



# SERVICE MANUAL

VHF MARINE TRANSCEIVER

## **IC-M502**

---

---

---

---

---

## INTRODUCTION

This service manual describes the latest service information for the **IC-M502** VHF MARINE TRANSCEIVER at the time of publication

To upgrade quality, any electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

## DANGER

**NEVER** connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 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.



## ORDERING PARTS

Be sure to include the following four 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>

1110003200 S.IC TA31136FN IC-M502 MAIN UNIT 5 pieces  
 8810006050 Screw Icom screw E7 IC-M502 CHASSIS 10 pieces  
 Addresses are provided on the inside back cover for your convenience.

## REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its 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 40 dB to 50 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.

---

**TABLE OF CONTENTS**

---

<b>SECTION 1</b>	<b>SPECIFICATIONS</b>	
<b>SECTION 2</b>	<b>INSIDE VIEWS</b>	
2 - 1	IC-M502 .....	2 - 1
2 - 2	HM-127 (OPTIONAL UNIT) .....	2 - 2
<b>SECTION 3</b>	<b>DISASSEMBLY INSTRUCTION</b>	
<b>SECTION 4</b>	<b>CIRCUIT DESCRIPTION</b>	
4 - 1	RECEIVER CIRCUITS .....	4 - 1
4 - 2	TRANSMITTER CIRCUITS .....	4 - 2
4 - 3	PLL CIRCUIT .....	4 - 3
4 - 4	DSC CIRCUIT .....	4 - 4
4 - 5	POWER SUPPLY CIRCUITS .....	4 - 4
4 - 6	LOGIC CIRCUITS .....	4 - 4
4 - 7	PORT ALLOCATIONS .....	4 - 4
<b>SECTION 5</b>	<b>ADJUSTMENT PROCEDURES</b>	
5 - 1	PREPARATION .....	5 - 1
5 - 2	PLL ADJUSTMENTS .....	5 - 2
5 - 3	TRANSMITTER ADJUSTMENTS .....	5 - 3
5 - 4	RECEIVER ADJUSTMENTS .....	5 - 4
<b>SECTION 6</b>	<b>PARTS LIST</b>	
<b>SECTION 7</b>	<b>MECHANICAL PARTS</b>	
7 - 1	IC-M502 .....	7 - 1
7 - 2	HM-126 .....	7 - 3
7 - 3	HM-127 (OPTIONAL UNIT) .....	7 - 3
<b>SECTION 8</b>	<b>SEMI-CONDUCTOR INFORMATION</b>	
<b>SECTION 9</b>	<b>BOARD LAYOUTS</b>	
9 - 1	VOL UNIT .....	9 - 1
9 - 2	DIAL UNIT .....	9 - 1
9 - 3	SQL UNIT .....	9 - 1
9 - 4	LOGIC UNIT .....	9 - 2
9 - 5	MAIN UNIT .....	9 - 4
9 - 6	CTRL UNIT .....	9 - 6
9 - 7	PWR-CORD UNIT .....	9 - 6
9 - 8	HM-126 .....	9 - 6
9 - 9	HM-127 (OPTIONAL UNIT) .....	9 - 6
<b>SECTION 10</b>	<b>BLOCK DIAGRAM</b>	
<b>SECTION 11</b>	<b>VOLTAGE DIAGRAM</b>	
11 - 1	LOGIC UNIT .....	11 - 1
11 - 2	MAIN UNIT .....	11 - 2
11 - 3	HM-127 (OPTIONAL UNIT) .....	11 - 4
11 - 4	HM-126 .....	11 - 5

## SECTION 1 SPECIFICATIONS

### ■ GENERAL

• Frequency coverage	: 156.025–157.425 MHz (Tx) 156.050–163.275 MHz (Rx)
• Mode	: 16K0G3E (FM) 16K0G2E (DSC)
• Usable channels	: All international and USA channels
• Power supply requirement	: 13.8 V DC (negative ground)
• Usable temperature range	: –20°C to +60°C (–4 °F to +140°F)
• Frequency stability	: ±10 ppm (–20°C to +60°C; –4 °F to +140°F)
• Current drain (at 13.8 V DC)	: Transmit at 25 W 6.5 A Receive max. audio 1.2 A
• Antenna connector	: SO-239 (50 Ω)
• Dimensions (projections not included)	: 165(W)×110(H)×109.4(D) mm 6½(W) × 4⅓(H) × 4⅝(D) in
• Weight	: 1130 g (2 lb 8 oz)

### ■ TRANSMITTER

• Output power (at 13.8 V DC)	: High 25 W Low 1 W
• Modulation	: Variable reactance frequency modulation
• Maximum frequency deviation	: ±5.0 kHz
• Spurious emissions	: 70 dBc
• Adjacent channel power	: 70 dB
• Residual modulation	: 40 dB
• Audio harmonic distortion	: Less than 10% at 60% deviation
• Audio frequency response	: +1 dB to –3 dB of 6 dB octave from 300 Hz to 2500 Hz
• Microphone impedance	: 600 Ω

### ■ RECEIVER

• Receive system	: Double conversion superheterodyne system
• Intermediate frequencies	: 1st 21.7 MHz 2nd 450 kHz
• Sensitivity	: 0.32 μV (–117 dBm) at 12 dB SINAD
• Squelch sensitivity	: 0.32 μV at threshold
• Adjacent channel selectivity	: 75 dB
• Spurious response	: 75 dB
• Intermodulation rejection ratio	: 75 dB
• Hum and noise	: 40 dB
• Audio output power (at 13.8 V DC)	: 3.5 W typical at 10% distortion with an 4 Ω load
• Audio frequency response	: +1 dB to –3 dB of –6 dB octave from 300 Hz to 3000 Hz

Specifications are measured in accordance with TIA/EIA-603

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

### ■ VHF MARINE CHANNEL LIST

Channel No.			Frequency (MHz)		Channel No.			Frequency (MHz)		Channel No.			Frequency (MHz)	
USA	INT	CAN	Transmit	Receive	USA	INT	CAN	Transmit	Receive	USA	INT	CAN	Transmit	Receive
	01	01	156.050	160.650	21A		21A	157.050	157.050	73	73	73	156.675	156.675
01A			156.050	156.050		22		157.100	161.700	74	74	74	156.725	156.725
	02	02	156.100	160.700	22A		22A	157.100	157.100	77*1	77	77*1	156.875	156.875
	03	03	156.150	160.750		23	23	157.150	161.750		78		156.925	161.525
03A			156.150	156.150	23A			157.150	157.150	78A		78A	156.925	156.925
	04		156.200	160.800	24	24	24	157.200	161.800		79		156.975	161.575
		04A	156.200	156.200	25	25	25	157.250	161.850	79A		79A	156.975	156.975
	05		156.250	160.850	26	26	26	157.300	161.900		80		157.025	161.625
05A		05A	156.250	156.250	27	27	27	157.350	161.950	80A		80A	157.025	157.025
06	06	06	156.300	156.300	28	28	28	157.400	162.000		81		157.075	161.675
	07		156.350	160.950		60	60	156.025	160.625	81A		81A	157.075	157.075
07A		07A	156.350	156.350		61		156.075	160.675		82		157.125	161.725
08	08	08	156.400	156.400	61A		61A	156.075	156.075	82A		82A	157.125	157.125
09	09	09	156.450	156.450		62		156.125	160.725		83	83	157.175	161.775
10	10	10	156.500	156.500			62A	156.125	156.125	83A		83A	157.175	157.175
11	11	11	156.550	156.550		63		156.175	160.775	84	84	84	157.225	161.825
12	12	12	156.600	156.600	63A			156.175	156.175	84A			157.225	157.225
13*1	13	13*1	156.650	156.650		64	64	156.225	160.825	85	85	85	157.275	161.875
14	14	14	156.700	156.700	64A		64A	156.225	156.225	85A			157.275	157.275
15*1	15*1	15*1	156.750	156.750		65		156.275	160.875	86	86	86	157.325	161.925
16	16	16	156.800	156.800	65A	65A	65A	156.275	156.275	86A			157.325	157.325
17*1	17	17*1	156.850	156.850		66		156.325	160.925	87	87	87	157.375	161.975
	18		156.900	161.500	66A	66A	66A*1	156.325	156.325	87A			157.375	157.375
18A		18A	156.900	156.900	67*1	67	67	156.375	156.375	88	88	88	157.425	162.025
	19		156.950	161.550	68	68	68	156.425	156.425	88A			157.425	157.425
19A		19A	156.950	156.950	69	69	69	156.475	156.475					
20	20	20*1	157.000	161.600	70*2	70*2	70*2	156.525	156.525					
20A			157.000	157.000	71	71	71	156.575	156.575					
	21	21	157.050	161.650	72	72	72	156.625	156.625					

\*1 Low power only, \*2 Receive only

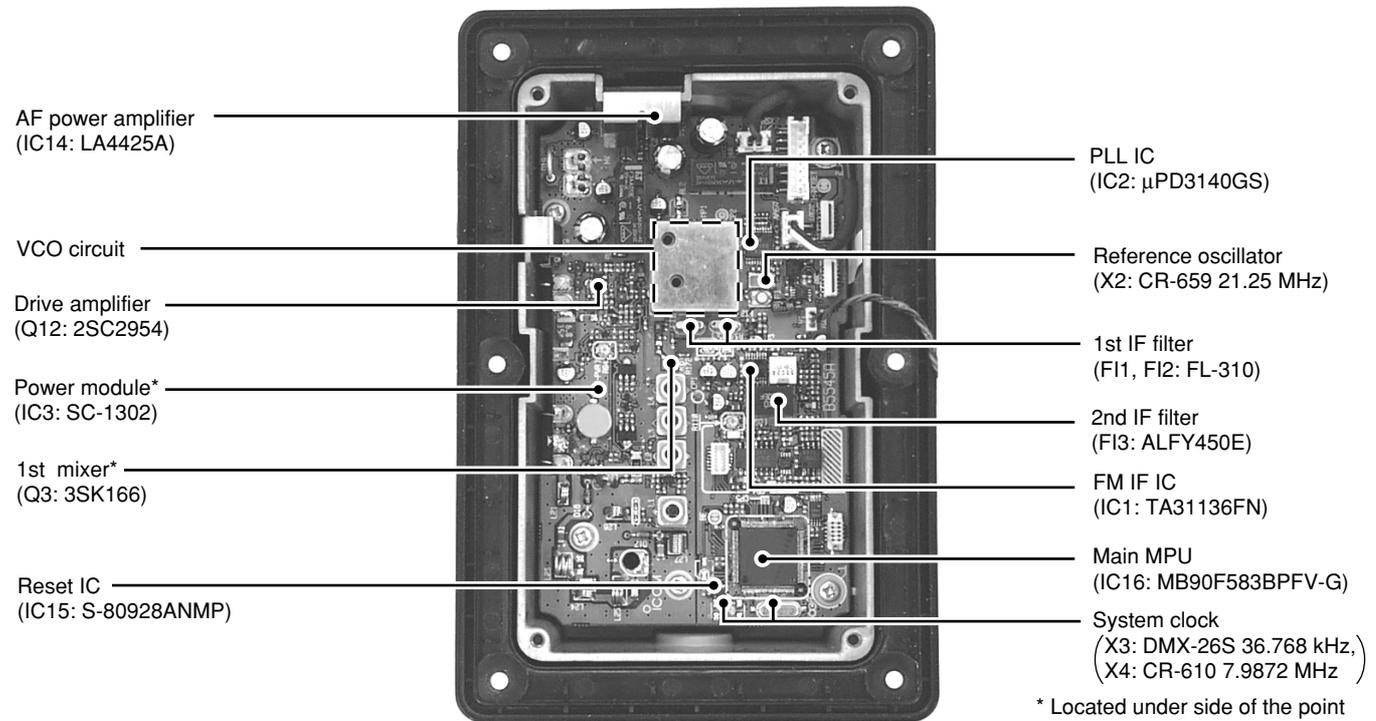
**NOTE:** Simplex channels 3, 21, 23, 61, 64, 81, 82 and 83 **CANNOT** be lawfully used by the general public in USA waters.

Weather channel	Frequency (MHz)		Weather channel	Frequency (MHz)	
	Transmit	Receive		Transmit	Receive
WX01	Receive only	162.550	WX06	Receive only	162.500
WX02	Receive only	162.400	WX07	Receive only	162.525
WX03	Receive only	162.475	WX08	Receive only	161.650
WX04	Receive only	162.425	WX09	Receive only	161.775
WX05	Receive only	162.450	WX10	Receive only	163.275

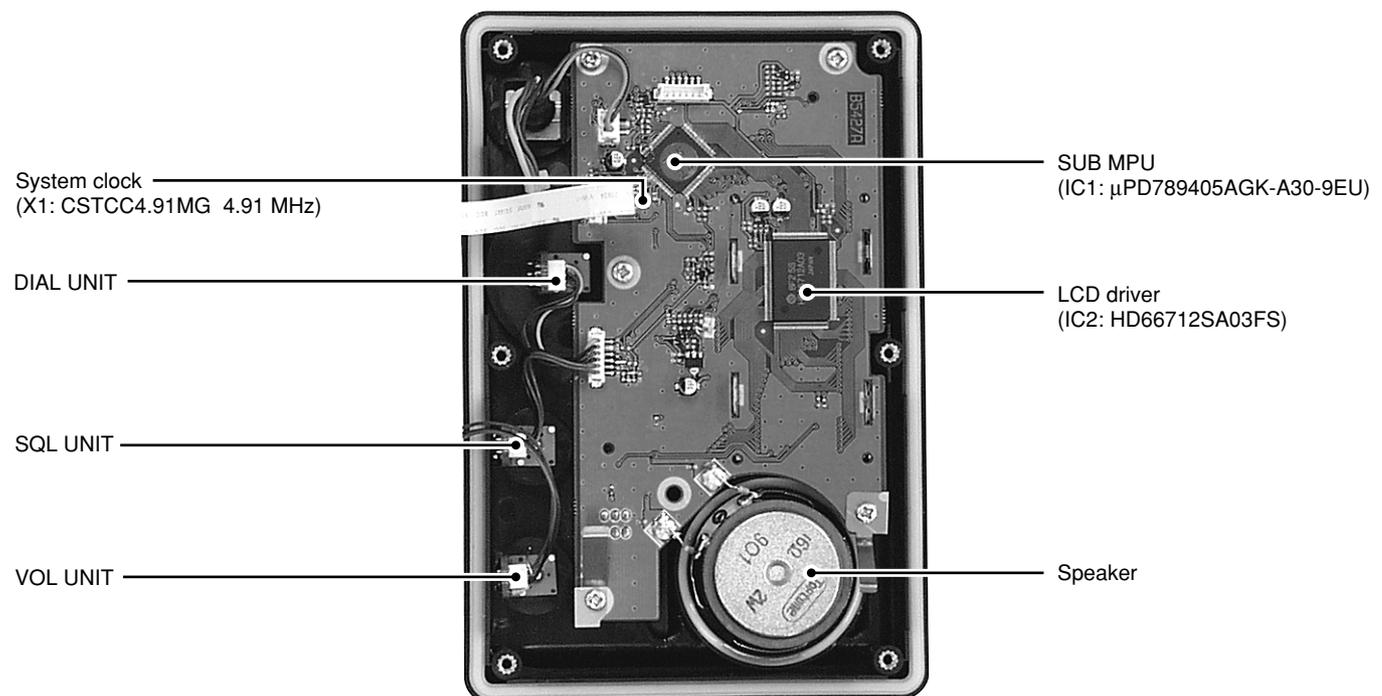
## SECTION 2 INSIDE VIEWS

### 2-1 IC-M502

#### • MAIN UNIT

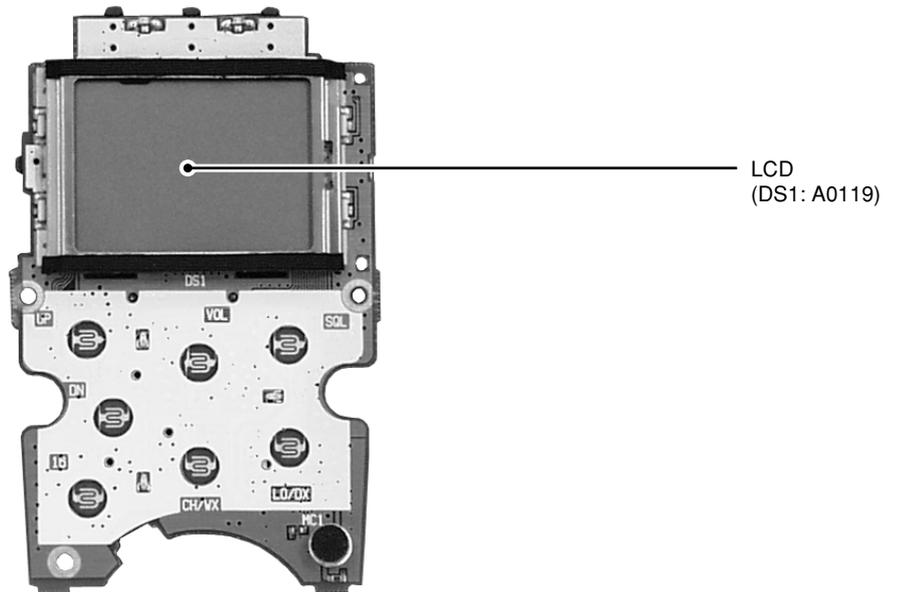


#### • LOGIC UNIT

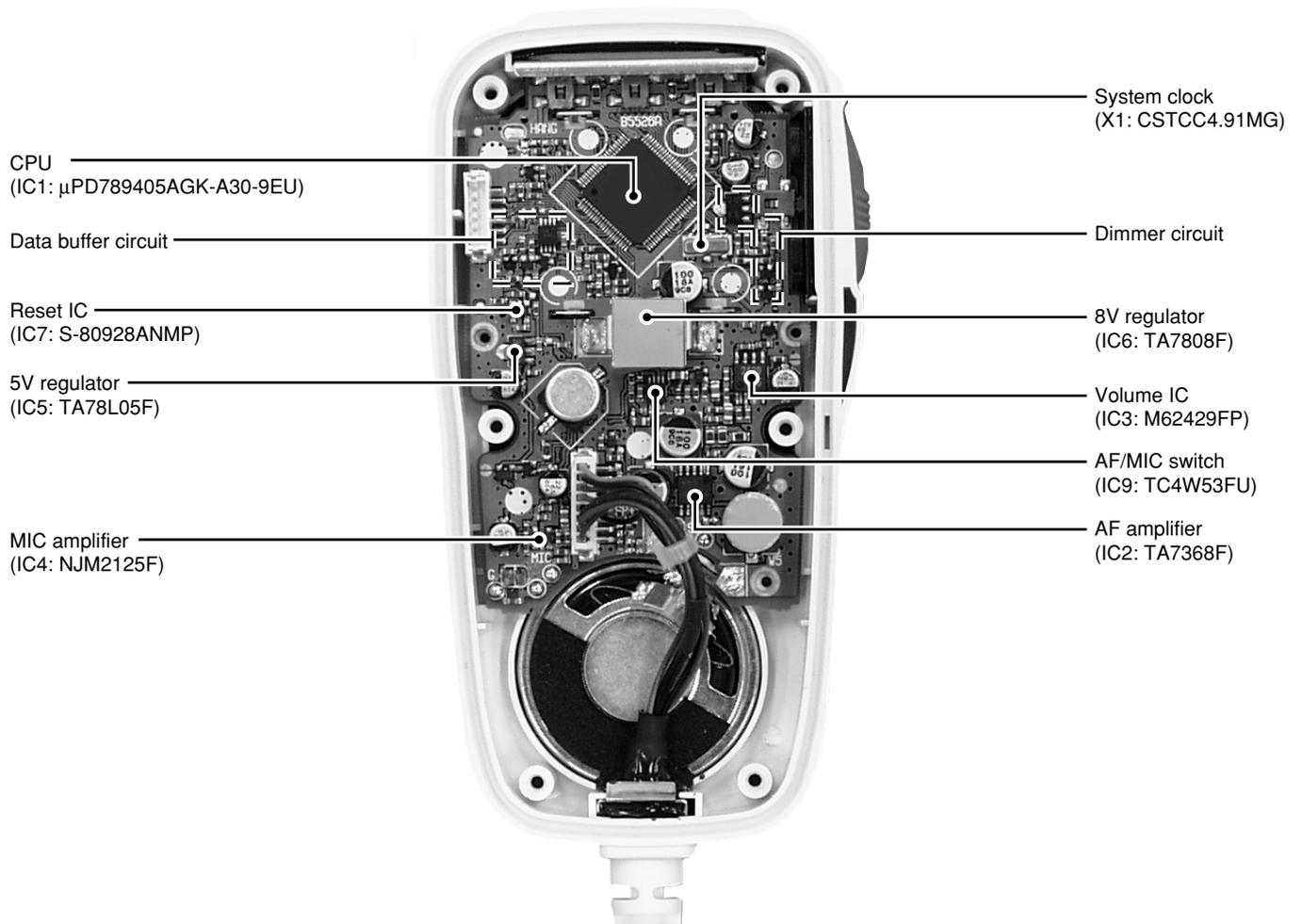


## 2-2 HM-127 (OPTIONAL UNIT)

### • TOP VIEW



### • BOTTOM VIEW

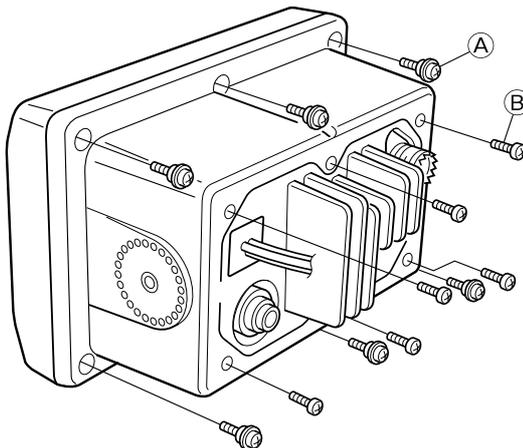


## SECTION 3 DISASSEMBLY INSTRUCTION

**CAUTION: DISCONNECT** the DC power cable from the transceiver before performing any work on the transceiver. Otherwise, there is danger of electric shock and/or equipment damage.

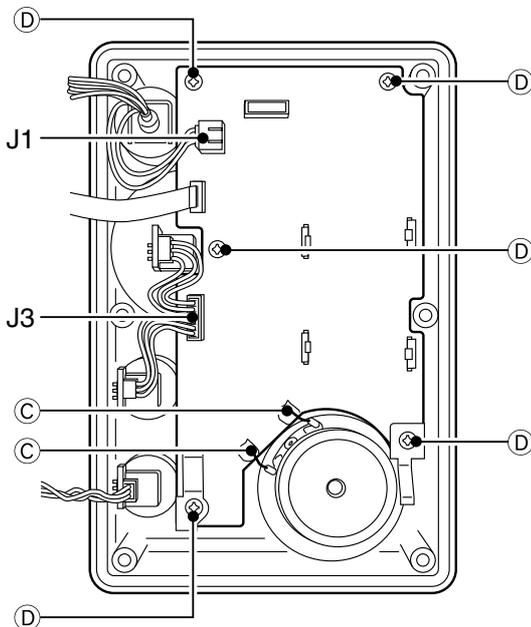
### • Opening the transceiver case

- ① Unscrew 6 screws (A), and remove the front unit.
- ② Unscrew 6 screws (B), and remove the rear panel.



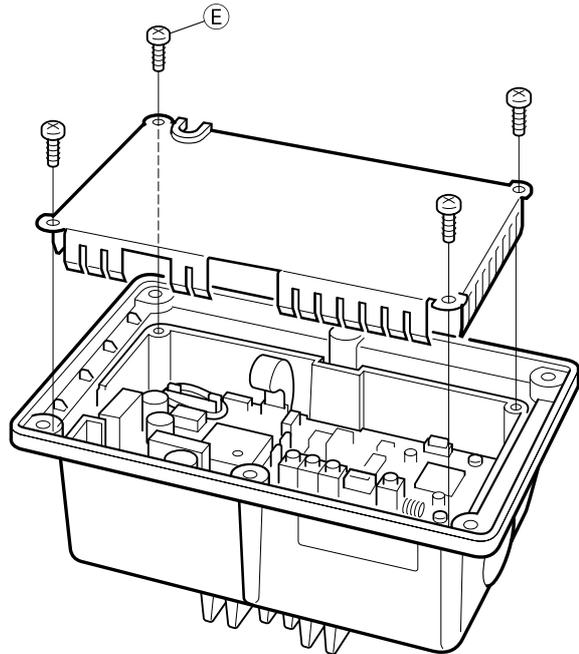
### • Removing the LOGIC unit

- ① Unsolder 2 point (C).
- ② Disconnect microphone connector from J1 and SQL/DIAL connector from J3.
- ③ Unscrew 5 screws (D), and remove the LOGIC unit.

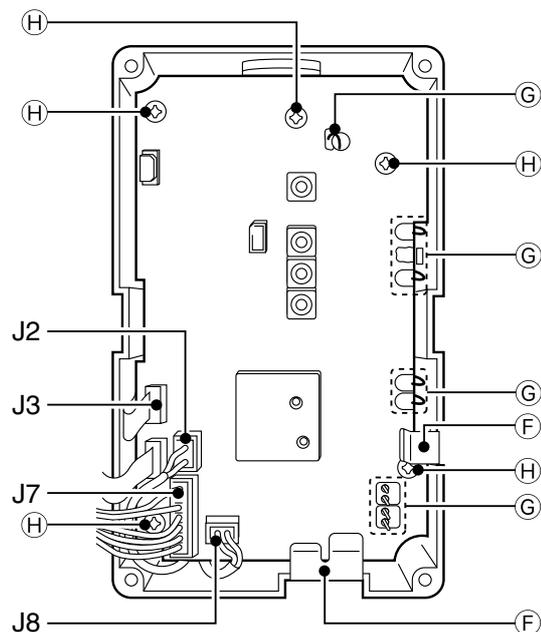


### • Remove the MAIN unit

- ① Unscrew 4 screws (E) from the shielding plate, then lift up the shielding plate.



- ② Remove the 2 clips (F).
- ③ Disconnect microphone connector from J7 and CTRL connector from J3 and EX-SP connector from J8 and EX-GPS connector from J2.
- ④ Unsolder 10 point (G).
- ⑤ Unscrew 5 screws (H), and remove the MAIN unit.



## SECTION 4 CIRCUIT DESCRIPTION

### 4-1 RECEIVER CIRCUITS

#### 4-1-1 ANTENNA SWITCHING CIRCUIT

The antenna switching circuit functions as a low-pass filter while receiving and as resonator circuit while transmitting. The circuit does not allow transmit signals to enter receiver circuits.

Received signals enter the MAIN unit from the antenna connector and pass through the low-pass filter (L23–L25, C134, C136–C139). The signals are then applied to the RF circuit via the antenna switching circuit (D17, L26, L27, C141–C143).

#### 4-1-2 RF CIRCUIT

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

The signals from the antenna switching circuit pass through a tunable bandpass filter (D1, L1, C2–C4) where the object signals are led to the RF amplifier circuit (Q2).

The amplified signals at Q2 are applied to the 3-stage tunable bandpass filter (D2–D4, D34–D36, L2–L4, C13, C14, L33, C16–C18, C20–C24) to suppress unwanted signals and improve the selectivity. The signals are then applied to the 1st mixer circuit.

D1–D4, D34–D36 employ varactor diodes, that are controlled by the PLL lock voltage, to track the band pass filters.

#### 4-1-3 1ST MIXER AND 1ST IF CIRCUITS

The 1st mixer circuit converts the received signal into a fixed frequency of the 1st IF signal with a 1st LO (VCO output) frequency. By changing the 1st LO frequency, only the desired frequency will pass through a pair of crystal filters at the next stage of the mixer.

The signals from the RF circuit are mixed with the VCO signals at the 1st mixer circuit (Q3) to produce a 21.7 MHz 1st IF signal.

The 1st IF signal is applied to a pair of crystal filters (F11, F12) to suppress out-of-band signals and is then amplified at the IF amplifier (Q4). The amplified signal is applied to the 2nd mixer circuit (IC1).

#### 4-1-4 2ND IF AND DEMODULATOR CIRCUITS

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

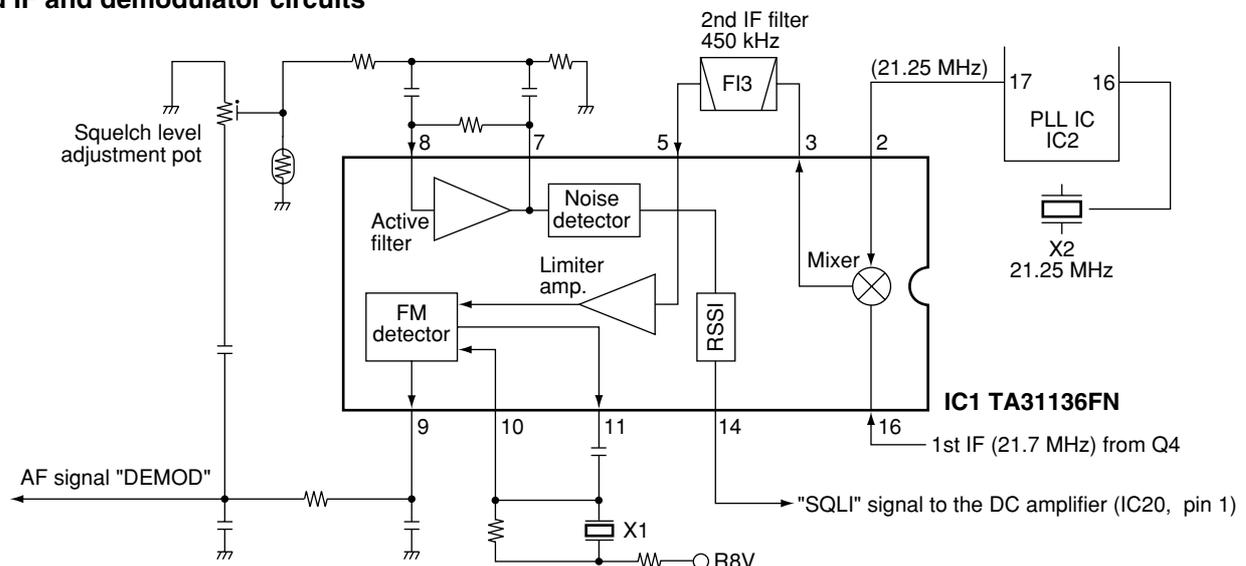
The FM IF IC (IC1) contains the 2nd local oscillator, 2nd mixer, limiter amplifier, quadrature detector, and noise detector circuits, etc.

The 1st IF signal from Q4 is applied to the 2nd mixer section of IC1 (pin 16), and is mixed with a 21.25 MHz 2nd LO signal generated at the PLL circuit using the reference frequency (21.25 MHz) to produce a 450 kHz 2nd IF signal.

The 2nd IF signal from IC1 (pin 3) is passed through the ceramic filter (F13), where unwanted signals are suppressed, and is then applied to the 2nd IF (limiter) amplifier in IC1 (pin 5). The signal is applied to the FM detector section in IC1 for demodulation into AF signals.

The FM detector circuit employs a quadrature detection method (linear phase detection), which uses a ceramic discriminator (X1) for phase delay to obtain a non-adjusting circuit. The detected signal from IC1 (pin 9) is applied to the AF circuit.

#### •2nd IF and demodulator circuits



### 4-1-5 AF AMPLIFIER CIRCUIT

The AF amplifier circuit amplifies the detected signals to drive a speaker. The AF circuit includes an AF mute circuit for the squelch.

AF signals from IC1 (pin 9) are passed through the analog switch (IC12, pins 10, 11), and are applied to the de-emphasis circuit (R118, C182). The de-emphasis circuit is an integrated circuit with frequency characteristic of  $-6$  dB/octave.

The integrated signals are applied to the active filters (Q24, Q25). Q24 functions as a high-pass filter to suppress unwanted lower noise signals and Q25 functions as a low-pass filter to suppress higher noise signals.

The filtered signals are passed through the [VOLUME] control, and are then applied to the AF power amplifier (IC14, pin 1). The output signal from IC14 (pin 4) drives the internal (external) speaker.

### 4-1-6 SQUELCH CIRCUIT

A squelch circuit cuts out AF signals when no RF signals are received. By detecting noise components in the AF signals, the squelch circuit switches the AF mute switch.

A portion of the AF signals from the FM IF IC (IC1, pin 9) pass through the squelch adjustment pot (R33), and are then applied to the active filter section (IC1, pin 8). The active filter section amplifies and filters noise components. The filtered signals are applied to the noise detector section and output from pin 14 as the "SQLI" signal. The "SQLI" signal is amplified at the DC amplifier (IC20) and applied to the CPU (IC16, pin 39) as the "SQL" signal. The CPU analyzes the noise condition and outputs the "RMUTM", "RMUTS" signals to toggle the AF mute switches (Q26, Q27).

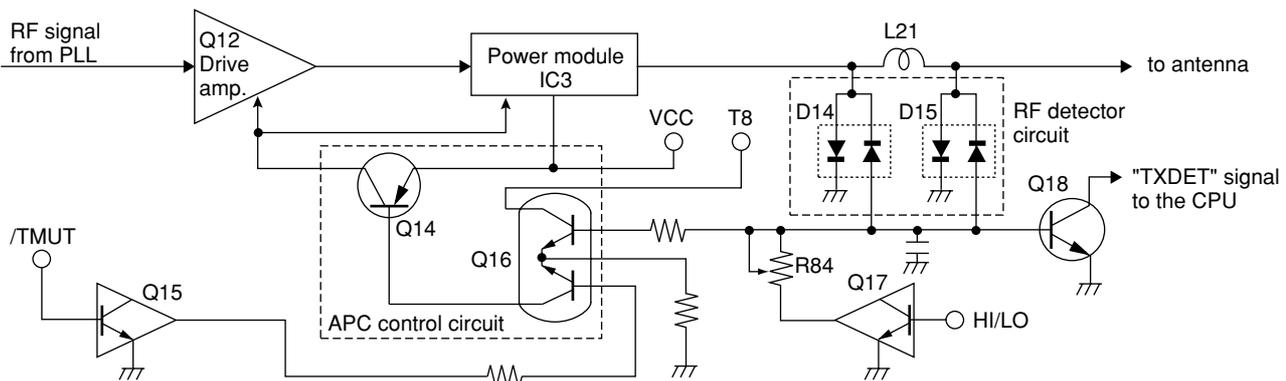
## 4-2 TRANSMITTER CIRCUITS

### 4-2-1 MICROPHONE AMPLIFIER CIRCUIT

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

The AF signals from the microphone are amplified at the microphone amplifier (IC11a) via the analog switch (IC10, pins 11, 10). A capacitor (C214) and resistor (R147) are connected to the amplifier to obtain the pre-emphasis characteristics.

### • APC circuit



The amplified signals are applied to the IDC amplifier (IC13a, pin 2) via the analog switch (IC12, pins 9, 8 and pins 4, 3) and are passed through the splatter filter (IC13b) to suppress unwanted 3 kHz or higher signals. The filtered signals are then applied to the modulation circuit.

### 4-2-2 MODULATION CIRCUIT

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

Audio signals from the splatter filter (IC13b) pass through the frequency deviation adjustment pot (R172) and are then applied to the modulation circuit (D8) to change the reactance of D8, and modulate the oscillated signal at the TX-VCO (Q7).

### 4-2-3 DRIVE AMPLIFIER CIRCUIT

The drive amplifier circuit amplifies the VCO oscillating signal to a level needed at the power amplifier.

The VCO output is buffer-amplified by Q9 and Q10, and is then applied to the Tx/Rx switch (D12). The transmit signal from the Tx/Rx switch is amplified to the pre-drive (Q11) and drive (Q12) amplifiers to obtain an approximate 200 mW signal level. The amplified signal is then applied to the RF power amplifier (IC3).

### 4-2-4 POWER AMPLIFIER CIRCUIT

The power amplifier circuit amplifies the driver signal to an output power level.

IC3 is a power module which has amplification output capabilities of about 35 W with 300 mW input. The output from IC3 (pin 4) is passed through the antenna switching circuit (D16) and is then applied to the antenna connector via the low-pass filter.

### 4-2-5 APC CIRCUIT

The APC circuit stabilizes transmit output power.

The RF output signal from the power amplifier (IC3) is detected at the power detector circuit (D14, D15, L21) and is then applied to one of the differential amplifier inputs (Q16, pin 5) via the High/Low control circuit (R84, Q17). The applied voltage controls the differential amplifier output (Q16, pin 2) and the bias voltage control (Q14). Thus the APC circuit maintains a constant output power.

### 4-3 PLL CIRCUITS

#### 4-3-1 GENERAL

The PLL circuit provides stable oscillation of the transmit frequency and receive 1st LO frequency. The PLL circuit compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by a crystal oscillator and the divided ratio of the programmable divider.

IC2 is a dual PLL IC which controls both VCO circuits for Tx and Rx, and contains a prescaler, programmable counter, programmable divider phase detector, charge pump and etc.

The PLL circuit, using a one chip PLL IC (IC2), directly generates the transmit frequency and receive 1st IF frequency with VCOs. The PLL sets the divided ratio based on serial data from the CPU and compares the phases of VCO signals with the reference oscillator frequency. The PLL IC detects the out-of-step phase and output from pins 8 and 13 for Tx and Rx, respectively. The reference frequency (21.25 MHz) is oscillated at X2.

#### 4-3-2 TX LOOP

The generated signal at the TX-VCO (Q7, D6–D8) enters the PLL IC (IC2, pin 2) and is divided at the programmable divider section and is then applied to the phase detector section.

The phase detector compares the input signal with a reference frequency, and then outputs the out-of-phase signal (pulse-type signal) from pin 8.

The pulse-type signal is converted into DC voltage (lock voltage) at the loop filter (R252–R254, C292–C294), and is then applied to varactor diodes (D6, D7) of the TX-VCO to stabilize the oscillated frequency.

#### 4-3-3 RX LOOP

The generated signal at the RX-VCO (Q8, D9, D10) enters the PLL IC (IC2, pin 19) and is divided at the programmable divider section and is then applied to the phase detector section.

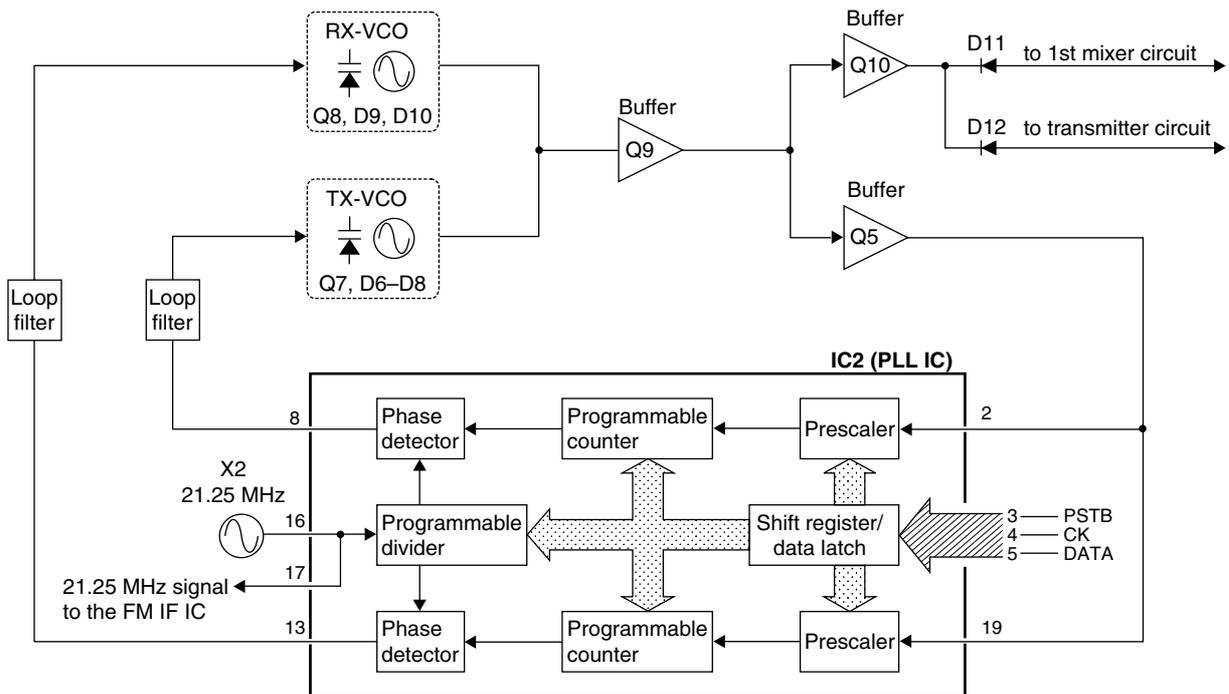
The phase detector compares the input signal with a reference frequency, and then outputs the out-of-phase signal (pulse-type signal) from pin 13.

The pulse-type signal is converted into DC voltage (lock voltage) at the loop filter (R255–R257, C295, C296), and is then applied to varactor diodes (D9, D10) of the RX-VCO to stabilize the oscillated frequency. The lock voltage is also used for the receiver circuit for the bandpass filter center frequency. The lock voltage from the loop filter is amplified at the buffer-amplifier (Q6) and then applied to the RF circuit.

#### 4-3-4 VCO CIRCUIT

The VCO outputs from TX-VCO (Q7) and RX-VCO (Q8) are amplified at the buffer amplifiers (Q9 and Q10), and are then sent to the Tx/Rx switch (D11, D12). The receive LO signal is applied to the 1st mixer circuit (Q3) through a low-pass filter, and the transmit signal is applied to the pre-drive amplifier (Q11). A portion of the VCO output is reappplied to the PLL IC (IC2, pin 2 or pin 13) via the buffer amplifier (Q5).

#### • PLL circuit



## 4-4 DSC CIRCUITS (DSC UNIT)

### 4-4-1 DSC ENCODE CIRCUIT

The DSC signal created at CPU (IC16), is passed through the buffer amplifier (Q33) and applied to the analog switch (IC12, pin 1). The analog switch (IC12) is a modulation switch that switches between microphone audio signal and DSC signal.

### 4-4-2 DSC DECODE CIRCUIT

The AF signals from FM IF IC (IC1, pin 9) are filtered at the bandpass filter (IC4) with +18 dB/octave characteristics. IC4b functions as a low-pass filter to suppress unwanted higher noise signals and IC4a functions as a high-pass filter to suppress lower noise signals. The filtered signals are converted analog signals into digital signals at DSC decoder IC (IC5), and are then applied to the CPU (IC16) after shaping waveform at IC6.

## 4-5 POWER SUPPLY CIRCUITS

### 4-5-1 VOLTAGE LINE (MAIN UNIT)

LINE	DESCRIPTION
HV	The voltage from the connected DC power supply.
HVS	Same voltage as the HV line which is passed through the [PWR] switch (LOGIC unit; S1).
VCC	Same voltage as the HVS line which is passed through the power controller (RL1).
8V	Common 8 V converted from the VCC line at the 8V regulator circuit (IC8).
+5V	Common 5 V converted from the 8V line at the +5V regulator circuit (IC9).
T8	Transmit 8 V controlled by the T8 control circuit (Q20, Q21) using the SEND signal from CPU.
R8	Receive 8 V controlled by the R8 control circuit (Q22, Q23) using the RCV signal from CPU. The controlled voltage is applied to the receiver circuits.

## 4-6 LOGIC CIRCUITS

### 4-6-1 MAIN UNIT

#### • MPU

IC16 is a 16 bit multifunction micro-computer and contains FLASH memory, serial I/O, timer, A/D converter, D/A converter, programmable I/O, ROM and RAM.

#### • SYSTEM CLOCK CIRCUIT

X3, X4 are crystal oscillators and oscillate 7.9872 MHz and 32.768 kHz system clocks for the MPU (IC16) respectively.

#### • RESET CIRCUIT

IC15 is a reset IC. When turn power ON, IC15 outputs a reset signal ("LOW" pulse) to MPU (IC16, pin 75).

#### • LOW BATTERY DETECTOR

VCC voltage is divided by R204, R205 and is applied to the low battery detector section in the MPU (IC16, pin 42).

### 4-6-2 LOGIC UNIT

#### • CPU

IC1 is an 8 bit single chip micro-computer and contains LCD driver, serial I/O, timer, A/D converter, programmable I/O, ROM and RAM.

#### • SYSTEM CLOCK CIRCUIT

X1 is a ceramic oscillator and oscillates a 4.91 MHz system clock for the CPU (IC1).

#### • LCD DRIVER

IC2 is a LCD driver for a dot matrix LCD.

#### • DIMMER CIRCUIT

CPU (IC1) and Q2, Q3, Q8 are dimmer circuit and control the LCD backlight (LED).

#### • CONTRAST CIRCUIT

CPU (IC1) and Q1, Q4 are contrast circuit and control the 8 step display contrast.

## 4-7 PORT ALLOCATIONS

### 4-7-1 SUB CPU (LOGIC unit; IC1)

Pin number	Port name	Description
27, 28, 29, 30	LRESET, E, RW, RS	Output ports for the LCD driver (IC2) control signals.
31-38	DB7-DB0	I/O port for the LCD driver (IC2) control signals.
42	SCAN	Input port for the [SCAN] key.
43	CHWX	Input port for the [CH/WX] key.
44	CH16	Input port for the [16/9] key.
46	SQLV	Input port for the squelch volume level.
47	KEYM	Input port from the microphone (HM-126) for remote control signal
51, 52	DIALA, DIALB	Input ports for the [CHANNEL].
54	SRXD	Outputs communication data for main CPU (MAIN unit; IC16).
55	STXD	Input port for the communication data from main CPU (MIAN unit; IC16).
58-60	CONTSEG3-CONTSEG1	Output port for the LCD contrast.
61	DTRS	Input port for the [DISTRESS] key.
62	IC	Input port for the [LO/DX] key.
63	DSC	Input port for the [DSC/ENT] key.
64	HL	Input port for the [HI/LO] key.
75-77	DIM3-DIM1	Output LCD backlight control signal for the dimmer circuit (Q2, Q3, Q8).
78-80	CONDOT3-CONDOT1	Output port for the LCD contrast.

## 4-7-2 MAIN CPU (MAIN unit; IC16)

Pin number	Port name	Description
1	STRU	Outputs control signal to the analog switch (IC12) for passing through the optional VOICE SCRAMBLER unit (UT98 or UT-112).
2	SCON	Outputs ON/OFF control signal for the optional VOICE SCRAMBLER unit (UT-98 or UT-112).
3	OPSTB	Outputs strobe signals for the optional VOICE SCRAMBLER unit UT-98 or UT-112.
4	PSTB	Outputs strobe signals to PLL IC (IC2, pin 2).
5	CK	Outputs clock signal to PLL IC (IC2, pin 3).
6	DATA	Outputs clock signal to PLL IC (IC2, pin 4).
7	PTTM	Outputs main microphone (HM-126) select signal to the analog switch (IC10) while intercom operation.
8	PTTS	Outputs optional remote microphone (HM-127) select signal to the analog switch (IC10) while intercom operation.
10	MMUTE	Outputs select signal for the speaker of main microphone (HM-126) to the analog switch (IC10) while intercom operation.
11	SMUTE	Outputs select signal for the speaker of optional remote microphone (HM-127) to the analog switch (IC10) while intercom operation.
12	SP	Outputs ON/OFF control signal for the internal speaker to the AF mute circuit (Q32, D23, RL2). Low : While internal speaker is ON.
13	HI/LO	Output port for RF output power (High or Low) select signal. Low : While low power is selected.
14	SEND	Outputs the T8 regulator (Q20, Q21) control signal. Low : While transmitting
15	TMUTE	Outputs transmit mute signal. High : While transmitting
16	SRXD	Input port for the communication data from sub CPU (LOGIC unit; IC1).
17	STXD	Outputs communication data for sub CPU (LOGIC unit; IC1).
19	CLR X	Input port for the cloning data from the buffer (D24).

Pin number	Port name	Description
20	CLTX	Output port for the cloning data to the buffer (MAIN unit; Q37).
23	ECK	Outputs clock signal for EEPROM (IC17).
24	EDA	Outputs serial data signal for EEPROM (IC17).
27	MICDSC	Outputs select signal to the analog switch (IC12) for the microphone audio signal or DSC signal.
30	DSC	D/A output port for the ATIS/DSC encode signal to the buffer amplifier (Q33).
39	SQL	Input port from the FM IF IC (IC1) for the squelch operation.
42	LBAT	Input port for the connected power supply voltage detection (low battery indicator).
44	TXDET	Input port for the "TX" indicator from the power detector circuit (D14, D15).
45	DSDEC	Input port for the ATIS/DSC decode signal.
46	UNLK	Input port for the PLL unlock signal. Low : While PLL is locked.
60	PTT	Input port for the PTT switch.
61	HANG	Input port for the microphone hanger detection signal. Low : Microphone on hook
62	OPTIN	Input port for the optional unit connection detection.
66	RCV	Outputs the R8 regulator (Q22, Q23) control signal. Low : While receiving
67	RMUTM	Outputs the AF mute switch (Q26) control signal for main body. Low : While squelched
68	RMUTS	Outputs the AF mute switch (Q27) control signal for the optional remote microphone (HM-127). Low : While squelched
69	BEEP M	Outputs beep audio for main body.
71	BPLVM	Outputs beep audio for the optional remote microphone (HM-127).
75	RESET	Input port for the reset signal.
100	SRESET	Outputs the reset signal for sub CPU (LOGIC unit; IC1).

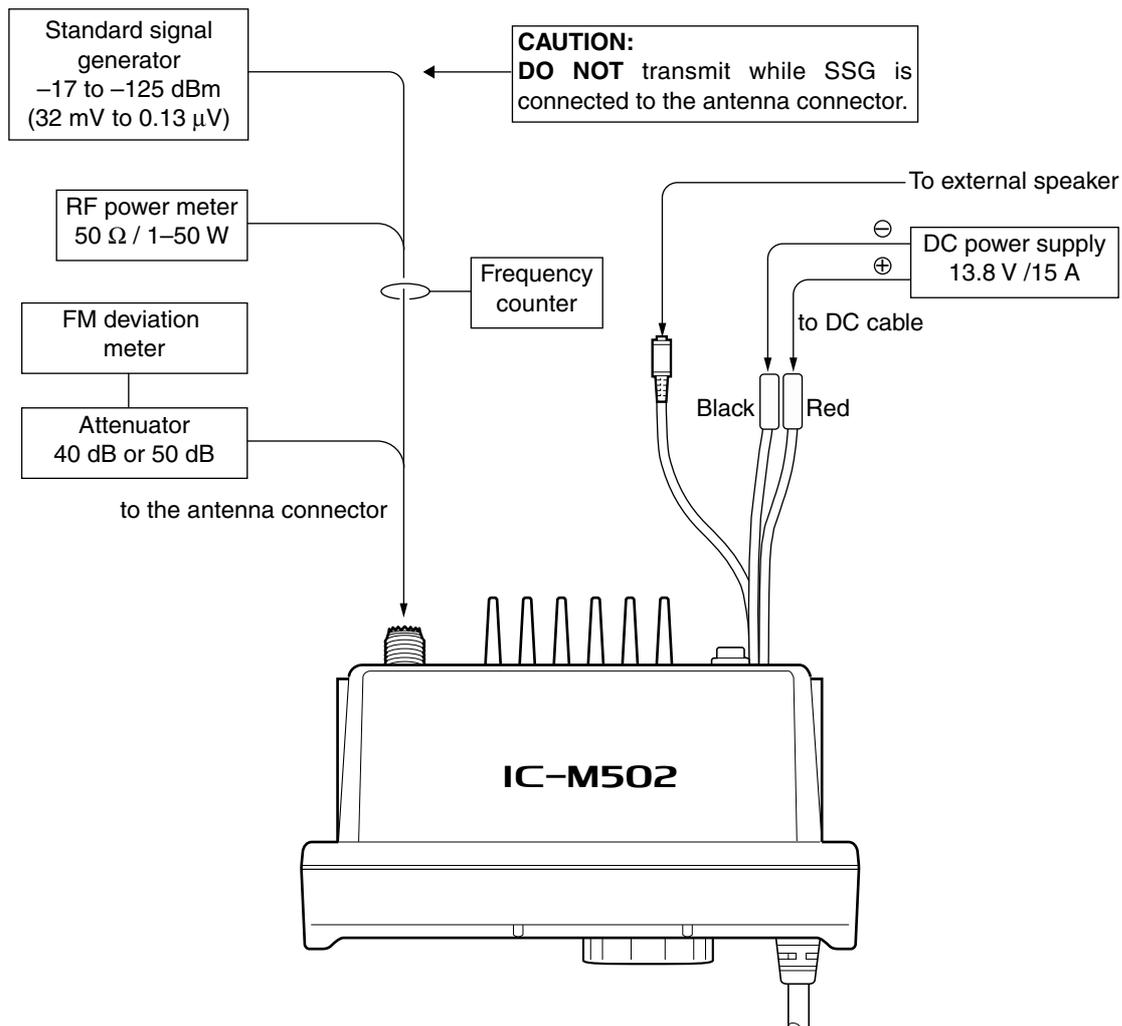
## SECTION 5 ADJUSTMENT PROCEDURES

### 5-1 PREPARATION

#### ■ REQUIRED TEST EQUIPMENT

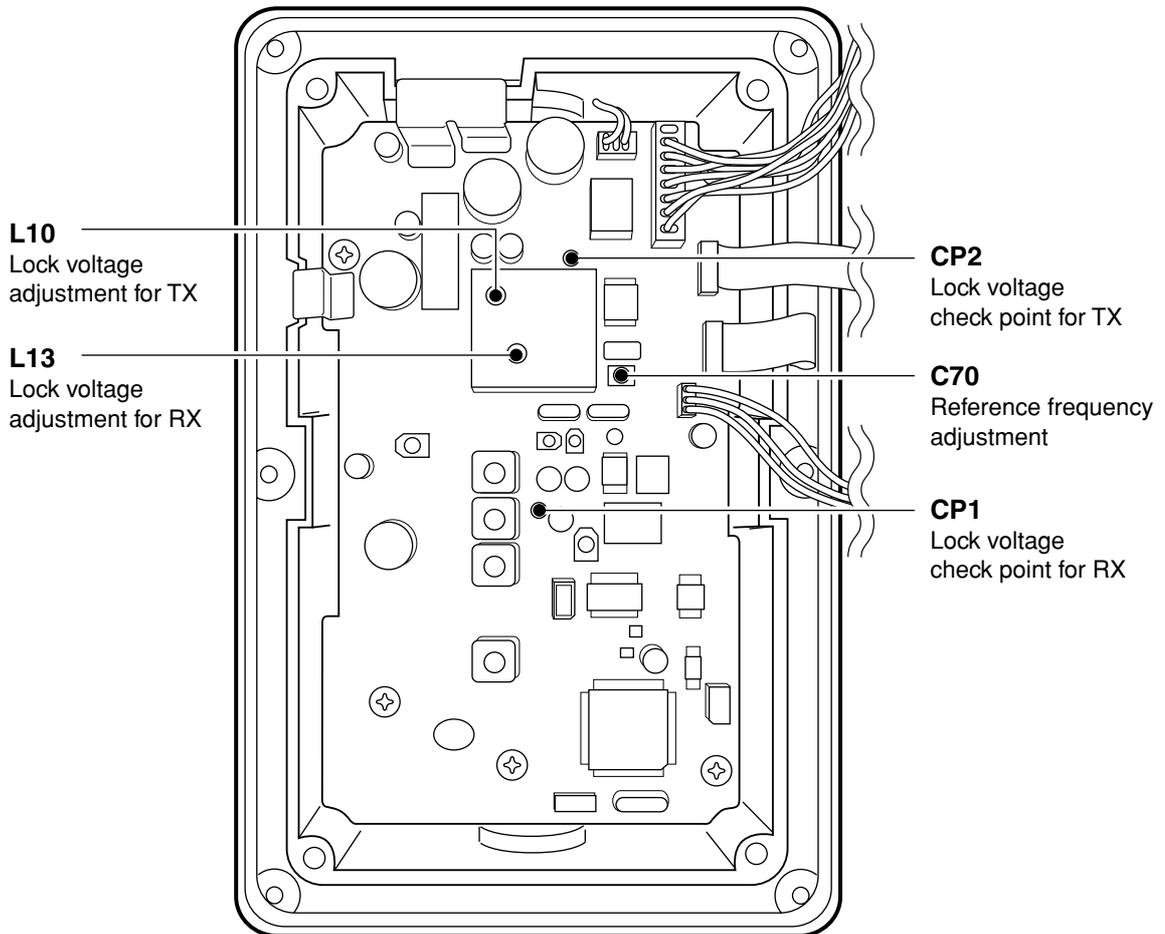
EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC Current capacity : 10 A or more	Audio generator	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
RF power meter (terminated type)	Measuring range : 1–50 W Frequency range : 100–300 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Standard signal generator (SSG)	Frequency range : 0.1–300 MHz Output level : 0.1 μV–32 mV (–127 to –17 dBm)
Frequency counter	Frequency range : 0.1–300 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
		AC millivoltmeter	Measuring range : 10 mV–10 V
FM deviation meter	Frequency range : 30–300 MHz Measuring range : 0 to ±10 kHz	External speaker	Input impedance : 4 Ω Capacity : 5 W or more
DC voltmeter	Input impedance : 50 kΩ/V DC or better	Attenuator	Power attenuation : 40 or 50 dB Capacity : 50 W or more

#### ■ CONNECTIONS



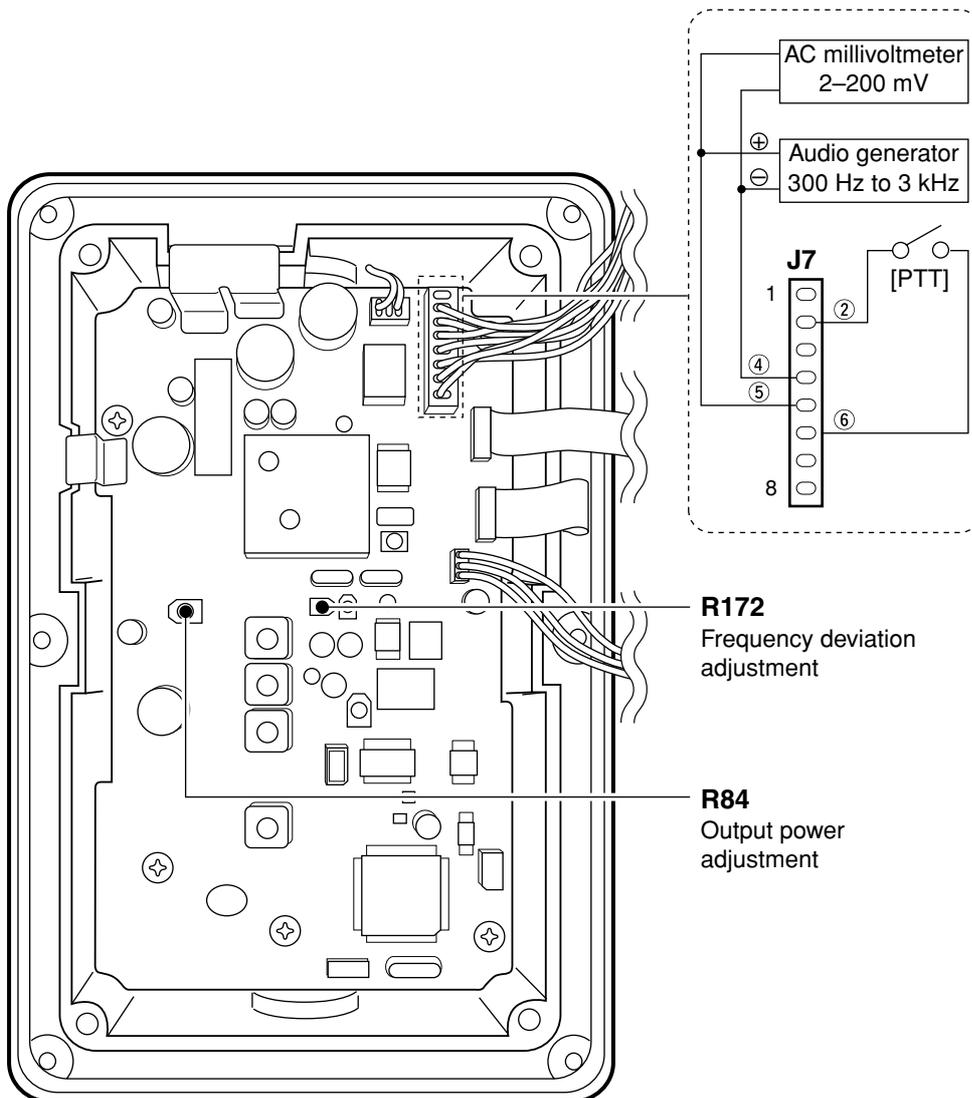
5-2 PLL ADJUSTMENTS

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1 • Operating channel : ch16 • Receiving	MAIN	Connect a digital multi-meter or oscilloscope to check point CP1.	3.5 V	MAIN	L13
	2 • Operating channel : ch116 • Receiving			4.5–6.0 V		Verify
	3 • Operating channel : ch16 • Output power : Low • Transmitting			2.5 V		L10
	4 • Operating channel : ch116 • Output power : Low • Transmitting			2.5–3.5 V		Verify
REFERENCE FREQUENCY	1 • Operating channel : ch16 • Output power : Low • Connect an RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting	Rear Panel	Loosely couple the frequency counter to the antenna connector.	156.8000 MHz	MAIN	C70



### 5-3 TRANSMITTER ADJUSTMENTS

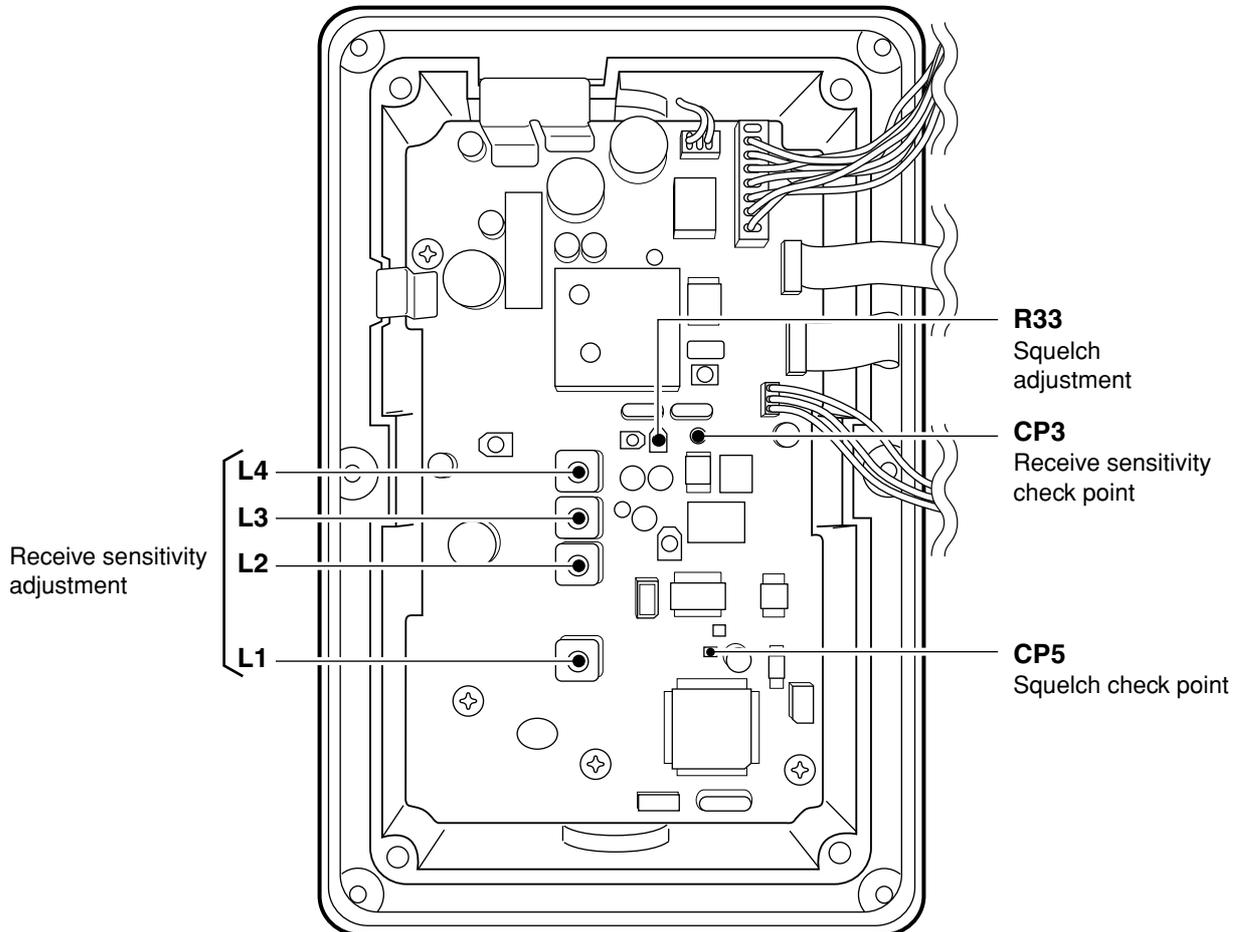
ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1 <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• Output power : High</li> <li>• Transmitting</li> </ul>	Rear Panel	Connect an RF power meter to the antenna connector.	25 W	MAIN	R84
FREQUENCY DEVIATION	1 <ul style="list-style-type: none"> <li>• Operating channel : ch16</li> <li>• Output power : Low</li> <li>• Connect an audio generator to J7 (pin 5) with an AC millivoltmeter and set as:                             <ul style="list-style-type: none"> <li>Frequency : 1 kHz</li> <li>Level : 70 mV</li> </ul> </li> <li>• Set an FM deviation meter as:                             <ul style="list-style-type: none"> <li>HPF : OFF</li> <li>LPF : 20 kHz</li> <li>De-emphasis : OFF</li> <li>Detector : (P-P)/2</li> </ul> </li> <li>• Transmitting</li> </ul>	Rear Panel	Connect an FM deviation meter to the antenna connector through an attenuator.	±4.3 kHz	MAIN	R172



5-4 RECEIVER ADJUSTMENTS

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY 1	<ul style="list-style-type: none"> <li>Operating channel : ch16</li> <li>[SQUELCH] control: Max. counterclockwise</li> <li>Set the internal speaker OFF in the SET mode, and connect a distortion meter with a 4 Ω load to [EXT SP] receptacle.</li> <li>Connect an SSG to the antenna connector and set as:                      Frequency : 156.800 MHz                      Level : 10 μV*                      (-97 dBm)                      Modulation : 1 kHz                      Deviation : ±3.5 kHz</li> <li>Receiving</li> </ul>	MAIN	Connect a DC voltmeter to check point CP3.	Maximum voltage	MAIN	L1, L2, L3, L4
SQUELCH 1	<ul style="list-style-type: none"> <li>Operating channel : ch16</li> <li>[SQUELCH] control: Max. counterclockwise</li> <li>Connect an SSG to the antenna connector and set as:                      Frequency : 156.800 MHz                      Level : 0.18 μV*                      (-122 dBm)                      Modulation : 1 kHz                      Deviation : ±3.5 kHz</li> <li>Receiving</li> </ul>	MAIN	Connect a DC voltmeter to check point CP5.	2 V	MAIN	R33

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



## SECTION 6 PARTS LIST

## 6-1 IC-M502

## [LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1140009280	S.IC	μPD78F9418AGK-9EU
IC2	1140008960	S.IC	HD66712SA03FS
Q1	1560000810	S.FET	2SK1069-4-TL
Q2	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q3	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q4	1560000810	S.FET	2SK1069-4-TL
Q5	1590000720	S.TRANSISTOR	DTA144EUA T106
Q6	1590000430	S.TRANSISTOR	DTC144EUA T106
Q8	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
D1	1790001010	S.ZENER	MA8043-L (TX)
X1	6060000750	S.CERAMIC	CSTCC4.91MG
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R3	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R4	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R5	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R6	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R7	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R8	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R9	7510001150	S.THERMISTOR	NTCCM1608 4BH 103KC
R10	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R11	7030004120	S.RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R12	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R13	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R14	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R15	7030004120	S.RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R16	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R17	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R18	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R20	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R22	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R23	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R24	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R25	7510001150	S.THERMISTOR	NTCCM1608 4BH 103KC
R26	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R28	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R29	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R30	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R32	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R33	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R34	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R35	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R36	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R37	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R38	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R41	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R42	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R43	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R44	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R45	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R46	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R47	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R48	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R49	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R50	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R51	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R52	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R53	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R54	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R55	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R56	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R64	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R65	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)

## [LOGIC UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R66	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R67	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R68	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R69	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R70	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C4	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C8	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C9	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C11	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C13	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C14	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C15	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C16	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C17	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C18	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C19	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C20	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C21	4510004440	S.ELECTROLYTIC	ECEV1HA010SR
C22	4510004440	S.ELECTROLYTIC	ECEV1HA010SR
C23	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C24	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C25	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
J1	6510021600	S.CONNECTOR	S2B-PH-SM3-TB
J2	6510021440	S.CONNECTOR	B6B-ZR-SM3-TF
J3	6510021440	S.CONNECTOR	B6B-ZR-SM3-TF
J4	6510022020	S.CONNECTOR	14FLT-SM1-TB
DS1	5030001880	LCD	TSD0393-UFFDCW
DS2	5040002310	S.LED	SML-311YTT86
DS3	5040002310	S.LED	SML-311YTT86
DS4	5040002310	S.LED	SML-311YTT86
DS5	5040002310	S.LED	SML-311YTT86
DS6	5040002310	S.LED	SML-311YTT86
DS7	5040002310	S.LED	SML-311YTT86
DS8	5040002310	S.LED	SML-311YTT86
DS9	5040002310	S.LED	SML-311YTT86
DS10	5040002310	S.LED	SML-311YTT86
DS11	5040002310	S.LED	SML-311YTT86
DS12	5040002310	S.LED	SML-311YTT86
DS13	5040002310	S.LED	SML-311YTT86
DS14	5040002310	S.LED	SML-311YTT86
DS15	5040002310	S.LED	SML-311YTT86
DS16	5040002310	S.LED	SML-311YTT86
DS17	5040002310	S.LED	SML-311YTT86
S1	2230000250	SWITCH	SPPH22014A
EP1	8930052590	LCD CONTACT	SRCN-2345-SP-N-W
EP2	0910052903	PCB	B 5427C

S.=Surface mount

[VOL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R1	7210003080	VARIABLE	TP96N97-15F-10KA-2345
J1	6510009470	CONNECTOR	S3B-ZR
W1	8900009860	CABLE	OPC-970
EP1	0910053363	PCB	B 5428C

[SQL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R1	7210002360	VARIABLE	TP96N97-15F-10KB-1301
W1	8900009870	CABLE	OPC-971
EP1	0910053372	PCB	B 5429B

[DIAL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
S1	2250000220	ENCODER	TP90N937E20-15F-1540
EP1	0910053382	PCB	B 5430B

[CTRL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1130005640	S.IC	TC4W53F (TE12L)
D4	1730002360	S.ZENER	MA8062-M (TX)
R1	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R4	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R5	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R6	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
C7	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C9	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C10	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C11	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C12	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C13	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C14	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C15	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
J1	6510022440	CONNECTOR	LTW-8MP-C
J2	6510022020	S.CONNECTOR	14FLT-SM1-TB
EP1	0910052823	PCB	B 5471C

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1110003200	S.IC	TA31136FN (EL)
IC2	1130007610	S.IC	μPD3140GS-E1 (DS8)
IC3	1150001540	IC	M57710-A/SC-1302
IC4	1110003750	S.IC	M5218AFP 600C
IC5	1110003650	S.IC	NJM2211M-TE1
IC6	1130007420	S.IC	TC7W14FU (TE12L)
IC8	1110002030	IC	TA7808S
IC9	1180001070	S.IC	TA7805F (TE16L)
IC10	1130007690	S.IC	BU4066BCF-T1
IC11	1110003750	S.IC	M5218AFP 600C
IC12	1130007690	S.IC	BU4066BCF-T1
IC13	1110003750	S.IC	M5218AFP 600C
IC14	1110003090	IC	LA4425A
IC15	1110004710	S.IC	S-80928ANMP-DDR-T2
IC16	1140009270	S.IC	MB90F583BPFV-G
IC17	1140008650	S.IC	HN58X2464T1
IC18	1130007420	S.IC	TC7W14FU (TE12L)
IC19	1170000280	S.IC	TLP121 (GB-TPL)
IC20	1120002830	S.IC	NJM2125F-TE1
IC21	1120002830	S.IC	NJM2125F-TE1
Q2	1580000700	S.FET	3SK292 (TE85R)
Q3	1580000490	S.FET	3SK166A-2-T7
Q4	1530002360	S.TRANSISTOR	2SC2714-Y (TE85R)
Q5	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q6	1560000540	S.FET	2SK880-Y (TE85R)
Q7	1560000330	S.FET	2SK210-GR (TE85R)
Q8	1560000330	S.FET	2SK210-GR (TE85R)
Q9	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q10	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q11	1530002240	S.TRANSISTOR	2SC3775-3-TB
Q12	1530002340	S.TRANSISTOR	2SC2954-T2B
Q14	1520000380	TRANSISTOR	2SB1143 S
Q15	1590000430	S.TRANSISTOR	DTC144EUA T106
Q16	1590000670	S.TRANSISTOR	FMW1 T148
Q17	1590000430	S.TRANSISTOR	DTC144EUA T106
Q18	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q20	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q21	1590000430	S.TRANSISTOR	DTC144EUA T106
Q22	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q23	1590000430	S.TRANSISTOR	DTC144EUA T106
Q24	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q25	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q26	1590001390	S.FET	2SJ144-Y (TE85R)
Q27	1590001390	S.FET	2SJ144-Y (TE85R)
Q28	1560000810	S.FET	2SK1069-4-TL
Q29	1590000430	S.TRANSISTOR	DTC144EUA T106
Q30	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q31	1590000430	S.TRANSISTOR	DTC144EUA T106
Q32	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q33	1560000810	S.FET	2SK1069-4-TL
Q34	1590000720	S.TRANSISTOR	DTA144EUA T106
Q35	1590000720	S.TRANSISTOR	DTA144EUA T106
Q36	1590000660	S.TRANSISTOR	DTC144TU T107
Q37	1590000660	S.TRANSISTOR	DTC144TU T107
Q38	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q39	1510000510	S.TRANSISTOR	2SA1576A T106R
Q40	1560000810	S.FET	2SK1069-4-TL
Q41	1590000720	S.TRANSISTOR	DTA144EUA T106
Q42	1590000720	S.TRANSISTOR	DTA144EUA T106
Q44	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q45	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q46	1590001390	S.FET	2SJ144-Y (TE85R)
Q47	1530002550	S.TRANSISTOR	2SC3326-B (TE85R)
D1	1720000260	S.VARICAP	1SV214 (TPH2)
D2	1720000260	S.VARICAP	1SV214 (TPH2)
D3	1720000260	S.VARICAP	1SV214 (TPH2)
D4	1720000260	S.VARICAP	1SV214 (TPH2)
D5	1790001330	S.ZENER	MA8036-L (TX)
D6	1790000640	S.VARICAP	MA363B (TX)
D7	1790000640	S.VARICAP	MA363B (TX)
D8	1790000640	S.VARICAP	MA363B (TX)
D9	1790000640	S.VARICAP	MA363B (TX)
D10	1790000640	S.VARICAP	MA363B (TX)
D11	1790000620	S.DIODE	MA77 (TX)
D12	1790000620	S.DIODE	MA77 (TX)
D13	1750000550	S.DIODE	1SS355 TE-17
D14	1790000690	S.DIODE	HSM88ASR-TR
D15	1790000690	S.DIODE	HSM88ASR-TR

S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
D16	1710001080	DIODE	XB15A308
D17	1710001080	DIODE	XB15A308
D18	1750000550	S.DIODE	1SS355 TE-17
D19	1790000700	DIODE	DSA3A1
D20	1750000130	S.DIODE	DA204U T107
D21	1750000130	S.DIODE	DA204U T107
D22	1750000130	S.DIODE	DA204U T107
D23	1750000550	S.DIODE	1SS355 TE-17
D24	1750000130	S.DIODE	DA204U T107
D26	1720000360	S.DIODE	HSU88TRF
D27	1750000550	S.DIODE	1SS355 TE-17
D28	1160000050	S.DIODE	DAP202U T107
D29	1750000550	S.DIODE	1SS355 TE-17
D31	1790000620	S.DIODE	MA77 (TX)
D32	1790000620	S.DIODE	MA77 (TX)
D33	1790001210	S.DIODE	1SS375-TL
D34	1720000260	S.VARICAP	1SV214 (TPH2)
D35	1720000260	S.VARICAP	1SV214 (TPH2)
D36	1720000260	S.VARICAP	1SV214 (TPH2)
D37	1160000050	S.DIODE	DAP202U T107
D38	1160000050	S.DIODE	DAP202U T107
FI1	2010002420	MONOLITH	FL-310 (21R15AB)
FI2	2010002420	MONOLITH	FL-310 (21R15AB)
FI3	2020001680	CERAMIC	ALFY450E
X1	6070000210	S.DISCRIMINATOR	CDBCA450CX24
X2	6050010800	S.XTAL	CR-659 (21.25 MHz)
X3	6050011030	S.XTAL	DMX-26S (32.768 kHz)
X4	6050010290	S.XTAL	CR-610 (7.9872 MHz)
L1	6150003820	COIL	LS-440
L2	6150003820	COIL	LS-440
L3	6150003820	COIL	LS-440
L4	6150003820	COIL	LS-440
L7	6200002410	S.COIL	NL 252018T-056J
L8	6200004700	S.COIL	MLR1608M R10K-T
L9	6200003320	S.COIL	NL 322522T-3R3J-3
L10	6130002370	S.COIL	LB-258
L11	6200003090	S.COIL	NL 322522T-2R7J-3
L12	6200003100	S.COIL	NL 322522T-3R9J-3
L13	6130002360	S.COIL	LB-257
L14	6200003090	S.COIL	NL 322522T-2R7J-3
L15	6200004700	S.COIL	MLR1608M R10K-T
L16	6200004700	S.COIL	MLR1608M R10K-T
L17	6200002430	S.COIL	NL 252018T-082J
L18	6200002430	S.COIL	NL 252018T-082J
L19	6200002600	S.COIL	NL 252018T-047J
L20	6200002600	S.COIL	NL 252018T-047J
L21	6110001600	COIL	LA-243
L22	6170000230	COIL	LW-25
L23	6110001130	COIL	LA-149
L24	6110001600	COIL	LA-243
L25	6110001670	COIL	LA-253
L26	6110001600	COIL	LA-243
L27	6110001580	COIL	LA-238
L30	6200004600	S.COIL	MLF1608D R15K-T
L31	6200003960	S.COIL	MLF1608A 1R0K-T
L32	6200003960	S.COIL	MLF1608A 1R0K-T
L33	6200003640	S.COIL	MLF1608E 100K-T
L34	6200009520	S.COIL	LQS33N 1R0G04
R1	7030003270	S.RESISTOR	ERJ3GEYJ 390 V (39 Ω)
R2	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R3	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R4	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R5	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R6	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R7	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R8	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R9	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R10	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R11	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R12	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R16	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R18	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R19	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R20	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R21	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R22	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R23	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R25	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R26	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R27	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R28	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R29	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R30	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R31	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R32	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R33	7310003590	S.TRIMMER	EVM-1XSX50 B24 (203)
R35	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R36	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R37	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R38	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R39	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R40	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R41	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R42	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R43	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R44	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R45	7410000950	S.ARRAY	EXB-V8V 102JV
R55	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R56	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R57	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R58	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R59	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R60	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R61	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R62	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R63	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R64	7030003270	S.RESISTOR	ERJ3GEYJ 390 V (39 Ω)
R65	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R66	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R67	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R68	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R69	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R70	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R71	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R72	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R73	7030004700	S.RESISTOR	MCR18EZJH 10 Ω (100)
R74	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R75	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R76	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R77	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R78	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R79	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R80	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R81	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R82	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R83	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R84	7310002670	S.TRIMMER	RV-143 (RH03A3AS2) 471
R85	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R86	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R87	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R88	7030001150	S.RESISTOR	MCR50JZHJ 150 Ω (151)
R90	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R95	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R96	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R97	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R98	7030003550	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R99	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R100	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R101	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R102	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R103	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R104	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R105	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R106	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R107	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R108	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R109	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R110	7310002720	S.TRIMMER	RV-148 (RH03A3AS3X0DA) 472
R111	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R112	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R113	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R114	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R115	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R116	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R117	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R118	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)

S.=Surface mount

**[MAIN UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	
R119	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R120	7030003770	S.RESISTOR	ERJ3GEYJ 564 V (560 kΩ)
R121	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R122	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R123	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R124	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R125	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R126	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R127	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R128	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R129	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R130	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R131	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R132	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R133	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R134	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R135	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R136	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R137	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R140	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R141	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R142	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R143	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R144	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R145	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R147	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R148	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R149	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R150	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R151	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R152	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R153	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R154	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R155	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R156	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R157	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R158	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R159	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R160	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R161	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R162	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R163	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R164	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R165	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R166	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R167	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R168	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R169	7510001150	S.THERMISTOR	NTCCM1608 4BH 103KC
R170	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R171	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R172	7310002600	S.TRIMMER	RV-110 (RH03A3AS4X0AA) 473
R173	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R174	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R175	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R176	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R177	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R178	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R179	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R180	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R181	7030000100	S.RESISTOR	MCR10EZHZ 4.7 Ω (4R7)
R182	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R183	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R184	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R185	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R186	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R187	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R188	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R189	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R190	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R191	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R192	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R193	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R194	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R199	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R200	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R201	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R202	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R203	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R204	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R205	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R208	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R209	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)

**[MAIN UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	
R210	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R211	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R212	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R218	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R219	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R220	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R221	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R222	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R223	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R224	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R225	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R226	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R227	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R228	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R229	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R230	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R231	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R233	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R234	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R235	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R236	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R237	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R238	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R239	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R240	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R241	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R242	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R246	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R247	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R248	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R249	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R250	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R251	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R252	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R253	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R254	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R255	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R256	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R257	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R258	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R259	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R260	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R261	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R262	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R263	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R264	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R265	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R266	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R267	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R268	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R270	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R276	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R277	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R278	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R280	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R281	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R283	7510001050	S.THERMISTOR	NTCCM1608 4LH 333KC-T
R284	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R285	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R286	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R287	7030004050	S.RESISTOR	ERJ3GEYJ 1R0 V (1 Ω)
R288	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R289	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R290	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R291	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R292	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R293	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R294	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R295	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R296	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R297	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R298	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R299	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R300	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R301	7030000320	S.RESISTOR	MCR10EZHZ 330 Ω (331)
R302	7030000320	S.RESISTOR	MCR10EZHZ 330 Ω (331)
R303	7030000320	S.RESISTOR	MCR10EZHZ 330 Ω (331)
R304	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)

S.=Surface mount

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION
C1	4030009510	S.CERAMIC C1608 CH 1H 010B-T-A
C2	4030007010	S.CERAMIC C1608 CH 1H 100D-T-A
C3	4030009570	S.CERAMIC C1608 CH 1H 0R3B-T-A
C4	4030007030	S.CERAMIC C1608 CH 1H 150J-T-A
C5	4030009520	S.CERAMIC C1608 CH 1H 020B-T-A
C6	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C7	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C8	4030006850	S.CERAMIC C1608 JB 1H 471K-T-A
C9	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C11	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C12	4030006850	S.CERAMIC C1608 JB 1H 471K-T-A
C13	4030009540	S.CERAMIC C1608 CH 1H 1R5B-T-A
C14	4030007030	S.CERAMIC C1608 CH 1H 150J-T-A
C15	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C16	4030009530	S.CERAMIC C1608 CH 1H 030B-T-A
C17	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C18	4030007030	S.CERAMIC C1608 CH 1H 150J-T-A
C19	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C20	4030009520	S.CERAMIC C1608 CH 1H 020B-T-A
C21	4030009500	S.CERAMIC C1608 CH 1H 0R5B-T-A
C22	4030009520	S.CERAMIC C1608 CH 1H 020B-T-A
C23	4030009520	S.CERAMIC C1608 CH 1H 020B-T-A
C24	4030007030	S.CERAMIC C1608 CH 1H 150J-T-A
C25	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C26	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C27	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C28	4030007010	S.CERAMIC C1608 CH 1H 100D-T-A
C31	4030007090	S.CERAMIC C1608 CH 1H 470J-T-A
C32	4030008880	S.CERAMIC C1608 JB 1C 223K-T-A
C33	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C34	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C36	4030011770	S.CERAMIC C1608 CH 1H 060B-T-A
C38	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C39	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C40	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C42	4030008880	S.CERAMIC C1608 JB 1C 223K-T-A
C43	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C45	4030007080	S.CERAMIC C1608 CH 1H 390J-T-A
C46	4030007080	S.CERAMIC C1608 CH 1H 390J-T-A
C47	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C48	4030011810	S.CERAMIC C1608 JB 1A 224K-T-N
C49	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C50	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C51	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C52	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C53	4030007130	S.CERAMIC C1608 CH 1H 101J-T-A
C54	4030007090	S.CERAMIC C1608 CH 1H 470J-T-A
C55	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C56	4510004630	S.ELECTROLYTIC ECEV1CA100SR
C57	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C58	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C59	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C60	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C62	4030012600	S.CERAMIC C2012 JB 1A 105M-T-A
C63	4030007170	S.CERAMIC C1608 CH 1H 221J-T-A
C64	4030007170	S.CERAMIC C1608 CH 1H 221J-T-A
C65	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C66	4030009920	S.CERAMIC C1608 CH 1H 050B-T-A
C67	4030009990	S.CERAMIC C1608 CH 1H 200J-T-A
C68	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C69	4030007040	S.CERAMIC C1608 CH 1H 180J-T-A
C70	4610002150	S.TRIMMER CTZ3S-10A-W1-AF
C71	4030007010	S.CERAMIC C1608 CH 1H 100D-T-A
C72	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C74	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C77	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C79	4030008880	S.CERAMIC C1608 JB 1C 223K-T-A
C81	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C96	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C97	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C98	4030007020	S.CERAMIC C1608 CH 1H 120J-T-A
C99	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C100	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C101	4030007020	S.CERAMIC C1608 CH 1H 120J-T-A
C102	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C103	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C104	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C105	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C106	4030007090	S.CERAMIC C1608 CH 1H 470J-T-A
C107	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C108	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION
C109	4030007040	S.CERAMIC C1608 CH 1H 180J-T-A
C110	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C111	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C112	4030009510	S.CERAMIC C1608 CH 1H 010B-T-A
C113	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C114	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C115	4550002830	S.TANTALUM TESVD2 1V 685M-12R
C116	4030007050	S.CERAMIC C1608 CH 1H 220J-T-A
C117	4030007040	S.CERAMIC C1608 CH 1H 180J-T-A
C118	4030007080	S.CERAMIC C1608 CH 1H 390J-T-A
C119	4030007040	S.CERAMIC C1608 CH 1H 180J-T-A
C120	4510006240	S.ELECTROLYTIC ECEV1CA221P
C123	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C124	4510004440	S.ELECTROLYTIC ECEV1HA010SR
C125	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C126	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C127	4030011290	S.CERAMIC GRM42-6 CH 240J 500PT
C128	4030011170	S.CERAMIC GRM42-6 CH 180J 500PT
C129	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C130	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C131	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C132	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C133	4030011260	S.CERAMIC GRM42-6 W5R 102K 500PT
C134	4030011100	S.CERAMIC GRM42-6 CH 080D 500PT
C136	4030011140	S.CERAMIC GRM42-6 CH 120J 500PT
C137	4030011070	S.CERAMIC GRM42-6 CH 050C 500PT
C138	4030011190	S.CERAMIC GRM42-6 CH 270J 500PT
C139	4030011060	S.CERAMIC GRM42-6 CH 040C 500PT
C141	4030011210	S.CERAMIC GRM42-6 CH 330J 500PT
C142	4030011190	S.CERAMIC GRM42-6 CH 270J 500PT
C143	4030011730	S.CERAMIC GRM42-6 CH 101J 500PT
C148	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C149	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C150	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C151	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C152	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C153	4030008850	S.CERAMIC C1608 JB 1C 123K-T-A
C154	4030008900	S.CERAMIC C1608 JB 1C 333K-T-A
C155	4030008900	S.CERAMIC C1608 JB 1C 333K-T-A
C156	4030006850	S.CERAMIC C1608 JB 1H 471K-T-A
C157	4030008920	S.CERAMIC C1608 JB 1C 473K-T-A
C158	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C159	4030011810	S.CERAMIC C1608 JB 1A 224K-T-N
C160	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C161	4340000020	S.MYLAR ECWJ 1C 333JB5
C162	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C163	4030006870	S.CERAMIC C1608 JB 1H 222K-T-A
C164	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C165	4030006850	S.CERAMIC C1608 JB 1H 471K-T-A
C166	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C167	4030006860	S.CERAMIC C1608 JB 1H 102K-T-A
C171	4510004630	S.ELECTROLYTIC ECEV1CA100SR
C172	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C173	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C174	4510004630	S.ELECTROLYTIC ECEV1CA100SR
C175	4510004630	S.ELECTROLYTIC ECEV1CA100SR
C176	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C177	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C178	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C179	4510004590	ELECTROLYTIC 16 MV 470 HC
C182	4550006130	S.TANTALUM ECST1VY224R
C183	4030008890	S.CERAMIC C1608 JB 1C 273K-T-A
C184	4030008890	S.CERAMIC C1608 JB 1C 273K-T-A
C185	4030006870	S.CERAMIC C1608 JB 1H 222K-T-A
C186	4030009490	S.CERAMIC C1608 JB 1H 821K-T-A
C188	4510004630	S.ELECTROLYTIC ECEV1CA100SR
C189	4030012600	S.CERAMIC C2012 JB 1A 105M-T-A
C190	4030010770	S.CERAMIC C1608 JB 1H 392K-T-A
C191	4030010770	S.CERAMIC C1608 JB 1H 392K-T-A
C192	4030012600	S.CERAMIC C2012 JB 1A 105M-T-A
C193	4030012600	S.CERAMIC C2012 JB 1A 105M-T-A
C194	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C195	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C196	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C197	4030006900	S.CERAMIC C1608 JB 1E 103K-T-A
C198	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C199	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C200	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C202	4030007090	S.CERAMIC C1608 CH 1H 470J-T-A
C203	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C204	4030011600	S.CERAMIC C1608 JB 1C 104KT-N
C205	4030011600	S.CERAMIC C1608 JB 1C 104KT-N

S.=Surface mount

**[MAIN UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	
C206	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C207	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C208	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C209	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C210	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C212	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C213	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C214	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C215	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C217	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C218	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C219	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C222	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C223	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C224	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C225	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C226	4030010770	S.CERAMIC	C1608 JB 1H 392K-T-A
C227	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C228	4030008470	S.CERAMIC	C1608 JB 1H 272K-T-A
C229	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C231	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C232	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C233	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C234	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C235	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C236	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C238	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C239	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C240	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C241	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C242	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C243	4510004590	ELECTROLYTIC	16 MV 470 HC
C244	4510004590	ELECTROLYTIC	16 MV 470 HC
C245	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C246	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C248	4030008890	S.CERAMIC	C1608 JB 1C 273K-T-A
C249	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C250	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C251	4030009650	S.CERAMIC	C1608 CH 1H 240J-T-A
C252	4030009650	S.CERAMIC	C1608 CH 1H 240J-T-A
C253	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C254	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C255	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C256	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C257	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C258	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C259	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C262	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C263	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C274	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C275	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C276	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C278	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C279	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C282	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C283	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C284	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C285	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C286	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C287	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C288	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C289	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C290	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C291	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C292	4550006130	S.TANTALUM	ECST1VY224R
C293	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C294	4550006560	S.TANTALUM	ECST1CY225R
C295	4550006810	S.TANTALUM	ECST1VY473R
C296	4550006810	S.TANTALUM	ECST1VY473R
C297	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C298	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C299	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C300	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C301	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C302	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C303	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C304	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C305	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C306	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C307	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C308	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C309	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N

**[MAIN UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	
C312	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C314	4550006700	S.TANTALUM	ECST1AY106R
C315	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C316	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C317	4550006700	S.TANTALUM	ECST1AY106R
C318	4550006700	S.TANTALUM	ECST1AY106R
C319	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C321	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C326	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C327	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C328	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C330	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C331	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C332	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C333	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C334	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C335	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C337	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
RL1	6330001620	RELAY	FTR-F3AA012E
RL2	6330001620	RELAY	FTR-F3AA012E
J1	6510021300	S.CONNECTOR	52365-1091
J2	6510018960	S.CONNECTOR	B2B-PH-SM3-TB
J3	6510022020	S.CONNECTOR	14FLT-SM1-TB
J4	6510022020	S.CONNECTOR	14FLT-SM1-TB
J6	6510016430	S.CONNECTOR	53307-1491
J7	6510018920	S.CONNECTOR	B8B-PH-SM3-TB
J8	6510018960	S.CONNECTOR	B2B-PH-SM3-TB
W1	8900010210	CABLE	OPC-1026
W5	7030003860	S.JUMPER	ERJ3GE JPW V
W6	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910053352	PCB	B 5545B

**[PWR-CORD UNIT]**

REF NO.	ORDER NO.	DESCRIPTION	
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6510003130	CONNECTOR	SB4P-HVQ-22
EP1	0910053340	PCB	B 5559

S.=Surface mount

## 6-2 HM-126

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R1	7010006890	RESISTOR	R20J 12 kΩ
R2	7010006880	RESISTOR	R20J 6.8 kΩ
R3	7010006900	RESISTOR	R20J 15 kΩ
R4	7010006910	RESISTOR	R20J 33 kΩ
R5	7070000860	RESISTOR	ERG2SJ 150
C1	4010000460	CERAMIC	DD104 B 471K 50V
J1	6510003550	CONNECTOR	S07B-EH-S
MC1	7700001600	MICROPHONE	KUC2123-030245
S1	2260000980	SWITCH	SKHHL014A
S2	2260000080	SWITCH	SKHHAM024A
S3	2260000080	SWITCH	SKHHAM024A
S4	2260000080	SWITCH	SKHHAM024A
SP1	2510000930	SPEAKER	SU-36W08040C
EP1	0910052553	PCB	B 5431C
EP2	9029701901	TUBE	IRRAX 0.7 (d) L=4 mm

## 6-3 HM-127

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1140009280	S.IC	μPD78F9418AGK-9EU
IC2	1110001810	S.IC	TA7368F (TP1)
IC3	1110004490	S.IC	M62429FP 700C
IC4	1120002830	S.IC	NJM2125F-TE1
IC5	1180000420	S.IC	TA78L05F (TE12R)
IC6	1180001250	S.IC	TA7808F (TE16L)
IC7	1110004710	S.IC	S-80928ANMP-DDR-T2
IC8	1130007420	S.IC	TC7W14FU (TE12L)
IC9	1130006220	S.IC	TC4W53FU (TE12L)
Q1	1560000810	S.FET	2SK1069-4-TL
Q2	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q3	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
Q4	1590001390	S.FET	2SJ144-Y (TE85R)
Q5	1590000430	S.TRANSISTOR	DTC144EUA T106
Q6	1590000980	S.TRANSISTOR	DTB123EK T147
Q9	1560000810	S.FET	2SK1069-4-TL
Q10	1530002060	S.TRANSISTOR	2SC4081 T107 R
Q11	1510000510	S.TRANSISTOR	2SA1576A T106R
Q12	1530002850	S.TRANSISTOR	2SC4116-BL (TE85R)
D1	1750000130	S.DIODE	DA204U T107
D2	1160000060	S.DIODE	DAN202U T107
D3	1750000550	S.DIODE	1SS355 TE-17
X1	6060000750	S.CERAMIC	CSTCC4.91MG
R1	7030000270	S.RESISTOR	MCR10EZHZJ 120 Ω (121)
R2	7030000270	S.RESISTOR	MCR10EZHZJ 120 Ω (121)
R3	7030000280	S.RESISTOR	MCR10EZHZJ 150 Ω (151)
R6	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R7	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R8	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R11	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R12	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R13	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R14	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R15	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R16	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R17	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R20	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R21	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R22	7030004120	S.RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R23	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R24	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R25	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R26	7510001150	S.THERMISTOR	NTCCM1608 4BH 103KC
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R28	7030004120	S.RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R29	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R30	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R31	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R32	7030004120	S.RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R33	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R34	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R35	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R36	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R37	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R38	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R39	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R40	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R41	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R42	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R43	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R44	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R45	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R46	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R47	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R50	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R51	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R52	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R53	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)

S.=Surface mount

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
R54	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 k $\Omega$ )
R55	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 k $\Omega$ )
R56	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 k $\Omega$ )
R57	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 k $\Omega$ )
R58	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 $\Omega$ )
R59	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 k $\Omega$ )
R60	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k $\Omega$ )
R61	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 k $\Omega$ )
R62	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 k $\Omega$ )
R63	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k $\Omega$ )
R64	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 k $\Omega$ )
R65	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 M $\Omega$ )
R66	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 M $\Omega$ )
R67	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 M $\Omega$ )
R68	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 $\Omega$ )
R69	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 $\Omega$ )
R70	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 $\Omega$ )
R75	7030000180	S.RESISTOR	MCR10EZHJ 22 $\Omega$ (220)
R76	7030000180	S.RESISTOR	MCR10EZHJ 22 $\Omega$ (220)
R77	7030000180	S.RESISTOR	MCR10EZHJ 22 $\Omega$ (220)
C1	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C3	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C4	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C5	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C6	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C7	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C9	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C10	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C11	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C12	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C13	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C14	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C15	4510006220	S.ELECTROLYTIC	ECEV1CA101UP
C16	4510006220	S.ELECTROLYTIC	ECEV1CA101UP
C17	4510006220	S.ELECTROLYTIC	ECEV1CA101UP
C18	4510006250	S.ELECTROLYTIC	ECEV1CA331UP
C22	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C23	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C24	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C25	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C26	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C27	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C28	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C29	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C30	4510004630	S.ELECTROLYTIC	ECEV1CA100SR
C31	4030011810	S.CERAMIC	C1608 JB 1A 224K-T-N
C32	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C33	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
C34	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C35	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C36	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C37	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C38	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C39	4510006220	S.ELECTROLYTIC	ECEV1CA101UP
C40	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C41	4510006250	S.ELECTROLYTIC	ECEV1CA331UP
C42	4030008890	S.CERAMIC	C1608 JB 1C 273K-T-A
C44	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C45	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C46	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C47	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C50	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C51	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C52	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C53	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C54	4030012600	S.CERAMIC	C2012 JB 1A 105M-T-A
J1	6510019420	S.CONNECTOR	B8B-ZR-SM3-TF
J2	6510021440	S.CONNECTOR	B6B-ZR-SM3-TF
DS1	5030001900	LCD	A0119 (LCD36*28.5)
DS2	5040002660	S.LED	FY1101F-TR (LED)
DS3	5040002660	S.LED	FY1101F-TR (LED)
DS4	5040002310	S.LED	SML-311YTT86
DS5	5040002660	S.LED	FY1101F-TR (LED)
DS6	5040002660	S.LED	FY1101F-TR (LED)
DS7	5040002310	S.LED	SML-311YTT86
DS8	5040002310	S.LED	SML-311YTT86

## [MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
DS9	5040002310	S.LED	SML-311YTT86
DS10	5040002310	S.LED	SML-311YTT86
MC1	7700002480	MICROPHONE	SKB-2746 LPC
S1	2260002140	S.SWITCH	SKQLLC
S2	2260002140	S.SWITCH	SKQLLC
S3	2260002140	S.SWITCH	SKQLLC
S4	2260002140	S.SWITCH	SKQLLC
EP1	0910053142	PCB	B 5526B
EP2	8930051120	LCD CONTACT	SRCN-2320-SP-N-W

S.=Surface mount

## SECTION 7 MECHANICAL PARTS

### 7-1 IC-M502

#### [CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6510004880	Antenna connector MR-DS-E 01	1
W1	8900009720	Cable OPC-943	1
W5	8900009850	Cable OPC-969	1
W6	8900009850	Cable OPC-969	1
EP1	6950000420	Cover LTD-4/8-IC	1
MP1	8210017191	2345 front panel-1 assembly [BLACK]	1
	8210017172	2345 front panel (A)-1 assembly [WHITE]	1
MP2	8210017150	2345 rear panel assembly [BLACK]	1
	8210017160	2345 rear panel (A) assembly [WHITE]	1
MP3	8410002400	2345 A-heatsink	1
MP5	8930052060	2345 F-packing	1
MP6	8930052050	2345 R-packing	1
MP7	8610010851	Knob N279-1 [BLACK]	2
	8610010891	Knob N279 (A)-1 [WHITE]	2
MP8	8610010861	Knob N280-1 [BLACK]	1
	8610010901	Knob N280 (A)-1 [WHITE]	1
MP9	8930051970	2345 A-bush plate	1
MP12	8510013460	2345 module cover assembly	1
MP18	8110007180	2345 shield cover	1
MP21	8930052280	O-ring (AC)	3
MP22	8930052290	O-ring (AD)	6
MP27	8930034300	1542 ANT seal	1
MP29	8930049320	2288 VENT. sheet	1
MP30	8810008660	Screw PH BT M3 × 8 NI-ZU	1
MP31	8810008660	Screw PH BT M3 × 8 NI-ZU	2
MP33	8810008660	Screw PH BT M3 × 8 NI-ZU	2
MP34	8810008660	Screw PH BT M3 × 8 NI-ZU	5
MP35	8810008660	Screw PH BT M3 × 8 NI-ZU	4
MP36	8810008660	Screw PH BT M3 × 8 NI-ZU	5
MP37	8810004540	Screw M3 × 8 SUS	2
MP38	8810004540	Screw M3 × 8 SUS	6
MP40	8850000690	Flat washer M3 (3×7×0.5) SUS	6
MP41	8810006050	Icom screw E 7	6
MP43	8930052430	2345 A-IC clip	1
MP44	8930052440	2345 B-IC clip	1
MP45	8930053030	2345 earth plate	1
MP46	8930053030	2345 earth plate	1
MP47	8010004340	Edging rubber FX452	1

#### [CTRL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510022440	Connector LTW-8MP-C	1

#### [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8510013150	2345 VCO case	1

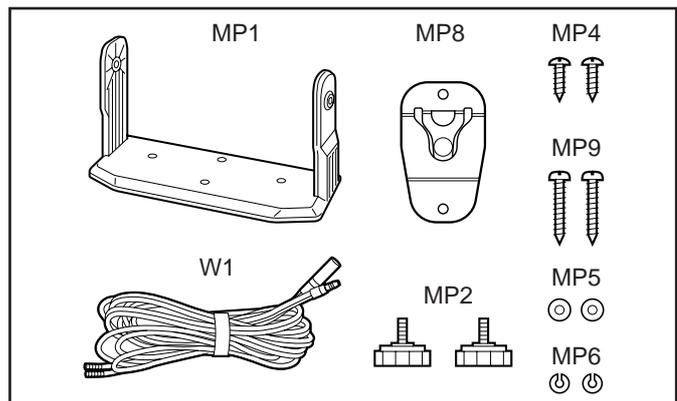
#### [LOGIC UNIT]

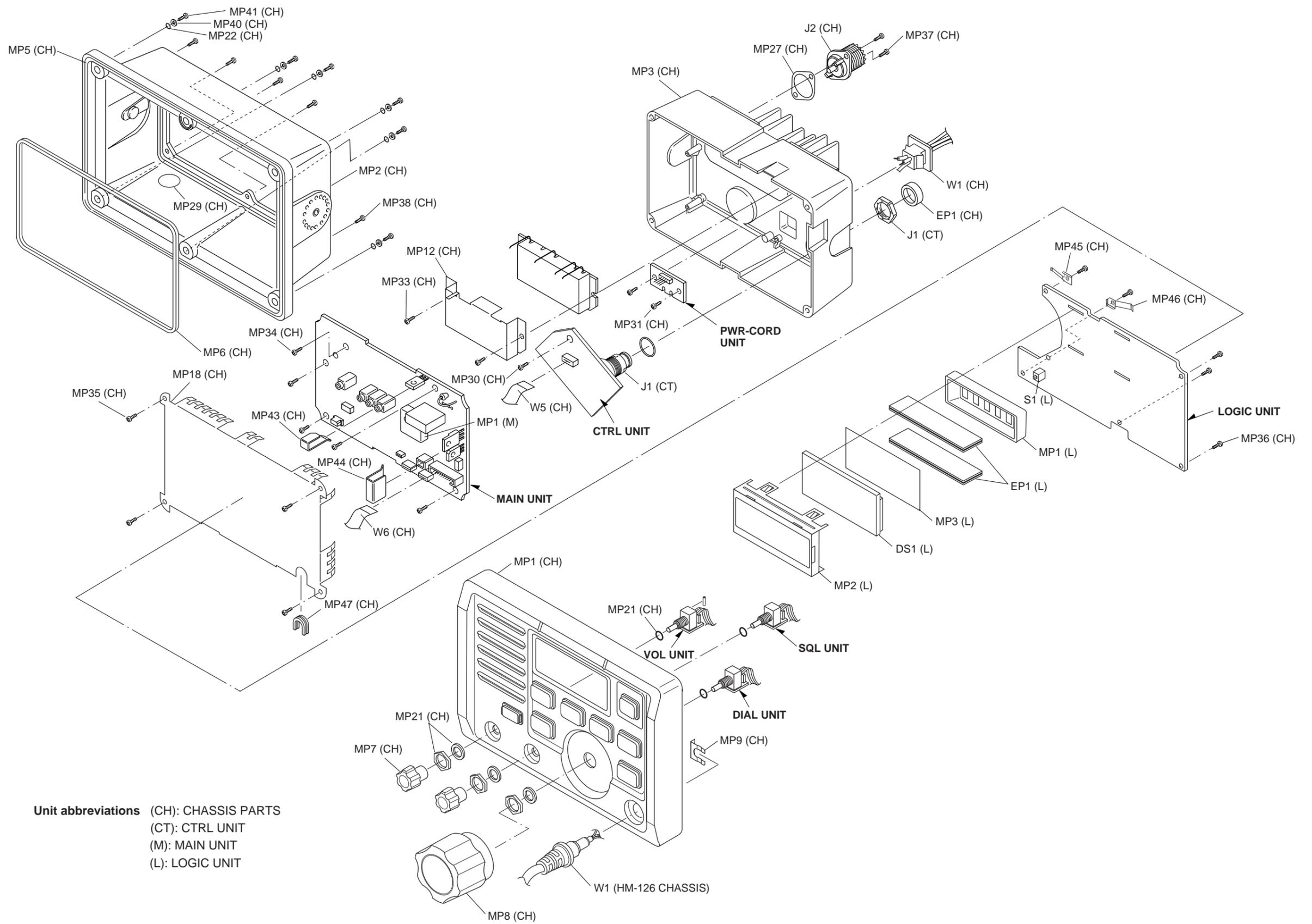
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
S1	2230000250	Switch SPPH22014A	1
DS1	5030001880	LCD TSD0393-UFFDCW	1
EP1	8930052590	LCD contact SRCN-2345-SP-N-W	2
MP1	8210016830	2345 reflector	1
MP2	8930052000	2345 LCD holder	1
MP3	8930052630	2345 LCD filter	1

#### [UNPACKING]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W1	8900009751	Cable OPC-946A	1
MP1	8010018151	2345 mobile bracket-1 [BLACK]	1
	8010018241	2345 mobile bracket (A)-1 [WHITE]	1
MP2	8610010560	2040 knob bolt [BLACK]	2
	8610010590	2040 knob bolt (A) [WHITE]	2
MP4	8810001490	Screw PH A M5 × 20 SUS	2
MP5	8850000180	Flat washer M5 SUS	2
MP6	8850000500	Spring washer M5 SUS	2
MP8	8950005110	2289 MIC hanger	1
MP9	8810004700	Screw PH A M3 × 16 SUS	2

**Screw abbreviations** BT: Self-tapping PH: Pan head  
 NI: Nickel SUS: Stainless  
 NI-ZU: Nickel-zinc ZK: Black





## 7-2 HM-126

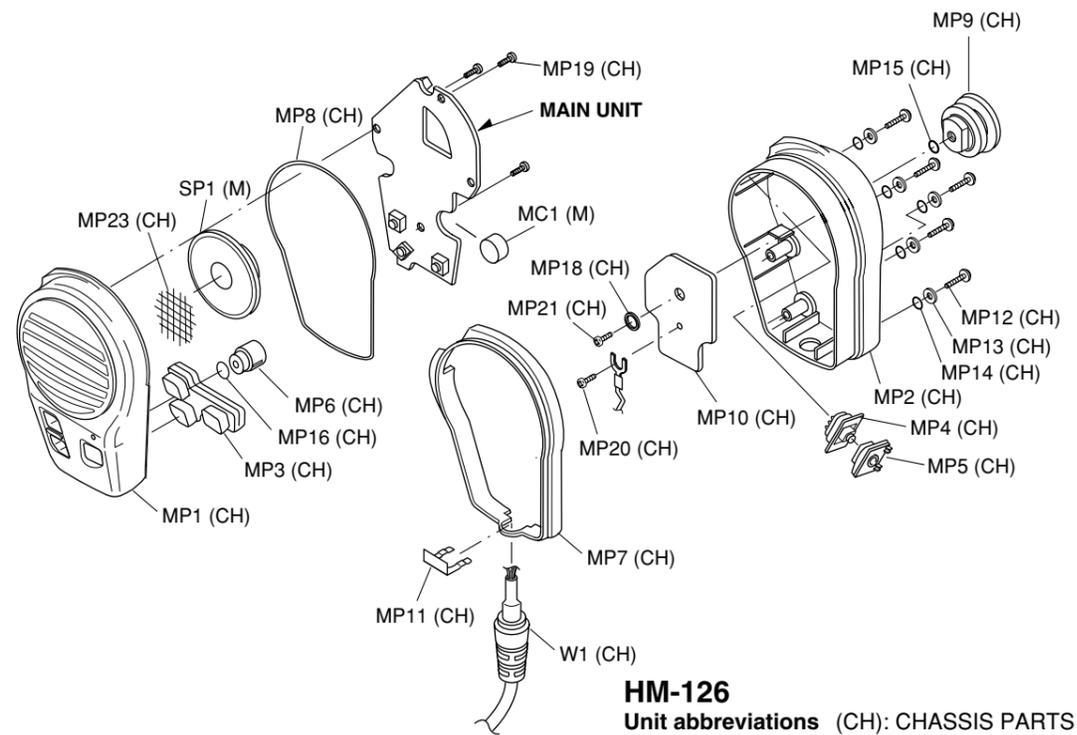
### [CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W1	8900009770	Cable OPC-948 [BLACK]	1
	8900009780	Cable OPC-949 [WHITE]	1
MP1	8210016861	2352 front panel-1 [BLACK]	1
	8210016961	2352 front panel (A)-1 [WHITE]	1
MP2	8210016850	2352 rear panel [BLACK]	1
	8210017110	2352 rear panel (A) [WHITE]	1
MP3	8930052160	2352 key	1
MP4	8930052150	2352 PTT rubber	1
MP5	8930052140	2352 PTT holder	1
MP6	8930052690	2352 MIC rubber	1
MP7	8930052120	2352 rubber	1
MP8	8930052110	2352 main seal	1
MP9	8610010870	2352 hanger knob	1
MP10	8310048760	2352 R-plate	1
MP11	8310048780	2352 MIC plate	1
MP12	8820001150	2352 screw	5
MP13	8850001850	ICOM washer (Y)	5
MP14	8930052340	O-ring (AE)	5
MP15	8930052350	O-ring (AF)	1
MP16	8930053870	2352 sheet (A)	1
MP17	8930053040	2352 SP net	1
MP18	8850001610	Spring washer M4 SUS	1
MP19	8810009260	Screw PH BT 2 × 6 NI	3
MP20	8810008900	Screw PH M3 × 6 NI	1
MP21	8810009240	Screw M4 × 10 ZK	1
MP23	8930053850	2352 SP rubber	1

### [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MC1	7700002120	Microphone KUC2123-030245	1
SP1	2510001070	Speaker S36G04K-4	1

**Screw abbreviations** BT: Self-Tapping PH: Pan head  
 NI: Nickel SUS: Stainless  
 NI-ZU: Nickel-zinc ZK: Black



### HM-126

**Unit abbreviations** (CH): CHASSIS PARTS  
 (M): MAIN UNIT

## 7-3 HM-127 (OPTIONAL UNIT)

### [CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W3	8900010220	Cable OPC-997 [BLACK]	1
	8900010230	Cable OPC-998 [WHITE]	1
SP1	2510001090	Speaker 036D0801	1
MP1	8210017360	2417 front panel assembly [BLACK]	1
	8210017390	2417 front panel (A) assembly [WHITE]	1
MP3	8930053510	2417 key board	1
MP4	8930053540	2417 PTT rubber	1
MP5	8930053990	2417 PTT sheet	1
MP6	8930053550	2417 PTT holder	1
MP7	8930053520	2417 top key	1
MP8	8930053760	2417 key plate	1
MP10	8930039000	1757 sheet	1
MP11	8810009180	Screw FT BT M2 × 5 NI-ZU	3
MP12	8930053750	2417 plate	1
MP13	8210017250	2417 rear panel [BLACK]	1
	8210017300	2417 rear panel (A) [WHITE]	1
MP14	8310049970	2417 R-plate	1
MP15	8610010980	2417 hanger knob	1
MP16	8930053740	O-ring (AJ)	1
MP17	8810008450	Screw M4 × 8 ZK	1
MP18	8850000490	Spring washer M4 SUS	1
MP19	8930053530	2417 rubber	1
MP20	8820001180	2417 screw 2.6 × 16	6
MP21	8930053730	O-ring (AI)	6

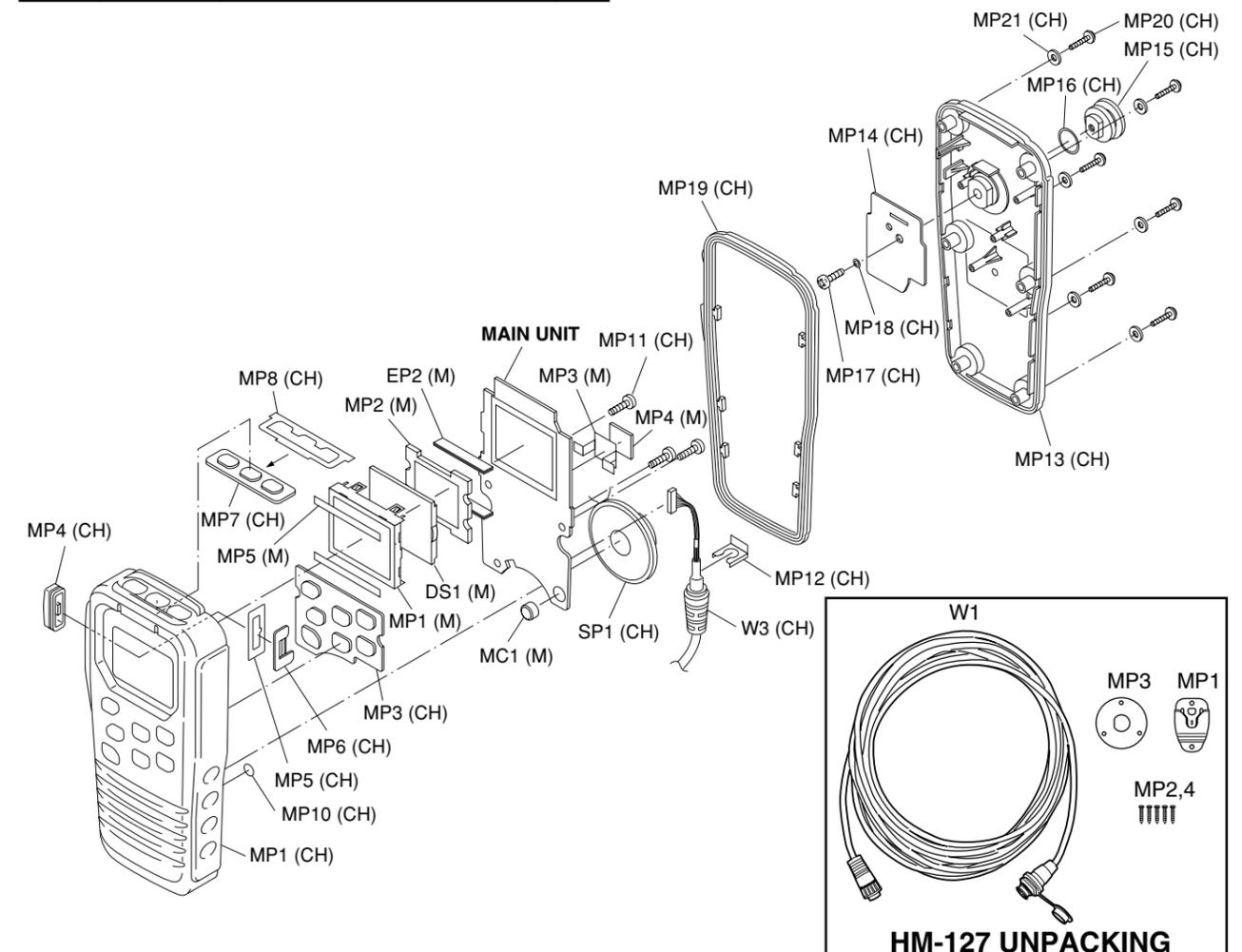
### [MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
DS1	5030001900	LCD A0119 (LCD 36 × 28.5)	1
EP2	8930051120	LCD contact SRCN-2320-SP-N-W	2
MC1	7700002480	Microphone SKB-2746 LPC	1
MP1	8930053780	2417 LCD holder	1
MP2	8210017240	2417 reflector	1
MP3	8310050200	2417 H-plate	1
MP4	8930039610	Thermally sheet (C)	1
MP5	8930054120	Insulate sheet (J)	2

### [UNPACKING]

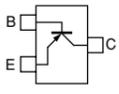
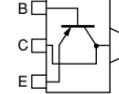
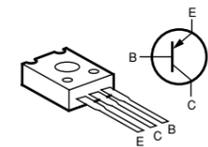
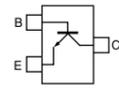
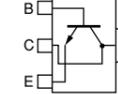
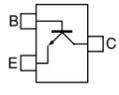
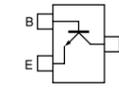
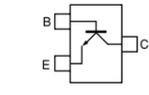
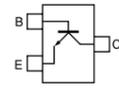
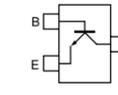
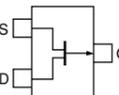
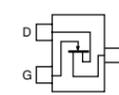
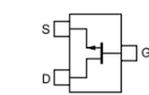
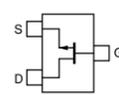
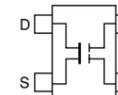
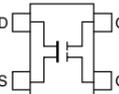
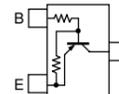
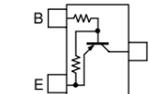
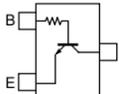
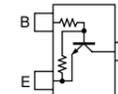
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W1	8900010280	Cable OPC-1000	1
MP1	8950005110	2289 mic hanger	1
MP2	8810004700	Screw PH M3 × 16 SUS	2
MP3	8310050320	2417 C-plate	1
MP4	8810004700	Screw PH M3 × 16 SUS	3

**Screw abbreviations** PH: Pan head FT: Flat head  
 BT: Self-tapping NI-ZU: Nickel-zinc  
 SUS: Stainless ZK: Black

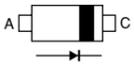
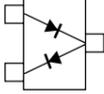
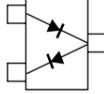
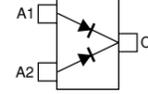
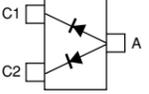
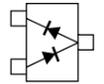
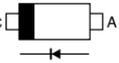
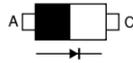
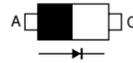
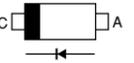
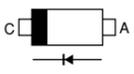
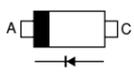


# SECTION 8 SEMI-CONDUCTOR INFORMATION

## • TRANSISTORS AND FET'S

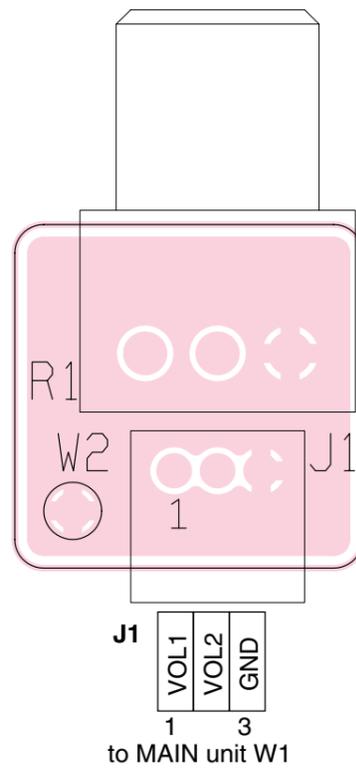
<b>2SA1576A T106R</b> (Symbol: FR) 	<b>2SB1132 T100 R</b> (Symbol: BARB) 	<b>2SB1143 S</b> (Symbol: B1143) 	<b>2SC2714-Y</b> (Symbol: QY) 	<b>2SC2954 T2B</b> (Symbol: QK) 
<b>2SC3326 B</b> (Symbol: CCB) 	<b>2SC3775-3-TB</b> (Symbol: OY3) 	<b>2SC4081 T107 R</b> (Symbol: BR) 	<b>2SC4116 BL</b> (Symbol: LL) 	<b>2SC4215 O</b> (Symbol: QO) 
<b>2SJ144 Y</b> (Symbol: VY) 	<b>2SK210 GR</b> (Symbol: YG) 	<b>2SK880 Y</b> (Symbol: XY) 	<b>2SK1069-4-TL</b> (Symbol: FJ) 	<b>3SK166A-2-T7</b> (Symbol: K) 
<b>3SK292</b> (Symbol: UK) 	<b>DTA144EUA T106</b> (Symbol: 16) 	<b>DTB123EK</b> (Symbol: F12) 	<b>DTC144 TU T107</b> (Symbol: 06) 	<b>DTC144EUA T106</b> (Symbol: 26) 

## • DIODES

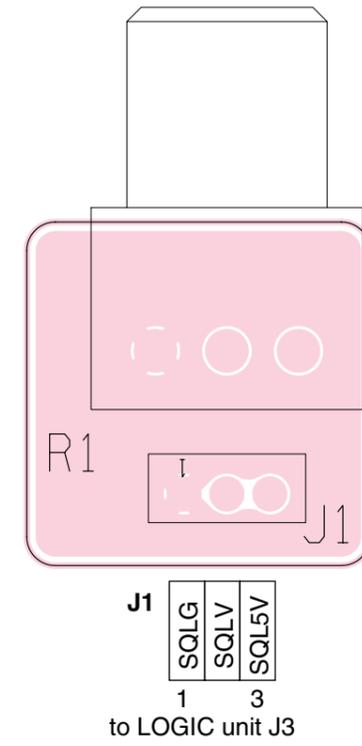
<b>1SS355</b> (Symbol: A) 	<b>1SS375-TL</b> (Symbol: FH) 	<b>DA204 U</b> (Symbol: K) 	<b>DAN202 U</b> (Symbol: N) 	<b>DAP202U</b> (Symbol: P) 
<b>HSM88ASR TR</b> (Symbol: C3) 	<b>HSU88TRF</b> (Symbol: 9) 	<b>MA363 B</b> (Symbol: 6D) 	<b>MA77</b> (Symbol: 4B) 	<b>MA8036 L</b> (Symbol: 3_6) 
<b>MA8043 L</b> (Symbol: 4_3) 	<b>MA8062 M</b> (Symbol: 6-2) 			

## SECTION 9 BOARD LAYOUTS

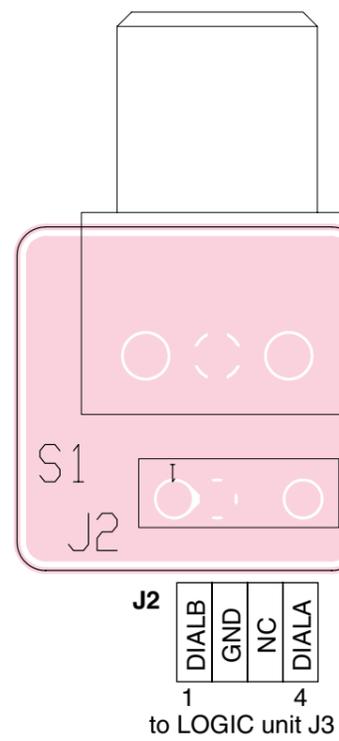
9-1 VOL UNIT



9-3 SQL UNIT

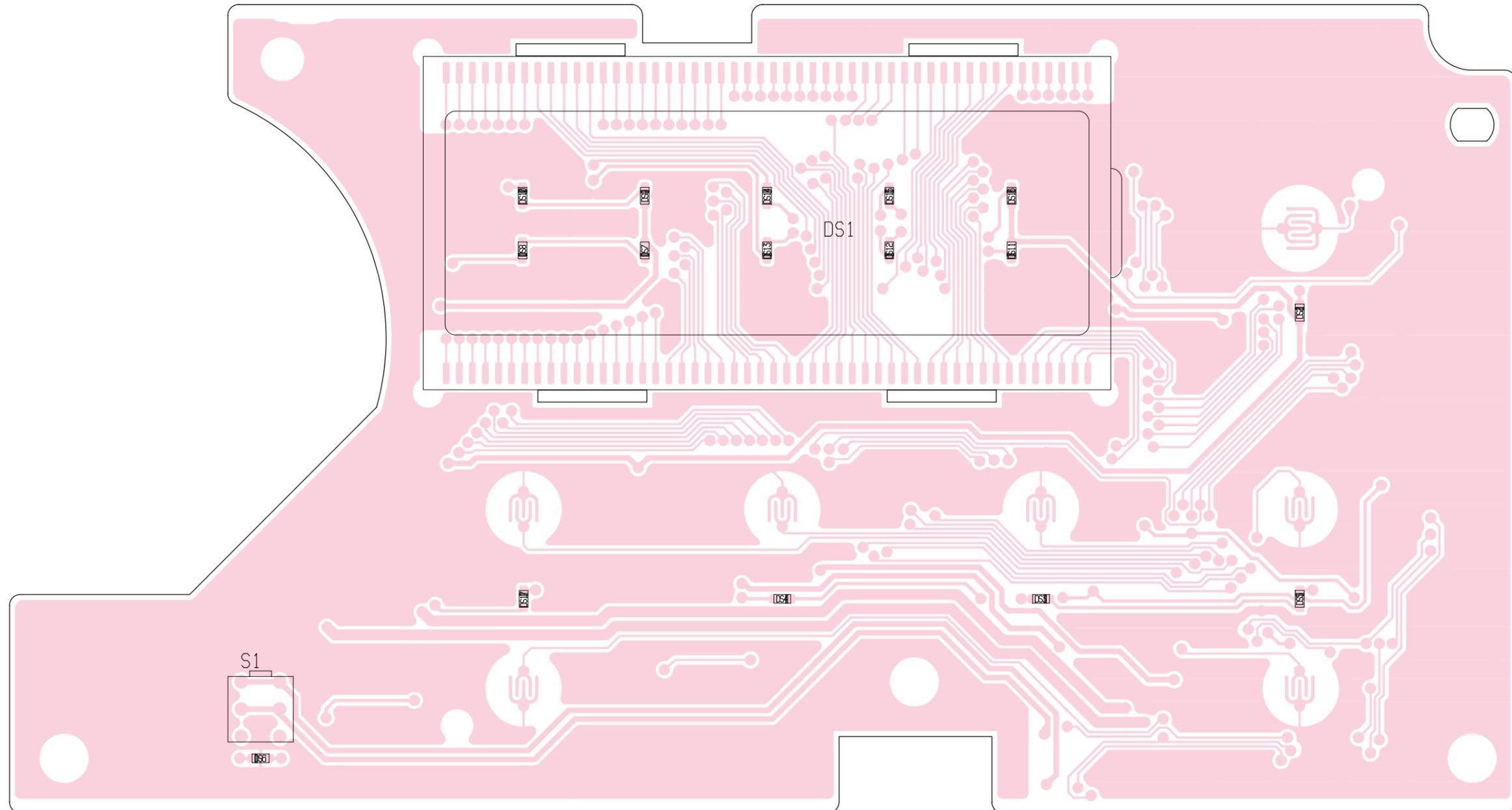


9-2 DIAL UNIT

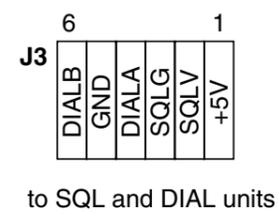
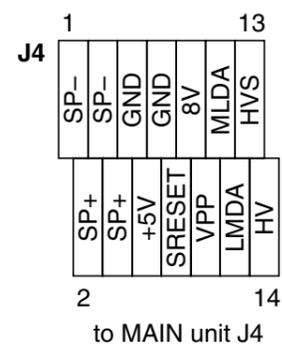
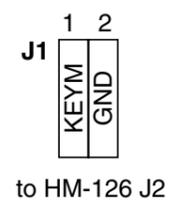
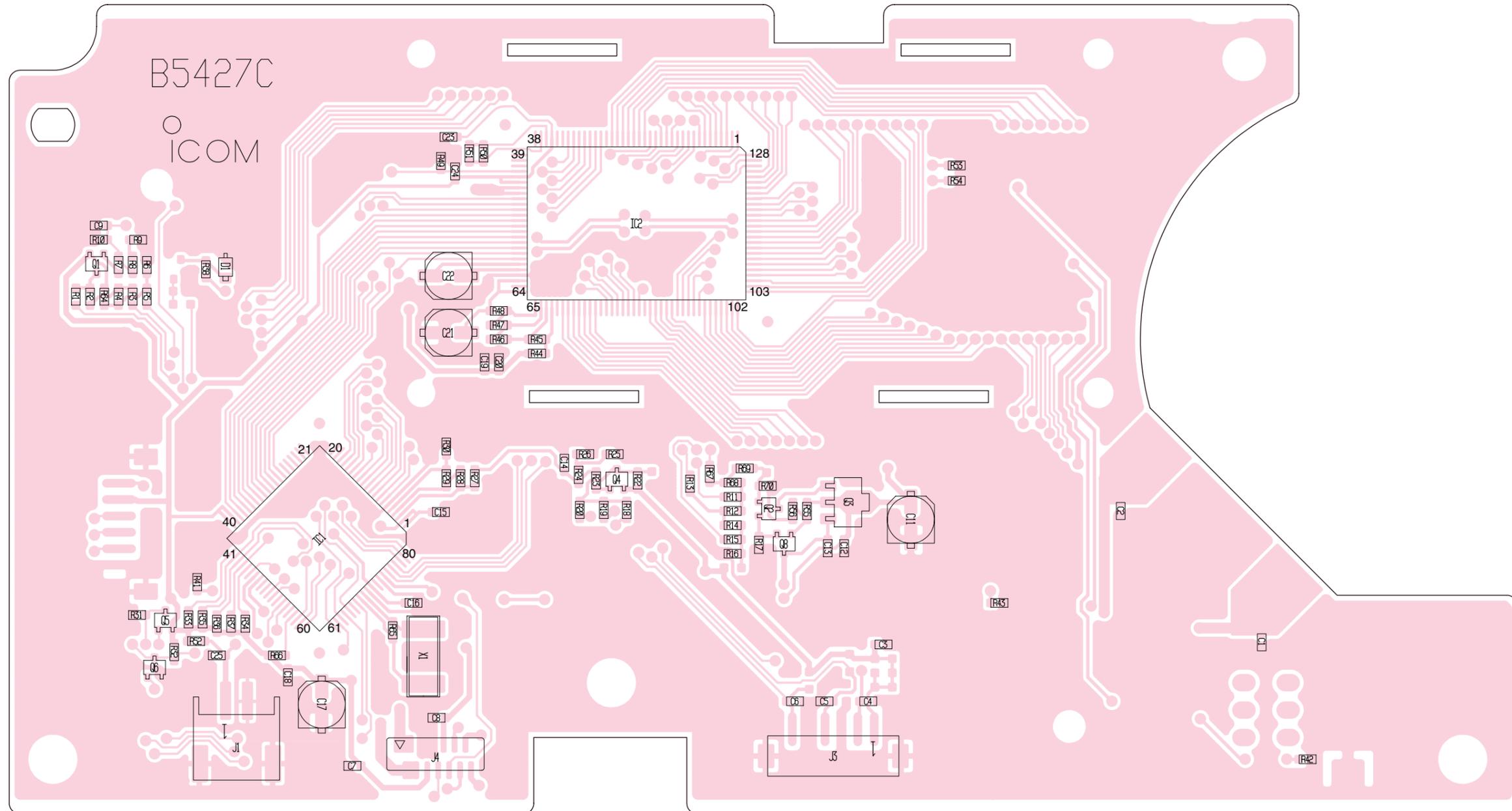


## 9-4 LOGIC UNIT

• TOP VIEW

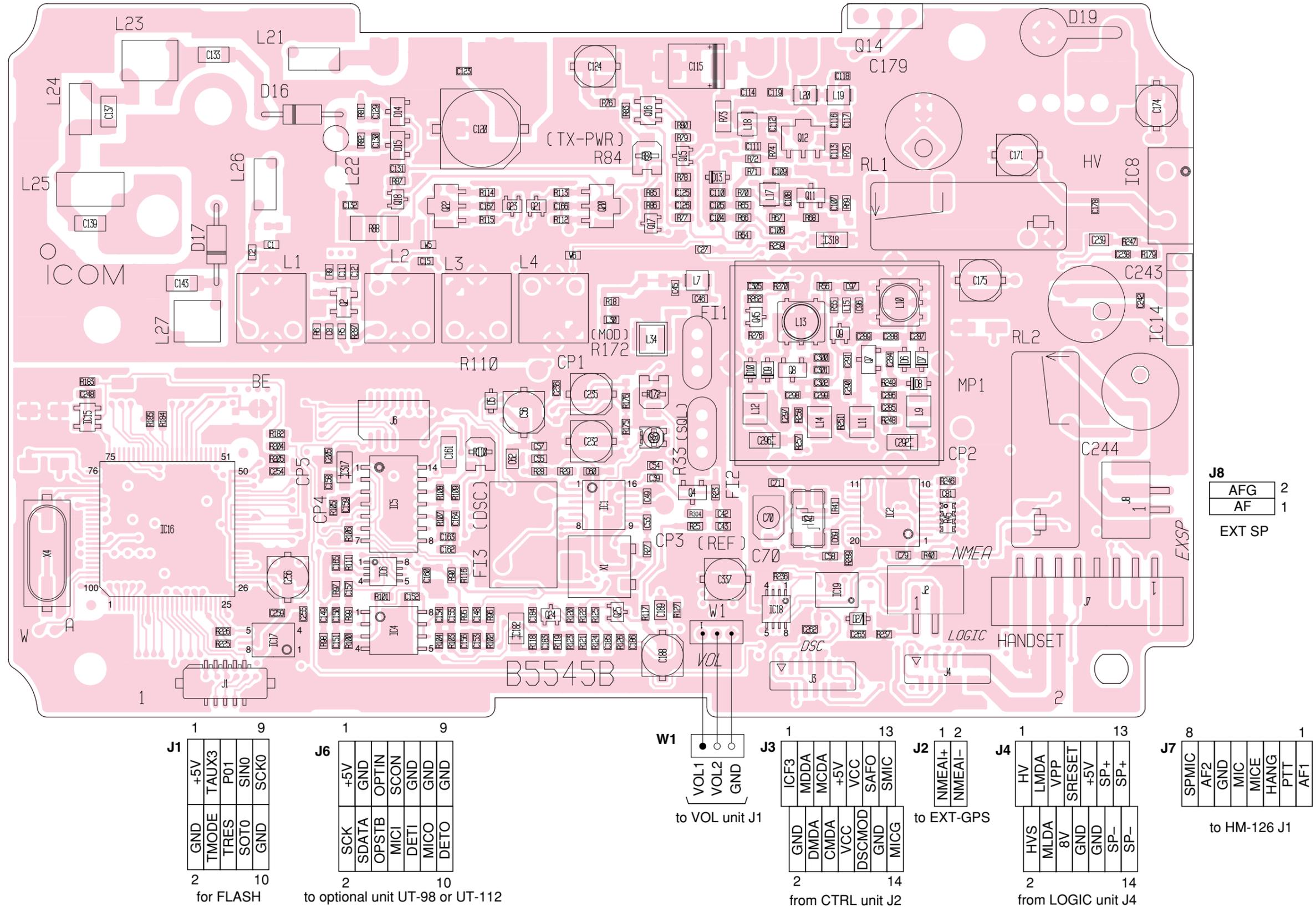


• BOTTOM VIEW



# 9-5 MAIN UNIT

• TOP VIEW



**J1**

1	+5V
2	TMODE
3	TAUX3
4	TRES
5	P01
6	SINO
7	SCK0
8	GND
9	GND
10	GND

for FLASH

**J6**

1	+5V
2	SCK
3	SDATA
4	GND
5	OPSTB
6	OPTIN
7	MIC1
8	SCON
9	DETI
10	GND
11	MICO
12	GND
13	DETO
14	GND

to optional unit UT-98 or UT-112

**W1**

1	VOL1
2	VOL2
3	GND

to VOL unit J1

**J3**

1	ICF3
2	MDDA
3	MCDA
4	MCDA
5	+5V
6	VCC
7	VCC
8	SAFO
9	SMIC
10	GND
11	MICG
12	GND
13	GND
14	GND

from CTRL unit J2

**J2**

1	NMEA+
2	NMEA-

to EXT-GPS

**J4**

1	HV
2	LMDA
3	MLDA
4	VPP
5	8V
6	SRESET
7	GND
8	+5V
9	GND
10	SP+
11	SP+
12	SP-
13	SP-
14	SP-

from LOGIC unit J4

**J7**

1	SPMIC
2	AF2
3	GND
4	MIC
5	MICE
6	HANG
7	PTT
8	AF1

to HM-126 J1

**J8**

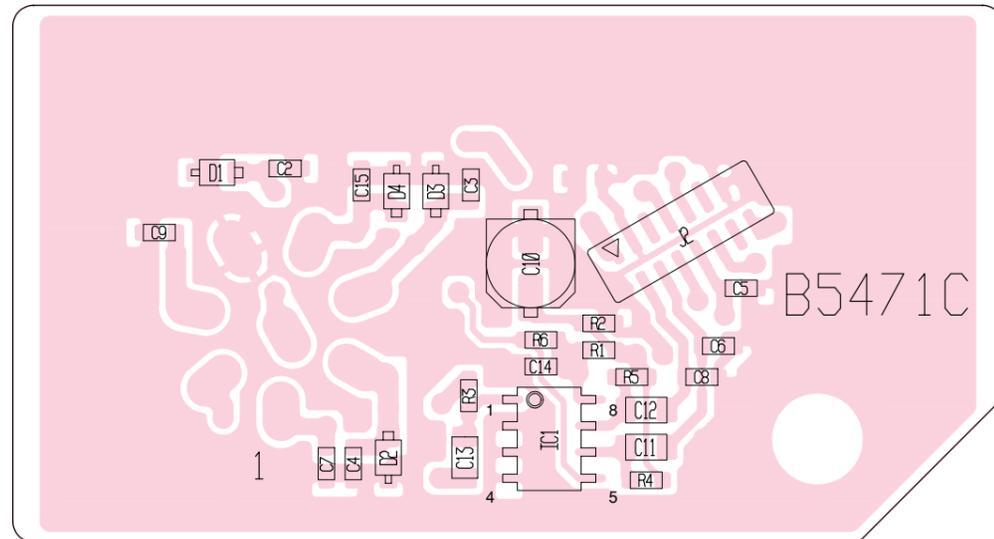
1	AF
2	AFG

EXT SP



### 9-6 CTRL UNIT

• TOP VIEW



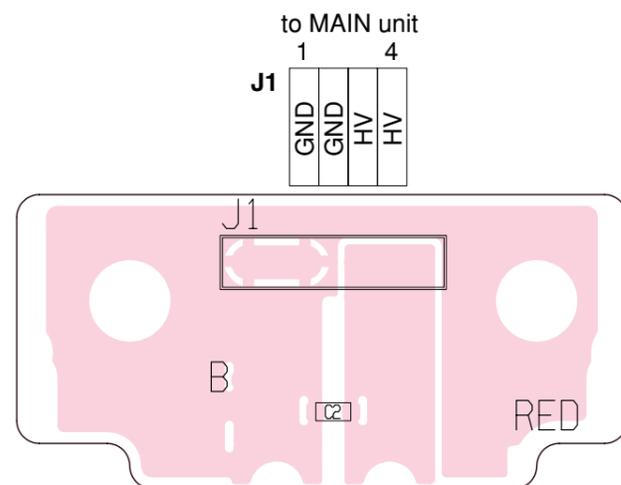
**J2**

14	PWR/ICF3	2
	MDDA	
	MCDA	
	+5V	
	VCC	
	SAFO	
	SMIC	
13	GND	1
	DMDA	
	CMDA	
	GND	
	DSCMOD	
	GND	
	MICG	

to MAIN unit J3

### 9-7 PWR-CORD UNIT

• TOP VIEW



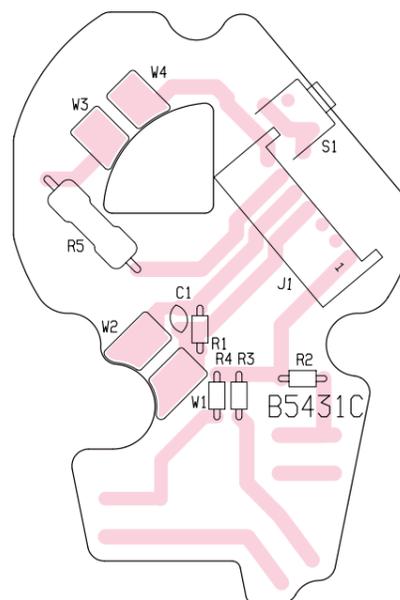
to MAIN unit

**J1**

1	GND	4
	GND	
	HV	
	HV	

### 9-8 HM-126

• TOP VIEW

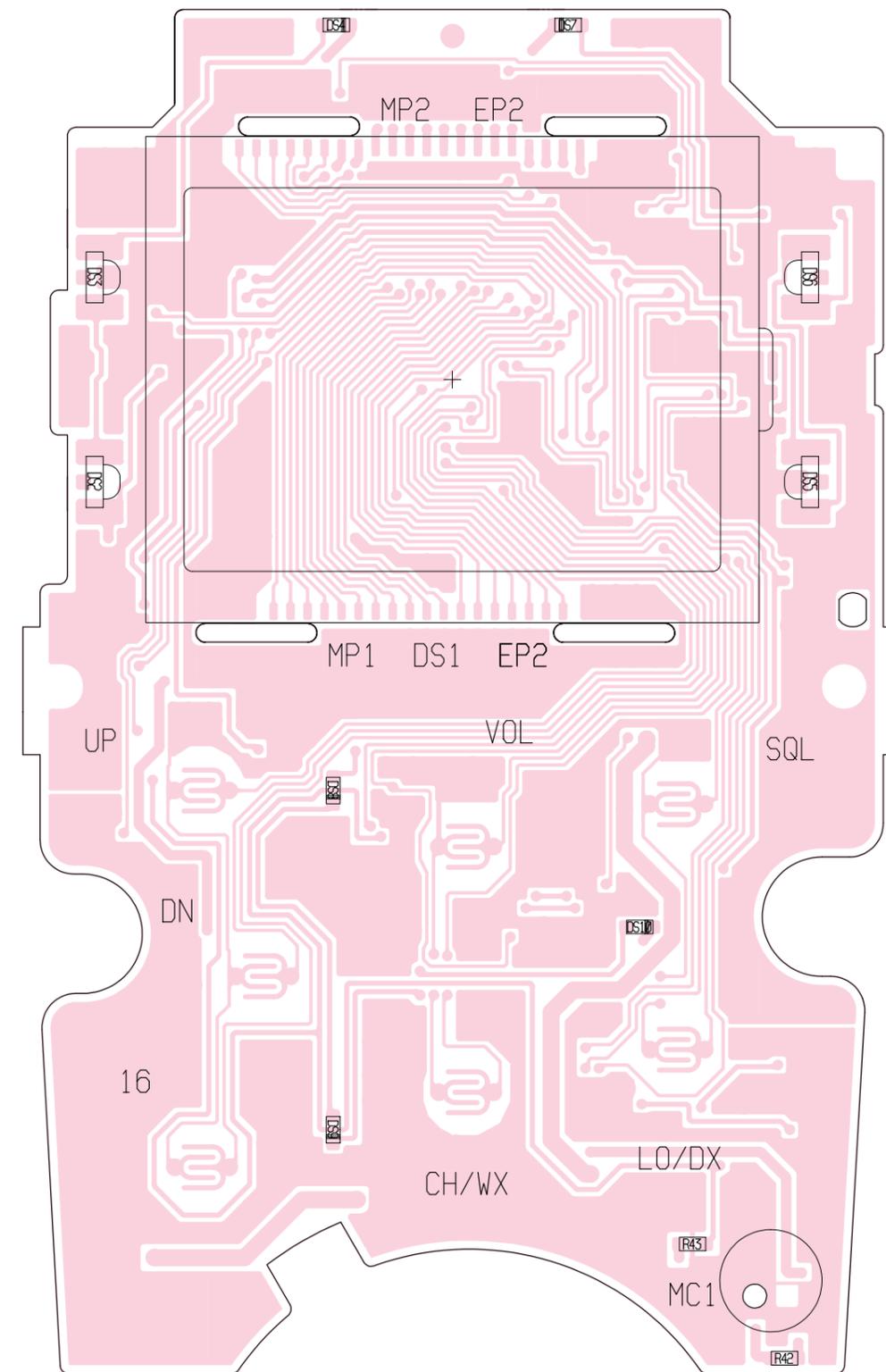


**J1**

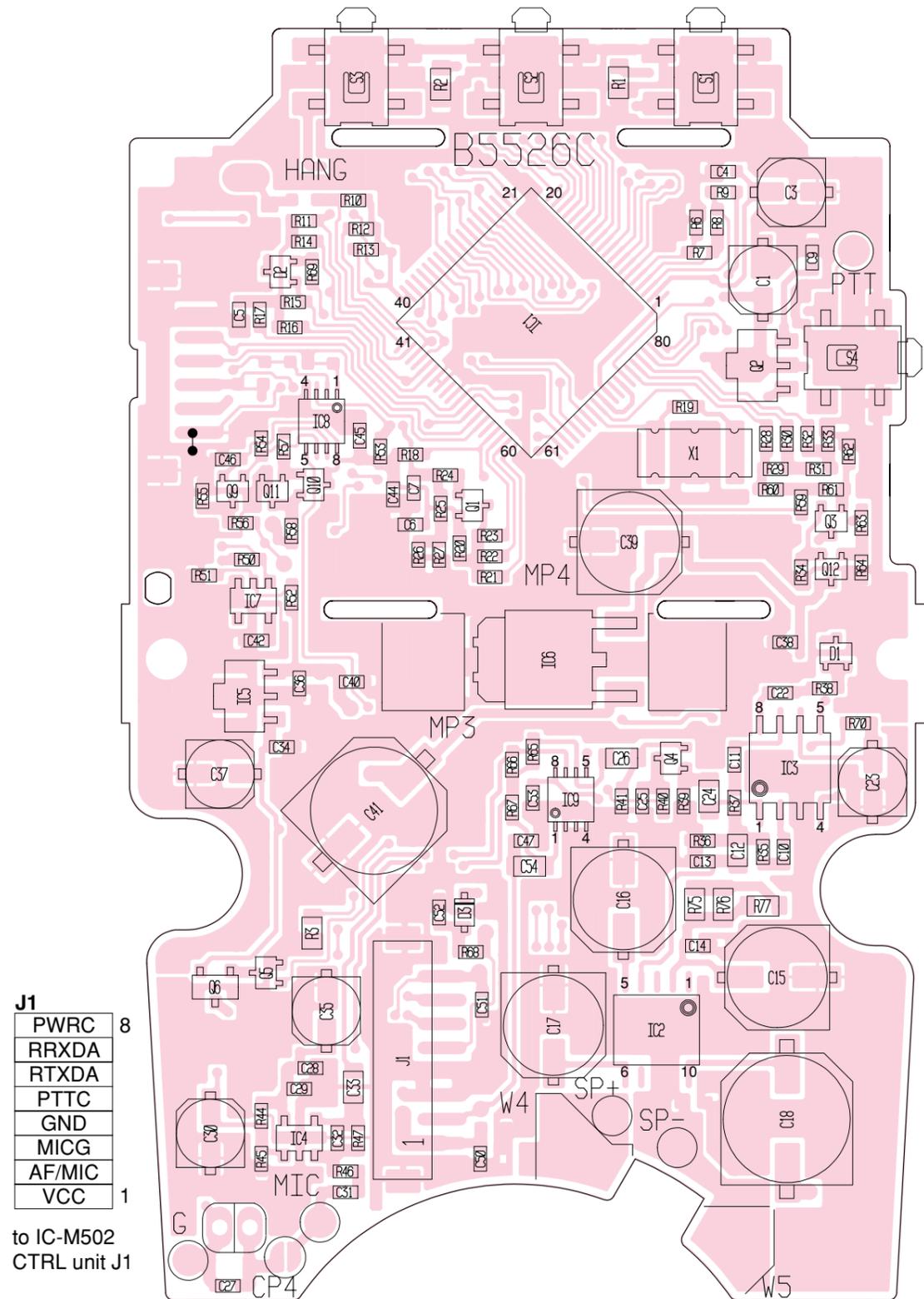
7	GND
	SPMIC
	MICE
	MIC
	PTT
	KGND
1	KEYM

### 9-9 HM-127 (OPTIONAL UNIT)

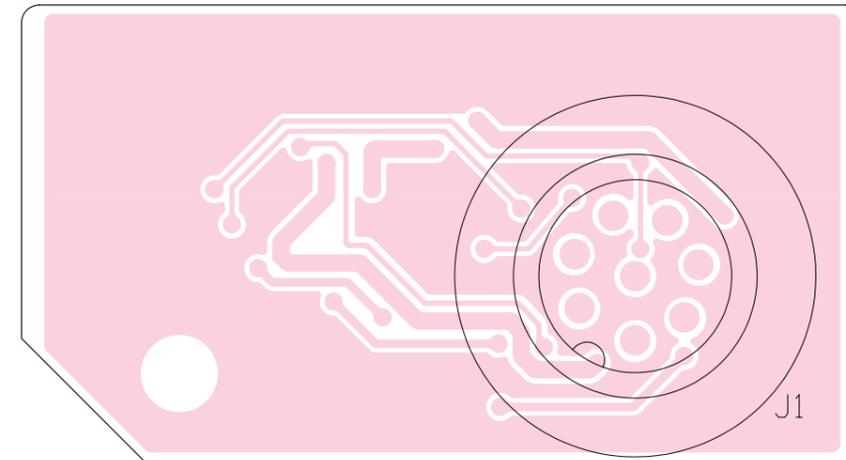
• TOP VIEW



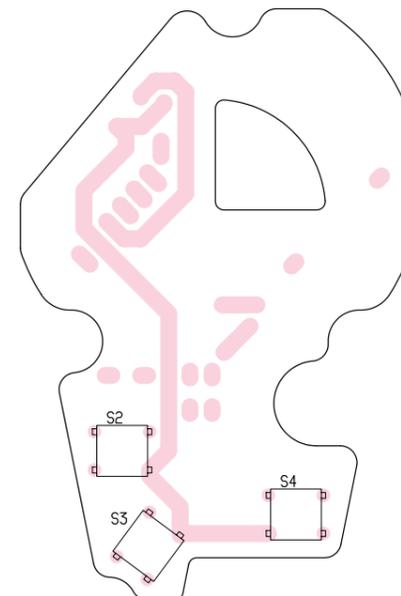
• BOTTOM VIEW (HM-127)



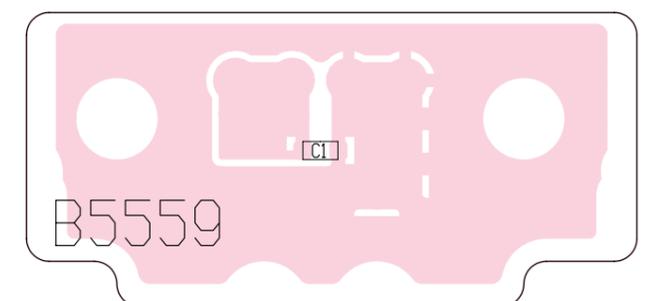
• BOTTOM VIEW (CTRL)



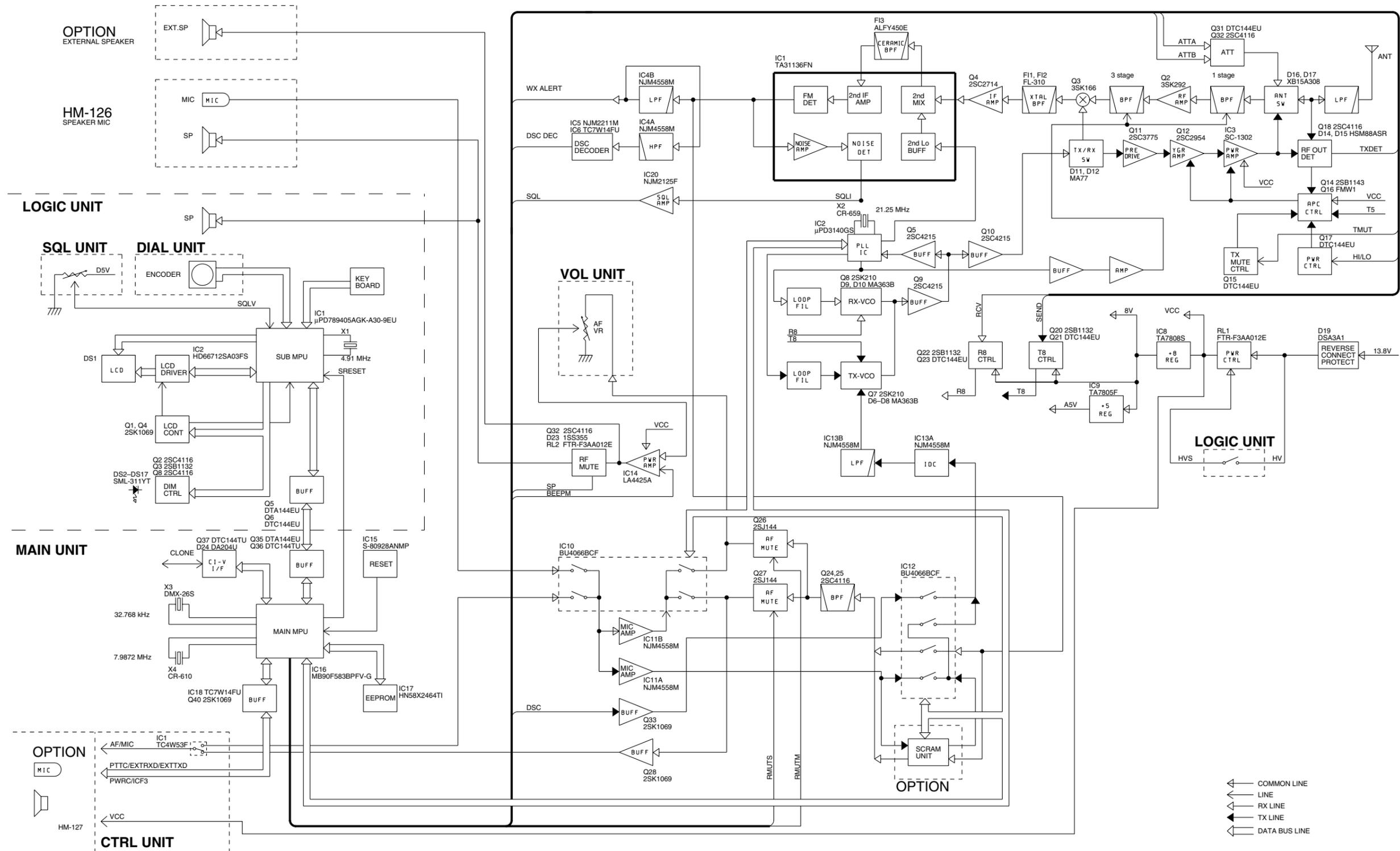
• BOTTOM VIEW (HM-126)



• BOTTOM VIEW (PWR-CORD)

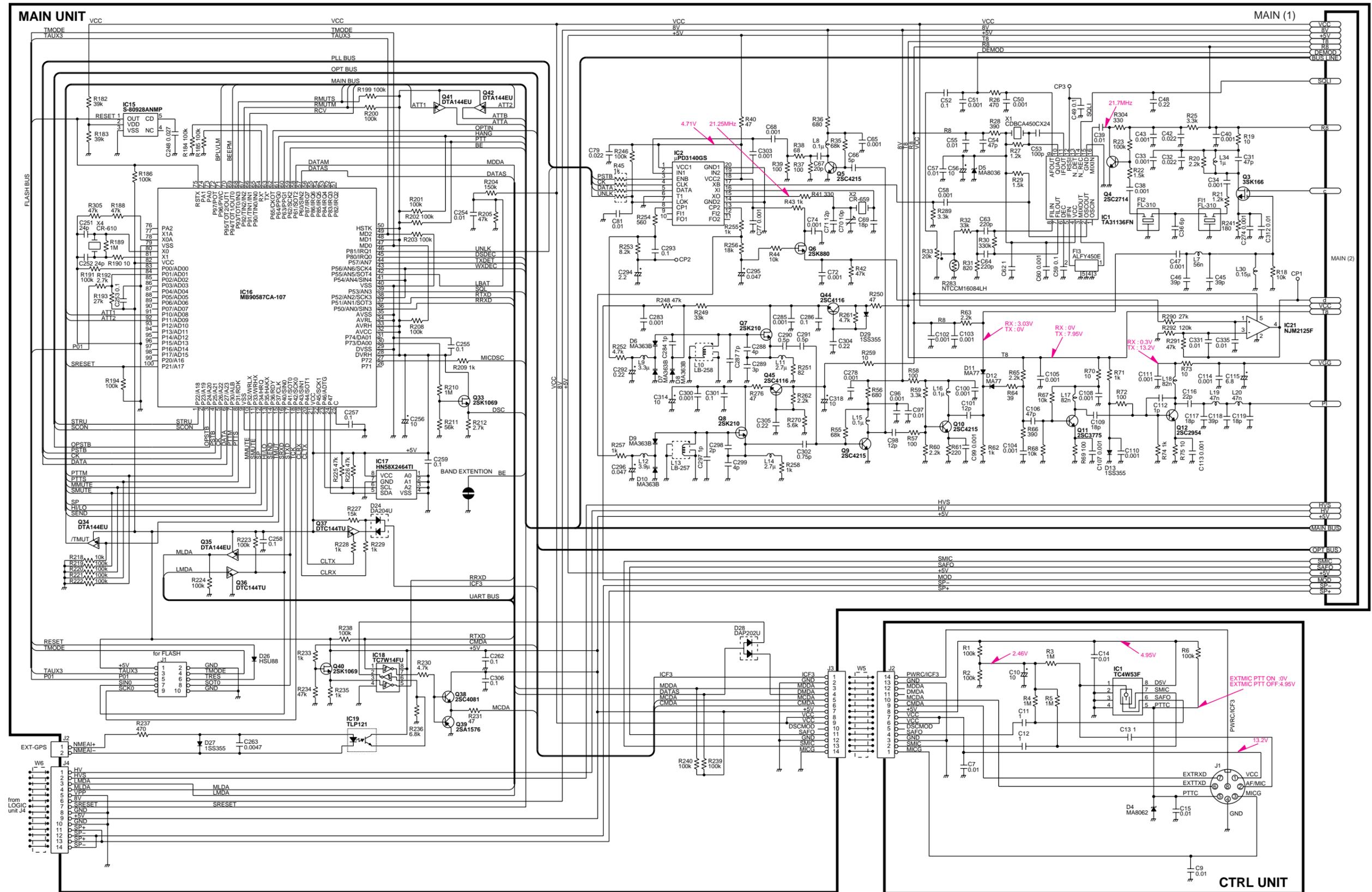


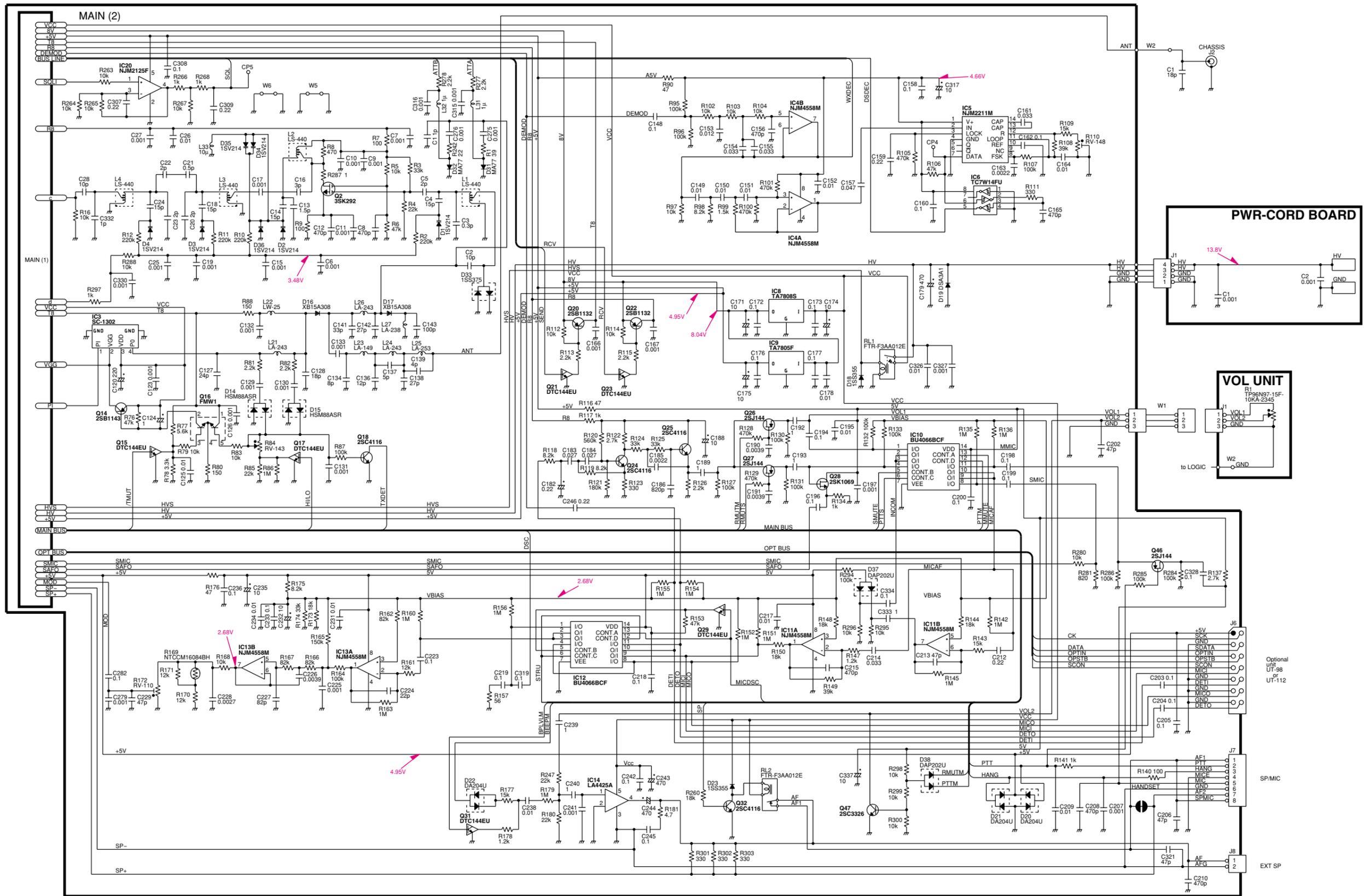
# SECTION 10 BLOCK DIAGRAM



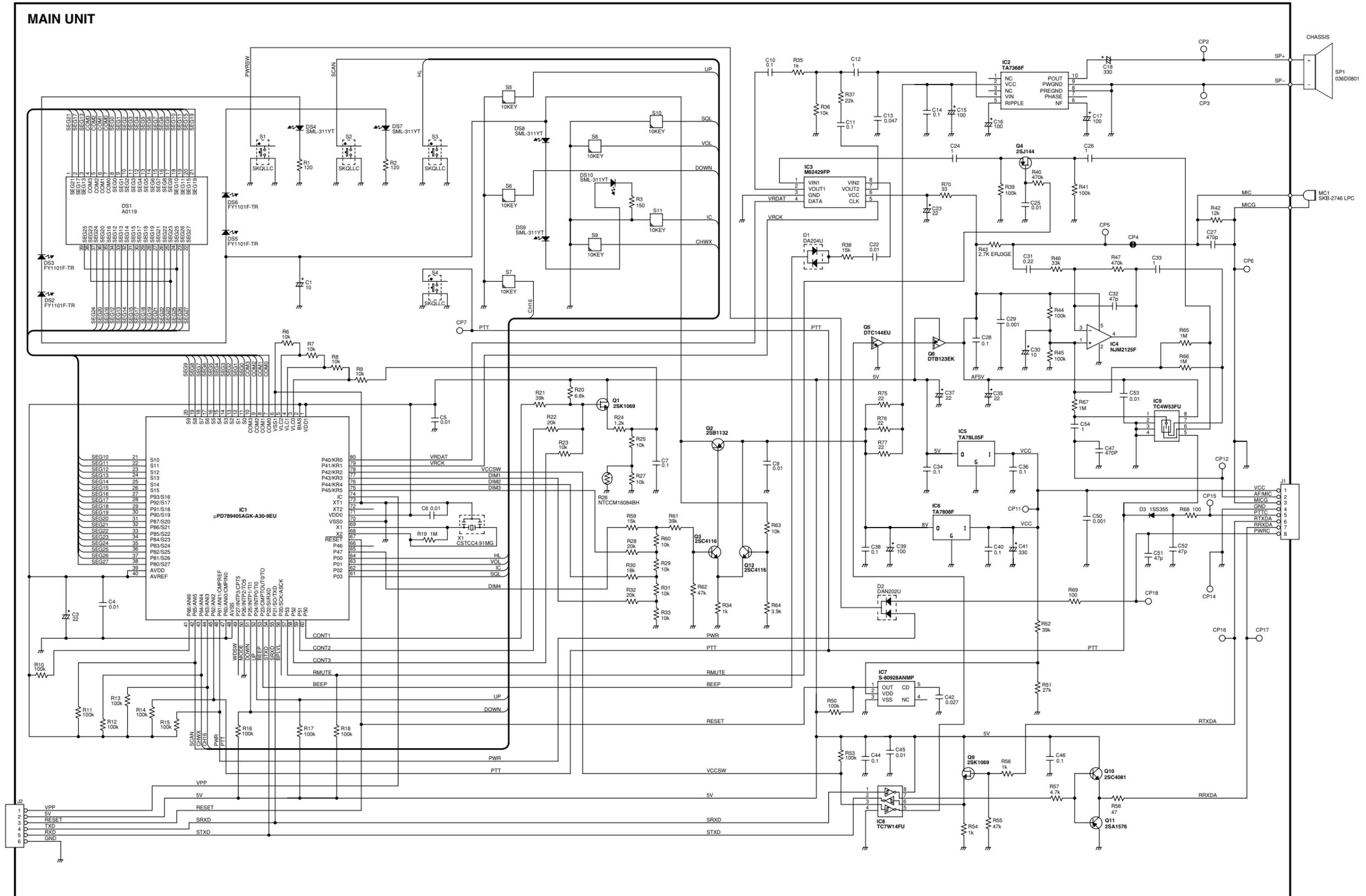


# 11-2 MAIN UNIT

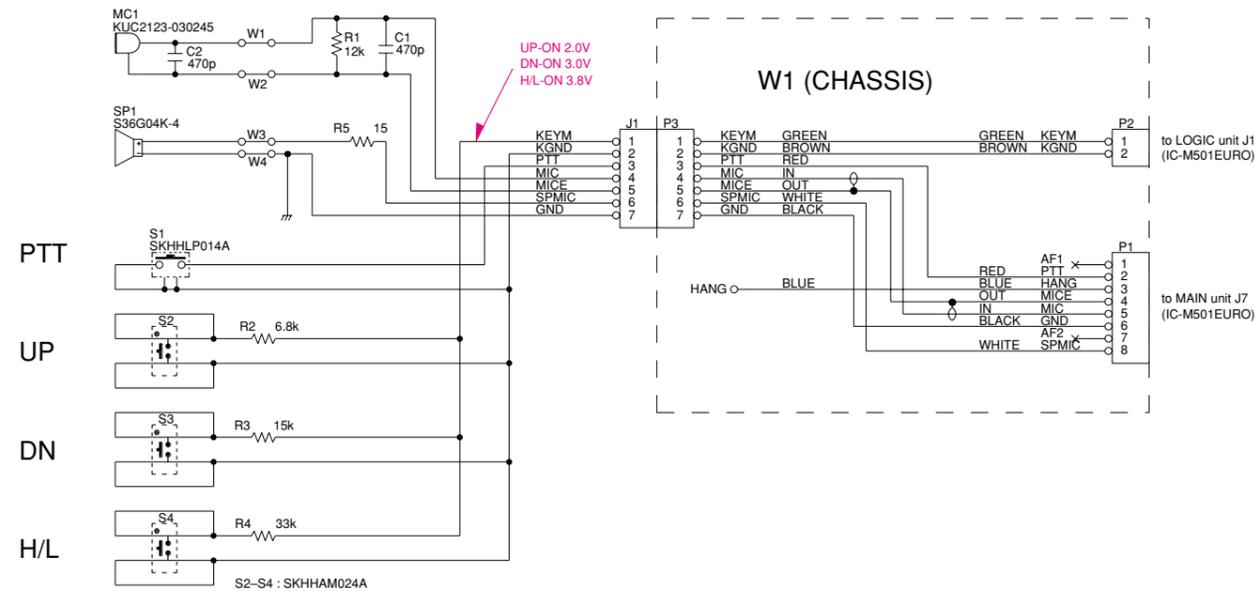




# 11-3 HM-127 (OPTIONAL UNIT)



# 11-4 HM-126



## Icom Inc.

1-1-32, Kamiminami, Hirano-ku, Osaka 547-0003, Japan  
Phone : 06 6793 5302  
Fax : 06 6793 0013  
URL : <http://www.icom.co.jp/world/index.html>

### Icom America Inc.

<Corporate Headquarters>  
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.  
Phone : (425) 454-8155 Fax : (425) 454-1509  
URL : <http://www.icomamerica.com>  
<Customer Service>  
Phone : (425) 454-7619

### Icom Canada

Glenwood Centre #150-6165  
Highway 17 Delta, B.C., V4K 5B8, Canada  
Phone : (604) 952-4266 Fax : (604) 952-0090  
URL : <http://www.icomcanada.com>

### Icom (Australia) Pty. Ltd.

A.B.N. 88 006 092 575  
290-294 Albert Street, Brunswick, Victoria, 3056, Australia  
Phone : 03 9387 0666 Fax : 03 9387 0022  
URL : <http://www.icom.net.au>

### Icom New Zealand

146A Harris Road, East Tamaki,  
Auckland, New Zealand  
Phone : 09 274 4062 Fax : 09 274 4708  
URL : <http://www.icom.co.nz>

### Beijing Icom Ltd.

1305, Wanshang Plaza, Shijingshan Road, Beijing China  
Phone : (010) 6866 6337 Fax : (010) 6866 3553

### Icom (Europe) GmbH

Communication Equipment  
Himmelgeister Str. 100, D-40225 Düsseldorf, Germany  
Phone : 0211 346047 Fax : 0211 333639  
URL : <http://www.icomeurope.com>

### Icom Spain S.L

Crta. de Gracia a Manresa Km. 14,750  
08190 Sant Cugat del Valles Barcelona, SPAIN  
Phone : (93) 590 26 70 Fax : (93) 589 04 46  
URL : <http://www.icomspain.com>

### Icom (UK) Ltd.

Unit 9, Sea St., Herne Bay, Kent, CT6 8LD, U.K.  
Phone : 01227 741741 Fax : 01227 741742  
URL : <http://www.icomuk.co.uk>

### Icom France S.a

Zac de la Plaine, Rue Brindejone des Moulinais  
BP 5804, 31505 Toulouse Cedex, France  
Phone : 561 36 03 03 Fax : 561 36 03 00  
URL : <http://www.icom-france.com>

### Asia Icom Inc.

6F No. 68, Sec. 1 Cheng-Teh Road, Taipei, Taiwan, R.O.C.  
Phone : (02) 2559 1899 Fax : (02) 2559 1874

**Count on us!**

**ManualsPlus.com**

**Icom Inc.**

1-1-32, Kamiminami, Hirano-ku Osaka 547-0003, Japan

S-13710HZ-CD-①

© 2000 Icom Inc.