144/440MHz FM DUAL BANDER

TM-733A/E

SERVICE MANUAL

KENWOOD

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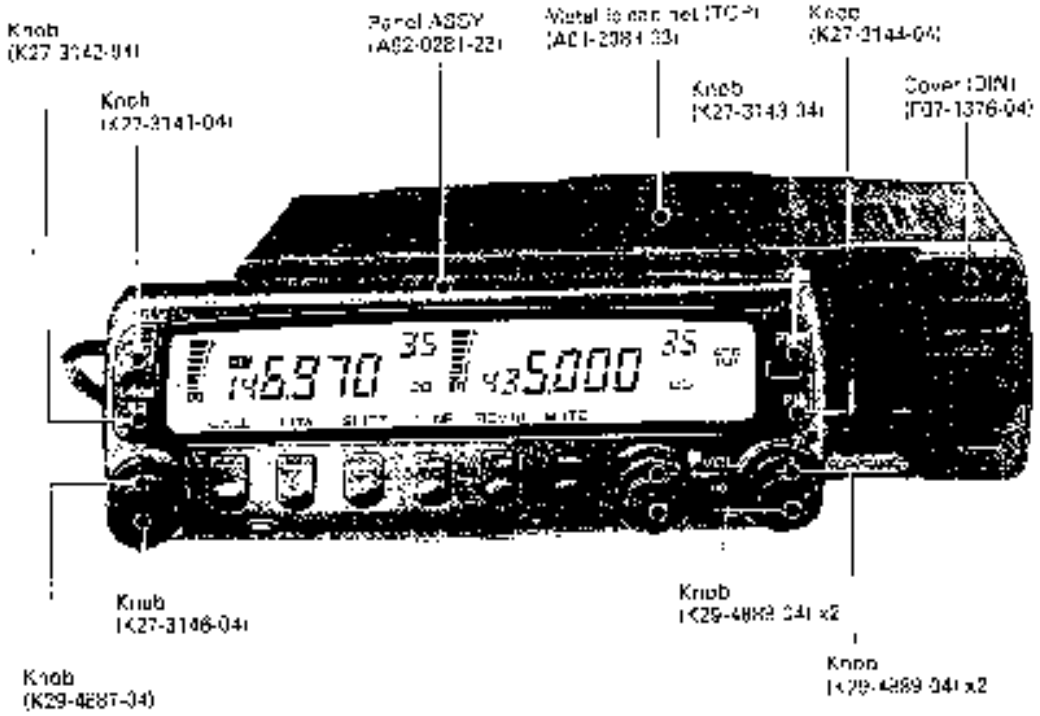

CONTENTS

TM-733A/E

CIRCUIT DESCRIPTION

Outline

The TM-733A/E are 144/430MHz FM dual band cartransceivers designed for amateur radio communications

- **Features**

1. The current operating state can be stored in six programmable memory channels.
2. Complete compact dual band function.
3. The extended cable (option) can be used to disconnect the panel with one touch of a finger. Free setting is made possible.
4. Independent receiving function enables the simultaneous receiving of 144MHz and 430MHz bands. (Both bands independent, full display, volume, squelch, signaling, external loudspeaker.)
5. Large LCD (97.0 x 19.0 mm).
6. Simple operation like mobile radio type.
7. Both 144MHz and 430MHz bands can be received at a time.
8. Duplexer built in (Types K and P excluded).
9. S-meter squelch function built in. Switching to the S-meter squelch provides the adjustment of S-meter squelch level with a squelch volume.
10. With a maximum of 70 memory channels, the switching of a memory channel mode permits the number of memory channels for each band to be changed. (All channels in full split memory)
11. DTSS and paging functions built in.
12. Wireless DTMF autodial function built in.
13. Equipped with packet communication connector.

Accessories

Parts name	Parts No.	Destination code									
		K	P	M	M2	M3	MH	S	E	E2	E3
Warranty card	B46-0310-03							1			1
Warranty card	B46-0410-00	1	1								
Warranty card	B46-0422-00		1								
Instruction manual	B62-2391-00			1			1	1	1		1
Instruction manual	B62-0392-00							1			
Instruction manual	B62-0393-00		1								1
Instruction manual	B62-0394-00		1								
Instruction manual	B62-0436-00										
DC power cord	E30-21 1-05	1	1	1							
Fuse (15A)	F01-0017-05	1	1	1			1				
Mic hook	J30-0315-24										
Microphone hanger	J39-0436-03										
Screw set	N92-0337-05										
Screw set	N92-0382-05	1	1								
Microphone	T91-0516-05										1
Microphone	T91-0517-05	1	1								
Scanner	W01-0414-04	1	1	1							

Units for Each Model and Destination

Parts No.	Unit name	Destination code									
		K	P	M	M2	M3	MH	S	E	E2	E3
X57-4160-01	TX-RX unit	1	1								
X57-4380-21	TX-RX unit			1							
X57-4380-22	TX-RX unit				1	1					
X57-4380-23	TX-RX unit						1				
X57-4382-71	TX-RX unit							1			1
X57-4382-72	TX-RX unit								1		
B38-0709-25	LCD Assy									1	
B38-0709-25	LCD Assy	1	1	1	1						

List of Destinations

Model	Destination	Destination code	Frequency range (MHz)						Output power (W)	
			144			430			144	430
TM-733A	North America	K	TX 144.00–147.995			TX 438.00–449.995			50	35
			*1 RX 118.00–173.995			*3 RX 410.00–469.995				
TM-733A	Canada	P	TX 144.00–147.995			TX 438.00–449.995			50	35
			*1 RX 118.00–173.995			*3 RX 410.00–469.995				
TM-733A	Other countries	M	144.00–147.995			430.00–439.995			50	35
TM-733A	Other countries	M2	TX 136.00–173.995			*2 410.00–469.995			50	35
			*1 RX 118.00–173.995							
TM-733A	Other countries	M3	TX 136.00–173.995			*2 410.00–469.995			50	35
			*1 RX 118.00–173.995							
TM-733A	China	MH	TX 136.00–174.000			*2 410.00–469.995			50	35
			*1 TX 118.20–173.995							
TM-733E	European countries	E,S,E3	144.00–145.800			430.00–439.995			50	35
TM-733E	European countries	E2	TX 136.00–174.000			*2 410.00–434.995			50	40
			*1 RX 118.00–173.995							

*1 Guarantee frequency range 144.00–147.995
*2 Guarantee frequency range 430.00–439.995
*3 Guarantee frequency range 438.00–449.995

CIRCUIT DESCRIPTION

Frequency Configuration

The TM-733A/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 163.05 to 219.045MHz (K,P), 169.05 to 191.045MHz (M,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 351.475 to 411.47MHz (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 118.525 to 232.52MHz (K,P), 202.525 to 206.52MHz (M), 202.525 to 204.52 MHz (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 384.95 to 424.945MHz (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.

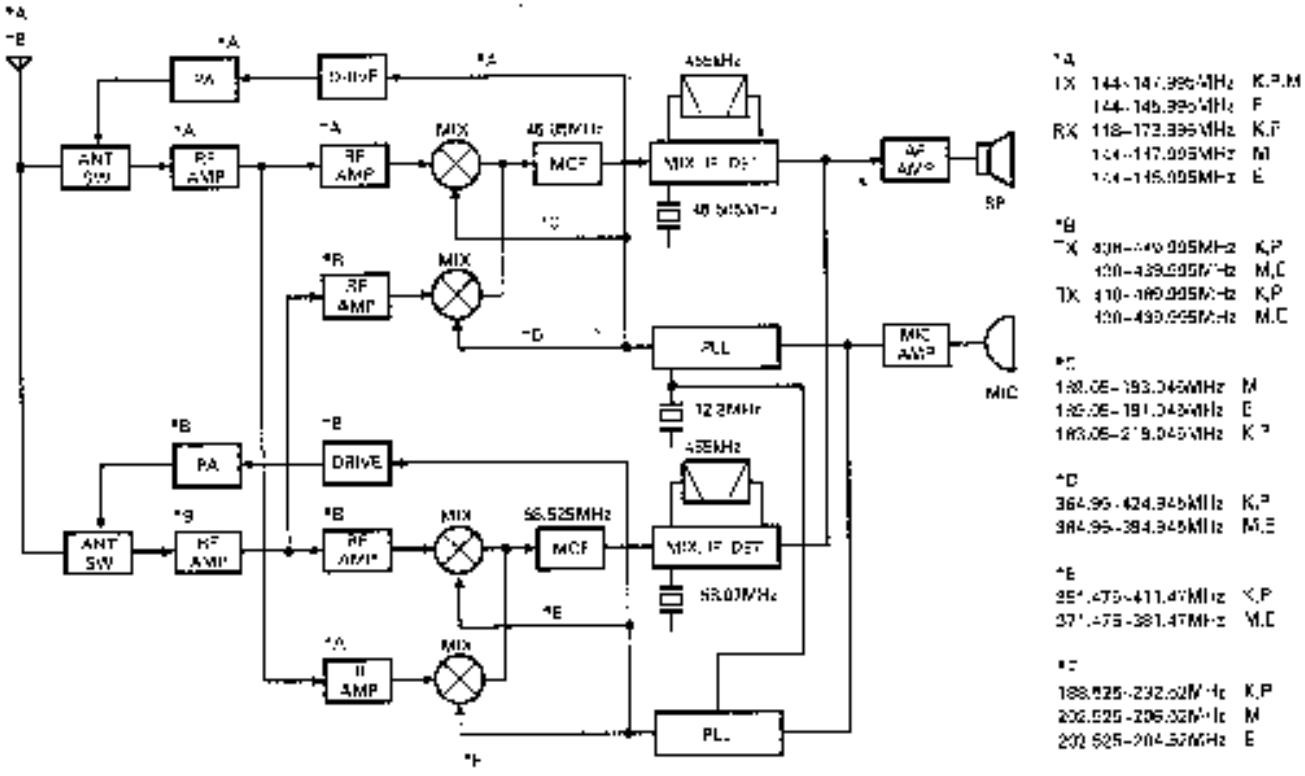

Fig.1 **Frequency configuration**

TM-733A/E

CIRCUIT DESCRIPTION

144MHz Band Transmit Circuit

- **Outline**

The transmit circuit produces the desired carrier frequency directly, and directly modulates its frequency by means of a varicap 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 (HIC IC9). The PLL unit directly modulates the carrier frequency with the input audio signal by using a varicap 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 varicap 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 (KCH23) IC207. The PLL unit directly modulates the carrier frequency with the input audio signal by using a varicap diode to control the frequency of the VCO.

- **Younger stage circuit**

The signal output from the PLL unit goes to drive circuit HIC C209. 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 (IC205). To protect the high power module from excessive temperature rise, there is a thermal switch to reduce the power automatically if the temperature reaches a certain level.

CIRCUIT DESCRIPTION

144MHz Band Receive Circuit

The received 144MHz band signal from the antenna passes through a transmit/receive 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 joint type 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 IC (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 IC IC1 (KCD04) is input to the control unit. It is then digitized to drive the pointer 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 1st~850~-330kHz (Spurious: 40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	3dB or less
Terminating impedance	900Ω ± 10%, 2pF ± 10%

Table 1 MCF (L71-0443-05) (TX-RX unit XF1)

Item	Rating
Center frequency	45kHz
6dB bandwidth	+8.0kHz or more (from 455kHz)
50dB bandwidth	±12.5kHz or less (from ±55kHz)
Ripple	3dB or less within 455kHz±8kHz
Insertion loss	6dB or less (between impedance matched pair)
Guaranteed attenuation	35dB or more within 455kHz~10kHz
I/O matching terminating impedance	2.0kΩ

Table 2 Ceramic filter (L72-0400-05) (TX-RX unit CF1, CF201)

430MHz Band Receive Circuit

The incoming 430MHz band signal from the antenna passes through a transmission/reception selection diode switch in the final unit and a matching coil in the front end. The signal is amplified by a GaAs field-effect transistor (FET) and passes through a divider and a two-pole dielectric filter to eliminate unwanted signal components. The resulting signal is amplified by a GaAs FET, passes through a two-pole dielectric filter, and 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 IC 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 IC 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	±23kHz or less at 25dB ±60kHz or less at 80dB
Guaranteed attenuation	80dB or more within 1020kHz (Spurious: 40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	4dB or less
Terminating impedance	3900Ω ± 10%, 3.5pF ± 10%

Table 3 MCF (L71-0447-05) (TX-RX unit XF201)

CIRCUIT DESCRIPTION

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 58.52MHz. The signal is input to the 430MHz band main circuit, and the 144MHz sub band signal is received by the main circuit.

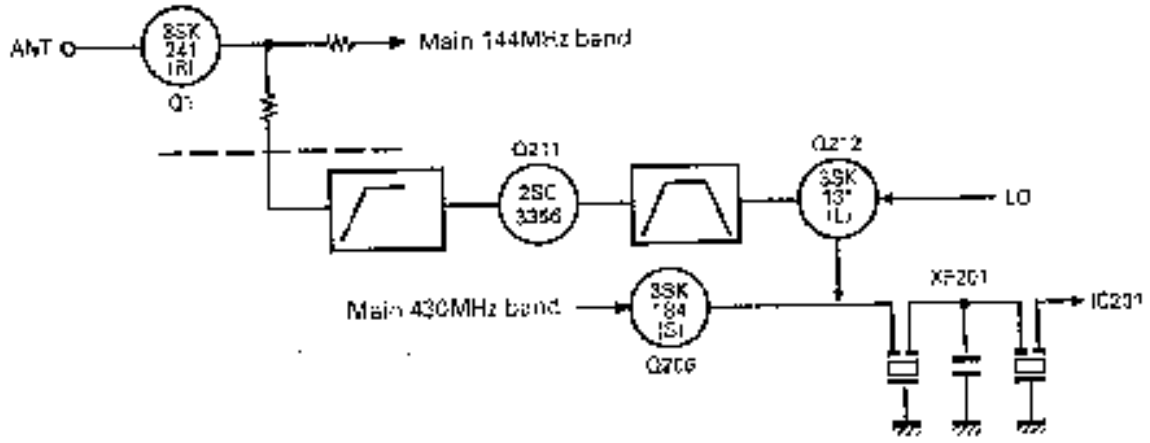

Fig. 2 144MHz band sub receive circuit block diagram

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.

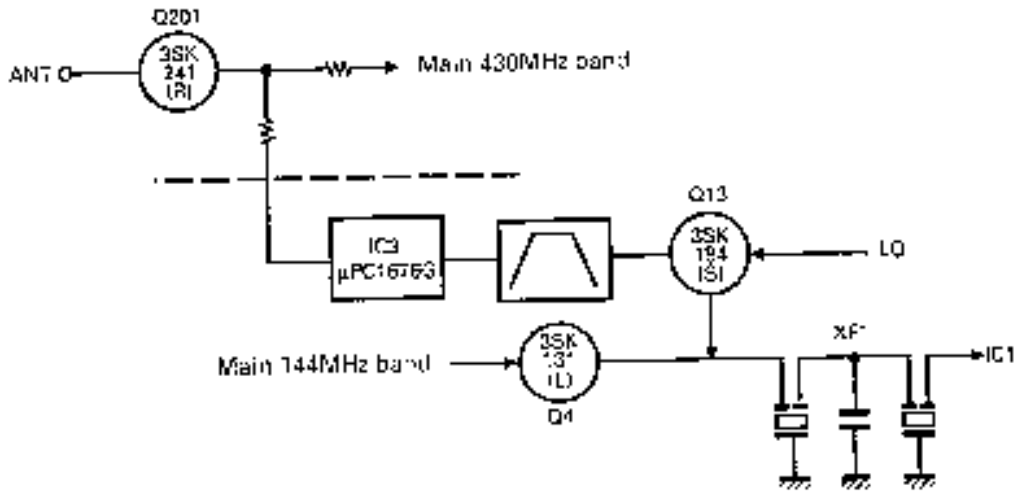

Fig. 3 430MHz band sub receive circuit block diagram

CIRCUIT DESCRIPTION

Squelch Circuit

The panel unit microprocessor reads the angle of rotation of the squelch VR, and converts it to a 8 bit digital value. The panel unit microprocessor transfers the data to the control unit microprocessor, which in turn transfers the data to IC5 (IC205) : XRU4094BF.

The data is converted to analog by analog switch IC4 (IC204) : XRU4066BF according to the output from IC5 (IC205).

The ICs in parentheses are used in the 430MHz band unit.

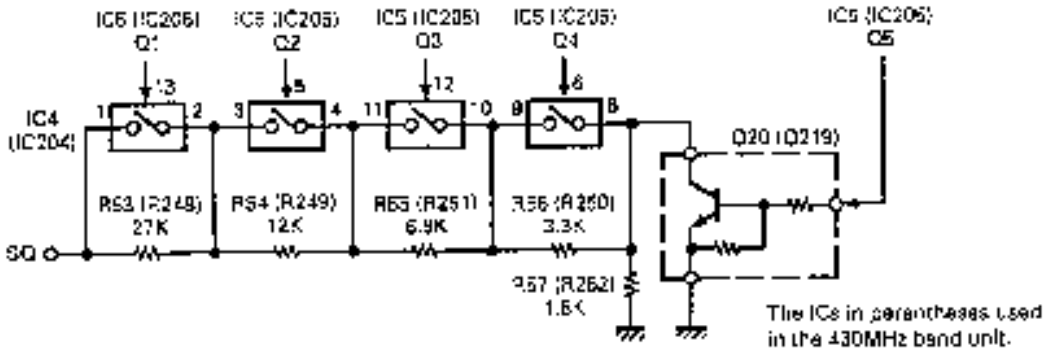

Fig. 4 Squelch circuit

144MHz Band Shift Register Circuit

The ESV1, ESV2, CKV, and DTV serial data from the control unit is sent to IC5, 8 (XRU4094BF) to perform the control operations outlined in the following table.

- **IC5 control**

Pin No.	Name	Function
1	Strobe	Enable input (ESV2)
2	Data	Serial data input (DTV)
3	Clock	Clock input (CKV)
4	Q1	Squelch level adjustment bit 4. "L" : Resistor present, "H" : Resistor absent
5	Q2	Squelch level adjustment bit 3. "L" : Resistor present, "H" : Resistor absent
6	Q3	Squelch level adjustment bit 2. "L" : Resistor present, "H" : Resistor absent
7	Q4	Squelch level adjustment bit 1. "L" : Resistor present, "H" : Resistor absent
8	Vss	GND
9	Q5	
10	Q'5	
11	Q6	
12	Q7	AIP switching. Low: AIP off
13	Q8	AM gain limit. Low: Low mic
14	QS	Squelch level adjustment bit 5. "L" : Resistor present, "H" : Resistor absent
15	OE	8V
16	Vcc	8V

- **IC8 control**

Pin No.	Name	Function
1	Strobe	Enable input (ESV1)
2	Data	Serial data input (DTV)
3	Clock	Clock input (CKV)
4	Q1	TX/RX assignment. TX : "L"
5	Q2	Tx power selection. MID and LOW power : "L", HI power : "H"
6	Q3	TX power selection. H and LOW power : "L", MID power : "H"
7	Q4	
8	Vss	GND
9	Q5	
10	Q'5	
11	Q6	Receiving power switching. VHF band main reception : "L"
12	Q7	
13	Q8	Receiving power switching. UHF band sub reception : "L"
14	Q5	
15	Qb	8V
16	Vdd	8V

CIRCUIT DESCRIPTION

430MHz Band Shift Register Circuit

The ESU1, ESU2, CKU, and DTU serial data from the control unit is sent to IC205, 206 (RXU4094BP) to perform the control operation outlined in the following table.

• IC205 control

Pin No.	Name	Function
1	Strobe	Enable input (ESU2)
2	Data	Serial data input (DTU)
3	Clock	Clock input (CKU)
4	Q1	Squelch level adjustment bit 4. "L": Resistor present, "H": Resistor absent
5	Q2	Squelch level adjustment bit 3. "L": Resistor present, "H": Resistor absent
6	Q3	Squelch level adjustment bit 2. "L": Resistor present, "H": Resistor absent
7	Q4	Squelch level adjustment bit 1. "L": Resistor present, "H": Resistor absent
8	Vss	GND.
9	Q8	
10	Q7	
11	Q6	
12	Q7	8 R switching. "H": OFF, "L":
13	Q8	
14	Q9	Squelch level adjustment bit 0. "L": Resistor present, "H": Resistor absent
15	OE	8V
16	VDD	8V

• IC206 control

Pin No.	Name	Function
1	Strobe	Enable input (ESU1).
2	Data	Serial data input (DTU).
3	Clock	Clock input (CKU).
4	Q1	TX/RX selection.
5	Q2	TX power selection. MID and LOW power: "L", Hi power: "H"
6	Q3	TX power selection. Hi and LOW power: "L", MID power: "H"
7	Q4	Fan control. "H": during transmission. High for several minutes after TX turns off.
8	Vss	GND.
9	Q5	
10	Q6	
11	Q8	
12	Q7	Receiving power switching. 144 band main reception: "L"
13	Q8	
14	Q9	Sub receiving power switching. 144 band sub reception: "L"
15	OE	8V
16	VDD	8V

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.

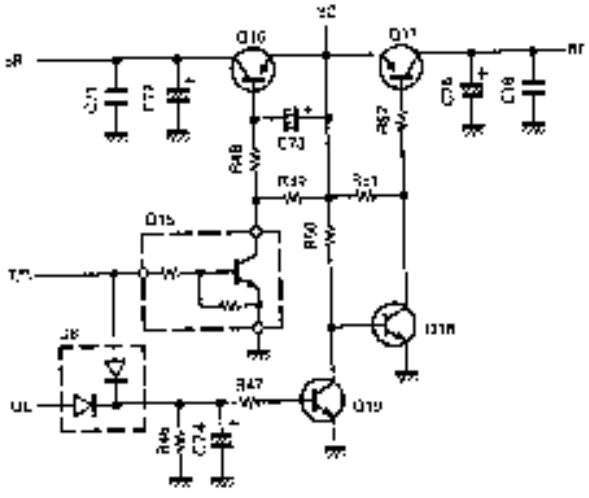

Fig. 5 144MHz band 8T/8R switching circuit and unlock circuit

CIRCUIT DESCRIPTION

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 on, 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.

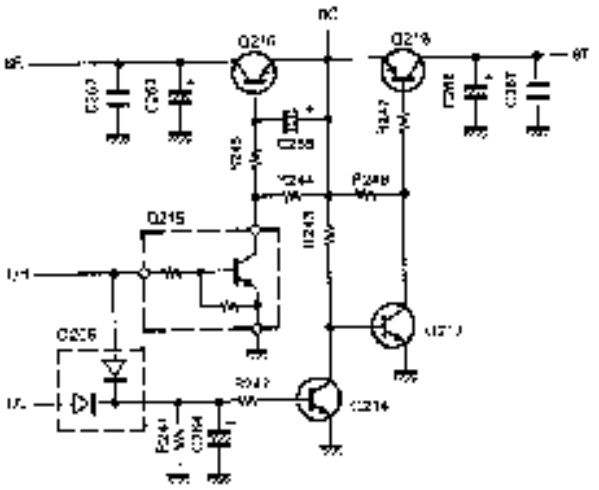

Fig. 6 430MHz band 8T/8R switching circuit and unlock circuit

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 P28 of the CPU, mixed with the output through the buffer (Q403) of monitor IC402 (DTMF encoder) for DTMF operation, passed through the beep mute circuit (Q404 and Q405) for each band, mixed with the detection signal for each band, and sent to the electronic VR. The audio mute circuit (Q409 and Q410) 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 (Q411 and Q412), and is output to the speaker switching circuit. The CPU transfers data to the electronic volume in the same way as for the TM-342.

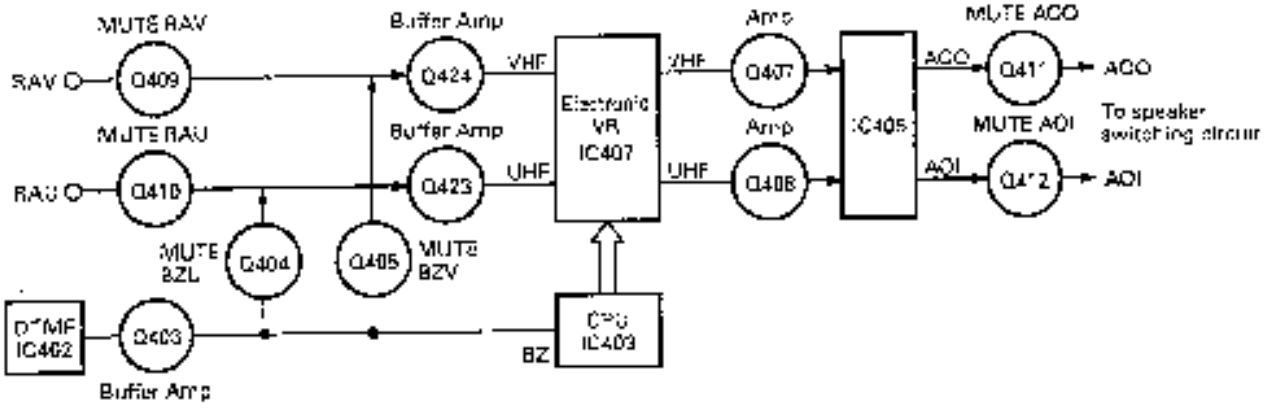

Fig. 7 AF signal system block diagram

CIRCUIT DESCRIPTION

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, a scramble 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 AOO and AOI 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 AOO and AOI are input to IC6 separately.

Combinations of AF signals are listed below.

	AOO	AOI
Internal speaker only	Internal speaker	
External speaker (J2)	External speaker	
External speaker (J1)	Internal speaker	External speaker
Internal speakers (2)	External speaker	Internal speaker

Data Communication Circuit in the Panel Control Unit

Figure 9 shows the data communication circuit in the panel control unit. SO is serial data out and SI is serial data in. There is an inverter between them to protect the microprocessor ports.

Data communication is based on start-stop synchronization, and the transmission speed is 31250 bps. The microcomputer in the control unit checks connection every half second. If the check fails twice or the panel section is disconnected for more than one second, the power is turned off.

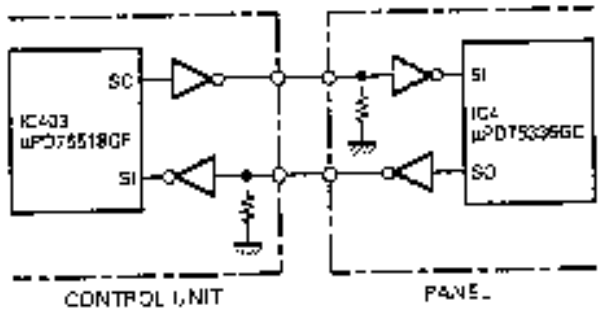

Fig. 9 Data communication circuit in the panel control unit

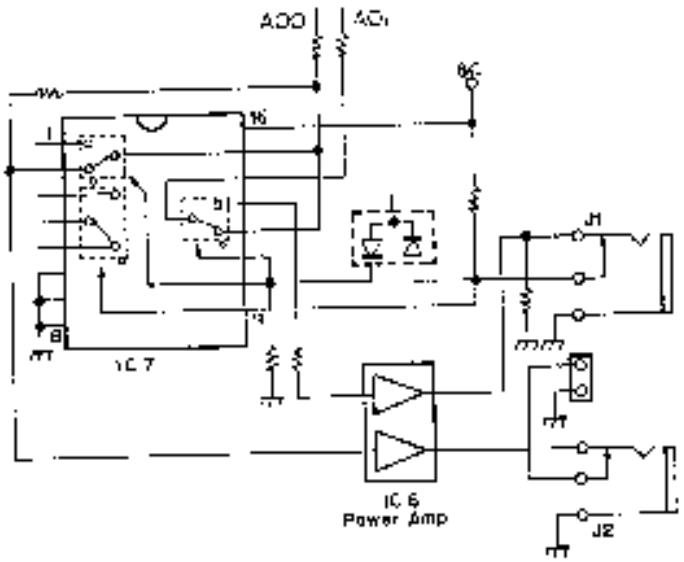

Fig. 8 Speaker switching circuit

CIRCUIT DESCRIPTION

Tone Output Circuit

The signal is input to CP401 (decoder resistor) from P41 to P43, and P50 to P53 of the CPU, and converted from digital to analog to produce 38 signals of 67.0 to 250.3Hz. Figure 10 shows the internal configuration of CP401.

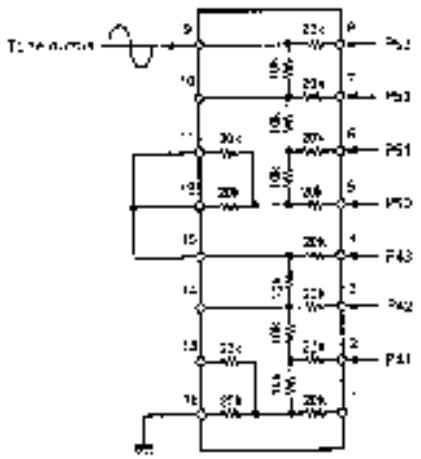

Fig. 10 Internal configuration of CP401

DTMF Encode/Decode Circuit

- **DTMF encode/decode circuit**

Data is transmitted to IC402 (TC35219F) from P90 to P93, and P72 to P73 of the CPU, and a DTMF signal is output from IC402.

- **DTMF decode circuit**

When the received signal or a signal from the DTMF microphone (option) enters IC401 (LC7536/M) and an effective tone pair is detected, StD goes High, is input to P12 of the CPU, and serial data from IC401 is read into P61 according to the serial clock from P22.

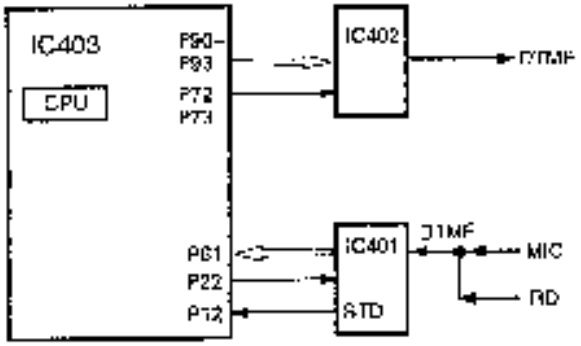

Fig. 11 DTMF encode/decode circuit

Analog Signal Switching Circuit

IC405 switches the audio signal and DTMF decoder input MIC/RD, and IC406 switches between RDV and RDU of MIC, DTMF, and CTCSS.

- **Audio signal switching**

Switches the VHF AF signal and UHF AF signal from the electronic VR to AO1 or AO2.

- **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 input signal to the DTMF decoder IC to RDV or RDU. The signal passes through this circuit and the DTMF MIC/RD switching circuit, and goes to the DTMF decoder IC.

The signal is switched to RDV or RDU when a busy sense signal (SQ) enters the CPU and DTSS and PAG are on for the band. If busy sense signals enter the CPU for both bands at the same time, the last detected band is used.

- **CTCSS RD V/U switching**

Switches the signal to the CTCSS unit (CSU-8 option) to RDV or RDU. The signal is switched to RDV or RDU when a busy sense signal (SQ) enters the CPU and CTSCC is on for the band. If busy sense signals enter the CPU for both cards, the circuit is switched in 500msec intervals.

P107 (Audio signal switching)	H : AO1=VHF AF, AO2=UHF AF L : AO1=UHF AF, AO2=VHF AF
P100 (DTMF MIC/RD switching)	H : DTMF signal in the detection signal L : DTMF signal from microphone
P106 (MIC RD V/U switching)	H : RDV L : RDU
P103 (DTMF RD V/U switching)	H : RDV L : RDU
P102 (CTCSS RD V/U switching)	H : RDV L : RDU

CIRCUIT DESCRIPTION

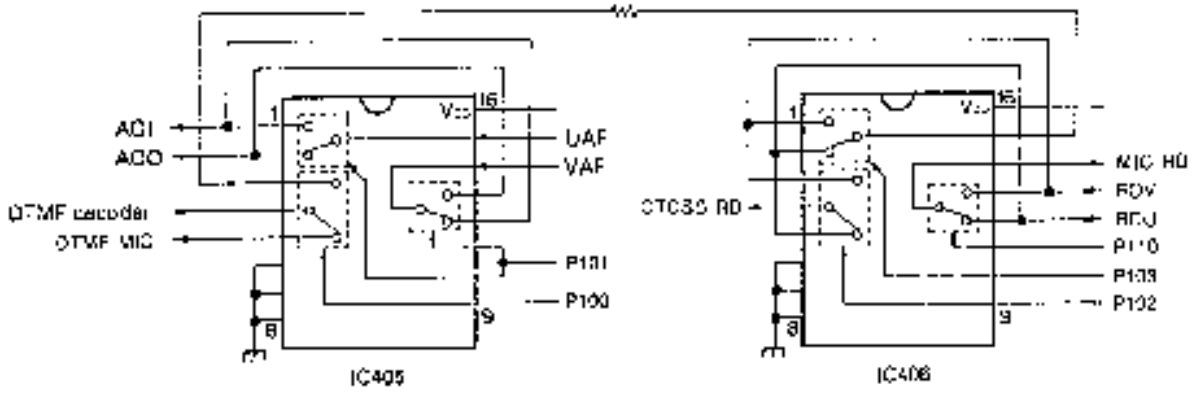

Fig. 12 Analog signal switching circuit

DATA Connector and Peripheral Circuits

The data communication connector (J402) is on the front panel to control transmission, data input/output, and squelch signals. There are two data communication modes: 9600 bps mode and conventional 1200 bps mode.

The 9600 bps mode is mainly used for 9600 bps GMSK and G3RUH packet communication. Unlike general 1200 bps AFSK, this high-speed modulation system effects frequency modulation by passing digital base band signals (square waves) through a filter for bandwidth limiting. This signal is similar to a digitally modulated 4800Hz signal (nearly sine wave because it is passed through a filter). In 9600 bps GMSK mode, and sounds like noise. There are GMSK and G3RUH systems according to the type of bandwidth limiting filter.

• Transmit signals

The transmission modulation signal enters through PKD. The path to the modulator when 9600 bps mode is on is different from that when it is off. The path when the DATA connector PKS is low is different from the path when PTT is low. Figure 13 lists paths ⓐ,ⓑ, and ⓒ, and table 4 lists modulation input levels.

When 9600 bps mode is on, the frequency deviation changes according to the input signal level. A protection circuit is provided to inhibit transmission when the level reaches 4Vp-p.

The input PKD signal is partially detected by D411, and smoothed by C470 and R528. If the signal level reaches 4Vp-p, Q420 turns on and the Q422 output goes low. At the same time, the PKD signal connected to MD by IC411 is disconnected, Q421 turns off, and the PTT control signal goes high to stop transmission. PKS transmission is inhibited if the input reaches 4Vp-p.

Pin No.	Pin name	Specification		
1	PKD		Bps selection	
			1200 bps	9600 bps
		Modulation input	40mVp-p	2Vp-p
		Frequency deviation	3±0.3kHz	2±0.5kHz
4	PKS	Output level: 500mVp-p/10kΩ Always input during reception		
5	PRI	Output level: 300mVp-p/10kΩ Not output if squelch is closed.		

Table 4 DATA connector input/output level

• Receive signal

PRS is a receive output for high-speed data communication (9600 bps), and the FM detection circuit output (DET signal) is output through the Q402 buffer amplifier. This signal is always output, regardless of whether the squelch is open or closed.

PRI is a receive output for general communication (1200 bps), and like PRS, the FM detection circuit output (DET signal) is output through the Q418 buffer amplifier. PRI is squelch-controlled by Q404.

CIRCUIT DESCRIPTION

• Squelch signal output circuit

The squelch signal is input to TNC to prevent collision during packet communication. It is a digital transistor output pulled up by 5V and has the logic shown on the right.

SQL open output	Low: SQL close
(J402 pin 5)	High: SQL busy

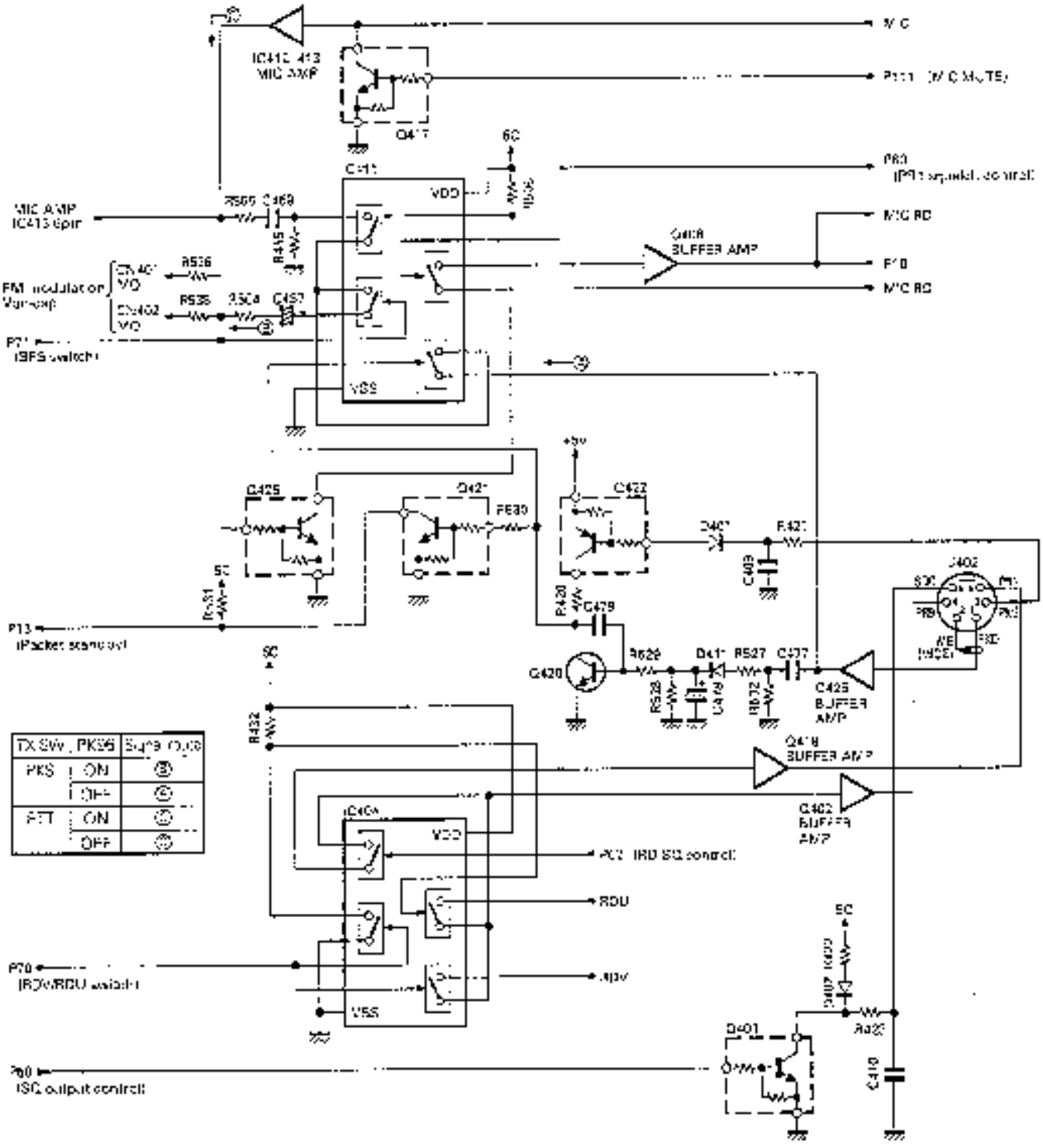

Fig. 13 DATA connector and peripheral circuits

CIRCUIT DESCRIPTION

Reset and Backup Circuits

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.

When the power supply is disconnected and the voltage drop of the 5V line is detected, BA11 (backup battery), which has been charged through D18, discharges to provide backup power for the CPU through D18.

When the power supply is connected, a low level pulse of about 2msec duration is output by the reset circuit. This pulse goes to RESET of the CPU for power-on reset.

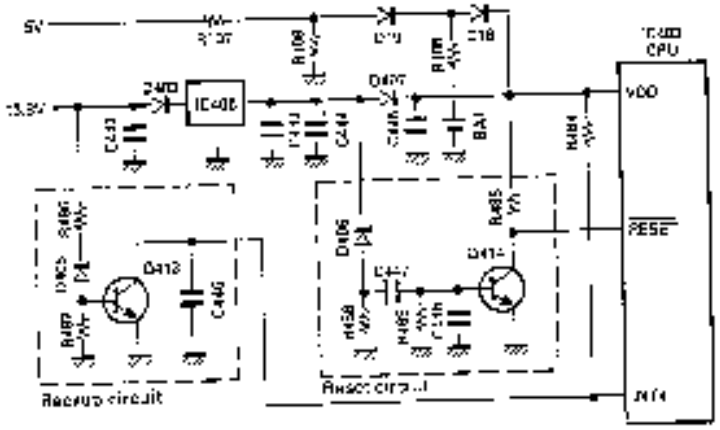

Fig. 14 Reset and backup circuits

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 varicap diode.

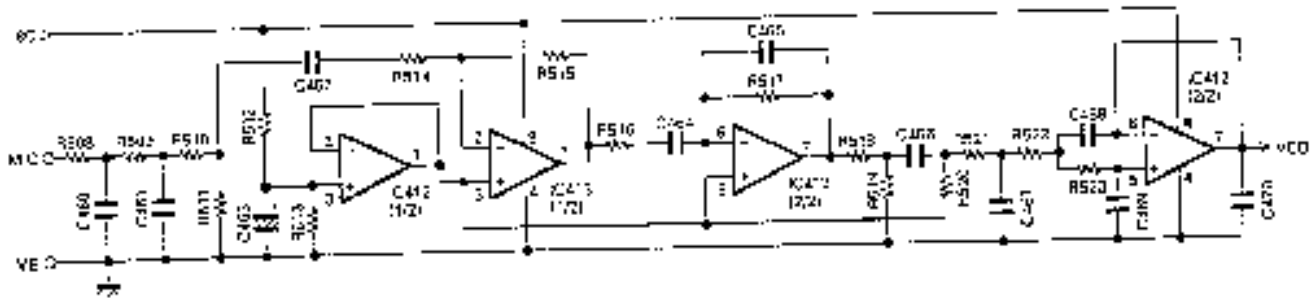

Fig. 15 Microphone amplifier circuit

CIRCUIT DESCRIPTION

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.

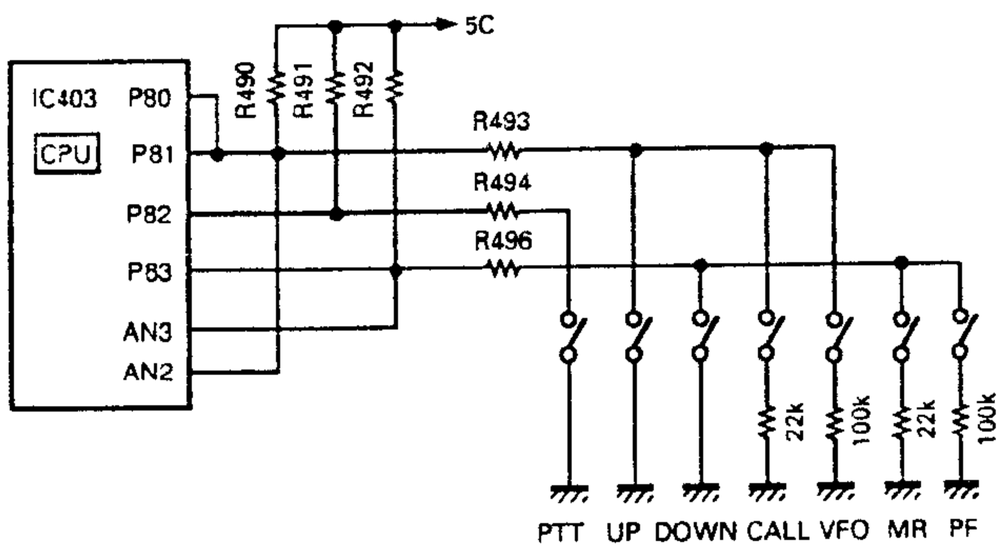

Fig. 16 Microphone key input

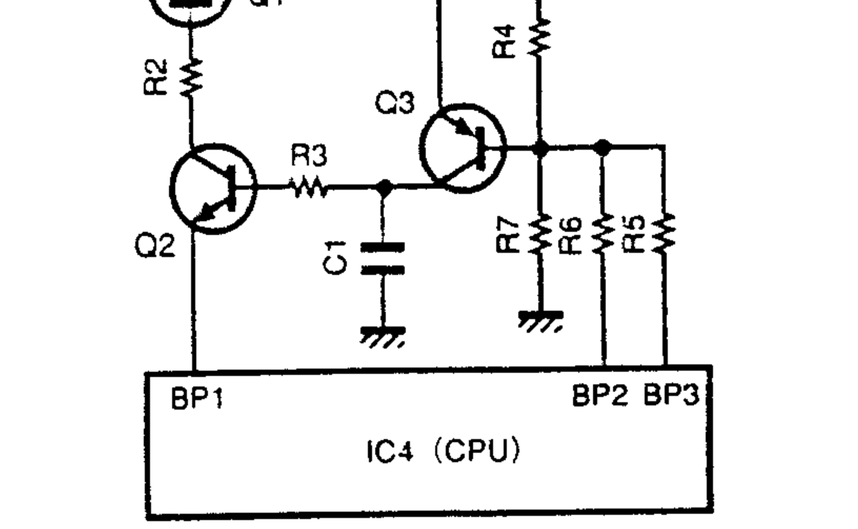

Fig. 17 Dimmer circuit

Panel Unit (LCD Assy) (B38-0708-25 : M4 type B38-0709-25 : Except M4 type)

• Outline

The panel unit has a microcomputer to control serial communication with the control unit of the main unit, the display circuit, memory, and dimmer circuit. The keys and key rotary encoder input signals directly to the microcomputer.

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.

Reset Circuit

When the power supply is connected, the IC1 (L78LR05B-FA) output (pin 5) becomes 5V, and after about 100msec, RESET (pin 4) 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 VFO, and PM 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.

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CIRCUIT DESCRIPTION

Display Circuit

The display circuit consists of the microcomputer, LCD driver and peripheral circuits, and LCD. The LCD is driven dynamically with a half-duty cycle. Part of the display is controlled by the driver (IC4) in the microcomputer, and part is controlled by the LCD driver (IC6 and IC7), as shown in Figure 18. Data is transferred serially to the LCD driver from P40 to P43 of the microcomputer.

Memory

Memory channel data is stored in IC5 (non-volatile memory). Data is written and read as serial data through P31 and P32.

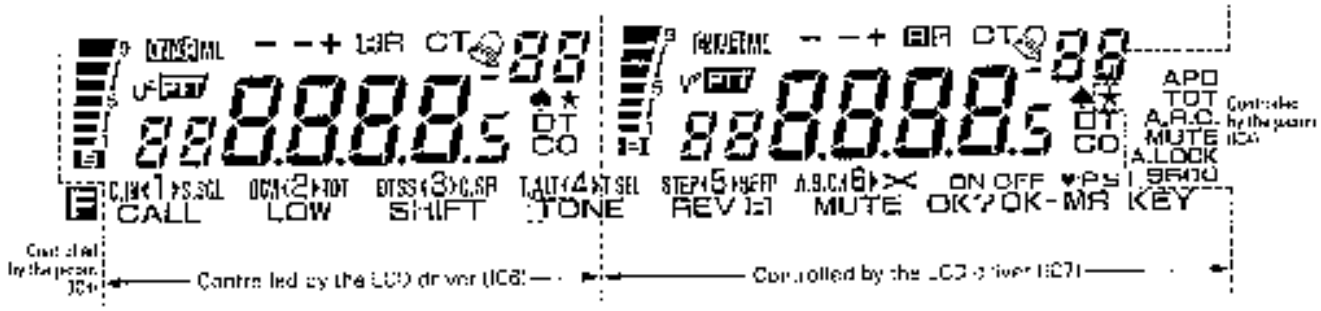

Fig. 18 Display LCD (Except M4 type)

144MHz Band PLL Synthesizer

The VCO and PLL circuits comprise a hybrid integrated circuit housed in a solid state case. X2 (12.8MHz) is generated by the PLL IC (M50700-P) in the RIC, 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, 160.05 to 210.045MHz (K,P), 189.05 to 193.045MHz (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 364.95 to 424.945MHz (K,P), 364.95 to 394.945MHz (M,E).

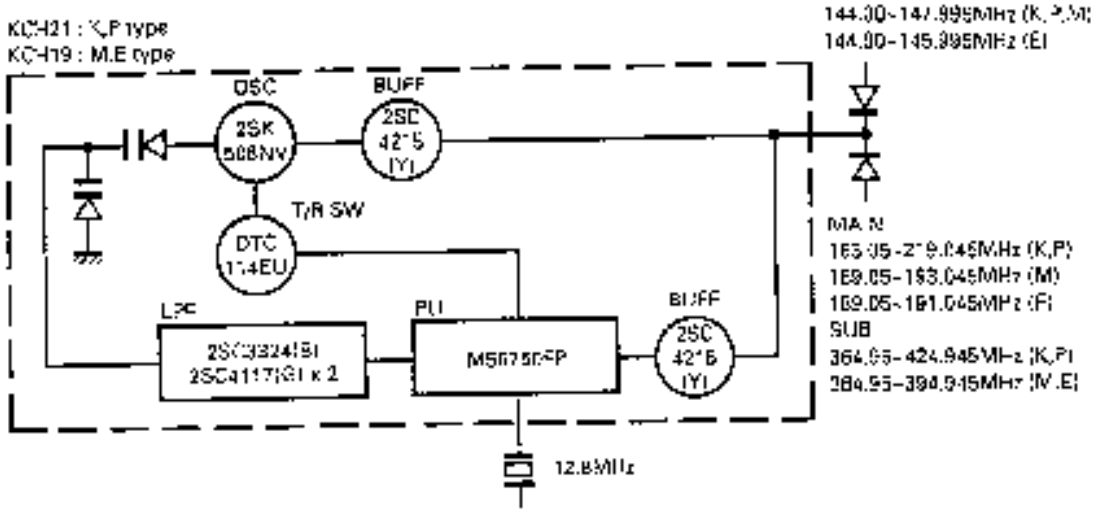

Fig. 19 144MHz band PLL block diagram

CIRCUIT DESCRIPTION

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, 351.475 to 411.475MHz (K,P), 371.475 to 381.475MHz (M,E) is generated, and when UHF-band signals are transmitted, 438.00 to 448.995MHz (K,P), 430.00 to 439.995MHz (M,E) is generated. When sub-VHF-band signals are received, the main VCO in the PLL circuit is used and the sub-VCO for VHF operates to produce 166.525 to 232.52MHz (K,P), 202.525 to 206.52MHz (M), 202.525 to 204.52MHz (E).

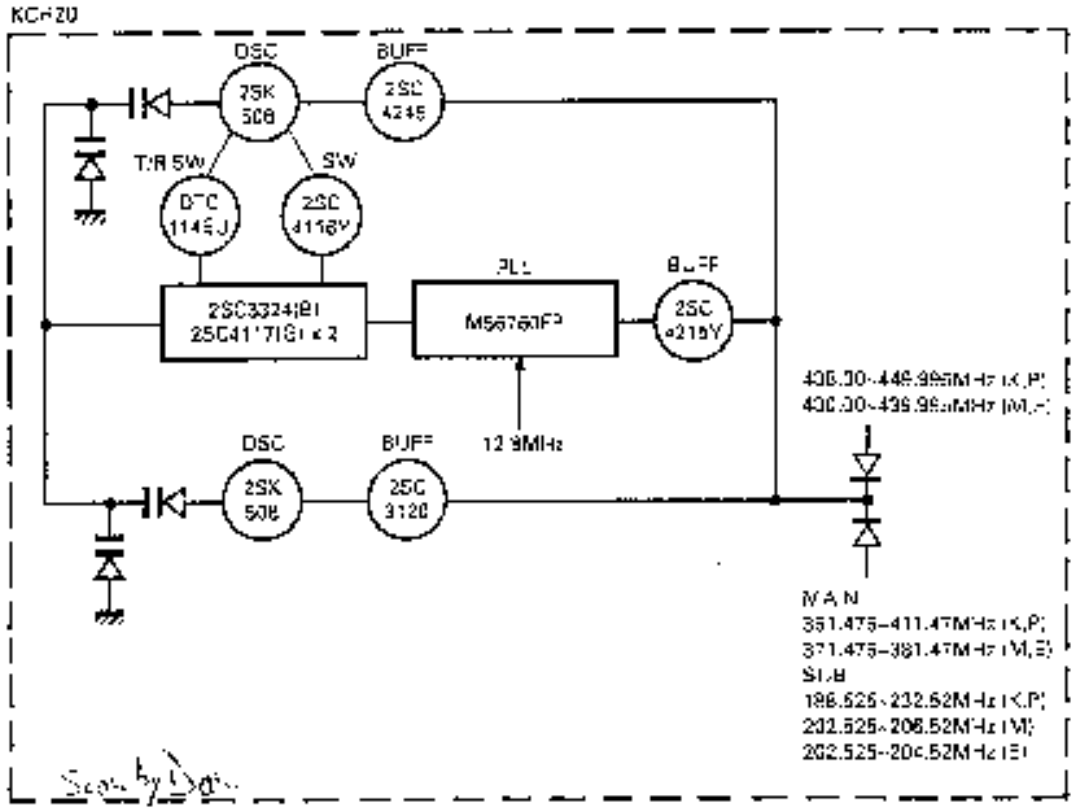

Fig. 20 430MHz band PLL block diagram

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CIRCUIT DESCRIPTION

I/O Port Specifications

- 75336GC-075-389 (LCD ASSY : IC4)

Pin No.	u-com port	Port name	I/O	Pull up	Back up	Description	Circuit pin name
1–4	S3 (SP7–SP4/RP4		C			Not used.	
5, 6	S2/BP3, S1/BP2	P DIM3, P DIM2	C			Dimmer 3, 2, 1, 0 : 23, 11 : ON, 00 : OFF, 01 : 50	
7	S2/BP1	P LAMP	O			Lamp 1 : ON, 0 : OFF	
8	S2/SP0		O			No used.	
9–13	S23–S19	S23–S19	C			Not used.	
14–20	S18–S12	S18–S12	O			LCD segment driver	
21, 22	COM0, COM1	COM0, COM1	O			LCD common driver	
23, 24	COM2, COM3		O			No used.	
25	BIAS	BIAS	C			External bias resistor setting output pin	
26–29	VLC3–VLC0	VLC3–VLC0				LCD drive power pin.	
29	P42	P LCDCS1	O	•		LCD driver chip enable 1 NJU6432	CS1
30	P41	P LCDCK	O	•		LCD driver clock NJU6432	CLK
31	P40	P LCDDT	O	•		LCD driver data NJU6432	DA
32	P43	P LCDCS2	O	•		LCD driver chip enable 2 NJU6432	CS2
33	Vss	Vss	-			GND	
34	P50	P LEDV	O			Control display LED (VHF) 0 : ON, 1 : OFF	
35	P51	P LEDU	O			Control display LED (UHF) 0 : ON, 1 : OFF	
36	P52	P LCDINH	O	•		LCD display blank NJU6432	VH
37	P53		O			Not used.	
38	INT4/P00	P ECHK	I			Power check 0 : Power not connected, 1 : Power connected	
39	SCK/P01		O		O	Not used	
40	SO/SDA/P02	P SO	O		O	Connect to the comparator S	
41	SI/SCL/P03	P SI	I		O	Connect to microprocessor SO	
42	INT0/P10	P ENCCK	I	•		Encoder clock.	
43	INT1/P11	P ENT	I			Connect to P51.	
44	INT2/P12	P ENDT	I	•		Encoder data.	
45	TI0/P13	P P5				Power switch (on-hook)	S4
46	PTO0/P20	P KEY2	I		O	Band select VHF	SWA
47	P21	P KEY3	I		O	Band select UHF	SWB
48	PCL/P22		I		O	Not used.	
49	BUZ/P23		I		O	Not used	
50	LCDCL/P32	P S3	O			MS switching.	
51	SYNC/P31	P EPSDA	I/C	•		EEPROM SDA	SDA
52	P32	P EPSCL	C	■		EEPROM SCL	SCL
53	P33		O			Not used.	
54	P30	P KEY3	I		O	VHF key	ESW
55	P61	P KEY2	I		O	UP key	S2
56	P62	P KEY1	I	•		VFO key	S1
57	P63	P KEY4	I	•		PW key	S3
58, 59	AN0, AN1		I			Not used.	
60	AN2	P SCLV	I			VHF band squelch input	
61	AN3	P VOLV	I			VHF band volume input	
62	AN4	P SQLU	I			UHF band squelch input	
63	AN5	P VOLU	I			UHF band volume input	
64	AVss	AVss	-			A/D converter reference (GND)	
65	AVrel	AVrel	I			A/D converter reference voltage	
66	Vcc	Vcc	-			Power supply (Microprocessor)	

CIRCUIT DESCRIPTION

Pin No.	μ-com port	Port name	I/O	Pull up	Back up	Description	Circuit pin name
67	XT1					Not used	
68	XT2		-			Not used	
69	Vss	Vss	-			GND	
70	X1, X2	X1, X2				Clock oscillator connection (4.192MHz)	
72	RESET	RESET				Power on	
73	KP0/P60	P KEY 11		○		CONFIG key	S12
74	KP1/P61	P KEY 10		○		F key	S11
75	KP2/P62	P KEY9		○		MUTE key	S10
76	KP3/P63	P KEY8		○		REV key	S9
77	KP4/P70	P KEY7		○		TONE key	S8
78	KP5/P71	P KEY6		○		BELL key	S7
79	KP6/P72	P KEY5		○		LOW key	S6
80	KP7/P73	P KEY4		○		CALL key	S5

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

CIRCUIT DESCRIPTION

- 75518GF-18X-3B9 (TX-RX UNIT : IC403)

Pin No.	µ-com port	Port name	I/O	Pull up	Back up	Description	Chan. pin name
1	ANO	P SMV	I			VHF band signal-strength meter input.	SMV
2	AVREF	AVREF				Reference voltage for A/D converter	
3, 4	VDD	VDD	I			Power for microcomputer	
5	P113	P MUTE IN	O			Internal speaker mute 0 : OFF, 1 : ON (Off when a beep is output)	
6	P112	P MUTE EX	O		I	External speaker mute. 0 : OFF, 1 : ON (Off when a beep is output)	
7	P111	P MMUTE	O		I	Microphone mute 0 : OFF 1 : ON	
8	P110	P MICRO	O			Microphone PTT switching. 0 : UHF, 1 : VHF	
9	P103	P DTMFPO	O			DTMF PO switching. 0 : UHF, 1 : VHF	
10	P102	P CTCSPO	O		I	CTCSS PO switching 0 : UHF, 1 : VHF	
11	P101	P SP	O		I	Speaker switching 0 : Internal speaker for VHF, 1 : Internal speaker for UHF	
12	P100	P DTSEL	O			DTMF input switching. 0 : Microphone, 1 : Detector output	
13–16	P93–P90	PB3/PD4–PB0/PD1	O		I	Destination of bus [illegible] power unit. DTMF encoder data (D4–D1) TC35219	D4–D1
17	SI1/P63	P DOWN	I	●		Microphone DOWN.	
18	SO1/P62	P PTT	I	●		Microphone PTT.	
19	SCK1/P61	P UP	I	●	I	Microphone UP	
20	PPO/P60		I		I	Connected to SCK1 (for clock for cloning)	
21	KR7/P73	P TDPC	O			DTMF encoder (TD/PC) TC35218	TD/PC
22	KR6/P72	P CP	O			Single tone (1623Hz) 0 : Single tone, 1 : Dual tone (CONT2) TC35219	CONT2
23	KR5/P71	P PSS	O	●	I	bps selection 0 : 1200 bps, 1 : 9600 bps	PSS
24	KR4/P70	P PSRD	O	●		PTT band RD control 0 : UHF, 1 : VHF	PSRD
25	KR3/P63	P MASQ	O			Microphone PTT SQ control 0 : SQ close, 1 : SQ busy	M-SQ
26	KR2/P62	P PRD	O		I	RD SQ control 0 : SQ close, 1 : SQ busy	PRD
27	KR1/P61	P SD	I		I	DTMF decoder data (SD) LC7367M	SD
28	KR0/P60	P SQ	I		I	Display mode setting 0 : Normal, 1 : Channel display	PSQ
			O			Data communication control 0 : SQ busy, 1 : SQ close	
29–32	P53–P50	P TONE	O	●	I	Subtone output bits 7–4	
34–36	P43–P4	P TONE	O	●	I	Subtone output bits 3–1	
37	P40	P 1750	O	●	I	1750Hz tone	
38	P33	P SC	O			SC ON/OFF 0 : ON, 1 : OFF	
39	P32	P ET	O/I			CTCSS unit enable/connection check 0 : Connected 1 : Not connected	CTE
40	P31	P ES2U	O		I	Shift register 2 enable. UHF	ES2U
41	P30	P ES1U	O			Shift register 1 enable UHF	ES1U
42	BUZ/P23	P EPL	O		-	PLL enable UHF	EPL
43	PCL/P22	P CKU	O		I	Shift register/PLL/DTMF clock. UHF	CKU
44	P21	P DTU	O		L	Shift register/PLL data. UHF	DTU
45	P120/P20	P BEEP	O		I	Beep output (or [illegible] sound) "1" when the beep is output.	
46	TI0/P13	P PKS				Packet standby. 0 : Standby, 1 : Busy	PKS
47	INTP2/P12	P STD		■	I	DTMF detection (LC7367 STD) 0 : No signal detected, 1 : Signal detected	STD
48	INTP1/P11	P CTCSS	I			CTCSS detection. 0 : Tone match, 1 : Tone mismatch	SDG
49	INTP0/P10	P RO				Remote control data connection 0 : Not connected, 1 : Connected	
50	SI0/SB0/P00	P SI	I	O		Panel microprocessor. SO	

CIRCUIT DESCRIPTION

Pin No.	μ-com port	Port name	I/O	Pull up	Back up	Description	Chip pin name
51	SO0/SB0/P02	P SO	O	△		[illegible]	
52	SCK0/P01		I			Not used	
53	INT4/P00	P VF	I			Power check 0: Operating, 1: Back up	
54	VSS	VSS				GND	
55	XT1		I			Not used	
56, 57	XT2, IC		–			Not used	
58, 59	X1, X2	X1, X2				Clock oscillator connection 4.192MHz	
60	RESET	RESET	I			Reset input	
61	P143	P DTV	O	●		Shift register/PLL/Electronic volume/CTCSS data VHF	DTV
62	P142	P CKV	O	●		Shift register/PLL/Electronic volume/CTCSS clock VHF	CKV
63	P141	P EPV	O	●		PLL enable VHF	EPV
64	P140	P ES1V	O	●		Shift register 1 enable VHF	ES1V
65	P103	P ES2V	O	●		Shift register 2 enable VHF	ES2V
66	P102	P PSW	O	●		Power switch 0: Power OFF, 1: Power ON	PSW
67	P101	P RDMUTE	O	●		RD mute 0: Transmission with repeater, 1: ON	
68	P100	P VOLEN	O	●		Electronic volume chip select L: UHF, H: VHF	CS
69	P123	P BPMUTU	O	●		Beep mute (UHF) 0: OFF, 1: ON	
70	P122	P BPMUTV	O	●		Beep mute (VHF) 0: OFF, 1: ON	
71	P121	P BPAFMU	O	●		Beep AF mute (UHF) 0: OFF, 1: ON	
72	P120	P BPAFMV	O	●		Beep AF mute (VHF) 0: OFF, 1: ON	
74	AN7/P157	P SQU	I			SQ input (UHF) 0: Busy, 1: Close	SQU
75	AN6/P156	P SQV	I			SQ input (VHF) 0: Busy, 1: Close	SQV
76	AN5/P155						AGC
77	AN4/P154						RF1
78	AN3	P DNAN	I			DOWN, MR, RE	
79	AN2	P UPAN	I			UP, CALL, VFO	
80	AN1	P SMU	I			UHF band S-meter input	SMU

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

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CIRCUIT DESCRIPTION

- **Shift register XRU4094BF (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 FAN			0 : FAN OFF, 1 : FAN ON	FAN
Q5	14	PD 14R			144MHz band power supply voltage switching	14R
Q6	13	PD 43R			430MHz band power supply voltage switching	43R
Q7	12	PD AM			AM/FM switching 0 : AM, 1 : FM	
Q8	11	PD 14F			144MHz band 20MHz supply voltage switching	14F

- **Shift register XRU4094BF (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 AM			AM gain control 0 : Normal, 1 : Low	
Q7	12	PD IMV			Mute control 0 : IM OFF, 1 : IM ON	
Q8	11	PD			-	

- **Shift register XRU4094BF (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	-
Q3	6	PD MID			0 : HI, LOW power, 1 : MID power	MID
Q4	7	PD FAN			0 : FAN OFF, 1 : FAN ON	FAN
Q5	14	PD 14R			144MHz band power supply voltage switching	14R
Q6	13	PD 85R				85R
Q7	2	PD 43R			430MHz band power supply voltage switching	43R
Q8	11	PD 38R				38R

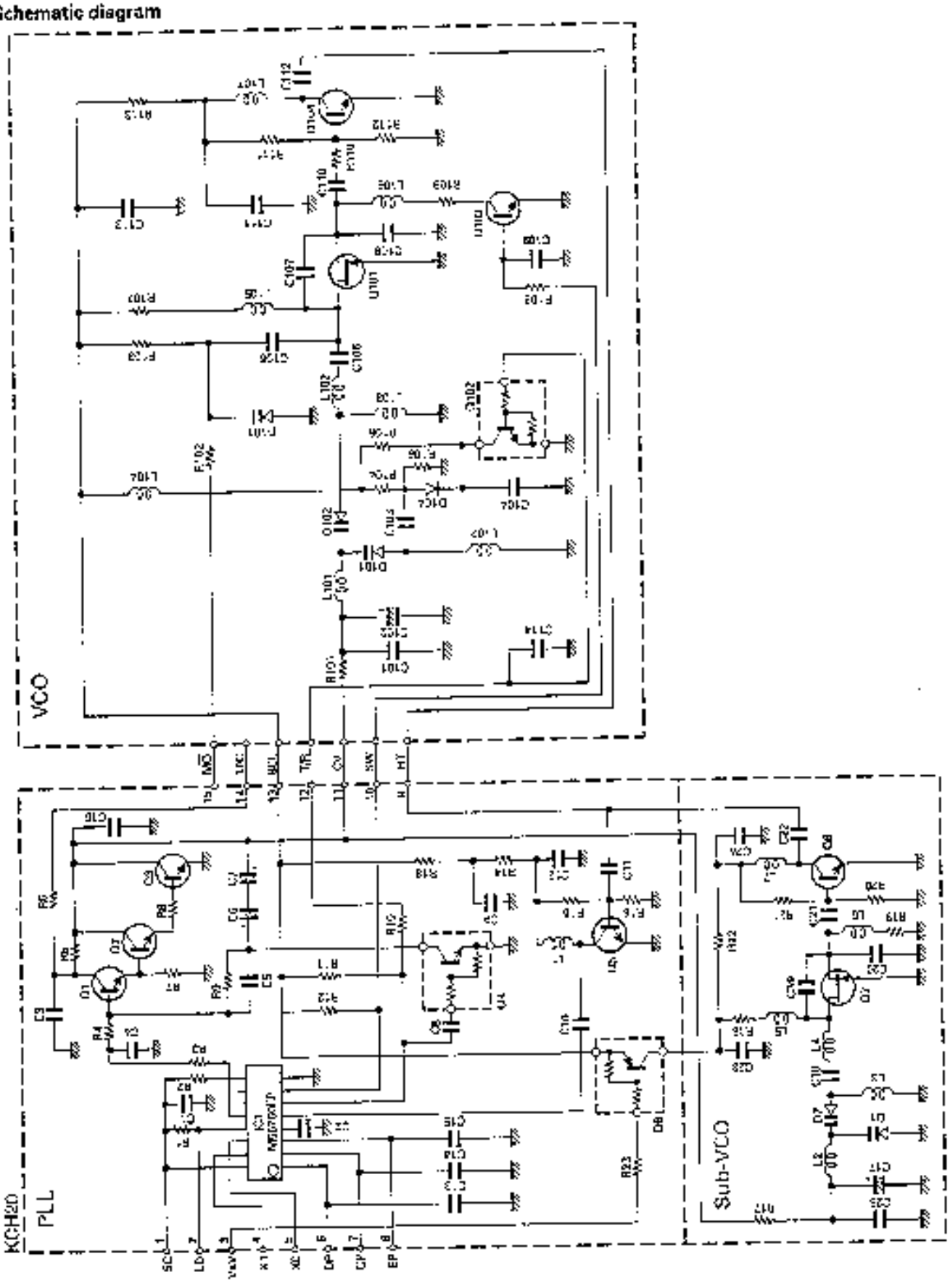
- **Shift register XRU4094BF (TX-RX UNIT : IC205) : UHF squelch**

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 IMU			AIF selection 0 : AIF OFF, 1 : AIF ON	
Q8	11	PD			-	

SEMICONDUCTOR DATA

430MHz Band PLL (With Sub-VCO) : KCH20 (TX-RX Unit B/4 IC207)

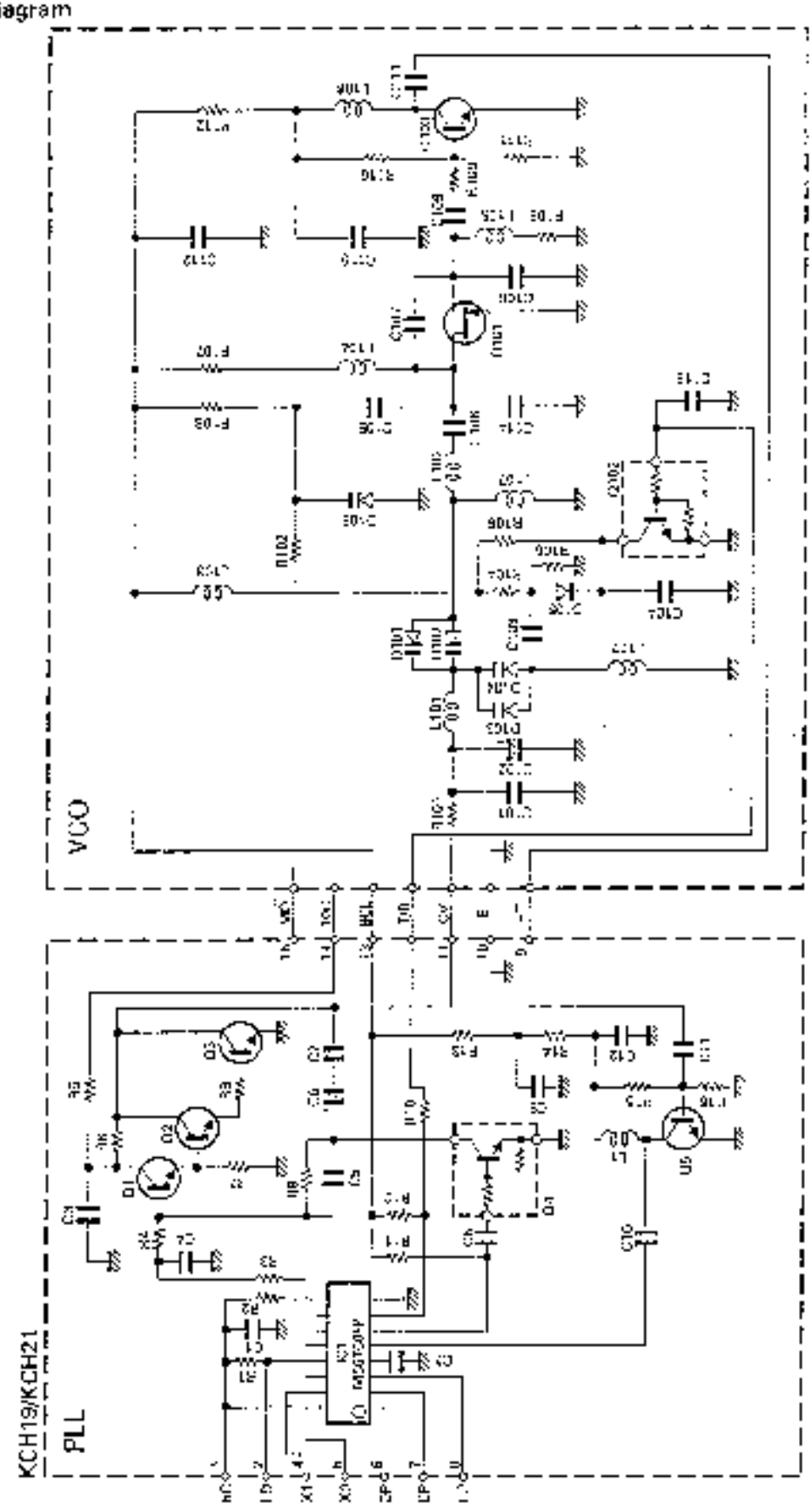
- Schematic diagram



SEMICONDUCTOR DATA

144MHz Band PLL : KCH19/KCH21 (TX-RX Unit A/4 IC9)

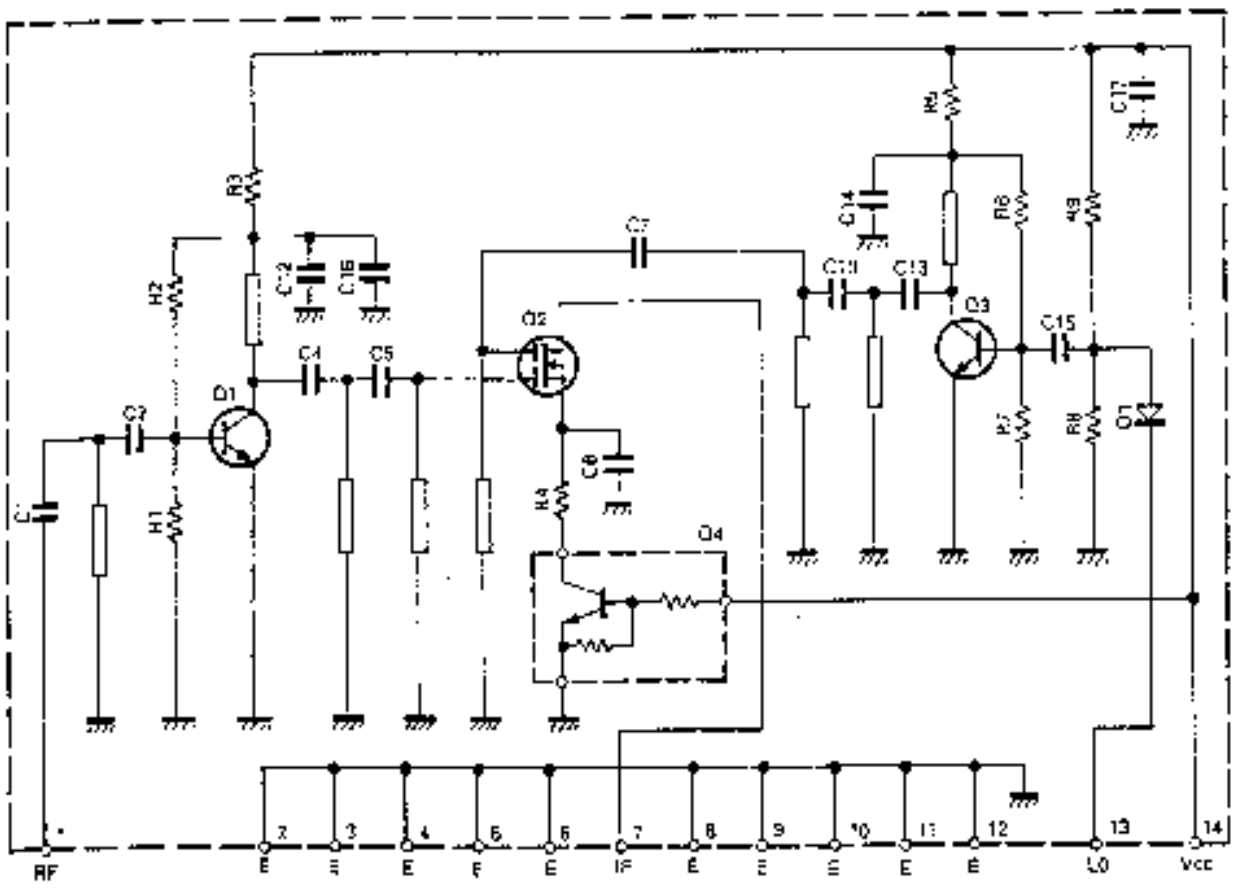
• Schematic diagram



SEMICONDUCTOR DATA

800MHz Front-End : KCB28 (TX-RX Unit B/4 IC202) Except K,P Type

• Schematic diagram



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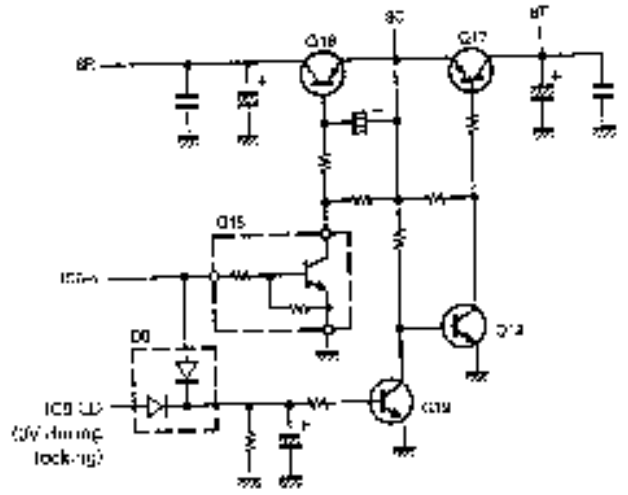
TM-733A/E

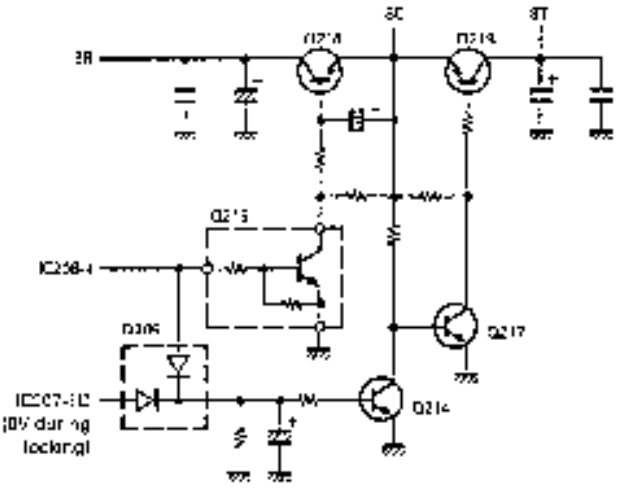
DESCRIPTION OF COMPONENTS

TX-RX UNIT (X57-436X-XX) 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2

Ref. No	Use/Function	Operation/Condition compatibility
Q1	High-frequency amplifier	
Q3	High-frequency amplifier	
Q4	First mixer	Except U2
Q5	First mixer switch	On for U2
Q6	1st IF amplifier	43.05MHz
Q8	Squelch hysteresis	On when squelch is on
Q10	RD buffer amplifier	
Q11	Power switching 24V	Except U2
Q12	Power switching 8V	On for U2
Q13	First mixer	U2
Q14	First mixer switch	On for U2
Q15–Q19	During transmission Q15, Q16, Q17 : Off Q17 and Q18 : On During receive Q15, Q16, Q19 : On Q17 and Q18 : On	
Q20	Squelch switch	See IC4 description
Q21	Modulation mute	On during transmit
Q22, Q23	Inverter	
Q24	CV line buffer	
Q25	VCO output amplifier	
Q26	PLL 8V ripple filter	
Q27	Power switching between medium and low	
Q28	APC circuit	
Q29	12.8MHz buffer	On for AIP on
Q30	AIP switch	
Q201	High-frequency amplifier	
Q202	Power switching	4GR
Q204	High-frequency amplifier	
Q206	AIP switch	On for AIP on
Q208	First mixer	Except U2
Q207	First mixer switch	On for U2
Q208	First IF amplifier	52.525MHz
Q209	Squelch hysteresis	On when squelch is on
Q210	RD buffer amplifier	
Q211	High-frequency amplifier	For U2
Q212	First mixer	For U2
Q213	First mixer switch	On for U2



DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
Q214–Q219	During transmission Q214, Q215, Q216 : Off Q217 and Q218 : On During reception Q214, Q215, Q216 : On Q217 and Q218 : Off	
Q219	Squelch switch	See IC234 operation
Q220	Power switching 14R	On for TX
Q221–Q223	Inverter	
Q227	Modulation mute	On during reception
Q228	PLL 8V amplifier	
Q229	VCO output amplifier	
Q230	Fan switch	
Q231	Power switching between medium and low	
Q232	AFC control	
Q233	Power switch	
Q234	Power switch control	
Q235	12.8MHz amplifier	
Q401	Data communication squelch switch	On for busy
Q402	9600 bps PD buffer amplifier	
Q403	DTMF signal buffer amplifier	
Q404, Q405	Beep mute	Q404 : UHF, Q405 : V/F
Q406	MIC RO buffer amplifier	
Q407, Q408	AF amplifier	Q407 : VHF, Q408 : UHF
Q409, Q410	AF mute	Q409 : VHF, Q4010 : UHF
Q411, Q412	Speaker output mute	Q411 : External speaker, Q412 : Internal speaker
Q413	Back up switch	On when 7.5V or more
Q414	Regulator switch	
Q415	5C switch	
Q416	MIC AMP mute	
Q417	Mic mute	
Q418	1200 bps PD buffer amplifier	
Q420	Data communication switch for transmission system	On when High level input
Q421	Data communication switch for reception system	On during data transmission
Q422	Data communication transmission switch control	On during data transmission
Q423, Q424	Electronic volume buffer amplifier	Q423 : UHF, Q424 : VHF
Q425	Packet comparator amplifier	

TM-733A/E

DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
IC1	Second local oscillator, Mixer, IF amplifier, Detection, Low-frequency amplifier, Noise amplifier, Noise detector, Squelch switching	1 : First IF input, 45.05MHz 3,4 : Second local oscillator, 45.5MHz 9 : Scan control busy signal, 0V while busy 10 : Noise-detection voltage output (DC) 11 : S-meter output 12 : Detection output 14 : PD output 15 : AF output
IC3	High-resistance amplifier	See circuit description
IC4	Analog switch (squelch)	See circuit description
IC5	Shift register	For scanner
IC6	AF amplifier	
IC7	Multiplexer (AF output)	See circuit description
IC8	Shift register	See circuit description
IC9	PLL	5V → 5C; 0V during locking → LD; NC; 12.8MHz → X1; XO; Data input → DP; Clock input → CP; Enable input → EP MO ← Modulation input; 10C ← 10V; 8CL ← 8V; NC; CV → Lock voltage; E ↔ E; HT → PLL output
IC10	144MHz-band transmit driver	
IC11	10V AVR	
IC201	Second local oscillator, Mixer, IF amplifier, Detection, Low-frequency amplifier, Noise amplifier, Noise 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 : PD output 15 : AF output
IC204	Analog switch (squelch)	See circuit description
IC205	Shift register	For scanner
IC206	Shift register	See circuit description
IC207	PLL	5V → 5C; 0V during locking → LD; NC; 12.8MHz input → XI; XO; Data input → DP; Clock input → CP; Enable input → EP MO ← Modulation input; 10C ← 10V; 8CL ← 8V; NC; CV → Lock voltage; E ↔ E; HT → PLL output
IC208	10V AVR	
IC209	430MHz-band transmit driver	
IC210	APC	
IC211	5V AVR	
IC401	DTMF decoder	
IC402	DTMF encoder	
IC403	Microprocessor	See circuit description
IC404	Analog switch	See circuit description
IC405, IC406	Multiplexer	See circuit description
IC407	Electronic volume	Rch : VHF band, Lch : UHF band
IC408	8V AVR	
IC409, IC410	Serial data inverter	
IC411	Analog switch	See circuit description
IC412, IC413	Low-frequency amplifier	For loudspeaker amplifier

DESCRIPTION OF COMPONENTS

Ref. No	Use/Function	Operation/Condition compatibility
D1–D5	Varistor unit	
D6	Heterodyne probe	
D7	Reference voltage	
D8	Reverse-flow prevention	
D9	Voltage correction	
D10	Heterodyne switch	Band selective switch
D11	Reverse-flow prevention	
D12	APC temperature compensation	
D13, D14	Antenna selection switch	
D15, D16	Power detection	
D17	Varistor unit	
D18, D19	Reverse-flow prevention	
D202	Reverse-flow prevention	
D203	Level limiter	
D204, D205	Heterodyne switch	
D206, D207	Reverse-flow prevention	
D208	Heterodyne switch	Band selective switch
D211	APC temperature compensation	
D212	Reverse-flow prevention	
D213, D214	Antenna selection switch	
D215, D216	Power detection	
D217	Reverse power connection prevention	
D401–D404	Reverse-flow prevention	
D405	Beam detection	
D406	Beam detection	
D407, D408	Reverse-flow prevention	
D409	Surge protector	
D41	Regulator	

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PARTS LIST

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

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格		Desti-nation 仕向	Re-marks 備考
				TM-733A/E			
1	3C	*	A01-2082-03	METALLIC CABINET(BOTTOM)			
2	1C	*	A01-2083-03	METALLIC CABINET(TOP)			
3	2A	*	A62-0280-12	PANEL (BODY)			
4	3A	*	A62-0281-1[illegible]	PANEL ASSY(SEPARATE)			
5	1B	*	A82-0014-0[illegible]	BACK PANEL(SEPARATE)			
6	3B	*	B30-2708-25	LCD ASSY		M4	
7	1B	*	B38-0709-25	LCD ASSY		KPMM2	
7	3D	*	B38-0709-25	LCD ASSY		M3[illegible]	
8	3B	*	B38-0709-25	LCD ASSY		E E3 E9	
8	3D		B4[illegible]-3322-14	LABEL (ANT)		KP	
9	3C		B42-3343-04	LABEL (SAND)			
10	3C		B42-3394-14	LABEL (FCC)		K	
11			B42-3526-04	LABEL (HYATT)		K	
12	-		B46-0310-1[illegible]	USER & WARRANTY CARD	ACSY	E E2 E9	
13	-		B46-0410-33	USER & WARRANTY CARD	ACSY	K	
14			B46-0420-0[illegible]	USER & WARRANTY CARD	ACSY	P	
15	-	*	B62-0391-00	INSTRUCTION MANUAL	ACSY		
16		*	B62-0392-00	INSTRUCTION MANUAL	ACSY	E32	
17	-	*	B62-0393-00	INSTRUCTION MANUAL	ACSY	MM2M3	
17	-	*	B62-0395-00	INSTRUCTION MANUAL	ACSY	PE3	
18	-	*	B62-0394-00	INSTRUCTION MANUAL	ACSY	MM2M3	
19	-	*	B62-0394-00	INSTRUCTION MANUAL	ACSY	PE3E9	
19	-	*	B62-0464-0[illegible]	INSTRUCTION MANUAL	ACSY	M4	
20	3C	*	B72-1092-04	MODEL NAME PLATE		MM2M3	
20	3C	*	B72-1092-24	MODEL NAME PLATE		M4	
21	3C	*	B72-0693-04	MODEL NAME PLATE		EE2E3	
21	3C	*	B72-0693-04	MODEL NAME PLATE		E9	
22	3C		B72-0651-14	MODEL NAME PLATE		E9	
23	3C	*	B72-1040-04	MODEL NAME PLATE		KP	
-			E23-0435-05	TERMINAL(TEST)			
25	2A		E30-2108-05	ANT CABLE ASSY(N)		E2E3	
25	2A		E30-2108-05	ANT CABLE ASSY(N)		E9	
26	-		E30-2111-05	DC POWER CORD ASSY	ACSY		
27	2D		E30-2142-15	ANT CABLE ASSY(M)		KPMM2	
27	2D		E30-2143-15	ANT CABLE ASSY(M)		M3M4	
28	1D		E30-3025-05	DC CORD ASSY(BODY)			
29	2B		E30-3029-1[illegible]	ANT CABLE ASSY(M WITH COVER)		KP	
-			E30-3206-08	DUAL CORD ASSY (MIC)		MM2M4	
-			E30-3206-08	DUAL CORD ASSY (MIC)		E2E3	
-			E30-3206-08	DUAL CORD ASSY (MIC)		E9	
-			E30-3208-08	DUAL CORD ASSY (MIC)		KPM3	
32	1C		E31-3197-15	CONNECTING WIRE(5P)			
33	2C	*	E37-0401-05	FLAT CABLE (21P)			
34	2C	*	E37-0402-05	FLAT CABLE (19P)			
35	2C		E40-5321-05	PIN ASSY (TP40N20Z)			
36	1C		E40-5837-05	PIN CONNECTOR ASSY(TP40N3Z)			
37	1D		F07-1247-03	COVER (FAN)			
38	3B	*	F07-1774-04	COVER (DIN:6P)			
39	1C		F10-2239-04	SHIELDING COVER(V-F)			
40	3D	*	F10-2129-04	SHIELDING COVER(UHF)			
41	-		F51-0017-05	FUSE (15A)	ACSY		
42	1D		F51-0017-05	FUSE (15A)			

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

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

TM-733A/E

PARTS LIST

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

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格		Desti-nation 仕向	Re-marks 備考
-			F31-0210-05	DUST [illegible] POWER CORD)			
45	2?		F29-0450-0?	INSULATOR			
44	2A	*	G01-0573-04	COIL SPRING(RELEASE)			
45	1?		G02-0731-14	FLAT SPRING(SP)			
46	1?	*	G02-0741-04	FLAT SPRING(THERMAL SW)			
47	2?	*	G02-0745-04	FLAT SPRING(TRANSISTOR)			
49	2A,3B		G13-0651-04	AUXILIARY PART([illegible] PANEL)			
50	3A	*	G11-2004-03	SHEET			
51	2?	*	G11-2710-14	SHEET (LARGE SIZE)			
52	2B	*	G11-2712-04	SHEET (SMALL SIZE)			
53	3?		G13-1820-14	CUSHION([illegible] CASE)			
54	3A,3B	*	G13-1432-04	CUSHION(PANEL)			
55	-	*	H10-2776-02	POLYSTYRENE FOAMED FIXTURE			
56	-		H12-0874-14	CARTON BOARD(BRACKET)			
57	-		H12-0893-04	CARTON BOARD			
58	-		H12-0842-04	CARTON BOARD		E33	
59	-		H25-0117-04	BAG (30X250)			
60	-		H25-0730-04	BAG (250X350)			
61	-		H25-0750-04	BAG (130X270)			
62	-	*	H52-0476-04	ITEM CARTON BOX		KP	
62	-	*	H52-0477-04	ITEM CARTON BOX		MM2M3	
62	-	*	H52-0479-04	ITEM CARTON BOX		M4	
64	-	*	H52-0458-04	ITEM CARTON BOX		EE2E3	
64		*	H52-0470-04	ITEM CARTON BOX		E9	
65	-		J20-0319-24	HSNK	ASSY	KP	
66	1B	*	J21-4446-04	HARDWARE FIXTURE(SP)			
67	-		J29-0436-03	BRACKET	ASSY		
68	2?		J42-0459-15	BUSHING (ANT)		KM2M3	
68	2?		J42-0453-05	BUSHING (ANT)		M4E2	
68	2B		J42-0455-05	BUSHING (ANT)		E3E9	
-		*	K29-3140-12	KNOB (8 KEYS)			
71	3A	*	K29-3141-04	KNOB (VFO)			
71	3A	*	K29-3142-04	KNOB (MR)			
72	3A	*	K29-3143-04	KNOB (PWR)			
73	3A	*	K29-3144-04	KNOB (PM)			
74	2A	*	K29-3145-04	KNOB (RELEASE)			
75	2A	*	K29-3146-04	KNOB (MAIN PUSH)			
76	2A	*	K29-4887-04	KNOB (MAIN)			
77	2A	*	K29-4888-04	KNOB (VOL)			
78	2A	*	K29-4889-04	KNOB (SQL)			
79	2A		N14-0552-05	NUT (VOL)			
A	1C,1D		N35-2606-45	OVAL HEAD MACHINE SCREW(CASE)			
B	1D		N35-2608-45	BINDING HEAD MACHINE SCREW			
C	1C,2D		N67-3010-46	SCREW (M3X10)			
D	2B,3B		N80-2010-45	SCREW (PANEL)			
E	1C,2D		N80-2610-45	SCREW (PAN)			
F	1C,3C		N87-2606-45	BRAZIER HEAD TAPTITE SCREW			
80	-		N99-0332-05	SCREW SET	ASSY	MM2M3	
80	-		N99-0331-05	SCREW SET	ASSY	M4E2	
80			N99-0331-05	SCREW SET	ASSY	E3E9	
81	-	*	N99-0330-05	SCREW SET	ASSY	KP	
SP	1B		T07-0246-05	LOUDSPEAKER(16 ohm 1W)			

L:Scandinavia K:USA P:Canada
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TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

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-733A/E
TX-RX UNIT (X57-436X-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		Desti-nation 仕向	Re-marks 備考
FAN	2I		T42-0411-15	DC MOTOR (FAN)			
MIC	-		T91-0515-05	MICROPHONE	FACSY	K,M,M4	
MIC	-		T91-0516-03	MICROPHONE	FACSY	E,E2,E3	
MIC	-		T91-0516-08	MICROPHONE	FACSY	E9	
MIC	-		T91-0517-05	MICROPHONE	FACSY	KPM3	
IC501	10		M57788MR	IC(POWER MODULE/440-450M-Z1)			
IC502	10		S-AV17	IC(POWER MODULE FOR 144M-Z1)			
82	-		W01-0414-04	SPANNER	FACSY		
700	10,20	✱	X57-4360-11	TX-RX UNIT (A/4~D/4)		K,P	
700	10,20	✱	X57-4360-21	TX-RX UNIT (A/4~D/4)		M	
700	10,20	✱	X57-4360-22	TX-RX UNIT (A/4~D/4)		M2,M3	
700	10,20	✱	X57-4360-23	TX-RX UNIT (A/4~D/4)		M4	
700	10,20	✱	X57-4360-71	TX-RX UNIT (A/4~D/4)		E,E3,E9	
700	10,20	✱	X57-4360-72	TX-RX UNIT (A/4~D/4)		E2	

TX-RX UNIT (X57-436X-XX) 0-11 : K, P 0-21 : M 0-22 : M2, M3 0-23 : M4 2-71 : E, E3, E9 2-72 : E2

Ref. No.	Address	New Parts	Parts No.	Description	Value	Tol./Rating	Destination	Remarks
C1			CC73FCH1H010C	CHIP C	[illegible]	C		
C2			CC73FCH1H060D	CHIP C	6PF	D		
C3 -8			CK73FB1H102K	CHIP C	1000PF	K		
C5			CC73FCH1H060D	CHIP C	6PF	D		
C10			CK73FB1H102K	CHIP C	1000PF	K		
C11			CC73FCH1H060D	CHIP C	6PF	D		
C12 -14			CK73FB1H102K	CHIP C	1000PF	K		
C13			CC73FCH1H221J	CHIP C	220PF	J		
C16			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C17 -19			CK73FB1H102K	CHIP C	1000PF	K		
C20 ,21			CC73FCH1H150J	CHIP C	15PF	J		
C22			CC73FCH1H060D	CHIP C	6PF	D		
C24			CC73FCH1H040C	CHIP C	4PF	C		
C25			CK73FB1H102K	CHIP C	1000PF	K		
C26 ,27			CK73FB1H103K	CHIP C	0.010UF	K		
C28			CC73FCH1H080D	CHIP C	8PF	D		
C29			CK73FB1E103K	CHIP C	0.010UF	K		
C30 -32			CK73FB1H102K	CHIP C	1000PF	K		
C33			CK73FB1E103K	CHIP C	0.010UF	K		
C34			CE04KW1CA470M	ELECTRO	47UF	16WV		
C35			CC73FCH1H270J	CHIP C	27PF	J		
C36			CK73FB1H102K	CHIP C	1000PF	K		
C37			CC73FCH1H180J	CHIP C	18PF	J		
C38			CE04NW1E100M	ELECTRO	10UF	25WV		
C39			CK73FB1H102K	CHIP C	1000PF	K		
C40			C92-0203-05	CHIP TAN	0.47UF	25WV		
C41			CK73FF1C105Z	CHIP C	1.0UF	Z		
C42			CK73FF1C474Z	CHIP C	0.47UF	Z		
C43 ,44			CK73FF1C105Z	CHIP C	1.0UF	Z		
C45 -48			CK73FB1H102K	CHIP C	1000PF	K		
C49			CK73FB1E103K	CHIP C	0.010UF	K		
C50			CK73FF1C105Z	CHIP C	1.0UF	Z		
C51 -53			CK73FB1H102K	CHIP C	1000PF	K		
C54			CC73FCH1H120J	CHIP C	12PF	J		
C55			CC73FCH1H150J	CHIP C	15PF	J		
C56			CC73FCH1H060D	CHIP C	6PF	D		
C57			CC73FCH1H150J	CHIP C	15PF	J		
C58 ,59			CC73FCH1H060D	CHIP C	6PF	D		

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

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

⚠ indicates safety critical components.

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Items marked "*" are not stocked because they are seldom required for routine service.
Parts whose Parts No. begins with "X" are assembled parts.

TX-RX UNIT (X57-436X-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
C10			CC73FCH1H4R0C	CHIP C	4PF	C	
C61			CC73FCH1H050D	CHIP C	5PF	D	
C62			CC73FCH1H050C	CHIP C	5PF	C	
C63 ,65			CC73FCH1H100D	CHIP C	10PF	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			CK73FB1E102K	CHIP C	1000PF	K	
C71			CK73FB1C103K	CHIP C	0.01UF	K	
C72 ,77			CE04W1C470Y	ELECTRO	47UF	16WV	
C74			CC91-0502-05	CHIP TAN	0.68UF	35WV	
C75			CE04W1C470Y	ELECTRO	47UF	16WV	
C76			CK73FB1E103K	CHIP C	0.01UF	K	
C77			CK73FB1C104K	CHIP C	0.1UF	K	
C78			CE04W1C101M	ELECTRO	100UF	16WV	
C79			CC73FSL1H120J	CHIP C	12PF	J	
C80			CE04EW1V470M	ELECTRO	47UF	35WV	
C81			CE04EW1C470Y	ELECTRO	47UF	16WV	
C82			CE04EW1C471M	ELECTRO	470UF	16WV	
C83 ,84			CK73FB1C104K	CHIP C	0.1UF	K	
C85			CE04EW1C471M	ELECTRO	470UF	16WV	
C86			CE04EW1C470M	ELECTRO	47UF	16WV	
C87			CE04EW1A470M	ELECTRO	47UF	10WV	
C88			CK73FB1E225K	CHIP C	2.2UF	K	
C89 ,90			CK73FB1H102K	CHIP C	1000PF	K	
C91 ,93			CC73FSL1H101J	CHIP C	100PF	J	
C94			CK73FB1H102K	CHIP C	1000PF	K	
C95			CK73FB1E102K	CHIP C	1000PF	K	
C97 ,98			CC73FSL1H100D	CHIP C	10PF	D	
C99			CK73FB1E103K	CHIP C	0.01UF	K	
C100			CK73FB1H102K	CHIP C	1000PF	K	
C101			CE04W1C100M	ELECTRO	10UF	16WV	
C102			CC73FCH1H150J	CHIP C	15PF	J	
C103			CC73FCH1H160J	CHIP C	16PF	J	
C104			CE04EW1C470M	ELECTRO	47UF	16WV	
C105			CK73FB1H102K	CHIP C	1000PF	K	
C106		*	CC91-0604-05	CHIP TAN	4.7UF	10WV	
C107,108			CK73FB1H102K	CHIP C	1000PF	K	
C109			CC73FSL1H100J	CHIP C	10PF	J	
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			CC73FCH1H680J	CHIP C	68PF	J	
C117			CK73FB1H102K	CHIP C	1000PF	K	
C118			CC73FCH1H100D	CHIP C	10PF	D	
C119			CK73FB1C103K	CHIP C	0.01UF	K	
C120			CE04EW1C101M	ELECTRO	100UF	16WV	
C121			CC73FCH1H220J	CHIP C	22PF	J	
C122			CK73FB1H102K	CHIP C	1000PF	K	
C125			CK73FB1E223K	CHIP C	0.022UF	K	
C124			CK73FB1H102K	CHIP C	1000PF	K	

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TM-733E : E, E2, E3, E9

⚠ indicates safety critical components

TM-733A/E

PARTS LIST

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avec the Parts No. section numéro référent.

TX-RX UNIT (X57-436X-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
C23			CK73FCH1H470K	CHIP C	47000PF K		
C104,107			CK73FB1-102K	CHIP C	1000PF K		
C126			CK73FF1C105Z	CHIP C	1.0UF Z		
C129			CE04SW1E102Y	ELECTRO	1000F 25WV		
C130			CK73FB1-102K	CHIP C	1000PF K		
C131			CK73FF1C103Z	CHIP C	1.0UF Z		
C132			CK73FB1H102K	CHIP C	1500PF K		
C133			CK73FB1E103K	CHIP C	0.01UF K		
C134			CK73FB1H102K	CHIP C	1000PF K		
C135			CE04SW1C100Y	ELECTRO	10UF 16WV		
C137			CC45SL2H100D	CERAMIC	10PF C		
C138			CK45E2H102K	CERAMIC	1000PF K		
C139			CC45SL2H330J	CERAM C	33PF J		
C142			CC73FCH1H0R5C	CHIP C	0.5PF C		
C143			CC73FCH1H030C	CHIP C	3PF C		
C142			CK73FB1-102K	CHIP C	1000PF K		
C143			CC45SL2H560J	CERAMIC	56PF J		
C144			CC45SL2H470J	CERAMIC	47PF J		
C145,146			CK73F1H102K	CHIP C	1000PF K		
C147			CC73FCH1H030C	CHIP C	3PF C		
C148			CC73FCH1-0R5C	CHIP C	0.5PF C		
C149			CK73FCH3E50J	CHIP C	5PF J	KP	
C149			CK73F2H330J	CHIP C	33PF J	YM2Y3	
C149			CK73F2H330J	CHIP C	33PF J	M4552	
C149			CK73F2H330J	CHIP C	33PF J	P389	
C150			CK73F2H180J	CHIP C	18PF J		
C151			CC73FCH1H220J	CHIP C	22PF J		
C152			CC73FCH1H050C	CHIP C	5PF C		
C155,156			CK73FB1C105Z	CHIP C	1.0UF Z		
C157,158			CK73FB1E103K	CHIP C	0.01UF K		
C159			CC73FCH1H050C	CHIP C	5PF C		
C161			CK73FB1E103K	CHIP C	0.01UF K		
C162-165			CK73FB1H102K	CHIP C	1000PF K		
C201			CC73FCH1H010C	CHIP C	1PF C		
C200-205			CK73FB1H102K	CHIP C	1000PF K		
C206			CC73FCH1H060D	CHIP C	6PF D		
C207			CK73FB1H102K	CHIP C	1000PF K		
C209			CC73FSL1H101J	CHIP C	100PF J		
C210-212			CK73FB1H102K	CHIP C	1000PF K		
C213			CC73FCH1H1R5C	CHIP C	1.5PF C		
C215			CC73FCH1H030C	CHIP C	3PF C		
C216-220			CK73FB1H102K	CHIP C	1000PF K		
C221			CC73FCH1H050C	CHIP C	5PF C		
C222			CC73FC41H040C	CHIP C	4PF C		
C223-225			CK73FB1H102K	CHIP C	1000PF K		
C226			CC73FCH1H030C	CHIP C	3PF C	MN2M3	
C226			CC73FCH1H050C	CHIP C	5PF C	Y4C32	
C226			CC73FCH1H030C	CHIP C	3PF C	E389	
C226			CC73FCH1H050C	CHIP C	5PF C	KP	
C227			CK73FB1H102K	CHIP C	1000PF K		
C228			CC73FCH1H120J	CHIP C	12PF J		
C229-231			CK73FB1H102K	CHIP C	1000PF K		
C232,233			CC73FCH1H1R0C	CHIP C	1PF C		
C234,235			CK73FB1H102K	CHIP C	1000PF K		
C236			CE04HW1C470M	ELECTRO	47UF 16WV		

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PARTS LIST

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TX-RX UNIT (X57-406X-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			Desti-nation 仕向	Re-marks 備考
C237			CK73FB1H102K	CHIP C	1000PF	K		
C239			C92-0502-05	CHIP TAN	0.47UF	35WV		
C240,241			CK73FF1C105Z	CHIP C	1.0UF	Z		
C242			CK73FF1C474Z	CHIP C	0.47UF	Z		
C243			CK73FB1H102K	CHIP C	1000PF	K		
C244			CK73FF1C105Z	CHIP C	1.0UF	Z		
C245-249			CK73FB1H102K	CHIP C	1000PF	K		
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			CC73FCH1H050D	CHIP C	5PF	D		
C258			CC73FCH1H100J	CHIP C	10PF	J		
C259			CC73FCH1H010D	CHIP C	1.0PF	D		
C260			CC73FCH1H090D	CHIP C	9PF	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		
C267,268			CK73FB1H102K	CHIP C	1000PF	K		
C269,270			CC73FSL1H100J	CHIP C	10PF	J		
C271,272			CK73FB1H102K	CHIP C	1000PF	K		
C273			CC73FSL1H100J	CHIP C	10PF	J		
C274			CK73FB1H102K	CHIP C	1000PF	K		
C275,276			CC73FSL1H100J	CHIP C	10PF	J		
C277-282			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		✻	C92-0484-05	CHIP TAN	4.7UF	10WV		
C289			CE04NW1C100M	ELECTRO	10UF	16WV		
C291-292			CC73FSL1H101J	CHIP C	100PF	J		
C300			CC73FSL1H101J	CHIP C	100PF	J		
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			CC73FCH1H030C	CHIP C	3PF	C		
C311			CK73FB1H102K	CHIP C	1000PF	K		
C312			CC73FCH1H050D	CHIP C	5PF	D		
C313			CK73FB1H102K	CHIP C	1000PF	K		
C314			CE04NW1C101M	ELECTRO	100UF	16WV		
C315-325			CK73FB1H102K	CHIP C	1000PF	K		
[illegible]			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			CK73FB1C103K	CHIP C	0.010UF	K		
C330			CC73FCH1H040D	CHIP C	4.0PF	D	K2	
C331			CC73FCH1H060D	CHIP C	6.0PF	D	M,M2,M3	

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TM-733A/E

PARTS LIST

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TX-RX UNIT (X57-438X-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
C330			CM73F2H060D	CHIP C	6.0PF	D	M4252	
C330			CM73F2H060D	CHIP C	6.0PF	D	E7E9	
C331,332			CK73FB1H102K	CHIP C	1000PF	K		
C333			CC45SL2H050D	CERAMIC	5.0PF	D		
C334			CC45SL2H090D	CERAMIC	9.0PF	D		
C335			CC73FCH1H0R5C	CHIP C	0.5PF	C		
C336			CC73FCH1H020C	CHIP C	2.0PF	C		
C337			CK73FB1H102K	CHIP C	1000PF	K		
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		
C343			CC45SL2H050C	CERAMIC	5.0PF	C		
C344			CC45SL2H390J	CERAMIC	39PF	J		
C345			CC45SL2H070D	CERAMIC	7.0PF	D		
C346			CC73FCH1HR75C	CHIP C	0.75PF	C	MN2M5	
C346			CC73FCH1HR75C	CHIP C	0.75PF	C	M4E62	
C346			CC73FCH1HR75C	CHIP C	0.75PF	C	E2E3	
C347			CC73FCH1H010C	CHIP C	1PF	C	KPM3	
C347			CC73FCH1H010C	CHIP C	1PF	C	M4E62	
C347			CC73FCH1H010C	CHIP C	1PF	C	E3E9	
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	33UF	16WV		
C356			CK73FB1H471K	CHIP C	470PF	K		
C358			CK73FB1H102K	CHIP C	1000PF	K		
C361,362			CK73FF1C105Z	CHIP C	1.0UF	Z		
C363-365			CK73FB1H102K	CHIP C	1000PF	K		
C367			CC73FCH1H220J	CHIP C	22PF	J		
C368,369			CK73FB1H102K	CHIP C	1000PF	K		
C372,373			CK73FB1H102K	CHIP C	1000PF	K		
C401,402			CK73FB1E103K	CHIP C	0.01UF	K		
C404			CK73FB1E103K	CHIP C	0.010UF	K		
C405			CK73FB1H102K	CHIP C	1000PF	K		
C406			CK73FB1H332K	CHIP C	3300PF	K		
C407			CC73FSL1H151J	CHIP C	150PF	J		
C408			CC73FSL1H121J	CHIP C	120PF	J		
C409-411			CC73FSL1H101J	CHIP C	100PF	J		
C412			CK73FF1C105Z	CHIP C	1.0UF	Z		
C413		※	C92-0205-05	CHIP TAN	4.7UF	10WV		
C414-416			CK73FB1E103K	CHIP C	0.01UF	K		
C419			CK73FB1H332K	CHIP C	3300PF	K		
C420			CC73FSL1H101J	CHIP C	100PF	J		
C421			CK73FB1E103K	CHIP C	0.01UF	K		
C422,423			CC73FSL1H101J	CHIP C	100PF	J		
C424			CK73FB1H102K	CHIP C	1000PF	K		
C425,426			CC73FCH1H330J	CHIP C	33PF	J		
C427,428			CK73FB1H102K	CHIP C	1000PF	K		
C429			CK73FB1H102K	CHIP C	1000PF	K	RE2E3	
C429			CK73FB1H102K	CHIP C	1000PF	K	E9	
C434			CK73FF1C105Z	CHIP C	1.0UF	Z		

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TX-RX UNIT (X57-436X-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			Desti-nation 仕向	Re-marks 備考
C435,436			CK73FB1E104K	CHIP C	0.10UF	K		
C437,438			C92-0507-05	CHIP TAN	4.7UF	6.3WV		
C439			CE04DW1A101M	ELECTRO	100UF	10WV		
C440,441			CC73FSL1H101J	CHIP C	100PF	J		
C442,443			CK73FB1H102K	CHIP C	1000PF	K		
C444			CE04CW1A221M	ELECTRO	220UF	10WV		
C445			CK73FF1C105Z	CHIP C	1.0UF	Z		
C446			CK73FB1E103K	CHIP C	0.010UF	K		
C447			CK73FB1E223K	CHIP C	0.022UF	K		
C448			CK73FB1H122K	CHIP C	1200PF	K		
C449			CC73FSL1H101J	CHIP C	100PF	J		
C450			CK73FF1C105Z	CHIP C	1.0UF	Z		
C451-453			CC73FSL1H101J	CHIP C	100PF	J		
C454			CK73FB1H102K	CHIP C	1000PF	K		
C455			CK73FB1E104K	CHIP C	0.10UF	K		
C456			CK73FB1E103K	CHIP C	0.010UF	K		
C457		*	C92-0606-05	CHIP TAN	4.7UF	10WV		
C458			C92-0523-05	ELECTRO	10UF	16WV		
C459			CK73FB1E104K	CHIP C	0.10UF	K		
C460,461			CC73FSL1H101J	CHIP C	100PF	J		
C462			CK73FB1E393K	CHIP C	0.039UF	K		
C463			C92-0507-05	CHIP TAN	4.7UF	6.3WV		
C464			CK73FB1E223K	CHIP C	0.022UF	K		
C465			CC73FCH1H270J	CHIP C	27PF	J		
C466			CK73FB1E333K	CHIP C	0.033UF	K		
C467			CK73FH1H821K	CHIP C	820PF	K		
C468			CK73FB1H332K	CHIP C	3300PF	K		
C469			CC73FSL1H820J	CHIP C	82PF	J		
C470			CC73FSL1H101J	CHIP C	100PF	J		
C471			CK73FB1E104K	CHIP C	0.10UF	K		
C472			CK73FB1E223K	CHIP C	0.022UF	K		
C473-477			CK73FF1C105Z	CHIP C	1.0UF	Z		
C478			C92-0507-05	CHIP TAN	4.7UF	6.3WV		
C479			CK73FB1H104K	CHIP C	0.10UF	K		
C480,481			CK73FF1C105Z	CHIP C	1.0UF	Z		
C482			CK73FH1H563K	CHIP C	0.056UF	K		
C483			C92-0559-05	CHIP TAN	6.8UF	6.3WV		
C601-606			CK73FB1E103K	CHIP C	0.010UF	K		
TC1			C05-0371-05	TRIM CAP		10PF		
A1,2			J72-0405-04	TERMINAL BOARD				
CN1		*	E40-[illegible]-05	FLAT CABLE CONNECTOR(19P)				
CN2			E40-3257-05	PIN CONNECTOR ASSY(2P+5P)				
CN201			E40-3299-05	PIN CONNECTOR ASSY(2P+5P)				
CN202			E40-5498-05	FLAT CABLE CONNECTOR([illegible]P)				
CN401		*	E40-[illegible]-05	FLAT CABLE CONNECTOR([illegible]P)				
CN402		*	E40-5639-05	FLAT CABLE CONNECTOR(19P)				
CN403		*	E40-5652-05	PIN CONNECTOR ASSY(4P)				
CN404			E40-5619-05	FLAT CABLE CONNECTOR(3P)				
CN601-603			E40-5403-05	PIN CONNECTOR ASSY(5P)				
J1,2			E11-0446-05	PHONE JACK				
J401			E08-0875-05	RECTANGULAR RECEPTACLE				
J402		*	E56-0404-05	CYLINDRICAL RECEPTACLE(4P)				
W1,2		*	E[illegible]-0458-05	CABLE			KP	
-			G10-2029-04	S-FOLDING CASE				

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TX-RX UNIT (X57-436X-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	Desti-nation 仕向	Re-marks 備考
F201		✱	F53-0128-05	FUSE (1.2A)		
F202		✱	F53-0110-05	FUSE (1.2A)		
F401		✱	F53-0110-05	FUSE (1.2A)		
100	5C	✱	G02-0760-04	FLAT SPRING		
-		✱	G13-1439-04	CUSHION(LITHIUM BATT)		
-			J30-0545-08	SPACER(CRYSTAL RESONATOR)		
CF1			L79-1013-05	FILTER(455KHZ)		
CF201			L79-1013-05	FILTER(455KHZ)		
CF1		✱	L72-0420-05	CERAMIC FILTER(455KHZ)		
CF201		✱	L72-0400-05	CERAMIC FILTER(455KHZ)		
L2			L40-1085-34	SMALL FIXED INDUCTOR(100NH)		
L3			L40-2785-34	SMALL FIXED INDUCTOR(270NH)		
L4		✱	L34-4343-05	COIL		
L5		✱	L34-4344-05	COIL		
L6			L40-1003-34	SMALL FIXED INDUCTOR(10UH)		
L7		✱	L34-4344-05	COIL		
L8			L40-1585-34	SMALL FIXED INDUCTOR(150NH)		
L10		✱	L34-4345-05	COIL		
L11			L40-1095-34	SMALL FIXED INDUCTOR(1UH)		
L12			L92-0131-05	CORE		
L13,14			L40-1891-34	SMALL FIXED INDUCTOR(18NH)		
L15			L40-1271-34	SMALL FIXED INDUCTOR(12NH)		
L16			L40-1271-34	SMALL FIXED INDUCTOR(12NH)		
L17			L40-3371-34	SMALL FIXED INDUCTOR(33NH)		
L18			L40-2271-34	SMALL FIXED INDUCTOR(22NH)		
L19			L40-1005-34	SMALL FIXED INDUCTOR(100NH)		
L20			L40-3395-34	SMALL FIXED INDUCTOR(330NH)		
L21			L40-8271-34	SMALL FIXED INDUCTOR(82NH)		
L22			L40-4785-34	SMALL FIXED INDUCTOR(470NH)		
L23			L34-1229-05	COIL (10.5T)		
L24			L34-0895-05	COIL (6T)		
L25			L34-0742-05	COIL (5T)		
L26			L34-1539-05	COIL (11.5T)		
L27,28			L34-0499-05	COIL (4T)		
L29			L34-0742-05	COIL (5T)		
L201			L40-4771-34	SMALL FIXED INDUCTOR(47NH)		
L202			L40-1871-34	SMALL FIXED INDUCTOR(18NH)		
L203			L79-1027-05	FILTER(455KHZ)	M,M2,M3	
L203			L79-1033-05	FILTER(455KHZ)	M4,E2	
L203			L79-1037-05	FILTER(455KHZ)	E3,E9	
L203			L79-1038-05	FILTER(445KHZ)	K,P	
L204		✱	L40-3971-34	SMALL FIXED INDUCTOR(39NH)		
L205			L79-1037-05	FILTER(455KHZ)	M,M2,M3	
L205			L79-1037-05	FILTER(455KHZ)	M4,E2	
L205			L79-1037-05	FILTER(455KHZ)	E3,E9	
L205			L79-1038-05	FILTER(445KHZ)	K,P	
L211			L40-1095-34	SMALL FIXED INDUCTOR(1UH)		
L212			L40-3371-34	SMALL FIXED INDUCTOR(33NH)		
L213			L40-2271-34	SMALL FIXED INDUCTOR(22NH)		
L214		✱	L34-4546-05	COIL		
L215			L40-3985-34	SMALL FIXED INDUCTOR(390NH)		
L217			L40-1071-34	SMALL FIXED INDUCTOR(10NH)		
L218			L40-1095-34	SMALL FIXED INDUCTOR(1UH)		

E: Scandinavia K: USA P: Canada
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TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

PARTS LIST

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

TX-RX UNIT (X57-436X-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				Desti-nation 仕向	Re-marks 備考
L219			L41-1271-34	SMALL FIXED INDUCTOR(10NH)					
L220			L40-6871-34	SMALL FIXED INDUCTOR(68NH)					
L221,225			L40-4771-34	SMALL FIXED INDUCTOR(47NH)					
L222			L40-1005-34	SMALL FIXED INDUCTOR(10UH)					
L230			L40-2771-34	SMALL FIXED INDUCTOR(27NH)					
L231			L34-1231-05	COIL (4.5T)					
L232			L34-1207-05	COIL (3.5T)					
L233,234			L34-1183-05	COIL (2.5T)					
L235			L34-1226-05	COIL (1.5T)					
L236,237			L34-1014-05	COIL (5.5T)					
L238,239			L34-1052-05	COIL (1.5T)					
L241			L34-0742-05	COIL (5T)					
L243			L92-0131-05	CORE					
L244			L40-3371-34	SMALL FIXED INDUCTOR(33NH)					
L401			L92-0131-05	CORE					
X1			L77-1278-05	CRYSTAL RESONATOR(45.57[illegible]MHZ)					
X2		*	L77-1370-05	CRYSTAL RESONATOR(12.0MHZ)					
X201			L77-1479-05	CRYSTAL RESONATOR(58.77MHZ)					
X401			L79-0269-05	RESONATOR (455KHZ)					
X402			L77-1397-05	CRYSTAL RESONATOR([illegible]4.15MHZ)					
XF1		*	L71-0443-05	CRYSTAL FILTER (45.050MHZ)					
XF201		*	L71-0447-05	CRYSTAL FILTER (58.525MHZ)					
CP401			R90-0711-05	MULTI-COMP					
CP402			R90-0714-05	MULTI COMP	10KX4				
CP403			R90-0727-05	MULTI COMP	100K				
R1			RK73FB2A473J	CHIP R	47K	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			RK73FB2A223J	CHIP R	22K	J	1/10W		
R6			RK73FB2A123J	CHIP R	12K	J	1/10W		
R7			RK73FB2A820J	CHIP R	82	J	1/10W		
R8			RK73FB2A103J	CHIP R	10K	J	1/10W		
R9,10			RK73FB2A470J	CHIP R	47	J	1/10W		
R11			RK73FB2A103J	CHIP R	10K	J	1/10W		
R12			RK73FB2A152J	CHIP R	1.5K	J	1/10W		
R13			RK73FB2A104J	CHIP R	100K	J	1/10W		
R14			RK73FB2A100J	CHIP R	10	J	1/10W		
R15			RK73FB2A103J	CHIP R	10K	J	1/10W		
R16			RK73FB2A471J	CHIP R	470	J	1/10W		
R17,18			RK73FB2A104J	CHIP R	100K	J	1/10W		
R19			RK73FB2A121J	CHIP R	120	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		
R24			RK73FB2A104J	CHIP R	100K	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			RK73FB2A331J	CHIP R	330	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		

L:Scandinavia K:USA P:Canada
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Y:AAFES(Europe) X:Australia M:Other Areas

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E8

⚠ indicates safety critical components.

PARTS LIST

★ New Parts.
Parts without Parts No. are not supplied.
Les pièces sans numéro ne sont pas fournies.
Teile ohne Teile-Nr. werden nicht geliefert.

TX-RX UNIT (X57-438X-XX)

Ref No. 参照番号	Address 位置	New Parts 新部品	Parts No. 部品番号	Description 部品名／規格			Destination 仕向	Remarks 備考
L219			L40 1971-34	SMALL FIXED INDUCTOR(12NH)				
L220			L40-6671-34	SMALL FIXED INDUCTOR(68NH)				
L221,229			L40-2771-34	SMALL FIXED INDUCTOR(27NH)				
L223			L40-1025-54	SMALL FIXED INDUCTOR(10UH)				
L250			L40 2771-34	SMALL FIXED INDUCTOR(27NH)				
L231			L34-1248-05	COIL (4.6T)				
L232			L34-1249-05	COIL (3.5T)				
L233,234			L34-1105-05	COIL (2.6T)				
L235			L34-1224-05	COIL (1.6T)				
L236,237			L34-1049-05	COIL (2.5T)				
L238,239			L34-1050-05	COIL (1.5T)				
L241			L34-0742-05	COIL (5T)				
L242			L99-0131-05	CORE				
L244			L40-3331-34	SMALL FIXED INDUCTOR(330NH)				
L401			L99-0131-05	CORE				
X1			L77-1470-05	CRYSTAL RESONATOR(45.525MHZ)				
X2		*	L77-1570-05	CRYSTAL RESONATOR(10.8MHZ)				
X201			L77-1479-05	CRYSTAL RESONATOR(59.52MHZ)				
X401			L78-0099-05	RESONATOR (480K-Z)				
X402			L77-1491-05	CRYSTAL RESONATOR(14.19MHZ)				
X51		±	L71-0443-05	CRYSTAL FILTER (45.05MHZ)				
X202		±	L71-0447-05	CRYSTAL FILTER (59.525MHZ)				
CP401			R90-0711-05	VOLTAGE REG				
CP402			R90-2711-05	MINUTE CRYP 10KX4				
CP407			R90-2711-05	MINUTE CRYP 100K				
R1			RK73FB2A473J	CHIP R 47K J 1/10W				
R2			RK73FB2A100J	CHIP R 10 J 1/10W				
R3			RK73FB2A104J	CHIP R 100K J 1/10W				
R4			RK73FB2A274J	CHIP R 270K J 1/10W				
R5			RK73FB2A223J	CHIP R 22K J 1/10W				
R6			RK73FB2A123J	CHIP R 12K J 1/10W				
R7			RK73FB2A020J	CHIP R 2Ω J 1/10W				
R8			RK73FB2A103J	CHIP R 10K J 1/10W				
R9			RK73FB2A470J	CHIP R 47 J 1/10W				
R11			RK73FB2A103J	CHIP R 10K J 1/10W				
R12			RK73FB2A152J	CHIP R 1.5K J 1/10W				
R13			RK73FB2A104J	CHIP R 100K J 1/10W				
R14			RK73FB2A100J	CHIP R 10 J 1/10W				
R15			RK73FB2A103J	CHIP R 10K J 1/10W				
R16			RK73FB2A471J	CHIP R 470 J 1/10W				
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			RK73FB2A104J	CHIP R 100K J 1/10W				
R24			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			RK73FB2A331J	CHIP R 330 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				

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

K:USA P:Canada
T:England E:Europe
J:Australia M:Other Areas

⚠ Indicates safety critical components.

TM-733A/E

PARTS LIST

TX-RX UNIT (X57-436X-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
R53			RK73FB2A123J	CHIP R	12K	J 1/10W		
R54			RK73FB2A103J	CHIP R	10K	J 1/10W		
R55			RK73FB2A221J	CHIP R	220	J 1/10W		
R57			RK73FB2A123J	CHIP R	12K	J 1/10W		
R58			RK73FB2A104J	CHIP R	100K	J 1/10W		
R59			RK73FB2A473J	CHIP R	47K	J 1/10W		
R60			RK73FB2A103J	CHIP R	10K	J 1/10W		
R61			RK73FB2A122J	CHIP R	1.2K	J 1/10W		
R62			RK73FB2A101J	CHIP R	100	J 1/10W		
R63			RK73FB2A473J	CHIP R	47K	J 1/10W		
R64			RK73FB2A470J	CHIP R	47	J 1/10W		
R65			RK73FB2A222J	CHIP R	2.2K	J 1/10W		
R66			RK73FB2A223J	CHIP R	22K	J 1/10W		
R67			RK73FB2A162J	CHIP R	1.6K	J 1/10W		
R68 -81			RK73FB2A103J	CHIP R	10K	J 1/10W		
R82			RK73FB2A102J	CHIP R	1.0K	J 1/10W		
R83			RK73FB2A223J	CHIP R	22K	J 1/10W		
R84			RK73FB2A123J	CHIP R	12K	J 1/10W		
R85			RK73FB2A682J	CHIP R	6.8K	J 1/10W		
R86			RK73FB2A472J	CHIP R	4.7K	J 1/10W		
R87			RK73FB2A103J	CHIP R	10K	J 1/10W		
R88			RK73FB2A182J	CHIP R	1.8K	J 1/10W		
R89			RK73FB2A473J	CHIP R	47K	J 1/10W		
R90			RK73FB2A223J	CHIP R	22K	J 1/10W		
R91			RK73FB2A472J	CHIP R	4.7K	J 1/10W		
R92			RK73FB2A104J	CHIP R	100K	J 1/10W		
R93 ,94			RK73FB2A473J	CHIP R	47K	J 1/10W		
R95 -97			RK73FB2A223J	CHIP R	22K	J 1/10W		
R98			RK73FB2A153J	CHIP R	15K	J 1/10W		
R99			RK73FB2A104J	CHIP R	100K	J 1/10W		
R100			RK73FB2A103J	CHIP R	10K	J 1/10W		
R101			RK73FB2A471J	CHIP R	470	J 1/10W		
R102			RK73FB2A184J	CHIP R	180K	J 1/10W		
R103			RK73FB2A103J	CHIP R	10K	J 1/10W		
R104			RK73FB2A471J	CHIP R	470	J 1/10W		
R105 ,06			RK73FB2A223J	CHIP R	22K	J 1/10W		
R107			RK73FB2A222J	CHIP R	2.2K	J 1/10W		
R108			RK73FB2A223J	CHIP R	22K	J 1/10W		
R109 ,10			RK73-0603-1J	CHIP R	0 OHM			
R111			RK73FB2A473J	CHIP R	47K	J 1/10W		
R112			RK73FB2A471J	CHIP R	470	J 1/10W		
R113			RK73FB2A101J	CHIP R	100	J 1/10W		
R114			RK73FB2A223J	CHIP R	22K	J 1/10W		
R115			RK73FB2A154J	CHIP R	150K	J 1/10W		
R116			RK73FB2A472J	CHIP R	4.7K	J 1/10W		
R117			RK73-0605-05	CHIP R	22	J 1/2W		

LScandinavia　K:USA　P:Canada
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Y:AAFES(Europe)　X:Australia　M:Other Areas

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components

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.

TX-RX UNIT (X57-436X-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				Desti-nation 仕向	Re-marks 備考
R98			RK73FB2A680J	CHIP R	680	J	1/10W		
R99			RK73FB2A5R6J	CHIP R	5.6	J	1/10W		
R100			RK73FB2A821J	CHIP R	820	J	1/10W		
R101			R92-1213-05	CARBON	100	J	1/4W		
R102,103			RK73FB2A223J	CHIP R	22K	J	1/10W		
R104			RK73FB2A220J	CHIP R	22	J	1/10W		
R105			RK73FB2A471J	CHIP R	470	J	1/10W		
R107			RK73FB2A471J	CHIP R	470	J	1/10W		
R108			RK73FB2A182J	CHIP R	1.8K	J	1/10W		
R109			RK73FB2A151J	CHIP R	150	J	1/10W		
R110			RK73FB2A220J	CHIP R	22	J	1/10W		
R111			R92-0670-05	CHIP R	0 OHM				
R201			RK73FB2A104J	CHIP R	100K	J	1/10W		
R202			RK73FB2A223J	CHIP R	22K	J	1/10W		
R203			RK73FB2A151J	CHIP R	150	J	1/10W		
R204			RK73FB2A101J	CHIP R	100	J	1/10W		
R205			RK73FB2A470J	CHIP R	47	J	1/10W		
R206			RK73FB2A220J	CHIP R	22	J	1/10W		
R207			RK73FB2A222J	CHIP R	2.2K	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			RK73FB2A332J	CHIP R	3.3K	J	1/10W		
R213			RK73FB2A470J	CHIP R	47	J	1/10W		
R214			RK73FB2A223J	CHIP R	22K	J	1/10W		
R215,216			RK73FB2A103J	CHIP R	10K	J	1/10W		
R217			RK73FB2A221J	CHIP R	220	J	1/10W		
R218			RK73FB2A102J	CHIP R	1.0K	J	1/10W		
R219			RK73FB2A470J	CHIP R	47	J	1/10W		
R220			RK73FB2A221J	CHIP R	220	J	1/10W		
R221			RK73FB2A151J	CHIP R	150	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		
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			RK73FB2A220J	CHIP R	22	J	1/10W		
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		

L: Scandinavia K: USA P: Canada
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Y: AAFES (Europe) X: Australia M: Other Areas

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

TM-733A/E

PARTS LIST

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

TX-RX UNIT (X57-436X-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
R248			RK73FB2A273J	CHIP R 27K J 1/10W		
R249			RK73FB2A103J	CHIP R 10K J 1/10W		
R250			RK73FB2A332J	CHIP R 3.3K J 1/10W		
R251			RK73FB2A682J	CHIP R 6.8K J 1/10W		
R253			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R254,255			RK73FB2A223J	CHIP R 22K J 1/10W		
R256			RK73FB2A474J	CHIP R 470K J 1/10W		
R257			R92-0670-05	CHIP R 0 OHM		
R262,263			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-[illegible]-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-[illegible]-05	CHIP R 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 [illegible] J 1/5W		
R284,285			RK73FB2A103J	CHIP R 10K J 1/10W		
R287			RK73FB2A471J	CHIP R 470 J 1/10W		
R288			RK73FB2A103J	CHIP R 10K J 1/10W		
R290			RK73FB2A473J	CHIP R 47K J 1/10W		
R291			RK73FB2A104J	CHIP R 100K J 1/10W		
R292			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R297			RK73FB2A151J	CHIP R 150 J 1/10W		
R401			RK73FB2A123J	CHIP R 12K J 1/10W		
R402			RK73FB2A224J	CHIP R 220K J 1/10W		
R403			RK73FB2A473J	CHIP R 47K J 1/10W		
R404			RK73FB2A682J	CHIP R 6.8K J 1/10W		
R405			R92-0670-05	CHIP R 0 OHM		
R407			R92-0670-05	CHIP R 0 OHM		
R408			RK73FB2A472J	CHIP R 4.7K J 1/10W		
R409			RK73FB2A470J	CHIP R 47 J 1/10W		
R410			R92-0670-05	CHIP R 0 OHM	ME3E9	
R411			R92-0670-05	CHIP R 0 OHM	EE2E3	
R411			R92-0670-05	CHIP R 0 OHM	E9	
R412			R92-0670-05	CHIP R 0 OHM	KP	
R412			R92-0670-05	CHIP R 0 OHM	MM2M3	
R413			R92-0670-05	CHIP R 0 OHM	M4	
R414			R92-0670-05	CHIP R 0 OHM	KPM4	
R414			R92-0670-05	CHIP R 0 OHM	E3E9	
R415			RK73FB2A274J	CHIP R 270K J 1/10W		
R417			RK73FB2A182J	CHIP R 1.8K J 1/10W		
R419			RK73FB2A473J	CHIP R 47K J 1/10W		
R418			RK73FB2A224J	CHIP R 220K J 1/10W		
R420			RK73FB2A392J	CHIP R 3.9K J 1/10W		
R421			RK73FB2A102J	CHIP R 1.0K J 1/10W		
R422			RK73FB2A103J	CHIP R 10K J 1/10W		
R423,424			RK73FB2A102J	CHIP R 1.0K J 1/10W		

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

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

PARTS LIST

[redacted]

TX-RX UNIT (X57-436X-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
[redacted]								
R425			RK73FB2A224J	CHIP R 220K	J	1/10W		
R427			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R426			R92-0602-05	C-TP R 0 @1W				
R429			RK73FB2A152J	CHIP R 1.5K	J	1/10W		
R432			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R433			RK73FB2A103T	CHIP R 10K	J	1/10W		
R434			RK73FB2A392J	CHIP R 3.9K	J	1/10W		
R435			RK73FB2A221J	CHIP R 220	J	1/10W		
R436			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R437			RK73FB2A824J	CHIP R 820K	J	1/10W		
R438			RK73FB2A562J	CHIP R 5.6K	J	1/10W		
R439			RK73FB2A223J	CHIP R 22K	J	1/10W		
R440			RK73FB2A272J	CHIP R 2.7K	J	1/10W		
R441			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R442-444			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R445			RK73FB2A472J	CHIP R 47K	J	1/10W		
R446			R92-0670-05	CHIP R 0 @1W				
R447,448			RK73FB2A472J	CHIP R 47K	J	1/10W		
R449			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R450,451			RK73FB2A223J	CHIP R 22K	J	1/10W		
R452								
R453			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R454-458			RK73FB2A473J	CHIP R 47K	J	1/10W		
R459,460			RK73FB2A272J	CHIP R 2.7K	J	1/10W		
R461			RK73FB2A103J	CHIP R 10K	J	1/10W		
R462			RK73FB2A1021	CHIP R 1.02K	F	1/10W		
R463			RK73FB2A473J	CHIP R 47K	J	1/10W		
R466			RK73FB2A104J	CHIP R 100K	J	1/10W	D32E9	
R467			RK73FB2A103J	CHIP R 10K	J	1/10W		
R468			RK73FB2A104J	CHIP R 100K	J	1/10W		
R470			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R471			RK73FB2A684J	CHIP R 680K	J	1/10W		
R472			RK73FB2A392J	CHIP R 3.9K	J	1/10W		
R474			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R475			RK73FB2A684J	CHIP R 680K	J	1/10W		
R476			RK73FB2A392J	CHIP R 3.9K	J	1/10W		
R477			R92-0670-05	CHIP R 0 @1W				
R478			RK73FB2A153J	CHIP R 15K	J	1/10W		
R480			RK73FB2A153J	CHIP R 15K	J	1/10W		
R481			RK73FB2A101J	CHIP R 100	J	1/10W		
R482			RK73FB2A105J	CHIP R 1.0M	J	1/10W		
R484,485			RK73FB2A473J	CHIP R 47K	J	1/10W		
R486			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R487			RK73FB2A103J	CHIP R 10K	J	1/10W		
R488			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R489			RK73FB2A563J	CHIP R 56K	J	1/10W		
R490-492			RK73FB2A473J	CHIP R 47K	J	1/10W		
R495,496			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R494			RK73FB2A472J	CHIP R 4.7K	J	1/10W		
R495			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R497			RK73FB2A474J	CHIP R 470K	J	1/10W		
R498			RK73FB2A103J	CHIP R 10K	J	1/10W		
R500			RK73FB2A273J	CHIP R 27K	J	1/10W		
R501			RK73FB2A224J	CHIP R 220K	J	1/10W		
R503			RK73FB2A102J	CHIP R 1.0K	J	1/10W		
R504			RK73FB2A472J	CHIP R 4.7K	J	1/10W		

[redacted]

TM-733A : K, P, M, MZ, M3, M4
TM-733E : E, E2, E3, E9

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

⚠ : denotes safety critical components

TM-733A/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.

TX RX UNIT (X57-430X-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				Desti-nation 仕向	Re-marks 備考
R504			RK73FB2A272J	CHIP R	2.7K	J	1/10W		
R505			RK73FB2A473J	CHIP R	47K	J	1/10W		
R507			RK73FB2A103J	CHIP R	10K	J	1/10W		
R508,509			RK73FB2A102J	CHIP R	1.0K	J	1/10W		
R510			RK73FB2A392J	CHIP R	3.9K	J	1/10W	K,M2	
R510			RK73FB2A392J	CHIP R	3.9K	J	1/10W	M4	
R510			RK73FB2A562J	CHIP R	5.6K	J	1/10W	E,E3,E9	
R511			RK73FB2A102J	CHIP R	1.0K	J	1/10W	EZ,P	
R511			RK73FB2A222J	CHIP R	2.2K	J	1/10W	M,M3	
R512			RK73FB2A184J	CHIP R	180K	J	1/10W		
R513			RK73FB2A224J	CHIP R	220K	J	1/10W		
R514			RK73FB2A103J	CHIP R	10K	J	1/10W		
R515			RK73FB2A334J	CHIP R	330K	J	1/10W		
R516			RK73FB2A561J	CHIP R	560	J	1/10W		
R517			RK73FB2A394J	CHIP R	390K	J	1/10W		
R518			RK73FB2A333J	CHIP R	33K	J	1/10W		
R519			RK73FB2A473J	CHIP R	47K	J	1/10W		
R520			RK73FB2A224J	CHIP R	220K	J	1/10W		
R521-R523			RK73FB2A823J	CHIP R	82K	J	1/10W		
R524			RK73FB2A472J	CHIP R	4.7K	J	1/10W		
R525			RK73FB2A151J	CHIP R	150	J	1/10W		
R526			RK73FB2A102J	CHIP R	1.0K	J	1/10W		
R527			RK73FB2A183J	CHIP R	18K	J	1/10W		
R528			RK73FB2A474J	CHIP R	470K	J	1/10W		
R529			RK73FB2A103J	CHIP R	10K	J	1/10W		
R530			RK73FB2A823J	CHIP R	82K	J	1/10W		
R531			RK73FB2A103J	CHIP R	10K	J	1/10W		
R532			RK73FB2A473J	CHIP R	47K	J	1/10W		
R533			RK73FB2A224J	CHIP R	220K	J	1/10W		
R534			RK73FB2A103J	CHIP R	10K	J	1/10W		
R535			RK73FB2A393J	CHIP R	39K	J	1/10W		
R536			RK73FB2A563J	CHIP R	56K	J	1/10W		
R537			RK73FB2A223J	CHIP R	22K	J	1/10W		
R538			RK73FB2A273J	CHIP R	27K	J	1/10W		
R540			RK73FB2A224J	CHIP R	220K	J	1/10W		
R541			RK73FB2A102J	CHIP R	1.0K	J	1/10W		
R542-548			RK73FB2A182J	CHIP R	1.8K	J	1/10W		
R549			RK73FB2A103J	CHIP R	10K	J	1/10W		
R550			RK73FB2A473J	CHIP R	47K	J	1/10W		
R551			RK73FB2A472J	CHIP R	4.7K	J	1/10W	E,E3	
R551			RK73FB2A472J	CHIP R	4.7K	J	1/10W	E9	
R552,553			RK73FB2A103J	CHIP R	10K	J	1/10W		
R554			RK73FB2A3R3J	CHIP R	3.3	J	1/10W		
VR1,2			R12-6719-05	TRIM POT	100K				
VR3			R12-6713-05	TRIM POT	10K				
VR4			R12-6717-05	TRIM POT	47K				
VR201			R12-6719-05	TRIM POT	100K				
VR202			R12-6717-05	TRIM POT	47K				
VR203,204			R12-6711-05	TRIM POT	4.7K				
VR601,602			R03-9407-05	POTENTIOMETER	50K				
TS1			S59-7444-05	THERMAL SWITCH(90°C)					
D1 -5			MA350	DIODE					
D6			MAN233K	DIODE					
D7		✽	DTZ5.6(A)	DIODE					

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

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, EZ, E3, E9

⚠ indicates safety critical components.

PARTS LIST

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

TX-RX UNIT (X57-438X-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	Desti-nation 仕向	Re-marks 備考
D8			DAN202U	DIODE		
D9			1SS226	DIODE		
D10			DAN235K	DIODE		
D11			DAN202U	DIODE		
D12			1SS181	DIODE		
D13			MI407	DIODE		
D14			MI209	DIODE		
D15 ,16			1SS226	DIODE		
D17			MA360	DIODE		
D18 ,19			MA110	DIODE		
D201			1SV128	DIODE		
D202			DAN202U	DIODE		
D203			MA716	DIODE		
D204			MA77	DIODE		
D205			MA862	DIODE		
D206,207			DAN202U	DIODE		
D210			MA862	DIODE		
D211			1SS184	DIODE		
D212			DAN202U	DIODE		
D213			MI407	DIODE		
D214			MI209	DIODE		
D215,216			MA716	DIODE		
D217			DSA3A1	DIODE		
D401,402			MA110	DIODE		
D403,404			MA112	DIODE		
D405			DTZ7.5(B)	DIODE		
D406		*	DTZ3.0(A)	DIODE		
D407,408			MA110	DIODE		
D409			1SS226	DIODE		
D411			MA110	DIODE		
IC1			KC024	HIC(FM IF)		
IC2			KC005	HIC(AM IF)		
IC3			UPC1676G	IC(POWER AMP)		
IC4			XRU4066BCF	IC (or BU4066BCF)		
IC5			XRL4094BF	IC (or BU4094BF)		
IC6			LA4445	IC(2CHANNEL AF POWER AMP 5.5W)		
IC7			XRU4053BCF	IC (or BU4053BCF)		
IC8			XRU4094BF	IC (or BU4094BF)		
IC9		*	KCH19	HIC	M M2 M3	
IC9		*	KCH19	HIC	M4 E2	
IC9		*	KCH19	HIC	E3 E9	
IC9		*	KCH21	HIC	K P	
IC10			KCB11	HIC(DRIVER)		
IC11			LA5010M	IC(LOW SATURATION REGULATOR)		
IC12			TC4S66F	IC(BILATERAL SWITCH)		
IC201			KC024	HIC(FM IF)		
IC202		*	KC926	HIC	M M2 M3	
IC202		*	KC926	HIC	M4 E2	
IC202		*	KC926	HIC	E3 E9	
IC203			KC927	HIC		
IC204			XRL4066BCF	IC (or BU4066BCF)		
IC205,206			XRU4094BF	IC (or BU4094BF)		
IC207		*	KCH23	HIC		
IC208			LA5010M	IC(LOW SATURATION REGULATOR)		
IC209			KCB14	HIC(DRIVER)	M M2 M3	

L:Scandinavia K:USA P:Canada
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TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

TM-733A/E

PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
[illegible]
[illegible]

TX-RX UNIT (X57-436X-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		Desti-nation 仕向	Re-marks 備考
IC209			KC914	[illegible]		[illegible]	
IC209			KC914	[illegible]		[illegible]	
IC209		*	KC910	[illegible]		K?	
IC210			[illegible]	[illegible]			
IC211			MC78?08CT	IC(VOLTAGE REGULATOR/ 8V)			
IC401		*	LC7387M	IC			
IC402			TC9?10?	IC			
IC403		*	95?1607-196-399	IC(CPU)		[illegible]	
IC403		*	95?1607-196-307	IC(CPU)		[illegible]	
IC403		*	[illegible]-196-399	IC(CPU)		[illegible]	
IC403		*	[illegible]-196-399	IC(CPU)		K?	
IC404			XRU4066??	IC	(or ?4066BCP)		
IC405,406			XRU4053??	IC	(or BU4053BCF)		
IC407			M5?7032??	IC			
IC408			TA75[illegible]	IC			
IC409,410			SC145???	IC	(or TC4S??)		
IC411			XRU4066??	IC	(or BU4066BCF)		
IC412,413			NJM4558?	IC(OP AMP)			
Q1		*	3SK241(R)	FET			
Q2			FM??	TRANSISTOR			
Q3,4			2SK1??	FET			
Q5			DTC114EU	DIGITAL TRANSISTOR			
Q6			2SC4215(Y)	TRANSISTOR			
Q7			DTA123??	DIGITAL TRANSISTOR			
Q8		*	DTC14??	DIGITAL TRANSISTOR			
Q9			2SK1??(GR)	FET			
Q10			2SC4116(Y)	TRANSISTOR			
Q11,12			DTA123??	DIGITAL TRANSISTOR			
Q13			2SK184(?)	FET			
Q14			DTC114EU	DIGITAL TRANSISTOR			
Q15			DTC144EU	DIGITAL TRANSISTOR			
Q16			2SA1362(Y)	TRANSISTOR			
Q17			2SB1119(S)	TRANSISTOR			
Q18,19			2SC4116(Y)	TRANSISTOR			
Q20			DTC114EU	DIGITAL TRANSISTOR			
Q21			?S?1824	FET			
Q22			2SK1399?	FET			
Q23			UPA502T	IC(SWITCHING/MOS FET)			
Q24			2SK879(Y)	FET			
Q25			2SC4215(Y)	TRANSISTOR			
Q26			2SC4116(Y)	TRANSISTOR			
Q27			FMG1	TRANSISTOR			
Q28,29			2SC4116(Y)	TRANSISTOR			
Q30,31			DTC114EU	DIGITAL TRANSISTOR			
Q201		*	3SK241(R)	FET			
Q202			FMA5	TRANSISTOR		[illegible]	
Q203			DTA123?U	DIGITAL TRANSISTOR		[illegible]	
Q203			DTA123??	DIGITAL TRANSISTOR		[illegible]	
Q203			DTA123??	DIGITAL TRANSISTOR			
Q204		*	3SK241(R)	FET			
Q205			DTC114EU	DIGITAL TRANSISTOR			
Q206			2SK184(S)	FET			
Q207			DTC114EK	DIGITAL TRANSISTOR			
Q208			2SC4215(Y)	TRANSISTOR			
Q209			2SC1??(GR)	FET			

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

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ indicates safety critical components.

PARTS LIST

TX-RX UNIT (X57-436X-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
Q210			[illegible]	TRANSISTOR		
Q211			2SC3356	TRANSISTOR		
Q212			2SK1824-[illegible]	FET		
Q213			DTC114EU	DIGITAL TRANSISTOR		
Q214			2SC4116(Y)	TRANSISTOR		
Q215			DTC144EL	DIGITAL TRANSISTOR		
Q216			2SA1360(Y)	TRANSISTOR		
Q217			2SC4116(Y)	TRANSISTOR		
Q218			2SB1197(Q)	TRANSISTOR		
Q219			DTC143E-	DIGITAL TRANSISTOR		
Q220			DTA123E-	DIGITAL TRANSISTOR		
Q221,222			2SK1824	FET		
Q223			2SC4116(Y)	TRANSISTOR		
Q224			2SC2712	TRANSISTOR		
Q230			DTC143EK	DIGITAL TRANSISTOR		
Q231			FMG7	TRANSISTOR		
Q232			2SC4726(K)	TRANSISTOR		
Q233			2SB1202(S)	TRANSISTOR		
Q234			DTC114E-	DIGITAL TRANSISTOR		
Q236			2SC4116(Y)	TRANSISTOR		
Q401			DTC144EU	DIGITAL TRANSISTOR		
Q402,403			2SC4116(Y)	TRANSISTOR		
Q404,405			DTC143EU	DIGITAL TRANSISTOR		
Q406-408			2SC4116(Y)	TRANSISTOR		
Q409-412			2SK1824	FET		
Q413,414			2SC4116(Y)	TRANSISTOR		
Q415			2SA1519	TRANSISTOR		
Q416			2SK1824	FET		
Q417			DTC114E-	DIGITAL TRANSISTOR		
Q418			2SC4116(Y)	TRANSISTOR		
Q419			2SC4116(Y)	TRANSISTOR		
Q421			DTC144EU	DIGITAL TRANSISTOR		
Q422			DTA123JU	DIGITAL TRANSISTOR		
Q423-425			2SC4116(Y)	TRANSISTOR		
Q426			DTC114EU	DIGITAL TRANSISTOR		
B41			MCR-3570-05	LITHIUM BATTERY(3V 70mAH)		
CN21		*	W10-1622-05	RINGSOCKET		

D:Standard K:USA P:France
X:PX(Far East, Hawaii) T:England E:Europe
M:MTE(Europe) C:Canada M:Other Area

TM-733A : K, P, M, M2, M3, M4
TM-733E : E, E2, E3, E9

⚠ Indicates safety critical components

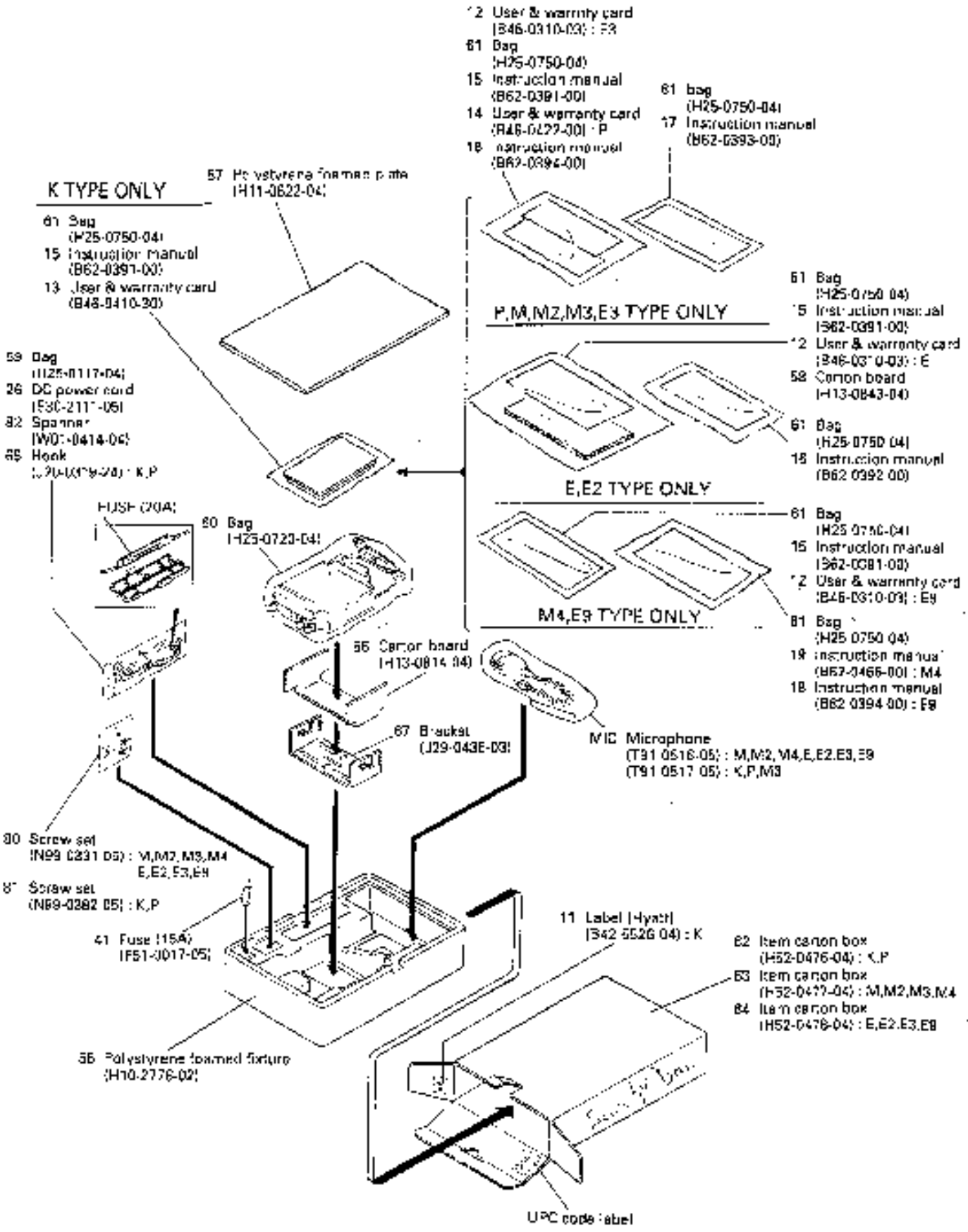
TM-733A/E

PARTS LIST

LCD ASSY (B38-070X-25)
LCD ASSY TEMPORARY UNIT

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格			Desti-nation 仕向	Re-marks 備考
LCD ASSY (B38-070X-25) 8 : M4 9 : K, P, M, M2, M3, E, E2, E3, E9								
-		*	[illegible]-05	FRONT GLASS				
-		*	[illegible]-03	RUBBER CONNECTOR				
CN1		*	E40-[illegible]-05	CONNECTOR (4 P)				
CN2 -4			E40-[illegible]-03	CONNECTOR (5 P)				
		*	[illegible]-0718-05	SPACER				
-		*	[illegible]-08	METAL FRAME				
XT1			L77-1797-05	CRYSTAL RESONATOR (4.[illegible]MHz)				
SW1 -12			S70-04[illegible]-18	TACT SWITCH				
D1			FB01	DIODE				
D2			MA110	DIODE				
LED1 ,2		*	B30-2[illegible]-05	LED				
IC1			L76LR[illegible]-RA	IC				
IC2 ,3			5C14S11P	IC	(or TC4S11F)			
IC4		*	[illegible]-073-339	IC(CPU)				
IC5		*	AT24C0[illegible]	IC				
IC6 ,7		*	[illegible]	IC				
LCD1		*	B38-0710-[illegible]	LCD ELEMENT				[illegible]
LCD1		*	B38-[illegible]-08	LCD ELEMENT				[illegible]
LCD1		*	B38-[illegible]	LCD ELEMENT				[illegible]
LCD1		*	B30-[illegible]-08	LCD ELEMENT				[illegible]
PL1 -4			B30-[illegible]	LAMP (6.3V [illegible]mA)				
Q1		*	2SJ1[illegible]	TRANSISTOR				
Q2			2SC2712(Y)	TRANSISTOR				
Q3 ,4			2SA1162(Y)	TRANSISTOR				
LCD ASSY TEMPORARY UNIT								
C701			C92-[illegible]-05	CHIP TAN	2.2UF	6.3WV		
C702			CK73[illegible]	CHIP C	0.[illegible]UF	K		
R701			RK73GB1J22[illegible]	CHIP R	22K	J	1/16W		
R703			R92-1252-05	CHIP R	0 OHM		1/16W		
R704			RK73GB1J[illegible]	CHIP R	10K	J	1/16W		
R705			RK73GB1J[illegible]	CHIP R	33K	J	1/16W		
R706			RK73GB1J[illegible]	CHIP R	82K	J	1/16W		
R707			RK73GB1J[illegible]	CHIP R	56K	J	1/16W		
R708			RK73GB1J[illegible]	CHIP R	22K	J	1/16W		
R709			RK73GB1J[illegible]	CHIP R	10K	J	1/16W		
R710			RK73GB1J[illegible]	CHIP R	33K	J	1/16W		
R711			RK73GB1J[illegible]	CHIP R	33K	J	1/16W		
R712			R92-1252-05	CHIP R	0 OHM		1/16W		
R713			RK73GB1J563J	CHIP R	56K	J	1/16W		
R715-718			R92-1252-05	CHIP R	0 OHM		1/16W		
IC701			[illegible]	IC				
Q701,702			2SC4116(Y)	TRANSISTOR				

PACKING


12 User & warranty card (B46-0310-03) : E3
61 Bag (H25-0750-04)
15 Instruction manual (B62-0391-00)
14 User & warranty card (B46-0329-00) : P
18 Instruction manual (B62-0394-00)
61 bag (H25-0750-04)
17 Instruction manual (B62-0393-00)
K TYPE ONLY
57 Polystyrene foamed plate (H11-0622-04)
61 Bag (H25-0750-04)
15 Instruction manual (B62-0391-00)
13 User & warranty card (B46-0410-30)
P,M,M2,M3,E3 TYPE ONLY
61 Bag (H25-0750-04)
15 Instruction manual (B62-0391-00)
12 User & warranty card (B46-0310-03) : E
58 Canon board (H13-0843-04)
61 Bag (H25-0750-04)
15 Instruction manual (B62-0392-00)
E,E2 TYPE ONLY
61 Bag (H25-0750-04)
15 Instruction manual (B62-0391-00)
12 User & warranty card (B46-0310-03) : E9
M4,E9 TYPE ONLY
61 Bag (H25-0750-04)
19 Instruction manual (B67-0466-00) : M4
18 Instruction manual (B62-0394-00) : E9
59 Bag (H25-0117-04)
26 DC power cord (E30-2117-05)
82 Spanner (W01-0414-04)
65 Hook (J29-0479-04) : K,P
HUSH (20A)
60 Bag (H25-0720-04)
56 Canon board (H13-0814-04)
67 Bracket (J29-0436-03)
MIC Microphone (T91-0516-05) : M,M2,M4,E,E2,E3,E9 (T91-0517-05) : K,P,M3
80 Screw set (N99-0231-05) : M,M2,M3,M4 E,E2,E3,E9
87 Screw set (N99-0282-05) : K,P
41 Fuse (15A) (F51-0017-05)
11 Label (Hyatt) (B42-0526-04) : K
55 Polystyrene foamed fixture (H10-2776-02)
62 Item canon box (H52-0476-04) : K,P
63 Item canon box (H52-0477-04) : M,M2,M3,M4
64 Item canon box (H52-0478-04) : E,E2,E3,E9
UPC code label

ADJUSTMENT

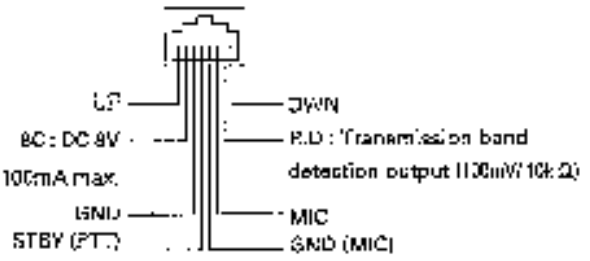
Measuring Equipment for Adjustment

1. Tester
   Input impedance: High
2. RF valve voltmeter (RF V.M)
   Input impedance: 1MΩ or more, 2pF or less
   Voltage range: Full scale = 10mV to 30V
   Measurable frequency range: up to 450MHz
3. Frequency counter (Frequency counter)
   Input sensitivity: About 50mV
   Measurable frequency: 450MHz or more
4. DC power supply
   Voltage: Variable in the range 10 to 17V
   Current: 13A or more
5. Power meter
   Measurement power: 60W, 10W, 1W
   Impedance: 50Ω
   Measurable frequency: 450MHz
6. AF valve voltmeter (AF V.M)
   Input impedance: 1MΩ or more
   Voltage range: Full scale = 1mV to 30V
   Measurable frequency range: 50Hz to 10kHz
7. AF generator (AG)
   Output frequency: 100Hz to 10kHz
   Output voltage: 0.5mV to 3V
8. Tone detector
   Measurable frequency: 450MHz
9. Spectrum analyzer
   Measurable frequency: 450MHz
10. Directional coupler
11. Oscilloscope
    High sensitivity with horizontal input terminal
12. Standard signal generator (SSG)
    The standard signal generator must be able to generate the 144 and 430MHz band frequencies and vary the amplitude and frequency.
    Output: 0.1μV to greater than 1mV
13. Dummy load (For AF)
    8Ω, about 5W
14. Noise generator
    The noise generator must be able to generate noise similar to ignition noise containing high frequency components of 450MHz or more.
15. Sweep generator
    The sweep generator must be able to sweep the 144 and 430MHz bands.
16. Tracking generator
17. Adjustment jig

Preparation

- Set the controls and switches to the positions listed below unless otherwise specified.

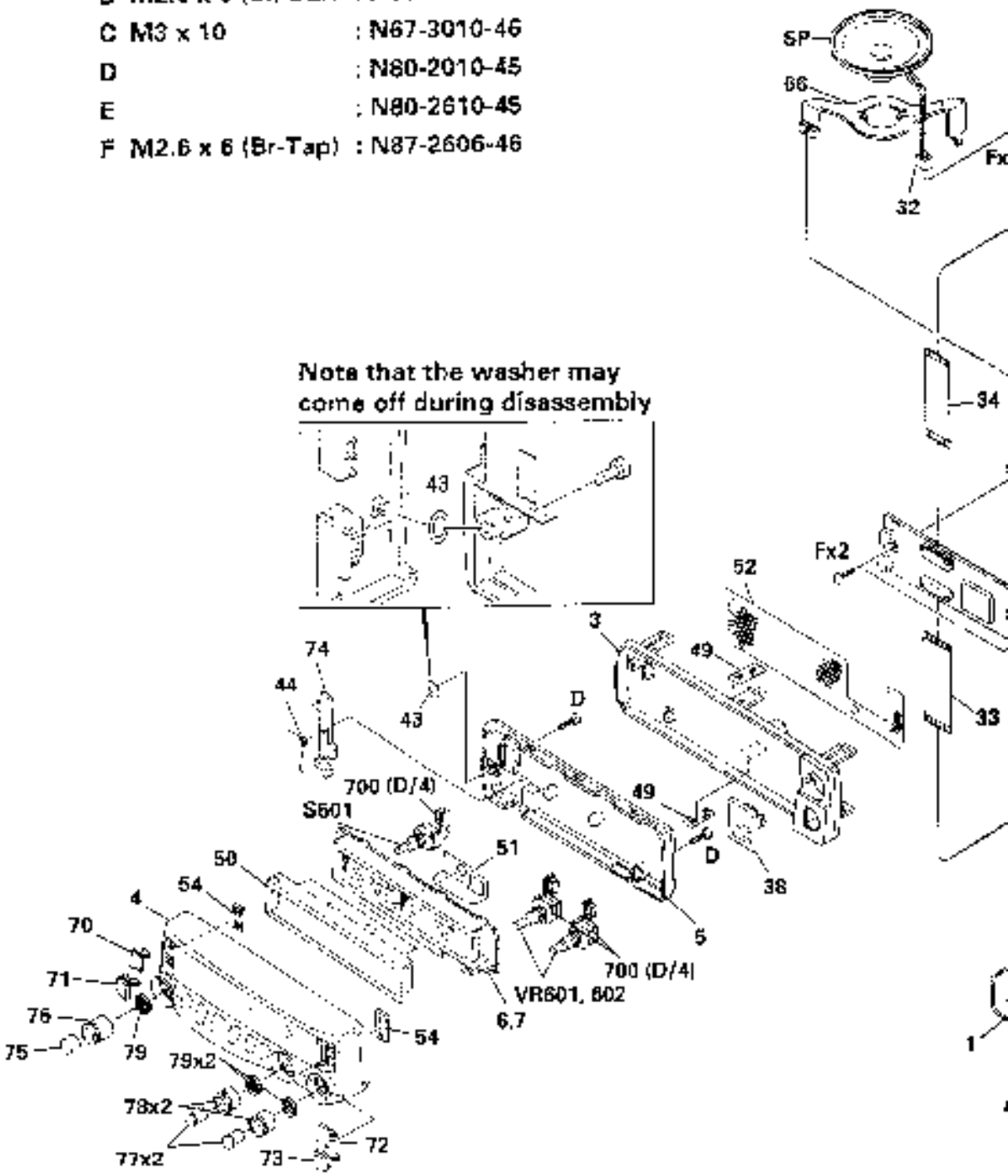
VOL control	Fully counterclockwise
SQL control	Fully counterclockwise
POWER switch	OFF
(For Fixed station)	OFF
DC power supply POWER switch	



Microphone socket
(as viewed from the front of the set)

- Use an insulated rod, such as a plastic rod, for adjustment (especially for trimmers, coils, etc.).
- To protect the signal generator, never connect the microphone to the microphone socket when the receiver section is adjusted.
- Before the power cord is connected, make sure the power switch is off.
- The SSG output level in parentheses are displayed at the release end.
  Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV : ±3kHz, AF output : 0.63V/8Ω)
- See the instruction manual for transmit and receive operations.

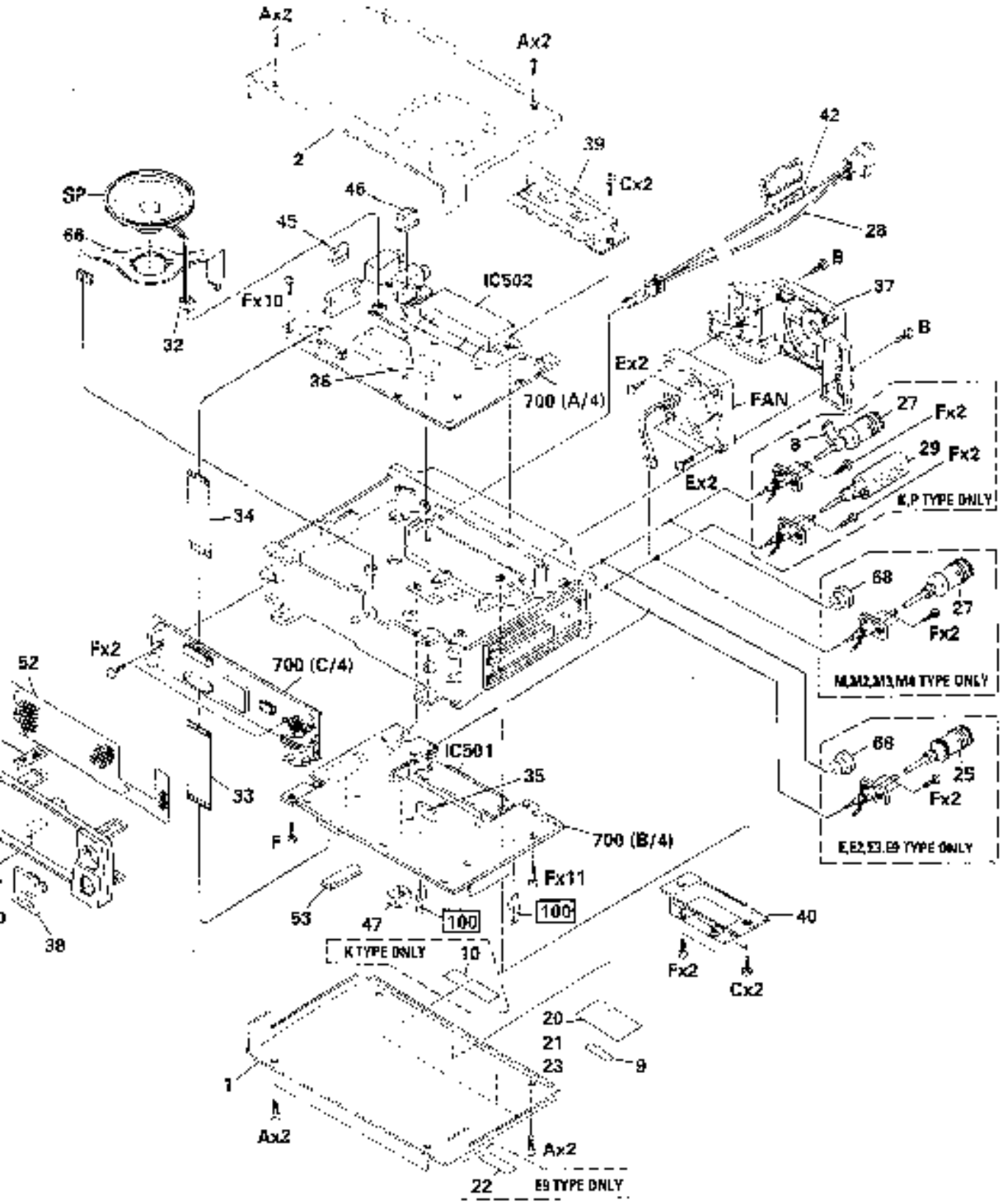
A M2.6 x 6 (OC) BLK : N33-2606-45
B M2.6 x 8 (Bi) BLK : N35-2608-45
C M3 x 10 : N67-3010-46
D : N80-2010-45
E : N80-2610-45
F M2.6 x 6 (Br-Tap) : N87-2606-46



Parts with the exploded numbers larger than 700 are not supplied.

3A/E TM-733A/E

EXPLODED VIEW



ADJUSTMENT

Method of Checking the Operation of the LCD Assembly

The display microcomputer has an Assembly mode function that is useful in checking for panel display and key operation faults. The function is also helpful in investigating problems or checking operation after a repair.

When the main unit and the panel are connected together in the normal way (or by using a separate cable), the operation of the microcomputer in the main unit can also be checked.

- **Entering Assembly mode**

Hold down the CALL and MUTE keys and press the PWR key. All LCD segments come on and Assembly mode is entered. (See the figure below.)

If the mode fails to be entered, DC power supply power goes off, then entering assembly mode again. To exit Assembly mode, press the PWR key again or DC power supply power goes off.

- **Checking operation**

1. Press the VFO/M>V key. **(This must always be done first.)**
   The serial port is automatically checked.
   - If it functions normally,
     "F" and "80" are displayed. (See the figure below.)
   - If it does not function normally,
     "1" or "2" is displayed.
     ("1": When SO is made low, SI does not go low.)
     ("2": When SO is made high, SI does not go high.)

2. Press the BAND SEL key. (Press the AF VOL control.)
   "82" and the function indicator appear.
   (The left green LED lights.)
   "83" and the function indicator appear.
   (The right green LED lights.)
3. Press the CONT SEL key.
   "84" and the function indicator appear.
4. Press the PM key.
   "85" and the "1" to "6" key indicators appear.
5. Press the MHz key.
   "82" and the function indicator appear.
6. Press the CALL key.
   "5" and "83" appear briefly. (Minimum intensity)
7. Press the LOW key.
   "4" and "89" appear. (Intensity level 4: Dim)
8. Press the SHIFT (BELL) key.
   "3" and "85" appear. (Intensity level 3: Slightly dim)
9. Press the TONE key.
   "2" and "86" appear. (Intensity level 2)
10. Press the REV key.
    "1" and "87" appear. (Intensity level 1: Strongest)
11. Press the MUTE key.
    "-2222" and "22" appear.
12. Press the F key.
    Each time the F key is pressed, the 6 key function display changes in three levels.
13. Set the AF and SQL-VRs to minimum, then press the M/M key.
    "00" appears on the UHF-band frequency display and "00" appears on the memory channel display.

- When the tuning knob (encoder) is turned, the number changes in the range 00 to 15.
- When the AF VOL(V) control is turned, the VHF S meter changes.
  When the AF VOL(U) control is turned, the UHF S meter changes.
  When the SQ VOL(V) control is turned, the VHF MR channel display changes in the range 00 to 63.
  When the SQ VOL(U) control is turned, the UHF MR channel display changes in the range 00 to 63.

TM-733A/E

ADJUSTMENT

Method of Checking the Operation of the LCD Assembly

The display microcomputer has an Assembly mode function that is useful in checking for panel display and key operation faults. The function is also useful in investigating problems or checking operation after a repair.

When the main unit and the panel are connected together in the normal way or by using a separate cable, the operation of the microcomputer in the main unit can also be checked.

- **Entering Assembly mode**

Hold down the CALL and MUTE keys and press the PWR key. All LCD segments come on and Assembly mode is entered. (See the figure below.)

If the mode fails to be entered, DC power supply power goes off, then entering assembly mode again. To exit Assembly mode, press the PWR key again or DC power supply power goes off.

- **Checking operation**

1. Press the VFO/M>V key. **(This must always be done first.)**
   The serial port is automatically checked.
   If it functions normally:
   "F" and "80" are displayed. (See the figure below.)
   If it does not function normally:
   "1" or "2" is displayed.
   ("1": When SC is made low, SI does not go low.)
   ("2": When SC is made high, SI does not go high.)

2. Press the BAND SEL key. (Press the AF VOL control.)
   "80" and the function indicator appear.
   (The left green LED lights.)
   "8F" and the function indicator appear.
   (The right green LED lights.)
3. Press the CONT SEL key.
   "8A" and the function indicator appear.
4. Press the PM key.
   "8b" and the "1" to "6" key indicators appear.
5. Press the M/B key.
   "82" and the function indicator appear.
6. Press the CALL key.
   "5" and "83" appear dimly. (Minimum intensity)
7. Press the LOW key.
   "4" and "83" appear. (Intensity level 4: Dim)
8. Press the SHIFT (SELJ key.
   "3" and "85" appear. (Intensity level 3: Slightly dim)
9. Press the TONE key.
   "2" and "85" appear. (Intensity level 2)
10. Press the REV key.
    "1" and "87" appear. (Intensity level 1: Strongest)
11. Press the MUTE key.
    "-2222" and "22" appear.
12. Press the F key.
    Each time the F key is pressed, the 6 key function display changes in three levels.
13. Set the AF and SQL-VRs to minimum, then press the M/B/M key.
    "00" appears on the UHF-band frequency display and "00" appears on the memory channel display.

When the tuning knob (encoder) is turned, the number changes in the range 99 to 15.
When the AF VOL(V) control is turned, the VHF S meter changes.
When the AF VOL(U) control is turned, the UHF S meter changes.
When the SQ VOL(V) control is turned, the VHF MR channel display changes in the range 00 to 63.
When the SQ VOL(U) control is turned, the UHF MR channel display changes in the range 00 to 63.

ADJUSTMENT

Common Section

Item	Condition	Measurement: Test equipment	Measurement: Unit	Adjustment: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specifications/Remarks
1. Setting	1) Power voltage : DC 13.8V 2) Check to see LCD lights on. While pushing CALL key and MUTE key, turn on POWER. Upon confirming that all have lit up, turn off POWER after pushing VFO key. 3) Hint: While pushing MR key, turn on POWER. (frequency section lights on) Wait there for about 10 seconds until memory is initialized, then turn off POWER. 4) Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV : 3kHz, AF output : 0.63V/8Ω).	All LCD lights on (Except M4 type)  All LCD lights on (M4 type) 						
2. Lock voltage	1) V band (VHF) FREQ. : 144.600MHz POWER : LOW Receiving and transmission. 2) U band (UHF) Use band SEL key to select a band. FREQ. : 435.000MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. : 445.000MHz **K,P** Receiving and transmission. 3) Pushing the band SEL key of UHF band, then set to the V2 (V x V) band by the F key. CONT SEL key. V2 (V x V) band FREQ. : 145.040MHz Receiving After checked, return to the original state with F key, CONT SEL key.	DC V.M	Power cord	TX-RX (V/U) Rear panel	CV ANT	Check	1.2 – 1.8V **M,M2,M3,M4,E,E2,E3,E9** 3.0 – 5.0V **K,P** 4.7 – 6.3V 2.3 – 4.0V
3. BPF	1) V band FREQ. : 145.940MHz **E,E3,E9** FREQ. : 147.940MHz **K,P,M,M2,M3,M4,E2** Connect speaker to EXT SP2, operating AF VR of each band. SSG : Lowering SSG from -113dBm (0.5μV), adjust it between -120dBm (0.23μV) to -121dBm (0.2μV).	DC V.M SSG	TX-RX (V/U) Rear panel	SM ANT EXT SP2	TX-RX (V/U)	L4 5.7 10Ω	Voltage MAX	Reference : approx. 2.5V Except operating AF VR + MIN. AF output (taken from external speaker)
	2) U band FREQ. : 435.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. : 445.040MHz **K,P** SSG : Lowering SSG from -113dBm (0.5μV), adjust it between -120dBm (0.23μV) to -121dBm (0.2μV).		TX-RX (U/V) Rear panel	SM ANT EXT SP2	TX-RX (U/V)	L214		

ADJUSTMENT

Receiver Section

Item	Condition	Measurement: Test equipment	Measurement: Unit	Adjustment: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specifications/Remarks
Sensitivity	1) V band **E,E3,E9** FREQ. 144.040MHz FREQ. 145.040MHz FREQ. 145.940MHz **K,P,M,M2,M3,M4,E2** FREQ. 144.040MHz FREQ. 146.940MHz FREQ. 147.940MHz SSG : –17dBm (0.1µV)	Distortion meter Oscilloscope AF VTVM	Rear panel	EXT SP			Check	SINAD 12dB or more
	2) U band **M,M2,M3,M4,E,E2,E3,E9** FREQ. 430.040MHz FREQ. 435.040MHz FREQ. 439.940MHz **K,P** FREQ. 438.040MHz FREQ. 440.040MHz FREQ. 449.940MHz SSG : –12dBm (0.1µV)							SINAD 12dB or more.
	3) Display combination unit LED lighting at V2 (V x V or U2 (U x U) with F key. CONT SEL key. After check, return to the original state with F key. CONT SEL key. Switching the LED side with SEL key, set a band for confirmation with F key. CONT SEL key, once again. V2 band FREQ. 145.040MHz SSG : –17dBm (0.22µV)							SINAD 12dB or more.
	4) U band FREQ. 435.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. 445.040MHz **K,P** SSG : –11dBm (0.28µV)							SINAD 12dB or more
2 High level input S/N	1) V band FREQ. 145.040MHz **E,E3,E9** FREQ. 145.940MHz **K,P,M,M2,M3,M4,E2** SSG –4dBm (500µV) AF output 2.83V/8Ω	Oscilloscope AF VTVM SSG	Rear panel	EXT SP			Check	S/N 44dB or more.
	2) U band FREQ. 435.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. 445.040MHz **K,P** SSG : –6dBm (500µV) AF output 2.83V/8Ω							S/N 42dB or more

ADJUSTMENT

Item	Condition	Measurement: Test equipment	Measurement: Unit	Measurement: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specifications/Remarks
3. Distortion	1) V band FREQ. : 145.040MHz **E,E3,E9** FREQ. : 145.94[illegible]MHz **K,P,M,M2,M3,M4,E2** SSG : -33dBm (50μV) AF output : 4V/8Ω	Distortion meter Oscilloscope AF VTVM SSG	Rear panel	EXT SP			Check	3% or less
	2) U band FREQ. : 438.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. : 445.[illegible]0MHz **K,P** SSG : -73dBm (50μV) AF output : 4V/8Ω							5% or less
4. S-meter	1) V band FREQ. : 145.040MHz **E,E3,E9** FREQ. : 145.94[illegible]MHz **K,P,M,M2,M3,M4,E2** SSG : -93dBm (3.5μV)	SSG	Rear panel	ANT	TX-RX (X-4)	VR1	Set the SSG output to the point where the S-meter just lights by 1 dots from full (0dB)	
	2) U band FREQ. : 435.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. : 445.0[illegible]0MHz **K,P** SSG : -86dBm (3.5μV)				TX-RX (X-4)	VR201		
	3) V band FREQ. : As the above SSG : -9[illegible]dBm (4.5μV)						Check	S-meter 1st lighting
	4) SSG : OFF							S-meter lights out.
5. Squelch	1) V band FREQ. : 145.040MHz **E,E3,E9** FREQ. : 145.94[illegible]MHz **K,P,M,M2,M3,M4,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 B : 09 – 11 : 00 BUSY lights off.
	2) SSG : -127dBm (0.1μV)							Squelch open BUSY lights on.
	3) SQL knob : Clockwise MAX							AF output disappear BUSY lights off.
	4) SSG : -110dBm (0.7μV)							Squelch open. Note : If not squelch opened, minimum 20dB NQ level is acceptable.
	5) U band FREQ. : 435.040MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ. : 445.040MHz **K,P** SSG : OFF Turning the squelch knob, set it to a point where noise disappears.						Check	Squelch knob position B : 09 – 11 : 00 BUSY lights off.
	6) SSG : -127dBm (0.1μV)							Squelch open BUSY lights on.
	7) SQL knob : Clockwise MAX							AF output disappear. BUSY lights off.
	8) SSG : -110dBm (0.7μV)							Squelch open. Note : If not squelch opened, minimum 20dB NQ level is acceptable.

TM-733A/E

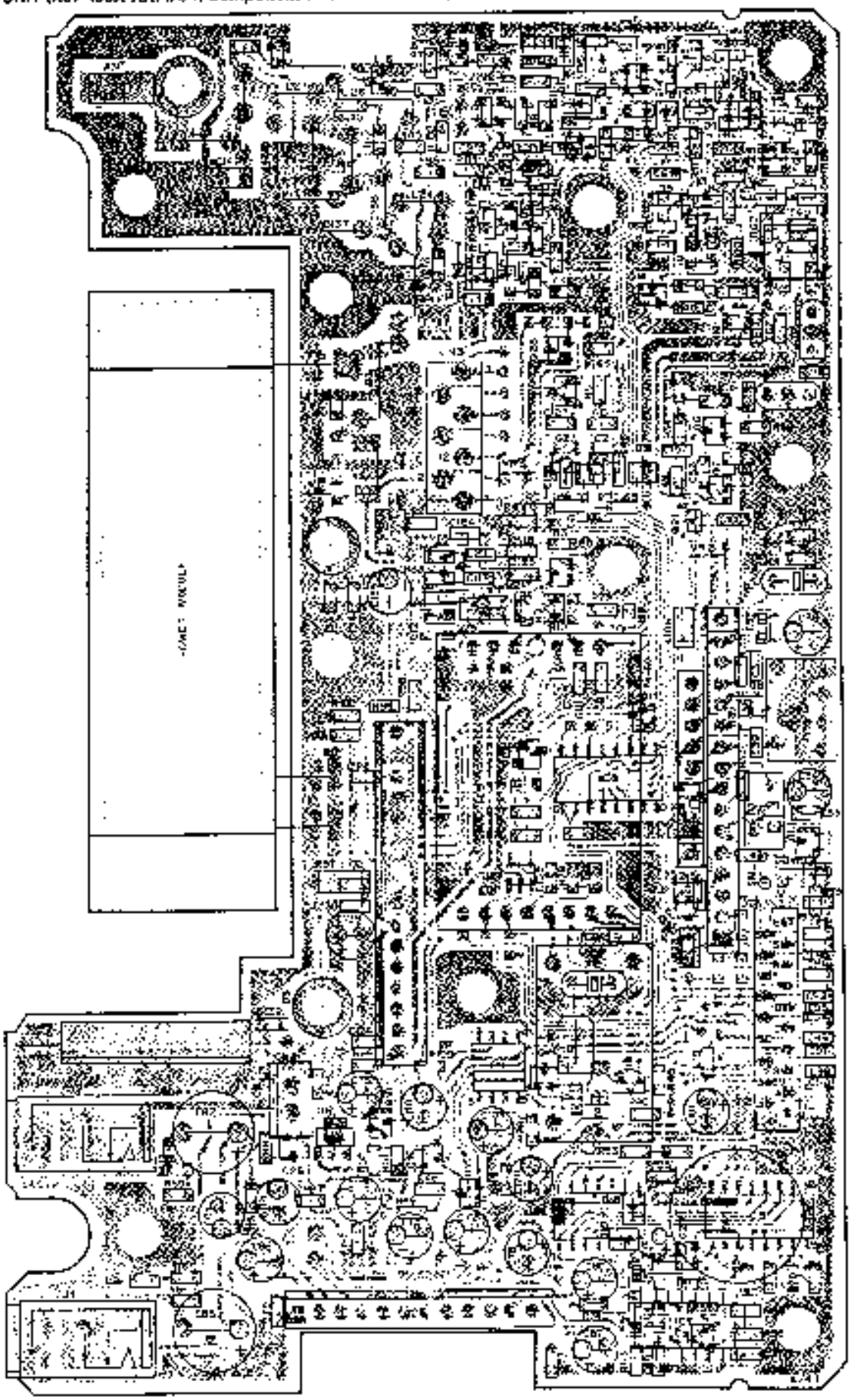
ADJUSTMENT

ansmission Section

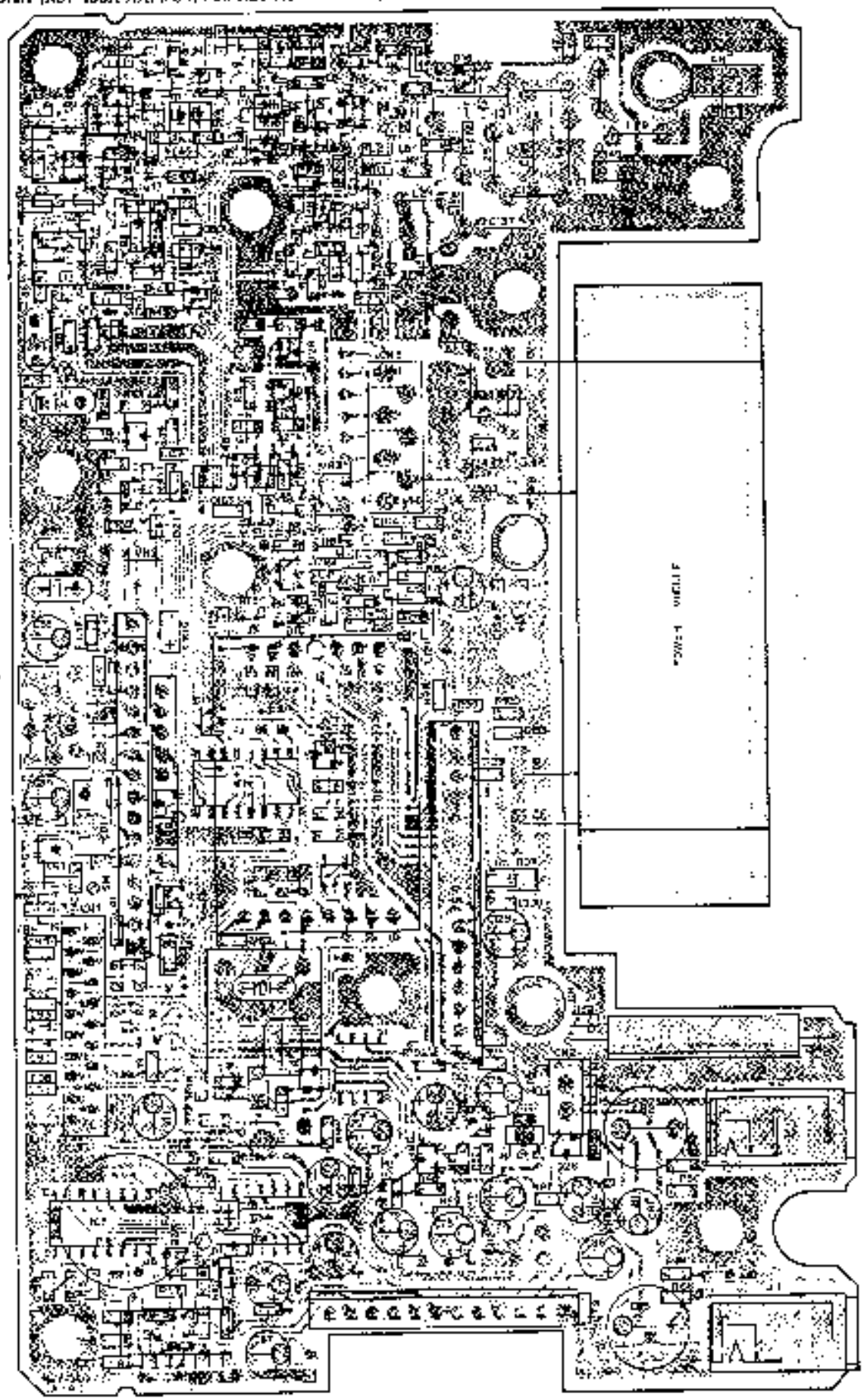
Item	Condition	Measurement: Test equipment	Measurement: Unit	Measurement: Terminal	Adjustment: Unit	Adjustment: Parts	Adjustment: Method	Specifications/Remarks
mission power	1) U band FREQ. : 455.000MHz M,M2,M3,M4,E,E2,E3,E9 FREQ. : 449.000MHz K,P	Counter Dummy load Power meter	Rear panel	ANT	TX-RX (A/4)	TC1	435.000MHz M,M2,M3,M4,S,E2,E3,E9 441.000MHz K,P	Hot warm-up time set. 3 × 1000 for ± 100Hz
POWER meter band	1) FREQ. : 144.000MHz E,E3,E9 FREQ. : 145.000MHz K,P,M,M2,M3,M4,E2 Transmission.	Power meter Attenuator	Rear panel	ANT	TX-RX (A/4)	VR3	Clockwise MAX	50W or more
	2) POWER : HI Transmission					VR3	10W	±1W 1'34" or less.
	3) POWER : MID Transmission					VR4	2W	±1W
	4) POWER : LOW Transmission.						Check	3.0–5.0W
	5) E,E3,E9 FREQ. : 144.000MHz FREQ. : 145.000MHz K,P,M,M2,M3,M4,E2 FREQ. : 144.000MHz FREQ. : 147.000MHz POWER : HI Transmission							40–60W 1'34" or less.
	6) POWER : MID Transmission.							10–14W
	7) POWER : LOW Transmission.							3.0–5.0W
	8) POWER : HI M2,M3,E2 Transmission							Power meter
POWER meter band	1) U band FREQ. : 435.000MHz M,M2,M3,M4,E,E2,E3,E9 FREQ. : 449.000MHz K,P Transmission				TX-RX (B/4)	VR203 VR204	Clockwise MAX	55W or more.
	2) POWER : HI Transmission					VR203	34W	±1W
	3) POWER : MID Transmission					VR204	19W	±1W
	4) POWER : LOW Transmission.						Check	3.0–5.0W
	5) M,M2,M3,M4,E,E2,E3,E9 FREQ. : 430.000MHz FREQ. : 450.000MHz K,P FREQ. : 449.000MHz FREQ. : 430.000MHz POWER : HI Transmission.							28–42W 10" or less.
	6) POWER : MID Transmission.							10–14W
	7) POWER : LOW Transmission							3.0–5.0W

TM-733A/E PC BOARD VIEWS

TX-RX UNIT (X57-436X-XX) (A/4) Component side view 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2



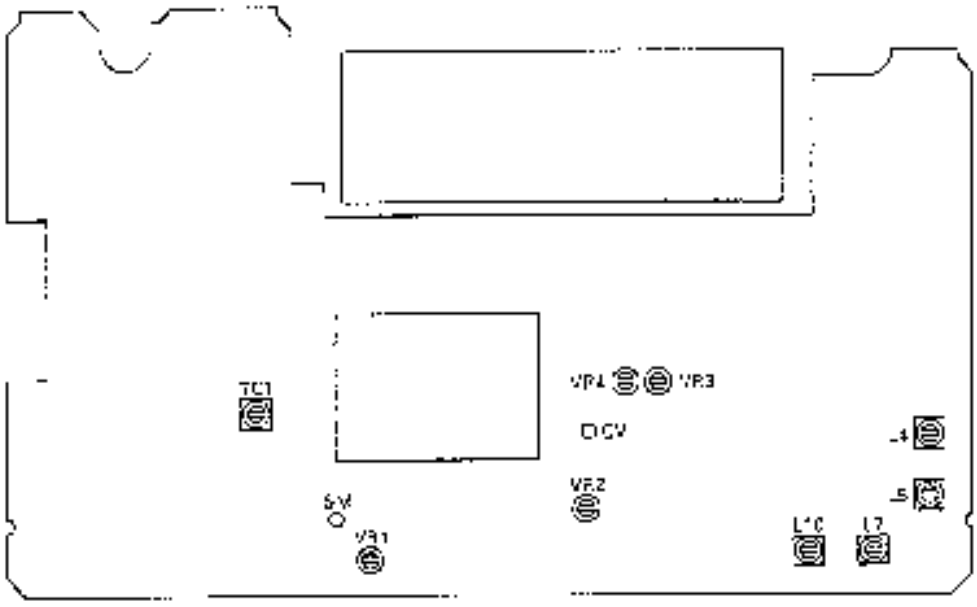
-RX UNIT (X57-436X-XX) (A/4) Foil side view 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2



ADJUSTMENT

Adjustment Points

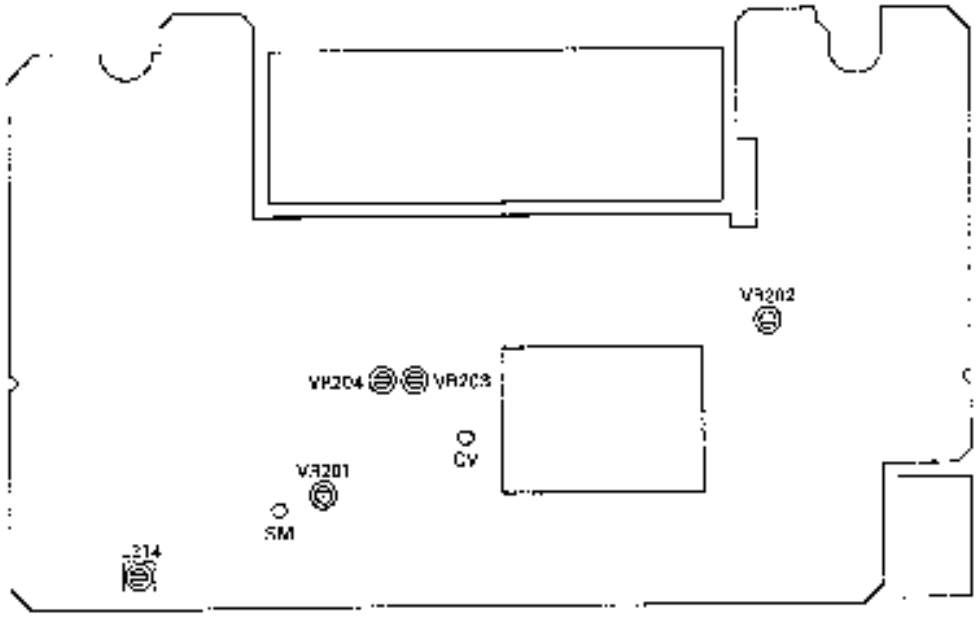
•TX-RX UNIT (A/4)
Upper side



UHF
- TC1 : Transmission frequency
- L4,L5,L7,L10 : BPF
- VR1 : S meter

VHF
- VR2 : DEV
- VR3 : POWER (HI)
- VR4 : POWER (MID)

•TX-RX UNIT (B/4)
Lower side

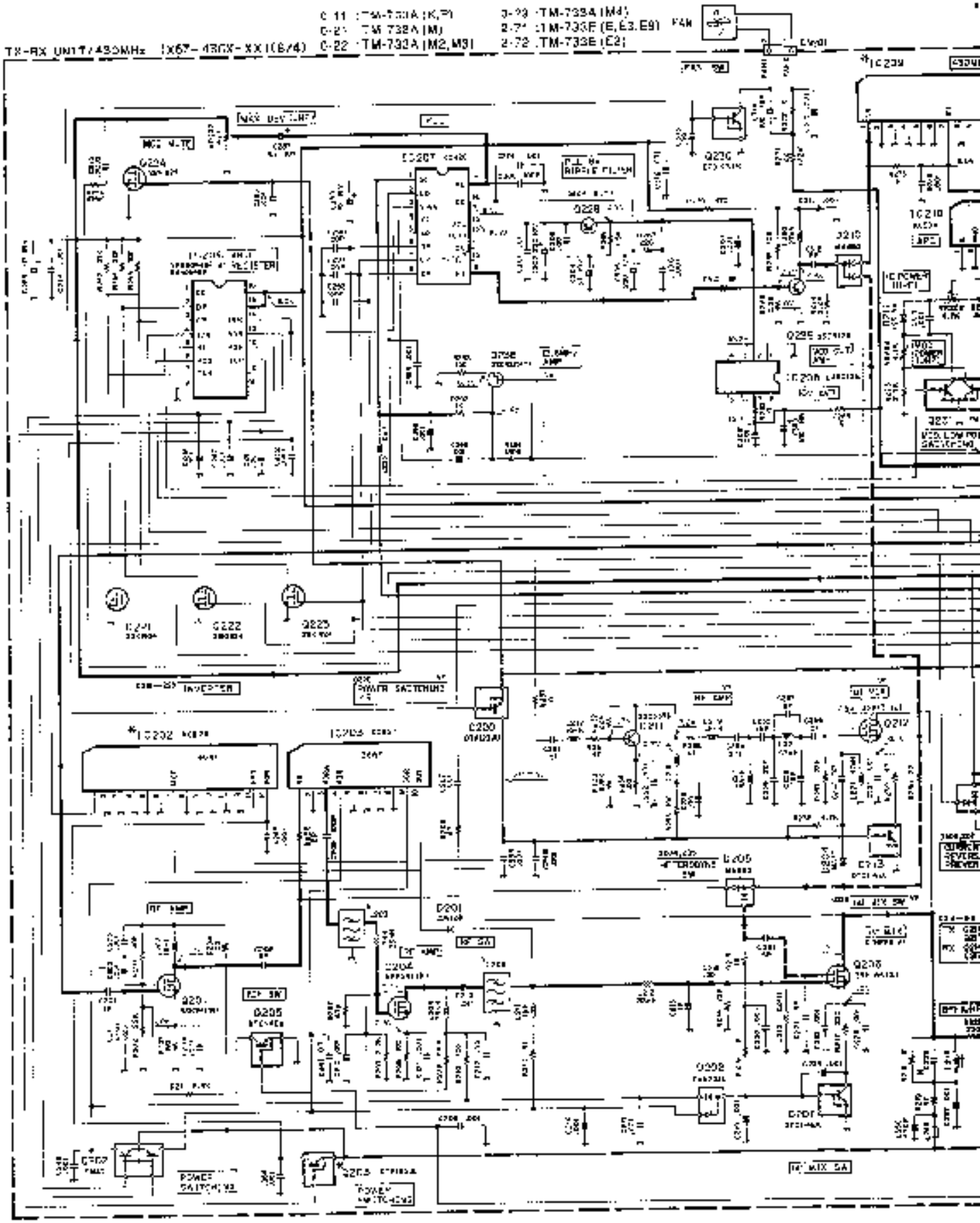


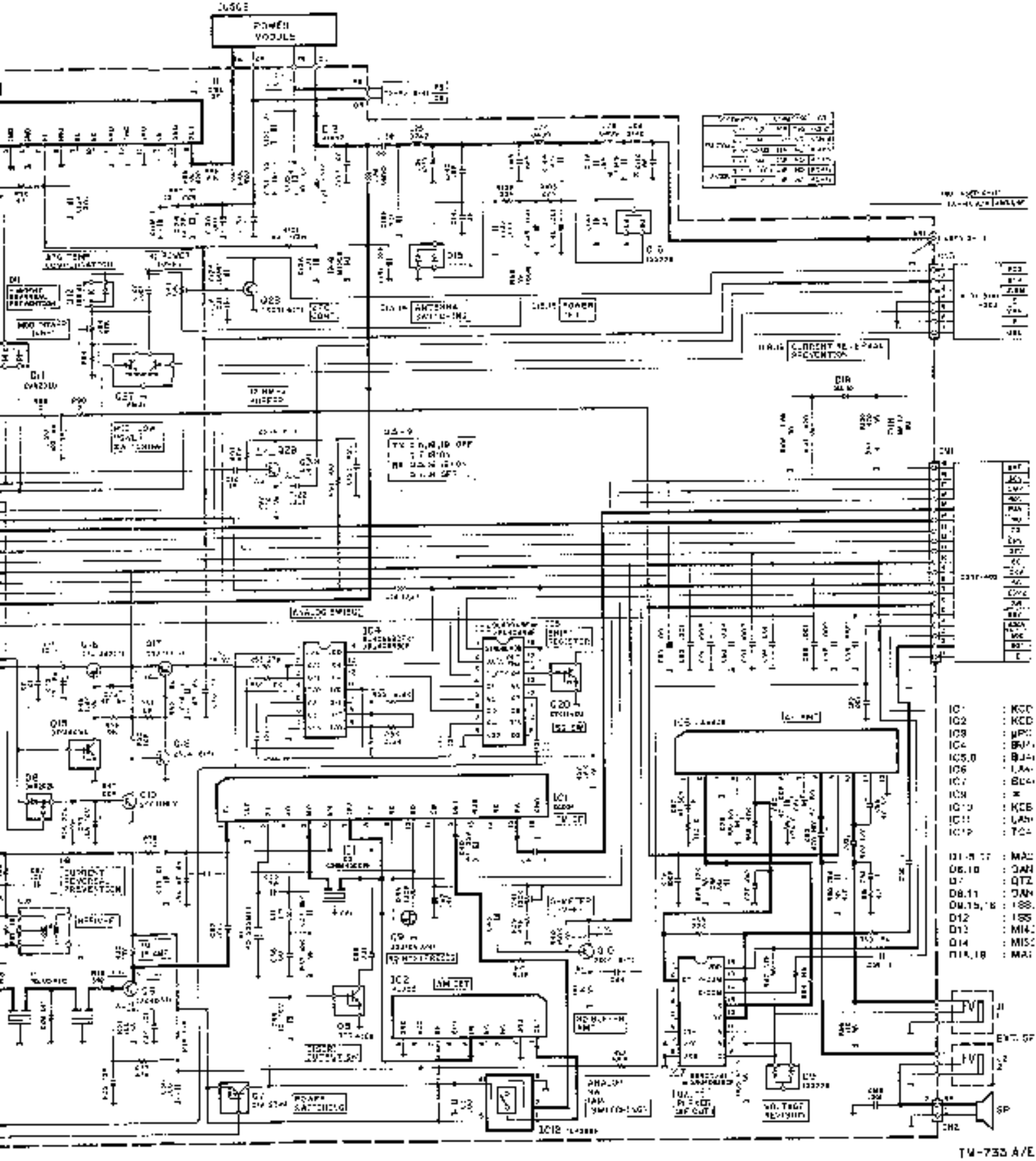
UHF
- L214 : BPF
- VR201 : S meter
- VR202 : DEV
- VR203 : POWER (HI)
- VR204 : POWER (MID)

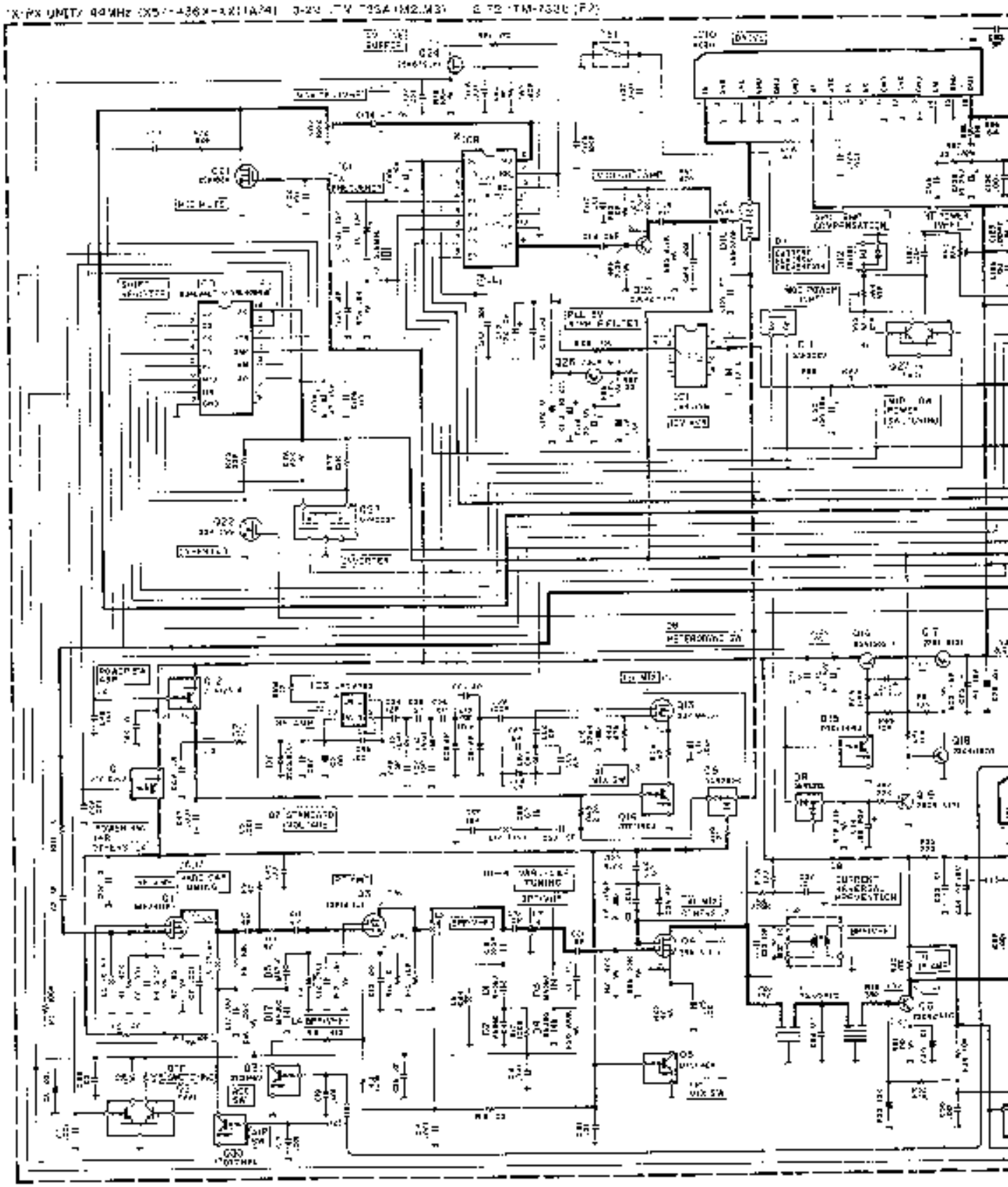
ADJUSTMENT

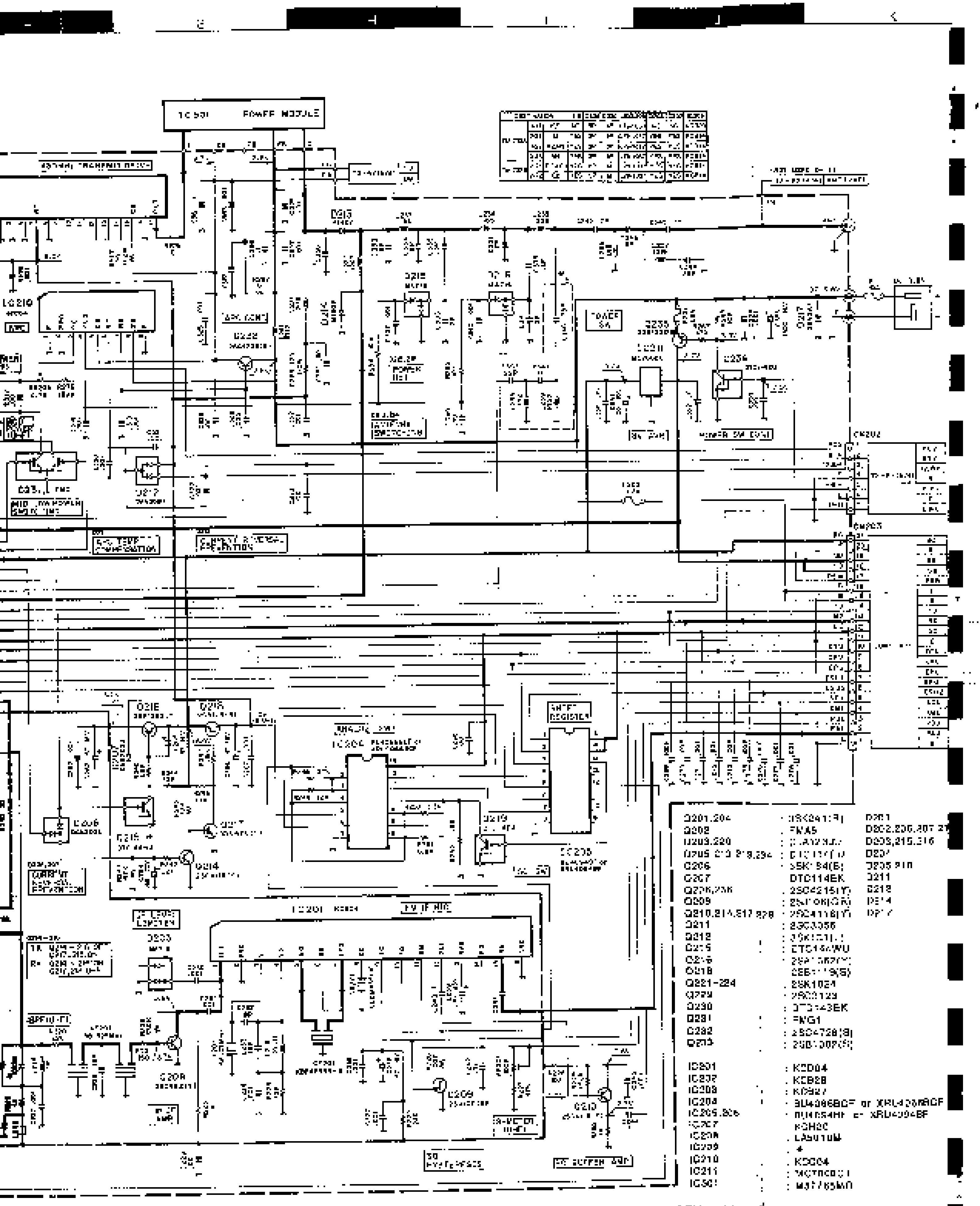
Item	Condition	Measurement: Test-equipment	Measurement: Unit	Measurement: Terminal	Adjustment: Unit	Adjustment: Parts	Method	Specifications/Remarks
3. DEV	1) V band FREQ: 144.980MHz **E,E3,E9** FREQ: 145.980MHz **K,P,M,M2,M3,M4,E2** AG: 1kHz/25mV **E,E2,E3,E9** AG: 1kHz/50mV **K,P,M,M2,M3,M4** Transmission	Linear detector Oscilloscope AG	Rear panel	ANT	TX-RX (A/2)	VR2	±4.3kHz (+, − with a larger value)	±100Hz
	2) Down AG output from the above state by 20dB (1kHz/2.5mV or 5.0mV) Transmission						Check	±3.3kHz +0.3kHz −0.4kHz
	3) U band FREQ: 434.000MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ: 445.000MHz **K,P** AG: 1kHz/25mV **E,E2,E3,E9** AG: 1kHz/50mV **K,P,M,M2,M3,M4** Transmission				TX-RX (B/4)	VR203	±4.3kHz (+, − with a larger value)	±100Hz
	4) Down AG output from the above state by 20dB (1kHz/2.5mV or 5.0mV) Transmission						Check	±3.3kHz +0.3kHz −0.4kHz
4. 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
5. Protection	1) V band FREQ: 145.980MHz **E,E3,E9** FREQ: 147.980MHz **K,P,M,M2,M3,M4,E2** ANT: OPEN Transmission	Ammeter					Check	12.0A or less.
	2) U band FREQ: 439.980MHz **M,M2,M3,M4,E,E2,E3,E9** FREQ: 449.980MHz **K,P** ANT: OPEN Transmission							10A or less.

TM-733A/E CIRCUIT DIAGRAM




POWER MODULE
IC1 : KCD
IC2 : KCD
IC3 : μPC
IC4 : BA
IC5,6 : BU
IC6 : LA
IC7 : BU
IC8 : ∗
IC10 : KCB
IC11 : LA
IC12 : TC
D1,5,17 : MA
D6,10 : DA
D7 : QT
D8,11 : DA
D9,15,16 : 1S
D12 : 1S
D13 : MI
D14 : MI
D18,19 : MA
TM-733 A/E





IC501 POWER MODULE
POWER 5V
POWER SW (Q34)
CN202
CN203
SHIFT REGISTER
IC204
IC206
IC201 KCD04
FM IF AMP
IF AMP
S-METER
DC BUFFER AMP
Q201,204 : 3SK241(R)
Q202 : FMA5
Q205 ... : DTC114EK
Q206 : 3SK184(B)
Q207 : DTC114EK
Q226,236 : 2SC4215(Y)
Q210,214,217,228 : 2SC4116(Y)
Q211 : 2SC3356
Q221-224 : 2SK1824
Q230 : DTC143EK
Q231 : FMG1
Q232 : 2SC4728(S)
IC201 : KCD04
IC202 : KCB28
IC203 : KC927
IC204 : BU4066BCF or XRU4066BF
IC205,206 : BU4094BF or XRU4094BF
IC208 : LA5010M
IC210 : KCD04
IC501 : M57765MA

CIRCUIT DIAGRAM TM-733A/E

2SA1362 2SC4116 LA5010M
2SC4215 DTA123JU
DTC114EU DTC143EU
DTC144WU

2SJ105 LA4445
2SK879

2SK131 µPC1678G
2SK184
2SK241

2SB1119 TC4S66F

FV1G1 2SK1399
2SK1624

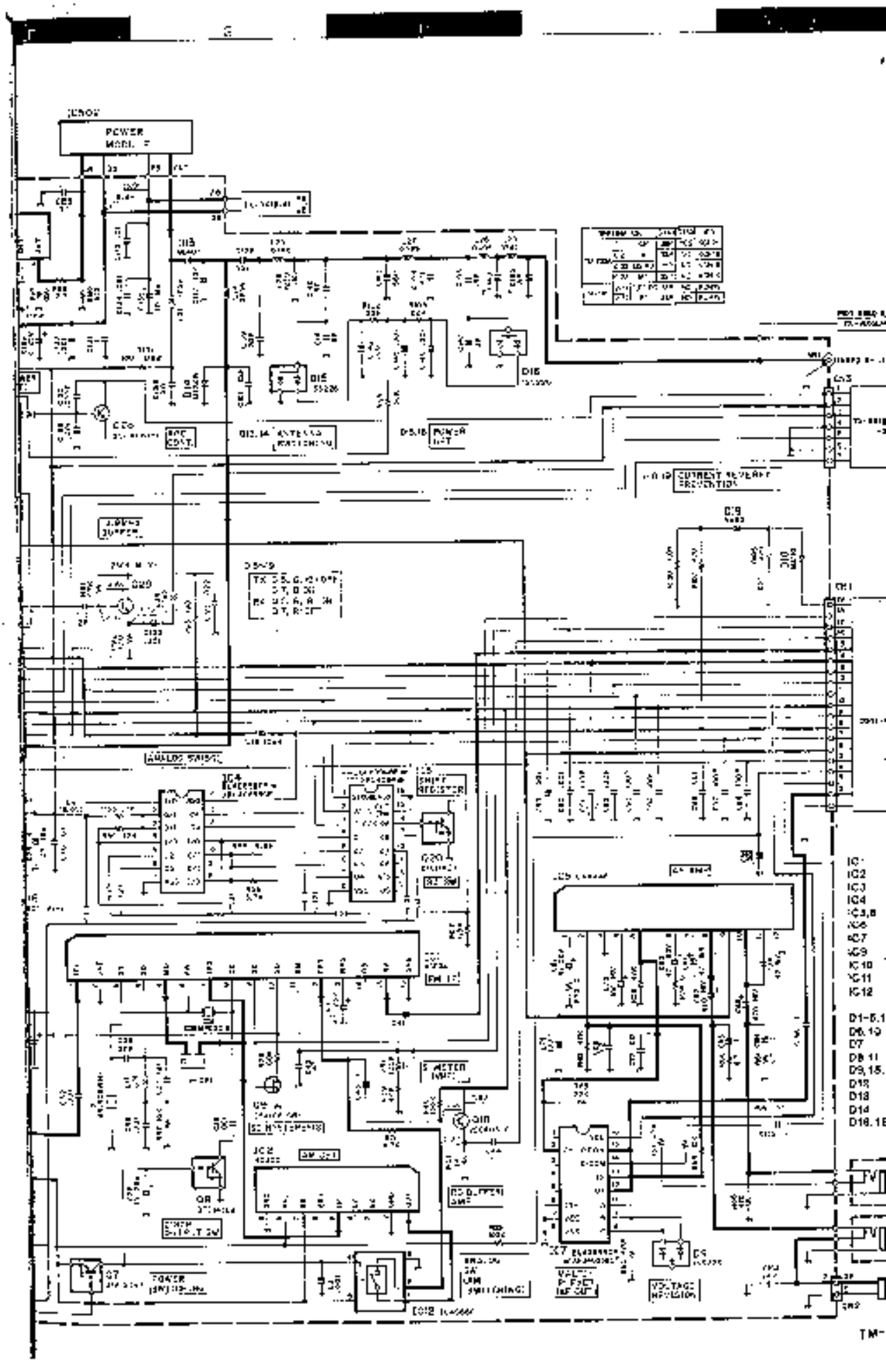
XRU4053BCF µPA602T
XRU4094BF

XRU4066BCF

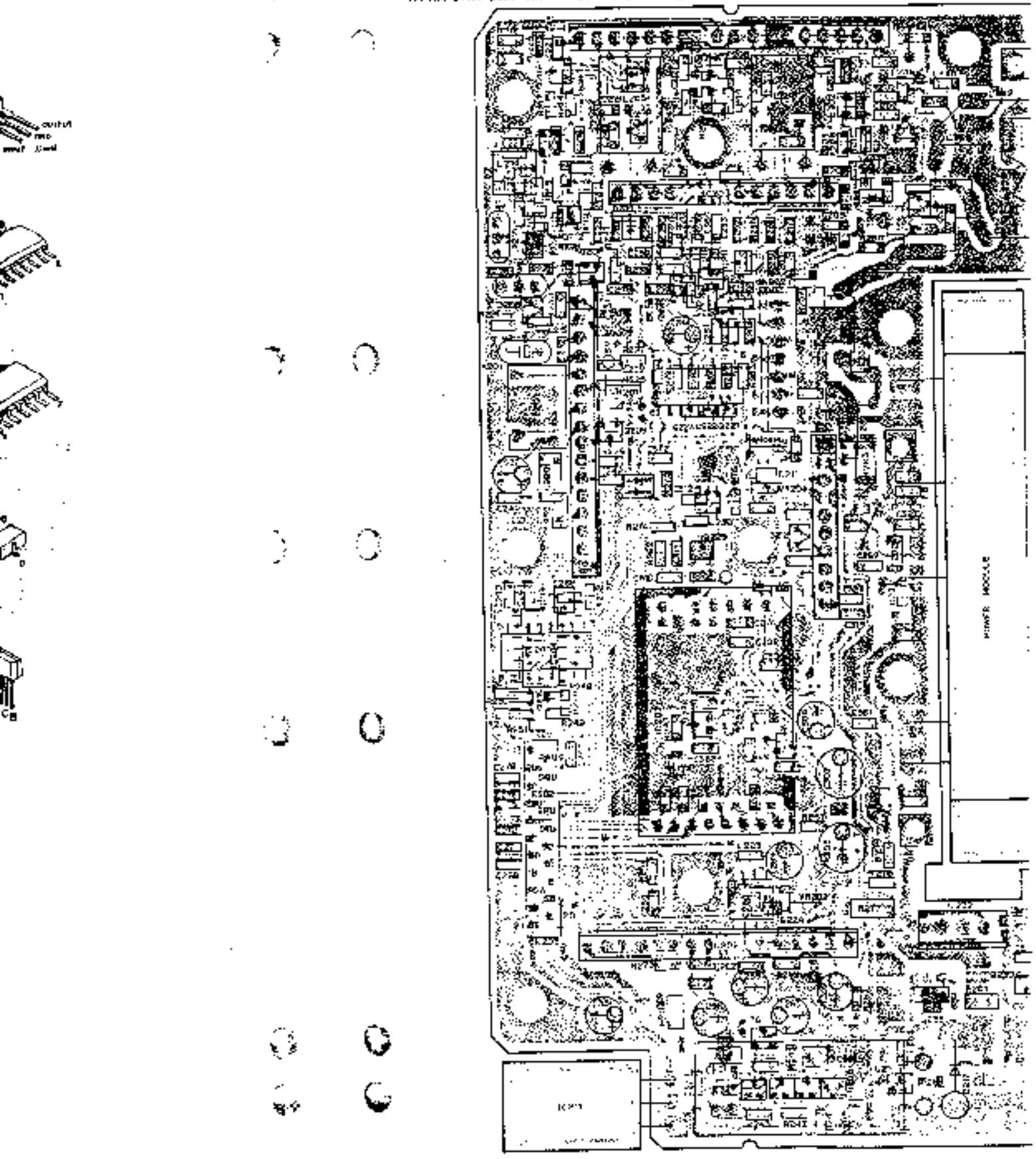
VOOD

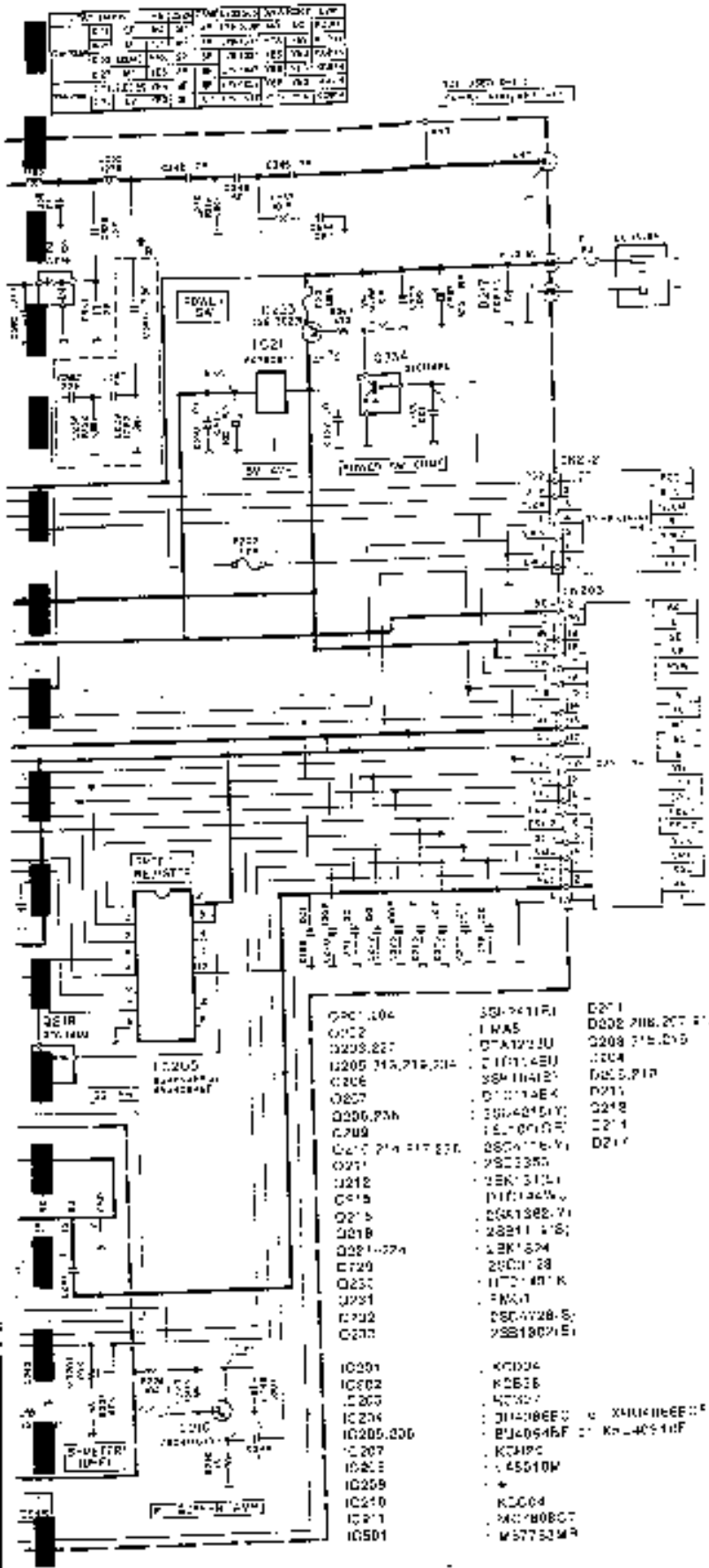
N JAPAN

041



TX-RX UNIT (X57-436X-XX) (B/4,D/4) Component side view 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-





2SA1362
2SC3359
2SC4215
DTC114EK
DTC144WU

2SC3123
2SC4116
DTA123JU
DTC114EU
DTC143EK

MC7806CT

2SJ106

XRU4094BF

2SK131
2SK184
2SK241

XRU4066BCF

2SB1119
2SB1302

2SK1824

FMA5
FMG7

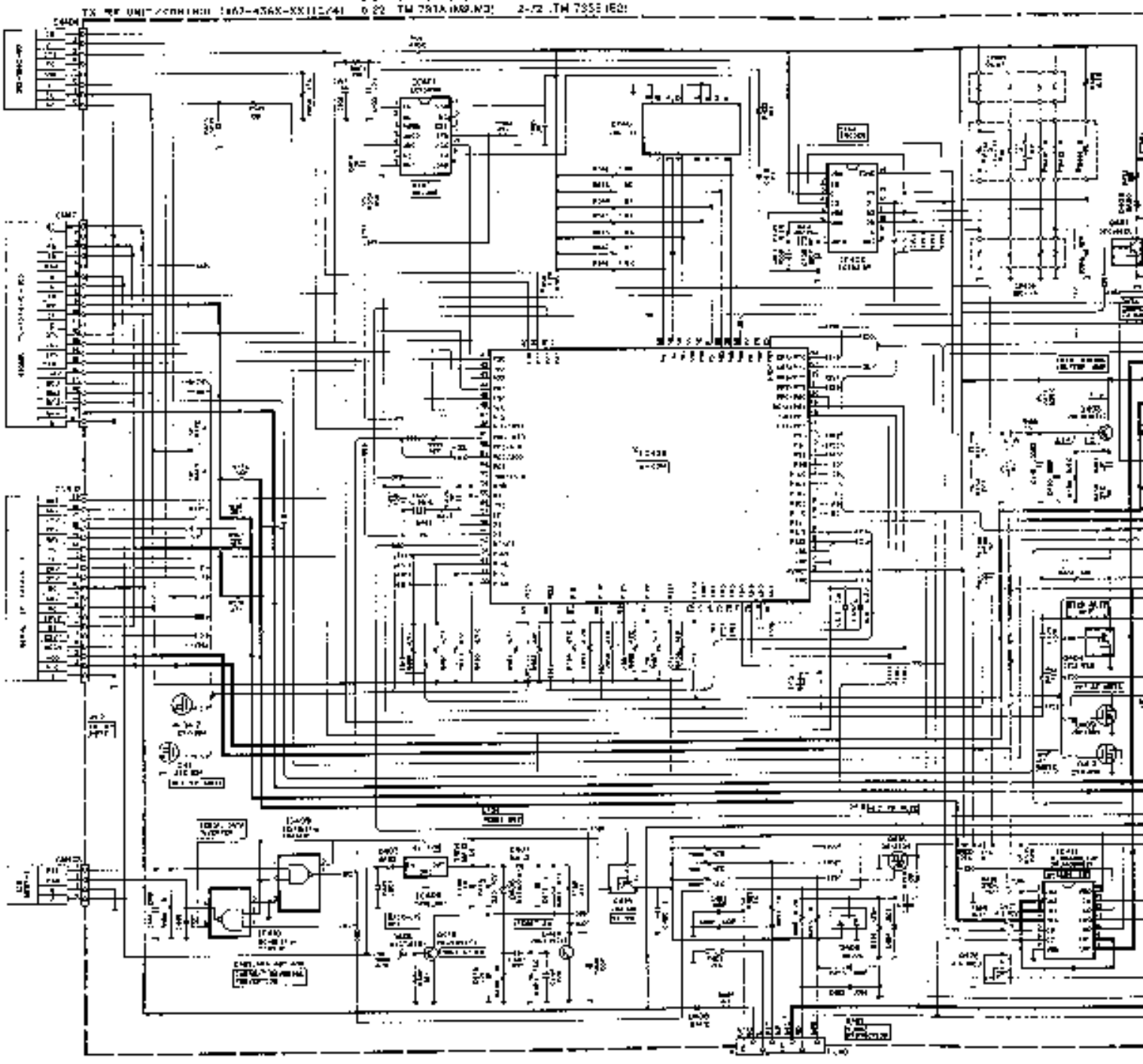
2SC4726

LA6010M

Q201,204	2SB1119R	D211	1SV128
Q202	FMA5	D202,208,209,212	1SV209
Q203,227	DTA123JU	D203,215,219	MA716
Q205,213,218,224	DTC114EU	D204	MA77
Q206	2SB1302	D205,210	MA3062
Q207	DTC114EK	D211	1SV124
Q208,230	2SJ106	D213	MA737
Q209	FMG7	D214	MA809
Q210,217,220	2SC4726-Y	D217	1SV43A
Q211	2SC3359		
Q212	2SK131(L)		
Q215	DTC144WU		
Q216	2SA1362-Y		
Q219	2SB1119(R)		
Q221,222	2SK1824		
Q228	2SC3123		
Q232	DTC143EK		
Q233	FMA1		
Q234	2SC4726-R		
Q235	2SB1302(E)		

IC201	KC004
IC202	KC836
IC203	KC007
IC204	BU4066BCF or XRU4066BCF
IC205,206	BU4094BF or XRU4094BF
IC207	KC4PC
IC208	LA6010M
IC209	—
IC210	KC004
IC211	MC7806CT
IC501	M37732M8

TM-733A/E CIRCUIT DIAGRAM



2SA1619
2SC4116
DTA123JU
DTC114EU
DTC144EU

NJM4558E

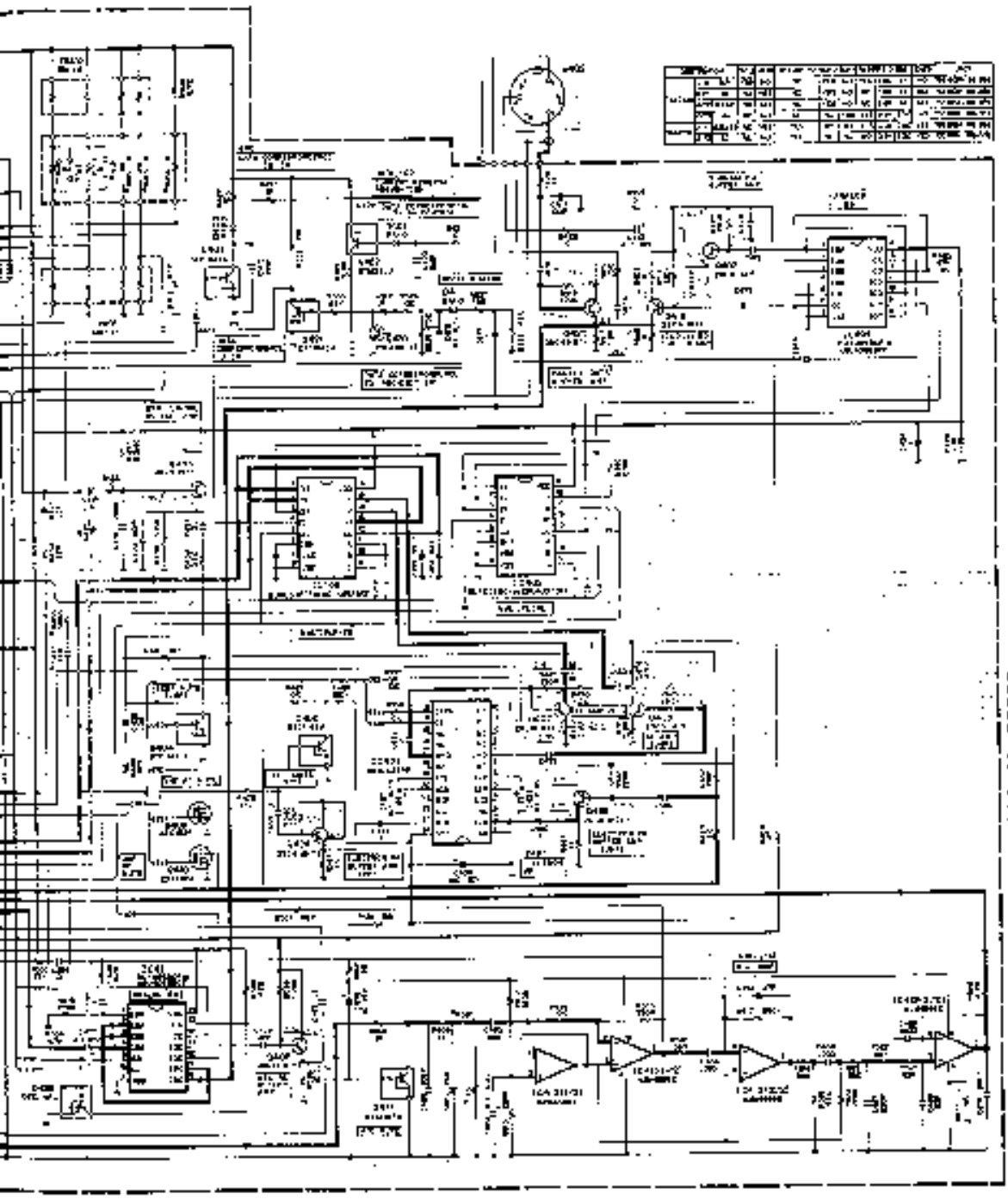
TC35213F

LC7397M
XRJ40868CF

XRJ40533CF

M5870328P

TA78L



TA78L06F

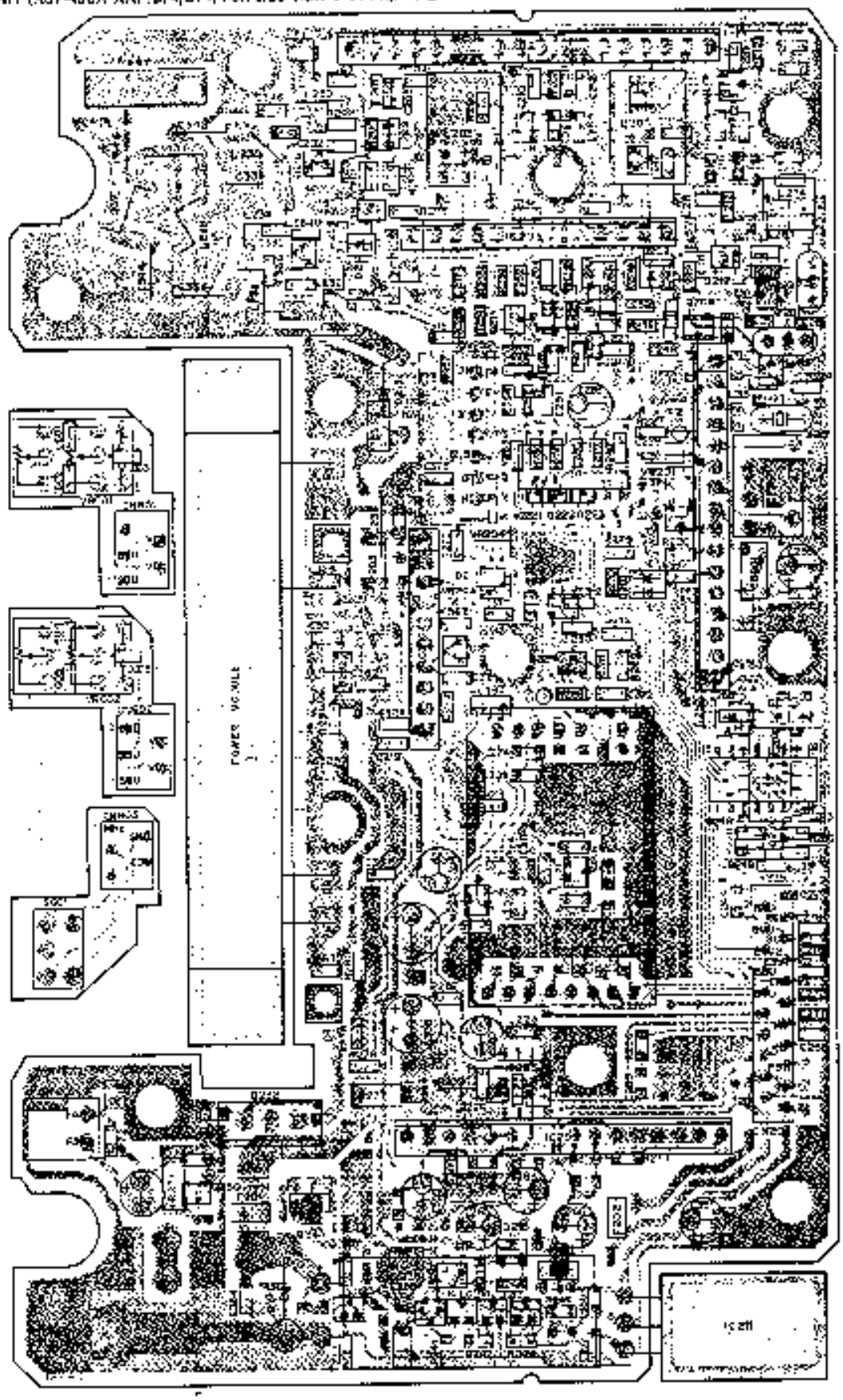
7S519GF-18X-338

5C14S11F

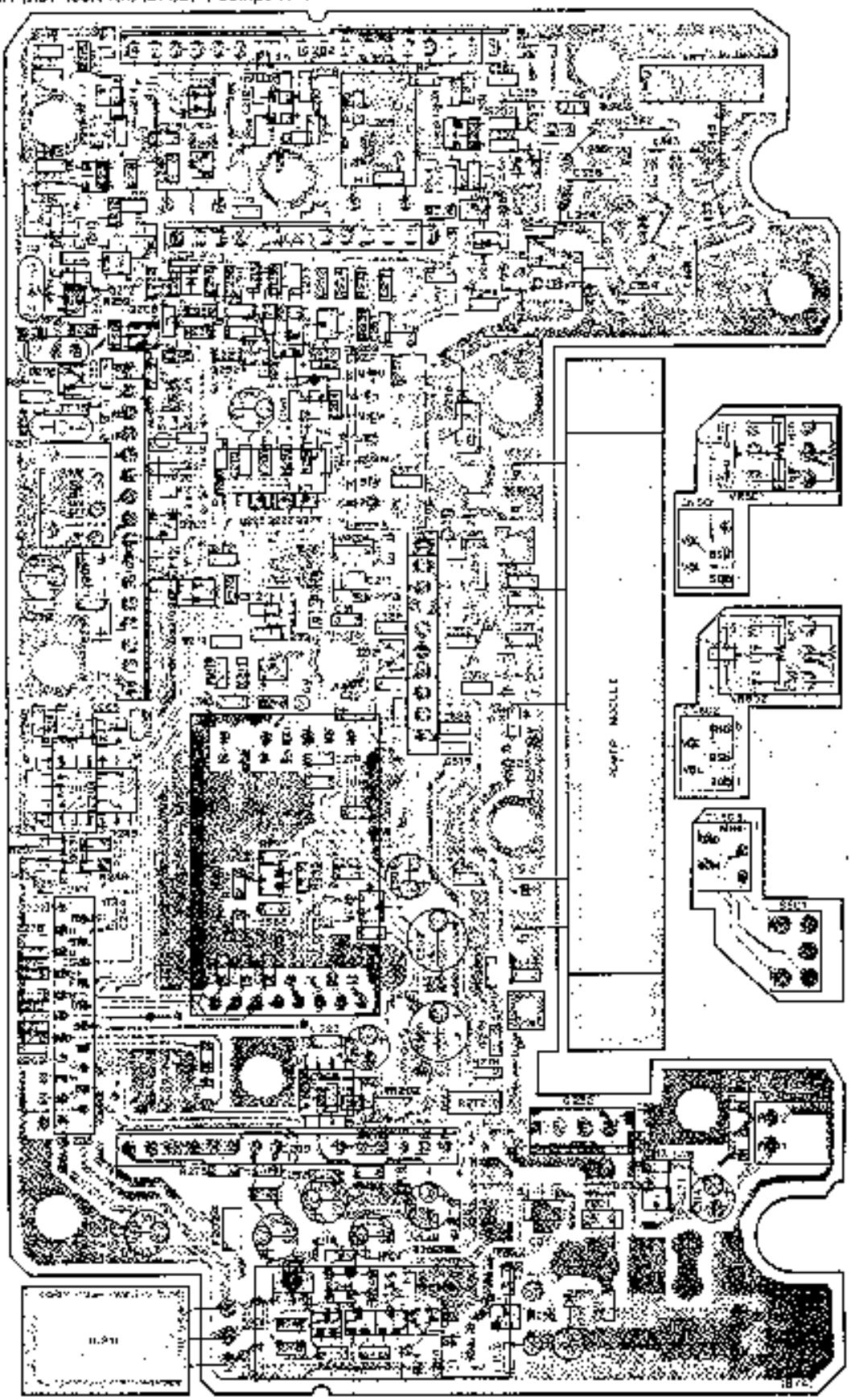
25K1824

E9 2-72 : E2

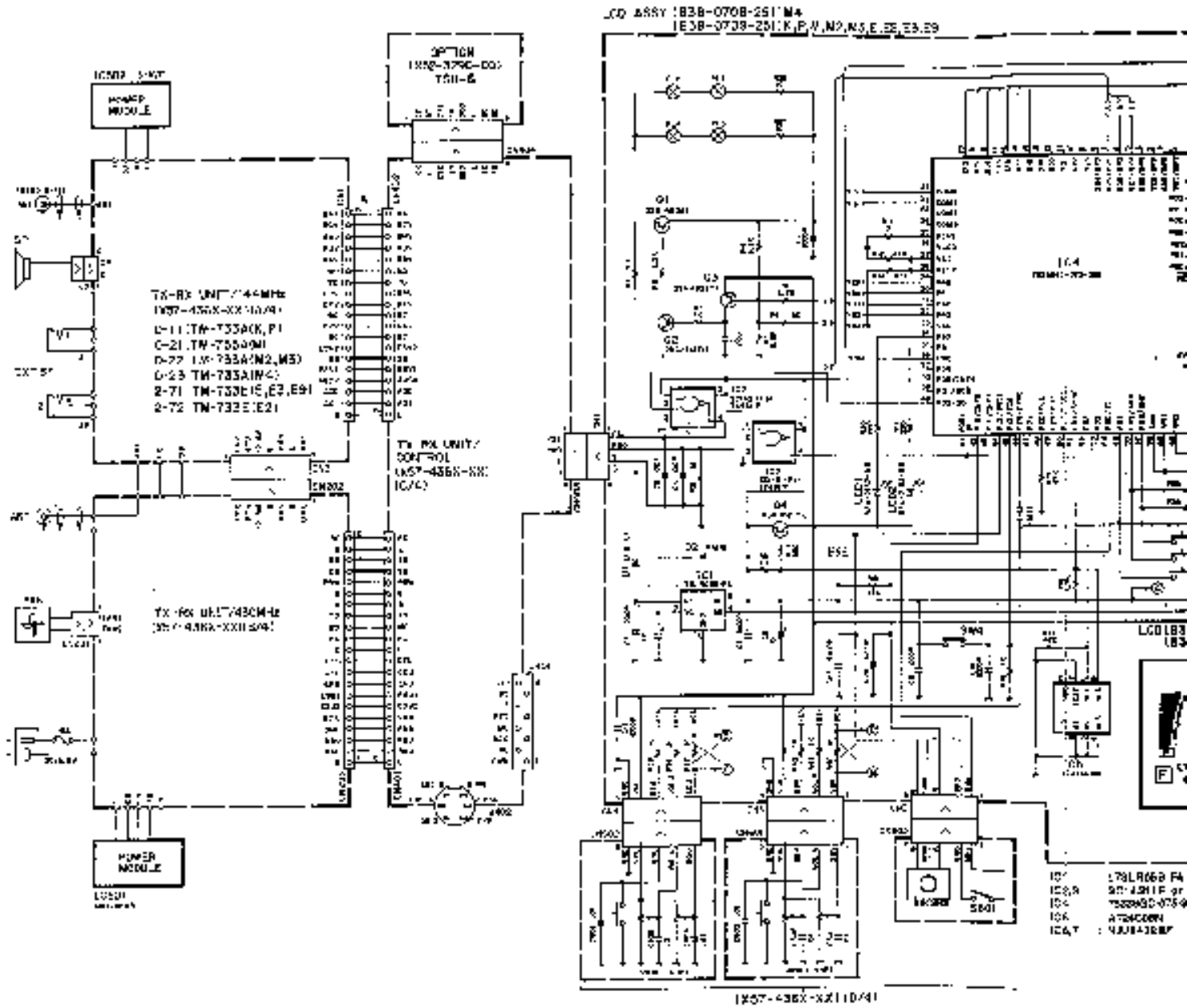
TX-RX UNIT (X57-436X-XX) (B/4,D/4) Foil side view 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2

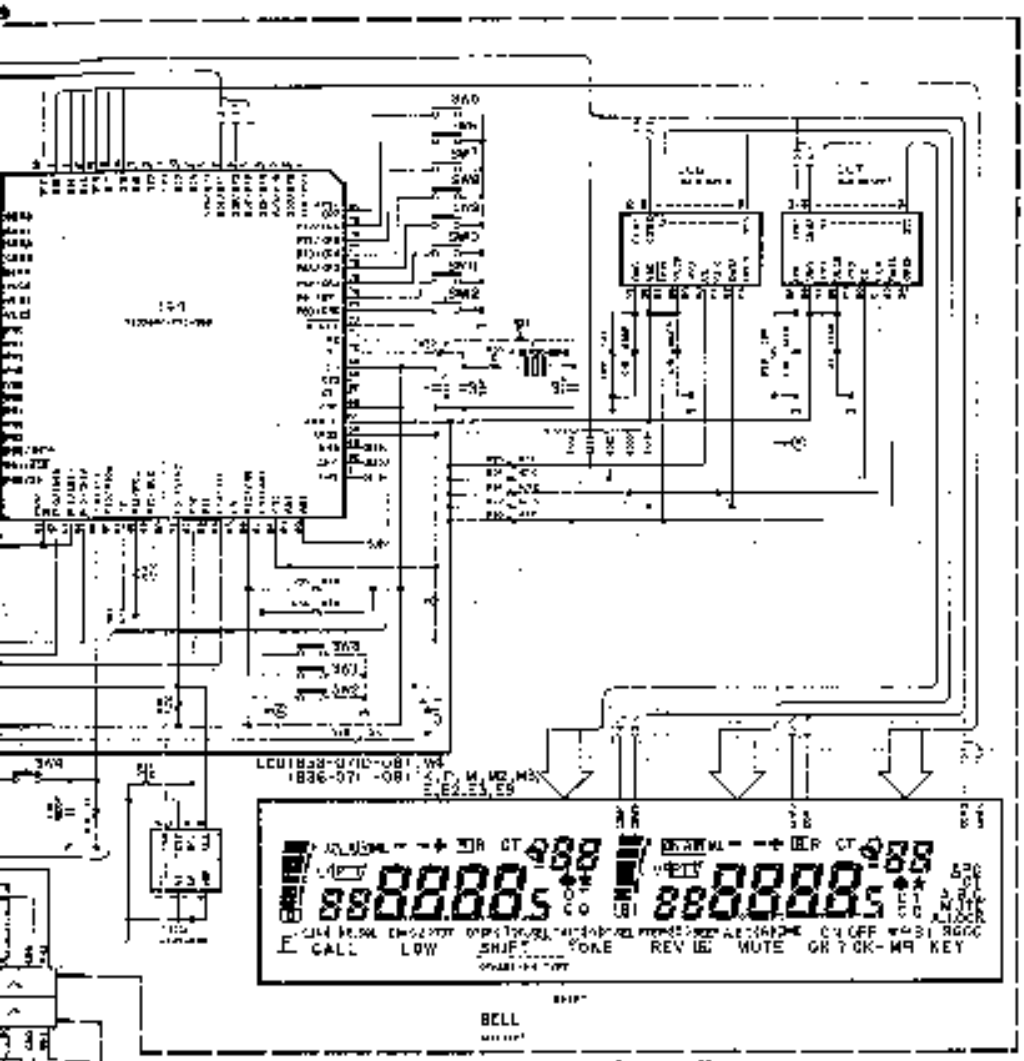


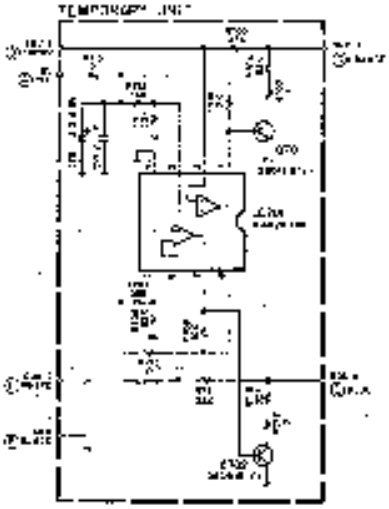
TX-RX UNIT (X57-436X-XX) :B/4,D/4; Component side view 0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2



TM-733A/E SCHEMATIC DIAGRAM



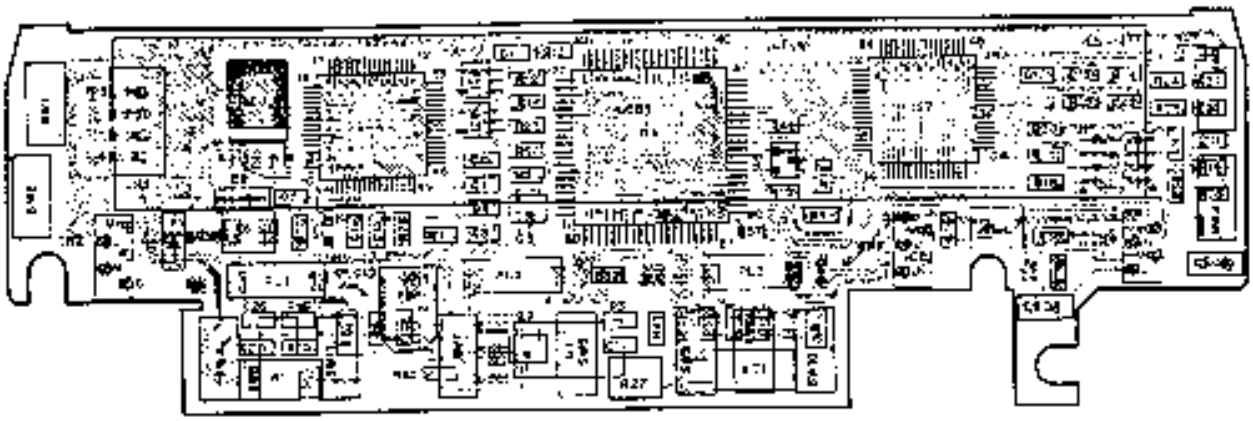

CALL
LOW
SHIFT
TONE
REV
MUTE
CLOCK
KEY
BELL



E,E3,E9 2-72 : E2

LCD ASSY (B38-070X-25) 8 : M4 9 : K, P, M, M2, M3, E, E2, E3, E9

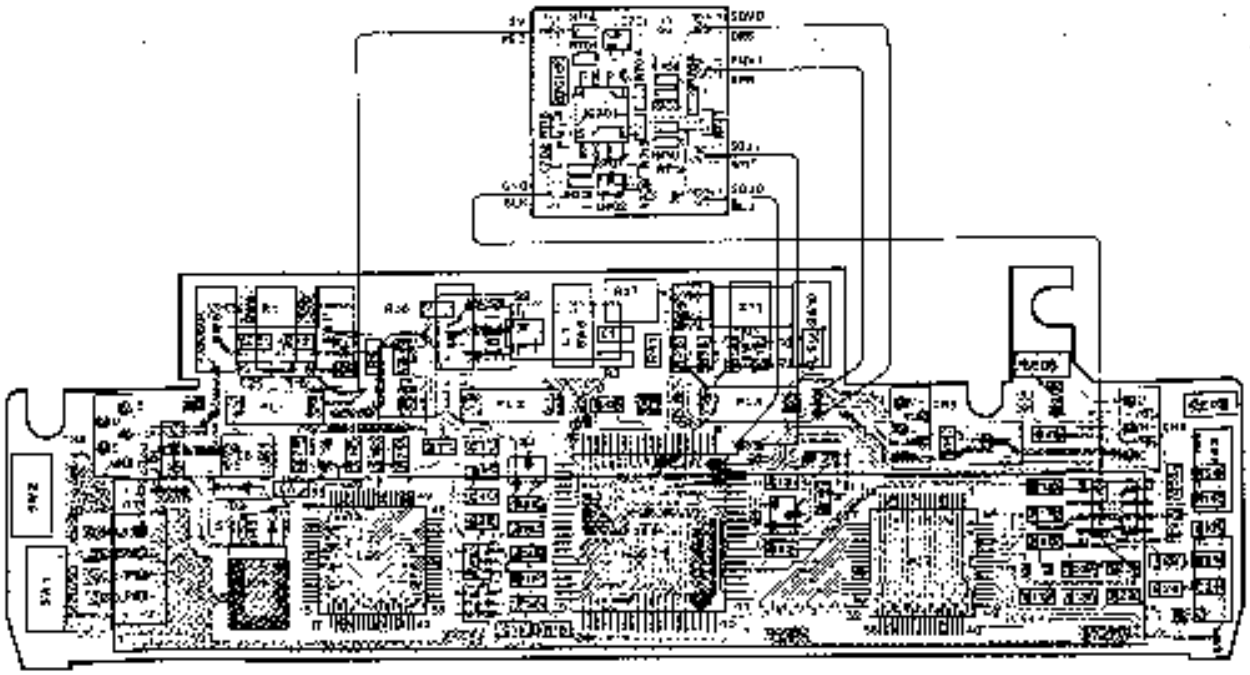
Component side view



LCD ASSY (B38-070X-25) 8 : M4 9 : K, P, M, M2, M3, E, E2, E3, E9

LCD ASSY TEMPORARY UNIT

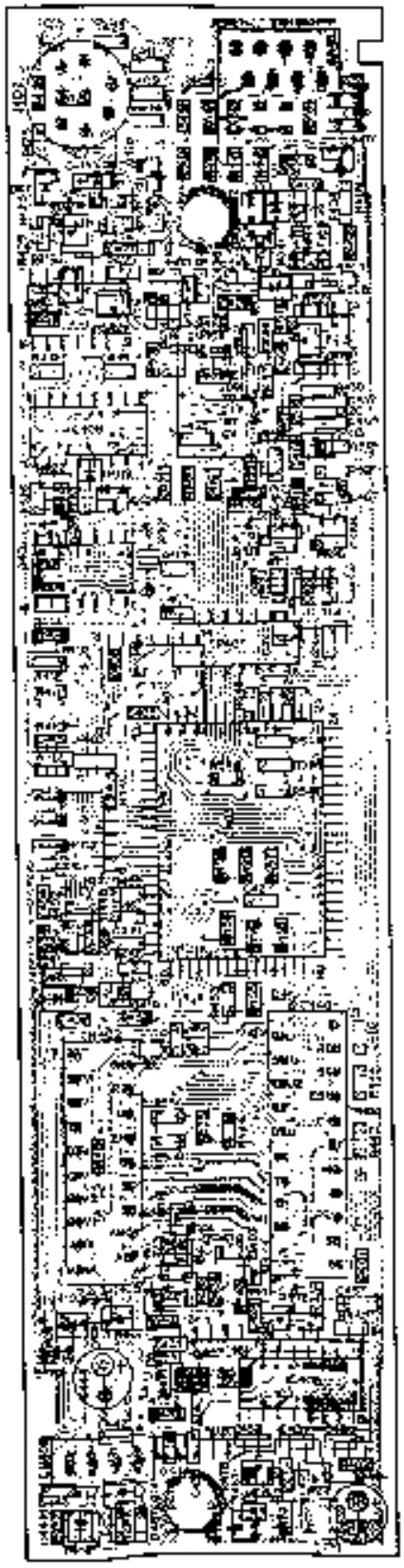
Foil side view



TX-RX UNIT (X57-436X-XX) (C/4)

Component side view

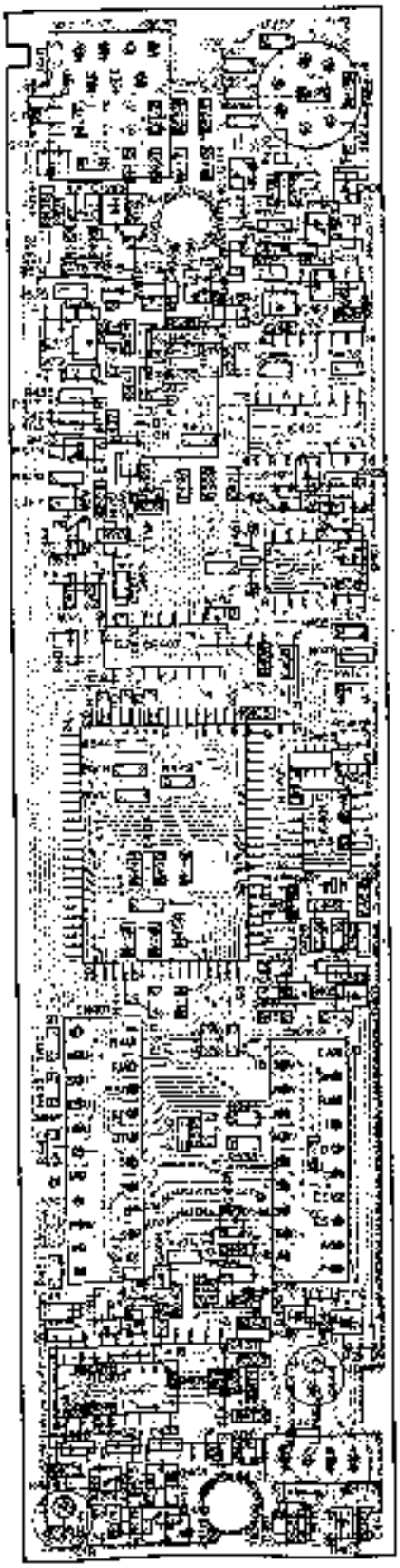
0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2



TX-RX UNIT (X57-436X-XX) (C/4)

Foil side view

0-11 : K,P 0-21 : M 0-22 : M2,M3 0-23 : M4 2-71 : E,E3,E9 2-72 : E2



LCD A

Compo

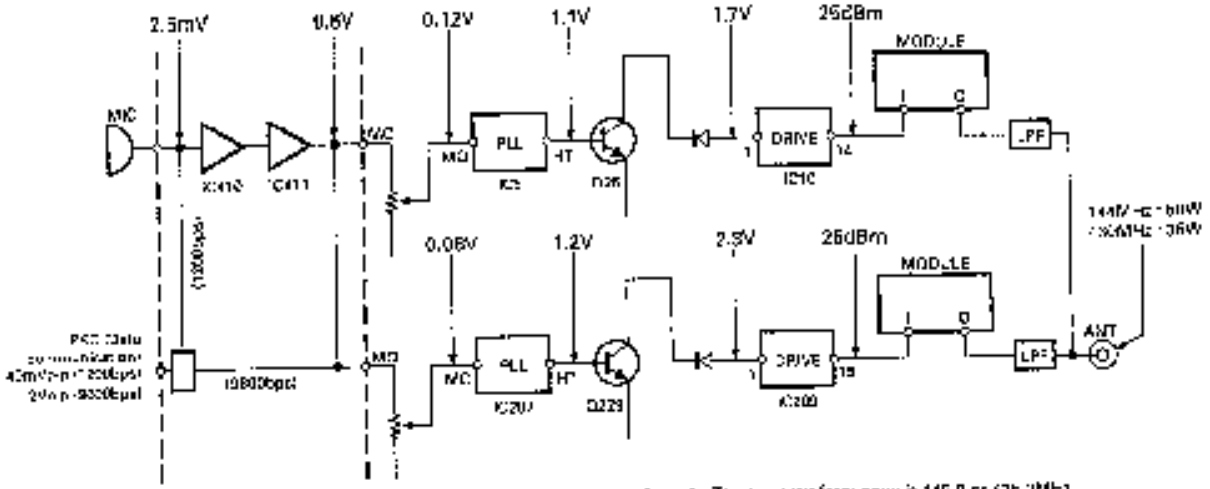
LCD A

LCD A

Foil si

LEVEL DIAGRAM

Transmitter Section



Note 1: Set the AF so that the microphone jacket input is 3kHz deviation at 1kHz modulation.
The data communication connector input level is 3kHz deviation at 1kHz modulation for 1200bps and 2kHz deviation at 1kHz modulation for 9600bps.

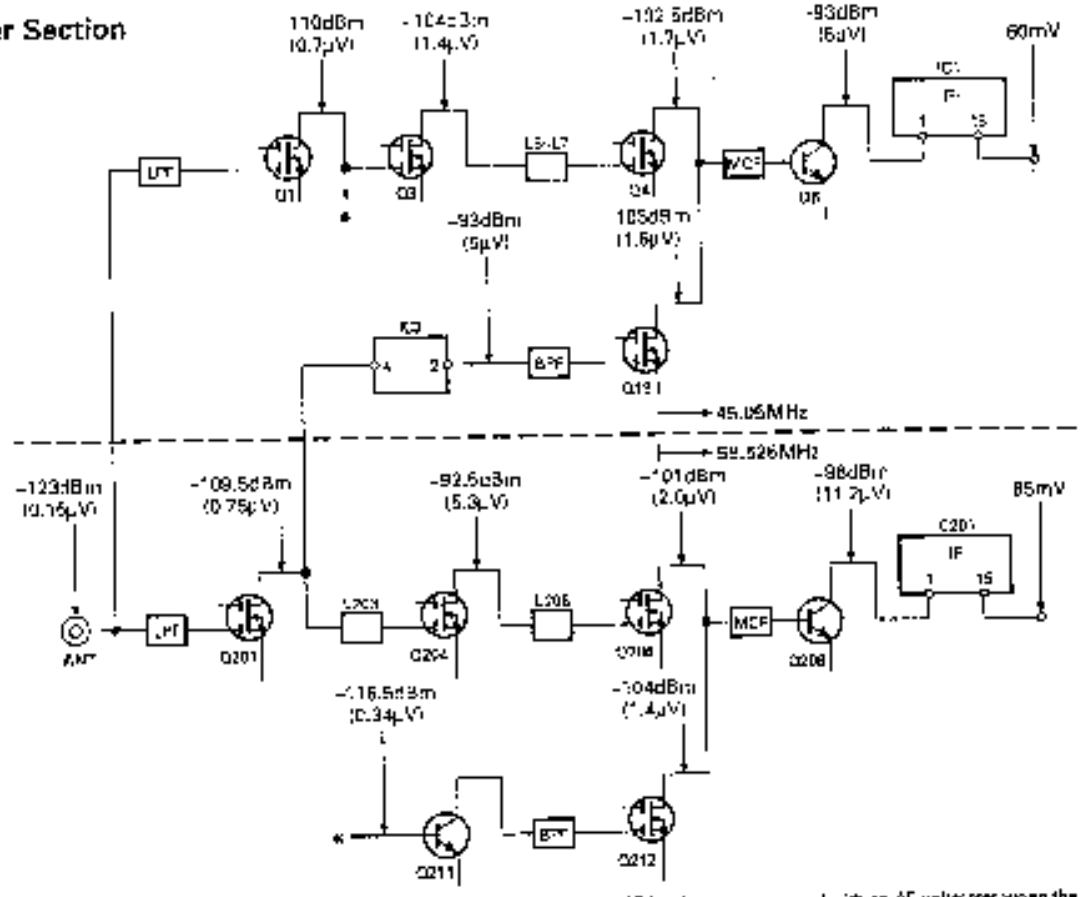
Note 2: The transmit frequency is 145.0 or 435.0MHz.

Note 3: The HI/MID/LOW switch is set to HI.

Note 4: The measurements with the power meter, except for the ANT connector, are the values with the APC off.

Note 5: The voltages are RMS values unless otherwise specified.

Receiver Section



Note 1: The 12dB SINAD levels were plotted using a standard signal generator through a 0.01μF ceramic capacitor at each point from the RF to the first IF.

Note 2: The AF levels were measured with an AF voltmeter when the -75dBm (30μV) standard signal generator signal modulated by a 1kHz modulation frequency and a 3kHz deviation was received and the AF output was adjusted to 0.63V/8Ω by the AF VR.

M-733A/E

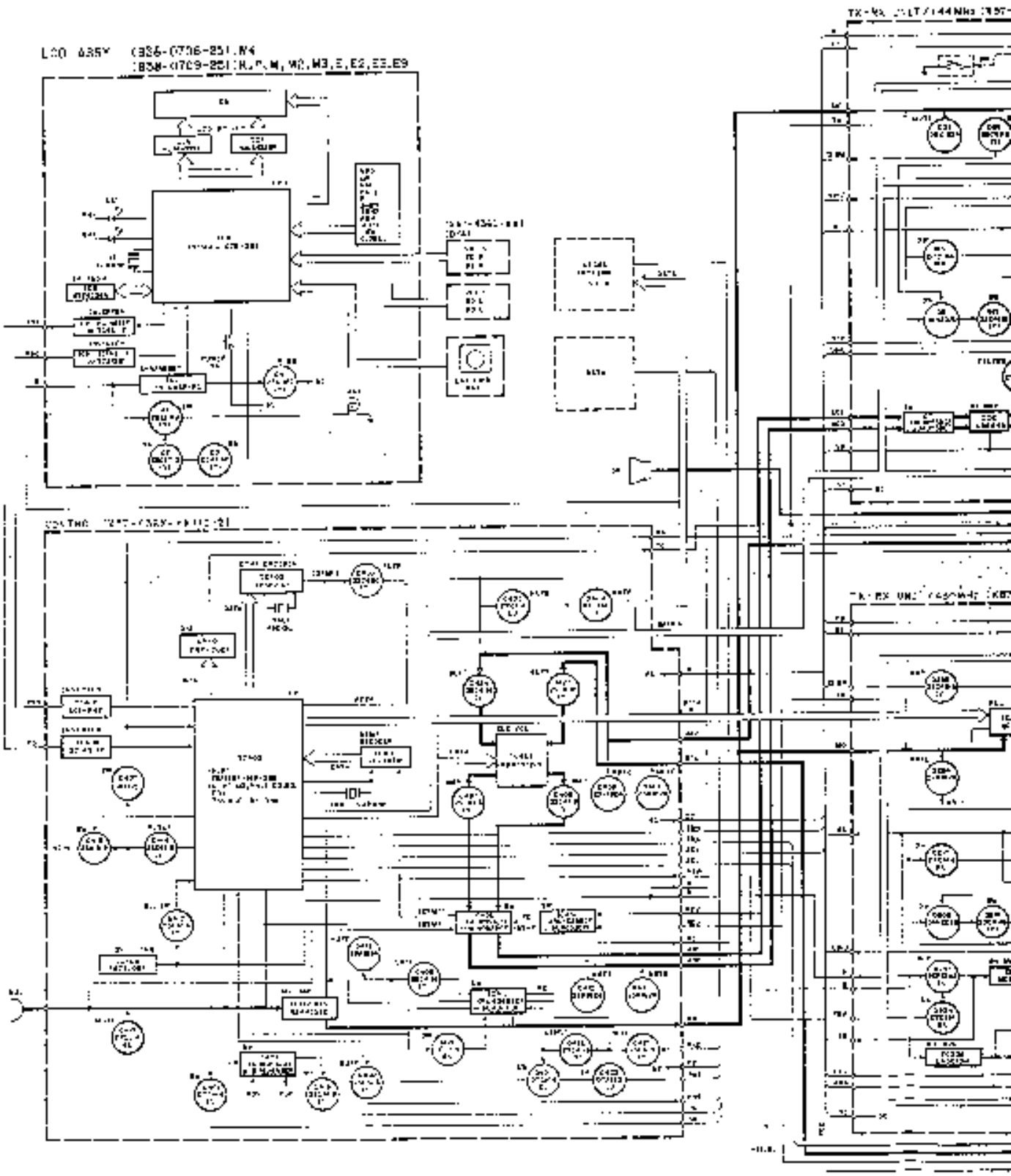
TERMINAL FUNCTION

No.	Pin No.	Name	Function
N1	1	E	GND
	2	AO	Internal speaker audio signal input
	3	AOO	External speaker audio signal input.
	4	AGCV	AGC voltage output.
	5	SSV1	VHF-band shift register enable (IC5).
	6	SB	Switched +B input.
	7	SSV2	VHF band shift register enable (IC6).
	8	5C	Common 5V.
	9	CKV	VHF-band clock input
	10	8C	Common 8V.
	11	DTV	VHF-band data input.
	12	EPV	VHF-band PLL enable input.
	13	TO	Sub-tone modulation input.
	14	MO	Modulation signal input
	15	RAV	VHF-band audio signal output
	16	RDV	VHF band de-modulation signal output.
	17	SMV	VHF-band S-meter signal output.
	18	SCV	VHF-band squelch busy control output.
	19	BAT	Backup power supply output.
N2	1	E	GND
	2	SP	Speaker output.
N3	1	AC2	VHF-band APC output
	2	BTV	VHF-band BT output
	3	12.8M	12.8MHz output.
	4	E	GND.
	5	VXV	VP output
	6	E	GND.
	7	UxL	UP output.
N201	1	FAN2	SB input for fan
	2	FAN1	Fan GND.
N202	1	PC2	V HF-band APC input.
	2	BTV	VHF-band BT input.
	3	12.8M	12.8MHz input
	4	E	GND.
	5	VXV	VP input.
	6	E	GND.
	7	UxL	UP output.
CN203	1	E	GND
	2	RAU	UHF-band audio signal output.
	3	RDL	UHF-band de-modulation signal output
	4	SMU	UHF band S-meter signal output
	5	SCU	UHF band squelch busy control output.
	6	SSU2	UHF-band shift register enable input (IC205).
	7	SSU1	UHF band shift register enable input (IC204).
	8	EPU	UHF band PLL enable input.
	9	CKU	UHF-band clock input
	10	DTU	UHF-band data input.
	11	E	GND.
	12	8C	Common 8V.
	13	MO	Modulation signal input.
	14	TO	Sub-tone modulation signal input.
	15	B	13.8V
	16	B	13.8V
	17	PSW	Power switch control signal input.
	18	SB	Switched +B output
	19	SB	Switched +B output
	20	E	GND.
	21	8C	Common 8V output.
CN401	1	8C	Common 8V input.
	2	E	GND
	3	SB	Switched +B input
	4	SB	Switched +B input
	5	PSW	Power switch control signal output.

CN No.	Pin No	Name	Function
	6	R	13.8V.
	7	B	13.8V.
	8	TO	Sub-tone modulation signal output.
	9	MO	Modulation signal output.
	10	5C	Common 5V.
	11	E	GND
	12	DTU	UHF-band data output.
	13	CKU	UHF-band clock output.
	14	EPU	UHF-band PLL enable output.
	15	SSU1	UHF band shift register enable output (IC205)
	16	SSU2	UHF-band shift register enable output (IC206)
	17	SCU	UHF-band squelch busy control input
	18	SMU	UHF-band S-meter signal input
	19	RDU	UHF-band de-modulation signal input.
	20	RAU	UHF-band audio signal input
	21	E	GND
CN402	1	BAT	Back up power supply input.
	2	SCV	VHF-band squelch busy control input
	3	SMV	VHF-band S-meter signal input
	4	RDV	VHF-band de-modulation signal input
	5	RAV	VHF-band audio signal input.
	6	MO	Modulation signal output
	7	TO	Sub-tone modulation signal output
	8	EPV	VHF band PLL enable output.
	9	DTV	VHF-band data output.
	10	8C	Common 8V.
	11	CKV	VHF-band clock output
	12	5C	Common 5V.
	13	SSV2	VHF-band shift register enable (IC5).
	14	SB	Switched +B output
	15	SSV1	VHF-band shift register enable (IC6).
	16	AGCV	AGC voltage input.
	17	AOO	External speaker audio signal output
	18	AOI	External speaker audio signal output
	19	E	GND
CN403	1	DSI	Serial data input
	2	PSO	Serial data output.
	3	E	GND.
	4	B	13.8V
CN404	1	CK	CTCSS clock output
	2	DT	CTCSS data output
	3	CTE	CTCSS enable output.
	4	NC	Not used
	5	SDO	CTCSS tone matched signal input.
	6	E	GND.
	7	5C	Common 5V.
	8	RX	CTCSS de-modulation signal output.
CN501	1	SCV	VHF-band squelch output
	2	VOLV	VHF band volume output.
	3	BSV	VHF-band band select switch output.
	4	VCC	5V.
	5	GND	GND.
CN502	1	SCU	UHF-band squelch output.
	2	VOLU	UHF-band volume output
	3	BSL	UHF-band band select switch output
	4	VCC	5V.
	5	GND	GND
CN503	1	M+2	M+2 key output.
	2	GND	GND
	3	A	Encoder output.
	4	COM	GND.
	5	B	Encoder output.

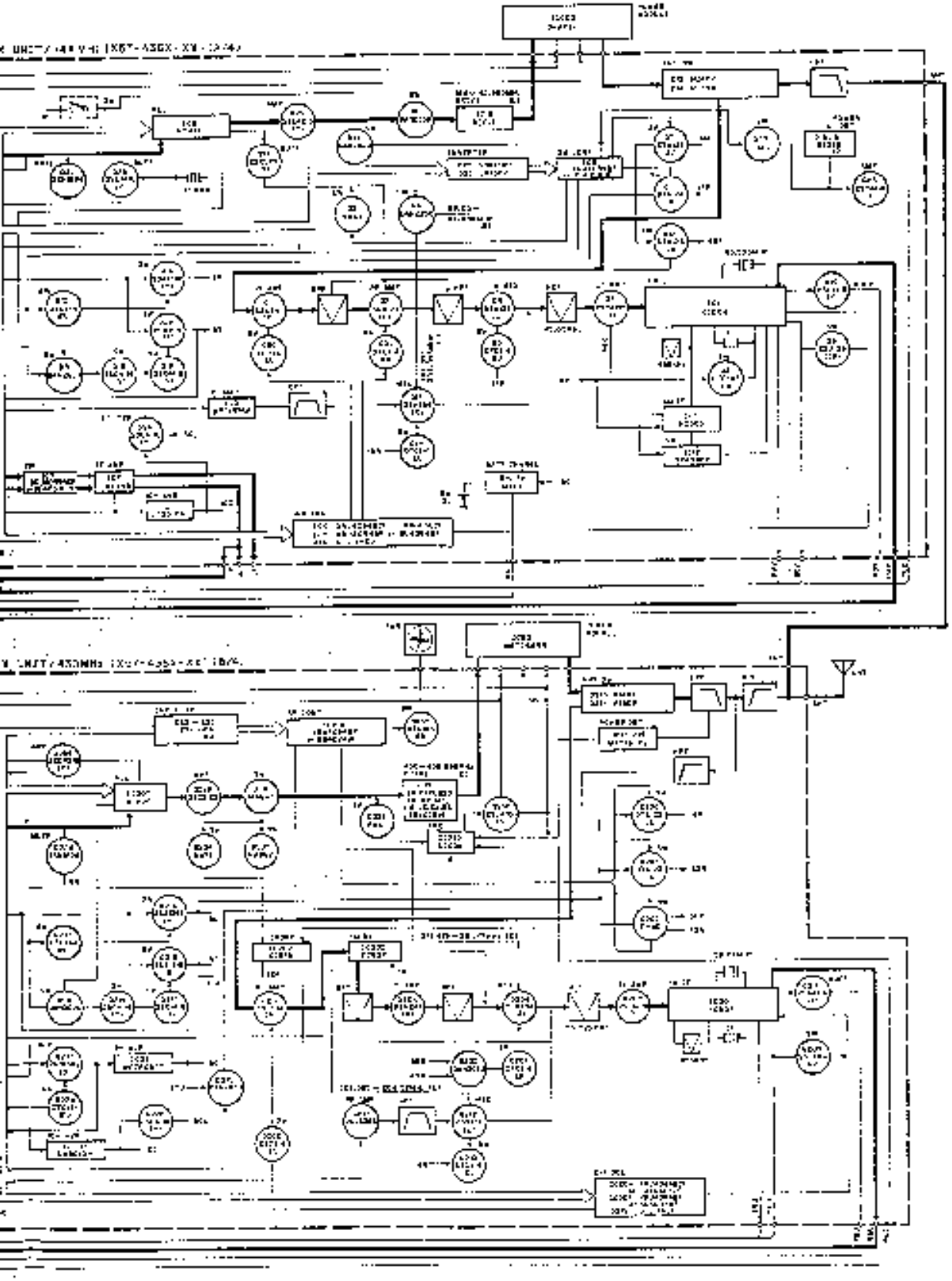
TM-733A/E TM

BLOCK DIAGRA



TM-733A/E

K DIAGRAM



TM-733A/E

SPECIFICATIONS

Specifications are subject to change without notice due to development in technology.

General

		144MHz Band	430/440MHz Band
Frequency range	U.S.A. Canada	144~148MHz	438~450MHz
	General	144~148MHz	430~440MHz
	TM-733E	144~146MHz	430~440MHz
Mode		F3E (FM)	
Antenna impedance		50Ω	
Usable temperature range		–20°C~+60°C (–4°F~140°F)	
Power supply		13.8V DC ±15% (11.7~15.8V)	
Grounding method		Negative ground	
Current	Transmit (max.)	11.5A or less	10.0A or less
	Receive (no signal)	1.2A or less	
Frequency stability		Within ±10ppm	
Dimensions (W x H x D projections included)		141 x 42 x 165mm 5.55" x 1.65" x 6.50"	
Weight		1.1kg/2.4lb	

Transmitter

Power output	High	50W	35W
	Mid	10W	
	Low	Approx. 5W	
Modulation		Reactance	
Spurious emissions		–60dB or less	

	144MHz Band	430/440MHz Band
Maximum frequency deviation	±5kHz	
Audio distortion (at 60% modulation)	3% or less	
Microphone impedance	600Ω	

Receive

Circuitry		Double conversion superheterodyne	
Intermediate frequency (1st/2nd)		45.05MHz /455kHz	58.525MHz /455kHz
Sensitivity (12dB SINAD)	V or U band	0.16μV or less	
	V^2 or U^2 band	0.25μV or less	
Selectivity (–6dB)		12kHz or more	
Selectivity (–60dB)		28kHz or less	
Squelch sensitivity		0.1μV or less	
Audio output (8Ω, 5% distortion)		2W or higher	
Audio output impedance		8Ω	

Note : Receiver specifications apply only when using the V or U band. They do not apply to the V^2 or U^2 band.

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