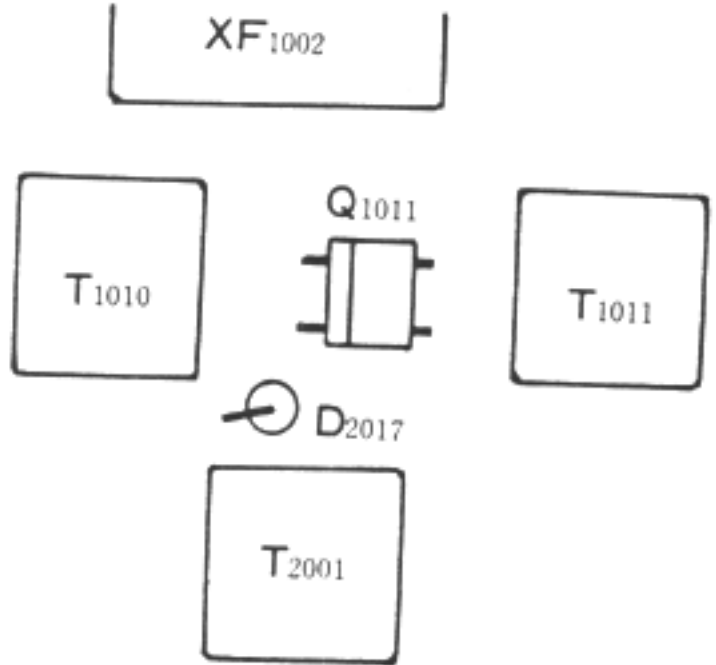
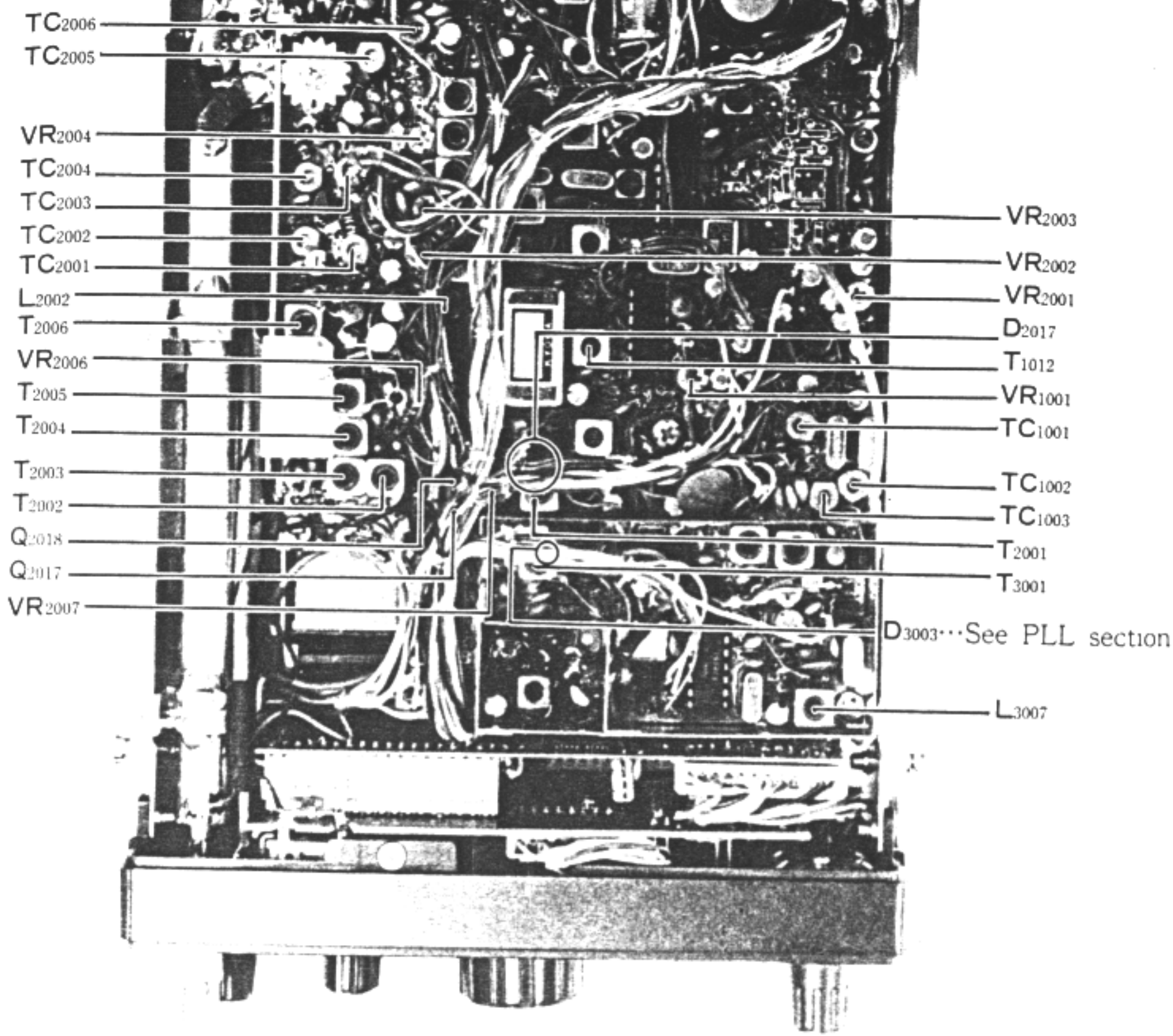
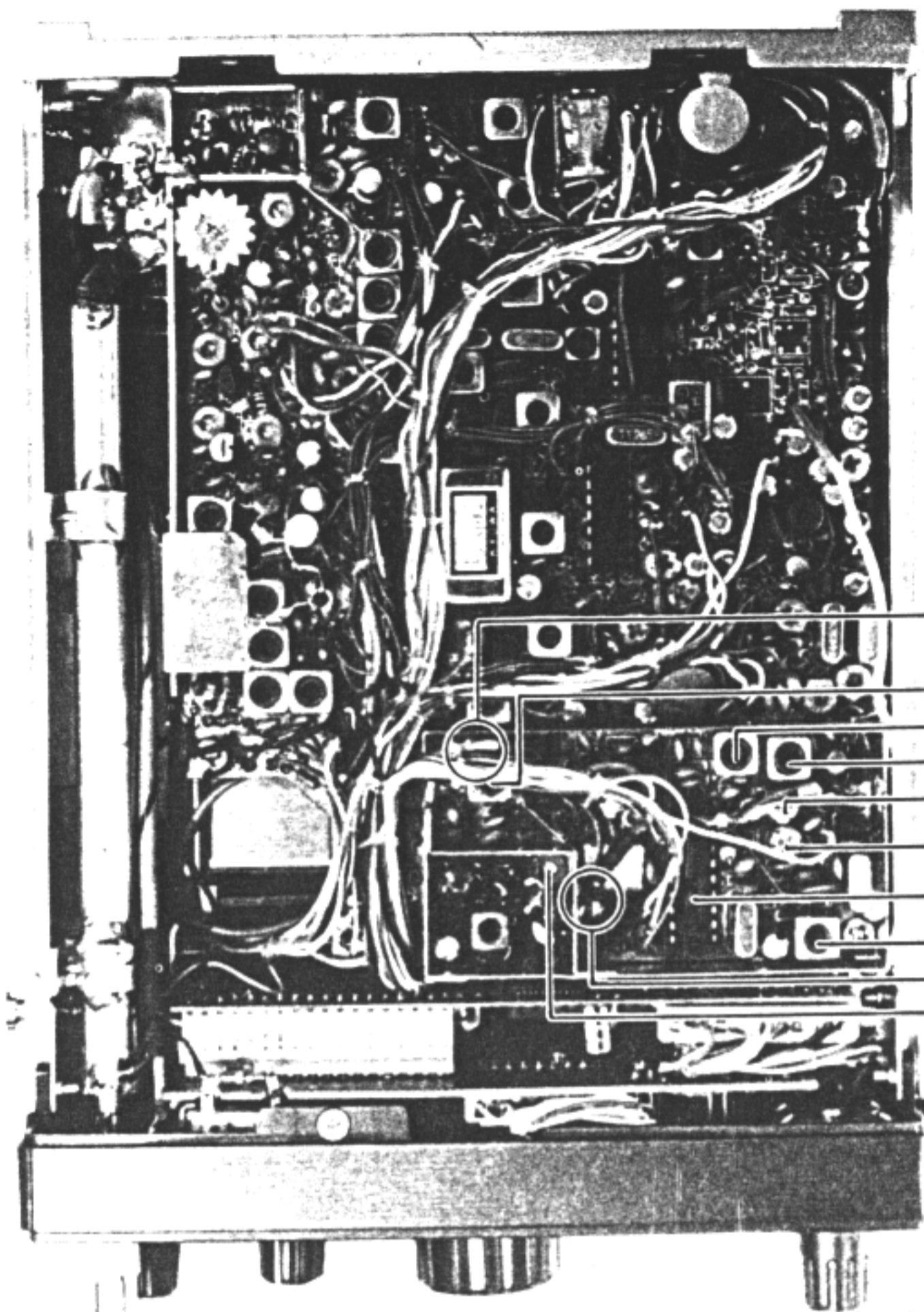


RECEIVER SECTION ALIGNMENT POINTS

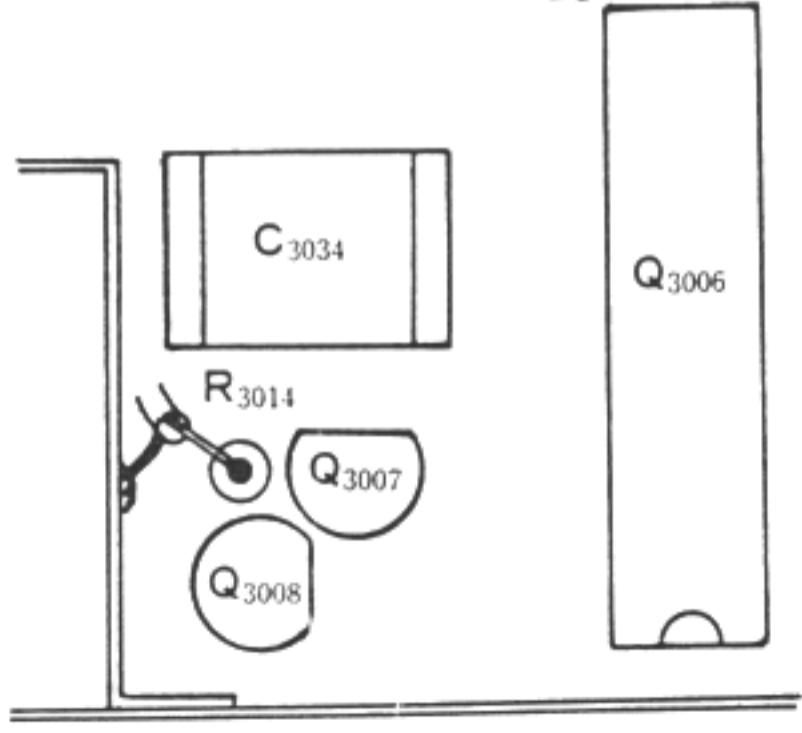
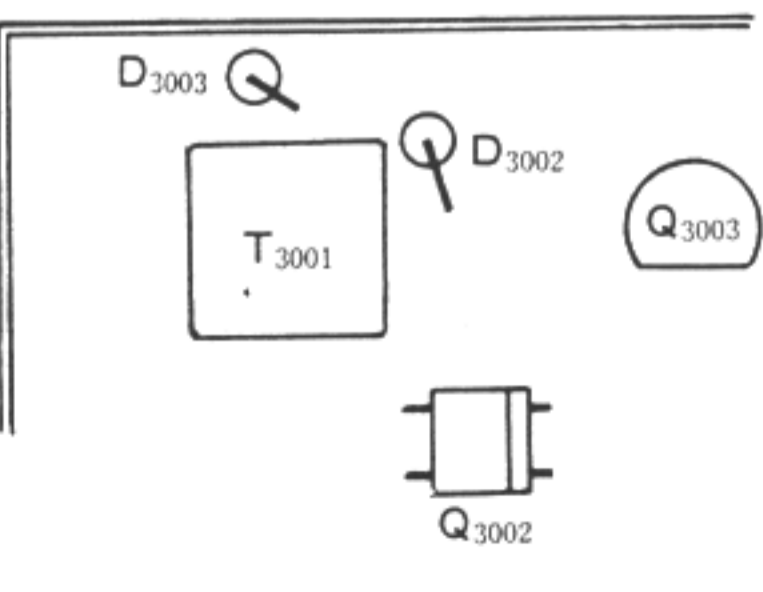


TRANSMITTER SECTION ALIGNMENT POINTS

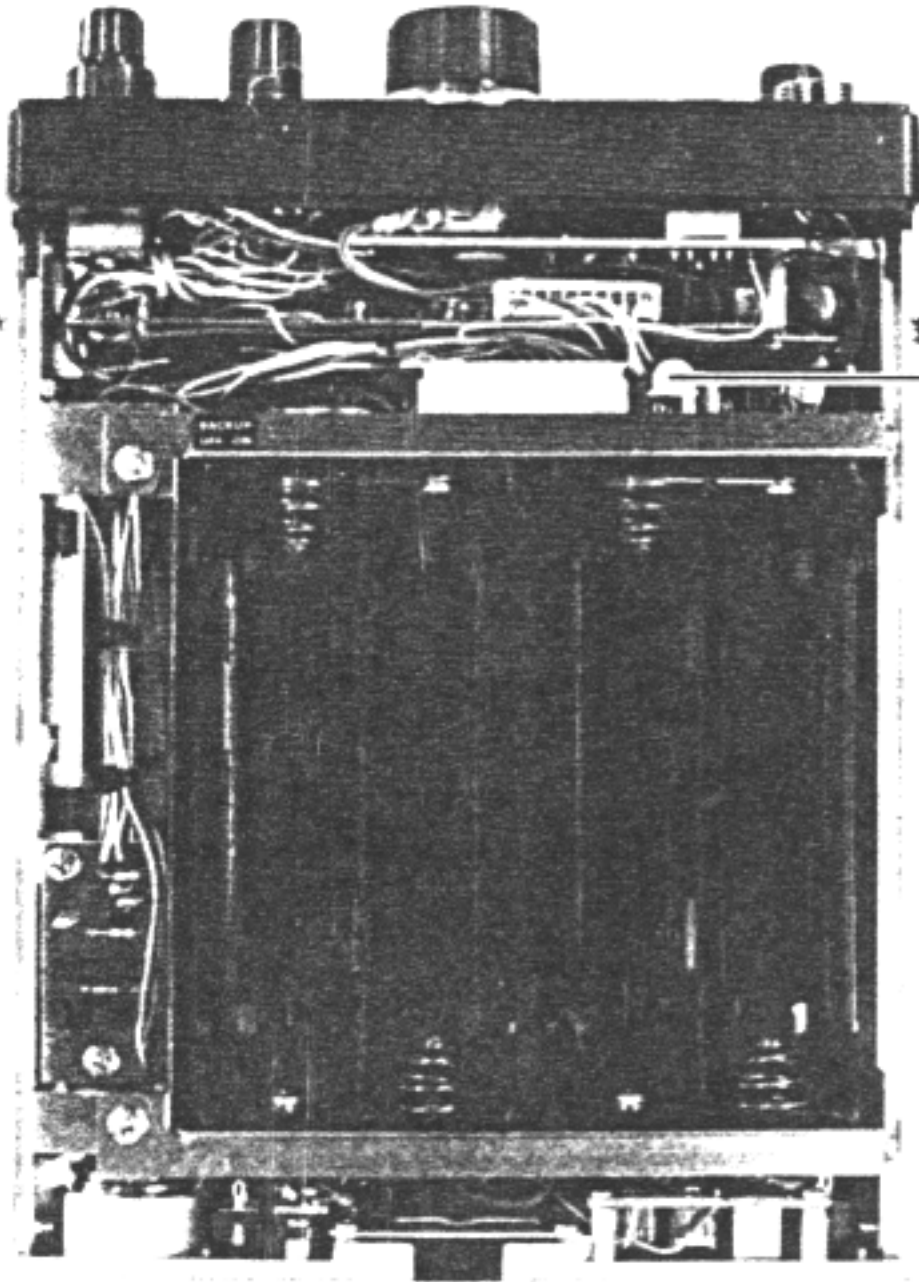
FT 290R



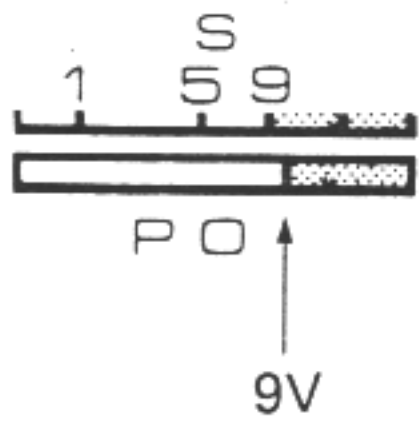
- D 3002
- D 3003
- T 3001
- T 3003
- T 3002
- VR 3002
- VR 3001
- Q 3006
- L 3007
- R 3014
- TC 3001

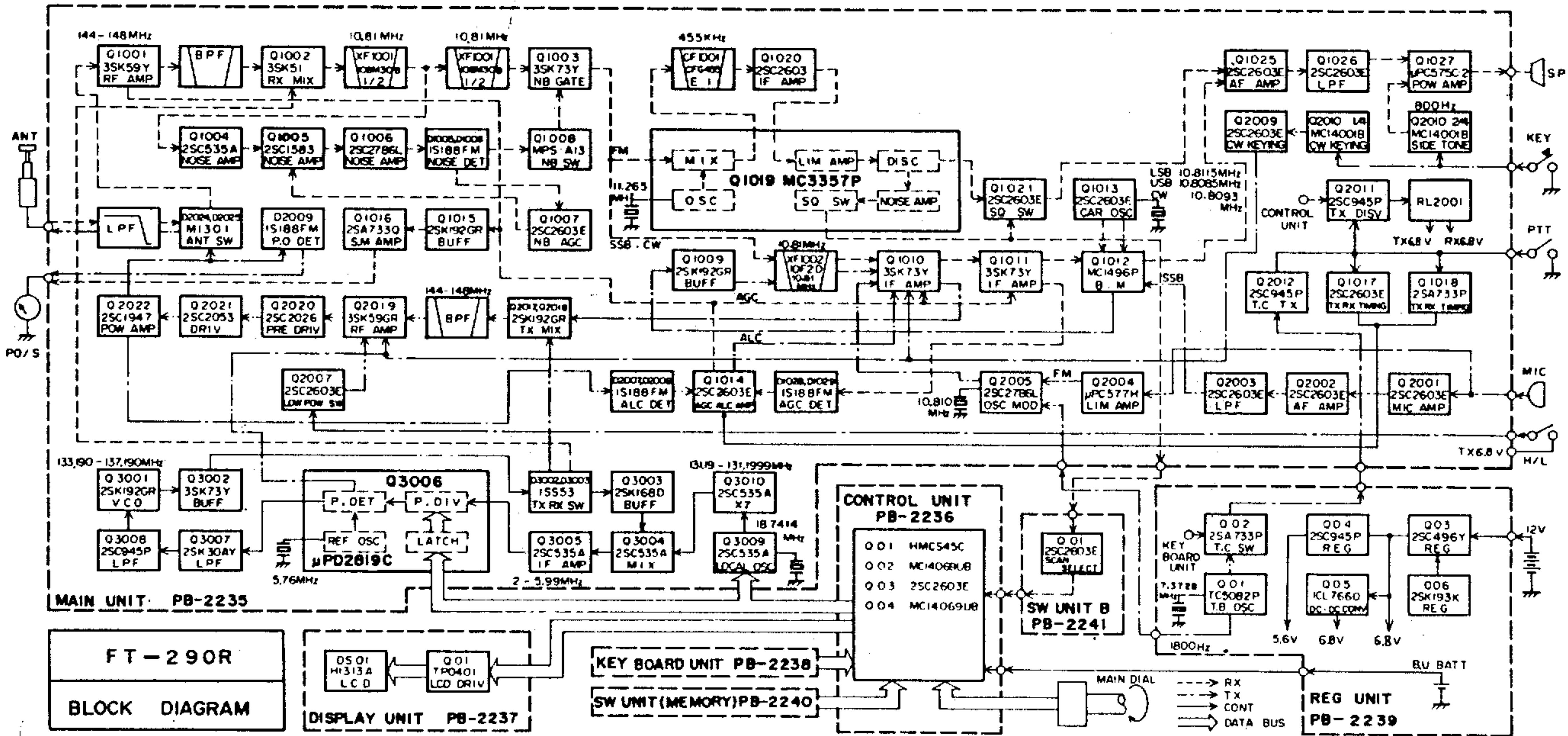


PLL SECTION ALIGNMENT POINTS



VR4001





**FT-290R**  
BLOCK DIAGRAM

0501 HI313A LCD  
001 TPO401 LCD DRIV  
**DISPLAY UNIT PB-2237**

**KEY BOARD UNIT PB-2238**  
**SW UNIT (MEMORY) PB-2240**

**CONTROL UNIT PB-2236**  
001 HMC545C  
002 MC14069UB  
003 2SC2603E  
004 MC14069UB

001 2SC2603E SCAN SELECT  
**SW UNIT B PB-2241**

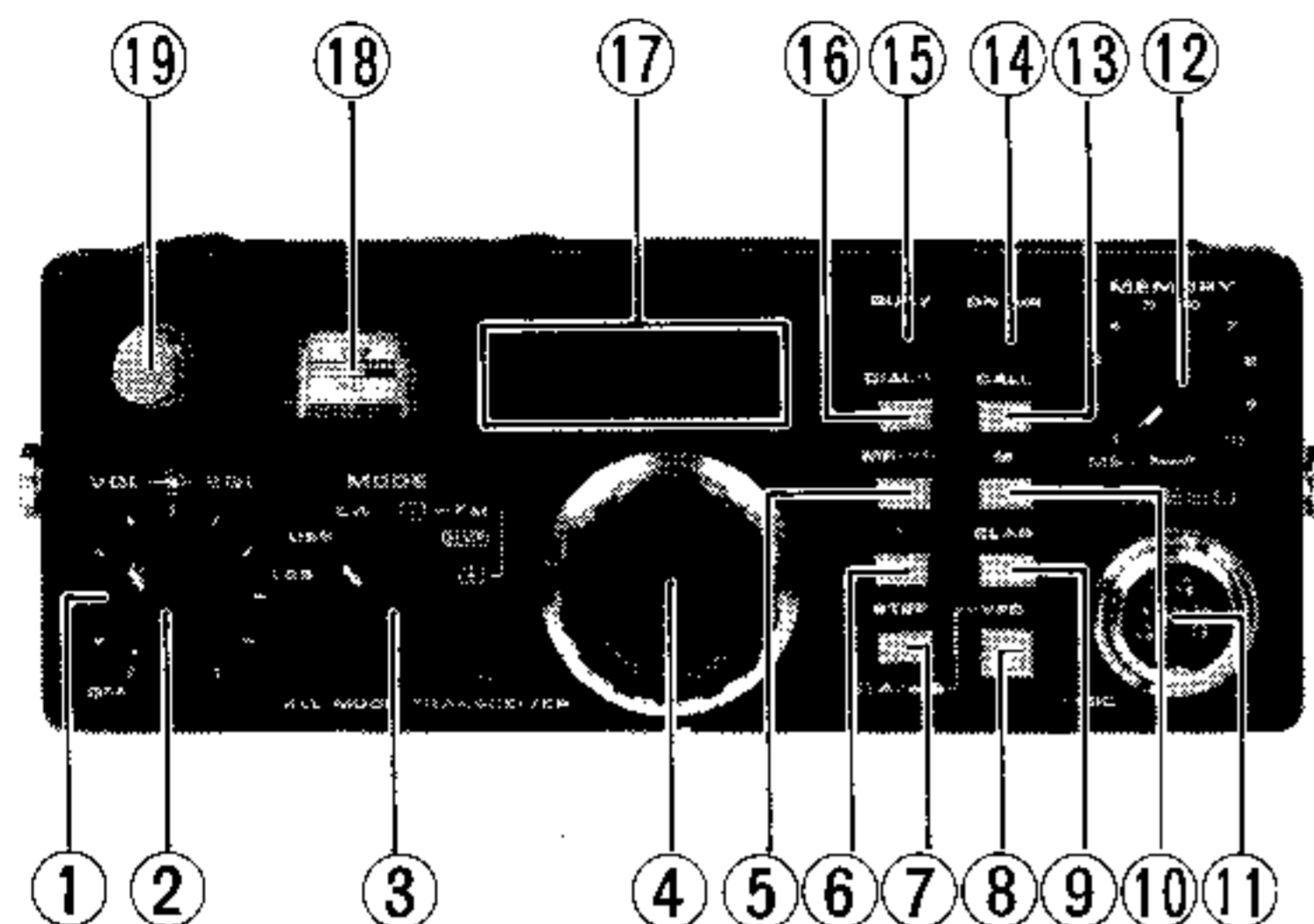
KEY BOARD UNIT  
002 2SA733P T.C. SW  
004 2SC945P REG  
003 2SC496Y REG  
001 TC5082P T.B. OSC  
005 ICL7660 DC-DC CONV  
006 2SK193K REG

**REG UNIT PB-2239**  
BU BATT

1800Hz  
5.6V 6.8V 6.8V

---> RX  
...> TX  
—> CONT  
—+> DATA BUS

# FRONT PANEL CONTROLS AND SWITCHES



## (1) SQL

The squelch control silences the receiver in the FM mode when no stations are being received on the channel in use. The SQL control should only be advanced to the threshold point of background noise silencing; further advancement of this control will lead to reduced sensitivity to weak signals.

## (2) VOL

This is the audio gain control for the receiver, as well as the main ON/OFF switch for the transceiver.

## (3) MODE

This switch selects the desired mode: LSB, USB, CW, or FM.

## (4) MAIN DIAL

The main tuning dial is used for selection of operating frequencies using the two main VFOs or the clarifier. In the LSB, USB, and CW modes, synthesizer steps of 100 Hz or 1 kHz are programmed, while on FM the channel steps are 5 kHz or 10 kHz each. In the clarifier mode, the synthesizer moves in 100 Hz steps.

## (5) MR/PRI

This switch selects either the memory recall mode or priority channel operation. If only the MR/PRI switch is pressed, the memory channel selected by the MEMORY rotary switch will be activated. If the yellow F button is first pressed, then the MR/PRI button, priority channel operation will be selected.

## (6) F

The yellow "F" (Function) button activates either the priority channel mode or the memory split mode. The F button itself does not select a mode, but it programs the microprocessor to select the mode labeled in yellow letters in either of the two switches immediately above the F button: DIAL/S or MR/PRI.

## (7) STEP

This switch selects the desired synthesizer steps. In the LSB, USB, or CW mode, the preset mode is 1 kHz per step. Press the STEP button to switch to 100 Hz steps. A second press of this switch returns you to 1 kHz steps. In the FM mode, the preset is for 10 kHz steps. Pressing the STEP switch selects 5 kHz steps, while a second press returns you to 10 kHz steps.

## (8) VFO Switch

The VFO button selects one of the two internal VFOs on the FT-290R. Upon switch-on, VFO-A is automatically selected. Press the VFO switch to select VFO-B, and dial up the new frequency. A second press of the button releases the switch, returning you to VFO-A.

## (9) CLAR

This switch activates the receiver offset tuning feature (Clarifier). The clarifier allows  $\pm 10$  kHz of offset from the transmit frequency, tuned in 100 Hz steps (all modes).

## (10) M

The M (Memory) button is used to store a frequency in memory.

### (11) MIC

This seven pin jack accepts microphone audio input, the scanning control lines, and the PTT (Push to Talk) control line. Microphone impedance is 500 ohms.

### (12) MEMORY

The memory channel selector is used to choose any of the 10 memory channels. In the MS (Memory Scan) position, scanning of the memories may be performed.

### (13) CALL

When this button is pressed (FM mode only), a 1800 Hz (or 1750 Hz) tone will be superimposed on the microphone line, and the PTT switch line will be grounded, activating the transmitter. This allows manual-length access of repeaters requiring a burst tone.

### (14) ON AIR

This indicator lights up while transmitting.

### (15) BUSY

This indicator lights up when the main squelch is opened up by an incoming signal.

### (16) DIAL/S

When the DIAL/S button alone is pushed, tuning is accomplished by the main dial on either VFO-A or VFO-B. If the F button is pushed, then the DIAL/S button, the memory split mode will be selected, for receiving of the memory while transmitting on the VFO.

### (17) DIGITAL DISPLAY

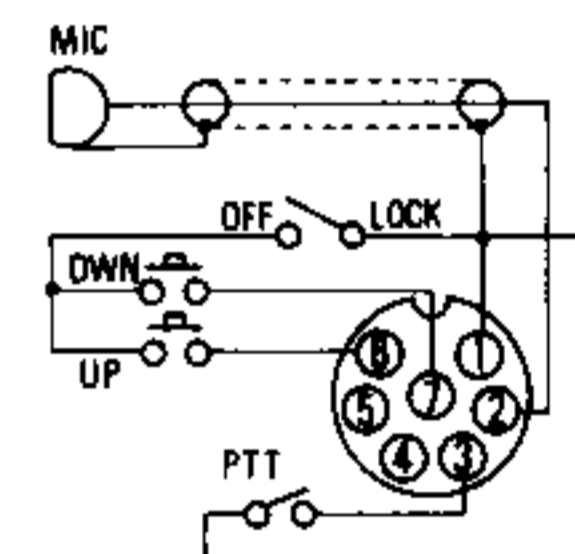
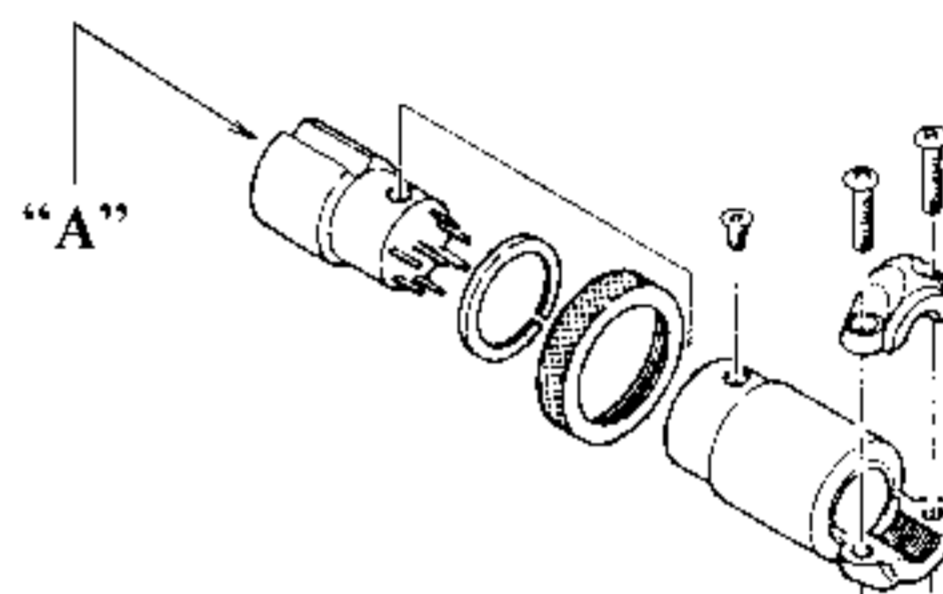
The digital display uses a liquid crystal display for indication of the operating frequency and mode. The frequency readout displays the last five digits of the operating frequency, with resolution to 0.1 kHz. Indicators are also provided for indication of clarifier operation ("CLAR"), memory channel operation ("M"), or memory split operation ("- " on transmit).

### (18) S/PO

The meter allows determination of incoming signal strength and relative power output. The meter is also used for checking battery operation.

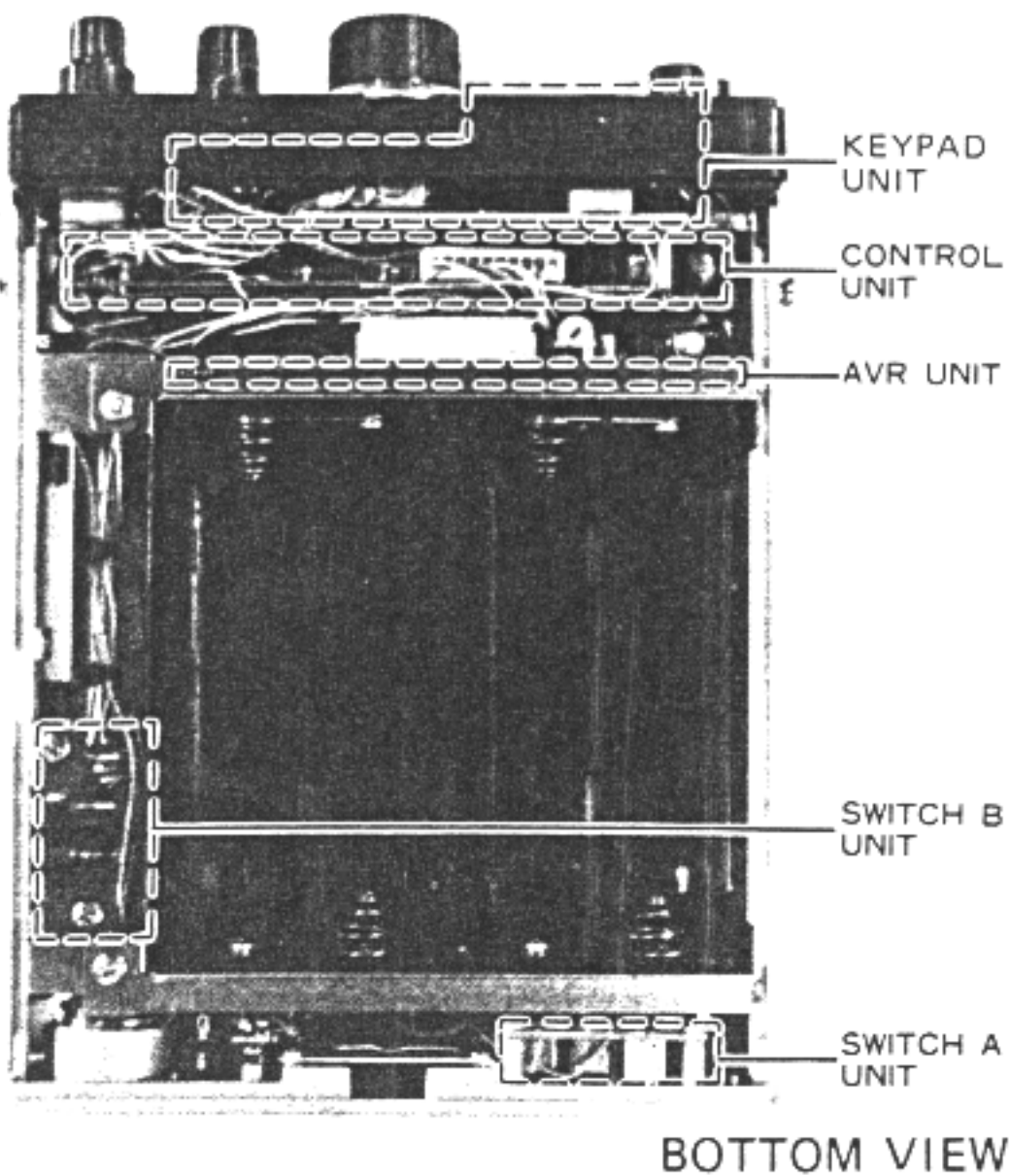
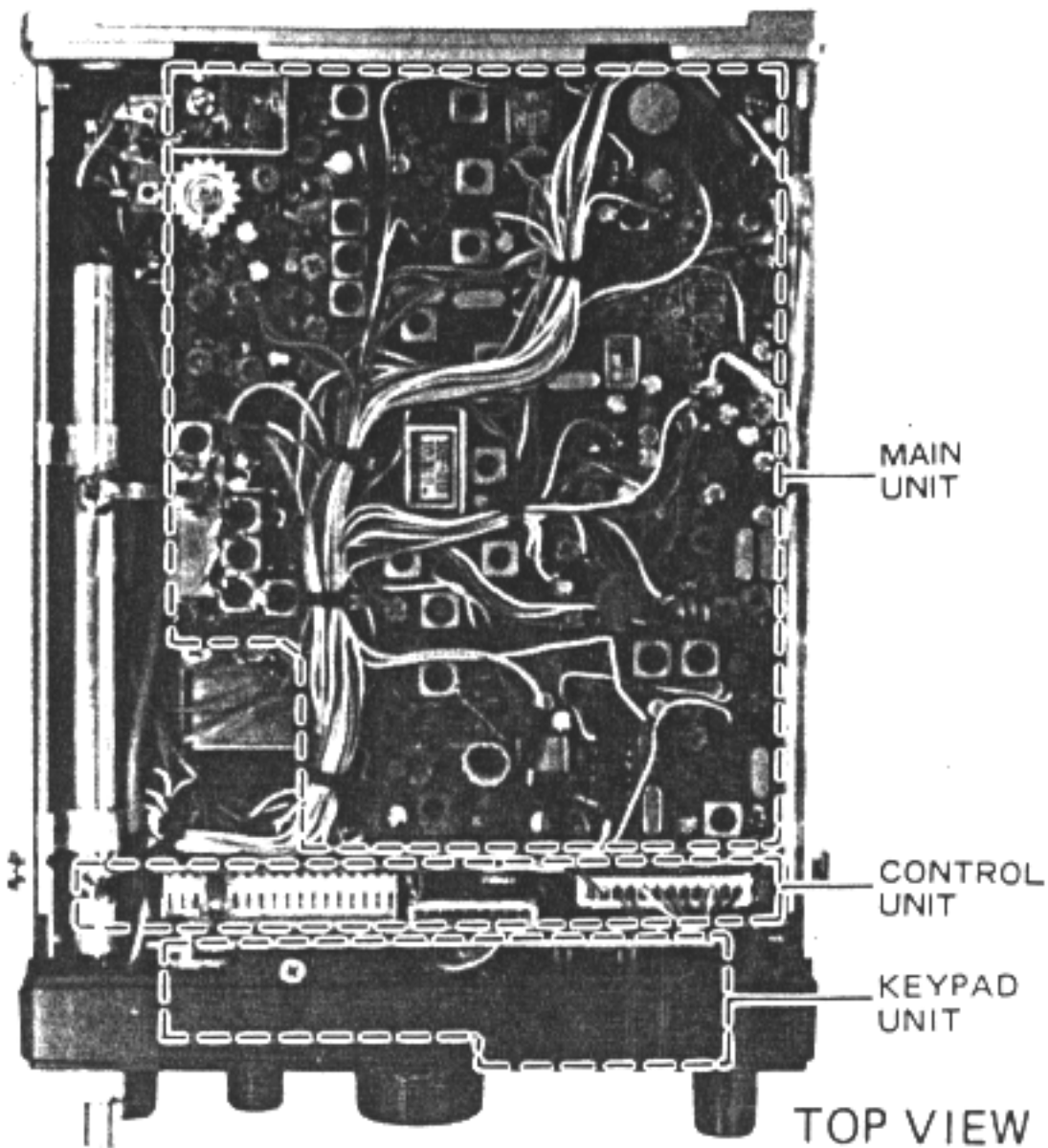
### (19) WHIP ANTENNA

The built-in whip antenna is satisfactory for most portable operation. When using an external antenna, the whip should be telescoped fully into the transceiver. Conversely, when an external antenna is not used, the whip should always be fully extended.

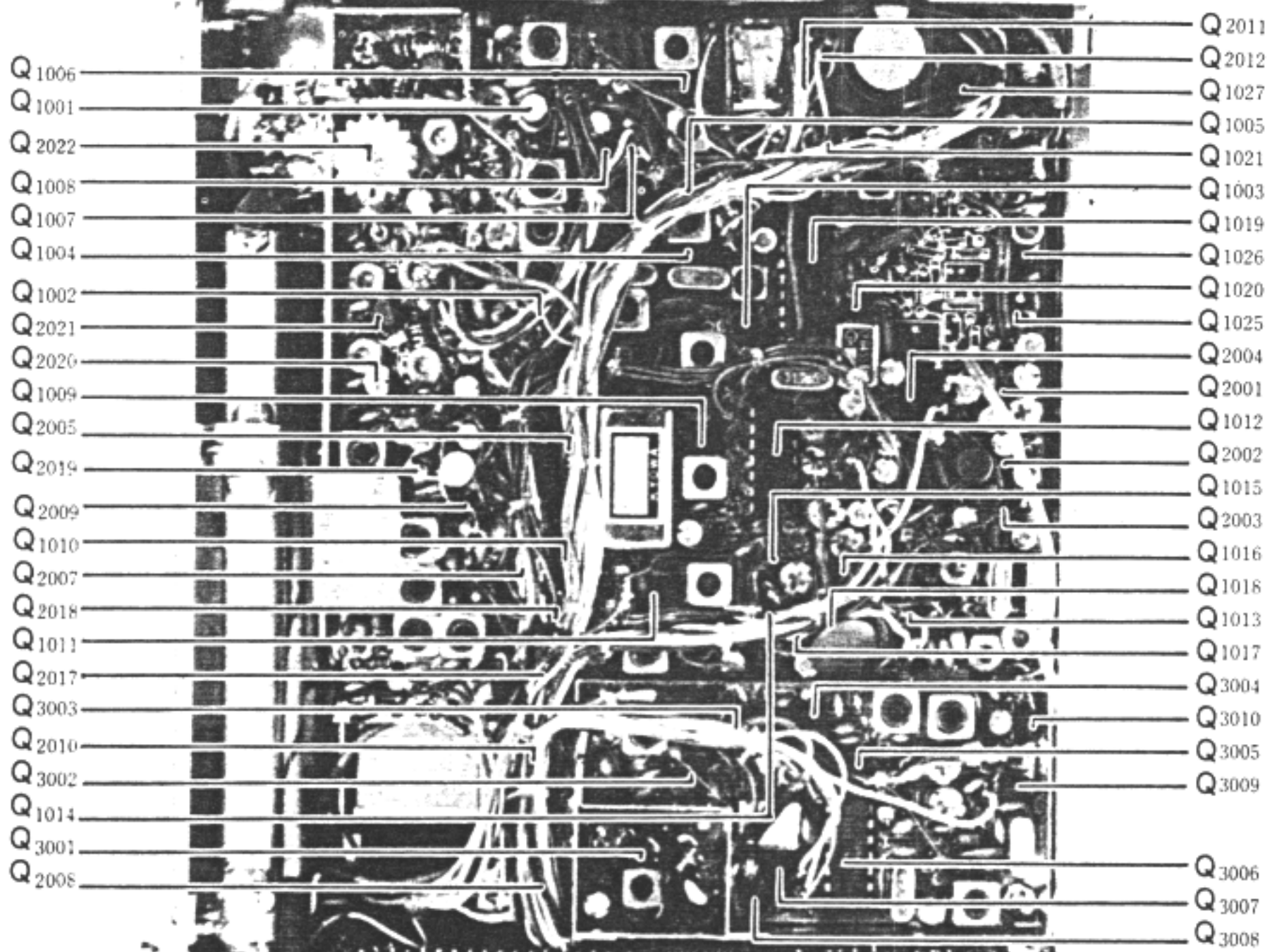


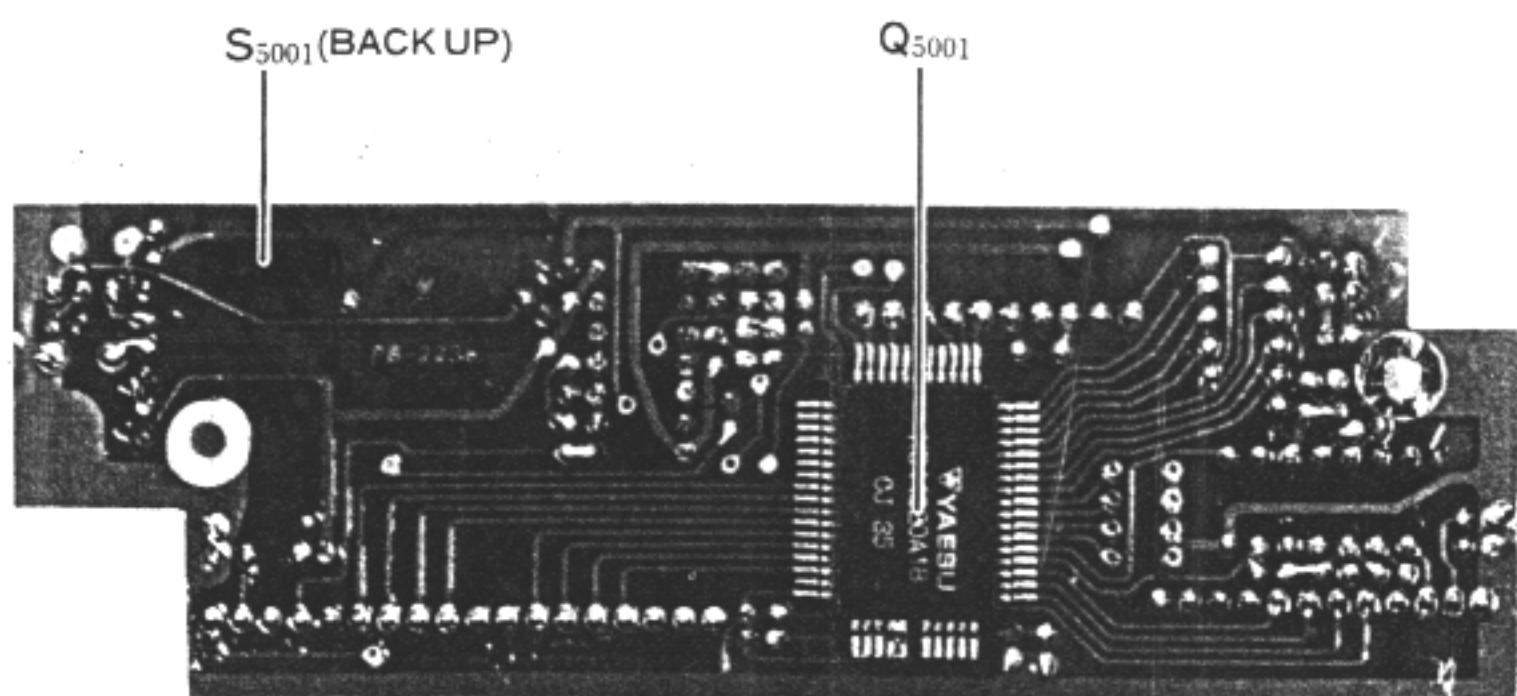
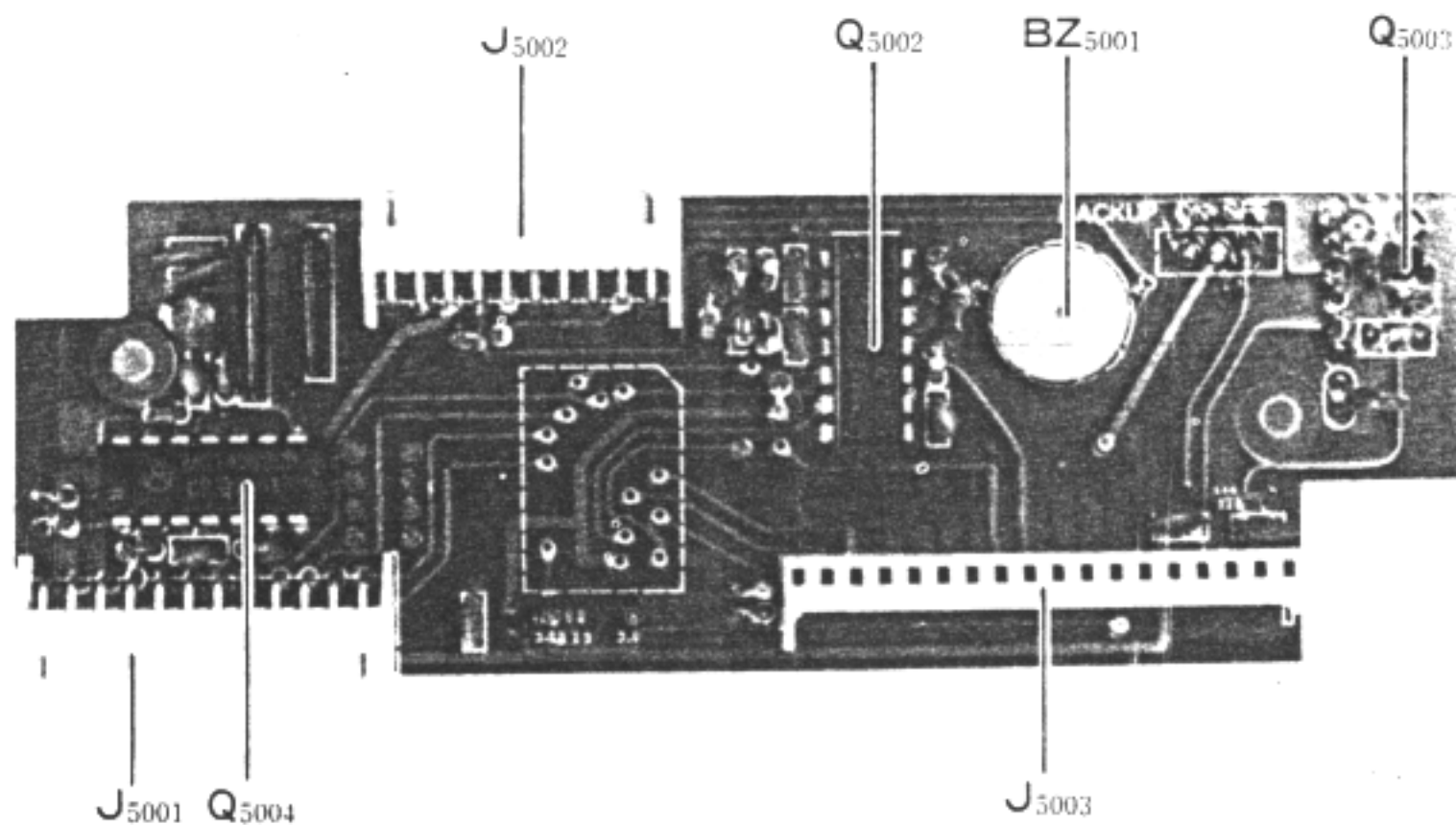
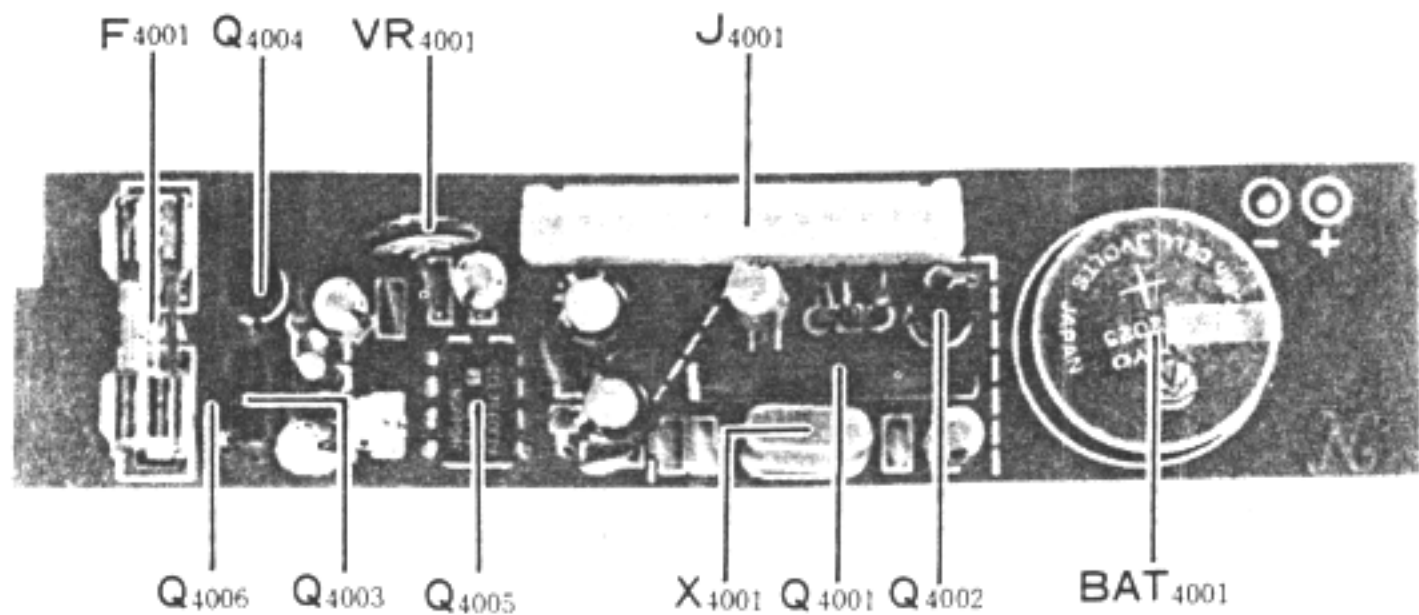
Viewed from "A" Side

YM-47  
MICROPHONE PLUG  
CONNECTIONS

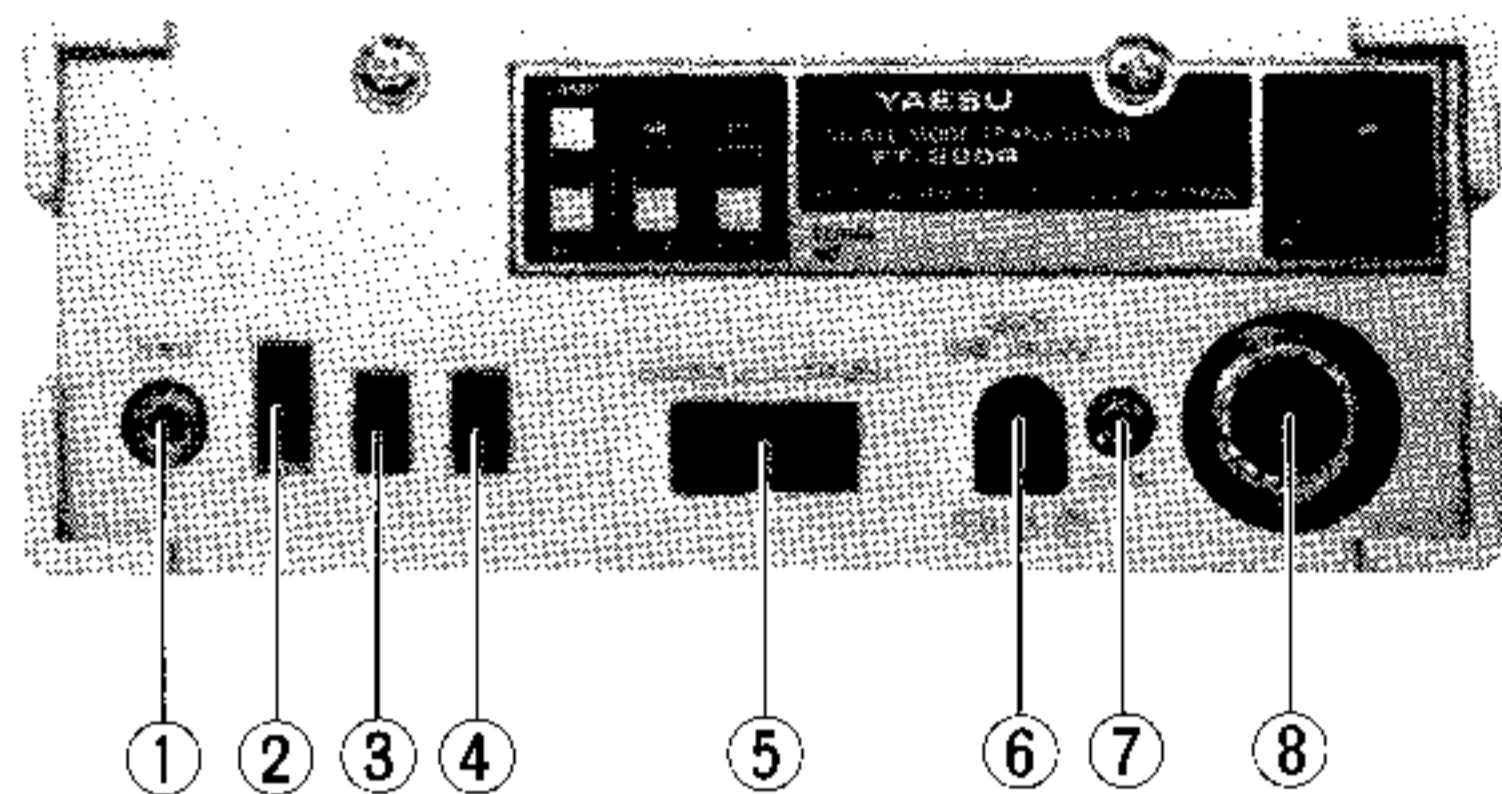








# REAR APRON SWITCHES AND JACKS



## (1) KEY

This jack is used for the keying input line. Use a miniature phone plug for connection to your telegraph key or keyer. The key-up voltage is 7V, and the key-down current is 0.3 mA.

## (2) LAMP/BATT CHECK

With this switch in the LAMP mode, the front panel meter and LCD display will become illuminated for nighttime operation. If the power switch (on the VOL control) is off, this lamp will not come on, thus preventing inadvertent battery discharge.

In the BATT mode, the battery voltage is checked. The meter needle should deflect at least to the dividing line between the green and white zones of the meter scale. If not, the batteries will require replacement or recharging.

## (3) NB

This switch activates the built-in noise blanker. While no blanker can be expected to eliminate all types of noise, such as white noise, etc., this blanker should prove highly effective in minimizing pulse-type noise such as that caused by automotive ignition systems.

## (4) HI/LOW

This switch selects power outputs of 2.5 watts (HI) or 0.5 watt (LOW).

## (5) CASE LATCH

This mechanism provides easy opening and closing of the cabinet for battery removal.

## (6) EXT DC 13.8V

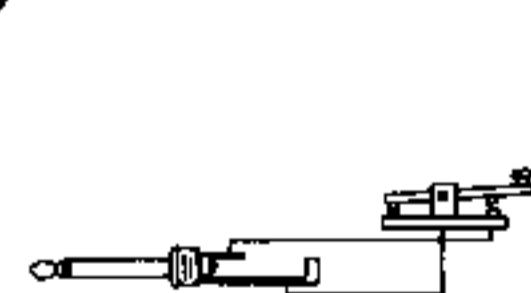
Use this jack for connection to an external DC supply. Never exceed 15 volts at this jack, and never apply AC power of any kind at this point. Also, be absolutely certain that DC power of the proper polarity is applied; when replacing DC plugs, check to be sure that the plug is wired correctly, as there is little standardization in the world for the power plug used for the FT-290R. Failure to observe these simple precautions will void any and all warranties on this equipment.

## (7) CHG

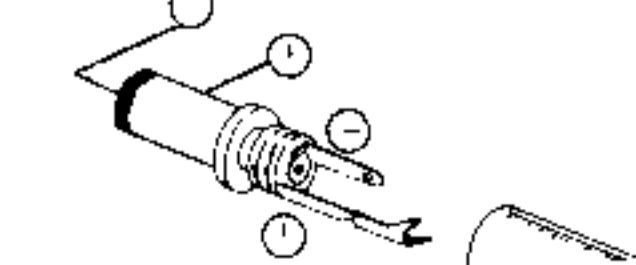
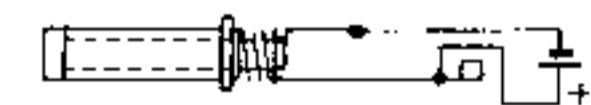
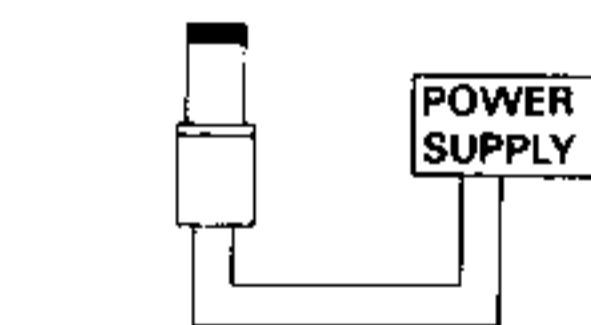
The external charge jack accepts charging voltage from the NC-11B/C battery charger (Option). When using alkaline or other dry cell batteries, do not attempt to recharge them. Use only C size Ni-Cd cells (available from your Yaesu dealer) if you desire rechargeable cells.

## (8) ANT

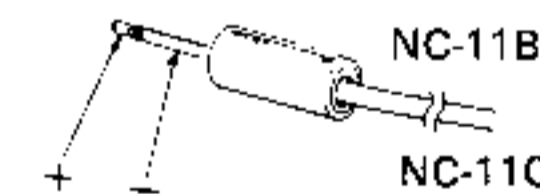
This is a UHF type connector for use with an external antenna of 50 ohms impedance (nominal). When using an external antenna, the internal whip should be telescoped fully inside the radio.



KEY PLUG CONNECTION



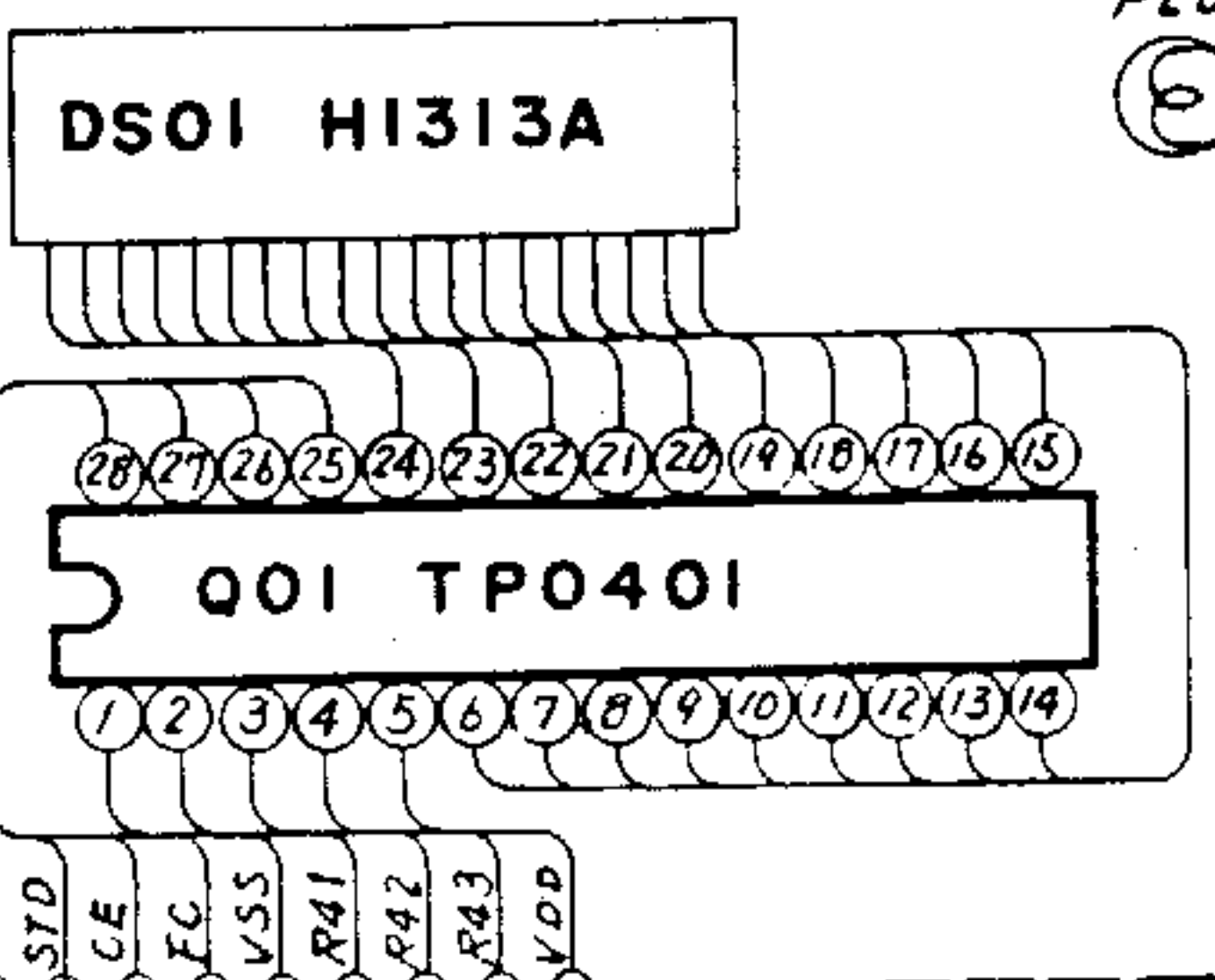
EXT DC PLUG CONNECTIONS



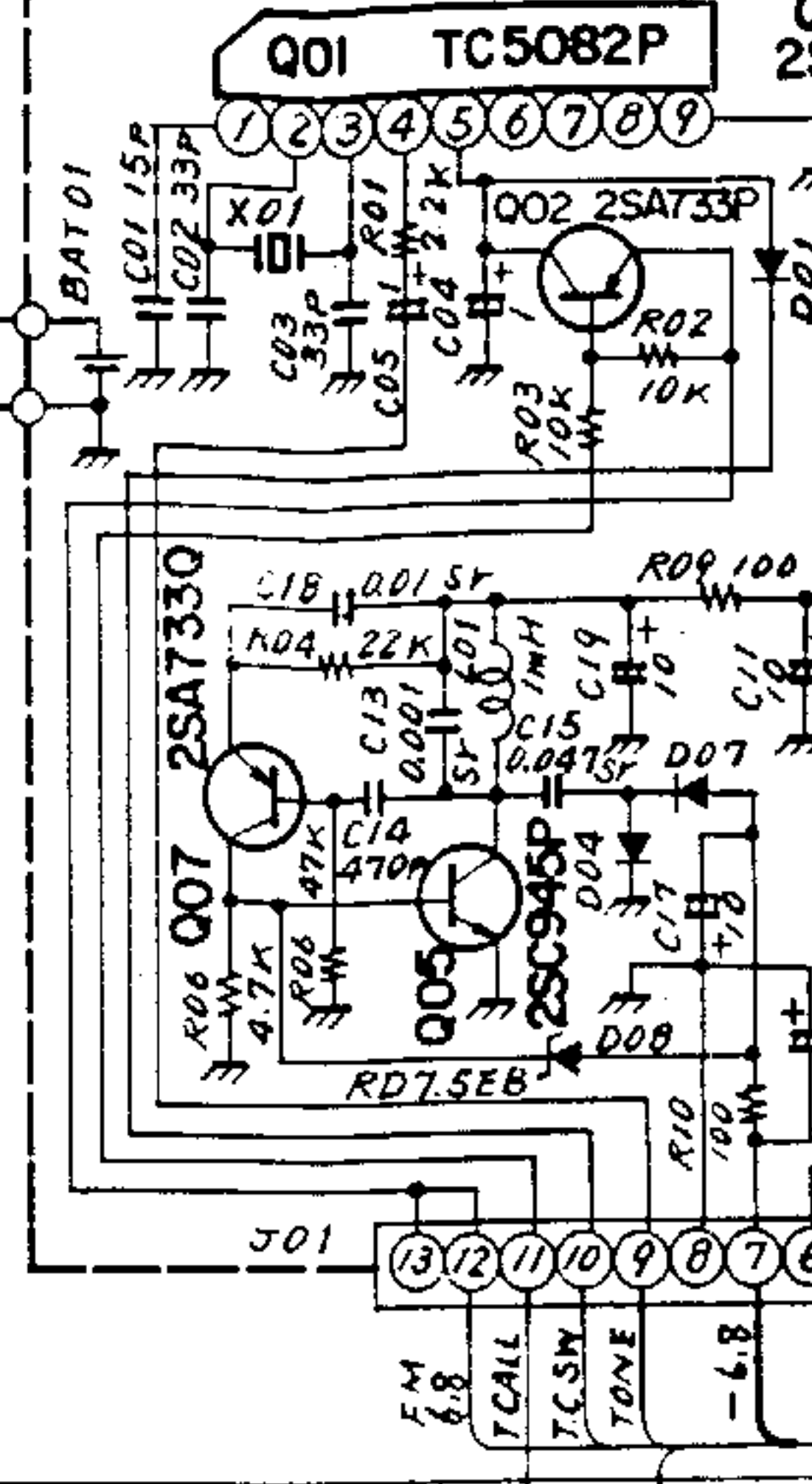
CHARGER PLUG CONNECTIONS

# FT 290R CIRCUIT DIAGRAM

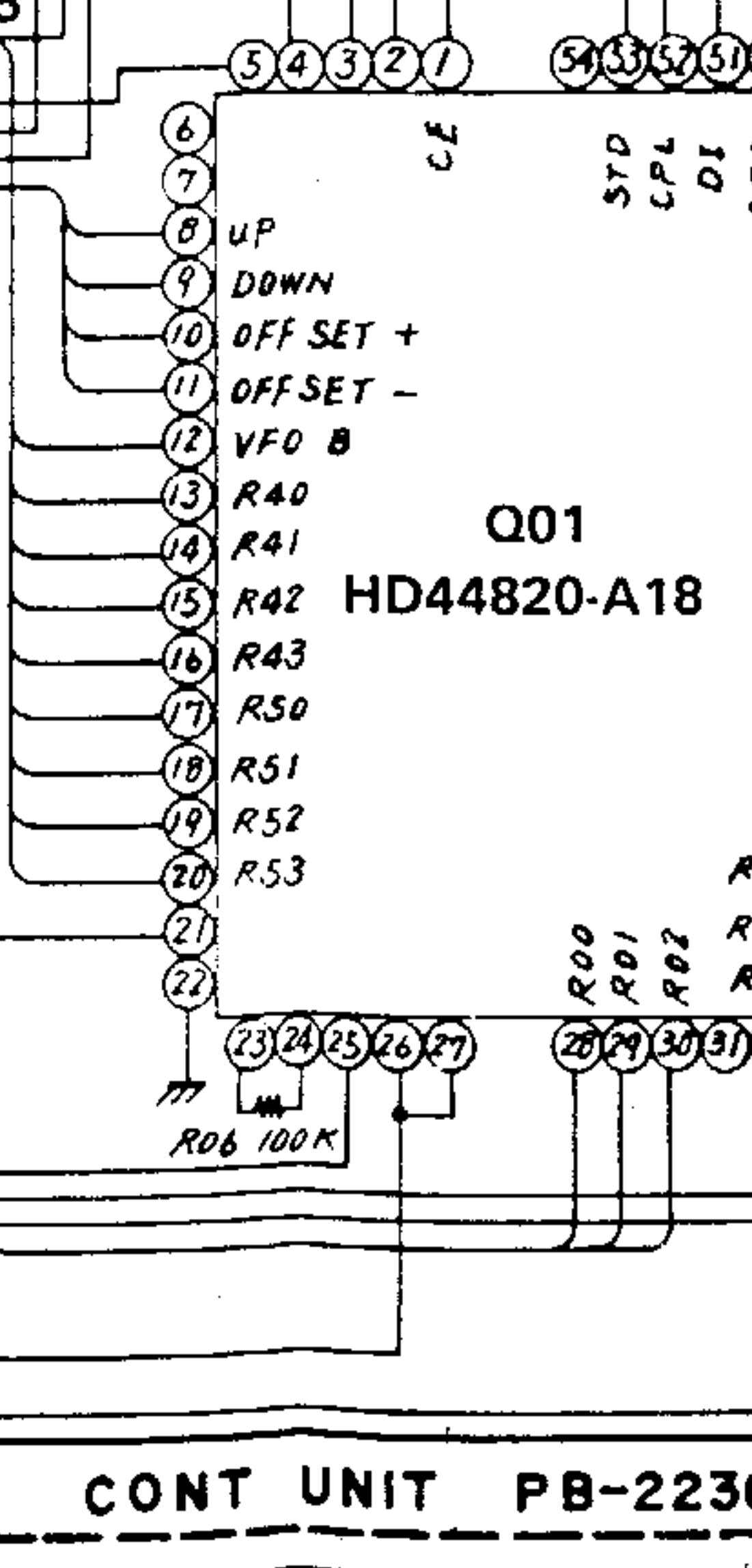
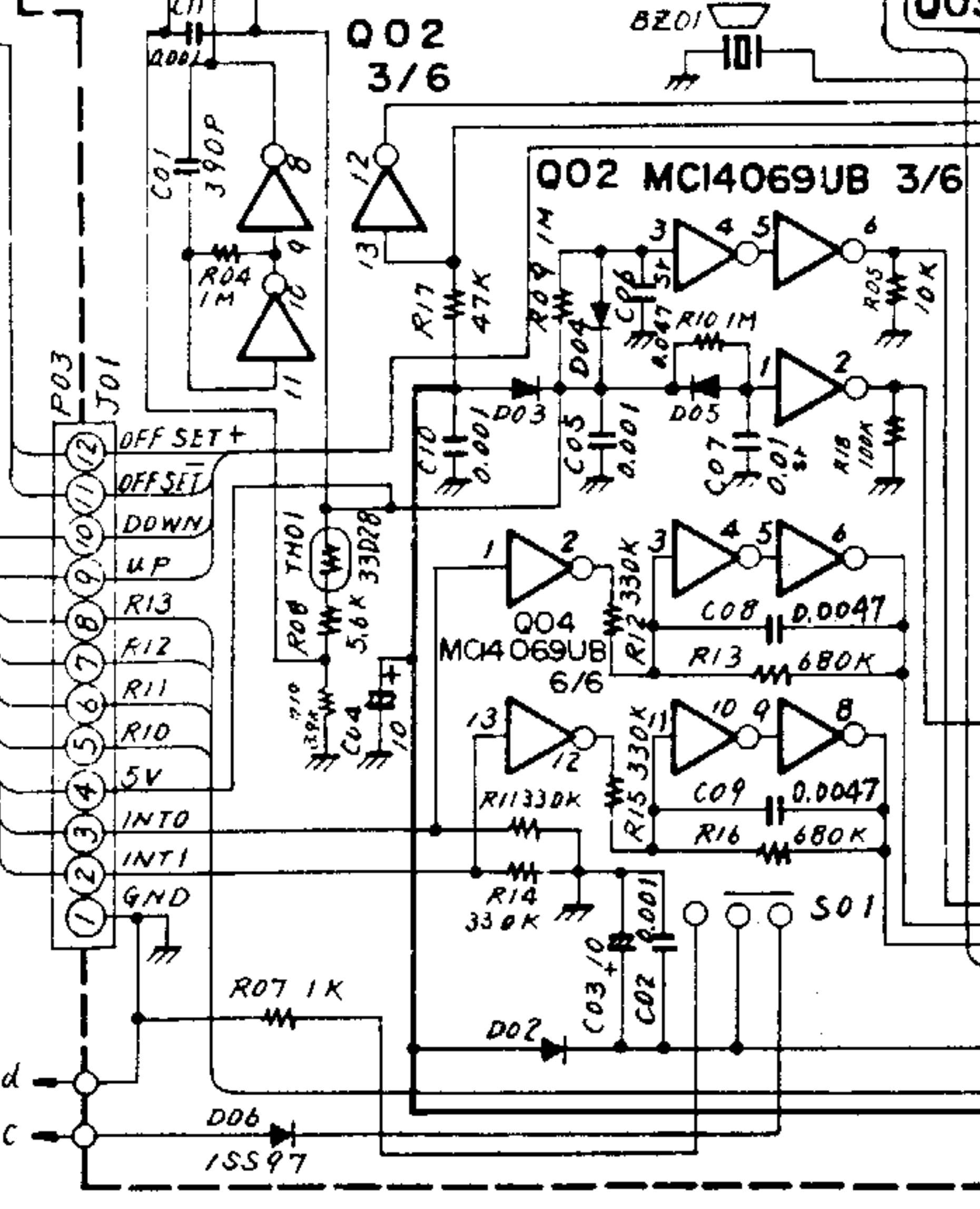
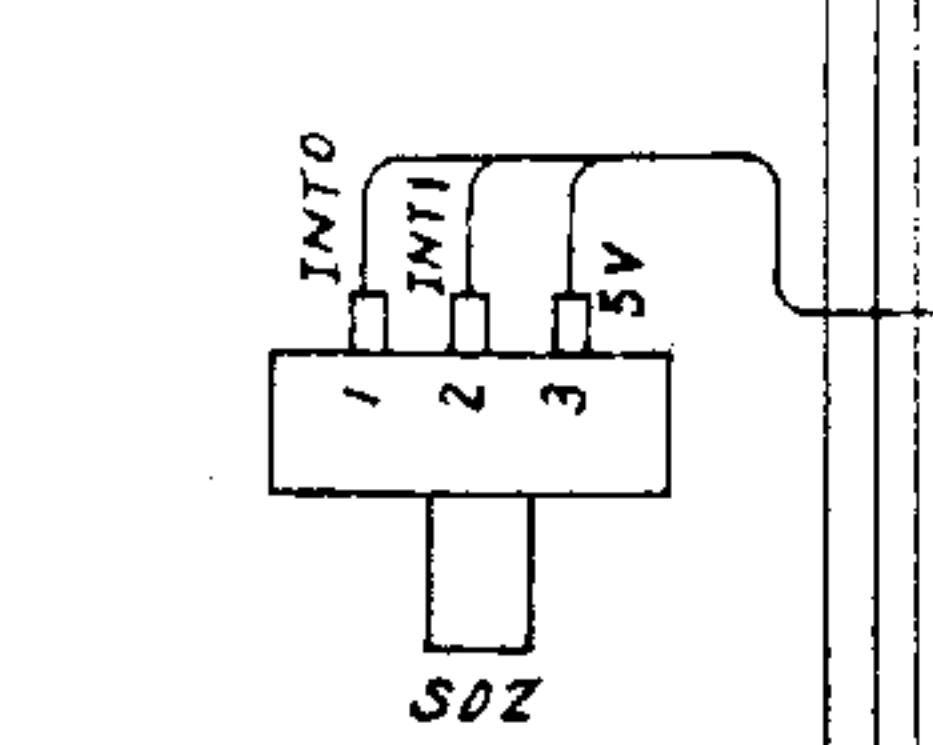
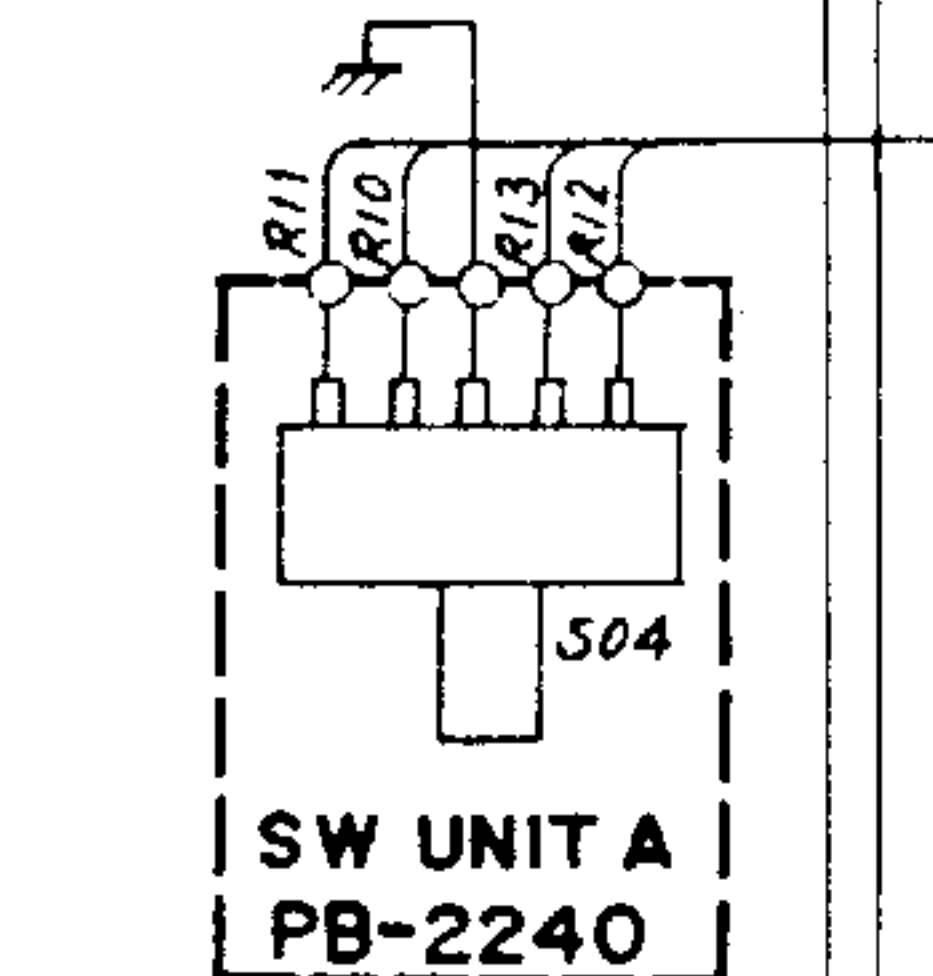
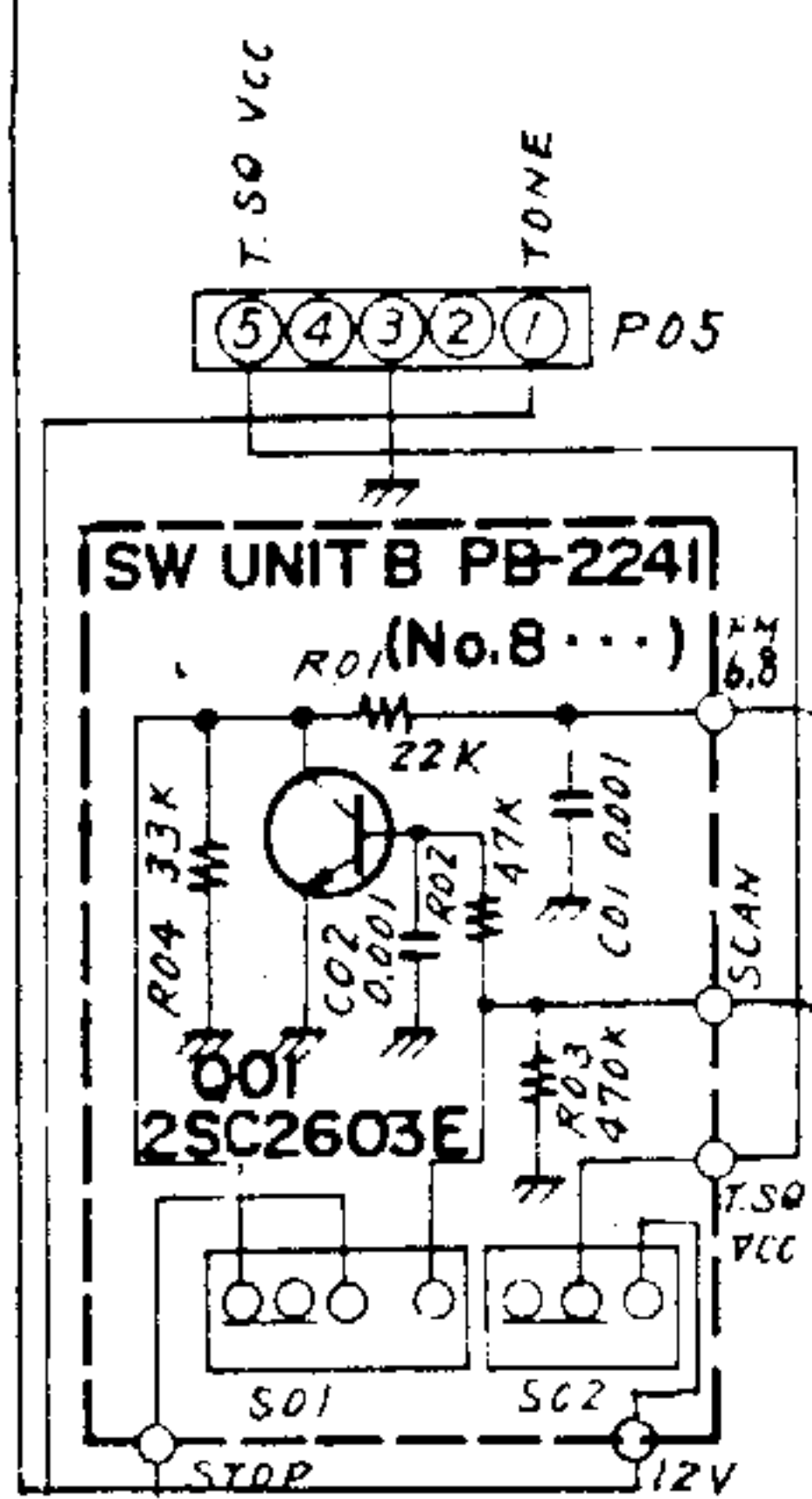
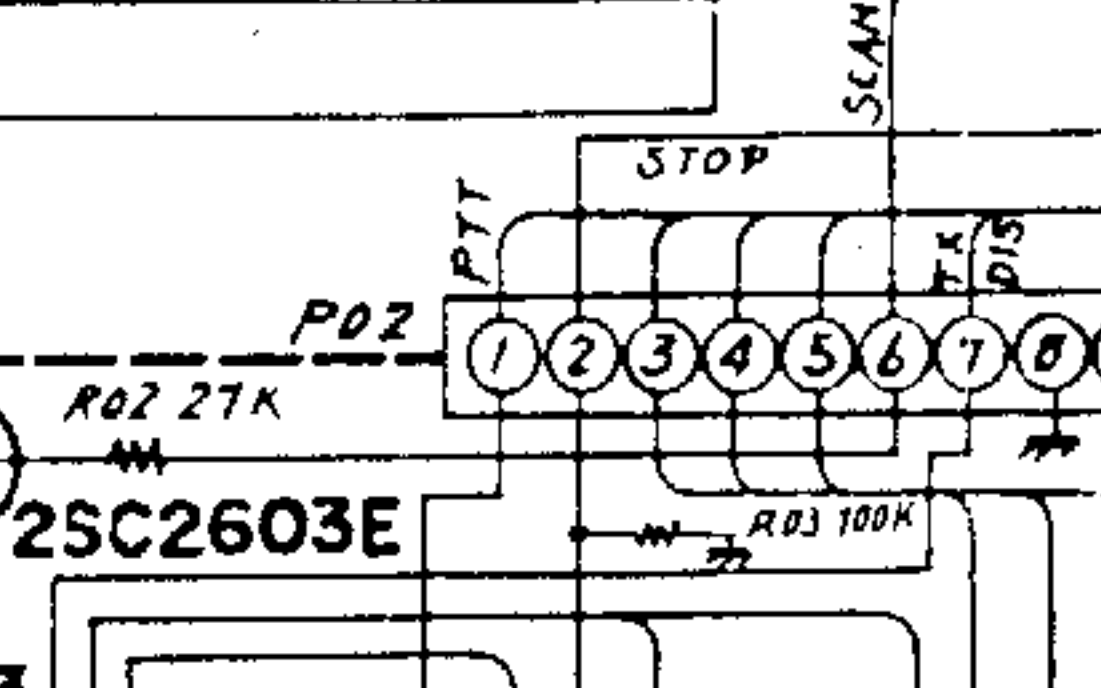
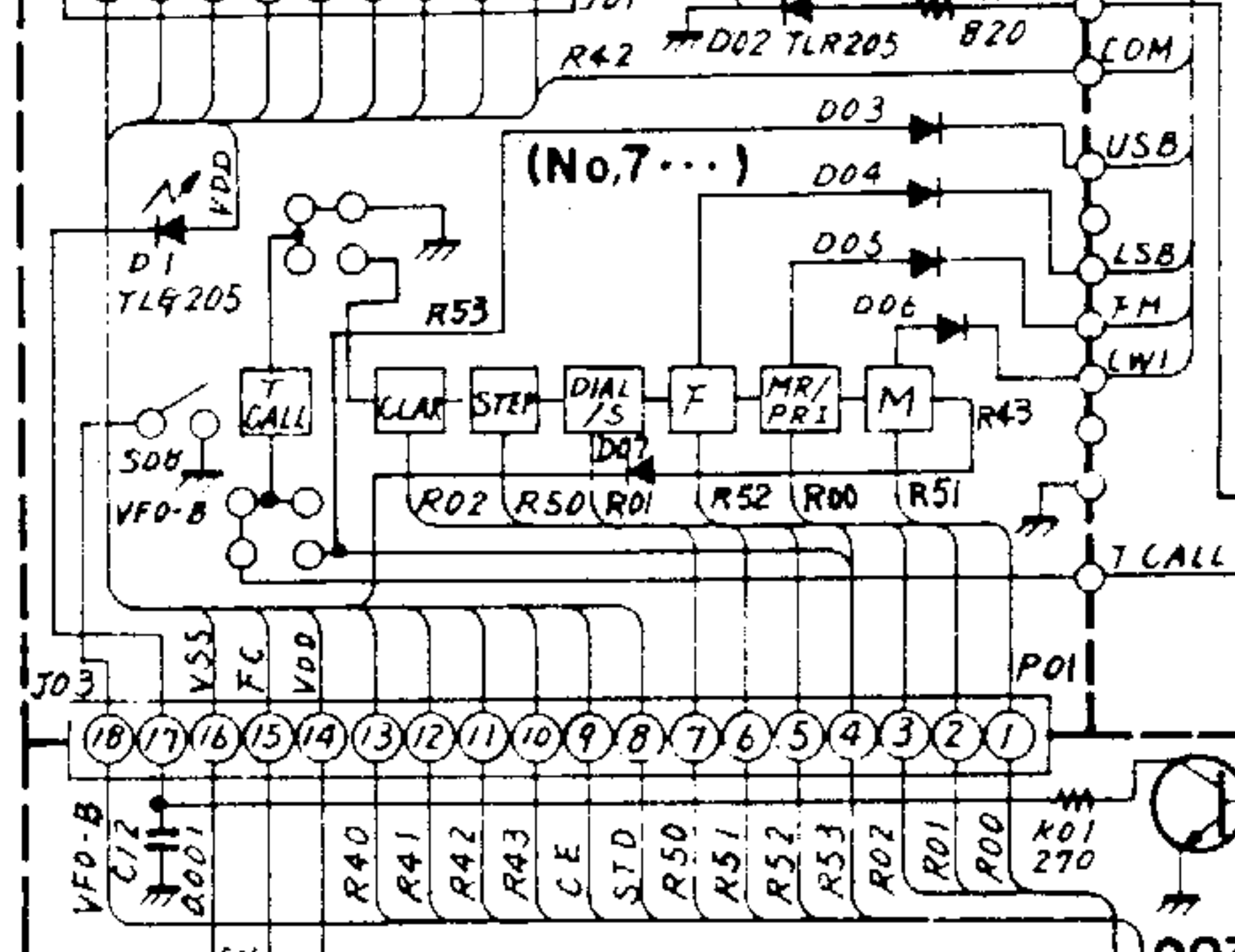
## DISPLAY UNIT PB-2237 (No.6...)



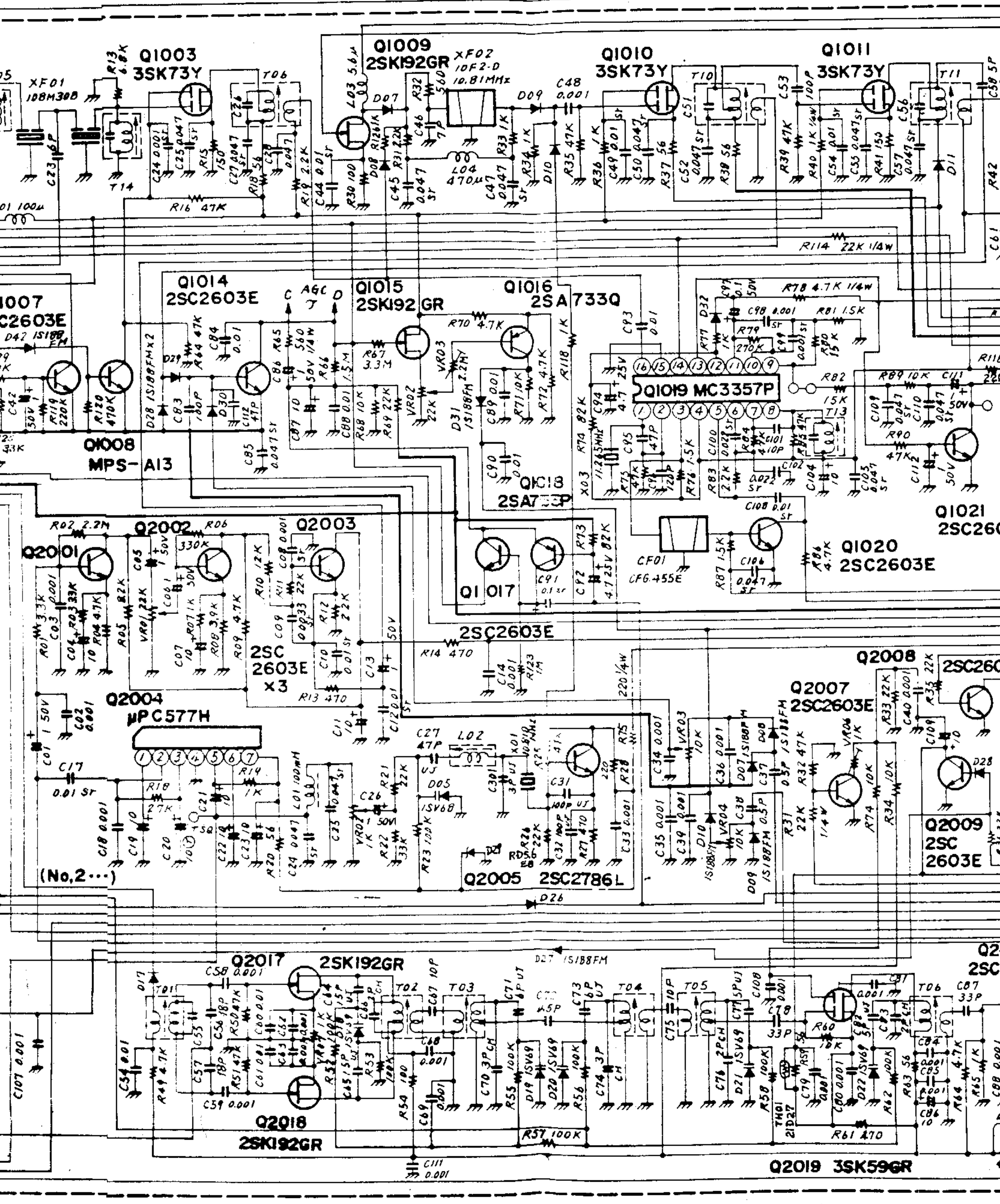
## REG UNIT PB-2396 (No.4...)



## KEY BOARD UNIT PB-2238 (No.7...)

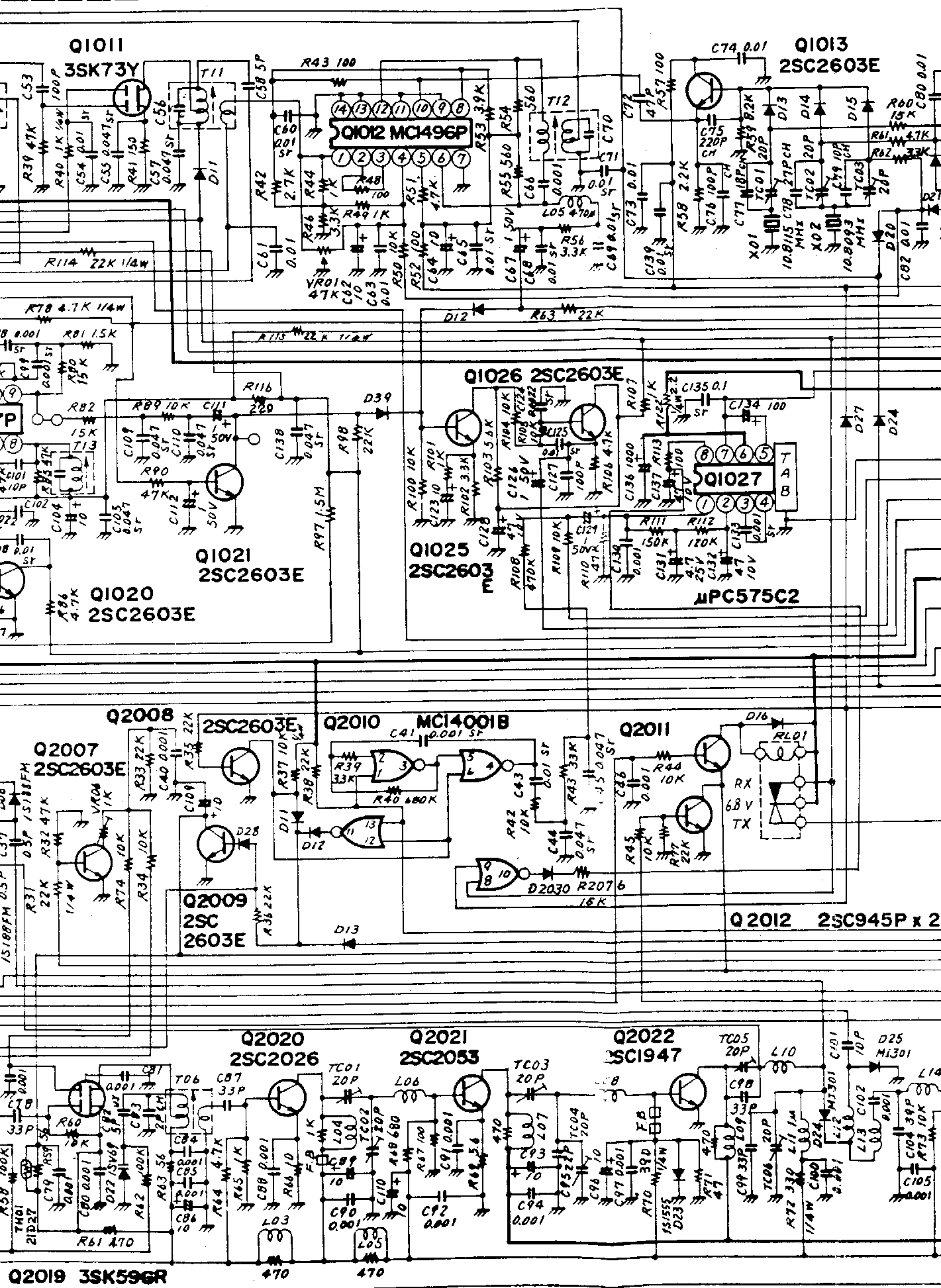


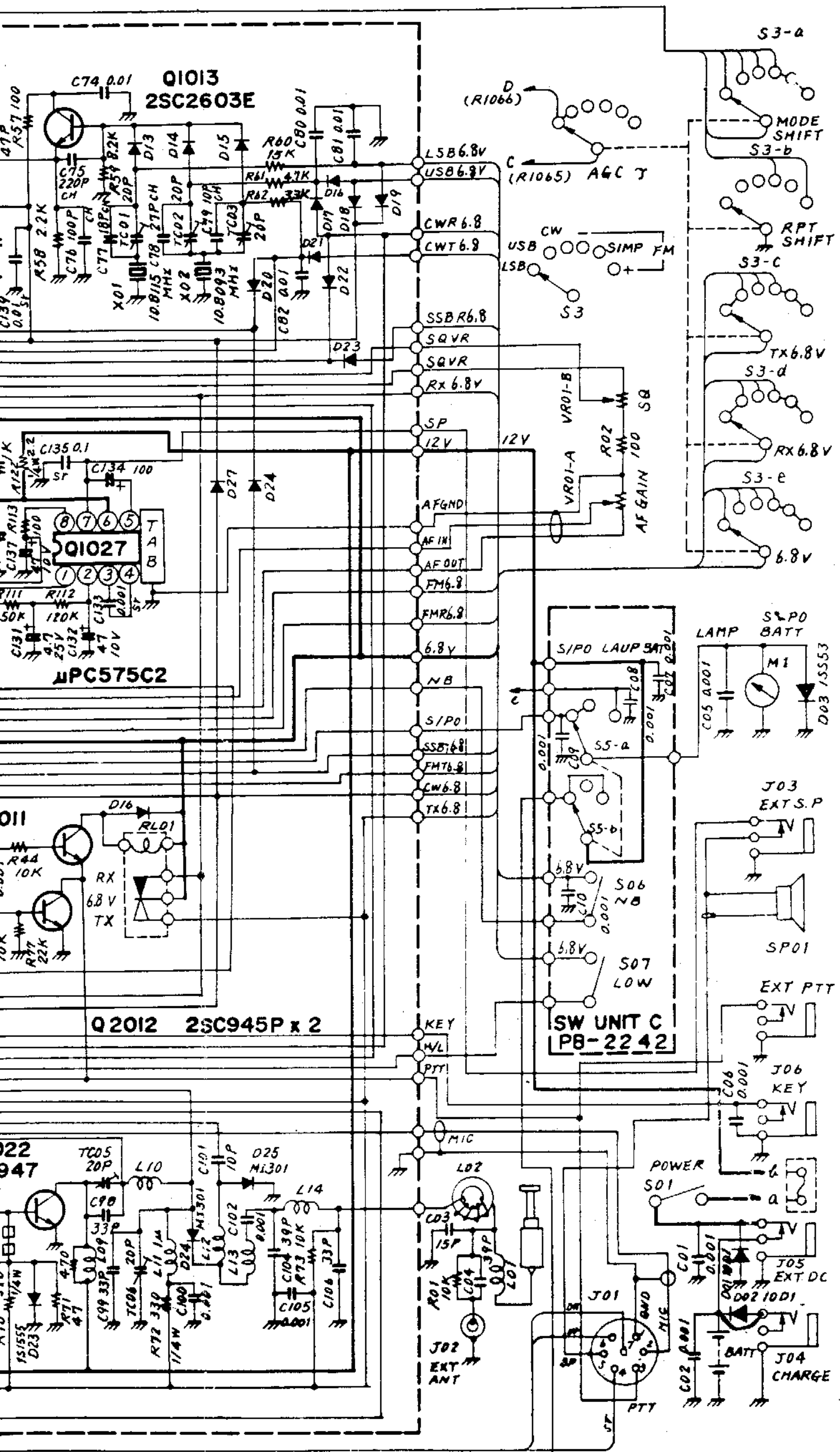




NOTED.  
 NOTED.  
 NOTED.

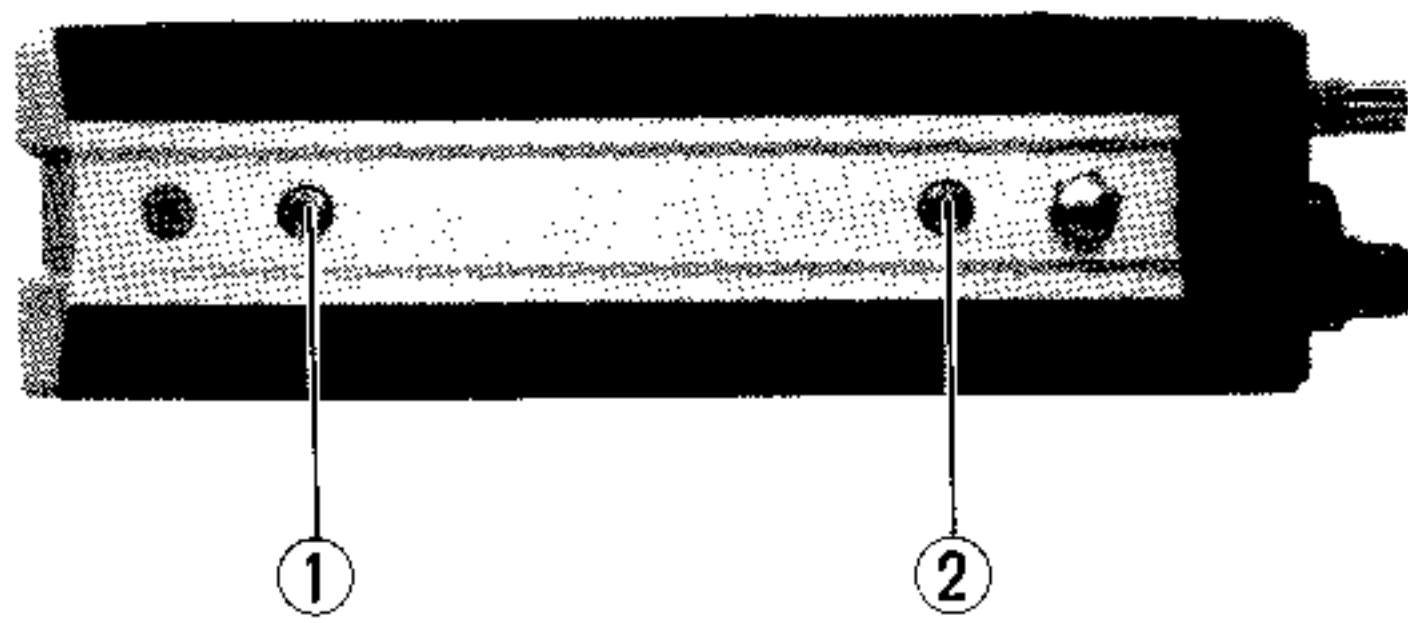
4. ALL ELECTROLYTIC CAPACITORS ARE 16WV UNLESS OTHERWISE NOTED.  
 5. VALUE IS NOMINAL.







## SIDE PANEL JACKS

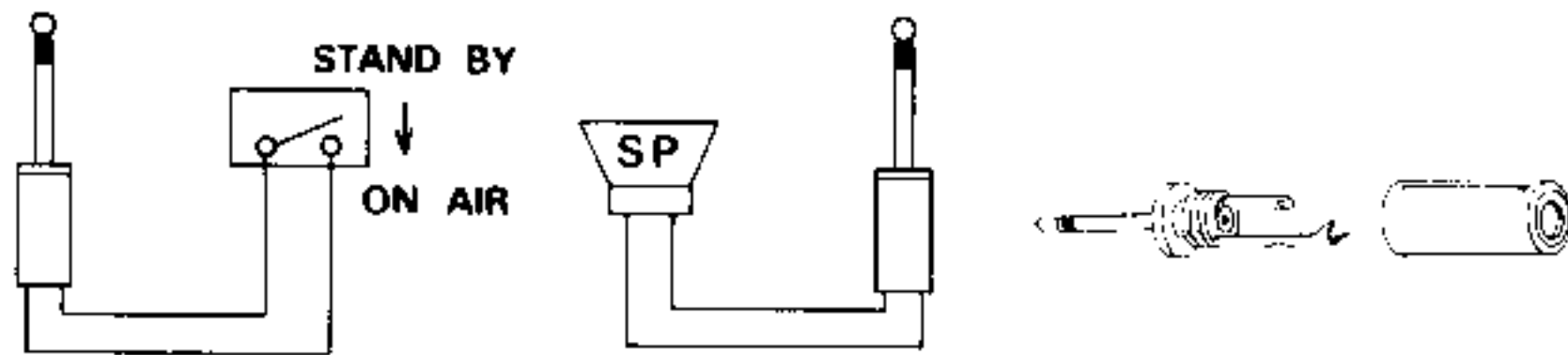


### (1) STAND BY

This jack is wired in parallel with the PTT line of the microphone, allowing the use of a footswitch to activate the transmitter.

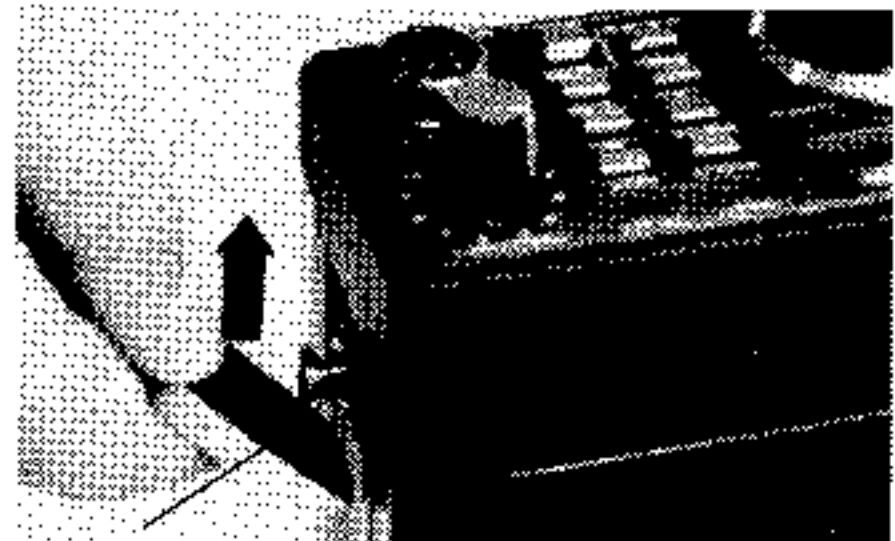
### (2) EXT SP

Use this jack to connect an external speaker. The output impedance is 8 ohms.



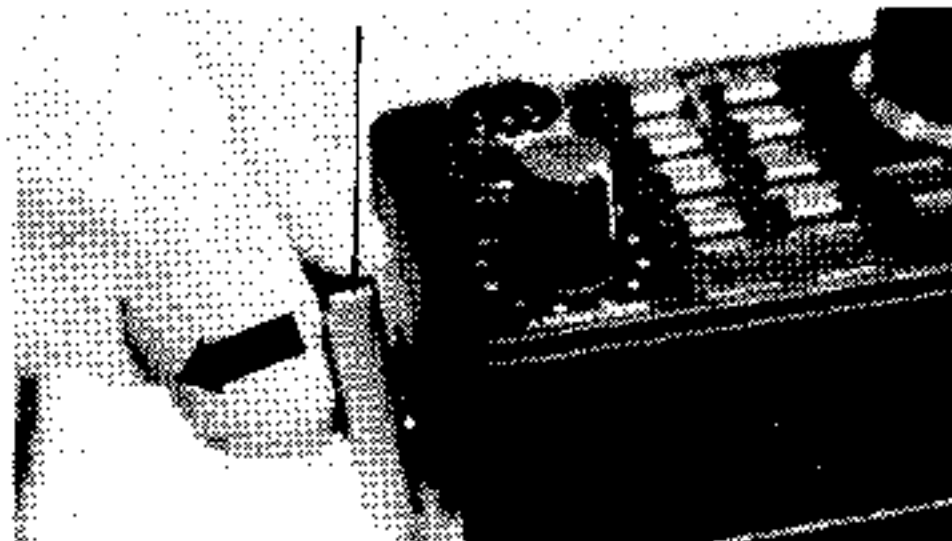
## SHOULDER STRAP ATTACHMENT AND REMOVAL

### ATTACHMENT



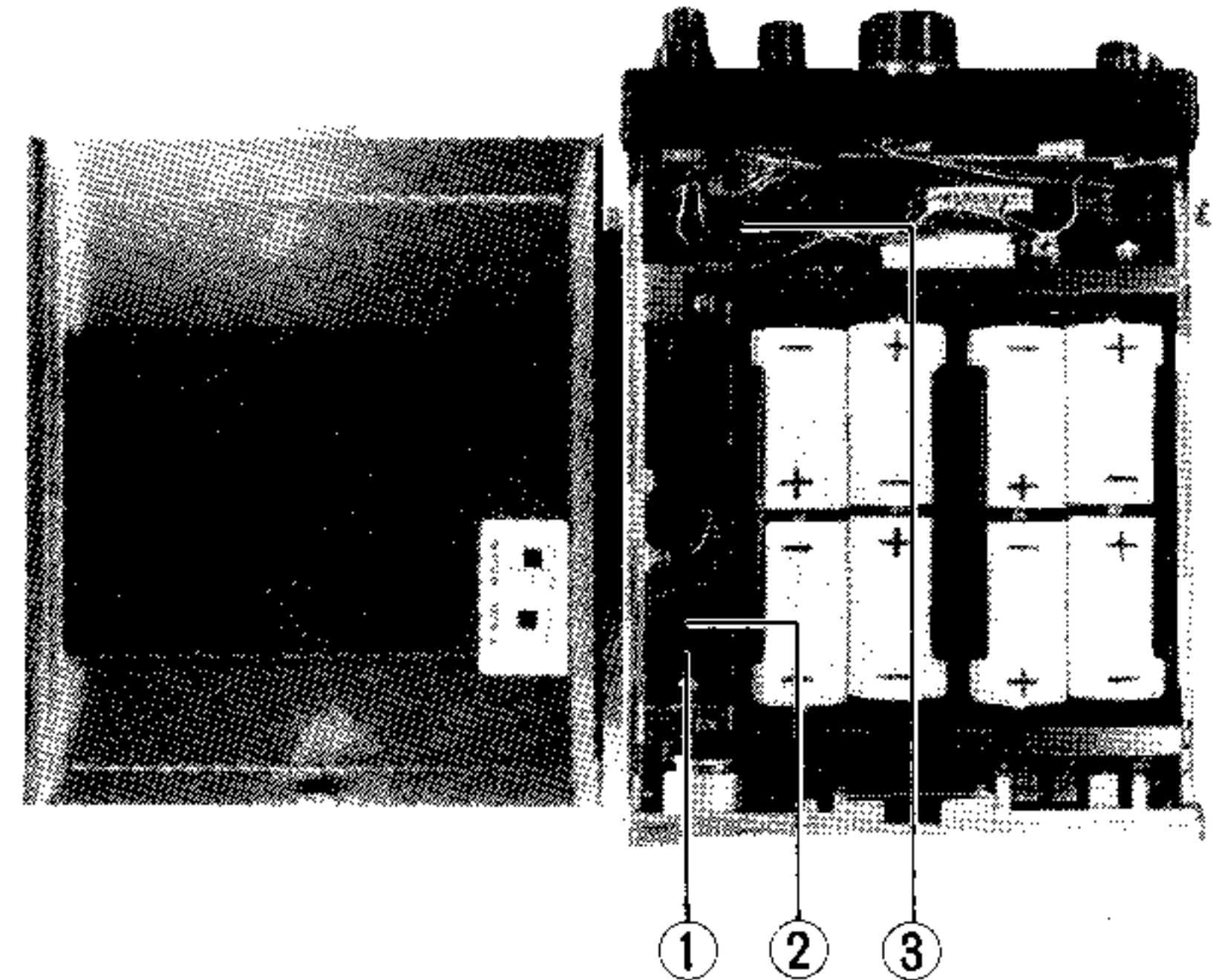
Press pin into hole, then pull up tab.

### REMOVAL



Press with thumb while lifting tab, swiveling back and forth slightly until pin disengages.

## INTERNAL SWITCHES



### (1) T SQL

When the optional tone squelch unit is installed, this switch will place the unit in operation.

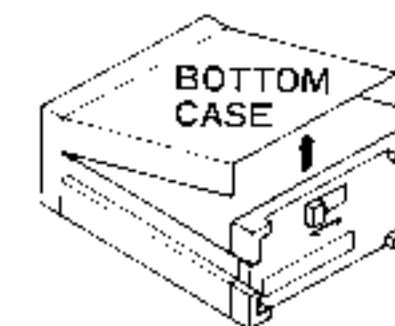
### (2) SCAN

This switch selects scanning stop on a busy or clear channel, per your requirements. Manual scanning can also be selected, if desired.

### (3) BACKUP

This switch activates the memory backup feature. Once the batteries are correctly installed, this switch may be turned on and left on indefinitely. See the operation section for details.

LOCK ← OPEN



# SPECIFICATIONS

## GENERAL

**Frequency coverage:**  
144 – 148 MHz; 144 – 146 MHz  
(as per your local regulations)

**Modes of operation:**  
SSB (USB, LSB), CW and FM

**Synthesizer steps:**  
SSB/CW: 100 Hz, 1 kHz  
FM: 5 kHz, 10 kHz (12.5 kHz, 25 kHz,  
depending on local requirements)

**Power requirements:**  
8 C - size dry battery cells or  
8 C - size Ni-Cd battery cells  
External: 8.5 – 15.2 V DC  
Memory backup: built-in lithium bat-  
tery cell

**Current consumption:**  
60mA on receive;  
800mA on transmit (2.5W RF, FM)

**Antenna impedance:**  
50 ohms

**Case size:**  
58(H) x 150(W) x 195(D) mm

**Weight:**  
1.3kg. without batteries

## TRANSMITTER

**Power output:**  
2.5 watts at 12 volts

**Carrier suppression:**  
Better than 40 dB

**Spurious radiation:**  
Better than 60 dB

**Unwanted sideband suppression:**  
Better than 40 dB

**Tone burst frequency:**  
1800 Hz (U.S.A. model)  
1750 Hz (other models)

**Frequency response:**  
300 – 2700 Hz (–6 dB)

**FM deviation:**  
±5 kHz

**Microphone impedance:**  
600 ohms

## RECEIVER

**Circuit type:**  
SSB/CW: Single conversion  
superheterodyne  
FM: Double conversion  
superheterodyne

**Intermediate frequencies:**  
1st IF 10.81 MHz  
2nd IF 455 kHz (FM)

**Sensitivity:**  
SSB/CW: 0.5 $\mu$ V for 20 dB S/N  
FM: 0.25 $\mu$ V for 12 dB SINAD

**Selectivity:**  
SSB/CW: 2.4 kHz at 6 dB down;  
4.1 kHz at 60 dB down  
FM: 14 kHz at 6 dB down;  
25 kHz at 60 dB down

**Image reduction:**  
Better than –60 dB

**Audio output impedance:**  
8 ohms

**Audio output:**  
1 watt @10% THD

Specifications subject to change without notice or obligation.

# SEMICONDUCTORS

ICs:		Transistors:		Diodes:	
HD44820A62	1	2SA733P	2	1S188FM (Ge)	12
ICL7660CPA	1	2SA733Q	1	1SS53(Si)	49
MC1496P	1	2SC496Y	1	10D1(Si)	2
MC3357P	1	2SC535A	5	MI301(Si)	2
MC14001B	1	2SC945P	4	V05B (Si)	1
MC14069UB	2	2SC1583	1	1SS97	1
TC5082P	1	2SC1947	1	(Schottky Barrier)	
TP0401	1	2SC2026	1	1SV50 (Varactor)	1
$\mu$ PC575-C2	1	2SC2053	1	1SV68 ( " )	1
$\mu$ PC577H	1	2SC2603E	16	1SV69 ( " )	8
$\mu$ PD2819-C	1	2SC2786L	2	1T25 ( " )	1
		MPS-A13	1	HZ6C-1L (Zener)	1
				RD5.6EB-3( " )	2
				RD6.8EB-3( " )	1
				TLG205(LED)	1
				TLR205(LED)	1
				<b>LCD:</b>	
				H1313A	1

FETs:	
2SK30A-Y	1
2SK168D	2
2SK192GR	4
2SK193F	1
3SK51-03	1
3SK59GR	1
3SK59Y	1
3SK73Y	4

## ACCESSORIES

MICROPHONE YM-47 (M3090033)	1
MICROPHONE HANGER (R0071360)	1
SHOULDER STRAP (R7070600B)	1
EXTERNAL POWER SUPPLY PLUG P-200 (P1090139)	1
EXTERNAL SPEAKER PLUG C-107 (P0090034)	1