ICOM

SERVICE MANUAL

DUAL BAND FM TRANSCEIVER

IC-W31A
IC-W31E

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the IC-W31A/E DUAL BAND FM TRANSCEIVER at the time of publication.

MODEL	VERSION No.	VERSION	SYMBOL
IC-W31E	#02	Europe	EUR
	#04	Italy	ITA
IC-W31A	#05	U.S.A.	USA
	#07	Australia	AUS
	#09	Asia	SEA

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.
DO NOT expose the transceiver to rain, snow or any liquids.
DO NOT reverse the polarities of the power supply when connecting the transceiver.
DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

ORDERING PARTS

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

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

<SAMPLE ORDER>

1140004600	IC	HD404639A84FS	IC-W31A	LOGIC UNIT	5 pieces
8810004370	Screw	PH B0 M2 x 10 ZK	IC-W31A	Front 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 of 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 coverage

Version	144 MHz band	440 MHz band
U.S.A.	Rx:136.0–174.0 MHz*1 Tx:144.0–148.0 MHz	Rx:400.0–470.0 MHz*2 Tx:440.0–450.0 MHz
Italy	Rx:136.0–174.0 MHz*1 Tx:144.0–148.0 MHz	Rx:400.0–470.0 MHz*3 Tx:430.0–440.0 MHz
EUR	144.0–146.0 MHz	430.0–440.0 MHz
Asia	Rx:140.0–150.0 MHz*1 Tx:144.0–148.0 MHz	430.0–440.0 MHz

Guaranteed ranges are: *1 144.0–148.0 MHz
*2 440.0–450.0 MHz
*3 430.0–440.0 MHz

- Mode : FM (F3E)
- Number of memory channels : 98 (VHF 49 ch, UHF 49 ch)
- Frequency stability : ±5 ppm (0 °C to +50 °C, +32 °F to +122 °F)
- Tuning steps : 5, 10, 12.5, 15, 20, 25, 30 or 50 kHz
- Antenna impedance : 50 Ω (unbalanced)
- External DC power : 4.5 to 16 V DC (negative ground)
- Current drain : at 13.5 V, typical

CONDITION		VHF	UHF
Tx	High	1.3 A	1.5 A
	Low	500 mA	600 mA
1 band Rx	Power saved	15 mA*4	19 mA*4
	Rated audio output	160 mA	170 mA
2 band Rx	Power saved	28 mA*4	
	Rated audio output	210 mA	

*4 average value

- Usable temperature range:
  –10 °C to +60 °C (+14 °F to +140 °F)
- Dimensions (projections not included)
  U.S.A. version (with BP-180) : 57 (W) x 137 (H) x 31 (D) mm
  2.2 (W) x 5.3 (H) x 1.2 (D) in
  Other versions (with BP-170 or BP-171) : 57 (W) x 125 (H) x 31 (D) mm
  2.2 (W) x 4.9 (H) x 1.2 (D) in
- Weight
  U.S.A. version (with BP-180) : 365 g ; 12.9 oz
  EUR, Italy, Australia versions (with BP-171) : 340 g ; 12.0 oz
  Asia versions (with BP-170) : 330 g ; 11.7 oz

■ TRANSMITTER

- Output power : 5 W, 0.5 W, 15 mW (selectable)
- Modulation system : Variable reactance frequency modulation
- Max. freq. deviation*5 : ±5.0 kHz
- Spurious emissions : Less than –60 dB
- Microphone impedance : 2 kΩ

■ RECEIVER

- Receiver system : Double conversion superheterodyne
- Intermediate frequency : VHF 1st 43.100 MHz
  2nd 455 kHz
  : UHF 1st 35.800 MHz
  2nd 455 kHz
- Sensitivity* (12 dB SINAD) : Less than 0.16 µV
  Less than 0.32 µV for V/V and U/U
- Squelch sensitivity : Less than 0.16 µV (at threshold)
- Selectivity : More than 15 kHz/–6 dB
  Less than 30 kHz/–60 dB
- Spurious and image rejection ratio*5 : More than 50 dB
  (more than 40 dB at IF/2)
- Audio output power*5 (at 13.5 V) : More than 180 mW
  (at 10 % distortion with an 8 Ω load)
- Audio output impedance : 8 Ω

*5 Specifications guaranteed at a transceiver temperature of +25 °C (+77 °F).

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

SECTION 2 DISASSEMBLY INSTRUCTIONS

• Removing the rear panel

① Remove the 4 screws, Ⓐ (black, 2 mm), and 2 screws, Ⓑ (silver, 2 mm), to separate front and rear panel as shown below.

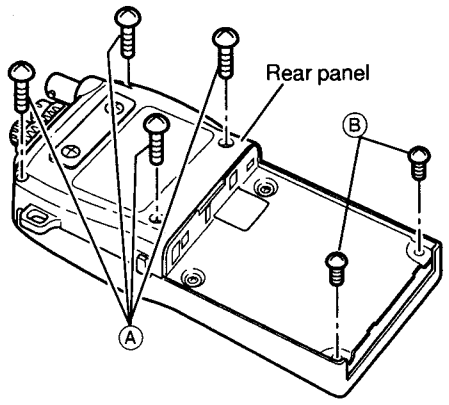


Fig. 1 Removing the rear panel

• Removing the LOGIC unit

② Unplug J4 to separate front and rear panel then remove 3 screws, Ⓒ (silver, 2 mm), and unsolder speaker leads.

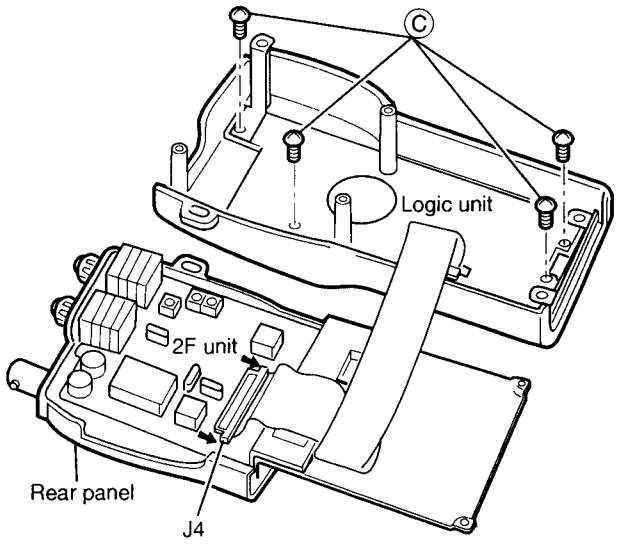


Fig. 2 Removing the LOGIC unit

• Removing the 2F unit

③ Unsolder the point Ⓔ, and remove 2 nuts Ⓕ (black).

④ Remove 4 screws, Ⓓ (silver, 2 mm), to separate the rear plate as shown Fig. 3.

⑤ Remove 3 screws, Ⓖ (silver, 1.4 mm), to separate the contact base and rear panel. Take off the contact base in the direction of the arrow.

⑥ Remove 2 screws, Ⓗ (silver, 2 mm), and unplug J4 – J7 on the bottom side, to separate 2F and 1F units.

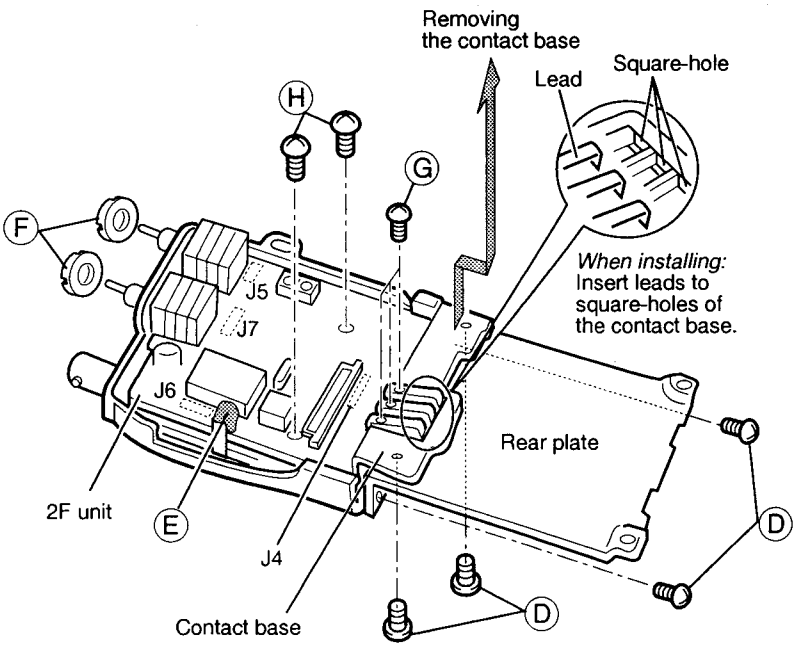


Fig. 3 Removing the 2F unit

• Removing the 1F unit

⑦ Remove 3 screws, Ⓘ (nickel, 2 mm), and 1 screw, Ⓙ (black, 2 mm), 1 nut Ⓚ (incl. antenna connector unit), to separate the 1F unit.

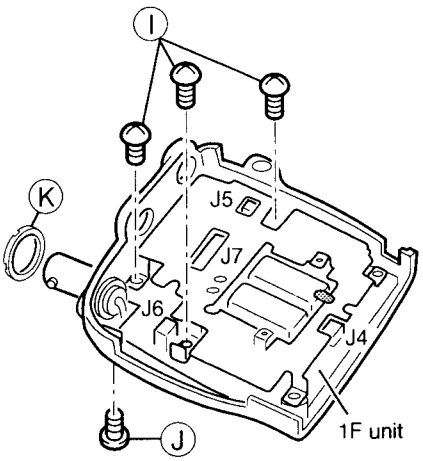
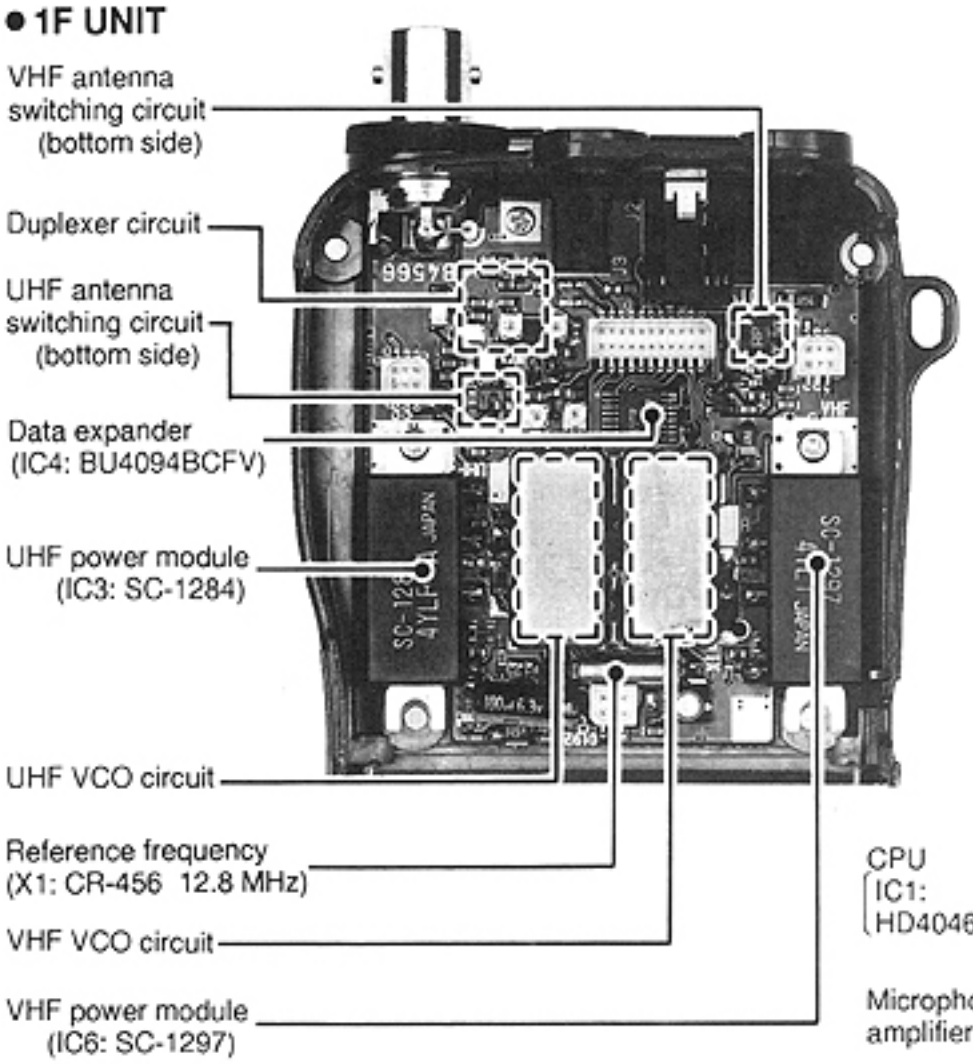


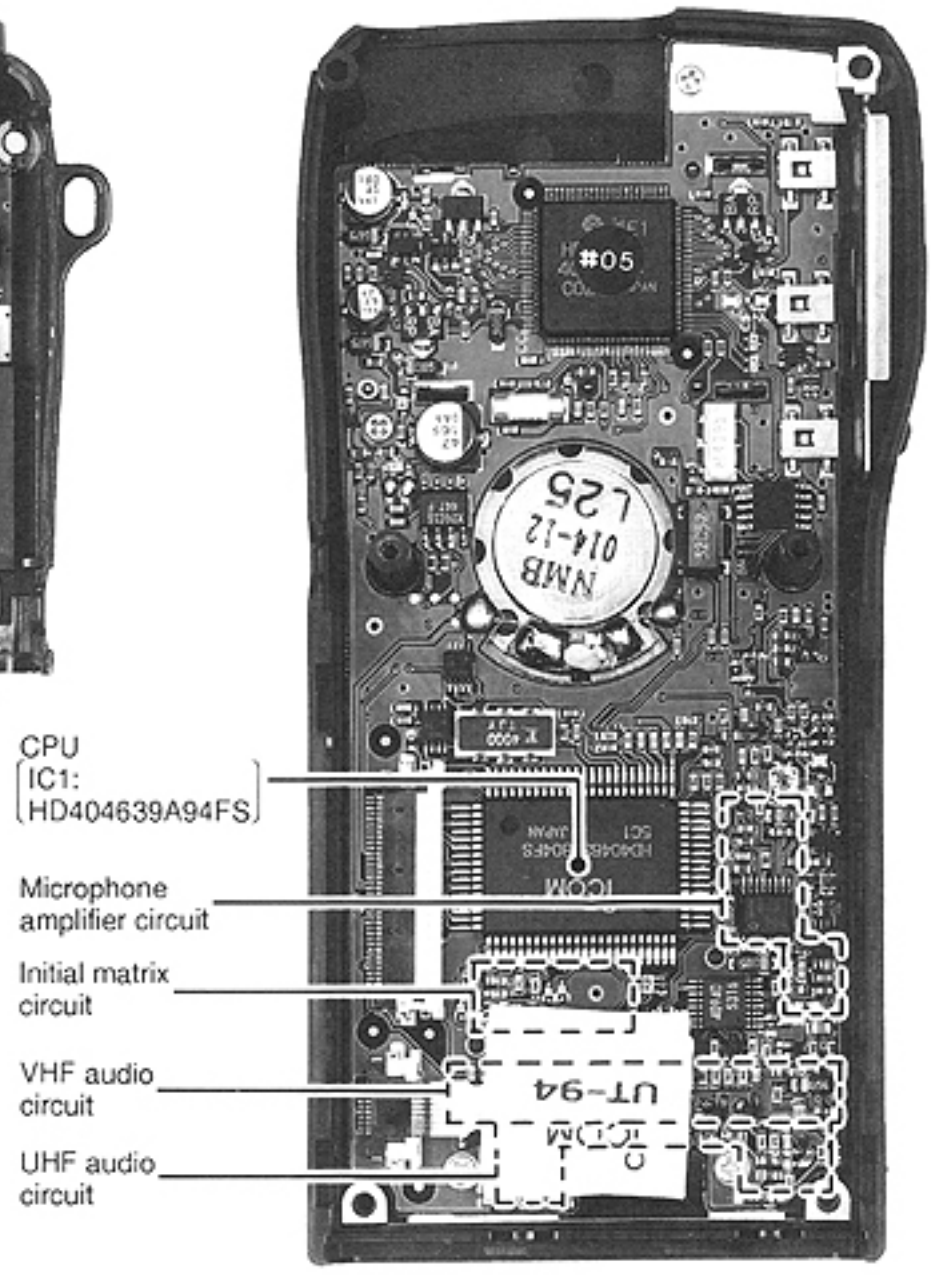
Fig. 4 Removing the 1F unit

SECTION 3 INSIDE VIEWS

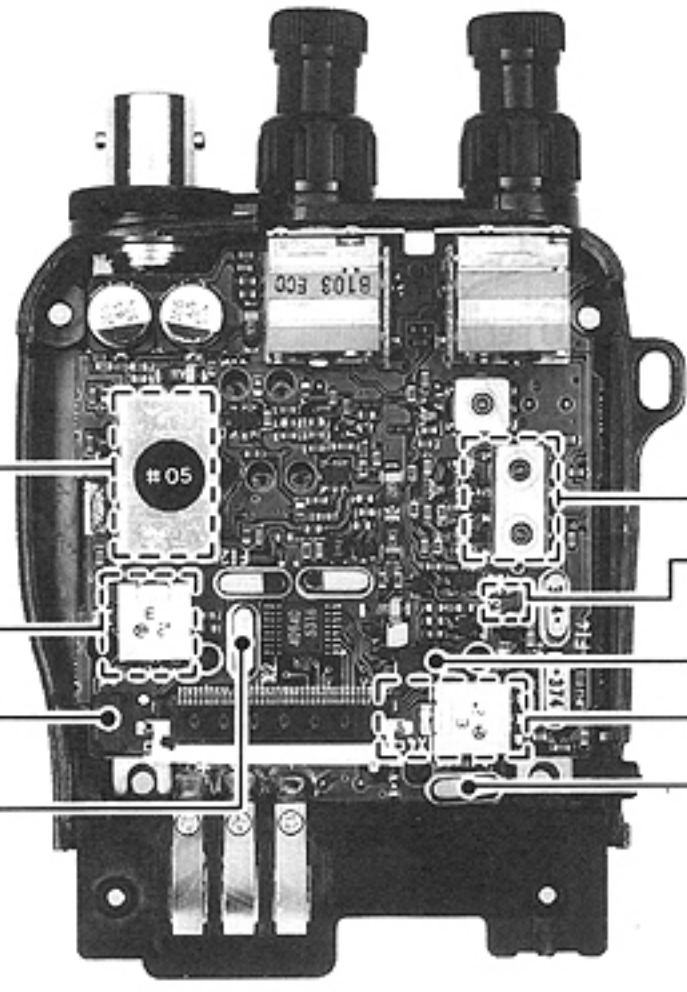
● 1F UNIT



● LOGIC UNIT



● 2F UNIT



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 DUPLEXER CIRCUIT (1F UNIT)

The transceiver has a duplexer (low-pass and high-pass filters) on the first stage from the antenna connector to separate the signals into VHF and UHF signals. The low-pass filter (L14–L16, C53–C58) for VHF signals and the high-pass filter (C48, C49, C147, C148, L11, L12) for UHF signals. The separated signals are applied to each RF circuit.

4-1-2 VHF ANTENNA SWITCHING CIRCUIT (1F UNIT)

The antenna switching circuit functions as a low-pass filter while receiving. However, its impedance becomes very high while transmitting by grounding cathode of D37 and D38. Thus, transmit signals are blocked from entering the receiver circuits. The antenna switching circuit employs a 1/4λ type diode switching system. The passed signals are then applied to the RF amplifier circuit on the 2F unit.

4-1-3 VHF RF CIRCUIT (2F UNIT)

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

The signals from the antenna switching circuit pass through a band-pass filter (L10, D15), and are applied to the RF amplifier (Q18, Q19). The RF amplifier consists of a cascade circuit. The amplified signals are passed through the next stage band-pass filter (L8, L9, D12, D13) to suppress unwanted signals. The filtered signals are then applied to the mixer circuit (Q13).

D12 and D13 track the band-pass 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 response rejection.

4-1-4 VHF 1ST MIXER AND 1ST IF CIRCUITS (2F UNIT)

The 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 mixer.

The signals from the VHF RF circuit are mixed with the VLO signal at the 1st mixer (Q13) to produce a 43.10 MHz 1st IF signal.

The 1st IF signal is applied to a pair of crystal filters (FI4) to suppress out-of-band signals. The 1st IF signal is amplified at the IF amplifier (Q10) and applied to the 2nd mixer circuit (IC2).

4-1-5 V/V FUNCTION CIRCUIT

During the V/V function, VHF RF signals are applied to the UHF mixer (Q5) as well as the VHF mixer.

When the V/V function is activated, Q4 is turned ON, thus the VHF RF signals are entered to the UHF mixer via D10.

Q5 mixers doubled VCO output and RF signals for UHF receiving, however, direct VCO components are used for VHF receiving.

4-1-6 VHF 2ND IF AND DEMODULATOR CIRCUITS (2F 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 FI4 is amplified at Q10 and is applied to the 2nd mixer section of IC2 (pin 16), and is mixed with the 2nd LO signal to be converted to a 455 kHz 2nd IF signal.

IC2 contains the 2nd mixer, 2nd local oscillator, limiter amplifier, S-meter detector and quadrature detector circuits. The 2nd local oscillator section and X4 generate 42.645 MHz for the 2nd LO signal.

The 2nd IF signal (455 kHz) from the 2nd mixer (IC2 pin 3) passes through the ceramic filter (FI3) where unwanted signals are suppressed. It is then amplified at the limiter amplifier section (IC2 pin 5) and applied to the quadrature detector section (IC2 pin 8 and ceramic discriminator X3) to demodulate the 2nd IF signal into AF signals.

AF signals output from IC2 (pin 9) are applied to the AF amplifier (2F unit IC6), through the LOGIC unit. The S-meter output "L SD" signal from IC2 (pin 13) is applied to the CPU (IC1 pin 4). See Figure 1.

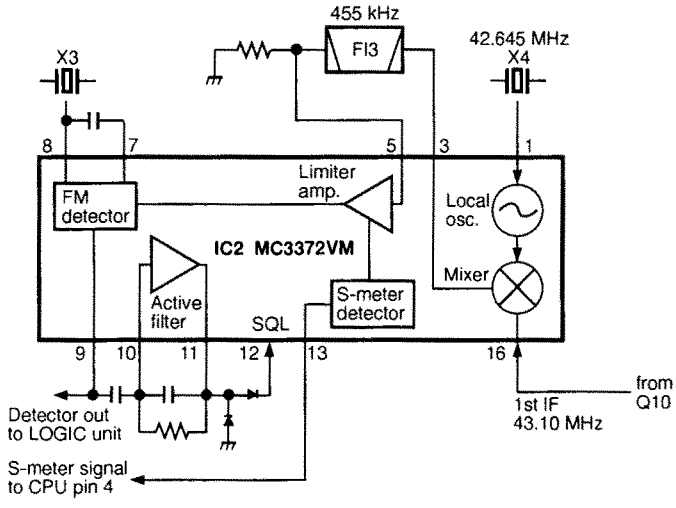


Fig. 1 VHF 2ND IF AMPLIFIER

4-1-7 VHF AF AMPLIFIER CIRCUIT (LOGIC AND 2F UNITS)

The AF amplifier circuit, including an AF mute switch, amplifies the demodulated signal to drive a speaker.

AF signals are applied to Q19 on the LOGIC unit. Q19 (pins 2 – 4) is an active filter that functions as a high-pass filter to suppress subaudible tone signals for tone squelch operation. Q19 (pins 1, 5, 6) is also an active filter that functions as a low-pass filter to suppress higher noise signals.

The filtered signals are amplified at Q21 after passing through the AF mute switch (Q18) and the volume control circuit (Q12, Q13).

IC9 converts from the serial data of the CPU (IC1) to the parallel data. Those parallel data controls the attenuation level of Q10–Q13 for the volume control.

4-1-8 VHF NOISE SQUELCH (2F UNIT)

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

Some of the noise components in the AF signal from IC2 (2F unit pin 9) are applied to the active filter section (IC2 pin 10, pin 11). The [VHF SQL] control on the V VR board adjusts the IC2 input level.

The active filter section amplifies noise components of frequencies of 20 kHz and above. Output signals are rectified by D25 for conversion to DC voltage.

The rectified voltage triggers the squelch switch section (IC2 pin 12). The squelch switch section sets the "LBUSY" line "HIGH/LOW" to apply the signal to the CPU (IC1 pin 49) on the LOGIC unit. Then the CPU outputs the L RMUTE.

The LRMUTE signal, activates the AF mute circuit (Q18) on the LOGIC unit to cut the VHF AF signals.

4-1-9 AF POWER AMPLIFIER CIRCUIT (2F UNIT)

Audio signals for the VHF band are combined with audio signals for the UHF band and are then applied to IC6 pin 6 on the 2F unit. When no plug is connected to the [EXT SP] jack, the amplified audio signals are fed back to the at AF power amplifier (IC6, pin 7) and are then applied to the internal speaker.

The voltage regulator (Q30, Q31) supplies power to the AF power amplifier. The AF ON signal from the CPU (LOGIC unit IC1) controls Q30 (2F unit) to reduce the current drain while the squelch is closed.

4-1-10 UHF RF CIRCUIT (1F AND 2F UNITS)

UHF band signals from the antenna connector pass through the high-pass filter (L11 – L13, C48 – C50), low-pass filter (L9, L10, L36, C43 – C447, C197) and the antenna switching circuit (D18, D19, L5).

The UHF RF signals are applied to the 2F unit and are then amplified at the RF amplifiers (Q1, IC1). Saw filters (FI1, FI2) are used at the last stage of these amplifiers.

4-1-11 UHF 1ST MIXER AND 1ST IF CIRCUITS (2F UNIT)

The filtered signals are mixed at Q5 with a ULO signal to produce a 35.8 MHz 1st IF signal.

The 1st IF signal passes through the pair of crystal filters (FI2) and is then amplified at Q1 and applied to the FM IF IC (IC1 pin 16).

4-1-12 U/U FUNCTION CIRCUIT

During the U/U function, UHF RF signals are applied to the VHF mixer (Q13) parallel with the UHF mixer.

When the U/U function is activated, Q25 is turned ON, thus the UHF RF signals are amplified at IC7, and then applied to the VHF mixer.

Q13 mixers the UHF RF signals and doubled components of VHF PLL output to produce a 43.10 MHz IF signal.

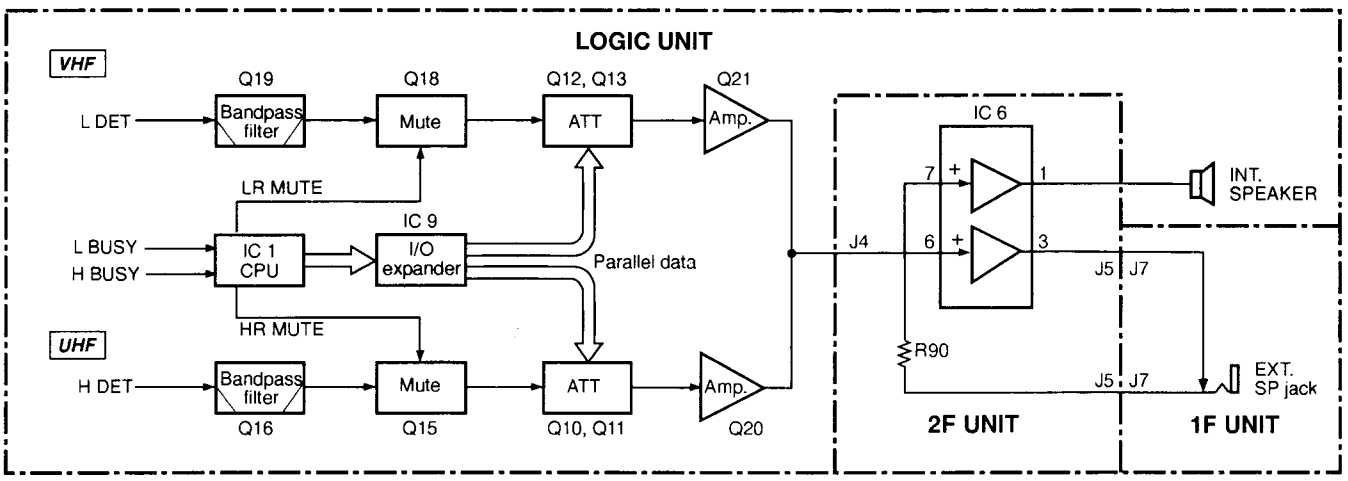


Fig. 2 AF SIGNAL LINE

4-1-13 UHF 2ND IF AND DEMODULATOR CIRCUITS (2F UNIT)

A 2nd mixer, 2nd IF, 2nd local oscillator, limiter amplifier, quadrature detector circuit and S-meter detector circuit are incorporated in IC1. The 2nd local oscillator section and X2 generate a 35.345 MHz for the 2nd LO signal.

A 35.8 MHz IF signal is mixed with the 2nd Lo signal to produce the 2nd IF signal (455 kHz) at IC1. The 2nd IF signal from pin 3 is applied to pin 5 through the ceramic filter (FI1) and is amplified at the limiter amplifier section in IC1. It is then applied to the quadrature detector section (IC1 pin 8 and ceramic discriminator X1) to demodulate the 2nd IF signal into AF signals.

The signals are output from IC1 (pin 9) as an "HDET" signal and then applied to the AF circuit (LOGIC unit).

The S-meter output "H SD" signal is applied to the CPU (IC1 pin 3) on the LOGIC unit from from the FM IF IC (IC1 pin 13).

4-1-14 UHF AF CIRCUIT (LOGIC UNIT)

The "HDET" signals (AF signals) from the FM IF IC (IC1 pin 9) are applied to the active filter (Q16) on the LOGIC unit. The filtered signals pass through the AF mute switch (Q15) and the volume control (Q10, Q11). The signals are amplified at Q20 and are then combined with audio signals with the VHF band audio.

4-1-15 UHF SQUELCH CIRCUIT (2F UNIT)

Some of the noise components in the AF signal from IC1 (pin 9) are applied to the active filter section (IC1 pins 10 and 11). The [UHF SQL] control on the U VR board adjusts the IC1 input level. IC1 amplifies noise components and D1 rectifies them for conversion to DC voltage.

The rectified voltage triggers the squelch switch section (IC1 pin 12). The squelch switch controls the "HBUSY" signal to inform the CPU (IC1 pin 47) on the LOGIC unit.

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER CIRCUIT (LOGIC UNIT)

The microphone amplifier circuit amplifies audio signals with +6 dB/octave pre-emphasis from the microphone to a level needed for the modulation circuit. The microphone amplifier circuit is used for both the VHF and UHF bands.

The AF signals from the built-in condenser microphone, or from the [MIC] jack are applied to the microphone amplifier (IC10 pin 16).

The output signals from IC10 (pin 8) pass through the low-pass filter (C76, C78, R111, R112) where signal components greater than 3 kHz are attenuated. The signals are applied to the VHF VCO or UHF VCO circuit in the 1F unit.

4-2-2 VHF MODULATION CIRCUIT (V VCO BOARD)

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

The "V MOD" signal changes the reactance of a diode (D1) to modulate the oscillated signal at the VHF VCO circuit (Q1, Q2, D1). The VCO output is buffer-amplified at Q3 and Q28 on the 1F unit and is then applied to the transmit/receive switching circuit (D24, D25) on the 1F unit.

4-2-3 VHF POWER AMPLIFIER CIRCUIT (1F UNIT)

IC6 is a power module which provides more than 5 W of output power with a 13.5 V DC power source.

An RF signal from the transmit/receive switching circuit (D25) is amplified at the drive amplifiers (Q29, Q31) and then applied to IC6. The amplified signal is then applied to the antenna connector via the transmit/receive switching circuit (D39) and duplexer.

When E LOW power is selected, the output of the drive amplifier (Q31) bypasses the power module (IC6) through D30 and D32.

4-2-4 VHF APC CIRCUIT (1F UNIT)

The APC circuit protects the power module (IC6) from a mismatched output load and selects HIGH, LOW1 or LOW2 output power.

The APC detector circuit (L21, D34 – D36) detects forward signals and rectified signals at D35 and D36 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 (Q25). When the antenna impedance is mismatched, the detected voltage exceeds the reference voltage. Thus the bias voltage of IC6 is decreased via Q13.

Low output power is obtained by changing the reference voltage (Q25 base) coming from IC4 pin 7. A thermistor (R93) controls APC reference voltage to reduce the output power when the temperature is increased.

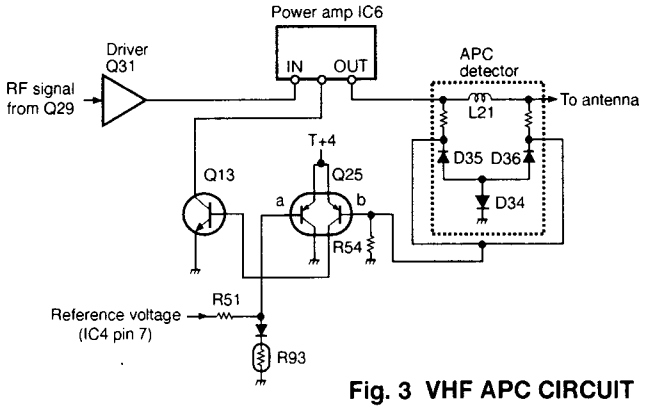


Fig. 3 VHF APC CIRCUIT

4-2-7 UHF MODULATION CIRCUIT (UHF VCO BOARD)

The audio signals from the microphone amplifier circuit (described in Section 4-2-1) are applied to D3 on the UHF VCO board.

The audio signals change the reactance of D3 to modulate the oscillated signal (200 MHz band) at the UHF VCO circuit (Q1, Q2). The oscillated signal is amplified at Q3 and doubled at Q1 (UHF VCO2F board). The signal (400 MHz band) is amplified at the buffer amplifier (1F unit Q4) and then applied to the drive amplifiers (Q8, Q9).

4-2-8 UHF POWER AMPLIFIER CIRCUIT (1F UNIT)

IC3 is a power module which provides a stable 5 W (DC 13.5 V) of output power.

The drive amplifier (Q8, Q9) and power amplifier (IC3) amplify the VCO oscillating signal to an output level. The output signal passes through the APC detector circuit (L20, D20, D21) and duplexer, and is applied to the antenna connector.

4-2-9 UHF APC CIRCUIT (1F UNIT)

The APC circuit detects the output signal from the UHF power module on the 1F unit. Q25 compares the voltages detected by the APC detector and the reference voltages. When a voltage detected by APC exceeds a reference voltage, Q25 controls bias voltage of IC3 via Q13 to reduce the RF output power.

4-3 PLL CIRCUITS

4-3-1 VHF PLL CIRCUIT (1F UNIT)

The oscillated signal at the VHF VCO circuit (VHF VCO board Q1, Q2) is amplified at Q27 and then applied to the PLL IC (IC5 pin 19). IC5 divides this input with the serial data from the CPU and phase-detects it with the divided reference frequency and then outputs the phase difference as pulses.

The output signals from IC5 (pin 13) are converted to DC voltages (lock voltage) by the loop filter (R58, C104) and are then fed back to the VCO circuit to stabilize the VCO frequency.

The DC voltage is also applied to the receiver turned bandpass filters as a "VTUNE" signal.

4-3-2 UHF PLL CIRCUITS (1F UNIT)

The oscillated signal at the UHF VCO circuit (UHF VCO board Q1, Q2, D2) is amplified at Q3 and then applied to the UHF VCO 2F board.

The signal is doubled on the board to obtain 370 – 380 MHz frequency. The doubled signal is applied to the PLL IC (IC1 pin 19).

IC1 divides this input with the serial data from the CPU and phase-detects it with the reference frequency from IC5 and then outputs the phase difference as pulses.

The output signals from IC1 (pin 13) are converted to DC voltage (lock voltage) by the loop filter (R1 – R3, C1 – C3) and are then fed back to the VCO circuit to stabilize the VCO frequency.

The oscillated signal is doubled for UHF transmit and receiver circuits or bypassed the doubler circuit for V/V function.

4-4 OTHER CIRCUITS

4-4-1 TONE SQUELCH UNIT (U.S.A. version only: TSQL UNIT)

The TSQL UNIT provides pocket beep, tone squelch and programmable tone encoder functions.

ENCODER FUNCTION

The serial data from the CPU (LOGIC unit IC1) is applied to IC1. The tone signal reply to the data signal is output from IC1 (pin 21) and is applied to R9. R9 adjusts the deviation level.

DECODER FUNCTION

The DET signal line is applied to the active low-pass filter between pin 1 and pin 2 within IC1. The filtered signal is compared with the programmed tone signal. Pin 14 of IC1 becomes "LOW" when the received signal matches to the programmed tone frequency. One of AF decoder signals (LED and HDET) are switched at IC12 (LOGIC unit), then applied to the TONE SQUELCH unit as a "DET" signal.

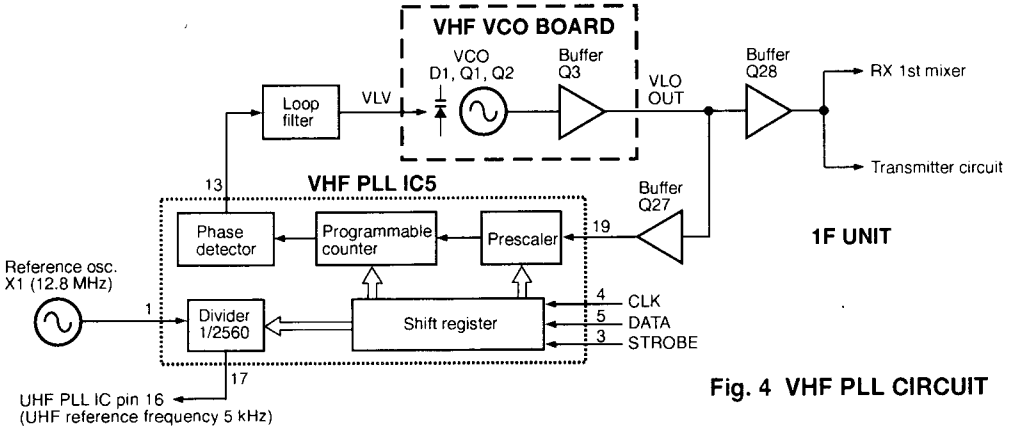


Fig. 4 VHF PLL CIRCUIT

4-5 PORT ALLOCATIONS

4-5-1 CPU (LOGIC UNIT)

Pin number	Port name	Description
1	BATT	Input port for the CPU power source.
2	REMOTE	Input port for optional speaker-microphones remote control signal.
3	HSD	Input port for a UHF S-meter detection signal.
4	LSD	Input port for a VHF S-meter detection signal.
7, 8	OSC1, 2	Clock oscillator terminals for a CPU clock.
9	RESET	CPU is initialized when this port receives "HIGH."
10, 11	X1, X2	Clock oscillator terminals for clock/timer function.
13	AFON	Outputs an AF power amplifier control signal. "HIGH": AF amp activates. "LOW" : AF amp deactivates.
14	HPLST	Outputs a strobe signal to the UHF PLL IC (1F unit, IC1).
15	HDATA	Outputs a serial data for the UHF PLL IC (1F unit, IC1).
16	HCK	Outputs a serial clock signal to the UHF PLL IC (1F unit, IC1).
17	LIOST	Outputs a strobe signal to the VHF band's data expander (1F unit, IC4).
18	LDATA	Outputs serial data for the VHF band.
19	LCK	Outputs a serial clock signal for the VHF band's data, expander (1F unit, IC4) and the VHF PLL IC.
20	BUSY LED	Outputs the receive LED signal (VHF band).
21	PTT	Input port for the [PTT] switch. "HIGH": [PTT] is pushed.
22	EDATA	Outputs a serial data for the EEPROM (IC3).
23	ECK	Outputs a serial clock signal for the EEPROM (IC3).
24	LPLST	Outputs a strobe signal to the VHF PLL IC (1F unit, IC5).
25	$\overline{\text{STOPC}}$	Input port for the [POWER] switch.
26	STD	Input port for detection of a DTMF decoder.
27	INT	CPU enters back up mode when this port receives "LOW."
28	MSTI	Data bus for the SUB CPU.
29	LDCK	Input port for the VHF dial clock signal.
30	HDCK	Input port for the UHF dial clock signal.
31	LDDN	Input port for the VHF dial down signal.
32	HDUP	Input port for the UHF dial up signal.
33	HDDN	Input port for the UHF dial down signal.
34	LDUP	Input port for the VHF dial up signal.

Pin number	Port name	Description
35	KEY	Inputport for [FUNC], [BAND], [LIGHT] and [VOL] switch with different voltage.
36	DPD	Outputs a DTMF decoder power control signal.
37	DCK	Outputs a serial clock signal for the DTMF decoder (IC4).
38	DDATA	Input port for DTMF decoder data from IC4.
39	HUL	Input port for the UHF PLL unlock signal "HIGH" : When PLL is unlocked.
40	LUL	Input port for the VHF PLL unlock signal "HIGH" : When PLL is unlocked.
41	LTXC	Outputs VHF transmit control signal.
42	HTXC	Outputs UHF transmit control signal.
43–45	K1, RTSST, RIOST	Output strobe signals to the initial matrix.
46	MSTO	Data bus line for the SUB CPU.
47	H BUSY	Input port for the UHF noise squelch condition. "HIGH": Squelch close. "LOW" : Squelch open.
48	RCK	Outputs a serial clock signal to I/O expanders (LOGIC unit IC9, 2F unit IC5).
49	L BUSY	Input port for the VHF noise squelch condition. "HIGH": Squelch close. "LOW" : Squelch open.
50	RDATA	Outputs a serial data to I/O expanders (LOGIC unit IC9, 2F unit IC5).
51–54	KR0–KR3	Input port for the key matrix.
55–59	KS0–KS4	Outputs strobe signals to the key matrix.
60	PCON	Outputs the power save control signal. "LOW" : When the circuits are idled.
61	TCALL	Outputs a 1750 Hz tone burst signal.
62	TBSEL	Outputs a tone squelch unit audio input selector signal.
63	MICM	Outputs a microphone mute signal. "HIGH": Mic mute
64	MICC	Outputs a microphone amplifier control signal.
65	LRMUT	Outputs a VHF band audio mute signal.
66	HRMUT	Outputs a UHF band audio mute signal.
70	TSQL	Input port for tone squelch decoder signal. "LOW" when matched tone is received.
71–75	DA0–DA4	Output reference voltage control signal for a meter.
77, 78	TONE C, TONE R	Output DTMF row and column signals.

4-5-2 I/O EXPANDERS

● 1F UNIT IC4

Pin number	Port name	Description
4	U3SC	Outputs a power save control signal for the UHF band. "HIGH" : When the circuits are idled.
5	UELOW	Outputs an E LOW power control signal for the UHF band. "LOW" : When E LOW is selected.
6	U SHIFT	Outputs a UHF VCO switching signal. "LOW" : During transmission.
7	H/L	Outputs a RF power selection signal. "HIGH" : When high power is selected.
11	VV3SC	Outputs a power save control signal during the V/V function. "HIGH" : When the circuits are idled.
12	VELO	Outputs an E LOW power control signal for the VHF band. "LOW" : When E LOW is selected.
13	V SHIFT	Outputs a VHF VCO switching signal. "HIGH" : During transmission.
14	V3SC	Outputs a power save control signal for the VHF band. "HIGH" : When the circuits are idled.

SECTION 5 ADJUSTMENT PROCEDURES

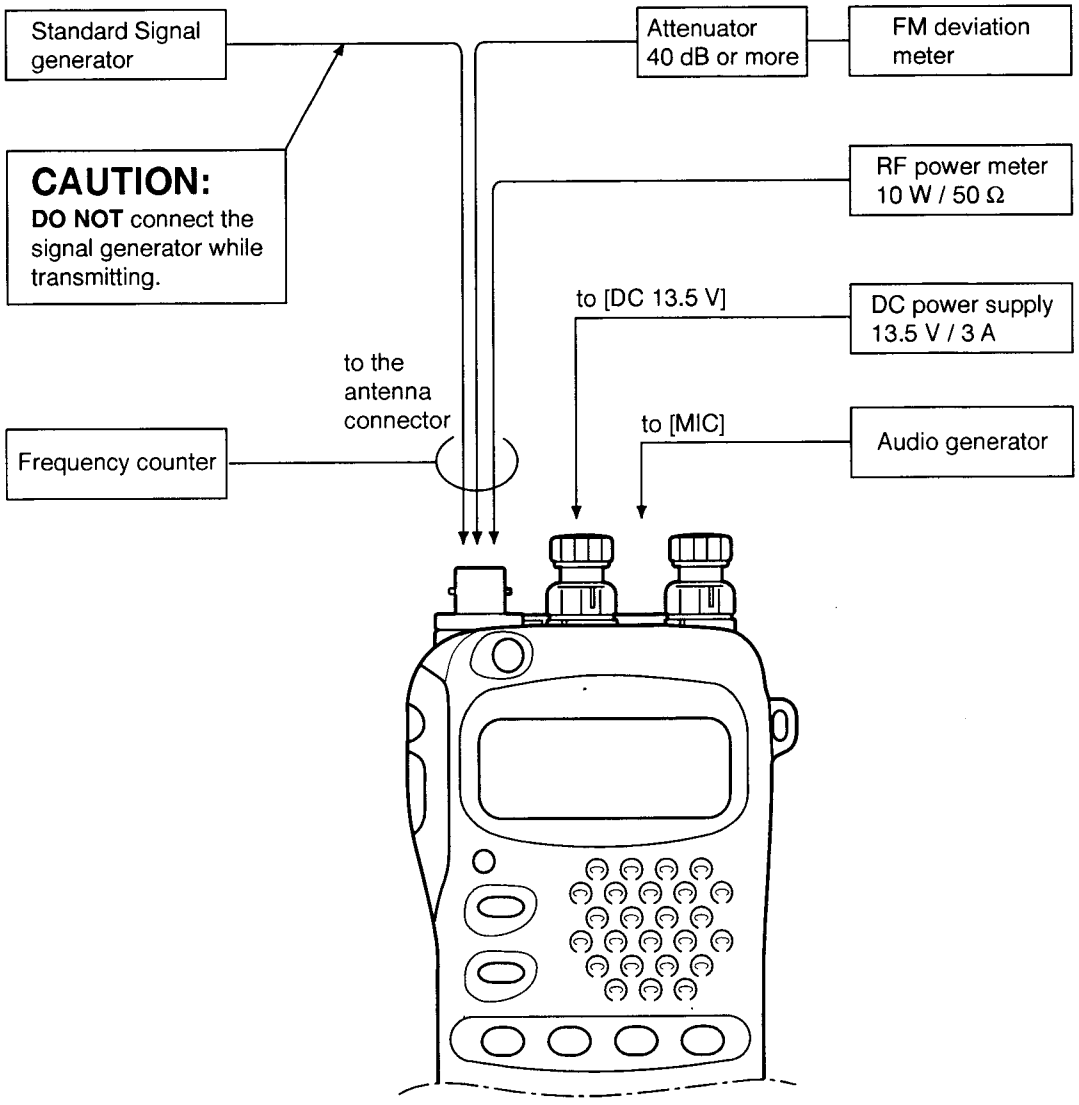
5-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.5 V DC Current capacity : 3 A or more	Standard signal generator (SSG)	Frequency range : 100–470 MHz Output level : –127 to –17 dBm (0.1 µV to 32 mV)
RF power meter (terminated type)	Measuring range : 1–10 W Frequency range : 100–500 MHz Input impedance : 50 Ω SWR : 1.2 : 1 or better	DC voltmeter	Input impedance : 50 kΩ/V DC or better
Frequency counter	Frequency range : 100–470 MHz Frequency accuracy : ± 1 ppm or better Sensitivity : 100 mV or better	Audio generator (AG)	Frequency range : 300–3000 Hz Measuring range : 1–500 mV
Oscilloscope	Frequency range : DC–20 MHz Output range : 0.01–10 V	Attenuator	Attenuation : 40 dB or more Capacity : 10 W or more
		FM deviation meter	Frequency minimum : 470 MHz Measuring range : 0 to ±10 kHz

CW: Clockwise
CCW: Counterclockwise

■ CONNECTIONS



5-2 PLL ADJUSTMENT

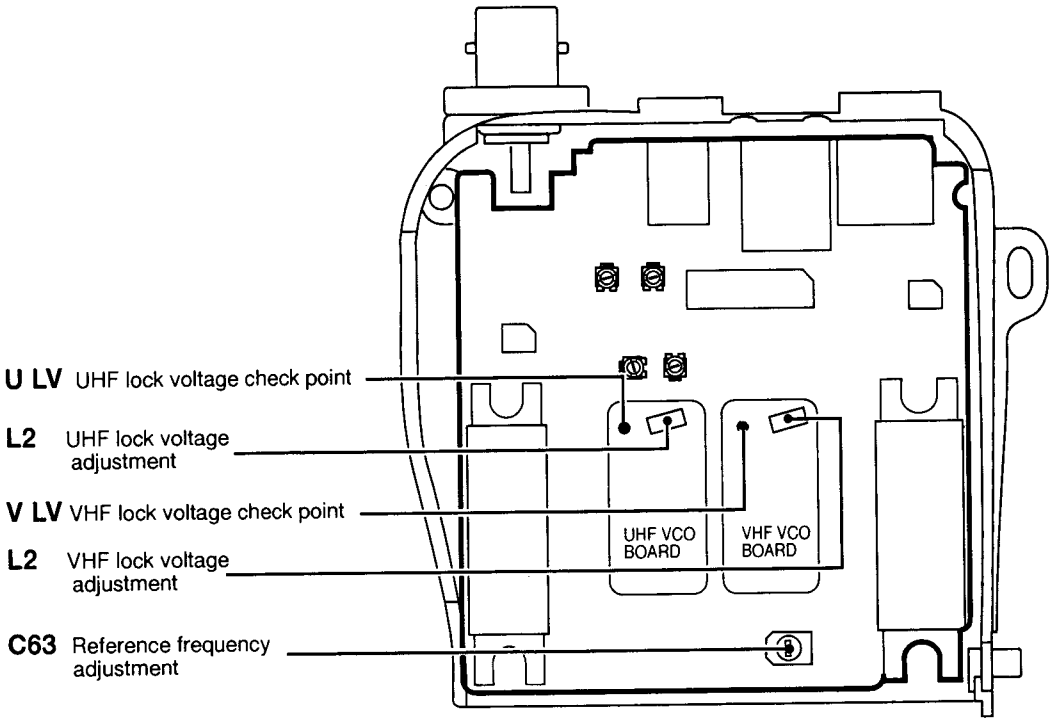
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF LOCK VOLTAGE	1	• Displayed frequency: 145.000 MHz • Adjust either the transmit lock voltage or receive lock voltage.	VHF VCO	Connect the DC voltmeter to the point, "V LV."	1.4 V ± 0.3 V (Transmitting) 1.3 V ± 0.3 V (Receiving)	VHF VCO	L2
UHF LOCK VOLTAGE	1	• Displayed frequency: 440.000 MHz (USA) 430.000 MHz (All other versions) • Adjust either the transmit lock voltage or receive lock voltage (whichever is higher).	UHF VCO	Connect the DC voltmeter to the point, "U LV."	1.9 V ± 0.3 V (USA) 1.5 V ± 0.3 V (All other versions)	UHF VCO	L2
REFERENCE FREQUENCY	1	• Displayed frequency: 440.000 MHz • Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	440.000 MHz	1F	C63

5-3 RECEIVER ADJUSTMENT

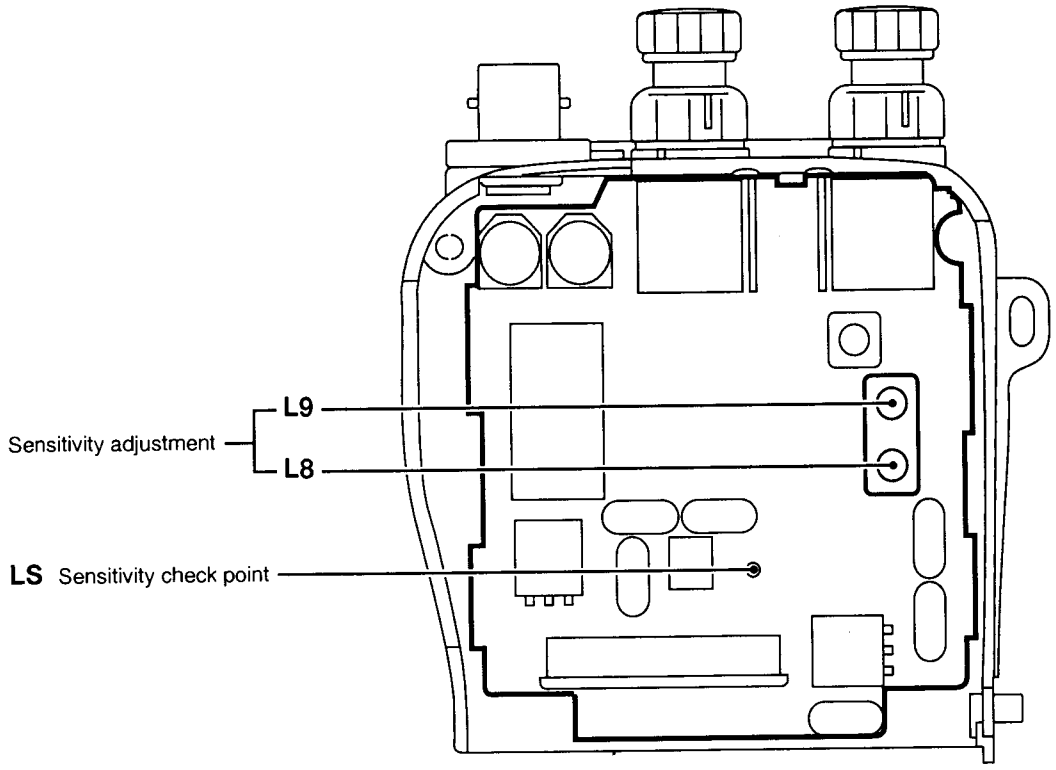
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Displayed frequency : 145.000 MHz • Connect the SSG to the antenna connector and set as: Level : 1.0 μV* (–107 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • [VHF SQL] control : CCW • Receiving	2F	Connect the oscilloscope to the point, "LSD."	Maximum DC voltage	2F	Adjust in sequence L9, L8
		NOTE : The transceiver has no adjustment points for the UHF sensitivity.					
S-METER	1	• VHF displayed frequency: 145.000 MHz • UHF displayed frequency: 443.000 MHz (USA) 433.000 MHz (All other versions) • Connect the SSG to the antenna connector and set as: Level : 0.5 μV (–113 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz • Receiving • Connect the terminator to the [MIC] jack as shown Page 5 – 3.				For VHF adjustment: While pushing the [VOL] key, push [MONI]. For UHF adjustment: While pushing the [VOL] key, push [RPT·M].	
	2	• Set the SSG output for the S-meter becoming to S3.		The SSG output level.	0.32 μV to 0.79 μV (–117 dBm to –109dBm)		Verify

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

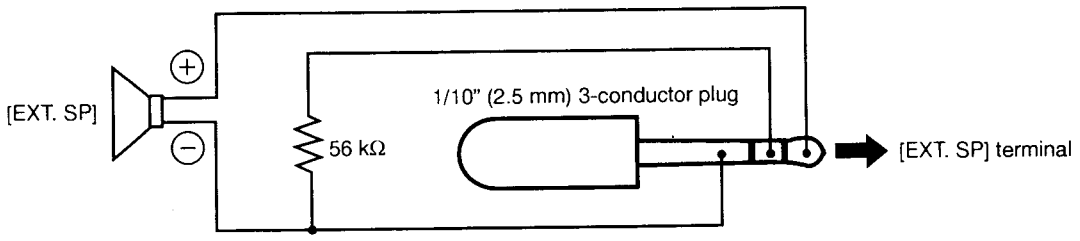
• **1F UNIT**



• **2F UNIT**



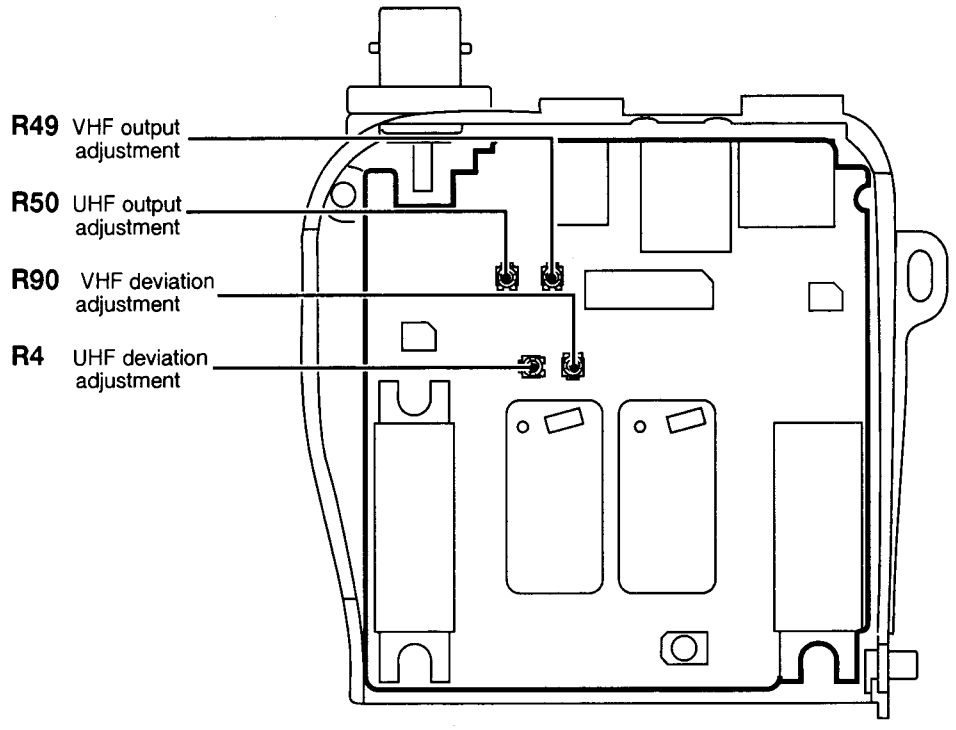
• **Terminator for the S-meter adjustment**



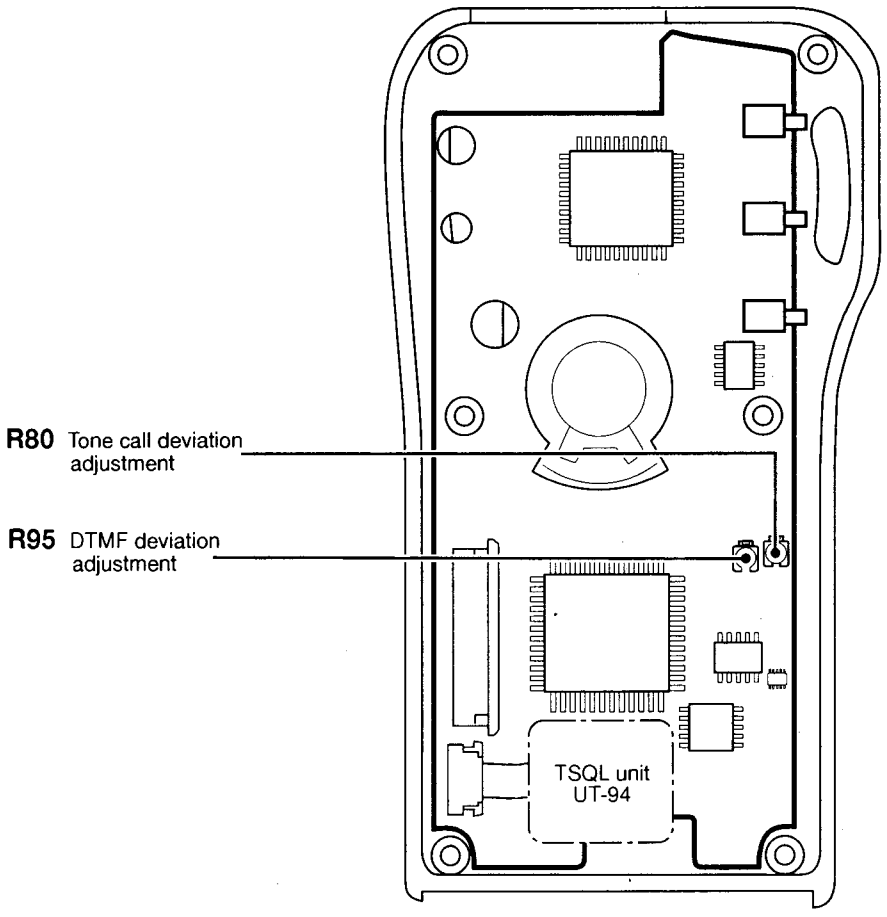
5-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF OUTPUT POWER	1	• Displayed frequency 145.00 MHz • Output power : High • Transmitting • Be sure the power supply voltage is 13.5 V.	Top panel	Connect the RF power meter to the antenna connector.	5.0 W	1F	R49
	2	• Output power : Low (RF-meter 1 dot)			0.25 W–1.0 W		Verify
UHF OUTPUT	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Output power : High • Transmitting • Be sure the power supply voltage is 13.5 V.	Top panel	Connect the RF power meter to the antenna connector.	5.0 W	1F	R50
	2	• Output power : Low (RF-meter 1 dot)			0.25 W–1.0 W		Verify
VHF DEVIATION	1	• Displayed frequency: 145.00 MHz • Connect the audio generator to the [MIC] connector and set as: 95 mV/1.0 kHz • Set the FM deviation meter as: HPF : 50 Hz 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.	±4.6 kHz	1F	R90
	2	• Set the audio generator for the deviation becoming to ±3.5 kHz.		Audio generator output level.	5.6 – 18 mV		Verify
UHF DEVIATION	1	• Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) • Connect the audio generator to the [MIC] connector and set as : 95 mV/1.0 kHz • Set the FM deviation meter as: HPF : 50 Hz 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.	±4.6 kHz	1F	R4
	2	• Set the audio generator for the deviation becoming to ±3.5 kHz.		Audio generator output level.	5.6 – 18 mV		Verify
TONE CALL DEVIATION (EUR, ITA only)	1	• Displayed frequency: 435.000 MHz HPF : 50 Hz LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 • Push and hold [RPT•M] key while transmitting.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±3.5 kHz	LOGIC	R80
DTMF DEVIATION	1	• Displayed frequency: 445.00 MHz (USA) 435.00 MHz (All other versions) • Push [D] key while transmitting.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±3.5 kHz	LOGIC	R95

• **1F UNIT**



• **LOGIC UNIT**



SECTION 6 PARTS LIST

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130007610	S.IC	μPD3140GS-E1 (DS8)
IC2	1130007280	S.IC	TC7S32FU(TE85R)
IC3	1150001530	IC	SC1284
IC4	1130007570	S.IC	BU4094BCFV-EZ
IC5	1130007610	S.IC	μPD3140GS-E1 (DS8)
IC6	1140004380	IC	SC1297
IC7	1130004500	S.IC	TC4S11F (TE85R)
Q1	1590001150	S.TRANSISTOR	UN9211(TX)
Q3	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q4	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q5	1590001690	S.TRANSISTOR	UN9115(TX)
Q6	1590001690	S.TRANSISTOR	UN9115(TX)
Q7	1590002080	S.TRANSISTOR	UN9117(TX)
Q8	1530002900	S.TRANSISTOR	2SC4228-T2
Q9	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q10	1590001140	S.TRANSISTOR	UN9210(TX)
Q11	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q12	1590001150	S.TRANSISTOR	UN9211(TX)
Q13	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q14	1530003190	S.TRANSISTOR	2SC4617 TLQ
Q15	1530003190	S.TRANSISTOR	2SC4617 TLQ
Q16	1530003190	S.TRANSISTOR	2SC4617 TLQ
Q17	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q18	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q20	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q21	1590001150	S.TRANSISTOR	UN9211(TX)
Q22	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q23	1590001150	S.TRANSISTOR	UN9211(TX)
Q24	1590001150	S.TRANSISTOR	UN9211(TX)
Q25	1590001160	S.TRANSISTOR	XP1401-(TX).AB
Q26	1590001150	S.TRANSISTOR	UN9211(TX)
Q27	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q28	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q29	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q30	1590002080	S.TRANSISTOR	UN9117(TX)
Q31	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q32	1590001140	S.TRANSISTOR	UN9210(TX)
Q33	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q34	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q35	1590001150	S.TRANSISTOR	UN9211(TX)
Q36	1590001150	S.TRANSISTOR	UN9211(TX)
Q37	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q38	1590001970	S.TRANSISTOR	UN921E(TX)
Q39	1590001140	S.TRANSISTOR	UN9210(TX)
Q40	1590001130	S.TRANSISTOR	UN9110(TX)
Q41	1540000410	S.TRANSISTOR	2SD2345(TX)S
Q42	1550000010	S.FET	2SJ364-Q (TX)
Q43	1590001150	S.TRANSISTOR	UN9211(TX)
D1	1790000860	S.DIODE	MA133(TX)
D2	1790001260	S.DIODE	MA2S077-(TX)
D3	1790001260	S.DIODE	MA2S077-(TX)
D4	1790001260	S.DIODE	MA2S077-(TX)
D5	1790001260	S.DIODE	MA2S077-(TX)
D6	1790001260	S.DIODE	MA2S077-(TX)
D7	1790001260	S.DIODE	MA2S077-(TX)
D8	1790001260	S.DIODE	MA2S077-(TX)
D9	1790001260	S.DIODE	MA2S077-(TX)
D10	1790001260	S.DIODE	MA2S077-(TX)
D11	1790001260	S.DIODE	MA2S077-(TX)
D12	1790001260	S.DIODE	MA2S077-(TX)
D14	1790001260	S.DIODE	MA2S077-(TX)
D15	1790001260	S.DIODE	MA2S077-(TX)
D16	1790001260	S.DIODE	MA2S077-(TX)
D17	1790001260	S.DIODE	MA2S077-(TX)
D18	1790001260	S.DIODE	MA2S077-(TX)
D19	1790001260	S.DIODE	MA2S077-(TX)

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D20	1790001240	S.DIODE	MA2S728-(TX)
D21	1790001240	S.DIODE	MA2S728-(TX)
D22	1790001250	S.DIODE	MA2S111-(TX)
D24	1790001260	S.DIODE	MA2S077-(TX)
D25	1790001260	S.DIODE	MA2S077-(TX)
D26	1790001250	S.DIODE	MA2S111-(TX)
D27	1790001240	S.DIODE	MA2S728-(TX)
D28	1790001250	S.DIODE	MA2S111-(TX)
D29	1790001250	S.DIODE	MA2S111-(TX)
D30	1790001260	S.DIODE	MA2S077-(TX)
D31	1790001260	S.DIODE	MA2S077-(TX)
D32	1790001260	S.DIODE	MA2S077-(TX)
D34	1790001250	S.DIODE	MA2S111-(TX)
D35	1790001240	S.DIODE	MA2S728-(TX)
D36	1790001240	S.DIODE	MA2S728-(TX)
D37	1790001260	S.DIODE	MA2S077-(TX)
D38	1790001260	S.DIODE	MA2S077-(TX)
D39	1790001260	S.DIODE	MA2S077-(TX)
D42	1790001250	S.DIODE	MA2S111-(TX)
D43	1790001250	S.DIODE	MA2S111-(TX)
D44	1790001030	S.DIODE	SB30-03P-TD
D46	1790001240	S.DIODE	MA2S728-(TX)
D47	1790001240	S.DIODE	MA2S728-(TX)
D48	1790001240	S.DIODE	MA2S728-(TX)
D49	1790001250	S.DIODE	MA2S111-(TX)
D50	1790001240	S.DIODE	MA2S728-(TX)
X1	6050008730	XTAL	CR-456 (12.8 MHz)
L1	6200004380	S.COIL	LL1608-F18NK
L3	6200004380	S.COIL	LL1608-F18NK
L4	6200004380	S.COIL	LL1608-F18NK
L5	6200002100	S.COIL	LQN 1A 17NJ04
L6	6200002100	S.COIL	LQN 1A 17NJ04
L7	6200004680	S.COIL	LL1608-F8N2K
L8	6200004410	S.COIL	LL1608-F27NK
L9	6200002100	S.COIL	LQN 1A 17NJ04
L10	6200002340	S.COIL	LQN 1A 23NJ04
L11	6200002340	S.COIL	LQN 1A 23NJ04
L12	6200002100	S.COIL	LQN 1A 17NJ04
L13	6200002830	S.COIL	LQN 1A 84NJ04
L14	6200002820	S.COIL	LQN 1A 47NJ04
L15	6200002390	S.COIL	LQN 1A 64NJ04
L16	6200002820	S.COIL	LQN 1A 47NJ04
L17	6200004460	S.COIL	MLF1608D 82NM-T
L18	6200004460	S.COIL	MLF1608D 82NM-T
L19	6200004430	S.COIL	LL1608-F56NK
L20	6200002100	S.COIL	LQN 1A 17NJ04
L21	6200002820	S.COIL	LQN 1A 47NJ04
L22	6200002820	S.COIL	LQN 1A 47NJ04
L23	6200002820	S.COIL	LQN 1A 47NJ04
L24	6200004480	S.COIL	MLF1608D R82K-T
L25	6200004480	S.COIL	MLF1608D R82K-T
L26	6200004380	S.COIL	LL1608-F18NK
L27	6200004490	S.COIL	LL1608-F39NK
L30	6200004480	S.COIL	MLF1608D R82K-T
L31	6200004460	S.COIL	MLF1608D 82NM-T
L32	6200004470	S.COIL	MLF1608D R12K-T
L34	6200004600	S.COIL	MLF1608D R15K-T
L35	6200004370	S.COIL	LL1608-F15NK
L36	6200002100	S.COIL	LQN 1A 17NJ04
L37	6200003550	S.COIL	MLF1608A 4R7K-T
R1	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R2	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R4	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)

S.=Surface mount

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R5	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R6	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R10	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R11	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R14	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R15	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R16	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R17	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R18	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R19	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R20	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R21	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R22	7030003230	S.RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R23	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R24	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R25	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R29	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R32	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R33	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R34	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R35	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R36	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R37	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R38	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R39	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R40	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R41	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R42	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R43	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R44	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R45	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R47	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R49	7310003580	S.TRIMMER	EVM-1XSX50 B15 (104)
R50	7310003580	S.TRIMMER	EVM-1XSX50 B15 (104)
R51	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R52	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R53	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R54	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R55	7030005670	S.RESISTOR	RR0816R-393-D (39 kΩ)
R56	7030000330	S.RESISTOR	MCR10EZHJ 390 Ω (391)
R58	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R59	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R60	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R62	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R64	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R66	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R67	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R68	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R69	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R70	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R71	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R72	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R73	7030003230	S.RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R74	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R75	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R76	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R77	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R78	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R79	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R80	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R83	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R84	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R85	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R86	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R87	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R88	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R90	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R91	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R93	7510000940	S.THERMISTOR	TBPS1R473K475H5Q
R94	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R95	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R96	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R101	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R102	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R103	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R104	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R105	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R106	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R108	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R109	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R110	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R111	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R112	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R113	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R114	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R115	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R116	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R118	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R119	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R120	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R121	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R122	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R123	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R125	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R126	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
C1	4550006160	S.TANTALUM	ECST1CY155R
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4550006360	S.TANTALUM	ECST1VY104R
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006970	S.CERAMIC	C1608 CH 1H 060D-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
C13	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C19	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C20	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006860	S.CERAMIC	C1608 JB 1H 102K-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	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C28	4030009910	S.CERAMIC	C1608 CH 1H 040B-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	4550006140	S.TANTALUM	ECST1EY474R
C33	4550006080	S.TANTALUM	TEMSVB2 1C 106M-8L
C34	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C35	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C38	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C39	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C40	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C41	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C43	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C44	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C45	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C46	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C47	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C48	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C49	4030007150	S.CERAMIC	C1608 CH 1H 151J-T-A
C50	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C51	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C53	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C54	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C55	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C56	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C57	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C58	4030009650	S.CERAMIC	C1608 CH 1H 240J-T-A

S.=Surface mount

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C59	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C60	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C61	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C62	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C63	4610001910	S.TRIMMER	CTZ3E-10A-W1
C64	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C65	4550006190	S.TANTALUM	ECST0GY106R
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C69	4550006190	S.TANTALUM	ECST0GY106R
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4550006220	S.TANTALUM	TEMSVA 0J 156M-8L
C74	4550006220	S.TANTALUM	TEMSVA 0J 156M-8L
C75	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C76	4550006220	S.TANTALUM	TEMSVA 0J 156M-8L
C77	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C79	4550006121	S.TANTALUM	TEMSVA 0G 226M-8R
C80	4550006121	S.TANTALUM	TEMSVA 0G 226M-8R
C81	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C82	4550006190	S.TANTALUM	ECST0GY106R
C85	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C94	4550006150	S.TANTALUM	ECST1CY105R
C95	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C98	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C99	4550006080	S.TANTALUM	TEMSVB2 1C 106M-8L
C100	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C101	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C102	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C103	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C104	4550006360	S.TANTALUM	ECST1VY104R
C105	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C106	4550006340	S.TANTALUM	ECST1AY335R
C108	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C109	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C110	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C111	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C112	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C113	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C114	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C115	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C117	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C118	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C119	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C120	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C121	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C122	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C123	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C124	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C125	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C126	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C128	4550006080	S.TANTALUM	TEMSVB2 1C 106M-8L
C129	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C130	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C132	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C133	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C134	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C135	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C136	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C137	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C138	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C139	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C140	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C141	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C142	4550006150	S.TANTALUM	ECST1CY105R
C144	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C146	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C147	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C148	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C149	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A

[1F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C153	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C170	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C171	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C172	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C173	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C174	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C175	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C176	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C177	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C178	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C180	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C182	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C183	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C185	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C186	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C187	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C188	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C189	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C190	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C191	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C192	4510005610	ELECTROLITIC	ECA 0JG 101X
C193	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C197	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C201	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6450000130	CONNECTOR	HSJ1102-01-540
J2	6450001060	CONNECTOR	HSJ1493-01-010
J3	6450000870	CONNECTOR	HEC2711-01-020
J4	6510017630	S.CONNECTOR	53264-0690
J5	6510017630	S.CONNECTOR	53264-0690
J6	6510017630	S.CONNECTOR	53264-0690
J7	6510017610	S.CONNECTOR	53264-2290
W2	7120000380	JUMPER	JPW 01 R-01
W3	7030003860	S.JUMPER	ERJ3GE JPW V
W4	7030003860	S.JUMPER	ERJ3GE JPW V
W5	7030003860	S.JUMPER	ERJ3GE JPW V
W6	7030003860	S.JUMPER	ERJ3GE JPW V
W7	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910045080	PCB	B 4566

S.=Surface mount

[V VCO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530003260	S.TRANSISTOR	2SC5006-T1
Q2	1530003260	S.TRANSISTOR	2SC5006-T1
Q3	1530003260	S.TRANSISTOR	2SC5006-T1
D1	1790001290	S.VARICAP	MA304(TX)
D2	1790001260	S.DIODE	MA2S077-(TX)
L1	6200004480	S.COIL	MLF1608D R82K-T
L2	6110003100	COIL	LA-499
L3	6200004460	S.COIL	MLF1608D 82NM-T
R1	7030006050	S.RESISTOR	RR0510P-181-D (180 Ω)
R2	7030006030	S.RESISTOR	RR0510P-822-D (8.2 kΩ)
R3	7030005700	S.RESISTOR	ERJ2GEJ 274 X (270 kΩ)
R4	7030005810	S.RESISTOR	RR0510P-152-D (1.5 kΩ)
R5	7030005780	S.RESISTOR	RR0510P-221-D (220 Ω)
R6	7030005110	S.RESISTOR	ERJ2GEJ 224 X (220 kΩ)
R7	7030005760	S.RESISTOR	RR0510R-680-D (68 Ω)
R8	7030006030	S.RESISTOR	RR0510P-822-D (8.2 kΩ)
R9	7030005880	S.RESISTOR	RR0510R-820-D (82 Ω)
R10	7030005840	S.RESISTOR	RR0510R-473-D (47 kΩ)
R11	7030005770	S.RESISTOR	RR0510P-101-D (100 Ω)
R13	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R14	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R15	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R16	7030005760	S.RESISTOR	RR0510R-680-D (68 Ω)
C1	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030009550	S.CERAMIC	C1608 CH 1H 2R5B-T-A
C5	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C6	4030009550	S.CERAMIC	C1608 CH 1H 2R5B-T-A
C7	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C8	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C9	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C10	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C11	4030009670	S.CERAMIC	C1005 CH 1E 010C-T-A
C12	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C13	4030009830	S.CERAMIC	C1005 CH 1E 180J-T-A
C14	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C15	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
J1	6910008020	CONNECTOR	IPS-1323
J2	6910008020	CONNECTOR	IPS-1323
J3	6910008020	CONNECTOR	IPS-1323
J4	6910008020	CONNECTOR	IPS-1323
J5	6910008020	CONNECTOR	IPS-1323
J6	6910008020	CONNECTOR	IPS-1323
EP1	0910045140	PCB	B 4571

[U VCO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530003260	S.TRANSISTOR	2SC5006-T1
Q2	1530003260	S.TRANSISTOR	2SC5006-T1
Q3	1530003260	S.TRANSISTOR	2SC5006-T1
D2	1790001310	S.VARICAP	1SV270(TPH3)
D3	1790001260	S.DIODE	MA2S077-(TX)
L1	6200001520	S.COIL	MLF2012D R82K-T
L2	6110003100	COIL	LA-499
L3	6200004400	S.COIL	LL1608-F47NK
R1	7030006020	S.RESISTOR	RR0510P-682-D (6.8 kΩ)
R2	7030005880	S.RESISTOR	RR0510R-820-D (82 Ω)
R4	7030005810	S.RESISTOR	RR0510P-152-D (1.5 kΩ)
R5	7030005780	S.RESISTOR	RR0510P-221-D (220 Ω)
R6	7030006030	S.RESISTOR	RR0510P-822-D (8.2 kΩ)
R7	7030005880	S.RESISTOR	RR0510R-820-D (82 Ω)
R8	7030005850	S.RESISTOR	RR0510R-563-D (56 kΩ)
R9	7030005760	S.RESISTOR	RR0510R-680-D (68 Ω)
R11	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R12	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R13	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R14	7030005760	S.RESISTOR	RR0510R-680-D (68 Ω)
R15	7030005110	S.RESISTOR	ERJ2GEJ 224 X (220 kΩ)
R16	7030005770	S.RESISTOR	RR0510P-101-D (100 Ω)
C1	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C2	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C6	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C7	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C8	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C9	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C10	4030009890	S.CERAMIC	C1005 CH 1E 020C-T-A
C11	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C12	4030009730	S.CERAMIC	C1005 CH 1E 090D-T-A
C13	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
J1	6910008020	CONNECTOR	IPS-1323
J2	6910008020	CONNECTOR	IPS-1323
J3	6910008020	CONNECTOR	IPS-1323
EP1	0910045150	PCB	B 4572

S.=Surface mount

[V VCO 2F BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530003260	S.TRANSISTOR	2SC5006-T1
Q2	1530003260	S.TRANSISTOR	2SC5006-T1
L2	6200004410	S.COIL	LL1608-F27NK
L3	6200004370	S.COIL	LL1608-F15NK
L4	6200004390	S.COIL	LL1608-F22NK
L6	6200004420	S.COIL	LL1608-F33NK
L7	6200004410	S.COIL	LL1608-F27NK
R1	7030006290	S.RESISTOR	RR0510R-333-D (33 kΩ)
R2	7030005950	S.RESISTOR	RR0510R-123-D (12 kΩ)
R3	7030006280	S.RESISTOR	RR0510R-330-D (33 Ω)
R4	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R5	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R6	7030005740	S.RESISTOR	RR0510R-150-D (15 Ω)
R8	7030005780	S.RESISTOR	RR0510P-221-D (220 Ω)
R9	7030006290	S.RESISTOR	RR0510R-333-D (33 kΩ)
R11	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
C1	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030009690	S.CERAMIC	C1005 CH 1E 030C-T-A
C4	4030010380	S.CERAMIC	C1005 CH 1E 820J-T-A
C5	4030009840	S.CERAMIC	C1005 CH 1E 060D-T-A
C6	4030009740	S.CERAMIC	C1005 CH 1E 100D-T-A
C7	4030009690	S.CERAMIC	C1005 CH 1E 030C-T-A
C8	4030009760	S.CERAMIC	C1005 CH 1E 150J-T-A
C9	4030009670	S.CERAMIC	C1005 CH 1E 010C-T-A
C10	4030009720	S.CERAMIC	C1005 CH 1E 080D-T-A
C11	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C12	4030009810	S.CERAMIC	C1005 JB 1E 102K-T-A
C13	4030009690	S.CERAMIC	C1005 CH 1E 030C-T-A
C14	4030009840	S.CERAMIC	C1005 CH 1E 060D-T-A
C15	4030009790	S.CERAMIC	C1005 CH 1E 330J-T-A
J1	6910008020	CONNECTOR	IPS-1323
J2	6910008020	CONNECTOR	IPS-1323
J3	6910008020	CONNECTOR	IPS-1323
J4	6910008020	CONNECTOR	IPS-1323
EP1	0910045100	PCB	B 4568

[2F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110003570	S.IC	MC3372VMEL
IC2	1110003570	S.IC	MC3372VMEL
IC3	1110003370	S.IC	μPC2748T-E3
IC4	1110003370	S.IC	μPC2748T-E3
IC5	1130007570	S.IC	BU4094BCFV-EZ
IC6	1110002420	S.IC	NJM2073M(T1)
IC7	1110003370	S.IC	μPC2748T-E3
Q1	1530003220	S.TRANSISTOR	2SC4406-4-TR
Q2	1590001690	S.TRANSISTOR	UN9115(TX)
Q4	1590002080	S.TRANSISTOR	UN9117(TX)
Q5	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q6	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q7	1590001140	S.TRANSISTOR	UN9210(TX)
Q8	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q9	1590001140	S.TRANSISTOR	UN9210(TX)
Q10	1530003220	S.TRANSISTOR	2SC4406-4-TR
Q12	1590001690	S.TRANSISTOR	UN9115(TX)
Q13	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q14	1590001690	S.TRANSISTOR	UN9115(TX)
Q15	1590002080	S.TRANSISTOR	UN9117(TX)
Q16	1590002080	S.TRANSISTOR	UN9117(TX)
Q17	1590001690	S.TRANSISTOR	UN9115(TX)
Q18	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q19	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q20	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q21	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q22	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q23	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q24	1560000540	S.FET	2SK880-Y (TE85R)
Q25	1590001860	S.TRANSISTOR	UN9215(TX)
Q27	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q30	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q31	1520000650	S.TRANSISTOR	2SB1201-S-TL
Q32	1590001860	S.TRANSISTOR	UN9215(TX)
D1	1790000490	S.DIODE	HSM88AS-TR
D3	1790001260	S.DIODE	MA2S077-(TX)
D4	1790001260	S.DIODE	MA2S077-(TX)
D5	1790001250	S.DIODE	MA2S111-(TX)
D6	1790001260	S.DIODE	MA2S077-(TX)
D7	1790001260	S.DIODE	MA2S077-(TX)
D8	1790001260	S.DIODE	MA2S077-(TX)
D10	1750000350	S.VARICAP	1SV252(TE85R)
D11	1790001260	S.DIODE	MA2S077-(TX)
D12	1790001290	S.VARICAP	MA304(TX)
D13	1790001290	S.VARICAP	MA304(TX)
D14	1790001260	S.DIODE	MA2S077-(TX)
D15	1790001290	S.VARICAP	MA304(TX)
D16	1790001260	S.DIODE	MA2S077-(TX)
D17	1790001250	S.DIODE	MA2S111-(TX)
D18	1790001260	S.DIODE	MA2S077-(TX)
D19	1790001240	S.DIODE	MA2S728-(TX)
D20	1790001030	S.DIODE	SB30-03P-TD
D21	1750000130	S.DIODE	DA204U T107
D22	1790000670	S.DIODE	SB07-03C-TA
D25	1790000490	S.DIODE	HSM88AS-TR
D27	1790001260	S.DIODE	MA2S077-(TX)
D28	1790001250	S.DIODE	MA2S111-(TX)
D29	1790001250	S.DIODE	MA2S111-(TX)
D30	1790001260	S.DIODE	MA2S077-(TX)
D31	1790000980	S.DIODE	MA742(TX)
D32	1790001260	S.DIODE	MA2S077-(TX)
D33	1790001260	S.DIODE	MA2S077-(TX)
D34	1790001260	S.DIODE	MA2S077-(TX)
FI1	2020001050	S.CERAMIC	SFPC455E-TC01
FI2	2010001640	FILTER	FL-203 (35.800MHz)
FI3	2020001050	S.CERAMIC	SFPC455E-TC01
FI4	2010001780	MONOLITHIC	FL-219 (43.100MHz)
X1	6070000080	DISCRIMINATOR	CDBM455C16

S.=Surface mount

[2F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
X2	6050008880	XTAL	CR-458 (35.345106MHz)
X3	6070000080	DISCRIMINATOR	CDBM455C16
X4	6050008400	XTAL	CR-419 (42.645MHz)
L1	6200002710	S.COIL	ELJFC 1R8K-F
L2	6200002240	S.COIL	ELJFC 2R2K-F
L3	6200004350	S.COIL	LL1608-F10NK
L4	6200004350	S.COIL	LL1608-F10NK
L5	6200004390	S.COIL	LL1608-F22NK
L6	6200004380	S.COIL	LL1608-F18NK
L7	6200002710	S.COIL	ELJFC 1R8K-F
L8	6130002800	S.COIL	LB-320
L9	6130002810	S.COIL	LB-321
L10	6150004340	S.COIL	LS-490
L13	6200004380	S.COIL	LL1608-F18NK
L15	6200004370	S.COIL	LL1608-F15NK
L16	6200004390	S.COIL	LL1608-F22NK
L17	6200004380	S.COIL	LL1608-F18NK
L18	6200004660	S.COIL	MLF1608A 1R8K-T
L19	6200004940	S.COIL	MLF1608D R27K-T
R1	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R2	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R4	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R5	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R7	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R8	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R9	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R10	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R11	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R12	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R13	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R14	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R15	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R16	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R17	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R18	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R19	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R20	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R22	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R23	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R24	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R25	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R26	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R27	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R28	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R30	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R31	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R32	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R33	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R35	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R36	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R38	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R39	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R40	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R41	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R42	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R43	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R45	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R46	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R47	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R48	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R49	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R50	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R51	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R52	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R53	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R54	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R55	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R56	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R57	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R58	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R59	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)

[2F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R60	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R61	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R62	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R63	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R64	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R65	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R66	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R67	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R68	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R69	7030003280	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R70	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R71	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R73	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R74	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R75	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R76	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R77	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R78	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R79	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R80	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R81	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R83	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R84	7030000180	S.RESISTOR	MCR10EZHJ 22 Ω (220)
R85	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R86	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R87	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R88	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R89	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R90	7030003830	S.RESISTOR	ERJ3GEYJ 185 V (1.8 MΩ)
R91	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R92	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R94	7030005330	S.RESISTOR	RR0816P-562-D (5.6 kΩ)
R95	7030005320	S.RESISTOR	RR0816P-103-D (10 kΩ)
R96	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R97	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R98	7030000200	S.RESISTOR	MCR10EZHJ 33 Ω (330)
R104	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R105	7030000180	S.RESISTOR	MCR10EZHJ 22 Ω (220)
R109	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R110	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R111	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R112	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R113	7030005330	S.RESISTOR	RR0816P-562-D (5.6 kΩ)
R114	7030005330	S.RESISTOR	RR0816P-562-D (5.6 kΩ)
R115	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R117	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R118	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R119	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R120	7030000200	S.RESISTOR	MCR10EZHJ 33 Ω (330)
R121	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R122	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R123	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R124	7030000200	S.RESISTOR	MCR10EZHJ 33 Ω (330)
R125	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
C1	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C2	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C3	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C4	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C8	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C9	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C10	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C11	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C12	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C13	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C17	4030006990	S.CERAMIC	C1608 CH 1H 080D-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	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A

S.=Surface mount

[2F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030007060	S.CERAMIC	C1608 CH 1H 270J-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	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C33	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C34	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C35	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C36	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C37	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C38	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C39	4030006860	S.CERAMIC	C1608 JB 1H 102K-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	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C44	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C45	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C46	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C47	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C48	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C49	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C50	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C52	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C53	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C54	4030008920	S.CERAMIC	C1608 JB 1C 473K-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
C61	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C62	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C63	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C64	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C65	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C66	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C67	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C68	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C69	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030009920	S.CERAMIC	C1608 CH 1H 050B-T-A
C74	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C75	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C76	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C77	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C78	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C81	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C82	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C83	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C84	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C85	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C88	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C89	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C91	4550006190	S.TANTALUM	ECST0GY106R
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4550006190	S.TANTALUM	ECST0GY106R
C94	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C95	4550006121	S.TANTALUM	TEMSVA 0G 226M-8R
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C98	4550006320	S.TANTALUM	ECST0JY475R
C99	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C100	4550006320	S.TANTALUM	ECST0JY475R
C101	4550006590	S.TANTALUM	ECST1CY684R
C102	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A

[2F UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C103	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C105	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C106	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C107	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C108	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C109	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C110	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C111	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C112	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C113	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C114	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C115	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C116	4550006121	S.TANTALUM	TEMSVA 0G 226M-8R
C117	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C118	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C122	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C123	4510005320	S.ELECTROLITIC	ECEV0JA101SP
C124	4510005320	S.ELECTROLITIC	ECEV0JA101SP
C125	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C126	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C127	4550006170	S.TANTALUM	ECST1AY225R
C128	4550006170	S.TANTALUM	ECST1AY225R
C129	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C130	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C131	4510005320	S.ELECTROLITIC	ECEV0JA101SP
C132	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C133	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C134	4550006600	S.TANTALUM	ECST0JY335R
C135	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C142	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C144	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C145	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C146	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C148	4030009530	S.CERAMIC	C1608 CH 1H 030B-T-A
C149	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C150	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C151	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C152	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C153	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C154	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C155	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C156	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C157	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C158	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C159	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C160	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C161	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C162	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C163	4030009910	S.CERAMIC	C1608 CH 1H 040B-T-A
C164	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C165	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C166	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C167	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C168	4510005310	S.ELECTROLITIC	ECEV1CA220SR
C169	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C170	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C171	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C172	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C173	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C174	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C175	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C176	4030008770	S.CERAMIC	C1608 JB 1H 562K-T-A
J1	6510018180	S.CONNECTOR	52365-0690
J2	6510018180	S.CONNECTOR	52365-0690
J3	6510018180	S.CONNECTOR	52365-0690
J4	6510017940	S.CONNECTOR	IL-FPR-U38S-HF-E3000
J5	6510017620	S.CONNECTOR	52357-2290
W1	7030003860	S.JUMPER	ERJ3GE JPW V
W2	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910045092	PCB	B 4567B

S.=Surface mount

[V VR BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
S1	7600000170	ENCODER	TP98D98E 20-15FB10K-1460
EP1	0910045111	PCB	B 4589A

[U VR BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
S1	7600000170	ENCODER	TP98D98E 20-15FB10K-1460
EP1	0910045131	PCB	B 4570A

[UHF RF-A BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC7	1110003370	S.IC	μPC2748T-E3
Q32	1530002900	S.TRANSISTOR	2SC4228-T2
D1	1790001260	S.DIODE	MA2S077-(TX)
FI5	2040000750	S.FILTER	HWCK002 (435MHz) [except USA]
	2040000750	S.FILTER	HWCK001 (445MHz) [USA]
FI6	2040000750	S.FILTER	HWCK002 (435MHz) [except USA]
	2040000750	S.FILTER	HWCK001 (445MHz) [USA]
L11	6200002340	S.COIL	LQN 1A 23NJ04
L12	6200002350	S.COIL	LQN 1A 27NJ04
R99	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R100	7030003230	S.RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R101	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R102	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R103	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R116	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C136	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C137	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C138	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C139	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C140	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C154	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
J1	6910008020	CONNECTOR	IPS-1323
J2	6910008020	CONNECTOR	IPS-1323
J3	6910008020	CONNECTOR	IPS-1323
J4	6910008020	CONNECTOR	IPS-1323
EP1	0910046160	PCB	B 4655

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140005380	S.IC	HD404639B04FS
IC2	1130007110	S.IC	TC7W04FU(TE12L)
IC3	1140004620	S.IC	X24C16S8-2.7
IC4	1130007560	S.IC	LC73881M-TLM
IC5	1130006220	S.IC	TC4W53FU (TE12L)
IC6	1180001240	S.IC	S-81335HG-KI-T1
IC7	1110003380	S.IC	S-80730SL-AT-T1
IC8	1130003760	S.IC	TC4S81F (TE85R)
IC9	1130007570	S.IC	BU4094BCFV-EZ
IC10	1110003410	S.IC	μPC5023GR-043-GJG-T2
IC11	1130006220	S.IC	TC4W53FU (TE12L)
IC12	1130006220	S.IC	TC4W53FU (TE12L)
IC13	1140004440	S.IC	HD404829C02H
Q1	1590001470	S.TRANSISTOR	UN9213(TX)
Q4	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q6	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q7	1530003280	S.TRANSISTOR	2SC4211-6-TR
Q8	1590001170	S.TRANSISTOR	XP1501-(TX).AB
Q9	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q10	1590001180	S.TRANSISTOR	XP1210(TX)
Q11	1590001180	S.TRANSISTOR	XP1210(TX)
Q12	1590001180	S.TRANSISTOR	XP1210(TX)
Q13	1590001180	S.TRANSISTOR	XP1210(TX)
Q14	1590001860	S.TRANSISTOR	UN9215(TX)
Q15	1550000010	S.FET	2SJ364-Q (TX)
Q16	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q17	1590001860	S.TRANSISTOR	UN9215(TX)
Q18	1550000010	S.FET	2SJ364-Q (TX)
Q19	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q20	1540000350	S.TRANSISTOR	2SD2216-S(TX)
Q21	1540000350	S.TRANSISTOR	2SD2216-S(TX)
Q22	1540000350	S.TRANSISTOR	2SD2216-S(TX)
Q23	1540000350	S.TRANSISTOR	2SD2216-S(TX) [IC-W31E only]
Q25	1590001150	S.TRANSISTOR	UN9211(TX)
Q26	1520000430	S.TRANSISTOR	2SB1462-R(TX)
Q27	1590001130	S.TRANSISTOR	UN9110(TX)
Q28	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q29	1590002210	S.TRANSISTOR	RN4904(TE85L)
D4	1790001250	S.DIODE	MA2S111-(TX)
D6	1790001250	S.DIODE	MA2S111-(TX)
D7	1790001250	S.DIODE	MA2S111-(TX)
D8	1790001200	S.DIODE	MA8S121(TX)
D11	1750000220	S.DIODE	DA113W T107 [USA, EUR]
	1750000240	S.DIODE	DA112 T107 [UK, AUS]
	1160000050	S.DIODE	DAP202U T107 [SEA]
D12	1750000240	S.DIODE	DA112 T107 [USA, SEA, AUS, ITA]
D14	1790001250	S.DIODE	MA2S111-(TX) [except ITA]
D15	1160000050	S.DIODE	DAP202U T107 [except ITA]
D17	1790001250	S.DIODE	MA2S111-(TX) [USA]
D19	1790000990	S.ZENER	MA8051-H(TX)
D20	1790001250	S.DIODE	MA2S111-(TX)
D21	1790000840	S.DIODE	MA132WA(TX)
D22	1790000840	S.DIODE	MA132WA(TX)
D23	1790000970	S.DIODE	MA729(TX)
D25	1790001250	S.DIODE	MA2S111-(TX)
X1	6060000570	S.CERAMIC	FAR-C3CA-04000-J00-R
X2	6050009460	S.XTAL	CM200S SMD(32.768KHz)
X3	6050009020	S.CERAMIC	EFOS4194E3
X4	6060000520	S.CERAMIC	CSAC2.00MGC200-TC
R1	7030005470	S.RESISTOR	RR0816R-244-D (240 kΩ)
R2	7030005490	S.RESISTOR	RR0816R-363-D (36 kΩ)
R3	7030005330	S.RESISTOR	RR0816P-562-D (5.6 kΩ)
R4	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R5	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)

S.=Surface mount

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R8	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R10	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R12	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R13	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R18	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R19	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R20	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R21	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R22	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R23	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R24	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R25	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R26	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R27	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R28	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R29	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R30	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R31	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R32	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R33	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R34	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R35	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R36	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R37	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R38	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R39	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R40	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R41	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R42	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R43	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R44	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R45	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R46	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R47	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R49	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R50	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R51	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R52	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R53	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R54	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R55	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R56	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R57	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R58	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R59	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R61	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R62	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R63	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R64	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R65	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R66	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R67	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R68	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 kΩ)
R69	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R70	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R71	7410000750	S.ARRAY	EXB-V4V 104JV (100 kΩ)
R72	7410000580	S.ARRAY	EXB-V4V 224JV (220 kΩ) [IC-W31E only]
R73	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R74	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R75	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R76	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R77	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R78	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R79	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R80	7310003910	S.TRIMMER	MVR32HXBR N502 (5K) [IC-W31E only]
R81	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R82	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R84	7030005470	S.RESISTOR	RR0816R-244-D (240 kΩ)
R85	7030005500	S.RESISTOR	RR0816R-124-D (120 kΩ)
R86	7030005960	S.RESISTOR	RR0816R-623-D (62 kΩ)
R87	7030005510	S.RESISTOR	RR0816P-303-D (30 kΩ)
R88	7030005450	S.RESISTOR	RR0816P-153-D (15 kΩ)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R89	7030005450	S.RESISTOR	RR0816P-153-D (15 kΩ)
R90	7030005830	S.RESISTOR	RR0816R-154-D (150 kΩ)
R91	7030005830	S.RESISTOR	RR0816R-154-D (150 kΩ)
R92	7030005830	S.RESISTOR	RR0816R-154-D (150 kΩ)
R93	7410000830	S.ARRAY	EXB-V4V 103JV (10 kΩ)
R94	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R95	7310003550	S.TRIMMER	MVR32HXBR N473
R96	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R97	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ) [IC-W31E only]
R98	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R99	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R100	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R101	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R102	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R103	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R104	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R105	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R106	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R107	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R108	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R109	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R110	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R111	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R112	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R114	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R115	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R117	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R118	7410000830	S.ARRAY	EXB-V4V 103JV (10 kΩ)
R120	7410000820	S.ARRAY	EXB-V4V 223JV (22 kΩ)
R122	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R123	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R124	7410001020	S.ARRAY	EXB-V4V 152JV (1.5 kΩ)
R126	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R127	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R128	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R129	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R130	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R131	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R132	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R133	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R134	7030003680	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R135	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R136	7410000930	S.ARRAY	EXB-V4V 121JV (120 Ω)
R137	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ) [IC-W31E only]
R138	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ) [IC-W31E only]
R139	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ) [IC-W31E only]
R140	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R142	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R143	7410001060	S.ARRAY	EXB-V4V 221JV (220 Ω)
R144	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 kΩ) [IC-W31E only]
R145	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R146	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R147	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R148	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R149	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R150	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R151	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R152	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R153	7030003390	S.RESISTOR	ERJ3GEYJ 391 V (390 Ω)
R154	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
C1	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C2	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C3	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C7	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C8	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C9	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A

S.=Surface mount

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C15	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C16	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C17	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C18	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C19	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4510004640	S.ELECTROLITIC	ECEV1CA470SP
C23	4510005900	S.ELECTROLITIC	ECEV0GA101SR
C24	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C26	4550003290	S.TANTALUM	TESVA 0G 475M1-8L
C27	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C28	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C29	4510006090	S.ELECTROLITIC	ECEV0GA470SR
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C31	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C32	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C33	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C34	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C35	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C36	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C37	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C38	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C39	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C41	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C42	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C43	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C44	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C45	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C46	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C48	4550006030	S.TANTALUM	TEMSVA 0G 156M1-8L
C49	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C50	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C51	4550006030	S.TANTALUM	TEMSVA 0G 156M1-8L
C52	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C53	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C54	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C55	4030008850	S.CERAMIC	C1608 JB 1C 123K-T-A
C56	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C57	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C58	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A [IC-W31E only]
C59	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A [IC-W31E only]
C61	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C63	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C66	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C67	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C68	4550003290	S.TANTALUM	TESVA 0G 475M1-8L
C69	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C70	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C71	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C72	4030006770	S.CERAMIC	C1608 SL 1H 151J-T-A
C73	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C74	4550000270	S.TANTALUM	TESVA 1E 474M1-8L
C75	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C76	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C77	4030009970	S.CERAMIC	C1608 JB 1H 182K-T-A
C78	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C79	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C80	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C81	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C83	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C84	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C85	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C86	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C87	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C88	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C89	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C92	4550000460	S.TANTALUM	TESVA 1C 105M1-8L
C93	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C95	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C96	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C97	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C100	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C101	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C102	4550006010	S.TANTALUM	TEMSVA 0G 106M8L
C103	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C104	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C105	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
DS1	5030001140	LCD	T-535001A
DS2	5040001110	S.LED	SLM-23VMWS T97B
DS3	5040001920	S.LED	SML-110MT T86
DS4	5040001920	S.LED	SML-110MT T86
DS5	5040001920	S.LED	SML-110MT T86
DS6	5040001920	S.LED	SML-110MT T86
DS7	5010000120	S.LED	LN1371G-(TR)
DS8	5010000120	S.LED	LN1371G-(TR)
DS9	5010000120	S.LED	LN1371G-(TR)
DS10	5010000120	S.LED	LN1371G-(TR)
DS11	5010000120	S.LED	LN1371G-(TR)
DS12	5010000120	S.LED	LN1371G-(TR)
DS13	5010000120	S.LED	LN1371G-(TR)
S1	2260001680	S.SWITCH	SKQDPB
S2	2260002140	S.SWITCH	SKQLLC
S3	2260002140	S.SWITCH	SKQLLC
S4	2260002140	S.SWITCH	SKQLLC
J1	6510017680	S.CONNECTOR	IL-FPR-38S-HF-E3000
J2	6510018600	S.CONNECTOR	IL-FPR-U10S-HF-E3000
W1	7030003860	S.JUMPER	ERJ3GE JPW V
W2	7030003860	S.JUMPER	ERJ3GE JPW V
W3	9045995030	WIRE	71/98/020/X98/X98
W4	8900005810	CABLE	OPC-545 (N:38 L:105)
MC1	7700001750	MICROPHONE	EM-123TH
EP1	8930037540	LCD CONTACT	SRCN-1459 ZCC
EP2	0910045174	PCB	B 4466D

S.=Surface mount

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

7-1 CABINET PARTS

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J 1	6510015550	Connector BNC-R117	1
MP 1	8210011591	1460 Rear panel	1
MP 2	8930035520	1459 Rear plate	1
MP 3	8930033760	1460 Release plate	1
MP 4	8930033770	1460 Release button	1
MP 5	8930035131	Spring (V)-1	1
MP 6	8510009310	1460 Shield plate	1
MP 7	8610009330	Knob N225	2
MP 8	8610009341	Knob N226-1	2
MP 10	8310034261	1460 Contact base-1	1
MP 11	8930033820	1460 Contact spring	3
MP 12	8930035410	1460 Contact rubber	3
MP 13	8930033811	1460 Connector seal-1	1
MP 14	8930035030	1460 VR spacer	1
MP 15	8810004370	Screw PH B0 M2 x 10 ZK	4
MP 16	8810006760	Screw PH B0 No.0 M2 x 3 NI	2
MP 17	8810006760	Screw PH B0 No.0 M2 x 3 NI	2
MP 18	8810003850	Screw PH B0 No.0-3 M1.4x 2.5 NI	3
MP 19	8810005860	Screw PH No.0 M2 x 3 NI	1
MP 20	8810005860	Screw PH No.0 M2 x 3 NI	2
MP 21	8810005860	Screw PH No.0 M2 x 3 NI	2
MP 22	8810005360	Screw PH No.0 M2 x 3 ZK	1
MP 23	8810005320	Screw PH M2 X 4 NI FE	2
MP 24	8830000570	Nut (A)	2
MP 25	8010014982	Hole bush (B)-2	2

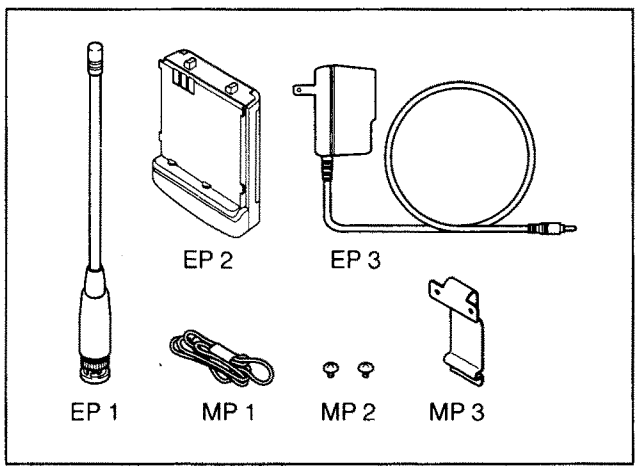
[LOGIC UNIT]

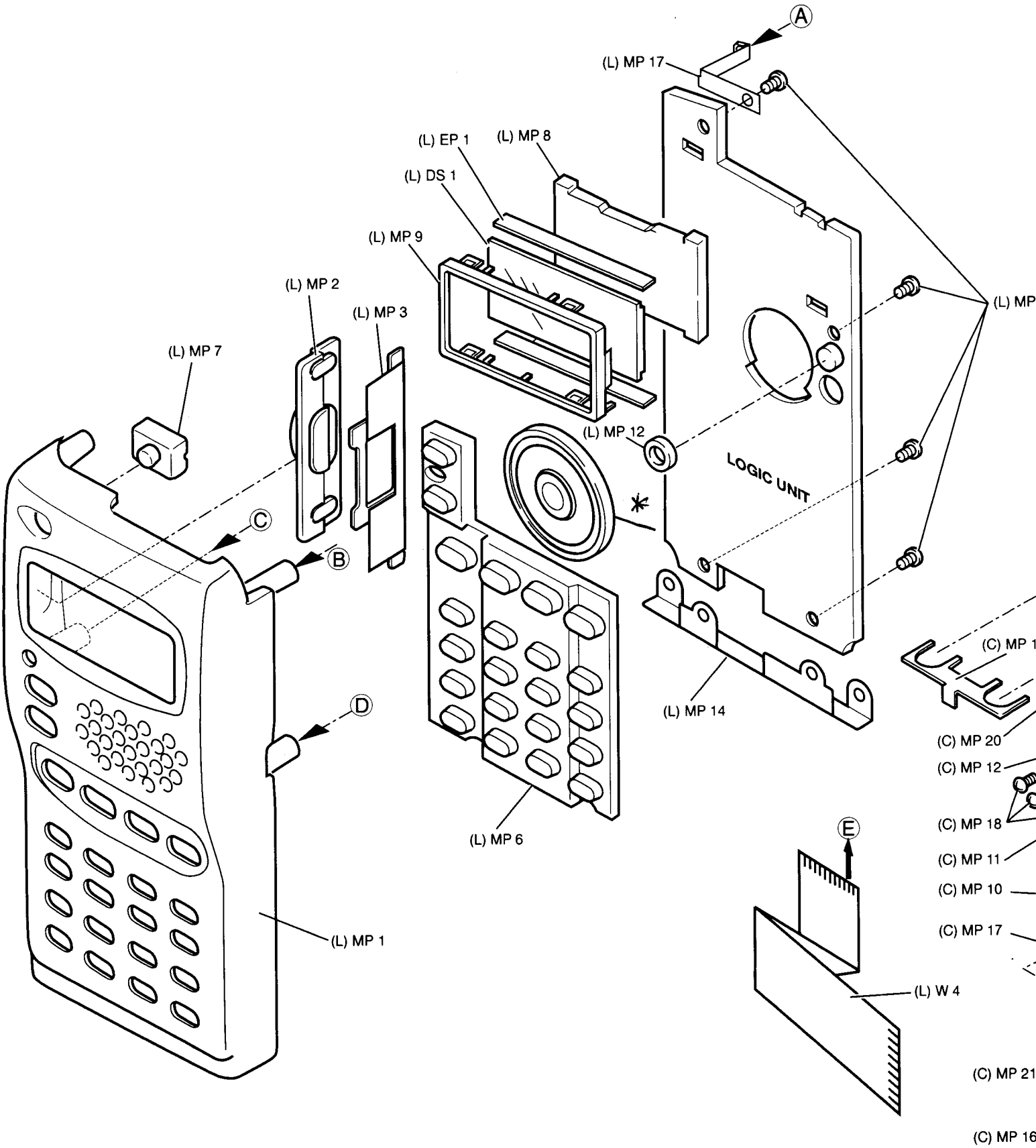
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
EP 1	8930037540	LCD contact screen SRCN-1459 ZCC	2
DS 1	5030001140	LCD T-535001A	1
MP 1	8210012891	1459 Front panel-1 W-31A (incl. MP2, 3)	1
	8210012901	1459 Front panel-1 W-31E (incl. MP2, 3)	1
MP 6	8930035431	Rubber button 1459 10 key-1	1
MP 7	8930035440	1459 Power button	1
MP 8	8210012180	1459 Reflector	1
MP 9	8930035530	1459 LCD holder	1
MP 12	8930024231	1121 Microphone seal-1	1
MP 13	8810006760	Screw No.0 B0 PH No.1 M2 x 3 NI	4
MP 14	8930036230	1459 Grouunding plate	1
MP 17	8930037480	1459 L-grounding plate	1
W 4	8900005810	Cable OPC-545 (N:38 L:105)	1
*	2510000340	SPEAKER CS-428014-12	1

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

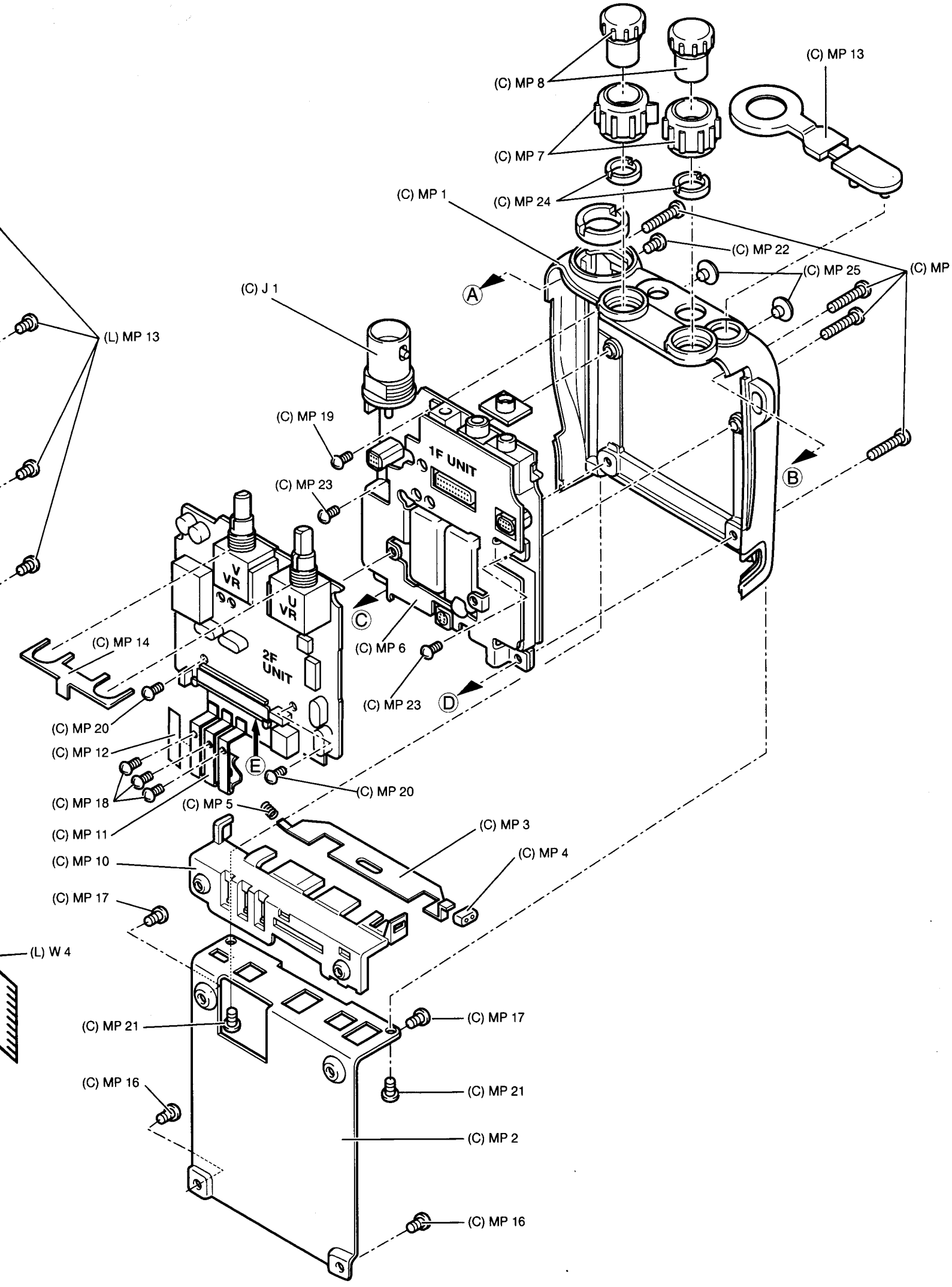
7-2 ACCESSORIES

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
EP 1	Optional products	Antenna FA-B270C (EUR, ITA, AUS, SEA)	1
		Antenna FA-1443B (USA)	1
EP 2	Optional products	Battery pack BP-171 (EUR, ITA, AUS)	1
2	Optional products	Battery case BP-170 (SEA) 1	
EP 3	Optional products	Wall charger BC-74D (EUR, ITA)	1
	Optional products	Wall charger BC-74A (USA)	1
	Optional products	Wall charger BC-110V (AUS)	1
MP 1	8010011960	Strap belt HK-005	1
MP 2	8810005730	Screw PH M3 x 3 BS ZK	2
MP 3	8930035330	752 Belt clip (A)	1





Unit abbreviations (C): CHASSIS PARTS (L): LOGIC UNIT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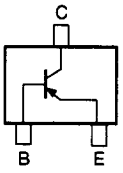
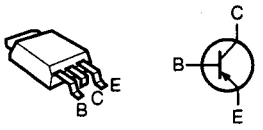
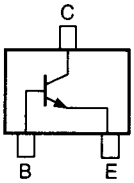
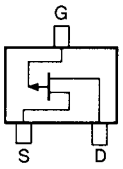
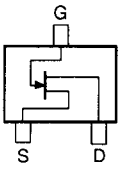
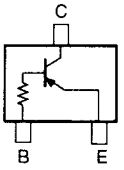
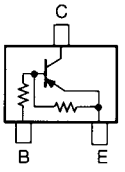
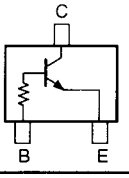
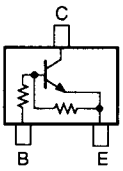
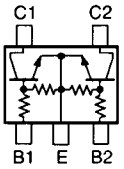
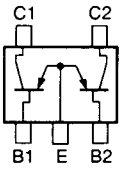
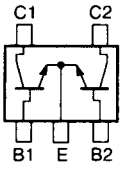
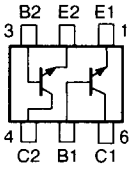
(C) MP 13
(C) MP 7
(C) MP 24
(C) MP 1
(C) MP 22
(C) MP 25
(C) MP
(C) J 1
(L) MP 13
(C) MP 19
1F UNIT
(C) MP 23
VR
VR
(C) MP 14
2F UNIT
(C) MP 6
(C) MP 23
(C) MP 20
(C) MP 12
(C) MP 18
(C) MP 20
(C) MP 5
(C) MP 3
(C) MP 4
(C) MP 11
(C) MP 10
(C) MP 17
(L) W 4
(C) MP 21
(C) MP 17
(C) MP 16
(C) MP 21
(C) MP 2
(C) MP 16
A
B
C
D
E

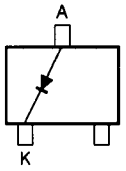
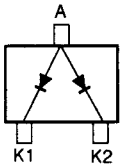
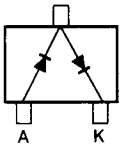
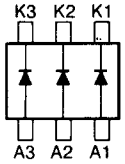
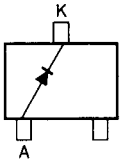
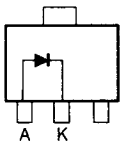
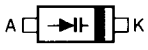
SECTION 8 SEMI-CONDUCTOR INFORMATIONS

8-1 TRANSISTORS

NAME	SYMBOL	INSIDE VIEW
2SA1588-GR 2SB1132-R 2SB1462-R	ZG BAR AR	
2SB1201	–	
2SC4211-TR 2SC4226-T2 2SC4228-T2 2SC4403-TR 2SC4406-4-TR 2SC4405-3-TR 2SC4617-TLQ 2SC5006-T1 2SD2216-S 2SD2345	L7 R25 R44 LY3 JT4 OY3 BQ 24 YS 1Z	
2SJ364Q	4M	
2SK880-Y	XY	
UN9110	6L	
UN9115 UN9117	6E 6H	
DTC144TU UN9210 UN9215	06 8L 8E	

NAME	SYMBOL	INSIDE VIEW
DTC144EU UN921E UN9211 UN9213	26 8N 8A 8C	
XP1210	AC	
XP1401	5V	
XP1501	5R	
XP6501 AB	5N	

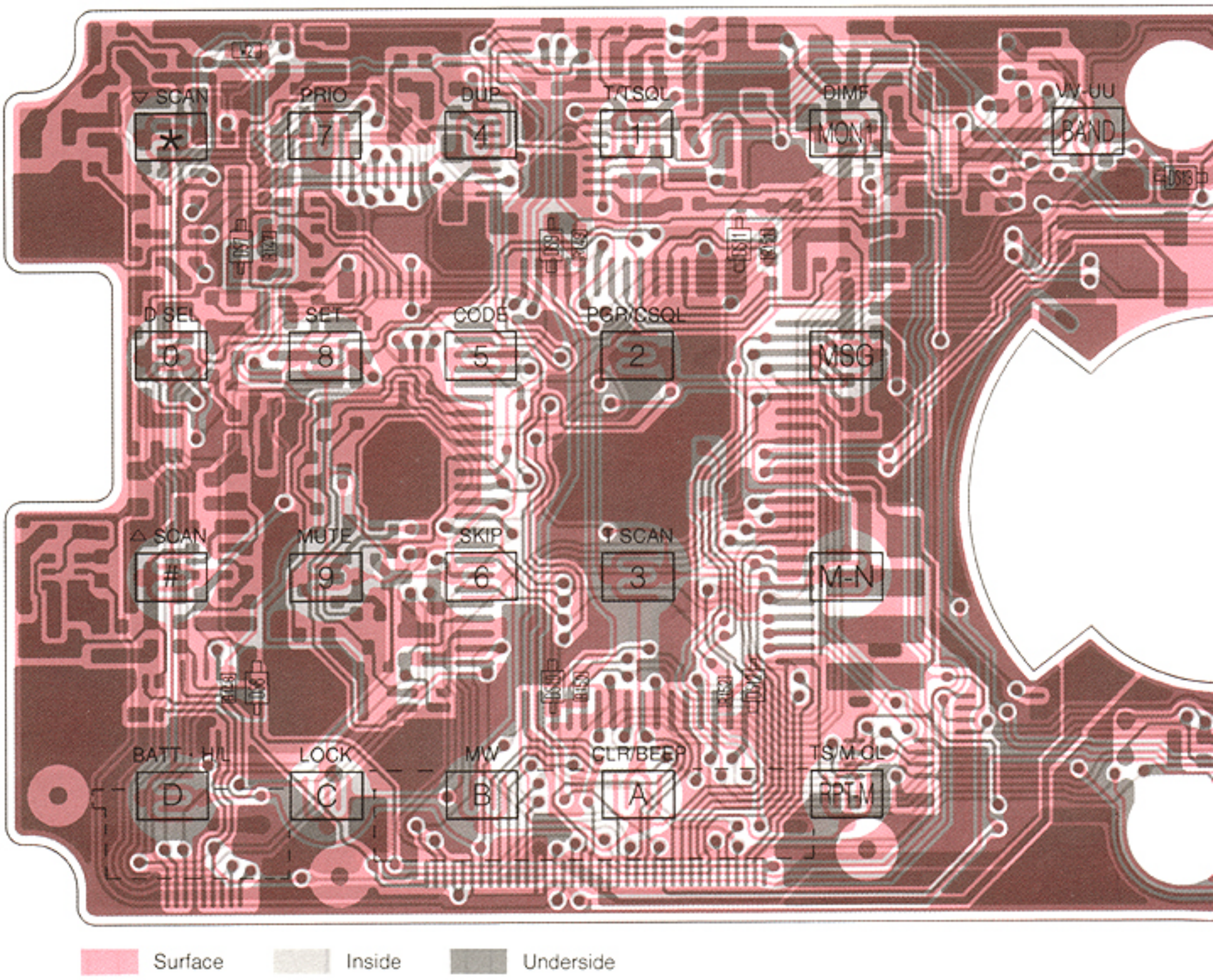
8-2 DIODES

NAME	SYMBOL	INSIDE VIEW
DA113W	AY	
DAP202U	P	
1SV252 DA204U MA133 MA742 HSM88AS	3E K MP N1V C1	
MA6S121	M2D	
SB07-03C-TA	J	
SB30-03P	SG	
1SV270 MA304	TF 7R	
MA729 MA2S111 MA2S077 MA2S728	2B A S B	

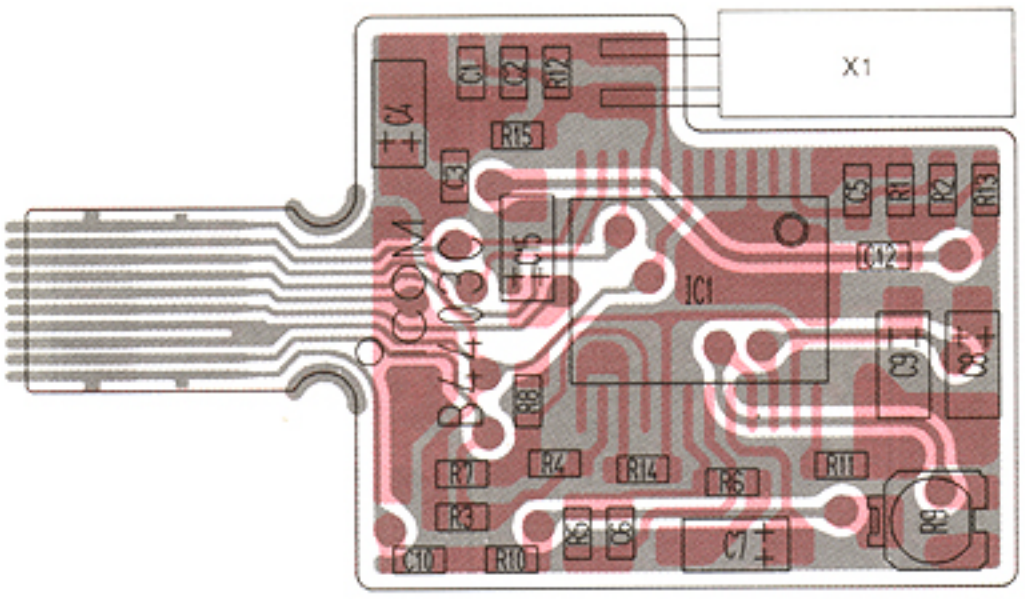
SECTION 9 BOARD LAYOUTS

9-1 LOGIC UNIT

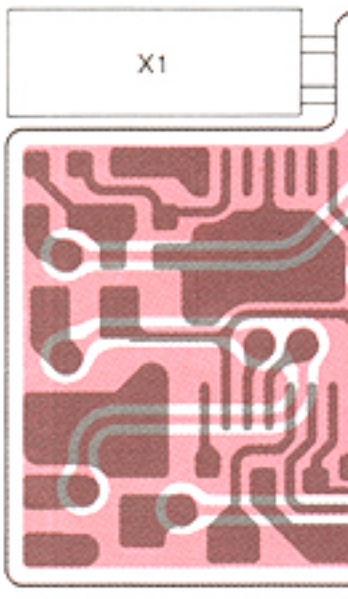
- LOGIC UNIT (TOP VIEW)

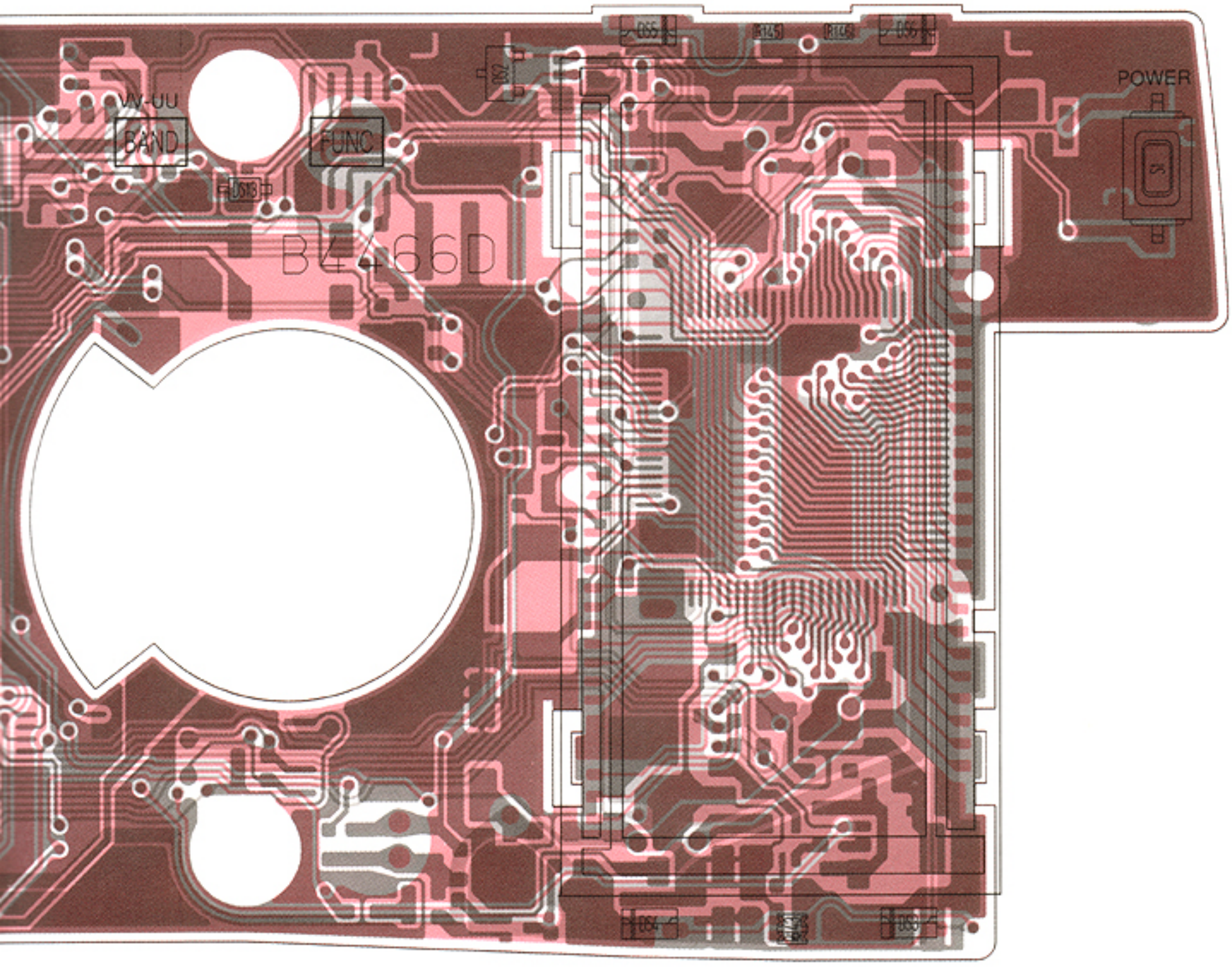


- TSQL UNIT (TOP VIEW)
  (Built-in for USA, optional for other versions.)



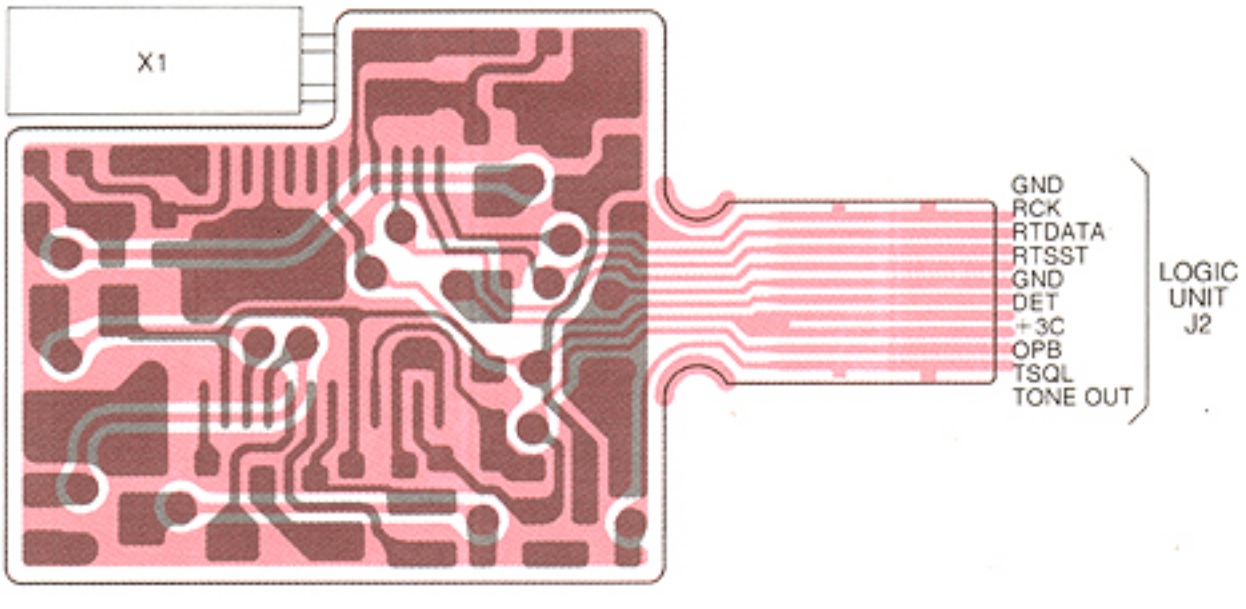
- TSQL UNIT (BOTT
  (Built-in for USA, optio



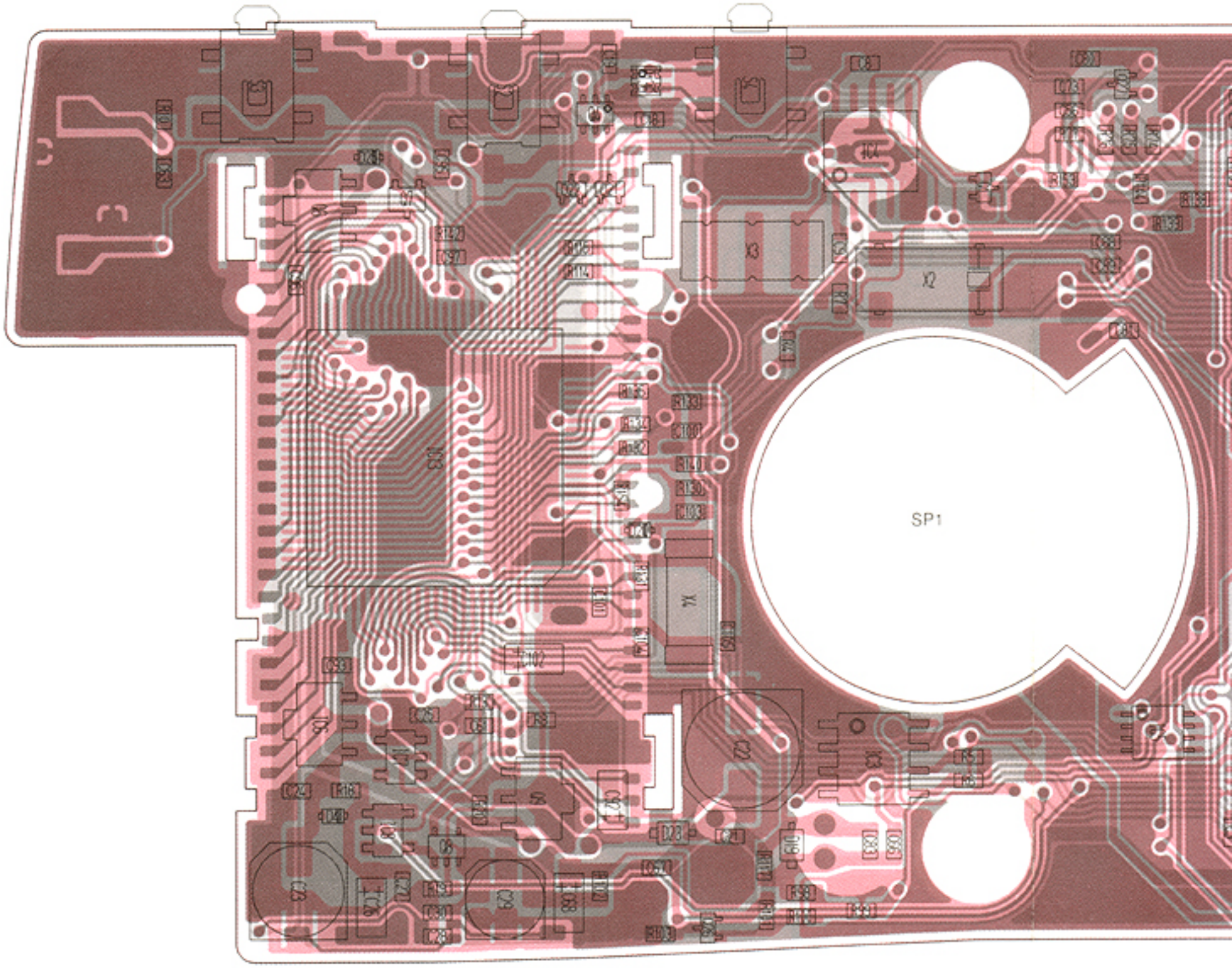


- **TSQL UNIT (BOTTOM VIEW)**

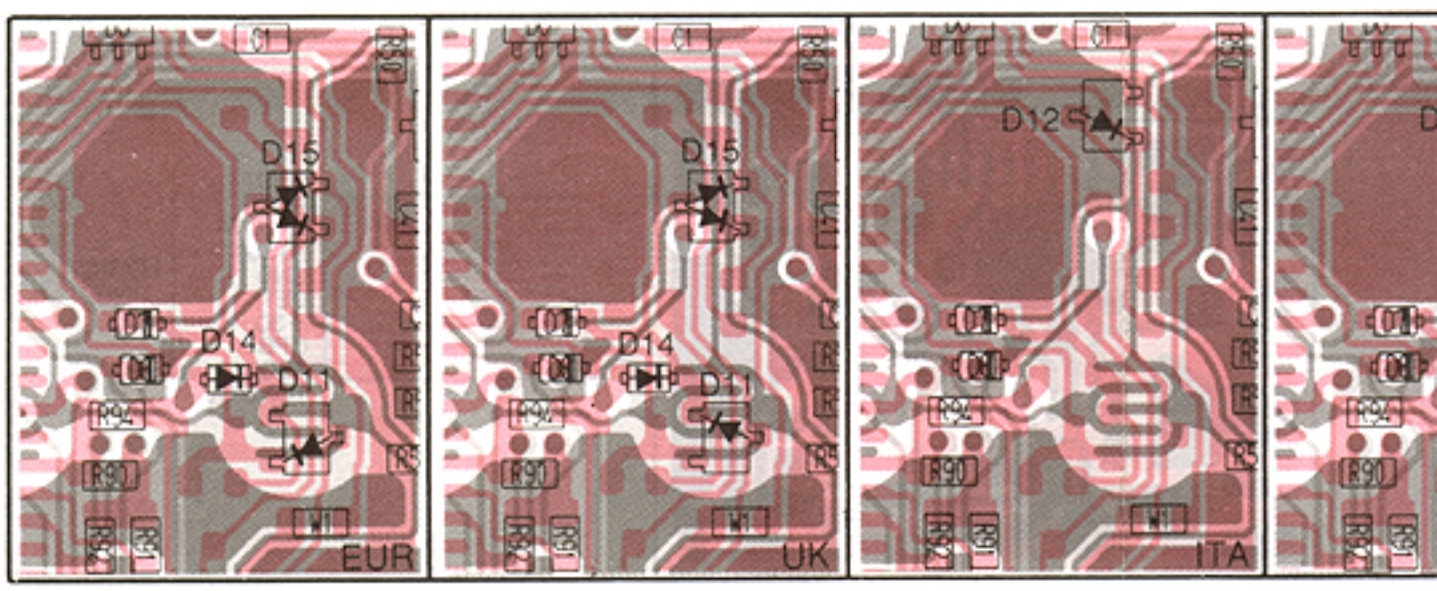
  (Built-in for USA, optional for other versions.)

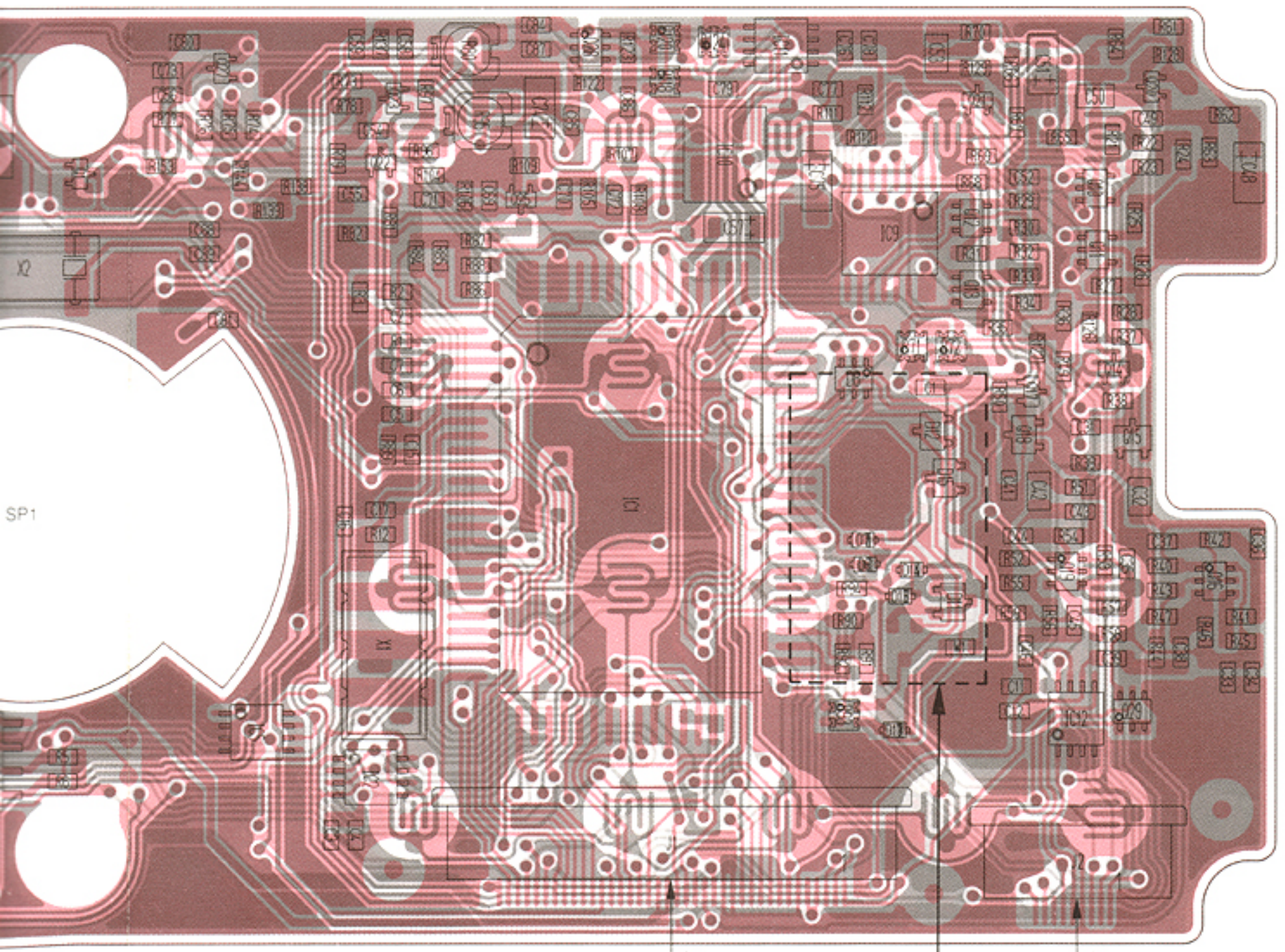


• LOGIC UNIT (BOTTOM VIEW)



LDET
LSD
LBUSY
RCK
RDATA
RIOST
LPLST
LCK
LDATA
LIOST
REMOTE
EXTMIC
LTXC
HDCK



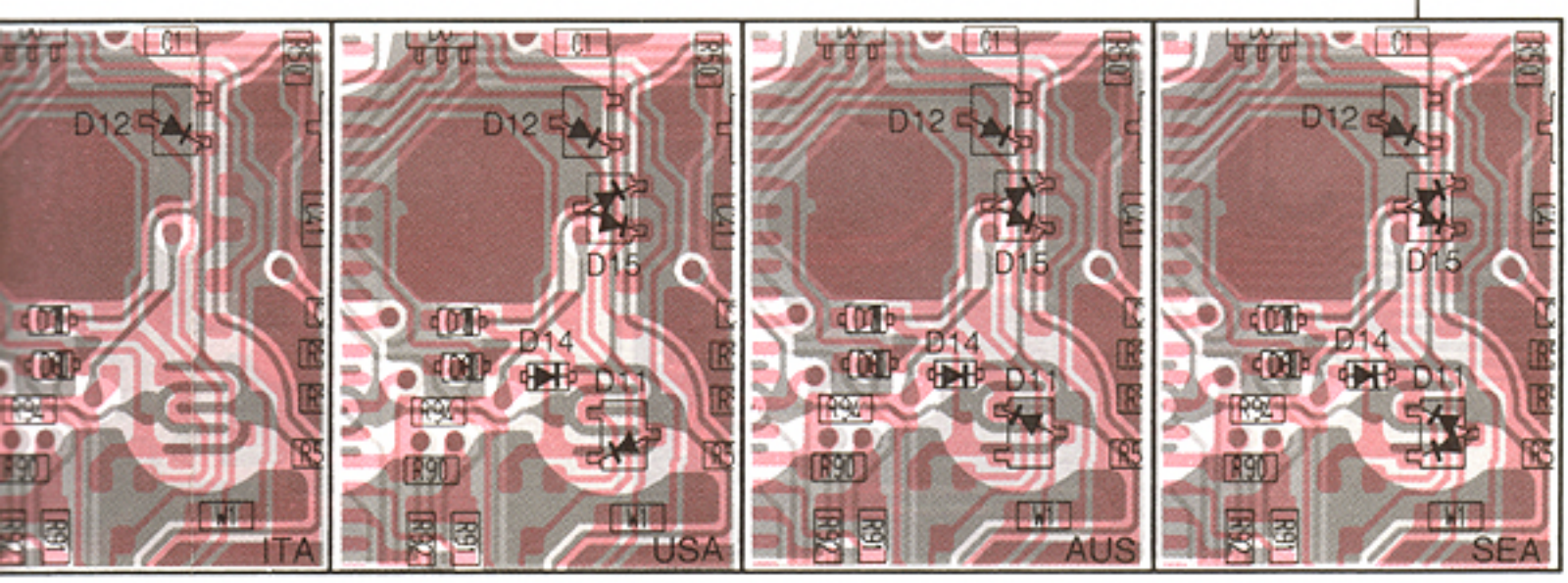


LSD	LBUSY	RCK	RDATA	RIOST	LPLST	LCK	LDATA	LIOST	REMOTE	EXTMIC	LTXC	HDCK	HDUP	HTXC	MOD	SPG	SPG	LUL	HUL	+3C	OUTAF	VCC	GND	GND	HPLST	HCK	HDATA	LDUP	LDCK	AFON	GND	INSP	INSP	HBUSY	HSD	HDET
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37

2F UNIT J4

TONE OUT	TSQL	OPB	+3C	DET	GND	RTSST	RTDATA	RCK	GND
1	2	3	4	5	6	7	8	9	10

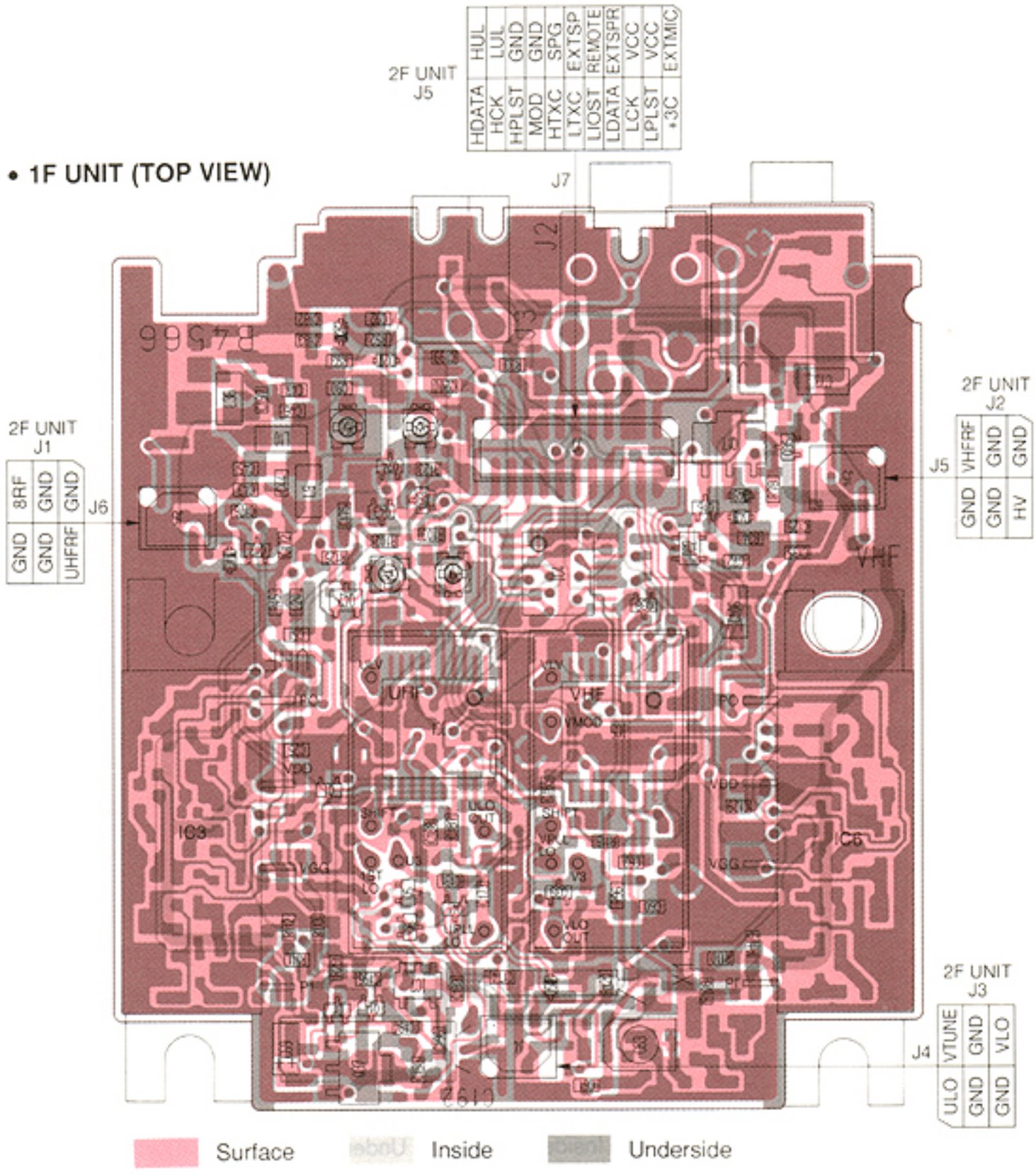
TSQL UNIT (OPTIONAL)



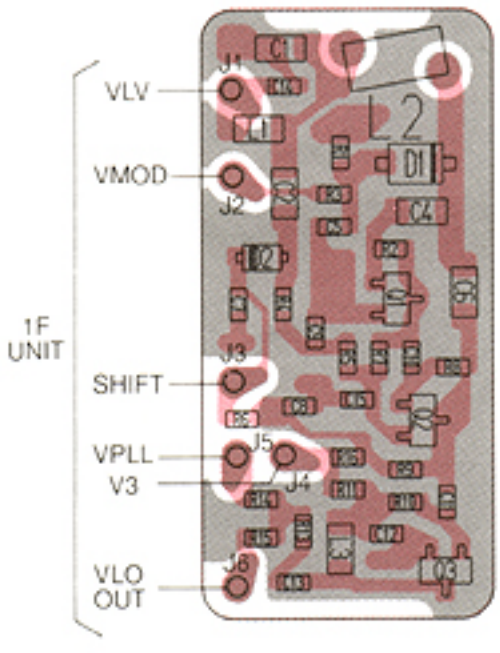
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

9-2 1F UNIT

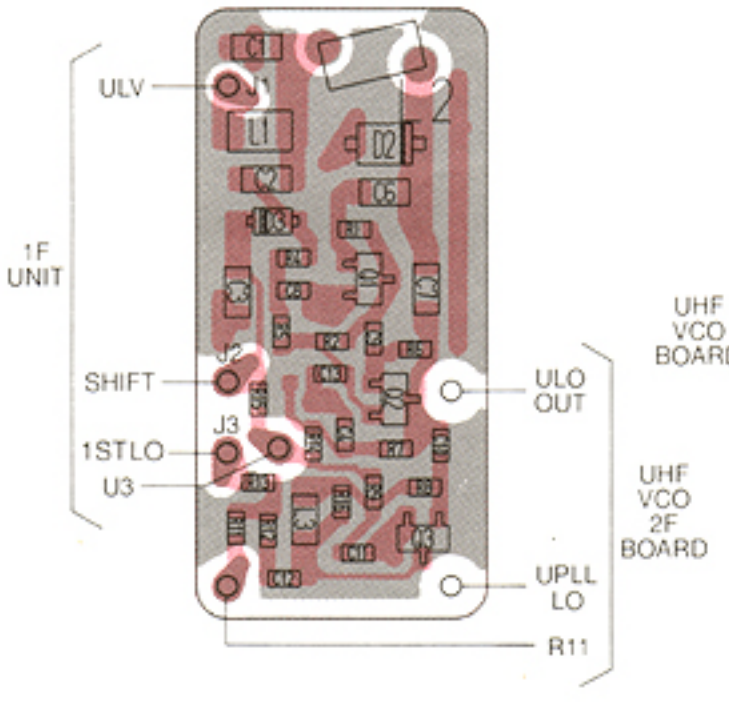
• 1F UNIT (TOP VIEW)



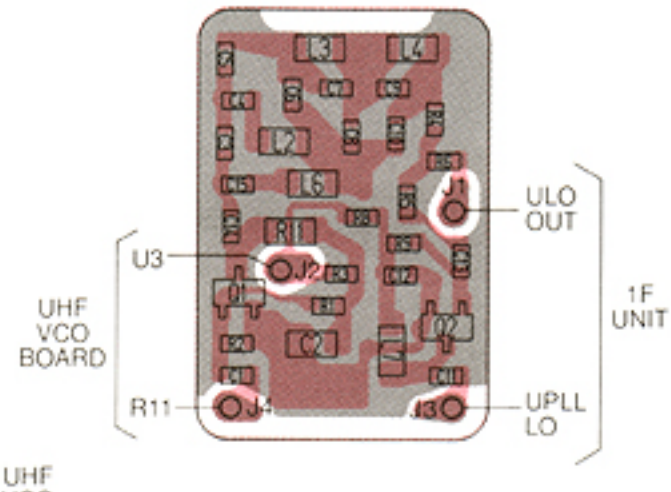
• VHF VCO BOARD (TOP VIEW)



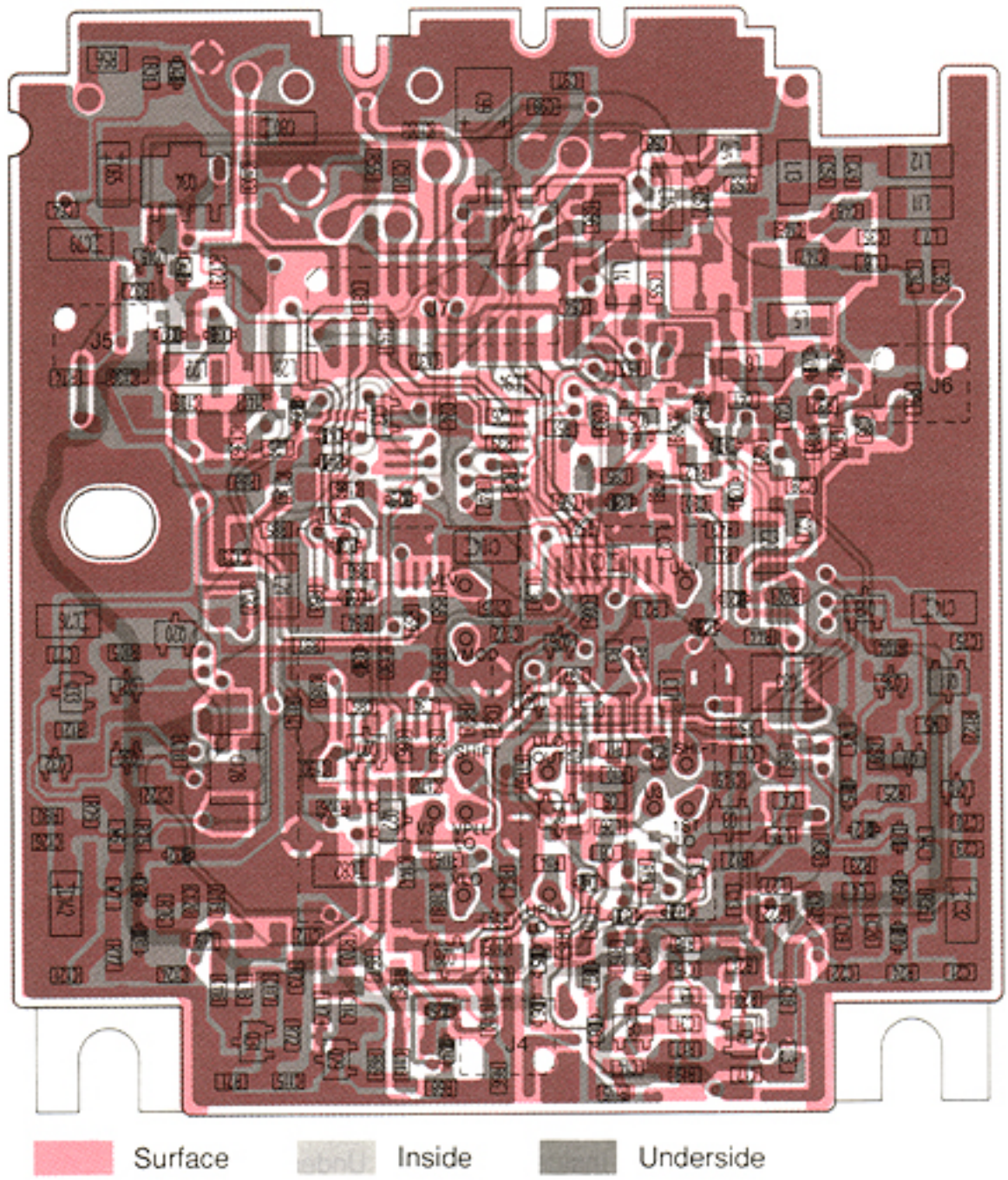
• UHF VCO BOARD (TOP VIEW)



• UHF VCO 2F BOARD (TOP VIEW)



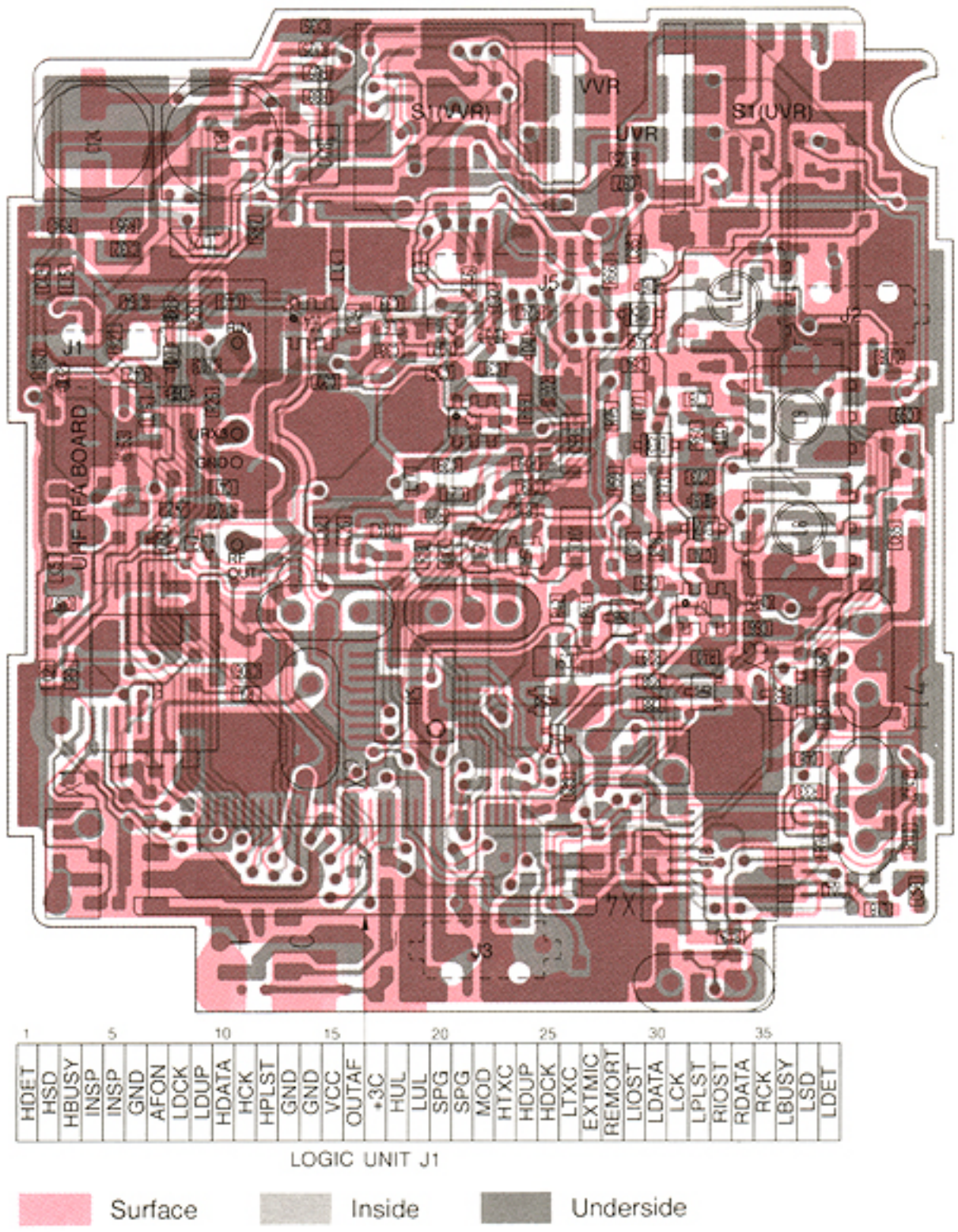
• 1F UNIT (BOTTOM VIEW)



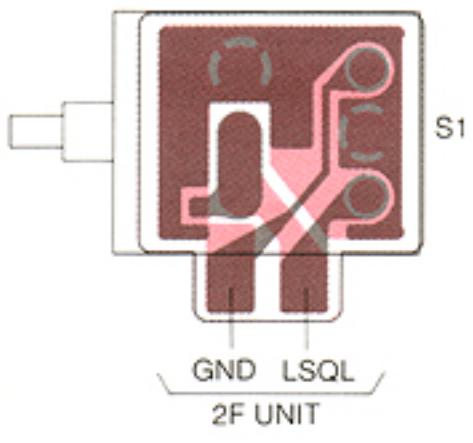
The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

9-3 2F UNIT

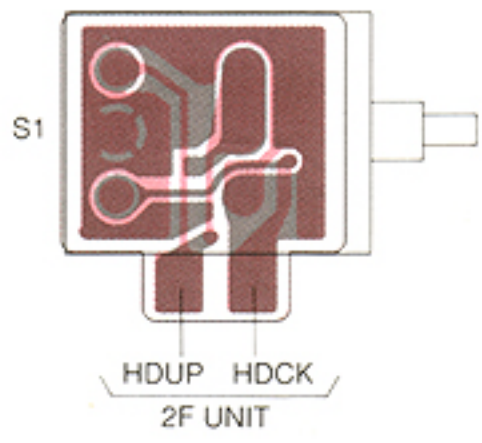
• 2F UNIT (TOP VIEW)



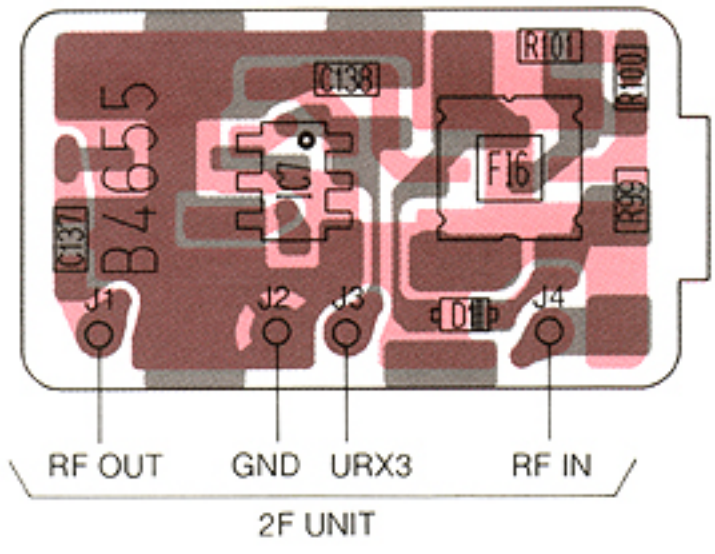
• V VR BOARD (TOP VIEW)



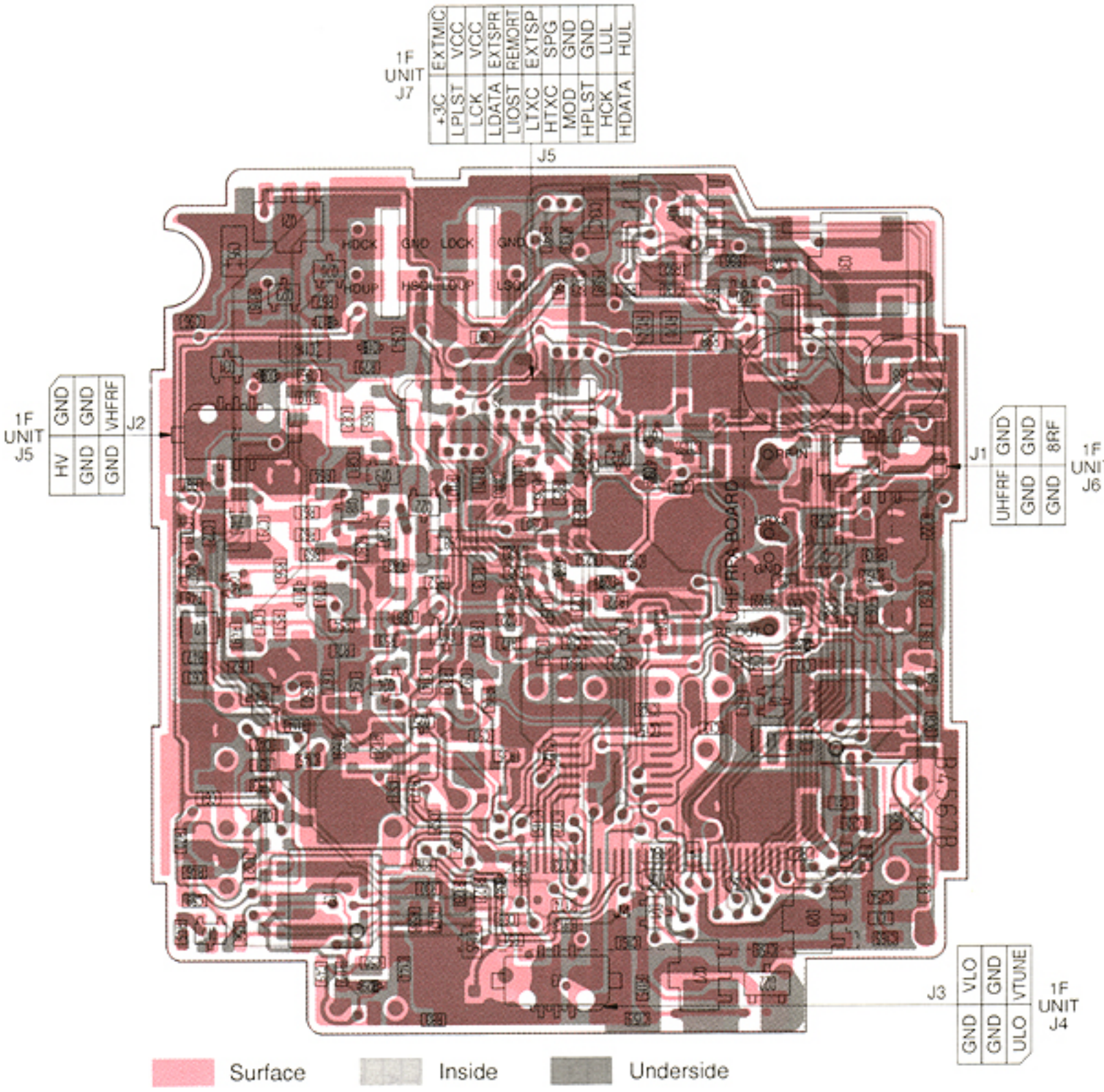
• U VR BOARD (TOP VIEW)



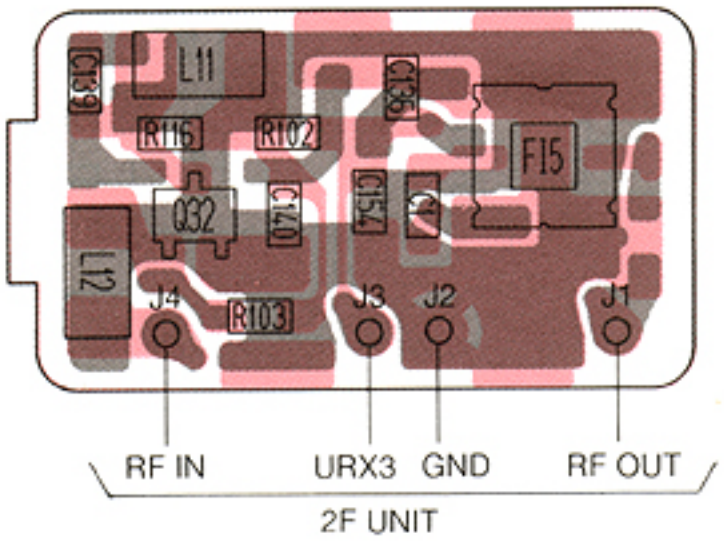
• UHF RF-A BOARD (TOP VIEW)



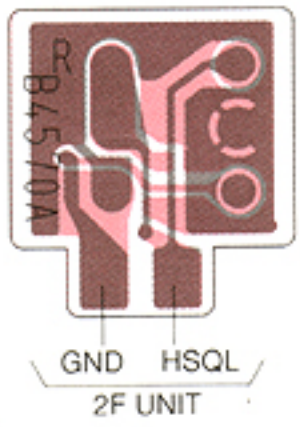
• 2F UNIT (BOTTOM VIEW)



• UHF RF-A BOARD (BOTTOM VIEW)

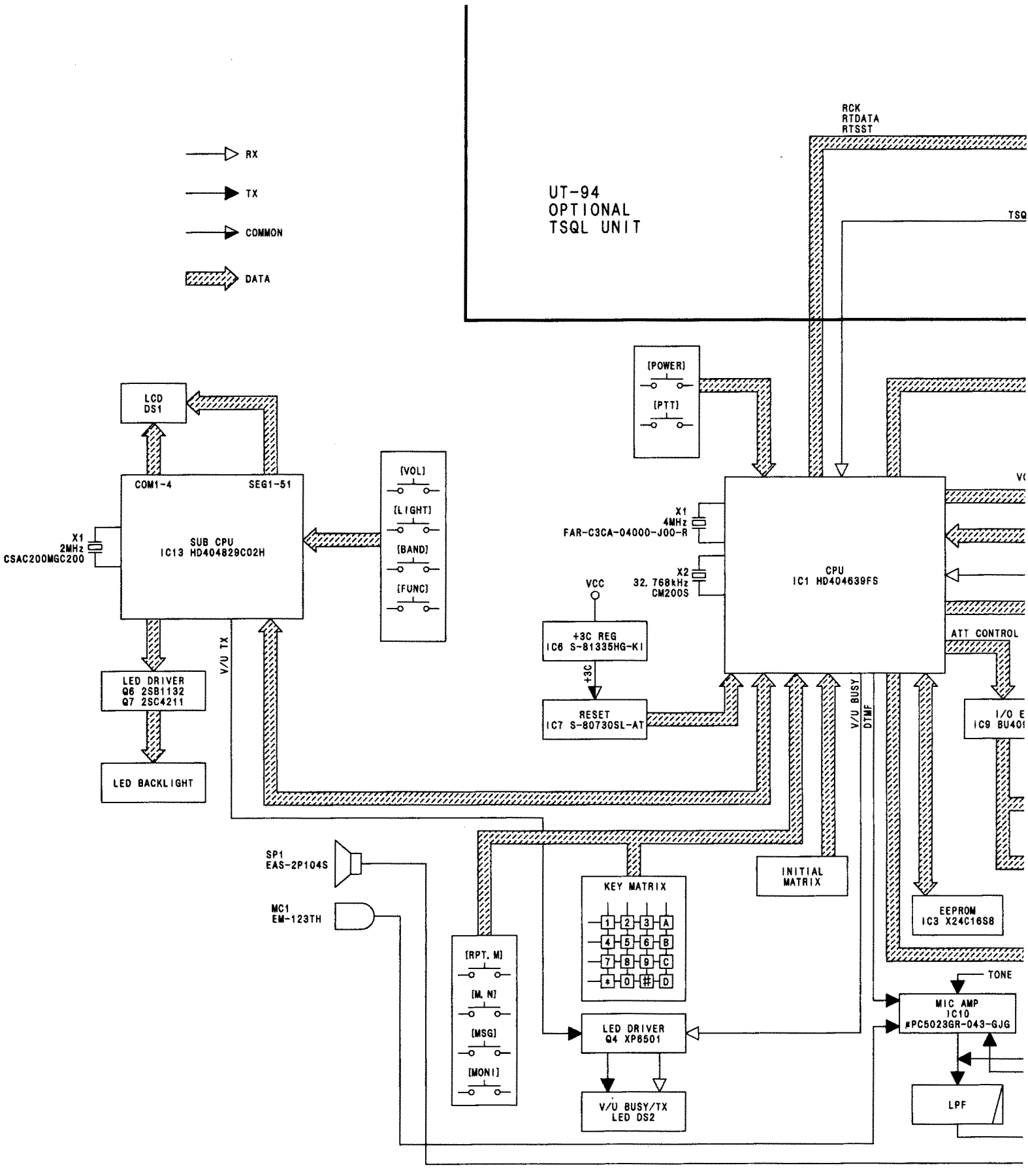


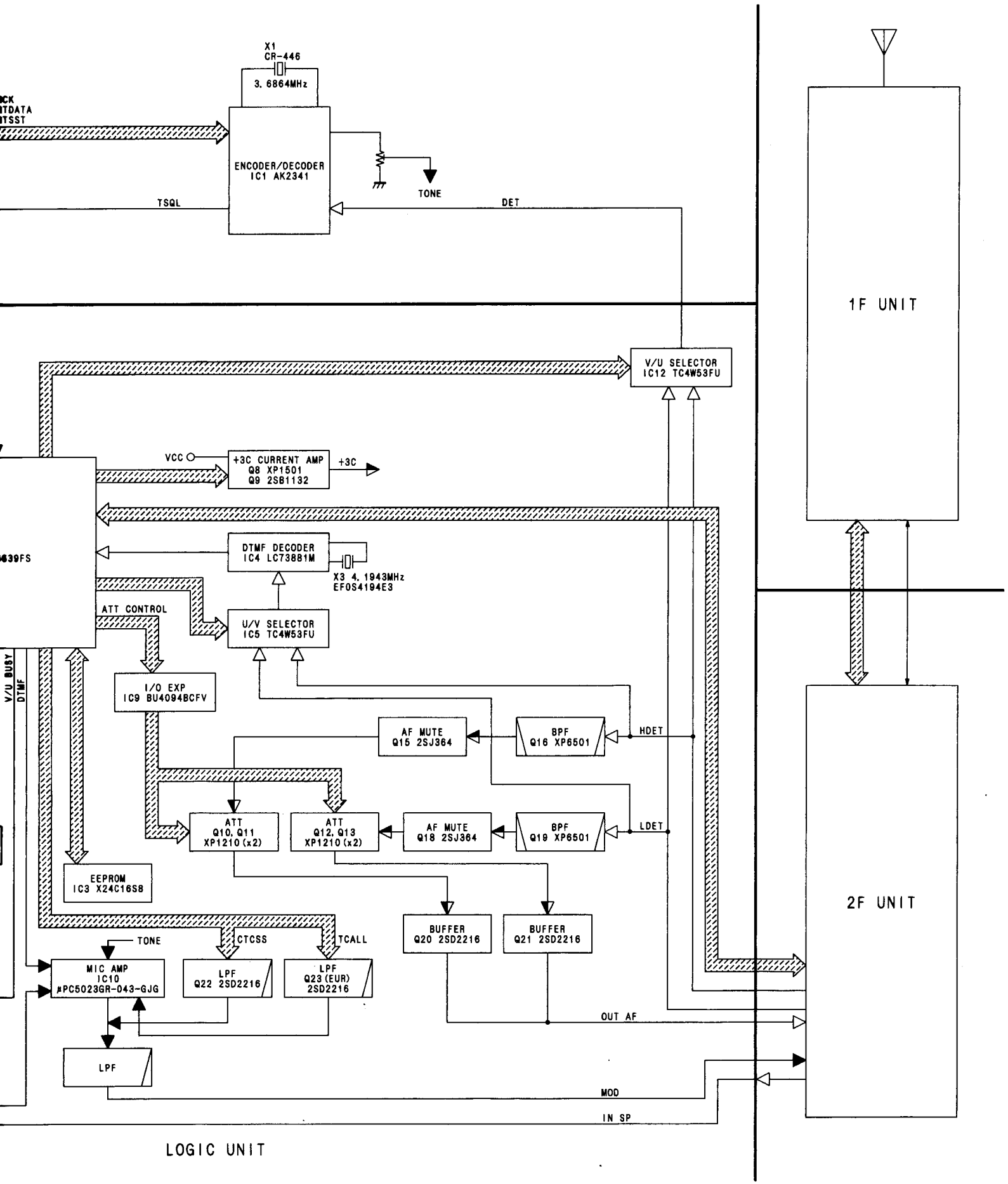
• U VR BOARD (BOTTOM VIEW)

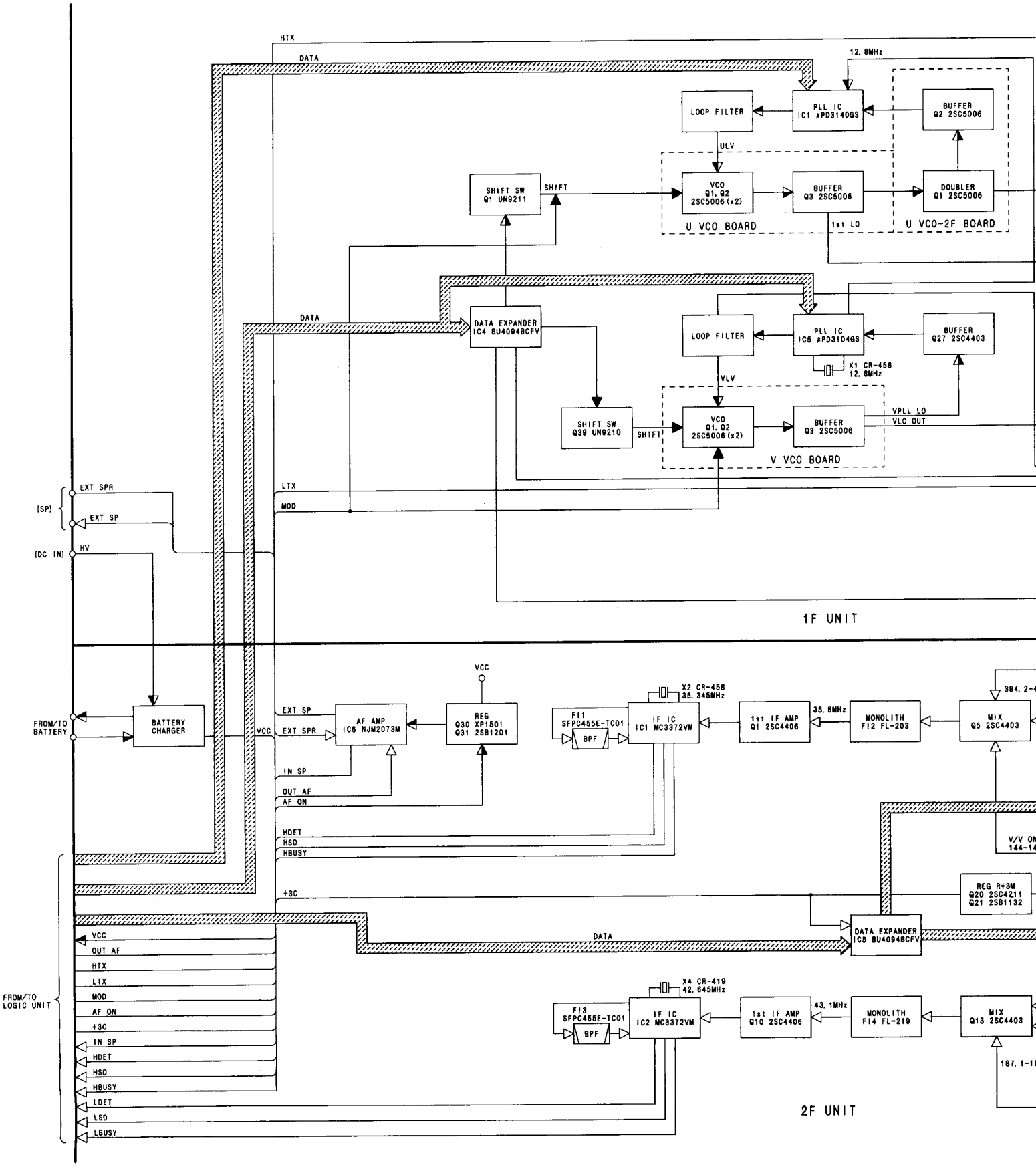


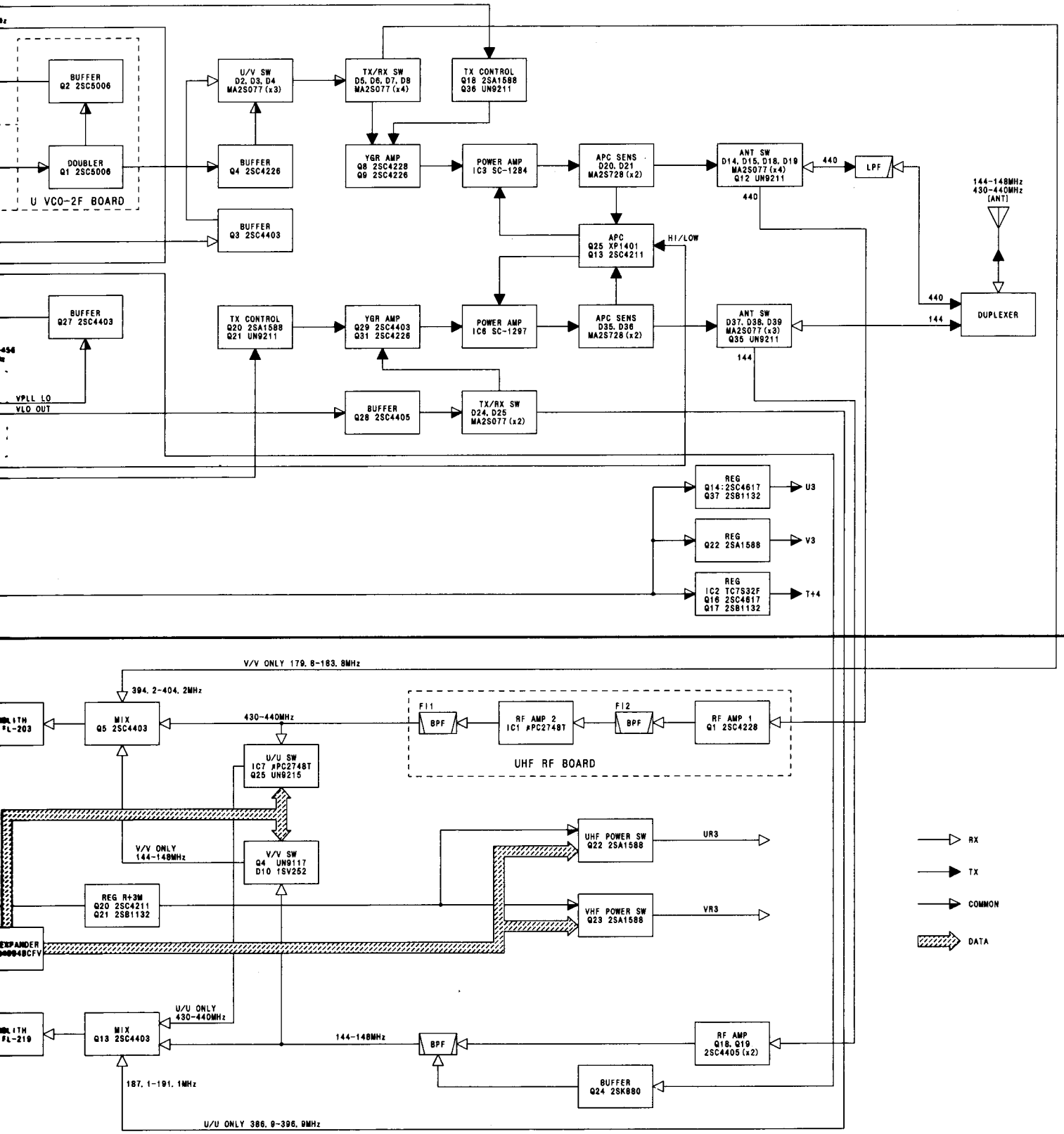
• V VR BOARD (BOTTOM VIEW)

SECTION 10 BLOCK DIAGRAM

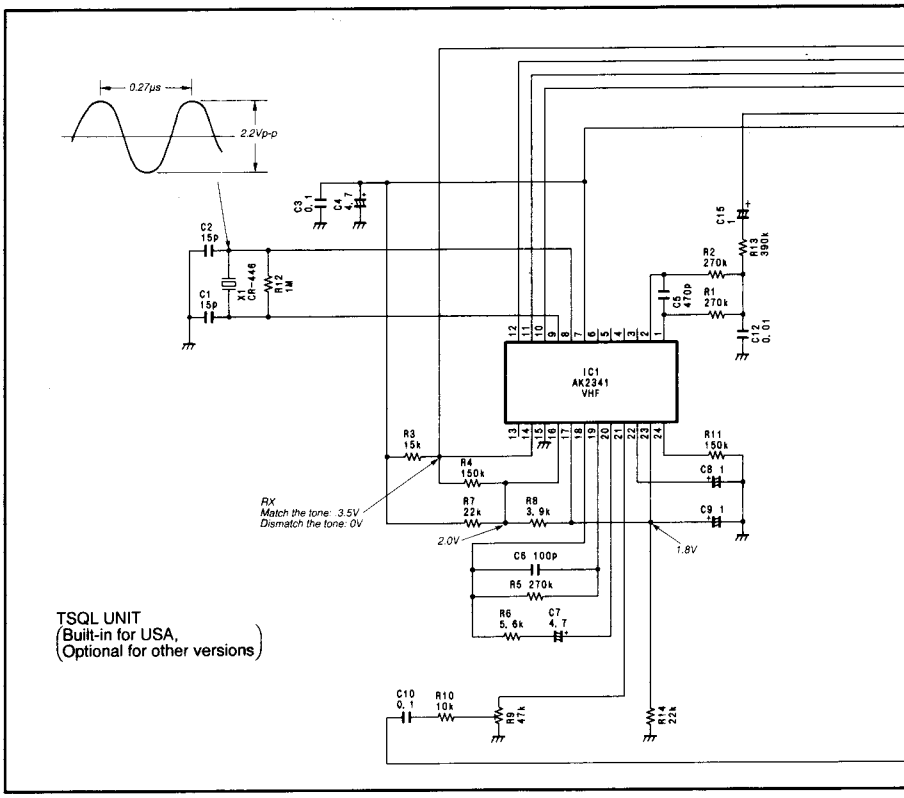


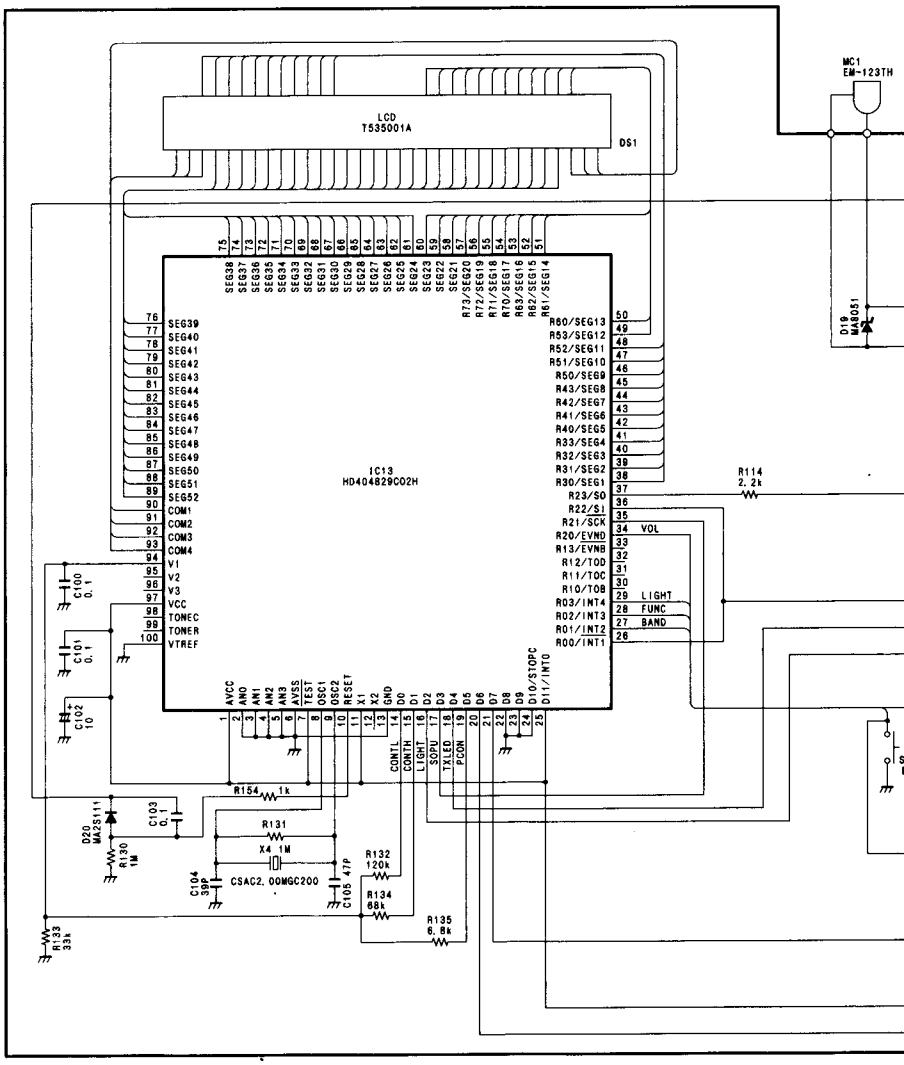

X1
CR-446
3. 6864MHz
ENCODER/DECODER
IC1 AK2341
TONE
TSQL
DET
1F UNIT
V/U SELECTOR
IC12 TC4W53FU
VCC
+3C CURRENT AMP
Q8 XP1501
Q9 2SB1132
+3C
DTMF DECODER
IC4 LC73881M
X3 4. 1943MHz
EF0S4194E3
ATT CONTROL
U/V SELECTOR
IC5 TC4W53FU
I/O EXP
IC9 BU4094BCFV
AF MUTE
Q15 2SJ364
BPF
Q16 XP6501
HDET
ATT
Q10, Q11
XP1210 (x2)
ATT
Q12, Q13
XP1210 (x2)
AF MUTE
Q18 2SJ364
BPF
Q19 XP6501
LDET
EEPROM
IC3 X24C16S8
BUFFER
Q20 2SD2216
BUFFER
Q21 2SD2216
2F UNIT
TONE
CTCSS
TCALL
MIC AMP
IC10
μPC5023GR-043-GJG
LPF
Q22 2SD2216
LPF
Q23 (EUR)
2SD2216
OUT AF
LPF
MOD
IN SP
LOGIC UNIT

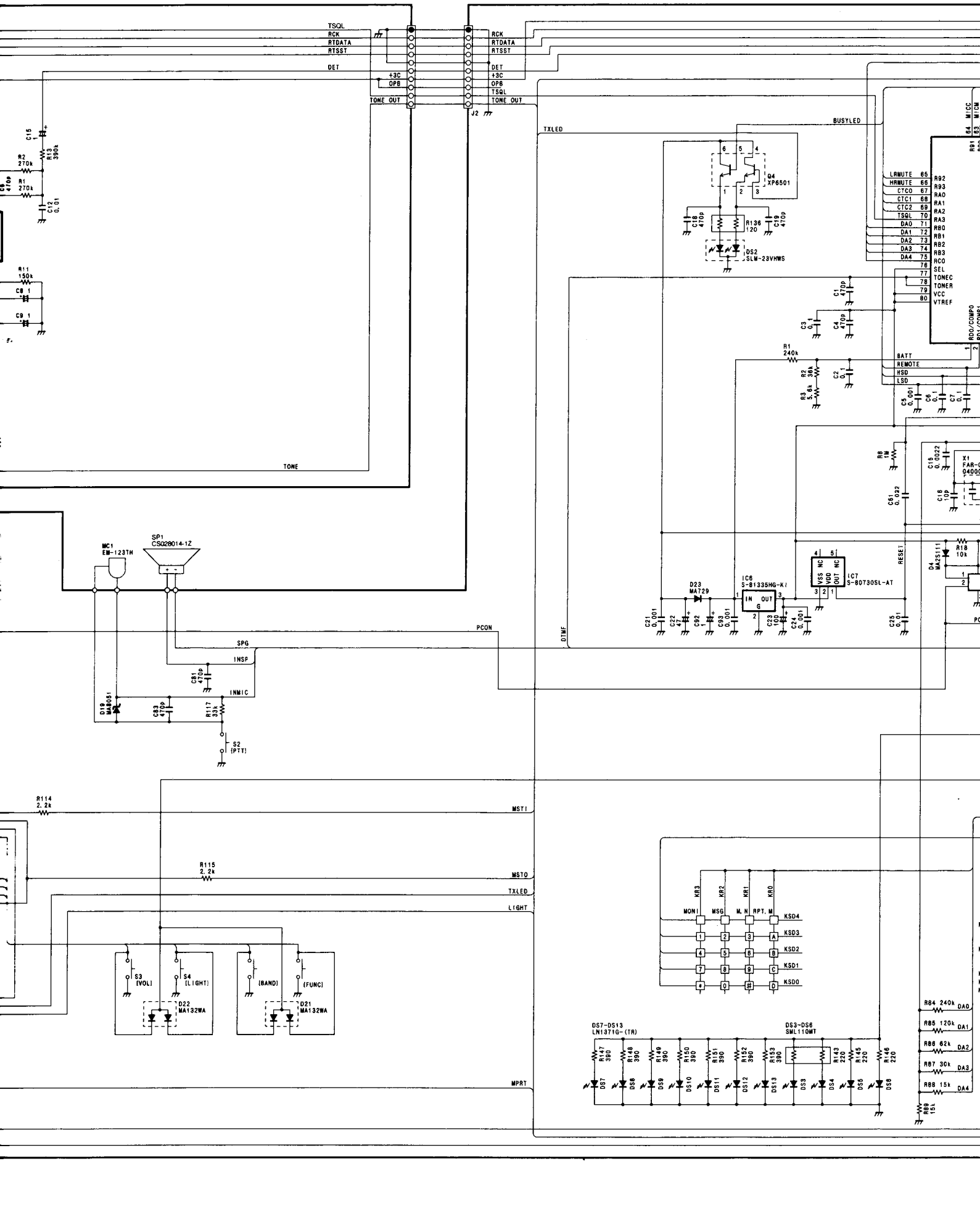

HTX
DATA
12.8MHz
LOOP FILTER
PLL IC
IC1 μPD3140GS
BUFFER
Q2 2SC5006
ULV
SHIFT SW
Q1 UN9211
SHIFT
VCO
Q1, Q2
2SC5006 (x2)
BUFFER
Q3 2SC5006
DOUBLER
Q1 2SC5006
U VCO BOARD
1st LO
U VCO-2F BOARD
DATA
DATA EXPANDER
IC4 BU4094BCFV
LOOP FILTER
PLL IC
IC5 μPD3104GS
BUFFER
Q27 2SC4403
X1 CR-456
12.8MHz
VLV
SHIFT SW
Q39 UN9210
SHIFT
VCO
Q1, Q2
2SC5006 (x2)
BUFFER
Q3 2SC5006
VPLL LO
VLO OUT
V VCO BOARD
EXT SPR
[SP]
EXT SP
[DC IN]
HV
LTX
MOD
1F UNIT
VCC
FROM/TO
BATTERY
BATTERY
CHARGER
EXT SP
EXT SPR
VCC
AF AMP
IC6 NJM2073M
REG
Q30 XP1501
Q31 2SB1201
FI1
SFPC455E-TC01
BPF
X2 CR-458
35.345MHz
IF IC
IC1 MC3372VM
1st IF AMP
Q1 2SC4406
35.8MHz
MONOLITH
FI2 FL-203
MIX
Q5 2SC4403
IN SP
OUT AF
AF ON
HDET
HSD
HBUSY
+3C
REG R+3M
Q20 2SC4211
Q21 2SB1132
DATA
DATA EXPANDER
IC5 BU4094BCFV
FROM/TO
LOGIC UNIT
VCC
OUT AF
HTX
LTX
MOD
AF ON
+3C
IN SP
HDET
HSD
HBUSY
LDET
LSD
LBUSY
X4 CR-419
42.645MHz
FI3
SFPC455E-TC01
BPF
IF IC
IC2 MC3372VM
1st IF AMP
Q10 2SC4406
43.1MHz
MONOLITH
FI4 FL-219
MIX
Q13 2SC4403
2F UNIT

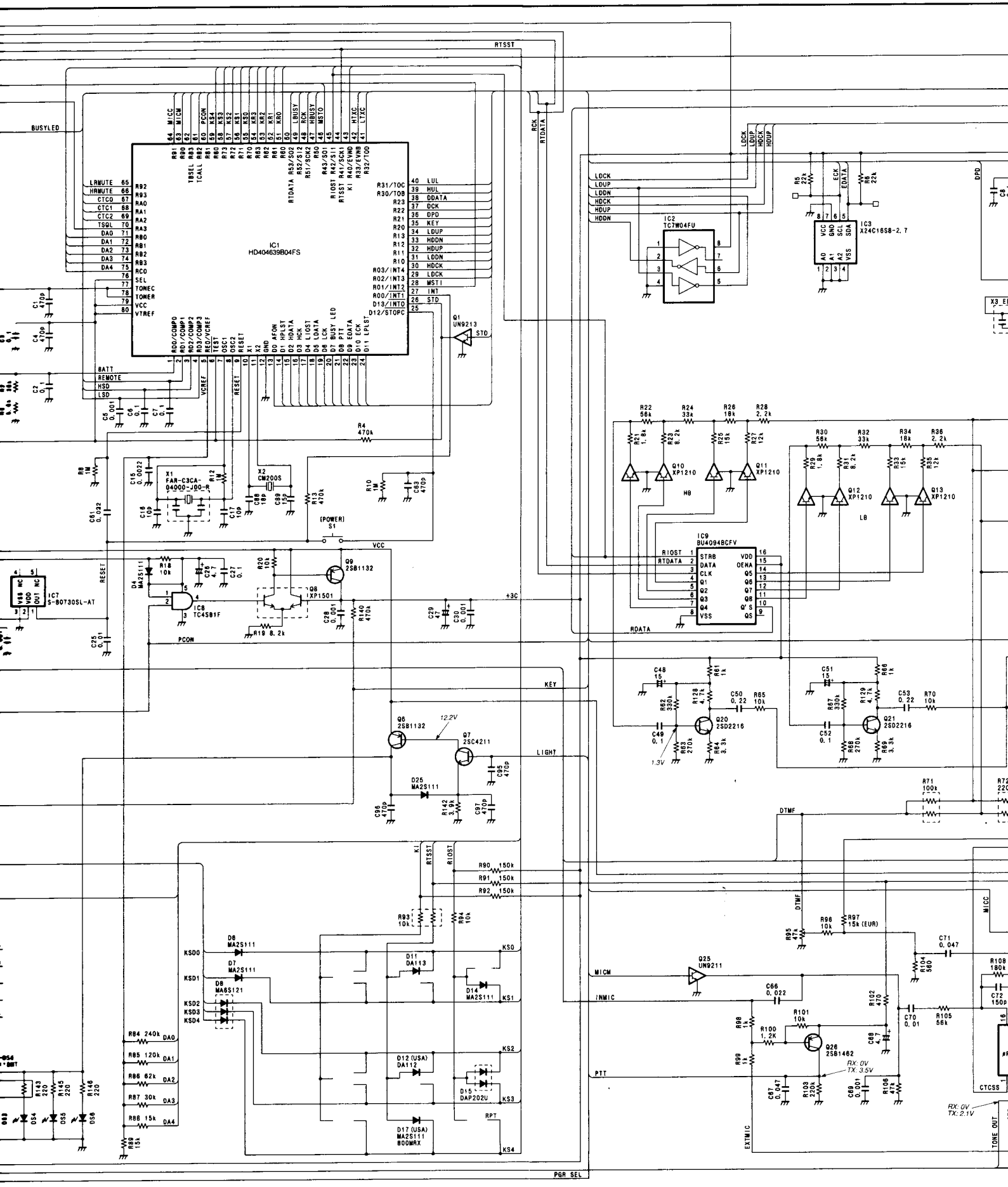

BUFFER Q2 2SC5006
DOUBLER Q1 2SC5006
U VCO-2F BOARD
U/V SW D2, D3, D4 MA2S077 (x3)
BUFFER Q4 2SC4226
BUFFER Q3 2SC4403
TX/RX SW D5, D6, D7, D8 MA2S077 (x4)
TX CONTROL Q18 2SA1588 Q36 UN9211
YGR AMP Q8 2SC4228 Q9 2SC4226
POWER AMP IC3 SC-1284
APC SENS D20, D21 MA2S728 (x2)
ANT SW D14, D15, D18, D19 MA2S077 (x4) Q12 UN9211
440
LPF
144-148MHz 430-440MHz [ANT]
APC Q25 XP1401 Q13 2SC4211
HI/LOW
DUPLEXER
144
BUFFER Q27 2SC4403
TX CONTROL Q20 2SA1588 Q21 UN9211
YGR AMP Q29 2SC4403 Q31 2SC4226
POWER AMP IC6 SC-1297
APC SENS D35, D36 MA2S728 (x2)
ANT SW D37, D38, D39 MA2S077 (x3) Q35 UN9211
VPLL LO
VLO OUT
BUFFER Q28 2SC4405
TX/RX SW D24, D25 MA2S077 (x2)
REG Q14:2SC4617 Q37 2SB1132
U3
REG Q22 2SA1588
V3
REG IC2 TC7S32F Q16 2SC4617 Q17 2SB1132
T+4
V/V ONLY 179.8-183.8MHz
394.2-404.2MHz
MIX Q5 2SC4403
430-440MHz
F11
BPF
RF AMP 2 IC1 μPC2748T
F12
BPF
RF AMP 1 Q1 2SC4228
UHF RF BOARD
U/U SW IC7 μPC2748T Q25 UN9215
V/V ONLY 144-148MHz
V/V SW Q4 UN9117 D10 1SV252
REG R+3M Q20 2SC4211 Q21 2SB1132
UHF POWER SW Q22 2SA1588
UR3
VHF POWER SW Q23 2SA1588
VR3
RX
TX
COMMON
DATA
U/U ONLY 430-440MHz
MIX Q13 2SC4403
144-148MHz
BPF
RF AMP Q18, Q19 2SC4405 (x2)
BUFFER Q24 2SK880
187.1-191.1MHz
U/U ONLY 386.9-396.9MHz

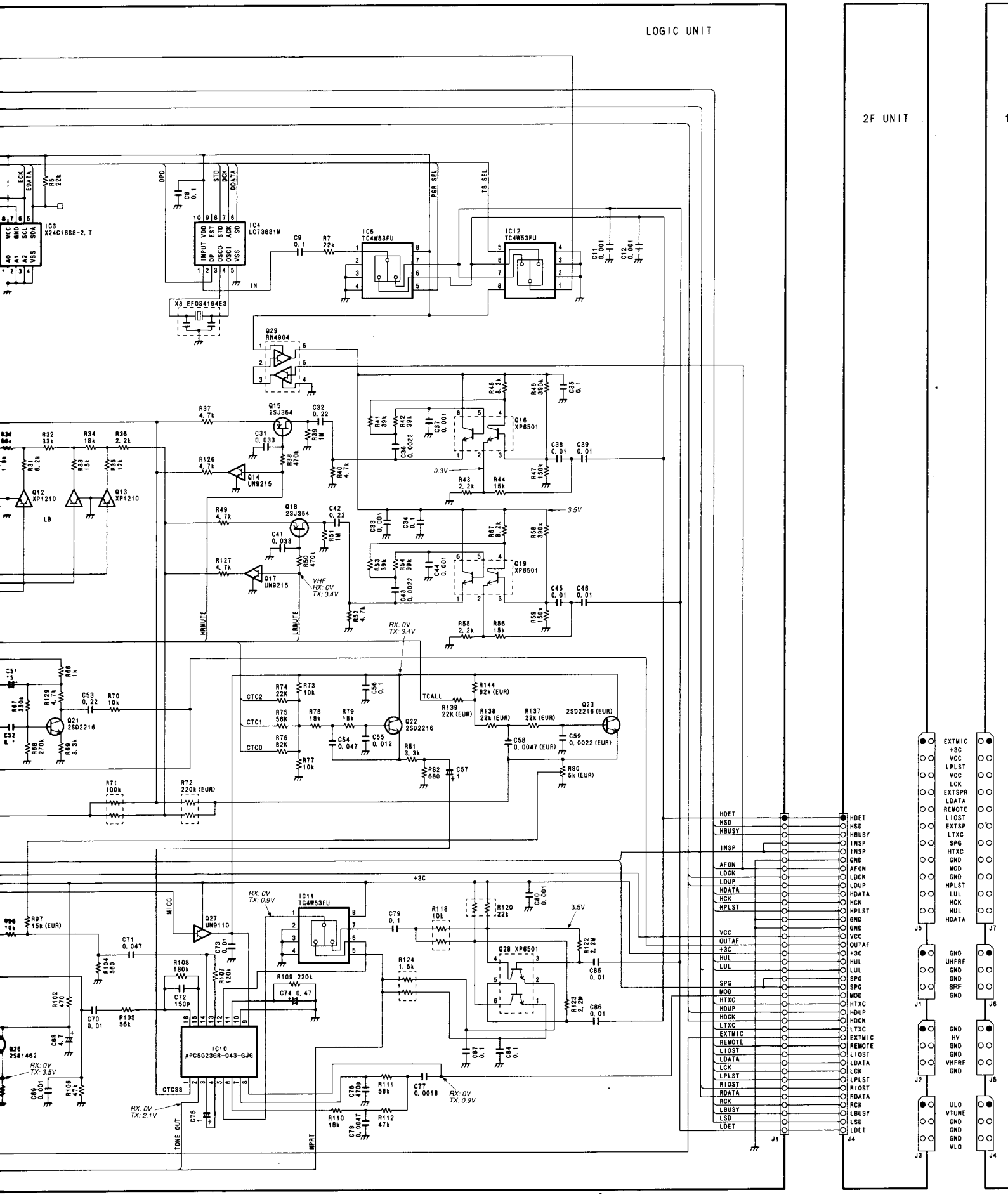
SECTION 11 VOLTAGE DIAGRAM

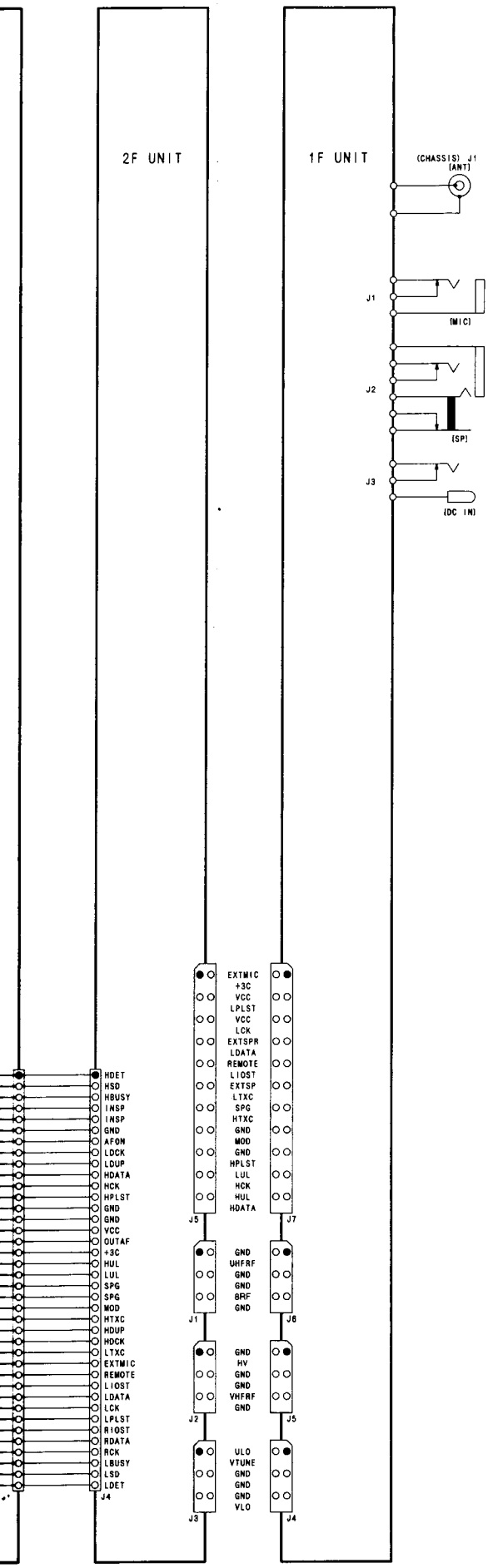


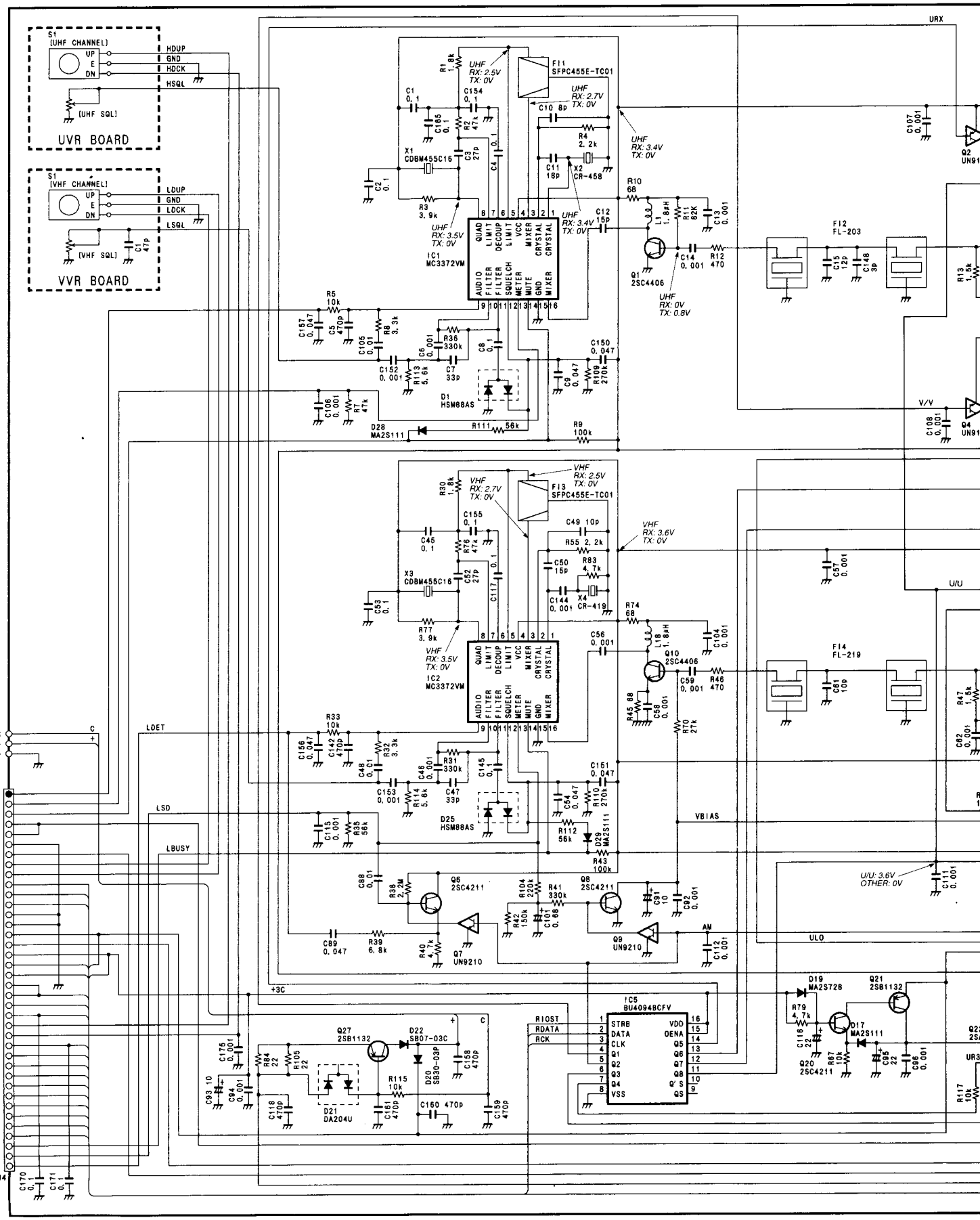


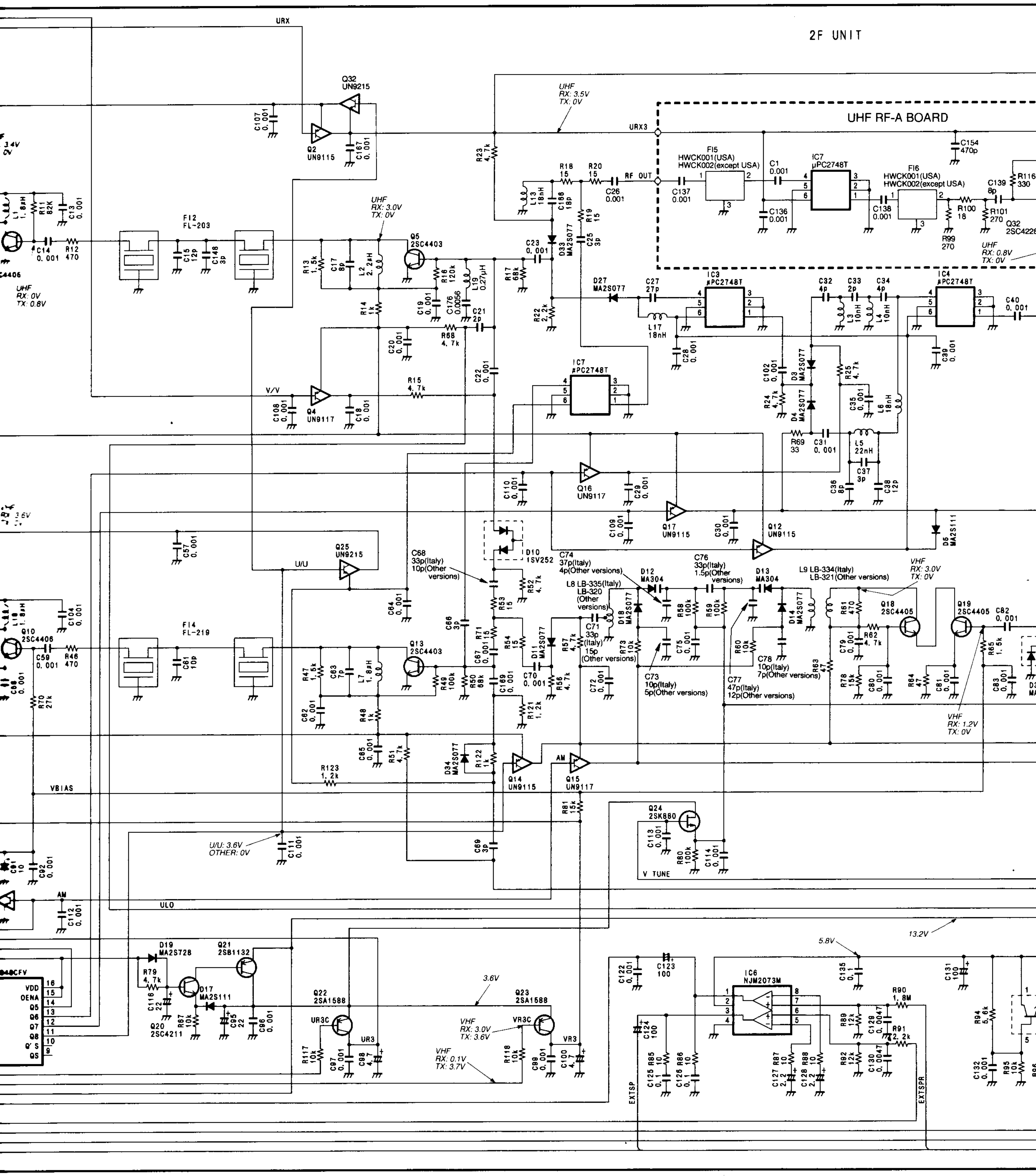

TSQL
RCK
RTDATA
RTSST
DET
+3C
OPB
TONE OUT
J2
TONE
TXLED
BUSYLED
Q4 XP6501
DS2 SLM-23VHWS
LRMUTE
HRMUTE
CTCO
CTC1
CTC2
TSQL
DA0
DA1
DA2
DA3
DA4
SEL
TONEC
TONER
VCC
VTREF
BATT
REMOTE
MSD
LSD
RESET
DTMF
PCON
SPG
INSP
INMIC
MC1 EM-123TH
SP1 CS028014-1Z
D19 MA8051
S2 [PTT]
IC6 S-81335HG-K
IC7 S-80730SL-AT
D23 MA729
D4 MA2S111
MST1
MSTO
TXLED
LIGHT
MPRT
S3 [VOL]
S4 [LIGHT]
[BAND]
[FUNC]
D22 MA132WA
D21 MA132WA
KR3
KR2
KR1
KR0
MON1
MSG
M. N
RPT. M
KSD4
KSD3
KSD2
KSD1
KSD0
DS7-DS13 LN1371G-(TR)
DS3-DS6 SML110MT
R84 240k DA0
R85 120k DA1
R86 62k DA2
R87 30k DA3
R88 15k DA4


IC1
HD404639B04FS
IC2
TC7W04FU
IC3
X24C16S8-2.7
IC7
S-80730SL-AT
IC8
TC4S81F
IC9
BU4094BCFV
Q1
UN9213
Q6
2SB1132
Q7
2SC4211
Q8
XP1501
Q9
2SB1132
Q10
XP1210
Q11
XP1210
Q12
XP1210
Q13
XP1210
Q20
2SD2216
Q21
2SD2216
Q25
UN9211
Q26
2SB1462
X1
FAR-C3CA-04000-J00-R
X2
CM200S
D4
MA2S111
D6
MA2S111
D7
MA2S111
D8
MA6S121
D11
DA113
D12 (USA)
DA112
D14
MA2S111
D15
DAP202U
D17 (USA)
MA2S111
800MRX
D25
MA2S111
BUSYLED
RTSST
RCK
RTDATA
LOCK
LDUP
HDCK
HDUP
LDCK
LDUP
LDDN
HDCK
HDUP
HDDN
DPD
BATT
REMOTE
HSD
LSD
VCREF
RESET
(POWER)
S1
VCC
+3C
PCON
KEY
LIGHT
RDATA
DTMF
MICM
INMIC
PTT
EXTMIC
CTCSS
TONE OUT
PGR SEL
RPT
12.2V
1.3V
RX: 0V
TX: 3.5V
RX: 0V
TX: 2.1V
H8
L8

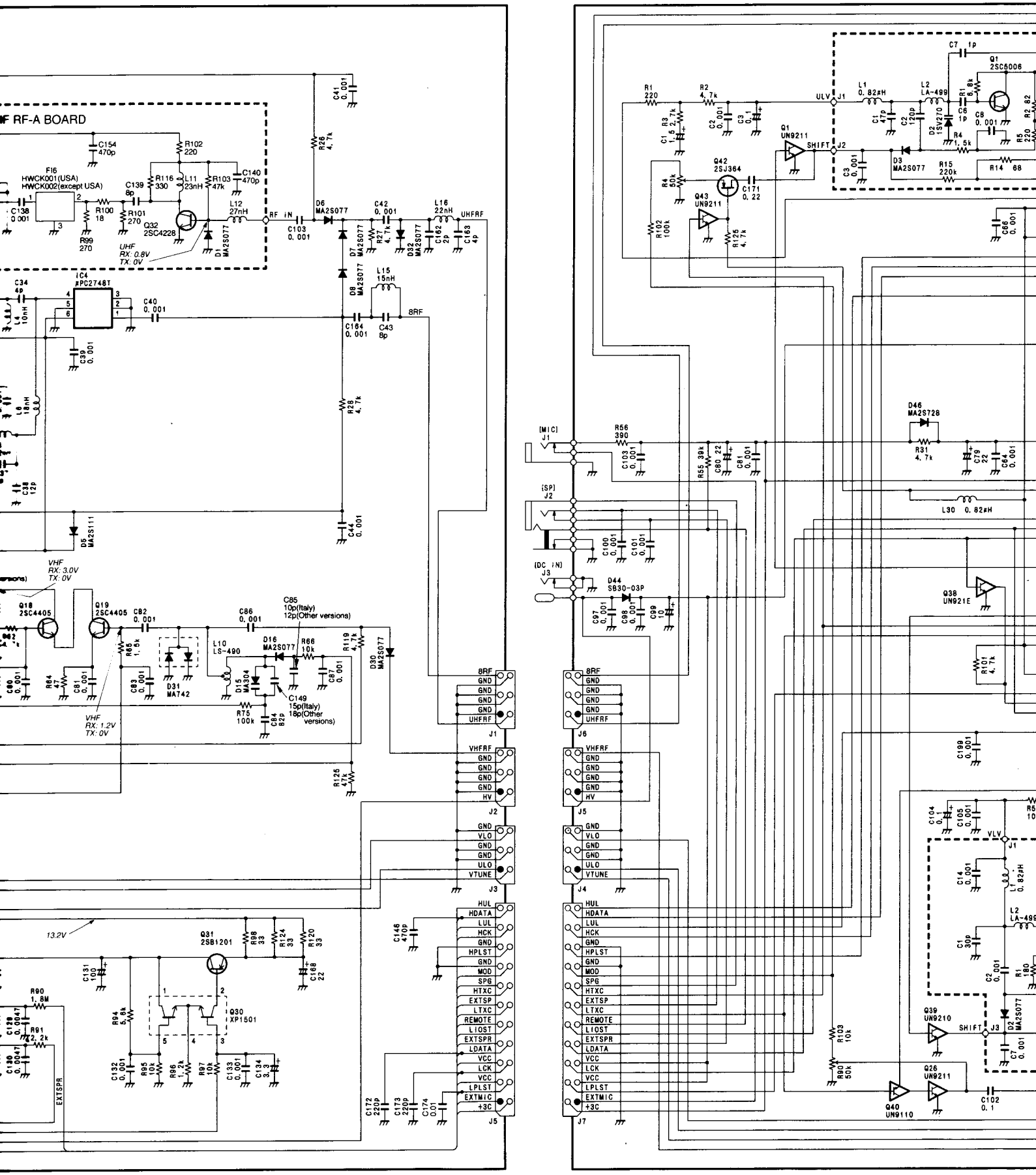

LOGIC UNIT
2F UNIT
IC3 X24C16S8-2.7
IC4 LC73881M
IC5 TC4W53FU
IC12 TC4W53FU
IC11 TC4W53FU
IC10 #PC5023GR-043-GJG
X3 EFOS4194E3
Q29 RN4904
Q12 XP1210
Q13 XP1210
Q14 UN9215
Q15 2SJ364
Q16 XP6501
Q17 UN9215
Q18 2SJ364
Q19 XP6501
Q21 2SD2216
Q22 2SD2216
Q23 2SD2216 (EUR)
Q26 2SB1462
Q27 UN9110
Q28 XP6501
DPD
IN
PGR SEL
TB SEL
HRMUTE
LRMUTE
MICC
CTCSS
TONE OUT
MPRT
TCALL
VHF RX: 0V TX: 3.4V
RX: 0V TX: 3.4V
RX: 0V TX: 0.9V
RX: 0V TX: 3.5V
RX: 0V TX: 2.1V
0.3V
3.5V
+3C
HDET
HSD
HBUSY
INSP
AFON
LDCK
LDUP
HDATA
HCK
HPLST
VCC
OUTAF
+3C
HUL
LUL
SPG
MOD
HTXC
HDUP
HDCK
LTXC
EXTMIC
REMOTE
LIOST
LDATA
LCK
LPLST
RIOST
RDATA
RCK
LBUSY
LSD
LDET
EXTMIC
+3C
VCC
LPLST
VCC
LCK
EXTSPR
LDATA
REMOTE
LIOST
EXTSP
LTXC
SPG
HTXC
GND
MOD
GND
HPLST
LUL
HCK
HUL
HDATA
GND
UHFRF
GND
GND
BRF
GND
GND
HV
GND
GND
VHFRF
GND
ULO
VTUNE
GND
GND
GND
VLO

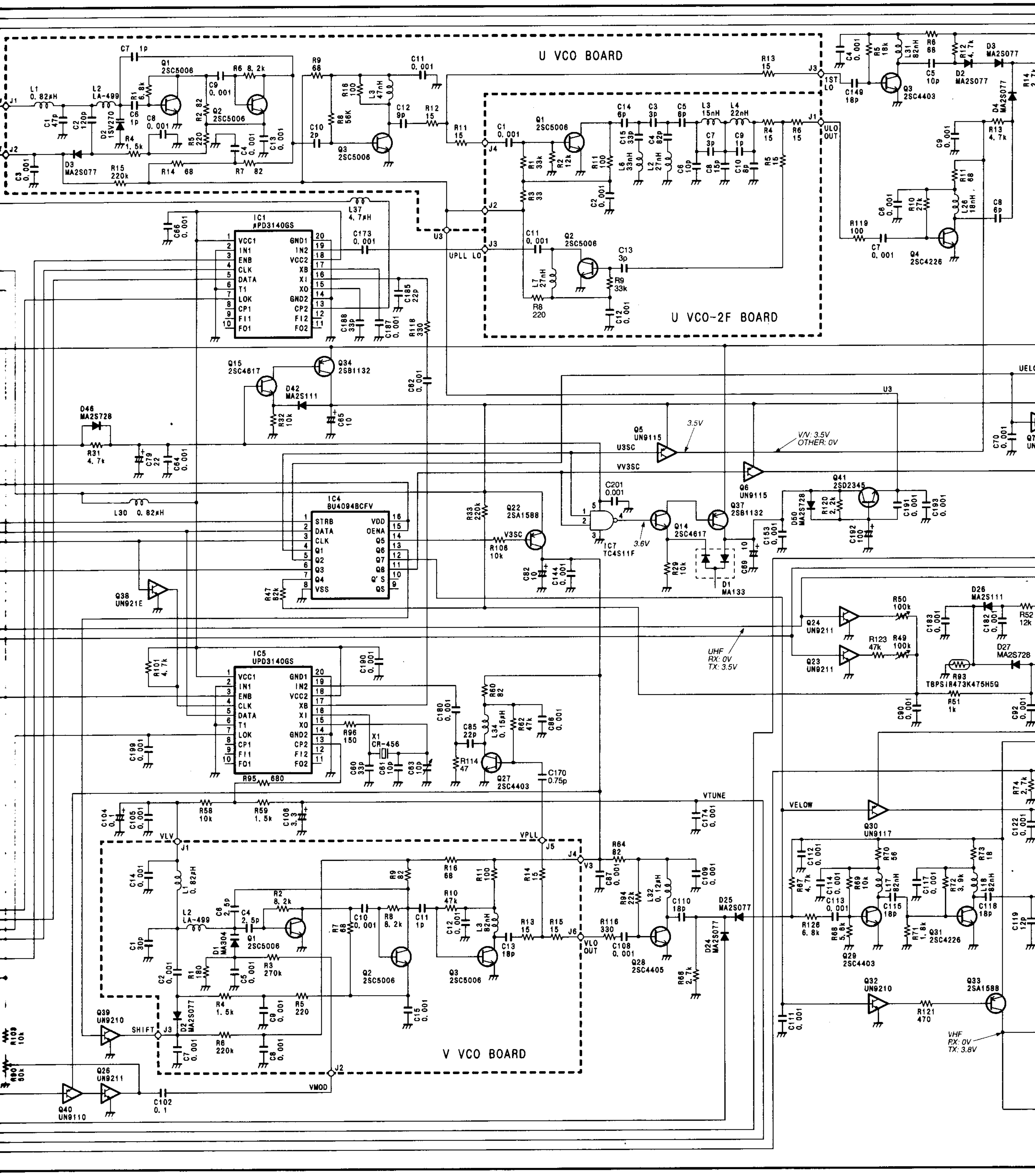

2F UNIT
1F UNIT
(CHASSIS) J1
(ANT)
J1
(MIC)
J2
(SP)
J3
(DC IN)
HDET
HSD
HBUSY
INSP
INSP
GND
AFON
LDCK
LDUP
HDATA
HCK
HPLST
GND
GND
VCC
OUTAF
+3C
HUL
LUL
SPG
SPG
MOD
HTXC
HDUP
HDCK
LTXC
EXTMIC
REMOTE
LIOST
LDATA
LCK
LPLST
RIOST
RDATA
RCK
LBUSY
LSD
LDET
J4
EXTMIC
+3C
VCC
LPLST
VCC
LCK
EXTSPR
LDATA
REMOTE
LIOST
EXTSP
LTXC
SPG
HTXC
GND
MOD
GND
HPLST
LUL
HCK
HUL
HDATA
J5
J7
GND
UHFRF
GND
GND
BRF
GND
J1
J6
GND
HV
GND
GND
VHFRF
GND
J2
J5
ULO
VTUNE
GND
GND
GND
VLO
J3
J4


S1
[UHF CHANNEL]
UP
E
DN
HDUP
GND
HDCK
HSQL
[UHF SQL]
UVR BOARD
S1
[VHF CHANNEL]
UP
E
DN
LDUP
GND
LDCK
LSQL
[VHF SQL]
C1
47p
VVR BOARD
URX
F11
SFPC455E-TC01
IC1
MC3372VM
QUAD
LIMIT
DECOUP
LIMIT
VCC
MIXER
CRYSTAL
CRYSTAL
AUDIO
FILTER
FILTER
SQUELCH
METER
MUTE
GND
MIXER
Q1
2SC4406
F12
FL-203
Q2
UN91
V/V
Q4
UN91
D1
HSMB8AS
D28
MA2S111
F13
SFPC455E-TC01
IC2
MC3372VM
Q10
2SC4406
F14
FL-219
U/U
D25
HSMB8AS
D29
MA2S111
Q6
2SC4211
Q7
UN9210
Q8
2SC4211
Q9
UN9210
AM
ULO
VBIAS
LDET
LSD
LBUSY
+3C
C
to BATTERY
to LOGIC UNIT J1
J4
HDET
HSD
HBUSY
INSP
INSP
GND
AFON
LDCK
LDUP
HDATA
HCK
HPLST
GND
GND
VCC
OUTAF
+3C
HUL
LUL
SPG
SPG
MOD
HTXC
HDUP
HDCK
LTXC
EXTMIC
REMOTE
LIOST
LDATA
LCK
LPLST
RIOST
RDATA
RCK
LBUSY
LSD
LDET
IC5
BU4094BCFV
STRB
DATA
CLK
Q1
Q2
Q3
Q4
VSS
VDD
OENA
Q5
Q6
Q7
Q8
Q'S
QS
RIOST
RDATA
RCK
Q27
2SB1132
D22
SB07-03C
D20
SB30-03P
D21
DA204U
D19
MA2S728
Q21
2SB1132
D17
MA2S111
Q20
2SC4211
UHF
RX: 2.5V
TX: 0V
UHF
RX: 2.7V
TX: 0V
UHF
RX: 3.4V
TX: 0V
UHF
RX: 3.5V
TX: 0V
UHF
RX: 0V
TX: 0.8V
VHF
RX: 2.5V
TX: 0V
VHF
RX: 2.7V
TX: 0V
VHF
RX: 3.6V
TX: 0V
VHF
RX: 3.5V
TX: 0V
U/U: 3.6V
OTHER: 0V

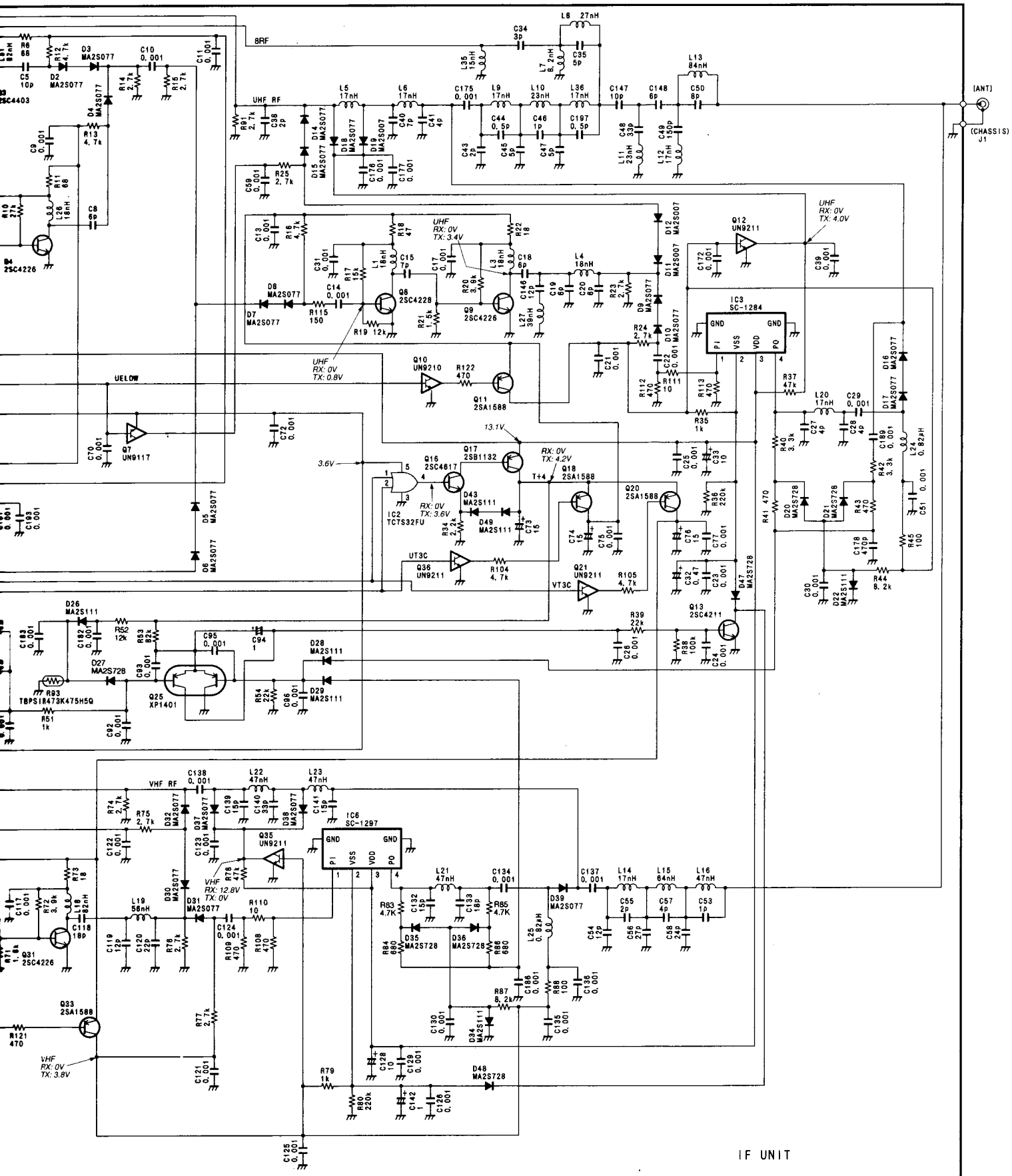


2F UNIT
UHF RF-A BOARD
URX
URX3
UHF RX: 3.5V TX: 0V
Q32 UN9215
Q2 UN9115
FI5 HWCK001(USA) HWCK002(except USA)
IC7 µPC2748T
FI6 HWCK001(USA) HWCK002(except USA)
RF OUT
FL-203
FL-219
Q5 2SC4403
Q13 2SC4403
UHF RX: 3.0V TX: 0V
UHF RX: 0V TX: 0.8V
UHF RX: 0.8V TX: 0V
IC3 µPC2748T
IC4 µPC2748T
V/V
Q4 UN9117
Q16 UN9117
Q17 UN9115
Q12 UN9115
Q25 UN9215
U/U
D10 1SV252
L8 LB-335(Italy) LB-320 (Other versions)
L9 LB-334(Italy) LB-321(Other versions)
D12 MA304
D13 MA304
VHF RX: 3.0V TX: 0V
Q18 2SC4405
Q19 2SC4405
VHF RX: 1.2V TX: 0V
Q14 UN9115
Q15 UN9117
AM
VBIAS
Q24 2SK880
V TUNE
U/U: 3.6V OTHER: 0V
ULO
13.2V
5.8V
D19 MA2S728
Q21 2SB1132
Q20 2SC4211
D17 MA2S111
3.6V
Q22 2SA1588
Q23 2SA1588
UR3C
UR3
VR3C
VR3
VHF RX: 3.0V TX: 3.6V
VHF RX: 0.1V TX: 3.7V
IC6 NJM2073M
EXTSP
EXTSPR
VDD
OENA
Q5
Q6
Q7
Q8
Q'S
QS


F RF-A BOARD
F16
HWCK001(USA)
HWCK002(except USA)
IC4
PC2748T
UHF
RX: 0.8V
TX: 0V
VHF
RX: 3.0V
TX: 0V
VHF
RX: 1.2V
TX: 0V
13.2V
EXTSPR
RF IN
8RF
UHFRF
VHFRF
[MIC]
[SP]
[DC IN]
ULV
VLV
SHIFT
C85
10p(Italy)
12p(Other versions)
C149
15p(Italy)
18p(Other versions)
GND
VLO
ULO
VTUNE
HV
HUL
HDATA
LUL
HCK
HPLST
MOD
SPG
HTXC
EXTSP
LTXC
REMOTE
LIOST
EXTSPR
LDATA
VCC
LCK
LPLST
EXTMIC
+3C
J1
J2
J3
J4
J5
J6
J7



U VCO BOARD
U VCO-2F BOARD
V VCO BOARD
IC1 μPD3140GS
IC4 BU4094BCFV
IC5 UPD3140GS
IC7 TC4S11F
X1 CR-456
1ST LO
ULO OUT
UPLL LO
VLO OUT
VLV
VPLL
VTUNE
VMOD
VELOW
UELO
U3SC
VV3SC
V3SC
SHIFT
V/V: 3.5V
OTHER: 0V
UHF
RX: 0V
TX: 3.5V
VHF
RX: 0V
TX: 3.8V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