

TM-701A/E

SERVICE MANUAL

KENWOOD

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B51-8004-00 (O) 1346



Photo is TM-701A.

*Refer to parts list on page 18.

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CIRCUIT DESCRIPTION

Frequency Configuration

The TM-701A/E incorporates a PLL synthesizer that works with a digital VFO and allows channel steps of 5, 10, 12.5, 15, 20, or 25kHz to be selected.

In the 144MHz-band receiver, an incoming signal is down converted to the 1st IF of 30.825MHz using a 1st local oscillator frequency of from 113.175 to 114.170 MHz (T,W) and 113.175 to 117.170MHz (K,M,M2). The 1st IF signal is then mixed with the 2nd local oscillator frequency of 30.37MHz to produce the 2nd IF of 455 kHz.

In the 430MHz-band receiver, an incoming signal is

down converted to the 1st IF of 30.825MHz using a 1st local oscillator frequency of 399.175 to 409.175MHz (M,M2,T,W) and 407.175 to 419.170MHz(K). The 1st IF signal is further mixed with the 2nd local oscillator frequency of 30.37MHz to produce the 2nd IF of 455kHz.

Both the 144MHz and 430MHz-band receivers are double-conversion.

The transmitter consists of a PLL circuit, which allows direct modulation and direct frequency division in both bands. Signals from the PLL circuit are amplified by a power amplifier for transmission.

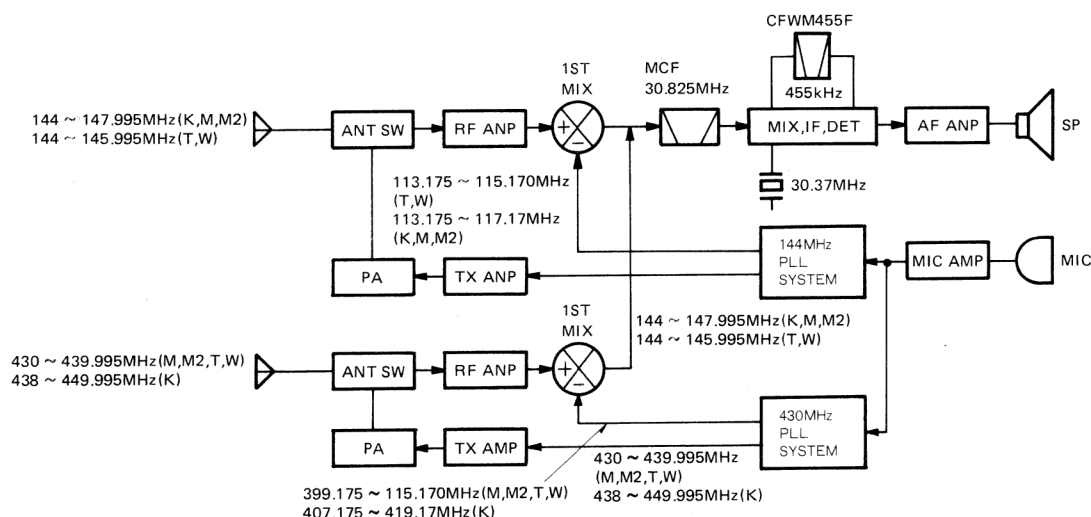


Fig. 1 Frequency configuration

Receiving System

• General

Separate receiver circuitry is provided from the antenna connector to the 1 mixer for both bands of the TM-701A/E.

• 144 MHz band

Incoming 144MHz-band signals from the antenna are passed through a low-pass filter in the final block of the transmitter system, and are then switched to the front-end of the receiver system via a transmit/receive switching diode. This signal is then passed through an antenna matching coil and amplified by a GaAs FET. Undesirable components are removed from the signal by the bandpass filter that utilizes three varactor diodes. The resulting signal

is fed to the 1st mixer, which mixes the signal with the 1st local oscillator signal in order to obtain the 1st IF (30.825MHz). This signal is then passed through two monolithic crystal filters (MCFs). The signal from the MCFs is used as the 1st IF signal.

The 1st IF signal is amplified and fed into IC3 (KCD01) in the FM IF HIC (HIC =Highbret IC). The IF signal is mixed with the 2nd local oscillator signal of 30.37MHz to produce the 2nd IF of 455kHz. The 455kHz signal is then passed through an FM ceramic filter and fed into IC3 again for amplification. The output signal from IC3 is then fed into a power amplifier via the audio volume control and sent to the speaker.

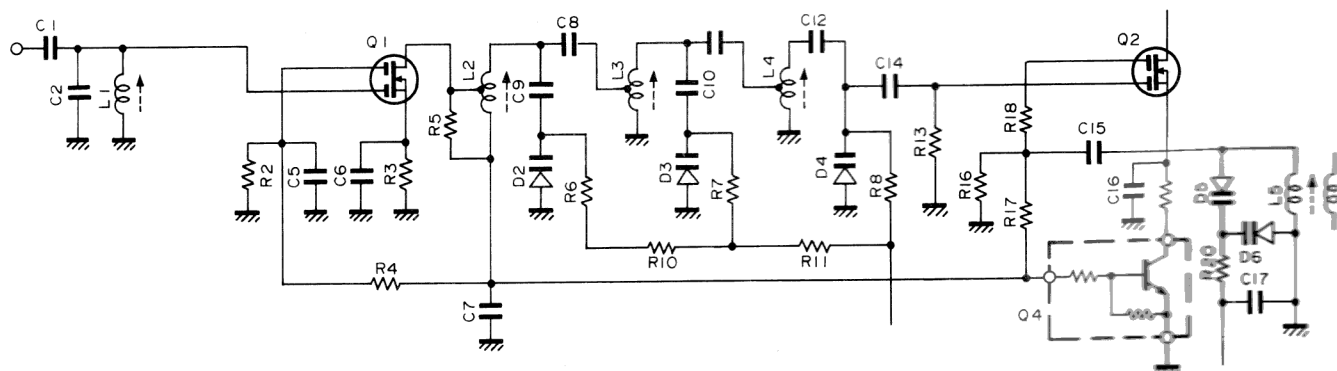


Fig. 2 144 MHz front-end (varactor diode tuning)

CIRCUIT DESCRIPTION

• 430MHz band

Incoming 430MHz-band signals from the antenna are passed through a low-pass filter in the final block of the transmitter system and switched to the front-end of the receiver system via a transmit/receive switching diode. This signal is then passed through an antenna matching coil in the front-end and amplified by a GaAs FET and a junction-type FET. The signal is then fed into a two-pole helical resonator and fed into the 1st mixer. The 1st mixer combines the signal with the 1st local oscillator signal from the PLL and converts it to the 1st IF (30.825 MHz). The signal path is now the same as previously described for the 144MHz section.

Item	Rating
Nominal center frequency	30.825MHz
Pass band width	$\pm 7.5\text{kHz}$ or more at 3dB
Attenuation band width	$\pm 28\text{kHz}$ or less at 40dB
Ripple	1.5dB or less
Insertion loss	3dB or less
Guaranteed attenuation	60dB or more within $\pm 1\text{MHz}$ (Spurious : 40dB or more)
Terminating impedance	1.4k Ω /1pF

Table 1 MCF (L71-0263-05) (TX-RX unit XF1)

Item	Rating
Nominal center frequency	455kHz $\pm$ 1kHz
6dB bandwidth	$\pm 6\text{kHz}$ or more (from 455kHz)
50dB bandwidth	$\pm 12.5\text{kHz}$ or less (from 455kHz)
Ripple (within $\pm 4\text{kHz}$ of 455kHz)	3dB or less
Insertion loss	6dB or less
Guaranteed attenuation (within $\pm 100\text{kHz}$ of 455kHz)	35dB or more
I/O matching impedance	2.0k Ω

Table 2 Ceramic filter CFWM455F (L72-0372-05)

• S-meter circuit

The S-meter control voltage from IC3 (KCD01) in the FM IF HIC is fed into the control unit. The CPU digitizes the analog voltage to operate the LCD bar meter.

• AF unit and volume control switching

The audio signal detected by the FM IF HIC is passed through the preamplifier and audio volume control, amplified by the AF power amplifier, and fed to the speaker for output. Normally, the analog switch (MN4066BS) functions so that the level can be adjusted with the volume control on the panel. When the remote control unit is used, the shift register (MC14094BF) operates according to the data from the CPU, and the analog switch is switched to allow the electronic volume control (LC7532M) to adjust the level.

• Shift register

The following control is executed by sending serial data from the CPU to the shift register (MC14094BF) in the electronic volume control module (X59-3620-00).

Pin No.	Pin name	Function
1	Strobe	Enable input
2	Data	Serial data input
3	Clock	Clock input
4	Q1	TX power switching : "H" in LOW mode, "L" in HIGH mode
5	Q2	TX power switching : "L" in HIGH or LOW mode
6	Q3	"H" for AF MUTE
7	Q4	
8	Vss	GND
9	Qs	
10	Q's	
11	Q8	"H" when electronic volume control is not used
12	Q7	"H" when electronic volume control is used
13	UP	"H" when electronic volume control is UP
14	DWN	"H" when electronic volume control is DOWN
15	Output Enable	5V (Power)
16	VDD	5V (Power)

Table 3

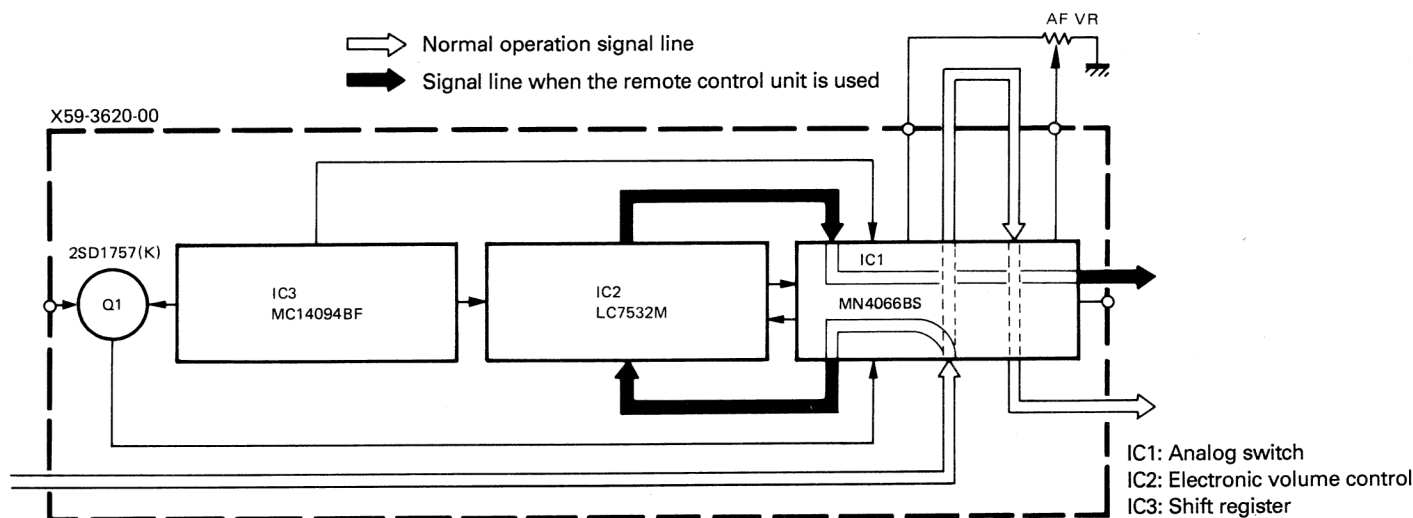


Fig. 3 Block diagram of electronic volume control

CIRCUIT DESCRIPTION

Transmitting System

• General

Separate circuits are provided for the 2 meter and 70 cmeter bands, except for the mic amplifier and APC circuits.

• Modulation circuit

Audio signals from the microphone are fed into the mic amplifier for amplification, and then into two operational amplifiers. The operational amplifiers form a splatter filter and provide pre-emphasis, amplification, limiting, and removal of undesirable high-frequency components.

The modulation circuit directly frequency-modulates the VCO (Voltage Controlled Oscillator) signals for both the 144MHz and 430MHz bands using a varactor diode.

• Preamplifier circuit

The output signal from the VCO is applied to drive HIC IC9 (KCB05; two-stage linear amplifier) for the 144MHz band, and drive HIC IC10 (KCB04; three-stage linear amplifier) for the 430MHz band.

This amplifier is designed to cover a wide range of frequencies, and can produce stable output without adjustment. The APC controls the collector voltage from the last stage of the amplifier.

• Power amplifier circuit

The drive signal is amplified to the required level by the power module. The signal is passed through a transmit/receive diode switch and filter, and output to the antenna.

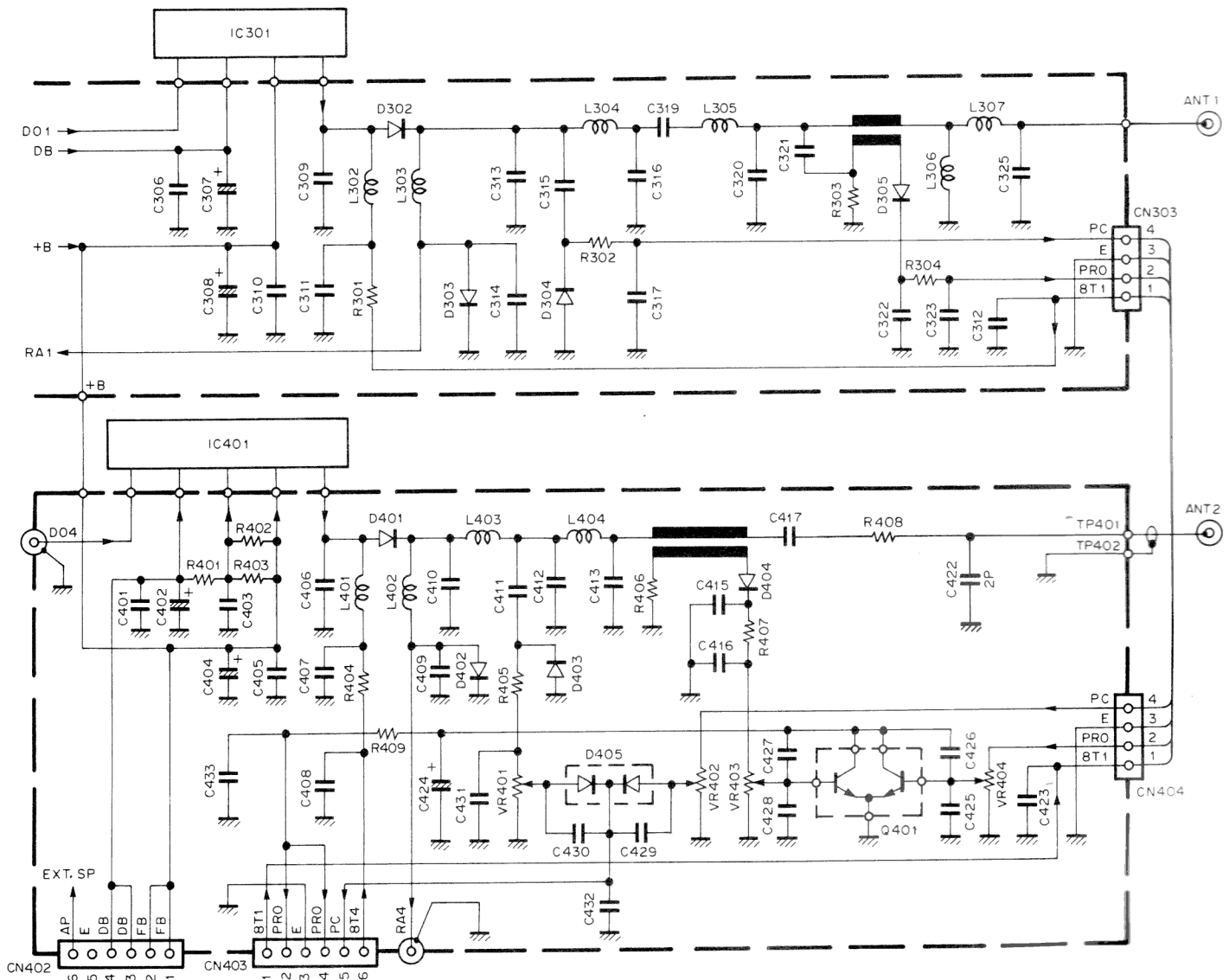


Fig. 4 Transmitting circuit

CIRCUIT DESCRIPTION

• APC (Automatic Power Control) and SWR (Standing Wave Ratio) protection circuits

The SWR protection circuit detects any reflected power produced by a mismatch in the antenna with a CM (CM =Capacitance matching) coupler and amplifies it. This circuit reduces the output control voltage and the gain to protect the power module.

The APC circuit detects a portion of the power module output and amplifies it to obtain a control voltage for output

control. Since the output control voltage is inversely proportional to the output of the power module, the output is kept constant.

The power switching circuit uses the output of the shift register (MC14094BF) in the electronic volume control module (X59-3620-00). When the LOW switch on the panel is pressed and LOW is indicated, an "H" signal is output from pin 4 of the shift register(MC14094BF); this turns Q33 of the TX-RX unit on, selecting LOW power.

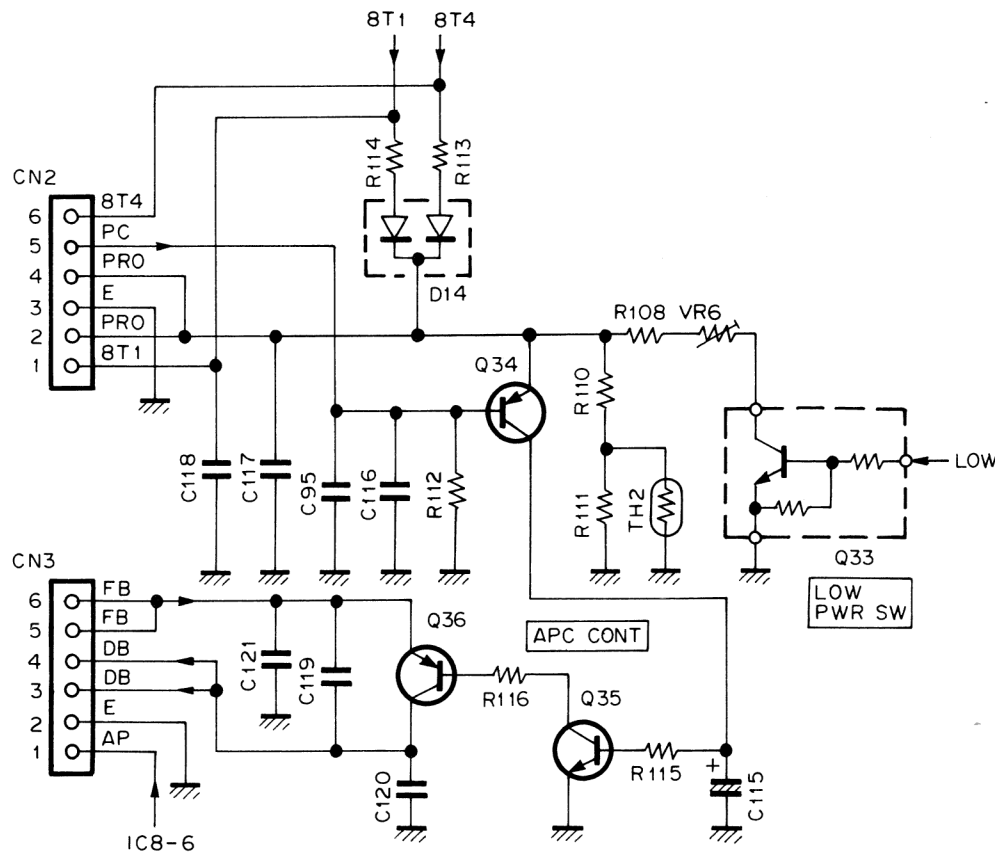


Fig. 5 LOW power selection circuit

CIRCUIT DESCRIPTION

PLL Synthesizer Block

The TM-701A/E PLL system is implemented as a sub-unit divided into upper VCO and lower PLL blocks. The 144MHz-band PLL block is independent of the 430 MHz-band PLL block. The sub-unit is shielded to prevent external interference.

Two reference frequencies, 6.25kHz and 5kHz, are provided in order to allow 5, 10, 12.5, 15, 20, and 25 kHz step operation by dividing the reference oscillator frequency of 12.8MHz by 2048 and 2506.

The VCO directly generates the target frequency. This

signal is amplified once and then fed into a pulse-swallow PLL IC for frequency division and phase comparison.

The 144MHz-band PLL system has two VCOs, one for transmission and one for reception. Using a signal ("H" in transmit mode) from pin 10 of the PLL IC (M54959FP), the LPF is deactivated by Q105 only for the instant when the TM-701A/E enters transmit mode. This helps produce a more rapid PLL lock-up.

The 430MHz-band PLL system has a single VCO for transmission and reception. Using Q5 as a switch, it reduces the PLL lock-up time in the same way as for the 144MHz section.

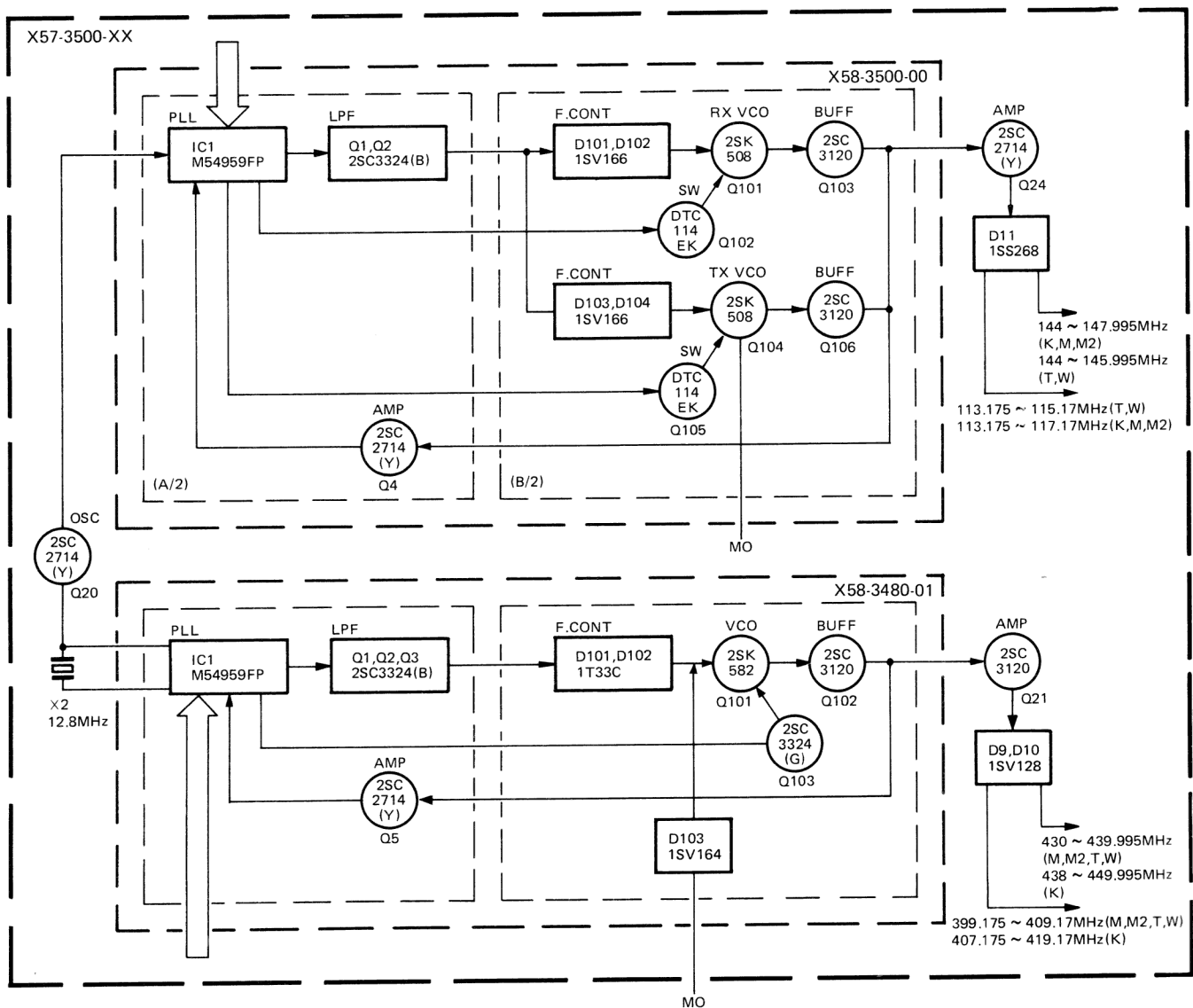


Fig. 6 PLL block diagram

CIRCUIT DESCRIPTION

• Reset and back-up circuits

When the power is turned on, the reset circuit sends an "L" level reset pulse to the RESET pin of the CPU for approx. 3 ms. This initiates the power on reset sequence.

When the power is turned off, the back-up circuit detects a voltage drop in the 13.8 V line and pulls the CPU INT4 pin to a "H" level. This causes the CPU to enter the back-up state.

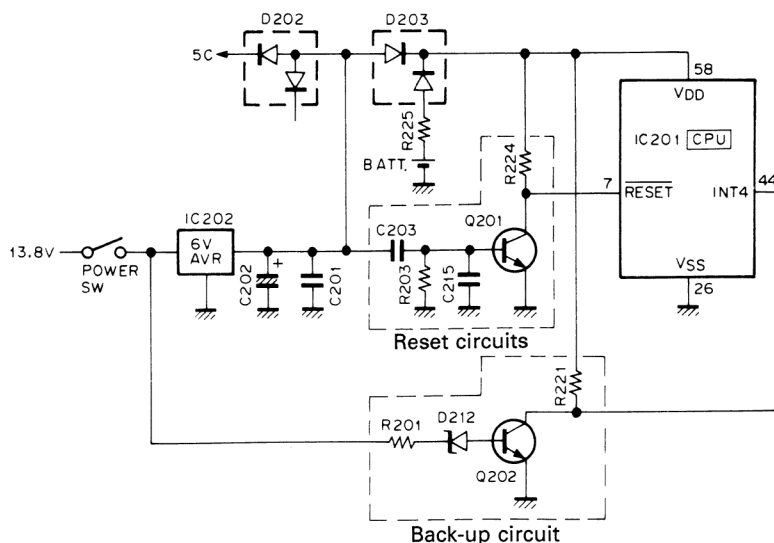


Fig. 9 Reset and back-up circuits

• Display circuit

The display circuit is contained in the LCD assembly. It consists of a LCD driver, its peripheral circuits, and an LCD. The LCD is dynamically operated with a 50% duty cycle. The LCD driver receives LCD data from P33, P141, and P140 of the CPU.

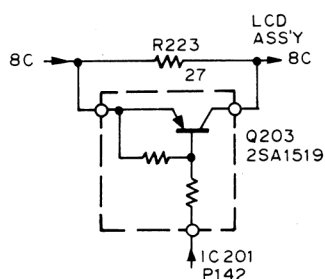


Fig. 10 Dimmer circuit

• Shift register circuit

The following control is executed by sending serial data from the CPU to the shift register (MB88307PF) in IC5 (KCC03).

Pin No.	Pin name	Function
1	SO	
2	LOAD	Enable input
3	O0	Normally, "H"
4	O1	Normally, "H"
5	O2	Normally, "H"
6	O3	"L" in receive mode (144MHz band)
7	SC / SC	Clock input
8	Vss	GND
9	OE	GND
10	O4	"L" in receive mode (430MHz band)
11	O5	"L" in receive mode, "H" in transmit mode
12	O6	"L" in transmit mode (144MHz band)
13	O7	"L" in transmit mode (430MHz band)
14	SI	Serial data input
15	RESET	5V (Power)
16	Vcc	5V (Power)

Table 4

CIRCUIT DESCRIPTION

• Tone generator circuit

IC203 (ladder resistor network) receives analog signals from P40 thru P43 and P50 thru P53 of the CPU and digitizes them to produce 38 different tones from 67.0Hz to 250.3 Hz. Figure 11 shows the internal configuration of IC203.

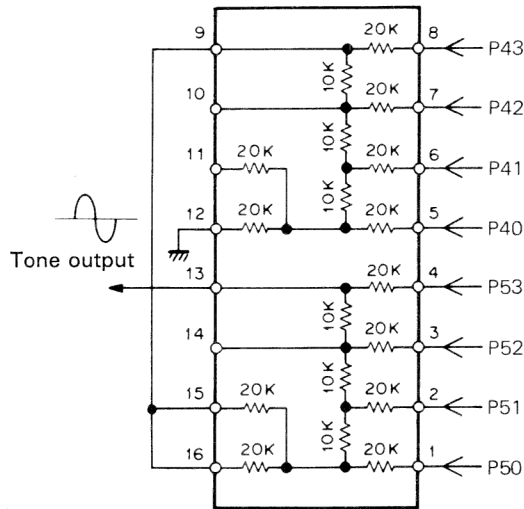


Fig. 11 Internal configuration of ladder resistor network KRR-C001 (TX-RX unit IC203)

• PLL data output

PLL data is sent from P21 (CK), P22 (DT), P61 (ACL), and P23 (EN1) of the CPU. Figure 12 is a timing chart for PLL data transfer, and Figure 13 shows the format of PLL data.

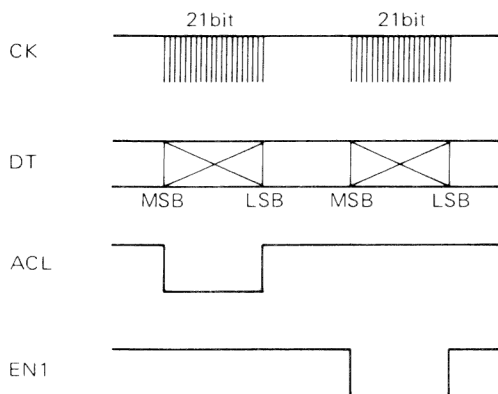
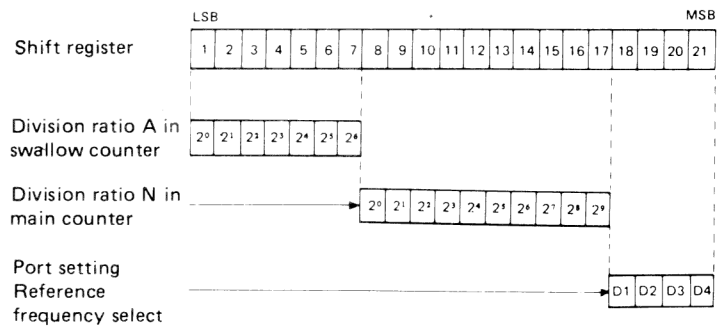


Fig. 12 Timing chart for PLL data transfer



The 21-bit data is made up of the following:

1. Division ratio data A and N (17 bits)

F (display – 10.7MHz in RX mode)

$$= \{(N \times 128) + A\} \times 12.8\text{MHz} / \text{ref}$$

N : Division ratio set in 10-bit-main counter (binary)

A : Division ratio set in 7-bit swallow counter (binary)

2. Reference frequency (ref) select (2 bits)

Data		Phase reference frequency	
D1	D2	frequency	
L	L	5kHz	5, 10, 15, 20, 25kHz step mode
H	L	6.25kHz	12.5kHz step mode

3. Switch select (2 bits)

Data		Output port		
D3	D4	SW1	SW2	
L	H	L	H	RX mode
H	L	H	L	TX mode

Fig. 13 PLL data format

CIRCUIT DESCRIPTION

• Power switching circuit

The power switching circuit is an HIC that consists of a shift register (MB88307PF), 3-pin regulator (TA78L05F) that supplies 5V to the main unit, and three digital transistors.

The eight output pins of the shift register are controlled according to data from the CPU, and the power supply is switched depending on the state of the shift register.

	8R1	8R0	8R3	8R4	T1	8R8	8R	T4
RX 144MHz band	H	L	L	L	H	L	H	H
TX 144MHz band	L	L	L	L	L	L	L	H
RX 430MHz band	L	L	L	H	H	L	H	H
TX 430MHz band	L	L	L	L	H	L	L	L

H : 8V, L : 0V

Table 5

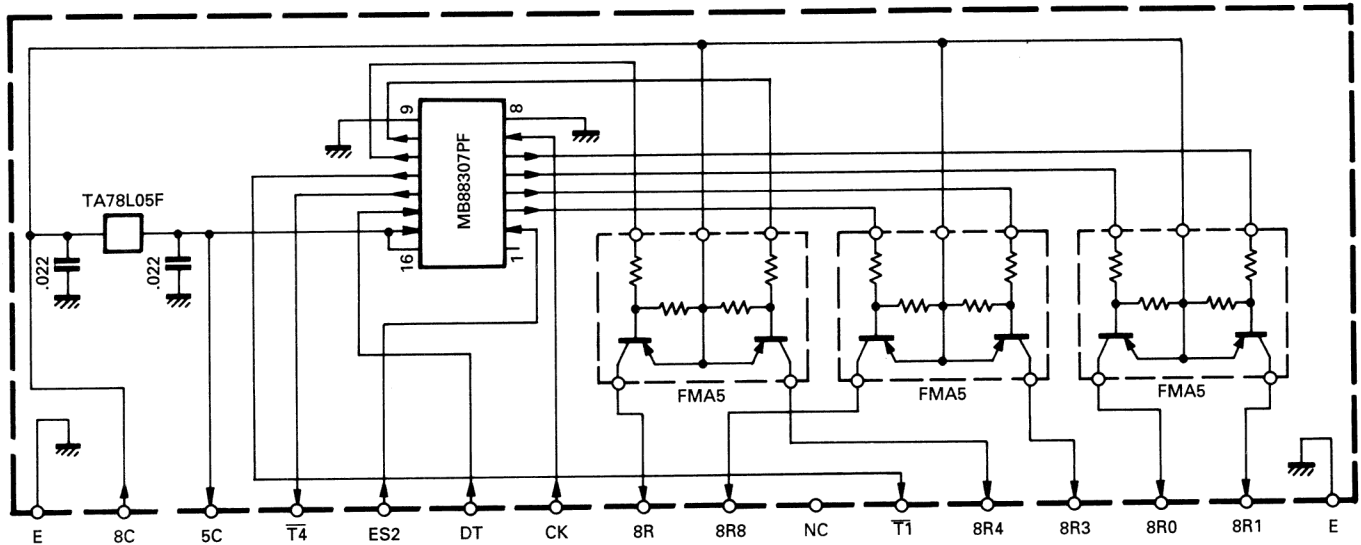


Fig. 14 Power switching circuit

• Input and output of CTCSS unit (option)

The optional CTCSS unit receives data from P21, P22, and P73 of the CPU. Figure 15 is a timing chart for CTCSS data transfer, and Figure 16 shows the format of CTCSS data. When a tone from the CTCSS unit is detected, an "H" level signal is input to P63 of the CPU, opening the squelch.

• Input and output of the remote control unit (option)

When the optional remote control unit is connected, an "H" level signal is input to INTO of the CPU, changing the function of the following pins.

- P03 → S1 : Serial data input pin
- P02 → S2 : Serial data output pin
- P01 → SCK : Serial clock I/O pin

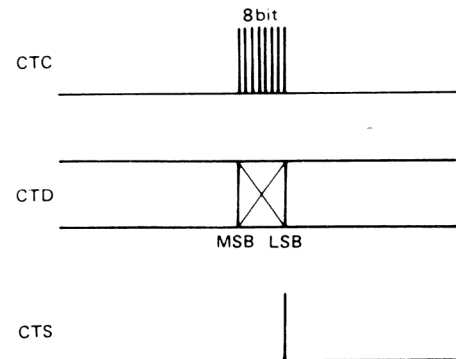


Fig. 15 Timing chart for CTCSS data transfer

Tone frequency select data for CTCSS unit

D1	D2	D3	D4	D5	D6
----	----	----	----	----	----

Example : 88.5Hz L H L H H H

Fig. 16 CTCSS data format

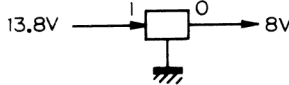
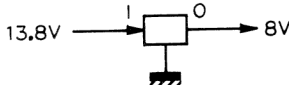
CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Logic	Function	Pin No.	Pin name	I/O	Logic	Function
1	P41	O	-	D/A digital output (tone).	33	PTH01	I	-	Mic DOWN input.
2	P40	O	-		34	PTH00	I	-	Mic UP input.
3	P53	O	-		35	T11	-	L	Not used.
4	P52	O	-		36	T10	-	L	Not used.
5	P51	O	-		37	P23	O	L	PLL IC enable output.
6	P50	O	-		38	P22	O	-	PLL IC data output.
7	RESET	I	L	Reset input.	39	P21	O	-	PLL IC clock output.
8	X2	-	-	4.194304MHz crystal oscillator.	40	P20	O	-	Beeper output.
9	X1	-	-		41	P03/SI	I/I	L/-	Mic DOWN/serial data input.
10	P63	I	H	CTCSS tone matching input.	42	P02/SO	I/O	L/-	Mic PTT input/serial data output.
11	P62	O	H	Power switch.	43	P01/SCK	I/-	L/-	Mic UP input/serial clock I/O.
12	P61	O	-	Not used.	44	INT4	I	H	Back-up detect input.
13	P60	I	-	Not used.	45	P123	I	L	CALL, VFO
14	P73	O	H	CTCSS unit enable output.	46	P122	I	L	F, MR/M
15	P72	O	H	Shift register enable output.	47	P121	I	L	SHIFT, MHz
16	P71	O	H	Shift register enable output.	48	P120	I	L	TONE
17	P70	-	-	Not used.	49	P133	I	L	REV
18	P83	-	-	Not used.	50	P132	I	L	LOW, BAND
19	P82	-	L	Not used.	51	P131	I	L	Transmit power select.
20	P81	-	L	Not used.	52	P130	I	L	Busy input.
21	P80	-	L	Not used.	53	P143	O	L	Squelch control.
22	P93	-	L	Not used.	54	P142	O	H	Dimmer control.
23	P92	-	L		55	P141	O	-	LCD driver clock output.
24	P91	-	L		56	P140	O	-	LCD driver data output.
25	P90	-	L		57	NC	-	-	Not used.
26	Vss	-	-	GND.	58	Vdd	-	-	Power supply pin.
27	INT3	-	L	Not used.	59	P33	O	-	LCD driver enable output.
28	INT2	I	-	Encoder input.	60	P32	O	L	Distination output.
29	INT1	I	-		61	P31	O	L	Key output.
30	INT0	I	H	Remote connect detect input.	62	P30	O	L	
31	PTH03	I	-	S-meter analog input.	63	P43	O	-	D/A digital output (tone).
32	PTH02	I	-	Not used.	64	P42	O	-	

Table 6 75108G-E19-1B terminal functions (TX-RX unit IC201)

DESCRIPTION OF COMPONENTS

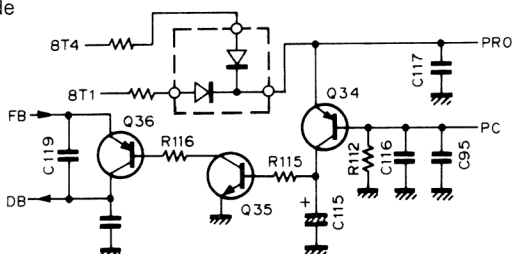
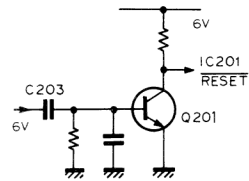
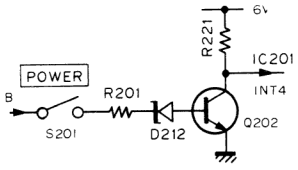
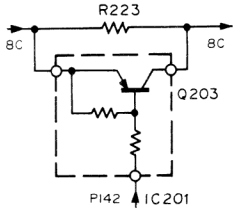
TX-RX UNIT (X57-3350-XX) -11:TM-701A (K), -21:TM-701A (M), -22:TM-701A (M2), -61:TM-701E (T,W)

Component	Use/Function	Operation/Condition/Compatibility
IC3	2nd local oscillator, mixer, IF amplifier, detector, low-frequency amplifier, noise amplifier, noise detector, squelch switch	① 1st IF signal oscillator (30.825MHz) ③ ④ 2nd local oscillator (30.37MHz) ⑨ Scan control, busy signal, busy : 0V ⑩ Noise detection voltage output (DC) ⑪ S-meter output ⑫ Detection output ⑭ RD output ⑮ AF output
IC5	Power switching	② 8V in receive mode (144MHz band) ⑬ 5V output ⑤ 8V in receive mode (430MHz band) ⑭ 8V input ⑥ 0V in transmit mode (144MHz band) ⑧ 8V in receive mode ⑫ 0V in transmit mode (430MHz band)
IC6	8V AVR	3-pin regulator 
IC7	10V AVR	② 10V output ⑦ 13.8V input
IC8	AF amplification	① AF input ⑥ AF output
IC9	144MHz-band transmit driver	Operates in transmit mode, 144 to 146MHz (K, M, M2) 144 to 148MHz (T, W) ① Output ⑪ Input
IC10	430MHz-band transmit driver	Operates in transmit mode, 430 to 440MHz (M, M2, T, W) 438 to 450MHz (K) ① Output ⑪ Input
IC201	Microprocessor	See Circuit Description
IC202	6V AVR	3-pin regulator 
IC203	Tone A / D converter	① ~ ⑧ Input ⑮ Output
IC301	Power amplification	144MHz band M57737R
IC401	Power amplification	430MHz band M57729
Q1	High-frequency amplification	Operates in receive mode, 144MHz-band
Q2	1st mixer	Operates in receive mode
Q4	Receive band switching	On in receive mode, 144MHz-band
Q5, 6	High-frequency amplification	Operates in receive mode, 430MHz band
Q7	1st mixer	Operates in receive mode
Q8	Receive band switching	In receive mode, 430MHz band

DESCRIPTION OF COMPONENTS

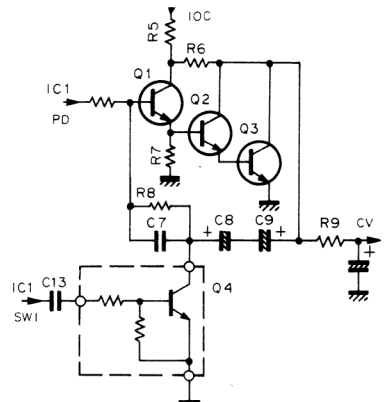
Component	Use/Function	Operation/Condition/Compatibility
Q12	1st IF amplification	Operates in receive mode, 30.825MHz
Q13	1st IF gain switching	Off in receive mode (144MHz band) On in receive mode (430MHz band)
Q17, 18	Power switch	When power switch is ON, Q17 and Q18 are ON When power switch is OFF, Q17 and Q18 are OFF
Q19	PLL 8V ripple filter	
Q20	Buffer amplification	12.8MHz
Q21	430MHz band PLL output amplification	399.175 to 409.17MHz (M, M2, T, W), 407.175 to 419.17MHz(K) in receive mode, 430 to 440MHz (M, M2, T, W), 438 to 450MHz (K) in transmit mode
Q22	Mic line mute	On in receive mode (430MHz band)
Q23	CV line buffer	144MHz band
Q24	144MHz band PLL output amplification	113.175 to 115.17MHz (K, M, M2), 113.175 to 117.17MHz (T, W) in receive 144 to 146MHz (T, W), 144 to 148MHz (K, M, M2) in transmit mode
Q25	Mic line mute	On in receive mode, 144MHz band
Q26 ~ 28	430MHz band 8T swicting	In receive mode, Q29 : OFF Q27 and Q28 : ON
Q29 ~ 31	144MHz band 8T switching	In receive mode, Q29 : OFF Q30 and Q31 : ON
Q33	LOW power switch	ON in LOW power mode

DESCRIPTION OF COMPONENTS

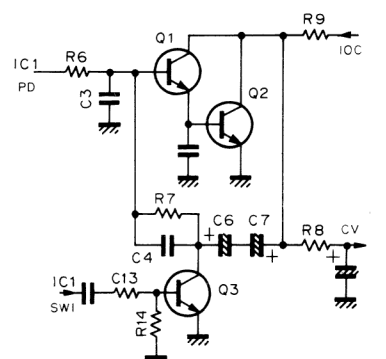
Component	Use/Function	Operation/Condition/Compatibility
Q34 ~ 36	APC control	Operates in transmit mode 
Q201	Reset switch	On for approx. 3 ms when system power is turned on ; usually OFF 
Q202	Back-up switch	On when S201 power switch is turned on, Off when S201 power switch is turned off 
Q203	Dimmer switch	Off in DIM mode 
Q401	Protection switch	Adjust 430MHz with VR403, and 144MHz with VR404
D2 ~ 6	Variable capacitance diode tuning	144MHz band
D7	430MHz band transmit / receive switch	OFF in receive mode
D9	430MHz band PLL output switch	
D10	430MHz band PLL output switch	
D11	144MHz band PLL output switch	
D12 ~ 14	Reverse current prevention	
D201, 202		
D203	Reverse current prevention, lithium battery switching	Lithium battery provides power when power is off
D204,205	Microprocessor protection	
D206 ~209	Destination setting	
D212	Back-up detection	
D301	Power reverse connection prevention	
D302	144MHz band transmit /receive switching	MI407
D303	144MHz band transmit/receive switching	
D304	144MHz band power detection	APC, RF meter
D305	144MHz band reflected wave detection	Adjust with VR404, ANT : open 3A
D401	430MHz band transmit/receive switching	MI407
D402	430MHz band transmit/receive switching	
D403	430MHz band power detection	APC, RF meter
D404	430MHz band reflected wave detection	Adjust with VR403, ANT short : 3A
D405	Temperature compensation	APC

DESCRIPTION OF COMPONENTS

430PLL (X58-3480-01)

Component	Use/Function	Operation/Condition/Compatibility
IC1	PLL	① VOC input 399.175 ~ 409.17MHz (M, M2, T, W) 407.175 ~ 419.17MHz (K) in receive mode 430 ~ 440MHz (M, M2, T, W) 438 ~ 450MHz (K) in transmit mode ⑩ "H" in transmit mode ⑪ "H" in receive mode ⑬ Phase comparison output ⑭ "H" when PLL unlocked ⑳ Reference oscillation input
Q1 ~ 3	LPF	
Q4	Transmit switch	On for an instant when transmission starts
Q5	VCO output amplification	399.175 ~ 409.17MHz (M, M2, T, W), 407.175 ~ 419.17MHz(K) in receive mode 430 ~ 440MHz (M, M2, T, W), 438 ~ 450MHz (K) in trasmit mode On when operated (430MHz band)
Q101	VCO	
Q102	VCO output buffer	
Q103	VCO switch	
D1		
D101, 102	VCO voltage control	
D103	Varactor diode for modulation in transmit mod	

144PLL (X58-3500-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1	PLL	① VCO input 113.175 ~ 115.17MHz (T, W), 113.175 ~ 177.17MHz (K, M, M2) in reseive mode 144 ~ 146MHz (T, W), 144 ~ 148MHz (K, M, M2) in transmit mode ⑩ "H" in transmit mod ⑪ "H" in receive mode ⑬ Phase comparison output ⑭ "H" when PLL unlocked ⑳ Reference oscillation input
Q1,2	LPF	
Q3	Transmit switch	On for instant when transmission starts

DESCRIPTION OF COMPONENTS

Component	Use/Function	Operation/Condition/Compatibility
Q4	VCO output amplification	113.175 ~ 115.17MHz (T, W), 113.175 ~ 117.17MHz (K, M, M2) in receive mode 114 ~ 146MHz(T, W), 144 ~ 148MHz (K, M, M2) in transmit mode
Q101	Receive VCO	113.175 ~ 115.17MHz (T, W), 113.175 ~ 117.17MHz (K, M, M2)
Q102	Receive VCO switch	On in receive mode
Q103	Receive VCO output buffer	113.175 ~ 115.17MHz (T, W), 113.175 ~ 117.17MHz (K, M, M2)
Q104	Transmit VCO	144 ~ 146MHz (T, W), 144 ~ 148MHz (K, M, M2)
Q105	Transmit VCO switch	On in transmit mode
Q106	Transmit VCO output buffer	144 ~ 146MHz (T, W), 144 ~ 148MHz (K, M, M2)
D101, 102	VCO voltage control	Receive
D103	VCO voltage control / varactor diode for modulation in transmit mode	
D104	VCO voltage control	Transmission

MIC AMP (X59-3610-00)

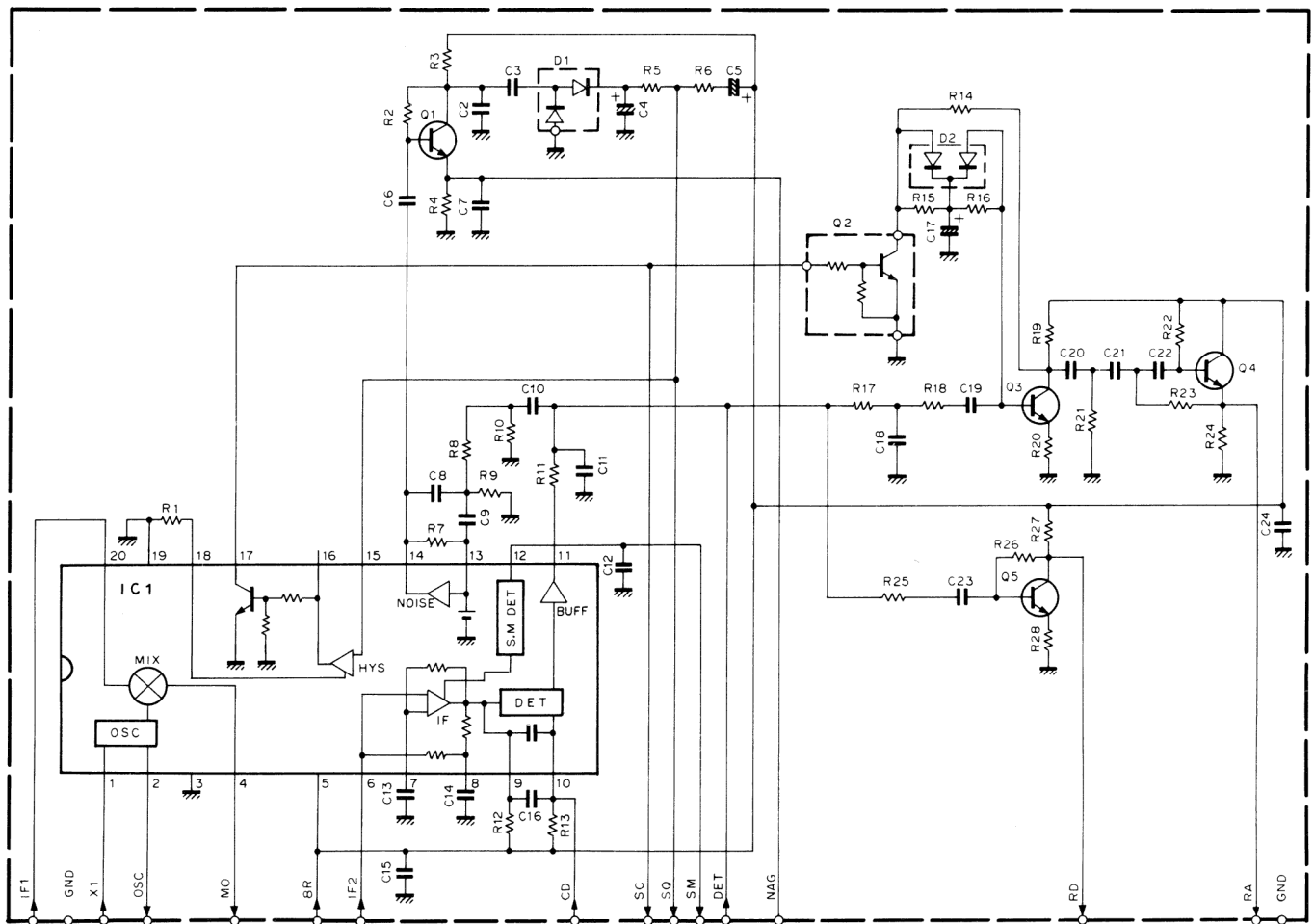
Component	Use/Function	Operation/Condition/Compatibility
IC1 (1/2)	Limited amplification	
IC1 (2/2)	LPF	
Q1	Low-frequency amplification	

ELECTRONIC VOLUME CONTROL (X59-3620-00)

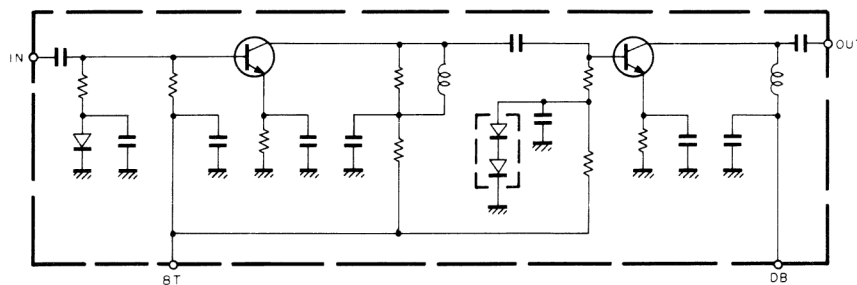
Component	Use/Function	Operation/Condition/Compatibility
IC1	Electronic volume control (IC2) switching	During normal operation, ⑤ ⑥ "H" level, ⑫ ⑬ "L" level ON between ③ and ④, and ⑧ and ⑨ OFF between ① and ②, and ⑩ and ⑪ RC-10 and RC-20 remote operation ⑤ ⑥ "L" level, ⑫ ⑬ "H" level OFF between ③ and ④, and ⑧ and ⑨ ON between ① and ②, and ⑩ and ⑪
IC2	Electronic volume control	② Output ⑦ Input ⑧ Initial pin "L" level volume step 6 ⑨ "L" level volume up ⑩ "L" level volume down
IC3	Shift register	① Enable input ② Data input ③ Clock input ④ "H" for transmit LOW power ⑥ "H" during AF mute (⑦ "L" when repeater operates) ⑪ ⑫ Electronic volume control switching : remote operation ⑪ "L" ⑫ "H" ⑬ Electronic volume control up output : Up operation "L" ⑭ Electronic volume control down output : Down operation "L"
Q1	AF mute	Operated in transmit mode, in AL, in 1-channel receive mode, when CTCSS ON, when BELL ON, when squelch ON

SEMICONDUCTOR DATA

FM IF H.IC KCD01 (TX-RX UNIT IC3)

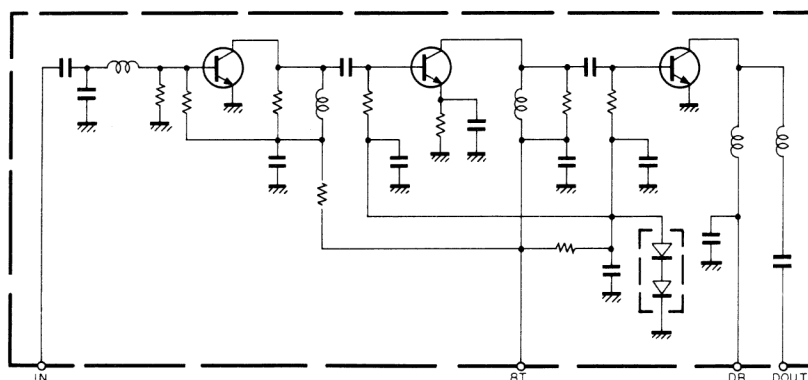


H.IC KCB05 (TX-RX UNIT IC9)



Tr1 : 2SC3357 D1 : 1SS196
Tr2 : 2SC2954 D2 : 1SS226

H.IC KCB06 (TX-RX UNIT IC10)



PARTS LIST

CAPACITORS

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

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

• Temperature Coefficient

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

• 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	10μF-10~+50 4.7μF-10~+75

Less than 10 pF

• Rating voltage

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

• Chip capacitors

(EX) CC 73 F SL 1H 000 J
1 2 3 4 5 6 7
(Chip) (CH,RH,UJ,SL)
(EX) CK 73 F F 1H 000 Z
1 2 3 4 5 6 7
(Chip) (B,F)

Refer to the table above.

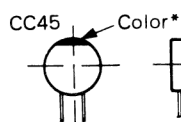
RESISTORS

• Chip resistor (Carbon)

(EX) RD 73 E B 2B 000 J
1 2 3 4 5 6 7
(Chip) (B,F)

• Carbon resistor (Normal type)

RD 14 B B 2C 000 J
1 2 3 4 5 6 7



• 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

Example CC45TH = -470 ± 60 ppm/°C

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

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

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

Dimension



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TM-701A/E						
1	1B	*	A01-1067-03	METALLIC CABINET (UPSIDE)	KMM2 TW	
2	3B	*	A01-1068-03	METALLIC CABINET (BOTTOM)		
3	2B	*	A10-1294-01	CHASSIS CALKED ASSY		
4	2A, 3A	*	A20-2697-02	PANEL ASSY		
4	2A, 3A	*	A20-2698-02	PANEL ASSY		
5	2A, 2B		A22-0760-13	SUB PANEL		
6	2A		B11-0462-08	FILTER	K MM2	
7	2A		B30-0870-05	LAMP		
8	2A, 2B		B38-0311-05	LCD ASSY		
		*	B40-3888-04	MODEL NAME PLATE		
		*	B40-3889-04	MODEL NAME PLATE		
		*	B40-3927-04	MODEL NAME PLATE	TW	
-	1B		B42-2454-04	LABEL (PACKING)		
9			B42-2455-04	LABEL (M4X8 MAX)		
-			B42-3322-14	LABEL (ANT)		
-			B42-3343-04	LABEL (MODEL)		
-		*	B42-3369-04	LABEL (DC13.8V, EXT.SP)	K W	
-			B46-0410-20	WARRANTY CARD		
-			B46-0419-00	WARRANTY CARD		
-		*	B50-8269-00	INSTRUCTION MANUAL		
			E23-0435-05	TERMINAL (ANT)	TW KMM2	
10	1B		E30-2105-05	ANT CABLE (M)		
11	2B		E30-2106-05	ANT CABLE (N)		
11	2B		E30-2107-05	ANT CABLE (M)		
			E30-2111-05	DC CORD		
12	1B		E30-2137-05	DC CORD		
			E31-3346-05	CONNECTING WIRE(SP)		
		*	E31-6011-05	CONNECTING CABLE(6P)		
			F05-2036-05	FUSE (20A)		
13	1B		F05-8021-05	FUSE (8A)		
15	2B		F12-0415-04	CONDUCTIVE SHEET		
16	2B		F20-0521-04	INSULATING BOARD(LITHIUM BATT)		
17	2B		F20-0587-04	INSULATING SHEET(LITHIUM BATT)		
18	2B		G02-0576-14	FLAT SPRING		
20	2A		G09-0405-05	KNOB FIXED SPRING		
21	1B		G10-0651-04	NON-WOVEN FABRIC(SP)		
22	1B	*	G10-0684-04	NON-WOVEN FABRIC(130X10)		
23	2B		G13-0639-04	CUSHION (15X6X5)		
24	2A		G13-0906-04	CUSHION (3 KEY)		
25	2A		G13-0907-04	CUSHION (6 KEY)		
26	1B	*	G13-0910-14	CONDUCTIVE CUSHION(UPSIDE)		
27	3B		G13-0932-04	CONDUCTIVE CUSHION		
			G13-0926-04	CUSHION		
-			H11-0822-04	POLYSTYRENE PLATE	K MM2 TW	
-			H13-0814-04	PROTECTION BOARD(BRACKET)		
-		*	H01-8233-04	ITEM CARTON BOX		
-		*	H01-8234-04	ITEM CARTON BOX		
-		*	H01-8235-04	ITEM CARTON BOX		
-		*	H10-2656-02	POLYSTYRENE FOAMED FIXTURE	K	
-			H25-0029-04	PROTECTION BAG(MIC HOOK, SCREW)		
-			H25-0049-03	PROTECTION BAG(DC CORD)		
-			H25-0720-04	PROTECTION BAG(TM-701)		

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TM-701A : K, M, M2

TM-701E : T, W

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29	1B		J20-0319-24	MIC HOOK	K	
30	2A		J21-2717-14 J21-4147-14 J21-4256-08 J29-0436-03	MOUNTING HARDWARE(SP) STACKING PLATE MOUNTING HARDWARE(LCD ASSY) BRACKET		
32	2A		K27-3035-04	KNOB (VFO,MR,MHZ)		
33	2A, 3A		K27-3036-04	KNOB (CALL,F,ETC)		
34	2A, 2B		K27-3037-04	KNOB (LOW)		
35	2B		K27-3038-04	KNOB (POWER)		
36	3A		K29-3156-04	KNOB (MAIN)		
37	3A		K29-3157-04	KNOB (VOL,SQL)		
A	1B, 2B		N09-0626-04	SCREW		
B	2B		N09-0650-05	SCREW		
C	1B, 3B		N33-2606-45	OVAL HEAD MACHINE SCREW	K	
D	1B, 2B		N46-3010-46	PAN HEAD TAPPING SCREW		
E	2A		N88-2606-46	BRAZIER HEAD TAPTITE SCREW		
			N99-0331-05	FLAT HEAD TAPTITE SCREW SCREW SET		
39	1B		T07-0246-05 T91-0379-15 T91-0380-15 T91-0382-15	LOUDSPEAKER(FULLRANGE) MICROPHONE MICROPHONE MICROPHONE	MM2 K TW	
IC1			LC7582	IC(LCD DRIVER)		
41	2B		W01-0414-04 W09-0326-05	WRENCH LITHIUM BATTERY		
42	1B, 2B	*	X57-3350-11	TX-RX UNIT	K	
42	1B, 2B	*	X57-3350-21	TX-RX UNIT	M	
42	1B, 2B	*	X57-3350-22	TX-RX UNIT	M2	
42	1B, 2B	*	X57-3350-61	TX-RX UNIT	TW	
TX-RX UNIT (X57-3350-XX) -11 : K, -21 : M, -22 : M2, (TM-701A) -61 : T, W (TM-701E)						
C413			CM73F2H100D	CHIP C 10PF D		
C424			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C436			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		
C1			CC73FCH1H040C	CHIP C 4.0PF C		
C2			CC73FCH1H060D	CHIP C 6.0PF D		
C5 -7			CK73FB1H102K	CHIP C 1000PF K		
C8			CC73FCH1H0R5C	CHIP C 0.5PF C		
C9 ,10			CC73FCH1H680J	CHIP C 68PF J		
C11			CC73FCH1H0R5C	CHIP C 0.5PF C		
C12			CC73FCH1H680J	CHIP C 68PF J		
C13			CK73FB1H102K	CHIP C 1000PF K		
C14			CC73FCH1H150J	CHIP C 15PF J		
C15			CC73FCH1H030C	CHIP C 3.0PF C		
C16 -18			CK73FB1H102K	CHIP C 1000PF K		
C19			CC73FCH1H030C	CHIP C 3.0PF C		
C21			CC73FCH1H040C	CHIP C 4.0PF C		
C22 ,23			CK73FB1H102K	CHIP C 1000PF K		
C24			CK73FB1H471K	CHIP C 470PF K		
C25			CK73FB1H102K	CHIP C 1000PF K		
C26			CK73FB1E223K	CHIP C 0.022UF K		
C27			CK73FB1H102K	CHIP C 1000PF K		
C28			CC73FCH1H010C	CHIP C 1.0PF C		

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C29			CK73FB1H471K	CHIP C 470PF K		
C30			CC73FCH1H390J	CHIP C 39PF J		
C31 ,32			CK73FB1H102K	CHIP C 1000PF K		
C33			CC73FCH1HR75C	CHIP C 0.75PF C		
C34			CC73FCH1H390J	CHIP C 39PF J		
C35			CC73FCH1H030C	CHIP C 3.0PF C	K	
C35			CC73FCH1H050C	CHIP C 5.0PF C	MM2TW	
C36 ,37			CK73FB1H102K	CHIP C 1000PF K		
C38			CK73FB1H471K	CHIP C 470PF K		
C39			CK73FB1H102K	CHIP C 1000PF K		
C40			CK73FB1H103K	CHIP C 0.010UF K		
C41			CC73FCH1H080D	CHIP C 8.0PF D		
C42			CK73FB1H103K	CHIP C 0.010UF K		
C43			CK73FB1H102K	CHIP C 1000PF K		
C44			CK73EB1E104K	CHIP C 0.10UF K		
C45			CK73FB1E223K	CHIP C 0.022UF K		
C46			CE04EW1C470M	ELECTR0 47UF 16WV		
C47			CC73FCH1H120J	CHIP C 12PF J		
C127			CC73FCH1H120J	CHIP C 12PF J		
C48			CC73FCH1H330J	CHIP C 33PF J		
C49			CK73FB1H102K	CHIP C 1000PF K		
C50			C92-0502-05	CHIP-TAN 0.33UF 35WV		
C51			CK73EF1C105Z	CHIP C 1.0UF Z		
C53			CK73EF1C105Z	CHIP C 1.0UF Z		
C64			CK73FB1H102K	CHIP C 1000PF K		
C65 ,66			CC73FSL1H101J	CHIP C 100PF J		
C67 -70			CK73FB1H102K	CHIP C 1000PF K		
C71			CK73FB1H103K	CHIP C 0.010UF K		
C72			CE04EW1A101M	ELECTR0 100UF 10WV		
C73			CK73FB1H102K	CHIP C 1000PF K		
C74			CE04EW1A221M	ELECTR0 220UF 10WV		
C75			CK73FB1H102K	CHIP C 1000PF K		
C76			CK73FB1H103K	CHIP C 0.010UF K		
C77			CE04EW1A221M	ELECTR0 220UF 10WV		
C78			CK73EB1E104K	CHIP C 0.10UF K		
C79			CK73FB1H102K	CHIP C 1000PF K		
C80			CE04EW1A221M	ELECTR0 220UF 10WV		
C81			CK73FB1E223K	CHIP C 0.022UF K		
C82			CK73FB1E333K	CHIP C 0.033UF K		
C83 -85			CE04EW1C470M	ELECTR0 47UF 16WV		
C86			CQ92M1H154K	MYLAR 0.15UF K		
C87			CE04EW1A471M	ELECTR0 470UF 10WV		
C88			CE04EW1C101M	ELECTR0 100UF 16WV		
C89			CK73FB1H103K	CHIP C 0.010UF K		
C90			CC73FCH1H050C	CHIP C 5.0PF C		
C91			CK73FB1E223K	CHIP C 0.022UF K		
C92			CK73FB1H102K	CHIP C 1000PF K		
C93			CK73EF1C105Z	CHIP C 1.0UF Z		
C94			CK73EB1E104K	CHIP C 0.10UF K		
C96			CE04EW1C470M	ELECTR0 47UF 16WV		
C97			CC73FCH1H060D	CHIP C 6.0PF D		
C98			CK73FB1H102K	CHIP C 1000PF K		
C99			CC73FCH1H060D	CHIP C 6.0PF D		
C100			CK73EF1C105Z	CHIP C 1.0UF Z		
C101			CK73FB1H103K	CHIP C 0.010UF K		

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C102 C103 C104 C125, 126 C105			CC73FCH1H220J CK73FB1H102K CK73FB1H471K CK73FB1H471K CK73EF1C105Z	CHIP C 22PF J CHIP C 1000PF K CHIP C 470PF K CHIP C 470PF K CHIP C 1.0UF Z		
C112 C106 C107 C108 C109			CK73EF1C105Z C92-0002-05 C92-0504-05 C92-0002-05 C92-0504-05	CHIP C 1.0UF Z CHIP-TAN 0.22UF 35WV CHIP-TAN 0.68UF 20WV CHIP-TAN 0.22UF 35WV CHIP-TAN 0.68UF 20WV		
C110, 111 C113, 114 C115 C116-122 C123			CK73FB1H102K CE04EW1C100M C92-0005-05 CK73FB1H102K C90-2092-05	CHIP C 1000PF K ELECTRO 10UF 16WV CHIP-TAN 2.2UF 6.3WV CHIP C 1000PF K ELECTRO 1800UF 16WV		
C201 C202 C203 C204, 205 C206, 207			CK73FB1H103K CE04CW1C100M CK73FB1E223K CK73FB1H102K CC73FCH1H330J	CHIP C 0.010UF K ELECTRO 10UF 16WV CHIP C 0.022UF K CHIP C 1000PF K CHIP C 33PF J		
C208, 209 C210-215 C301-303 C305, 306 C307, 308			CK73FB1H103K CK73FB1H102K CK73FB1H102K CK73FB1H102K CE04EW1C100M	CHIP C 0.010UF K CHIP C 1000PF K CHIP C 1000PF K CHIP C 1000PF K ELECTRO 10UF 16WV		
C309 C310-312 C313 C314 C315			CC45SL2H330J CK73FB1H102K CC45SL2H220J CC73FCH1H180J CC73FCH1H010C	CERAMIC 33PF J CHIP C 1000PF K CERAMIC 22PF J CHIP C 18PF J CHIP C 1.0PF C		
C316 C317 C319 C320 C321			CC45SL2H390J CK73FB1H102K CK45B2H102K CC45SL2H330J CC73FCH1H020C	CERAMIC 39PF J CHIP C 1000PF K CERAMIC 1000PF K CERAMIC 33PF J CHIP C 2.0PF C		
C322, 323 C325 C401 C402 C403			CK73FB1H102K CC45SL2H220J CK73FB1H471K CE04CW1C100M CK73FB1H471K	CHIP C 1000PF K CERAMIC 22PF J CHIP C 470PF K ELECTRO 10UF 16WV CHIP C 470PF K		
C404 C405 C406 C406 C407, 408			CE04CW1C100M CK73FB1H471K CM73F2H080D CM73F2H090D CK73FB1H471K	ELECTRO 10UF 16WV CHIP C 470PF K CHIP C 8.0PF D CHIP C 9.0PF D CHIP C 470PF K	K MM2TW	
C409 C410 C411 C412 C415, 416			CC73FCH1H050C CC45SL2H030C CC73FCH1H010C CM73F2H140J CK73FB1H471K	CHIP C 5.0PF C CERAMIC 3.0PF C CHIP C 1.0PF C CHIP C 14PF J CHIP C 470PF K		
C417 C422 C423 C425 C426, 427			CK45B2H102K CM73F2H020C CK73FB1H102K CK73FB1H102K CK73FB1H472K	CERAMIC 1000PF K CHIP C 2.0PF C CHIP C 1000PF K CHIP C 1000PF K CHIP C 4700PF K		

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C428-430 C431 C432-435 TC1 -3			CK73FB1H102K CK73FB1H471K CK73FB1H102K C05-0346-05	CHIP C 1000PF K CHIP C 470PF K CHIP C 1000PF K TRIMMING CAP 6PF		
W402 W201 CN1 CN2 ,3 CN4		*	E31-6013-05 E31-6003-25 E04-0154-05 E40-5209-05 E04-0154-05	CONNECTING WIRE (RA) CONNECTING WIRE (CTCSS) RF COAXIAL CABLE RECEPTACLE PIN CONNECTOR (6P) RF COAXIAL CABLE RECEPTACLE		
CN5 ,6 CN201,202 CN203,204 CN301 CN302			E40-5202-05 E40-5203-05 E40-5204-05 E40-3249-05 E40-3246-05	PIN CONNECTOR (13P) PIN CONNECTOR (13P) PIN CONNECTOR (3P) PIN CONNECTOR (5P) PIN CONNECTOR (2P)		
CN303 CN401 CN402,403 CN404 J201		*	E40-3483-05 E40-0274-05 E40-5208-05 E40-5210-05 E06-0858-15	PIN CONNECTOR (4P) PIN CONNECTOR (2P) PIN CONNECTOR (6P) PIN CONNECTOR (4P) CYLINDRICAL RECEPTACLE		
J401 TP1 TP2 TP301 TP401,402			E11-0425-05 E40-0211-05 E23-0464-05 E23-0465-05 E23-0465-05	PHONE JACK PIN CONNECTOR (2P) TERMINAL TERMINAL TERMINAL		
W1 W2 W301 W401		*	E31-6009-05 E31-6010-05 E31-3350-05 E31-2066-05	CONNECTING WIRE (2P) CONNECTING WIRE (5P) CONNECTING WIRE (FB) CONNECTING WIRE (DO)		
			J30-0545-05	SPACER		
CD1 CF1 L1 -4 L5 L6		*	L79-0855-05 L72-0372-05 L34-4080-05 L34-4113-05 L40-1872-80	CERAMIC DISCRI. CERAMIC FILTER COIL COIL SMALL FIXED INDUCTOR (18NH)		
L7 L8 ,9 L10 L11 L12			L40-1272-48 L79-0690-05 L40-1872-48 L40-1872-48 L34-2157-05	SMALL FIXED INDUCTOR (12NH) HELICAL BLOCK SMALL FIXED INDUCTOR (18NH) SMALL FIXED INDUCTOR (18NH) TUNING COIL		
L13 L13 L14 L15 L16			L40-3972-48 L40-2772-48 L40-1092-48 L40-2272-48 L40-1092-48	SMALL FIXED INDUCTOR (39NH) SMALL FIXED INDUCTOR (27NH) SMALL FIXED INDUCTOR (1UH) SMALL FIXED INDUCTOR (22UH) SMALL FIXED INDUCTOR (1UH)	MM2TW k	
L302 L303 L304 L305 L306		*	L34-1260-05 L34-0895-05 L34-0742-05 L34-0499-05 L34-1260-05	COIL COIL COIL COIL COIL		
L307 L401 L402 L403 L404			L34-0499-05 L34-1239-05 L34-1185-05 L34-1040-05 L34-1226-05	COIL COIL COIL COIL COIL		

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X1 X2 X201 XF1		*	L77-1312-05 L77-1405-05 L77-1397-05 L71-0263-05	CRYSTAL RESONATOR 30.37MHZ CRYSTAL RESONATOR 12.8MHZ CRYSTAL RESONATOR 4.19MHZ MCF 30.825MH	Z	
R410 R2 R3 R4 R5 -8			R92-0150-05 RK73FB2A103J RK73FB2A101J RK73FB2A274J RK73FB2A103J	JUMPER REST 0 OHM CHIP R 10K J 1/10W CHIP R 100 J 1/10W CHIP R 270K J 1/10W CHIP R 10K J 1/10W		
R9 R10 ,11 R13 R15 R16			RK73FB2A101J R92-0670-05 RK73FB2A473J RK73FB2A104J RK73FB2A473J	CHIP R 100 J 1/10W CHIP R 0 OHM CHIP R 47K J 1/10W CHIP R 100K J 1/10W CHIP R 47K J 1/10W		
R17 R18 ,19 R20 R21 ,22 R23			RK73FB2A274J RK73FB2A470J RK73FB2A104J R92-0670-05 RK73FB2A222J	CHIP R 270K J 1/10W CHIP R 47 J 1/10W CHIP R 100K J 1/10W CHIP R 0 OHM CHIP R 2.2K J 1/10W		
R24 R25 R26 ,27 R28 R29			RK73FB2A104J RK73FB2A333J RK73FB2A101J RK73FB2A470J RK73FB2A270J	CHIP R 100K J 1/10W CHIP R 33K J 1/10W CHIP R 100 J 1/10W CHIP R 47 J 1/10W CHIP R 27 J 1/10W		
R30 R31 ,32 R33 R34 R35			RK73FB2A471J RK73FB2A102J RK73FB2A223J RK73FB2A102J RK73FB2A221J	CHIP R 470 J 1/10W CHIP R 1.0K J 1/10W CHIP R 22K J 1/10W CHIP R 1.0K J 1/10W CHIP R 220 J 1/10W		
R37 R39 R40 R41 R42			R92-0670-05 R92-0670-05 RK73FB2A222J RK73FB2A101J RK73FB2A122J	CHIP R 0 OHM CHIP R 0 OHM CHIP R 2.2K J 1/10W CHIP R 100 J 1/10W CHIP R 1.2K J 1/10W		
R43 R44 R45 R46 R47			RK73FB2A224J RK73FB2A473J RK73FB2A102J RK73FB2A103J RK73FB2A104J	CHIP R 220K J 1/10W CHIP R 47K J 1/10W CHIP R 1.0K J 1/10W CHIP R 10K J 1/10W CHIP R 100K J 1/10W		
R48 R49 R56 R57 ,58 R59			RK73FB2A224J RK73FB2A122J RK73FB2A102J RK73FB2A473J RK73FB2A123J	CHIP R 220K J 1/10W CHIP R 1.2K J 1/10W CHIP R 1.0K J 1/10W CHIP R 47K J 1/10W CHIP R 12K J 1/10W		
R60 R61 R62 R61 R62			RK73FB2A102J RK73FB2A272J RK73FB2A472J R92-0670-05 RK73FB2A682J	CHIP R 1.0K J 1/10W CHIP R 2.7K J 1/10W CHIP R 4.7K J 1/10W CHIP R 0 OHM J CHIP R 6.8K J 1/10W	KMM2 KMM2 TW TW	
R63 R64 R66 R67 R68			R92-0670-05 RK73FB2A223J RK73FB2A823J RK73FB2A103J RK73FB2A154J	CHIP R 0 OHM CHIP R 22K J 1/10W CHIP R 82K J 1/10W CHIP R 10K J 1/10W CHIP R 150K J 1/10W		

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R69			RK73FB2A223J	CHIP R 22K J 1/10W		
R70			R92-0670-05	CHIP R 0 OHM		
R71			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R72			R92-1215-05	CHIP R 470 1/2W		
R73			RK73FB2A103J	CHIP R 10K J 1/10W		
R74			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R75 , 76			RK73FB2A101J	CHIP R 100 J 1/10W		
R77			RK73FB2A473J	CHIP R 47K J 1/10W		
R78			RK73FB2A471J	CHIP R 470 J 1/10W		
R79			RK73FB2A470J	CHIP R 47 J 1/10W		
R406			RK73FB2A470J	CHIP R 47 J 1/10W		
R80			RK73FB2A471J	CHIP R 470 J 1/10W		
R81			RK73FB2A103J	CHIP R 10K J 1/10W		
R82 , 83			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R84			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R85			RK73FB2A471J	CHIP R 470 J 1/10W		
R86			RK73FB2A104J	CHIP R 100K J 1/10W		
R87			RK73FB2A471J	CHIP R 470 J 1/10W		
R88			RK73FB2A103J	CHIP R 10K J 1/10W		
R89 , 90			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R91		*	R92-1217-05	CHIP R 0 OHM		
R92			RK73FB2A223J	CHIP R 22K J 1/10W		
R93 , 94			RK73FB2A473J	CHIP R 47K J 1/10W		
R95			RK73FB2A103J	CHIP R 10K J 1/10W		
R96			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R97			R92-0670-05	CHIP R 0 OHM		
R98			RK73FB2A223J	CHIP R 22K J 1/10W		
R99 , 100			RK73FB2A473J	CHIP R 47K J 1/10W		
R101			RK73FB2A103J	CHIP R 10K J 1/10W		
R102			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R103			R92-0679-05	CHIP R 0 OHM		
R104			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R105			R92-0685-05	CHIP R 22 J 1/2W		
R106			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R108			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R110			RK73FB2A273J	CHIP R 27K J 1/10W		
R111			RK73FB2A333J	CHIP R 33K J 1/10W		
R112-114			RK73FB2A223J	CHIP R 22K J 1/10W		
R115			RK73FB2A103J	CHIP R 10K J 1/10W		
R116			RK73FB2A471J	CHIP R 470 J 1/10W		
R117			RK73FB2A271J	CHIP R 270 J 1/10W		
R118 , 119			RK73FB2A473J	CHIP R 47K J 1/10W		
R123			RK73FB2A473J	CHIP R 47K J 1/10W		
R120			RK73FB2A821J	CHIP R 820 J 1/10W		
R121			RK73FB2A5R6J	CHIP R 5.6 J 1/10W		
R122			RK73FB2A821J	CHIP R 820 J 1/10W		
R124			RK73FB2A223J	CHIP R 22K J 1/10W		
R125			RK73FB2A471J	CHIP R 470 J 1/10W		
R126			RK73FB2A120J	CHIP R 12 J 1/10W		
R127			RK73FB2A821J	CHIP R 820 J 1/10W		
R201			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R203			RK73FB2A563J	CHIP R 56K J 1/10W		
R204			RK73FB2A103J	CHIP R 10K J 1/10W		
R205			R92-0670-05	CHIP R 0 OHM		
R206			RK73FB2A105J	CHIP R 1.0M J 1/10W		

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R208-210 R211-213 R214 R215 R216, 217			RK73FB2A473J RK73FB2A102J R92-0670-05 RK73FB2A105J RK73FB2A104J	CHIP R 47K J 1/10W CHIP R 1.0K J 1/10W CHIP R 0 ΩHM CHIP R 1.0M J 1/10W CHIP R 100K J 1/10W		
R237 R218 R219 R220 R221			RK73FB2A104J RK73FB2A102J RK73FB2A473J RK73FB2A332J RK73FB2A474J	CHIP R 100K J 1/10W CHIP R 1.0K J 1/10W CHIP R 47K J 1/10W CHIP R 3.3K J 1/10W CHIP R 470K J 1/10W		
R222 R223 R224 R238 R225			RK73FB2A473J R92-1212-05 RK73FB2A474J RK73FB2A474J RK73FB2A472J	CHIP R 47K J 1/10W CHIP R 27 J 1/2 W CHIP R 470K J 1/10W CHIP R 470K J 1/10W CHIP R 4.7K J 1/10W		
R235, 236 R226-228 R230, 232 R234 R301			RK73FB2A472J R92-0670-05 R92-0670-05 R92-0670-05 R92-1214-05	CHIP R 4.7K J 1/10W CHIP R 0 ΩHM CHIP R 0 ΩHM CHIP R 0 ΩHM CHIP R 120 J 1/2 W		
R302 R303 R304 R402, 403 R410			RK73FB2A223J RK73FB2A220J RK73FB2A103J R92-0670-05 R92-0670-05	CHIP R 22K J 1/10W CHIP R 22 J 1/10W CHIP R 10K J 1/10W CHIP R 0 ΩHM CHIP R 0 ΩHM		
R404 R405 R407 R408 R409			R92-1214-05 RK73FB2A103J RK73FB2A103J R92-0679-05 RK73FB2A270J	CHIP R 120 J 1/2 W CHIP R 10K J 1/10W CHIP R 10K J 1/10W CHIP R 0 ΩHM CHIP R 27 J 1/10W		
TH1 VR1 VR2 VR3 VR4		*	R92-1216-05 R12-6431-05 R12-6427-05 R12-6452-05 R12-6427-05	THERMISTOR 10K TRIMMING POT. 220K TRIMMING POT. 47K TRIMMING POT. 100K TRIMMING POT. 47K		
VR6 VR201 VR202 VR401 VR402-404		*	R12-6423-05 R05-3441-05 R05-4420-05 R12-6450-05 R12-6427-05	TRIMMING POT. 10K POTENTIOMETER 10K(A) POTENTIOMETER 50K(B) TRIMMING POT. 47K TRIMMING POT. 47K		
S201 S202-211			S40-2458-05 S40-1086-05	PUSH SWITCH TAKT SWITCH		
Q18 D2 -4 D5 ,6 D7 D9 ,10			2SB1302(S) 1SV164 1SV166 HSK277 1SV128	CHIP TRANSISTOR CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE		
D11 D12 -14 D201 D202 D203			1SS268 1SS184 DLS1585 1SS181 1SS184	CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE CHIP DIODE		
D204 D205			1SS187 1SS196	CHIP DIODE CHIP DIODE		

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D206			1SS181	CHIP DIODE	KMTW	
D207			1SS181	CHIP DIODE	MM2TW	
D208			1SS181	CHIP DIODE	KMM2	
D209			MA141A	CHIP DIODE	MM2TW	
D212			02CZ7.5(X)	CHIP ZENER DIODE		
D301			DSA3A1	DIODE		
D302			MI407	DIODE		
D303			MI308	DIODE		
D304			1SS101	DIODE		
D305			1SS184	CHIP DIODE		
D401			MI407	DIODE		
D402			MI308	DIODE		
D403			1SS101	DIODE		
D404			MA716	CHIP DIODE		
D405			1SS184	CHIP DIODE		
IC3			KCD01	H.IC		
IC5		*	KCC03	H.IC		
IC6			UPC78M08H	IC(VOLTAGE REGULATOR/ +8V)		
IC7			LA5010M	IC(LOW SATURATION REGULATOR)		
IC8			UPC1241H	IC		
IC9			KCB05	H.IC		
IC10			KCB06	H.IC		
IC201		*	75108G-E19-1B	IC(MICROPROCESSOR)		
IC202			NJM78L06UA	IC(VOLTAGE REGULATOR/ +6V)		
IC203			KRR-C001	IC(CHIP NETWORK)		
IC301		*	M57729	IC(POWER MODULE)		
IC401		*	M57737R	IC(POWER MODULE)		
Q1			3SK184(S)	CHIP FET		
Q2			3SK131(V12)	CHIP FET		
Q4			DTC114EK	DIGITAL TRANSISTOR		
Q5			3SK184(S)	CHIP FET		
Q6			2SK582	FET		
Q7			3SK184(S)	CHIP FET		
Q8			DTC114EK	DIGITAL TRANSISTOR		
Q12			2SC2714(Y)	CHIP TRANSISTOR		
Q13			DTC114EK	DIGITAL TRANSISTOR		
Q17			2SC2712(Y)	CHIP TRANSISTOR		
Q19			2SC2712(Y)	CHIP TRANSISTOR		
Q20			2SC2714(Y)	CHIP TRANSISTOR		
Q21			2SC3120	CHIP TRANSISTOR		
Q22			DTC114EK	DIGITAL TRANSISTOR		
Q23			2SK208(O)	CHIP FET		
Q24			2SC2714(Y)	CHIP TRANSISTOR		
Q25			DTC114EK	DIGITAL TRANSISTOR		
Q26			2SC2712(Y)	CHIP TRANSISTOR		
Q27			DTC114EK	DIGITAL TRANSISTOR		
Q28			2SB1119S	CHIP TRANSISTOR		
Q29			2SC2712(Y)	CHIP TRANSISTOR		
Q30			DTC114EK	DIGITAL TRANSISTOR		
Q31			2SB1119S	CHIP TRANSISTOR		
Q33			DTC114EK	DIGITAL TRANSISTOR		
Q34			2SA1162(Y)	CHIP TRANSISTOR		
Q35			2SC2712(Y)	CHIP TRANSISTOR		
Q36			2SA1307(Y)	TRANSISTOR		
Q37			2SD1757(K)	CHIP TRANSISTOR		

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Q201,202 Q203 Q401 TH2 S212			2SC2712(Y) 2SA1519 FMW1 112-202-2 W02-0388-05	CHIP TRANSISTOR DIGITAL TRANSISTOR DIGITAL TRANSISTOR THERMISTOR(2K) ENCODER		
		*	X58-3480-01	SUB UNIT(430 PLL)		
		*	X58-3500-00	SUB UNIT(144 PLL)		
		*	X59-3610-00	MODULE UNIT(MIC AMP)		
		*	X59-3620-00	MODULE UNIT(ELE VOL)		
430PLL (X58-3480-01)						
C106,107 C109 C104 C16 ,17 C1			CC73FCH1HR75C CC73FCH1H090D CC73FCH1H120J CC73FSL1H101J CK73FB1H223K	CHIP C 0.75PF C CHIP C 9.0PF D CHIP C 12PF J CHIP C 100PF J CHIP C 0.022UF K		
C2 C2 C4 C5 C6 ,7			CC73FUJ1H220J CC73FCH1H180J CK73FB1H102K CK73EB1H683K CK73FB1H223K	CHIP C 22PF J CHIP C 18PF J CHIP C 1000PF K CHIP C 0.068UF K CHIP C 0.022UF K		
C8 ,9 C10 C11 C12 C13			C92-0007-05 C92-0002-05 CK73FB1H223K CC73FCH1H100D CK73FB1H223K	CHIP TAN 2.2UF 20WV CHIP TAN 0.22UF 35WV CHIP C 0.022UF K CHIP C 10PF D CHIP C 0.022UF K		
C14 C15 C101 C102 C103			CC73FCH1H040C CK73FB1H102K CK73FB1H102K CK73FB1H471K CC73FCH1H470J	CHIP C 4.0PF C CHIP C 1000PF K CHIP C 1000PF K CHIP C 470PF K CHIP C 47PF J		
C105 C110 C108,111 C112 C113-115			CC73FCH1H080D CC73FCH1H080D CC73FCH1H0R5C CC73FCH1H040C CK73FB1H102K	CHIP C 8.0PF D CHIP C 8.0PF D CHIP C 0.5PF C CHIP C 4.0PF C CHIP C 1000PF K		
CN102 CN101 CN1		*	E40-0311-05 E40-0411-05 E40-5201-05	PIN CONNECTOR (3P) PIN CONNECTOR (4P) PIN CONNECTOR		
			F11-1122-04	SHIELDING COVER		
L1 L101,102 L103 L104 L105		*	L40-3972-80 L40-8282-19 L34-2333-05 L40-5682-19 L40-3382-19	SMALL FIXED INDUCTOR(39NH) SMALL FIXED INDUCTOR(0.82UH) COIL SMALL FIXED INDUCTOR(0.56UH) SMALL FIXED INDUCTOR(0.33UH)		
L106			L40-3972-80	SMALL FIXED INDUCTOR(39NH)		
R4			RK73FB2A332J RK73FB2A682J	CHIP R 3.3K J 1/10W CHIP R 6.8K J 1/10W		
R103 R1 ,2			RK73FB2A683J RK73FB2A473J	CHIP R 68K J 1/10W CHIP R 47K J 1/10W		

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R3 R5 R6 R7 R8 , 9			RK73FB2A392J RK73FB2A221J RK73FB2A222J RK73FB2A474J RK73FB2A822J	CHIP R 3.9K J 1/10W CHIP R 220 J 1/10W CHIP R 2.2K J 1/10W CHIP R 470K J 1/10W CHIP R 8.2K J 1/10W		
R10 -13 R14 R15 R16 R18 , 19			RK73FB2A473J RK73FB2A331J RK73FB2A472J RK73FB2A222J RK73FB2A103J	CHIP R 47K J 1/10W CHIP R 330 J 1/10W CHIP R 4.7K J 1/10W CHIP R 2.2K J 1/10W CHIP R 10K J 1/10W		
R101 R102 R104 R105 R107			R92-0670-05 RK73FB2A102J RK73FB2A470J RK73FB2A560J RK73FB2A470J	CHIP R 0 OHM CHIP R 1.0K J 1/10W CHIP R 47 J 1/10W CHIP R 56 J 1/10W CHIP R 47 J 1/10W		
R108 R109 R110 R111			RK73FB2A392J RK73FB2A103J RK73FB2A101J RK73FB2A103J	CHIP R 3.9K J 1/10W CHIP R 10K J 1/10W CHIP R 100 J 1/10W CHIP R 10K J 1/10W		
D101, 102 D1 D103 IC1 Q1 -3			IT33C 1SS184 1SV164 M54959FP 2SC3324(B)	CHIP VARI-CAP DIODE CHIP DIODE CHIP VARI-CAP DIODE IC(FREQ SYNTHESIZER PLL) TRANSISTOR		
Q4 Q5 Q101 Q102 Q103			DTC144EK 2SC2714(Y) 2SK582 2SC3120 2SC3324(G)	DIGITAL TRANSISTOR TRANSISTOR FET TRANSISTOR TRANSISTOR		
144PLL (X58-3500-00)						
C1 C2 , 3 C4 C5 C6 , 7			CK73FB1E223K CK73FB1H102K CK73FB1E223K CK73FB1H471K C92-0507-05	CHIP C 0.022UF K CHIP C 1000PF K CHIP C 0.022UF K CHIP C 470PF K CHIP TAN 4.7UF 6.3WV		
C8 C9 C10 C11 , 12 C13 , 14			C92-0003-05 CK73EB1E473K CC73FCH1H050C CK73FB1H102K CK73FB1E223K	CHIP TAN 0.47UF 25WV CHIP C 0.047UF K CHIP C 5.0PF C CHIP C 1000PF K CHIP C 0.022UF K		
C101 C102 C103, 104 C105 C106			CK73GB1E103K CC73GCH1H010C CK73GB1E103K CC73GCH1H010C CC73GCH1H220J	CHIP C 0.010UF K CHIP C 1.0PF C CHIP C 0.010UF K CHIP C 1.0PF C CHIP C 22PF J		
C107, 108 C109, 110 C111 C112, 113 C114			CK73GB1H102K CK73GB1E103K CC73GCH1H020C CK73GB1E103K CC73GCH1H010C	CHIP C 1000PF K CHIP C 0.010UF K CHIP C 2.0PF C CHIP C 0.010UF K CHIP C 1.0PF C		
C115 C116			CC73GCH1H220J CK73GB1H102K	CHIP C 22PF J CHIP C 1000PF K		
CN1 CN101			E40-5201-05 E40-0411-05	PIN CONNECTOR (7P) PIN CONNECTOR (4P)		

E: Scandinavia & Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

PARTS LIST

× New Parts

Parts without **Parts No.** are not supplied.

Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.

Teile ohne **Parts No.** werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
CN102			E40-0311-05	PIN CONNECTOR (3P)		
			F11-1122-14	SHIELDING COVER		
L1			L40-3391-19	SMALL FIXED INDUCTOR(3.3UH)		
L101,102			L40-4791-19	SMALL FIXED INDUCTOR(4.7UH)		
L103		*	L34-2331-05	COIL (RX)		
L104-106			L40-4791-19	SMALL FIXED INDUCTOR(4.7UH)		
L107		*	L34-2332-05	COIL (TX)		
L108			L40-4791-19	SMALL FIXED INDUCTOR(4.7UH)		
R1-5			RK73FB2A473J	CHIP R 47K J 1/10W		
R14			RK73FB2A473J	CHIP R 47K J 1/10W		
R6			RK73GB1J152J	CHIP R 1.5K J 1/16W		
R8			RK73GB1J392J	CHIP R 3.9K J 1/16W		
R7 ,9			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R10 ,11			RK73GB1J103J	CHIP R 10K J 1/16W		
R13			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R15			RK73GB1J223J	CHIP R 22K J 1/16W		
R16			RK73GB1J103J	CHIP R 10K J 1/16W		
R17			RK73GB1J221J	CHIP R 220 J 1/16W		
R101			RK73GB1J101J	CHIP R 100 J 1/16W		
R102			RK73GB1J470J	CHIP R 47 J 1/16W		
R103			RK73GB1J101J	CHIP R 100 J 1/16W		
R104			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R105			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R106			RK73GB1J471J	CHIP R 470 J 1/16W		
R107			RK73GB1J101J	CHIP R 100 J 1/16W		
R108			RK73GB1J470J	CHIP R 47 J 1/16W		
R109			RK73GB1J682J	CHIP R 6.8K J 1/16W		
R110			RK73GB1J470J	CHIP R 47 J 1/16W		
R111			RK73GB1J101J	CHIP R 100 J 1/16W		
R112			RK73GB1J222J	CHIP R 2.2K J 1/16W		
R113			RK73GB1J472J	CHIP R 4.7K J 1/16W		
R114			RK73GB1J471J	CHIP R 470 J 1/16W		
D101-104			1SV166	CHIP VARI-CAP DIODE		
IC1			M54959FP	IC(FREQ SYNTHESIZER PLL)		
Q1 ,2			2SC3324(B)	CHIP TRANSISTOR		
Q3			2SC2712(Y)	CHIP TRANSISTOR		
Q4			2SC2714(Y)	CHIP TRANSISTOR		
Q101			2SK508NV(K52)	CHIP FET		
Q102			DTC114EK	DIGITAL TRANSISTOR		
Q103			2SC3120	CHIP TRANSISTOR		
Q104			2SK508NV(K52)	CHIP FET		
Q105			DTC114EK	DIGITAL TRANSISTOR		
Q106			2SC3120	CHIP TRANSISTOR		
MIC AMP (X59-3610-00)						
C1			CK73FF1E104Z	CHIP C 0.10UF Z		
C7			CK73GB1H681K	CHIP C 680PF K		
C2			CK73GB1H102K	CHIP C 1000PF K		
C11			CK73GB1H102K	CHIP C 1000PF K		
C8			CK73FB1E333K	CHIP C 0.033UF K		
C3			CK73FB1E333K	CHIP C 0.033UF K		
C4			CC73GCH1H270J	CHIP C 27PF J		
C5			C92-0004-05	CHIP TAN 1UF 16WV		

E: Scandinavia & Europe K: USA P: Canada W: Europe

U: PX(Far East, Hawaii) T: England M: Other Areas

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Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向	Re- marks 備考
C6 C9 C10			CK73FB1E333K CC73GCH1H820J CC73GCH1H101J E23-0471-05	CHIP C 0.033UF K CHIP C 82PF J CHIP C 100PF J TERMINAL		
11 7 R1 R2 R3			RK73FB2A473J RK73GB1J394J RK73GB1J223J RK73GB1J104J RK73GB1J561J	CHIP R 47K J 1/10W CHIP R 390K J 1/16W CHIP R 22K J 1/16W CHIP R 100K J 1/16W CHIP R 560 J 1/16W		
R4 R5 R6 R8 R9			RK73GB1J470J RK73GB1J561J RK73GB1J000J RK73GB1J224J RK73GB1J184J	CHIP R 47 J 1/16W CHIP R 560 J 1/16W CHIP R 0.0 J 1/16W CHIP R 220K J 1/16W CHIP R 180K J 1/16W		
R10 R12 R13 -15 R16		*	RK73GB1J333J RK73GB1J224J RK73GB1J823J RK73GB1J000J	CHIP R 33K J 1/16W CHIP R 220K J 1/16W CHIP R 82K J 1/16W CHIP R 0.0 J 1/16W		
IC1 Q1		*	NJM4558M 2SC4116(Y)	IC(OP AMP X2) CHIP TRANSISTOR		
ELE VOL (X59-3620-00)						
C1 C2 C3			CK73FF1E104Z C92-0004-05 C92-0005-05 E23-0471-05	CHIP C 0.10UF Z CHIP-TAN 1UF 16WV CHIP-TAN 2.2UF 6.3WV TERMINAL		
R1 ,2 R3			RK73FB2A104J RK73FB2A223J	CHIP R 100K J 1/10W CHIP R 22K J 1/10W		
IC1 IC2 IC3 Q1			MN4066BS LC7532M MC14094BF 2SD1757(K)	IC(QUAD ANALOG SWITCH) IC(BILATERAL SWITCH) IC(8-ST SHIFT/STORE REGISTER) CHIP TRANSISTOR		

E: Scandinavia & Europe K: USA P: Canada W: Europe

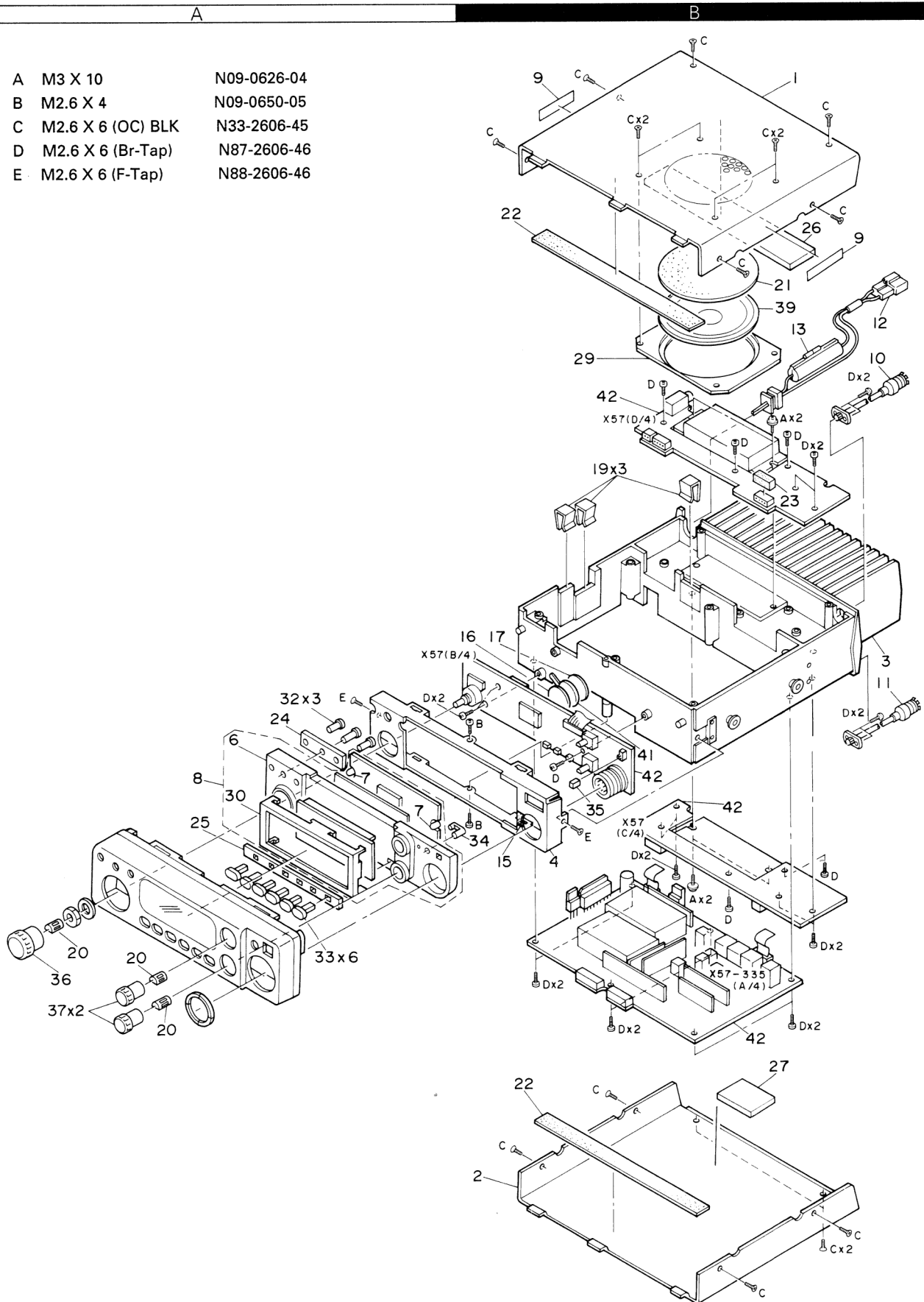
U: PX(Far East, Hawaii) T: England M: Other Areas

UE: AAFES(Europe) X: Australia

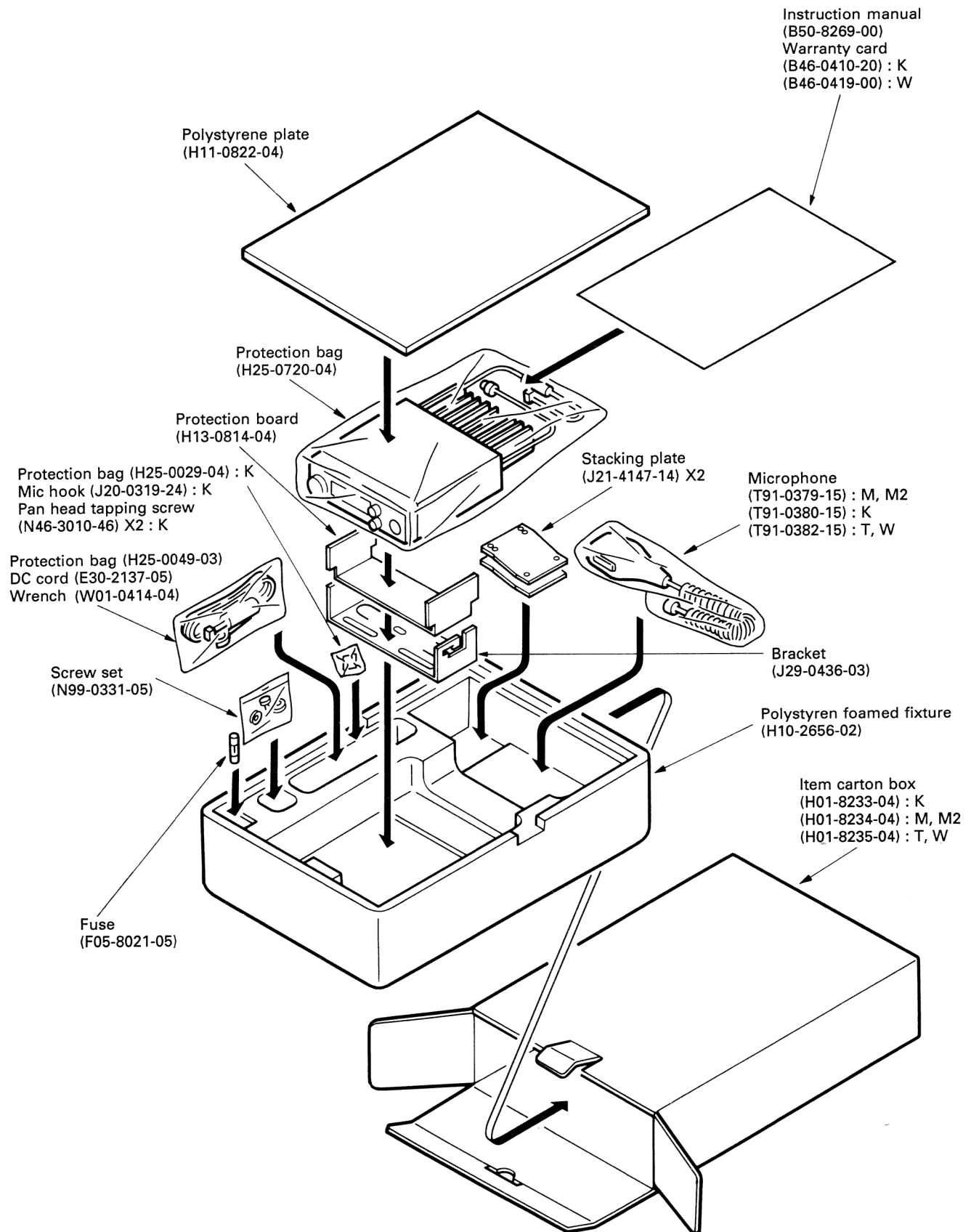
⚠ indicates safety critical components.

EXPLODED VIEW

A	M3 X 10	N09-0626-04
B	M2.6 X 4	N09-0650-05
C	M2.6 X 6 (OC) BLK	N33-2606-45
D	M2.6 X 6 (Br-Tap)	N87-2606-46
E	M2.6 X 6 (F-Tap)	N88-2606-46



PACKING



ADJUSTMENT

REQUIRED TEST EQUIPMENT

- 1. DC V.M and Tester**
 - 1) High input impedance
- 2. RF VTVM (RF V.M)**
 - 1) Input impedance : 1M Ω min., 2pF max.
 - 2) Voltage range : F.S = 10mV to 300V
 - 3) Frequency range : Up to 450MHz
- 3. Frequency Counter (f. counter)**
 - 1) Input sensitivity : Approx. 50mV
 - 2) Frequency range : Up to 450MHz
- 4. DC Power Supply**
 - 1) Voltage : 10V to 17V, variable
 - 2) Current : 6A min.
- 5. Power Meter**
 - 1) Measurement range : Approx. 30W, 3W, 1W
 - 2) Input impedance : 50 Ω
 - 3) Frequency range : 450MHz
- 6. AF VTVM (AF V.M)**
 - 1) Input impedance : 1M Ω min.
 - 2) Voltage range : F.S = 1mV to 30V
 - 3) Frequency range : 50Hz to 10kHz
- 7. AF Generator (AG)**
 - 1) Output frequency : 100Hz to 10kHz
 - 2) Output voltage : 0.5mV to 1V
- 8. Linear Detector**
 - 1) Frequency range : 450MHz
- 9. Spectrum Analyzer**
 - 1) Frequency range : 450MHz
- 10. Directional Coupler**
- 11. Oscilloscope**
 - 1) High sensitivity oscilloscope with horizontal input terminal
- 12. SSG**
 - 1) Frequency range : 144MHz band
 - 2) Modulation: AM and FM MOD.
 - 3) Output level : -20dB μ ~ 100dB μ
- 13. Dummy Load**
 - 1) 8 Ω , 5W (approx.)
- 14. Noise Generator**
 - 1) Must generate ignition-like noise containing harmonics beyond 450MHz.

15. Sweep Generator

- 1) Sweep range : 144MHz bands

16. Tracking Generator

PREPARATION

- 1) Unless otherwise specified, knobs and switches should be set as follows **Table 7**.

POWER SW	ON	CALL SW	OFF
AF VOL VR	MIN	SHIFT/AL	OFF
SQL VOL VR	MIN	TONE/T. ALT	OFF
LOW SW	OFF	REV/STEP	OFF
VFO, MR / M	VFO	BAND / DUP	OFF

Table 7

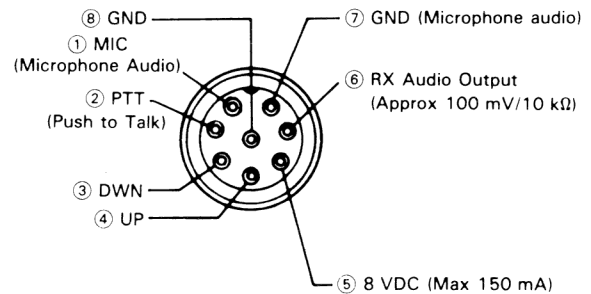


Fig. 17 MIC terminals (view from front panel side)

- 2) Use an insulated adjusting rod to adjust trimmers and coils.
- 3) To prevent damaging SSG, never set the stand by switch to SEND while adjusting the receiver section.
- 4) Be sure to turn the power switch OFF, before connecting the power cable to a power source.
- 5) SSG output levels are those at the time the output terminal is open.
- 6) Meter and display section should be set as follows

Fig. 18

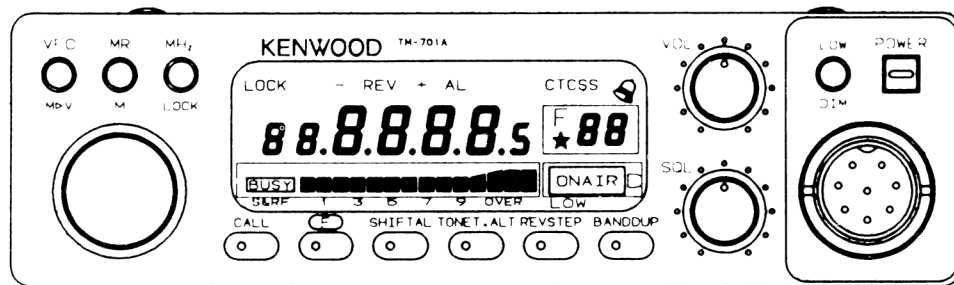


Fig. 18

ADJUSTMENT

COMMON SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting	1) Source voltage : DC 13.8V POWER SW : OFF VOL SW : OFF SQL VR : MAX							
2. Reset	1) Turn POWER SW ON while holding down MR/M.							Display 144.000 Display 430.000 M,M2,T,W 440.000 K

PLL SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. VCO voltage	1) FREQ. : 144.975 T,W FREQ. : 146.000 K,M,M2 Receive	DC V.M	TX-RX	TP5			Check	2.5V or more.
	2) Transmit	Power meter	Rear panel	ANT1 (144M)				4.5~ 6.5V "ON AIR" light on.
	3) FREQ. : 435.000 M,M2,T,W FREQ. : 445.000 K Receive		TX-RX	TP4				2.5V or more.
	4) Transmit		Rear panel	ANT2 (430M)				6.0V "ON AIR" light off.

RECEIVER SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Helical (430MHz)	1) FREQ. : 435.050 M,M2,T,W FREQ. : 445.050 K Connect the tracking generator to ANT2. Connect the spectrum analyzer to TP1.	Tracking generator Spectrum analyzer	Rear panel TX-RX	ANT2 (430M) TP1	TX-RX	TC1,2 L8,9	Check whether required band obtained at max. gain.	440445450(K) 430435440(M,T,W)
2-1. GAIN (144MHz)	1) FREQ. : 145.050 T,W FREQ. : 146.050 K,M,M2 SSG output : 0.5μV (-113dBm) SSG MOD : 1kHz SSG DEV : 3kHz	SSG DC V.M	Rear panel TX-RX	ANT1 (144M) TP2	TX-RX	L1~5	MAX.	All S-meter light on.
2-2. GAIN (430MHz)	1) FREQ. : 435.050 M,M2,T,W FREQ. : 445.050 K SSG output : 0.5μV (-113dBm) SSG MOD : 1kHz SSG DEV : 3kHz	SSG DC V.M	Rear panel TX-RX	ANT2 (430M) TP2		L12		
3. Squelch	1) SQL VR : Threshold point	AF V.M	Rear panel	SP	Front panel	SQL VR	Turn the SQL VR clockwise to the point at which squelch just close.	8 : 00 ~ 11 : 00 0.6A or less.
	2) Tight squelch FREQ. : 435.050 M,M2,T,W FREQ. : 445.050 K SSG output : 0.25μV (-119dBm) SSG MOD : 1kHz SSG DEV : 3kHz SQL VR : MAX	SSG AF V.M SP Ammeter	Rear panel Front	ANT2 (430M) EXT.SP	TX-RX	VR1 (CCW)	Set to the point at which squelch just open.	

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. S-meter	1) FREQ. : 435.050 M,M2,T,W FREQ. : 445.050 K SSG output : 4μV (-95dBm) SSG MOD : 1kHz SSG DEV : 3kHz	SSG	Rear panel	ANT2 (430M)	TX-RX	VR2 (CCW)	Last S-meter segment off.	
	2) SSG output : OFF	S-meter	Front panel				Check	S-meter off.

COMMON TRANSMITTER SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmit frequency	1) FREQ. : 435.000 M,M2,T,W FREQ. : 445.000 K Transmit	f.counter Power meter	Rear panel	ANT2 (430M)	TX-RX	TC3	435.000.0MHz M,M2,T,W 445.000.0MHz K	±100Hz

144MHz TRANSMITTER SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Power	1) HI POWER FREQ. : 144.975 T,W FREQ. : 146.000 K,M,M2 HI/LOW SW : HI Transmit.	Power meter Ammeter	Rear panel	ANT1 (144M)	430 FINAL	VR402 (CCW)	MAX Read RF meter	30W or more. All RF meter on. "ON AIR" light on.
	2) APC Transmit.					VR402	28W	±4W 6.9A or less.
	3) LOW POWER HI/LOW SW : LOW Transmit						Check Read RF meter	3 ~ 8W 6 RF meter on.
2. Protection (Current)	1) FREQ. : 144.975 T,W FREQ. : 146.000 K,M,M2 ANT : Open 430 final unit VR404 : ø Transmit.	Ammeter			430 FINAL	VR404 (CCW)	3A M,M2,T,W 4A K	±0.2A
3. DEV	1) FREQ. : 145.100 T,W FREQ. : 146.100 K,M,M2 AG : 1kHz, 28mV T,W AG : 1kHz, 50mV K,M,M2 LOW SW : ON Transmit.	Linear detector Oscilloscope Power meter	Rear panel	ANT1 (144M)	TX-RX	VR4	±4.6kHz	±200Hz Check for detected waveform. • Linear detector LPF : OFF HPF : 20kHz De-emphasis : OFF
	2) MIC GAIN AG : 1kHz, 2.8mV T,W AG : 1kHz, 5.0mV K,M,M2 Transmit.						Check	±2.4 ~ 3.6kHz
4. TONE	1) FREQ. : 145.250 T,W FREQ. : 145.260 K,M,M2 LOW SW : ON Transmit.						Check	DEV : ±0.5 ~ 1.2kHz • Linear detector LPF : 50Hz HPF : 3kHz De-emphasis : OFF
5. TONE T,W type	1) FREQ. : 144.975 LOW SW : ON Transmit.						MIC TONE SW : ON	DEV : ±2.5kHz or more.

ADJUSTMENT

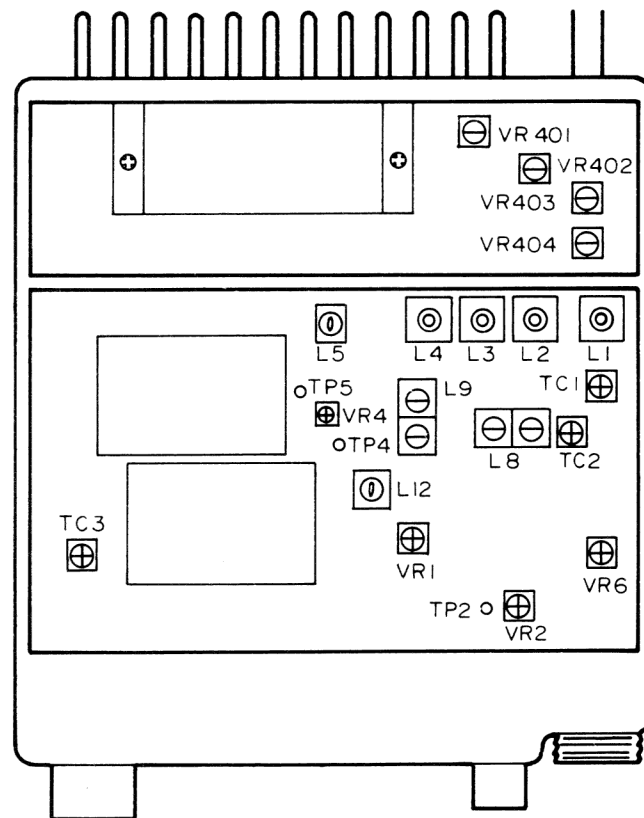
430MHz TRANSMITTER SECTION ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Power	1) HI POWER FREQ. : 435.000 M,M2,T,W FREQ. : 445.000 K HI/LOW SW : HI Transmit.	Power meter Ammeter	Rear panel	ANT2 (430M)	430 FINAL	VR401 (CCW)	MAX Read RF meter	30W or more. All RF meter on. "ON AIR" light on.
	2) APC Transmit.					VR401	28W	±4W or less. 7.2A or less.
	3) LOW POWER HI/LOW SW : LOW Transmit.				TX-RX	VR6	6W Read RF meter	±2W 6 RF meter on.
2. Protection (Current)	1) FREQ. : 435.000 M,M2,T,W FREQ. : 445.000 K ANT : Short 430 final unit VR403 : ø Transmit.	Ammeter			430 FINAL	VR403 (CCW)	3.0A	±0.2A
3. DEV	1) FREQ. : 434.960 M,M2,T,W FREQ. : 444.960 K AG : 1kHz, 28mV M,M2,T,W AG : 1kHz 50mV K LOW SW : ON Transmit.	Linear detector Oscilloscope Power meter	Rear panel	ANT2 (430M)	TX-RX	VR3	±4.6kHz	±200Hz Check for detected waveform. • Linear detector LPF : OFF HPF : 20kHz De-emphasis : OFF
	2) MIC GAIN AG : 1kHz, 2.8mV M,M2,T,W AG : 1kHz, 5.0mV K						Check	±2.4 ~ 3.6kHz
4. TONE	1) FREQ. : 435.250 M,M2,T,W FREQ. : 445.250 K LOW SW : ON Transmit.						Check	DEV : ±0.5 ~ 1kHz • Linear detector LPF : 50Hz HPF : 3kHz De-emphasis : OFF
5. TONE T,W type	1) FREQ. : 435.000 LOW SW : ON Transmit.						MIC TONE SW : ON	DEV : ±2.5kHz or more.
6. DTMF K type	1) FREQ. : 445.100 MIC A and B key : Push at the same time. Transmit.						Check	DEV : 2.8 ~ 4.5kHz

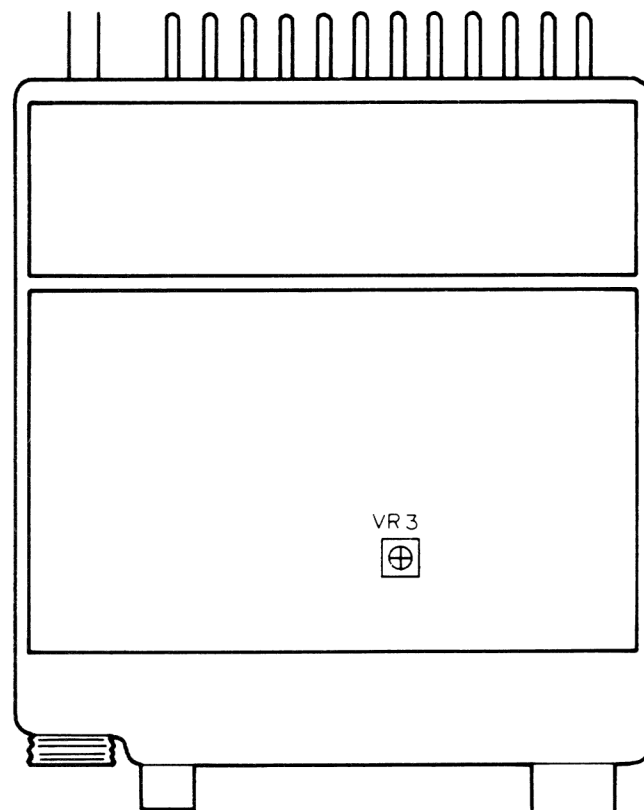
ADJUSTMENT

Adjustment point Layout

Top of set



Bottom of set



TX-RX unit (X57-3350-XX)

VR1: Squelch

VR2: S-eter

VF3: DEV

VR4: TONE DEV 1kHz,
2.8mV±4.6 kHz (M, T, W)
5.0mV±4.6kHz (K)

VR5, VR6, VR401, VR402

VR403, VR404: Protection

L1~L5: Gain (144MHz)

L8, L9: Helical (430MHz)

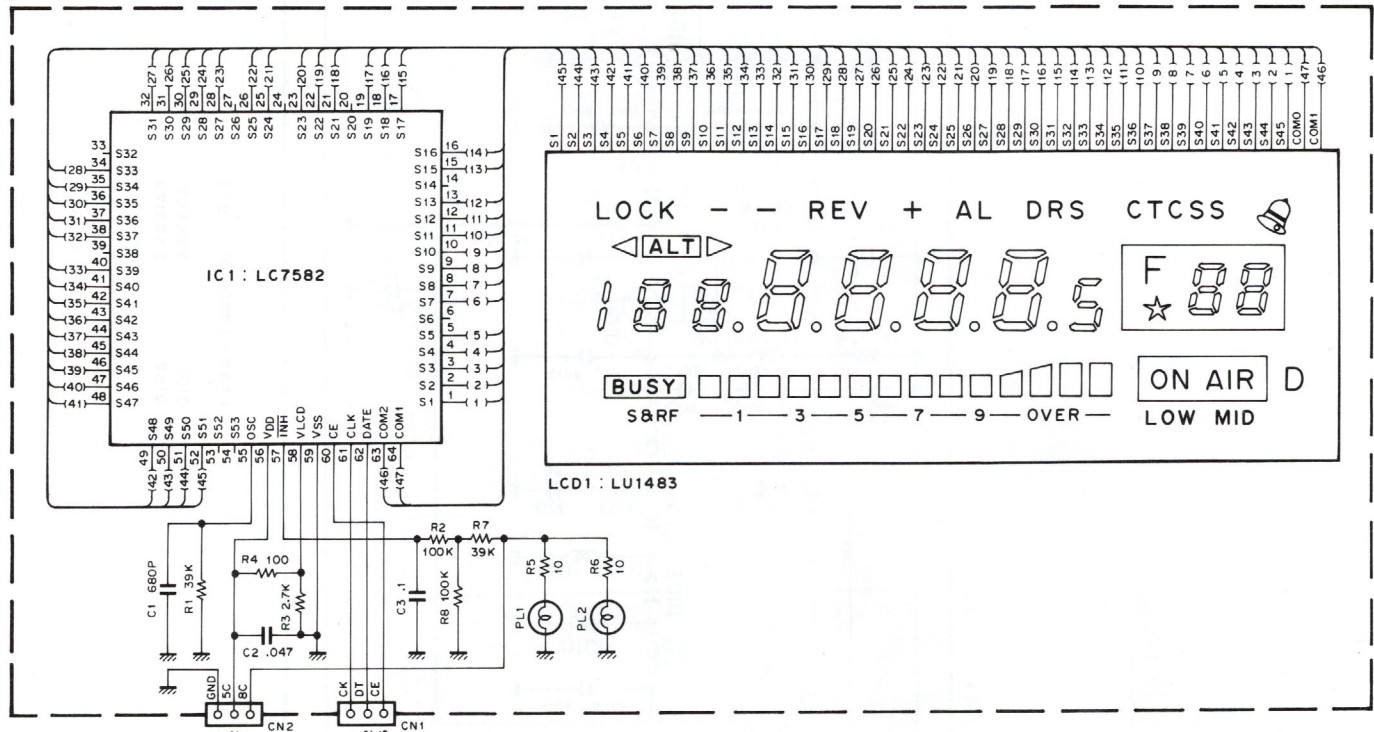
L12: Gain (430MHz)

TC1, TC2: Helical (430MHz)

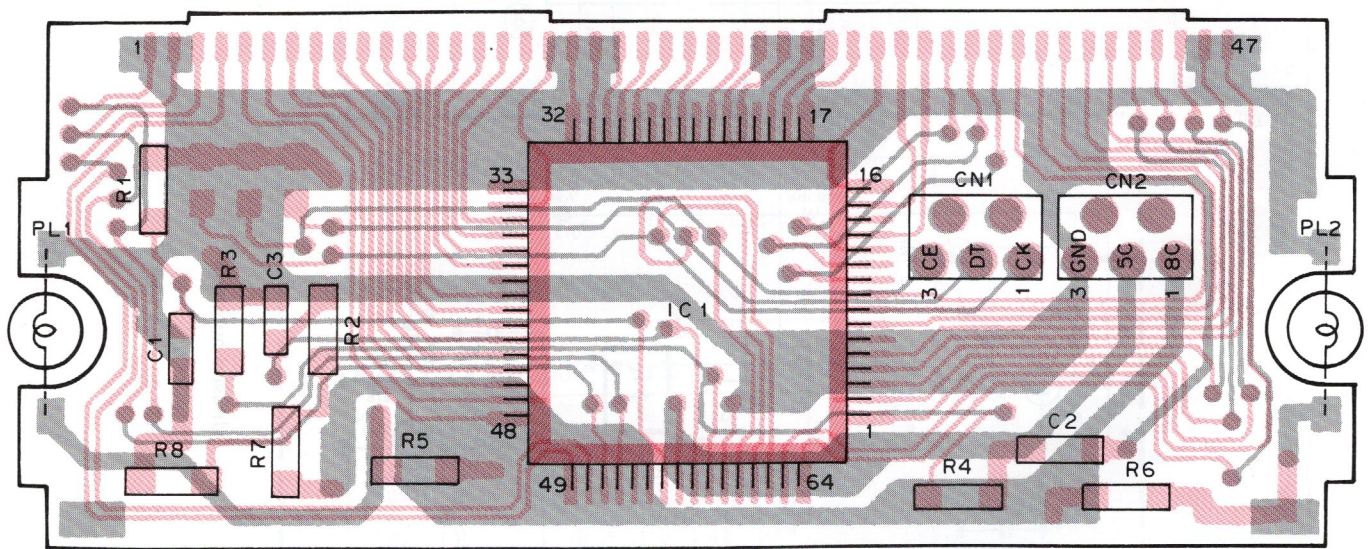
TC3: Transmit frequency

PC BOARD VIEW/CIRCUIT DIAGRAM TM-701A/E

LCD ASS'Y (B38-0311-05)



LCD ASS'Y (B38-0311-05) Component side view



IC1 : LC7582 LCD1 : LU1483

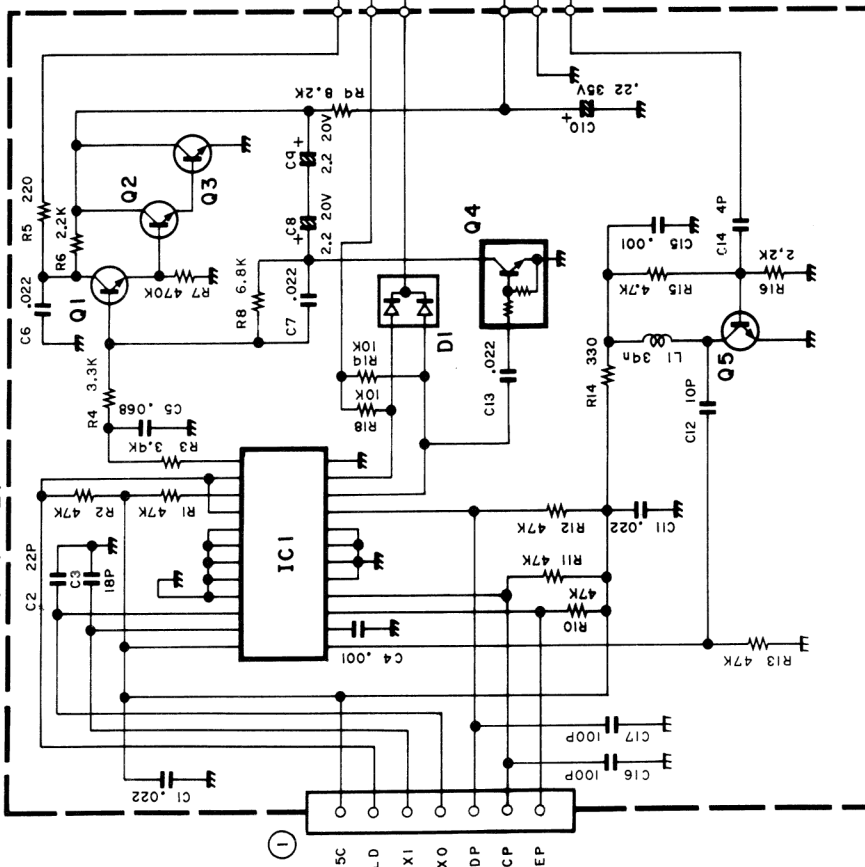
TM-701A/E CIRCUIT DIAGRAM

430PLL (X58-3480-01)

MO	O	5C
IOC	O	LD
8CL	O	XI
ST	O	XO
CV	O	DP
E	O	CP
HT	O	EP

(TOP VIEW)

(X58-3480-01) (A/2)



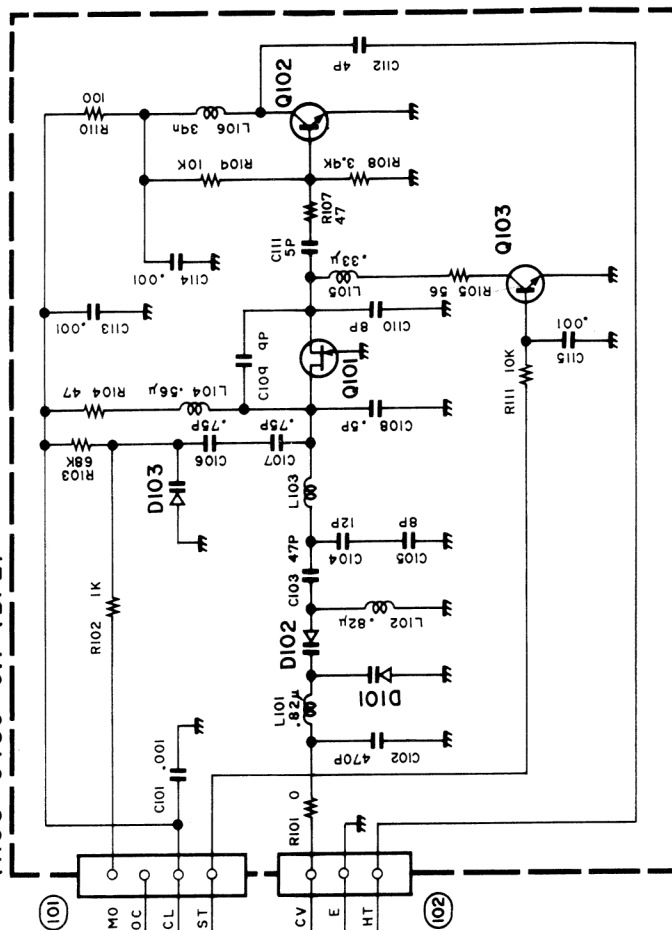
(X58-3480-01) (A/2)

IC 1 : M54959FP
Q1~3 : 2SC324(B)
Q4 : DTC144EK
Q5 : 2SC2714(Y)
DI : ISS184

Unused numbers

C18-100
R17,20-100,106

(X58-3480-01) (B/2)



(X58-3480-01) (B/2)

Q101 : 2SK582
Q102 : 2SC3120
Q103 : 2SC3324(G)
D101,102 : 1T33C
D103 : 1SV164

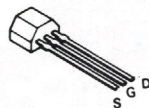
DTC114EK
DTC144EK
2SC2712(Y)
2SC2714(Y)
2SC3120
2SC3324(B,G)



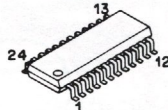
2SK508NV(K52)



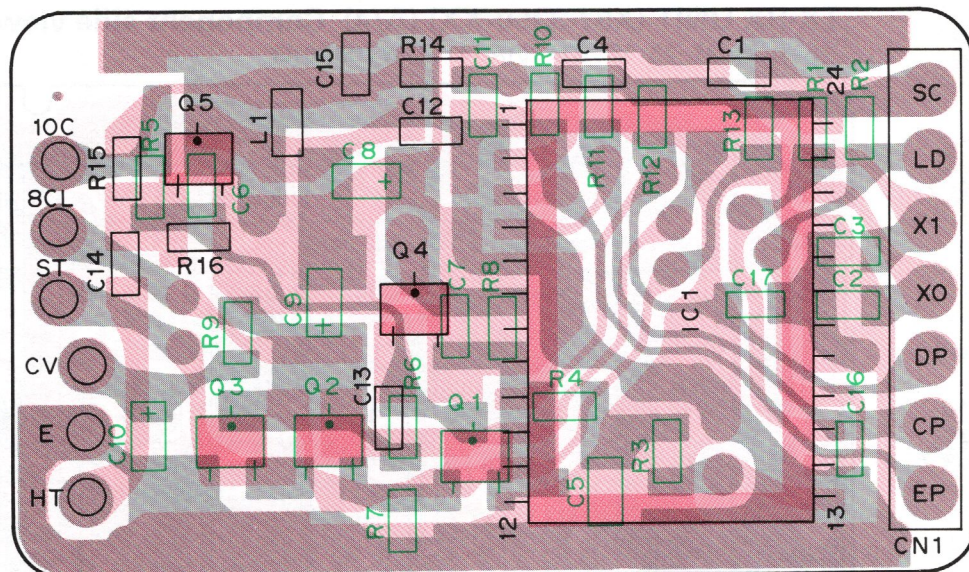
2SK582



M54959FP

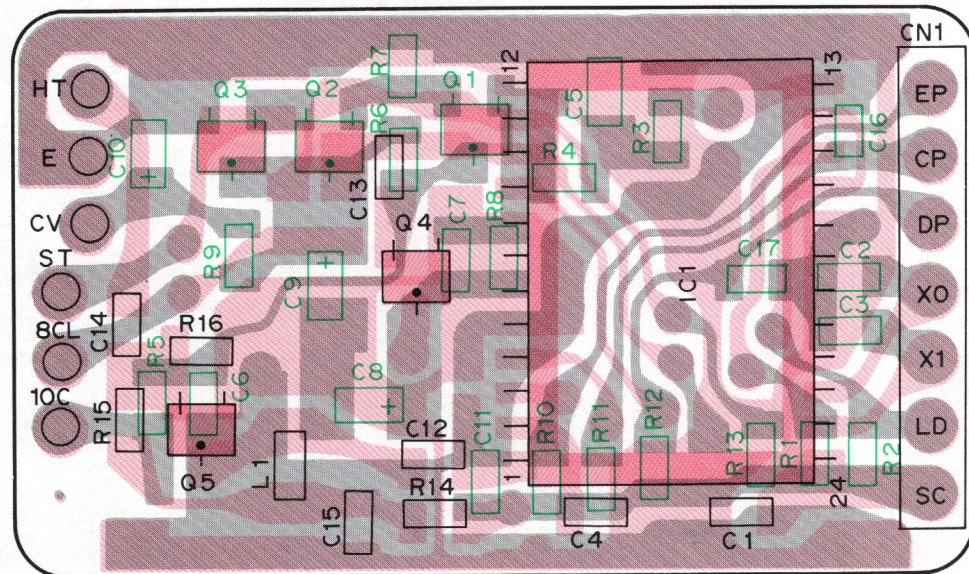


430PLL (X58-3480-01) (A/2) Component side view

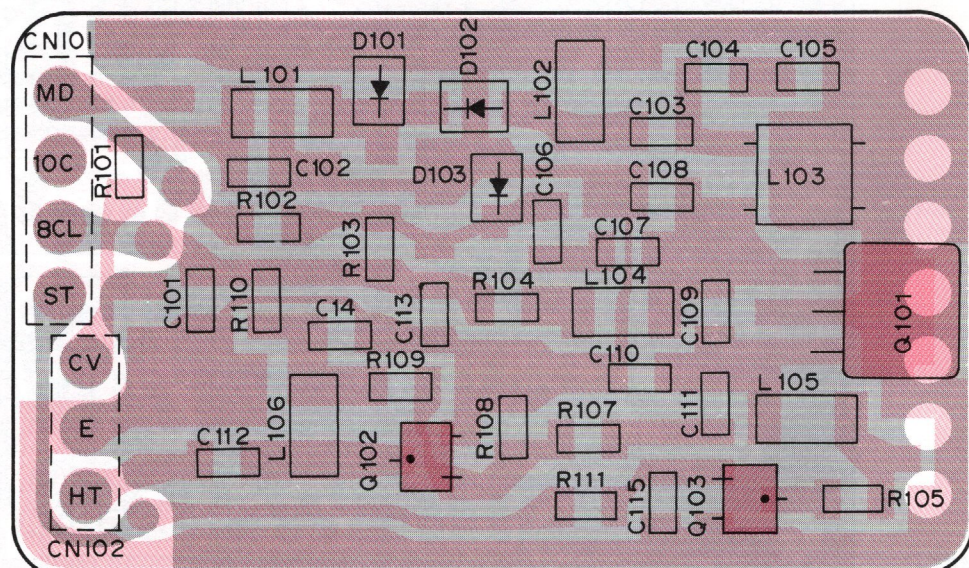


IC1 : M54959FP Q1~3 : 2SC3324 (B) Q4 : DTC144EK Q5 : 2SC2714 (Y) D1 : 1SS184

430PLL (X58-3480-01) (A/2) Foil side view



430PLL (X58-3480-01) (B/2) Component side view

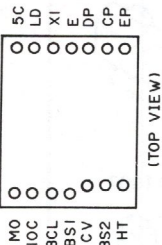


Q101 : 2SK582 Q102 : 2SC3120 Q103 : 2SC3324 (G) D101,102 : 1T33C D103 : 1SV164

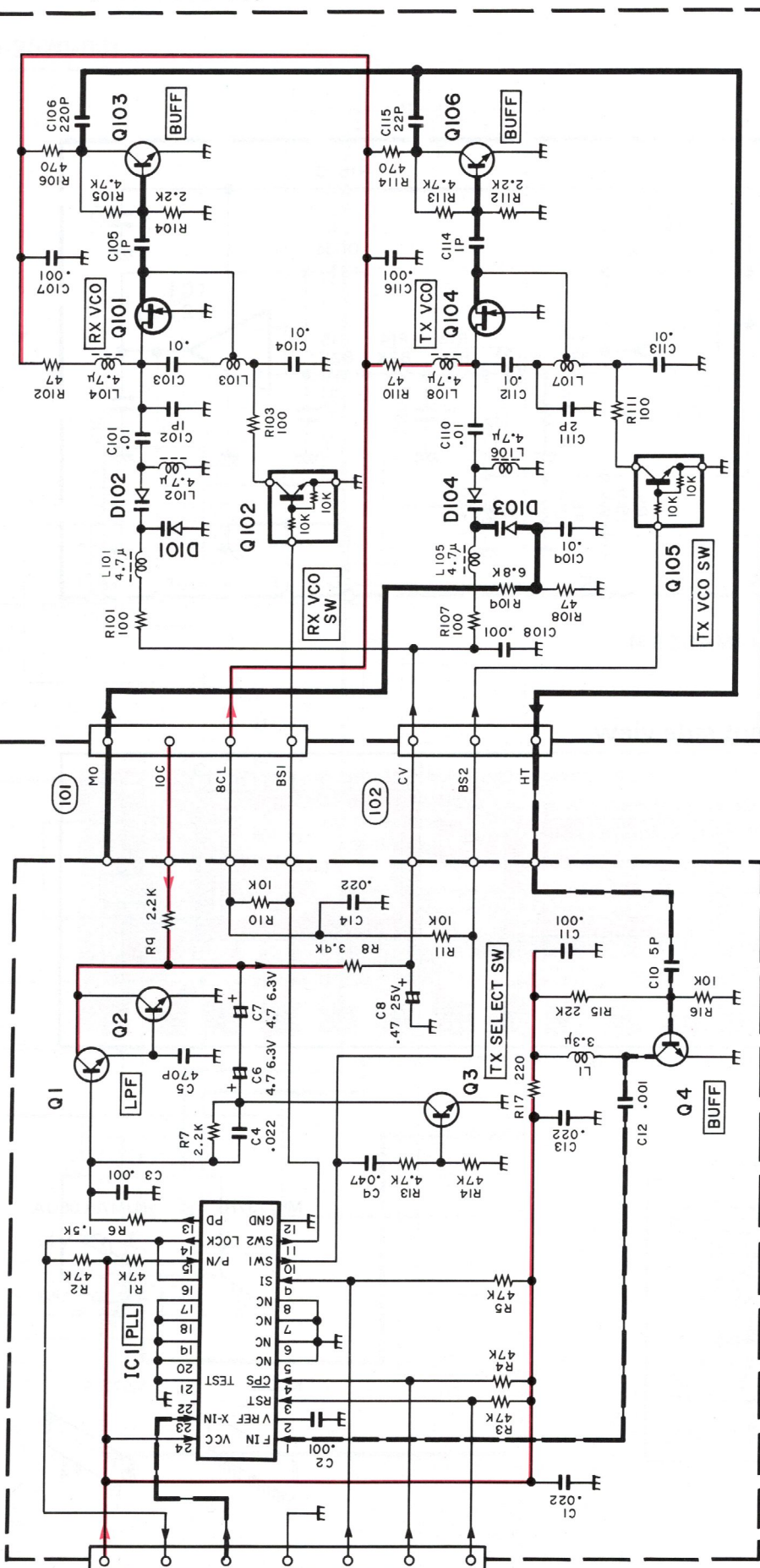
144PLL (X58-3500-00)

(X58-3500-00) (B/2)

(X58-3500-00) (A/2)



(TOP VIEW)



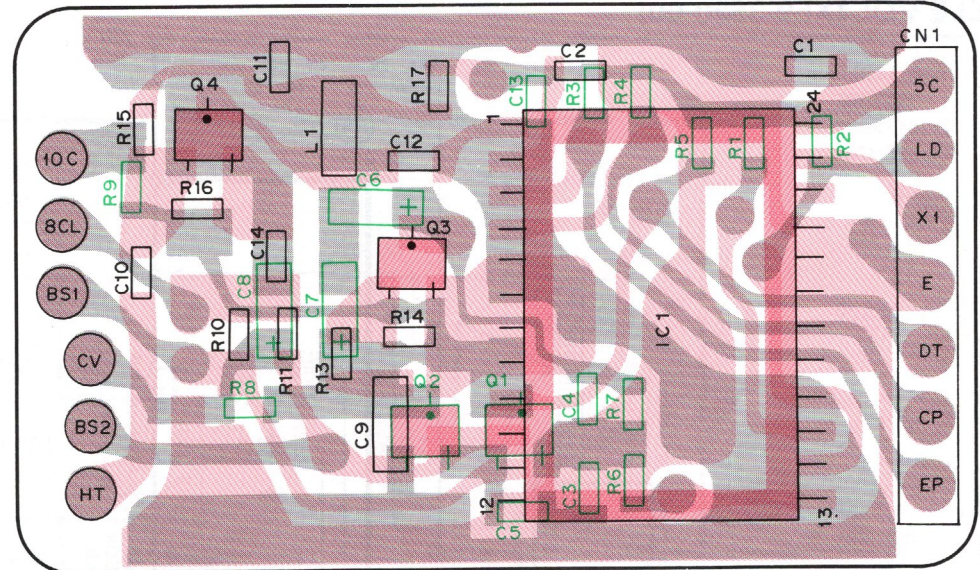
(X58-3500-00) (B/2)
 Q101, I04 : 2SK508NV (K52)
 Q102, I05 : DTC114EK
 Q103, I06 : 2SC3120
 D101 ~ I04 : ISV166

Unused numbers
 C15-100
 R12, 18-100

(X58-3500-00) (A/2)
 IC1 : M54959FP
 Q1, 2 : 2SC3324(B)
 Q3 : 2SC2712(Y)
 Q4 : 2SC2714(Y)

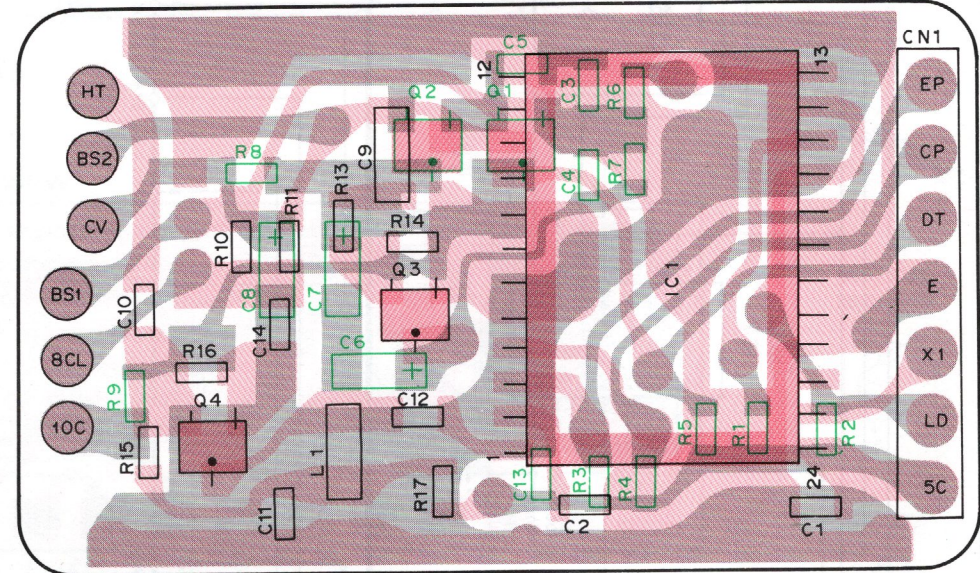
PC BOARD VIEWS/CIRCUIT DIAGRAMS TM-701A/E

▼PLL (X58-3500-00) (A/2) 部品面

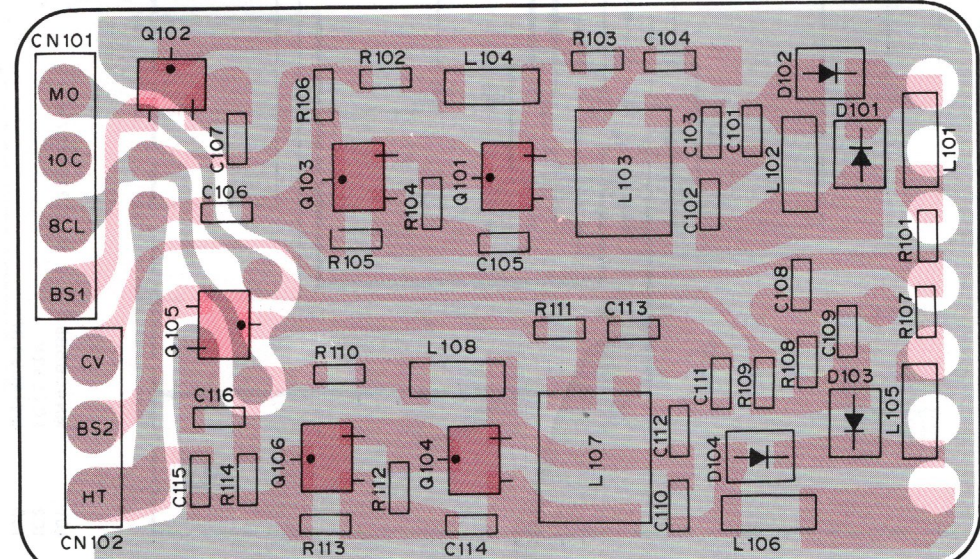


IC1 : M54959FP Q1,2 : 2SC3324 (B) Q3 : 2SC2712 (Y) Q4 : 2SC2714 (Y)

▼PLL (X58-3500-00) (A/2) ハンダ面



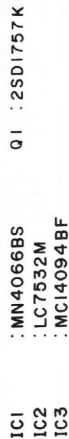
▼PLL (X58-3500-00) (B/2) 部品面



Q101,104 : 2SK508NV (K52) Q102,105 : DTC114EK Q103,106 : 2SC3120 D101~104 : 1SV166

(X59-3620-00)

44



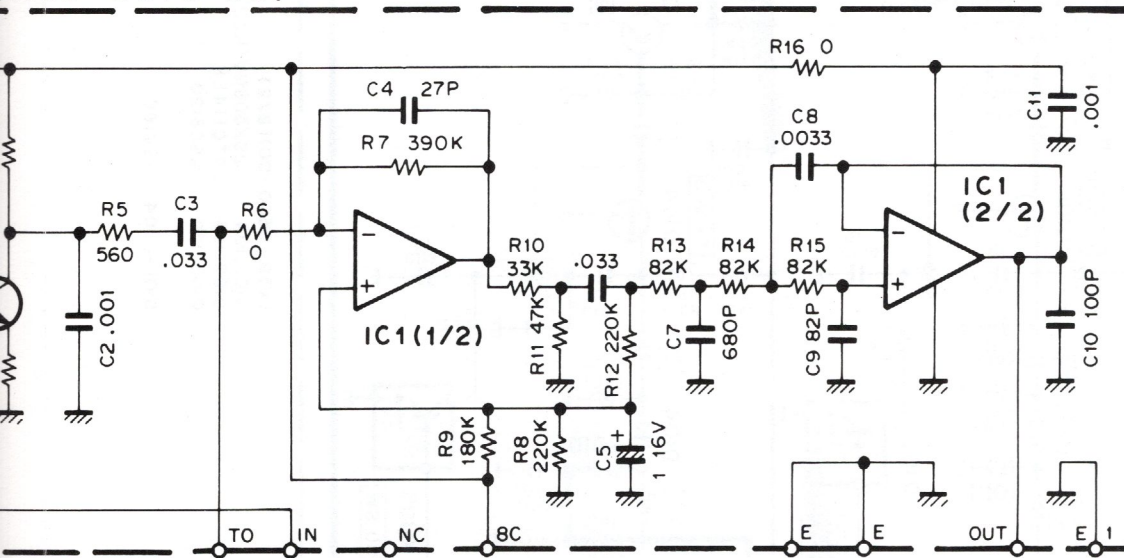
Q 1 : 2SC4116(Y)

IC1 : MN4066BS IC2 : LC7532M IC3 :

Q1 : 2SC4116(Y) IC1 : NJM4558M

59-3610-00)

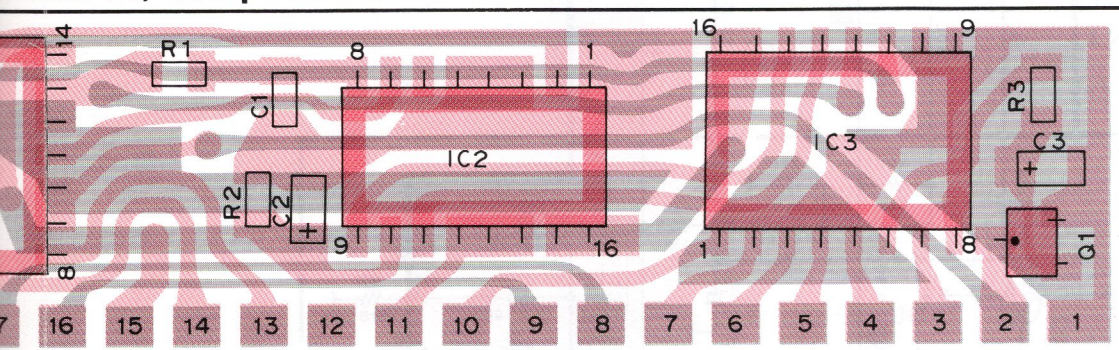
X59-3610-00)



4116 (Y)

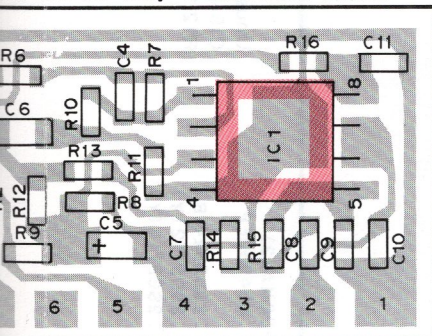
IC1 : NJM4558M

9-3620-00) Component side view



IC2 : LC7532M IC3 : MC14094BF Q1 : 2SD1757 (K)

59-3610-00) Foil side view



IC1 : NJM4558M

DTC114EK
2SA1162 (Y)
2SC2712 (Y)
2SC2714 (Y)
2SC3120
2SC4116(Y)
2SD1757(K)



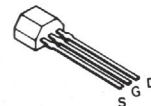
2SK208(O)



3SK131(V12)
3SK184(S)



2SK582



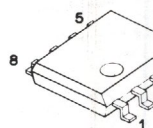
2SB1119S
2SB1302S



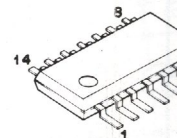
2SA1307



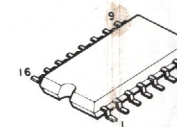
LA5010M
NJM4558M



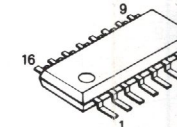
MN4066BS



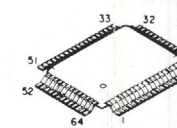
MC14094BF



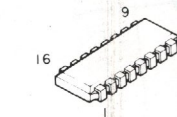
LC7532M



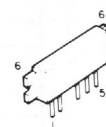
75108 G-E19-1



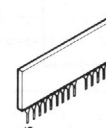
KRR-C001



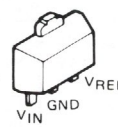
M57737R



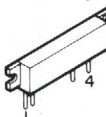
KCC03



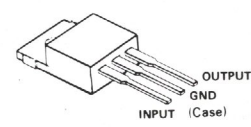
NJM78L06UA



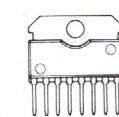
M57729



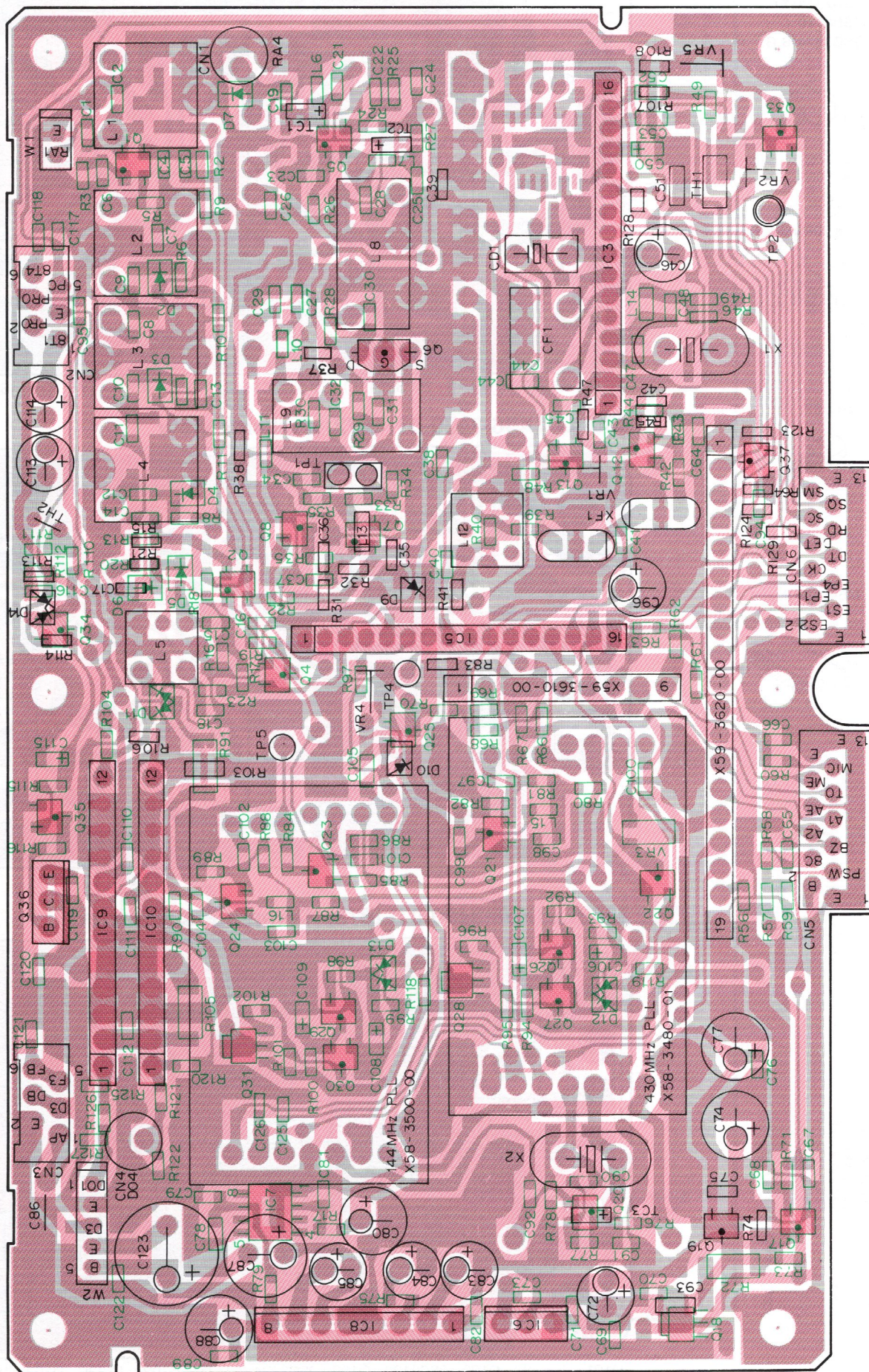
μPC78M08H



μPC1241H



46

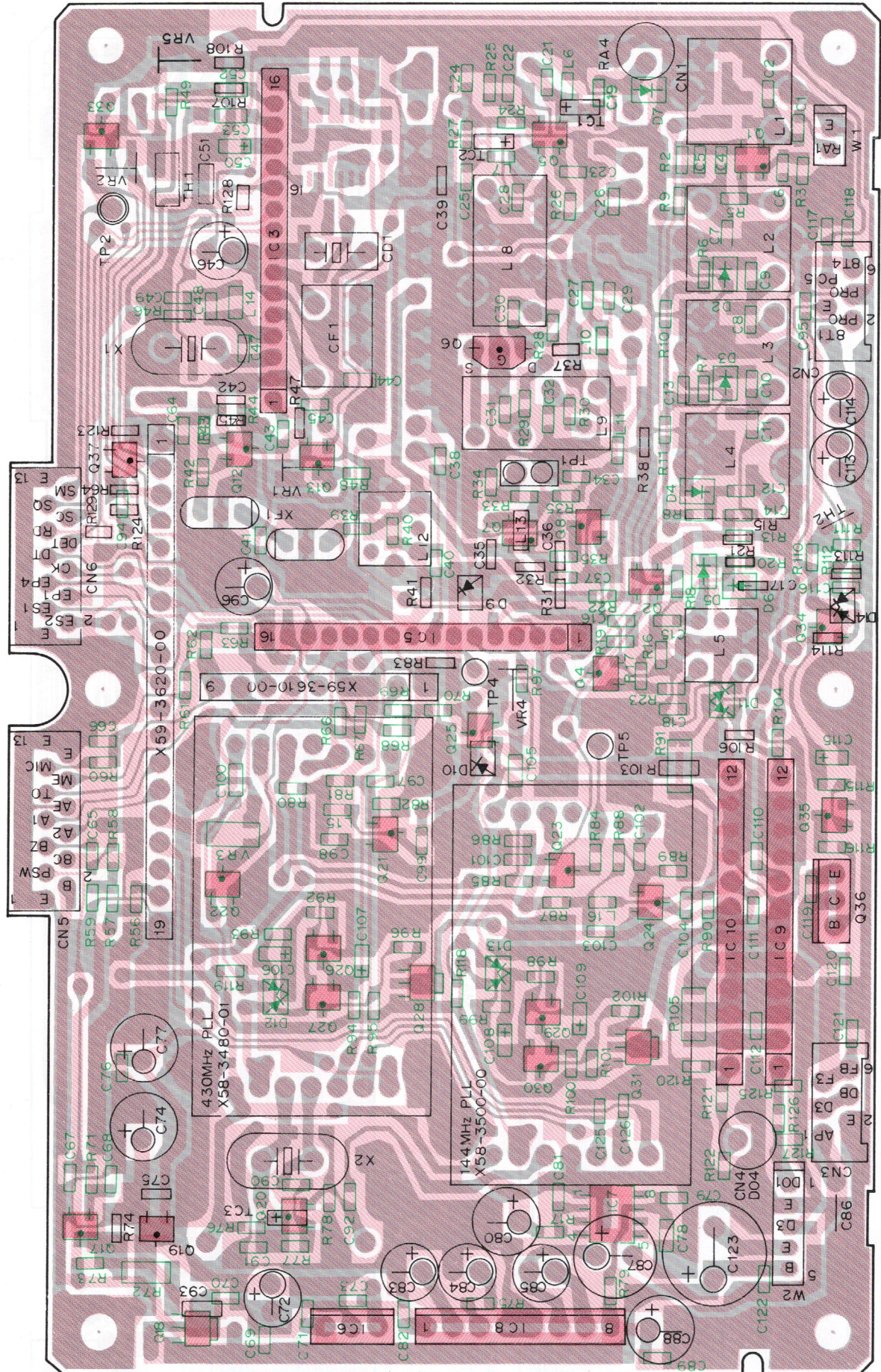


PC BOARD VIEWS

TM-701A/E

TX-RX UNIT (X57-3350-XX)(A/4) Foil side view

-11 : K, -21 : M, -22 : M2, (TM-701A) -61 : T, W (TM-701E)

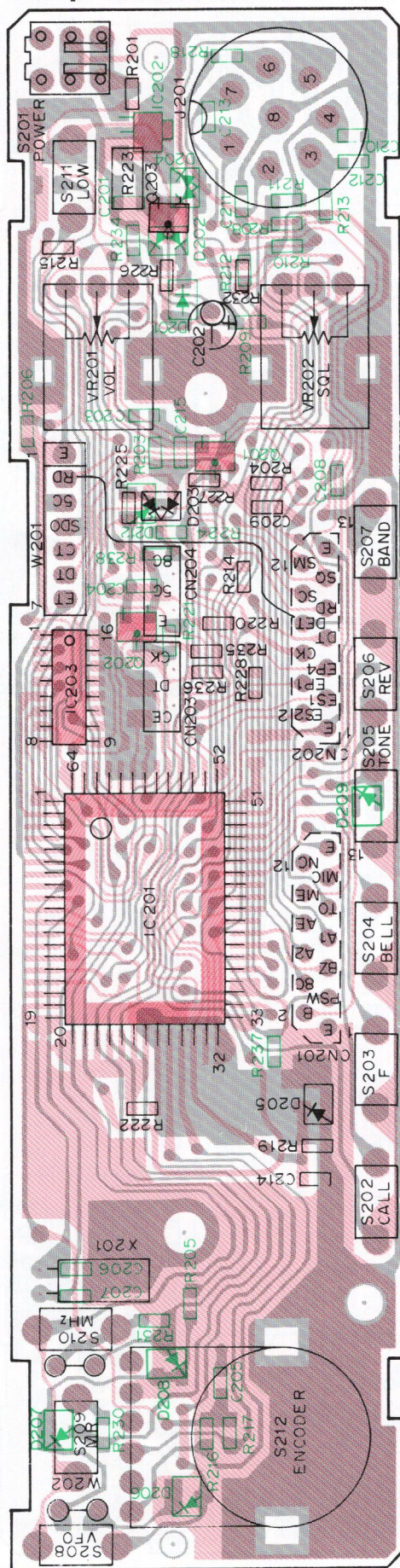


IC3 : KCD01 IC5 : KCC03 IC6 : LA5010M IC7 : LA5010M IC8 : LA5010M IC9 : KCB05 IC10 : KCB06 Q1, 5, 7 : 3SK184(S) Q2 : 3SK131(V12) Q4, 8, 13, 22, 25, 27, 30, 33 : DTC114EK Q6 : 2SK582 Q12, 20, 24 : 2SC2714(Y) Q17, 19, 26, 29, 35 : 2SC2712(Y) Q18 : 2SB1302(S) Q21 : 2SC3120 Q23 : 2SK208(O) Q28, 31 : 2SB1119S Q34 : 2SA1162(Y) Q36 : 2SA1307(Y) Q37 : 2SD1757(K) D2 ~ 4 : 1SV164 D5, 6 : 1SV166 D7 : HSK277 D9, 10 : 1SV128 D11 : 1SS268 D12 ~ 14 : 1SS184

TM-701A/E PC BOARD VIEWS

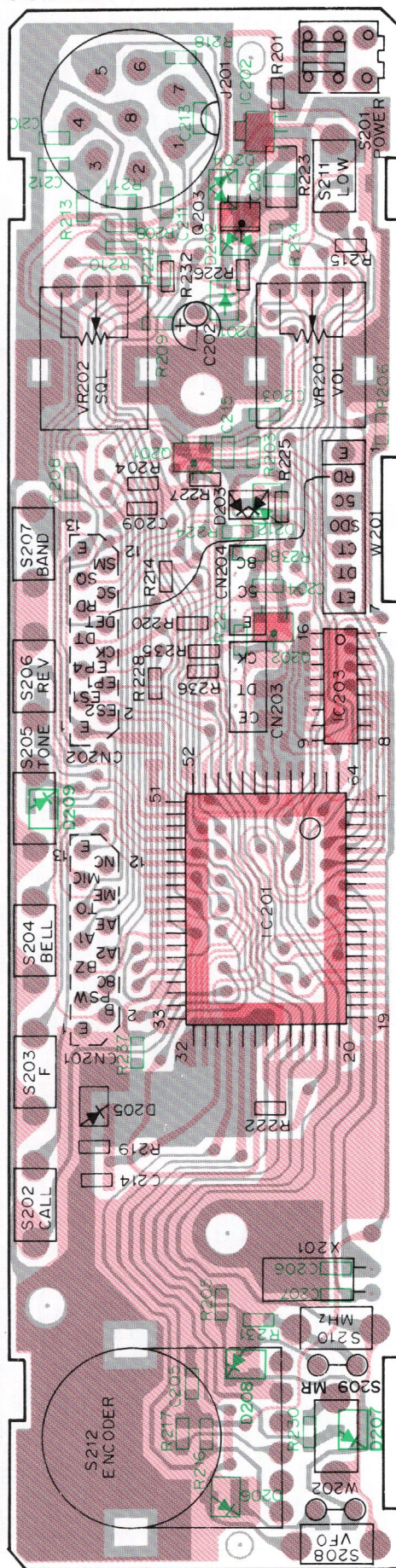
TX-RX UNIT (X57-3350-XX)(B/4) -11 : K, -21 : M, -22 : M2, (TM-701A) -61 : T, W (TM-701E)

Component side view



IC201 : 75108G-E19-1B IC202 : NJM78L06UA IC203 : KRR-C001 Q201, 202 : 2SC2712(Y) Q203 : 2SA1519 D201 : DLS1585 D202, 206 ~ 208 : 1SS181 D203 : 1SS184 D204 : 1SS187 D205 : 1SS196 D209 : MA141A D212 : 02CZ.5(X)

Foil side view



PC BOARD VIEWS TM-701A/E

TX-RX UNIT (X57-3350-XX)(C/4) -11 : K, -21 : M, -22 : M2, (TM-701A) -61 : T, W (TM-701E)

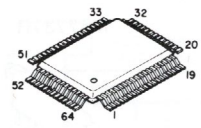
Component side view

Foil side view

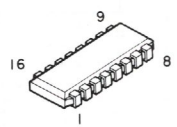
2SA1519
2SC2712(Y)



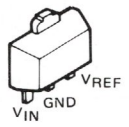
75108G-E19-1B



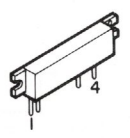
KRR-C001



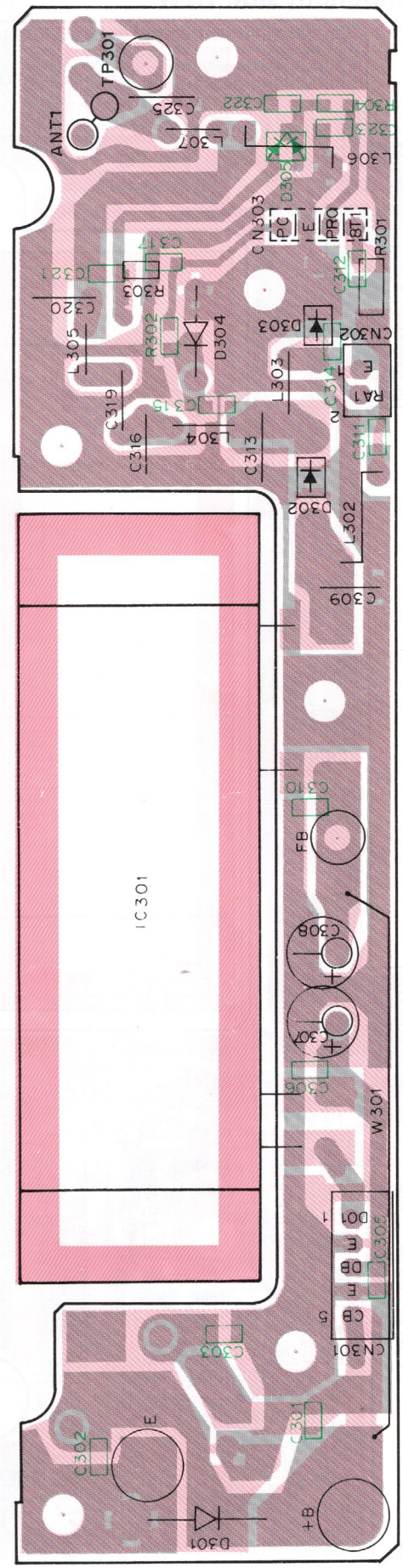
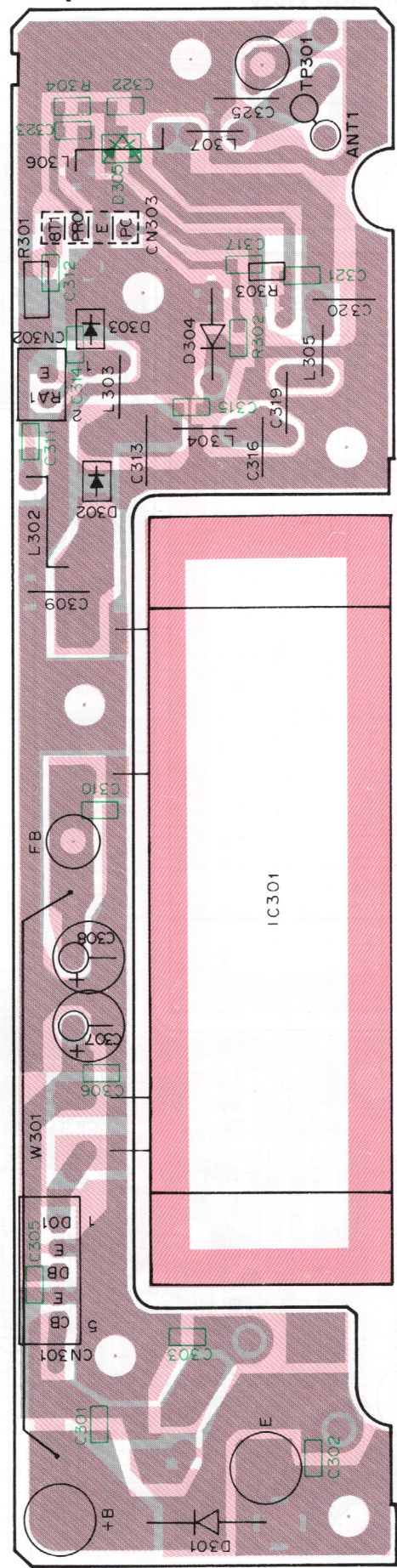
NJM78L06UA



M57729

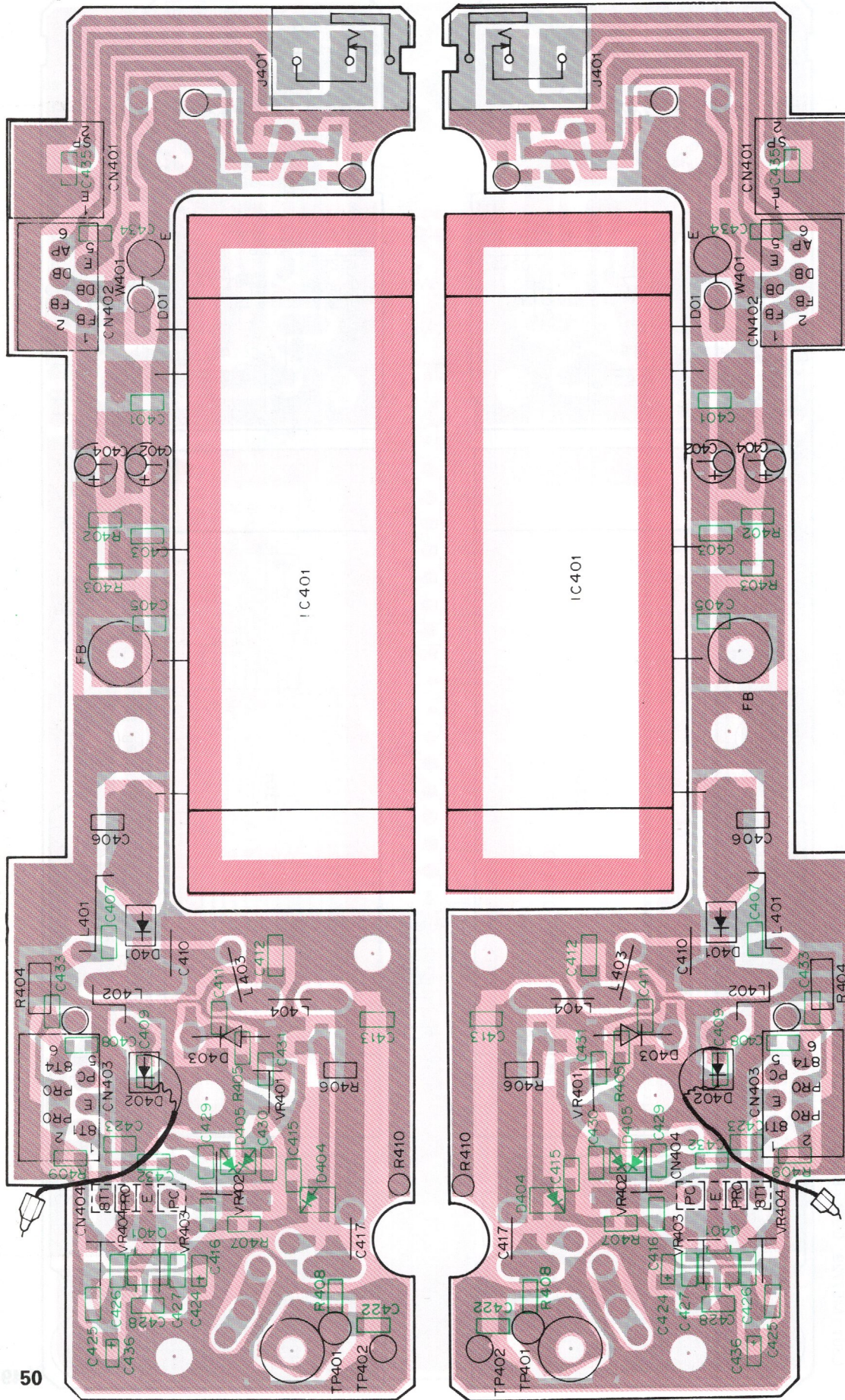


IC301 : M57729 D301 : DSA3A1 D302 : M1407 D303 : M1308 D304 : 1SS101 D305 : 1SS184

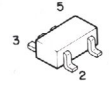


TM-701A/E PC BOARD VIEWS

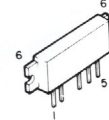
TX-RX UNIT (X57-3350-XX)(D/4) -11 : K, -21 : M, -22 : M2, (TM-701A) -61 : T, W (TM-701E)
 Component side view Foil side view



FMW1

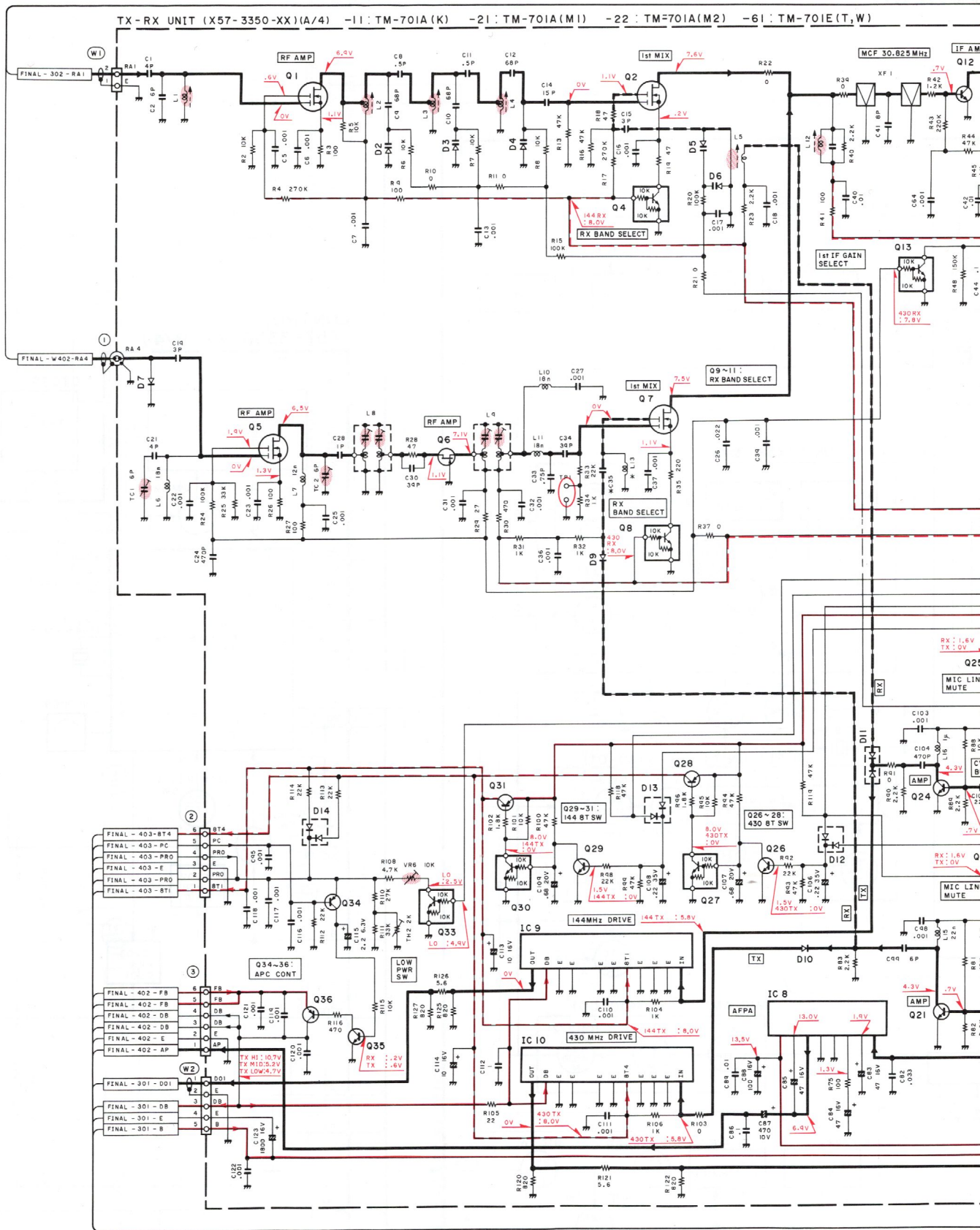


M57737R



IC401 : M57737R Q401 : FMW1 D401 : MI407 D402 : MI308 D403 : 1SS101 D404 : MA716 D405 : 1SS184

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



IC3 : KCD01
IC5 : KCC03
IC6 : μ PC78M08H
IC7 : LA5010M
IC8 : μ PC1241H
IC9 : KCB05
IC10 : KCB06

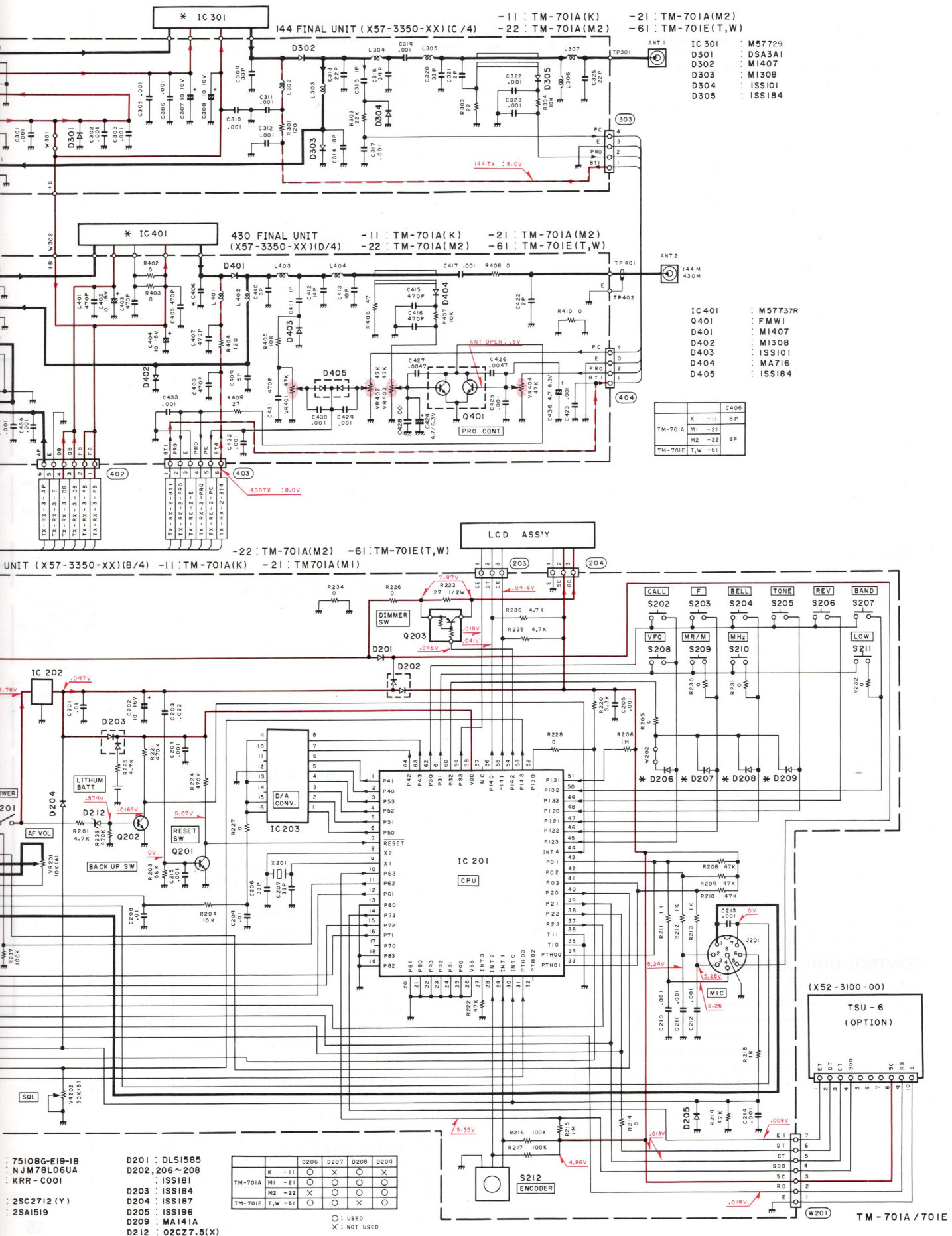
Q1,5,7 : 3SK184(S)
Q2 : 3SK131(VI2)
Q4,8,13,22,25,27,30,33 : DTC114EK
Q6 : 2SK582
Q12,20,24 : 2SC2714(Y)
Q17,19 : 2SC2712(Y)
Q26,29,35 : 2SB1302S
Q18 : 2SB1302S
Q21 : 2SC3120

Q23 : 2SK208(O)
Q26,31 : 2SB1119S
Q34 : 2SA1142(Y)
Q36 : 2SA1307(Y)
Q37 : 2SC1757(K)

D2~4 : 1SV164
D5,6 : 1SV166
D7 : HSK277
D9,10 : 1SV128
D11 : ISS268
D12~14 : ISS184

		L13	R61	R62	C35
TM-701A	K -11	27k	2.7k	4.7k	3P
	M1 -21	34k	2.7k	4.7k	5P
	M2 -22	34k	2.7k	4.7k	5P
TM-701E	T,W -61	34k	0	6.8k	5P

SCHEMATIC DIAGRAM TM-701A/E



TERMINAL FUNCTIONS

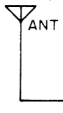
Connector No.	Terminal No.	Terminal Name	Terminal Function
TX-RX UNIT (X57-3350-XX) (A4)			
CN1	1	RA4	430MHz ANT input
CN2	1	8T4	8V in transmit mode (430MHz)
	2	PC	APC input
	3	PRO	Protection input
	4	E	GND
	5	PRO	Protection
	6	8T1	8V in transmit mode (144MHz)
CN3	1	AP	Audio output (from AF PA IC)
	2	E	GND
	3	DB	Drive + B
	4	DB	Drive + B
	5	FB	Final + B (13.8V)
	6	FB	Final + B (13.8V)
CN4	1	DO4	430MHz drive output
CN5	1	E	GND
	2	B	+13.8V
	3	PSW	Power switch control output (from microprocessor)
	4	8C	Common + 8V
	5	BZ	Beeper output (from microprocessor)
	6	A2	AF output (from AF VOL)
	7	A1	AF output (from electronic VOL)
	8	AE	GND
	9	TO	Tone output (from ladder resister network IC IC203)
	10	ME	MIC GND
	11	MIC	MIC output
	12	E	GND
	13	E	GND
CN6	1	E	GND
	2	ES2	430MHz shift register enable (from microprocessor)
	3	ES1	144MHz shift register enable (from microprocessor)
	4	EP1	144MHz shift register enable (to 144MHz PLL)
	5	EP4	430MHz shift register enable (to 430MHz PLL)
	6	CK	PLL clock
	7	DT	PLL data
	8	NC	
	9	RD	Audio output (from IC3 KCD01)
	10	SC	Busy control output (from IC3 KCD01)
	11	SQ	Squelch output (from IC3 KCD01)
	12	SM	S-meter output (from IC3 KCD01)
	13	E	
W1	1	E	GND
	2	RA1	144MHz receive ANT input
W2	1	DO1	144MHz transmit drive output
	2	E	GND
	3	DB	Drive + B
	4	E	GND
	5	B	13.8V
CONTROL UNIT (X57-3350-XX) (B/4)			
CN201	1	E	GND
	2	B	+ 13.8V (to power switch)
	3	PSW	Power switch control output (from microprocessor IC)
	5	BZ	Beeper output (from microprocessor P20)
	6	AZ	Audio output (from AF VOL)
	7	A1	Audio input (from electronic VOL)
	8	AE	GND (AF VOL)
	9	TO	Tone output (from ladder register network IC203)
	10	ME	MIC GND
	11	MIC	MIC output (from mic jack)
	12	NC	
	13	E	GND

Connector No.	Terminal No.	Terminal Name	Terminal Function
CN202	1	E	GND
	2	ES2	430MHz shift register enable output
	3	ES1	144MHz shift register enable output
	4	EP1	144MHz PLL enable output
	5	EP4	430MHz PLL enable output
	6	CK	PLL clock
	7	DT	PLL data
	8	NC	
	9	RD	Audio output (to microprocessor INT0)
	10	SC	Busy control output (to microprocessor P130)
	11	SQ	Squelch output
	12	SM	S-meter output (to microprocessor TPH03)
	13	E	GND
CN203	1	CE	LCD driver enable output (from microprocessor P33)
	2	DT	LCD driver data (from microprocessor P140)
	3	CK	LCD driver clock (from microprocessor P141)
CN204	1	E	GND
	2	5C	Common + 5V
	3	8C	Common + 8V
W201	1	ET	CTCSS unit enable output (from microprocessor P73)
	2	DT	CTCSS unit data output (from microprocessor P22)
	3	CT	CTCSS unit clock output (from microprocessor P21)
	4	SDD	CTCSS tone matching input
	5	5C	+5V
	6	RD	Audio demodulation output (to CTCSS unit)
	7	E	GND
144 FINAL UNIT (X57-3350-XX) (C/4)			
CN301	1	DO1	144MHz transmit drive output
	2	E	GND
	3	DB	Transmit drive stage + B
	4	E	GND
	5	B	13.8V
CN302	1	E	GND
	2	RA1	144MHz receiver ANT input
+		+ B	13.8V (from fuse holder)
		E	GND
430FINAL UNIT (X57-3350-XX) (D/4)			
CN401	1	SP	Speaker output (to speaker)
	2	E	GND
CN402	1	FB	+13.8V
	2	FB	+13.8V
	3	DB	Module transmit drive stage + B
	4	DB	Module transmit drive stage + B
	5	E	GND
	6	AP	AF output (to EXT SP jack)
CN403	1	8T1	+8V in transmit mode (430MHz)
	2	PRO	Protection input
	3	E	GND
	4	PRO	Protection input
	5	PC	APC input
	6	8T4	+8V in transmit mode (430MHz)
CN404	1	8T1	+8V in transmit mode (144MHz) (to 144final unit)
	2	PRO	Protection input (from final unit)
	3	E	GND
	4	PC	APC input (from 144final unit)
J401			EXT. SP jack
TP401		ANT2	ANT connector
W401		E	GND
		DO4	430MHz drive output
W402		E	GND
		RA4	430MHz receive ANT output
W302		E	GND
		+B	+13.8V

144 ~ 148MHz
(K,M,M2)
144 ~ 146MHz
(T,W)

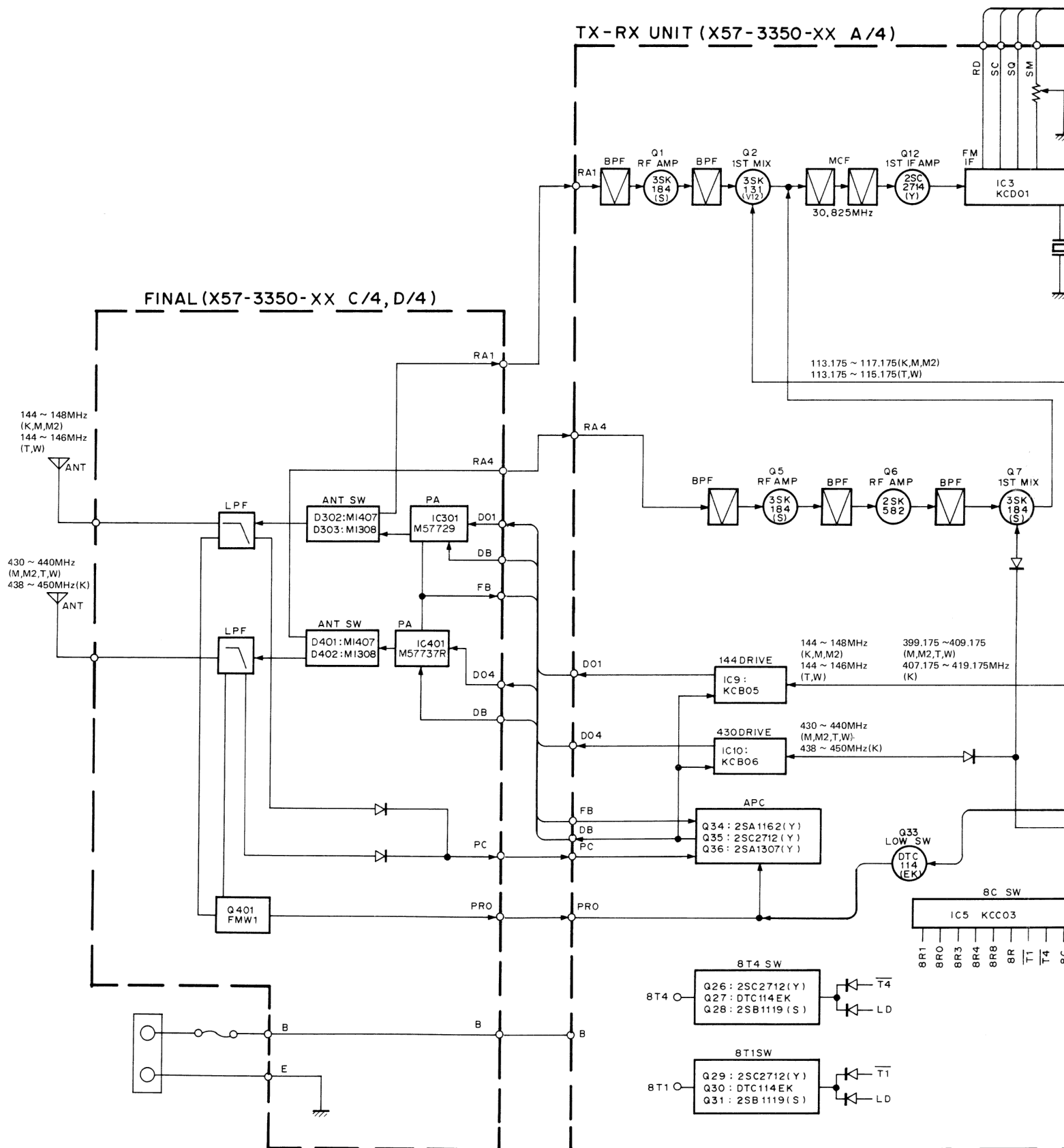


430 ~ 440MHz
(M,M2,T,W)
438 ~ 450MHz(K)



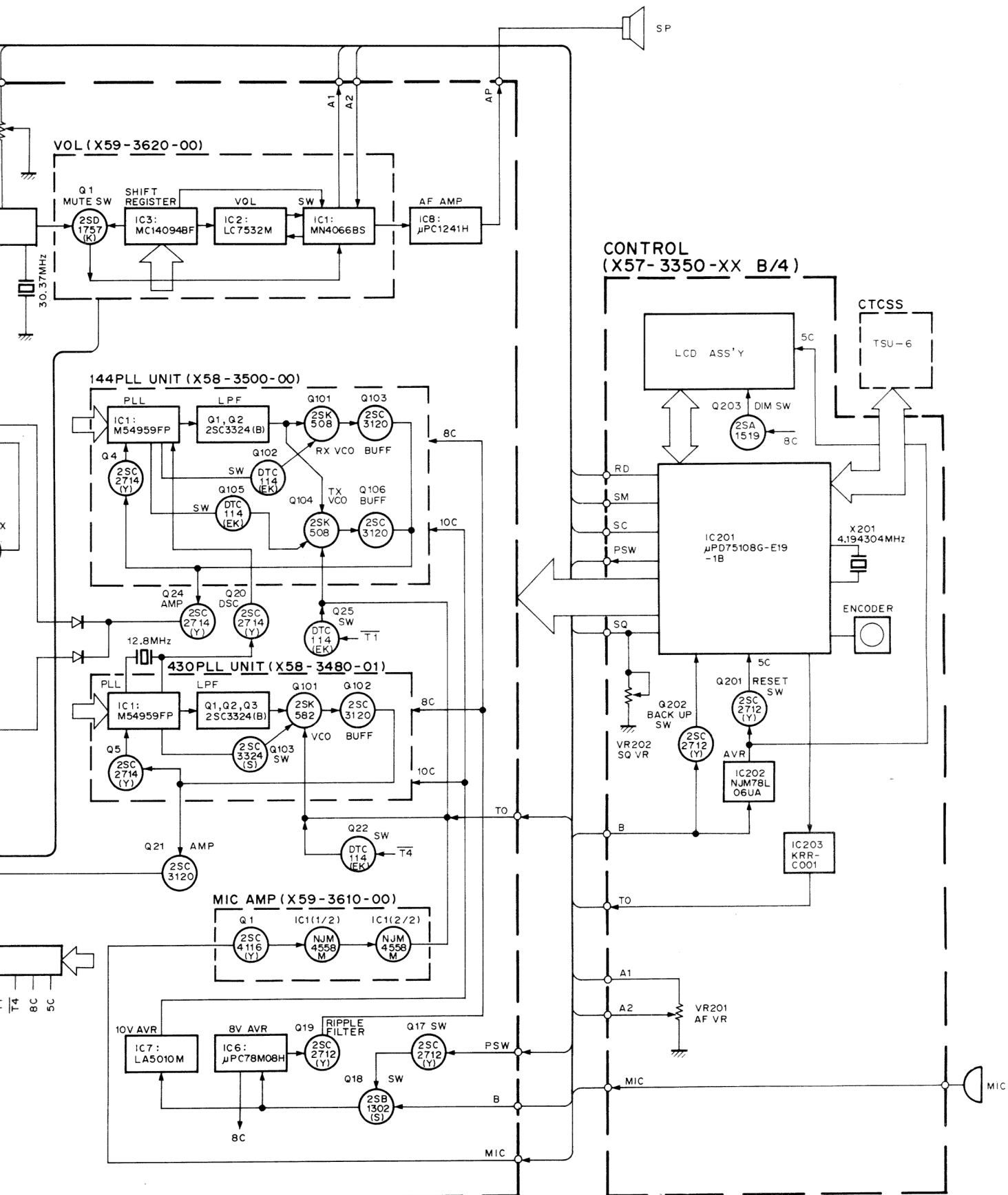
TM-701A/E

BLOCK DIAGONALIZATION



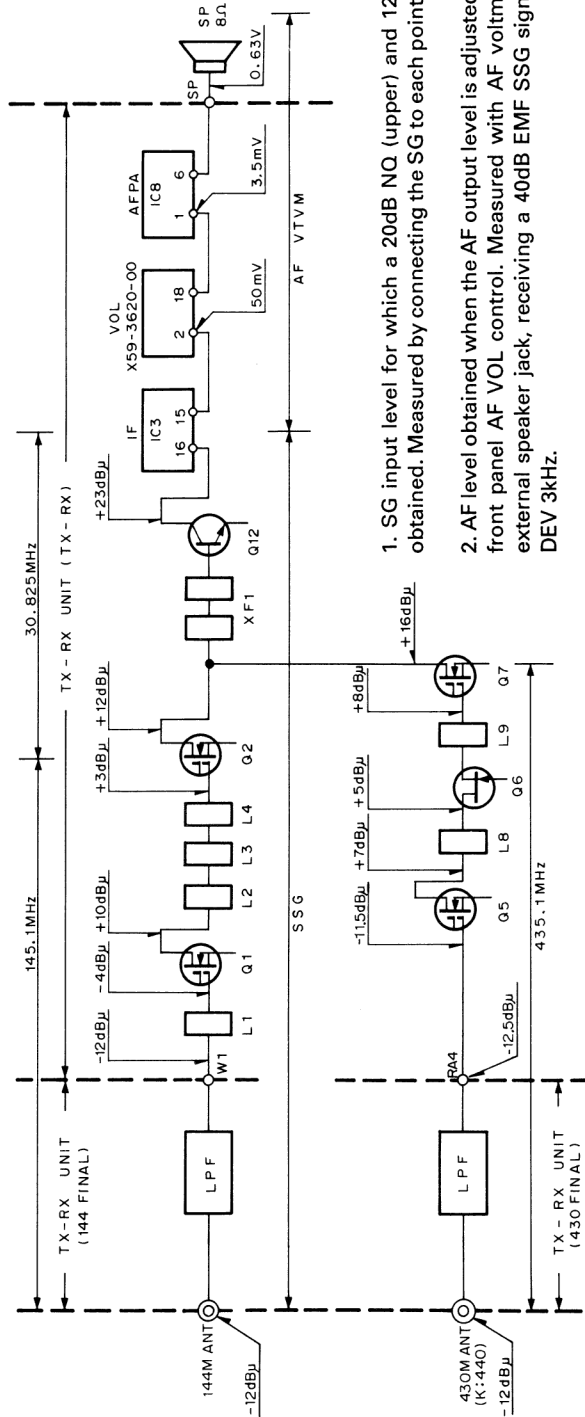
TM-701A/E

GRAM



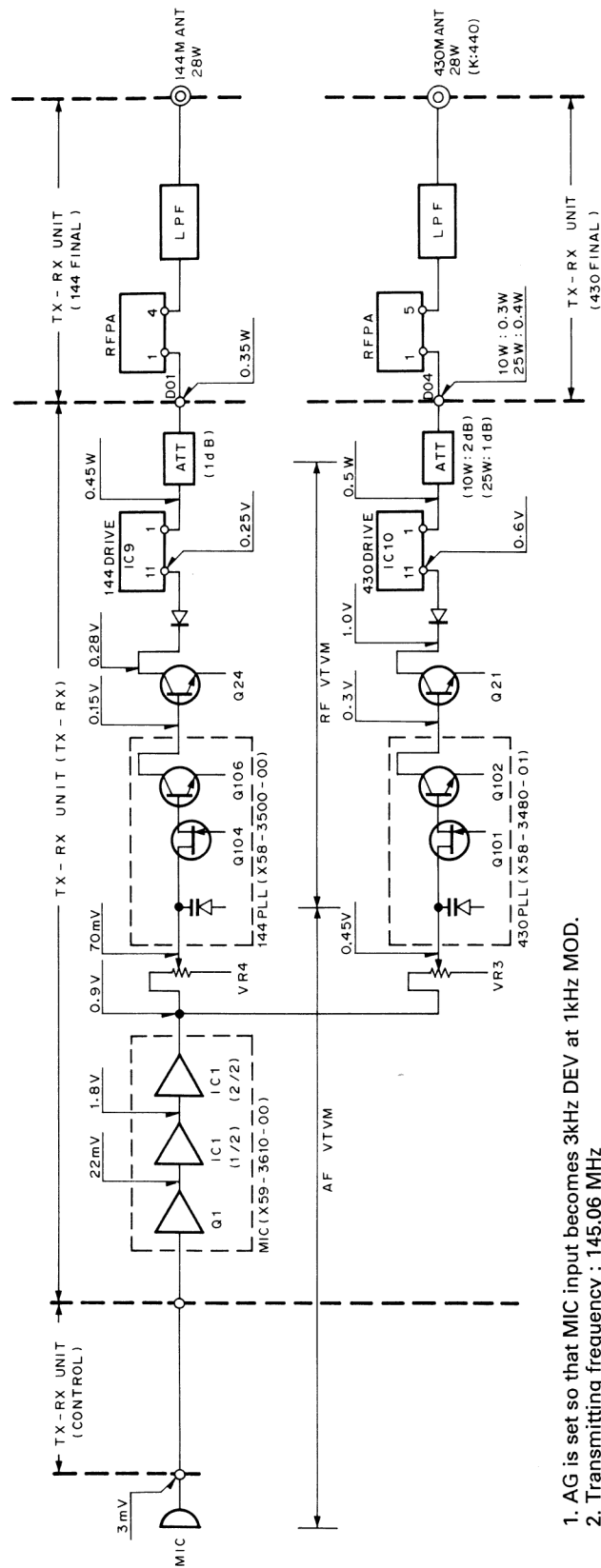
LEVEL DIAGRAM

Receiver section



1. SG input level for which a 20dB NO (upper) and 12dB SINAD (lower) are obtained. Measured by connecting the SG to each point via a 0.01 μ F capacitor.
2. AF level obtained when the AF output level is adjusted for 0.63V/8 Ω with the front panel AF VOL control. Measured with AF voltmeter connected to the external speaker jack, receiving a 40dB EMF SSG signal modulated at 1kHz, DEV 3kHz.

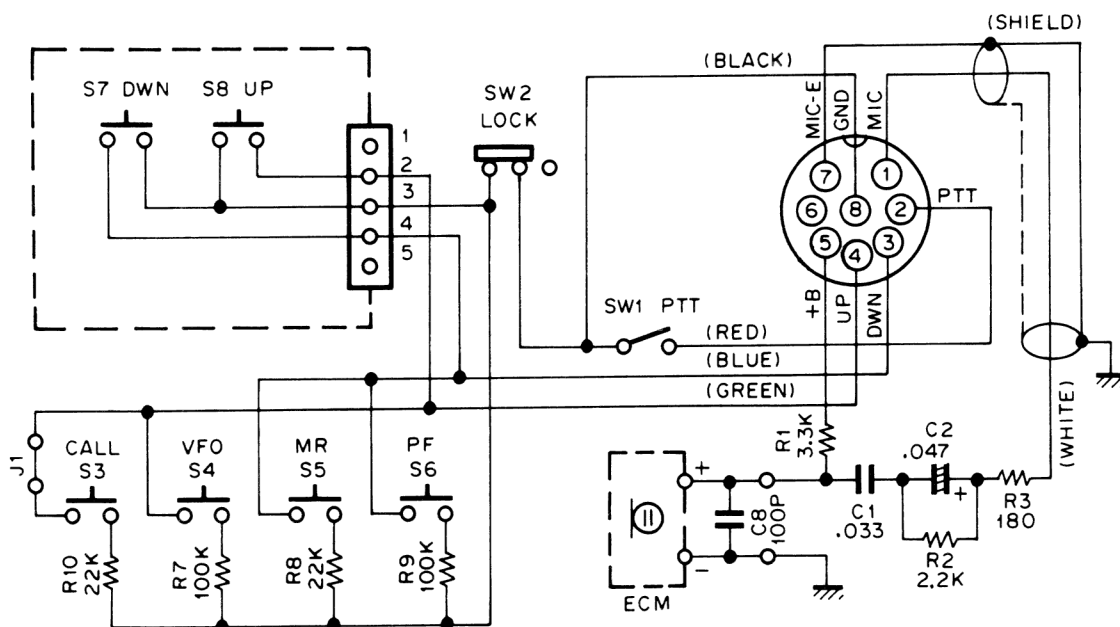
Transmitter section



1. AG is set so that MIC input becomes 3kHz DEV at 1kHz MOD.
2. Transmitting frequency : 145.06 MHz

MC-44 (MULTI FUNCTION MICROPHONE)

MC-44 SCHEMATIC DIAGRAM



MC-44 PARTS LIST

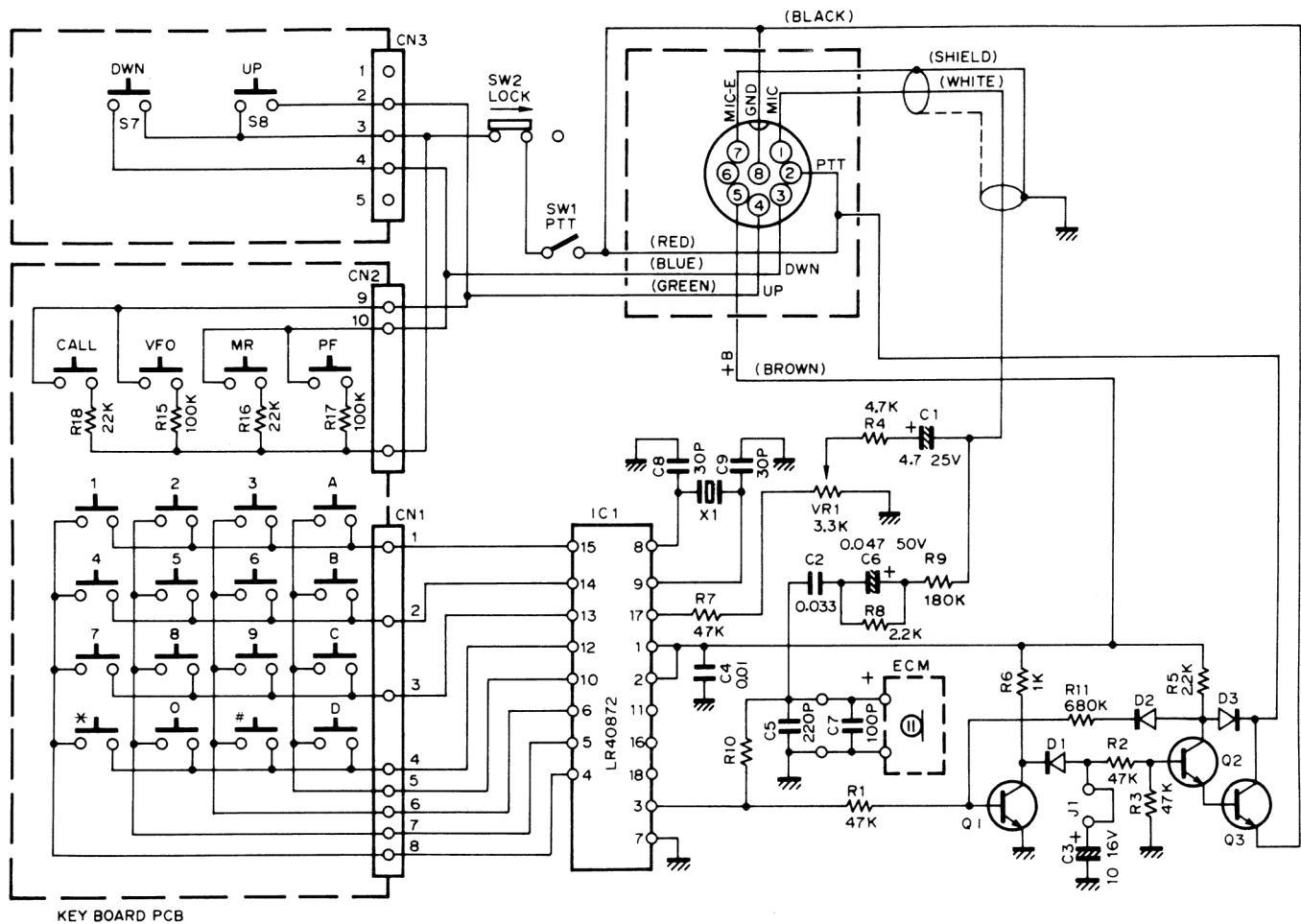
Ref. No.	New parts	Parts No.	Description
	*	A02-0896-08	Case (Front)
	*	A02-0900-08	Case (Rear)
	*	B50-8293-08	Instruction manual
		E30-2149-08	Curl cord
	*	K29-3165-08	Knob PTT
	*	K29-3168-08	Knob UP
	*	K29-3169-08	Knob DOWN
	*	K29-3170-08	Knob CALL, VFO, MR, PF
SW2	*	S31-1422-08	Slide switch LOCK
SW1	*	S50-1431-08	Micro switch PTT
S7, 8	*	S59-1409-08	Switch UP, DOWN
	*	T91-0383-08	Microphone element (Condenser microphone)

MC-44DM/44DME

(MULTI FUNCTION MICROPHONE WITH AUTOPATCH)

TM-701A/E

MC-44DM/MC-44DME SCHEMATIC DIAGRAM



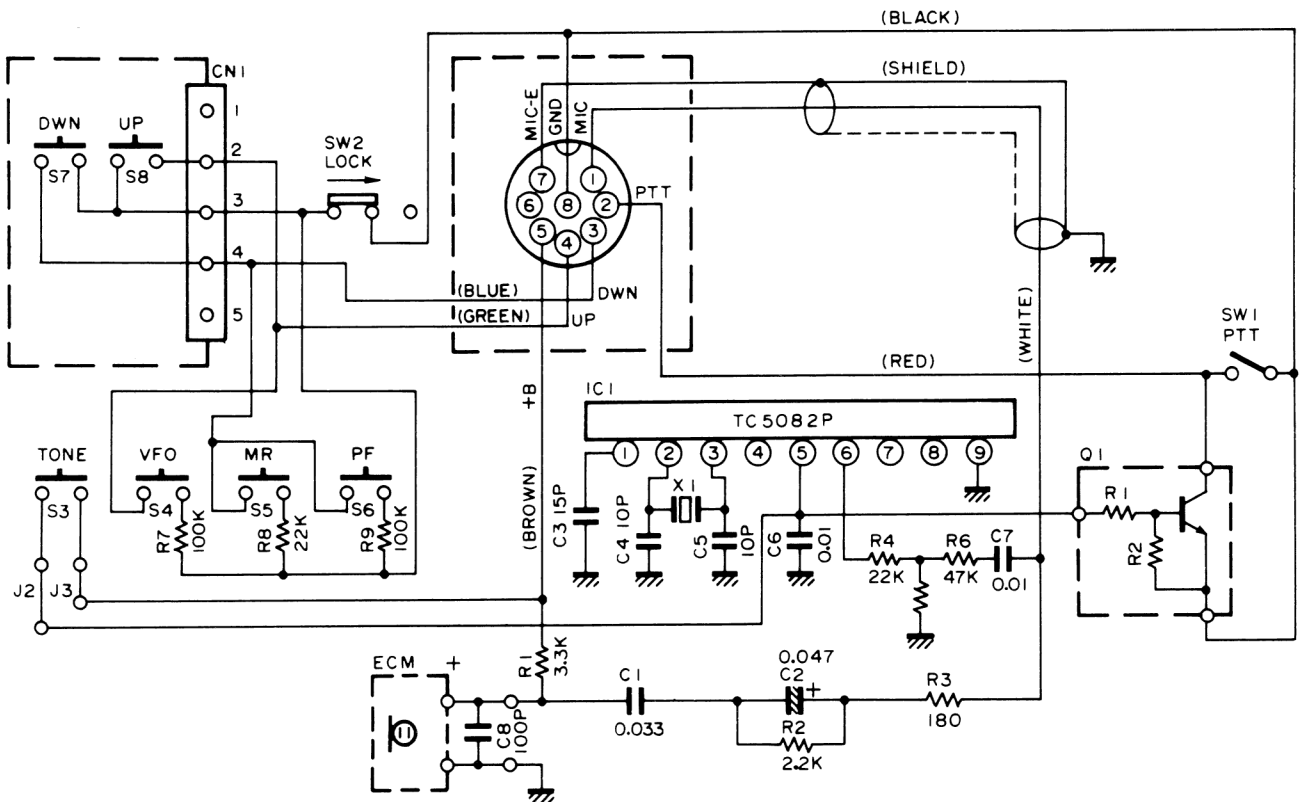
MC-44DM/MC-44DME PARTS LIST

Ref. No.	New parts	Parts No.	Description	
	*	A02-0898-08	Case (Front)	DTMF
	*	A20-0899-08	Case (Front)	DTMF (With TONE)
	*	A02-0901-08	Case (Rear)	DTMF
	*	B50-8293-08	Instruction manual	
		E30-2149-08	Curl cord	
		K29-3165-08	Knob	PTT
	*	K29-3167-08	Key top	DTMF
	*	K29-3168-08	Knob	UP
	*	K29-3169-08	Knob	DOWN
SW2	*	S31-1422-08	Slide switch	LOCK
SW1	*	S50-1431-08	Micro switch	PTT
S7, 8	*	S59-1409-08	Switch	UP, DOWN
	*	T91-0383-08	Microphone element (Condenser microphone)	

TM-701A/E

MC-44E (MULTI FUNCTION MICROPHONE)

MC-44E SCHEMATIC DIAGRAM

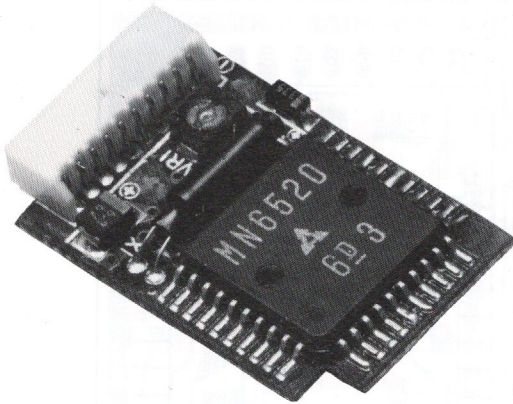


MC-44E PARTS LIST

Ref. No.	New parts	Parts No.	Description
	*	A02-0897-08	Case (Front) With TONE
	*	A02-0900-08	Case (Rear)
	*	B50-8293-08	Instruction manual
	*	E30-2149-08	Curl cord
	*	K29-3165-08	Knob PTT
	*	K29-3168-08	Knob UP
	*	K29-3169-08	Knob DOWN
	*	K29-3170-08	Knob 1750, VFO, MR, PF
SW2	*	S31-1422-08	Slide switch LOCK
SW1	*	S50-1431-08	Micro switch PTT
S7, 8	*	S59-1409-08	Switch UP, DOWN
	*	T91-0383-08	Microphone element (Condenser microphone)

TSU-6 (CTCSS UNIT)

TSU-6 EXTERNAL VIEW



TSU-6 PARTS LIST

* : New Parts

Ref. No.	New Parts	Parts No.	Description
CTCSS UNIT (X52-3100-00)			
C1		CK73FB1H102K	Chip C 1000pF K
C2		C92-0010-05	Tantal 6.8μF 6.3WV
C3	*	C92-0006-05	Tantal 3.3μF 4.0WV
C4, 5		CK73EB1E104K	Chip C 0.1μF K
C6		CK73EB1H223K	Chip C 0.022μF K
C7		CK73EB1E104K	Chip C 0.1μF K
C8, 9		CC73FCH1H150J	Chip C 15pF J
C10		CK73FB1H102K	Chip C 1000pF K
C11		CK73EB1E104K	Chip C 0.1μF K
C12		C92-0507-05	Chip tan. 4.7μF 6.3WV
C13	*	C92-0510-05	Chip tan. 3.3μF 4.0WV
	*	E40-5121-05	Pin connector (10P)
X1		L77-1313-05	X'tal resonator 4.194304MHz
R1-10		RK73FB2A000J	Chip resistor
R12-14		RK73FB2A000J	Chip resistor
VR1	*	R12-3460-05	Trimming pot. 33kΩ
Q1		DTC144TK	Digital transistor
Q2		DTA114EK	Digital transistor
Q3		2SC2712(GR)	Chip transistor
IC1		MN6520	IC
IC2		MN4094BS	IC

TSU-6 FINE ADJUSTMENT OF TONE FREQUENCY

The tone frequency can be fine adjusted with an interval of 0.5% step over the range of 0 to +1.5%. Ground the T1 (pin 10) and T2 (pin 9) of IC1 to obtain the desired frequency.

	T1	T2
0%	X	X
+0.5%	O	X
+1.0%	X	O
+1.5%	O	O

O : GND, X : OPEN

Table 3

TSU-6 REFERENCE DATA

TH-25's condition and MN4094BS (IC2) relationship

CTCSS switch	TONE switch	TX/RX	MN4094BS terminal		
			Q5	Q6	Q1 ~ 4, 7, 8
OFF	OFF	TX	L	H	L
		RX	L	H	L
	ON	TX	L	L	See table 2
		RX	L	H	L
ON	OFF	TX	L	L	See table 2
		RX	H	L	
	ON	TX	L	L	
		RX	H	L	

Q1 ~ 4, 7, 8 : Tone frequency setting

Q5 : TX/RX switch for MN6520 (IC1). "H" : RX, "L" : TX.

Q6 : Power switch for MN6520 (IC1). "H" : OFF, "L" : ON.

Table 1

Tone frequency and MN6520 (IC1) relationship

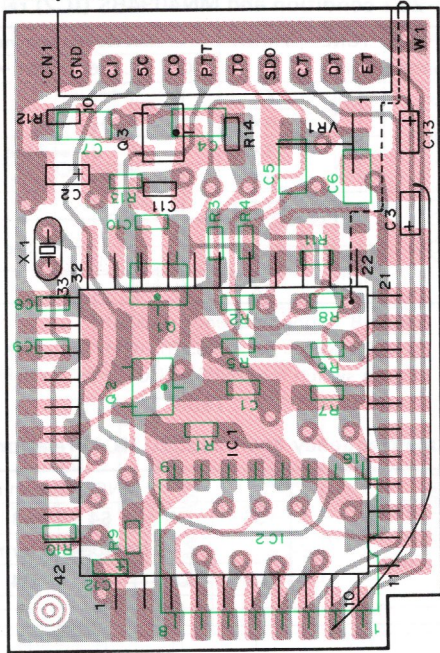
Tone frequency (Hz)	MN6520 terminal					
	S6	S5	S4	S3	S2	S1
	Q1	Q2	Q3	Q4	Q7	Q8
67.0	L	H	H	H	L	H
71.9	L	H	H	H	L	L
74.4	L	H	H	L	H	H
77.0	L	H	H	L	H	L
79.7	L	H	H	L	L	H
82.5	L	H	H	L	L	L
85.4	L	H	L	H	H	H
88.5	L	H	L	H	H	L
91.5	L	H	L	H	L	H
94.8	H	H	H	L	L	H
100.0	H	H	H	L	L	L
103.5	H	H	L	H	H	H
107.2	H	H	L	H	H	L
110.9	H	H	L	H	L	H
114.8	H	H	L	H	L	L
118.8	H	H	L	L	H	H
123.0	H	H	L	L	H	L
127.3	H	H	L	L	L	H
131.8	H	H	L	L	L	L
136.5	H	L	H	H	H	H
141.3	H	L	H	H	H	L
146.2	H	L	H	H	L	H
151.4	H	L	H	H	L	L
156.7	H	L	H	L	H	H
162.2	H	L	H	L	H	L
167.9	H	L	H	L	L	H
173.8	H	L	H	L	L	L
179.9	H	L	L	H	H	H
186.2	H	L	L	H	H	L
192.8	H	L	L	H	L	H
203.5	H	L	L	H	L	L
210.7	H	L	L	L	H	H
218.1	H	L	L	L	H	L
225.7	H	L	L	L	L	H
233.6	H	L	L	L	L	L
241.8	L	H	H	H	H	H
250.3	L	H	H	H	H	L

Table 2

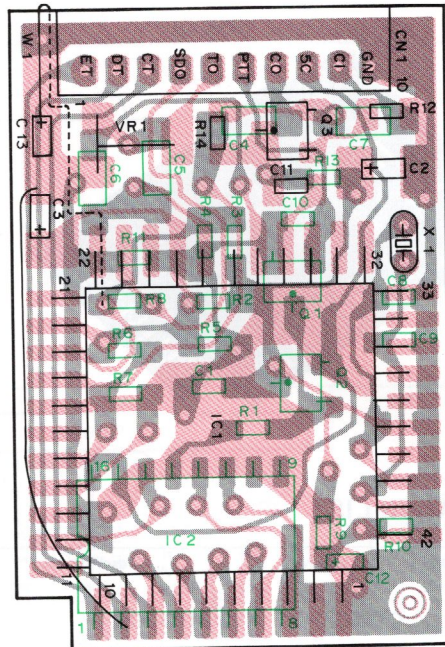
TSU-6 (CTCSS UNIT)

TSU-6 PC BOARD VIEWS

Component side view



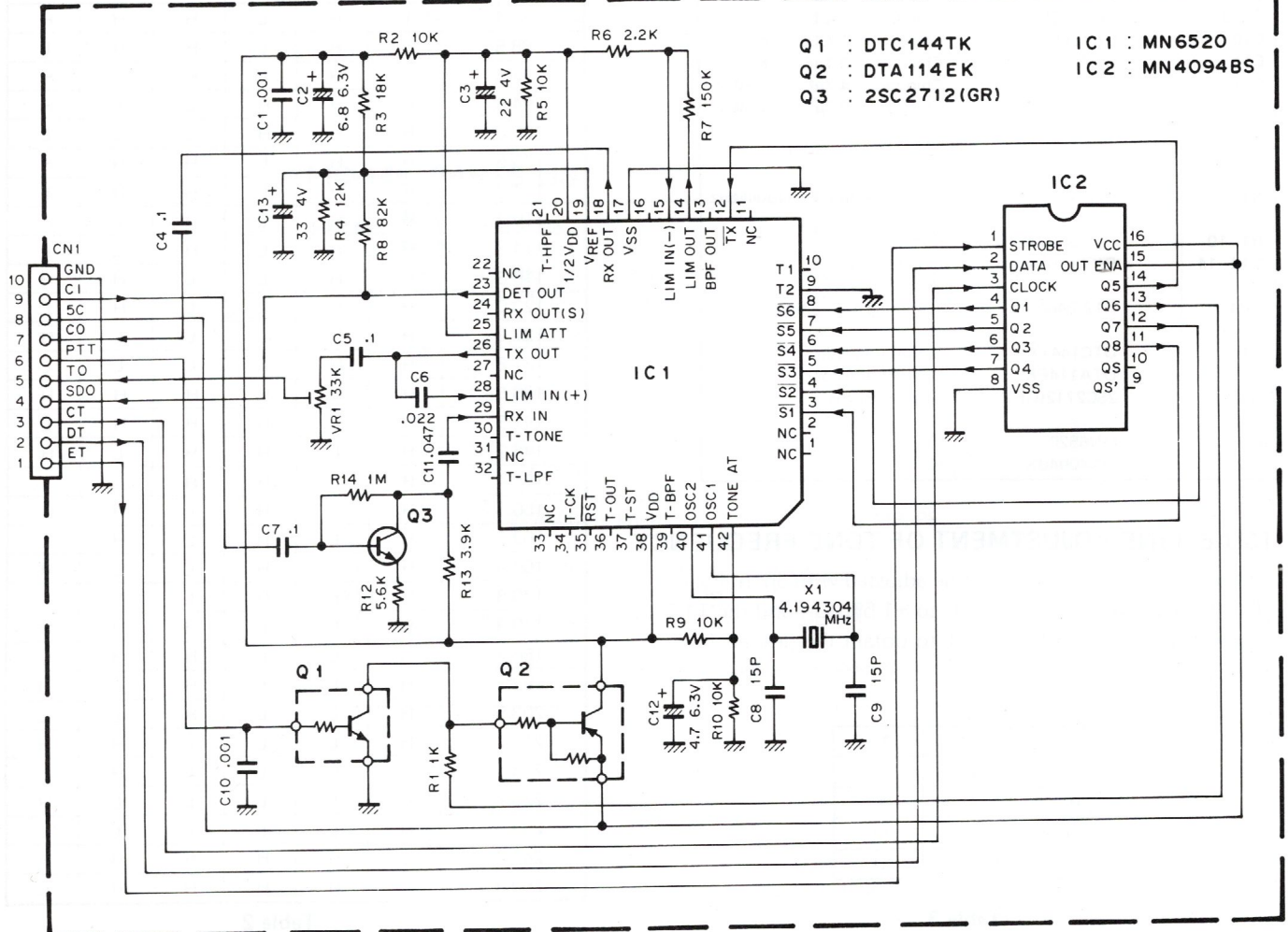
Foil side view



■ : Component side
■ : Foil side

TSU-6 CIRCUIT DIAGRAM

CTCSS UNIT (X52-3100-00)



SPECIFICATIONS

General

Frequency range	144 to 146MHz : T, W 144 to 148MHz : K, M, M2
.....	430 to 440MHz : M, M2, T, W 438 to 450 : K
Mode	F3E (FM)
Antenna impedance	50Ω
Power requirements	13.8V DC ±15% (11.7 to 15.8)
Ground	Negative
Frequency stability	Less than ±10ppm
Current drain	
Transmit mode	Less than 6.9A
Receiver mode with no signal	Less than 0.6A
Operating temperature	-20°C to +60°C (-4°F to +140°F)
Dimensions (W x H x D)	140 x 40 x 200 mm (5-1/2" x 1-37/64" x 7-7/8")
(Projection included)	141 x 42 x 212 mm (5-9/16" x 1-21/32" x 8-11/32")
Weight	1.4kg (3.1lbs)

Transmitter

Output power*	
HI	25W
LOW	Approx. 5W
Modulation	Reactance modulation
Spurious radiation	Less than -60dB
Maximum frequency deviation	±5kHz
Audio distortion (at 60% modulation)	Less than 3% (300 to 3000Hz)
Microphone impedance	500 to 600Ω

Receiver

Circuitry	Double conversion superheterodyne
Intermediate frequency (1st/2nd)	30.825MHz/455kHz
Sensitivity (12dB SINAD)	Less than 0.16μV
Selectivity	
-6dB	More than 12kHz
-60dB	Less than 24kHz
Supurious response	Better than 60dB
Squelch sensitivity	Less than 0.1μV
Output (5% distortion)	More than 2W across 8Ω loads
External speaker impedance	8Ω

Notes :

1. Circuit and ratings are subject to change without notice due to advancements in technology.
2. Recommended duty cycle : 1 minute Transmit, 3 minutes Reception.

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