

# KENWOOD

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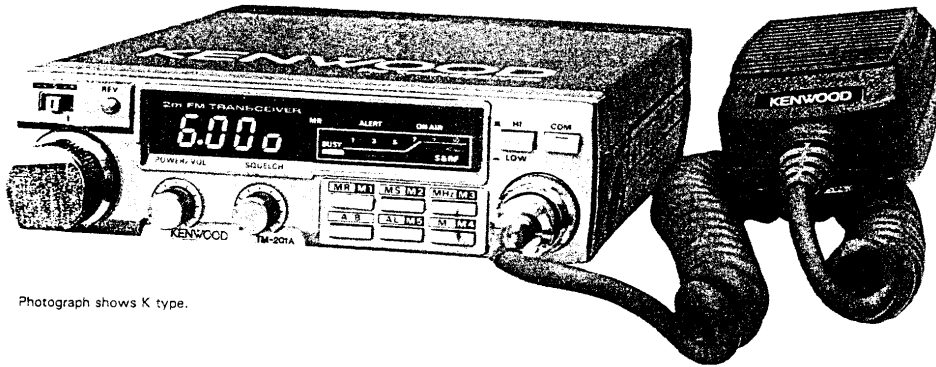
# SERVICE MANUAL

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

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### VHF FM TRANSCEIVER



Photograph shows K type.

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# M-201A

## 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 ( $\mu$ PC577H) 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 is 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	$f_0 \pm 7.5$ kHz or more at 30 dB
Attenuation band	$f_0 \pm 25$ kHz or less at 40 dB $f_0 \pm 45$ kHz or less at 60 dB
Guaranteed attenuation	70 dB or more within $f_0 \pm 1$ MHz (Spurious level = 35 dB or more) 80 dB or more within $f_0 \pm (910 \text{ kHz} \pm 20 \text{ kHz})$
Ripple	1.0 dB or less
Loss	1.5 dB or less
Terminal impedance	3 k $\Omega$ 110PF

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

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

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

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

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

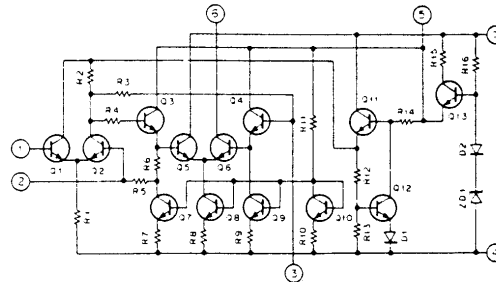


Fig. 1 TA7302P Equivalent circuit (A unit: Q4FM IF & amp.)

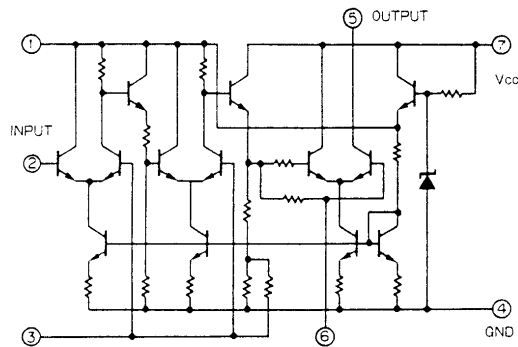


Fig. 2  $\mu$ PC577H (A unit: Q6 wide band amp.)

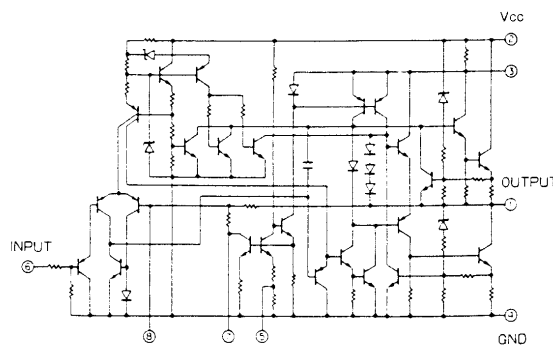


Fig. 3 MB3712 (A unit: Q14 AF power amp.)

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.

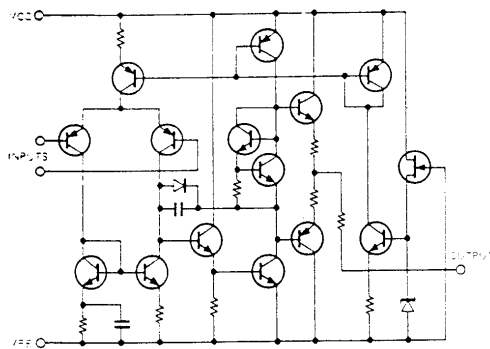


Fig. 4 NJM4558S (B unit: Q54, 55)

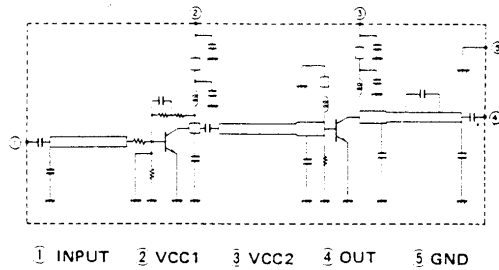


Fig. 5 Power module M57737 equivalent circuit

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

### LED DRIVE CIRCUIT

The LED drive system consists of 4-digit LEDs. The segment signal is output at ports P20 - P23 and P40 - P43 of the microprocessor Q1 and driven by digital transistors Q10. The digit signal is output at port P30 - P33 and driven by digital transistor Q8. The 2 dots (MHz decimal point and A,B) of the frequency display and MR and ALARM LEDs are driven dynamically.

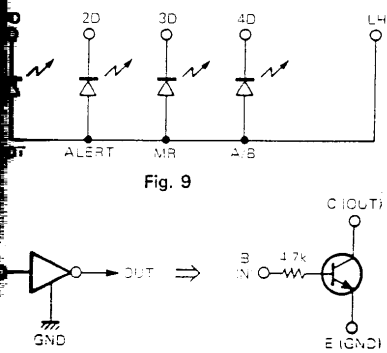


Fig. 9

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 eliminated 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.

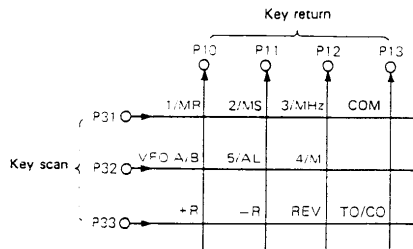


Fig. 11 Key matrix

### Beep sound

The beep signal is switched by the 3-stage inverter 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 inverter 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	P31	KEY SCAN OUTPUT
	P32	
	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	P10	KEY RETURN OUTPUT
	P11	
	P12	
	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

# M-201A

## 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 20.98 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 2453Y), which then turns off Q43 (2SA 1015Y). The result is that no bias is applied to Q45-Q47 and transmitter output is inhibited.

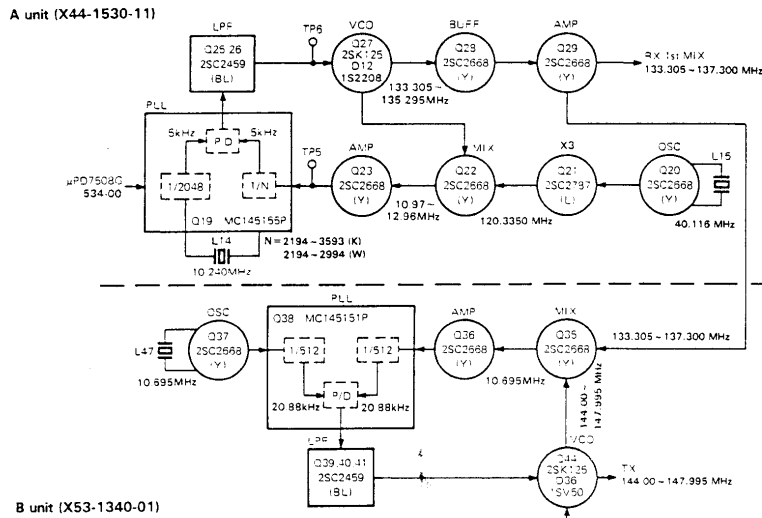


Fig. 6 PLL block diagram

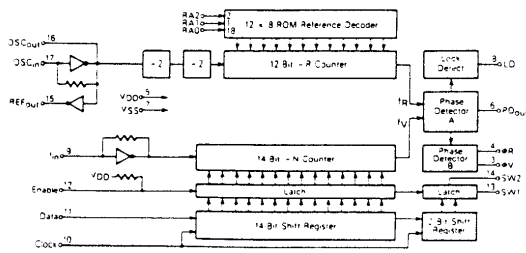


Fig. 7 MC145155 Block diagram (A unit: Q19) serial input PLL freq. synthesizer

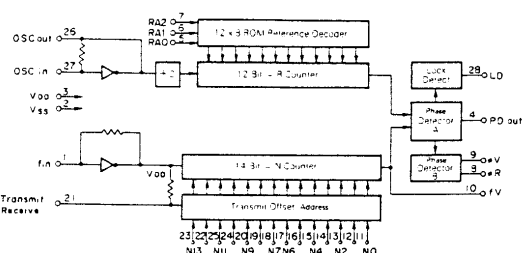


Fig. 8 145151P Block diagram (B unit: Q38) Parallel input PLL freq. synthesizer

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	LA	LED Segment a Data	SP	Speaker
A2	Arm of AF control	LB	LED Segment b Data	SQ	Squelch
B	+13.8V	LC	LED Segment c Data	SS	Scan Stop
BD	Busy Light	LD	LED Segment d Data	ST	Stand by Switch
BP	Beep Tone Output	LE	LED Segment e Data	TB	Tone +B
CB	Common +B	LF	LED Segment f Data	TO	Tone Output
CL	LCD Display Data in Remote Control	LG	LED Segment g Data	UP	MIC UP Switch
CP	PLL IC Data	LH	LED Dot point Data	1D	LED Digit 1 Data
DB	Drive +B	LO	Low Power Switch	2D	LED Digit 2 Data
DL	LCD Display Data in Remote Control	LP	PLL IC Data	3D	LED Digit 3 Data
DO	Drive Output	MC	MIC	4D	LED Digit 4 Data
DP	PLL IC Data	MN	Monitor	8C	+3V Common
DT	Detect Output	PC	Power Control	8M	+3V at MIC
DW	Mic Down Switch	PR	Protection	8R	+3V in RX
E	GND	PS	Squelch Switch	8T	+3V in TX
E1	Encoder 1	QS	Squelch Switch	10	μ-Proc. port-10
E2	Encoder 2	RA	RX Antenna	11	μ-Proc. port-11
E3	Encoder 3	RCB	Remote Control Common +B	12	μ-Proc. port-12
FB	Final +B	RM	RF Meter	13	μ-Proc. port-13
HET	Hetero	RO	Remote Control 0	31	μ-Proc. port-31
HNG	Hanger	R1	Remote Control 1	32	μ-Proc. port-32
		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	PTB		○	No TX pro & alert audio mute signal	28	P42		○	LED Segment c
3	RESET	○		Reser. input	29	NC			
4	NC				30	P43		○	LED Segment d
5	CL1			Clock OSC CR connector terminal	31	V <sub>SS</sub>		○	GND
6	NC				32	K1		○	GND
7	V <sub>DD</sub>			+B power terminal (+5.0 V)	33	V <sub>DD</sub>			NC
8	NC				34	K2			NC
9	CL2			Clock OSC CR connector terminal	35	NC			
10	INT1			GND	36	P20		○	LED Segment e
11	P00 INT0	○		Back-up detector input	37	P21		○	LED Segment f
					38	P22		○	LED Segment g
12	P01 SCK		○	PLL, LCD Serial data, Synchronize clock terminal	39	P23		○	LED Segment h
					40	NC			
13	NC				41	P10	○		KEY Return input (KA)
14	NC				42	P11	○		KEY Return input (KB)
15	P02 S0		○	PLL, LCD Serial data	43	P12	○		KEY Return input (KC)
16	P03 S1	○		Squelch BUSY detector input	44	P13	○		KEY Return input (KD)
17	P00	○		PLL Serial data, Latch output	45	NC			
18	P61	○		LCD Serial data, Latch output	46	P30		○	KEY SCAN output & LED digit output (1 kHz)
19	P62	○		ENCODER E1 (CLOCK)	47	P31		○	KEY SCAN output & LED digit output (10 kHz)
20	P63	○		ENCODER E2 (DATA)	48	P32		○	KEY SCAN output & LED digit output (100 kHz)
21	P50	○		REMOCON R0 Remote Control Keyboard input	49	P33		○	KEY SCAN output & LED digit output (1 MHz)
22	P51	○		REMOCON R1 Remote Control Keyboard input	50	P70		○	Beep signal output
23	P52	○		REMOCON R2 Remote Control Keyboard input	51	P71		○	KEY SCAN shut off signal
24	P53	○		TX, RX discrimination input	52	P72		○	Tone encoder access signal
25	P40		○	LED Segment a					
26	P41		○	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

<b>Model</b>	CR2032
<b>Nominal Voltage</b>	3 V
<b>Nominal Capacity</b>	170 m Ah
<b>Discharge Stop Voltage</b>	2.0 V
<b>Dimensions</b>	Diameter 20.2 mm
	High 3.2 mm
<b>Weight</b>	3 g

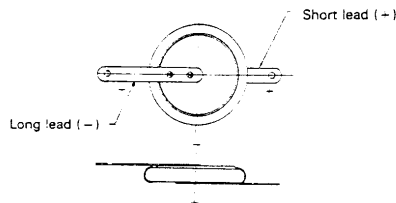


Fig. 12

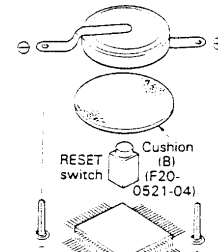


Fig. 13

#### Replacement procedure

When replace the back-up battery read as follows.

1. Remove the lower case.
2. Take care not to damage parts on 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 ARSE-NIDE 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.

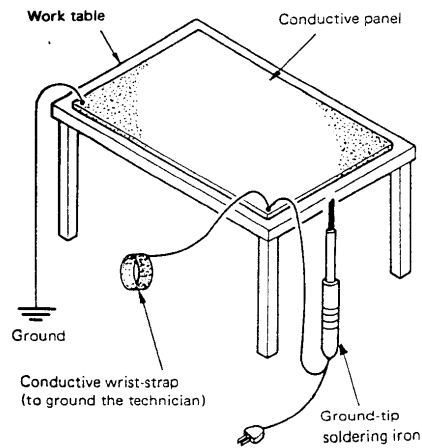
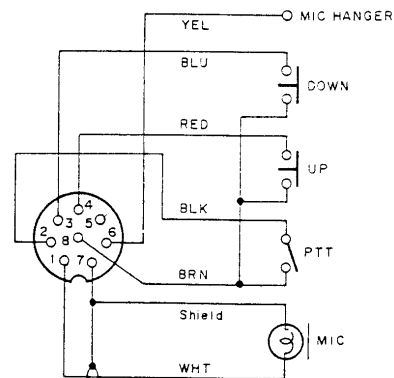


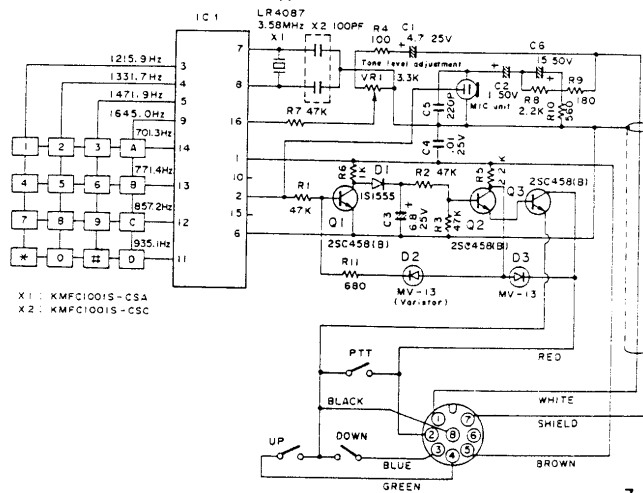
Fig. 14

#### ACCESSORY MICROPHONE

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

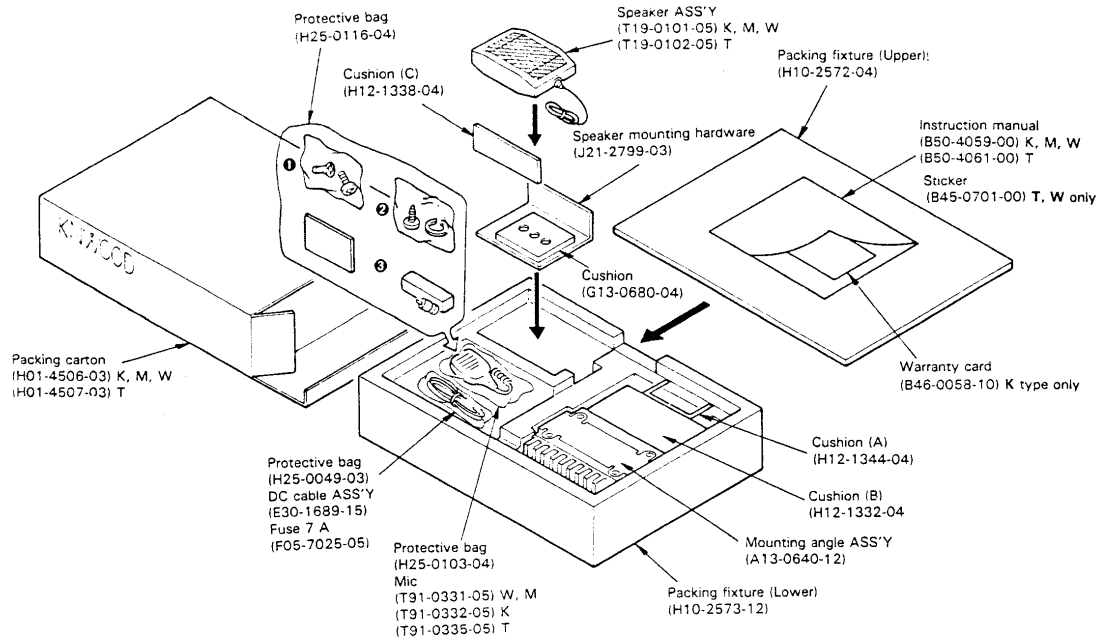


(T91-0332-05) K type



# FM-201A

## PACKING



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

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

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

Fig. 17



# TM-201A

## PARTS LIST

### CAPACITORS

CC 45 TH 1H 320 J  
 1 2 3 4 5 6  
 1 = Type ... ceramic, electrolytic, etc. 4 = Voltage rating  
 2 = Shape ... round, square, etc. 5 = Value  
 3 = Temp. coefficient 6 = Tolerance

#### Temperature coefficient

1st Word	C	L	P	R	S	T	U
Color #	Black	Red	Orange/Yellow	Green	Blue	Violet	
ppm/°C	0	-30	-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

#### Tolerance

Code	C	D	G	J	K	M	X	Z	P	No code
%	±0.25	±0.5	±2	±5	±10	±20	+10	+80	+100	More than 10µF -10 ~ +50 Less than 1µF -10 ~ +75

Less than 10 pF

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

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

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

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

#### 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	620	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

### SEMICONDUCTOR

Name	Re- marks	Part No.	Name	Re- marks	Part No.	Name	Re- marks	Part No.		
Diode	N	IN60	TR	N	2SA1015 (Y)	Microprocessor	N	UPD7508G-534-00		
		IS1555			2SA1115 (E)			IC	N	LB1258
		IS1587			2SC1959 (Y)					LB1409
		IS2208			2SC2347					LR4087 (MC-48)
		MC911			2SC2458 (Y)					MB3712
		MI308			2SC2459 (BL)					MC14069UBCP
		MI407			2SC2538-22-A					MC145151P
		MV13			2SC2668 (Y)					MC145155P*K
		U15B			2SC2787 (L)					NJM78L05K
		Vari-cap diode			N					1SV50
1SV123	2SD880 (Y)		TA7302P							
Zener diode	N	XZ-039	FET	N	2SK125	TC4011BP				
		XZ-055			3SK73 (GR)	TC4049BP				
Thermistor	N	112-102-2			3SK74 (L)	TC4081BP				
					3SK97 (Q2)	UPC78M05H				
Digital TR	N	DTC143T (F)	Power module	N	M57737	UPC78M08H				
						UPC577H (E or F)				

Part No.	Re- marks	Description
<b>TM-201A GENERAL</b>		
A01-0949-03	N	Case (Upper) K, M, W
A01-0950-03	N	Case (Lower) T
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.	Re- marks	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	N	Sticker	T, W
B46-0058-10	N	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	N	8P metal socket	
E30-1689-15	N	DC cable ASS'Y	
E30-1729-08	N	Cable with plug	
E31-2171-05	N	Connector with coax. (HET)	
F05-7025-05	N	Fuse 7A	
F20-0521-04	N	Insulating plate (Lithium cell)	
G01-0821-04	N	Coil spring x9	
G02-0505-05	N	Knob fitting spring x 2 AF, SQL	
G13-0679-04	N	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 x 2 (Mounting angle)	
G13-0687-04	N	Cushion Tone unit (small)	W, T
H01-4506-03	N	Packing Carton (Inside)	K, M, W
H01-4507-03	N	Packing Carton (Inside)	T
H10-2572-04	N	Packing fixture (Upper)	
H10-2573-12	N	Packing fixture (Lower)	
H12-1332-04	N	Cushion (B)	
H12-1338-04	N	Cushion (C)	
H12-1344-04	N	Cushion (A)	
H25-0029-04	N	Protective bag boss, screw	
H25-0049-03	N	Protective bag AC & ANT cable	
H25-0103-04	N	Protective bag MIC	
H25-0112-04	N	Protective bag	
H25-0116-04	N	Protective bag Accessory screw	
J21-2799-13	N	Speaker mounting hardware	
J29-0409-04	N	SW guid x 3	
J30-0526-04	N	Spacer SLIDE KNOB	
J32-0775-04	N	Mounting boss x 4	
J32-0776-04	N	Round boss x 2 B unit	
J39-0418-08	N	Spacer	
J61-0408-05	N	Nylon band x 6 SKB-85	
K21-0771-05	N	Main knob	
K23-0757-05	N	AF knob x 2 AF, SQ	
K27-0443-05	N	Key-knob (A) MR	
K27-0444-05	N	Key-knob (B) x 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	N	Round screw x 4 Mounting angle, Accessory	
N09-0632-05	N	Tapping screw(A) x 4 Mounting angle, Accessory	
N09-0659-05	N	Round screw x 2 DISPLAY M2 x 4	
N10-2040-41	N	Hex, head nut x 2 SP	
N13-0310-04	N	Dreced nut x 2 AF, SQL	
N14-0510-04	N	Flange nut x 4 Mounting angle Accessory	

Part No.	Re- marks	Description	
N15-1050-46		Flat washer x 4 Mounting angle Accessory	
N15-1060-46		Flat washer x 4 Mounting angle Accessory	
N16-0026-46		Spring washer A unit	
N16-0060-46		Spring washer x 4 Mounting angle Accessory	
N19-0631-05	N	Flat washer x 4 Mounting, Accessory	
N29-0301-04		Stopper ling A x 6	
N30-2606-41		Round screw x 2 Heat sink for A unit	
N30-4010-41		Round screw x 2 SP Accessory	
N32-2604-41		Flat screw x 8 Sub panel	
N32-2605-45		Flat screw x 5 Side escutcheon	
N32-3014-41		Flat screw x 4 Mounting boss, Accessory	
N33-2606-41		Round flat screw x 7 Case	
N35-2004-41		Bind screw x 2 DISPLAY	
N35-2604-41		Bind screw x 3 A unit	
N87-2605-41		Self tapping screw x 15 A, B unit	
N87-4008-41		Self tapping screw x 4 SP Accessory	
N88-4008-41		Flat tapping screw x 2 SP Accessory	
S50-1406-05		Tact switch x 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
<b>A UNIT (X44-1530-11, 61) 11: K, M 61: T, W</b>				
C05-0030-15		Ceramic Trimmer 20P	TC-2	1
C05-0308-05		Ceramic Trimmer 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.	Re- marks	Description	Ref. No.	Q'ty	Part No.	Re- marks	Description	Ref. No.	Q'ty
CC65SH1H560J		C 56P	C77	1	L33-0668-05	N	Ferri-inductor 3.3μH	L21	1
CC45SL1H101J		C 100P	C18, 70, 111	3	L71-0216-05		MCF 10.695MHz	L5	1
CC45SL1H121J		C 120P	C46	1	L72-0315-05		Ceramic filter	L8	1
CC45SL1H221J		C 220P	C114	1	L77-0858-15		Quartz Xtal	L25	1
CC73ECH1H020C		Chip Cap 2P	C13	1	L77-0989-05	N	Quartz Xtal	L15	1
CC73ECH1H120J	N	Chip Cap 12P	C97	1	L79-0446-05		Ceramic Discr	L11	1
CC73EB1H102	N	Chip Cap 0.001	C10	1	L79-0498-15	N	Helical W, T	L3	1
CCD4W1A101M		E 100 10V	C69	1	L79-0499-05	N	Helical K, M	L3	1
CCD4W1A470M		E 47 10V	C36,43,53, 68,87,90,101	7	N30-3004-46		Screw		2
CCD4W1E4R7M		E 4.7 10V	C31	1	R12-3430-05		Trim Pot 10kΩ	VR-1	1
CCD4W1E100M		E 10 25V	C44	1	<b>FINAL UNIT (X45-1330-11)</b>				
CCD4W1HOR1M		E 0.10 50V	C88, 94	2	CC45SL2H101J		C 100P	C5	1
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	CC45SL2H150J		C 15P	C4, 6	2
CO92M1H473		C 470P	C26,29,85, 108,112,115	6	CC45SL2H330J		C 33P	C9	1
CO92M1H122K		ML 0.0012	C71	1	CC45SL2H390J		C 39P	C7	1
CO92M1H563K		ML 0.056	C41	1	CK45B1H102K		C 0.001	C12 - 18	6
CS15E1A2R2M		T 2.20 10V	C54, 93	2	CK45CH1H010C		C 1P	C8, 10	1
CS15E1A4R7M		T 4.70 10V	C103	1	CM73F2H220J		MC 22P	C11	1
CS15E1E010M		T 1 25V	C55, 118	2	C90-0868-05		E 10 16V	C1, 2	2
CS15E1ER68M		T 0.68 25V	C56	1	CC45SL2H180J		C 18P	C3	1
CS15E1VR47M		T 0.47 35V	C57	1	E11-0401-05		Earphone Jack		1
C90-0820-05		E 470 16V (Small)	C65	1	E23-0512-05		Terminal		1
C90-0834-05		E 0.15 25V (Small)	C67	1	E30-1730-05	N	Power Cable		1
C90-0840-05		E 10 16V (Small)	C58	1	E31-2066-05		Coax. Cable with terminal DO		1
C90-0849-05		E 220 16V (Small)	C63	1	E31-2089-05		Coax. Cable with terminal RA		1
C90-0867-05		E 100 25V (Small)	C64	1	E31-2172-15	N	ANT. Connector		1
C91-0117-05		C 0.01	C16,25,30, 59,60,62,89,113,117	9	F01-0796-05	N	Heat sink		1
C91-0457-05		C 0.022	C21,24,27	3	F05-7025-05		Fuse 7 A		1
C91-0473-05	N	ML 0.033 (Small)	C39,40,42	3	J19-1375-04		Coax. fixed hardware		1
C91-0474-05	N	ML 0.068 (Small)	C48	1	J41-0006-05		Cable bush (Power Cable)		1
C91-0475-05	N	ML 0.022 (Small)	C92, 95	2	J41-0024-15		Cable bush (ANT)		1
C91-0667-05		C 0.047 (Small)	C45,47,50,86,4	4	L34-0499-05		Coil (3φ 4T)	L5, 6	2
C91-1008-05	N	C 0.022	C20,22,23, 28,32 - 35,91,120	10	L34-0742-05		Coil (3φ 5T)	L3	1
E04-0154-05		Coax. Pin Jack RA		1	L34-0895-05		Coil (3φ 5T)	L2	1
E23-0512-05		Terminal		4	L34-0908-05		Coil (3φ 9.5T)	L1, 4	2
E40-0211-05	△	Pin connector/wafer 2P	TP-1	1	L40-1091-03		Ferri-inductor 1μH	L7	1
E40-3007-05	△	Pin Connector 2P		2	N09-0626-05		Screw M3 x 10		2
E40-3008-05	△	Pin Connector 3P		3	N87-2606-41		Bind screw		6
E40-3009-05	△	Pin Connector 4P		1	R12-0541-05		Trim, Pot. 100Ω	VR-1	1
E40-3011-05	△	Pin Connector 6P		1	<b>B UNIT (X53-1340-11, 61) 11: K, M 61: T, W</b>				
E40-3013-05	△	Pin Connector 8P		1	C05-0030-15		Ceramic Trimmer 20P	TC-1,5,6	3
F11-0818-14		Shield Case (VCO Case top)		1	C05-0308-05		Ceramic Trimmer 4P	TC-2	1
J31-0503-05		Bead		4	CC45CH1HOR5C		C 0.5P ±0.25P	C56	1
L15-0016-05		Choke Coil	L14	1	CC45CH1H020C		C 2P ±0.25P	C37,59,63	3
L30-0005-05		IFT	L4, 6	2	CC45CH1H030C		C 3P ±0.25P	C62	1
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					

PARTS LIST

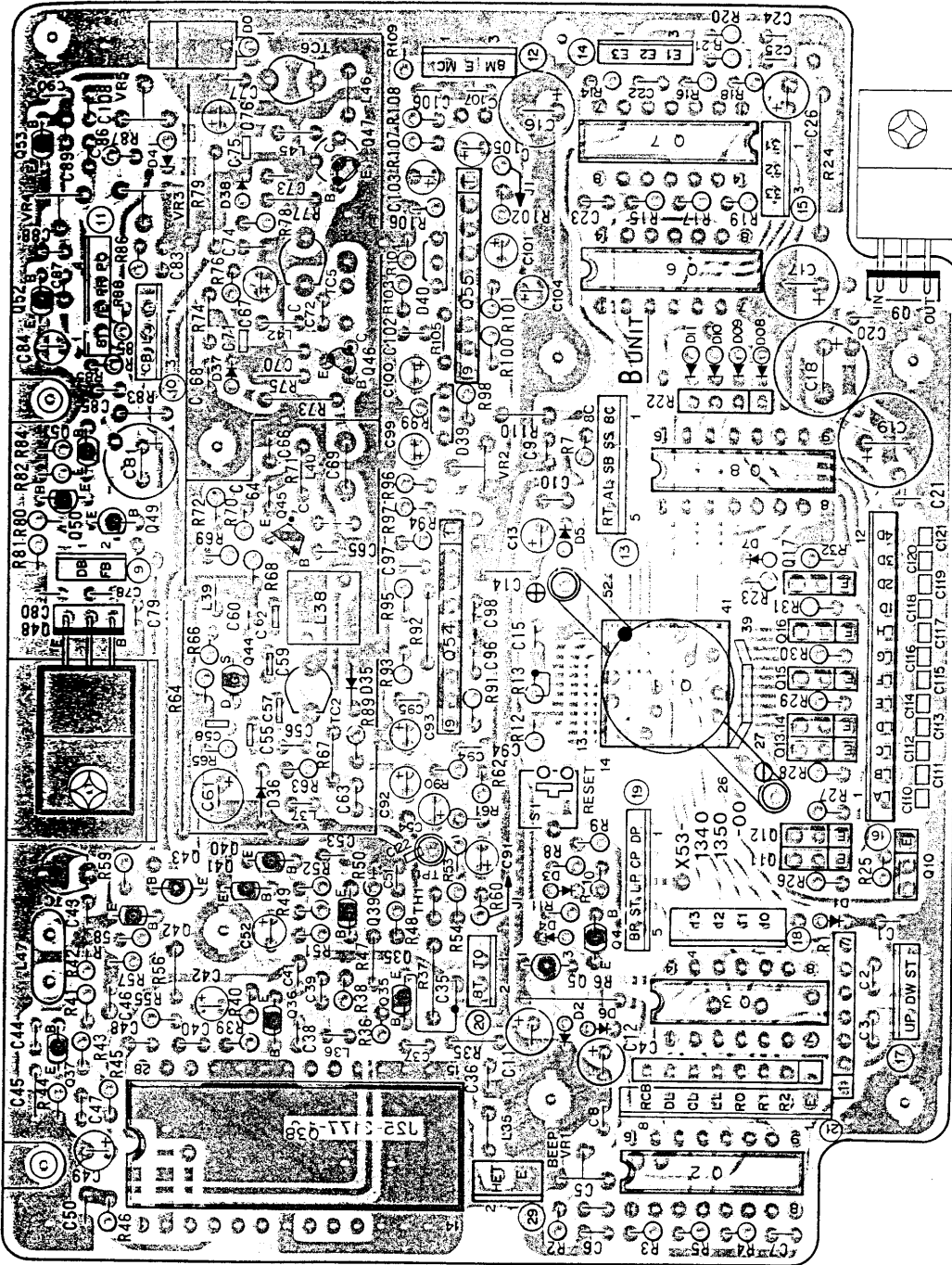
Part No.	Re- marks	Description	Ref. No.	Qty	Part No.	Re- marks	Description	Ref. No.	Qty
CC45CH1H080D		C 8P ±0.5P	C57	1	L34-0893-05		Coil 4T	L43, 46	2
CC45CH1H100D		C 10P ±0.5P	C60	1	L34-0894-05		Coil 5T	L42, 45	2
CC45CH1H101J		C 10CP	C45	1	L40-1091-03		Ferri-inductor 1μH	L39	1
CC45CH1H220J		C 22P	C39,77	2	L40-3391-03		Ferri-inductor 3.3μH	L36, 37	2
CC45CH1H330J		C 33P	C15, 43	2	L77-0990-05	N	Quartz Xtal 10.695MHz	L47	1
CC45CH1H180J		C 18P	C55	1	N35-3006-41		Bind screw (for Q48)		1
CC45SL1H390J		C 39P	C96	1	R12-3430-05		Trim, Pot. 10kΩ	VR2, 5	2
CC45CH1H101T		C 100P	C45	1	R12-4408-05		Trim, Pot. 50kΩ	VR1, 3, 4	3
CC45SL2H180J		C 18P	C69	1	RS14AB3A220J		Metal film 1W 22Ω ±5%	R24	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	R90-0564-05	N	Resistor block 10kΩ	R1	1
CK45B1H152K		C 0.0015	C95	1	R90-0565-05	N	Capacitor block 470P	C4	1
CK45B1H222K		C 0.0022	C14	1	R90-0566-05	N	Resistor block 27kΩ	R22	1
CK45B1H331K		C 330P	C94, 98	2	S59-0415-05		Keyboard switch (RESET SW)	S1	1
CK45B1H471K		C 470P	C5,22,23,38, 44	5	<b>DISPLAY UNIT (X54-1740-01, -51, -61) 01: K, M 51: T 61: W</b>				
CK45B1H561K		C 560P	C97	1	CK45B1H102K		C 0.001	C1,3,5	3
CK73EB1H102K		Chip Cap 0.001	C71, 75	2	CK45B1H102K		C 0.001 T	C6,7	2
CK73EB1H103K		Chip Cap 0.01	C110~121	12	CK73EB1H102K		Chip Cap 0.001	C4	1
CS15E1A100M		T 10 10V	C13	1	CS15E1E010M		T 1 25V	C2	1
CS15E1A3R3M		T 3.3 10V	C84	1	E23-0512-05		Terminal		1
CS15E1C1R5M		T 1.5 16V	C54	1	E40-3011-05		Pin Connector 6P		1
CS15E1E010M		T 1 25V	C52,92,93	3	J32-0774-04	N	Boss		2
CS15E1V0R1M		T 0.1 35V KM	C91	1	J61-0408-05		Nylon band		1
CS15E1VR47M		T 0.47 35V	C42, 105	2	N35-2004-41		Bind screw		4
C90-0838-05		E 1 50V	C99~101,103	4	R05-3417-05		Trim, Pot. AF	VR2	1
C90-0840-05		E 10 16V	C49,67,76	3	R05-4408-05	N	Trim, Pot. SQ	VR1	1
C90-0871-05	N	E 220 16V	C18, 19	2	S31-2405-05	N	Slide switch CTCSS	S10	1
C90-0872-05	N	E 33 16V	C11	1	S40-2443-05		Push switch HI/LOW, SCAN W	S8, 9	2
C90-0873-05	N	E 47 10V	C12,26,104	3	S40-2443-05		Push switch HI/LOW REV. TONE T	S7,8,9	3
C90-0874-05	N	E 100 10V	C61	1	S40-2444-05		Push switch CALL W	S7	1
C90-0875-05	N	E 100 16V	C16,17,81	3	S50-1412-05		Tact switch	S1,2,3,4,5,6	6
C91-0117-05		C 0.01	C8, 46	2	W02-0335-05	N	DISPLAY ASS'Y		1
C91-0460-05		C 0.068	C50	1	<b>TONE UNIT (X52-1250-50, -61) 50: T 61: W</b>				
C91-0667-05		C 0.0047	C40,48,87,89 102	5	C90-0478-05		E 10 16V T	C6	1
C91-1008-05		C 0.022	C2,3,24,25 35,51	6	C90-0480-05		E 47 10V	C1	1
E04-0157-05		Minipin Jack, A DO		1	C91-0433-05		Laminated cap. 0.0039	C5	1
E23-0512-05		Terminal		3	C91-0473-05		ML 0.033	C4	1
E29-0440-04	N	Ground plate		1	C91-0484-05		ML 0.01	C2,3	2
E40-3007-05	△	Pin Connector 2P		3	E40-3010-05		Mini connector 5P		1
E40-3008-05	△	Pin Connector 3P		5	R12-3521-05		Trim. pot. 20kΩ	VR1	1
E40-3009-05	△	Pin Connector 4P		2	RN14BK2B9102F		MF 91kΩ 1/8W	R3	1
E40-3010-05	△	Pin Connector 5P		2	R92-0150-05		Short jumper W		1
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					





# PC BOARD VIEW TM-201A

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



- Q1 : #PD7508G-534-00 Q2 : TC4049BP Q3 : TC4011BP Q4 : 2SA1115(E)
- Q5 : NJM78L05K Q6 : TC4081BP Q7 : MC14069BCP Q8 : LB1258 Q9 : #PC78M05H
- Q10-17 : DTC143T(F) Q35-37,45 : 2SC2668(Y) Q38 : MCT145151P
- Q39-41 : 2SC2459(BL) Q42,50-53 : 2SC2458(Y) Q43,59 : 2SA1015(Y)
- Q44 : 2SK125 Q46 : 2SC2347 Q47 : 2SC2538-22-A Q48 : 2SD880(Y)
- Q54,55 : NJM4558S
- D1,2,4-9(W,T),10(W,T),11,38 : 1S1555 D3 : XZ-031 D35 : 1SV123 D36 : 1SV50
- D37 : MV13 D39,40 : MC911

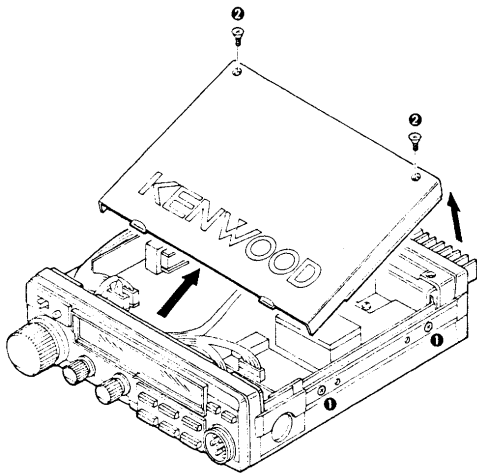
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# M-201A

## DISASSEMBLY

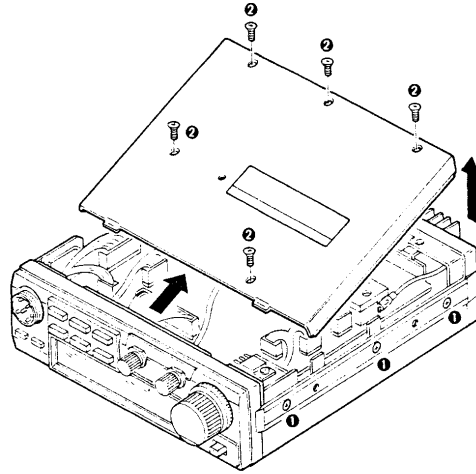
### DISASSEMBLY FOR UPPER CASE

- 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).

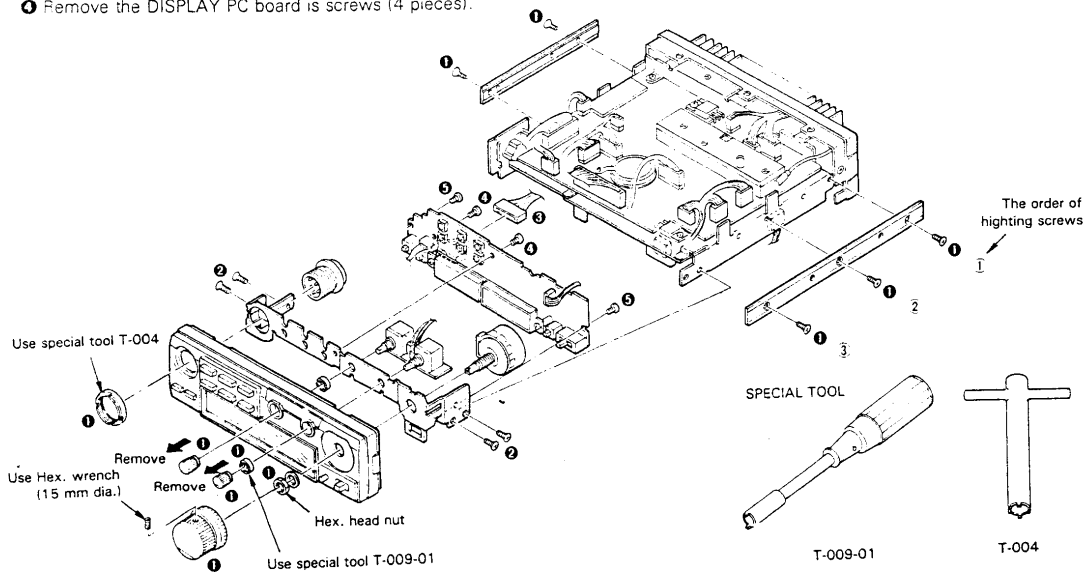


### DISASSEMBLY FOR DISPLAY UNIT

- 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).

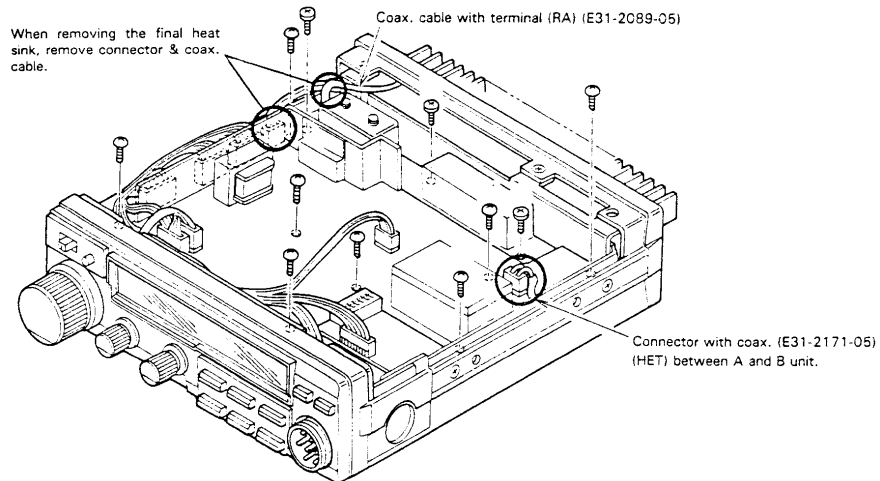




## DISASSEMBLY

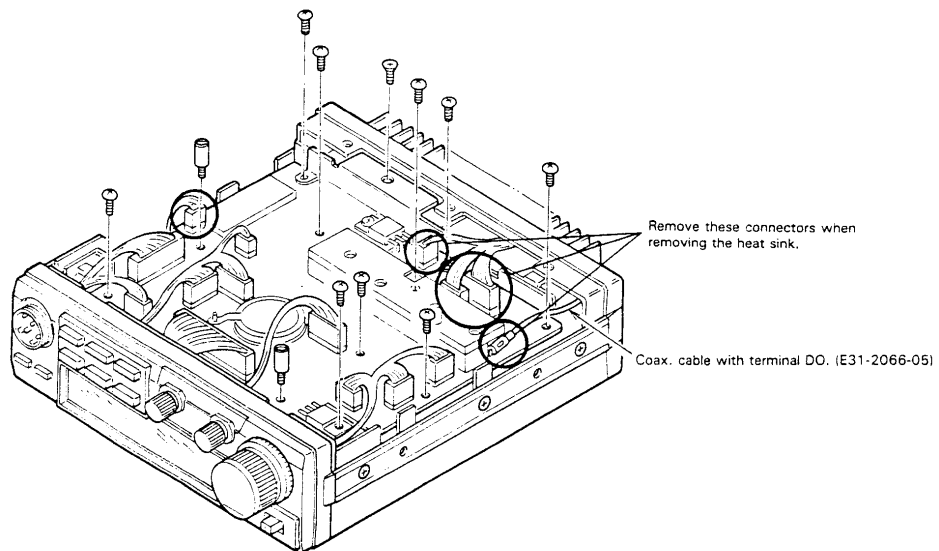
### REMOVING A UNIT

- 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).



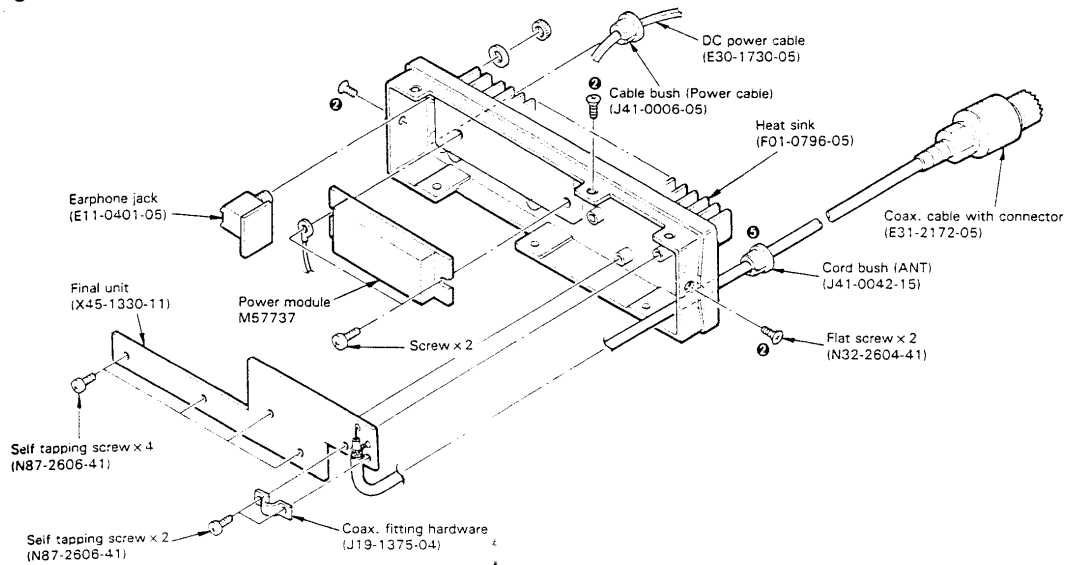


## DISASSEMBLY/DIMENSIONS

### COAX. CONNECTOR REPLACEMENT

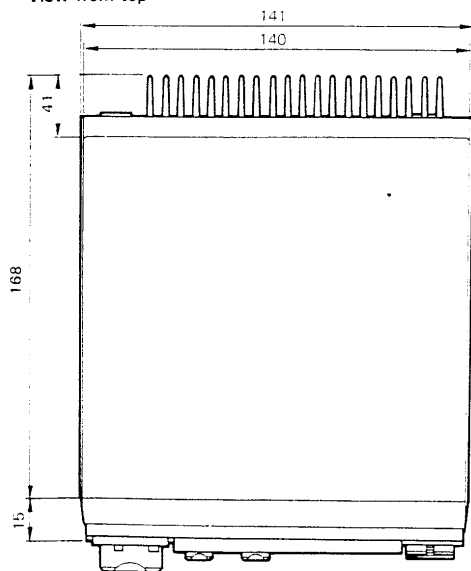
- 1 Remove side escutcheon (L & R).
- 2 Remove final heat sink's screw (3 pieces).
- 3 Remove connector.

- 4 Remove the coax. fitting hardware on final unit.
- 5 Resolder coax. cable.
- 6 Remove cordbush, remove coax. connector.

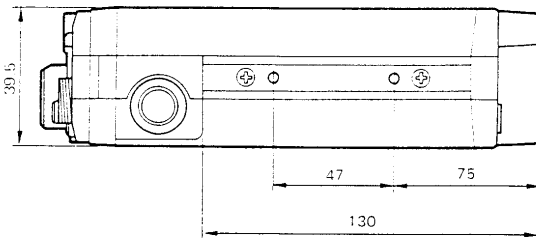


### DIMENSIONS (:mm)

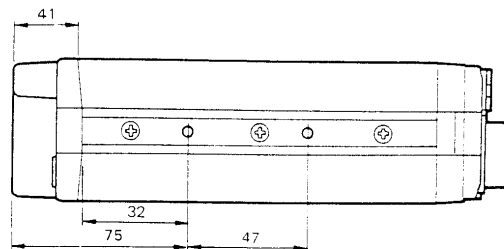
View from top



Right side view



Left side view



# TM-201A

## ADJUSTMENT

### PREPARATION

Unless otherwise specified, set the control as follows.

POWER SW	.....ON
VOLUME	.....MIN
DC VOL	.....MiN
DCN SW	.....HI
COM SW	.....OFF
STSS	.....OFF
RF	.....OFF
AGC	.....OFF
PC 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.

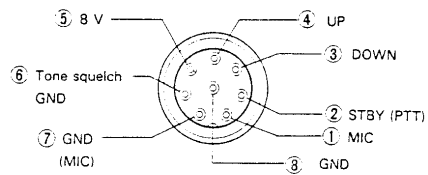


Fig. 18 MIC terminals (view from front panel side)

### RX ADJUSTMENT

Item	Condition	Measurement			Adjustment		Specifications	
		Test equipment	Unit	Terminal	Unit	Part		Method
1) Meter	1) Push switch S1 ON on B unit (near Lithium cell)	DISPLAY					4.00	
2) SSG level	1) DC SUPPLY 13.2V POWER SW ON  2) Transmit	DC V/M	A	3R		JP-2 Jumper lead	7.6 V ~ 8.2 V	
				3C		Connector No. 5 (5-6 pins)	7.7 V ~ 8.3 V	
				3T		Connector No. 5 (1-4 pins)	0.3 V or less	
				3P			7.6 V ~ 8.2 V	
3) SSG P.L.L.	1) DISPLAY 4.00	DVM	A	TP4 (VCO case left side)	A	TC1 (in VCO case)	6.2 V ± 0.1 V	
	2) DISPLAY 7.98 (K.M) 5.975 (W.T)	RF V/TVM	A	TP3 (near Q13)	A	L18 L19	MAX.	
	3) DISPLAY 7.98 (K.M) 5.975 (W.T)	DC V/TVM	A	TP4			Check	
	4) DISPLAY 6.00 (W.T) 6.00 (K.M)	Freq. counter	A	TP2	A	TC2	134.3050 MHz (W.T) 135.3050 MHz (K.M)	
4) SSG	1) Connect the sweep generator to ANT	Oscilloscope Detector	A	TP1	A	L1 L2 L3	Minimum ripple Adjust L1-3 for the response shown	

## ADJUSTMENT

Item	Condition	Measurement				Adjustment		Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
5) RF GAIN	(1) DISPLAY 5.00 (W.T.) 6.00 (K.M.) Connect the SSG to ANT MOD: 1 kHz DEV: 5 kHz OUT: 10 dB $\mu$	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 dB $\mu$	AM VM Oscilloscope	Rear panel	SP	A	L10 (near Q6)	MAX.	
7) S Level	(2) SSG OUT: 20 dB $\mu$ (W.T.) 16 dB $\mu$ (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.	Oscilloscope	Rear panel	SP	B	VR1	30°	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 dB $\mu$ -8 dB $\mu$ (K.W.T.M)	AF VTVM	Rear panel	SP				S/N 20 dB or more (4.00 - 7.98 K.M.) (4.00 - 5.98 W.T.)


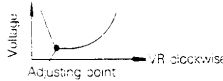
### TX ADJUSTMENT\*

- \* 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 (2) DISPLAY 5.375 (W.T.) 8.995 (K.M.) Transmit	DC VM	B	TP1	B	TC2	3.5 V $\pm$ 0.1 V	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.

# M-201A

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications
		Test equipment	Unit	Terminal	Unit	Part	Method	
1. RF output	(1) DISPLAY 5.395 (W.T) 8.00 (K.M) Transmit	RF power meter	Rear panel	ANT	B	VR5	27 W 5 A or less	$\pm 0.5$ W (W.T)
	26 W 4 B A or less						$\pm 0.5$ 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) $\pm 100$ Hz 146.000 MHz (K.M) $\pm 100$ 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 deviation	
5. TONE (Voice 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	$\pm 10$ Hz 2.5 kHz or more
	TONE SW: ON						1750 Hz	Tone burst time 0.5-1.0 second. $\pm 10$ 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 button 2. Adjust VR-1 (clockwise) for dip point	Dip point 
	2) Shorted to ANT Transmit	DC AM		B	VR4	3.5 A		

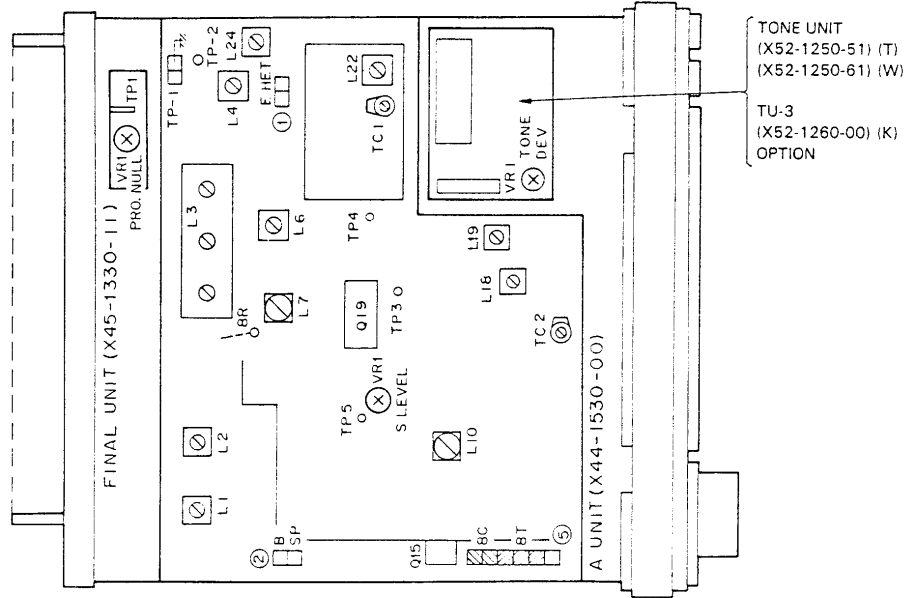
## OPERATIONAL CHECKS

Item	Condition	Check of movement	Item	Condition	Check of movement
1. RESET	1) RESET SW: ON 2) AF VOL: Center 3) SQ VOL: MAX	4.00 displayed	7. MS	1) MS M2: ON SQ VR: Center	5.10-5.00 (4 digit display) MR LED Light on. MHz dot is flashed. Tone sounds.
2. Main dial	1) Main dial: Clockwise	Display increases by 5 kHz (K.M) Display increases by 25 kHz (W.T)		2) A.B: ON	5.00 or 5.10 (4 digits display) Tone sounds. Scan stopped.
	2) Main dial: Counterclockwise	Display decreases by 5 kHz (K.M) Display decreases by 25 kHz (W.T)		3) A.B: ON again	5.10 displayed Tone sounds.
3. VFO A/B	1) A.B: ON • • Means VFO B position	4.00 • Display increases and decreases by 5 kHz	8. ALERT	1) AL M5: ON SQL VOL: MAX	5.10 displayed ALERT LED Light on. Ping sounds each 6 seconds, at the same time the noise should stop 0.3 seconds.
	2) Main dial turn to clockwise and counterclockwise			2) AL M5: ON again SQL VOL: MAX	5.10 Displayed
	3) A.B: ON	5.00 is displayed and tone sounds same as item 2	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.
4. COM ON	1) COM: ON (K.M)	5.00 (W.T)		2) SQL VOL: MIN	Scan stopped after 6 seconds, will start increases by 20 kHz
	2) COM: ON again	4.00 (K.M)		3) SQL VOL: MAX	Scan again
5. Memory write	1) MM4 knob is depressed make a continuous deep sounds	Tone sounds, memory write already		4) MIC PTT: ON	Scan stopped
	2) MS M2 knob is depressed during deep sounds				
6. Memory check	1) MR: ON	5.00 (4 digits displayed) MR LED Light on. Tone sounds.			
	2) MS M2: ON	5.10 (4 digits displayed) Tone sounds.			

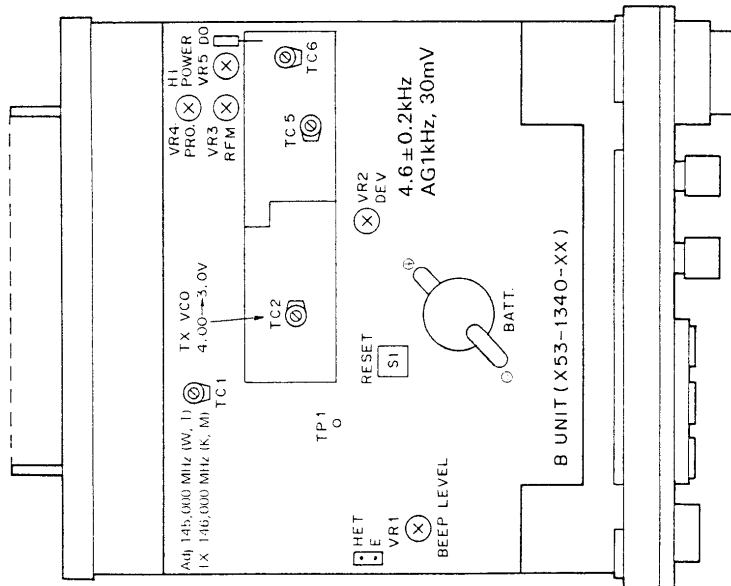
# TM-201A

## ADJUSTMENT

TOP VIEW

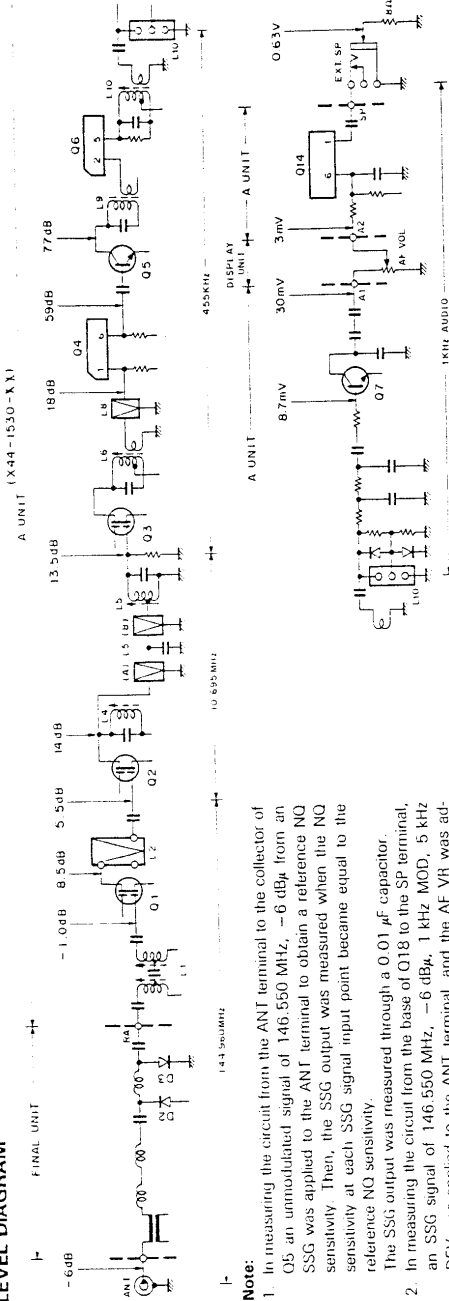


BOTTOM VIEW



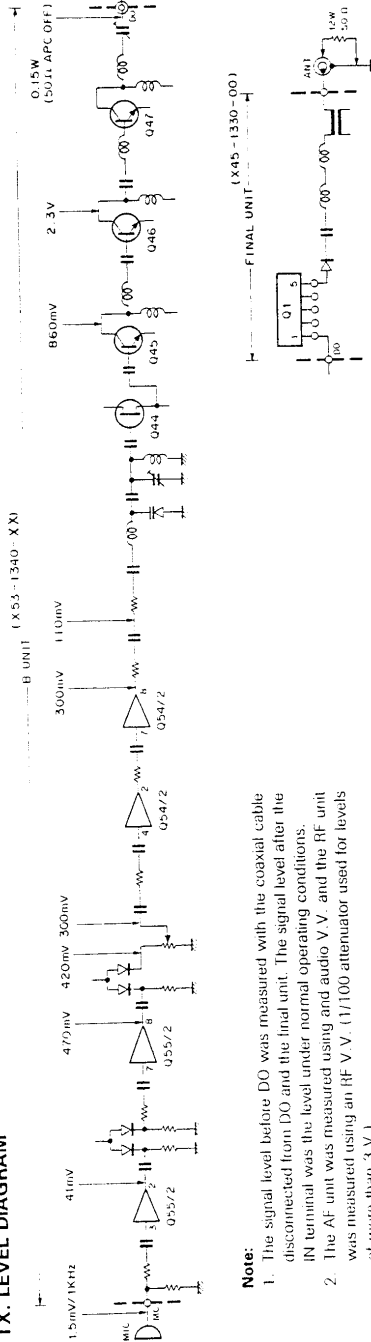
## LEVEL DIAGRAM

### RX: LEVEL DIAGRAM



- Note:**
1. In measuring the circuit from the ANI terminal to the collector of Q5 an unmodulated signal of 146.550 MHz, -6 dB<sub>m</sub> from an SSG was applied to the ANI 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.
  2. The SSG output was measured through a 0.01  $\mu$ F capacitor. In measuring the circuit from the base of Q18 to the SP terminal, an SSG signal of 146.550 MHz, -6 dB<sub>m</sub>, 1 kHz MOD, 5 kHz DEV was applied to the ANI terminal, and the AF VR was adjusted to obtain an AF output of 0.63/8 $\Omega$ . 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 an 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.



# TM-201A

## FC-10 OPTION (REMOTE FREQUENCY CONTROL)

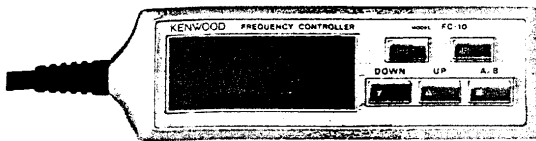
### SPECIFICATIONS

Dimensions: W: 112 mm (4-13/32") x H: 35 mm (1-13/32") x D: 22.5 mm (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 transferred 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

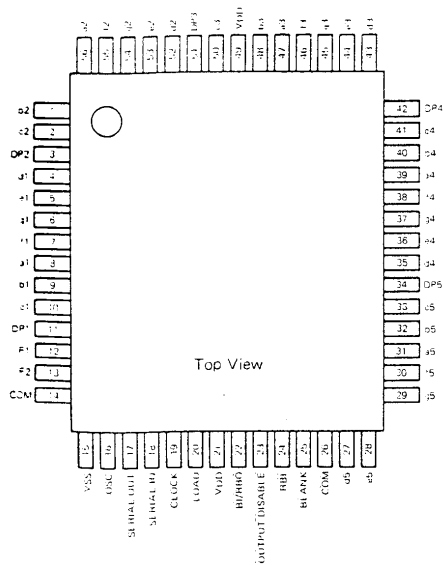


Fig. 19 MSM5829GS (Control Ass'y IC3)

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

# M-201A

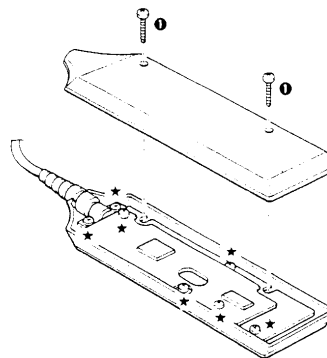
## FC-10 OPTION (REMOTE FREQUENCY CONTROL)

### Parts List

Parts No.	Re- marks	Description	Ref. No.	Parts No.	Re- marks	Description	Ref. No.	Q'ty
<b>GENERAL</b>				<b>SWITCH UNIT (X41-1510-00)</b>				
A02-0640-02	N	Case (Upper)		B30-0828-05		Lamp with cap	LP1, 2	2
A02-0641-03	N	Case (Lower)		C90-0876-05	N	E <small>(small)</small> 22 16V	C1	1
A13-0647-03	N	Mounting fitting hardware		C91-0117-05		Cap. 0.01 (SR)	C2	1
B10-0657-04	N	Front glass		R90-0565-05		Capacitor block 470p × 7	C3	1
B11-0415-04	N	LCD guiding plate		R90-0566-05		Resistor block 27kΩ × 3	R2, 3	2
B41-0635-04	N	Caution plate		S50-1412-05		Tact switch	S1-5	5
B42-1795-04	N	Name plate		DAN201	N	Diode	D2-3	2
B50-4056-00	N	Instruction manual		XZ-051		Zener diode	D1	1
E30-1738-05	N	Cable with 8P plug		TC40498F		IC	Q1	1
E31-2179-05	N	Flat cable						
G01-0819-04	N	Cable fitting spring		<b>LCD UNIT (X54-1760-00)</b>				
H01-4500-03	△N	Carton		CS15E1V0R1M		T 0.1 35V	C101	1
H12-1339-04	△N	Packing fixture		C91-0117-05		Cap. 0.01 (SR)	C102	1
H25-0029-04	△	Protective bag		F39-0402-04		LCD reinforced sheet		1
H25-0049-03	△	Protective bag		J25-3136-05		Flexible PC board		1
J19-1379-04	△N	Fitting hardware		J30-0519-04		Spacer(A)		1
J19-1381-04	N	Bothside tape		FTS1212		LCD		1
J30-0529-04	△N	Spacer (Tact switch)		MSM58292GS		IC	Q101	1
J42-0439-05	N	Cable bush		μPD4584BG	N	IC	Q102	1
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						

### DISASSEMBLY

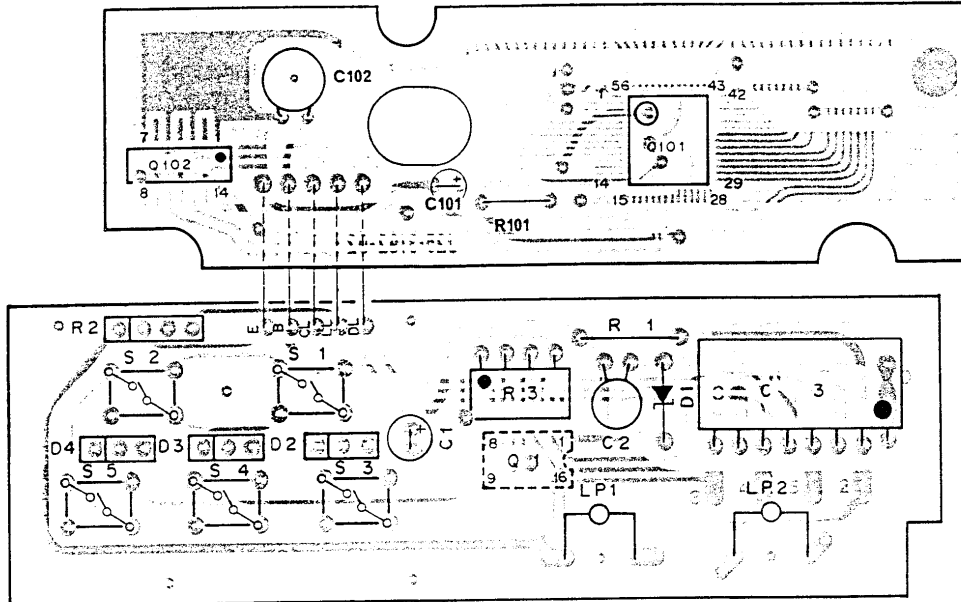
- ① Remove lower case screw (× 2)
- ② Remove seven screws on PC board.



# TM-201A

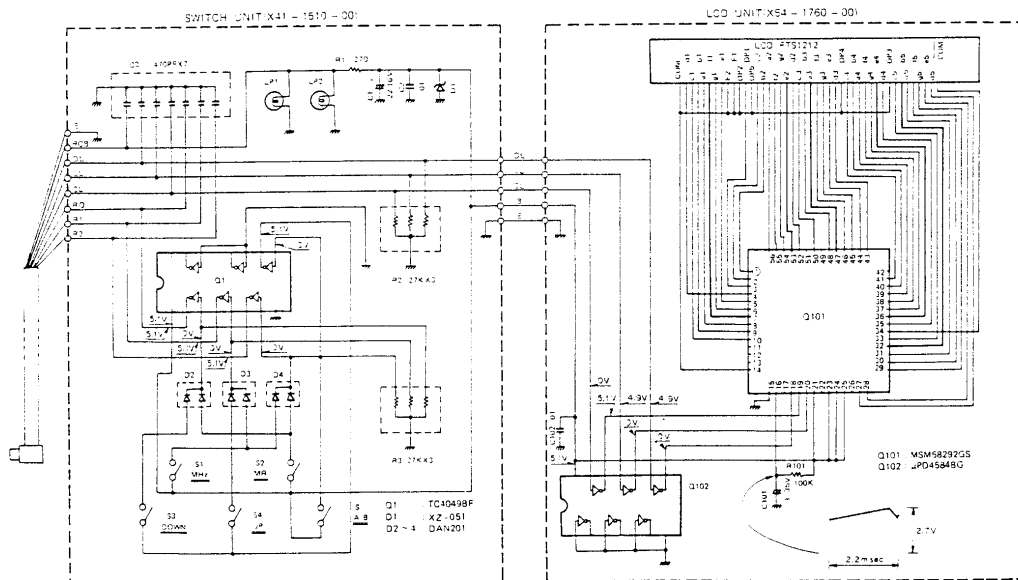
## FC-10 OPTION REMOTE FREQUENCY CONTROL

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



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

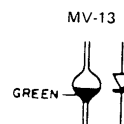
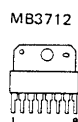
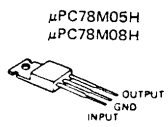
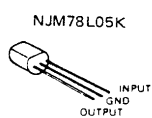
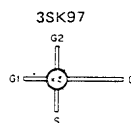
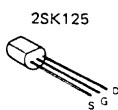
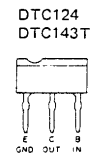
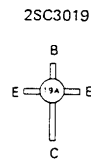
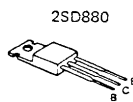
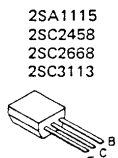
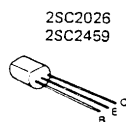
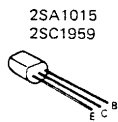
### SCHEMATIC DIAGRAM



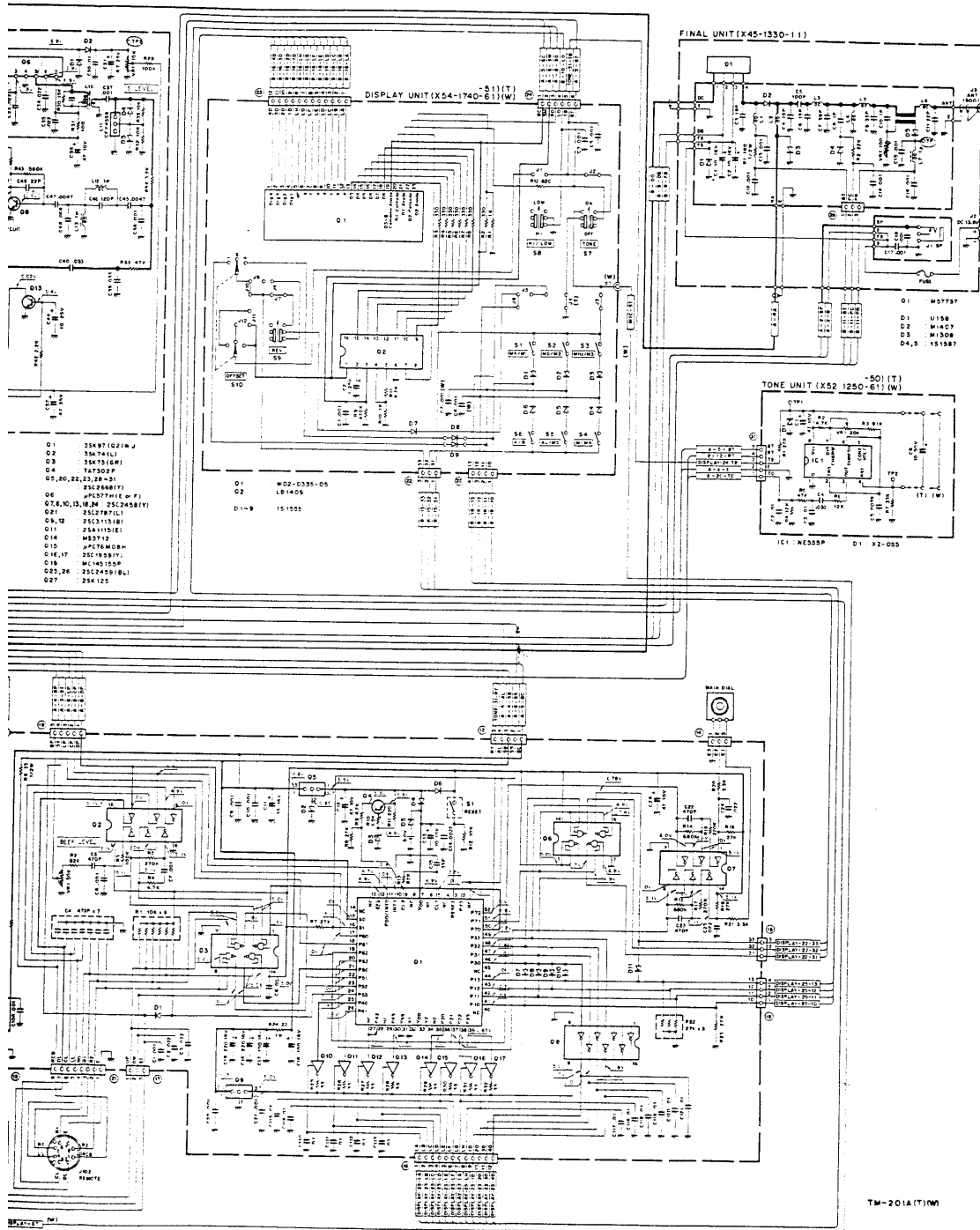


# TM-201A

## MEMO



# SCHEMATIC DIAGRAM (W, T) TM-201A



TM-201A (T) (W)

A

B

C

D

E

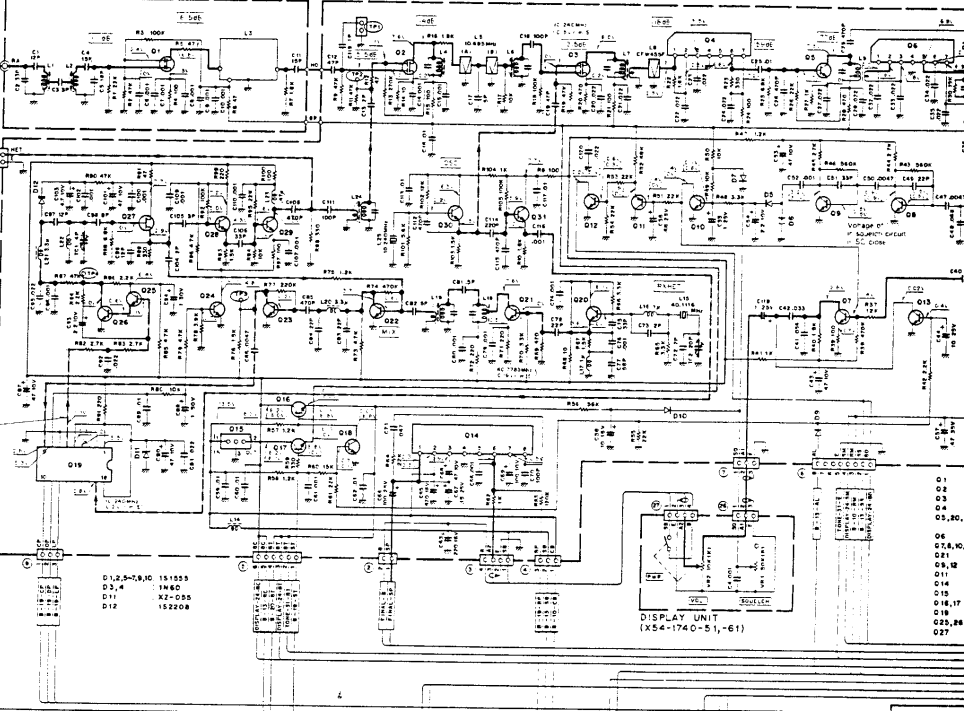
Signal Line

Control Line

Common DC Line

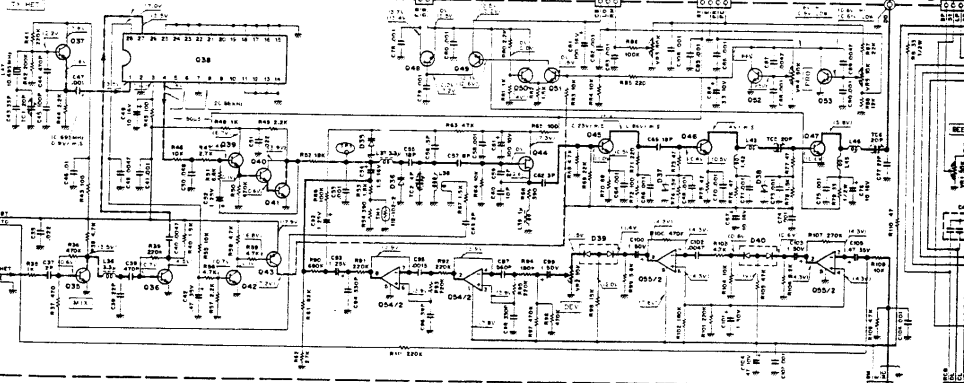
Measurement  
#145 000 MHz

A UNIT (X44-1530-61)



DISPLAY UNIT (X54-1740-51, -61)

B UNIT (X53-1340-61)



Remove DU coax cable on B unit. Connect Power Meter to DO socket on B unit.

- Q1
- Q2
- Q3
- Q4
- Q5
- Q6
- Q7, 8, 10
- Q8, 10
- Q11
- Q12
- Q13
- Q14
- Q15
- Q16, 17
- Q18
- Q19
- Q20, 28
- Q27

F

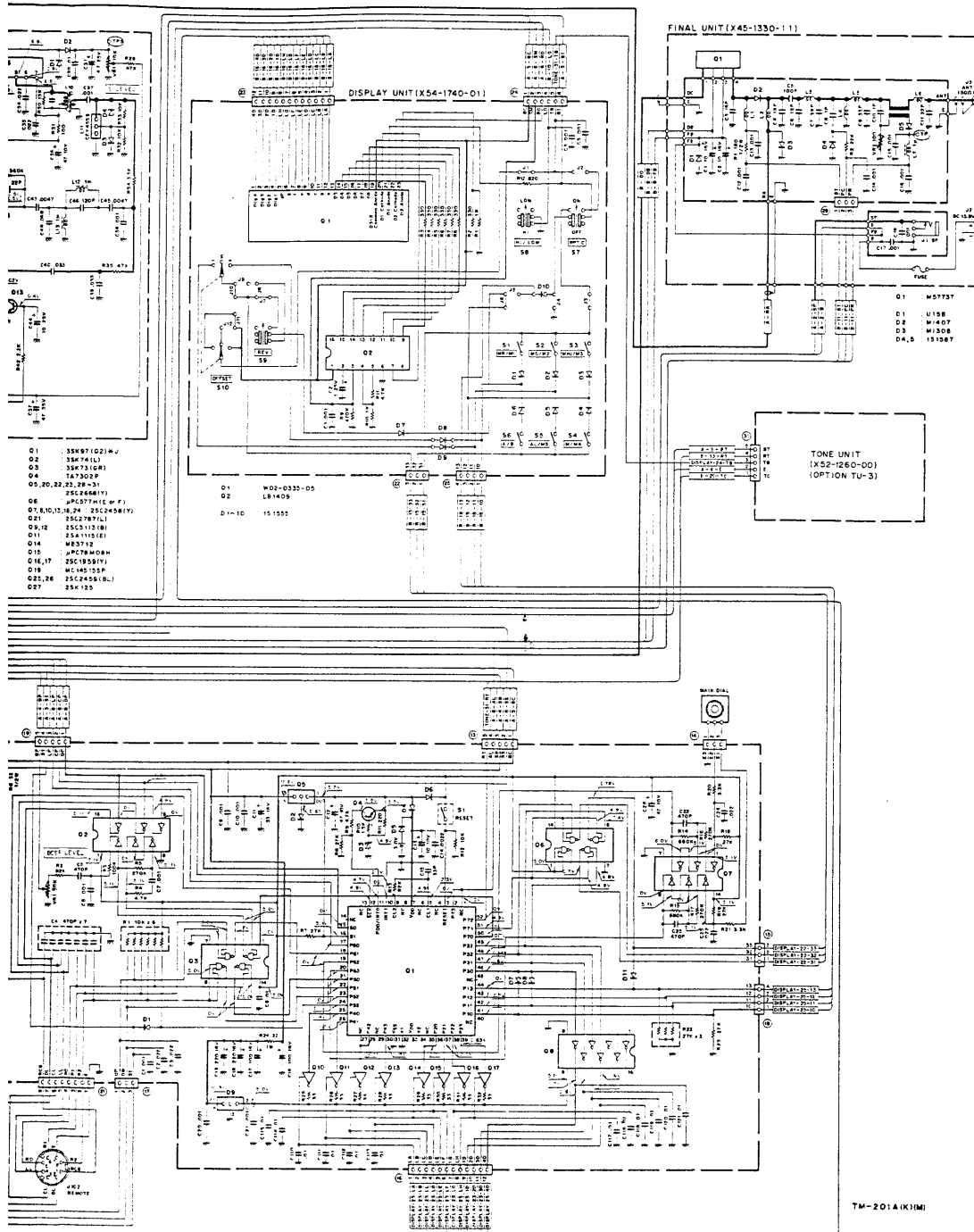
G

H

I

J

# SCHEMATIC DIAGRAM (K, M) TM-201A

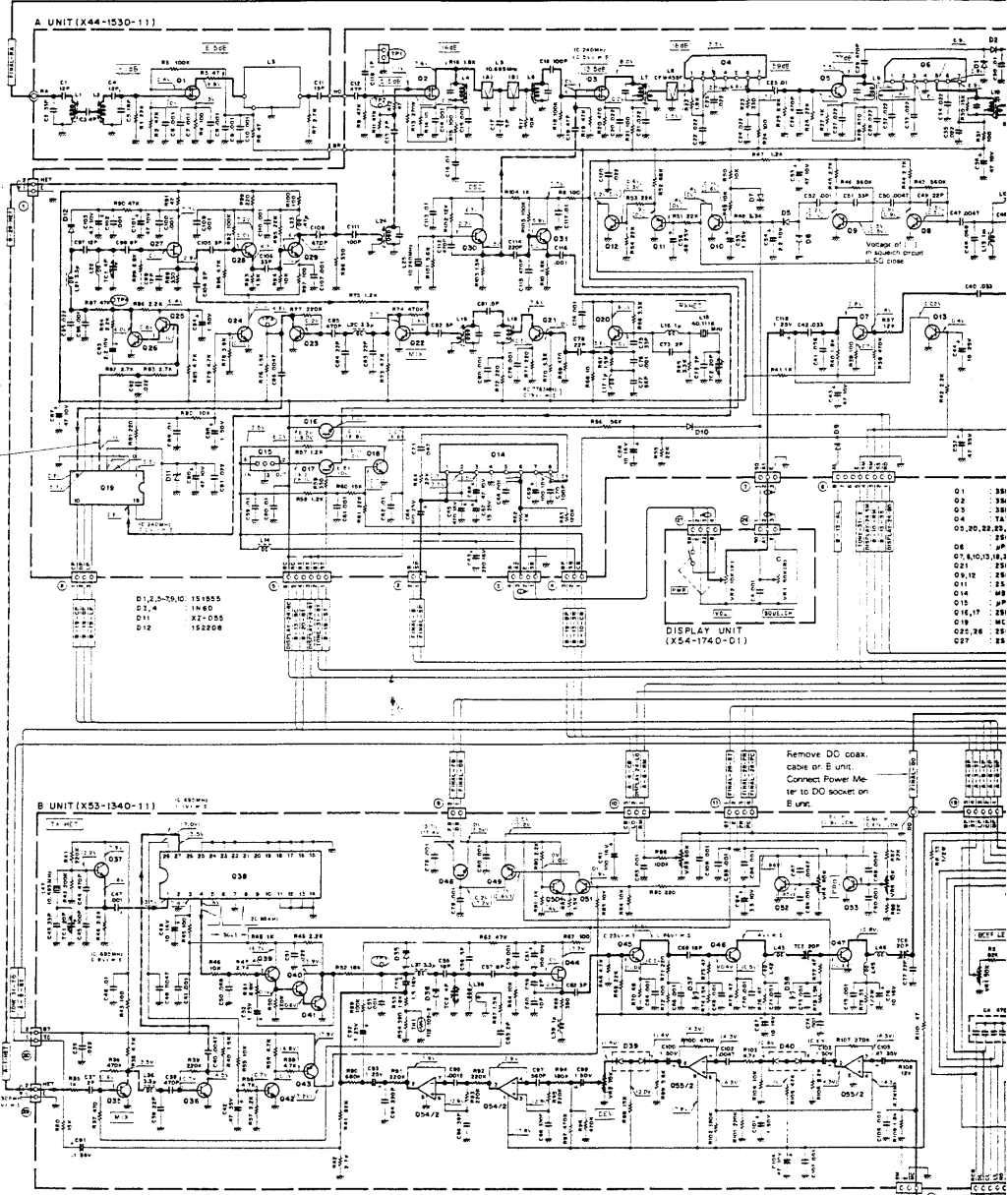


TM-201A(K)(M)

1  
2  
3  
4  
5  
6  
7



MANUFACTURE  
# 142 000 MHz



D12, 2-70, 10 151935  
D1, 4 1N60  
D11 2Z-055  
D12 122208

DISPLAY UNIT  
(X54-1740-01)

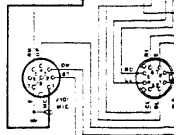
Remove DC coax cable of B unit. Connect Power Meter to DO socket on B unit.

01 JPD70086-334-00  
02 TC4048BP  
03 TC4011BP  
04 2SA1103(E)  
05 NJM78L05P  
06 TC4081BP  
07 MC14069UBCP  
08 LB1259  
09 JRC78M05P  
010-17 DTC14311P

025-37, 40 25C2668(7)  
036 MC140151P  
039-41 25C243918(6)  
042, 30-53 25C243917(7)  
043, 49 25A10151(7)  
046 25A125  
047 25C2047  
048 25C2539-72-A  
049 25C880(7)  
054, 55 NJM45583

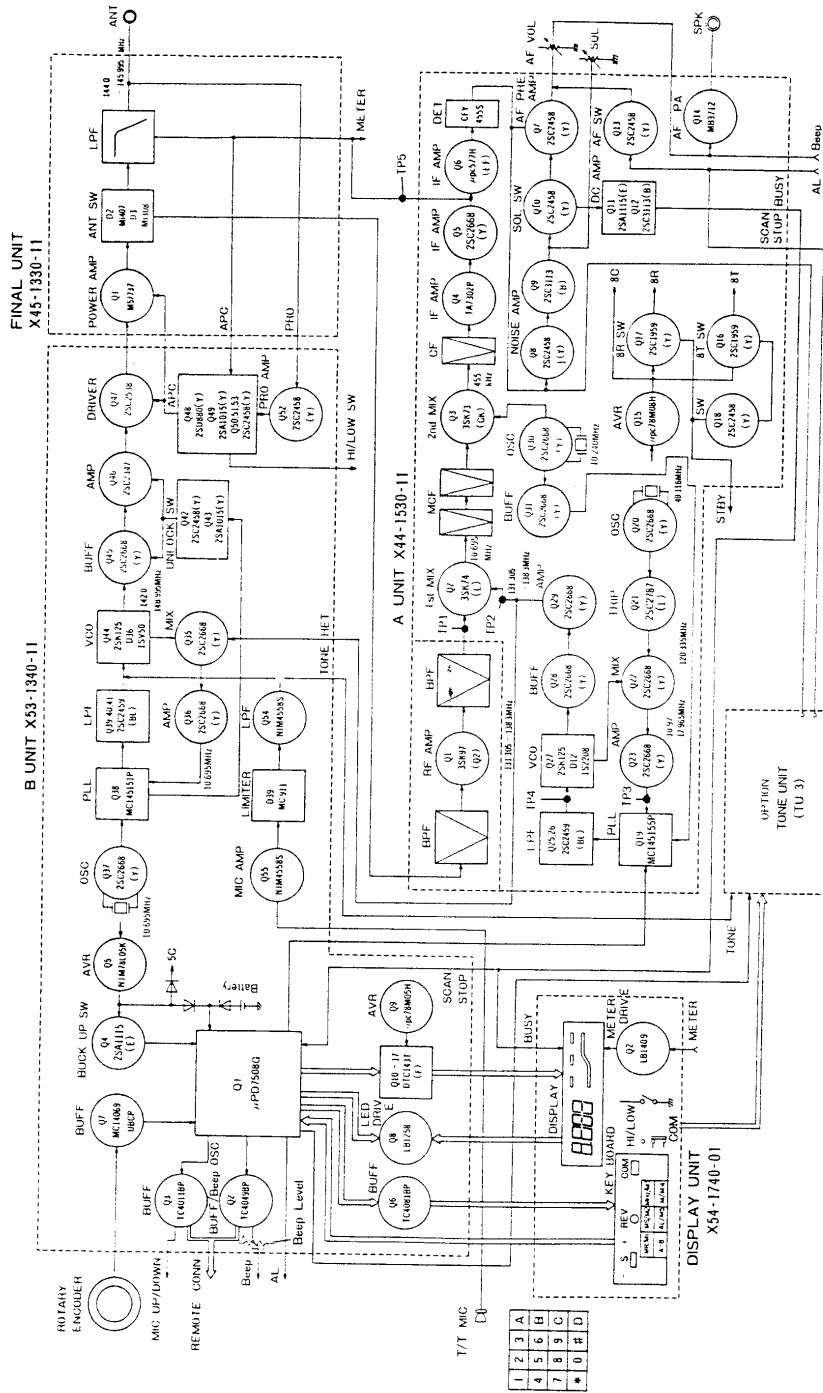
01, 2, 4-8, 11, 38 151935  
03 2Z-039  
035 15V122  
036 15V30  
037 MV13  
039, 40 MC911

01 35  
02 35  
03 35  
04 74  
05, 20, 22, 23  
06 AP  
07, 8, 10, 13, 18, 21  
08, 12 25  
09 25  
10 25  
11 25  
12 25  
13 25  
14 25  
15 25  
16 25  
17 25  
18 25  
19 25  
20 25  
21 25  
22 25  
23 25



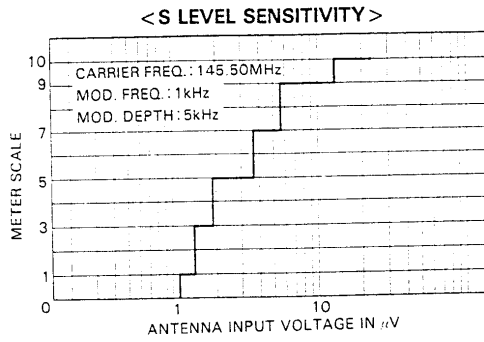
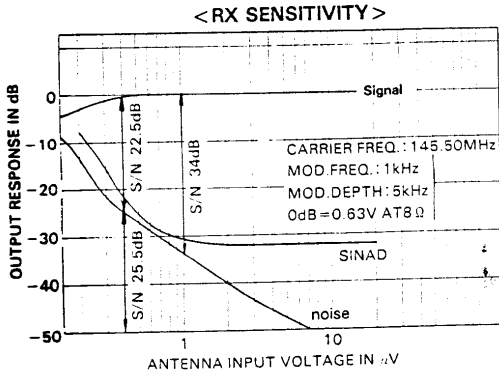
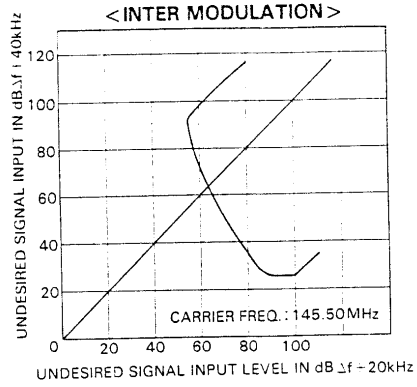
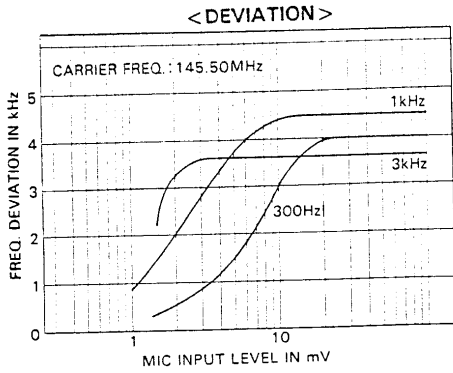
# TM-201A

## BLOCK DIAGRAM (K TYPE)

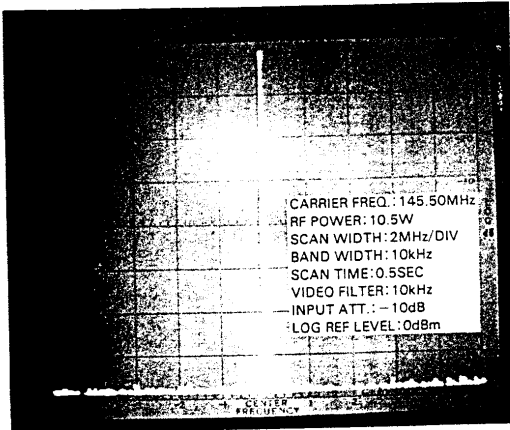


# TM-201A

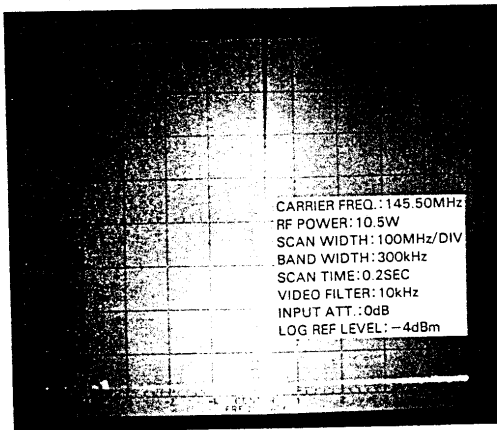
## REFERENCE DATA



**[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)
Antenna 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 ± 15 × 10 <sup>-6</sup>
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 <sub>o</sub> -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	

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

A product of

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