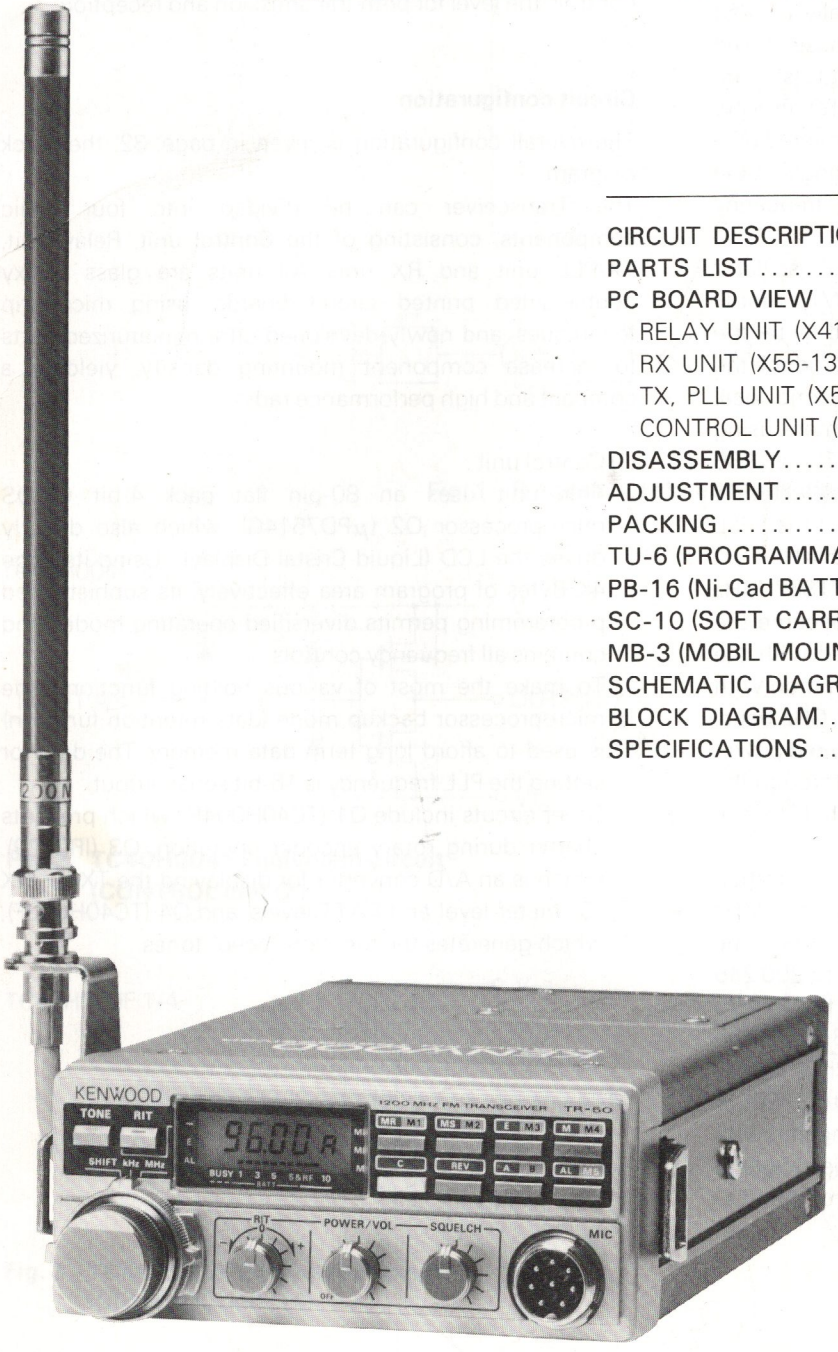
KENWOOD

SERVICE MANUAL

TR-50

MB-3 SC-10
PB-16 TU-6

1200MHz FM TRANSCEIVER



CONTENTS

CIRCUIT DESCRIPTION

Model	Destination	TONE	SHIFT Control
TR-50	K.	Option (TU-6)	−20 MHz TX offset
	W.	1750 Hz TONE Burst	+35 MHz TX offset

K: U.S.A. W: Europe

Table 1 Destination chart

Overall Frequency configuration

The 1.2 GHz amateur band has a 40 MHz wide bandwidth. Normally, a frequency band this wide is usually divided into several band segments, for which PLL (Phase locked Loop) VCO's (Voltage Controlled Oscillators) are Micro-processor Selected. Howeve, in the TR-50, in view of its compact size, this amateur band is fully covered by a highly stable PLL system using only a single VCO operating at a 10 kHz step rate. This frequency configuration is shown in Fig. 1.

The received signal is mixed with the first local oscillator signal (lower heterodyne) to become the 139 MHz first IF (intermediate frequency), then further mixed with the 118.065 MHz second local oscillator signal to produce the 20.935 MHz second IF. This 118.065 MHz second local oscillator signal can be varied by ±5 kHz or more using the RIT (Receiver Incremental Tuning) control. The 20.935 MHz second IF is mixed with the 20.48 MHz third local oscillator signal (shared in common with the PLL reference oscillator IC) to produce the 455 kHz third IF.

In the transmitter, the reactance-modulated 19.857 MHz signal is amplified and multiplied 7 times to become the 139 MHz FM-modulated RF signal, then mixed with the first local oscillator signal which is used in common with the receiver to produce output within the 1.2 GHz band. The target frequency is amplified up to the required power by a 6-stage microstrip amplifier, then passed through the receiver/transmitter switching relay to be fed to the antenna.

The first local oscillator is PLL synthesized and is common to both the receiver and transmitter. The 20.48 MHz reference oscillator is divided down by 1/4096 to become the 5 kHz comparison signal. The 280.25 MHz to 290.245 MHz VCO oscillator frequency is mixed with the 271.75 MHz local oscillator frequency to yiela an 8.5 MHz to 18.495 MHz intermediate PLL frequency, which is further counted down by 1N (where N equals 1700 to 3700) to produce a 5 kHz signal. This 5 kHz signal is compared with the reference 5 kHz signal in the phase comparator, and the comparator output voltage is used to control the VCO oscillator.

The VCO frequency is multiplied by a factor of 4 up to the target frequency and level. At the same time, this circuit controls the level for both transmission and reception.

Circuit configuration

The overall configuration is given in page. 32, the block diagram.

The Transceiver can be divided into four basic components, consisting of the Control unit, Relay unit, TX-PLL unit and RX unit. All units are glass epoxy double-sided printed circuit boards, using microstrip techniques, and newly-developed ultra miniaturized parts to increase component mounting density, yielding a compact and high performance radio.

(1) Control unit

This unit uses an 80-pin flat pack 4-bit CMOS microprocessor Q2 (μPD7514G), which also directly drives the LCD (Liquid Cristal Display) . Using its large 4K Bytes of program area effectively, its sophisticated programming permits diversified operating modes and contains all frequency controls.

To make the most of various holding functions, the microprocessor backup mode (data retention function) is used to afford long term data memory. The data for setting the PLL frequency is 16-bit serial output.

Other circuts include Q1 (TC40H004F), which prevents chatter during rotary encoder operation, Q3 (IR2429), which is an A/D converter for displaying the TX RF, RX "S" meter level and BATT levels, and Q4 (TC40H000F), which generates the function "beep" tones.

CIRCUIT DESCRIPTION

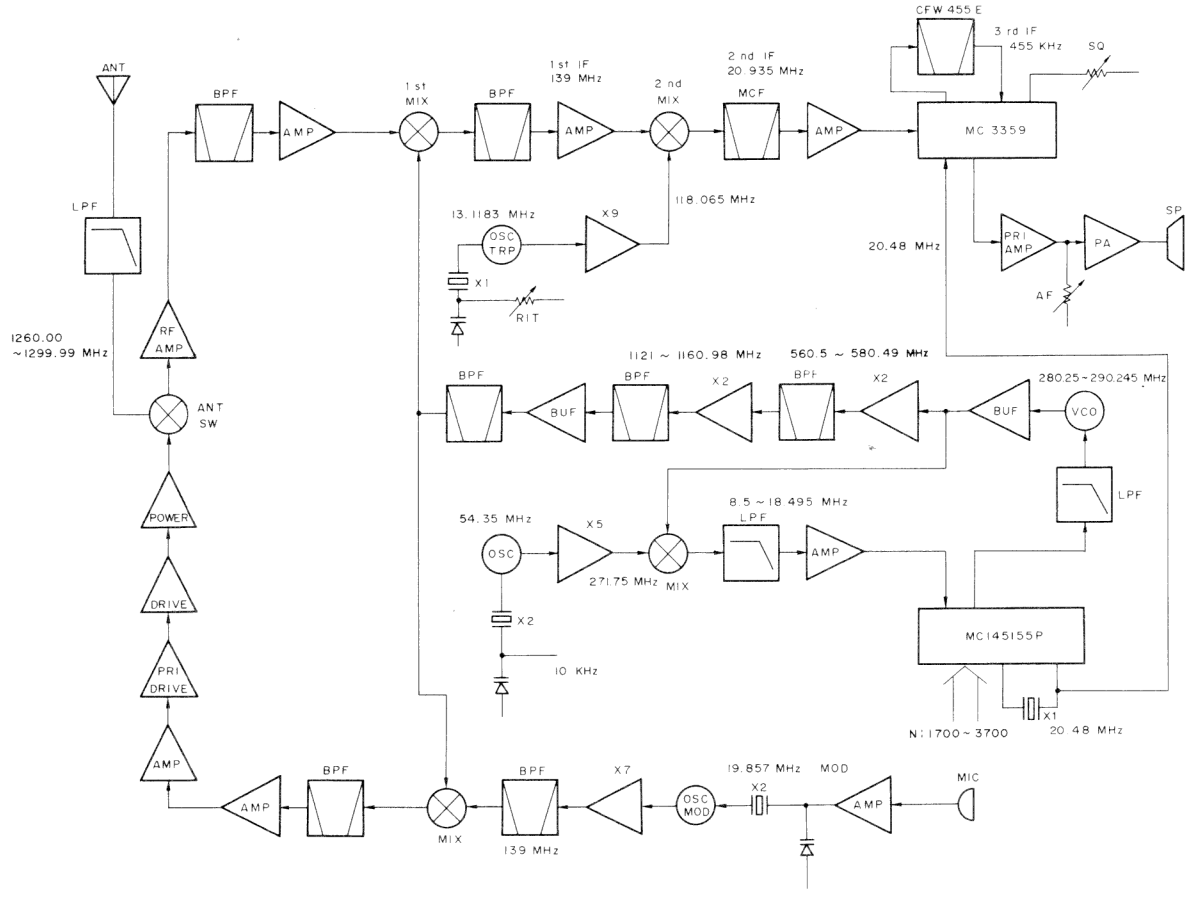


Fig. 1 Frequency-related block diagram

TC40H004F 1/6

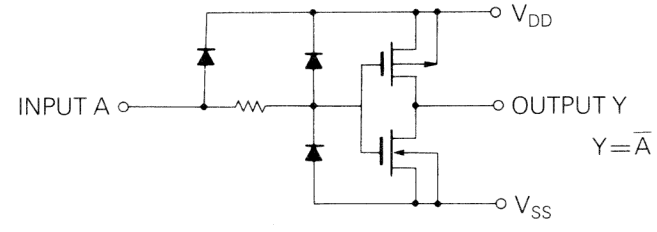


Fig. 2 TC40H004F Equivalent circuit (CONTROL unit Q1)

TC40H000F 1/4

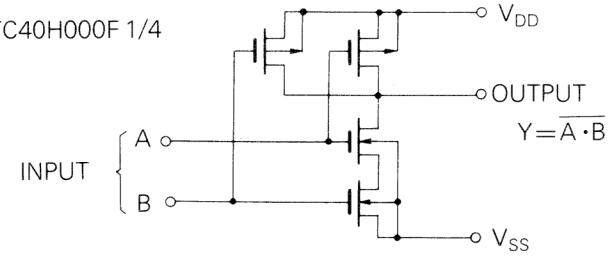


Fig. 3 TC40H000F Equivalent circuit (CONTROL unit Q4)

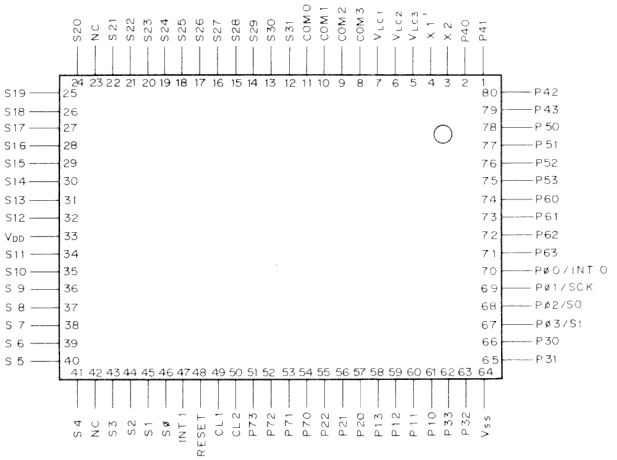


Fig. 4 μPD7514G-030-12 (CONTROL unit Q2)

CIRCUIT DESCRIPTION

PIN No.	PIN NAME	I/O	FUNCTION
1	P41	I	Type return
2	P40	I	Type return
3	X2	—	Crystal oscillator connection pin
4	X1	—	Crystal oscillator connection pin
5	V_{CL3}	I	LED power supply set up pin
6	V_{CL2}	I	LED power supply set up pin
7	V_{CL1}	I	LED power supply set up pin
8			Open
9	COM2	O	LED common signal output pin
10	COM1	O	LED common signal output pin
11	COM ϕ	O	LED common signal output pin
12			Open
13			Open
14			Open
15			Open
16			Open
17			Open
18			Open
19			Open
20	S23	O	LED segment, CH (1—5), VFO (A, B), RPT·C (0)
21	S22	O	LED segment, CH (1—5), VFO (A, B), RPT·C (0)
22	S21	O	LED segment, CH (1—5), VFO (A, B), RPT·C (0)
23	NC	—	
24			Open
25	S19	O	LED segment, RIT, E, AL ◀
26	S18	O	LED segment, BUSY
27	S17	O	LED segment, 10 MHz
28	S16	O	LED segment, 10 MHz
29	S15	O	LED segment, 10 MHz
30	S14	O	LED segment, 1 MHz
31	S13	O	LED segment, 1 MHz
32	S12	O	LED segment, 1 MHz
33	VDD	—	Power supply
34			Open
35			Open
36			Open
37	S8	O	LED segment, 100 kHz
38	S7	O	LED segment, 100 kHz
39	S6	O	LED segment, 100 kHz
40	S5	O	LED segment, 10 kHz

PIN No.	PIN NAME	I/O	FUNCTION
41	S4	O	LED segment, 10 kHz
42	NC	—	
43	S3	O	LED segment, 10 kHz
44			Open
45	S1	O	LED segment, MR, MS, M ▶
46			Open
47	INT 1	I	External input → R17 → GND
48	RESET	I	RESET input. H: active
49	CL1	—	System clock oscillator CR pin
50	CL2	—	System clock oscillator CR pin
51	P73	I	→ R17 → GND
52	P72	I	KEY return RPT.C
53	P71	I	KEY return C, REV, A—B, M/M4
54	P70	I	KEY return MR/M1, MS/M2, E/M3, AL/MS
55	P22	O	Type SCAN, AF TX STOP
56	P21	O	Type SCAN, external tone SW
57	P20	O	1 MHz step, shift SW scan
58	P13	I	BUSY detect
59	P12	I	PTT detector
60	P11	I	UN LOCK detector
61	P10	I	OPEN SCAN, BUSYSCAN change detect
62	P33	O	PLL enable. H: active
63	P32	O	LED ON-OFF. L: ON, H: OFF
64	VSS	—	GND
65	P31	O	BZ ON-OFF. H: ON, L: OFF
66	P30	O	10 k data. H: +0, L: +10 K
67	Pϕ3/S1	I	RIT ON-OFF detector, H: ON
68	Pϕ2/S0	O	Sirial data output
69	Pϕ1/SCK	O	Sirial clock output
70	P$\phi\phi$/INTϕ	I	Power ON-OFF detector H: ON
71	P63	O	Type SCAN, 88.5 Hz TONE
72	P62	I	88.5 Hz TONE SW. L: ON, H: OFF
73	P61	I	UP Key (Mic) detector. L: active
74	P60	I	DOWN Key (Mic) detector. L: active
75	P53	O	Key scan M/M4, AL/M5
76	P52	O	Key scan MR/M2, REV
77	P51	O	Key scan MS/M2, C
78	P50	O	Key scan E/M3, A—B
79	P43	I	Encoder pulse input E1
80	P42	I	Encoder pulse input E2.

Table 2 μPD7514G-030-12 Terminal function (CONTROL unit Q2)

(2) Relay unit

This unit is composed of a low-loss 50-ohm coaxial relay for switching between transmission and reception, a printed circuit pattern low pass filter and a low noise microstrip receiver preamplifier Q1 (2SC3358). This pre-amplifier has been especially designed for this wide band application and has superb characteristics, with a noise figure of 3.2 dB within the band and a gain of 8 dB.

CIRCUIT DESCRIPTION

(3) RX unit

The received signal from the Relay unit is fed to a 3-pole helical resonator which attenuates the out of band signal component and the target signal alone is amplified by low-noise amplifier Q1 (2SC3358) before being fed to the first mixer Q2 (2SC3356).

The first local oscillator signal (1121 MHz to 1160.99 MHz) produced by the TX-PLL unit is delivered to J4 of the RX unit, passed through the wide band filter circuit, and is then applied to mixer Q2, to produce the 139 MHz first IF signal. This IF signal is passed through the band-pass filter (BPF) consisting of L2 and L3, and is amplified by low-noise GaAs FET Q3 (3SK97). This signal is passed through BPF L4 to L6, and is then applied to gate 1 of the second mixer amplifier Q4 (3SK97).

The second local oscillator circuit is made up of Q10 (2SC2347) and Q11 (2SC2668), and is provided with a voltage follower RIT circuit. This circuit can track a station whose frequency has drifted since the reception frequency will be 118.065 MHz after multiplication by a factor of 9. This second local oscillator signal is input to gate two of Q4 (3SK97), where the signal is mixed with the first IF (139 MHz) to produce the second IF signal (20.937 MHz), then passed through a 2-stage MCF (monolithic crystal filter) (L8). This is amplified by Q5 (2SC2669) before being input to Q7 pin 18 (MC3359P).

The 20.48 MHz reference oscillator frequency from Q17 (MC145155P) on the TX-PLL unit is amplified by Q12 (3SK73GR) as the third local oscillator frequency, then wave-shaped before being fed to Q7 pin 1 (MC3359P) where the incoming IF signal is mixed with the second injection signal (20.937 MHz) to produce the third IF signal (455 kHz). Amplification and other operations (Squelch, Limiting, Quadrature Detection, etc.) for the 455 kHz third IF signal are basically those used in our other current FM transceivers, and employ field-proven circuitry into which minor improvements have been incorporated. The transmitter uses a microphone amplifier circuit with excellent limiter characteristics consisting of Q13 and Q14 (NJM4558S), a crystal oscillator Q15 (2SC2347) (operating at 19.857 MHz), for direct FM modulation and an amplifier and multiplier with a multiplication factor of 7, consisting of Q15 (2SC2347), Q16 and Q17 (2SC2668).

Item	Rating
Nominal center frequency (fo)	20.935 MHz
Pass bandwidth	fo ±7.5 kHz or more at 3 dB
Attenuation bandwidth	fo ±25 kHz or less at 40 dB fo ±45 kHz or less at 60 dB
Guaranteed attenuation	70 dB or more within fo ±1 MHz spurious level=35 dB or more at fo-fo+500 kHz 80 dB or more at fo ±(890 ~930 kHz)
Ripple	1.0 dB or less
Loss	2.0 dB or less
Input and output impedance	1.1 kΩ // 0.5 pF

Table 3 MCF (L71-0251-05) (RX unit L8)

Item	Rating
Center frequency of 6 dB bandwidth	Within 455 kHz±1.5 kHz
6 dB bandwidth	±9 kHz or more
50 dB bandwidth	±18 kHz or less
Ripple (within 455 kHz±8 kHz)	2 dB or less
Guaranteed attenuation (within ±100 kHz)	40 dB or more
Loss	6 dB or less (455 kHz)
Input and output impedance	1.5 kΩ
Weight	1.5 g

Table 4 Ceramic discriminator (L72-0347-05) CFW455D (RX unit L14)

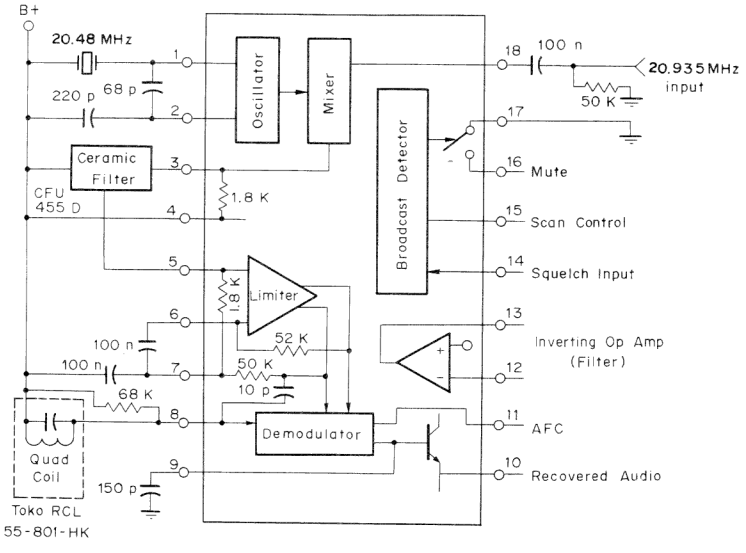


Fig. 5 MC3359 Block diagram (RX unit Q7)

CIRCUIT DESCRIPTION

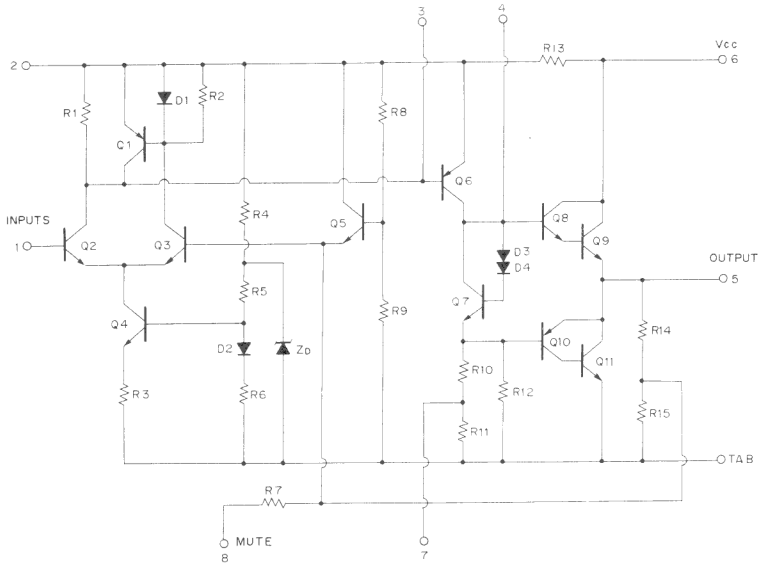


Fig. 6 μPC575C2 Equivalent circuit (RX unit Q19)

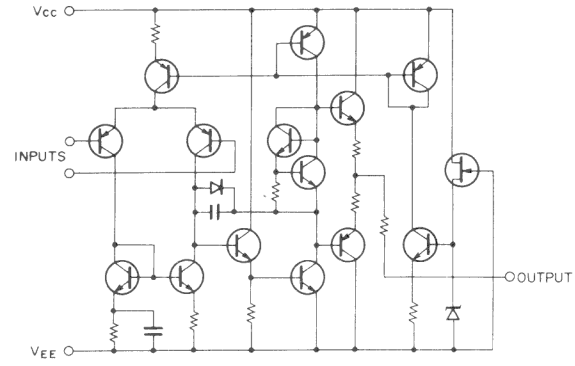


Fig. 7 NJM4558S Equivalent circuit (RX unit Q13,14)

	VCBO	VEBO	ICBO	Ic	Pc	Po	Tj	Ta
Condition				Ic	Tc=25°C	f=860MHz VCC=13.5V Pi=0.1W		25°C
Rating	35V	3V	50μA	250mA	8.3W	1.25W	200°C	

Table 4 2SC2558 Max. rating (TX, PLL unit Q1)

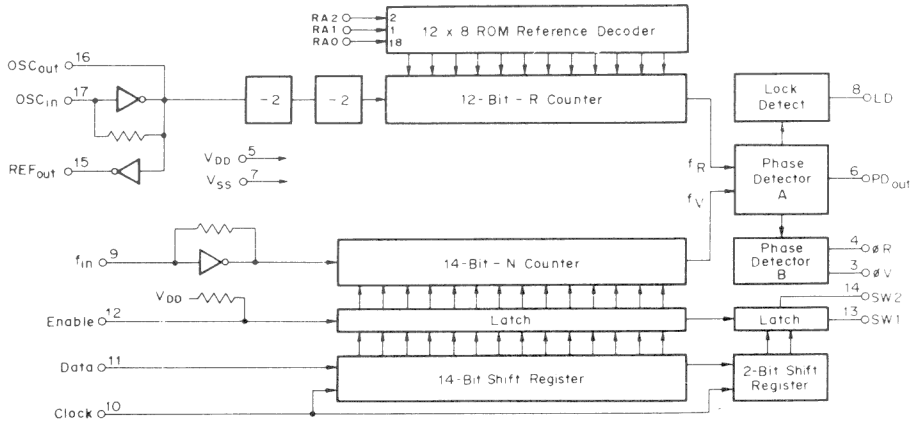


Fig. 8 MC145155P Block diagram (TX, PLL unit Q17)

CIRCUIT DESCRIPTION

(4) TX-PLL unit

As can be seen in Fig. 1 frequency configuration, the PLL circuit is used in common for both the transmitter and receiver. The VCO uses Q11 (2SK125) in a highly stable Colpitts oscillator circuit operating at output frequency of from 280.25 to 290.245 MHz.

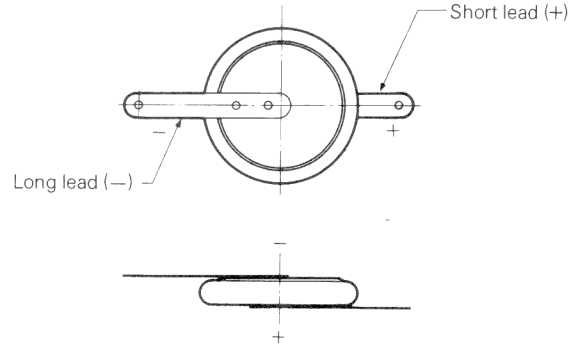
The local oscillator is composed of Q20 (2SC2347), two third-overtone crystals (X2: 54.350 MHz) and Q19 (DTC114Y) switching transistor for switching in 10 kHz steps. This switching operation is controlled by the microprocessor on the Control unit. If the displayed (target) frequency is odd, a local oscillator frequency (multiplied by a factor of 5) of 271.725 MHz is used, whereas if it is even, a frequency of 271.75 MHz is used. This VCO frequency signal is mixed with the local oscillator frecuency signal at mixer Q15 (2SC2026) to produce the 8.5 MHz to 18.495 MHz IF signal, which in turn is passed through a low-pass filter, then amplified by Q16 (2SC2347) up to a level sufficient to drive PLL IC Q17 (MC145155P) at the next stage before being input to Q17 pin 9.

The VCO oscillator signal is buffer amplified by Q10 (2SC2026), then multiplies by Q9 (2SC2026) by a factor of 2, and further doubled by Q8 (2SC3355) to produce the first local oscillator frequency of 1121 MHz to 1160.99 MHz. Q7 (2SC3355) amplifies the signal up to the transmission level. During reception, Q7 is off. Q9 (2SC2026) stops PLL operation to prevent illegal transmission output if the PLL unlocks, and Q14 (2SC2603) turns off. L6 and L7 are a 2-pole helical resonator and serve as a band-pass filter which eliminates unnecessary signals. The transmitter is made up of a 2 DBM (Double Balanced Mixer) circuit consisting of Schottky diodes D5~D8 (1SS99) and their matching transformer. The FM modulated 139 MHz IF signal from the RX unit and the 1121 MHz to 1160.99 MHz first local oscillator frequency signal are input to the DBM circuit and mixed there to produce the final 1260 MHz to 1299.99 MHz output frequency. Unwanted spurious signal components are then eliminated by helical resonator band-pass filter L3. The desired signal is amplified by Q6, Q5, Q4 (2SC3358), Q3 (2SC3357), Q2 (MRF559) and Q1 (2SC2558) up to the final output level before being fed to the Relay unit. All stages of this circuit use microstrip line construction and operate in either Class-A and Class-AB mode. This is a linear, distortion free mode.

LITHIUM BATTERY (W09-0323-05)

SPECIFICATIONS

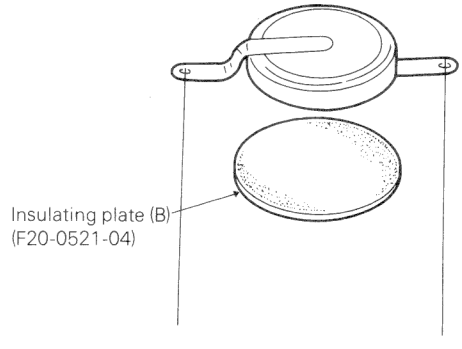
Model and Efficiency	
Model	CR2032
Nominal Voltage	3V
Nominal Capacity	170 m Ah
Discharge Stop Voltage	2.0 V
Dimensions	Diameter 20.2 mm
	High 3.2 mm
Weight	3 g



Replacement procedure

When replace the back-up battery read as follows.

1. Remove the upper and lower cases, then pull out the panel.
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.

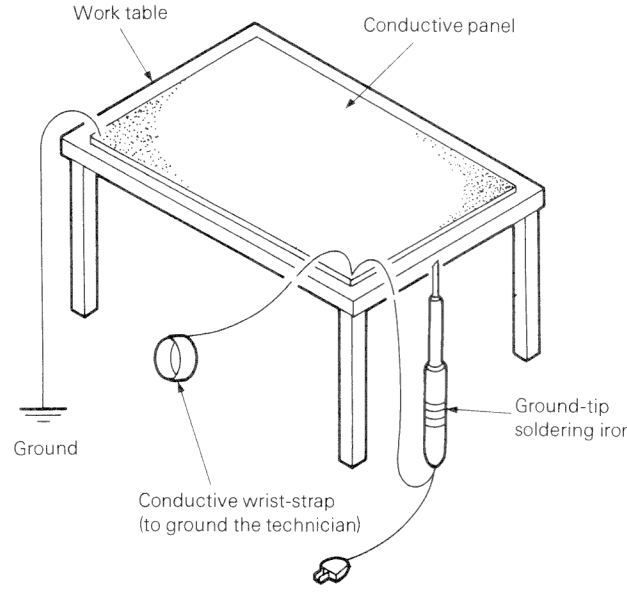


CIRCUIT DESCRIPTION

PRECAUTIONS FOR HANDLING GALLIUM ARSENIDE FET'S

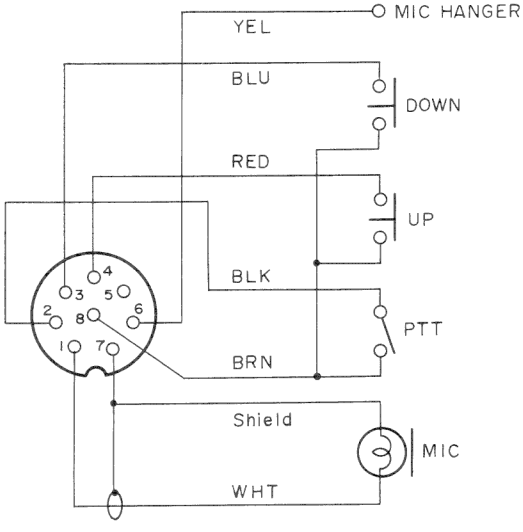
The gallium arsenide FET (3SK97) used in this device is easily damaged by static electricity. Take careful note of the following points when soldering and handling this device.

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.

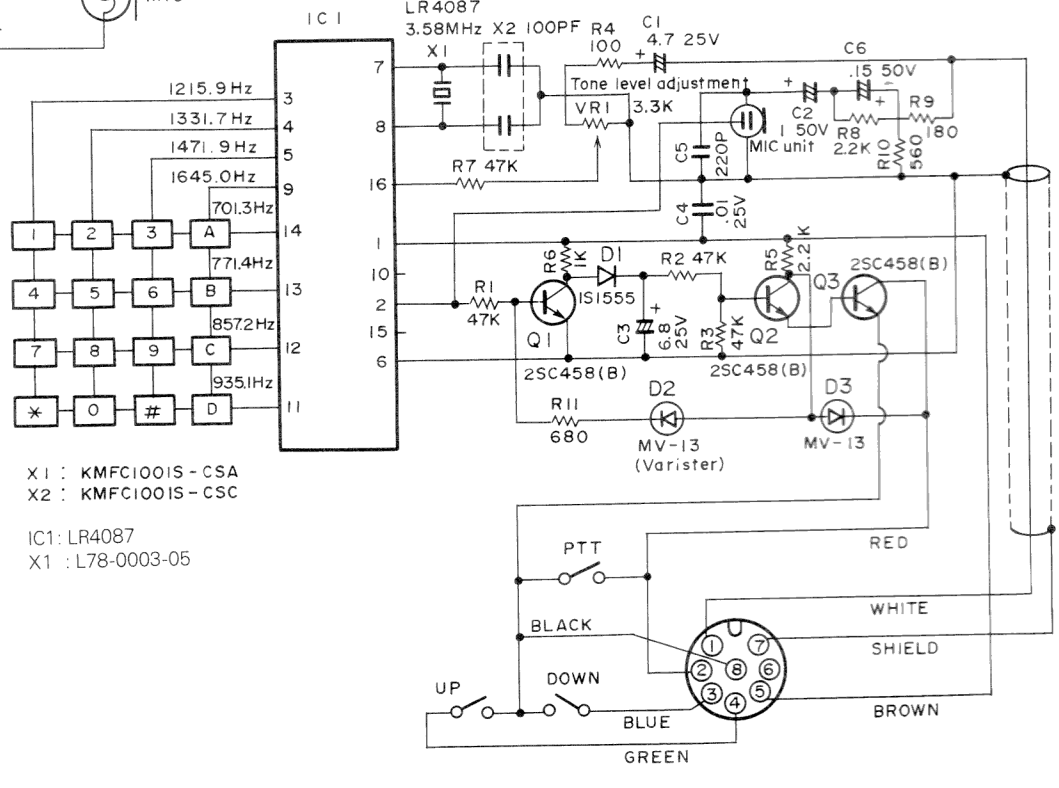


ACCESSORY MICROPHONE

(T91-0349-05) W type



(T91-0332-05) K type



X1 : KMFC100IS-CSA
X2 : KMFC100IS-CSC

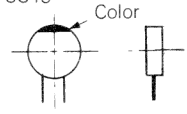
IC1: LR4087
X1 : L78-0003-05

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

CC45



- **Capacitor value**

0 1 0 = 1pF
1 0 0 = 10pF
1 0 1 = 100pF
1 0 2 = 1000pF = 0.001 μF
1 0 3 = 0.01 μF

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

- **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

- **Tolerance**

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

Less than 10 pt

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

- **Rating voltage**

1st word \ 2nd 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	—

- **Chip capacitors**

(EX) C C 7 3 F S L 1 H 0 0 0 J
1 2 3 4 5 6 7
(Chip) (CH, RH, UJ, SL)

(EX) C K 7 3 F F 1 H 0 0 0 Z
1 2 3 4 5 6 7
(Chip) (B, F)

[ ] Refer to the above table.

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

- **Chip resistor (Carbon)**

(EX) R D 7 3 E B 2 B 0 0 0 J
1 2 3 4 5 6 7
(Chip) (B, F)

Dimension

Dimension code	L	W	T
Empty	5.6±0.5	5.0±0.5	Less than 2.0
E	3.2±0.2	1.6±0.2	Less than 1.25
F	2.0±0.3	1.25±0.2	Less than 1.25

Dimension

Dimension code	L	W	T	Wattage
E	3.2±0.2	1.6±0.2	0.57	2B
F	2.0±0.3	1.25±0.2	0.45	2A

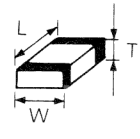
Rating wattage

Code	Wattage	Code	Wattage	Code	Wattage
2A	1 10W	2E	1 4W	3A	1W
2B	1 8W	2H	1 2W	3D	2W
2C	1 6W				

- **Carbon resistor (Normal type)**

(EX) R D 1 4 B B 2 C 0 0 0 J
1 2 3 4 5 6 7

Dimension



Model	Destination	RELAY unit	CONTROL unit	RX unit	TX, PLL unit
TR-50	K.	X41-1560-11	X53-1400-11	X55-1390-11	X-56-1480-00
	W.	X41-1560-61	X53-1400-61	X55-1390-61	

PARTS LIST

N: New parts

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

TR-50 GENERAL

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 011	061	REFERENCE.NO
A01-0984-03	N*	CASE(TOP)	1	1	
A01-0985-03	N*	CASE(BOTTOM)	1	1	
A20-2533-03	N*	PANEL ASS'Y	1	1	
A21-0787-04	N*	ORNAMENTAL PANEL(A)	1	1	
A21-0786-04	N*	ORNAMENTAL PANEL(B)	1	1	
A23-1483-03	N*	REAR PANEL ASS'Y	1	1	
A23-1484-05	N*	REAR PANEL	1	1	
B05-0706-14	N*	SP GRILE CLOTH	1	1	
B05-0736-04	N*		1	1	
B07-0652-03	N	SIDE ESCUTCHEON(L)	1	1	
B07-0653-03	N	SIDE ESCUTCHEON(R)	1	1	
B10-0670-04	N*	FRONT GLASS	1	1	
B40-3553-04	N*	MODEL NAME PLATE	1	1	
B41-0610-04	N*	CAUTION LABEL	1	1	
B41-0649-04	N*	CAUTION LABEL	1	1	
B42-2374-04	N*	LABEL(CASE TOP)	1	1	
B46-0410-00	*	WARRANTY CARD	1		
B50-4177-00	N	INSTRUCTION MANUAL (K,W)	1	1	
D21-0806-04	*	SHAFT	1	1	
D23-0706-04	N	FLANGE COLOR	1	1	
D40-0628-02	N	ANTENNA MECHANISM ASS'Y	1	1	
E20-0381-03	N*	TERMINAL PLATE	1	1	
E30-1794-05	N	DC CABLE ASS'Y	1	1	
F07-0854-05	N*	BATTERY COVER	1	1	
F20-0521-04	*	INSULATING PLATE	1	1	
F20-0510-04	*	INSULATING PLATE	2	2	
G01-0821-04		COIL SPRING	10	10	
G02-0505-05		KNOB FITTING SPRING	3	3	
G02-0504-04		PLATE SPRING	1	1	
G02-0547-04	N	GND SPRING	2	2	
G13-0630-14	*	CUSHION	1		
G13-0635-04	*	CUSHION(UNDER LED)	1		
G53-0511-04	*	PACKING	2	2	
G53-0523-04	*	PACKING	1	1	
H01-4616-03	N*	PACKING	1	1	
H10-2600-02	N*	PACKING FIXTURE(BOTTOM)	1	1	
H10-2572-04	*	PACKING FIXTURE(TOP)	1	1	
H12-1369-04	*	CUSHION(A)	1	1	
H12-1370-04	*	CUSHION(B)	1	1	
H25-0705-04	*	BAG 200X300	1	1	
H25-0077-03	*	BAG	1	1	
J19-1409-04	N*	CABLE FITTING HARDWARE	1	1	
J19-1311-04		FITTING HARDWARE(BATT CASE)	1	1	
J19-1410-04	N*	BELT HARDWARE	1	1	
J19-1415-04	N*	BELT HARDWARE	1	1	
J19-0461-05		BATTERY CASE(6P)	1	1	
J19-0462-05		BATTERY CASE(4P)	1	1	
J21-2566-04	*	SPEAKER MOUNTING PLATE	1	1	

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 011	061	REFERENCE.NO
J29-0409-04		SW GUIDE	2	2	
J61-0412-05	N	SHOULDER BAND	1	1	
K21-0776-05	N	KNOB MAIN	1	1	
K21-0775-05	N	KNOB SHIFT	1	1	
K23-0769-05		KNOB RIT,AF,SQL	3	3	
K27-0445-05		SQUARE KNOB RIT	1	1	
K27-0446-05		SQUARE KNOB TONE	1	1	
K27-0444-05		KEY KNOB(SILVER)	7	7	
K27-0443-05		KEY KNOB(ORANGE)	1	1	
LR4087		IC	1		
N08-0501-14		DRESSED SCREW	1	1	
N09-0687-04	N	ROUND FLAT SCREW	16	16	
N09-0688-04	N	ROUND FLAT SCREW	3	3	
N09-0689-04	N	BIND SCREW	1	1	
N13-0310-04		DRESSED NUT AF,SQL	3	3	
N19-0604-04		SPACER	1	1	
N19-0634-04	N	SPRING WASHER	1	1	
N24-3015-41	*	E-RING	2	2	
N29-0301-04		STOPER LING	8	8	
N30-2605-45		PAN HD SCREW	2	2	
N30-2604-46		PAN HD SCREW	2	2	
N30-2004-46		PAN HD SCREW	2	2	
N32-2604-46		FLAT HD SCREW	1	1	
N32-3005-46		FLAT HD SCREW	6	6	
N33-2605-45		ROUND FLAT SCREW	1	1	
N35-2605-46		BIND SCREW(JOINT HARDWARE)	17	17	
N35-2004-45		BIND SCREW	5		
N35-2004-45		BIND SCREW		3	
N35-3004-46		BIND SCREW	2	2	
N35-3006-46		BIND SCREW	1	1	
T07-0237-05		SPEAKER	1	1	
T90-0344-05	N	ANTENNA	1	1	
T91-0332-05		MICROPHONE MC-48	1		
T91-0349-05	N	MICROPHONE		1	
W02-0367-05	N	ROTARY ENCODER	1	1	
W09-0002-05		DUMMY BATTERY	1	1	
W09-0342-05	N	BATTERY CHARGER	1		
W09-0344-05	N	BATTERY CHARGER		1	
W09-0343-05	N	NI-CD BATTERY ASS'Y (PB-16)	1	1	
W09-0326-05		LITHIUM BATTERY	1	1	
X41-1560-11	N*	RELAY UNIT	1		
X41-1560-61	N*	RELAY UNIT		1	
X53-1400-11	N*	CONTROL UNIT	1		
X53-1400-61	N*	CONTROL UNIT		1	
X55-1390-11	N*	RX UNIT	1		
X55-1390-61	N*	RX UNIT		1	
X56-1480-00	N*	TX/PLL UNIT	1	1	

PARTS LIST

RELAY UNIT (X41-1560-XX) -11:K, -61:W

PART.NO	NOTE	NAME & DESCRIPTION	011	061	REFERENCE.NO
AFG05F1750A2		IC		1	Q , 2
CC45CH1H020C		CERAMIC 2P 50V	1	1	C , 1
CC45SL1H470J		CERAMIC 47P 50V		1	C , 22
CC73ECH1H0R5C		CHIP CAP. 0.5P 50V	2	2	C , 5, 7
CC73ECH1H1R5C		CHIP CAP. 1.5P 50V	1	1	C , 2
CC73ECH1H020C		CHIP CAP. 2P 50V	1	1	C , 3
CC73ECH1H100D		CHIP CAP. 10P 50V	1	1	C , 4
CC73ECH1H101J		CHIP CAP. 100P 50V	1	1	C , 6
CK73EB1H102K		CHIP CAP. 1000P 50V	9	9	C , 8, 9, 10, 11, 13, 14, 15 , 16, 17
CK73EB1H103K		CHIP CAP. 0.01 50V	1	1	C , 12
C05-0334-05	N	MICRO WAVE TRIMMER	1	1	TC , 2
C05-0062-05		TRIM.CAP. 6P	2	2	TC , 1, 3
C90-1248-05		ELECTRO 1 50V		1	C , 20
C90-0868-05		ELECTRO 10 16V		3	C , 19, 23, 24
E04-0154-05		RF COAX. CONNECTOR	2	2	J , 1, 2
E06-0858-05		8P METAL SOCKET	1	1	J , 3
E11-0401-05		EARPHONE JACK EXT.SP	1	1	J , 4
E18-0352-05	N	POWER JACK	1	1	J , 5
E40-3007-05	*	MINI CONNECTOR 2P	1	1	J , 6
E40-3010-05		MINI CONNECTOR 5P	1	1	J , 9
F29-0428-04	N	INSULATING WASHER	1	1	
L33-0683-05	N	CHOKE COIL	1	1	L , 3
L34-1083-05		COIL 1.25T	2	2	L , 1, 2
RD73FB2A470J		CHIP RES. 47 OHM 1/10W	1	1	R , 3
RD73FB2A101J		CHIP RES. 100 OHM 1/10W	1	1	R , 2
RD73FB2A563J		CHIP RES. 56K OHM 1/10W	1	1	R , 1
R05-3429-05	N	POTENTIOMETER 10K(K)	1	1	VR , 1
R05-3430-05	N	POTENTIOMETER 10K(B)	2	2	VR , 2, 3
R12-3451-05		TRIM.POT. 22 OHM		1	VR , 4
R12-1433-05		TRIM.POT 4.7K(B)		1	VR , 5
R92-1061-05		JUMPER WIRE		2	R , 7, 8
S31-2411-05	N	SLIDE SWITCH	1	1	S , 1
S51-1419-05		RELAY	1	1	RL , 1
U05B		DIODE	1	1	D , 8
1SS133		DIODE	5	5	D , 1, 2, 3, 4, 7
2SA1115(E)		TR		1	Q , 4
2SC3358K		TR	1	1	Q , 1
2SC2603(E)		TR		1	Q , 3

RX UNIT (X55-1390-XX) -11:K, -61:W

PART.NO	NOTE	NAME & DESCRIPTION	011	061	REFERENCE.NO
CC45CH1H0R5C		CERAMIC 0.5P 50V	5	5	C , 15, 23, 24, 71, 73
CC45RH1H040C		CERAMIC 4P 50V	1	1	C , 16
CC45CH1H010C		CERAMIC 1P 50V	3	3	C , 68, 80,119
CC45RH1H050C		CERAMIC 5P 50V	1	1	C , 27
CC45CH1H020C		CERAMIC 2P 50V	2	2	C ,114,117
CC45RH1H060D		CERAMIC 6P 50V	1	1	C ,109
CC45CH1H040C		CERAMIC 4P 50V	1	1	C , 25
CC45RH1H070D		CERAMIC 7P 50V	6	6	C , 14, 26,112,115,118,120
CC45CH1H050C		CERAMIC 5P 50V	2	2	C , 18, 81
CC45RH1H080D		CERAMIC 8P 50V	1	1	C , 21
CC45CH1H060D		CERAMIC 6P 50V	1	1	C , 28
CC45RH1H090D		CERAMIC 9P 50V	1	1	C , 74
CC45RH1H100D		CERAMIC 10P 50V	3	3	C , 66, 70, 72
CC45CH1H100D		CERAMIC 10P 50V	4	4	C , 31, 62, 75,111
CC45CH1H120J		CERAMIC 12P 50V	1	1	C ,104
CC45CH1H220J		CERAMIC 22P 50V	1	1	C , 76
CC45SL1H101J		CERAMIC 100P 50V	1	1	C , 40
CC45CH1H470J		CERAMIC 47P 50V	2	2	C ,107,108
CC73ECH1H010C		CHIP CAP. 1P 50V	1	1	C , 10
CC73ECH1H020C		CHIP CAP. 2P 50V	3	3	C , 7, 8, 11
CC73ECH1H040C		CHIP CAP. 4P 50V	1	1	C , 9
CE04W1E220M		ELECTRO 22 25V	2	2	C ,105,168
CK73EB1H102K		CHIP CAP. 1000P 50V	10	10	C , 1, 2, 3, 4, 5, 6, 12 , 13, 17,152
CQ92M1H102K		MYLAR 1000P 50V	1	1	C ,102
CQ92M1H152K		MYLAR 1500P 50V	1	1	C , 94
CQ92M1H222K		MYLAR 2200P 50V	1	1	C ,103
CQ92M1H472K		MYLAR 4700P 50V	1	1	C , 87
CQ92M1H153K		MYLAR 0.015 50V	1	1	C ,129
CQ92M1H223K		MYLAR 0.022 50V	2	2	C , 42, 97
CQ92M1H333K		MYLAR 0.033 50V	4	4	C , 46, 47,149,150
CQ92M1H104K		MYLAR 0.1 50V	1	1	C ,135
CS15E1VR47M		TANTALUM 0.47 35V	1	1	C , 85
CS15E1E010M		TANTALUM 1 25V	1	1	C ,101
C05-0062-05		TRIM.CAP. 6P	2	2	TC , 1, 2
C90-0837-05		ELECTRO 0.1 50V	2	2	C ,128,147
C90-0843-05		ELECTRO 0.33 50V	1	1	C , 58
C90-0838-05		ELECTRO 1 50V	10	10	C , 39, 86, 88, 89, 90, 98,130 ,148,161,169
C90-0508-05		ELECTRO 2.2 50V	1	1	C , 38
C90-0840-05		ELECTRO 10 16V	4	4	C ,122,125,131,160
C90-0873-05		ELECTRO 47 10V	3	3	C , 95,132,146
C90-0896-05		ELECTRO 460 16V	3	3	C , 50,138,143
C90-0854-05		ELECTRO 100 25V	1	1	C ,134
C90-2008-05		ELECTRO 220 16V	1	1	C ,145
C90-2009-05	N	ELECTRO 470 16V	1	1	C ,139
C91-0462-05		CERAMIC 0.0047 50V	11	11	C , 35, 36, 51, 52, 54, 55, 57 , 59, 77, 78, 82
C91-0488-05		CERAMIC 0.1 50V	2	2	C , 48, 49
E04-0154-05		RF COAX. CONNECTOR	3	3	J , 3, 4, 5
E29-0455-04		GND TERMINAL	1	1	
E40-3007-05	*	MINI CONNECTOR 2P	1	1	J , 10
E40-3008-05	*	MINI CONNECTOR 3P	1	1	J , 8
E40-3010-05	*	MINI CONNECTOR 5P	2	2	J , 9, 12
E40-3011-05	*	MINI CONNECTOR 6P	1	1	J , 7
E40-3012-05	*	MINI CONNECTOR 7P	2	2	J , 6, 11

PARTS LIST

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 011	061	REFERENCE.NO
E40-3018-05	*	MINI CONNECTOR 13P	1	1	J , 13
F10-1323-04	N*	SHIELDING PLATE	1	1	
F11-0875-04	N*	SHIELDING CASE	1	1	
L33-0666-05		CHOKE COIL	3	3	L , 11, 12, 13
L34-2034-05		VXO COIL	1	1	L , 17
L34-0890-05		TUNING COIL	14	14	L , 2, 3, 4, 5, 6, 18, 19 , 20, 21, 26, 27, 28, 29, 30
L34-2032-05		TUNING COIL	1	1	L , 15
L34-2233-05	N	TUNING COIL	2	2	L , 7, 10
L34-2234-05	N	TUNING COIL	3	3	L , 22, 23, 24
L34-2135-05		TUNING COIL	1	1	L , 25
L40-1021-03		INDUCTOR 1 MH	1	1	L , 16
L71-0251-05	N	MCF 20.935MHZ	1	1	L , 8
L72-0347-05	N	CERAMIC FILTER 455KHZ	1	1	L , 14
L77-1258-05	N	XTAL 13.1183MHZ	1	1	X , 1
L77-1259-05	N	XTAL 19.857MHZ	1	1	X , 2
L79-0646-05	N	HELICAL BLOCK	1	1	L , 1
MC3359P		IC	1	1	Q , 7
MC911		DIODE	2	2	D , 8, 9
NJM4558S		IC	2	2	Q , 13, 14
RD73FB2A470J		CHIP RES. 47 OHM 1/10W	1	1	R , 3
RD73FB2A332J		CHIP RES. 3.3KOHM 1/10W	1	1	R , 8
RD73FB2A392J		CHIP RES. 3.9KOHM 1/10W	1	1	R , 7
RD73FB2A472J		CHIP RES. 4.7KOHM 1/10W	2	2	R , 1, 2
RD73FB2A473J		CHIP RES. 47K OHM 1/10W	1	1	R ,122
RD73FB2A105J		CHIP RES. 1M OHM 1/10W	1	1	R ,123
R12-3444-05		TRIM.POT. 10K OHM	1	1	VR , 3
R12-3451-05		TRIM.POT. 22 OHM	2	2	VR , 2, 6
R12-3445-05		TRIM.POT. 47K OHM	3	3	VR , 1, 4, 5
UPC7808H		IC	1	1	Q , 20
UPC575C2		IC	1	1	Q , 19
1SV50E		VOLTAGE VARIABLE	2	2	D , 7, 10
1S1555		DIODE	8	8	D , 3, 4, 11, 16, 17, 18, 19 , 20
1S1588		DIODE	4	4	D , 1, 2, 5, 6
2SA1115(E)		TR	2	2	Q , 6, 8
2SB873(R)	N	TR	2	2	Q , 21, 23
2SC2347		TR	2	2	Q , 10, 15
2SC2668(Y)		TR	3	3	Q , 11, 16, 17
2SC2669(Y)		TR	1	1	Q , 5
2SC3356		TR	1	1	Q , 2
2SC3358K		TR	1	1	Q , 1
2SC2603(E)		TR	6	6	Q , 9, 18, 22, 24, 25, 26
3SK73(GR)		FET	1	1	Q , 12
3SK97(Q2)		FET	2	2	Q , 3, 4
32D27		THERMISTOR	1	1	R , 31

TX, PLL UNIT (X56-1480-00)

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 000	REFERENCE.NO
CC45CH1H0R5C		CERAMIC 0.5P 50V	2	C ,111,112
CC45CH1H010C		CERAMIC 1P 50V	2	C , 38, 49
CC45SL1H101J		CERAMIC 100P 50V	2	C , 66, 67
CC45CH1H020C		CERAMIC 2P 50V	1	C ,105
CC45SL1H221J		CERAMIC 220P 50V	1	C , 97
CC45CH1H030C		CERAMIC 3P 50V	1	C , 45
CC45CH1H050C		CERAMIC 5P 50V	3	C , 32, 33, 37
CC45CH1H060D		CERAMIC 6P 50V	2	C , 78, 98
CC45CH1H100D		CERAMIC 10P 50V	2	C , 43, 44
CC45CH1H150J		CERAMIC 15P 50V	1	C , 71
CC45CH1H220J		CERAMIC 22P 50V	3	C , 70, 81, 84
CC45CH1H330J		CERAMIC 33P 50V	1	C ,101
CC45CH1H560J		CERAMIC 56P 50V	1	C ,100
CC45RH1H030C		CERAMIC 3P 50V	2	C ,104,109
CC45RH1H040C		CERAMIC 4P 50V	2	C ,108,110
CC45RH1H080D		CERAMIC 8P 50V	1	C , 50
CC45RH1H100D		CERAMIC 10P 50V	2	C , 48, 55
CC45RH1H120J		CERAMIC 12P 50V	1	C ,122
CC73ECH1H1R5C		CHIP CAP. 1.5P 50V	2	C , 2,135
CC73ECH1H020C		CHIP CAP. 2P 50V	2	C , 20, 26
CC73ECH1H030C		CHIP CAP. 3P 50V	3	C , 12, 16, 25
CC73ECH1H080D		CHIP CAP. 8P 50V	1	C ,134
CC73ECH1H060D		CHIP CAP. 6P 50V	2	C , 22, 23
CC73ECH1H470J		CHIP CAP. 47P 50V	1	C , 1
CC73ECH1H101J		CHIP CAP. 100P 50V	3	C ,127,128,130
CK73EB1H102K		CHIP CAP. 1000P 50V	16	C , 3, 6, 9, 11, 13, 15, 17 , 19, 21, 24, 27, 34, 36, 42 ,124,126
CM73F2H030C		CHIP MICA 3P 500V	1	C , 7
CQ92M1H223K		MYLAR 0.022 50V	1	C , 64
CS15E1V0R1M		TANTALUM 0.1 35V	1	C , 56
CS15E1C2R2M		TANTALUM 2.2 16V	2	C , 58,118
CS15E1C4R7M		TANTALUM 4.7 16V	3	C , 53, 60, 61
C05-0062-05		TRIM.CAP. 6P	5	TC , 2, 3, 4, 6, 7
C05-0030-15		TRIM.CAP. 20P	1	TC , 8
C05-0031-15		TRIM.CAP. 10P	1	TC , 5
C05-0335-05		TRIM.CAP. 4P	1	TC , 1
C90-0844-05		ELECTRO 3.3 50V	4	C , 5, 10, 14, 18
C90-0840-05		ELECTRO 10 16V	3	C , 74, 90,119
C90-0873-05		ELECTRO 47 10V	8	C , 28, 41, 62, 65, 87, 88,131 ,133
C90-2008-05		ELECTRO 220 16V	1	C , 94
C90-2010-05		ELECTRO 1000 10V	1	C , 52
C91-0462-05		CERAMIC 0.0047 50V	1	C , 80
DTC114YF		DIGITAL TR	1	Q , 19
E04-0154-05		RF COAX. CONNECTOR	4	J , 1, 2, 3, 8
E29-0455-04	N*	GND TERMINAL	8	
E40-3007-05	*	MINI CONNECTOR 2P	2	J , 7, 9
E40-3008-05	*	MINI CONNECTOR 3P	1	J , 6
E40-3010-05	*	MINI CONNECTOR 5P	2	J , 4, 5
F11-0877-04	N*	PLL SHIELD COVER	1	
F20-0550-04	N*	INSULATING BOARD	1	
L19-0349-05		TOROIDAL COIL	2	L , 4, 5

PARTS LIST

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 000	REFERENCE.NO
L32-0673-05	N	VCO COIL	1	L , 14
L33-0680-05		CHOKE COIL 1 UH	1	L , 26
L34-1115-05	N	TINING COIL	2	L , 8, 9
L34-1111-05	N	TUNING COIL	1	L , 2
L34-1108-05	N	TUNING COIL	1	L , 11
L34-1109-05	N	TUNING COIL	1	L , 10
L34-1110-05	N	TUNING COIL	1	L , 1
L34-2235-05		TUNING COIL	3	L , 22, 23, 24
L34-2236-05	N	TUNING COIL	1	L , 25
L34-2139-05		VXO COIL	1	L , 20
L40-2282-01		INDUCTOR 2.2 UH	1	L , 18
L40-4782-14		INDUCTOR 0.47UH	1	L , 12
L40-1092-14		INDUCTOR 1 UH	2	L , 21, 27
L40-1091-03		INDUCTOR 1 UH	1	L , 17
L40-3391-03		INDUCTOR 3.3 UH	2	L , 15, 16
L40-1001-01		INDUCTOR 10 UH	1	L , 19
L40-3391-14		INDUCTOR 3.3 UH	1	L , 13
L77-1260-05	N	XTAL 20.480MHZ	1	X , 1
L77-1261-05	N	XTAL 54.350MHZ	1	X , 2
L79-0648-05	N	HELICAL BLOCK	2	L , 6, 7
L79-0647-05	N	HELICAL BLOCK	1	L , 3
MC145155P*K		IC	1	Q , 17
MRF559	N	TR	1	Q , 2
MTZ6.2J(A,B)		ZENER DIODE 6.2V	1	D , 15
RD73FB2A100J		CHIP RES. 10 OHM 1/10W	2	R , 11, 22
RD73FB2A101J		CHIP RES. 100 OHM 1/10W	1	R , 14
RD73FB2A471J		CHIP RES 470 OHM 1/10W	2	R , 12, 13
R12-3451-05		TRIM.POT. 22 OHM	1	VR , 2
R12-3445-05		TRIM.POT. 47K OHM	1	VR , 1
S59-1405-05		TACT SW RESET	1	S , 1
05Z5.1-Y		ZENAR DIODE	1	D , 10
1SS99		DIODE	4	D , 5, 6, 7, 8
1SS101		DIODE	1	D , 1
1SS133		DIODE	6	D , 2, 3, 4, 11, 12, 14
1SV123		VOLTAGE VARIABLE	1	D , 9
1SV50E		VOLTAGE VARIABLE	1	D , 13
2SA1115(E)		TR	1	Q , 24
2SB698		TR	1	Q , 18
2SC1815(Y)		TR	1	Q , 23
2SC2558KA	N	TR	1	Q , 1
2SC3357	N	TR	1	Q , 3
2SC3358K	N	TR	3	Q , 4, 5, 6
2SC3355K	N	TR	2	Q , 7, 8
2SC2026		TR	3	Q , 9, 10, 15
2SC2603(E)		TR	2	Q , 14, 22
2SC2668(Y)		TR	1	Q , 21
2SC2347		TR	2	Q , 16, 20
2SC1775(E)		TR	1	Q , 12
2SK125		FET	1	Q , 11
2SK30A(O)		FET	1	Q , 13

CONTROL UNIT (X53-1400-XX) -11:K, -61:W

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 011	061	REFERENCE.NO
B11-0423-04	N*	LIGHT GUIDING PLATE	1	1	
B11-0424-04	N*	REFLECTING SHEET	1	1	
B30-0832-05	N	LAMP 8V 40MA	2	2	
CC73FCH1H200J		CHIP CAP. 20P 50V	1	1	C , 6
CC73FCH1H300J		CHIP CAP. 30P 50V	1	1	C , 5
CC73FCH1H330J		CHIP CAP. 33P 50V	1	1	C , 11
CE04CW1A330M		ELECTRO 33 10V	2	2	C , 18, 21
CK73FF1H223Z		CHIP CAP. 0.022 50V	2	2	C , 1, 2
CK73FF1E104Z		CHIP CAP. 0.1 25V	1	1	C , 10
CK73FB1H471K		CHIP CAP. 470P 50V	2	2	C , 3, 4
CK73FB1H102K		CHIP CAP. 1000P 50V	6	6	C , 13, 14, 15, 20, 26, 27
CK73FF1H103Z		CHIP CAP. 0.01 50V	3	3	C , 7, 8, 9
CS15E1C3R3M		TANTALUM 3.3 16V	1	1	C , 17
CS15E1C4R7M		TANTALUM 4.7 16V	1	1	C , 12
C90-0885-05		ELECTRO 10 25V	1	1	C , 28
C90-2011-05	N	ELECTRO 4.7 25V	1	1	C , 16
C90-0868-05		ELECTRO 10 16V	1	1	C , 29
E29-0456-04	N*	LCD CONNECTOR(A)	1	1	J , 15
E29-0457-04	N*	LCD CONNECTOR(B)	1	1	J , 16
FTD1613	N	LED	1	1	V , 1
IR2429		IC	1	1	Q , 3
J19-1412-04	N*	LCD HOLDER	1	1	
J30-0533-04	N	SWITCH SPACER	2	2	
J32-0788-04	N	ROUND BOSS	3	3	
L77-1256-05		XTAL 32.758KHZ	1	1	X , 1
NJM78L06A		IC	1	1	Q , 8
N35-2004-46		BIND SCREW	6	6	
RD73FB2A104J		CHIP RES. 100KOHM 1/10W	11	11	R , 13, 14, 15, 19, 20, 21, 23 , 30, 46, 47, 48
RD73FB2A154J		CHIP RES. 150KOHM 1/10W	2	2	R , 12, 31
RD73FB2A274J		CHIP RES. 270KOHM 1/10W	4	4	R , 5, 6, 29, 34
RD73FB2A684J		CHIP RES. 680KOHM 1/10W	1	1	R , 8
RD73FB2A100J		CHIP RES. 10 OHM 1/10W	1	1	R , 17
RD73FB2A471J		CHIP RES. 470 OHM 1/10W	1	1	R , 16
RD73FB2A332J		CHIP RES. 3.3KOHM 1/10W	2	2	R , 1, 2
RD73FB2A472J		CHIP RES. 4.7KOHM 1/10W	1	1	R , 28
RD73FB2A273J		CHIP RES. 27K OHM 1/10W	2	2	R , 3, 4
RD73FB2A473J		CHIP RES. 47K OHM 1/10W	9	9	R , 9, 10, 11, 22, 25, 26, 27 , 36, 42
RD73FB2A823J		CHIP RES. 82K OHM 1/10W	1	1	R , 18
R92-1061-05		JUMPER WIRE	2	2	R , 10, 12
R92-0150-05		JUMPER WIRE		1	R , 19
S31-2410-05	N	SLIDE SWITCH SHIFT	1	1	S , 11
S40-2443-05		PUSH SWITCH RIT.TONE	2		S , 9, 10
S40-2443-05		PUSH SWITCH RIT		1	S , 10
S40-2444-05		PUSH SWITCH TONE		1	S , 9
S50-1412-05		TACT SWITCH	8	8	S , 1, 2, 3, 4, 5, 6, 7 , 8

PARTS LIST

PART.NO	NOTE	NAME & DESCRIPTION	DISTINCTION & QUANTITY 011	061	REFERENCE.NO
TC40H000F	N	IC	1	1	Q , 4
TC40H004F	N	IC	1	1	Q , 1
UPD7514G-030-12	N	MICRO-PROCESSOR	1	1	Q , 2
1SS133		DIODE	13		D , 1, 2, 3, 4, 5, 7, 8 , 9, 10, 12, 13, 14, 15
1SS133		DIODE		11	D , 1, 2, 3, 4, 7, 10, 12 , 13, 14, 15
2SA1115(E)		TR	1	1	Q , 6

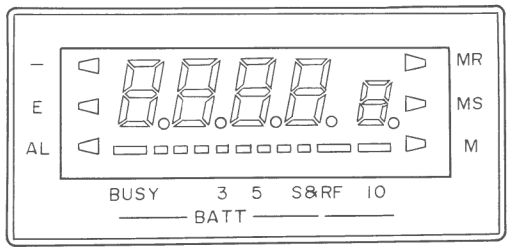
SEMICONDUCTOR

Item	Remarks	Part NO.
Diode		IS1555
		IS1588
		ISS99
		ISS101
		MC911
		U05B
		05Z5. 1-Y
		ISS133
Vari cap		ISV123
		ISV50E
Thermister		32D-27
TR		2SA1115(E)
		2SB698
	N	2SB873(R)

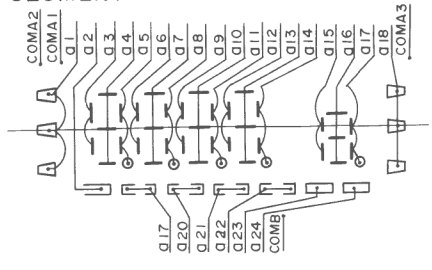
Item	Remarks	Part NO.
TR		2SC1775(E)
		2SC2026
		2SC2347
	N	2SC2558KA
		2SC2603(E)
		2SC2668(Y)
		2SC2669(Y)
	N	2SC3355K
		2SC3356
	N	2SC3357
	N	2SC3358K
	N	MRF559
Digital TR		DTC114Y(F)
FET		2SK125
		2SK30A(O)
		3SK73(GR)
		3SK97(Q2)

Item	Remarks	Part NO.
IC		IR2429
		MC145155P•K
		MC3359P
		NJM4558S
		NJM78L06A
	N	TC40H000F
	N	TC40H004F
		μPC575C2
		μPC7808H
Micro processor	N	μPD7514G-030-12

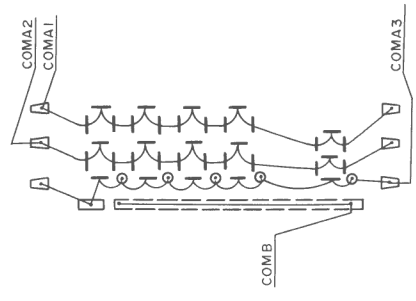
LCD : FTD-1613



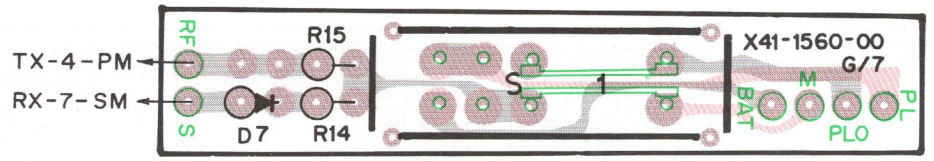
SEGMENT



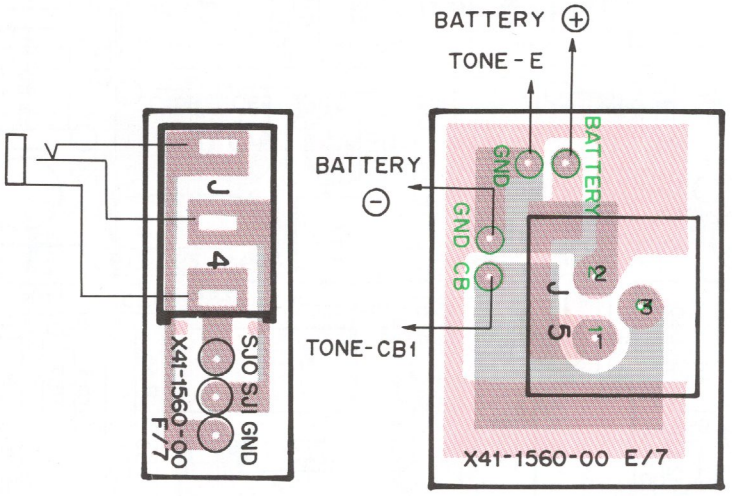
COMMON

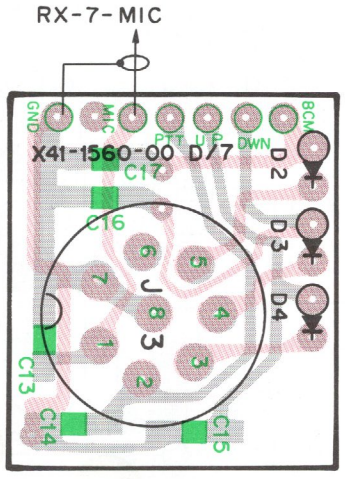


▼ RELAY UNIT [X41-1560-XX] [-11:K, -61:W] [Component side view]

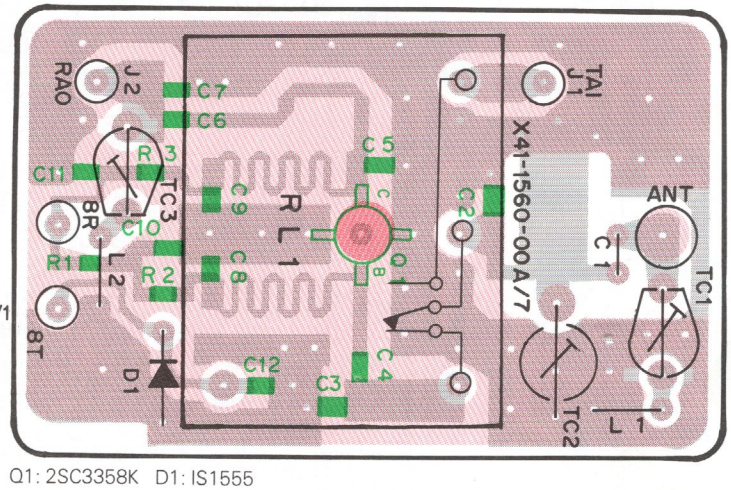


D7: IS1555

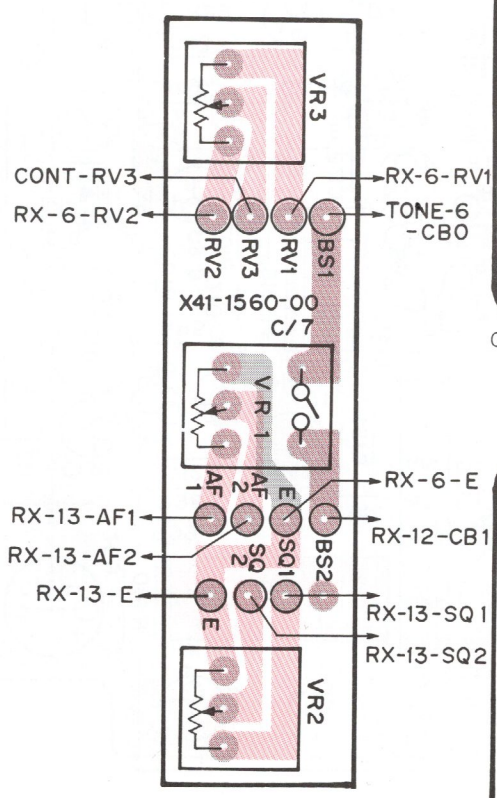


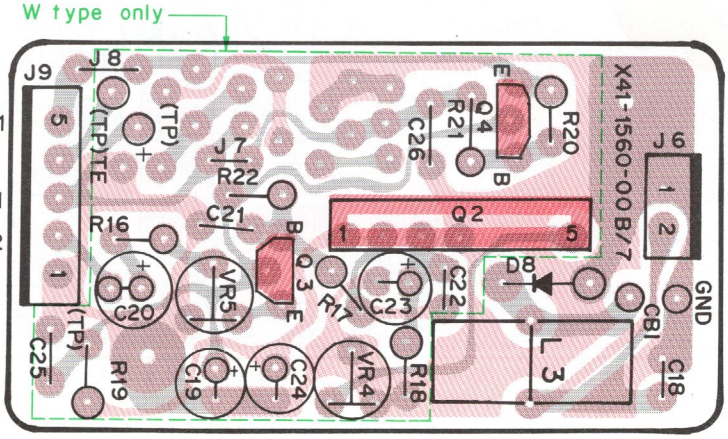


D2～4: IS1555



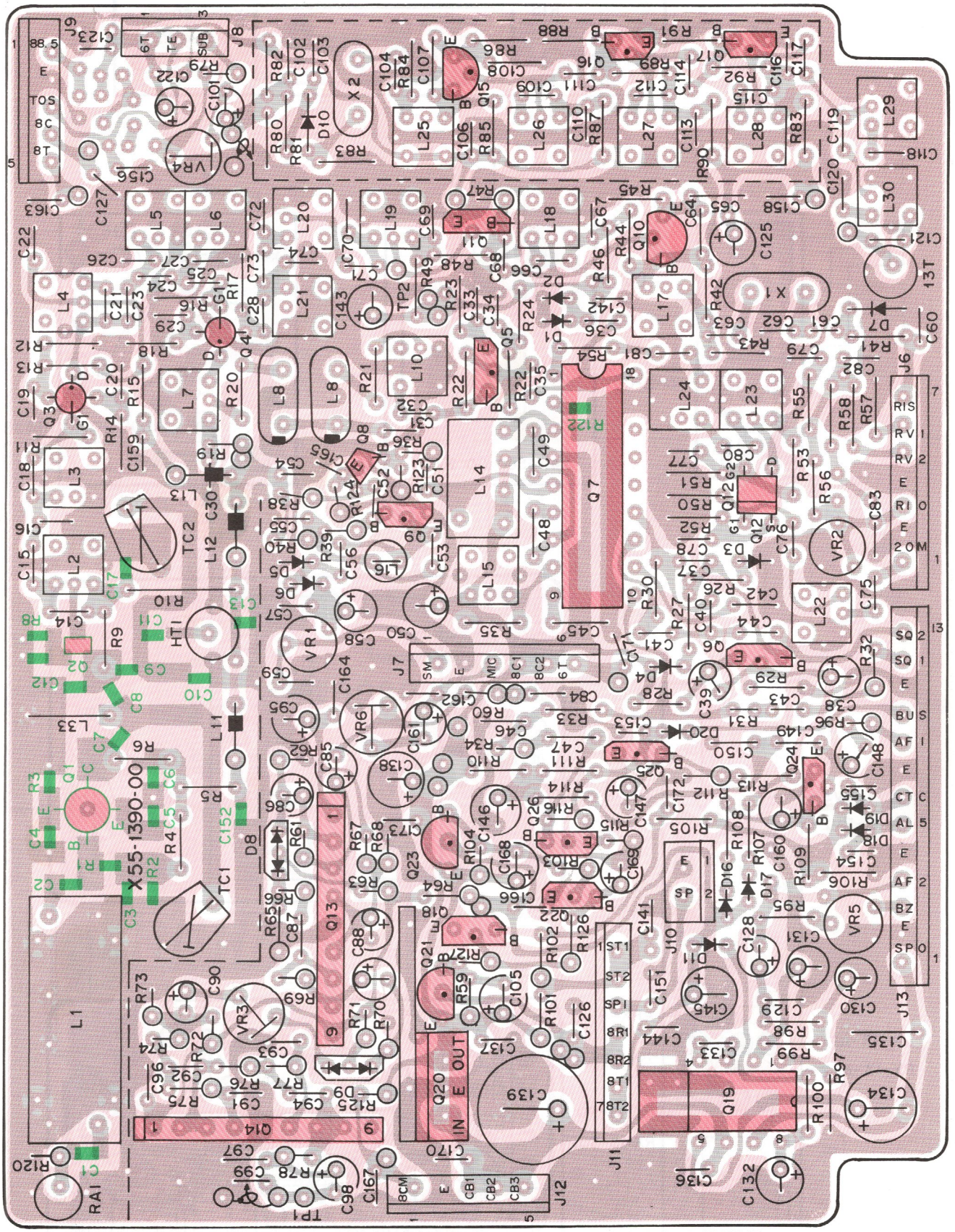
Q1: 2SC3358K D1: IS1555





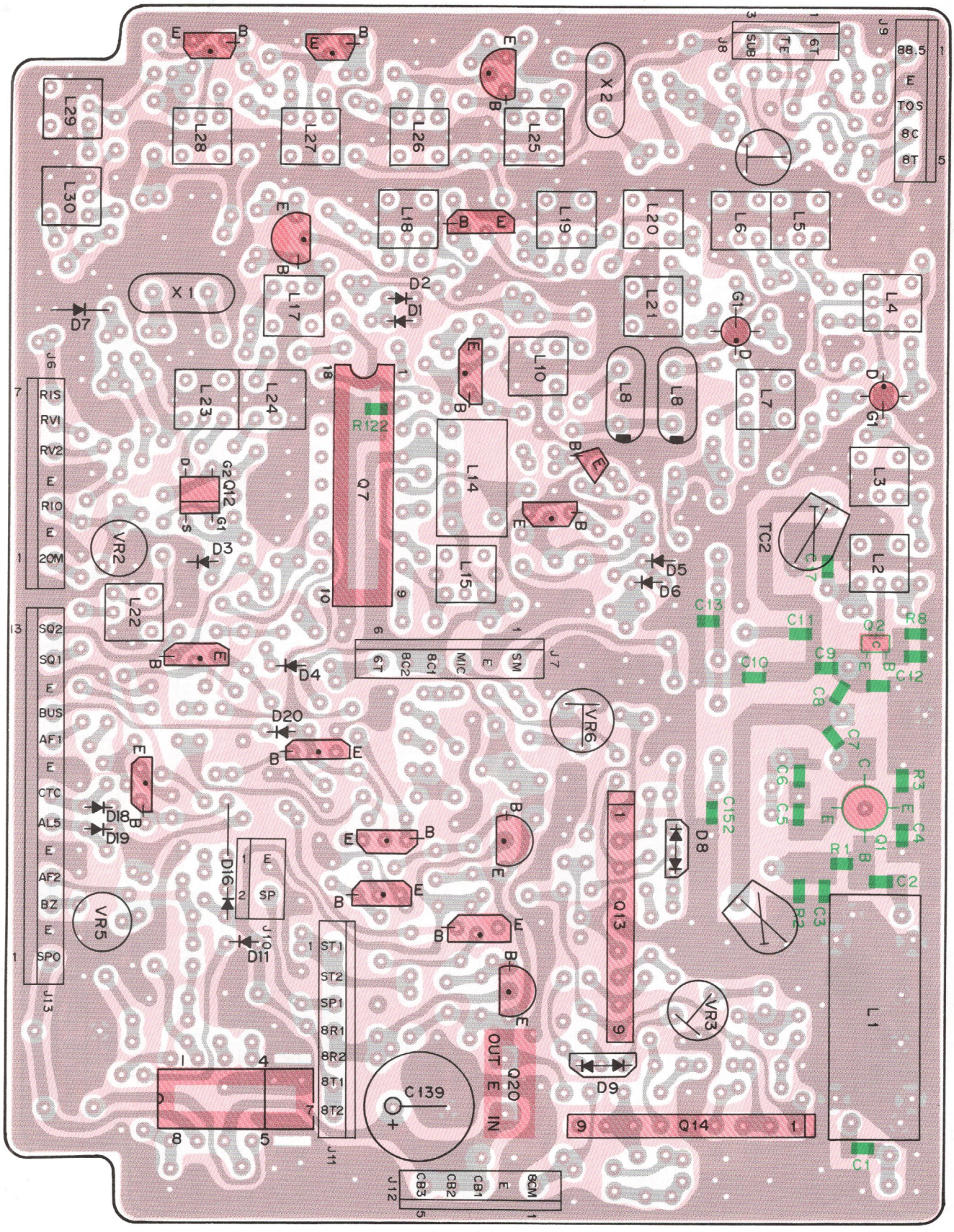
Q2: AFG05F1750A2 Q3: 2SC2603E
Q4: 2SA1115E D8: U05B

▼ RX UNIT [X55-1390-XX] [-11:K, -61:W] [Component side view]

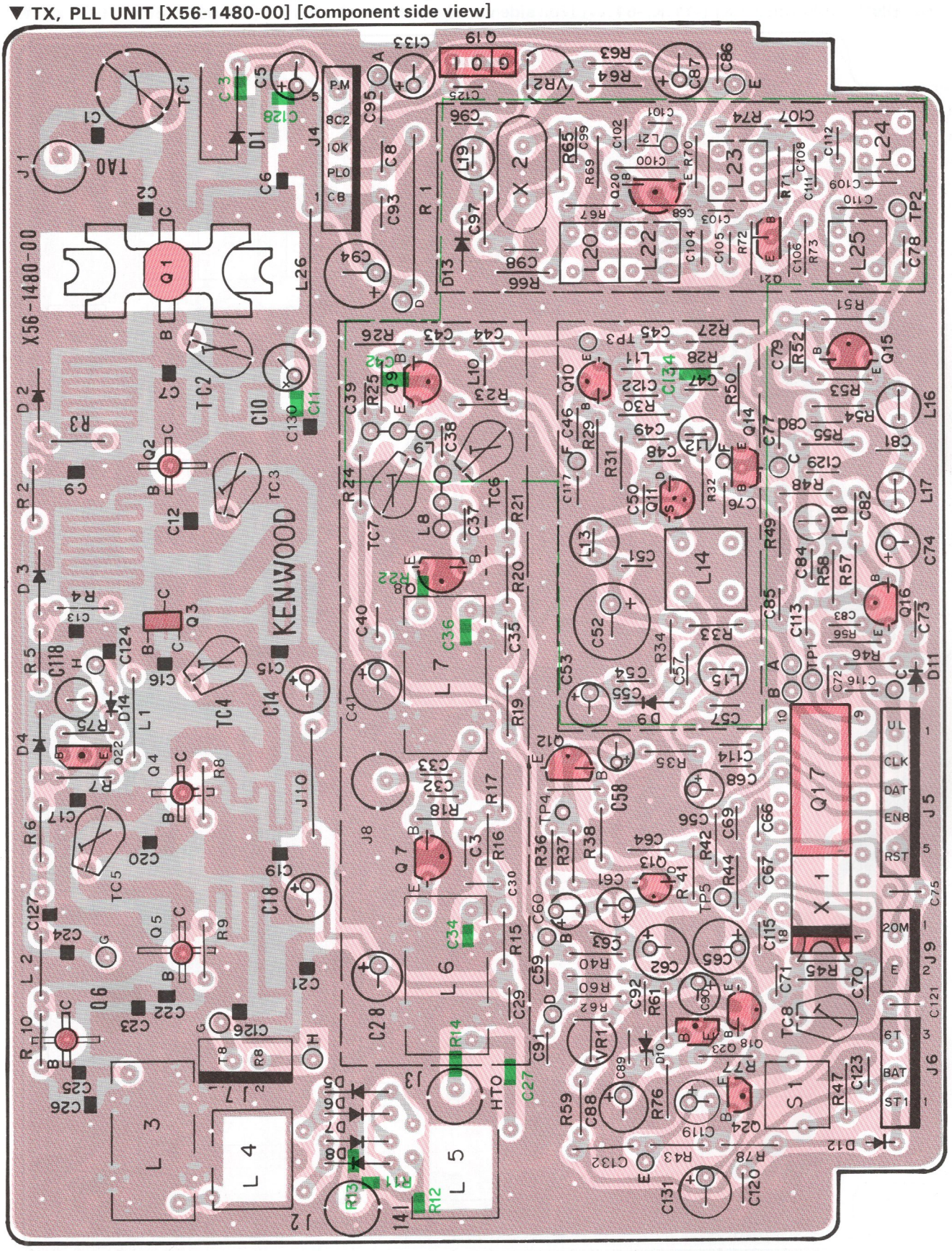


Q1: 2SC3358K Q2: 2SC3356 Q3, 4: 3SK97Q2 Q5: 2SC2669Y Q6, 8: 2SA1115E Q7: MC3359 Q10, 15: 2SC2347
Q11, 16, 17: 2SC2668 Q12: 3SK73GR Q13, 14: NJM4558S Q19: μPC575C2 Q20: μPC7808H Q21, 23: 2SB873
Q18, 22, 9, 24～26: 2SC2603E D1, 2, 5, 6:1S1588 D3, 4, 11, 16～20: 1S1555 D7, 10: ISV50E D8, 9: MC911

RX UNIT [X55-1390-XX] [-11:K, -61:W] [Foil side view]

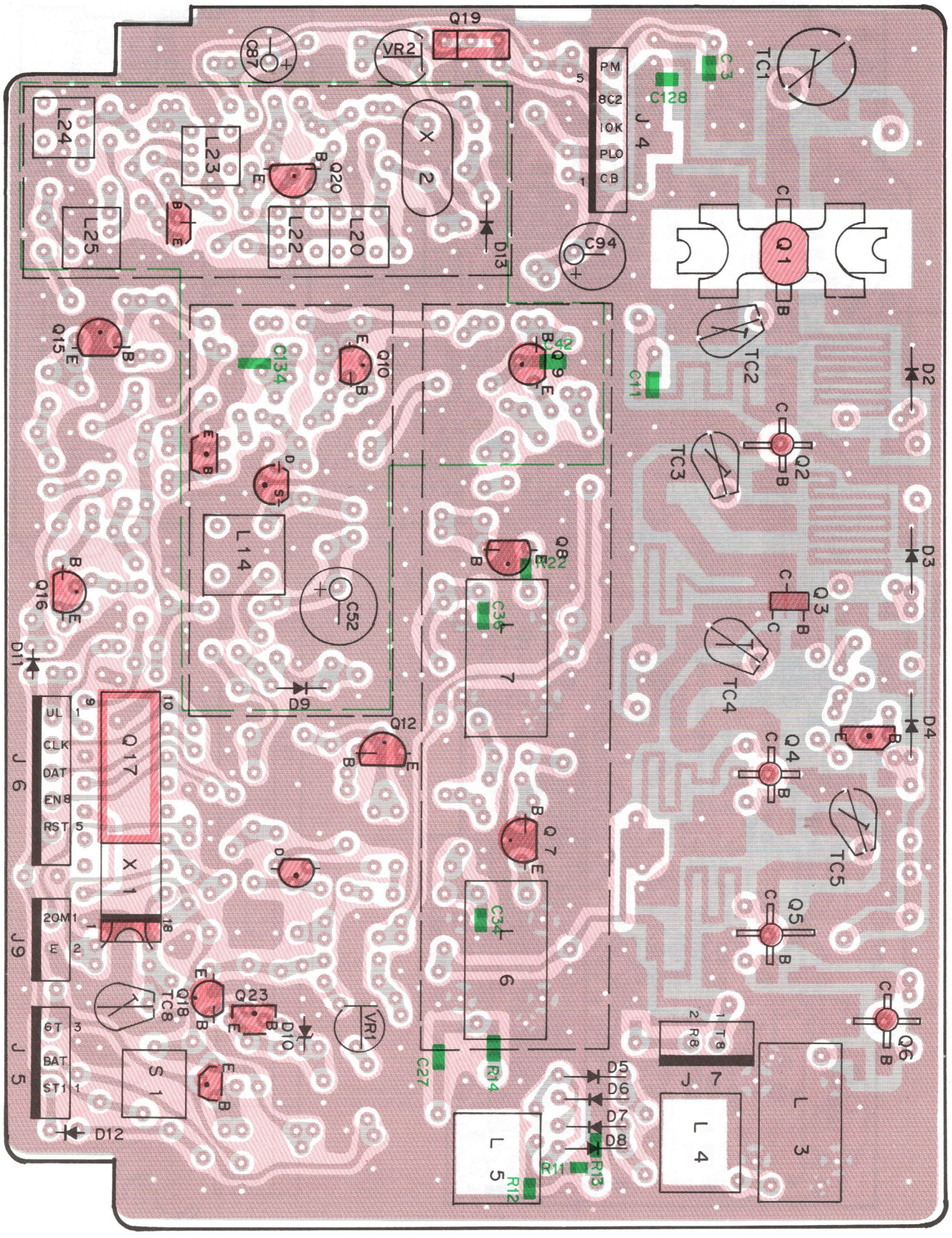


▼ TX, PLL UNIT [X56-1480-00] [Component side view]

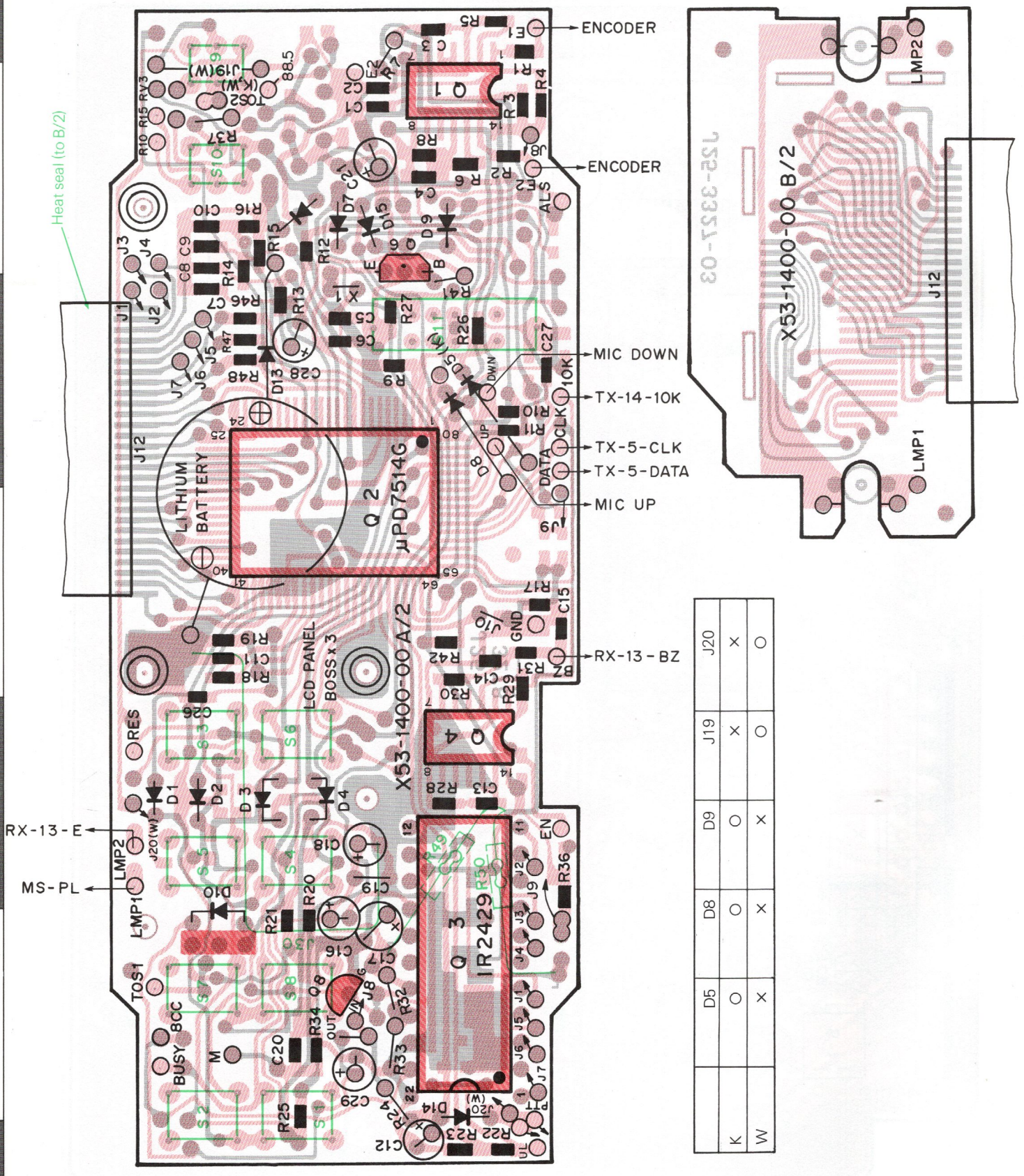


Q1: 2SC2558KA Q2: MRF559 Q3: 2SC3357 Q4, 5, 6: 2SC3358K Q7, 8: 2SC3355K Q9, 10, 15: 2SC2026 Q11: 2SK125
Q12: 2SC1775 Q13: 2SK30A(O) Q14, 22, 23: 2SC2603E Q16, 20: 2SC2347 Q17: MC145155P Q18: 2SB698 Q19: DTC114Y
Q21: 2SC2668Y Q24: 2SA1115E D1: ISS101 D2, 3, 4, 11, 12, 14: ISS133 D5, 6, 7, 8: ISS99 D9: ISV123 D10: 05Z5. 1-Y
D13: ISV50E D15: MTZ6.2J (A,B)

▼ TX, PLL UNIT [X56-1480-00] [Foil side view]



▼ CONTROL UNIT [X53-1400-XX] [-11:K, -61:W] A/2 [Component side view]



	D5	D8	D9	J19	J20
K	○	○	○	×	×
W	×	×	×	○	○

Q1: TC40H004F Q2: μPD7514G-030-12 Q3: IR2429
Q4: TC40H000F Q6: 2SA1115E
Q8: NJM78L06A D1～D10, D12～D15: ISS133

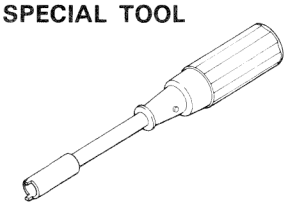
DISASSEMBLY

Front Panel Disassembly

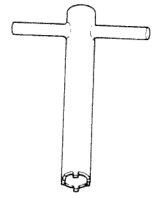
NOTES

1. When assembling ❶ , align the Slider switch knob with the notch on ❷ .
2. Use the special tool (T-009-01) to assemble/disassemble ❸ .
   Use the special tool (T-004) to assemble/disassemble ❹ .

SPECIAL TOOL

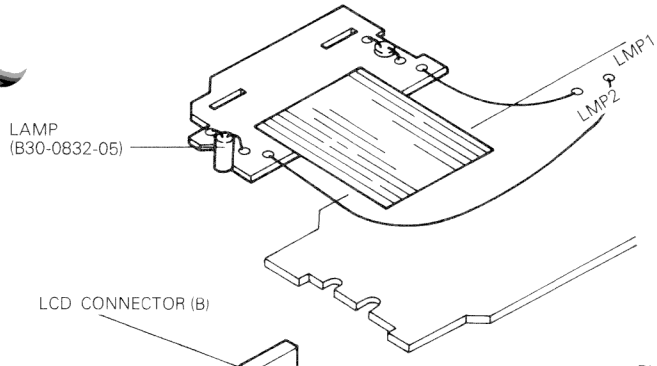


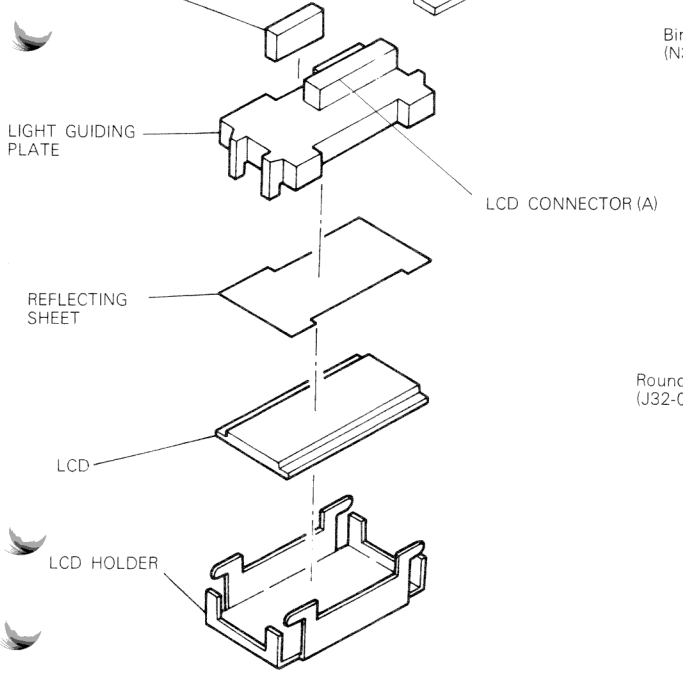
T-009-01

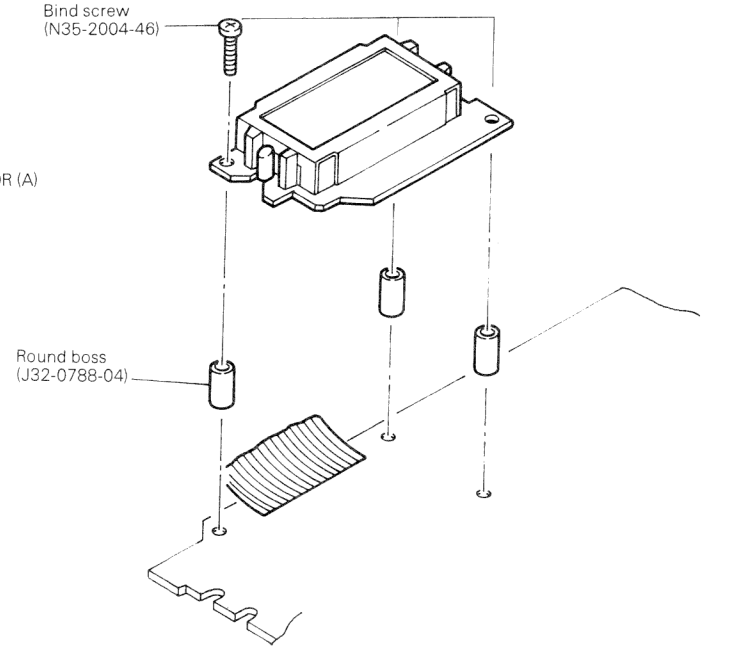


(T-004)

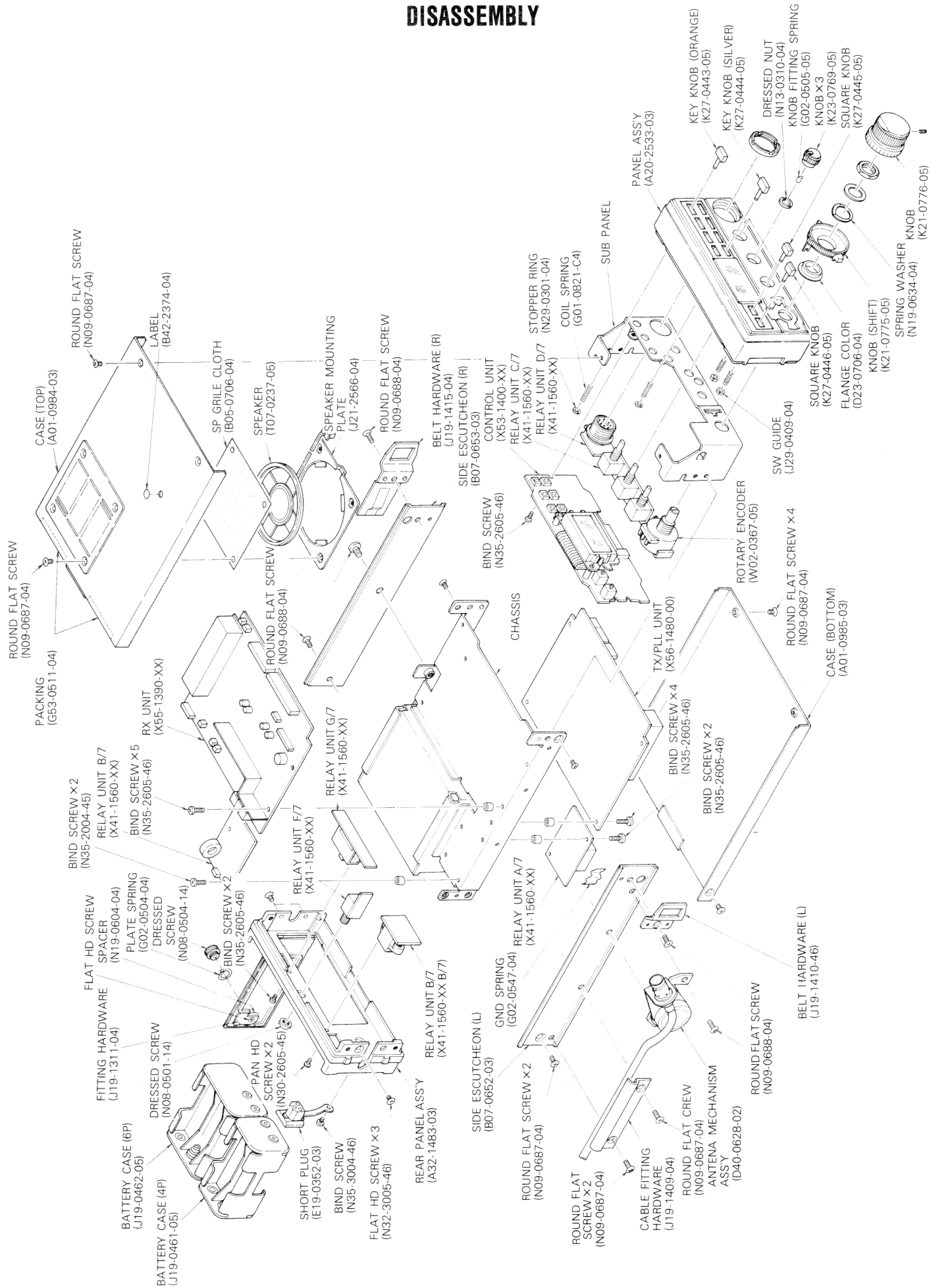
DISASSEMBLY FOR LCD







DISASSEMBLY



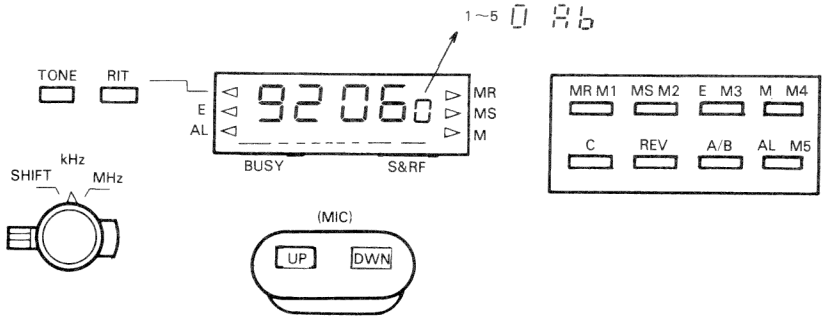
ADJUSTMENT

A. Necessary specification of test-equipment

No.	Test-equipment	Specification
1	AVR DC power supply	Current capacity; over 1 [A] Voltage; variable 8～18 [V] (standard; 13.8 [V])
2	Current metter with low loss cable	Full scall 0.3 [A] and 1.0 [A] analog type.
3	f. counter	Upper frequency responce; 1.5 [GHz] approx. 0.2 [ppm] stability
4	Power metter with cable (5D2W, 1m)	Upper frequency responce; 1.5 [GHz] Impedance; unbalanced 50 Ω Full scale; 3 [W]
5	Dummy resistor	Impedance; 8 [Ω], more than 3 [W]
6	RF VTVM	Upper frequency responce; 1.5 [GHz]
7	Linear detector	Upper frequency responce; 1～1.5 [GHz] C/N; better than 60 dB
8	DVM	DC input impedance; more than 1 [MΩ] Full scall; approx. 18 [Volt]
9	Oscilloscope	Frequency responce; DC～30 [MHz]
10	AF VTVM	Frequency responce; 50 Hz～1 [MHz] Minimum lenge; more than 1 [mV]
11	Spectrum analyzer	Frequency responce; DC～4 [GHz]
12	SSG	Upper frequency; more than 1.3 [GHz] Output level; −120 dBm～+20 dBm (0.1 μV) (1 V) Output impedance; 50 [Ω]

B. Control

Arrangement figure and control function



C. Preoperation

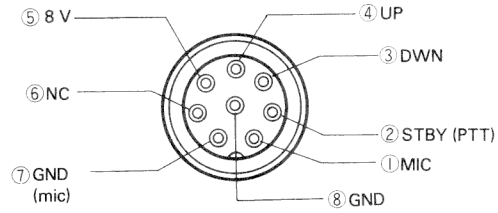
Initial setting for check or adjustment

Power SW ..... ON
AF VOL ..... MIN
SQ VOL ..... MIN
TONE ..... OFF
SHIFT SW ..... kHz
RIT ..... OFF

ADJUSTMENT

- When adjusting the trimmers or coils, use non-induced adjusting rod.
- When adjusting the RX section, never transmit to prevent SSG damage.
- Connect MIC connector as shown in right Figure.
- Output level of SSG is indicated as SSG's open circuit.

MIC connector (8 pins)

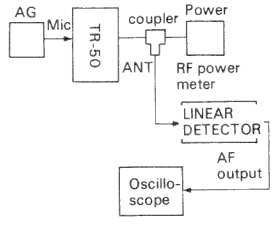
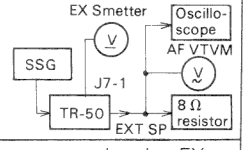


Front panel side view

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification
		Equipment	Unit	Terminal	Unit	Part	Method	
1. TX IF section (139 MHz)	JP-5 (13T) terminates in 50 Ω load.	RF VTVM	RX	JP-5 (13T)	RX	L26, 27 28, 29 30	Max	Better than 0 dBm
	Transmites	F.counter				L25	139.000 MHz	±100 Hz
2. Sensitivity in Pre.Amp.	Connect SSG (649.75 MHz, 100 dB). RAO terminates in 50 Ω load	RF VTVM	Relay	RAO	Relay	TC-1	Center position	
						TC-3	Minimum.	
3. Battery indicator	DC power supply voltage sets to 10.3 [V]. LAMP/BATT SW; BATT					POT.1	Sets max. bar indicate to 8th bar.	
4. PLL part a) Input level to PLL IC	Display f.: 1299.98 [MHz]	Oscillo-scope	TX	TP-1	TX	L22, 23 24, 25	Maximum «caution» L25 adjustment direction; corror move down	Reference 0.3 [Vrms]
	Display f.: 1260.00 [MHz]					L10	Vary pitch-width	0.35～1.15 [Vrms]
b) Reference oscillator		F. countor	TX	TP-5	TX	TC-8	20, 480 [MHz]	±100 [Hz]
c) VCO part	Display f.: 1260.00 [MHz]	DVM		TP-4	TX	L14	4.2[V]	±0.2 [V]
	Display f.: 1299.98 [MHz]						Confirm 1.2～1.8 [V]	
	Display f.: 1280.00 [MHz]	RF VTVM		TP-3			Confirm 0.6 [Vrms]	
	Display f.: 1260.00 [MHz]	F.counter					Confirm approx. 280.25 [MHz]	
d) Multiply part	HTO terminates in 50 Ω load. TX at 1260.00 [MHz]	Spectrum analyzer	TX	HTO	TX	TC-6 output side L6, 7	Max.	−3～+5 dBm
	TX at 1299.98 [MHz]		TX	HTO	TX	TC-7 input side L6, 7	Max.	−3～+5 dBm
	TX at 1299.98 [MHz]	F. counter	TX	HTO			Confirm 1160.98 [MHz]	
	TX at 1260.00 [MHz]						Confirm 1121.00 [MHz]	
5. Drive/final stage	Transmits at following f.: 1260 [MHz]	RF Power metter			TX	Output side L6, 3 TC-5, 4, 3	Max.	
	1299.98 [MHz]				TX	Input side L6, 3	Max.	
	1280.00 [MHz]				TX	TC-2,1	Max.	
					Relay	TC-2	Max.	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specification
		Equipment	Unit	Terminal	Unit	Part	Method	
	1299.98 [MHz]	RF Power meter					Confirm RF output power	Over 1 [W] with less than 0.9 [A] operation 9 current
	1260.00 [MHz]						Confirm RF output power	
6. TX frequency	Pick up TX radio-wave with F. counter. 1260.00 [MHz]	F. counter			TX	VR-2	1260.00 [MHz]	±300 [Hz]
	1260.01 [MHz]					L20	1260.01 [MHz]	
7. RF indicator	Transmits at following f.: 1280.00 [MHz]				TX	D1	Cuppling capacitance by stripline and D1 lead	Full scale
	Both band edge				TX	D1		
8. Modulation	Connect AG (1 kHz, 2 mV) to MIC jack, and transmite at 1299.98 [MHz].	Linear Detector 						
a) Mic gain					RX	VR-6	±3 [kHz]	
b) Dev.	Increase AG output +20 dB				RX	VR-3	±4,5 [kHz dev]	
	Decrease AG output to privious level.						Confirm ±2.5~3.5 [kHz]	
c) Tone circuit	Tone ON, (W type)				Key board (1/2)	VR-4	Tone frequency 1750 [Hz]	
					Key board (1/2)	VR-5	±3.5 [kHz dev.]	
9. RIT	RIT ON	RF VTVM	RX	TP-2	RX	L18	Max.	
	RIT knob, center	F. counter				L17	118.065 [MHz]	
	RIT OFF					VR-2	118.065 [MHz]	
	RIT knob turn						Confirm ±5 [kHz] variable	
10. Sensitivity	Set f. and output level in following step	SSG oscillo-scope						
	1280 [MHz], 30 dBμ 	EX Smetter			RX	L15	AF Max.	
			RX	J7-1	RX	TC-1,2 L2~7 L10, 19 L20, 21	Max. *TC-2, L20~21 adjust circlely.	
	Decrease output level to EX Smetter starting point.		RX	J7-1	RX	L22~24	Max.	
	1280 [MHz], −4 dBμ		RX	J7-1	RX	Center L1	EX Smetter, Max	
	1260 [MHz], −4 dBμ		RX	J7-1	RX	Output side L1		More than S/N 20 dB
	1299.98 [MHz], −4 dBμ		RX	J7-1	RX	Input side L1		
11. LCD Bar graph S metter	1280 [MHz], 0 dBμ		Confirm no LCD bar graph. In case still LCD bar graph indicates, adjuste L24 in RX unit (adjust mentdirection — corror moves out).					
	1280 [MHz], 17 dBμ				RX	VR-1	LCD bar graph, full scale	±3 dB
	1280 [MHz], 6 dBμ						Confirm that max. Bar graph points over 2nd Bar.	
	Output level vary 40 to 100 dBμ						All Bar graph indicates.	

ADJUSTMENT

OPERATION CHECKS

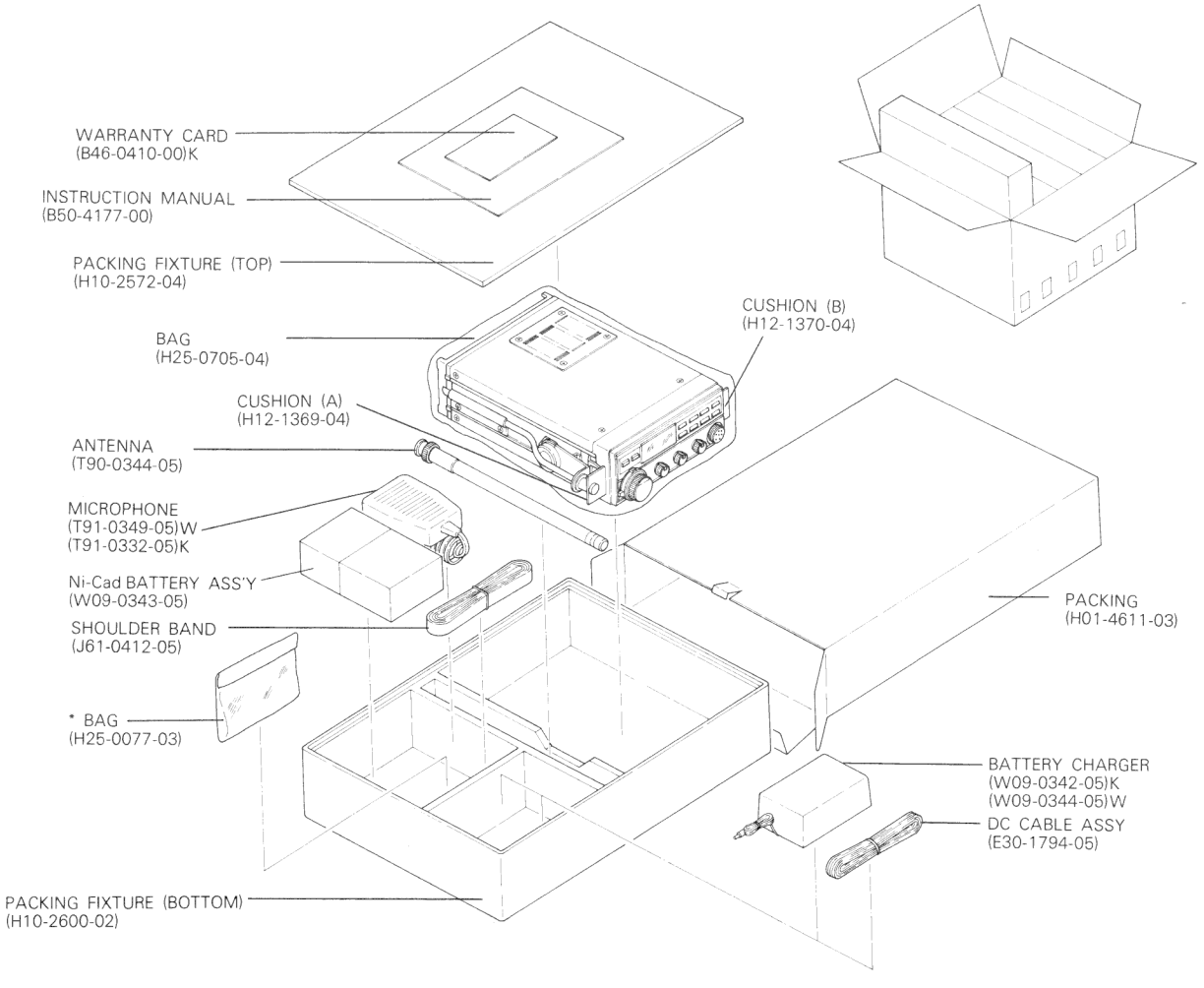
Item	Condition	Operation Checks	Specification
1. Operation check	POWER: ON, SQ: ON RESET: ON (TX unit S1)		Display: 60.000 A
	STEP knob; kHz Turn Main knob clockwise: UP counter clockwise: DOWN		in 20 kHz step step up/down
	[A/B] ON		Display: 95.00 b
	Turn Main dial		Step up/down in 10 kHz step
	Connect Mic: Push UP/DOWN botton		Change in 1 step each
	Keep pushing UP/DOWN botton		Change continuously
	Release UP/DOWN botton		Scan start
	Push both botton at same time		Scan stop
	Start scan with UP/DOWN botton Key PTT		Scan stop
2. Memory	display; 60.00	One beep [M/M4] → display; ▶ M → beeps with Morse "R" [MR/M1] → Memorized	
	display; 99.98	One beep [M/M4] → display; ▶ M → beeps with Morse "R" [E/M3] → Memorized	
	display; 80.00	One beep [M/M4] → display; ▶ M → beeps with Morse "R" [MS/M2] → Memorized	
		One beep [M/M4] → display; ▶ M → beeps with Morse "R" [M/M4] → Memorized	
		One beep [M/M4] → display; ▶ M → beeps with Morse "R", and beeps [AL/M5] → Memorized	
	display; 82.00	beeps with Morse "R" [AL/M5] → Memorized One beep	
3. Memory recall	TX	One beep [MR/M1] → Display; ▶ [MR/(M1)] → Display; 60.00_1 One beep [MS/M2] → Display; 80.00_2 One beep [E/M3] → Display; 99.98_3 One beep [M/M4] → Display; 80.00_4 One beep [AL/M5] → Display; 80.00_5 Display; 82.00_5 [C]	
4. Memory scan		One beep [MS/M2] → Scan CH1 to CH5	
5. Memory erase		One beep One beep One beep [C] → [C] → [E/M3] → Display; E ◀ One beep beeps with Morse "R" One beep [M/M4] → [E/M3] → [MS/M2] → Scan CH1 to CH5.	

6. Memory erase	SQ OFF		Busy light. Step next CH, after holding for approx. 5 minutes.
	SQ ON PTT ON		Scan stop
7. Program Scan	Push UP botton PTT ON	One beep One beep One beep [C] → [MR/M1] → [AL/M5] → Display; 80.00	Scan from 80.00 to 82.00. Scan stop
8. Alert	SQ OFF	One beep [AL/M5] → Display: AL◀ → Beep tone sounds every 7 minute [AL/M5] → Alert Operation stops.	

PACKING

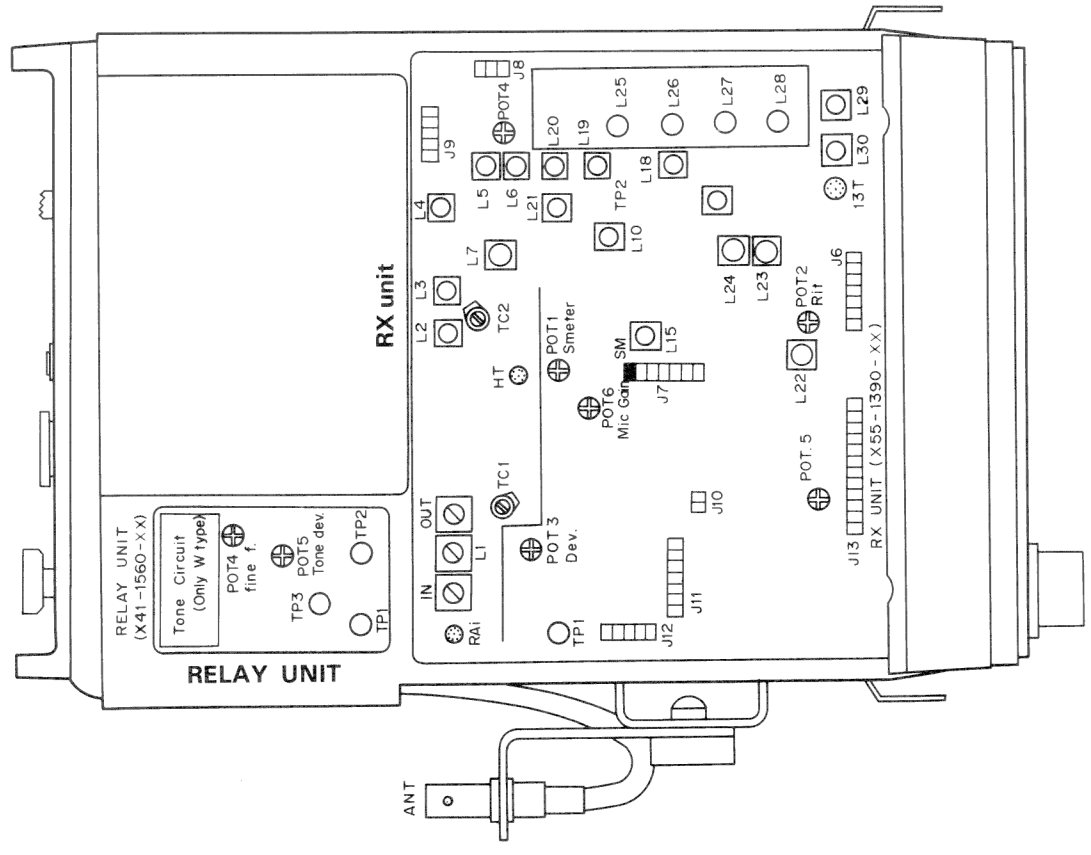
*** PART. CONTENTS**

NAME	PART. NO.	QUANTITY
DUMMY BATTERY	W 09-0002-05	1

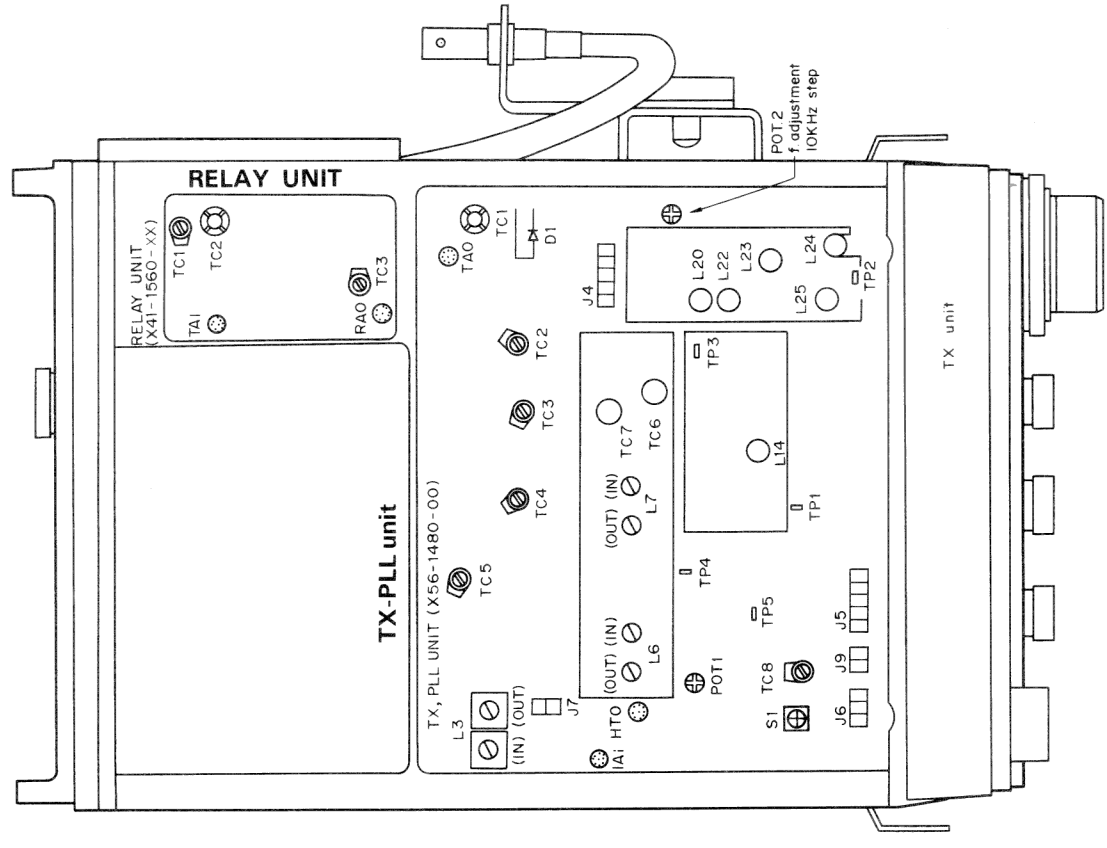


ADJUSTMENT

TOP VIEW



BOTTOM VIEW



TU-6 (PROGRAMMABLE TONE ENCODER)

TU-6 SPECIFICATIONS

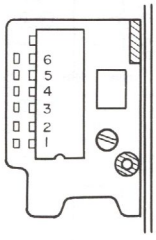
Oscillator frequency ..... 1 MHz±0.1%
Usable frequency range ..... 37 EIA Specification Group Frequencies (67.0—250.3 Hz)
Weight ..... 3 g

TU-6 TONE FREQUENCY CHART

Setting the frequency

Cut and connect pins 1—6 of the IC to the PC board pattern by soldering to set the frequency.

- "0" in the table indicates the connection.
- "1" in the table indicates the disconnection.



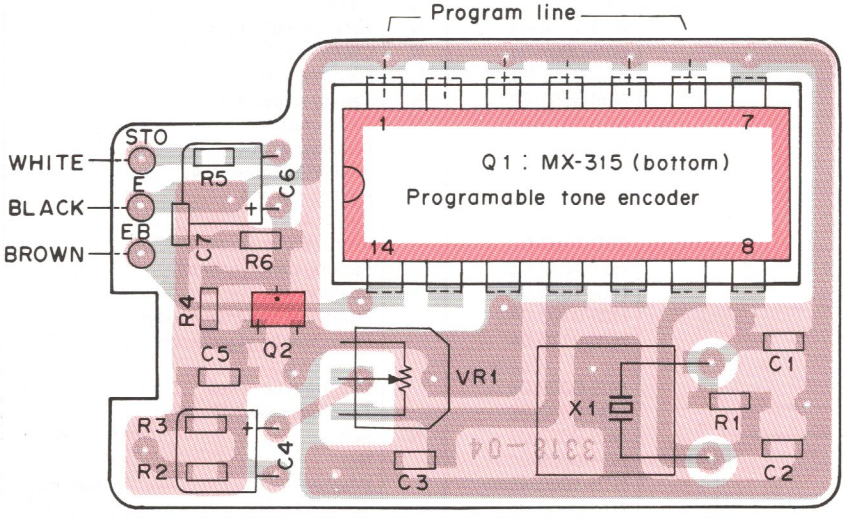
#	EIA Specification Group	Hz	Program Lines (ON...1, OFF...0) 1	2	3	4	5	6	#	EIA Specification Group	Hz	Program Lines (ON...1, OFF...0) 1	2	3	4	5	6
1	A	67.0	1	1	1	1	1	1	21	A	141.3	1	0	0	0	0	0
2	B	71.9	1	1	1	1	0	1	22	B	146.2	0	1	1	1	0	1
3	C	74.4	1	1	1	0	1	1	23	A	151.4	0	1	1	1	0	0
4	A	77.0	1	1	1	1	0	0	24	B	156.7	0	1	1	0	0	1
5	C	79.7	1	1	0	1	1	1	25	A	162.2	0	1	1	0	0	0
6	B	82.5	1	1	1	0	0	1	26	B	167.9	0	1	0	1	0	1
7	C	85.4	1	1	0	0	1	1	27	A	173.8	0	1	0	1	0	0
8	A	88.5	1	1	1	0	0	0	28	B	179.9	0	1	0	0	0	1
9	C	91.5	1	0	1	1	1	1	29	A	186.2	0	1	0	0	0	0
10	B	94.8	1	1	0	1	0	1	30	B	192.8	0	0	1	1	0	1
11	A	100.0	1	1	0	1	0	0	31	A	203.5	0	0	1	1	0	0
12	B	103.5	1	1	0	0	0	1	32	B	210.7	0	0	1	0	0	1
13	A	107.2	1	1	0	0	0	0	33	A	218.1	0	0	1	0	0	0
14	B	110.9	1	0	1	1	0	1	34	B	225.7	0	0	0	1	0	1
15	A	114.8	1	0	1	1	0	0	35	A	233.6	0	0	0	1	0	0
16	B	118.8	1	0	1	0	0	1	36	B	241.8	0	0	0	0	0	1
17	A	123.0	1	0	1	0	0	0	37	A	250.3	0	0	0	0	0	0
18	B	127.3	1	0	0	1	0	1										
19	A	131.8	1	0	0	1	0	0										
20	B	136.5	1	0	0	0	0	1										

TU-6 PARTS LIST

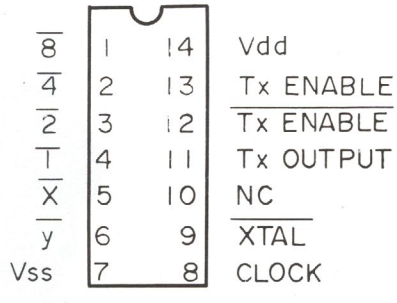
Parts No.	Re-marks	Description		Ref. No.	Q'ty
TU-6 GENERAL					
B50-4178-00	N	Instruction manual			1
G13-0806-04	N	Cushion			1
H25-0029-04		Protective bag			1
X52-1320-10	N	Tone unit			1
TONE UNIT (X52-1320-10)					
CC73FCH1H330J		Chip cap.	33P	C1, 2	2
CE04CW1A100M		Electro	10 10 V	C6	1
CK73FB1E103K		Chip cap.	0.01	C3	1
CK73FB1E223K		Chip cap.	0.022	C5	1
CK73FB1H102K		Chip cap.	0.001	C7	1
C90-0888-05		Tantalum	0.1 16 V	C4	1
L77-0982-05		Crystal	1 MHz	X1	1
RD73FB2A103J		Chip resistor	10 kΩ	R6	1
RD73FB2A105J		Chip resistor	1 MΩ	R1	1
RD73FB2A223J		Chip resistor	22 kΩ	R2	1
RD73FB2A224J		Chip resistor	220 kΩ	R4	1
RD73FB2A473J		Chip resistor	47 kΩ	R3	1
R12-3449-05		Trim. pot.	10 kΩ(B)	VR1	1
R92-0670-05		Chip resistor	0 Ω	R5	1
MX315		IC		Q1	1
2SC1412K(Q) or 2SC2712(Y)		TR		Q2	1

TU-6 PC BOARD VIEW

TONE UNIT (X52-1320-10) Foil side view



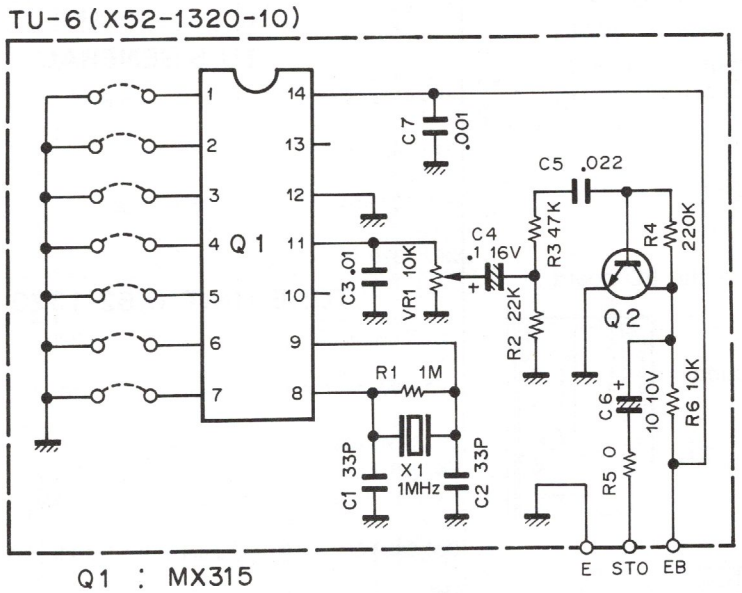
MX-315



Q1: MX315 Q2: 2SC2412K(Q) or 2SC2712(Y)

TU-6 (PROGRAMMABLE TONE ENCODER)/PB-16 (Ni-Cad BATTERY) SC-10 (SOFT CARRYING BAG)/MB-3 (MOBIL MOUNT KIT)

TU-6 SCHEMATIC DIAGRAM

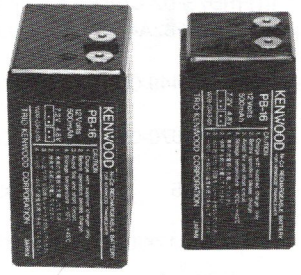


Q1 : MX315

Q2 : 2SC2412K(Q) or 2SC2712(Y)

2SC2412K
2SC2714

PB-16 (Ni-Cad BATTERY)



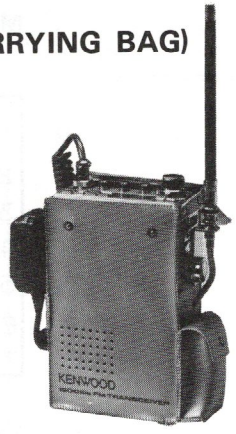
PB-16 SPECIFICATION

Nominal voltage . . . 12 V, 500 mA
Charging voltage . . . 15.5 V
Charging carrent . . . 125 mA

PARTS LIST

Parts No.	Re-marks	Description
B50-4187-08	N*	Instruction manual
H01-4630-08	N*	Packing carton (inside)
W09-0343-05		PB-16

SC-10 (SOFT CARRYING BAG)



PARTS LIST

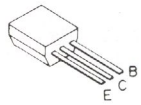
Parts No.	Re-marks	Description
B50-4190-08	N*	Instruction manual
H01-4633-08	N*	Packing carton (inside)
H90-0318-08	N*	SOFT CARRYING BAG

MB-3 (MOBIL MOUNT KIT)

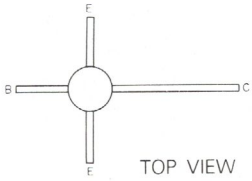
PARTS LIST

Parts No.	Re-marks	Description	
A13-0663-02	N	Mounting bracket ass'y	
A13-0664-03	N	Bracket	
A19-1414-04	N	Backing metal fitting	
G13-0807-04	N	Cushion ×2	
J19-1413-03	N	Fix metal fitting	
N09-0691-04	N	Taping screw ×4	
N14-0527-04	N	Flange nut ×4	
N15-1040-45		Flat washer ×4	
N33-3006-45		Round flat screw ×4	
N35-3006-45		Bind screw ×4	
N99-0303-04		Bolt ×4	
B50-4189-00		Instruction manual	
H01-4632-03	N	Packing carton (inside)	
H12-1373-03	N	Cushion	
H25-0103-04		Protective bag (main body)	
H25-0116-04		Protective bag (accessory)	
N09-0008-04		Mounting boss M4	
N09-0632-05		Tapping screw M5	
N09-0692-04	N	Bolt	M6 ×20
N14-0009-04		Nut	M6
N15-1060-41		Washer	for M6 bolt
N16-0060-46		Spring washer	for M6 bolt
W01-0401-04		Hex. bar wrench	

2SA1115
2SC2603

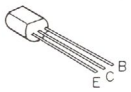


2SC3358

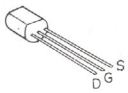


TOP VIEW

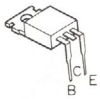
2SB698
2SC2347



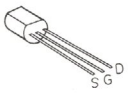
2SK125



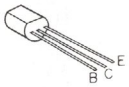
2SC1775



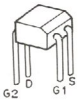
2SK30



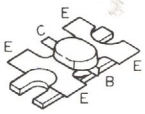
2SC2026
2SC3355



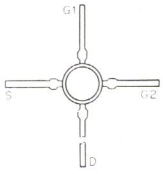
3SK73



2SC2558

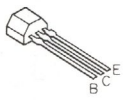


3SK97C2

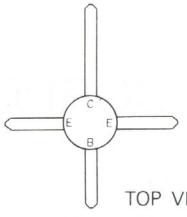


TOP VIEW

2SC2668



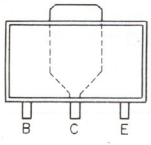
MRF559



TOP VIEW

2SC3356

2SC3357



NJM78L06A

RELAY UNIT (X41-1560-XX) A/7 (-11:K,-61:W)

TX, PLL UNIT (X56-1480-00)

CONTROL UNIT (X53-1400-XX) (-11:

POWER
VOL
SQ
RIT

X41-1560-XX C/7

MIC

X41-1560-XX D/7

S/RF
BATT
LAMP

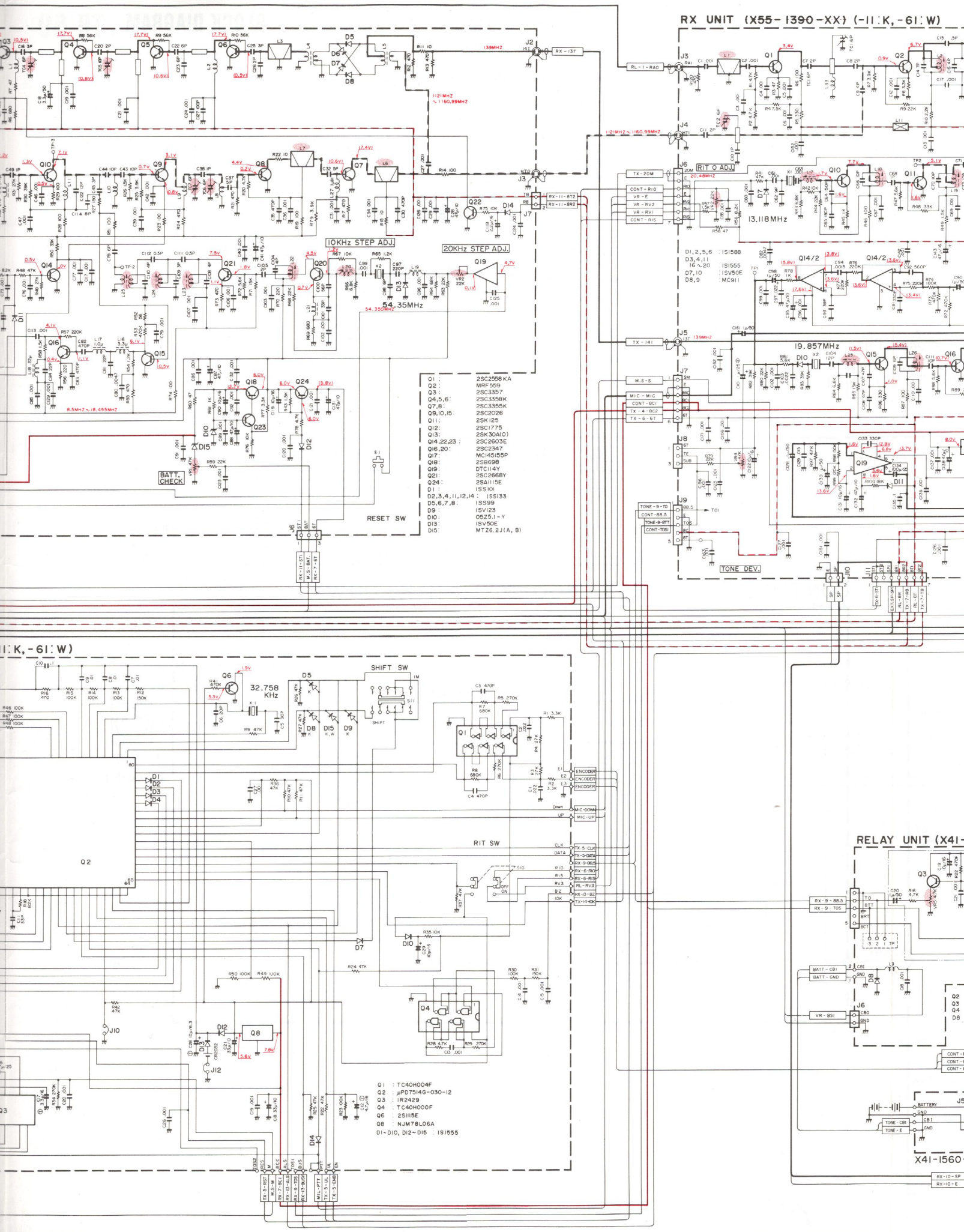
X41-1560-XX G/7

EXT. SP

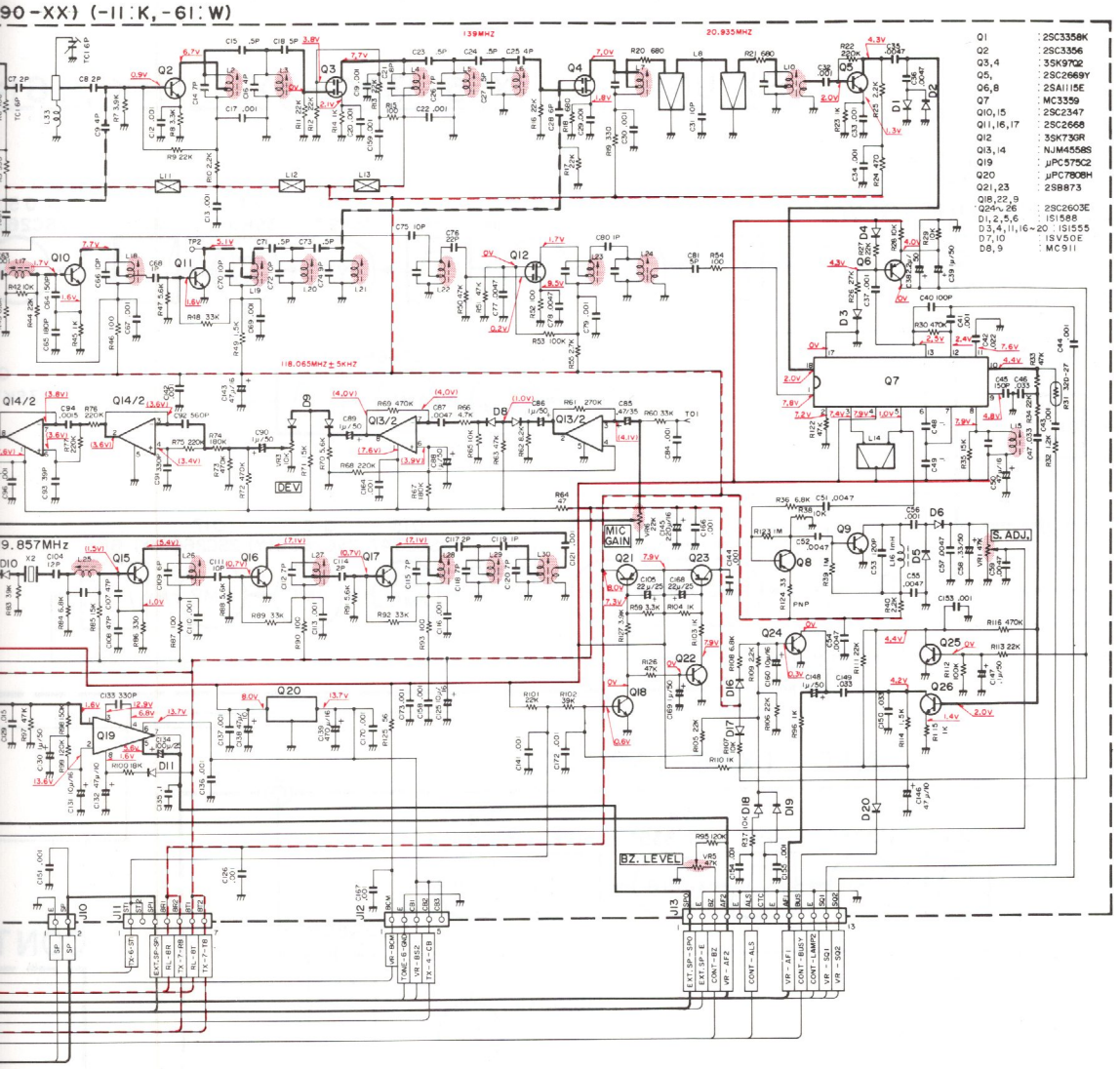
X41-1560-XX F/7

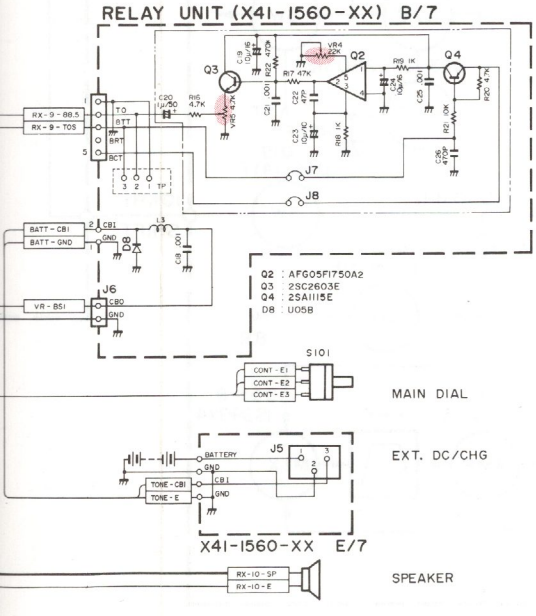
20.48MHz

Signal line
Control line
Common DC line
Adjustment point

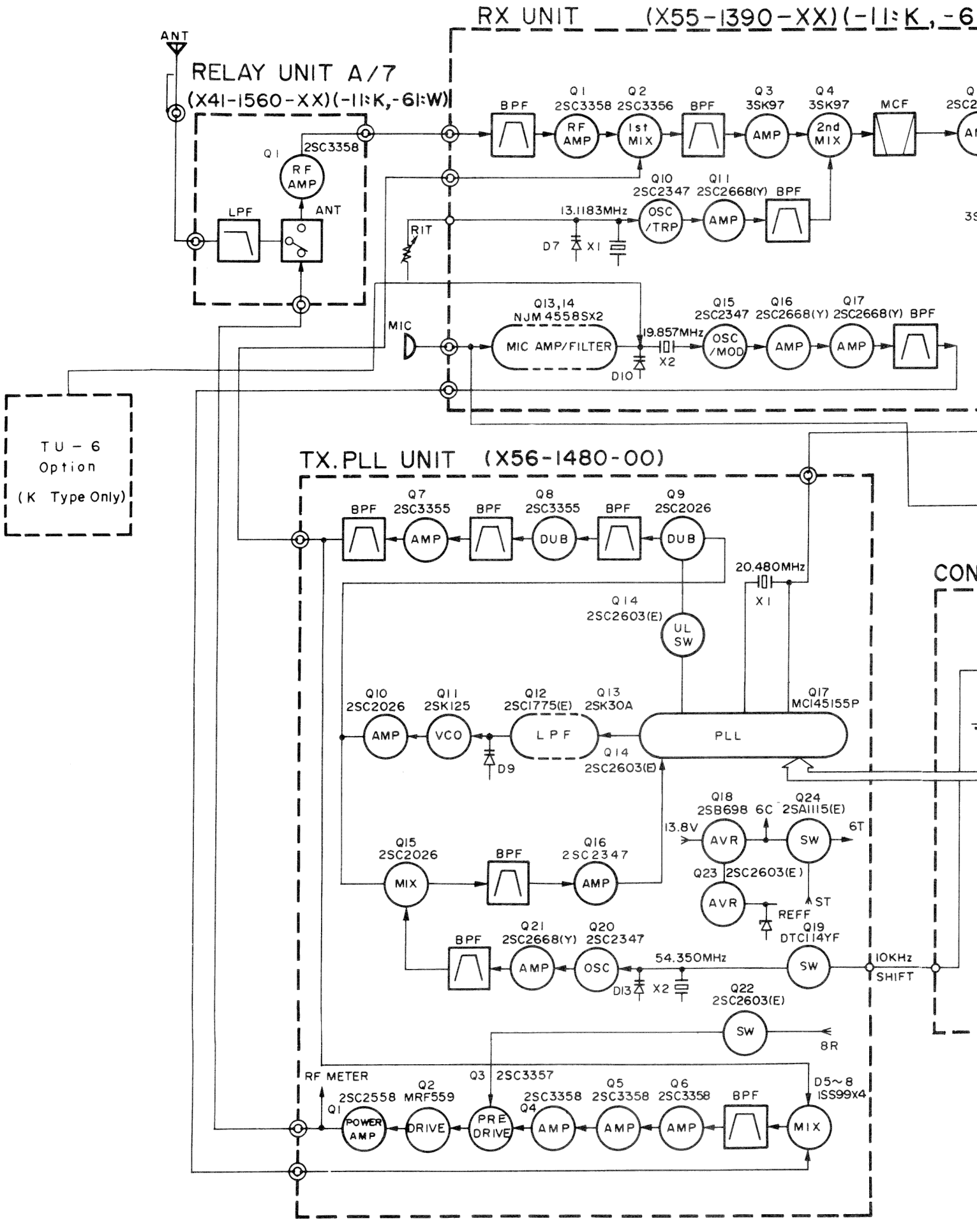

RX UNIT (X55-1390-XX) (-11:K,-61:W)
10KHz STEP ADJ.
20KHz STEP ADJ.
54.35MHz
RESET SW
BATT. CHECK
8.5MHz~18.495MHz
Q1 : 2SC2558KA
Q2 : MRF559
Q3 : 2SC3357
Q4,5,6: 2SC3358K
Q7,8: 2SC3355K
Q9,10,15: 2SC2026
Q11: 2SK125
Q12: 2SC1775
Q13: 2SK30A(O)
Q14,22,23: 2SC2603E
Q16,20: 2SC2347
Q17: MC145155P
Q18: 2SB698
Q19: DTC114Y
Q21: 2SC2668Y
Q24: 2SA1115E
D1: 1SS101
D2,3,4,11,12,14: 1SS133
D5,6,7,8: 1SS99
D9: 1SV123
D10: 05Z5.1-Y
D13: 1SV50E
D15: MTZ6.2J(A,B)
RIT O ADJ.
13.118MHz
D1,2,5,6: 1SS188
D3,4,11 16~20: 1SS155
D7,10: 1SV50E
D8,9: MC911
19.857MHz
TONE DEV.
RELAY UNIT (X41-
X41-1560-
SHIFT SW
RIT SW
32.758 KHz
Q1 : TC40H004F
Q2 : μPD75146-030-12
Q3 : IR2429
Q4 : TC40H000F
Q6 : 2S1115E
Q8 : NJM78L06A
D1~D10, D12~D15 : 1SS155

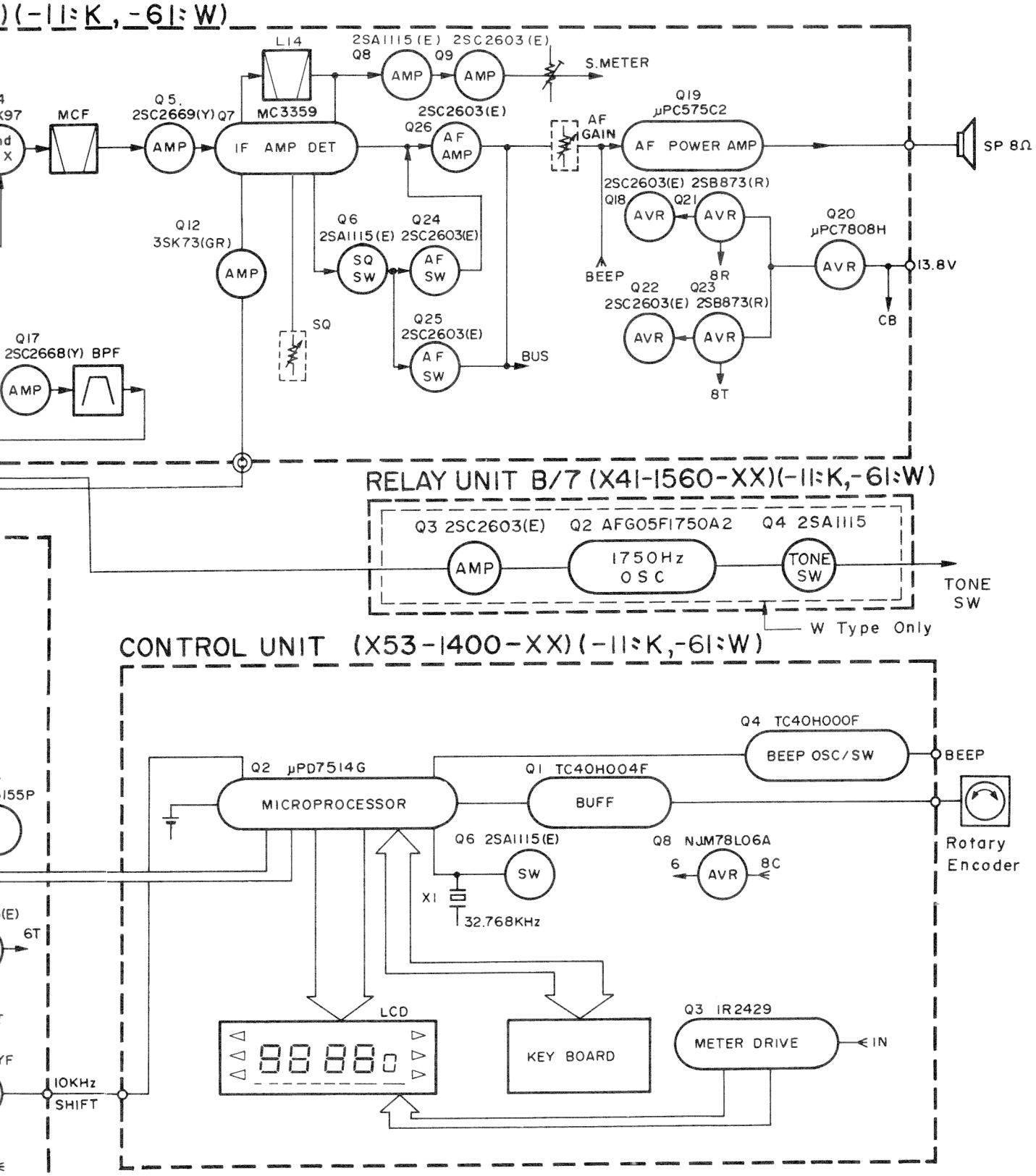
F G H I J





Voltage measurement conditions
f=1280 MHz
( ): TX
RX no signal


RX UNIT (X55-1390-XX)(-11:K,-6
ANT
RELAY UNIT A/7
(X41-1560-XX)(-11:K,-61:W)
Q1 2SC3358
RF AMP
LPF
ANT
RIT
BPF
Q1 2SC3358
RF AMP
Q2 2SC3356
1st MIX
BPF
Q3 3SK97
AMP
Q4 3SK97
2nd MIX
MCF
Q10 2SC2347
OSC /TRP
13.1183MHz
D7
X1
Q11 2SC2668(Y)
AMP
BPF
MIC
Q13,14 NJM4558SX2
MIC AMP/FILTER
19.857MHz
D10
X2
Q15 2SC2347
OSC /MOD
Q16 2SC2668(Y)
AMP
Q17 2SC2668(Y)
AMP
BPF
TU-6 Option
(K Type Only)
TX.PLL UNIT (X56-1480-00)
BPF
Q7 2SC3355
AMP
BPF
Q8 2SC3355
DUB
BPF
Q9 2SC2026
DUB
20.480MHz
X1
Q14 2SC2603(E)
UL SW
Q10 2SC2026
AMP
Q11 2SK125
VCO
D9
Q12 2SC1775(E)
L P F
Q13 2SK30A
Q14 2SC2603(E)
PLL
Q17 MC145155P
Q18 2SB698 6C
Q24 2SA1115(E)
13.8V
AVR
SW
6T
Q23 2SC2603(E)
AVR
ST
REFF
Q19 DTC114YF
Q15 2SC2026
MIX
BPF
Q16 2SC2347
AMP
BPF
Q21 2SC2668(Y)
AMP
Q20 2SC2347
OSC
54.350MHz
D13
X2
SW
10KHz SHIFT
Q22 2SC2603(E)
SW
8R
RF METER
Q1 2SC2558
POWER AMP
Q2 MRF559
DRIVE
Q3 2SC3357
PRE DRIVE
Q4 2SC3358
AMP
Q5 2SC3358
AMP
Q6 2SC3358
AMP
BPF
D5~8 1SS99X4
MIX


)(-11:K,-61:W)
L14
MC3359
2SA1115(E) 2SC2603(E)
Q8
Q9
AMP
AMP
S.METER
Q5
2SC2669(Y) Q7
MCF
AMP
IF AMP DET
2SC2603(E)
Q26
AF AMP
AF GAIN
Q19
μPC575C2
AF POWER AMP
SP 8Ω
2SC2603(E) 2SB873(R)
Q18
Q21
AVR
AVR
Q20
μPC7808H
AVR
13.8V
CB
BEEP
8R
Q12
3SK73(GR)
AMP
Q6
2SA1115(E)
Q24
2SC2603(E)
SQ SW
AF SW
SQ
Q25
2SC2603(E)
AF SW
BUS
Q22
2SC2603(E)
Q23
2SB873(R)
AVR
AVR
8T
Q17
2SC2668(Y) BPF
AMP
RELAY UNIT B/7 (X41-1560-XX)(-11:K,-61:W)
Q3 2SC2603(E)
Q2 AFG05F1750A2
Q4 2SA1115
AMP
1750Hz OSC
TONE SW
TONE SW
W Type Only
CONTROL UNIT (X53-1400-XX)(-11:K,-61:W)
Q4 TC40H000F
BEEP OSC/SW
BEEP
Q2 μPD7514G
MICROPROCESSOR
Q1 TC40H004F
BUFF
Rotary Encoder
Q6 2SA1115(E)
SW
Q8 NJM78L06A
6
AVR
8C
X1
32.768KHz
LCD
KEY BOARD
Q3 IR2429
METER DRIVE
IN
10KHz
SHIFT

SPECIFICATIONS

[GENERAL]

Frequency range	1260.00—1299.99 MHz
Mode	F3
Operating temperature	—20°C to +50°C
Antenna impedance	50 Ω
Supply voltage	13.8 V +15%, —25%
Current drain (13.8 V, lamp OFF)	Approx. 180 mA at standby
	Approx. 850 mA at transmission (1 W)
Dimensions	
(Maximum dimensions including projections)	123 (157.5) W × 192 (210) D × 51 (51.5) H mm (inch)
Weight	Approx. 1,200 g (including antenna and battery)

[TRANSMITTER]

Output power	1 W
Modulation	Reactance
Maximum frequency deviation	±5 kHz
Spurious radiation	—40 dB
Microphone impedance	500~600 Ω

[RECEIVER]

Circuitry	Triple superheterodyne
Intermediate frequency	1st IF: 139 MHz
	2nd IF: 20.935 MHz
	3rd IF: 455 kHz
Receiver sensitivity	SINAD 12 dB: —10 dBμ (0.3 μV) or less
	S/N ratio: 30 dB or more at 1 μV input
Squelch sensitivity	0.25 μV or more
Pass band width	15 kHz or more (—6 dB)
	30 kHz or less (—60 dB)
RIT variable range	±5 kHz or more
Audio output	1 W or more (10% distortion, 8 Ω load)

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

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