144/440MHz FM DUAL BANDER

TM-732A/E

SERVICE MANUAL

KENWOOD

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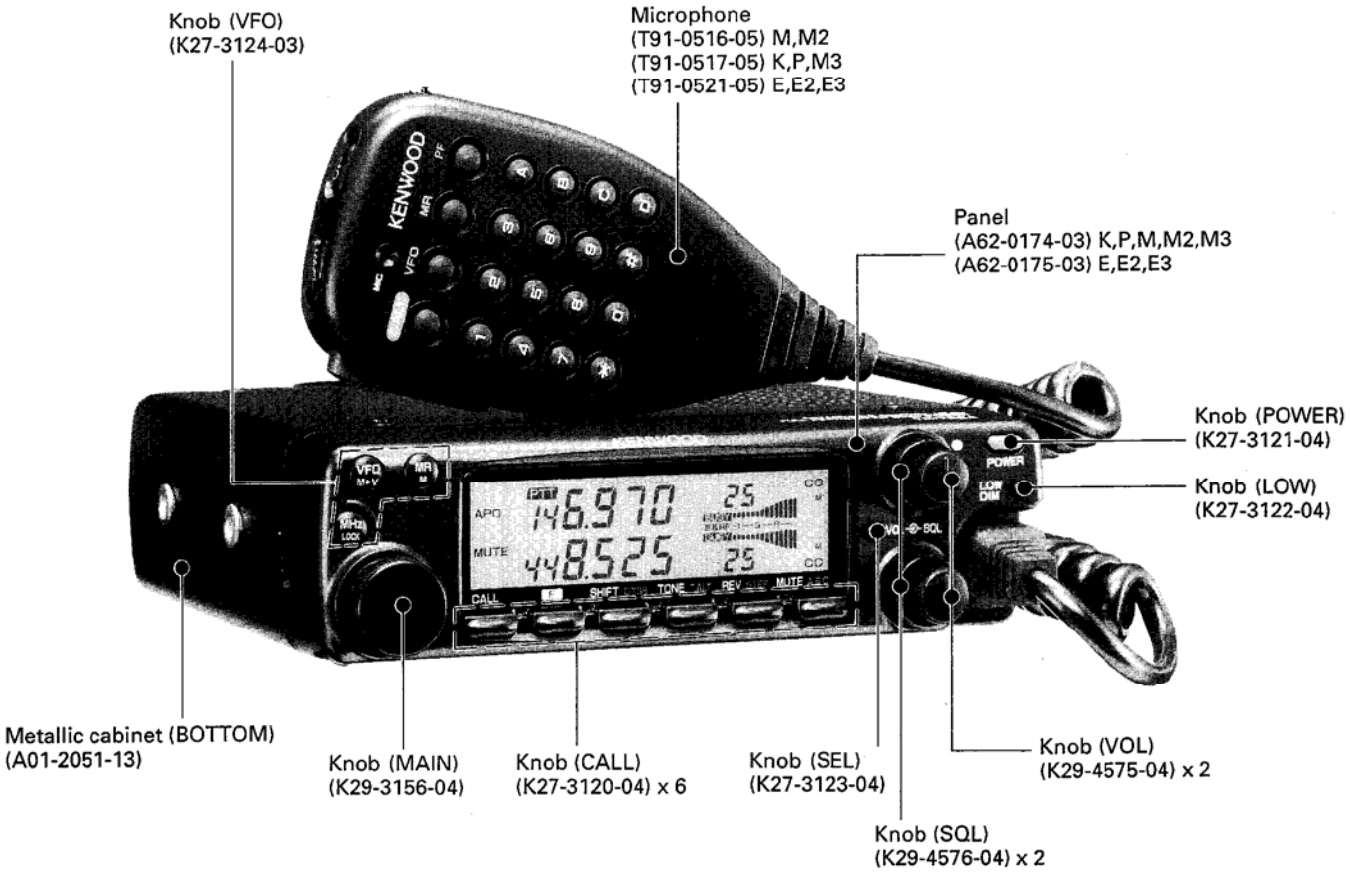

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TM-732A/E

CIRCUIT DESCRIPTION

Outline

The TM-732A/E are 144/430MHz FM dual band car transceivers designed for armature radio communications.

- **Features**

1. Complete compact dual band function.
2. The extended cable kit (option) car be used to disconnect the panel with one touch of a finger. Free setting is made possible.
3. Independent receiving function enables the simultaneous receiving of 144MHz and 430MHz bands. (Both bands independent, full display, volume, squelch, signaling, external loudspeaker.)
4. Large LCD (68.0 x 19.0 mm).
5. Simple operation like monoband type.
6. Both 144MHz and 430MHz bands can be received at a time.
7. Duplexer built in (Types K and P excluded).
8. S-meter squelch function built in. Switching to noise squelch provides the adjustment of S-meter squelch level with a squelch volume.
9. With a maximum of 64 memory channels, the switching of a memory channel mode permits changing the number of split and normal memory channels for each band. (50 channels in full split memory)
10. DTSS and paging functions built in.
11. Wire (microphone jack connected) and wireless (DTMF) coulomb function built in.

Accessories

Parts name	Parts No.	Destination code							
		K	P	M	M2	M3	E	E2	E3
Warranty card	B46-0410-30	1							
Warranty card	B46-0419-00						1		1
Warranty card	B46-0422-00		1						
Instruction manual	B62-0201-00	1	1	1	1	1	1	1	1
Instruction manual	B62-0202-00		1				1		
Instruction manual	B62-0225-00			1	1	1		1	1
DC power cord	E30-2111-05	1	1	1	1	1	1	1	1
Fuse (15A)	F51-0017-05	1	1	1	1	1	1	1	1
Mic hook	J20-0319-24	1	1						
Mobile mount bracket	J29-0436-03	1	1	1	1	1	1	1	1
Mic hook screw	N46-3010-46	1	1						
Screw set	N99-0331-05	1	1	1	1	1	1	1	1
Microphone	T91-0516-05			1	1				
Microphone	T91-0517-05	1	1			1			
Microphone	T91-0521-05						1	1	1
Spanner	W01-0414-04	1	1	1	1	1	1	1	1

Units for Each Model and Destination

Parts No.	Unit name	Destination code							
		K	P	M	M2	M3	E	E2	E3
X57-4000-11	TX-RX unit	1	1						
X57-4000-21	TX-RX unit			1	1	1			
X57-4002-71	TX-RX unit						1	1	1
B38-0366-15	LCD Ass'y	1	1						
B38-0367-15	LCD Ass'y			1					
B38-0368-15	LCD Ass'y						1		1
B38-0370-15	LCD Ass'y				1	1			
B38-0371-15	LCD Ass'y							1	

List of Destinations

Model	Destination	Destination code	Frequency range (MHz)		Output power (W)	
			144	430	144	430
TM-732A	North America	K	TX 144.00~147.995 *1 RX 118.00~173.995	438.00~449.995	50	35
TM-732A	Canada	P	TX 144.00~147.995 *1 RX 118.00~173.995	438.00~449.995	50	35
TM-732A	Other countries	M	144.00~147.995	430.00~439.995	50	35
TM-732A	Other countries	M2	TX 136.00~173.995 *1 RX 118.00~173.995	*2 410.00~469.995	50	35
TM-732A	Other countries	M3	TX 136.00~173.995 *1 RX 118.00~173.995	*2 410.00~469.995	50	35
TM-732E	European countries	E,E3	144.00~145.995	430.00~439.995	50	35
TM-732E	European countries	E2	TX 136.00~173.995 *1 RX 118.00~173.995	*2 410.00~469.995	50	35

*1 : Guarantee frequency range 144.00~147.995, 118.00~135.995 = AM

*2 : Guarantee frequency range 430.00~439.995

CIRCUIT DESCRIPTION

Frequency Configuration

The TM-732A/E has separate PLL and IF units for the VHF and UHF bands, so it can receive signals on both bands at the same time. It has a VHF sub-receiver to receive a UHF signal in the VHF band and a UHF sub-receiver to receive the VHF band signal in the UHF band.

The 144MHz band receiver mixes the received signal with the first local oscillation frequency of 189.05 to 193.045MHz (K,P,M), 189.05 to 191.045MHz (E) to produce the first intermediate frequency of 45.05MHz. The signal is then mixed with the second local oscillation frequency of 45.505MHz to produce the second intermediate frequency of 455kHz.

The 430MHz band receiver mixes the received signal with the first local oscillation frequency of 379.475 to 391.47MHz (K,P), 371.475 to 381.47MHz (M,E) to produce the first intermediate frequency of 58.525MHz. The signal is then mixed with the second local oscillation frequency of 58.0MHz to produce the second intermediate frequency of 455kHz.

The 144MHz band sub-receiver mixes the received signal with the first local oscillation frequency of 202.525 to 206.52MHz (K,P,M), 202.525 to 204.52MHz (E) to produce the first intermediate frequency of 58.525MHz. The signal then goes to the second intermediate frequency section of the UHF receiver to produce the second intermediate frequency of 455kHz.

The 430MHz band sub-receiver mixes the received signal with the first local oscillation frequency of 392.95 to 404.945MHz (K,P), 384.95 to 394.945MHz (M,E) to produce the first intermediate frequency of 45.05MHz. The signal then goes to the second intermediate frequency section of the VHF receiver to produce the second intermediate frequency of 455kHz.

The receivers and sub-receivers for the 144 and, 430MHz bands all use double conversion. The transmitter contains a PLL circuit that directly generates and divides down carriers for both bands. The transmission signals are amplified by a linear amplifier and transmitted. The main circuits are used to transmit signals even if a sub-band is being used.

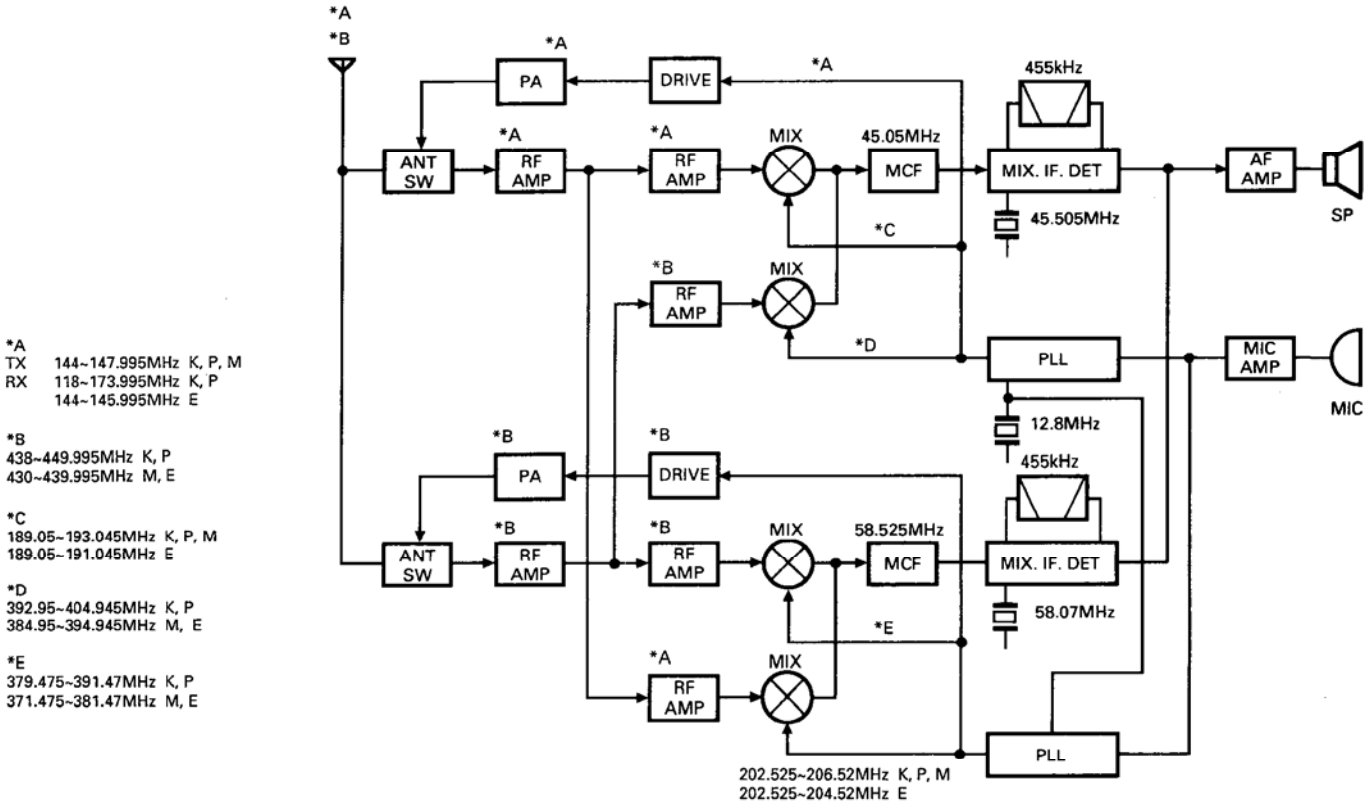


Fig.1 Frequency configuration

CIRCUIT DISCRIPTION

144MHz Band Transmit Circuit

- **Outline**

The transmit circuit produces the desired carrier frequency directly, and directly modulates its frequency by means of a vari-cap diode.

- **Modulator circuit**

The audio signal amplified and limited by the control unit passes through a splatter filter, is mixed with the sub-tone from the microcomputer, and input to PLL unit (KCH11) IC9. The PLL unit directly modulates the carrier frequency with the input audio signal by using a vari-cap diode to control the frequency of the VCO.

- **Younger-stage circuit**

The signal output from the PLL unit goes to drive circuit HIC IC10 (KCB11). The HIC can provide a stable drive output for the final module without adjustment because it has a large bandwidth.

- **Power amplifier circuit**

The drive signal input to the power module according to the output power is amplified to the specified level.

- **APC and power switching circuits**

The automatic transmission output control circuit (APC) detects and partially amplifies the transmission output with a diode, and controls the DB voltage for the drive stage and final module to keep the transmit output constant. The power switching circuit can switch the power by changing the setting resistor for the APC control voltage with a signal from the shift register (IC8).

430MHz Band Transmit Circuit

- **Outline**

The transmit circuit produces the desired carrier frequency directly and directly modulates its frequency by means of a vari-cap diode.

- **Modulator circuit**

The audio signal amplified and limited by the control unit passes through a splatter filter, is mixed with the sub-tone from the microcomputer, and input to PLL unit (KCH12) IC207. The PLL unit directly modulates the carrier frequency with the input audio signal by using a vari-cap diode to control the frequency of the VCO.

- **Younger stage circuit**

The signal output from the PLL unit goes to drive circuit HIC IC209 (KCB14). The HIC can provide stable drive output for the final module without adjustment because it has a large bandwidth.

- **Power amplifier circuit**

The drive signal input to the power module according to the output power is amplified to the specified level.

- **APC and power-switching circuits**

The automatic transmission output control circuit (APC) detects and partially amplifies the transmission output with a diode, and controls the DB voltage for the drive stage and final module to keep the transmit output constant. The power switching circuit can switch the power by changing the setting resistor for the APC control voltage with a signal from the shift register (IC206). To protect the high power model from excessive temperature rise, there is a thermal switch to reduce the power automatically if the temperature reaches a certain level.

CIRCUIT DISCRIPTION

144MHz Band Receive Circuit

The received 144MHz band signal from the antenna passes through a transmission/reception selection diode switch. The signal then passes through an antenna matching coil in the receiver front end and a divider, and is amplified by a GaAs (gallium arsenide) field-effect transistor. The unwanted components of the signal are eliminated by a band-pass filter consisting of a three stage variable capacitor. The resulting signal goes to the first mixer, is mixed with the first local oscillator signal from the PLL circuit, and so converted to the first intermediate frequency of 45.05MHz. The unwanted near by signal components are eliminated by a two stage MCF.

The first intermediate frequency signal is amplified and input to FM IF HIC IC1 (KCD04). This signal is then mixed with the second local oscillation frequency of 45.505MHz to produce the second intermediate frequency signal of 455kHz. The unwanted near by signal components are eliminated by an FM ceramic filter. The resulting signal is input to IC1 again, amplified, and detected to produce an audio signal.

- **Signal strength meter**

The signal strength meter output voltage of FM IF HIC IC1 (KCD01) is input to the control unit. It is then digitized to drive the bar meter of the LCD.

Item	Rating
Center frequency	45.050MHz
Pass bandwidth	±7.5kHz or more at 3dB
Attenuation bandwidth	±22kHz or less at 25dB
Guaranteed attenuation	80dB or more within Fo – 910kHz (Spurious : ±1MHz at 40dB or more)
Ripple	1dB or less
Insertion loss	4dB or less
Terminating impedance	800kΩ ± 10%, 2pF ± 10%

Table 1 MCF (L71-0409-05) (TX-RX unit XF1)

Item	Rating
Nominal center frequency	455kHz
6dB bandwidth	±6.0kHz or more (from 455kHz)
50dB bandwidth	±12.5kHz or less (from 455kHz)
Ripple	3dB or less (within ±5kHz of 455kHz)
Insertion loss	6dB or less (at maximum output point)
Guaranteed attenuation	35dB or more (within ±100kHz of 455kHz)
I/O matching terminating impedance	2.0kΩ

Table 2 Ceramic filter CFWM455F (L72-0372-05) (TX-RX unit CF1)

430MHz Band Receive Circuit

The received 430MHz band signal from the antenna passes through a filter in the final unit and a transmission/reception selection diode switch. The signal then passes through an antenna matching coil in the receiver front end, is amplified by a GaAs (gallium arsenide) field-effect transistor and joint type FET, and passes through two 2 pole dielectric filters. The resulting signal goes to the first mixer, is mixed with the first local oscillator signal from the PLL circuit, and so converted to the first intermediate frequency of 58.525MHz. The unwanted near-by signal components are eliminated by a two stage MCF. The first intermediate frequency signal is amplified and input to FM IF HIC IC201 (KCD04). This signal is then mixed with the second local oscillation frequency of 58.07MHz to produce the second intermediate frequency signal of 455kHz. The unwanted near by signal components are eliminated by a ceramic filter. The resulting signal is amplified, and detected to produce an audio signal.

- **Signal-strength meter**

The signal strength meter output voltage of FM IF HIC IC201 (KCD04) is input to the control unit microcomputer to drive the signal strength meter.

Item	Rating
Center frequency	58.525MHz
Pass bandwidth	±8.5kHz or more at 3dB
Attenuation bandwidth	±25kHz or less at 25dB ±7.5kHz or less at 60dB
Guaranteed attenuation	40dB or more within ±75 to 1000kHz 80dB or more at ±910kHz
Ripple	1dB or less
Insertion loss	4dB or less
Terminating impedance	380Ω ± 10%, 3.5pF ± 10%

Table 1 MCF (L71-0410-05) (TX-RX unit XF201)

Item	Rating
Nominal center frequency	455kHz
6dB bandwidth	±6.0kHz or more (from 455kHz)
50dB bandwidth	±12.5kHz or less (from 455kHz)
Ripple	3dB or less (within ±5kHz of 455kHz)
Insertion loss	6dB or less (at maximum output point)
Guaranteed attenuation	35dB or more (within ±100kHz of 455kHz)
I/O matching terminating impedance	2.0kΩ

Table 2 Ceramic filter CFWM455F (L72-0372-05) (TX-RX unit CF201)

CIRCUIT DISCRIPTION

144MHz Band Sub Receive Circuit

The received signal from the antenna goes to the receiver front end for the 144MHz main band. The signal is amplified by a GaAs (gallium arsenide) field-effect transistor (Q1), input to the main 144MHz main circuit and sub circuit by the divider circuit, and input to the 430MHz band sub circuit. The unwanted signal components are eliminated by the filter circuit of the sub-receive circuit, and the resulting signal is amplified by transistor Q211. The unwanted signal components are further eliminated by another filter circuit. The resulting signal is then mixed with the first local oscillation frequency by the FET (Q212) mixer to produce the first intermediate frequency signal of 58.525MHz. The signal is input to the 430MHz band main circuit, and the 144MHz sub band signal is received by the main circuit.

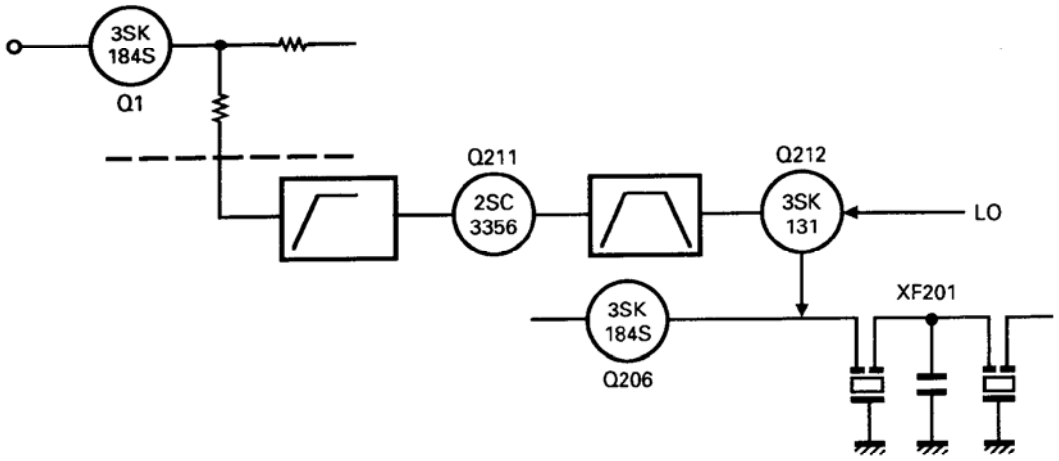


Fig. 2 144MHz band sub receive circuit block diagram

430MHz Band Sub Receive Circuit

The 144MHz unit can receive 430MHz band signals. The received signal from the antenna passes through a transmission/reception selection diode switch in the final section of the 430MHz unit. The signal then passes through an antenna matching coil, and is amplified by a GaAs (gallium arsenide) field-effect transistor (Q201). The amplified receive signal passes through a divider, and is amplified by IC3 (high frequency wide-band amplifier) of the 144MHz unit. The unwanted signal components are removed by a band-pass filter. The resulting signal goes to the first mixer, is mixed with the first local oscillator signal from the PLL circuit, and so converted to the first intermediate frequency of 45.05MHz. The subsequent receive operation is the same as for the 144MHz band.

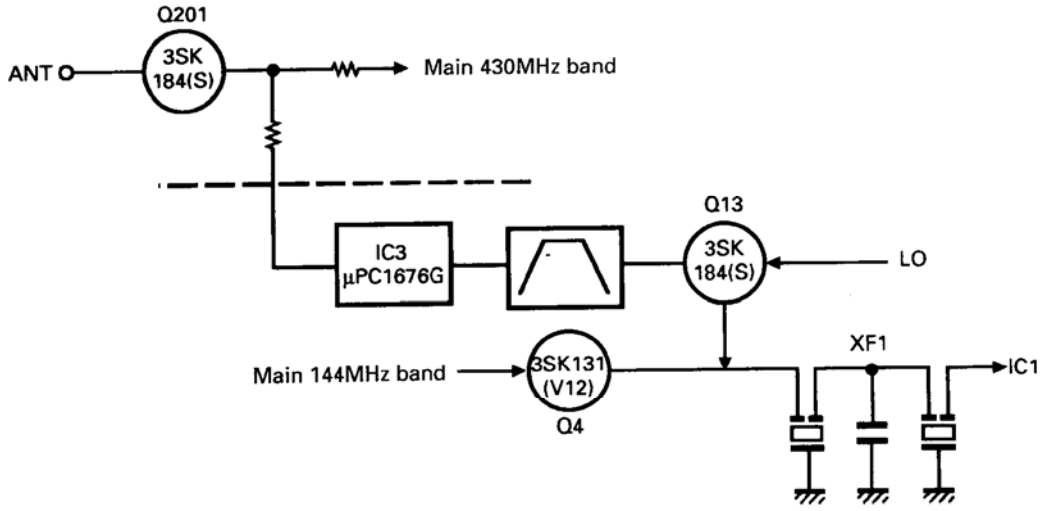


Fig. 3 430MHz band sub receive circuit block diagram

CIRCUIT DISCRIPTION

Squelch Circuit

The panel unit microprocessor reads the angle of rotation of the squelch VR, and converts it to a 6 bit digital value. The panel unit microprocessor transfers the data to the control unit microprocessor, which in turn transfers the data to IC5 (BU4094BF). The data is converted to analog by analog switch IC4 (BU4066BF) according to the output from IC5.

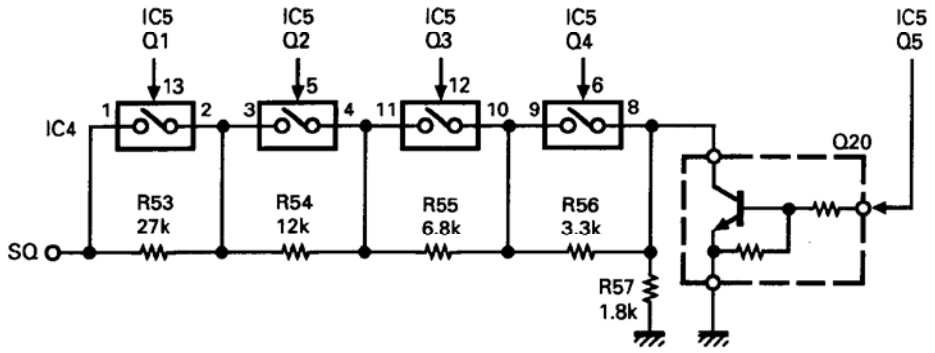


Fig. 4 Squelch circuit

144MHz Band Shift Register Circuit

The ES, CK, and DT serial data from the control unit is sent to IC8 (BU4094BF) to perform the control operations outlined in the following table.

Pin No.	Name	Function
1	Strobe	Enable input
2	Data	Serial data input
3	Clock	Clock input
4	Q1	TX/RX selection. Low when TX is set
5	Q2	TX power selection "L" : MID and LOW power, "H" : HI power
6	Q3	TX power selection "L" : HI and LOW power, "H" : MID power
7	Q4	
8	Vss	GND
9	Qs	
10	Q's	
11	Q8	Receiving power switching "L" : VHF band main reception
12	Q7	
13	Q6	Receiving power switching "L" : UHF band sub reception
14	Q5	
15	QE	8V
16	VDD	8V

430MHz Band Shift Register Circuit

The serial data from the control unit is sent to IC206 (BU4094BF) to perform the control operation outlined in the following table.

Pin No.	Name	Function
1	Strobe	Enable input
2	Data	Data input
3	Clock	Clock input
4	Q1	TX/RX selection.
5	Q2	TX power selection. "H" : HI power
6	Q3	TX power selection. "H" : MID power
7	Q4	Fan control. "H" : Transmission
8	Vss	
9	Qs	
10	Q's	
11	Q8	
12	Q7	Receiving power switching "L" : Main reception
13	Q6	
14	Q5	Receiving power switching "L" : Sub-reception
15	QE	8V
16	VDD	8V

CIRCUIT DISCRIPTION

SQL Circuit

The SQL circuit varies the voltage output from IC201 (KCD04) by the electronic VR with the same analog switch as used for the 144MHz band.

144MHz Band 8T/8R Switching Circuit and Unlock Circuit

A high signal is applied to the base of Q15 and Q19 from the shift register during reception, Q16 is turned on, 8R is output, and Q18 and Q17 are turned off. 8T is not output. 8R is turned off, and 8T is turned on during transmission. The unlock signal is input to Q19 from the PLL unit. When the PLL is unlocked, this signal goes high. So, 8T is not turned on, and transmission does not occur even if a signal arrives from the shift register.

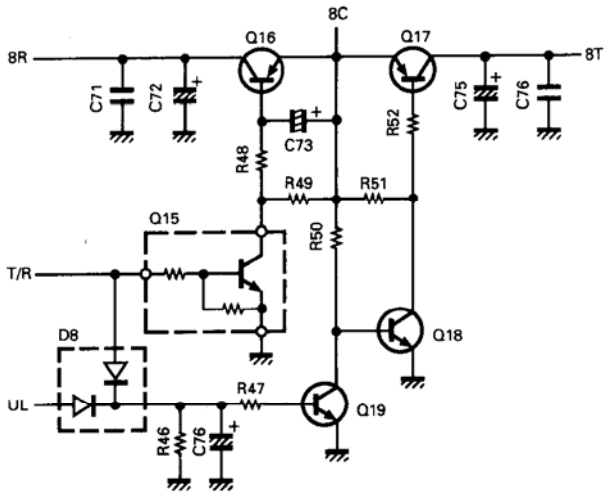


Fig. 5 144MHz band 8T/8R switching circuit and unlock circuit

430MHz Band 8T/8R Switching Circuit and Unlock Circuit

A high signal is applied to the base of Q215 and Q214 from the shift register during reception, Q216 is turned on, 8R is output, and Q217 and Q218 are turned off. 8T is not output. 8R is turned off, and 8T is turned on during transmission. The unlock signal is input to Q214 from the PLL unit. When the PLL is unlocked, this signal goes high. So, 8T is not turned on, and transmission does not occur even if a signal arrives from the shift register.

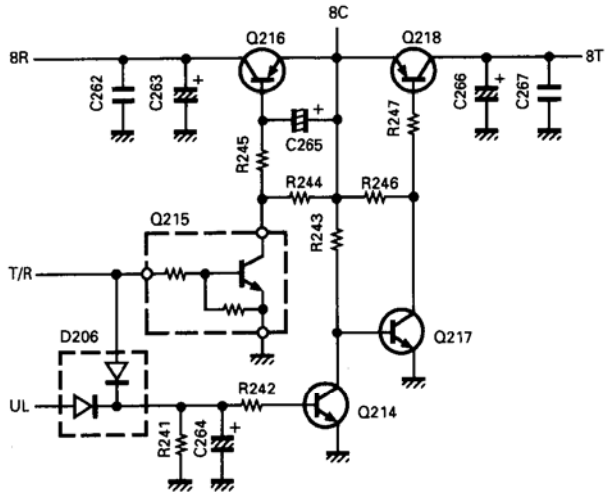


Fig. 6 430MHz band 8T/8R switching circuit and unlock circuit

AF Signal System

- **Outline**

Detection signals RAV and RAU from the 144MHz and 430MHz units go to the mute and beep circuits of the control unit. The signals pass through the electronic VR, analog signal switching circuit, and speaker switching circuit of the 144MHz unit, and are output to the power amplifier and speaker.

- **Beep and mute circuits**

To sound the beep when a key is pressed, a pulse is output from P20 of the CPU, mixed with the output through the buffer (Q401) of monitor IC401 (DTMF encoder) for DTSS operation, passed through the beep mute circuit (Q405 and Q406) for each band, mixed with the detection signal for each band, and sent to the electronic VR. The audio mute circuit (Q404 and Q409) for each band works only when the beep sound is output from the CPU. The signal output from the electronic VR passes through analog switch IC404 and the audio mute circuit (Q402 and Q403), and is output to the speaker switching circuit. The CPU transfers data to the electronic volume in the same way as for the TM-941.

CIRCUIT DISCRIPTION

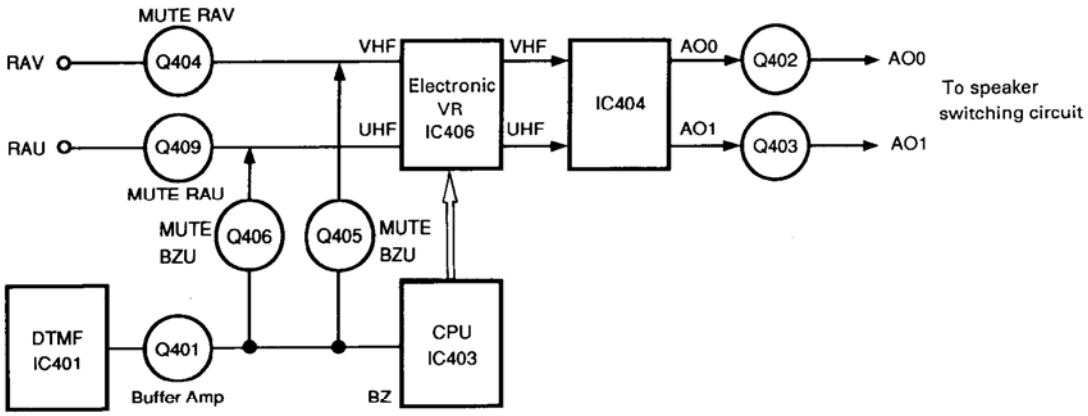


Fig. 7 AF signal system block diagram

Digital Control Unit

- **Outline**

The digital control unit controls functions with a single microprocessor (CPU). It consists of the tone output circuit, DTMF encode/decode circuit, electronic VR circuit, and analog signal switching circuit. It contains the reset and backup circuits, microphone amplifier circuit, and microphone key input circuit.

Speaker switching circuit

The 144MHz unit has two speaker jacks, J1 and J2. AF signals can be output to various combinations of speakers, including the internal speaker. If no external speaker is connected to J1, pins 10 and 11 of IC7 go low, and AF signals AO0 and AO1 from the control unit are added. The resulting signal goes to power amplifier IC6. If an external speaker is connected to J1, pins 10 and 11 of IC7 go high, and AO0 and AO1 are input to IC6 separately.

Combinations of AF signals are listed below.

	AO0	AO1
Internal speaker only	Internal speaker	
External speaker (J2)	External speaker	
External speaker (J1)	Internal speaker	External speaker
Internal speakers (2)	External speaker	External speaker

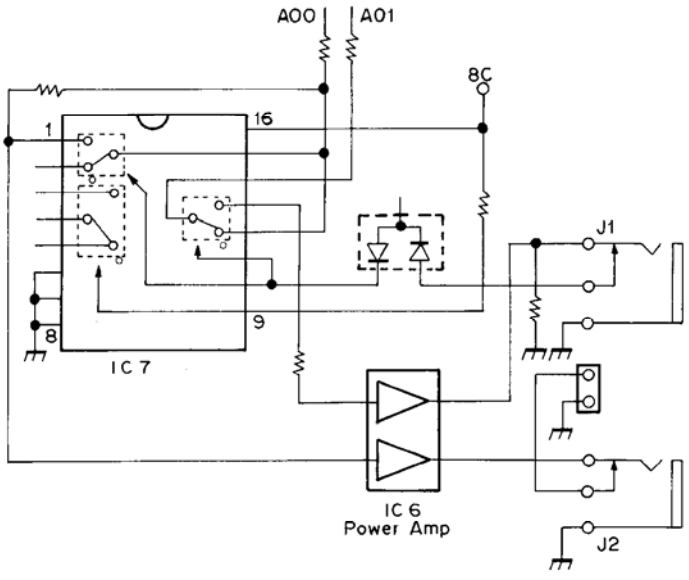


Fig. 8 Speaker switching circuit

CIRCUIT DISCRIPTION

Tone Output Circuit

The signal is input to R402 (ladder resistor) from P61 to P63, and P70 to P73 of the CPU, and converted from digital to analog to produce 38 signals of 67.0 to 250.3Hz. Figure 9 shows the internal configuration of R402.

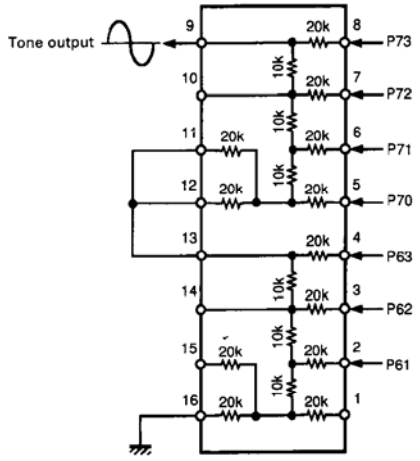


Fig. 9 Internal configuration of R402

DTMF Encode/Decode Circuit

- **DTMF encode/decode circuit**

Data is transmitted to IC401 (LR4089BN) from P40 to P43, and P50 to P53 of the CPU, and a DTMF signal is output from IC401.

- **DTMF decode circuit**

When the received signal or a signal from the DTMF microphone (option) enters IC402 (LC7385M) and an effective tone pair is detected, STD goes high, is input to RIZ of the CPU, and data is read into P90 to P93.

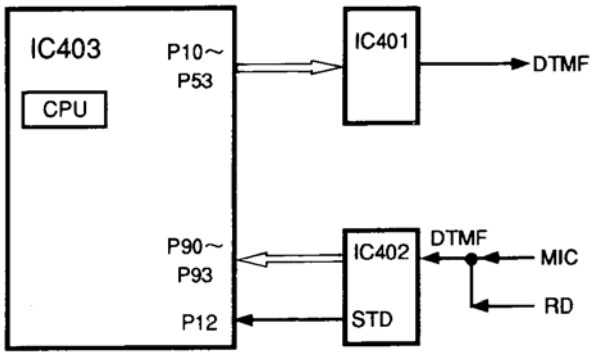


Fig. 10 DTMF encode/decode circuit

Analog Signal Switching Circuit

IC404 switches the audio signal and DTMF MIC/RD, and IC405 switches between V/U of MIC RD, DTMF RD, and CTCSS RD.

- **Audio signal switching**

Switches the VHF AF signal and UHF AF signal from the electronic VR to AO1 or AO0.

- **DTMF MIC/RD switching**

Switches the DTMF decoder IC input to the DTMF signal in the detection signal or the DTMF signal from the microphone.

- **MIC RD V/U switching**

Switches the signal output from microphone pin RD to RDV or RDU.

- **DTMF RD V/U switching**

Switches the DTMF decoder IC input to RDV or RDU.

The signal passes through this circuit and the DTMF MIC/RD switching circuit, and goes to the DTMF decoder IC. When switching to either RDV or RDU, the signal is switched to the band for which a busy sense signal (SC) is being input to the CPU. If busy sense signals for both bands are being input to the CPU at the same time, the last detected band is used.

- **CTCSS RD V/U switching**

Switches the signal to the CTCSS unit (TSU-7 option) to RDV or RDU. When switching to either RDV or RDU, the signal is switched to the band for which a busy sense signal (SC) is being input to the CPU. If busy sense signals for both bands are being input to the CPU, the circuit is switched in 500msec intervals.

P101 (Audio signal switching)	H : AO0=VHF AF, AO1=UHF AF L : AO0=UHF AF, AO1=VHF AF
P100 (DTMF MIC/RD switching)	H : DTMF signal in the detection signal L : DTMF signal from microphone
P110 (MIC RD V/U switching)	H : RDV L : RDU
P103 (DTMF RD V/U switching)	H : RDV H : RDU
P102 (CTCSS RD V/U switching)	H : RDV L : RDU

CIRCUIT DISCRIPTION

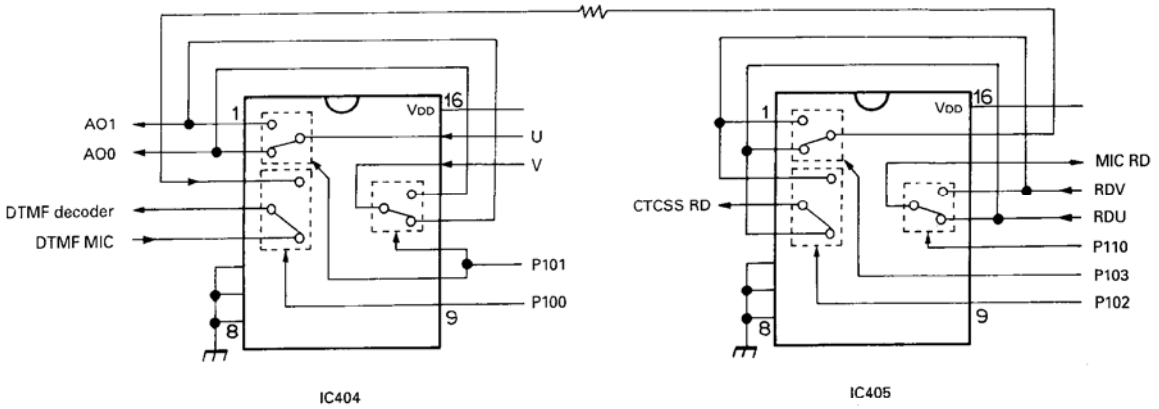


Fig. 11 Analog signal switching circuit

Reset and Backup Circuits

When the power supply is connected, a low level pulse of about 3msec duration is output by the reset circuit. This pulse goes to RESET of the CPU for power-on reset. When the power supply is disconnected, the voltage drop of the 13.8V line is detected, and INT4 of the CPU goes high. The CPU enters the backup mode.

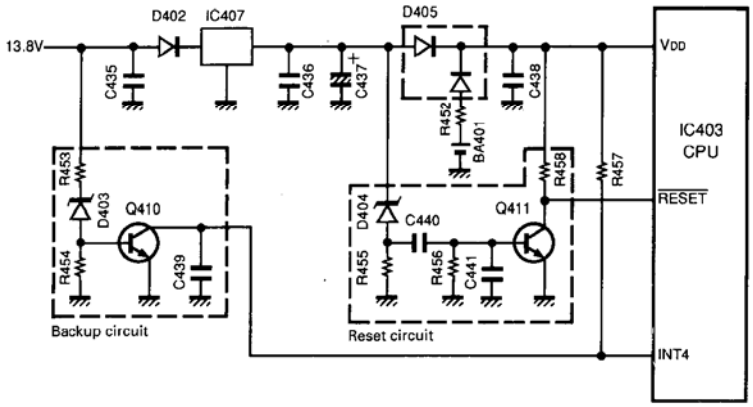


Fig. 12 Reset and backup circuits

Microphone Amplifier Circuit

The audio signal from the microphone goes to three operational amplifiers. These amplifiers constitute a pre-emphasis circuit, amplifier, limiter, and splatter circuit that eliminates unwanted high frequency components.

The modulator circuit directly modulates the frequency of the VCO for both the 144 and 430MHz bands by means of a vari-cap diode.

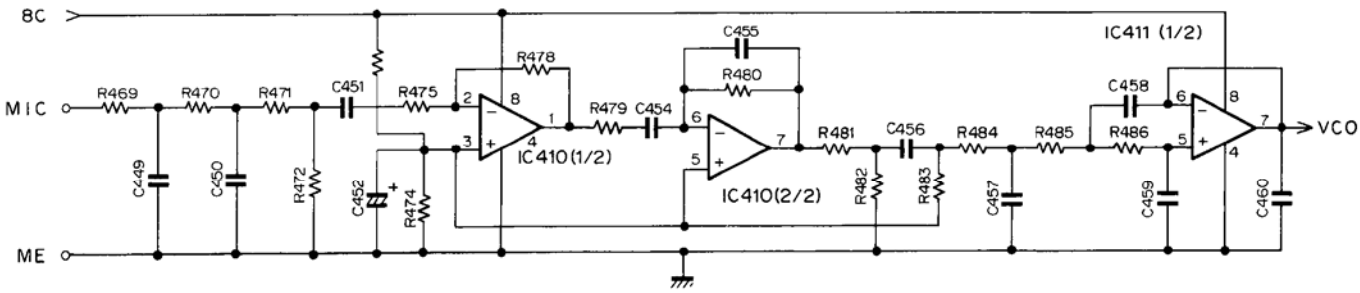


Fig. 13 Microphone amplifier circuit

CIRCUIT DISCRIPTION

Microphone Key Input

The microphone UP, DOWN, and function keys are connected to the analog input of the CPU, and each function is activated according to the voltage applied when a key is pressed.

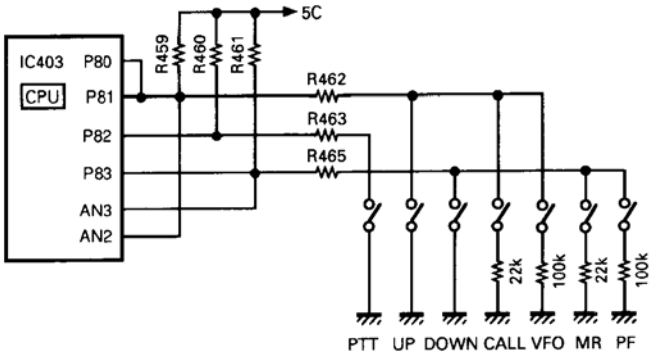


Fig. 14 Microphone key input

Panel Unit

- **Outline**

The panel unit controls the display circuit, memory, and dimmer circuit with a microprocessor. The keys and the rotary encoder are connected directly to the microprocessor.

Dimmer Circuit

The dimmer circuit can change the brightness of the lamp in four steps, and turn the lamp off. Q3 amplifies the error of the stabilized power supply using a 5V reference voltage. The output voltage can be controlled in four steps by grounding a combination of the BP2 and BP3 ports of the microprocessor. If the impedance of BP1, connected to the emitter of Q2, is made high , Q2 is turned off. No lamp voltage is output, and the lamp goes off.

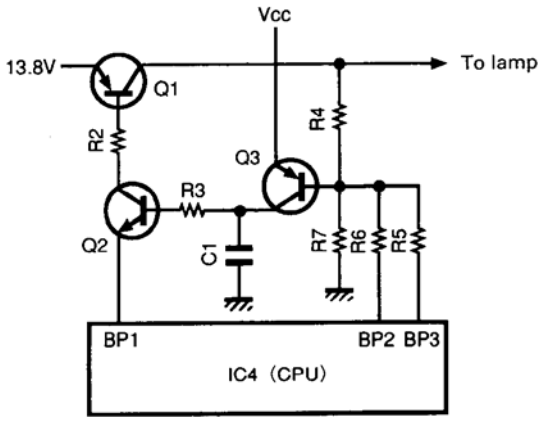


Fig. 15 Dimmer circuit

Reset Circuit

When the power supply is connected, the IC1 (L78LR05B-FA) output (pin5) becomes 5V, and after about 100msec, RESET (pin4) goes high. The signal is input to the RESET pin of the CPU (IC4) to reset it.

Key and Rotary Encoder Input Circuit

Each panel key signal is input from its own port. The MR, VFO, and MHz keys are pulled up by external resistors (the PSW key is pulled down), and the other keys are pulled up by software. The rotary encoder inputs signals directly to the microcomputer.

Display Circuit

The display circuit consists of the CPU, LCD driver and peripheral circuits, and LCD. The LCD is driven dynamically with 1/2 duty. Part of the display is controlled by the CPU (IC4), and part is controlled by the LCD driver (IC5), as shown in the figure. Data is transferred serially from P40, P41, and P42 of the CPU to the LCD driver.

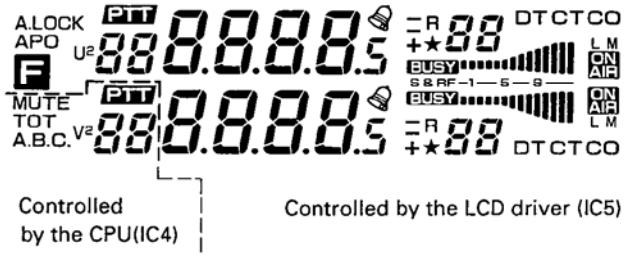


Fig. 16 Display LCD

Memory

Memory channel data is stored in IC6 (non volatile memory). Data is written according to the serial data from P31, P32, and P33 of the microcomputer (IC4), and is read by P23.

CIRCUIT DISCRIPTION

430MHz Band PLL Synthesizer

The VCO and PLL circuits comprise a hybrid integrated circuit housed in a solid shielded case. Comparison frequencies are produced by dividing a 12.8MHz reference frequency from the 144MHz band unit to correspond to the 5, 10, 15, 20, 12.5, and 25kHz channel steps.

When UHF band signals are received, 379.475 to 391.47MHz (K,P), 371.475 to 381.47MHz (M, E) is generated, and when UHF band signals are transmitted, 438.00 to 449.995MHz (K,P), 430.00 to 439.995MHz (M,E) is generated. When VHF sub band signals are received, the VCO in the PLL unit stops, and the VHF sub VCO on the mother board is operated to produce 202.525 to 206.52MHz (K,P,M), 202.525 to 204.52MHz (E).

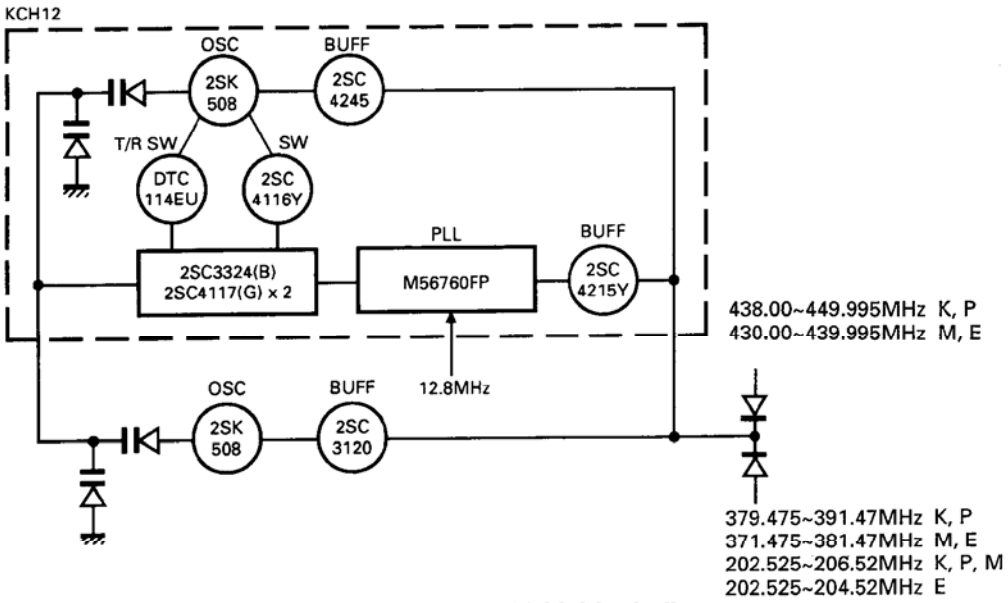


Fig. 17 430MHz band PLL block diagram

144MHz Band PLL Synthesizer

The VCO and PLL circuits comprise a hybrid integrated circuit housed in a solid shielded case. X2 (12.8MHz) is generated by the PLL IC (M56760FP) in the HIC, and is divided to produce a 5 or 6.25kHz reference frequency. Part of the 12.8MHz output is passed through the buffer amplifier, and goes to the 430MHz unit.

Comparison frequencies are produced by dividing X2 to correspond to the 5, 10, 15, 20, 12.5, and 25kHz channel steps. When VHF band signals are received, 189.05 to 193.045MHz (K,P,M), 189.05 to 191.045MHz (E) is generated, and when VHF band signals are transmitted, 144.00 to 147.995MHz (K,P,M), 144.00 to 145.995MHz (E) is generated. When UHF sub band signals are received, a lock is established at twice the VCO oscillation frequency to produce 379.475 to 391.47MHz (K,P), 371.475 to 381.47MHz (M,E).

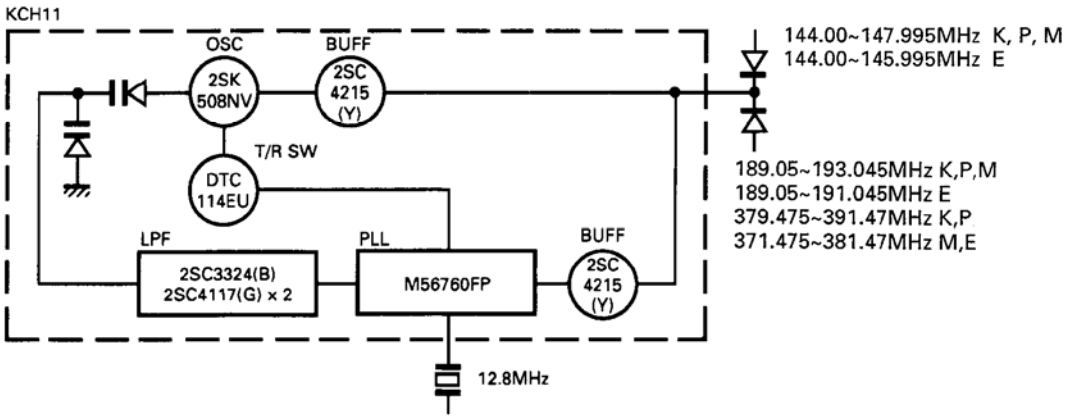


Fig. 18 144MHz band PLL block diagram

CIRCUIT DESCRIPTION

I/O Port Specifications

- **75328GC-540-3B9 (LCD ASSY : IC4)**

μ-com port	Port name	I/O	Pull up	Back up	Description	Circuit pin name
P00/INT4	P_BCHK	I			+B check. 0 : Power not connected, 1 : Power connected	
P01/SCK		I	○			
P02/SO/SB0	P_SO	O	○		Common microprocessor. SI	
P03/SI/SB1	P_SI	I	○		Common microprocessor. SO	
P10/INT0	P_ENCCK	I	●		Encoder clock.	
P11/INT1	P_INT1	I			Connect to P_SI.	
P12/INT2	P_ENCDT	I	●		Encoder data.	
P13/INT3	P_PS	I			Power switch (non-locking).	S1
P20/PTO0	P_KEY12	I	○		Band select VHF.	
P21	P_KEY13	I	○		Band select UHF.	
P22/PCL		I	○			
P23/BUZ	P_EPDO	I	○		EEPROM. DO	
P30/LLCDCL	P_S5	O			5C switching.	
P31/SYNC	P_EPDI	O	■		EEPROM. DI	
P32	P_EPSK	O	■		EEPROM. SK	
P33	P_EPCS	O	■		EEPROM. CS	
P40	P_LCDLD	O	●		LCD driver strobe. MSM5265	
P41	P_LCDCK	O	●		LCD driver clock. MSM5265	
P42	P_LCDDT	O	●		LCD driver data. MSM5265	
P43	P_TEST	O	●		LCD all on. MSM5265	
P50	P_KEY3	I	●		MHz key.	S4
P51	P_KEY2	I	●		MR key.	S3
P52	P_KEY1	I	●		VFO key.	S2
P53		I	Vss			
P60/KR0	P_KEY11	I		○	CONT SEL key.	S12
P61/KR1	P_KEY10	I		○	LOW key.	S11
P62/KR2	P_KEY9	I		○	MUTE key.	S10
P63/KR3	P_KEY8	I		○	REV key.	S9
P70/KR4	P_KEY7	I		○	TONE key.	S8
P71/KR5	P_KEY6	I		○	BELL key.	S7
P72/KR6	P_KEY5	I		○	F key.	S6
P73/KR7	P_KEY4	I		○	CALL key.	S5
P80	P_B0	I		○	Destination input b0.	
P81	P_B1	I		○	Destination input b1.	
P82	P_B2	I		○	Destination input b2.	
P83	P_B3	I		○	Destination input b3.	
S24/BP0	P_BLANK	O				
S25/BP1	P_LAMP	O			Lamp. 0 : ON, 1 : OFF	
S26/BP2	P_DIM1	O			Dimmer. 1,2 = 0,0 : D1, 0,1 : D2	
S27/BP3	P_DIM2	O			Dimmer. 1,2 = 1,0 : D3, 1,1 : D4	
S28/BP4		O				
S29/BP5		O				
S30/BP6	P_LEDU	O			Control display LED (UHF). 0 : ON, 1 : OFF	
S31/BP7	P_LEDV	O			Control display LED (VHF). 0 : ON, 1 : OFF	
AN0			Vss			
AN1			Vss			
AN2	P_SQLV				VHF band squelch input.	
AN3	P_VOLV				VHF band volume input.	
AN4	P_SQLU				UHF band squelch input.	
AN5	P_VOLU				UHF band volume input.	

Δ : Pulled up by software during checking only
○ : Always pulled up by software
● : Always pulled up by hardware
■ : Always pulled down by hardware

CIRCUIT DESCRIPTION

- **75517GF-029-3B9 (TX-RX UNIT : IC403)**

μ-com port	Port name	I/O	Pull up	Back up	Description	Circuit pin name
P00/INT4	P_VF	I			Power check. 0 : Operation, 1 : Backup	
P01/SCK0		I	○			
P02/SO0/SB0	P_SO	O	○		Panel microprocessor. SI	
P03/SI0/SB1	P_SI	I	○		Panel microprocessor. SO	
P10/INT0	P_	I		I		
P11/INT1	P_CTCSS	I		I	CTCSS detection. 0 : Tone match, 1 : Tone mismatch	SD0
P12/INT2	P_STD	I	■	I	DTMF detection (LC7385 STD). 0 : No signal detected, 1 : Signal detected	STD
P13/TI0	P_CHMOD	I		I	Display mode setting. 0 : Normal, 1 : Channel display	
P20?PTO0	P_BEEP	O		L	Beep output pin (Beep sound). "L" : No beep output	
P21	P_DTU	O		L	Shift register/PLL data (UHF).	DTU
P22/PCL	P_CKU	O		L	Shift register/PLL clock (UHF).	CKU
P23/BUZ	P_EPU	O		L	PLL enable (UHF).	EPU
P30	P_ES1U	O		I	Shift register 1 enable (UHF).	ESU1
P31	P_ES2U	O		I	Shift register 2 enable (UHF).	ESU2
P32	P_ET	I/O		I	CTCSS unit enable connection check. 0 : Connected, 1 : Not connected	CTE
P33	P_5C	O		I	5C ON/OFF. 0 : ON, 1 : OFF	
P40	P_R4	O	●	I	DTMF encoder data (R4). LR4089BN	C1
P41	P_R3	O	●	I	DTMF encoder data (R3).	C2
P42	P_R2	O	●	I	DTMF encoder data (R2).	C3
P43	P_R1	O	●	I	DTMF encoder data (R1).	C4
P50	P_C4	O	●	I	DTMF encoder data (C4).	R4
P51	P_C1	O	●	I	DTMF encoder data (C1).	R3
P52	P_C2	O	●	I	DTMF encoder data (C2).	R2
P53	P_C3	O	●	I	DTMF encoder data (C3).	R1
P60/KR0	P_1750	O		I	1750Hz tone.	
P61/KR1	P_TONE	O		I	Sub-tone output bit 1.	
P62/KR2	P_TONE	O		I	Sub-tone output bit 2.	
P63/KR3	P_TONE	O		I	Sub-tone output bit 3.	
P70/KR4	P_TONE	O		I	Sub-tone output bit 4.	
P71/KR5	P_TONE	O		I	Sub-tone output bit 5.	
P72/KR6	P_TONE	O		I	Sub-tone output bit 6.	
P73/KR7	P_TONE	O		I	Sub-tone output bit 7.	
P80/PPO		I		I	Connected to SCK (for clock when cloning).	
P81/SCK1	P_UP	I	●	I	Microphone UP.	
P82/SO1	P_PTT	I	●	I	Microphone PTT.	
P83/SI1	P_DOWN	I	●	I	Microphone DOWN.	
P90	P_Q1	I		I	DTMF decoder data (Q1). LC7385	Q1
P91	P_Q2	I		I	DTMF decoder data (Q2).	Q2
P92	P_Q3	I		I	DTMF decoder data (Q3).	Q3
P93	P_Q4	I		I	DTMF decoder data (Q4).	Q4
P100	P_DTSEL	O		I	DTMF switching. 0 : Microphone, 1 : Detection output	
P101	P_SP	O		I	Speaker switching. 0 : Internal SP for VHF, 1 : Internal SP for UHF	
P102	P_CTCSRD	O		I	CTCSS RD switching. 0 : UHF, 1 : VHF	
P103	P_DTMFRD	O		I	DTMF RD switching. 0 : UHF, 1 : VHF	
P110	P_MICRD	O		I	Microphone RD switching. 0 : UHF, 1 : VHF	
P111	P_MMUTE	O		I	Microphone mute. 0 : OFF, 1 : ON	
P112	P_MUTEEX	O		I	External speaker mute (off when beep output). 0 : OFF, 1 : ON	
P113	P_MUTEIN	O		I	Internal speaker mute (off when beep output). 0 : OFF, 1 : ON	
P120	P_BPAFMV	O	●	I	Beep AF mute (VHF). 0 : OFF, 1 : ON	
P121	P_BPAFMU	O	●	I	Beep AF mute (UHF). 0 : OFF, 1 : ON	

Δ : Pulled up by software during checking only
○ : Always pulled up by software
● : Always pulled up by hardware
■ : Always pulled down by hardware

CIRCUIT DESCRIPTION

• 75517GF-029-3B9 (TX-RX UNIT : IC403)

μ-com port	Port name	I/O	Pull up	Back up	Description	Circuit pin name
P122	P_BPMUTV	O	●	I	Beep mute (VHF). 0 : OFF, 1 : ON	
P123	P_BPMUTU	O	●	I	Beep mute (UHF). 0 : OFF, 1 : ON	
P130	P_VOLEN	O	●	I	Electronic volume enable. L : UHF, H : VHF	
P131	P_RDMUTE	O	●	I	RD mute. 0 : Transmission with repeater, 1 : ON	
P132	P_PSW	O	●	I	Power switch. 0 : Power OFF, 1 : Power ON	PSW
P133	P_ES2V	O	●	I	Shift register 2 enable (VHF).	ESV2
P140	P_ES1V	O	●	I	Shift register 1 enable (VHF).	ESV1
P141	P_EPV	O	●	I	PLL enable (VHF).	EPV
P142	P_CKV	O	●	I	Shift register/PLL/Electronic volume/CTCSS clock (VHF).	CKV
P143	P_DTV	O	●	I	Shift register/PLL/Electronic volume/CTCSS data (VHF).	DTV
AN0	P_SMV	I			VHF band S-meter input	SMV
AN1	P+SMU	I			UHF band S-meter input.	SMU
AN2	P_UPAN	I			UP, CALL, VFO	
AN3	P_DNAN	I			DOWN, MR, RF	
P150/AN4		I	Vss			
P151/AN5		I	Vss			
P152/AN6	P_SCV	I			SC VHF input. 0 : BUSY, 1 : CLOSE	SCV
P153/AN7	P_SCU	I			SC UHF input. 0 : BUSY, 1 : CLOSE	SCU

Δ : Pulled up by software during checking only
○ : Always pulled up by software
● : Always pulled up by hardware
■ : Always pulled down by hardware

• Shift register BU4094BF (TX-RX UNIT : IC8) : VHF

S.Reg port	Pin No.	Port data name	Save	Back up	Function	Remarks
Q1	4	PD_TXRX			0 : Transmission, 1 : Reception	TX/RX
Q2	5	PD_HI			0 : MID, LOW power, 1 : HI power	HI
Q3	6	PD_MID			0 : HI, LOW power, 1 : MID power	MID
Q4	7	PD_11R			See next page table 1.	11R
Q5	14	PD_12R			See next page table 1.	12R
Q6	13	PD_43R			See next page table 1.	43R
Q7	12	PD_AM			AM/FM switching. 0 : AM, 1 : FM	
Q8	11	PD_14R			See next page table 1.	14R

Note that logic is negative. (Reversed when data is output.)
Enable : ES1 VHF = P140 (63 pin)
Data = P143 (61 pin)
Clock = P142 (62 pin)

• Shift register BU4094BF (TX-RX UNIT : IC206) : UHF

S.Reg port	Pin No.	Port data name	Save	Back up	Function	Remarks
Q1	4	PD_TXRX			0 : Transmission, 1 : Reception	TX/RX
Q2	5	PD_HI			0 : MID, LOW power, 1 : HI power	HI
Q3	6	PD_MID			0 : HI, LOW power, 1 : MID power	MID
Q4	7	PD_FAN			0 : FAN OFF, 1 : FAN ON	
Q5	14	PD_14R			See next page table 1.	14R
Q6	13	PD_80R			See next page table 1.	80R
Q7	12	PD_43R			See next page table 1.	43R
Q8	11	PD_36R			See next page table 1.	36R

Note that logic is negative. (Reversed when data is output.)
Enable : ES1 UHF = P30 (41 pin)
Data = P21 (44 pin)
Clock = P22 (43 pin)

CIRCUIT DESCRIPTION

- **Relationship between frequencies and Q4, Q5, Q6, and Q7 (Table 1)**

Band	144MHz				430MHz				
Frequency (MHz) K,P	118~ 123.995	124~ 129.995	130~ 173.995	400~ 469.995	410~ 437.995	430~ 449.995	440~ 469.995	800~ 999.990	136~ 173.995
Frequency (MHz) M,M2,M3,E,E2					410~ 429.995	430~ 439.995	440~ 469.995		
Q4	H	L	L	L	FAN	FAN	FAN	FAN	FAN
Q5	L	H	L	L	H	H	H	H	L
Q6	H	H	H	L	H	H	H	L	H
Q7	–	–	–	–	H	L	H	H	H
Q8	L	L	L	H	L	H	L	H	H
IF	45.05	45.05	45.05	45.05	58.525	58.525	58.525	58.525	58.525
IF shift	U	U	U	L	L	L	L	L	U
				U x U					V x V

- **PLL M56760FP (TX-RX UNIT : IC9, 207 internal IC)**

Band	144MHz			430MHz			
Frequency	118~129.995	130~173.995	400~469.995	410~469.995	800~879.990	880~999.990	136~173.995
SW1 (T/R)	L	0 : Reception 1 : Transmission	L	0 : Reception 1 : Transmission	L	H	–
SW2 (VCO)	L	0 : Transmission 1 : Reception	H	H	H	H	L

- **Shift register BU4094BF (TX-RX UNIT : IC5) : VHF squelch**

S.Reg port	Pin No.	Port data name	Save	Back up	Function	Remarks
Q1	4	PD_SQV4			SQL bit 4.	
Q2	5	PD_SQV3			SQL bit 3.	
Q3	6	PD_SQV2			SQL bit 2.	
Q4	7	PD_SQV1			SQL bit 1.	
Q5	14	PD_SQV0			SQL bit 0.	
Q6	13	PD_AMFM				
Q7	12	PD_			–	
Q8	11	PD_			–	

Enable : ES2 VHF = P133 (65 pin)
Data = P143 (61 pin)
Clock = P142 (62 pin)

- **Shift register BU4094BF (TX-RX UNIT : IC205) : UHF squelch**

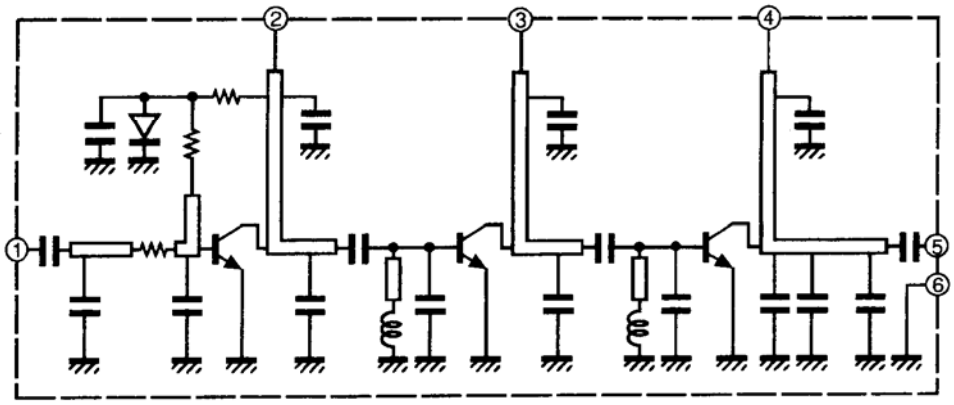
S.Reg port	Pin No.	Port data name	Save	Back up	Function	Remarks
Q1	4	PD_SQU4			SQL bit 4.	
Q2	5	PD_SQU3			SQL bit 3.	
Q3	6	PD_SQU2			SQL bit 2.	
Q4	7	PD_SQU1			SQL bit 1.	
Q5	14	PD_SQU0			SQL bit 0.	
Q6	13	PD_			–	
Q7	12	PD_			–	
Q8	11	PD_			–	

Enable : ES2 UHF = P31 (40 pin)
Data = P21 (44 pin)
Clock = P22 (43 pin)

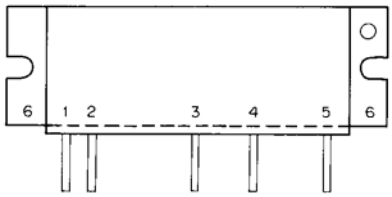
SEMICONDUCTOR DATA

Final Module : M57788MR (TX-RX Unit IC501)

- **Equivalent circuit**



- **Terminal connection**



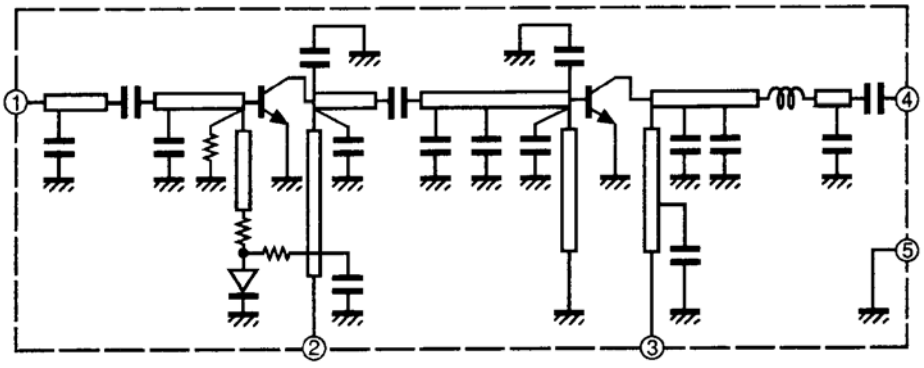
1 : Input
2 : First stage power supply
3 : Drive stage power supply
4 : Final stage power supply
5 : Output
6 : Fin (GND)

- **Electrical characteristics**

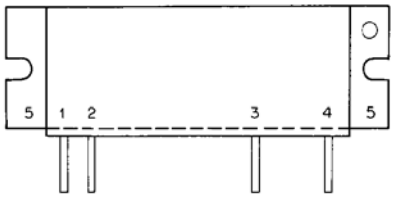
Item	Symbol	Tc (°C)	Condition	Rating			Unit
				MIN.	TYP.	MAX.	
Frequency	f			430		450	MHz
Output power	Po	25	Vcc = 12.5V	40	45		W
Total efficiency	ηT	25	Pin = 400mW	40	45		%
2nd spurious		25	Zg = Zl = 50Ω			–30	dB
3rd spurious		25				–30	dB

Final Module : S-AV17 (TX-RX Unit IC502)

- **Equivalent circuit**



- **Terminal connection**



1 : Input
2 : First stage power supply
3 : Final stage power supply
4 : Output
5 : Fin (GND)

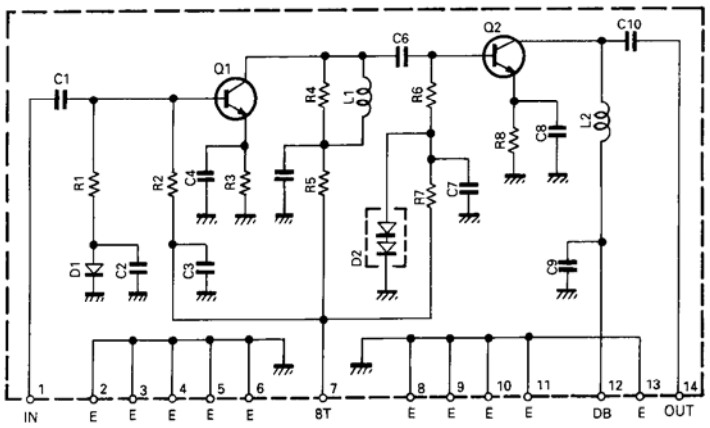
- **Electrical characteristics**

Item	Symbol	Tc (°C)	Condition	Rating			Unit
				MIN.	TYP.	MAX.	
Frequency	f			144		148	MHz
Output power	Po	25	Vcc = 12.5V			65	W
Total efficiency	ηT	25	Pin = 400mW	45			%
Harmonics	HRM	25	Zg = Zl = 50Ω		–30	–25	dB

SEMICONDUCTOR DATA

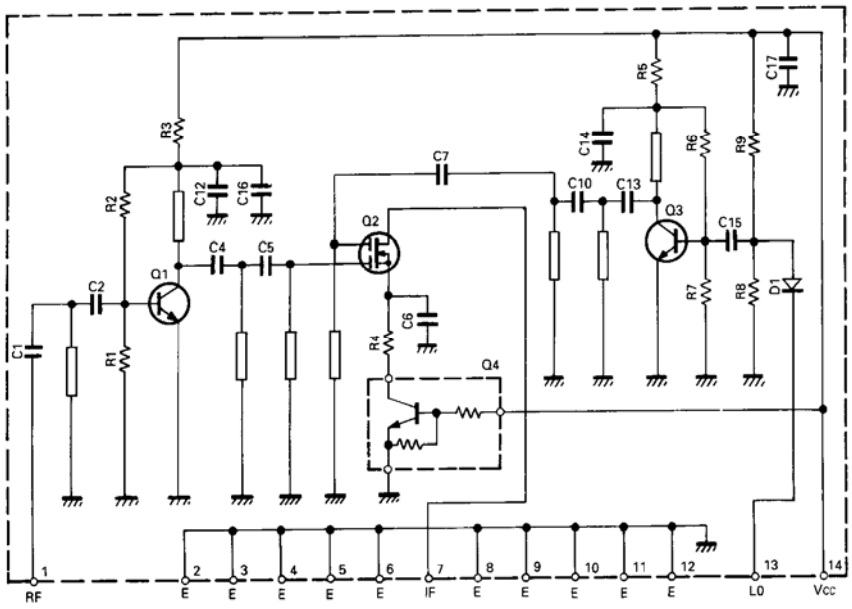
Drive HIC : KCB11 (TX-RX Unit IC10)

- **Circuit diagram**



80RF HIC : KCB13 (TX-RX Unit IC202)

- **Circuit diagram**

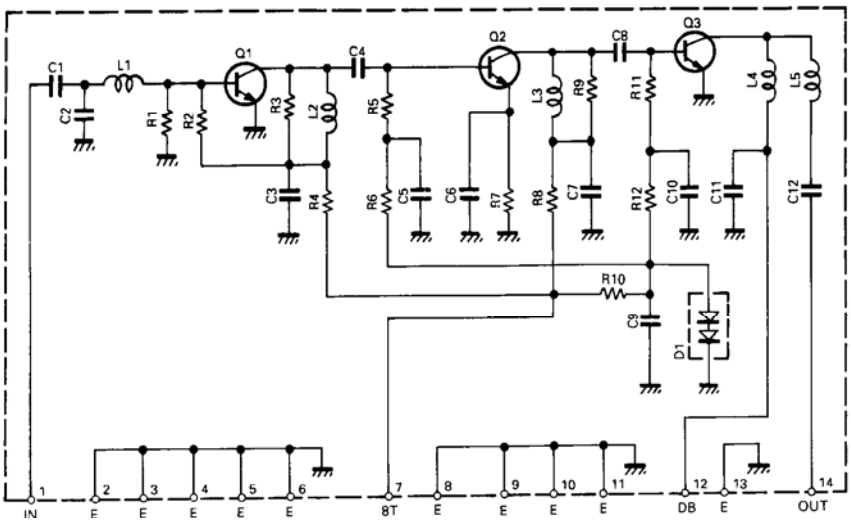


Scan by Dan

SEMICONDUCTOR DATA

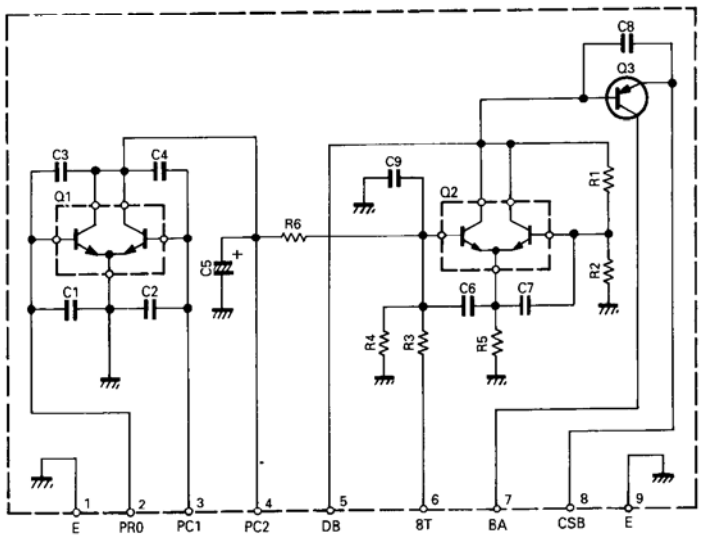
Drive HIC : KCB14 (TX-RX Unit IC209)

- **Circuit diagram**



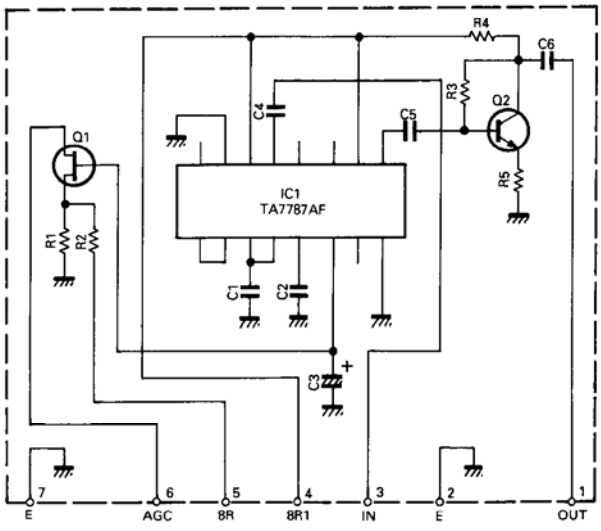
APC HIC : KCC04 (TX-RX Unit IC210)

- **Circuit diagram**



AF IF HIC : KCD05 (TX-RX Unit IC2)

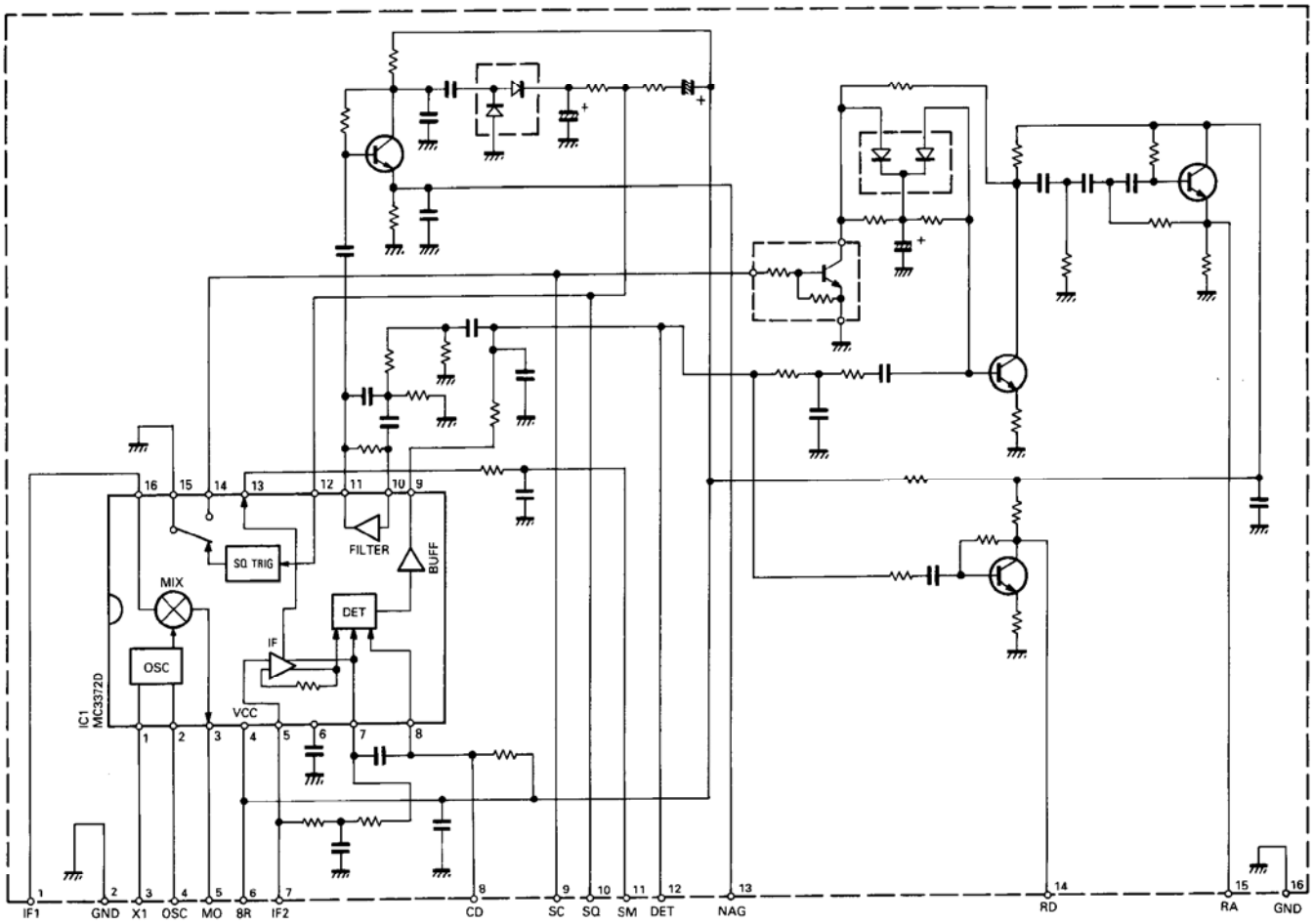
- **Circuit diagram**



SEMICONDUCTOR DATA

FM IF HIC : KCD04 (TX-RX Unit IC1, 201)

- **Circuit diagram**



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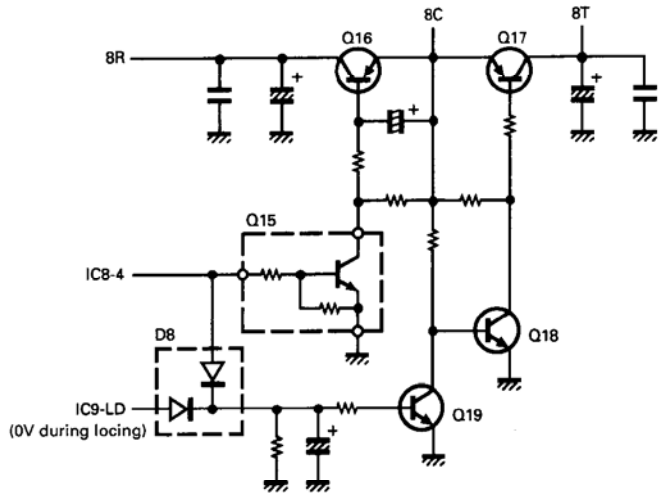
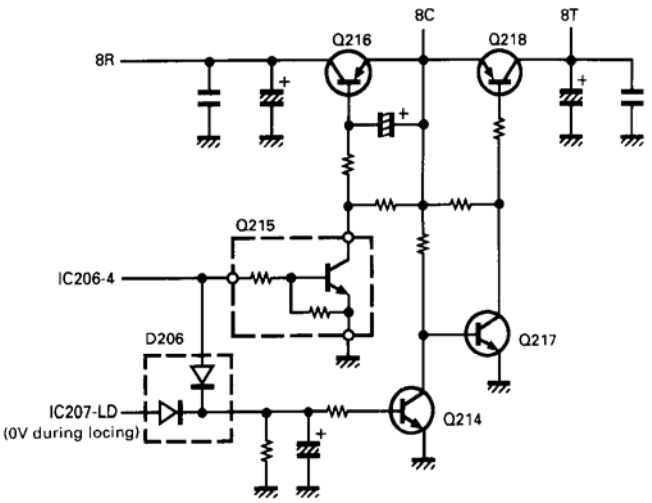
DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-400X-XX) 0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2

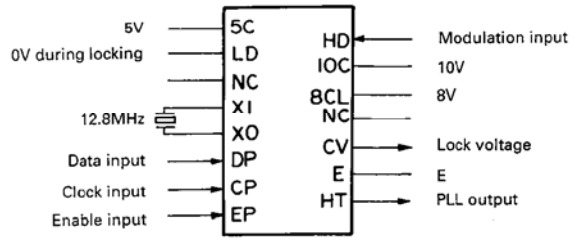
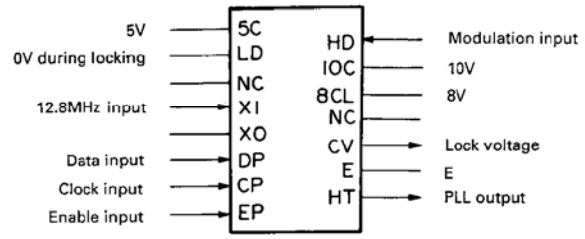
Ref. No	Use/Function	Operation/Condition compatibility
Q1	High-frequency amplifier	
Q2 *	Band-pass filter band switching	
Q3	High-frequency amplifier	
Q4	First mixer	Except U²
Q5	First mixer switch	Off for U²
Q6	First IF amplifier	45.05MHz
Q7 *	Power switching	For AM
Q8 *	Discrete output switch	On for AM
Q9	Squelch hysterisis	On when squelch is on
Q10	RD buffer amplifier	
Q11	Power switching 14R	Except U²
Q12	Power switching 43R	U²
Q13	First mixer	U²
Q14	First mixer switch	On for U²
Q15~Q19	During transmission Q16, Q15, Q19 : Off Q17 and Q18 : On During reception Q16, Q15, Q19 : On Q17 and Q18 : Off	
Q20	Squelch switch	See IC4 Operation
Q21	Microphone mute	On during reception
Q22, Q23	Inverter	
Q24	CV line buffer	
Q25	PLL output amplifier	
Q26	PLL 8V ripple filter	
Q27	Power switching between medium and low	
Q28	APC control	
Q29	12.8MHz buffer	
Q201	High-frequency amplifier	
Q202 *	Power switching	43R, 36R
Q203 *	Power switching	80R
Q204, Q205	High-frequency amplifier	
Q206	First mixer	Except V²
Q207	First mixer switch	Off for V²
Q208	First IF amplifier	58.525MHz
Q209	Squelch hysterisis	On when squelch is on
Q210	RD buffer amplifier	
Q211	High-frequency amplifier	For V²
Q212	First mixer	For V²
Q213	First mixer switch	On for V²

DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
Q214~Q218		
Q219	Squelch switch	See IC204 Operation
Q220	Power switching	14R
Q221~Q223	Inverter	
Q224	Microphone mute	On during reception
Q228	PLL 8V ripple filter	
Q229	PLL output amplifier	
Q230	Fan switch	
Q231	Power switching between medium and low	
Q232	APC control	
Q233	Power switch	
Q234	Power switch control	
Q401	DTMF signal buffer	
Q402	External speaker output mute	See Microprocessor Ports
Q403	Internal speaker output mute	See Microprocessor Ports
Q404	VHF-band audio mute	See Microprocessor Ports
Q405	Beep mute, VHF	See Microprocessor Ports
Q406	Beep mute, UHF	See Microprocessor Ports
Q407	Electronic VR buffer amplifier, VHF	
Q408	Electronic VR buffer ampifier, UHF	
Q409	UHF-band audio mute	See Microprocessor Ports
Q410	Backup switch	
Q411	Reset switch	
Q412	5C switch	
Q413	RD mute	
Q414	Microphone mute	
IC1	Second local oscillator, mixer, IF amplifier, detection, low-frequency amplifier, noise amplifier, detector squelch switching	1 : First IF input, 45.05MHz 3,4 : Second local oscillator, 45.505MHz 9 : Scan control busy signal, 0V while busy 10 : Noise-detection voltage output (DC) 11: S-meter output 12 : Detection output 14 : RD output 15 : AF output
IC2 *	AM	–
IC3	High-frequency amplifier	U^2
IC4	Analog switch (squelch)	See Circuit Description
IC5	Shift register	For squelch
IC6	AF amplifier	
IC7	Multiplexer (AF output)	See Circuit Description

TM-732A/E

DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
IC8	Shift register	See Circuit Description
IC9	PLL	
IC10	144MHz-band transmit driver	
IC11	10V AVR	
IC201	Second local oscillator, mixer, IF amplifier, detection low-frequency amplifier noise amplifier, detector squelch switching	1 : First IF input, 58.525MHz 3,4 : Second local oscillator, 58.07MHz 9 : Scan control busy signal, 0V while busy 10 : Noise-detection voltage output (DC) 11 : S-meter output 12 : Detection output 14 : RD output 15 : AF output
IC202, 203 *		
IC204	Analog switch (squelch)	See Circuit Description
IC205	Shift register	For squelch
IC206	Shift register	See Circuit Description
IC207	PLL	
IC208	10V AVR	
IC209	430MHz-band transmit driver	
IC210	APC	
IC211	8V AVR	
IC401	DTMF encoder	
IC402	DTMF decoder	
IC403	Microprocessor	See Circuit Description
IC404, IC405	Multiplexer	See Circuit Description
IC406	Electronic VR	Right channel : VHF band Left channel : UHF band
IC407	6V AVR	
IC408, IC409	Serial data inverter	
IC410, IC411	Low-frequency amplifier (microphone)	
D1~D5	Vari-cap tuner	
D6	Heterodyne switch	
D7	Reference voltage	
D8	Reverse-flow prevention	
D9	Voltage correction	
D10	Heterodyne switch	Transmit/receive switch
D11	Reverse-flow prevention	
D12	APC temperature compensation	
D13, D14	Antenna selection switch	
D15, D16	Power detection	
D201 *	RF switch	
D202	Reverse-flow prevention	

DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
D203	IF level limiter	
D204, D205	Heterodyne switch	
D206, D207	Reverse-flow prevention	
D210	Heterodyne switch	
D211	APC temperature compensation	
D212	Reverse-flow prevention	
D213, D214	Antenna selection switch	
D215, D216	Power detection	
D217	Reverse power connection prevention	
D401, D402	Reverse-flow prevention	
D403	Backup detection	
D404	Reset detection	
D405	Reverse-flow prevention	
D406	Microprocessor protection	
D407	Reverse-flow prevention	

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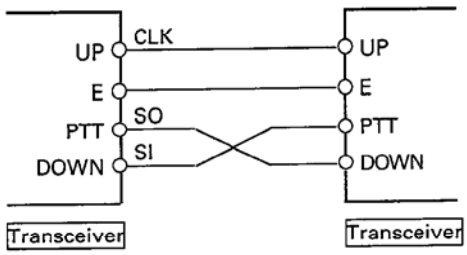
MODIFICATION

Cloning Function

- **Wired cloning (Modification not required)**

Cloning cable



Operation

1. Write memory data into the master transceiver.
2. Switch the power off, hold down the F and MHz keys, and switch the power on again. The frequency display shows "CLonE".
3. Set the slave transceiver to clone mode in the same way.
4. Connect the microphone jacks of the two transceivers with a cloning cable.
5. Press the CALL key on the master transceiver. The "ON AIR" indicator lights, and cloning starts. When data output ends, a beep sounds, and "End" is displayed. When the writing of all channel data finishes, a beep sounds, and "End" is displayed.

Note : Cloning is possible only between TM-732s. Memory channel modes, the number of channels for each band, and all memory channel data are cloned.

- **Cloning with transceiver (DTMF) (Modification required)**

Operation

1. Write data into the master transceiver, and specify the transmit band and transmit frequency.
2. Switch the power off, hold down the CALL and BELL keys, and switch the power on again. Clone receive mode is entered, and "CLonE" is displayed on the frequency display for the band other than the transmit band.
3. Set the receive frequency of the slave transceiver to the transmit frequency of the master transceiver, hold down the CALL and BELL keys, and switch the power on.
4. Press the PTT key on the master transceiver. The power goes low automatically and transmission starts. (The remaining data is displayed on the signal-strength meter display.)
5. When all the data has been output, a beep sounds, and "End" is displayed.
6. When all the data has been written into the slave transceiver, a beep sounds, and "End" is displayed.

Note : If the signal breaks during reception, a beep sounds, and "Err" is displayed.

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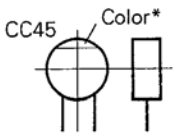
PARTS LIST

CAPACITORS

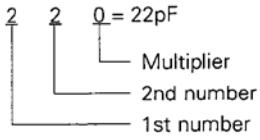
CC 45 TH 1H 220 J
1 2 3 4 5 6

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



• Capacitor value

010 = 1pF
100 = 10pF
101 = 100pF
102 = 1000pF = 0.001µF
103 = 0.01µF



• 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 ± 60ppm/°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 10µF – 10 ~ +50 Less than 4.7µF –10 ~ +75

Less than 10pF

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

• Voltage rating

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 (Refer to the table above except dimension)

(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)

RESISTORS

• Chip resistor (Carbon)

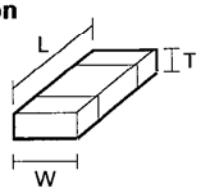
(EX) RD 73 F B 2B 000 J
1 2 3 4 5 6 7
(Chip) (B,F)

• Carbon resistor (Normal type)

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

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

Dimension



• Dimension (Chip capacitor)

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 (Chip resistor)

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				

TM-732A/E

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

TM-732A/E

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
			TM-732A/E			
1	1C	*	A01-2050-13	METALLIC CABINET(TOP)		
2	3C	*	A01-2051-13	METALLIC CABINET(BOTTOM)		
4	2B,2C	*	A22-0782-04	SUB PANEL		
5	3B	*	A62-0141-03	PANEL ASSY(TM-732E)	EE2E3	
5	3B	*	A62-0142-03	PANEL ASSY(TM-732A)	KP	
5	3B	*	A62-0142-03	PANEL ASSY(TM-732A)	MM2M3	
6	2B	*	A62-0143-12	PANEL(MAIN BODY)		
7	3B	*	A62-0174-03	PANEL(TM-732A)	KP	
7	3B	*	A62-0174-03	PANEL(TM-732A)	MM2M3	
7	3B	*	A62-0175-03	PANEL(TM-732E)	EE2E3	
8	2B	*	A82-0008-12	REAR PANEL		
9	2B	*	B10-1173-03	FRONT GLASS		
10	3B	*	B11-1038-03	FILTER(POW)		
11	3B	*	B11-1039-04	FILTER(VFO)		
-	-	*	B11-1040-04	FILTER		
-	-	*	B11-1041-08	FILTER		
-	-		B30-0865-15	LAMP(6.3V 75MA)		
16	2B	*	B38-0366-15	LCD ASSY	KP	
16	2B	*	B38-0367-15	LCD ASSY	M	
16	2B	*	B38-0368-15	LCD ASSY	EE3	
16	2B	*	B38-0370-15	LCD ASSY	M2M3	
16	2B	*	B38-0371-15	LCD ASSY	E2	
17	2B		B41-0679-04	CAUTION LABEL(PANEL)		
18	1C		B42-2455-04	LABEL(M4X8)		
-	-		B42-3322-14	LABEL(ANT)	KP	
20	1A		B42-3343-04	LABEL(MODEL NAME)		
21	1A		B42-3394-14	LABEL(FCC)	K	
22	3F		B44-2163-04	UPC CODE LABEL(ITEM CARTON		
23	3E		B44-2165-04	UPC CODE LABEL(OUTER CARTON		
24	1F		B46-0410-30	WARRANTY CARD(ACSY)	K	
24	1E		B46-0419-00	WARRANTY CARD(ACSY)	EE3	
24	1E		B46-0422-00	WARRANTY CARD(ACSY)	P	
28	1E,1F	*	B62-0201-00	INSTRUCTION MANUAL(ACSY)		
28	1E	*	B62-0202-00	INSTRUCTION MANUAL(ACSY)	PE	
28	1E	*	B62-0225-00	INSTRUCTION MANUAL(ACSY)	MM2M3	
28	1E	*	B62-0225-00	INSTRUCTION MANUAL(ACSY)	E2E3	
29	1A,3C	*	B72-0324-04	MODEL NAME PLATE	KP	
29	1A,3C	*	B72-0325-04	MODEL NAME PLATE	MM2M3	
29	1A,3C	*	B72-0326-04	MODEL NAME PLATE	EE2E3	
-	-		E23-0435-05	TERMINAL		
37	2E		E30-2111-05	DC CABLE		
38	2D		E30-2108-05	ANT CABLE(N)	EE2E3	
38	2D		E30-2145-05	ANT CABLE(M)	KP	
38	2D		E30-2145-05	ANT CABLE(M)	MM2M3	
38	-		E30-3009-05	ANT CABLE(M)	KP	
40	2D		E30-3007-05	DC POWER CORD		
42	1C		E31-3197-15	CONNECTING WIRE(SP)		
CN4	-	*	E40-5537-05	PIN ASSY(7P)		
CN202	-		E40-5021-05	PIN ASSY(7P)		
CN403	-		E40-3262-05	PIN CONNECTOR(4P)		
J401	2C	*	E08-0877-05	RECTANGULAR RECEPTACLE		
W1	2C	*	E37-0232-05	FLAT CABLE(20P 40MM VHF)		

L:Scandinavia **K:**USA **P:**Canada
Y:PX(Far East, Hawaii) **T:**England **E:**Europe
Y:AAFES(Europe) **X:**Australia **M:**Other Areas

TM-732A : K,P,M,M2,M3
TM-732E : E,E2,E3

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without **Parts No.** are not supplied.
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Teile ohne **Parts No.** werden nicht geliefert.

TM-732A/E

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
W2	2B	*	E30-3096-05	REPEATING CABLR(PANEL-BODY)		
-	-		F05-2036-05	FUSE(20A)		
47	2B	*	F07-1345-04	COVER(BODY,PANEL)		
48	1D	*	F07-1347-03	COVER(FAN)		
49	3C	*	F10-2020-04	SHIELDING COVER(UHF)		
51	1D	*	F10-2039-04	SHIELDING COVER(VHF)		
-	-		F20-1088-04	INSULATING BOARD(LITHIUM BATT.		
55	2D,2E		F51-0017-05	FUSE(15A)		
58	2B	*	G01-0864-14	COIL SPRING(RELEASE)		
59	3A,3B		G02-0505-05	LEAF SPRING(VOL)		
60	1C		G02-0576-04	FLAT SPRING(IC)		
61	1C,2A		G02-0600-14	FLAT SPRING(THERMAL SW)		
-	-	*	G02-0721-04	FLAT SPRING(APC)		
-	-	*	G02-0723-04	FLAT SPRING(TRANSISTOR)		
-	-	*	G02-0729-04	FLAT SPRING		
65	2C	*	G02-0730-04	FLAT SPRING(HERICAL)		
67	3A		G09-0405-05	SPRING(ENCORDER)		
68	1C		G10-0651-04	NON-WOVEN FABRIC		
-	-		G11-0661-04	INSULATION SHEET(APC)		
73	1C		G13-0887-04	CUSHION(CABINET)		
-	-		G13-0921-04	CUSHION(ELECTRO C)		
-	-		G13-0926-04	CUSHION		
-	-	*	G13-1342-04	CUSHION(6 KEY)		
80	3B	*	G13-1343-04	CUSHION(POW)		
-	-	*	G13-1344-04	CUSHION(SEL)		
-	-	*	G13-1361-04	CUSHION(HOLDER)		
84	2C,2D	*	G13-1362-04	CUSHION(CHASSIS)		
-	-	*	G13-1371-04	CUSHION		
85	2E	*	H10-2738-02	POLYSTYRENE FOAMED FIXTURE		
86	1F		H11-0822-04	POLYSTYRENE FOAMED FIXTURE	K	
87	1E		H11-0823-04	POLYSTYRENE FOAMED FIXTURE	PE	
88	2F		H13-0814-04	PROTECTION BOARD(BRACKET)		
89	1E		H13-0825-04	PROTECTION BOARD(309X219 B)	MM2M3	
89	1E		H13-0825-04	PROTECTION BOARD(309X219 B)	PEE2E3	
-	-		H13-0843-04	PROTECTION BOARD(153X215 A)	MM2M3	
-	-		H13-0843-04	PROTECTION BOARD(153X215 A)	E2E3	
95	2E		H25-0029-04	PROTECTION BAG(MIC HOOK)	KP	
100	2E		H25-0117-04	PROTECTION BAG(DC CABLE)		
101	1F		H25-0720-04	PROTECTION BAG(BODY)		
103	1E		H25-0750-04	PROTECTION BAG(OP MANUAL)	MM2M3	
103	1E		H25-0750-04	PROTECTION BAG(OP MANUAL)	PEE2E3	
105	3F	*	H52-0220-04	ITEM CARTON BOX(732A)	KP	
105	3F	*	H52-0221-04	ITEM CARTON BOX(732A)	MM2M3	
105	3F	*	H52-0244-04	ITEM CARTON BOX(732E)	EE2E3	
106	3E	*	H62-0192-04	OUTER CARTON BOX	KMM2	
106	3E	*	H62-0192-04	OUTER CARTON BOX	M3P	
106	3E	*	H62-0193-04	OUTER CARTON BOX	EE2E3	
110	2B	*	J19-1513-04	HOLDER(RELEASE)		
111	2E		J20-0319-24	MIC HOOK(ACSY)	KP	
112	1C	*	J21-4374-14	MOUNTING HARDWARE(SP)		
-	-		J21-4383-08	MOUNTING HARDWARE		
114	2F		J29-0436-03	BRACKET		
-	-		J39-0439-05	SPACER		

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TM-732A/E

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TM-732A/E
TX-RX UNIT (X57-400X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
116	2C		J42-0453-05	CORD BUSHING(ANT)	MM2M3	
116	2C		J42-0453-05	CORD BUSHING(ANT)	EE2	
120	2B	*	K27-3119-14	KNOB(RELEASE)		
121	3A	*	K27-3120-04	KNOB(CALL)		
122	3B	*	K27-3121-04	KNOB(POWER)		
123	3B	*	K27-3122-04	KNOB(LOW)		
124	3B	*	K27-3123-04	KNOB(SEL)		
125	1A	*	K27-3124-03	KNOB(VFO)		
126	3A		K29-3156-04	KNOB(MAIN)		
127	3A		K29-4575-04	KNOB(VOL)		
128	3B		K29-4576-04	KNOB(SQL)		
A	1C,3C		N09-2077-05	SCREW(MODULE 3X8)		
B	3B		N14-0552-05	NUT(VOL.)		
C	1C		N33-2606-45	OVAL HEAD MACHINE SCREW(CABI		
D	1D		N35-2608-45	BINDING HEAD MACHINE SCREW(FAN		
E	2E		N46-3010-46	PAN HEAD TAPPING SCREW(MIC ACS	KP	
F	2B		N78-2030-45	SCREW		
G	3B		N78-2050-45	SCREW		
H	2B,3B		N80-2006-45	PAN HEAD TAPTITE SCREW		
I	2C	*	N80-2610-45	PAN HEAD TAPTITE SCREW		
J	2C		N87-2606-46	BRAZIER HEAD TAPTITE SCREW(PCB		
K	2B,2C		N88-2606-46	FLAT HEAD TAPTITE SCREW(SUB PA		
N	2E		N99-0331-05	SCREW SET(ACSY)		
-	-		S70-0408-05	TACT SWITCH		
133	2F	*	T91-0516-05	MICROPHONE(ACSY)	MM2	
133	2F	*	T91-0517-05	MICROPHONE(ACSY/DTMF)	KPM3	
133	2F	*	T91-0521-05	MICROPHONE(ACSY)	EE2E3	
FAN	2D		T42-0311-05	FAN MOTOR		
SP	1C		T07-0246-05	SPEAKER		
IC4	-		75328GC-540-3B9	IC(LCD ASSY)		
IC5	-		MSM5265GS-V1K	IC(LCD DRIVER/LCD ASSY)		
IC6	-		NM93C66(E)	IC(LCD ASSY)		
IC501	-		M57788MR	IC(POWER MODULE)		
IC502	-		S-AV17	IC(POWER MODULE FOR 144MHZ)		
142	2E		W01-0414-04	SPANNER(ACSY)		
143	2B	*	W02-1707-05	ENCODER		
144	2C	*	W09-0599-05	LITHIUM BATTERY(CONT. UNIT)		
150	2C,3C	*	X57-4000-11	TX-RX UNIT	KP	
150	2C,3C	*	X57-4000-21	TX-RX UNIT	MM2M3	
150	2C,3C	*	X57-4002-71	TX-RX UNIT	EE2E3	
152	1A		490-0160-05	PROTECTION SHEET(FRONT GLASS)		
TX-RX UNIT (X57-400X-XX) 0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3						
C1			CC73FCH1H180J	CHIP C 18PF J		
C2			CC73FCH1H060D	CHIP C 6PF D		
C3			CC73FCH1H470J	CHIP C 47PF J		
C4 -8			CK73FB1H102K	CHIP C 1000PF K		
C9			CC73FCH1H180J	CHIP C 18PF J		
C10			CK73FB1H102K	CHIP C 1000PF K		
C11			CC73FCH1H060D	CHIP C 6PF D		
C12 -14			CK73FB1H102K	CHIP C 1000PF K		
C15			CC73FCH1H121J	CHIP C 120PF J		
C16			CC73FCH1H0R5C	CHIP C 0.5PF C		

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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			Destination 仕向	Remarks 備考
C17			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C18			CK73FB1H102K	CHIP C	1000PF	K		
C19 ,20			CC73FCH1H020C	CHIP C	2.0PF	C		
C21			CC73FCH1H150J	CHIP C	15PF	J		
C22			CC73FCH1H060D	CHIP C	6PF	D		
C23			CK73FB1H102K	CHIP C	1000PF	K		
C24			CC73FCH1H040C	CHIP C	4PF	C		
C25			CK73FB1H102K	CHIP C	1000PF	K		
C26			CC73FCH1H050C	CHIP C	5PF	C		
C27			CK73FB1E103K	CHIP C	0.01UF	K		
C28			CC73FCH1H080D	CHIP C	8PF	D		
C29			CK73FB1E103K	CHIP C	0.01UF	K		
C30 -32			CK73FB1H102K	CHIP C	1000PF	K		
C33			CK73FB1E103K	CHIP C	0.01UF	K		
C34			CE04EW1C470M	ELECTRO	47UF	16WV		
C35			CC73FCH1H270J	CHIP C	27PF	J		
C36			CK73FB1H102K	CHIP C	1000PF	K		
C37			CC73FCH1H150J	CHIP C	15PF	J		
C38			CE04EW1E100M	ELECTRO	10UF	25WV		
C39			CK73FB1H102K	CHIP C	1000PF	K		
C40			C92-0003-05	CHIP TAN	0.47UF	25WV		
C41			CK73FB1E104K	CHIP C	0.10UF	K		
C42 -44			CK73FF1C105Z	CHIP C	1.0UF	Z		
C45 -48			CK73FB1H102K	CHIP C	1000PF	K		
C49			CK73FB1E103K	CHIP C	0.01UF	K		
C50			CK73FF1C105Z	CHIP C	1.0UF	Z		
C51			CK73FB1H102K	CHIP C	1000PF	K		
C53			CK73FB1H102K	CHIP C	1000PF	K		
C54 ,55			CC73FCH1H120J	CHIP C	12PF	J		
C56			CC73FCH1H060D	CHIP C	6PF	D		
C57			CC73FCH1H120J	CHIP C	12PF	J		
C58			CC73FCH1H060D	CHIP C	6PF	D		
C59			CC73FCH1H080D	CHIP C	8PF	D		
C60			CC73FCH1H040C	CHIP C	4PF	C		
C61			CC73FCH1H080D	CHIP C	8PF	D		
C62			CC73FCH1H050C	CHIP C	5PF	C		
C63 -65			CC73FCH1H060D	CHIP C	6PF	D		
C66			CC73FCH1H080D	CHIP C	8PF	D		
C67			CC73FCH1H180J	CHIP C	18PF	J		
C68			CC73FCH1H120J	CHIP C	12PF	J		
C69			CC73FCH1H101J	CHIP C	100PF	J		
C70			CK73FB1H102K	CHIP C	1000PF	K		
C71			CK73FB1E103K	CHIP C	0.01UF	K		
C72 ,73			CE04EW1C470M	ELECTRO	47UF	16WV		
C74			C92-0504-05	CHIP TAN	0.68UF	20WV		
C75			CE04EW1C470M	ELECTRO	47UF	16WV		
C76			CK73FB1E103K	CHIP C	0.01UF	K		
C77			CK73FB1E123K	CHIP C	0.012UF	K		
C78			CE04EW1C101M	ELECTRO	100UF	16WV		
C79			CC73FSL1H101J	CHIP C	100PF	J		
C80			CE04EW1H470M	ELECTRO	47UF	50WV		
C81			CE04EW1C470M	ELECTRO	47UF	16WV		
C82			CE04EW1C471M	ELECTRO	470UF	16WV		
C83 ,84			CK73FB1E104K	CHIP C	0.10UF	K		
C85			CE04EW1C471M	ELECTRO	470UF	16WV		

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C86			CE04EW1C470M	ELECTRO	47UF	16WV		
C87			CE04EW1H470M	ELECTRO	47UF	50WV		
C88			CK73FB1E123K	CHIP C	0.012UF	K		
C89 ,90			CK73FB1H102K	CHIP C	1000PF	K		
C91 -93			CC73FSL1H101J	CHIP C	100PF	J		
C94			CK73FB1H102K	CHIP C	1000PF	K		
C95			CC73FSL1H101J	CHIP C	100PF	J		
C96			CK73FB1H102K	CHIP C	1000PF	K		
C97 ,98			CC73FSL1H101J	CHIP C	100PF	J		
C99			CK73FB1E103K	CHIP C	0.01UF	K		
C100			CK73FB1H102K	CHIP C	1000PF	K		
C101			CE04EW1E100M	ELECTRO	10UF	25WV		
C102			CC73FUJ1H150J	CHIP C	15PF	J		
C103			CC73FUJ1H220J	CHIP C	22PF	J		
C104			CE04EW1C470M	ELECTRO	47UF	16WV		
C105			CK73FB1H102K	CHIP C	1000PF	K		
C106			CK73EF1C105Z	CHIP C	1.0UF	Z		
C107-109			CK73FB1H102K	CHIP C	1000PF	K		
C110			CE04EW1A221M	ELECTRO	220UF	10WV		
C111			CK73FB1H102K	CHIP C	1000PF	K		
C112			CK73FB1E103K	CHIP C	0.01UF	K		
C113			CE04EW1E100M	ELECTRO	10UF	25WV		
C114			CE04EW1A330M	ELECTRO	33UF	10WV		
C115			CK73FB1E103K	CHIP C	0.01UF	K		
C116			CC73FCH1H560J	CHIP C	56PF	J		
C117			CK73FB1H102K	CHIP C	1000PF	K		
C118			CC73FCH1H100D	CHIP C	10PF	D		
C119			CK73FB1E103K	CHIP C	0.01UF	K		
C120			CE04EW1C101M	ELECTRO	100UF	16WV		
C121			CC73FCH1H050C	CHIP C	5PF	C		
C122			CK73FB1H102K	CHIP C	1000PF	K		
C123			CK73FB1E223K	CHIP C	0.022UF	K		
C124			CK73FB1H102K	CHIP C	1000PF	K		
C125			CK73FB1H472K	CHIP C	4700PF	K		
C126,127			CK73FB1H102K	CHIP C	1000PF	K		
C128			CK73FF1C105Z	CHIP C	1.0UF	Z		
C129			CE04EW1E100M	ELECTRO	10UF	25WV		
C130			CK73FB1H102K	CHIP C	1000PF	K		
C131			CK73FF1C105Z	CHIP C	1.0UF	Z		
C132			CK73FB1H102K	CHIP C	1000PF	K		
C133			CK73FB1E103K	CHIP C	0.01UF	K		
C134			CK73FB1H102K	CHIP C	1000PF	K		
C135			CE04EW1E100M	ELECTRO	10UF	25WV		
C136			CK73FB1H102K	CHIP C	1000PF	K		
C137			CC45SL2H100D	CERAMIC	10PF	D		
C138			CK45B2H102K	CERAMIC	1000PF	K		
C139			CC45SL2H330J	CERAMIC	33PF	J		
C140			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C141			CC73FCH1H020C	CHIP C	2.0PF	C	KP	
C141			CC73FCH1H030C	CHIP C	3.0PF	C	MM2M3	
C141			CC73FCH1H030C	CHIP C	3.0PF	C	EE2E3	
C142			CK73FB1H102K	CHIP C	1000PF	K		
C143			CC45SL2H560J	CERAMIC	56PF	J		
C144			CC45SL2H470J	CERAMIC	47PF	J		
C145,146			CK73FB1H102K	CHIP C	1000PF	K		

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C147			CC73FCH1H020C	CHIP C	2.0PF	C	KP	
C147			CC73FCH1H010C	CHIP C	1.0PF	C	MM2M3	
C147			CC73FCH1H010C	CHIP C	1.0PF	C	EE2E3	
C148			CC73FCH1H0R5C	CHIP C	0.5PF	C	MM2M3	
C148			CC73FCH1H010C	CHIP C	1PF	C	KP	
C149			CM73F2H300J	CHIP C	30PF	J	KP	
C149			CM73F2H330J	CHIP C	33PF	J	MM2M3	
C149			CM73F2H330J	CHIP C	33PF	J	EE2E3	
C150			CM73F2H080D	CHIP C	8.0PF	D	KP	
C151			CC73FCH1H180J	CHIP C	18PF	J		
C201			CC73FCH1H010C	CHIP C	1.0PF	C		
C202-204			CK73FB1H102K	CHIP C	1000PF	K		
C205			CC73FCH1H020C	CHIP C	2.0PF	C		
C206			CC73FCH1H060D	CHIP C	6PF	D		
C207			CK73FB1H102K	CHIP C	1000PF	K		
C208			CC73FCH1H030C	CHIP C	3PF	C		
C210-212			CK73FB1H102K	CHIP C	1000PF	K		
C213			CC73FCH1HR75C	CHIP C	0.75PF	C	KP	
C213			CC73FCH1H010C	CHIP C	1PF	C	MM2M3	
C213			CC73FCH1H010C	CHIP C	1PF	C	EE2E3	
C214-220			CK73FB1H102K	CHIP C	1000PF	K		
C221			CC73FCH1H050C	CHIP C	5PF	C		
C222			CC73FCH1H040C	CHIP C	4PF	C		
C223-225			CK73FB1H102K	CHIP C	1000PF	K		
C226			CC73FCH1H040C	CHIP C	4PF	C		
C227			CK73FB1H102K	CHIP C	1000PF	K		
C228			CC73FCH1H120J	CHIP C	12PF	J		
C229-231			CK73FB1H102K	CHIP C	1000PF	K		
C232,233			CC73FCH1H220J	CHIP C	22PF	J		
C234			CK73FB1H102K	CHIP C	1000PF	K		
C235			CK73FB1H102K	CHIP C	1000PF	K		
C236			CE04NW1C470M	ELECTRO	47UF	16WV		
C237			CK73FB1H102K	CHIP C	1000PF	K		
C238			CK73FB1H471K	CHIP C	470PF	K		
C239			C92-0003-05	CHIP TAN	0.47UF	25WV		
C240-242			CK73FF1C105Z	CHIP C	1.0UF	Z		
C243			CK73FB1H102K	CHIP C	1000PF	K		
C244			CK73FF1C105Z	CHIP C	1.0UF	Z		
C245,246			CK73FB1H102K	CHIP C	1000PF	K		
C248			CK73FB1H102K	CHIP C	1000PF	K		
C249			CC73FCH1H150J	CHIP C	15PF	J		
C250			CC73FCH1H560J	CHIP C	56PF	J		
C251			CC73FCH1H150J	CHIP C	15PF	J		
C252,253			CK73FB1H102K	CHIP C	1000PF	K		
C254			CC73FCH1H270J	CHIP C	27PF	J		
C255			CC73FCH1H180J	CHIP C	18PF	J		
C256			CC73FCH1H220J	CHIP C	22PF	J		
C257			CC73FCH1H060D	CHIP C	6PF	D		
C258			CC73FCH1H180J	CHIP C	18PF	J		
C259			CC73FCH1H100D	CHIP C	10PF	D		
C260			CC73FCH1H060D	CHIP C	6PF	D		
C261,262			CK73FB1H102K	CHIP C	1000PF	K		
C263			CE04NW1C470M	ELECTRO	47UF	16WV		
C264			C92-0504-05	CHIP TAN	0.68UF	20WV		
C265,266			CE04NW1C470M	ELECTRO	47UF	16WV		

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C266			CE04NW1C470M	ELECTRO	47UF	16WV		
C267,268			CK73FB1H102K	CHIP C	1000PF	K		
C268			CK73FB1H102K	CHIP C	1000PF	K		
C269,270			CC73FSL1H101J	CHIP C	100PF	J		
C271			CK73FB1H102K	CHIP C	1000PF	K		
C272,273			CC73FSL1H101J	CHIP C	100PF	J		
C274			CK73FB1H102K	CHIP C	1000PF	K		
C275,276			CC73FSL1H101J	CHIP C	100PF	J		
C276			CC73FSL1H101J	CHIP C	100PF	J		
C277,278			CK73FB1H102K	CHIP C	1000PF	K		
C280-282			CK73FB1H102K	CHIP C	1000PF	K		
C283			CE04NW1C470M	ELECTRO	47UF	16WV		
C284			CK73FB1H102K	CHIP C	1000PF	K		
C285			CK73FB1H822K	CHIP C	8200PF	K		
C286			CK73FB1H102K	CHIP C	1000PF	K		
C287			CK73FF1C105Z	CHIP C	1.0UF	Z		
C288			CK73FB1H102K	CHIP C	1000PF	K		
C289			CE04NW1C100M	ELECTRO	10UF	16WV		
C290-292			CC73FSL1H101J	CHIP C	100PF	J		
C295			CC73FCH1H220J	CHIP C	22PF	J		
C300			CK73FB1H102K	CHIP C	1000PF	K		
C301			CK73FB1H102K	CHIP C	1000PF	K		
C302			CE04NW1A221M	ELECTRO	220UF	10WV		
C303			CK73FB1H102K	CHIP C	1000PF	K		
C304			CE04NW1A330M	ELECTRO	33UF	10WV		
C305			CE04NW1A221M	ELECTRO	220UF	10WV		
C306-308			CK73FB1H102K	CHIP C	1000PF	K		
C309			CE04NW1C101M	ELECTRO	100UF	16WV		
C310			CC73FCH1H030D	CHIP C	3PF	D		
C311			CK73FB1H102K	CHIP C	1000PF	K		
C312			CC73FCH1H060D	CHIP C	6PF	D		
C313			CK73FB1H102K	CHIP C	1000PF	K		
C314			CE04NW1C101M	ELECTRO	100UF	16WV		
C315			CK73FB1H102K	CHIP C	1000PF	K		
C316-323			CK73FB1H102K	CHIP C	1000PF	K		
C324			CE04NW1C220M	ELECTRO	22UF	16WV		
C325			CK73FB1H102K	CHIP C	1000PF	K		
C326			CK73FB1E104K	CHIP C	0.10UF	K		
C327			CK73FB1H102K	CHIP C	1000PF	K		
C328			CK73FB1E333K	CHIP C	0.033UF	K		
C329			CK73FB1E103K	CHIP C	0.01UF	K		
C330			CM73F2H040D	CHIP C	4.0PF	D	KP	
C330			CM73F2H060D	CHIP C	6.0PF	D	MM2M3	
C330			CM73F2H060D	CHIP C	6.0PF	D	EE2E3	
C331,332			CK73FB1H102K	CHIP C	1000PF	K		
C333			CC45SL2H070D	CERAMIC	7.0PF	D	KP	
C333			CC45SL2H070D	CERAMIC	7.0PF	D	MM2M3	
C333			CC45SL2H070D	CERAMIC	7.0PF	D	EE2E3	
C334			CC45SL2H100D	CERAMIC	10PF	D		
C335			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C336			CC73FCH1H020C	CHIP C	2.0PF	C		
C337			CK73FB1H102K	CHIP C	1000PF	K		

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PARTS LIST

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TX-RX UNIT (X57-400X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格			Destination 仕向	Remarks 備考
C338			CC45SL2H070D	CERAMIC	7.0PF	D		
C339			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C340			CK73FB1H102K	CHIP C	1000PF	K		
C341			CC73FCH1H020C	CHIP C	2.0PF	C		
C342			CC45SL2H070D	CERAMIC	7.0PF	D	MM2M3	
C342			CC45SL2H070D	CERAMIC	7.0PF	D	EE2E3	
C343			CC45SL2H050C	CERAMIC	5.0PF	C	MM2M3	
C343			CC45SL2H050C	CERAMIC	5.0PF	C	EE2E3	
C344			CC45SL2H390J	CERAMIC	39PF	J	MM2M3	
C344			CC45SL2H390J	CERAMIC	39PF	J	EE2E3	
C345			CC45SL2H070D	CERAMIC	7.0PF	D	MM2M3	
C345			CC45SL2H070D	CERAMIC	7.0PF	D	EE2E3	
C346			CC73FCH1H020C	CHIP C	2PF	C		
C347			CC73FCH1H010C	CHIP C	1PF	C		
C349			CK73FB1H102K	CHIP C	1000PF	K		
C350			CK73FB1E103K	CHIP C	0.01UF	K		
C351			CE04NW1A101M	ELECTRO	100UF	10WV		
C352			CK73FB1E103K	CHIP C	0.01UF	K		
C353,354			CK73FB1H102K	CHIP C	1000PF	K		
C355			C90-2092-05	ELECTRO	10UF	16WV		
C401			CK73FB1E103K	CHIP C	0.01UF	K		
C402			CK73FB1E103K	CHIP C	0.01UF	K		
C403			CC73FCH1H100D	CHIP C	10PF	D		
C404,405			CC73FCH1H330J	CHIP C	33PF	J		
C406			CK73FB1E104K	CHIP C	0.10UF	K		
C407-409			CK73FB1E103K	CHIP C	0.01UF	K		
C410			CK73FB1H332K	CHIP C	3300PF	K		
C411			CC73FSL1H101J	CHIP C	100PF	J		
C412			CK73FB1E103K	CHIP C	0.01UF	K		
C413,414			CC73FCH1H330J	CHIP C	33PF	J		
C415			CC73FSL1H101J	CHIP C	100PF	J		
C416			CC73FSL1H101J	CHIP C	100PF	J		
C417			CK73FB1H102K	CHIP C	1000PF	K		
C418,419			C92-0005-05	ELECTRO	2.2UF	6.3WV		
C420			CK73FB1H102K	CHIP C	1000PF	K		
C421-428			CK73FB1E104K	CHIP C	0.10UF	K		
C431			CK73FB1H102K	CHIP C	1000PF	K		
C433,434			CC73FSL1H101J	CHIP C	100PF	J		
C435,436			CK73FB1H102K	CHIP C	1000PF	K		
C437			CE04CW1A470M	ELECTRO	47UF	10WV		
C438			CK73FF1C105Z	CHIP C	1.0UF	Z		
C439			CK73FB1E103K	CHIP C	0.01UF	K		
C440			CK73FB1E223K	CHIP C	0.022UF	K		
C441			CK73FB1H102K	CHIP C	1000PF	K		
C442			CC73FSL1H101J	CHIP C	100PF	J		
C443			CK73FF1C105Z	CHIP C	1.0UF	Z		
C444-446			CC73FSL1H101J	CHIP C	100PF	J		
C447			CK73FB1H102K	CHIP C	1000PF	K		
C448			CK73FB1E104K	CHIP C	0.10UF	K		
C449			CC73FSL1H101J	CHIP C	100PF	J		
C450			CC73FSL1H101J	CHIP C	100PF	J		
C451			CK73FB1E393K	CHIP C	0.039UF	K		
C452			C92-0507-05	CHIP TAN	4.7UF	6.3WV		
C453			CK73FB1E104K	CHIP C	0.10UF	K		

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TM-732A/E

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TX-RX UNIT (X57-400X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
C454			CK73FB1E333K	CHIP C 0.033UF K		
C455			CC73FCH1H270J	CHIP C 27PF J		
C456			CK73FB1E333K	CHIP C 0.033UF K		
C457			CK73FB1H821K	CHIP C 820PF K		
C458			CK73FB1H332K	CHIP C 3300PF K		
C459			CC73FCH1H820J	CHIP C 82PF J		
C460			CC73FSL1H101J	CHIP C 100PF J		
C461			CK73FF1C105Z	CHIP C 1.0UF Z		
C501-506			CK73FB1E103K	CHIP C 0.01UF K		
TC1			C05-0371-05	TRIM CAP 10PF		
TC201			C05-0369-05	TRIMMING CAP 6PF	KP	
TC201			C05-0371-05	TRIM CAP 10PF	MM2M3	
TC201			C05-0371-05	TRIM CAP 10PF	EE2E3	
W201		*	E37-0281-05	CABLE(V X V)		
		*	E72-0405-04	TERMINAL BOARD		
CN1			E40-5228-05	PIN CONNECTOR(20P)		
CN2			E40-5343-05	PIN CONNECTOR(9P)		
CN3			E40-3237-05	PIN CONNECTOR(2P SP)		
CN201			E40-3299-05	PIN CONNECTOR(2P FAN)		
CN203		*	E40-5536-05	PIN CONNECTOR(21P)		
CN401		*	E40-5535-05	PIN CONNECTOR(21P)		
CN402		*	E40-5228-05	PIN CONNECTOR(20P)		
CN501		*	E40-5534-05	PIN CONNECTOR(8P)		
J1 ,2		*	E11-0448-05	PHONE JACK		
		*	F10-2028-04	SHIELDING CASE		
F201		*	F53-0056-05	FUSE(1.0A)		
		*	G02-0728-04	FLAT SPRING		
			J30-0545-05	SPACER		
			J30-0564-05	SPACER		
CD1			L79-1013-05	FILTER		
CD201			L79-1013-05	FILTER		
CF1			L72-0372-05	CERAMIC FILTER(CFWM455F)		
CF201			L72-0372-05	CERAMIC FILTER(CFWM455F)		
L1			L40-8272-48	SMALL FIXED INDUCTOR(82NH)		
L2 -4			L40-1882-48	SMALL FIXED INDUCTOR(180NH)		
L5 -7			L34-4252-05	COIL		
L8			L40-1582-19	SMALL FIXED INDUCTOR(15UH)		
L9			L40-1081-80	SMALL FIXED INDUCTOR(100NH)		
L10			L34-4069-05	COIL		
L11			L40-1092-19	SMALL FIXED INDUCTOR(1UH)		
L12			L92-0131-05	FERRITE CHIP		
L13 ,14			L40-1872-48	SMALL FIXED INDUCTOR(18NH)		
L15			L40-1272-48	SMALL FIXED INDUCTOR(12NH)		
L16			L40-1072-48	SMALL FIXED INDUCTOR(10NH)		
L17			L40-3372-48	SMALL FIXED INDUCTOR(33NH)		
L18			L40-2272-48	SMALL FIXED INDUCTOR(22NH)		
L19			L40-1001-19	SMALL FIXED INDUCTOR(10UH)		
L20			L40-3382-19	SMALL FIXED INDUCTOR(0.33UH)		
L21			L40-8272-48	SMALL FIXED INDUCTOR(82NH)		
L22			L40-4782-19	SMALL FIXED INDUCTOR(0.47UH)		
L23			L34-1239-05	COIL(10.5T)		
L24			L34-0895-05	COIL(6T)		

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L25			L34-0742-05	COIL(5T)		
L26			L34-1239-05	COIL(10.5T)		
L27 -29			L34-0499-05	COIL(4T)		
L201			L40-4772-48	SMALL FIXED INDUCTOR(47NH)		
L202			L40-2272-48	SMALL FIXED INDUCTOR(22NH)		
L203			L40-1072-48	SMALL FIXED INDUCTOR(10NH)		
L204			L40-3972-48	SMALL FIXED INDUCTOR(39NH)		
L205		*	L79-1037-05	FILTER(430M)	MM2M3	
L205		*	L79-1037-05	FILTER(430M)	EE2E3	
L205		*	L79-1038-05	FILTER(440M)	KP	
L206			L40-4772-48	SMALL FIXED INDUCTOR(47NH)		
L207,208			L40-2272-48	SMALL FIXED INDUCTOR(22NH)		
L209			L40-4772-48	SMALL FIXED INDUCTOR(47NH)		
L210		*	L79-1037-05	FILTER(430M)	MM2M3	
L210		*	L79-1037-05	FILTER(430M)	EE2E3	
L210		*	L79-1038-05	FILTER(440M)	KP	
L212			L40-3372-48	SMALL FIXED INDUCTOR(33NH)	KP	
L212			L40-3972-48	SMALL FIXED INDUCTOR(39NH)	MM2M3	
L212			L40-3972-48	SMALL FIXED INDUCTOR(39NH)	EE2E3	
L213			L40-2272-48	SMALL FIXED INDUCTOR(22NH)		
L214			L34-4259-05	COIL		
L215			L40-3982-81	SMALL FIXED INDUCTOR(0.39UH)		
L216			L40-8272-48	SMALL FIXED INDUCTOR(82NH)		
L217			L40-1072-48	SMALL FIXED INDUCTOR(10NH)		
L218			L40-1092-48	SMALL FIXED INDUCTOR(1UH)		
L219			L40-1272-48	SMALL FIXED INDUCTOR(12NH)		
L220			L40-6872-48	SMALL FIXED INDUCTOR(6.8NH)		
L221,222			L40-4772-48	SMALL FIXED INDUCTOR(47NH)		
L223			L40-1001-19	SMALL FIXED INDUCTOR(10UH)		
L230			L40-2772-48	SMALL FIXED INDUCTOR(27NH)		
L231			L34-1238-05	COIL(9.5T)		
L232			L34-1207-05	COIL(3.5T)		
L233,234			L34-1185-05	COIL(2.5T)		
L235			L34-1226-05	COIL(1.5T)		
L236			L34-1019-05	COIL(2.5T)	MM2M3	
L236			L34-1019-05	COIL(2.5T)	EE2E3	
L237			L34-1019-05	COIL(2.5T)	MM2M3	
L237			L34-1019-05	COIL(2.5T)	EE2E3	
L238,239			L34-1052-05	COIL(1.5T)		
L240			L34-1238-05	COIL(9.5T)	KP	
L241			L34-0742-05	COIL(5T)		
X1		*	L77-1478-05	CRYSTAL RESONATOR(45.505MHZ)		
X2			L77-1491-05	CRYSTAL RESONATOR(12.8MHZ)		
X201		*	L77-1479-05	CRYSTAL RESONATOR(58.07MHZ)		
X401			L78-0061-05	RESONATOR(3.58MHZ)		
X402			L77-1397-05	CRYSTAL RESONATOR(4.19MHZ)		
XF1			L71-0409-05	MCF(45.05MHZ)		
XF201			L71-0410-05	MCF(58.525MHZ)		
R1			RK73FB2A104J	CHIP R 100K J 1/10W		
R2			RK73FB2A101J	CHIP R 100 J 1/10W		
R3			RK73FB2A104J	CHIP R 100K J 1/10W		
R4			RK73FB2A274J	CHIP R 270K J 1/10W		
R5			RK73FB2A273J	CHIP R 27K J 1/10W		
R6			RK73FB2A183J	CHIP R 18K J 1/10W		

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R7			RK73FB2A101J	CHIP R 100 J 1/10W		
R8			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R9			RK73FB2A101J	CHIP R 100 J 1/10W		
R10 ,11			RK73FB2A470J	CHIP R 47 J 1/10W		
R12			RK73FB2A274J	CHIP R 270K J 1/10W		
R13			RK73FB2A473J	CHIP R 47K J 1/10W		
R14			RK73FB2A470J	CHIP R 47 J 1/10W		
R15			RK73FB2A103J	CHIP R 10K J 1/10W		
R16			R92-0670-05	CHIP R 0 ΩHM		
R17 ,18			RK73FB2A104J	CHIP R 100K J 1/10W		
R19			RK73FB2A101J	CHIP R 100 J 1/10W		
R20			RK73FB2A104J	CHIP R 100K J 1/10W		
R21			RK73FB2A473J	CHIP R 47K J 1/10W		
R22			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R23			RK73FB2A274J	CHIP R 270K J 1/10W		
R24			RK73FB2A223J	CHIP R 22K J 1/10W		
R25			RK73FB2A470J	CHIP R 47 J 1/10W		
R26			RK73FB2A331J	CHIP R 330 J 1/10W		
R27			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R28			RK73FB2A101J	CHIP R 100 J 1/10W		
R29			RK73FB2A681J	CHIP R 680 J 1/10W		
R30			RK73FB2A471J	CHIP R 470 J 1/10W		
R31			RK73FB2A101J	CHIP R 100 J 1/10W		
R32			RK73FB2A103J	CHIP R 10K J 1/10W		
R33			RK73FB2A473J	CHIP R 47K J 1/10W		
R34			RK73FB2A103J	CHIP R 10K J 1/10W		
R35			RK73FB2A221J	CHIP R 220 J 1/10W		
R36			RK73FB2A394J	CHIP R 390K J 1/10W		
R37			RK73FB2A103J	CHIP R 10K J 1/10W		
R38			RK73FB2A104J	CHIP R 100K J 1/10W		
R39			RK73FB2A473J	CHIP R 47K J 1/10W		
R40			RK73FB2A154J	CHIP R 150K J 1/10W		
R41			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R42			RK73FB2A101J	CHIP R 100 J 1/10W		
R43			RK73FB2A473J	CHIP R 47K J 1/10W		
R44			RK73FB2A470J	CHIP R 47 J 1/10W		
R45			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R46			RK73FB2A273J	CHIP R 27K J 1/10W		
R47			RK73FB2A223J	CHIP R 22K J 1/10W		
R48			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R49 -51			RK73FB2A103J	CHIP R 10K J 1/10W		
R52			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R53			RK73FB2A273J	CHIP R 27K J 1/10W		
R54			RK73FB2A123J	CHIP R 12K J 1/10W		
R55			RK73FB2A682J	CHIP R 6.8K J 1/10W		
R56			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R57			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R58			RK73FB2A473J	CHIP R 47K J 1/10W		
R59			RK73FB2A101J	CHIP R 100 J 1/10W		
R60 ,61			RK73FB2A4R7J	CHIP R 4.7 J 1/10W		
R62			RK73FB2A101J	CHIP R 100 J 1/10W		
R63			RK73FB2A473J	CHIP R 47K J 1/10W		
R64			RK73FB2A153J	CHIP R 15K J 1/10W		
R65			RK73FB2A474J	CHIP R 470K J 1/10W		
R66			RK73FB2A471J	CHIP R 470 J 1/10W		

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R67			RK73FB2A473J	CHIP R 47K J 1/10W		
R68			RK73FB2A223J	CHIP R 22K J 1/10W		
R69 ,70			RK73FB2A153J	CHIP R 15K J 1/10W		
R71			RK73FB2A223J	CHIP R 22K J 1/10W		
R72			RK73FB2A124J	CHIP R 120K J 1/10W		
R73			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R74			RK73FB2A103J	CHIP R 10K J 1/10W		
R75 -78			RK73FB2A473J	CHIP R 47K J 1/10W		
R79			RK73FB2A104J	CHIP R 100K J 1/10W		
R80			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R81			RK73FB2A471J	CHIP R 470 J 1/10W		
R82			RK73FB2A184J	CHIP R 180K J 1/10W		
R83			RK73FB2A103J	CHIP R 10K J 1/10W		
R84			RK73FB2A471J	CHIP R 470 J 1/10W		
R85 ,86			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R87			RK73FB2A220J	CHIP R 22 J 1/10W		
R88			RK73FB2A122J	CHIP R 1.2K J 1/10W		
R89 ,90			R92-0670-05	CHIP R 0 OHM		
R91			RK73FB2A473J	CHIP R 47K J 1/10W		
R92			RK73FB2A471J	CHIP R 470 J 1/10W		
R93			RK73FB2A101J	CHIP R 100 J 1/10W		
R94			RK73FB2A562J	CHIP R 5.6K J 1/10W	KP	
R94			RK73FB2A822J	CHIP R 8.2K J 1/10W	MM2M3	
R94			RK73FB2A822J	CHIP R 8.2K J 1/10W	EE2E3	
R95			RK73FB2A154J	CHIP R 150K J 1/10W		
R96			RK73FB2A470J	CHIP R 47 J 1/10W		
R97			R92-0685-05	CHIP R 22 J 1/2W		
R99			R92-0670-05	CHIP R 0 OHM		
R101			R92-1213-05	CARBON 100 J 1/2W		
R102,103			RK73FB2A223J	CHIP R 22K J 1/10W		
R104			RK73FB2A220J	CHIP R 22 J 1/10W		
R201			RK73FB2A104J	CHIP R 100K J 1/10W		
R202			RK73FB2A333J	CHIP R 33K J 1/10W		
R203-205			RK73FB2A101J	CHIP R 100 J 1/10W		
R206			RK73FB2A470J	CHIP R 47 J 1/10W		
R207			RK73FB2A333J	CHIP R 33K J 1/10W		
R208			RK73FB2A101J	CHIP R 100 J 1/10W		
R209			RK73FB2A104J	CHIP R 100K J 1/10W		
R210			RK73FB2A101J	CHIP R 100 J 1/10W		
R211			RK73FB2A470J	CHIP R 47 J 1/10W		
R212			RK73FB2A220J	CHIP R 22 J 1/10W		
R214			RK73FB2A223J	CHIP R 22K J 1/10W		
R215			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R216			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R217			RK73FB2A221J	CHIP R 220 J 1/10W		
R218			RK73FB2A222J	CHIP R 2.2K J 1/10W		
R219			RK73FB2A470J	CHIP R 47 J 1/10W		
R220			RK73FB2A221J	CHIP R 220 J 1/10W		
R221			RK73FB2A331J	CHIP R 330 J 1/10W		
R222			RK73FB2A334J	CHIP R 330K J 1/10W		
R223			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R224			RK73FB2A103J	CHIP R 10K J 1/10W		
R225			RK73FB2A221J	CHIP R 220 J 1/10W		
R226			RK73FB2A104J	CHIP R 100K J 1/10W		
R227			RK73FB2A473J	CHIP R 47K J 1/10W		

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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			Destination 仕向	Remarks 備考
R228			RK73FB2A101J	CHIP R	100	J 1/10W		
R229			RK73FB2A154J	CHIP R	150K	J 1/10W		
R230			RK73FB2A102J	CHIP R	1.0K	J 1/10W		
R231			RK73FB2A470J	CHIP R	47	J 1/10W		
R232			RK73FB2A223J	CHIP R	22K	J 1/10W		
R233			RK73FB2A682J	CHIP R	6.8K	J 1/10W		
R234,235			RK73FB2A101J	CHIP R	100	J 1/10W		
R236			RK73FB2A470J	CHIP R	47	J 1/10W		
R237			RK73FB2A223J	CHIP R	22K	J 1/10W		
R238			RK73FB2A472J	CHIP R	4.7K	J 1/10W		
R239			RK73FB2A470J	CHIP R	47	J 1/10W		
R240			R92-0679-05	CHIP R	0 OHM			
R241			RK73FB2A473J	CHIP R	47K	J 1/10W		
R242			RK73FB2A223J	CHIP R	22K	J 1/10W		
R243,244			RK73FB2A103J	CHIP R	10K	J 1/10W		
R245			RK73FB2A182J	CHIP R	1.8K	J 1/10W		
R246			RK73FB2A103J	CHIP R	10K	J 1/10W		
R247			RK73FB2A182J	CHIP R	1.8K	J 1/10W		
R248			RK73FB2A273J	CHIP R	27K	J 1/10W		
R249			RK73FB2A123J	CHIP R	12K	J 1/10W		
R250			RK73FB2A332J	CHIP R	3.3K	J 1/10W		
R251			RK73FB2A682J	CHIP R	6.8K	J 1/10W		
R252			RK73FB2A182J	CHIP R	1.8K	J 1/10W		
R253-255			RK73FB2A473J	CHIP R	47K	J 1/10W		
R256			RK73FB2A154J	CHIP R	150K	J 1/10W		
R257			RK73FB2A273J	CHIP R	27K	J 1/10W		
R258			RK73FB2A222J	CHIP R	2.2K	J 1/10W		
R259			RK73FB2A103J	CHIP R	10K	J 1/10W		
R260			R92-0670-05	CHIP R	0 OHM			
R266			RK73FB2A152J	CHIP R	1.5K	J 1/10W		
R267			RK73FB2A221J	CHIP R	220	J 1/10W		
R268			RK73FB2A222J	CHIP R	2.2K	J 1/10W		
R269			RK73FB2A103J	CHIP R	10K	J 1/10W		
R270			RK73FB2A471J	CHIP R	470	J 1/10W		
R271			R92-0685-05	CHIP R	22	J 1/2W		
R272			R92-0670-05	CHIP R	0 OHM			
R273			RK73FB2A102J	CHIP R	1.0K	J 1/10W		
R274			RK73FB2A222J	CHIP R	2.2K	J 1/10W		
R275			RK73FB2A272J	CHIP R	2.7K	J 1/10W		
R276			RK73FB2A154J	CHIP R	150K	J 1/10W		
R277			R92-0685-05	CHIP R	22	J 1/2W		
R279			R92-0670-05	CHIP R	0 OHM			
R282			R92-0679-05	CHIP R	0 OHM			
R283			R92-1214-05	CHIP R	120	J 1/2W		
R284,285			RK73FB2A103J	CHIP R	10K	J 1/10W		
R286			R92-0679-05	CHIP R	0 OHM		KP	
R287			RK73FB2A471J	CHIP R	470	J 1/10W		
R288			RK73FB2A103J	CHIP R	10K	J 1/10W		
R289			RK73FB2A103J	CHIP R	10K	J 1/10W		
R401			RK73FB2A103J	CHIP R	10K	J 1/10W		
R402			R90-0711-05	MULTI-COMP				
R403			RK73FB2A124J	CHIP R	120K	J 1/10W		
R404			RK73FB2A103J	CHIP R	10K	J 1/10W		
R405			RK73FB2A473J	CHIP R	47K	J 1/10W		
R406			RK73FB2A102J	CHIP R	1.0K	J 1/10W		

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PARTS LIST

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TX-RX UNIT (X57-400X-XX)

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
R407			RK73FB2A824J	CHIP R 820K J 1/10W		
R408			RK73FB2A562J	CHIP R 5.6K J 1/10W		
R409,410			RK73FB2A473J	CHIP R 47K J 1/10W		
R411			RK73FB2A334J	CHIP R 330K J 1/10W		
R412			RK73FB2A684J	CHIP R 680K J 1/10W		
R413			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R414			RK73FB2A474J	CHIP R 470K J 1/10W		
R415			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R416			R92-0670-05	CHIP R 0 OHM		
R417			RK73FB2A473J	CHIP R 47K J 1/10W		
R418,419			RK73FB2A153J	CHIP R 15K J 1/10W		
R420			RK73FB2A473J	CHIP R 47K J 1/10W		
R421			RK73FB2A473J	CHIP R 47K J 1/10W		
R422,423			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R424,425			RK73FB2A473J	CHIP R 47K J 1/10W		
R426			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R427			RK73FB2A473J	CHIP R 47K J 1/10W		
R428			RK73FB2A473J	CHIP R 47K J 1/10W		
R429-432			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R433			RK73FB2A473J	CHIP R 47K J 1/10W		
R434,435			RK73FB2A103J	CHIP R 10K J 1/10W		
R436			RK73FB2A104J	CHIP R 100K J 1/10W		
R437			RK73FB2A473J	CHIP R 47K J 1/10W		
R438			RK73FB2A153J	CHIP R 15K J 1/10W		
R439			RK73FB2A274J	CHIP R 270K J 1/10W		
R440,441			R92-0670-05	CHIP R 0 OHM		
R442			RK73FB2A104J	CHIP R 100K J 1/10W		
R443			RK73FB2A684J	CHIP R 680K J 1/10W		
R444			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R445			RK73FB2A561J	CHIP R 560 J 1/10W		
R446			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R447			RK73FB2A561J	CHIP R 560 J 1/10W		
R448			RK73FB2A684J	CHIP R 680K J 1/10W		
R449			RK73FB2A153J	CHIP R 15K J 1/10W		
R450			RK73FB2A473J	CHIP R 47K J 1/10W		
R451			RK73FB2A105J	CHIP R 1.0M J 1/10W		
R452,453			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R454			RK73FB2A103J	CHIP R 10K J 1/10W		
R455			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R456			RK73FB2A563J	CHIP R 56K J 1/10W		
R457-461			RK73FB2A473J	CHIP R 47K J 1/10W		
R462-465			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R466			RK73FB2A473J	CHIP R 47K J 1/10W		
R467			RK73FB2A103J	CHIP R 10K J 1/10W		
R468			RK73FB2A104J	CHIP R 100K J 1/10W		
R469,470			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R471			RK73FB2A222J	CHIP R 2.2K J 1/10W	EE2E3	
R471			RK73FB2A392J	CHIP R 3.9K J 1/10W	KP	
R472			RK73FB2A182J	CHIP R 1.8K J 1/10W	KP	
R472			RK73FB2A332J	CHIP R 3.3K J 1/10W	EE2E3	
R473			RK73FB2A184J	CHIP R 180K J 1/10W		
R474			RK73FB2A224J	CHIP R 220K J 1/10W		
R475,476			RK73FB2A103J	CHIP R 10K J 1/10W		
R477			RK73FB2A104J	CHIP R 100K J 1/10W	EE2E3	
R478			RK73FB2A334J	CHIP R 330K J 1/10W		

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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	Destination 仕向	Remarks 備考
R479			RK73FB2A561J	CHIP R 560 J 1/10W		
R480			RK73FB2A394J	CHIP R 390K J 1/10W		
R481			RK73FB2A333J	CHIP R 33K J 1/10W		
R482			RK73FB2A473J	CHIP R 47K J 1/10W		
R483			RK73FB2A224J	CHIP R 220K J 1/10W		
R484-486			RK73FB2A823J	CHIP R 82K J 1/10W		
R487			RK73FB2A473J	CHIP R 47K J 1/10W		
VR1			R12-6719-05	TRIMMING POT.100K		
VR2			R12-6717-05	TRIMMING POT. 47K		
VR3			R12-6713-05	TRIMMING POT. 10K		
VR4			R12-6713-05	TRIMMING POT. 10K		
VR201			R12-6719-05	TRIMMING POT.100K		
VR202			R12-6717-05	TRIMMING POT. 47K		
VR203			R12-6711-05	TRIMMING POT.4.7K		
VR204			R12-6711-05	TRIMMING POT.4.7K		
VR501,502			R23-9407-05	POTENTIOMETER(VHF)		
TS1			S79-0401-05	THERMAL SWITCH(95°C)		
D1			1SV164	DIODE		
D2			1SV166	DIODE		
D3			1SV164	DIODE		
D4			1SV166	DIODE		
D5			1SV164	DIODE		
D6			DAN235K	DIODE		
D7			02CZ5.6(X)	DIODE		
D8			1SS184	DIODE		
D9			1SS226	DIODE		
D10			DAN235K	DIODE		
D11			1SS184	DIODE		
D12			1SS181	DIODE		
D13			MI407	DIODE		
D14			MI308	DIODE		
D15 ,16			1SS226	DIODE		
D202			1SS184	DIODE		
D203			MA716	DIODE		
D204			MA77	DIODE		
D205			MA862	DIODE		
D206,207			1SS184	DIODE		
D210			MA862	DIODE		
D211,212			1SS184	DIODE		
D213			MI407	DIODE		
D214			MI308	DIODE		
D215,216			MA716	DIODE		
D217			DSA3A1	DIODE		
D401,402			LFB01	DIODE		
D403			02CZ7.5(X)	DIODE		
D404			02CZ3.0(Z)	DIODE		
D405			1SS184	DIODE		
D406			1SS226	DIODE		
D407			LFB01	DIODE		
IC1			KCD04	IC(FM IF)		
IC2			KCD05	IC(AM IF)		
IC3			UPC1676G	IC(POWER AMP)		
IC4			BU4066BF	IC(ANALOG SWITCH X4)		

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IC4			XRU4066BF	IC		
IC5			BU4094BF	IC(SHIFT/STORE REGISTER)		
IC6			LA4446	IC(AF PA)		
IC7			TC4053BF	IC(3-INPUT 2CH MPX/DE-MPX)		
IC8			BU4094BF	IC(SHIFT/STORE REGISTER)		
IC9		*	KCH11	IC(VCO PLL 144M)		
IC10			KCB11	IC(DRIVER)		
IC11			LA5010M	IC(LOW SATURATION REGULATOR)		
IC201			KCD04	IC(FM IF)		
IC202			KCB13	IC(80RF)		
IC204			BU4066BF	IC(ANALOG SWITCH X4)		
IC204			XRU4066BF	IC		
IC205,206			BU4094BF	IC(SHIFT/STORE REGISTER)		
IC207		*	KCH12	IC(VCO PLL 430M)		
IC208			LA5010M	IC(LOW SATURATION REGULATOR)		
IC209			KCB14	IC(DRIVE)		
IC210			KCC04	IC(APC)		
IC211			MC7808CT	IC(VOLTAGE REGULATORS/ +8V)		
IC401			LR4089BN	IC		
IC402			LC7385M	IC		
IC403		*	75517GF-029-3B9	IC		
IC404,405			TC4053BF	IC(3-INPUT 2CH MPX/DE-MPX)		
IC406			TC9154AP	IC(2CH ELECTRONIC VOLUME)		
IC407			TA78L06F	IC		
IC408,409			TC4S11F	IC(2 INPUT NAND GATE)		
IC410,411			NJM4558E	IC(OP AMP)		
Q1			3SK184(S)	FET		
Q2			FMG1	DIGITAL TRANSISTOR		
Q3 ,4			3SK131(V12)	FET		
Q5			DTC114EK	DIGITAL TRANSISTOR		
Q6			2SC2714(Y)	TRANSISTOR		
Q7			DTA123JK	DIGITAL TRANSISTOR		
Q8			DTC143EK	DIGITAL TRANSISTOR		
Q9			2SJ106(GR)	FET		
Q10			2SC4116(Y)	TRANSISTOR		
Q11 ,12			DTA123JK	DIGITAL TRANSISTOR		
Q13			3SK184(S)	FET		
Q14			DTC114EK	DIGITAL TRANSISTOR		
Q15			DTC144WK	DIGITAL TRANSISTOR		
Q16			2SA1362(Y)	TRANSISTOR		
Q17			2SB1119S	TRANSISTOR		
Q18 ,19			2SC4116(Y)	TRANSISTOR		
Q20			DTC114EK	DIGITAL TRANSISTOR		
Q21			2SD1757K	TRANSISTOR		
Q22		*	2SK1399	FET		
Q23		*	UPA502T	IC		
Q24			2SK879(Y)	FET		
Q25			2SC2714(Y)	TRANSISTOR		
Q26			2SC4116(Y)	TRANSISTOR		
Q27			FMG1	TRANSISTOR		
Q28			2SC4116(Y)	TRANSISTOR		
Q29			2SC2714(Y)	TRANSISTOR		
Q201			3SK184(S)	FET		
Q202			FMA5	DIGITAL TRANSISTOR		
Q203			DTA123JK	DIGITAL TRANSISTOR		

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Q204			3SK184(S)	FET		
Q205		*	2SK1577(2,3)	FET		
Q206			3SK184(S)	FET		
Q207			DTC114EK	DIGITAL TRANSISTOR		
Q208			2SC2714(Y)	TRANSISTOR		
Q209			2SJ106(GR)	FET		
Q210			2SC4116(Y)	TRANSISTOR		
Q211			2SC3356	TRANSISTOR		
Q212			3SK131(V12)	FET		
Q213			DTC114EK	DIGITAL TRANSISTOR		
Q214			2SC4116(Y)	TRANSISTOR		
Q215			DTC144WK	DIGITAL TRANSISTOR		
Q216			2SA1362(Y)	TRANSISTOR		
Q217			2SC4116(Y)	TRANSISTOR		
Q218			2SB1119S	TRANSISTOR		
Q219			DTC114EK	DIGITAL TRANSISTOR		
Q220			DTA123JK	DIGITAL TRANSISTOR		
Q221-223		*	2SK1399	FET		
Q224			2SD1757K	TRANSISTOR		
Q228			2SC4116(Y)	TRANSISTOR		
Q229			2SC3123	TRANSISTOR		
Q230			DTD143EK	DIGITAL TRANSISTOR		
Q231			FMG1	DIGITAL TRANSISTOR		
Q232			2SD1902R	TRANSISTOR		
Q233			2SB1302S	TRANSISTOR		
Q234			2SC4116(Y)	TRANSISTOR		
Q401			2SC4116(Y)	TRANSISTOR		
Q402-404			2SD1757K	TRANSISTOR		
Q405,406			DTC114EK	DIGITAL TRANSISTOR		
Q407,408			2SC4116(Y)	TRANSISTOR		
Q409			2SD1757K	TRANSISTOR		
Q410,411			2SC4116(Y)	TRANSISTOR		
Q412			2SA1519	TRANSISTOR		
Q413			2SD1757K	TRANSISTOR		
Q414			DTC114EK	DIGITAL TRANSISTOR		

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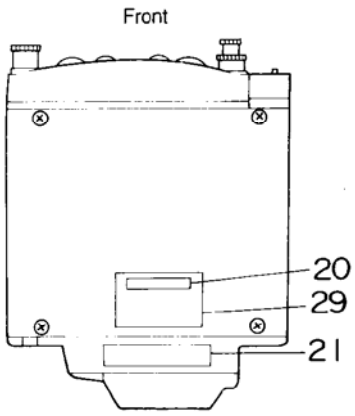
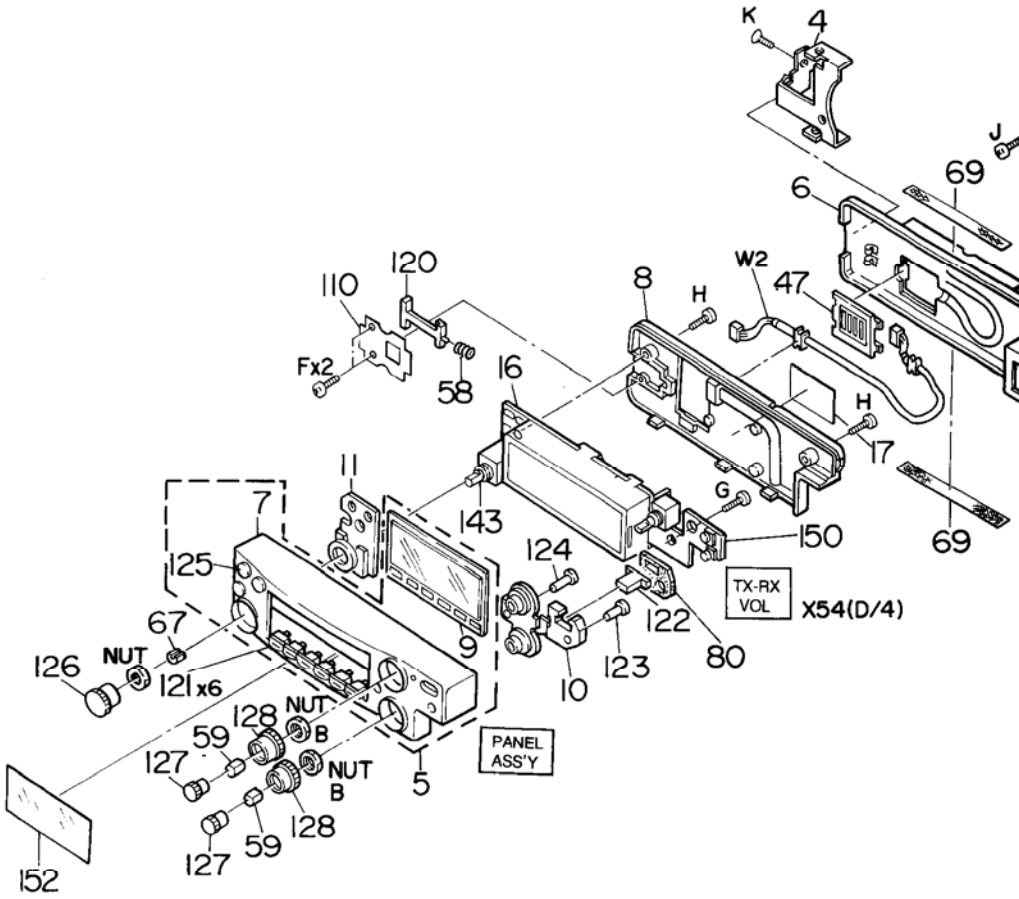
TM-732A/E T

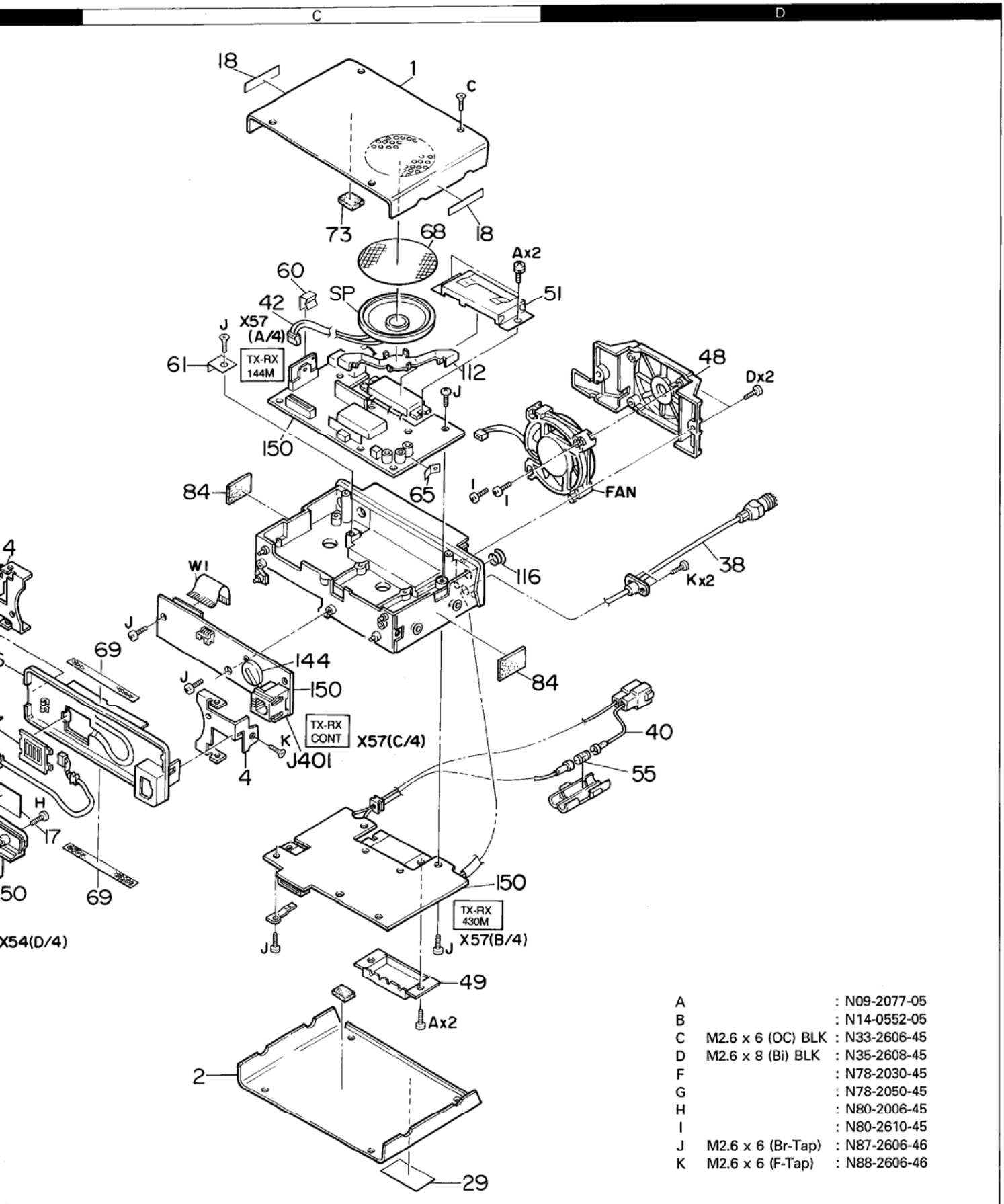
EXPLODED VI





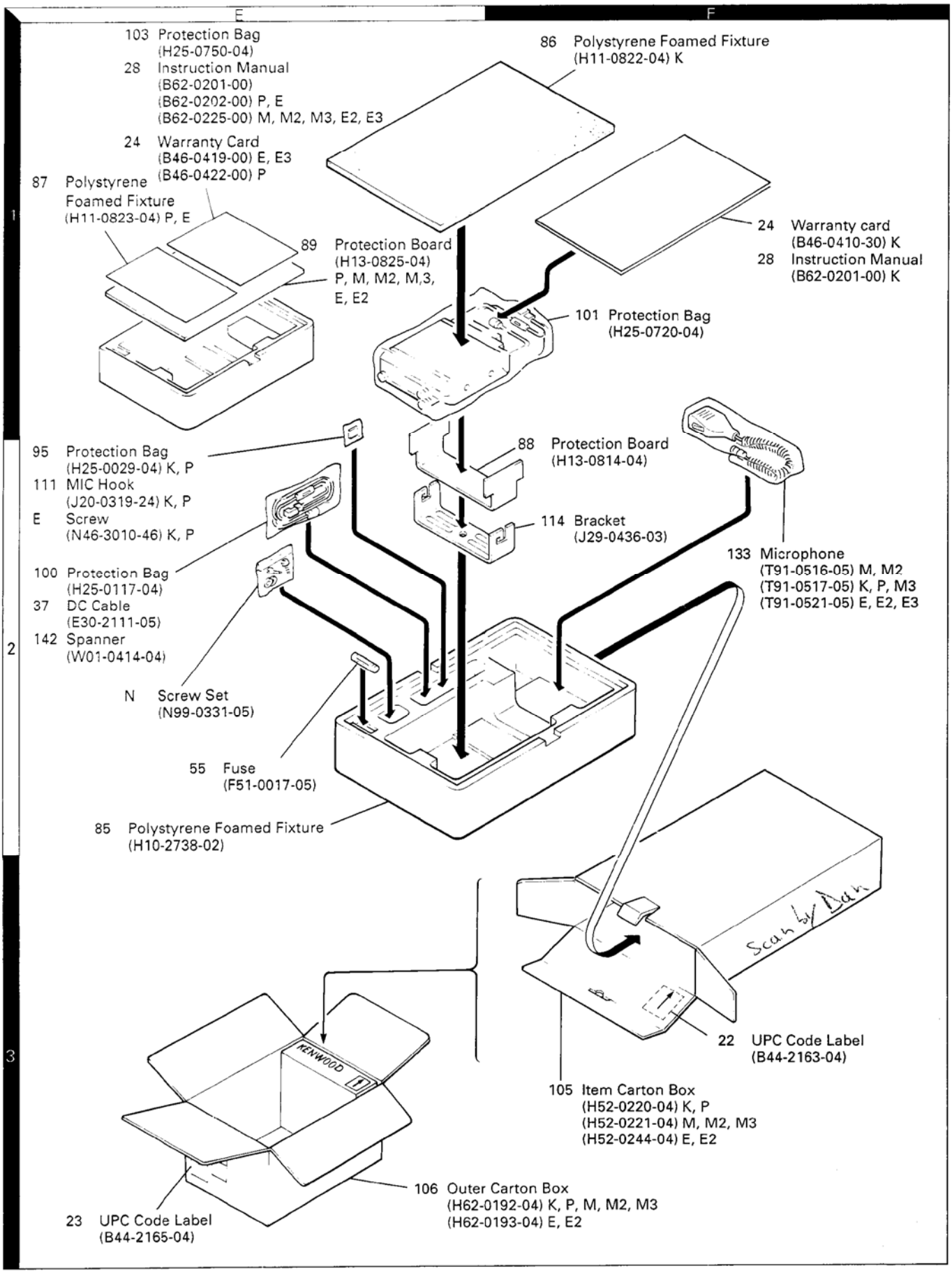
/E TM-732A/E

PLODED VIEW



A		: N09-2077-05
B		: N14-0552-05
C	M2.6 x 6 (OC) BLK	: N33-2606-45
D	M2.6 x 8 (Bi) BLK	: N35-2608-45
F		: N78-2030-45
G		: N78-2050-45
H		: N80-2006-45
I		: N80-2610-45
J	M2.6 x 6 (Br-Tap)	: N87-2606-46
K	M2.6 x 6 (F-Tap)	: N88-2606-46

PACKING


E
F
1
2
3
103 Protection Bag
(H25-0750-04)
28 Instruction Manual
(B62-0201-00)
(B62-0202-00) P, E
(B62-0225-00) M, M2, M3, E2, E3
24 Warranty Card
(B46-0419-00) E, E3
(B46-0422-00) P
87 Polystyrene
Foamed Fixture
(H11-0823-04) P, E
86 Polystyrene Foamed Fixture
(H11-0822-04) K
24 Warranty card
(B46-0410-30) K
28 Instruction Manual
(B62-0201-00) K
89 Protection Board
(H13-0825-04)
P, M, M2, M,3,
E, E2
101 Protection Bag
(H25-0720-04)
95 Protection Bag
(H25-0029-04) K, P
111 MIC Hook
(J20-0319-24) K, P
E Screw
(N46-3010-46) K, P
88 Protection Board
(H13-0814-04)
114 Bracket
(J29-0436-03)
133 Microphone
(T91-0516-05) M, M2
(T91-0517-05) K, P, M3
(T91-0521-05) E, E2, E3
100 Protection Bag
(H25-0117-04)
37 DC Cable
(E30-2111-05)
142 Spanner
(W01-0414-04)
N Screw Set
(N99-0331-05)
55 Fuse
(F51-0017-05)
85 Polystyrene Foamed Fixture
(H10-2738-02)
22 UPC Code Label
(B44-2163-04)
105 Item Carton Box
(H52-0220-04) K, P
(H52-0221-04) M, M2, M3
(H52-0244-04) E, E2
KENWOOD
106 Outer Carton Box
(H62-0192-04) K, P, M, M2, M3
(H62-0193-04) E, E2
23 UPC Code Label
(B44-2165-04)

ADJUSTMENT

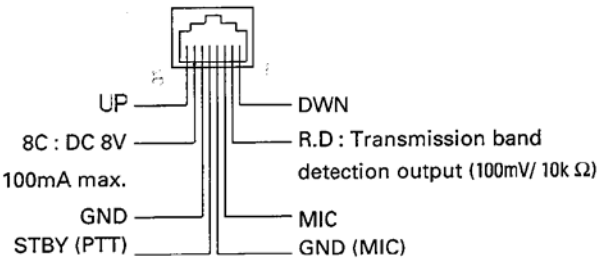
Required Test Equipment

1. **DC V.M and Tester**
   1) High input impedance
2. **RF VTVM (RF V.M)**
   1) Input impedance : 1MΩ 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. 60W, 3W, 1W
   2) Input impedance : 50Ω
   3) Frequency range : 450MHz
6. **AF VTVM (AF V.M)**
   1) Input impedance : 1MΩ 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 in put terminal
12. **SSG**
    1) Frequency range : 144/430MHz band
    2) Modulation : AM and FM MOD.
    3) Output level : –20dBμ~100dBμ
13. **Dummy Load**
    1) 8Ω, 5W (approx.)
14. **Noise Generator**
    1) Must generate ignition-like noise containing har monics beyond 450MHz.
15. **Sweep Generator**
    1) Sweep range : 144/430MHz bands
16. **Tracking Generator**

Preparation

- Set controls to position shown in Table unless otherwise specified.

POWER SW	OFF
AF VOL VR	MIN
SQL VOL VR	MIN



Microphone Socket (on Front Panel)

- Use an insulated tool such as a plastic tool during adjustment (especially trimmer coil adjustment).
- For SSG protection, do not connect a microphone to the microphone socket during receiver block adjustment.
- Check that the power switch is off before the power cord is connected.
- The SSG output level is displayed at the release end.

ADJUSTMENT

<table>
<tr><th rowspan="2">Item</th><th rowspan="2">Condition</th><th colspan="3">Measurement</th><th colspan="3">Adjustment</th><th rowspan="2">Specifications/Remarks</th></tr>
<tr><th>Test-equipment</th><th>Unit</th><th>Terminal</th><th>Unit</th><th>Parts</th><th>Method</th></tr>
<tr><td>1. Frequency table</td><td></td><td colspan="7">
<table>
<tr><th>Destination</th><th></th><th>Frequency range (MHz)
144MHz band</th><th>430MHz band</th><th>Transmission power (W)
144MHz band</th><th>430MHz band</th></tr>
<tr><td>K,P</td><td>TX</td><td>144.00~147.995</td><td>438.00~449.995</td><td>50</td><td>35</td></tr>
<tr><td></td><td>RX</td><td>118.00~173.995</td><td></td><td></td><td></td></tr>
<tr><td>M</td><td></td><td>144.00~147.995</td><td>430.00~439.995</td><td>50</td><td>35</td></tr>
<tr><td>M2,M3,E2</td><td>TX</td><td>136.00~173.995</td><td>410.00~469.995</td><td>50</td><td>35</td></tr>
<tr><td></td><td>RX</td><td>118.00~173.995</td><td></td><td></td><td></td></tr>
<tr><td>E,E3</td><td></td><td>144.00~145.995</td><td>430.00~439.995</td><td>50</td><td>35</td></tr>
</table>
</td></tr>
<tr><td>2. Setting Reset Memory</td><td>1) Power voltage : 13.8V
VOL, SQL knob
: Fully counterclockwise
2) While pushing MR key, turn on POWER.
Upon confirming that all have lit up, turn off POWER.
3) While pushing F key and MR key, turn on POWER.
Wait there for about 4 seconds (until memory is set to production mode).
4) Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV : ±3kHz).</td><td colspan="7"> </td></tr>
<tr><td>3. Memory frequency (production mode)</td><td></td><td colspan="7">
<table>
<tr><th colspan="2">VHF band (V band)</th><th colspan="2">UHF band (U band) : M,M2,M3,E,E2,E3</th><th colspan="2">UHF band (U band) : K,P</th></tr>
<tr><td>CH1</td><td>136.000MHz</td><td>CH1</td><td>430.000MHz</td><td>CH1</td><td>440.000MHz</td></tr>
<tr><td>CH2</td><td>144.000</td><td>CH2</td><td>430.040</td><td>CH2</td><td>438.040</td></tr>
<tr><td>CH3</td><td>144.040</td><td>CH3</td><td>435.000</td><td>CH3</td><td>445.000</td></tr>
<tr><td>CH4</td><td>144.980</td><td>CH4</td><td>435.040</td><td>CH4</td><td>445.040</td></tr>
<tr><td>CH5</td><td>145.040</td><td>CH5</td><td>435.100</td><td>CH5</td><td>445.100</td></tr>
<tr><td>CH6</td><td>145.220</td><td>CH6</td><td>438.200</td><td>CH6</td><td>448.200</td></tr>
<tr><td>CH7</td><td>145.440</td><td>CH7</td><td>439.980</td><td>CH7</td><td>449.980</td></tr>
<tr><td>CH8</td><td>145.980</td><td>CH8</td><td>439.940</td><td>CH8</td><td>449.940</td></tr>
<tr><td>CH9</td><td>145.940</td><td>CH9</td><td>428.200</td><td>CH9</td><td>440.040</td></tr>
<tr><td>CH10</td><td>147.980</td><td>CH10</td><td>430.080</td><td>CH10</td><td>438.080</td></tr>
<tr><td>CH11</td><td>147.940</td><td>CH11</td><td>435.080</td><td>CH11</td><td>445.080</td></tr>
<tr><td>CH12</td><td>173.980</td><td>CH12</td><td>439.920</td><td>CH12</td><td>439.920</td></tr>
<tr><td>CH13</td><td>144.080</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CH14</td><td>145.080</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CH15</td><td>145.920</td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td rowspan="3">4. Lock voltage</td><td>1) V band (VHF)
CH4 : 144.980MHz
Receiving
Transmission</td><td rowspan="3">DVM</td><td rowspan="2">TX-RX (A/4)</td><td rowspan="2">CV</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Check</td><td>RX : 2.6~3.8V
TX : 2.6~3.8V</td></tr>
<tr><td>2) U band (UHF)
Use band SEL key to select a band.
CH3 : 435.000MHz
M,M2,M3,E,E2,E3
CH3 : 445.000MHz K,P
Receiving
Transmission</td><td>M,M2,M3,E,E2,E3
RX : 3.9~5.1V
TX : 3.9~5.1V
K,P
RX : 4.7~5.9V
TX : 4.7~5.9V</td></tr>
<tr><td>3) Pushing the band SEL key, of UHF band, then set to the V2 band by the F key, CONT SEL key.
V2 (V x V) band
CH5 : 145.040MHz
Receiving
After checked, return to the original state with F key, CONT SEL key.</td><td>TX-RX (B/4)</td><td>CV</td><td>RX : 2.5~4.1V</td></tr>
</table>

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. Transmission frequency	1) U band CH3 : 435.000MHz **M,M2,M3,E,E2,E3** CH3 : 445.000MHz **K,P**	f. counter Dummy load	Rear panel	ANT	TX-RX (A/4)	TC1	435.000MHz **M,M2,M3,E,E2,E3** 445.000MHz **K,P**	±100Hz
6. BPF	1) V band CH5 : 145.040MHz **E,E3** CH9 : 145.940MHz **K,P,M,M2,M3,E2** SSG : Lowering SSG from 0dBμ, adjust it between –7~–8dBμ.	DVM SSG	TX-RX (A/4)	SM	TX-RX (A/4)	L5~7 L10	Voltage MAX	Ref. value : approx. 2.5V
	2) U band CH4 : 435.040MHz **M,M2,M3,E,E2,E3** CH4 : 445.040MHz **K,P** SSG : Lowering SSG from 0dBμ, adjust it between –7~–8dBμ.		TX-RX (B/4)	SM	TX-RX (B/4)	TC201 L214		
7. Sensitivity	1) V band **E,E3** CH3 : 144.040MHz CH9 : 145.940MHz CH5 : 145.040MHz **K,P,M,M2,M3,E2** CH3 : 144.040MHz CH9 : 145.940MHz CH11 : 147.940MHz SSG : –9dBμ	Distortion meter Oscilloscope Voltmeter	Rear panel	EXT. SP			Check	SINAD 12dB or more.
	2) U band **M,M2,M3,E,E2,E3** CH2 : 430.040MHz CH4 : 435.040MHz CH8 : 439.940MHz **K,P** CH2 : 438.040MHz CH4 : 445.040MHz CH8 : 449.940MHz SSG : –9dBμ							SINAD 12dB or more.
	3) Display control unit LED lighting on V2 or U2 with F key, CONT SEL key. After check, return to the original state with F key, CONT SEL key. Switching the LED lit side with SEL key, set a band for confirmation with F key, CONT SEL key, once again. V2 band CH14 : 145.080MHz SSG : –3dBμ							SINAD 12dB or more.
	4) U2 band CH11 : 435.080MHz **M,M2,M3,E,E2,E3** CH11 : 445.080MHz **K,P** SSG : –3dBμ							SINAD 12dB or more.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
8. High level input S/N	1) V band CH5 : 145.040MHz **E,E3** CH9 : 145.940MHz **K,P,M,M2,M3,E2** SSG : 60dBμ AF output : 2.83V/8Ω	Oscilloscope Voltmeter SSG	Rear panel	EXT. SP			Check	S/N 44dB or more.
	2) U band CH4 : 435.040MHz **M,M2,M3,E,E2,E3** CH4 : 445.040MHz **K,P** SSG : 60dBμ AF output : 2.83V/8Ω							S/N 42dB or more.
9. Distortion	1) V band CH5 : 145.040MHz **E,E3** CH9 : 145.940MHz **K,P,M,M2,M3,E2** SSG : 40dBμ AF output : 4V/8Ω	Distortion meter Oscilloscope Voltmeter SSG	Rear panel	EXT. SP			Check	5% or less.
	2) U band CH4 : 435.040MHz **M,M2,M3,E,E2,E3** CH4 : 445.040MHz **K,P** SSG : 40dBμ AF output : 4V/8Ω							5% or less.
10. S-meter	1) V band CH5 : 145.040MHz **E,E3** CH9 : 145.940MHz **K,P,M,M2,M3,E2** SSG : 17dBμ	SSG	Rear panel	ANT	TX-RX (A/4)	VR1	Set the SSG output to the point where the S-meter puts out lights by 2 dots from full lighting.	
	2) U band CH4 : 435.040MHz **M,M2,M3,E,E2,E3** CH4 : 445.040MHz **K,P** SSG : 17dBμ				TX-RX (B/4)	VR201		
	3) V,U band CH : In the above SSG : 18dBμ						Check	S-meter full lighting.
	4) SSG : OFF							S-meter lights out.
11. Squelch	1) V band CH5 : 145.040MHz **E,E3** CH9 : 145.940MHz **K,P,M,M2,M3,E2** SSG : OFF Turning the squelch knob, set it to a point where noise disappears.	Oscilloscope SSG	Rear panel	EXT. SP			Check	Squelch knob position 8 : 00 ~11 : 00 BUSY lights off.
	2) SSG : –14dBμ							Squelch open. BUSY lights on.
	3) SQL knob : Clockwise MAX							AF output disappear. BUSY lights off.
	4) SSG : –3dBμ							Squelch open. Note : If not squelch opened, minimum 20dB NQ level is acceptable.

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
11. Squelch	5) U band CH4 : 435.040MHz **M,M2,M3,E,E2,E3** CH4 : 445.040MHz **K,P** SSG : OFF Turning the squelch knob, set it to a point where noise disappears.	Oscilloscope SSG	Rear panel	EXT. SP			Check	Squelch knob position 8 : 00 ~11 : 00 BUSY lights off.
	6) SSG : −14dBμ							Squelch open. BUSY lights on.
	7) SQL knob : Clockwise MAX							AF output disappear. BUSY lights off.
	8) SSG : −3dBμ							Squelch open. Note : If not squelch opened, minimum 20dB NQ level is acceptable.
12. EXT. SP V,U band	1) Connect SPs in turn with EXT. SP terminal of each band and check, through operating VR of each band, that band output with a SP connected is switched from the internal SP to the external SP.		Rear panel	EXT. SP			Check	SP is switched from the internal SP to the external SP for each band.
13. POWER	1) V band CH4 : 144.980MHz **E,E3** CH8 : 145.980MHz **K,P,M,M2,M3,E2** Transmission	Power meter Ammeter	Rear panel	ANT	TX-RX (A/4)	VR3, 4	Clockwise MAX	57W or more.
	2) POWER : HI Transmission					VR3	53W	±4W 11.5A or less.
	3) POWER : MID Transmission					VR4	12W	±1W
	4) POWER : LOW Transmission						Check	3.0~8.0W
	5) **E,E3** CH2 : 144.000MHz CH15 : 145.920MHz **K,P** CH2 : 144.000MHz CH10 : 147.980MHz **M,M2,M3,E2** CH1 : 136.000MHz CH12 : 173.980MHz POWER : HI Transmission							46~59W
	6) POWER : MID Transmission							10~14W
	7) POWER : LOW Transmission							3.0~8.0W

ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
13. POWER	8) U band CH3 : 435.000MHz **M,M2,M3,E,E2,E3** CH3 : 445.000MHz **K,P** Transmission	Power meter Ammeter	Rear panel	ANT	TX-RX (B/4)	VR203 VR204	Clockwise MAX	37W or more.
	9) POWER : HI Transmission					VR203	35W	±3W 10A or less.
	10) POWER : MID Transmission					VR204	12W	±1W
	11) POWER : LOW Transmission						Check	3.0~8.0W
	12) **M,M2,M3,E,E2,E3** CH1 : 430.000MHz CH7 : 439.980MHz **K,P** CH7 : 449.980MHz CH10 : 438.080MHz POWER : HI Transmission							28~42W
	13) POWER : MID Transmission							10~14W
	14) POWER : LOW Transmission							3.0~8.0W
14. DEV	1) V band CH4 : 144.980MHz **E,E3** CH8 : 145.980MHz **K,P,M,M2,M3,E2** 1kHz/25mV **E,E2,E3** AG : 1kHz/50mV **K,P,M,M2,M3** Transmission	Linear detector Oscilloscope AG	Rear panel	ANT	TX-RX (A/4)	VR2	±4.4kHz (+, – with a larger value)	±200Hz
	2) Down AG output from the above state by 20dB. (1kHz/2.5mV or 5.0mV) Transmission						Check	±2.2~3.8kHz
	3) U band CH3 : 435.000MHz **M,M2,M3,E,E2,E3** CH3 : 445.000MHz **K,P** AG : 1kHz/25mV **E,E2,E3** AG : 1kHz/50mV **K,P,M,M2,M3** Transmission				TX-RX (B/4)	VR202	+4.4kHz (+, – with a larger value)	+200Hz
	4) Down AG output from the above state by 20dB. (1kHz/2.5mV or 5.0mV) Transmission						Check	±2.2~3.8kHz
15. TONE	1) V band TONE key : ON Transmission After checked TONE key : OFF	Linear detector Oscilloscope	Rear panel	ANT			Check	±0.5~1.5kHz
	2) U band TONE key : ON Transmission After checked TONE key : OFF							±0.5~1.5kHz

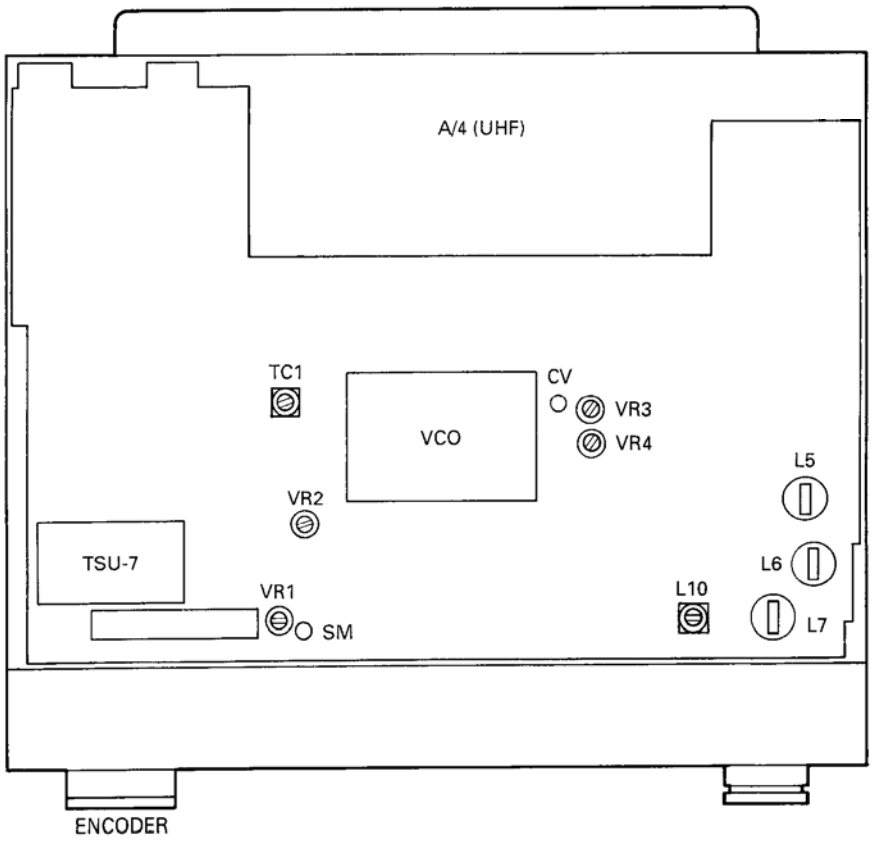
ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
16. DTSS	1) V band POWER : OFF While pushing VFO and MHz keys, turn on POWER. Transmission After check, reset. Set a frequency memory once again.	Linear detector Oscilloscope	Rear panel	ANT			1633Hz single tone	±2.5kHz or more.
17. Spurious abnormal oscillation	1) V band **E,E3** CH2 : 144.000MHz CH4 : 144.980MHz CH8 : 145.980MHz **K,P,M** CH2 : 144.000MHz CH8 : 145.980MHz CH10 : 147.980MHz **M2,M3,E2** CH1 : 136.000MHz CH8 : 145.980MHz CH12 : 173.980MHz POWER : HI/MID/LOW Power supply : 11.7~16.0V variable Transmission	Spectrum analyzer					Check	Spurious –60dB or less. Free of abnormal oscillation.
	2) U band **M,M2,M3,E,E2,E3** CH1 : 430.000MHz CH3 : 435.000MHz CH7 : 439.980MHz **K,P** CH1 : 440.000MHz CH3 : 445.000MHz CH7 : 449.980MHz POWER : HI/MID/LOW Power supply : 11.7~16.0V variable Transmission							Spurious –60dB or less. Free of abnormal oscillation.
18. CTCSS	1) V band CH7 : 145.440MHz Only with built-in TSU-7 model. Set TONE frequency to the same frequency between under test equipment and monitor equipment each other. (Pushing F key for 1 second or more, push TONE key.) Turning the SQL VR, set it to a point where noise disappears.	Monitor equipment					Check	Sound matching should be attainable.
	2) Change the TONE frequency, then transmit from the monitor equipment.							Squelch does not open.
19. Protection	1) V band CH8 : 145.980MHz **E,E3** CH10 : 147.980MHz **K,P,M,M2,M3,E2** ANT : OPEN Transmission	Ammeter					Check	12.0A or less.
	2) U band CH7 : 439.980MHz **M,M2,M3,E,E2,E3** CH7 : 449.980MHz **K,P** ANT : OPEN Transmission							10A or less.

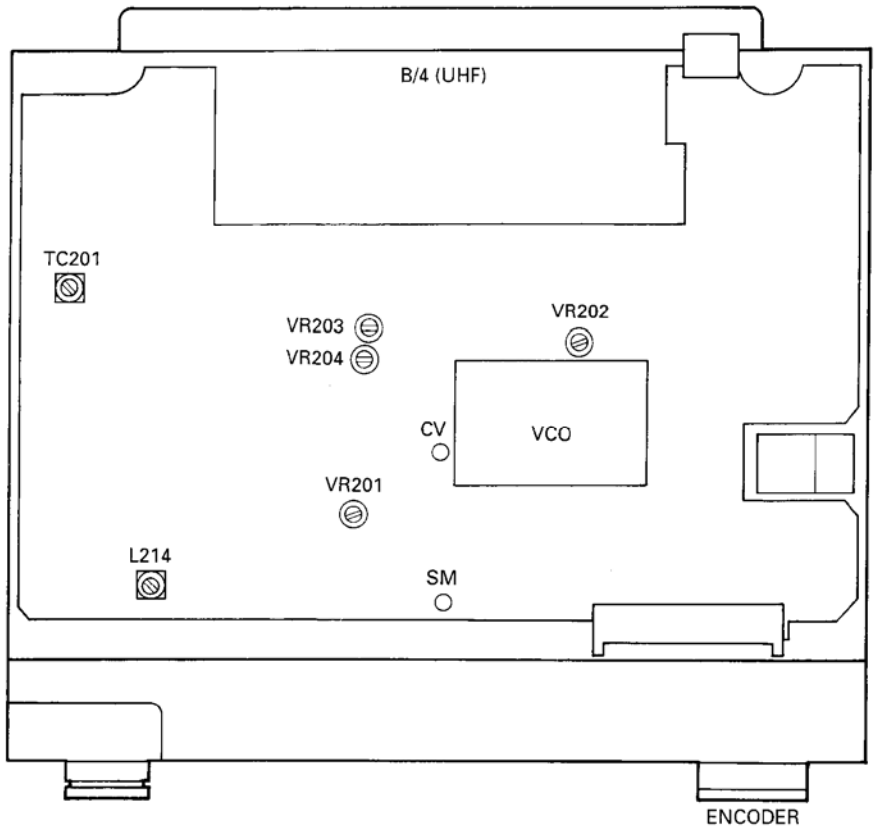
ADJUSTMENT

Adjustment Points

Upper side



Lower side



TERMINAL FUNCTIONS

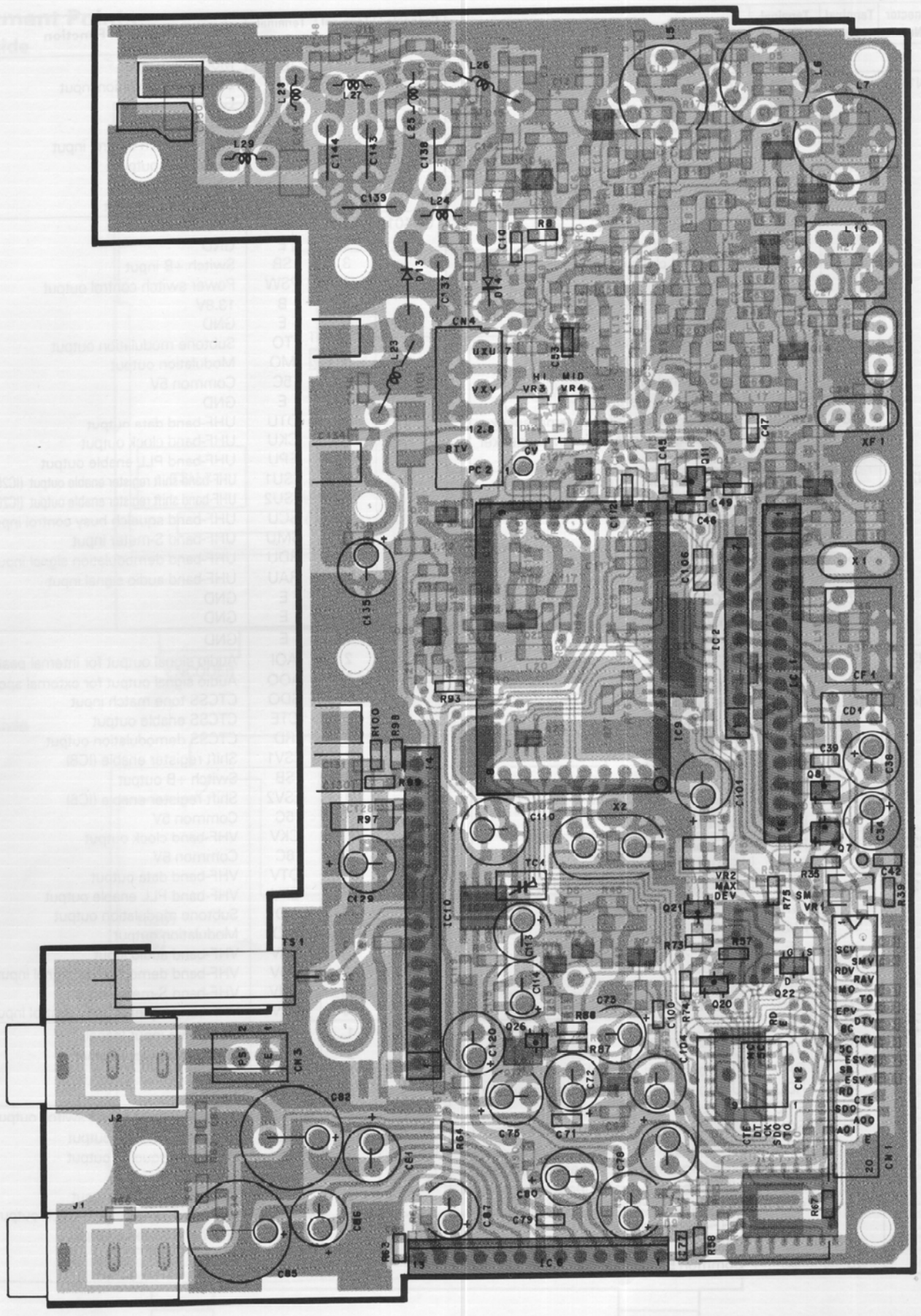
Connector No.	Terminal No.	Terminal Name	Terminal Function
TX-RX UNIT (X57-400X-XX)			
CN1	1	SCV	VHF-band squelch busy control output
	2	SMV	VHF-band S-meter output
	3	RDV	VHF-band demodulation signal output
	4	RAV	VHF-band audio output
	5	MO	Modulation input
	6	TO	Subtone modulation input
	7	EPV	VHF-band PLL enable input
	8	DTV	VHF-band data input
	9	8C	Common 8V
	10	CKV	VHF-band clock input
	11	5C	Common 5V
	12	ESV2	Shift register enable (IC5)
	13	SB	Switch +B input
	14	ESV1	Shift register enable (IC8)
	15	RD	CTCSS demodulation input
	16	CTE	CTCSS enable input
	17	SDO	CTCSS tone match output
	18	AOO	Audio signal input for external speaker
	19	AOI	Audio signal input for internal speaker
	20	E	GND
CN2	1	CTE	CTCSS enable output
	2	NC	
	3	DT	CTCSS data output
	4	5C	Common 5V
	5	CK	CTCSS clock output
	6	RD	CTCSS demodulation output
	7	SDO	CTCSS tone match input
	8	E	GND
	9	TO	Unused
CN3	1	E	GND
	2	SP	Speaker output
CN4	1	PC2	VHF-band APC output
	2	8TV	VHF-band 8T output
	3	12.8M	12.8MHz output
	4	E	GND
	5	V x V	V^2 output
	6	E	GND
	7	U x U	U^2 input
CN201	1	FAN2	SB input for fan
	2	FAN1	FAN GND
CN202	1	PC2	VHF-band APC input
	2	8TV	VHF-band 8T input
	3	12.8M	12.8MHz input
	4	E	GND
	5	V x V	V^2 input
	6	E	GND
	7	U x U	U^2 output
CN203	1	E	GND
	2	E	GND
	3	RAU	UHF-band audio signal output
	4	RDU	UHF-band demodulation signal output
	5	SMU	UHF-band S-meter output
	6	SCU	UHF-band squelch busy control output
	7	ESU2	UHF-band shift register enable (IC205)
	8	ESU1	UHF-band shift register enable (IC206)
	9	EPU	UHF-band PLL enable input
	10	CKU	UHF-band clock input
	11	DTU	UHF-band data input
	12	E	GND
	13	5C	Common 5V

Connector No.	Terminal No.	Terminal Name	Terminal Function
	14	MO	Modulation input
	15	TO	Subtone modulation input
	16	E	GND
	17	B	13.8V
	18	PSW	Power switch control input
	19	SB	Switch +B output
	20	E	GND
	21	8C	8V common output
CN401	1	8C	Common 8V
	2	E	GND
	3	SB	Switch +B input
	4	PSW	Power switch control output
	5	B	13.8V
	6	E	GND
	7	TO	Subtone modulation output
	8	MO	Modulation output
	9	5C	Common 5V
	10	E	GND
	11	DTU	UHF-band data output
	12	CKU	UHF-band clock output
	13	EPU	UHF-band PLL enable output
	14	ESU1	UHF-band shift register enable output (IC206)
	15	ESU2	UHF-band shift register enable output (IC205)
	16	SCU	UHF-band squelch busy control input
	17	SMU	UHF-band S-meter input
	18	RDU	UHF-band demodulation signal input
	19	RAU	UHF-band audio signal input
	20	E	GND
	21	E	GND
CN402	1	E	GND
	2	AOI	Audio signal output for internal peaker
	3	AOO	Audio signal output for external speaker
	4	SDO	CTCSS tone match input
	5	CTE	CTCSS enable output
	6	RD	CTCSS demodulation output
	7	ESV1	Shift register enable (IC8)
	8	SB	Switch +B output
	9	ESV2	Shift register enable (IC5)
	10	5C	Common 5V
	11	CKV	VHF-band clock output
	12	8C	Common 8V
	13	DTV	VHF-band data output
	14	EPV	VHF-band PLL enable output
	15	TO	Subtone modulation output
	16	MO	Modulation output
	17	RAV	VHF-band audio input
	18	RDV	VHF-band demodulation signal input
	19	SMV	VHF-band S-meter input
	20	SCV	VHF-band squelch busy control input
CN403	1	PSI	Serial data input (panel)
	2	PSO	Serial data output (panel)
	3	E	GND
	4	B	13.8V
CN501	1	BANDU	UHF-band band select switch output
	2	VOLU	UHF-band Volume output
	3	SQU	UHF-band squelch output
	4	Vcc	5V
	5	VOLV	VHF-band volume output
	6	BANDV	VHF-band band select switch output
	7	SQV	VHF-band squelch output
	8	GND	GND

TM-732A/E PC BOARD VIEWS

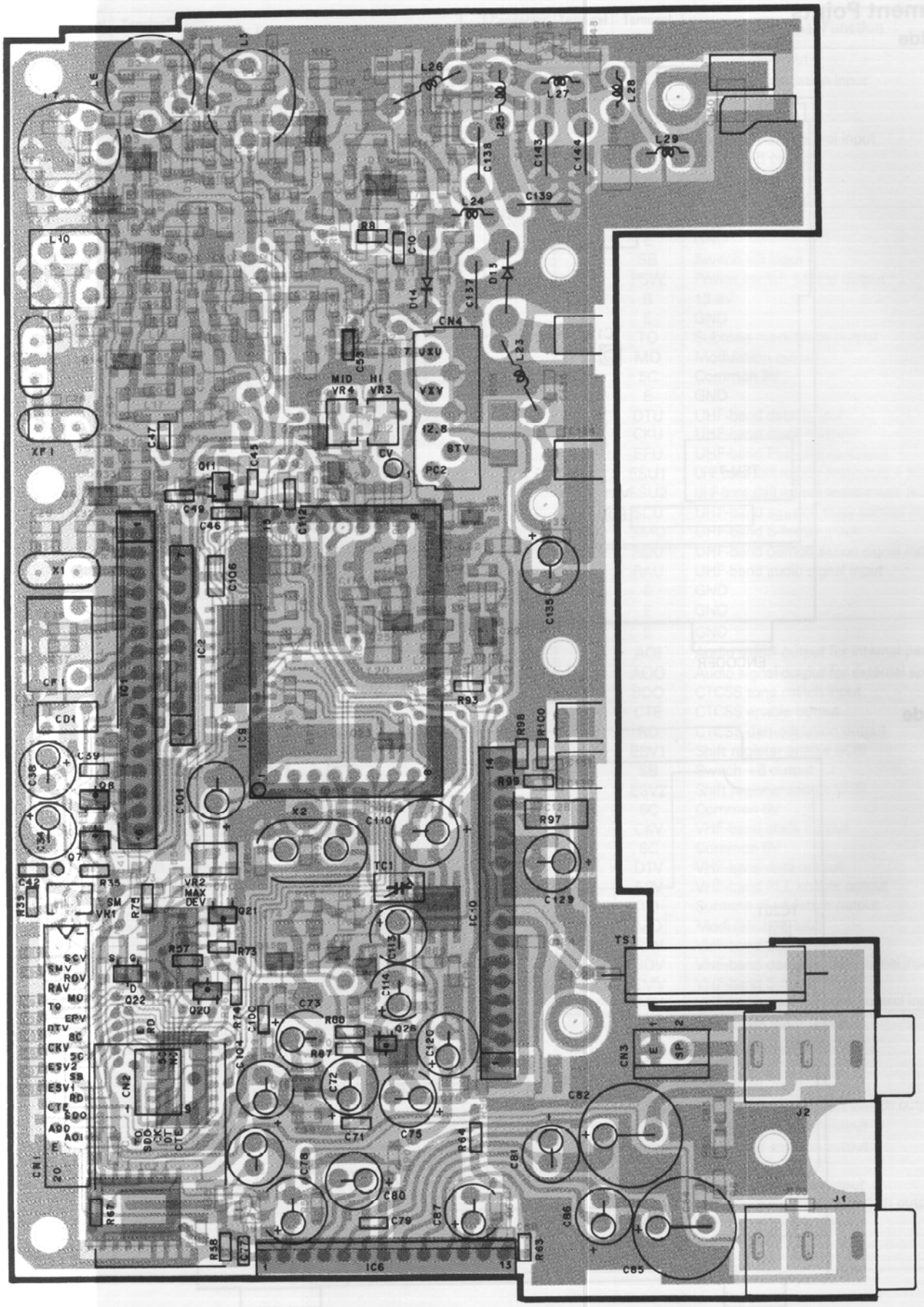
144MHz TX-RX UNIT (X57-400X-XX) (A/4) Component side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3

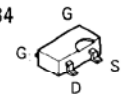


144MHz TX-RX UNIT (X57-400X-XX) (A/4) Foil side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3



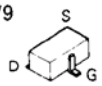
3SK131
3SK184



FMG1

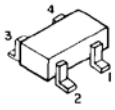
DTA123JK
DTC114EK
DTC143EK
DTC144WK
2SA1362
2SC2714
2SC4116
2SD1757K

2SJ106
2SK879

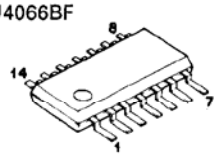


2SB1119S

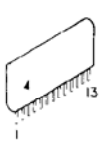
µPC1676G



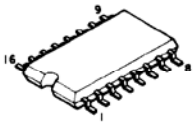
BU4066BF



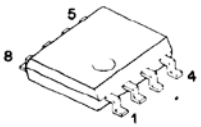
LA4446



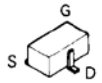
TC4053BF



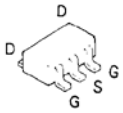
LA5010M



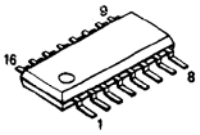
2SK1399



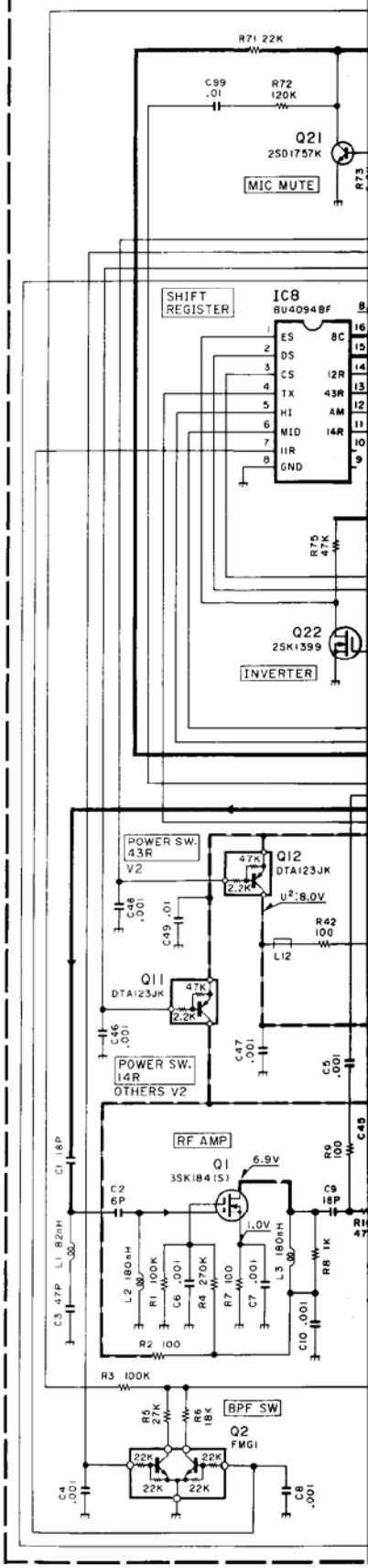
µPA502T



BU4094BF



TX-RX UNIT/144MHz (X57-400X-XX)(A

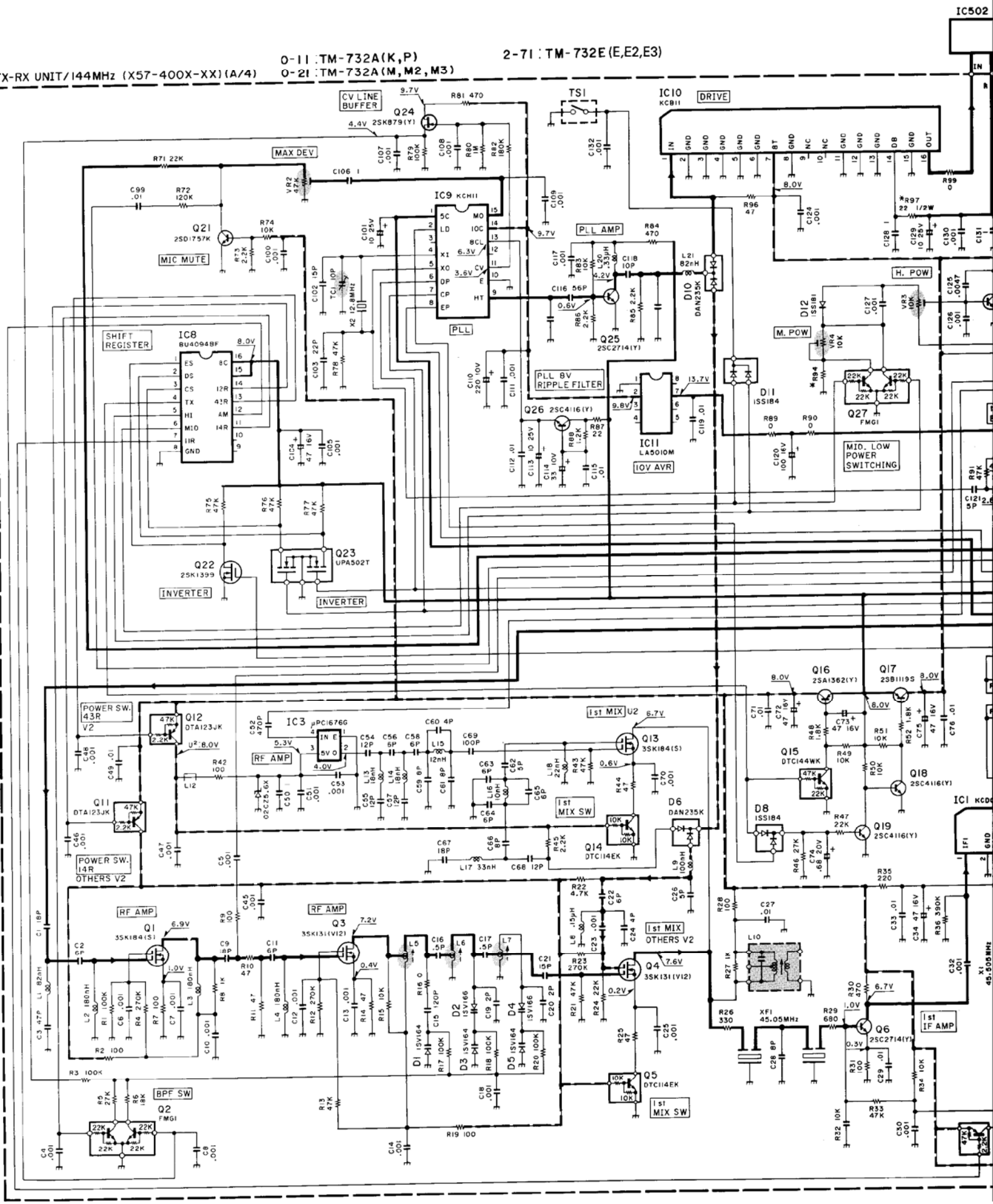


E F G H I J

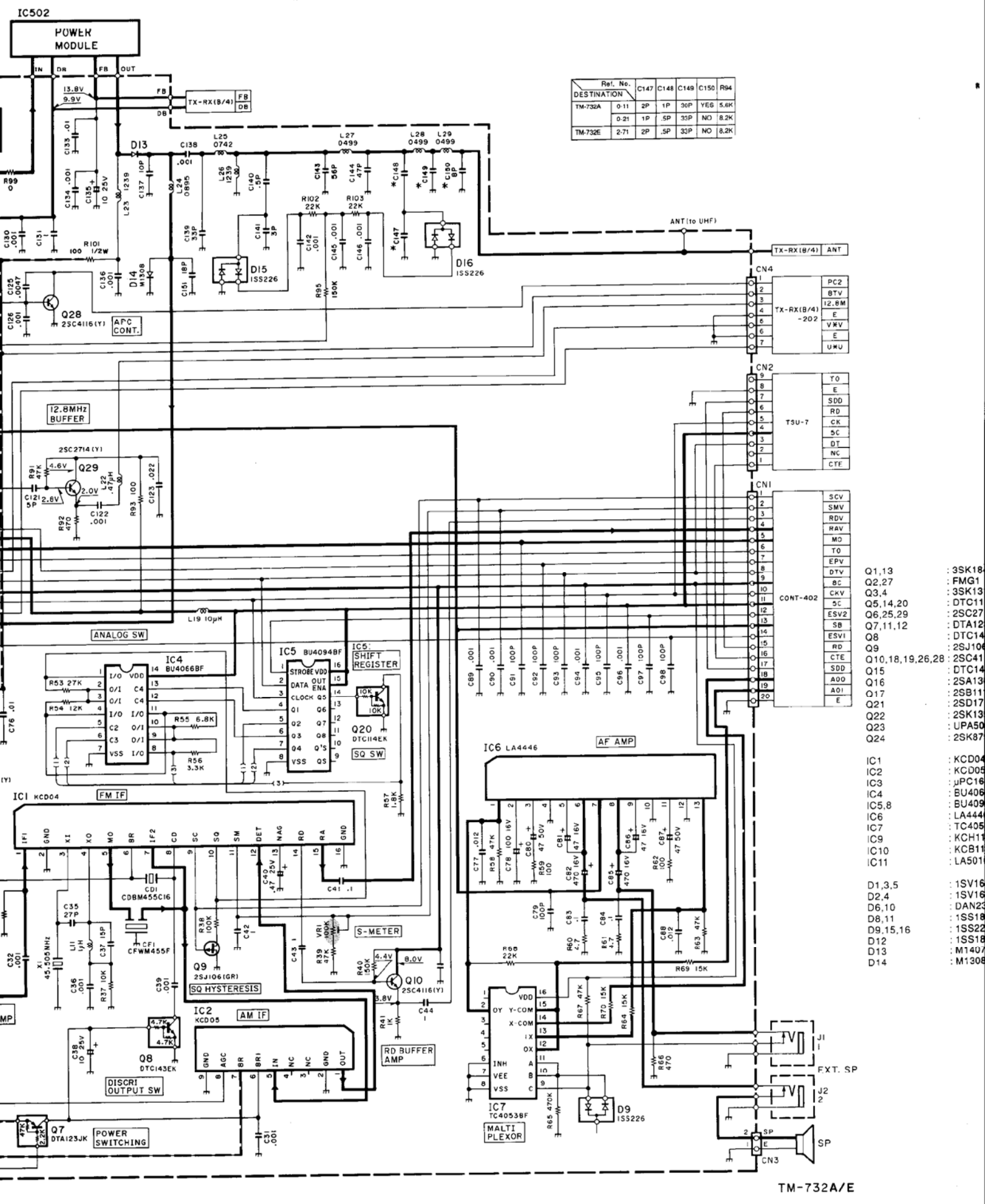
0-11 : TM-732A(K,P)
0-21 : TM-732A(M,M2,M3)

2-71 : TM-732E(E,E2,E3)

TX-RX UNIT/144MHz (X57-400X-XX)(A/4)



144MHz TX-RX UNIT CIRCUIT DIAGRAM TM-732



Ref. No. / DESTINATION		C147	C148	C149	C150	R94
TM-732A	0-11	2P	1P	30P	YES	5.6K
	0-21	1P	.5P	33P	NO	8.2K
TM-732E	2-71	2P	.5P	33P	NO	8.2K

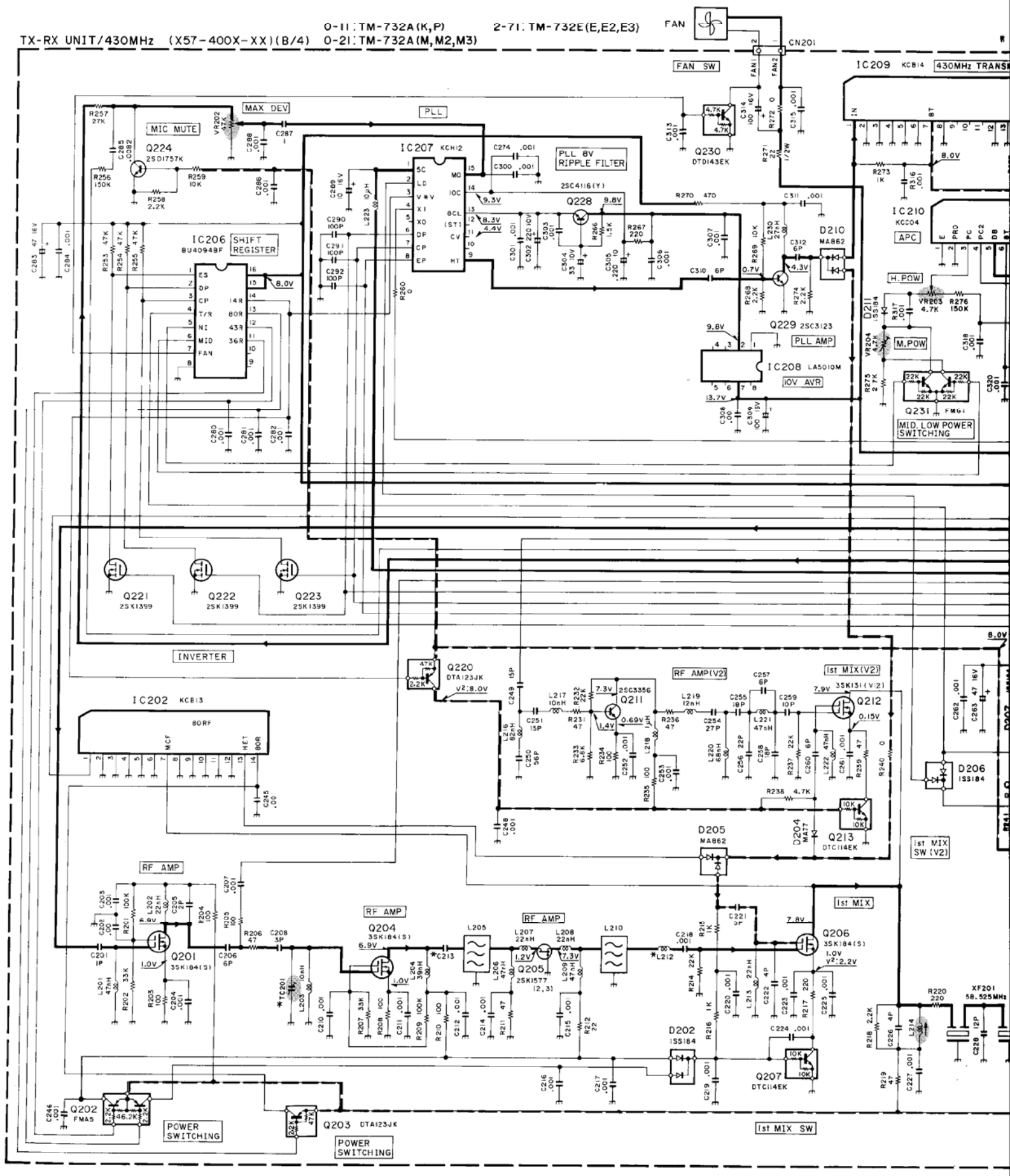
Q1,13	: 3SK18
Q2,27	: FMG1
Q3,4	: 3SK13
Q5,14,20	: DTC11
Q6,25,29	: 2SC27
Q7,11,12	: DTA12
Q8	: DTC14
Q9	: 2SJ106
Q10,18,19,26,28	: 2SC41
Q15	: DTC14
Q16	: 2SA13
Q17	: 2SB11
Q21	: 2SD17
Q22	: 2SK13
Q23	: UPA50
Q24	: 2SK87
IC1	: KCD04
IC2	: KCD05
IC3	: μPC16
IC4	: BU406
IC5,8	: BU409
IC6	: LA444
IC7	: TC405
IC9	: KCH11
IC10	: KCB11
IC11	: LA501
D1,3,5	: 1SV16
D2,4	: 1SV16
D6,10	: DAN23
D8,11	: 1SS18
D9,15,16	: 1SS22
D12	: 1SS18
D13	: M1407
D14	: M1308

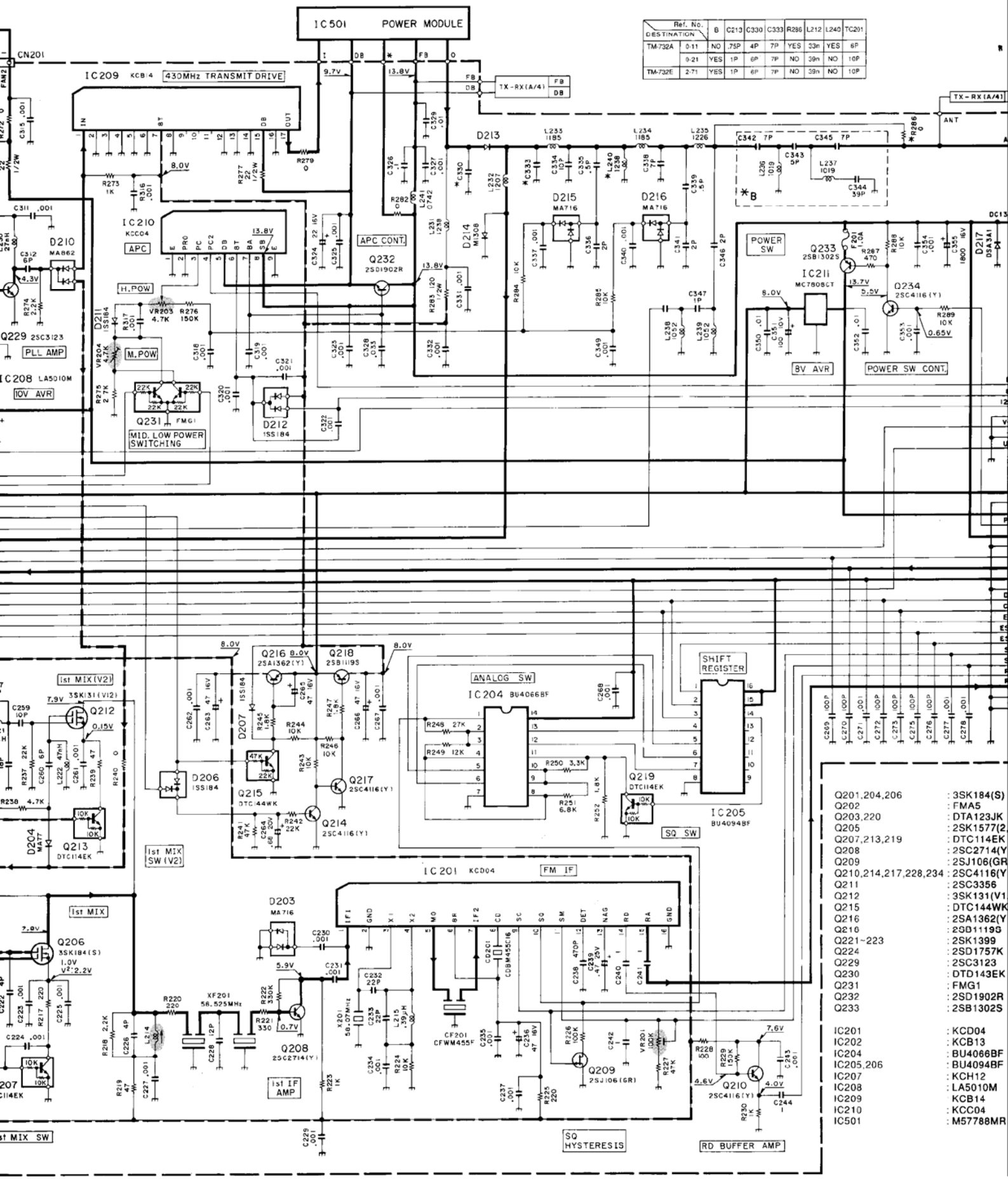
M-732A/E 430MHz TX-RX UNIT CIRCUIT DIAGRAM

TX-RX UNIT/430MHz (X57-400X-XX)(B/4)

0-11: TM-732A(K,P) 0-21: TM-732A(M,M2,M3)

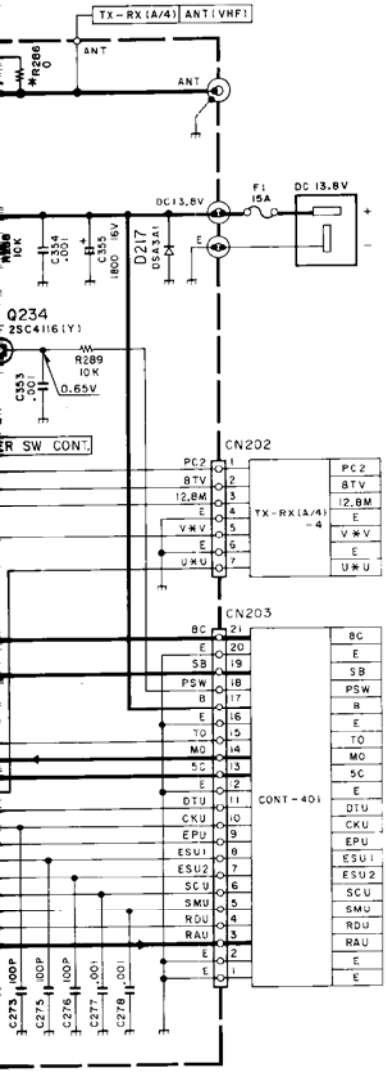
2-71: TM-732E(E,E2,E3)





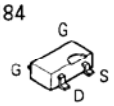
Ref. No. / DESTINATION		B	C213	C330	C333	R286	L212	L240	TC201
TM-732A	0-11	NO	.75P	4P	7P	YES	33n	YES	6P
	0-21	YES	1P	6P	7P	NO	39n	NO	10P
TM-732E	2-71	YES	1P	6P	7P	NO	39n	NO	10P

Q201,204,206	: 3SK184(S)
Q202	: FMA5
Q203,220	: DTA123JK
Q205	: 2SK1577(2
Q207,213,219	: DTC114EK
Q208	: 2SC2714(Y
Q209	: 2SJ106(GR
Q210,214,217,228,234	: 2SC4116(Y
Q211	: 2SC3356
Q212	: 3SK131(V1
Q215	: DTC144WK
Q216	: 2SA1362(Y
Q218	: 2SB1119S
Q221~223	: 2SK1399
Q224	: 2SD1757K
Q229	: 2SC3123
Q230	: DTD143EK
Q231	: FMG1
Q232	: 2SD1902R
Q233	: 2SB1302S
IC201	: KCD04
IC202	: KCB13
IC204	: BU4066BF
IC205,206	: BU4094BF
IC207	: KCH12
IC208	: LA5010M
IC209	: KCB14
IC210	: KCC04
IC501	: M57788MR



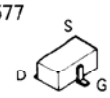
206	: 3SK184(S)	D202,206,207,211,212	: 1SS184
	: FMA5	D203,215,216	: MA716
	: DTA123JK	D204	: MA77
	: 2SK1577(2,3)	D205,210	: MA862
219	: DTC114EK	D213	: M1407
	: 2SC2714(Y)	D214	: M1308
	: 2SJ106(GR)	D217	: DSA3A1
217,228,234	: 2SC4116(Y)		
	: 2SC3356		
	: 3SK131(V12)		
	: DTC144WK		
	: 2SA1362(Y)		
	: 2SB1119S		
	: 2SK1399		
	: 2SD1757K		
	: 2SC3123		
	: DTD143EK		
	: FMG1		
	: 2SD1902R		
	: 2SB1302S		
	: KCD04		
	: KCB13		
	: BU4066BF		
	: BU4094BF		
	: KCH12		
	: LA5010M		
	KCB14		
	: KCC04		
	: M57788MR		

3SK131
3SK184



DTA123JK
DTC114EK
DTC144WK
DTD143EK
2SA1362
2SC2714
2SC3123
2SC3356
2SC4116
2SD1757K

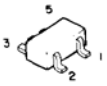
2SJ106
2SK1577



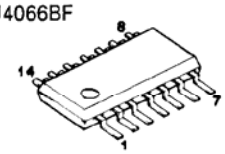
2SB1119S
2SB1302S

2SK1399

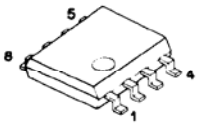
FMA5
FMG1



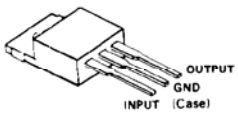
BU4066BF



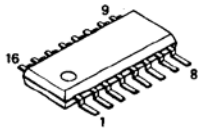
LA5010M



MC7808CT



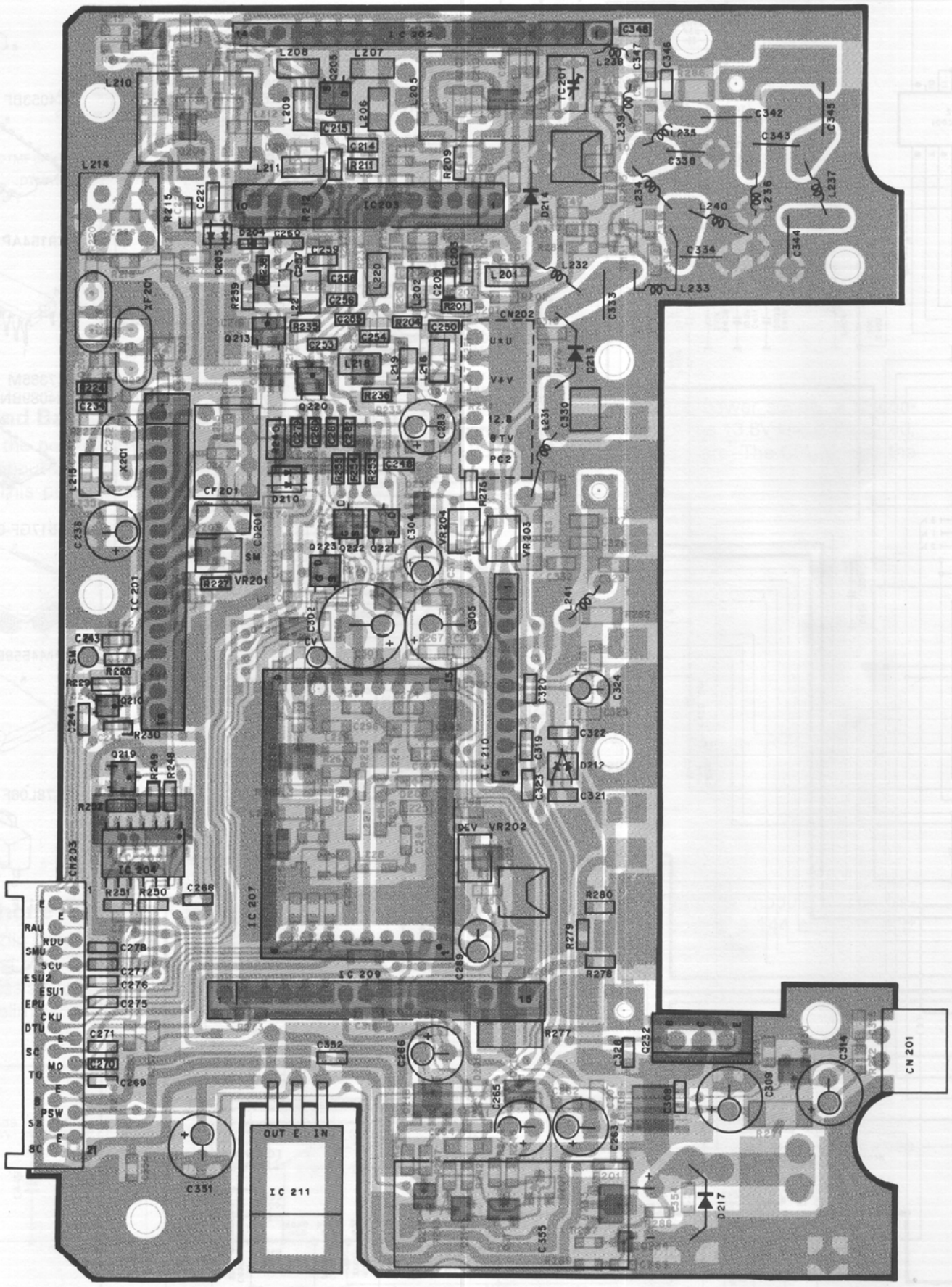
BU4094BF



2SD1902R

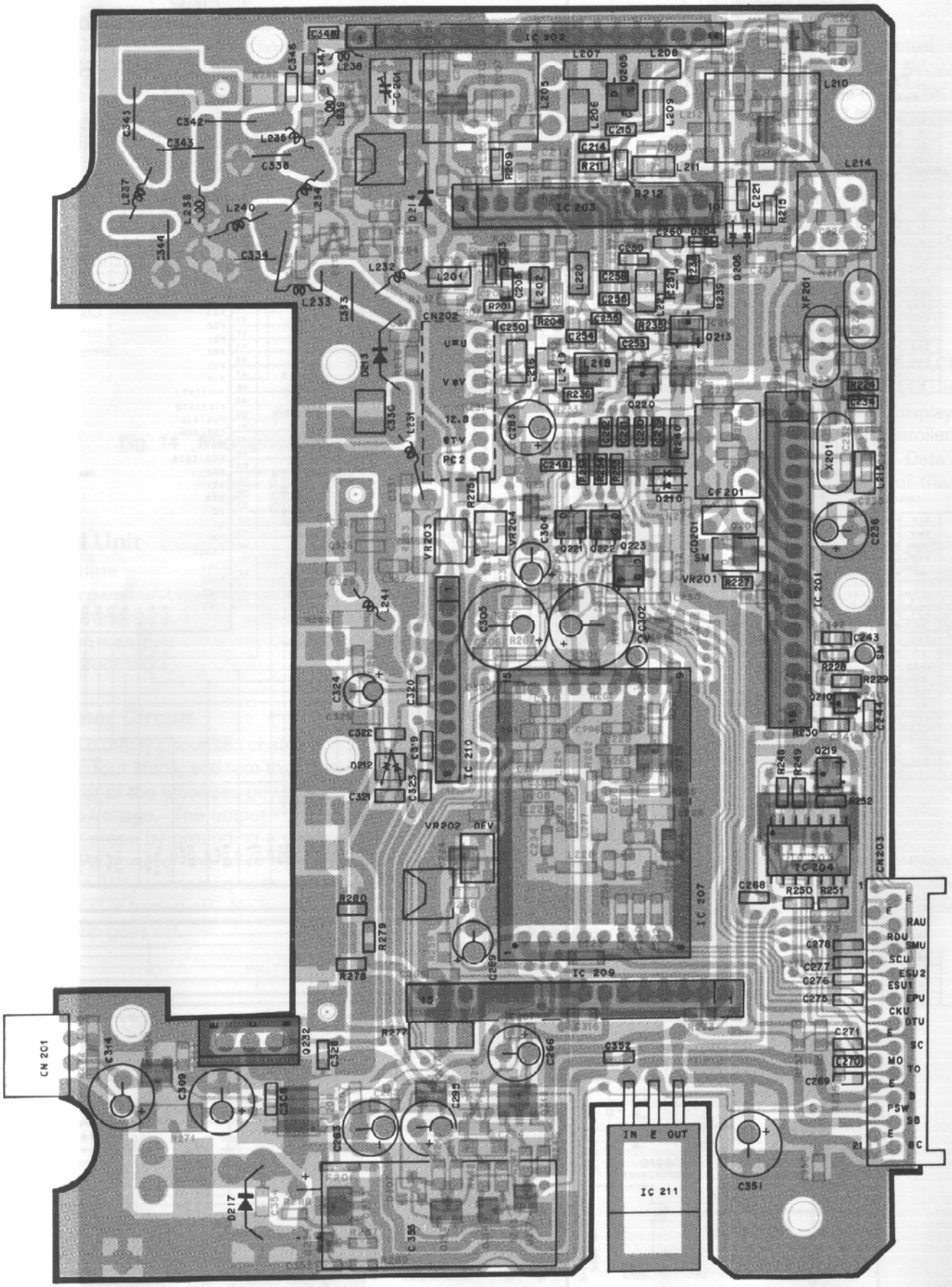
430MHz TX-RX UNIT (X57-400X-XX) (B/4) Component side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3



430MHz TX-RX UNIT (X57-400X-XX) (B/4) Foil side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3



TM-732A/E CONTROL UNIT CIRCUIT DIAGRAM

Ref. No. / DESTINATION		C432	R471	R472	R477
TM-732A	0-11	NO	3.9K	1.8K	NO
	0-21	NO	3.9K	1.8K	NO
TM-732E	2-71	YES	2.2K	3.3K	YES

0-11 : TM-732A (K, P)
0-21 : TM-732A (M, M2, M3)
2-71 : TM-732E (E, E2, E3)

TX-RX UNIT/CONROL (X57-400X-XX) (C/4)

CN401 — TX-RX (B/4) -203

CN402 — TX-RX (A/4) -1

CN403 — LCD

IC401 LR4089BN — DTMF ENCODE

IC403 UPC 75517GF-029-389

IC407 TA78L06F — 6V AVR

IC408 TC4S11F — INVERTER

IC409 TC4S11F — INVERTER

Q402 2SD1757K — OUT.SP MUTE

Q403 2SD1757K — INT.SP MUTE

Q410 2SC4116(Y) — BACK-UP SW

Q411 2SC4116(Y) — RESET SW

Q412 2SA1519 — 5C SW

Q413 2SD1757K — RD MUTE

D402 LFB01

D403 02CZ7.5(X)

D404 02CZ3.0(Z)

D405 1SS184

D406 1SS226

D407 LFB01

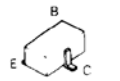
X402 4.19MHz

J401

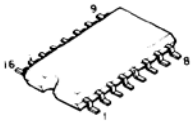
F G H I J

Q401,407,408,410,411	: 2SC4116(Y)
Q402~404,409,413	: 2SD1757K
Q405,406,414	: DTC114EK
Q412	: 2SA1519
IC401	: LR4089BN
IC402	: LC7385M
IC403	: 75517GF-029-3B9
IC404,405	: TC4053BF
IC406	: TC9154AP
IC407	: TA78L06F
IC408,409	: TC4S11F
IC410,411	: NJM4558E
D401,402,407	: LFB01
D403	: 02CZ7.5(X)
D404	: 02CZ3.0(Z)
D405	: 1SS184
D406	: 1SS226

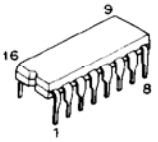
DTC114EK
2SA1519
2SC4116
2SD1757K



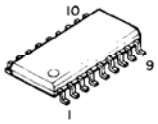
TC4053BF



TC9154AP



LC7385M
LR4089BN



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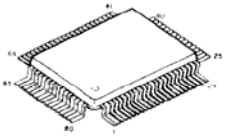

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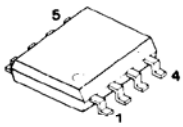
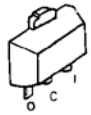


TA78L06F



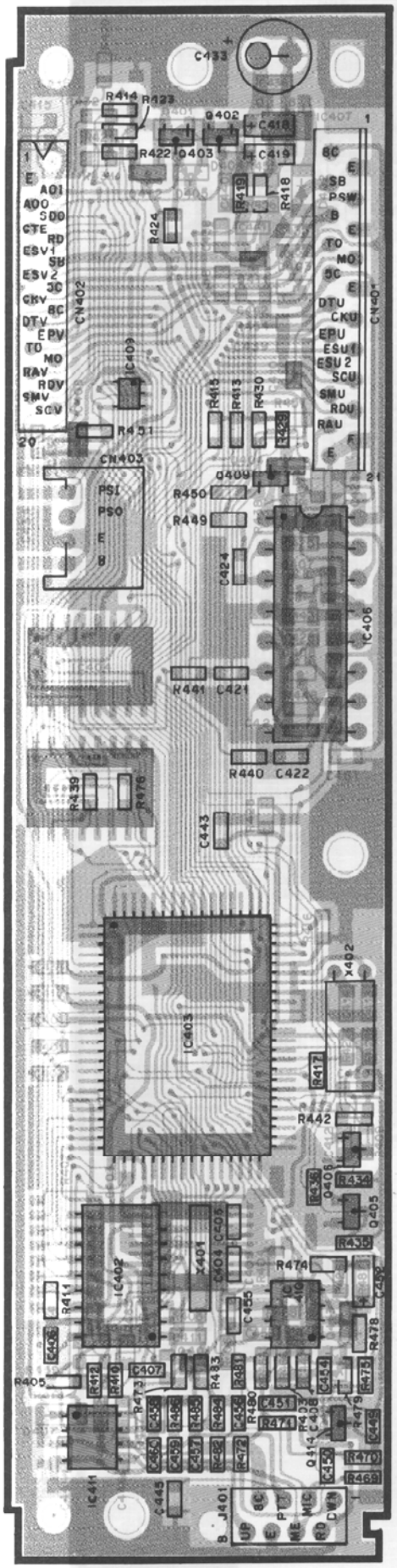
TC4S11F

TM-732A/E

PC BOARD VIEWS TM-732A/E

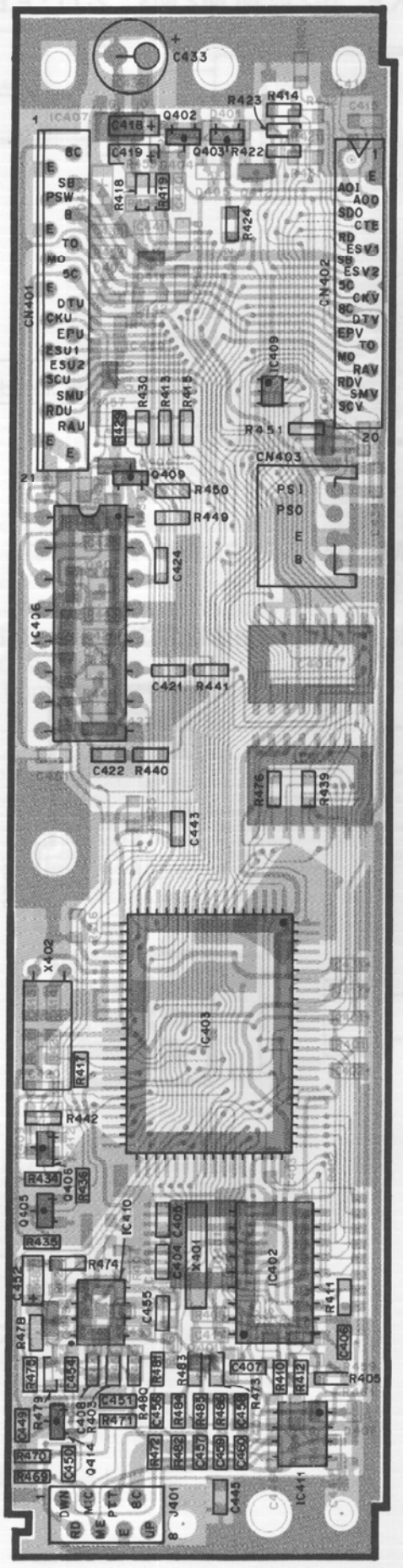
CONTROL UNIT (X57-400X-XX) (C/4) Component side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3



CONTROL UNIT (X57-400X-XX) (C/4) Foil side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3

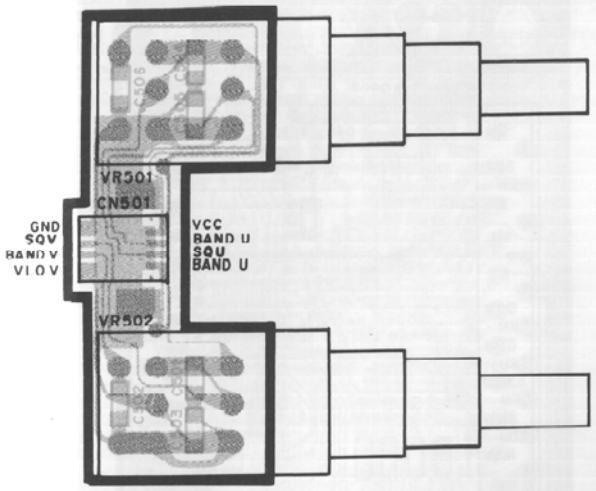


TM-732A/E PC BOARD VIEWS

VOLUME UNIT (X57-400X-XX)(D/4)

Component side view

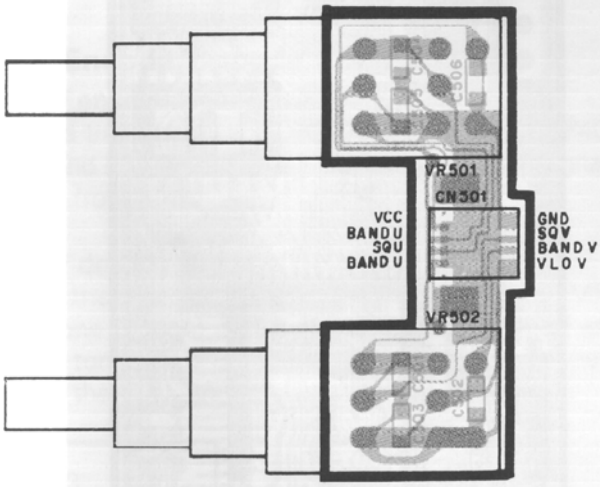
0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3



VOLUME UNIT (X57-400X-XX)(D/4)

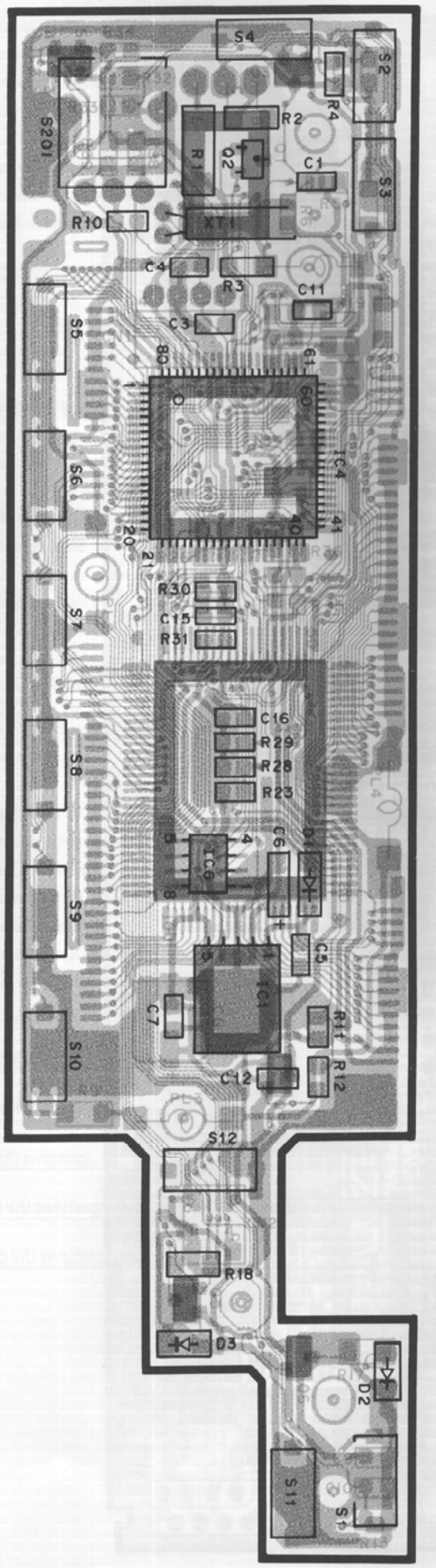
Foil side view

0-11 : K,P 0-21 : M,M2,M3 2-71 : E,E2,E3

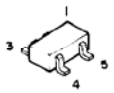


LCD ASSY (B38-03XX-15) Component side view

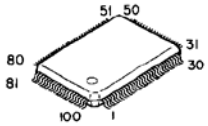
66 : K,P 67 : M 68 : E,E3 70 : M2,M3 71 : E2



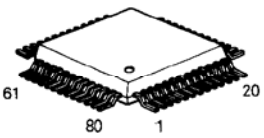
TC4S11F



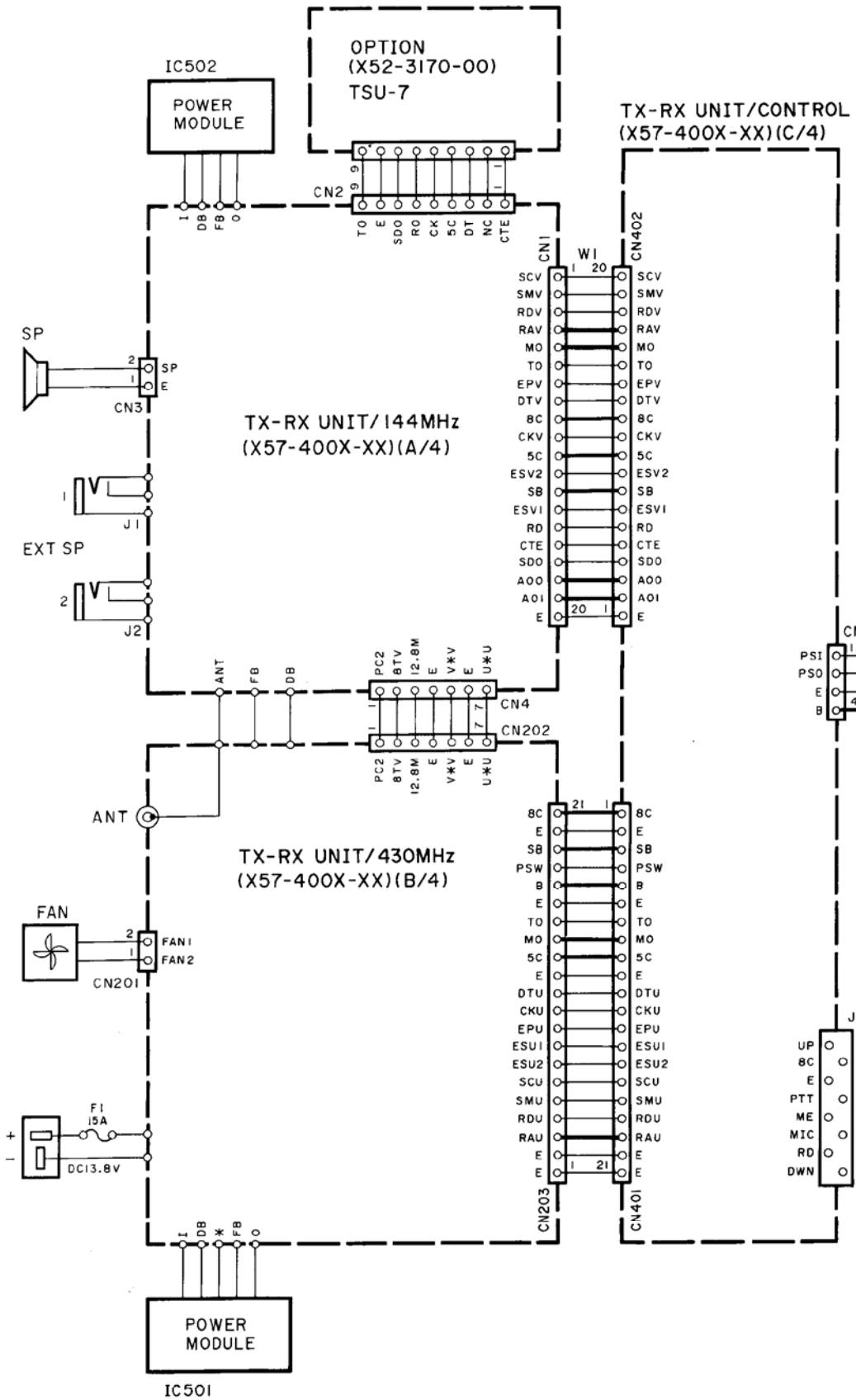
MSM5265GS-V1K



75328GC-540-3B9



DTA114EK
2SA1162
2SC2712



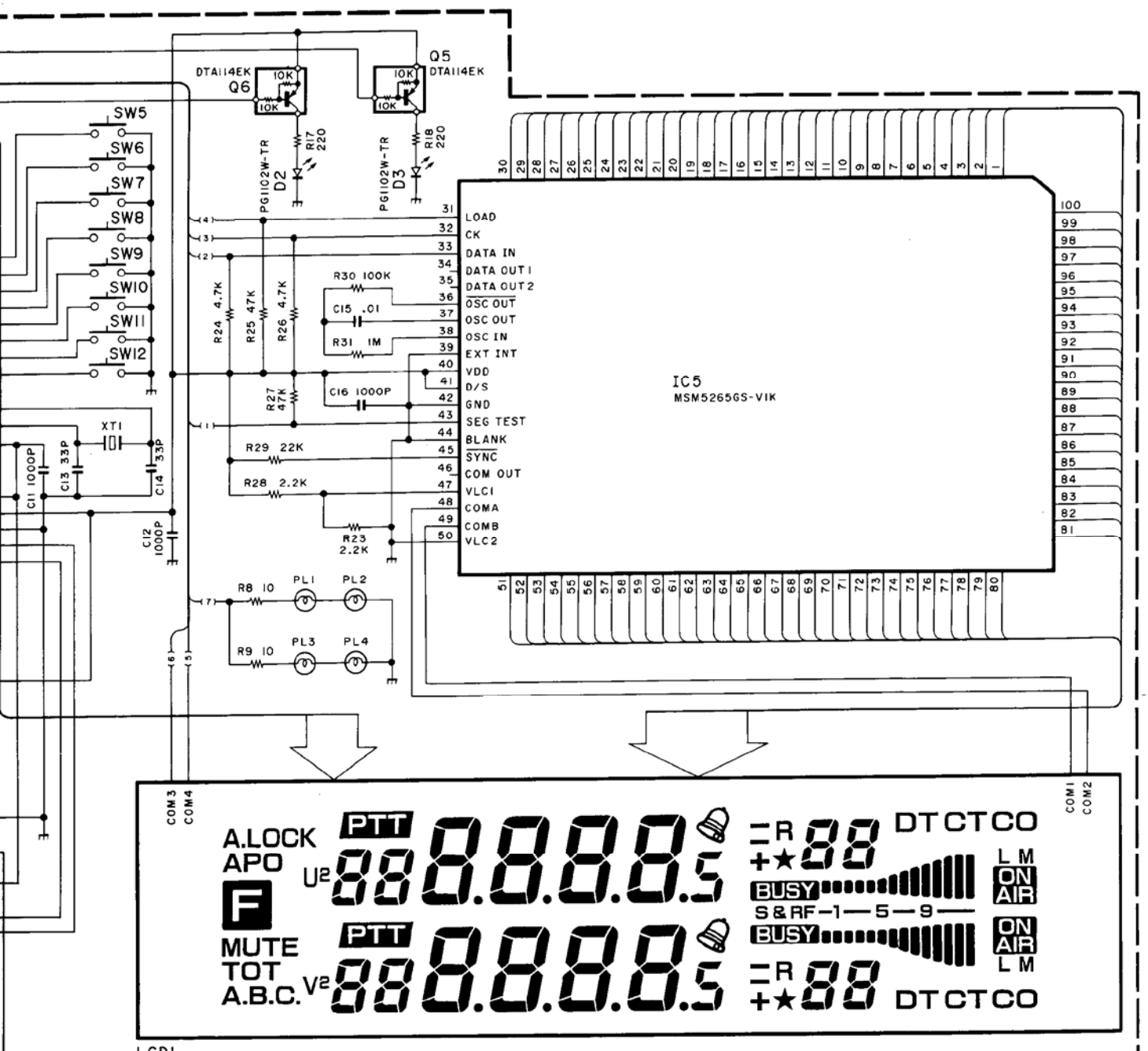
F G H I J K

66-05:TM-732A(K,P) 70-05:TM-732A(M2,M3) 71-05:TM-732E(E2)
LCD ASS'Y(B38-03XX-XX) 67-05:TM-732A(M) 68-05:TM-732E(E,E3)

Ref. No. / DESTINATION		R19	R20	R21	R22	W1
TM-732A	66-05	NO	YES	NO	NO	YES
	67-05	YES	YES	YES	YES	NO
	70-05	YES	YES	NO	YES	NO
TM-732E	68-05	YES	NO	YES	YES	NO
	71-05	NO	NO	YES	NO	NO

TX-RX UNIT/VOLUME(X57-400X-XX)(D/4

2)

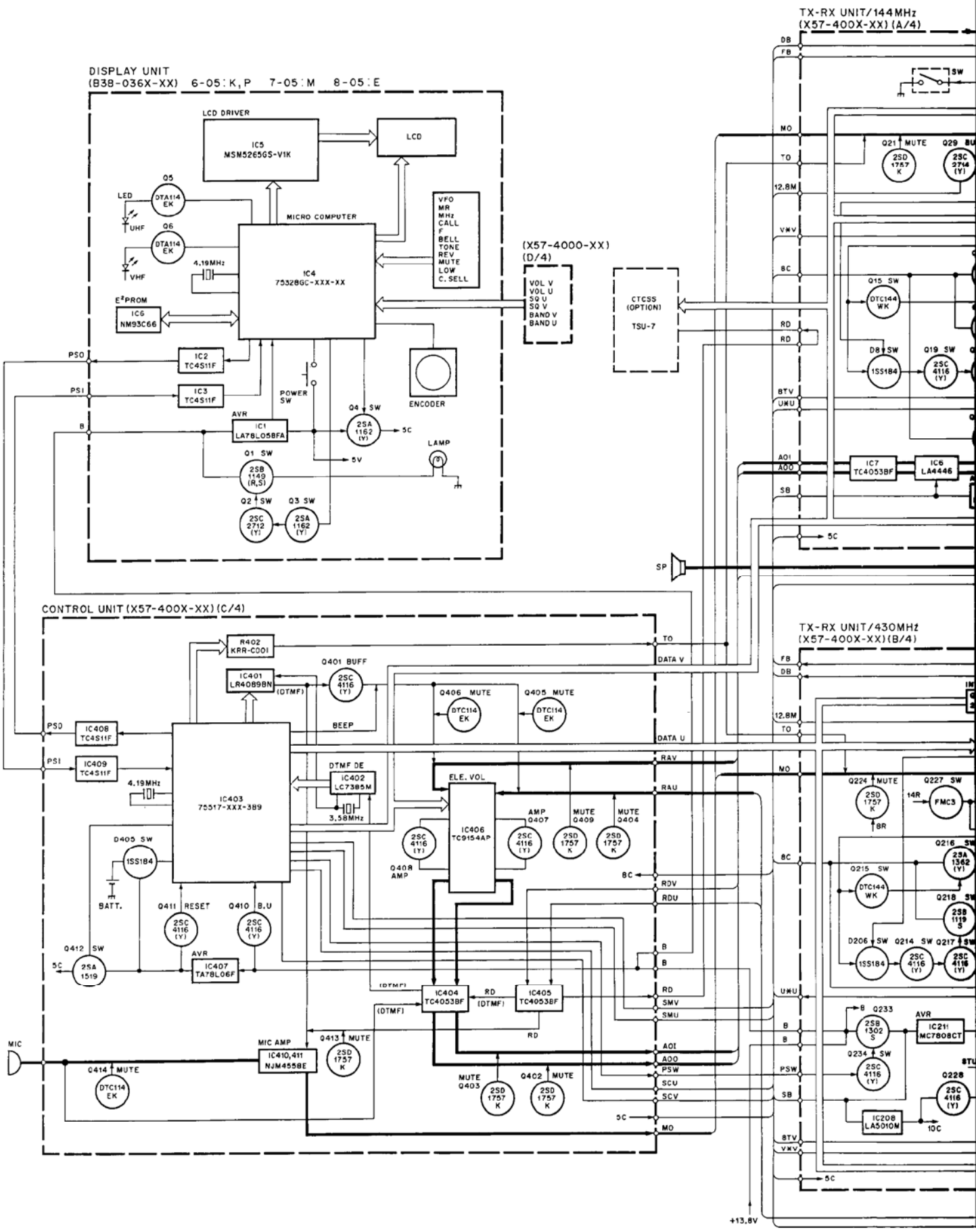


Q1	: 2SB1149
Q2	: 2SC2712(Y)
Q3,4	: 2SA1162(Y)
Q5,6	: DTA114EK
IC1	: L78LR05BFA
IC2,3	: TC4S11
IC4	: 75328GC-540-3BE
IC5	: MSM5265GS-V1K
IC6	: NM93C66(E)
D1	: 1FB01
D2,3	: PG1102W-TR
LCD1	: LU1780

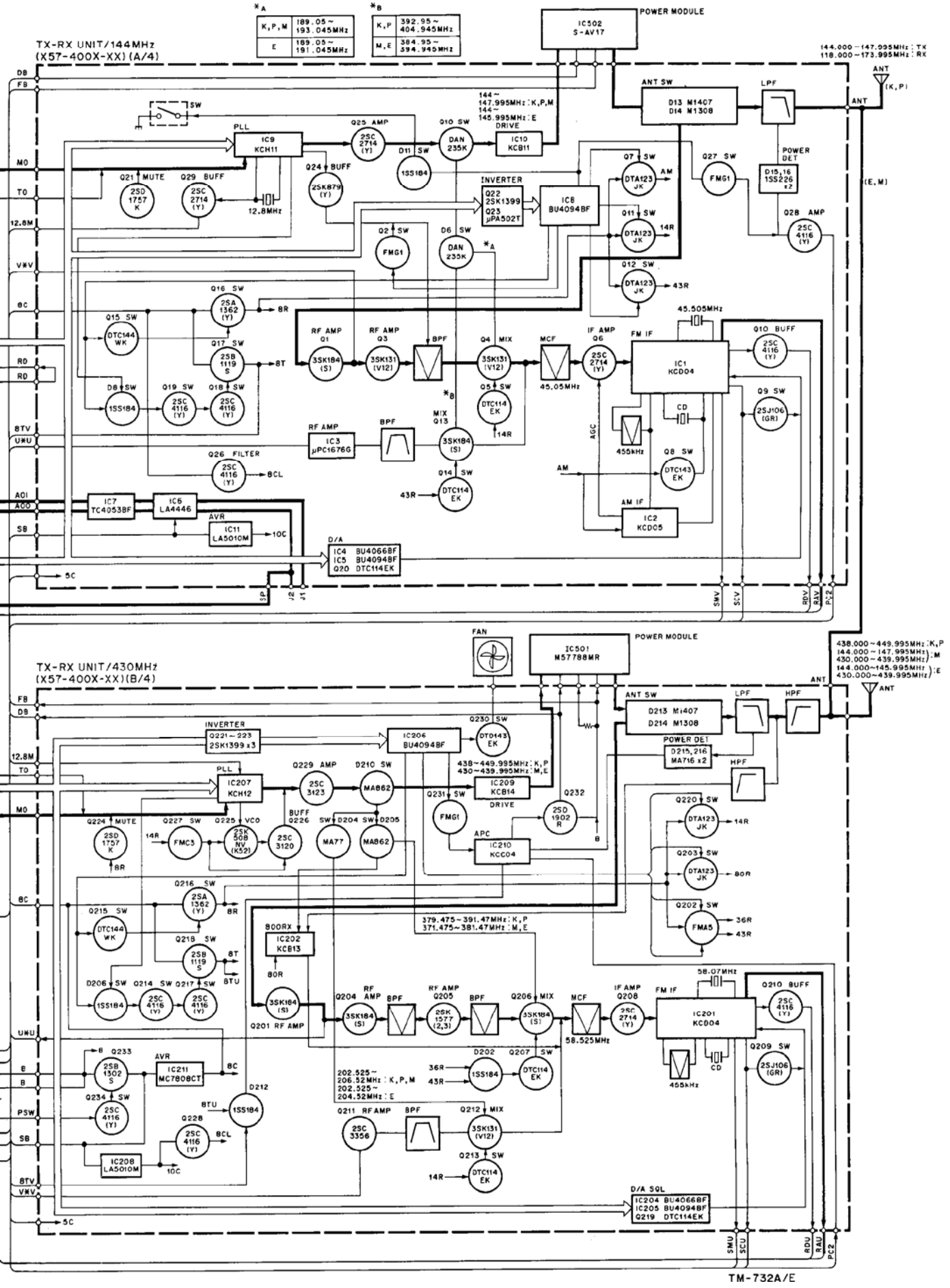
-400X-XX)(D/4)

0-11 : TM-732A(K,P)
0-21 : TM-732A(M,M2,M3)
2-71 : TM-732E(E,E2,E3)

BLOCK DIAGRAM

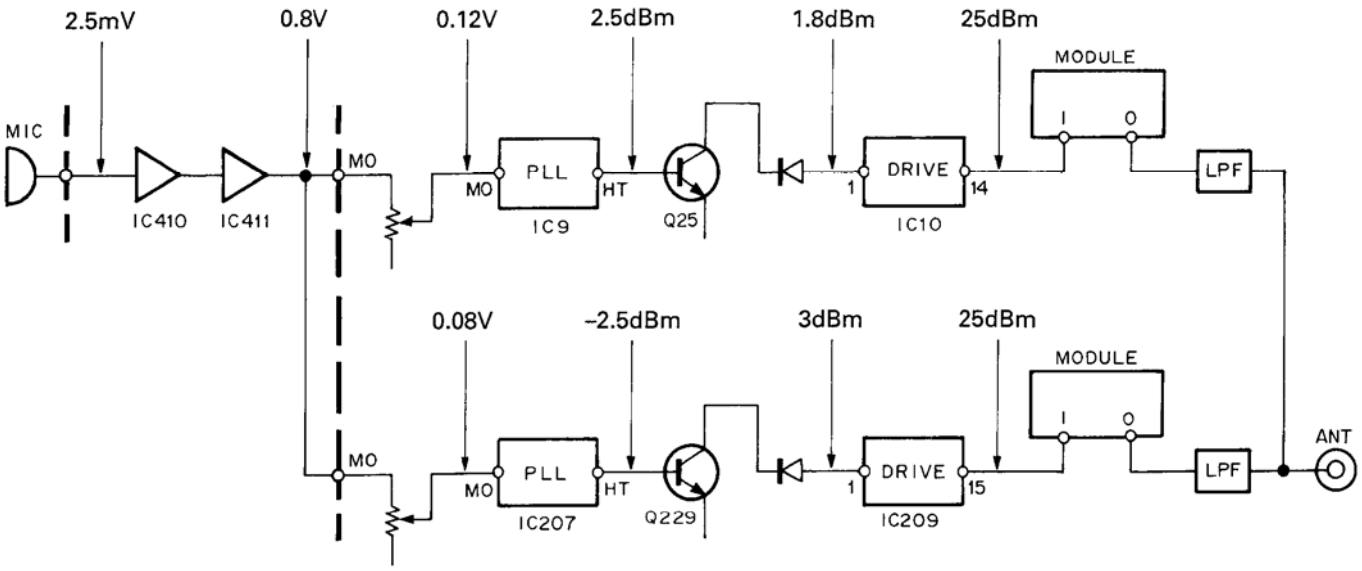


LOCK DIAGRAM

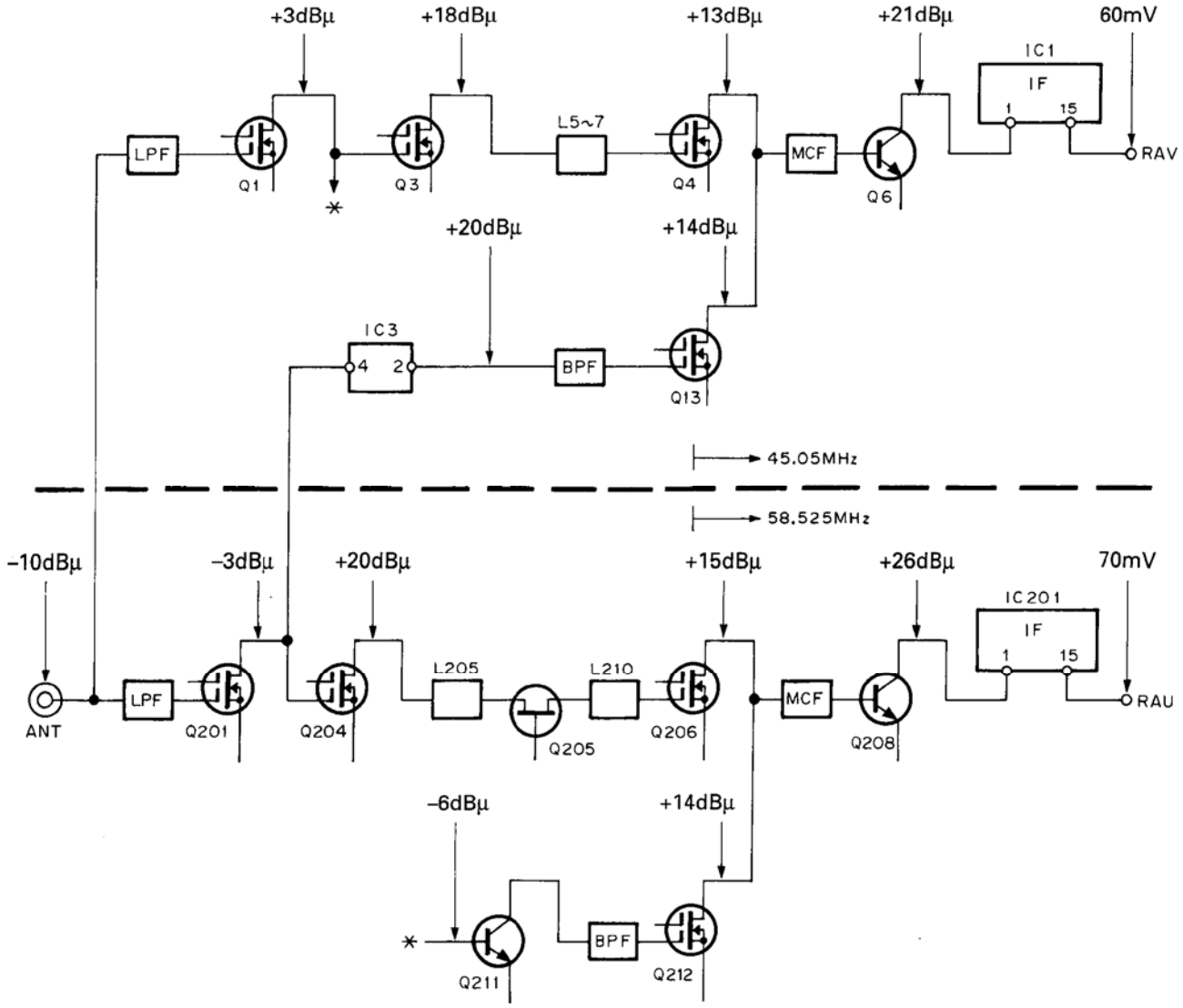


LEVEL DIAGRAM

TX Section



RX Section



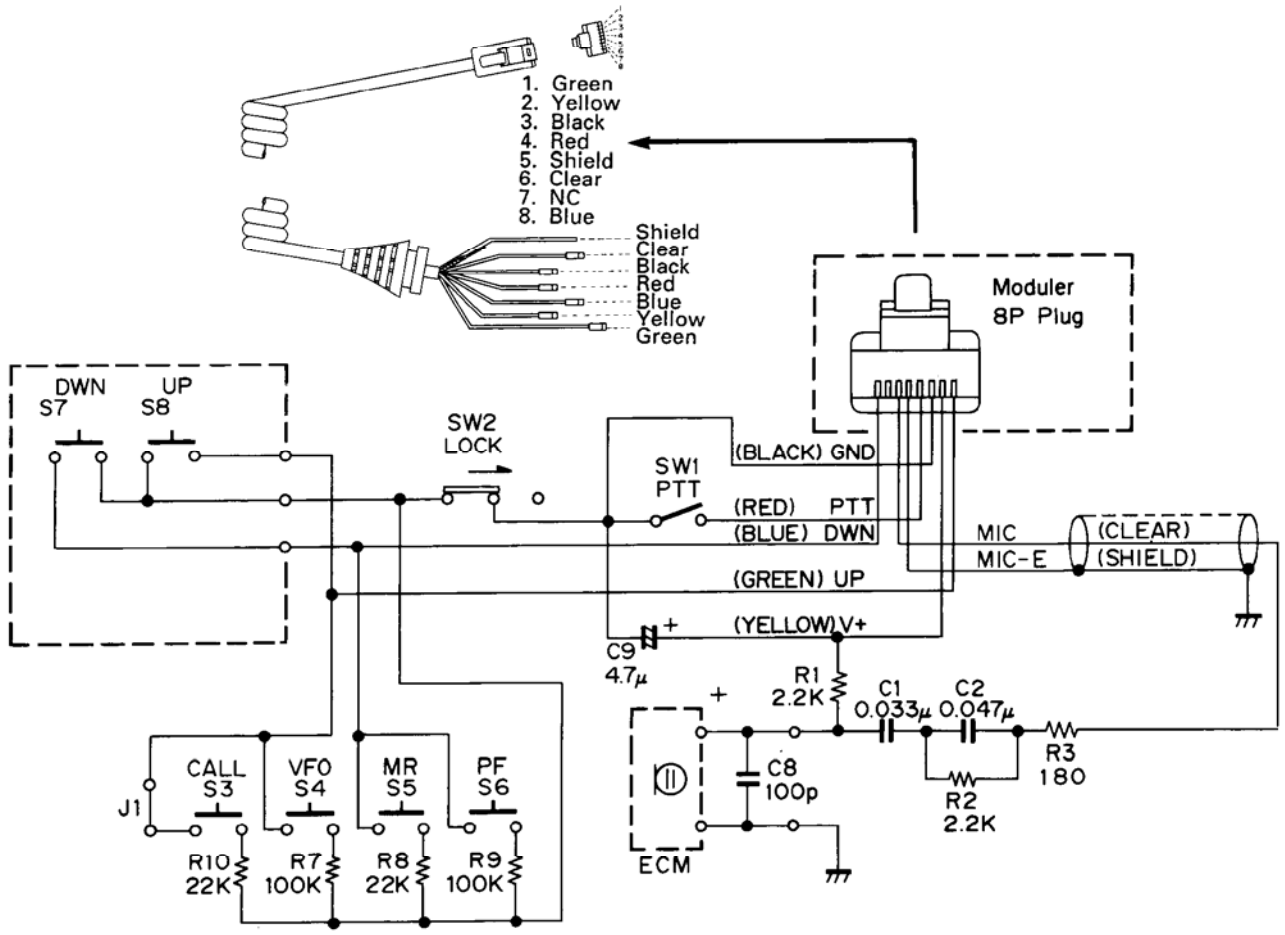
MC-45 (MULTI FUNCTION MICROPHONE)

EXTERNAL VIEW

PARTS LIST

Ref. No.	Address	New Parts	Parts No.	Description	Destination	Remarks
			A02-0896-08	CASE (FRONT)		
			A02-0900-08	CASE (REAR)		
			E30-3006-08	CURL CORD ASSY		
			G13-0933-08	CUSHION (UP,DWN)		
			K29-3165-08	KNOB PTT		
			K29-3168-08	KNOB UP		
			K29-3169-08	KNOB DWN		
			K29-3170-08	KNOB CALL,VFO, MR,PF		
			S59-1409-28	SWITCH ASSY UP,DWN		
S3-6			S40-1431-08	TACT SWITCH CALL,VFO, MR,PF		
S7,8		*	S40-1437-08	TACT SWITCH UP,DWN		
SW1			S50-1431-08	MICRO SWITCH LOCK		
SW2			S31-1422-08	SLIDE SWITCH LOCK		
			T91-0383-08	MICROPHONE ELEMENT		

SCHEMATIC DIAGRAM



TM-732A/E

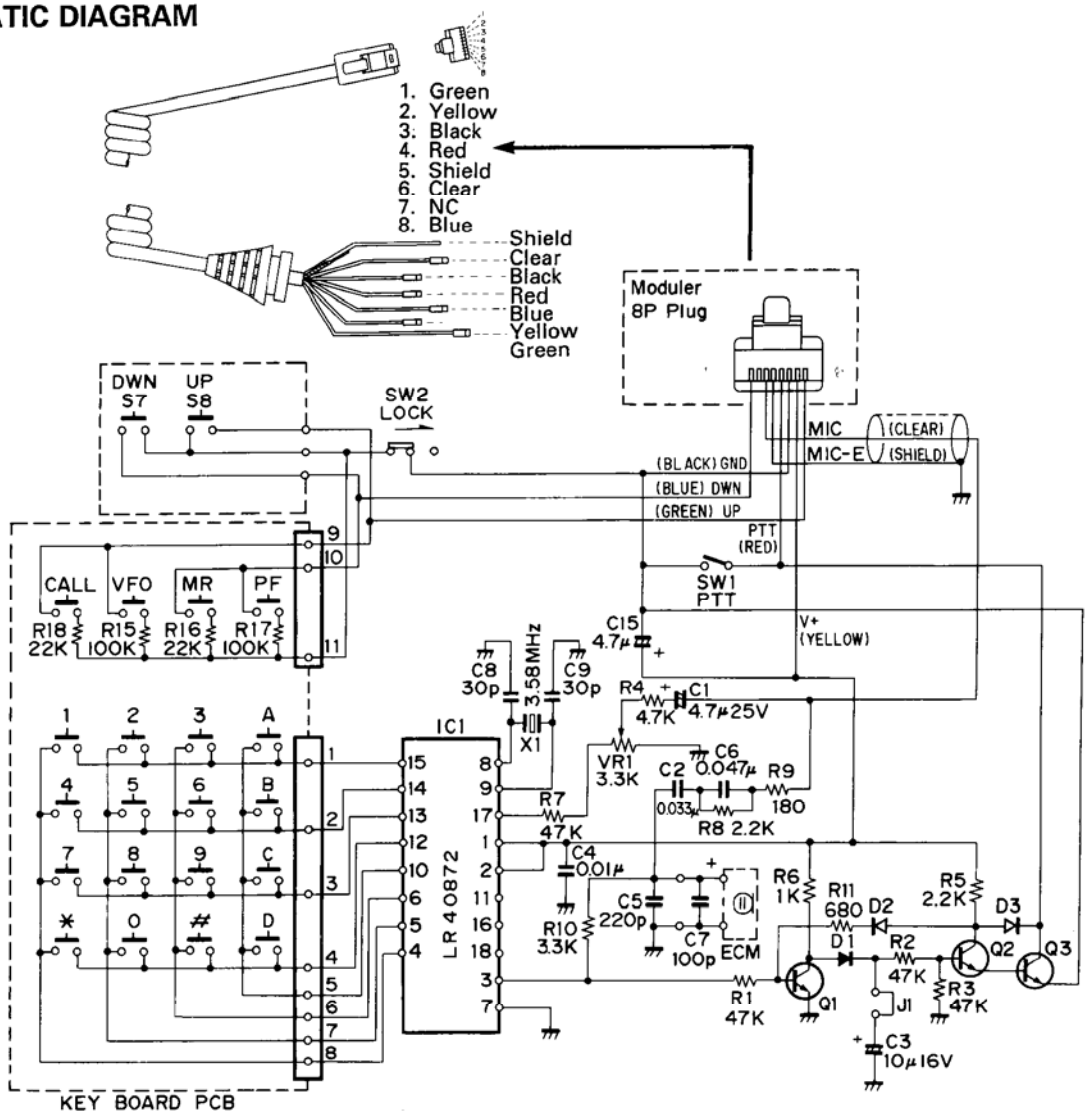
MC-45DM (MULTI FUNCTION MICROPHONE WITH AUTOPATCH)

EXTERNAL VIEW

PARTS LIST

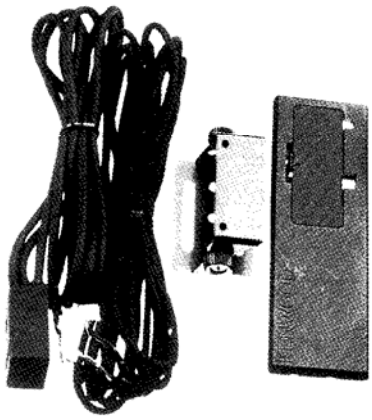
Ref. No.	Address	New Parts	Parts No.	Description	Destination	Remarks
			A02-0898-08	CASE (FRONT)		
			A02-0901-08	CASE (REAR)		
			E30-3006-08	CURL CORD ASSY		
			G13-0933-08	CUSHION (UP,DWN)		
			K29-3165-08	KNOB PTT		
			K29-3167-08	KEY TOP DTMF		
			K29-3168-18	KNOB UP		
			K29-3169-18	KNOB DOWN		
			S59-1409-28	SWITCH ASSY UP,DWN		
S7,8		*	S40-1437-08	TACT SWITCH UP,DWN		
SW1			S50-1431-08	MICRO SWITCH PTT		
SW2			S31-1422-08	SLIDE SWITCH LOCK		
			T91-0393-08	MICROPHONE ELEMENT		

SCHEMATIC DIAGRAM

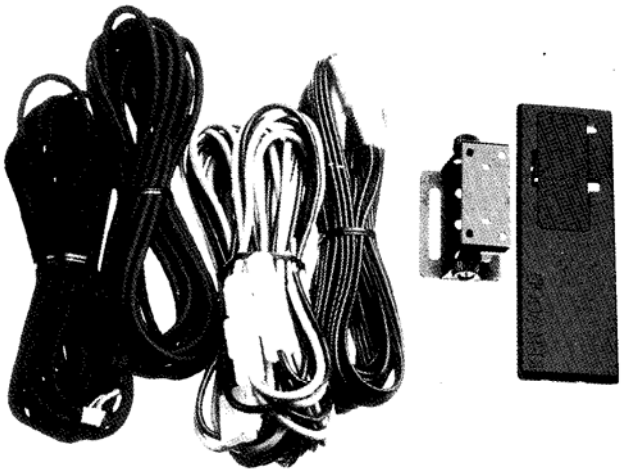


PG-4K/L (PANEL SEPARATE KIT K : 4M,L : 7M)

PG-4K EXTERNAL VIEW

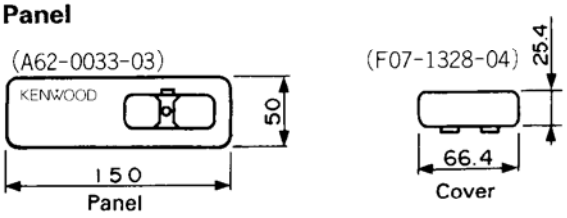


PG-4L EXTERNAL VIEW

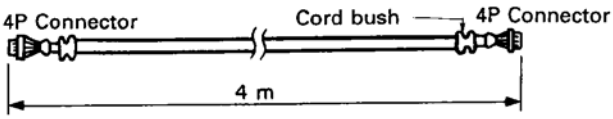


PG-4K MAIN EXTERNAL DIMENSIONS

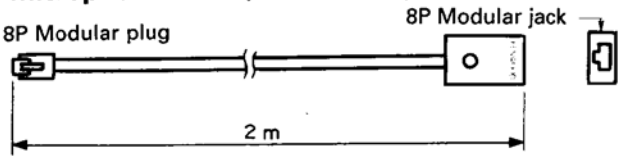
- **Panel**



- **Panel cable (E30-3012-05)**



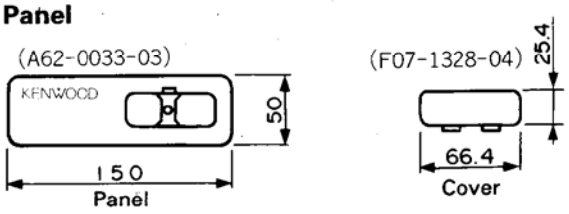
- **Microphone cable (E30-3013-05)**



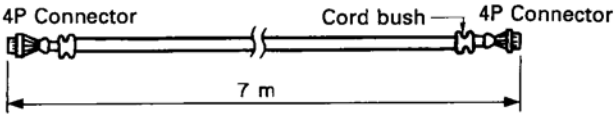
- **Screw set (N99-0347-05)**

PG-4L MAIN EXTERNAL DIMENSIONS

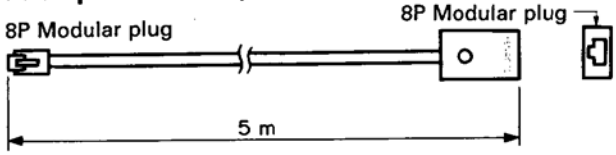
- **Panel**



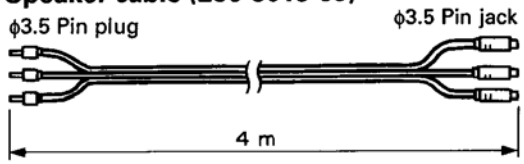
- **Panel cable (E30-3014-05)**



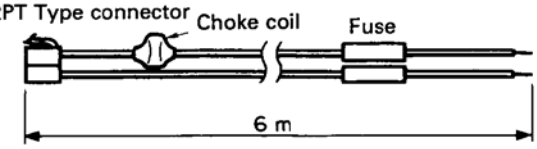
- **Microphone cable (E30-3015-05)**



- **Speaker cable (E30-3016-05)**



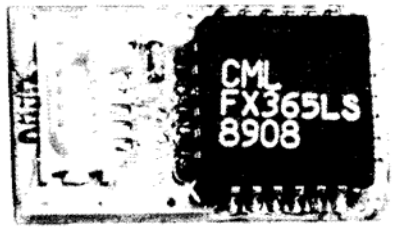
- **DC cord (E30-3032-05)**



- **DC cord (N99-0347-05)**

TSU-7 (CTCSS UNIT)

TSU-7 EXTERNAL VIEW



Scan by Dan

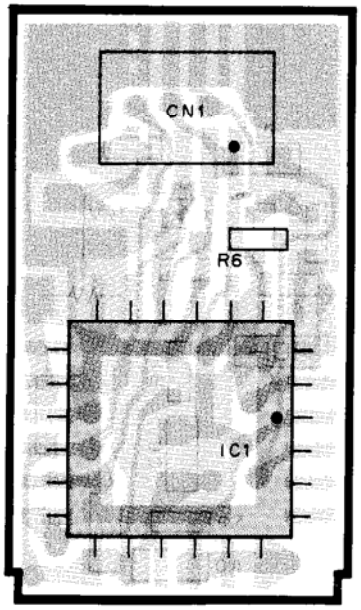
TSU-7 PARTS LIST

Ref. No	Address	Rart	Rarts No.	Description	Desti-nation	Re-marks
TSU-7 (X52-3170-00)						
			G10-0692-04	CUTTION		
			H21-0704-04	CUTTION		
X1			L78-0062-05	STAL (1MHz)		
IC1			FX365LS	IC		
D1			DAN202U	DIODE		
CN1			E40-5341-05			
VR1			R12-6526-05	TRIM. POT. (47K)		
R1			RK73BG1J274J	CHIP R J 270K		
R2			RK73BG1J824J	CHIP R J 820K		
R4			RK73BF1J103J	CHIP R J 10K		
R5			RK73BG1J105J	CHIP R J 1M		
R6			RK73BG1J473J	CHIP R J 47K		
C1			CK73GB1H471K	CHIP C K 470pF		
C2			C92-0521-05	CHIP TAN 20WV		
C4-6			CK73FB1E104K	CHIP C K 0.1UF		
C7			CK73GB1H471K	CHIP C K 470pF		
C8.9			CC73GCH1H221J	CHIP C J 220pF		

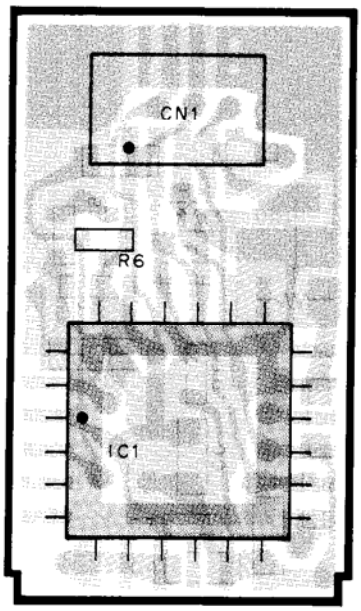
TSU-7 (CTCSS UNIT)

TSU-7 PC BOARD VIEWS

[Component side view]

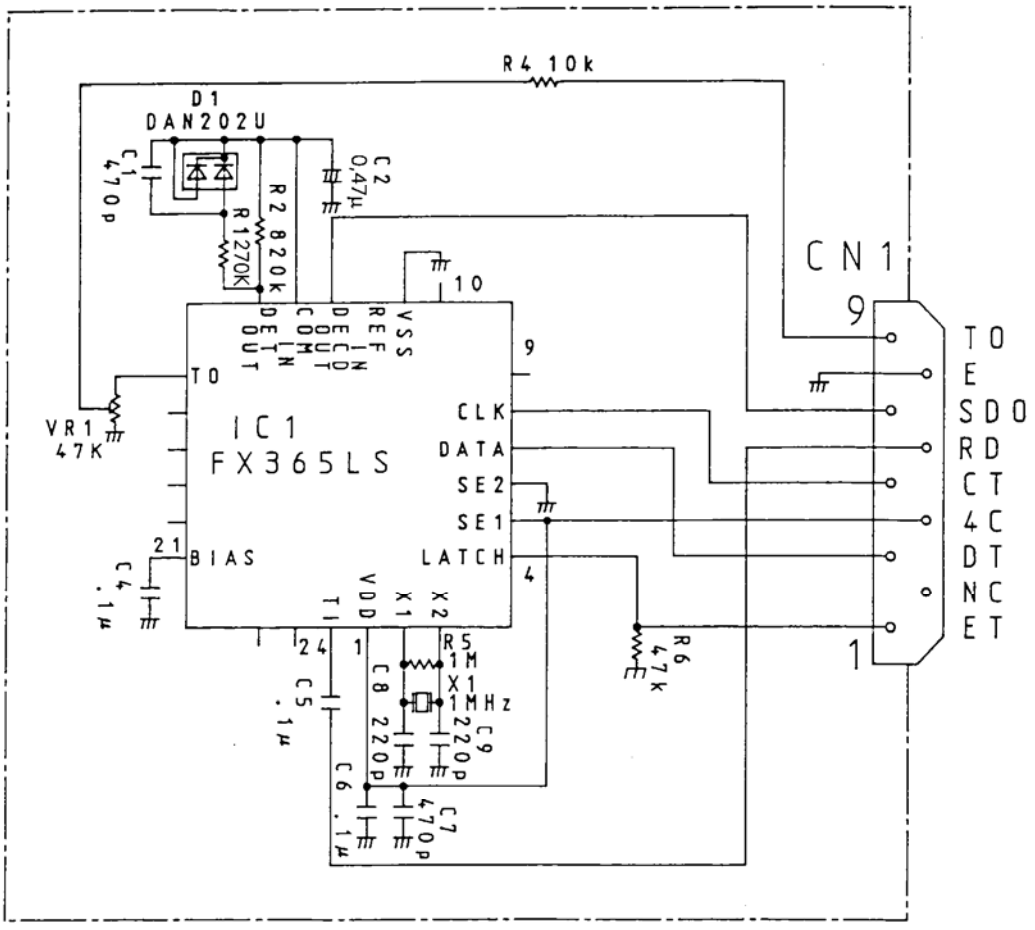


[Foil side view]



: Component side pattern : Foil side pattern

TSU-7 CIRCUIT DIAGRAM



TM-732A/E

SPECIFICATIONS

			144MHz Band	440MHz Band
GENERAL	Frequency range MHz	U.S.A. and Canada	144~148	438~450
		Other market	144~148	430~440
		TM-732E	144~146	430~440
	Mode		F3E (FM)	
	Antenna impedance		50Ω	
	Operating temperature		–20°C~+60°C (–4°F~+140°F)	
	Power requirements		13.8V DC ±15% (11.7~15.8V)	
	Ground		Negative	
	Current drain	Transmit mode	Less than 11.5A	Less than 10.0A
		Receiver mode	Less than 1.2A	
	Frequency stability		±10ppm	
	Dimensions (W x H x D)		141 x 42 x175 mm	
	Weight		1.1kg	
TRANSMITTER	Output power	HI	50W	35W
		MID	10W	
		LOW	Approx. 5W	
	Modulation		Reactance modulation	
	Spurious radiation		Less than –60dB	
	Maximum frequency deviation		±5kHz	
	Audio distortion (at 60% modulation)		Less than 3%	
	Microphone impedance		600Ω	
RECEIVER	Circuitry		Double conversion superheterodyne	
	Intermediate frequency 1st/2nd		45.05MHz/455kHz	58.525MHz/455kHz
	Sensitivity (12dB SINAD)		Less than 0.16μV (–10dBμ)	
	Selectivity –6dB		More than 12kHz	
	Selectivity –60dB		Less than 24kHz	
	Squelch sensitivity		Less than 0.1μV (–14dBμ)	
	Output (5% distortion)		More than 2W (8Ω load)	
	External speaker impedance		8Ω	

NOTES : 1. Circuit and ratings are subject to change without notice, due to developments in technology.

2. Recommended duty cycle : 1 minute Transmission, 3 minutes Reception.

Scan by Dan

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