KENWOOD

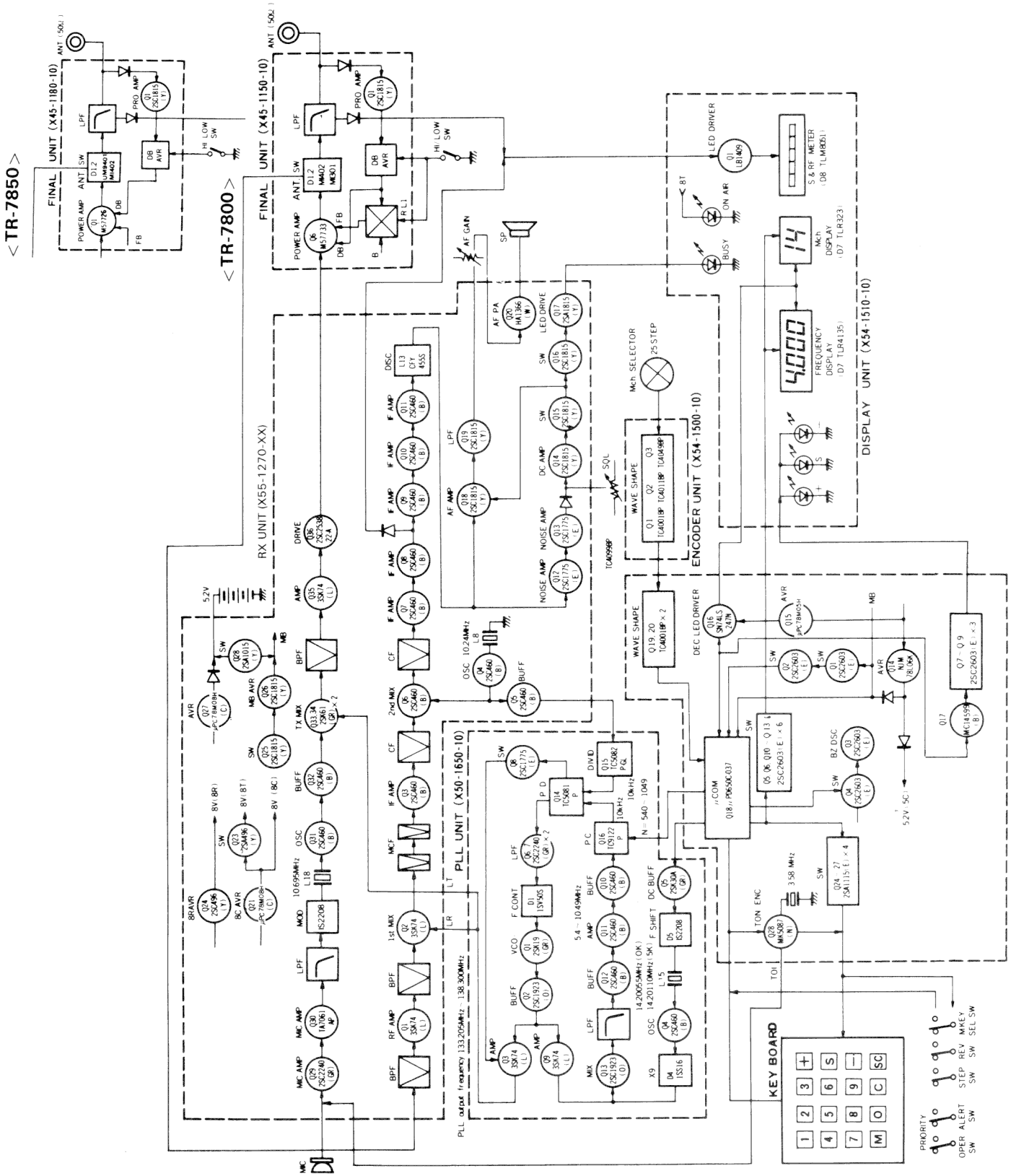
SERVICE MANUAL

Model TR-7800
TR-7850

VHF FM TRANSCEIVER

CONTENTS

BLOCK DIAGRAM (K)



CIRCUIT DESCRIPTION

RX Section (X55-1270-XX)

The RF signal amplified by the front end dual gate MOS FET Q1 is applied through the helical resonator L3 to Q2 to obtain a 10.695 MHz IF signal.

The output of Q2 passes through the 2-element MCF (monolithic crystal filter to provide an excellent 2-signal characteristic. The IF signal amplified by Q3 is applied to Q6 to produce the 455 kHz 2nd IF signal. This signal is then amplified by Q7-11 and is applied to the ceramic discriminator L13. The output from Q8 (455 kHz amplifier) is fed to the LED level meter for an S meter signal.

The squelch circuit, composed of Q12-15, controls the AF circuit Q18. The busy lamp drive signal and scan busy stop signal (SS) are produced by Q16 and 17 and fed to the busy lamp circuit on the display unit and the scan circuit on the control unit.

The AF signal is amplified by Q18. This is fed to the power amplifier Q20 through the active LPF (low pass filter) Q19 and the AF gain control.

Item	Symbol	Condition (Ta=25°C)	Rating			Unit
			MIN	TYP	MAX	
DC current with no input	Iq	Vin = 0	–	30.0	60.0	mA
Gain in voltage	Gv	Vin = −50 dB	50.0	52.5	55.0	dB
Output power	Po	THD = 10%	4.5	5.5	–	W
Distortion	THD	Po = 0.5W	–	–	1.5	%
Noise level	WBN	Rg = 10 kΩ, BW=20 Hz ~ 20 kHz	–	–	2.0	mV
Hum ratio	HR	f = 500 Hz	28.0	–	–	dB
Voltage allowance with a shorted load		f = 500 Hz Vin = 10 mV, t = 5 sec.	16.0	–	–	V

Rank	1	2	3
Gv (dB)	50.0 ~ 52.2	51.4 ~ 53.6	52.8 ~ 55.0

Table 1. HA1366W (RX Unit: Q20)

Item	Rating
Nominal center frequency (fo)	10.695 MHz
Pass bandwidth	±7.5 kHz or more at 3 dB
Attenuation bandwidth	±25 kHz or less at 40 dB ±45 kHz or less at 60 dB
Guaranteed attenuation	1. 70 dB or more within ±1 MHz 2. Spurious level = 40 dB or more at fo ~ fo + 500 kHz 3. Spurious level = 80 dB or more at fo − (910 kHz ±10 kHz)
Ripple Loss	1.0 dB or less 1.5 dB or less
Impedance	3 kΩ/0 pF

Table 2. MCF (L71-0216-05) (RX Unit : XF1)

Item	Rating
Nominal center frequency	A: 10.7 MHz (RED) B: 10.67 MHz (BLUE) C: 10.73 MHz (ORANGE) D: 10.64 MHz (BLACK) E: 10.76 MHz (WHITE) } ±30 kHz
3 dB bandwidth	280±50 kHz
20 dB bandwidth	650 kHz or less
Ripple	0.5 dB or less
Loss	6 dB or less
Spurious response	30 dB or more at 9 ~ 12 MHz
Input and output impedance	330Ω

Table 3 Ceramic filter (L72-0014-05) SFE10.7MA5 (RX unit: L7)

Item	Rating
Nominal center frequency	455 kHz±1 kHz
6 dB bandwidth	±6 kHz or more
50 dB bandwidth	±12.5 kHz or less
Ripple (within 455 ±4 kHz)	3 dB or less
Loss	6 dB or less
Guaranteed attenuation (within 455±100 kHz)	35 dB or more
Input and output impedance	2.0 kΩ

Table 4. Ceramic filter (L72-0315-05) CFW455F (RX Unit: L10)

TX Section (X55-1270-XX, X45-1150-10) <TR-7800>

The microphone and Touch Tone signals are amplified by Q29 and fed to the FM modulator vari-cap diode D20 through the MIC amplifier Q30 and splatter filter to produce an FM signal. The 10.695 MHz signal from the oscillator circuit Q31 is applied to the transmit balanced mixer (Q33, Q34) via buffer amplifier Q32. The 144 MHz signal obtained from the balanced mixer is fed through the 4-stage BPF (with voltage variable tuning) to eliminate unwanted spurious components.

This signal is then amplified by Q35 and 36 to drive the final unit. Both Q36 and the Final unit are powered by the DB Line, which also functions at low power and during protection. The DB circuit is a 12.4V AVR (Automatic Voltage Regulator) circuit using Q2-5 and D5.

The signal to the Final unit is power amplified by the power hybrid Q6. It passes through the transmit/receive antenna switch diodes D1, D2, harmonics are eliminated by LPF (Low Pass Filter), and the signal is then applied to the ANT terminal.

The protection circuit is an automatic reset VSWR detector. DB voltage is dropped by driving Q1 with the reflected output component. Low power control is effected by RL1, which switches the power hybrid FB terminal over to the DB line. Power is reduced to 5W by controlling the DB line with VR4.

CIRCUIT DESCRIPTION

MAX Rating M57733

Item	Symbol	Tc (°C)	Rating
Operating voltage	Vcc	25	17V
DC current	Icc	25	6A
Operating case temperature	Tc (op)	—	−30 ~ +110°C
Storage temperature	Tstg	—	−40 ~ +110°C
Base bias voltage	VBB	25	10V

MAX Rating M57726

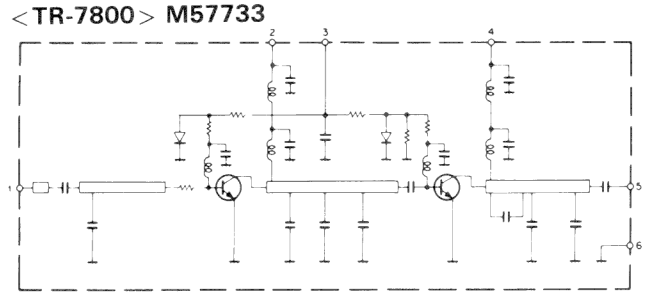
Item	Symbol	Tc (°C)	Rating
Operating voltage	Vcc	25	17V
DC current	Icc	25	14A
Operating case temp.	Tc (op)		−30 ~ +110°C
Storage temp.	Tstg		−40 ~ +110°C

Electrical characteristic M57726

Item	Symbol	Tc (°C)	Condition	Value	
				Min.	Typ.
Power output	P_o	25	Vcc = 12.5V, F = 144 ~ 148 MHz, PIN = 0.4W, ZL = ZG = 50Ω	43W	47W
Total efficiency	η_T	25	Vcc = 12.5V, F = 144 ~ 148 MHz, PIN = 0.4W, ZL = ZG = 50Ω	50%	54%

Table 5. Power modules MAX Rating and Electrical characteristic

<TR-7800> M57733



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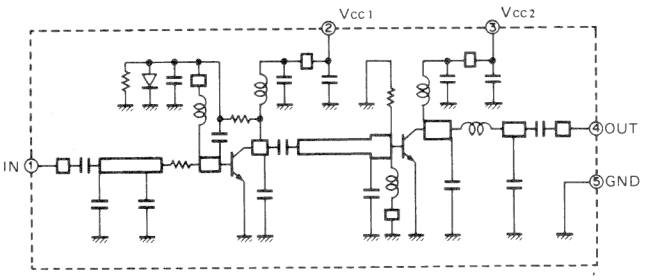


Fig. 1 Power modules Equivalent Circuit

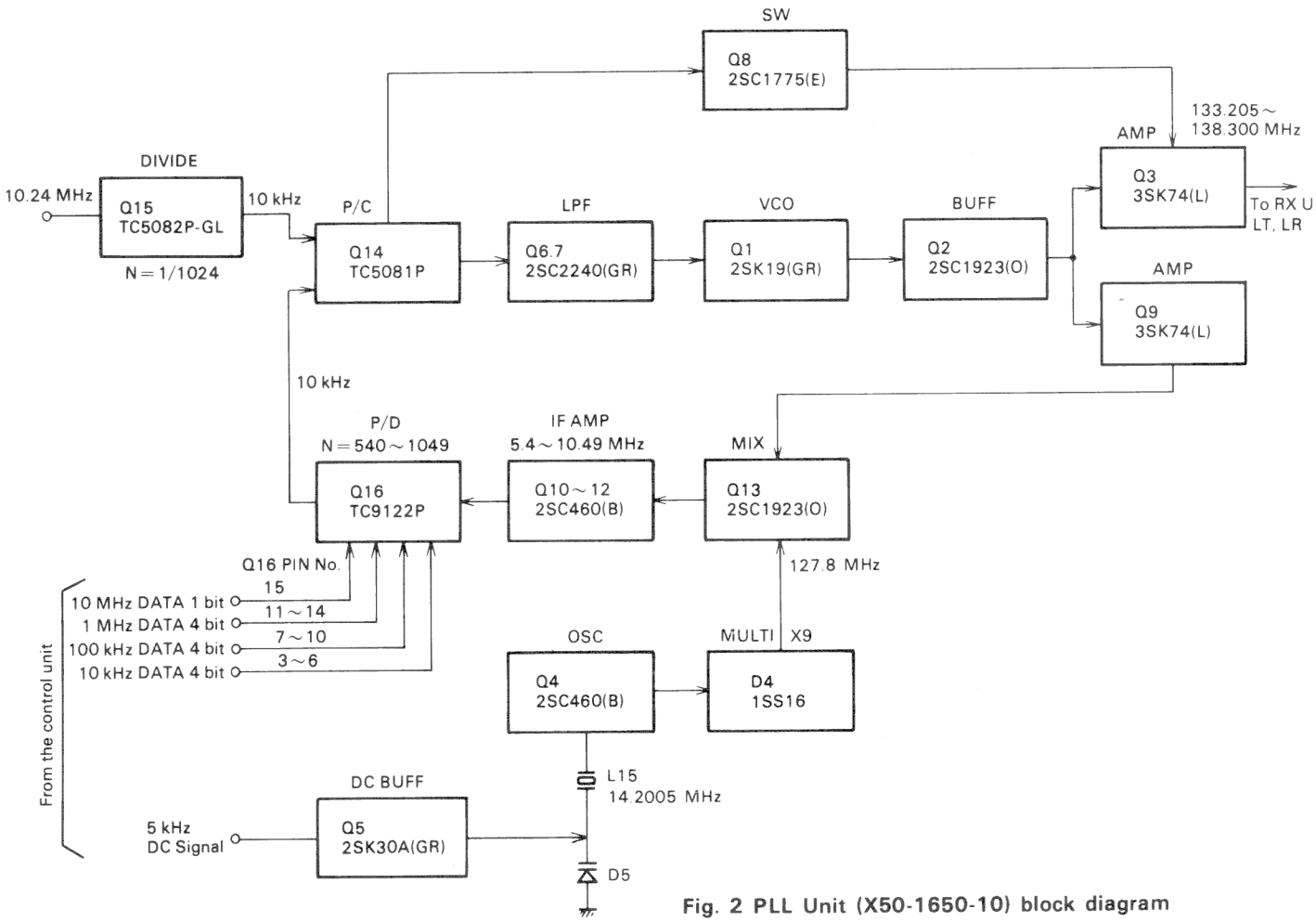


Fig. 2 PLL Unit (X50-1650-10) block diagram

CIRCUIT DESCRIPTION

S Meter Circuit (X54-1510-10)

The digital S meter circuit uses ICs and LEDs to indicate input signal strength.

When the receive signal is about 0 dBμ, the first LED will light. Refer to S meter sensitivity on page 32 for the signal level at which each LED lights. When the signal level is about 20-30 dB, all LEDs will light. In the transmit mode, 5 LEDs will light at "Hi" power, and 1 ~ 4 LEDs at "Low" power.

Backup Circuit (X55-1270-XX)

1. Backup, power cord connected.
   When the power cable is connected to the vehicles battery, 13.8V is available at the BB terminal even at Power switch OFF, this AVR circuit (Q26, D16 and D17) supplies 5.2V to the MB terminal.
   When the Power switch is ON, Q26 is turned OFF by Q25 and memory power is available directly from the control unit.
2. Backup, power cable disconnected.
   With Ni-Cd cells installed in the battery case, Q28 is turned ON, and 5.2V is fed from the BT line through Q28 to the MB line. When the Power switch is ON, the 8V AVR circuit is activated by Q27 and the Ni-Cd's are charged through R94 and D19.
3. Backup Hold Time.
   1) During engine start-up, voltage at the battery terminal drops. C6 and C7 in the control unit afford about 1.5 sec of backup time.
   2) When the Ni-Cd batterie's are fully charged, the backup hold time is about 1 week max. And normally about 5 days.
   3) If backup greater than 1 week is required, 13.8V DC ±20% should be applied through the Ext. Backup terminal.

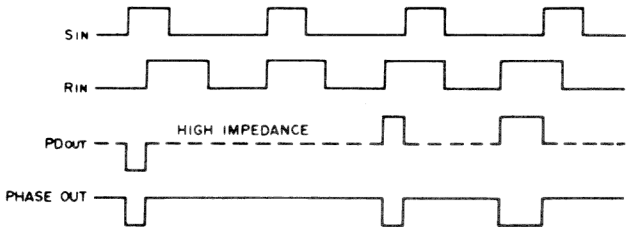


Fig. 3 TC5081P (PLL Unit : Q14)
Phase comparator timing chart

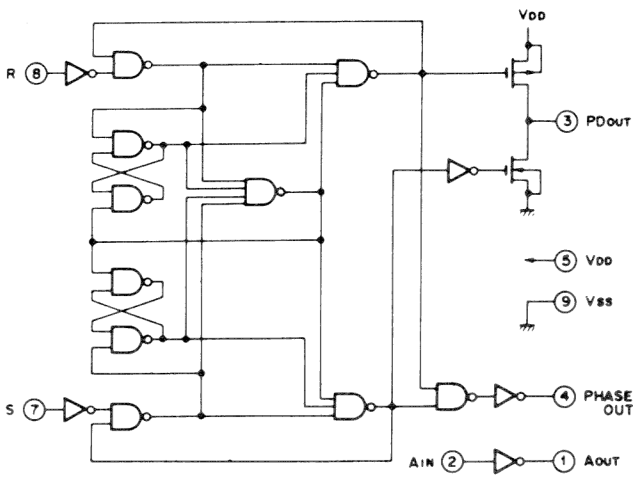


Fig. 4 TC5081P (PLL Unit : Q14)

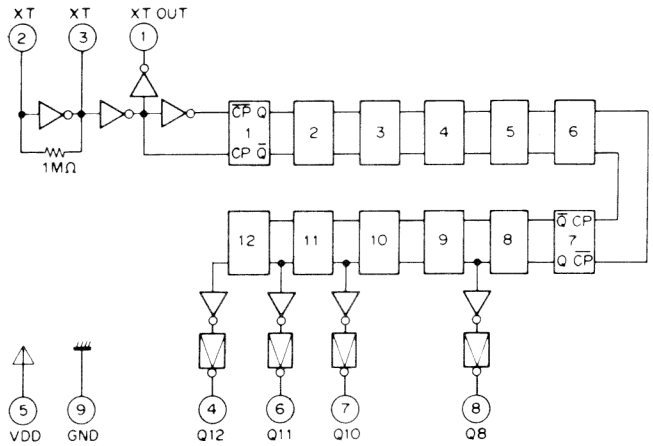


Fig. 5 TC5082P-GL (PLL UNIT: Q15)

PIN NO	8	7	6	4	1
PIN NAME	Q_8	Q_{10}	Q_{11}	Q_{12}	XT_{out}
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

Table 6. TC5082P-GL (PLL Unit: Q15)

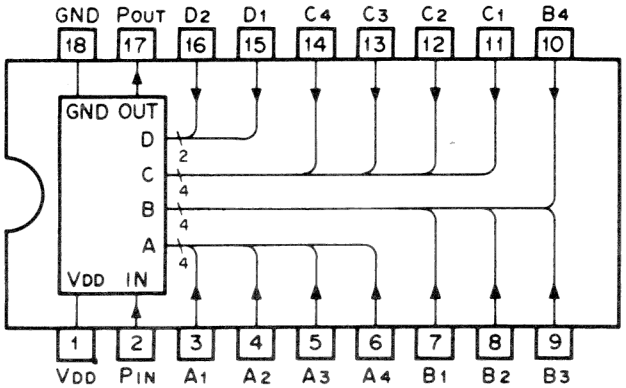


Fig. 6 TC9122P (PLL Unit : Q16)

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	
$A_1 \sim A_4$ $B_1 \sim B_4$ $C_1 \sim C_4$ $D_1 \sim D_4$	× 1 × 10 × 100 × 1000 Program input terminals	Terminal to set the dividing ratio. The following input combination is prohibited. A_1 A_2 A_3 A_4 B_1 B_2 B_3 B_4 C_1 C_2 C_3 C_4 D_1 D_2 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	Built-in pull-down resistor

Table 7. Functions of TC 9122P (PLL Unit : Q16)

CIRCUIT DESCRIPTION

Table. 8 Micro-Processor Functions (μPD650C-037 Control Unit, Q18)

Terminal No.	Name of terminal	Input signal	Output signal	Description	Pulse
1	CL1			Clock frequency ≒ 400 kHz	
2	PC0	○		Normal: L Transmit: H	
3	PC1	○		Squelch open: H Squelch OFF: L	
4	PC2		○	PO, PA, MR, ST common output CH display: 10-digit signal	○
5	PC3		○	Rev., TX OFFSET, 600/700 common output CH display: 1-digit signal	
6	$\overline{INT}$	○		Normal: H	
7	RES	○		Normal: L	
8	PD0		○	Display BCD output A: Latch address output A0	○
9	PD1		○	Display BCD output B: Latch address output A1	○
10	PD2		○	Display BCD output C: Latch address output A2	○
11	PD3		○	Display BCD output D: Latch data output D	○
12	PE0		○	Frequency display, 1 kHz digit: CL, 0, MW touch tone R4	○
13	PE1		○	Frequency display, 10 kHz digit: 7, 8, 9 touch tone R3	○
14	PE2		○	Frequency display, 100 kHz digit: 4, 5, 6 touch tone R2	○
15	PE3		○	Frequency display, 1 MHz digit: 1, 2, 3 scan touch tone R2	○
16	PF0		○	PLL data output, 10 kHz digit: L at 146.000	
17	PF1		○	PLL data output, 10 kHz digit: L at 146.000	
18	PF2		○	PLL data output, 10 kHz digit: L at 146.000	
19	PF3		○	PLL data output, 10 kHz digit: L at 146.000	
20	TEST			Power supply, 5V	
21	VCC			Power supply, 5V	
22	PG0		○	PLL data output, 100 kHz digit: H at 146.000	
23	PG1		○	PLL data output, 100 kHz digit: L at 146.000	
24	PG2		○	PLL data output, 100 kHz digit: H at 146.000	
25	PG3		○	PLL data output, 100 kHz digit: L at 146.000	
26	PH0		○	PLL data output, 1 MHz digit: H at 146.000	
27	PH1		○	PLL data output, 1MHz digit: H at 146.000	
28	PH2		○	PLL data output, 1 MHz digit: H at 146.000	
29	PH3		○	PLL data output, 1 MHz digit: L at 146.000	
30	PI0		○	PLL data output, 5 kHz	
31	PI1		○	PLL data output, 10 MHz	
32	PI2		○	Latch timing pulse output	○
33	PA0	○		Rotary encoder UP input	○
34	PA1	○		Rotary encoder DOWN input	○
35	PA2	○		MIC UP input; UP at L, Stops when both are L	
36	PA3	○		MIC DOWN input; DOWN at L, Stops when both are L	
37	PB0	○		700 at H of 600/700 selector, C3 5 kHz at H of step selector, C2 Scan input E3 Destination E0 1 0 1, 0 E1 1 1 0, 0 K X W	
38	PB1	○		Reverse input C3, MW input E0: MR input C2 7E1, 4E2, 1E3, touch tone B1	
39	PB2	○		⊖ shift input C3: P.O input, C2 0E0, 8E1, 5E2, 2E3: Touch tone B2	
40	PB3	○		⊕ shift input C3, touch tone B3: P.A input C2 CL, E0, 9E1, 6E2, 3E3: Simplex input C3 (common to B2)	
41	VSS			Earth (Ground)	
42	CL			Clock frequency ≒ 400 kHz	

PLL Unit (X50-1650-10)

Fig. 2 shows a basic block diagram of the PLL circuit. The VCO signal from Q1 is buffered by Q2 and amplified by Q9. It is then mixed with the heterodyne signal by Q13 to produce a 5.4 — 10.49 MHz signal.

This signal is filtered and then amplified by Q12-10, and then frequency divided by Q16 according to the binary data (10 MHz, 1 MHz, 100 kHz and 10 kHz order) from the control unit to obtain a 10 kHz step signal.

The 10.24 MHz signal from the RX unit is frequency divided 1/1024 by Q15 to a 10 kHz reference signal is then phase detected by Q14. This signal, through low pass filters Q6 and Q7, is applied via the CV line to the vari-cap diodes D21-24 in the RX unit as a control voltage. In the VCO HET circuit, a 14.2 MHz crystal controlled signal is generated by OSC Q4, and is multiplied 9X by D4 to obtain 127.8 MHz signal, which is applied to the mixer Q13.

Vari-cap D5 in the crystal oscillator circuit shifts the oscillator frequency +5 kHz through the Q5 source voltage variation, derived from the control unit 5 kHz DC signal.

CIRCUIT DESCRIPTION

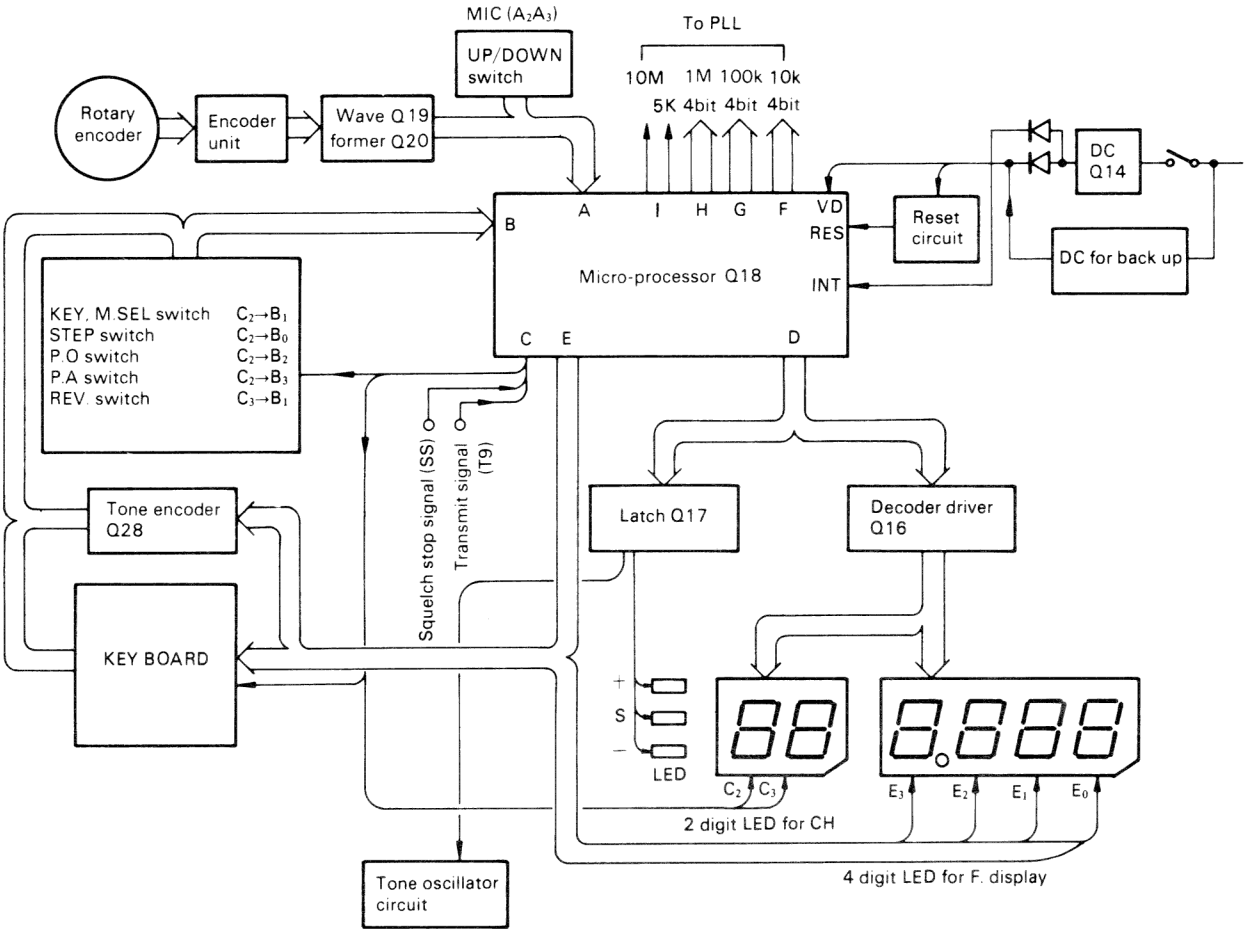


Fig. 7 Control Unit block diagram

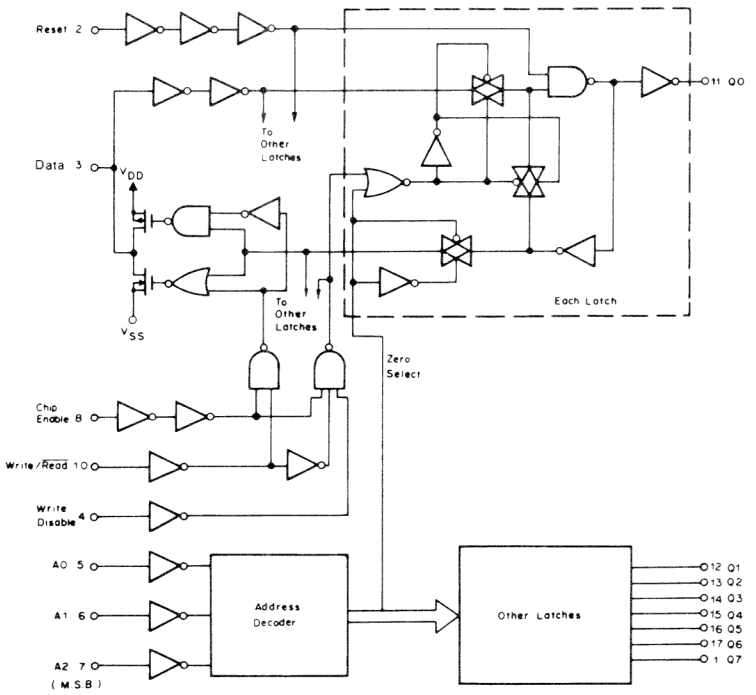


Fig. 8 Function diagram of MC14599B (Control Unit: Q17)

TRUTH TABLE

Chip Enable	Write/ Read	Write Disable	Reset	Addressed Latch	Other Latches	Data Pin
0	×	×	0	•	•	Z
1	1	0	0	Data	•	Input
1	1	1	0	•	•	Z
1	0	×	0	•	•	Qn
×	×	×	1	0	0	Z/0

× = Don't care.
• = No change in state of latch.
Z = High impedance.
Qn = State of addressed latch.

Table 9. Truth table (Control Unit: Q17)

CIRCUIT DESCRIPTION

Table 10. Control Unit Q16 (SN74LS247N) function

DECIMAL OR FUNCTION	INPUTS LT	RBI	D	C	B	A	BI RBO	OUTPUTS a	b	c	d	e	f	g
0	H	H	L	L	L	L	H	ON	ON	ON	ON	ON	ON	OFF
1	H	X	L	L	L	H	H	OFF	ON	ON	OFF	OFF	OFF	OFF
2	H	X	L	L	H	L	H	ON	ON	OFF	ON	ON	OFF	ON
3	H	X	L	L	H	H	H	ON	ON	ON	ON	OFF	OFF	ON
4	H	X	L	H	L	L	H	OFF	ON	ON	OFF	OFF	ON	ON
5	H	X	L	H	L	H	H	ON	OFF	ON	ON	OFF	ON	ON
6	H	X	L	H	H	L	H	ON	OFF	ON	ON	ON	ON	ON
7	H	X	L	H	H	H	H	ON	ON	ON	OFF	OFF	OFF	OFF
8	H	X	H	L	L	L	H	ON	ON	ON	ON	ON	ON	ON
9	H	X	H	L	L	H	H	ON	ON	ON	ON	OFF	ON	ON
10	H	X	H	L	H	L	H	OFF	OFF	OFF	ON	ON	OFF	ON
11	H	X	H	L	H	H	H	OFF	OFF	ON	ON	OFF	OFF	ON
12	H	X	H	H	L	L	H	OFF	ON	OFF	OFF	OFF	ON	ON
13	H	X	H	H	L	H	H	ON	OFF	OFF	ON	OFF	ON	ON
14	H	X	H	H	H	L	H	OFF	OFF	OFF	ON	ON	ON	ON
15	H	X	H	H	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF
BI	X	X	X	X	X	X	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF
RBI	H	L	L	L	L	L	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LT	L	X	X	X	X	X	H	ON	ON	ON	ON	ON	ON	ON

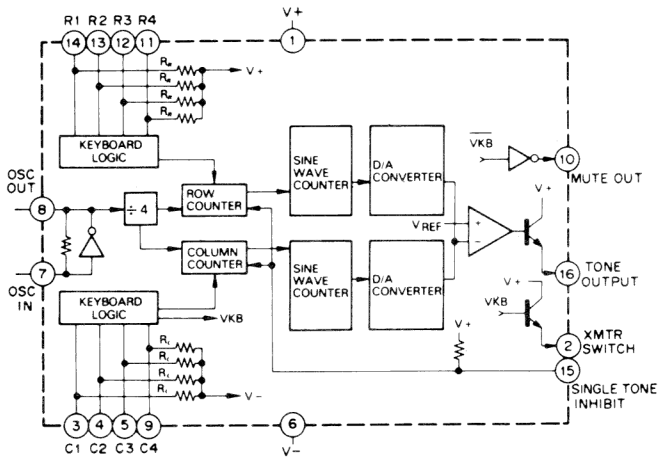


Fig. 9 MK5087 (N) (Control Unit Q28)

Control Unit (X53-1180-10)

The Control unit has an LED dynamic display to indicate frequency in 4 digits and storage channels in 2 digits. The BCD (Binary Coded Decimal) data in the micro-computer D port (pins 8-11) are converted into 7-segment data by the decoder driver Q16. Frequencies are displayed by the E port (pins 12-15), and channels by the C2 and C3 ports (Pins 4, 5), switching Q10-Q13 and Q5-Q6. TX OFFSET is displayed when the dynamic data from the D port is latched by Q17. The display lights in static mode through Q7-Q9.

- PLL Data Output
  The BCD codes for 10k, 100k and MHz are output from the F, G, and H ports (pins 16-19, 22-29) as PLL data output. The Io port is 5k/bit and the I1 port is 10M/bit. The data in the 12-F0 are 0550 for 4000, 0551 for 4010, 0650 for 5000.
- Reset Circuit
  The reset circuit is a voltage detector. When the voltage exceeds about 3.5V, Q1 is ON and Q2 is OFF, thereby applying pulses to Q18 pin 7 through the differentiation circuit C10 and R5 to reset the circuit.
- Tone Oscillator Circuit
  When the latch Q17 pin 17 goes H, Q4 turns ON to activate the tone generator.
- Switch Circuits
  Each switch functions when dynamic pulses from the micro-computer are input. Diodes are used to prevent reverse current flow.
- Power Supply Circuits
  The micro-computer power supply is Q14, a 6V AVR. Diode D3 provides reverse flow protection. Display power is Q15, a 5V AVR.

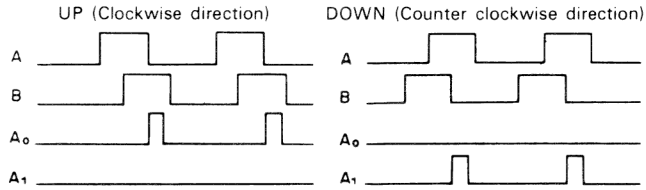


Fig. 10 Encoder input timing chart

- Encoder Input
  The encoder (25 clicks/turn) is a mechanical ON/OFF switch having a phase difference. The encoder circuit, Q19 and Q20 are used to prevent chatter and to shape waveform. A right turn inputs pulses to the Ao port (pin 33), and a left turn to the A1 port (pin 34).
- UP/DOWN
  The micro-computer UP/DOWN inputs A2 (pin 35) and A3 (pin 36) are connected to the microphone switches and are normally H. The UP/DOWN function is effected at L.

Table 11.

	697 Hz	770 Hz	852 Hz
1209 Hz	1	2	3
1336 Hz	4	5	6
1477 Hz	7	8	9
1633 Hz	M *	0	C #

- Tone Encoder Circuit
  In transmit mode, Q28 MK5078N is operated by the 8T (power) line. Q24-Q27 are OFF so the pulse signal from the micro-computer Q18 is cut off. By pressing buttons 1-9, 0, C and M on the key board, the logical level is inverted; Q28 3-5 becomes L and 11-14 becomes H to produce 2-tone output at pin 16. Tone output deviation is adjustable by VR1. Table 11 shows the frequencies of the two signals.
- Backup Circuit
  When the power cable is connected to the power supply or batteries are installed, the CB line is at 0V and the MB line is 5V at the power switch OFF position. Pins 6 and 35 of micro-processor Q18 (μPD650C-037) are switched from H to L, thereby operating the backup circuit. At this time, all terminals of Q18 are set to L except for pins 1, 20, 21, 42. The backup function is reset when pin 35 becomes H.

Encoder Unit (X54-1500-10)

The memory channel selector (25 clicks/turn) is a mechanical ON/OFF switch which phase inverts according to the direction of rotation. It is a Schmidt circuit using Q3 (6 inverter gates) to waveform shape the pulses at terminals EA and ED.

By using Q2 (4 NAND gates) and Q1 (4 NOR gates), the rising and falling portions of the pulse are detected and fed to the terminals A, B, C and D. The signal is applied to Q19 of the control unit to separate the pulse by the rotational direction. The separated pulse width is set to about 3m sec by the one shot circuit Q20 to input the signal to the micro-processor Q18.

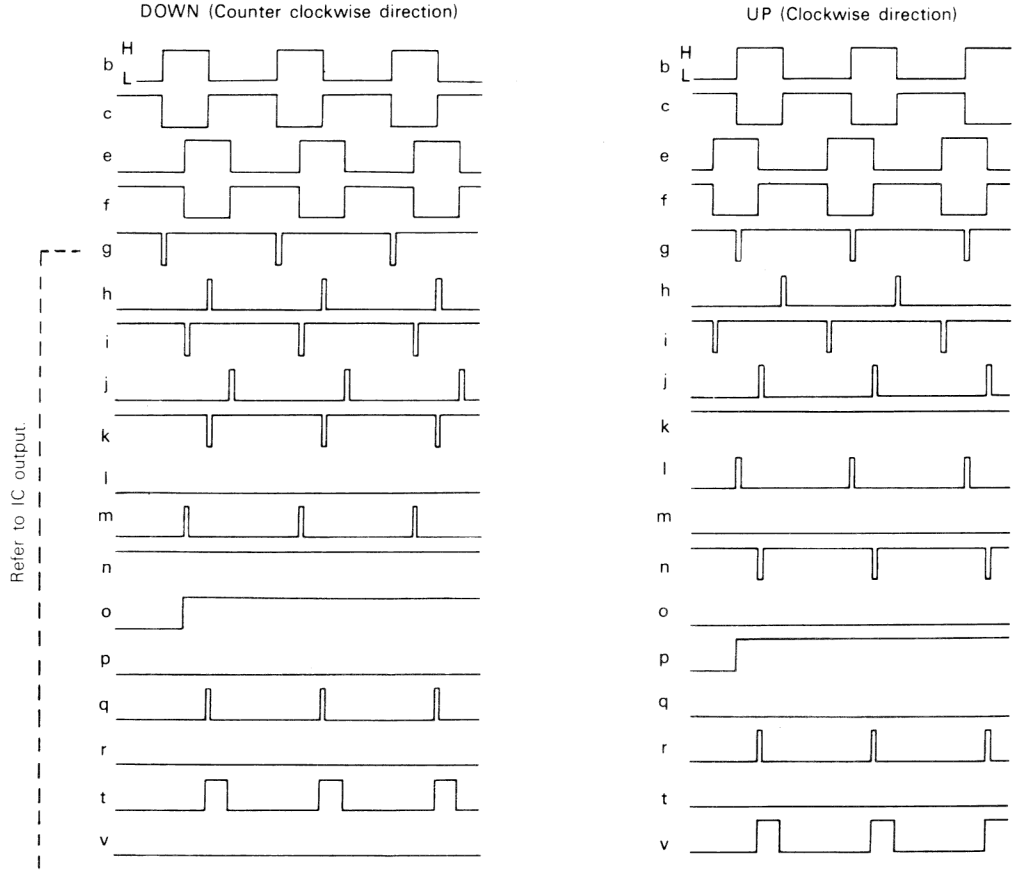


Fig. 11 Encoder Unit timing chart

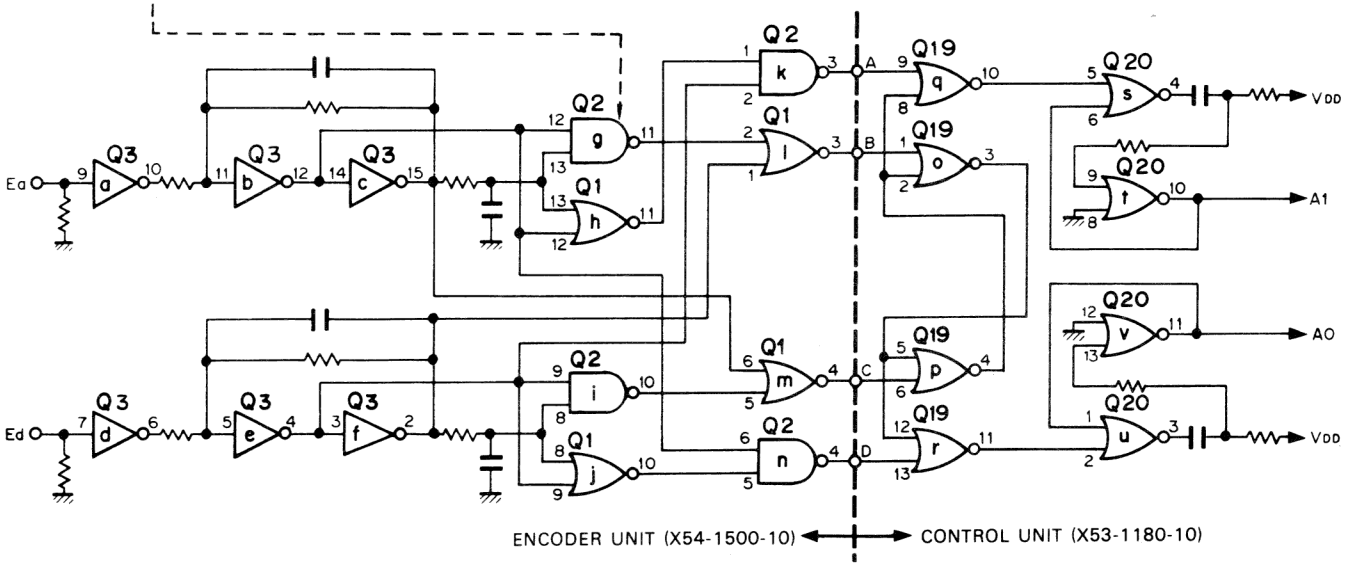
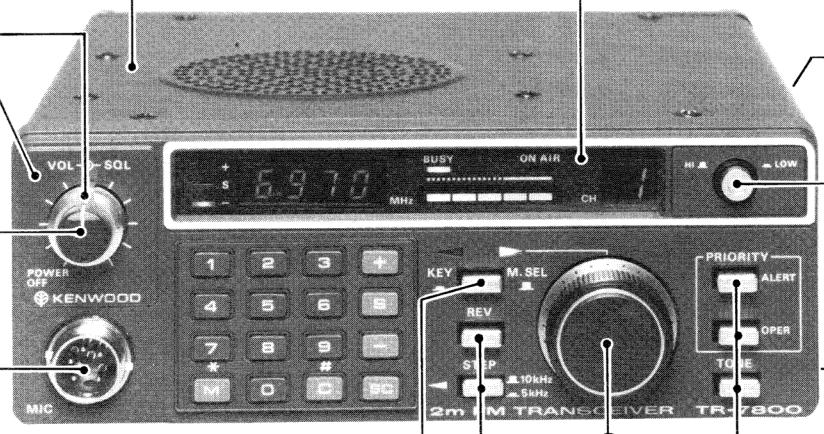


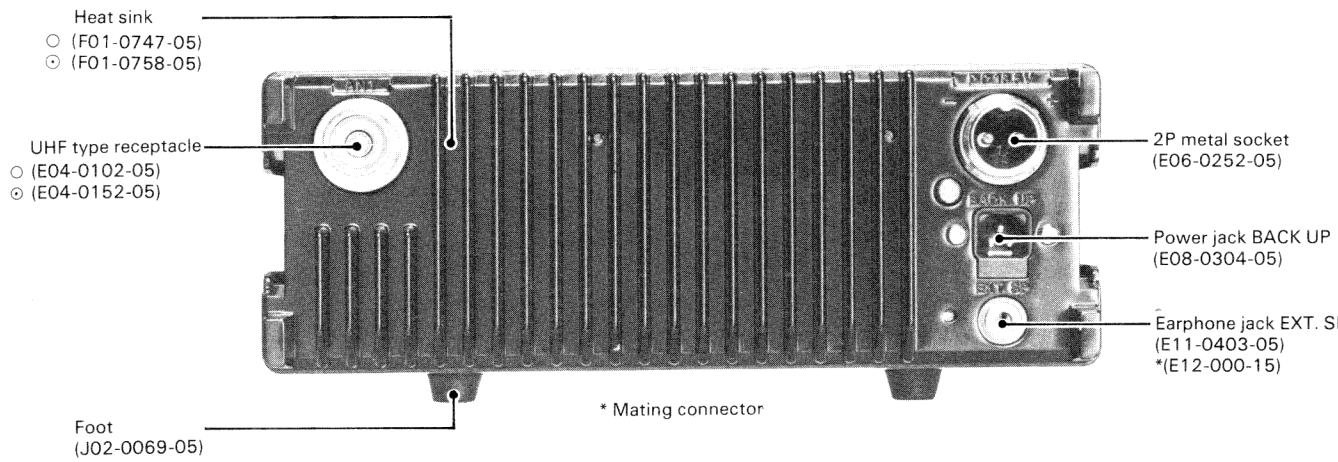
Fig. 12 Encoder, Control Unit circuit diagram

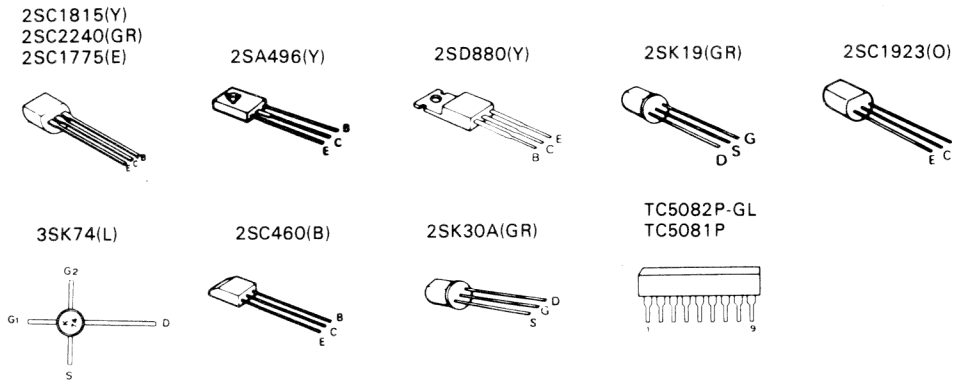
OUTSIDE VIEWS

<FRONT PANEL>



<REAR PANEL>

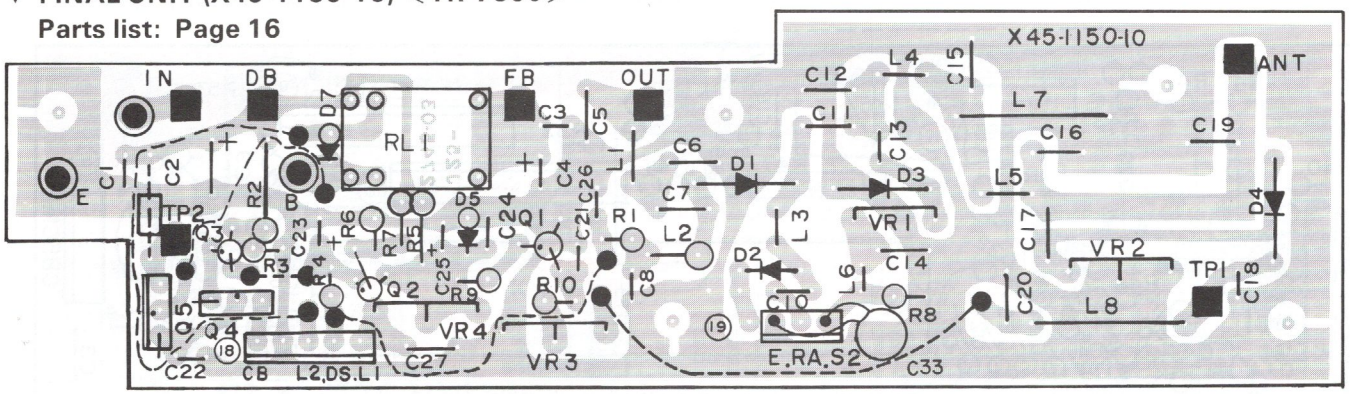




PC BOARD VIEWS

▼ FINAL UNIT (X45-1150-10) <TR-7800>

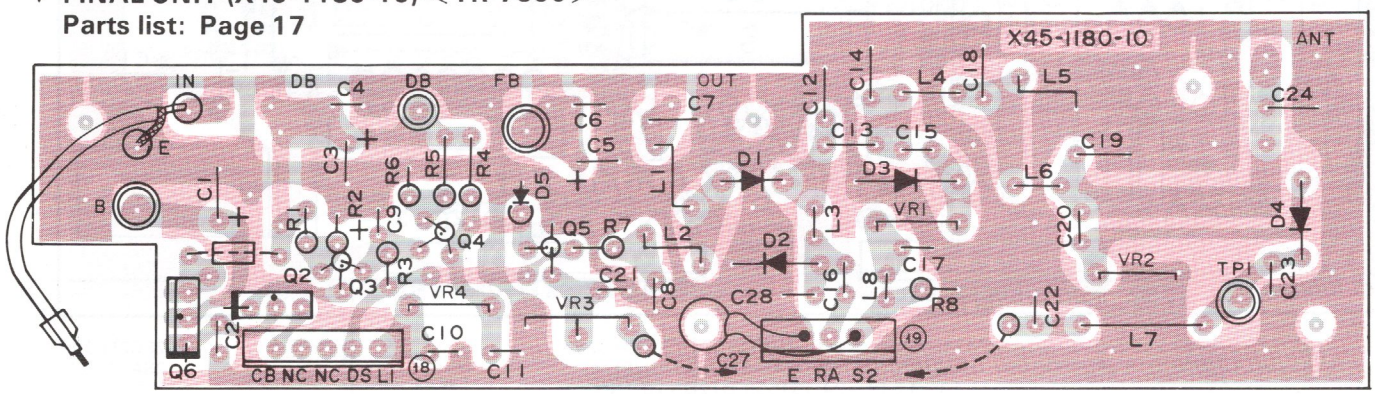
Parts list: Page 16



Q1～3:2SC1815(Y) Q4:2SA496(Y) Q5:2SD880(Y)
Q6:M57733 D1:MI402 D2:MI-303 D3,4:1N60
D5:XZ-064 D6:U15B D7:1S1555

▼ FINAL UNIT (X45-1180-10) <TR-7850>

Parts list: Page 17

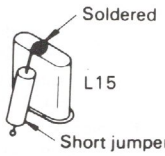


Q1: M57726 Q2: 2SA496 (Y) Q3～5: 2SC1815 (Y) Q6: 2SD880 (Y)
D1: UM9401 D2: MI402 D3: 1N60 D4: 1SS99 D5: XZ-064 D6: U15B

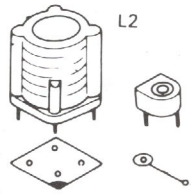
▼ PLL UNIT (X50-1650-10)

Parts list: Page 17

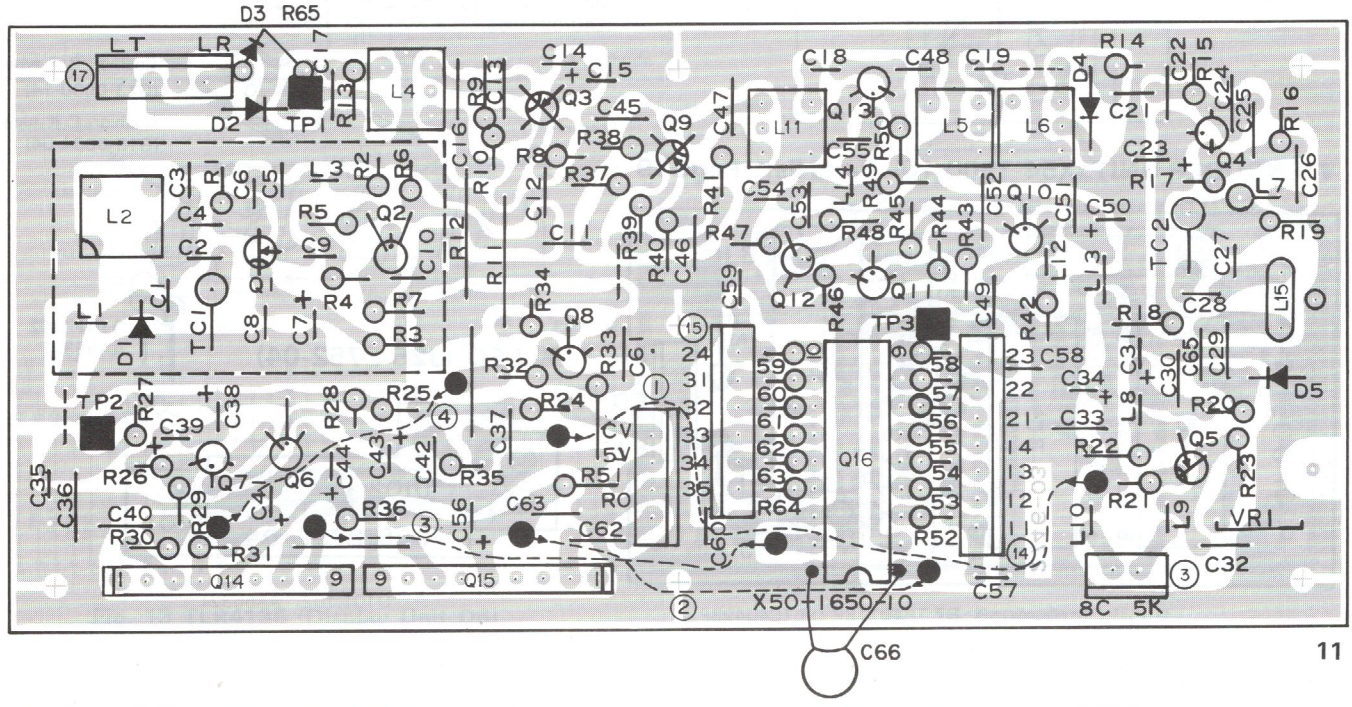
<Attachment method of L15>



<Attachment direction of TC1 and L2>

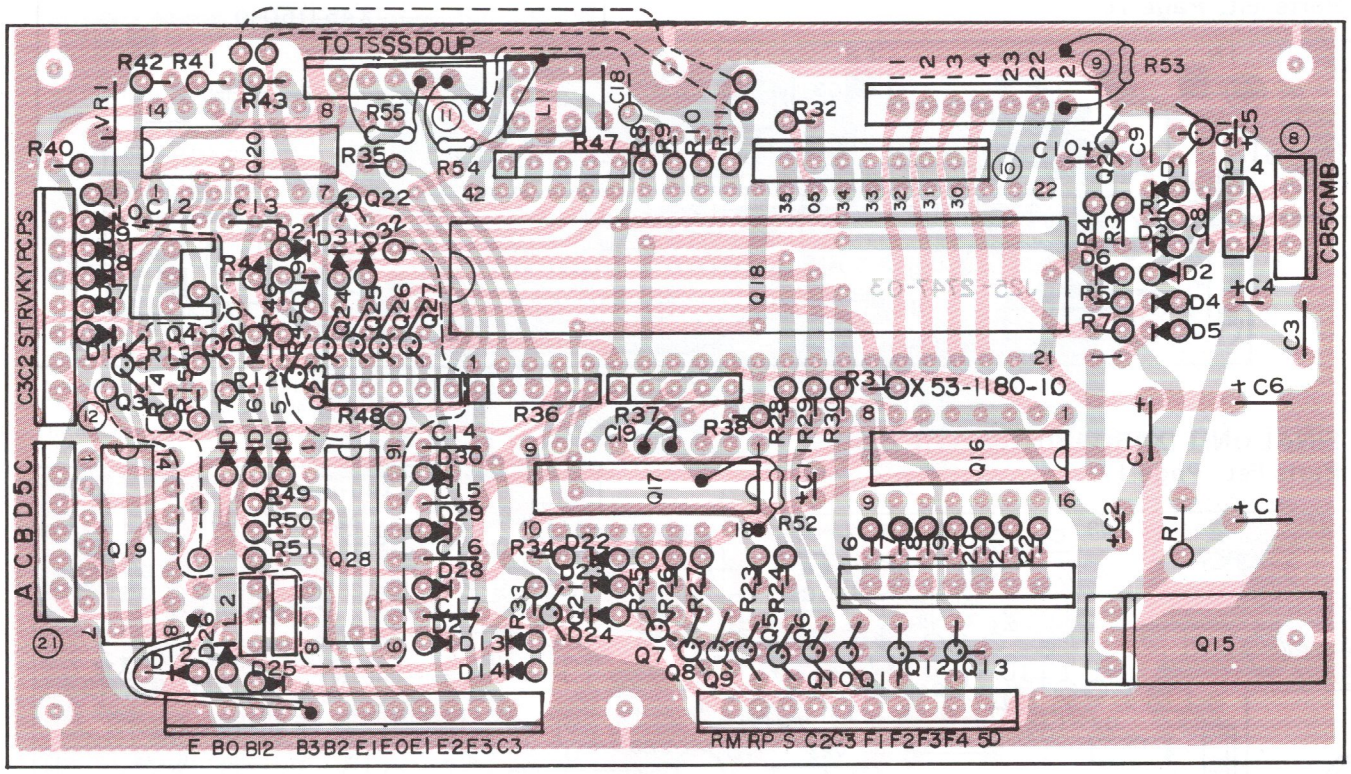


Q1:2SK19(GR) TRIO-5 Q2,13:2SC1923(O) Q3,9:3SK74(L) Q4,10～12:2SC460(B)
Q5:2SK30A(GR) Q6,7:2SC2240(GR) Q8:2SC1775(E) Q14:TC5081P Q15:TC5082P-GL
Q16:TC9122P D1:1SV50S D2,3:1S2588 D4:1SS16 D5:1S2208



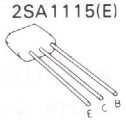
PC BOARD VIEWS

▼ CONTROL UNIT (X53-1180-XX) XX: 10(K), 61(W)(T) Parts list: Page 18



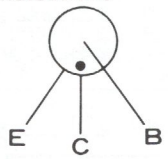
Q1～13,21～23 2SC2603(E) Q14 NJM78L06K Q15 μPC78M05H Q16 SN74LS247N
Q17 MC14599B Q18 μPD650C-037 Q19,20 TC4001BP Q24～27 2SA1115(E) (K)
Q28 MK5087N (K) D1 XZ-060 D2～11,13～17,19～24 1S1555 D12,25,26 1N60
D27～32 1S1555 (K) D33～36 1S1555 (W)

2SC2603(E)
2SA1115(E)

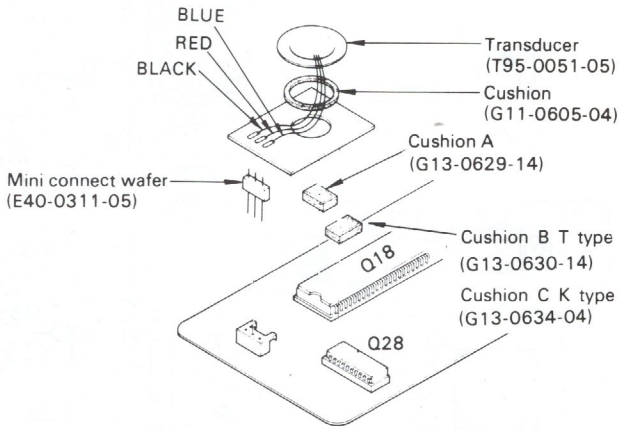


NOTES:
All printed circuit views are component side.

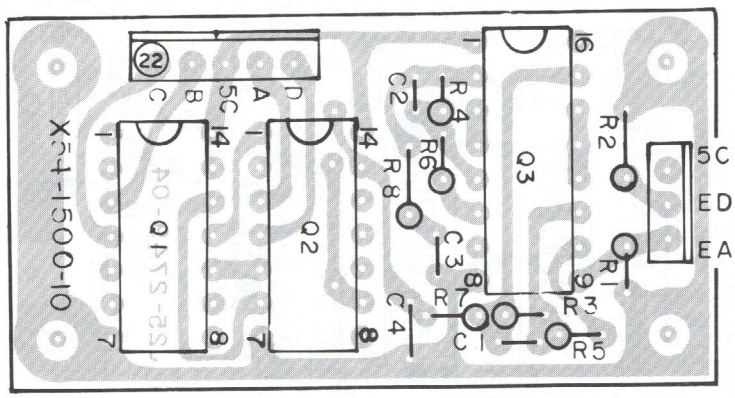
[Transistor Terminal Indication]



<Attachment method of the transducer>

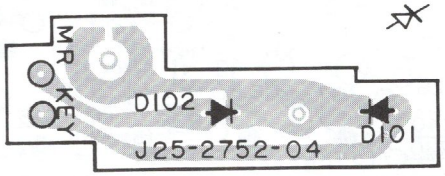


▼ ENCODER UNIT (X54-1500-10) Parts list: Page 19



Q1 TC4001BP Q2 TC4011BP Q3 TC4049BP

▼ LED (J25-2752-04)

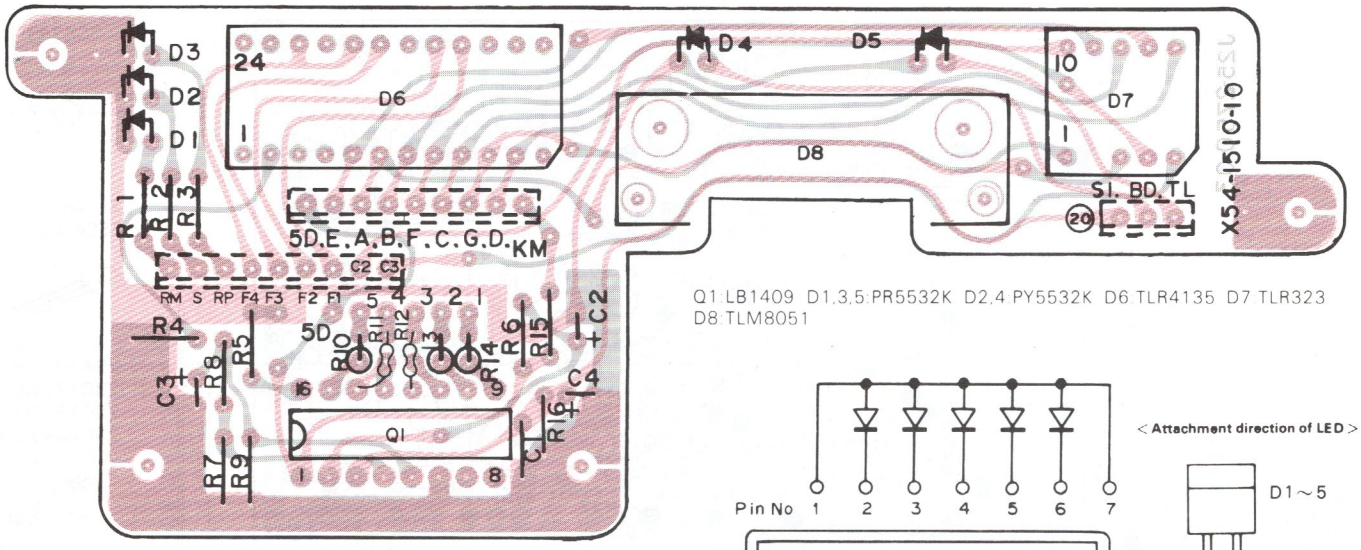


D101, 102
AA5532T

D101,102: AA5532T

PC BOARD VIEW/IC.LED DATA

▼ DISPLAY UNIT (X54-1510-10) Parts list: Page 19



Q1 LB1409 D1,3,5 PR5532K D2,4 PY5532K D6 TLR4135 D7 TLR323
D8 TLM8051

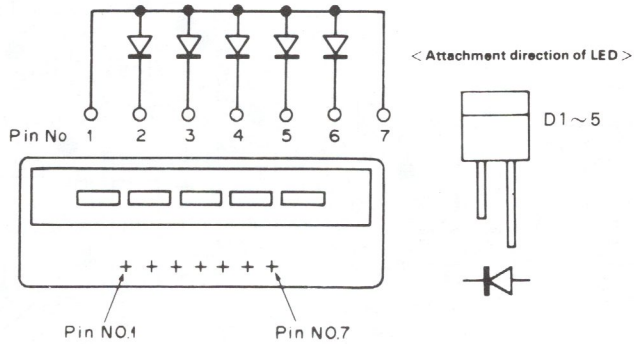


Fig. 14 TLM8051 (Display Unit D8)

Pin No.	Connection	TLR4135
1	PM	Cathode
2	Dot 3	Cathode
3	Upper Colon	Cathode
4	Lower Colon	Cathode
5	E	Cathode*
6	A	Cathode*
7	B	Cathode
8	F	Cathode*
9	C	Cathode
10	G	Cathode*
11	D	Cathode*
12	Dot 2	Cathode

Pin No.	Connection	TLR4135
13	Dot 1	Cathode
14	Dot 1	Anode
15	Dot 2	Anode
16	Unit M Common	Anode
17	10's M Common	Anode
18	Upper Colon	Anode
19	Unit H Common	Anode
20	10's H Common	Anode
21	Lower Colon	Anode
22	Dot 3	Anode
23	AM & PM Common	Anode
24	AM	Cathode

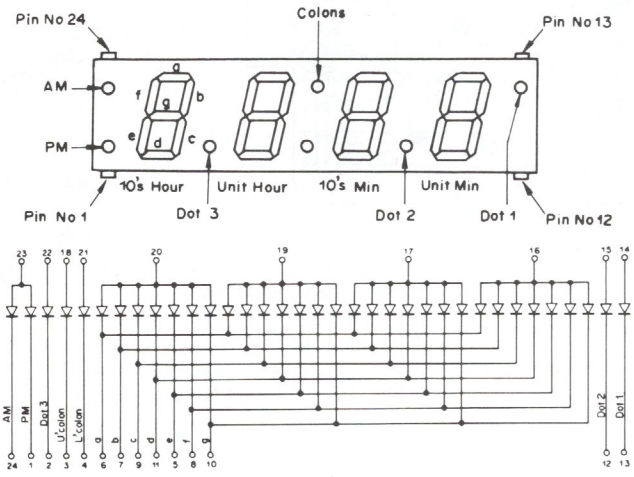


Fig. 13 TLR4135 (Display Unit D6)

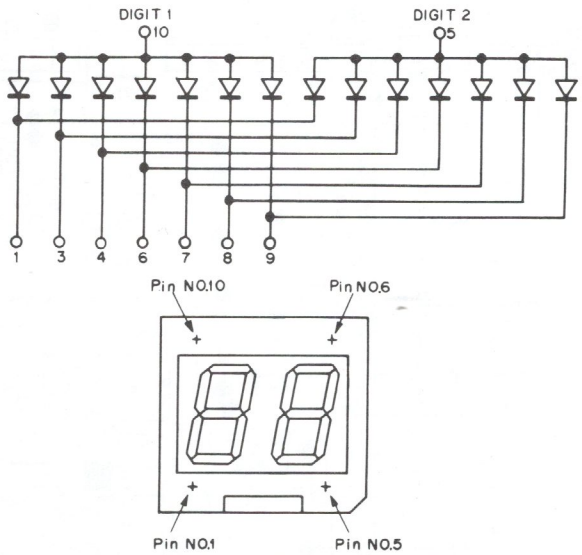


Fig. 15 TLR323 (Display Unit D7)

LB1409 (Display Unit Q1)

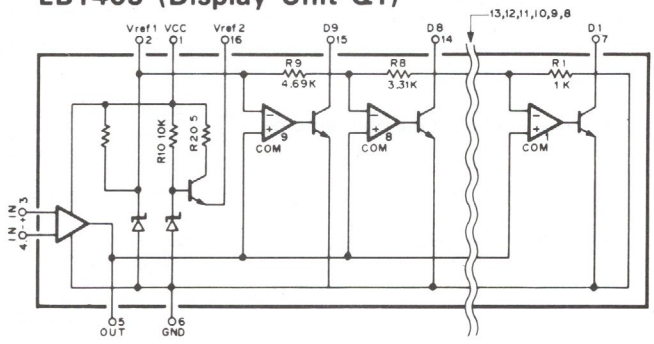
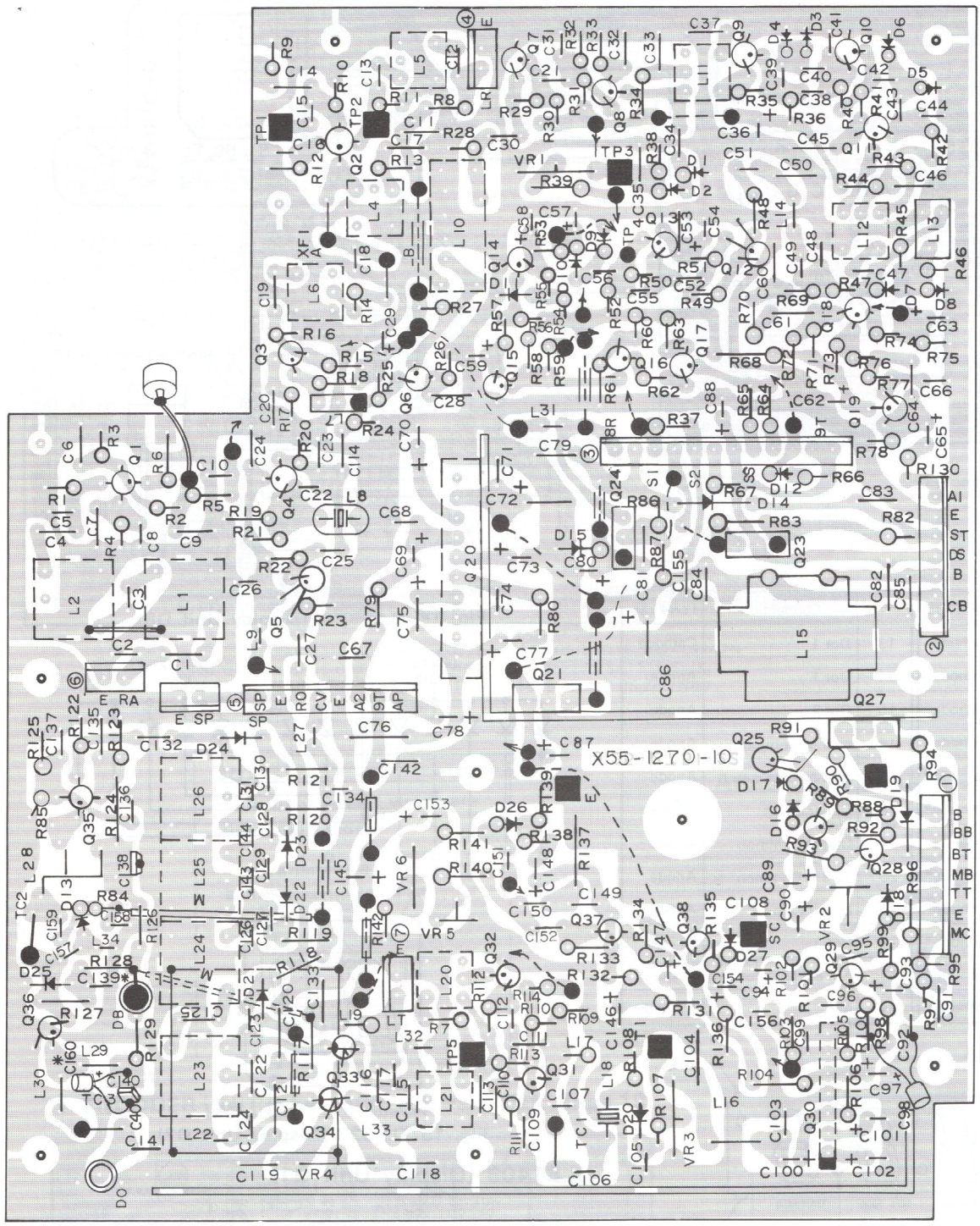


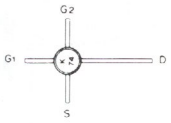
Fig. 16 Equivalent circuit

PC BOARD VIEW

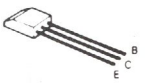
▼ RX UNIT (X55-1270-XX) XX: <TR-7800> 11(K), 52(T), 62(W) Parts list: Page 19
<TR-7850> 10(K), 51(T), 61(W)



3SK74(L)

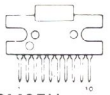


2SC460(B)
2SC458(B)

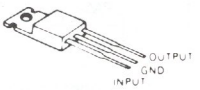


2SA1015(Y)
2SC1775(E)
2SC1815(Y)
2SC2240(GR)

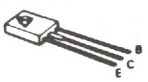
HA1366W



μPC78M05H
μPC78M08H

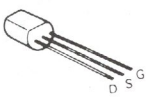


2SA496(Y)
2SC496(Y)

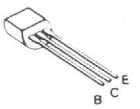


TA7061AP

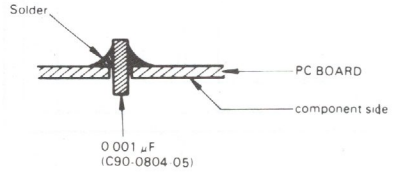
2SK61(GR)



2SC2538



< **Attachment method of the C90-0804-05** >



Q1,2,35:3SK74(L) Q3~11,31,32:2SC460(B) Q12,13:2SC1775(E)
Q14~16,18,19,25,26:2SC1815(Y) Q17,28:2SA1015(Y) Q20:HA1366W
Q21,27:μPC78M08H Q23:2SA496(Y) Q24:2SC496(Y) Q29:2SC2240(GR)
Q30:TA7061AP Q33,34:2SK61(GR) Q36:2SC2538-22-A
Q37,38:2SC458(B) (W)(T)
D1,2,7~10:1N60 D3~6,12,14,16,25:1S1555 D11:1S1212 D15:XZ-088
D17:XZ-060 D18:XZ-070 D19:V06B D20,21:1S2208 D22~24:1TT410
D26:1S1555(W)(T) D27:1S1555(T)

*C160 and short jumper are added only TR-7800.

PARTS LIST

CAPACITORS

CC 45 TH 1H 220 J
1 2 3 4 5 6

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

● **Temperature coefficient**

1st Word	C	L	P	R	S	T	U
Color※	Black	Red	Orange	Yellow	Green	Blue	Violet
ppm/℃	0	−80	−150	−220	−330	−470	−750

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

Example: CC45TH = −470 ± 60ppm/℃

● **Rating voltage**

2nd word / 1st word	A	B	C	D	E	F	G	H	J	K	V
0	1.0	1.25	1.6	2.0	2.5	3.15	4.0	5.0	6.3	8.0	—
1	10	12.5	16	20	25	31.5	40	50	63	80	35
2	100	125	160	200	250	315	400	500	630	800	—
3	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	—

● **Capacitor value**

1 0 3 = 0.01μF

0 1 0 = 1pF

1 0 0 = 10pF

1 0 1 = 100pF

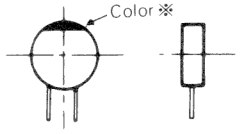
1 0 2 = 1000pF = 0.001μF

2 2 0 = 22pF
1st number | Multiplier
2nd number

● **Tolerance**

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

CC45



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		

GENERAL

○ TR-7800 only
⊙ TR-7850 only
☆ New parts

Ref. No.	Parts No.	Description	Remarks
	A01-0772-03	Case (A) Upper	☆
	A01-0773-03	Case (B) Lower	☆
	A13-0612-02	Angle ass'y (right)	
	A13-0613-02	Angle ass'y (left)	
	A13-0614-04	Angle (top)	
	A13-0625-04	Angle ass'y See page 21	☆
	A20-2379-13	Panel (K)	○☆
	A20-2380-13	Panel (T)	○☆
	A20-2381-13	Panel (W)	○☆
	A20-2426-13	Panel (K)(M)	⊙☆
	A20-2427-13	Panel (W)	⊙☆
	A20-2428-13	Panel (T)	⊙☆
	B03-0516-04	Switch mask × 6	○☆
	B03-0516-04	Switch mask × 2	⊙☆
	B05-0701-04	Speaker grill cloth	
	B05-0713-04	Grill cloth (Tone oscillator)	
	B07-0625-04	Side escutcheon × 2	☆
	B07-0626-03	Front escutcheon	☆
	B10-0628-14	Front glass	☆
	B42-1685-04	Switch plate (H/L)	☆

Ref. No.	Parts No.	Description	Remarks
	B46-0058-10	Warranty card (K)	
	B50-2727-00	Operating manual (K)	○☆
	B50-2728-00	Operating manual (T)	○☆
	B50-2729-00	Operating manual (W)	○☆
	B50-3901-00	Operating manual (K)(M)	⊙☆
	B50-3902-00	Operating manual (W)	⊙☆
	B50-3903-00	Operating manual (T)	⊙☆
	E06-0651-05	6P Metal socket (MIC)	
	E07-0252-05	2P Metal socket (DC cord ass'y)	
	E07-0651-05	6P Metal plug (MIC)	
	E12-0001-15	Earphone plug	
	E29-0412-05	1P Connector (male) × 2	
	E29-0413-05	1P Connector (female) × 2	
	E30-1674-05	DC cord ass'y	○
	E30-1685-05	DC cord ass'y	⊙☆
	E31-0456-05	Plug with lead (SP)	
	F05-1031-05	Fuse (10A)	⊙
	F05-8021-05	Fuse (8A)	○☆

PARTS LIST

Ref. No.	Parts No.	Description	Re-marks
	G02-0505-05	Knob spring AF	
	G09-0411-05	Knob spring SOL	☆
	G13-0643-04	Cushion (battery) 96 × 25 × 10.5 mm	☆
	G53-0511-04	Packing × 8 (case)	☆
	H01-2683-03	Carton case (inside)(K)(W)	○☆
	H01-2684-03	Carton case (inside)(T)	○☆
	H01-2750-03	Carton case (inside)(K)(W)(M)	⊙☆
	H01-2751-03	Carton case (inside)(T)	⊙☆
	H10-2501-03	Styrene foam cushion (upper)	
	H10-2534-12	Styrene foam cushion (lower)	☆
	H25-0049-03	Accessories bag	
	H25-0079-04	Protective bag (MIC)	
	H25-0103-04	Protective bag (cord)	
	H25-0106-04	Protective bag (cord)	
	J02-0069-05	Foot × 2 (small, Rear)	
	J02-0070-05	Foot × 2 (large, Front)	
	J19-1334-05	Battery case	☆
	J21-0392-04	Lead holder	
	J21-2504-04	Speaker mounting plate	
	J31-0514-04	Speaker collar H/L	
	J32-0745-14	Round boss × 5	☆
	J32-0746-04	Hex, boss	☆
	J42-0409-04	Knob bush H/L	
	J61-0019-05	Vinyl tie × 2	
	K21-0751-03	Main knob	☆
	K23-0734-04	Knob (AF)	☆
	K23-0735-04	Knob (SQL)	☆
	K27-0414-04	Push knob × 5	☆
	K27-0415-04	Push knob (key M SEL)	☆
	K29-0734-04	Push knob HI/LOW	☆
	N09-0008-04	Screw × 4 (angle)	
	N09-0256-05	Ground screw × 3	
	N09-0619-05	Plastic screw × 2 (battery)	☆
	N14-0508-04	Spanner nut	
	N14-0510-04	Flange nut × 4 (angle)	
	N14-0516-05	Speed nut × 2	
	N15-1040-46	Flat washer × 4 (angle)	
	N15-1060-41	Flat washer × 4 (angle)	
	N16-0060-41	Spring washer × 4 (angle)	
	N30-2604-46	Round screw × 31	⊙
	N30-3006-46	Screw × 2 (accessary)	
	N30-3008-11	Screw × 2 (accessary)	
	N30-3008-45	Screw × 2	⊙
	N32-2606-45	Flat screw × 5	⊙
	N32-3006-45	Flat screw × 12	⊙
	N33-3006-45	Round flat screw (case, etc.)	
	N99-0304-04	Allen head bolt × 4 (angle)	
	R19-9404-05	Pot 50kΩ(B), 10kΩ(K)	☆
	S40-2403-05	Push switch H/L	
	S40-2415-05	Push switch (K,T,M) × 5, (W) × 4	☆
	S40-2416-05	Push switch (K,T,M) × 1, (W) × 2	☆
	S59-0406-05	Key board ass'y	☆
	T03-0027-15	Speaker	
	T91-0311-05	Microphone (TIRO)(T)	
	T91-0313-05	Microphone (KENWOOD)(K)(W)(M)	
D101,102	V30-1170-06	LED AA 5532T	☆

Ref. No.	Parts No.	Description	Re-marks
	W01-0401-04	Allen key	
	W02-0315-05	Rotary encoder	☆
	X45-1150-10	Final unit	○☆
	X45-1180-10	Final unit	⊙☆
	X50-1650-10	PLL unit	☆
	X53-1180-10	Control unit (K)(M)	☆
	X53-1180-61	Control unit (W)(T)	☆
	X54-1500-10	Encoder unit	☆
	X54-1510-10	Display unit	☆
	X55-1270-10	RX unit (K)(M)	⊙☆
	X55-1270-11	RX unit (K)(M)	○☆
	X55-1270-51	RX unit (T)	⊙☆
	X55-1270-52	RX unit (T)	○☆
	X55-1270-61	RX unit (W)	⊙☆
	X55-1270-62	RX unit (W)	○☆

FINAL UNIT (X45-1150-10) <TR-7800>

Ref. No.	Parts No.	Description			Re-marks
C2	CE04W1C221Q	E	220μF	16V	○
C4	CE04W1C101Q	E	100μF	16V	○
C5	CC45SL2H070D	C	7pF	±0.5pF	○
C6	CC45SL2H120J	C	12pF	±5%	○
C7	CC45SL2H101J	C	100pF	±5%	○
C10	CC45CH1H330J	C	33pF	±5%	○
C11	CC45SL2H101J	C	100pF	±5%	○
C12	CC45SL2H330J	C	33pF	±5%	○
C13	CC45CH1H0R5C	C	0.5pF	±0.25pF	○
C15	CC45SL2H390J	C	39pF	±5%	○
C16	CC45SL2H100D	C	10pF	±0.5pF	○
C17	CC45SL2H020C	C	2pF	±0.25pF	○
C19	CC45SL2H220J	C	22pF	±5%	○
C23	CS15E1VR47M	T	0.47μF	35V	○
C25	CS15E1C4R7M	T	4.7μF	16V	○
C28	CC45SL2H120J	C	12pF	±5%	○
—	E04-0102-05	UHF type receptacle			○
—	E06-0252-05	2P Metal socket			○
—	E08-0304-05	Power jack (BACK UP)			○
—	E11-0403-05	Earphone jack			○
—	E23-0046-04	Square terminal × 7			○
—	E23-0401-05	Round terminal × 3			○
—	E40-0373-05	Mini connect wafer 4P			○
—	E40-0573-05	Mini connect wafer 5p			○
—	F01-0747-05	Heat sink			○☆
—	F11-0781-04	Shield cover FINAL			○☆
—	F20-0078-05	MICA insulator (Q5)			○
—	F29-0014-05	Shoulder washer (Q5)			○
L1	L34-0823-05	VHF coil	5φ3T		○
L2	L34-0438-05	Coil	0.9μH		○
L3	L34-0692-05	VHF coil	5φ4T		○
L4	L34-0817-05	VHF coil	5φ3T		○
L5	L34-0823-05	VHF coil	5φ3T		○
L6	L40-1511-03	Ferri-inductor	150μH		○
L7,8	L33-0025-05	Choke coil	1μH		○
L9	L34-0887-05	VHF coil	5φ3T		○
VR1	R12-5024-05	Trim. pot	100kΩ (2 poles)		○

PARTS LIST

Ref. No.	Parts No.	Description		Remarks
VR2	R12-0048-05	Trim. pot	100Ω	○
VR3	R12-4016-05	Trim. pot	50kΩ	○
VR4	R12-0042-05	Trim. pot	500Ω	○
—	R92-0150-05	Short jumper		○
RL1	S51-1404-05	Relay		○
Q1～3	V03-1815-06	TR	2SC1815 (Y)	○
Q4	V01-0113-05	TR	2SA496 (Y)	○
Q5	V04-0880-16	TR	2SD880 (Y)	○
Q6	V30-1171-06	Power module	M57733	○☆
D1	V11-5260-16	Diode	MI402	○
D2	V11-5273-66	Diode	MI303	○
D3,4	V11-0051-05	Diode	IN60	○
D5	V11-4104-20	Zener diode	XZ-064	○
D6	V11-6460-26	Diode	U15B	○☆
D7	V11-0076-05	Diode	1S1555	○

FINAL UNIT (X45-1180-10) <TR-7850>

Ref. No.	Parts No.	Description			Remarks
C1	C90-0820-05	E 470μF	16V		⊙
C2	CK45B1H102K	C 0.001μF			⊙
C3	CE04W1C101M	E 100μF	16V		⊙
C4	CK45B1H102K	C 0.001μF			⊙
C5	CE04W1C101M	E 100μF	16V		⊙
C6	CK45B1H102K	C 0.001μF			⊙
C7	CC45SL2H050C	C 5pF	±0.25pF	500V	⊙
C8	CK45B1H102K	C 0.001μF			⊙
C9	CS15E1VR47M	T 0.47μF	35V		⊙
C10,11	CK45B1H102K	C 0.001μF			⊙
C12	CC45SL2H150J	C 15pF	500V		⊙
C13	CC45SL2H101J	C 100pF	500V		⊙
C14	CC45SL2H150J	C 15pF	500V		⊙
C15	CC45CH1H020C	C 2pF	±0.25pF		⊙
C16	CC45SL1H101J	C 100pF			⊙
C17	CK45B1H102K	C 0.001μF			⊙
C18	CC45SL2H390J	C 39pF	500V		⊙
C19	CC45SL2H100D	C 10pF	±0.5pF	500V	⊙
C20	CC45CH1H010C	C 1pF	±0.25pF		⊙
C21～23	CK45B1H102K	C 0.001μF			⊙
C24	CC45SL2H220J	C 22pF	500V		⊙
C25	CC45SL2H120J	C 12pF	500V		⊙
C26	CC45SL2H120J	C 0.001μF			⊙
C27	CK45B1H102K	C 0.001μF			⊙
C28	CC45CH1H070D	C 7pF	±0.5pF		⊙
	E04-0152-05	UHF type receptacle			⊙
	E06-0252-05	2P metal socket (Power)			⊙
	E08-0304-05	Power jack Back up			⊙
	E11-0403-05	Earphone jack			⊙
	E23-0046-04	Square terminal			⊙
	E23-0401-05	Round terminal			⊙
	F01-0758-05	Heat sink			⊙☆
	F20-0078-05	Insulating board			⊙
	F29-0014-05	Shoulder washer			⊙

Ref. No.	Parts No.	Description			Remarks
L1	L34-1020-05	Coil	φ3	3.5T	⊙☆
L2	L34-0908-05	Coil	φ3		⊙
L3	L34-0692-05	VHF coil	φ5	4T	⊙
L4	L34-0452-05	Coil	φ3	6T	⊙
L5	L34-0908-05	Coil	φ3		⊙
L6	L34-0742-05	VHF coil	φ3	5T	⊙
L7	L33-0026-05	Choke coil	1μH		⊙
L8	L40-1511-03	Ferri-inductor	150μH		⊙
L9	L34-0822-05	VHF coil	φ5	3T	⊙
R7	RC05GF2H151J	Solid	150Ω	1/2W	⊙
VR1	R12-4020-05	Trim. pot	50kΩ (2 poles)		⊙
VR2	R12-0417-05	Trim. pot	100Ω (2 poles)		⊙
VR3	R12-4016-05	Trim. pot	50kΩ (2 poles)		⊙
VR4	R12-0053-05	Trim. pot	500Ω (2 poles)		⊙
	R92-0150-05	Short jumper			⊙
Q1	V30-1239-56	Power module	M57726		⊙☆
Q2	V01-0113-05	TR	2SA496 (Y)		⊙
Q3～5	V03-1815-06	TR	2SC1815 (Y)		⊙
Q6	V04-0880-16	TR	2SD880 (Y)		⊙
D1	V11-7778-16	Diode	UM9401		⊙☆
D2	V11-5260-16	Diode	MI402		⊙
D3	V11-0051-05	Diode	1N60		⊙
D4	V11-1277-86	Diode	1SS99		⊙
D5	V11-4104-20	Zener diode	XZ064		⊙
D6	V11-6460-26	Diode	U15B		⊙

PLL UNIT (X50-1650-10)

Ref. No.	Parts No.	Description			Remarks
C1	CC45PH1H080D	C	8pF	±0.5pF	
C2	CC45CH1H060D	C	6pF	±0.5pF	
C3	CC45CH1H0R5C	C	0.5pF	±0.25pF	
C4	CC45CH1H060D	C	6pF	±0.5pF	
C5	CC45CH1H150J	C	15pF	±5%	
C6	CC45CH1H030C	C	3pF	±0.25pF	
C7	CE04W1A101M	E	100μF	10V	
C9	CC45CH1H040C	C	4pF	±0.25pF	
C11	CC45CH1H020C	C	2pF	±0.25pF	
C12	CC45CH1H220J	C	22pF	±5%	
C15	CE04W1C100M	E	10μF	16V	
C18	CC45CH1H030C	C	3pF	±0.25pF	
C19	CC45CH1H0R5C	C	0.5pF	±0.25pF	
C21	CC45CH1H220J	C	22pF	±5%	
C23	CE04W1A470M	E	47μF	10V	
C24,25	CC45CH1H101J	C	100pF	±5%	
C27	CC45UJ1H150J	C	15pF	±5%	
C28	CC45UJ1H330D	C	33pF	±0.5pF	
C29	CC45UJ1H390J	C	39pF	±5%	
C31	CS15E1VR47M	T	0.47μF	35V	
C34	CE04W1A101M	E	100μF	10V	
C35	C91-0131-05	C	0.01μF	±10%	☆
C36	CQ92M1H473K	ML	0.047μF	±10%	
C38	CS15E1C4R7M	T	4.7μF	16V	
C39	CS15E1C2R2M	T	2.2μF	16V	
C40	CQ92M1H223K	ML	0.022μF	±10%	
C41	CE04W1E4R7M	E	4.7μF	25V	
C43	CE04W1H010M	E	1μF	50V	
C44	CE04W1A101M	E	100μF	10V	

PARTS LIST

Ref. No.	Parts No.	Description	Re-marks
C48	CC45CH1H030C	C 3pF ±0.25pF	
C49	CC45SL1H101J	C 100pF ±5%	
C50	CE04W1A470M	E 47μF 10V	
C52	CQ92M1H223K	ML 0.022μF ±10%	
C53	CC45SL1H101J	C 100pF ±5%	
C54,55	CC45CH1H100D	C 10pF ±0.5pF	
C56	CE04W1A101M	E 100μF 10V	
C63	C91-0457-05	C 0.022μF ±10%	
C65	CC45UJ1H070D	C 7pF ±0.5pF	
TC1	C05-0062-05	Ceramic timmer 6pF	
TC2	C05-0030-15	Ceramic timmer 20pF	
—	E23-0046-04	Square terminal × 3	
—	E40-0273-05	Mini connect wafer 2P	
—	E40-0473-05	Mini connect wafer 4P	
—	E40-0673-05	Mini connect wafer 6P	
—	E40-0773-05	Mini connect wafer 7P	
L1	L40-3391-03	Ferri-inductor 3.3μH	
L2	L32-0624-05	Oscillating coil VCO	
L3	L40-3391-03	Ferri-inductor 3.3μH	
L4	L34-0820-05	Tuning coil	
L5,6	L34-0901-05	Tuning coil	
L7	L33-0631-05	Choke coil 4.7μH ±5%	
L8,9	L40-1021-03	Ferri-inductor 1mH	
L10	L40-4711-03	Ferri-inductor 470μH	
L11	L34-0683-05	Tuning coil	
L12,13	L40-1021-03	Ferri-inductor 1mH	
L14	L40-1501-03	Ferri-inductor 15μH	
L15	L77-0855-05	Crystal 14.2005 MHz	
L16	L40-4711-03	Ferri-inductor 470μH	
VR1	R12-4020-05	Trim. pot 50kΩ	
—	R92-0150-05	Short jumper × 3	
Q1	V09-1001-16	FET 2SK19 (GR) TRI0-5	
Q2	V03-1923-06	TR 2SC1923 (0)	
Q3	V09-1002-56	FET 3SK74 (L)	
Q4	V03-0079-05	TR 2SC460 (B)	
Q5	V09-0060-05	FET 2SK30A (GR)	
Q6,7	V03-2240-06	TR 2SC2240 (GR)	
Q8	V03-1775-06	TR 2SC1775 (E)	
Q9	V09-1002-56	FET 3SK74 (L)	
Q10～1	V03-0079-05	TR 2SC460 (B)	
Q13	V03-1923-06	TR 2SC1923 (O)	
Q14	V30-1132-06	IC TC5081P	
Q15	V30-1133-06	IC TC5082P-GL	
Q16	V30-1036-16	IC TC9122P	
D1	V11-1260-36	Vari-cap diode 1SV50S	
D2,3	V11-0414-05	Diode 1S2588	
D4	V11-0374-05	Diode 1SS16	
D5	V11-0317-05	Vari-cap diode 1S2208	

CONTROL UNIT (X53-1180-XX)
XX: 10(K), 61(W)(T)

Ref. No.	Parts No.	Description	Re-marks
C1	CE04W1C331Q	E 330μF 16V	
C2	CE04W1A101Q	E 100μF 10V	
C4	CE04W1C470Q	E 47μF 16V	
C5	CE04W1A470Q	E 47μF 10V	
C6,7	CE04W1A471Q	E 470μF 10V	
C10	CE04W1H010Q	E 1μF 50V	
C11	CE04W1A101Q	E 100μF 10V	
C12,13	CQ92M1H393K	ML 0.039μF ±10%	
C18	CQ92M1H393K	ML 0.039μF ±10%	
C19	CC45SL1H101J	C 100pF ±5%	
—	E02-0103-05	IC Socket 16P (K)	
—	E02-0106-05	IC Socket 42P	
—	E40-0311-05	Mini connect wafer 3P	
—	E40-0373-05	Mini connect wafer 3P	
—	E40-0573-05	Mini connect wafer 5P	
—	E40-0773-05	Mini connect wafer 7P	
—	E40-1073-05	Mini connect wafer 10P	
—	E40-1273-05	Mini connect wafer 12P	
—	G11-0605-04	Cushion (Transducer)	
—	G13-0629-14	Cushion (A) (Transducer) (K) × 1 (W) × 1	☆
—	G13-0630-14	Cushion (B) (Transducer) (W)	☆
	G13-0634-04	Cushion (C) (Transducer) (K)	☆
L1	L30-0503-05	IFT	
L2	L78-0003-05	Ceramic oscillator 3.58MHz (K)	
R1	RS14AB3A330J	Metal film 33Ω±5%1W	
R36	R90-0526-05	Resistor block 27kΩ × 4	
R37	R90-0530-05	Resistor block 2.7kΩ × 4	☆
R47	R90-0529-05	Resistor block 100kΩ × 4	☆
R48	R90-0526-05	Resistor block 27kΩ × 4 (K)	
VR1	R12-2015-05	Trim.pot 5kΩ (K)	
BZ1	T95-0051-05	Transducer	
Q1～13	V03-2603-06	TR 2SC2603 (E)	
Q14	V30-1067-06	IC NJM78L06K	
Q15	V30-1223-16	IC μPC78M05H	☆
Q16	V30-1030-56	IC SN74LS247N	
Q17	V30-1166-06	IC MC14599B	
Q18	V30-1164-06	IC μPD650C-037	
Q19,20	V30-1066-06	IC TC4001BP	
Q21～23	V03-2603-06	TR 2SC2603 (E)	
Q24～27	V01-1115-16	TR 2SA1115 (E)(K)(M)	
Q28	V30-1074-06	IC MK5087N (K)(M)	
D1	V11-4101-20	Zener diode XZ-060	
D2～11	V11-0076-05	Diode 1S1555	
D12	V11-0051-05	Diode 1N60	
D13～17	V11-0076-05	Diode 1S1555	
D18		not used	
D19～24	V11-0076-05	Diode 1S1555	
D25,26	V11-0051-05	Diode 1N60	
D27～32	V11-0076-05	Diode 1S1555 (K)	
D33～36	V11-0076-05	Diode 1S1555 (W, T)	

PARTS LIST

ENCODER UNIT (X54-1500-10)

Ref. No.	Parts No.	Description	Re-marks
C1～4	CC45SL1H101J	C 100pF ±5%	
—	E40-0373-05	Mini connect wafer 3P	
—	E40-0573-05	Mini connect wafer 5P	
Q1	V30-1066-06	IC TC4001BP	
Q2	V30-0301-70	IC TC4011BP	
Q3	V30-1009-26	IC TC4049BP	

DISPLAY UNIT (X54-1510-10)

Ref. No.	Parts No.	Description	Re-marks
C2	CS15E1C010M	T 1μF 16V	
C3	CS15E1C4R7M	T 4.7μF 16V	
C4	CS15E1V0R1M	T 0.1μF 35V	
—	E40-0373-05	Mini connect wafer 3P	
—	E40-0973-05	Mini connect wafer 9P	
—	N09-0625-04	Screw M2.5 × 6	☆
—	N14-0520-04	Nut M2.5	☆
D1	V11-7272-36	LED PR5532K	
D2	V11-7272-46	LED PY5532K	
D3	V11-7272-36	LED PR5532K	
D4	V11-7272-46	LED PY5532K	
D5	V11-7272-36	LED PR5532K	
D6	V11-3173-06	LED TLR4135	☆
D7	V11-3172-96	LED TLR323	☆
D8	V11-3173-16	LED block TLM8051	☆
Q1	V30-1163-06	IC LB1409	☆

RX UNIT (X55-1270-XX)
<TR-7800> XX: 11(K), 52(T), 62(W)
<TR-7850> XX: 10(K), 51(T), 61(W)

Ref. No.	Parts No.	Description	Re-marks
C1	CC45RH1H120J	C 12pF ±5%	
C2	CC45CH1H330J	C 33pF ±5%	
C3	CC45CH1H030C	C 3pF ±0.25pF	
C4	CC45CH1H220J	C 22pF ±5%	
C5	CC45RH1H100D	C 10pF ±0.5pF	
C12	CC45CH1H330J	C 33pF ±5%	
C13	CC45CH1H020C	C 2pF ±0.25pF	
C14	CC45CH1H150J	C 15pF ±5%	
C15	CC45CH1H0R5C	C 0.5pF ±0.25pF	
C18	CC45CH1H050C	C 5pF ±0.25pF	
C19	CC45CH1H680J	C 68pF ±5%	
C20	CQ92M1H223K	ML 0.022μF ±10%	
C21	CQ92M1H103K	ML 0.01μF ±10%	
C23	CC45SL1H151J	C 150pF ±5%	
C25	CC45CH1H220J	C 22pF ±5%	
C26	CE04W1A470M	E 47μF 10V	
C28	CQ92M1H223K	ML 0.022μF ±10%	
C29	CE04W1A470M	E 47μF 10V	
C32,33	CQ92M1H223K	ML 0.022μF ±10%	
C36	CE04W1A101M	E 100μF 10V	
C37	CQ92M1H223K	ML 0.022μF ±10%	
C38	CC45SL1H470J	C 47pF ±5%	
C41	CQ92M1H222K	ML 0.0022μF ±10%	
C44	CQ92M1H222K	ML 0.0022μF ±10%	
C45	CQ92M1H473K	ML 0.047μF ±10%	
C46	CQ92M1H223K	ML 0.022μF ±10%	
C47	CQ92M1H102K	ML 0.001μF ±10%	
C48	CQ92M1H332K	ML 0.0033μF ±10%	
C49	CQ92M1H222K	ML 0.0022μF ±10%	
C50	CQ92M1H393K	ML 0.039μF ±10%	
C51	CQ92M1H222K	ML 0.0022μF ±10%	
C52	CQ92M1H103K	ML 0.01μF ±10%	
C53	CQ92M1H393K	ML 0.039μF ±10%	
C54	CS15E1V0R1M	T 0.1μF 35V	
C55	CC45SL1H220J	C 22pF ±5%	
C56	CQ92M1H222K	ML 0.0022μF ±10%	
C57,58	CS15E1A3R3M	T 3.3μF 10V	
C59	CS15E1C4R7M	T 4.7μF 16V	
C60	CQ92M1H223K	ML 0.022μF ±10%	
C61	CQ92M1H473K	ML 0.047μF ±10%	
C62	CE04W1C220M	E 22μF 16V	
C63	CE04W1C100M	E 10μF 16V	
C64	CQ92M1H103K	ML 0.01μF ±10%	
C65	CS15E1V0R1M	T 0.1μF 35V	
C66	CQ92M1H332K	ML 0.0033μF ±10%	
C67	CC45SL1H101J	C 100pF ±5%	
C68	CQ92M1H332K	ML 0.0033μF ±10%	
C69	CE04W1H010M	E 1μF 50V	
C70	CE04W1A101M	E 100μF 10V	
C72	C90-0820-05	E 470μF 16V (small)	
C73	CE04W1A470M	E 47μF 10V	
C74	CC45SL1H101J	C 100pF ±5%	
C75	CE04W1A101M	E 100μF 10V	
C76	CQ92M1H104K	ML 0.1μF ±10%	
C77	CE04W1H010M	E 1μF 50V	
C78	CE04W1A101M	E 100μF 10V	
C80	CE04W1C220M	E 22μF 16V	
C86	C90-0820-05	E 470μF 16V (small)	
C87,88	CE04W1A470M	E 47μF 10V	
C89	CE04W1C470M	E 47μF 16V	
C90	CE04W1A470M	E 47μF 10V	
C93	CS15E1C010M	T 1μF 16V	
C94	CE04W1E4R7M	E 4.7μF 25V	
C95	CQ92M1H682K	ML 0.0068μF ±10%	
C96	CQ92M1H222K	ML 0.0022μF ±10%	
C97	CE04W1C220M	E 22μF 16V	
C98	C90-0478-05	E 10μF 16V	☆
C100	CE04W1H010M	E 1μF 50V	
C101	CE04W1E4R7M	E 4.7μF 25V	
C102	CE04W1A470M	E 47μF 10V	
C103	CQ92M1H103K	ML 0.01μF ±10%	
C104	CQ92M1H393K	ML 0.039μF ±10%	
C106	CC45TH1H100D	C 10pF ±0.5pF	
C107	CC45UJ1H010C	C 1pF ±0.25pF	
C110,111	CC45SL1H221J	C 220pF ±5%	
C112	CC45CH1H100D	C 10pF ±0.5pF	
C114	CC45CH1H180J	C 18pF ±5%	
C115	CC45CH1H330J	C 33pF ±5%	
C116,117	CC45CH1H220J	C 22pF ±5%	
C122	CC45TH1H020C	C 2pF ±0.25pF	
C123,124	CC45TH1H100D	C 10pF ±0.5pF	
C125	CC45CH2H070D	C 7pF ±0.5pF	

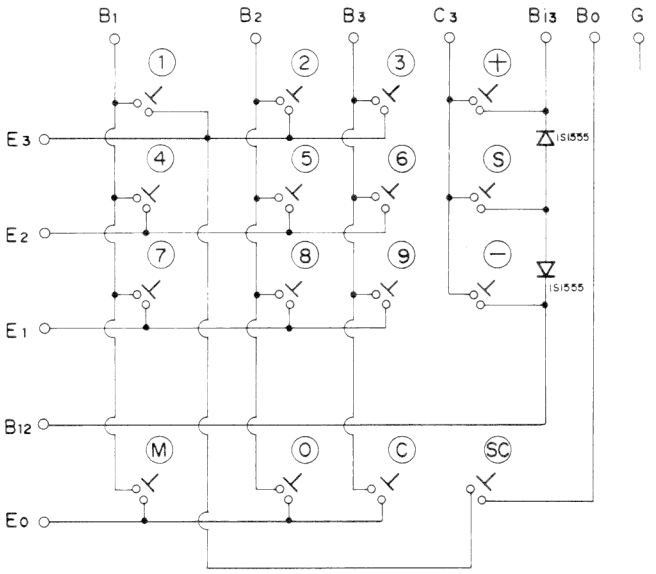
PARTS LIST

Ref. No.	Parts No.	Description			Re-marks
C126	CC45TH1H030C	C	3pF	±0.25pF	
C127,128	CC45TH1H060D	C	6pF	±0.5pF	
C129	CC45TH1H050C	C	5pF	±0.25pF	
C130	CC45TH1H060D	C	6pF	±0.5pF	
C131	CC45TH1H050C	C	5pF	±0.25pF	
C132	CC45CH1H220J	C	22pF	±5%	
C138	C90-0804-05	C	0.001μF		
C140	C90-0804-05	C	0.001μF		
C141	CC45CH1H150J	C	15pF	±5%	○
C141	CC45CH1H220J	C	22pF	±5%	⊙
C142	C91-0431-05	E	0.1μF		
C143,144	CC45CH1H0R5C	C	0.5pF0.25pF		
C145	CE04W1A101M	E	100μF	10V	
C146,147	CE04W1C220M	E	22μF	16V (W) (T)	
C148	CE04W1H010M	E	1μF	50V (W) (T)	
C149,150	C91-0433-05	Laminated cap.	0.0039μF (W) (T)		
C151	CQ92M1H472K	ML	0.0047μF	±10% (W) (T)	
C152	C91-0433-05	Laminated cap.	0.0039μF (W) (T)		
C153,154	CS15E1A150K	T	15μF	10V (T)	
C159	CC45CH1H100D	C	10pF		
C160	C90-0478-05	E	10pF	16V	○☆
TC1	C05-0062-05	Ceramic Trimmer 6PF			
TC2	C05-0031-15	Ceramic Trimmer 10PF			
TC3	C05-0030-15	Ceramic Trimmer 20PF			
	E04-0154-05	Coax, cable			
—	E23-0046-04	Square terminal × 7			
—	E23-0401-05	Round terminal × 3			
—	E40-0273-05	Mini connect wafer 2P			
—	E40-0773-05	Mini connect wafer 7P			
—	E40-0873-05	Mini connect wafer 8P			
—	E40-1273-05	Mini connect wafer 12P			
—	J31-0502-04	PC Board collar × 6			
—	J42-0428-05	PC Board bush × 6			
L1,2	L31-0267-05	Tuning coil			
L3	L79-0452-05	Helical block	2 MHz (W)(T)		
L3	L79-0461-05	Helical block	5 MHz (K)		☆
L4	L30-0289-05	IFT			
L5	L34-0683-05	Tuning coil			
L6	L30-0289-05	IFT			
L7	L72-0014-05	Ceramic filter	SFE 10.7 MA5		
L8	L77-0858-05	Crystal	10.240 MHz		
L9	L40-1511-03	Ferri-inductor	150μH		
L10	L72-0315-05	Ceramic filter	CFW455F		
L11	L30-0504-05	IFT			
L12	L30-0503-05	IFT			
L13	L79-0446-05	Ceramic discri	CFY455S		
L14	L40-6825-04	Ferri-inductor	6.8 mH		
L15	L15-0016-05	Choke trans.			
L16	L40-1541-27	Ferri-inductor	150mH		
L17	L33-0615-05	Choke coil			
L18	L77-0859-05	Crystal	10.695 MHz		
L19	L33-0605-03	Choke oil			
L20	L30-0005-05	IFT			
L21	L31-0313-05	Tuning coil			
L22	L40-1001-03	Ferri-inductor	10μH		
L23	L34-0886-05	Tuning coil			
L24	L31-0180-05	Tuning coil			
L25	L31-2052-05	Tuning coil			
L26	L31-0267-05	Tuning coil			
L27	L40-1511-03	Ferri-indudor	150μH		
L28	L34-0902-05	VHF coil	5φ5T		☆
L29	L34-0452-05	VHFcoil	3φ6T		
L30	L34-0691-05	VHF coil	5φ5T		

Ref. No.	Parts No.	Description		Re-marks
L31	L40-1021-03	Ferri-inductor	1 mH	
L32,33	L40-1011-03	Ferri-inductor	100μH	
L34	L40-1001-01	Ferri-inductor	10μH	
XF,(A,B)	L71-0216-05	MCF	10.695 MHz	
VR1	R12-3025-05	Trim. pot	10kΩ	
VR2	R12-1403-05	Trim. pot	1kΩ	
VR3	R12-2015-05	Trim. pot	5kΩ	
VR4	R12-0042-05	Trim. pot	500Ω	
VR5	R12-2405-05	Trim. pot	5kΩ (W) (T)	
VR6	R12-4020-05	Trim. pot	50kΩ (2 pole) (T)	
—	R92-0150-05	Short jumper × 12		
R94	RC05GF2H560J	Solid	56Ω ±5% 1/2W	
R132	R92-0616-05	Metal film	10kΩ (W) (T)	
R133	RN14BK2E4703F	Metal film	470kΩ ±1%1/4W	
R137	R92-0616-05	Metal film	10kΩ (W) (T)	
R140	R92-0617-05	Metal film	7.5kΩ (W) (T)	
Q1,2	V09-1002-56	FET	3SK74 (L)	
Q3～11	V03-0079-05	TR	2SC460 (B)	
Q12,13	V03-1775-06	TR	2SC1775 (E)	
Q14～16	V03-1815-06	TR	2SC1815 (Y)	
Q17	V01-1015-06	TR	2SA1015 (Y)	
Q18,19	V03-1815-06	TR	2SC1815 (Y)	
Q20	V30-1045-06	IC	HA1366W	
Q21	V30-1223-16	IC	μPC78M08H	
Q22		Not used		
Q23	V01-0113-05	TR	2SA496 (Y)	
Q24	V03-0336-05	TR	2SC496 (Y)	
Q25,26	V03-1815-06	TR	2SC1815 (Y)	
Q27	V30-1223-16	IC	μPC78M08H	
Q28	V01-1015-06	TR	2SA1015 (Y)	
Q29	V03-2240-06	TR	2SC2240 (GR)	
Q30	V30-0039-05	IC	TA7061AP	
Q31,32	V03-0079-05	TR	2SC460 (B)	
Q33,34	V09-1014-06	FET	2SK61 (GR)	
Q35	V09-1002-56	FET	3SK74 (L)	
Q36	V03-2538-16	TR	2SC2538-22-A	
Q37,38	V03-0093-05	TR	2SC458(B) (W)(T)	
D1,2	V11-0051-05	Diode	1N60	
D3～6	V11-0076-05	Diode	1S1555	
D7～10	V11-0051-05	Diode	1N60	
D11	V11-1262-06	Varistor	1S1212	
D12	V11-0076-05	Diode	1S1555	
D13		not used		
D14	V11-0076-05	Diode	1S1555	
D15	V11-4163-56	Zener diode	XZ-088	
D16	V11-0076-05	Diode	1S1555	
D17	V11-4101-20	Zener diode	XZ-060	
D18	V11-4162-66	Zener diode	XZ-070	
D19	V11-0219-05	Diode	V06B	
D20,21	V11-0317-05	Vari-cap diode	1S2208	
D22～24	V11-7761-86	Vari-cap diode	ITT410	
D25	V11-0076-05	Diode	1S1555	
D26	V11-0076-05	Diode	1S1555 (W) (T)	
D27	V11-0076-05	Diode	1S1555 (T)	

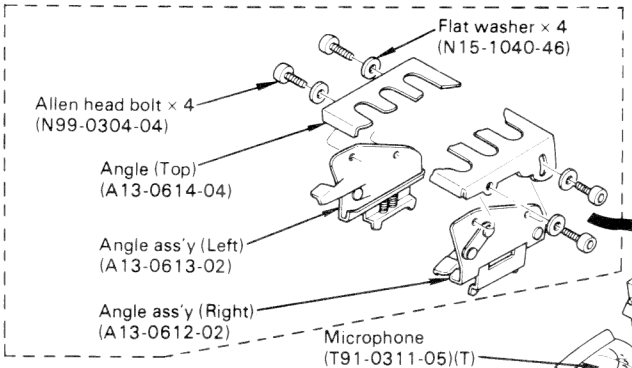
KEY BOARD ASSEMBLY / PACKING

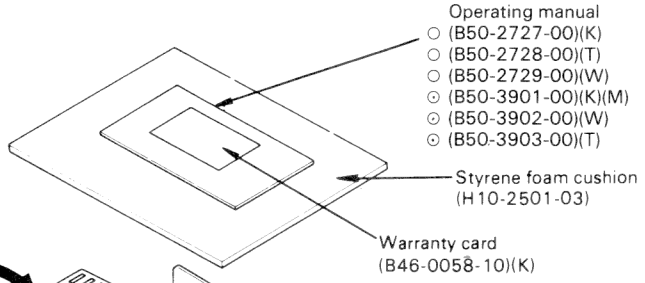
Key board ass'y (S59-0406-05)

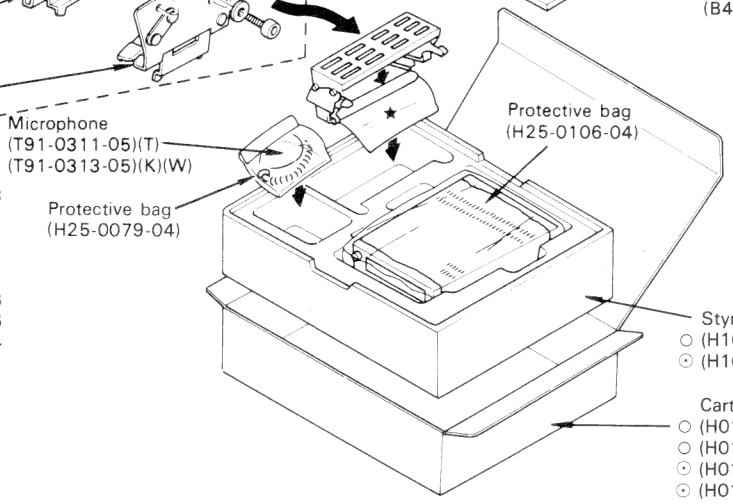


○ TR-7800
⊙ TR-7850

Angle ass'y (A13-0625-04)

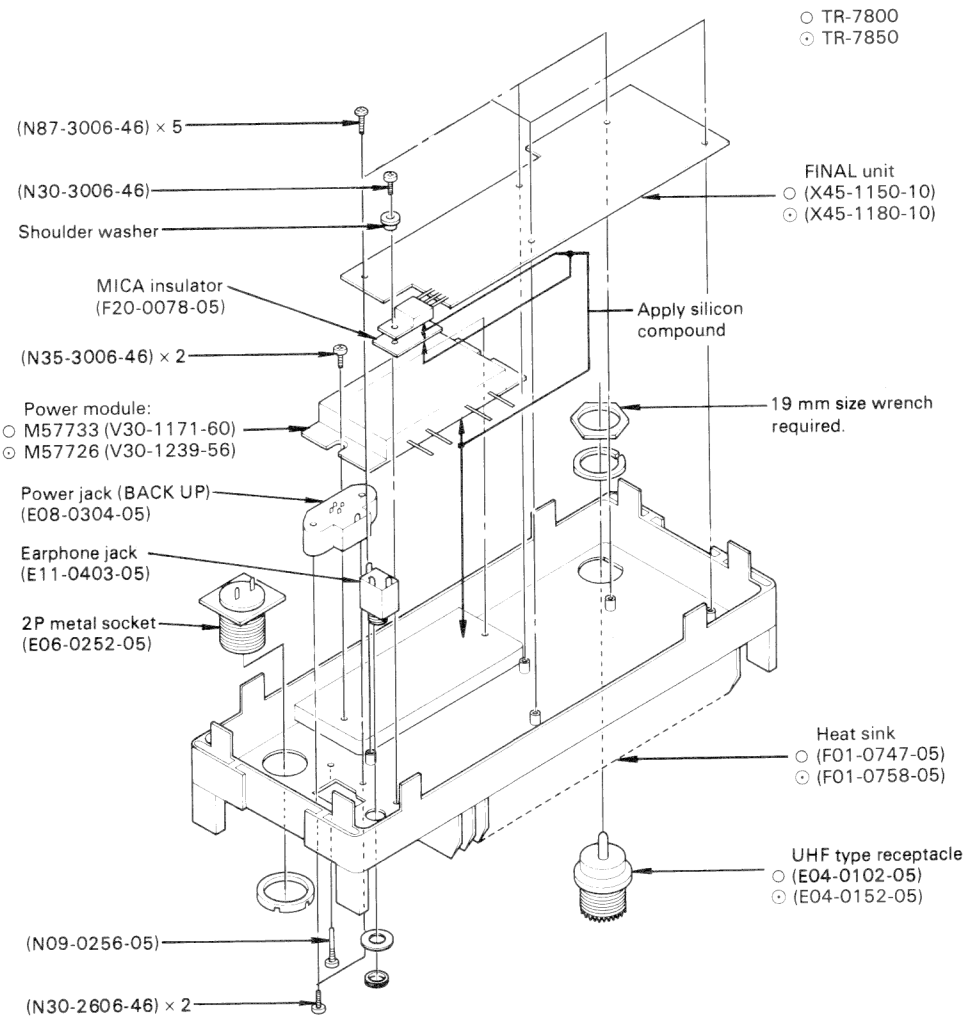






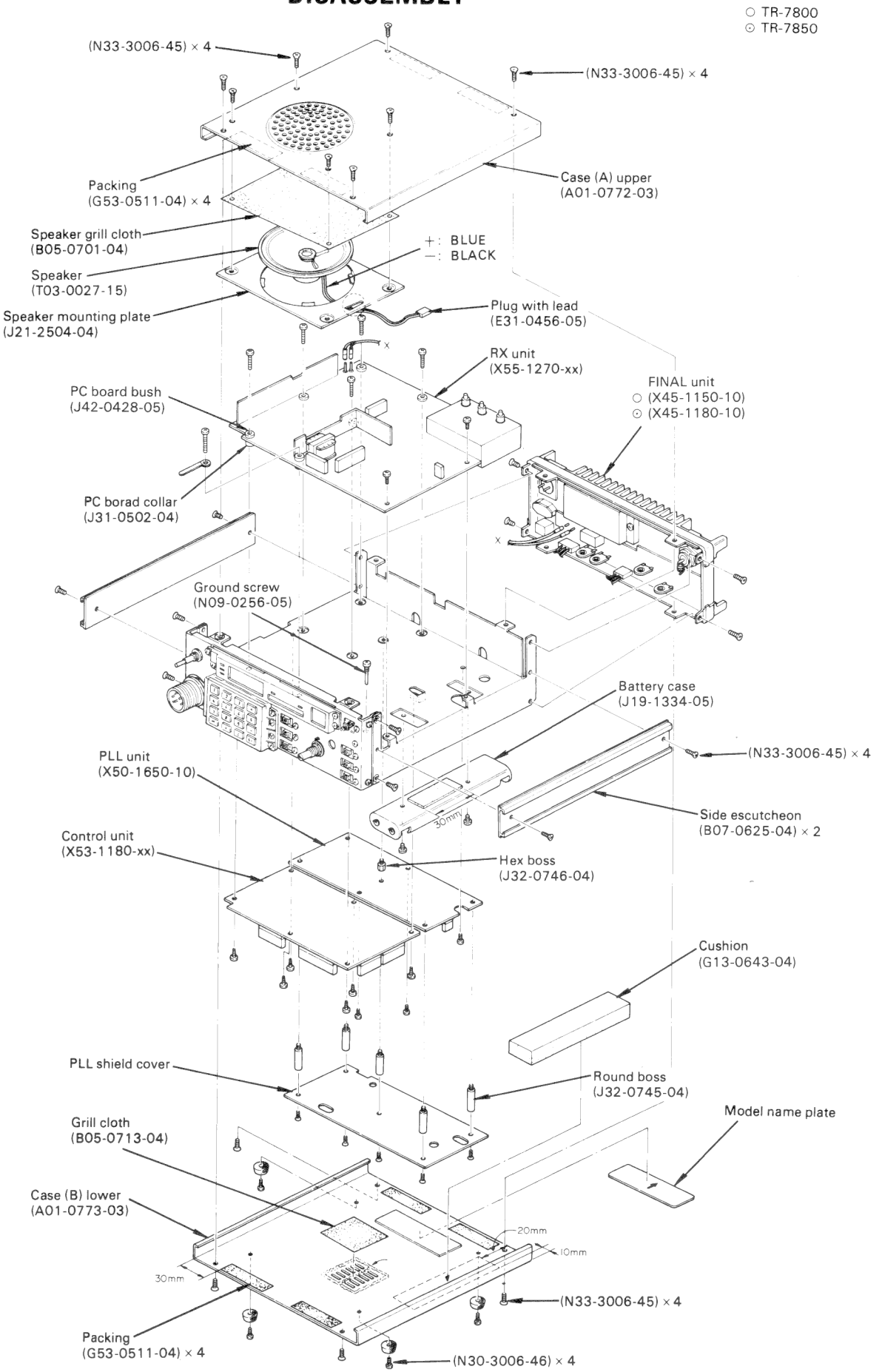
★ Accessory bag	H25-0049-03
Phone plug × 1	E12-0001-15
Fuse (8A) × 1	F05-8021-05
Foot × 2	J02-0069-05
Foot × 2	J02-0070-05
Screw × 2	N30-3006-46
Screw × 2	N30-3008-46
★ Protective bag	H25-0103-04
DC cord ass'y	○ E30-1674-05
	⊙ E30-1685-05

DISASSEMBLY

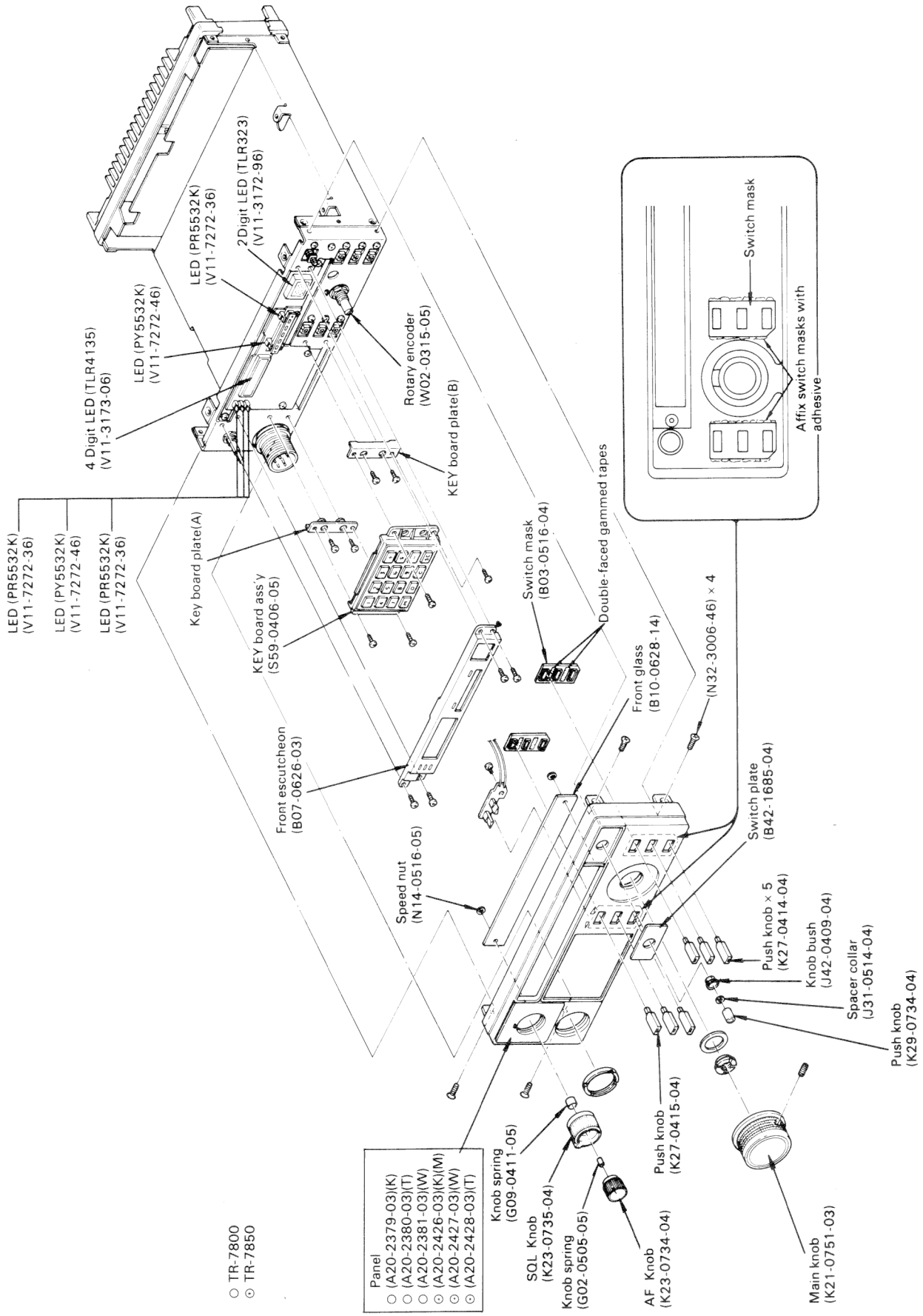


Heat sink ass'y/disassembly

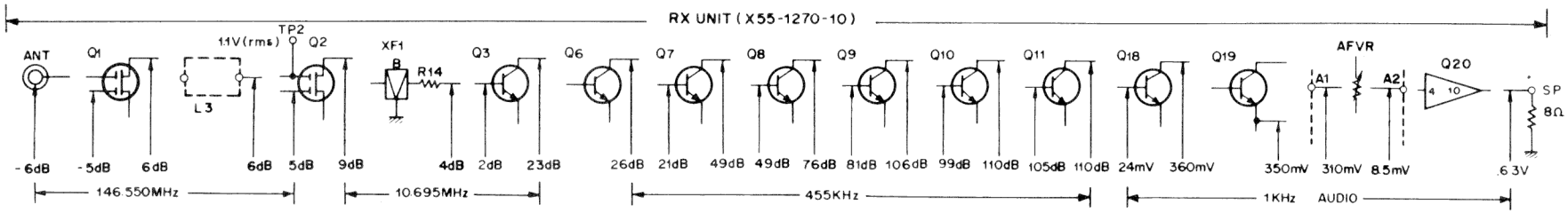
DISASSEMBLY



DISASSEMBLY



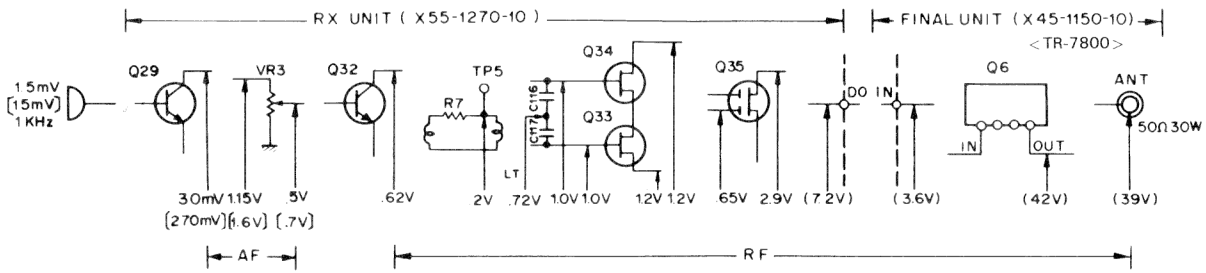
<Receiver Section>



Note:

1. In measuring the circuit from the ANT terminal to the collector of Q11, an unmodulated signal of 146.550 MHz, −6 dBμ from an SSG was applied to the ANT terminal to obtain a reference NQ sensitivity. Then, the SSG output was measured when the NQ sensitivity at each SSG signal input point became equal to the reference NQ sensitivity.
   The SSG output was measured through a 0.01 μF capacitor.
2. In measuring the circuit from the base of Q18 to the SP terminal, an SSG signal of 146.550 MHz, −6 dBμ, 1 kHz MOD, 5 kHz DEV was applied to the ANT terminal, and the AF VR was adjusted to obtain an AF output of 0.63V/8Ω. The signal voltage at each point was measured with an audio V.V.

<Transmitter Section>



Note:

1. The signal level before DO was measured with the coaxial cable disconnected from DO and the final unit. The signal level after the IN terminal was the level under normal operating conditions.
2. The AF unit was measured using an audio V.V., and the RF unit was measured using an RF V.V. (1/100 attenuator used for levels of more than 3V).
3. The RF voltages shown in round parentheses ( ) are reference values since they are subject to change according to the positions of the probes.
4. The AF voltages shown in square parentheses [ ] are values with an input of 15 mV.

<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	0.5V

ADJUSTMENTS

< Test Equipment >

1. Tester
   - 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 count)
   - 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 (MIC)	REC
AF VOL	MIN
SQUELCH VOL	MIN
KEY M. SEL SW	KEY
STEP SW	10 kHz
HI/LOW SW	HI
PRIORITY	
ALERT	OFF
OPER	OFF
TONE	OFF

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. 18.

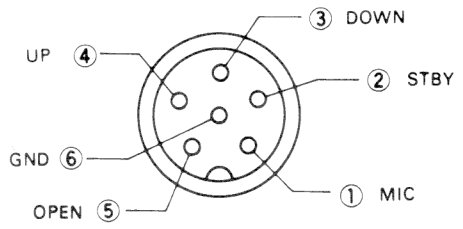
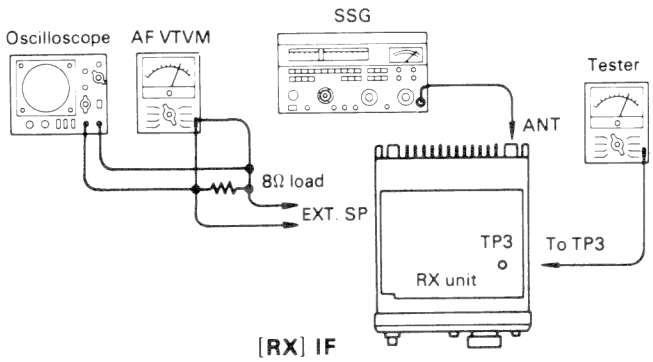
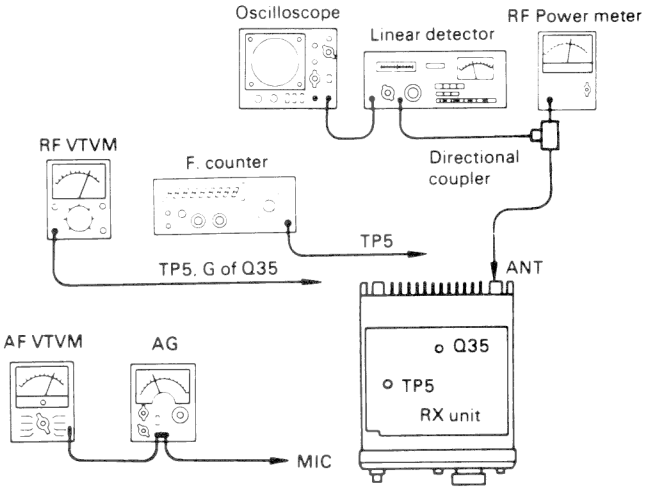


Fig. 17 MIC terminals (view from front panel side)

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



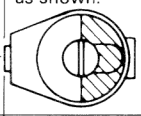
[RX] IF

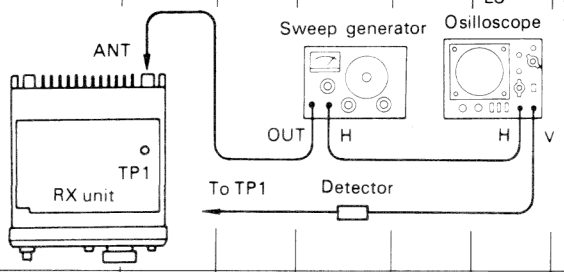


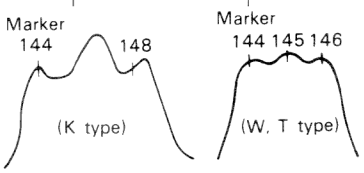
[TX] 10.695 MHz, VCT, Drive, Deviation

ADJUSTMENT

<TR-7800/7850>

Item	Condition	Measurement			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
(RX UNIT) 1. 10.695 MHz	1) Disconnect the LT connector. TX mode.	RF VTVM	RX	TP5	RX	L20, 21	Max.	0.21V rms nominal	
		f counter	RX	TP5	RX	TC1	f = 10.6950 MHz		
2. VCT circuit	1) Connect the LT connector. Adjust the dial frequency to 147.000 MHz (K type), 145.000 MHz (W,T type). Disconnect the D0 terminal. TX mode.	RF VTVM	RX	Q35.D	RX	L23, L24, L25, L26	Max. Repeat twice.	Nominal reading is 2 ~ 3V	Preset VR4 to the center position and TC2 to the minimum position as shown. 
3. Drive	1) Connect the D0 terminal and transmit. f=147.000 MHz (K) f=145.000 MHz (W, T)	Power meter			RX	TC2, TC3	Max. current drain	Approx. 31W	
		Spectrum analyzer			RX	VR4	Min. ± 10.7 MHz spurious		VR4 adjusting range: 11 o'clock.
4. Deviation	1) f = 147.000 MHz (K type) f = 145.000 MHz (W,T type) Apply a signal of 1 kHz, 60 mV to the MIC terminal.	Linear detector			RX	VR3	5.0 kHz deviation		
	2) Adjust the AG output level for 3.5 kHz deviation. TX mode							6 mV or less (AG output)	Check
5. Helical	1) Disconnect the LR connector (any frequency)		RX	TP1	RX	L1, L2, L3	Adjust L1 ~ L3 until the band response shown at the right is obtained.		
6. IF	1) Connect the LR terminal f = 146.100 MHz (K) f = 145.100 MHz (W, T) SSG output 10 dBμ (1 kHz, 5 kHz dev.)	DC V.M (3V range)	RX	TP3	RX	L4, L5, L6,	Max		
						L12	Max. AF output with best waveform.		
7. MB voltage	1) Turn the volume control to power SW. OFF.	DC V.M (6V range)	RX	MB terminal (harness connector)	RX	VR2	5.0V		
8. LED meter RX	1) SSG output 0 dBμ					VR1	One LED lights		
	2) SSG output 20 dBμ						Five LEDs light	+10 dB, −2 dB	Check
9-A. Tone frequency (W type)	1) Disconnect the D0 terminal. Press the tone switch (TX mode)	f counter	RX	Cathode of D26	RX	VR5	1750 Hz	± 10 Hz	
9-B. Tone burst frequency (T type)	1) Press the tone switch RX mode					VR5	1750 Hz	± 10 Hz	
	TX mode					VR6	To obtain modulation within about 0.7 sec.		





ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications	Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method		
(FINAL UNIT) 10. Protection NULL TR-7800 only	**TR-7800** 1) f = 147.000 MHz HI/LOW SW: HI TX mode	DC V.M (3V range)	Final	TP1	Final	VR2	Min.	0.7V or less	
11. High power output TR-7800 only	1) f = 147.000 MHz HI/LOW SW: HI TX mode	Power meter						Total current: 6.5A or less output: 28W or more	Check
	2) f = 139.900 MHz f = 148.995 MHz (K type) f = 144.000 MHz f = 145.995 MHz (W,T type)							25W or more	Check
12. Low power output and LED meter TR-7800 only	1) f = 147.000 MHz HI/LOW SW: LOW TX mode	Power meter			Final	VR4	12W		
						VR1	4th LED (red) disappears		
						VR4	5W	±0.5W	
	2) f = 143,900 MHz f = 148,995 MHz							5W within ±2W	Check
	3) HI/LOW SW: HI							Five LEDs light	Check
13. Protection TR-7800 only	1) f = 147,000 MHz HI/LOW SW: HI Open the ANT terminal (disconnect the load).	DCV.M (12V range)	Final	TP2	Final	VR3	VR3 turned fully counterclockwise, the meter should indicate about 12V. Clockwise adjustment reduces the voltage from about 12V to 6V. Adjust VR3 clockwise approx. 60° from this point.	Voltage: 5.0 ~ 6.0V Total current: 3A or less	Check
		FINAL UNIT adjustments for TR-7850, see page 29.							
(PLL) 14. IF	1) f = 148.995 MHz	RF VTVM	PLL	TP3	PLL	L5, L6, L11	Max.	0.5V or more	
15. Lock voltage	1) f = 148.994 MHz (K type) f = 144,000 MHz (W,T type)	DC V.M	PLL	TP2	PLL	TC1	7.0V (K type) 2.0V (W,T type)		TC1 is located in the VCO shielded compartment.
	2)-a f = 144.000 MHz (K type)							1.9V or more	Check
	2)-b f = 145.995 MHz (W,T type)							3 ~ 3,5V	Check
16. Output	1) f = 147.000 MHz (K) f = 145.000 MHz (W, T) TX mode	RF VTVM	PLL	TP1	PLL	L4	Max.		0.2V
17. Frequency	1) f = 144.000 MHz	f counter	PLL	TP1	PLL	TC2	133,305 MHz	±100 Hz	
	2) f = 144.005 MHz					VR1	133.310 MHz	±100 Hz	
(CONTROL) 18. Touch tone deviation K type only	1) First perform the RX unit deviation Adjustment in Item 4. After this adjustment transmit and depress the "1" key.	Linear detector			Control	VR1	2.6 kHz deviation. (L1: Adjustment is not needed.)		

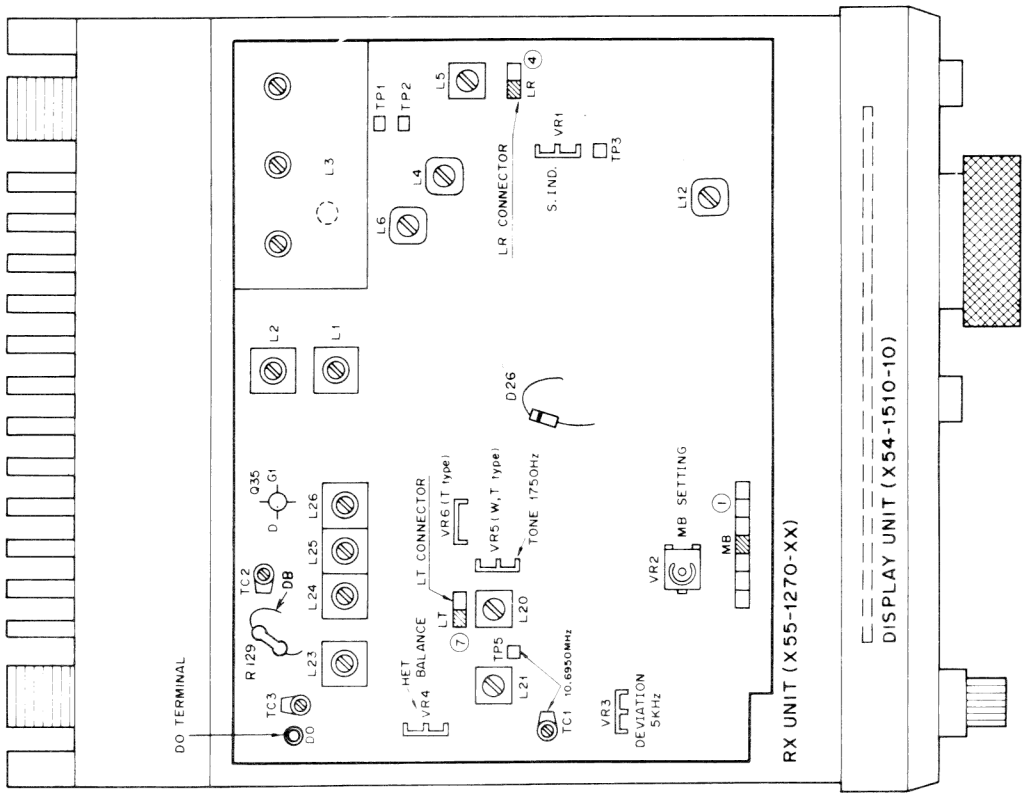
ADJUSTMENTS

<FINAL UNIT ADJUSTMENTS FOR TR-7850>

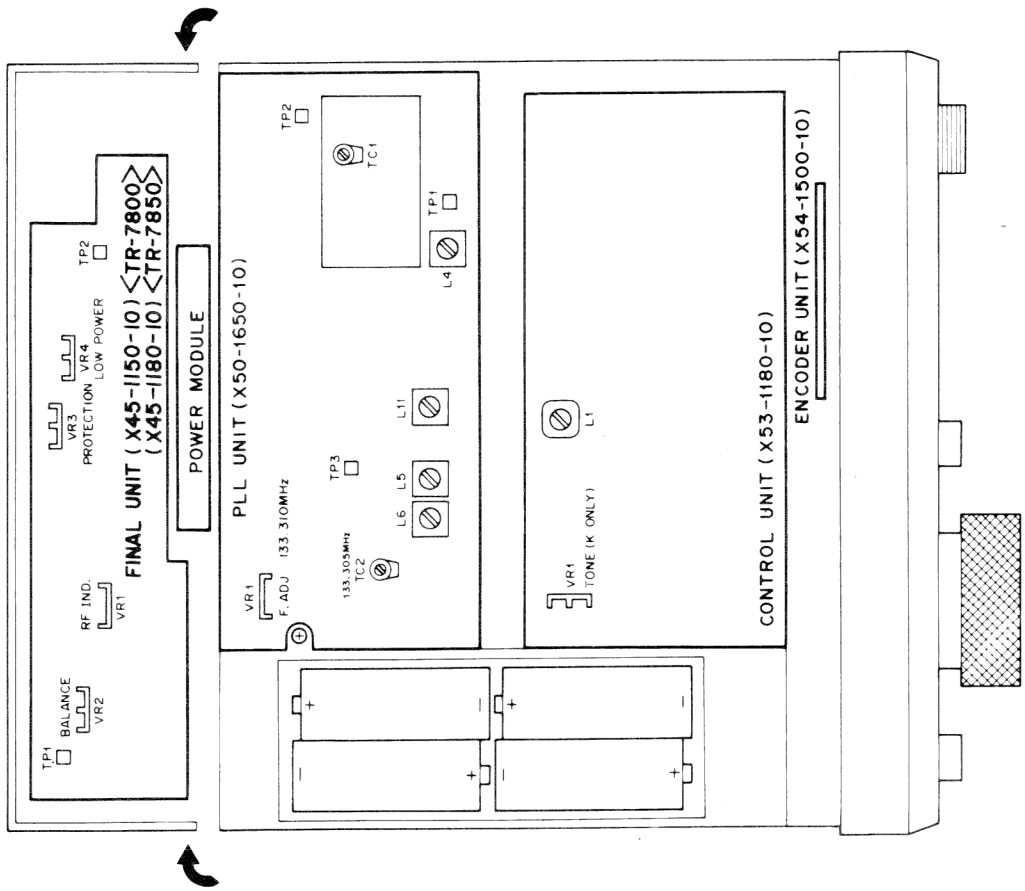
Item	Condition	Measurement			Adjustment			Specifications	Remarks
		Test equipment	Unit	Ter-minal	Unit	Part	Method		
1. Drive check	1) Remove the coaxial cable connected to terminal DO of the RX unit. Connect a power meter of F.S. = 3W to terminal DO f=148.00 MHz (K) f=145.995 MHz (W, T) Transmit	Power meter 3W			RX	TC2, 3	Adjust TC2 and TC3 for maximum output.	0.4~0.5W	
2. Power check	1) Center VR1, VR2 and VR4 of the final unit and set VR3 to 9 o'-clock. f=146.000 MHz(K) f=145.000 MHz(W,T) Connect the coaxial cable to terminal DO. Transmit	DC V.M	Final	TP1	Final	VR2	Adjust VR2 for the minimum voltage reading.	0.7V or less	
	2) Adjust the frequency to each of the following frequencies f=144.00 MHz, 146.00 MHz, 148.00 MHz (K); f=144.00 MHz, 145.995 MHz (W, T)	Power meter, DC A.M.						42W or more, 9.0A or less	Check
	3) K type only f= 148.995 MHz	Power meter						38W or more	
3. LOW power and LED meter	1) HI/LOW switch: LOW f=148.00 MHz (K) f=145.995 MHz (W, T)	Power meter			Final	VR4	Adjust VR4 for a power meter reading of 16W.		
	2) f=148.995 MHz (K) f=145.995 MHz (W, T)				Final	VR1	Adjust VR1 so that the fifth digit of the LED meter just goes off.		
	3) f=148.000 MHz (K) f=145.995 MHz (W, T)				Final	VR4	Adjust VR4 so that the power meter reads 12W (K) or 10W (W, T).		
	4) HI/LOW switch: HI.							All digits of the LED meter light.	Check
	5) HI/LOW switch: LOW f=144.000 MHz							2W or more	
4. Output power at a power supply voltage of 11V	1) Power supply votage: 11.0V HI/LOW switch: HI.	Power meter						20W or more	Check
	2) HI/LOW switch: LOW							The power meter moves to some extent.	
5. Protection	1) ANT terminal: Open Power supply voltage: 13.8V HI/LOW switch: HI f=148.000 MHz (K) f=145.995 MHz (W, T)	DC A.M.	Final	TP2	Final	VR3	Turn VR3 clockwise until the DC ammeter reads 4A.		
	2) f=143.900~148.995 MHz (K) f=144.000~145.995 MHz (W, T)							5A or less	Check
	3) Connect the power meter to the ANT terminal.	Power meter						42W or more	

ADJUSTMENTS

▼ TOP VIEW



▼BOTTOM VIEW

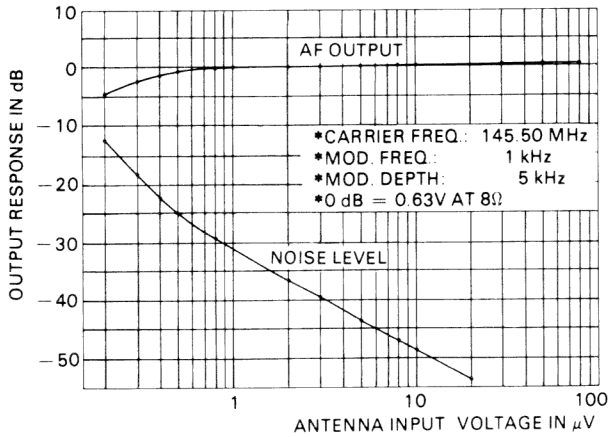


OPERATIONAL CHECKS (K type)

1. Depress the ▟ key.
   1) The orange ◄ LED will light.
   2) Enter frequency.
      a) The 4-digit frequency display will indicate 3 — 8 MHz.
      When the MHz digit is 3, only 9 should enter as a 100 kHz digit.
      When the 0 — 4 key is pressed, 0 enters as the 1 kHz digit.
      When the 5 — 9 key is pressed, 5 enters as the 1 kHz digit.
      b) After the full 4-digit frequency is entered, the yellow S (Simplex) LED will light.
   3) Selecting the TX OFFSET mode.
      a) The offset mode will enter when the "+", "—" or "S" keys are pressed between the frequency range of 4.000 to 7.995.
      b) Only the S mode should enter above or below this range.
   4) REV SW check
      a) Set frequency to 4.500 and press the "+" key.
      b) Press the REV key. The display should indicate 5.100 and the offset mode should indicate "+".
      c) Release the REV key. The display should again indicate 4.500 "—".
      d) Press the REV key. The display should indicate 4.500, S. The beeper will sound.
   5) "C" key check
      a) The display should indicate 4.500 S.
      b) Enter half frequency in the display.
      c) Press the "C" key. The display should return to 4.500 S.
   6) Memory channel selector check
      a) Turn the memory channel selector to the right. The channel display will continuously count from 0 to 14 in endless sequence.
      b) Turn the memory channel selector to the left. The channel display will count down from 14 to 0 in endless sequence.
   7) "M" key check
      a) When the memory channel selector is channel in 0 or 14 (K type) (channel 13 or 14W type).
         (1) Set frequency to 3.950.
         (2) Press the "M" key. The beeper will pulse.
         (3) Set TX frequency to 8.500.
         (4) Press the "M" key again. The display will indicate 3.950 and the beeper will stop sounding.
      b) When the memory channel selector is 0 channel 1 — 13 (K type) (channel 0 — 12W type)
         (1) Set frequency to 4.270 and TX offset to "+".
         (2) Press the "M" key and the beeper will sound.
         (3) Set frequency to 4.270 and the TX offset to "—".
         (4) The beeper will stop when the "M" key is pressed.
   8) "SC" key check
      a) Press the "SC" key. The radio will scan up continuously while the squelch is closed.
      b) Open the squelch and the scan will stop momentarily. Scan will resume at approx. 6 second intervals.
      c) Scan should release when the "C" key or PTT is pressed.
      d) The scan step will change from 10 kHz to 5 kHz by using the STEP switch.
   9) UP/DOWN check
      a) Connect the UP/DOWN microphone. The radio will scan up by pressing the UP switch and down by pressing the DOWN switch. Scan will stop when both switches are depressed.
      b) The scan up and down step is determined by the STEP switch.
2. Release the M. SEL ▟ key.
   1) The orange M. SEL ► LED will light.
   2) Turn the memory channel selector. The frequency set in item 1, 7) and TX mode will display.
   3) Priority alert switch check
      a) Press the priority alert switch to open the squelch.
      b) The beeper will sound at about 6 second intervals.
   4) Priority operate switch check
      a) Press the priority operate switch and the channel display will indicate CH 0 (CH 14 for W type). The display will indicate the frequency set in item 1, 7.
      b) This operation takes precedence over other functions (except during keyboard entry).
   5) REV will operate with any memory.
   6) The SC (scan) will operate with frequencies stored in memory. All other functions are as outlined in item 1 — 8.
   7) The scan will move up or down for the channel as selected by the UP/DOWN microphone switch.
3. Transmit mode checks.
   1) Touch tone encoder check.
      a) Press the 1 — 9, 0, C, and M keys. The signal from the receive monitor should be two tone.
      b) When two keys are pressed simultaneously, check that the signal from the receive monitor is A single tone.
4. Back up function check
   a) Turn the power switch ON and OFF. Check that the display frequency is retained.
      a) When the power switch is turned OFF and ON during scan, the scan should be released.
5. 7.6V DC ±0.5V should be present at the battery case "+" terminal at power SW ON when battery is not loaded.

REFERENCE DATA

< RX Sensitivity >



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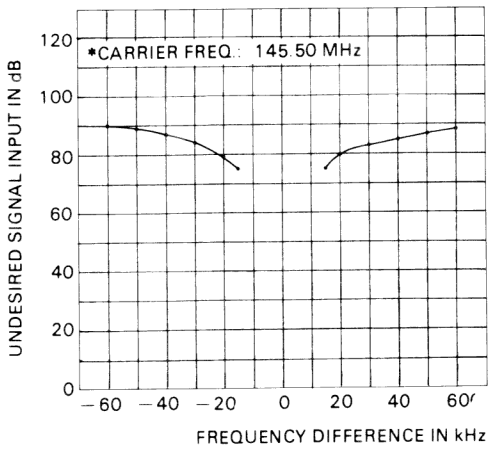
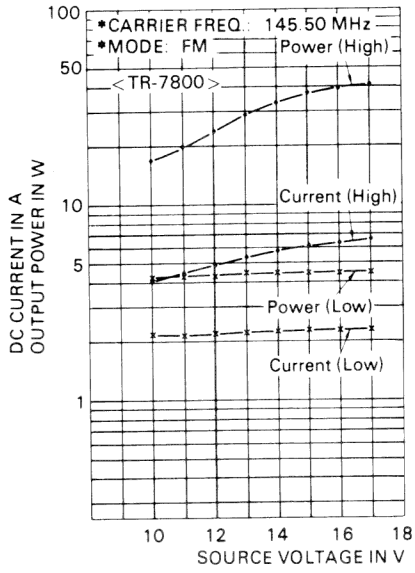


< OUTPUT POWER/CURRENT >



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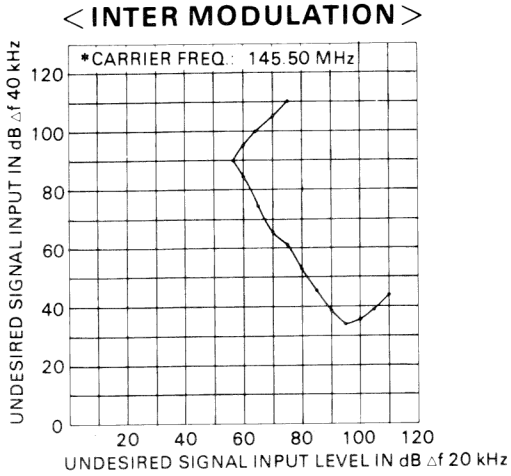

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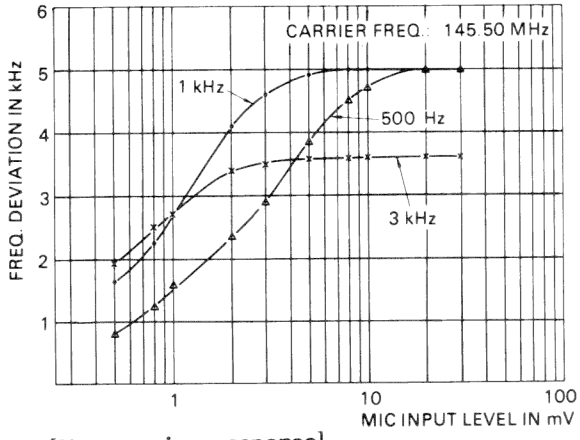
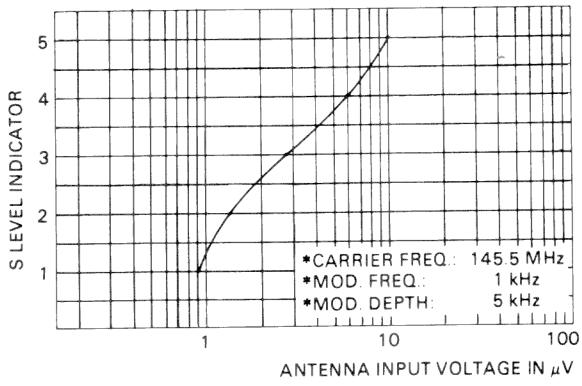
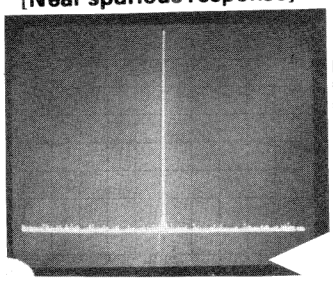


< S LEVEL SENSITIVITY >



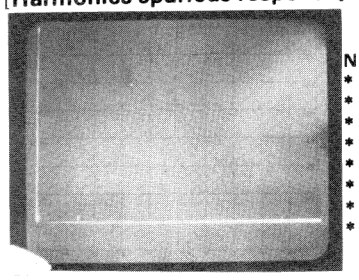
[Near spurious response]



< TR-7800 >

NOTE:
* CARRIER FREQ.: 146.00 MHz
* RF POWER: 30W
* SCAN WIDTH: 5 MHz/DIV
* BAND WIDTH: 10 kHz
* SCAN TIME: 0.5 SEC
* VIDEO FILTER: 10 kHz
* INPUT ATT.: 26 dB
LOG REF LEVEL: −6 dBm
10 dB/DIV

[Harmonics spurious response]

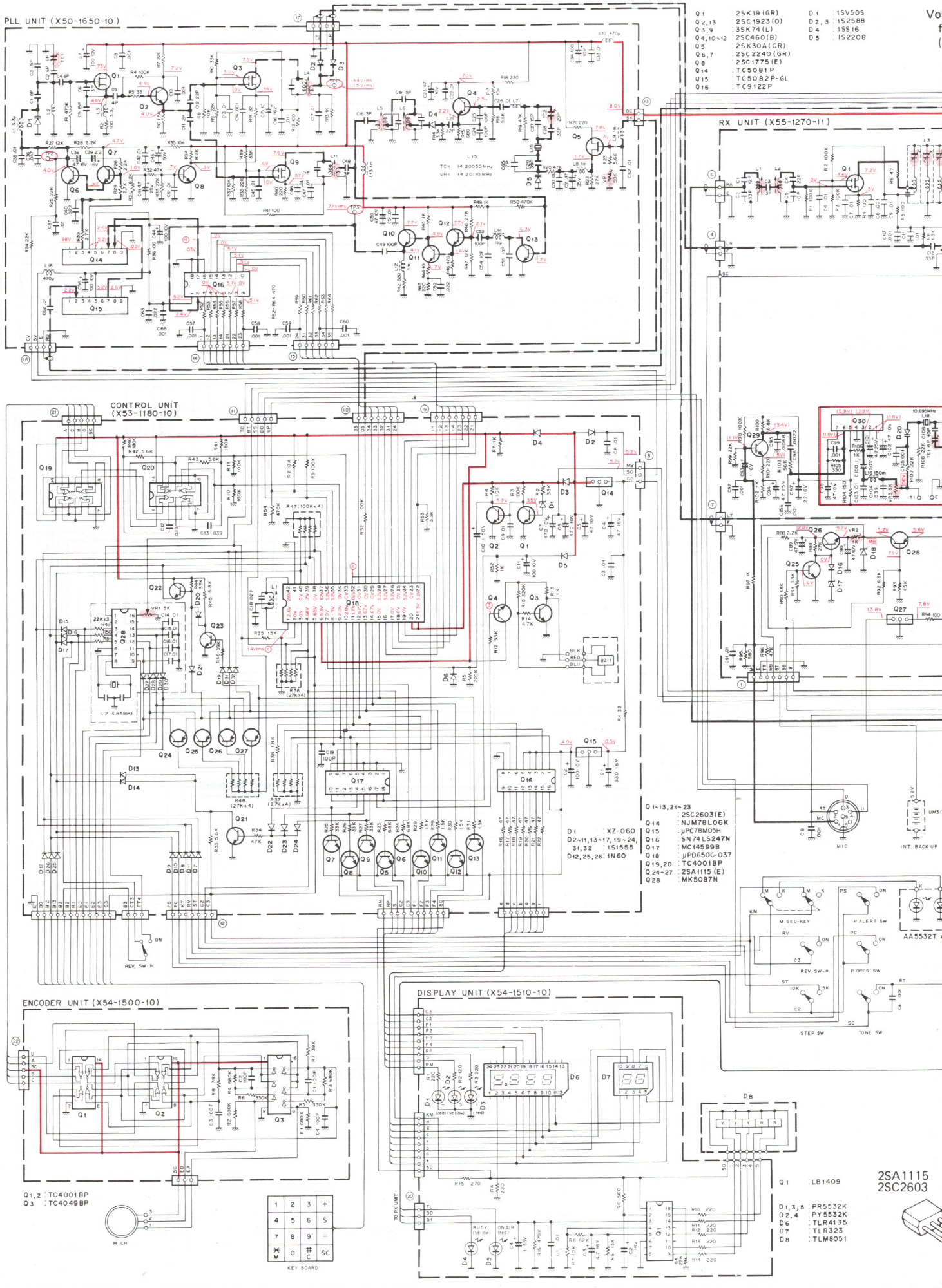


< TR-7800 >

NOTE:
* CARRIER FREQ.: 146.00 MHz
* RF POWER: 30W
* SCAN WIDTH: 100 MHz/DIV
* BAND WIDTH: 100 kHz
* SCAN TIME: 10 SEC
* VIDEO FILTER: 100 Hz
* INPUT ATT.: 26 dB
* LOG REF LEVEL: −7 dBm
10 dB/DIV

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

SCHEM



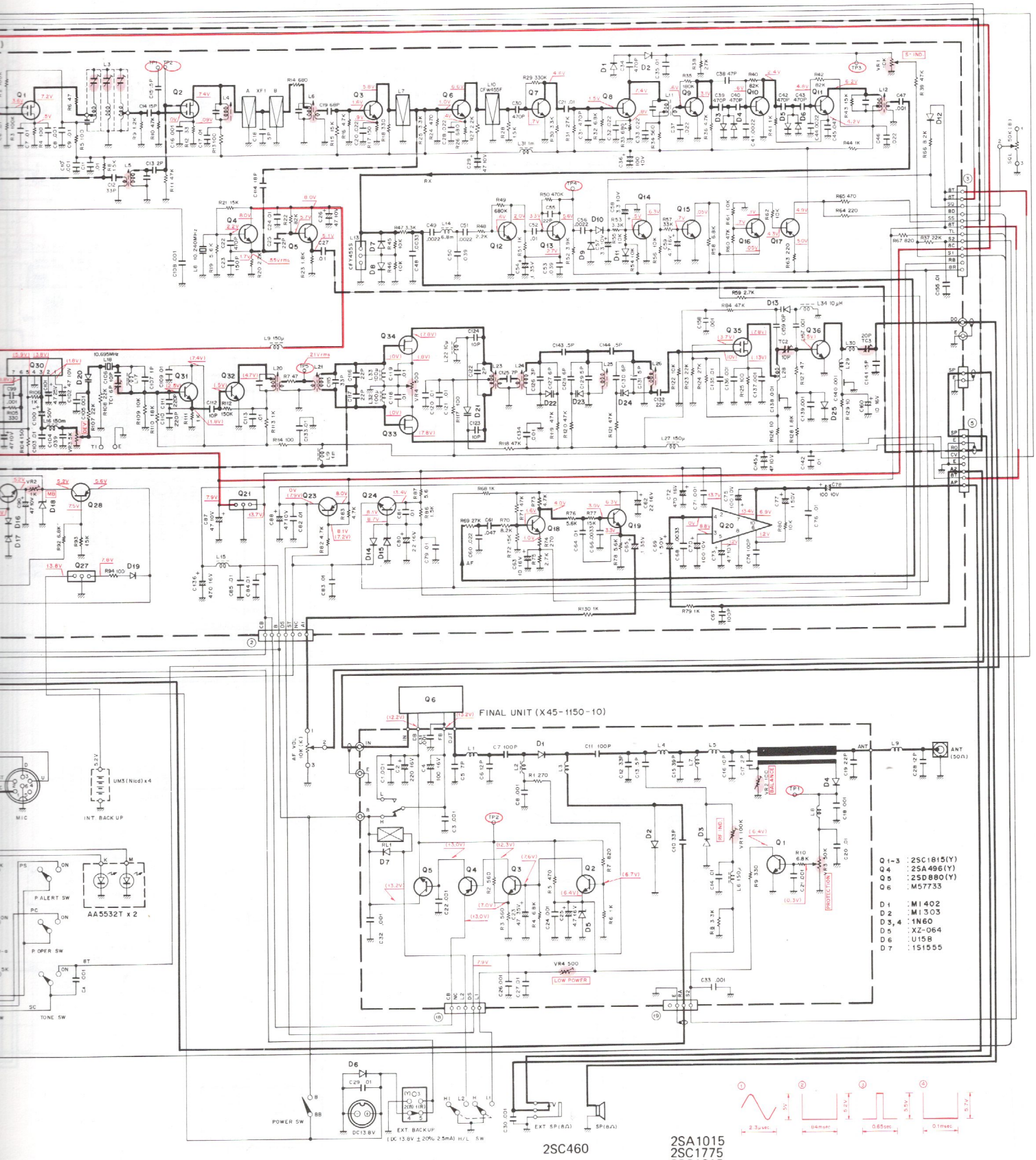
SCHEMATIC DIAGRAM (K)(M)

TR-7800

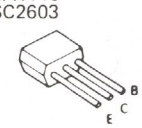
1SV50S
1S2588
1SS16
1S2208

Voltage measurement conditions
f = 146.0 MHz
( ): in TX

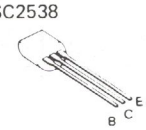
Q1, 2, 35	: 3SK74(L)	Q29	: 2SC2240 (GR)	D1, 2, 7~10	: 1N60
Q3~11, 31, 32	: 2SC460(B)	Q30	: TA7061AP	D3~6, 12, 14, 16, 25	: 1S1555
Q12, 13	: 2SC1775 (E)	Q33, 34	: 2SK61 (GR)	D11	: 1S4212
Q14~16, 18, 19, 25, 26	: 2SC1815(Y)	Q36	: 2SC2538-22-A	D15	: XZ-088
Q17, 28	: 2SA1015(Y)			D17	: XZ-060
Q20	: HA1366W			D18	: XZ-070
Q21, 27	: μPC78H08H			D19	: V06B
Q23	: 2SA496(Y)			D20, 21	: 1S2208
Q24	: 2SC496 (Y)			D13, 22~24	: 1TT410



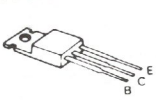
2SA1115
2SC2603



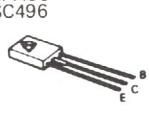
2SC2538



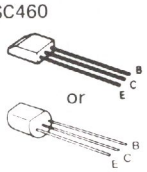
2SD880



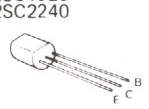
2SA496
2SC496



2SC460



2SA1015
2SC1775
2SC1815
2SC1923
2SC2240



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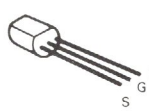
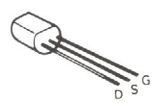


2SK61



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

SCHEMAT

Voltage measu
f=146.0 MH
( ): in TX

PLL UNIT (X50-1650-10)

CONTROL UNIT (X53-1180-61)

RX UNIT (X55-1270-52, -62)

ENCODER UNIT (X54-1500-10)

DISPLAY UNIT (X54-1510-10)

Q1	2SK19(GR)
Q2,13	2SC1923(O)
Q3,9	3SK74(L)
Q4,10~12	2SC460(B)
Q5	2SK30A(GR)
Q6,7	2SC2240(GR)
Q8	2SC1775(E)
Q14	TC5081P
Q15	TC5082P-GL
Q16	TC9122P
D1	1SV50S
D2,3	1S2588
D4	1SS16
D5	1S2208

Q1~13,21~23	2SC2603(E)
Q14	NJM78L06K
Q15	μPC78M05H
Q16	SN74LS247N
Q17	MC14599B
Q18	μPD650C-037
Q19,20	TC4001BP
D1	XZ-060
D2~11,13~17,19~24, 33~36	1S1555
D12,25,26	1N60

Q1,2	TC4001BP
Q3	TC4049BP

Q1	LB1409
D1,3,5	PR5532K
D2,4	PY5532K
D6	TLR4135
D7	TLR323
D8	TLM8051

2SK19

SCHEMATIC DIAGRAM (T)(W)

TR-7800

Voltage measurement conditions
f = 146.0 MHz
( ): in TX

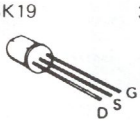
Q1, 2, 35	3SK74(L)
Q3~11, 31, 32	2SC460(B)
Q12, 13	2SC1775(E)
Q14~16, 18, 19, 25, 26	2SC1815(Y)
Q17, 28	2SA1015(Y)
Q20	HA1366W
Q21, 27	μPC78H08H
Q23	2SA496(Y)
Q24	2SC496(Y)
Q29	2SC2240(GR)
Q30	TA7061AP
Q33, 34	2SK61(GR)
Q36	2SC2538-22-A
Q37, 38	2SC458(B)

D1, 2, 7~10	1N60
D3~6, 12, 14, 16, 25~27	1S1555
D11	1S1212
D15	XZ-088
D17	XZ-060
D18	XZ-070
D19	V06B
D20, 21	1S2208
D13, 22~24	1T410

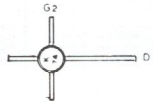
FINAL UNIT (X45-1150-10)

Q1~3	2SC1815(Y)
Q4	2SA496(Y)
Q5	2SD880(Y)
Q6	M57733
D1	M1402
D2	M1303
D3, 4	1N60
D5	XZ-064
D6	U15B
D7	1S1555

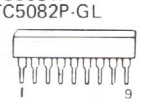
2SK19



3SK74



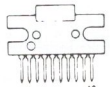
TC5081P
TC5082P-GL



μPC78M05H
μPC78M08H

NJM78L06K

HA1366W



TA7061AP

PR, Y-5532K

TERMINAL FANCTIONS

PLL UNIT (X50-1650-10)

Wire harness number	Terminal	Remarks
⑯	CV	Control voltage for Vari-caps
	5V	+5 Volts
	RO	Reference oscillator 10.240 MHz
⑭	11	A — 10 kHz PLL Data
	12	B — 10 kHz PLL Data
	13	C — 10 kHz PLL Data
	14	D — 10 kHz PLL Data
	21	A — 100 kHz PLL Data
	22	B — 100 kHz PLL Data
	23	C — 100 kHz PLL Data
⑮	24	D — 100 kHz PLL Data
	31	A — 10 MHz PLL Data
	32	B — 10 MHz PLL Data
	33	C — 10 MHz PLL Data
	34	D — 10 MHz PLL Data
	35	10 MHz PLL Data
⑬	8C	+8 Common
	5K	5 kHz from CPU to turn on Q-5

CONTROL UNIT (X53-1180-10)

⑧	MB	+5.2 Memory back up voltage
	5C	+5 Common
	CB	+13.8 Common
⑨	See PLL	
⑩	See PLL	
⑪	TO	Tone out
	8T	+8 on TX
	SS	Scan stop from Q17 Low to high when Squelch open
	DO	Down signal from mic sw. Hi to low when sw push
	UP	Up signal from mic sw. Hi to low when sw push
㉑	A	Rotary encoder information to CPU
	B	Rotary encoder information to CPU
	C	Rotary encoder information to CPU
	D	Rotary encoder information to CPU
	5C	+5 Common
⑫	PS	When priority/operate on
	PC	Priority operation input
	KY	When MEM/Sel on
	RV	When REV on
	ST	When Step 5 kHz/10 kHz on
	C2	Common pulse output
	C3	Common reverse pulse output
	RM	Minus offset Hi when + offset
	RP	Plus offset Hi when − offset
	S	Simplex Hi when in simplex
	C2	
	C3	
	F1～F4	Main digit display drive signals
	5D	+5 for display from Q-15
	a～f	Segment drive signals

RX UNIT (X55-1270-10)

①	MC	Mic input
	TT	Touch tone signal from control unit
	MB	Memory back up +5.2
	BT	Battery terminal back up batteries
	BB	External battery back up
	B	Common +13.8
	CGB	Always +13.8
②	CB	+13.8
	B	+13.8
	DS	Diode switch +8 when TX
	ST	Ptt switch signal +8 to 0 when PTT ON
	NC	open
	A1	Top of AF VR control
③	8T	+8 in TX
	SQ	Arm of squelch VR
	BD	To LED Busy Light
	SS	Scan stop +5 when squelch open
	TL	Transmit light
	S2	RF level from final unit for meter
	8C	+8 common from Q-21
	S1	S meter level signal to display
	RB	0 in TX +8.8 in RX
	8R	+8 in RX
④	LR	PLL signal local reference
⑤	SP	Speaker to external speaker
	RO	Reference oscillator 10.240 MHz
	CV	Control voltage for Varicaps
	A2	Arm of AF VR
	8T	+8 in TX
	AP	Audio output
⑥	RA	Receive antenna
⑦	LT	PLL drive for TX
	DO	Drive out to final
	SP	To internal speaker
	DB	Drive B+ 12.3 on TX

DISPLAY UNIT (X54-1510-10)

⑳	TL	Transmit light
	BD	Busy light
	S1	Smeter/power meter signal

FINAL UNIT (X45-1150-10) (X45-1180-10)

○ TR-7800 only

	B	+13.8 when power switch on
	IN	Drive from RX unit
	DB	+12.3 for Hi power TX
	FB	B + for in power
	OUT	RF out
	ANT	Antenna terminal
⑱	CB	Common 13.8
	○ L2	Ground when in low power RL-1 on
	○ DS	+8 when TX diode SW line for MI402, MI303
	DS	+8 when TX diode SW line for UM9401, MI402
	L1	Ground in low power
⑲	○ RB	+8 in RX
	RA	Receive antenna
	S2	RF level signal

Signal line – – – Control line ——— Common DC line

SCHEMA

Voltag
f = 1
( ) :

PLL UNIT (X50-1650-10)

RX UNIT (X55-1270-10)

CONTROL UNIT (X53-1180-10)

ENCODER UNIT (X54-1500-10)

DISPLAY UNIT (X54-1510-10)

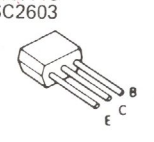
Q1	: 2SK19 (GR)	D1	: 1SV505
Q2,13	: 2SC1923 (O)	D2,3	: 1S2588
Q3,9	: 3SK74 (L)	D4	: 1SS16
Q4,10~12	: 2SC460 (B)	D5	: 1S2208
Q5	: 2SK30A (GR)		
Q6,7	: 2SC2240 (GR)		
Q8	: 2SC1775 (E)		
Q14	: TC5081P		
Q15	: TC5082P-GL		
Q16	: TC9122P		

Q1~13,21~23	: 2SC2603 (E)
Q14	: NJM78L06K
Q15	: μPC78M05H
Q16	: SN74LS247N
Q17	: MC14599B
Q18	: μPD6500-037
Q19,20	: TC40018P
Q24~27	: 2SA1115 (E)
Q28	: MK5087N

D1	: XZ-060
D2~11,13~17,19~24, 31,32	: 1S1555
D12,25,26	: 1N60

Q1,2 : TC4001BP
Q3 : TC4049BP

Q1	: LB1409		
D1,3,5	: PR5532K	2SA1115	
D2,4	: PY5532K	2SC2603	
D6	: TLR4135		
D7	: TLR323		
D8	: TLM8051		



SCHEMATIC DIAGRAM (K)(M)

TR-7850

D1 : 1SV505
D2,3 : 1S2588
D4 : 1SS16
D5 : 1S2208

Voltage measurement conditions
f = 146.0 MHz
( ): in TX

Q1,2,35	: 3SK74(L)	Q29	: 2SC2240(GR)	D1,2,7~10	: 1N60
Q3~11,31,32	: 2SC460(B)	Q30	: TA7061AP	D3~6,12,14,16,25	: 1S1555
Q12,13	: 2SC1775(E)	Q33,34	: 2SK61(GR)	D11	: 1S1212
Q14~16,18,19,25,26	: 2SC1815(Y)	Q36	: 2SC2538-22-A	D15	: XZ-088
Q17,28	: 2SA1015(Y)			D17	: XZ-060
Q20	: HA13666W			D18	: XZ-070
Q21,27	: μPC78M08H			D19	: V06B
Q23	: 2SA496(Y)			D20,21	: 1S2208
Q24	: 2SC496(Y)			D13,22~24	: 1TT410

FINAL UNIT (X45-1180-10)

Q1	: M57726
Q2	: 2SA496(Y)
Q3~5	: 2SC1815(Y)
Q6	: 2SD880(Y)
D1	: UM9401
D2	: MI402
D3	: 1S1587
D4	: 1SS99
D5	: XZ-064
D6	: U15B

2SA1115
2SC2603

2SC2538

2SD880

2SA496
2SC496

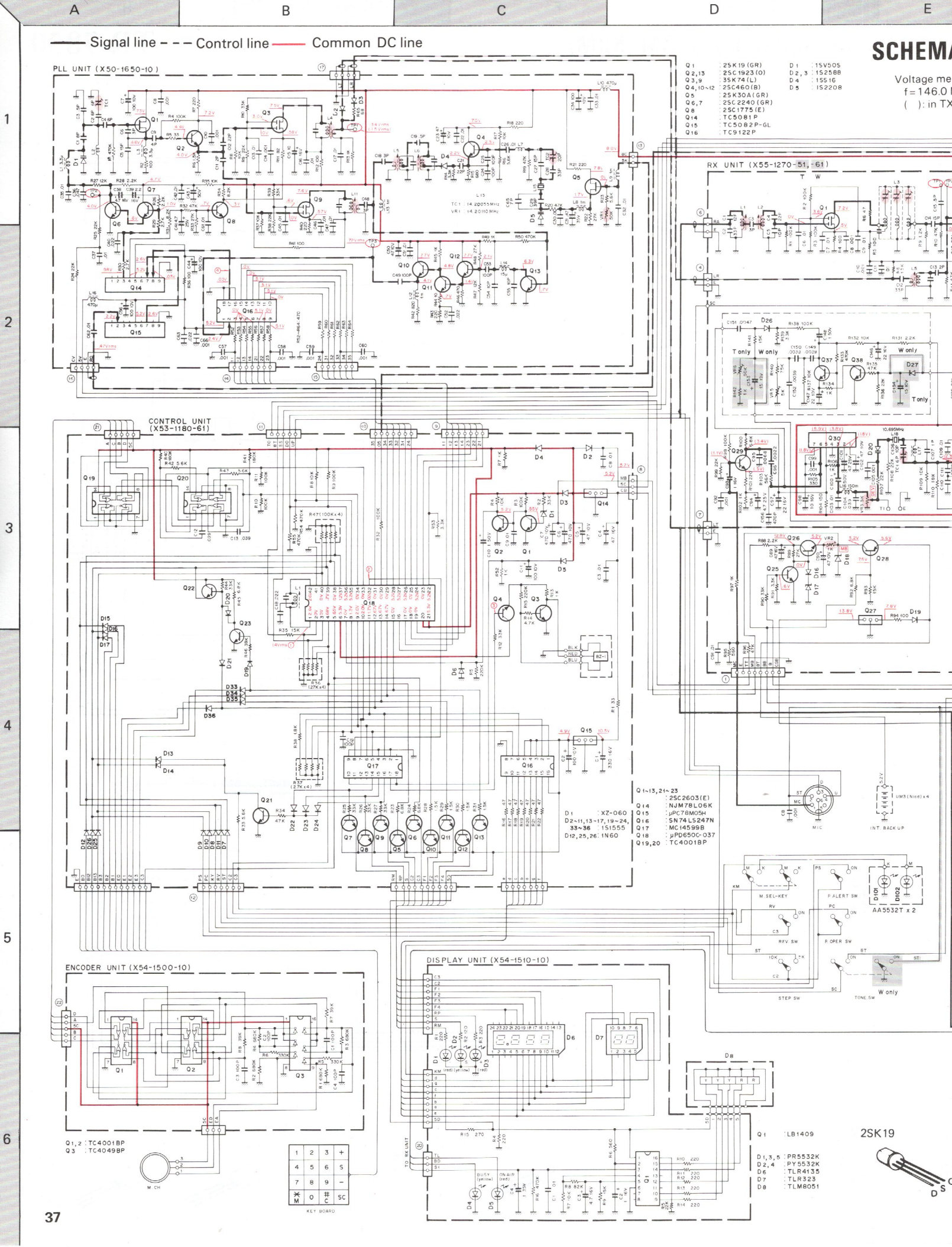
2SC460

or

2SA1015
2SC1775
2SC1815
2SC1923
2SC2240

2SK30A

2SK61


Signal line
Control line
Common DC line
SCHEMA
Voltage me
f=146.0
( ): in TX
PLL UNIT (X50-1650-10)
RX UNIT (X55-1270-51, -61)
CONTROL UNIT (X53-1180-61)
ENCODER UNIT (X54-1500-10)
DISPLAY UNIT (X54-1510-10)
Q1 : 2SK19 (GR)
Q2,13 : 2SC1923 (O)
Q3,9 : 3SK74 (L)
Q4,10~12 : 2SC460 (B)
Q5 : 2SK30A (GR)
Q6,7 : 2SC2240 (GR)
Q8 : 2SC1775 (E)
Q14 : TC5081P
Q15 : TC5082P-GL
Q16 : TC9122P
D1 : 1SV505
D2,3 : 1S2588
D4 : 1SS16
D5 : 1S2208
Q1~13,21~23 : 2SC2603(E)
Q14 : NJM78L06K
Q15 : μPC78M05H
Q16 : SN74LS247N
Q17 : MC14599B
Q18 : μPD650C-037
Q19,20 : TC4001BP
D1 : XZ-060
D2~11,13~17,19~24, 33~36 : 1S1555
D12,25,26 : 1N60
Q1,2 : TC4001BP
Q3 : TC4049BP
Q1 : LB1409
D1,3,5 : PR5532K
D2,4 : PY5532K
D6 : TLR4135
D7 : TLR323
D8 : TLM8051
2SK19
M.CH
KEY BOARD
MIC
INT. BACK UP
M.SEL-KEY
P.ALERT SW
REV. SW
P.OPER SW
STEP SW
TONE SW
AA5532T x 2
TO RK UNIT

SCHEMATIC DIAGRAM (T)(W)

TR-7850

Voltage measurement conditions
f=146.0 MHz
( ): in TX

D1 : 1SV505
D2, 3 : 1S2588
D4 : 1SS16
D5 : 1S2208

Q1, 2, 35 : 3SK74(L)
Q3~11, 31, 32 : 2SC460(B)
Q12, 13 : 2SC1775(E)
Q14~16, 18, 19, 25, 26 : 2SC1815(Y)
Q17, 28 : 2SA1015(Y)
Q20 : HA1366W
Q21, 27 : μPC78M08H
Q23 : 2SA496(Y)
Q24 : 2SC496(Y)
Q29 : 2SC2240(GR)
Q30 : TA7061AP
Q33, 34 : 2SK61(GR)
Q36 : 2SC2538-22-A
Q37, 38 : 2SC458(B)

D1, 2, 7~10 : 1N60
D3~6, 12, 14, 16, 25~27 : 1S1555
D11 : 1S1212
D15 : XZ-088
D17 : XZ-060
D18 : XZ-070
D19 : V06B
D20, 21 : 1S2208
D13, 22~24 : 1TT410

(270-51, -61)

T W

W only

T only

FINAL UNIT (X45-1180-10)

Q1 : M57726
Q2 : 2SA496(Y)
Q3~5 : 2SC1815(Y)
Q6 : 2SD880(Y)

D1 : UM9401
D2 : MI402
D3 : 1S1587
D4 : 1SS99
D5 : XZ-064
D6 : U15B

MIC
INT. BACK UP
UM3(Nicd)x4
P. ALERT SW
P. OPER SW
REV. SW
STEP SW
TONE SW
AA5532T x 2
POWER SW
DC13.8V
EXT. BACKUP
EXT. SP(8Ω)
SP(8Ω)

LB1409
PR5532K
PY5532K
TLR4135
TLR323
TLM8051

2SK19
3SK74
TC5081P
TC5082P-GL
μPC78M05H
μPC78M08H
NJM78L06K
HA1366W
TA7061AP

PR, Y-5532K

SPECIFICATIONS

TR-7800

General

Semiconductors	MPU 1 ICs 18 (W)(T), 19 (K)(M) Transistors 58 (W)(T), 60 (K)(M) FETs 9 Diodes 77 (K)(M), 78 (W), 79 (T)
Frequency range	144,000 to 145,995 MHz (W)(T) 144,000 to 147,995 MHz (K)
Frequency synthesizer	Digital control, phase locked VCO
Mode	FM (F3)
Antenna impedance	50 ohms
Power requirement	13.8V DC ±15%
Grounding	Negative
Operating temperature	−20°C to +50°C
Current drain	0.4A in receive mode with no input signal 6.5A in HI transmit mode (Approx.) 3A in LOW transmit mode (Approx.) Less than 2.3 mA for memory back up (from battery)
Dimensions	175 mm (6 − 7/8″) wide 64 mm (2 − 1/2″) high 206 mm (8-1/16″) deep (Projections excluded)
Weight	2.1 kg (4.63 lbs) (Approx.)

Transmitter Section

RF output power (at 13.8V DC, 50Ω load)	HI 25 Watts min. LOW 5 Watts approx. (Adjustable)
Modulation	Variable reactance direct shift
Frequency tolerance (−20°C ~ +50°C)	Less than $\pm 20 \times 10^{-6}$ dB
Spurious radiation	HI Less than −60 dB LOW Less than −53 dB
Maximum frequency deviation (FM)	±5 kHz
RPT. Tone (Burst) frequency	1,750 Hz (Burst): (T)
Microphone	Dynamic microphone with PTT switch, 500Ω

Receiver Section

Circuitry	Double conversion superheterodyne
Intermediate frequency	1st 1F 10,695 MHz 2nd 1F 455 kHz
Receiver sensitivity	Better than 0.5μV for 30 dB S/N Better than 0.2μV for 12 dB SINAD
Receiver selectivity	More than 12 kHz (−6 dB) Less than 24 kHz (−60 dB)
Spurious response	Better than 60 dB
Squelch sensitivity	0.16μV (threshold)
Auto scan stop level	Less than 0.2μV (threshold)
Audio output	More than 2.0 watts across 8 ohm load (10% dist.)

TR-7850

General

Semiconductors	MPU 1 ICs 18 (W)(T), 19 (K)(T) Transistors 58 (W)(T), 60 (K)(M) FETs 9 Diodes 78 (W), 79 (K)(M)(T)
Frequency range	144,000 to 145,995 MHz (W)(T) 144,000 to 148,995 MHz (K)(M)
Frequency synthesizer	Digital control, phase locked VCO
Mode	FM (F3)
Antenna impedance	50 ohms
Power requirement	13.8V DC ±15%
Grounding	Negative
Operating temperature	−20°C to +50°C
Current drain	0.4A in receive mode with no input signal 9A in HI transmit mode (Approx.) Less than 3 mA for memory back up (from an external power supply through the BACK UP terminal) Less than 2 mA for memory back up (from battery)
Dimensions	175 mm (6 − 7/8″) wide 64 mm (2 − 1/2″) high 220 mm (8-5/8″) deep (Projections excluded)
Weight	2.2 kg (4.84 lbs) (Approx.)

Transmitter Section

RF output power (at 13.8V DC, 50Ω load)	HI 40 Watts min. LOW 1 to 15 Watts approx. (According to FREQ.)
Modulation	Variable reactance direct shift
Frequency tolerance (−20°C ~ +50°C)	Less than $\pm 20 \times 10^{-6}$ dB
Spurious radiation	HI Less than −60 dB LOW Less than −53 dB
Maximum frequency deviation (FM)	±5 kHz
RPT. Tone (Burst) frequency	1,750 Hz (Burst): (T)
Microphone	Dynamic microphone with PTT switch, 500Ω

Receiver Section

Circuitry	Double conversion superheterodyne
Intermediate frequency	1st 1F 10,695 MHz 2nd 1F 455 kHz
Receiver sensitivity	Better than 0.5μV for 30 dB S/N Better than 0.2μV for 12 dB SINAD
Receiver selectivity	More than 12 kHz (−6 dB) Less than 24 kHz (−60 dB)
Spurious response	Better than 60 dB
Squelch sensitivity	0.16μV (threshold)
Auto scan stop level	Less than 0.2μV (threshold)
Audio output	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.

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