ICOM

SERVICE MANUAL

VHF TRANSCEIVER

IC-V68

Icom Inc.

INTRODUCTION

This service manual describes the latest information for the **IC-V68** VHF TRANSCEIVER at the time of publication.

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

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 9 V. This will ruin the transceiver.
DO NOT expose the transceiver to rain, snow or any liquids.
DO NOT reverse the polarities of the power supply when connecting the transceiver.
DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

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〉

1110003390	S. IC	AN8005M-(E1)	IC-V68	MAIN UNIT	5 pieces
8810005710	Screw	PH M2 × 6 ZK	IC-V68	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 : 136 MHz to 174 MHz
- Mode : FM (16K0F3E)
- Channel spacing : 25 kHz
- Frequency resolution : 5 kHz, 12.5 kHz
- Number of channels : 40 channels
- Antenna impedance : 50 Ω (nominal)
- Usable temperature range : −10°C to +60°C
- Power supply requirement : 9 V DC (nominal)
- Current drain (at 13.8 V) :

RECEIVE	Standby	29 mA
	Power saved	10 mA
	Max. audio	150 mA
TRANSMIT	High	1000 mA
	Low	500 mA

- Dimensions : 57 (W) × 145 (H) × 35 (D) mm
- Weight : 330 g (include dry cell batteries)

■ TRANSMITTER

- Output power (at 13.8 V) : High 136 MHz-150 MHz 5 W
  150 MHz-174 MHz 3 W
  Low 136 MHz-174 MHz 0.5 W
- Modulation : Variable reactance frequency modulation
- Maximum frequency deviation : ±5 kHz
- Frequency tolerance : ±0.0015% (±15 ppm)
- Spurious emissions : Less than −60 dB
- Audio frequency response : −3 dB to +1 dB of 6 dB/octave with 300 Hz to 3000 Hz input
- Audio harmonic distortion : 10%
- Noise and hum : More than 40 dB

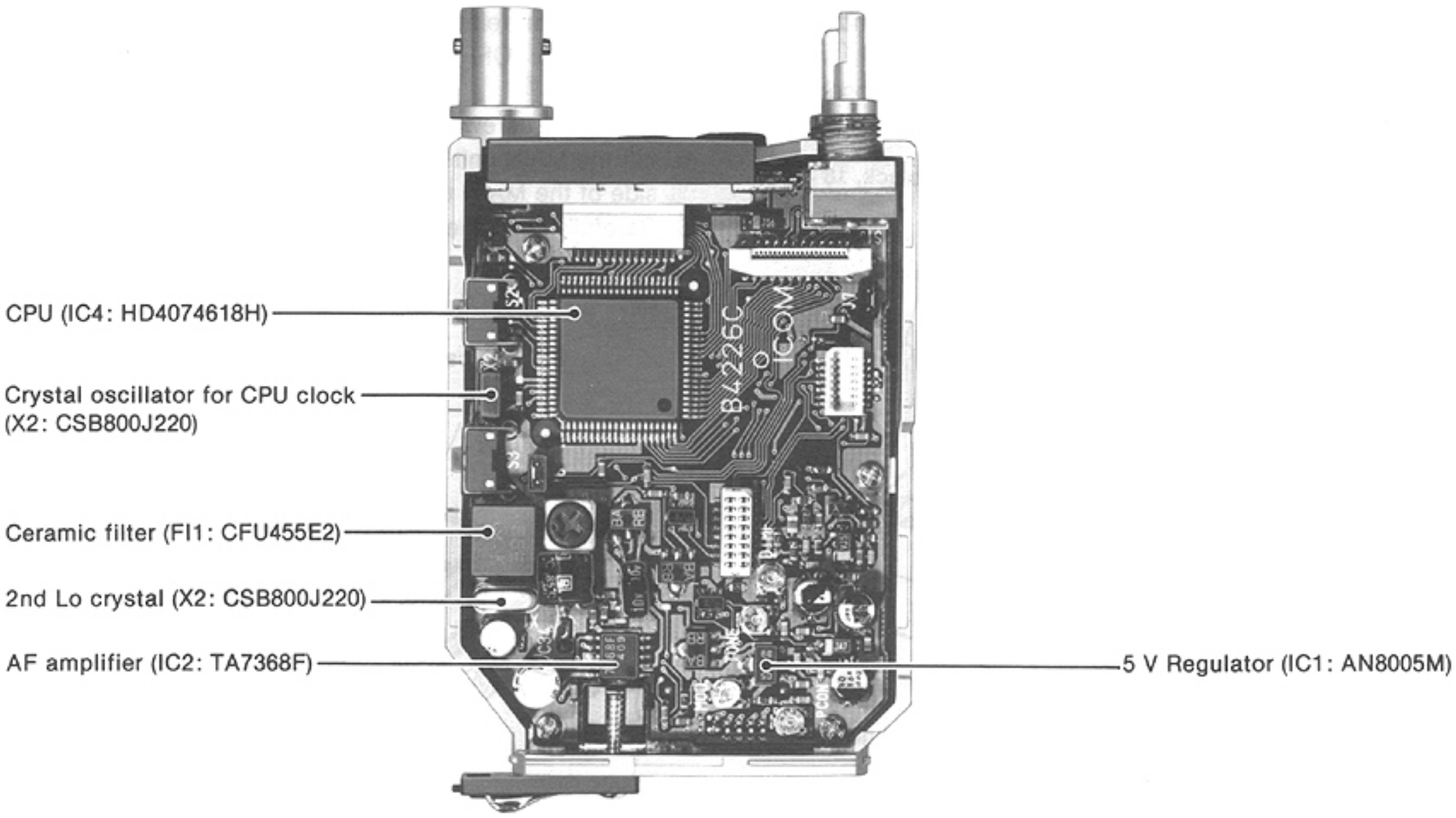
■ RECEIVER

- Receive system : Double conversion superheterodyne
- Intermediate frequencies : 1st 30.875 MHz
  2nd 455 kHz
- Sensitivity : 0.25 µV for 12 dB SINAD
- Squelch threshold sensitivity : 0.25 µV
- Adjacent channel selectivity : Less than −60 dB
- Spurious response : Less than −60 dB
- Image rejection : Less than −60 dB
- Intermodulation rejection : Less than −55 dB
- Audio frequency response : −6 dB to +2 dB of 6 dB/octave with 300 Hz to 3000 Hz modulation
- Noise and hum : More than 40 dB
- Frequency tolerance : ±0.0015% (±15 ppm) max.
- Audio output power : 350 mW at 10% distortion

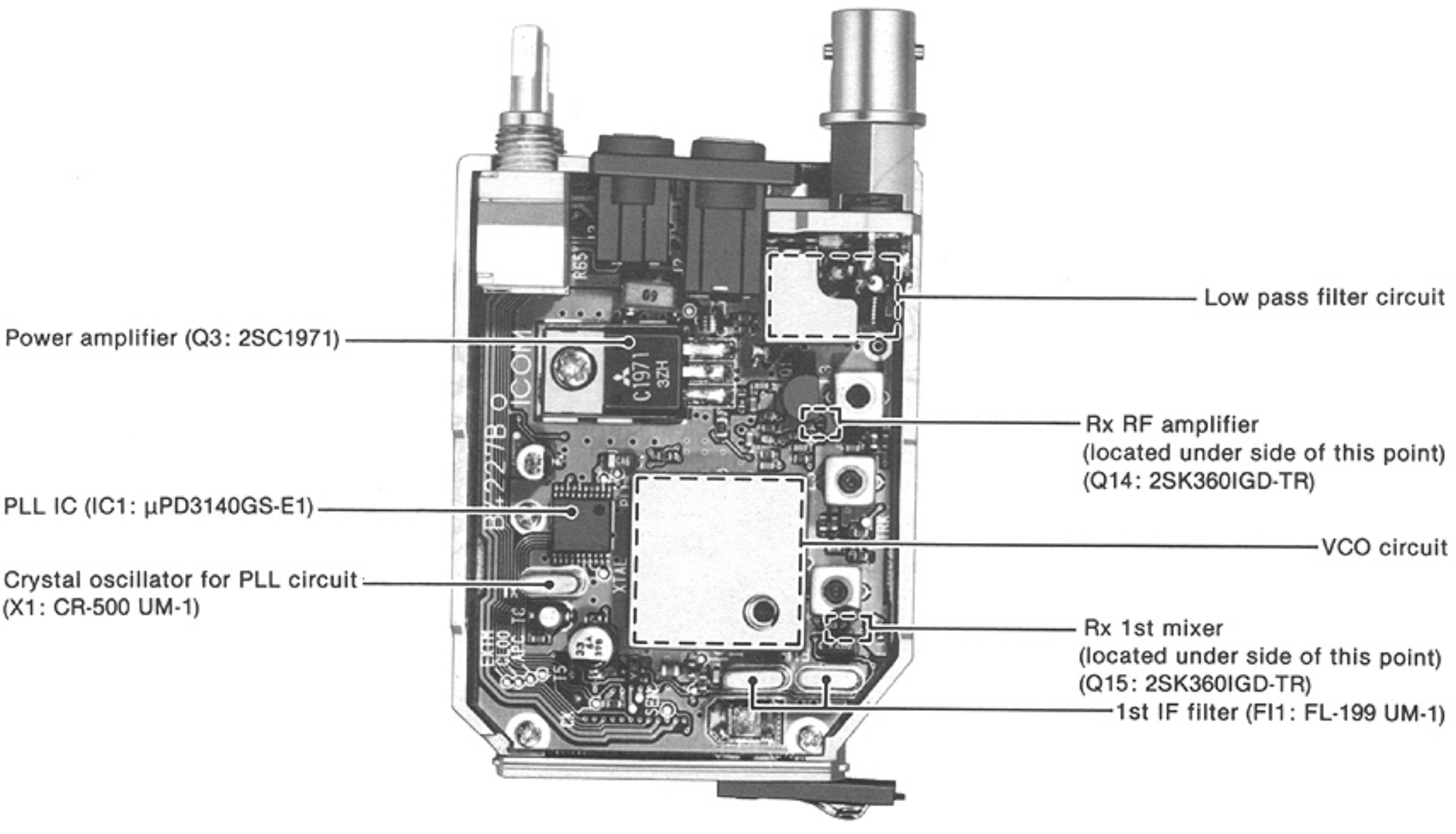
All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

• MAIN unit



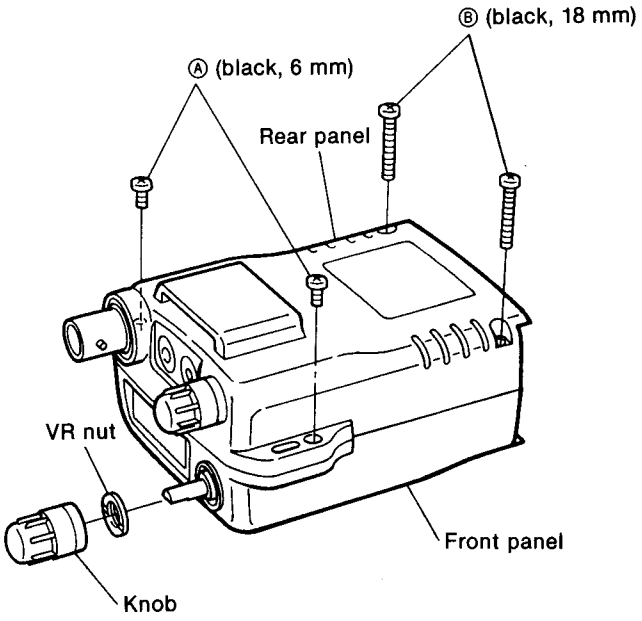
• RF unit



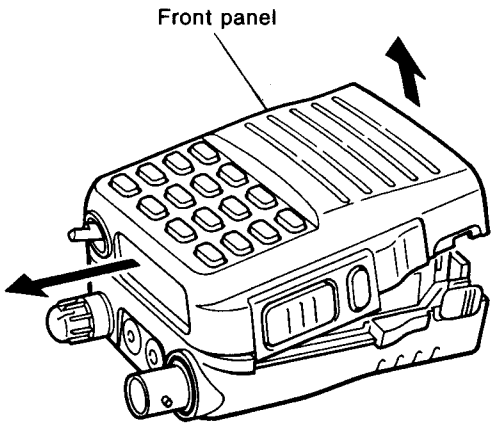
SECTION 3 DISASSEMBLY INSTRUCTIONS

• REMOVING THE FRONT PANEL

1. Turn the power OFF, then remove the battery pack.
2. Remove 4 screws Ⓐ and Ⓑ from the rear and front panels.
3. Pull off the [DIAL] knob, then remove the exposed VR nut.

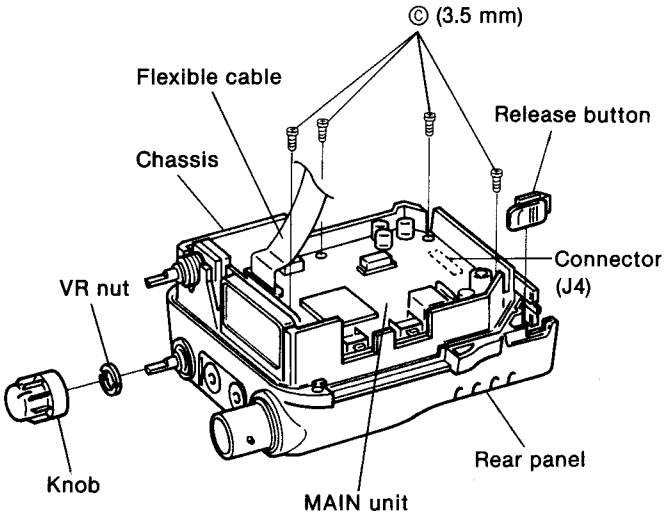


4. Carefully open the front panel from the bottom side.



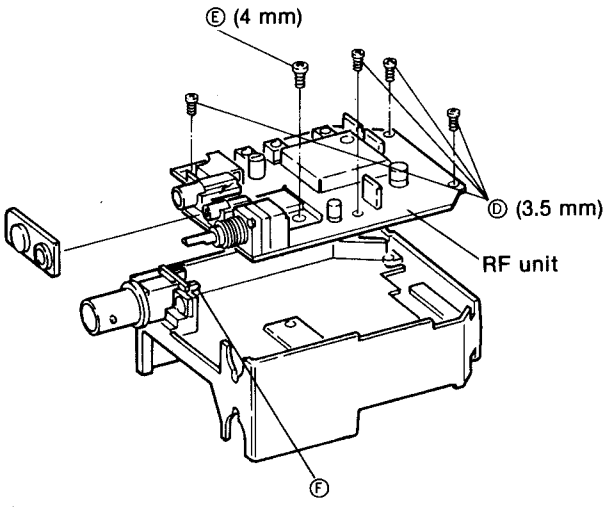
• REMOVING THE MAIN UNIT AND REAR PANEL

1. Unplug the Flexible cable.
2. Remove the release button.
3. Pull off the [OFF/VOL] knob, then remove the exposed VR nut.
4. Remove 4 screws Ⓒ from the MAIN unit.
5. Lift the MAIN unit to remove. (Disconnect J4 on reverse side of the MAIN unit to remove.)
6. Carefully open the rear panel from the chassis.



• REMOVING THE RF UNIT

1. Remove the jack seal.
2. Remove 5 screws Ⓓ and Ⓔ.
3. Unsolder the point Ⓕ, then remove the RF unit.



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT (RF 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 (L1, L2, L11, C39, C55–C58, C101, C102, C106) to suppress out-of-band signals. The filtered signals are passed through the λ/4 type antenna switching circuit (D2, D7) and are then applied to the RF circuit.

4-1-2 RF AND 1ST MIXER CIRCUITS (RF 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 (L3, D4) and amplified at the RF amplifier (Q14). The amplified signals are again passed through the tunable bandpass filter (L4, L5, D5, D6).

D4–D6 employ varactor diodes that track the bandpass filters and are controlled by the PLL lock voltage. These diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image rejection.

The signals are then mixed at the 1st mixer (Q15) 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), amplified at Q7 and is then applied to the MAIN unit.

4-1-3 2ND IF AND DEMODULATOR CIRCUITS (MAIN UNIT)

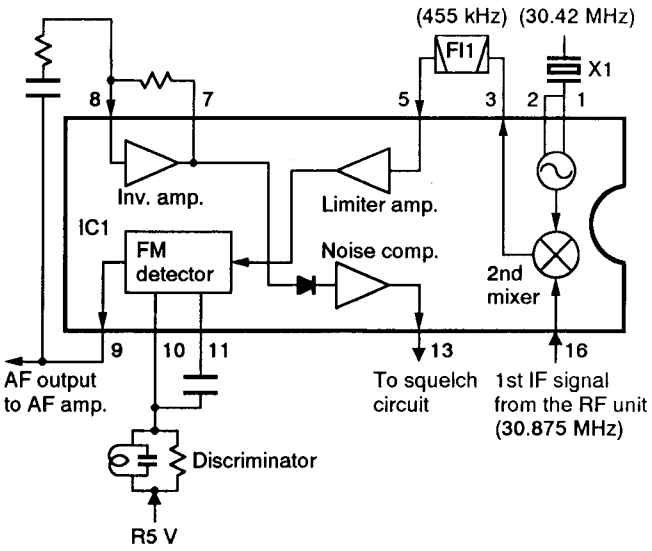
The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the RF unit is applied to a 2nd mixer section of IC3 (pin 16). 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 and noise detector. The local oscillator section generates 30.42 MHz using X1.

The 2nd IF signal from the 2nd mixer (IC3 pin 3) passes through a ceramic filter (FI1) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier (IC3 pin 5) and applied to the quadrature detector (IC3 pin 10, L1, C59, R43) to demodulate the 2nd IF signal into AF signals. The AF signals (detector signals) are output from pin 9 and applied to the AF circuit.

FM DETECTOR AND SQUELCH CIRCUITS



4-1-4 AF CIRCUIT (MAIN UNIT)

AF signals from the demodulator circuit are passed through the deemphasis circuit and are then applied to the AF circuit.

The signals are applied to the deemphasis circuit (Q1) and passed through the AF mute switch (Q2) and the [VOL] control (RF unit R65). The mute switch (Q2) cuts the audio line when the squelch closes.

The passed signals (via "AF IN") are amplified at the AF power amplifier (IC2) to a level needed to drive the speaker.

For power conservation, the power supply circuit (Q5, Q6, D1) does not supply Vcc voltage to the AF power amplifier (IC2) when the squelch closes. Q6, C11, R14 and R15 provide a linear voltage change to suppress pop noise.

4-1-5 SQUELCH CIRCUIT (MAIN 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 mute switch (Q2) in the MAIN unit.

A portion of the AF signals from the FM IF IC (IC3, pin 9) are applied to the active filter (IC3, pin 8) where noise components above 20 kHz are amplified. The signals are rectified at the noise detector and then applied to the noise comparator to obtain pulse signals.

The pulse signals output from IC3 pin 13 are applied to the differential circuit (IC5, Q12) for pulse width control. The resulting signals are applied to the CPU (IC4 pin 30).

The CPU counts the pulse signals and outputs the "TONL" signal from pin 79. The "TONL" signal is applied to the AF mute switch (Q2) to cut the AF signals.

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER (MAIN UNIT)

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 (MC1) pass through the TENKEY unit and enter the MAIN unit. The signals are amplified at the limiter amplifier (Q9–Q11) which has a negative feedback circuit for +6 dB/octave pre-emphasis.

The amplified signals are filtered out at the splatter filter (Q9) and applied to the RF unit as the "MOD" signal.

4-2-2 MODULATION CIRCUIT (RF UNIT)

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

While transmitting, the "SHIFT" (RX) line becomes "HIGH," and D8 and D10 turns OFF.

The audio signals (MOD) change the reactance of D8 and D10 on the RF unit to modulate the oscillated signal at the VCO (Q5). The oscillated signal is amplified at the buffer amplifier (Q4), then applied to the drive amplifiers (Q1, Q2).

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

The signal from the VCO circuit is passed through the transmit/receive switching circuit (D1) and amplified by the pre-driver (Q2), driver (Q1), and the power amplifier (Q3) in sequence to obtain 5 W (at 12.5 V DC) of RF power. The amplified signal is passed through the antenna switching circuit (D2), and low-pass filter (L1, L2, L11, C39, C55–C58, C101, C102, C106) and is then applied to the antenna connector.

The collector current of the pre-driver (Q2) and driver (Q1) are controlled by the APC circuit to stabilize the output power.

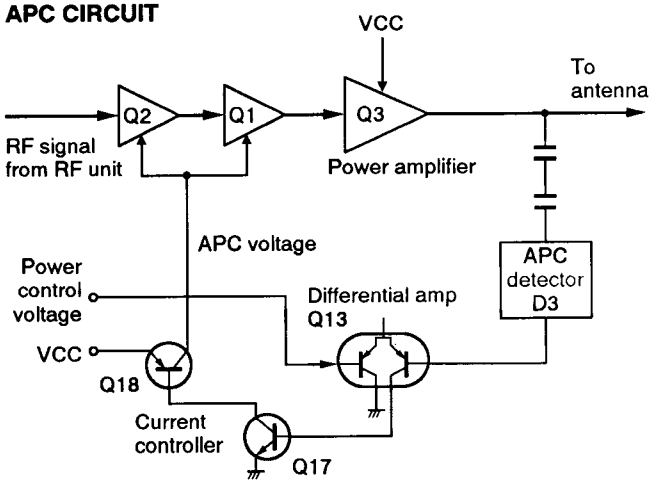
4-2-4 APC CIRCUIT (RF UNIT)

The APC circuit provides stable output power from the power amplifier (Q3) even when the input voltage or temperature changes; and, selects high or low output power.

The APC detector circuit (D3) detects the output power level. The detected voltage increases according to the output power level.

The detected voltage is applied to one of the differential amplifier inputs (Q13a) and a power setting voltage is applied to the other input (Q13b). When the output power is increased, the detected voltage exceeds the APC output current (Q18 collector) via Q17 to decrease the output power.

APC CIRCUIT



4-3 PLL CIRCUIT (RF UNIT)

A PLL circuit provides stable oscillation of the transmitter frequency and the receive 1st LO frequency. The PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

The oscillated signal at the VCO (Q5, D9, L8) is amplified at the buffer amplifier (Q16) and then applied to the PLL IC (IC1, pin 2).

The PLL IC (IC1) contains a prescaler, two programmable dividers, and a phase detector, charge pump, 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.

The VCO signal is amplified at the buffer amplifier (Q4) and is then applied to the receive 1st mixer or transmit driver circuit.

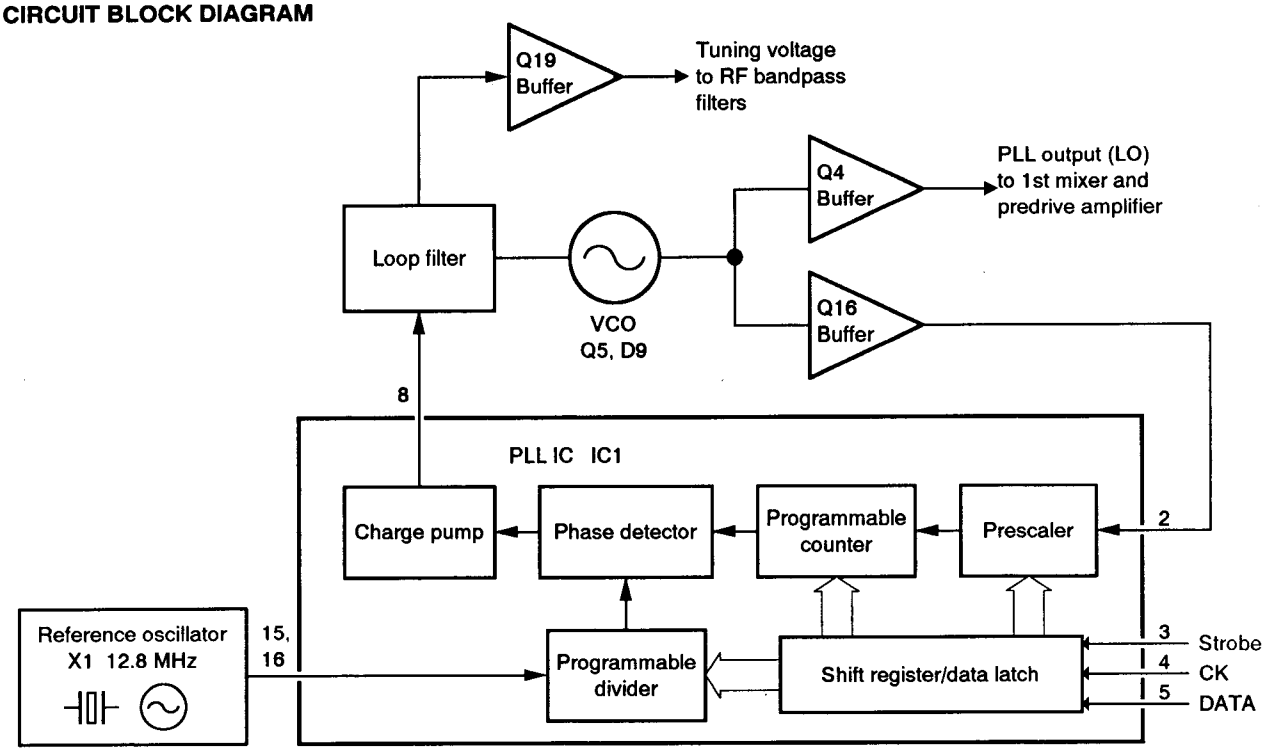
The lock voltage is also used for the receiver tunable bandpass filter to match the filter's center frequency to the desired receive frequency. The lock voltage is amplified at the buffer amplifier (Q19) and then applied to the RF circuits.

4-4 POWER SUPPLY CIRCUITS

4-4-1 VOLTAGE LINES

LINE	DESCRIPTION
BT	The voltage from the attached battery pack.
VCC	The same voltage as the BT 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 (Q3, Q4) using the reference regulator (IC1) on the MAIN unit.
+5S	Common 5 V controlled by the power saver function. The "+5S" regulator circuit (RF unit Q10) switches +5 V using the PLLP signal from the CPU (MAIN unit IC4).
R5	5 V for receiver circuit switched by Q12 in the RF unit with the RX signal from the CPU (MAIN unit IC4).
T5	5 V for transmitter circuit converted from the VCC line by the 5 V regulator circuit (Q7, Q8) using the reference regulator (IC1) on the MAIN unit. T5 is controlled by the TX signal from the CPU (MAIN unit IC4).

PLL CIRCUIT BLOCK DIAGRAM



4-5 PORT ALLOCATIONS

4-5-1 CPU (MAIN UNIT IC4)

PIN NO.	PORT NAME	DESCRIPTION
1	RX	Outputs a receiver control signal. "LOW" for receiver circuits ON.
2	LAMP	Outputs a display backlight signal. "LOW" for backlight ON.
3	BUSY/ CDR	Outputs the busy LED lighting and DTMF decoder control signals. "LOW" for lighting up and decoding.
4	MMUT/ FUNC	Outputs a microphone mute signal while transmitting. Inputs a [FUNC] switch signal while receiving.
5	CLO	Outputs cloning data.
6	EED	Input/output port for the EEPROM (TENKEY unit IC1) serial data.
7	SQL	Input port for the optional tone squelch unit. "LOW" when detecting a signal.
8	PTTOUT	Input port for the [PTT] switch. "HIGH" for transmitting. Also used for cloning data input.
9	OPB	Input port for the WST board installation.
10	STD	Input port for the DTMF decoder. "HIGH" when detecting a signal.
15	SCK	Outputs serial clock signals to PLL, tone squelch and EEPROM IC. Also detects the tuning dial rotation while this port is "LOW."
16	PSTB	Outputs a strobe signal to the PLL IC (RF unit IC1).
17	SDAT/ UNLK	Outputs serial data to PLL and tone squelch IC. Input port for the PLL unlock signal.
18	IOST	Outputs a strobe signal to the optional tone squelch unit.

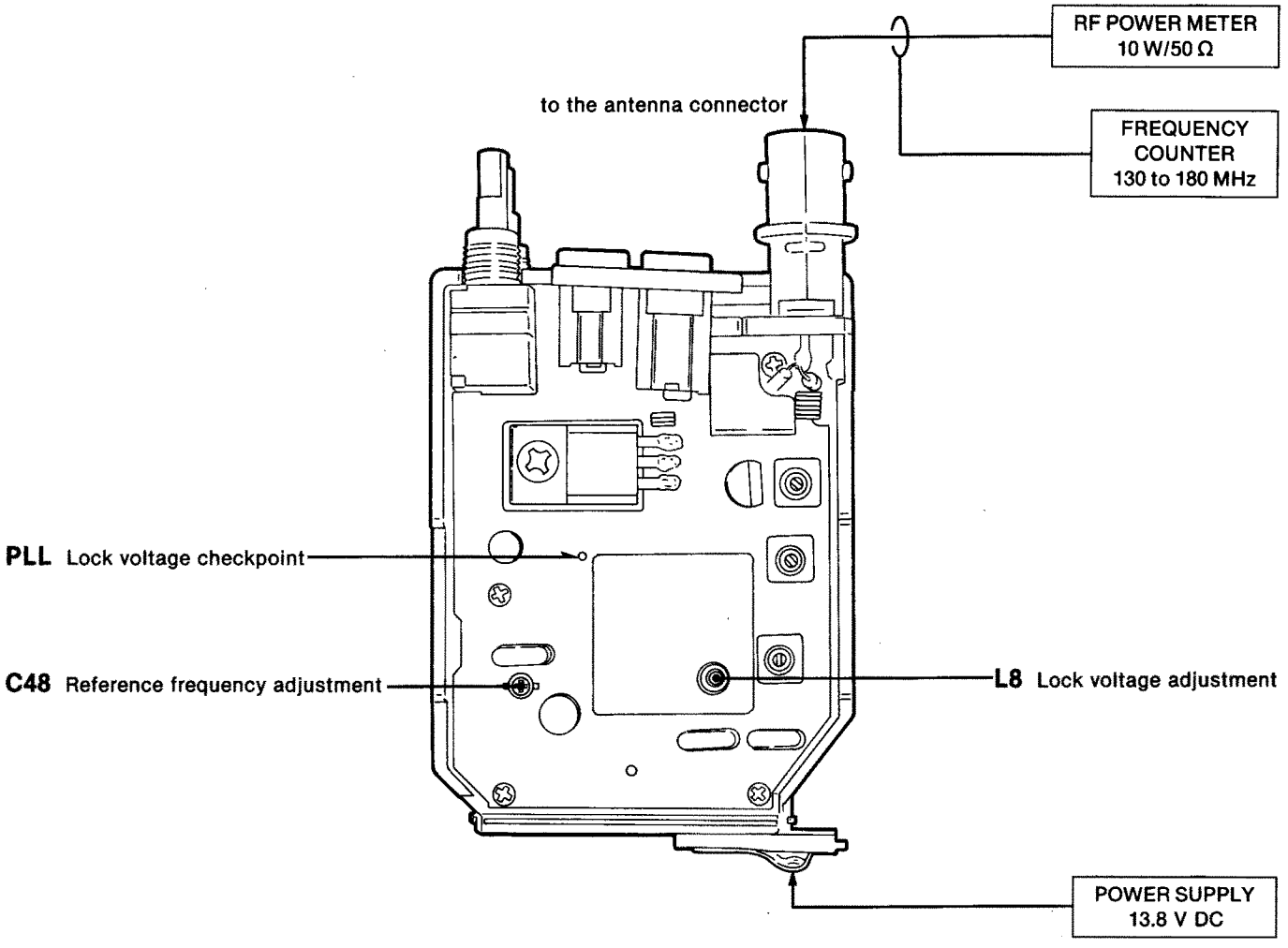
PIN NO.	PORT NAME	DESCRIPTION
19–22	KEY1–KEY4	Input ports for the key matrix, tuning dial and DTMF decoder.
23–26	KEY5–KEY8	Output strobe signals ("LOW") for the key matrix.
27	TOE	Outputs a DTMF decoder control signal. "HIGH" for decoding the receive signal.
28	PLLP	Outputs a VCO control signal. "LOW" to activate the VCO circuit.
29	SACT	Becomes "HIGH" when a switch is pushed.
30	NDET	Input port for the noise pulses from the noise amplifier. (IC5, Q12)
31–52	SEG1–SEG22	Output the LCD drive signal.
63–65	COM1–COM3	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	AFOF	Outputs an AF power amp control signal. "LOW" to activate the AF amp.
78	PCON	Outputs a transmit high/low switching signal. "HIGH" for high power.
79	TONL	Outputs a receive mute signal while receiving. "HIGH" to mute the receive audio. Outputs an 88.5 Hz tone signal while transmitting.
80	TX	Outputs a transmitter control signal. "LOW" for transmitter circuits ON.

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	• Displayed frequency: 136.000 MHz • Transmitting	RF	Connect the digital multimeter or oscilloscope to the check point "PLL" terminal.	1.0 V	RF	L8
REFERENCE FREQUENCY	1	• Displayed frequency: 174.000 MHz • Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	174.0000 MHz	RF	C48

RF UNIT



5-2 RECEIVER ADJUSTMENT

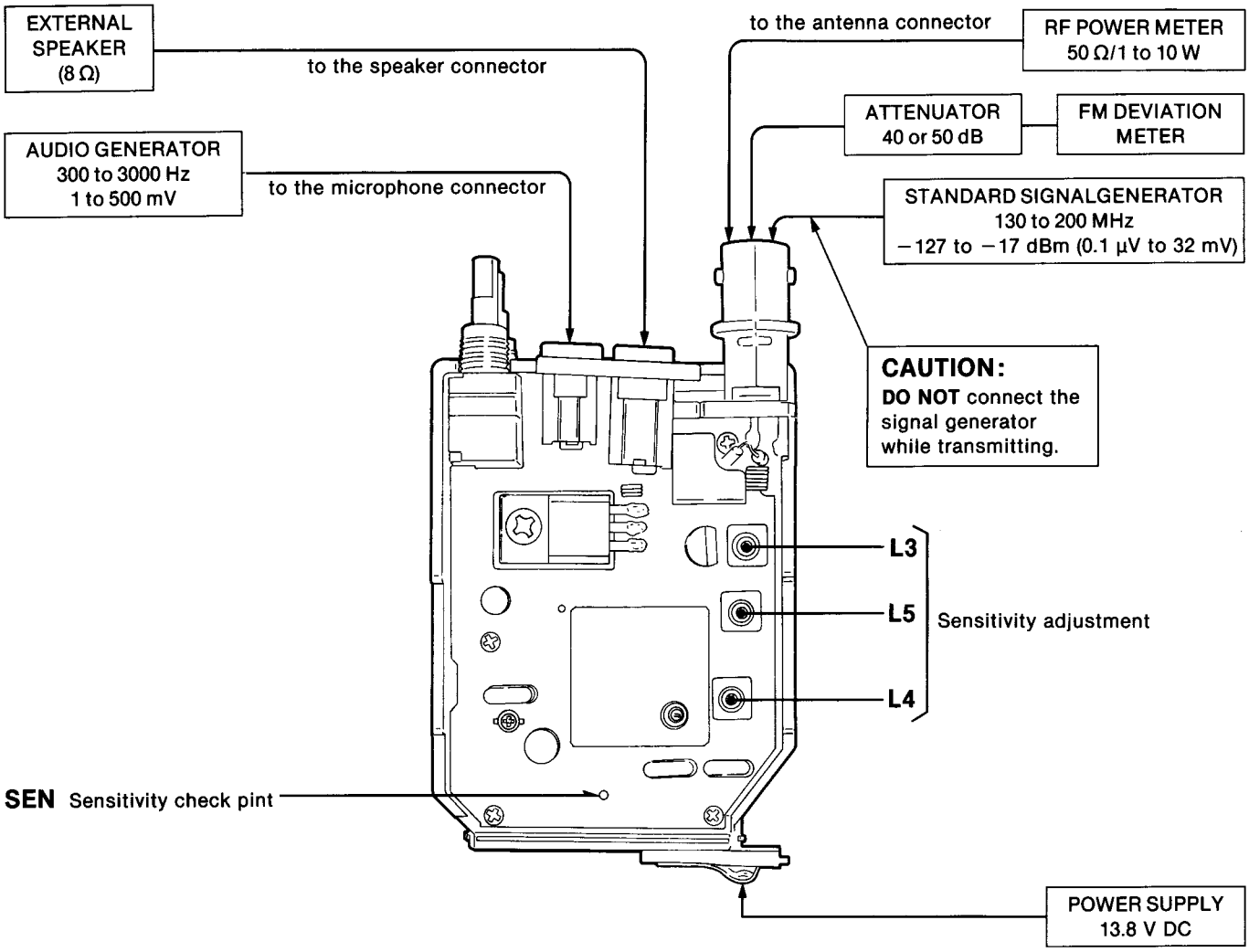
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Displayed frequency: 155.000 MHz • Connect the SSG to the antenna connector and set as: Level : 0.32 μV* (−117 dBm) Modulation: 1 kHz Deviation : ±3.5 kHz • Preset core of coil (L3, RF unit) with the flat surface to the coil and turn it clockwise 2 times and a half. • Receiving	RF	Connect the DC voltmeter to the check point, "SEN" terminal.	Maximum DC voltage	RF	Adjust in sequence L5, L4
	2	• Set the SSG as: Level : 1.0 mV* (−47 dBm)	MAIN	Connect the DC voltmeter to the check point "QUAD" terminal.	1.0 V	MAIN	L1

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

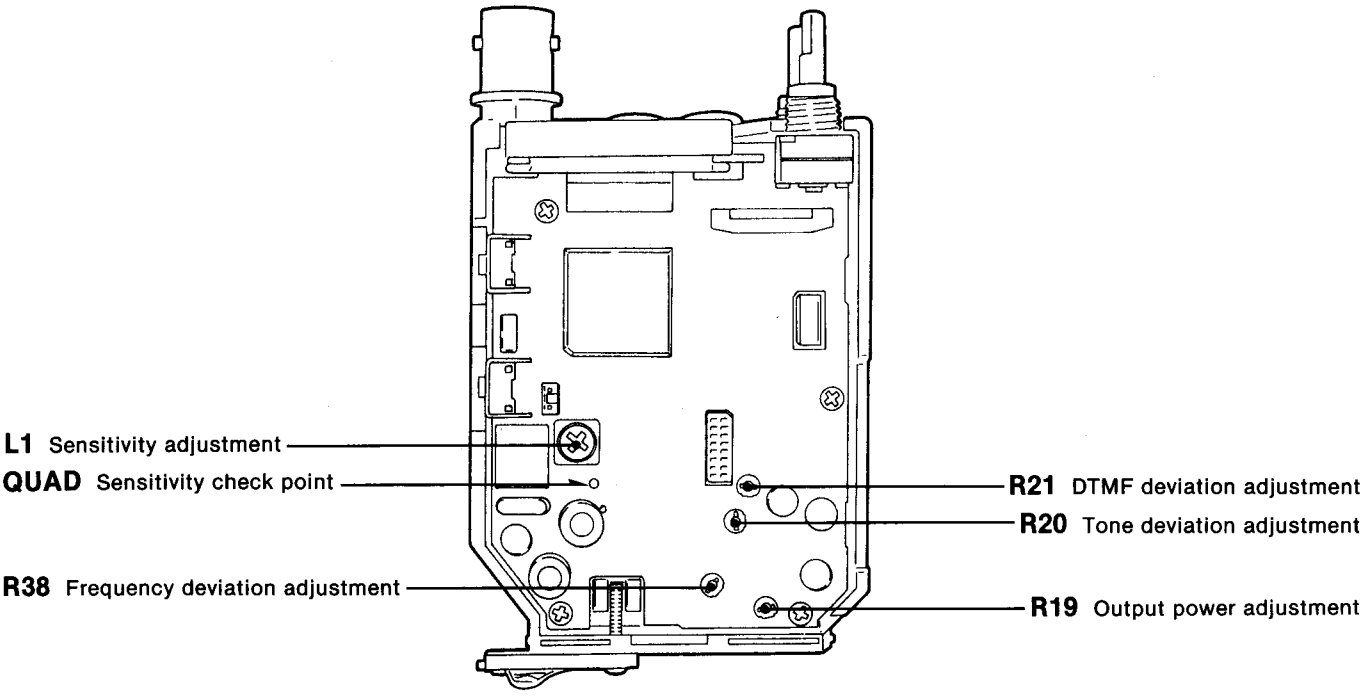
5-3 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Displayed frequency: 150.000 MHz • Output power : HIGH • Transmitting	Top panel	Connect to the RF power meter to the antenna connector.	5.0 W	MAIN	R19
FREQUENCY DEVIATION	1	• Displayed frequency: 136.000 MHz • Connect the audio generator to the microphone connector and set as: 1 kHz/100 mVrms • Set the FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Output power : HIGH • Transmitting	Top panel	Connect to the FM deviation meter to the antenna connector via the attenuator.	±4.5 kHz	MAIN	R38
TONE DEVIATION	1	• Displayed frequency: 136.000 MHz • Connect the audio generator to the microphone connector and set as: 1 kHz/100 mVrms • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Subaudible tone encoder: ON • Transmitting	Top panel	Connect to the FM deviation meter to the antenna connector via the attenuator.	±0.75 kHz	MAIN	R20
DTMF DEVIATION	1	• Displayed frequency: 150.000 MHz • Press [D] key while transmitting.	Top panel	Connect to the FM deviation meter to the antenna connector via the attenuator.	±3.0 kHz	MAIN	R21

RF UNIT



MAIN UNIT



SECTION 6 PARTS LIST

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130007610	S.IC	μPD3140GS-E1 (DS8)
Q1	1530000810	TRANSISTOR	2SC2053
Q2	1530002340	S.TRANSISTOR	2SC2954-T2B
Q3	1530000790	TRANSISTOR	2SC1971
Q4	1590001530	S.TRANSISTOR	UMX5 TL
Q5	1590001530	S.TRANSISTOR	UMX5 TL
Q6	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q7	1530002360	S.TRANSISTOR	2SC2714-Y (TE85R)
Q8	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q9	1590000410	S.TRANSISTOR	RN2404 (TE85R)
Q10	1590002040	S.TRANSISTOR	HN1B01F-GR (TE85R)
Q12	1590000480	S.TRANSISTOR	RN2402 (TE85R)
Q13	1590000620	S.TRANSISTOR	FMS1 T148
Q14	1560000800	S.FET	2SK360IGD-TR
Q15	1560000800	S.FET	2SK360IGD-TR
Q16	1530002020	S.TRANSISTOR	2SC3770-3-TA
Q17	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q18	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q19	1560000540	S.FET	2SK880-Y (TE85R)
D1	1790000450	S.DIODE	MA862(TX)
D2	1790000620	S.DIODE	MA77(TW)
D3	1790000660	S.DIODE	MA728(TW)
D4	1720000370	S.VARICAP	HVU350TRF
D5	1720000370	S.VARICAP	HVU350TRF
D6	1720000370	S.VARICAP	HVU350TRF
D7	1790000450	S.DIODE	MA862(TX)
D8	1790000620	S.DIODE	MA77(TW)
D9	1720000370	S.VARICAP	HVU350TRF
D10	1790000620	S.DIODE	MA77(TW)
D11	1750000010	S.DIODE	1SS181 (TE85R)
D12	1790000680	S.DIODE	SB20-03P-TD
D13	1750000390	S.DIODE	1SS353 TE-17
FI1	2010001600	XTAL	FL-199 UM-1 (30.875MHz)
X1	6050009250	XTAL	CR-500 UM-1 (12.8MHz)
L1	6110002070	COIL	LA-227
L2	6110002070	COIL	LA-227
L3	6150003120	COIL	LS-321
L4	6150003430	COIL	LS-378
L5	6150003430	COIL	LS-378
L6	6200003850	S.COIL	36CS-656LZ-09K=P3
L7	6110002010	COIL	LA-224
L8	6130002480	S.COIL	LB-277
L9	6200004300	S.COIL	MLR1608M 12NJ-T
L10	6200004430	S.COIL	LL1608-F56NK
L11	6110002140	COIL	LA-384
L12	6200003090	S.COIL	NL 322522T-2R7J-3
L13	6200003090	S.COIL	NL 322522T-2R7J-3
L14	6200003420	S.COIL	NL 322522T-R15J-3
L15	6200004430	S.COIL	LL1608-F56NK
L16	6200004080	S.COIL	MLR1608M 33NJ-T
L17	6200004430	S.COIL	LL1608-F56NK
L18	6200002960	S.COIL	NL 322522T-4R7J-3
R1	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R2	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R3	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R4	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R5	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R6	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R7	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R8	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R9	7030000280	S.RESISTOR	MCR10EZHJ 150 Ω (151)
R10	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R11	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R12	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R13	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R14	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R15	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R16	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R17	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R18	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R19	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R20	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R21	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R22	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R23	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R24	7030003250	S.RESISTOR	ERJ3GEYJ 270 V (27 Ω)
R25	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R26	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R27	7030003830	S.RESISTOR	ERJ3GEYJ 185 V (1.8 MΩ)
R28	7030004040	S.RESISTOR	ERJ3GEYJ 4R7 V (4.7 Ω)
R29	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R30	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R32	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R33	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R34	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R35	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R36	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R37	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R38	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R40	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R41	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R42	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R43	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R44	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R45	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R46	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R47	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R48	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R49	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R50	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R51	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R52	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R53	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R54	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R55	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R56	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R57	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R58	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R59	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R61	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R62	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R63	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R65	7210002520	VARIABLE	TP96N00N-16F-10KA-1517
R66	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R67	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R68	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R69	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R70	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R71	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R72	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R73	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R74	7010004190	RESISTOR	R20J 1 kΩ
C1	4030006890	S.CERAMIC	C1608 JF 1H 103Z-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	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

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030009170	S.CERAMIC	GRM40 F 105Z 16PT
C11	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C13	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C19	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006890	S.CERAMIC	C1608 JF 1H 103Z-T-A
C24	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C28	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C29	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-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	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C35	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C36	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C37	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C38	4030009170	S.CERAMIC	GRM40 F 105Z 16PT
C39	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C40	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C41	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C42	4030006860	S.CERAMIC	C1608 JB 1H 102K-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	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C47	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C48	4610001890	S.TRIMMER	CTZ3E-20C-W1
C49	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C50	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C51	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C52	4550006150	S.TANTALUM	ECST1CY105R
C53	4510004460	S.ELECTROLITIC	ECEV0JA330P
C54	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C55	4030006670	S.CERAMIC	C1608 SL 1H 270J-T-A
C56	4030006570	S.CERAMIC	C1608 SL 1H 060D-T-A
C57	4030006620	S.CERAMIC	C1608 SL 1H 120J-T-A
C58	4030006660	S.CERAMIC	C1608 SL 1H 220J-T-A
C59	4030006640	S.CERAMIC	C1608 SL 1H 180J-T-A
C60	4030006560	S.CERAMIC	C1608 SL 1H 050C-T-A
C61	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C62	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C63	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C64	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C65	4030006590	S.CERAMIC	C1608 SL 1H 080D-T-A
C66	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C67	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C68	4030006550	S.CERAMIC	C1608 SL 1H 040C-T-A
C69	4030006560	S.CERAMIC	C1608 SL 1H 050C-T-A
C70	4030006670	S.CERAMIC	C1608 SL 1H 270J-T-A
C71	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C72	4030008570	S.CERAMIC	C1608 SL 1H R75C-T-A
C73	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C74	4030008570	S.CERAMIC	C1608 SL 1H R75C-T-A
C75	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C76	4030006590	S.CERAMIC	C1608 SL 1H 080D-T-A
C77	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C80	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C81	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C82	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C83	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C84	4030006630	S.CERAMIC	C1608 SL 1H 150J-T-A
C85	4030006630	S.CERAMIC	C1608 SL 1H 150J-T-A

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006630	S.CERAMIC	C1608 SL 1H 150J-T-A
C89	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C91	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C92	4030006610	S.CERAMIC	C1608 SL 1H 100D-T-A
C96	4510004650	S.ELECTROLITIC	ECEV1EA4R7SR
C97	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C105	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C106	4010000150	CERAMIC	DD104 SL 150J 50V
W1	7120000380	JUMPER	JPW 01 R-01
W2	7030003860	S.JUMPER	ERJ3GE JPW V
W3	7030003860	S.JUMPER	ERJ3GE JPW V
J2	6450001440	CONNECTOR	HSJ1403-01-010
J3	6450001430	CONNECTOR	HSJ1462-01-010
J4	6510016080	S.CONNECTOR	53281-2490
EP1	0910042512	PCB	B 4227B

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110003390	S.IC	AN8005M-(E1)
IC2	1110001810	S.IC	TA7368F(TP1)
IC3	1110003330	S.IC	TA31136F(EL)
IC4	1140002520	S.IC	HD4074618H
IC5	1130001910	S.IC	μPD4011BG-T1
Q1	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q2	1590001390	S.FET	2SJ144-Y (TE85R)
Q3	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q4	1590001930	S.TRANSISTOR	IMX2 T108
Q5	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q6	1590001930	S.TRANSISTOR	IMX2 T108
Q7	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q8	1590001930	S.TRANSISTOR	IMX2 T108
Q9	1590001930	S.TRANSISTOR	IMX2 T108
Q10	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q11	1590001930	S.TRANSISTOR	IMX2 T108
Q12	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q13	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q14	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q15	1590001930	S.TRANSISTOR	IMX2 T108
Q16	1590000630	S.TRANSISTOR	RN1403 (TE85R)
Q17	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q18	1590000410	S.TRANSISTOR	RN2404 (TE85R)
Q19	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
D1	1790001170	S.ZENER	MA8068-M(TX)
D2	1790001010	S.ZENER	MA8043-L(TX)
D3	1750000120	S.DIODE	DWA010-TE
D4	1750000020	S.DIODE	1SS184 (TE85R)
D5	1750000020	S.DIODE	1SS184 (TE85R)
D6	1750000020	S.DIODE	1SS184 (TE85R)
FI1	2020000080	CERAMIC	CFU455E2
X1	6050008810	XTAL	CR-473 UM-1 (30.41909MHz)

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
X2	6060000260	CERAMIC	CSB800J220
L1	6150002770	COIL	LS-293
R2	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R3	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R4	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R5	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R8	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R11	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R14	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R15	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R16	7030003830	S.RESISTOR	ERJ3GEYJ 185 V (1.8 MΩ)
R17	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R18	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R19	7310002600	S.TRIMMER	RV-110 (RH03A3AS4X0AA 473
R20	7310002740	S.TRIMMER	RV-150 (RH03A3A14X0FC) 103
R21	7310002600	S.TRIMMER	RV-110 (RH03A3AS4X0AA) 473
R22	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R23	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R24	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R25	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R26	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R28	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R29	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R30	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R31	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R32	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R33	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R34	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R35	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R36	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R37	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R38	7310002740	S.TRIMMER	RV-150 (RH03A3A14X0FC) 103
R39	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R40	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R41	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R42	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R43	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R44	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R45	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R46	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R47	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R48	7030003480	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R49	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R50	7030003480	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R51	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R52	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R53	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R54	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R55	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R56	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R57	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R58	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R59	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R60	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R61	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R62	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R63	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R64	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R65	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R66	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R67	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R68	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R69	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R70	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R71	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R72	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R73	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R74	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R75	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R78	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R79	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R80	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R81	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R82	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R83	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R84	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R85	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R86	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R87	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R88	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R89	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R90	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R91	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R92	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030009630	S.CERAMIC	C1608 JB 1H 822K-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
C8	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C9	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030009660	S.CERAMIC	C1608 JF 1C 224Z-T-A
C12	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C13	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C14	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4030006890	S.CERAMIC	C1608 JF 1H 103Z-T-A
C17	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C18	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C19	4030009970	S.CERAMIC	C1608 JB 1H 182K-T-A
C21	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C22	4510006090	S.ELECTROLITIC	ECEV0GA470SR
C23	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C24	4510001840	ELECTROLITIC	10 MS5 47UF
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4510004650	S.ELECTROLITIC	ECEV1EA4R7SR
C27	4550006130	S.TANTALUM	ECST1VY224R
C28	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C29	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C31	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C32	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C33	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C34	4510003180	ELECTROLITIC	6.3 RC2 100UF (D=5.0)
C35	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C36	4030006750	S.CERAMIC	C1608 SL 1H 101J-T-A
C37	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C38	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C39	4030006780	S.CERAMIC	C1608 SL 1H 181J-T-A
C40	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C41	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C42	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C43	4550006200	S.TANTALUM	ECST0JY106R
C44	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C45	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C46	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C47	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C48	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C49	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C50	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C51	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C52	4030006750	S.CERAMIC	C1608 SL 1H 101J-T-A
C53	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C54	4030009170	S.CERAMIC	GRM40 F 105Z 16PT
C55	4030006720	S.CERAMIC	C1608 SL 1H 560J-T-A
C56	4030006640	S.CERAMIC	C1608 SL 1H 180J-T-A
C57	4030009580	S.CERAMIC	C1608 JB 1H 681K-T-A
C58	4030009580	S.CERAMIC	C1608 JB 1H 681K-T-A
C59	4030006610	S.CERAMIC	C1608 SL 1H 100D-T-A
C60	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C61	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C62	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C65	4550006320	S.TANTALUM	ECST0JY475R
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C68	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C69	4030008870	S.CERAMIC	C1608 JB 1C 183K-T-A
C70	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C71	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C76	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C77	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C86	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C94	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C95	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C98	4510001350	ELECTROLITIC	16 MS5 10UF
W1	7030003860	S.JUMPER	ERJ3GE JPW V
J1	6510016430	S.CONNECTOR	53307-1491
J2	6510017640	S.CONNECTOR	52559-2090
J3	6510016040	S.CONNECTOR	52357-2490
J4	6510017450	S.CONNECTOR	3-178750-0
J5	6510017860	S.CONNECTOR	52357-1690
J6	6910007660	CONNECTOR	IMSA-9210B-1-02T
J7	6910007660	CONNECTOR	IMSA-9210B-1-02T
P1	6910007600	CONNECTOR	IMSA-9215H-T
P2	6910007600	CONNECTOR	IMSA-9215H-T
S1	2250000200	ENCODER	TP90N00E20-16F-1517
S2	2260001900	SWITCH	SW-149 (SKHLLD)
S3	2260001900	SWITCH	SW-149 (SKHLLD)
EP1	0910042503	PCB	B 4226C

[TENKEY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130007670	S.IC	24LC04BT-I/SN
IC2	1130004330	S.IC	LC7385M
D1	1750000120	S.DIODE	DWA010-TE
D2	1750000120	S.DIODE	DWA010-TE
D3	1790001170	S.ZENER	MA8068-M(TX)
X1	6060000550	S.CERAMIC	PBRC 3.58AR
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R5	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R6	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
C1	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C6	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C7	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C8	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C9	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
SP1	2510000640	SPEAKER	T036S23A0000
MC1	7700001600	MICROPHONE	KUC2123-030245
W5	8900005310	CABLE	OPC-518
J1	6510017640	S.CONNECTOR	52559-2090
EP1	0910042523	PCB	B 4228C

[DISP UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
DS1	5040001760	S.LED	SEC 2422C
DS2	5010000120	S.LED	LN1371G-(TR)
DS3	5010000120	S.LED	LN1371G-(TR)
DS4	5030001130	LCD	LD-B4234J (E-4126)
J1	6510017460	S.CONNECTOR	3-178749-0
EP1	0910042532	PCB	B 4229B
EP2	8930034440	LCD CONTACT	SRCN-1517SC

S.=Surface mount

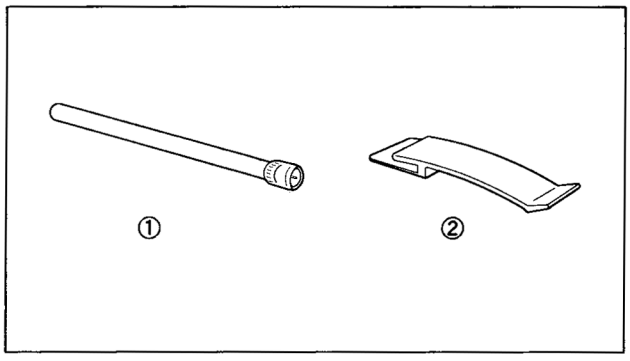
SECTION 7 MECHANICAL PARTS

• CHASSIS PARTS

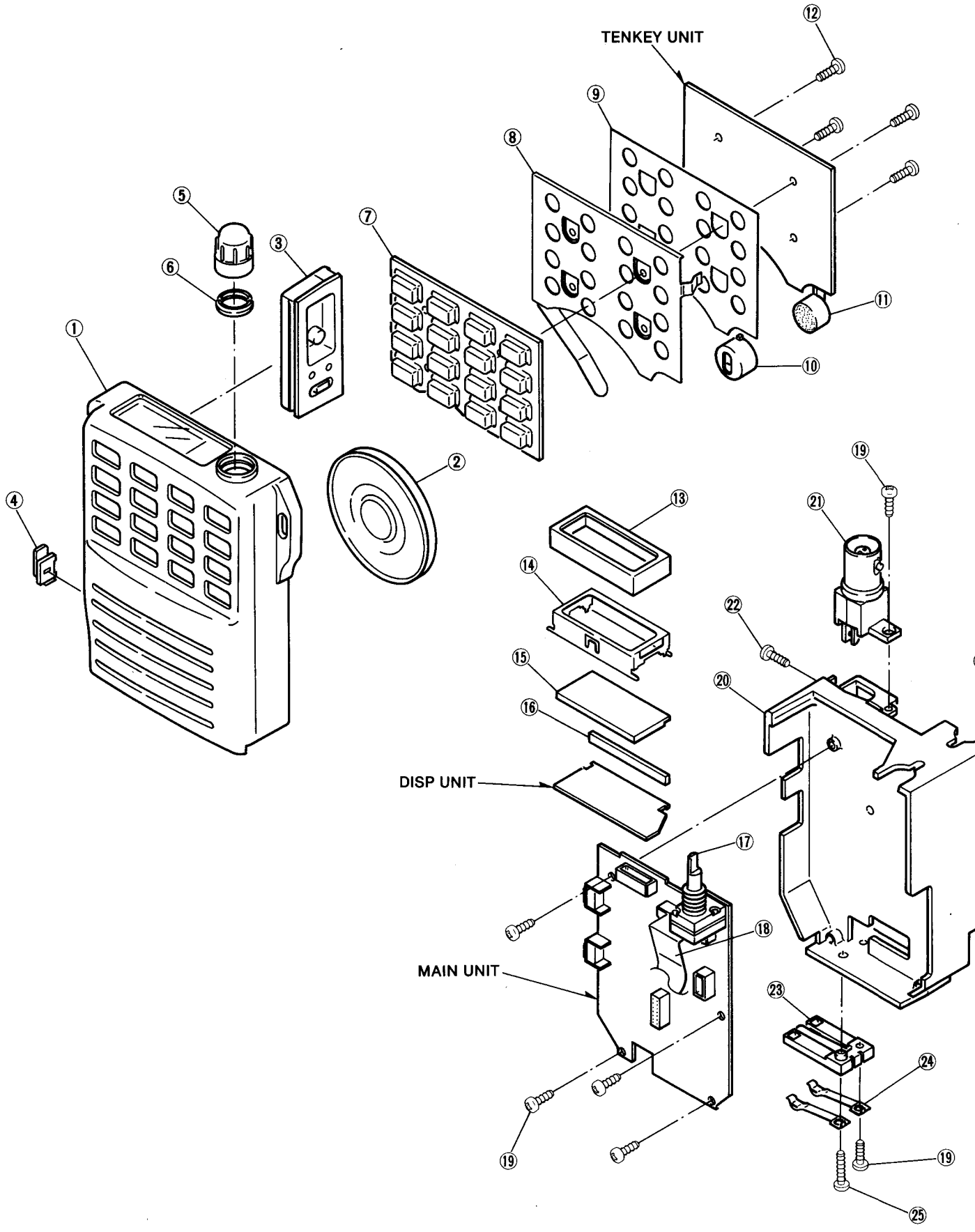
LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8210011200	1517 front panel	1	㉑	6510005240	Connector BNC-RM 107 [ANT]	1
②	2510000640	Speaker T036S23A0000	1	㉒	8810006460	Screw FH M2×3.5 NI	1
③	8930032560	1517 PTT rubber	1	㉓	8930032520	1517 contact base	1
④	8930029121	1257 release button (A) -1	1	㉔	8930030041	1452 contact spring-1	2
⑤	8610009200	Knob N214 [CH]	1	㉕	8810008380	Screw PH B0 M2×10 NI	1
⑥	8830000570	VR nut (A) FX643	2	㉖	8930034230	1518 jack seal	1
⑦	8930032510	1517 keyboard	1	㉗	8930033180	1517 TR plate	1
⑧	8510009240	1517 front shield	1	㉘	6450001440	Connector HSJ1403-01-010 [SP]	1
⑨	8930033290	1517 key sheet	1	㉙	6450001430	Connector HSJ1462-01-010 [MIC]	1
⑩	8930034220	1518 mic seal	1	㉚	7210002520	Variable resistor TP96N00N-16F-10KA-1517 [OFF/VOL]	1
⑪	7700001600	Microphone KUC2123-030245	1				
⑫	8810006550	Screw PH B0 No.0-3 M1.4×3 NI	4				
⑬	8930032650	1517 LCD rubber	1	㉛	8810006040	Screw PH M3×4 NI	1
⑭	8930032540	1517 LCD holder	1	㉜	8930032550	1517 terminal	1
⑮	5030001130	LCD LD-B4234J (E-4126)	1	㉝	8210011110	1517 rear panel	1
⑯	8930034440	LCD contact SRCN-1517SC	1	㉞	8930033120	1517 main seal	1
⑰	2250000200	Encoder TP90N00E20-16F-1517 [DIAL]	1	㉟	8810005710	Screw PH B0 M2×6 ZK	2
				㊱	8810007910	Screw PH B0 M2×18 ZK	2
⑱	8900005310	Flexible cable OPC-518	1	㊲	8610009250	Knob N216 [OFF/VOL]	1
⑲	8810006620	Screw PH No.0 M2×3.5 NI	10	㊳	8930032530	1517 connector seal	1
⑳	8010015590	1517 chassis	1				

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

• ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	3310001390	FA-B44V flexible antenna	1
②	8010015600	1517 belt clip	1


TENKEY UNIT
DISP UNIT
MAIN UNIT
①
②
③
④
⑤
⑥
⑦
⑧
⑨
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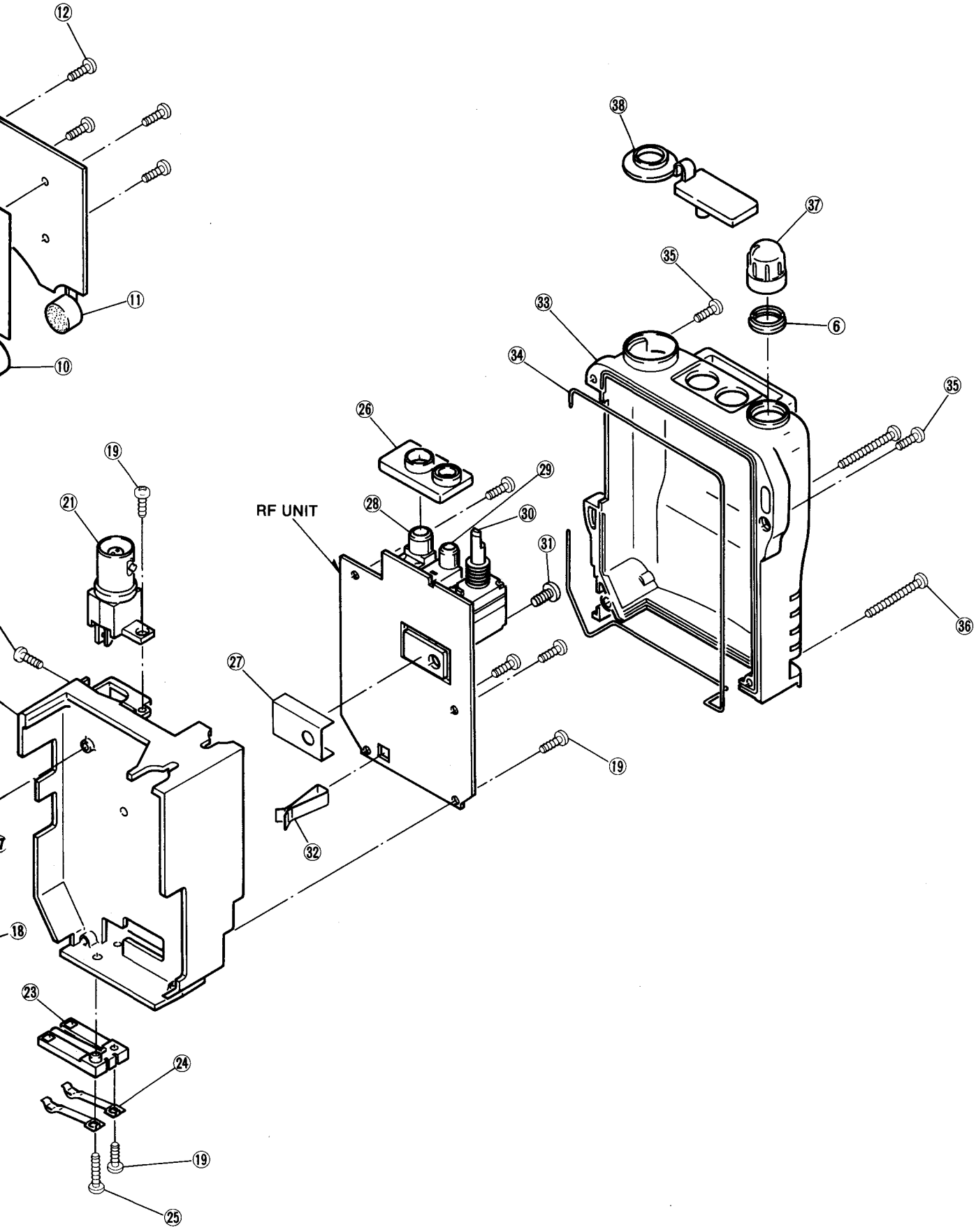
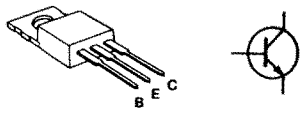

RF UNIT

SECTION 8 SEMI-CONDUCTOR INFORMATION

• TRANSISTORS

2SC1971



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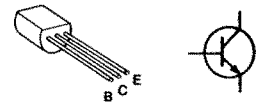
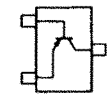


2SA1162 Y
(Symbol: SY)



2SB1132 R
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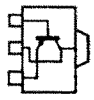
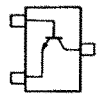


2SC2712 Y
(Symbol: LY)



2SC2714 Y
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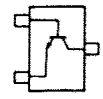
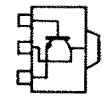
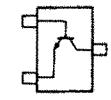


2SC2954
(Symbol: QK)



2SC3770 3
(Symbol: JY3)



2SJ144 Y
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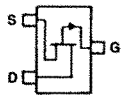

2SK360IGD
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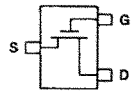

2SK880 Y
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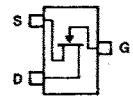

FMS1
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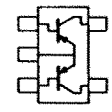

HN1B01F GR
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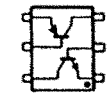

IMX2
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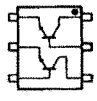

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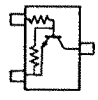

RN1404
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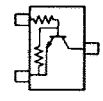

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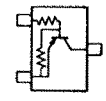

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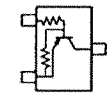

UMX5
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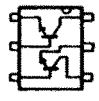

• DIODES

1SS181
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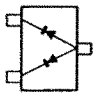

1SS184
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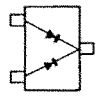
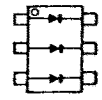
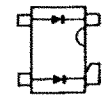


DWA010
(Symbol: W8)

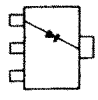


HVU350TRF
(Symbol: 4)

MA862
(Symbol: M1I)

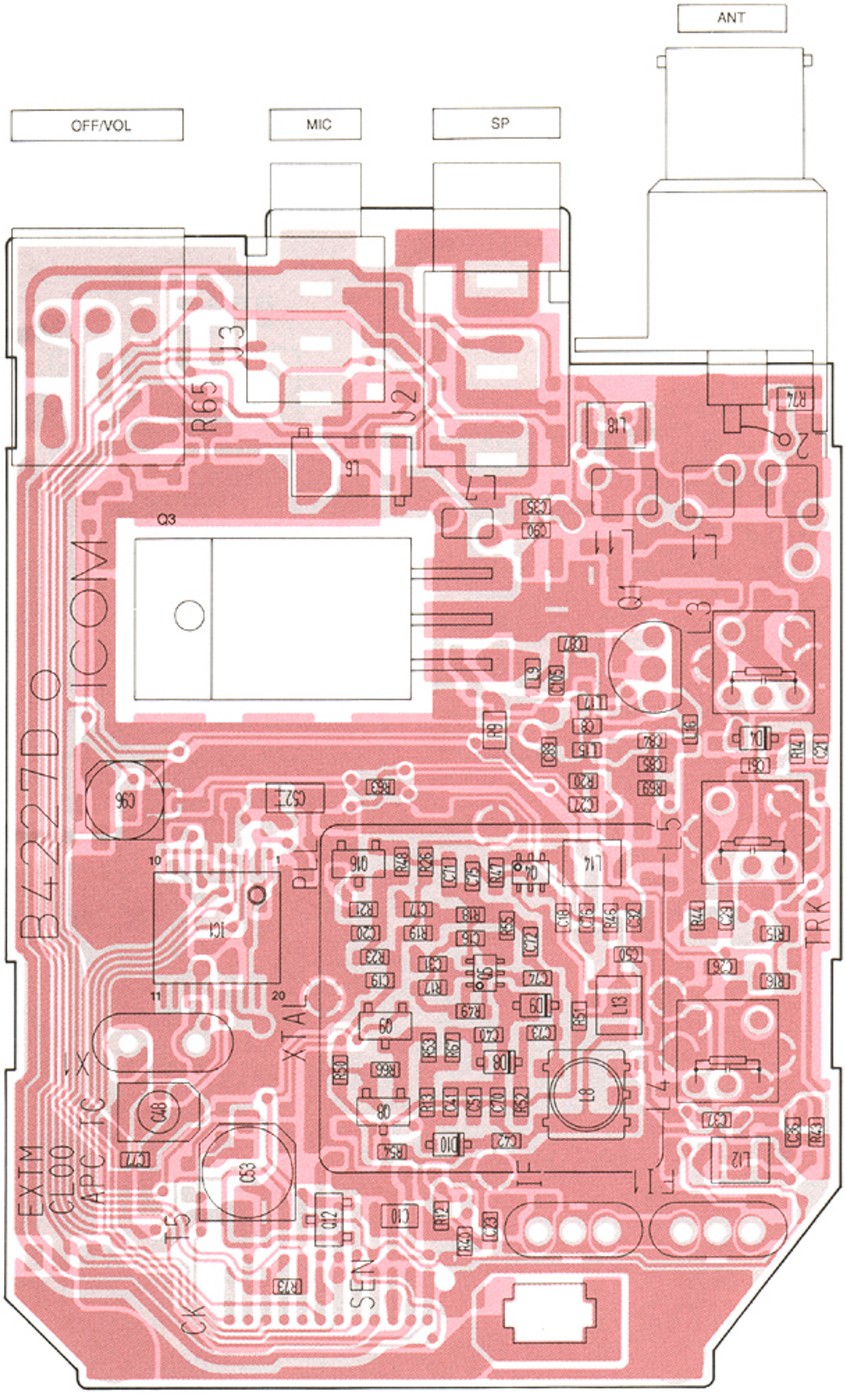


SB20 03P
(Symbol: SC)

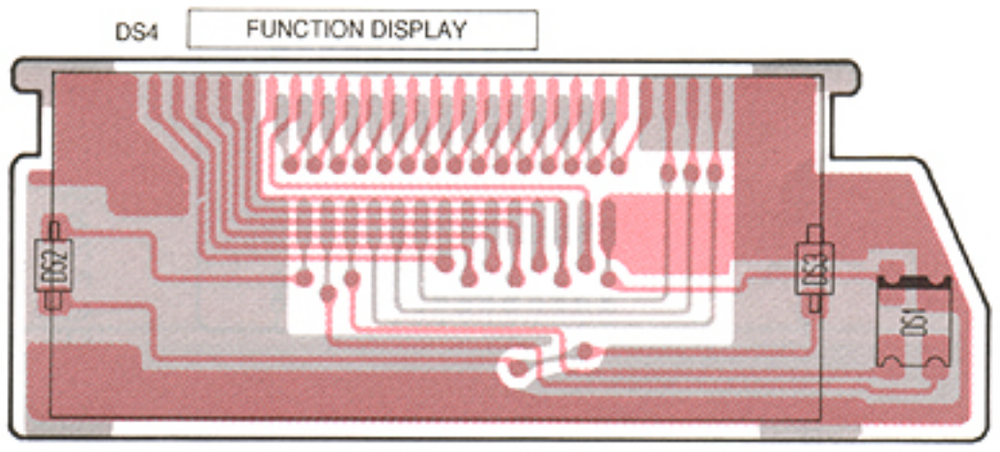


SECTION 9 BOARD LAYOUTS

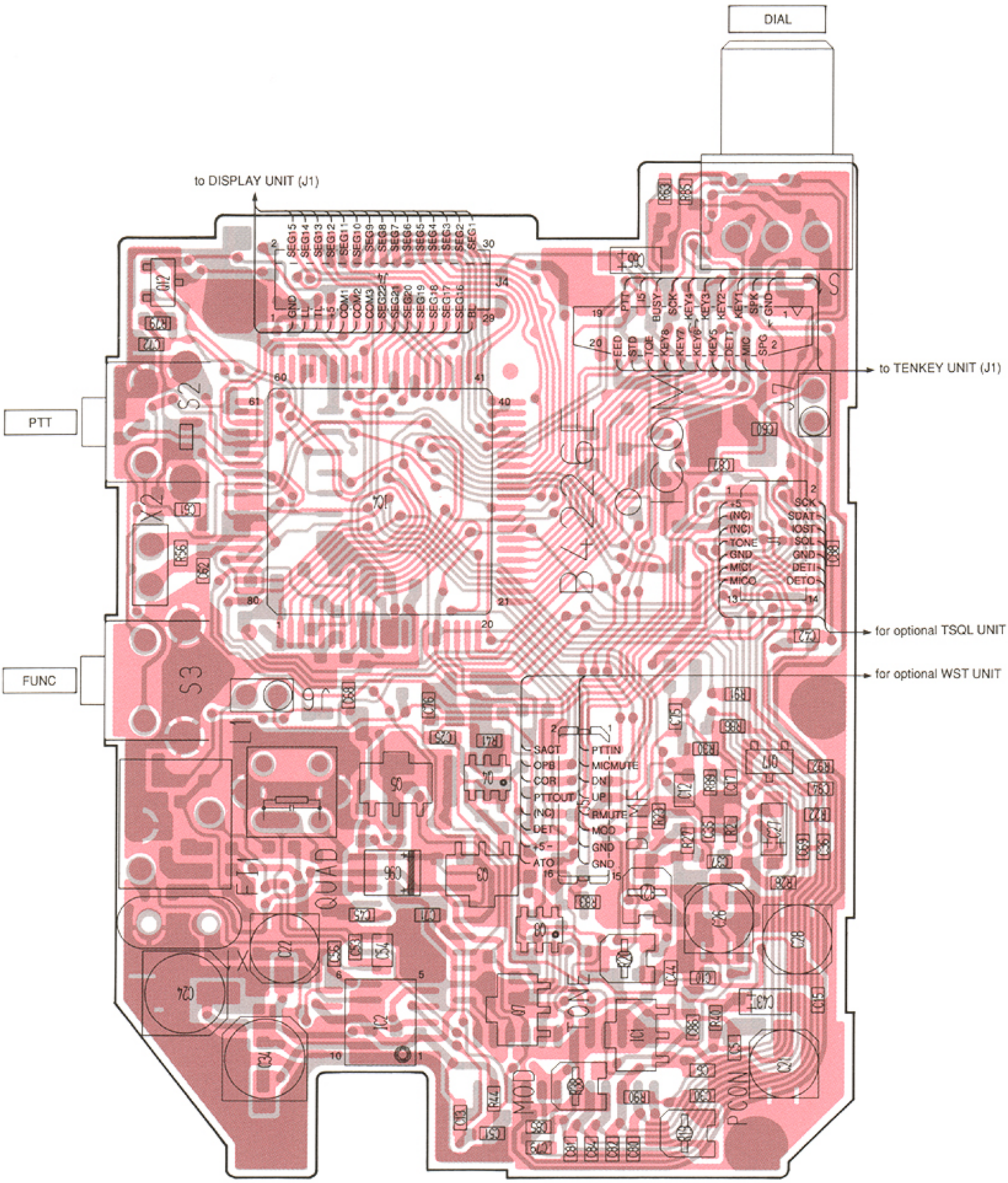
- **RF UNIT**



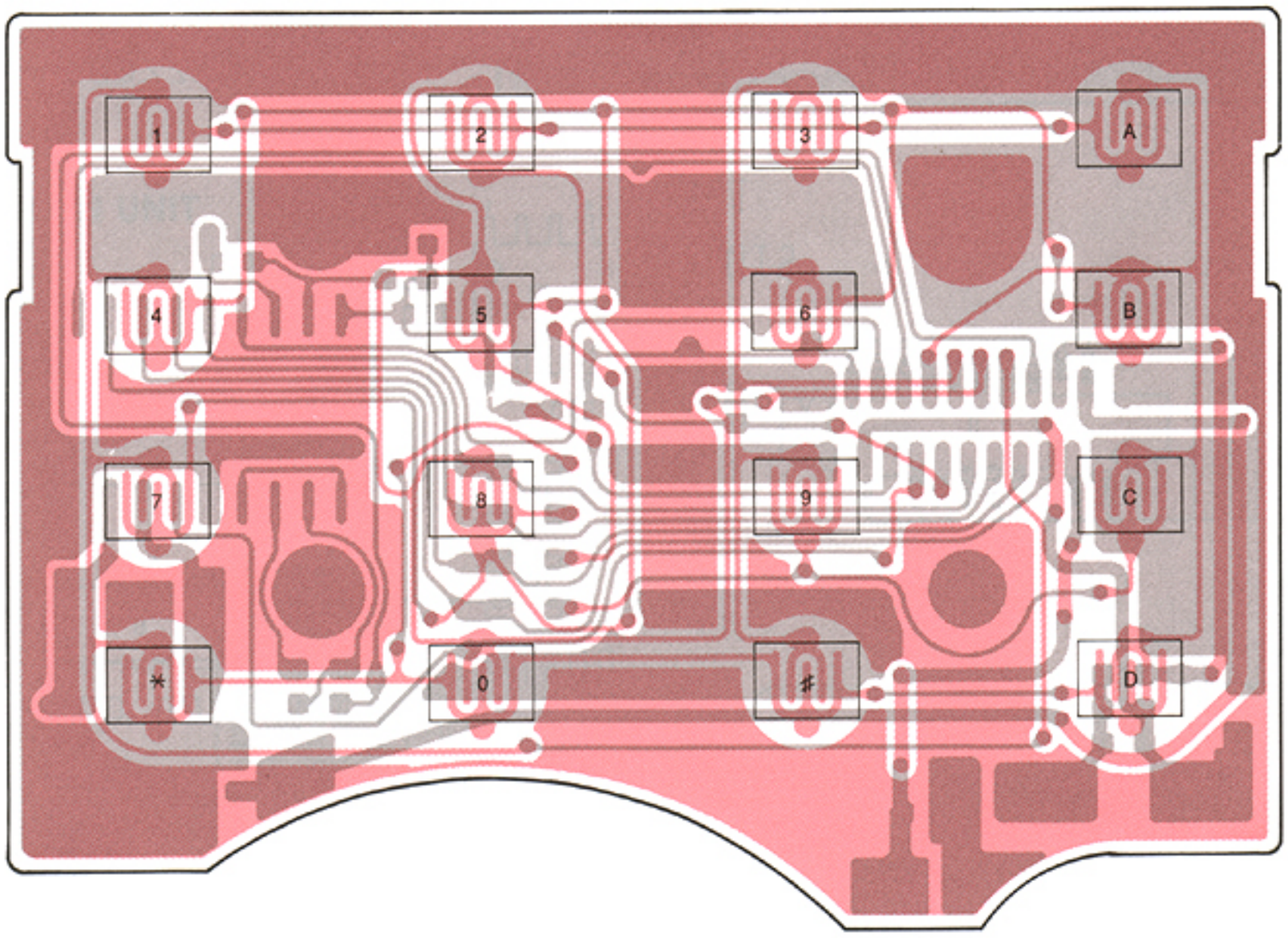
• DISP UNIT



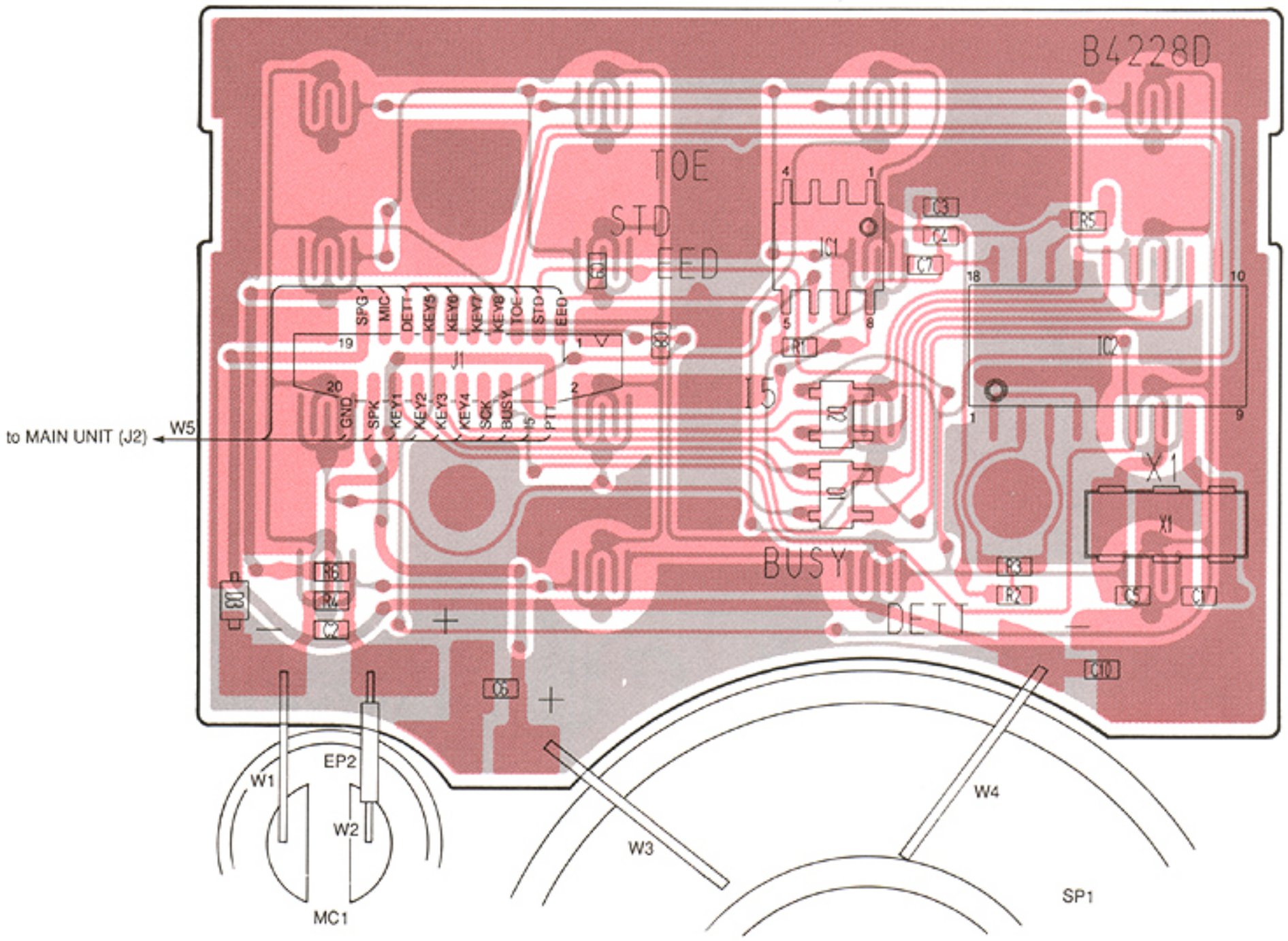
• MAIN UNIT



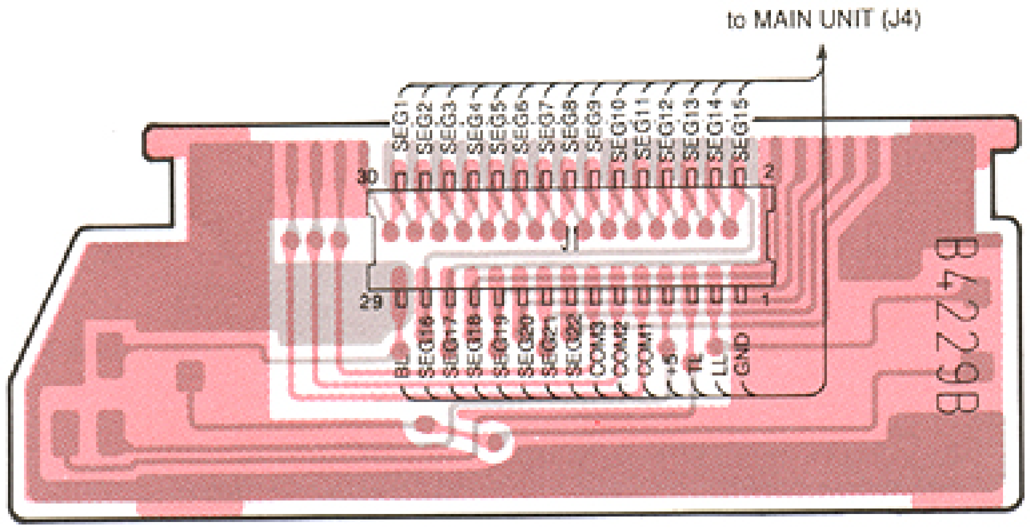
• **TENKEY UNIT**



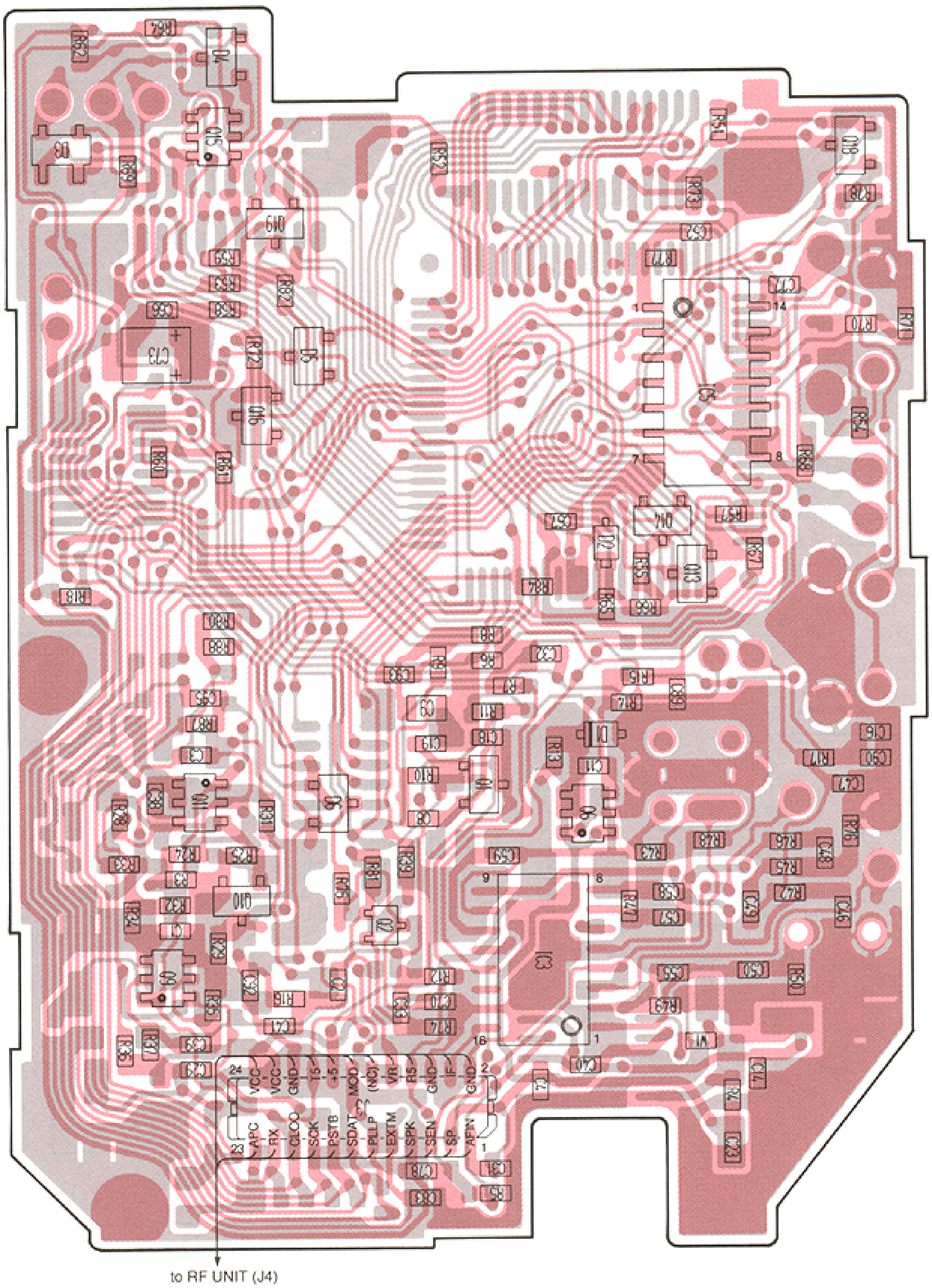
• **TENKEY UNIT**


B4228D
TOE
STD
EED
SPG
MIC
DETT
KEY5
KEY6
KEY7
KEY8
TOE
STD
EED
J1
GND
SPK
KEY1
KEY2
KEY3
KEY4
SCK
BUSY
PTT
W5
to MAIN UNIT (J2)
IC1
IC2
X1
BUSY
DETT
EP2
W1
W2
W3
W4
MC1
SP1

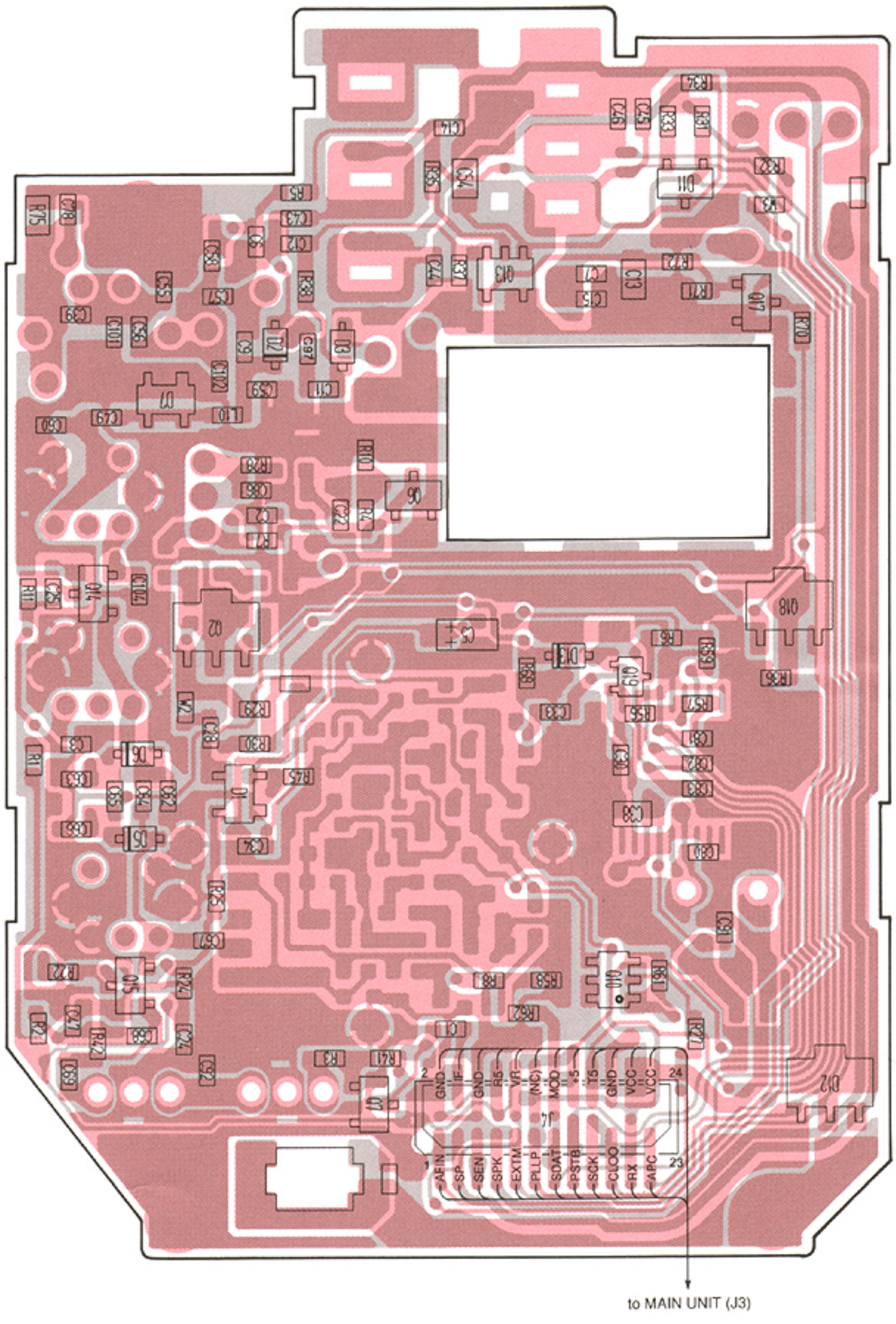
• **DISP UNIT**



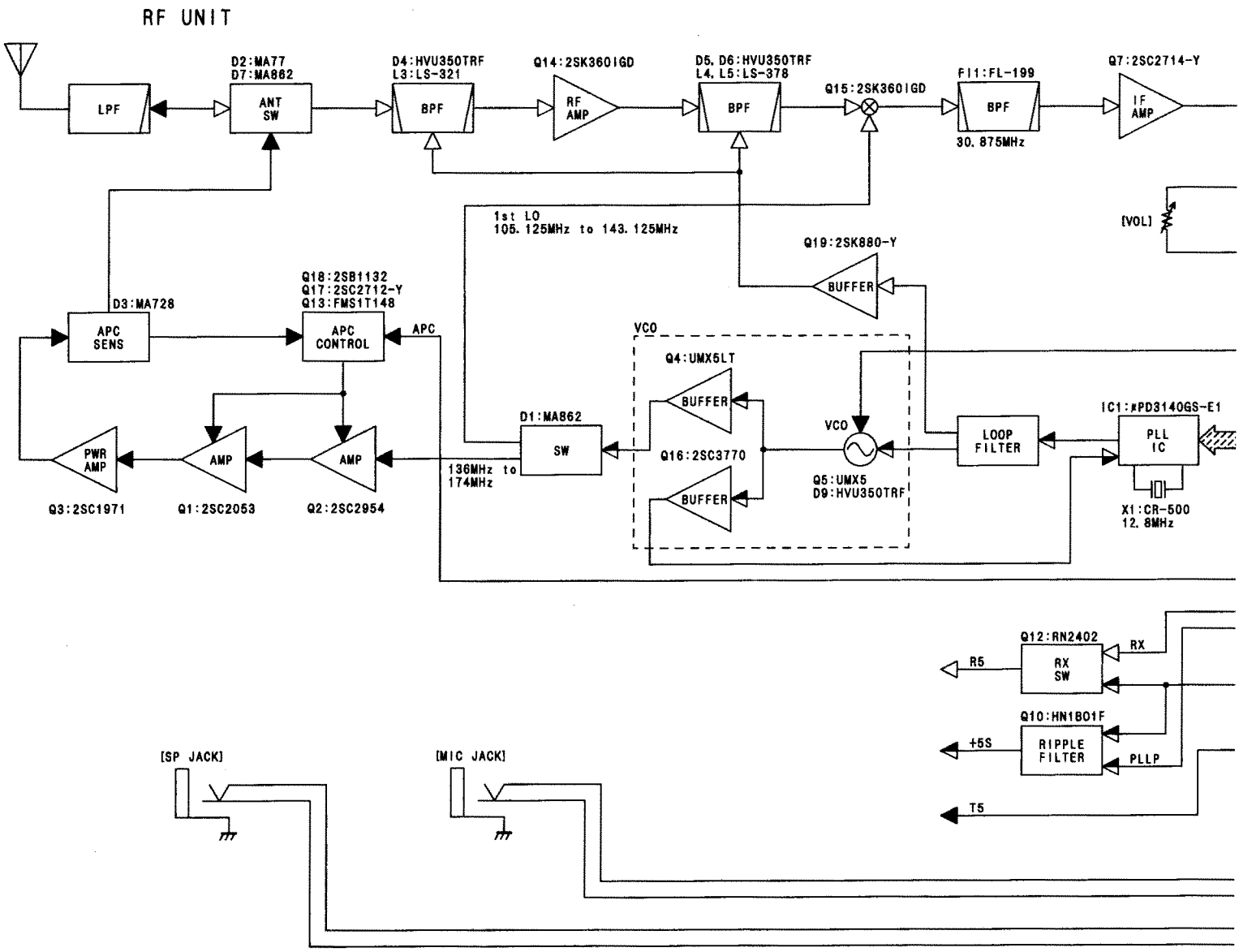
• **MAIN UNIT**

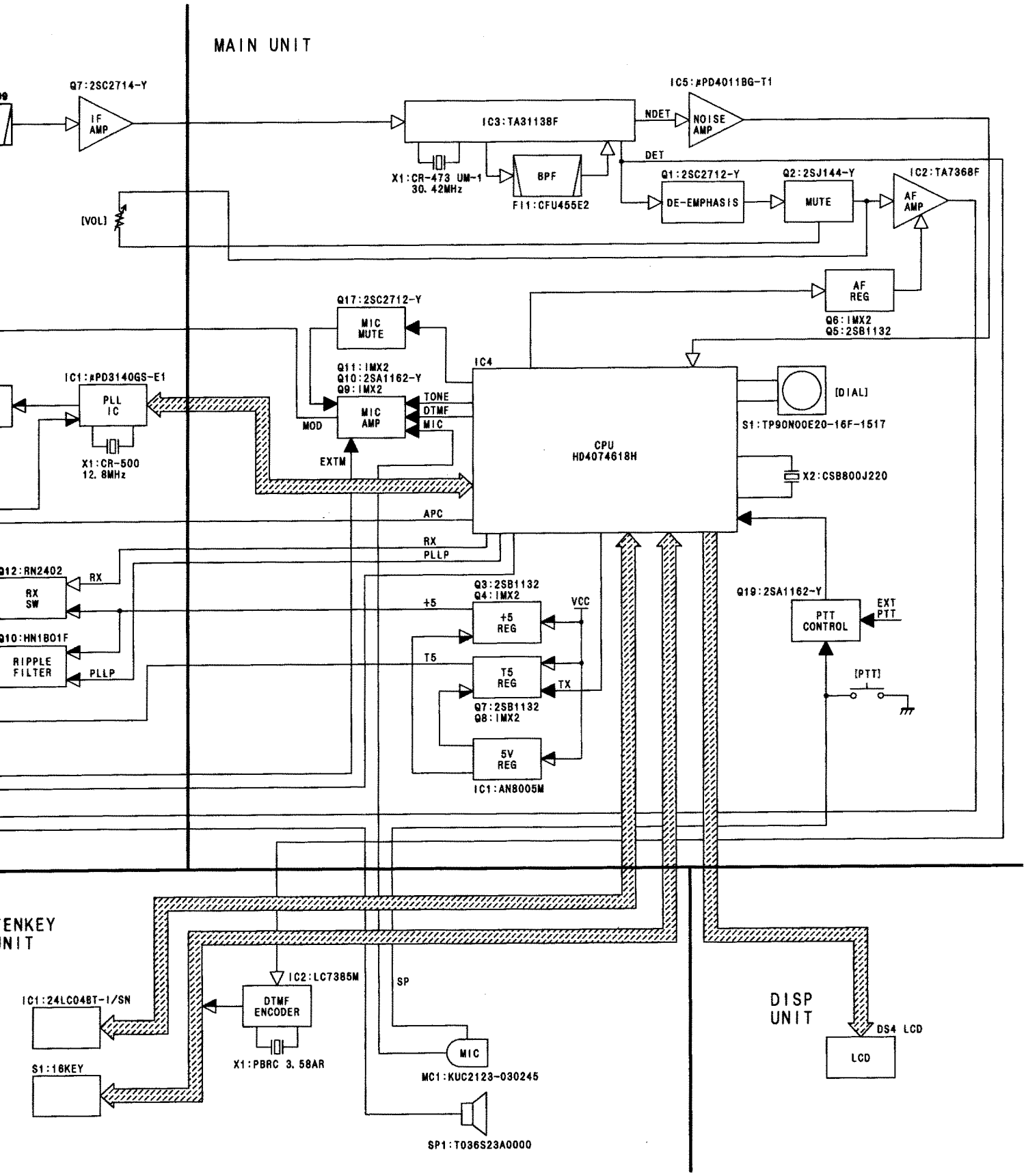


• RF UNIT

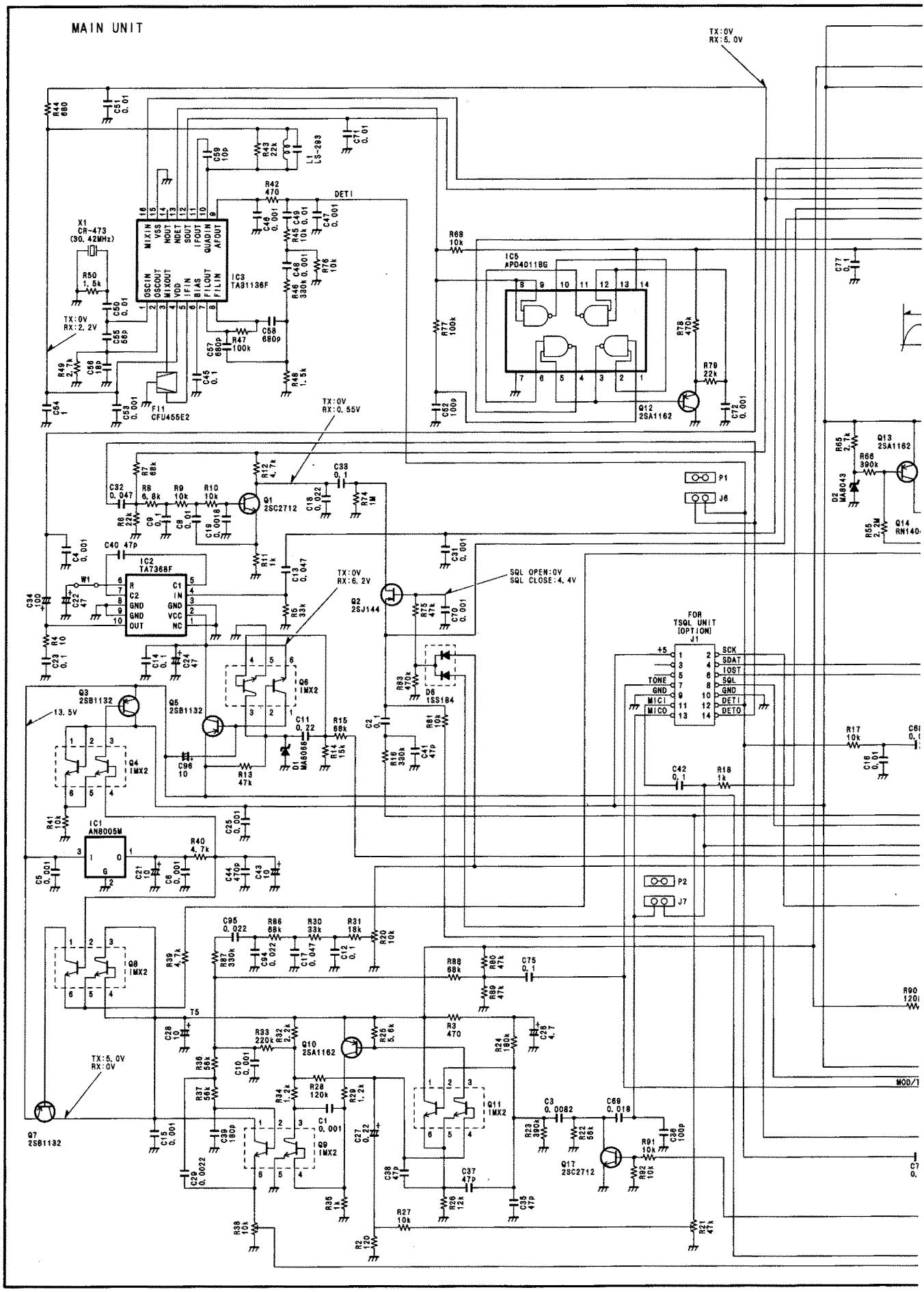


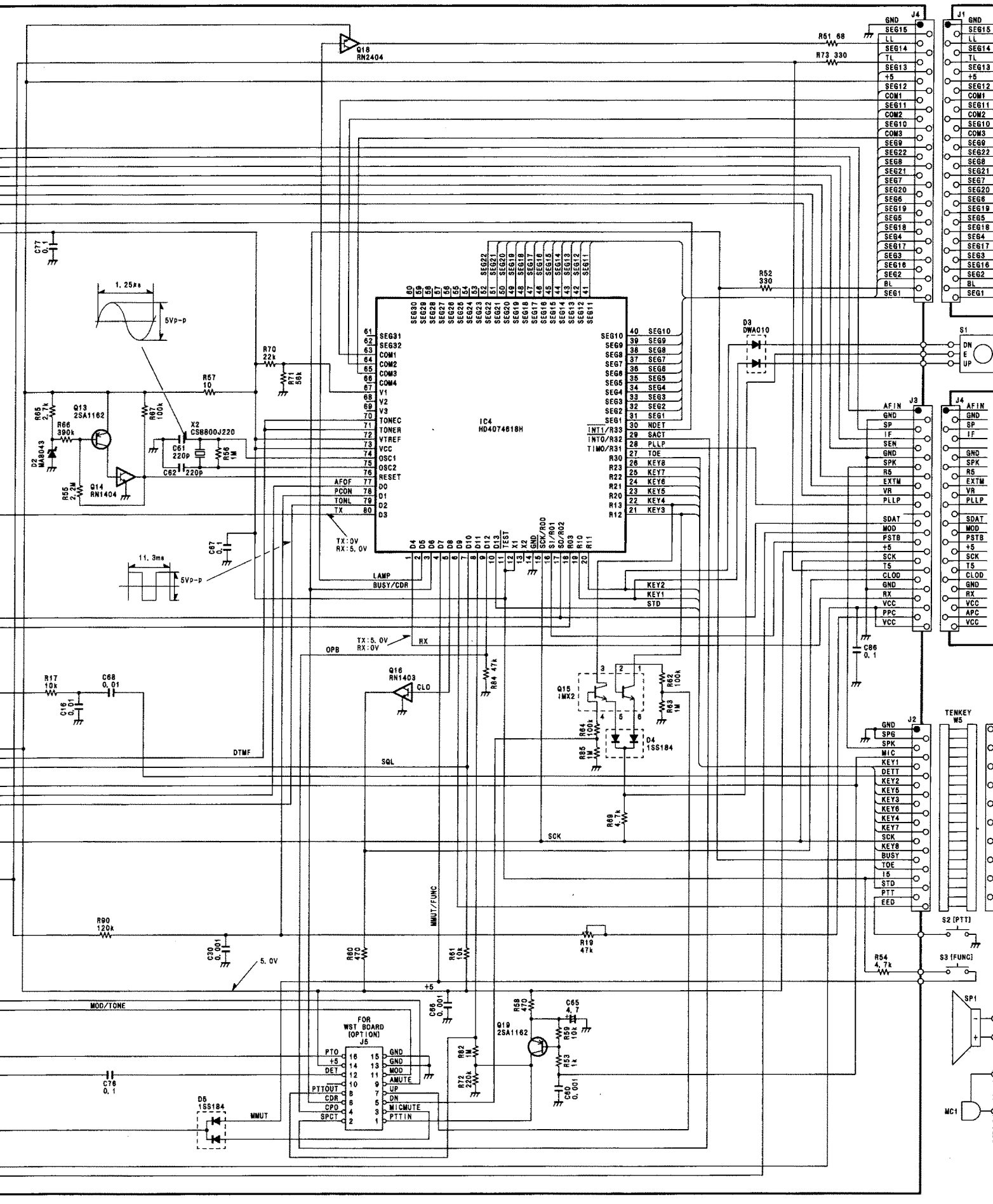
SECTION 10 BLOCK DIAGRAM

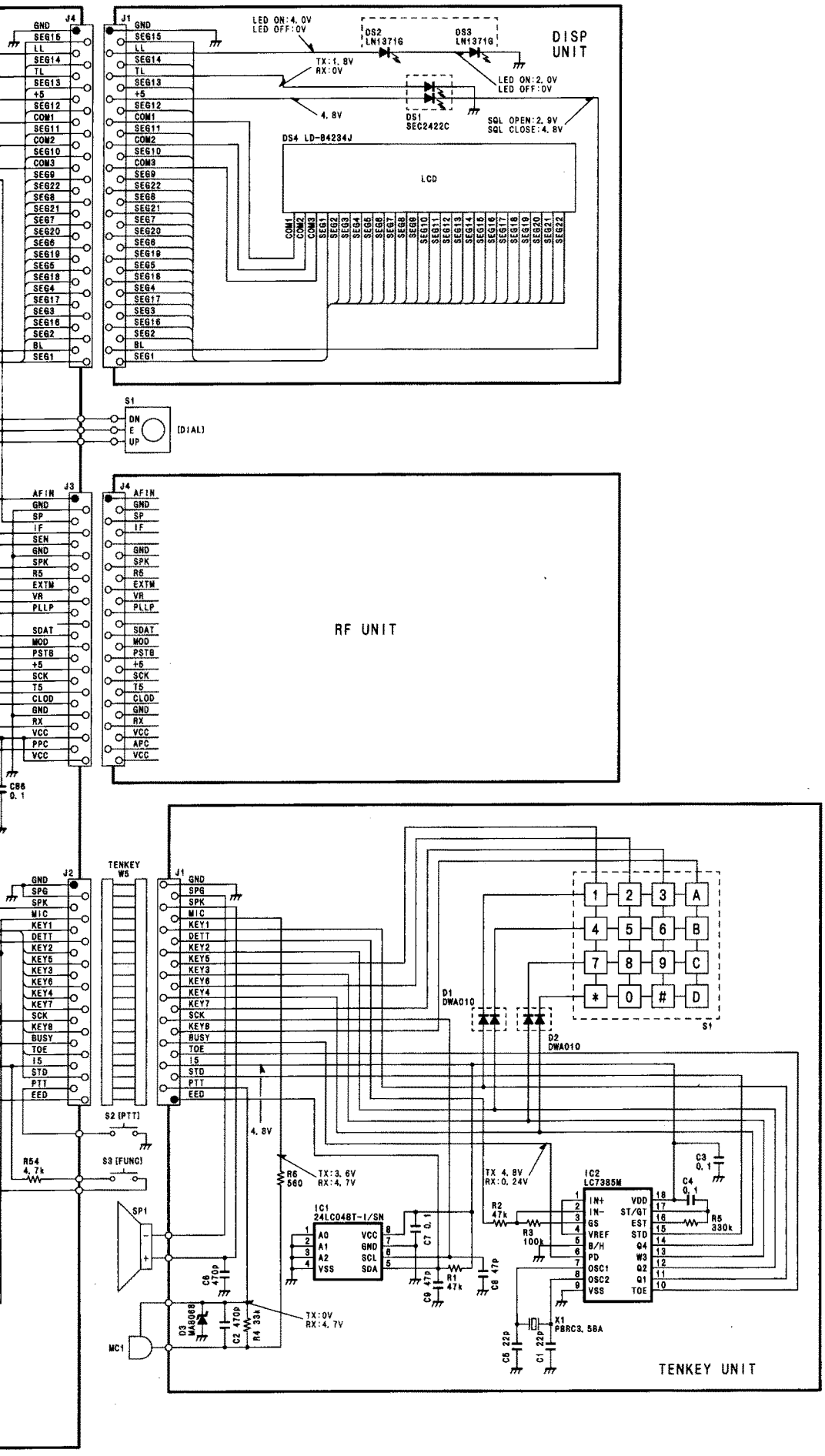


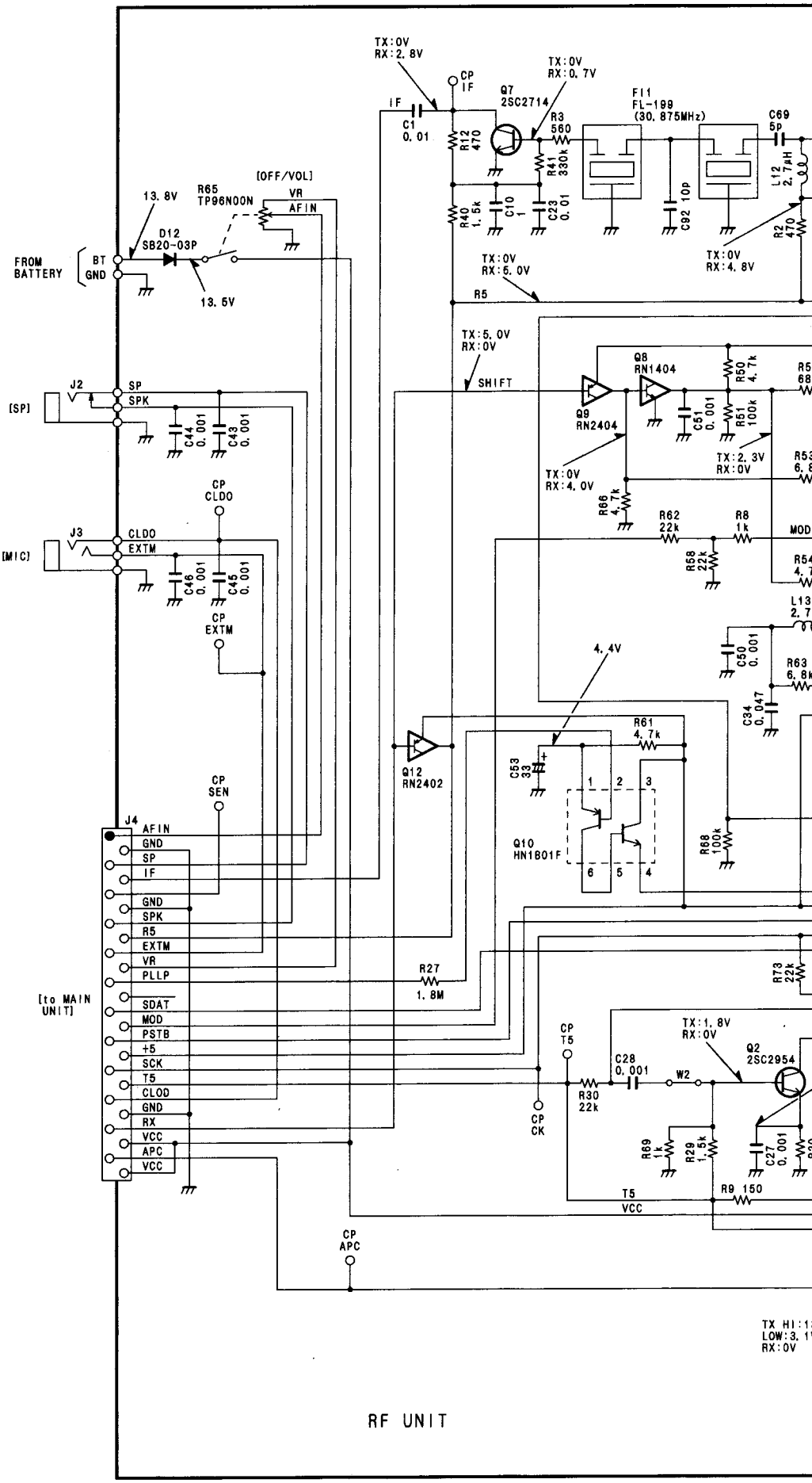

MAIN UNIT
Q7:2SC2714-Y
IF AMP
IC3:TA31138F
X1:CR-473 UM-1 30.42MHz
BPF
FI1:CFU455E2
IC5:μPD4011BG-T1
NOISE AMP
NDET
DET
Q1:2SC2712-Y
DE-EMPHASIS
Q2:2SJ144-Y
MUTE
IC2:TA7368F
AF AMP
[VOL]
AF REG
Q6:IMX2
Q5:2SB1132
Q17:2SC2712-Y
MIC MUTE
IC4
Q11:IMX2
Q10:2SA1162-Y
Q9:IMX2
IC1:μPD3140GS-E1
PLL IC
X1:CR-500 12.8MHz
MOD
MIC AMP
TONE
DTMF
MIC
EXTM
CPU HD4074618H
[DIAL]
S1:TP90N00E20-16F-1517
X2:CSB800J220
APC
RX
PLLP
Q12:RN2402
RX SW
Q10:HN1B01F
RIPPLE FILTER
Q3:2SB1132
Q4:IMX2
+5
+5 REG
VCC
T5
T5 REG
TX
Q7:2SB1132
Q8:IMX2
5V REG
IC1:AN8005M
Q19:2SA1162-Y
PTT CONTROL
EXT PTT
[PTT]
ENKEY
NIT
IC1:24LC04BT-I/SN
S1:16KEY
IC2:LC7385M
DTMF ENCODER
X1:PBRC 3.58AR
SP
MIC
MC1:KUC2123-030245
SP1:T036S23A0000
DISP UNIT
DS4 LCD
LCD

SECTION 11 VOLTAGE DIAGRAM

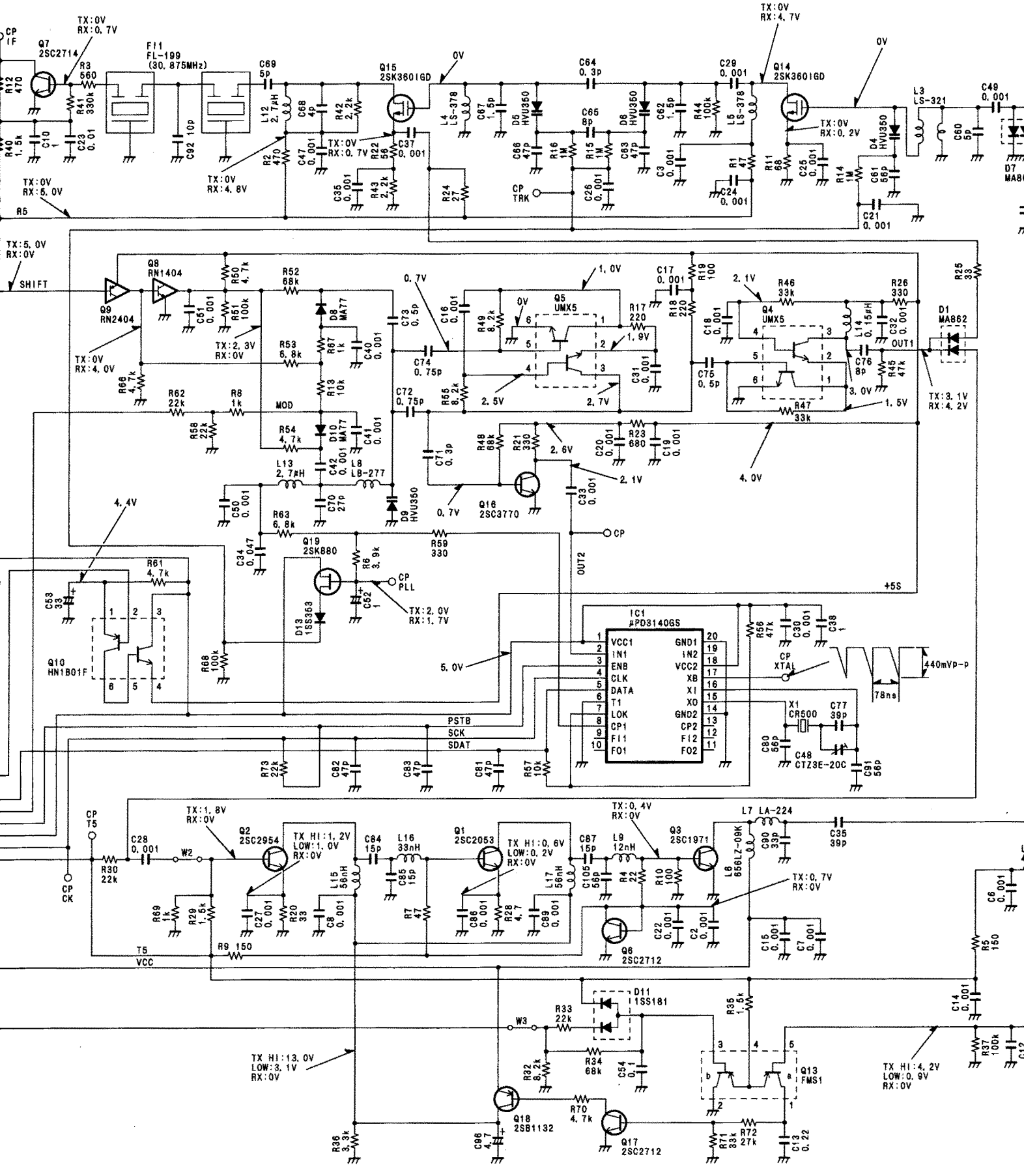


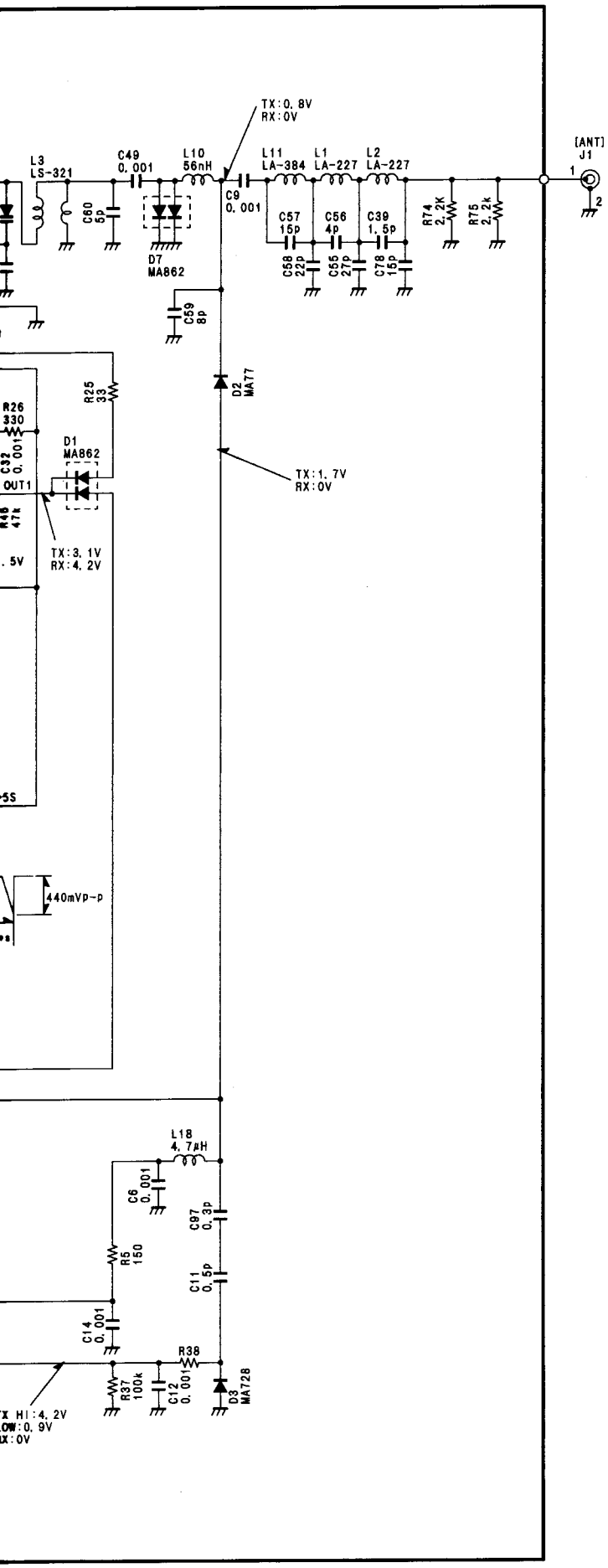

IC4
HD4074618H
Q18
RN2404
Q13
2SA1162
Q14
RN1404
Q16
RN1403
Q15
IMX2
Q19
2SA1162
X2
CS8800J220
D2
MA8043
D3
DWA010
D4
1SS184
D5
1SS184
J1
J2
J3
J4
J5
S1
S2 [PTT]
S3 [FUNC]
SP1
MC1
TENKEY
W5
FOR
WST BOARD
(OPTION)
1.25ms
5Vp-p
11.3ms
5Vp-p
TX:0V
RX:5.0V
TX:5.0V
RX:0V
5.0V
DTMF
SQL
SCK
MMUT/FUNC
MOD/TONE
MMUT
OPB
LAMP
BUSY/CDR
KEY2
KEY1
STD
+5
R51 68
R73 330
R52 330
R70 22k
R71 56k
R57 10
R65 2.7k
R66 390k
R67 100k
R56 1M
R55 2.2M
C61 220p
C62 220p
C67 0.1
C77 0.1
C76 0.1
C86 0.1
R17 10k
C68 0.01
C16 0.1
R84 47k
R62 100k
R63 1M
R64 100k
R85 1M
R69 4.7k
R90 120k
C30 0.001
R60 470
R61 10k
R19 47k
R54 4.7k
C66 0.001
R58 470
C65 4.7
R59 10k
R53 1k
C60 0.001
R82 1M
R72 220k
C76 0.1


DISP UNIT
LED ON: 4. 0V
LED OFF: 0V
DS2 LN1371G
DS3 LN1371G
TX: 1. 8V
RX: 0V
LED ON: 2. 0V
LED OFF: 0V
4. 8V
DS1 SEC2422C
SQL OPEN: 2. 9V
SQL CLOSE: 4. 8V
DS4 LD-84234J
LCD
S1
UP
E
DN
[DIAL]
RF UNIT
TENKEY UNIT
TENKEY W5
S2 [PTT]
S3 [FUNC]
R54 4. 7k
SP1
MC1
D1 DWA010
D2 DWA010
IC1 24LC04BT-I/SN
IC2 LC7385M
X1 PBRC3. 58A
TX: 3. 6V
RX: 4. 7V
TX 4. 8V
RX: 0. 24V
TX: 0V
RX: 4. 7V
C86 0. 1


TX:0V
RX:2.8V
CP
IF
IF
C1
0.01
Q7
2SC2714
TX:0V
RX:0.7V
FI1
FL-189
(30.875MHz)
C69
5p
R12
470
R3
560
R41
330k
C10
1
C23
0.01
R40
1.5k
C92 10p
L12
2.7μH
R2
470
TX:0V
RX:4.8V
[OFF/VOL]
VR
AFIN
R65
TP96N00N
13.8V
D12
SB20-03P
FROM
BATTERY
BT
GND
13.5V
TX:0V
RX:5.0V
R5
TX:5.0V
RX:0V
SHIFT
Q8
RN1404
Q9
RN2404
R50
4.7k
C51
0.001
R51
100k
TX:2.3V
RX:0V
TX:0V
RX:4.0V
R66
4.7k
J2
SP
SPK
[SP]
C44
0.001
C43
0.001
CP
CLDO
J3
CLDO
EXTM
[MIC]
C46
0.001
C45
0.001
CP
EXTM
R62
22k
R8
1k
MOD
R58
22k
C50
0.001
C34
0.047
4.4V
R61
4.7k
Q12
RN2402
C53
33
CP
SEN
J4
AFIN
GND
SP
IF
GND
SPK
R5
EXTM
VR
PLLP
SDAT
MOD
PSTB
+5
SCK
T5
CLOD
GND
RX
VCC
APC
VCC
[to MAIN
UNIT]
Q10
HN1B01F
R68
100k
R27
1.8M
R73
22k
CP
T5
TX:1.8V
RX:0V
C28
0.001
W2
Q2
2SC2954
R30
22k
CP
CK
R69
1k
R29
1.5k
C27
0.001
R9 150
T5
VCC
CP
APC
TX HI:1
LOW:3.1
RX:0V

RF UNIT


CP IF
Q7 2SC2714
TX:0V RX:0.7V
R3 560
R41 330k
R40 1.5k
C10
C23 0.01
FI1 FL-199 (30.875MHz)
C92 10p
C69 5p
L12 2.7μH
C68 4p
R42 2.2k
R2 470
C47 0.001
TX:0V RX:4.8V
TX:0V RX:0.7V
R22 56
C37 0.001
C35 0.001
R43 2.2k
R24 27
Q15 2SK3601GD
0V
L4 LS-378
C67 1.5p
D5 HVU350
C64 0.3p
C65 8p
D6 HVU350
C66 47p
R16 1M
R15 1M
C63 47p
C26 0.001
CP TRK
C62 1.5p
C3 0.001
C29 0.001
Q14 2SK3601GD
TX:0V RX:4.7V
0V
L5 LS-378
R44 100k
R1 47
C24 0.001
R11 68
C25 0.001
TX:0V RX:0.2V
D4 HVU350
R14 1M
C61 56p
C21 0.001
L3 LS-321
C60 5p
C49 0.001
D7 MA8
TX:0V RX:5.0V
R5
TX:5.0V RX:0V
SHIFT
Q8 RN1404
Q9 RN2404
R50 4.7k
R51 100k
C51 0.001
TX:2.3V RX:0V
TX:0V RX:4.0V
R66 4.7k
R52 68k
R53 6.8k
R67 1k
C40 0.001
D8 MA77
R13 10k
R62 22k
R8 1k
MOD
R58 22k
R54 4.7k
D10 MA77
C41 0.001
C42 0.001
L13 2.7μH
L8 LB-277
C50 0.001
C70 27p
D9 HVU350
R63 6.8k
C34 0.047
Q19 2SK880
R6 3.9k
CP PLL
C62 1
D13 1SS363
TX:2.0V RX:1.7V
4.4V
R61 4.7k
C53 33
Q10 HN1B01F
R68 100k
5.0V
0.7V
C73 0.5p
C16 0.001
C74 0.75p
R49 8.2k
Q5 UMX5
1.0V
0V
R17 220
1.9V
2.5V
2.7V
C31 0.001
C72 0.75p
R55 8.2k
C71 0.3p
0.7V
Q16 2SC3770
R48 68k
R21 330
2.6V
2.1V
C33 0.001
C20 0.001
R23 680
C19 0.001
C17 0.001
R19 100
R18 220
2.1V
R46 33k
Q4 UMX5
C18 0.001
C75 0.5p
C76 8p
R47 33k
3.0V
1.5V
R26 330
C32 0.001
OUT1
L14 0.15μH
R45 47k
D1 MA862
TX:3.1V RX:4.2V
R25 33
4.0V
CP
OUT2
+5S
IC1 μPD3140GS
VCC1 IN1 ENB CLK DATA T1 LOK CP1 FI1 FO1
GND1 IN2 VCC2 XB XI XO GND2 CP2 FI2 FO2
R56 47k
C30 0.001
C38 1
CP XTAL
440mVp-p
78ns
X1 CR500
C77 39p
C80 56p
C48 CTZ3E-20C
C91 56p
PSTB
SCK
SDAT
R73 22k
C82 47p
C83 47p
C81 47p
R57 10k
CP T5
TX:1.8V RX:0V
Q2 2SC2954
TX HI:1.2V LOW:1.0V RX:0V
C28 0.001
W2
R30 22k
C84 15p
L16 33nH
Q1 2SC2053
TX HI:0.6V LOW:0.2V RX:0V
C87 15p
L9 12nH
Q3 2SC1971
TX:0.4V RX:0V
L7 LA-224
C90 33p
C35 39p
L6 656LZ-09K
TX:0.7V RX:0V
C105 56p
R4 22
R10 100
C22 0.001
C2 0.001
Q6 2SC2712
C15 0.001
C7 0.001
C6 0.001
R5 150
C14 0.001
R37 100k
C12
CP CK
R69 1k
R29 1.5k
C27 0.001
R20 33
C8 0.001
L15 56nH
C85 15p
R7 47
C86 0.001
L17 56nH
R28 4.7
C89 0.001
R9 150
T5 VCC
D11 1SS181
W3
R33 22k
R34 68k
C54 0.1
R32 8.2k
R35 1.5k
Q13 FMS1
TX HI:13.0V LOW:3.1V RX:0V
TX HI:4.2V LOW:0.9V RX:0V
Q18 2SB1132
R70 4.7k
Q17 2SC2712
R36 3.3k
C96 4.7
R71 33k
R72 27k
C13 0.22


TX:0.8V
RX:0V
[ANT]
J1
L3
LS-321
C49
0.001
L10
56nH
L11
LA-384
L1
LA-227
L2
LA-227
C9
0.001
C60
5p
C57
15p
C56
4p
C39
1.5p
R74
2.2K
R75
2.2k
C58
22p
C55
27p
C78
15p
D7
MA862
C59
8p
D2
MA77
R25
33
R26
330
D1
MA862
TX:1.7V
RX:0V
TX:3.1V
RX:4.2V
440mVp-p
L18
4.7μH
C6
0.001
C97
0.3p
R5
150
C11
0.5p
C14
0.001
R38
R37
100k
C12
0.001
D3
MA728

Icom Inc.

6-9-16, Kamihigashi, Hirano-ku, Osaka 547, Japan
Phone: 06 793 5302
Fax : 06 793 0013
Telex : 05277822 ICOMTR J

Icom America Inc.

<Corporate Headquarters>
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.
Phone : (206) 454-8155
Fax : (206) 454-1509
Telex : 152210 ICOM AMER BVUE

<Customer Service>
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18102 Sky Park South, Suite 52-B, Irvine, CA 92714, U.S.A.
Phone : (714) 852-8026
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Icom Canada

A Division of Icom America Inc.
3071 #5 Road, Unit 9, Richmond, B.C., V6X 2T4, Canada
Phone : (604) 273-7400
Fax : (604) 273-1900

Icom (Europe) GmbH

Communication Equipment
Himmelgeister Str. 100, 40225 Düsseldorf 1, Germany
Phone : 0211 346047
Fax : 0211 333639

Icom (Australia) Pty. Ltd.

A.C.N 006 092 575
7 Duke Street, Windsor, Victoria, 3181, Australia
Phone : 03 529 7582
Fax : 03 529 8485

Icom (UK) Ltd.

Unit 9, Sea St., Herne Bay, Kent, CT6 8LD, U.K.
Phone : 0227 741741
Fax : 0227 741742
Telex : 965179 ICOM G

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Zac de la Plaine, Rue Brindejonc des Moulinais
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Telex : 521515 ICOM FRA

Count on us!

Icom Inc.
6-9-16, Kamihigashi, Hirano-ku, Osaka 547, Japan

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