



# SERVICE MANUAL

# TR-7730

## VHF FM TRANSCEIVER



### CONTENTS

SPECIFICATIONS .....	2	DISPLAY UNIT (X54-1520-11) .....	12
CIRCUIT DESCRIPTION .....	2	M, MR BOARD (J25-2757-14) .....	12
PC BOARDS		M.S, TONE BOARD (J25-2757-14) .....	12
RX.TX UNIT (X44-1450-10) (K, M TYPE) .....	8	SCAN, HOLD BOARD (J25-2758-14) .....	12
RX.TX UNIT (X44-1450-51, -61) (T, W TYPE) .....	9	PARTS LIST .....	13
FINAL UNIT (X45-1190-10) .....	10	DISASSEMBLY .....	18
PLL UNIT (X50-1750-10) .....	10	LEVEL DIAGRAM .....	20
CONTROL UNIT (X53-1230-10, -61) .....	11	ADJUSTMENTS .....	21
M.CH BOARD (J25-2715-04) .....	11	PACKING .....	28
RPT BOARD (J25-2744-04) .....	11	SCHEMATIC DIAGRAM (K, M TYPE) .....	29
SCHMITT BOARD (J25-2755-14) .....	11	SCHEMATIC DIAGRAM (T, W TYPE) .....	30
10K/5K or 25K/5K (J25-2756-04) .....	11	REFERENCE DATA .....	31
HI/LOW BOARD (J25-2756-04) .....	11	BLOCK DIAGRAM .....	BACK COVER

## SPECIFICATIONS/CIRCUIT DESCRIPTION

### [General]

<b>Semiconductors</b> .....	ICs	15 (K, M) 16 (W, T)
	Transistors	46 (K, M) 49 (W, T)
	FETs	7
	Diodes	91 (K, M) 95 (W, T)
<b>Frequency range</b> .....	144.000 to 147.995 MHz (K, M) 144.000 to 145.995 MHz (W, T)	
<b>Frequency synthesizer</b> .....	Digital control, phase locked VCO	
<b>Mode</b> .....	FM (F3)	
<b>Antenna impedance</b> .....	50 ohms	
<b>Power requirement</b> .....	13.8 V DC $\pm$ 15%	
<b>Grounding</b> .....	Negative	
<b>Operating temperature</b> .....	- 20°C to + 60°C	
<b>Current drain</b> .....	0.4A in receive mode with no input signal	
	5.5A in HI transmit mode (Approx.)	
	3A in LOW transmit mode (Approx.)	
	Less than 2.5 mA for memory back up (from power supply)	
<b>Dimensions</b> .....	147.5 mm (5-3/4") wide	
	51.5 mm (2") high	
	198.0 mm (7-3/4") deep	
	(projections excluded)	
<b>Weight</b> .....	1.5 kg (3.3 lbs) (Approx.)	

### [Transmitter Section]

<b>RF output power</b>	
(at 13.8 V DC, 50 $\Omega$ load) .....	HI 25 Watts min.
	LOW 5 Watts approx. (Adjustable)
<b>Modulation</b> .....	Variable reactance direct shift
<b>Frequency tolerance</b> .....	Less than $\pm 20 \times 10^{-6}$
(- 10°C ~ + 50°C)	
<b>Spurious radiation</b> .....	HI Less than - 60 dB
	LOW Less than - 53 dB
<b>Maximum frequency deviation (FM)</b> .....	$\pm 5$ kHz
<b>Microphone</b> .....	Dynamic microphone with PTT, up, down, switches, 500 $\Omega$

### [Receiver Section]

<b>Circuitry</b> .....	Double conversion superheterodyne	
<b>Intermediate frequency</b> .....	1st IF	10.7 MHz
	2nd IF	455 kHz
<b>Receiver sensitivity</b> .....	Better than 0.5 $\mu$ V for 30 dB S/N	
	Better than 0.25 $\mu$ V for 12 dB SINAD	
<b>Receiver selectivity</b> .....	More than 12 kHz (- 6 dB)	
	Less than 25 kHz (- 60 dB)	
<b>Spurious response</b> .....	Better than 60 dB	
<b>Squelch sensitivity</b> .....	0.16 $\mu$ V (threshold)	
<b>Audio output</b> .....	More than 2.0 watts across 8 ohm load (10% dist.)	

**Note:** Circuit and ratings are subject to change without notice due to developments in technology.

**NOTE :** Letter designations used in this manual :

K	U.S.A.	X	AUSTRALIA
T	BRITAIN	M	GENERAL MARKET
W	EUROPE		

### < RECEIVER SECTION >

#### RX.TX UNIT (X44-1450-XX)

The antenna signal is applied to the RF amplifier (Q3 : 3SK76), a dual gate MOS FET and helical resonator L5 (3 poles) and L6 (2 poles), and is then converted to the 10.7 MHz 1st IF signal by Q4, the 1st mixer.

A 2-stage MCF (Monolithic crystal filter) is used in the 1st IF stage. All this achieves high dynamic range and high sensitivity.

The 1st IF signal, after passing through the MCF, is mixed with the 10.245 MHz 2nd local oscillator signal, generated by Q5 to obtain a 455 kHz 2nd IF signal.

This signal passes through the ceramic filter (CFW455F) and is amplified by IC1, Q7 through Q10, and is then demodulated. An S meter signal is obtained by detecting the signal from the collector of Q7 by diodes D2 and D3, and is then applied to the display unit. The S meter uses 8 LEDs, and indicates 6 amber and 1 red LED when the antenna input level is 15 dB $\mu$ .

## CIRCUIT DESCRIPTION

Item	Rating
Nominal center frequency ( $f_0$ )	10.7 MHz
Pass bandwidth	$f_0 \pm 7.5$ kHz or more at 3 dB
Attenuation bandwidth	$f_0 \pm 25$ kHz or less at 40 dB $f_0 \pm 45$ kHz or less at 60 dB
Guaranteed attenuation	70 dB or more within $f_0 \pm 1$ MHz 80 dB or more within $f_0 - (910 \text{ kHz} \pm 10 \text{ kHz})$
Spurious	40 dB or more within $f_0$ to $f_0 + 500$ kHz
Ripple	1.0 dB or less
Loss	1.5 dB or less
Input and Output impedance	$3k\Omega$
Operating temperature	$-20^\circ\text{C} \sim +70^\circ\text{C}$

**Table 1 MCF (L71-0219-05) (RX.TX unit, L17)**

Item	Rating
Nominal center frequency	455 kHz
6 dB bandwidth	$\pm 6$ kHz or more
50 dB bandwidth	$\pm 12.5$ kHz or less
Ripple (within $455 \pm 4$ kHz)	3 dB or less
Loss	6 dB or less
Guaranteed attenuation (within $455 \pm 100$ kHz)	35 dB or more
Input and output impedance	$2.0 k\Omega$

**Table 2 Ceramic filter CFW455F (L72-0315-05) (RX.TX unit, L18)**

Item	Rating
Center frequency and deviation	$455 \text{ kHz} \pm 1.0 \text{ kHz}$
Peak separation	15 kHz or more
Voltage sensitivity (at 455 kHz)	15 mV/kHz or more
Operating temperature	$-10^\circ\text{C} \sim +50^\circ\text{C}$

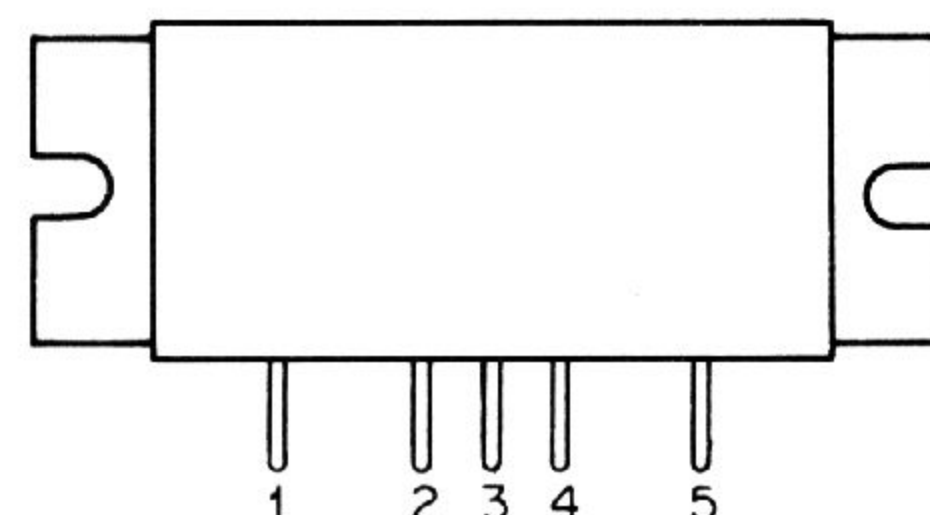
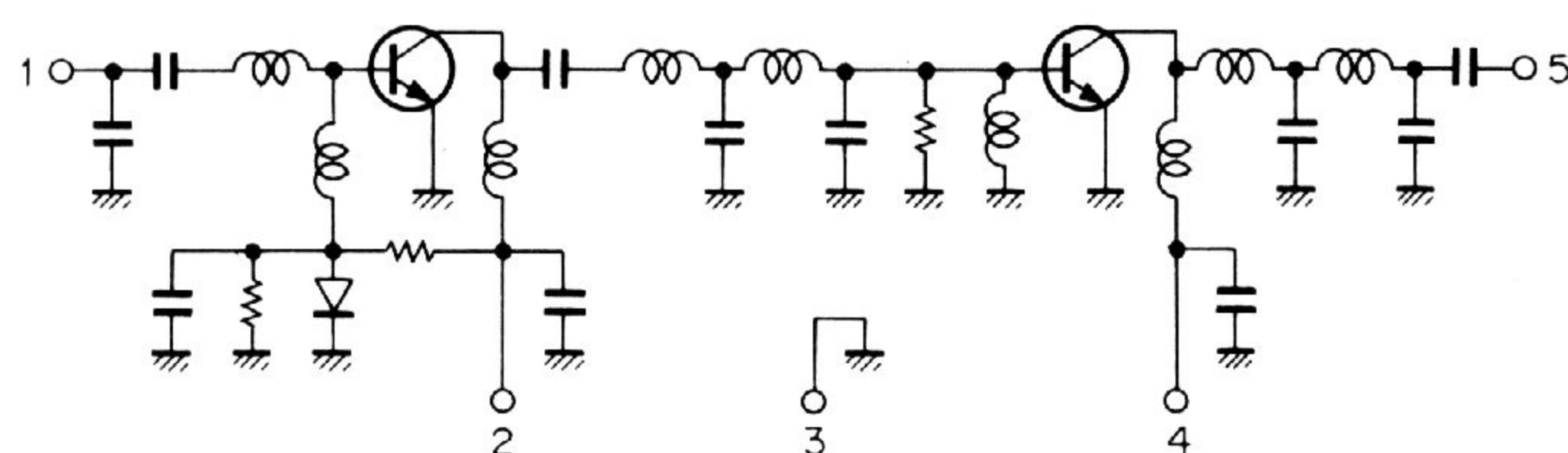
**Table 3 Ceramic disc CFY455S (L79-0446-05) (RX.TX unit, L19)**

### < TRANSMITTER >

#### RX.TX UNIT (X44-1450-XX)

The microphone signal is amplified and limited by IC2 (TA7061AP), and is then applied to D1 (1S2208) in the PLL unit to directly modulate the VCO. The VCO generates 144~145.995 MHz (W, T) or 143.9~148.995 MHz (K, M) according to the control signal from the microprocessor.

The VCO signal is amplified by Q2 and Q3 in the PLL unit, and then applied to the RX.TX unit via the LT terminal. The signal is amplified by Q1 and Q2 before it is applied to the power module. This simple transmitter structure provides superior spurious radiation characteristic. The HIGH/LOW switch signal is applied to Q28, Q22 and Q21 in the RX.TX unit, which controls the B+ voltage applied to the driver stage (Q2), so that final input and output power is varied. The RF meter is adjusted so that 6 amber LEDs light at HIGH power. However, the number of LEDs on may vary according to the VSWR of the antenna system.



Terminal  
1 : RF Input  
2 : Vcc 1  
3 : GND  
4 : Vcc 2  
5 : RF Output

**Fig. 1 POWER MODULE VP-15E1305**

Item	Symbol	MAX Rating	Condition
Power supply voltage	Vcc	17V	$T_c = 25^\circ\text{C}$
DC current	Icc	8A	$T_c = 25^\circ\text{C}$
Operating case temperature	Top	$-30 \sim 100^\circ\text{C}$	
Storage temperature	Tstg	$-40 \sim 110^\circ\text{C}$	

#### VP-15E1305 MAX Rating

Item	Symbol	Condition	Rating			Unit
			MIN	TYP	MAX	
f range	f		144		148	MHz
Power input	Pin			250		mW
Power output	Po	Pin = 250 mW Vcc = 13.0V	30			W
Operating voltage	Vcc			13.0		V
Input and output impedance	Z	Pin = 250 mW Vcc = 13.0V		50		$\Omega$
Total efficiency	$\eta_T$	Pin = 250 mW Vcc = 13.0V	45	50		%

#### VP-15E1305 Electrical Characteristic

## CIRCUIT DESCRIPTION

### PLL CIRCUIT (X50-1750-10)

VCO Q1 : 2SK19 (GR) generates 143.900~148.995 MHz (K, M) or 144.00~145.995 MHz (W, T) during transmission and 133.200~138.295 MHz (K, M) or 133.30~135.295 MHz (W, T) during reception.

The VCO signal is buffered by Q2 and amplified by Q3 and Q4. It is then mixed with the HET signal (from Q5) by Q12 to obtain a PLL IF signal (5.4~10.495 MHz [K, M] or 5.5~7.49 MHz [W, T]).

The HET signal is generated by Q5, a third overtone oscillator using a 46.1666 MHz crystal to generate 138.5 MHz for transmission and a 42.6 MHz crystal to generate 127.8 MHz for reception. Both frequencies are shifted 5 kHz when the 5K control signal from the control unit (X53-1120-10) is applied to D9 and D10 to shunt TC3 and TC4.

The resonant frequencies of L5, L7, L10, and the VCO tank circuit and the HET frequency are switched for reception and transmission using the 8R (8V DC during reception) and 8T (8V DC during transmission) control lines.

The PLL IF signal is amplified by Q10 and buffered by Q11 and Q9, and then applied to pin 2 of IC3 (TC9122P) the programmable divider. IC3 is supplied with frequency dividing data from the control unit : 550~1049 (K, M) or 550~749 (W, T) in BCD, and the PLL IF frequency is also divided to a 10 kHz signal for a phase-lock comparison signal. IC2 (TC5082P-GL) is the 10.24 MHz oscillator. Its output is divided by 1024 to 10 kHz for IC1's reference signal. These comparison and reference signals are input to the phase comparator (IC1 : TC5081P) and the resultant DC output signal is applied through the low pass filter Q8 and Q7 to the VCO tank circuit through varicap diode (D2 : 1S2208) to control the VCO output frequency. If the PLL unlocks, the voltage at IC1 pin4 drops to turn off Q6 and D11, which shuts off Q3.

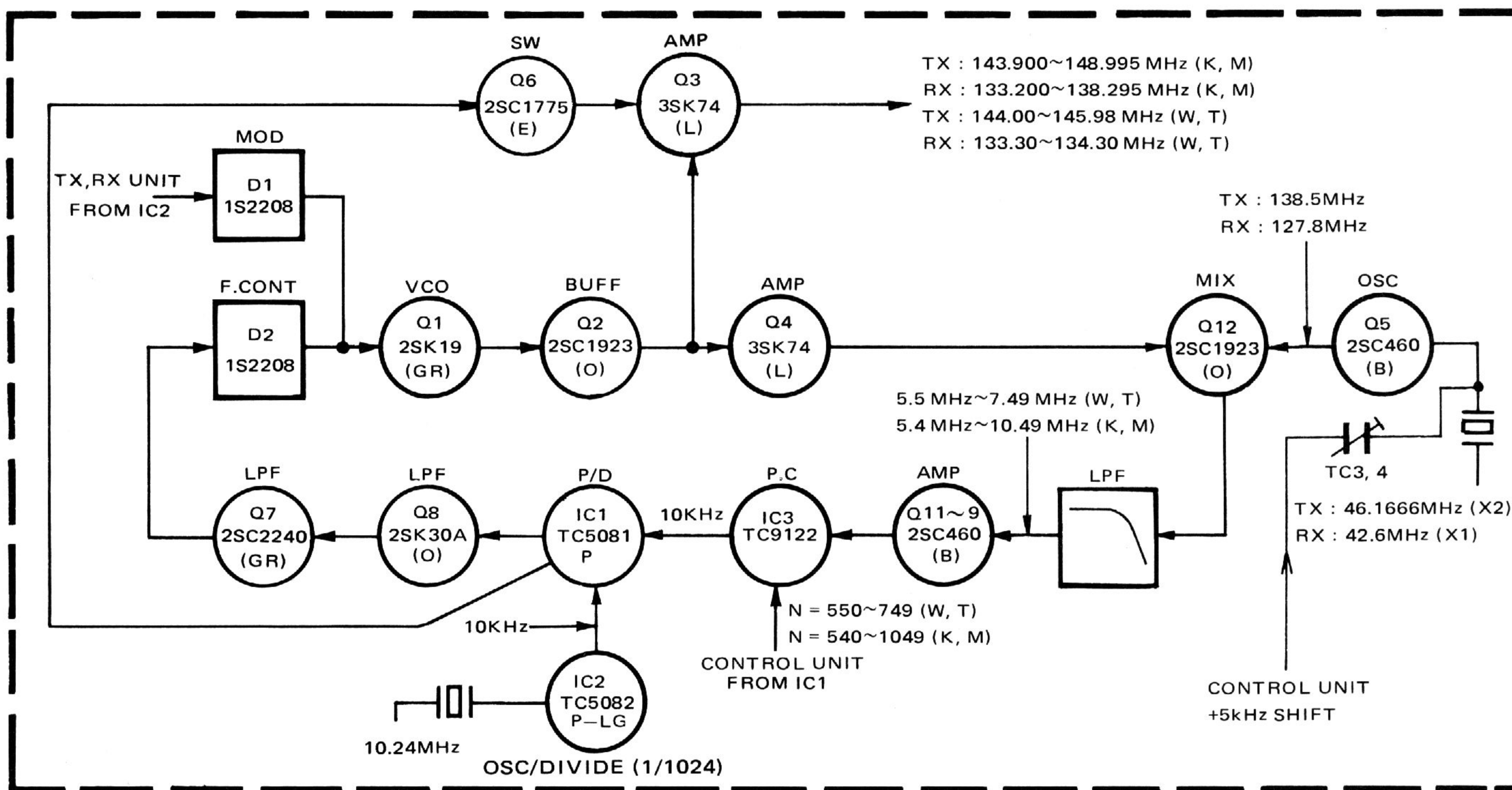


Fig. 2 PLL unit block diagram

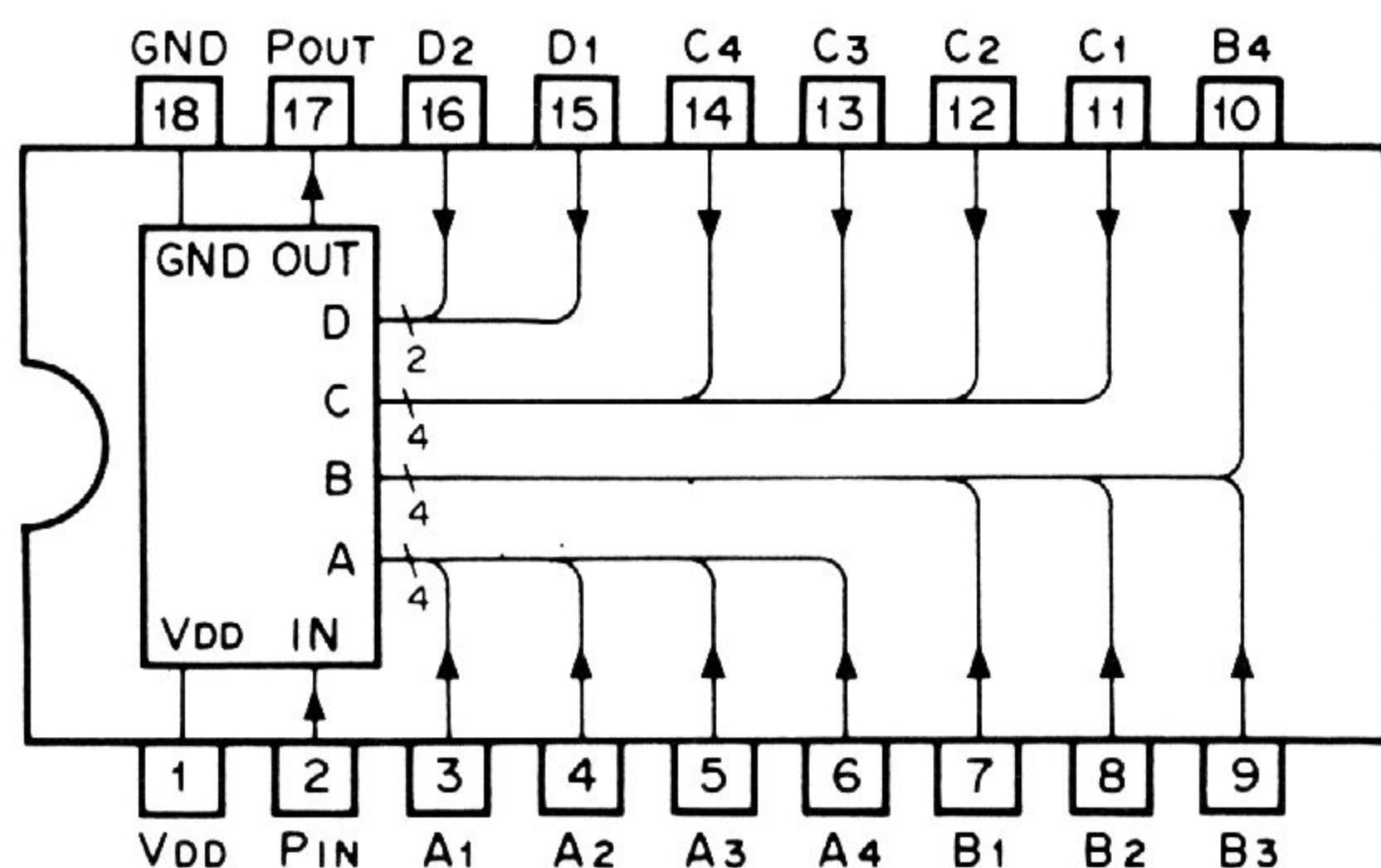
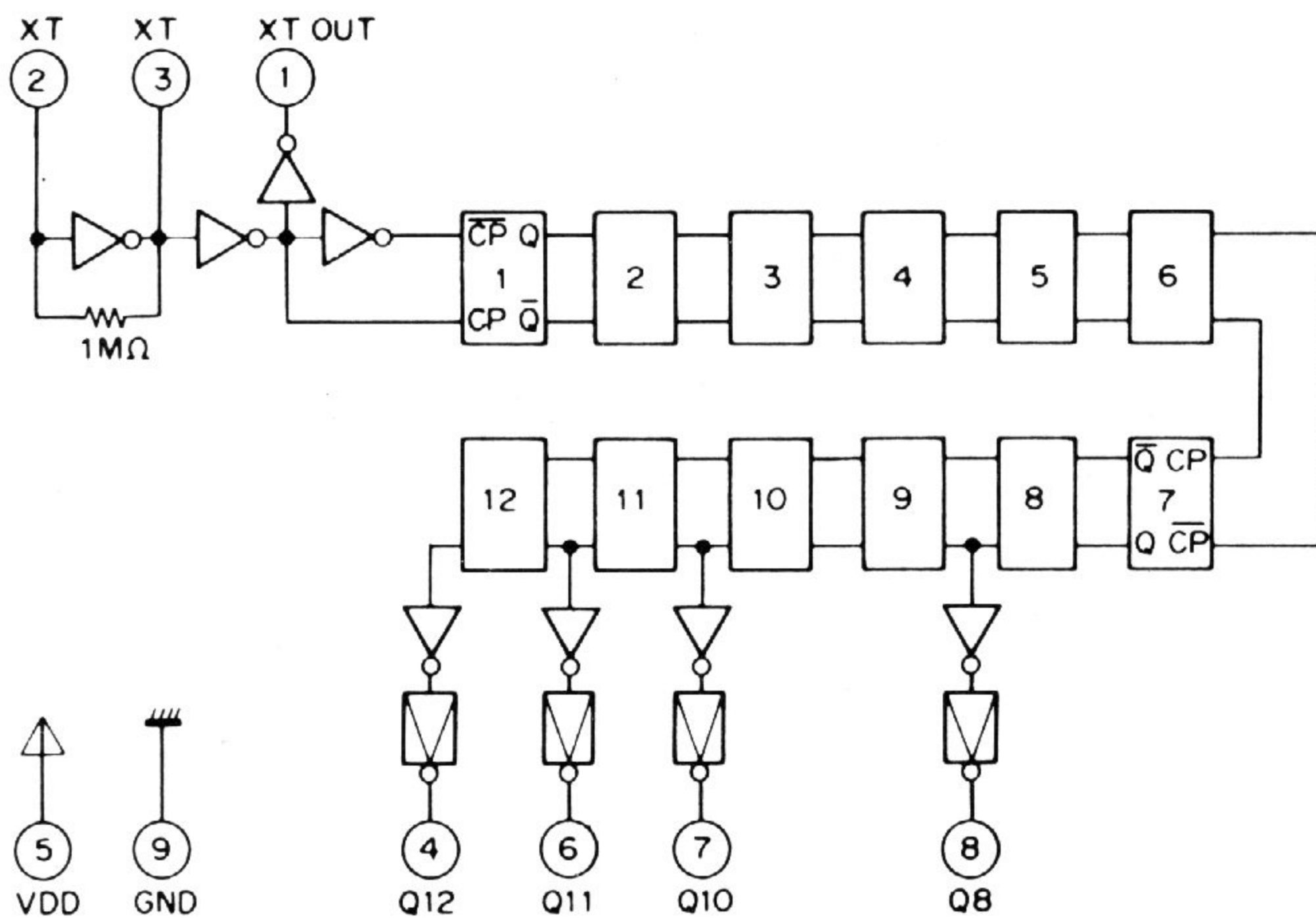


Fig. 3 TC9122P (PLL unit, IC3)

Symbol	Name	Content and operation	Remarks																																																																																																																
Pin	Programmable counter input terminal	Programmable counter input terminal to which the signal to be divided is input	Build-in bias circuit																																																																																																																
Pout	Programmable counter output terminal	Programmable counter output terminal. Output is 1/N of the input frequency. The output pulse width equals 5 bit of the input																																																																																																																	
A <sub>1</sub> ~A <sub>4</sub> B <sub>1</sub> ~B <sub>4</sub> C <sub>1</sub> ~C <sub>4</sub> D <sub>1</sub> ~D <sub>4</sub>	× 1 × 10 × 100 × 1000 Program input terminals	Terminal to set the dividing ratio. The following input combination is prohibited.	Built-in pull-down resistor																																																																																																																
		<table border="1"> <thead> <tr> <th>A<sub>1</sub></th> <th>A<sub>2</sub></th> <th>A<sub>3</sub></th> <th>A<sub>4</sub></th> <th>B<sub>1</sub></th> <th>B<sub>2</sub></th> <th>B<sub>3</sub></th> <th>B<sub>4</sub></th> <th>C<sub>1</sub></th> <th>C<sub>2</sub></th> <th>C<sub>3</sub></th> <th>C<sub>4</sub></th> <th>D<sub>1</sub></th> <th>D<sub>2</sub></th> </tr> </thead> <tbody> <tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> </tbody> </table>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	
A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	D <sub>1</sub>	D <sub>2</sub>																																																																																																						
1	0	0	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
0	1	0	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
1	1	0	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
0	0	1	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
1	0	1	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
0	1	1	0	0	0	0	0	0	0	0	0	0	0																																																																																																						
1	1	1	0	0	0	0	0	0	0	0	0	0	0																																																																																																						

Table 4 TC9122P (PLL unit, IC3)

CIRCUIT DESCRIPTION



PIN NO	8	7	6	4	1
PIN NAME	Q <sub>8</sub>	Q <sub>10</sub>	Q <sub>11</sub>	Q <sub>12</sub>	XT <sub>out</sub>
Dividing ratio	1/256	1/1024	1/2048	1/4096	1/1
Output frequency X-tal 10.24 MHz	40 kHz	10 kHz	5 kHz	2.5 kHz	10.24 MHz

Fig. 4 TC5082P-GL (PLL unit, IC2)

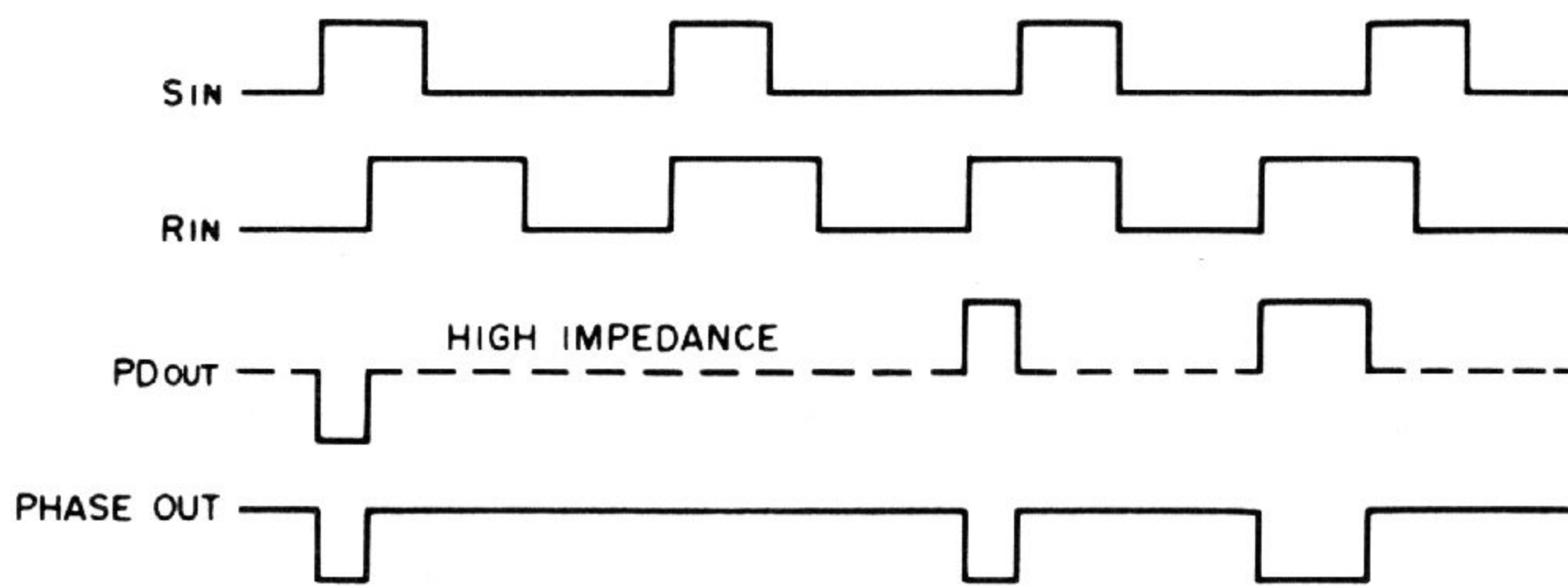


Fig. 5-A TC5081P (PLL unit, IC1) Timing chart

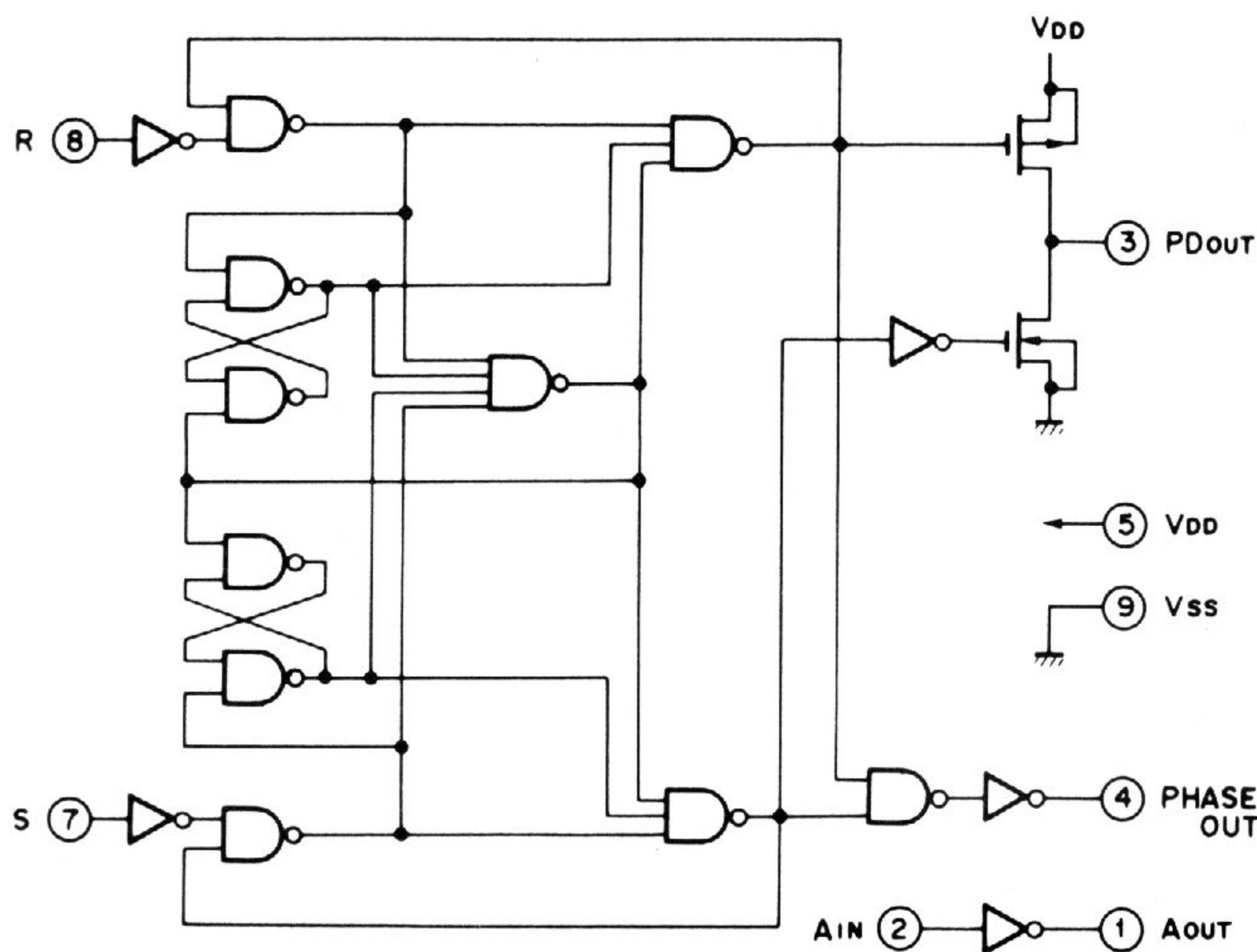


Fig. 5-B TC5081P (PLL unit, IC1) Equivalent circuit

CONTROL CIRCUIT (X53-1230-10)

Fig. 6 shows a block diagram of the control circuit, which uses a microprocessor to minimize the number of peripheral circuits.

● Frequency Indicator

The frequency indicator uses a 4 digit dynamically driven LED display. The BCD data from the microprocessor D port (pins 8~11) is converted by decoder driver IC2 (TC5022BP) into the segment signals which are applied to the corresponding segments of all digits. The signals from the E port (pins 12~15) turn ON Q7 through Q10 (2SC1959) to light the digits.

● PLL Data (Frequency Dividing Data)

The frequency dividing data is output from ports D, E, G,H and I (pins 9~11, 12, and 22~32) in BCD. It is 550 when 4.00 is displayed, 650 when 5.00 is displayed, 749 when 5.99 is displayed and 1049 (K, M only) when 9.99 is displayed.

● Reset Circuit

Current flows through D36 when the power source voltage supplied to the microprocessor exceeds about 3.5V. The collector voltage of Q5 (2SC1815 (Y)) then becomes H and a pulse is generated by the CR differentiating circuit. This pulse is applied to and resets the microprocessor.

● Switch Circuit

One terminal of each control switch is connected to one of the control pulse signal output terminals of the microprocessor and the other terminal to one of the input terminals. When a control switch is turned ON, the corresponding output pulse signal is input to the corresponding input terminal and the prescribed function is performed. Diodes are used to prevent the control pulse signals from being input to the wrong circuit.

● Encoder and UP/DOWN Switch Input Circuit

The mechanical encoder output signals are applied to the Schmitt circuits formed by IC102 (TC7404UBP), then applied to part A (pins 33~36) of the microprocessor. The microprocessor judges UP/DOWN and counts the number of applied pulses. One turn of the dial equals 50 step output.

● Scan Circuit

Scan operation is controlled entirely by the microprocessor. It starts when the SCAN switch is pressed and stops when either the HOLD switch is pressed or the transmit signal (8T) becomes H. Scan operation temporarily stops when the squelch stop signal (input to the SS terminal) becomes H. Variation of the frequency dividing data for the least significant digit is detected by the circuit consisting of Q1, Q2 and the OR circuit D10~13 so that a pulse is obtained every time the data changes. This pulse signal is applied to the scan stop terminal (pin 4) of the microprocessor to momentarily suspend slow scanning after the frequency has been changed.

## CIRCUIT DESCRIPTION

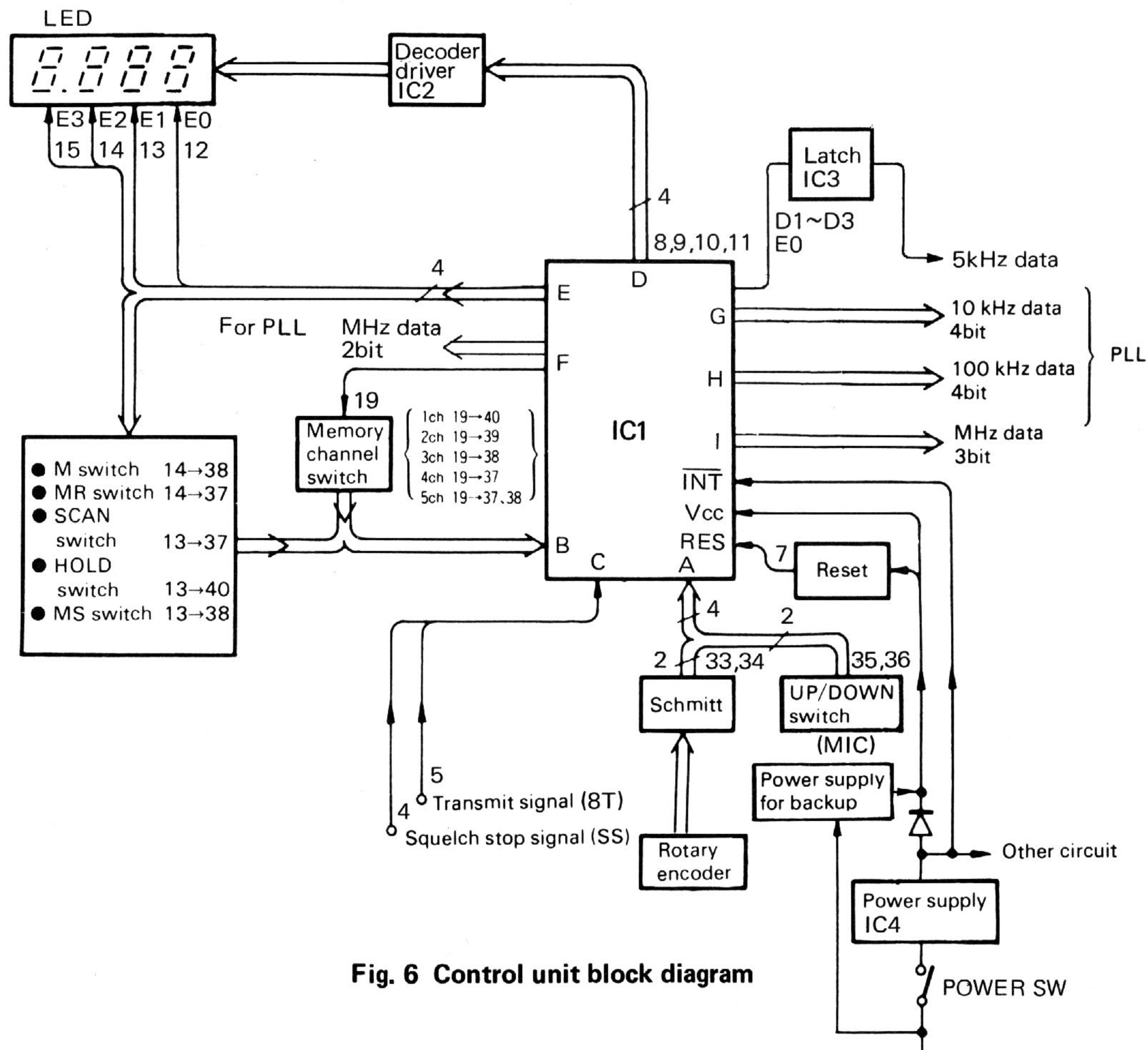


Fig. 6 Control unit block diagram

Pin No.	Pin	Input signal	Output signal	Note	Pulse signal
1	CL1			Clock signal 400 kHz	
2	PC0			Normally L	
3	PC1	○		Normally L	
4	PC2	○		Squelch signal, SCAN stops when H.	
5	PC3	○		Normally L, H during transmission.	
6	INT	○		Normally H	
7	RES	○		Microprocessor is reset when H.	
8	PD0	○	○	10 kHz, 100 kHz, and MHz digit signals are output.	○
9	PD1	○	○		○
10	PD2	○	○		○
11	PD3	○	○		○
12	PE0		○	5 kHz digit signal is output.	○
13	PE1		○	10 kHz digit signal, SCAN, HOLD or M.S is output.	○
14	PE2		○	100 kHz digit signal, M or MR is output.	○
15	PE3		○	1 MHz digit signal is output.	○
16	PF0			Not connected.	
17	PF1		○	1 MHz data signals for PLL	L
18	PF2		○		L
19	PF3		○	Memory output signal	○
20	TEST			Normally H	
21	Vcc			5V power supply	

Pin No.	Pin	Input signal	Output signal	Note	Pulse signal
22	PG0		○	(Level at 145.00 MHz)	A } L
23	PG1		○		B } L
24	PG2		○		C } L
25	PG3		○		D } L
26	PH0		○	100 kHz data signals for PLL	A } H
27	PH1		○		B } L
28	PH2		○		C } H
29	PH3		○		D } L
30	PI0		○	1 MHz data signals for PLL	A } L
31	PI1		○		B } H
32	PI2		○		C } H
33	PA0	○		Encoder signal	
34	PA1	○		Encoder signal	
35	PA2	○		Normally H, L when MIC UP switch is pressed.	
36	PA3	○		Normally H, L when MIC DOWN switch is pressed.	
37	PB0	○		MR, SCAN, Memory CH4 or 5 pulse signal is input.	○
38	PB1	○		M, MS, Memory CH3 or 5 pulse signal is input.	○
39	PB2	○		Memory CH2 pulse signal is input.	○
40	PB3	○		STEP or Memory CH1 pulse signal is input.	○
41	GND			GND	
42	CL0			Clock signal 400 kHz	

Table 5 Microprocessor Functions  $\mu$ PD650C-021 (Control unit, IC1)

# CIRCUIT DESCRIPTION

● **Power Supply for control system**

Transistor Q6 (2SC496 (Y)) generates 5V for the frequency display. A 6V AVR (Automatic voltage regulator) IC (IC4 : NJM78L06K) supplies power to the microprocessor through diode D18.

● **Backup Circuit**

The level at the microprocessor INT terminal becomes L when the POWER SW is turned OFF, and the microprocessor enters the backup mode. In this mode, all output ports are low to minimize power consumption. At power OFF, the backup supply is Q24 (2SC2603 (E)) on the RX.TX unit.

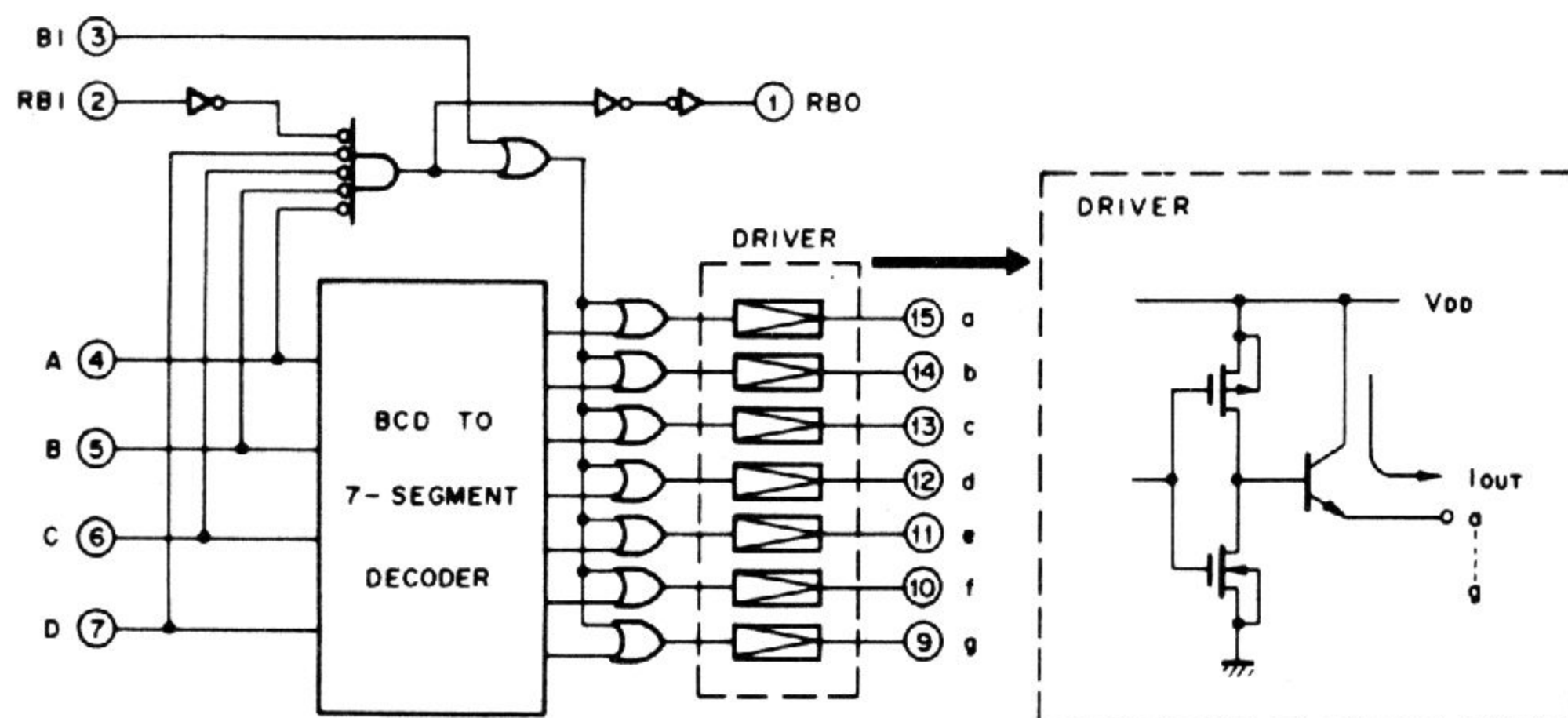


Fig. 7 TC5022BP (Control unit, IC2) Equivalent circuit

INPUT						OUTPUT															
BI	RBI	A	B	C	D	a	b	c	d	e	f	g									
H	*	*	*	*	*	L	L	L	L	L	L	L	L	☆							
L	H	L	L	L	L	L	L	L	L	L	L	L	L	H							
L	L	L	L	L	L	H	H	H	H	H	H	H	L	L							
L	*	H	L	L	L	L	L	L	L	L	L	L	L	L							
L	*	L	H	L	L	H	H	L	H	H	L	H	L	H							
L	*	H	H	L	L	H	H	H	H	L	L	H	L	L							
L	*	L	L	H	L	L	H	H	L	L	H	H	L	L							
L	*	H	L	H	L	H	L	H	H	L	H	H	L	L							
L	*	L	L	H	L	H	H	H	H	H	H	H	L	L							
L	*	H	L	L	H	H	H	H	H	L	H	H	L	L							
L	*	L	L	L	H	H	H	H	H	H	H	H	L	L							
L	*	H	L	L	H	H	H	H	H	L	L	H	L	L							
L	*	L	L	H	H	H	H	L	H	H	L	H	L	L							
L	*	H	L	H	H	H	H	H	H	L	L	H	L	L							
L	*	L	L	H	H	H	H	L	L	L	H	H	L	L							
L	*	H	L	H	H	H	H	L	L	L	H	H	L	L							
L	*	L	L	H	H	H	L	L	L	L	H	H	L	L							
L	*	H	L	H	H	H	L	L	L	L	H	H	L	L							
L	*	L	L	H	H	H	L	L	L	L	H	H	L	L							

☆ : Undetermined  
\* : Don't Care

Table 6 TC5022BP (Control unit, IC2) Truth table

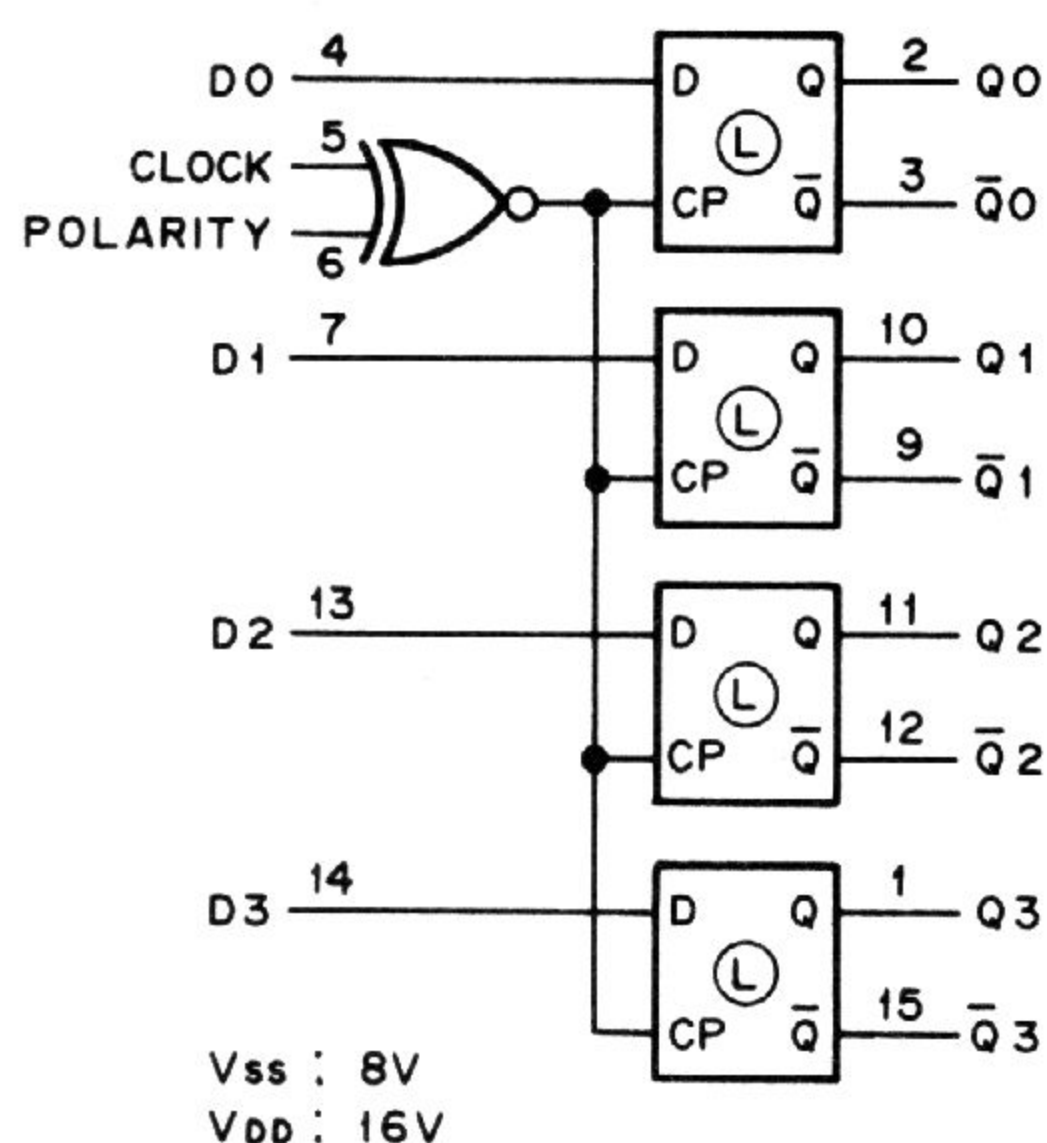


Fig. 8 TC4042BP Block diagram

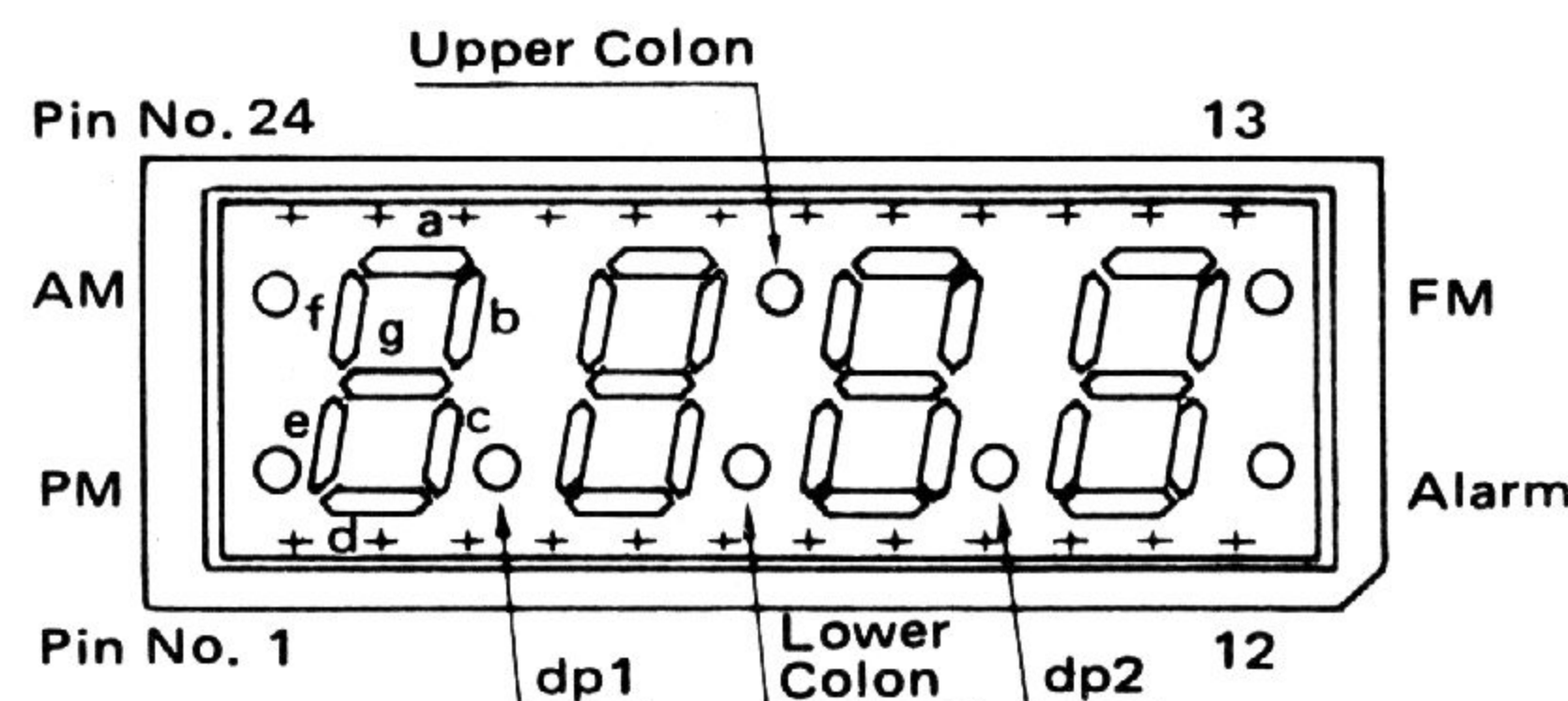
INPUTS		OUTPUT
CLOCK Δ	POLARITY	Qn *
H	H	Dn
L	L	Dn
	L	LATCH
	H	LATCH

Δ Level change  
\* n : 0~3

Table 7 TC4042BP Truth table

When the POWER SW is turned ON, the levels at both the INT (pin 6) and UP/DOWN (pins 35 and 36) terminals become H, returning the microprocessor to operation as before the POWER SW was turned OFF.

Input port B pins (37~40) are grounded by Q3 and Q4 when the POWER SW is turned OFF, and scan operation is stopped by momentarily simulating the transmission mode through Q11.



PIN NO	FUNCTION	PIN NO	FUNCTION
1	PM Anode	13	FM, Alarm Cathode
2	Dig 1 Cathode	14	FM Anode
3	Seg d Anode	15	Seg a Anode
4	dp 1 Anode	16	dp 2 Cathode
5	Dig 2 Cathode	17	Upper/Lower Colon Cathode
6	Lower Colon Anode	18	Seg f Anode
7	Upper Colon Anode	19	Seg b Anode
8	Dig 3 Cathode	20	Seg c Anode
9	dp 2 Anode	21	dp 1 Cathode
10	Dig 4 Cathode	22	Seg g Anode
11	Seg e Anode	23	AM Anode
12	Alarm Anode	24	AM, PM Cathode

Fig. 9 4-digit LED LN543RK (Display unit, D1)

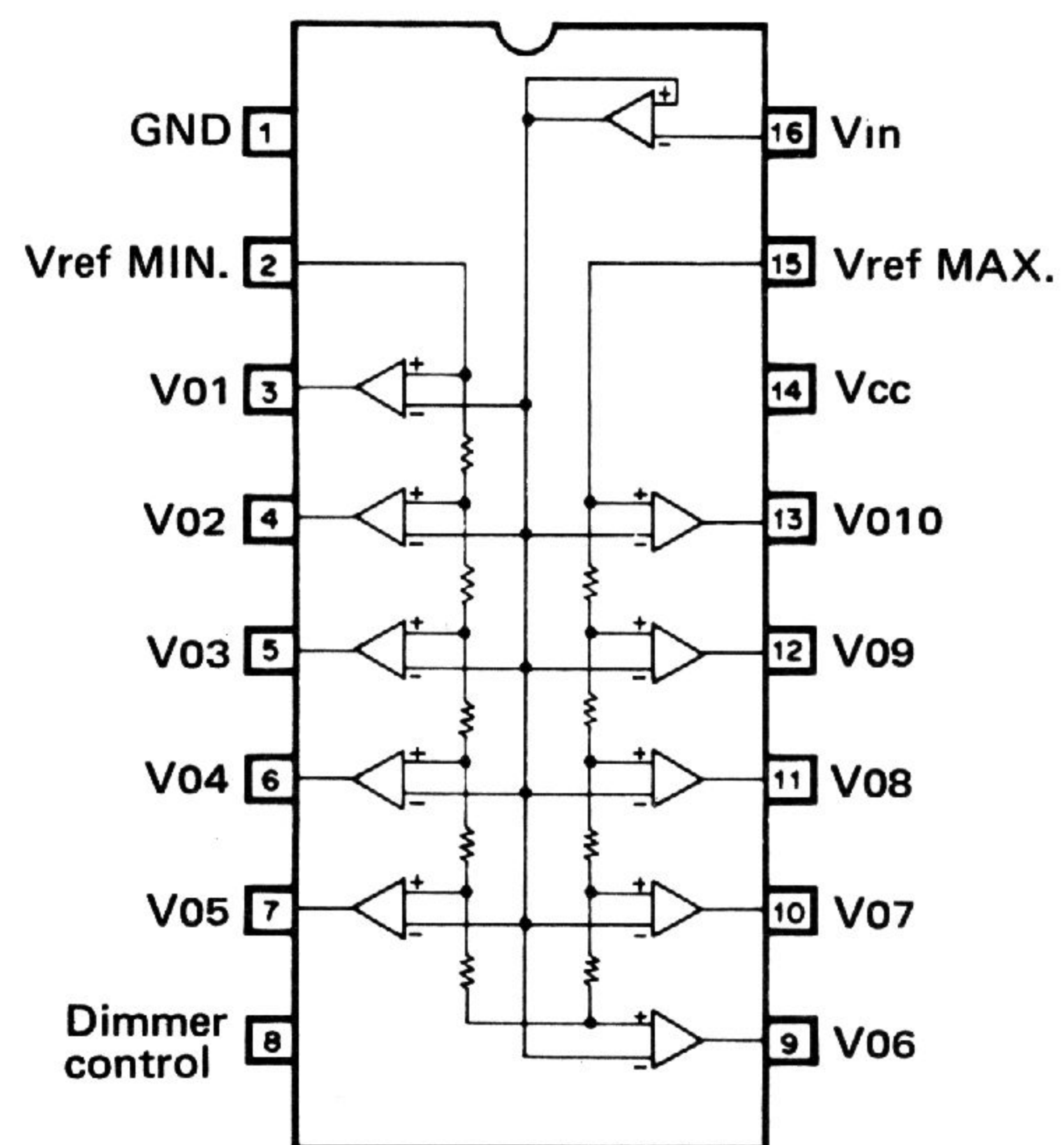
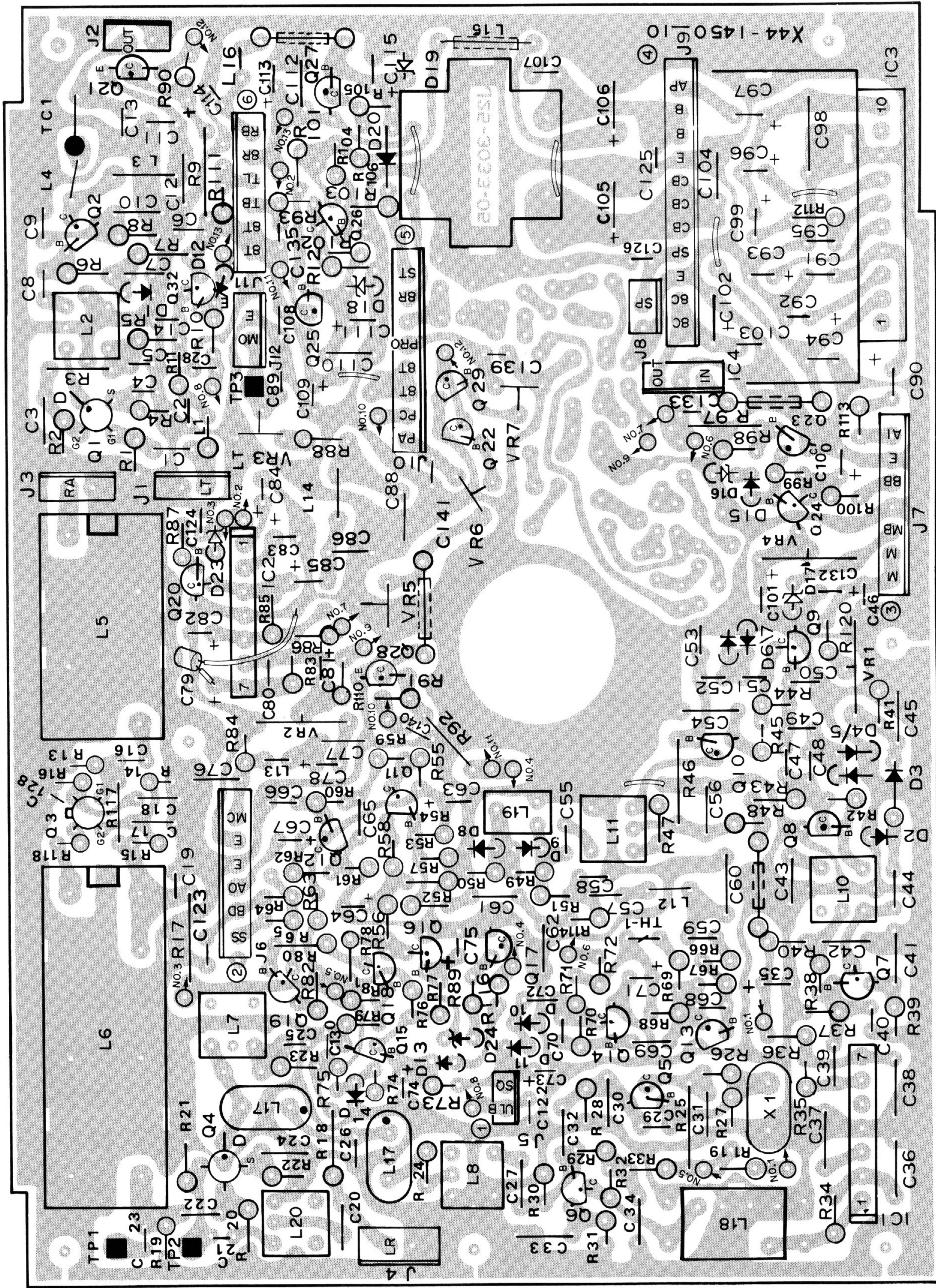


Fig. 10 TA7612AP (Display unit, IC1)

# TR-7730 PC BOARD VIEW

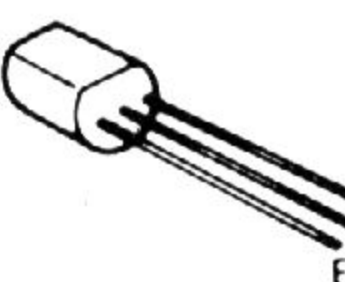
▼RX.TX UNIT (X44-1450-10) (K, M TYPE) Components side view



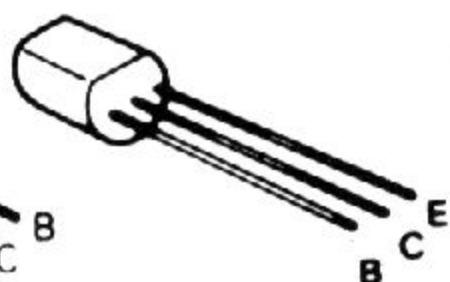
Q1,4 : 3SK74(L) Q2 : 2SC2538 Q3 : 3SK76 or 3SK92 Q5, 7~10 : 2SC460(B) Q6 : 2SC1923(O) Q11~14 : 2SC1815(Y) Q15~18, 20, 23, 24 : 2SC2603(E)  
 Q19 : 2SA1115(E) Q21, 25, 27 : 2SC496(Y) Q22, 28, 29 : 2SC458(B) Q26 : 2SA1015(Y) Q32 : 2SA562TM(Y)  
 IC1 : TA7302P IC2 : TA7061AP IC3 : HA1366W IC4 :  $\mu$ PC78L08A

D1, 4~7, 12, 13, 15, 20 : 1S1555 D2, 3, 8~11 : 1N60 D14 : 1S1212 D16 : XZ-060 D17 : XZ-070 D18 : XZ-100 D19 : XZ-090 D23, 24 : WZ-040

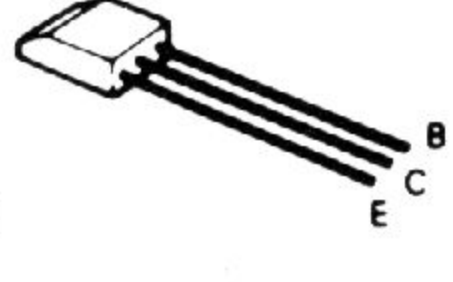
2SA1015  
2SC1815  
2SC1923



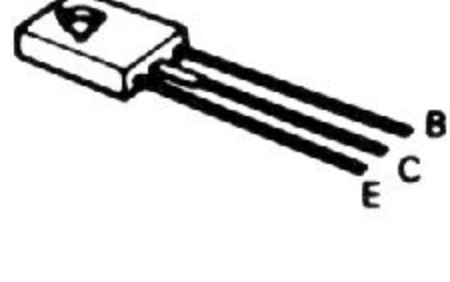
2SC2538



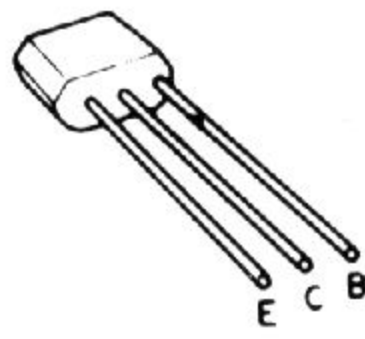
2SC458  
2SC460



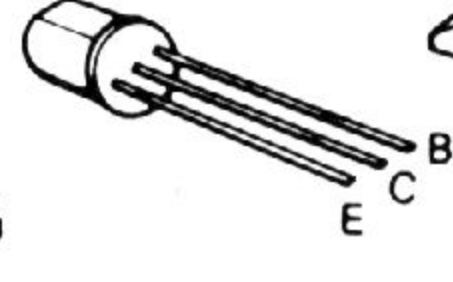
2SC496



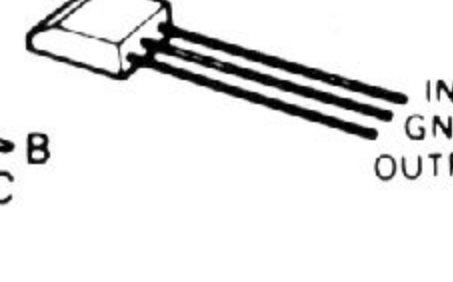
2SA1115  
2SC2603



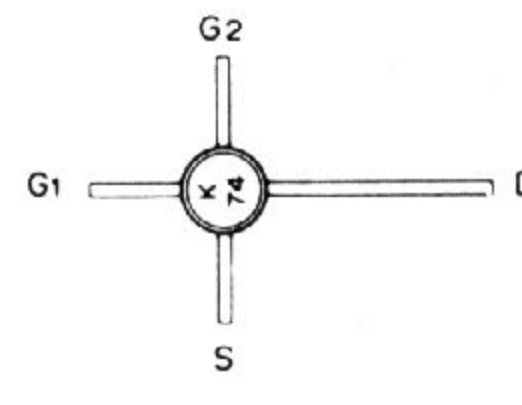
2SA562-TM



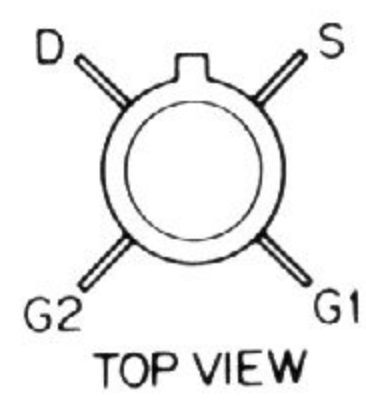
$\mu$ PC78L08A



3SK74



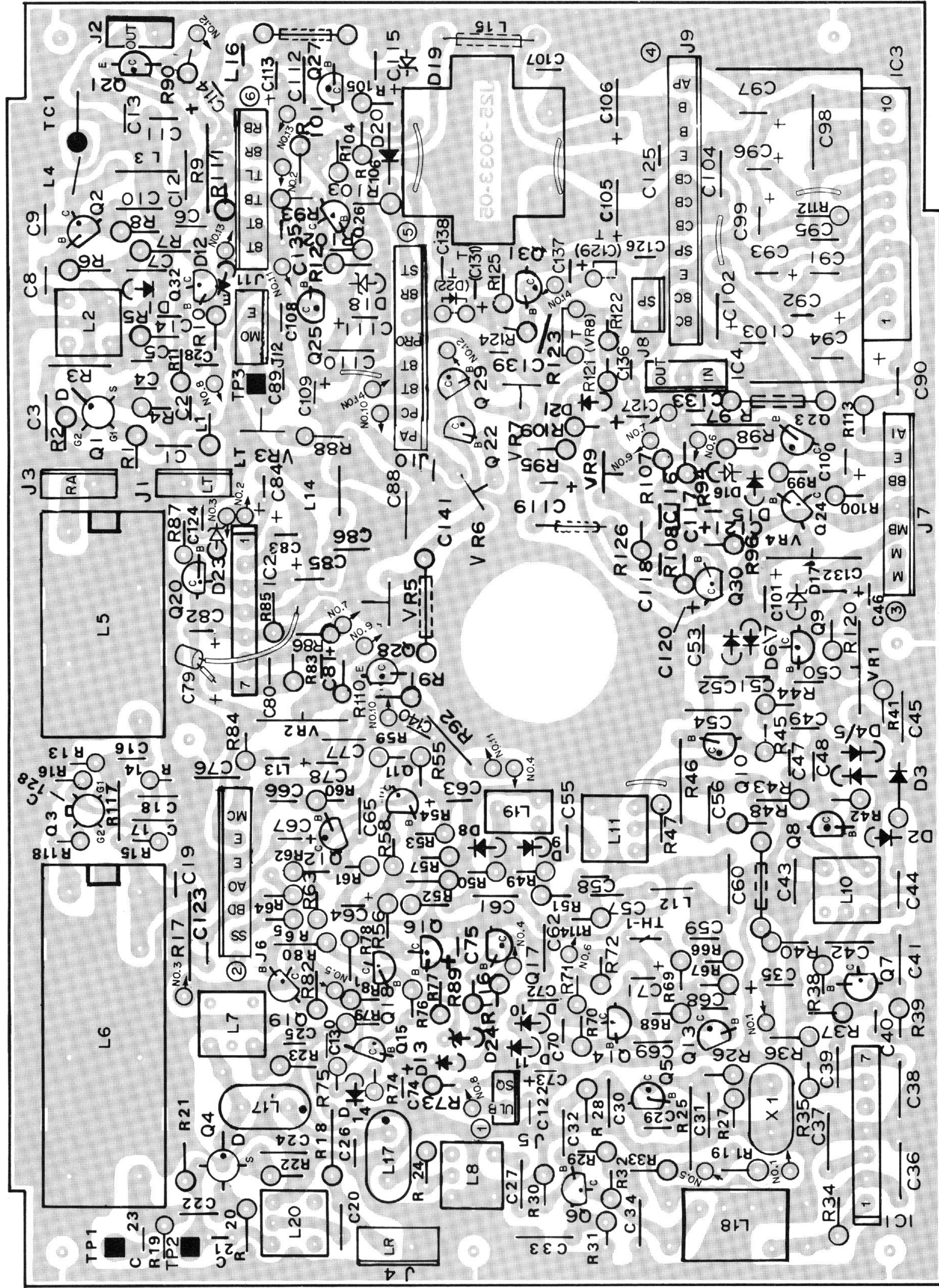
3SK76  
3SK92



TOP VIEW



▼RX.TX UNIT (X44-1450-51, -61) (T, W TYPE) Components side view

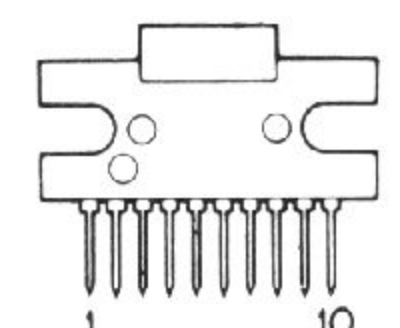


Q1, 4 : 3SK74(L) Q2 : 2SC2538 Q3 : 3SK76 or 3SK92 Q5, 7~10 : 2SC460(B) Q6 : 2SC1923(O) Q11~14 : 2SC1815(Y) Q15~18, 20, 23, 24 : 2SC2603(E)  
 Q19 : 2SA1115(E) Q21, 25, 27 : 2SC496(Y) Q22, 28~31 : 2SC458(B) Q26 : 2SC1015(Y) Q32 : 2SA562TM(Y)  
 IC1 : TA7302P IC2 : TA7061AP IC3 : HA1366W IC4 :  $\mu$ PC78L08A  
 D1, 4~7, 12, 13, 15, 20~22 : 1S1555 D2, 3, 8~11 : 1N60 D14 : 1S1212 D16 : XZ-060 D17 : XZ-070 D18 : XZ-100 D19 : XZ-090 D23, 24 : WZ-040

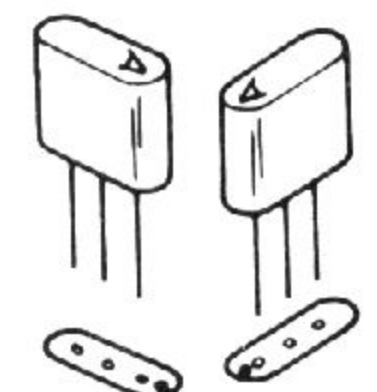
TA7061AP  
TA7302P



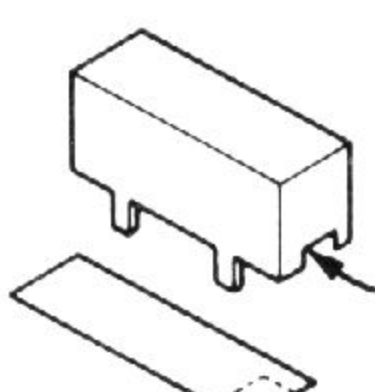
HA1366W



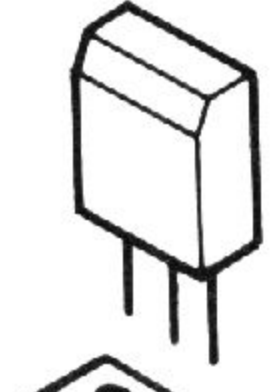
< Attachment direction of L17 >



< Attachment direction of L5, 6 >



< Attachment direction of IC4 >



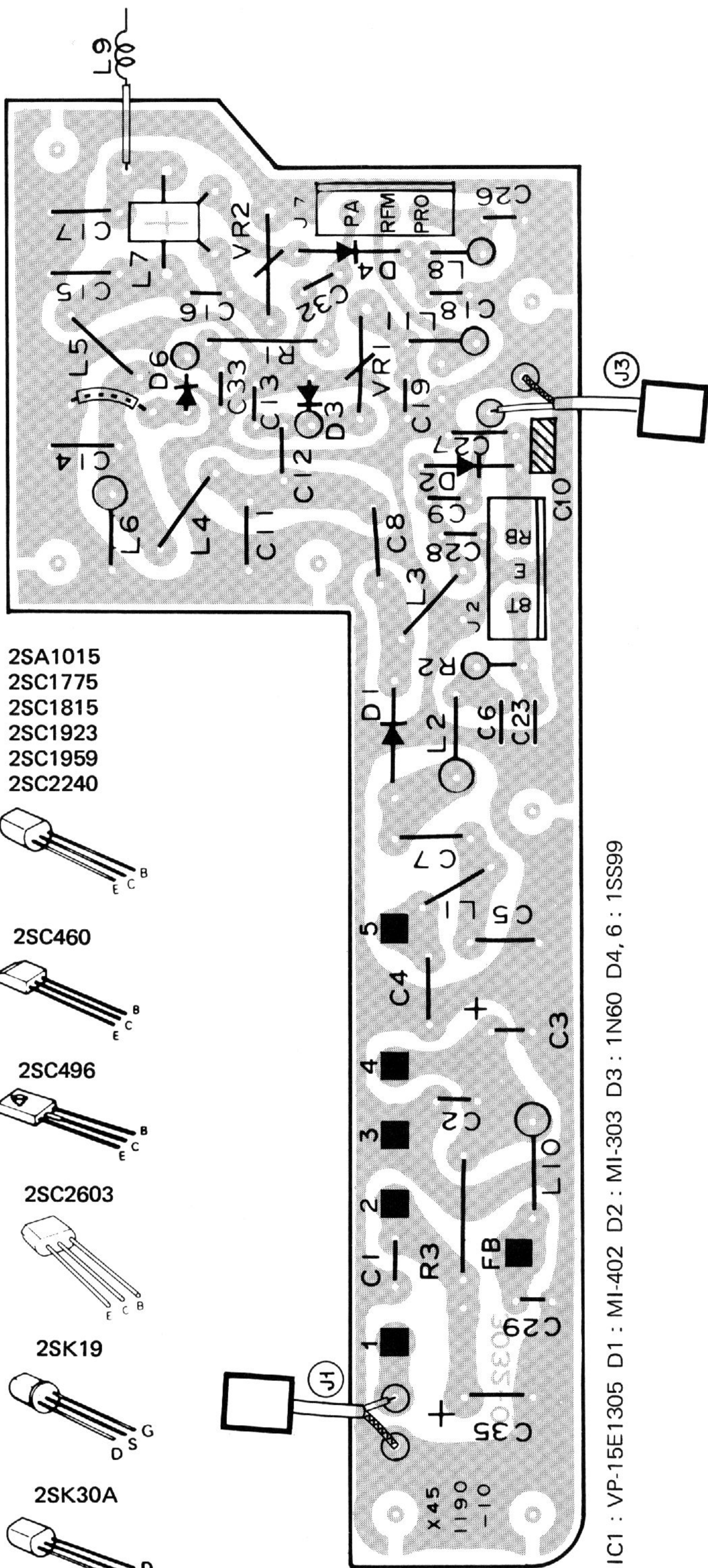
Notch

L17 should be used as a pair.

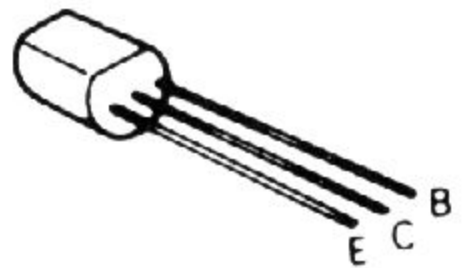
	T	W
D22	Used	Not used
VR8	Used	Not used
C129, 131	Used	Not used

# TR-7730 PC BOARD VIEWS

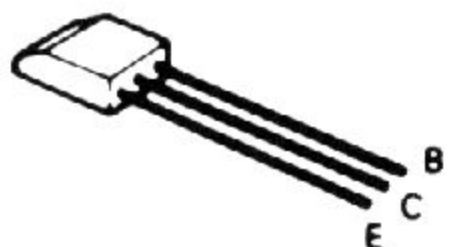
## ▼FINAL UNIT (X45-1190-10) Components side view



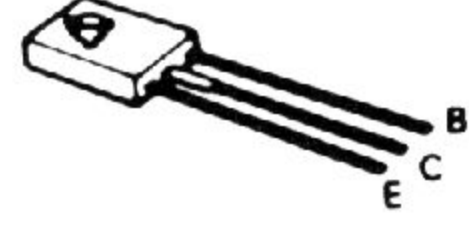
2SA1015  
2SC1775  
2SC1815  
2SC1923  
2SC1959  
2SC2240



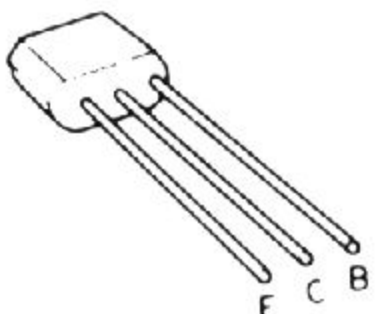
2SC460



2SC496



2SC2603



2SK19



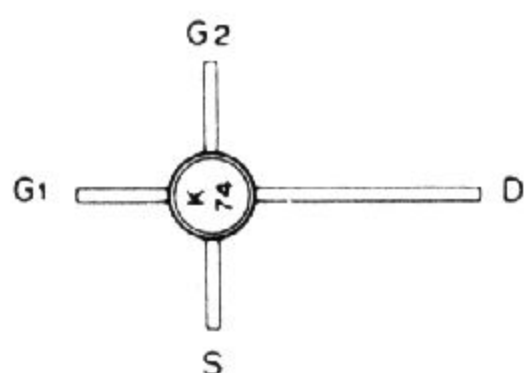
2SK30A



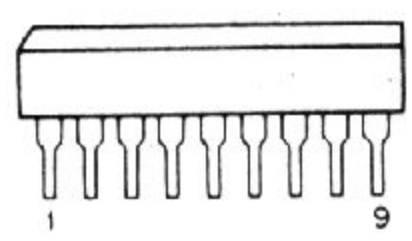
NJM78L06K



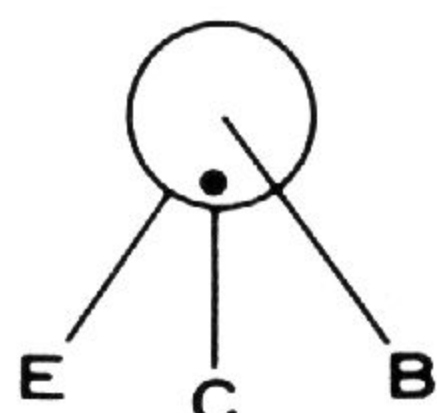
3SK74



TC5081P  
TC5082P-GL

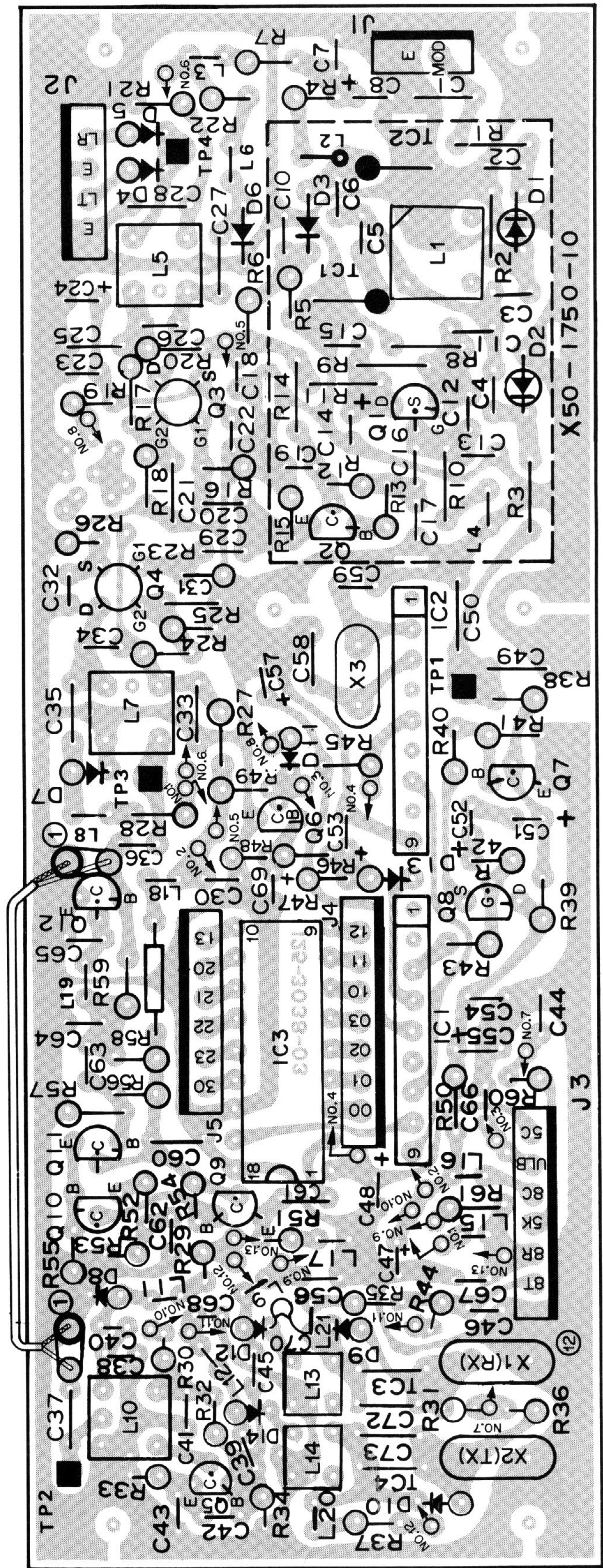


Transistor terminal indication



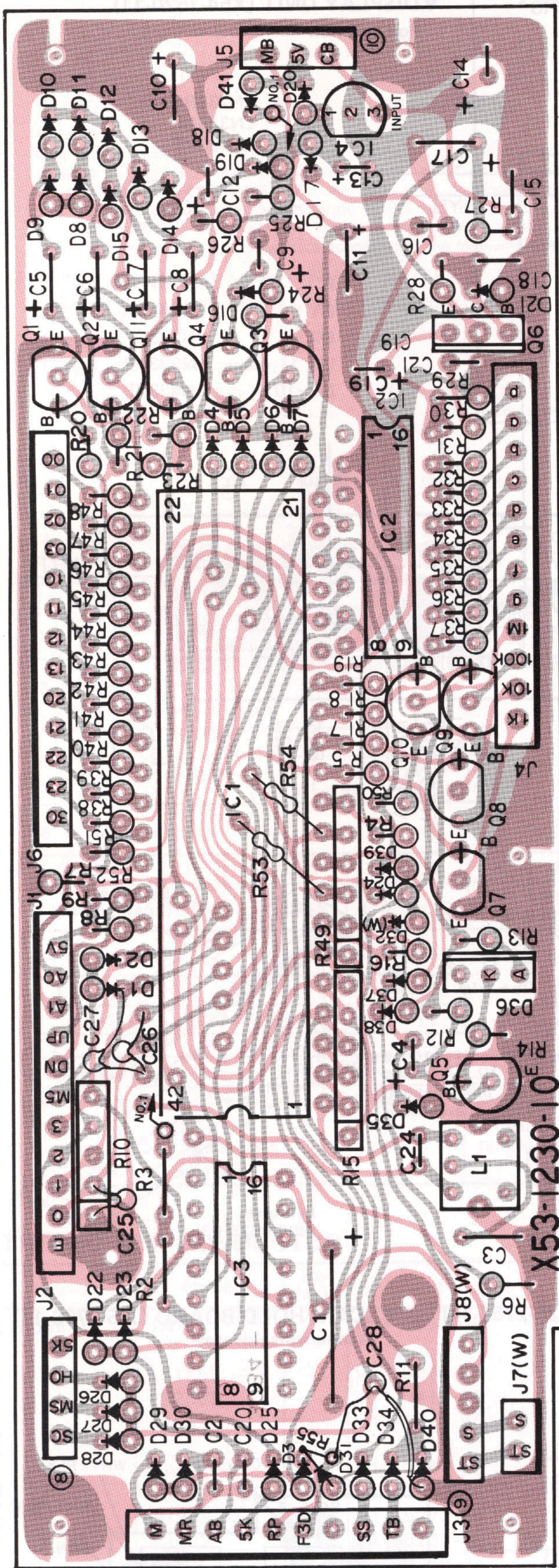
IC1 : VP-15E1305 D1 : MI-402 D2 : MI-303 D3 : 1N60 D4, 6 : 1S599

## ▼PLL UNIT (X50-1750-10) Components side view



Q1 : 2SK19(GR) Q2, 12 : 2SC1923(O) Q3, 4 : 3SK74(L)  
Q5, 9~11 : 2SC460(B) Q6 : 2SC1775(E) Q7 : 2SC2240(GR)  
Q8 : 2SK30A(O) IC1 : TC5081P IC2 : TC5082P-GL IC3 : TC9122P  
D1, 2 : 1S2208 D3 : 1S2588 D4, 5, 9, 10, 12, 14 : BA243S  
D6~8 : 1S1555 D11, 13 : 1N60

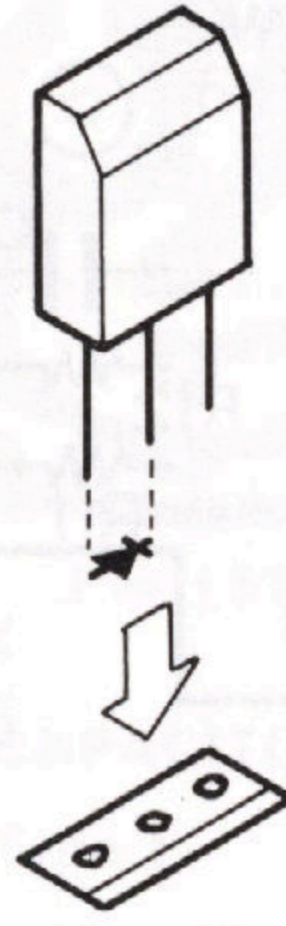
▼ CONTROL UNIT (X53-1230-10, -61) -10 : K, M -61 : T, W  
Components side view



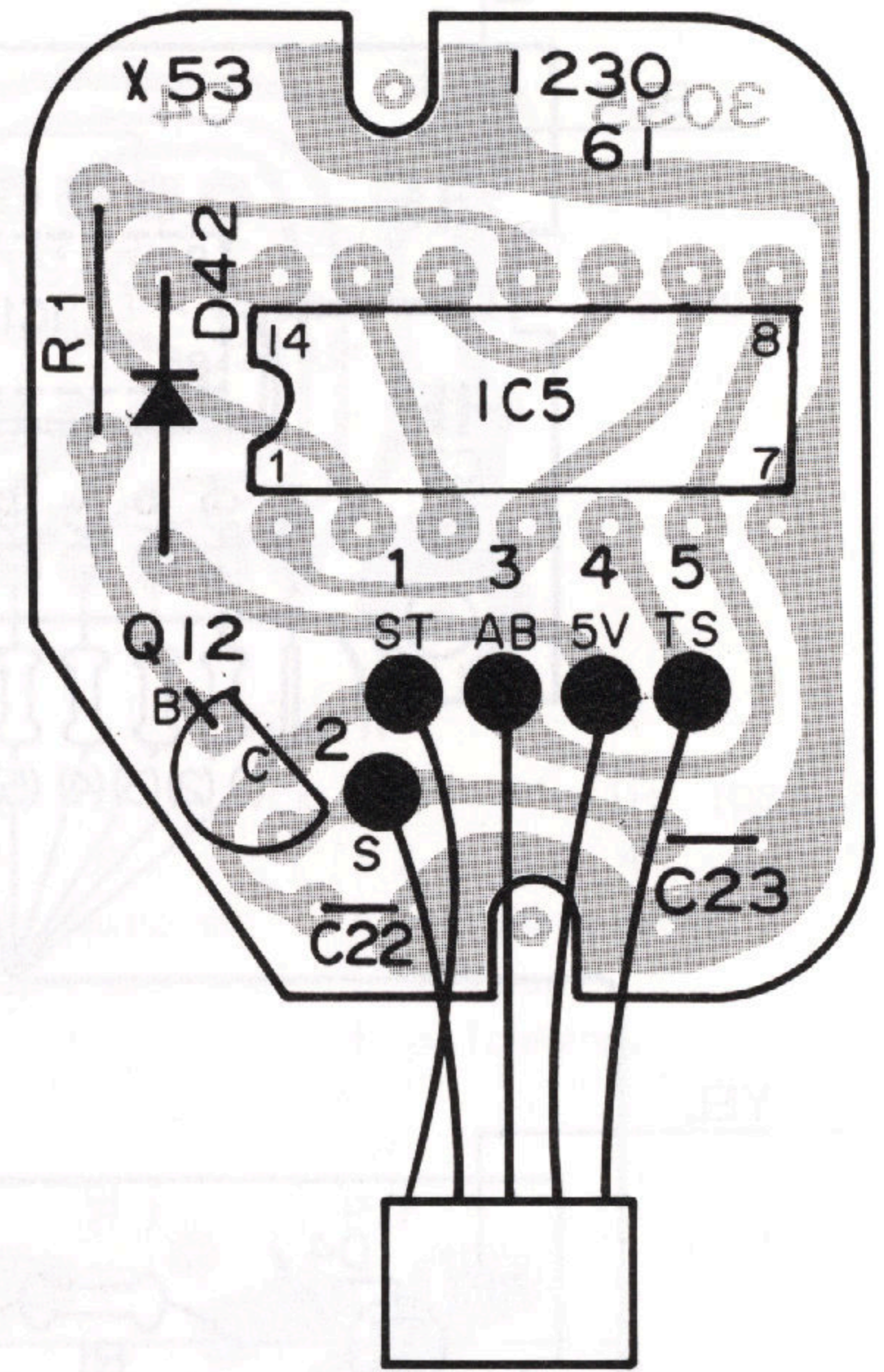
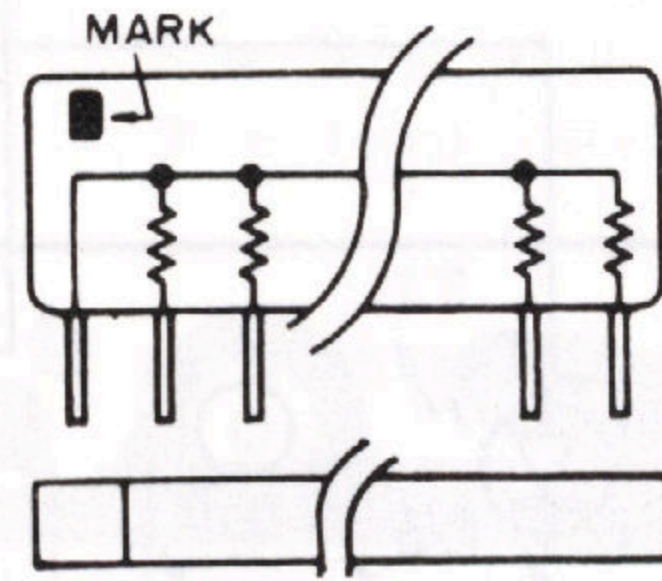
Q1~3, 5 : 2SC1815(Y) Q4, 11 : 2SA1015(Y) Q6 : 2SC496(Y)  
Q7~10 : 2SC1959(Y) IC1 :  $\mu$ PD650C-078 IC2 : TC5022BP  
IC3 : TC4042BP IC4 : NJM78L06K  
D1~3, 8~15, 22~31, 33, 34 : 1N60  
D4~7, 16~20, 35, 37~39, 41 : 1S1555 D21 : XZ-060  
D32 : 1N60 (T, W only) D36 : MA522 (Q) D40 : XZ-090

▼ CONTROL UNIT (X53-1230-61)  
T, W TYPE ONLY Components side view

< Attachment direction of D36 : MA522 >

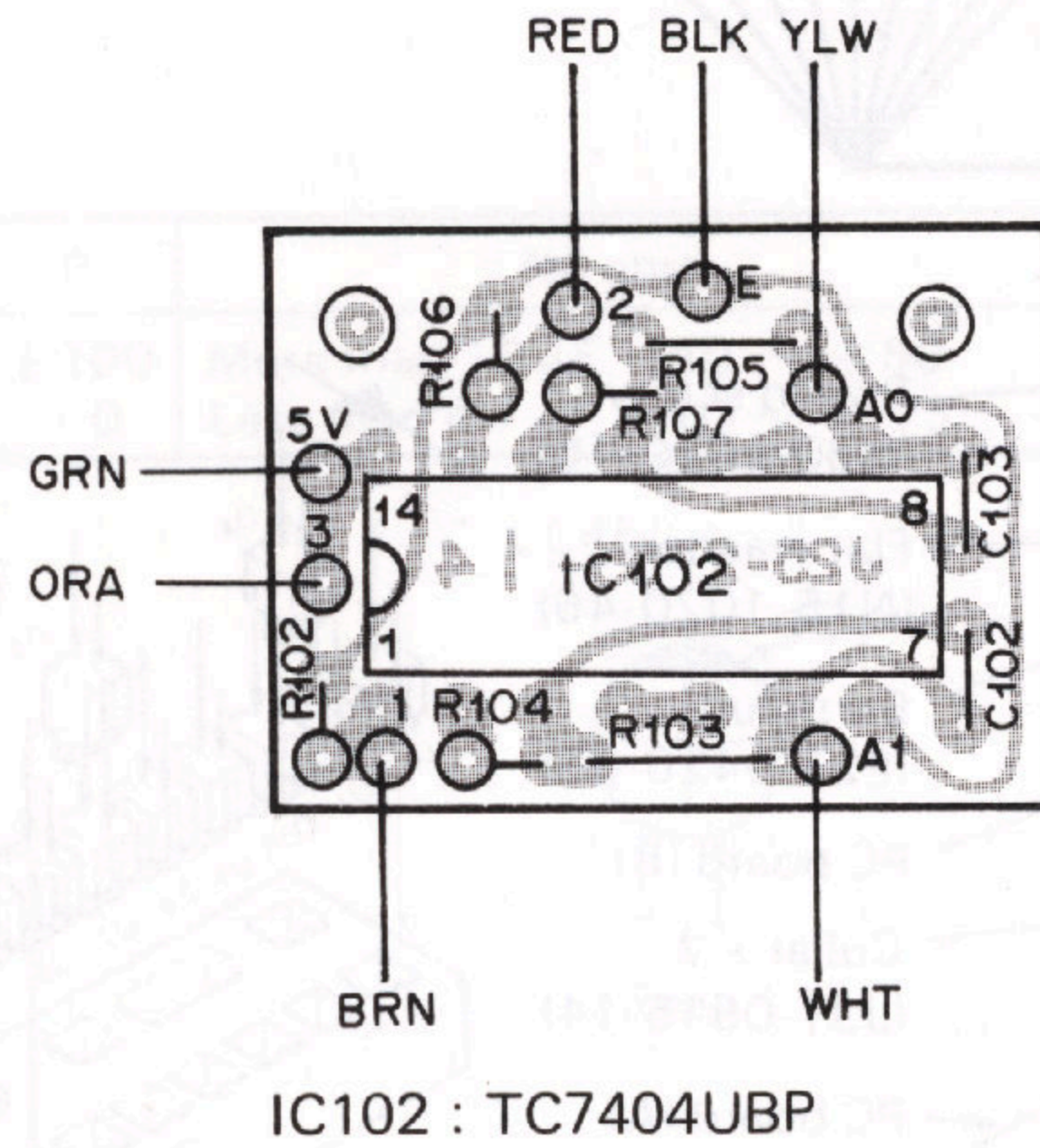


< Attachment direction of R10, 15, 49 >



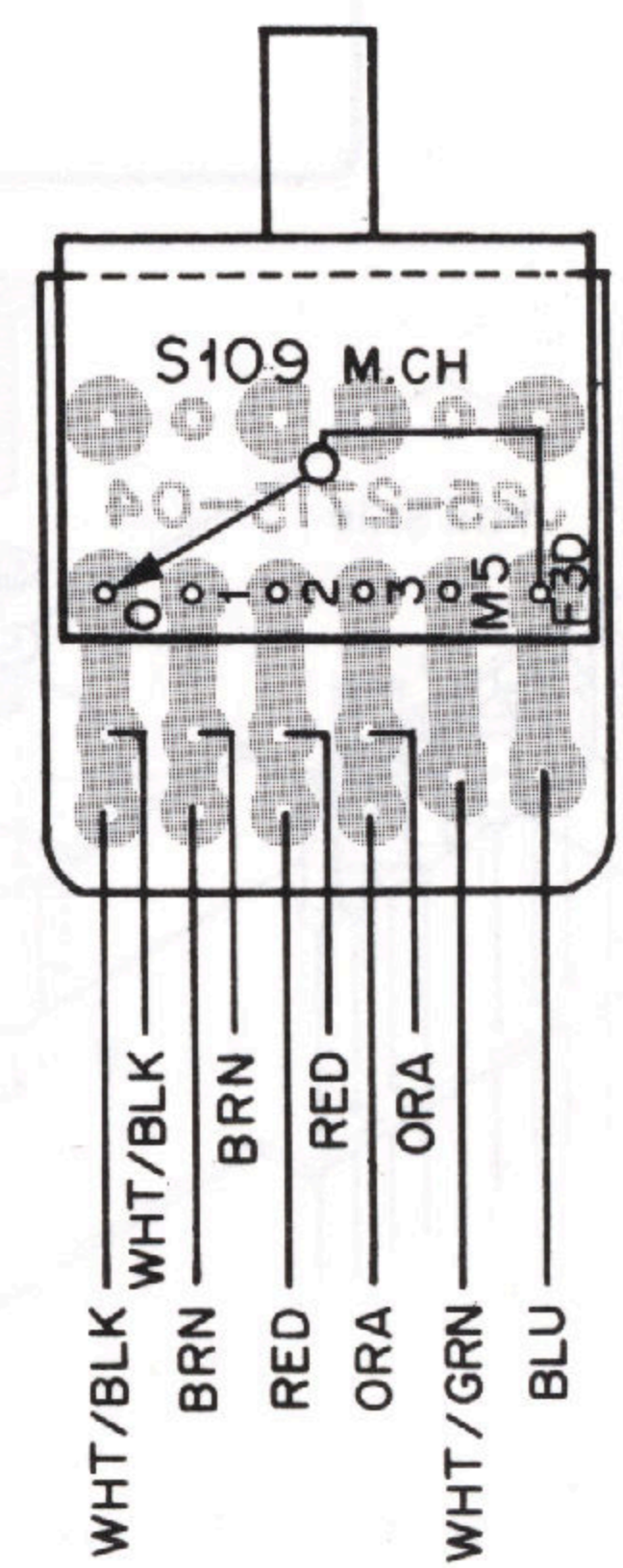
Q12 : 2SC2603(E) IC5 : TC4011BP  
D42 : 1N60

▼ SCHMITT BOARD (J25-2755-14) Components side view

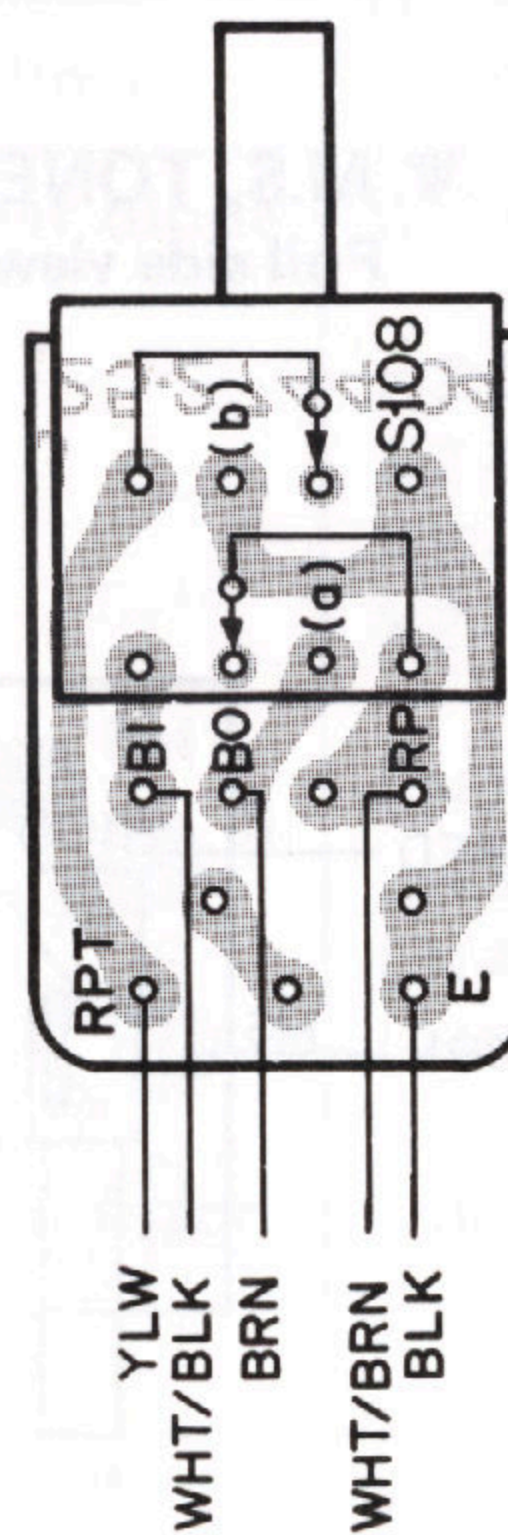


IC102 : TC7404UBP

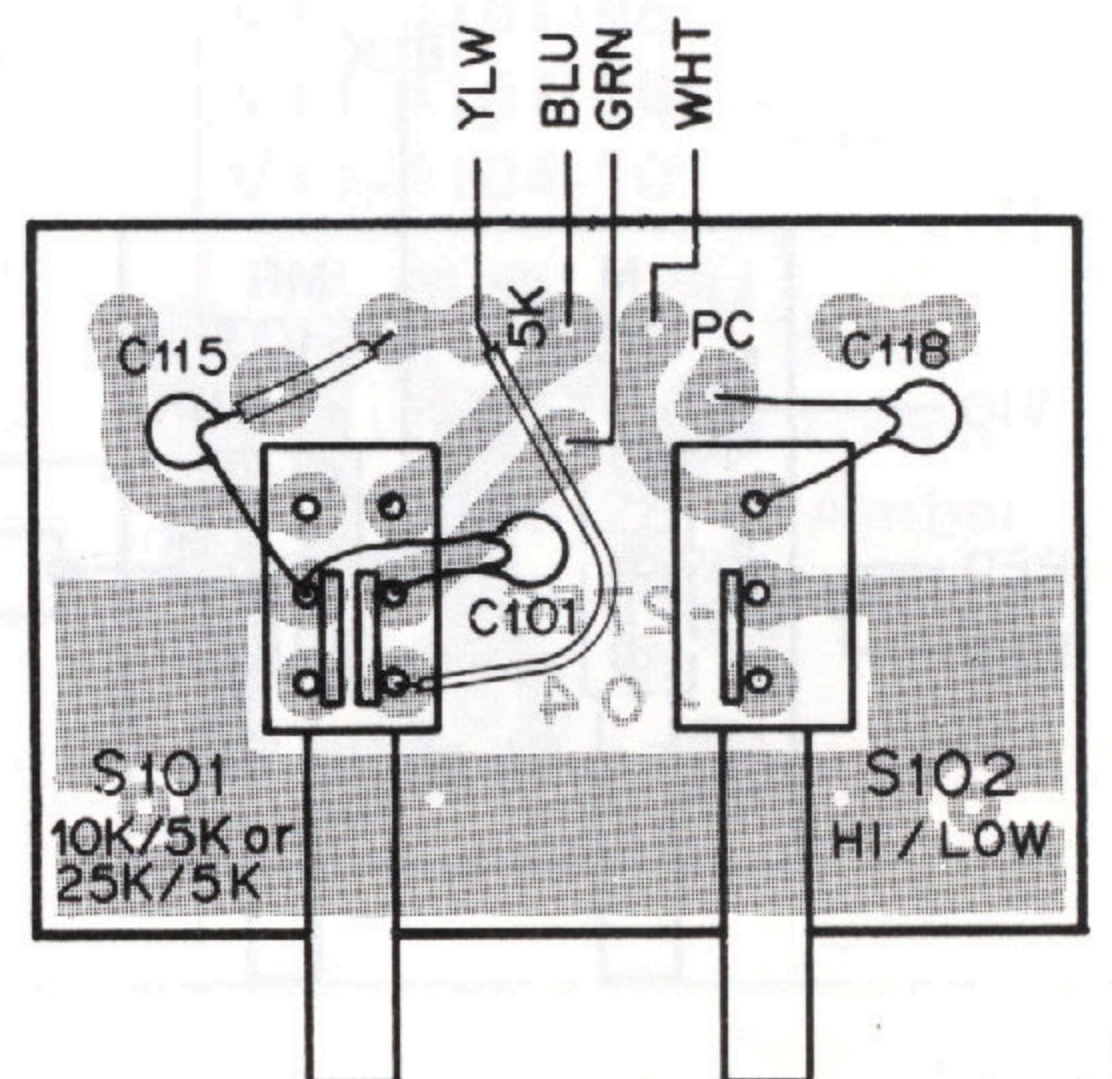
▼ M. CH BOARD (J25-2715-04) Components side view



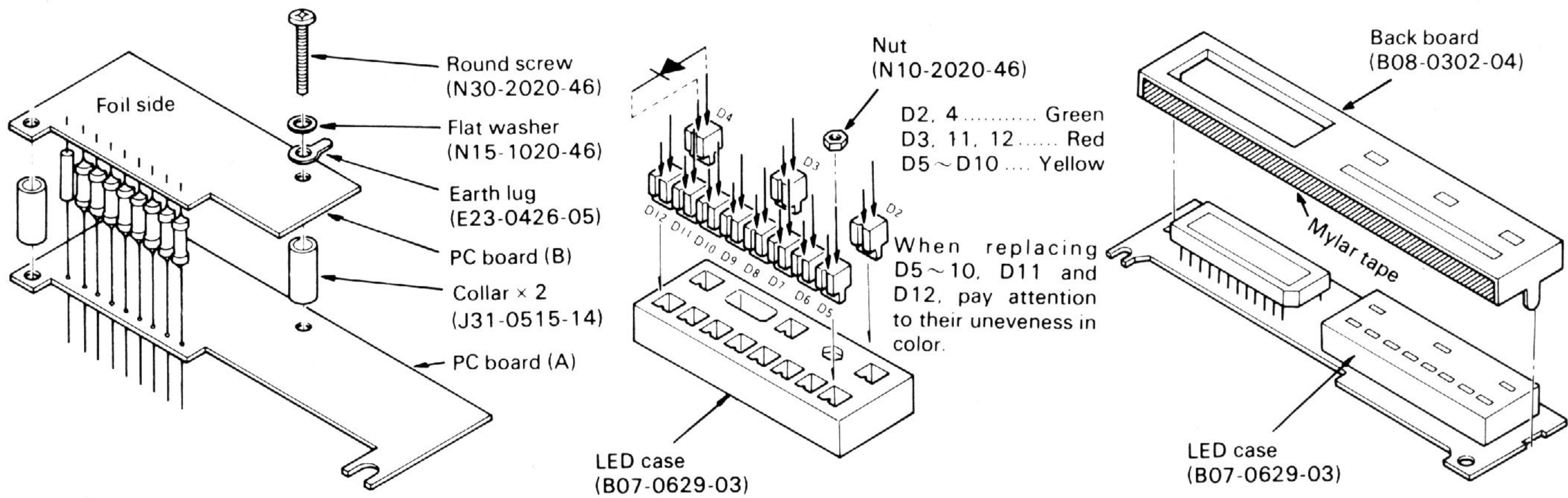
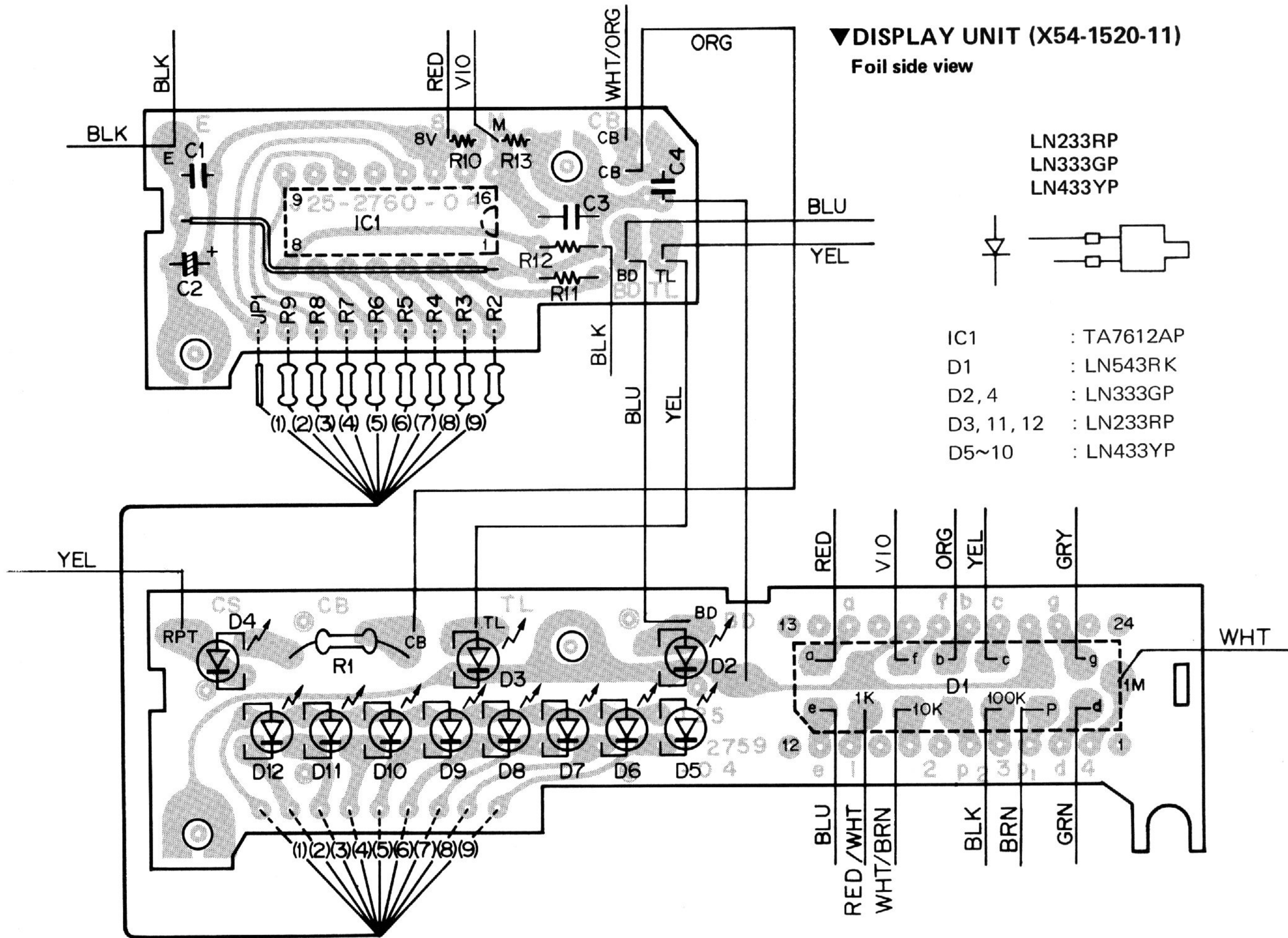
▼ RPT BOARD (J25-2744-04) Components side view



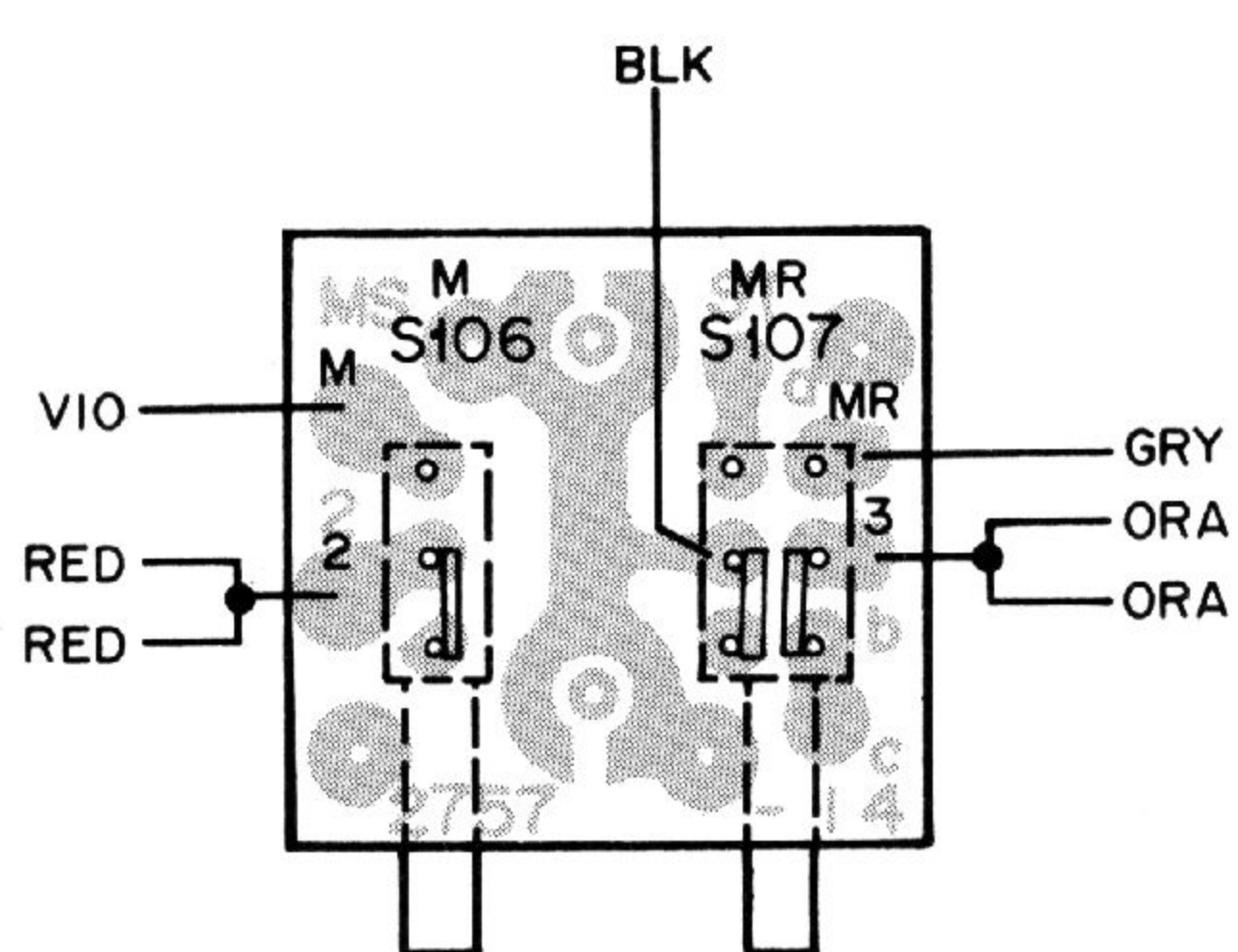
▼ 10k/5k or 25k/5k, HI/LOW BOARD (J25-2756-04) Components side view



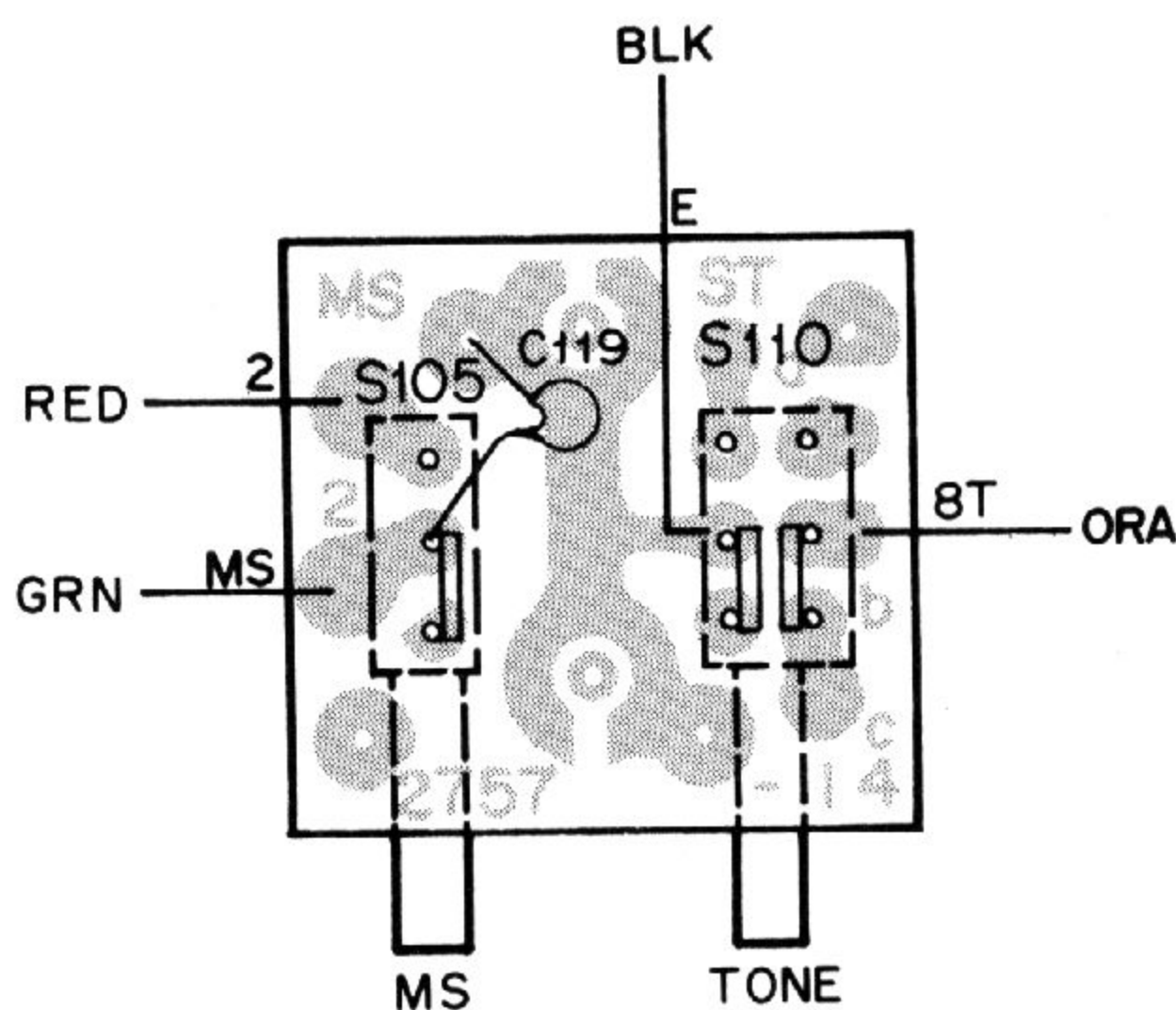
# TR-7730 PC BOARD VIEWS



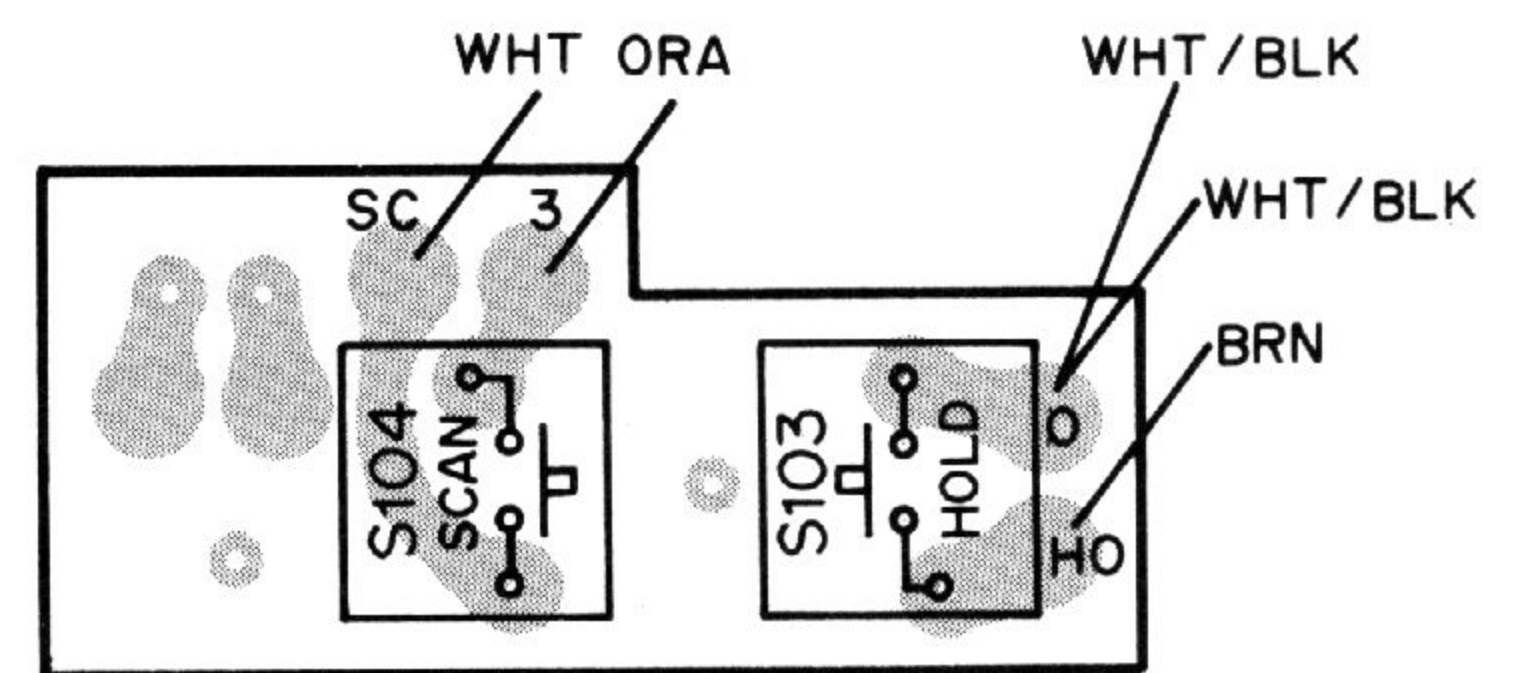
**▼ M, MR BOARD (J25-2757-14)**  
Foil side view



**▼ M.S, TONE BOARD (J25-2757-14)**  
Foil side view



**▼ SCAN, HOLD BOARD (J25-2758-14)**  
Components side view



## PARTS LIST

### Note 1:

K: U.S.A. T: Britain W: Europe X: Australia

### Note 2:

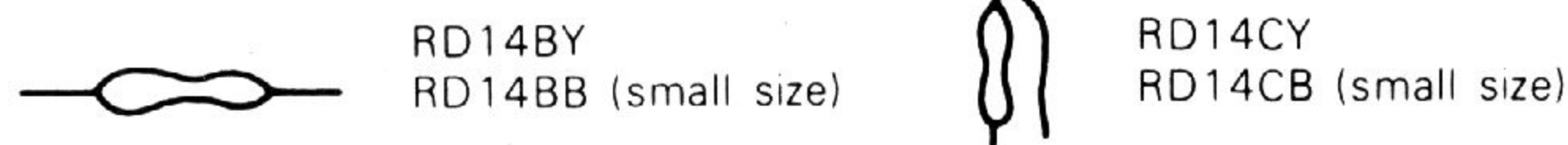
Only special type of resistors (example: cement, metal film, etc.) and capacitors (example: electrolytic, tantalum, mylar, temp. coeff. capacitors) are detailed in the PARTS LIST. For the value of all common type components, refer to the schematic diagram of the P.C. board illustration. Resistors not otherwise detailed are carbon type (1/4W or 1/8W). Order carbon resistors and capacitors according to the following example:

A carbon resistor's part number is RD14BY 2E222J.

A ceramic capacitor's number is CK45F1H103Z, CC45TH1H220J.

### RESISTOR

#### 1. Type of the carbon resistor



#### 2. Wattage

1W → 3A      3W → 3F      5W → 3H  
2W → 3D      4W → 3G

3' = CC45 ○ ○ ...

Ceramic capacitor (type I) temperature coeff. capacitor 1' 3'

1st word (Color)	C (Black)	L (Red)	P (Orange)	R (Yellow)	S (Green)	T (Blue)	U (Violet)
ppm/°C	0	-80	-150	-220	-330	-470	-750

3 = CK45 ○

Ceramic capacitor (type II) 3

Cord	B	D	E	F
Operating temperature °C	-30 +85	-30 +85	-30 +85	-10 +70

6 = Tolerance

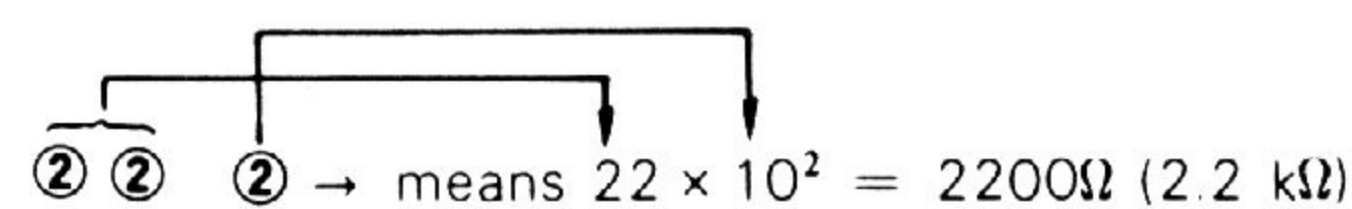
Cord	C	D	G	J	K	M	X	Z	P	No cord
(%)	±0.25	±0.5	±2	±5	±10	±20	+40 -20	+80 -20	+100 -0	More than 10 μF -10 ~ +50 Less than 4.7 μF -10 ~ +75

Less than 10 pF

Cord	B	C	D	F	G
(pF)	±0.1	±0.25	±0.5	±1	±2

Abbreviation		Abbreviation	
Cap.	Capacitor	ML	Mylar
C	Ceramic	S	Styren
E	Electrolytic	T	Tantalum
MC	Mica		

#### 3. Resistance value



Example: 221 → 220Ω      223 → 22 kΩ      225 → 2.2 MΩ  
222 → 2.2 kΩ      224 → 220 kΩ

#### 4. Tolerance

J = ±5% (Gold)      K = ±10% (Silver)

### CAPACITORS

#### Type I

CC 45 TH 1H 220 J      CK 45 F 1H 103 Z  
1' 2 3' 4 5 6      1 2 3 4 5 6

1 = Type ... ceramic, electrolytic, etc.      4 = Voltage rating  
2 = Shape ... round, square, etc.      5 = Value  
3 = Temp range      6 = Tolerance  
3' = Temp coefficient

#### Type II

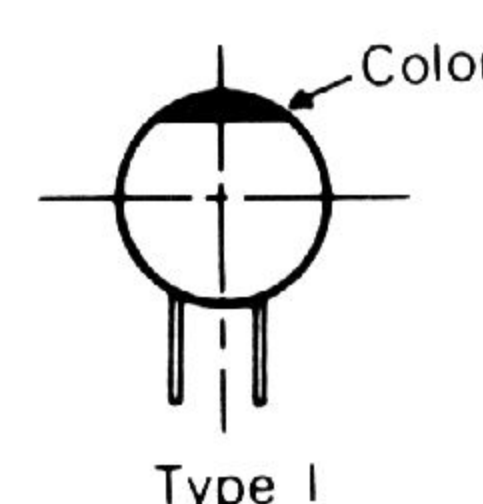
Ex. CC45TH = -470 ±60 ppm/°C

2nd Word	G	H	J	K	L
ppm/°C	±30	±60	±120	±250	±500

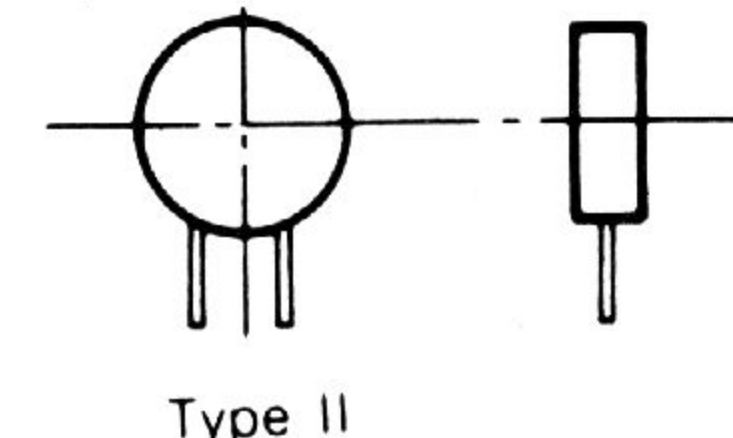
5 = Capacitor value

Example: 010 → 1 pF  
100 → 10 pF  
101 → 100 pF  
102 → 1000 pF = 0.001 μF  
103 → 0.01 μF

CC45



CK45



## TR-7730 SEMICONDUCTOR

☆: New parts

Item	Name	Re- marks	Parts No.	Item	Name	Re- marks	Parts No.		
Diode	1N60		V11-0051-05	Zener diode	WZ-040		V11-4102-50		
	1S1555		V11-0076-05		XZ-060		V11-4101-20		
	1S2588		V11-0414-05		XZ-070		V11-4161-96		
	1SS99		V11-1277-86		XZ-090		V11-4167-06		
					XZ-100		V11-4104-10		
		BA243S		V11-7767-06	LED	LN233RP		V11-1173-06	Red
		MA522 (Q)		V11-1173-46		LN333GP		V11-1173-16	Green
		MI303		V11-5273-66		LN433YP		V11-1173-26	Amber
	MI402		V11-5260-16	LN543RK			V11-1173-36	4 Digit	
	U05B		V11-0270-05	Thermistor	D33A		V11-3161-86		
Vari-Cap	1S2208		V11-0317-05						
Varistor	1S1212		V11-1262-06						

## PARTS LIST

Item	Name	Re- marks	Parts No.	Ref. No.	Parts No.	Re- marks	Description	
TR	2SA562TM (Y)		V01-0562-16		B07-0636-04	☆	Side escutcheon x 2	
	2SA1015 (Y)		V01-1015-06		B10-0629-04		Front glass	
	2SA1115 (E)		V01-1115-16		B40-2571-04	☆	Model name plate K, M	
					B40-2572-04	☆	Model name plate T	
	2SC458 (B)		V03-0093-05		B40-2573-04	☆	Model name plate W	
	2SC460 (B)		V03-0079-05		B46-0058-10		Warranty card K	
	2SC496 (Y)		V03-0336-05		B50-3911-00	☆	Operating manual K, M	
	2SC1775 (E)		V03-1775-06		B50-3912-00	☆	Operating manual T	
	2SC1815 (Y)		V03-1815-06		B50-3913-00	☆	Operating manual W	
	2SC1923 (O)		V03-1923-06					
	2SC1959 (Y)		V03-1959-06		C101	CC45SL1H470J		C 47pF
	2SC2240 (GR)		V03-2240-06		C102, 103	C91-0430-05		Laminated cap. 0.047μF
	2SC2538		V03-2538-06		C104~113	C91-0469-05		Cap. 0.001μF
2SC2603 (E)		V03-2603-06		C115, 118, 119	CC45SL1H470J		C 47pF	
FET	2SK19 (GR) TRIO-5		V09-1001-16		E06-0651-05		6P male socket MIC	
	2SK30A (O)		V09-0056-05		E07-0651-05		6P metal plug MIC	
					E12-0001-05		Phone plug (accessary)	
	3SK74 (L)		V09-1002-56		E30-1689-05	☆	DC cord (C) (accessary)	
	3SK76		V09-1012-06		E31-2074-15		Connector with lead (B)	
	3SK92		V09-1006-16					
Power module	VP-15E1305	☆	V30-1240-26		F05-6021-05		Fuse 6A (accessary)	
IC	HA1366W		V30-1045-06		G02-0518-04		Gnd spring (C) x 2 Helical	
					G10-0607-04		Cushion cloth x 4 120 x 4 mm	
					G10-0611-04		Cushion cloth (B) 30 x 13 mm	
					G10-0612-04		Cushion cloth (C) 150 x 45 mm	
					G10-0613-14		Cushion cloth (D) 140 x 24 mm	
					G10-0615-04	☆	Cushion cloth (E) x 2 73 x 15 mm Case	
					G13-0638-04		Cushion (A) x 2 53 x 24 x 5 mm	
					G16-0503-03		Conductive rubber sheet	
					H01-2760-03	☆	Carton case (inside) K, M, W	
					H01-2761-03	☆	Carton case (inside) T	
					H10-2536-04		Packing fixture (B)	
					H10-2551-02	☆	Packing fixture (A)	
					H12-0474-04		Cushion	
					H20-1417-03		Protective cover	
					H25-0029-04		Protective bag Boss	
				H25-0049-03		Accessory bag		
				H25-0079-04		Protective bag MIC		
				H25-0103-04		Protective bag Cord		
Micro- processor					J02-0022-05		Foot x 2 (accessary) Rear	
					J02-0420-04		Foot (accessary) Front	
					J21-2676-04		Foot mounting hardware x 2 (accessary)	
					J25-2715-04		PC board M. CH	
					J25-2744-04		PC board (E) RPT	
					J25-2755-14		PC board (A) Schmitt	
					J25-2756-04		PC board (B) 10k/5k, H/L	
					J25-2757-14		PC board (C) M/MR, M.S/TONE	
					J25-2758-14		PC board (D) SCAN, HOLD	
					J32-0748-04		Boss x 4 (accessary)	
					K21-0752-03		Main knob	
					K23-0736-04		Knob (A) x 2 VOL, SQU	
					K23-0737-04		Knob (B) M. CH	
					K23-0743-04		Knob (C) RPT	
					K27-0416-05		Push knob (A) M	
				K27-0417-05		Push knob (B) MR		
				K27-0418-05		Push knob (C) x 3 10k/5k, H/L, TONE		

Ref. No.	Parts No.	Re- marks	Description
<b>TR-7730 GENERAL</b>			
	A01-0905-03	☆	Case (upper)
	A01-0906-03	☆	Case (lower)
	A13-0618-22		Angle ass'y (accessary)
	A20-2433-04	☆	Panel
	B01-0639-03	☆	Panel escutcheon K, M
	B01-0640-03	☆	Panel escutcheon T
	B01-0641-03	☆	Panel escutcheon W
	B03-0517-04		Switch mask x 2 M, MR
	B03-0518-04		Switch mask x 4 5k/10k, H/L, TONE, MS
	B05-0714-04		SP grill cloth

PARTS LIST

Ref. No.	Parts No.	Re- marks	Description	Ref. No.	Parts No.	Re- marks	Description
	K27-0419-05		Push knob (D) MS	C25	C91-0131-05		C 0.01 $\mu$ F
	K27-0420-04		Push knob (E) x 2 SCAN, HOLD	C26	CC45CH1H050C		C 5pF $\pm$ 0.25pF
	N09-0008-04		Round screw x 4 Angle (accessary)	C30	CC45SL1H151J		C 150pF
	N13-0302-04		Ornamental nut M. CH	C32	CC45CH1H150J		C 15pF
	N14-0510-04		Flange nut x 4 Angle (accessary)	C33	CQ92M1H393K		ML 0.039 $\mu$ F 50V
	N14-0512-05		Speed nut x 3	C34	CQ92M1H223K		ML 0.022 $\mu$ F 50V
	N15-1020-46		Flat washer x 2	C35	CE04W1A101M		E 100 $\mu$ F 10V
	N15-1060-46		Flat washer x 4 Angle (accessary)	C36, 37	CQ92M1H473K		ML 0.047 $\mu$ F 50V
	N16-0060-46		Spring washer x 4 Angle (accessary)	C38	CQ92M1H393K		ML 0.039 $\mu$ F 50V
	N30-2004-46		Round screw x 20	C39	CQ92M1H103K		ML 0.01 $\mu$ F 50V
	N30-2020-46		Round screw	C41~43	CQ92M1H223K		ML 0.022 $\mu$ F 50V
	N30-2604-46		Round screw x 23	C47	CC45SL1H470J		C 47pF
	N30-3004-46		Round screw x 5	C50, 53	CQ92M1H222K		ML 0.0022 $\mu$ F 50V
	N30-3006-46		Round screw	C54	CQ92M1H473K		ML 0.047 $\mu$ F 50V
	N32-2604-46		Flat screw x 7	C55	CQ92M1H102K		ML 0.001 $\mu$ F 50V
	N32-2606-45		Flat screw x 4	C56	CQ92M1H223K		ML 0.022 $\mu$ F 50V
	N33-2605-45		Round flat screw x 13	C57	CQ92M1H222K		ML 0.0022 $\mu$ F 50V
	N33-2606-45		Round flat screw x 10	C58	CQ92M1H332K		ML 0.0033 $\mu$ F 50V
	N35-3006-45		Bind screw x 6 (accessary)	C59	CQ92M1H222K		ML 0.0022 $\mu$ F 50V
	N35-3012-45		Bind screw x 4 (accessary)	C60	CQ92M1H393K		ML 0.039 $\mu$ F 50V
VR101	R05-3410-15		Pot. 10k $\Omega$ (A) with SW VOL	C61, 62	CQ92M1H223K		ML 0.022 $\mu$ F 50V
VR102	R05-4405-05		Pot. 50k $\Omega$ (B) SQU	C63	CE04W1A470M		E 47 $\mu$ F 10V
	S01-1421-05		Rotary switch RPT	C64	CS15E1A220M		T 22 $\mu$ F 10V
	S01-1422-05		Rotary switch M. CH	C65	CQ92M1H103K		ML 0.01 $\mu$ F 50V
	S40-1401-05		Push switch x 2 MS, H/L	C66	CQ92M1H392K		ML 0.0039 $\mu$ F 50V
	S40-1402-05		Push switch M	C67	CS15E1V0R1M		T 0.1 $\mu$ F 35V
	S40-2417-05		Push switch x 2 10k/5k, MR	C68	CC45CH1H220J		C 22pF
	S40-2417-05		Push switch TONE K, M, T	C69	CQ92M1H103K		ML 0.01 $\mu$ F 50V
	S40-2421-05		Push switch TONE W	C70	CC45CH1H220J		C 22pF
	S50-1406-05		Tact switch x 2	C71	CS15E1A100M		T 10 $\mu$ F 10V
	S59-1405-05		Key board switch x 2 SCAN, HOLD	C72	CQ92M1H332K		ML 0.0033 $\mu$ F 50V
	T07-0216-05		Speaker	C73, 74	CS15E1C3R3M		T 3.3 $\mu$ F 16V
	T91-0311-05		Microphone T	C75	CS15E1C4R7M		T 4.7 $\mu$ F 16V
	T91-0313-05		Microphone K, M, W	C78	CS15E1V0R1M		T 0.1 $\mu$ F 35V
	W02-0316-05		Rotary encoder	C79	CE04W1A330M		E 33 $\mu$ F 10V
	X44-1450-10	☆	RX.TX unit K, M	C81	CS15E1V0R1M		T 0.1 $\mu$ F 35V
	X44-1450-51	☆	RX.TX unit T	C82	CE04W1A220M		E 22 $\mu$ F 10V
	X44-1450-61	☆	RX.TX unit W	C83	CS15E1C4R7M		T 4.7 $\mu$ F 16V
	X45-1190-10	☆	Final unit	C84	CE04W1A330M		E 33 $\mu$ F 10V
	X50-1750-10	☆	PLL unit	C85	CE04W1H010M		E 1 $\mu$ F 50V
	X53-1230-10	☆	Control unit K, M	C86	CQ92M1H103K		ML 0.01 $\mu$ F 50V
	X53-1230-61	☆	Control unit W, T	C88	CQ92M1H473K		ML 0.047 $\mu$ F 50V
	X54-1520-11		Display unit	C89	C91-0131-05		C 0.01 $\mu$ F
<b>RX.TX UNIT (X44-1450-10, -51, -61) -10 : K, M</b>				C90	CE04W1H010M		E 1 $\mu$ F 50V
<b>-51 : T -61 : W</b>				C91	CQ92M1H332K		ML 0.0033 $\mu$ F 50V
C1	CC45CH1H220J		C 22pF	C92	CE04W1A101M		E 100 $\mu$ F 10V
C4, 5, 7	C91-0131-05		C 0.01 $\mu$ F	C93	CE04W1A470M		E 47 $\mu$ F 10V
C8	CC45CH1H060D		C 6pF $\pm$ 0.5pF	C94	CQ92M1H102K		ML 0.001 $\mu$ F 50V
C11	CE04W1C100M		E 10 $\mu$ F 16V	C95	CC45SL1H101J		C 100pF
C13	CC45CH1H220J		C 22pF	C96	CE04W1A470M		E 47 $\mu$ F 10V
C16	CC45SL1H101J		C 100pF	C97	CE04W1A101M		E 100 $\mu$ F 10V
C19	C91-0131-05		C 0.01 $\mu$ F	C98	CQ92M1H104K		ML 0.1 $\mu$ F 50V
C20	CC45CH1H180J		C 18pF	C99	CE04W1H010M		E 1 $\mu$ F 50V
C21	CC45CH1H050C		C 5pF $\pm$ 0.25pF	C100, 101, 103	CE04W1A470M		E 47 $\mu$ F 10V
C22	CC45CH1H220J		C 22pF	C105, 106	C90-0820-05		E 470 $\mu$ F 16V
C23	CC45CH1H0R5C		C 0.5pF $\pm$ 0.25pF	C107	C91-0131-05		C 0.01 $\mu$ F
				C109	CE04W1C100M		E 10 $\mu$ F 16V
				C111	CE04W1A470M		E 47 $\mu$ F 10V
				C113, 115	CE04W1C100M		E 10 $\mu$ F 16V
				C116~118	CQ92M1H392K		ML 0.0039 $\mu$ F 50V W, T
				C119	CE04W1H010M		E 1 $\mu$ F 50V W, T
				C120, 121	CS15E1A220M		T 22 $\mu$ F 10V W, T
				C126	CC45SL1H101J		C 100pF
				C127	CE04W1H010M		E 1 $\mu$ F 50V W, T

## PARTS LIST

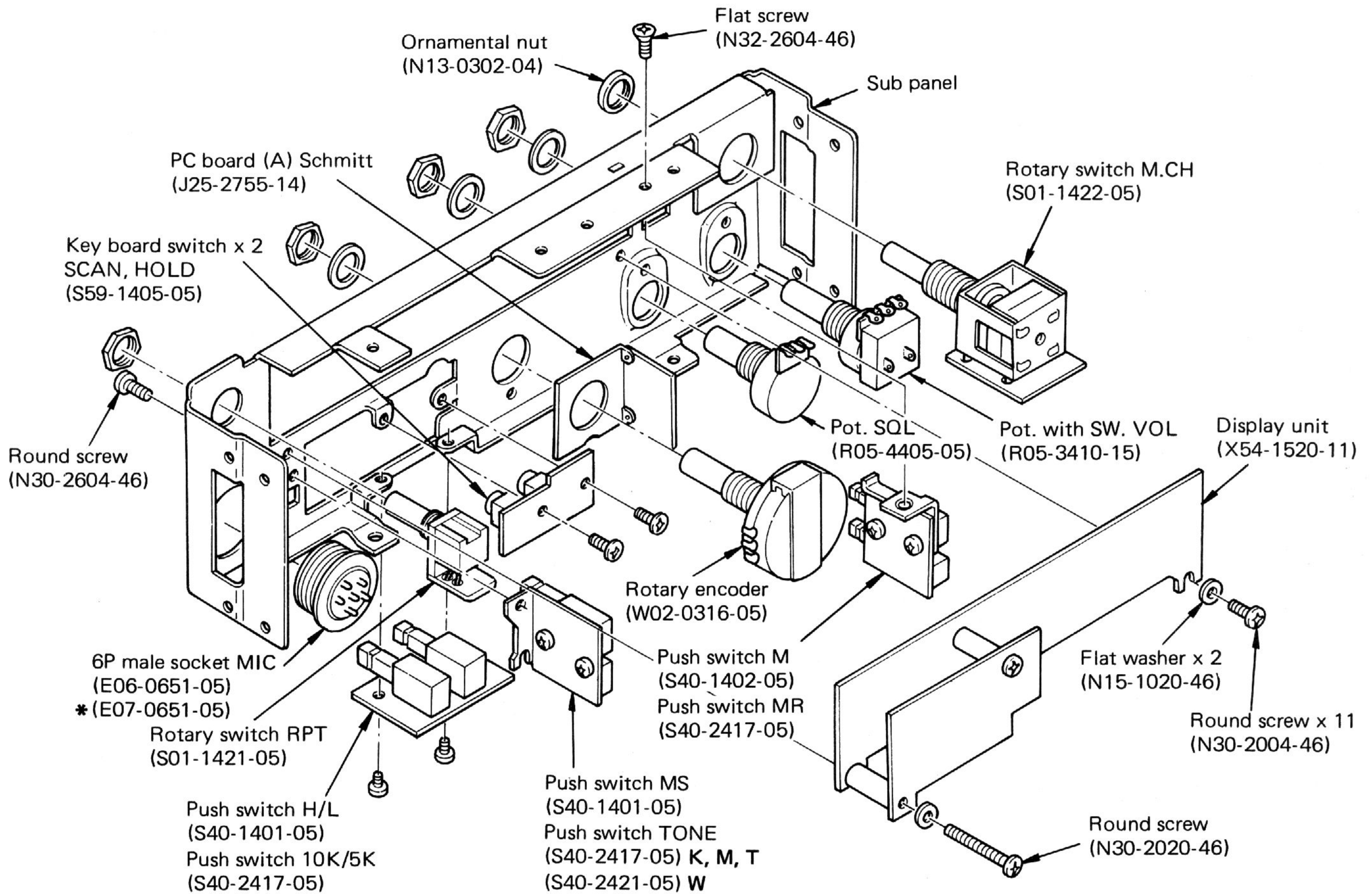
Ref. No.	Parts No.	Re- marks	Description	Ref. No.	Parts No.	Re- marks	Description
C129	CS15E1A150M		T 15 $\mu$ F 10V T	C10	C91-0466-05		Cap. 0.001 $\mu$ F
C130	C91-0131-05		C 0.01 $\mu$ F	C11	CC45SL2H330J		C 33pF 500V
C131	CS15E1A150M		T 15 $\mu$ F 10V T	C12	CC45CH1H0R5C		C 0.5pF $\pm$ 0.25pF
C132	CE04W1HR47M		E 0.47 $\mu$ F 50V	C13	CC45CH1H030C		C 3pF $\pm$ 0.25pF
C139~141	C91-0131-05		C 0.01 $\mu$ F	C14	CC45SL2H330J		C 33pF 500V
TC1	C05-0030-15		Ceramic trimmer 20pF	C15	CC45SL2H100D		C 10pF $\pm$ 0.5pF 500V
	E23-0046-04		Square terminal x 3	C16	CC45CH1H0R5C		C 0.5pF $\pm$ 0.25pF
J1~5	E40-0273-05		Mini connect wafer 2P	C17	CC45SL2H220J		C 22pF 500V
J6	E40-0673-05		Mini connect wafer 6P	C19	C91-0131-05		C 0.01 $\mu$ F
J7	E40-0773-05		Mini connect wafer 7P	C21	CC45SL2H150J		C 15pF 500V
J8	E40-0273-05		Mini connect wafer 2P	C30, 31	CC45SL1H101J		C 100pF
J9	E40-1173-05		Mini connect wafer 11P	C35	CE04W1C221M		E 220 $\mu$ F 16V
J10	E40-0873-05		Mini connect wafer 8P	J1	E31-2093-05	☆	Coax. connector with 2P lead
J11	E40-0673-05		Mini connect wafer 6P	J2	E40-0373-05		Mini connect wafer 3P
J12	E40-0273-05		Mini connect wafer 2P	J3	E31-2093-05	☆	Coax. connector with 2P lead
L1	L33-0002-05		Choke coil 1 $\mu$ H	J4	E04-0152-05		UHF type receptacle
L2	L34-0948-05		Tuning coil	J5	E11-0403-05		Phone jack
L3	L34-0452-05		VHF coil 3 $\phi$ 6T	J6	E08-0304-05		Power jack Backup
L4	L34-0691-05		VHF coil 5 $\phi$ 5T	J7	E40-0373-05		Mini connect wafer 3P
L5	L79-0482-05	☆	Helical resonator (A) 4 MHz 2pole		E23-0046-04		Square terminal x 6
L6	L79-0483-05	☆	Helical resonator (B) 4 MHz 3pole		E30-1688-05	☆	DC cord (D) with 6A Fuse
L7, 8	L30-0281-05		IFT 10.7 MHz		F01-0760-05	☆	Heat sink
L10	L30-0504-05		IFT 455 kHz		F05-6021-05		Fuse 6A
L11	L30-0503-05		IFT 455 kHz		J41-0006-05		Cord bushing DC cord
L12	L40-6825-04		Ferri-inductor 6.8mH	L1	L34-0951-05		Coil (A) 4 $\phi$ 2.5T
L13	L40-1021-03		Ferri-inductor 1mH	L2	L34-0438-05		Coil 0.94 $\mu$ H
L14	L40-1541-27		Ferri-inductor 150mH	L3	L34-0952-05		Coil (B) 4 $\phi$ 5.5T
L15	L15-0016-05		Choke trans.	L4, 5	L34-0953-05		Coil (C) 4 $\phi$ 3.5T
L16	L40-1511-03		Ferri-inductor 150 $\mu$ H	L6	L33-0025-05		Choke coil 1 $\mu$ H
L17 (A), (B)	L71-0219-05		MCF 10.7 MHz	L7	L39-0409-05		Detector coil
L18	L72-0315-05		Ceramic filter CFW455F	L8	L33-0002-05		Choke coil 1 $\mu$ H
L19	L79-0446-05		Ceramic discri CFY455S	L9	L34-0955-15		Coil (E) 4 $\phi$ 3.5T
L20	L34-0683-05		Tuning coil	L10	L33-0074-05		Heater choke
X1	L77-0327-05		Crystal 10.245 MHz	L11	L33-0002-05		Choke coil 1 $\mu$ H
	N30-3008-11		Round screw x 2 IC		N30-2604-11		Round screw x 7
R96	R92-0616-05		Metal film 10k $\Omega$ $\pm$ 1% 1/4W W, T		N30-2606-11		Round screw x 2 Back up
R101	RC05GF2H5R6J		Solid 5.6 $\Omega$ 1/2W		N35-3006-46		Bind screw x 2 Module
R107	R92-0616-05		Metal film 10k $\Omega$ $\pm$ 1% 1/4W W, T	R3	R92-0144-05		Metal film 1 $\Omega$
R108	RN14BK2E4703F		Metal film 470k $\Omega$ $\pm$ 1% 1/4W W, T	VR1	R12-5024-05		Trim. pot 100k $\Omega$ (B)
R126	R92-0617-05		Metal film 7.5k $\Omega$ $\pm$ 1% 1/4W W, T	VR2	R12-0053-05		Trim. pot 500 $\Omega$ (B)
VR1	R12-4016-05		Trim. pot 50k $\Omega$ (B)	<b>PLL UNIT (X50-1750-10)</b>			
VR2	R12-1020-05		Trim. pot 1k $\Omega$ (B)	C3	CC45CH1H0R5C		C 0.5pF $\pm$ 0.25pF
VR3	R12-1414-05		Trim. pot 1k $\Omega$ (B)	C4	CC45TH1H080D		C 8pF $\pm$ 0.5pF
VR4	R12-1020-05		Trim. pot 1k $\Omega$ (B)	C5	CC45CH1H020C		C 2pF $\pm$ 0.25pF
VR5~7	R12-1405-05		Trim. pot 3k $\Omega$ (B)	C6	CC45CH1H050C		C 5pF $\pm$ 0.25pF
VR8	R12-4403-05		Trim. pot 50k $\Omega$ T	C7	CE04W1A220M		E 22 $\mu$ F 10V
VR9	R12-2409-05		Trim. pot 5k $\Omega$ W, T	C11	CC45CH1H070D		C 7pF $\pm$ 0.5pF
	R92-0150-05		Short jumper	C12	CC45CH1H030C		C 3pF $\pm$ 0.25pF
<b>FINAL UNIT (X45-1190-10)</b>				C13	CC45CH1H050C		C 5pF $\pm$ 0.25pF
C3	CE04W1C101M		E 100 $\mu$ F 16V	C14	CE04W1A101M		E 100 $\mu$ F 10V
C4, 5	CC45SL2H070D		C 7pF $\pm$ 0.5pF 500V	C16	CC45CH1H040C		C 4pF $\pm$ 0.25pF
C7, 8	CC45SL2H101J		C 100pF 500V	C17	CC45CH1H010C		C 1pF $\pm$ 0.25pF
C9	CC45CH1H150J		C 15pF	C20	CC45CH1H220J		C 22pF
				C22	C91-0131-05		C 0.01 $\mu$ F



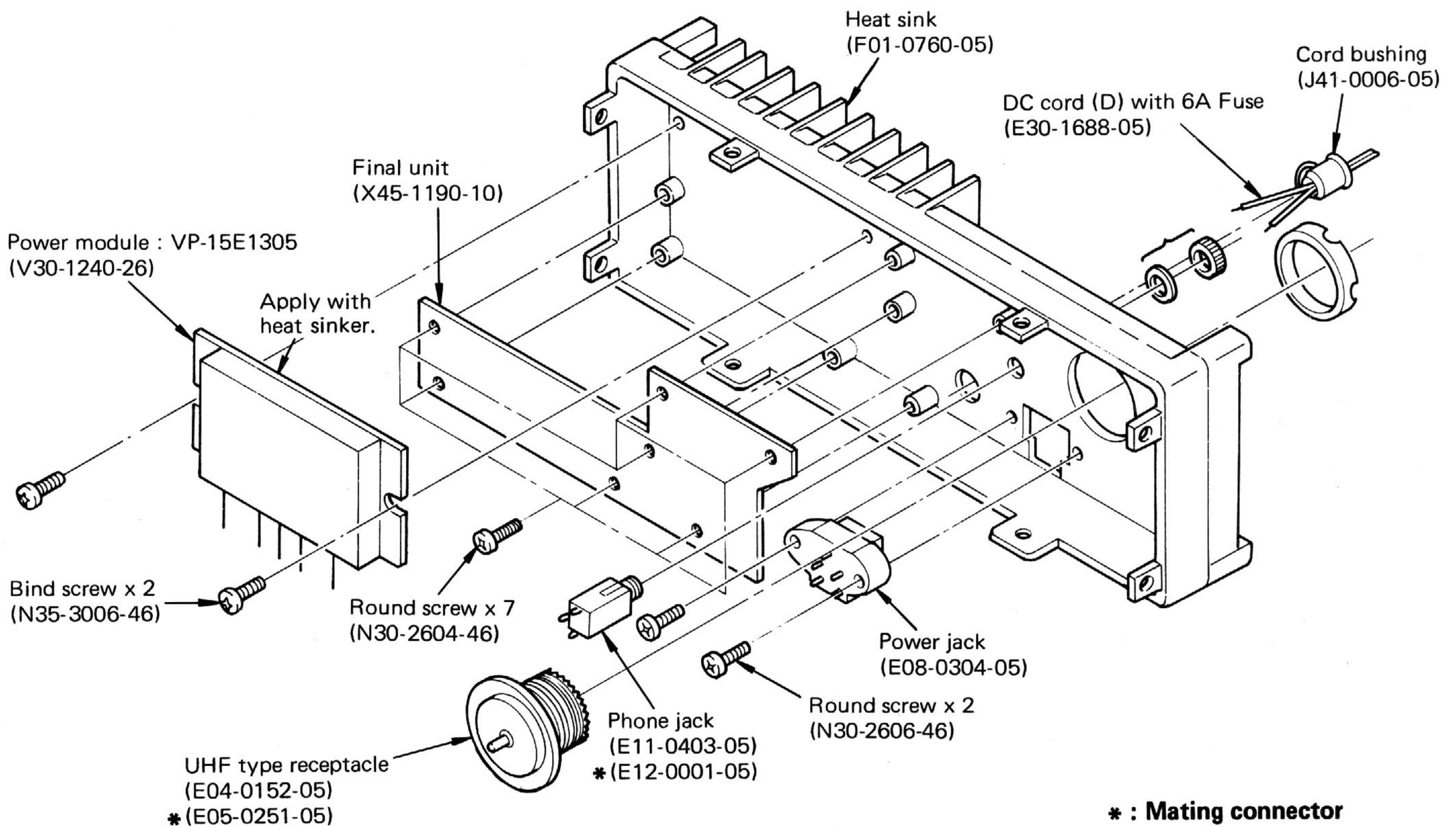
## PARTS LIST

Ref. No.	Parts No.	Re- marks	Description	Ref. No.	Parts No.	Re- marks	Description
C24	CE04W1H3R3M		E 3.3 $\mu$ F 50V	X1	L77-0944-05	☆	Crystal R 42.6000 MHz
C26	CC45RH1H020C		C 2pF $\pm$ 0.25pF	X2	L77-0945-05	☆	Crystal T 46.1667 MHz
C27	CC45RH1H040C		C 4pF $\pm$ 0.25pF	X3	L77-0720-05		Crystal 10.240 MHz
C29	CC45CH1H020C		C 2pF $\pm$ 0.25pF		R92-0150-05		Short jumper
C32	C91-0131-05		C 0.01 $\mu$ F	<b>CONTROL UNIT (X53-1230-10, -61) -10 : K, M -61 : T, W</b>			
C34	CC45RH1H020C		C 2pF $\pm$ 0.25pF	C1	CE02W0J470		E 47 $\mu$ F 6.3V
C35	CC45RH1H030C		C 3pF $\pm$ 0.25pF	C2	CC45SL1H470J		C 47pF
C36, 37	CC45CH1H040C		C 4pF $\pm$ 0.25pF	C3	CQ92M1H223K		ML 0.022 $\mu$ F
C38	CC45RH1H050C		C 5pF $\pm$ 0.25pF	C4	CE04W1H010M		E 1 $\mu$ F 50V
C40	CC45RH1H040C		C 4pF $\pm$ 0.25pF	C5~8	CS15E1VR22M		T 0.22 $\mu$ F 35V
C41	C91-0131-05		C 0.01 $\mu$ F	C9	CE04W1C220M		E 22 $\mu$ F 16V
C42	CC45CH1H390J		C 39pF	C10, 11	CE04W0J471M		E 470 $\mu$ F 6.3V
C43	CC45CH1H330J		C 33pF	C12	CE04W1H2R2M		E 2.2 $\mu$ F 50V
C44, 46	C91-0131-05		C 0.01 $\mu$ F	C13	CE04W1A470M		E 47 $\mu$ F 10V
C47	CE04W1A101M		E 100 $\mu$ F 10V	C14	CE04W1C470M		E 47 $\mu$ F 16V
C48	CE04W1A470M		E 47 $\mu$ F 10V	C15	C91-0131-05		C 0.01 $\mu$ F
C50	CQ92M1H473K		ML 0.047 $\mu$ F	C17	C90-0827-05		E 330 $\mu$ F 16V
C51, 52	CS15E1C100M		T 10 $\mu$ F 16V	C18	C91-0131-05		C 0.01 $\mu$ F
C53	CS15E1V0R1M		T 0.1 $\mu$ F 35V	C19	CE04W1A101M		E 100 $\mu$ F 10V
C54	CE04W1A101M		E 100 $\mu$ F 10V	C20	CC45SL1H470J		C 47pF
C55	CQ92M1H223K		ML 0.022 $\mu$ F	C24	CC45CH1H270J		C 27pF
C57	CE04W1A101M		E 100 $\mu$ F 10V	C25~28	CC45SL1H470J		C 47pF
C58	CC45CH1H220J		C 22pF		E31-2098-05	☆	Connector with lead W, T
C59	CC45CH1H270J		C 27pF	J1	E40-1173-05		Mini connect wafer 11P
C60	CQ92M1H333K		ML 0.033 $\mu$ F	J2	E40-0473-05		Mini connect wafer 4P
C61	CC45SL1H101J		C 100pF	J3	E40-1073-05		Mini connect wafer 10P
C62	CQ92M1H153K		ML 0.015 $\mu$ F	J4	E40-1273-05		Mini connect wafer 12P
C63	CC45SL1H101J		C 100pF	J5	E40-0373-05		Mini connect wafer 3P
C64, 65	CC45CH1H100D		C 10pF $\pm$ 0.5pF	J6	E40-1373-05		Mini connect wafer 13P
C69	CS15E1VR22M		T 0.22 $\mu$ F 35V	J7	E40-0273-05		Mini connect wafer 2P W, T
C70	CC45CH1H020C		C 2pF $\pm$ 0.25pF	J8	E40-0573-05		Mini connect wafer 5P W, T
C72, 73	CC45CH1H330J		C 33pF		J31-0503-05		Bead x 8
TC1	C05-0062-05		Ceramic trimmer 6pF		J32-0755-04	☆	Round boss x 2 W, T
TC2	C05-0308-05		Ceramic trimmer 4pF	L1	L30-0503-05		IFT 455 kHz
TC3, 4	C05-0309-05		Ceramic trimmer 40pF		N30-2606-46		Round screw x 4 W, T
J1	E23-0046-04		Square terminal x 4	R10	R90-0526-05		Resistor block 27k $\Omega$ x 4
J2	E40-0273-05		Mini connect wafer 2P	R15, 49	R90-0520-05		Resistor block 47k $\Omega$ x 5
J3	E40-0473-05		Mini connect wafer 4P	<b>DISPLAY UNIT (X54-1520-11)</b>			
J4	E40-0673-05		Mini connect wafer 6P	C2	B07-0629-03		LED case
J5	E40-0773-05		Mini connect wafer 7P		B08-0302-04		Back board
L1	E40-0673-05		Mini connect wafer 6P		CE04W1C100M		E 10 $\mu$ F 16V
L2	L32-0632-05		OSC coil		E23-0426-05		Earth lug $\phi$ 2
L3	L33-0637-05		Choke coil 3 $\mu$ H		J31-0515-14		Collar
L4	L40-6811-03		Ferri-inductor 680 $\mu$ H		N10-2020-46		Nut
L5	L40-3391-03		Ferri-inductor 3.3 $\mu$ H		N15-1020-46		Flat washer
L6	L34-0956-05		Tuning coil		N30-2020-46		Round screw
L7	L40-2211-03		Ferri-inductor 220 $\mu$ H		R92-0150-05		Short jumper
L8	L34-0956-05		Tuning coil				
L9	L40-2211-03		Ferri-inductor 220 $\mu$ H				
L10	L40-1511-03		Ferri-inductor 150 $\mu$ H				
L11	L31-0343-05		Tuning coil				
L12	L40-2211-03		Ferri-inductor 220 $\mu$ H				
L13, 14	L40-1511-03		Ferri-inductor 150 $\mu$ H				
L15	L32-0637-05		OSC coil				
L16	L40-2211-03		Ferri-inductor 220 $\mu$ H				
L17	L40-4711-03		Ferri-inductor 470 $\mu$ H				
L18	L40-1021-03		Ferri-inductor 1mH				
L19	L40-4711-03		Ferri-inductor 470 $\mu$ H				
L20, 21	L40-2201-03		Ferri-inductor 22 $\mu$ H				
	L40-1001-03		Ferri-inductor 10 $\mu$ H				

## DISASSEMBLY

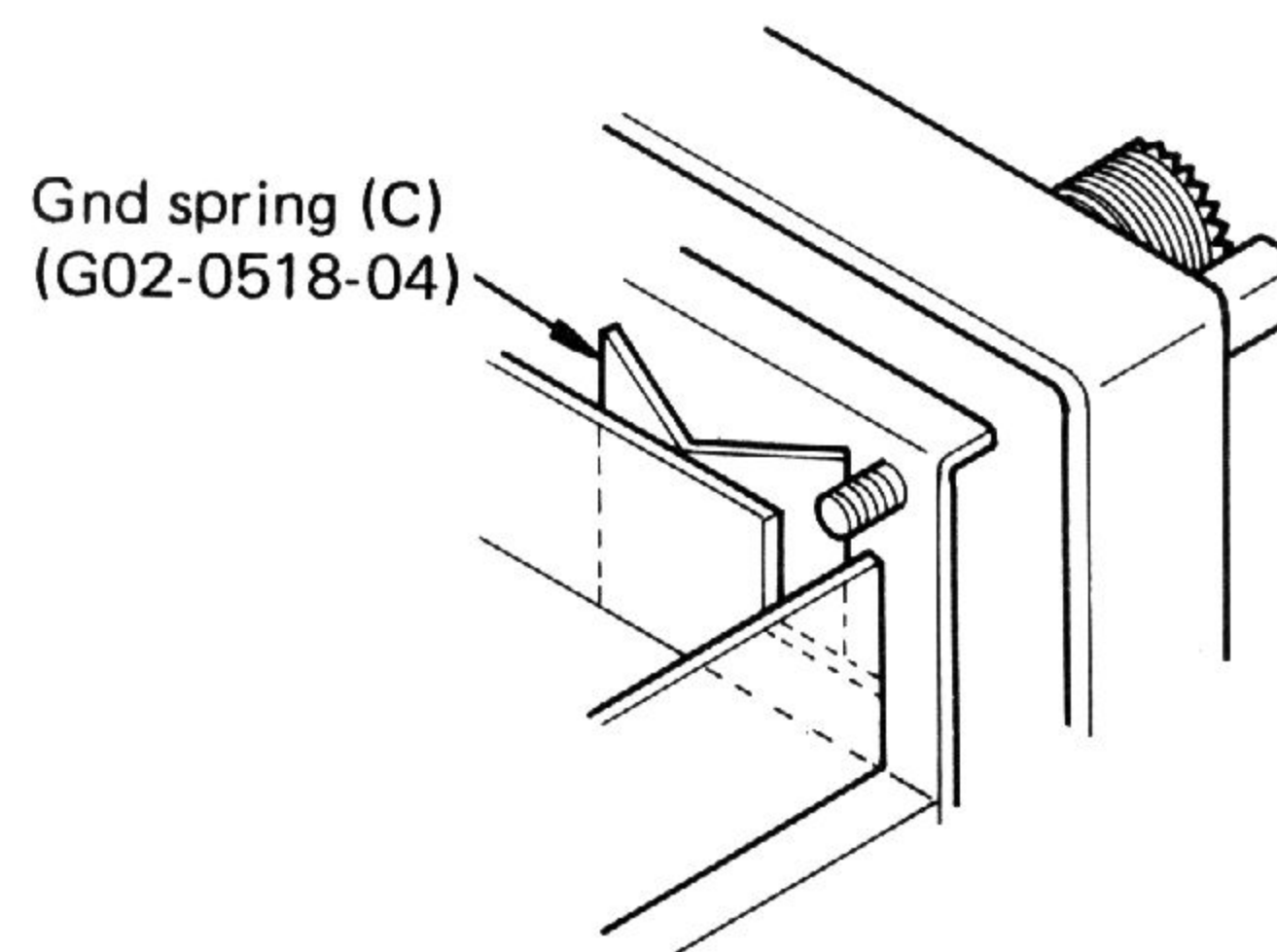
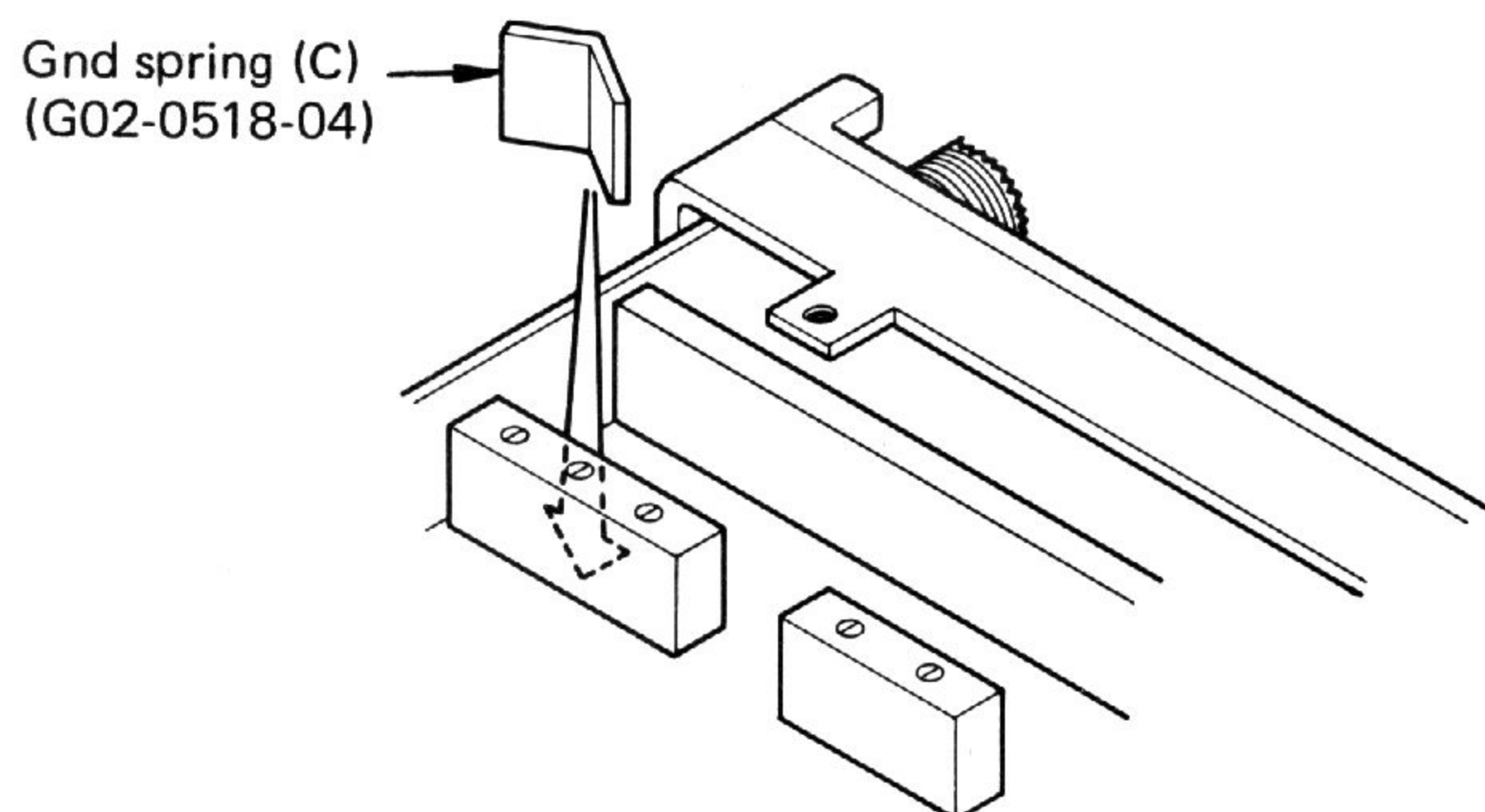
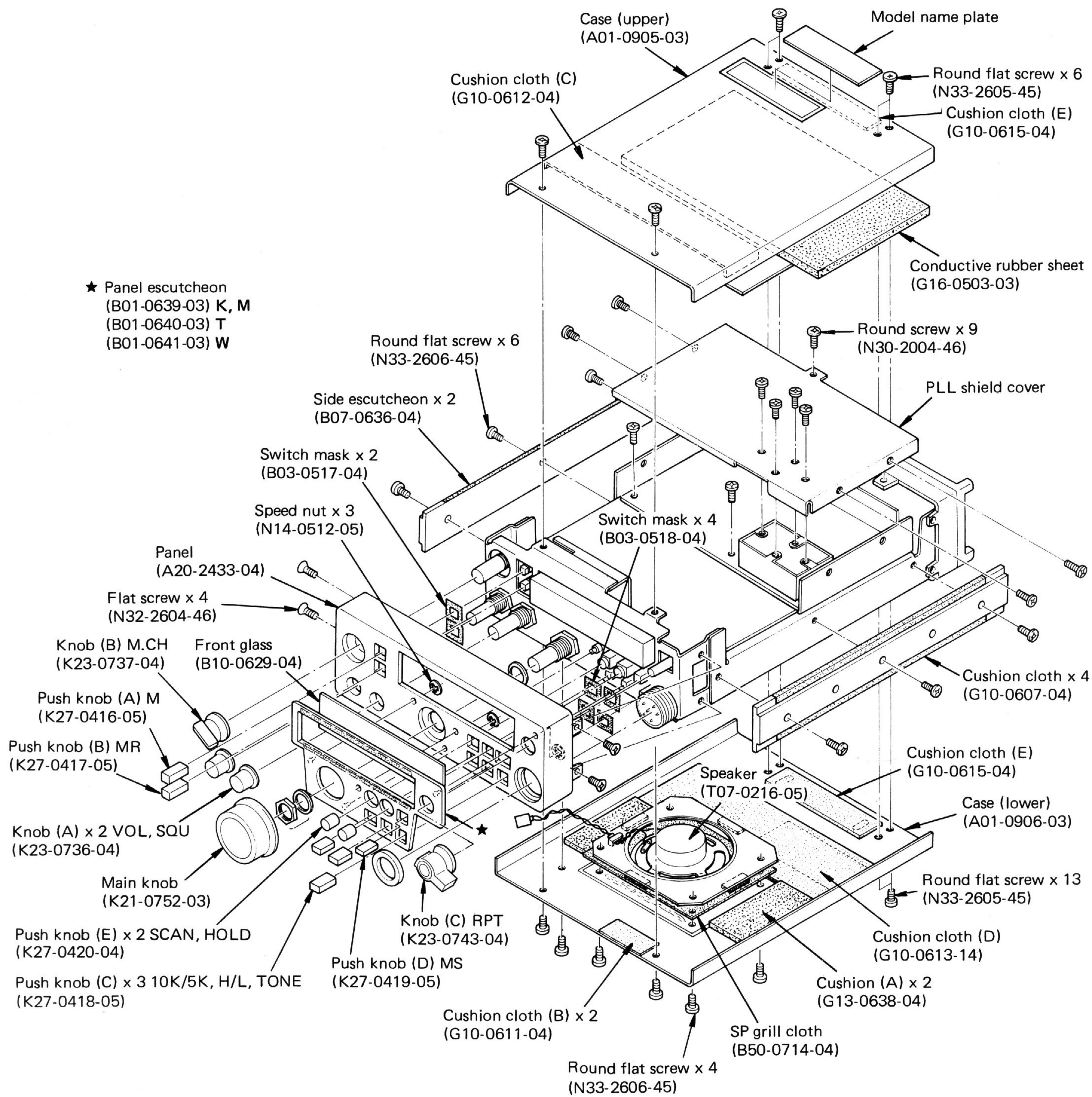


\* : Mating connector



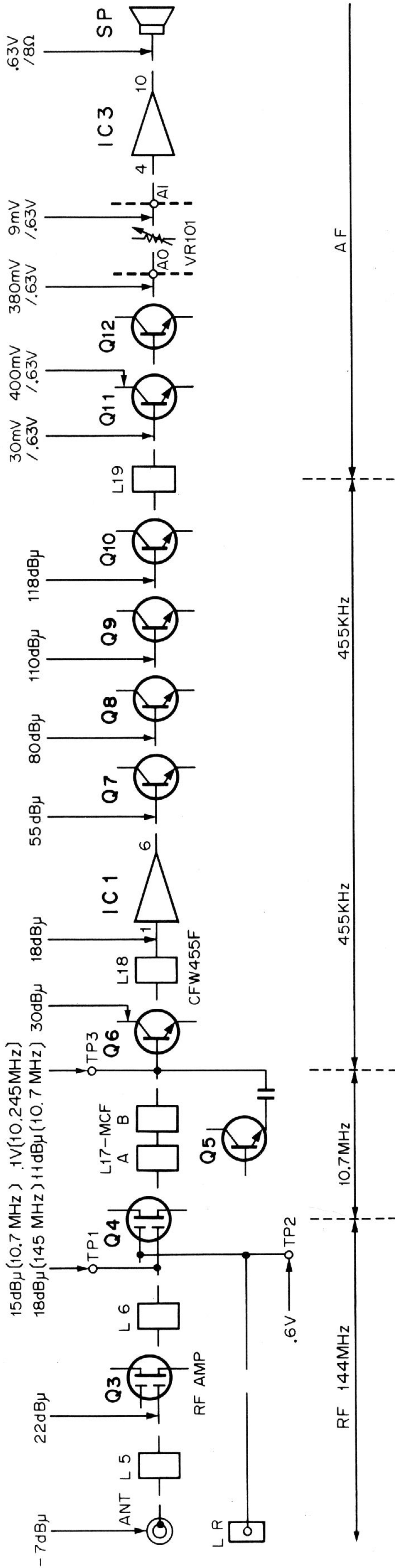
\* : Mating connector

## DISASSEMBLY



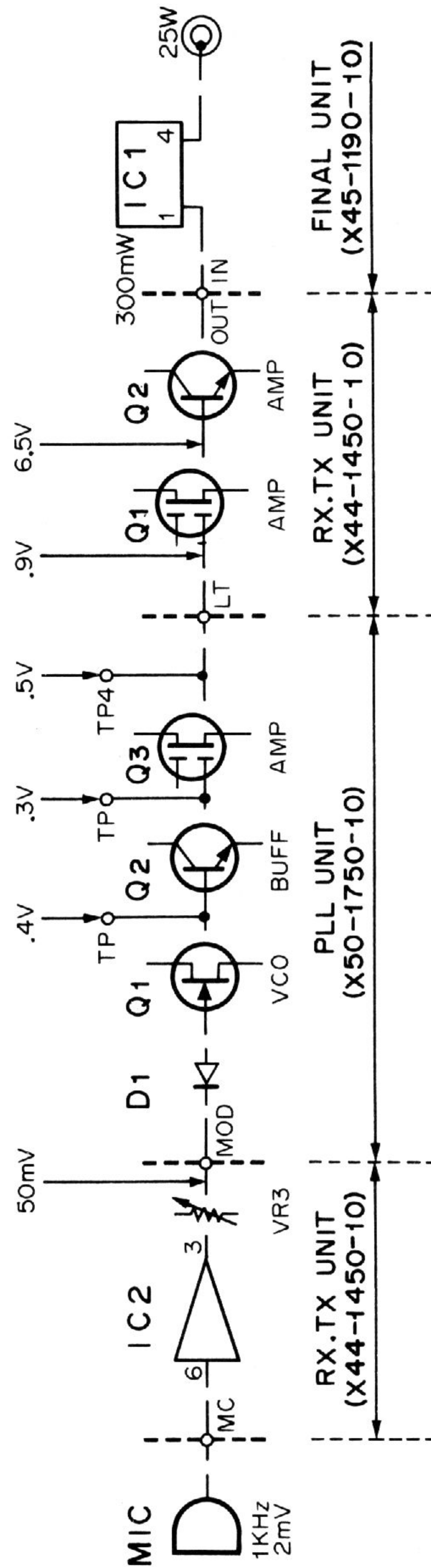
## LEVEL DIAGRAM

### RECEIVER SECTION



- Notes:**
1. To inject signal generator output connect a 0.01μF capacitor between the signal generator and the check point.
  2. In measuring the circuit from the ANT terminal to the base of Q10, unmodulated 144MHz, 10.7MHz, and 455kHz signals from an SSG are applied to the check point to obtain a 20 dB NO sensitivity.
  3. In measuring the circuit from the base of Q11 to the SP terminal, an SSG signal of 144 MHz, 0 dBμ, 1 kHz MOD, 5 kHz DEV is applied to the ANT terminal, and the AF control is adjusted to obtain an AF output of 0.63V/8Ω. The signal voltage at each point is measured with an AF VTVM.

### TRANSMITTER SECTION



- Notes:**
1. Voltages in MIC AMP are measured by an AF VTVM with an input of 1 kHz, 2 mV.
  2. Voltage measurements before OUT terminal are read from an RF VTVM with OUT cable disconnected at HI power position.

### < REFERENCE >

Japanese "SG"	American "SG"
-6 dB	0.25 μV
0 dB	0.5 μV
6 dB	1 μV
12 dB	2 μV
24 dB	8 μV
30 dB	15.8 μV
40 dB	50 μV
50 dB	158 μV
60 dB	500 μV
70 dB	1.58 mV
80 dB	5 mV
90 dB	15.8 mV
100 dB	50 mV
120 dB	0.5 V

## ADJUSTMENT

### < Test Equipment >

1. **Tester or DVM**
  - Input: Sufficient
2. **RF VTVM (RF V.M.)**
  - Input impedance: 1 MΩ and less than 2 pF
  - Voltage range: F.S. = 10 mV to 300V
  - Frequency range: 150 MHz or greater
3. **Frequency counter (f counter)**
  - Minimum input voltage: 50 mV
  - Frequency range: 150 MHz or greater
4. **DC power supply**
  - Voltage 10V to 17V variable
  - Current: 8A min.
5. **RF Power Meter**
  - Dissipation: 50W
  - Impedance: 50Ω
  - Frequency range: 144 MHz
6. **AF VTVM (AF V.M.)**
  - Input impedance: 1 MΩ or greater
  - Voltage range: F.S = 1 mV to 30V
  - Frequency range: 50 Hz to 10 kHz
7. **AF Generator (AG)**
  - Frequency range: 100 Hz to 10 kHz
  - Output: 0.5 mV to 1V
8. **Linear detector**
  - Frequency range: 144 MHz
9. **Directional coupler**
10. **Oscilloscope**
  - With horizontal input and high sensitivity
11. **Standard signal generator (SSG)**
  - Frequency range: 144 ~ 149 MHz
  - Modulation: amplitude and frequency modulation
  - Output: -20 dB ~ 100 dB
12. **AF Dummy load**
  - 8Ω, 5W (approx.)
13. **Sweep generator**
  - Frequency range: 144 ~ 149 MHz

### < Preparation >

Unless otherwise specified, set the controls as follows.

POWER / VOL SW	ON
SEND / REC	REC
SQUELCH VOL	MIN
M. CH SW	1
M. SW	OFF
M.R SW	OFF
SCAN SW	OFF
HOLD SW	OFF
M.S SW	OFF
STONE	OFF
HI /LOW SW	HI
25k / 5k (W) (T)	25k
10k / 5k (K) (M)	5k

#### Notes:

- When adjusting the trimmers or coils, use a non-induced adjusting rod of bakelite, etc.
- When adjusting the RX section never transmit to prevent SSG damage.
- Connect MIC connector as shown in Fig. 11.

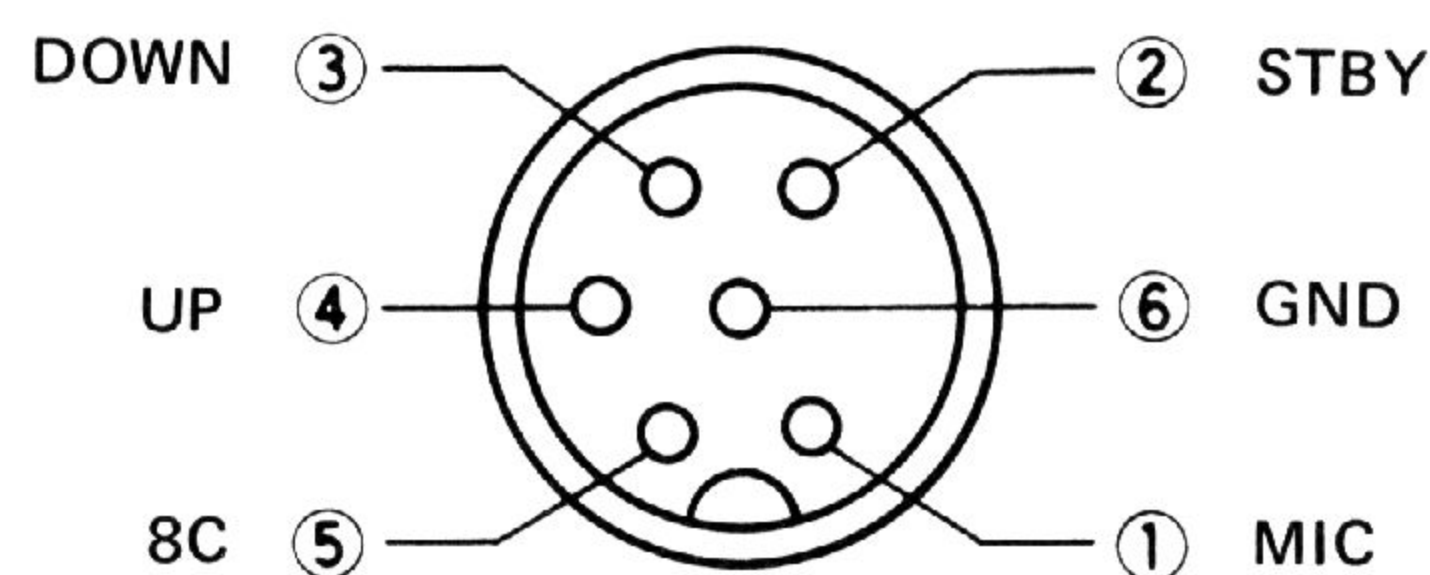


Fig. 11 MIC terminals (view from front panel side)

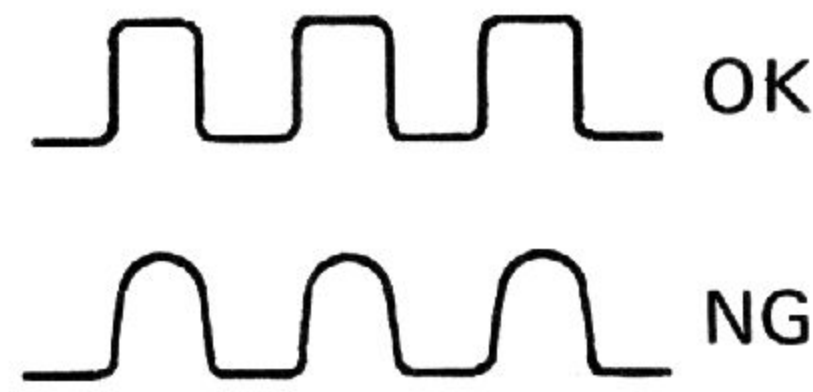
- The output level of SSG is indicated as SSG's open circuit.

## ADJUSTMENT

### VOLTAGE CHECK

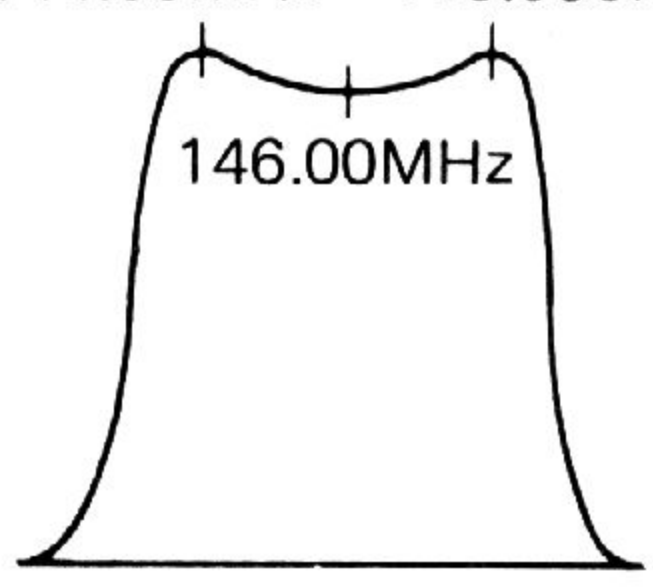
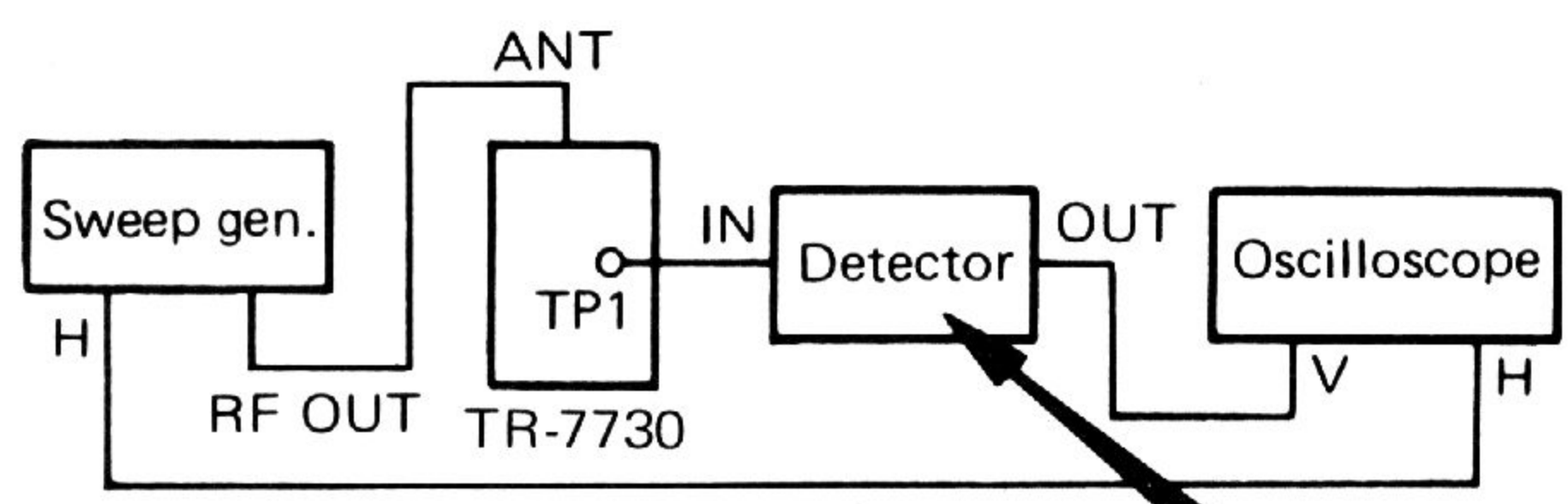
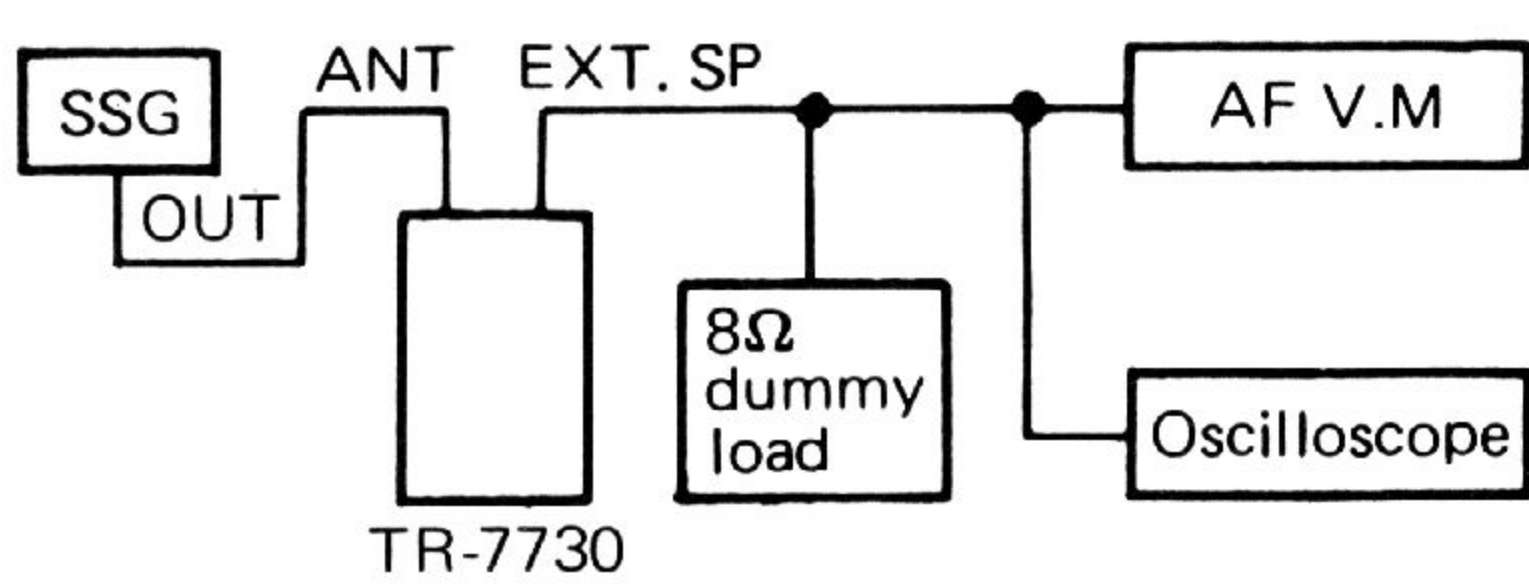
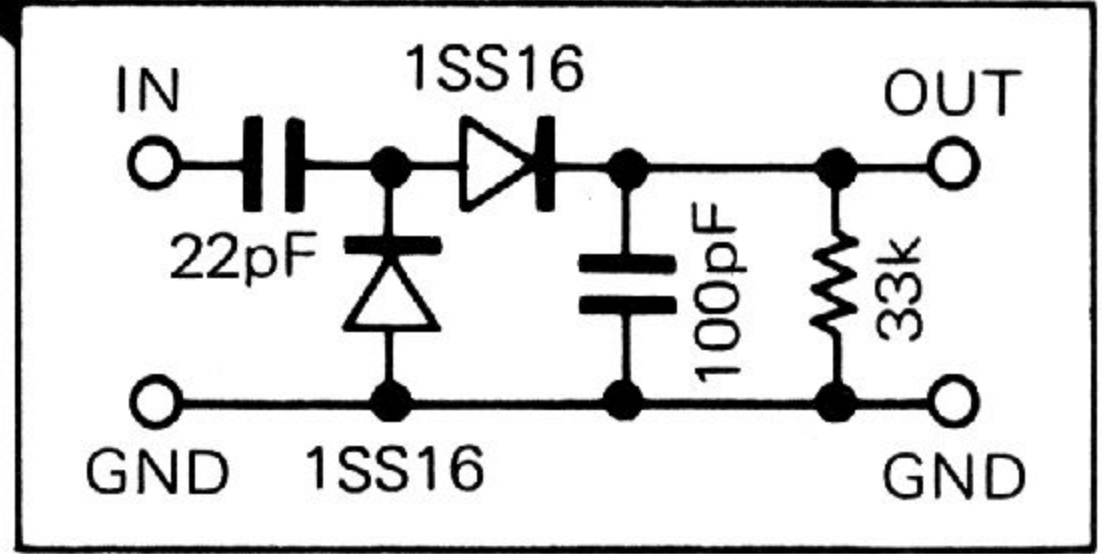
Item	Condition	Measuring point			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method		
1. Voltage check	1) Connect DC power (13.8V) to the radio.	DVM	RX.TX	8C				7.8~8.25V	Verify all voltage levels.
				8R				7.8~8.25V	
				8T				0V	
				ST				13~13.8V	
			Control	Pin 21 of IC1				5.0~5.4V	
				Pin 16 of IC2				5.0~5.4V	
	2) POWER SW : OFF	Control	Pin 21 of IC1	RX.TX	VR4	5.2V	±0.2V		
	3) POWER SW : ON Transmit.	RX.TX	8T				9.3~9.7V	Verify voltages.	
8R						0.5V or less			
4) Return to receive.									

### PLL ADJUSTMENT

Item	Condition	Measuring point			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method		
1. PLL (1)	1) Remove the PLL shield. f : 147.000 MHz Disconnect the coax. connector J2 from the RX. TX unit.	Oscilloscope	PLL	R51 (Emitter of Q9)	PLL	L7, 10	Adjust for square wave.		
									2)
2. PLL (2)	1) f : 144.000 MHz Receive. --- Transmit. ---	f counter	PLL	TP4	PLL	L14	133.3000 MHz	±100 Hz	
						L13	144.0000 MHz		
	2) f : 144.005 MHz Receive. --- Transmit. ---					TC4	133.3050 MHz	±100 Hz	
	3) f : 144.000 MHz Receive. --- Transmit. ---					TC3	134.0050 MHz	±100 Hz	
	L14	133.3000 MHz							
		L13	144.0000 MHz						
3. Lock voltage	1) f : 144.000 MHz Receive. --- Transmit. ---	DVM	PLL	TP1	PLL	TC1	1.9V	±0.01V	
						TC2	2.0V		
	2) f : 148.990 MHz Receive. --- Transmit. ---							7V or less	Check
								6V or less	
4. Unlock voltage	1) Ground TP1 on the PLL unit. f : 145.000 MHz	DVM	PLL	ULB				Approx. 8V	Check 0.4V or less at locked state.
	2) Disconnect ground from TP1.								
5. Lock voltage check	1) Replace the PLL shield.	DVM	PLL	TP1	PLL	TC1	1.7V	±0.3V	
6. Frequency adjustment	1) f : 144.000 MHz Transmit. --- Receive. ---	f counter	PLL	TP4	PLL	L14	144.0000 MHz	±100 Hz	
						L13	133.3000 MHz		

## ADJUSTMENT

### RECEIVER ADJUSTMENT

Item	Condition	Measuring point			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method		
1. Helical resonator	1) Disconnect the LR coax. connector J4 from the RX. TX unit. Connect the sweep generator output to the ANT terminal. 2) Reconnect the LR coax. connector on the RX. TX unit.		RX.TX	TP1	RX.TX	L5, 6	Adjust L5 and 6 to obtain the waveform shown at right.	144.00MHz 148.990MHz 146.00MHz 	
									
2. Sensitivity	1) Connect a 100μA S meter to the M terminal on the RX. TX unit. Connect an AF V.M, oscilloscope and an 8Ω load to the EXT.SP terminal. Connect an SSG (MOD : 1 kHz, DEV : 5 kHz) to the ANT terminal.								
									
	2) f : 145.000 MHz	RF V.M	RX.TX	TP2	RX.TX	L20 PLL L5	MAX	(0.7V)	
	3) SQ VOL : Min. Receive the SSG signal.	External S meter	RX.TX	M	RX.TX	L7, 8	MAX		
	4) SSG output level : 40 dBμ	AF V.M, Oscilloscope	Rear panel	EXT. SP	RX.TX	L11	MAX		
3. S meter	1) SSG output level : 15 dBμ Disconnect the external S meter from the M terminal.	S-indicator			RX.TX	VR1	Adjust VR1 so that the LED "8" indicator is lit.		
4. Squelch	1) SSG output level : -10 dBμ Fine tune the SSG frequency so that the SSG signal is received at maximum strength.								
	2) f : 145.020 MHz Turn the squelch control until noise is gated.	BUSY-indicator Squelch control setting						Must go off. 9 o'clock to 12 o'clock	Check
	3) f : 145.000 MHz	BUSY-indicator						Must be lit when the SSG signal is again received.	Check
	4) SQUELCH VR : Min.								
5. Sensitivity measurement	1) SSG output level : -6 dBμ f : 145.000 MHz AF gain control setting : 0.63V/8Ω Fine tune the SSG frequency to obtain the maximum AF V.M reading.	AF V.M			< REFERENCE > Japanese "SG"    American "SG" -6dB            0.25μV 0dB             0.5μV 6dB             1μV 12dB            2μV 24dB            8μV 30dB            15.8μV 40dB            50μV 50dB            158μV 60dB            500μV 70dB            1.58mV 80dB            5mV 90dB            15.8mV 100dB           50mV 120dB           0.5V			S/N 20 dB or more	Check

## ADJUSTMENT

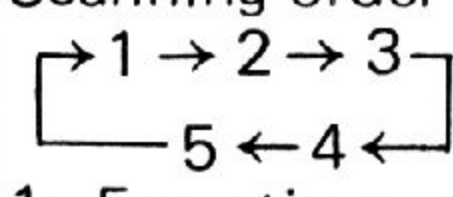
### TRANSMITTER ADJUSTMENT

Item	Condition	Measuring point			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Part	Method		
1. Setting	Connect the power meter to the ANT terminal. f : 146.000 MHz RX.TX unit, TC1 : centered RX.TX unit, VR6 : fully clockwise								
2. Power and RF indicator adjustment	1) Transmit.	DC A.M, Power meter			RX.TX	L2 TC1	} MAX	30W or more	
	2) HI/LOW : LOW				RX.TX	VR6		29W	
	3) HI/LOW : HI				RX.TX	VR5	5W		
	4) RF indicator at high power	RF indicator			Final	VR1	Set VR1 so that LED "10" is lit.		
	5) HI/LOW : HI	Power meter			RX.TX	VR6	29W		
	6) RF indicator at low power	RF indicator						At least one of the LEDs should light.	Check
3. Protection	1) HI/LOW SW : HI	DVM	RX.TX	PRO	Final	VR2	Min.	(0.4V or less)	
	2) Disconnect the power meter from the ANT terminal.	DC A.M			RX.TX	VR7	1.5A	±0.1A	Adjust as quickly as possible.
4. Power check	1) Adjust the power supply voltage to 13.8V. Connect the power meter to the ANT terminal. f : 144.000MHz 146.000 148.990	Power meter, DC A.M						25W or more 5.5A or less	Check
	2) HI/LOW SW : LOW	Power meter, DC A.M						0.8~1.5W 1.2A or less	
5. Modulation	1) HI/LOW SW : HI Connect the AG (20mV, 1 kHz) to the MIC terminal.	Linear detector			RX.TX	VR3	5 kHz deviation	±0.3 kHz	
	2) AG output level : 2 mV, 1 kHz	Linear detector			RX.TX	VR2	3.5 kHz deviation	±0.3 kHz	
	3) Check for abnormal oscillation by varying the power supply voltage from 11.5V to 16V at any frequency.							There should be no abnormal oscillation.	
	4) Return to receive.								



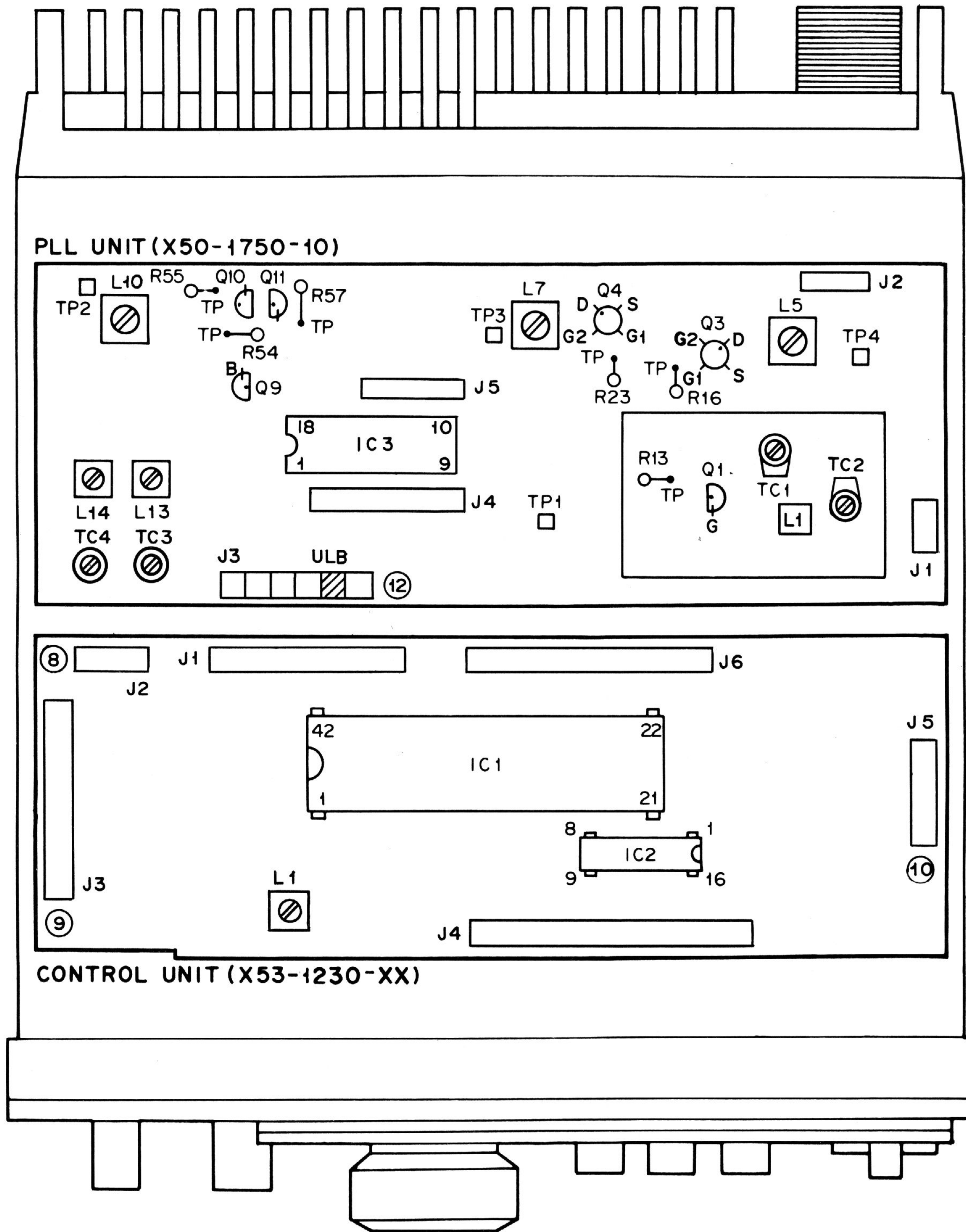
## ADJUSTMENT

## MICROPROCESSOR OPERATION CHECK

Item	Control functions	Microprocessor functions	Remarks
1.	1) Disconnect DC power. Reconnect after waiting 20 sec.	5.000 is displayed.	Reset operation check
2. Main dial	1) Turn the main dial.	Indication changes in 5 kHz increments.	
	2) 5K/10K SW : 10K, Turn the main dial.	Indication changes in 10 kHz increments.	
3. UP/DOWN	1) Press the UP or DOWN switch once. 2) 5K/10K SW : 5K	When pressed, the frequency indication increases or decreases in 5 kHz increments.	The frequency indication changes in 10 kHz steps with 5K/10 kHz SW at 10K.
	2) Press and hold the UP or DOWN switch.	The frequency indication increases or decreases continuously.	
	3) Press the UP and DOWN switch simultaneously.	The frequency does not change.	
4. Memory entry	1) M.CH switch : 1~5 M.R switch : ON	4.000 is displayed.	
	2) M.R switch : OFF M.S switch : ON	4.000 is displayed.	
	3) M.S switch : OFF M.CH switch : 1~5 M switch : ON	Pressing the M switch causes the displayed frequency to be stored in the selected memory corresponding to the M.CH switch setting.	
	4) M.CH switch : 5 Set the main dial in a position different from that set during step (3). Set in transmit mode and then press the M switch.	The displayed frequency is stored in the transmit frequency memory of memory 5.	In memory channel 5, the transmitting frequency is different from the receiving frequency.
	5) Return to receive.		
5. Memory recall	1) M.CH switch : 1~5 M.R switch : ON	Each frequency stored during step 4. (3) is displayed.	
	2) Turn the main dial.	The frequency displayed does not vary.	M.R operation has priority.
	3) UP/DOWN switch : ON		
	4) M.S switch : ON		
	5) SCAN switch : ON		
	6) M.S switch : OFF		
	7) M.CH switch : 5 Set in transmit.	The frequency stored during step 4. (4) is displayed.	
	8) Return to receive. M.R switch : OFF		
6. SCAN	1) Squelch control : Max SCAN switch : ON	The frequency increases in increments of 5 kHz.	
	2) Press and hold the SCAN switch.	Scan speed becomes faster.	
	3) Squelch control : Min.	BUSY indicator is lit and scan stops.	
	4) Squelch control : Max	Scan resumes.	
	5) Set in transmit.	Scan stops.	
	6) Set in receive. SCAN switch : ON		
	7) HOLD switch : ON	Scan stops.	
	8) SCAN switch : ON		
7. Memory scan	1) M.S switch : ON	Frequencies stored in the memory during step 4. (3) are scanned.	Memory scan has priority.
	2) Squelch control : Min.	BUSY indicator is lit and scan stops.	Scanning order  1~5 continuous.
	3) Squelch control : Max	Scan resumes.	
	4) Set in transmit.	Scan stops.	
	5) Return to receive. SCAN switch : ON	Scan resumes.	
8. Switch priority	1) M.R : ON	Memory reading	Priority 1st
	2) M.S : ON	Memory scan	2nd
	3) SCAN, HOLD : ON	Scanning operation	3rd
	4) UP DOWN : ON	UP/DOWN operation	4th
	5) Main dial		5th
	6) M : ON	Memory entry	6th

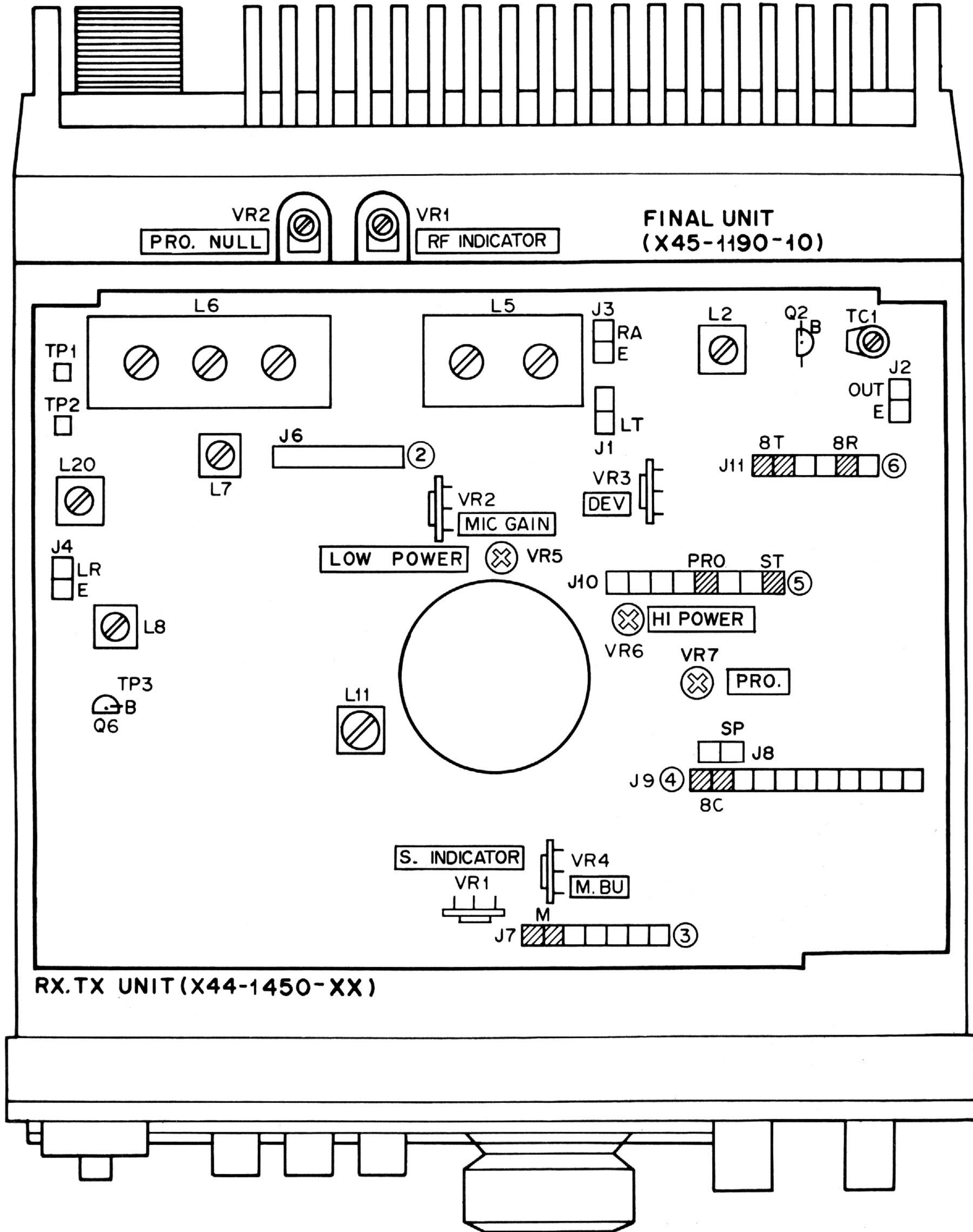
## ADJUSTMENT

TOP VIEW

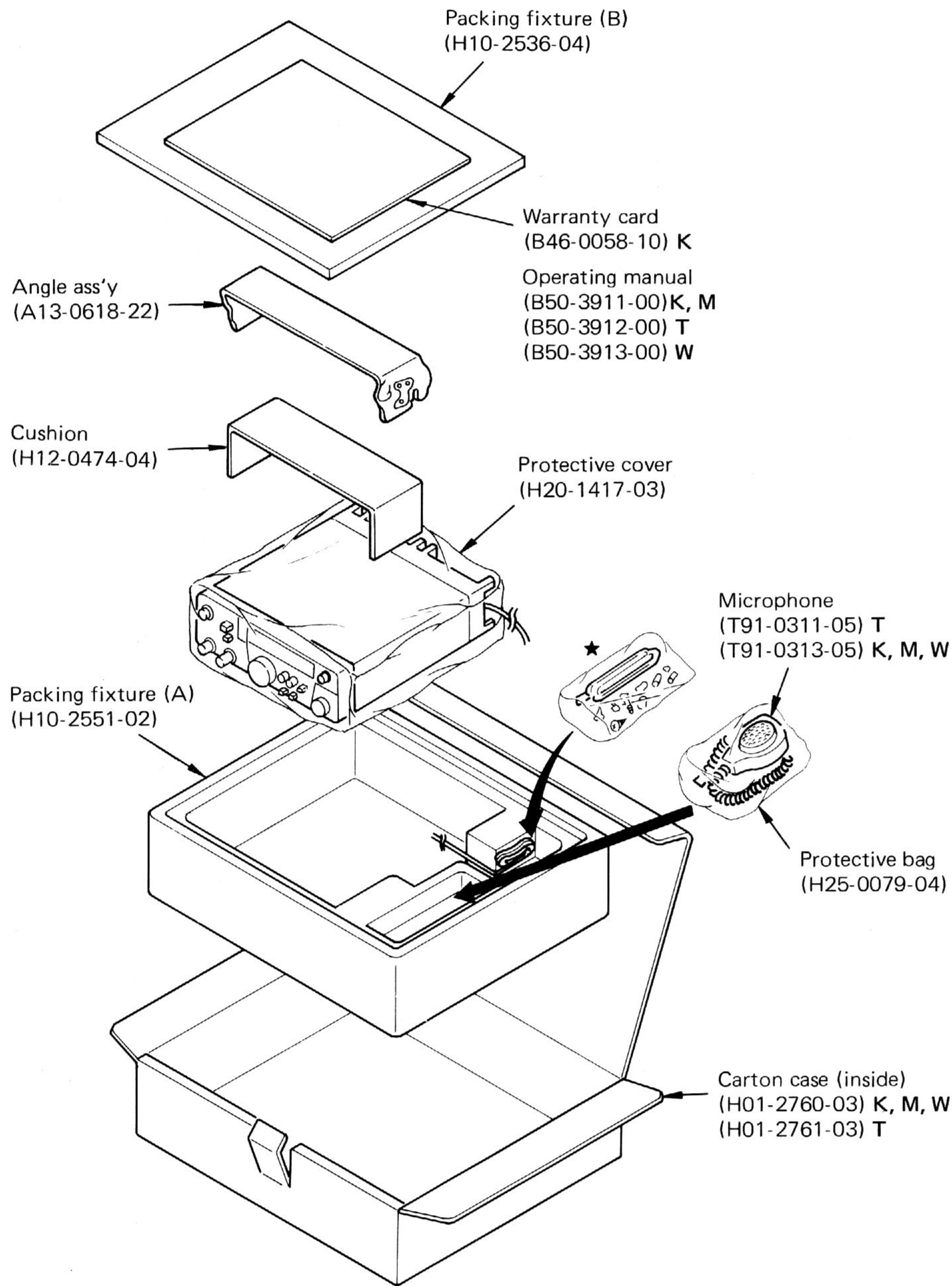


# ADJUSTMENT

BOTTOM VIEW

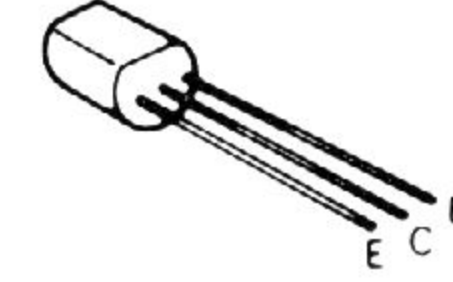


## PACKING

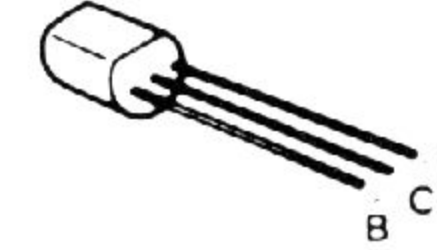


- ★ Protective bag (H25-0103-04)
- Phone plug (E12-0001-05)
- DC cord (C) (E30-1689-05)
- Fuse 6A (F05-6021-05)
- Foot x 2 (J02-0022-05) (Rear)
- Foot (J02-0420-04) (Front)
- Foot mounting hardware x 2 (J21-2676-04)
- Protective bag (H25-0029-04)
- Boss x 4 (J32-0748-04)
- Bind screw x 4 (N35-3012-45)
- Accessory bag (H25-0049-03)
- Round screw x 4 (N09-0008-04)
- Flange nut x 4 (N14-0510-04)
- Flat washer x 4 (N15-1060-46)
- Spring washer x 4 (N16-0060-46)
- Bind screw x 6 (N35-3006-45)

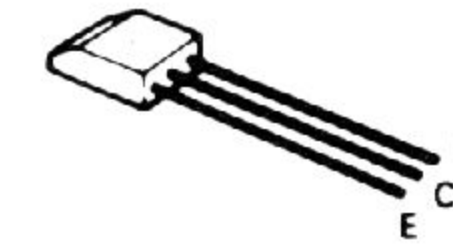
2SA1015  
2SC1775  
2SC1815  
2SC1923  
2SC1959  
2SC2240



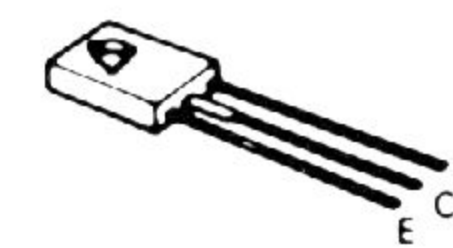
2SC2538



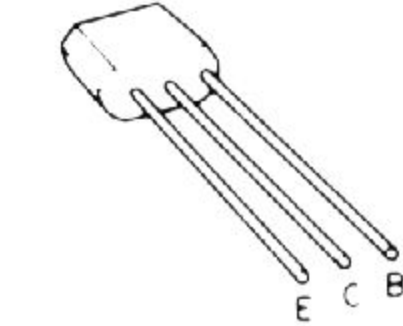
2SC458  
2SC460



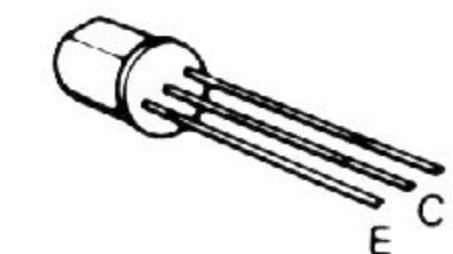
2SC496



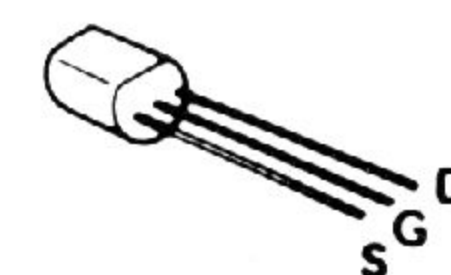
2SA1115  
2SC2603



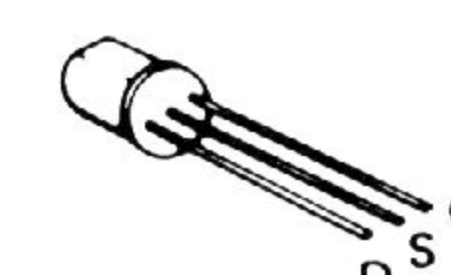
2SA562-TM



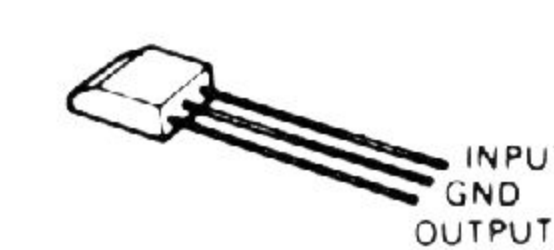
2SK30A



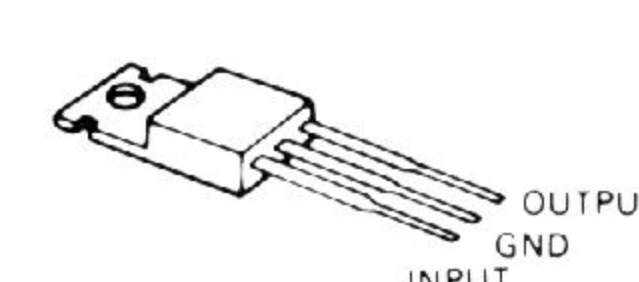
2SK19



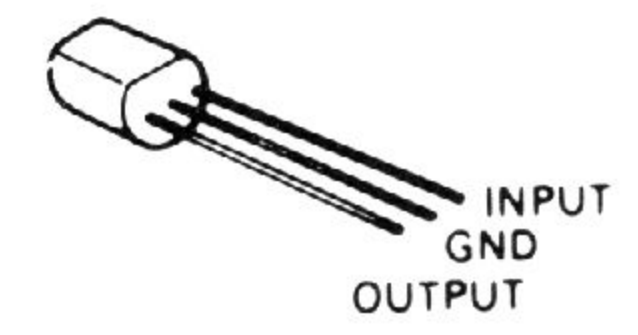
μPC78L08A



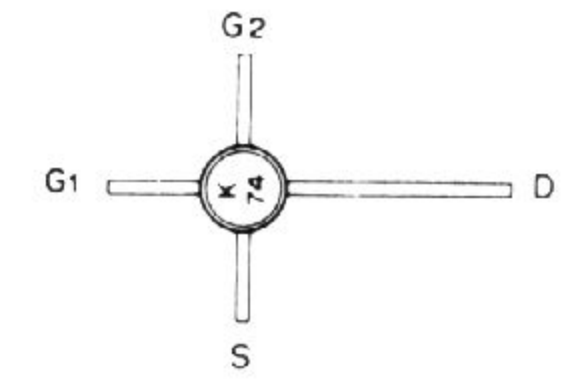
μPC78M08H



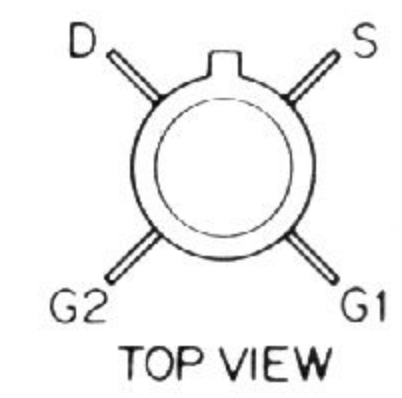
NJM78L06K



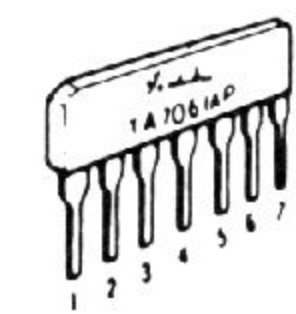
3SK74



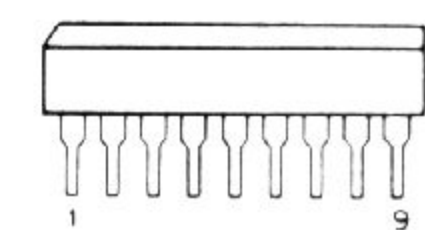
3SK76  
3SK92



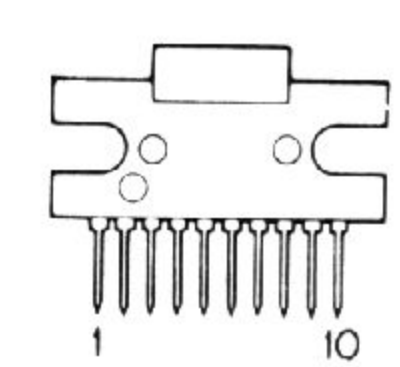
TC5081P  
TC5082P-GL



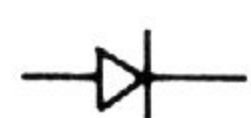
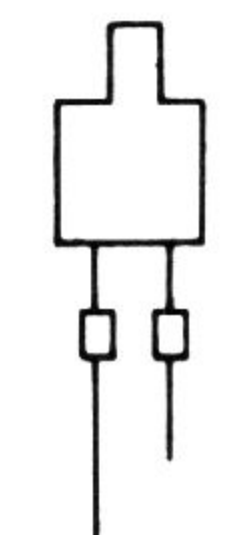
TA7061AP  
TA7302P



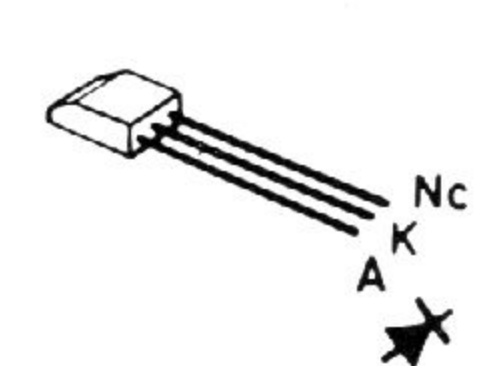
HA1366W



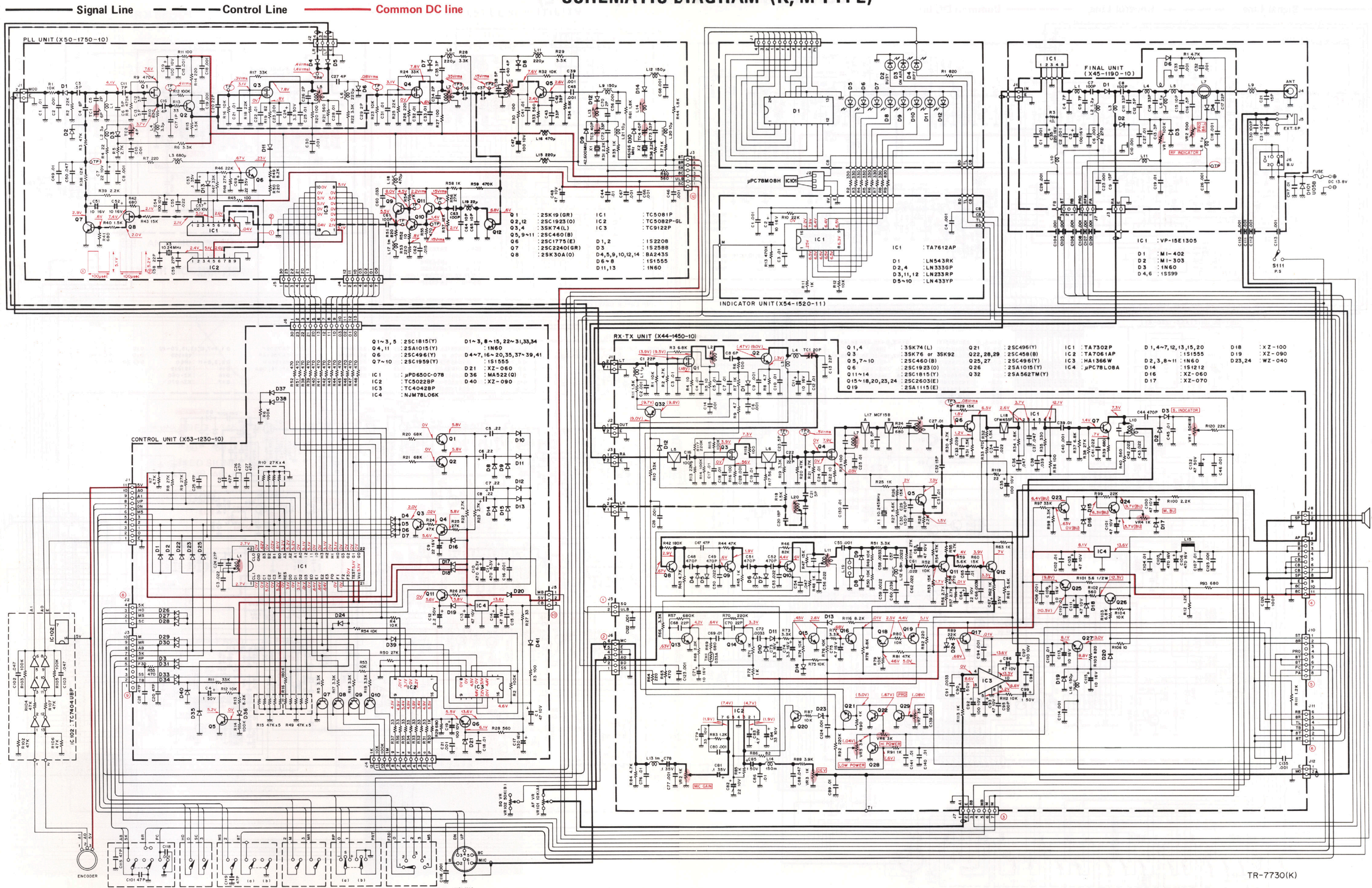
LN233RP  
LN333GP  
LN433YP



MA522



# SCHEMATIC DIAGRAM (K, M TYPE)

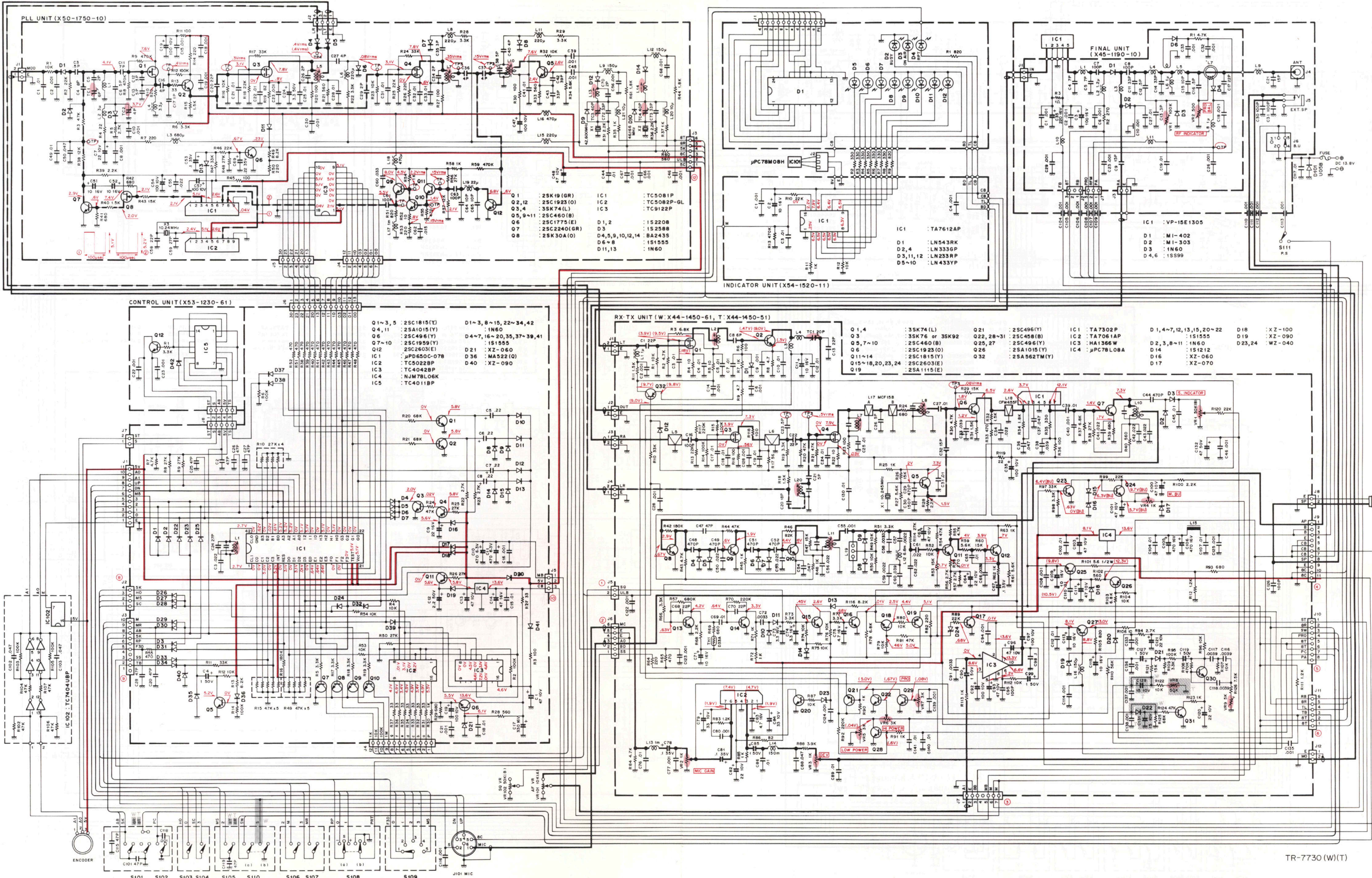


Voltage measurement conditions f = 145.00MHz, RX no signal, DC 13.8V, ( ) : TX

TR-7730(K)

# SCHEMATIC DIAGRAM (T, W TYPE)

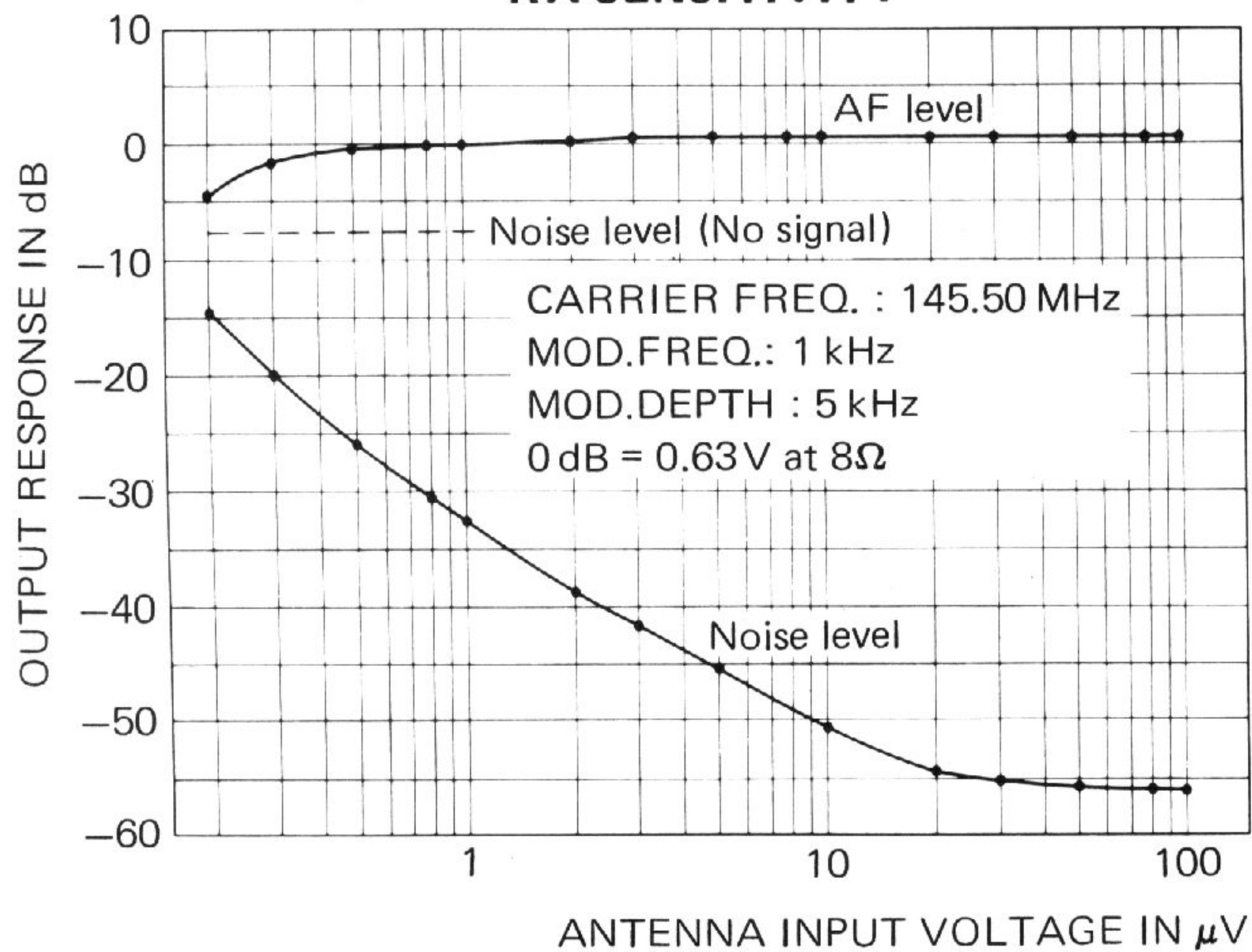
Signal Line    - - - - - Control Line    ——— Common DC line



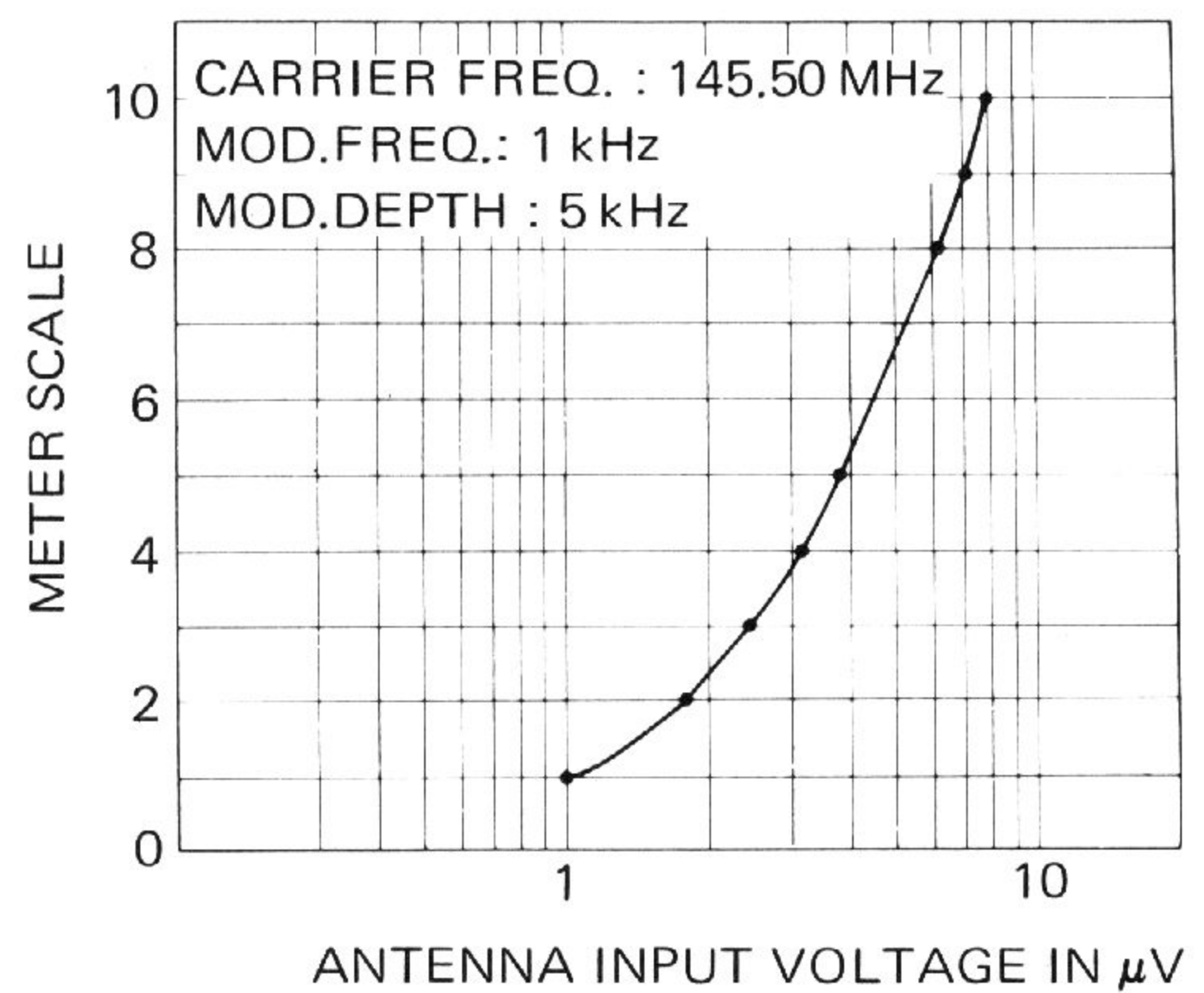
TR-7730 (W)(T)

Voltage measurement conditions  $f = 145.00\text{MHz}$ , RX no signal, DC 13.8V, ( ) : TX

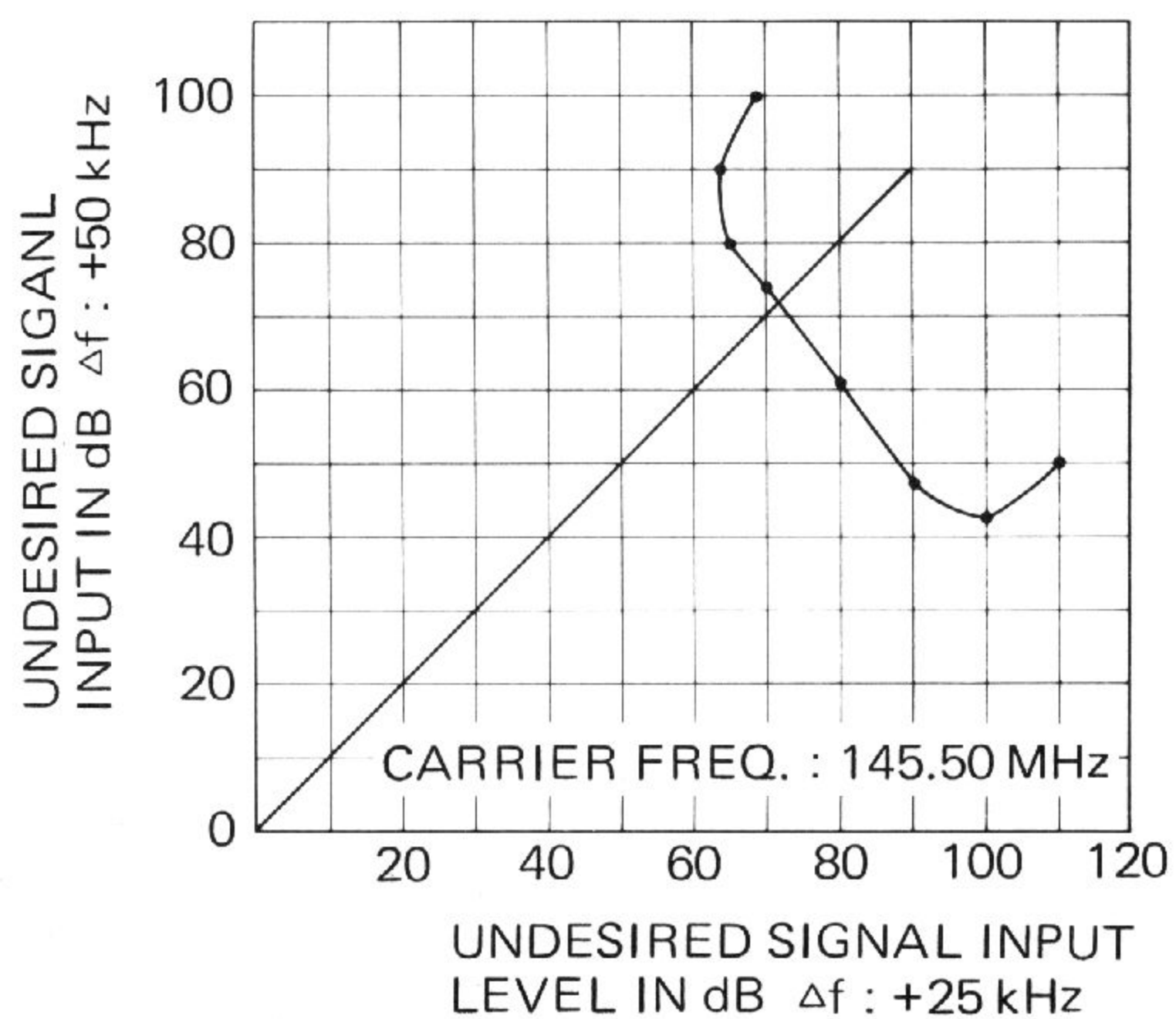
## RX SENSITIVITY



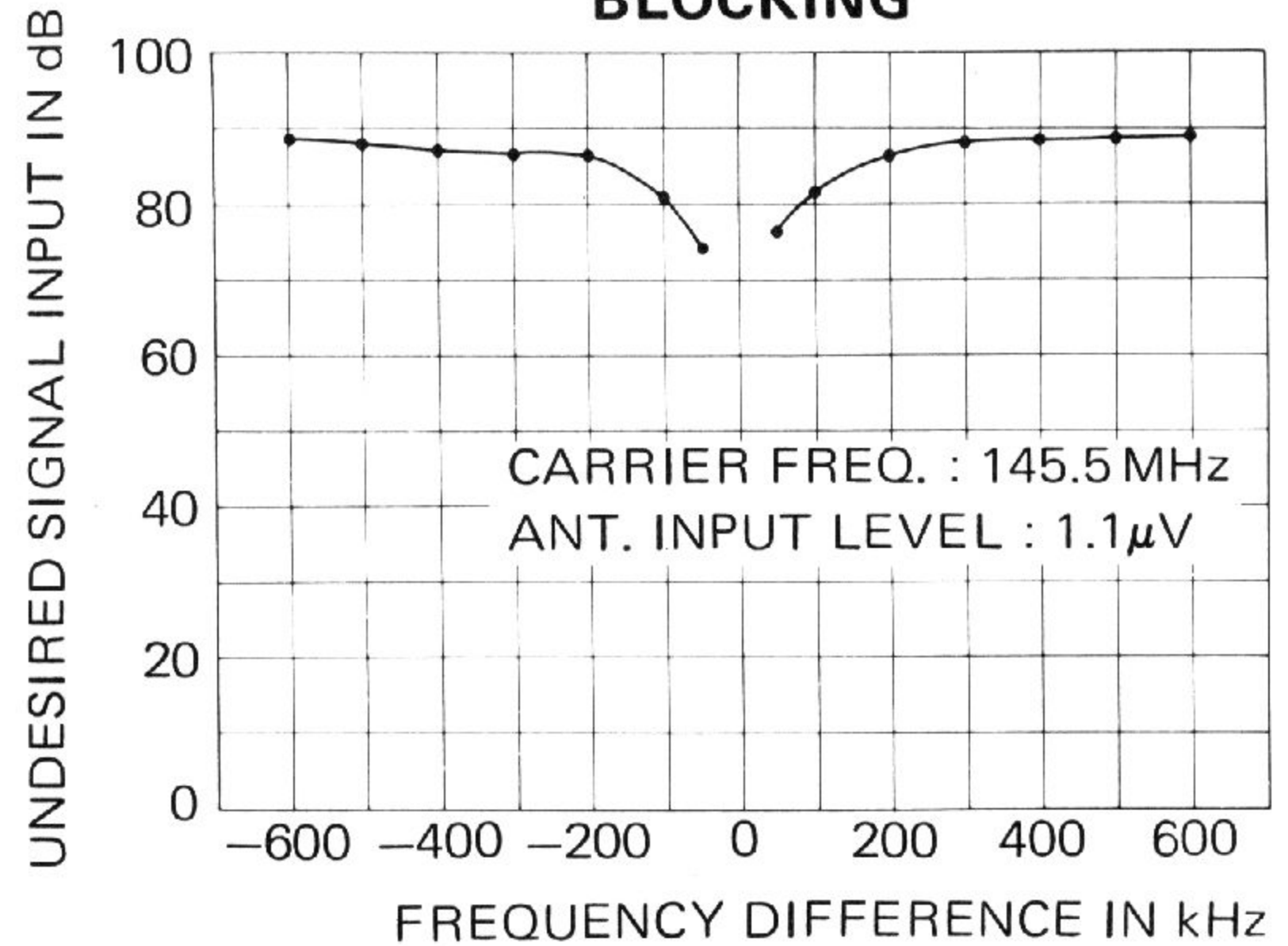
## S LEVEL SENSITIVITY



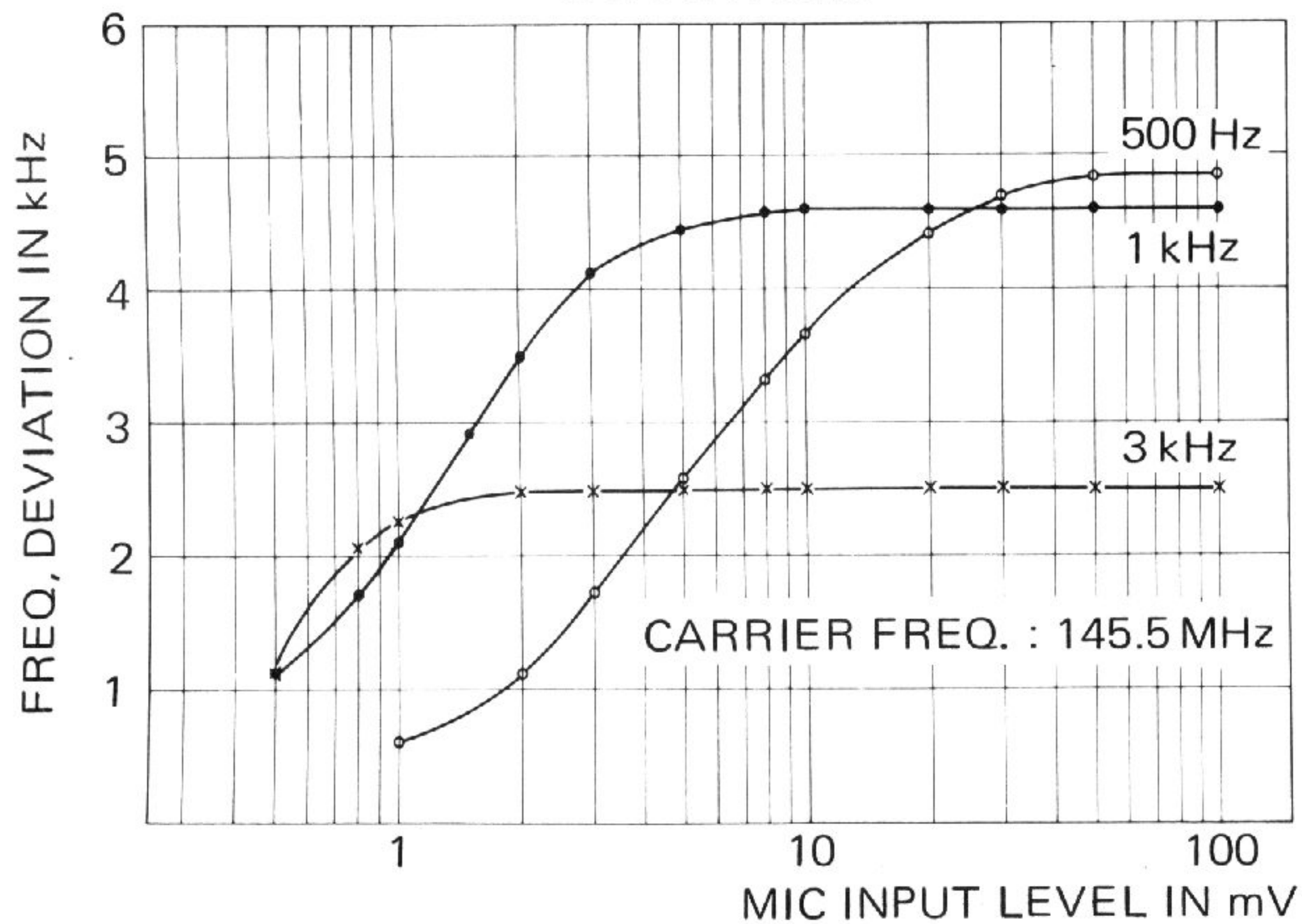
## INTER MODULATION



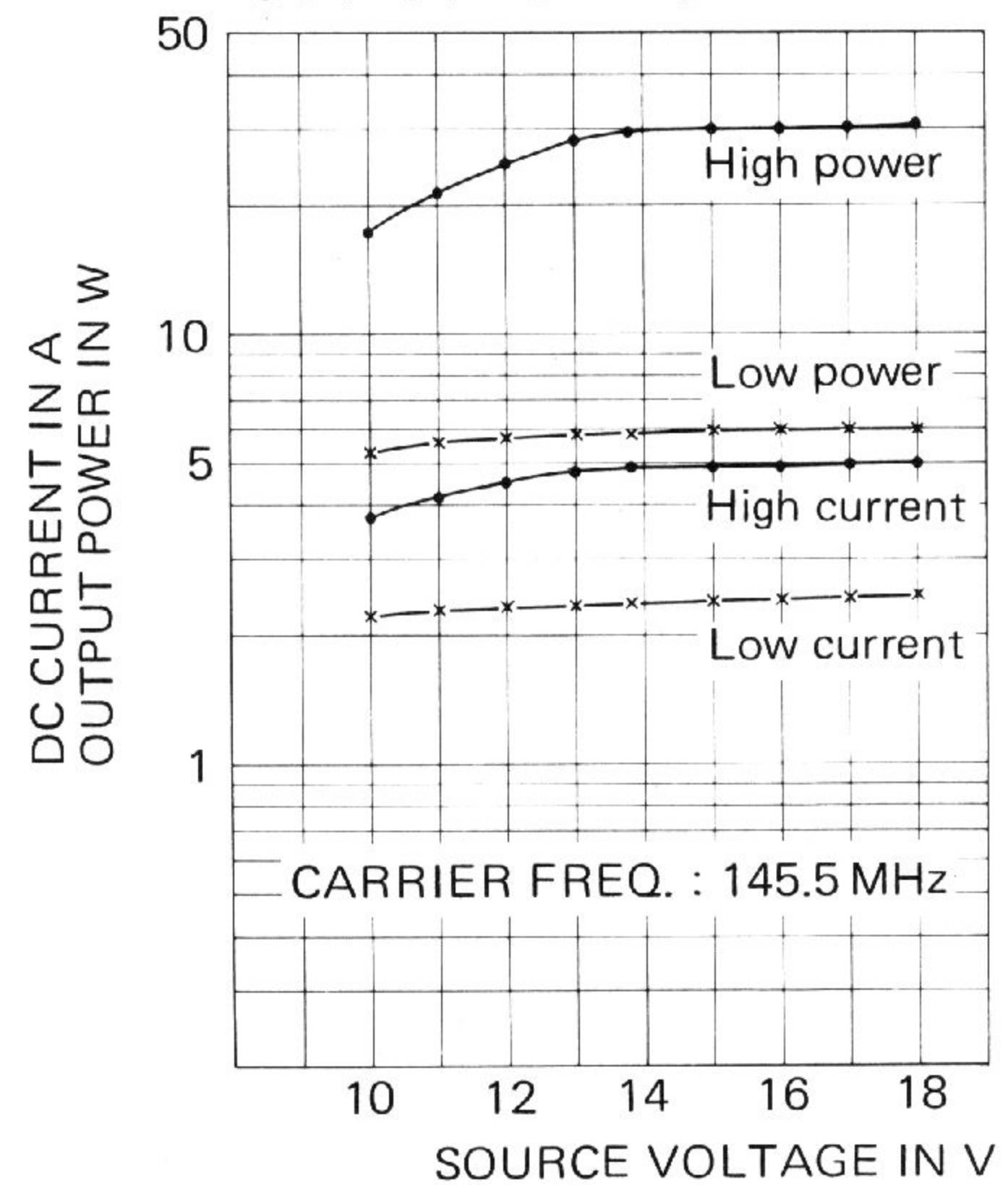
## BLOCKING



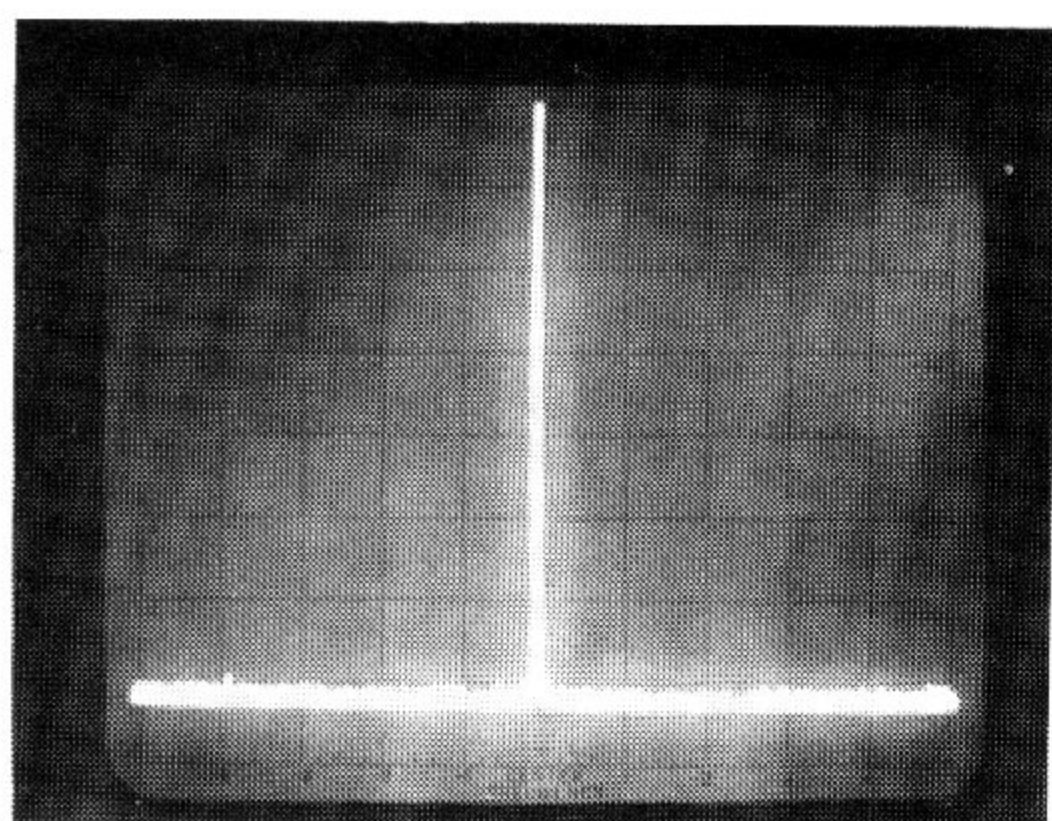
## DEVIATION



## OUTPUT POWER/CURRENT



## Near spurious response



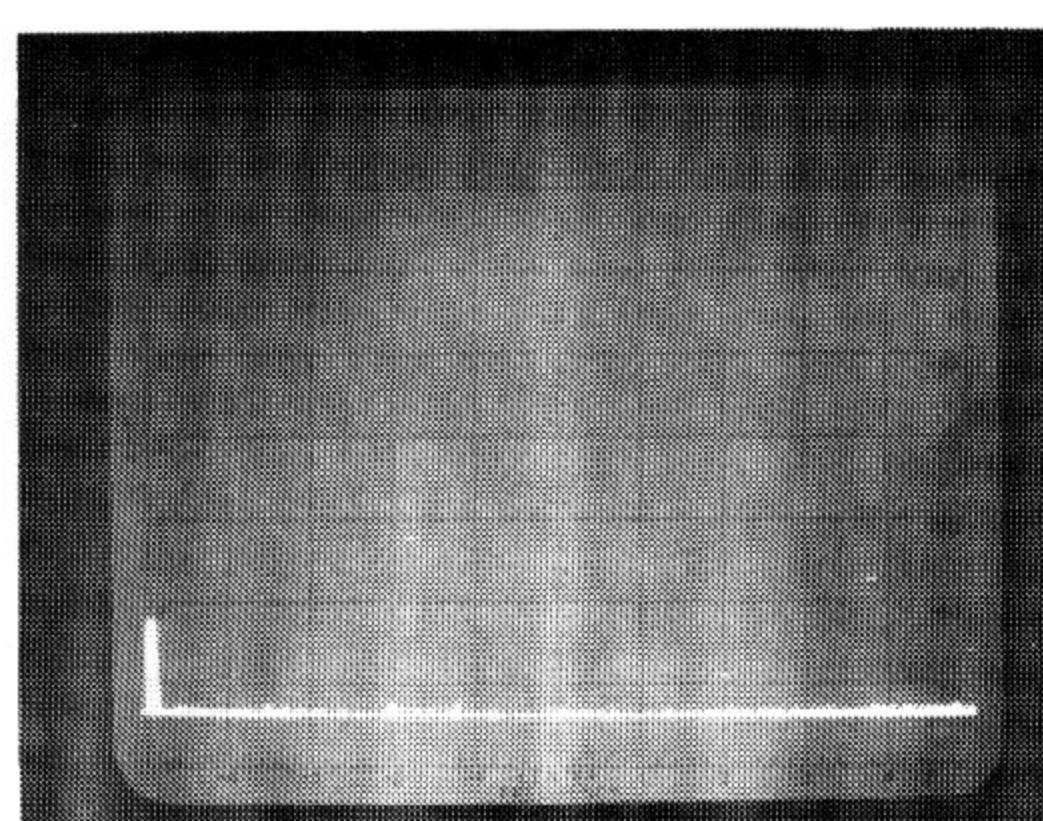
135.5 MHz

145.5 MHz Fundamental

155.5 MHz

CARRIER FREQ. : 145.50 MHz  
RF POWER : 28W  
SCAN WIDTH : 5 MHz/DIV  
BAND WIDTH : 30 kHz  
SCAN TIME : 0.1 sec  
VIDEO FILTER : 10 kHz  
INPUT ATT. : 20 dB  
LOG REF LEVEL : -1 dBm  
10 dB/DIV

## Harmonics spurious response



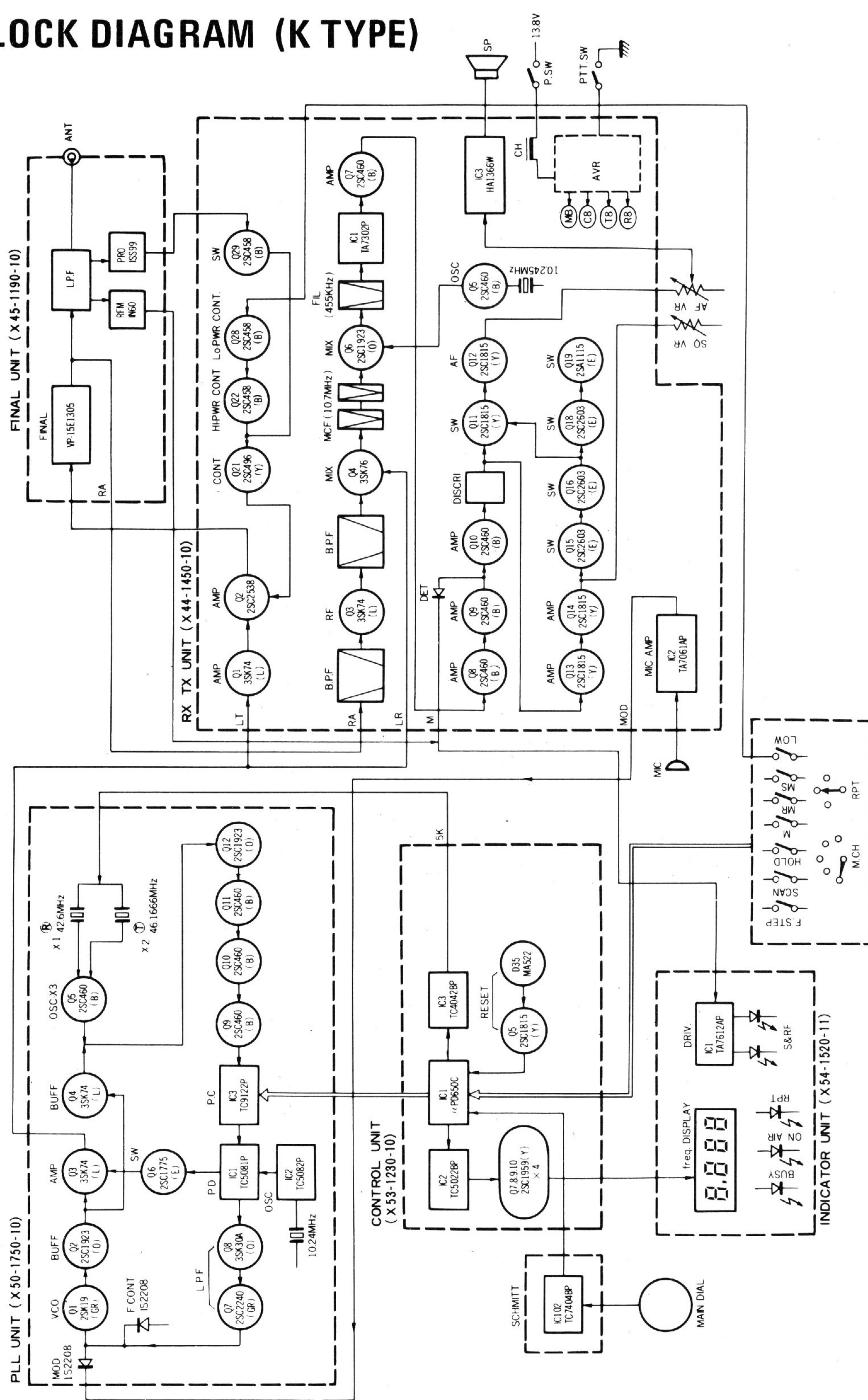
145.5 MHz Fundamental

645.5 MHz

CARRIER FREQ. : 145.5 MHz  
RF POWER : 28W  
SCAN WIDTH : 100 MHz/DIV  
BAND WIDTH : 300 kHz  
SCAN TIME : 0.1 sec  
VIDEO FILTER : 10 kHz  
INPUT ATT. : 10 dB  
LOG REF LEVEL : -1 dBm  
10 dB/DIV

\* The fundamental has been reduced in amplitude by the H.P.F.

# TR-7730 BLOCK DIAGRAM (K TYPE)



A product of  
**TRIO-KENWOOD CORPORATION**  
 17-5, 2-chome, Shibuya, Shibuya-ku, Tokyo 150, Japan

**TRIO-KENWOOD COMMUNICATIONS, INC.**

1111, West Walnut Street, Compton, California, 90220, U.S.A.

**TRIO-KENWOOD COMMUNICATIONS, GmbH**

D-6374 Steinbach TS, Industriestrasse 8A, West Germany

**TRIO-KENWOOD(AUSTRALIA)PTY. LTD.**

4E Woodcock Place, Lane Cove N.S.W. Australia 2066