ICOM

SERVICE MANUAL

VHF MARINE TRANSCEIVER

IC-M9

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-M9** VHF MARINE TRANSCEIVER at the time of publication.

To upgrade quality, all 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 18 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-M9	MAIN UNIT	5 pieces
8810005720	Screw	PH B0 M2 × 20 ZK	IC-M9	Rear panel	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

SECTION 1 SPECIFICATIONS

■ GENERAL

• Frequency range	:	Transmit 156-157.5 MHz
		Receive 156-163 MHz
• Mode	:	FM (16K0G3E)
• Channel spacing	:	25 kHz
• Power supply requirement	:	BP-81 to BP-85, BP-90 or CM-89
• Current drain (at 12.5 V)	:	Transmit High 1.8 A max.
		Low 0.9 A max.
		Receive Max. audio 300 mA max.
		Squelched 15 mA typical
• Antenna impedance	:	50 Ω (unbalanced)
• Usable temperature range	:	−20°C to +60°C (−4°F to +140°F)
• Frequency stability	:	±5 ppm (−20°C to +60°C)
• Dimensions (with CM-89)	:	49 (W) × 123 (H) × 33 (D) mm; 1.9 (W) × 4.8 (H) × 1.3 (D) in (Projections not included)
• Weight (with CM-89)	:	310 g (10.9 oz)

■ TRANSMITTER

• Output power	:	High 5 W (with BP-85)
		4.5 W (typical, with CM-89)
		Low 500 mW
• Modulation system	:	Variable reactance phase modulation
• Microphone impedance	:	2 kΩ
• Max. frequency deviation	:	±5 kHz
• Spurious emissions	:	−65 dB
• FM noise and hum	:	−40 dB
• Audio response	:	+1 dB to −3 dB of +6 dB/octave with 300 Hz to 3000 Hz input

■ RECEIVER

• Receive system	:	Double-conversion superheterodyne
• Sensitivity	:	0.35 µV for 12 dB SINAD
• Intermediate frequencies	:	1st 30.875 MHz
		2nd 455 kHz
• Squelch sensitivity (at threshold)	:	Less than 0.3 µV
• Adjacent channel selectivity	:	−60 dB
• Intermodulation rejection	:	−60 dB
• Spurious rejection	:	−60 dB
• Audio output power	:	500 mW with an 8 Ω load
• FM noise and hum	:	−40 dB
• Audio response	:	+1 dB to −3 dB of −6 dB/octave with 300 Hz to 3000 Hz modulation

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

■ VHF MARINE CHANNEL LIST

INT ch.	U.S.A. ch.	Frequency (MHz)		Comment
		Transmit	Receive	
01	—	156.050	160.650	
01A	01A	165.050	156.050	
02	—	156.100	160.700	
02A	02A	156.100	156.100	
03	—	156.150	160.750	
03A	03A	156.150	156.150	
04	—	156.200	160.800	
04A	04A	156.200	156.200	
05	—	156.250	160.850	
05A	05A	156.250	156.250	
06	06	156.300	156.300	
07	—	156.350	160.950	
07A	07A	156.350	156.350	
08	08	156.400	156.400	
09	09	156.450	156.450	
10	10	156.500	156.500	
11	11	156.550	156.550	
12	12	156.600	156.600	
13	13	156.650	156.650	Momentary high on USA ch
14	14	156.700	156.700	
15	15	156.750	156.750	Refer to NOTE below
16	16	156.800	156.800	
17	17	156.850	156.850	Low power only
18	—	156.900	161.500	
18A	18A	156.900	156.900	
19	—	156.950	161.550	
19A	19A	156.950	156.950	
20	20	157.000	161.600	
20A	20A	157.000	157.000	
21	—	157.050	161.650	
21A	21A	157.050	157.050	
22	—	157.100	161.700	
22A	22A	157.100	157.100	
23	—	157.150	161.750	
23A	23A	157.150	157.150	
24	24	157.200	161.800	
25	25	157.250	161.850	
26	26	157.300	161.900	
27	27	157.350	161.950	
28	28	157.400	162.000	
60	—	156.025	160.625	
60A	60A	156.025	156.025	
61	—	156.075	160.675	
61A	61A	156.075	156.075	
62	—	156.125	160.725	
62A	62A	156.125	156.125	
63	—	156.175	160.775	
63A	63A	156.175	156.175	
64	—	156.225	160.825	
64A	64A	156.225	156.225	

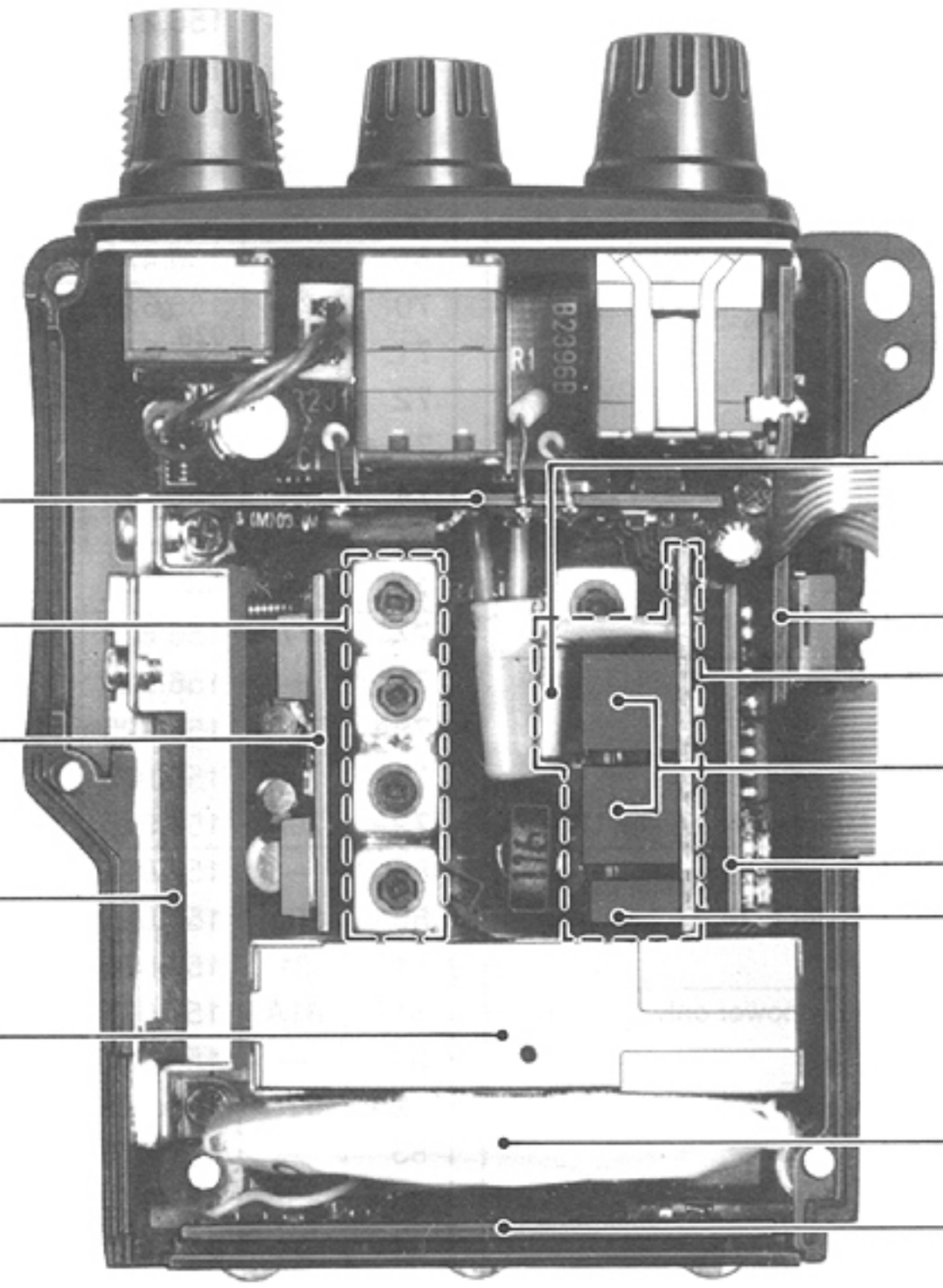
INT ch.	U.S.A. ch.	Frequency (MHz)		Comment
		Transmit	Receive	
65	—	156.275	160.875	
65A	65A	156.275	156.275	
66	—	156.325	160.925	
66A	66A	156.325	156.325	
67	67	156.375	156.375	Momentary high on USA ch
68	68	156.425	156.425	
69	69	156.475	156.475	
70	70	156.525	156.525	Low power only
71	71	156.575	156.575	
72	72	156.625	156.625	
73	73	156.675	156.675	
74	74	156.725	156.725	
75	—	———	———	Guard
76	—	———	———	Guard
77	77	156.875	156.875	
78	–	156.925	161.525	
78A	78A	156.925	156.925	
79	—	156.975	161.575	
79A	79A	156.975	156.975	
80	—	157.025	161.625	
80A	80A	157.025	157.025	
81	81	157.075	161.675	
81A	81A	157.075	157.075	
82	—	157.125	161.725	
82A	82A	157.125	157.125	
83	—	157.175	161.775	
83A	83A	157.175	157.175	
84	84	157.225	161.825	
84A	—	157.225	157.225	
85	85	157.275	161.875	
85A	—	157.275	157.275	
86	86	157.325	161.925	
86A	86A	157.325	157.325	
87	87	157.375	161.975	
87A	—	157.375	157.375	
88	88	157.425	162.025	
88A	88A	157.425	157.425	

Weather channel	Receive frequency (MHz)	Comment
WX 1	162.550	RX only
WX 2	162.400	RX only
WX 3	162.475	RX only
WX 4	162.425	RX only
WX 5	162.450	RX only
WX 6	162.500	RX only
WX 7	162.525	RX only
WX 8	161.650	RX only
WX 9	161.775	RX only
WX 10	163.275	RX only

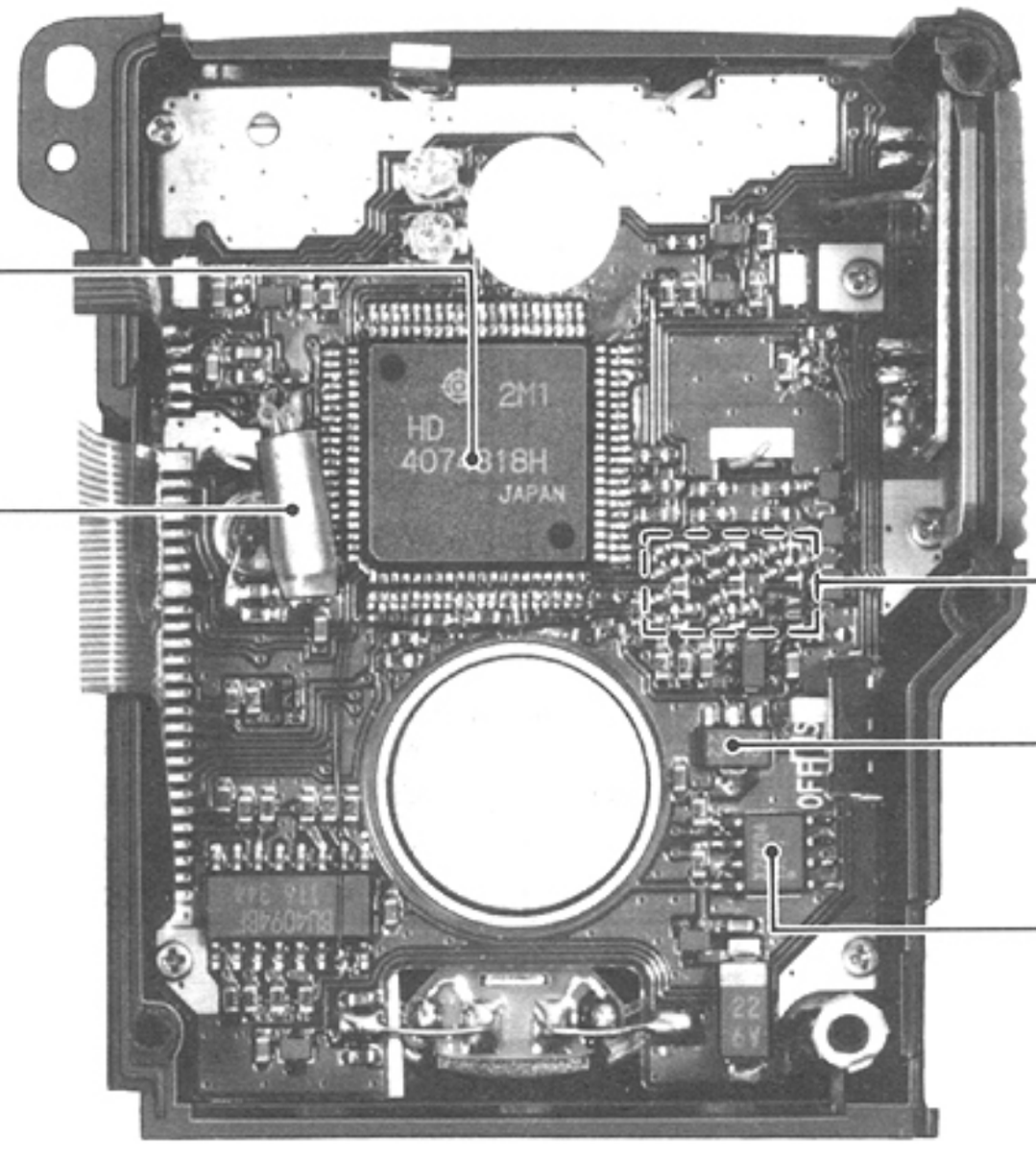
NOTE: INT ch 15 is low power only, U.S.A. ch 15 is receive only.

SECTION 2 INSIDE VIEWS

• MAIN UNIT



• LOGIC UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

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

Received signals enter the antenna connector and then pass through the low-pass filter (L5, L6, C12–C16) to suppress out-of-band signals. The filtered signals are passed through the λ/4 type antenna switching circuit (D1, L3, L4, C8–C10) and are then applied to the RFA board.

3-1-2 RF AND 1ST MIXER CIRCUITS (RFA BOARD AND MAIN UNIT)

The 1st mixer circuit converts the received signal to a fixed frequency of the 1st IF signal with a PLL output frequency. By changing the PLL frequency, only the desired frequency will be passed through a pair of crystal filters at the next stage of the 1st mixer.

The signals from the antenna switching circuit are passed through the tunable bandpass filter (L1, L2, D1, D2) and amplified at the RF amplifier (Q1). The amplified signals are again passed through the tunable bandpass filter (L3, L4, D3, D4) and applied to the MAIN unit. The signals are then mixed at the double balanced mixer (Q1, Q2) with a 1st LO signal coming from the PLL circuit to produce a 30.875 MHz 1st IF signal. The 1st IF signal is passed through a pair of crystal filters (FI1) and is then applied to the DETA board.

3-1-3 2ND IF AND DEMODULATOR CIRCUITS (DETA BOARD)

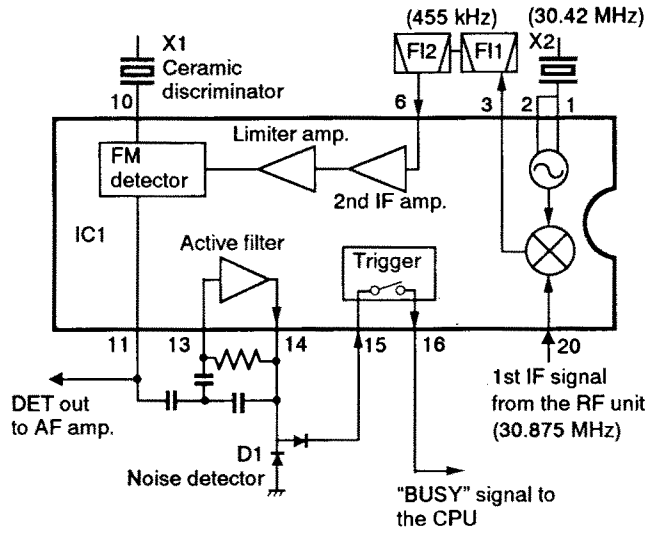
The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signal twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the MAIN unit is amplified at Q1 and applied to a 2nd mixer section of IC1 (pin 20). The signal is then mixed with a 2nd LO signal for conversion to a 455 kHz 2nd IF signal.

IC1 contains the 2nd mixer, local oscillator, limiter amplifier, quadrature detector, S-meter detector and active filter. The local oscillator section generates 30.42 MHz using X2.

The 2nd IF signal from the 2nd mixer (IC1, pin 4) passes through ceramic filters (FI1, FI2) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier (IC1, pin 6) and applied to the quadrature detector (IC1, pins 9, 10 and X1) to demodulate the 2nd IF signal into AF signals. The AF signals (detector signals) are output from pin 11 and applied to the MAIN unit via the "DETO" line.

FM DETECTOR AND SQUELCH CIRCUITS



3-1-4 AF CIRCUIT (AF BOARD)

AF signals from the DETA board are passed through the SCRMN unit and are then applied to the AF board via the "DET" line. When an optional UT-79 is installed instead of the SCRMN unit, the scrambled audio is demodulated to a normal audio signal.

The signals are amplified at the active filters (Q4 HPF; Q5 LPF) and passed through the AF mute switch (Q6) and the [VOL] control (VR unit). The mute switch (Q6) cuts the audio line when the squelch closes.

The passed signals (via "AF2") are amplified at the AF power amplifier (IC1) to a level needed to drive the speaker.

For power conservation, the power supply circuit (Q1, Q2, Q3, D1) does not supply Vcc voltage to the AF power amplifier (IC1) when the squelch closes.

3-1-5 SQUELCH CIRCUIT (DETA and AF BOARDS)

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 mute switch in the AF board.

A portion of the AF signals from the FM IF IC (IC1, pin 11) are applied to the active filter (IC1, pin 13) where noise components above 20 kHz are amplified and output from pin 14. The [SQL] control is connected in parallel to the active filter input (pin 13) to control the input noise level. The output signals are rectified at the noise detector (D1) and then applied to the trigger circuit (pin 15).

The trigger circuit converts the rectified signals to a "High" or "Low" signal and applies this to the CPU (LOGIC unit IC1, pin 27) as the busy signal. When the CPU receives "High," the CPU outputs the "RMUT" signal via the I/O expander IC (LOGIC unit IC4, pin 13) to cut the AF signals.

The "RMUT" signal is applied to the AF board and switches the AF mute switch (Q6). At the same time, the "AFON" signal disappears to deactivate the power supply circuit of the AF amplifier (Q1–Q3). However, it activates while emitting beeps.

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER (MIC BOARD)

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

The AF signals from the microphone are amplified at the limiter amplifier (MIC board IC1b) which has a negative feedback circuit for +6 dB/octave pre-emphasis.

The amplified signals pass through the SCRMN unit and are then returned to the MIC board. If an optional UT-79 is installed instead of the SCRMN unit, the audio signals are scrambled in there.

The returned signals are amplified at the buffer amplifier (IC2). RF components are then filtered out at the splatter filter (IC1a) and applied to the PLL VCO board as the "MOD" signal.

3-2-2 MODULATION CIRCUIT (PLL VCO BOARD)

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

The audio signals (MOD) change the reactance of D3 on the PLL VCO board to modulate the oscillated signal at the transmitter VCO (Q7). The oscillated signal is amplified at the buffer amplifier (Q8, Q10), then applied to the drive amplifiers on the MAIN unit.

3-2-3 DRIVE/POWER AMPLIFIER CIRCUITS (RF UNIT)

The signal from the PLL VCO board is passed through the transmit/receive switching circuit (D2) and amplified by the pre-driver (Q4), driver (Q5), and the power module (IC1) in sequence to obtain 5 W (at 12.5 V DC) of RF power. The amplified signal is passed through the APC detector circuit (L9, D4–D6), antenna switching circuit (D7), and low-pass filter (L5, L6, C12–C16) and is then applied to the antenna connector.

The collector current of the pre-driver (Q4) and driver (Q5) are controlled by the APC circuit to protect the power module from a mismatched condition as well as to stabilize the output power.

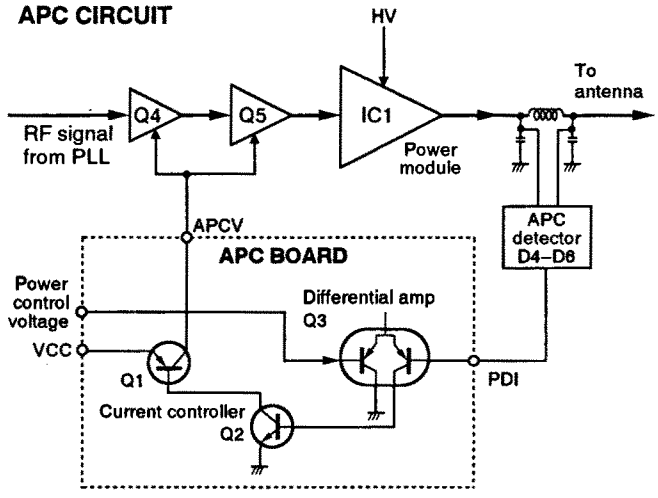
3-2-4 APC CIRCUIT (MAIN UNIT and APC BOARD)

The APC circuit protects the power module (MAIN unit IC1) from a mismatched output load and selects High or Low output power.

The APC detector circuit (L9, D4–D6) detects forward signals and rectified signals at D4 and D5 respectively. The combined voltage is at a minimum level when the antenna is matched at 50 Ω and is increased when it is mismatched.

The detected voltage is applied to one of the differential amplifier inputs (Q3a) and a power setting voltage is applied to the other input (Q3b). When the antenna impedance is mismatched, the detected voltage exceeds the APC output current (Q1 collector) via Q2 to decrease the output power.

APC CIRCUIT



3-3 PLL CIRCUIT (PLL VCO BOARD)

A PLL circuit provides stable oscillation of the transmitter frequency and the receive frequency. The PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

The IC-M9's PLL circuit contains a separate receiver VCO (Q6, D1) and transmitter VCO (Q7, D2). The oscillated signal is amplified at the buffer amplifier (Q8, Q9) and then applied to the PLL IC (IC1, pin 8)

The PLL IC (IC1) contains a prescaler, two programmable dividers, and a phase detector, etc. The entered signal is divided at the prescaler and programmable counter sections by the N-data ratio from the CPU. The divided signals are detected on phase at the phase detector using the reference frequency.

If the oscillated signal drifts, the phase of its frequency changes from the reference frequency, causing a lock voltage change to compensate for the drift in the oscillated frequency.

One of VCO signals is amplified at the buffer amplifiers (Q8, Q10) and is then applied to the receive 1st mixer or transmit driver circuit.

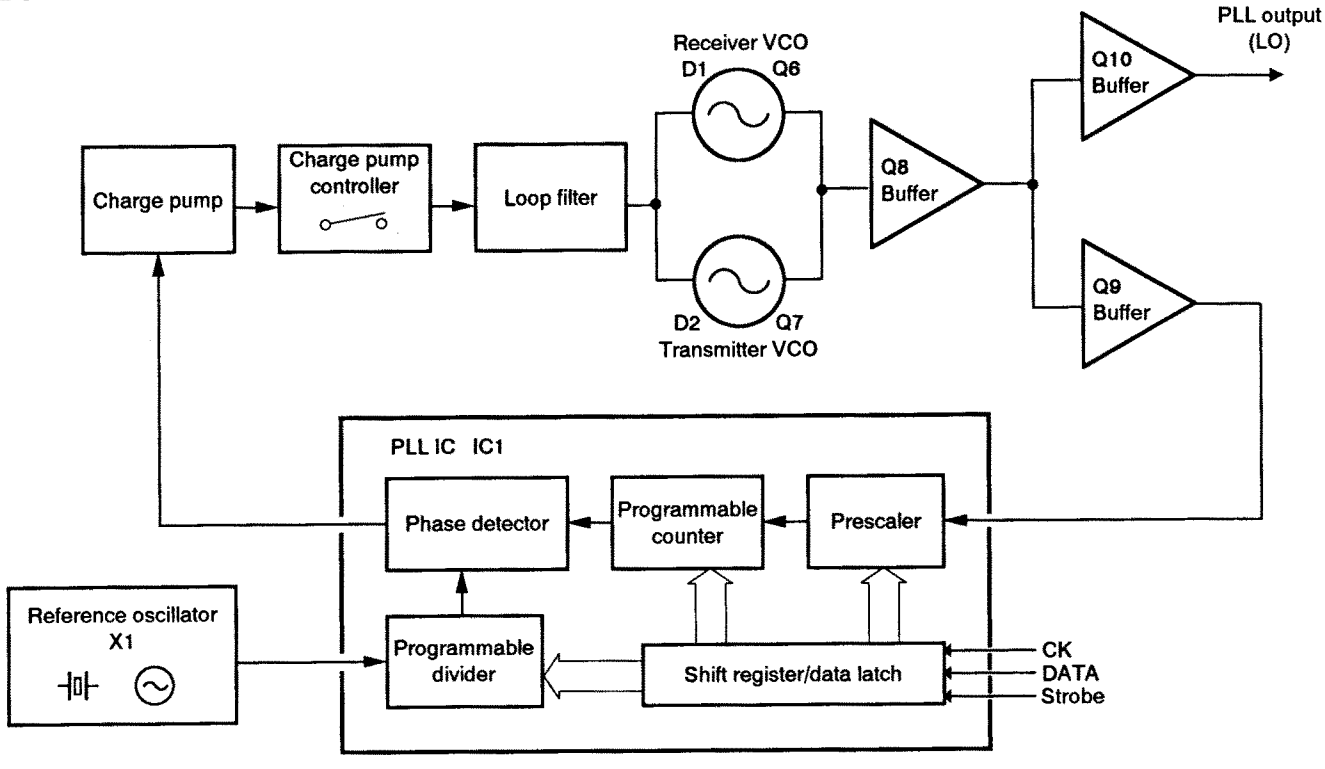
The lock voltage is also used for the receiver tunable bandpass filter to match the filter's center frequency to the desired receive frequency. The lock voltage is amplified at the buffer amplifier (MAIN unit Q8) and then applied to the RFA board.

3-4 POWER SUPPLY CIRCUITS

3-4-1 VOLTAGE LINES

LINE	DESCRIPTION
⊕	The voltage from the attached battery pack.
VCC	The same voltage as the ⊕ line (battery voltage) which is controlled by the power switch ([VOL] control).
+5	Common 5 V converted from the VCC line by the 5 V regulator circuit (Q5, Q6, D3) using the reference regulator (IC1) on the REG board.
+5S	Common 5 V controlled by the power saver function. The "+5S" regulator circuit (Q1, Q2, D1, IC2 in the REG board) produces 5 V from the VCC voltage using the power save controlled signal from the I/O expander IC (LOGIC unit IC4).
R+5S	5 V for receiver circuit controlled by the power saver function and the T/R switching signal (SEND) from the I/O expander IC (LOGIC unit IC4). The "R+5S" regulator is located on the REG board and consists of Q3, Q4, D2, IC3.
T+5	5 V for transmitter circuit controlled by the TMUTE signal from the I/O expander (LOGIC unit IC4). The "T+5" regulator circuit located on the APC board and consists of Q4, Q5 and D1.

PLL CIRCUIT BLOCK DIAGRAM



3-4-2 CHARGING CIRCUIT (PRT UNIT)

The charging circuit determines the charging current using the ⊖ terminal of the battery pack.

The power voltage from the [CHARGE] jack is applied to Q1 via D3. The base current of Q1 is controlled by comparing the divided voltage of R6/R9 with the voltage at the ⊖ terminal of the battery pack.

3-5 PORT ALLOCATIONS

3-5-1 EXPANDER IC

(LOGIC UNIT IC4)

PIN No.	PORT NAME	DESCRIPTION
1	STB	Input port for a strobe signal from the CPU.
2	DATA	Input port for a data signal from the CPU.
3	CK	Input port for a clock signal from the CPU.
5	SC ON	Outputs a scrambler signal when an optional scrambler unit is in use.
6	PSC	Outputs a power save control signal to the REG board.
7	CPC	Outputs a charge pump control signal to the PLL VCO board.
11	SEND	Outputs a transmit/receive switching signal. "HIGH" when transmitting.
12	TMUTE	Outputs a transmit mute signal. "LOW" to mute the transmit power.
13	RMUTE	Outputs a receive mute signal. "HIGH" to mute the receive audio.
14	AF ON	Outputs an AF power amp control signal. "HIGH" to activate the AF amp.

3-5-2 CPU

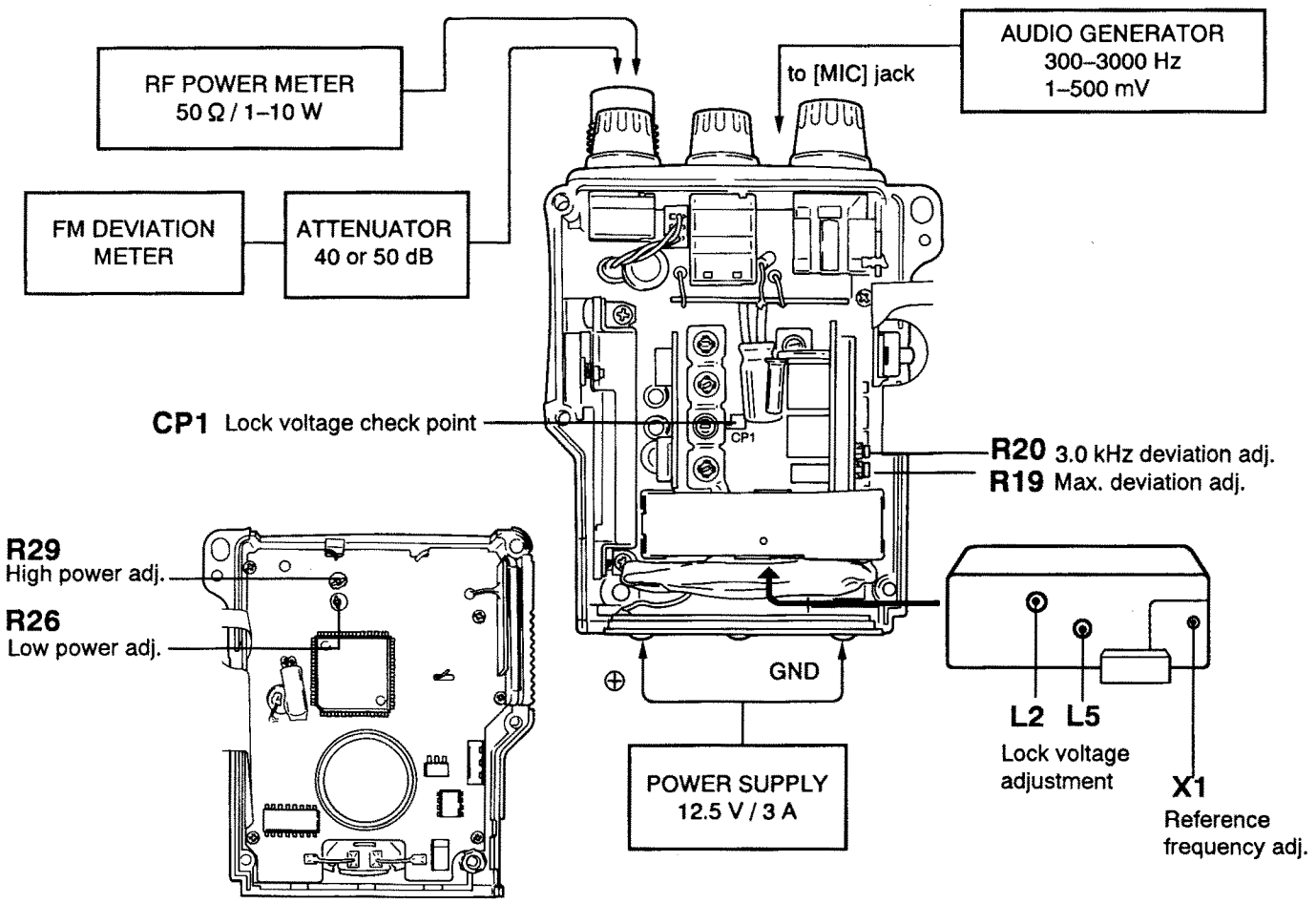
(LOGIC UNIT IC1)

PIN NO.	PORT NAME	DESCRIPTION
1	EX STB	Outputs a strobe signal to the I/O expander IC (IC4).
2 3	EP SDA EP SCL	Used for the memory backup EPROM (IC5).
4	SCSTB	Outputs a strobe signal to an optional scrambler unit.
5	H/L CONT	Outputs a transmit high/low switching signal. "HIGH" for low power.
6	LAMPO	Outputs a display backlight signal. "HIGH" for backlight ON.
7	H/L KEY	Input port for the [HI/LOW] switch.
9 10	UP DN	Input ports for the channel selector.
15–18	KS0–KS3	Output ports for the initial matrix and key matrix.
19–22	KI0–KI3	Input ports for the initial matrix and key matrix.
23	OPT IN	Input port for the optional scrambler unit connection.
26	BUSY LED	Outputs the busy LED lighting signal. "LOW" for lighting up.
27	BUSY	Input port for the noise squelch signal from the FM IF IC (DETA board IC1). "HIGH" when the squelch closes.
28	BEEP	Outputs beep tone signals.
29	INT0	Input port for the interrupt signal. "LOW" for CPU stand-by. "HIGH" for CPU operation
30	PTT/ CL IN	Input port for the [PTT] switch. Also used for cloning data input.
32–56	SEG2–SEG26	Output the LCD drive signal.
63 64	COM1 COM2	Output a common signal for the LCD display.
74 75	OSC1 OSC2	Terminals for CPU clock.
76	RESET	Input port for the CPU reset signal.
77	S.CK	Outputs clock signals to an optional scrambler unit.
78	UNLK	Input port for the PLL unlock signal.
79	S.DATA	Outputs serial data to an optional scrambler unit.
80	PLSTB	Outputs a strobe signal to the PLL IC (PLL VCO board IC1).

SECTION 4 ADJUSTMENT PROCEDURES

4-1 PLL AND TRANSMITTER ADJUSTMENTS

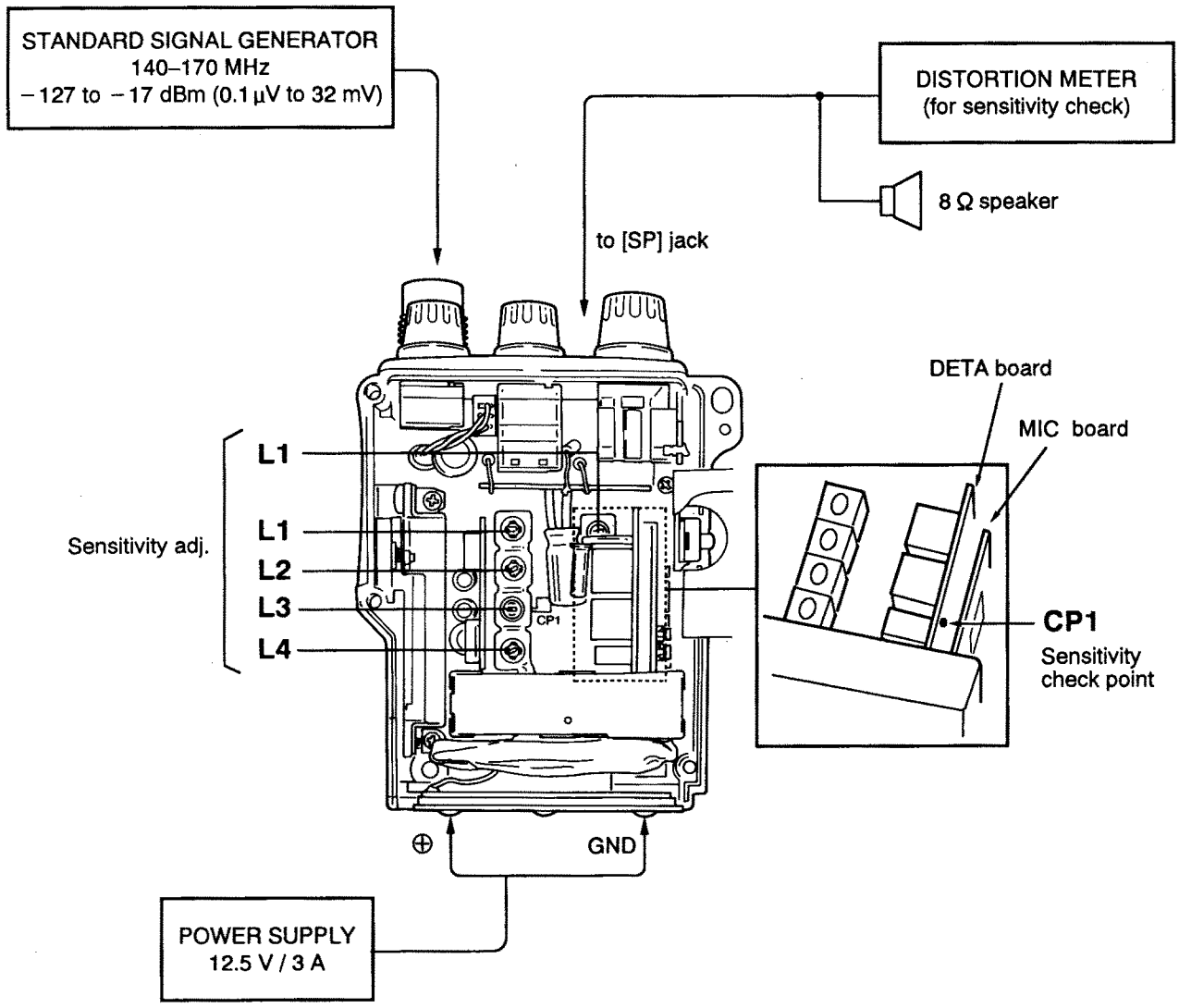
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
PLL LOCK VOLTAGE	1	• Operating channel: 16 • Receiving	MAIN	Connect the digital multi-meter or oscilloscope to CP1.	2.0 V	PLL VCO	L2
	2	• Transmitting			2.8 V		L5
PLL REFERENCE FREQUENCY	1	• Operating channel: 16 • Transmitting	MAIN	Loosely couple the frequency counter to the antenna connector.	156.800 MHz	PLL VCO	X1
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	LOGIC	R29
	2	• [HI/LOW] switch : LOW			0.7 W		R26
FM DEVIATION	1	• Operating channel: 16 • Apply an AF signal to the [MIC] jack: 1 kHz / 150 mV • Connect the FM deviation meter to the antenna connector and set as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P – P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±4.5 kHz	MIC	R19
	2	• Apply an AF signal to the [MIC] jack: 1 kHz / 15 mV			±3.0 kHz		R20



4-2 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Operating channel: 16 • Connect the SSG to the antenna connector and set as: Frequency: 156.80 MHz Level : 3.2 μV* (−97 dBm) Deviation : ±3.5 kHz Modulation: 1 kHz • Receiving			Preset cores of coils with the flat surface to the coil.	RFB	L1, L2 L3, L4
			DETA	Connect the oscilloscope to CP1.	Maximum level	RFB	Adjust in sequence: L1, L2 L3, L4
						MAIN	L1

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



SECTION 5 PARTS LIST

[CHASSIS PART]

REF. NO.	ORDER NO.	DESCRIPTION	
J1	6510010951	CONNECTOR	TNC-R111-1 [ANTENNA]

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1150000780	IC	SC1106
IC2	1130006800	S. IC	TC7W08F (TE12L)
IC3	1130003610	S. IC	TC4SU69F (TE85R)
Q1	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q2	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q3	1510000510	S. TRANSISTOR	2SA1576 T107 R
Q4	1530002560	S. TRANSISTOR	2SC4403-3-TR
Q5	1530002340	S. TRANSISTOR	2SC2954-T2B
Q6	1590000430	S. TRANSISTOR	DTC144EU T107
Q7	1510000510	S. TRANSISTOR	2SA1576 T107 R
Q8	1560000540	S. FET	2SK880-Y (TE85R)
D1	1790000450	S. DIODE	MA862 (TX)
D2	1790000450	S. DIODE	MA862 (TX)
D3	1750000130	S. DIODE	DA204U T107
D4	1790000490	S. DIODE	HSM88AS-TR
D5	1790000490	S. DIODE	HSM88AS-TR
D6	1790000590	S. DIODE	MA110 (TW)
D7	1750000080	S. DIODE	1SS153-T2
FI1	2010001600	XTAL	FL-199 (UM-1) 30.875MHz
L1	6150003570	COIL	LS-393
L2	6140000930	COIL	LR-116
L3	6110002000	COIL	LA-226
L4	6110002070	COIL	LA-227
L5	6110002120	COIL	LA-228
L6	6110002070	COIL	LA-227
L7	6200000260	S. COIL	LQN 2A R10K
L8	6200000770	S. COIL	LQN 2A 68NM
L9	6110002070	COIL	LA-227
L10	6200000750	S. COIL	LQH 3N 4R7M
R1	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R2	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R3	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R4	7030003240	S. RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R5	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R6	7030003240	S. RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R7	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R8	7030003280	S. RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R9	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R11	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R12	7030003230	S. RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R13	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R14	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R15	7030003450	S. RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R16	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R17	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R18	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R19	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R20	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R21	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R22	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R23	7030003280	S. RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R24	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R26	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R27	7030003310	S. RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R28	7030003410	S. RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R29	7030003280	S. RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R30	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R31	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R32	7030003490	S. RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R33	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R34	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R35	7030003490	S. RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R36	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R37	7030003340	S. RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R38	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R39	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R40	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R41	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R42	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R43	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R44	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
C1	4030006620	S. CERAMIC	C1608 SL 1H 120J-T-A
C2	4030006660	S. CERAMIC	C1608 SL 1H 220J-T-A
C3	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006630	S. CERAMIC	C1608 SL 1H 150J-T-A
C9	4030006690	S. CERAMIC	C1608 SL 1H 330J-T-A
C10	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C11	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C12	4030006620	S. CERAMIC	C1608 SL 1H 120J-T-A
C13	4030008440	S. CERAMIC	C1608 SL 1H 1R5C-T-A
C14	4030006660	S. CERAMIC	C1608 SL 1H 220J-T-A
C15	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C16	4030006610	S. CERAMIC	C1608 SL 1H 100D-T-A
C17	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C19	4550003040	S. TANTALUM	TEMSVB2 0J 106M-8L
C20	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C21	4550002890	S. TANTALUM	TESVA 1A 225M1-8L
C22	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C24	4550002890	S. TANTALUM	TESVA 1A 225M1-8L
C25	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C26	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C27	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C28	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C29	4030006600	S. CERAMIC	C1608 SL 1H 090D-T-A
C30	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C31	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C32	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C33	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C34	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C35	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C36	4510001350	ELECTROLYTIC	16 MS5 10 µF
C37	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C38	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C39	4510003160	ELECTROLYTIC	16 RC2 22 µF (D=4.0)
C40	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C41	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C42	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C43	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C44	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C45	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C46	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C47	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C48	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C49	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C50	4510001380	ELECTROLYTIC	25 MS5 4R7 µF
C51	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C52	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C53	4550000550	S. TANTALUM	TESVA 1V 224M1-8L
C54	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C56	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C57	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C58	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C59	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C60	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
J1	6450001070	CONNECTOR	HSJ1493-01-050 [SP]
J2	6450000130	CONNECTOR	HSJ1102-01-540 [MIC]
J3	6450000870	CONNECTOR	HEC2711-01-020 [CHARGE]
J4	6510012880	S. CONNECTOR	CEW9114-0201
W8	7120000380	JUMPER	JPW 01 R-01
EP1	0910039532	PCB	B 3842B (MAIN)

[RFA BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1560000550	S. FET	2SK882-Y (TE85R)
D1	1790000640	S. VARICAP	MA363B (TX)
D2	1790000640	S. VARICAP	MA363B (TX)
D3	1790000640	S. VARICAP	MA363B (TX)
D4	1790000640	S. VARICAP	MA363B (TX)
R1	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R2	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R3	7030003230	S. RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R4	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R5	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R6	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)

[RFA BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030006700	S. CERAMIC	C1608 SL 1H 390J-T-A
C2	4030006540	S. CERAMIC	C1608 SL 1H 030C-T-A
C3	4030008570	S. CERAMIC	C1608 SL 1H R75C-T-A
C4	4030006610	S. CERAMIC	C1608 SL 1H 100D-T-A
C5	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006590	S. CERAMIC	C1608 SL 1H 080D-T-A
C8	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C9	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C10	4030006620	S. CERAMIC	C1608 SL 1H 120J-T-A
C11	4030006540	S. CERAMIC	C1608 SL 1H 030C-T-A
C12	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C14	4030006560	S. CERAMIC	C1608 SL 1H 050C-T-A
C15	4030006560	S. CERAMIC	C1608 SL 1H 050C-T-A
C16	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C17	4030006560	S. CERAMIC	C1608 SL 1H 050C-T-A
EP1	0910024772	PCB	B 2383B (RFA)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

[RFB BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
L1	6150003580	COIL	LS-394
L2	6150003590	COIL	LS-395
L3	6150003600	COIL	LS-404
L4	6150003590	COIL	LS-395
EP1	0910024811	PCB	B 2384A (RFB)

S.=Surface mount

[DETA BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1120001650	S. IC	TK10487MTR
Q1	1530002020	S. TRANSISTOR	2SC3770-3-TA
D1	1790000490	S. DIODE	HSM88AS-TR
D2	1750000130	S. DIODE	DA204U T107
X1	6070000060	DISCRIMINATOR	CDBM455C7
X2	6050005010	XTAL	CR-214
FI1	2020000550	CERAMIC	CFUM455E
FI2	2020000550	CERAMIC	CFUM455E
R1	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R2	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R3	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R4	7030003460	S. RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R5	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R6	7030003730	S. RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R7	7030003730	S. RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R8	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R9	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R10	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R11	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R13	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R14	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R15	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R16	7030003430	S. RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R17	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R18	7030003710	S. RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R19	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R20	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R21	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
C1	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006740	S. CERAMIC	C1608 SL 1H 820J-T-A
C3	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C6	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C7	4030006720	S. CERAMIC	C1608 SL 1H 560J-T-A
C8	4030006860	S. CERAMIC	C1608 JB 1H 102K-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	4030006690	S. CERAMIC	C1608 SL 1H 330J-T-A
C13	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C14	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C15	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C16	4550000550	S. TANTALUM	TESVA 1V 224M1-8L
C19	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C20	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C21	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C22	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C23	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
W1	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910025772	PCB	B 2590B (DETA)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

[AF BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001810	S. IC	TA7368F (TP1)
Q1	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q2	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q3	1520000270	S. TRANSISTOR	2SB1182 TL Q
Q4	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q5	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q6	1590000520	S. FET	2SJ106-GR (TE85R)
D1	1160000060	S. DIODE	DAN202U T107
R1	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R2	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R3	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R4	7030003420	S. RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R5	7030003430	S. RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R6	7030003630	S. RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R7	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R8	7030003710	S. RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R9	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R10	7030003610	S. RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R11	7030003610	S. RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R12	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R13	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R14	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R15	7030003340	S. RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R16	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R17	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R18	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
C1	4550000280	S. TANTALUM	TESVB2 1A 475M-8L
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C3	4510001340	ELECTROLYTIC	10 MS5 33 µF
C4	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C6	4030006900	S. CERAMIC	C1608 JB 1E 103K-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
C11	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C12	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C13	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C14	4550003040	S. TANTALUM	TEMSVB2 0J 106M-8L
C15	4030005110	S. CERAMIC	C2012 JB 1E 473K-T-A
C16	4510002740	ELECTROLYTIC	10 SS 220 µF
C17	4550000550	S. TANTALUM	TESVA 1V 224M1-8L
C18	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
EP1	0910025422	PCB	B 2386B (AF)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

S.=Surface mount

[MIC BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002490	S. IC	M5218FP-73A
IC2	1110002750	S. IC	TA75S01F (TE85R)
Q1	1590001660	S. TRANSISTOR	XP4312
R1	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R2	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R3	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R4	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R5	7030003690	S. RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R6	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R8	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R9	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R10	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R11	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R12	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R13	7030003750	S. RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R14	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R15	7030003730	S. RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R16	7510000180	S. THERMISTOR	TN20-3S223LT
R17	7030003570	S. RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R18	7030003540	S. RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R19	7310003630	S. TRIMMER	EVM-1XSX50 BQ4 (473)
R20	7310003800	S. TRIMMER	EVM-1XSX50 BC5 (154)
R21	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
C1	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C2	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C3	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C5	4030008650	S. CERAMIC	C1608 JB 1H 332K-T-A
C6	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4510001470	ELECTROLYTIC	50 MS5 1 µF
C9	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C10	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C12	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C13	4030006740	S. CERAMIC	C1608 SL 1H 820J-T-A
C14	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910039542	PCB	B 3850B (MIC)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

[PLL VCO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001310	S. IC	MB1504PF-G-BND
IC2	1130004200	S. IC	TC4S66F (TE85R)
Q1	1590000440	S. TRANSISTOR	DTA143ZU T107
Q2	1590000430	S. TRANSISTOR	DTC144EU T107
Q3	1590000970	S. TRANSISTOR	FMA2 T148
Q4	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q5	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q6	1560000340	S. FET	2SK210-Y (TE85R)

[PLL VCO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q7	1560000340	S. FET	2SK210-Y (TE85R)
Q8	1530002600	S. TRANSISTOR	2SC4215-O (TE85R)
Q9	1530002600	S. TRANSISTOR	2SC4215-O (TE85R)
Q10	1530002600	S. TRANSISTOR	2SC4215-O (TE85R)
D1	1790000640	S. VARICAP	MA363B (TX)
D2	1790000640	S. VARICAP	MA363B (TX)
D3	1790000640	S. VARICAP	MA363B (TX)
X1	6050008640	XTAL	CR-448 12.800MHz
L1	6200000750	S. COIL	LQH 3N 4R7M
L2	6130002360	S. COIL	LB-257
L3	6200000750	S. COIL	LQH 3N 4R7M
L4	6200000750	S. COIL	LQH 3N 4R7M
L5	6130002370	S. COIL	LB-258
L6	6200000750	S. COIL	LQH 3N 4R7M
L7	6200000260	S. COIL	LQN 2A R10K
L8	6200000260	S. COIL	LQN 2A R10K
R1	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R5	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R6	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R8	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R9	7030003390	S. RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R10	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R11	7030003310	S. RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R12	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R13	7030003610	S. RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R14	7030003260	S. RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R15	7030003660	S. RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R16	7030003420	S. RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R17	7030003420	S. RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R18	7030003660	S. RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R19	7030003650	S. RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R20	7030003390	S. RESISTOR	ERJ3GEYJ 391 V (390 Ω)
C1	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C3	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C6	4550003080	S. TANTALUM	TEMSVA 1A 335M-8L
C7	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C8	4030006670	S. CERAMIC	C1608 SL 1H 270J-T-A
C9	4030006570	S. CERAMIC	C1608 SL 1H 060D-T-A
C10	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C11	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C12	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C13	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C14	4030006750	S. CERAMIC	C1608 SL 1H 101J-T-A
C15	4030006520	S. CERAMIC	C1608 SL 1H 010C-T-A
C16	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C17	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C18	4030006540	S. CERAMIC	C1608 SL 1H 030C-T-A
C19	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C20	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C21	4030006510	S. CERAMIC	C1608 SL 1H 0R5C-T-A
C22	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C24	4030006580	S. CERAMIC	C1608 SL 1H 070D-T-A
C25	4030006620	S. CERAMIC	C1608 SL 1H 120J-T-A
C26	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C27	4030006620	S. CERAMIC	C1608 SL 1H 120J-T-A
C28	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A

S.=Surface mount

[PLL VCO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
J1	6510012250	CONNECTOR	TKX-P04P-A2
J2	6510012310	CONNECTOR	TKX-P10P-A2
W1	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910039552	PCB	B 3844B (PLL VCO)

[APC BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1520000270	S. TRANSISTOR	2SB1182 TL Q
Q2	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q3	1590000620	S. TRANSISTOR	FMS1 T148
Q4	1520000270	S. TRANSISTOR	2SB1182 TL Q
Q5	1530002280	S. TRANSISTOR	2SC4081 T107 S
D1	1160000050	S. DIODE	DAP202U T107
R2	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003770	S. RESISTOR	ERJ3GEYJ 564 V (560 kΩ)
R4	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R6	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R8	7030003590	S. RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R9	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R10	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C9	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
EP1	0910040110	PCB	B 2391 (APC)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

[REG BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1180000530	S. IC	S-81250HG-RD-T1
IC2	1130004170	S. IC	TC4S01F (TE85R)
IC3	1130004170	S. IC	TC4S01F (TE85R)
Q1	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q2	1510000510	S. TRANSISTOR	2SA1576 T107 R
Q3	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q4	1510000500	S. TRANSISTOR	2SA1162-GR (TE85R)
Q5	1530002280	S. TRANSISTOR	2SC4081 T107 S
Q6	1520000200	S. TRANSISTOR	2SB798-T2 DK
D1	1750000160	S. DIODE	DA114 T107
D2	1790000590	S. DIODE	MA110 (TW)
D3	1160000060	S. DIODE	DAN202U T107
R1	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R2	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R4	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R5	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
C1	4510001360	ELECTROLYTIC	16 MS5 22 µF
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C3	4510003190	ELECTROLYTIC	6.3 RC2 47 µF (D=4.0)
C4	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4510001320	ELECTROLYTIC	6R3 MS5 47 µF
C6	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C9	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C10	4510003190	ELECTROLYTIC	6.3 RC2 47 µF (D=4.0)
C11	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
W1	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910026170	PCB	B 2392 (REG)
EP2	6910003110	LEAD FRAME	HFB2.0-0.7-8 (N)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140003800	S. IC	HD404818A35H
IC2	1130003760	S. IC	TC4S81F (TE85R)
IC3	1180000610	S. IC	RH5VA42CA-T1
IC4	1130005810	S. IC	BU4094BF-T1
IC5	1140003610	S. IC	X24C04S8-2.7
Q1	1590000720	S. TRANSISTOR	DTA144EU T107
Q2	1590000430	S. TRANSISTOR	DTC144EU T107
Q3	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q4	1590000430	S. TRANSISTOR	DTC144EU T107
D1	1750000160	S. DIODE	DA114 T107
D2	1750000130	S. DIODE	DA204U T107

S.=Surface mount

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D3	1750000220	S. DIODE	DA113W T107
D4	1750000220	S. DIODE	DA113W T107
D5	1750000220	S. DIODE	DA113W T107
D10	1750000170	S. DIODE	DA115 T107
X1	6050006980	XTAL	CR-333 AT-38 4.182MHz
R1	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R2	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
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	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R7	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R8	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R9	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R10	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R11	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R12	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R13	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R14	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R15	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R16	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R17	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R18	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R19	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R20	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R21	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R22	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R23	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R24	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R25	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R26	7310002720	S. TRIMMER	RV-148 (RH03A3AS3X0DA) 472
R27	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R28	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R29	7310002770	S. TRIMMER	RV-153 (RH03A3AN4X02A) 333
R31	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R32	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R33	7030003280	S. RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R34	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R35	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R36	7030003530	S. RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R37	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R38	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R39	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R40	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R41	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
C1	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C2	4030006640	S. CERAMIC	C1608 SL 1H 180J-T-A
C3	4550000770	S. TANTALUM	TESVC 0J 226M-12L
C4	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C5	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C6	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C7	4030008630	S. CERAMIC	C1608 JF 1C 104Z-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	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C12	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C13	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C14	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C16	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C17	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C18	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C19	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C20	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
DS1	5030000950	LCD	LD-BU5579J (E-5777)
DS2	5040001110	S. LED	SLM-23VMWS T97B [TX]
DS3	5040001260	LED	LN01301C (Q)
DS4	5040001260	LED	LN01301C (Q)
S1	2260001310	S. SWITCH	SW-120 (SKHUPD) [DW/SCAN]
S2	2260001310	S. SWITCH	SW-120 (SKHUPD) [16]
S3	2260001310	S. SWITCH	SW-120 (SKHUPD) [C]
S4	2220000050	SWITCH	SSSS21148A
MC1	7700000861	MICROPHONE	WM-62A103
SP1	2510000650	SPEAKER	EAS-3P127D
EP1	0910039562	PCB	B 3843B (LOGIC)
EP2	0910039570	FPC	B 3878
EP3	0910021912	FPC	B 2111B
EP4	8930014860	LCD CONTACT	SRCN-752 SG-TYPE

[PTT BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
S1	2260001320	S. SWITCH	SW-121 (SKHUPF) [HI/LO]
S2	2260001320	S. SWITCH	SW-121 (SKHUPF) [PTT]
EP1	0910026690	PCB	B 2394 (PTT)

S.=Surface mount

[ENC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D1	1750000170	S. DIODE	DA115 T107
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
S1	2260000890	ENCODER	SRBM1L040A [CHANNEL SELECTOR]
S2	2260001310	S. SWITCH	SW-120 (SKHUPD) [LIGHT(SCRM)/LOCK]
EP1	0910040091	PCB	B 2395A (ENC)

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210001440	VARIABLE	RK097111101NA (10KA) [VOL]
R2	7210001450	VARIABLE	RK0971110051A (10KB) [SQL]
C1	4510002650	ELECTROLYTIC	16 MS7 100 µF
C2	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
J1	6510007170	CONNECTOR	PI28A-03M
W1	7120000380	JUMPER	JPW 01 R-01
W2	7120000380	JUMPER	JPW 01 R-01
W3	7120000380	JUMPER	JPW 01 R-01
W4	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910040102	PCB	B 2396B (VR)

[PRT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1520000200	S. TRANSISTOR	2SB798-T2 DK
Q2	1530002280	S. TRANSISTOR	2SC4081 T107 S
D1	1730000970	S. ZENER	RD15M-T2B2
D2	1790000670	S. DIODE	SB07-03C-TA
D3	1790000670	S. DIODE	SB07-03C-TA
D4	1790000590	S. DIODE	MA110 (TW)
D5	1730002160	S. ZENER	02CZ5.1-Z (TE85R)
R1	7030003250	S. RESISTOR	ERJ3GEYJ 270 V (27 Ω)
R2	7030003250	S. RESISTOR	ERJ3GEYJ 270 V (27 Ω)
R3	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R4	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R6	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R7	7030000420	S. RESISTOR	MCR10EZHJ 2.2 kΩ (222)
R8	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R9	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
C1	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C2	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C4	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910040080	PCB	B 3853 (PRT)

[SCRMN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7030003450	S. RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
C1	4030008680	S. CERAMIC	C2012 JF 1C 105Z-T-A
C2	4030008680	S. CERAMIC	C2012 JF 1C 105Z-T-A
C3	4030008680	S. CERAMIC	C2012 JF 1C 105Z-T-A
C4	4030008680	S. CERAMIC	C2012 JF 1C 105Z-T-A
EP1	0910039522	PCB	B 3855B (SCRMN)

S.=Surface mount

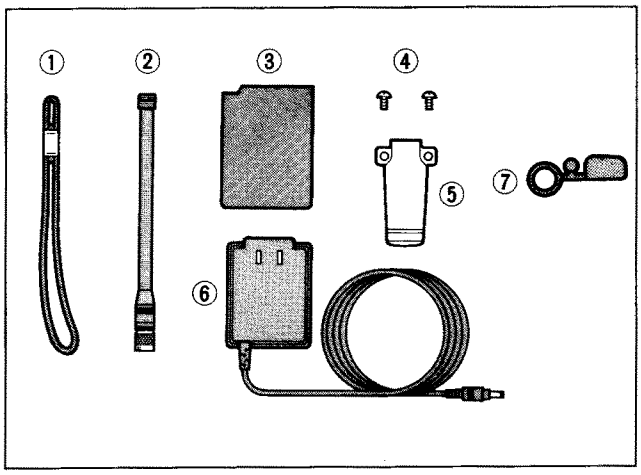
SECTION 6 MECHANICAL PARTS AND DISASSEMBLY

• CHASSIS PARTS

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	6510010951	Antenna connector TNC-R111-1	1	㉓	8810005740	Screw FH B0 No. 0 M2×3	4
②	8010008633	752 rear panel -3	1	㉔	8930018720	751 module plate	1
③	8810005710	Screw PH B0 M2×6 ZK	1	㉕	8810005860	Screw PH No. 0 M2×3 NI	5
④	8810005720	Screw PH B0 M2×20 ZK	3	㉖	2260001310	Switch SW-120 [LIGHT]	1
⑤	8010007602	Bushing (A)-2	2	㉗	8810000120	Screw PH M2.6×3	1
⑥	8930015651	LOGIC ground spring -1	1	㉘	8810005700	Screw PH No. 0 M2×4 ZK	1
⑦	8810001700	Screw PH B0 No. 0-3 M1.4×3	5	㉙	8930014971	752 contact holder -1	1
⑧	2260001320	Switch SW-121 [HI/LOW], [PTT]	2	㉚	8930014852	752 battery terminal -2	3
⑨	5030000950	LCD LD-BU5579J (E-5777)	1	㉛	8510008240	1416 PLL case	1
⑩	2510000650	Speaker EAS-3P127D	1	㉜	8510008210	1416 PLL cover	1
⑪	8930014860	LCD contact SRCN-752 SG-type	2	㉝	8510005830	Co-PLL cover	1
⑫	8930014870	752 LCD holder	1	㉞	8930014912	LIGHT switch rubber -2	1
⑬	8930021180	LCD cover	1	㉟	8610005790	Knob N147 [CHANNEL]	1
⑭	8930014930	752 lens	1	㊱	8610005780	Knob N146 [VOL], [SQL]	2
⑮	8930017831	PTT switch (A)-1	1	㊲	8830000550	VR nut (E)	3
⑯	8810000100	Screw PH M2×4 ZK	1	㊳	8210005580	752 top panel (A)	1
⑰	8930028642	Front switch (C)-2	1	㊴	8930014950	752 top seal	1
⑱	8210009440	752 front panel (O)-1 (incl. window plate)	1	㊵	8930014801	752 VR plate -1	1
				㊶	2260000890	Switch SRBM1L040A [CHANNEL]	1
⑲	8930014922	752 release button -2	1	㊷	7210001440	Variable resistor RK097111101NA (10KA) [VOL]	1
⑳	8930014820	Release spring (M)	1				
㉑	8930014810	752 speaker plate	1	㊸	7210001450	Variable resistor RK0971110051A (10KB) [SQL]	1
㉒	8930014830	Speaker ground lug	1				

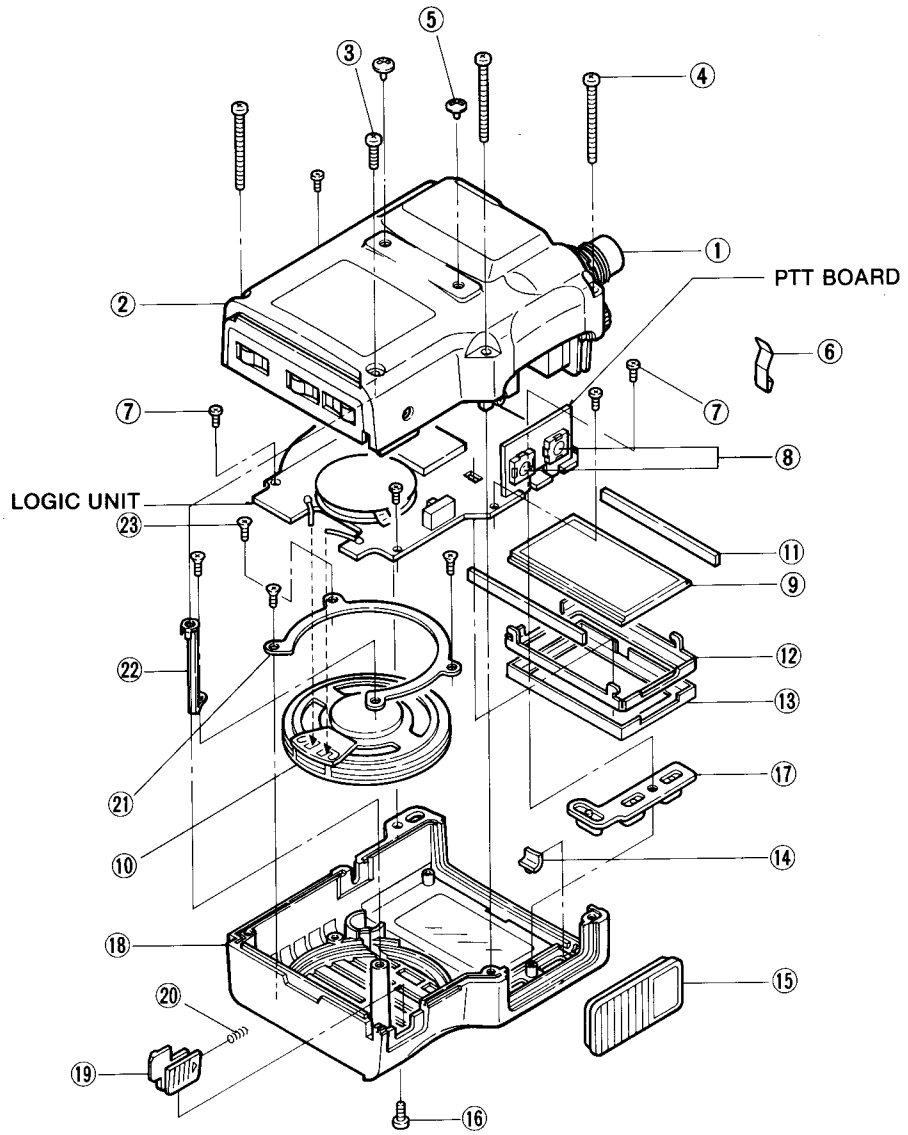
Screw abbreviations PH: Pan head FH: Flat head B0: Self-tapping NI: Nickel ZK: Black

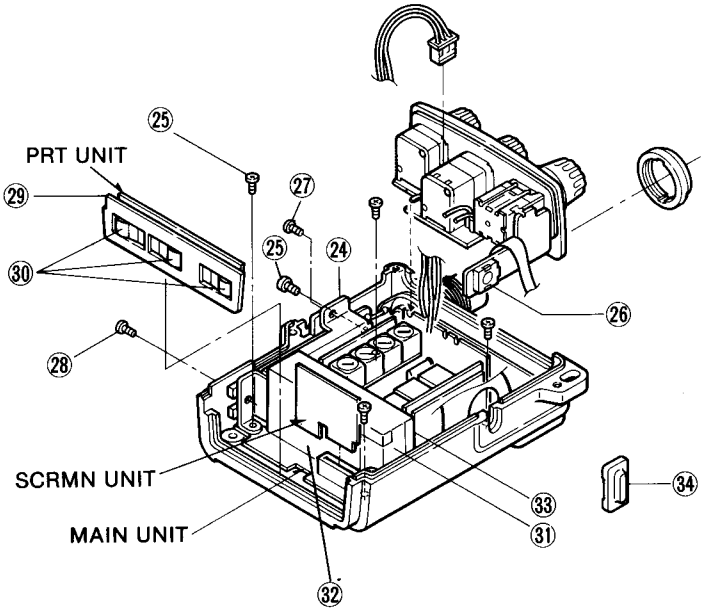
• ACCESSORIES

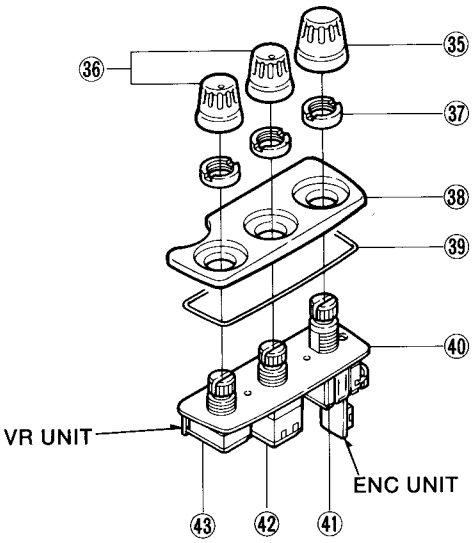


LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8010011960	Handstrap HK-005	1
②	Optional product	FA-150T FLEXIBLE ANTENNA	1
③	Optional product	CM-89 BATTERY PACK	1
④	8810005730	Screw BuH M3×3 ZK BS	2
⑤	8010008620	752 belt clip	1
⑥	Optional product	BM-76A WALL CHARGER	1
⑦	8930024280	751 connector seal	1

Screw abbreviations BuH: Button head BS: Brass ZK: Black


PTT BOARD
LOGIC UNIT


PRT UNIT
SCRMN UNIT
MAIN UNIT

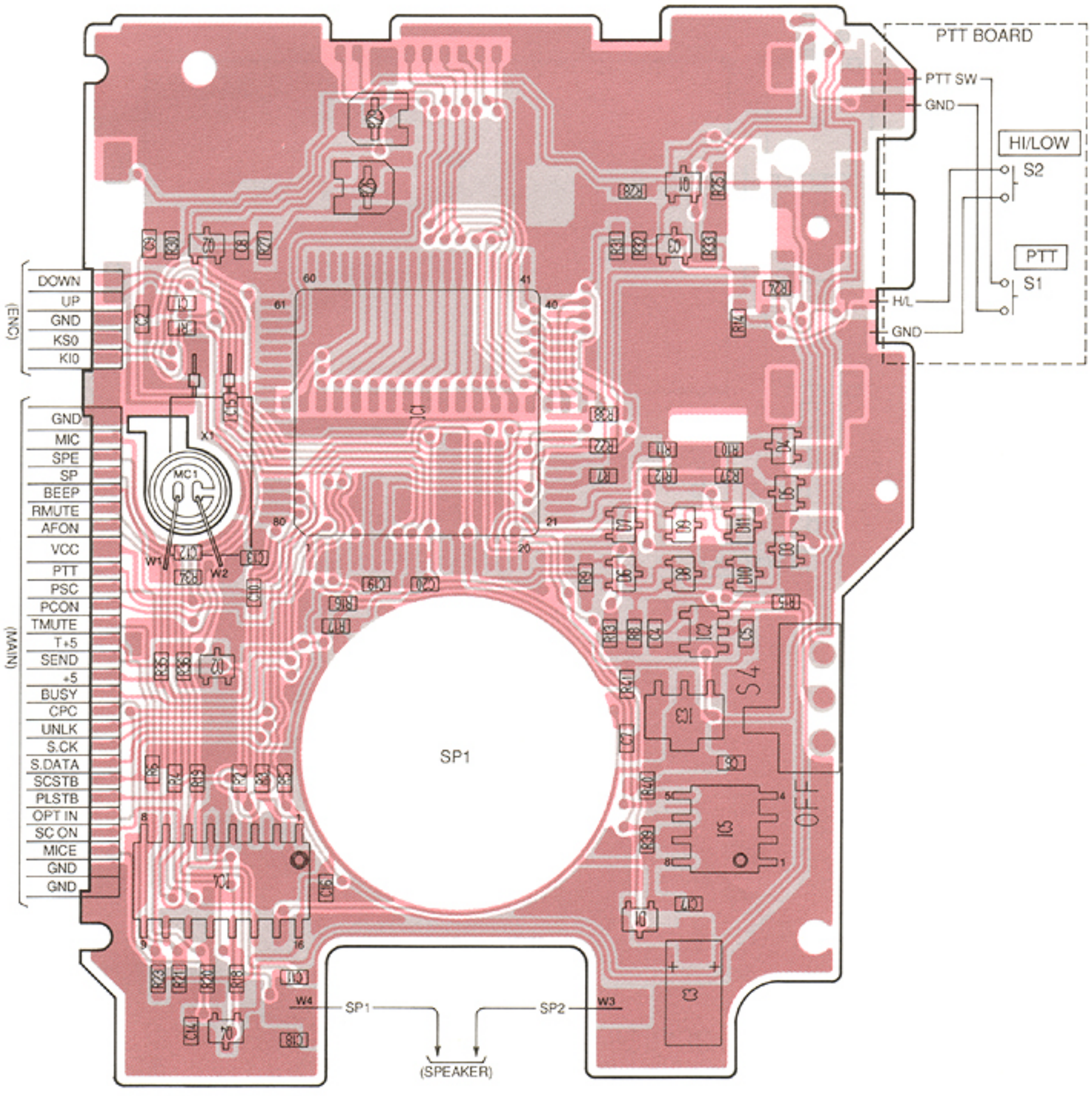

VR UNIT
ENC UNIT

SECTION 7 BOARD LAYOUTS

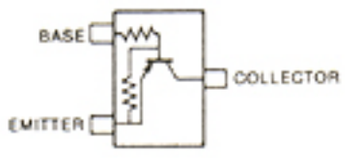
7-1 LOGIC UNIT

- LOGIC UNIT

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

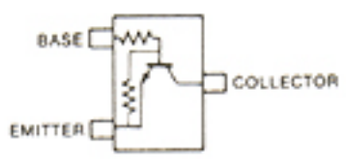


DTA144EU
(Symbol: 16)



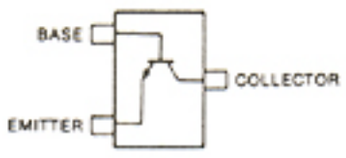
Q1

DTC144EU
(Symbol: 26)



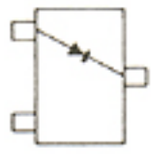
Q2, Q4

2SC4081 R
(Symbol: BR)



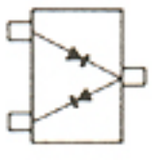
Q3

DA114
(Symbol: AV)



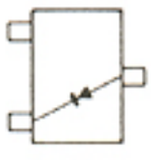
D1

DA204U
(Symbol: K)



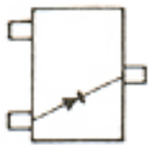
D2

DA113W
(Symbol: AY)



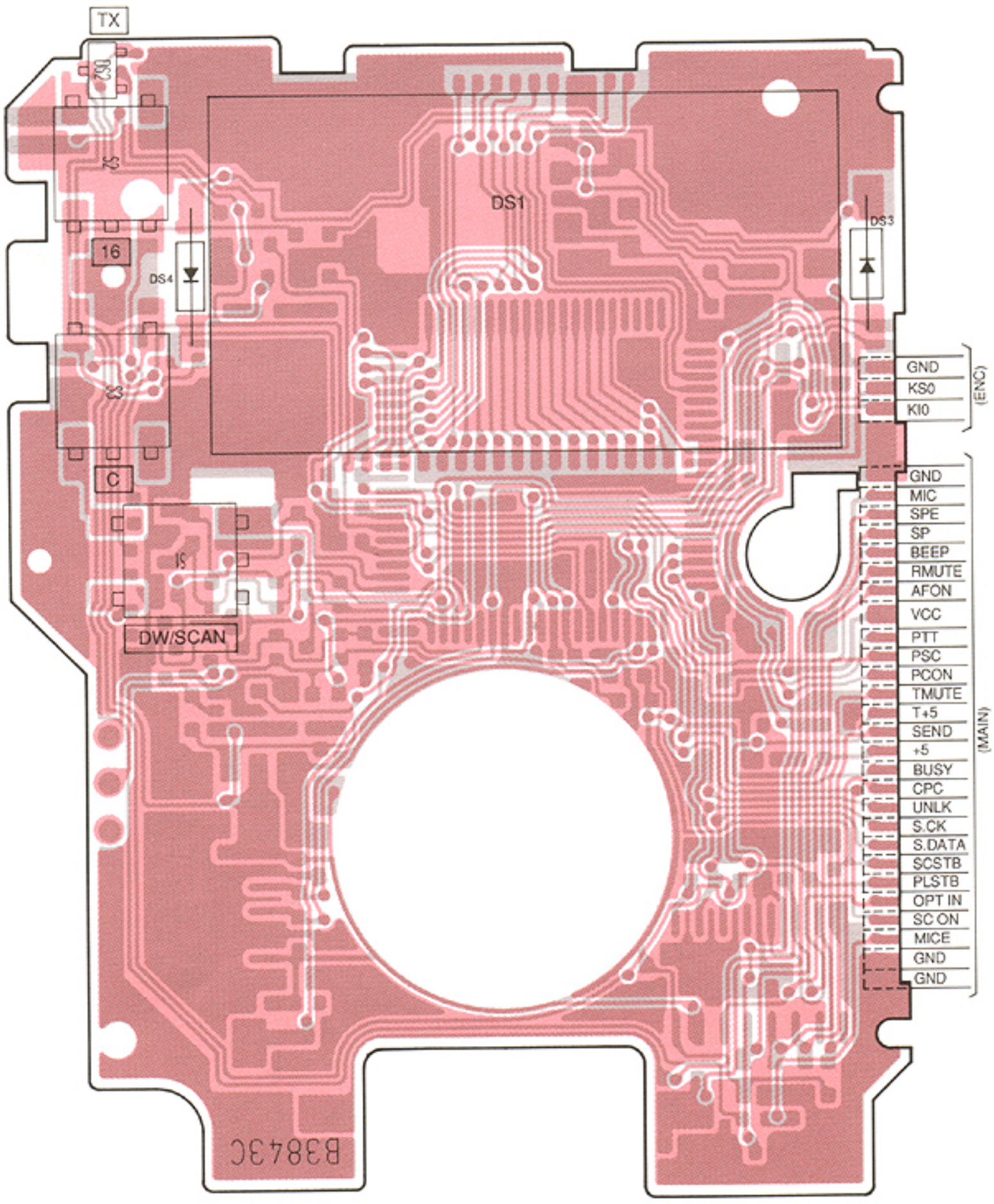
D3, D4, D5

DA115
(Symbol: AU)



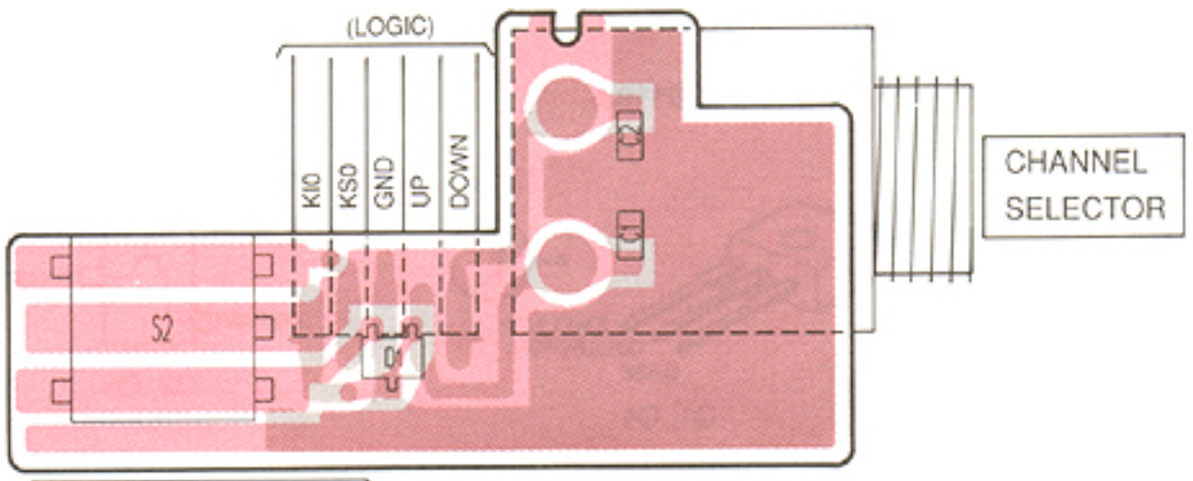
D10

• LOGIC UNIT

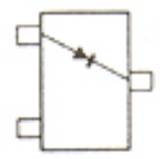

TX
DS2
S2
16
DS4
S3
C
IS
DW/SCAN
DS1
DS3
GND
KS0
KI0
(ENC)
GND
MIC
SPE
SP
BEEP
RMUTE
AFON
VCC
PTT
PSC
PCON
TMUTE
T+5
SEND
+5
BUSY
CPC
UNLK
S.CK
S.DATA
SCSTB
PLSTB
OPT IN
SC ON
MICE
GND
GND
(MAIN)
B3843C

7-2 ENC, VR AND PRT UNITS

• ENC UNIT

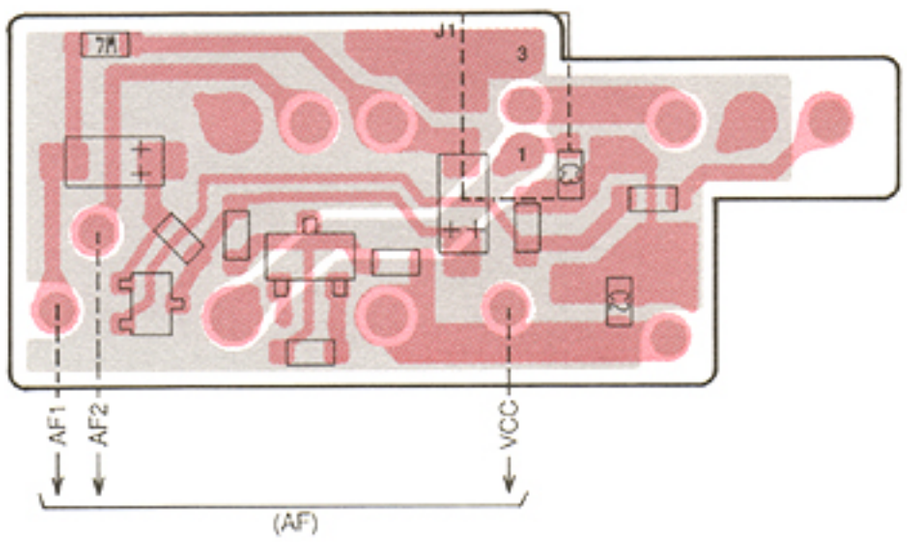


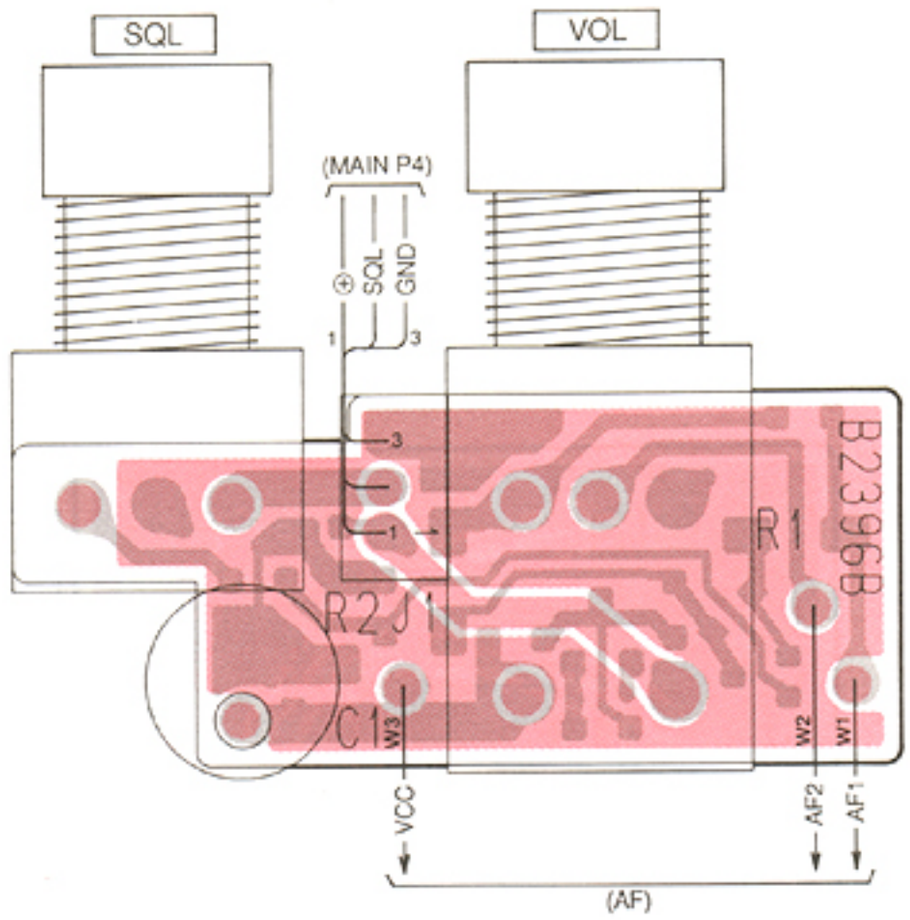
DA115
(Symbol: AU)



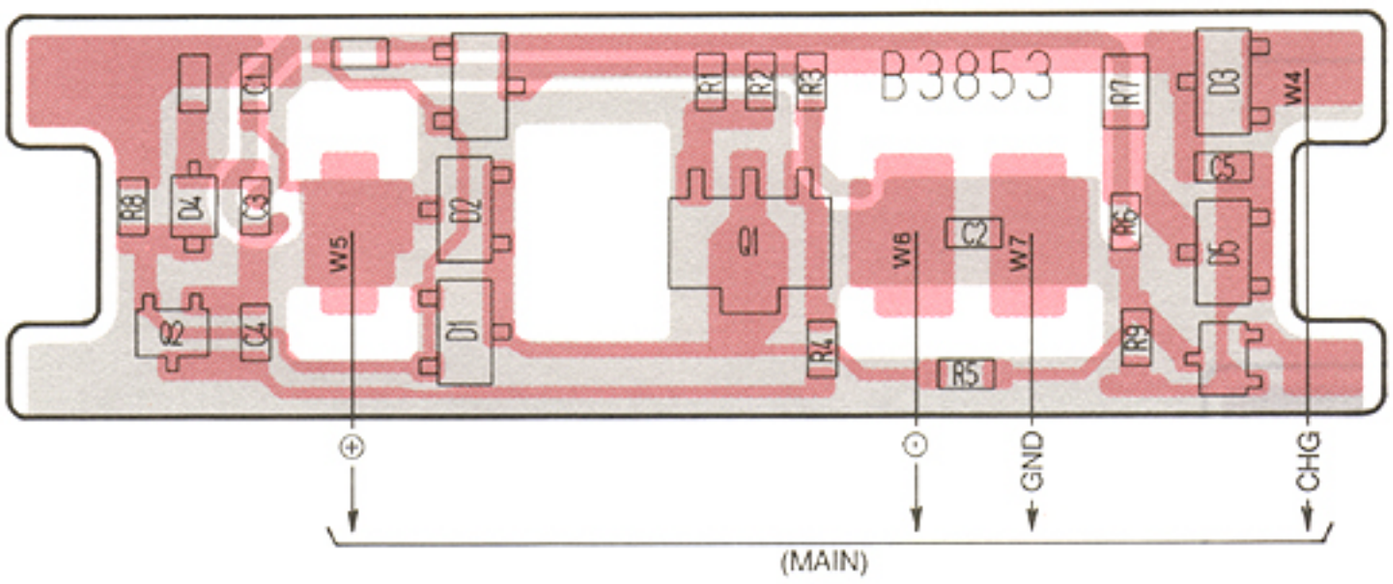
D1

• VR UNIT

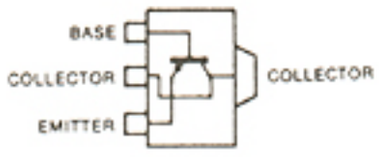




• PRT UNIT

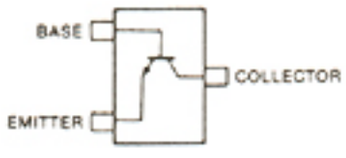


2SB798 DK
(Symbol: DK)



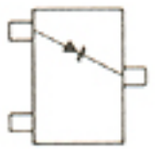
Q1

2SC4081 S
(Symbol: BS)



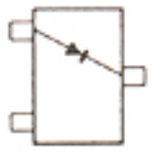
Q2

RD15M B2
(Symbol: 152)



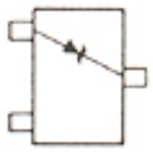
D1

SB07 03C
(Symbol: J)



D2, D3

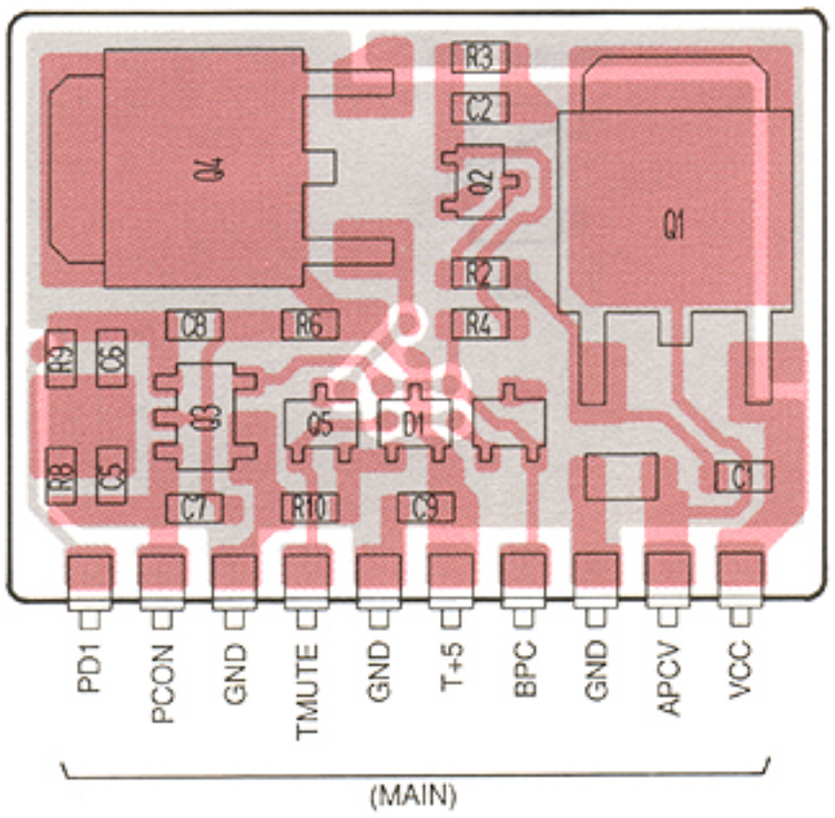
02CZ5.1 Z
(Symbol: 5.1Z)



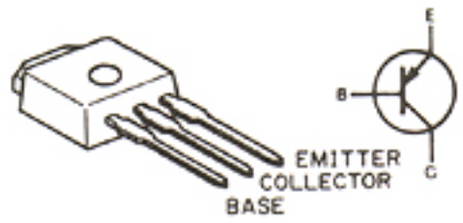
D5

7-3 MAIN UNIT

• APC BOARD



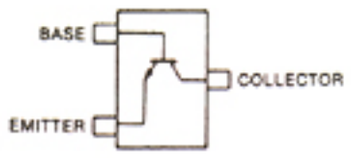
2SB1182



Q1, Q4

2SC4081 S

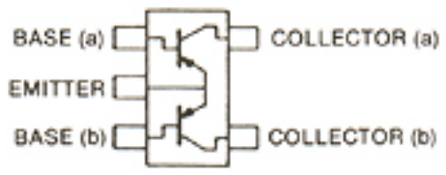
(Symbol: BS)



Q2, Q5

FMS1

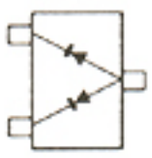
(Symbol: SI)



Q3

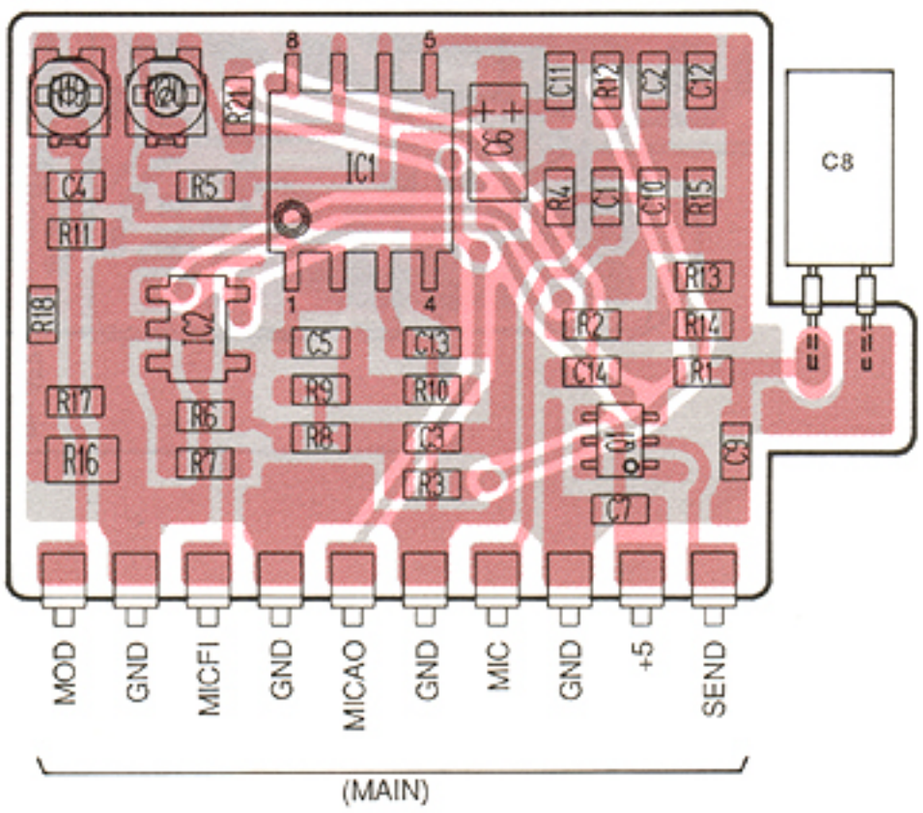
DAP202U

(Symbol: P)



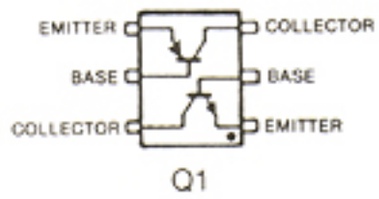
D1

• MIC BOARD



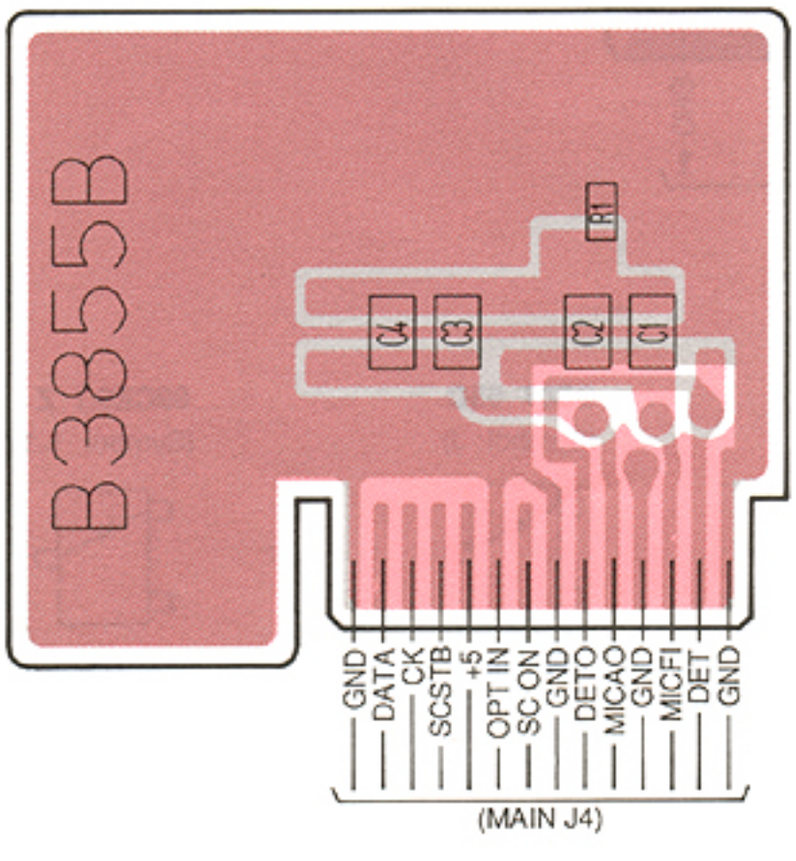
XP4312

(Symbol: 7T)



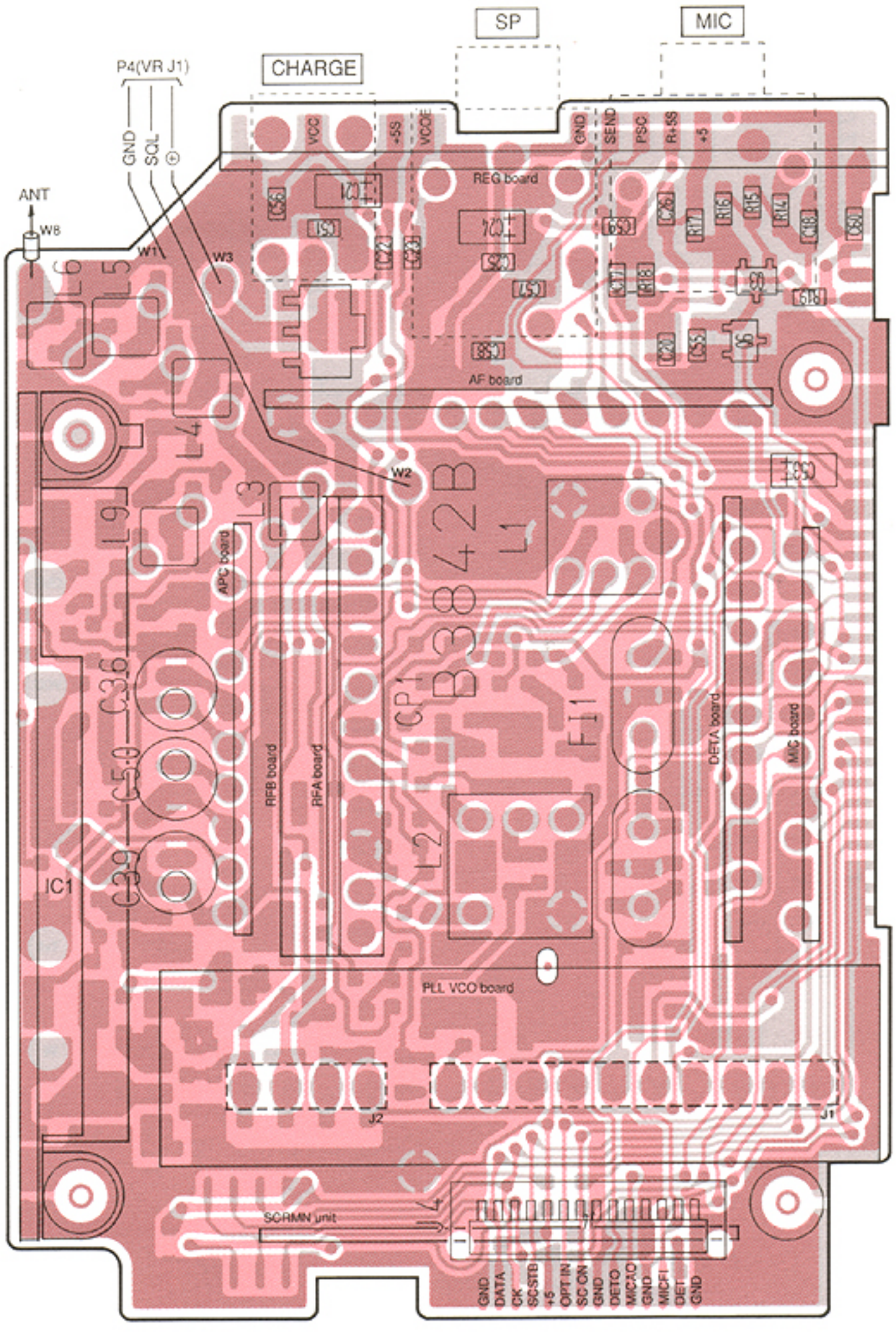
Q1

• SCRMN UNIT

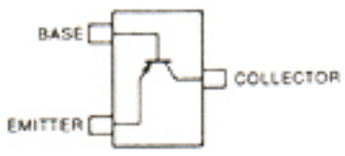


• MAIN UNIT

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

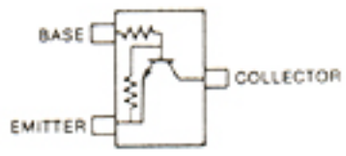


2SA1576 R
(Symbol: FR)



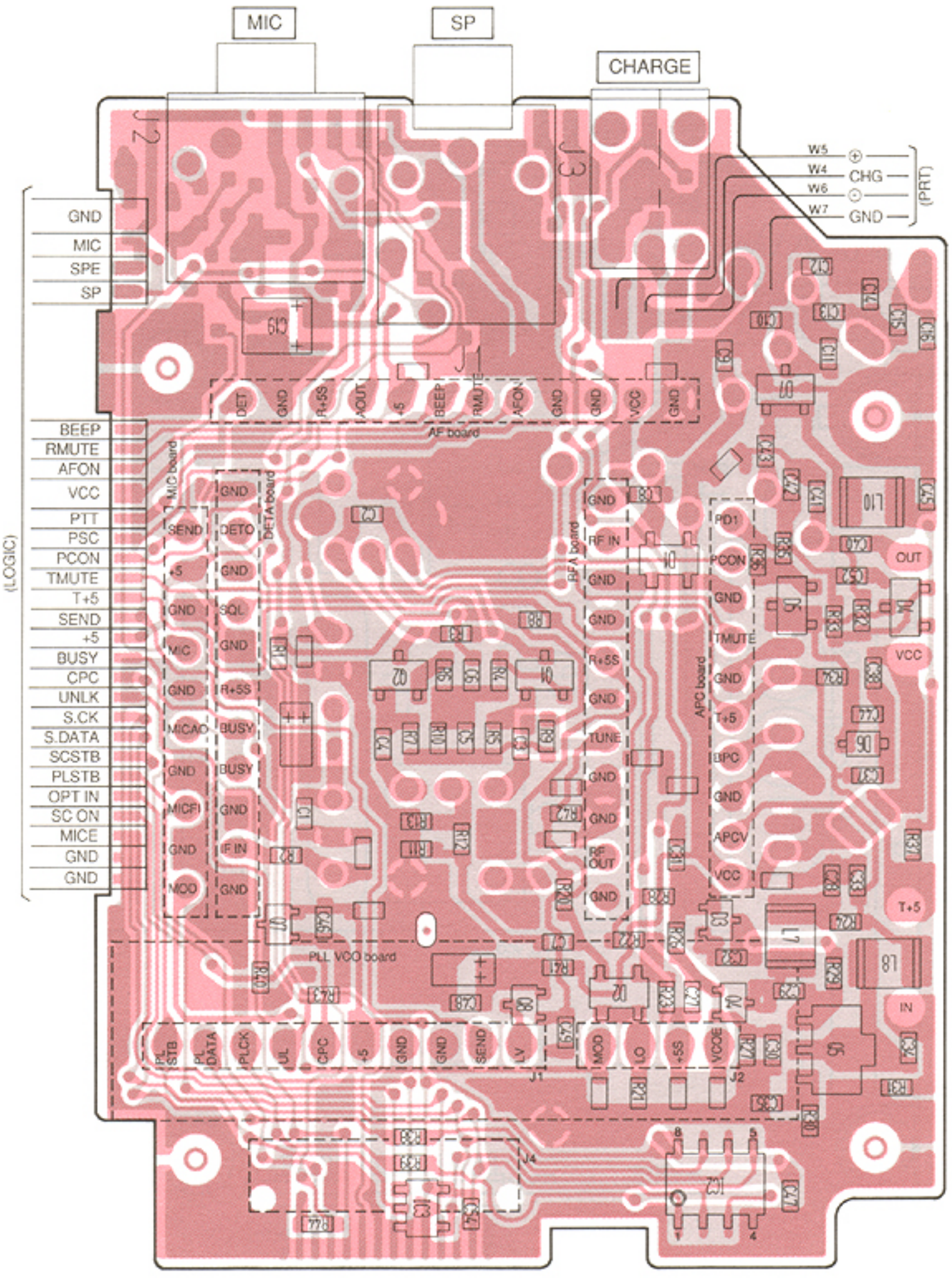
Q3

DTC144EU
(Symbol: 26)



Q6

• MAIN UNIT



2SC3356 R25
(Symbol: R25)

Q1, Q2

2SC4403 3
(Symbol: LY3)

Q4

2SC2954
(Symbol: QK)

Q5

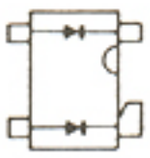
2SA1576 R
(Symbol: FR)

Q7

2SK880 Y
(Symbol: XY)

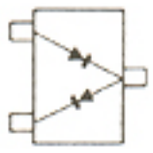
Q8

MA862
(Symbol: M1I)



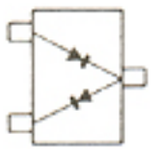
D1, D2

AD204U
(Symbol: K)



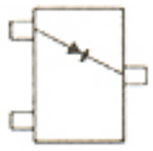
D3

HSM88AS
(Symbol: C1)



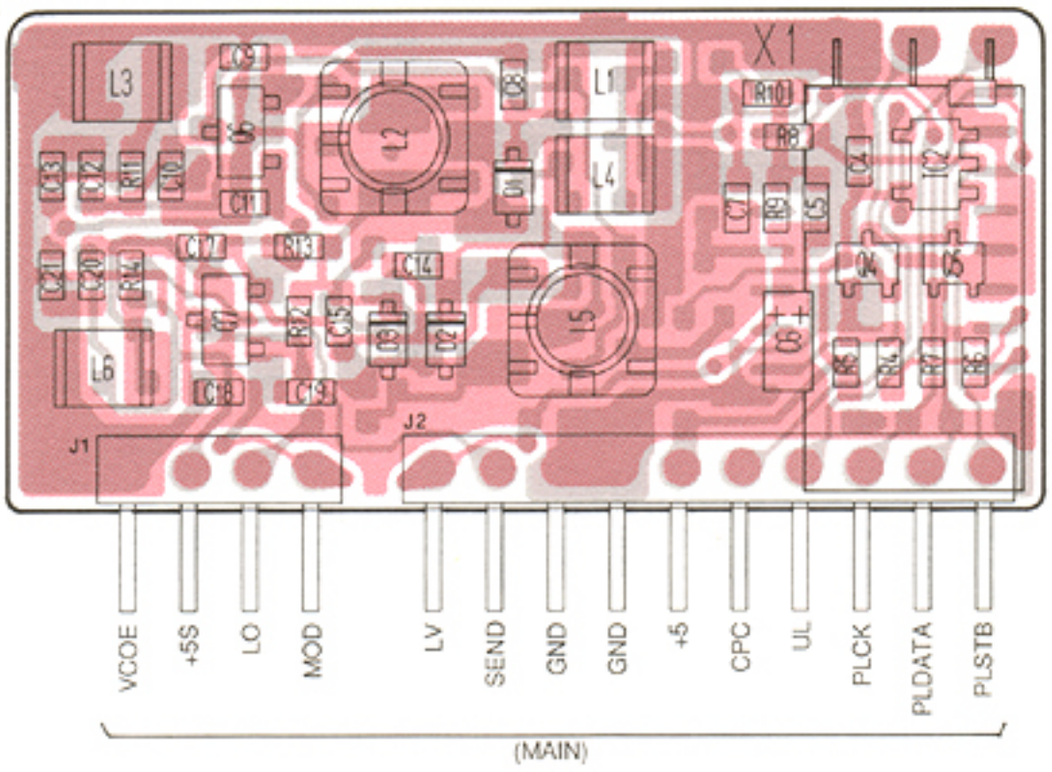
D4, D5

1SS153
(Symbol: A9)

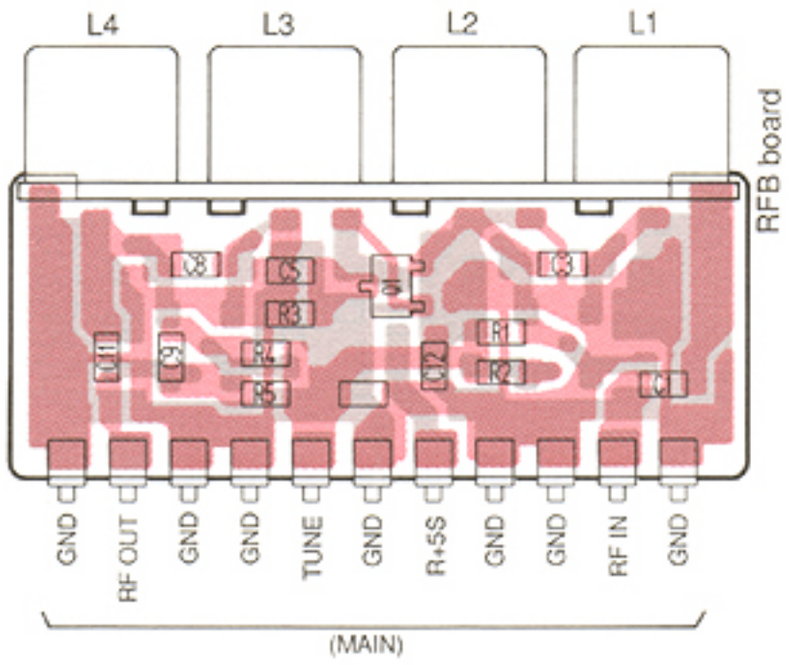


D7

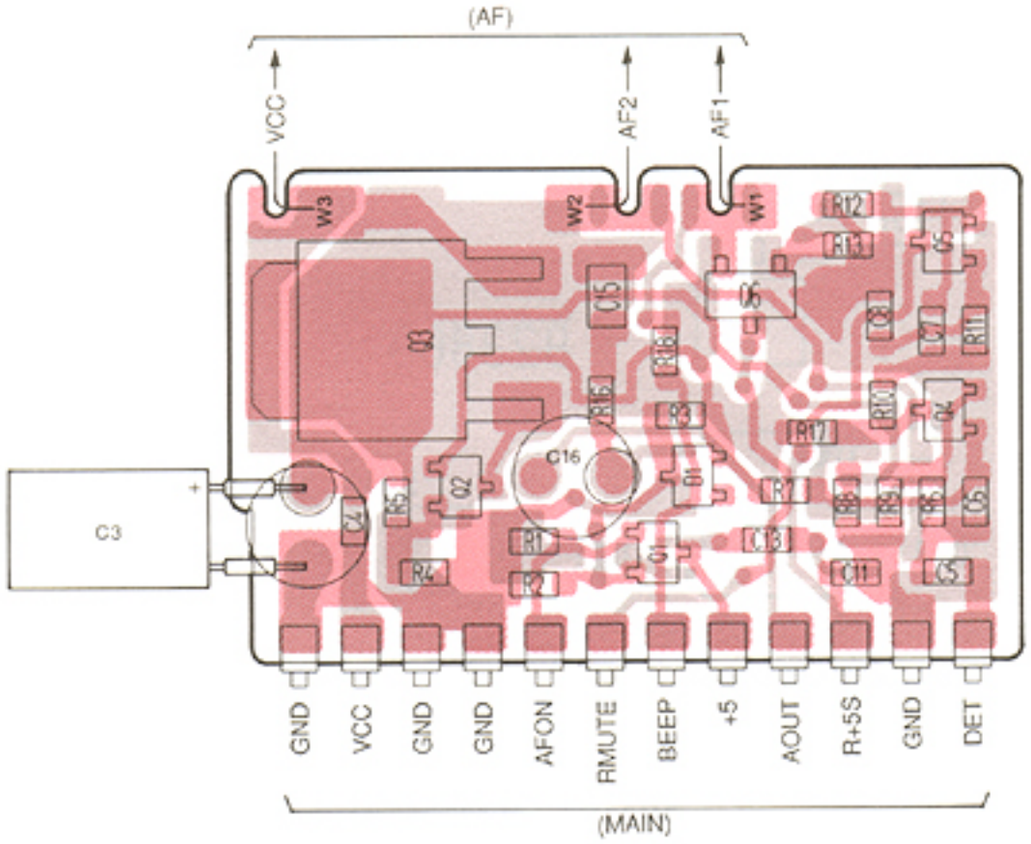
• PLL VCO BOARD



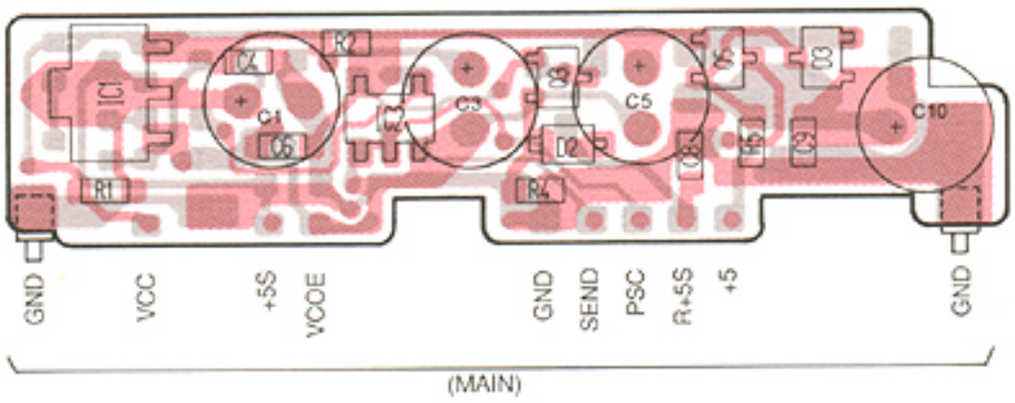
• RFA BOARD



• AF BOARD

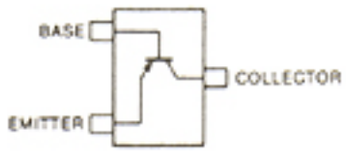


• REG BOARD



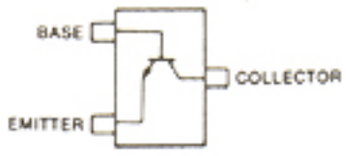
The combination of this page and the next page show the board layout in the same configuration as the actual P.C. Board.

2SA1576 S
(Symbol: FS)



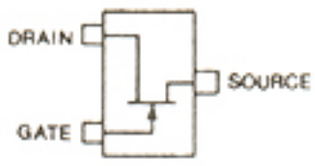
Q4

2SC4081 S
(Symbol: BS)



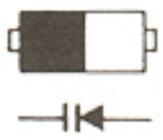
Q5

2SK210 Y
(Symbol: YY)



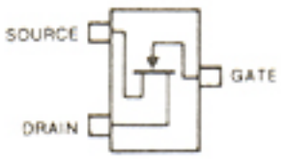
Q6, Q7

MA363B
(Symbol: 6D on anode area)



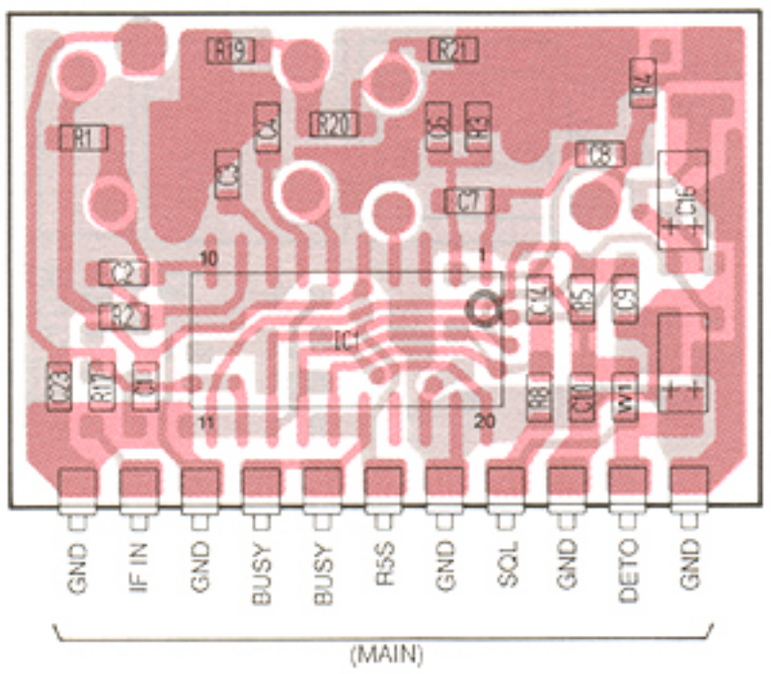
D1, D2, D3

2SK882 Y
(Symbol: TY)

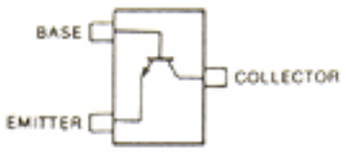


Q1

• DETA BOARD

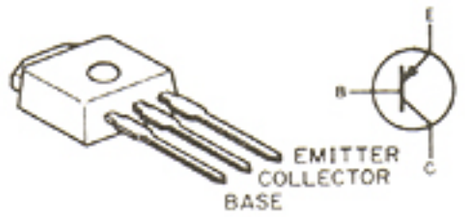


2SC4081 R
(Symbol: BR)



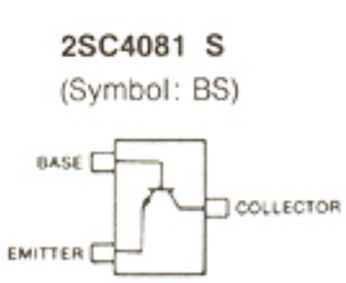
Q1, Q2, Q5

2SC1182



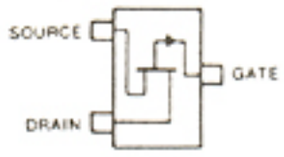
Q3

2SC4081 S
(Symbol: BS)



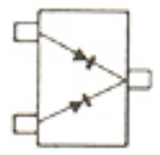
Q4

2SJ106 GR
(Symbol: VG)



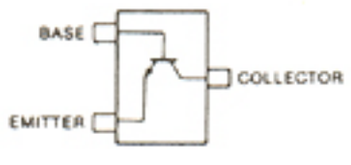
Q6

DAN202U
(Symbol: N)



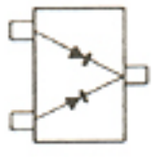
D1

2SC4081 S
(Symbol: BS)



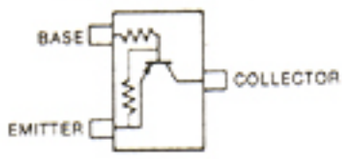
Q3, Q5

DAN202U
(Symbol: N)



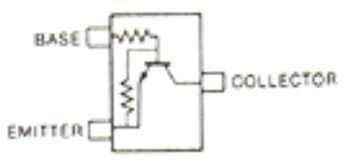
D3

DTA143ZU
(Symbol: 113)



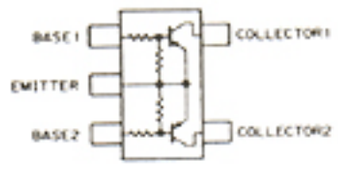
Q1

DTC144EU
(Symbol: 26)



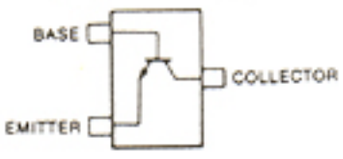
Q2

FMA2
(Symbol: A2)



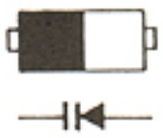
Q3

2SC4215 0
(Symbol: Q0)



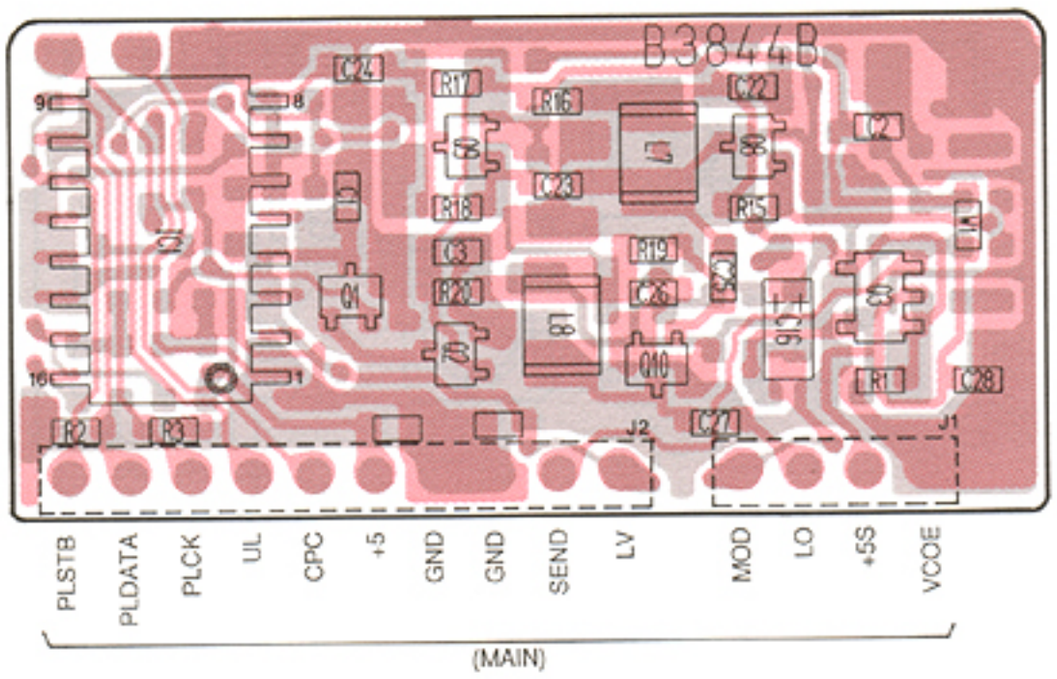
Q8, Q9, Q10

MA363B
(Symbol: 6D on anode area)

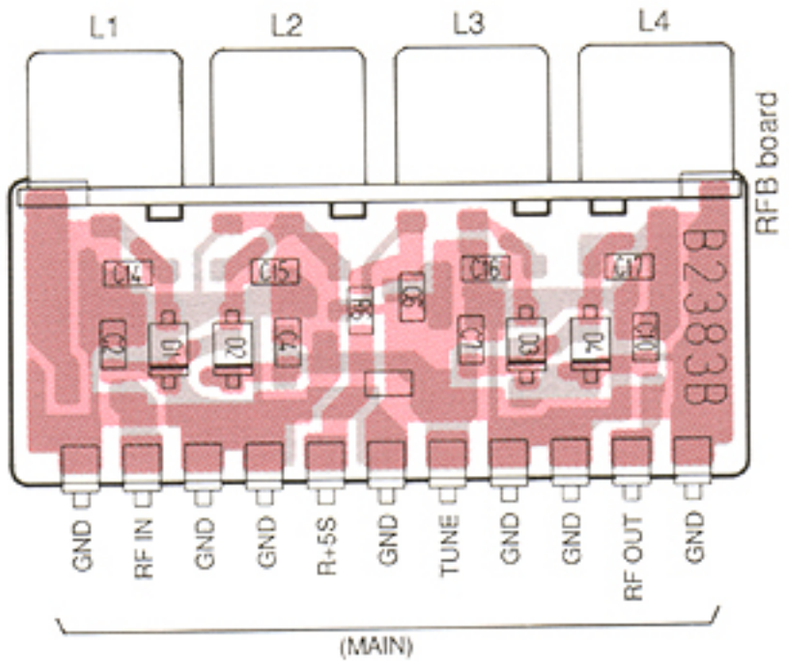


D1, D2, D3, D4

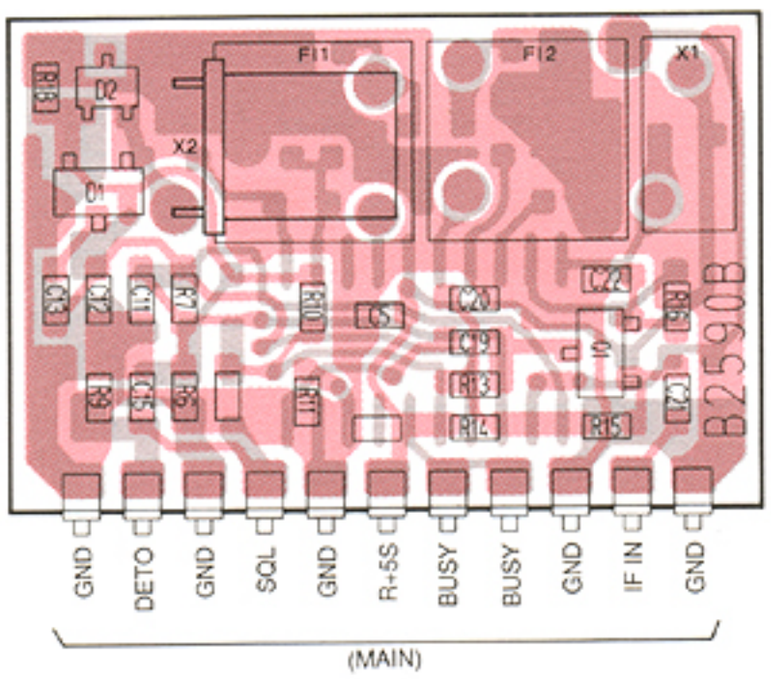
• PLL VCO BOARD



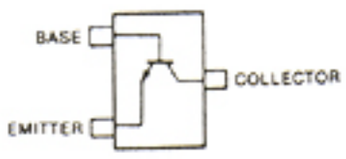
• RFA BOARD



• DETA BOARD

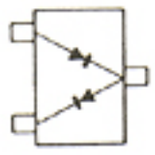


2SC3770 3
(Symbol: JY3)



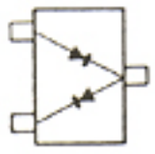
Q1

HSM88AS
(Symbol: C1)



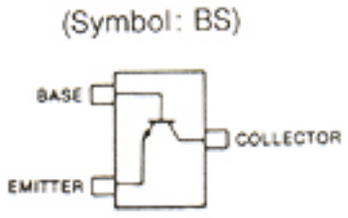
D1

DA204U
(Symbol: K)



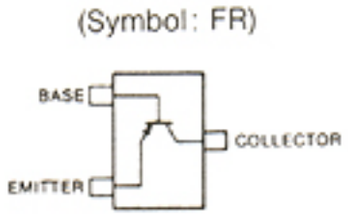
D2

2SC4081 S
(Symbol: BS)



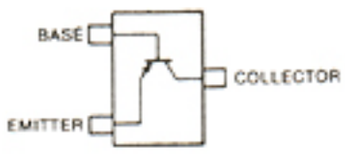
Q1

2SA1576 R
(Symbol: FR)



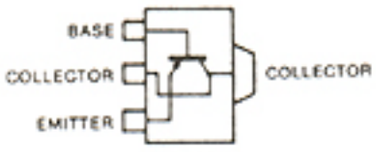
Q2

2SA1162 GR
(Symbol: SG)



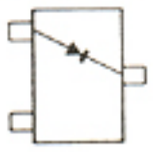
Q4

2SB798 DK
(Symbol: DK)



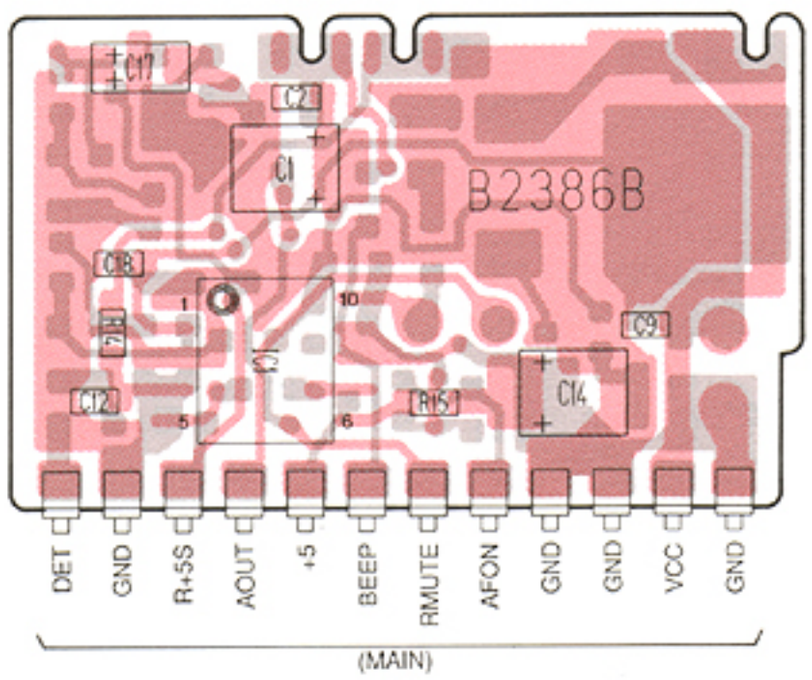
Q6

DA144
(Symbol: AV)

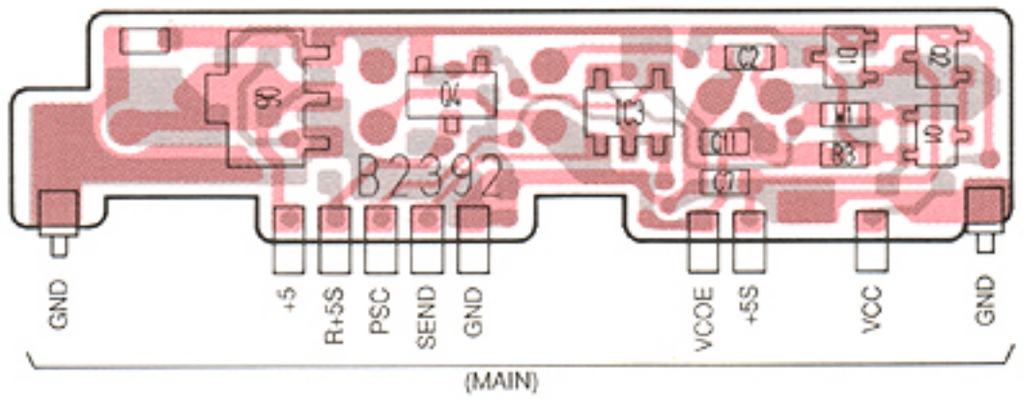


D1

• AF BOARD

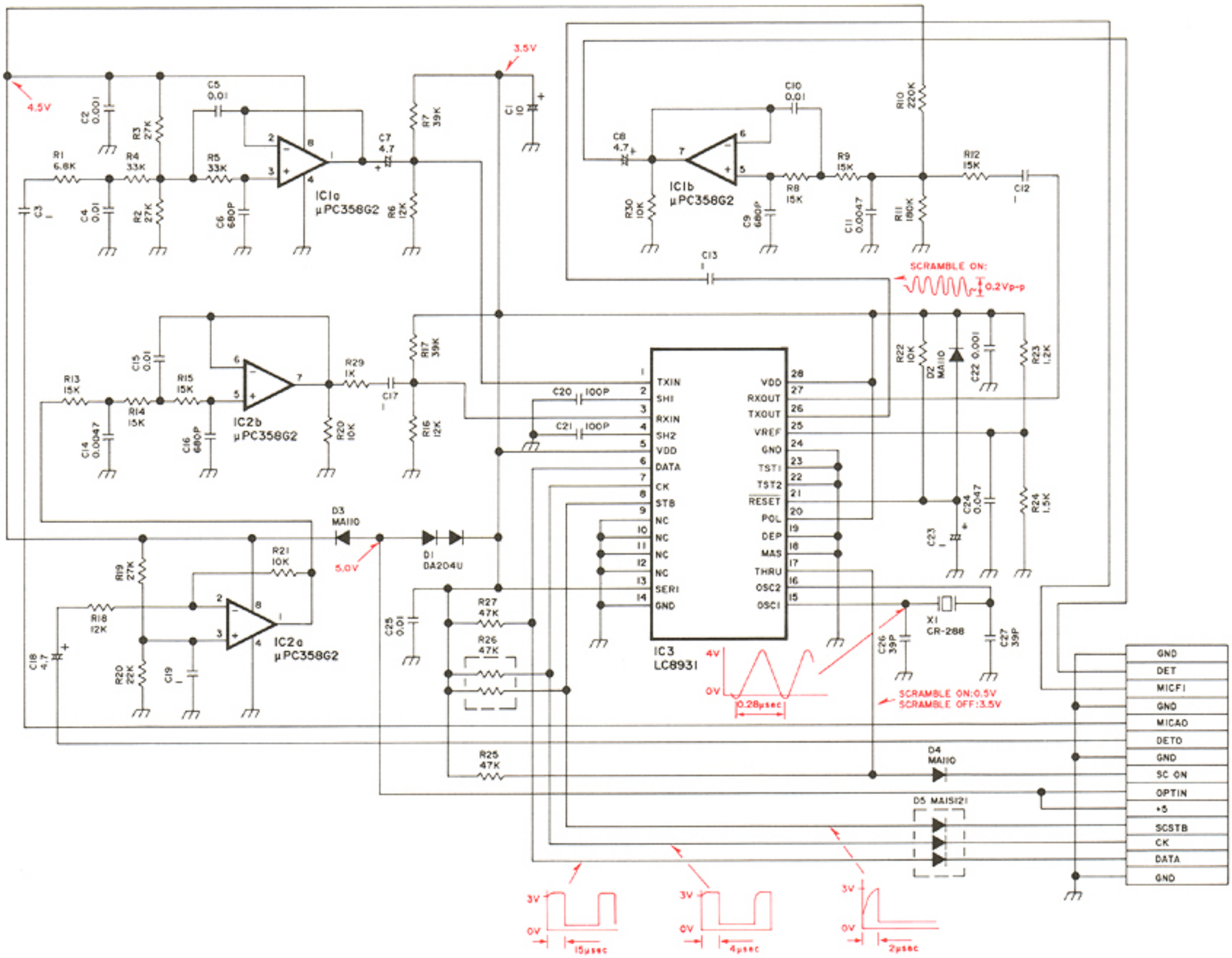


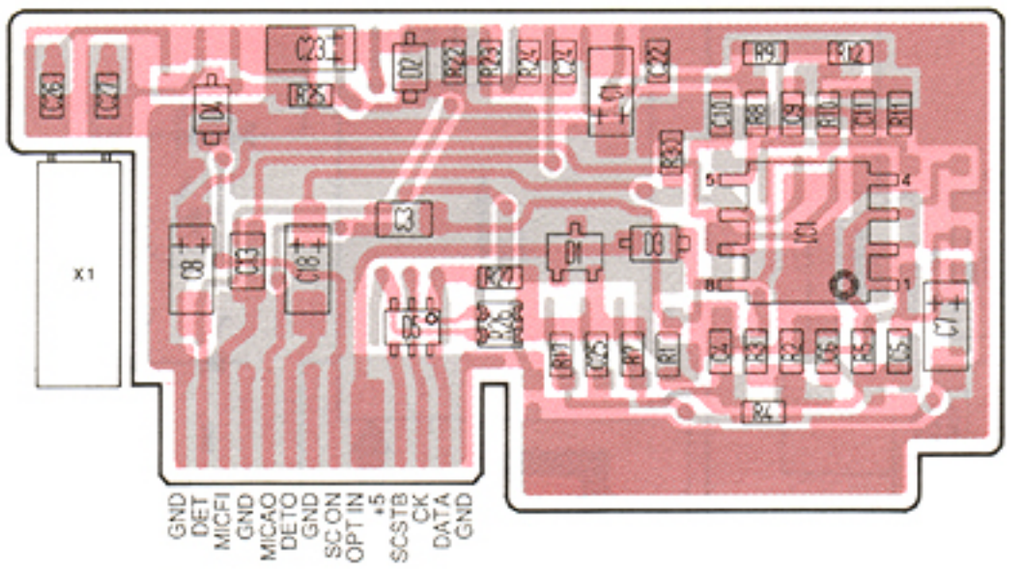
• REG BOARD

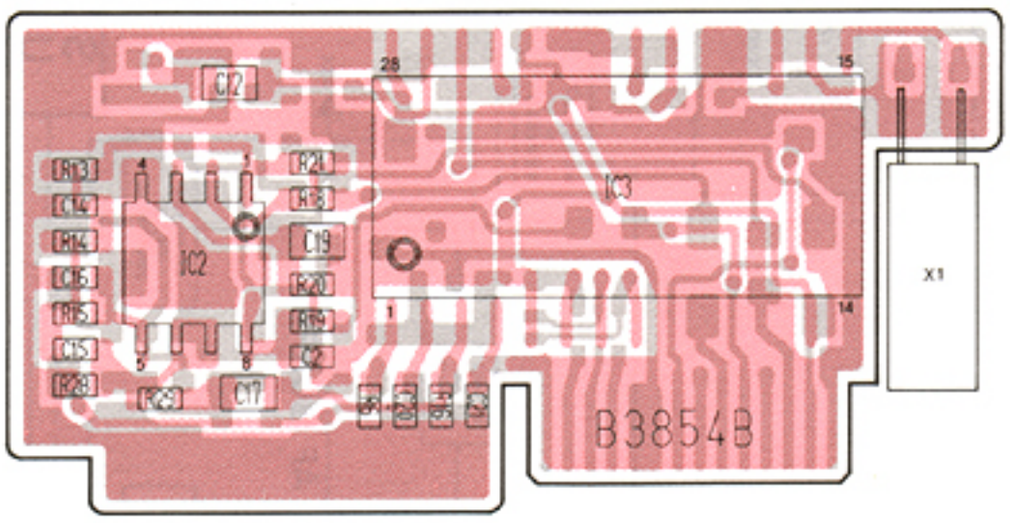


SECTION 8 OPTIONAL UNIT

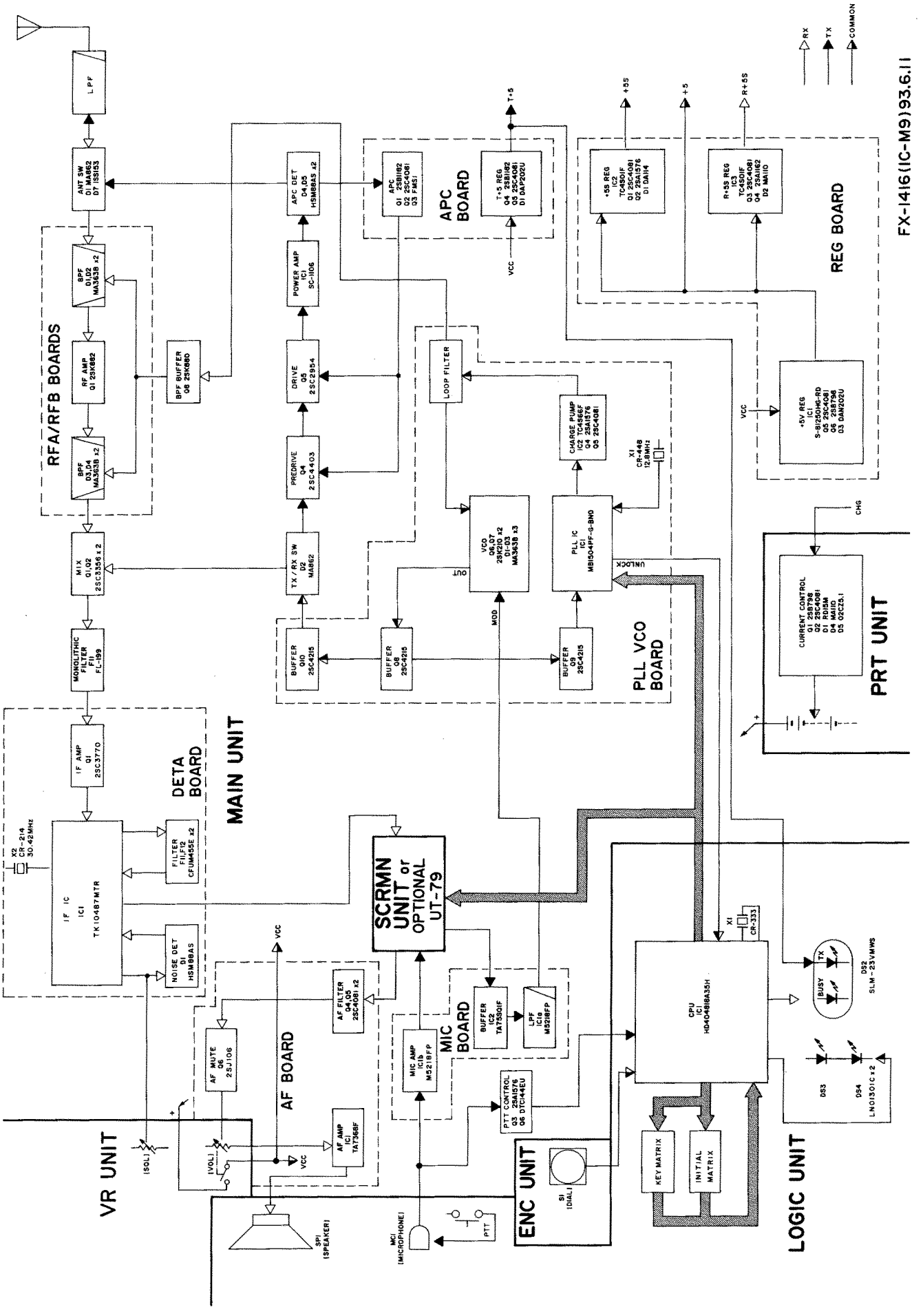
• UT-79 VOICE SCRAMBLER UNIT



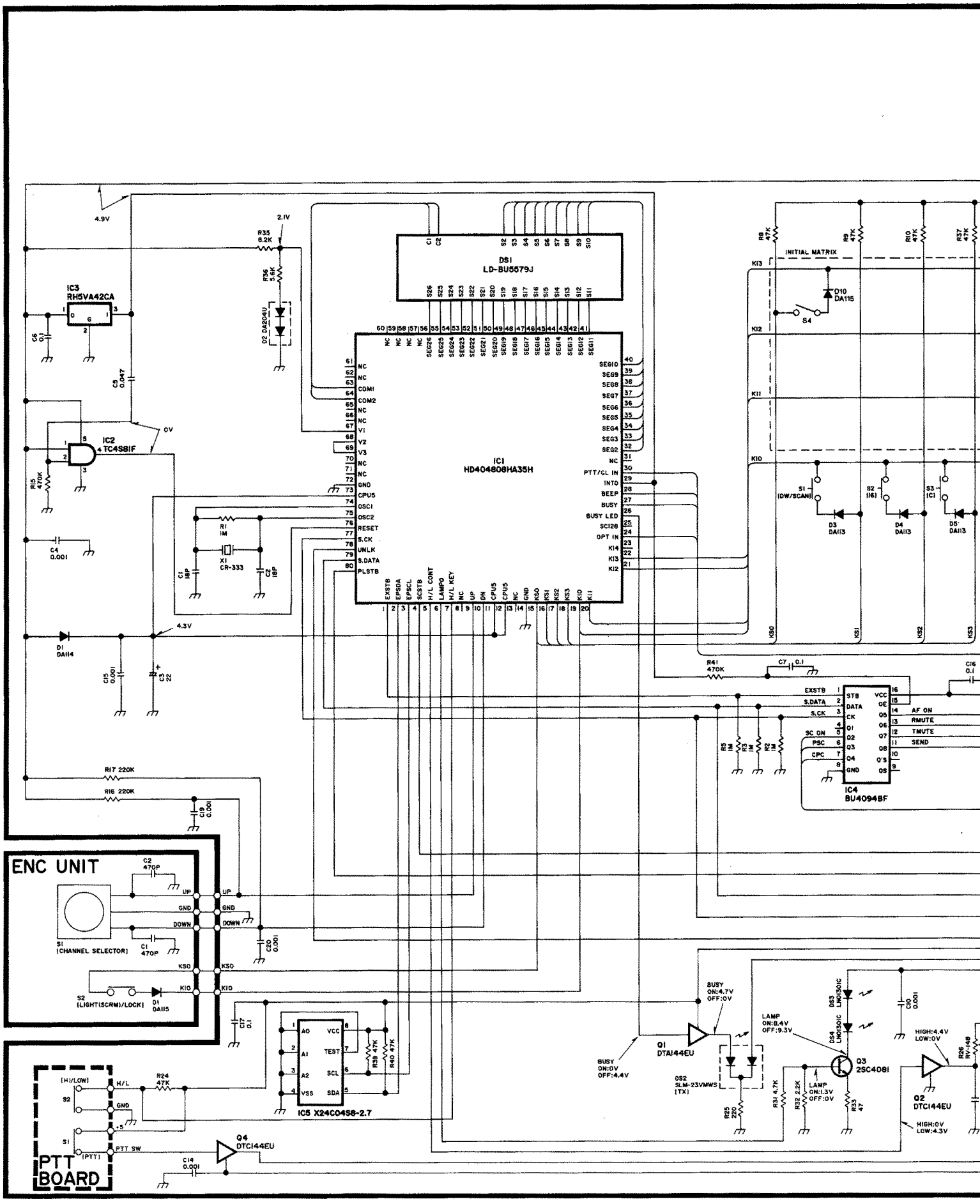


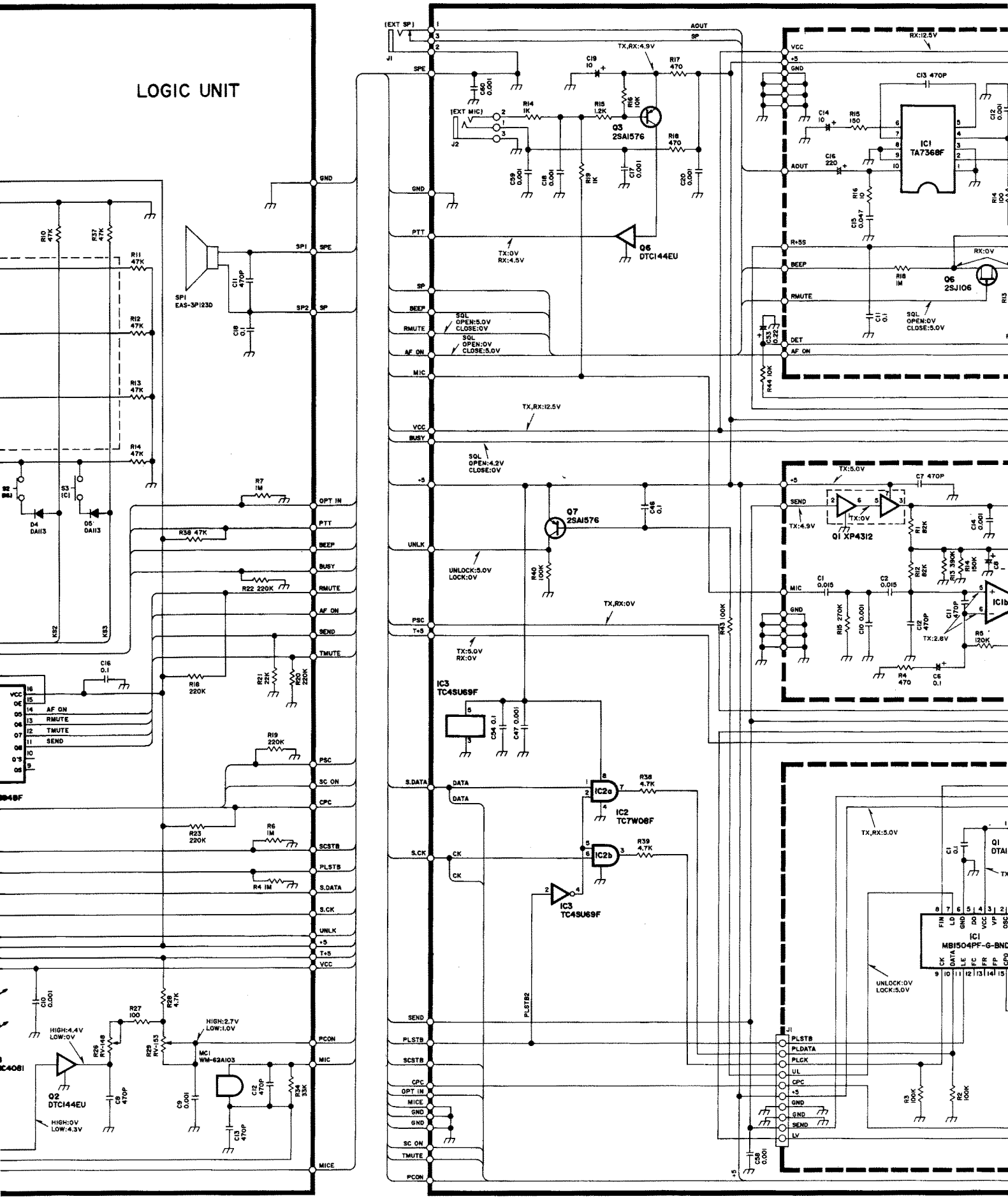


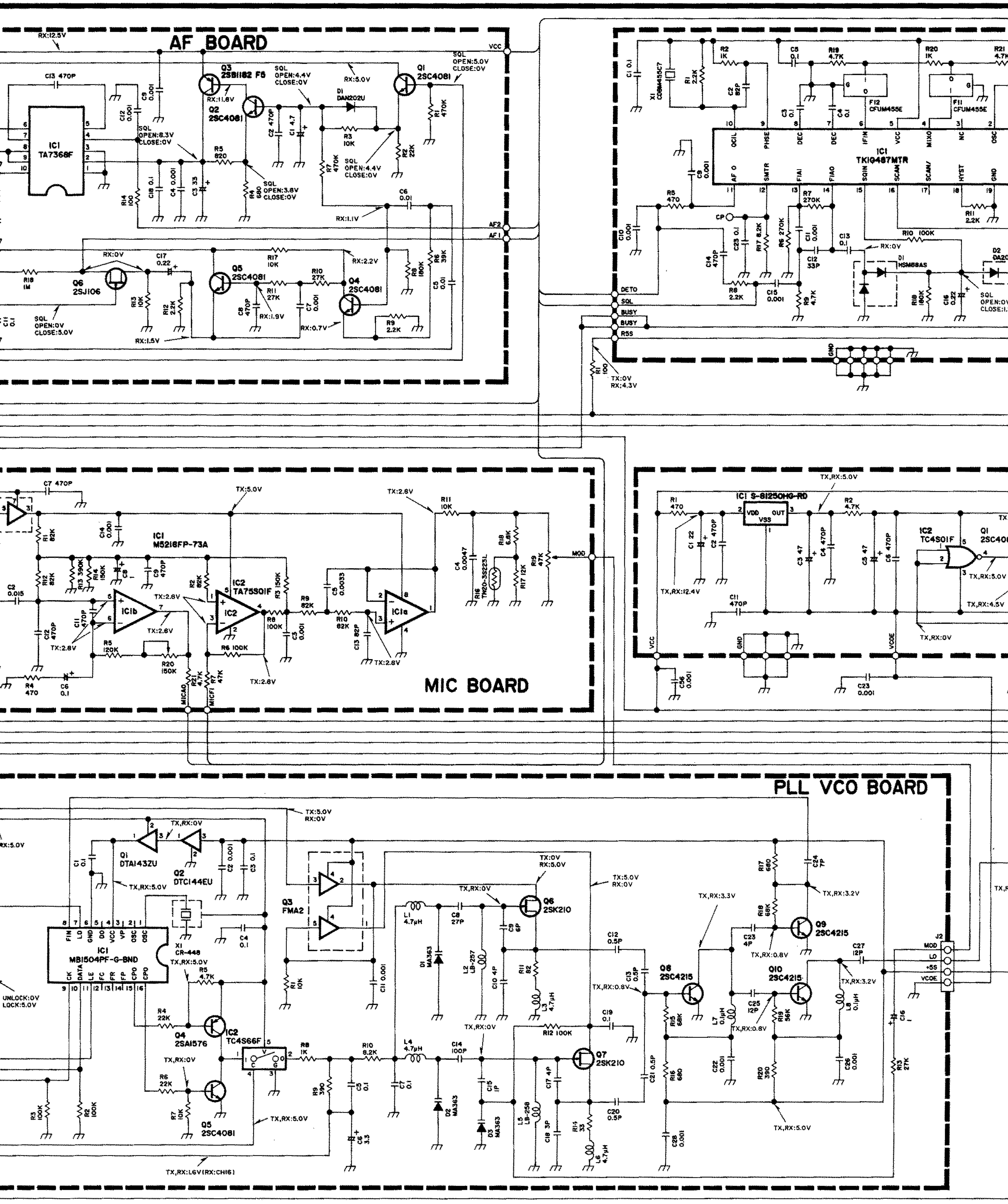
SECTION 9 BLOCK DIAGRAM

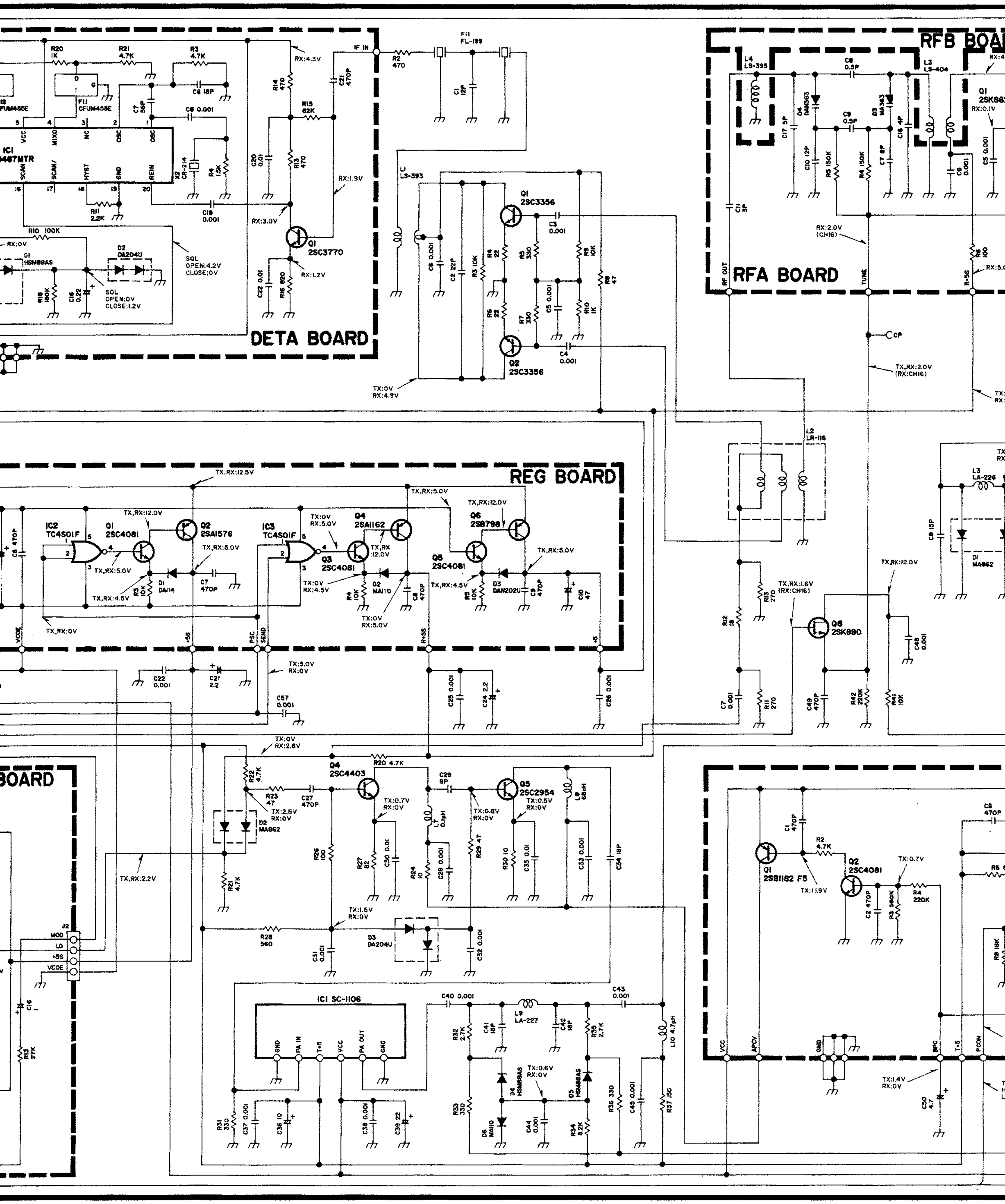


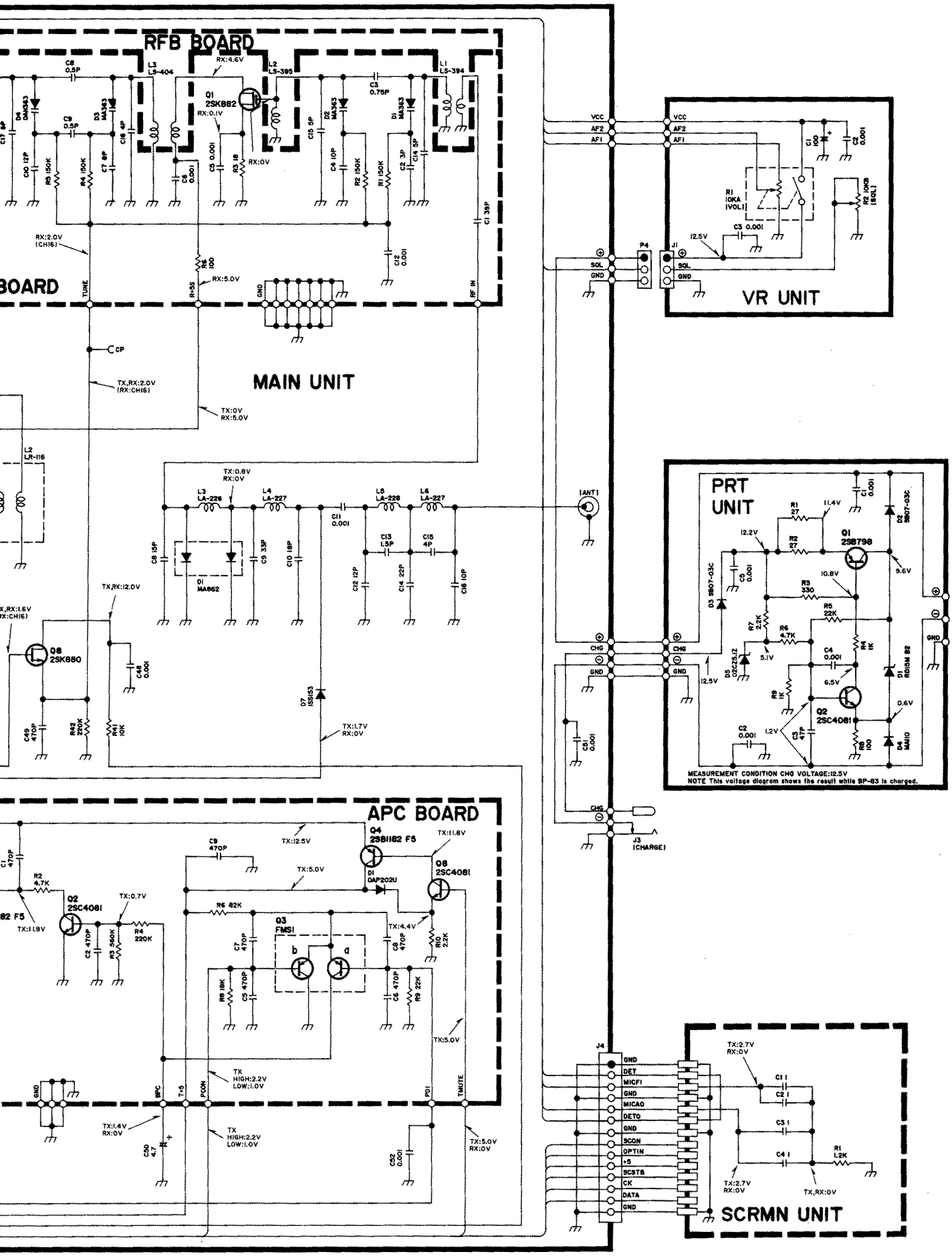
SECTION 10 VOLTAGE DIAGRAM




LOGIC UNIT
(EXT SP)
(EXT MIC)
J1
J2
SPE
GND
PTT
SP
BEEP
RMUTE
AF ON
MIC
VCC
BUSY
+5
UNLK
PSC
T+5
S.DATA
S.CK
SCSTB
PLSTB
SEND
PCON
OPT IN
SC ON
TMUTE
MICE
AOUT
TX,RX:4.9V
TX:0V
RX:4.5V
SQL
OPEN:5.0V
CLOSE:0V
OPEN:0V
CLOSE:5.0V
OPEN:4.2V
CLOSE:0V
TX,RX:12.5V
UNLOCK:5.0V
LOCK:0V
TX,RX:0V
TX:5.0V
RX:0V
TX:4.9V
TX:2.8V
TX,RX:5.0V
UNLOCK:0V
LOCK:5.0V
HIGH:4.4V
LOW:0V
HIGH:0V
LOW:4.3V
HIGH:2.7V
LOW:1.0V
Q3
2SA1576
Q6
DTC144EU
Q7
2SA1576
Q2
DTC144EU
Q1
XP4312
Q6
2SJ106
IC1
TA7368F
IC1
MB1504PF-G-BND
IC2
TC7W08F
IC3
TC4SU69F
MC1
WM-62A103
SP1
EAS-3P123D
D4
DA113
D5
DA113
S2
S3
K52
K53
R1 82K
R2 100K
R3 100K
R4 470
R5 120K
R6 1M
R7 1M
R10 47K
R11 47K
R12 47K
R13 47K
R14 47K
R15 1.2K
R16 10K
R17 470
R18 470
R18 220K
R19 220K
R20 220K
R21 22K
R22 220K
R23 220K
R26 RV-14B
R27 100
R28 4.7K
R29 RV-15B
R34 33K
R36 4.7K
R37 47K
R38 47K
R38 4.7K
R39 4.7K
R40 100K
R43 100K
R44 10K
C1 0.015
C2 0.015
C5 0.001
C6 0.1
C7 470P
C8 470P
C9 0.001
C10 0.001
C11 470P
C12 470P
C13 470P
C15 0.047
C16 0.1
C16 220
C17 0.001
C18 0.1
C19 10
C20 0.001
C33 0.22
C46 0.1
C47 0.001
C54 0.1
C56 0.001
C59 0.001


AF BOARD
TA7368F
2SB1182 F5
2SC4081
DAN202U
2SJ106
TK10487MTR
CFUM455E
HSM88AS
MIC BOARD
M5218FP-73A
TA75S01F
S-81250HG-RD
TC4S01F
PLL VCO BOARD
MB1504PF-G-BND
DTA143ZU
DTC144EU
FMA2
2SK210
2SC4215
2SA1576
TC4S66F
CR-448
MA363


DETA BOARD
IC1
IF IN
FI1
FL-199
Q1
2SC3770
R10 100K
D1
HSM88AS
D2
DA204U
SQL
OPEN:4.2V
CLOSE:0V
L1
LS-393
Q1
2SC3356
Q2
2SC3356
TX:0V
RX:4.9V
RFB BOARD
RFA BOARD
RF OUT
TUNE
L4
LS-395
L3
LS-404
D4
DAN363
D3
MA363
Q1
2SK882
RX:2.0V
(CH16)
TX,RX:2.0V
(RX:CH16)
L2
LR-116
Q8
2SK880
TX,RX:1.6V
(RX:CH16)
TX,RX:12.0V
L3
LA-226
D1
MA862
REG BOARD
IC2
TC4S01F
Q1
2SC4081
Q2
2SA1576
IC3
TC4S01F
Q3
2SC4081
Q4
2SA1162
Q5
2SC4081
Q6
2SB798
D1
DA114
D2
MA110
D3
DAN202U
TX,RX:12.5V
TX,RX:12.0V
TX,RX:5.0V
TX,RX:4.5V
TX,RX:0V
TX:0V
RX:5.0V
TX:5.0V
RX:0V
VCOE
+5S
PSC
SEND
R+5S
+5
BOARD
J2
MOD
LO
+5S
VCOE
Q4
2SC4403
Q5
2SC2954
D2
MA862
D3
DA204U
L7
0.1μH
L8
68nH
TX,RX:2.2V
TX:0V
RX:2.8V
TX:2.8V
RX:0V
TX:0.7V
RX:0V
TX:0.8V
RX:0V
TX:0.5V
RX:0V
TX:1.5V
RX:0V
IC1 SC-1106
GND
PA IN
T+5
VCC
PA OUT
GND
L9
LA-227
L10 4.7μH
D4
HSM88AS
D5
HSM88AS
D6
MA110
TX:0.6V
RX:0V
Q1
2SB1182 F5
Q2
2SC4081
TX:11.9V
TX:0.7V
TX:1.4V
RX:0V
VCC
APCV
GND
BPC
T+5
PCON
CP


RFB BOARD
MAIN UNIT
VR UNIT
PRT UNIT
APC BOARD
SCRMN UNIT
MEASUREMENT CONDITION CHG VOLTAGE:12.5V
NOTE This voltage diagram shows the result while BP-83 is charged.

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