ICOM

SERVICE MANUAL

VHF MARINE TRANSCEIVER

IC-M7

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-M7** VHF MARINE TRANSCEIVER at the time of going to press.
8 versions of the **IC-M7** have been designed. This service manual covers each version.

VERSION NUMBER	VERSION	MODEL
#01	U.S.A.	USA
#02	France	FRA
#03	U.K.	UK
#04	Holland	HOL
#05	Australia	AUS
#06	General-1	GEN1
#07	General-2	GEN2
#08	Europe	EUR
#09	Italy	ITA

To upgrade quality, any electric or mechanical part 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>

1150000780	IC	SC1106	IC-M7	MAIN UNIT	5 pieces
8810005720	Screw	PH B0 M2 × 20 ZK	IC-M7	Rear panel	10 pieces

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

REPAIR NOTE

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

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency range :

VERSION	USA	FRA	UK	HOL	AUS	GEN1	GEN2	EUR	ITA
International Channels	●	●	●	*	●	●	●	●	●
U.S.A. Channels	●	—	●	—	●	●	●	—	●
Weather Channels	●	—	—	—	●	●	●	—	—

●: Yes —: No *: Holland channels only

- Type of emission : FM (16K0G3E)
- Frequency stability : ±0.0005 %
- Antenna impedance : 50 Ω unbalanced
- Power supply requirement : Icom battery packs BP-81~BP-85 and CM-89
  Icom battery case (AA (R6) size dry batteries or NiCd batteries × 6) BP-90
  (Negative ground)
- Usable temperature range : −20 °C~+60 °C (−4 °F~+140 °F)
- Dimensions : 49 (W) × 123 (H) × 33 (D) mm
  1.9 (W) × 4.8 (H) × 1.3 (D) in (with CM-89)
  103.5 (H) mm; 4.1 (H) in (with BP-82)
  (Projections not included)
- Weight : 310 g; 10.9 oz (with CM-89)
  278 g; 9.8 oz (with BP-82)

■ TRANSMITTER

- RF output power (at 12.5 V DC) : High: 5.0 W (FRA version 1.0 W)
  Low : 500 mW (FRA version 150 mW)
- Modulation system : Variable reactance frequency modulation
- Current drain (at 12.5 V DC) : High power 1.8 A (FRA version 1.0 A)
  Low power 0.9 A (FRA version 0.5 A)
- Microphone impedance : 2 kΩ
- Maximum deviation : ±5 kHz
- Spurious emissions : −65 dB
- FM hum and noise : −40 dB
- Audio response : +1 dB~−3 dB of +6 dB/octave from 300 Hz to 3000 Hz

■ RECEIVER

- Receive system : Double-conversion superheterodyne
- Sensitivity : 0.35 μV for 12 dB SINAD
- Squelch threshold sensitivity : 0.32 μV
- Intermediate frequencies : 1st 30.875 MHz 2nd 455 kHz
- Current drain (at 12.5 V DC) : Audio max. 300 mA Power saved 15 mA
- Audio output power : 500 mW
- Audio output impedance : 8 Ω
- Adjacent selectivity : −60 dB
- Spurious frequency rejection : −60 dB
- Intermodulation : −60 dB
- Noise and hum : −40 dB
- Audio response : +1 dB~−3 dB of −6 dB/octave from 300 Hz to 3000 Hz

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

■ VHF MARINE TRANSCEIVER CHANNEL CHART

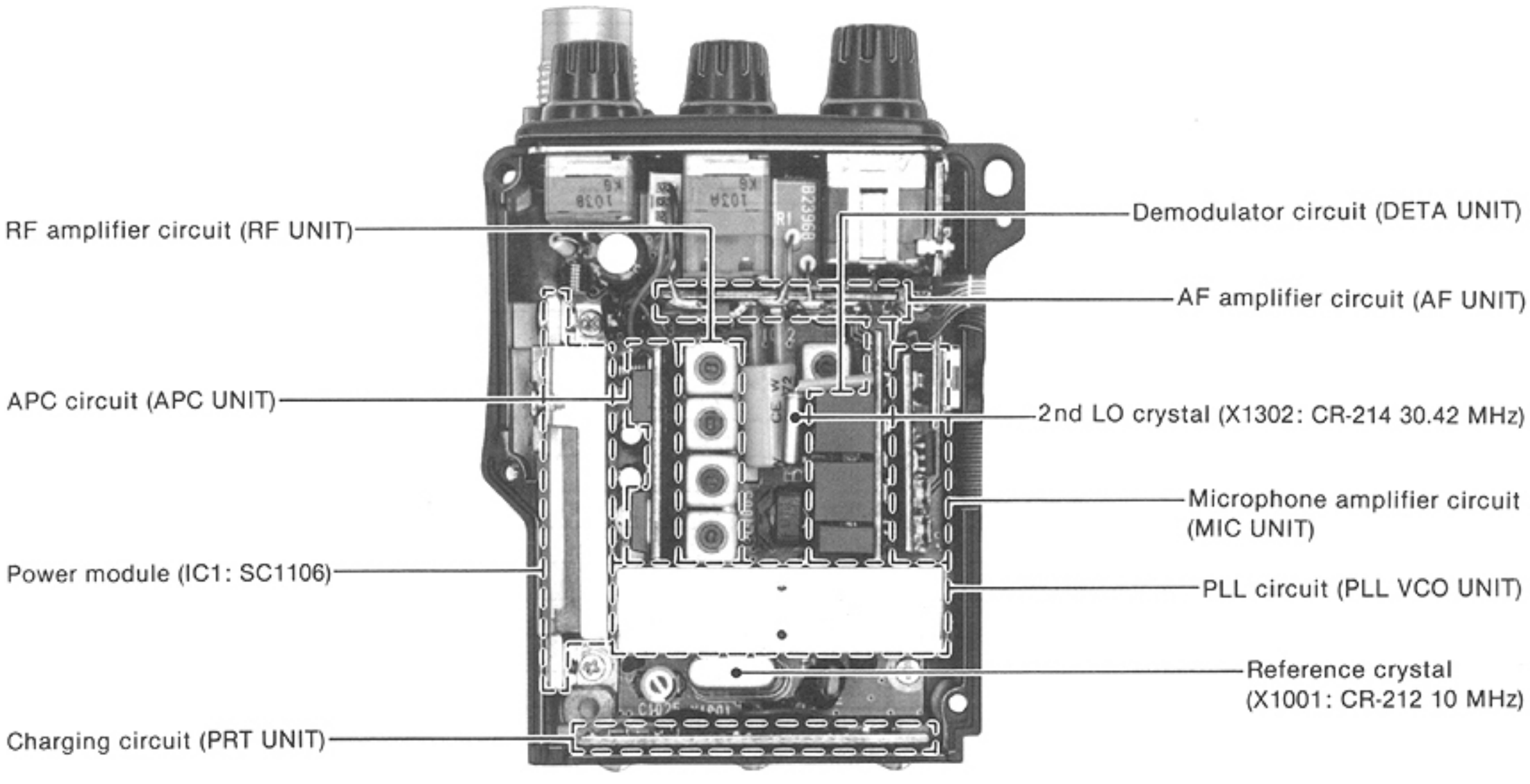
Channel number			Frequency (MHz)		Channel number			Frequency (MHz)	
INT 1	INT 2	USA	Transmitter	Receiver	INT 1	INT 2	USA	Transmitter	Receiver
01	01		156.050	160.650	62	62		156.125	160.725
	01A	01A	156.050	156.050		62A	62A	156.125	156.125
02	02		156.100	160.700	63	63		156.175	160.775
	02A	02A	156.100	156.100		63A	63A	156.175	156.175
03	03		156.150	160.750	64	64		156.225	160.825
	03A	03A	156.150	156.150		64A	64A	156.225	156.225
04	04		156.200	160.800	65	65		156.275	160.875
	04A	04A	156.200	156.200		65A	65A	156.275	156.275
05	05		156.250	160.850	66	66		156.325	160.925
	05A	05A	156.250	156.250		66A	66A	156.325	156.325
06	06	06	156.300	156.300	67	67	67	156.375	156.375
07	07		156.350	160.950	68	68	68	156.425	156.425
	07A	07A	156.350	156.350	69	69	69	156.475	156.475
08	08	08	156.400	156.400	70	70	70	156.525	156.525
09	09	09	156.450	156.450	71	71	71	156.575	156.575
10	10	10	156.500	156.500	72	72	72	156.625	156.625
11	11	11	156.550	156.550	73	73	73	156.675	156.675
12	12	12	156.600	156.600	74	74	74	156.725	156.725
13	13	13	156.650	156.650	75	75	75	Guard	Guard
14	14	14	156.700	156.700	76	76	76	Guard	Guard
15	15	15*	156.750	156.750	77	77	77	156.875	156.875
16	16	16	156.800	156.800	78	78		156.925	161.525
17	17	17	156.850	156.850		78A	78A	156.925	156.925
18	18		156.900	161.500	79	79		156.975	161.575
	18A	18A	156.900	156.900		79A	79A	156.975	156.975
19	19		156.950	161.550	80	80		157.025	161.625
	19A	19A	156.950	156.950		80A	80A	157.025	157.025
20	20	20	157.000	161.600	81	81		157.075	161.675
	20A	20A	157.000	157.000		81A	81A	157.075	157.075
21	21		157.050	161.650	82	82		157.125	161.725
	21A	21A	157.050	157.050		82A	82A	157.125	157.125
22	22		157.100	161.700	83	83		157.175	161.775
	22A	22A	157.100	157.100		83A	83A	157.175	157.175
23	23		157.150	161.750	84	84	84	157.225	161.825
	23A	23A	157.150	157.150		84A		157.225	157.225
24	24	24	157.200	161.800	85	85	85	157.275	161.875
25	25	25	157.250	161.850		85A		157.275	157.275
26	26	26	157.300	161.900	86	86	86	157.325	161.925
27	27	27	157.350	161.950		86A	86A	157.325	157.325
28	28	28	157.400	162.000	87	87	87	157.375	161.975
60	60		156.025	160.625		87A		157.375	157.375
	60A	60A	156.025	156.025	88	88	88	157.425	162.025
61	61		156.075	160.675		88A	88A	157.425	157.425
	61A	61A	156.075	156.075					

WX channel	Frequency (MHz)		WX channel	Frequency (MHz)	
	Transmitter	Receiver		Transmitter	Receiver
WX 01	RX only	162.550	WX 06	RX only	162.500
WX 02	RX only	162.400	WX 07	RX only	162.525
WX 03	RX only	162.475	WX 08	RX only	161.650
WX 04	RX only	162.425	WX 09	RX only	161.775
WX 05	RX only	162.450	WX 10	RX only	163.275

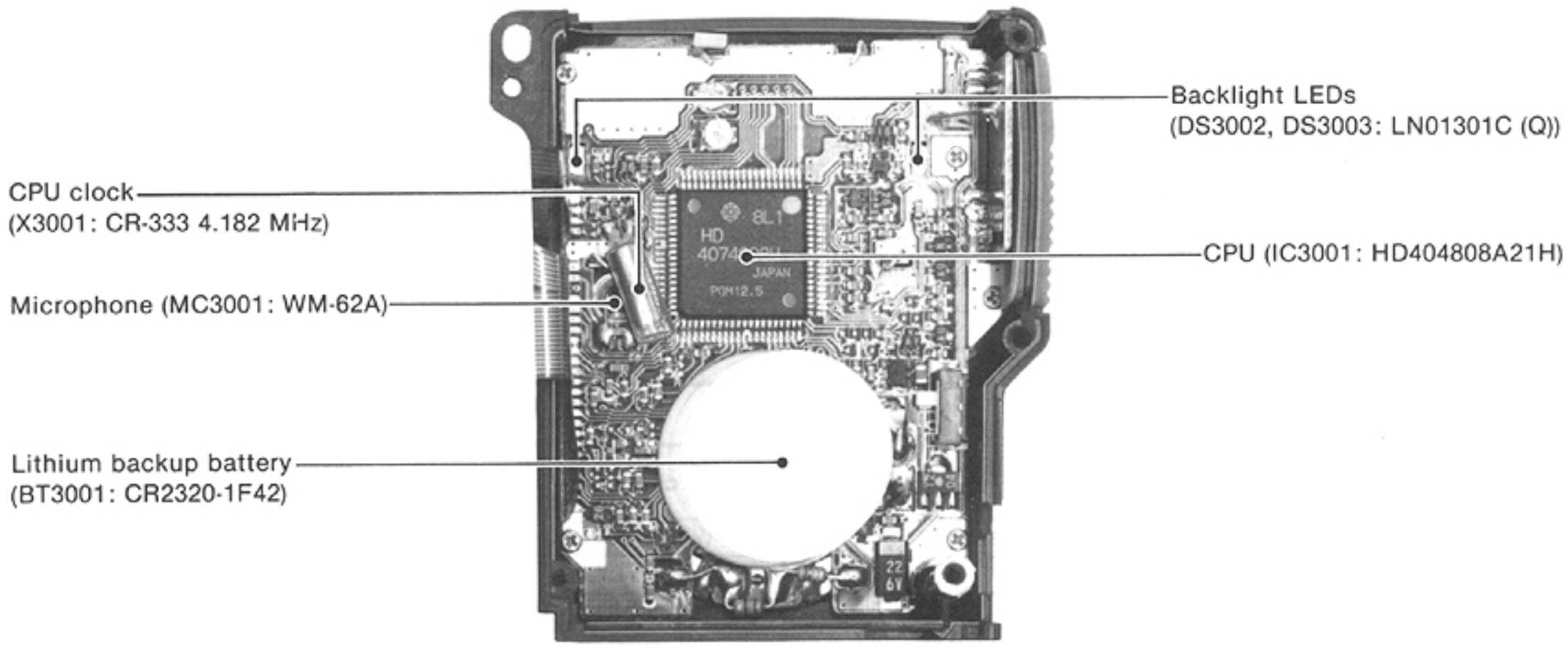
* U.S.A. channel 15 is a receive-only channel.

SECTION 2 INSIDE VIEWS

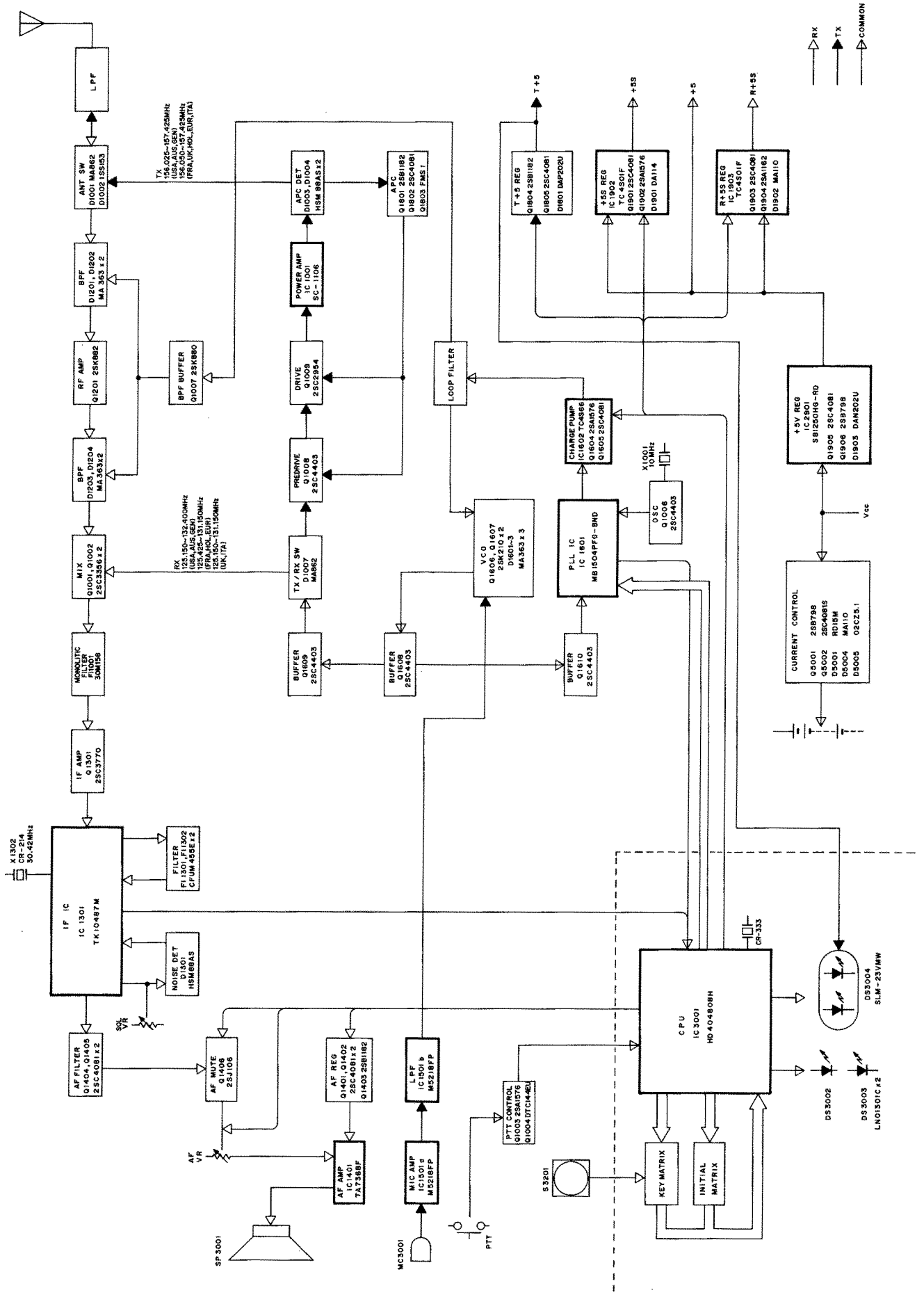
• MAIN UNIT



• LOGIC UNIT



SECTION 3 BLOCK DIAGRAM



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

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

Received signals enter the antenna connector and pass through a low-pass filter (L1001, L1002, C1001~C1005). The signals are applied to the antenna switching circuit (D1001, D1002, L1003, L1004, C1007~C1009), and then to the RF circuit. The antenna switching circuit employs a λ/4-type diode switching system. The signals are applied to the RF UNIT via the RF IN signal line.

4-1-2 RF CIRCUIT (RF UNIT)

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

The signals from the antenna switching circuit pass through a bandpass filter (D1201, D1202, L1251, L1252, C1202~C1204, C1214, C1215), and are applied to the RF amplifier (Q1201).

Amplified signals are reapplied to the other bandpass filter (D1203, D1204, L1253, L1254, C1207~C1210, C1216, C1217) to suppress unwanted signals. The signals are applied to a 1st mixer circuit (MAIN UNIT Q1001, Q1002).

D1201~D1204 are varactor diodes that track the bandpass filters and are controlled by the PLL lock voltage. These diodes tune the center frequency of the bandpass filters for wide bandwidth reception and good image response rejection.

4-1-3 1ST MIXER CIRCUIT (MAIN UNIT)

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

The signals from the RF circuit are mixed with a 1st LO signal from the PLL UNIT to produce a 30.875 MHz 1st IF signal.

4-1-4 1ST IF CIRCUIT (MAIN AND DETA UNITS)

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

After passing through the matching circuit (L1006), the 1st IF signal is applied to a pair of crystal filters (FI1001) to suppress out-of-band signals. The 1st IF signal enters the DETA UNIT and is amplified at an IF amplifier (Q1301) and then applied to a 2nd mixer circuit.

4-1-5 2ND IF AND DEMODULATOR CIRCUITS (DETA UNIT)

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

RECEIVER CIRCUIT BLOCK DIAGRAM

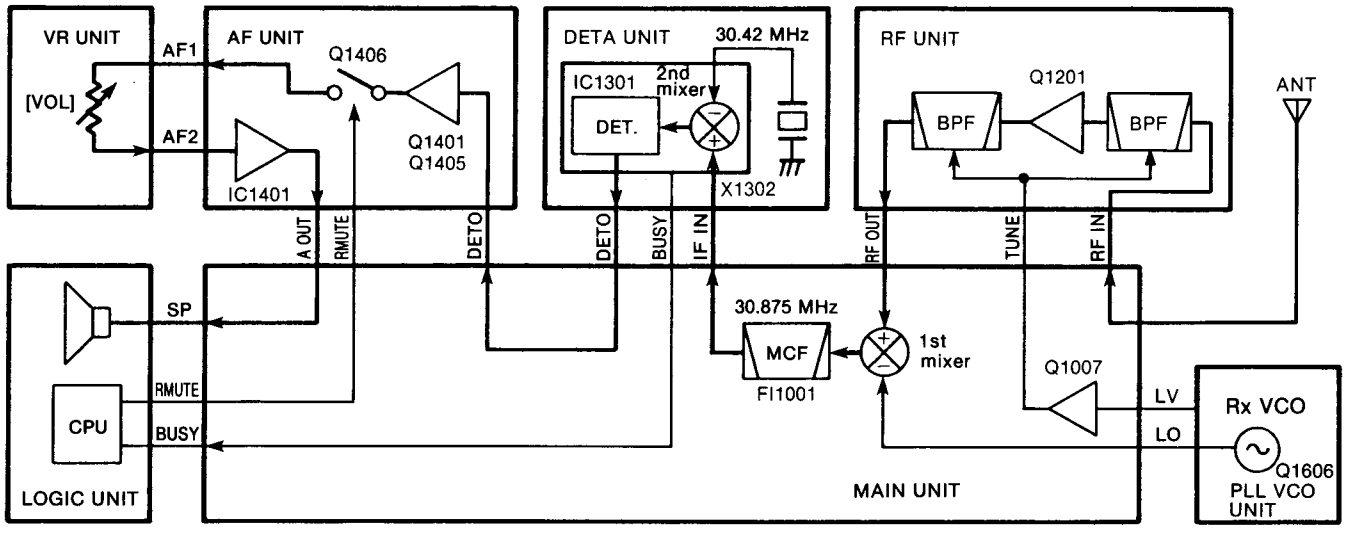


Fig. 1

The 1st IF signal from Q1301 is applied to the 2nd mixer section of IC1301, and is mixed with a 2nd LO signal to be converted to a 455 kHz 2nd IF signal.

IC1301 contains the 2nd mixer, local oscillator, limiter amplifier and quadrature detector circuits. The local oscillator section and X1302 generate 30.420 MHz for the 2nd LO signal.

The 2nd IF signal from the 2nd mixer (IC1301, pin 4) passes through ceramic filters (FI1301, FI1302), where unwanted signals are suppressed. It is then amplified at the limiter amplifier section (IC1301, pin 6) and applied to the quadrature detector section (IC1301, pin 10 and ceramic discriminator X1301) to demodulate the 2nd IF signal into an AF signal.

AF signal output from IC1301 pin 11 is applied to a squelch circuit and de-emphasis circuit (R1312, C1318). This de-emphasis circuit is an integrated circuit with frequency characteristics of −6 dB/octave. The resulting signal is applied to the AF circuit.

FM DEMODULATOR CIRCUIT

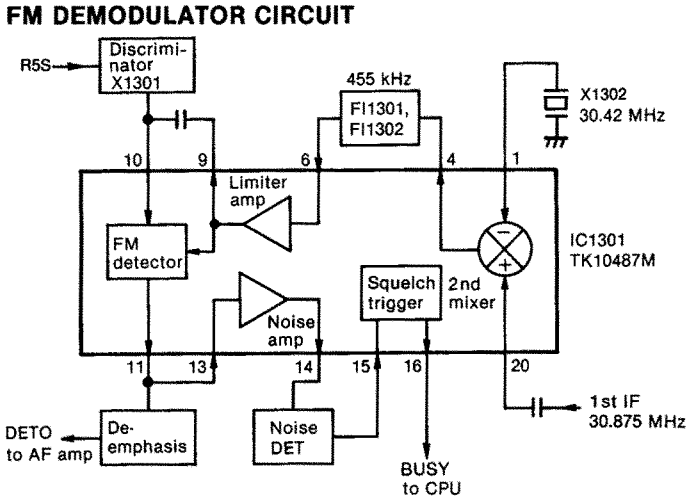


Fig. 2

4-1-6 AF CIRCUIT (AF AND VR UNITS)

An AF circuit amplifies the signals to drive a speaker. The AF circuit includes a mute circuit to mute the signal with a noise squelch.

The AF signal is applied to Q1404 and Q1405 on the AF UNIT. Q1404 is an active filter that functions as a high-pass filter to suppress unwanted low-frequency signals. Q1405 is also an active filter that functions as a low-pass filter to suppress higher noise signals.

The filtered signal is applied to the [VOL] control (R4001) on the VR UNIT via the AF mute circuit (Q1406). The AF signal is power-amplified at the AF power amplifier (IC1401) to drive the speaker.

The AF voltage regulator (Q1401~Q1403) supplies power to the AF power amplifier. The AF ON signal from the CPU controls Q1401 and mutes AF output while receiving no signal.

4-1-7 SQUELCH CIRCUIT (DETA UNIT)

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

Some of the noise components in the AF signal from IC1301 pin 11 are applied to IC1301 pin 13 via C1314, R1308, C1315 and C1311. The [SQL] control (R4002) on the VR UNIT adjusts the IC1301 pin 13 input level.

The active filter section in IC1301 amplifies noise components of frequencies of 20 kHz and above, and outputs the resulting signals from IC1301 pin 14. Output signals are rectified by D1301 and are converted to DC voltage.

The DC voltage triggers the squelch circuit in IC1301. IC1301 pin 16 outputs the squelch signal. The signal is applied to the CPU (IC3001, pin 27) on the LOGIC UNIT through the BUSY signal line. The CPU outputs the RMUTE and BUSY LED signals.

The RMUTE signal activates the AF mute circuit (Q1406) on the AF UNIT to cut the AF signal. The BUSY LED signal is applied to Q3003 on the LOGIC UNIT, turning OFF the receive indicator.

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER (MIC UNIT)

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

AF signals from the built-in condenser microphone or from the [MIC] jack are applied to IC1501 pin 3, and are pre-emphasized to +6 dB/octave through C1506 and R1503 connected to pin 2. IC1501 functions as the microphone amplifier and the limiter.

The output signals from IC1501 pin 1 pass through the splatter filter circuit (IC1501 pins 5 and 6) where signals of 3 kHz and above are attenuated. IC1501 pin 7 then outputs the signals. The signals are applied to the modulation circuit (PLL VCO UNIT, D1603) in the VCO to produce an FM signal.

The VCO circuit (Q1607, D1602, D1603) on the PLL VCO UNIT oscillates the transmit frequency with AF signal modulation.

4-2-2 DRIVE AMPLIFIER (MAIN UNIT)

The drive amplifier circuit amplifies the VCO oscillating signal.

The VCO output, buffer-amplified at Q1609 on the PLL VCO UNIT, is applied to the the transmit/receive switching circuit (D1007) on the MAIN UNIT. The VCO output is then amplified at the predrive amplifier (Q1008) and the drive amplifier (Q1009).

The voltage controlled by the APC circuit is applied to the collector of Q1008 and Q1009 to protect the RF power module from damage by an antenna mismatch.

4-2-3 RF POWER AMPLIFIER (MAIN UNIT)

The power amplifier circuit amplifies the drive signal.

IC1001 is a power module which provides stable 5 W output power. (FRA version: 1 W) An RF signal from the drive amplifier (Q1009) is applied to IC1001 pin 1. The amplified signal is output from pin 4, and applied to the antenna connector through the diode switching and low-pass filter circuits.

4-2-4 APC CIRCUIT (MAIN AND APC UNITS)

The APC circuit protects the power module (IC1001) from a mismatched output load and selects HIGH and LOW output power.

The output power level from the power module (IC1001) is detected at the APC detector (D1003~D1005). When antenna impedance is matched at 50 Ω, the detected level is at a minimum. However, when antenna impedance is mismatched, the detected voltage is higher than when matched.

When the antenna impedance is mismatched, the base voltage of Q1803b (APC UNIT) is higher than the other base voltage of Q1803a (reference voltage). Q1803b decreases the collector current of Q1801 using Q1802. Collector current of Q1801 is used at the drive amplifiers (Q1008, Q1009) on the MAIN UNIT. Hence, when the antenna impedance is mismatched, the output power is decreased.

The output power selecting circuit uses the APC circuit. The [HI/LOW] switch selects the reference voltage, changing the output power to HIGH or LOW.

4-2-5 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

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

When transmitting, D1001 and D1002 are turned ON. The RF output signal is not applied to the receiver circuit, passing through D1002 and C1006, the low-pass filter (L1001, L1002, C1001~C1005) and then to the antenna. The low-pass filter suppresses high harmonic components.

4-3 PLL CIRCUITS

4-3-1 GENERAL (PLL VCO UNIT)

A PLL circuit stably oscillates the transmit frequency and the receive local frequency. The PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

TRANSMITTER CIRCUIT BLOCK DIAGRAM

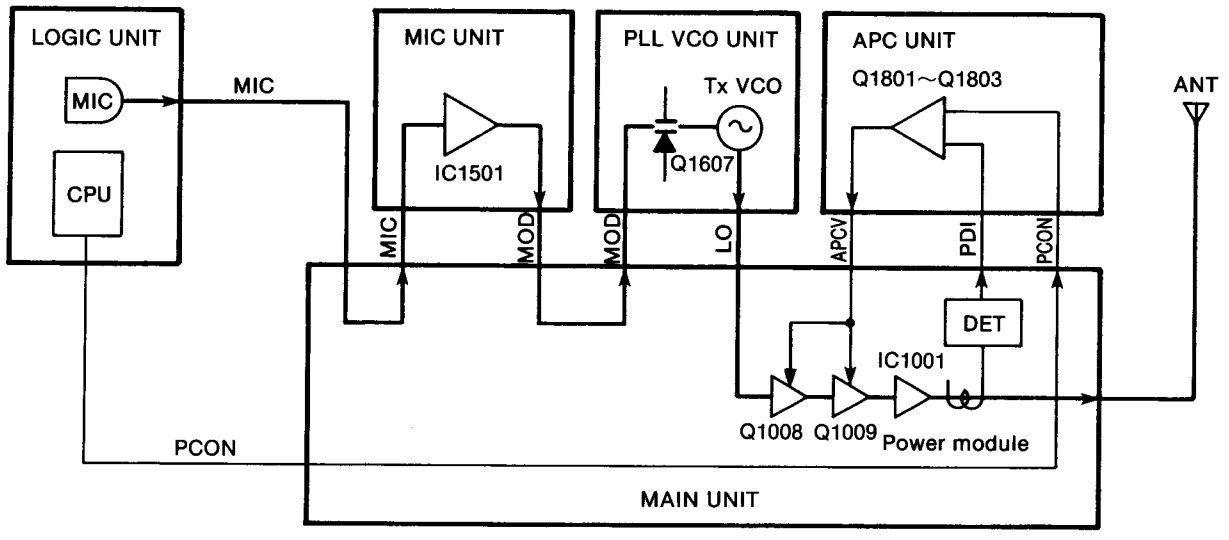


Fig. 3

The PLL circuit, using a one chip modulus prescaler (IC1601), directly generates the transmit frequency with the Tx VCO (Q1607) and the 1st LO frequency with the Rx VCO (Q1606). The modulus prescaler (IC1601) sets the dividing ratio based on serial data from the CPU, and compares the phases of a VCO signal and the reference oscillator frequency. It detects the out-of-step phase and outputs it. The reference frequency is oscillated at X1001 on the MAIN UNIT.

4-3-2 REFERENCE OSCILLATOR CIRCUIT (MAIN UNIT)

A reference frequency is produced by the local oscillator (Q1006) and X1001. D1008 and R1029 provide frequency control. Thus, the output frequency of this circuit is stable over a wide temperature range.

4-3-3 LOOP FILTER CIRCUIT (PLL VCO UNIT)

Phase-detected signals from IC1601 pin 15 and 16 are converted to DC voltage by a charge pump (Q1604, Q1605) and lag-lead loop filter (R1606, R1607, C1605, C1606). The DC voltage is applied to varactor diodes (D1601 ~D1603) in the VCO to lock the VCO oscillation.

On the other hand, the output of the loop filter passes though Q1007 on the MAIN UNIT and is used as the tuning voltage for the RX bandpass filters.

4-3-4 VCO CIRCUIT (PLL VCO UNIT)

The IC-M7 has 2 VCO circuits for transmitting and receiving which generate the receive and transmit frequencies and makes an FM modulation.

The CPU outputs a control signal for selecting the receive VCO circuit (Q1606, L1602, D1601) or transmit VCO circuit (Q1607, L1605, D1602, D1603). Varactor diodes (D1601 ~D1603) provide frequency control. The buffer amplifiers (Q1608~Q1610) do not affect the PLL output signal from VCO oscillation. Q1601 selects the transmit or receive VCO circuit.

4-3-5 UNLOCK SENSOR CIRCUIT (PLL VCO UNIT)

When the PLL circuit is unlocked, IC1601 pin 7 is "LOW" and a "LOW" signal is applied to Q1005 on the MAIN UNIT and then to the CPU pin 7 as an unlock signal.

4-4 POWER SUPPLY CIRCUITS

4-4-1 VOLTAGE LINES

LINE	DESCRIPTION
Vcc	The connected battery pack voltage passed through the power switch.
+5	Common 5 V converted from the Vcc line at Q1905 and Q1906 on the REG UNIT using IC1901 output as the reference voltage.
+5S	5 V controlled by the power saver function. This voltage is converted from the Vcc line at Q1901 and Q1902 on the REG UNIT using IC1902 output as the reference voltage.
R+5S	Receive 5 V controlled by the power saver function and SEND signal line. This voltage is converted from the Vcc line at Q1903 and Q1904 on the REG UNIT using IC1903 output as the reference voltage.
T+5	Transmit 5 V controlled by the TMUTE signal line. This voltage is converted from the Vcc line at Q1804 and Q1805 on the APC UNIT.
AF 8 V	AF amp power source controlled by the AF ON signal line. R1404/R1405 provides reference voltage.

4-4-2 CPU POWER SUPPLY CIRCUIT (LOGIC UNIT)

When the power switch is turned OFF, a voltage is applied to the CPU (IC3001) pin 73 via D3007 from the lithium backup battery (BT3001) installed in the transceiver to provide backup for the memory contents.

PLL CIRCUIT

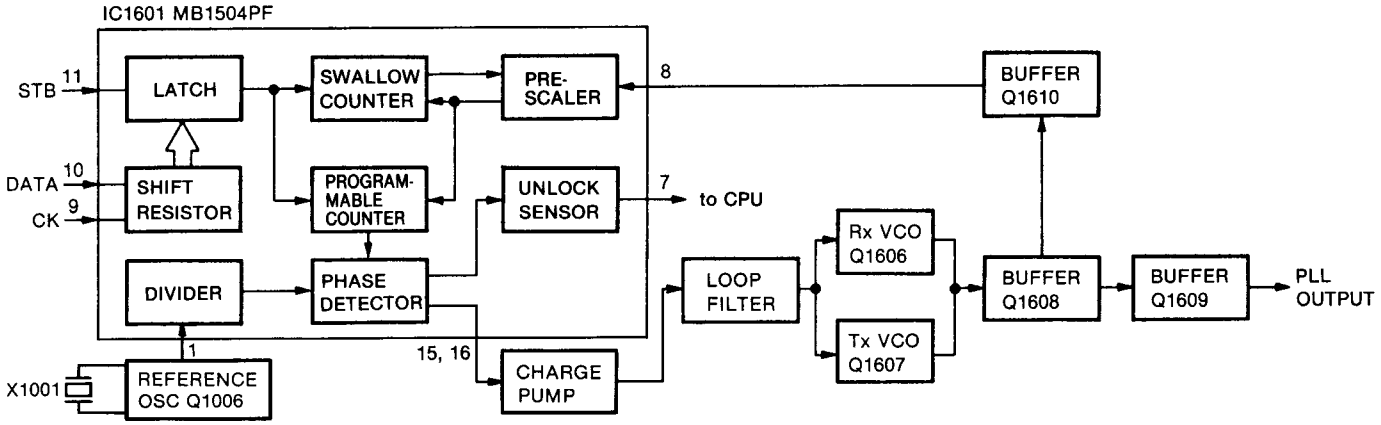


Fig. 4

4-4-3 +5S AND R+5S SWITCHING CIRCUITS (REG UNIT)

The IC-M7 has a power saver to reduce current consumption to approx. 1/4.

The PSC (Power Saver Control) signal is applied to IC1902. IC1902 controls +5S regulator (Q1901, Q1902, D1901) to turn ON and OFF +5S voltage.

PSC and SEND signals are applied to IC1903. IC1903 controls R+5S regulator (Q1903, Q1904, D1902). R+5S turns OFF during power saved period or transmitting.

4-4-4 CHARGING CIRCUIT (PRT UNIT)

Voltage from the [CHARGE] jack is applied to current control circuit (Q5001, Q5002, D5003, D5005) to charge an attached battery pack (except the BP-85). This circuit charges the battery pack in approx. 15 hours.

4-5 OTHER CIRCUITS

4-5-1 DISPLAY BACKLIGHT CIRCUIT (LOGIC UNIT)

When the [LIGHT] switch is pushed, pin 77 of the CPU outputs "HIGH." The signal is applied to Q3002 to light up the backlight LEDs (DS3002, DS3003).

4-5-2 CPU RESET CIRCUIT (LOGIC UNIT)

IC3002 detects +5 voltage. When the +5 voltage line becomes 5 V, IC3002 turns INT0 "HIGH" and the CPU (IC3001) restarts operation.

The CPU is reset when IC3001 pin 76 becomes "HIGH." The AND gate IC (IC3003) outputs a reset signal when both input terminals are "HIGH." One terminal is "HIGH" when the INT0 just becomes "HIGH." The CPU is always reset when the power is turned ON.

RESET CIRCUIT

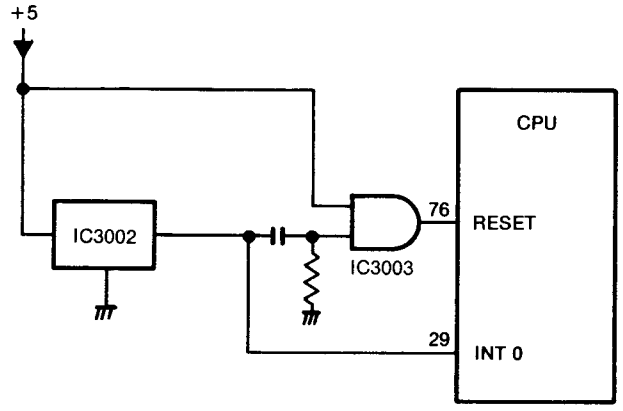


Fig. 5

4-5-3 TRANSMIT/RECEIVE INDICATOR CIRCUIT (LOGIC UNIT)

The transmit/receive indicator (DS3004) uses a 2-input LED and lights up in red or green.

The indicator lights up in red as the transmit indicator while transmitting using the T+5 voltage.

The indicator lights up in green as the busy indicator while the squelch opens using CPU pin 78 output via an inverter (Q3003).

4-6 CPU PORT ALLOCATIONS (LOGIC UNIT)

• INPUT PORT

PORT NUMBER	PIN NUMBER	DESCRIPTION
D4 [PTT]	1	Inputs a signal on the PTT line. This port becomes "LOW" when the PTT switch is pushed. This port is also used for cloning input.
D9 [FUNC]	6	Input port for the [FUNC] switch. (USA version: [LOCK] switch)
D10 [UNLOCK]	7	Detects a PLL unlock signal. When the signal is "HIGH," the PLL is unlocked.
D12, D13 [DIAL UP/DOWN]	9, 10	Input port for the up/down signal of the channel selector.
R01 [HI/LO]	16	Input port for the [HI/LOW] switch.
R10~R13 [KEYI0~ KEYI3]	19~22	These are input ports for the initial and key matrices.
R30 [BUSY]	27	Detects a squelch signal. The signal is "HIGH" when the squelch opens.
R32 [INT0]	29	Detects a signal for the standby mode of the CPU. The CPU enters the standby mode when the port becomes "LOW."
RESET	76	Inputs a signal for CPU resetting. The CPU program is reset when the port becomes "HIGH."

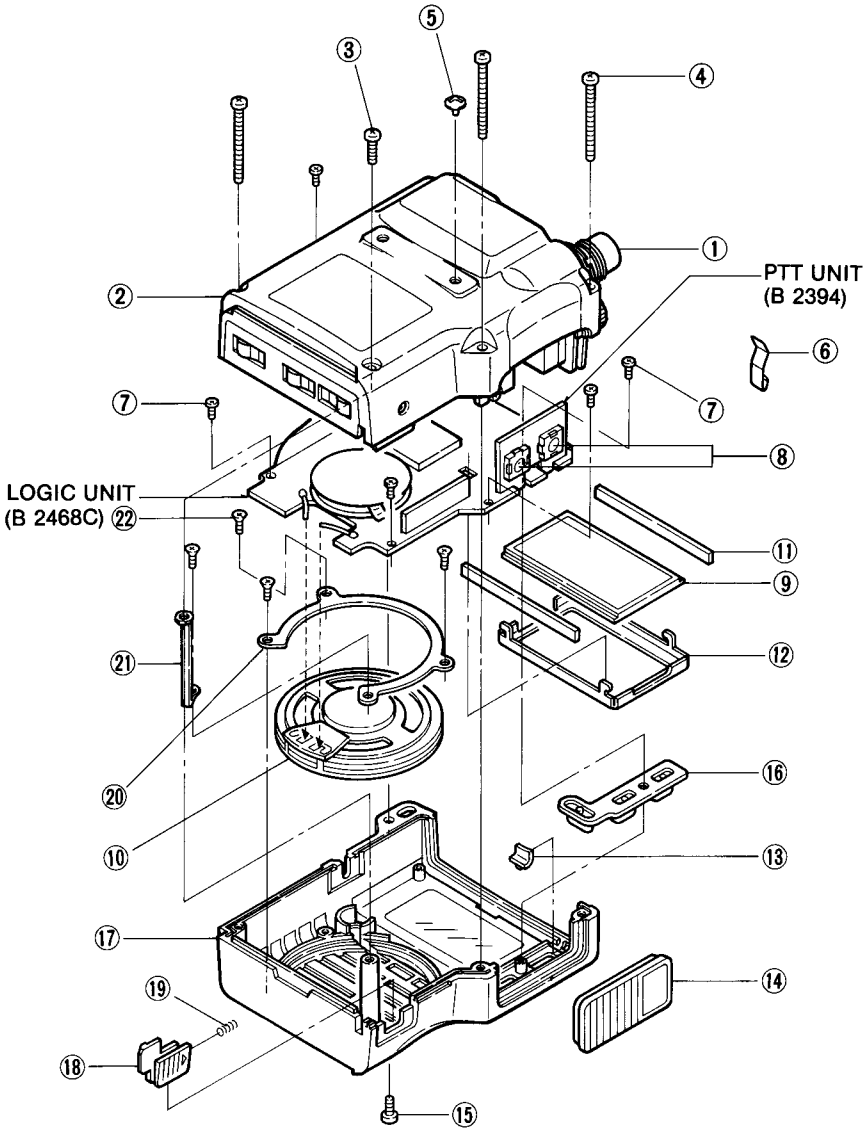
• **OUTPUT PORT**

PORT NUMBER	PIN NUMBER	DESCRIPTION
D0 [LAMPO]	77	Becomes "HIGH" when the backlight LEDs light up.
D1 [BUSY LED]	78	Outputs a signal for lighting up in green the transmit/receive indicator. This port becomes "LOW" while receiving. (squelch opens)
D2 [HI/LOW]	79	This port become "HIGH" when LOW output power is selected.
D3 [CPC]	80	Outputs a control signal to cut off the loop filter while the power saver function is activated.
D5 [PSC]	2	This port becomes "HIGH" while the power saver function is activated.
D6~D8 [KEYS0~ KEYS2]	3~5	These are output ports for the initial and key matrices.
R00 [SCK]	15	Outputs clock signals for serial data.
R02 [SDATA]	17	Outputs serial data synchronized with the SCK signal.
R03 [PLSTB]	18	Outputs a strobe signal for serial data to the PLL IC.
R20 [TMUTE]	23	Outputs a control signal for T+5 V regulator.
R21 [SEND]	24	Outputs transmit/receive switching signals. This port becomes "HIGH" while transmitting.
R22 [AF ON]	25	Outputs an AF mute signal for AF power amplifier.
R23 [RMUTE]	26	Outputs a receive mute signal for the AF mute circuit. When emitting a beep tone, this port outputs the mute signal and the AF ON port does not output it.
R31 [BEEP]	28	Outputs a beep tone.

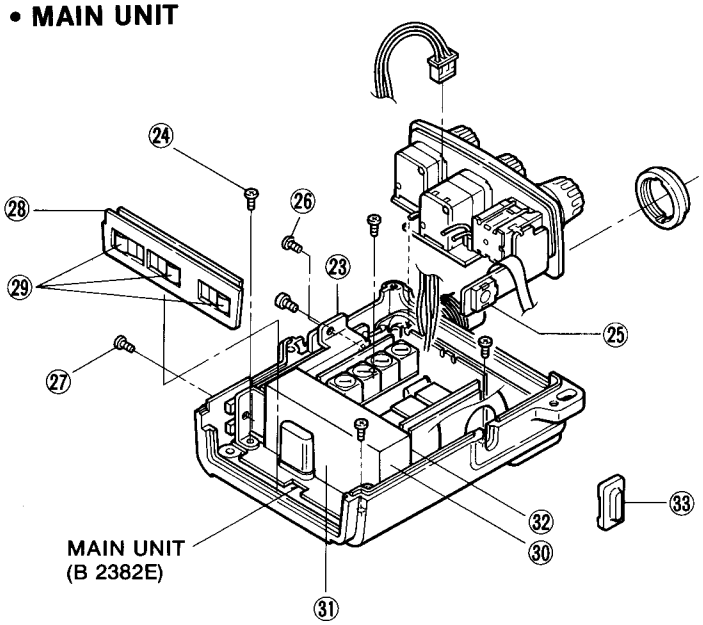
SECTION 5 MECHANICAL PARTS AND DISASSEMBLY

5-1 TRANSCEIVER

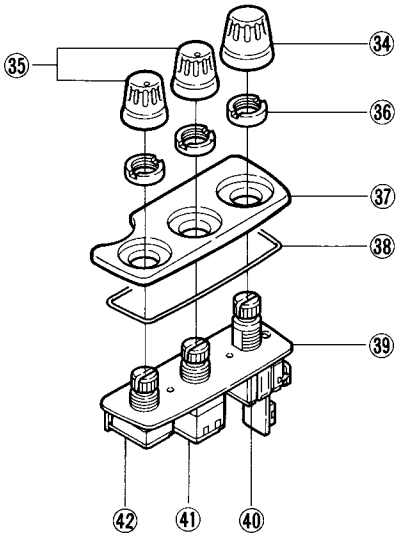
• **CHASSIS**



• **MAIN UNIT**



• **TOP UNIT**



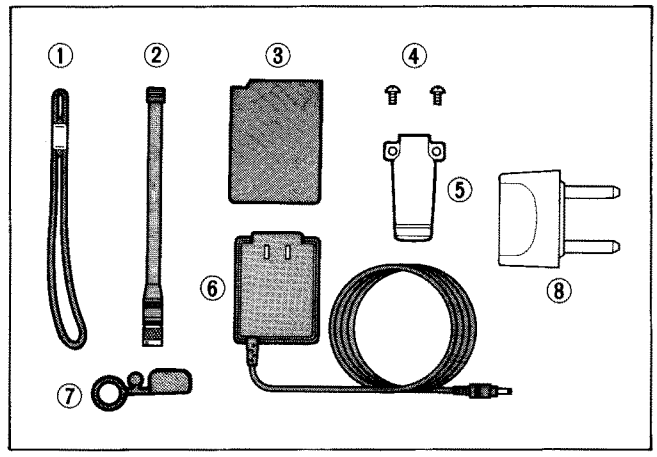
LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	6510010950	ANT Connector TNC-R111	1
②	8010008631	752 Rear panel-1	1
③	8810005710	Screw PH B0 M2×6 ZK	1
④	8810005720	Screw PH B0 M2×20 ZK	3
⑤	8010007601	Bushing (A)-1	2
⑥	8930015651	LOGIC ground spring-1	1
⑦	8810001700	Screw PH B0 No. 0-3 M1.4×3	5
⑧	2230000770	Switch [HI/LOW], [PTT] SW-104 (SKHUPE004B)	2
⑨	5030000550	LCD LD-BU9492J (incl. shield)	1
⑩	2510000450	Speaker EAS-3P123D	1
⑪	8930014860	LCD contact strip SRCN-752	2
⑫	8930014870	752 LCD holder	1
⑬	8930014930	752 lens	1
⑭	8930017830	PTT switch (A) rubber	1
⑮	8810000100	Screw PH M2×4 ZK	1
⑯	8930017840	Front switch (A)-1 rubber (FRA), (UK), (HOL), (EUR), (AUS), (GEN1), (GEN2), (ITA)	1
	8930018420	Front switch (B)-1 rubber (USA)	1
⑰	8210005721	752 Front panel (G)-1 (USA)	1
	8210005731	752 Front panel (H)-1 (FRA), (UK), (HOL), (GEN2)	1
	8210005780	752 Front panel (F)-1 (EUR), (AUS), (GEN1)	1
	8210005890	752 Front panel (I)-1 (ITA)	1
⑱	8930014922	752 Release button-2	1
⑲	8930014820	Release spring (M)	1

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
⑳	8930014810	752 SP plate	1
㉑	8930014830	Speaker ground lag	1
㉒	8810005740	Screw FH B0 No. 0 M2×3	4
㉓	8930014840	752 Module plate	1
㉔	8810005860	Screw PH No. 0 M2×3 Ni	5
㉕	2260001150	Switch [LIGHT] SW-103 (SKHUPC007B)	1
㉖	8810000120	Screw PH M2.6×3	1
㉗	8810005700	Screw PH No. 0 M2×4 ZK	1
㉘	8930014971	752 Contact holder-1	1
㉙	8930014852	752 Battery terminal-2	3
㉚	8510006130	758 PLL case	1
㉛	8510006490	861 PLL cover	1
㉜	8510005830	CO-PLL cover	1
㉝	8930014911	LAMP switch-1 rubber	1
㉞	8610005790	Knob N147 [CHANNEL]	1
㉟	8610005780	Knob N146 [SQL, VOL]	2
㊱	8830000550	VR nut (E)	3
㊲	8210005580	752 TOP panel (A)	1
㊳	8930014950	752 TOP seal rubber	1
㊴	8930014801	752 VR plate-1	1
㊵	2260000890	Switch [CHANNEL] SRBM1L040A	1
㊶	7210001440	Variable resistor [VOL] RK097111101NA (10KA)	1
㊷	7210001450	Variable resistor [SQL] RK0971110051A (10KB)	1

Screw abbreviations PH: Pan head FH: Flat head B0: Self-tapping screw ZK: Black Ni: Nickel

5-2 ACCESSORIES

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8010008970	Handstrap Belt HK-002	1
②	Optional product	FA-150T FLEXIBLE ANTENNA	1
③	Optional product	BC-73D (FRA), (HOL), (GEN2)	1
	Optional product	BC-73E (UK)	1
	Optional product	BC-74D (ITA)	1
	Optional product	BM-76A (USA), (GEN1)	1
	Optional product	BM-76E (AUS)	1
	Optional product	BM-76V (EUR)	1
④	8810005730	Screw BuH M3×3 ZK BS	2
⑤	8010008620	752 Belt clip	1
⑥	Optional product	BP-82 (FRA), (UK), (HOL), (GEN2)	1
	Optional product	BP-83 (ITA)	1
	Optional product	CM-89 (USA), (EUR), (AUS), (GEN1)	1
⑦	8930014960	752 Connector seal	1
⑧	6910000090	#2505S/U Pin plug (UK), (AUS)	1



Screw abbreviations BuH: Button head ZK: Black

SECTION 6 PARTS LIST

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC3001	1140001370	IC	HD404808A21H
IC3002	1180000610	IC	RH5VA42CA-T1
IC3003	1130003760	IC	TC4S81F (TE85R)
Q3001	1590000430	Transistor	DTC144EU T107
Q3002	1530002060	Transistor	2SC4081 T107 R
Q3003	1590000720	Transistor	DTA144EU T107
Q3005	1590000430	Transistor	DTC144EU T107
Q3006	1590000430	Transistor	DTC144EU T107
Q3007	1510000670	Transistor	2SA1588-GR (TE85R)
D3001	1160000060	Diode	DAN202U T107 (France, Europe)
	1750000160	Diode	DA114 T107 (U.K., Italy)
	1750000160	Diode	DA114 T107 (Italy)
D3002	1750000170	Diode	DA115 T107 (France, U.K., Europe)
	1160000060	Diode	DAN202U T107 (Holland)
	1750000170	Diode	DA115 T107 (Italy)
D3003	1750000170	Diode	DA115 T107
D3005	1750000170	Diode	DA115 T107
D3006	1750000130	Diode	DA204U T107
D3007	1160000060	Diode	DAN202U T107
D3008	1160000060	Diode	DAN202U T107
D3009	1750000160	Diode	DA114 T107 (U.S.A. only)
X3001	6050006980	Crystal	CR-333 AT-38 4.182MHZ
R3001	7030003620	Resistor	ERJ3GEYJ 333 V (33 kΩ)
R3003	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3005	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3006	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3008	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3009	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3010	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3011	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R3012	7310002770	Trimmer	RV-153 (RH03A3AN4X02A) 333
R3013	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R3014	7310002720	Trimmer	RV-148 (RH03A3AS3X0DA) 472
R3015	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R3016	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R3017	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R3018	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R3019	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3020	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3021	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3022	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3023	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3024	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3025	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3026	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3028	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R3029	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R3031	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R3032	7030003530	Resistor	ERJ3GEYJ 562 V (5.6 kΩ)
R3033	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R3034	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R3035	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R3036	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3038	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3039	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3041	7030003830	Resistor	ERJ3GEYJ 185 V (1.8 MΩ)
R3042	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R3043	7010003870	Resistor	R20J 2.2 Ω
R3044	7010003980	Resistor	R20J 18 Ω
R3045	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R3046	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R3047	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ) (France only)
R3048	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
C3001	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3002	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3003	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3004	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3005	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3006	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3007	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3008	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3009	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C3010	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C3011	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C3012	4550000770	Tantalum	TESVC 0J 226M-12L
C3013	4030005110	Ceramic	C2012 JB 1E 473K-T-A
C3015	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C3016	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3017	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C3018	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3019	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3020	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3021	4030006860	Ceramic	C1608 JB 1H 102K-T-A
DS3001	5030000550	LCD	LD-BU9492J (E-5134)
DS3002	5040001260	LED	LN01301C (Q)
DS3003	5040001260	LED	LN01301C (Q)
DS3004	5040001110	LED	SLM-23VMWS T97B
MC3001	7700000860	Microphone	WM-62A
BT3001	3020000140	Lithium Battery	CR2320-1F42
S3001	2220000050	Switch	SSSS21148A
S3002	2260001150	Switch	SW-103 (SKHUPC007B) [D/M (CALL)] [CH16/D] (U.S.A. only)
S3003	2260001150	Switch	SW-103 (SKHUPC007B) [16 (DUAL)] [DUAL] (U.S.A. only)
S3004	2260001150	Switch	SW-103 (SKHUPC007B) [FUNC] [LOCK] (U.S.A. only)
SP3001	2510000450	Speaker	EAS-3P123D

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
EP3001	0910025363	P.C. Board	B 2468C (LOGIC)
EP3002	0910021322	F.P. Board	B 2108B (LOGIC to MAIN)
EP3003	0910021912	F.P. Board	B 2111B (LOGIC to ENC)
EP3004	8930014860	LCD Contact Strip	SR CN-752

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1001	1150000780	IC	SC1106
Q1001	1530000370	Transistor	2SC3356-T2B
Q1002	1530000370	Transistor	2SC3356-T2B
Q1003	1510000510	Transistor	2SA1576 T107 R
Q1004	1590000430	Transistor	DTC144EU T107
Q1005	1510000510	Transistor	2SA1576 T107 R
Q1006	1530002560	Transistor	2SC4403-3-TR
Q1007	1560000540	FET	2SK880-Y (TE85R)
Q1008	1530002560	Transistor	2SC4403-3-TR
Q1009	1530002340	Transistor	2SC2954-T2B
D1001	1790000450	Diode	MA862 (TX)
D1002	1750000080	Diode	1SS153-T2
D1003	1790000490	Diode	HSM88AS-TR
D1004	1790000490	Diode	HSM88AS-TR
D1005	1790000590	Diode	MA110 (TW)
D1006	1750000130	Diode	DA204U T107
D1007	1790000450	Diode	MA862 (TX)
D1008	1790000540	Varicap	MA338 (TX)
FI1001	2010000230	Filter	30M15B (FL-76)
X1001	6050004930	Crystal	CR-212
L1001	6110002070	Coil	LA-227
L1002	6110002120	Coil	LA-228
L1003	6110002070	Coil	LA-227
L1004	6110002000	Coil	LA-226
L1005	6140000930	Coil	LR-116
L1006	6150003570	Coil	LS-393
L1008	6200000260	Coil	LQN 2A R10K
L1009	6200000770	Coil	LQN 2A 68NM
L1010	6110002070	Coil	LA-227
L1011	6200000750	Coil	LQH 3N 4R7M
R1001	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R1002	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R1003	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1004	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1005	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R1006	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R1007	7030003240	Resistor	ERJ3GEYJ 220 V (22 Ω)
R1008	7030003240	Resistor	ERJ3GEYJ 220 V (22 Ω)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1009	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1011	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1013	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1014	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1015	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1016	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R1017	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1018	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1019	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1020	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1021	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R1022	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R1023	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1024	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R1025	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1027	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R1029	7510000090	Thermistor	ERT-D2FGL202S
R1030	7030003620	Resistor	ERJ3GEYJ 333 V (33 kΩ)
R1031	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1033	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R1035	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1036	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1037	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1038	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R1039	7030003410	Resistor	ERJ3GEYJ 561 V (560 Ω)
R1040	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R1041	7030003310	Resistor	ERJ3GEYJ 820 V (82 Ω)
R1042	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R1043	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R1044	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R1045	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 kΩ)
R1046	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R1047	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R1048	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 kΩ)
R1049	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R1050	7030003340	Resistor	ERJ3GEYJ 151 V (150 Ω)
R1052	7030003230	Resistor	ERJ3GEYJ 180 V (18 Ω)
R1053	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R1054	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R1055	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R1056	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1057	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
C1001	4030006610	Ceramic	C1608 SL 1H 100D-T-A
C1002	4030006550	Ceramic	C1608 SL 1H 040C-T-A
C1003	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C1004	4030008440	Ceramic	C1608 SL 1H 1R5C-T-A
C1005	4030006620	Ceramic	C1608 SL 1H 120J-T-A
C1006	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1007	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C1008	4030006690	Ceramic	C1608 SL 1H 330J-T-A
C1009	4030006630	Ceramic	C1608 SL 1H 150J-T-A
C1010	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1011	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1012	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1013	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C1014	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1015	4030006620	Ceramic	C1608 SL 1H 120J-T-A
C1016	4550003040	Tantalum	TEMSVB2 0J 106M-8L
C1017	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1019	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1020	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1021	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1022	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1023	4030006800	Ceramic	C1608 SL 1H 221J-T-A
C1024	4030006750	Ceramic	C1608 SL 1H 101J-T-A
C1025	4610000300	Trimmer	ECRGA015E30
C1026	4030007020	Ceramic	C1608 CH 1H 120J-T-A
C1027	4030008750	Ceramic	C1608 CH 1H 360J-T-A
C1028	4030006860	Ceramic	C1608 JB 1H 102K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1030	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1034	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1035	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1036	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1037	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1038	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C1039	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1040	4030006600	Ceramic	C1608 SL 1H 090D-T-A
C1041	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C1042	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1043	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C1044	4510001350	Electrolytic	16 MS5 10 µF
C1045	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1046	4510003160	Electrolytic	16 RC2 22 µF (D=4.0)
C1047	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1048	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C1049	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C1050	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1051	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1052	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1053	4510001380	Electrolytic	25 MS5 4R7 µF
C1058	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1059	4550002890	Tantalum	TESVA 1A 225M1-8L
C1060	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1061	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1062	4550002890	Tantalum	TESVA 1A 225M1-8L
C1063	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1065	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1066	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1067	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1070	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP1001	0910025325	P.C. Board	B 2382E (MAIN)

[AF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1401	1110001810	IC	TA7368F (TP1)
Q1401	1530002060	Transistor	2SC4081 T107 R
Q1402	1530002060	Transistor	2SC4081 T107 R
Q1403	1520000270	Transistor	2SB1182 T201 Q
Q1404	1530002060	Transistor	2SC4081 T107 R
Q1405	1530002060	Transistor	2SC4081 T107 R
Q1406	1590000520	FET	2SJ106-GR (TE85R)
D1401	1160000060	Diode	DAN202U T107
R1401	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R1402	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R1403	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1404	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R1405	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R1406	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)

[AF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1407	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)
R1408	7030003710	Resistor	ERJ3GEYJ 184 V (180 kΩ)
R1409	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R1410	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R1411	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R1412	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R1413	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R1414	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R1415	7030003340	Resistor	ERJ3GEYJ 151 V (150 Ω)
R1416	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R1417	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1418	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
C1401	4550000280	Tantalum	TESVB2 1A 475M-8L
C1402	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1403	4510001340	Electrolytic	10 MS5 33 µF
C1404	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1405	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C1406	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C1407	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1408	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1409	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1411	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1412	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1413	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C1414	4550003040	Tantalum	TEMSVB2 0J 106M-8L
C1415	4030005110	Ceramic	C2012 JB 1E 473K-T-A
C1416	4510002740	Electrolytic	10 SS 220 µF
C1417	4550000550	Tantalum	TESVA 1V 224M1-8L
C1418	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
EP1401	0910025422	P.C. Board	B 2386B (AF)
EP1402	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[MIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1501	1110001540	IC	M5218FP-71A
Q1501	1590000430	Transistor	DTC144EU T107
Q1502	1590000720	Transistor	DTA144EU T107
R1501	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R1502	7030003880	Resistor	ERJ3GEYJ 244 V (240 kΩ)
R1503	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R1504	7030003690	Resistor	ERJ3GEYJ 124 V (120 kΩ)
R1505	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R1506	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R1507	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1508	7510000180	Thermistor	DTN-T203S223LS (T)
R1509	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 kΩ)
R1510	7030003570	Resistor	ERJ3GEYJ 123 V (12 kΩ)
R1511	7310002600	Trimmer	RV-110 (RH03A3AS4X0AA) 473

[MIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1512	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1513	7030003710	Resistor	ERJ3GEYJ 184 V (180 kΩ)
R1514	7310002790	Trimmer	RV-155 (RH03A3AE5J 154)
R1515	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R1516	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R1517	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
C1501	4030006470	Ceramic	C2012 JB 1H 153K-T-A
C1502	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1503	4030006470	Ceramic	C2012 JB 1H 153K-T-A
C1504	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1505	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1506	4550000530	Tantalum	TESVA 1V 104M1-8L
C1507	4030008650	Ceramic	C1608 JB 1H 332K-T-A
C1508	4030006740	Ceramic	C1608 SL 1H 820J-T-A
C1509	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C1510	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1511	4510001850	Electrolytic	16 MS5 4R7 µF
C1512	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1513	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP1501	0910024931	P.C. Board	B 2387A (MIC)
EP1502	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[DETA UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1301	1120001650	IC	TK10487MT1
Q1301	1530002020	Transistor	2SC3770-3-TA
D1301	1790000490	Diode	HSM88AS-TR
D1302	1750000130	Diode	DA204U T107
FI1301	2020000550	Ceramic Filter	CFUM455E
FI1302	2020000550	Ceramic Filter	CFUM455E
X1301	6070000060	Discriminator	CDBM455C7
X1302	6050005010	Crystal	CR-214
R1301	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R1302	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1303	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1304	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 kΩ)
R1305	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1306	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R1307	7030003730	Resistor	ERJ3GEYJ 274 V (270 kΩ)
R1308	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R1309	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1310	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1311	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)

[DETA UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1312	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1313	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1314	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1315	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R1316	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R1317	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R1318	7030003710	Resistor	ERJ3GEYJ 184 V (180 kΩ)
R1319	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1320	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1321	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
C1301	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1302	4030006740	Ceramic	C1608 SL 1H 820J-T-A
C1303	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1304	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1305	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1306	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C1307	4030006720	Ceramic	C1608 SL 1H 560J-T-A
C1308	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1309	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1310	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1311	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1312	4030006690	Ceramic	C1608 SL 1H 330J-T-A
C1313	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1314	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1315	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1316	4550000550	Tantalum	TESVA 1V 224M1-8L
C1318	4550000550	Tantalum	TESVA 1V 224M1-8L
C1319	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1320	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C1321	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1322	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C1323	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
EP1301	0910025772	P.C. Board	B 2590B (DETA)
EP1302	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[APC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1801	1520000270	Transistor	2SB1182 T201 Q
Q1802	1530002280	Transistor	2SC4081 T107 S
Q1803	1590000620	Transistor	FMS1 T148
Q1804	1520000270	Transistor	2SB1182 T201 Q
Q1805	1530002280	Transistor	2SC4081 T107 S
D1801	1160000050	Diode	DAP202U T107
R1802	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1803	7030003770	Resistor	ERJ3GEYJ 564 V (560 kΩ)
R1804	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R1806	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R1808	7030003590	Resistor	ERJ3GEYJ 183 V (18 kΩ)
R1809	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)

[APC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1810	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
C1801	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1802	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1805	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1806	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1807	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1808	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1809	4030006850	Ceramic	C1608 JB 1H 471K-T-A
EP1801	0910026230	P.C. Board	B 2391 (APC)
EP1802	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[REG UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1901	1180000530	IC	S-81250HG-RD-T1
IC1902	1130004170	IC	TC4S01F (TE85R)
IC1903	1130004170	IC	TC4S01F (TE85R)
Q1901	1530002280	Transistor	2SC4081 T107 S
Q1902	1510000510	Transistor	2SA1576 T107 R
Q1903	1530002280	Transistor	2SC4081 T107 S
Q1904	1510000500	Transistor	2SA1162-GR (TE85R)
Q1905	1530002280	Transistor	2SC4081 T107 S
Q1906	1520000200	Transistor	2SB798-T2 DK
D1901	1750000160	Diode	DA114 T107
D1902	1790000590	Diode	MA110 (TW)
D1903	1160000060	Diode	DAN202U T107
R1901	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R1902	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R1903	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1904	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1905	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
C1901	4510001360	Electrolytic	16 MS5 22 µF
C1902	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1903	4510003190	Electrolytic	6.3 RC2 47 µF (D=4.0)
C1904	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1905	4510001320	Electrolytic	6R3 MS5 47 µF
C1906	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1907	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1908	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1909	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C1910	4510003190	Electrolytic	6.3 RC2 47 µF (D=4.0)
C1911	4030006850	Ceramic	C1608 JB 1H 471K-T-A
EP1901	0910026170	P.C. Board	B 2392 (REG)
EP1902	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[PLL VCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1601	1140001310	IC	MB1504PF-G-BND
IC1602	1130004200	IC	TC4S66F (TE85R)
Q1601	1590000970	Transistor	FMA2 T148
Q1602	1590000430	Transistor	DTC144EU T107
Q1603	1590000440	Transistor	DTA143ZU T107
Q1604	1510000620	Transistor	2SA1576 T107 S
Q1605	1530002280	Transistor	2SC4081 T107 S
Q1606	1560000340	FET	2SK210-Y (TE85R)
Q1607	1560000340	FET	2SK210-Y (TE85R)
Q1608	1530002560	Transistor	2SC4403-3-TR
Q1609	1530002560	Transistor	2SC4403-3-TR
Q1610	1530002560	Transistor	2SC4403-3-TR
D1601	1790000640	Varicap	MA363B (TX)
D1602	1790000640	Varicap	MA363B (TX)
D1603	1790000640	Varicap	MA363B (TX)
L1601	6200000750	Coil	LQH 3N 4R7M
L1602	6130002360	Coil	LB-257
L1603	6200000750	Coil	LQH 3N 4R7M
L1604	6200000750	Coil	LQH 3N 4R7M
L1605	6130002370	Coil	LB-258
L1606	6200000750	Coil	LQH 3N 4R7M
L1607	6200000260	Coil	LQN 2A R10K
L1608	6200000260	Coil	LQN 2A R10K
R1601	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1602	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R1603	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1604	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R1605	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R1606	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R1607	7030003390	Resistor	ERJ3GEYJ 391 V (390 Ω)
R1608	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R1609	7030003310	Resistor	ERJ3GEYJ 820 V (82 Ω)
R1610	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R1611	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R1612	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R1613	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R1614	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R1615	7030003650	Resistor	ERJ3GEYJ 563 V (56 kΩ)
R1616	7030003390	Resistor	ERJ3GEYJ 391 V (390 Ω)
R1617	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1618	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R1619	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R1620	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
C1601	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1602	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1603	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1604	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1605	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C1606	4550003080	Tantalum	TEMSVA 1A 335M-8L
C1607	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C1608	4030006670	Ceramic	C1608 SL 1H 270J-T-A
C1609	4030006570	Ceramic	C1608 SL 1H 060D-T-A
C1610	4030006550	Ceramic	C1608 SL 1H 040C-T-A
C1611	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1612	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1613	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1614	4030006750	Ceramic	C1608 SL 1H 101J-T-A
C1615	4030006520	Ceramic	C1608 SL 1H 010C-T-A
C1616	4030006550	Ceramic	C1608 SL 1H 040C-T-A
C1617	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C1618	4030008630	Ceramic	C1608 JF 1C 104Z-T-A

[PLL VCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1619	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1620	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1621	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1622	4030006550	Ceramic	C1608 SL 1H 040C-T-A
C1623	4030006580	Ceramic	C1608 SL 1H 070D-T-A
C1624	4030006580	Ceramic	C1608 SL 1H 070D-T-A
C1625	4030006620	Ceramic	C1608 SL 1H 120J-T-A
C1626	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1627	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1628	4550000460	Tantalum	TESVA 1C 105M1-8L
EP1601	0910025372	P.C. Board	B 2583B (PLL VCO)

[RFA UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1201	1560000550	FET	2SK882-Y (TE85R)
D1201	1790000640	Varicap	MA363B (TX)
D1202	1790000640	Varicap	MA363B (TX)
D1203	1790000640	Varicap	MA363B (TX)
D1204	1790000640	Varicap	MA363B (TX)
R1201	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R1202	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R1203	7030003230	Resistor	ERJ3GEYJ 180 V (18 Ω)
R1204	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R1205	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R1206	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
C1201	4030006700	Ceramic	C1608 SL 1H 390J-T-A
C1202	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C1203	4030008570	Ceramic	C1608 SL 1H R75C-T-A
C1204	4030006610	Ceramic	C1608 SL 1H 100D-T-A
C1205	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1206	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1207	4030006590	Ceramic	C1608 SL 1H 080D-T-A
C1208	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1209	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C1210	4030006620	Ceramic	C1608 SL 1H 120J-T-A
C1211	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C1212	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C1214	4030006560	Ceramic	C1608 SL 1H 050C-T-A
C1215	4030006560	Ceramic	C1608 SL 1H 050C-T-A
C1216	4030006550	Ceramic	C1608 SL 1H 040C-T-A
C1217	4030006560	Ceramic	C1608 SL 1H 050C-T-A
EP1201	0910024772	P.C. Board	B 2383B (RFA)
EP1202	6910003110	Lead Frame	HFB2.0-0.7-8 (N)

[RFB UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L1251	6150003580	Coil	LS-394
L1252	6150003590	Coil	LS-395
L1253	6150003600	Coil	LS-404
L1254	6150003590	Coil	LS-395
EP1251	0910024811	P.C. Board	B 2384A (RFB)

[ENC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D3201	1160000050	Diode	DAP202U T107
C3201	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C3202	4030006850	Ceramic	C1608 JB 1H 471K-T-A
S3201	2260000890	Encoder	SRBM1L040A [CHANNEL]
S3202	2260001150	Switch	SW-103 (SKHUPC007B) [LIGHT (LOCK)] [LIGHT] (U.S.A. only)
EP3201	0910026181	P.C. Board	B 2395A (ENC)

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R4001	7210001440	Variable Resistor	RK097111101NA (10KA) [VOL]
R4002	7210001450	Variable Resistor	RK0971110051A (10KB) [SQL]
C4001	4510002650	Electrolytic	16 MS7 100 µF
C4002	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C4003	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP4001	0910026192	P.C. Board	B 2396B (VR)

[PTT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
S3101	2230000770	Switch	SW-104 (SKHUPE004B) [HI/LOW]
S3102	2230000770	Switch	SW-104 (SKHUPE004B) [PTT]
EP3101	0910026690	P.C. Board	B 2394 (PTT)

[PRT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q5001	1520000200	Transistor	2SB798-T2 DK
Q5002	1530002280	Transistor	2SC4081 T107 S
D5001	1730000970	Zener	RD15M-T2B2
D5002	1790000670	Diode	SB07-03C-TA
D5003	1790000670	Diode	SB07-03C-TA
D5004	1790000590	Diode	MA110 (TW)
D5005	1730002160	Zener	02CZ5.1-Z (TE85R)
R5001	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R5002	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R5003	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R5004	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R5005	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R5006	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R5007	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R5008	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R5009	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
C5001	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5002	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5003	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C5004	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5005	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP5001	0910026111	P.C. Board	B 2397A (PRT)

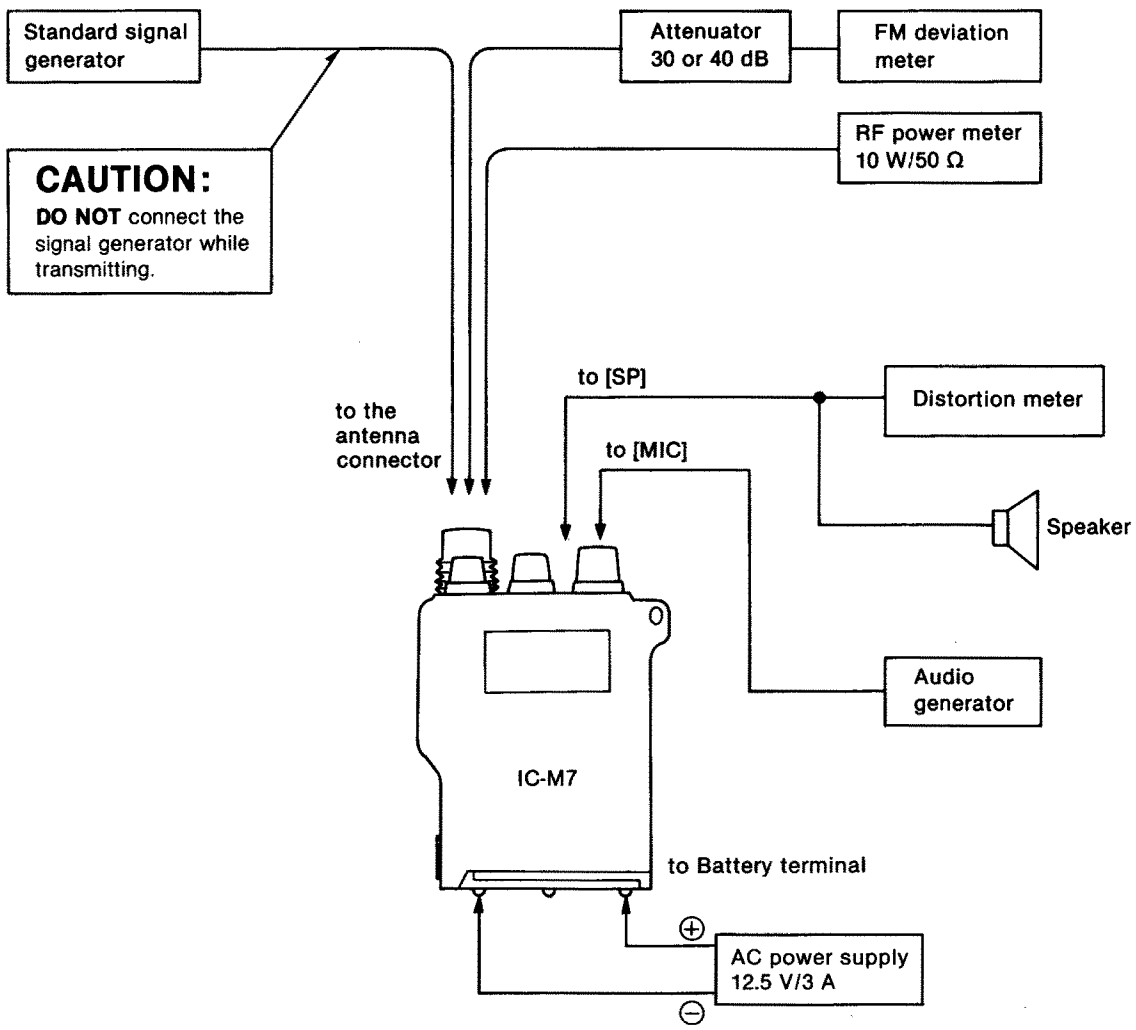
SECTION 7 ADJUSTMENT PROCEDURES

7-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
AC power supply	Output voltage : 12.5 V DC Current capacity : 3 A or more	AC milli-voltmeter	Measuring range : 10 mV~10 V
		External speaker	Impedance : 8 Ω
RF power meter (terminated type)	Measuring range : 1~10 W Frequency range : 140~180 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Audio generator	Frequency range : 300~3000 Hz Output level : 1~500 mV
		Attenuator	Power attenuation : 30 or 40 dB Capacity : 10 W or more
Frequency counter	Frequency range : 0.1~180 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Distortion meter	Measuring range : 0.1~20 %
		FM deviation meter	Frequency minimum : 180 MHz Measuring range : 0~±10 kHz
Oscilloscope	Frequency range : DC~20 MHz Measuring range : 0.01~10 V		
Standard signal generator (SSG)	Frequency range : 0.1~180 MHz Output level : −127~−17 dBm (0.1 μV~32 mV)		

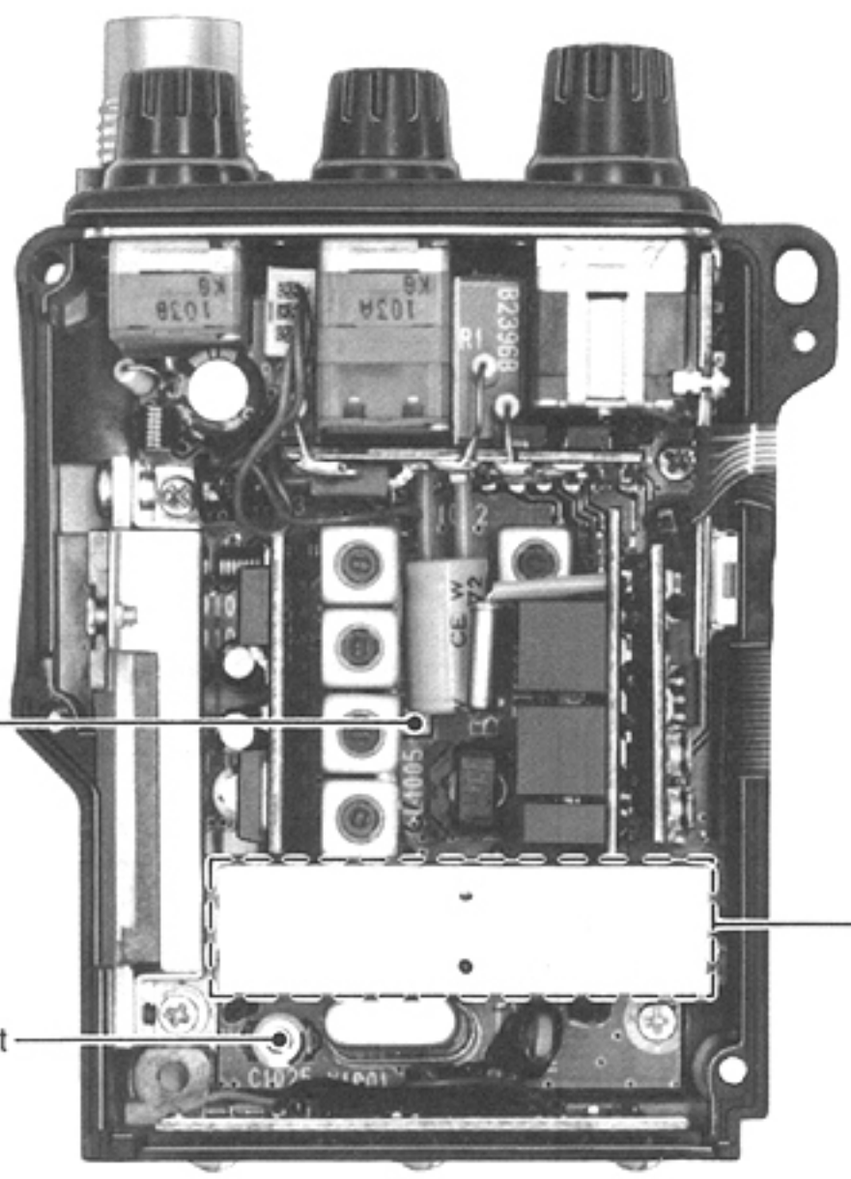
■ CONNECTION



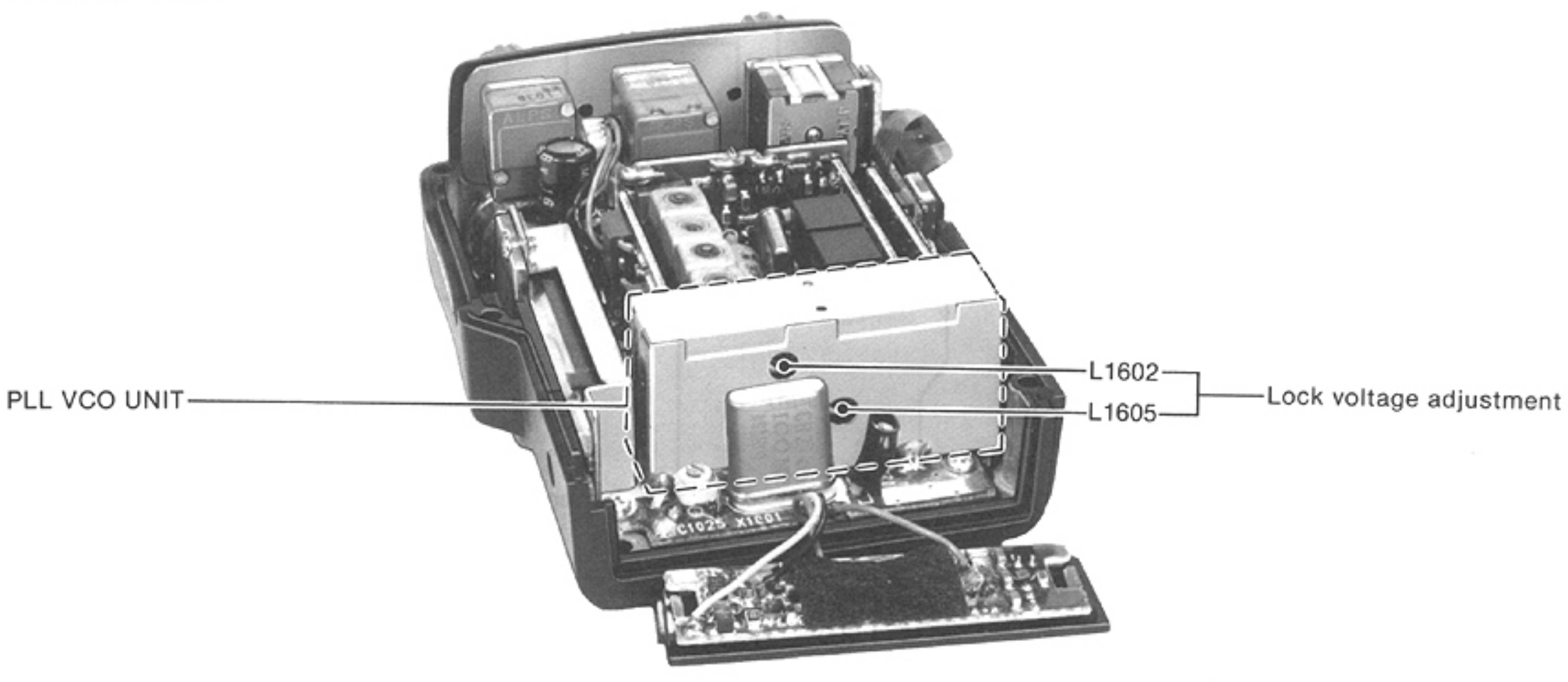
7-2 PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	• Operating channel : 16 • Receiving	PLL	Connect the oscilloscope to CP1001.	1.8 V DC	PLL VCO	L1602
	2	• Transmitting			2.8 V DC		L1605
REFERENCE FREQUENCY	1	• Operating channel : 16 • Connect a 50 Ω dummy load. • Transmitting	Top panel	Loose couple the frequency counter to the dummy load.	156.800 MHz	MAIN	C1025

MAIN UNIT



PLL VCO UNIT

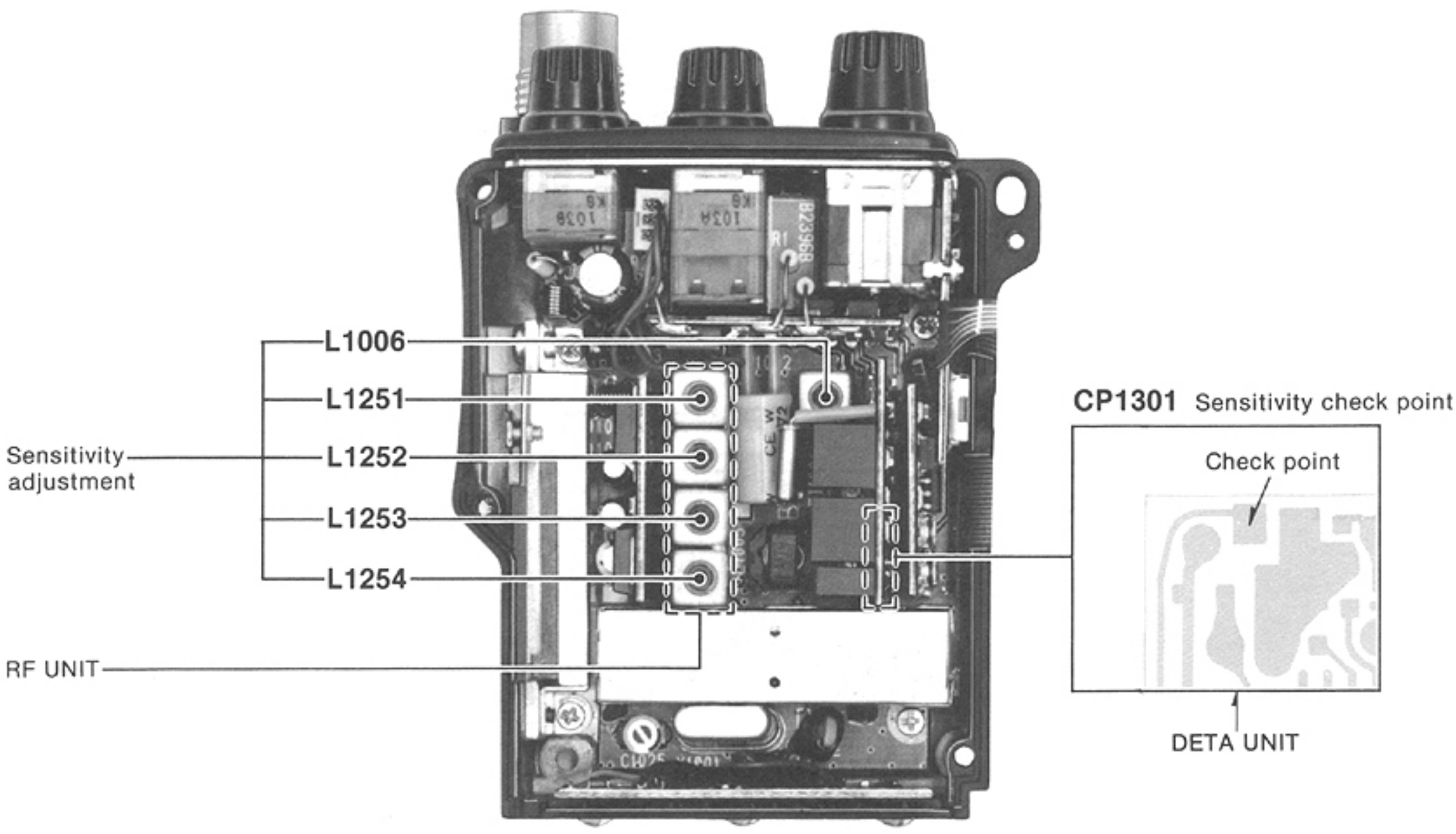


7-3 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Operating channel : 16 • Apply an RF signal to the antenna connector. Frequency: 156.800 MHz Level : 0.35 µV (−116 dBm) Mod. : 1 kHz Dev. : ±3.5 kHz • [SQL] control : Max. CCW • Receiving	DETA	Connect the oscilloscope to CP1301.	Pre-set to the top of the coil case.	RF	L1251, L1252, L1253, L1254
	2				Maximum level		Adjust in sequence L1251, L1252, L1253, L1254
						MAIN	L1006
	3	• Adjust SSG output level so that SINAD level becomes 12 dB.	Top panel	Connect the distortion meter with the 8 Ω load to the [SP] jack.	Applied RF signal level is less than 0.35 µV (−116 dBm).		Verify

CCW: Counterclockwise

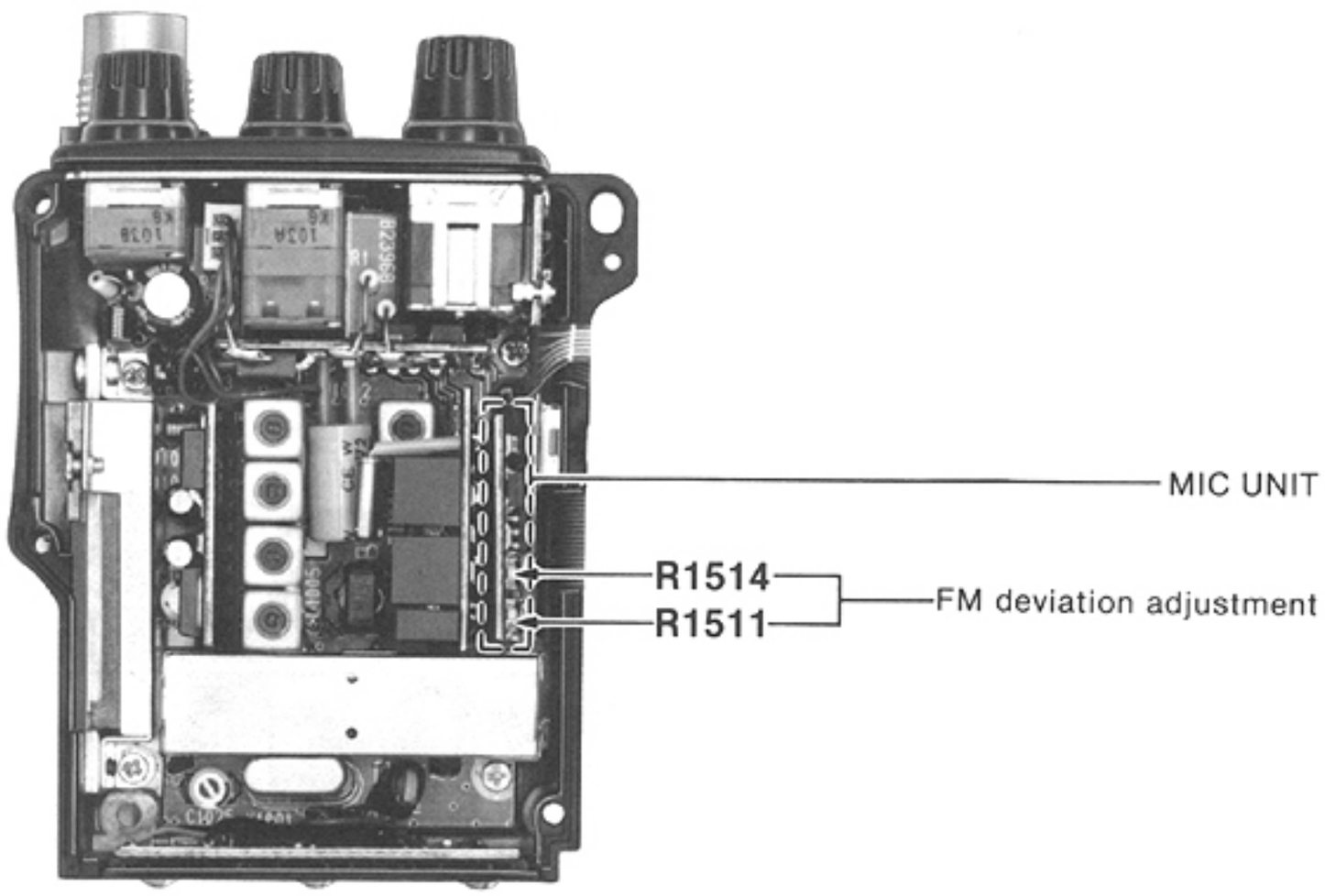
MAIN, DETA AND RF UNITS



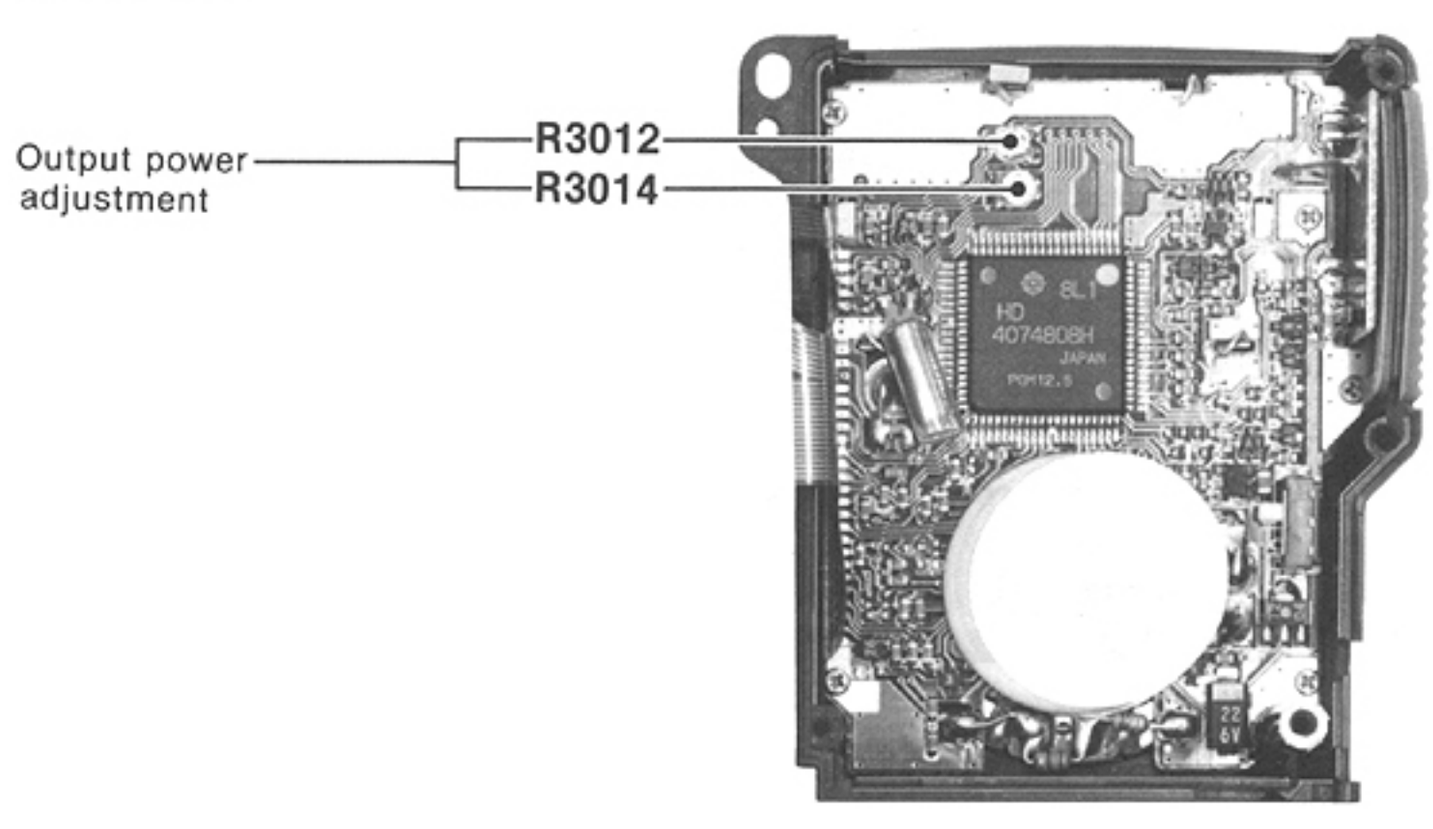
7-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Operating channel : 16 • [HI/LOW] switch : HI • Transmitting	Top panel	Connect the RF power meter to the antenna connector.	5.0 W (except FRA version) 1.0 W (FRA version)	LOGIC	R3012
	2	• [HI/LOW] switch : LOW			500 mW (except FRA version) 150 mW (FRA version)		R3014
FM DEVIATION	1	• Operating channel : 16 • Apply an AF signal to the [MIC] jack.: 1 kHz/150 mV • Set the FM deviation meter. HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±4.5 kHz	MIC	R1511
	2	• Apply an AF signal to the [MIC] jack.: 1 kHz/15 mV			±3.0 kHz		R1514

MIC UNIT



LOGIC UNIT

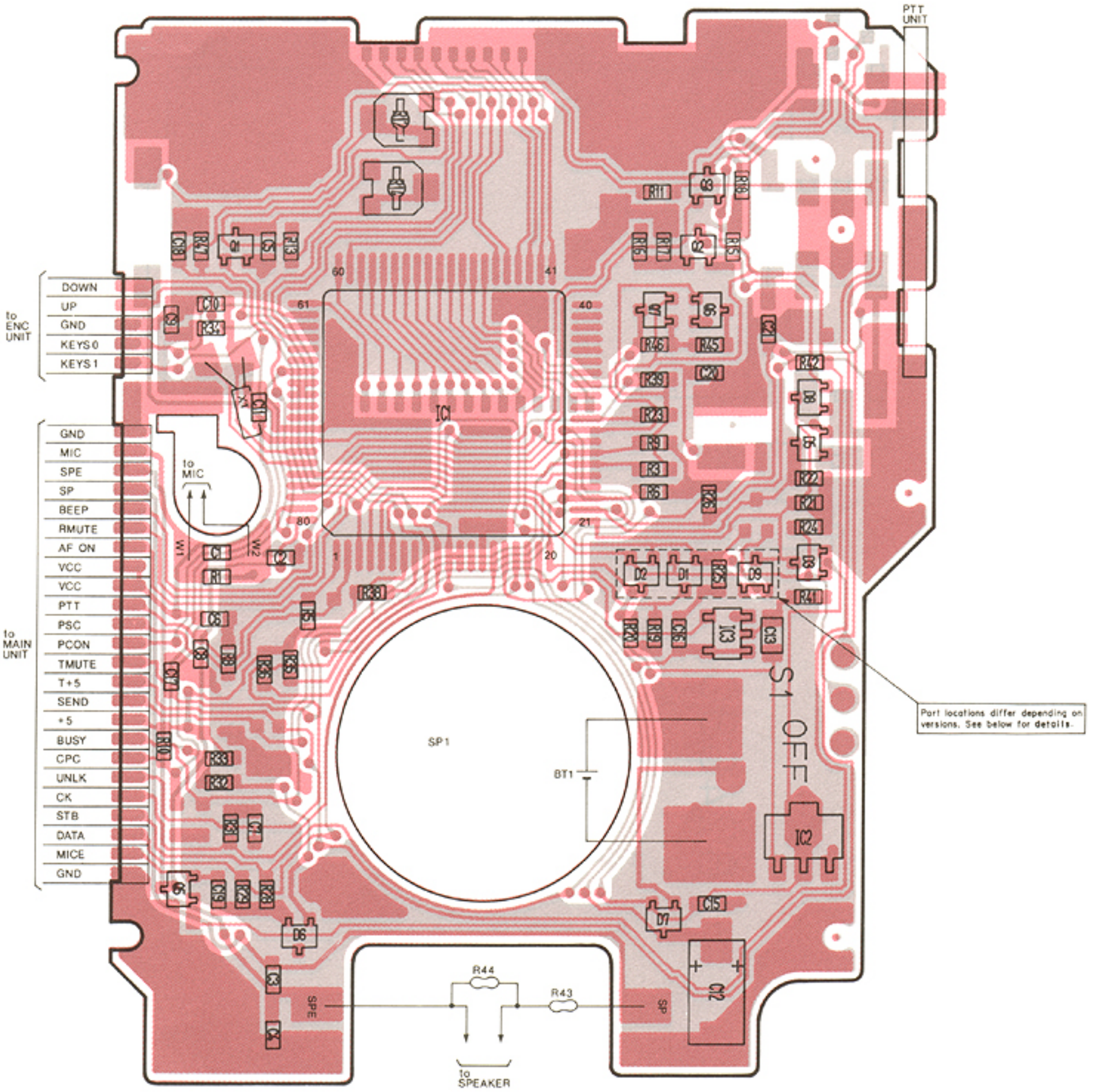


SECTION 8 BOARD LAYOUTS

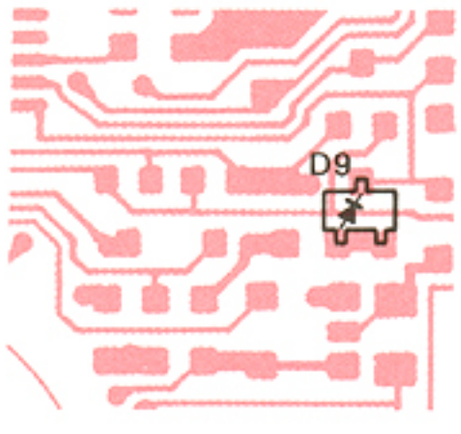
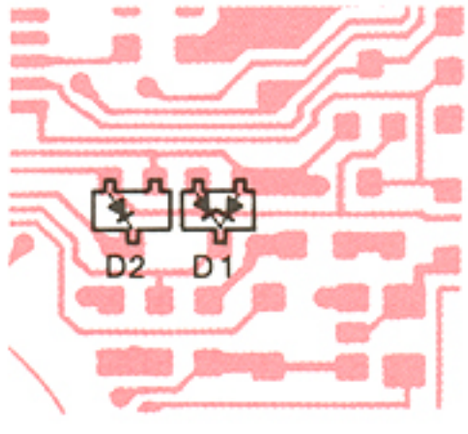
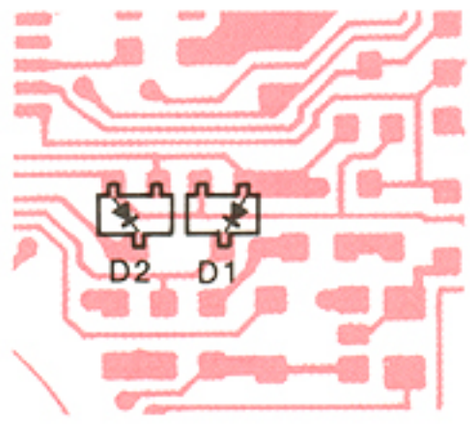
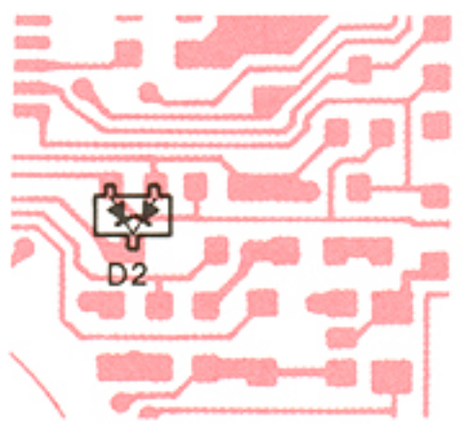
8-1 LOGIC UNIT

- **LOGIC UNIT (TOP VIEW)**

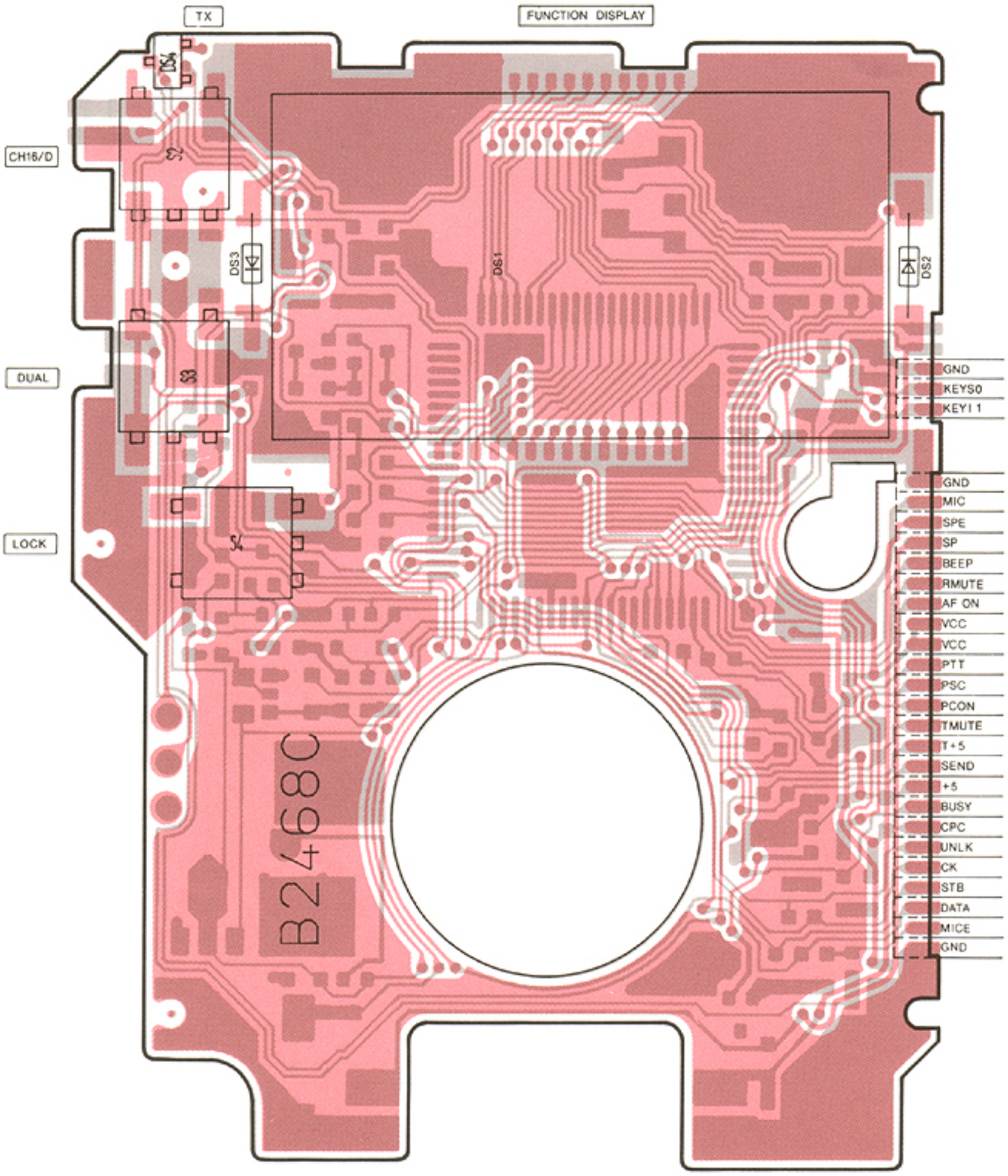
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.



NOTE: Add "3000" to each indicated part number on the unit for the actual part number.

USA	FRA, EUR	UK, ITA	HOL
			

- **LOGIC UNIT (BOTTOM VIEW)**

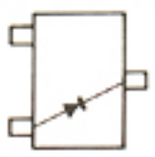


NOTE: Add "3000" to each indicated part number on the unit for the actual part number.

DA114
(Symbol: AV)

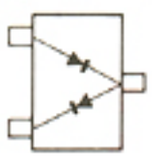
D3001 (U.K., Italy)
D3009 (U.S.A.)

DA115
(Symbol: AU)



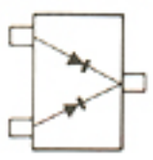
D3002 (France, U.K., Europe, Italy)
D3003, D3005

DA204U
(Symbol: K)



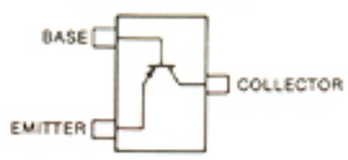
D3006

DAN202U
(Symbol: N)



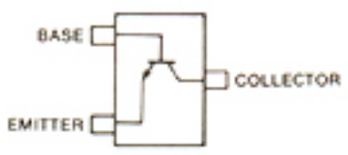
D3001 (France, Europe)
D3002 (Holland)
D3007, D3008

2SA1588 GR
(Symbol: ZG)



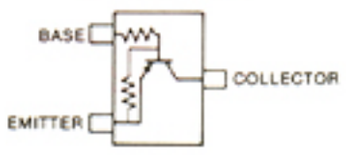
Q3007

2SC4081 R
(Symbol: BR)



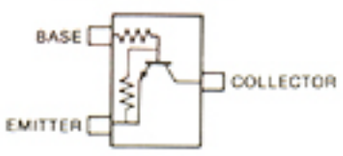
Q3002

DTA144EU
(Symbol: 16)



Q3003

DTC144EU
(Symbol: 26)

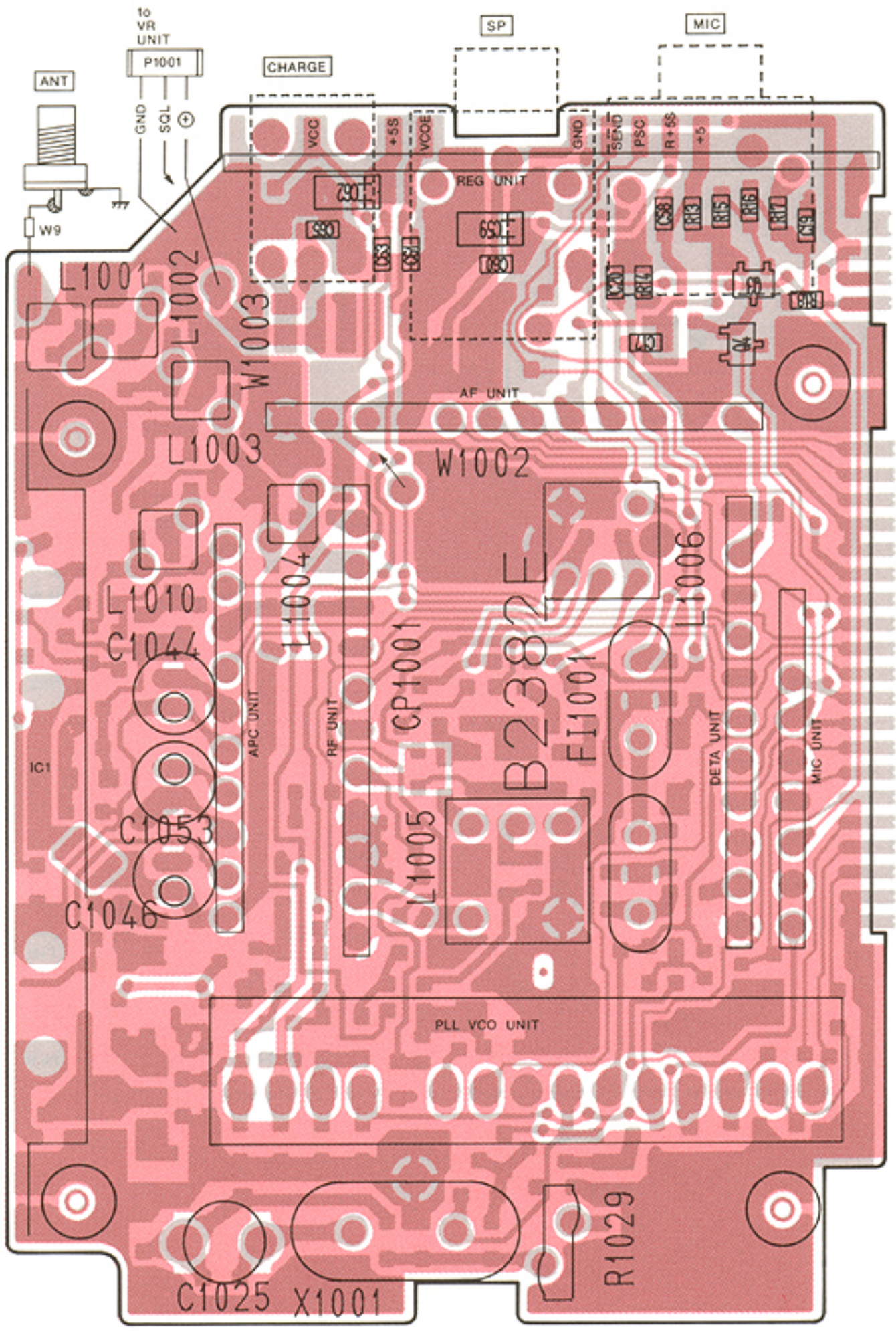


Q3001, Q3005, Q3006

8-2 MAIN UNIT

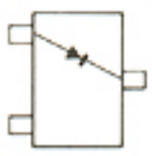
• MAIN UNIT (TOP VIEW)

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



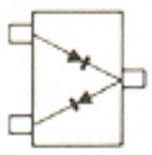
NOTE: Add "1000" to each indicated part number on the unit for the actual part number.

1SS153
(Symbol: A9)



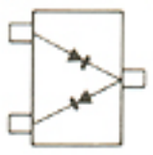
D1002

DA204U
(Symbol: K)



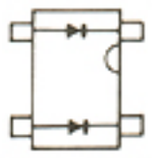
D1006

HSM88AS
(Symbol: C1)



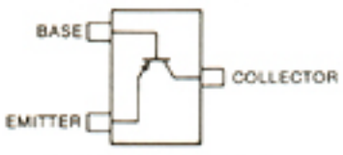
D1003, D1004

MA862
(Symbol: M1I)



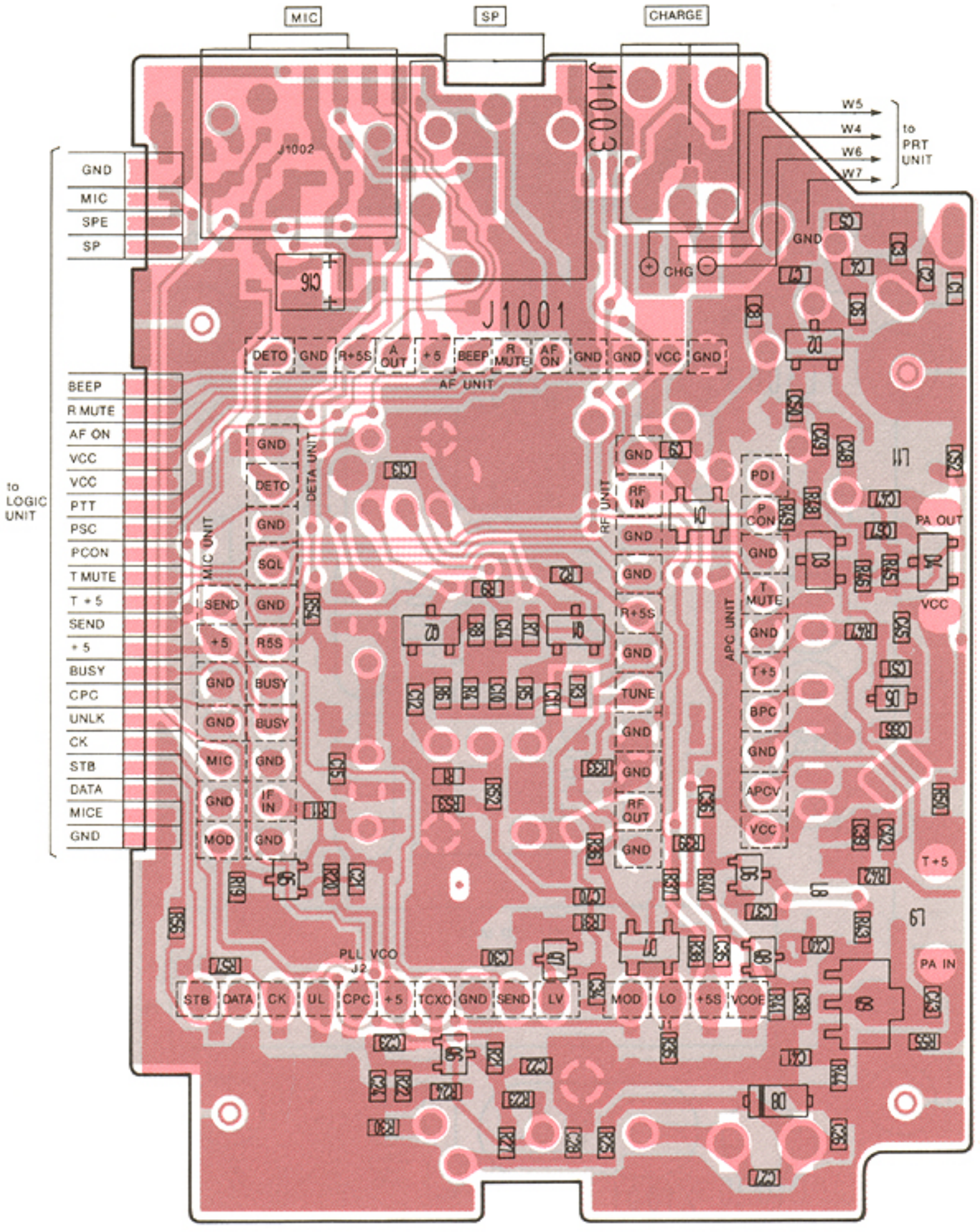
D1001, D1007

2SA1576 R
(Symbol: FR)



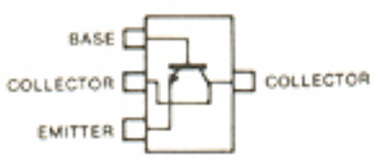
Q1003, Q1005

- **MAIN UNIT**
  (BOTTOM VIEW)



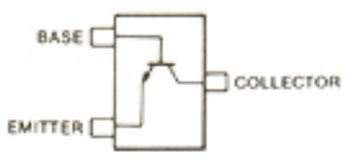
NOTE: Add "1000" to each indicated part number on the unit for the actual part number.

2SC2954
(Symbol: QK)



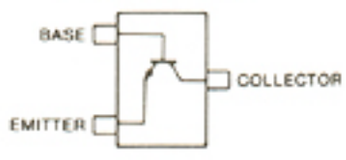
Q1009

2SC3356
(Symbol: R22)



Q1001, Q1002

2SC4403 3
(Symbol: LY3)

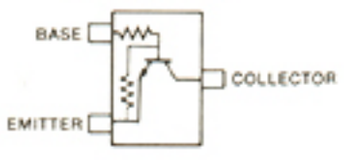


Q1006, Q1008

2SK880 Y
(Symbol: XY)

Q1007

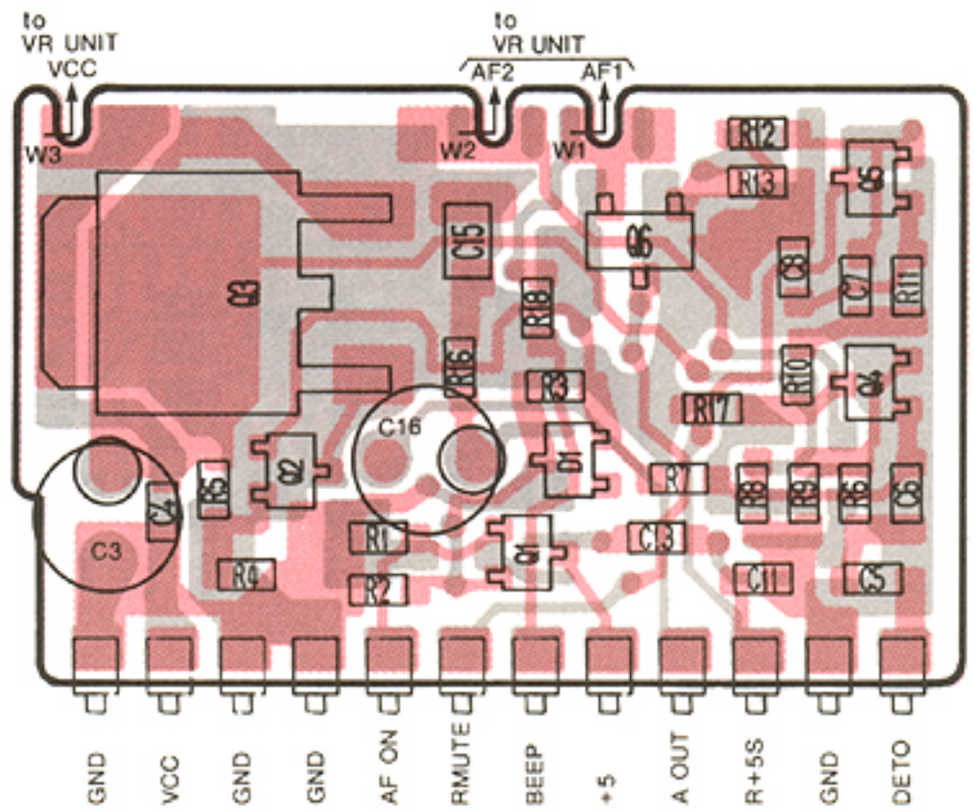
DTC144EU
(Symbol: 26)

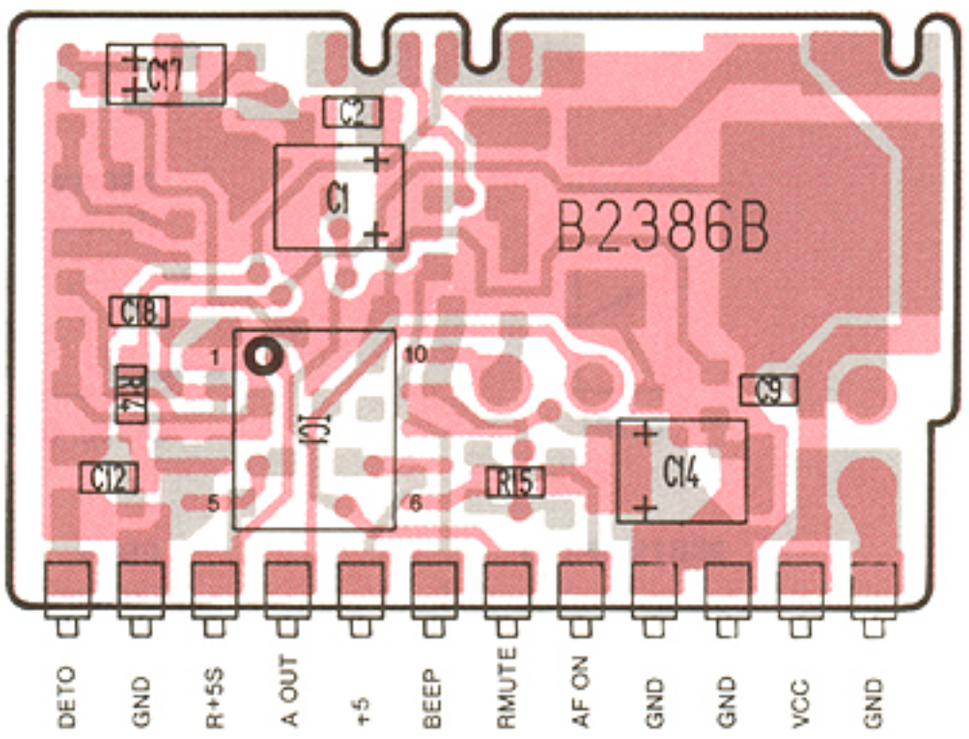


Q1004

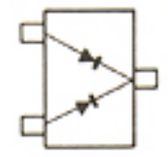
8-3 AF AND MIC UNITS

• AF UNIT





DAN202U
(Symbol: N)

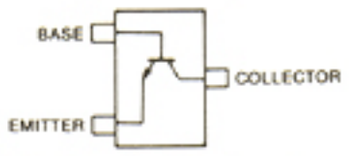


D1401

2SB1182F5 Q

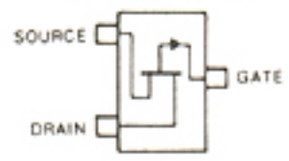
Q1403

2SC4081 R
(Symbol: BR)



Q1401, Q1402, Q1404
Q1405

2SJ106 GR
(Symbol: VG)

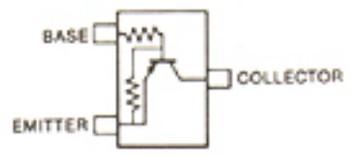


Q1406

NOTE: Add "1400" to each indicated part number on the unit for the actual part number.

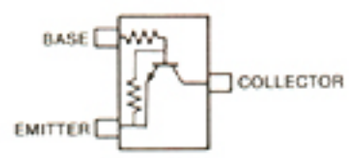
• MIC UNIT

DTA144EU
(Symbol: 16)



Q1502

DTC144EU
(Symbol: 26)

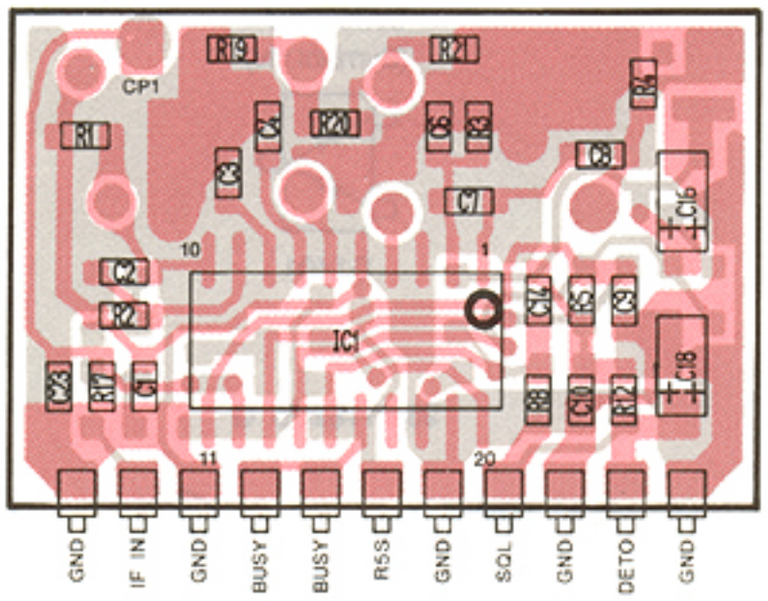


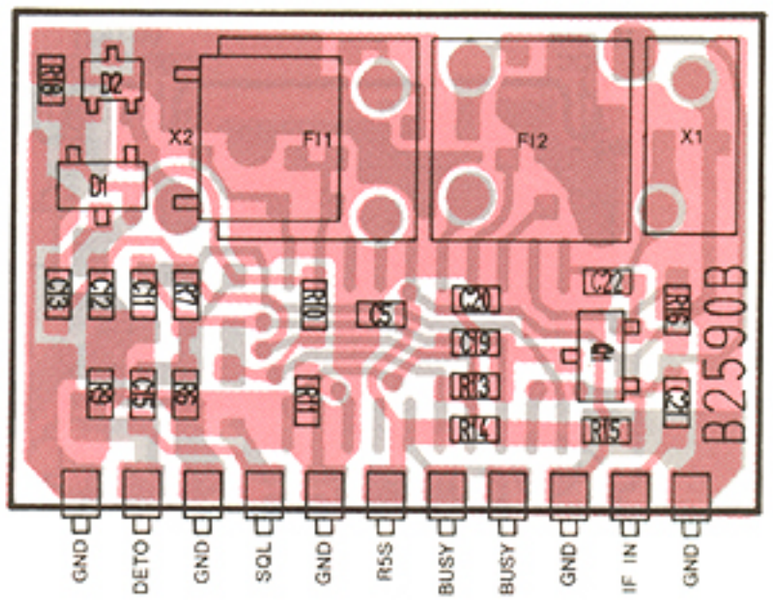
Q1501

NOTE: Add "1500" to each indicated part number on the unit for the actual part number.

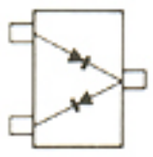
8-4 DETA, APC AND REG UNITS

• DETA UNIT



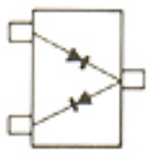


DA204U
(Symbol: K)



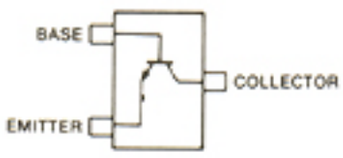
D1302

HSM88AS
(Symbol: C1)



D1301

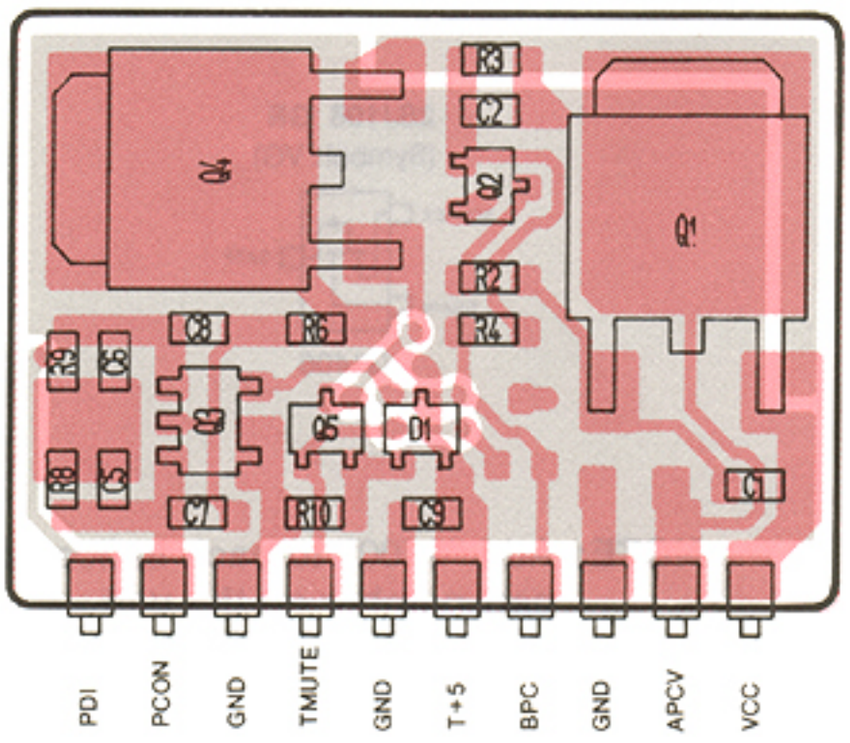
2SC3770 3
(Symbol: JY3)



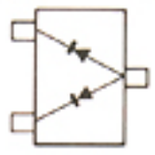
Q1301

NOTE: Add "1300" to each indicated part number on the unit for the actual part number.

• APC UNIT

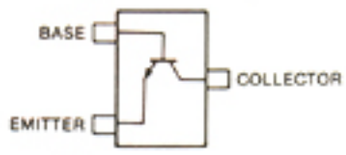


DAP202U
(Symbol: P)



D1801

2SC4081 S
(Symbol: BS)

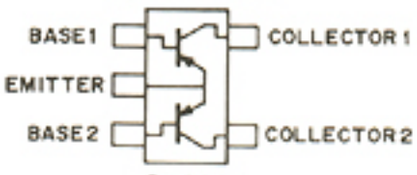


Q1802, Q1805

2SB1182F5 Q

Q1801, Q1804

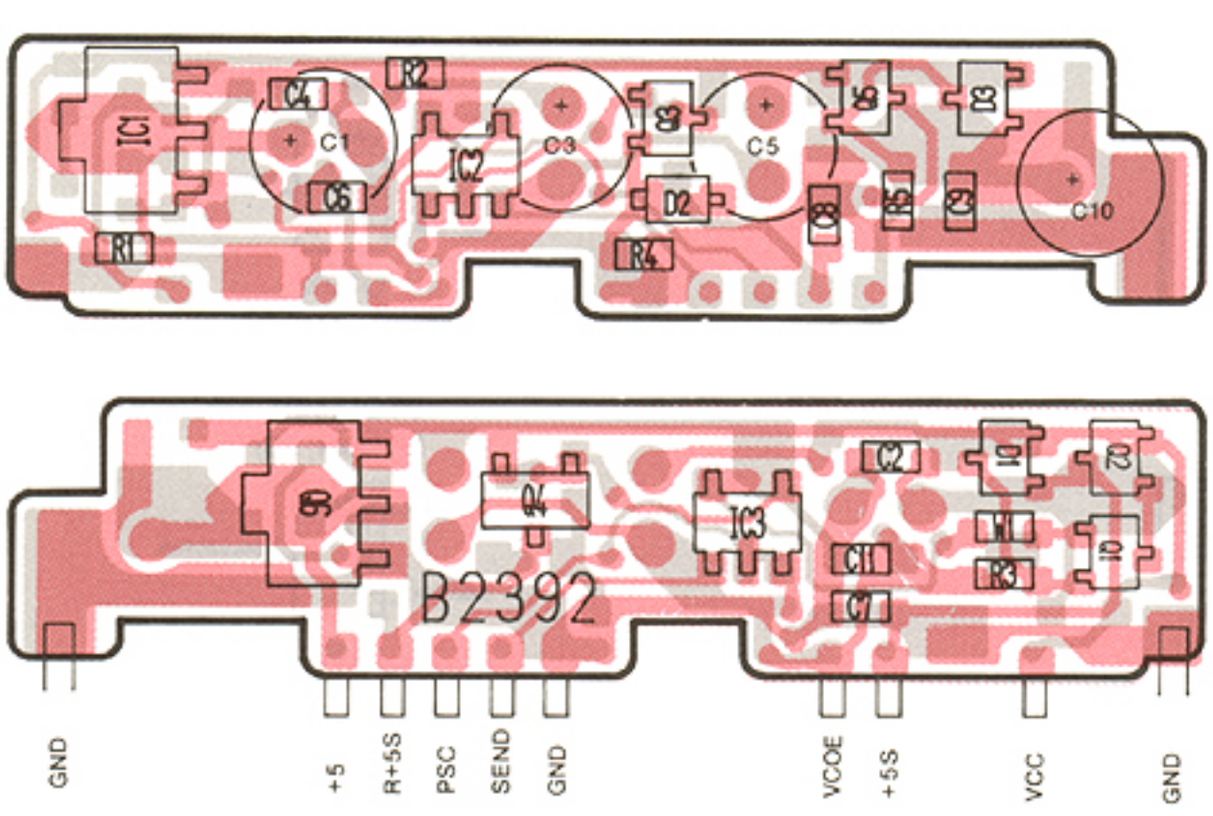
FMS1
(Symbol: S1)



Q1803

NOTE: Add "1800" to each indicated part number on the unit for the actual part number.

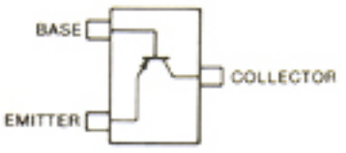
• REG UNIT



DA114
(Symbol: AV)

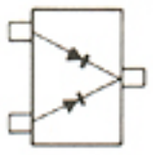
D1901

2SA1162 GR
(Symbol: SG)



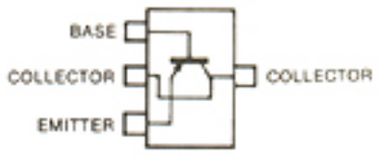
Q1904

DAN202U
(Symbol: N)



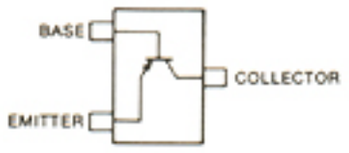
D1903

2SB798
(Symbol: DK)



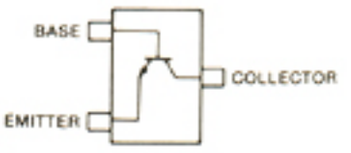
Q1906

2SA1576 R
(Symbol: FR)



Q1902

2SC4081 S
(Symbol: BS)

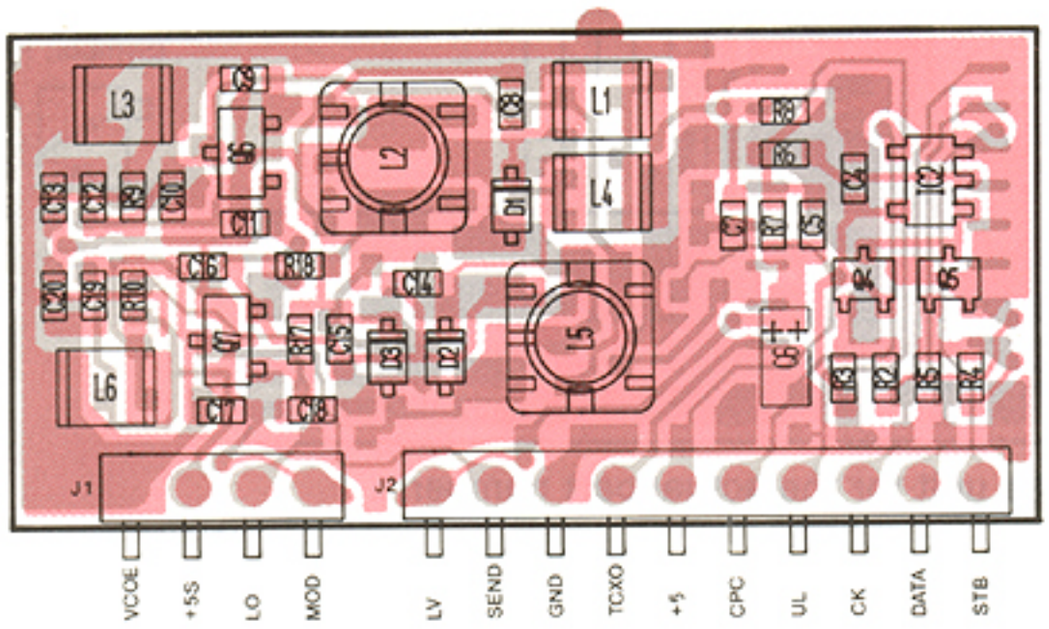


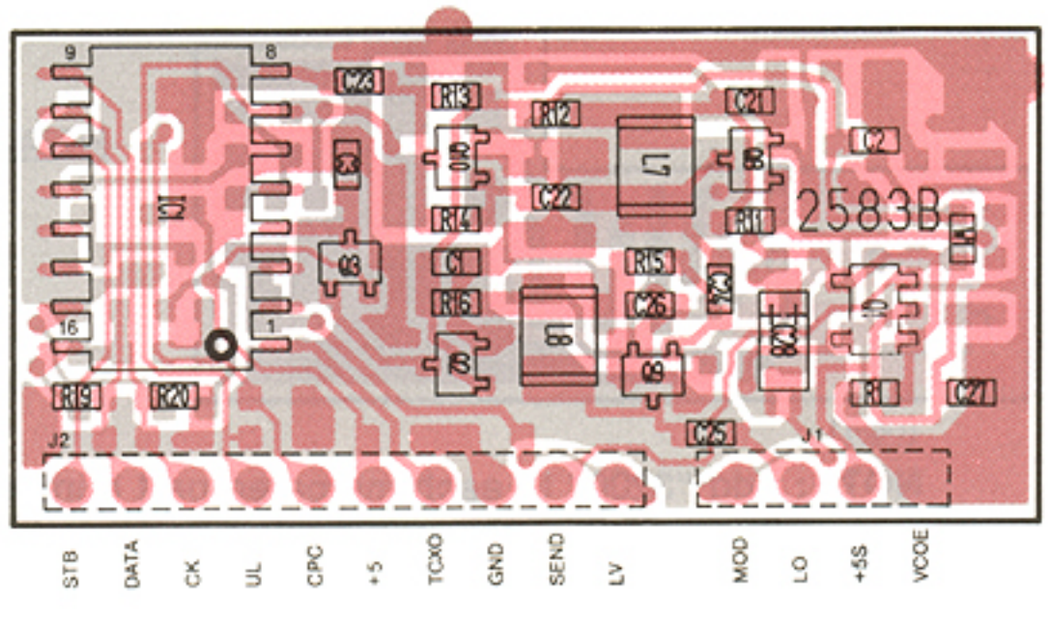
Q1901, Q1903, Q1905

NOTE: Add "1900" to each indicated part number on the unit for the actual part number.

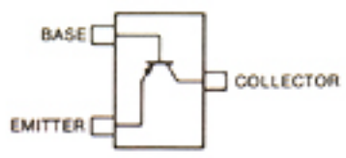
8-5 PLL VCO, RFA AND RFB UNITS

• PLL VCO UNIT



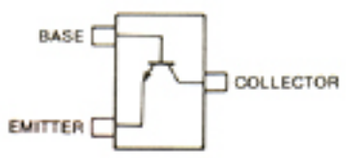


2SA1576 S
(Symbol: FS)



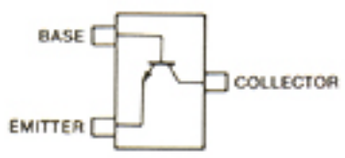
Q1604

2SC4081 S
(Symbol: BS)



Q1605

2SC4403 3
(Symbol: LY3)

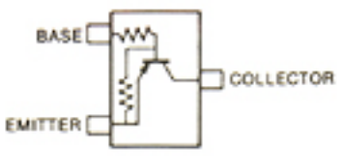


Q1608, Q1609, Q1610

2SK210 Y
(Symbol: YY)

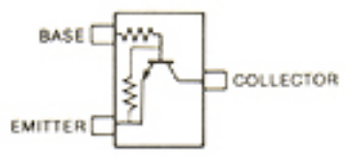
Q1606, Q1607

DTA143ZU
(Symbol: 113)



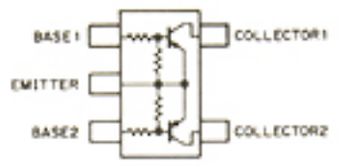
Q1603

DTC144EU
(Symbol: 26)



Q1602

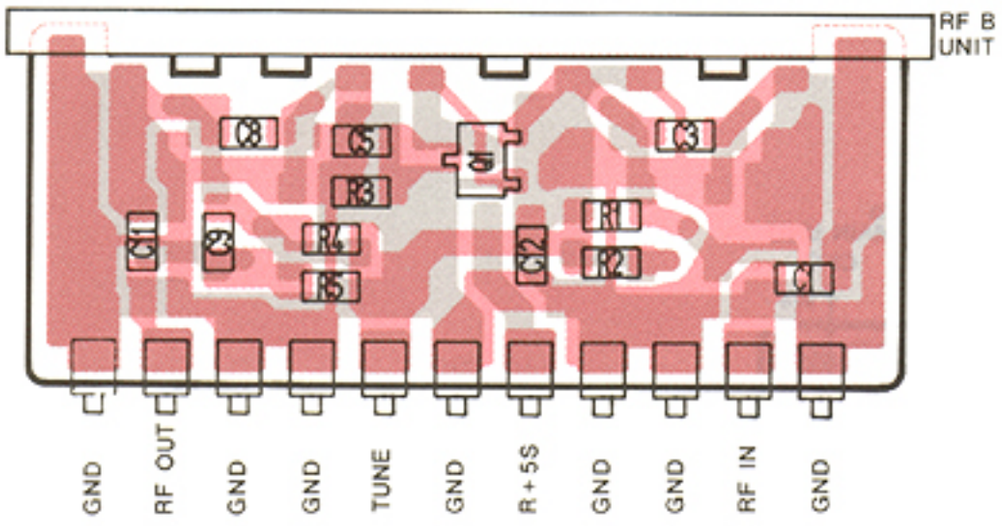
FMA2
(Symbol: A2)

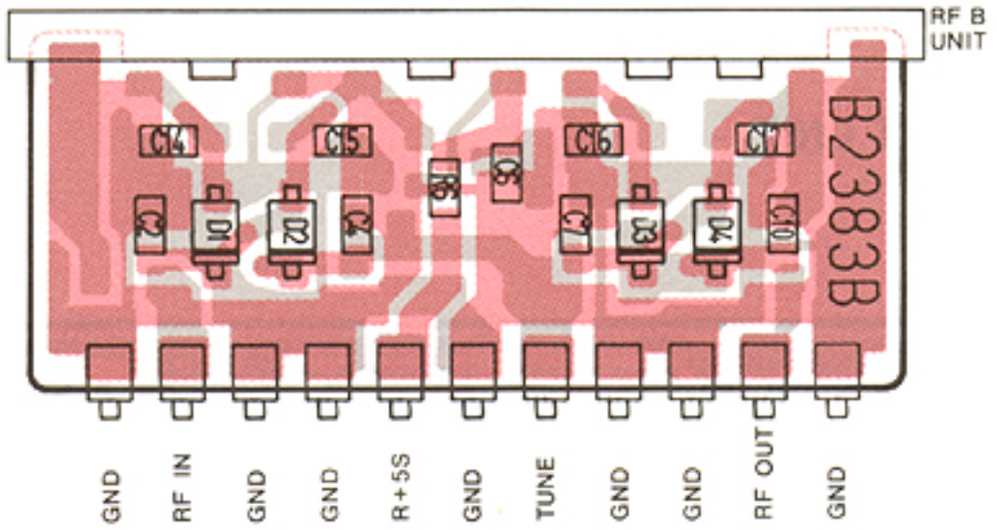


Q1601

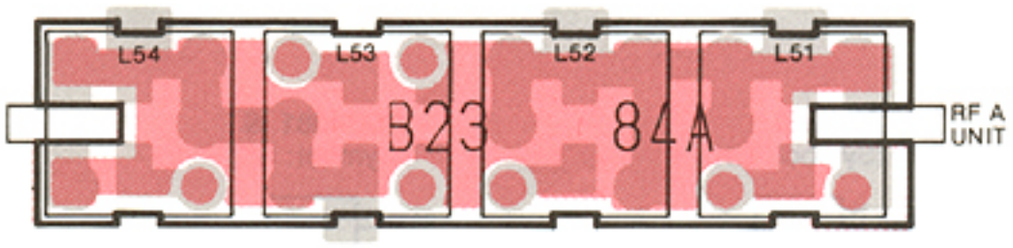
NOTE: Add "1600" to each indicated part number on the unit for the actual part number.

• RFA UNIT

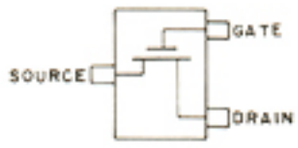




• RFB UNIT



2SK882 Y
(Symbol: TY)

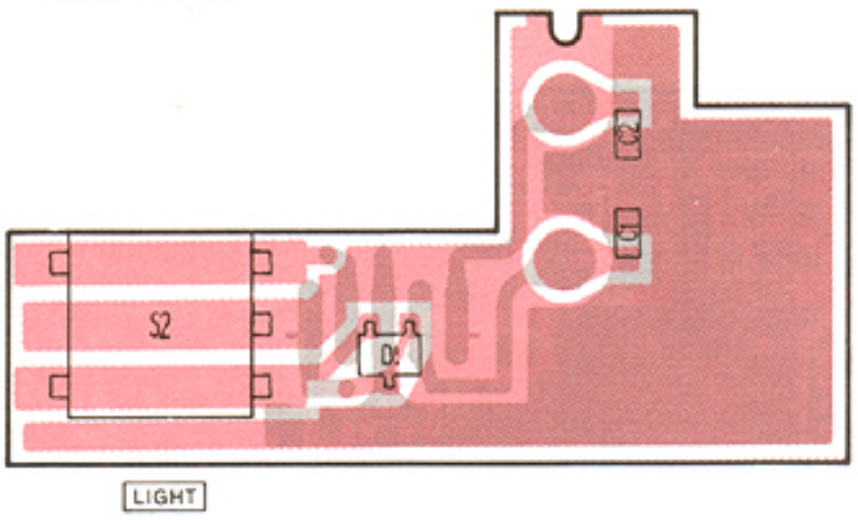


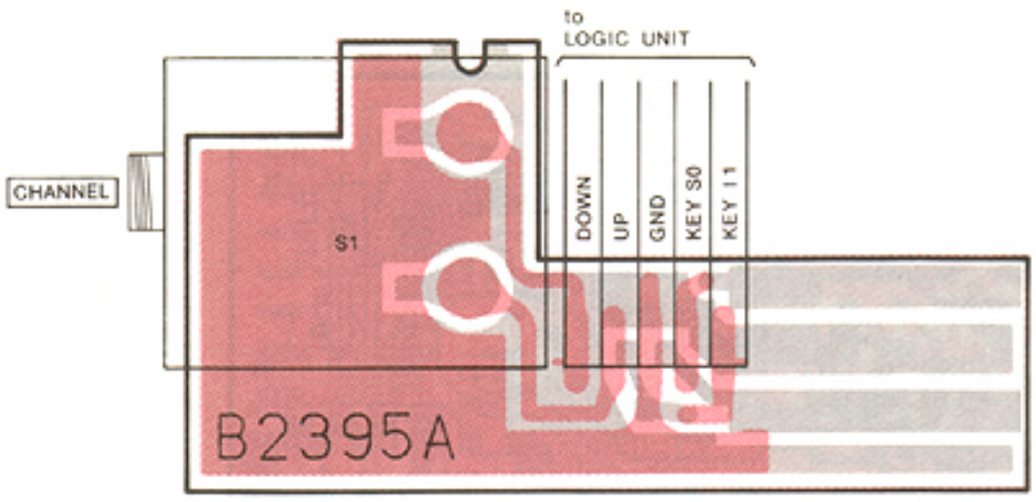
Q1201

NOTE: Add "1200" to each indicated part number on the unit for the actual part number.

8-6 LOGIC AND PRT UNITS

• ENC UNIT



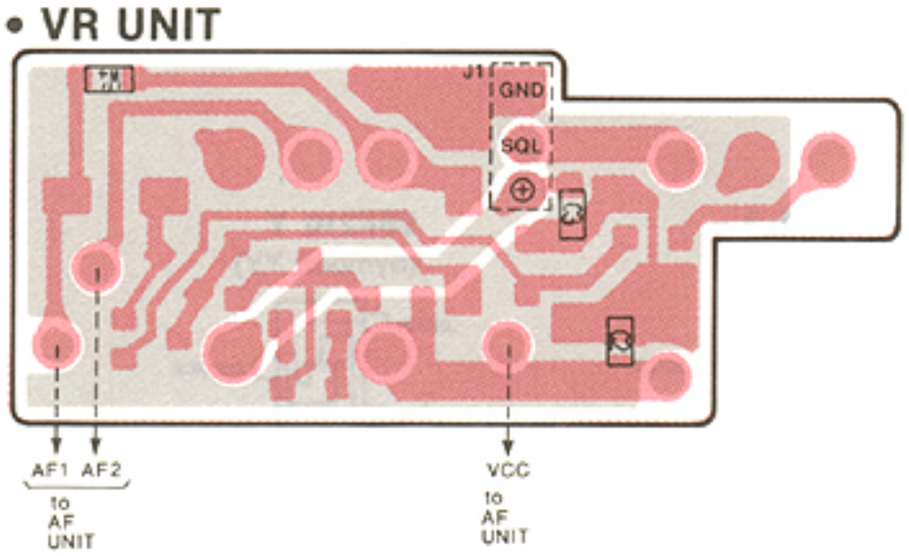


DAP202U
(Symbol: P)

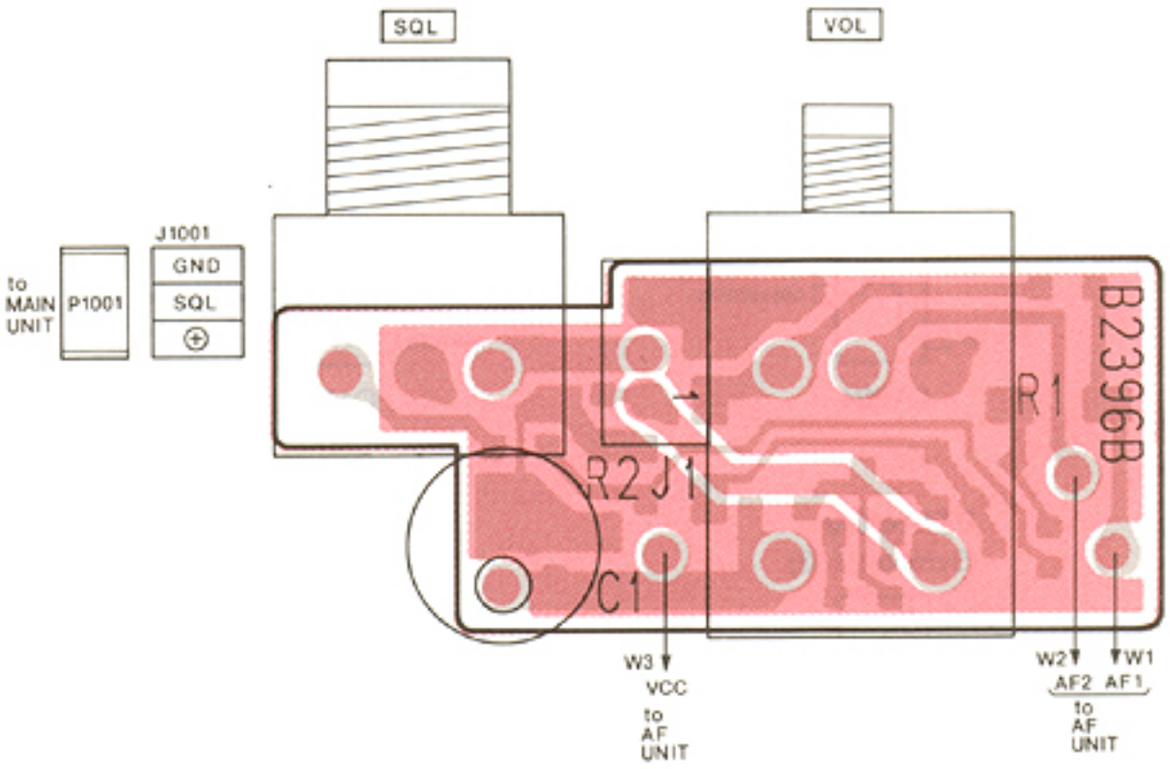
D3201

NOTE: Add "3200" to each indicated part number on the unit for the actual part number.

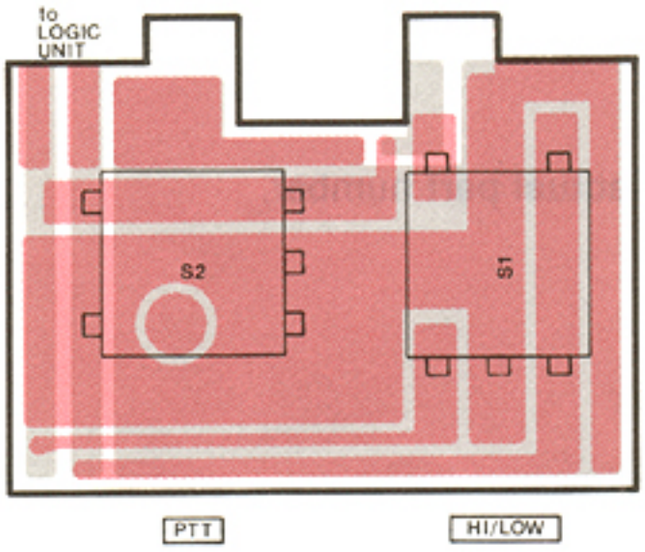
• VR UNIT



NOTE: Add "4000" to each indicated part number on the unit for the actual part number.

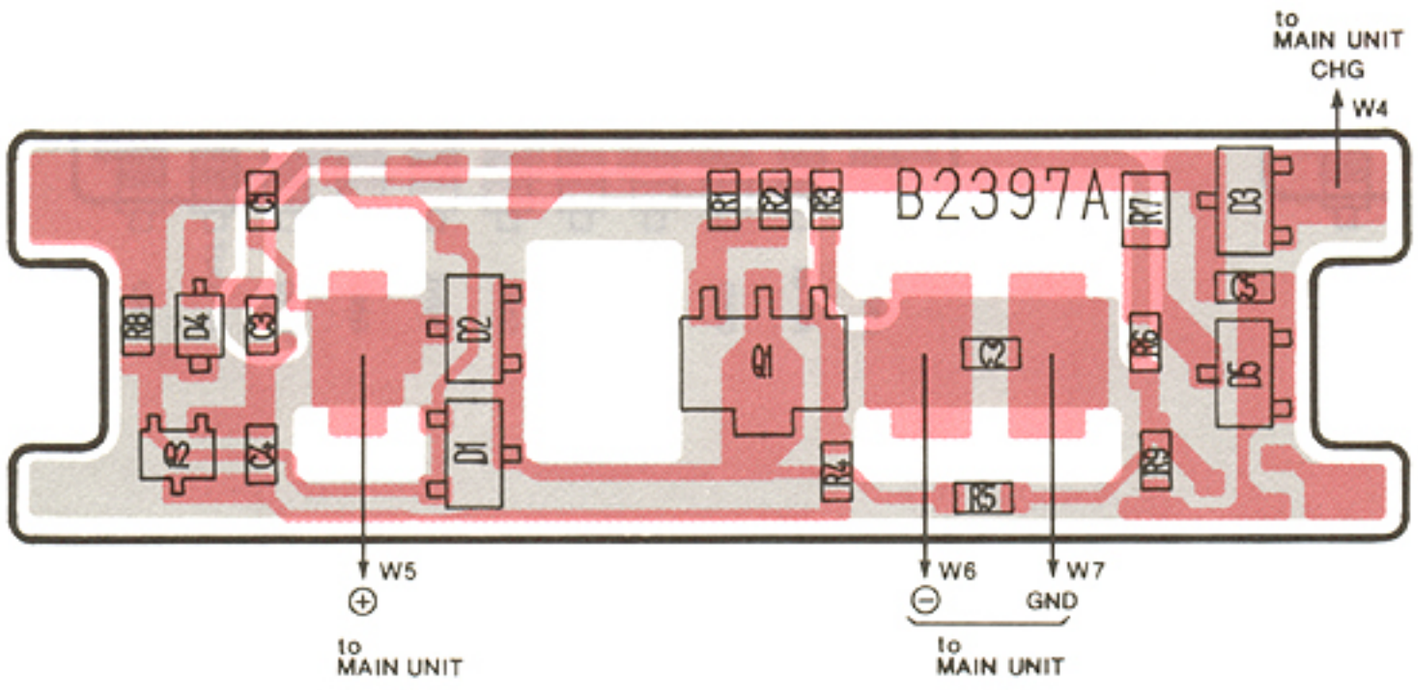


• PTT UNIT



NOTE: Add "3100" to each indicated part number on the unit for the actual part number.

• PRT UNIT

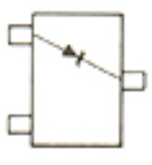


NOTE: Add "5000" to each indicated part number on the unit for the actual part number.

02CZ5.1 Z
(Symbol: 5.1Z)

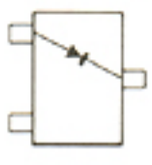
D5005

RD15M B2
(Symbol: 152)



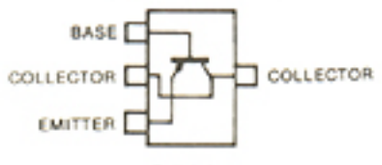
D5001

SB07-03C
(Symbol: J)



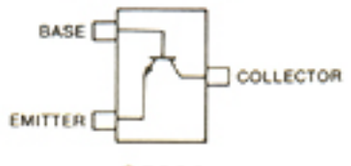
D5002, D5003

2SB798
(Symbol: DK)



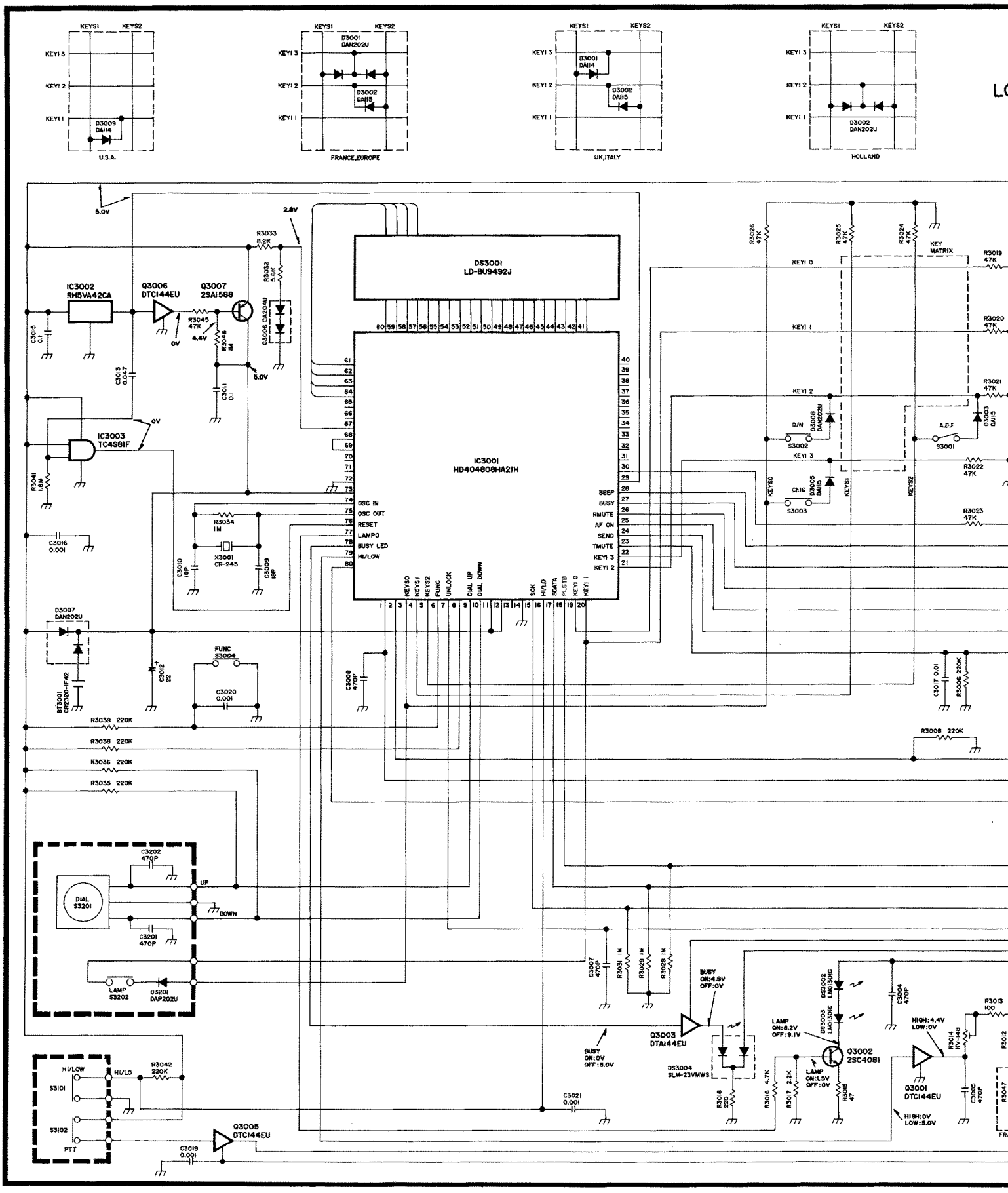
Q5001

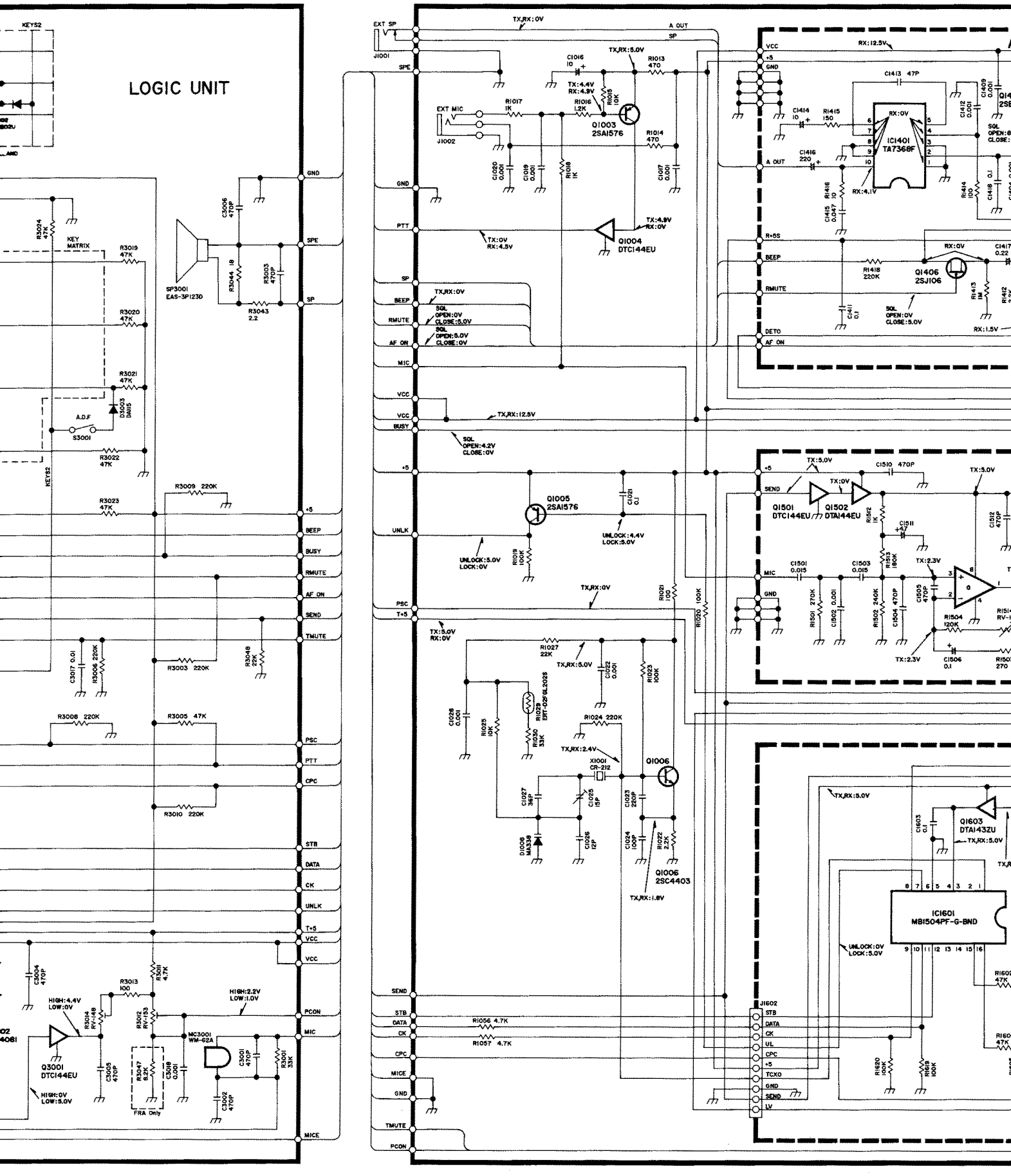
2SC4081 S
(Symbol: BS)

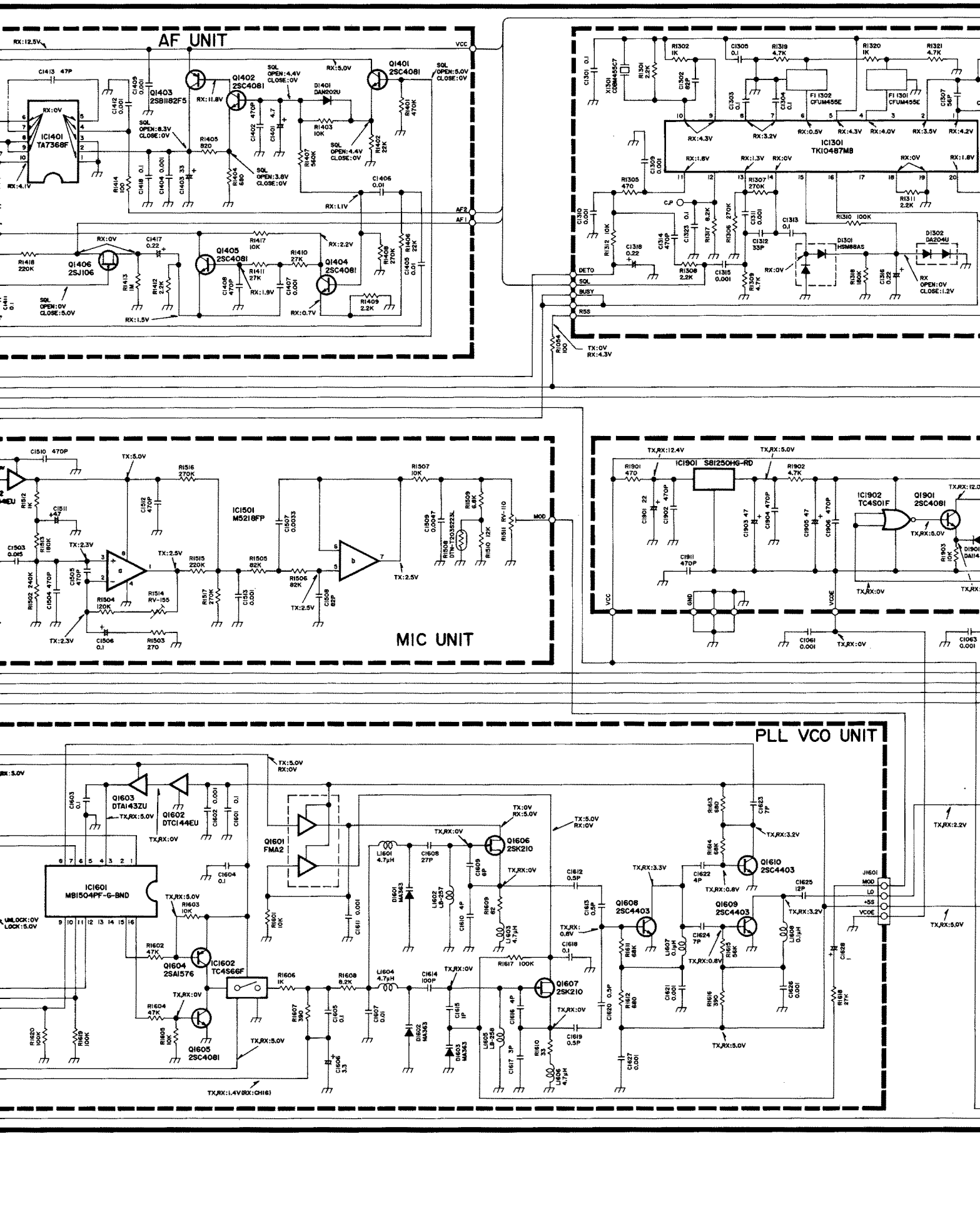


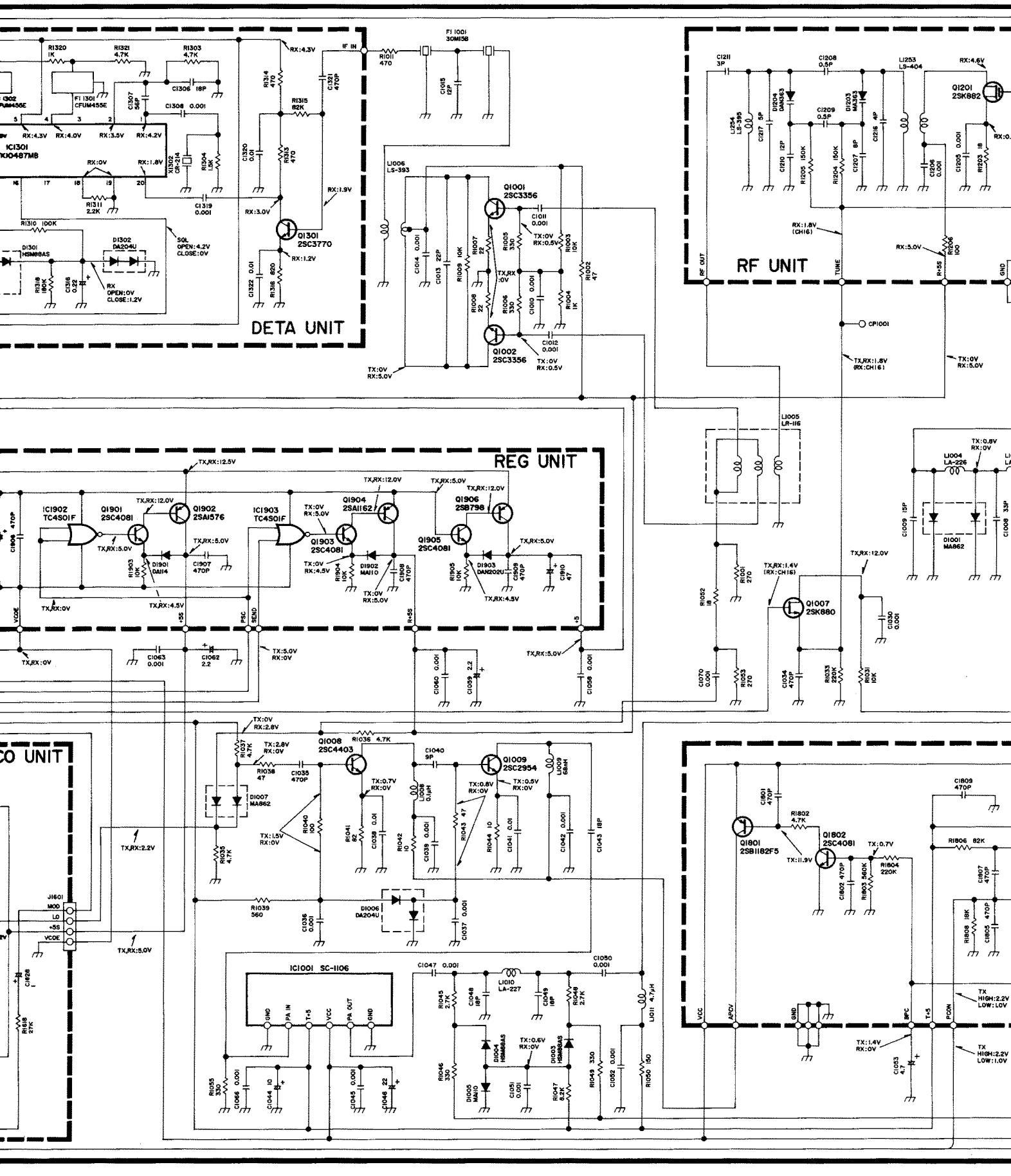
Q5002

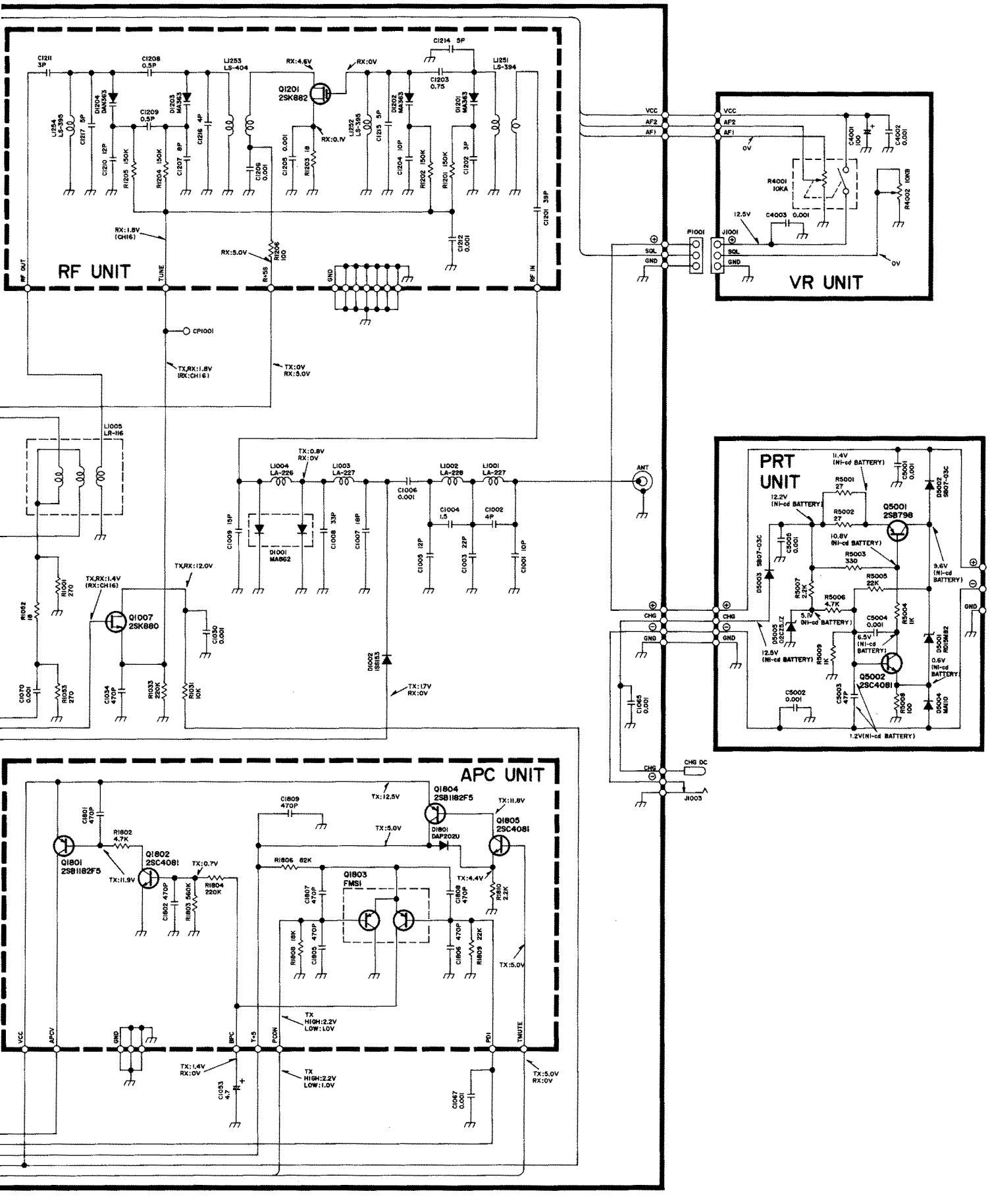
SECTION 9 VOLTAGE DIAGRAM




LOGIC UNIT
KEY2
KEY MATRIX
R3024 47K
R3019 47K
R3020 47K
R3021 47K
D3003 DAN15
A.D.F
S3001
R3022 47K
R3023 47K
R3009 220K
R3003 220K
R3006 220K
C3017 0.01
R3048 22K
R3008 220K
R3005 47K
R3010 220K
C3004 470P
R3013 100
R3011 4.7K
HIGH:4.4V LOW:0V
R3014 RV-14B
HIGH:2.2V LOW:1.0V
R3012 RV-15B
MC3001 WM-62A
C3005 470P
R3047 8.2K
C3018 0.001
FRA Only
C3002 470P
C3001 470P
R3001 33K
Q3001 DTC144EU
HIGH:0V LOW:5.0V
C3006 470P
SP3001 EAS-3P1230
R3044 18
R3003 470P
R3043 2.2
GND
SPE
SP
BEEP
RMUTE
AF ON
SEND
TMUTE
PSC
PTT
CPC
STB
DATA
CK
UNLK
T+5
VCC
VCC
PCON
MIC
MICE
EXT SP
J1001
EXT MIC
J1002
TX,RX:0V
A OUT
SP
C1016 10
TX:4.4V RX:4.9V
R1015 10K
R1013 470
R1017 1K
R1016 1.2K
Q1003 2SA1576
R1014 470
C1020 0.001
C1019 0.001
R1018 1K
C1017 0.001
TX:4.8V RX:0V
Q1004 DTC144EU
TX:0V RX:4.5V
TX,RX:12.5V
SQL OPEN:4.2V CLOSE:0V
Q1005 2SA1576
C1021 0.1
UNLOCK:4.4V LOCK:5.0V
UNLOCK:5.0V LOCK:0V
R1019 10K
TX,RX:0V
R1021 100
R1020 100K
TX:5.0V RX:0V
R1027 22K
TX,RX:5.0V
C1022 0.001
R1023 100K
C1026 0.001
R1025 10K
D1029 ERT-05FGL2026
R1030 33K
R1024 220K
TX,RX:2.4V
X1001 CR-212
Q1006
C1027 36P
C1025 15P
C1023 220P
D1006 MA339
C1028 12P
C1024 100P
R1022 2.2K
Q1006 2SC4403
TX,RX:1.8V
SQL OPEN:8 CLOSE:
VCC
+5
GND
RX:12.5V
C1413 47P
C1414 10
R1415 150
RX:0V
IC1401 TA7368F
C1412 0.001
C1416 220
R1416 10
RX:4.1V
C1415 0.047
R1414 100
C1418 0.1
R+5S
BEEP
RMUTE
DETO
AF ON
R1418 220K
Q1406 2SJ106
C1417 0.22
R1413 1M
R1412
C1411 0.1
SQL OPEN:0V CLOSE:5.0V
RX:1.5V
SEND
TX:5.0V
C1510 470P
TX:0V
Q1501 DTC144EU
Q1502 DTA144EU
R1512 1K
C1511 4.7
C1512 470P
MIC
C1501 0.015
C1503 0.015
R1513 180K
TX:2.3V
GND
R1501 270K
C1502 0.001
R1502 240K
C1504 470P
C1505 470P
R1504 120K
C1506 0.1
R1503 270
TX,RX:5.0V
Q1603 DTA143ZU
C1603 0.1
IC1601 MB1504PF-G-BND
UNLOCK:0V LOCK:5.0V
J1602
STB
DATA
CK
UL
CPC
+5
TCXO
GND
SEND
LV
R1056 4.7K
R1057 4.7K
R1620 100K
R1621 100K
R1602 47K
R1603 47K


AF UNIT
IC1401 TA7368F
Q1401 2SC4081
Q1402 2SC4081
Q1403 2SB1182F5
Q1404 2SC4081
Q1405 2SC4081
Q1406 2SJ106
IC1301 TK10487MB
IC1501 M5218FP
MIC UNIT
IC1901 S8I250HG-RD
IC1902 TC4S01F
Q1901 2SC4081
PLL VCO UNIT
IC1601 MB1504PF-G-BND
IC1602 TC4S66F
Q1601 FMA2
Q1603 DTA143ZU
Q1602 DTC144EU
Q1604 2SA1576
Q1605 2SC4081
Q1606 2SK210
Q1607 2SK210
Q1608 2SC4403
Q1609 2SC4403
Q1610 2SC4403
VCC
DET0
SQL
BUSY
RSS
MOD
VCOE
GND


DETA UNIT
RF UNIT
REG UNIT
CO UNIT
IC1301
IC1902 TC4S01F
IC1903 TC4S01F
IC1001 SC-1106
Q1001 2SC3356
Q1002 2SC3356
Q1301 2SC3770
Q1201 2SK882
Q1901 2SC4081
Q1902 2SA1576
Q1903 2SC4081
Q1904 2SA1162
Q1905 2SC4081
Q1906 2SB798
Q1007 2SK880
Q1008 2SC4403
Q1009 2SC2954
Q1801 2SB1182F5
Q1802 2SC4081
D1001 MA862
D1002 MA110
D1003 HSM88AS
D1004 HSM88AS
D1005 MA110
D1006 DA204U
D1007 MA862
D1008 DA204U
D1201 DAN383
D1203 MA862
D1204 DAN383
D1301 HSM88AS
D1302 DA204U
D1901 DAN14
D1902 MA110
D1903 DAN202U
L1001 30MI58
L1004 LA-226
L1005 LR-116
L1006 LS-393
L1010 LA-227
L1011 4.7μH
L1201 LS-404
L1234 LS-395
L1253 LS-404
J1601
MOD
LO
+5S
VCOE
RF OUT
TUNE
R+5S
GND
VCC
APCV
BPC
T+5
PCON
IF IN
SQL
OPEN:4.2V
CLOSE:0V
RX
OPEN:0V
CLOSE:1.2V
TX:0V
RX:5.0V
TX,RX:12.5V
TX,RX:12.0V
TX,RX:5.0V
TX,RX:4.5V
TX,RX:0V
TX:5.0V
RX:0V
TX:2.8V
RX:0V
TX:0.7V
RX:0V
TX:0.8V
RX:0V
TX:0.5V
RX:0V
TX:0.6V
RX:0V
TX:1.4V
RX:0V
TX:11.9V
TX,RX:1.4V
(RX:CH16)
TX,RX:1.8V
(RX:CH16)
TX:0.8V
RX:0V
TX:2.2V
TX:1.5V
RX:0V
TX HIGH:2.2V
LOW:1.0V


RF UNIT
VR UNIT
PRT UNIT
APC UNIT
Q1201 2SK882
Q1007 2SK880
Q1804 2SB1182F5
Q1801 2SB1182F5
Q1802 2SC4081
Q1805 2SC4081
Q1803 FMSI
Q5001 2SB798
Q5002 2SC4081
D1001 MA862
D1801 DAP202U
D5002 1SS133
D5003 SB07-03C
D5004 MA110
D5005 DZ2S12Z
D5006 RD15M1Z
D5007 SB07-03C
ANT
CHG
CHG DC
GND
VCC
AF2
AF1
SQL
RF OUT
TUNE
R-SS
RF IN
TX:0.8V RX:0V
TX:12.5V
TX:11.8V
TX:5.0V
TX:0.7V
TX:4.4V
TX:1.7V RX:0V
TX:1.4V RX:0V
TX HIGH:2.2V LOW:1.0V
TX:5.0V RX:0V
TX,RX:1.8V (RX:CH16)
TX,RX:1.4V (RX:CH16)
TX,RX:12.0V
TX:0V RX:5.0V
RX:4.6V
RX:0V
RX:0.1V
RX:1.8V (CH16)
RX:5.0V
11.4V (Ni-cd BATTERY)
12.2V (Ni-cd BATTERY)
10.8V (Ni-cd BATTERY)
9.6V (Ni-cd BATTERY)
5.1V (Ni-cd BATTERY)
6.5V (Ni-cd BATTERY)
12.5V (Ni-cd BATTERY)
0.6V (Ni-cd BATTERY)
1.2V(Ni-cd BATTERY)

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