C2028	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
R2080	J02245471	" " " " 470Ω			
R2081	J02245332	" " " " 3.3kΩ	C2029	K10179015	" " " 0.01μF (")
R2082	J02245562	" " " " 5.6kΩ			
R2083	J02245391	" " " " 390Ω	C2030	K01182059	" " " CH 0.5pF (RD870-1CG-0R5C)
R2084	J10246330	" composition 1/4W GK 33Ω	C2031	K05185220	" " " RH 22pF (RD870-1RG-220J)
R2085	J02245472	" film " SJ 4.7kΩ			
			C2032	K05185390	" " " " 39pF (RD870-1RG-390J)
		POTENTIOMETER	C2033	K10179014	" " 50WV 0.001μF (CK45B1H102MY)
VR2001	J51723103	H1051A013-10KB 10kΩB			
VR2002	J51724103	PN822H103H 10kΩB	C2034	K10179015	" " " 0.01μF (CK45B1H103MY)
			C2035	K10179014	" " " 0.001μF (CK45B1H102MY)
		CAPACITOR			
C2001	K06185680	Ceramic Disc 63WV UJ 68pF (RD871-1UG-680J)	C2036	K10179014	" " " 0.001μF (")
C2003	K06185221	" " " " 220pF (RD873-2UG-221J)	C2037	K02182030	" " 63WV CH 3pF (RD870-1CG-3R0C)
C2004	K06185221	" " " " 220pF (")	C2039	K02185470	" " " " 47pF (RD871-2CG-470J)
C2006	K10179015	" " 50WV 0.01μF (CK45B1H103MY)	C2040	K10179014	" " 50WV 0.001μF (CK45B1H102MY)
C2007	K02185101	" " 63WV CH 100pF (RD874-2CG-101J)	C2041	K10179014	" " " 0.001μF (")
C2008	K10179015	" " 50WV 0.01μF (CK45B1H103MY)	C2042	K10179014	" " " 0.001μF (")
C2009	K05189007	" " 63WV RH 68pF (RD872-2RG-680J)	C2043	K10179014	" " " 0.001μF (")
C2010	K10179015	" " 50WV 0.01μF (CK45B1H103MY)	C2044	K02185180	" " 63WV CH 18pF (RD870-1CG-180J)
C2012	K10179014	" " " 0.001μF (CK45B1H102MY)	C2051	K50177223	Mylar 50WV 0.022μF (50F2U223M)

C2052	K05177102	Mylar 50WV 0.001μF (50F2U102M)	C2087	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2053	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2092	K10179015	" " " 0.01μF (CK45B1H103MY)
C2054	K70140001	" 16WV 4.7μF (489D475X0016B1)	C2093	K10179014	" " " 0.001μF (CK45B1H102MY)
C2055	K70140007	" 25WV 1μF (489D105X0025A1)	C2094	K10179015	" " " 0.01μF (CK45B1H103MY)
C2056	K50177332	Mylar 50WV 0.0033μF (50F2U332M)	C2095	K40129007	Electrolytic 16WV 100μF (16RE100)
C2057	K50177102	" " 0.001μF (50F2U102M)	C2096	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C2058	K02185390	Ceramic Disc 63WV CH 39pF (RD871-1CG-390J)	C2097	K40129006	Electrolytic 16WV 470μF (16RE470)
C2059	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2098	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2060	K50177223	Mylar 50WV 0.022μF (50F2U223M)	C2100	K02185150	" " 63WV CH 15pF (RD870-1CG-150J)
C2061	K70120002	Tantalom 16WV 10μF (489D106X0016C1)	C2101	K21170002	Feed through 50WV 0.001μF (ECKY1H-102WE)
C2062	K40129007	Electrolytic " 100μF (16RE100)	C2102	K21170002	" " " 0.001μF (")
C2063	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)	C2103	K21170002	" " " 0.001μF (")
C2064	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2104	K21170002	" " " 0.001μF (")
C2065	K70167474	" 35WV 0.47μF (CS15E1VR47)	C2105	K21170002	" " " 0.001μF (")
C2066	K70120002	" 16WV 10μF (489D106X0016C1)	C2106	K21170002	" " " 0.001μF (")
C2067	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)	C2107	K02185560	Ceramic Disc 63WV CH 56pF (RD872-2CG-560J)
C2068	K07185151	" " 63WV PH 150pF (RD874-2PG-151J)	C2108	K02185560	" " " " 56pF (")
C2069	K10179015	" " 50WV 0.01μF (CK45B1H103MY)	C2115	K21170002	Feed through 50WV 0.001μF (ECKY1H-102WE)
C2070	K10179014	" " " 0.001μF (CK45B1H102MY)	C2116	K21170002	" " " 0.001μF (")
C2071	K10179014	" " " 0.001μF (")			
C2072	K10179014	" " " 0.001μF (")			TRIMMER CAPACITOR
C2073	K50177103	Mylar " 0.01μF (50F2U103M)	TC2001	K91000029	ECV-1ZW-20x53T 20pF
C2074	K10179014	Ceramic Disc " 0.001μF (CK45B1H102MY)	TC2002	K91000029	" -20x53T 20pF
C2075	K02185121	" " 63WV CH 120pF (RD874-2CG-121J)	TC2003	K91000029	" -20x53T 20pF
C2076	K10179014	" " 50WV 0.001μF (CK45B1H102MY)	TC2004	K91000029	" -20x53T 20pF
C2077	K10179014	" " " 0.001μF (")			
C2080	K70120009	Tantalum 16WV 33μF (489D336X0016E1)			TRANSFORMER
C2081	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)	T2003	L0020820	199CN-11451N
C2082	K50177103	Mylar " 0.01μF (50F2U103M)	T2004	L0020652	113CN-6396Z
C2083	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	T2005	L0020820	119CN-11451N
C2084	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)	T2006	L0190011	113KN-6407N
C2086	K70120009	Tantalum 16WV 33μF (489D336X0016E1)	T2007	L0190011	"
			T2008	L0020653	113SN-6397Y
			T2009	L0020653	"
					INDUCTOR
			L2001	L1190017	FL5H-102K 1mH
			L2002	L1020081A	
			L2003	L1020081A	
			L2004	L1020081A	
			L2005	L0020716	MC-108
			L2006	L1020081A	
			L2007	L0020716	MC-108

L2013	L0021251	
L2014	L0020716	MC-108
L2015	L1020079A	
L2019	L1020080A	
L2020	L1020080A	
L2021	L1190041	181LY-104K 100mH
L2022	L2030060	
L2023	L1020080A	
L2024	L1190017	FL5H-102K 1mH
		CRYSTAL SOCKET
XS2001	P3090002	S2-101P-00
		CONNECTOR
J2001	P0090092	3022-08A
J2002	P1090254	BNC-LR
J2003	P0090091	5049-07A
J2004	P1090016	SQ3056
J2005	P0090091	5049-07A
P2001	T9204332A	
	T9204496	
		TP TERMINAL
TP2001	Q5000037	TP-H
TP2002	Q5000037	"
TP2003	Q5000037	"
TP2004	Q5000037	"
TP2006	Q5000037	"
TP2007	Q5000037	"
TP2008	Q5000038	SMF
		PIN PLUG
P2004	P0090009	SQ4152
		FERRITE BEADS
	L9190001	Ri 3x3x1

FTR-710A BAND TABLE

Symbol No.	Part No.	Description
68MHz–74MHz BAND		
C1001	K05185180	Ceramic Disc 63WV RH 18pF (RD870-1RG-180J)
C1004	K05189007	" " " " 68pF (RD872-2RG-680J)
C1005	K05185120	" " " " 12pF (RD870-1RG-120J)
C1010	K05185180	" " " " 18pF (RD870-1RG-180J)
C1011	K05185390	" " " " 39pF (RD870-1RG-390J)
C1013	K05185180	" " " " 18pF (RD870-1RG-180J)
C1015	K05185180	" " " " 18pF (")
C1016	K05189007	" " " " 68pF (RD872-2RG-680J)
C1018	K05185820	Ceramic Disc 63WV RH 82pF (RD872-2RG-820J)
C1019	K05185330	" " " " 33pF (RD870-1RG-330J)
C1021	K05185330	" " " " 33pF (")
C1022	K05185820	" " " " 82pF (RD872-2RG-820J)
C1040	K05185270	" " " " 27pF (RD870-1RG-270J)
C1044	K05185270	" " " " 27pF (")
C2038	K02179034	" " " CH 22pF (2222-638-40229)
C2099	K02179050	" " " " 39pF (2222-637-10399)
74MHz–81MHz BAND		
C1001	K05185150	Ceramic Disc 63WV RH 15pF (RD870-1RG-150J)
C1004	K05185560	" " " " 56pF (RD871-1RG-560J)
C1005	K05183070	" " " " 7pF (RD870-1RG-070D)
C1010	K05185150	" " " " 15pF (RD870-1RG-150J)
C1011	K05185330	" " " " 33pF (RD871-1RG-330J)
C1013	K05185150	" " " " 15pF (RD870-1RG-150J)
C1015	K05185150	" " " " 15pF (")
C1016	K05185560	" " " " 56pF (RD871-1RG-560J)
C1018	K05185680	" " " " 68pF (RD872-1RG-680J)
C1019	K05185270	" " " " 27pF (RD870-1RG-270J)
C1021	K05185270	" " " " 27pF (")
C1022	K05185680	" " " " 68pF (RD872-1RG-680J)
C1040	K05185220	" " " " 22pF (RD870-1RG-220J)
C1044	K05185220	" " " " 22pF (")
C2038	K02183100	" " " CH 10pF (RD870-1CG-100D)
C2099	K02175150	" " " " 15pF (DD104CH150J50V)
81MHz–88MHz BAND		
C1001	K05185120	Ceramic Disc 63WV RH 12pF (RD870-1RG-120J)
C1004	K05185470	" " " " 47pF (RD871-1RG-470J)
C1005	K05182040	" " " " 4pF (RD870-1RG-040C)
C1010	K05185120	" " " " 12pF (RD870-1RG-120J)
C1011	K05185220	" " " " 22pF (RD870-1RG-220J)

(FTR-710A)

C1013	K05185120	Ceramic Disc 63WV RH 12pF (RD870-1RG-120J)
C1015	K05185120	" " " " 12pF (")
C1016	K05185470	" " " " 47pF (RD871-1RG-470J)
C1018	K05185560	" " " " 56pF (RD871-1RG-560J)
C1019	K05185180	" " " " 18pF (RD870-1RG-180J)
C1021	K05185180	" " " " 18pF (")
C1022	K05185560	" " " " 56pF (RD871-1RG-560J)
C1040	K05185150	" " " " 15pF (RD870-1RG-150J)
C1044	K05185150	" " " " 15pF (")
C2038	K02185270	" " " CH 27pF (RD871-1CG-270J)
C2099	K02189008	" " " " 22pF (RD871-2CG-220J)

PA BOARD

Symbol No.	Part No.	Description
PB-2399B	F0002399B	Printed Circuit Board
	C023990A	PCB with Components (68–74MHz)
	C023990B	" " " (74–81MHz)
	C023990C	" " " (81–88MHz)
		TRANSISTOR
Q2008	G3307300	2SC730
Q2009	G3090009	MRF212
		RESISTOR
R2035	J10276270	Carbon composition 1/2W GK 27Ω
R2036		L2026
R2037	J10246101	Carbon composition 1/4W GK 100Ω
R2038		L2028
R2043	J02245220	Carbon film 1/4W SJ 22Ω
R2044	J02245471	" " " " 470Ω
		CAPACITOR
C2045 (68–74MHz)	K02185470	Ceramic Disc 63WV CH 47pF (RD872-2CG-470J)
C2045 (74–81MHz)	K02185390	" " " " 39pF (RD871-1CG-390J)
C2045 (81–88MHz)	K02185270	" " " " 27pF (RD871-CG-270J)
C2046	K02185560	" " " " 56pF (RD872-2CG-560J)
C2047	K02185560	" " " " 56pF (")
C2048	K02185560	" " " " 56pF (RD872-2CG-560J)
C2049	K02185560	Ceramic Disc 63WV CH 56pF (RD872-2CG-560J)
C2050	K02185560	" " " " 56pF (")
C2085	K10179014	" " 50WV 0.001μF (CK45B1H102MY)
C2088	K10179014	" " " 0.001μF (")
C2089	K02185150	" " 63WV CH 15pF (RD870-1CG-150J)
C2090	K02185560	" " " " 56pF (RD872-2CG-560J)
C2091	K01182059	" " " " 0.5pF (RD870-1CG-0R5C)
C2107	K02185560	" " " " 56pF (RD872-2CG-560J)
C2109	K40129004	Electrolytic 16WV 10μF (16RE10)
C2110	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C2111	K40129004	Electrolytic 16WV 10μF (16RE10)
C2112	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C2113 (68–74MHz)	K02185470	" " 63WV CH 47pF (RD871-1CG-470J)
C2113 (74–81MHz)	K02185390	" " " " 39pF (RD871-1CG-390J)
C2113 (81–88MHz)	K02185150	" " " " 15pF (RD870-1CG-150J)
C2114 (68–74MHz)	K02185270	" " " " 27pF (RD871-1CG-270J)
C2114 (74–81MHz)	K02185150	" " " " 15pF (RD870-1CG-150J)
C2114 (81–88MHz)	K02182050	" " " " 5pF (RD870-1CG-050C)
		TRIMMER CAPACITOR
TC2005	K91000022	ECV-1ZW-40x40 40pF
TC2006	K91000020	" -20x40 20pF
TC2007	K91000058	2222-808-61809 80pF
TC2008	K91000094	2222-808-61659 65pF
		INDUCTOR
L2025	L0021252	
L2026	L1020003	
L2027	L0020657	
L2028	L1020705	
L2029	L0020658	
L2030	L0020659	
L2031	L0020660	
L2032	L0021253	
L2033	L0021253	
L2034	L0021253	
L2035	L0021254	
		TP TERMINAL
	Q5000037	TP-H
		FERRITE BEADS
	L9190001	Ri 3x3x1

(FTR-710A)

FTR-2410A RECEIVER UNIT

Symbol No.	Part No.	Description
PB-2306	F0002306	Printed Circuit Board
		PCB with Components (w/o crystal)
	C023060A	134–146MHz 25kHz
	C023060C	144–160MHz "
	C023060E	160–174MHz "
	C023060B	134–146MHz 12.5kHz
	C023060D	144–160MHz "
	C023060F	160–174MHz "
PB-2309	F0002309	Printed Circuit Board (Connector board)
		IC, FET, TRANSISTOR
Q1001	G4800600	3SK60 (FET)
Q1002	G4800600	" (FET)
Q1003	G3305350B	2SC535B (TR)
Q1004	G3319060	2SC1906 (TR)
Q1005	G3319060	" (TR)
Q1006	G3305350B	2SC535B (TR)
Q1007	G3305350B	" (TR)
Q1008	G3305350B	" (TR)
Q1009	G3304600B	2SC460B (TR)
Q1010	G3304600B	" (TR)
Q1011	G1090072	μPC577H (IC)
Q1012	G1090218	AN315 (IC)
Q1013	G3304600C	2SC460C (TR)
Q1014	G3304600B	2SC460B (TR)
Q1015	G3304600B	" (TR)
Q1016	G3304600B	" (TR)
Q1017	G3304600B	" (TR)
Q1018	G1090222	MB3756 (IC)
		DIODE
D1001	G2015550	Si 1S1555
D1002	G2015550	" "
D1003	G2015550	" "
D1004	G2015550	" "
D1005	G2015550	" "
D1006	G2015550	" "
		CRYSTAL
X1001	H0102029	HC-25/U (fR-21.4)/3 (MHz)
X1002	H0102050	HC-18/U 20.945MHz
		CRYSTAL FILTER
XF1001	H1101990	21J2B2(1/2) PAIR (25kHz)
XF1002	H1101990	21J2B2(1/2)
XF1001	H1102034	21J2F2(1/2) PAIR (12.5kHz)
XF1002	H1102034	21J2F2(1/2)
		CERAMIC FILTER
CF1001	H3900030	LF-B15 (25kHz)
CF1002	H3900030	LF-B15 (25kHz)
CF1001	H3900140	LF-B8A (12.5kHz)
CF1002	H3900140	LF-B8A (12.5kHz)

		CERAMIC DISCRIMINATOR
CD1001	H7900010	455D
		POSISTOR
PTH1001	G9090019	PTH-2928
		RESISTOR
R1001	J02245683	Carbon film 1/4W SJ 68kΩ
R1002	J02245273	" " " " 27kΩ
R1003	J02245124	" " " " 120kΩ
R1004	J02245271	" " " " 270Ω
R1005	J02245273	" " " " 27kΩ
R1006	J02245224	" " " " 220kΩ
R1007	J02245473	" " " " 47kΩ
R1008	J02245470	" " " " 47Ω
R1009	J02245471	" " " " 470Ω
R1010	J02245101	" " " " 100Ω
R1011	J02245561	" " " " 560Ω
R1012	J02245103	" " " " 10kΩ
R1013	J02245472	" " " " 4.7kΩ
R1014	J02245471	" " " " 470Ω
R1015	J02245222	" " " " 2.2kΩ
R1016	J02245223	" " " " 22kΩ
R1017	J02245471	" " " " 470Ω
R1018	J02245222	" " " " 2.2kΩ
R1019	J02245223	" " " " 22kΩ
R1020	J02245101	" " " " 100Ω
R1021(25kHz)	J10246122	Carbon composition 1/4W GK 1.2kΩ
R1021(12.5kHz)	J10246821	" " " " 820Ω
R1022	J02245472	Carbon film 1/4W SJ 4.7kΩ
R1023	J02245223	" " " " 22kΩ
R1024	J02245102	" " " " 1kΩ
R1025	J02245102	" " " " 1kΩ
R1026	J02245223	" " " " 22kΩ
R1027	J02245333	" " " " 33kΩ
R1028	J02245102	" " " " 1kΩ
R1029	J02245101	" " " " 100Ω
R1030	J02245472	" " " " 4.7kΩ
R1031	J02245223	" " " " 22kΩ
R1032	J02245102	" " " " 1kΩ
R1033	J02245102	" " " " 1kΩ
R1034	J02245101	" " " " 100Ω
R1035	J02245222	" " " " 2.2kΩ
R1036	J02245102	" " " " 1kΩ
R1037	J02245154	" " " " 150kΩ
R1038	J02245222	" " " " 2.2kΩ
R1039	J02245154	" " " " 150kΩ
R1040	J02245222	" " " " 2.2kΩ
R1041	J02245222	" " " " 2.2kΩ
R1042	J02245473	" " " " 47kΩ
R1043	J02245102	" " " " 1kΩ
R1044	J02245103	" " " " 10kΩ
R1045	J02245103	" " " " 10kΩ
R1046	J02245332	" " " " 3.3kΩ
R1048	J02245333	" " " " 33kΩ
R1049	J02245820	" " " " 82Ω
R1050(25kHz)	J02245103	" " " " 10kΩ
R1050(12.5kHz)	–	Not used
R1051	J02245333	Carbon film 1/4W SJ 33kΩ
R1052	J02245562	" " " " 5.6kΩ
R1053	J02245332	" " " " 3.3kΩ
R1054	J02245102	" " " " 1kΩ

(FTR-2410A)

R1055	J02245333	Carbon film 1/4W SJ 33kΩ		C1031	K06189002	Ceramic Disc 63WV UJ 82pF (RD871-2UJ-820J63V)
R1056	J02245104	" " " " 100kΩ		C1032	K06189003	" " " " 56pF (RD871-2UJ-560J63V)
R1057	J02245682	" " " " 6.8kΩ		C1033	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
R1058	J02245224	" " " " 220kΩ		C1034	K10179015	" " " 0.01μF (")
R1059	J02245472	" " " " 4.7kΩ		C1035	K10179014	" " " 0.001μF (CK45B1H102MY)
R1060	J02245820	" " " " 82Ω		C1037	K10179014	" " " 0.001μF (")
R1062	J02245332	" " " " 3.3kΩ		C1038	K10179014	" " " 0.001μF (")
R1063	J02245332	" " " " 3.3kΩ		C1039	K10179015	" " " 0.01μF (CK45B1H103MY)
R1064	J02245472	" " " " 4.7kΩ		C1040	K05183080	" " " RH 8pF (RD870-1RG-080D63V)
R1065	J02245391	" " " " 390Ω		C1041	K10179015	" " " 0.01μF (CK45B1H103MY)
R1066(25kHz)	J02245562	" " " " 5.6kΩ		C1042	K10179014	" " " 0.001μF (CK45B1H102MY)
R1066(12.5kHz)	J02245272	" " " " 2.7kΩ		C1043	K08182010	" " 63WV AH 1pF (RD870-1AG-010C63V)
R1067	J10246103	Carbon composition 1/4W GK 10kΩ		C1044	K05185120	" " " RH 12pF (RD870-1RG-120J63V)
				C1045	K05185330	" " " " 33pF (RD871-2RG-330J63V)
		POTENTIOMETER		C1046	K10179014	" " 50WV 0.001μF (CK45B1H102MY)
VR1001	J51723103	H1051A013-10KB 10kΩB		C1048	K10179014	" " " 0.001μF (")
				C1049(25kHz)	K02183070	" " 63WV CH 7pF (RD870-1CG-070D63V)
		CAPACITOR		C1049(12.5kHz)	K02185120	" " " " 12pF (RD870-1CG-120J63V)
C1003	K01182059	Ceramic Disc 63WV AH 0.5pF (RD870-1CG-0R5C63V)		C1050	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1006	K10179014	" " 50WV 0.001μF (CK45B1H102MY)		C1051	K10179015	" " " 0.01μF (")
C1007	K10179014	" " " 0.001μF (")		C1052	K10179014	" " " 0.001μF (CK45B1H102MY)
C1008	K10179014	" " " 0.001μF (")		C1053	K06185330	" " 63WV UJ 33pF (RD870-1UJ-330J63V)
C1009	K10179014	" " " 0.001μF (")		C1054	K06189007	" " " " 220pF (RD873-2UJ-221J63V)
C1012	K08179003	" " " AH 0.35pF (RAU-04-AK-0R 35C)		C1055	K06189004	" " " " 100pF (RD871-2UJ-101J63V)
C1013	K05183060	" " 63WV RH 8pF (RD870-1N270-060D63V)		C1056	K02183100	" " " CH 10pF (RD870-1CG-100D63V)
C1014	K08179003	" " 50WV AH 0.35pF (RAU-04-AK-0R 35C)		C1057	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C1017	K10179015	" " " 0.01μF (CK45B1H103MY)		C1058	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C1018	K05182050	" " 63WV RH 5pF (RD870-1RG-050C63V)		C1059	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1019	K50185330	" " " " 33pF (RD871-2RG-330J63V)		C1060	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
C1020	K08179003	" " 50WV AH 0.35pF (RAU-04-AK-0R 35C)		C1061	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1021	K05189008	" " " RH 15pF (RD870-2RG-150J63V)		C1062	K10179014	" " " 0.001μF (")
C1022	K05189004	" " 63WV " 47pF (RD871-2N220-470J63V)		C1063	K70120001	Tantalum 16WV 4.7μF
C1023	K10179014	" " 50WV 0.001μF (CK45B1H102MY)				
C1024	K10179014	" " " 0.001μF (")				
C1025	K10179014	" " " 0.001μF (")				
C1026	K10179015	" " " 0.01μF (CK45B1H103MY)				
C1027	K10179015	" " " 0.01μF (")				
C1028	K10179015	" " " 0.01μF (")				
C1029	K06185150	" " 63WV UJ 15pF (RD870-1N750-150J63V)				

C1064	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)	C1097	K02185101	Ceramic Disc 63WV CH 100pF (RD874-2CG-101J63V)
C1065	K10179015	〃 〃 〃 0.01μF (〃)	C1098	K10185821	〃 〃 〃 〃 820pF (RD870-2B821K63V)
C1066	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C1099(25kHz)	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C1067	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)	C1099(12.5kHz)	K70140009	〃 〃 2.2μF (489D225X0025B1)
C1068	K10179014	〃 〃 〃 0.001μF (CK45B1H102MY)	C1100	K70120002	〃 16WV 10μF (489D106X0016C1)
C1069	K10179014	〃 〃 〃 0.001μF (〃)	C1101	K02189050	Ceramic Disc 63WV CH 5pF (RD870-1NPO-050C63V)
C1070	K10179014	〃 〃 〃 0.001μF (〃)	C1102	K10179014	〃 〃 50WV 0.001μF (CK45B1H102MY)
C1071	K50177222	Mylar 〃 0.0022μF (50F2U222M)	C1106	K40129006	Electrolytic 16WV 470μF (16RE470)
C1072	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C1107	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C1073	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1108	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C1074	K50176473	〃 〃 0.047μF (〃)	C1109	K40129007	Electrolytic 16WV 100μF (16RE100)
C1075	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1110	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C1076	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1111	K40129007	Electrolytic 16WV 100μF (16RE100)
C1077	K50176473	〃 〃 0.047μF (〃)	C1112	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
C1078	K50176473	〃 〃 0.047μF (〃)	C1113	K10179015	〃 〃 〃 0.01μF (〃)
C1079	K10179014	Ceramic Disc 〃 0.001μF (CK45B1H102MY)	C1114	K10179014	〃 〃 〃 0.001μF (CK45B1H102MY)
C1080	K50176473	Mylar 〃 0.047μF (MRS-473K)	C1115	K21170002	Feed through 〃 0.001μF (ECKY1H-102WE)
C1081	K10186471	Ceramic Disc 63WV 470pF (RD870-1B-471K63V)	C1116	K21170002	〃 〃 〃 0.001μF (〃)
C1082	K50177103	Mylar 50WV 0.01μF (50F2U103M)	C1117	K21170002	〃 〃 〃 0.001μF (〃)
C1083	K50177222	〃 〃 0.0022μF (50F2U222M)	C1118	K21170002	〃 〃 〃 0.001μF (〃)
C1084	K50177222	〃 〃 0.0022μF (〃)	C1119	K21170002	〃 〃 〃 0.001μF (〃)
C1086	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C1120	K21170002	〃 〃 〃 0.001μF (〃)
C1087	K50177332	Mylar 50WV 0.0033μF (50F2U332M)	C1121	K21170002	〃 〃 〃 0.001μF (〃)
C1088	K70120010	Tantalum 16WV 22μF (499D226X0016GS1)	C1122	K21170002	〃 〃 〃 0.001μF (〃)
C1089	K50177102	Mylar 50WV 0.001μF (50F2U102M)	C1123	K21170002	〃 〃 〃 0.001μF (〃)
C1090	K10186331	Ceramic Disc 63WV 330pF (RD870-1B-331K63V)	C1124	K21170002	〃 〃 〃 0.001μF (〃)
C1091	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1125	K21170002	〃 〃 〃 0.001μF (〃)
C1092	K70120002	〃 〃 10μF (489D106X0016C1)	C1126	K21170002	〃 〃 〃 0.001μF (〃)
C1093	K40129006	Electrolytic 〃 470μF (16RE470)	C1127	K50177103	Mylar 〃 0.01μF (50F2U103M)
C1094	K70167154	Tantalum 35WV 0.15μF (CS15E1VR15M)			
C1095	K50177472	Mylar 50WV 0.0047μF (50F2U472M)			TRIMMER CAPACITOR
			TC1001	K91000029	ECV-1ZW 20x53T 20pF
C1096	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	TC1002	K91000029	〃 〃 20pF

(FTR-2410A)

		TRANSFORMER		C023061C	160–174MHz
T1001	L0020346	113CN-3393Y	PB-2309	F0002309	Printed Circuit Board
T1002	L0190013	113KN-6409X			(Connector board)
T1003	L0020343	113SN-3392Y			
T1004	L0020343	〃			
T1005	L0020717A	199CC-12843A8W			**IC, TRANSISTOR**
T1006	L0020647	199CC-11114N	Q2001	G3305350B	2SC535B (TR)
T1007	L0020649	7MC-5896T	Q2002	G3305350B	〃 (TR)
			Q2003	G3305350B	〃 (TR)
			Q2004	G3319060	2SC1906 (TR)
		INDUCTOR	Q2005	G3319060	〃 (TR)
L1001	L0020706		Q2006	G3319060	〃 (TR)
L1002	L0020706		Q2008	G3320530	2SC2053 (TR)
L1004	L1020081A		Q2009	G1090362	M57719 (IC)
L1005	L0020706		Q2010	G3304600B	2SC460B (TR)
L1006	L0020706		Q2011	G3304600B	〃 (TR)
L1007	L0020706		Q2012	G1090220	MLM2902 (IC)
L1008	L0020706		Q2013	G3208560B	2SB856B (TR)
L1009	L0020706		Q2014	G3304580B	2SC458B (TR)
L1010	L1020082A		Q2015	G1090221	MC3401P (IC)
L1011	L1020082A		Q2016	G3304600B	2SC460B (TR)
L1012	L1190017	FL5H-102K 1mH	Q2017	G1090222	MB3576 (IC)
L1013	L1020082A				
L1014	L1020081A				
L1015	L1190017	FL5H-102K 1mH			**DIODE**
L1016	L1190017	〃 1mH	D2001	G2090084	Varactor MV201
L1017	L1190038	FL5H-271K 270μH	D2002	G2015550	Si 1S1555
L1018	L2030060		D2003	G2015550	〃 〃
L1019	L1020080A				
					CRYSTAL
		CRYSTAL SOCKET	X2001	H0102030	HC-25/U fT/6 (MHz)
XS1001	P3090002	S2-101P-00			
					POSISTOR
		CONNECTOR	PTH2001	G9090019	PTH-2928
J1001	P0090059	3022-11A			
J1002	P0090091	5049-07A			
J1003	P0090091	〃			**RESISTOR**
J1004	P1090050	UG-625B/U	R2001	J02245561	Carbon film 1/4W SJ 560Ω
			R2002	J02245472	〃 〃 〃 〃 4.7kΩ
			R2003	J02245103	〃 〃 〃 〃 10kΩ
		TP TERMINAL	R2004	J02245471	〃 〃 〃 〃 470Ω
TP1001	Q5000037	TP-H	R2005	J02245101	〃 〃 〃 〃 100Ω
TP1002	Q5000037	〃	R2006	J02245102	〃 〃 〃 〃 1kΩ
			R2007	J02245103	〃 〃 〃 〃 10kΩ
			R2008	J02245473	〃 〃 〃 〃 47kΩ
		SHIELD CASE	R2009	J02245101	〃 〃 〃 〃 100Ω
	L9190015		R2010	J02245101	〃 〃 〃 〃 100Ω
			R2011	J02245220	〃 〃 〃 〃 22Ω
			R2012	J02245220	〃 〃 〃 〃 22Ω
		FERRITE BEADS	R2013	J10246121	〃 composition
	L9190001	Ri 3x3x1			1/4W GK 120Ω
			R2014	J02245333	〃 film 〃 SJ 33kΩ
			R2015	J02245333	〃 〃 〃 〃 33kΩ
			R2016	J02245473	〃 〃 〃 〃 47kΩ
			R2017	J02245333	〃 〃 〃 〃 33kΩ
			R2018	J02245104	〃 〃 〃 〃 100kΩ
			R2019	J02245470	〃 〃 〃 〃 47Ω
			R2020	J02245102	〃 〃 〃 〃 1kΩ
			R2021	J02245471	〃 〃 〃 〃 470Ω
			R2022	J02245102	〃 〃 〃 〃 1kΩ
			R2023	J02245682	〃 〃 〃 〃 6.8kΩ
			R2024	J02245683	〃 〃 〃 〃 68kΩ
			R2025	J02245331	〃 〃 〃 〃 330Ω

FTR-2410A TRANSMITTER UNIT

Symbol No.	Part No.	Description
PB-2306	F0002306	Printed Circuit Board
		PCB with Components
		(w/o crystal)
	C023061A	134–146MHz
	C023061B	144–160MHz

(FTR-2410A)

R2026	J02245222	Carbon film 1/4W SJ 2.2kΩ	C2003	K06189010	Ceramic Disc 63WV UJ 120pF (RD872-2UJ-121J63V)
R2027	J02245222	〃 〃 〃 〃 2.2kΩ			
R2028	J02245333	〃 〃 〃 〃 33kΩ	C2004	K06189004	〃 〃 〃 〃 100pF (RD871-2UJ-101J63V)
R2029	J02245100	〃 〃 〃 〃 10Ω			
R2030	J02245222	〃 〃 〃 〃 2.2kΩ	C2005	K10179015	〃 〃 50WV 0.01μF (CK45B1H103MY)
R2031	J02245103	〃 〃 〃 〃 10kΩ			
R2032	J00245104	〃 〃 〃 〃 100kΩ	C2006	K10179015	〃 〃 〃 0.01μF (〃)
R2033	J02245100	〃 〃 〃 〃 10Ω			
R2034	J02245101	〃 〃 〃 〃 100Ω	C2007	K02185101	〃 〃 63WV CH 100pF (RD874-2CG-101J63V)
R2039	J02245101	〃 〃 〃 〃 100Ω			
R2040	J02245103	〃 〃 〃 〃 10kΩ	C2008	K10179015	〃 〃 50WV 0.01μF (CK45B1H103MY)
R2041	J02245229	〃 〃 〃 〃 2.2Ω			
R2042	J02245100	〃 〃 〃 〃 10Ω	C2009	K05185330	〃 〃 63WV RH 33pF (RD871-2RG-330J63V)
R2045	J02245471	〃 〃 〃 〃 470Ω			
R2046	J02245224	〃 〃 〃 〃 220kΩ	C2010	K10179015	〃 〃 50WV 0.01μF (CK45B1H103MY)
R2047	J02245824	〃 〃 〃 〃 820kΩ			
R2048	J02245333	〃 〃 〃 〃 33kΩ	C2012	K10179014	〃 〃 〃 0.001μF (CK45B1H102MY)
R2049	J02245824	〃 〃 〃 〃 820kΩ			
R2050	J02245334	〃 〃 〃 〃 330kΩ	C2013	K02185121	〃 〃 63WV CH 120pF (RD874-2CG-121J63V)
R2051	J02245562	〃 〃 〃 〃 5.6kΩ			
R2052	J02245273	〃 〃 〃 〃 27kΩ	C2014	K10179014	〃 〃 50WV 0.001μF (CK45B1H102MY)
R2053	J02245562	〃 〃 〃 〃 5.6kΩ			
R2054	J02245153	〃 〃 〃 〃 15kΩ	C2015	K70120001	Tantalum 16WV 4.7μF (489D475X0016A1)
R2055	J02245224	〃 〃 〃 〃 220kΩ			
R2056	J02245474	〃 〃 〃 〃 470kΩ	C2016	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)
R2057	J02245124	〃 〃 〃 〃 120kΩ			
R2058	J02245155	〃 〃 〃 〃 1.5MΩ	C2017	K02185121	〃 〃 63WV CH 120pF (RD874-2CG-121J63V)
R2059	J02245223	〃 〃 〃 〃 22kΩ			
R2060	J02245104	〃 〃 〃 〃 100kΩ	C2019	K10179015	〃 〃 50WV 0.01μF (CK45B1H103MY)
R2061	J02245473	〃 〃 〃 〃 47kΩ			
R2062	J02245103	〃 〃 〃 〃 10kΩ	C2020	K10179015	〃 〃 〃 0.01μF (〃)
R2063	J02245103	〃 〃 〃 〃 10kΩ			
R2064	J02245153	〃 〃 〃 〃 15kΩ	C2023	K10179015	〃 〃 〃 0.01μF (〃)
R2065	J02245104	〃 〃 〃 〃 100kΩ			
R2066	J02245102	〃 〃 〃 〃 1kΩ	C2026	K05189003	〃 〃 63WV RH 39pF (RD871-2RG-390J63V)
R2067	J02245103	〃 〃 〃 〃 10kΩ			
R2068	J02245103	〃 〃 〃 〃 10kΩ	C2028	K10179015	〃 〃 50WV 0.01μF (CK45B1H103MY)
R2069	J02245102	〃 〃 〃 〃 1kΩ			
R2070	J02245102	〃 〃 〃 〃 1kΩ	C2029	K10179015	〃 〃 〃 0.01μF (〃)
R2071	J02245103	〃 〃 〃 〃 10kΩ			
R2072	J02245153	〃 〃 〃 〃 15kΩ	C2030	K01182059	〃 〃 63WV CH 0.5pF (RD870-1CG-0R5C63V)
R2073	J02245102	〃 〃 〃 〃 1kΩ			
R2074	J02245103	〃 〃 〃 〃 10kΩ	C2033	K10179014	〃 〃 50WV 0.001μF (CK45B1H102MY)
R2075	J00245103	〃 〃 〃 〃 10kΩ			
R2076	J02245154	〃 〃 〃 〃 150kΩ	C2034	K10179015	〃 〃 〃 0.01μF (CK45B1H103MY)
R2077	J02245683	〃 〃 〃 〃 68kΩ			
R2078	J02245103	〃 〃 〃 〃 10kΩ	C2035	K10179014	〃 〃 〃 0.001μF (CK45B1H102MY)
R2079	J02245472	〃 〃 〃 〃 4.7kΩ			
R2080	J02245471	〃 〃 〃 〃 470Ω	C2036	K10179014	〃 〃 〃 0.001μF (〃)
R2081	J02245332	〃 〃 〃 〃 3.3kΩ			
R2082	J02245562	〃 〃 〃 〃 5.6kΩ	C2038	K02179028	〃 〃 〃 CH 10pF (2222-636-10109)
R2083	J02245391	〃 〃 〃 〃 390Ω			
			C2039	K02185470	〃 〃 63WV 47pF (RD872-2CG-470J63V)
		POTENTIOMETER	C2040	K10179014	〃 〃 〃 0.001μF (CK45B1H102MY)
VR2001	J51723103	H1051A013-10KB 10kΩB			
VR2002	J51724103	PN822H103H 10kΩB	C2041	K10179014	〃 〃 〃 0.001μF (〃)
			C2042	K10179014	〃 〃 〃 0.001μF (〃)
		CAPACITOR			
C2001	K06185150	Ceramic Disc 63WV UJ 15pF (RD870-1N750-150J63V)	C2043	K10179014	〃 〃 〃 0.001μF (〃)
C2002	K10179014	〃 〃 50WV 0.001μF (CK45B1H102MY)	C2044	K02179028	〃 〃 〃 CH 10pF (2222-636-10109)

(FTR-2410A)

C2045	K02175150	Ceramic Disc 63WV CH 15pF (DD104CH150J50V02)	C2077	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2046	K02175150	" " " " 15pF (")	C2080	K70120009	Tantalum 16WV 33μF (489D336X0016E1)
C2047	K02175150	" " " " 15pF (")	C2081	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2048	K02175150	" " " " 15pF (")	C2082	K50177103	Mylar " 0.01μF (50F2U103M)
C2049	K02175150	" " " " 15pF (")	C2083	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C2050	K02175150	" " " " 15pF (")	C2084	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2051	K50177223	Mylar " 0.022μF (50F2U223M)	C2085	K10179014	" " " 0.001μF (")
C2052	K50177102	" " 0.001μF (50F2U102M)	C2086	K70120009	Tantalum 16WV 33μF (489D336X0016E1)
C2053	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2087	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2054	K70120001	" 16WV 4.7μF (489D475X0016B1)	C2088	K10179014	" " " 0.001μF (")
C2055	K70140007	" 25WV 1μF (489D105X0025A1)	C2091	K01182059	" " 63WV CH 0.5pF (RD870-1CG-0R5C63V)
C2056	K50177332	Mylar 50WV 0.0033μF (50F2U332M)	C2092	K10179015	" " 50WV 0.01μF (CK45B1H103MY)
C2057	K50177102	" " 0.001μF (50F2U102M)	C2093	K10179014	" " " 0.001μF (CK45B1H102MY)
C2058	K02179066	Ceramic Disc 63WV CH 39pF (RD871-2CG-390J63V)	C2094	K10179015	" " " 0.001μF (CK45B1H103MY)
C2059	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2095	K40129007	Electrolytic 16WV 100μF (16RE100)
C2060	K50177223	Mylar 50WV 0.022μF (50F2U223M)	C2096	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C2061	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C2097	K40129006	Electrolytic 16WV 470μF (16RE470)
C2062	K40129007	Electrolytic " 100μF (16RE100)	C2098	K10179014	Ceramic Disc 50WV 0.001μF (CK45B1H102MY)
C2063	K10179015	Ceramic Disc 50WV 0.01μF (CK45B1H103MY)	C2099	K02175150	" " " CH 15pF (DD104CH150J50V02)
C2064	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2100	K02175150	" " " " 15pF (")
C2065	K70167474	" 35WV 0.47μF (CS15E1VR47)	C2101	K21170002	Feed through " 0.001μF (ECKY1H-102WE)
C2066	K70120002	" 16WV 10μF (489D106X0016C1)	C2102	K21170002	" " " 0.001μF (")
C2067	K10179014	" 50WV 0.001μF (CK45B1H102MY)	C2103	K21170002	" " " 0.001μF (")
C2068	K70185151	Ceramic Disc 63WV PH 150pF (RD874-2PG-151J63V)	C2104	K21170002	" " " 0.001μF (")
C2069	K10179015	" " 50WV 0.01μF (CK45B1H103MY)	C2105	K21170002	" " " 0.001μF (")
C2070	K10179014	" " " 0.001μF (CK45B1H102MY)	C2106	K21170002	" " " 0.001μF (")
C2071	K10179014	" " " 0.001μF (")	C2108	K21170002	Feed through " 0.001μF (ECKY1H-102WE)
C2072	K10179014	" " " 0.001μF (")	C2109	K21170002	" " " 0.001μF (")
C2073	K50177103	Mylar " 0.01μF (50F2U103)			
C2074	K10179014	Ceramic Disc " 0.001μF (CK45B1H102MY)			**TRIMMER CAPACITOR**
			TC2001	K91000029	ECV-1ZW-20x53T 20pF
C2075	K02185121	" " 63WV CH 120pF (RD874-2CG-121J63V)	TC2002	K91000028	" -10x53T 10pF
			TC2003	K91000028	" " 10pF
C2076	K10179014	" " 50WV 0.001μF (CK45B1H102MY)	TC2006	K91000028	" " 10pF

		TRANSFORMER
T2001	L0020666	113CN-6391Z
T2002	L0190011	113CN-6394N
T2003	L0190011	〃
T2004	L0020652	113CN-6396Z
T2005	L0020346	113CN-3393Y
T2006	L0020653	113SN-6397Y
T2007	L0020653	〃
T2008	L0020429	113SN-4530Y
T2009	L0020429	〃
		INDUCTOR
L2001	L1190017	FL5H-102K 1mH
L2002	L1020081A	
L2003	L1020081A	
L2004	L1020081A	
L2005	L0020679	
L2006	L1020081A	
L2007	L0020679	
L2008	L0020852	
L2013	L0020678	
L2014	L0020679	
L2015	L1020079A	
L2016	L0020679	
L2017	L0020679	
L2018	L0020679	
L2019	L1020080A	
L2020	L1020080A	
L2021	L1190041	181LY-104K 100mH
L2022	L2030060	
L2023	L1020080A	
L2024	L1190017	FL5H-102K 1mH
L2025	L0020334	
		CRYSTAL SOCKET
XS2001	P3090002	S2-101P-00
		CONNECTOR
J2001	P0090092	3022-08A
J2002	P1090254	BNC-LR
J2003	P0090091	5049-07A
J2004	P1090016	SQ3056
J2005	P0090091	5049-07A
		TP TERMINAL
TP2001	Q5000037	TP-H
TP2002	Q5000037	〃
TP2003	Q5000037	〃
TP2004	Q5000037	〃
TP2006	Q5000037	〃
TP2007	Q5000037	〃
		PIN PLUG
P2004	P0090009	SQ4152

FTR-2410A BAND TABLE

Symbol No.	Part No.	Description
134–146MHz BAND		
C1001	K05183100	Ceramic Disc 63WV RH 10pF (RD870-1BG-100D)
C1002	K05185390	〃 〃 〃 〃 39pF (RD871-2RG-390J)
C1004	K05185330	〃 〃 〃 〃 33pF (RD871-2RG-330J)
C1005	K02182050	〃 〃 〃 CH 5pF (RD870-1CG-050C)
C1010	K05185390	〃 〃 〃 RH 39pF (RD871-2RG-390J)
C1011	K05183100	〃 〃 〃 〃 10pF (RD870-1RG-100D)
C1013	K05185120	〃 〃 〃 〃 12pF (RD870-1RG-120J)
C1015	K05185330	〃 〃 〃 〃 33pF (RD871-2RG-330J)
C1016	K02182040	〃 〃 〃 CH 4pF (RD870-1CG-040C)
C1021	K05185220	〃 〃 〃 RH 22pF (RD870-1RG-220J)
C1040	K05183100	〃 〃 〃 〃 10pF (RD870-1RG-100D)
C1103	K02183100	〃 〃 〃 CH 10pF (RD870-1CG-100D)
C1128	K06182040	〃 〃 〃 UJ 4pF (RD870-1UG-040C)
C2018	K05185680	〃 〃 〃 RH 68pF (RD872-1RG-680J)
C2021	K05185820	〃 〃 〃 〃 82pF (RD872-2RG-820J)
C2022	K05185180	〃 〃 〃 〃 18pF (RD870-1RG-180J)
C2024	K02182010	〃 〃 〃 CH 1pF (RD870-1CG-010C)
C2025	K05185270	〃 〃 〃 RH 27pF (RD870-1RG-270J)
C2027	K05185120	〃 〃 〃 〃 12pF (RD870-1RG-120J)
C2031	K05185120	〃 〃 〃 〃 12pF (RD870-1RG-120J)
C2032	K05185680	〃 〃 〃 〃 68pF (RD872-1RG-680J)
C2037	K02182159	〃 〃 〃 CH 1.5pF (RD870-1CG-1R5C)
C2038	K02185150	〃 〃 〃 〃 15pF (RD870-1CG-150J)
C2045	K02183100	〃 〃 〃 〃 10pF (RD870-1CG-100D)
C2046	K02185120	〃 〃 〃 〃 12pF (RD870-1CG-120J)
C2047	K02183100	〃 〃 〃 〃 10pF (RD870-1CG-100D)
C2048	K02185120	〃 〃 〃 〃 12pF (RD870-1CG-120J)
C2049	K02183100	〃 〃 〃 〃 10pF (RD870-1CG-100D)
C2050	K02185120	〃 〃 〃 〃 12pF (RD870-1CG-120J)
C2089	K02183100	〃 〃 〃 〃 10pF (RD870-1CG-100D)
C2099	K02183100	〃 〃 〃 〃 10pF

(FTR-2410A)

C2107	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
L2008	Q90000043	Jumper A (06-5.0)
144–160MHz BAND		
C1001	K05183070	Ceramic Disc 63WV RH 7pF (RD870-1RG-070D)
C1002	K05185270	" " " " 27pF (RD870-1RG-270J)
C1004	K05189009	" " " " 33pF (RD870-1RG-330J)
C1005	K02182030	" " " CH 3pF (RD870-1CG-030C)
C1010	K05185390	" " " RH 39pF (RD871-2RG-390J)
C1011	K05183070	" " " " 7pF (RD870-1RG-070D)
C1013	K05183080	" " " " 8pF (RD870-1RG-080D)
C1015	K05185270	" " " " 27pF (RD870-1RG-270J)
C1016	K02182010	" " " CH 1pF (RD870-1CG-010C)
C1021	K05185150	" " " RH 15pF (RD870-1RG-150J)
C1040	K05183080	" " " " 8pF (RD870-1RG-080D)
C1103	K02182030	" " " CH 3pF (RD870-1CG-030C)
C1128	K06182040	" " " UJ 4pF (RD870-1UG-040C)
C2018	K05185560	" " " RH 56pF (RD871-1RG-560J)
C2021	K05185680	" " " " 68pF (RD872-1RG-680J)
C2022	K05185150	" " " " 15pF (RD870-1RG-150J)
C2024	K02182010	" " " CH 1pF (RD870-1CG-010C)
C2025	K05185150	" " " RH 15pF (RD870-1RG-150J)
C2027	K05183100	" " " " 10pF (RD870-1RG-100D)
C2031	K05183100	" " " " 10pF (RD870-1RG-100D)
C2032	K05185470	" " " " 47pF (RD870-1RG-470J)
C2037	K02182020	" " " CH 2pF (RD870-1CG-020C)
C2038	K02183100	" " " " 10pF (RD870-1CG-100D)
C2045	K02185150	" " " " 15pF (RD870-1CG-150J)
C2046	K02185150	" " " " 15pF (")
C2047	K02185150	" " " " 15pF (")
C2048	K02185150	" " " " 15pF (")
C2049	K02185150	" " " " 15pF (")
C2050	K02185150	" " " " 15pF (")

C2089		Not Used
C2099		"
C2107		"
L2008	L0020852	L0020852
160–174MHz BAND		
C1001	K05183060	Ceramic Disc 63WV RH 6pF (RD870-1RG-060D)
C1002	K05185220	" " " " 22pF (RD870-1RG-220J)
C1004	K05185270	" " " " 27pF (RD870-1RG-270J)
C1005	K02182020	" " " CH 2pF (RD870-1CG-020C)
C1010	K05185330	" " " RH 33pF (RD871-2RG-330J)
C1011	K05183060	" " " " 6pF (RD870-1RG-060D)
C1013	K05183080	" " " " 8pF (RD870-1RG-080D)
C1015	K05185220	" " " " 22pF (RD870-1RG-220J)
C1016		Not Used
C1021	K05185150	Ceramic Disc 63WV RH 15pF (RD870-1RG-150J)
C1040	K05183080	" " " " 8pF (RD870-1RG-080D)
C1103		Not Used
C1128		" "
C2018	K05185390	Ceramic Disc 63WV RH 39pF (RD871-1RG-390J)
C2021	K05185470	" " " " 47pF (RD871-1RG-470J)
C2022	K05183100	" " " " 10pF (RD871-1RG-100D)
C2024	K02182059	" " " CH 0.5pF (RD870-1CG-0R5C)
C2025	K05185120	" " " RH 12pF (RD870-1RG-120J)
C2027	K05183080	" " " " 8pF (RD870-1RG-080D)
C2031	K05183080	" " " " 8pF (")
C2032	K05185390	" " " " 39pF (RD871-1RG-390J)
C2037	K02182159	" " " CH 1.5pF (RD870-1CG-1R5C)
C2038	K02183100	" " " " 10pF (RD870-1CG-100D)
C2045	K02185150	" " " " 15pF (RD870-1CG-150J)
C2046	K02185150	" " " " 15pF (")
C2047	K02185150	" " " " 15pF (")
C2048	K02185150	" " " " 15pF (")
C2049	K02185150	" " " " 15pF (")
C2050	K02185150	" " " " 15pF (")
C2089		Not Used
C2099		" "
C2107		" "
L2008	L0020852	L0020852

(FTR-2410A)

FTR-5410 RECEIVER UNIT

Symbol No.	Part No.	Description
PB-2306	F0002306	Printed Circuit Board
		PCB with Components (w/o crystal)
	C023062C	400–420MHz 25kHz
	C023062D	420–430MHz "
	C023062E	430–450MHz "
	C023062F	450–470MHz "
	C023062G	470–490MHz "
	C023062H	490–512MHz "
PB-2309	F0002309	Printed Circuit Board
	C023090A	(Connector board)
		IC, FET, TRANSISTOR
Q1001	G4800760	3SK76 (FET)
Q1002	G4800760	" (")
Q1003	G3305350B	2SC535B (TR)
Q1004	G3319060	2SC1906 (")
Q1005	G3319070	2SC1907 (")
Q1006	G3305350B	2SC535B (")
Q1007	G3005350B	" (")
Q1008	G3305350B	" (")
Q1009	G3304600B	2SC460B (")
Q1010	G330460B	" (")
Q1011	G1090072	μPC577H (IC)
Q1012	G1090218	AN315 (")
Q1013	G3304600C	2SC460C (TR)
Q1014	G3304600B	2SC460B (")
Q1015	G3304600B	" (")
Q1016	G3304600B	" (")
Q1017	G3304600B	" (")
Q1018	G1090222	MB3756 (IC)
		DIODE
D1001	G2015550	Si 1S1555
D1002	G2015550	" "
D1003	G2015550	" "
D1004	G2015550	" "
D1005	G2015550	" "
D1006	G2015550	" "
		CRYSTAL
X1001	H0102346	HC-25/U (f_R-21.4)/9 (MHz)
X1002	H0102050	HC-18/U 20.945MHz
		CRYSTAL FILTER
XF1001 (25kHz)	H1101990	21J2B2(1/2) PAIR
XF1002	H1101990	" (")
XF1001(12.5kHz)	H1102034	21J2F2(1/2) PAIR
XF1002	H1102034	" (")
		CERAMIC FILTER
CF1001(25kHz)	H3900030	LF-B15
CF1002(25kHz)	H3900030	"
CF1001(12.5kHz)	H3900146	LF-B8A
CF1002(12.5kHz)	H3900146	"

		CERAMIC DISCRIMINATOR
CD1001	H7900010	455D
		POSISTOR
PTH1001	G9090019	PTH-2928
		RESISTOR
R1001	J02245333	Carbon film 1/4W SJ 33kΩ
R1002	J02245154	" " " " 150kΩ
R1003	J02245473	" " " " 47kΩ
R1004	J02245101	" " " " 100Ω
R1005	J02245333	" " " " 33kΩ
R1006	J02245154	" " " " 150kΩ
R1007(25kHz)	J02245103	" " " " 10kΩ
R1007(12.5kHz)	J02245272	" " " " 2.7kΩ
R1008	J02245470	" " " " 47Ω
R1009	J02245101	" " " " 100Ω
R1010	J02245101	" " " " 100Ω
R1011	J02245561	" " " " 560Ω
R1012	J02245103	" " " " 10kΩ
R1013	J02245472	" " " " 4.7kΩ
R1014	J02245471	" " " " 470Ω
R1015	J02245222	" " " " 2.2kΩ
R1016	J02245223	" " " " 22kΩ
R1017	J02245471	" " " " 470Ω
R1018	J02245222	" " " " 2.2kΩ
R1019	J02245223	" " " " 22kΩ
R1020	J02245681	" " " " 680Ω
R1021(25kHz)	J10246102	Carbon composition 1/4W GK 1kΩ
R1021(12.5kHz)	J10246821	" " " " 820Ω
R1022	J02245472	Carbon film " SJ 4.7kΩ
R1023	J02245223	" " " " 22kΩ
R1024	J02245102	" " " " 1kΩ
R1025	J02245102	" " " " 1kΩ
R1026	J02245223	" " " " 22kΩ
R1027	J02245333	" " " " 33kΩ
R1028	J02245102	" " " " 1kΩ
R1029	J02245101	" " " " 100Ω
R1030	J02245472	" " " " 4.7kΩ
R1031	J02245223	" " " " 22kΩ
R1032	J02245102	" " " " 1kΩ
R1033	J02245102	" " " " 1kΩ
R1034	J02245101	" " " " 100Ω
R1035	J02245222	" " " " 2.2kΩ
R1036	J02245102	" " " " 1kΩ
R1037	J02245154	" " " " 150kΩ
R1038	J02245222	" " " " 2.2kΩ
R1039	J02245154	" " " " 150kΩ
R1040	J02245222	" " " " 2.2kΩ
R1041	J02245222	" " " " 2.2kΩ
R1042	J02245473	" " " " 47kΩ
R1043	J02245102	" " " " 1kΩ
R1044	J02245103	" " " " 10kΩ
R1045	J02245103	" " " " 10kΩ
R1046	J02245332	" " " " 3.3kΩ
R1048	J02245333	" " " " 33kΩ
R1049	J02245820	" " " " 82Ω
R1050(25kHz)	J02245103	" " " " 10kΩ
R1050(12.5kHz)		Not Used
R1051	J02245333	Carbon film 1/4W SJ 33kΩ
R1052	J02245562	" " " " 5.6kΩ
R1053	J02245332	" " " " 3.3kΩ

(FTR-5410)

R1054	J02245102	Carbon film 1/4W SJ 1kΩ	C1035	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
R1055	J02245333	" " " " 33kΩ	C1037	K10179014	" " " 0.001μF (CD050XB102K50)
R1056	J02245104	" " " " 100kΩ	C1038	K10179014	" " " 0.001μF (")
R1057	J02245682	" " " " 6.8kΩ	C1039	K10179015	" " " 0.01μF (CD095XB103K50)
R1058	J02245224	" " " " 220kΩ	C1041	K10179015	" " " 0.01μF (CD095XB103K50)
R1059	J02245472	" " " " 4.7kΩ	C1042	K10179014	" " " 0.001μF (CD050XB102K50)
R1060	J02245820	" " " " 82Ω	C1043	K02182059	" " 63WV AH 0.5pF (RD870-1CG0R5C)
R1062	J02245332	" " " " 3.3kΩ	C1046	K10179014	" " 50WV 0.001μF (CD050XB102K50)
R1063	J02245332	" " " " 3.3kΩ	C1048	K10179014	" " " 0.001μF (")
R1064	J02245472	" " " " 4.7kΩ	C1049(25kHz)	K02183070	" " 63WV CH 7pF (RD870-1CG070D)
R1065	J02245391	" " " " 390Ω	C1049(12.5kHz)	K02185120	" " " 12pF (RD870-1CG-120J)
R1066	J02245333	" " " " 33kΩ	C1050	K10179015	" " 50WV 0.01μF (CD095XB103K50)
R1067	J10246103	Carbon composition 1/4W GK 10kΩ	C1051	K10179015	" " " 0.01μF (")
R1068	J02245103	Carbon film " SJ 10kΩ	C1052	K10179014	" " " 0.001μF (CD050XB102K50)
R1069	J02245332	" " " " 3.3kΩ	C1053	K06189005	" " 63WV UJ 33pF (RD870-2UG-330J)
			C1054	K06185221	" " " " 220pF (RD873-2UG-221J)
		POTENTIOMETER	C1055	K06185101	" " " " 100pF (RD871-1UG-101J)
VR1001	J51723103	H1051A013-10KB 10kΩB	C1056	K02183100	" " " CH 10pF (RD870-1CG-100D)
			C1057	K10179015	" " 50WV 0.01μF (CD095XB103K50)
		CAPACITOR	C1058	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C1003	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)	C1059	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C1005	K10179014	" " " 0.001μF (CD050XB102K50)	C1060	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
C1006	K10179014	" " " 0.001μF (")	C1061	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C1008	K10179014	" " " 0.001μF (")	C1062	K10179014	" " " 0.001μF (")
C1009	K10179014	" " " 0.001μF (")	C1063	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
C1015	K10179014	" " " 0.001μF (")	C1064	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
C1017	K10179014	" " " 0.001μF (")	C1065	K10179015	" " " 0.01μF (")
C1021	K10179014	" " " 0.001μF (")	C1066	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C1022	K10179014	" " " 0.001μF (")	C1067	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
C1023	K10179014	" " " 0.001μF (")	C1068	K10179014	" " " 0.001μF (CD050XB102K50)
C1024	K10179014	" " " 0.001μF (")	C1069	K10179014	" " " 0.001μF (")
C1025	K10179014	" " " 0.001μF (")	C1070	K10179014	" " " 0.001μF (")
C1026	K10179015	" " " 0.01μF (CD095XB103K50)			
C1027	K10179015	" " " 0.01μF (")			
C1028	K10179015	" " " 0.01μF (")			
C1029	K06185120	" " 63WV UJ 12pF (RD870-1N750-120J)			
C1030	K10179014	" " 50WV 0.001μF (CD050XB102K50)			
C1031	K06189002	" " 63WV UJ 82pF (RD871-2UG-820J)			
C1032	K06185560	" " " " 56pF (RD871-1UG-560J)			
C1033	K10179015	" " 50WV 0.01μF (CD095XB103K50)			
C1034	K10179014	" " " 0.001μF (CD050XB102K50)			

C1071	K50177222	Mylar 50WV 0.0022μF (50F2U222)	C1103	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C1072	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C1106	K40129006	Electrolytic 16WV 470μF (16RE470)
C1073	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1107	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C1074	K50176473	" " 0.047μF (")	C1108	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C1075	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1109	K40129007	Electrolytic 16WV 100μF (16RE100)
C1076	K50176473	Mylar 50WV 0.047μF (MRS-473K)	C1110	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
C1077	K50176473	" " 0.047μF (")	C1111	K40129007	Electrolytic 16WV 100μF (16RE100)
C1078	K50176473	" " 0.047μF (")	C1112	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
C1079	K10179014	Ceramic Disc " 0.001μF (CD050XB102K50)	C1113	K10179015	" " " 0.01μF (")
C1080	K50176473	Mylar " 0.047μF (MRS-473K)	C1114	K10179014	" " " 0.001μF (CD050XB102K50)
C1081	K10186471	Ceramic Disc " 470pF (RD870-1B471K63V)	C1115	K21170002	Feed through " 0.001μF (ECKY1H-102WE)
C1082	K50177103	Mylar " 0.01μF (50F2U103M)	C1116	K21170002	" " " 0.001μF (")
C1083	K50177222	" " 0.0022μF (50F2U222M)	C1117	K21170002	" " " 0.001μF (")
C1084	K50177222	" " 0.0022μF (")	C1118	K21170002	" " " 0.001μF (")
C1086	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C1119	K21170002	" " " 0.001μF (")
C1087	K50177332	Mylar 50WV 0.0033μF (50F2U332M)	C1121	K21170002	" " " 0.001μF (")
C1088	K70120010	Tantalum 16WV 22μF (499D226X0016GS1)	C1122	K21170002	" " " 0.001μF (")
C1089	K50177102	Mylar 50WV 0.001μF (50F2U102M)	C1123	K21170002	" " " 0.001μF (")
C1090	K10186331	" " 330pF (RD870-1B331K63V)	C1124	K21170002	" " " 0.001μF (")
C1091	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	C1125	K21170002	" " " 0.001μF (")
C1092	K70120002	" " 10μF (489D106X0016C1)	C1126	K21170002	" " " 0.001μF (")
C1093	K40129006	Electrolytic " 470μF (16RE470)	C1127	K50177103	Mylar " 0.01μF (50F2U103M)
C1094	K70167154	Tantalum 35WV 0.15μF (CS15E1VR15MIS)			
C1095	K50177472	Mylar 50WV 0.0047μF (50F2U472M)			**TRIMMER CAPACITOR**
			TC1001	K91000029	ECV-1ZW 20x53T 20pF
C1096	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	TC1002	K91000029	" " 20pF
C1097	K02185101	Ceramic Disc 63WV CH 100pF (RD874-2CG101J)			
					TRANSFORMER
C1098	K10185821	" " 50WV 820pF (RD870-1B-821K63V)	T1001	L0190012	113KN-6405Z
			T1002	L0190013	113KN-6409X
C1099(25kHz)	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	T1003	L0020343	113SN-3392Y
			T1004	L0020343	113SN-3392Y
C1099(12.5kHz)	K70140009	" " 2.2μF (489D225X0025B1)	T1005	L0020717	199CC-11125BWN
			T1006	L0020647	199CC-11114N
C1100	K70120002	" 16WV 10μF (489D106X0016C1)	T1007	L0020649	7MC-5896Y
C1101	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)			
					INDUCTOR
C1102	K10179014	" " " 0.001μF (")	L1010	L1020082A	
			L1011	L1020082A	

(FTR-5410)

012	L1190017	FL-5H	102K	1mH	Q2010	G3305350B	2SC535B	(TR)
013	L1020082A				Q2011	G3305350B	"	(")
014	L0020675				Q2012	G1090220	MLM2902	(IC)
015	L1190017	FL-5H	102K	1mH	Q2013	G3208560B	2SB856B	(TR)
016	L1190017	"	"	"	Q2014	G3304580B	2SC458B	(")
017	L1190038	"	271K	270μH	Q2015	G1090221	MC3401P	(IC)
018	L2030060				Q2016	G3304600B	2SC460B	(TR)
019	L1020080A				Q2017	G1090222	MB3756	(IC)
		CRYSTAL SOCKET					DIODE	
1001	P3090002	S2-101P-00			D2001	G2090084	Varactor	MV201
					D2002	G2015550	Si	1S1555
					D2003	G2015550	"	"
		CONNECTOR						
001	P0090059	3022-11A						
002	P0090091	5049-07A					CRYSTAL	
003	P0090091	"			X2001	H0102345	HC-25/U	f_T/12 (MHz)
004	P1090191	UG625B/U						
					XS2001	P3090002	S2-101P-00	
		TP TERMINAL						
1001	Q5000037	TP-H					POSISTOR	
1002	Q5000037	"			PTH2001	G9090019	PTH-2928	
	Q5000038	TP-I						
	U00312050	Nylon Screw					RESISTOR	
	U65003050	Fiber Washer			R2001	J02245561	Carbon film	1/4W SJ 560Ω
					R2002	J02245472	" "	" " 4.7kΩ
	R7066320	Insulator			R2003	J02245103	" "	" " 10kΩ
					R2004	J02245471	" "	" " 470Ω
					R2005	J02245101	" "	" " 100Ω
		FERRITE BEADS			R2006	J02245102	" "	" " 1kΩ
	L9190001	Ri 3x3x1			R2007	J02245103	" "	" " 10kΩ
					R2008	J02245473	" "	" " 47kΩ
					R2009	J02245101	" "	" " 100Ω
301 (with wire)	T9204326				R2010	J02245101	" "	" " 100Ω
					R2011	J02245220	" "	" " 22Ω
					R2012	J02245220	" "	" " 22Ω
					R2013	J10246221	Carbon composition	
							"	GK 220Ω
					R2014	J02245333	Carbon film	" SJ 33kΩ
FTR-5410 TRANSMITTER UNIT					R2015	J02245333	" "	" " 33kΩ
Symbol No.	Part No.	Description			R2016	J02245473	" "	" " 47kΩ
2306	F0002306	Printed Circuit Board			R2017	J02245333	" "	" " 33kΩ
		PCB with Components			R2018	J02245104	" "	" " 100kΩ
		(w/o crystal)			R2019	J02245470	" "	" " 47Ω
	C023063C	400–420MHz			R2020	J02245102	" "	" " 1kΩ
	C023063D	420–430MHz			R2021	J02245471	" "	" " 470Ω
	C023063E	430–450MHz			R2020	J02245222	" "	" " 2.2kΩ
	C023063F	450–470MHz			R2023	J02245102	" "	" " 1kΩ
	C023063G	470–490MHz			R2024	J02245103	" "	" " 10kΩ
	C023063H	490–512MHz			R2025	J02245100	" "	" " 10Ω
2309	F0002309	Printed Circuit Board			R2026	J02245222	" "	" " 2.2kΩ
	C023090A	(Connector board)			R2027	J02245681	" "	" " 680Ω
					R2028	J02245103	" "	" " 10kΩ
					R2029	J02245100	" "	" " 100Ω
		IC, TRANSISTOR			R2030	J02245222	" "	" " 2.2kΩ
001	G3305350B	2SC535B	(TR)		R2031	J02245471	" "	" " 470Ω
002	G3305350B	"	(")		R2033	J02245100	" "	" " 10Ω
003	G3305350B	"	(")		R2034	J02245102	" "	" " 1kΩ
004	G3319060	2SC1906	(")		R2035	J02245271	" "	" " 270Ω
005	G3319060	"	(")		R2036	J02245332	" "	" " 3.3kΩ
006	G3319070	2SC1907	(")		R2037	J02245229	" "	" " 2.2Ω
008	G3324070	2SC2407	(")		R2038	J02245101	" "	" " 100Ω

R2039	J02245101	Carbon film 1/4W SJ 100Ω	C2008	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
R2040	J02245472	" " " " 4.7kΩ			
R2041	J02245470	" " " " 47Ω	C2009	K05185270	" " 63WV RH 27pF (RD870-1RG270J)
R2042	J02245100	" " " " 10Ω			
R2045	J02245471	" " " " 470Ω	C2010	K10179015	" " 50WV 0.01μF (CD050XB103K50)
R2046	J02245224	" " " " 220kΩ			
R2047	J02245824	" " " " 820kΩ	C2012	K10179014	" " " 0.001μF (CD050XB102K50)
R2048	J02245333	" " " " 33kΩ			
R2049	J02245824	" " " " 820kΩ	C2013	K02185121	" " 63WV CH 120pF (RD874-2CG-121J)
R2050	J02245334	" " " " 330kΩ			
R2051	J02245562	" " " " 5.6kΩ	C2014	K10179014	" " 50WV 0.001μF (CD050XB102K50)
R2052	J02245273	" " " " 27kΩ			
R2053	J02245562	" " " " 5.6kΩ	C2015	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)
R2054	J02245153	" " " " 15kΩ			
R2055	J02245224	" " " " 220kΩ	C2016	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
R2056	J02245474	" " " " 470kΩ			
R2057	J02245124	" " " " 120kΩ	C2017	K02185121	" " 63WV CH 120pF (RD874-2CG121J)
R2058	J02245155	" " " " 1.5MΩ			
R2059	J02245223	" " " " 22kΩ	C2019	K10179015	" " 50WV 0.01μF (CD095XB103K50)
R2060	J02245104	" " " " 100kΩ			
R2061	J02245473	" " " " 47kΩ	C2020	K10179015	" " " 0.01μF (")
R2062	J02245103	" " " " 10kΩ			
R2063	J02245103	" " " " 10kΩ	C2021	K05185560	" " 63WV RH 56pF (RD871-1RG560J)
R2064	J02245223	" " " " 22kΩ			
R2065	J02245154	" " " " 150kΩ	C2023	K10179015	" " 50WV 0.01μF (CD095XB103K50)
R2066	J02245102	" " " " 1kΩ			
R2067	J02245103	" " " " 10kΩ	C2024	K02182159	" " 63WV CH 1.5pF (RD870-1CG1R5C)
R2068	J02245103	" " " " 10kΩ			
R2069	J02245561	" " " " 560Ω	C2025	K05185470	" " " RH 47pF (RD871-1RG470J)
R2070	J02245102	" " " " 1kΩ			
R2071	J02245103	" " " " 10kΩ	C2026	K05185560	" " " " 56pF (RD871-1RG560J)
R2072	J02245153	" " " " 15kΩ			
R2073	J02245102	" " " " 1kΩ	C2027	K05183080	" " " " 8pF (RD870-1RG080D)
R2074	J02245103	" " " " 10kΩ			
R2075	J02245103	" " " " 10kΩ	C2028	K10179015	" " 50WV 0.01μF (CD095XB103K50)
R2076	J02245154	" " " " 150kΩ			
R2077	J02245683	" " " " 68kΩ	C2029	K10179015	" " " 0.01μF (")
R2078	J02245103	" " " " 10kΩ			
R2079	J02245472	" " " " 4.7kΩ	C2030	K02182059	" " 63WV CH 0.5pF (RD870-1CG0R5J)
R2080	J02245331	" " " " 330Ω			
R2081	J02245103	" " " " 10kΩ	C2032	K05185270	" " " RH 27pF (RD870-1RG270J)
R2082	J02245562	" " " " 5.6kΩ			
R2083	J02245391	" " " " 390Ω	C2033	K02185560	" " " CH 56pF (RD872-2CG560J)
		POTENTIOMETER	C2034	K10179014	" " 50WV 0.001μF (CD050XB102K50)
VR2001	J51723103	H1051A013-10KB 10kΩB			
VR2002	J51724103	PN822H103H 10kΩB	C2035	K10179015	" " " 0.01μF (CD095XB103K50)
			C2036	K10179014	" " " 0.001μF (CD050XB102K50)
		CAPACITOR	C2037	K02182059	" " 63WV CH 0.5pF (RD870-1CG0R5C)
C2001	K06185150	Ceramic Disc 63WV UJ 15pF (RD870-1UG150J)			
			C2039	K10179014	" " 50WV 0.001μF (CD050XB102K50)
C2002	K10179014	" " 50WV 0.001μF (CD050XB102K50)	C2040	K10179014	" " " 0.001μF (")
C2003	K06185680	" " 63WV UJ 68pF (RD871-2UG680J)	C2041	K10179014	" " " 0.001μF (")
C2004	K06189003	" " " " 56pF (RD871-1UG560J)	C2042	K10179014	" " " 0.001μF (")
C2005	K10179015	" " 50WV 0.01μF (CD095XB103K50)	C2043	K10179014	" " " 0.001μF (")
C2006	K10179015	" " " 0.01μF (")	C2045	K02185150	" " " 15pF (RD870-1CG150J)
C2007	K02185101	" " 63WV CH 100pF (RD874-2CG-101J)			

(FTR-5410)

C2050	K02172030	Ceramic Disc 50WV 3pF (DD104CH030C50V02)	C2082	K50177103	Mylar 50WV 0.01μF (50F2U103M)
C2051	K50177223	Mylar " 0.022μF (50F2U223M)	C2083	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
C2052	K50177102	" " 0.001μF (50F2U102M)	C2084	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C2053	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2085	K10179014	" " " 0.001μF (")
C2054	K70120001	" 16WV 4.7μF (489D475X0016B1)	C2086	K70120009	Tantalum 16WV 33μF (489D336X0016E1)
C2055	K70140007	" 25WV 1μF (489D105X0025A1)	C2087	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C2056	K50177332	Mylar 50WV 0.0033μF (50F2U332M)	C2088	K10179014	" " " 0.001μF (")
C2057	K50177102	" " 0.001μF (50F2U102M)	C2089	K02182010	" " 63WV CH 1pF (RD870-1CG010C)
C2058	K02185390	Ceramic Disc 63WV CH 39pF (RD871-1CG390J)	C2092	K10179015	" " 50WV 0.01μF (CD095XB103K50)
C2059	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2093	K10179014	" " " 0.001μF (CD050XB102K50)
C2060	K50177223	Mylar 50WV 0.022μF (50F2U223M)	C2094	K10179015	" " " 0.01μF (CD095XB103K50)
C2061	K70120002	Tantalum 16WV 10μF (489D106X0016C1)	C2095	K40129007	Electrolytic 16WV 100μF (16RE100)
C2062	K40129007	Electrolytic " 100μF (16RE100)	C2096	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
C2063	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)	C2097	K40129006	Electrolytic 16WV 470μF (16RE470)
C2064	K70140007	Tantalum 25WV 1μF (489D105X0025A1)	C2098	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)
C2065	K70167474	" 35WV 0.47μF (CS15E1VR47M1S)	C2099	K21170002	Feed through " 0.001μF (ECKY1H-102WE)
C2066	K70120002	" 16WV 10μF (489D106X0016C1)	C2100	K21170002	" " " 0.001μF (")
C2067	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)	C2101	K21170002	" " " 0.001μF (")
C2068	K70185151	" " " PR 150pF (RD874-2PG-151J)	C2102	K21170002	" " " 0.001μF (")
C2069	K10179015	" " " 0.01μF (CD095XB103K50)	C2103	K21170002	" " " 0.001μF (")
C2070	K10179014	" " " 0.001μF (CD050XB102K50)	C2104	K21170002	" " " 0.001μF (")
C2071	K10179014	" " " 0.001μF (")	C2106	K02172050	Ceramic Disc " CH 5pF (DD104CH050C50V02)
C2072	K10179014	" " " 0.001μF (")	C2108	K10179014	" " " 0.001μF (CD050XB102K50)
C2073	K50177103	Mylar " " 0.01μF (50F2U103M)	C2109	K21170002	Feed through 50WV 0.01μF (ECKY1H102WE)
C2074	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)	C2110	K21170002	" " " 0.01μF (")
C2075	K02185121	" " 16WV CH 120pF (RD874-2CG121J)			
C2076	K10179014	" " 50WV 0.001μF (CD050XB102K50)			TRIMMER CAPACITOR
C2077	K10179014	" " " 0.001μF (")	TC2001	K91000029	ECV-1ZW-20x53T 20pF
C2078	K10179014	" " " 0.001μF (")	TC2002	K91000060	" -02x53T 2pF
C2079	K10179014	" " " 0.001μF (")	TC2003	K91000060	" -02x53T 2pF
C2080	K70120009	Tantalum 16WV 33μF (489D336X0016E1)	TC2004	K91000059	" -04x53T 4pF
C2081	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)	TC2006	K91000028	" -10x53T 10pF
			TC2007	K91000059	" -04x53T 4pF
					TRANSFORMER
			T2001	L0020346	113CN-3393Y
			T2002	L0190011	113KN-6407N
			T2003	L0190010	" -6406N

(FTR-5410)

T2004	L0190014	113KN-6408Z
T2005	L0020346	113CN-3393Y
T2006	L0020343	113SN-3392Y
T2007	L0020343	" - "
T2008	L0020429	" -4530Y
T2009	L0020429	" - "
		INDUCTOR
L2001	L1190017	FL5H-102K 1mH
L2002	L1020081A	
L2003	L1020081A	
L2004	L1020081A	
L2006	L0020081A	
L2007	L0020675	
L2008	L0020675	
L2013	L0020675	
L2015	L1020079A	
L2017	L0020677	
L2018	L0020677	
L2019	L1020080A	
L2020	L1020080A	
L2021	L1190041	181LY-104K 100mH
H2022	L2030060	
L2023	L1020080A	
L2024	L1190017	FL5H-102K 1mH
L2025	L0021269A	
		CONNECTOR
J2001	P0090092	3022-08A
J2002	P1090254	BNC-LR
J2003	P0090091	5049-07A
J2004	P1090016	SQ3056
J2005	P0090091	5049-07A
		TP TERMINAL
TP2001	Q5000037	TP-H
TP2002	Q5000037	"
TP2003	Q5000037	"
TP2004	Q5000037	"
TP2005	Q5000037	"
TP2006	Q5000037	"
TP2007	Q5000037	"
	Q5000015	TP-A
	Q5000038	TP-I
	U03312050	Nylon Screw
	U75003050	Fiber Washer
		PIN PLUG
P2001	T9204332	
P2004	P0090009	SQ4152
	T9204496	

BAND

Symbol No.	Part No.	Description
400–420MHz BAND		
Q2007	G3319070	2SC1907 (TR)
Q2009	G1090392	M57704L (IC)
CV1001	Q9000199	HRW-231MT-1032A
CV1002	Q9000201	HRQ-232MT-1023A
CV1003	Q9000200	HRW-231MT-1033A
R2084		Not Used
R2085		" "
C1004	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)
C1036	K02185120	" " " " 12pF (")
C1040	K05183100	" " " RH 10pF (RD870-1RG-100D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05189009	" " " " 33pF (RD871-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185220	" " " RH 22pF (RD870-1RG-220J)
C2022	K05189003	" " " " 39pF (RD871-2RG-390J)
C2031	K05185180	" " " " 18pF (RD870-1RG-180J)
C2038	K02182020	" " " CH 2pF (RD870-1CG-020C)
C2046	K02182050	" " " " 5pF (RD870-1CG-050C)
C2047	K02182050	" " " " 5pF (")
C2048	K02182030	" " " " 3pF (RD870-1CG-030C)
C2049	K02182030	" " " " 3pF (")
C2107	K02182030	" " " " 3pF (")
TC2005	K91000060	ECV-1ZW-02x53T 2pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020756	
L2005	L0020676	
L2010	L0020675	
L2011	L0020675	
L2014	L0020675	
420–430MHz BAND		
Q2007	G3319070	2SC1907 (TR)
Q2009	G1090392	M57704L (IC)
CV1001	Q9000198	HRW-231MT-1031A
CV1002	Q9000202	HRQ-232MT-1024A
CV1003	Q9000199	HRW-231MT-1032A
D2084		Not Used
R2085		" "
C1004	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)

(FTR-5410)

C1036	K02185120	Ceramic Disc 63WV CH 12pF (RD870-1CG-120J)
C1040	K05183100	" " " RH 10pF (RD870-1RG-100D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05189009	" " " " 33pF (RD871-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185220	" " " RH 22pF (RD870-1RG-220J)
C2022	K05189003	" " " " 39pF (RD871-2RG-390J)
C2031	K05185180	" " " " 18pF (RD870-1RG-180J)
C2038	K02182020	" " " CH 2pF (RD870-1CG-020C)
C2046	K02182050	" " " " 5pF (RD870-1CG-050C)
C2047	K02182050	" " " " 5pF (")
C2048	K02182030	" " " " 3pF (RD870-1CG-030C)
C2049	K02182030	" " " " 3pF (")
C2107	K02182030	" " " " 3pF (")
TC2005	K91000060	ECW-1ZW-02x53T 2pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020756	
L2005	L0020676	
L2010	L0020675	
L2011	L0020675	
L2014	L0020670	
430–450MHz BAND		
Q2007	G3319070	2SC1907 (TR)
Q2009	G1090225	M57704M (IC)
CV1001	Q9000240	HRW-231MT-1063A
CV1002	Q9000241	HRQ-232MT-1051A
CV1003	Q9000242	HRW-231MT-1068A
R2084		Not Used
R2085		" "
C1004	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)
C1036	K02185120	" " " " 12pF (")
C1040	K05183100	" " " RH 10pF (RD870-1RG-100D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05189009	" " " " 33pF (RD871-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185180	" " " RH 18pF (RD870-1RG-180J)
C2022	K05189009	" " " " 33pF (RD871-2RG-330J)
C2031	K05185120	" " " " 12pF (RD870-1RG-120J)
C2038	K02182010	" " " CH 1pF (RD870-1CG-010C)
C2046	K02182030	" " " " 3pF (RD870-1CG-030C)
C2047	K02182030	" " " " 3pF (")
C2048	K02182020	" " " " 2pF (RD870-1CG-020C)
C2049	K02182020	" " " " 2pF (")
C2107	K02182030	" " " " 3pF (RD870-1CG-030C)
TC2005	K91000060	ECV-1ZW-02x53T 2pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020756	
L2005	L0020675	
L2010	L0020674	
L2011	L0020675	
L2014	L0020675	
450–470MHz BAND		
Q2007	G3319070	2SC1907 (TR)
Q2009	G1090228	M57704H (IC)
CV1001	Q9000198	HRW-231MT-1031A
CV1002	Q9000202	HRQ-232MT-1024A
CV1003	Q9000199	HRW-231MT-1032A
R2084		Not Used
R2085		" "
C1004	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)
C1036	K02185120	" " " " 12pF (")
C1040	K05183100	" " " RH 10pF (RD870-1RG-100D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05189009	" " " " 33pF (RD871-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185180	" " " RH 18pF (RD870-1RG-180J)
C2022	K05189009	" " " " 33pF (RD871-2RG-330J)
C2031	K05185120	" " " " 12pF (RD870-1RG-120J)
C2038	K02182010	" " " CH 1pF (RD870-1CG-010C)
C2046	K02182030	" " " " 3pF (RD870-1CG-030C)
C2047	K02182030	" " " " 3pF (")
C2048	K02182020	" " " " 2pF (RD870-1CG-020C)
C2049	K02182020	" " " " 2pF (")
C2107	K02182030	" " " " 3pF (RD870-1CG-030C)

(FTR-5410)

TC2005	K91000060	ECV-1ZW-02x53T 2pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020756	
L2005	L0020675	
L2010	L0020674	
L2011	L0020675	
L2014	L0020675	
470–490MHz BAND		
Q2007	G3319070	2SC1907 (TR)
Q2009	G1090318	M57704UH (IC)
CV1001	Q9000198	HRW-231MT-1031A
CV1002	Q9000202	HRQ-232MT-1024A
CV1003	Q9000199	HRW-231MT-1032A
R2084		Not Used
R2085		" "
C1004	K02183060	Ceramic Disc 63WV CH 6pF (RD870-1CG-060D)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)
C1036	K02185120	" " " " 12pF (")
C1040	K05183100	" " " RH 10pF (RD870-1RG-100D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05189009	" " " " 33pF (RD871-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185180	" " " RH 18pF (RD870-1RG-180J)
C2022	K05189009	" " " " 33pF (RD871-2RG-330J)
C2031	K05185120	" " " " 12pF (RD870-1RG-120J)
C2038	K02182010	" " " CH 1pF (RD870-1CG-010C)
C2046	K02182030	" " " " 3pF (RD870-1CG-030C)
C2047	K02182030	" " " " 3pF (")
C2048	K02182010	" " " " 1pF (RD870-1CG-010C)
C2049	K02182010	" " " " 1pF (")
C2107	K02182030	" " " " 3pF (RD870-1CG-030C)
TC2005	K91000059	ECV-1ZW-04x53T 4pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020756	
L2005	L0020674	
L2010	L0020674	
L2011	L0020674	
L2014	L0020674	
490–512MHz BAND		
Q2007	G3324070	2SC2407 (TR)
Q2009	G1090319	M57704SH (IC)
CV1001	Q9000240	HRW-231MT-1067A
CV1002	Q9000241	HRQ-232MT-1051A
CV1003	Q9000242	HRW-231MT-1068A
R2084	J02245101	Carbon film 1/4W SJ 100Ω
R2085	J02245471	" " " " 470Ω
C1004	K02182050	Ceramic Disc 63WV CH 5pF (RD870-1CG-050C)
C1010	K02185120	" " " " 12pF (RD870-1CG-120J)
C1036	K02185120	" " " " 12pF (")
C1040	K05183080	" " " RH 8pF (RD870-1RG-080D)
C1044	K05185120	" " " " 12pF (RD870-1RG-120J)
C1045	K05185330	" " " " 33pF (RD870-2RG-330J)
C1047	K02182050	" " " CH 5pF (RD870-1CG-050C)
C2018	K05185150	" " " RH 15pF (RD870-1RG-150J)
C2022	K05189009	" " " " 33pF (RD871-2RG-330J)
C2031	K05185120	" " " " 12pF (RD870-1RG-120J)
C2038	K02182010	" " " CH 1pF (RD870-1CG-010C)
C2046	K02182030	" " " " 3pF (RD870-1CG-030C)
C2047	K02182030	" " " " 3pF (")
C2048	K02182010	" " " " 1pF (RD870-1CG-010C)
C2049	K02182010	" " " " 1pF (")
C2107	K02182020	" " " " 2pF (RD870-1CG-020C)
TC2005	K91000059	ECV-1ZW-04x53T 4pF
L1002	L0020675	
L1004	L0020675	
L1005	L0020675	
L1009	L0020676	
L2005	L0020674	
L2010	L0020674	
L2011	L0020674	
L2014	L0020674	

FTR-710A FTR-2410A FTR-5410 COR UNIT

Symbol No.	Part No.	Description
PB-2418C	F0002418C	Printed Circuit Board
	C024180C	PCB with components
		IC, TRANSISTOR
Q3001	G1090220	MLM2902 (IC)
Q3002	G1090257	MC14066B (")
Q3003	G1090220	MLM2902 (")
Q3004	G1090375	MC14536B (")
Q3005	G1090375	" (")
Q3006	G1090068	MC14011B (")
Q3007	G1090068	" (")

(FTR-5410)

Q3008	G1090126	MC14069B (IC)		R3042	J02245183	Carbon film 1/4W SJ 18kΩ
Q3009	G1090027	MC14001B (")		R3043	J02245183	" " " " 18kΩ
Q3010	G3304580P	2SC458B (TR)		R3044	J02245103	" " " " 10kΩ
Q3011	G3304580B	" (")		R3045	J02245103	" " " " 10kΩ
Q3012	G1090384	MC14538B (IC)		R3046	J02245104	" " " " 100kΩ
				R3047	J02245330	" " " " 33Ω
				R3048	J02245681	" " " " 680Ω
		DIODE		R3049	J02245103	" " " " 10kΩ
D3001	G2015550	Si 1S1555		R3051	J02245104	" " " " 100kΩ
D3002	G2015550	" "		R3052	J02245104	" " " " 100kΩ
D3003	G2015550	" "		R3053	J02245104	" " " " 100kΩ
D3004	G2090003	" V06B		R3054	J10216105	" composition 1/8W GK 1MΩ
D3006	G2015550	" 1S1555				
D3007	G2015550	" "				
						BLOCK RESISTOR
		RESISTOR		RB3001	J40900020	RA1/16K5R 100kΩx5
R3001	J10246103	Carbon composition 1/4W GK 10kΩ		RB3002	J40900020	" "
R3002	J02245683	" film " SJ 68kΩ				
R3003	J10246393	" composition " GK 39kΩ				**POTENTIOMETER**
				VR3001	J51745104	H0651A017 100KB 100kΩB
R3004	J10246393	" " " " 39kΩ		VR3002	J51745103	" 013 10KB 10kΩB
R3005	J02245183	" film " SJ 18kΩ		VR3003	J51745102	" 007 1KB 1kΩB
R3006	J02245393	" " " " 39kΩ		VR3004	J51724103	PN822H103H 10kB
R3007	J10246273	" composition GK 27kΩ		VR3005	J51724103	" " 10kB
R3008	J02245104	" film " SJ 100kΩ				
R3009	J10246473	" composition " GK 47kΩ				**CAPACITOR**
R3010	J10246473	" " " " 47kΩ		C3001	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
R3011	J02245473	" film " SJ 47kΩ		C3002	K50177332	Mylar 50WV 0.0033μF (50F2U332M)
R3012	J10246473	" composition " GK 47kΩ		C3003	K10186471	Ceramic Disc " 470pF (RD870-1B471K63V)
R3013	J02245473	" film " SJ 47kΩ		C3004	K50177223	Mylar " 0.022μF (50F2U223M)
R3014	J10246473	" composition " GK 47kΩ		C3005	K50177223	" " 0.022μF (")
R3015	J02245153	" film " SJ 15kΩ		C3006	K50177223	" " 0.022μF (")
R3016	J02245473	" " " " 47kΩ		C3007	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
R3017	J10246473	" composition " GK 47kΩ		C3008	K70120002	" " 10μF (")
R3018	J02245473	" film " SJ 47kΩ		C3009	K70120002	" " 10μF (")
R3019	J02245273	" " " " 27kΩ		C3010	K50177103	Mylar 50WV 0.01μF (50F2U103M)
R3020	J02245103	" " " " 10kΩ		C3011	K50177103	" " 0.01μF (")
R3021	J02245153	" " " " 15kΩ		C3012	K50177332	" " 0.0033μF (50F2U332M)
R3022	J02245104	" " " " 100kΩ		C3013	K50177332	" " 0.0033μF (")
R3023	J02245104	" " " " 100kΩ		C3014	K50177103	" " 0.01μF (50F2U103M)
R3024	J02245104	" " " " 100kΩ		C3015	K70120002	Tantalum 16WV 10μF (489D106X0016C1)
R3025	J02245104	" " " " 100kΩ		C3016	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
R3026	J02245104	" " " " 100kΩ		C3017	K40129002	Electrolytic 16WV 47μF (16RE47)
R3027	J02245104	" " " " 100kΩ		C3018	K40129002	" " 47μF (")
R3028	J02245104	" " " " 100kΩ				
R3029	J02245103	" " " " 10kΩ				
R3030	J02245104	" " " " 100kΩ				
R3031	J02245332	" " " " 3.3kΩ				
R3032	J02245473	" " " " 47kΩ				
R3033	J02245104	" " " " 100kΩ				
R3034	J02245104	" " " " 100kΩ				
R3035	J02245104	" " " " 100kΩ				
R3036	J02245332	" " " " 3.3kΩ				
R3037	J02245473	" " " " 47kΩ				
R3038	J02245104	" " " " 100kΩ				
R3039	J02245104	" " " " 100kΩ				
R3040	J02245103	" " " " 10kΩ				
R3041	J02245103	" " " " 10kΩ				

C3019	K10179014	Ceramic Disc 50WV 0.001μF (CD050XB102K50)			IC, TRANSISTOR
C3020	K10179014	" " " 0.001μF (")	Q4001	G1090373	TA7089P (IC)
C3021	K50177103	Mylar " 0.01μF (50F2U103M)	Q4002	G3408800O	2SD880-O (TR)
C3023	K10179014	Ceramic Disc " 0.001μF (CD050XB102K50)			DIODE
C3024	K10179014	" " " 0.001μF (")	D4001	G2090001	Si 10D1
C3025	K50177223	Mylar " 0.022μF (50F2U223M)	D4002	G2090001	" "
C3026	K50177332	" " 0.0033μF (50F2U332M)			RESISTOR
C3027	K50177332	" " 0.0033μF (")	R4001	J01245151	Carbon film 1/4W TJ 150Ω
			R4002	J01245103	" " " " 10kΩ
			R4003	J01245331	" " " " 330Ω
		INDUCTOR	R4004	J01245332	" " " " 3.3kΩ
L3001	L1190017	FL5H-102K 1mH	R4005	J01245822	" " " " 8.2kΩ
			R4006	J20306102	Metallic film 1W 1kΩ
			R4007	J10276681	Carbon composition 1/2W GK 680Ω
		RELAY			POTENTIOMETER
RL3001	M1190008	FBR-221D-006 6V	VR4001	J51721502	EVLS3AA00B53 5kΩB
			VR4002	J51721102	" 13 1kΩB
		SWITCH			CAPACITOR
S3001	N7090026	SGK-106-2	C4001	K40169003	Electrolytic 35WV 330μF (35RE330)
S3002	N7090026	"	C4002	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
S3003	N6090008	SSS012	C4003	K50177333	Mylar " 0.033μF (50F2U333)
		CONNECTOR	C4004	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
J3001	P0090054	5048-07A	C4005	K10179014	" " " 0.001μF (CD050XB102K50)
J3002	P0090054	"	C4006	K40129011	Electrolytic 16WV 1000μF (16RE1000)
J3003	P0090267	5233-08A	C4007	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)
J3004	P0090051	5048-06A			
J3005	P0090054	5048-07A			
J3006	P0090038	5048-12A			
J3007	P0090051	5048-06A			
J3008	P0090042	5048-05A			
					TERMINAL
		TP TERMINAL		Q5000011	Wrapping terminal C
TP3001	Q5000037	TP-H			
P3005 (with wire)	T9204467A				
P3006 (")	T9204468B				
P3008 (")	T9204469				
P3003 (")	T9204470A				

REG UNIT

Symbol No.	Part No.	Description
PB-2248A	F0002248A	Printed Circuit Board
	C022480A	PCB with components

RELAY UNIT

Symbol No.	Part No.	Description
PB-2308	F0002308	Printed Circuit Board
	C023080A	PCB with components
		IC
Q5001	G1090301	μPC7812H
		DIODE
D5001	G2090034	Si U05B
D5002	G2090034	" "
D5003	G2015550	" 1S1555

		RESISTOR	
R5001	J30376569	Cement 5W	5.6Ω
		CAPACITOR	
C5001	K50177103	Mylar 50WV	0.01μF
		(50F2U103)	
C5002	K70167334	Tantalum 35WV	0.33μF
		(CS15E1VR33M)	
C5003	K70120001	" 16WV	4.7μF
		(489D475X0016B1)	
		RELAY	
RL5001	M1090019	HC-2-DC-12V	
RLS5001	M1390010	HC-2 (Socket)	
		FUSE	
F5001	Q0000006	4A	
	P2000003	Fuse Holder F3265	
		TP TERMINAL	
	Q5000037	TP-H	

ID UNIT

Symbol No.	Part No.	Description
PB-2417A	F0002417A	Printed Circuit Board
	C024170A	PCB with components w/o Q6007
		IC, TRANSISTOR
Q6001	G1090375	MC14536B (IC)
Q6002	G1090068	MC14011B (")
Q6003	G1090419	MC14566B (")
Q6004	G1090149	MC14510B (")
Q6005	G1090126	MC14069B (")
Q6006	G1090420	SN74LS393N (")
Q6007	G1090020	SN74S188AN (")
Q6008	G1090421	SN74LS151N (")
Q6009	G3304580	2SC458B (TR)
Q6010	G3304580	" (")
Q6011	G3304580	" (")
Q6012	G1090037	MC14572B (IC)
Q6013	G1090253	NS74LS00N (")
Q6014	G1090174	MC14002B (")
Q6015	G1090068	MC14011B (")
Q6016	G1090299	μPC7805H (")
		DIODE
D6001	G2015550	Si 1S1555
D6002	G2015550	" "
D6003	G2015550	" "
D6004	G2015550	" "
D6005	G2015550	" "
D6006	G2090019	Ge 1N60
D6007	G2090019	" "
D6008	G2090019	" "
D6009	G2090019	Ge 1N60
		RESISTOR
R6001	J10246103	Carbon composition 1/4W GK 10kΩ
R6002	J02245473	Carbon film " SJ 47kΩ
R6003	J02245473	" " " " 47kΩ
R6004	J02245473	" " " " 47kΩ
R6005	J02245473	" " " " 47kΩ
R6006	J02245473	" " " " 47kΩ
R6007	J02245473	" " " " 47kΩ
R6008	J02245473	" " " " 47kΩ
R6009	J02245473	" " " " 47kΩ
R6010	J02245474	" " " " 470kΩ
R6012	J02245564	" " " " 560kΩ
R6013	J02245106	" " " " 10MΩ
R6015	J02245103	" " " " 10kΩ
R6016	J02245103	" " " " 10kΩ
R6017	J02245472	" " " " 4.7kΩ
R6018	J02245103	" " " " 10kΩ
R6019	J02245103	" " " " 10kΩ
R6020	J02245473	" " " " 47kΩ
R6021	J02245183	" " " " 18kΩ
R6022	J02245105	" " " " 1MΩ
R6023	J02245105	" " " " 1MΩ
R6024	J10246472	Carbon composition " GK 4.7kΩ
R6025	J02245183	Carbon film " SJ 18kΩ
R6026	J20336330	Metallic film 2W 33Ω
		INDUCTOR
L6001	L1190041	181LY-104K 100mH
		BLOCK RESISTOR
RB6001	J40900015	(EXB-P88-472K) 1/4W 4.7kΩx8
		POTENTIOMETER
VR6001	J51745225	H0651A027 2.2MB 2.2MΩB
VR6002	J51745473	H0651A017 47KB 47kΩB
		CAPACITOR
C6001	K00175220	Ceramic Disc 50WV 22pF (DD104SL220J50V02)
C6002	K02175820	" " " CH 82pF (DD104CH820J50V02)
C6003	K50177223	Mylar " 0.022μF (50F2U223)
C6004	K70167104	Tantalum 35WV 0.1μF (CS15E1V0R1M1S)
C6005	K50177103	Mylar " 0.01μF (50F2U103)
C6006	K50177102	" " 0.001μF (50F2U102)
C6007	K50177102	" " 0.001μF (")
C6008	K50177103	" " 0.01μF (50F2U103)
C6009	K50177473	" " 0.047μF (50F2U473)

C6010	K50177473	Mylar 35WV 0.047μF (50F2U473)			DIODE
C6011	K50177103	" " 0.01μF (50F2U103)	D7001	G2015550	Si 1S1555
C6012	K70120001	Tantalum 16WV 4.7μF (489D475X0016B1)	D7002	G2015550	" "
C6013	K70120002	" " 10μF (489D106X0016C1)	D7003	G2015550	" "
C6014	K10179015	Ceramic Disc 50WV 0.01μF (CD095XB103K50)	D7004	G2015550	" "
C6015	K50177223	Mylar " 0.022μF (50F2U223)	D7005	G2015550	" "
C6016	K10186471	Ceramic Disc 63WV 470pF (RD870-1B471K63V)	D7006	G2015550	" "
			D7007	G2015550	" "
			D7008	G2015550	" "
		CRYSTAL	D7009	G2015550	" "
X6001	H0102473	HT-38 32.768kHz	D7010	G2015550	" "
			D7011	G2015550	" "
	P3090033	IC Socket 116-16-30-114	D7012	G2015550	" "
			D7013	G2015550	" "
	P0090042	Connector 5048-05A	D7014	G2015550	" "
			D7015	G2015550	" "
	R0081800	Heat Sink	D7016	G2015550	" "
			D7017	G2015550	" "
		TP TERMINAL	D7018	G2015550	" "
	Q5000037	TP-H	D7019	D2015550	" "
			D7020	G2015550	" "
			D7021	G2090199	Zener RD-12EB-2
			DA7001	G2090230	Diode Array 1S1555x16
					CRYSTAL
			X7001	H0102347	HC-18/U 3.58MHz
					RESISTOR
			R7001	J10246563	Carbon composition 1/4W GK 56kΩ
			R7002	J10246563	" " " " 56kΩ
			R7003	J10246563	" " " " 56kΩ
			R7004	J10246563	" " " " 56kΩ
			R7005	J10246563	" " " " 56kΩ
			R7006	J10246823	" " " " 82kΩ
			R7007	J10246823	" " " " 82kΩ
			R7008	J10246104	" " " " 100kΩ
			R7009	J10246823	" " " " 82kΩ
			R7010	J10246823	" " " " 82kΩ
			R7011	J10246823	" " " " 82kΩ
			R7012	J10246105	" " " " 1MΩ
			R7013	J10246105	" " " " 1MΩ
			R7014	J10246105	" " " " 1MΩ
			R7015	J10246474	" " " " 470kΩ
			R7016	J10246104	" " " " 100kΩ
			R7017	J10246104	" " " " 100kΩ
			R7018	J10246104	" " " " 100kΩ
			R7019	J10246104	" " " " 100kΩ
			R7020	J10246104	" " " " 100kΩ
			R7021	J10246104	" " " " 100kΩ
			R7022	J10246104	" " " " 100kΩ
			R7023	J10246103	" " " " 10kΩ
			R7024	J10246103	" " " " 10kΩ
			R7025	J10246103	" " " " 10kΩ
			R7026	J10246103	" " " " 10kΩ
			R7027	J10246103	" " " " 10kΩ
			R7028	J10246103	" " " " 10kΩ
			R7029	J10246103	" " " " 10kΩ
			R7030	J10246222	" " " " 2.2kΩ
			R7031	J10246104	" " " " 100kΩ
			R7032	J02245473	Carbon film " SJ 47kΩ

DTMF RECEIVER UNIT

Symbol No.	Part No.	Description
PB-2416A	F0002416A	Printed Circuit Board
	C024160A	PCB with components
		IC, TRANSISTOR
Q7001	G1090422	SSi201 (IC)
Q7002	G1090409	MC14514B (")
Q7003	G1090384	MC14538B (")
Q7004	G1090053	MC14081B (")
Q7005	G1090384	MC14538B (")
Q7006	G1090053	MC14081B (")
Q7007	G1090053	" (")
Q7008	G1090053	" (")
Q7009	G1090053	" (")
Q7010	G1090067	MC14013B (")
Q7011	G1090067	" (")
Q7012	G1090067	" (")
Q7013	G1090375	MC14536B (")
Q7014	G3304580B	2SC458B (TR)
Q7015	G3304580B	" (")
Q7016	G3304580B	" (")
Q7017	G3304580B	" (")
Q7018	G3304580B	" (")
Q7019	G3304580B	" (")
Q7020	G3304580B	" (")
Q7021	G3107330R	2SA733R (")
Q7022	G3312090	2SC1209 (")
Q7023	G1090080	μPC78L08 (IC)

(FTR-710A) (FTR-2410A) (FTR-5410)

R7033	J02245332	Carbon film	1/4W SJ	3.3kΩ	C7020	K50177103	Mylar 50WV 0.01μF (50F2U103M)
R7034	J10246104	Carbon composition	" GK	100kΩ	C7021	K70120006	Tantalum 16WV 3.3μF (489D335X0016B1)
R7035	J10246221	" "	" "	220Ω	C7022	K70120006	" " 3.3μF (")
R7036	J10246104	" "	" "	100kΩ	C7023	K70120006	" " 3.3μF (")
R7037	J10216472	" "	1/8W "	4.7kΩ	C7024	K70127225	" " 2.2μF (CS15E1C2R2M1S)
R7038	J10216472	" "	" "	4.7kΩ	C7025	K50177223	Mylar 50WV 0.022μF (50F2U223)
R7039	J10216472	" "	" "	4.7kΩ	C7026	K70120006	Tantalum 16WV 3.3μF (489D335X0016B1)
R7040	J10216472	" "	" "	4.7kΩ	C7027	K50177332	Mylar 50WV 0.0033μF (50F2U332M)
R7041	J10216472	" "	" "	4.7kΩ	C7028	K70140007	Tantalum 25WV 1μF (489D105X0025A1)
R7042	J10216472	" "	" "	4.7kΩ	C7029	K70120002	" 16WV 10μF (489D106X0016C1)
R7043	J10216472	" "	" "	4.7kΩ	C7030	K70120002	" " 10μF (")
R7044	J10216472	" "	" "	4.7kΩ	C7031	K70167334	" 35WV 0.33μF (CS15E1VR33M1S)
R7045	J10216472	" "	" "	4.7kΩ	C7032–7038	K10186102	Ceramic Disc 63WV 0.001μF (RD870-1B102K63V)
R7046	J10216472	" "	" "	4.7kΩ			**DIP SWITCH**
R7047	J10216472	" "	" "	4.7kΩ	S7001	N7090026	SGK 106-2
R7048	J10216472	" "	" "	4.7kΩ			
R7049	J10246106	" "	1/4W "	10MΩ			**CONNECTOR**
					J7001	P0090039	5048-13A
		BLOCK RESISTOR					
RB7001	J40900041	01-0510	100kΩx16				**TP TERMINAL**
RB7002	J40900020	RA1/16K5R	100kΩx5		TP7001	Q5000037	TP-H
						Q5000036	TP-G
		POTENTIOMETER					
VR7001	J51745103	PN822H103	10kΩB		P7001	T9204471B	
							IC SOCKET
		CAPACITOR			QS7001	P3090073	C84-22-02
C7001	K50177103	Mylar 50WV 0.01μF (50F2U103M)					
C7002	K50177103	" " 0.01μF (")					
C7005	K50177103	" " 0.01μF (")					
C7006	K50177103	" " 0.01μF (")					
C7007	K50177103	" " 0.01μF (")					
C7008	K50177103	" " 0.01μF (")					
C7009	K50177103	" " 0.01μF (")					
C7010	K50177103	" " 0.01μF (")					
C7011	K50177103	" " 0.01μF (")					
C7012	K50177103	" " 0.01μF (")					
C7013	K50177103	" " 0.01μF (")					
C7014	K50177103	" " 0.01μF (")					
C7015	K50177103	" " 0.01μF (")					
C7016	K50177103	" " 0.01μF (")					
C7017	K50177103	" " 0.01μF (")					
C7018	K50177103	" " 0.01μF (")					
C7019	K50177103	" " 0.01μF (")					

FTR-710, FTR-2410 COS UNIT

Symbol No.	Part No.	Description
PB-2307A	F0002307	Printed Circuit Board
	C023070A	PCB with components
		IC, TRANSISTOR
Q3001	G1090220	MLM2902 (IC)
Q3002	G1090374	MC1458CP (IC)
Q3003	G1090124	MC14016B (IC)
Q3004	G1090052	MC14049B (IC)
Q3005	G1090052	" (IC)
Q3006	G3304580B	2SC458B (TR)
C3007	G3304580B	" (TR)
Q3008	G1090375	MC14536B (IC)
Q3009	G3304580B	2SC458B (TR)

		DIODE	
D3001	G2015550	Si	1S1555
D3002	G2015550	〃	〃
D3003	G2015550	〃	〃
D3004	G2015550	〃	〃
D3005	G2015550	〃	〃
D3006	G2015550	〃	〃
D3007	G2015550	〃	〃
D3008	G2015550	〃	〃
		RESISTOR	
R3001	J10246103	Carbon composition	1/4W GK 10kΩ
R3002(25kHz)	J02245473	〃 film	〃 SJ 47kΩ
R3002(12.5kHz)	J02245104	〃 〃	〃 〃 100kΩ
R3003	J10246393	〃 composition	1/4W GK 39kΩ
R3004	J10246393	〃 〃	〃 〃 39kΩ
R3005	J02245183	〃 film	〃 SJ 18kΩ
R3006	J02245393	〃 〃	〃 〃 39kΩ
R3007	J10246273	〃 composition	1/4W GK 27kΩ
R3008	J02245104	〃 film	〃 SJ 100kΩ
R3009	J10246473	〃 composition	1/4W GK 47kΩ
R3010	J10246473	〃 〃	〃 〃 47kΩ
R3011	J02245473	〃 film	〃 SJ 47kΩ
R3012	J10246473	〃 composition	1/4W GK 47kΩ
R3013	J02245153	〃 film	〃 SJ 15kΩ
R3014	J10246153	〃 composition	1/4W GK 15kΩ
R3015	J02245473	〃 film	〃 SJ 47kΩ
R3016	J02245473	〃 〃	〃 〃 47kΩ
R3017	J02245473	〃 〃	〃 〃 47kΩ
R3018	J02245473	〃 〃	〃 〃 47kΩ
R3019	J02245103	〃 〃	〃 〃 10kΩ
R3020	J02245103	〃 〃	〃 〃 10kΩ
R3021	J02245103	〃 〃	〃 〃 10kΩ
R3022	J02245103	〃 〃	〃 〃 10kΩ
R3023	J02245473	〃 〃	〃 〃 47kΩ
R3024	J02245103	〃 〃	〃 〃 10kΩ
R3025	J02245103	〃 〃	〃 〃 10kΩ
R3026	J10246103	〃 composition	1/4W GK 10kΩ
R3027	J10246103	〃 〃	〃 〃 10kΩ
R3028	J02245473	〃 film	〃 SJ 47kΩ
R3029	J02245332	〃 〃	〃 〃 3.3kΩ
R3030	J02245473	〃 〃	〃 〃 47kΩ
R3031	J02245473	〃 〃	〃 〃 47kΩ
R3032	J02245473	〃 〃	〃 〃 47kΩ
R3033	J10246473	〃 composition	1/4W GK 47kΩ
R3034	J02245473	〃 film	〃 SJ 47kΩ
R3035	J02245103	〃 〃	〃 〃 10kΩ
R3036	J02245473	〃 〃	〃 〃 47kΩ
R3037	J10246473	〃 composition	1/4W GK 47kΩ
R3038	J02245330	〃 film	〃 SJ 33Ω
R3039	J02245473	〃 〃	〃 〃 47kΩ
R3040	J02245103	〃 〃	〃 〃 10kΩ

		POTENTIOMETER	
VR3001	J51724503	PN822H503	50kΩB
VR3002	J51724103	〃 103	10kΩB
VR3003	J51724102	〃 102	1kΩB
VR3004	J51739205	EVM-G0GA01B26	2MΩB
VR3005	J51724103	PN822H103	10kΩB
		CAPACITOR	
C3001	K70120002	Tantalum 16WV (489D106X0016C1)	10μF
C3002	K50177332	Mylar 50WV (50F2U332M)	0.0033μF
C3003	K10179011	Ceramic Disc 〃 (2222-660-02471)	470pF
C3004	K50177223	Mylar 〃 (50F2U223M)	0.022μF
C3005	K50177223	〃 〃 (〃)	0.022μF
C3006	K50177223	〃 〃 (〃)	0.022μF
C3008	K70120002	Tantalum 16WV (489D106X0016C1)	10μF
C3009	K70120002	〃 〃 (〃)	10μF
C3010	K70120003	〃 〃 (489D476X0016F1)	47μF
C3011	K70120003	〃 〃 (〃)	47μF
C3012	K10179014	Ceramic Disc 50WV (CK45B1H102MY)	0.001μF
C3013	K70127225	Tantalum 16WV (CS15E1C2R2M)	2.2μF
C3014	K50177103	Mylar 50WV (50F2U103M)	0.01μF
C3015	K50177103	〃 〃 (50F2U103M)	0.01μF
C3016	K50177222	〃 〃 (50F2U222M)	0.0022μF
C3017	K10179014	Ceramic Disc 〃 (CK45B1H102MY)	0.001μF
C3018	K10179014	〃 〃 〃 (〃)	0.001μF
C3019	K10179014	〃 〃 〃 (〃)	0.001μF
C3020	K50177103	Mylar 〃 (50F2U103M)	0.01μF
C3021	K50177103	〃 〃 (〃)	0.01μF
C3022	K10179014	Ceramic Disc 〃 (CK45B1H102MY)	0.001μF
C3023	K10179015	〃 〃 〃 (CK45B1H103MY)	0.01μF
C3024	K70120002	Tantalum 16WV (489D106X0016C1)	10μF
		INDUCTOR	
L3001	L1190017	FL5H-102K 1mH	
		RELAY	
RL3001	M1190008	FBR-221D-006	

		CONNECTOR
J3001	P0090054	5048-07A
J3002	P0090054	〃
J3003	P0090054	〃
J3004	P0090051	5048-06A
J3005	P0090054	5048-07A
J3006	P0090054	〃
		TP TERMINAL
TP3001	Q5000037	TP-H
TP3002	Q5000037	〃
TP3003	Q5000037	〃
TP3004	Q5000037	〃
TP3005	Q5000037	〃

FTS-32R		
Symbol No.	Part No.	Description
	F0002423	Printed Circuit Board
		IC
Q1	G1090123	78L08A
Q2	G1090425	LM324
Q3	G1090426	IC-107
Q6	G1090427	TL063CP
		TRANSISTOR
Q4,5	G3309451P /Q	2SC945A P/Q
		DIODE
D1–4	G2090027	Si 1SS53
D5,6	G2015550	〃 1S1555
		CRYSTAL
X1	H0102474	UM-1 1MHz
		RESISTOR
R2	J00215222	Carbon film 1/8W VJ 2.2kΩ
R31	J00215272	〃 〃 〃 〃 2.7kΩ
R10	J00215562	〃 〃 〃 〃 5.6kΩ
R18	J01215562	〃 〃 〃 TJ 5.6kΩ
R3,26	J00215103	〃 〃 〃 VJ 10kΩ
R25	J01215103	〃 〃 〃 TJ 10kΩ
R1	J00215123	〃 〃 〃 VJ 12kΩ
R29	J00215153	〃 〃 〃 〃 15kΩ
R13	J01215183	〃 〃 〃 TJ 18kΩ
R22	J00215473	〃 〃 〃 VJ 47kΩ
R23	J01215473	〃 〃 〃 TJ 47kΩ
R28	J00215623	〃 〃 〃 VJ 62kΩ
R4,32	J00215104	〃 〃 〃 〃 100kΩ
R12,14,15,30,33	J01215104	〃 〃 〃 TJ 100kΩ
R21	J00215124	〃 〃 〃 VJ 120kΩ
R36	J00215184	〃 〃 〃 〃 180kΩ
R19	J00215224	〃 〃 〃 〃 220kΩ
R7,20	J00215474	〃 〃 〃 〃 470kΩ
R9,16,17	J01215474	〃 〃 〃 TJ 470kΩ
R8	J01215564	〃 〃 〃 〃 560kΩ
R5	J01215105	〃 〃 〃 〃 1MΩ
R6,24,34,35	J00215105	〃 〃 〃 VJ 1MΩ
R11,27	J00215275	〃 〃 〃 〃 2.7MΩ
		POTENTIOMETER
VR1	J51745103	H0651A013-10KB 10kΩB
		BLOCK RESISTOR
RB1	J40900023	DA-2
		CAPACITOR
C25	K00173100	Ceramic disc 50WV SL 10pF (DD104-SL100D50V)
C18,20	K10176101	〃 〃 〃 B 100pF (DD104B101K50V)
C10	K10176221	〃 〃 〃 〃 220pF (DD104B221K50V)

(FTR-710) (FTR-2410)

(FTS-32R)

C12	K10176271	Ceramic disc 50WV B 270pF (DD104B271K50V)
C7,8,9,19	K23170014	Monolithic ceramic 50WV 0.0033μF (SR155C332M)
C6	K23170013	" " " 0.01μF (SR155C103M)
C11	K23170011	" " " 0.22μF (SR205E224Z)
C22,23,24	K19149003	Semiconductor " " 0.0015μF (UAT04X152K-L05AE)
C1	K70140005	Tantalum 25WV 0.47μF (48PD474X0025A1)
C13–17,21,26	K70140007	" " 1μF (489D105X0025A1)
C5	K40179001	Electrolytic 50WV 1μF (ECE-A1HK010)
C2,3,4	K40129012	" 16WV 10μF (ECE-A1CK100)
		SWITCH
SW1	N7090026	SGK1062
		IC SOCKET
	P3090070	ICC04-004 350T
	P3090071	ICC04-007 350T
	P3090072	ICC04-009 350T

FTS-5

Symbol No.	Part No.	Description
	F2528000	Printed Circuit Board
		IC
Q1	G1090374	MC1458CP
Q3	G1090220	MLM2902P
Q7	G1090068	MC14011BCP
Q9	G1090384	MC14835BCP
		TRANSISTOR
Q2,4–6,8,10	G3326040E	2SC2603E
		DIODE
D1–4	G2015550	1S1555
		RESISTOR
R9	J20249043	Metallic Film 1/4W F 82.5kΩ (ERO25CKF8252)
R10	J20249065	" " " " 180kΩ (ERO25CKF1803)
R11	J20249012	" " " " 68.1kΩ (ERO25CKF6812)
R23	J00215331	Carbon film 1/8W VJ 330Ω
R21	J00215332	" " " " 3.3kΩ
R19	J00215562	" " " " 5.6kΩ
R14,15,16	J00215103	" " " " 10kΩ
R1,18,29,30,34	J00215153	" " " " 15kΩ
R20	J00215223	" " " " 22kΩ
R2,3,4	J00215273	Carbon film 1/8W VJ 27kΩ
R6,24,31	J00215473	" " " " 47kΩ
R8	J00215683	" " " " 68kΩ
R17	J00215823	" " " " 82kΩ
R25–28,32,33	J00215104	" " " " 100kΩ
R12,13,22	J00215154	" " " " 150kΩ
R7	J00215224	" " " " 220kΩ
R5	J00215824	" " " " 820kΩ
		POTENTIOMETER
VR1,2	J51745473	H0651A017-47KB 47kΩB
VR3,4	J51745225	H0651A027-2.2MB 2.2MΩB
		CAPACITOR
C7	K02185820	Ceramic disc 63WV CH 82pF (RD873-2NPO-820J63V)
C5,6	K23170007	Monlithic Ceramic 50WV " (RPE110C102K50V) 1000pF
C13,14	K50177332	Mylar " 0.0033μF (50F2U332M)
C1,2	K50177472	" " 0.0047μF (50F2U472M)
C15	K50177223	" " 0.022μF (50F2U223M)
C11,12	K70167684	Tantalum 35WV 0.68μF (CS15E1V-R68M)
C10	K70127225	" 16WV 2.2μF (CS15E1C2R2M)
C3,4,8,9	K70120002	" " 10μF (489D106X0016C1)
		SWITCH
SW1	N6090008	SSS-012148
		PIN CONNECTOR
J1	P0090051	5048-06A
	T9204618A	CONNECTION CABLE

FL-2450
MAIN CHASSIS

Symbol No.	Part No.	Description
		LED
	G2090203	SDB-205-BGD
		RECEPTACLE
J1,2	P1090326	M-PA-JJ
J3	P1090034	D7-701B-00
J4 (with wire)	T9204642B	
		TRANSISTOR
Q101	G3326940	2SC2694
		DIODE
D101–104	G2090118	1SS97
		POTENTIOMETER
VR101	J51721501	EVLS3AA00B52 500ΩB
		CAPACITOR
C109,110,120,121	K02182050	Ceramic disc 50WV CH 5pF (RD870-1NPO-050C63V)
C113,119	K02183070	" " " " 7pF (RD870-1NPO-070D63V)
C111,112, 114–118	K02183100	" " " " 10pF (RD870-1NPO-100D63V)
C122,125	K10179015	" " " B 0.01μF (CDS080XB103K50)
C123,126	K23170020	" chip " 0.001μF (GR40W5R102M)
C128–130	K21170002	" Feed thru " 0.001μF (ECK-Y1H-102WE)
C102	K30279070	Dipped Mica 500WV 39pF (DM15D390J5)
C103,104	K30279072	" " " 68pF (DM15D680J5)
C101,108	K30279093	" " " 1000pF (DM19D102J5)
C106	K32279018	Ribbon Mica " 22pF (RM40-2H220DA)
C105	K32279020	" " " 27pF (RM40-2H270DA)
C107	K32279060	" " " 250pF (RM20-251J5)
C124,127	K40129023	Electrolytic 16WV 47μF (16RJ2-47)
		TRIMMER CAPACITOR
TC101	K91000032	B2PY 100pF
TC102	K91000046	C1P2 70pF

PA UNIT

Symbol No.	Part No.	Description
	F2523000	Printed Circuit Board
	C025230A	PCB with components
		INDUCTOR
L101	L1020080A	
L102	L0020354A	
L103	L0020333	
L104,107	L0020358A	
L105,106	L0020661	
L108,109	L0020353	
		FERRITE BEADS
FB101	L9190001	Ri 3x3x1
		COAX PLUG/CABLE
P101,102	T9204644C	MP-3, 3D-QEV

AFP UNIT

Symbol	Part No.	Description
	F2524000	Printed Circuit Board
	C025240A	PCB with components
		THYRISTOR
Q201	G3090044	CW12B
		RESISTOR
R201	J02245102	Carbon film 1/4W 1kΩ
R202	J02245224	" " " 220kΩ
		POTENTIOMETER
VR201	J50707103	PN822H103V 10kΩB
		CAPACITOR
C201–203	K10186102	Ceramic disc 63WV 0.001μF (RD870-1B102K63V)

ACCESSORIES

Symbol No.	Part No.	Description
	T9100160A	Coaxial Cable
	T9101230	Control Cable

(FL-2450)

FL-5450
MAIN CHASSIS

Symbol No.	Part No.	Description
		LED
	G2090203	SDB-205-BGD
J1,2	P1090326	RECEPTACLE
J3	P1090034	M-PA-JJ
J4 (with wire)	T9204642B	D7-701B-00

PA UNIT

Symbol No.	Part No.	Description
	F2530000	Printed Circuit Board
	C025300A	PCB with components
		TRANSISTOR
Q101	G3326950	2SC2695
Q102	G3331020	2SC3102
		DIODE
D101–103	G2090118	1SS97
		RESISTOR
R101	J02245561	Carbon film 1/4W SJ 560Ω
		POTENTIOMETER
	J51729201	RV8-FAN 200Ω 200ΩB
		CAPACITOR
C115	K02182020	Ceramic disc 63WV CH 2pF (RD870-1NPO-020C63V)
C108,109,116	K02182030	" " " " 3pF (RD870-1NPO-030C63V)
C110,103	K02182040	" " " " 4pF (RD870-1NPO-040C63V)
C111–114	K02183070	" " " " 7pF (RD870-1NPO-070D63V)
C118,121,124	K10179015	" " " B 0.01μF (CDS080XB103K50)
C101	K22171211	" chip 50WV CH 10pF (C3216CH1H100DFA)
C102	K22171221	" " " " 27pF (C3216CH1H270JFA)
C117,120,123	K22171801	" " " B 0.001μF (C3216B1H102KFA)
C126–128	K21170002	" Feed thru 0.001μF (ECK-Y1H-102KWE)
C104	K32279016	Ribbon Mica " 18pF (RM40-2H180DA)
C105,106	K32279018	" " " 22pF (RM40-2H220DA)
C107	K32279028	" " " 56pF (RM40-2H560FA)
C119,122,124	K40129023	Electrolytic 16WV 47μF (16RJ2-47)

		TRIMMER CAPACITOR
TC101	K91000123	2222-808-31159 15pF
TC102,103	K91000031	B-1P 40pF
		INDUCTOR
L101,102	L0021372	
L103–106	L0021373A	
L107	L0021374	
L108	L0020665	
L109,110	L0021375	
		COAX PLUG/CABLE
P101,102	T9204644C	MP-3 3D-QEV

AFP UNIT

Symbol No.	Part No.	Description
	F2524000	Printed Circuit Board
	C025240A	PCB with components
		THYRISTOR
Q201	G3090044	CW12
		RESISTOR
R201	J02245102	Carbon film 1/4W 1kΩ
R202	J02245224	" " " 220kΩ
		POTENTIOMETER
VR201	J50707103	PN822H103V 10kΩB
		CAPACITOR
C201–203	K10186102	Ceramic disc 63WV 0.001μF (RD870-1B102K63V)

ACCESSORIES

Symbol No.	Part No.	Description
	T9100160A	Coaxial Cable
	T9101230	Control Cable

(FL-5450)

FP-15 MAIN CHASSIS

Symbol No.	Part No.	Description
		TRANSISTOR
Q1–4	G3090014	2N3055
Q5	G3408800D	2SD880D
		DIODE
	G2090121	S2SVB10
	G2090203	SDB-205-BGD (LED)
		RESISTOR
R1–4	J30406029	Cement 10W 0.2Ω
		CAPACITOR
C1	K43170002	Electrolytic 50WV 22000μF (50RL 22000)
C3,4	K12329002	Ceramic 1.4kV 0.0047μF (ECK-DAL472PE)
C5	K10179015	" 50WV B 0.01μF (CDS080XB103K50)
		POWER TRANSFORMER
PT1	L3030071	
		RELAY
RL1	M1090010	FRL-263D012/0.2CK-0E
		SWITCH
SW1	N2090028	8B2011
		FUSE HOLDER
FH1	P2000012	SN2059 (AC)
FH2	P2000025	H203 (DC)
		FUSE
F1	Q0000012	6A (100–117VAC)
	Q0000004	3A (200–234VAC)
F2	Q0000008	15A (DC)
		RECEPTACLE
	P0090094	PA125
		THRU TERMINAL
	Q6000161	M115A-2AK
	Q6000162	M115A-3AK
	S6000058	" COVER
		TERMINAL
	Q6000036	1L6P (3-0-3)
		PLUG/CABLE
P7 (with wire)	T9204496	(2SD880D)
P2 (")	T9204643A	(DC OUT)

AVR UNIT

Symbol No.	Part No.	Description
	F0002248A	Printed Circuit Board
	C022480A	PCB with components
		IC
Q101	G1090373	TA7089P
		DIODE
D101,102	G2090001	10D1
		RESISTOR
R103	J01245470	Carbon film 1/4W TJ 47Ω
R101	J01245151	" " " " 150Ω
R104	J01245332	" " " " 3.3kΩ
R105	J01245822	" " " " 8.2kΩ
R102	J01245103	" " " " 10kΩ
R106	J20306102	Metalic " 1W 1kΩ
R107	J10276681	Carbon Composition 1/2W 680Ω
		POTENTIOMETER
VR101	J51721502	EVL-S3AA00B53 5kΩB
VR102	J51721102	EVL-S3AA00B13 1kΩB
		CAPACITOR
C105	K12171102	Ceramic disc 50WV E 0.001μF (DD104E102P50V)
C102,104,107	K13179008	" " " F 0.01μF (DD106F103Z50V)
C103	K50177103	Mylar " 0.01μF (50F2U103M)
C101	K40169003	Electrolytic 35WV 330μF (35RE330)
C106	K40129011	" 16WV 1000μF (16RE1000)

RELAY CONTROL UNIT

Symbol No.	Part No.	Description
	F2522000	Printed Circuit Board
	C025220A	PCB with components
		IC
	G1090301	μPC7812H
		DIODE
	G2090211	V06C
		RESISTOR
R201	J20336330	Metallic film 2W 33Ω
R202	J30375569	Cement 5W 5.6Ω

(FP-15)

		CAPACITOR	
C201	K50177103	Mylar 50WV 0.01μF (50F2U103M)	
C202	K70167334	Tantalum 35WV 0.33μF (CS15E1V-R33MIS)	
C203	K70120001	" 16WV 4.7μF (48PD475X0016B1)	

ACCESSORIES

Symbol No.	Part No.	Description
		AC CORD
	T9013280	2 wire 2 prong plug
	T9013282	3 wire 3 prong UL plug
	T9013284	3 wire 2 prong EU plug
	T9013283	3 wire 3 prong Australia plug
		SPARE FUSE
	Q0000012	6A (100–117VAC)
	Q0000004	3A (200–234VAC)

(FP-15)

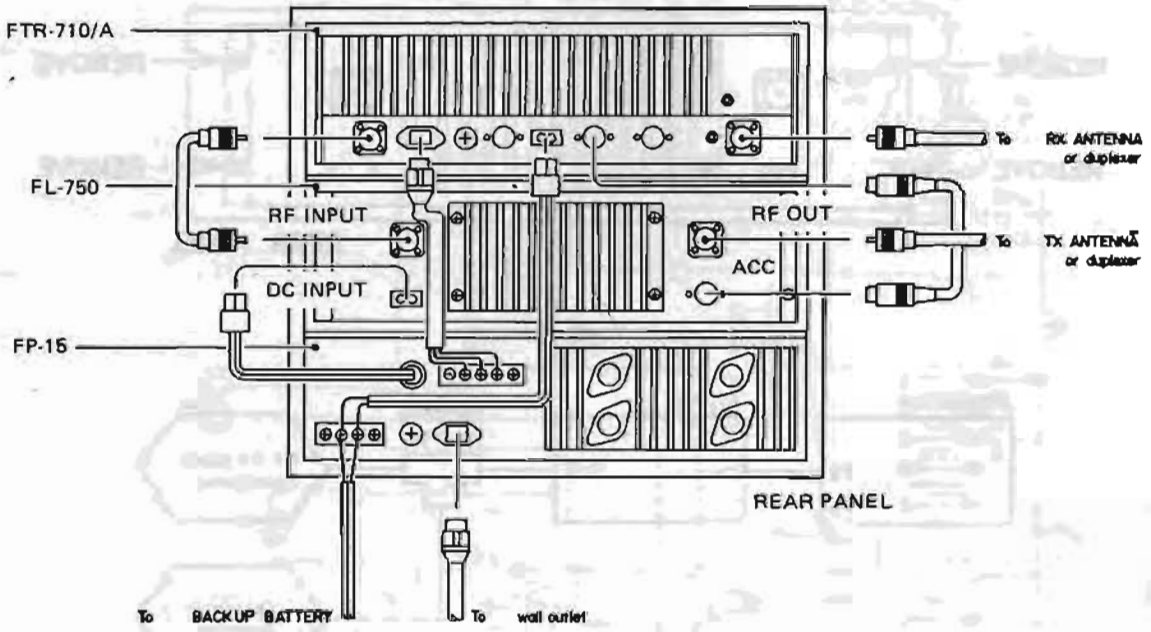
FL-750 50W VHF
REPEATER POWER AMPLIFIER

The FL-750 is a commercial-grade, continuous-duty class C VHF power amplifier designed to boost the RF power output of the FTR-710/A VHF Repeater to 50 watts. Designed to match the Repeater, the FL-750 mounts easily in the 19-inch rack just beneath the FTR-710/A. For operation from the AC line, the rack-mounting FP-15 AC Power Supply can be used to supply the required DC voltage for the FL-750.

Specifications

Frequency range	68–88 MHz
Exciter power	8 watts RF
Output power	50 watts RF
Spurious radiation	–60 dBc or better
Input/output impedance	50 ohms
Power requirements	13.6 VDC @ 8A
Operating temperature range	–30 to +60°C
Dimensions (WDH)	432 x 185 x 133 mm
Weight	approx. 3.5 kg (7.7 lb)

Interconnections



DC INPUT

This jack accepts 13.6 VDC @ 8 Amps from a DC power supply. The DC output cable from the FP-15 mates with this jack, and the POWER indicator on the front of the FL-750 will be lit whenever power is applied here.

RF INPUT

The TX output jack from the FTR-710/A should be connected to this coaxial jack using the coaxial cable supplied with the FL-750. During transmission, the repeater will supply 10W RF to this jack.

ACC

Beginning from production lot 8, this jack is provided along with a connection cable, for connection to the ACC jack on the FTR-710/A. This connection is not needed on earlier models.

RF OUTPUT

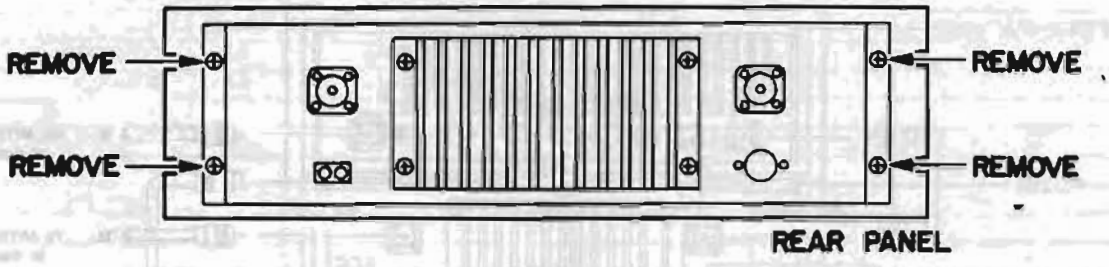
50 watts RF output is present at this coaxial jack, which must be connected to the transmitting antenna or TX terminal of the Duplexer. Impedance must be 50 ohms at the transmitting frequency.

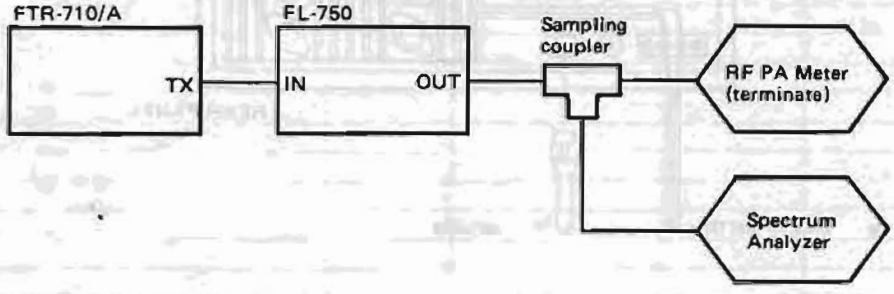
NOTE:

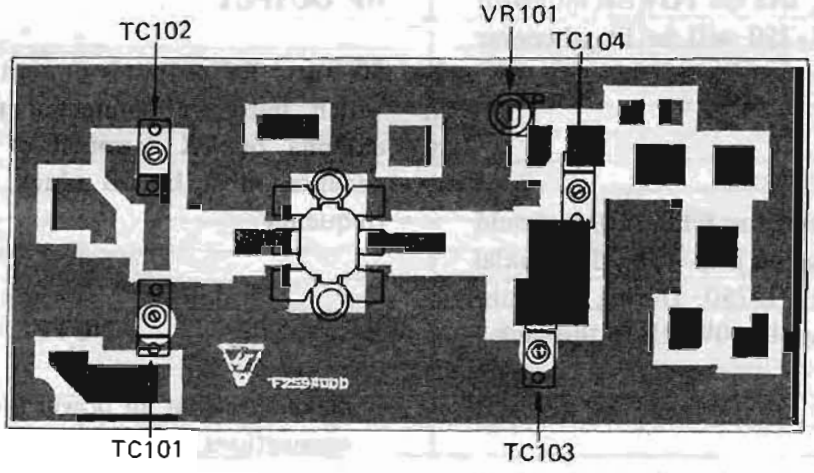
Make sure that all power is off before making connections.

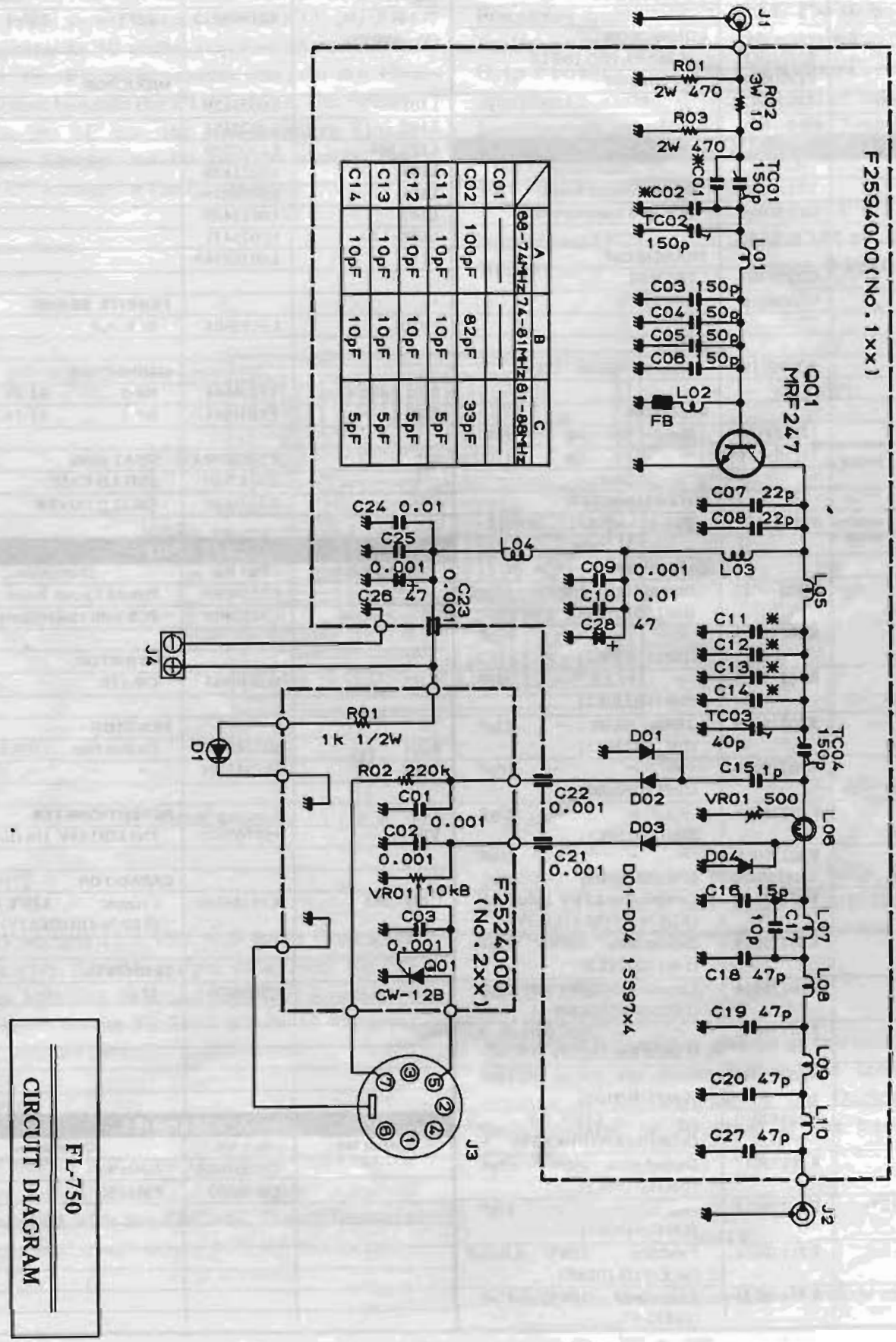
Alignment

1. Remove the four screws indicated by the arrows in the diagram, and remove the front panel slowly, just enough to gain access to the adjustment points without straining the POWER indicator wiring.
2. Connect the test equipment as indicated below.
3. In the FTR-710/A, adjust VR_{102} on the TX Unit to the fully clockwise position.
4. Activate the repeater transmitter, and adjust TC_{101} through TC_{104} alternately to provide maximum power output on the wattmeter and minimum spurious on the analyzer, simultaneously.
5. Now adjust VR_{102} again in the FTR-710/A so that the wattmeter indicates 50 watts.
6. Remove the test equipment and replace the front panel and the four screws. This completes the alignment.









FL-750

CIRCUIT DIAGRAM

FL-750 MAIN CHASSIS

Symbol No.	Part No.	Description
		LED
D1	G2090203	SDB-205-BGD
		CONNECTOR
J1,2	P1090265	M-261-PA (UG-104/U)
J3	P1090034	D7-701B-00
J4 (with wire)	T9204642A	

PA UNIT

Symbol	Part No.	Description
	F2594000	Printed Circuit Board
	C025940A	PCB with components
		TRANSISTOR
Q101	G3326940	2SC2694
	G3090056	(MRF247)
		DIODE
D101–104	G2090118	Schottky Barrier 1SS97
		RESISTOR
R102	J21355100	Metallic film 3W 10Ω
R101,103	J21335471	" " 2W 470Ω
		POTENTIOMETER
VR101	J51721501	EVL-S3AA00B52 500ΩB
		CAPACITOR
C102 (68–74MHz)	K30279027	Dipped Mica 500WV 100pF (DM15D101K5)
C102 (74–81MHz)	K30279026	" " " 82pF (DM15D820K5)
C102 (81–88MHz)	K30279021	" " " 33pF (DM15D330K5)
C111,112 (68–81MHz)	K30279019	" " " 22pF (DM15D220K5)
C111,112 (81–88MHz)	K30279010	" " " 10pF (DM15D100D5)
C113 (68–74MHz)	K30279019	" " " 22pF (DM15D220K5)
C113 (74–88MHz)	K30279015	" " " 10pF (DM15D100D5)
C103–106	K07185151	Ceramic disc 63WV 150pF RH (RD874-2N150-151J63V)
C107,108	K30279019	Dipped Mica 500WV 22pF (DM15D220K5)
C109,125	K10179014	Ceramic disc 50WV 0.001μF B (CD050XB102K50)
C110,124	K10179015	" " " 0.01μF B (CD095XB103K50)
C114,117	K30279015	" " " 10pF (DM15D100D5)
C115	K02182010	" " 63WV 1pF CH (RD870-1NPO-010C63V)
C116	K30279017	Dipped Mica 500WV 15pF (DM15D150K5)
C118–120,127	K30279023	" " " 47pF (DM15D470K5)
C121–123	K21170002	Feedthru 50WV 0.001μF (ECK-Y1H-102WE)
C126,128	K40129023	Electrolytic 16WV 47μF (16RJ2-47)
TC101,102	K91000034	**TRIMMER CAPACITOR** B3P 150pF
TC103	K91000031	B1P 40pF
TC104 (68–81MHz)	K91000034	B3P 150pF
TC104 (81–88MHz)	K91000032	B2PY 100pF
		INDUCTOR
L101	L0021428	
L102	L1020351	
L103,104	L1020709	
L105	L0021429	
L106	L0020355A	
L107	L0021430	
L108–110	L0021431	
L111	L0020354A	
		FERRITE BEADS
FB101	L9190001	Ri 3x3x1
		CONNECTOR
P101 (with wire)	T9204644	MP-3 RF IN
P102 (")	T9204644	MP-3 RF OUT
	R5088000A	HEAT SINK
	R0087980	SHIELD CASE
	R0501680	SHIELD COVER

AFP UNIT

Symbol No.	Part No.	Description
	F2524000	Printed Circuit Board
	C025240A	PCB with components
		THYRISTOR
D201	G3090044	CW-12B
		RESISTOR
R201	J02245102	Carbon film 1/4W SJ 1kΩ
R202	J02245224	" " " " 220kΩ
		POTENTIOMETER
VR201	J50707103	PN822H103V 10kΩB
		CAPACITOR
C201–203	K10186102	Ceramic 63WV B 0.001μF (RD870-1B102K63V)
		TERMINAL
	Q5000036	TP-G

ACCESSORIES

Symbol No.	Part No.	Description
	T9100160A	Cable A
	T9101230	Cable B

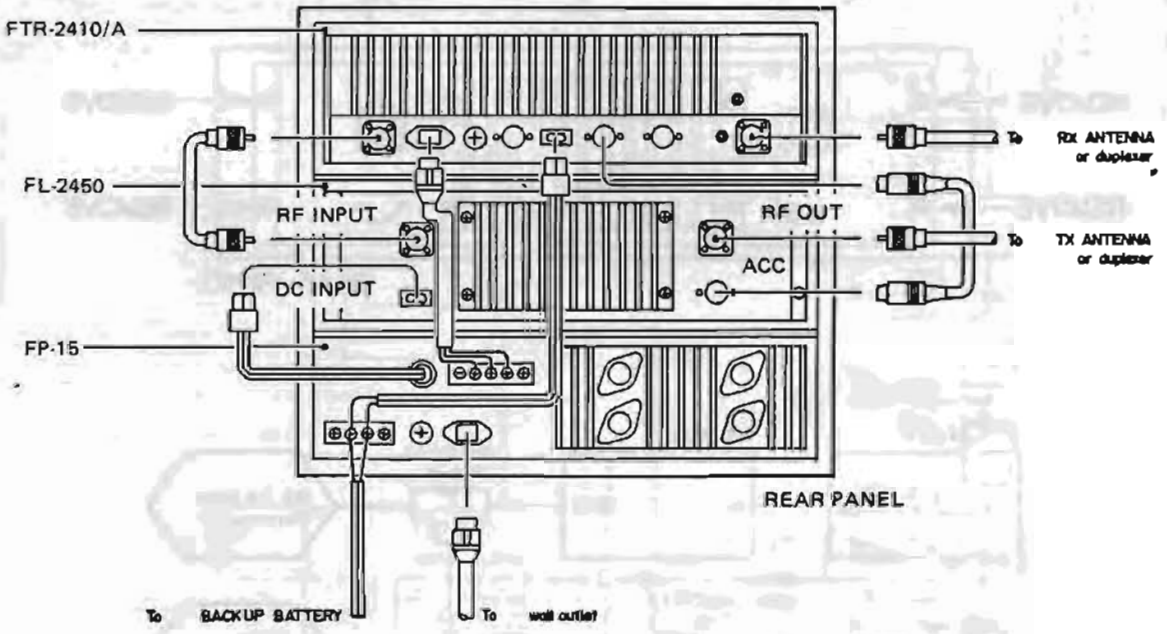
FL-2450 50W VHF
REPEATER POWER AMPLIFIER

The FL-2450 is a commercial-grade, continuous-duty class C VHF power amplifier designed to boost the RF power output of the FTR-2410/A VHF Repeater to 50 watts. Designed to match the Repeater, the FL-2450 mounts easily in the 19-inch rack just beneath the FTR-2410/A. For operation from the AC line, the rack-mounting FP-15 AC Power Supply can be used to supply the required DC voltage for the FL-2450.

Specifications

Frequency range	134–174 MHz
Exciter power	10 watts RF
Output power	50 watts RF
Spurious radiation	–60 dBc or better
Input/output impedance	50 ohms
Power requirements	13.6 VDC @ 8A
Operating temperature range	–10 to +50° C
Dimensions (WDH)	432 x 185 x 133 mm
Weight	approx. 3 kg (6.6 lb)

Interconnections



DC INPUT

This jack accepts 13.6 VDC @ 8 Amps from a DC power supply. The DC output cable from the FP-15 mates with this jack, and the POWER indicator on the front of the FL-2450 will be lit whenever power is applied here.

RF INPUT

The TX output jack from the FTR-2410/A should be connected to this coaxial jack using the coaxial cable supplied with the FL-2450. During transmission, the repeater will supply 10W RF to this jack.

ACC

Beginning from production lot 8, this jack is provided along with a connection cable, for connection to the ACC jack on the FTR-2410/A. This connection is not needed on earlier models.

RF OUTPUT

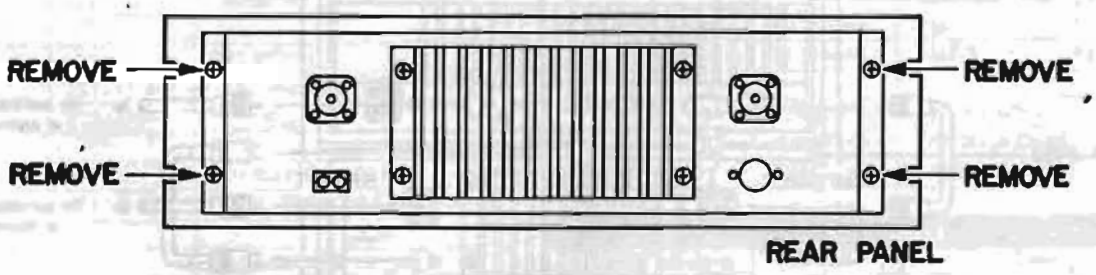
50 watts RF output is present at this coaxial jack, which must be connected to the transmitting antenna or TX terminal of the Duplexer. Impedance must be 50 ohms at the transmitting frequency.

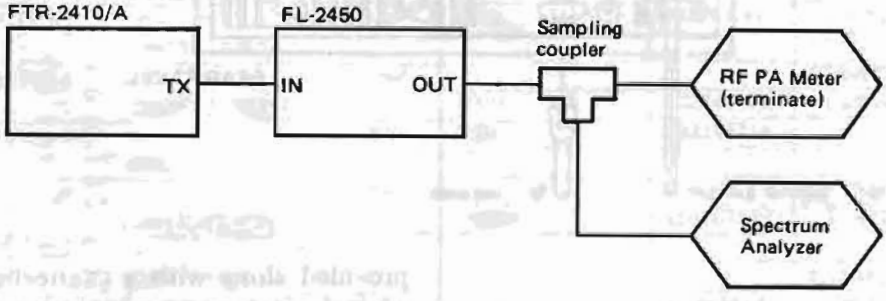
NOTE:

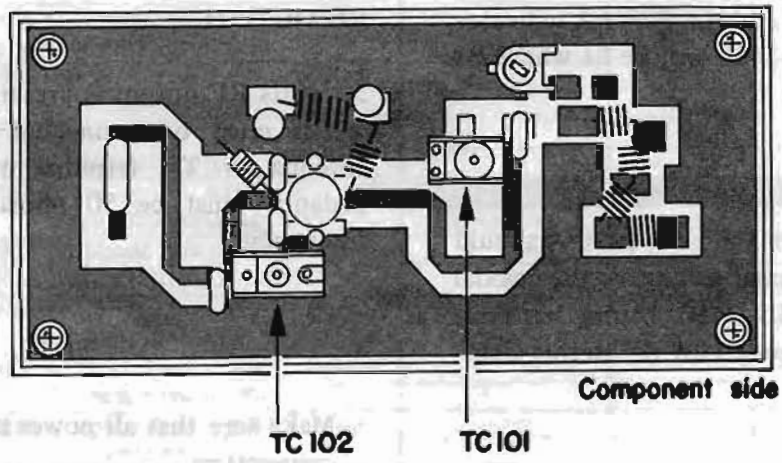
Make sure that all power is off before making connections.

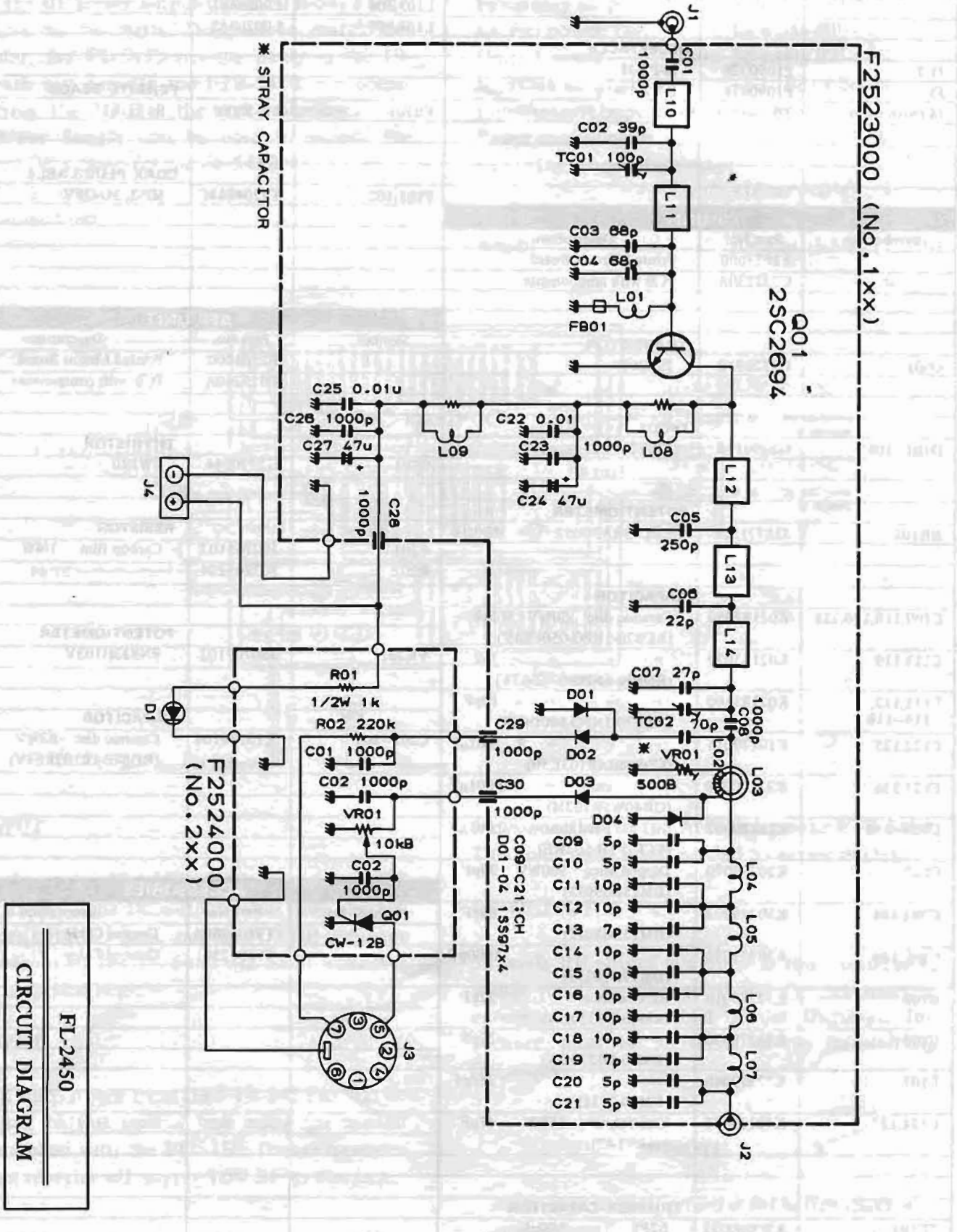
Alignment

1. Remove the four screws indicated by the arrows in the diagram, and remove the front panel slowly, just enough to gain access to the adjustment points without straining the POWER indicator wiring.
2. Connect the test equipment as indicated below.
3. In the FTR-2410/A, adjust VR_{102} on the TX Unit to the fully clockwise position.
4. Activate the repeater transmitter, and adjust TC_{101} and TC_{102} alternately to provide maximum power output on the wattmeter and minimum spurious on the analyzer, simultaneously.
5. Now adjust VR_{102} again in the FTR-2410/A so that the wattmeter indicates 50 watts.
6. Remove the test equipment and replace the front panel and the four screws. This completes the alignment.








FL-2450
CIRCUIT DIAGRAM
F2523000 (No.1xx)
F2524000 (No.2xx)
* STRAY CAPACITOR
Q01 2SC2694
J1
J2
J3
J4
C01 1000p
L10
C02 39p
TC01 100p
L11
C03 68p
C04 68p
L01
FB01
C25 0.01u
C26 1000p
C27 47u
L09
C22 0.01
C23 1000p
C24 47u
L08
L12
C05 250p
L13
C06 22p
L14
C07 27p
TC02 70p
C08 1000p
L02
L03
VR01 500B
C28 1000p
C29 1000p
C30 1000p
D01
D02
D03
D04
C09 5p
C10 5p
C11 10p
C12 10p
C13 7p
C14 10p
C15 10p
C16 10p
C17 10p
C18 10p
C19 7p
C20 5p
C21 5p
L04
L05
L06
L07
D01-04 1SS97x4
R01 1/2W 1k
D1
R02 220k
C01 1000p
C02 1000p
VR01 10kB
C02 1000p
Q01 CW-12B

FL-2450
MAIN CHASSIS

Symbol No.	Part No.	Description
		LED
D1	G2090203	SDB-205-BGD
		RECEPTACLE
J1,2	P1090326	M-PA-JJ
J3	P1090034	D7-701B-00
J4 (with wire)	T9204642B	

PA UNIT

Symbol No.	Part No.	Description
	F2523000	Printed Circuit Board
	C025230A	PCB with components
		TRANSISTOR
Q101	G3326940	2SC2694
		DIODE
D101–104	G2090118	1SS97
		POTENTIOMETER
VR101	J51721501	EVLS3AA00B52 500ΩB
		CAPACITOR
C109,110,120,121	K02182050	Ceramic disc 50WV CH 5pF (RD870-1NPO-050C63V)
C113,119	K02183070	" " " " 7pF (RD870-1NPO-070D63V)
C111,112, 114–118	K02183100	" " " " 10pF (RD870-1NPO-100D63V)
C122,125	K10179015	" " " B 0.01μF (CDS080XB103K50)
C123,126	K23170020	" chip " 0.001μF (GR40W5R102M)
C128–130	K21170002	" Feed thru " 0.001μF (ECK-Y1H-102WE)
C102	K30279070	Dipped Mica 500WV 39pF (DM15D390J5)
C103,104	K30279072	" " " 68pF (DM15D680J5)
C101,108	K30279093	" " " 1000pF (DM19D102J5)
C106	K32279018	Ribbon Mica " 22pF (RM40-2H220DA)
C105	K32279020	" " " 27pF (RM40-2H270DA)
C107	K32279060	" " " 250pF (RM20-251J5)
C124,127	K40129023	Electrolytic 16WV 47μF (16RJ2-47)
		TRIMMER CAPACITOR
TC101	K91000032	B2PY 100pF
TC102	K91000046	C1P2 70pF
		INDUCTOR
L101	L1020080A	
L102	L0020354A	
L103	L0020333	
L104,107	L0020358A	
L105,106	L0020661	
L108,109	L0020353	
		FERRITE BEADS
FB101	L9190001	Ri 3x3x1
		COAX PLUG/CABLE
P101,102	T9204644C	MP-3, 3D-QEV

AFP UNIT

Symbol	Part No.	Description
	F2524000	Printed Circuit Board
	C025240A	PCB with components
		THYRISTOR
Q201	G3090044	CW12B
		RESISTOR
R201	J02245102	Carbon film 1/4W 1kΩ
R202	J02245224	" " " 220kΩ
		POTENTIOMETER
VR201	J50707103	PN822H103V 10kΩB
		CAPACITOR
C201–203	K10186102	Ceramic disc 63WV 0.001μF (RD870-1B102K63V)

ACCESSORIES

Symbol No.	Part No.	Description
	T9100160A	Coaxial Cable
	T9101230	Control Cable

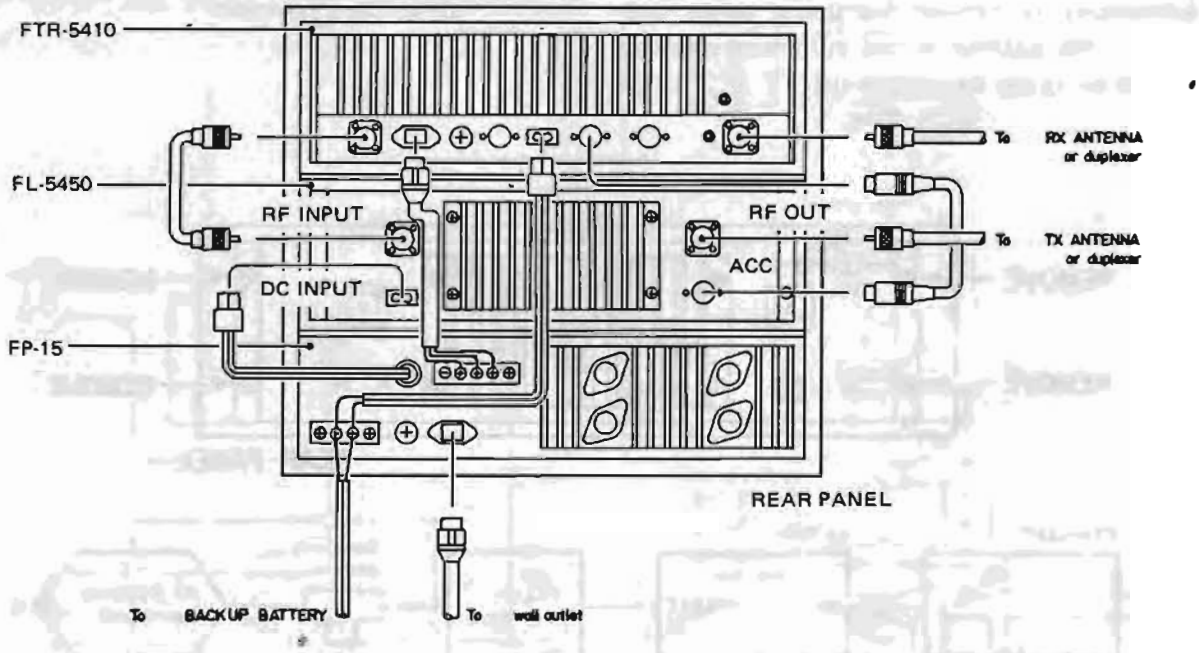
FL-5450 50W UHF
REPEATER POWER AMPLIFIER

The FL-5450 is a commercial-grade, continuous-duty class C UHF power amplifier designed to boost the RF power output of the FTR-5410 UHF Repeater to 50 watts. Designed to match the Repeater, the FL-5450 mounts easily in the 19-inch rack just beneath the FTR-5410. For operation from the AC line, the rack-mounting FP-15 AC Power Supply can be used to supply the required DC voltage for the FL-5450.

Specifications

Frequency range	400–512 MHz
Exciter power	10 watts RF
Output power	50 watts RF
Spurious radiation	–60 dBc or better
Input/output impedance	50 ohms
Power requirements	13.6 VDC @ 10A
Operating temperature range	–10 to +50°C
Dimensions (WDH)	432 x 185 x 133 mm
Weight	Approx. 3.5 kg (7.7 lb)

Interconnections



DC INPUT

This jack accepts 13.6 VDC @ 10 Amps from a DC power supply. The DC output cable from the FP-15 mates with this jack, and the POWER indicator on the front of the FL-5450 will be lit whenever power is applied here.

RF INPUT

The TX output jack from the FTR-5410 should be connected to this coaxial jack using the coaxial cable supplied with the FL-5450. During transmission, the repeater will supply 10W RF to this jack.

ACC

This jack is provided along with a connection cable, for connection to the ACC jack on the FTR-5410. This connection is not needed on earlier models.

RF OUTPUT

50 watts RF output is present at this coaxial jack, which must be connected to the transmitting antenna or TX terminal of the Duplexer. Impedance must be 50 ohms at the transmitting frequency.

NOTE:

Make sure that all power is off before making connections.

Alignment

1. Remove the four screws indicated by the arrows in the diagram, and remove the front panel slowly, just enough to gain access to the adjustment points without straining the POWER indicator wiring.

2. Connect the test equipment as indicated below.

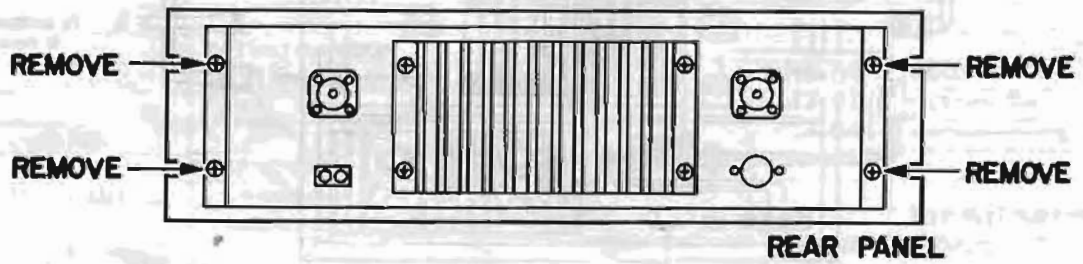
3. In the FTR-5410, adjust VR_{2002} on the TX Unit to the fully clockwise position.

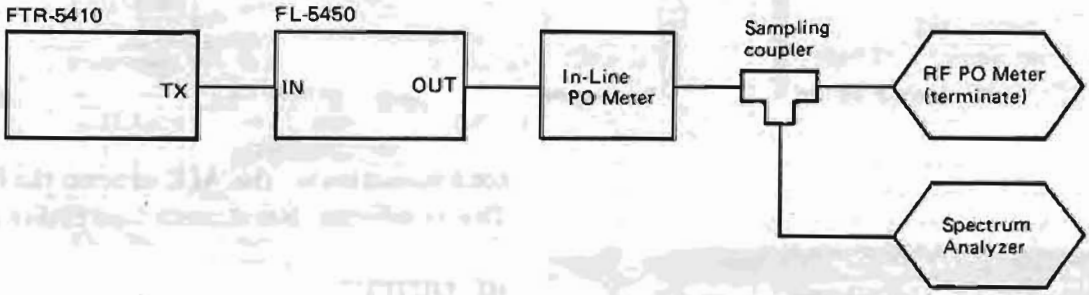
4. Activate the repeater transmitter, and adjust TC_{101}, TC_{102} and TC_{103} (in the FL-5450) alternately to provide maximum power output on the wattmeter and minimum spurious on the analyzer, simultaneously.

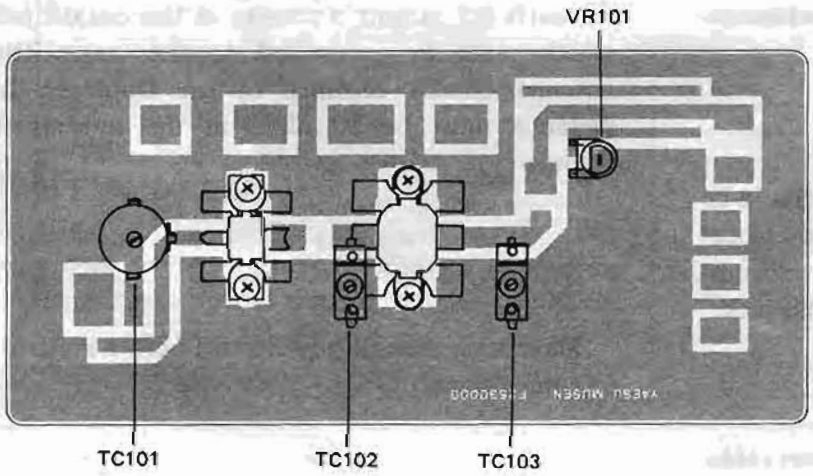
5. Connect a DC voltmeter to the AFP terminal and adjust VR_{101} for minimum DC voltage (null). Remove the load from the wattmeter output, and connect the test circuit shown on the following page to 7-pin DIN jack J_3. Close the test switch and adjust VR_{201} on the AFP Unit just to the point where the test LED lights. Now release the PTT and reconnect the load. Again key the transmitter to ensure that the test LED does not light.

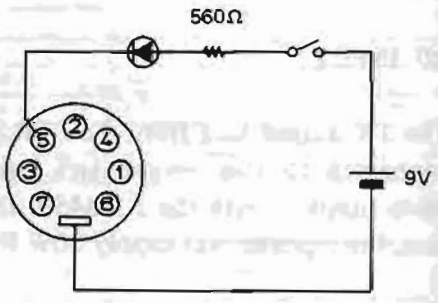
6. Now adjust VR_{2002} again in the FTR-5410 so that the wattmeter indicates 50 watts.

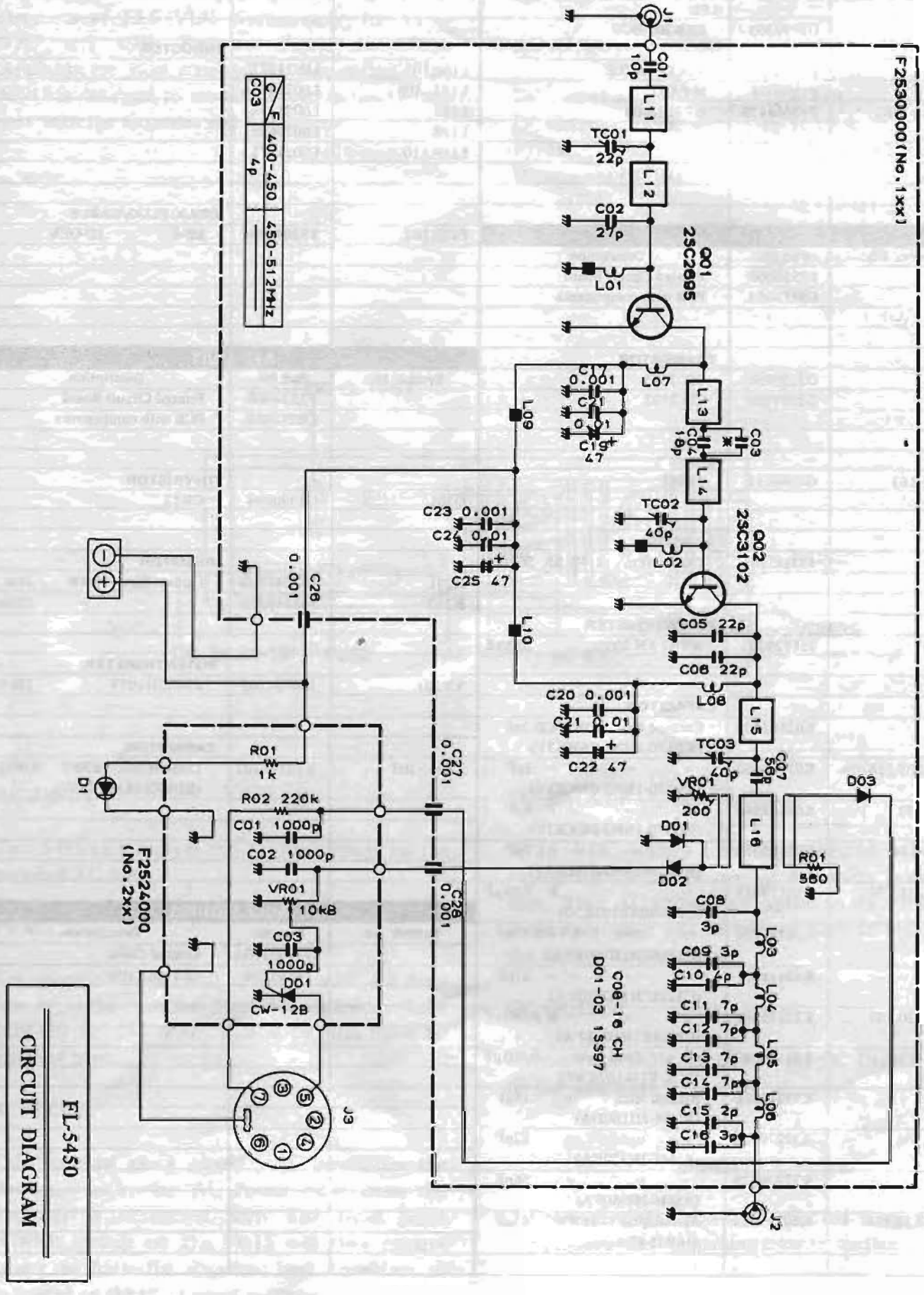
7. Remove the test equipment and replace the front panel and the four screws. This completes the alignment.











FL-5450

CIRCUIT DIAGRAM

FL-5450
MAIN CHASSIS

Symbol No.	Part No.	Description
		LED
D1	G2090203	SDB-205-BGD
J1,2	P1090326	RECEPTACLE
J3	P1090034	M-PA-JJ
J4 (with wire)	T9204642B	D7-701B-00

PA UNIT

Symbol No.	Part No.	Description
	F2530000	Printed Circuit Board
	C025300A	PCB with components
		TRANSISTOR
Q101	G3326950	2SC2695
Q102	G3331020	2SC3102
		DIODE
D101–103	G2090118	1SS97
		RESISTOR
R101	J02245561	Carbon film 1/4W SJ 560Ω
		POTENTIOMETER
VR101	J51729201	RV8-FAN 200Ω 200ΩB
		CAPACITOR
C115	K02182020	Ceramic disc 63WV CH 2pF (RD870-1NPO-020C63V)
C108,109,116	K02182030	" " " " 3pF (RD870-1NPO-030C63V)
C110,103	K02182040	" " " " 4pF (RD870-1NPO-040C63V)
C111–114	K02183070	" " " " 7pF (RD870-1NPO-070D63V)
C118,121,124	K10179015	" " " B 0.01μF (CDS080XB103K50)
C101	K22171211	" chip 50WV CH 10pF (C3216CH1H100DFA)
C102	K22171221	" " " " 27pF (C3216CH1H270JFA)
C117,120,123	K22171801	" " " B 0.001μF (C3216B1H102KFA)
C126–128	K21170002	" Feed thru 0.001μF (ECK-Y1H-102KWE)
C104	K32279016	Ribbon Mica " 18pF (RM40-2H180DA)
C105,106	K32279018	" " " 22pF (RM40-2H220DA)
C107	K32279028	" " " 56pF (RM40-2H560FA)
C119,122,124	K40129023	Electrolytic 16WV 47μF (16RJ2-47)
TC101	K91000123	**TRIMMER CAPACITOR** 2222-808-31159 15pF
TC102,103	K91000031	B-1P 40pF
		INDUCTOR
L101,102	L0021372	
L103–106	L0021373A	
L107	L0021374	
L108	L0020665	
L109,110	L0021375	
		COAX PLUG/CABLE
P101,102	T9204644C	MP-3 3D-QEV

AFP UNIT

Symbol No.	Part No.	Description
	F2524000	Printed Circuit Board
	C025240A	PCB with components
		THYRISTOR
Q201	G3090044	CW12
		RESISTOR
R201	J02245102	Carbon film 1/4W 1kΩ
R202	J02245224	" " " 220kΩ
		POTENTIOMETER
VR201	J50707103	PN822H103V 10kΩB
		CAPACITOR
C201–203	K10186102	Ceramic disc 63WV 0.001μF (RD870-1B102K63V)

ACCESSORIES

Symbol No.	Part No.	Description
	T9100160A	Coaxial Cable
	T9101230	Control Cable

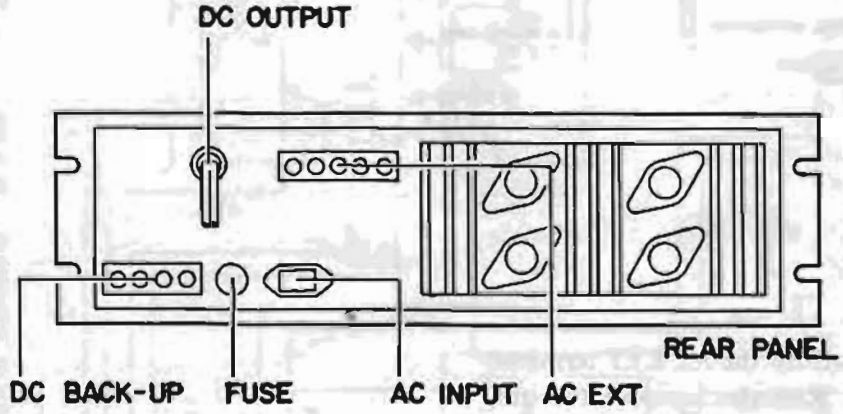
FP-15 AC POWER SUPPLY
FOR 50W REPEATER POWER AMPLIFIERS

The FP-15 Power Supply provides up to 10 Amperes at 13.6 VDC continuously, for Yaesu VHF and UHF Repeater Power Amplifiers. Available for most standard AC line voltages, the FP-15 is desinged to mount directly in the 19-inch rack with the Repeater and Amplifier.

Specifications

AC voltage requirements	100/110/117/200/220 or 234 VAC
DC output voltage	13.6 VDC
DC output current	up to 10 A
Ripple	50 mV p-p or better
Dimensions (WDH)	432 x 245 x 133 mm
Weight	10 kg (22 lb)
Emergency backup voltage	12V battery (not supplied)

Interconnections



AC INPUT

This 3-pin jack accepts the AC line voltage via the supplied AC cable.

FUSE

For operation from 100/110 or 117 VAC, a 6 Amp fuse must be installed here. For operation from 200/220 or 234 VAC, a 3 Amp fuse must be installed here.

AC EXT

This terminal block provides AC power for the Repeater when the AC Power cable from the Repeater is connected here. The front panel POWER switch on the FP-15 will then control power to both the Repeater and Amplifier, as indicated on the front panel indicator.

DC BACKUP

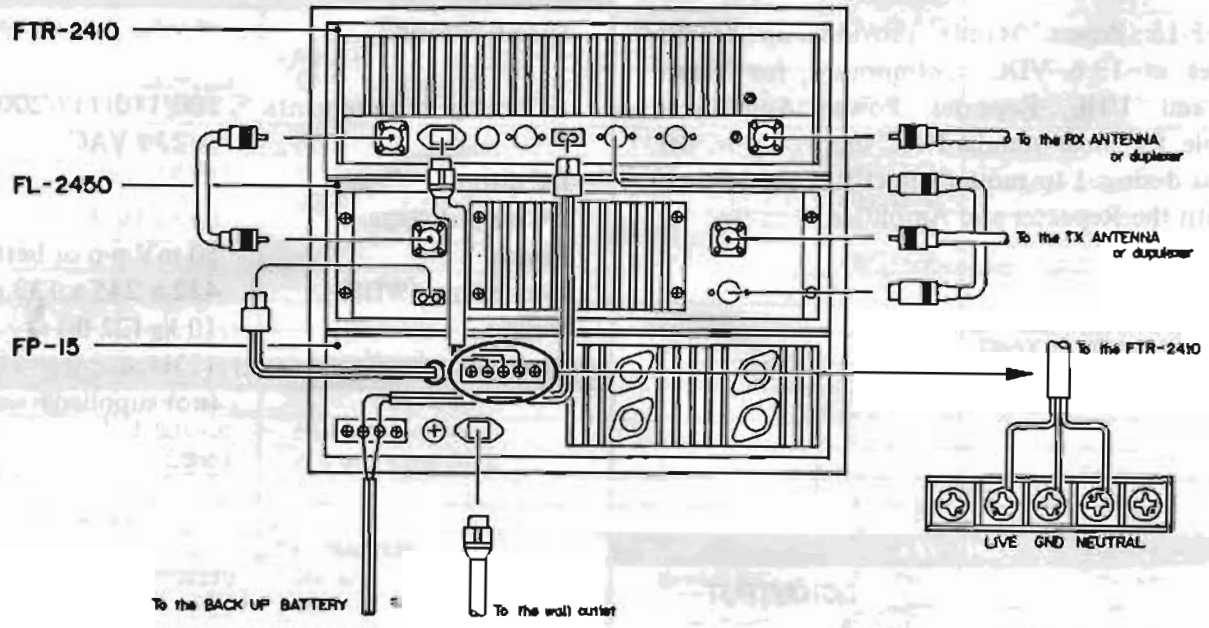
A 12 VDC battery may be connected here for emergency backup in case of AC mains interruption. While AC voltage is supplied to the FP-15, a charging voltage will be present here to maintain the backup battery charge.

DC OUTPUT

Connect this cable directly to the DC INPUT jack on the Amplifier.

NOTE:

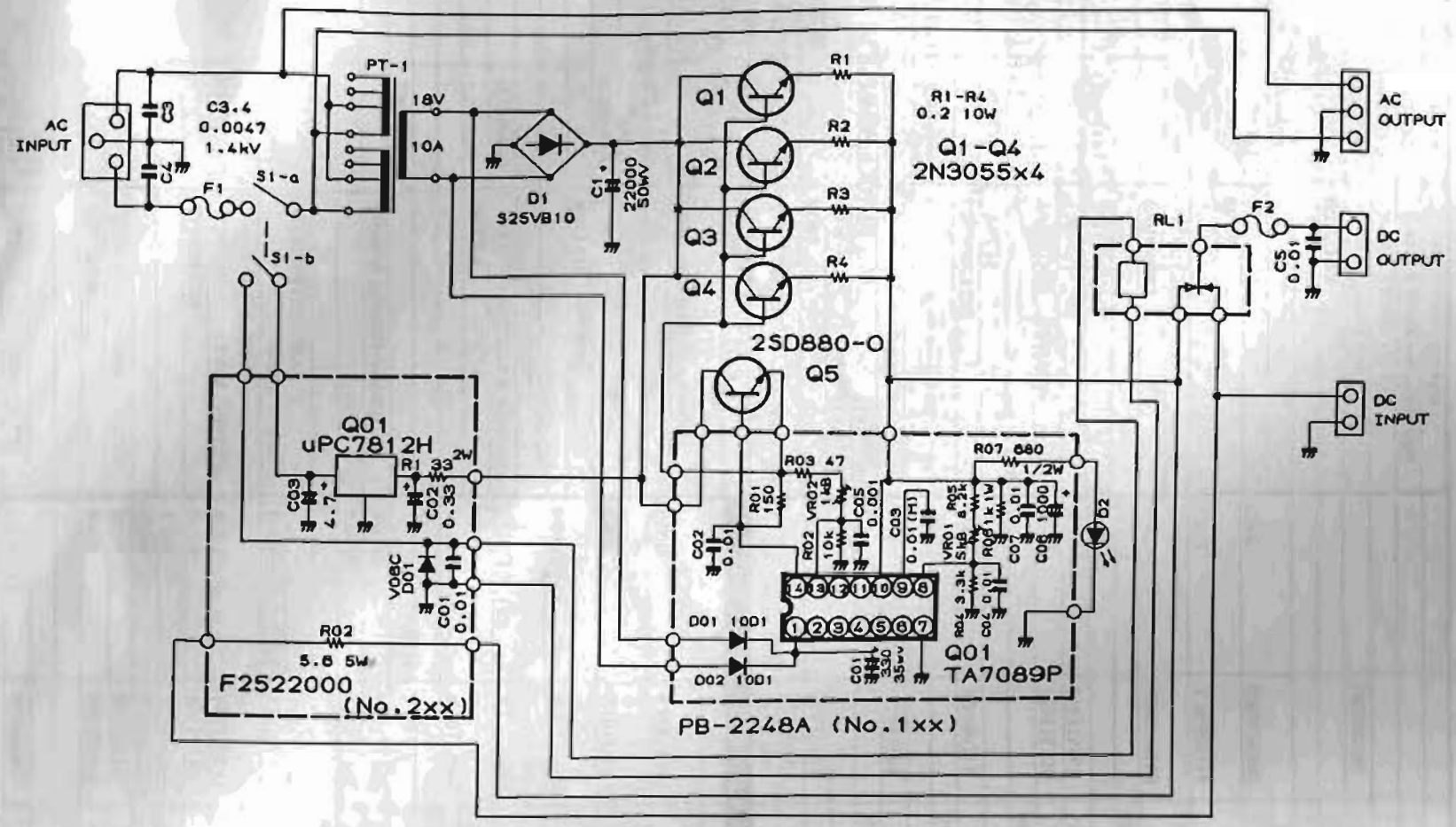
Make sure that power is removed from all equipment before making interconnections.



When it is desired to utilize the AC EXT terminals to supply AC to the Repeater, remove the plug from the AC power cord of the Repeater, and connect the power cord wires to the AC EXT terminal block as indicated below.

POWER CORD TYPE

TERMINAL	UL	EU/AUS
GND	green	grn/yel
NEUTRAL	white	blue
LIVE	black	brown



NOTE
1 ALL RESISTOR VALUES ARE IN OHMS.1/4W UNLESS OTHERWISE NOTED
2 ALL CAPACITOR VALUES ARE IN uF.50wvUNLESS OTHERWISE NOTED
3 ALL ELECTROLYTIC CAPACITOR VALUES ARE IN uF.16wv UNLESS OTHERWISE NOTED
4 (M)CAPACITORS ARE MYLAR FILM.50wv

FP-15
CIRCUIT DIAGRAM

FP-15
MAIN CHASSIS

Symbol No.	Part No.	Description
		TRANSISTOR
Q1–4	G3090014	2N3055
Q5	G34088000	2SD880O
		DIODE
D1	G2090121	Si S25VB10
D2	G2090203	LED SDB-205BGD
		RESISTOR
R1–4	J30406029	Cement 10W 0.2Ω
		CAPACITOR
C3,4	K12329002	Ceramic 1.4kV 0.0047μF (ECK-DAL472PE)
C5	K10179015	" 50WV 0.01μF (CK45B1H103MY)
		POWER TRANSFORMER
PT1	L3030071A	
		RELAY
RL1	M1090010	FRL-263-0012/02CK-0E
		SWITCH
S1	N2090028	8B2011
		FUSE HOLDER
FH1	P2000012	SN2059 (AC)
FH2	P2000025	H203 (DC)
		FUSE
F1	Q0000012	6A (100–117VAC)
F1	Q0000004	3A (200–234VDC)
F2	Q0000008	15A (DC)
		CONNECTOR
J1	P0090094	PA125
		THROUGH TERMINAL
	Q6000161	M115A-2AK
	Q6000162	M115A-3AK
		TERMINAL
	Q6000036	1L6P (3-0-3)
		PLUG
P1 (with wire)	T9204496	
P2 (")	T9204643A	
		AC CORD
	T9013280	2 wire, 2 prong plug
	T9013282	3 wire, 3 prong UL plug
	T9013283	3 wire, 3 prong Australian plug
	T9013284	3 wire, 2 prong EU plug

REG UNIT

Symbol No.	Part No.	Description
PB-2248A	F0002248A	Printed Circuit Board
	C022480A	PCB with components
		IC
Q101	G1090373	TA7089P
		DIODE
D101,102	G2090001	Si 10D1
		RESISTOR
R103	J01245470	Carbon film 1/4W TJ 47Ω
R101	J01245151	" " " " 150Ω
R104	J01245332	" " " " 3.3kΩ
R105	J01245822	" " " " 8.2kΩ
R102	J01245103	" " " " 10kΩ
R107	J10276681	" Composition 1/2W GK 680Ω
R106	J20306102	Metallic film 1W 1kΩ
		POTENTIOMETER
VR102	J51721102	EVL-S3AA00B13 1kΩB
VR101	J51721502	EVL-S3AA00B53 5kΩB
		CAPACITOR
C105	K12171102	Ceramic 50WV E 0.001μF (DD104E102P50V)
C102,104,107	K12179008	" " F 0.01μF (DD106F103Z50V)
C103	K50177103	Mylar " " 0.01μF (50F2U103M)
C101	K40169003	Electrolytic 35WV 330μF (35RE330)
C106	K40129011	" 16WV 1000μF (16RE1000)

CONTROL UNIT

Symbol No.	Part No.	Description
	F2522000	Printed Circuit Board
	C025220A	PCB with components
		IC
Q201	G1090301	μPC7812H
		DIODE
D201	G2090211	Si V06C
		RESISTOR
R201	J20336330	Metallic film 2W 33Ω
R201	J30375569	Cement 5W 5.6Ω
		CAPACITOR
C201	K50177103	Mylar 50WV 0.01μF (50F2U103)
C202	K70167334	Tantalum 35WV 0.33μF (CS15E1VR33M1S)
C203	K70120001	" 16WV 4.7μF (489D475X0016B1)
	Q5000036	TP-G terminal