



# SERVICE MANUAL

UHF TRANSCEIVER

**IC-U8**

**IC-U8s1**

**IC-U8s2**

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## INTRODUCTION

This service manual describes the latest service information for the IC-U8/U8S1/U8S2 UHF TRANSCEIVER at the time of publication.

MODEL	VERSION	INTRINSICALLY SAFE	BATTERY PACK
IC-U8	U.S.A.	Not approved	CM-80 *1
IC-U8	General	Not approved	CM-80 *1
IC-U8S1	U.S.A.	Groups C and D	CM-79 *2
IC-U8S2	U.S.A.	Groups E, F and G	CM-79 *2

\*1: Non-intrinsically safe type \*2: Intrinsically safe type

## DANGER

**NEVER** connect the transceiver to an AC outlet or to a DC power supply that uses more than 9 V. This will ruin the transceiver.

**DO NOT** expose the transceiver to rain, snow or any liquids.

**DO NOT** reverse the polarities of the power supply when connecting the transceiver.

**DO NOT** apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

## INTRINSICALLY SAFE QUALIFICATION

When servicing the IC-U8S1 and IC-U8S2, the following conditions must be met. Failing to satisfy any of these conditions will invalidate the INTRINSICALLY SAFE certification.

1. Servicing the transceiver should only be undertaken by suitably qualified personnel in a non-hazardous area. Never attempt to remove the case in a hazardous area.
2. **ONLY** the approved battery, ICOM's CM-79, may be used and this battery may only be removed or charged in a safe area.
3. **USE ONLY** safety critical components as specified in the parts list (SECTION 7), should replacement of any item be necessary.

## ORDERING PARTS

Be sure to include the following 4 points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

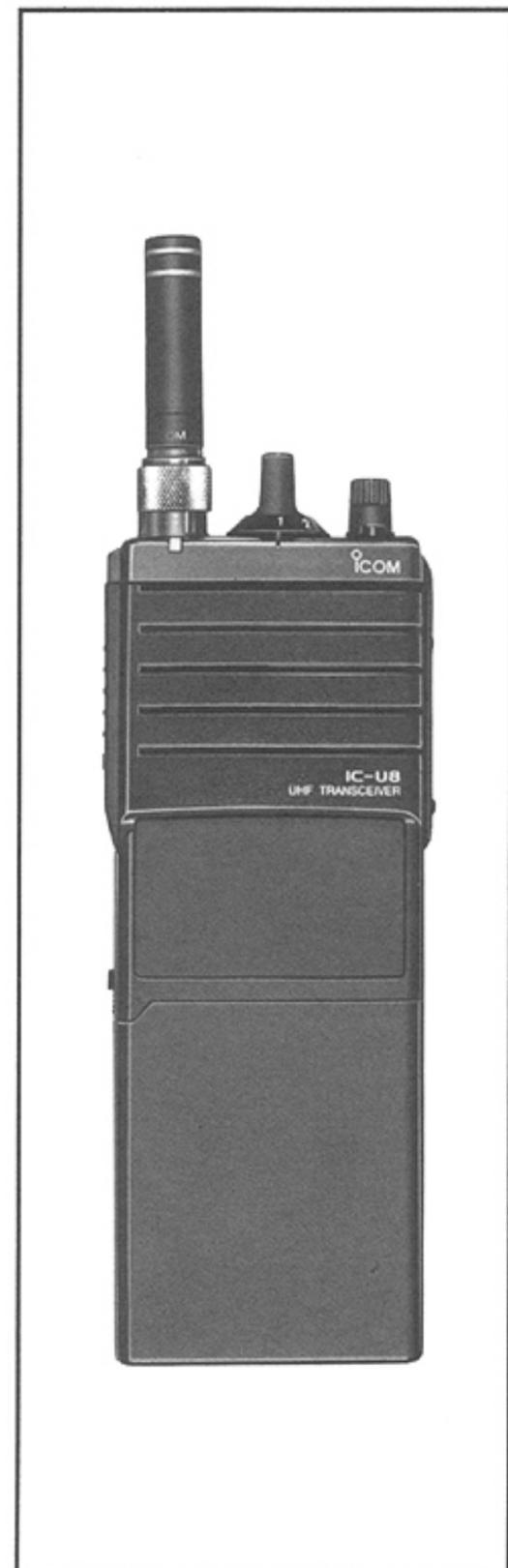
<SAMPLE ORDER>

1120001590	IC	M5236ML-73A	IC-U8 LOGIC UNIT	5 pieces
8810000740	Screw	PH A M2X 15ZK	IC-U8 Rear panel	10 pieces

Addresses are provided on the inside back cover for your convenience.

## REPAIR NOTE

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from a power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 30 dB~40 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.



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To program the operating frequency, tone frequency, etc., see the separately available EX-704 PROGRAMMING MANUAL (A-5069S-1EX).

## SECTION 1 SPECIFICATIONS

### ■ GENERAL

●Frequency range	: 450 ~ 470 MHz
●Type of emission	: 16K0F3E (8K50F3E, Narrow type)
●Number of channels	: Up to 6 channels
●Frequency stability	: $\pm 0.0005\%$
●Antenna impedance	: 50 $\Omega$ unbalanced
●Power supply requirement	: Icom battery packs CM-79 or CM-80 (Negative ground)
●Usable temperature range	: $-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ( $-22^{\circ}\text{F} \sim +140^{\circ}\text{F}$ )
●Dimensions (with CM-80)	: 58 (W) mm $\times$ 149 (H) mm $\times$ 29 (D) mm 2.3 (W) $\times$ 5.9 (H) $\times$ 1.1 (D) in
●Weight (with CM-80)	: 440 g (15.5 oz)

### ■ TRANSMITTER

●RF output power	: 1.5 W
●Modulation system	: Variable reactance frequency modulation
●Current drain (approx.)	: 1.0 A
●Maximum frequency separation	: 20 MHz
●Microphone impedance	: 1.2 k $\Omega$
●Maximum deviation	: $\pm 5$ kHz ( $\pm 2.5$ kHz Narrow type)
●Spurious emissions	: $-60$ dB
●Noise and hum rejection	: 43 dB
●Audio response	: $+1$ dB $\sim -3$ dB of $+6$ dB/octave from 300 Hz $\sim$ 3000 Hz
●Limiting of modulator	: 70%~100%

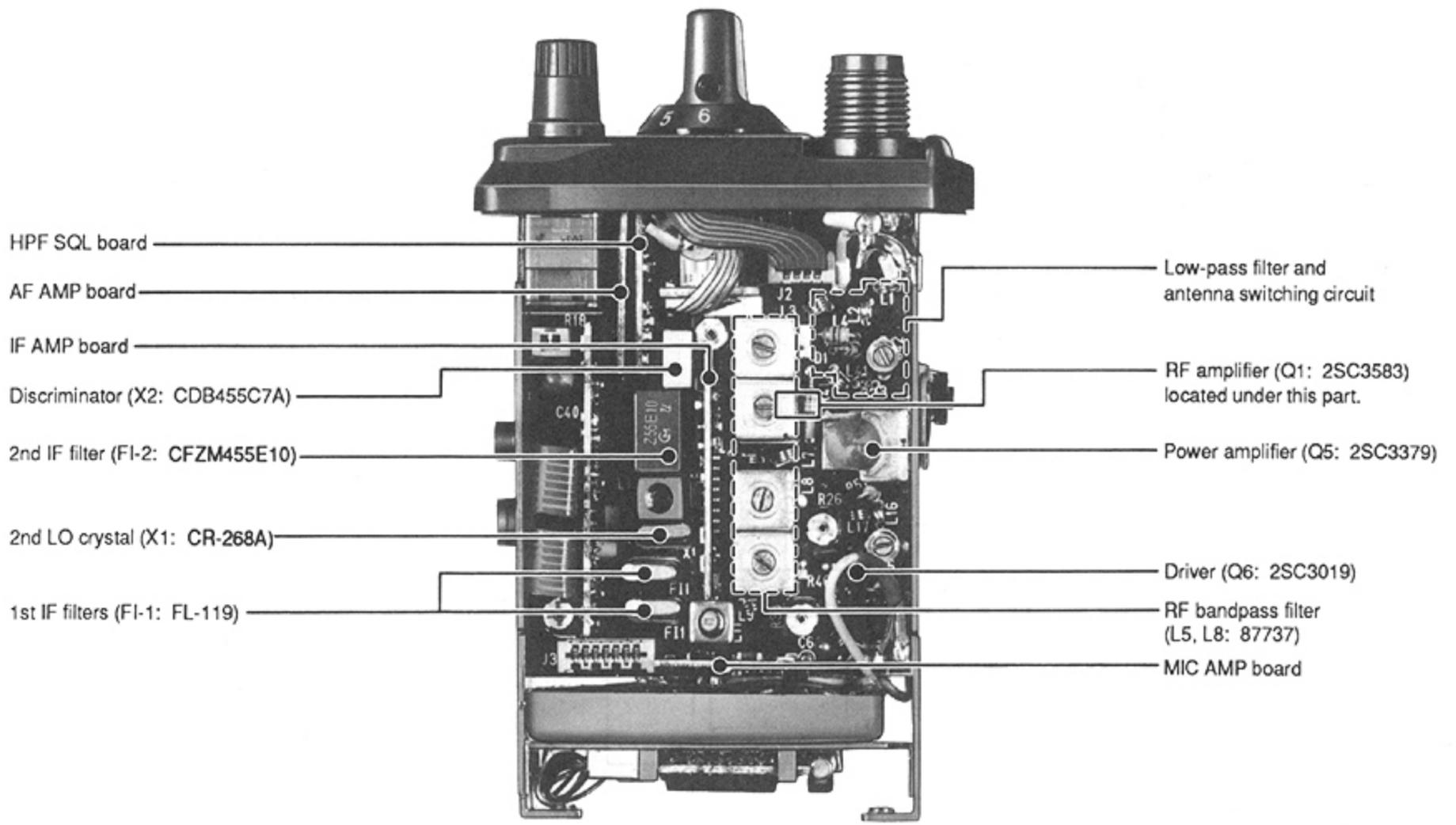
### ■ RECEIVER

●Receive system	: Double-conversion superheterodyne
●Sensitivity	: 0.32 $\mu\text{V}$ at 12 dB SINAD
●Squelch threshold sensitivity	: 0.32 $\mu\text{V}$
●Intermediate frequencies	: 1st 45.15 MHz 2nd 455 kHz
●Maximum frequency separation	: 20 MHz
●Current drain (approx.)	: Audio max. 250 mA Standby 75 mA
●Audio output power	: 300 mW
●Audio output impedance	: 8 $\Omega$
●Adjacent selectivity	: 70 dB
●Spurious frequency rejection	: 60 dB
●Image rejection	: 50 dB
●Intermodulation	: 60 dB
●Noise and hum	: 45 dB
●Audio response	: $+1$ dB $\sim -3$ dB of $-6$ dB/octave from 300 Hz~3000 Hz

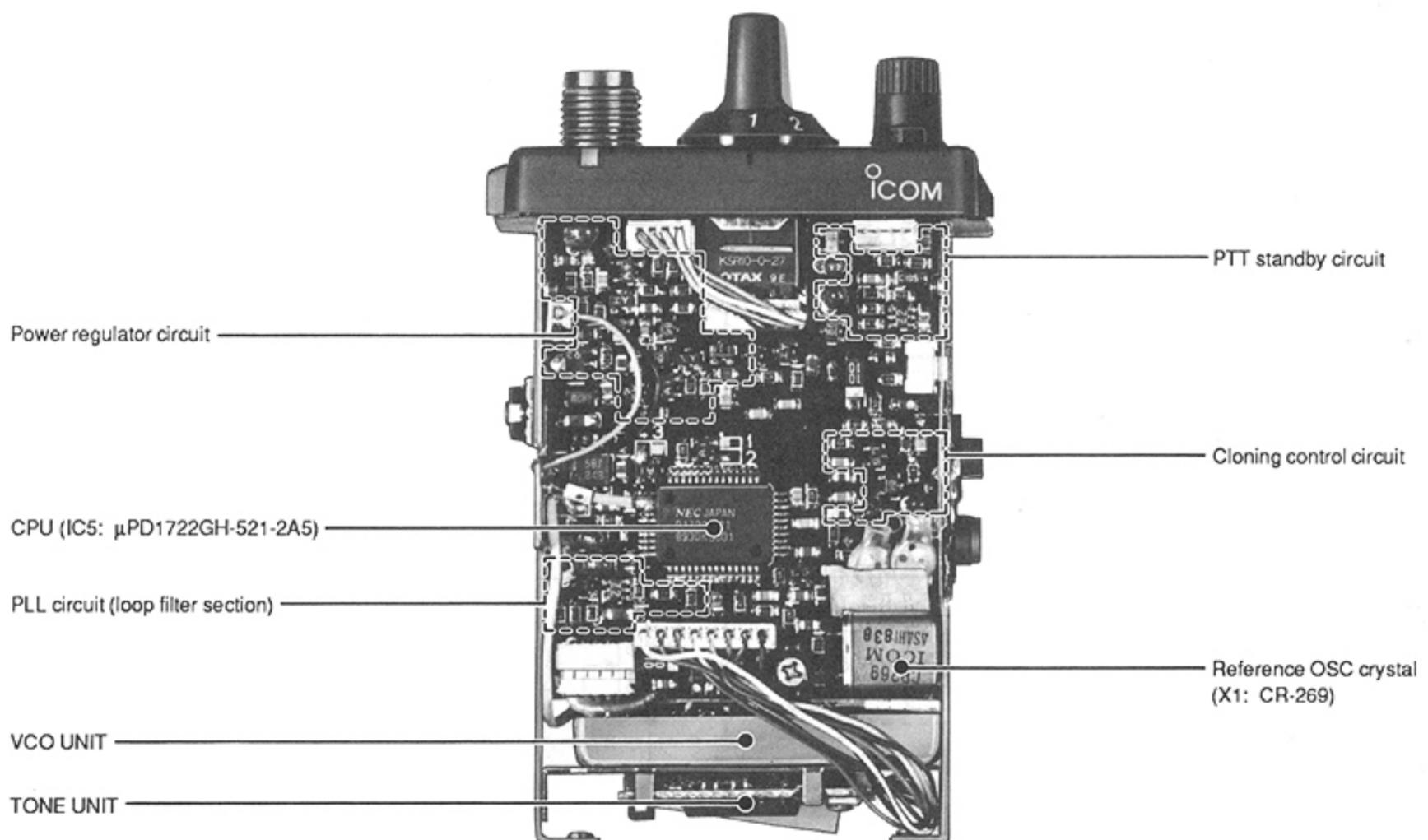
All stated specifications are subject to change without notice or obligation.

## SECTION 2 INSIDE VIEWS

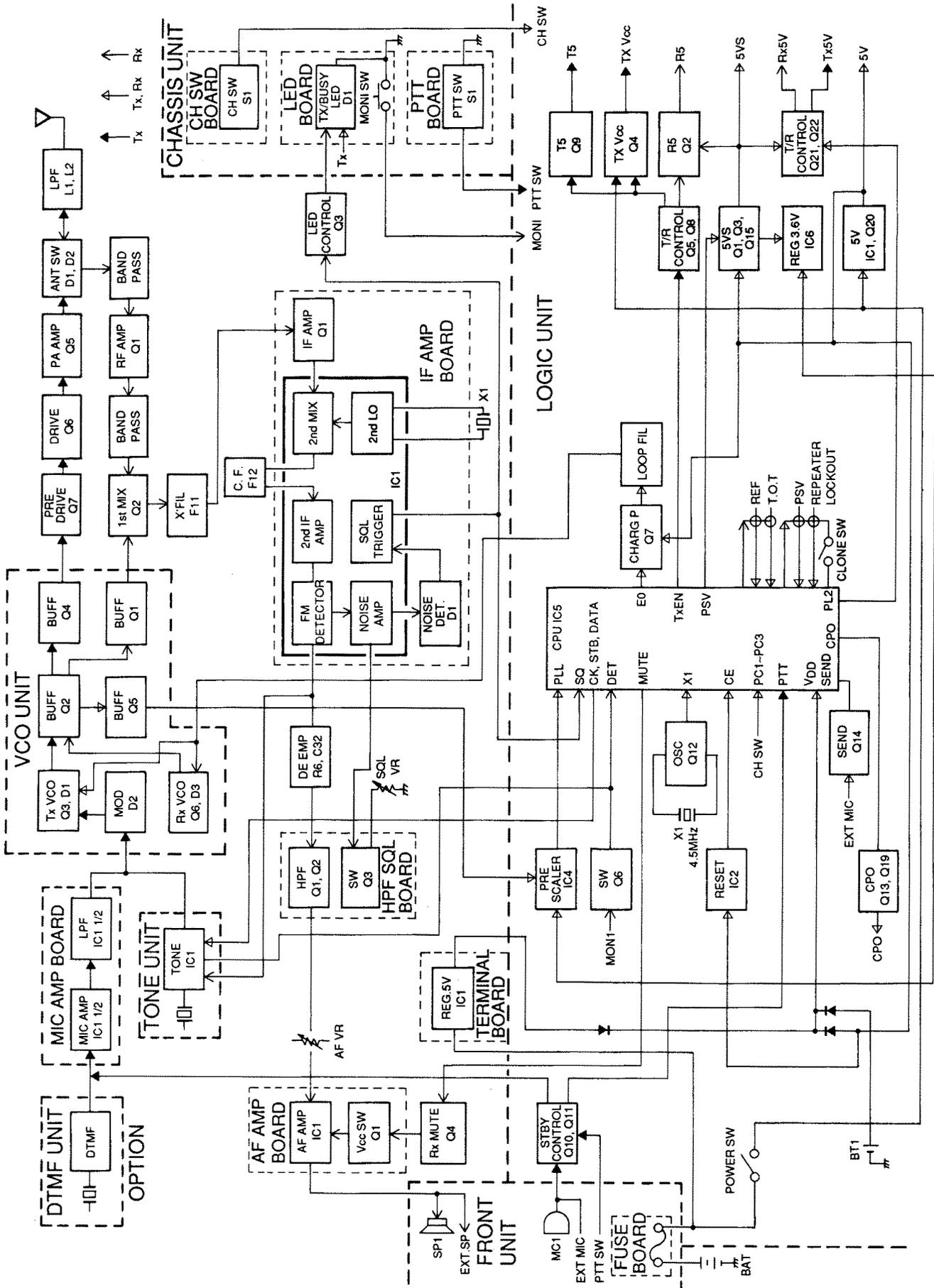
### RF UNIT



### LOGIC UNIT



SECTION 3 BLOCK DIAGRAM



## SECTION 4 CIRCUIT DESCRIPTION

### 4-1 RECEIVER CIRCUITS

#### 4-1-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT AND APC BOARD)

An antenna switching circuit switches the transmit/receive circuit and functions as a low-pass filter while receiving and as a resonator circuit while transmitting.

Received signals enter the antenna connector and pass through a two-stage Chebyshev low-pass filter (L1, L2, C1, C2, C4, C5, C10). The signals are applied to the antenna switching circuit (D1, D2, L3, C6, C8, C9), and then to the RF circuit. This antenna switching circuit employs a  $\lambda/4$ -type diode switching system.

By clipping signal voltages higher than 0.6 V, D3 prevents signals of excessive amplitudes from entering Q1. When the signals are received, D1 and D2 are OFF and the signals are applied to the RF circuit (Q1).

#### 4-1-2 RF CIRCUIT (RF UNIT)

The RF circuit amplifies signals within the range of frequency coverage, and filters out out-of-band signals.

Signals from the antenna switching circuit are passed through a helical coil (L5), amplified at Q1 and then applied to another helical coil (L8), to suppress out-of-band signals.

#### 4-1-3 1ST MIXER CIRCUIT (RF UNIT)

A 1st mixer circuit converts the received signal to a fixed frequency of 1st IF signals using a PLL output frequency. By changing a PLL frequency, only the desired frequency can be passed through a crystal filter located at the next stage of the 1st mixer.

The mixer circuit consists of a transistor (Q2). Signals are input as local signals from the PLL circuit to the mixer via C21 through the coaxial cable, and then mixed with the received signals. The mixed signals are converted by L11 into a 45.150 MHz 1st IF signal.

#### 4-1-4 1ST IF CIRCUIT (RF UNIT)

The 1st IF circuit amplifies a signal which is converted in a 1st mixer circuit.

After passing through the matching coil (L11), the 1st IF signal is applied to the crystal filter (F11) to suppress out-of-band signals. The filtered signal is amplified at Q1 in the IF AMP board, and is then applied to the 2nd IF circuit.

#### 4-1-5 2ND IF AND DEMODULATOR CIRCUITS (IF AMP BOARD)

The 2nd mixer circuit converts a 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts the receive signal twice) improves the image rejection ratio and obtains stable receiver gain.

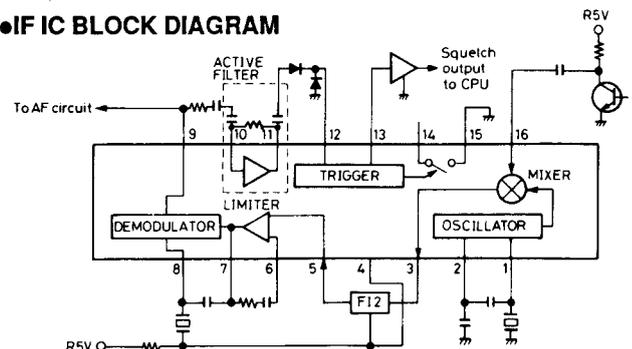
The amplified 1st IF signal enters IC1 via pin 16. IC1 contains a mixer, local oscillator, quadrature detector, op-amp, and a trigger circuit.

The entered signal is to be converted to a 2nd IF signal at the mixer section to obtain the 455 kHz 2nd IF frequency. The 2nd IF signal exits IC1 from pin 3 and passes through the ceramic filter (F12) where unwanted heterodyned signals are removed.

The signal re-enters IC1 pin 5 and is then amplified at the op-amp section that functions as a limiter amplifier.

The amplified signal is detected at the quadrature detector section (pins 7, 8 and an external ceramic resonator X2) and is output from pin 9 as AF signals.

#### ●IF IC BLOCK DIAGRAM



#### 4-1-6 AF CIRCUIT (HPF SQL BOARD AND AF AMP BOARD)

An AF circuit de-emphasizes a demodulated signal with  $-6$  dB/oct and power amplifies the signal to drive a speaker. The AF circuit includes a mute circuit to mute the signal with a noise squelch and a tone squelch.

The demodulated signal output from IC1 pin 9 in the IF AMP board is de-emphasized at R6 and C32 and is applied to active filters (high-pass filter), Q1 and Q2 in the HPF SQL board. The signal passes through the volume control (R18) and is applied to the AF AMP board to obtain 300 mW of speaker driving power.

Q4 in the RF unit and Q1 in the AF AMP board function as an AF mute switch when the noise squelch or tone squelch is closed.

### 4-1-7 SQUELCH CIRCUIT (HPF SQL BOARD AND IF AMP BOARD)

A squelch circuit cuts out AF signals when no RF signal is received. By detecting noise components in the AF signal, the squelch circuit switches the AF power amplifier.

IC1 pin 9 in the IF AMP board outputs demodulated signals to the AF circuit. A portion of the demodulated signals re-enters IC1 pin 10 via R10, C12 and C13. IC1 pins 10 and 11 function as an active filter with a CR connection (C5, C6 and R5).

Noise components above 20 kHz are amplified at the active filter and are then applied to a noise detector, D1. The detected signal (DC voltage) becomes a trigger in the trigger circuit section in IC1. The triggered signal is inverted at Q2. Q2 outputs "LOW" when the squelch opens.

### 4-1-8 TONE SQUELCH CIRCUIT (TONE UNIT)

A tone squelch circuit is decoded whether the CTCSS tone is superimposed on the AF signal or not. Also the circuit encodes the tone while transmitting for the subaudible tone encoder.

A portion of AF signal output from the IF AMP board is applied to the TONE unit via the "Rx AF" line and enters tone encoder/decoder IC1. IC1 detects signals which superimpose tones.

When the same tone as the programmed one is received, IC1 pin 23 outputs "HIGH" to send the decoding signal to the CPU (IC5 in the LOGIC unit). The CPU controls the AF mute switch using the "MUTE" signal.

## 4-2 TRANSMITTER CIRCUITS

### 4-2-1 MICROPHONE AMPLIFIER (MIC AMP BOARD)

The microphone amplifier circuit amplifies audio signals with 6 dB/oct pre-emphasis from the microphone to a level needed at the modulation circuit.

AF signals from the microphone enter the MIC AMP board via the LOGIC and RF units. IC1 on the MIC AMP board is a dual operational amplifier that functions as a low signal amplifier and limiter amplifier. IC1 also pre-emphasizes the signals using a C5 and R3 connection. Output signals from IC1 pin 1 pass through the splatter filter (R6, R9, R10 and C8-10) to filter out the audio components above 3 kHz. The signals amplified at IC1 pins 5-7 exit the MIC AMP board.

The output signals are level-adjusted at R34 on the MAIN unit and are then applied to the VCO unit to make a frequency modulation.

### 4-2-2 MODULATION CIRCUIT (VCO UNIT)

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signal.

The VCO unit consists of the oscillator sections for transmission (Q3) and reception (Q6), and the buffer amplifiers (Q2, Q1, Q4 and Q5). The oscillating frequency from the transmission section is between 450 MHz and 470 MHz and the one from the reception section is between 404.850 MHz and 424.850 MHz. D1 in the transmission section performs frequency modulation.

### 4-2-3 DRIVE AND POWER AMPLIFIER CIRCUITS (RF UNIT)

The drive and power amplifier circuits amplify the VCO oscillating signal to an output power level.

The output signal from the VCO unit is applied to the transmitter amplifier circuits in the RF unit. The transmitter amplifier circuits consist of a predriver Q7, driver Q6 and power amplifier Q5. The signal is amplified at this state up to 1.5W maximum and is then applied to the antenna connector via the low-pass filters.

### 4-2-4 ANTENNA SWITCHING CIRCUIT (RF UNIT)

The antenna switching circuit applies the received signal to the receiver circuits and the transmitter signal to the antenna connector.

The circuit employs a  $\lambda/4$ -type diode switching system consisting of 2 diodes and a low-pass filter. T5V switches the low-pass filter to a resonance or matching circuit using diodes.

When T5V are applied to D1 and D2, the diodes turn ON and L3 is seemingly grounded to an RF signal. The low-pass filter becomes a resonance circuit and has high impedance. The output signal from the power amplifier (Q5), therefore, is never applied to the receiver circuits.

### 4-2-5 TERMINAL CIRCUIT (RF UNIT)

The RF and the LOGIC units are connected by the TERMINAL board in the RF unit. IC1 on the TERMINAL board backs up the CPU memory. When the MAIN unit is switched off, the memory is backed up by the battery.

### 4-3 PLL CIRCUITS

#### 4-3-1 GENERAL DESCRIPTION

PLL circuits steadily oscillate the transmit frequency and receive the local frequency comparing the phase of the divided VCO frequency to the phase of the reference frequency. The PLL output frequency is therefore controlled by the divided ratio (N-data) of the programmable divider.

#### 4-3-2 VCO CIRCUITS (VCO UNIT)

The VCO circuits oscillate the PLL output frequency by controlling varactor diodes.

The VCO unit has 2 VCO circuits, transmitter VCO (Q3) and receiver VCO (Q6). An oscillating circuit is selected with Rx 5V and Tx 5V. An oscillating frequency is controlled with varactor diodes, D2 (when Q3 activates) or D3 (when Q6 activates).

The signal is buffer-amplified at Q2 and is then applied to the receiver or transmitter circuit via Q1, Q4 and fed back to the PLL circuit in the LOGIC unit via Q5.

#### 4-3-3 PHASE DETECTOR CIRCUITS (LOGIC UNIT)

The phase detector circuit detects the off phase components of the VCO frequency using a stable reference frequency.

The CPU IC5 contains logic and PLL sections. The oscillated signal comes from the VCO unit, enters IC5 from pin 5 and is divided at a prescaler part and divided again at a programmed divider part. The divided signal is applied to a phase detector part to compare with the reference frequency. The detected signal exits from IC5 pins 1 and 2.

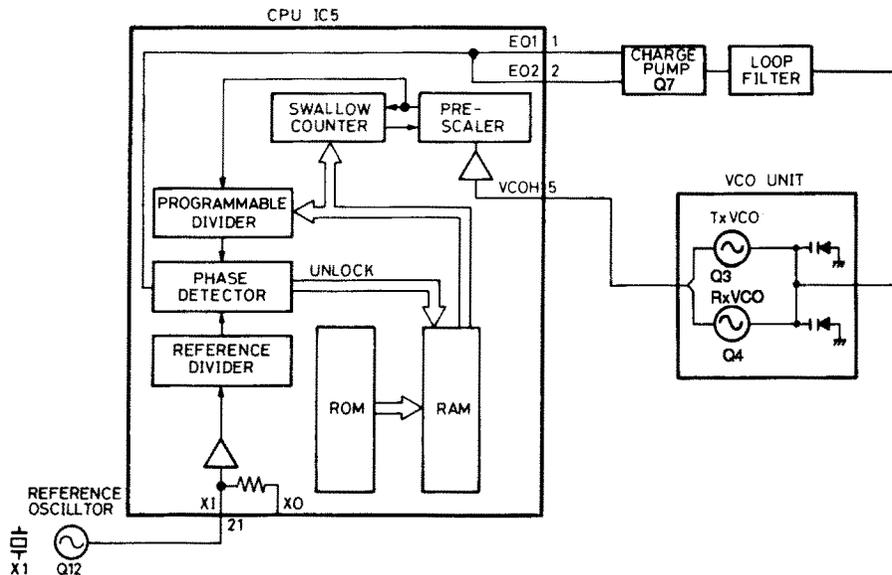
The reference frequency is obtained when the generated signal at an oscillator, Q12 with X1, is divided at a reference divider part inside IC5.

#### 4-3-4 CHARGE PUMP AND LOOP FILTER (LOGIC UNIT)

A loop filter and a charge pump convert the phase-detected signal (pulse signal) to DC voltage to control the VCO oscillating signal.

The phase-detected signal output from the CPU is applied to the charge pump (Q7) and the lag-lead-type loop filter (R71, C20, C41, C43, R70 and R23) to convert the pulse signal to DC voltages (PLL lock voltage). This voltage determines the clarity characteristics of the PLL output signal.

The lock voltage is then applied to the VCO circuit.



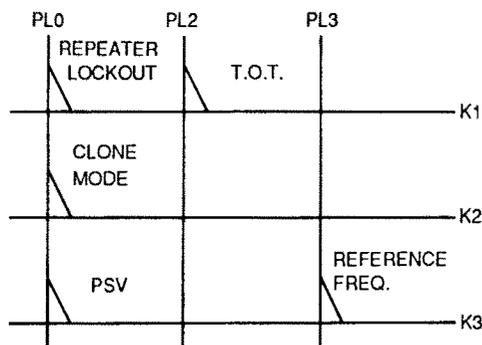
## 4-4 LOGIC CIRCUITS

### 4-4-1 CPU PORT ALLOCATIONS

The transceiver has only a few switches yet has many functions contained in a 4-bit CMOS CPU. All functions can be pre-programmed via cloning from another transceiver or a data programmer EX-704.

PIN NUMBER	PORT NAME	I/O	DESCRIPTION	PIN NUMBER	PORT NAME	I/O	DESCRIPTION
P01	E01	OUT	Outputs PLL phase-detected signal.	P17	PSV	OUT	Outputs the "circuit off" signal when the power saver function is activated.
P02	E02	OUT	Same as P01	P18	MUTE	OUT	Outputs the mute signal (LOW) when: —Squelch closes. —Tone squelch closes. —Transmitting. —PLL is unlocked.
P03	VDD1	IN	Power voltage input port that requires 5 V for operation and 2.5 V for CPU standby.	P19	STB	OUT	Outputs the strobe signal for tone encoder/decoder.
P04	VCOL	IN	Not used.	P20	XO	OUT	Oscillator output port connected at inside parallel with the XI port.
P05	VCOH	IN	PLL prescaler input port.	P21	XI	IN	Oscillator input port used for PLL reference frequency and the CPU clock.
P06	CE	IN	Chip enable port for the CPU. When the port is "HIGH" the CPU is in normal operation; when "LOW" the CPU is in standby.	P22	GND	—	Ground
P07	VDD2	IN	Power voltage input port. Same as P03.	P23	TxEN	OUT	Outputs "HIGH" when transmitting.
P08	SQ	IN	Squelch input port. When the port is "LOW" the CPU detects that the squelch is open.	P24, P25, P27	PL2, PL3, PL0	OUT	Output a signal to the key matrix when power is ON.
P09~11	PC1 ~PC3	IN	Input ports for the channel selector.	P26	BEEP	OUT	Outputs beep signals.
P12	PTT	IN	PTT input port. When the port is "LOW" the CPU detects that the transceiver is transmitting.	P28~P31	TEST	OUT	Not used.
P13	DATA	OUT	Outputs serial data for the tone encoder/decoder.	P32~P42	NC	—	Not used.
P14	SEND	IN	The same as the PTT input port. The port becomes "LOW" faster than the PTT input port. This port is also used as the cloning data input port.	P43~P45	K1~K3	IN	Input ports for the key matrix.
P15	CPO	OUT	Outputs the cloning data when the transceiver is in the clone output mode.	P46	DET	IN	Input port for the tone decoder. Receives "HIGH" when a tone is acknowledged.
P16	CK	OUT	Outputs the clock signal for the tone encoder/decoder.	P48	INT	IN	Interrupt port for CPU operation.

### 4-4-2 INITIAL MATRIX (LOGIC UNIT)



#### •REPEATER LOCKOUT

When the matrix is open the repeater lockout function is activated. This function inhibits transmitting on the receive tone programmed channel under the following conditions:

- When the channel is busy with a signal not including a correct tone. At this time, 5 beeps are emitted from the speaker.
- Transmitting is accepted when the channel is not busy, or when the channel is busy with a signal including a correct tone.

●CLONE MODE

While pushing the CLONING switch, power comes on, the transceiver enters the clone mode, then CPU pin 14 (SEND port) functions as the clone data input port.

When the CLONING switch is pushed again, the transceiver becomes a master transceiver of clone transmit. The CPU pin 15 (CPO port) outputs clone data.

●PSV (POWER SAVER) FUNCTION

When the matrix is open, the power saver function activates 30 sec. after the squelch closes or a switch is released. When the function is activated the circuit in the transceiver operates with the following time ratio:

- Circuit off: 1000 msec.
- Standby: 250 msec.

●T.O.T. (TIME-OUT TIMER) FUNCTION

When the matrix is open, the time-out timer function is activated. The function inhibits continuous transmitting of more than 60 sec.

●REFERENCE FREQUENCY

When the matrix is open, 6.25 kHz is used for the reference frequency.

When the matrix is shortened, 5.0 kHz is used for the reference frequency.

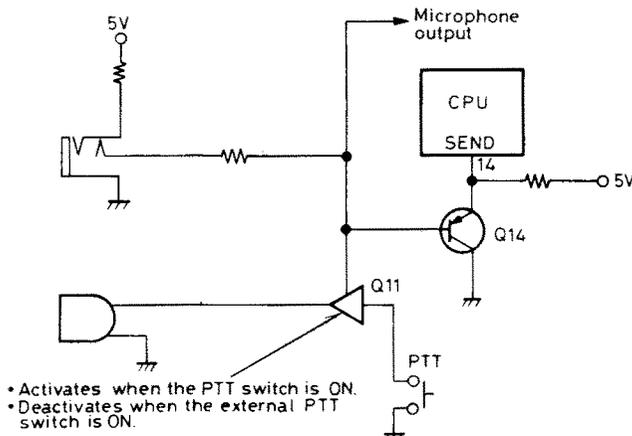
4-5 OTHER CIRCUITS

4-5-1 PTT CONTROL CIRCUIT (LOGIC UNIT)

When the PTT switch is pushed, Q11 is activated, hence voltage is applied to the microphone element. At this time, Q14 also is activated and a "LOW" SEND signal is applied to the CPU. CPU pin 23 outputs "HIGH" when the SEND signal is received and the PLL is not unlocked.

When the connected external microphone is used, a PTT line signal activates Q14 via R40. At this time, Q11 is deactivated, hence the internal microphone is not used.

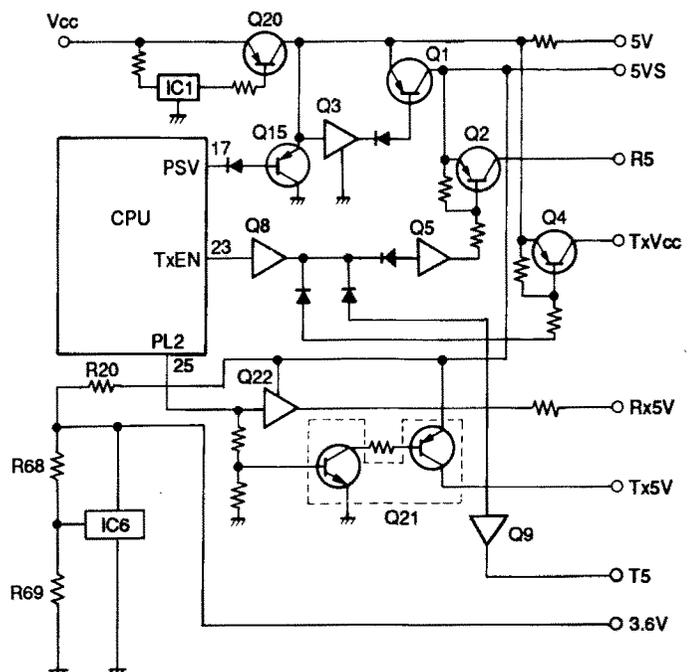
●PTT CONTROL CIRCUIT



4-5-2 VOLTAGE LINES (RF UNIT)

LINE	DESCRIPTION
Vcc	Battery pack voltage that passes through the fuse (F1), and the power switch (R25). Vcc is applied to the transmitter amplifier circuit and audio power amplifier circuit.
5VS	5 V controlled by the power saver function. Q1 produces the voltage from the 5 V line.
5V	Common 5 V produced at Q20 and IC1.
Rx5V	5 V for receiver VCO. Q22 is controlled by the output from the CPU pin 25 (PL2 port) by using the 5VS line.
Tx5V	5 V for transmitter VCO. Q21 is controlled by the output from CPU pin 25 (PL2 port) by using the 5VS line.
R5	5 V for the receiver circuit. Q2 is controlled by the output from CPU pin 23 (TxEN port) by using the 5VS line.
T5	5 V for the mic amplifier circuit and bias voltage for the transmitter amplifier circuit. Q9 is controlled by the output from CPU pin 23 (TxEN port) by using the 5VS line.
TxVcc	Voltage is supplied to Q6 on the transmitter circuit in the RF unit only when it is produced by Q4.
3.6V	The voltage from the 5VS line is converted into 3.6 V at IC6, R20, R68, and R69. IC6 is the regulator IC for 3.6 V. The voltage is then supplied to the prescaler IC4.
CPU5	Used for the CPU in the LOGIC unit. IC1 in the RF unit is controlled by the battery pack voltage. When the battery pack is removed, an internal lithium battery is used as a backup.

●REGULATOR CIRCUIT



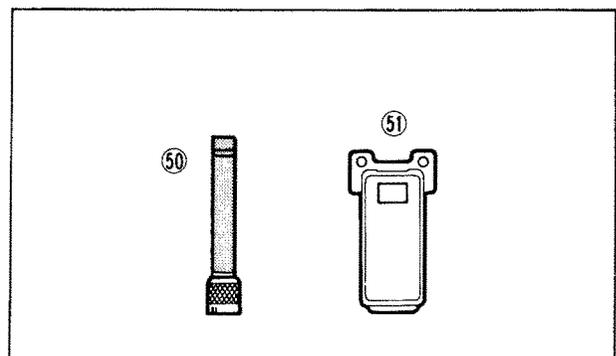
**SECTION 5 MECHANICAL PARTS AND DISASSEMBLY**

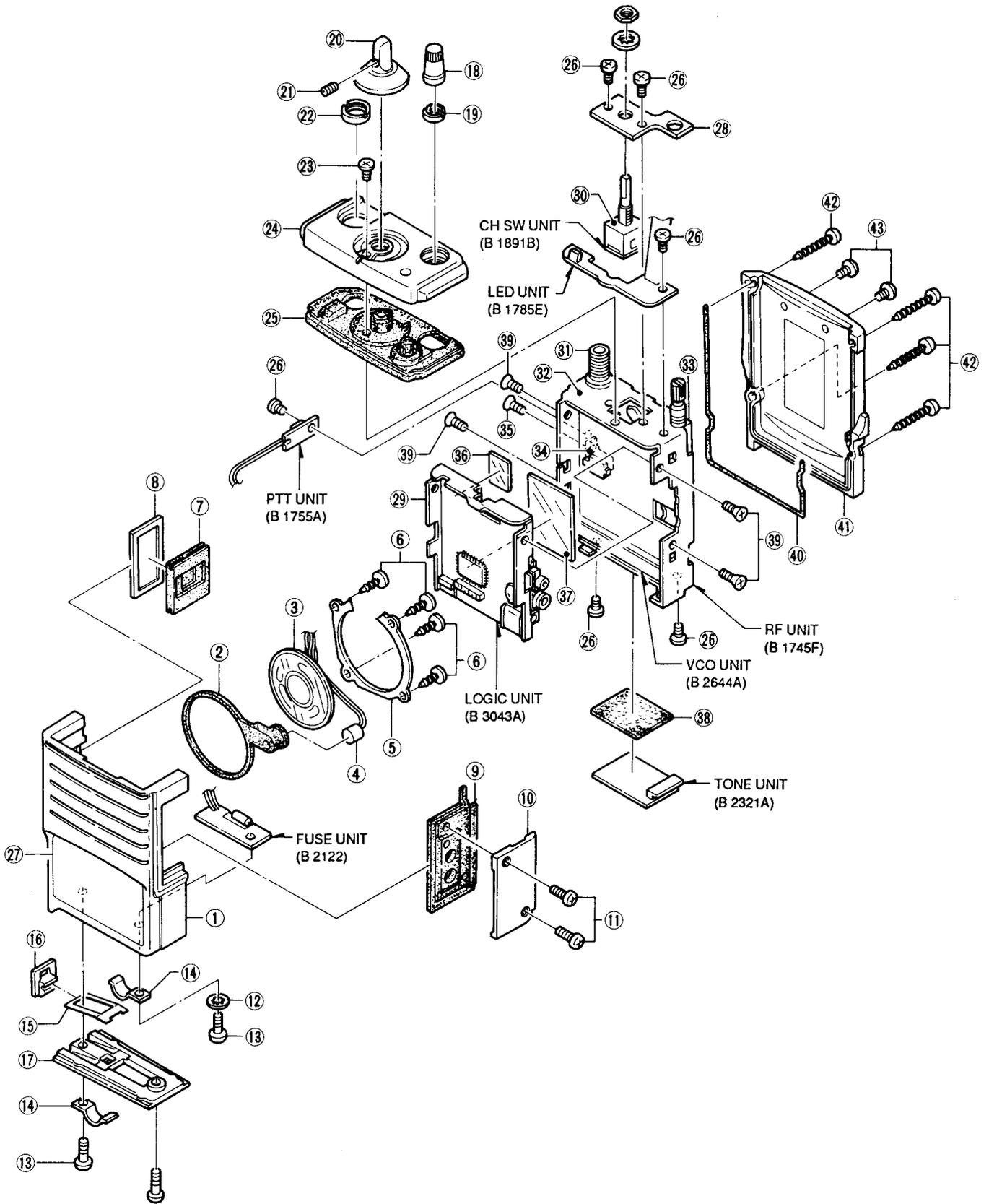
LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8210004440	Front panel (E)	1	②②	—	Nut (included ③①)	1
②	8930014440	Speaker seal	1	②③	8810000530	PH No. 0 M2×2.5 ZK	1
③	2510000460	Speaker SI003609	1	②④	8210004450	Top panel	1
④	7700000480	Microphone KUC2023-01-006	1	②⑤	8930014411	Top seal (1)	1
⑤	8930017361	Speaker plate (A-1)	1	②⑥	8810004870	PH No. 0 M2×2.5	1
⑥	8810006100	PH B0 No. 0 M2×3.5 Ni	4	②⑦	8310016471	Front plate (1)	1
⑦	8930014430	PTT switch rubber	1	②⑧	8930014180	VR plate	1
⑧	8930014392	PTT switch button-2	1	②⑨	8930014481	CPU Shield frame	1
⑨	8930014420	Side seal (assembled with metal plate)	1	③⑩	2260001160	Variable resistor KSR10-0-27	1
⑩	8930014380	Side plate	1	③①	6510008240	Antenna connector TNC-R109	1
⑪	8810004290	PH M2×4 ZK	2	③②	8010009821	Chassis (A-3)	1
⑫	8850001080	Inner toothed washer M2.5	1	③③	7030000600	Rotary encoder MCR10EZHJ	1
⑬	8810006050	Icom screw E5	3	③④	8410001050	PA heat sink	1
⑭	8930014170	Contact terminal	2	③⑤	8810006060	FH B0 No. 0 M2×4	1
⑮	8930014161	Lock spring (1)	1	③⑥	8930018390	Insulating plate BQ	1
⑯	8930014370	Battery pack release button	1	③⑦	8930018030	Leaf copper sheet	1
⑰	8010008180	Sliding guide plate	1	③⑧	8930016720	Sponge (BK)	1
⑱	8610004910	Knob N134	1	③⑨	8810005580	FH No. 0 M2×2.5	4
⑲	8830000550	VR nut (E)	1	④⑩	8930014451	Front seal (1)	1
⑳	8610004920	Knob N135	1	④①	8010008172	Rear panel (2)	1
㉑	—	Hexagon socket set screw (included ⑳)	1	④②	8010010710	Rear panel A-2	1
				④③	8810000740	PH A M2×15 ZK	4
				④④	8810003710	Icom screw B5 (except IC-U8S1)	2

**Screw abbreviations**

PH: Pan head FH: Flat heat OH: Oval countersunk head  
 BO: Self-tapping screw No. 0: Precision-type screw  
 ZK: Black Ni: Nickel

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
⑤⑩	Optional product	Flexible antenna	1
⑤①	Optional product	Alligator clip (except IC-U8S1)	1





## SECTION 6 ADJUSTMENT PROCEDURES

### ■ PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1	<ul style="list-style-type: none"> <li>Select any channel.</li> <li>Connect the power meter.</li> <li>Transmitting</li> </ul>	TOP PANEL	Loosely couple the frequency counter to the antenna connector.	Same frequency as the programmed one. To check the programmed frequency, use the EX-704.	LOGIC	C30
LOCK VOLTAGE		<b>NOTE:</b> To adjust the lock voltage, operating frequency must be set using the EX-704 DATA PROGRAMMER.					
	1	<ul style="list-style-type: none"> <li>Operating frequency: 470.000 MHz</li> <li>Receiving.</li> </ul>	LOGIC	Connect the DC voltmeter to J5 pin 4.	4.5 V	VCO	C27
	2	<ul style="list-style-type: none"> <li>Operating frequency: 470.000 MHz</li> <li>Transmitting</li> </ul>			4.5 V	VCO	C13

### ■ RECEIVER ADJUSTMENT

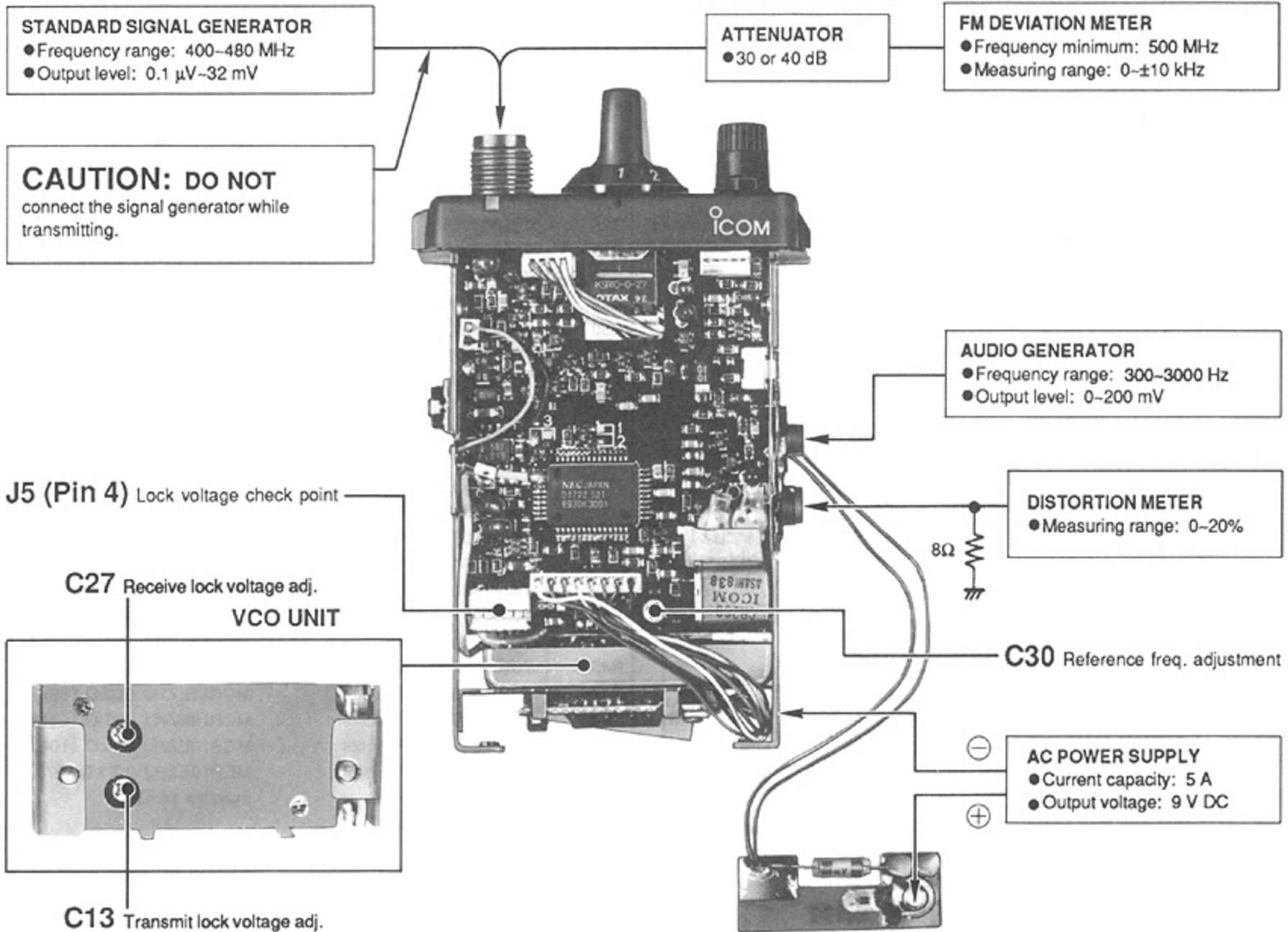
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	<ul style="list-style-type: none"> <li>Select any channel.</li> <li>Set the signal generator: Level: 0.32 <math>\mu\text{V}^*</math> (-117 dBm) Mod.: 1 kHz Dev.: <math>\pm 3.0</math> kHz</li> <li>Push IN the [MONITOR] switch.</li> <li>Receiving</li> </ul>	SIDE PANEL	Connect the distortion meter to the external microphone jack.	Minimum distortion level.	RF	Adjust in sequence L5, L8, L11, L12
SQUELCH THRESHOLD	1	<ul style="list-style-type: none"> <li>Set the signal generator: Level: 0.1 <math>\mu\text{V}^*</math> (-127 dBm) Dev.: <math>\pm 3.5</math> kHz</li> <li>Receiving</li> </ul>	SIDE PANEL	Connect a speaker to the [MIC] jack.	The point where noise is just disappearing.	RF	R12

### ■ TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	<ul style="list-style-type: none"> <li>Select any channel.</li> <li>R26 (RF unit): max. clockwise</li> <li>Transmitting</li> </ul>	TOP PANEL	Connect the RF power meter to the antenna connector.	Maximum output	RF	C42 C45
	2	<ul style="list-style-type: none"> <li>Same as above.</li> </ul>			1.5 W		
DEVIATION	1	<ul style="list-style-type: none"> <li>Select any channel.</li> <li>Set the FM deviation meter: LPF: 20 kHz HPF: OFF Deemphasis: OFF Detector: (P-P)/2</li> <li>Set the audio generator: 1 kHz, 100 mV</li> <li>Transmitting</li> </ul>	TOP PANEL	Connect the FM deviation meter to the antenna connector.	$\pm 4.2$ kHz	RF	R34
	2	<ul style="list-style-type: none"> <li>Set the FM deviation meter: LPF: 20 kHz HPF: OFF Deemphasis: OFF Detector: P and -P</li> </ul>			Same level on P and -P		
CTCSS TONE	1	<ul style="list-style-type: none"> <li>Select any channel.</li> <li>Set the FM deviation meter: LPF: OFF HPF: OFF Deemphasis: OFF Detector: (P-P)/2</li> <li>Apply no signal to the mic connector.</li> <li>Transmitting</li> </ul>	TOP PANEL	Connect the FM deviation meter to the antenna connector.	$\pm 0.75$ kHz	TONE	R10

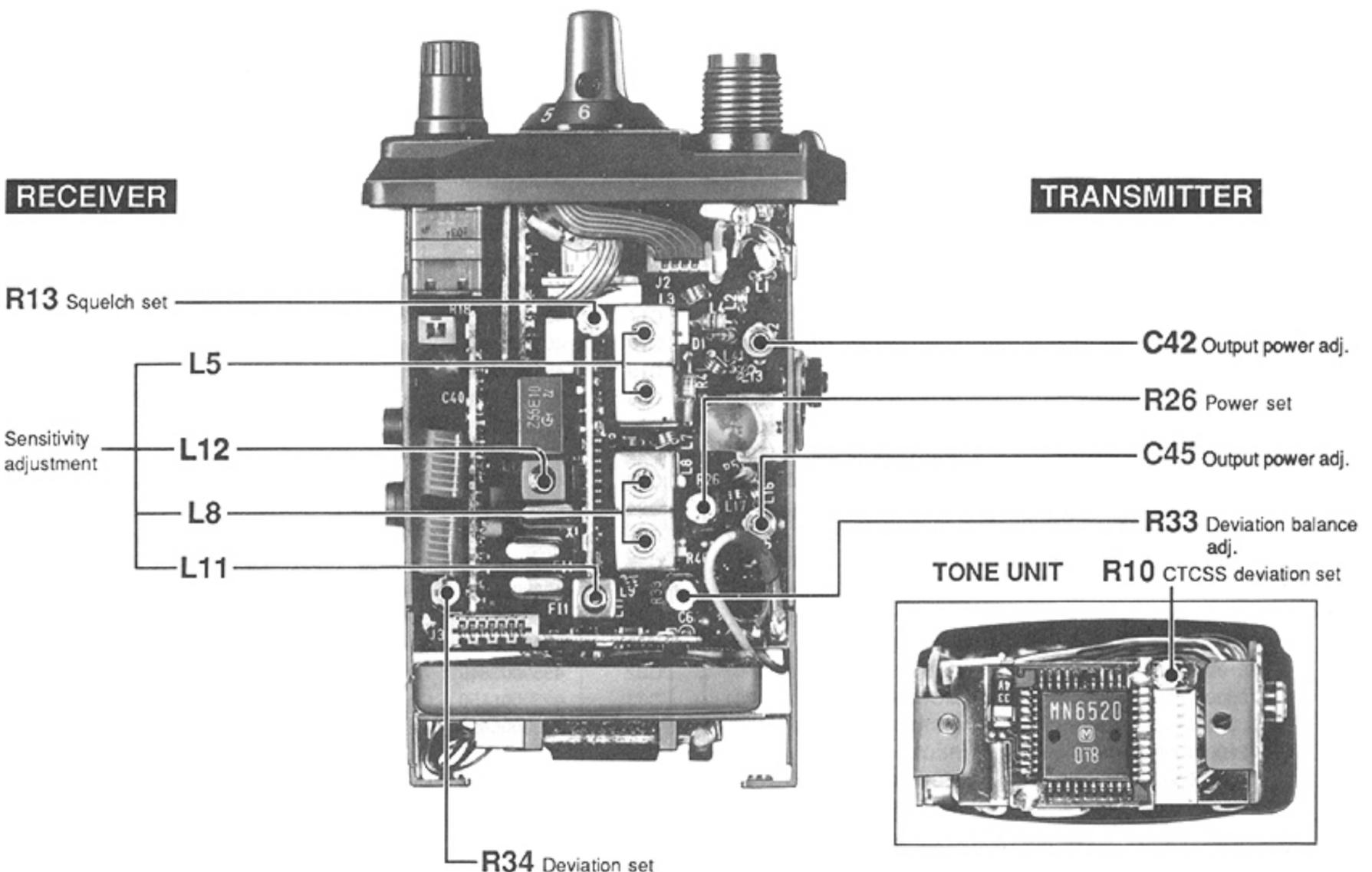
\*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

**CONNECTION AND PLL**



**RECEIVER**

**TRANSMITTER**



## SECTION 7 PARTS LIST

[ RF UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002640	Transistor	2SC3583 R34-T2B
Q2	1530002640	Transistor	2SC3583 R34-T2B
Q3	1510000500	Transistor	2SA1162-GR (TE85R)
Q4	1530001950	Transistor	2SC2712-GR (TE85R)
Q5	1530002510	Transistor	2SC3379
Q6	1530000900	Transistor	2SC3019
Q7	1530001890	Transistor	2SC2407 (1)
D1	1710000580	Diode	1SS265
D2	1790000450	Diode	MA862 (TX)
D3	1790000490	Diode	HSM88AS-TR
D4	1750000170	Diode	DA115 T107
D5	1750000110	Diode	1SS272 (TE85R)
D7	1750000060	Diode	1SS196 (TE85R)
D8	1750000060	Diode	1SS196 (TE85R)
L1	6110001980	Coil	LA-222
L2	6110001980	Coil	LA-222
L3	6110002010	Coil	LA-224
L4	6180002400	Coil	LAL 02NA 1R0K
L5	6190000430	Coil	87737 (7H2)
L6	6110001980	Coil	LA-222
L7	6110001990	Coil	LA-223
L8	6190000430	Coil	87737 (7H2)
L9	6110001980	Coil	LA-222
L11	6150003320	Coil	LS-362
L12	6150003310	Coil	LS-361
L13	6110001980	Coil	LA-222
L14	6110001990	Coil	LA-223
L16	6110001980	Coil	LA-222
L17	6110001990	Coil	LA-223
L18	6110001980	Coil	LA-222
L19	6110002040	Coil	LA-225
F11	2010000960	Filter	FL-119 45.150 (AFA70561)
F12	2020000490	Filter	CFZM455E10
X1	6050005541	Crystal	CR-268A
X2	6070000010	Discriminator	CDB455C7A
R1	7030000310	Resistor	MCR10EZHZ 270 Ω (271)
R2	7030000560	Resistor	MCR10EZHZ 33 kΩ (333)
R3	7030000600	Resistor	MCR10EZHZ 68 kΩ (683)
R4	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R5	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R6	7030000540	Resistor	MCR10EZHZ 22 kΩ (223)
R7	7030003410	Resistor	ERJ3GEYJ 560 Ω (561)
R8	7030000300	Resistor	MCR10EZHZ 220 Ω (221)
R9	7030000320	Resistor	MCR10EZHZ 330 Ω (331)
R10	7030000490	Resistor	MCR10EZHZ 8.2 kΩ (822)
R11	7030000400	Resistor	MCR10EZHZ 1.5 kΩ (152)
R12	7030000400	Resistor	MCR10EZHZ 1.5 kΩ (152)
R13	7310001710	Trimmer	RH0421 C14J0KA (103)
R15	7030000550	Resistor	MCR10EZHZ 27 kΩ (273)
R17	7030000140	Resistor	MCR10EZHZ 10 Ω (100)
R18	7210001500	Variable	RK097111102AA
R19	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R20	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)

[ RF UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
R21	7030000360	Resistor	MCR10EZHZ 680 Ω (681)
R22	7030000360	Resistor	MCR10EZHZ 680 Ω (681)
R25	7030000240	Resistor	MCR10EZHZ 68 Ω (680)
R26	7310001690	Trimmer	RH0421 C12J04A (101)
R27	7030000100	Resistor	MCR10EZHZ 4.7 Ω (4R7)
R28	7030000290	Resistor	MCR10EZHZ 180 Ω (181)
R29	7030000340	Resistor	MCR10EZHZ 470 Ω (471)
R30	7030000410	Resistor	MCR10EZHZ 1.8 kΩ (182)
R31	7030000380	Resistor	MCR10EZHZ 1 kΩ (102)
R32	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R33	7310001770	Trimmer	RH0421 CJ5J06A (224)
R34	7310001850	Trimmer	RH0421 CS4J08A (473)
R35	7030000550	Resistor	MCR10EZHZ 27 kΩ (273)
R36	7030003360	Resistor	ERJ3GEYJ 220 Ω (221)
R37	7010003180	Resistor	ELR20J 15 Ω
R40	7030000520	Resistor	MCR10EZHZ 15 kΩ (153)
R41	7010003870	Resistor	R20J 2.2 Ω
R42	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R43	7030003710	Resistor	ERJ3GEYJ 180 kΩ (184)
R45	7030000680	Resistor	MCR10EZHZ 330 kΩ (334)
R46	7010003280	Resistor	ELR20J 100 Ω
R47	7030000360	Resistor	MCR10EZHZ 680 Ω (681)
R48	7030000360	Resistor	MCR10EZHZ 680 Ω (681)
R49	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R50	7030000430	Resistor	MCR10EZHZ 2.7 kΩ (272)
R51	7010003160	Resistor	ELR20J 10 Ω
C1	4030000610	Ceramic	GRM40 SL 070D 50PT
C2	4030000650	Ceramic	GRM40 SL 150J 50PT
C3	4030000650	Ceramic	GRM40 SL 150J 50PT
C4	4030001100	Ceramic	GRM40 B 102K 50PT
C5	4030000550	Ceramic	GRM40 SL 010C 50PT
C6	4030000560	Ceramic	GRM40 SL 020C 50PT
C7	4030001100	Ceramic	GRM40 B 102K 50PT
C8	4030001100	Ceramic	GRM40 B 102K 50PT
C9	4030000550	Ceramic	GRM40 SL 010C 50PT
C10	4030000560	Ceramic	GRM40 SL 020C 50PT
C11	4030001100	Ceramic	GRM40 B 102K 50PT
C12	4030001100	Ceramic	GRM40 B 102K 50PT
C13	4030001100	Ceramic	GRM40 B 102K 50PT
C14	4030006630	Ceramic	C1608 SL 1H 150J-T-A
C15 *	4550002010	Tantalum	DN 1A 6R8M
C16	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C17	4030001090	Ceramic	GRM40 B 471K 50PT
C18	4030006520	Ceramic	C1608 SL 1H 010C-T-A
C19 *	4550003030	Tantalum	TEMSVA 0J 475M-8L
C20	4030001100	Ceramic	GRM40 B 102K 50PT
C21	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C22	4030008590	Ceramic	C1608 JF 1E 333Z-T-A
C23	4030001790	Ceramic	GRM40 RH 120J 50PT
C24	4030001100	Ceramic	GRM40 B 102K 50PT
C25	4030000650	Ceramic	GRM40 SL 150J 50PT
C26	4030001140	Ceramic	GRM40 F 103Z 50PT
C27	4030001860	Ceramic	GRM40 RH 560J 50PT
C28	4030001100	Ceramic	GRM40 B 102K 50PT
C29	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C32	4550003840	Tantalum	DSB 1V 104M
C33	4030001150	Ceramic	GRM40 F 104Z 25PT
C34	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C35	4030001140	Ceramic	GRM40 F 103Z 50PT
C36	4030000740	Ceramic	GRM40 SL 101J 50PT
C37	4030000560	Ceramic	GRM40 SL 020C 50PT

\* safety critical component

## [ RF UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
C38	4030001100	Ceramic	GRM40 B 102K 50PT
C39 *	4550003110	Tantalum	TEMSVC 1A 226M-12L
C40 *	4550001950	Tantalum	DN 0J 101M
C41 *	4550003060	Tantalum	TEMSVC 0J 336M-12L
C42	4610000280	Trimmer	ECRGA010D30
C43	4030005150	Ceramic	GRM40 CH 090D 50PT
C45	4610000280	Trimmer	ECRGA010D30
C46	4030000910	Ceramic	GRM40 CH 120J 50PT
C47	4030000630	Ceramic	GRM40 SL 100D 50PT
C48	4030005150	Ceramic	GRM40 CH 090D 50PT
C49	4030000590	Ceramic	GRM40 SL 050C 50PT
C50	4030000660	Ceramic	GRM40 SL 180J 50PT
C51	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C52	4030001100	Ceramic	GRM40 B 102K 50PT
C53	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C54	4030001100	Ceramic	GRM40 B 102K 50PT
C55	4030001100	Ceramic	GRM40 B 102K 50PT
C56	4030001090	Ceramic	GRM40 B 471K 50PT
C57	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C58	4030001090	Ceramic	GRM40 B 471K 50PT
C59	4030000550	Ceramic	GRM40 SL 010C 50PT
C60 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C61	4030006670	Ceramic	C1608 SL 1H 270J-T-A
C62	4030000660	Ceramic	GRM40 SL 180J 50PT
C63	4030001090	Ceramic	GRM40 B 471K 50PT
C64 *	4550002010	Tantalum	DN 1A 6R8M
C65 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C66	4030001090	Ceramic	GRM40 B 471K 50PT
C69	4030001150	Ceramic	GRM40 F 104Z 25PT
C70	4030006520	Ceramic	C1608 SL 1H 010C-T-A
C71	4030001090	Ceramic	GRM40 B 471K 50PT
C73	4030000740	Ceramic	GRM40 SL 101J 50PT
C74	4030000740	Ceramic	GRM40 SL 101J 50PT
C75	4030000740	Ceramic	GRM40 SL 101J 50PT
C77 *	4550002980	Tantalum	TEMSVA 1C 225M-8L
C78	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C79	4030006870	Ceramic	C1608 JB 1H 222K-T-A
W1	7120000380	Jumper	JPW 01 R-01
W2	7120000380	Jumper	JPW 01 R-01
W3	7120000380	Jumper	JPW 01 R-01
J1	6510007080	Connector	PI28A-02M
J2	6510008310	Connector	IL-FPC-4S-S1-T1
J3	6510008320	Connector	IL-FPC-7S-S1-T1
EP1	0910018455	P.C. Board	B 1745F
EP7	6910000970	Terminal	DL 2OP 2.6-3-1.2H

## [ IF AMP UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001020	IC	MC3357DR
Q1	1530002610	Transistor	2SC2620 QB-TR
Q2	1530000980	Transistor	2SC3395-TA
D1	1790000490	Diode	HSM88AS-TR
D2	1750000060	Diode	1SS196 (TE85R)
R1	7030000660	Resistor	MCR10EZHZ 220 kΩ (224)
R2	7030000380	Resistor	MCR10EZHZ 1 kΩ (102)
R3	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R4	7030000610	Resistor	MCR10EZHZ 82 kΩ (823)
R5	7030000680	Resistor	MCR10EZHZ 330 kΩ (334)
R7	7030000420	Resistor	MCR10EZHZ 2.2 kΩ (222)
R8	7030000400	Resistor	MCR10EZHZ 1.5 kΩ (152)
R9	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R10	7030000450	Resistor	MCR10EZHZ 3.9 kΩ (392)
R11	7030000410	Resistor	MCR10EZHZ 1.8 kΩ (182)
R13	7030000570	Resistor	MCR10EZHZ 39 kΩ (393)
C1	4030001100	Ceramic	GRM40 B 102K 50PT
C2	4030000650	Ceramic	GRM40 SL 150J 50PT
C3	4030001100	Ceramic	GRM40 B 102K 50PT
C4	4030001140	Ceramic	GRM40 F 103Z 50PT
C5	4030000680	Ceramic	GRM40 SL 330J 50PT
C6	4030001100	Ceramic	GRM40 B 102K 50PT
C7	4030000700	Ceramic	GRM40 SL 470J 50PT
C8 *	4550000740	Tantalum	TESVB2 0J 685M-8L
C9	4030001150	Ceramic	GRM40 F 104Z 25PT
C10	4030001150	Ceramic	GRM40 F 104Z 25PT
C11	4030001000	Ceramic	GRM40 CH 820J 50PT
C12	4030001090	Ceramic	GRM40 B 471K 50PT
C13	4030001100	Ceramic	GRM40 B 102K 50PT
C15	4030001130	Ceramic	GRM40 B 103K 50PT
C16 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C17 *	4550002980	Tantalum	TEMSVA 1C 225M-8L
C18	4030001100	Ceramic	GRM40 B 102K 50PT
C19	4030008700	Ceramic	GRM40 B 473K 50PT
EP1	0910024501	P.C. Board	B 2363A
EP2	6910003110	Terminal	HFB2.0-0.7-8 (N)

\* safety critical component

## [ HPF SQL UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130003920	IC	TC4S69F (TE85R)
Q1	1530001950	Transistor	2SC2712-GR (TE85R)
Q2	1530001950	Transistor	2SC2712-GR (TE85R)
Q3	1590000380	FET	2SJ106-Y (TE85R)
R1	7030000520	Resistor	MCR10EZHZ 15 k $\Omega$ (153)
R2	7030000720	Resistor	MCR10EZHZ 680 k $\Omega$ (684)
R3	7030000460	Resistor	MCR10EZHZ 4.7 k $\Omega$ (472)
R4	7030000680	Resistor	MCR10EZHZ 330 k $\Omega$ (334)
R5	7030000410	Resistor	MCR10EZHZ 1.8 k $\Omega$ (182)
R6	7030000600	Resistor	MCR10EZHZ 68 k $\Omega$ (683)
R7	7030000720	Resistor	MCR10EZHZ 680 k $\Omega$ (684)
R8	7030000390	Resistor	MCR10EZHZ 1.2 k $\Omega$ (122)
R9	7030000480	Resistor	MCR10EZHZ 6.8 k $\Omega$ (682)
R10	7030000470	Resistor	MCR10EZHZ 5.6 k $\Omega$ (562)
R11	7510000100	Thermistor	ERT-D2FGL601S
R12	7030000740	Resistor	MCR10EZHZ 1 M $\Omega$ (105)
R13	7510000090	Thermistor	ERT-D2FGL202S
R14	7030000480	Resistor	MCR10EZHZ 6.8 k $\Omega$ (682)
R15	7030000510	Resistor	MCR10EZHZ 12 k $\Omega$ (123)
C3	4030006490	Ceramic	GRM40 B 153K 50PT
C4	4030006490	Ceramic	GRM40 B 153K 50PT
C5	4030006490	Ceramic	GRM40 B 153K 50PT
C6	4030008700	Ceramic	GRM40 B 473K 50PT
C7	4550000270	Tantalum	TESVA 1E 474M1-8L
C8	4030001100	Ceramic	GRM40 B 102K 50PT
C9	4030001100	Ceramic	GRM40 B 102K 50PT
EP1	0910027891	P.C. Board	B 2333A
EP4	6910003110	Terminal	HFB2.0-0.7-8 (N)

## [ MIC AMP UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110000960	IC	NJM4558M (T1)
R1	7030000650	Resistor	MCR10EZHZ 180 k $\Omega$ (184)
R2	7030000650	Resistor	MCR10EZHZ 180 k $\Omega$ (184)
R3	7030000350	Resistor	MCR10EZHZ 560 $\Omega$ (561)
R4	7030000660	Resistor	MCR10EZHZ 220 k $\Omega$ (224)
R5	7030000630	Resistor	MCR10EZHZ 120 k $\Omega$ (124)
R6	7030000650	Resistor	MCR10EZHZ 180 k $\Omega$ (184)
R7	7030000550	Resistor	MCR10EZHZ 27 k $\Omega$ (273)
R8	7030000660	Resistor	MCR10EZHZ 220 k $\Omega$ (224)
R9	7030000610	Resistor	MCR10EZHZ 82 k $\Omega$ (823)
R10	7030000610	Resistor	MCR10EZHZ 82 k $\Omega$ (823)
R11	7030000380	Resistor	MCR10EZHZ 1 k $\Omega$ (102)
R12	7030000460	Resistor	MCR10EZHZ 4.7 k $\Omega$ (472)
R13	7030000500	Resistor	MCR10EZHZ 10 k $\Omega$ (103)
R14	7510000170	Thermistor	157-252-13013-TP
R15	7030000580	Resistor	MCR10EZHZ 47 k $\Omega$ (473)
C1	4030001100	Ceramic	GRM40 B 102K 50PT
C2 *	4550002980	Tantalum	TEMSVA 1C 225M-8L
C3	4030006480	Ceramic	GRM42-6 B 104K 50PT
C4	4030001090	Ceramic	GRM40 B 471K 50PT
C5	4030006480	Ceramic	GRM42-6 B 104K 50PT
C6	4030001090	Ceramic	GRM40 B 471K 50PT
C7	4030000740	Ceramic	GRM40 SL 101J 50PT
C8	4030001100	Ceramic	GRM40 B 102K 50PT
C9	4030000740	Ceramic	GRM40 SL 101J 50PT
C10	4030001110	Ceramic	GRM40 B 222K 50PT
C11	4030000740	Ceramic	GRM40 SL 101J 50PT
C12	4030001130	Ceramic	GRM40 B 103K 50PT
EP1	0910027873	P.C. Board	B 1731C
EP2	6910003110	Terminal	HFB2.0-0.7-8 (N)

## [ AF AMP UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001810	IC	TA7368F (TP1)
Q1	1510000600	Transistor	2SA1298-Y (TE85R)
R1	7030000580	Resistor	MCR10EZHZ 47 k $\Omega$ (473)
R2	7030000380	Resistor	MCR10EZHZ 1 k $\Omega$ (102)
C1	4030001110	Ceramic	GRM40 B 222K 50PT
C2	4030000700	Ceramic	GRM40 SL 470J 50PT
C3	4030001100	Ceramic	GRM40 B 102K 50PT
C4	4030000740	Ceramic	GRM40 SL 101J 50PT
EP1	0910027882	P.C. Board	B 2324B
EP2	6910003110	Terminal	HFB2.0-0.7-8 (N)

\*safety critical component

## [ TERMINAL UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	11 80000530	IC	S-81 250HG-RD-T1
R1	7030000550	Resistor	MCR10EZHZ 27 k $\Omega$ (273)
R2	7030000560	Resistor	MCR10EZHZ 33 k $\Omega$ (333)
R3	7030000310	Resistor	MCR10EZHZ 270 $\Omega$ (271)
R5	7030000620	Resistor	MCR10EZHZ 100 k $\Omega$ (104)
C1	4030001150	Ceramic	GRM40 F 104Z 25PT
C2	4030003620	Ceramic	GRM40 B 103K 25PT
C3	4030001100	Ceramic	GRM40 B 102K 50PT
C4	4030001110	Ceramic	GRM40 B 222K 50PT
C5 *	4550002980	Tantalum	TEMSVA 1C 225M-8L
C6	4030001090	Ceramic	GRM40 B 471K 50PT
C7 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C8	4030001090	Ceramic	GRM40 B 471K 50PT
C9	4030001100	Ceramic	GRM40 B 102K 50PT
C10	4030001090	Ceramic	GRM40 B 471K 50PT
C11	4030000740	Ceramic	GRM40 SL 101J 50PT
C12	4030001090	Ceramic	GRM40 B 471K 50PT
C13	4030001100	Ceramic	GRM40 B 102K 50PT
C14	4030001100	Ceramic	GRM40 B 102K 50PT
C15	4030001100	Ceramic	GRM40 B 102K 50PT
C16	4030001090	Ceramic	GRM40 B 471K 50PT
C17	4030001100	Ceramic	GRM40 B 102K 50PT
C18	4030001100	Ceramic	GRM40 B 102K 50PT
C19	4030001100	Ceramic	GRM40 B 102K 50PT
C20	4030001100	Ceramic	GRM40 B 102K 50PT
J1	6510008170	Connector	07FM-1.0ST
J2	6510008170	Connector	07FM-1.0ST
EP1	0910026032	P.C. Board	B 2635B
EP3	6910003110	Terminal	HFB2.0-0.7-8 (N)
EP4	6910003110	Terminal	HFB2.0-0.7-8 (N)

## [ VCO UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002480	Transistor	2SC3011 (TE85R)
Q2	1530002480	Transistor	2SC3011 (TE85R)
Q3	1560000490	FET	2SK508 K52 T2B
Q4	1530002480	Transistor	2SC3011 (TE85R)
Q5	1530002480	Transistor	2SC3011 (TE85R)
Q6	1560000490	FET	2SK508 K52 T2B
Q7	1560000420	FET	2SK209-GR (TE85R)
D1	1720000180	Varicap	1SV164-T2B
D2	1720000180	Varicap	1SV164-T2B
D3	1720000180	Varicap	1SV164-T2B
L1	6110002000	Coil	LA-226
L2	6200000140	Coil	LQH 3N 1R0M
L3	6170000360	Coil	LW-35
L4	6110001990	Coil	LA-223
L5	6200000140	Coil	LQH 3N 1R0M
L6	6110002000	Coil	LA-226
L7	6110002000	Coil	LA-226
L8	6200000140	Coil	LQH 3N 1R0M
L9	6170000360	Coil	LW-35
L10	6110002010	Coil	LA-224
L11	6200000140	Coil	LQH 3N 1R0M
R1	7030000340	Resistor	MCR10EZHZ 470 $\Omega$ (471)
R2	7030000660	Resistor	MCR10EZHZ 220 k $\Omega$ (224)
R3	7030000240	Resistor	MCR10EZHZ 68 $\Omega$ (680)
R4	7030000360	Resistor	MCR10EZHZ 680 $\Omega$ (681)
R5	7030000560	Resistor	MCR10EZHZ 33 k $\Omega$ (333)
R6	7030000240	Resistor	MCR10EZHZ 68 $\Omega$ (680)
R7	7030000280	Resistor	MCR10EZHZ 150 $\Omega$ (151)
R8	7030000500	Resistor	MCR10EZHZ 10 k $\Omega$ (103)
R9	7030000220	Resistor	MCR10EZHZ 47 $\Omega$ (470)
R10	7030000260	Resistor	MCR10EZHZ 100 $\Omega$ (101)
R11	7030000540	Resistor	MCR10EZHZ 22 k $\Omega$ (223)
R12	7030000340	Resistor	MCR10EZHZ 470 $\Omega$ (471)
R13	7030000640	Resistor	MCR10EZHZ 150 k $\Omega$ (154)
R14	7030000260	Resistor	MCR10EZHZ 100 $\Omega$ (101)
R15	7030000280	Resistor	MCR10EZHZ 150 $\Omega$ (151)
R16	7030000580	Resistor	MCR10EZHZ 47 k $\Omega$ (473)
R17	7030000220	Resistor	MCR10EZHZ 47 $\Omega$ (470)
R18	7030000200	Resistor	MCR10EZHZ 33 $\Omega$ (330)
R19	7030000570	Resistor	MCR10EZHZ 39 k $\Omega$ (393)
R20	7030000560	Resistor	MCR10EZHZ 33 k $\Omega$ (333)
R21	7030000380	Resistor	MCR10EZHZ 1 k $\Omega$ (102)
C1	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C2	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3	4030000630	Ceramic	GRM40 SL 100D 50PT
C4	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5	4030000540	Ceramic	GRM40 SL 0R5C 50PT
C6	4030000850	Ceramic	GRM40 CH 040C 50PT
C7	4030000870	Ceramic	GRM40 CH 060D 50PT
C8	4030001140	Ceramic	GRM40 F 103Z 50PT
C9	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C10	4030000830	Ceramic	GRM40 CK 020C 50PT
C11	4030003170	Ceramic	GRM40 SL 0R75C 50PT
C12	4030001090	Ceramic	GRM40 B 471K 50PT
C13	4610000840	Trimmer	TZB04Z030BA006
C15	4030000650	Ceramic	GRM40 SL 150J 50PT
C16	4030000700	Ceramic	GRM40 SL 470J 50PT
C17	4030001100	Ceramic	GRM40 B 102K 50PT
C18	4030000630	Ceramic	GRM40 SL 100D 50PT
C19	4030006860	Ceramic	C1608 JB 1H 102K-T-A

\* safety critical component

## [ VCO UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
C20	4030000630	Ceramic	GRM40 SL 100D 50PT
C21	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C22	4030000540	Ceramic	GRM40 SL 0R5C 50PT
C23	4030000870	Ceramic	GRM40 CH 060D 50PT
C24	4030000850	Ceramic	GRM40 CH 040C 50PT
C25	4030000840	Ceramic	GRM40 CJ 030C 50PT
C26	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C27	4610000840	Trimmer	TZB04Z030BA006
C29	4030000650	Ceramic	GRM40 SL 150J 50PT
C30	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C31	4030001100	Ceramic	GRM40 B 102K 50PT
C32	4030001150	Ceramic	GRM40 F 104Z 25PT
C33	4030001150	Ceramic	GRM40 F 104Z 25PT
C34	4030000740	Ceramic	GRM40 SL 101J 50PT
C35 *	4550002930	Tantalum	DSB 0J 336M
C36 *	4550002930	Tantalum	DSB 0J 336M
C37	4030000600	Ceramic	GRM40 SL 060D 50PT
C38	4030000590	Ceramic	GRM40 SL 050C 50PT
C39	4030000630	Ceramic	GRM40 SL 100D 50PT
C40	4030000740	Ceramic	GRM40 SL 101J 50PT
C41	4030001100	Ceramic	GRM40 B 102K 50PT
C42	4030001090	Ceramic	GRM40 B 471K 50PT
W14	7030000010	Jumper	MCR10EZHZ JPW (000)
EP1	0910026091	P.C. Board	B 2644A
EP2	0910025852	F.C. Board	B 2633B (shield)

## [ LOGIC UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1120001590	IC	M5236ML-73A
IC2	1110001550	IC	S-8054ALB-LM-T1
IC4	1110001830	IC	μ PB587G
IC5	1130004590	IC	μ PD1722GH-521-2A5
IC6	1110001820	IC	μ PC1093T
Q1	1510000600	Transistor	2SA1298-Y (TE85R)
Q2	1510000600	Transistor	2SA1298-Y (TE85R)
Q3	1590000900	Transistor	DTC144WK T147
Q4	1510000600	Transistor	2SA1298-Y (TE85R)
Q5	1590000900	Transistor	DTC144WK T147
Q6	1590000930	Transistor	DTA144EK T147
Q7	1590000910	Transistor	IMZ2 T108
Q8	1590000900	Transistor	DTC144WK T147
Q9	1590001010	Transistor	DTB113ZK T147
Q10	1590000910	Transistor	IMZ2 T108
Q11	1590000930	Transistor	DTA144EK T147
Q12	1530001950	Transistor	2SC2712-GR (TE85R)
Q13	1530001950	Transistor	2SC2712-GR (TE85R)
Q14	1510000110	Transistor	2SA1162-Y (TE85R)
Q15	1510000110	Transistor	2SA1162-Y (TE85R)
Q19	1590000900	Transistor	DTC144WK T147
Q20	1510000600	Transistor	2SA1298-Y (TE85R)
Q21	1590000910	Transistor	IMZ2 T108
Q22	1590000920	Transistor	DTA114EK T146
D1	1790000490	Diode	HSM88AS-TR
D2	1750000200	Diode	1SS319 (TE85R)
D3	1750000110	Diode	1SS272 (TE85R)
D4	1750000110	Diode	1SS272 (TE85R)
D5	1790000490	Diode	HSM88AS-TR
D6	1160000070	Diode	DAN202K T146
D7	1750000110	Diode	1SS272 (TE85R)
D8	1750000110	Diode	1SS272 (TE85R)
D10	1720000220	Varicap	1SV166-T2B
D11	1790000490	Diode	HSM88AS-TR
D13	1160000070	Diode	DAN202K T146
L1	6200000880	Coil	NL 322522T-4R7M
X1	6050005550	Crystal	CR-269
R1	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R2	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R3	7030000420	Resistor	MCR10EZHZ 2.2 kΩ (222)
R4	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R5	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R6	7030000420	Resistor	MCR10EZHZ 2.2 kΩ (222)
R7	7030000420	Resistor	MCR10EZHZ 2.2 kΩ (222)
R8	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R9	7030000300	Resistor	MCR10EZHZ 220 Ω (221)
R12	7030000440	Resistor	MCR10EZHZ 3.3 kΩ (332)
R13	7030000540	Resistor	MCR10EZHZ 22 kΩ (223)
R14	7030000540	Resistor	MCR10EZHZ 22 kΩ (223)
R15	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R16	7030000390	Resistor	MCR10EZHZ 1.2 kΩ (122)
R17	7030000160	Resistor	MCR10EZHZ 15 Ω (150)
R20	7030002640	Resistor	MCR10EZHFX 120 Ω (121)
R21	7030000740	Resistor	MCR10EZHZ 1 MΩ (105)
R22	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R23	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R24	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R25	7030000600	Resistor	MCR10EZHZ 68 kΩ (683)

\* safety critical component

## [ LOGIC UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
R26	7030000440	Resistor	MCR10EZHZ 3.3 kΩ (332)
R27	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R28	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R29	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R30	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R31	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R32	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R33	7030000440	Resistor	MCR10EZHZ 3.3 kΩ (332)
R34	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R35	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R36	7030000560	Resistor	MCR10EZHZ 33 kΩ (333)
R37	7030000390	Resistor	MCR10EZHZ 1.2 kΩ (122)
R38	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R39	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R40	7030000260	Resistor	MCR10EZHZ 100 Ω (101)
R41	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R42	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R43	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R44	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R45	7030000520	Resistor	MCR10EZHZ 15 kΩ (153)
R46	7510000090	Thermistor	ERT-D2FGL202S
R47	7510000090	Thermistor	ERT-D2FGL202S
R48	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R49	7030000600	Resistor	MCR10EZHZ 68 kΩ (683)
R50	7030000360	Resistor	MCR10EZHZ 680 Ω (681)
R51	7030000580	Resistor	MCR10EZHZ 47 kΩ (473)
R52	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R53	7030000740	Resistor	MCR10EZHZ 1 MΩ (105)
R54	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R55	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R56	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R57	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R58	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R59	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R60	7030000740	Resistor	MCR10EZHZ 1 MΩ (105)
R61	7030000500	Resistor	MCR10EZHZ 10 kΩ (103)
R62	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R63	7030000740	Resistor	MCR10EZHZ 1 MΩ (105)
R64	7030000620	Resistor	MCR10EZHZ 100 kΩ (104)
R65	7030000340	Resistor	MCR10EZHZ 470 Ω (471)
R66	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R67	7030000460	Resistor	MCR10EZHZ 4.7 kΩ (472)
R68	7030002870	Resistor	MCR10EZHF 10 kΩ (103)
R69	7030002910	Resistor	MCR10EZHF 33 kΩ (333)
R70	7030000330	Resistor	MCR10EZHZ 390 Ω (391)
R71	7030000340	Resistor	MCR10EZHZ 470 Ω (471)
R72	7030000440	Resistor	MCR10EZHZ 3.3 kΩ (332)
R73	7030002810	Resistor	MCR10EZHF 3.3 kΩ (332)
R74	7030002750	Resistor	MCR10EZHF 1 kΩ (102)
R75	7030000520	Resistor	MCR10EZHZ 15 kΩ (153)
R76	7030000280	Resistor	MCR10EZHZ 150 Ω (151)
C1 *	4550003490	Tantalum	DSB 0J 686M
C2	4030001100	Ceramic	GRM40 B 102K 50PT
C3 *	4550003100	Tantalum	TEMSVB 1A 106M-12L
C4	4030001100	Ceramic	GRM40 B 102K 50PT
C5	4030001100	Ceramic	GRM40 B 102K 50PT
C6	4030001100	Ceramic	GRM40 B 102K 50PT
C7 *	4550003100	Tantalum	TEMSVB 1A 106M-12L
C8	4030000740	Ceramic	GRM40 SL 101J 50PT
C9	4030001100	Ceramic	GRM40 B 102K 50PT
C10	4030001100	Ceramic	GRM40 B 102K 50PT
C11	4030000740	Ceramic	GRM40 SL 101J 50PT
C12	4030000620	Ceramic	GRM40 SL 080D 50PT
C13 *	4550002000	Tantalum	DN 1A 4R7M
C14	4030001140	Ceramic	GRM40 F 103Z 50PT
C15 *	4550002940	Tantalum	DSB 1A 106M

\* safety critical component

## [ LOGIC UNIT ]

REF. NO.	ORDER NO.	DESCRIPTION	
C16	4030001100	Ceramic	GRM40 B 102K 50PT
C17	4030001100	Ceramic	GRM40 B 102K 50PT
C18	4030001100	Ceramic	GRM40 B 102K 50PT
C19	4030000740	Ceramic	GRM40 SL 101J 50PT
C20	4030006480	Ceramic	GRM42-6 B 104K 50PT
C21	4030001140	Ceramic	GRM40 F 103Z 50PT
C22	4030001100	Ceramic	GRM40 B 102K 50PT
C23	4030002770	Ceramic	GRM40 UJ 121J 50PT
C24	4030002770	Ceramic	GRM40 UJ 121J 50PT
C25	4030000740	Ceramic	GRM40 SL 101J 50PT
C26	4030000740	Ceramic	GRM40 SL 101J 50PT
C27	4030001140	Ceramic	GRM40 F 103Z 50PT
C28	4030001100	Ceramic	GRM40 B 102K 50PT
C29	4030000850	Ceramic	GRM40 CH 040C 50PT
C30	4610000850	Trimmer	TZB04R200BA006
C31	4030000740	Ceramic	GRM40 SL 101J 50PT
C32 *	4550002940	Tantalum	DSB 1A 106M
C34	4030000710	Ceramic	GRM40 SL 560J 50PT
C35	4030000960	Ceramic	GRM40 CH 390J 50PT
C36	4030001100	Ceramic	GRM40 B 102K 50PT
C37	4030000740	Ceramic	GRM40 SL 101J 50PT
C38	4030000740	Ceramic	GRM40 SL 101J 50PT
C39 *	4550002940	Tantalum	DSB 1A 106M
C40 *	4550003550	Tantalum	DSB 1A 685M
C41	4030006480	Ceramic	GRM42-6 B 104K 50PT
C42	4030000740	Ceramic	GRM40 SL 101J 50PT
C43 *	4550002940	Tantalum	DSB 1A 106M
C44	4030000740	Ceramic	GRM40 SL 101J 50PT
C45	4030000740	Ceramic	GRM40 SL 101J 50PT
C46	4030000740	Ceramic	GRM40 SL 101J 50PT
C47	4030000740	Ceramic	GRM40 SL 101J 50PT
C48	4030000740	Ceramic	GRM40 SL 101J 50PT
C49	4030001090	Ceramic	GRM40 B 471K 50PT
C50 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C51	4030000740	Ceramic	GRM40 SL 101J 50PT
C52	4030000740	Ceramic	GRM40 SL 101J 50PT
C53	4030000930	Ceramic	GRM40 CH 180J 50PT
C54	4030001100	Ceramic	GRM40 B 102K 50PT
C55	4030001100	Ceramic	GRM40 B 102K 50PT
C56	4030000740	Ceramic	GRM40 SL 101J 50PT
C57	4030001100	Ceramic	GRM40 B 102K 50PT
C58	4030001100	Ceramic	GRM40 B 102K 50PT
C59	4030001140	Ceramic	GRM40 F 103Z 50PT
C60	4030006480	Ceramic	GRM42-6 B 104K 50PT
C61	4030001100	Ceramic	GRM40 B 102K 50PT
C62	4030001100	Ceramic	GRM40 B 102K 50PT
C63	4030001100	Ceramic	GRM40 B 102K 50PT
C64	4030000740	Ceramic	GRM40 SL 101J 50PT
C65	4030001090	Ceramic	GRM40 B 471K 50PT
C66	4030001100	Ceramic	GRM40 B 102K 50PT
C67	4030001100	Ceramic	GRM40 B 102K 50PT
C68	4030000940	Ceramic	GRM40 CH 220J 50PT
C69	4030001100	Ceramic	GRM40 B 102K 50PT
C70	4030001090	Ceramic	GRM40 B 471K 50PT
C71	4030001100	Ceramic	GRM40 B 102K 50PT
C72	4030001100	Ceramic	GRM40 B 102K 50PT
C73	4030001100	Ceramic	GRM40 B 102K 50PT
C74	4030001100	Ceramic	GRM40 B 102K 50PT
C75	4030001100	Ceramic	GRM40 B 102K 50PT
S1	2260000580	Switch	SKHLAD035A
BT1 *	3020000060	Lithium Battery	CR1220-1VF
W13	7030000010	Jumper	MCR10EZHZ JPW (000)

**[ LOGIC UNIT ]**

REF. NO.	ORDER NO.	DESCRIPTION	
W14	71 20000380	Jumper	JPW 01 R-01
J1	6450000130	Connector	HSJ1102-01-540
J2	6450000110	Connector	HSJ0836-01-010
J3	6510009370	Connector	B4B-ZR
J4	6510009370	Connector	B4B-ZR
J5	6510008270	Connector	PI28B-05M
EP1	0910026201	P.C. Board	B 3043A
EP4	0910019722	F.C. Board	B 1903B (shield)
EP7	0910024351	F.C. Board	B 2343A (shield)
EP8	0910025842	F.C. Board	B 2624B (shield)
EP9	0910026051	F.C. Board	B 2637A (shield)

**[ TONE UNIT ]**

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	11 30001 830	IC	MN6520
IC2	11 30000830	IC	μ PD4094BG-T1
IC3	11 30003760	IC	TC4S81 F (TE85R)
IC4	11 30003760	IC	TC4S81 F (TE85R)
Q1	1590000720	Transistor	DTA144EU T107
Q2	1590000720	Transistor	DTA144EU T107
Q3	1590000430	Transistor	DTC144EU T107
Q4	1530002060	Transistor	2SC4081 T107 R
D1	1750000130	Diode	DA204U T107
D2	1750000050	Diode	1SS193 (TE85R)
X1	6050005090	Crystal	CR-245
R1	7030002310	Resistor	MCR03EZHZ 18 kΩ (183)
R2	7030002300	Resistor	MCR03EZHZ 15 kΩ (153)
R3	7030002440	Resistor	MCR03EZHZ 150 kΩ (154)
R4	7030002200	Resistor	MCR03EZHZ 2.2 kΩ (222)
R5	7030002280	Resistor	MCR03EZHZ 10 kΩ (103)
R6	7030002280	Resistor	MCR03EZHZ 10 kΩ (103)
R7	7030002420	Resistor	MCR03EZHZ 100 kΩ (104)
R8	7030002360	Resistor	MCR03EZHZ 47 kΩ (473)
R9	7030002320	Resistor	MCR03EZHZ 22 kΩ (223)
R10	7310001 410	Trimmer	RH04A3AJ4J01A (223)
R11	7030002420	Resistor	MCR03EZHZ 100 kΩ (104)
R12	7030002420	Resistor	MCR03EZHZ 100 kΩ (104)
R13	7030002550	Resistor	MCR03EZHZ 1 MΩ (105)
R14	7030002240	Resistor	MCR03EZHZ 4.7 kΩ (472)
R15	7030002590	Resistor	MCR03EZHZ 2.2 MΩ (225)
C1	4030001150	Ceramic	GRM40 F 104Z 25PT
C2	4030001150	Ceramic	GRM40 F 104Z 25PT
C3	4030003880	Ceramic	GRM39 SL 180J 50PT
C4	4030003880	Ceramic	GRM39 SL 180J 50PT
C5 *	4550000700	Tantalum	TESVC 0G 336M-12L
C6	4030003890	Ceramic	GRM39 B 471K 50PT
C7 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C8 *	4550000460	Tantalum	TESVA 1C 105M1-8L
C9	4030001150	Ceramic	GRM40 F 104Z 25PT
J1	6510007110	Connector	PI28A-10M

\* safety critical component

**[ OTHER UNITS ]**

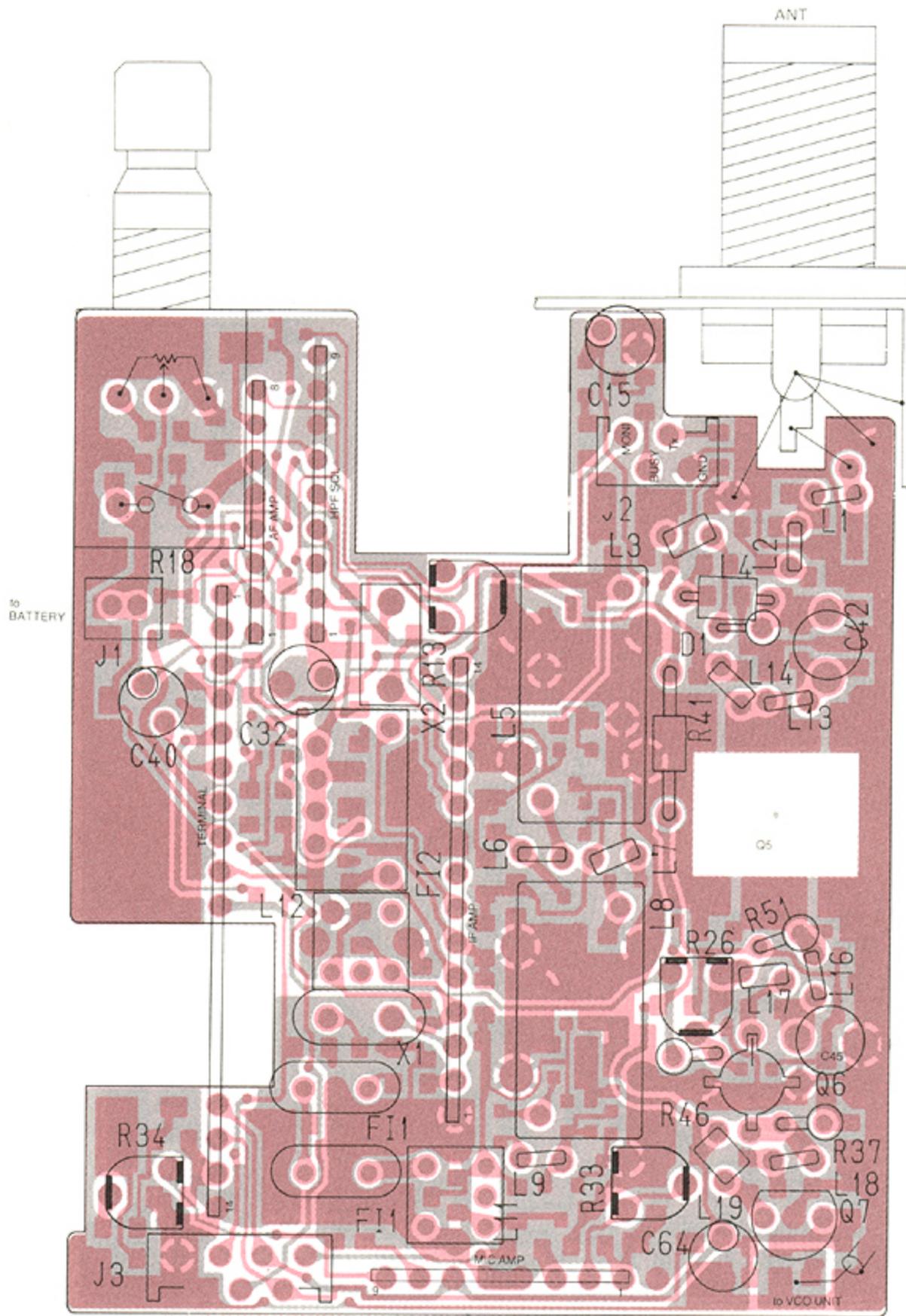
REF. NO.	ORDER NO.	DESCRIPTION	
EP2	3310000430	Antenna	[ ACC UNIT ]
J1	6510008240	Connector	[ CHASSIS UNIT ] TNC-R109
S1	2260001160	Switch	[ CH SW UNIT ] KSR10-0-27
EP1	0910019782	P.C. Board	[ PTT UNIT ]
S1	2260000600	Switch	[ LED UNIT ]
EP1	0910018591	P.C. Board	TLSG222
D1	5040001120	LED	B 1785E
EP1	0910018675	P.C. Board	B 1902
EP2	0910019710	P.C. Board	[ FRONT UNIT ]
MC1	7700000480	Microphone	KUC2023-01-006
SP1 *	2510000460	Speaker	SI003609
F1	5210000230	Fuse	[ FUSE UNIT ] MC 2 1/2
EP1	0910021370	P.C. Board	B 21 22

# SECTION 8 BOARD LAYOUTS

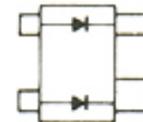
## 8-1 RF UNIT

### ●RF UNIT (TOP VIEW)

The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

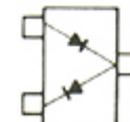


MA862  
D2



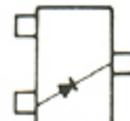
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HSM88AS  
D3



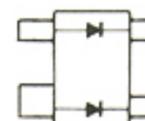
Symbol: C1

DA115  
D4



Symbol: AU

1SS272  
D5



Symbol: A1

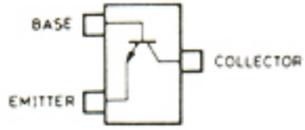
1SS196  
D7, D8



Symbol: G3

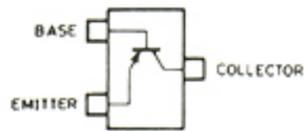
●RF UNIT (BOTTOM VIEW)

2SC3583  
Q1, Q2



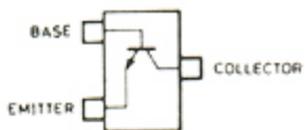
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2SA1162GR  
Q3



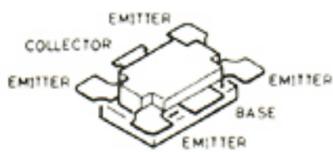
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2SC2712GR  
Q4

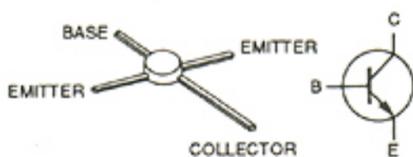


Symbol: LG

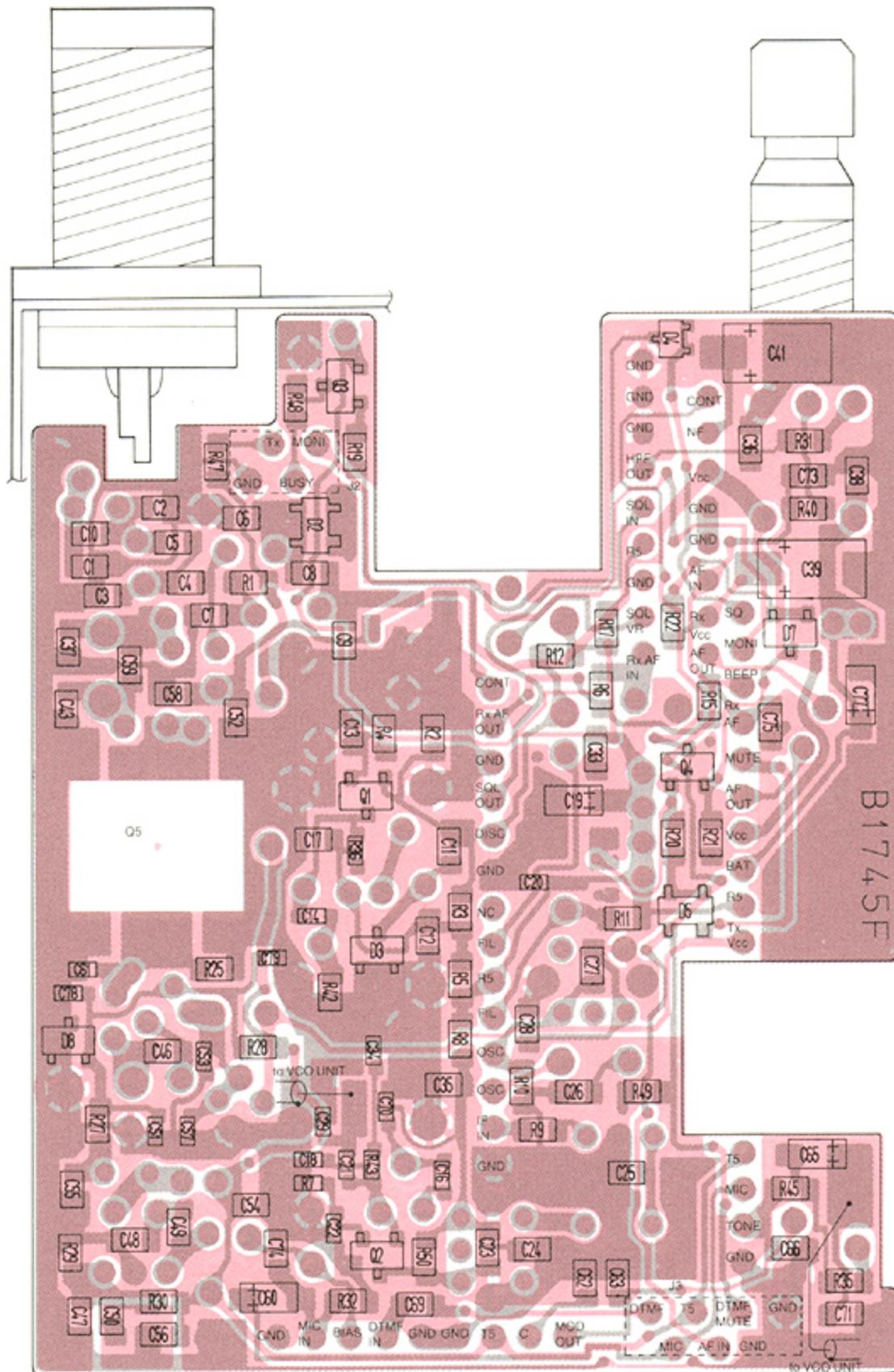
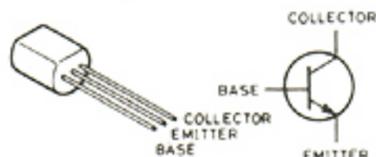
2SC3379  
Q5



2SC 3019  
Q6

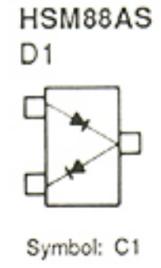
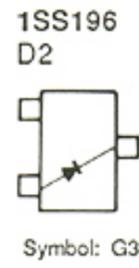
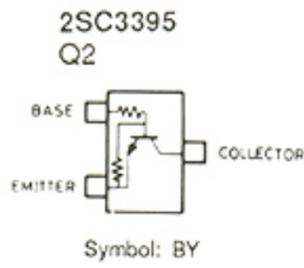
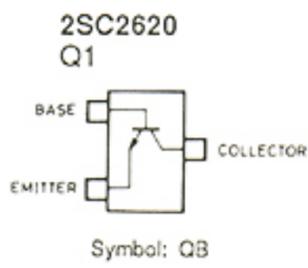
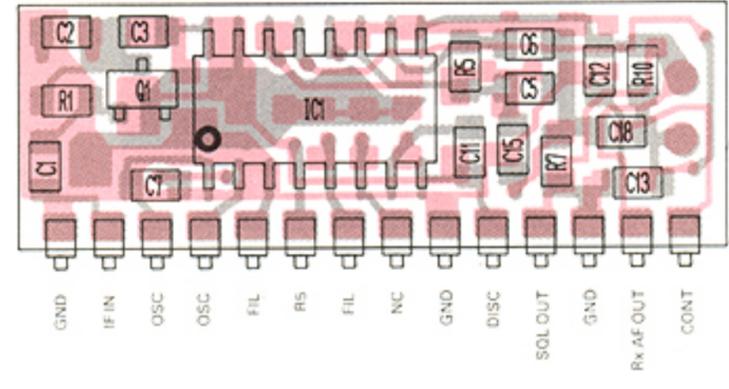
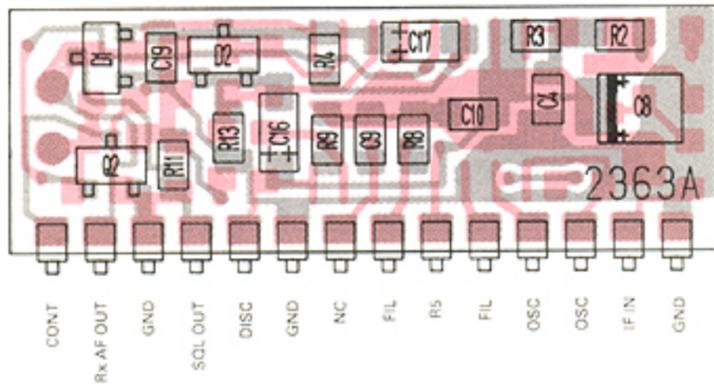


2SC2407  
Q7

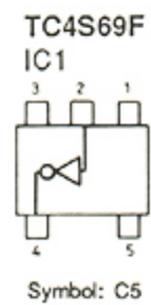
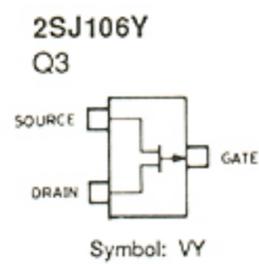
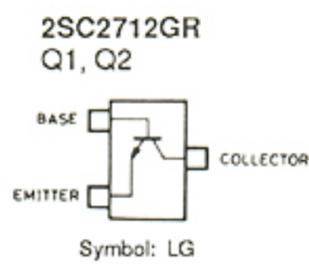
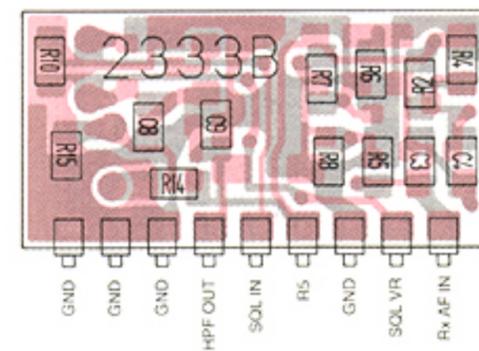
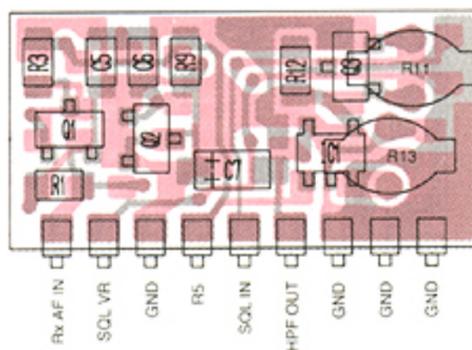


## 8-2 IF AMP AND HPF SQL UNITS

### ●IF AMP UNIT

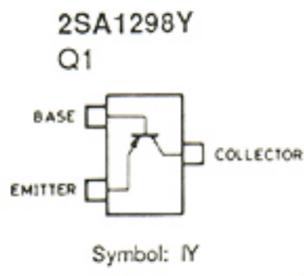
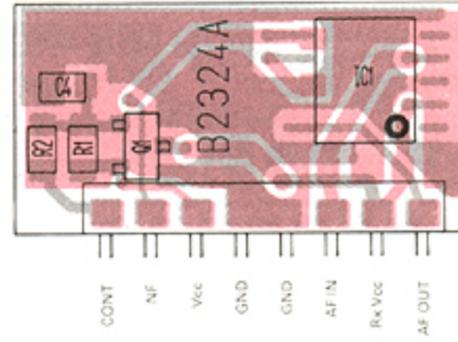
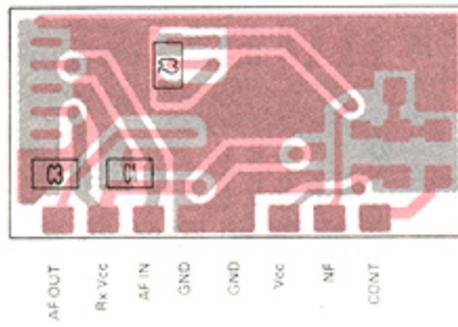


### ●HPF SQL UNIT

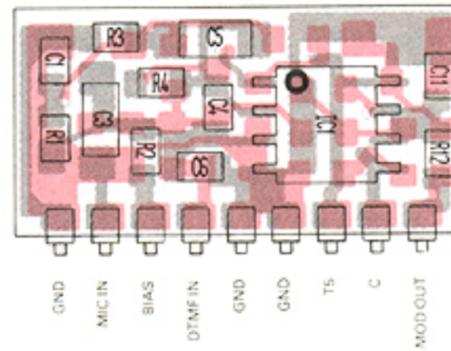
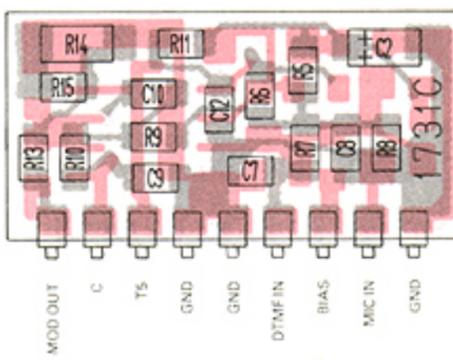


### 8-3 AF AMP AND MIC AMP UNITS

#### ●AF AMP UNIT

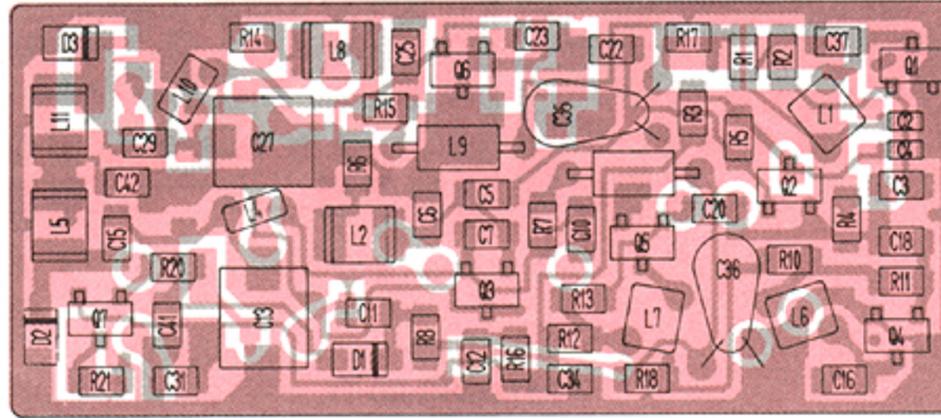


#### ●MIC AMP UNIT

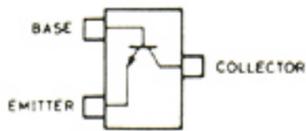




# 8-5 VCO UNIT

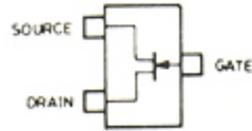


**2SC3011**  
Q1, Q2, Q4, Q5



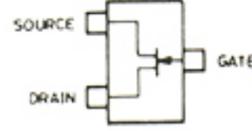
Symbol: MA

**2SK209GR**  
Q7

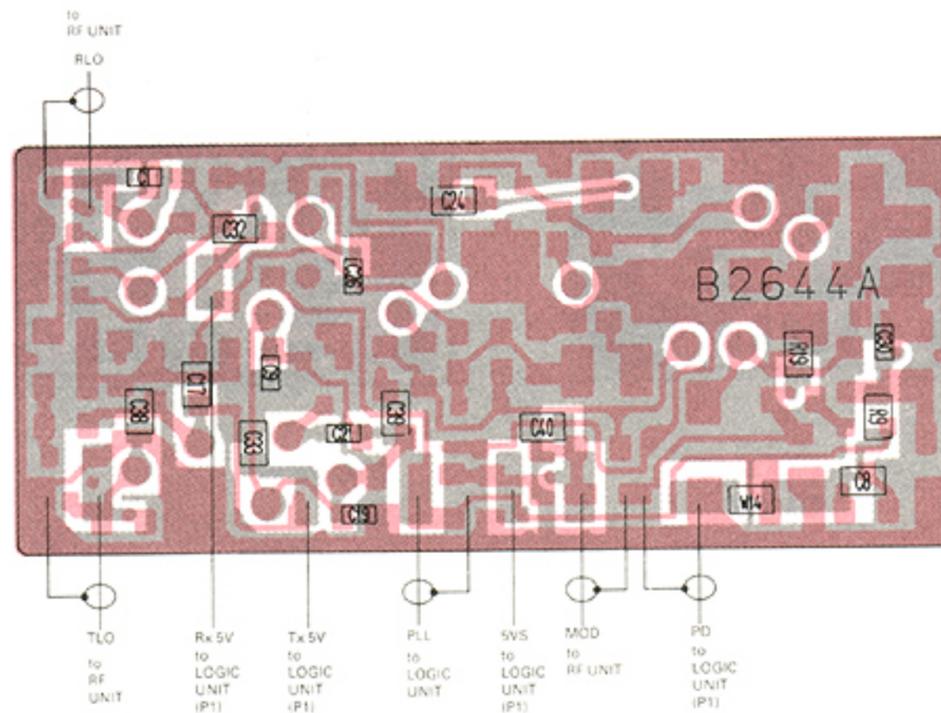


Symbol: XY

**2SK508**  
Q3, Q6



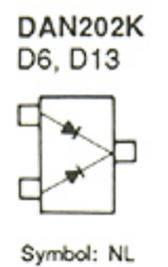
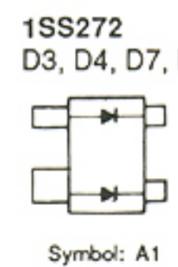
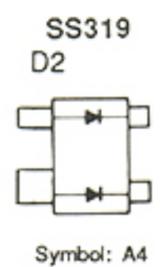
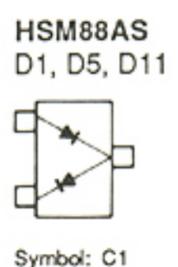
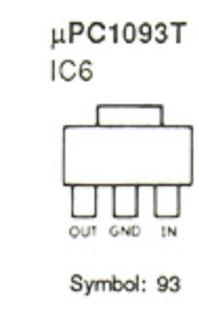
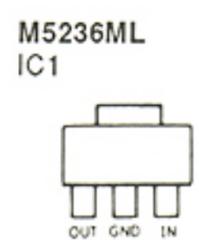
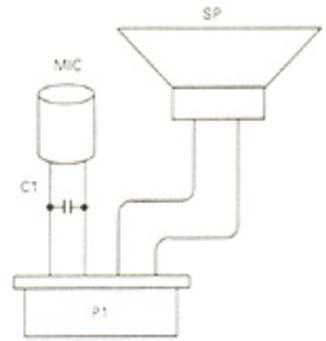
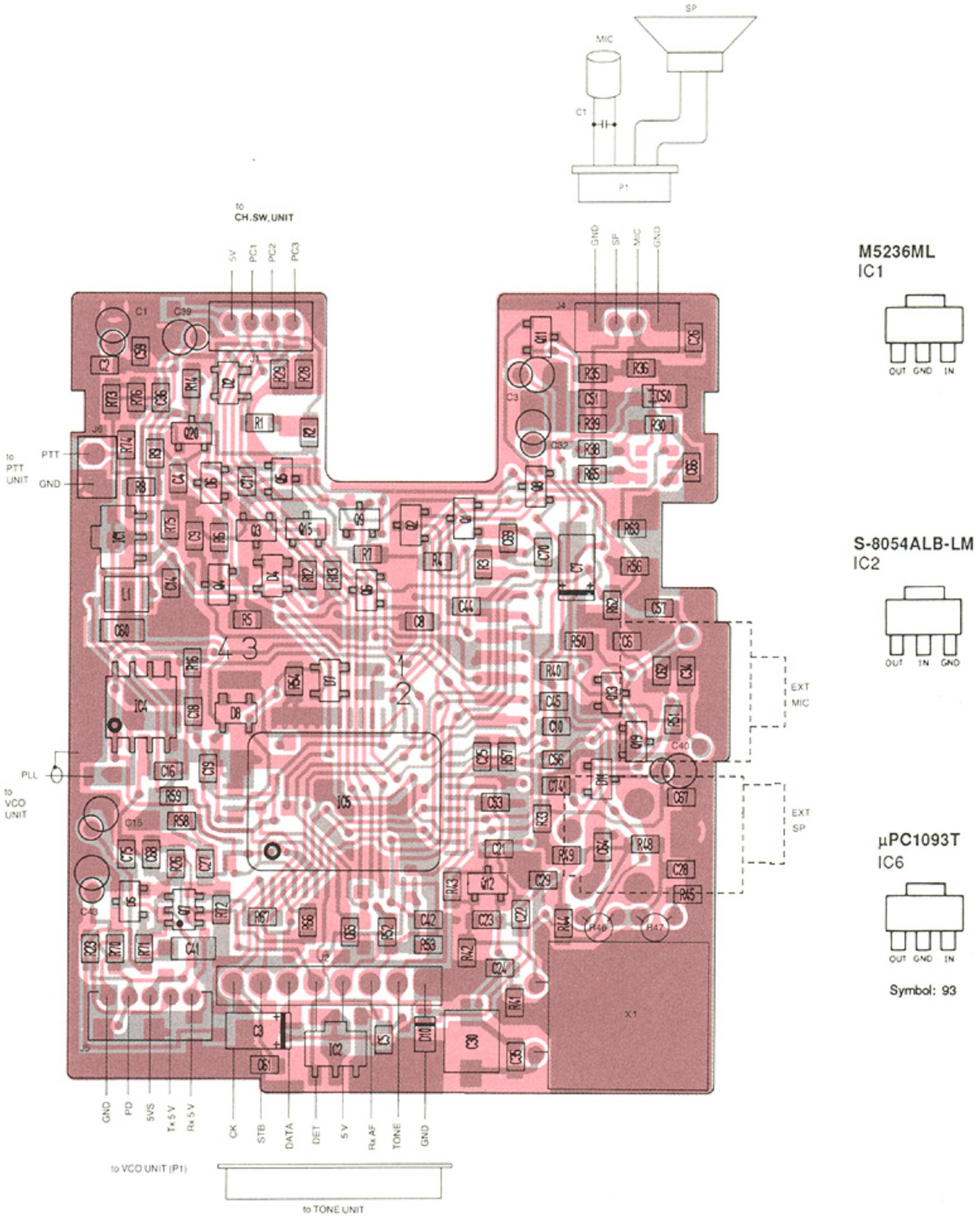
Symbol: K52



# 8-6 LOGIC UNIT

## •LOGIC UNIT (TOP VIEW)

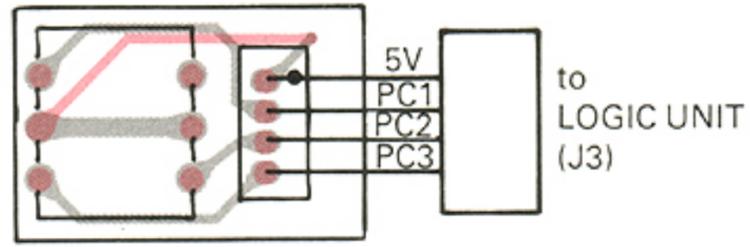
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.



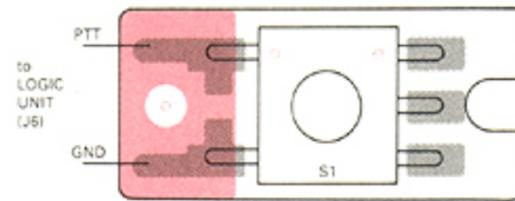


## 8-7 OTHER UNITS

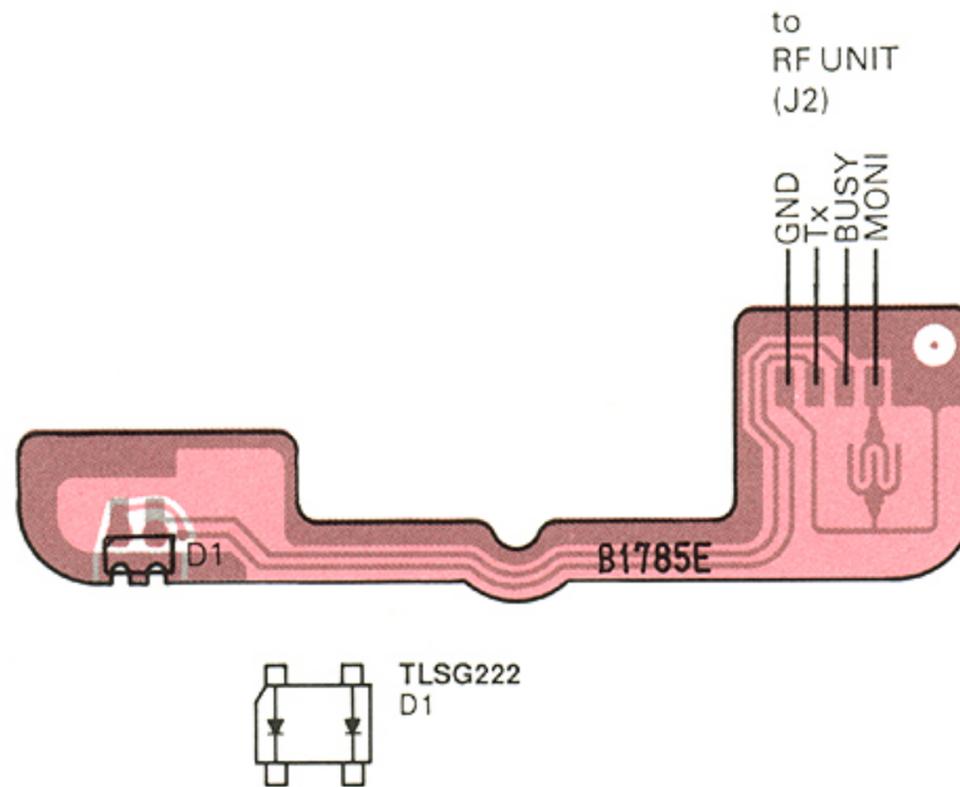
### ●CH SW UNIT



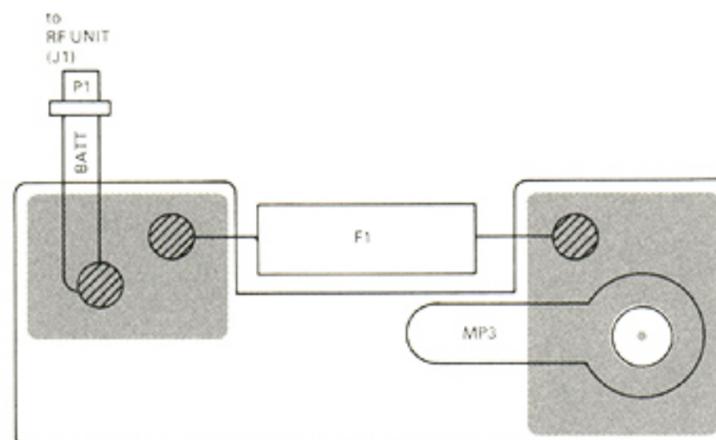
### ●PTT UNIT



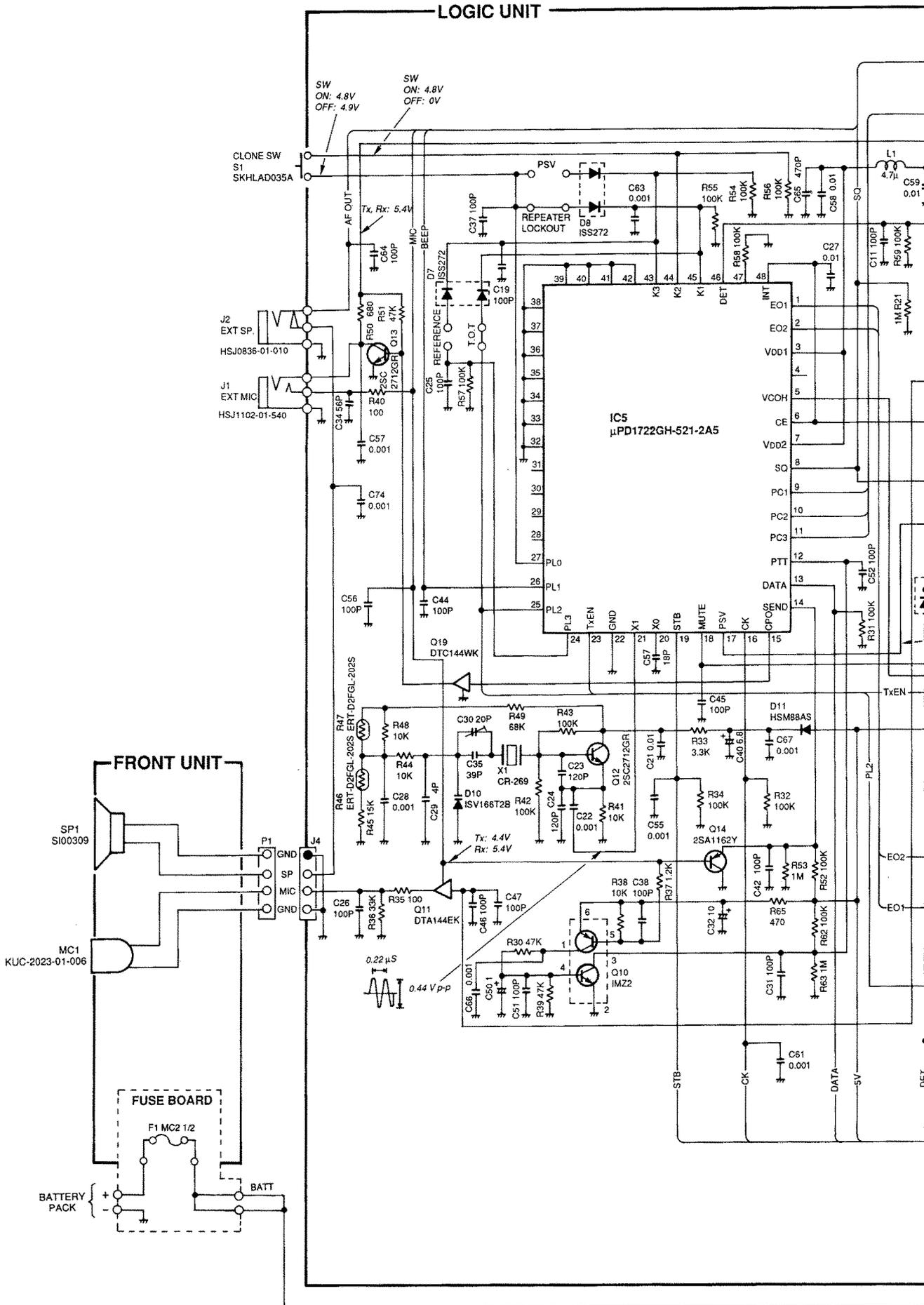
### ●LED UNIT

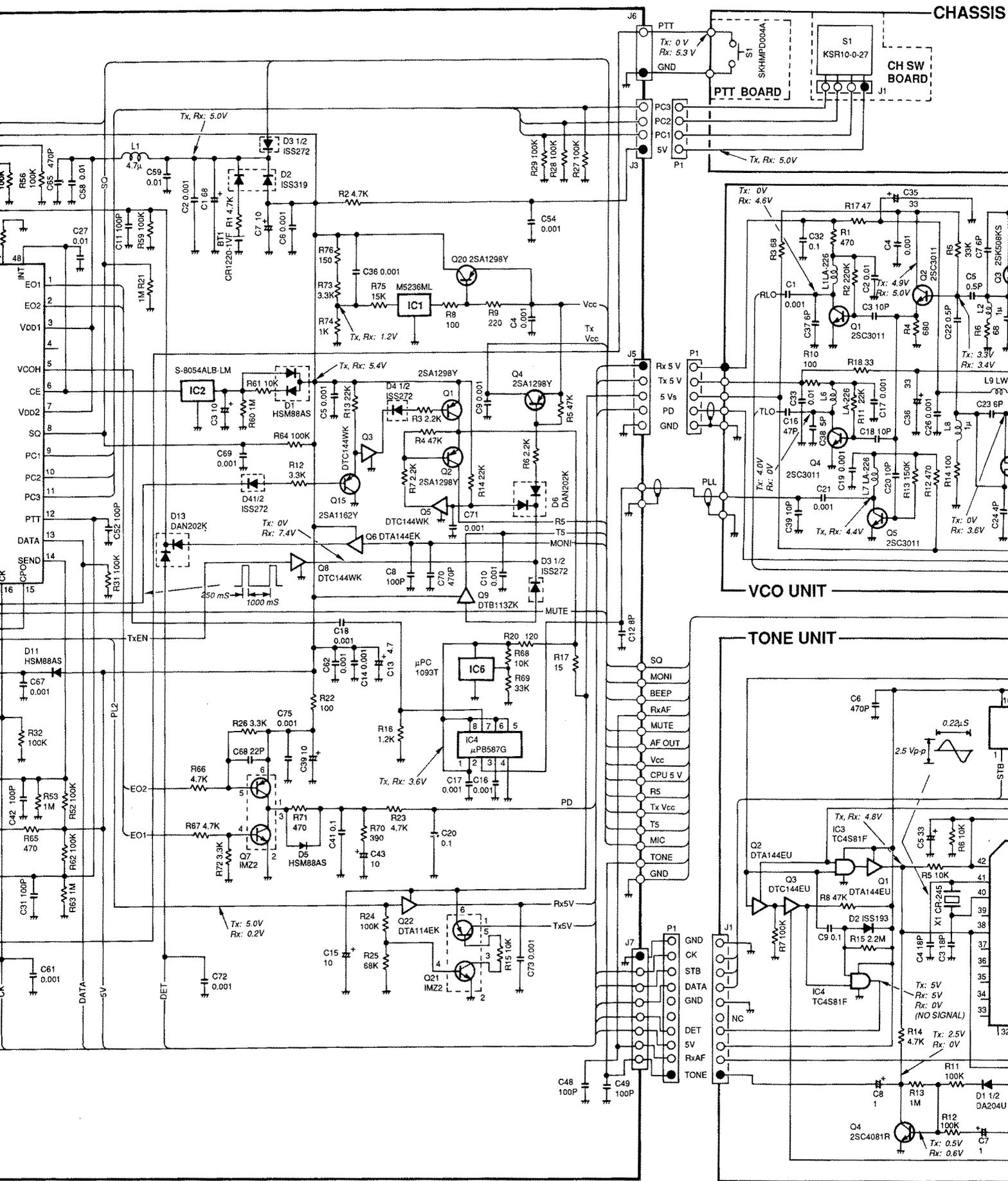


### ●FUSE UNIT

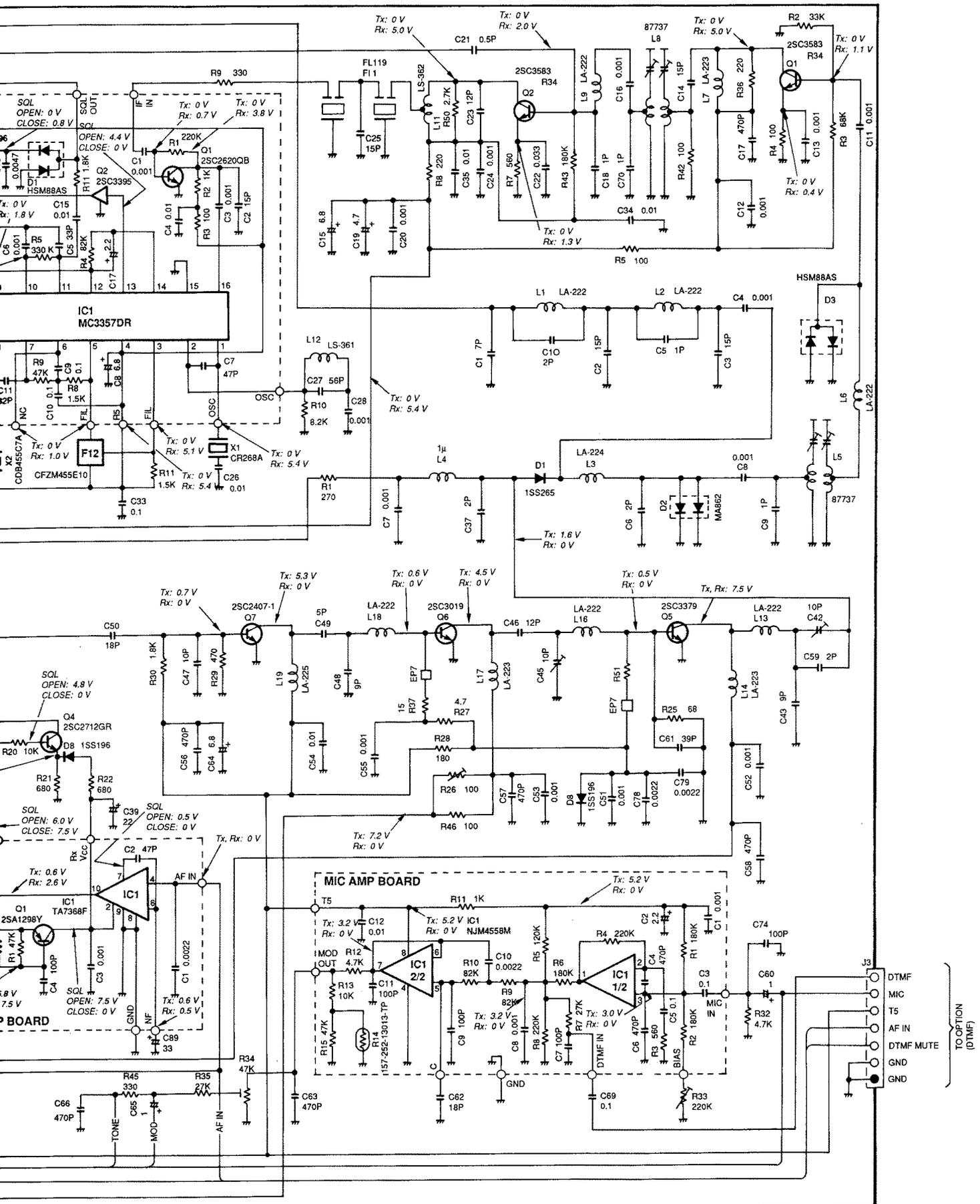


SECTION 9 VOLTAGE DIAGRAM









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