KENWOOD

SERVICE MANUAL

TM-201A FC-10 TU-3 (USA only)

VHF FM TRANSCEIVER

Photograph shows K type.

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CIRCUIT DESCRIPTION

RX SECTION

The input signal from the antenna passes through the transmitter/receiver diode switch on the Final unit before being input to the front end. The front end is comprised of RF amplifier Q1 (GaAs FET 3SK97 Q2), first mixer Q2 (3SK74L), a 3-pole helical resonator having a 4 MHz bandpass and a 2-stage MCF (Monolithic crystal filter) to give good sensitivity and two signal characteristics.

The first IF signal (10.695 MHz), having passed through the MCF, is mixed with the (10.240 MHz) second local oscillator signal at the second mixer Q3 (3SK74GR) to produce a second IF signal at 455 kHz. This (455 kHz) second IF signal is passed through ceramic filter CFW-455F, IF amplified by Q4 (TA7302P), Q5 (2SC2668Y), and Q6 (μPC577H) and detected by ceramic discriminator CFY-455S. The (10.240 MHz) second local oscillator output is also used by the receiver PLL for the comparator reference signal.

The detected output from the discriminator is divided into an audio frequency component and a noise component and are then coupled into their respective circuits. The audio frequency component is de-emphasised, and preamplified by Q7 (2SC2458Y) before delivery to Q14 (MB3712), which the power amplifier which drives the speaker. The noise component is derived through the BPF (bandpass filter), which detects the noise in the vicinity of 20 kHz. This is amplified by Q8 and Q9 (2SC3113B) and rectified by D5 and D6 to achieve squelch control. The squelch control signal is applied by Q10 (2SC2458Y) to control Q7. Q11 (2SA1115E) and Q12 (2SC3113B) are DC-amplifiers for the busy indicator.

Q13 prevents transient "clicks" when the alert function operates and mutes the audio when the CTCSS is being used.

Item	Rating
Nominal center frequency	10.695 MHz
Pass bandwidth	f_0 ±7.5 kHz or more at 30 dB
Attenuation band	f_0 ±25 kHz or less at 40 dB f_0 ±45 kHz or less at 60 dB
Guaranteed attenuation	70 dB or more within f_0 ±1 MHz (Spurious level = 35 dB or more) 80 dB or more within f_0 ±(910 kHz ± 20 kHz)
Ripple	1.0 dB or less
Loss	1.5 dB or less
Terminal impedance	3 kΩ 110PF

Table 1 MCF (L71-0216-05) (A unit: L4)

Item	Rating
Center frequency (f_0) and deviation	455 kHz ±1 kHz or less
Peak separation	15 kHz or more
Voltage sensitivity	15 ± 3 mV/kHz
Hump	No hump in the range ± 5 kHz
Linearity	455 ± 3 kHz or more
Temperature characteristics (−20°C to +60°C)	±0.3% or less (Center frequency)

Table 2 Ceramic discri. (L79-0446-05) CFY455S (A unit: L11)

Item	Rating
Nominal center frequency	455 kHz ±1 kHz
6 dB bandwidth	±6 kHz or more (from 455 kHz)
50 dB bandwidth	±12.5 kHz or less (from 455 kHz)
Ripple within pass bandwidth	3 dB or less (within 455 kHz ± 5 kHz)
Loss	60 dB or less
Guaranteed attenuation	35 dB or more (Within 455 kHz ± 100 kHz)
Input and output impedance	2.0 kΩ

Table 3 Ceramic filter (L72-0315-05) (A unit: L8)

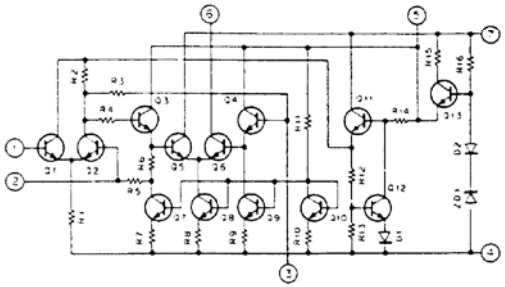


Fig. 1 TA7302P Equivalent circuit (A unit: Q4FM IF & amp.)

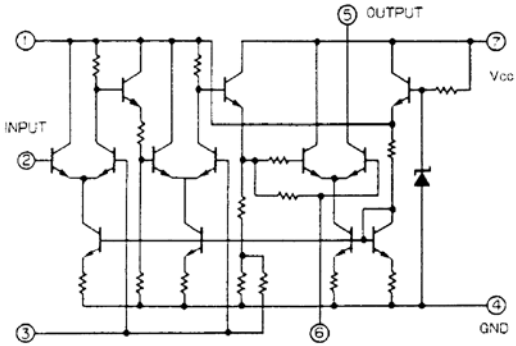


Fig. 2 μPC577H (A unit: Q6 wide band amp.)

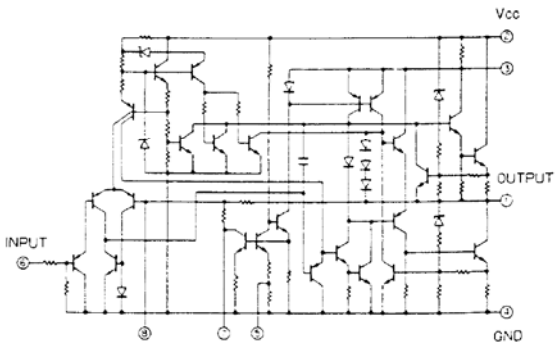


Fig. 3 MB3712 (A unit: Q14 AF power amp.)

CIRCUIT DESCRIPTION

TX SECTION

The signal from the microphone is amplified by Q55 (NJM4558S) on the "B" unit (X53-1340-11, X53-1340-61), before being diode limited by D39 (MC911) where IDC (instantaneous deviation control) is provided to prevent over-deviation. Then LPF (lowpass filter) Q54 (NJM 4558S) filters the higher frequencies and phase-modulates the transmitter PLL loop.

The phase-modulated FM signal is passed through VCO buffer Q45 (2SC2668Y) before being amplified by drive Q46 (2SC2347) and Q47 (2SC2538) to yield the output for the Final unit.

The signal fed to the Final unit (X45-1330-11) is power amplified by power hybrid Q1 (M57737). The signal is then passed through the transmitter/receiver diode switch before going through 3-stage LPF and is then fed to the antenna. and is then fed to the antenna.

The APC (automatic power control) circuit performs HI/LOW power control selection and SWR protection. The output from the power module is sampled through C8 and detected by D4 before being applied to unit "B", where the signal is applied through Q53 (2SC2458Y) and then to differential amplifier Q50 and Q51 (2SC2458Y). The protection circuit detects the reflected wave from the antenna terminal, which is amplified by Q52 (2SC2458Y) on the "B" unit before being applied to differential amplifier pair Q50 and Q51. The differential amplifier controls Q49 (2SA1015Y) and Q48 (2SC880) and varies the voltage at Q1 pin 2 on the Final unit and at Q47 on unit "B", thereby controlling the output of the transmitter.

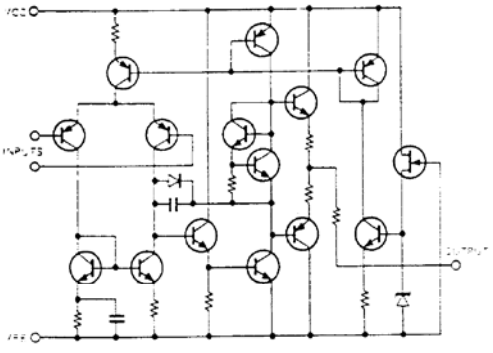
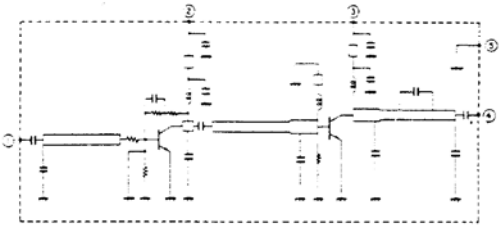


Fig. 4 NJM4558S (B unit: Q54, 55)



1 INPUT 2 VCC1 3 VCC2 4 OUT 5 GND

Fig. 5 Power module M57737 equivalent circuit

Item	Symbol	Tc (°C)	Condition	Rating
Operating	Vcc	25		17 V
DC current	Icc	25		7 A
Operating case temp.	Tc (op)		−30 ~ +110°C	
Storage temp.	Tstg		−40 ~ +110°C	
Power input	Pin	25	Zg = Zl = 50 Ω	0.4 W
Power output	Po	25	Zg = Zl = 50 Ω	40 W

Table 4 Power Module M57737 max rating and electrical characteristic

PLL SECTION

The PLL circuit is comprised of two loops: one for transmission and one for reception. The block diagram is given in Fig.6 .

Receiver PLL

The signal generated by RX VCO Q27 (2SK125) on "A" unit (X44-1530-11) (133.305-137.295 MHz) is mixed by Q22 (2SC2668Y) to become a PLL signal at 10.97-14.96 MHz. This is amplified by Q23 (2SC2668Y) and then input to PD (phase detector) IC Q19 (MC145155P). The 40.1116 MHz heterodyne signal generated by Q20 (2SC2668Y) is tripled to 122.335 MHz by Q21 (2SC2787L) before being input to mixer transistor Q22. When the PLL IF signal is input to Q19 (pin 9), it is divided by a ratio of N = 2194 ~ 2592, specified by the data from microprocessor Q1 (μPD7508G-534). Simultaneously, the 10.24 MHz signal generated by Q30 is buffered by Q31 and is then divided by 1/2048 to become the 5 kHz reference comparison signal.

The phase compared output signal is passed through LPF Q25 and Q26 (2SC2459BL) and is applied as the VCO control voltage to varicap D12 (1S2208), then locked to the desired frequency. If the PLL loop unlocks, the unlock signal from Q19 (pin 8) turns off Q24 (2SC2458Y), which in turn stops the operation of VCO buffer amplifier Q29.

Transmitter PLL

The signal generated by TX VCO Q44 (2SK125) on "B" unit (144.00-145.990 MHz) is mixed with the RX PLL output signal (133.305-135.295 MHz) at mixer Q35 (2SC2668Y)to become a 10.695 MHz signal. This is amplified by Q36

CIRCUIT DESCRIPTION

OL CIRCUIT

mic drive system consists of 4-digit LEDs. The segnal is output at ports P20 - P23 and P40 - P43 of the cessor Q1 and driven by digital transistors Q10 e digit signal is output at port P30 - P33 and driven tor alley Q8. The 2 dots (MHz decimal point and A/B of the frequency display and MR and ALARM LEDs driven dynamically.

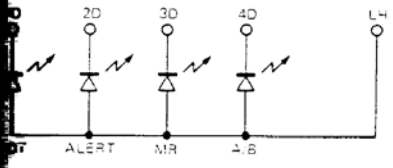


Fig. 9

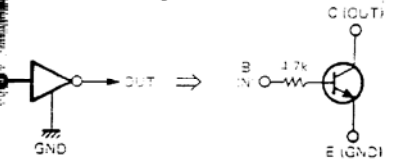


Fig. 10 Digital TR DTC143T (E) (B unit: Q10 – 17)

• Encoder

The mechanical contact system encoder outputs 25 pulses with 50 clicks at one cycle. The chattering component in the encoder output is eleminated by Schmitt circuit Q7 and directly applied to ports P62 and P63 of the microprocessor. The UP/DOWN operation of the encoder are judged by the microprocessor software.

• Switch signal

The key scan output pulse is used in common with the display digit signal and the key return signal is input to ports P10 -P13. The key scan signal is stopped by the AND gate Q6 so that it is not output in transmission mode.

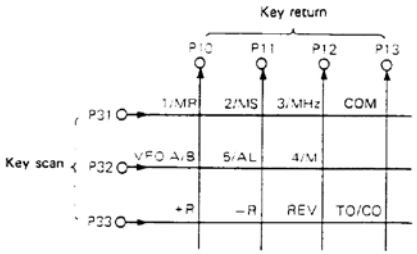


Fig. 11 Key matrix

• Beep sound

The beep signal is switched by the 3-stage invertor Q2 and NAND gate Q3. The oscillation frequency is determined by C7 and R5.

• Back-up circuit

The AVR output of Q5 is switched by Q4 and fed to P00. When the AVR voltage drops and approaches the lithium battery voltage, the P00 becomes L level, the unit enters the back-up mode, clocks CL1 and CL2 stop and the unit enters the low current hold mode.

• Frequency controller FC-10 interface

The LCD display data supplied from the unit to FC-10 is output at ports P01, P02 and P61 and amplified by invertor buffer Q2. The 3-bit keyboard information (R0, R1 and R2 of J21) is supplied from FC-10 and R0 and R1 are combined with the mic UP/DOWN signal and input to port P50 - P52.

Connector No.	Terminal name	Functions
13	8C	8 V Common
	SS	Squelch BUSY input
	SB	Switch B power supply
	AL	Alert mute and NO TX protection
	RT	Tone encoder access
14	E3	ENCODER 3 (GND)
	E2	ENCODER 2 (CLOCK)
	E1	ENCODER 1 (DATA)
15	31	P31
	32	P32 KEY SCAN OUTPUT
	33	P33
16	LA	LED Segment a
	LB	LED Segment b
	LC	LED Segment c
	LD	LED Segment d
	LE	LED Segment e
	LF	LED Segment f
	LG	LED Segment g
	LH	LED Segment h
	1D	Digit 1 (1 kHz)
	2D	Digit 2 (10 kHz)
	3D	Digit 3 (100 kHz)
	4D	Digit 4 (1 MHz)
17	UP	MIC UP
	DW	MIC DOWN
	ST	STAND BY
18	10	P10
	11	P11
	12	P12 KEY RETURN OUTPUT
	13	P13
19	DP	PLL Serial data output
	CP	PLL Synchronize clock output
	LP	PLL Latch output
	ST	STAND BY
	BP	Beep sound output
21	E	GND
	R2	REMOCON 2
	R1	REMOCON 1 Remote control keyboard input
	R0	REMOCON 0
	LL	LCD Latch output
	CL	LCD Synchronize output
	DL	LCD Serial data output
	RCB	Remote control power supply

Table 5 Connector terminals name and functions

CIRCUIT DESCRIPTION

(2SC2668Y) before being input to PD IC Q38 (MC145151P) pin 27. Concurrently, the 10.695 MHz reference signal generated by Q37 (2SC2668Y) is divided in PD IC Q38 by 1 512 to become the 20.88 kHz phase reference comparison signal.

The compared and phase-locked output signal is passed through LPF Q39-Q41 (2SC 2459BL) and applied as the VCO control voltage to varicap D36 (1SV50), to lock the VCO to the desired frequency. If the PLL loop unlocks, the unlock signal from Q38 (pin 28) turns off Q42 (2SC 2458Y), which then turns off Q43 (2SA 1015Y). The result is that no bias is applied to Q45-Q47 and transmitter output is inhibited.

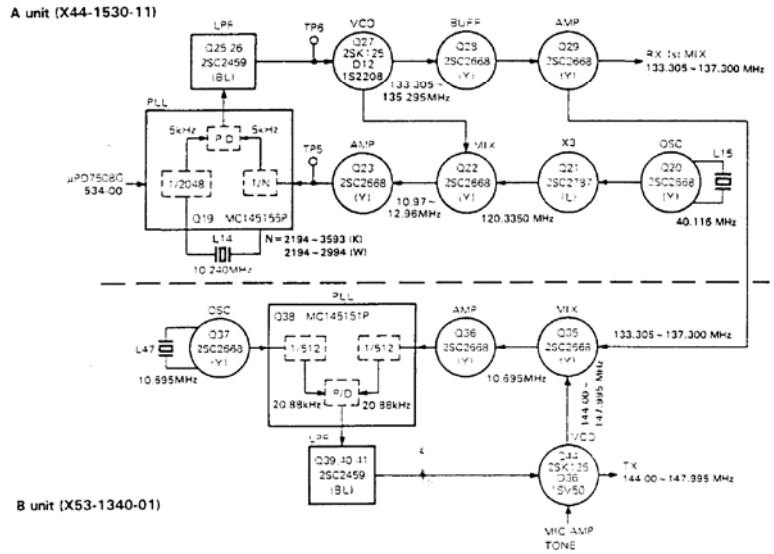


Fig. 6 PLL block diagram

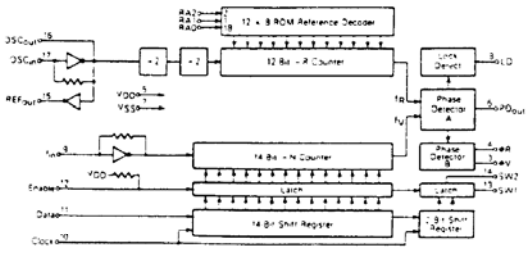


Fig. 7 MC145155 Block diagram (A unit: Q19) serial input PLL freq. synthesizer

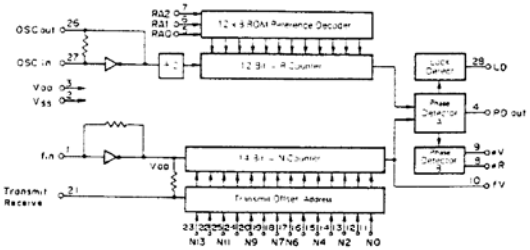


Fig. 8 145151P Block diagram (B unit: Q38) Parallel input PLL freq. synthesizer

CIRCUIT DESCRIPTION

Terminal name	Function	Terminal name	Function	Terminal name	Function
AL	Alert	HO	Helical Output	SB	Switched +B
ANT	Antenna	LL	LCD Display Data in Remote Control	SM	Signal Meter
A1	Top of AF Control			SP	Speaker
A2	Arm of AF control	LA	LED Segment a Data	SQ	Squelch
B	+13.8V	LB	LED Segment b Data	SS	Scan Stop
BD	Busy Light	LC	LED Segment c Data	ST	Stand by Switch
BP	Beep Tone Output	LD	LED Segment d Data	TB	Tone +B
CB	Common +B	LE	LED Segment e Data	TO	Tone Output
CL	LCD Display Data in Remote Control	LF	LED Segment f Data	UP	MIC UP Switch
		LG	LED Segment g Data	1D	LED Digit 1 Data
CP	PLL IC Data	LH	LED Dot point Data	2D	LED Digit 2 Data
DB	Drive +B	LO	Low Power Switch	3D	LED Digit 3 Data
DL	LCD Display Data in Remote Control	LP	PLL IC Data	4D	LED Digit 4 Data
DO	Drive Output	MC	MIC	8C	+8V Common
DP	PLL IC Data	MON	Monitor	8M	+8V at MIC
DT	Detect Output	PC	Power Control	8R	+8V in RX
DW	Mic Down Switch	PR	Protection	8T	+8V in TX
E	GND	QS	Squelch Switch	10	μ-Proc. port-10
E1	Encoder 1	RA	RX Antenna	11	μ-Proc. port-11
E2	Encoder 2	RCB	Remote Control Common +B	12	μ-Proc. port-12
E3	Encoder 3	RM	RF Meter	13	μ-Proc. port-13
FB	Final +B	R0	Remote Control 0	31	μ-Proc. port-31
HET	Hetero	R1	Remote Control 1	32	μ-Proc. port-32
HNG	Hanger	R2	Remote Control 2	33	μ-Proc. port-33

Table 6 Terminal functions

Terminal No	Name	Input	Output	Functions	Terminal No.	Name	Input	Output	Functions
1	NC				27	NC			
2	P73		O	No TX pro & alert audio mute signal	28	P42		O	LED Segment c
3	RESET	O		Reset input	29	NC			
4	NC				30	P43		O	LED Segment d
5	CL1			Clock OSC CR connector terminal	31	V_{SS}			GND
6	NC				32	X1			GND
7	V_{DD}			+B power terminal : +5.0 V	33	V_{DD}			NC
8	NC				34	X2			NC
9	CL2			Clock OSC CR connector terminal	35	NC			
10	INT1			GND	36	P20		O	LED Segment e
11	P00 INT0	O		Back-up detector input	37	P21		O	LED Segment f
					38	P22		O	LED Segment g
12	P01 SCK		O	PLL, LCD Serial data, Synchronize clock terminal	39	P23		O	LED Segment h
					40	NC			
13	NC				41	P10	O		KEY Return input (K4)
14	NC				42	P11	O		KEY Return input (K3)
15	P02 SO		O	PLL, LCD Serial data	43	P12	O		KEY Return input (K2)
16	P03 ST	O		Squelch BUSY detector input	44	P13	O		KEY Return input (K1)
17	P60		O	PLL Serial data, Latch output	45	NC			
18	P61		O	LCD Serial data, Latch output	46	P30		O	KEY SCAN output & LED digit output (1 kHz)
19	P62	O		ENCODER E1 (CLOCK)					
20	P63	O		ENCODER E2 (DATA)	47	P31		O	KEY SCAN output & LED digit output (10 kHz)
21	P50	O		REMOCON R0 Remote Control Keyboard input					
					48	P32		O	KEY SCAN output & LED digit output (100 kHz)
22	P51	O		REMOCON R1 Remote Control Keyboard input					
					49	P33		O	KEY SCAN output & LED digit output (1 MHz)
23	P52	O		REMOCON R2 Remote Control Keyboard input	50	P70		O	Beep signal output
24	P53	O		TX, RX discrimination input	51	P71		O	KEY SCAN shut off signal
25	P40		O	LED Segment a	52	P72		O	Tone encoder access signal
26	P41		O	LED Segment b					

Table 7 μPD7508-G-534-00 terminal function (B unit : Q1)

CIRCUIT DESCRIPTION

Lithium battery (W09-0323-05)

Specifications

Model and Efficiency	
Model	CR2032
Nominal Voltage	3 V
Nominal Capacity	170 m Ah
Discharge Stop Voltage	2.0 V
Dimensions	Diameter 20.2 mm
	High 3.2 mm
Weight	3 g

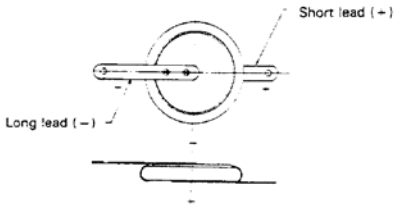


Fig. 12

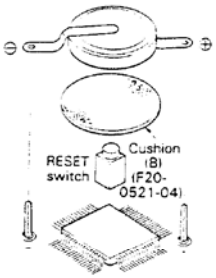


Fig. 13

Replacement procedure

When replace the back-up battery read as follows.

1. Remove the lower case.
2. Take care not to damage parts an the PC board since they are soldered battery.
3. Remount cell again (conform to cell pole).
4. After power switch is on, push the reset switch is on.

PRECAUTIONS FOR HANDLING GALLIUM ARSENIDE FET's (GaAs FET)

The gallium arsenide FET (3SK97) used in this device is easily damaged by static electricity. Take careful note of the following points when soldering and handling this device.

1. When handling this FET separated from the radio, make sure to first discharge yourself to ground.
2. Use a grounded-tip soldering iron.
3. Ground the FET while soldering-in.
4. Cover the work table with a conductive, grounded panel to insure an adequate static discharge path.

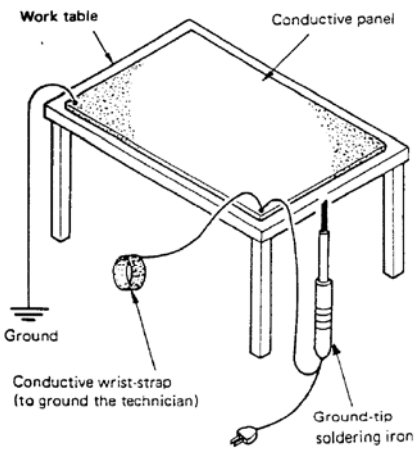
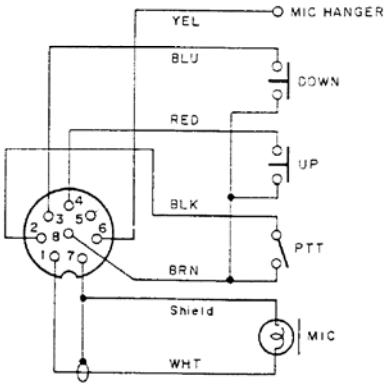


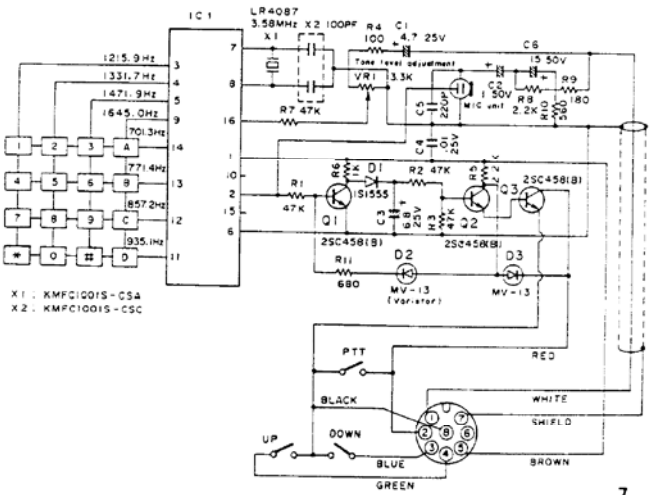
Fig. 14

ACCESSORY MICROPHONE

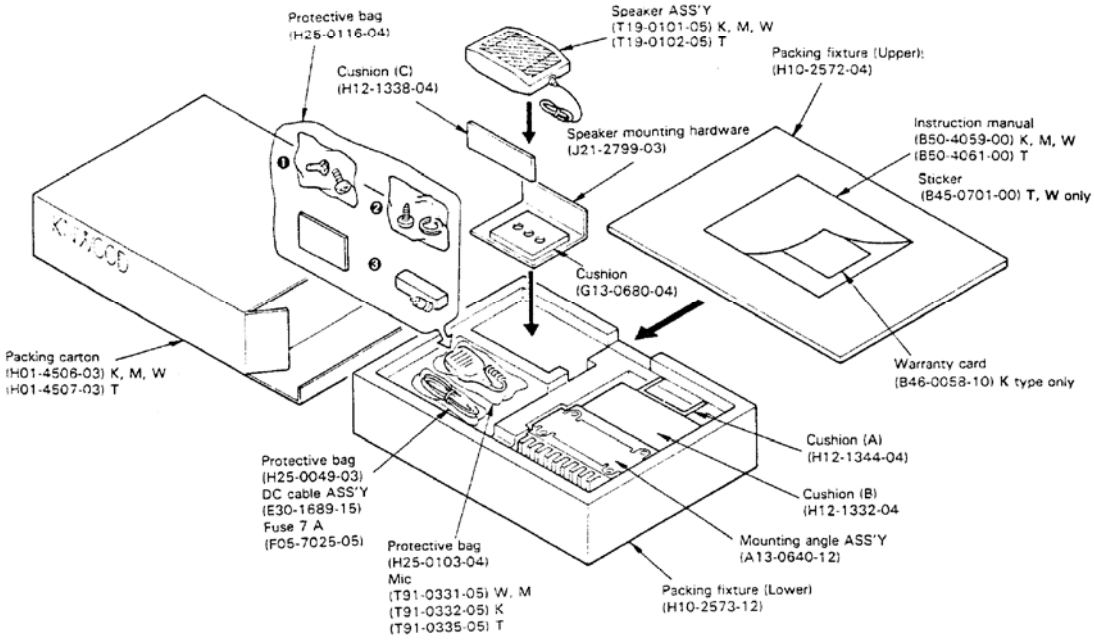
(T91-0331-05) M, W type ✳
(T91-0335-05) T type



(T91-0332-05) K type



PACKING



❶ Protective bag
(H25-0029-04)
Hex. head nut
(N10-2040-41)
Round screw × 2
(N30-4010-41)
Tapping screw × 4
(N87-4008-41)
Flat tapping screw × 2
(N88-4008-41)

❷ Protective bag
(H25-0029-04)
Round screw × 4
(N09-0008-04)
Tapping screw (A) × 4
(N09-0632-04
Flange nut × 4
(N14-0510-04)
Flat washer × 4
(N15-1050-46)
Flat washer × 4
(N15-1060-46)
Spring washer × 4
(N16-0060-46)

❸ Cushion
(G13-0683-04)
Cushion × 2
(G13-0686-04)
Mounting boss × 4
(J32-0775-04)
Flat washer × 4
(N15-1041-41)
Flat screw × 4
(N32-3014-41)

Fig. 17

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

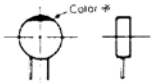
● **Temperature coefficient**

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

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

Example CC45TH ❋ −470 ±60 ppm/°C

CC45



● **Tolerance**

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

Less than 10 pF

Code	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		

● **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**

0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001μF
1 0 3 = 0.01μF
2 2 0 = 22pF
(1st number | Multiplier; 2nd number)

Symbol	Destination
K	U.S.A.
W	Europe
T	Britain
M	General market

Resistors not listed in this parts list are standard fixed carbon composition, 1/4W or 1/8W.
The resistance values, in ohms, are indicated on the schematic diagram.

N : New parts
△ : Please note that parts are sometimes not in stock and it takes much time to deliver.

SEMICONDUCTOR

Name	Remarks	Part No.
Diode	N	IN60
		IS1555
		IS1587
		IS2208
		MC911
		MI308
		MI407
	N	MV13
		U158
Vari-cap diode		1SV50
		1SV123
Zener diode		XZ-039
	N	XZ-055
Thermistor		112-102-2
Digital TR		DTC143T (F)

Name	Remarks	Part No.
TR		2SA1015 (Y)
		2SA1115 (E)
		2SC1959 (Y)
		2SC2347
		2SC2458 (Y)
		2SC2459 (BL)
		2SC2538-22-A
		2SC2668 (Y)
		2SC2787 (L)
	N	2SC3113 (B)
		2SD880 (Y)
FET		2SK125
		3SK73 (GR)
		3SK74 (L)
		3SK97 (Q2)
Power module	N	M57737

Name	Remarks	Part No.
Microprocessor	N	UPD7508G-534-00
IC	N	LB1258
		LB1409
		LR4087 (MC-48)
		MB3712
		MC14069UBCP
		MC145151P
		MC145155P❋K
		NJM78L05K
		NJM4558S
		TA7302P
		TC4011BP
		TC4049BP
		TC4081BP
		UPC78M05H
		UPC78M08H
		UPC577H (E or F)

Part No.	Remarks	Description	
TM-201A GENERAL			
A01-0949-03	N	Case (Upper)	K, M, W
A01-0950-03	N	Case (Lower)	
A01-0957-03	N	Case (Upper)	T
A02-0637-08	N	Speaker's case (Upper)	K, M, W
A02-0638-08	N	Speaker's case (Lower)	K, M, W
A02-0642-08	N	Speaker's case (Upper)	T
A13-0640-12	N	Mounting bracket Ass'y Accessory	
A20-2486-03	N	Front panel	K, M

Part No.	Remarks	Description	
A20-2487-03	N	Front panel	W, T
B01-0652-03	N	Panel escutcheon	
B07-0641-03	N	Remote grille	
B07-0642-14	N	Side escutcheon (R)	
B07-0643-14	N	Side escutcheon (L)	
B10-0655-04	N	Front glass	
B40-2663-04	N	Model name plate	K, M
B40-2664-04	N	Model name plate	W
B40-2665-04	N	Model name plate	T

PARTS LIST

Part No.	Re-marks	Description
B42-1781-04	N	Indicating plate
B43-0695-04	N	Badge K, M, W
B43-0696-04	N	Badge T
B45-0701-00		Sticker T, W
B46-0058-10		Warranty card K
B50-4059-00	N	Instruction manual K, M, W
B50-4061-00	N	Instruction manual T
E06-0856-05	N	8P Metal socket MIC
E06-0857-05	N	8P DIN socket REMOTE
E07-0852-05		8P metal socket
E30-1689-15		DC cable ASS'Y
E30-1729-08	N	Cable with plug
E31-2171-05	N	Connector with coax. (HET)
F05-7025-05		Fuse 7A
F20-0521-04		Insulating plate (Lithium cell)
G01-0821-04	N	Coil spring × 9
G02-0505-05		Knob fitting spring × 2 AF, SQL
G13-0679-04		Cushion Tone unit (Large) W, T
G13-0680-04	N	Cushion SP
G13-0683-04	N	Cushion (Mounting angle)
G13-0684-04	N	Cushion Lower case
G13-0686-04	N	Cushion × 2 (Mounting angle)
G13-0687-04	N	Cushion Tone unit (small) W, T
H01-4506-03		Packing Carton (Inside) K, M, W
H01-4507-03		Packing Carton (Inside) T
H10-2572-04		Packing fixture (Upper)
H10-2573-12		Packing fixture (Lower)
H12-1332-04		Cushion (B)
H12-1338-04		Cushion (C)
H12-1344-04		Cushion (A)
H25-0029-04		Protective bag boss, screw
H25-0049-03		Protective bag AC & ANT cable
H25-0103-04		Protective bag MIC
H25-0112-04		Protective bag
H25-0116-04		Protective bag Accessory screw
J21-2799-13	N	Speaker mounting hardware
J29-0409-04	N	SW guid × 3
J30-0526-04	N	Spacer SLIDE KNOB
J32-0775-04	N	Mounting boss × 4
J32-0776-04	N	Round boss × 2 B unit
J39-0418-08	N	Spacer
J61-0408-05	N	Nylon band × 6 SKB-85
K21-0771-05	N	Main knob
K23-0757-05	N	AF knob × 2 AF, SQ
K27-0443-05	N	Key-knob (A) MR
K27-0444-05	N	Key-knob (B) × 5 MS, MHz, A/B, AL, M
K27-0445-05	N	Square knob (A)
K27-0446-05	N	Square knob (B)
K27-0447-05	N	Round knob
K29-0782-05	N	Slide knob
N09-0008-04		Round screw × 4 Mounting angle, Accessory
N09-0632-05		Tapping screw(A) × 4 Mounting angle, Accessory
N09-0659-05	N	Round screw × 2 DISPLAY M2 × 4
N10-2040-41		Hex, head nut × 2 SP
N13-0310-04	N	Dreced nut × 2 AF, SQL
N14-0510-04		Flange nut × 4 Mounting angle Accessory

Part No.	Re-marks	Description
N15-1050-46		Flat washer × 4 Mounting angle Accessory
N15-1060-46		Flat washer × 4 Mounting angle Accessory
N16-0026-46		Spring washer A unit
N16-0060-46		Spring washer × 4 Mounting angle Accessory
N19-0631-05	N	Flat washer × 4 Mounting, Accessory
N29-0301-04		Stopper ling A × 6
N30-2606-41		Round screw × 2 Heat sink for A unit
N30-4010-41		Round screw × 2 SP Accessory
N32-2604-41		Flat screw × 8 Sub panel
N32-2605-45		Flat screw × 5 Side escutcheon
N32-3014-41		Flat screw × 4 Mounting boss. Accessory
N33-2606-41		Round flat screw × 7 Case
N35-2004-41		Bind screw × 2 DISPLAY
N35-2604-41		Bind screw × 3 A unit
N87-2605-41		Self tapping screw × 15 A, B unit
N87-4008-41		Self tapping screw × 4 SP Accessory
N88-4008-41		Flat tapping screw × 2 SP Accessory
S50-1406-05		Tact switch × 2
T07-0226-08		Speaker
T19-0101-05	N	Speaker ASS'Y Accessory K, M, W
T19-0102-05	N	Speaker ASS'Y Accessory T
T91-0331-05	N	Microphone Accessory M, W
T91-0332-05	N	Microphone Accessory K
T91-0335-05	N	Microphone Accessory T
W02-0334-05	N	Rotary encoder
W09-0323-05		Lithium cell CR2032
X44-1530-11		A unit K, M
X44-1530-61		A unit T, W
X45-1330-11		Final unit K, M, T, W
X52-1250-50		Tone unit T
X52-1250-61		Tone unit W
X53-1340-11		B unit K, M
X53-1340-61		B unit T, W
X54-1740-01		Display unit K, M
X54-1740-51		Display unit T
X54-1740-61		Display unit W

Part No.	Re-marks	Description	Ref. No.	Q'ty
A UNIT (X44-1530-11, 61) 11: K, M 61: T, W				
C05-0030-15		Ceramic Tirmmer 20P	TC-2	1
C05-0308-05		Ceramic Tirmmer 4P	TC-1	1
CC45CH1H0R5C		C 0.50P ±0.25P	C81	2
CC45CH1H010C		C 4P ±0.25P	C119	1
CC45CH1H020C		C 2P ±0.25P	C72, 73, 104	3
CC45CH1H030C		C 3P ±0.25P W, T	C3	1
CC45CH1H030C		C 3P ±0.25P W, T	C105	1
CC45CH1H050C		C 5P ±0.25P	C17, 82	2
CC45CH1H080D		C 8P ±0.5P	C98	1
CC45CH1H120J		C 12P	C99	1
CC45RH1H120J		C 12P	C1	1
CC45RH1H120J		C 12P K, M	C4	1
CC45CH1H150J		C 15P	C11	1
CC45CH1H180J		C 18P	C5	1
CC45CH1H220J		C 22P	C49,78,83,84	4
CC45CH1H330J		C 33P	C2,51,75,106	4
CC45RH1H150J		C 15P W, T	C4	1
CC45SL1H470J		C 47P	C12, 19	2

PARTS LIST

Part No.	Remarks	Description	Ref. No.	Q'ty
CC45SH1H560J		C 56P	C77	1
CC45SL1H101J		C 100P	C18, 70, 111	3
CC45SL1H121J		C 120P	C46	1
CC45SL1H221J		C 220P	C114	1
CC73CH1H020C		Chip Cap 2P	C13	1
CC73CH1H120J	N	Chip Cap 12P	C97	1
CC73EB1H102	N	Chip Cap 0.001	C10	1
CE04W1A101M		E 100 10V	C69	1
CE04W1A470M		E 47 10V	C36,43,53, 68,87,90,101	7
CE04W1E4R7M		E 4.7 10V	C31	1
CE04W1E100M		E 10 25V	C44	1
CE04W1H0R1M		E 0.10 50V	C88, 94	2
CK45B1H102K		C 0.001	C6,7,8,9,14, 15,37,38,52,61,66,74,76.79, 80,96,100,102,107,109,110,116	22
CQ92M1H473		C 470P	C26,29,85, 108,112,115	6
CQ92M1H122K		ML 0.0012	C71	1
CQ92M1H563K		ML 0.056	C41	1
CS15E1A2R2M		T 2.20 10V	C54, 93	2
CS15E1A4R7M		T 4.70 10V	C103	1
CS15E1E010M		T 1 25V	C55, 118	2
CS15E1ER68M		T 0.68 25V	C56	1
CS15E1VR47M		T 0.47 35V	C57	1
C90-0820-05		E 470 16V (Small)	C65	1
C90-0834-05		E 0.15 25V (Small)	C67	1
C90-0840-05		E 10 16V (Small)	C58	1
C90-0849-05		E 220 16V (Small)	C63	1
C90-0867-05		E 100 25V (Small)	C64	1
C91-0117-05		C 0.01	C16,25,30, 59,60,62,89,113,117	9
C91-0457-05		C 0.022	C21,24,27	3
C91-0473-05	N	ML 0.033 (Small)	C39,40,42	3
C91-0474-05	N	ML 0.068 (Small)	C48	1
C91-0475-05	N	ML 0.022 (Small)	C92, 95	2
C91-0667-05		C 0.047 (Small)	C45,47,50,86	4
C91-1008-05	N	C 0.022	C20,22,23, 28,32~35,91,120	10
E04-0154-05		Coax. Pin Jack RA		1
E23-0512-05		Terminal		4
E40-0211-05	△	Pin connectorwafer 2P TP-1		1
E40-3007-05	△	Pin Connector 2P		2
E40-3008-05	△	Pin Connector 3P		3
E40-3009-05	△	Pin Connector 4P		
E40-3011-05	△	Pin Connector 6P		1
E40-3013-05	△	Pin Connector 8P		1
F11-0818-14		Shield Case (VCO Case top)		1
J31-0503-05		Bead		4
L15-0016-05		Choke Coil	L14	1
L30-0005-05		IFT	L4, 6	2
L30-0503-05		IFT	L7, 10	2
L30-0504-05		IFT	L9	1
L31-0267-05		Tuning Coil	L1, 2	2
L32-0654-05		VCO Coil	L22	1
L33-0002-05		Choke Coil 1μH	L16, 17	2
L33-0605-05		Choke Coil 0.47μH	L23	1
L34-0683-05		Tuning Coil	L24	1
L34-2035-05		Tuning Coil	L18, 19	2
L40-1021-03		Ferri-inductor 1mH	L12,13	2
L40-3391-03		Ferri-inductor 3.3μH	L20	1

Part No.	Remarks	Description	Ref. No.	Q'ty
L33-0668-05	N	Ferri-inductor 3.3μH	L21	1
L71-0216-05		MCF 10.695MHz	L5	1
L72-0315-05		Ceramic filter CFW-455F	L8	1
L77-0858-15		Quartz Xtal 10.240MHz	L25	1
L77-0989-05	N	Quartz Xtal 40.1116MHz	L15	1
L79-0446-05		Ceramic Discri CFY-455S	L11	1
L79-0498-15	N	Helical W, T	L3	1
L79-0499-05	N	Helical K, M	L3	1
N30-3004-46		Screw		2
R12-3430-05		Trim Pot 10kΩ	VR-1	1
FINAL UNIT (X45-1330-11)				
CC45SL2H101J		C 100P	C5	1
CC45SL2H150J		C 15P	C4, 6	2
CC45SL2H330J		C 33P	C9	1
CC45SL2H390J		C 39P	C7	1
CK45B1H102K		C 0.001	C12~18	6
CK45CH1H010C		C 1P	C8, 10	
CM73F2H220J		MC 22P	C11	1
C90-0868-05		E 10 16V	C1, 2	2
CC45SL2H180J		C 18P	C3	1
E11-0401-05		Earphone Jack		1
E23-0512-05		Terminal		1
E30-1730-05	N	Power Cable		1
E31-2066-05		Coax. Cable with terminal DO		1
E31-2089-05		Coax. Cable with terminal RA		1
E31-2172-15	N	ANT. Connector		1
F01-0796-05	N	Heat sink		1
F05-7025-05		Fuse 7 A		1
J19-1375-04		Coax. fixed hardware		1
J41-0006-05		Cable bush (Power Cable)		1
J41-0024-15		Cable bush (ANT)		1
L34-0499-05		Coil (3φ 4T)	L5, 6	2
L34-0742-05		Coil (3φ 5T)	L3	1
L34-0895-05		Coil (3φ 5T)	L2	1
L34-0908-05		Coil (3φ 9.5T)	L1, 4	2
L40-1091-03		Ferri-inductor 1μH	L7	1
N09-0626-05		Screw M3×10		2
N87-2606-41		Bind screw		6
R12-0541-05		Trim, Pot. 100Ω	VR-1	1
B UNIT (X53-1340-11, 61) 11: K, M 61: T, W				
C05-0030-15		Ceramic Trimmer 20P	TC-1,5,6	3
C05-0308-05		Ceramic Tirmmer 4P	TC-2	1
CC45CH1H0R5C		C 0.5P ±0.25P	C56	1
CC45CH1H020C		C 2P ±0.25P	C37,59,63	3
CC45CH1H030C		C 3P ±0.25P	C62	1

PARTS LIST

Part No.	Re-marks	Description	Ref. No.	Q'ty
CC45CH1H080D		C 8P ±0.5P	C57	1
CC45CH1H100D		C 10P ±0.5P	C60	1
CC45CH1H101J		C 100P	C45	1
CC45CH1H220J		C 22P	C39,77	2
CC45CH1H330J		C 33P	C15, 43	2
CC45CH1H180J		C 18P	C55	1
CC45SL1H390J		C 39P	C96	1
CC45CH1H101T		C 100P	C45	1
CC45SL2H180J		C 18P	C69	1
CK45B1H102K		C 0.001	C1,6,7,9,10, 20,21,41,47, 53,58,64,66, 68,70,73,74, 78,79,80,83 85,86,88,90, 106,107,108	28
CK45B1H152K		C 0.0015	C95	1
CK45B1H222K		C 0.0022	C14	1
CK45B1H331K		C 330P	C94, 98	2
CK45B1H471K		C 470P	C5,22,23,38, 44	5
CK45B1H561K		C 560P	C97	1
CK73EB1H102K		Chip Cap 0.001	C71, 75	2
CK73EB1H103K		Chip Cap 0.01	C110~121	12
CS15E1A100M		T 10 10V	C13	1
CS15E1A3R3M		T 3.3 10V	C84	1
CS15E1C1R5M		T 1.5 16V	C54	1
CS15E1E010M		T 1 25V	C52,92,93	3
CS15E1V0R1M		T 0.1 35V KM	C91	1
CS15E1VR47M		T 0.47 35V	C42, 105	2
C90-0838-05		E 1 50V	C99~101,103	4
C90-0840-05		E 10 16V	C49,67,76	3
C90-0871-05	N	E 220 16V	C18, 19	2
C90-0872-05	N	E 33 16V	C11	1
C90-0873-05	N	E 47 10V	C12,26,104	3
C90-0874-05	N	E 100 10V	C61	1
C90-0875-05	N	E 100 16V	C16,17,81	3
C91-0117-05		C 0.01	C8, 46	2
C91-0460-05		C 0.068	C50	1
C91-0667-05		C 0.0047	C40,48,87,89 102	5
C91-1008-05		C 0.022	C2,3,24,25 35,51	6
E04-0157-05		Minipin Jack, A DO		1
E23-0512-05		Terminal		3
E29-0440-04	N	Ground plate		1
E40-3007-05	△	Pin Connector 2P		3
E40-3008-05	△	Pin Connector 3P		5
E40-3009-05	△	Pin Connector 4P		2
E40-3010-05	△	Pin Connector 5P		2
E40-3013-05	△	Pin Connector 8P		1
E40-3017-05	△	Pin Connector 12P		1
F11-0831-04	N	Shield Case (VCO)		1
F20-0078-05		Insulating plate		1
F20-0533-04	N	Insulating plate (Shield plate)		1
F29-0014-05		Insulating Washer		1
J31-0503-05		Bead		8
L32-0658-05	N	VCO Coil (White)	L38	1

Part No.	Re-marks	Description	Ref. No.	Q'ty
L34-0893-05		Coil 4T	L43, 46	2
L34-0894-05		Coil 5T	L42, 45	2
L40-1091-03		Ferri-inductor 1μH	L39	1
L40-3391-03		Ferri-inductor 3.3μH	L36, 37	2
L77-0990-05	N	Quartz Xtal 10.695MHz	L47	1
N35-3006-41		Bind screw (for Q48)		1
R12-3430-05		Trim, Pot. 10kΩ	VR2, 5	2
R12-4408-05		Trim, Pot. 50kΩ	VR1, 3. 4	3
RS14AB3A220J		Metal film 1W 22Ω ±5%	R24	1
R90-0564-05	N	Resistor block 10kΩ	R1	1
R90-0565-05	N	Capacitor block 470P	C4	1
R90-0566-05	N	Resistor block 27kΩ	R22	1
S59-0415-05		Keyboard switch (RESET SW)	S1	1

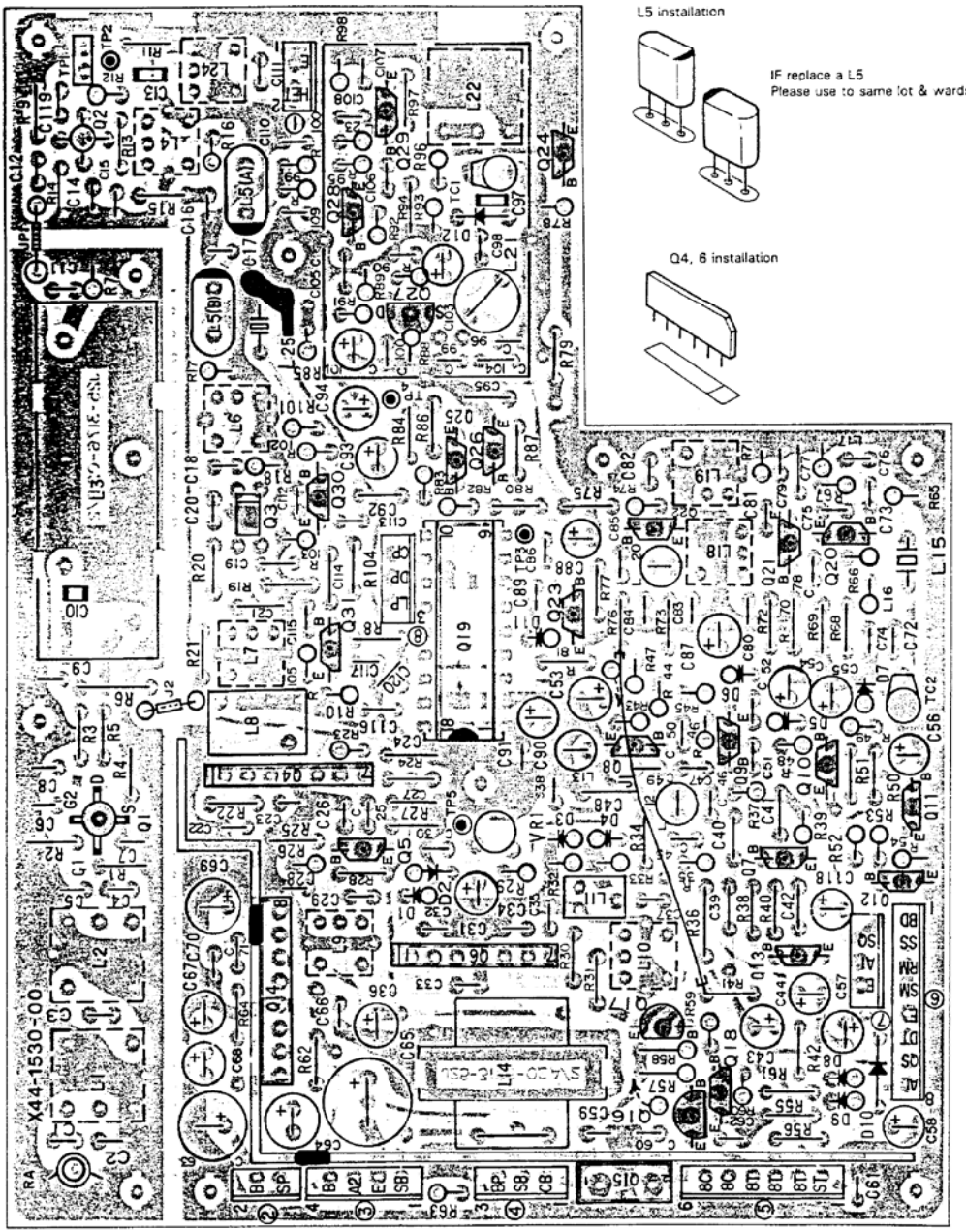
DISPLAY UNIT (X54-1740-01, -51, -61) 01: K, M 51: T 61: W

CK45B1H102K		C 0.001	C1,3,5	3
CK45B1H102K		C 0.001 T	C6,7	2
CK73EB1H102K		Chip Cap 0.001	C4	1
CS15E1E010M		T 1 25V	C2	1
E23-0512-05		Terminal		1
E40-3011-05		Pin Connector 6P		1
J32-0774-04	N	Boss		2
J61-0408-05		Nylon band		1
N35-2004-41		Bind screw		4
R05-3417-05		Trim, Pot. AF	VR2	1
R05-4408-05	N	Trim, Pot. SQ	VR1	1
S31-2405-05	N	Slide switch CTCSS	S10	1
S40-2443-05		Push switch HI/LOW, SCAN W	S8, 9	2
S40-2443-05		Push switch HI/LOW REV. TONE T	S7,8,9,	3
S40-2444-05		Push switch CALL W	S7	1
S50-1412-05		Tact switch	S1,2,3,4,5,6	6
W02-0335-05	N	DISPLAY ASS'Y		1

TONE UNIT (X52-1250-50, -61) 50: T 61: W

C90-0478-05		E 10 16V T	C6	1
C90-0480-05		E 47 10V	C1	1
C91-0433-05		Laminated cap. 0.0039	C5	1
C91-0473-05		ML 0.033	C4	1
C91-0484-05		ML 0.01	C2,3	2
E40-3010-05		Mini connector 5P		1
R12-3521-05		Trim. pot. 20kΩ	VR1	1
RN14BK2B9102F		MF 91kΩ 1/8W	R3	1
R92-0150-05		Short jumper W		1

▼ A UNIT (X44-1530-11, 61) Component side view

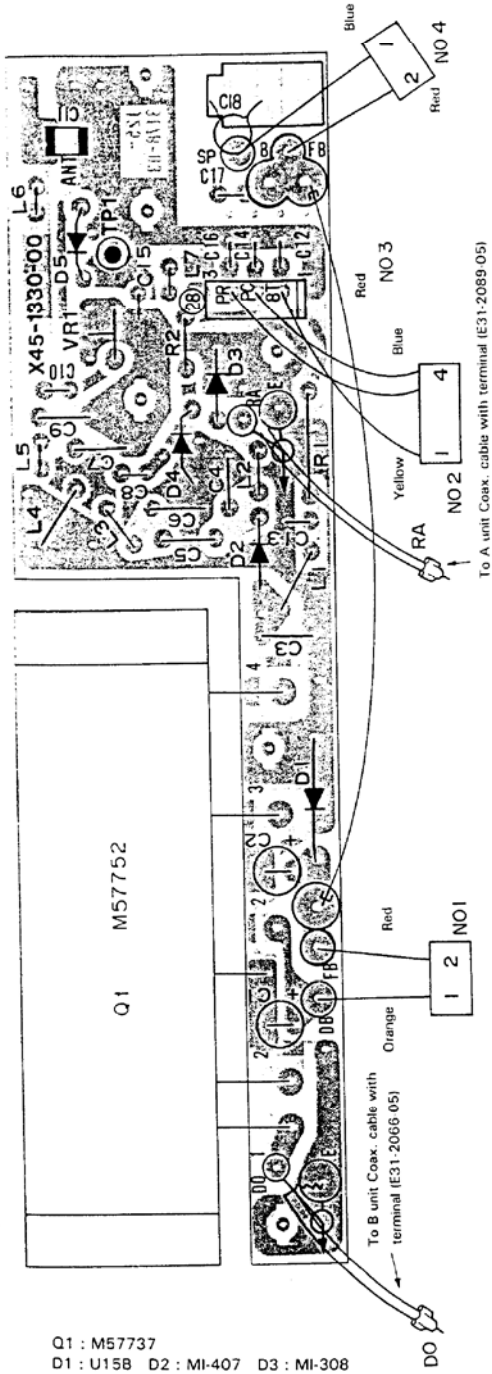


Q1 : 3SK97(Q2)★J Q2 : 3SK74(L) Q3 : 3SK73(GR) Q4 : TA7302P Q5,20,22,23,28~31 : 2SC2668(Y) Q6 : μPC577H(E or F)
Q7,8,10,13,18,24 : 2SC2458(Y) Q9,12 : 2SC3113(B) Q11 : 2SA1115(E) Q14 : MB3712 Q15 : μPC78M08H Q16,17 : 2SC1959(Y)
Q19 : MC145156P Q21 : 2SC2787(L) Q25,26 : 2SC2459(BL) Q27 : 2SK125

2SA1115(E)
2SC1959
2SC2459
2SC2458
2SC2668
2SC3113
2SC2787
2SK125
3SK74
3SK97
3SK73
μPC78M08H
TA7302P
μPC577H
MB3712

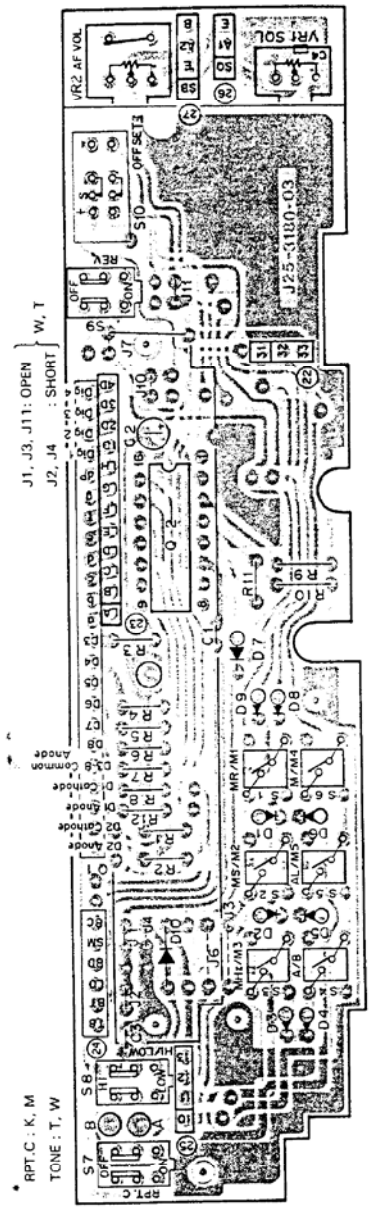
TM-201A PC BOARD VIEW

▼ FINAL UNIT (X45-1330-11) Component side view

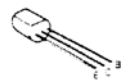


Q1 : M57737
D1 : U15B D2 : MI-407 D3 : MI-308
D4,5 : 1S1587

▼ DISPLAY UNIT (X54-1740-01) Foil side view

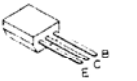


2SA1015
2SC2347

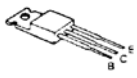


2SC2459

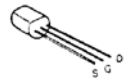
2SA1115
2SC2458
2SC2538-22-A
2SC2668



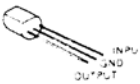
2SD880



2SK125



NJM78L05K



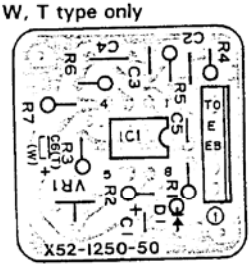
μPC78M05H

NJM4558S

MV-13

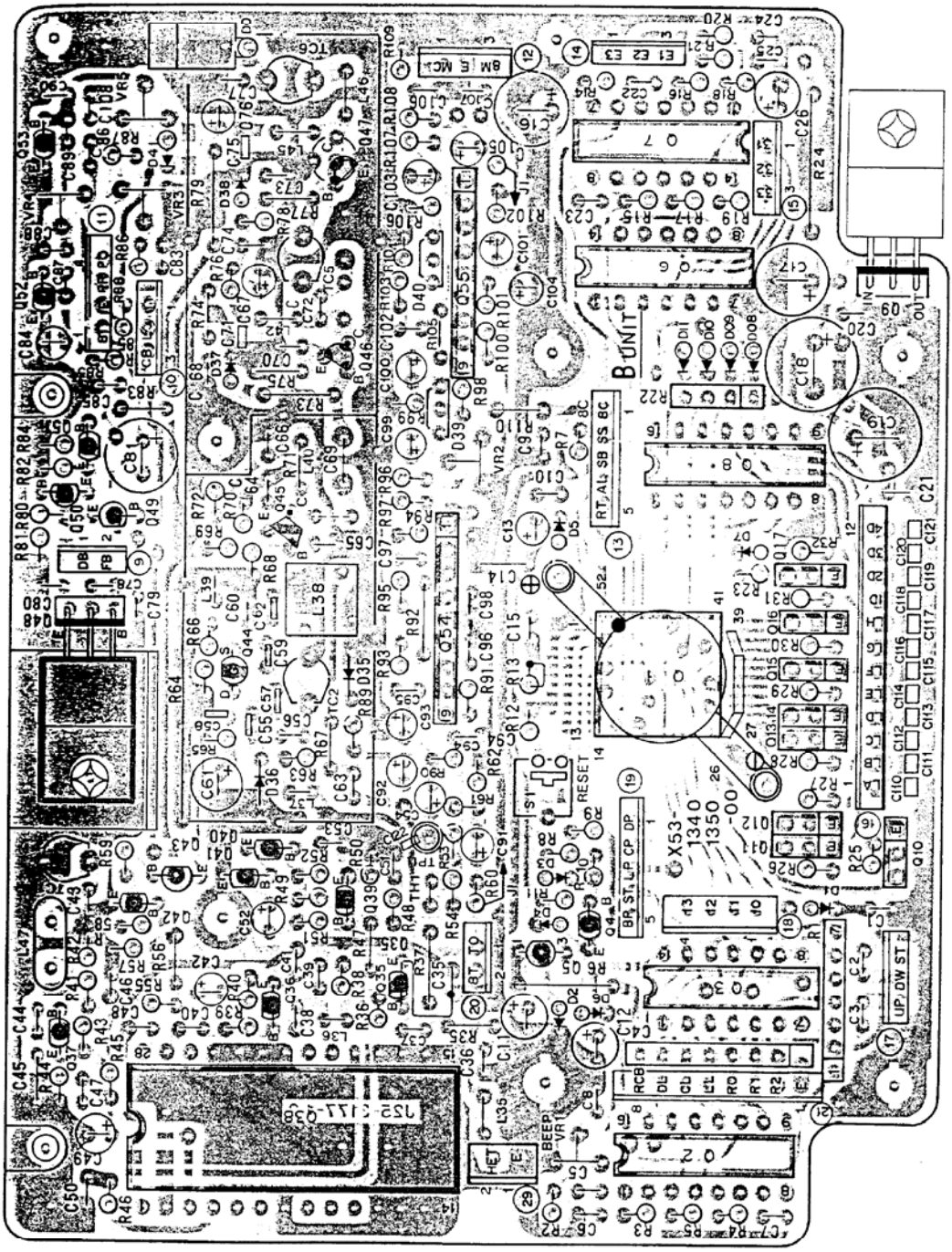
DTC124
DTC143T

▼ TONE UNIT (X52-1250-50, 61)
W, T type only



Q1 : W02-0335-05
Q2 : LB1409
D1 ~ 9, 10 (K, M) : 1S1555

▼ B UNIT (X53-1340-11, 61) Component side view

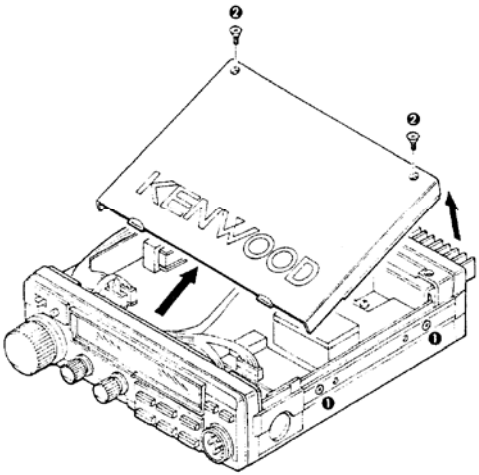


Q1 : μPD7508G-534-00 Q2 : TC4049BP Q3 : TC4011BP Q4 : 2SA1115(E) Q44 : 2SK125 Q46 : 2SC2347 Q47 : 2SC2538-22-A Q48 : 2SD880(Y)
Q5 : NJM78L05K Q6 : TC4081BP Q7 : MC14069BCP Q8 : LB1258 Q9 : μPC78M05H Q54,55 : NJM4558S
Q10—17 : DTC143T(F) Q35—37,45 : 2SC2668(Y) Q38 : MC145151P D1,2,4—9(W, T),10(W,T),11,38 : 1S1555 D3 : XZ-031 D35 : 1SV123 D36 : 1SV50
Q39—41 : 2SC2459(BL) Q42,50—53 : 2SC2458(Y) Q43,59 : 2SA1015(Y) D37 : MV13 D39,40 : MC911

DISASSEMBLY

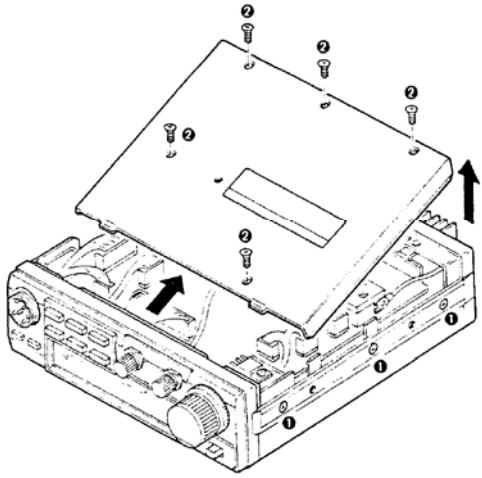
DISASSEMBLY FOR UPPER CASE

❶ To loosen the side escutcheon's (L & R) screw (5 pieces).
❷ Remove upper case is screw (2 pieces).



DISASSEMBLY FOR LOWER CASE

❶ To loosen the side escutcheon's (L & R) screw (5 pieces).
❷ Remove lower case's screw (5 pieces).

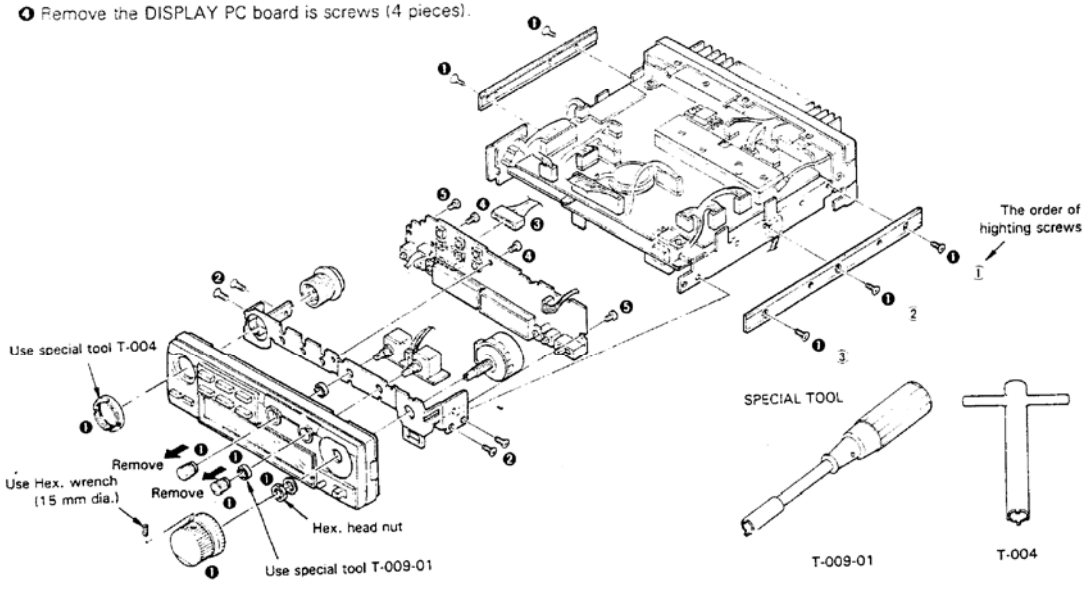


DISASSEMBLY FOR DISPLAY UNIT

❶ Remove side escutcheon's (R & L), remove knob (AF, SQ, MAIN).
❷ To remove the subpanel from the chassis, remove 4 screw.
❸ Remove connector.
❹ Remove the DISPLAY PC board is screws (4 pieces).

DISASSEMBLY FOR FRONT PANEL

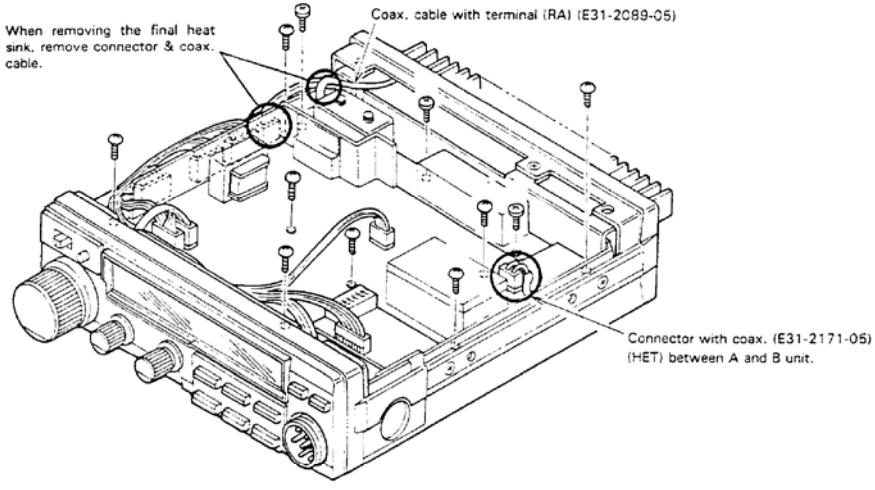
❶ Remove side escutcheon's (L & R) knob & nut.
❷ To remove the sub-panel from the chassis. Remove 4 screw's.
❸ Remove connector.
❹ Remove front panel's screw's (2 pieces).



DISASSEMBLY

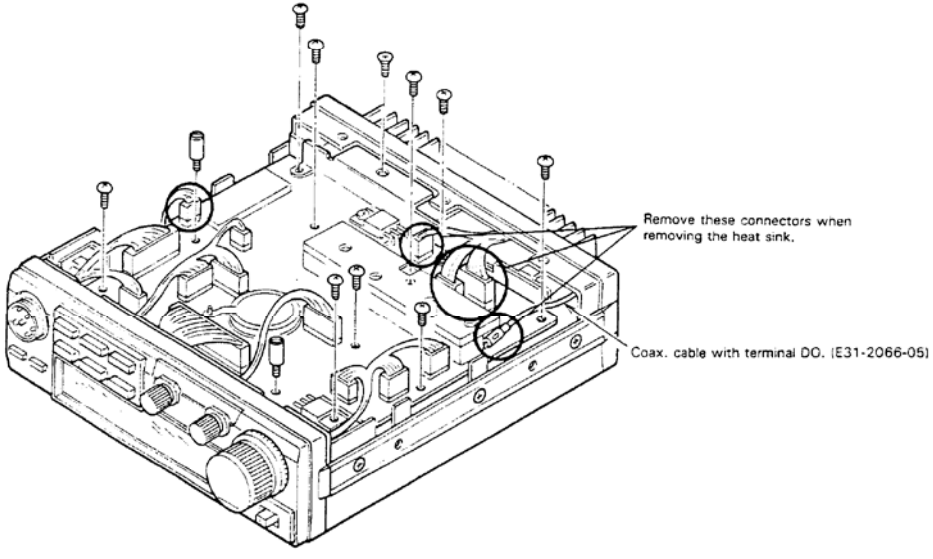
REMOVING A UNIT

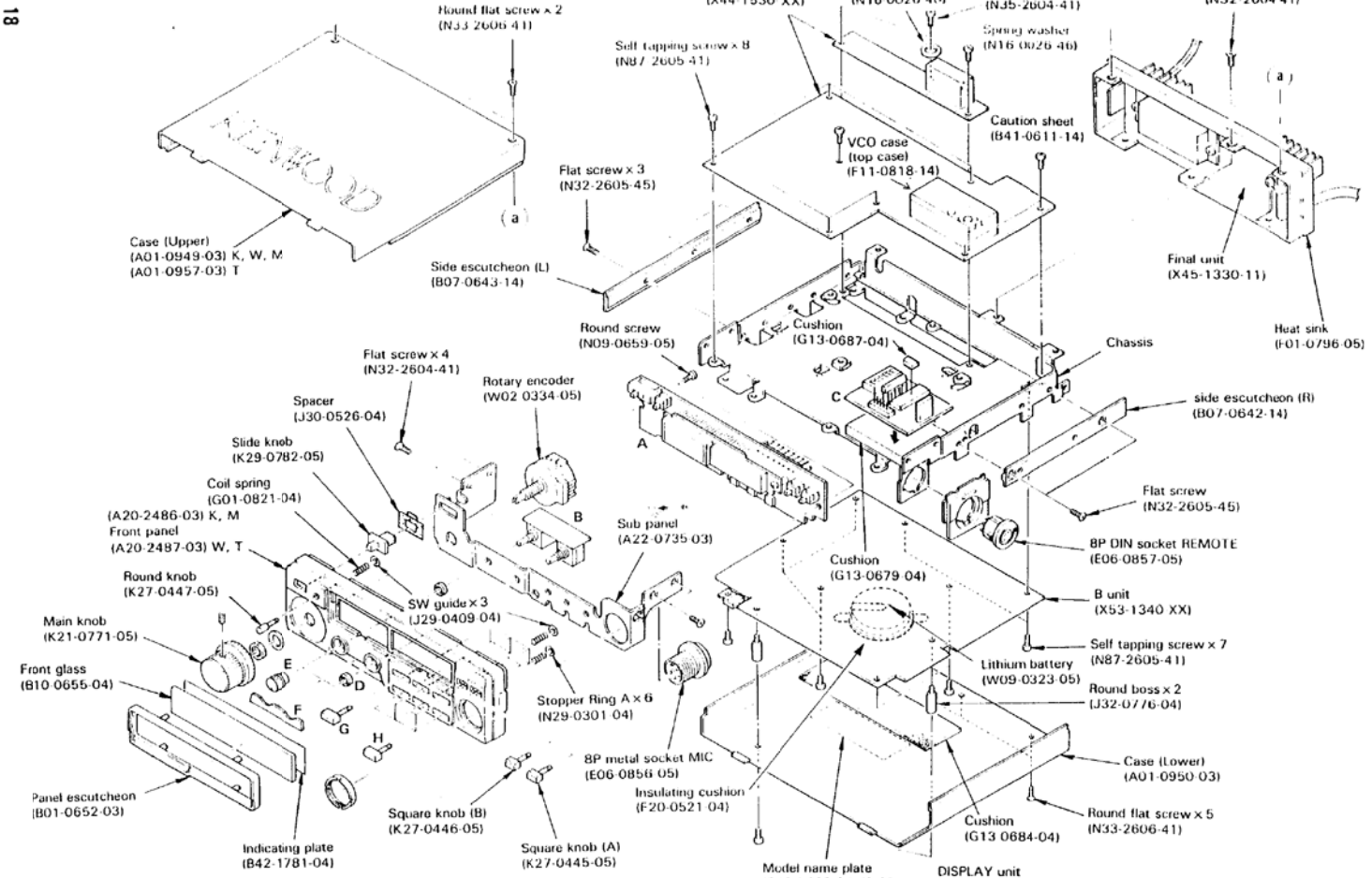
- Remove the A PC board's screws (11 pieces).
- Remove connector (No. 3) and coax. cable (RA).



REMOVING B UNIT

1. Remove connector (No. 9, 10, 11, 29) and coax. cable (DO).
2. Remove PC board's screw (8 pieces) and round boss (2 pieces).





C TONE unit
(X52-1250-50) T
(X52-1250-61) W

TU-3 (X52-1260-00)
K, M option

D Dreced nut × 2 AF, SQ
(N13-0310-04)

E AF knob × 2 AF, SQ
(K23-0757-05)
Knob fitting spring × 2
(G02-0505-05)

F Badge (B)
(B43-0695-04) (K) (M) (W)
(B43-0696-04) (T)

G Key knob (A) MR
(K27-0443-05)

H Key knob (B) × 5
MS, MHz, A/B, AL, M
(K27-0444-05)

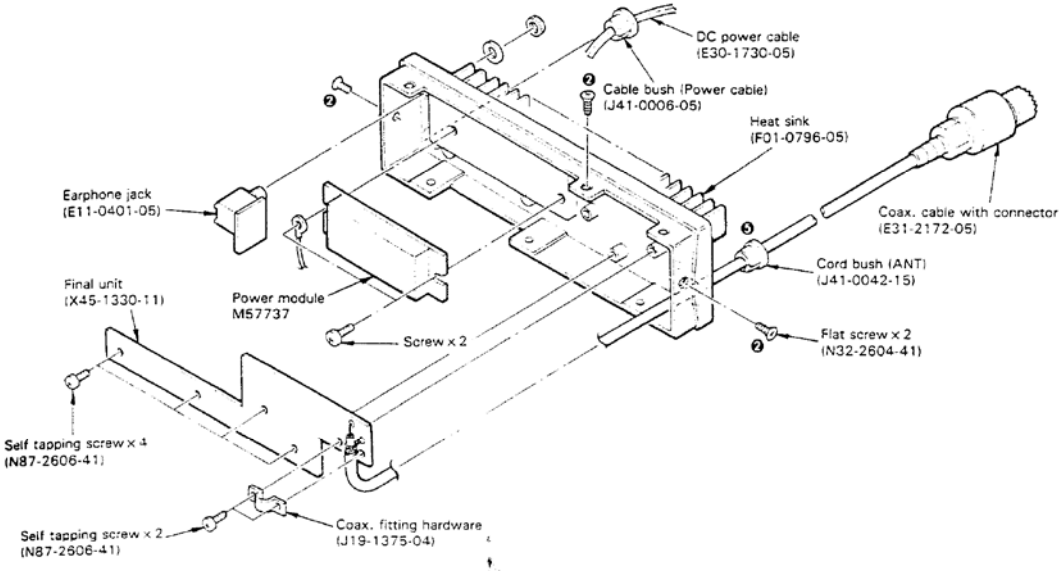
DISPLAY unit
(X54-1740-XX) A, B

A	S1 ~	(S50-1412-05) Tact switch	MR, MS, MHz, M, AL, A/B
	S7	(S40-2444-05) Push switch	COM
	S8, 9	(S40-2443-05) Push switch	HI/LOW, SCAN
	S10	(S31-2405-05) Slide switch	OFFSET
	Q1	(W02-0335-05) DISPLAY ASS'Y	
B	VR1	(R05-4408-05) Pot. SQL	SQL
	VR2	(R05-3417-05) Pot. with SW AF	AF

DISASSEMBLY/DIMENSIONS

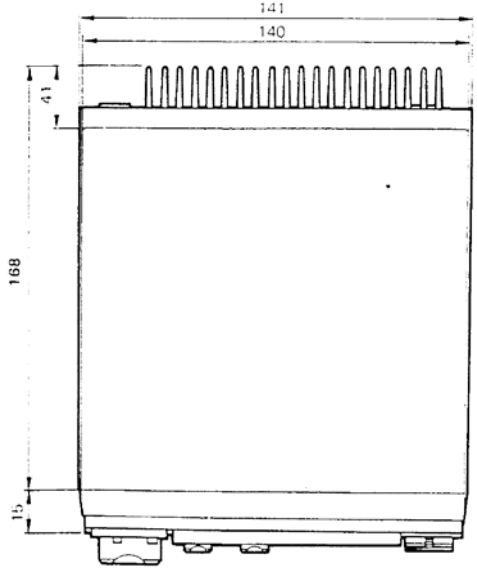
COAX. CONNECTOR REPLACEMENT

❶ Remove side escutcheon (L & R).
❷ Remove final heat sink's screw (3 pieces).
❸ Remove connector.
❹ Remove the coax. fitting hardware on final unit.
❺ Resolder coax. cable.
❻ Remove cordbush, remove coax. connector.

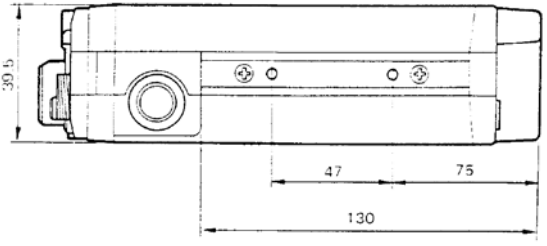


DIMENSIONS (:mm)

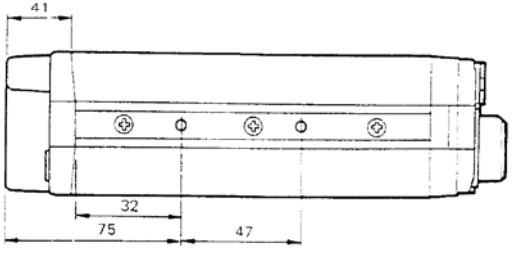
View from top



Right side view



Left side view



ADJUSTMENT

PREPARATION

Unless otherwise specified. Set the control as follows.

POWER SW .... ON
VOL .... MIN
SQL VOL .... MIN
HI/LOW SW .... HI
[illegible] SW .... OFF
CTCSS .... OFF
[illegible] .... OFF
[illegible] .... OFF
[illegible] A,B SW .... A

- When adjusting the trimmer or coils, use a non-induced adjusting rod of bakelite, etc.
- When adjusting the RX section never transmit to prevent SSG damage.
- The output level of SSG is indicated as SSG "s" open circuit.
- Connect MIC connector as shown in Fig. 18.

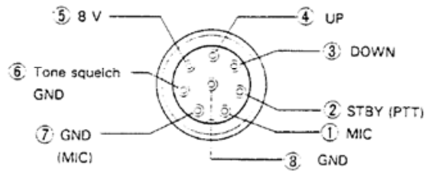
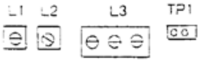


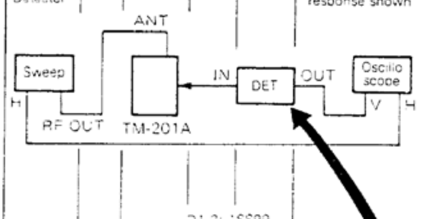
Fig. 18 MIC terminals (view from front panel side)

RX ADJUSTMENT

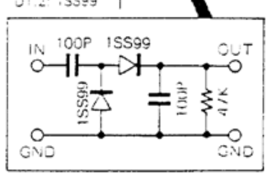
Item	Condition	Measurement			Adjustment			Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
[illegible]	1) Push switch S1 ON on B unit (near Lithium cell)	DISPLAY					Check	4.00
[illegible]	1) DC SUPPLY 13.8V POWER SW: ON	DC VM	A	8R		JP-2 Jumper lead		7.6 V ~ 8.2 V
				8C		Connector No.5 (5,6 pin)		7.7 V ~ 8.3 V
				8T		Connector No.5 (1 ~ 4 pin)		0.3 V or less
	2) Transmit			8T ↑				7.6 V ~ 8.2 V
				8R ↓				0.1 V or less
[illegible]	1) DISPLAY 4.00	DVM	A	TP4 (VCO case left side)	A	TC1 (in VCO case)	5.2 V ±0.1 V	
	2) DISPLAY 7.98 (K.M) 5.975 (W.T)	RF VTVM	A	TP3 (near Q19)	A	L18 L19	MAX.	1.2 V (r.m.s) or more Reference Value (1.5 V ~ 1.8 V)
	3) DISPLAY 7.98 (K.M) 5.975 (W.T)	DC VTVM	A	TP4			Check	2.8 V ~ 3.2 V (K.M) 3.9 V ~ 4.3 V (W.T)
	4) DISPLAY 5.00 (W.T) 6.00 (K.M)	Freq-counter	A	TP2	A	TC2	134.3050 MHz (W.T) 135.3050 MHz (K.M)	± 100 Hz
[illegible]	1) Connect the sweep generator to ANT	Oscillo-scope Detector	A	TP1	A	L1 L2 L3	Minimum ripple Adjust L1 ~ 3 for the response shown	



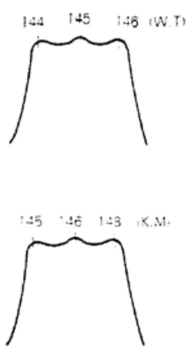
f: 145.00 MHz (W.T)
f: 146.00 MHz (K.M)



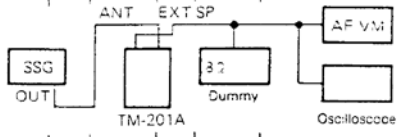
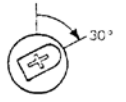
D1,2: 1SS99



100 pF: Chip capacitor

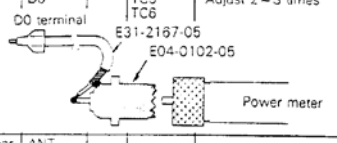


ADJUSTMENT

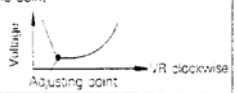
Item	Condition	Measurement			Adjustment			Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
5) IF GAIN	(1) DISPLAY 5.00 (W.T) 6.00 (K.M) Connect the SSG to ANT MOD : 1 kHz DEV : 5 kHz OUT : 10 dBμ	AF VTVM	A	TP5 (near Q19)	A	L24 L4 L6 L7	Max. Repeat 2 or 3 times Also, Repeat L4 and L6 again 	MAX.
6) Discriminator	(1) DISPLAY 5.00 (W.T) 6.00 (K.M) SSG f: 145.00 MHz (W.T) 146.00 MHz (K.M) OUT: 20 dBμ	AM VM Oscillo-scope	Rear panel	SP	A	L10 (near Q6)	MAX.	
7) S Level	(2) SSG OUT: 20 dBμ (W.T) 16 dBμ (K.M)	S-LED	LED		A	VR1 (near Q19)	All LED's light. (S10 LED should go off at 1 dB down)	
8) Beep	(1) Beep level adj.	Oscillo-scope	Rear panel	SP	B	VR1		0.3 ~ 1.2 Vpp
9) S/N	(1) DISPLAY 5.00 6.00 (K.M) SSG MOD: 1 kHz DEV: 5 kHz OUT: −9 dBμ −8 dBμ (K.W.T.M)	AF VTVM	Rear panel	SP				S/N 20 dB or more (4.00 ~ 7.38 K.M) (4.00 ~ 5.98 W.T)

TX ADJUSTMENT*

* 1) When adjusting PLL or B unit, must be transmit.
2) When transmitting, encoder are not change freq.

Item	Condition	Measurement			Adjustment			Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
1) B unit PLL	(1) DISPLAY 4.00 Transmit	DC VM	B	TP1	B	TC2	3.5 V ± 0.1 V	
	(2) DISPLAY 5.975 (W.T) 8.995 (K.M) Transmit							4.2 ~ 4.8 V (W.T) 5.6 ~ 6.4 V (K.M)
2) DRIVE	(1) DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit	0.6 W power meter	B	D0 		TC5 TC6	Adjust 2 ~ 3 times	0.25 W or more
3) MAX POWER	(1) B unit VR4, 5 MAX Full clockwise position DISPLAY 5.995 (W.T) 8.00 (K.M) Connect coax. cable to D0 terminal on the B unit, and transmit	Power meter	Rear panel	ANT				30 W or more (W.T) 28 W or more (K.M)
4) RF METER	(1) DISPLAY 5.00 (W.T) 6.00 (K.M)	RF power meter	Rear panel	ANT	B	VR3	1 Adjust VR-5 for 15 W (K.W.T.M)	At 15 W
		RF LED	Front panel				2 Adjust VR-3 for "10 digit" on	All RF-LED's should light.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. RF output	(1) DISPLAY 5.395 (W.T) 6.00 (K.M) Transmit	RF power meter	Rear panel	ANT	B	VR5	27 W 5 A or less	±0.5 W (W.T)
							26 W 4.3 A or less	±0.5 W (K.M)
	(2) DISPLAY 4.00 Transmit							26 W or more 5.3 A or less
	(3) DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit							
2. LOW POWER	(1) HI/LOW SW: LOW DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit	Power meter	Rear panel	ANT			Check	2 ~ 6 W 2.5 A or less
	(2) After check HI/LOW SW: HI	RF-LED						2 ~ 4 digits Light on.
3. Freq. adj.	(2) DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit	Freq. counter Power meter	Rear panel	ANT	B	TC (Linear Xtal)	145.000 MHz (W.T)	±100 Hz
							146.000 MHz (K.M)	±100 Hz
							If 145.000, 146.000 MHz freq. were unable to adjust correctly, check HET freq. of TP-2 on A unit.	
4. DEV	(1) Connect Audio Generator to MIC jack. 30 mV/1 kHz DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit. Disconnect the AG after check.	Linear Detector			B	VR2	4.6 kHz division	
5. TONE (Made only)	(1) TONE SW: ON Shorted between R2 and R7 on TONE unit. Transmit	Oscilloscope Linear detector Freq. counter			TONE	VR1	1750 Hz DEV 2.5 kHz	±10 Hz 2.5 kHz or more
								Tone burst time 0.5 ~ 1.0 second.
TONE (Made only)	TONE SW: ON						1750 Hz	±10 Hz DEV 2.5 kHz or more
6. Protection	1. DISPLAY 5.00 (W.T) 6.00 (K.M) Transmit	DC voltmeter	FINAL	TP1	FINAL	VR1	1. Set full power output 2. Adjust VR-1 clockwise for dip point	Dip point 
	2. Shorted to ANT Transmit	PC AM			B	VR4	3.5 A	

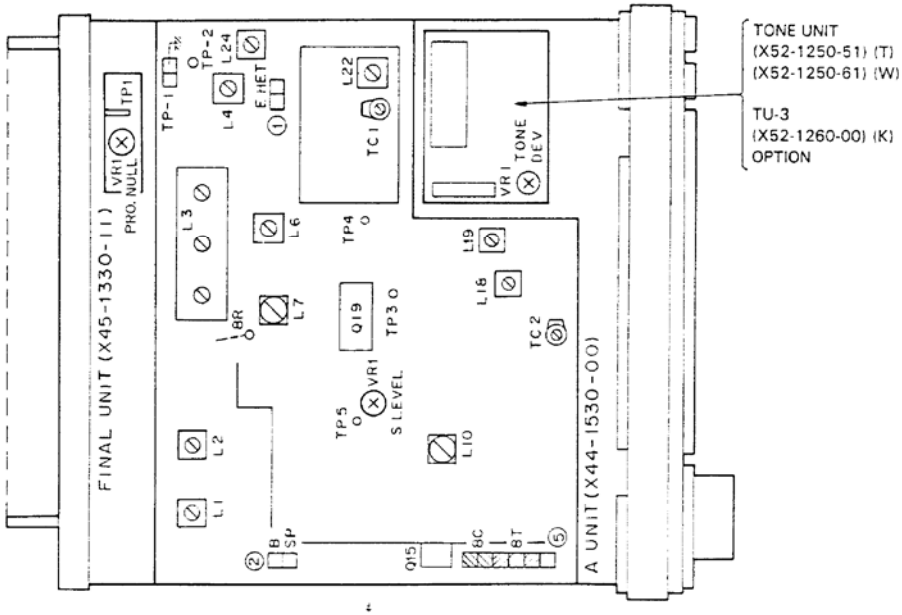
OPERATIONAL CHECKS

Item	Condition	Check of movement
1. Reset	1) RESET SW: ON 2) AF VOL: Center 2) SQ VOL: MAX	4.00 displayed
2. Main dial	1) Main dial: Clockwise	Display increases by 5 kHz (K.M) Display increases by 25 kHz (W.T)
	2) Main dial: Counterclockwise	Display decreases by 5 kHz (K.M) Display decreases by 25 kHz (W.T)
3. VFO A.B	1) A.B: ON • • Means VFO B position	4.00 • Display increases and decreases by 5 kHz
	2) Main dial turn to clockwise and counterclockwise	
	3) A.B: ON	5.00 is displayed and tone sounds same as item 2
4. COM. CH	1) COM: ON (K.M)	5.00e (W.T) 4.00e (K.M)
	2) COM: ON again	
5. Memory write	1) M-M2 knob is depressed make a continuous deep sounds.	Tone sounds, memory write already
	2) MS-M2 knob is depressed during deep sounds	
6. Memory check	1) MR: ON	5.00e (4 digits displayed) MR LED Light on. Tone sounds
	2) MS-M2: ON	5.10e (4 digits displayed) Tone sounds

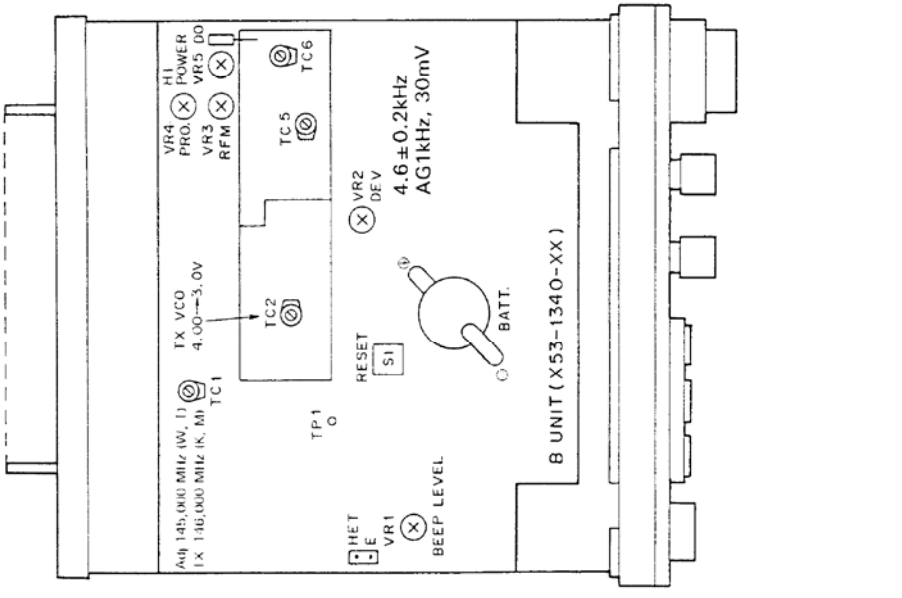
Item	Condition	Check of movement
7. MS	1) MS-M2: ON SQ VR Center	5.10e → 5.00e (4 digit display) MR LED Light on. MHz dot is flashed. Tone sounds.
	2) A.B: ON	5.00e or 5.10e (4 digits display) Tone sounds. Scan stopped.
	3) A.B: ON again	5.10 displayed Tone sounds.
8. ALERT	1) AL MS: ON SQL VOL: MAX	5.10 displayed ALERT LED Light on. Piping sounds each 6 seconds, at the same time the noise should stop 0.3 seconds.
	2) AL MS: ON again SQL VOL: MAX	5.10 Displayed
9. Program scan	1) MIC (UP position) is depressed during 2 seconds, then leave UP switch	Tone sounds. Scan will start increases by 20 kHz MHz dot is flashed.
	2) SQL VOL: MIN	Scan stopped after 6 seconds, will start increases by 20 kHz
	3) SQL VOL: MAX	Scan again
	4) MIC PTT: ON	Scan stopped

ADJUSTMENT

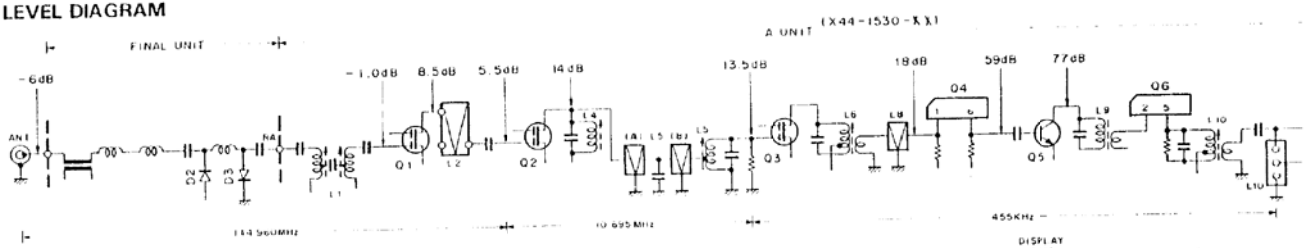
TOP VIEW



BOTTOM VIEW

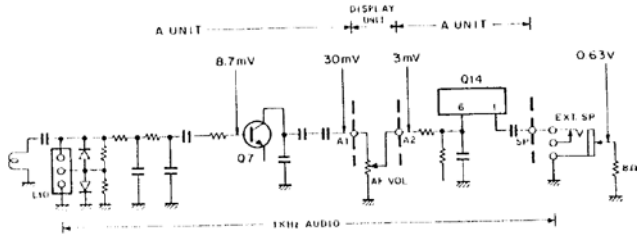


RX. LEVEL DIAGRAM

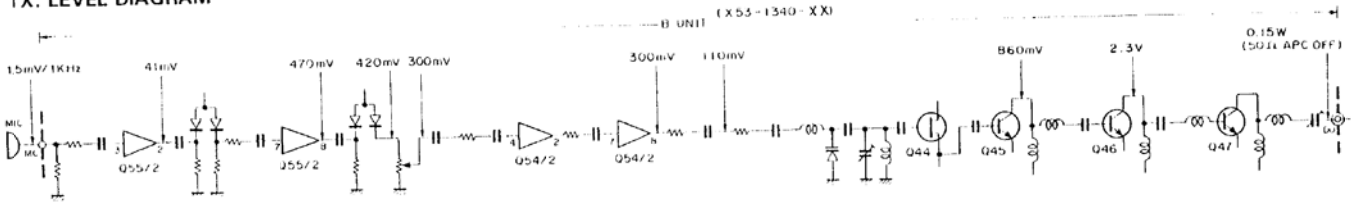


Note:

1. In measuring the circuit from the ANT terminal to the collector of Q5 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 0.63/8Ω. The signal voltage at each point was measured with an audio V.V.

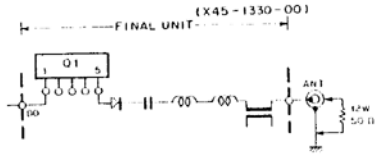


TX. LEVEL DIAGRAM



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 and audio V.V. and the RF unit was measured using an RF V.V. (1/100 attenuator used for levels of more than 3 V.)
3. The RF voltages shown in round parentheses ( ) are reference values since they are subject to change according to the positions of the probes.



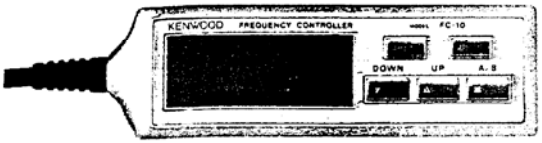
FC-10 OPTION (REMOTE FREQUENCY CONTROL)

■ SPECIFICATIONS

Dimensions: W112mm (4-13/32") × H35mm (1-13/32") × D22.5mm (29/32")
Weight: 100 g
Cable length: 1.5 m

■ APPLICATION

TM-201A : 2 m transceiver
TM-401A : 70 cm transceiver



CIRCUIT DESCRIPTION

In the switch unit, a diode matrix is constructed with D2 - D4 in order to convert 5 keys into a 3-bit cord. The output of the matrix is fed to the main unit after it is turned over and amplified by the inverter Q1.

In the LCD unit, the LCD display data is reshaped in wave form by the Schmit inverter Q102 and fed to Q101. The LCD data is a serial data of 3-bit and 32 bits are transfered at a time. The Q101 has a latch storing data is changed. The LCD display employs a static illumination system.

	R0	R1	R2
MR	L	H	L
MHz	L	L	H
UP	H	L	H
DOWN	H	H	L
A/B	L	H	H

Key matrix signal

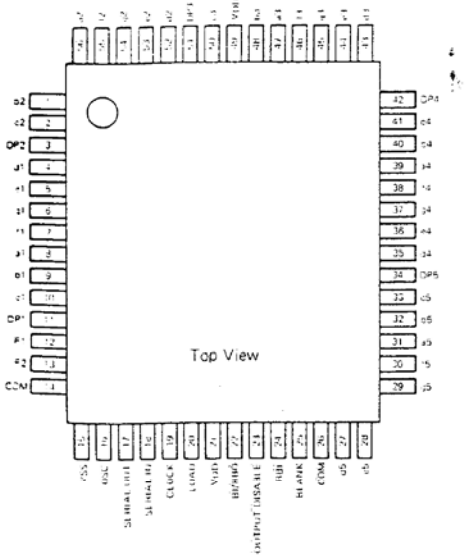


Fig. 19 MSM5829GS (Control Ass'y IC3)

Hex. No.	$\overline{RBI}$	BI/$\overline{RBO}$	SEGMENT OUT Note 1							Display
			a	b	c	d	e	f	g	
*	*	L	L	L	L	L	L	L	L	Note 3
0	*	Note 2	L	L	L	L	L	L	L	Note 4
0	*	H	H	H	H	H	H	H	L	
1	*	H	L	H	H	L	L	L	L	
2	*	H	H	H	L	H	H	L	H	
3	*	H	H	H	H	H	L	L	H	
4	*	H	L	H	H	L	L	H	H	
5	*	H	H	L	H	H	L	H	H	
6	*	H	H	L	H	H	H	H	H	
7	*	H	H	H	H	L	L	L	L	
8	*	H	H	H	H	H	H	H	H	
9	*	H	H	H	H	H	L	H	H	
A	*	H	H	H	H	L	H	H	H	
B	*	H	L	L	H	H	H	H	H	
C	*	H	H	L	L	H	H	H	L	
D	*	H	L	H	H	H	H	L	H	
E	*	H	H	L	L	H	H	H	H	
F	*	H	H	L	L	L	H	H	H	

21 MSM5829GS function table

Note: 1. H: Display state. The phase of this output is opposite to that of the COM pin output.
L: Nondisplay state. The phase of this output is the same as that of the COM pin output.
2. BI/RBO is "L" only when RB1 is "L" and all digits are 0 (blank display). When BI/RBO pin is forced to logic "H", 0 is displayed at the least significant digit.
3. When BI/RBO is forced to logic "L", only the least significant digit blanks.
4. When RBI is set to logic "L", the leading zeros are suppressed, i.e., the continuous zeros, if any, at the most significant digit down are blanked.

FC-10 OPTION (REMOTE FREQUENCY CONTROL)

Parts List

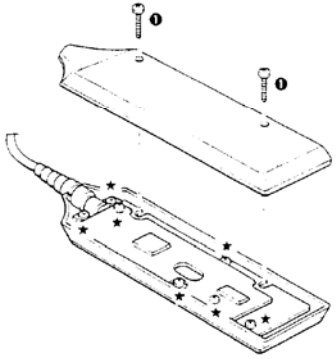
Parts No.	Remarks	Description	Ref. No.
		GENERAL	
A02-0640-02	N	Case (Upper)	
A02-0641-03	N	Case (Lower)	
A13-0647-03	N	Mounting fitting hardware	
B10-0657-04	N	Front glass	
B11-0415-04	N	LCD guiding plate	
B41-0635-04	N	Caution plate	
B42-1795-04	N	Name plate	
B50-4056-00	N	Instruction manual	
E30-1738-05	N	Cable with 8P plug	
E31-2179-05	N	Flat cable	
G01-0819-04	N	Cable fitting spring	
H01-4500-03	△N	Carton	
H12-1339-04	△N	Packing fixture	
H25-0029-04	△	Protective bag	
H25-0049-03	△	Protective bag	
J19-1379-04	△N	Fitting hardware	
J19-1381-04	N	Bothside tape	
J30-0529-04	△N	Spacer (Tact switch)	
J42-0439-05	N	Cable bush	
J69-0305-04	N	Magic fastener	
K27-0449-04	N	Key-knob (A) MHz	
K27-0450-04	N	Key-knob (B) MR	
K27-0451-04	N	Key-knob (C) DOWN(▼)	
K27-0452-04	N	Key-knob (D) UP(▲)	
K27-0453-04	N	Key-knob (E) A/B(■)	
N10-2030-41		Alen nut × 2	
N15-1030-41		Flat washer × 2	
N30-2008-41		Screw × 2	
N30-3016-41		Screw × 2	
N89-2006-46	N	Bind tap tight screw × 7	
N89-3012-41	N	Bind tap tight screw × 2	
X41-1510-00	N	Switch unit	
X54-1760-00	N	LCD unit	

Parts No.	Remarks	Description	Ref. No.	Q'ty
		SWITCH UNIT (X41-1510-00)		
B30-0828-05		Lamp with cap	LP1, 2	2
C90-0876-05	N	E(small) 22 16V	C1	1
C91-0117-05		Cap. 0.01 (SR)	C2	1
R90-0565-05		Capacitor block 47Ω × 7	C3	1
R90-0566-05		Resistor block 27kΩ × 3	R2, 3	2
S50-1412-05		Tact switch	S1–5	5
DAN201	N	Diode	D2–3	2
XZ-051		Zener diode	D1	1
TC4049BF		IC	Q1	1
		LCD UNIT (X54-1760-00)		
CS15E1V0R1M		T 0.1 35V	C101	1
C91-0117-05		Cap. 0.01 (SR)	C102	1
F39-0402-04		LCD reinforced sheet		1
J25-3136-05		Flexible PC board		1
J30-0519-04		Spacer(A)		1
FTS1212		LCD		1
MSM58292GS		IC	Q101	1
μPD4584BG	N	IC	Q102	1

DISASSEMBLY

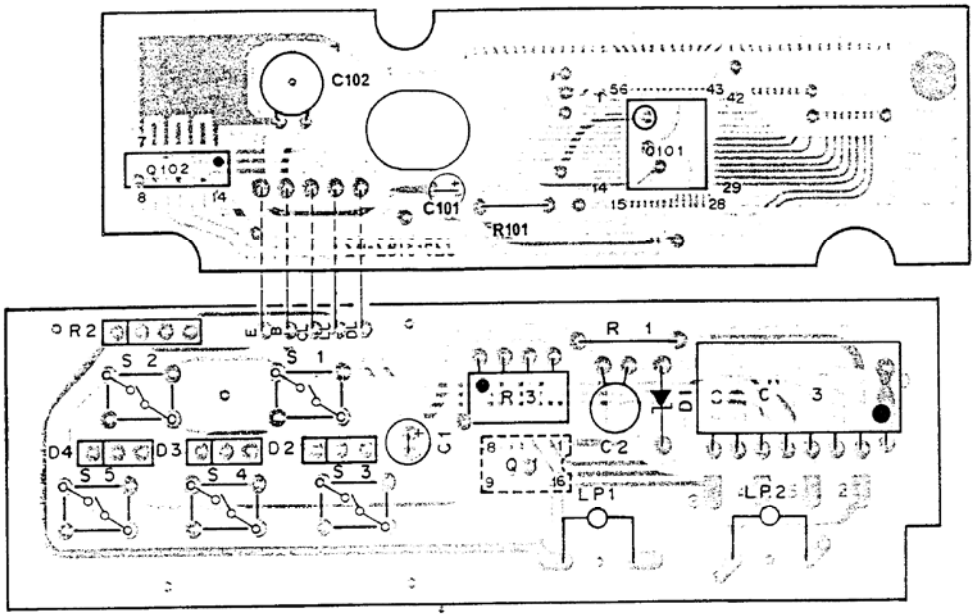
❶ Remove lower case screw (× 2)

❷ Remove seven screws on PC board.



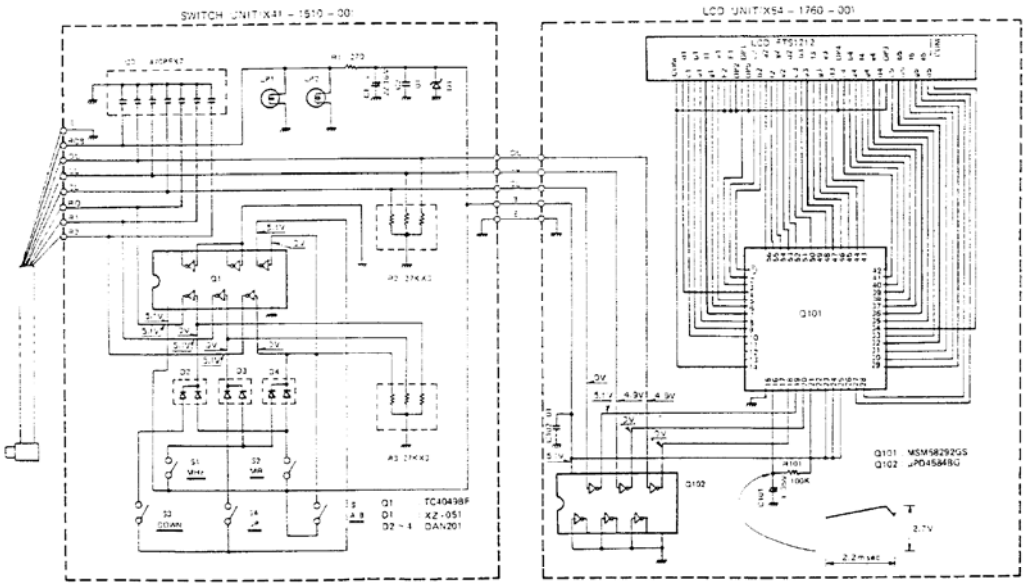
FC-10 OPTION REMOTE FREQUENCY CONTROL

▼ LCD UNIT (X54-1760-00) Component side view



▲ SWITCH UNIT (X41-1510-00) Foil side view

SCHEMATIC DIAGRAM



TU-3 OPTION

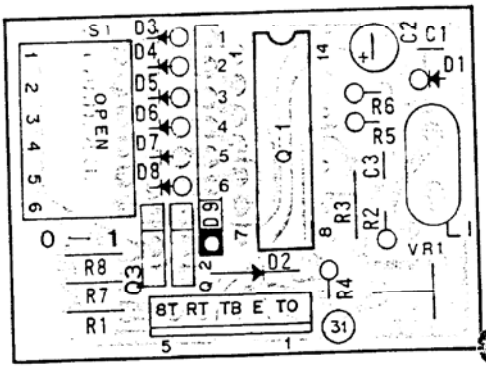
▼ TU-3 FREQUENCY CHART

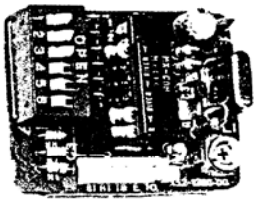
EIA Specification Group — 1 denotes that the diode must be cut.

#	EIA Specification Group	Hz	Program Lines (ON···1, OFF···0) 1 2 3 4 5 6	#	EIA Specification Group	Hz	Program Lines (ON···1, OFF···0) 1 2 3 4 5 6
1	A	67.0	1 1 1 1 1 1	21	A	141.3	1 0 0 0 0 0
2	B	71.9	1 1 1 1 1 0	22	B	146.2	0 1 1 1 1 1
3	C	74.4	1 1 1 1 0 1	23	A	151.4	0 1 1 1 1 0
4	A	77.0	1 1 1 1 0 0	24	B	156.7	0 1 1 1 0 1
5	C	79.7	1 1 1 0 1 1	25	A	162.2	0 1 1 1 0 0
6	B	82.5	1 1 1 0 0 1	26	B	167.9	0 1 1 0 1 1
7	C	85.4	1 1 1 0 0 0	27	A	173.8	0 1 1 0 1 0
8	A	88.5	1 1 1 0 0 0	28	B	179.9	0 1 1 0 0 1
9	C	91.5	1 1 0 1 1 1	29	A	186.2	0 1 1 0 0 0
10	B	94.8	1 1 0 1 1 0	30	B	192.8	0 1 0 1 1 1
11	A	150.0	1 1 0 1 1 0	31	A	203.6	0 1 0 1 1 0
12	B	103.5	1 1 0 1 0 1	32	B	210.7	0 1 0 1 0 1
13	A	107.2	1 1 0 1 0 0	33	A	218.1	0 1 0 1 0 0
14	B	110.9	1 1 0 0 1 1	34	B	225.7	0 1 0 0 1 1
15	A	114.8	1 1 0 0 1 0	35	A	233.6	0 1 0 0 1 0
16	B	118.8	1 1 0 0 0 1	36	B	241.8	0 1 0 0 0 1
17	A	123.0	1 1 0 0 0 0	37	A	250.3	0 1 0 0 0 0
18	B	127.3	1 0 1 1 1 1				
19	A	131.8	1 0 1 1 1 0				
20	B	136.5	1 0 1 1 0 1				

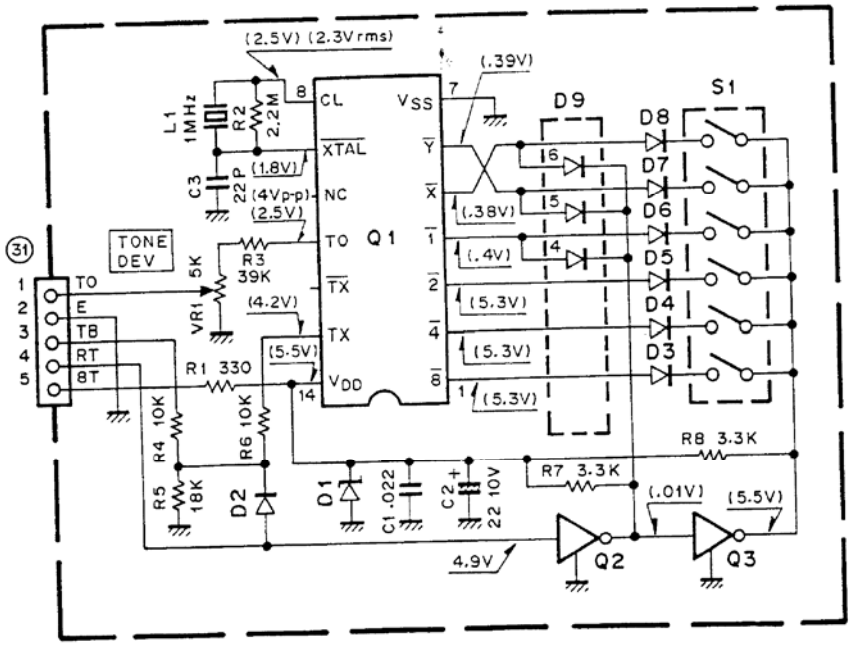
Ton Frequency Table

▼ TU-3 UNIT (X52-1260-XX) Component view





▼ TU-3 SCHEMATIC DIAGRAM

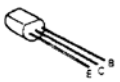


Q1 : MX315
Q2,3 : DTC124(F)

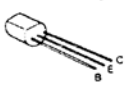
D1 : XZ-055
D2~8 : 1S1555
D9 : R90-0567-05

TM-201A
MEMO

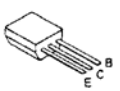
2SA1015
2SC1959



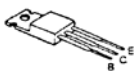
2SC2026
2SC2459



2SA1115
2SC2458
2SC2668
2SC3113



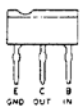
2SD880



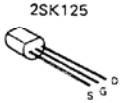
2SC2787

2SC3019

DTC124
DTC143T

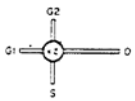


2SK125

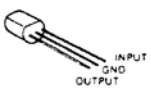


3SK73

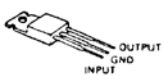
3SK97



NJM78L05K



μPC78M05H
μPC78M08H

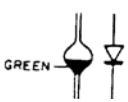


TA7302P
μPC577H

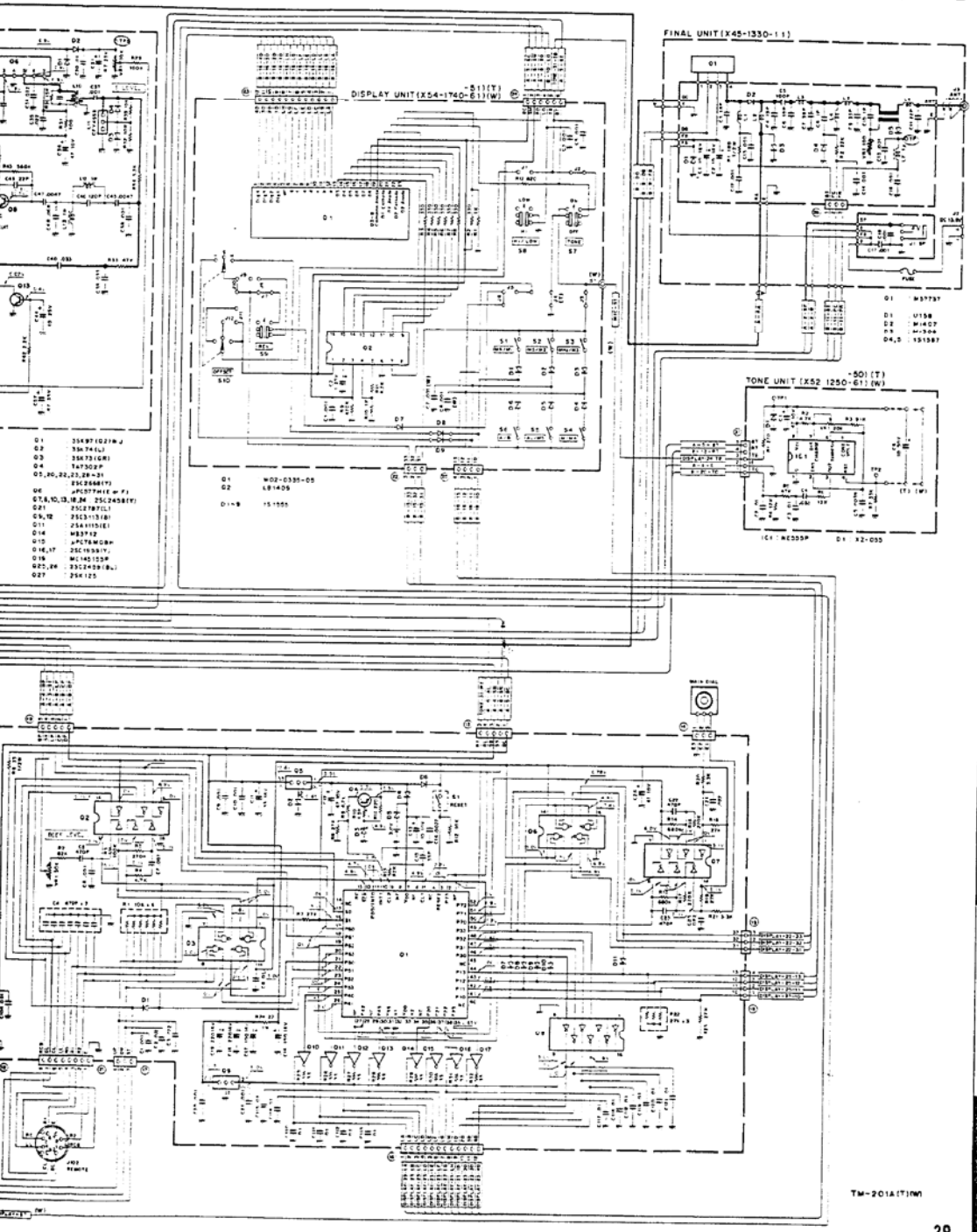
NJM4558S

MB3712

MV-13

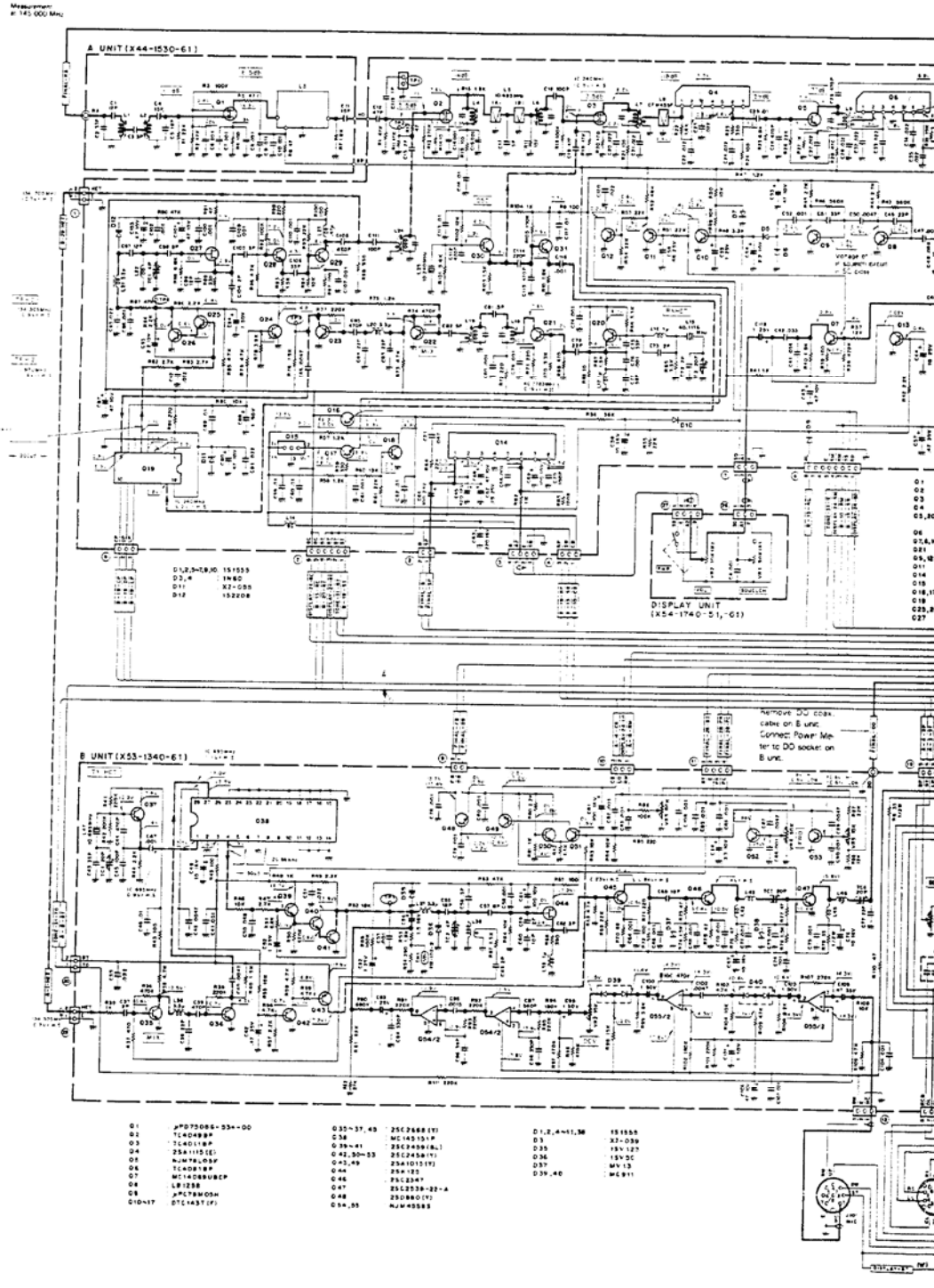


SCHEMATIC DIAGRAM (W, T) TM-201A

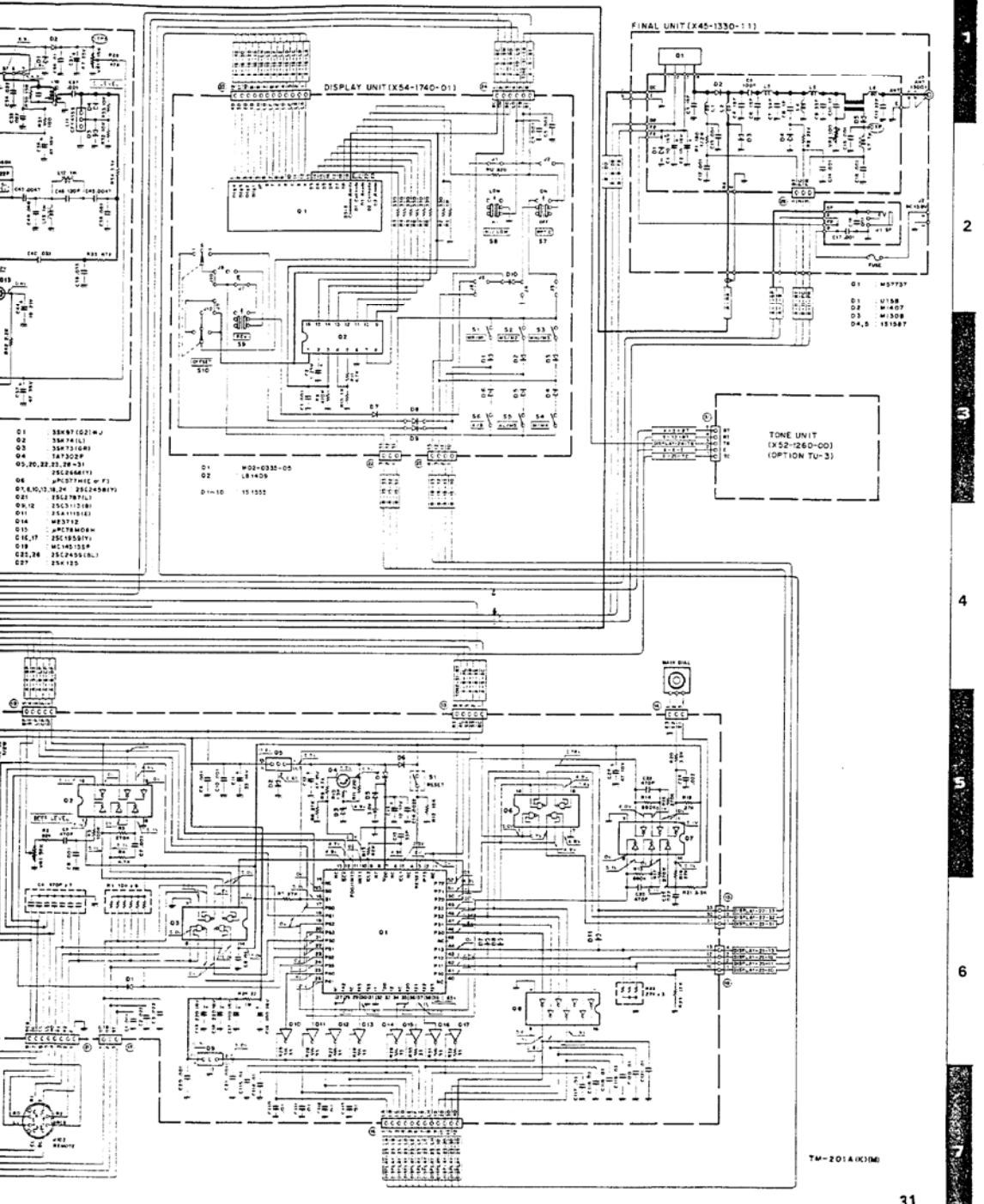


A | B | C | D | E

Signal Line — — — — Control Line ——— Common DC Line

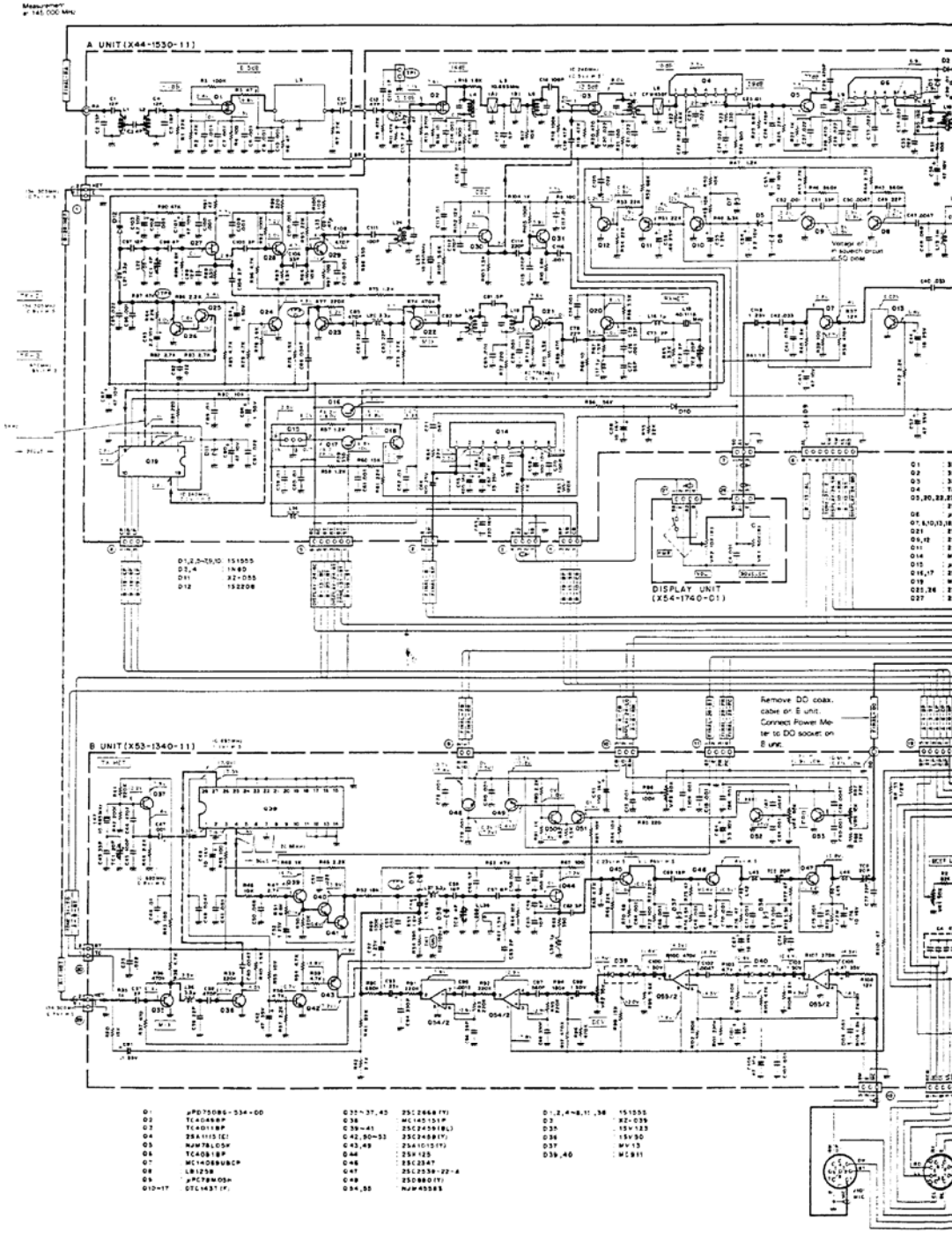


SCHEMATIC DIAGRAM (K, M) TM-201A



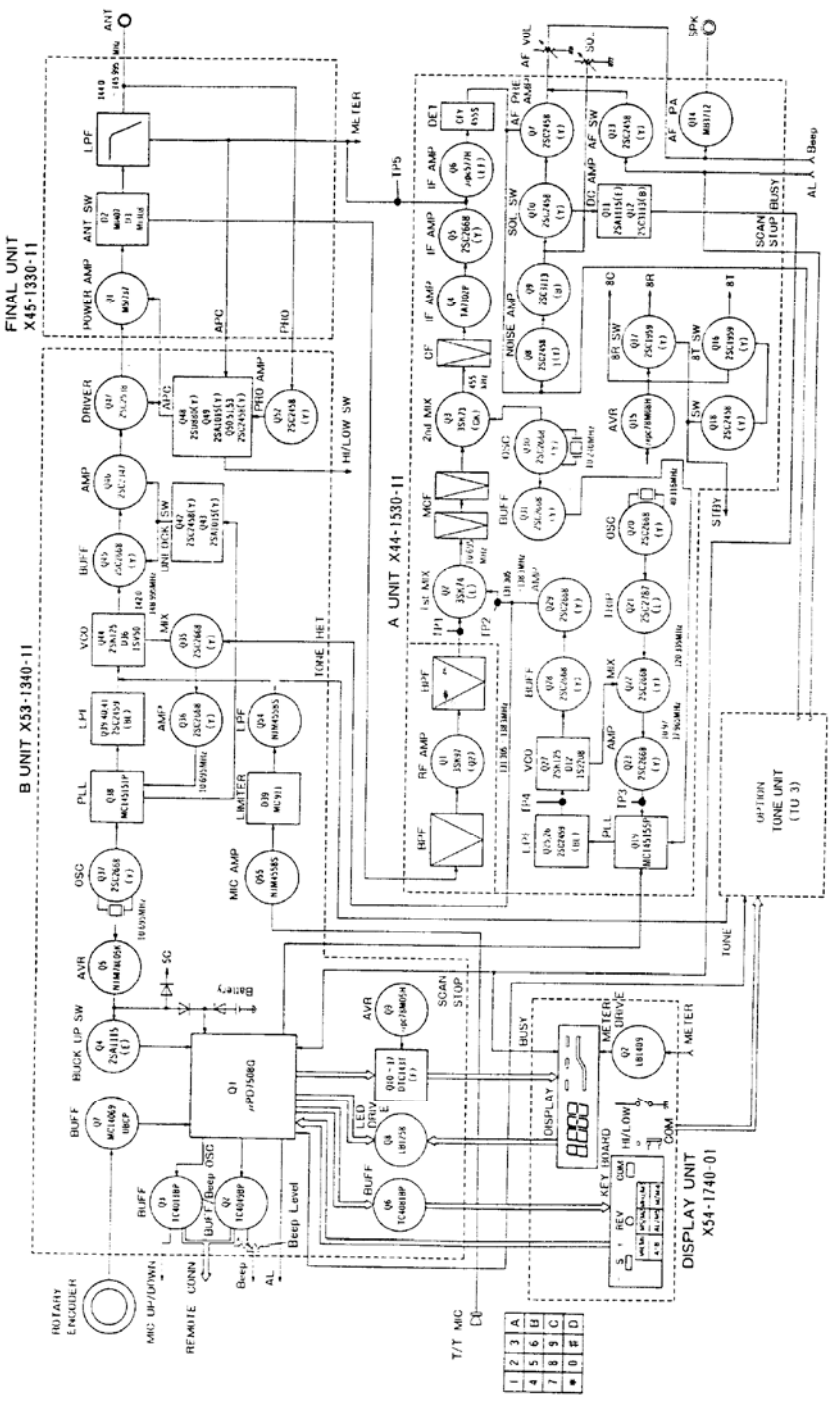
A | B | C | D | E

Signal Line — — — — Control Line ——— Common DC Line

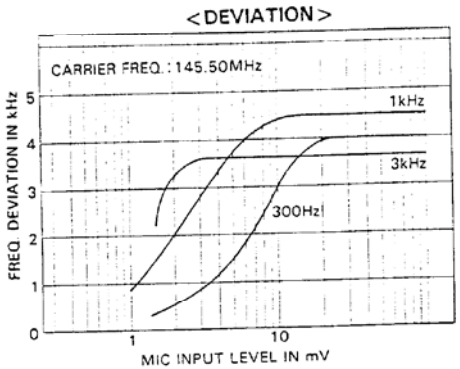


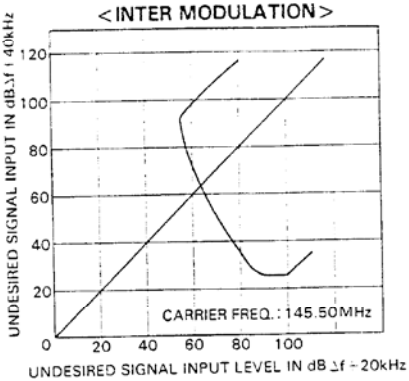
TM-201A

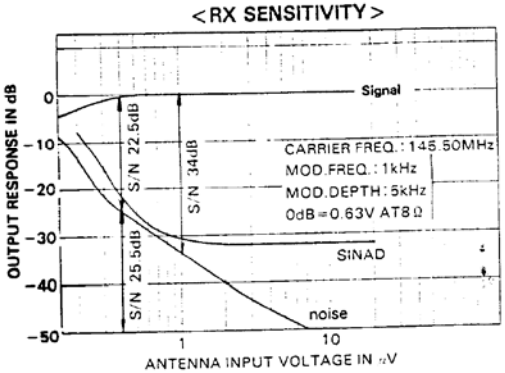
BLOCK DIAGRAM (K TYPE)

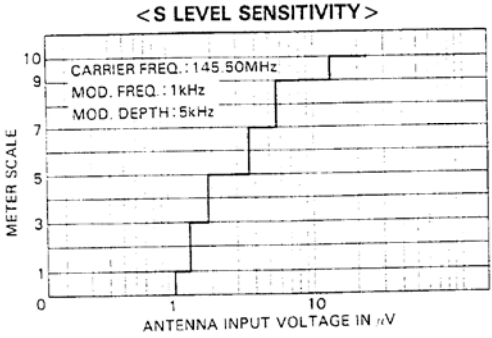


REFERENCE DATA

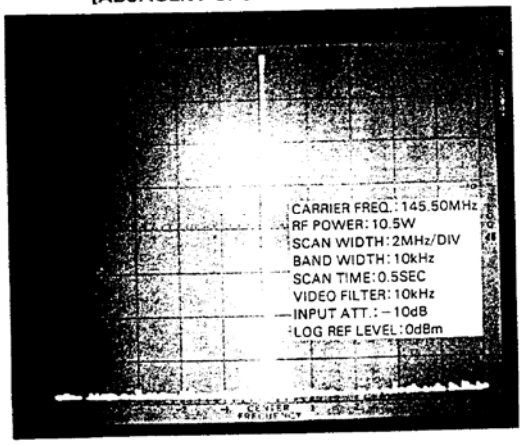




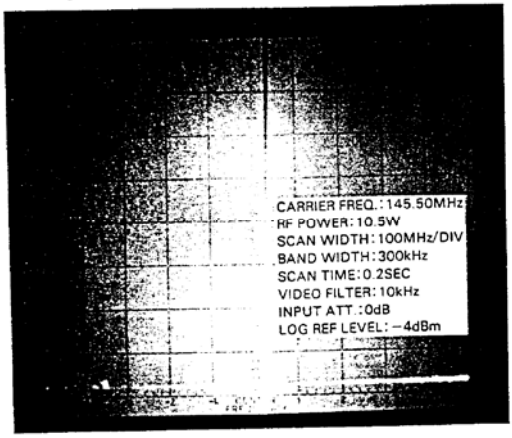




[ADJACENT SPURIOUS RESPONSE]



[HARMONICS SPURIOUS RESPONSE]



TM-201A

SPECIFICATIONS

[General]

Semiconductors	MPU	1
	ICs	18 (K, M)
		9 (T, W)
	Transistors	48
	FETs	5
	Diodes	42 (K, M)
		44 (T, W)
Frequency range	144.0 to 148.0 MHz (K, M)	
	144.0 to 146.0 MHz (T, W)	
Mode	FM (F3)	
Anntenna impedance	50 ohms	
Power requirement	13.8V DC ± 15%	
Grounding	Negative	
Operating temperature	−20°C to +50°C	
External speaker impedance	8 ohms	
Current drain	0.5 A in receive mode with no input signal	
	Max. 5.5 A in HI transmit mode	
	2.5 A in LOW transmit mode	
	(Approx.)	
Dimensions	141 mm wide	
	39.5 mm high	
	183 mm deep	
	(projections not included)	
Weight	1.25 kg (2.75 lbs)	

[Transmitter]

RF output power (at 13.8V DC, 50Ω load)	HI 25 Watts min.
	Low 5 Watts approx.
Modulation	Reactance
Frequency tolerance (−20°C ~ +50°C)	Less than $\pm 15 \times 10^{-6}$
Spurious radiation	HI Less than −70 dB
	LOW Less than −60 dB
Maximum frequency deviation (FM)	±5kHz
Audio distortion	3% max. (300 Hz ~ 3000 Hz)

[Receiver]

Circuitry	Double superheterodyne
Intermediate frequency	1st 10.695 MHz
	2nd 455 kHz
Receiver sensitivity	SINAD 12 dB less than 0.22 μV (K, M) 0.2 μV (T, W)
	S+N/N more than 50 dB at 1.0 mV input
Receiver selectivity	More than 12 kHz (−6 dB)
	Less than 24 kHz (−60 dB)
Spurious response	Better than 70 dB (except f_o-IF/2)
Squelch sensitivity	Less than 0.16 μV (threshold)
Auto scan stop level	Less than 0.2 μV (threshold)
Audio output	More than 2.0 watts across 8 ohms load (5% dist.)

[Auto patch microphone (MC-48) supplied] —— For U.S.A. version only

Semiconductors	IC	1
	Transistors	3
	Diodes	3
Impedance	500 ohms	

Scan by Dan

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

A product of

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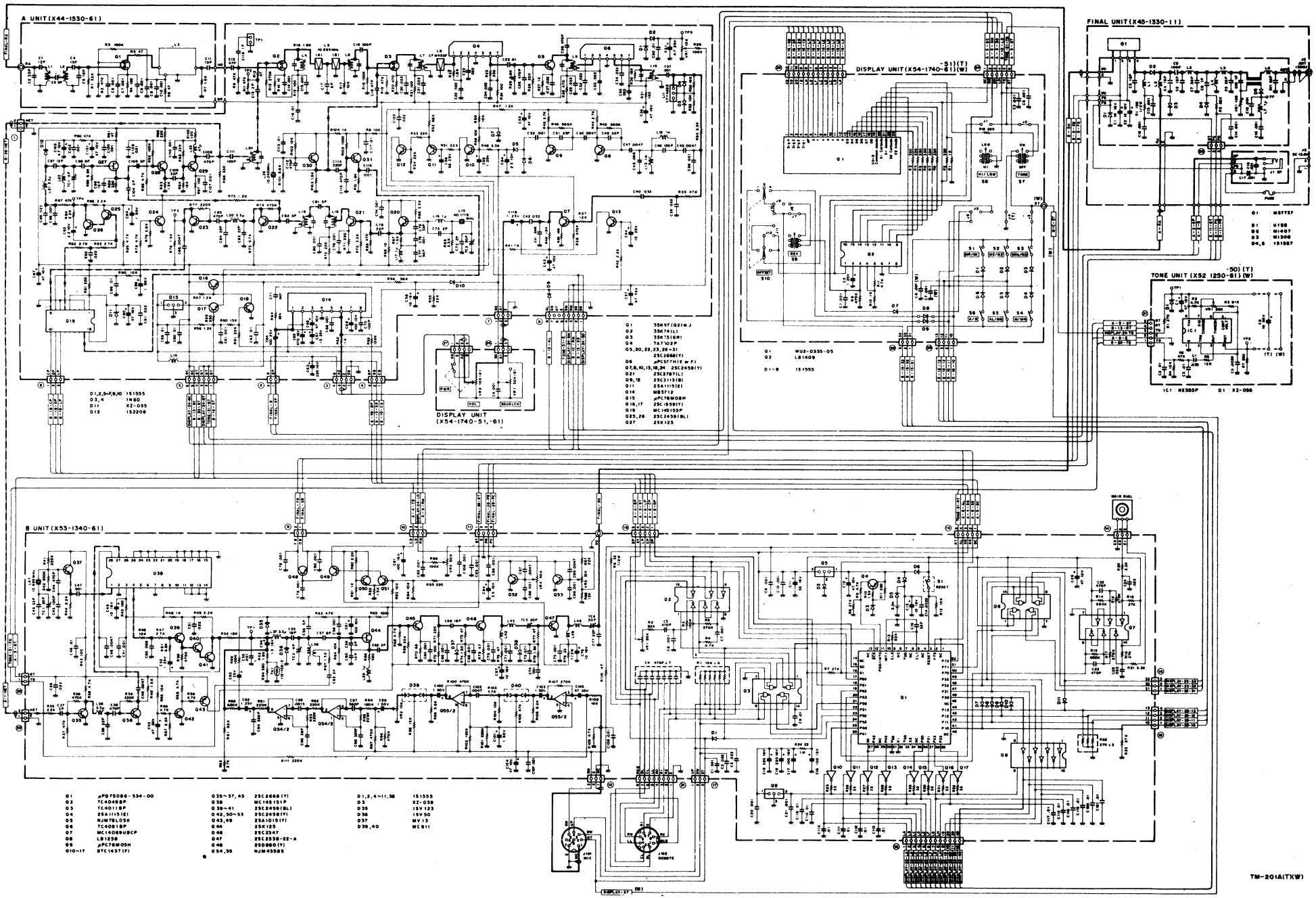
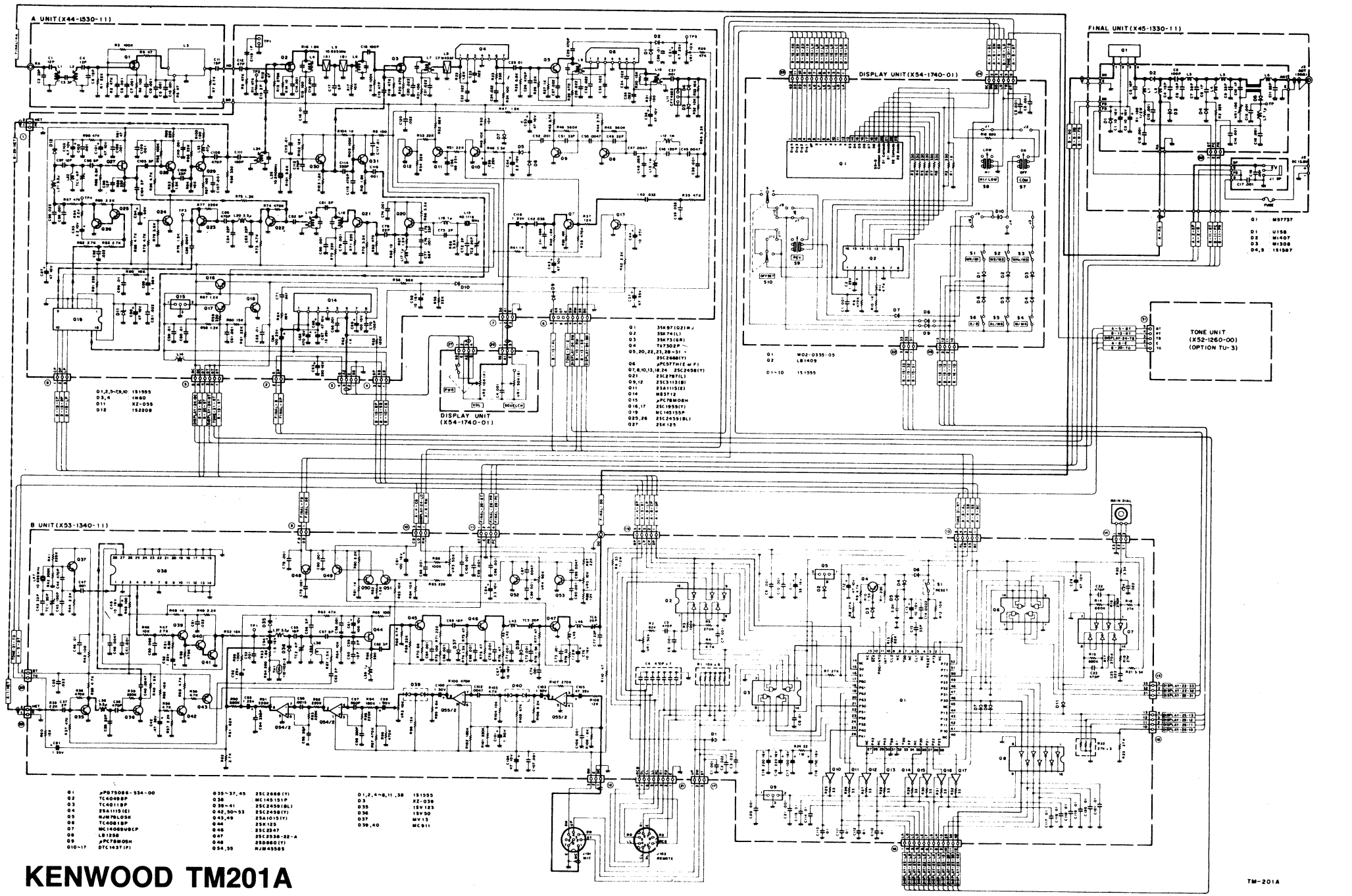
SCHEMATIC DIAGRAM

For users in Europe and England, refer to this schematic diagram



SCHEMATIC DIAGRAM

For users other than Europe and England, refer to this schematic diagram



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TM-201A