ICOM

SERVICE MANUAL

DUAL BAND FM TRANSCEIVER

IC-W21AT
IC-W21ET

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the IC-W21A/E DUAL BAND FM TRANSCEIVER at the time of publication.

MODEL	VERSION No.	VERSION	SYMBOL
IC-W21AT	#25	U.S.A.	USA
	#27	Australia	AUS
	#29	Asia	SEA
IC-W21ET	#22	Europe	EUR
	#23	U.K.	UK
	#24	Italy	ITA
	#32	Denmark	DEN

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>

1140003590	IC	HD404629A57H	IC-W21AT	LOGIC UNIT	5 pieces
8810005360	Screw	PH M2 x 3 ZK	IC-W21ET	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 – 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

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

SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage :

MODEL	VERSION	FREQUENCY COVERAGE	
		VHF	UHF
IC-W21AT	U.S.A.	144–148 MHz (Tx) 138–174 MHz* (Rx)	440–450 MHz
	Australia	144–148 MHz	430–440 MHz
	Asia	144–148 MHz (Tx) 138–174 MHz* (Rx)	
IC-W21ET	Italy	144–148 MHz (Tx) 138–174 MHz* (Rx)	430–440 MHz
	Europe	144–146 MHz	
	U.K.		
	Denmark	144–146 MHz	432–438 MHz

* Guaranteed frequency coverage is 144–148 MHz.

- Mode : F3E (FM)
- Antenna impedance : 50 Ω (nominal)
- Usable temperature range : –10°C to +60°C (+14°F to +140°F)
- Frequency stability : ±5 ppm (0°C to +50°C; +32°F to +122°F)
- External DC power supply : 6–16 V DC (negative ground)
- Current drain (Typical) :

CONDITION			VHF	UHF
TRANSMIT (DC 13.5 V)	High		1.3 A	1.5 A
	Low 1		500 mA	600 mA
RECEIVE (DC 12.5 V)	MONO BAND	Power saved	15 mA*	20 mA*
		Rated audio output	150 mA	
	DUAL BAND	Power saved	35 mA*	
		Rated audio output	200 mA	

* Average value

- Dimensions (projections not included) : 57 (W) x 125 (H) x 35 (D) mm; 2.2 (W) x 4.9 (H) x 1.4 (D) in (with BP-130, BP-131 or BP-157)
  57 (W) x 153 (H) x 35 (D) mm; 2.2 (W) x 6.0 (H) x 1.4 (D) in (with BP-132)
- Weight : 390 g; 13.8 oz (with BP-157)
  : 380 g; 13.4 oz (with BP-130)

■ RECEIVER

- Sensitivity : Less than 0.16 μV for 12 dB SINAD
- Receive system : Double-conversion superheterodyne
- Intermediate frequencies : VHF; 1st 43.100 MHz, 2nd 455 kHz
  UHF; 1st 45.150 MHz, 2nd 455 kHz
- Selectivity : More than 15 kHz/ –6 dB, less than 30 kHz/ –60 dB
- Audio output power : More than 0.2 W at 10% distortion with an 8 Ω load and DC 13.5 V
- Spurious rejection : More than 60 dB (More than 45 dB at IF/2)

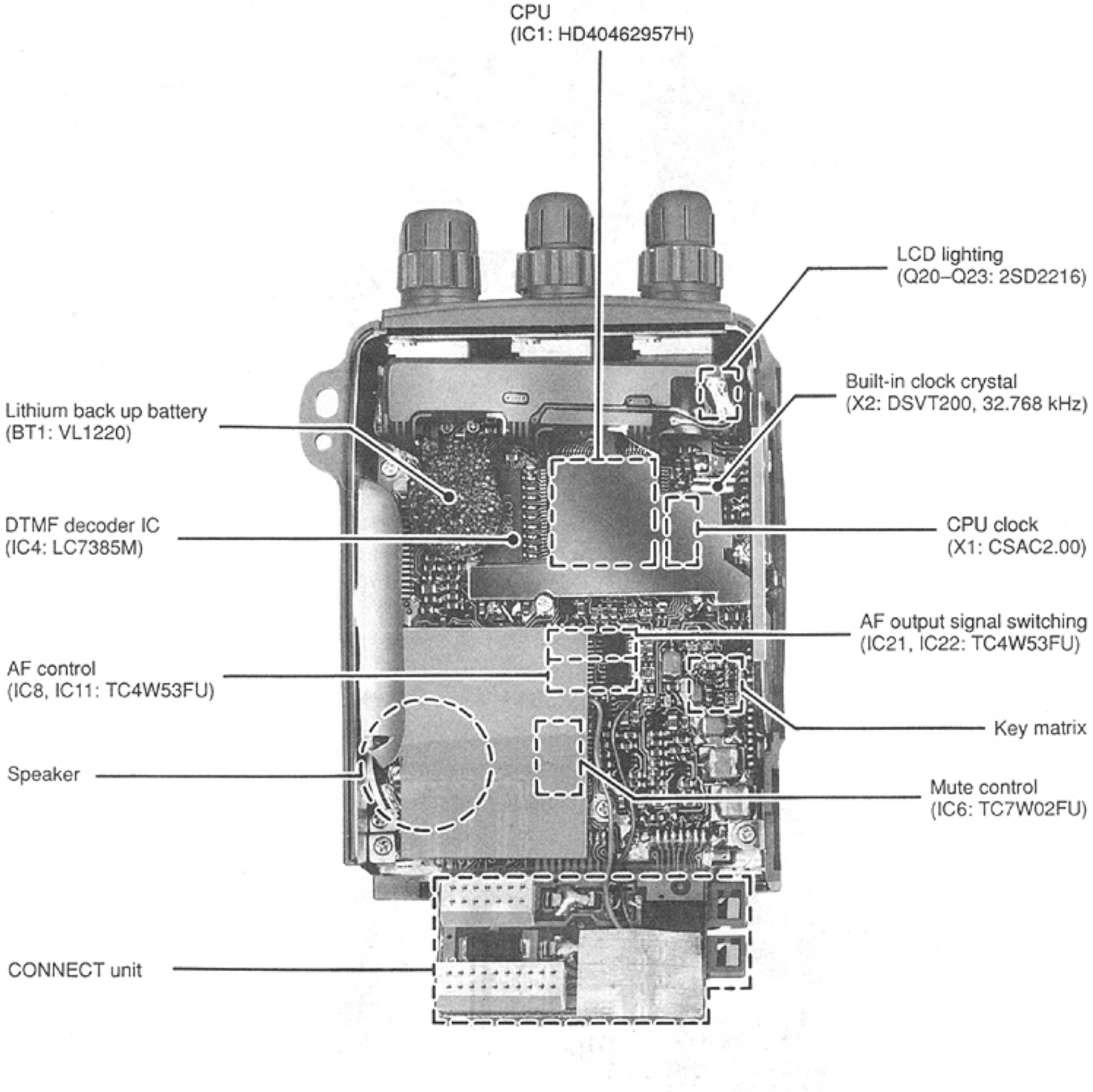
■ TRANSMITTER

- Output power (at 13.5 V) : 5 W (HIGH), 3.5 W (LOW3), 1.5 W (LOW2), 0.5 W (LOW1), 0.015 W (ELOW)*
  * DC power supply voltage of DC 7.2 V.
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ± 5 kHz
- Spurious emissions : Less than –60 dB (at 25°C; +77°F)
- Microphone impedance : 2 kΩ

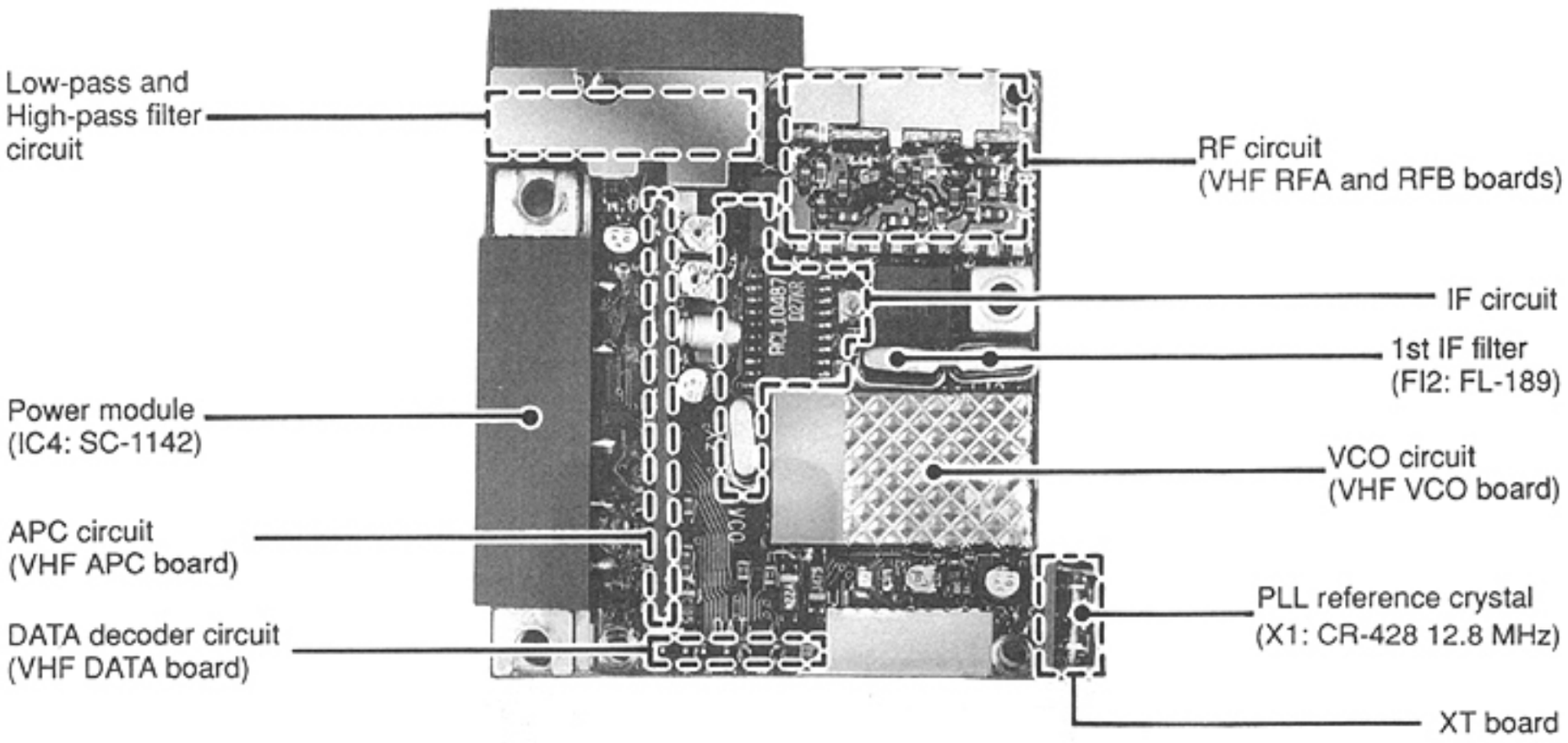
All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

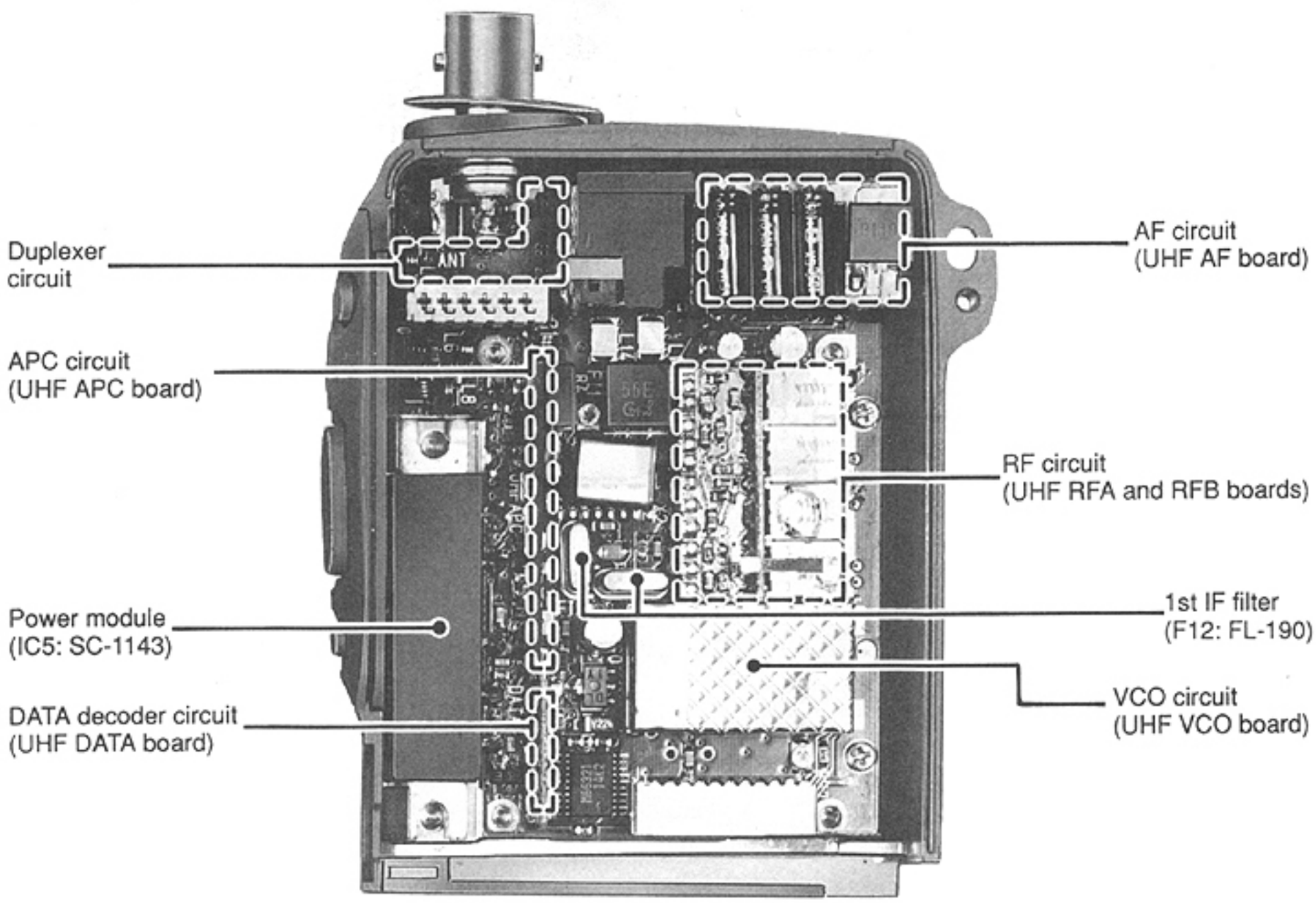
2-1 LOGIC UNIT



2-2 VHF RF UNIT

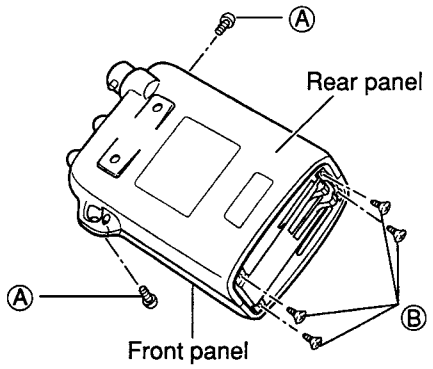


2-3 UHF RF UNIT



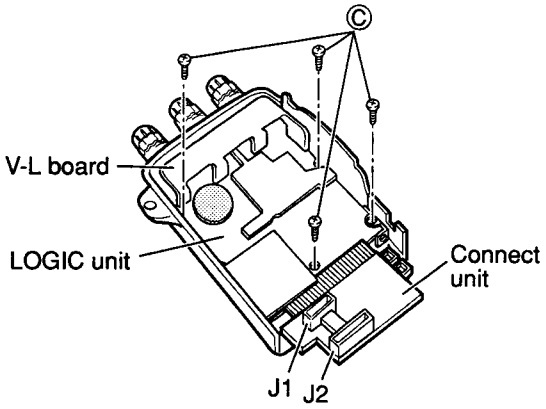
SECTION 3 DISASSEMBLY INSTRUCTIONS

Fig. 1 Remove the panel

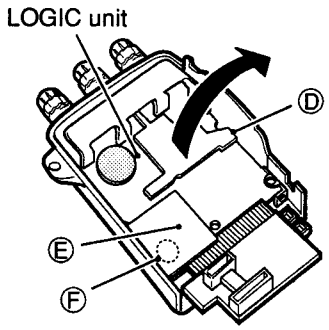


① Remove 2 screws, Ⓐ (black, 3 mm), and 4 screws, Ⓑ (flat head, 2.5 mm), to open the front panel.

Fig. 2 Remove the LOGIC unit



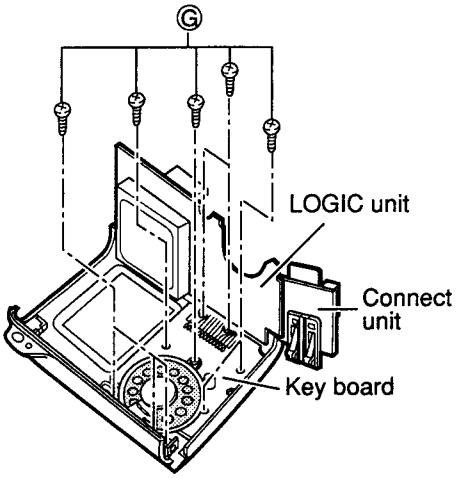
② Unplug J1 and J2 to separate front and rear panel, then remove 4 screws, Ⓒ (silver, 4.5 mm). Slide out the V-L board.



③ Take off Ⓔ (SP shield plate) and unsolder the point Ⓓ, Ⓕ (2 wires; speaker output wires) to remove the LOGIC unit from the front panel.

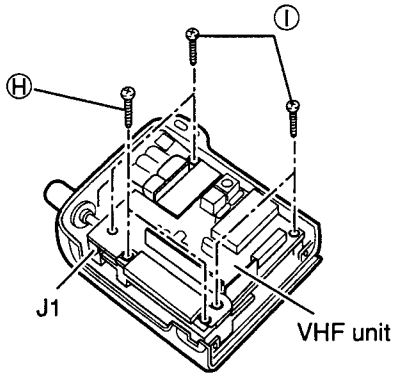
④ Turn the Logic unit in the direction of the arrow.

Fig. 3 Remove the key board



⑤ Remove 9 screws, Ⓖ (tapping, 1.4 x 4 mm).

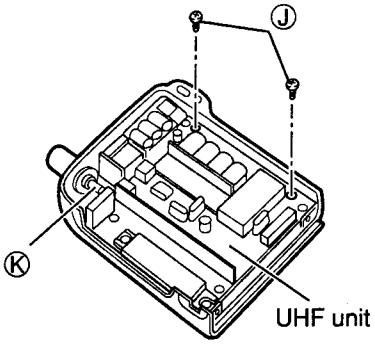
Fig. 4 Remove the VHF unit



⑥ Remove 6 screws, Ⓗ (14.5 mm x 2 pcs.) and Ⓘ (nickel, 14 mm x 4 pcs.).

⑦ Unplug J1 to remove the VHF unit and RF chassis plate.

Fig. 5 Remove the UHF unit



⑧ Remove 2 screws, Ⓙ (nickel, 2.5 mm), and unsolder the point Ⓚ to remove the UHF unit.

SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 DUPLEXER CIRCUIT (UHF RF UNIT)

The transceiver has a duplexer (low-pass and high-pass filter) on the first stage from the antenna connector to separate the signals into VHF and UHF signals. The low-pass filter (L16, L17, C52) for VHF signals and the high-pass filter (C40–C44, L11, L12) for UHF signals. The separated signals are applied to each RF circuit.

4-1-2 VHF ANTENNA SWITCHING CIRCUIT (VHF RF 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 D16 (except for at E-low power). 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.

4-1-3 VHF RF CIRCUIT (VHF RFA BOARD)

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 (L1, D2), and are applied to the RF amplifier (Q1, Q2). The RF amplifier consists of a cascade circuit. The amplified signals are passed through the next stage band-pass filter (L2, L3, D4, D5) to suppress unwanted signals. The filtered signals are then applied to the 1st mixer circuit (VHF RF unit Q5).

D2, D3 and D5 employ varactor diodes that 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 (VHF RF UNIT)

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

The signals from the VHF RFA board are mixed with the 1st LO signal from the VCO circuit (VHF VCO board) to produce a 43.10 MHz 1st IF signal.

After passing through the matching circuit (L1), the 1st IF signal is applied to a pair of crystal filters (FI2) to suppress out-of-band signals. The 1st IF signal is amplified at the IF amplifier (Q4) and applied to the 2nd mixer circuit (IC1).

4-1-5 U/U FUNCTION AMPLIFIER

For the U/U function, the VHF RF unit includes a UHF amplifier and a mixer circuit.

UHF RF signals from the UHF RF unit (via J2 U/U ANT terminal) are amplified at Q9 and Q8, and mixed with the PLL output at Q7. A doubled signal from the VHF VCO board is used as PLL output for UHF signal conversion. The mixed signal (43.10 MHz IF signal) is applied to an IF filter (FI2).

4-1-6 VHF 2ND IF AND DEMODULATOR CIRCUITS (VHF RF 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 FI2 is applied to the 2nd mixer section of IC1 (pin 20), 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 and quadrature detector circuits. The 2nd local oscillator section and X2 generate 42.645 MHz for the 2nd LO signal.

The 2nd IF signal (455 kHz) from the 2nd mixer (IC1 pin 4) passes through the ceramic filter (FI1) where unwanted signals are suppressed. It is then amplified at the limiter amplifier section (IC1 pin 6) and applied to the quadrature detector section (IC1 pin 9 and ceramic discriminator X1) to demodulate the 2nd IF signal into AF signals.

AF signals output from IC1 (pin 11) are applied to the AF amplifier (LOGIC unit Q16), DTMF decoder and optional tone squelch circuits (TSQL unit). The S-meter output "L SD" signal from IC1 (pin 12) is applied to the CPU (IC1 pin 2). See Figure 1.

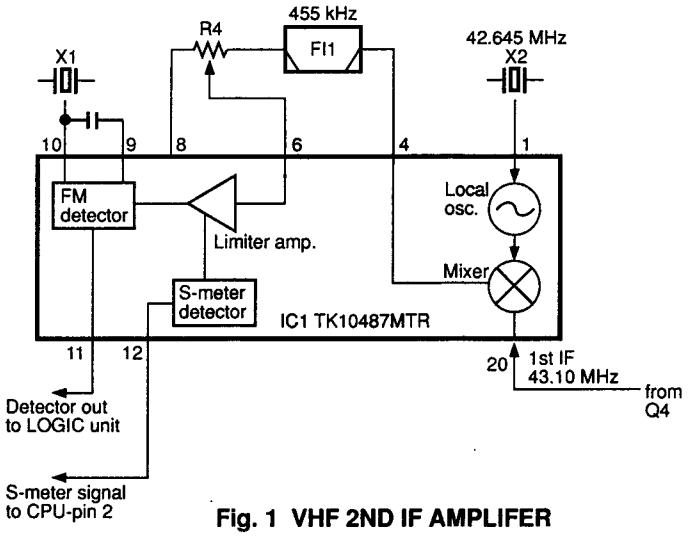


Fig. 1 VHF 2ND IF AMPLIFER

4-1-7 VHF AF AMPLIFIER CIRCUIT (LOGIC UNIT)

The AF amplifier circuit, including an AF mute switch, amplifies the demodulated signal to drive a speaker. For the separate speaker function, 4 multiplexers and a stereo power amplifier are used.

AF signals are applied to Q17. Q17b is an active filter that functions as a high-pass filter to suppress subaudible tone signals for tone squelch operation. Q17a is also an active filter that functions as a low-pass filter to suppress higher noise signals.

The filtered signals pass through the AF mute switch (Q18) and [VOL] control (R1) on the V-L board and are then applied to the multiplexers (IC8 and IC22). When the VHF audio is selected to the internal speaker by the separate speaker function, AF signals are applied to the one of the separate inputs of the stereo AF power amplifier (AF board IC1 pin 6); when the external speaker is selected, AF signals are applied to IC1 pin 7. See Figure 2.

4-1-8 VHF NOISE SQUELCH (LOGIC 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 IC1 (VHF RF unit pin 11) are applied to the noise amplifier (IC7). The [L SQL] control, R1 on the V-L board, adjusts the IC7 input level.

The noise amplifier (IC7) amplifies noise components of frequencies of 20 kHz and above. Output signals are rectified by D12 for conversion to DC voltage.

The rectified voltage triggers the squelch switch (Q10a). The squelch switch sets the "LBUSY" line "HIGH/LOW" to apply the signal to the CPU (IC1 pin 41). Then the CPU outputs the L-MUTE and BUSY LED signals.

The L-MUTE signal, decoded at the output expander (IC3), activates the AF mute circuit (Q18) to cut the VHF AF signals. The BUSY LED signal is applied to the LED drive (Q4).

The voltage regulator (AF board Q1, Q2) supplies power to the AF power amplifier. The AF ON signal from the data expander (LOGIC unit IC2) controls Q2 (AF board) to reduce the current drain while the squelch is closed.

4-1-9 UHF RF CIRCUIT (UHF RF UNIT AND UHF RFA BOARD)

Antenna-in signals are divided between VHF RF signals and UHF RF signals at the duplexer (L11, L12, C40–C44, L16, L17, C52).

The UHF RF signals are passed through the band-pass filter (L8–L12, C35–C44) and antenna switching circuit (L5, L6, D5, D6, D15, C30, C31). The UHF RF signals are then amplified at the RF amplifiers (Q2, Q1). Helical band-pass filters (L2, L1) are used at the last stage of these amplifiers.

4-1-10 V/V FUNCTION AMPLIFIER (UHF RF UNIT)

For the V/V function, the UHF RF unit includes a VHF amplifier circuit.

VHF RF signals from the VHF RF unit (via J2 V/V ANT terminal) are amplified at IC7 and applied to the 1st mixer (Q2) to be converted to a 1st IF signal. The UHF VCO circuit has a doubler circuit (UHF VCO2F board Q2) for UHF band operation. However, a buffer amplifier (Q1) is used instead of the doubler for VHF receiving.

4-1-11 UHF 1ST MIXER AND 1ST IF CIRCUIT (UHF RF UNIT)

The signals from the UHF RFA board are mixed at Q2 with a 1st LO signal coming from the UHF VCO circuit (UHF VCO2F board Q1) to produce a 45.15 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 UHF 2ND IF AND DEMODULATOR CIRCUITS (UHF RF UNIT)

A 2nd mixer, 2nd IF, 2nd local oscillator, limiter amplifier, quadrature detector circuit and S-meter detector circuit are incorporated in the IC1. The 2nd local oscillator section and X2 generate a 45.605 MHz for the 2nd LO signal.

A 45.605 MHz signal is mixed with the 1st IF 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 pins 5, 8 and ceramic discriminator X1) to demodulate the 2nd IF signal into an AF signal.

The signal is output from IC1 (pin 9) as a "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 IC1 (pin 13) on the UHF RF unit.

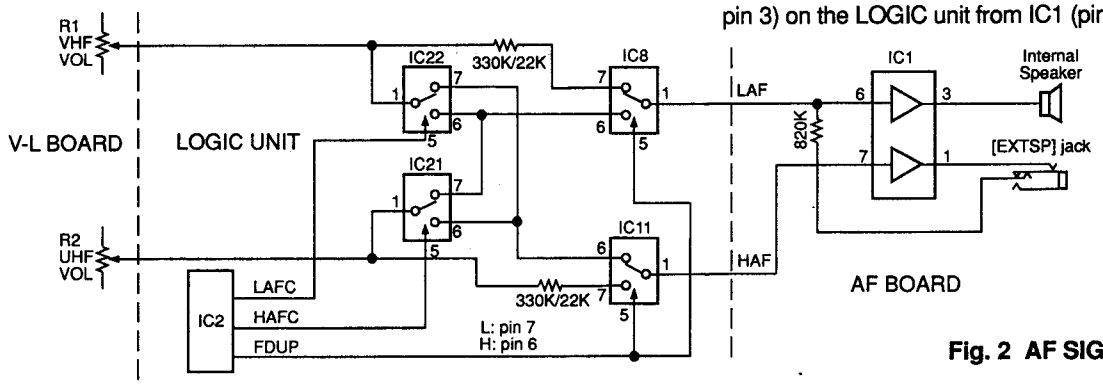


Fig. 2 AF SIGNAL LINE

4-1-13 UHF AF CIRCUIT (LOGIC UNIT)

The AF "HDET" signals from IC1 (pin 9) on the UHF RF unit are applied to the active filter (Q12) on the LOGIC unit. The filtered signals pass through the AF mute switch (Q13) and [H VOL] control (R2) on the V-L board and are then applied to the AF power amplifier (IC1) on the AF board via the multiplexers (IC11, IC21).

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

Some of the noise components in the AF signal from IC1 (pin 9) on the UHF RF unit are applied to the noise amplifier (IC10). The [H SQL] control, R2 on the V-L board, adjusts the IC10 input level. IC10 amplifies noise components and D7 rectifies them for conversion to DC voltage.

The rectified voltage triggers the squelch switch (Q10b). The squelch switch controls the "HBUSY" signal to inform the CPU (IC1 pin 24).

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, pass thorough the microphone selector (IC19 pins 6, 1) and are then applied to the microphone amplifier (IC17a pin 3).

The output signals from IC17a (pin 1) pass through the AF selector (IC18 pins 6, 1) and are then applied to the splatter filter (IC17b pin 5) where signal components greater than 3 kHz are attenuated. The output signals from IC17b (pin 7) are then separately applied to the VHF VCO circuit (VHF VCO board) as an "L MOD" signal and to the UHF VCO circuit (UHF VCO board) as an "H MOD" signal.

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

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

The "L MOD" signal changes the reactance of a diode (D2) to modulate the oscillated signal at the VHF VCO circuit (Q1, Q2, D1). The VCO output is buffer-amplified at Q3 and Q16 on the VHF RF unit and is then applied to the transmit/receive switching circuit (D4, D5) on the VHF RF unit.

4-2-3 VHF DRIVE AMPLIFIER CIRCUIT (VHF RF UNIT)

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

The signal from the transmit/receive switching circuit (D5) is amplified at the drive amplifiers (Q17, Q18) to obtain approx. 15 mW.

When low power (E LOW) is selected, the output of the drive amplifier (Q18) bypasses the RF power amplifier through D7. The signal is passed through the low-pass filter (C38–C40, L6, L7) and is then applied to the antenna connector. At this point, half of the antenna switching circuit (D1) is turned OFF to prevent the output power from entering the receiver circuit.

4-2-4 VHF POWER AMPLIFIER CIRCUIT (VHF RF UNIT)

IC4 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 drive amplifier (Q18) is applied to IC4. The amplified signal is then applied to the antenna connector via the transmit/receive switching circuit (D12) and band-pass filter.

4-2-5 VHF APC CIRCUIT (VHF RF UNIT AND VHF APC BOARD)

The APC circuit protects the power module (IC4) from a mismatched output load and selects HIGH, LOW1, LOW2 or LOW3 output power.

When the antenna impedance is matched at 50 Ω, the voltage detected at the APC detector circuit (L16, D9, D10, D11) is at its minimum. The detected voltage is applied to an APC amplifier Q4b on the VHF APC board.

When the antenna impedance is mismatched, the base voltage of Q4b is higher than the other base voltage of Q4a (reference voltage), resulting in a decrease in the collector current of Q4. This current controls the diode attenuator (VHF RF unit D6) using Q5 until the base voltage of Q4b reaches the same level as that of Q4a. See Figure 3.

Low output power is obtained by changing the reference voltage via the VAP line. The voltage of the VAP line is controlled by two ports of the data expander (VHF RF unit IC2). A thermistor (R3) controls APC reference voltage to reduce the output power when the temperature is increased.

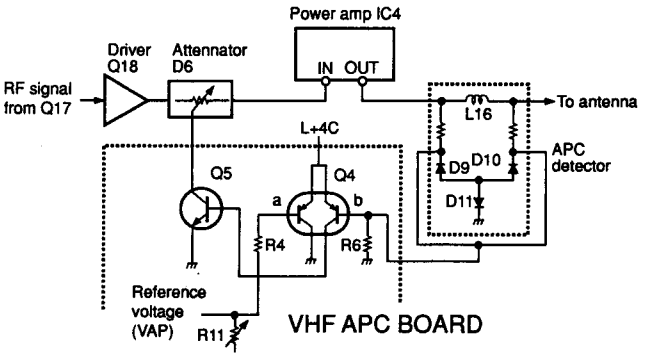


Fig. 3 VHF APC CIRCUIT

4-2-6 VHF ANTENNA SWITCHING CIRCUIT (VHF RF UNIT)

The antenna switching circuit applies receive signals to the receiver circuit and transmit signals to the antenna connector.

When transmitting, D12 and D16 are turned ON. The RF output signal is applied to the antenna connector via D12 and the low-pass filter (L8, L9, C42, C44, C46, C101, C102). At this time, D16 is also turned ON to activate the low-pass filter (L6, L7, C38–C40) as a resonator circuit.

4-2-7 UHF MODULATION CIRCUIT (UHF VCO1F/2F BOARD)

The audio signals from the microphone amplifier circuit (described in Section 4-2-1) are applied to D1 on the UHF VCO1F board.

The audio signals change the reactance of a varactor diode (D2) to modulate the oscillated signal (200 MHz band) at the UHF VCO1F circuit (Q1, Q2). The oscillated signal is amplified at Q3 and doubled at Q2 (UHF VCO2F board). The signal (400 MHz band) is amplified at the buffer amplifier (UHF RF unit Q13) and then applied to the drive amplifiers (Q15, Q16).

4-2-8 UHF POWER AMPLIFIER CIRCUIT (UHF RF UNIT)

IC5 is a power module which provides a stable 5 W (DC 13.5 V) of output power.

The drive amplifier (Q15, Q16) and power amplifier (IC5) amplify the VCO oscillating signal to an output level. The output signal passes through the APC detector circuit (D12–D14) and band-pass filter, and is applied to the antenna connector.

4-2-9 UHF APC CIRCUIT (UHF APC BOARD)

The APC circuit detects the output signal from the power module on the UHF RF unit. Q4 compares the voltages detected by the APC detector and the reference voltages. When a voltage detected by APC exceeds a reference voltage, Q4 increases D12 attenuation using Q5 to reduce the RF output power.

4-3 PLL CIRCUITS

4-3-1 GENERAL (VHF AND UHF RF UNITS)

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

The PLL circuit, using a one chip PLL IC (VHF IC3, UHF IC4), directly generates the transmit frequency and receive 1st LO frequency with a VCO. The PLL IC sets the divided ratio based on serial data from the CPU on the LOGIC unit and compares the phases of a VCO signal and the reference oscillator frequency. The PLL IC detects the out-of-step phase and output from pins 15 and 16. The reference frequency (12.8 MHz) is oscillated at X1 on the VHF XT board.

4-3-2 VHF PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (VHF RF UNIT)

The VCO generated signal enters the PLL IC (IC3 pin 8) and is divided at the programmable divider section and is then applied to the phase detector section.

The phase detector compares the input signal and a reference frequency and outputs the out-of-phase signal (pulse-type signal) from pin 15 and 16.

4-3-3 VHF CHARGE PUMP AND LOOP FILTER CIRCUITS (VHF RF UNIT)

The phase detected signal is amplified at the charge pump (Q11, Q12). This signal is converted to DC voltage at the loop filter (R49–R51, C51–C54) and is applied to a varactor diode (D2) in the VHF VCO circuit to control and stabilize the oscillated frequency.

4-3-4 VHF VCO CIRCUIT (VHF VCO BOARD)

A VCO circuit generates receive and transmit frequencies at Q1, Q2, L2 and D2, and produces FM modulation.

The frequency shift signal from the data expander (IC2 pin 13) turns Q14 (VHF RF unit) and D1 (VHF VCO board) ON or OFF to switch the VCO frequency between transmitting and receiving.

4-3-5 REFERENCE OSCILLATOR CIRCUIT (VHF XT BOARD)

A 12.8 MHz reference frequency is generated by the oscillator (VHF XT board X1). The reference frequency is applied to both the VHF and UHF PLL circuits.

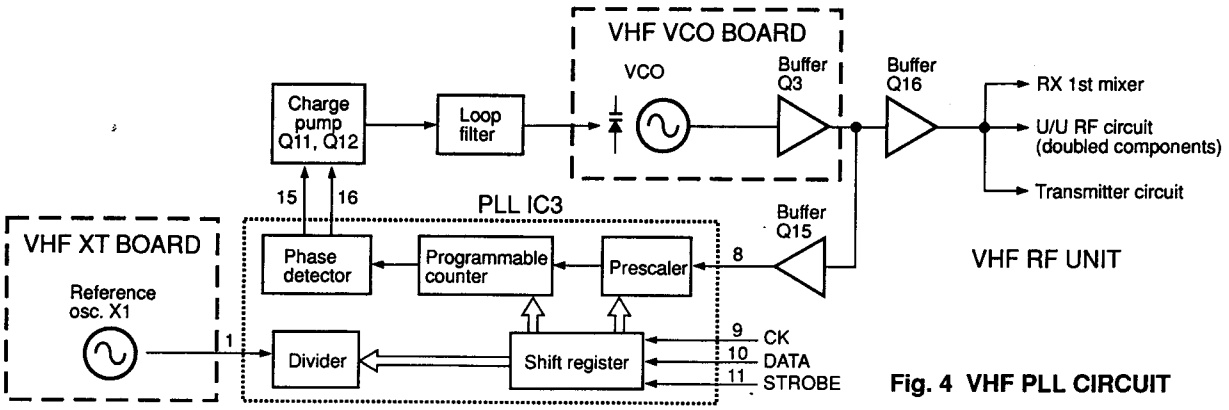


Fig. 4 VHF PLL CIRCUIT

4-3-6 UHF PLL CIRCUITS (UHF RF UNIT)

The VCO oscillated signal is buffer amplified at Q3 on the UHF VCO1F board and pass through a doubler circuit (Q2) on the VCO2F board, is amplified at Q11, and it is then applied to the PLL IC (IC4 pin 8).

This signal is divided at the programmable divider section and is then applied to the phase detector section inside IC4. A reference frequency is also applied to IC4 from X1 (VHF XT board), and the phase detector outputs the phase difference between the divided signal and the reference frequency via pin 15 and pin 16.

This out-of-phase signal is amplified at the charge pump (Q9, Q10) and is then converted to DC voltage by the loop filter (R38–R40, C69–C71).

The converted voltage is applied to a varactor diode (D2) of the VCO circuit on the UHF VCO1F board to control and stabilize the oscillated frequency.

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 (UHF) and IC2 (VHF). The tone signal reply to the data signal is output from IC1 (UHF pin 16) or IC2 (VHF pin 16) and is applied to the microphone amplifier (IC17a) through the modulation switch (IC18). R13 adjusts the deviation level.

DECODER FUNCTION

The received signal from the HDEF (LDEF) signal line is applied to the active low-pass filter Q6 (Q7) and then to pin 24 of IC1 (IC2). The filtered signal is compared with the programmed tone signal. Pin 13 of IC1 (IC2) becomes "LOW" when the received signal includes the same tone as the programmed tone frequency.

4-4-2 VOLTAGE LINES (VHF AND UHF RF UNITS)

VCC	This voltage is supplied from a battery pack or external DC power supply (DCJ board).
L M4C	VHF band common +4 V is produced at Q20, Q21 and D13 from the VCC using a +4 V reference voltage from the LOGIC unit (IC13). This 4 V is used for the charge pump and is controlled by the power save function (IC2, pin 19). This voltage provides quicker stand-up than L +4S when switching to transmit.
L R4S	VHF band receive 4 V is produced at Q24, Q25 and D14 using an LR4C voltage from the VHF DATA board (IC3). This voltage is used for the receiver circuit and is controlled by the PSC (power save control) and SEND lines.
L +4S	VHF band 4 V produced at Q26, Q27 and D15 using an L4SC voltage from the VHF DATA board (IC2). This voltage is used for the PLL circuit and is controlled by the PSC (power save control).
L T+4	VHF band transmit 4 V produced at Q1, Q2 and D1 on the VHF APC board using an LT4C from the VHF DATA board (IC4). This voltage is used for the transmitter circuit and is controlled by the inverted SEND and TMT (transmit mute) lines.
H M4C	UHF band common +4 V is produced at Q18, Q19 and D16 from the VCC using a +4 V reference voltage from the LOGIC unit (IC13). This 4 V is used for the charge pump and is controlled by the power save function (IC3, pin 19). This voltage provides quicker stand-up than H +4S when switching to transmit.
H R4S	UHF band receive 4 V is produced at Q22, Q23 and D18 using an HR4C voltage from the UHF DATA board (IC3). This voltage is used for the receiver circuit and is controlled by the PSC (power save control) and SEND line.
H +4S	UHF band 4 V produced at Q20, Q21 and D17 using an H4SC voltage from the UHF DATA board (IC2). This voltage is used for the PLL circuit and is controlled by the PSC (power save control).
H T+4	UHF band transmit 4 V produced at Q1, Q2 and D1 on the UHF APC board using an HT4C from the UHF DATA board (IC4). This voltage is used for the transmitter circuit and is controlled by the inverted SEND and TMT (transmit mute) lines.

4-5 PORT ALLOCATIONS

4-5-1 CPU (LOGIC UNIT)

1	AVCC	Power source input for A/D converter.
2	LSD	Input port for a VHF S-meter detection signal.
3	HSD	Input port for a UHF S-meter detection signal.
4	VIN	Input port for the CPU power source.
5	REMOTE	Input port for optional HM-75 remote control signal.
7	TEST	Not used.
8, 9	OSC1, 2	Clock oscillator terminals for a CPU clock.
10	RESET	CPU is initialized when this port receives "LOW."
11, 12	X1, X2	Clock oscillator terminals for clock/timer function.
14	LTSQLSTB	Outputs a strobe signal for a VHF tone squelch.
15	LIOSTB	Outputs a strobe signal to the VHF data expander IC (VHF RF unit, IC2).
16	LPLSTB	Outputs a strobe signal to the VHF PLL IC (VHF RF unit, IC3).
17	CLOCK	Outputs a serial clock signal for the VHF band's data expander and PLL IC.
18	DATA	Outputs serial data for the VHF band.
19	HTSQLSTB	Outputs a strobe signal for the UHF tone squelch.
20	HIOSTB	Outputs a strobe signal to the UHF data expander IC (UHF RF unit, IC3).
21	HPLSTB	Outputs a strobe signal to the UHF PLL IC (UHF RF unit, IC4).

22	HCK	Outputs a serial clock signal for the UHF band's data expander and PLL IC.
23	H DATA	Outputs serial data for the UHF band.
24	H BUSY	Input port for the UHF noise squelch condition. "HIGH": Squelch open. "LOW" : Squelch close.
25	POWER	Input port for the [F] key. "LOW": [F] key pushed.
26	INT	CPU enters backup mode when this port receives "LOW."
27	BUSYLED	Outputs the receive LED signal.
28	PCON	Outputs the power save control signal.
29	PTT	Input port for the [PTT] switch.
30	DTC	Input port for the POWER switch. The transceiver starts operation when this port receives "HIGH" for 1sec.
31	TONE	Outputs a 1750 Hz tone call signal.
32	BEEP	Outputs a beep signal.
34–39	KR0–KR5	Input ports for the key matrix. Also used for DTMF data input.
40	IOSTB	Outputs a strobe signal to data expanders (LOGIC unit, IC2 and IC3).
41	LBUSY	Input port for the VHF noise squelch condition. "HIGH": Squelch open. "LOW" : Squelch close.
42–93	COM1, COM2, COM3, COM4	Used to drive LCD output.
94	V1	Input port for LCD driver power source.
97	VCC	Input port for the CPU power source.
98, 99	TONE C TONE R	Output DTMF row and column signals.
100	VTREF	Input port for DTMF encoder power source.

4-5-2 DATA EXPANDER (LOGIC UNIT, IC2)

8	FDUP	Outputs the audio level switching signal for the whisper function.
9	CONT	Outputs LCD contrast signal.
11	L MUTE	Outputs a VHF band audio mute signal.
12	H MUTE	Outputs a UHF band audio mute signal. "HIGH": audio mute
13	MICM	Outputs a microphone mute signal. "HIGH": mic mute
14	MICC	Outputs a microphone amplifier control signal.
15	LIGHT	Outputs the LCD backlight signal. "HIGH": lights.
16	TXLED	Outputs the transmit LED signal.
17	PD	Outputs a DTMF encoder power control signal.
18	TOE	Outputs an enable signal for the DTMF decoder IC4.
19	INSEL	Outputs a DTMF audio selector signal. "HIGH": UHF band "LOW" : VHF band

4-5-3 DATA EXPANDER 2 (LOGIC UNIT, IC3)

8	HAFC	Outputs UHF band's separate speaker function signal. "HIGH": External speaker "LOW" : Internal speaker
9	LAFC	Outputs VHF band's separate speaker function signal. "HIGH": Internal speaker "LOW" : External speaker
11, 12	I0, I1	Output an initial matrix signal.
13–17	S0, K0–K3	Output key matrix signal.
18	H MONI	Outputs a UHF band's receive mute control signal.
19	L MONI	Outputs a VHF band's receive mute control signal.
20	AFON	Outputs the AF power amplifier control signal. "HIGH": AF amp activates. "LOW" : AF amp deactivates.

4-5-4 DATA EXPANDER 3 (VHF RF UNIT, IC2)

8, 9	VAP	Output transmit power (low1–low3) selector signals.
11	HIGH	Outputs transmit power (high or low) selector signal.
12	ELOW	Outputs transmit power (ELOW) selector signal.
13	SHIFT	Outputs VCO shift signal for transmit frequency.
15	U/U	Outputs U/U function control signal. "LOW" : Function ON.
16	$\overline{\text{SEND}}$	Outputs an inverted send signal. "HIGH": transmit
17	TMT	Outputs transmit mute signal. "LOW" : transmit mute
18	SEND	Outputs transmit control signal. "LOW" : transmit
19	PSC	Outputs power save control signal.

4-5-5 DATA EXPANDER 4 (UHF RF UNIT, IC3)

8, 9	USC	Output transmit power (low1–low3) selector signal.
11	VB	Outputs V/V function control signal. "LOW" : Function ON
12	ELOW	Outputs transmit power (ELOW) selector signal.
13	SHIFT	Outputs VCO shift signal for transmit frequency.
16	$\overline{\text{SEND}}$	Outputs an inverted send signal. "HIGH": transmit
17	TMT	Outputs transmit mute signal. "LOW" : transmit mute
18	SEND	Outputs transmit control signal. "LOW" : transmit
19	PSC	Outputs power save control signal.

SECTION 5 ADJUSTMENT PROCEDURES

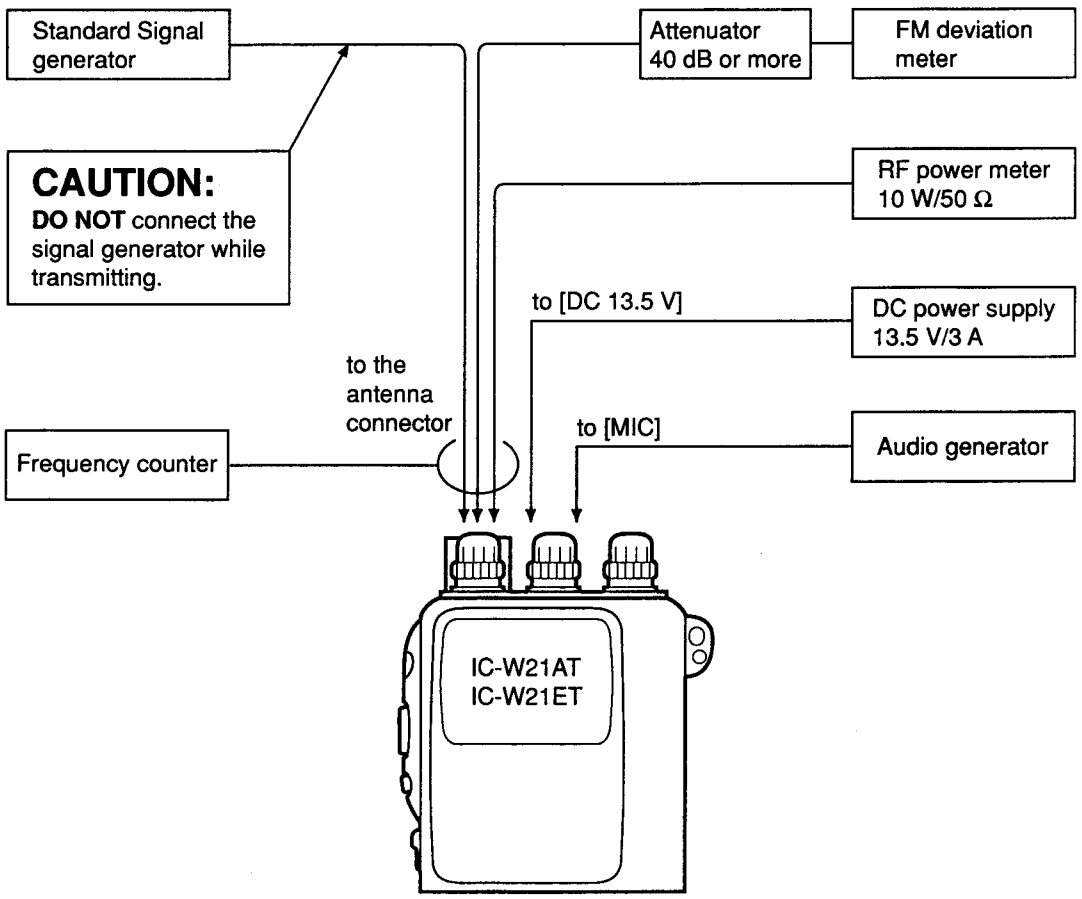
5-1 PREPARATION BEFORE SERVICING

■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 : 0.1–500 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

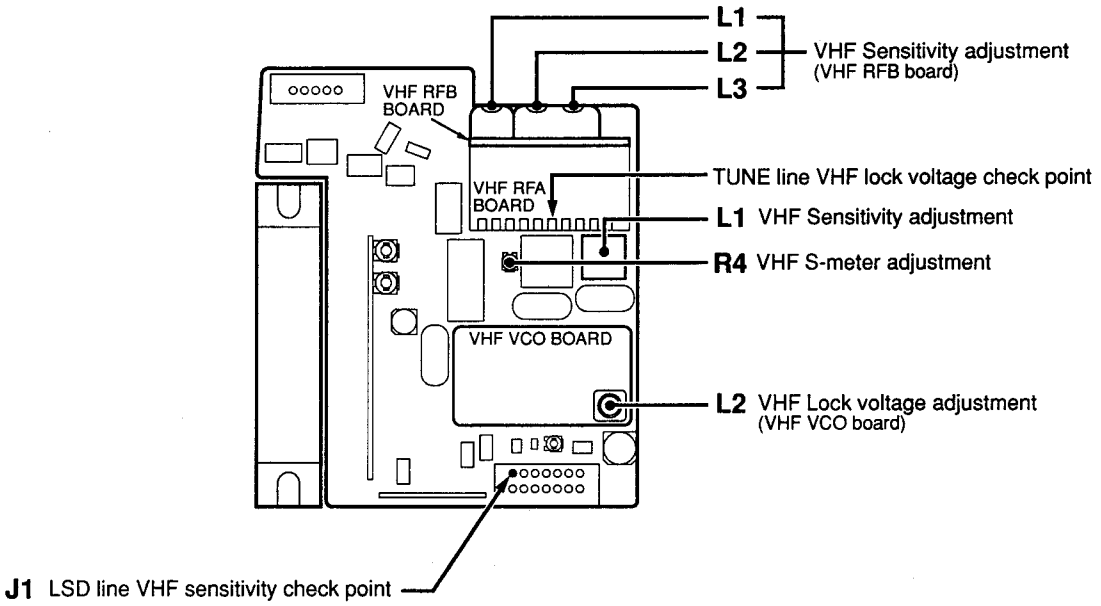
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF LOCK VOLTAGE	1	● Displayed frequency: 145.000 MHz ● Adjust either the transmit lock voltage or receive lock voltage (whichever is higher).	VHF RFA	Connect the DC voltmeter to the TUNE line.	1.9 V	VHF VCO	L2
	2				1.4 V ± 0.4 V after a foil is attached.		Verify
UHF LOCK VOLTAGE	1	● Displayed frequency: 440.000 MHz (USA) 438.000 MHz (Denmark) 430.000 MHz (All other versions) ● Adjust either the transmit lock voltage or receive lock voltage (whichever is higher).	UHF RF	Connect the DC voltmeter to the LV.	2.6 V (USA) 2.5 V (Denmark) 2.0 V (All other versions)	UHF VCO 1F	L2
REFERENCE FREQUENCY	1	● Displayed frequency: 440.000 MHz ● Transmitting	Top panel	Loosely couple the frequency counter to the antenna connector.	440.000 MHz ±500 Hz	UHF RF	Verify

5-3 RECEIVER ADJUSTMENT

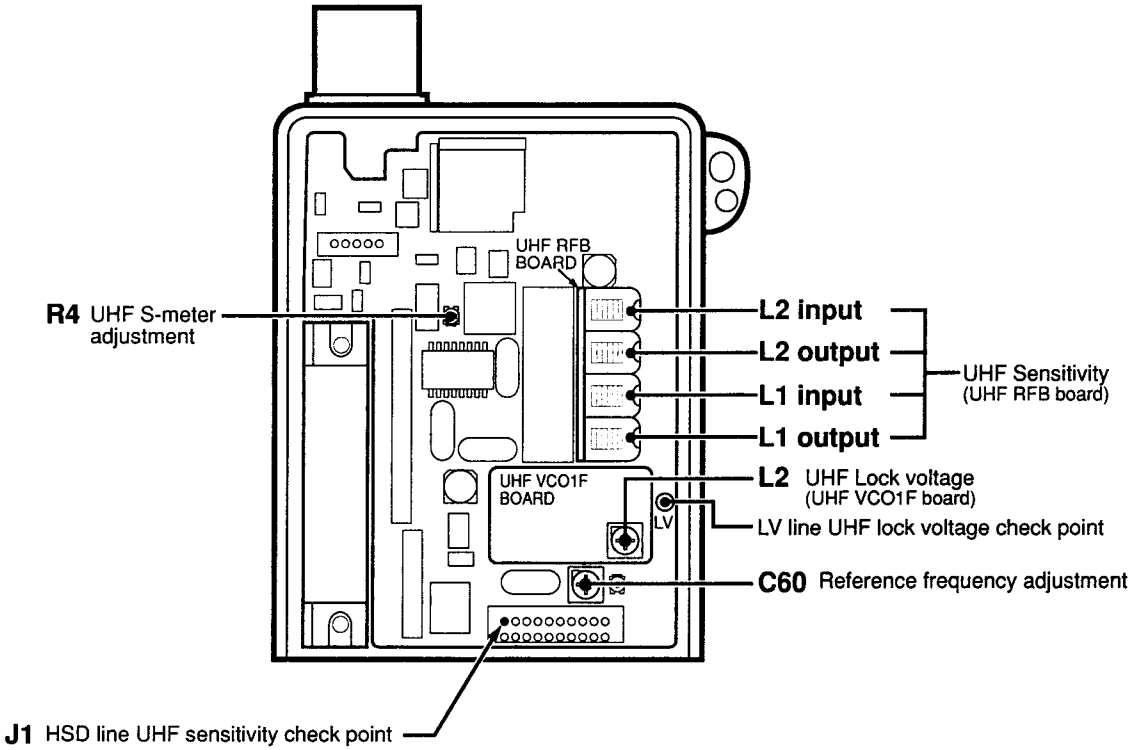
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF SENSITIVITY	1	● Displayed frequency: 145.000 MHz ● Connect the SSG to the antenna connector and set as: Level : 1.0 μV* (–107 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz ● [VHF SQL] control : CCW ● Receiving	VHF RF	Connect the oscilloscope to the LSD line of J1.	Maximum DC voltage	 VHF RFB VHF RF	Adjust in sequence L1, L2, L3 L1
VHF S-METER	1	● Displayed frequency: 145.000 MHz ● Connect the SSG to the antenna connector and set as: Level : 0.5 μV* (–113 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz ● Receiving	LCD display	S/RF indicator	S3 (3 dots)	VHF RF	R4
UHF SENSITIVITY	1	● Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) ● Connect the SSG to the antenna connector and set as: Level : 1.0 μV* (–107 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz ● [UHF SQL] control : CCW ● Receiving	UHF RF	Connect the oscilloscope to the HSD line of J1.	Maximum DC voltage Adjust in sequence L1 : input L2 : output L1 : output L2 : input	UHF RFB	L1 : input L2 : output L2 : input
	2	● Displayed frequency: 440.500 MHz (USA) 430.500 MHz (All other versions)					L1 : output
UHF S-METER	1	● Displayed frequency: 445.000 MHz (USA) 435.000 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	LCD display	S/RF indicator	S3 (3 dots)	UHF RF	R4

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

• **VHF RF UNIT**



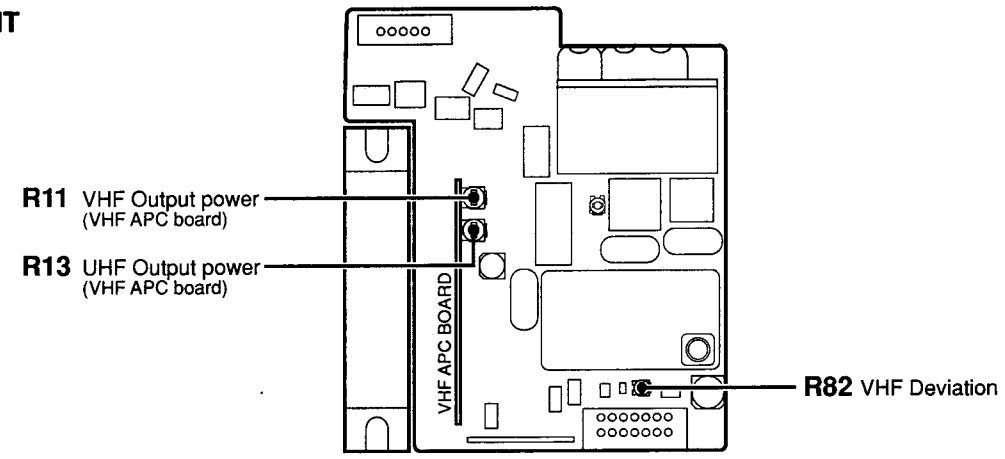
• **UHF RF UNIT**



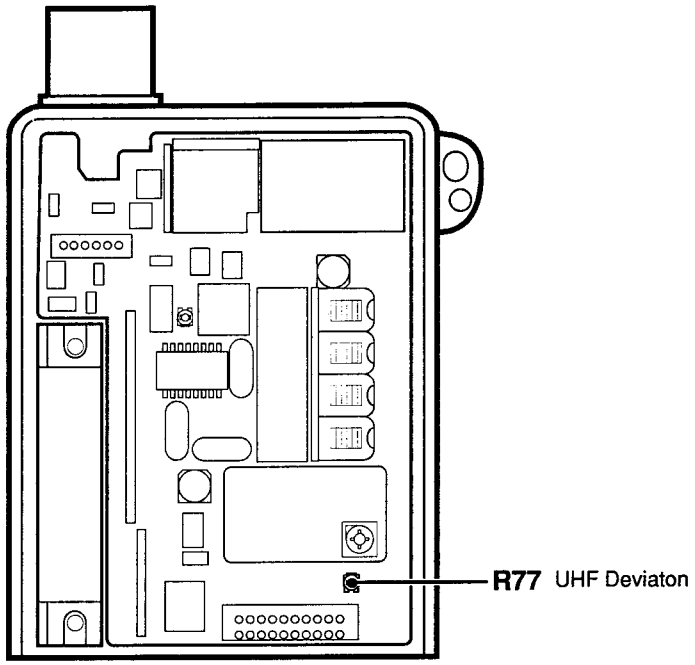
5-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
VHF OUTPUT POWER	1	● Displayed frequency 145.000 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	VHF APC	R11
VHF DEVIATION	1	● Displayed frequency: 145.000 MHz ● Connect the audio generator to the [MIC] connector and set as: 190 mV/1.0 kHz (USA) 95 mV/1.0 kHz (All other versions) ● 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.	±4.5 kHz	VHF RF	R82
UHF OUTPUT POWER	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	VHF APC	R13
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: 190 mV/1.0 kHz (USA) 95 mV/1.0 kHz (All other versions) ● 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.	±4.5 kHz	UHF RF	R77
DTMF DEVIATION	1	● Displayed frequency: 445.000 MHz (USA) 435.000 MHz (All other versions) ● While pushing [F], [MONI] and [LIGHT] keys, turn power ON. ● Push [RPT] key while transmitting.	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±3.5 kHz	LOGIC	R21
TONE CALL DEVIATION (IC-W21E 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	R33
TONE SQL DEVIATION (USA only)	1	● Displayed frequency : 445.000 MHz (USA) ● Tone frequency : 88.5 Hz ● Tone encoder : ON ● Transmitting ● Apply no signal to the [MIC] connector	Top panel	Connect the FM deviation meter to the antenna connector through the attenuator.	±0.75 kHz	TSQL	R13

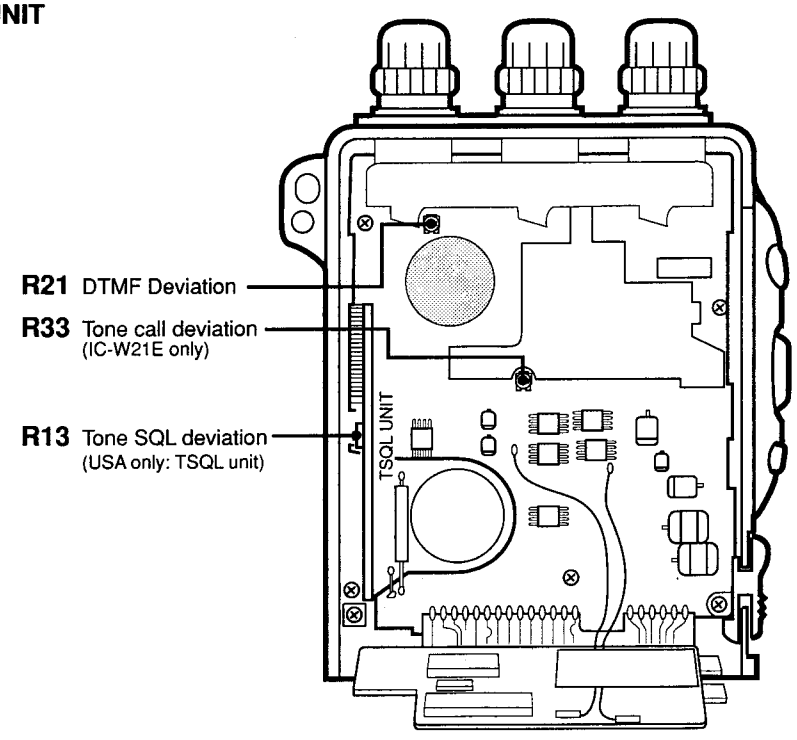
• **VHF RF UNIT**



• **UHF RF UNIT**



• **LOGIC UNIT**



SECTION 6 PARTS LIST

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1140003490	S.IC	HD404629A57H
IC2	1150001100	S.IC	M66321GP-30AD
IC3	1150001100	S.IC	M66321GP-30AD
IC4	1130004330	S.IC	LC7385M
IC5	1130006220	S.IC	TC4W53FU (TE12L)
IC6	1130007060	S.IC	TC7W02FU (TE12L)
IC7	1110002400	S.IC	NJM2107F (TE1)
IC8	1130006220	S.IC	TC4W53FU (TE12L)
IC10	1110002400	S.IC	NJM2107F (TE1)
IC11	1130006220	S.IC	TC4W53FU (TE12L)
IC12	1130006550	S.IC	TC7S08FU (TE85R)
IC13	1180001000	S.IC	S-81240PG-PJ-T1
IC14	1130006550	S.IC	TC7S08FU (TE85R)
IC15	1110003170	S.IC	S-80735SL-AZ-T1
IC17	1110002490	S.IC	M5218FP-73A
IC18	1130006220	S.IC	TC4W53FU (TE12L)
IC19	1130006220	S.IC	TC4W53FU (TE12L)
IC20	1130006890	S.IC	TC7S04FU (TE85R)
IC21	1130006220	S.IC	TC4W53FU (TE12L)
IC22	1130006220	S.IC	TC4W53FU (TE12L)
IC23	1130007020	S.IC	TC7S66FU (TE85R)
IC24	1130007030	S.IC	TC7W08FU (TE12L)
Q1	1590001170	S.TRANSISTOR	XP1501- (TX).AB
Q2	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q3	1520000430	S.TRANSISTOR	2SB1462-R (TX)
Q4	1590001750	S.TRANSISTOR	XP5501- (TX)
Q6	1590001170	S.TRANSISTOR	XP1501- (TX).AB
Q7	1590001130	S.TRANSISTOR	UN9110 (TX)
Q8	1590001150	S.TRANSISTOR	UN9211 (TX)
Q10	1590001170	S.TRANSISTOR	XP1501- (TX).AB
Q11	1590001190	S.TRANSISTOR	XP6501- (TX).AB
Q12	1590001190	S.TRANSISTOR	XP6501- (TX).AB
Q13	1590001410	S.TRANSISTOR	XP1215 (TX)
Q17	1590001190	S.TRANSISTOR	XP6501- (TX).AB
Q18	1590001410	S.TRANSISTOR	XP1215 (TX)
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)
Q25	1590001700	S.TRANSISTOR	XP6210- (TX)
Q26	1590001180	S.TRANSISTOR	XP1210 (TX)
Q28	1590001180	S.TRANSISTOR	XP1210 (TX)
Q29	1590001700	S.TRANSISTOR	XP6210- (TX)
Q31	1590001470	S.TRANSISTOR	UN9213 (TX)
Q32	1590001730	S.TRANSISTOR	UN9113 (TX)
Q33	1540000410	S.TRANSISTOR	2SD2345 (TX)S
Q34	1590001740	S.TRANSISTOR	XP6214- (TX)
D1	1750000340	S.DIODE	1SS357 (TPHR3)
D2	1790000980	S.DIODE	MA742 (TX)
D4	1790000820	S.DIODE	MA132K (TX)
D7	1790000490	S.DIODE	HSM88AS-TR
D8	1790000860	S.DIODE	MA133 (TX)
D9	1790000860	S.DIODE	MA133 (TX)
D10	1790000860	S.DIODE	MA133 (TX)
D12	1790000490	S.DIODE	HSM88AS-TR
D13	1790000860	S.DIODE	MA133 (TX)
D14	1790000860	S.DIODE	MA133 (TX)
D15	1790000860	S.DIODE	MA133 (TX)
D16	1790000840	S.DIODE	MA132WA (TX)
D17	1790000870	S.DIODE	MA1S121 (TX)

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
D18	1790000590	S.DIODE	MA110 (TW)
D19	1790000870	S.DIODE	MA1S121 (TX)
D20	1790000870	S.DIODE	MA1S121 (TX)
D21	1790000870	S.DIODE	MA1S121 (TX)
D22	1790000820	S.DIODE	MA132K (TX) except ITA
D23	1790000850	S.DIODE	MA132WK (TX) ITA only
D24	1790000820	S.DIODE	MA132K (TX) except ITA
D25	1790000830	S.DIODE	MA132HK (TX) IC-W21AT, ITA only
D26	1750000130	S.DIODE	DA204U T107
D27	1790000870	S.DIODE	MA1S121 (TX)
X1	6060000520	S.CERAMIC	CSAC2.00MGC200-TC
X2	6050005801	XTAL	DS-VT200 (32.768 kHz±20)
X3	6060000150	S.CERAMIC	CSAC3.58MGC300CD
R1	7410000610	S.ARRAY	EXB-V4V 153JV (15 KΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R3	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R4	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R5	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R6	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R8	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7410000560	S.ARRAY	EXB-V4V 474JV (470 KΩ)
R13	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R14	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R16	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R17	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R18	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R19	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R21	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R22	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R23	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R24	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R25	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R26	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 KΩ)
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R28	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R29	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)
R30	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 KΩ)
R32	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R33	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R38	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R39	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R40	7410000560	S.ARRAY	EXB-V4V 474JV (470 KΩ)
R41	7410000580	S.ARRAY	EXB-V4V 224JV (220 KΩ)
R42	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R43	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R44	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R45	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)
R46	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω) except USA
	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω) USA only
R47	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ) IC-W21ET only
R48	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 KΩ)
R49	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R50	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R51	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R53	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)

S. = Surface mount

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R54	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R55	7410000880	S.ARRAY	EXB-V4V 393JV (39 KΩ)
R58	7410000560	S.ARRAY	EXB-V4V 474JV (470 KΩ)
			IC-W21 ET only
R60	7410000910	S.ARRAY	EXB-V4V 683JV (68 KΩ)
R62	7410000750	S.ARRAY	EXB-V4V 104JV (100 KΩ)
R63	7410000900	S.ARRAY	EXB-V4V 105JV (1 MΩ)
R65	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 KΩ)
R66	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 KΩ)
R67	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 KΩ)
R68	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R69	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R70	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R71	7410000890	S.ARRAY	EXB-V4V 124JV (120 KΩ)
R72	7410000820	S.ARRAY	EXB-V4V 223JV (22 KΩ)
R73	7410000870	S.ARRAY	EXB-V4V 472JV (4.7 KΩ)
R74	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R75	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R78	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R79	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 KΩ)
R80	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 KΩ)
R81	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R82	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R83	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R84	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R85	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R86	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R87	7410000910	S.ARRAY	EXB-V4V 683JV (68 KΩ)
R92	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 KΩ)
R93	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 KΩ)
R94	7030003880	S.RESISTOR	ERJ3GEYJ 244 V (240 KΩ)
R95	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R96	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R97	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R98	7410000600	S.ARRAY	EXB-V4V 222JV (2.2 KΩ)
R104	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R105	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R106	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R107	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 KΩ)
R108	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 KΩ)
R109	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R110	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R111	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R112	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R113	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R114	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R115	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R116	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 KΩ)
R117	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R118	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R119	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R120	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R122	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R123	7410000560	S.ARRAY	EXB-V4V 474JV (470 KΩ)
R124	7410000860	S.ARRAY	EXB-V4V 181JV (180 Ω)
R127	7410000850	S.ARRAY	EXB-V4V 151JV (150 Ω)
R129	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R130	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R131	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R132	7410000840	S.ARRAY	EXB-V4V 563JV (56 KΩ)
R133	7410000590	S.ARRAY	EXB-V4V 473JV (47 KΩ)
R134	7410000720	S.ARRAY	EXB-V8V 473JV (47 KΩ)
R135	7410000820	S.ARRAY	EXB-V4V 223JV (22 KΩ)
R137	7410000750	S.ARRAY	EXB-V4V 104JV (100 KΩ)
R139	7410000900	S.ARRAY	EXB-V4V 105JV (1 MΩ)
R141	7410000580	S.ARRAY	EXB-V4V 224JV (220 KΩ)
R144	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R148	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R149	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R150	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R151	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R152	7030004010	S.RESISTOR	ERJ3GEYJ 2R2 V (2.2Ω)
R153	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 KΩ)
R154	7410000820	S.ARRAY	EXB-V4V 223JV (22 KΩ)
R155	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C4	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C5	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C7	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C8	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C9	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C10	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C11	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C12	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C14	4550004050	S.TANTALUME	F95 0G476MWCAQ2
C15	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C16	4550004480	S.TANTALUME	F95 0J686MFC
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4550004330	S.TANTALUME	F95 1C336MGC
C19	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C20	4550004450	S.TANTALUME	F95 0J475MQAAQ2
C21	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C24	4550004080	S.TANTALUME	F95 0J336MWCAQ2
C25	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C28	4550004450	S.TANTALUME	F95 0J475MQAAQ2
C29	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C30	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C31	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C32	4550004450	S.TANTALUME	F95 0J475MQAAQ2
C33	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C34	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C35	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C36	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
			USA only
	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
			except USA
C37	4030008470	S.CERAMIC	C1608 JB 1H 272K-T-A
C38	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C39	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C40	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C41	4550004700	S.TANTALUME	F95 1V474MQAAQ2
C45	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C51	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C52	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C53	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C54	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C55	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C56	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C57	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C58	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C59	4550004270	S.TANTALUME	F95 1C105MQAAQ2
C60	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C61	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C62	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C63	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C64	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C65	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C66	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C67	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C68	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C69	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C74	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C75	4550004270	S.TANTALUME	F95 1C105MQAAQ2

S. = Surface mount

[LOGIC UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C76	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C77	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C78	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C81	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C82	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C83	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C84	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C85	4030007080	S.CERAMIC	C1608 CH 1H 390J-T-A
C86	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C87	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C88	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C89	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4550004060	S.TANTALUME	F95 0J106MSAAQ2
C94	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C95	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C98	4030008860	S.CERAMIC	C1608 JB 1C 153K-T-A
C99	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C100	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C101	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C102	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
DS1	5030000890	LCD	LD-BU5545J
DS2	5040001110	S.LED	SLM-23VMWS T97B
DS3	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS4	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS5	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS6	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
SP1	2510000531	SPEAKER	T028S14I0811
BT1	3020000240	LITHIUM BATTERY	VL1220-1F5U
MC1	7700000861	MICROPHONE	WM-62A103
J1	6510012880	S.CONNECTOR	CEW9114-0201
EP1	0910038212	PCB	B 3696B

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1120001650	S.IC	TK10487MTR
IC2	1150001100	S.IC	M66321GP-30AD
IC3	1140002210	S.IC	MB1504HPF-G-BND
IC4	1150000960	IC	M67748L / SC1142
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q3	1590001180	S.TRANSISTOR	XP1210 (TX)
Q4	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q5	1560000550	S.FET	2SK882-Y (TE85R)
Q6	1590000650	S.TRANSISTOR	DTA144TU T107
Q7	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q8	1530002920	S.TRANSISTOR	2SC4226-T2 R25

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q9	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q10	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q11	1510000830	S.TRANSISTOR	2SA1587-GR (TE85R)
Q12	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q13	1560000540	S.FET	2SK880-Y (TE85R)
Q14	1590000680	S.TRANSISTOR	DTC114EU T107
Q15	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q16	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q17	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q18	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q19	1590001690	S.TRANSISTOR	UN9115 (TX)
Q20	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q21	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q22	1590000430	S.TRANSISTOR	DTC144EU T107
Q23	1590000440	S.TRANSISTOR	DTA143ZU T107
Q24	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q25	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q26	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q27	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q28	1590000720	S.TRANSISTOR	DTA144EU T107
Q29	1590000430	S.TRANSISTOR	DTC144EU T107
Q30	1590000650	S.TRANSISTOR	DTA144TU T107
Q31	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q32	1590000680	S.TRANSISTOR	DTC114EU T107
Q33	1590001150	S.TRANSISTOR	UN9211 (TX)
D1	1790000620	S.DIODE	MA77 (TW)
D2	1790000620	S.DIODE	MA77 (TW)
D3	1790000620	S.DIODE	MA77 (TW)
D4	1790000620	S.DIODE	MA77 (TW)
D5	1790000620	S.DIODE	MA77 (TW)
D6	1720000240	S.DIODE	1SV172 (TE85R)
D7	1790000620	S.DIODE	MA77 (TW)
D8	1790000620	S.DIODE	MA77 (TW)
D9	1720000360	S.DIODE	HSU88TRF
D10	1720000360	S.DIODE	HSU88TRF
D11	1790000590	S.DIODE	MA110 (TW)
D12	1790000450	S.DIODE	MA862 (TX)
D13	1790000590	S.DIODE	MA110 (TW)
D14	1790000590	S.DIODE	MA110 (TW)
D15	1790000590	S.DIODE	MA110 (TW)
D16	1790000450	S.DIODE	MA862 (TX)
D18	1790000590	S.DIODE	MA110 (TW)
X1	6070000060	DISCRIMINATOR	CDBM455C7
X2	6050008400	XTAL	CR-41942.645 MHz
FI1	2020000550	CERAMIC	CFUM455E
FI2	2010001530	MONOLITHIC	FL-18943.100 MHz
L1	6150004060	COIL	LS-467
L2	6200001650	S.COIL	ELJNC 18NK-F
L3	6200001650	S.COIL	ELJNC 18NK-F
L4	6110001990	COIL	LA-223
L5	6110002110	COIL	LA-382
L6	6110002000	COIL	LA-226
L7	6110001550	COIL	LA-235
L8	6110002150	COIL	LA-385
L9	6110001540	COIL	LA-234
L12	6200001120	S.COIL	MLF2012D R12M-T
L13	6200001120	S.COIL	MLF2012D R12M-T
L14	6200002160	S.COIL	ELJNC 82NK-F
L15	6200001060	S.COIL	MLF2012D 47NM-T
L16	6200001770	S.COIL	ELJNC 47NK-F
L17	6200001520	S.COIL	MLF2012D R82K-T

S. = Surface mount

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R1	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R2	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R4	7310003720	S.TRIMMER	EVM-1XSX50 B23 (202)
R5	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R7	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R8	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R9	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R10	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R11	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R13	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R14	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 KΩ)
R15	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R16	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R17	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R18	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R19	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R20	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R22	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R23	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R24	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R25	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R26	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R27	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R28	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R29	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R30	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R32	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R33	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R34	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R35	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R36	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R38	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R39	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)
R40	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R41	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R44	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R45	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R46	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R47	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R48	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R49	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R50	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R51	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R53	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 KΩ)
R54	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R55	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 KΩ)
R56	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R57	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R58	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R59	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R61	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R62	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
R63	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R64	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R65	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R66	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 KΩ)
R67	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R68	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 KΩ)
R69	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R70	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R71	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R72	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R73	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R74	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R75	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R77	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R78	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R79	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R80	7510000180	S.THERMISTOR	TN20-3S223LT
R81	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R82	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R83	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R84	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R85	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R86	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R87	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R88	7030003350	S.RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R89	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R90	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R91	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R92	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R93	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R94	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
C1	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C6	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C7	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C8	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C13	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C14	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C15	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C16	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C17	4550006010	S.TANTALUME	TEMSVA 0G 106M8L
C18	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C19	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C20	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C24	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C25	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C26	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C27	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C28	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C29	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C30	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C31	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C32	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C33	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C34	4030006950	S.CERAMIC	C1608 CH 1H 040C-T-A
C35	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C36	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C37	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C38	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C39	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C40	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C41	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C42	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C44	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A
C46	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C47	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C48	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C49	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C50	4550004440	S.TANTALUME	F95 0J335MQAAQ2
C51	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C52	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C53	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C54	4550000530	S.TANTALUME	TESVA 1V 104M1-8L
C55	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C56	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A

S. = Surface mount

[VHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C57	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C58	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C59	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C61	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C62	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C63	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C64	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C65	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C68	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C70	4550000460	S.TANTALUME	TESVA 1C 105M1-8L
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C74	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C76	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C77	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C78	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C79	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C80	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C81	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C82	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C83	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C84	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C85	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C86	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C89	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C94	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C95	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C96	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C97	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C98	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C99	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C101	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C102	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C103	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C105	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C106	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C107	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C108	4550004500	S.TANTALUME	F95 1D105MQAAQ2
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	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C114	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C115	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C116	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
J1	6510012720	CONNECTOR	53020-1410
J2	6510005350	CONNECTOR	5512-06A
EP1	0910037886	PCB	B 3694F

[VHF RFA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002570	S.TRANSISTOR	2SC4405-3-TR
Q2	1530002570	S.TRANSISTOR	2SC4405-3-TR
D1	1790000620	S.DIODE	MA77 (TW)
D2	1720000370	S.VARICAP	HVU350TRF
D3	1790000620	S.DIODE	MA77 (TW)
D4	1720000370	S.VARICAP	HVU350TRF
D5	1720000370	S.VARICAP	HVU350TRF
D6	1790000620	S.DIODE	MA77 (TW)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R2	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R3	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R4	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 KΩ)
R5	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R6	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R7	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R8	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R10	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R11	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R14	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
C1	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C2	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C3	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C4	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C7	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C9	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C12	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C13	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C21	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910038840	PCB	B 3710
EP3	6510008580	LEADFRAME	PT2.0-0.7-16.5 (K)

[VHF RFB BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6150003120	COIL	LS-321
L2	6130002680	COIL	LB-299
L3	6130002690	COIL	LB-300
EP1	0910037620	PCB	B 3717

S. = Surface mount

[VHF APC BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q3	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q4	1590000620	S.TRANSISTOR	FMS1 T148
Q5	1540000410	S.TRANSISTOR	2SD2345 (TX) S
D1	1790000590	S.DIODE	MA110 (TW)
D2	1790000850	S.DIODE	MA132WK (TX)
R1	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
R2	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R3	7510000200	S.THERMISTOR	TN20-3U473LT
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R5	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 KΩ)
R6	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R7	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R8	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 KΩ)
R11	7310003520	S.TRIMMER	RV-224 (RH03AVA15) 104
R12	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
R13	7310003520	S.TRIMMER	RV-224 (RH03AVA15) 104
R14	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 KΩ)
C1	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910038881	PCB	B 3708A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[VHF VCO BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q2	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q3	1530002560	S.TRANSISTOR	2SC4403-3-TR
D1	1790000620	S.DIODE	MA77 (TW)
D2	1720000370	S.VARICAP	HVU350TRF
L1	6200001520	S.COIL	MLF2012D R82K-T
L2	6130002660	S.COIL	LB-287 (TAPING)
L3	6200001630	S.COIL	ELJNC R10K-F
R1	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R3	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R4	7030003730	S.RESISTOR	ERJ3GEYJ 274 V (270 KΩ)
R5	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R6	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R7	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R8	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R9	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R10	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 KΩ)

[VHF VCO BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
R11	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R12	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R13	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R14	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R15	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 KΩ)
C1	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C7	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C12	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C13	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
J1	6910001230	CONNECTOR	HARNESS TERMINAL
J2	6910001230	CONNECTOR	HARNESS TERMINAL
J3	6910001230	CONNECTOR	HARNESS TERMINAL
J4	6910001230	CONNECTOR	HARNESS TERMINAL
J5	6910001230	CONNECTOR	HARNESS TERMINAL
J6	6910001230	CONNECTOR	HARNESS TERMINAL
EP1	0910038802	PCB	B 3522B

[VHF DATA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130004170	S.IC	TC4S01F (TE85R)
IC2	1130003760	S.IC	TC4S81F (TE85R)
IC3	1130003760	S.IC	TC4S81F (TE85R)
IC4	1130003760	S.IC	TC4S81F (TE85R)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100Ω)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
EP1	0910038851	PCB	B 3735A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002790	S.IC	MC3372DR
IC3	1150001100	S.IC	M66321GP-30AD
IC4	1140002210	S.IC	MB1504HPF-G-BND
IC5	1150000970	IC	M67749M / SC1143
IC6	1110003080	S.IC	μPC2715T-E3
IC7	1110003080	S.IC	μPC2715T-E3
IC8	1130007020	S.IC	TC7S66FU (TE85R)
IC9	1130006890	S.IC	TC7S04FU (TE85R)

S. = Surface mount

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q2	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q3	1590000740	S.TRANSISTOR	FMA4 T148
Q4	1590001060	S.TRANSISTOR	DTA114TU T107
Q6	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q7	1590000440	S.TRANSISTOR	DTA143ZU T107
Q8	1590000430	S.TRANSISTOR	DTC144EU T107
Q9	1510000820	S.TRANSISTOR	2SA1587-BL (TE85R)
Q10	1530003010	S.TRANSISTOR	2SC4117-GR (TE85R)
Q11	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q12	1590001470	S.TRANSISTOR	UN9213 (TX)
Q13	1530002900	S.TRANSISTOR	2SC4228-T2 R45
Q14	1510000670	S.TRANSISTOR	2SA1588-GR (TE85R)
Q15	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q16	1530000371	S.TRANSISTOR	2SC3356 R25-T2B
Q17	1590001060	S.TRANSISTOR	DTA114TU T107
Q18	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q19	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q20	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q21	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q22	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q23	1510000620	S.TRANSISTOR	2SA1576 T107 S
Q24	1590001690	S.TRANSISTOR	UN9115 (TX)
Q25	1590000680	S.TRANSISTOR	DTC114EU T107
Q31	1540000410	S.TRANSISTOR	2SD2345 (TX) S
Q32	1590001150	S.TRANSISTOR	UN9211 (TX)
D1	1160000060	S.DIODE	DAN202U T107
D5	1790000620	S.DIODE	MA77 (TW)
D6	1790000620	S.DIODE	MA77 (TW)
D8	1790000620	S.DIODE	MA77 (TW)
D9	1790000620	S.DIODE	MA77 (TW)
D11	1790000620	S.DIODE	MA77 (TW)
D12	1720000360	S.DIODE	HSU88TRF
D13	1720000360	S.DIODE	HSU88TRF
D14	1790000590	S.DIODE	MA110 (TW)
D15	1790000450	S.DIODE	MA862 (TX)
D16	1790000590	S.DIODE	MA110 (TW)
D17	1790000590	S.DIODE	MA110 (TW)
D18	1750000160	S.DIODE	DA114 T107
D19	1790000620	S.DIODE	MA77 (TW)
D20	1790000620	S.DIODE	MA77 (TW)
D21	1790000620	S.DIODE	MA77 (TW)
D22	1790000620	S.DIODE	MA77 (TW)
D23	1790001030	S.DIODE	SB30-03P-TD
D24	1790000620	S.DIODE	MA77 (TW)
D26	1790000620	S.DIODE	MA77 (TW)
D27	1790000620	S.DIODE	MA77 (TW)
D28	1750000350	S.VARICAP	1SV252 (TE85R)
D29	1790000620	S.DIODE	MA77 (TW)
X1	6070000080	DISCRIMINATOR	CDBM455C16
X2	6050008520	XTAL	CR-426
FI1	2020000550	CERAMIC	CFUM455E
FI2	2010001550	FILTER	FL-190 UM-53P 45.150 MHz
L1	6200002710	S.COIL	ELJFC 1R8K-F
L2	6200001640	S.COIL	ELJNC 10NK-F
L3	6200001760	S.COIL	ELJNC 22NK-F
L4	6200001760	S.COIL	ELJNC 22NK-F
L5	6110001990	COIL	LA-223
L6	6110001990	COIL	LA-223
L7	6200001760	S.COIL	ELJNC 22NK-F
L8	6110001980	COIL	LA-222
L9	6110002010	COIL	LA-224
L10	6110002130	COIL	LA-383

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
L11	6110001990	COIL	LA-223
L12	6200002460	S.COIL	LL2012-F18NK
L13	6200000720	S.COIL	LQN 2A 10NM
L14	6200000720	S.COIL	LQN 2A 10NM
L16	6200002660	S.COIL	LL2012-F39NK
L17	6200002670	S.COIL	LL2012-F47NK
L18	6200001510	S.COIL	MLF2012D R10K-T
L20	6200002760	S.COIL	LL2012-F56NK
L22	6200002460	S.COIL	LL2012-F18NK
L23	6200002230	S.COIL	LL2012-F22NK
L24	6200002230	S.COIL	LL2012-F22NK
L25	6200002470	S.COIL	ELJNC 12NK-F
L26	6200001520	S.COIL	MLF2012D R82K-T
L27	6200002150	S.COIL	ELJNC 56NK-F
L28	6200002660	S.COIL	LL2012-F39NK
R1	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R2	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 KΩ)
R3	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R4	7310003720	S.TRIMMER	EVM-1XSX50 B23 (202)
R5	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R6	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R8	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R9	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R10	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R11	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 KΩ)
R12	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R13	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R14	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R15	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 KΩ)
R22	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R24	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R25	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 KΩ)
R26	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R27	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R33	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R34	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R35	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R36	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R37	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R38	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R39	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
R40	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R41	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 KΩ)
R42	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R45	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R46	7030003370	S.RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R49	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R50	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R51	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 KΩ)
R52	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 KΩ)
R53	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R55	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R56	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
R57	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R58	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R59	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R60	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R61	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R62	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R64	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R65	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R66	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R67	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R68	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R69	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R70	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R71	7030000330	S.RESISTOR	MCR10EZHJ 390 Ω (391)
R72	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R73	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)

S. = Surface mount

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
R74	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 KΩ)
R75	7510000180	S.THERMISTOR	TN20-3S223LT
R76	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R77	7310003600	S.TRIMMER	EVM-1XSX50 B54 (503)
R78	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 KΩ)
R79	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R80	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R81	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R86	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R88	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R89	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R90	7030000260	S.RESISTOR	MCR10EZHJ 100 Ω (101)
R91	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R92	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R100	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R102	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R103	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R104	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R105	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R108	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R109	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R110	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 KΩ)
R111	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R112	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C3	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C4	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C5	4030010070	S.CERAMIC	C1608 X7S 1C 104K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C8	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C12	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C13	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C14	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C15	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C16	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C17	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C18	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C19	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C21	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C22	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C23	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C24	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C25	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C26	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C27	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C28	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C29	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C30	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C31	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C32	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C35	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C36	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C37	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C38	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C39	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C40	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C41	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C42	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C43	4030007140	S.CERAMIC	C1608 CH 1H 121J-T-A
C44	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C45	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C46	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C47	4030006910	S.CERAMIC	C1608 CH 1H 0R5C-T-A
C48	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C52	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C53	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C61	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C62	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C63	4550002950	S.TANTALUME	TESVA 0J 335M1-8L
C64	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C66	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C67	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C68	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C69	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C70	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C71	4550000530	S.TANTALUME	TESVA 1V 104M1-8L
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C73	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C74	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C75	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C77	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C78	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C82	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C83	4550003040	S.TANTALUME	TEMSVB2 0J 106M-8L
C84	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C88	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C90	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C91	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C92	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C93	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C94	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
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	4510004430	S.ELECTROLYTIC	ECEV1CV220WR
C99	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C100	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C101	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C102	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C103	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C104	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C106	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C107	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C108	4510004420	S.ELECTROLYTIC	ECEV0JV330SR
C109	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C110	4510005600	S.ELECTROLYTIC	ECEV1CAS100R
C111	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C112	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C113	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
C114	4030009000	S.CERAMIC	C2012 JB 1C 224K-T-A
C115	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C116	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C117	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C118	4550000550	S.TANTALUME	TESVA 1V 224M1-8L
C119	4030006860	S.CERAMIC	C1608 JB 1H 102K-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	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C129	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C130	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C131	4550003250	S.TANTALUME	TEMSVA 1V 474M-8L
C132	4550004500	S.TANTALUME	F95 1D105MQAAQ2
C133	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C134	4550004440	S.TANTALUME	F95 0J335MQAAQ2
C135	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C138	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C140	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C141	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C142	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C143	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C145	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A

S. = Surface mount

[UHF RF UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
C146	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C147	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C148	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A except UK, AUS, DEN
C149	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C150	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C151	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
J1	6510012750	CONNECTOR	53020-2010
J2	6510005730	CONNECTOR	5513-06CPB
J3	6450000130	CONNECTOR	HSJ1102-01-540
J4	6450001060	CONNECTOR	HSJ1493-01-010
EP1	0910037787	PCB	B 3695G

[UHF RFA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002940	S.TRANSISTOR	2SC4228-T2 R44
Q2	1530002940	S.TRANSISTOR	2SC4228-T2 R44
D1	1790000620	S.DIODE	MA77 (TW)
D2	1790000620	S.DIODE	MA77 (TW)
D3	1790000620	S.DIODE	MA77 (TW)
R1	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R2	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R3	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R4	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22K Ω)
R5	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R7	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R8	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
C1	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910038860	PCB	B 3785
EP2	6510008580	LEADFRAME	PT2.0-0.7-16.5 (K)

[UHF RFB BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
L1	6190000320	COIL	5HW-F367PN-157A
L2	6190000320	COIL	5HW-F367PN-157A
EP1	0910020033	PCB	B 1916C

[UHF APC BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q2	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q3	1510000510	S.TRANSISTOR	2SA1576 T107 R
Q4	1590000620	S.TRANSISTOR	FMS1 T148
Q5	1530002280	S.TRANSISTOR	2SC4081 T107 S
D1	1790000590	S.DIODE	MA110 (TW)
D2	1160000060	S.DIODE	DAN202U T107
R1	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
R2	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R3	7510000200	S.THERMISTOR	TN20-3U473LT
R4	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R5	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 KΩ)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R7	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R8	7030003770	S.RESISTOR	ERJ3GEYJ 564 V (560 KΩ)
C1	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4550003040	S.TANTALUME	TEMSVB2 0J 106M-8L
C7	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C8	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910038891	PCB	B 3709A
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[UHF VCO1F BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q2	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q3	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q4	1540000410	S.TRANSISTOR	2SD2345 (TX) S
D1	1790000620	S.DIODE	MA77 (TW)
D2	1790000640	S.VARICAP	MA363B (TX)
D3	1790000840	S.DIODE	MA132WA (TX)
L1	6200001520	S.COIL	MLF2012D R82K-T
L2	6130002700	S.COIL	LB-297 (TAPING)
R1	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 KΩ)
R2	7030005110	S.RESISTOR	ERJ2GEJ 224 X (220 KΩ)
R3	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R4	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R5	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R6	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R7	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R8	7030005040	S.RESISTOR	ERJ2GEJ 472 X (4.7 KΩ)
R9	7030005070	S.RESISTOR	ERJ2GEJ 683 X (68 KΩ)
R10	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R11	7030000320	S.RESISTOR	MCR10EZHJ 330 Ω (331)
R12	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)

S. = Surface mount

[UHF VCO1F BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
C1	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C2	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C7	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C8	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C9	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C12	4550004060	S.TANTALUME	F95 0J106MSAAQ2
C13	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C14	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6910001230	CONNECTOR	HARNESS TERMINAL
J2	6910001230	CONNECTOR	HARNESS TERMINAL
EP1	0910037452	PCB	B 3690B

[UHF VCO2F BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1530002560	S.TRANSISTOR	2SC4403-3-TR
Q2	1530002920	S.TRANSISTOR	2SC4226-T2 R25
L2	6200002720	S.COIL	LL2012-F27NK
L2	6200002720	S.COIL	LL2012-F27NK
L3	6200002230	S.COIL	LL2012-F22NK
L4	6200002450	S.COIL	LL2012-F15NK
L5	6200002460	S.COIL	LL2012-F18NK
R1	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R2	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 KΩ)
R3	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R4	7030003340	S.RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R5	7030003220	S.RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R6	7030003610	S.RESISTOR	ERJ3GEYJ 273 V (27 KΩ)
R7	7030003290	S.RESISTOR	ERJ3GEYJ 560 V (56 Ω)
R8	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R9	7030000260	S.RESISTOR	MCR10EZHJ 100 Ω (101)
C1	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C2	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C3	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C6	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C7	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C8	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C9	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C10	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C11	4030006980	S.CERAMIC	C1608 CH 1H 070D-T-A
C12	4030009350	S.CERAMIC	C1608 CH 1H 3R5B-T-A
C13	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C14	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C15	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
J1	6910001230	CONNECTOR	HARNESS TERMINAL
J2	6910001230	CONNECTOR	HARNESS TERMINAL
J3	6910001230	CONNECTOR	HARNESS TERMINAL

[UHF VCO2F BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
J4	6910001230	CONNECTOR	HARNESS TERMINAL
J5	6910001230	CONNECTOR	HARNESS TERMINAL
EP1	0910037832	PCB	B 3747B

[AF BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1110002420	S.IC	NJM2073M (T1)
Q1	1590001170	S.TRANSISTOR	XP1501- (TX).AB
Q2	1520000270	S.TRANSISTOR	2SB1182 TL Q
R1	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R2	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R3	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R4	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R5	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R6	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R7	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R8	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R9	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 KΩ)
R10	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 KΩ)
R11	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 KΩ)
R12	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 KΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C2	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C3	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C4	4510005610	ELECTROLYTIC	ECA 0JG 101X
C5	4510005610	ELECTROLYTIC	ECA 0JG 101X
C6	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C7	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C8	4550003030	S.TANTALUME	TEMSVA 0J 475M-8L
C9	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C10	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C11	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C12	4510005610	ELECTROLYTIC	ECA 0JG 101X
C13	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C14	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
EP1	6910003420	LEADFRAME	AR1.27-0.7-12.3
EP2	0910038832	PCB	B 3699B

[UHF DATA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130004170	S.IC	TC4S01F (TE85R)
IC2	1130003760	S.IC	TC4S81F (TE85R)
IC3	1130003760	S.IC	TC4S81F (TE85R)
IC4	1130003760	S.IC	TC4S81F (TE85R)
R1	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R2	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100Ω)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)

S. = Surface mount

[UHF DATA BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
C1	4550004060	S.TANTALUME	F95 0J106MSAAQ2
EP1	0910038812	PCB	B 3587B
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[DCJ BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6450001080	CONNECTOR	HEC3800-01-010
EP1	0910038870	PCB	B 3798

[PTT BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
S1	2260001680	S.SWITCH	SKQDPB
EP1	0910038111	FPC	B 3764A

[V-L BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
R1	7210001910	VARIABLE	RV-199 (RK0972210) 10 KB/10 KA
R2	7210001910	VARIABLE	RV-199 (RK0972210) 10 KB/10 KA
S1	2260001400	ENCODER	SW-122 (RK097103H)
EP1	0910037003	FPC	B 3650C

[KEY BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1540000350	S.TRANSISTOR	2SD2216-S (TX)
Q2	1540000350	S.TRANSISTOR	2SD2216-S (TX)
Q3	1540000350	S.TRANSISTOR	2SD2216-S (TX)
Q4	1540000350	S.TRANSISTOR	2SD2216-S (TX)
Q5	1540000350	S.TRANSISTOR	2SD2216-S (TX)
Q6	1540000350	S.TRANSISTOR	2SD2216-S (TX)
D1	1790000840	S.DIODE	MA132WA (TX)
D2	1790000840	S.DIODE	MA132WA (TX)
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R2	7410000850	S.ARRAY	EXB-V4V 151JV (150 Ω)

[KEY BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
R3	7410000850	S.ARRAY	EXB-V4V 151JV (150 Ω)
R4	7410000850	S.ARRAY	EXB-V4V 151JV (150 Ω)
DS1	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS2	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS3	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS4	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS5	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
DS6	5010000070	S.LED	LT1E73A (GL1EG73TAPING)
EP1	0910038203	PCB	B 3697C

[VHF XT BOARD]

REF. NO.	PARTS NO.	DESCRIPTION	
X1	6050008500	XTAL	CR-428
EP1	0910038102	PCB	B 3756B
EP2	6510015630	LEADFRAME	PU1.27-0.7-8.3 (N)

[CONNECT UNIT]

REF. NO.	PARTS NO.	DESCRIPTION	
Q1	1520000200	S.TRANSISTOR	2SB798-T2 DK
Q2	1530002280	S.TRANSISTOR	2SC4081 T107 S
D1	1790001030	S.DIODE	SB30-03P-TD
D2	1790000670	S.DIODE	SB07-03C-TA
D5	1790000590	S.DIODE	MA110 (TW)
D6	1730002160	S.ZENER	02CZ5.1-Z (TE85R)
D7	1790000590	S.DIODE	MA110 (TW)
R1	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R2	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R3	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R4	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R5	7030003470	S.RESISTOR	ERJ3GEYJ 182 V (1.8 KΩ)
R6	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R7	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R8	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 KΩ)
R9	7030003250	S.RESISTOR	ERJ3GEYJ 270 V (27 Ω)
R10	7030000080	S.RESISTOR	MCR10EZHJ 3.3 Ω (3R3)
R11	7030003250	S.RESISTOR	ERJ3GEYJ 270 V (27 Ω)
C1	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006710	S.CERAMIC	C1608 SL 1H 470J-T-A
C4	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C5	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
J1	6510010880	CONNECTOR	52022-1410
J2	6510012620	CONNECTOR	52022-2010
EP1	0910039672	PCB	B 3923B
EP2	0910037631	FPC	B 3730A

S. = Surface mount

[TSQL UNIT] (U.S.A only)

REF. NO.	PARTS NO.	DESCRIPTION	
IC1	1130005100	S.IC	FX365LG
IC2	1130005100	S.IC	FX365LG
IC3	1130003610	S.IC	TC4SU69F (TE85R)
Q1	1590000430	S.TRANSISTOR	DTC144EU T107
Q2	1510000580	S.TRANSISTOR	2SA1362-GR (TE85R)
Q3	1590000430	S.TRANSISTOR	DTC144EU T107
Q4	1510000580	S.TRANSISTOR	2SA1362-GR (TE85R)
Q5	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q6	1530002280	S.TRANSISTOR	2SC4081 T107 S
Q7	1530002280	S.TRANSISTOR	2SC4081 T107 S
D1	1790000590	S.DIODE	MA110 (TW)
D2	1790000590	S.DIODE	MA110 (TW)
D3	1790000870	S.DIODE	MA1S121 (TX)
D4	1160000060	S.DIODE	DAN202U T107
D5	1790000870	S.DIODE	MA1S121 (TX)
X1	6060000480	CERAMIC	CSB1000J221T
R1	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R2	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R3	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R4	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R5	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R6	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R7	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 KΩ)
R10	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 KΩ)
R11	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R12	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 KΩ)
R13	7310003550	S.TRIMMER	MVR32HXBR N473
R14	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R15	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 KΩ)
R16	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 KΩ)
R17	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R18	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 KΩ)
R19	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 KΩ)
R20	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R21	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R22	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R23	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R24	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 KΩ)
R25	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 KΩ)
R26	7030003780	S.RESISTOR	ERJ3GEYJ 684 V (680 KΩ)
R27	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R28	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R29	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R30	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 KΩ)
R31	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 KΩ)
R32	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 KΩ)
R33	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 KΩ)
R34	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 KΩ)
R35	7010004410	RESISTOR	R20J (47 KΩ)
R36	7010004410	RESISTOR	R20J (47 KΩ)
C1	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C4	4550000460	S.TANTALUME	TESVA 1C 105M1-8L
C5	4550000530	S.TANTALUME	TESVA 1V 104M1-8L
C6	4030006540	S.CERAMIC	C1608 SL 1H 030C-T-A
C7	4550002950	S.TANTALUME	TESVA 0J 335M1-8L
C8	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C9	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C10	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A

[TSQL UNIT] (U.S.A only)

REF. NO.	PARTS NO.	DESCRIPTION	
C11	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C12	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C13	4550000460	S.TANTALUME	TESVA 1C 105M1-8L
C15	4030006540	S.CERAMIC	C1608 SL 1H 030C-T-A
C16	4550000530	S.TANTALUME	TESVA 1V 104M1-8L
C17	4550002950	S.TANTALUME	TESVA 0J 335M1-8L
C18	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C19	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C20	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
EP1	0910030531	PCB	B 3110A

S. = Surface mount

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

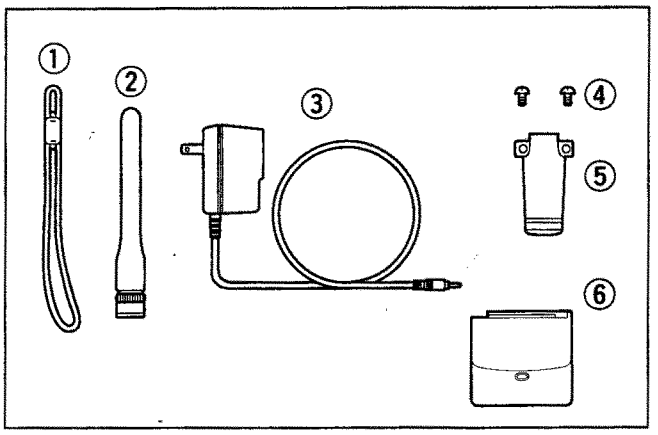
7-1 CHASSIS PARTS

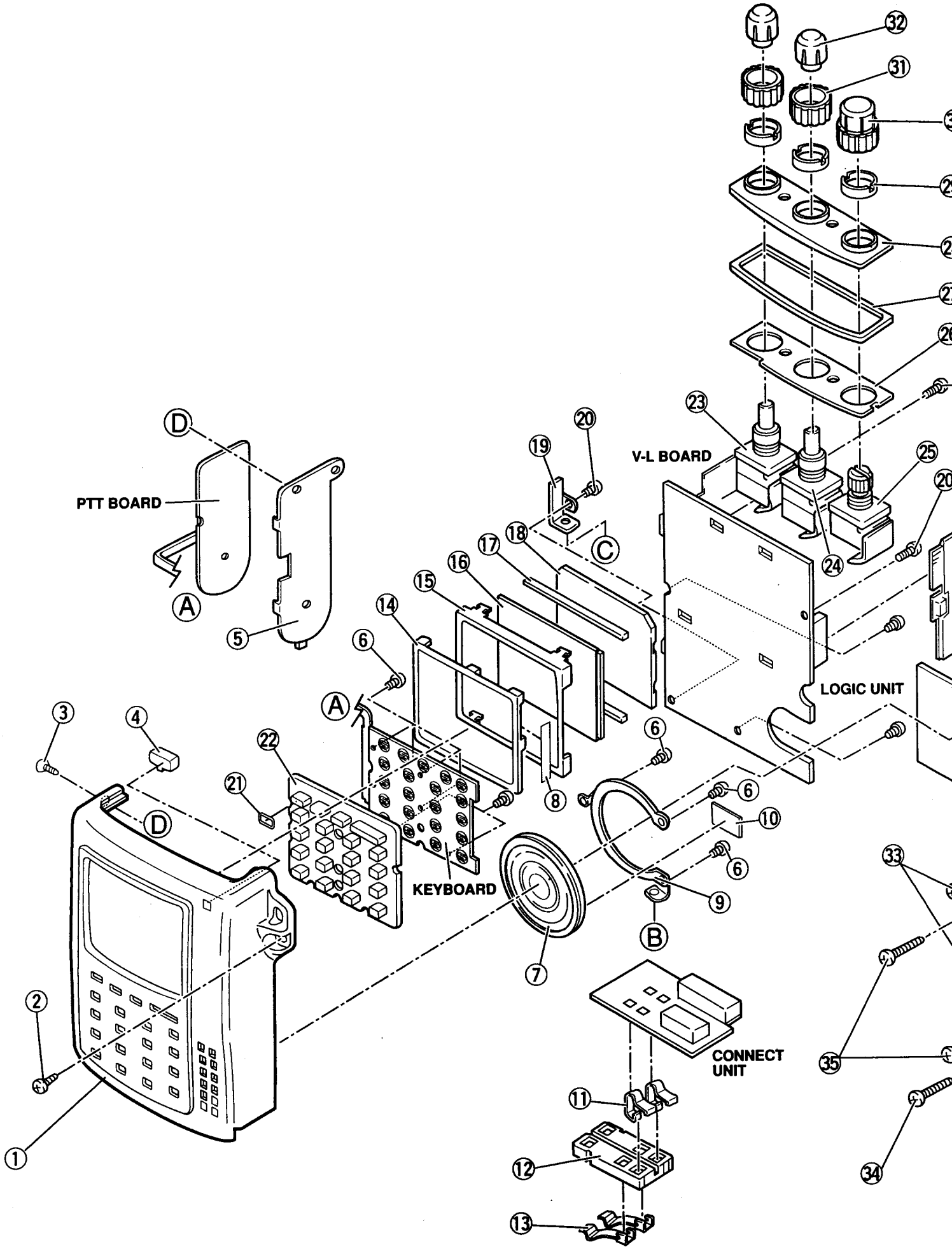
LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8210008590	Front panel IC-W21AT	1
	8210008600	Front panel IC-W21ET	
②	8810005360	Screw PH No. 0 M2 x 3 ZK	3
③	8810006980	Screw FH No. 0 M2 x 3 NI	1
④	8930026260	1257 LED lens	1
⑤	8930026710	1266 PTT holder	1
⑥	8810001720	Screw PH B0 No. 0-3 1.4 x 4	9
⑦	2510000531	Speaker T028S14I0811	1
⑧	8930027930	Isolating sheet (CP)	1
⑨	8930026720	1266 Speaker holder	1
⑩	8510008041	1266 SP isolating sheet-1	1
⑪	8930026371	1257 Microphone contact-1	2
⑫	8930026222	1257 Contact base-2	1
⑬	8930027740	1266 Contact spring	2
⑭	8930026300	1266 Display cover	1
⑮	8930026700	1266 LCD holder	1
⑯	5030000890	LCD LD-BU5545J	1
⑰	8930027610	LCD contact SRCN-1266	2
⑱	8930028760	1266 Reflector	1
⑲	8930026350	1257 A-angle	1
⑳	8810004980	Screw PH No. 0-3 B0 1.4 x 4.5 NI	4
㉑	8930027770	1266 Key mask	1
㉒	8930026690	1266 Key sheet (buttons)	1
㉓	7210001910	[VHF VR/SQL] control RV-199	1
㉔	7210001910	[UHF VR/SQL] control RV-199	1
㉕	2260001400	[DIAL] selector SW-122	1
㉖	8930026320	1257 Top plate	1
㉗	8930026330	1257 Top seal	1
㉘	8210007940	1257 Top panel	1
㉙	8830000710	VR nut (G)	3
㉚	8610008310	Knob N-200	1
㉛	8610008291	Knob N-198-1	2
㉜	8610008300	Knob N-199	2
㉝	8810007720	Screw PH No. 0-3 M2 x 14 NI	3
㉞	8810007830	Screw PH No. 0-3 M2 x 14.5	1
㉟	8810007800	Screw PH No. 0-3 M2.6 x 14.5 NI	2
㊱	8930027760	1257 plate	1
㊲	8010013901	1257 RF chassis-1	1
㊳	8810006610	Screw PH No. 0 M2 x 2.5 NI	2
㊴	8930004081	Grounding spring (B)-1	1
㊵	8930026270	1257 Release button	1
㊶	8930026210	1257 PTT rubber	1
㊷	8930026340	1257 Connector seal	1
㊸	8210007920	1257 Rear panel	1
㊹	6510015550	BNC-R117 (incl. Nut)	1
㊺	8930026451	1257 Jack cap-1	1
㊻	8930027680	Sponge (DB)	1
㊼	8930026280	1257 Bottom plate	1
㊽	8810007100	Screw FH No. 0 M2 x 2.5 NI	4
㊾	8930027340	1257 Bottom angle	1

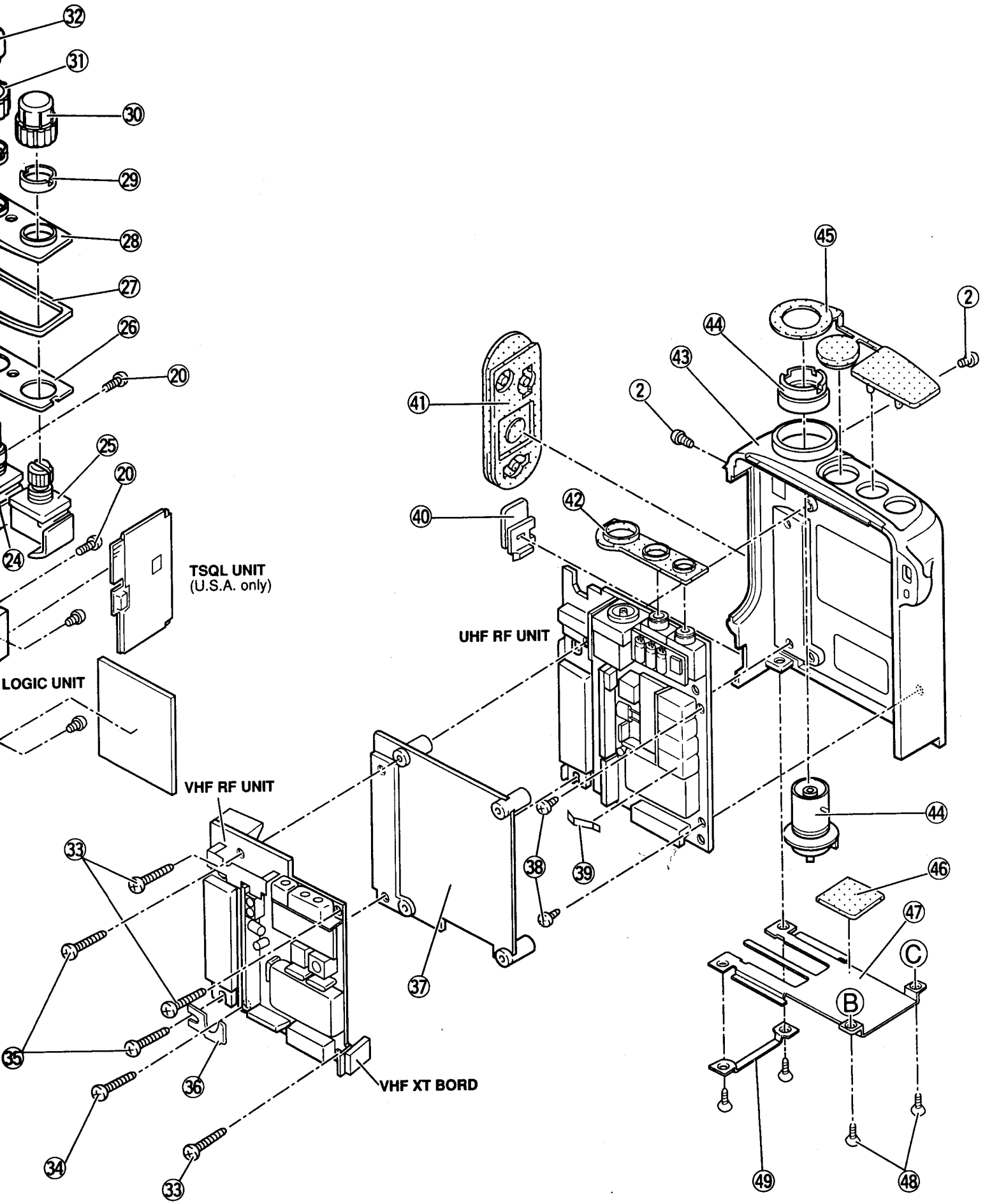
Screw abbreviations PH: Pan head FH: Flat head
NI: Nickel ZK: Black

7-2 ACCESSORIES

LABEL NO.	ORDER NO.	DESCRIPTION	QTY.
①	8010013920	Handstrap HK-006	1
②	Optional product	FA-B270A Flexible antenna	1
③	Optional product	Wall charger BC-77A (USA)	1
		Wall charger BC-77D (EUR, ITA, Denmark)	1
		Wall charger BC-77V (AUS)	1
④	8810005730	Screw BuH M3 x 3 ZK BS	2
⑤	8010008620	752 Belt clip	1
⑥	Optional product	Battery pack BP-157 (USA, EUR, ITA, UK, AUS)	1
		Battery case BP-130 (ASIA)	



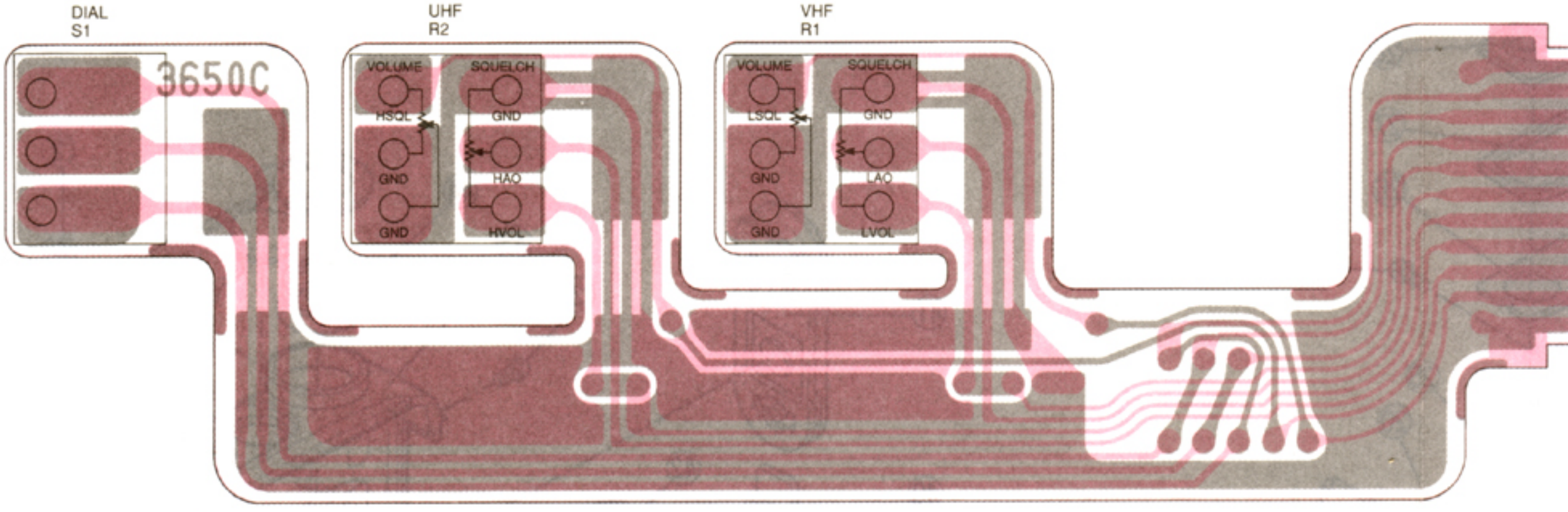

PTT BOARD
V-L BOARD
LOGIC UNIT
KEYBOARD
CONNECT UNIT


TSQL UNIT
(U.S.A. only)
LOGIC UNIT
VHF RF UNIT
UHF RF UNIT
VHF XT BORD

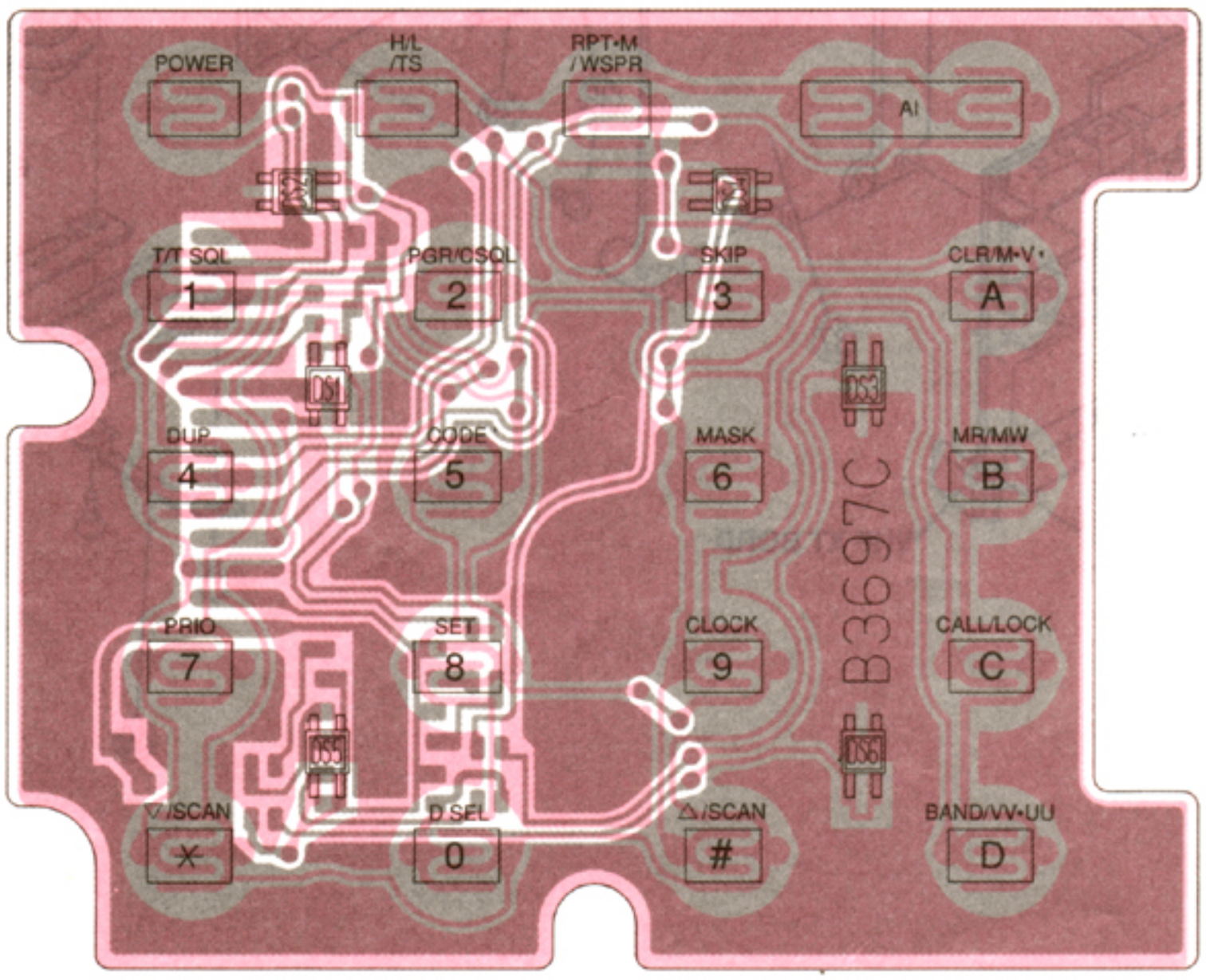
SECTION 8 BOARD LAYOUTS

8-1 V-L BOARD, CONNECT UNIT AND KEYBOARD UNIT

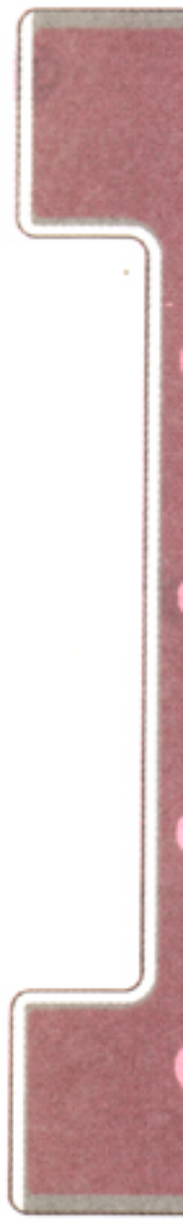
- **V-L BOARD (TOP VIEW)**



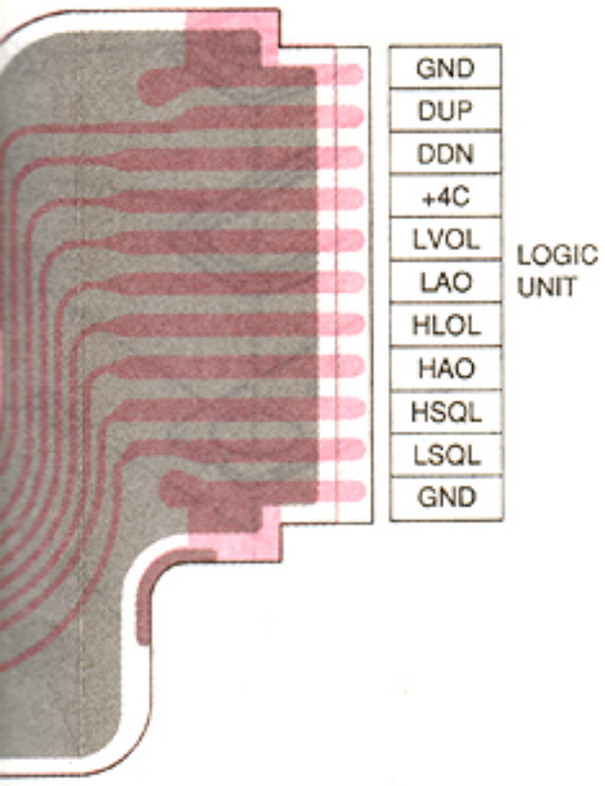
- **KEYBOARD UNIT (TOP VIEW)**

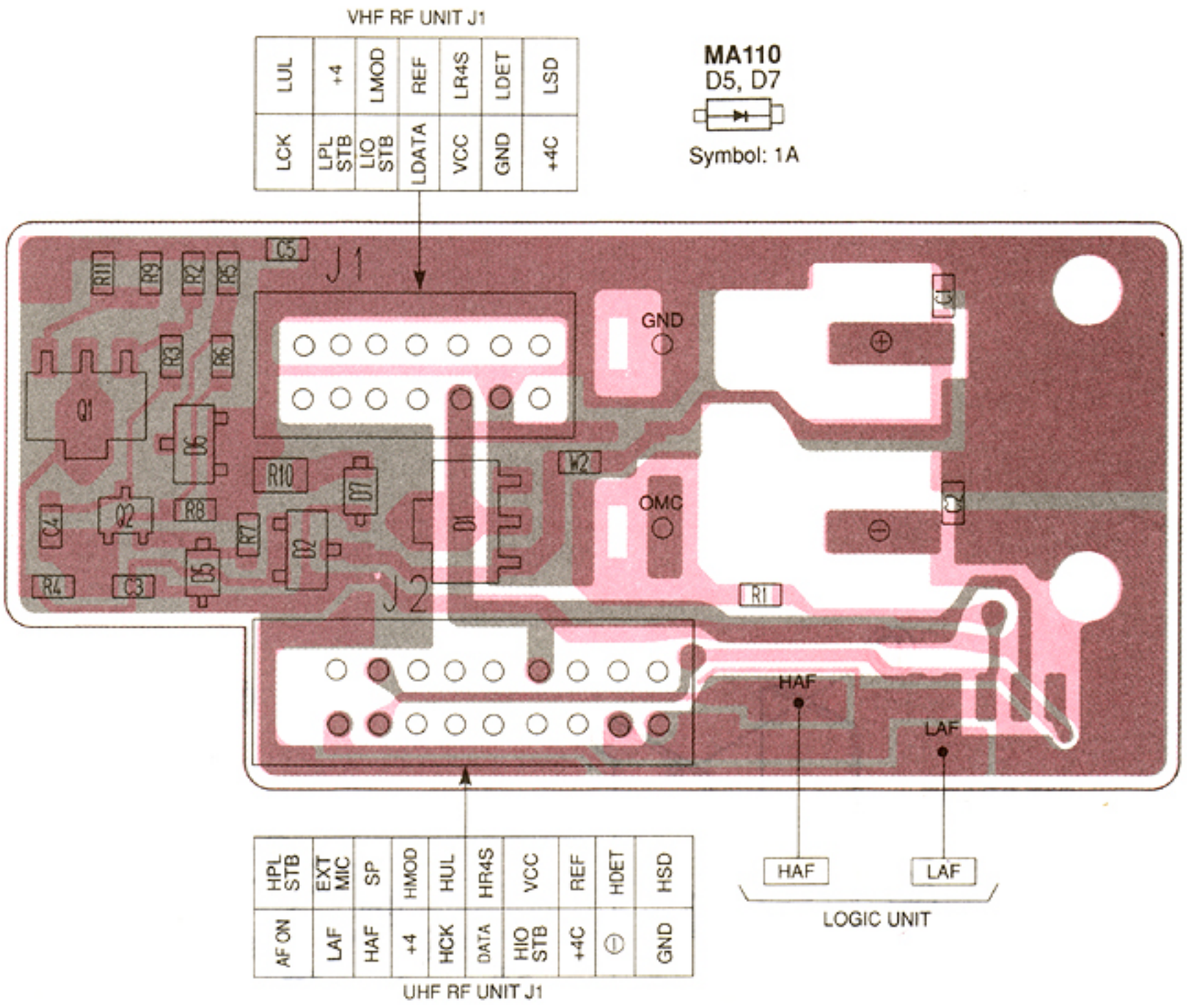


- **KEYBO**



• CONNECT UNIT (TOP VIEW)

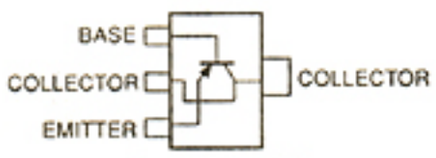




MA110
D5, D7

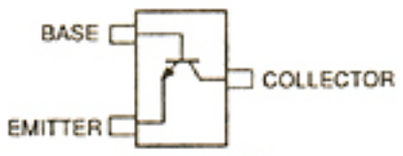
Symbol: 1A

2SB798
Q1



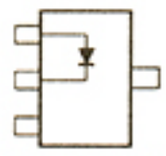
Symbol: DK

2SC4081
Q2



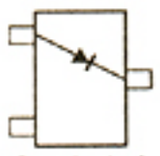
Symbol: BS

SB30-03P
D1



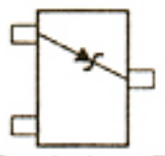
Symbol: SG

SB07-03C
D2



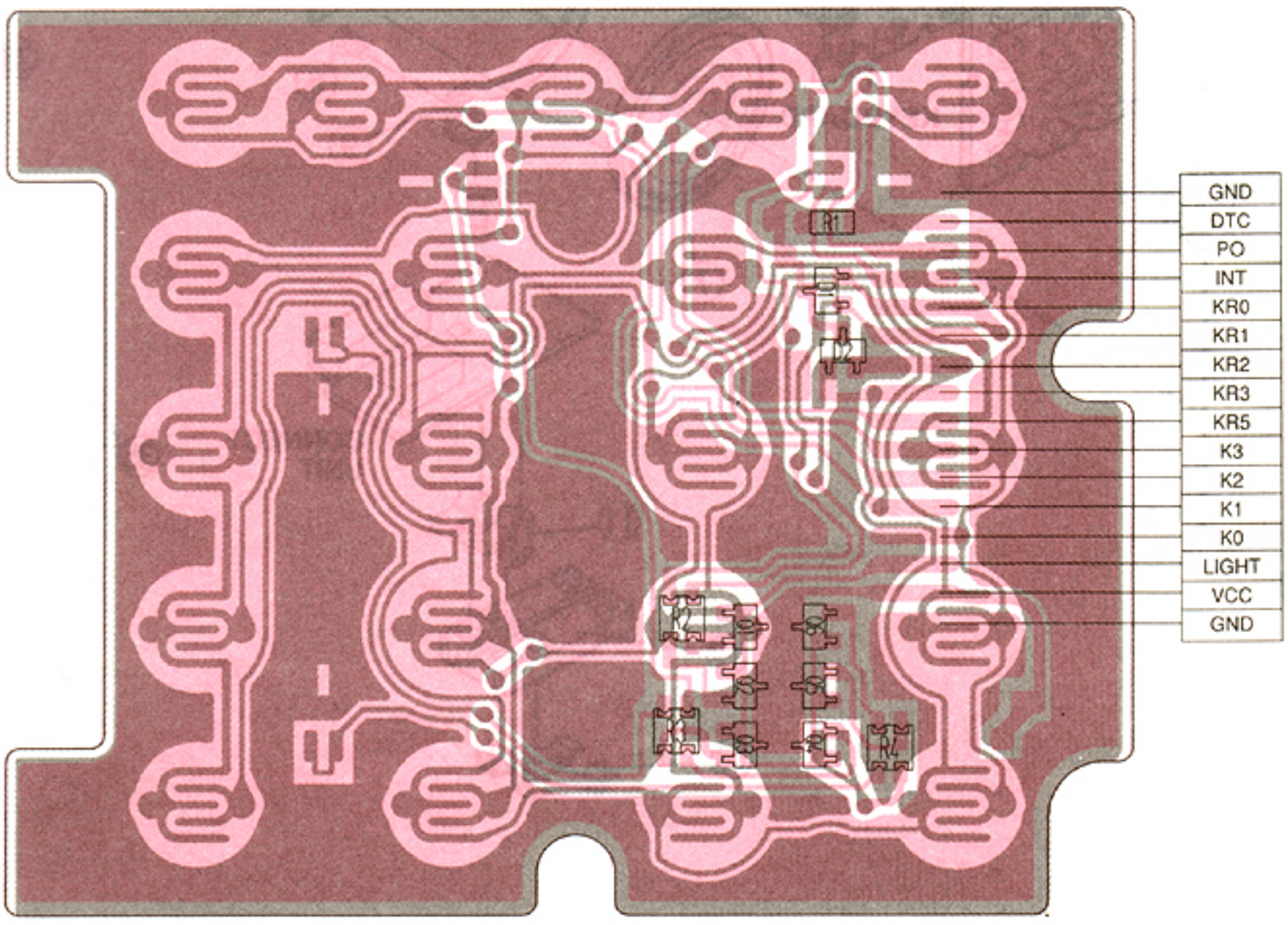
Symbol: J

02CZ5.1-Z
D6

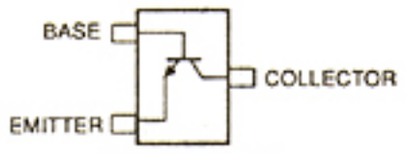


Symbol: 5.1Z

• KEYBOARD UNIT (BOTTOM VIEW)

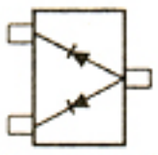


2SD2216S
Q1 – Q6



Symbol: YS

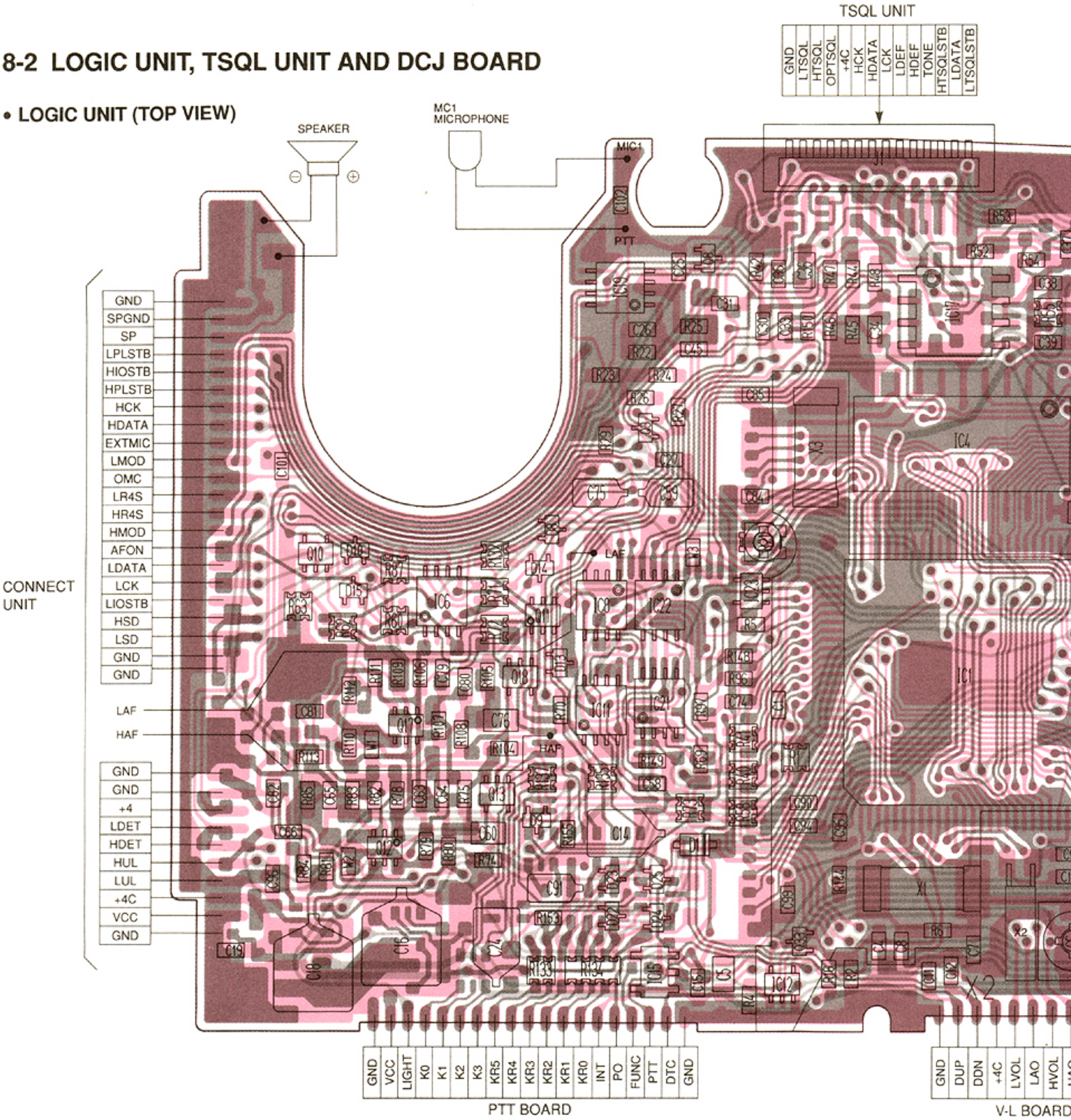
MA132WA
D1, D2



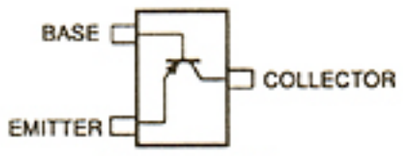
Symbol: MO

8-2 LOGIC UNIT, TSQL UNIT AND DCJ BOARD

• LOGIC UNIT (TOP VIEW)

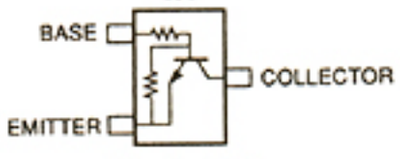


2SB1462R
Q3



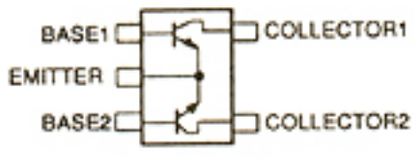
Symbol: AR

UN9211
Q8



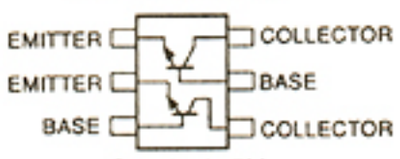
Symbol: 8A

XP1501
Q10



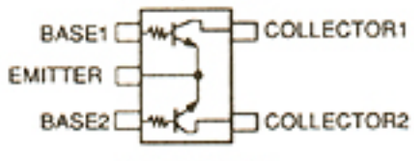
Symbol: 5R

XP6501
Q11, Q12, Q17



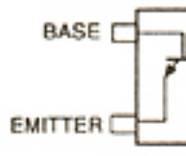
Symbol: 5N

XP1215
Q13, Q18



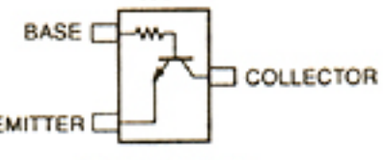
Symbol: 9M

2SD2
Q20,



Symbo

UN9213
Q31

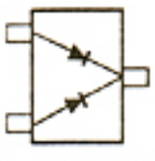


Symbol: 8C

1SS357
D1

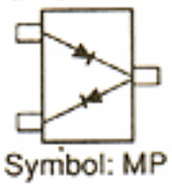
Symbol: 53

MA742
D2



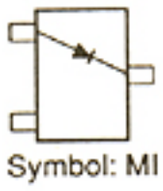
Symbol: N1U

MA133
D8 – D10,
D13 – D15



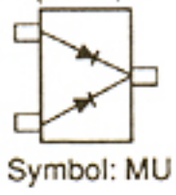
Symbol: MP

MA132K
D22 (EUR, UK, USA, AUS, SEA, DEN)
D24 (UK, AUS)



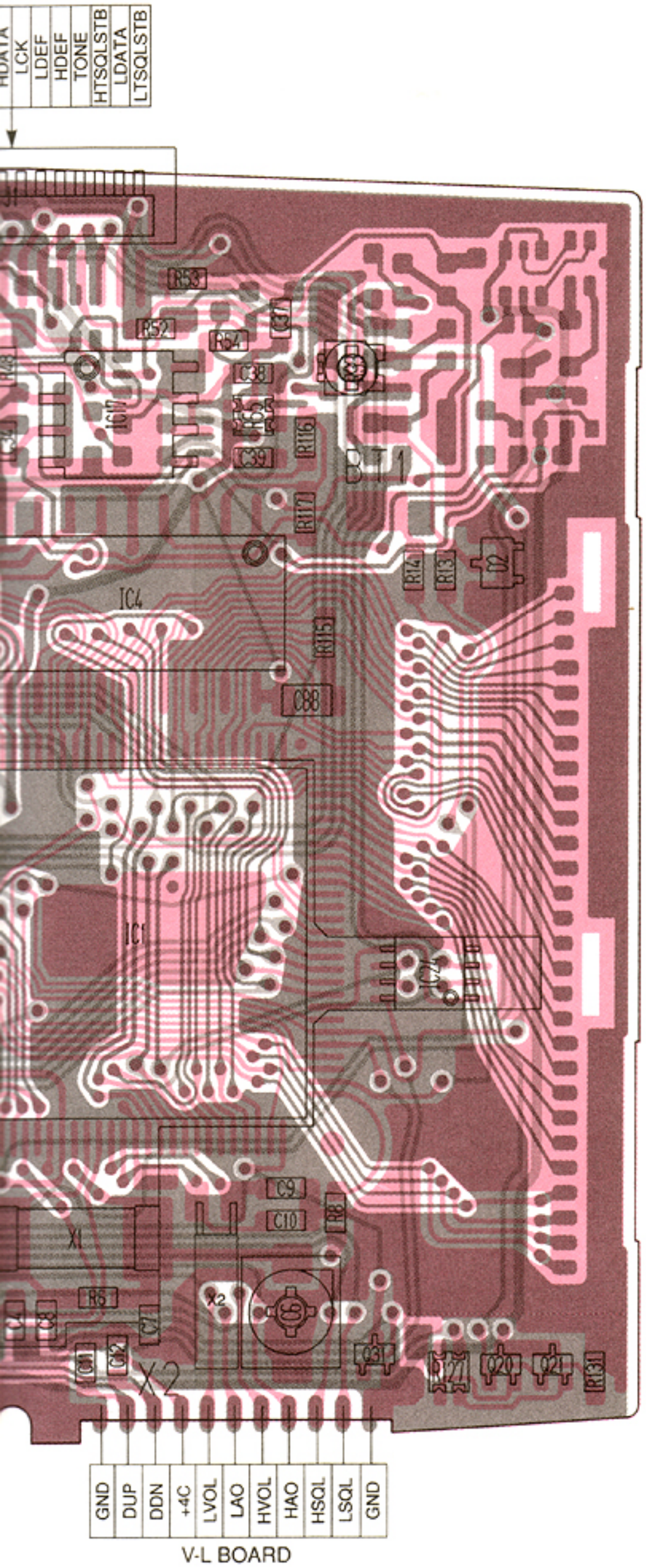
Symbol: MI

MA132WK
D23 (ITA)
D24 (SEA, DEN)



Symbol: MU

L UNIT



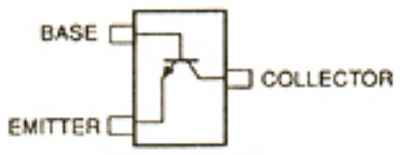
V-L BOARD

Surface Inside Underside

1215
, Q18

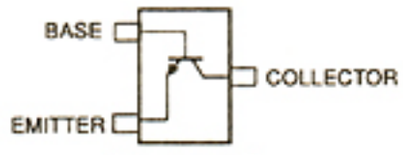
bol: 9M

2SD2216
Q20, Q21



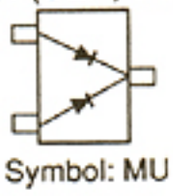
Symbol: YS

2SD2345
Q33



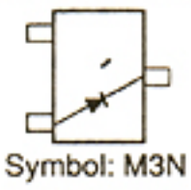
Symbol: 1Z

MA132WK
D23 (ITA)
D24 (SEA, DEN)



Symbol: MU

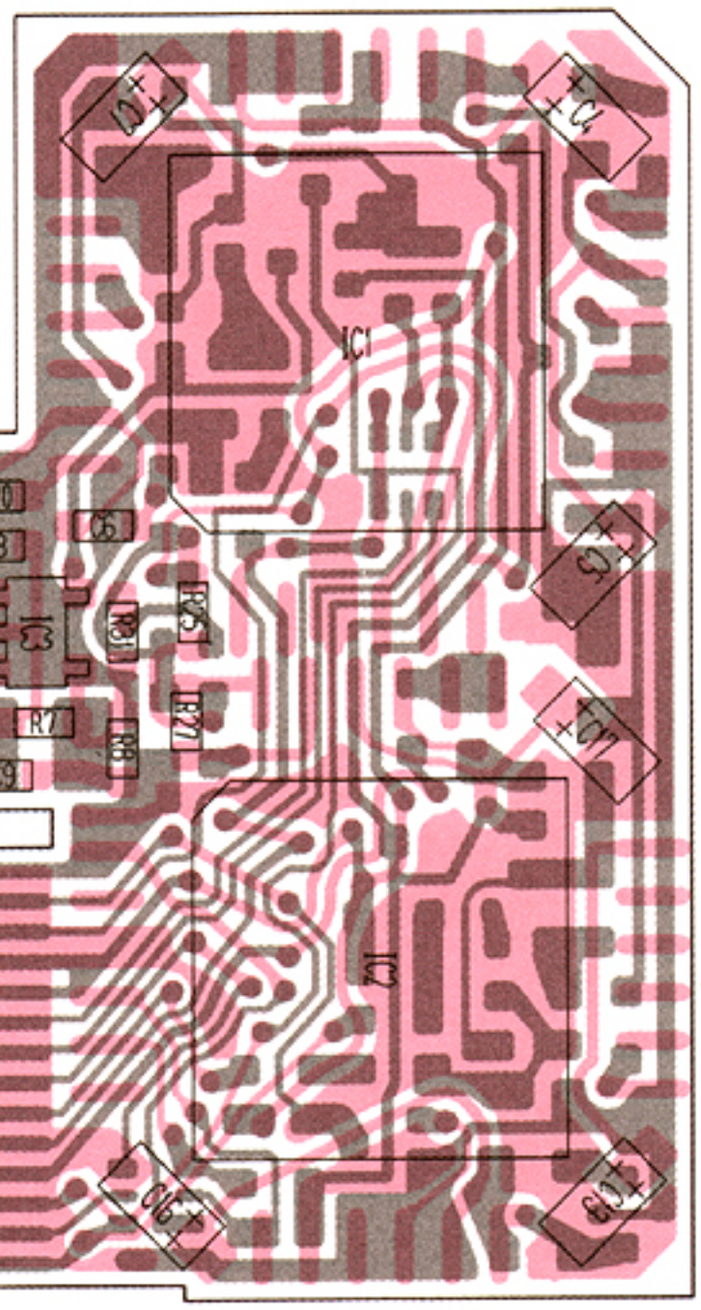
MA132HK
D24 (EUR, USA)
D25 (ITA, USA, AUS, SEA)



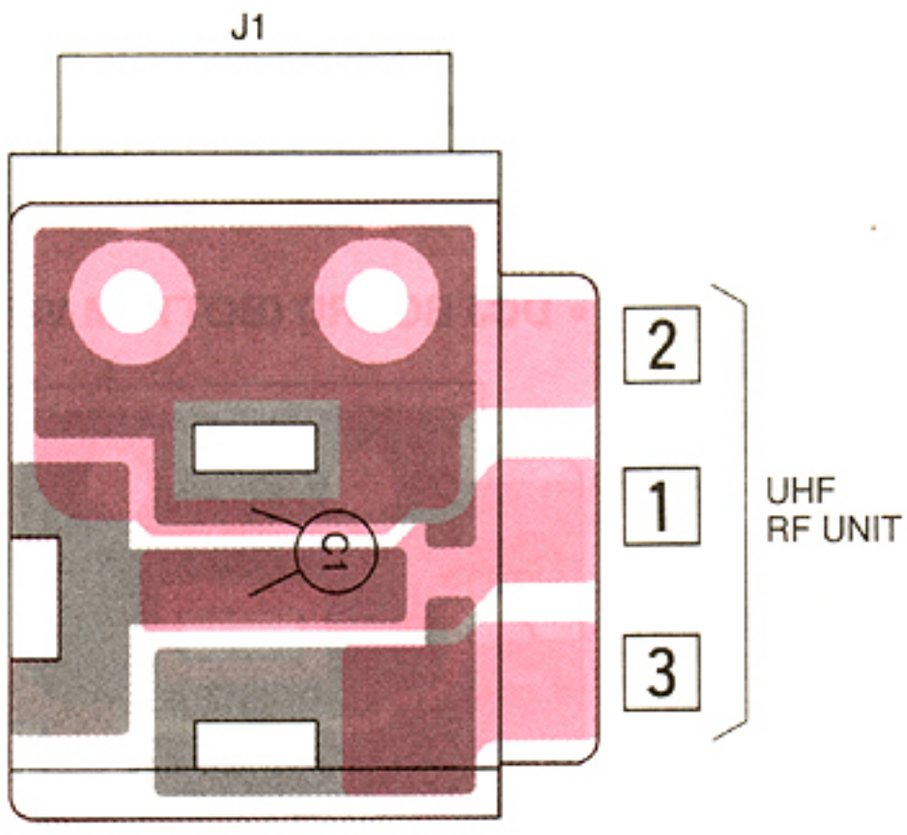
Symbol: M3N

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

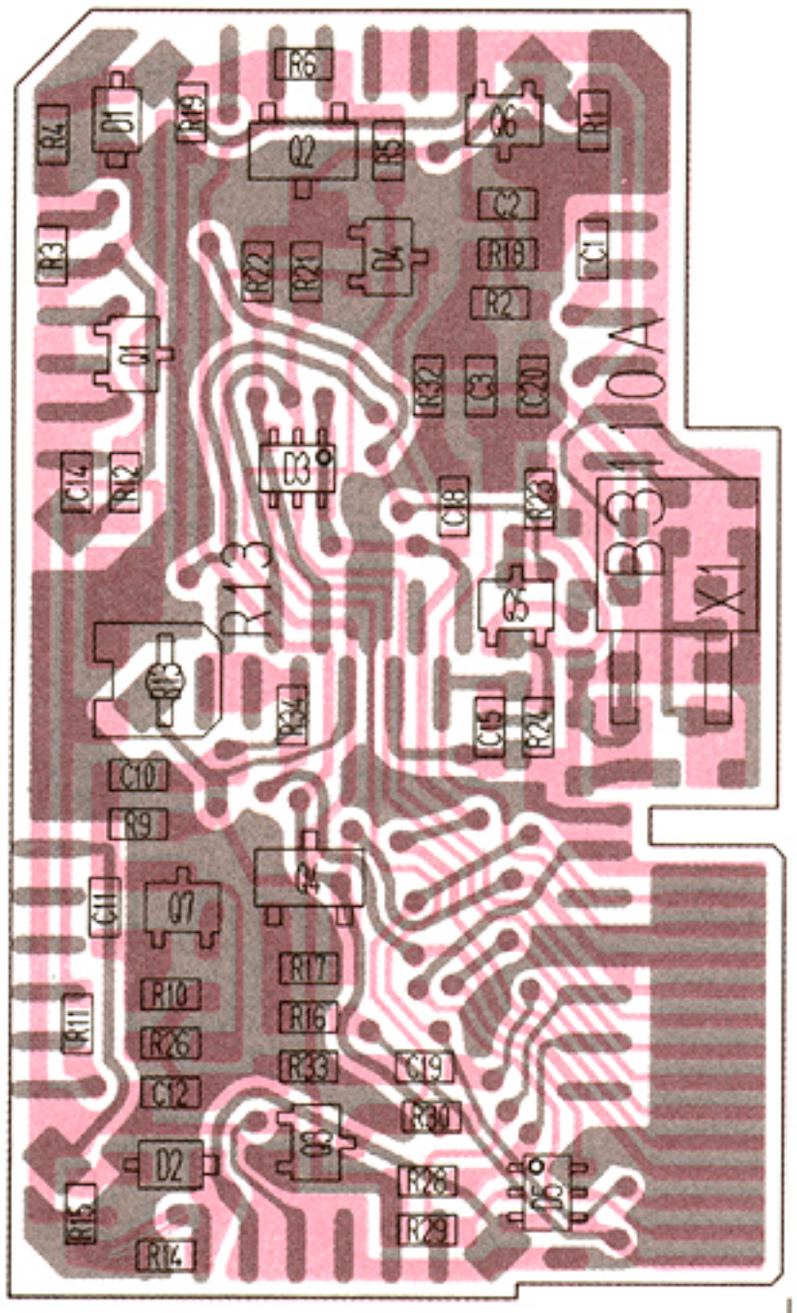
- **TSQL UNIT (TOP VIEW)**
(U.S.A. only)



- **DCJ BOARD (TOP VIEW)**

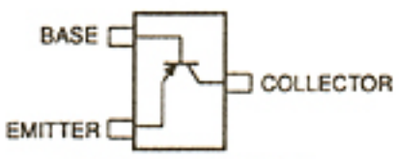


• TSQL UNIT (BOTTOM VIEW)
(U.S.A. only)



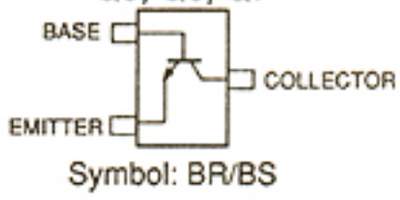
LOGIC UNIT

2SA1362
Q2, Q4



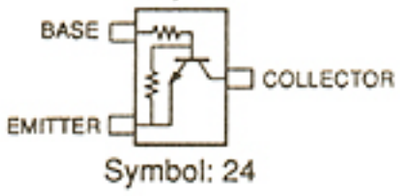
Symbol: AEL/AEG

2SC4081
Q5, Q6, Q7



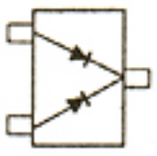
Symbol: BR/BS

DTC114EU
Q1, Q3



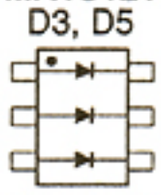
Symbol: 24

DAN202U
D4



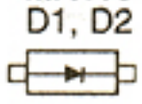
Symbol: N

MA1S121
D3, D5



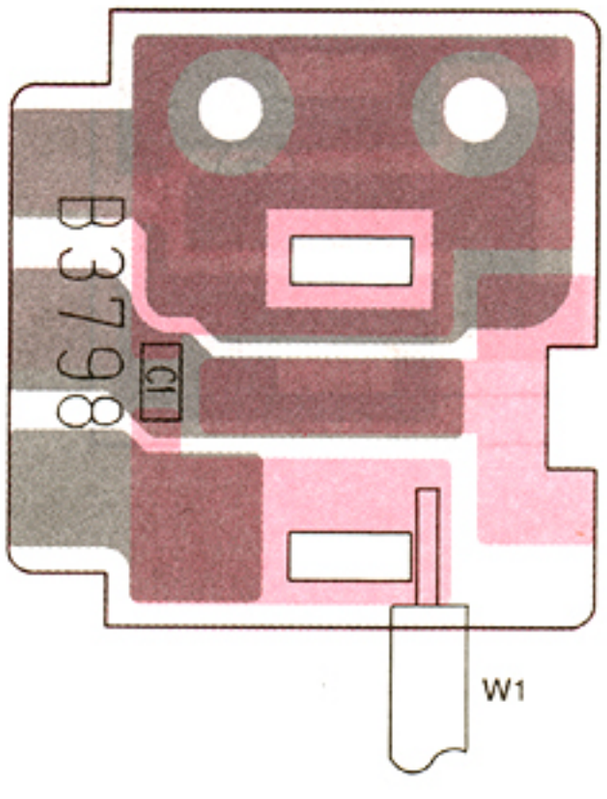
Symbol: M2D

MA110
D1, D2

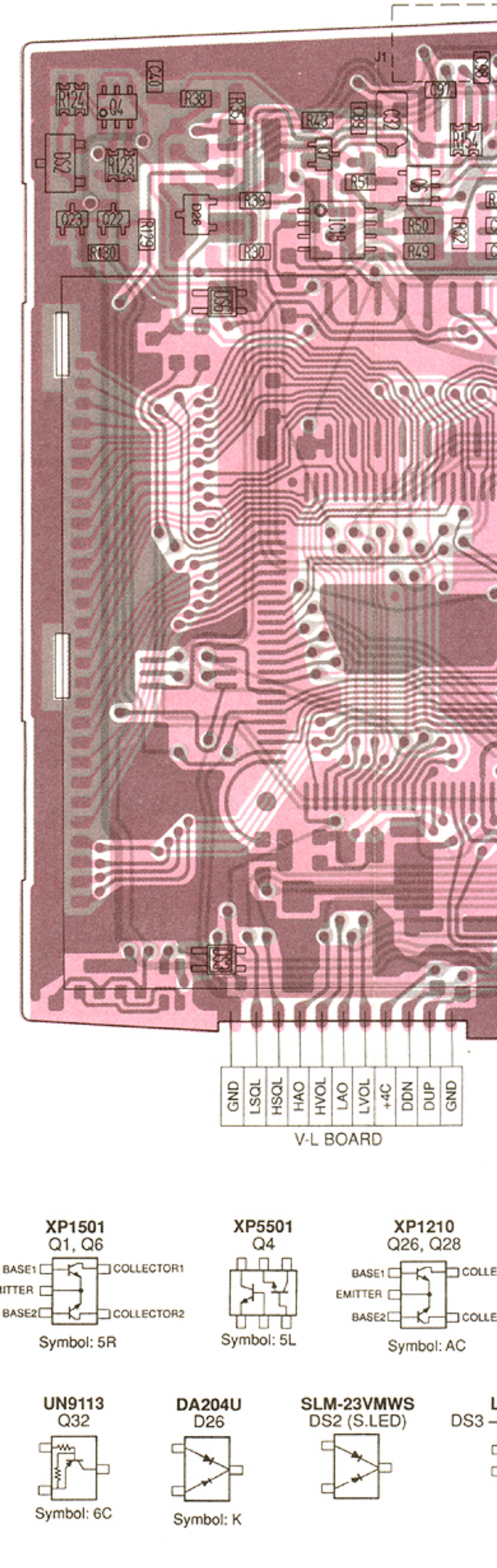


Symbol: 1A

• DCJ BOARD (BOTTOM VIEW)



• LOGIC UNIT (BOTTOM VIEW)



V-L BOARD

XP1501
Q1, Q6

Symbol: 5R

XP5501
Q4

Symbol: 5L

XP1210
Q26, Q28

Symbol: AC

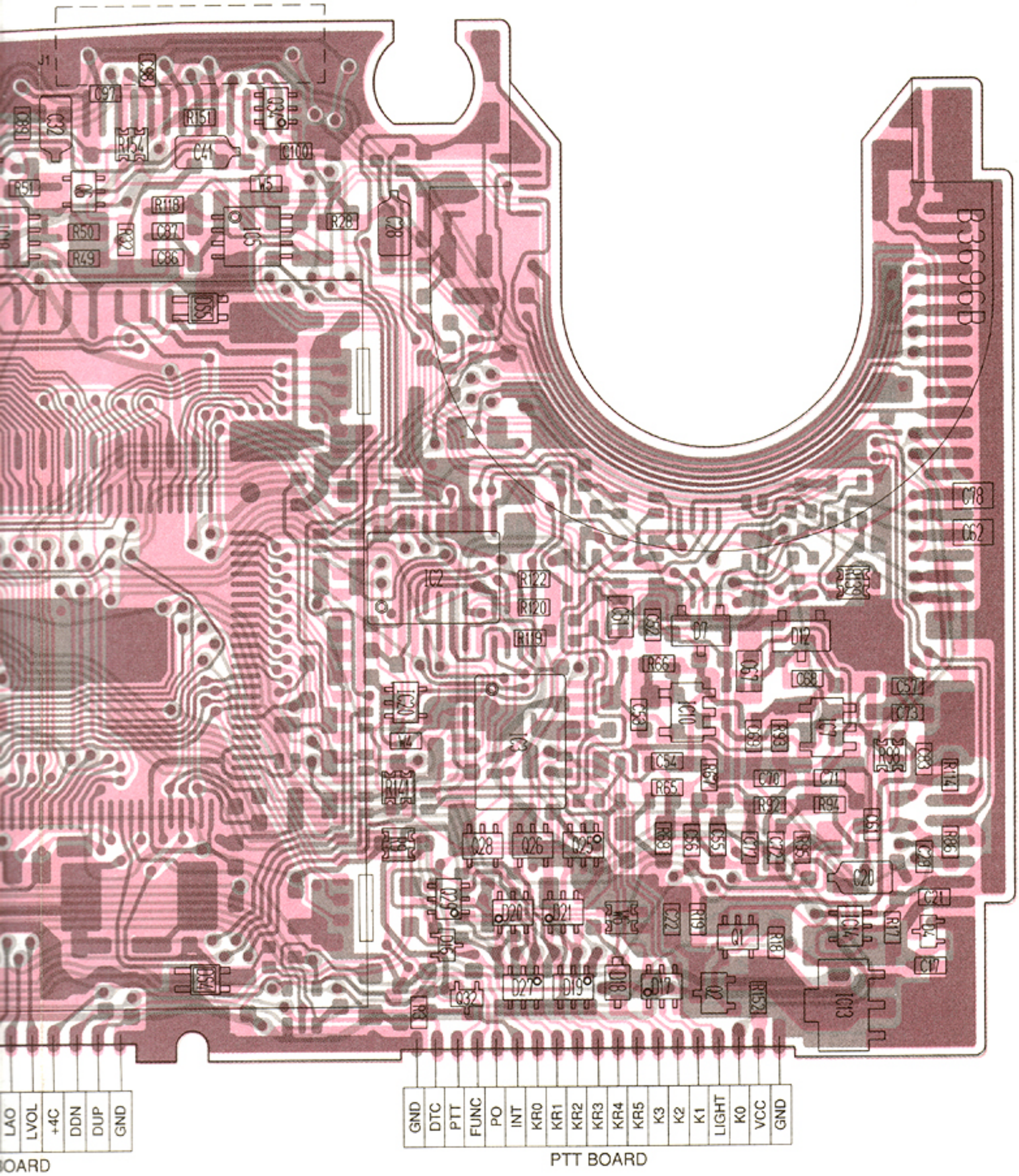
UN9113
Q32

Symbol: 6C

DA204U
D26

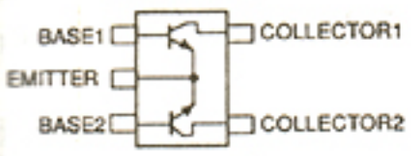
Symbol: K

SLM-23VMWS
DS2 (S.LED)



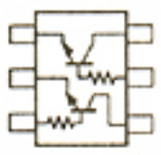
Surface Inside Underside

XP1210
Q26, Q28



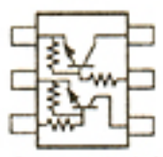
Symbol: AC

XP6210
Q25, Q29



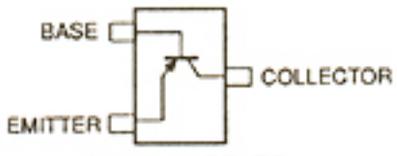
Symbol: CR

XP6214
Q34



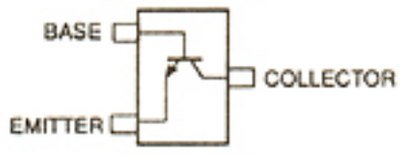
Symbol: AA

2SA1576
Q2



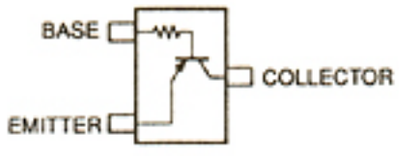
Symbol: FR/FS

2SD2216
Q22, Q23



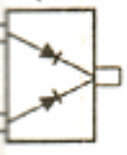
Symbol: YS

UN9110
Q7

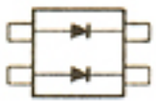


Symbol: 6L

M-23VMWS
2 (S.LED)



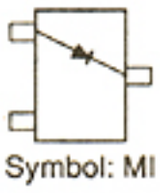
LT1E73A
DS3 – DS6 (S.LED)



MA110
D18

Symbol: 1A

MA132K
D4

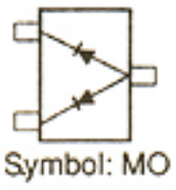


Symbol: MI

HSM88AS
D7, D12

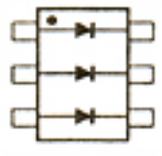
Symbol: C1

MA132WA
D16



Symbol: MO

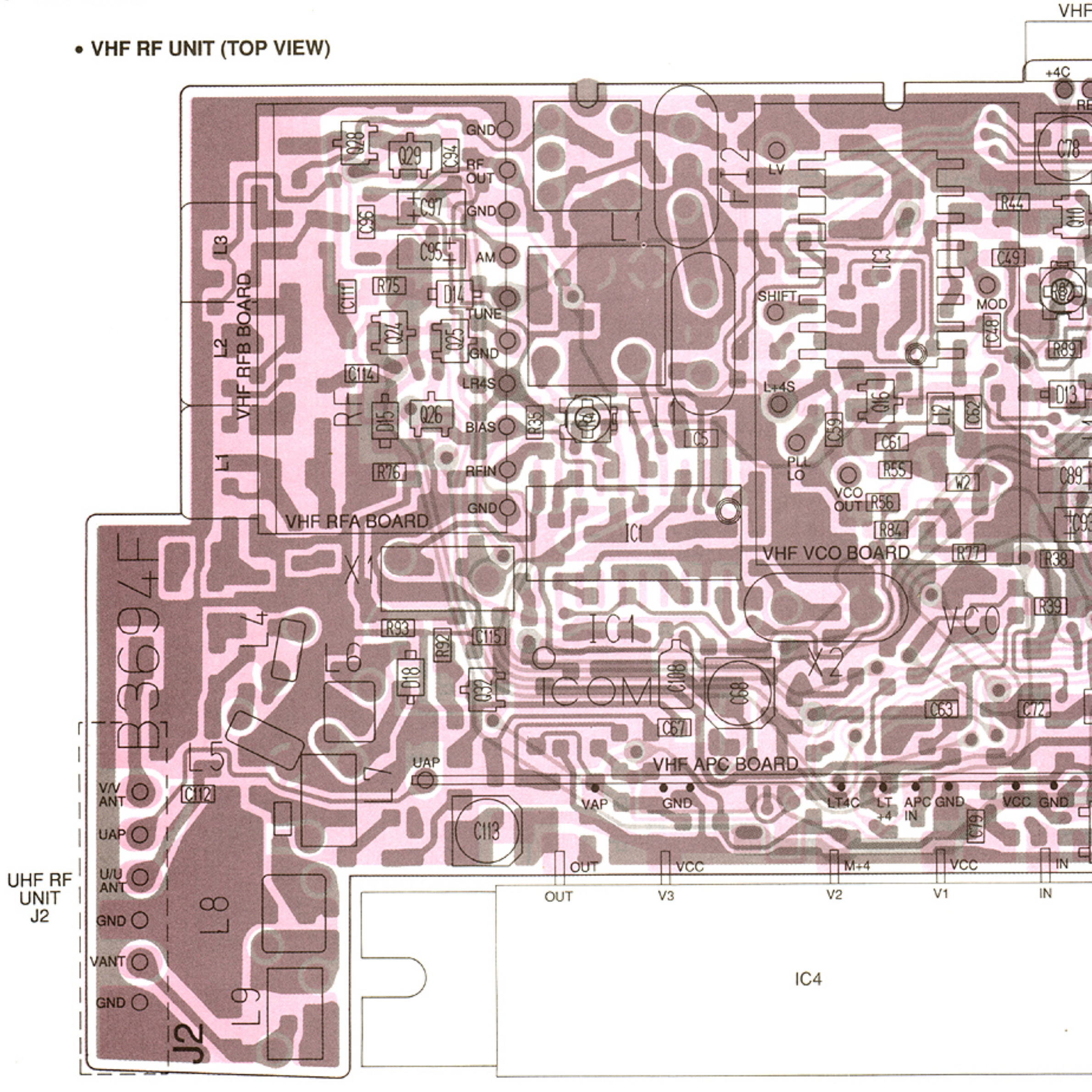
MA1S121
D17, D19 – D21, D27



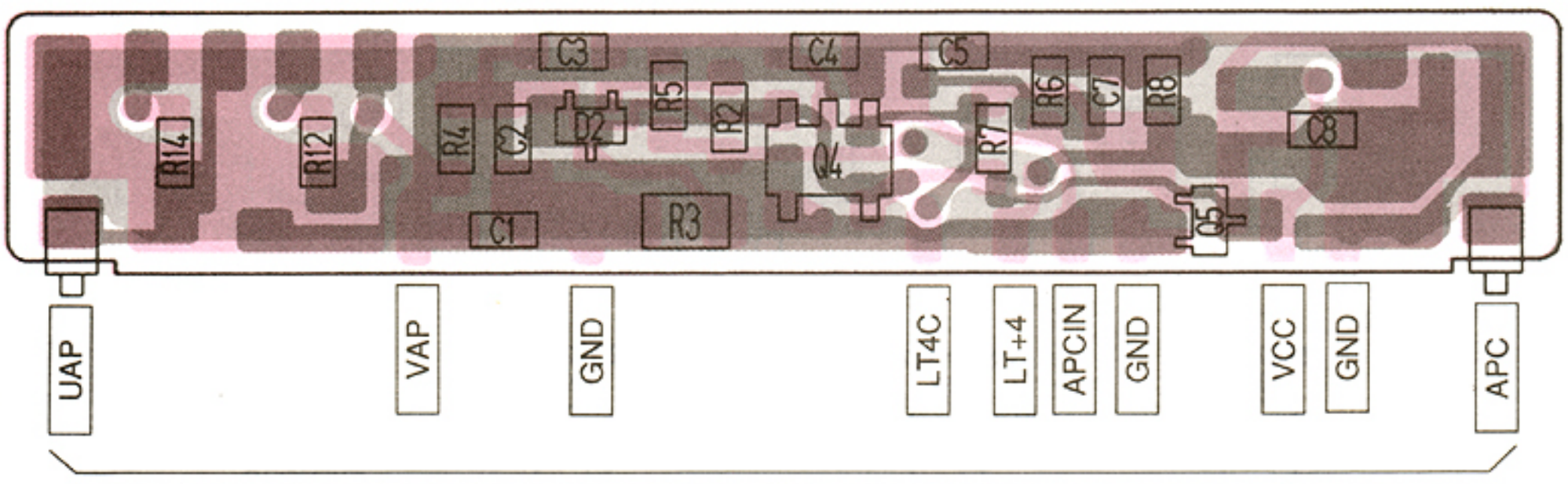
Symbol: M2D

8-3 VHF UNIT

• **VHF RF UNIT (TOP VIEW)**

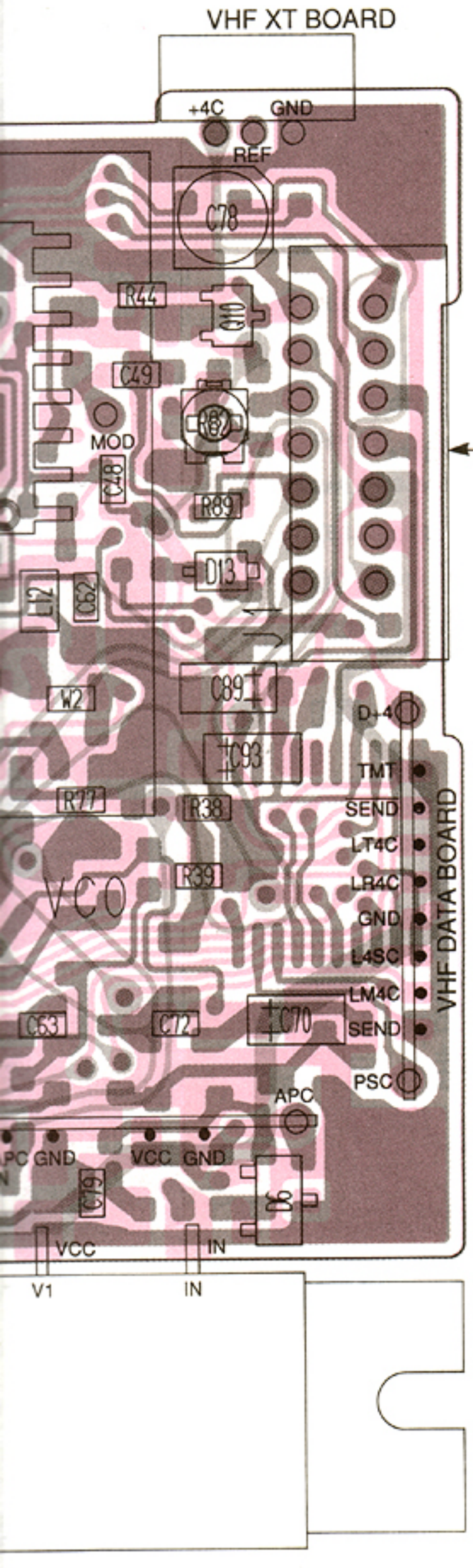


• **VHF APC BOARD (TOP VIEW)**



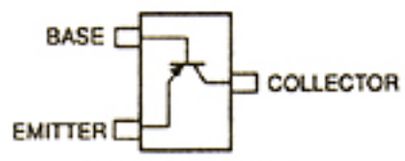
VHF RF UNIT

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



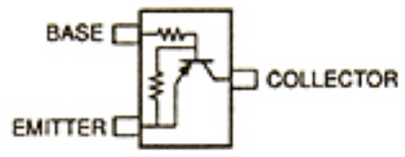
CONNECT UNIT J1	
LUL	LCK
+4	LPL STB
LMOD	LIO STB
REF	LDATA
LR4S	VCC
LDET	GND
+4C	LSD

2SA1576
Q10, Q25



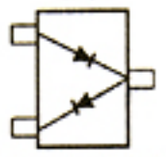
Symbol: FR/FS

DTA144EU
Q28



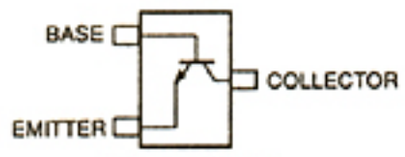
Symbol: 16

1SV172
D6



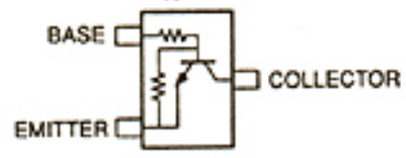
Symbol: BE

2SC4403
Q16



Symbol: LY3

DTC144EU
Q29

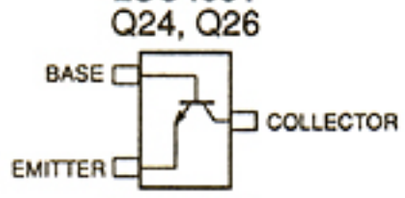


Symbol: 26

MA110
D13 – D15, D18

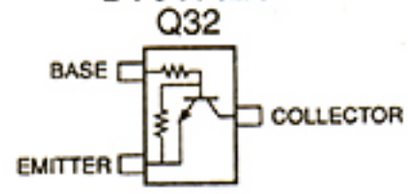
Symbol: 1A

2SC4081
Q24, Q26



Symbol: BS

DTC114EU
Q32



Symbol: 24

Inside Underside

FMS1
Q4

Symbol: S1

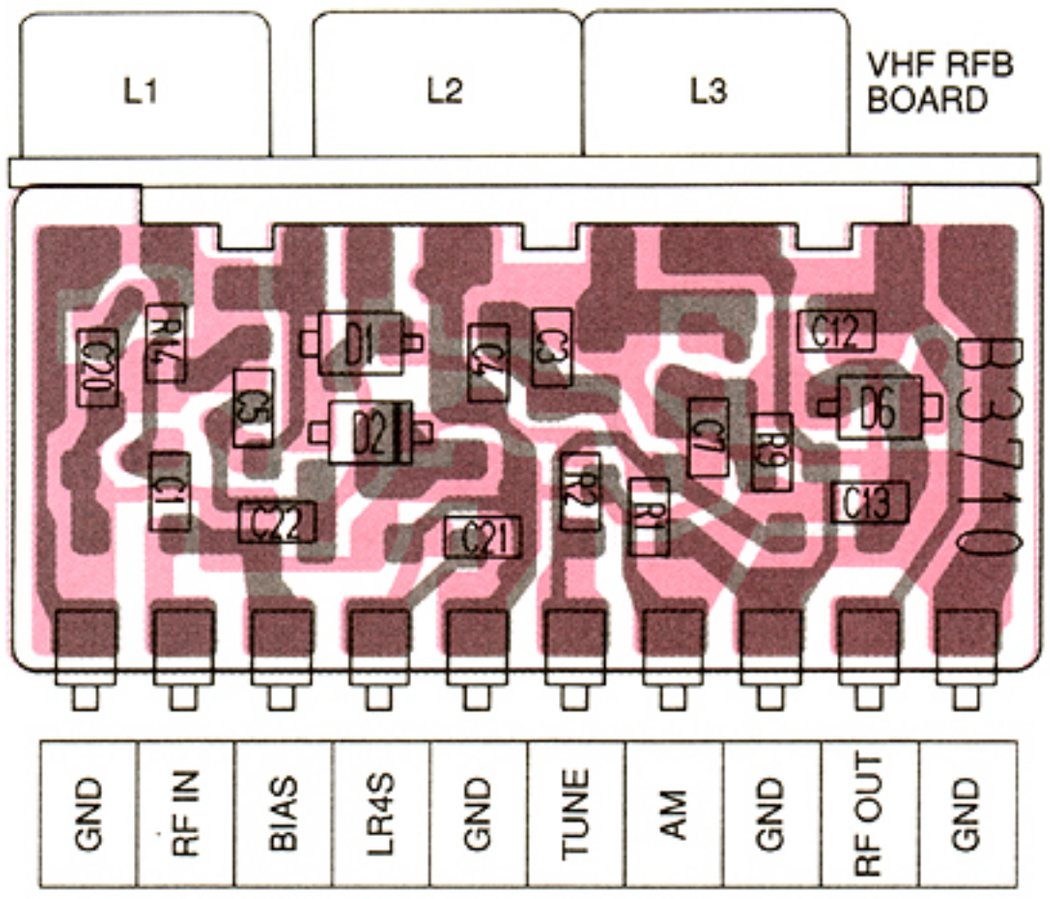
2SD2345
Q5

Symbol: 1Z

MA132WK
D2

Symbol: MU

- **VHF RFA BOARD (TOP VIEW)**



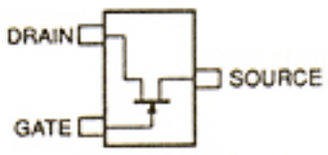
MA77
D1, D6

Symbol: 4B

HVU350TRF
D2

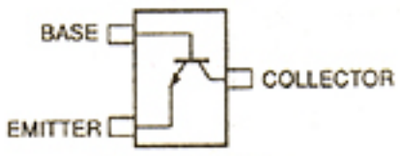
Symbol: 4

2SK882-Y
Q5



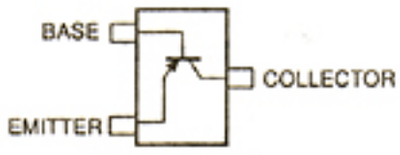
Symbol: TY

2SC4226
Q8, Q9



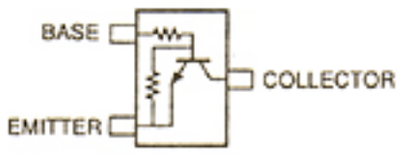
Symbol: R25

2SA1588-GR
Q31



Symbol: ZG

DTC144EU
Q22

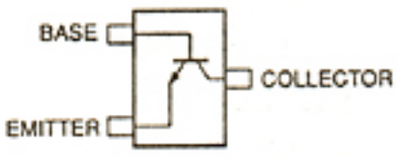


Symbol: 26

2SK880-Y
Q13

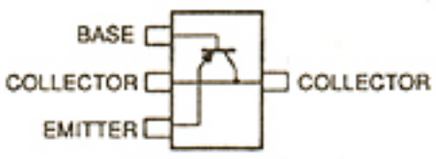
Symbol: XY

2SC4117
Q12



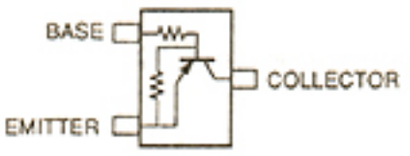
Symbol: CL

2SB798
Q27



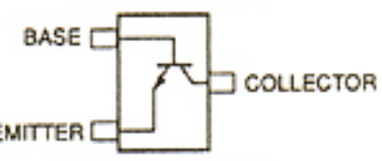
Symbol: DK

DTA143ZU
Q23



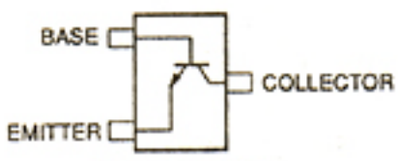
Symbol: 113

2SC4081
Q1, Q2, Q20



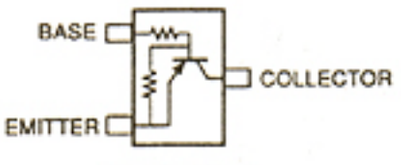
Symbol: BR/BS

2SC4405-3
Q17, Q18



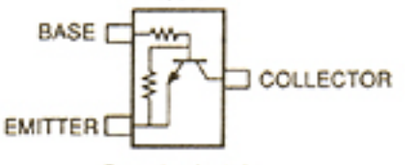
Symbol: OY3

DTA144TU
Q6, Q30



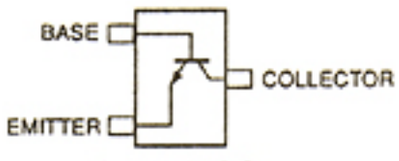
Symbol: 96

UN9211
Q33



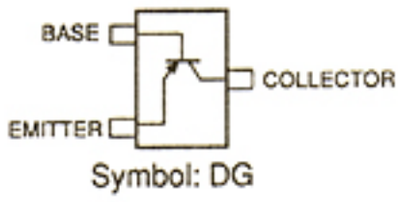
Symbol: 8A

2SC4215
Q4



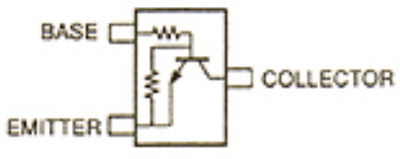
Symbol: QO

2SA1587
Q11



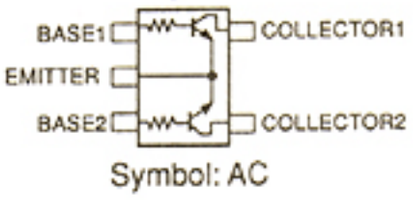
Symbol: DG

DTC114EU
Q14



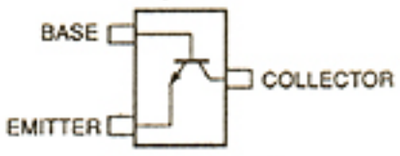
Symbol: 24

XP1210
Q3



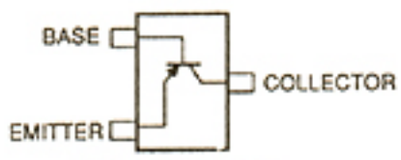
Symbol: AC

2SC4403
Q7, Q15



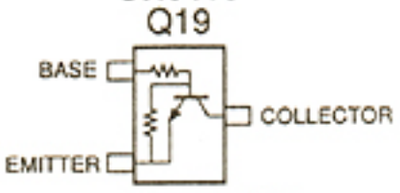
Symbol: LY3

2SA1576
Q21



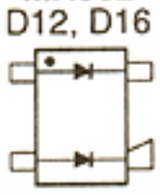
Symbol: FR/FS

UN9115
Q19



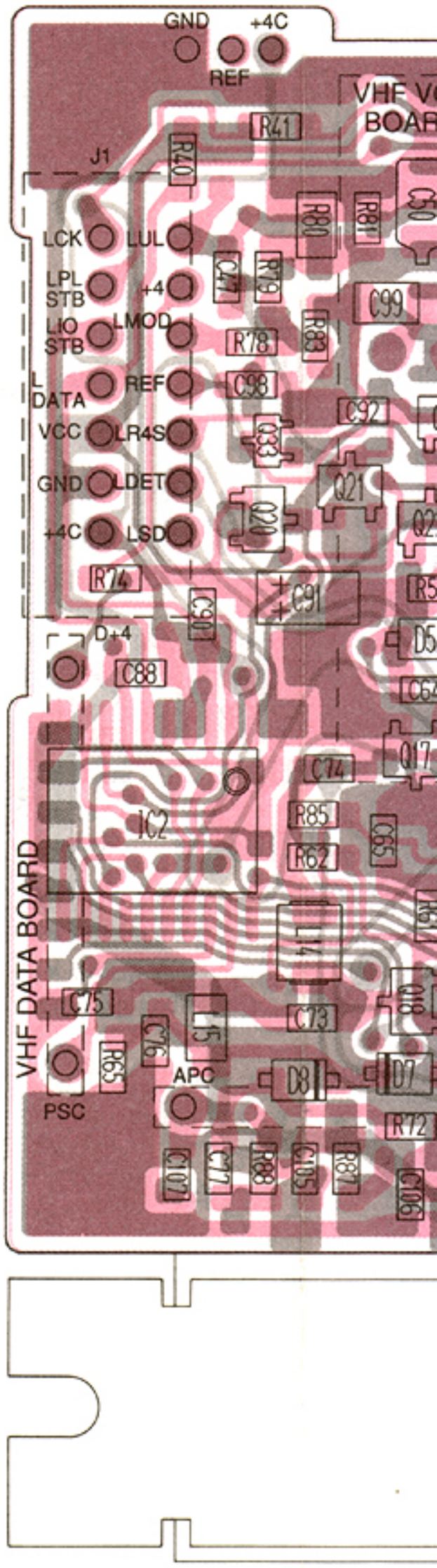
Symbol: 6E/6EH

MA862
D12, D16

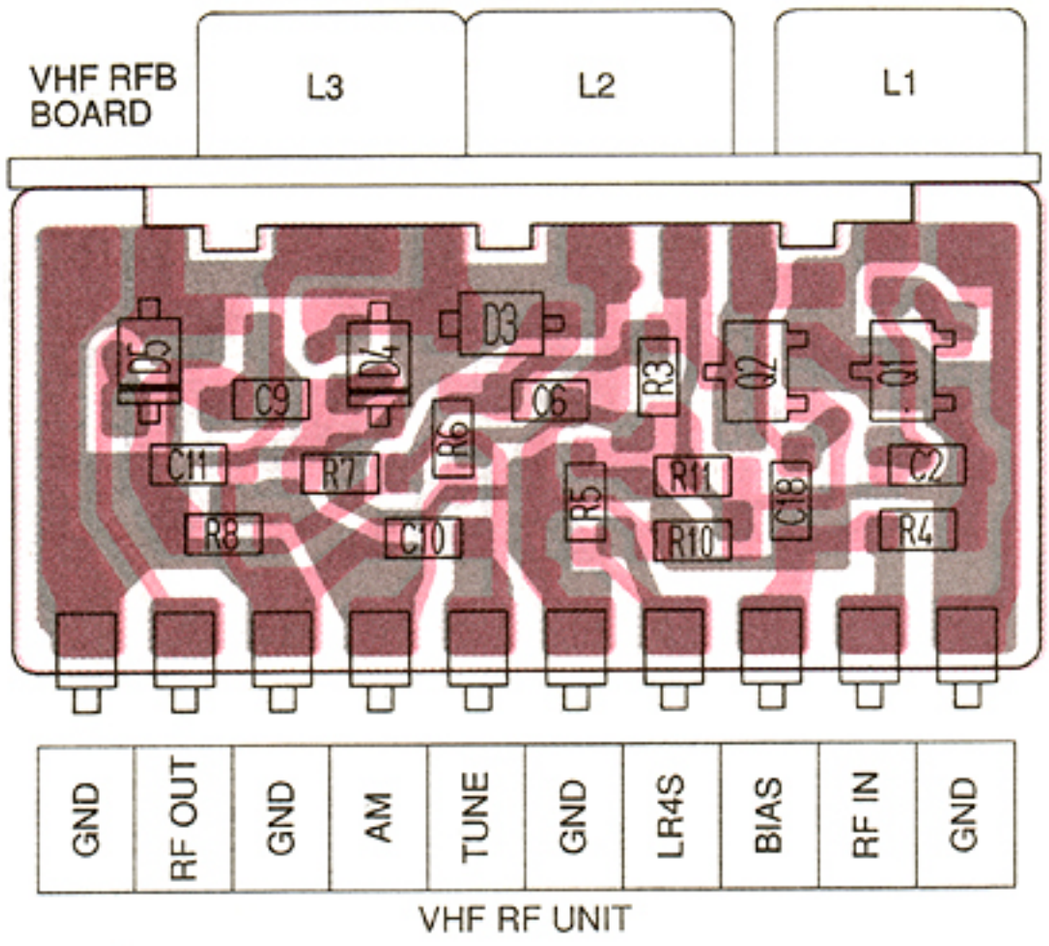


Symbol: M1I

• VHF RF UNIT (BOTTOM VIE

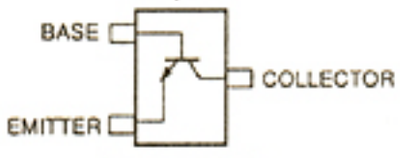


• VHF RFA BOARD (BOTTOM VIEW)



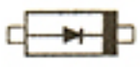
VHF RF UNIT

2SC4405
Q1, Q2



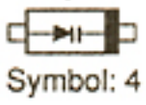
Symbol: OY3

MA77
D3



Symbol: 4B

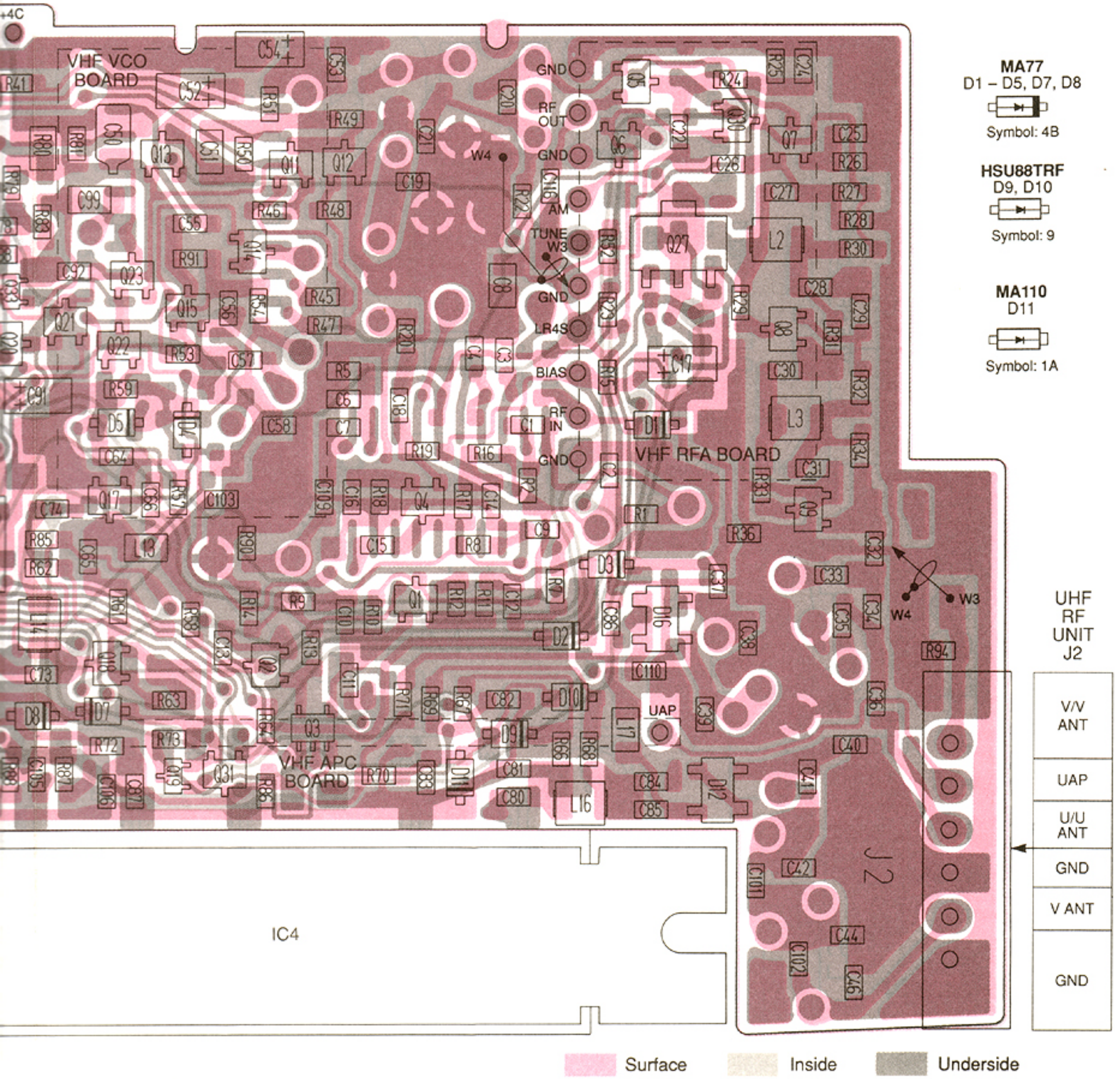
HVU350TRF
D4, D5



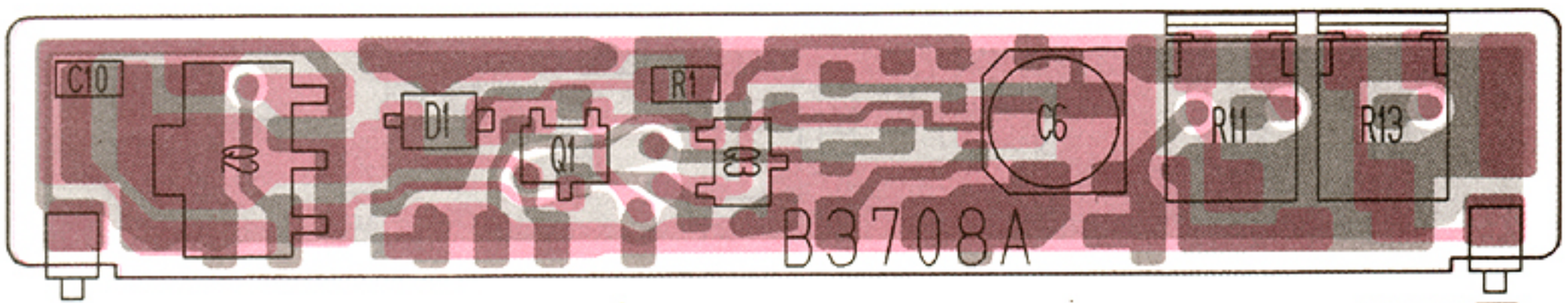
Symbol: 4

• VH

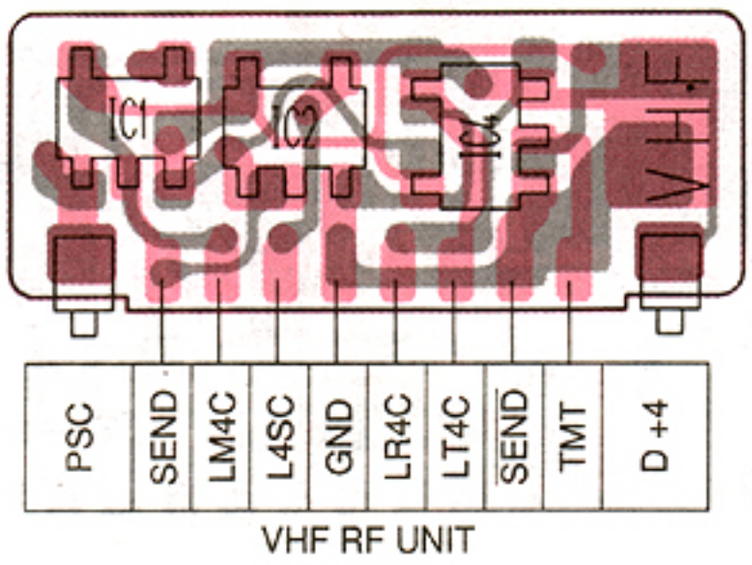
(BOTTOM VIEW)



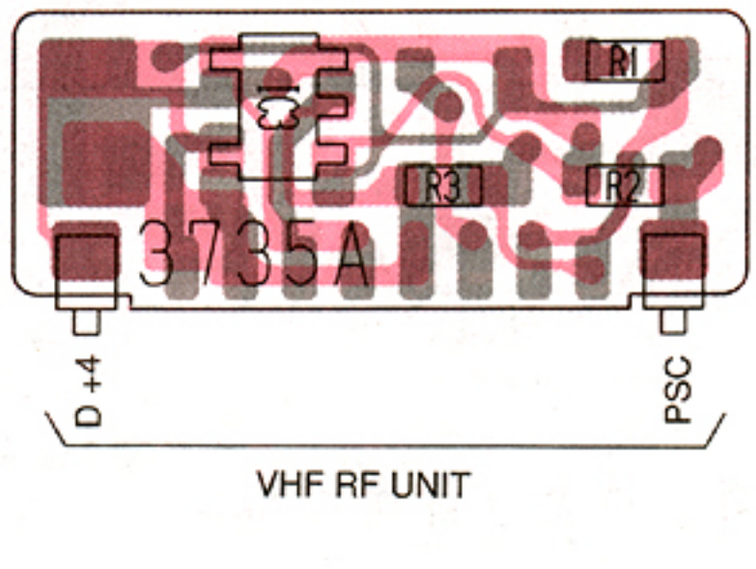
• VHF APC BOARD (BOTTOM VIEW)



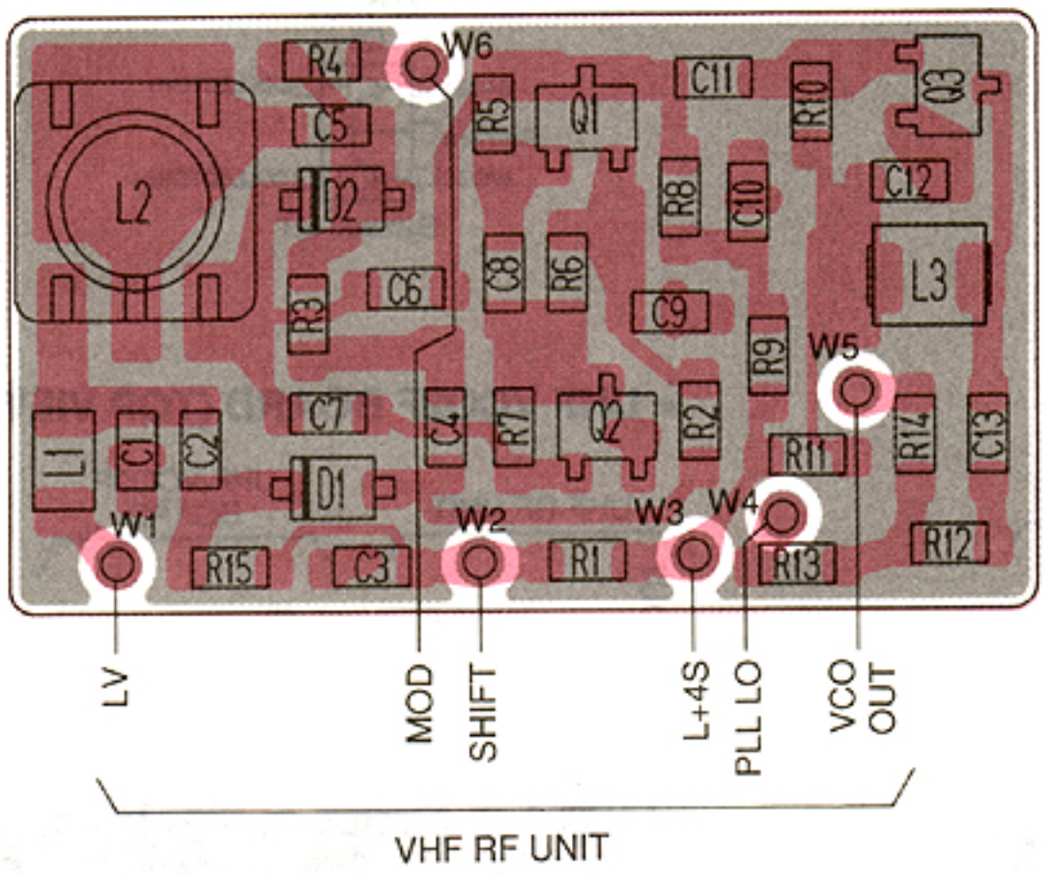
• VHF DATA BOARD (TOP VIEW)



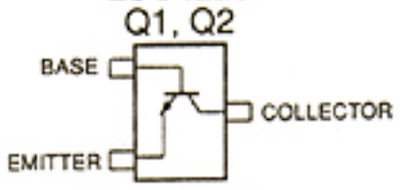
• VHF DATA BOARD (BOTTOM VIEW)



• VHF VCO BOARD (TOP VIEW)

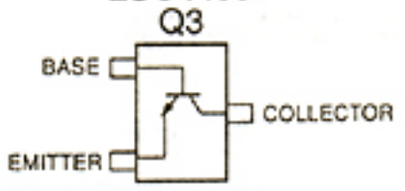


2SC4226
Q1, Q2



Symbol: R25

2SC4403
Q3

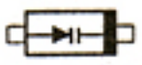


Symbol: LY3

MA77
D1

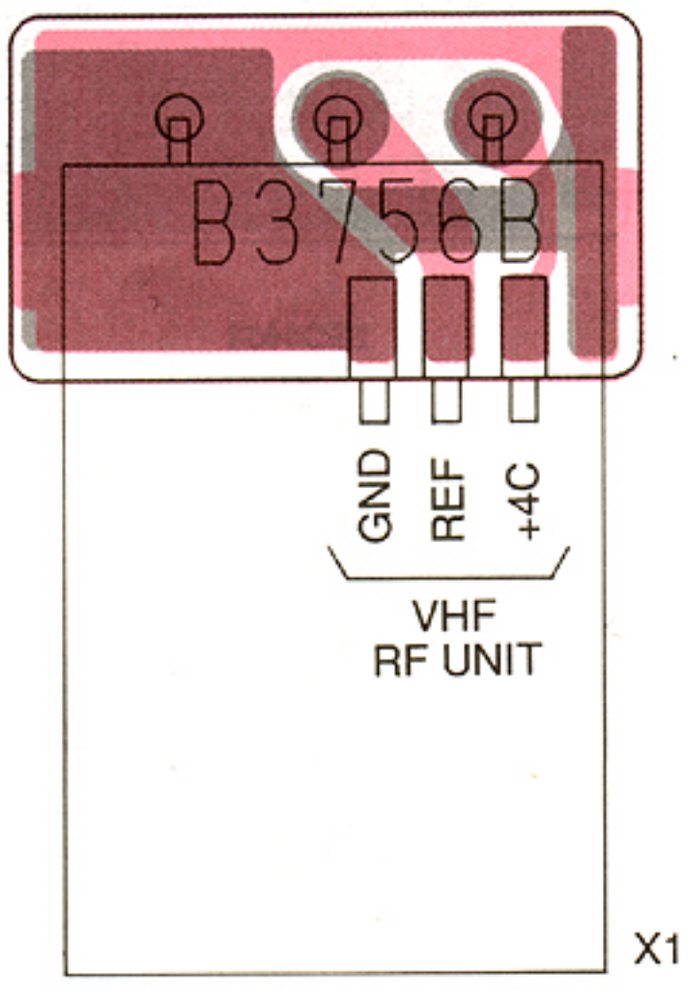
Symbol: 4B

HVU350TRF
D2



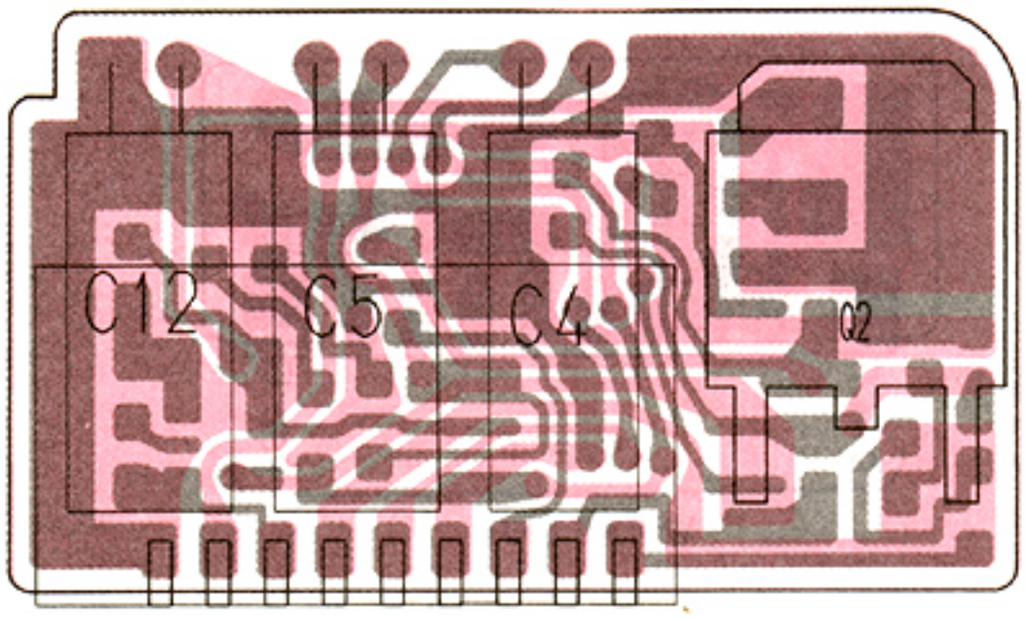
Symbol: 4

• XT BOARD (TOP VIEW)



8-4 UHF RF UNIT

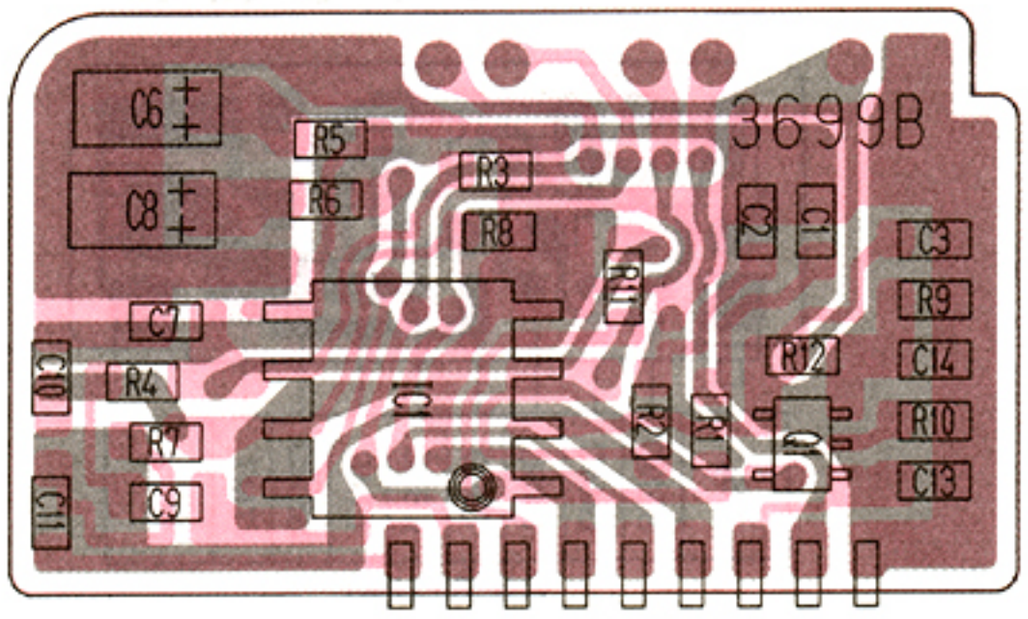
• AF BOARD (TOP VIEW)



GND	SP	AFON	VCC	EXTSP	GND	EXTSPR	LAF	HAF

UHF RF UNIT

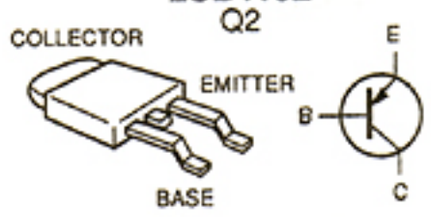
• AF BOARD (BOTTOM VIEW)



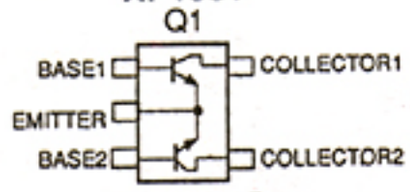
HAF	LAF	EXTSPR	GND	EXTSP	VCC	AFON	SP	GND

UHF RF UNIT

2SB1182
Q2

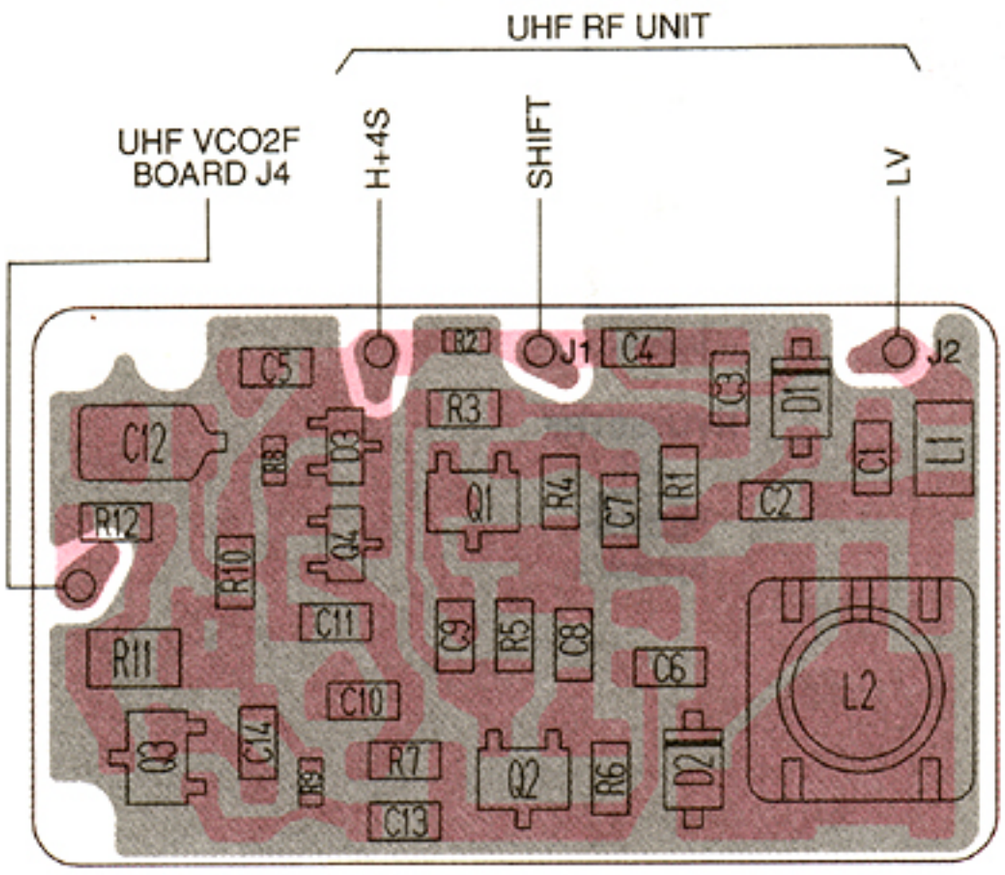


XP1501
Q1

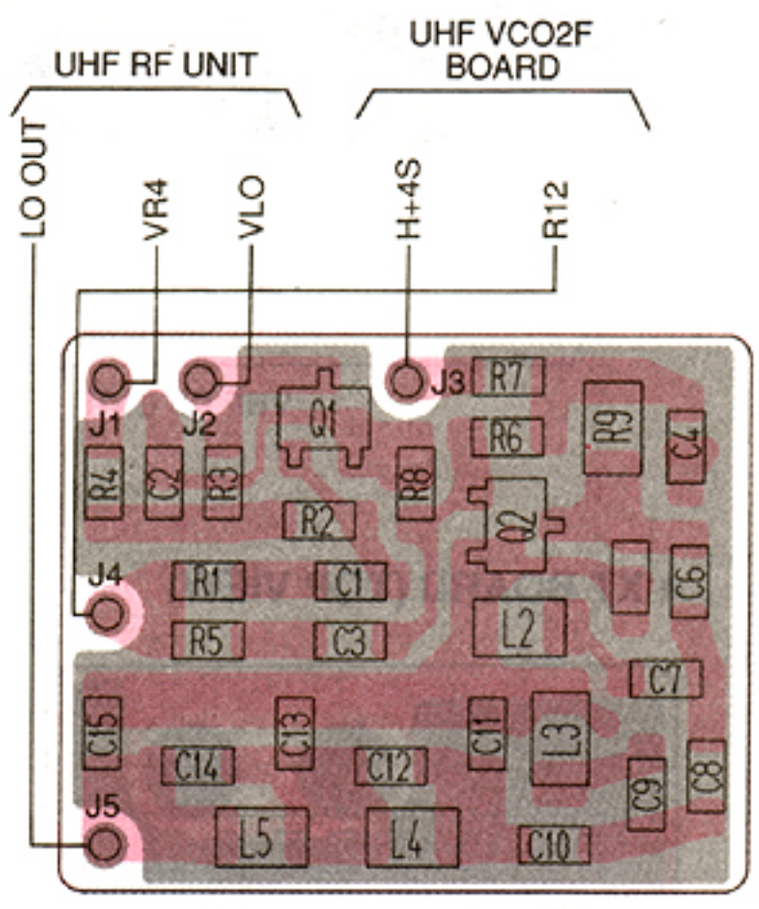


Symbol: 5R

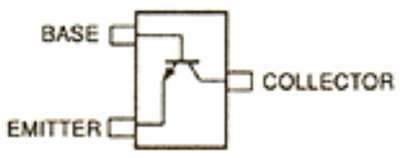
• UHF VCO1F BOARD (TOP VIEW)



• UHF VCO2F BOARD (TOP VIEW)

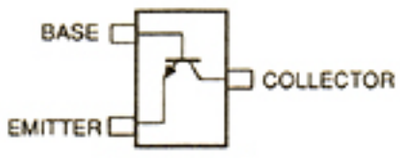


2SC4226
Q1 – Q3



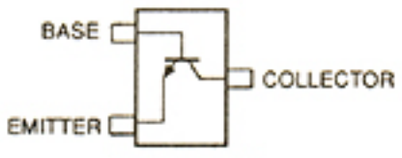
Symbol: R25

2SD2345
Q4



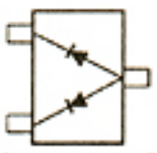
Symbol: 1Z

2SC4403
Q1



Symbol: LY3

MA132WA
D3



Symbol: MO

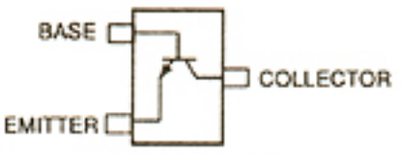
MA77
D1

Symbol: 4B

MA363B
D2

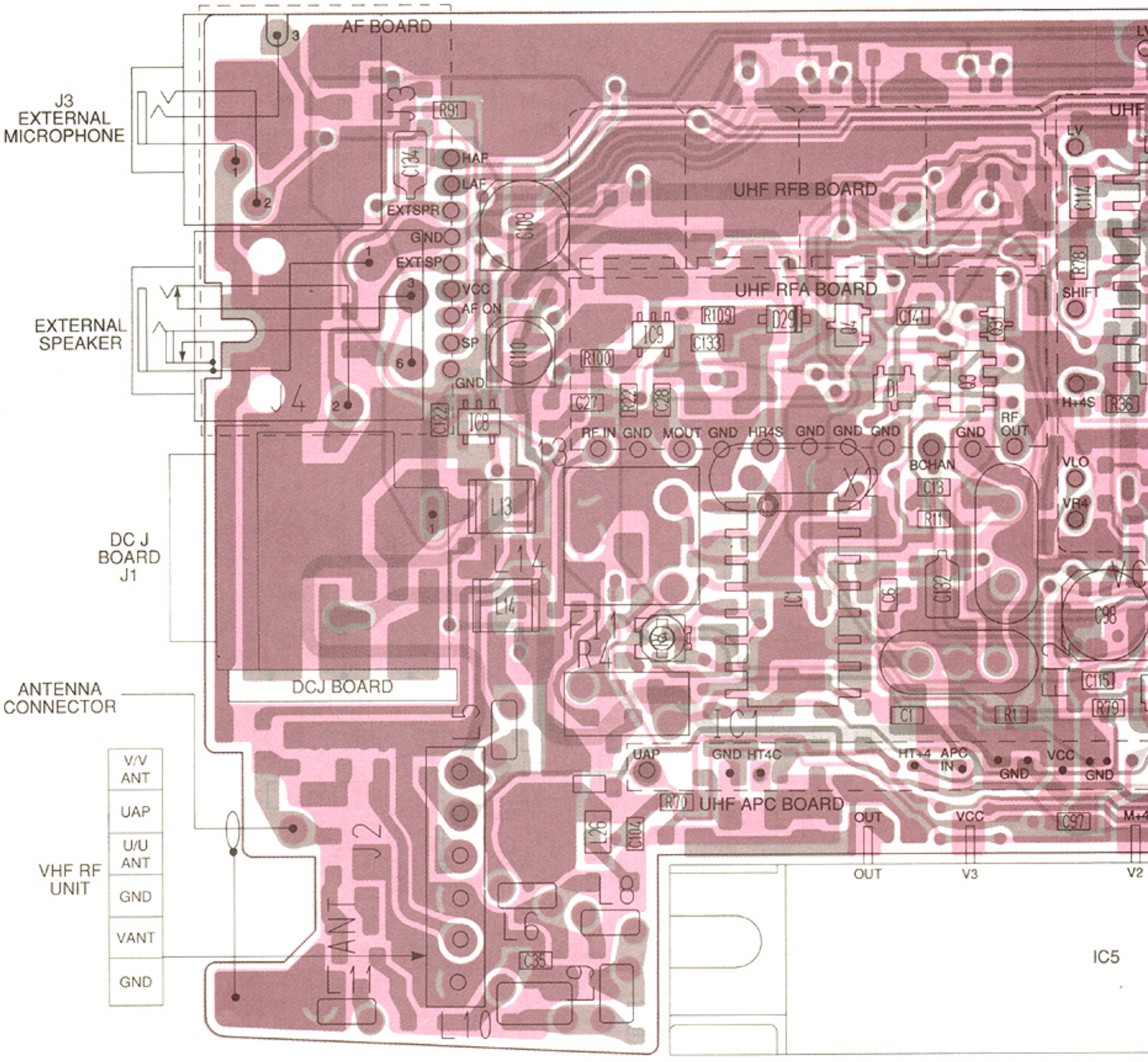
Symbol: 6D

2SC4226
Q2



Symbol: Stamped R25

• UHF RF UNIT (TOP VIEW)



• UHF DATA BOARD (TOP VIEW)

UHF RF UNIT

2SC4081
Q5

Symbol: BR/BS

FMS1
Q4

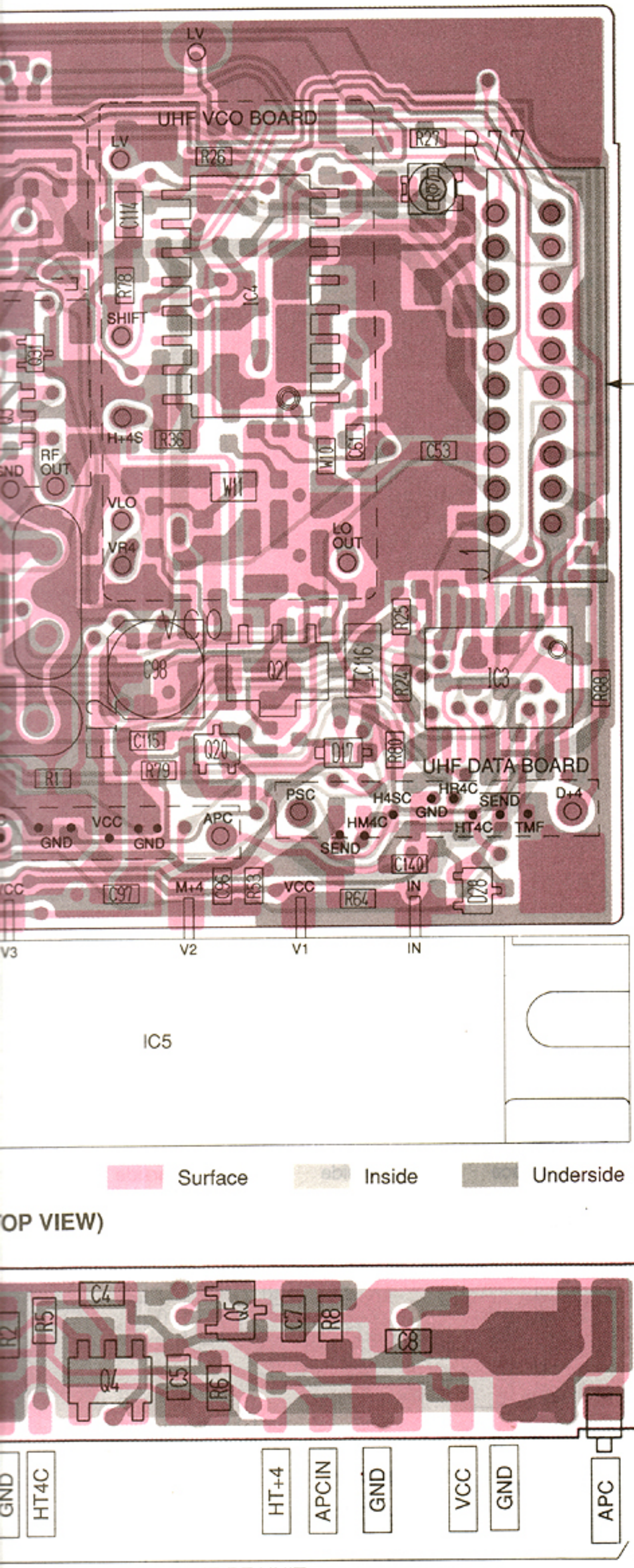
Symbol: S1

• UHF APC BOARD (TOP VIEW)

DAN202U
D2

Symbol: N

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

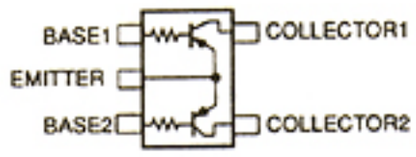


Surface Inside Underside

(TOP VIEW)

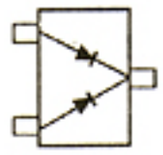
CONNECT UNIT J2	
HPL STB	AF ON
EXT MIC	LAF
SP	HAF
HMOD	+4
HUL	HCK
HR4S	HDATA
VCC	HIO STB
REF	+4C
HDET	⊖
HSD	GND

FMA4
Q3



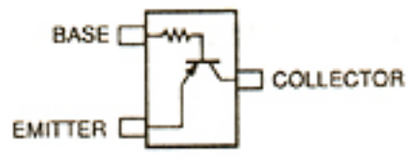
Symbol: A4

DAN202U
D1



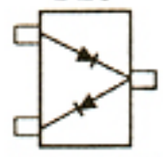
Symbol: N

DTA114TU
Q4



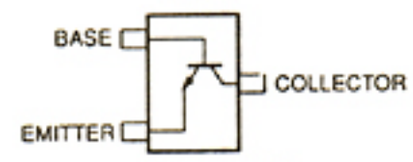
Symbol: 94

1SV252
D28



Symbol: 3E

2SC4081
Q20

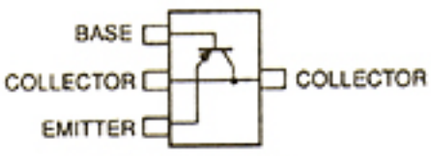


Symbol: BR/BS

MA110
D17

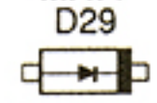
Symbol: 1A

2SB798
Q21



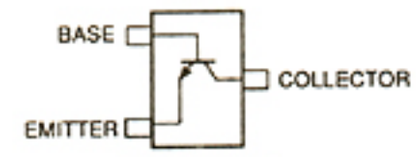
Symbol: DK/DL

MA77
D29



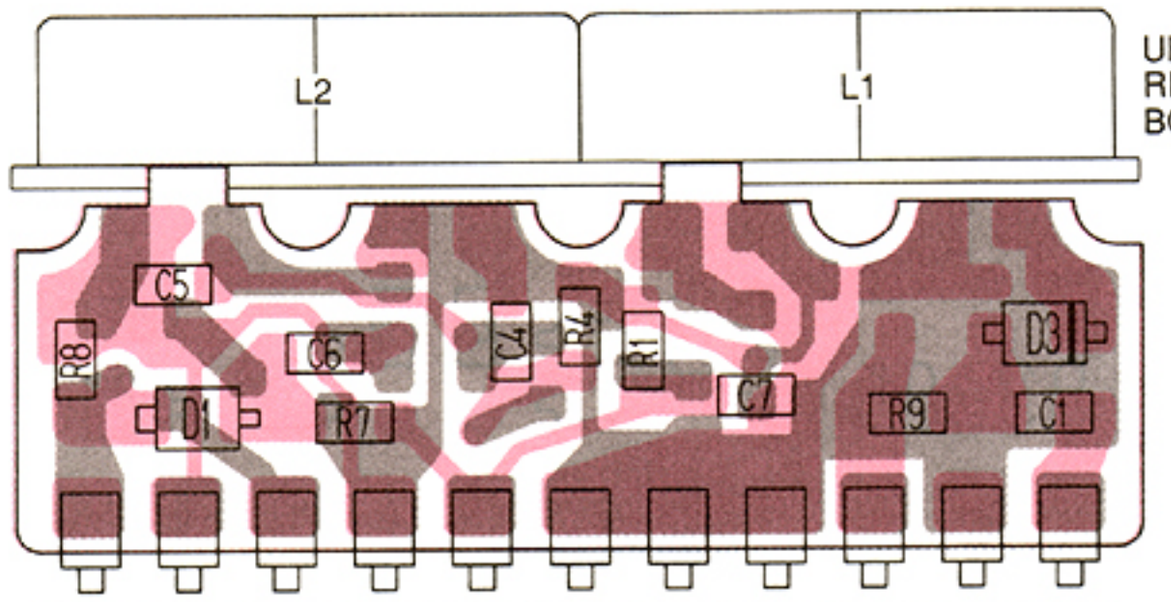
Symbol: 4B

2SD2345
Q31



Symbol: 1Z

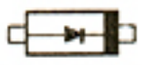
• **UHF RFA BOARD (TOP VIEW)**



UHF RF UNIT

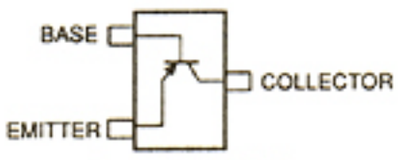
UHF RF UNIT

MA77
D1, D3



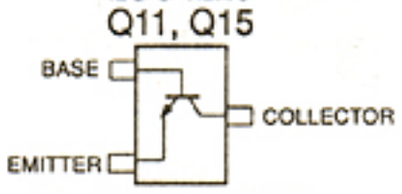
Symbol: 4B

2SA1576
Q6, Q19, Q23



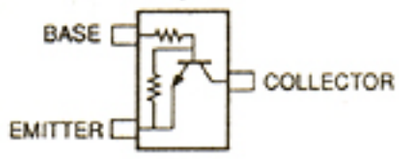
Symbol: FR/FS

2SC4226
Q11, Q15



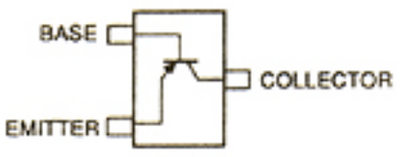
Symbol: Printed R25

DTC144EU
Q8



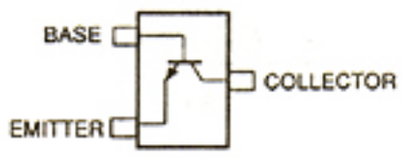
Symbol: 26

2SA1587
Q9



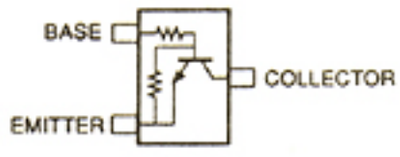
Symbol: DG

2SC4228
Q13



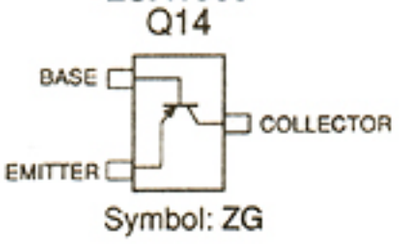
Symbol: R44

DTC114EU
Q25



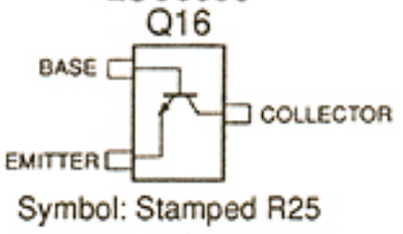
Symbol: 24

2SA1588
Q14



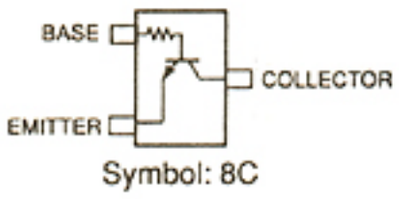
Symbol: ZG

2SC3356
Q16



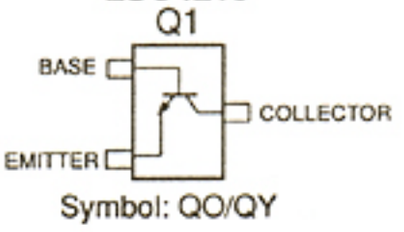
Symbol: Stamped R25

UN9213
Q12



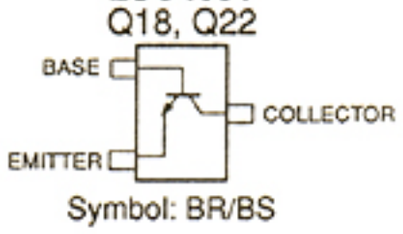
Symbol: 8C

2SC4215
Q1



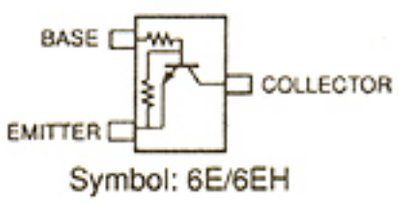
Symbol: QO/QY

2SC4081
Q18, Q22



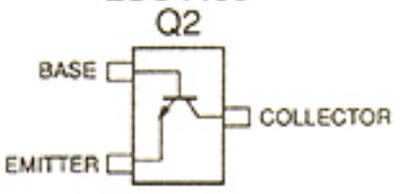
Symbol: BR/BS

UN9115
Q24



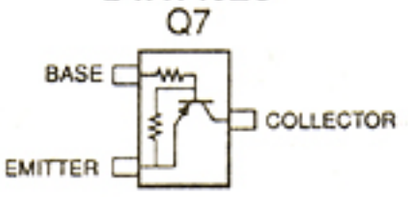
Symbol: 6E/6EH

2SC4403
Q2



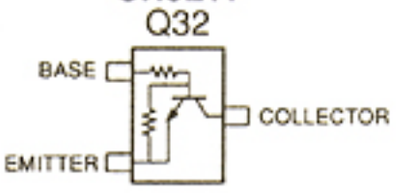
Symbol: LY3

DTA143ZU
Q7



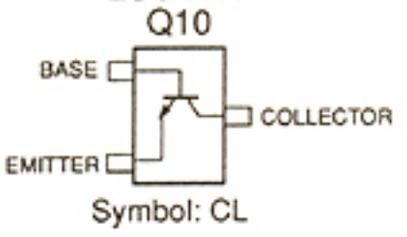
Symbol: 113

UN9211
Q32



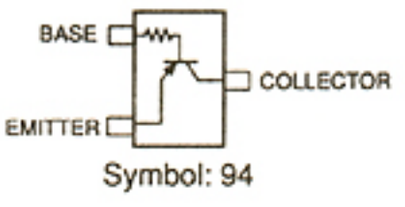
Symbol: 8A

2SC4117
Q10



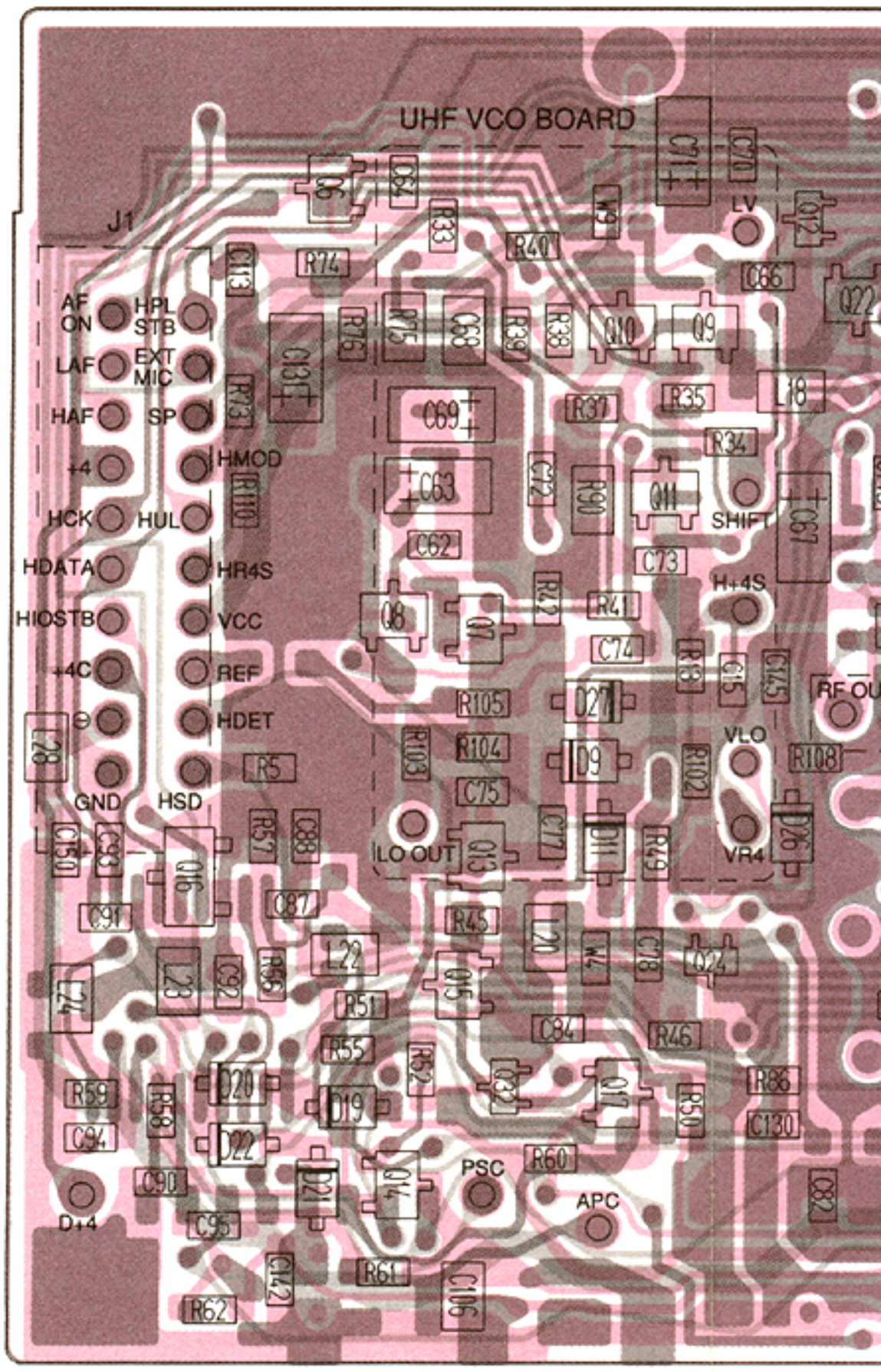
Symbol: CL

DTA114TU
Q17

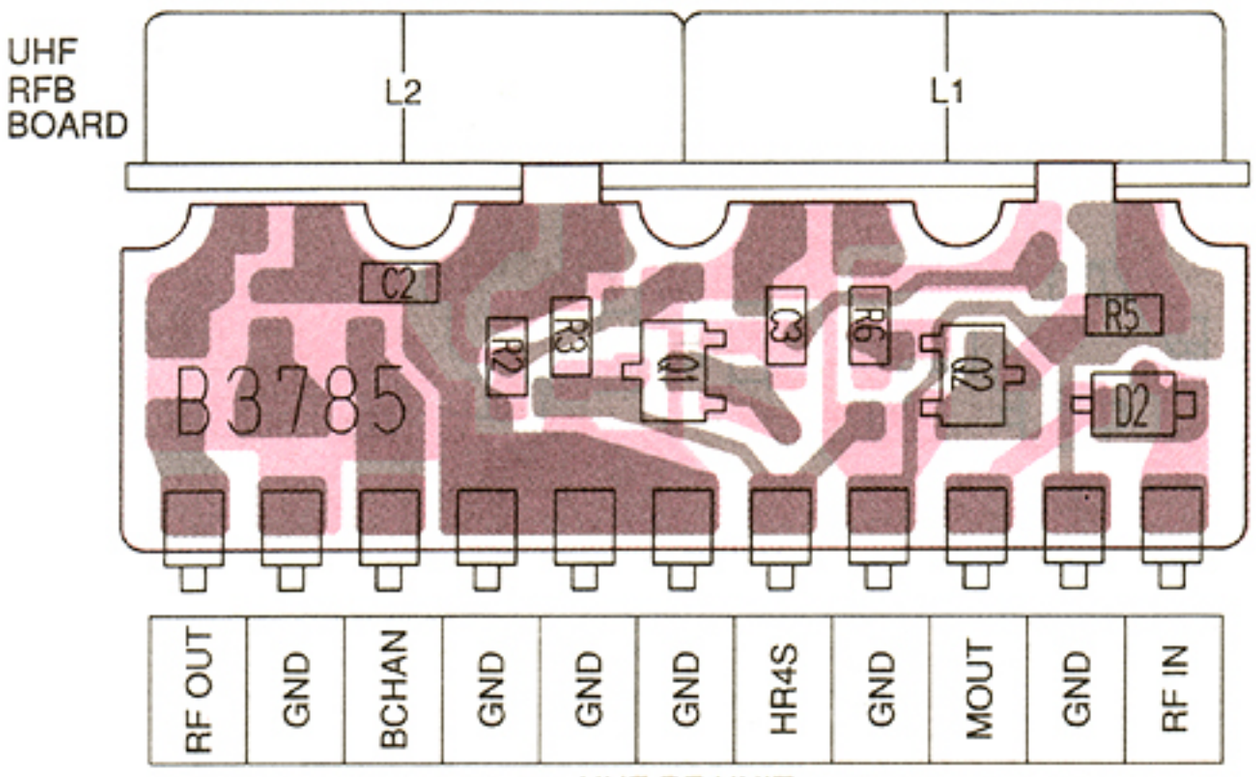


Symbol: 94

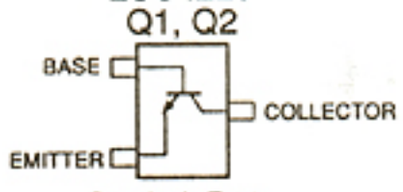
• UHF RF UNIT (BOTTOM VIEW)



• UHF RFA BOARD (BOTTOM VIEW)

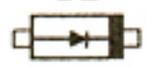


2SC4228
Q1, Q2



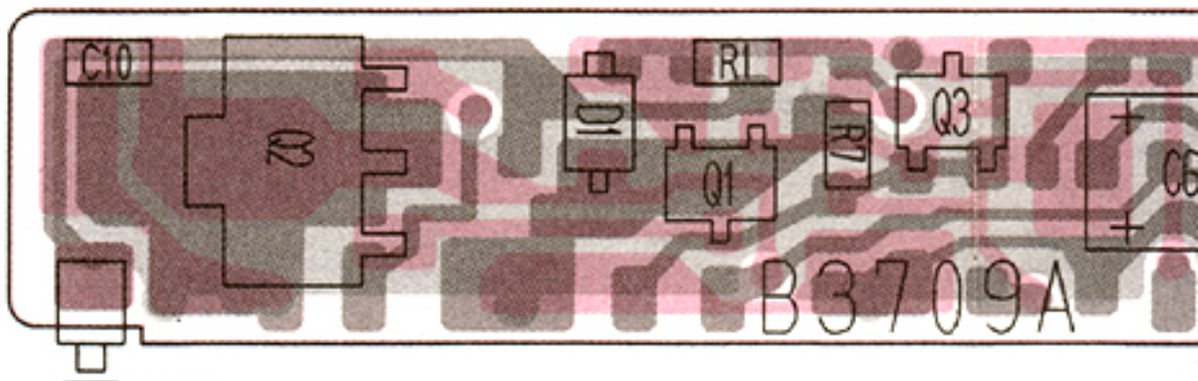
Symbol: R44

MA77
D2

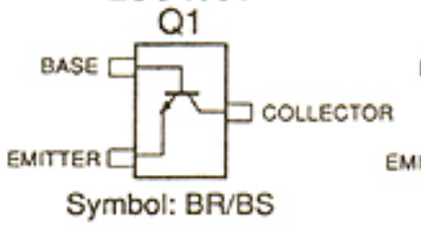


Symbol: 4B

• UHF APC BOARD (BOTTOM VIEW)

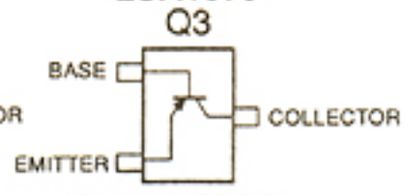


2SC4081
Q1



Symbol: BR/BS

2SA1576
Q3

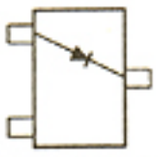


Symbol: FR/FS

DA114
D18

Symbol: AV

SB30-03P
D23



Symbol: SC

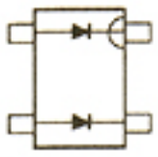
MA77
D5, D6, D8,
D9, D11, D19-D22,
D24, D26, D27

Symbol: 4B

MA110
D14, D16

Symbol: 1A

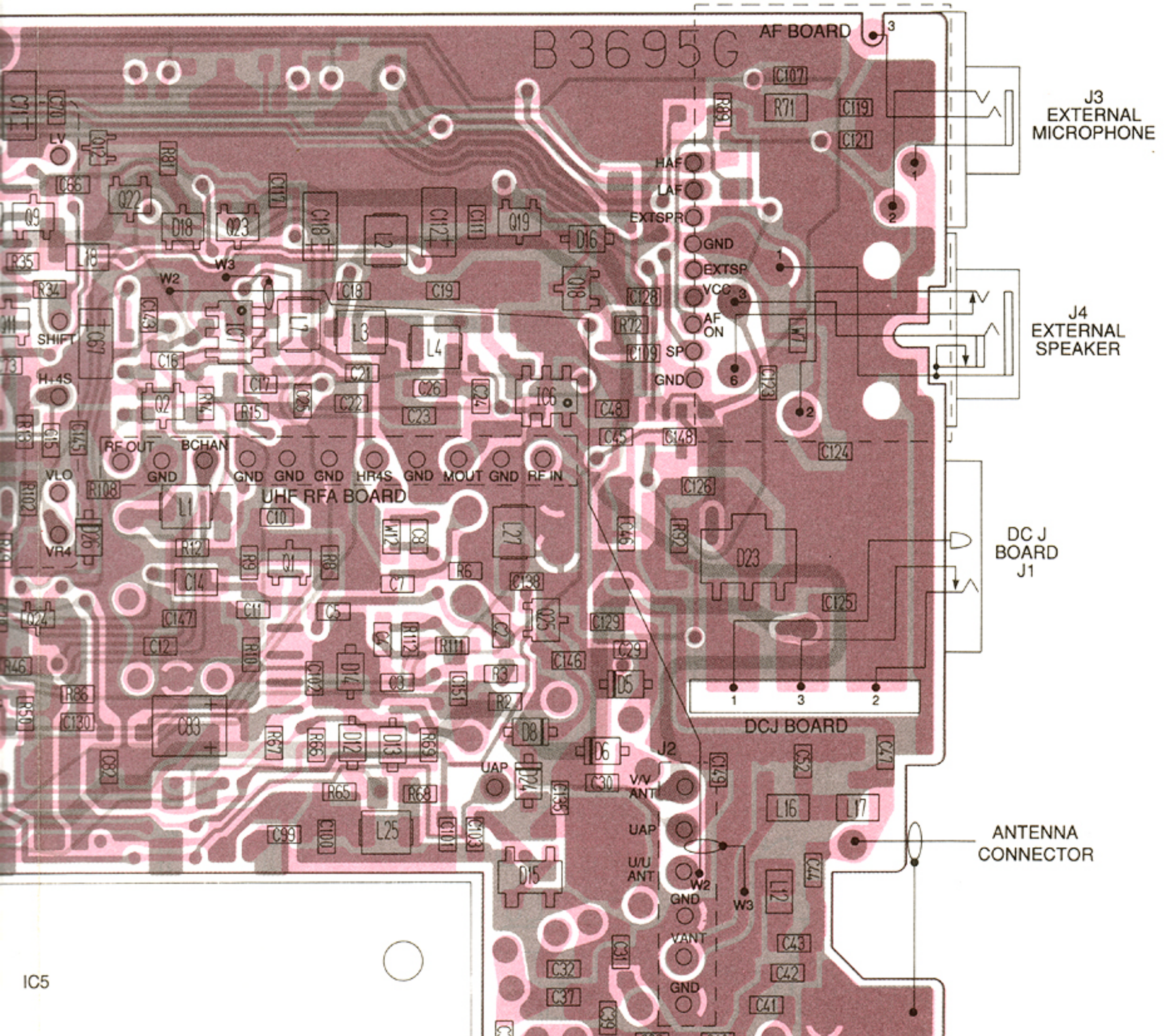
MA862
D15



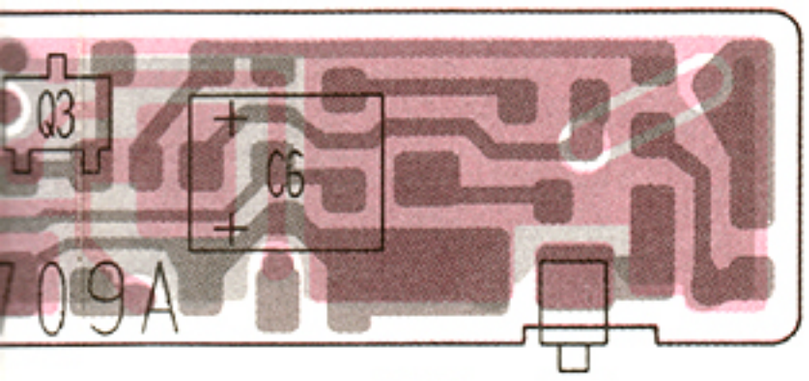
Symbol: M1I

HSU88
D12, D13

Symbol: 9



underside



MA110
D1

Symbol: 1A

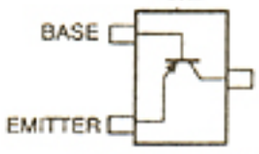
GA1576
Q3

Symbol: FR/FS

UHF
RF UNIT

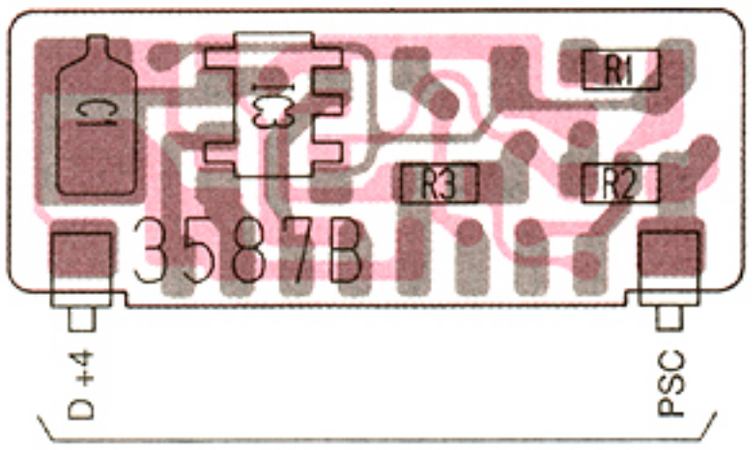
UAP

2SB798
Q2



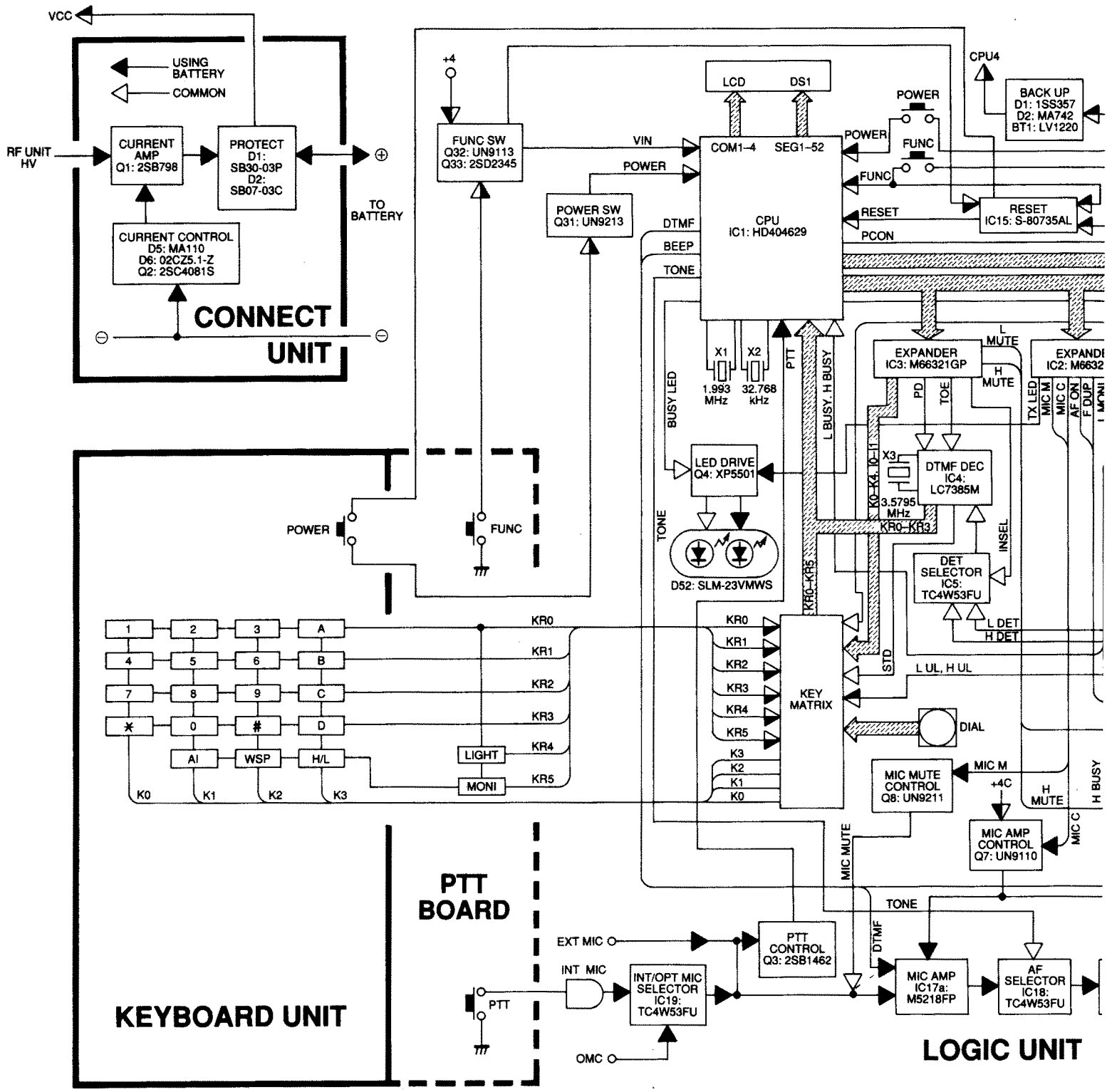
Symbol: DK/DL

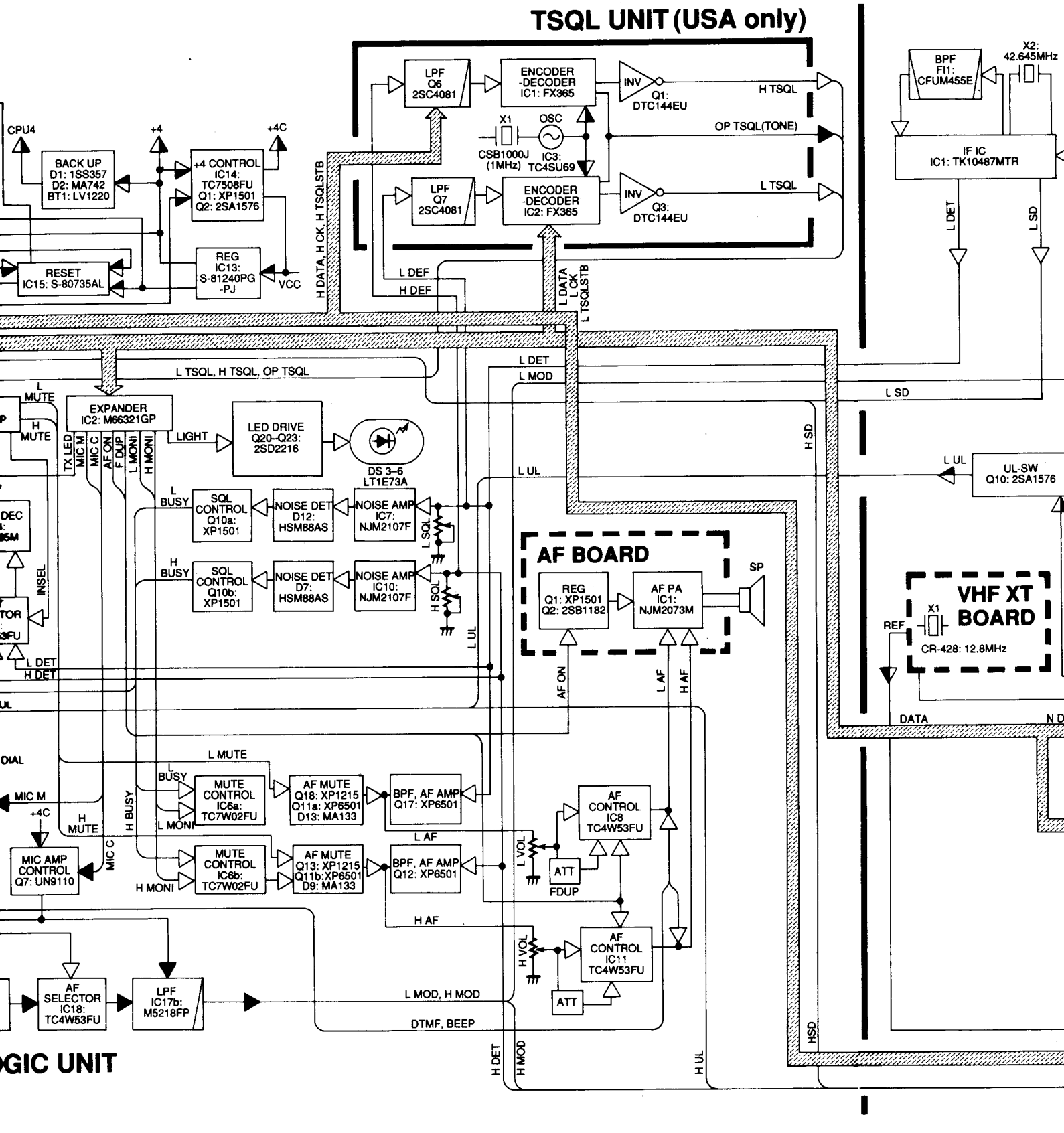
• **UHF DATA BOARD (BOTTOM VIEW)**

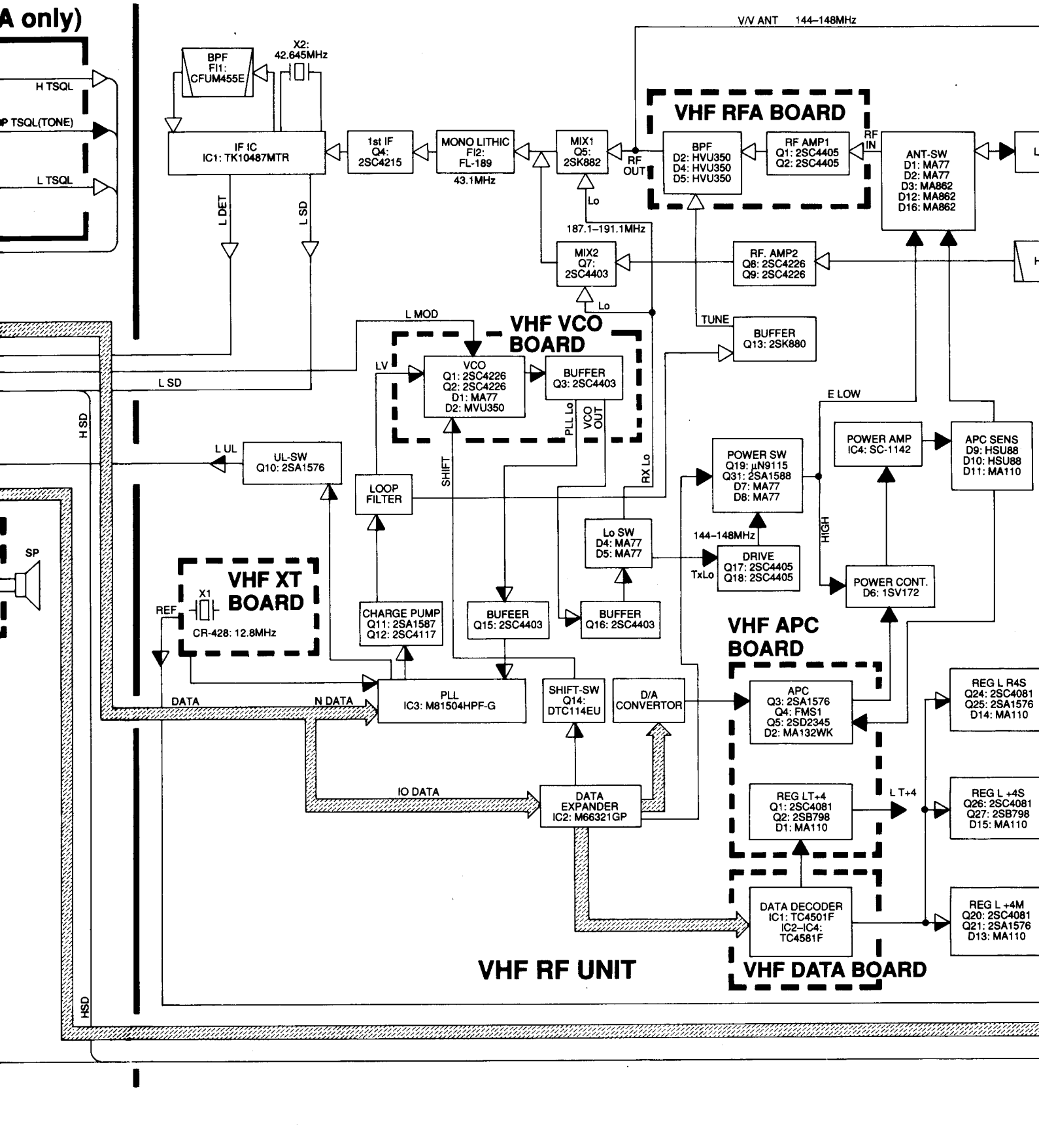


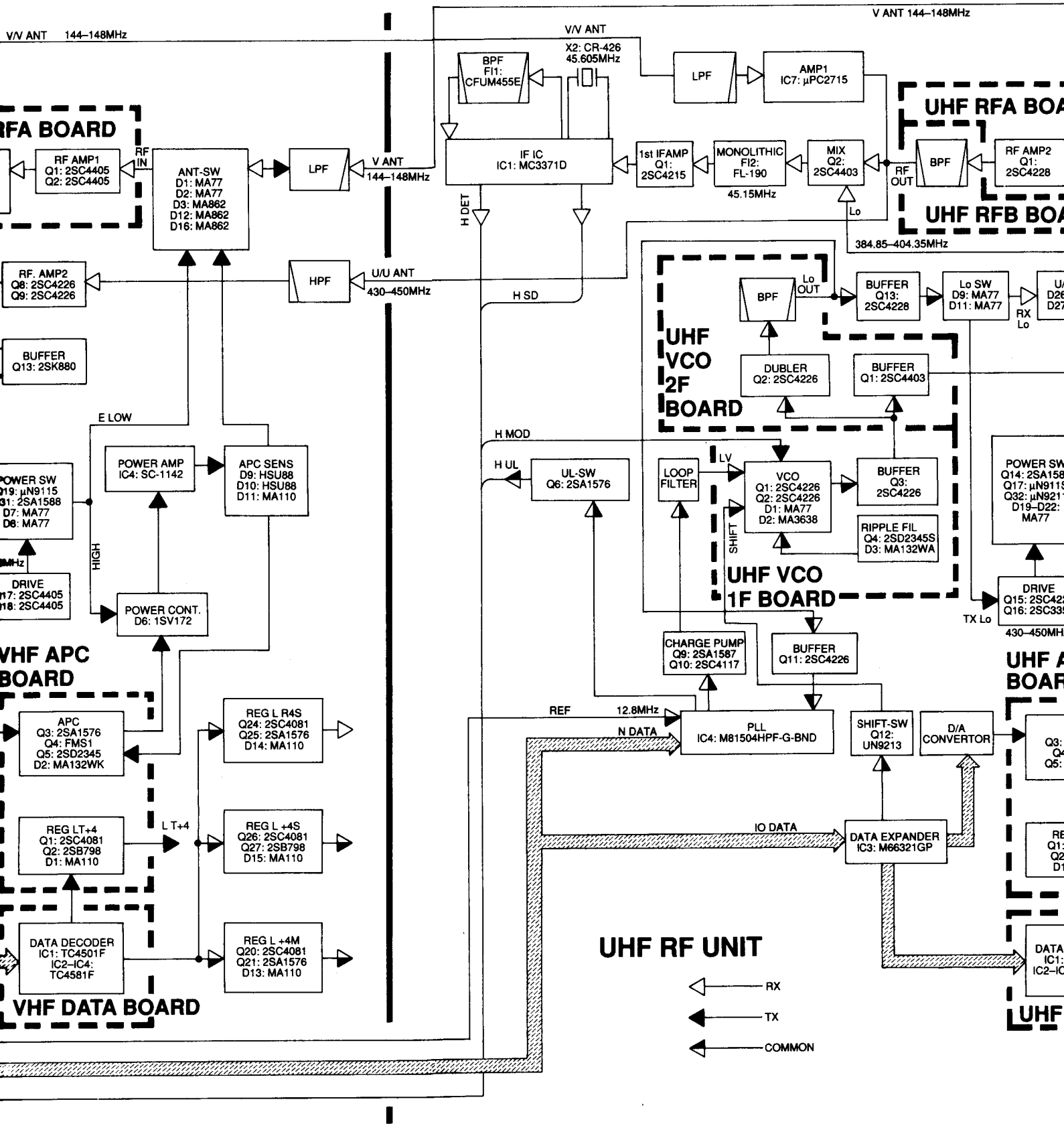
UHF RF UNIT

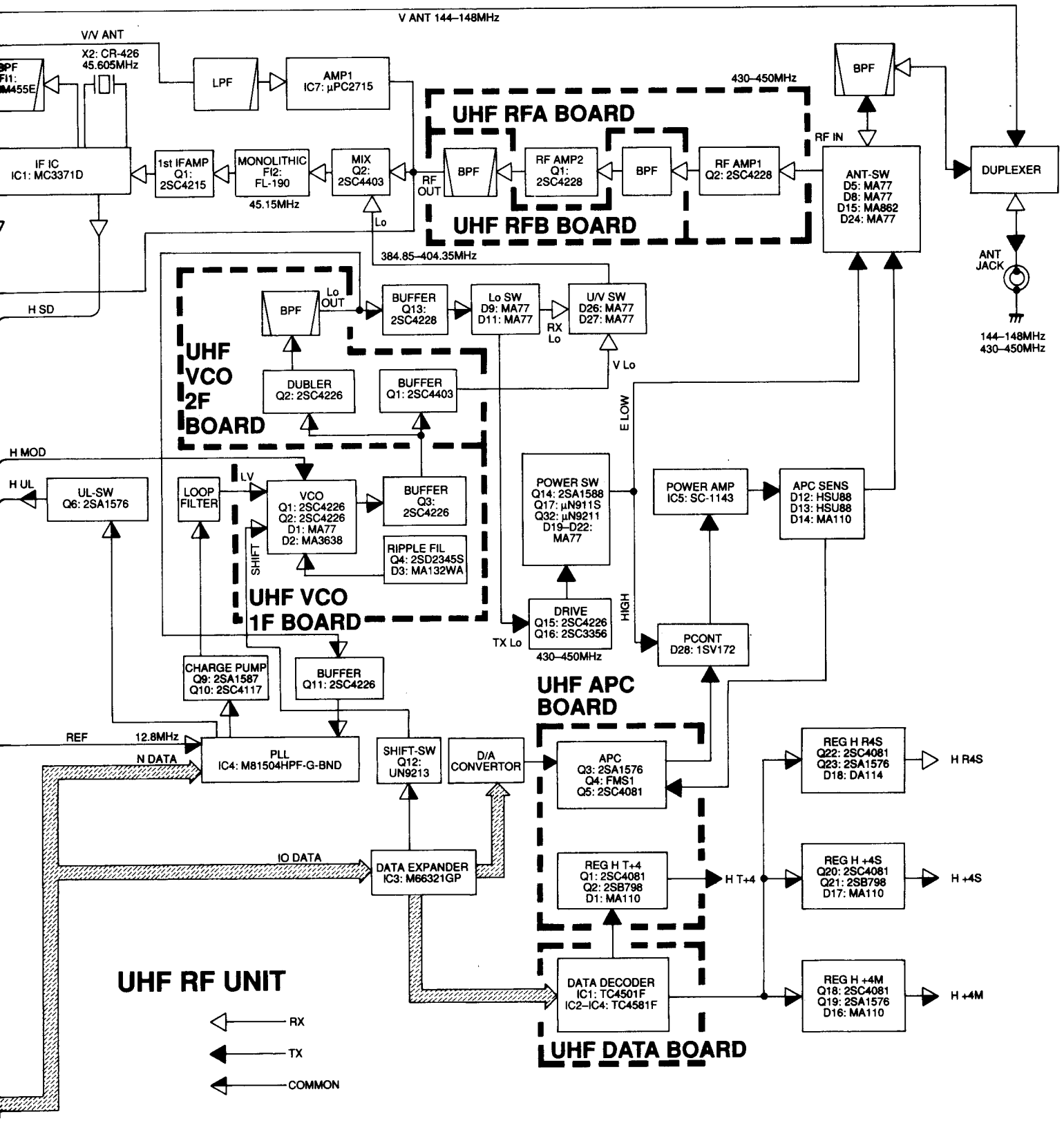
SECTION 9 BLOCK DIAGRAM



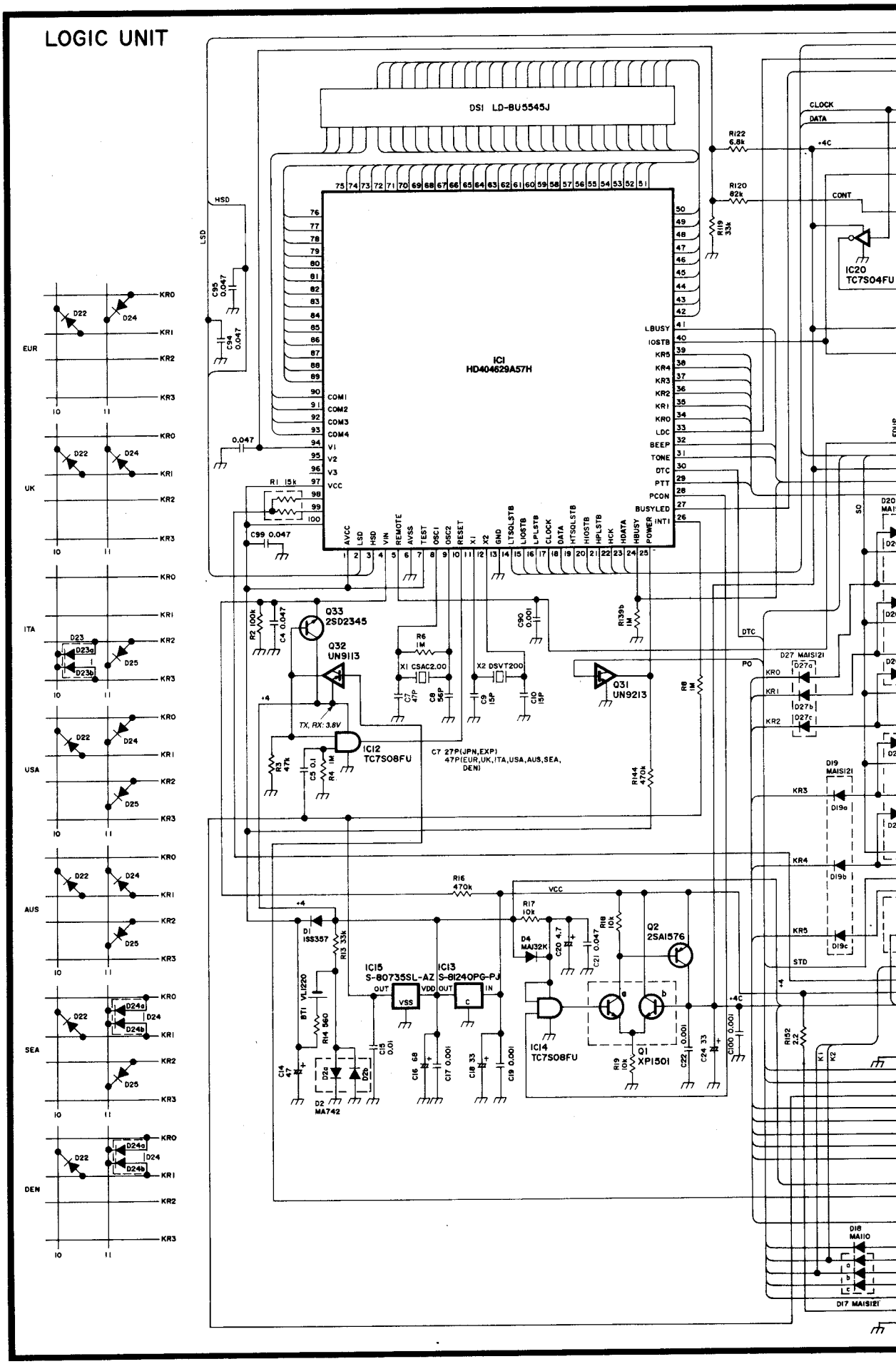

TSQL UNIT (USA only)
LPF Q6 2SC4081
ENCODER -DECODER IC1: FX365
INV Q1: DTC144EU
H TSQL
X1
OSC
CSB1000J (1MHz)
IC3: TC4SU69
OP TSQL(TONE)
LPF Q7 2SC4081
ENCODER -DECODER IC2: FX365
INV Q3: DTC144EU
L TSQL
BPF FI1: CFUM455E
X2: 42.645MHz
IF IC IC1: TK10487MTR
L DET
L SD
CPU4
+4
+4C
BACK UP D1: 1SS357 D2: MA742 BT1: LV1220
+4 CONTROL IC14: TC7508FU Q1: XP1501 Q2: 2SA1576
RESET IC15: S-80735AL
REG IC13: S-81240PG -PJ
VCC
H DATA, H CK, H TSQLSTB
L DEF
H DEF
L DATA
L CK
L TSQLSTB
L TSQL, H TSQL, OP TSQL
L DET
L MOD
L SD
H SD
L MUTE
H MUTE
EXPANDER IC2: M66321GP
TX LED
MIC M
MIC C
AF ON
F DUP
L MONI
H MONI
LIGHT
LED DRIVE Q20–Q23: 2SD2216
DS 3–6 LT1E73A
L UL
UL-SW Q10: 2SA1576
L BUSY
SQL CONTROL Q10a: XP1501
NOISE DET D12: HSM88AS
NOISE AMP IC7: NJM2107F
L SQL
H BUSY
SQL CONTROL Q10b: XP1501
NOISE DET D7: HSM88AS
NOISE AMP IC10: NJM2107F
H SQL
AF BOARD
REG Q1: XP1501 Q2: 2SB1182
AF PA IC1: NJM2073M
SP
VHF XT BOARD
X1
REF
CR-428: 12.8MHz
INSEL
L DET
H DET
L UL
AF ON
L AF
H AF
DATA
DIAL
L MUTE
MIC M
+4C
H MUTE
H BUSY
L MONI
MUTE CONTROL IC6a: TC7W02FU
AF MUTE Q18: XP1215 Q11a: XP6501 D13: MA133
BPF, AF AMP Q17: XP6501
AF CONTROL IC8 TC4W53FU
L AF
L VOL
ATT
FDUP
MIC AMP CONTROL Q7: UN9110
MIC C
H MONI
MUTE CONTROL IC6b: TC7W02FU
AF MUTE Q13: XP1215 Q11b:XP6501 D9: MA133
BPF, AF AMP Q12: XP6501
H AF
H VOL
AF CONTROL IC11 TC4W53FU
ATT
AF SELECTOR IC18: TC4W53FU
LPF IC17b: M5218FP
L MOD, H MOD
DTMF, BEEP
H DET
H MOD
H UL
HSD
GIC UNIT

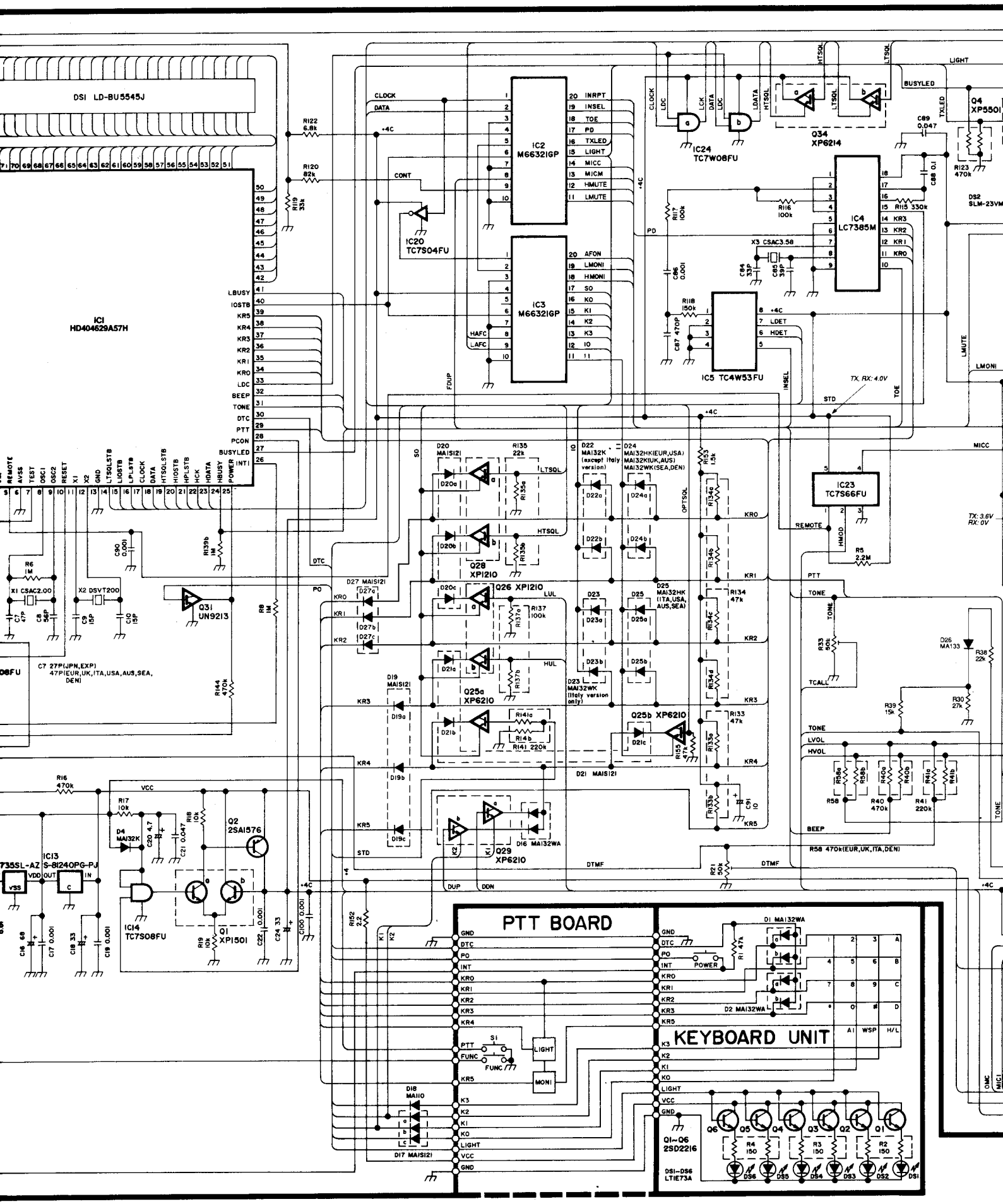

A only)
H TSQL
P TSQL(TONE)
L TSQL
V/V ANT 144–148MHz
BPF
FI1:
CFUM455E
X2:
42.645MHz
IF IC
IC1: TK10487MTR
1st IF
Q4:
2SC4215
MONO LITHIC
FI2:
FL-189
43.1MHz
MIX1
Q5:
2SK882
RF
OUT
VHF RFA BOARD
BPF
D2: HVU350
D4: HVU350
D5: HVU350
RF AMP1
Q1: 2SC4405
Q2: 2SC4405
RF
IN
ANT-SW
D1: MA77
D2: MA77
D3: MA862
D12: MA862
D16: MA862
L DET
L SD
Lo
187.1–191.1MHz
MIX2
Q7:
2SC4403
RF. AMP2
Q8: 2SC4226
Q9: 2SC4226
L MOD
VHF VCO
BOARD
TUNE
BUFFER
Q13: 2SK880
LV
VCO
Q1: 2SC4226
Q2: 2SC4226
D1: MA77
D2: MVU350
BUFFER
Q3: 2SC4403
PLL Lo
VCO
OUT
L SD
H SD
E LOW
L UL
UL-SW
Q10: 2SA1576
LOOP
FILTER
SHIFT
RX Lo
POWER SW
Q19: μN9115
Q31: 2SA1588
D7: MA77
D8: MA77
POWER AMP
IC4: SC-1142
APC SENS
D9: HSU88
D10: HSU88
D11: MA110
Lo SW
D4: MA77
D5: MA77
144–148MHz
DRIVE
Q17: 2SC4405
Q18: 2SC4405
TxLo
HIGH
POWER CONT.
D6: 1SV172
SP
VHF XT
BOARD
X1
REF
CR-428: 12.8MHz
CHARGE PUMP
Q11: 2SA1587
Q12: 2SC4117
BUFEER
Q15: 2SC4403
BUFFER
Q16: 2SC4403
VHF APC
BOARD
DATA
N DATA
PLL
IC3: M81504HPF-G
SHIFT-SW
Q14:
DTC114EU
D/A
CONVERTOR
APC
Q3: 2SA1576
Q4: FMS1
Q5: 2SD2345
D2: MA132WK
REG L R4S
Q24: 2SC4081
Q25: 2SA1576
D14: MA110
IO DATA
DATA
EXPANDER
IC2: M66321GP
REG LT+4
Q1: 2SC4081
Q2: 2SB798
D1: MA110
L T+4
REG L +4S
Q26: 2SC4081
Q27: 2SB798
D15: MA110
DATA DECODER
IC1: TC4501F
IC2–IC4:
TC4581F
REG L +4M
Q20: 2SC4081
Q21: 2SA1576
D13: MA110
VHF RF UNIT
VHF DATA BOARD
HSD

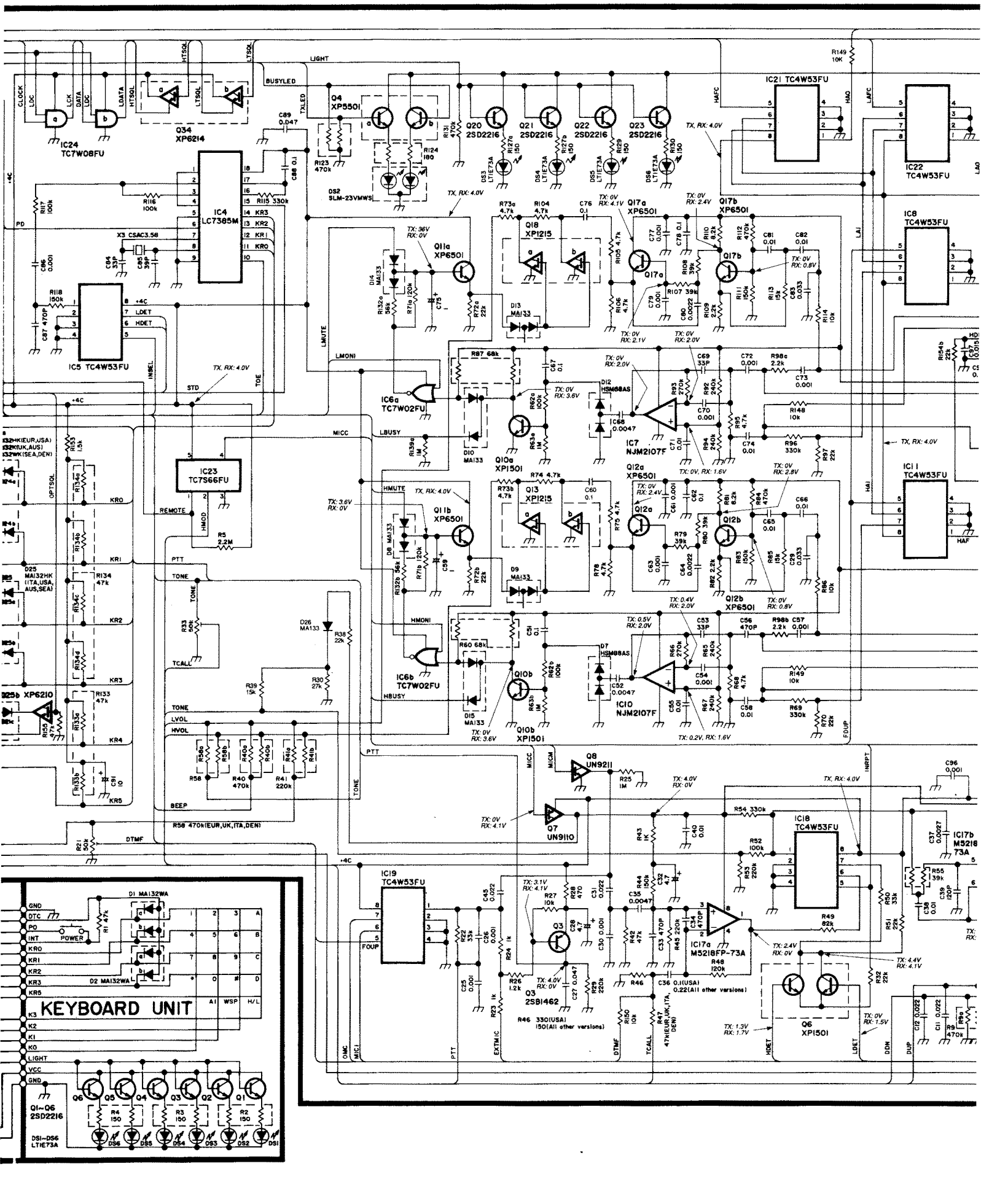

V/V ANT 144–148MHz
V ANT 144–148MHz
V/V ANT
X2: CR-426
45.605MHz
BPF
FI1:
CFUM455E
LPF
AMP1
IC7: µPC2715
UHF RFA BOA
RF AMP1
Q1: 2SC4405
Q2: 2SC4405
RF
IN
ANT-SW
D1: MA77
D2: MA77
D3: MA862
D12: MA862
D16: MA862
LPF
V ANT
144–148MHz
IF IC
IC1: MC3371D
1st IFAMP
Q1:
2SC4215
MONOLITHIC
FI2:
FL-190
45.15MHz
MIX
Q2:
2SC4403
RF
OUT
BPF
RF AMP2
Q1:
2SC4228
UHF RFB BOA
Lo
384.85–404.35MHz
H DET
H SD
RF. AMP2
Q8: 2SC4226
Q9: 2SC4226
HPF
U/U ANT
430–450MHz
BUFFER
Q13: 2SK880
BPF
Lo
OUT
BUFFER
Q13:
2SC4228
Lo SW
D9: MA77
D11: MA77
RX
Lo
UHF
VCO
2F
BOARD
DUBLER
Q2: 2SC4226
BUFFER
Q1: 2SC4403
E LOW
H MOD
H UL
UL-SW
Q6: 2SA1576
LOOP
FILTER
LV
VCO
Q1: 2SC4226
Q2: 2SC4226
D1: MA77
D2: MA3638
BUFFER
Q3:
2SC4226
SHIFT
RIPPLE FIL
Q4: 2SD2345S
D3: MA132WA
UHF VCO
1F BOARD
POWER AMP
IC4: SC-1142
APC SENS
D9: HSU88
D10: HSU88
D11: MA110
HIGH
POWER CONT.
D6: 1SV172
DRIVE
TX Lo
CHARGE PUMP
Q9: 2SA1587
Q10: 2SC4117
BUFFER
Q11: 2SC4226
VHF APC
BOARD
APC
Q3: 2SA1576
Q4: FMS1
Q5: 2SD2345
D2: MA132WK
REG L R4S
Q24: 2SC4081
Q25: 2SA1576
D14: MA110
REF
12.8MHz
N DATA
PLL
IC4: M81504HPF-G-BND
SHIFT-SW
Q12:
UN9213
D/A
CONVERTOR
REG LT+4
Q1: 2SC4081
Q2: 2SB798
D1: MA110
L T+4
REG L +4S
Q26: 2SC4081
Q27: 2SB798
D15: MA110
IO DATA
DATA EXPANDER
IC3: M66321GP
DATA DECODER
IC1: TC4501F
IC2–IC4:
TC4581F
REG L +4M
Q20: 2SC4081
Q21: 2SA1576
D13: MA110
VHF DATA BOARD
UHF RF UNIT
RX
TX
COMMON

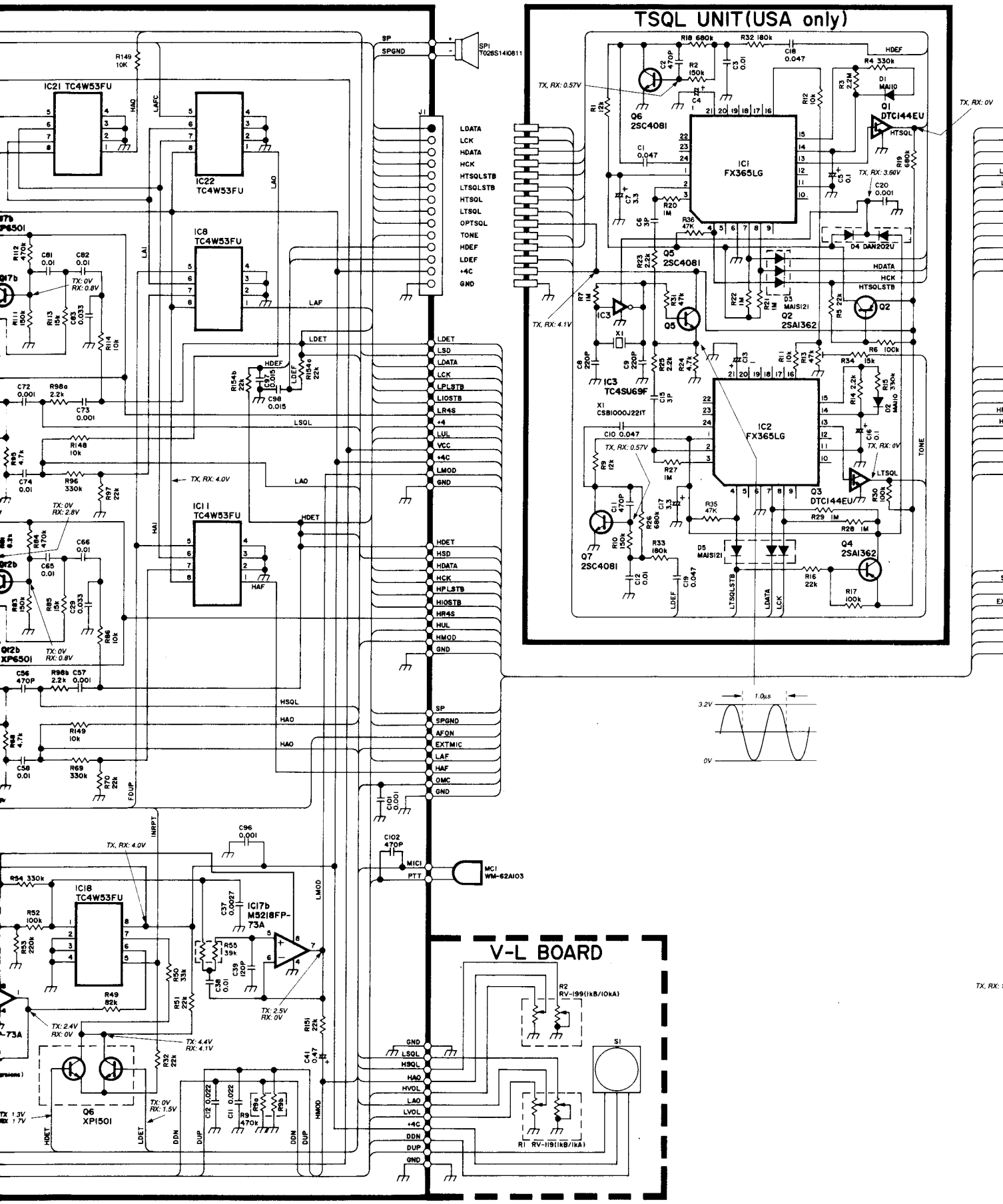

V ANT 144–148MHz
V/V ANT
X2: CR-426
45.605MHz
LPF
AMP1
IC7: µPC2715
430–450MHz
BPF
UHF RFA BOARD
RF IN
IF IC
IC1: MC3371D
1st IFAMP
Q1:
2SC4215
MONOLITHIC
FI2:
FL-190
45.15MHz
MIX
Q2:
2SC4403
RF
OUT
BPF
RF AMP2
Q1:
2SC4228
BPF
RF AMP1
Q2: 2SC4228
UHF RFB BOARD
ANT-SW
D5: MA77
D8: MA77
D15: MA862
D24: MA77
DUPLEXER
ANT
JACK
144–148MHz
430–450MHz
Lo
384.85–404.35MHz
H SD
BPF
Lo
OUT
BUFFER
Q13:
2SC4228
Lo SW
D9: MA77
D11: MA77
RX
Lo
U/V SW
D26: MA77
D27: MA77
V Lo
UHF
VCO
2F
BOARD
DUBLER
Q2: 2SC4226
BUFFER
Q1: 2SC4403
E LOW
H MOD
H UL
UL-SW
Q6: 2SA1576
LOOP
FILTER
LV
VCO
Q1: 2SC4226
Q2: 2SC4226
D1: MA77
D2: MA3638
BUFFER
Q3:
2SC4226
POWER SW
Q14: 2SA1588
Q17: µN911S
Q32: µN9211
D19–D22:
MA77
POWER AMP
IC5: SC-1143
APC SENS
D12: HSU88
D13: HSU88
D14: MA110
SHIFT
RIPPLE FIL
Q4: 2SD2345S
D3: MA132WA
UHF VCO
1F BOARD
DRIVE
Q15: 2SC4226
Q16: 2SC3356
HIGH
TX Lo
430–450MHz
PCONT
D28: 1SV172
CHARGE PUMP
Q9: 2SA1587
Q10: 2SC4117
BUFFER
Q11: 2SC4226
UHF APC
BOARD
REF
12.8MHz
N DATA
PLL
IC4: M81504HPF-G-BND
SHIFT-SW
Q12:
UN9213
D/A
CONVERTOR
APC
Q3: 2SA1576
Q4: FMS1
Q5: 2SC4081
REG H R4S
Q22: 2SC4081
Q23: 2SA1576
D18: DA114
H R4S
IO DATA
DATA EXPANDER
IC3: M66321GP
REG H T+4
Q1: 2SC4081
Q2: 2SB798
D1: MA110
H T+4
REG H +4S
Q20: 2SC4081
Q21: 2SB798
D17: MA110
H +4S
UHF RF UNIT
DATA DECODER
IC1: TC4501F
IC2–IC4: TC4581F
REG H +4M
Q18: 2SC4081
Q19: 2SA1576
D16: MA110
H +4M
UHF DATA BOARD
RX
TX
COMMON

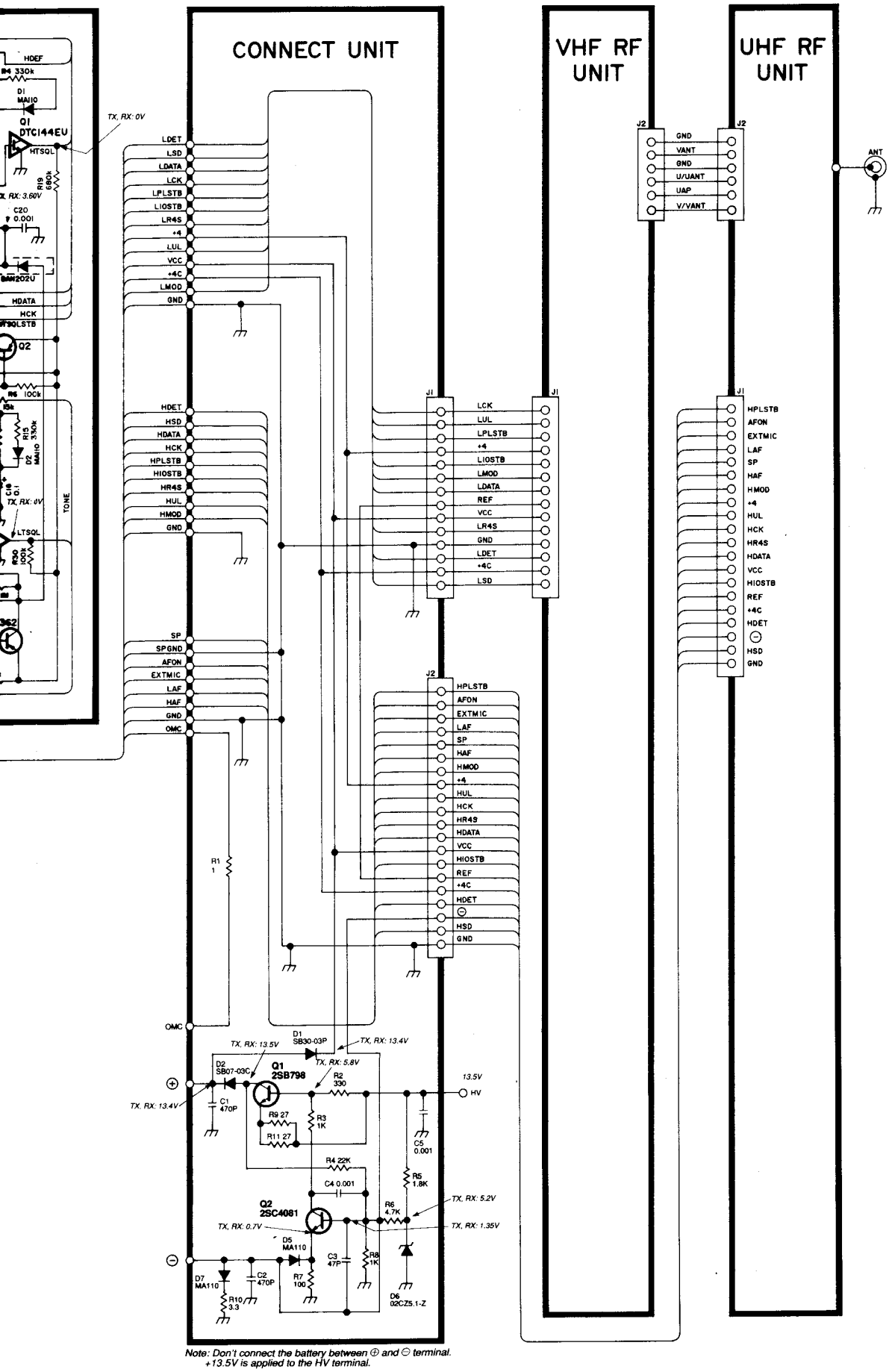
SECTION 10 VOLTAGE DIAGRAM



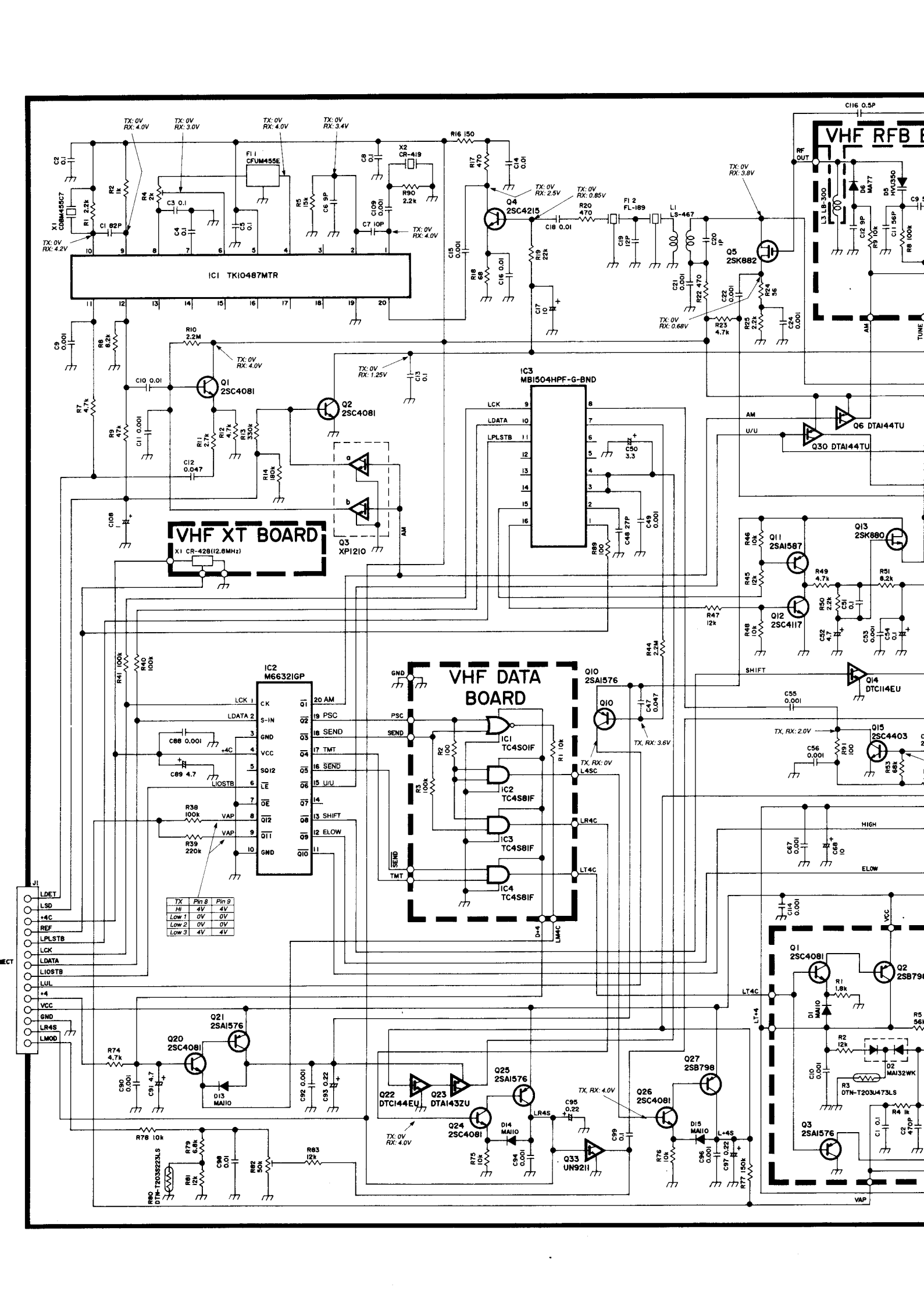

PTT BOARD
KEYBOARD UNIT
IC1 HD404629A57H
IC2 M66321GP
IC3 M66321GP
IC4 LC7385M
IC5 TC4W53FU
IC20 TC7S04FU
IC23 TC7S66FU
IC24 TC7W08FU
IC13 S-8124OPG-PJ
IC14 TC7S08FU
Q1 XP1501
Q2 2SA1576
Q25a XP6210
Q25b XP6210
Q26 XP1210
Q28 XP1210
Q29 XP6210
Q31 UN9213
Q34 XP6214
Q4 XP5501
D1 MA132WA
D2 MA132WA
D4 MA132K
D17 MA5121
D18 MA110
D19 MA5121
D20 MA5121
D21 MA5121
D23 MA132WK (Italy version only)
D25 MA132HK (ITA,USA, AUS,SEA)
D26 MA133
D27 MA5121
DS1-DS6 LT1E73A
Q1~Q6 2SD2216
DSI LD-BU5545J
DS2 SLM-23VM
X1 CSAC2.00
X2 DSVT200
X3 CSAC3.58
TX: 4.0V
RX: 4.0V
TX: 3.6V
RX: 0V
R58 470k(EUR,UK,ITA,DEN)
C7 27P(JPN,EXP) 47P(EUR,UK,ITA,USA,AUS,SEA, DEN)

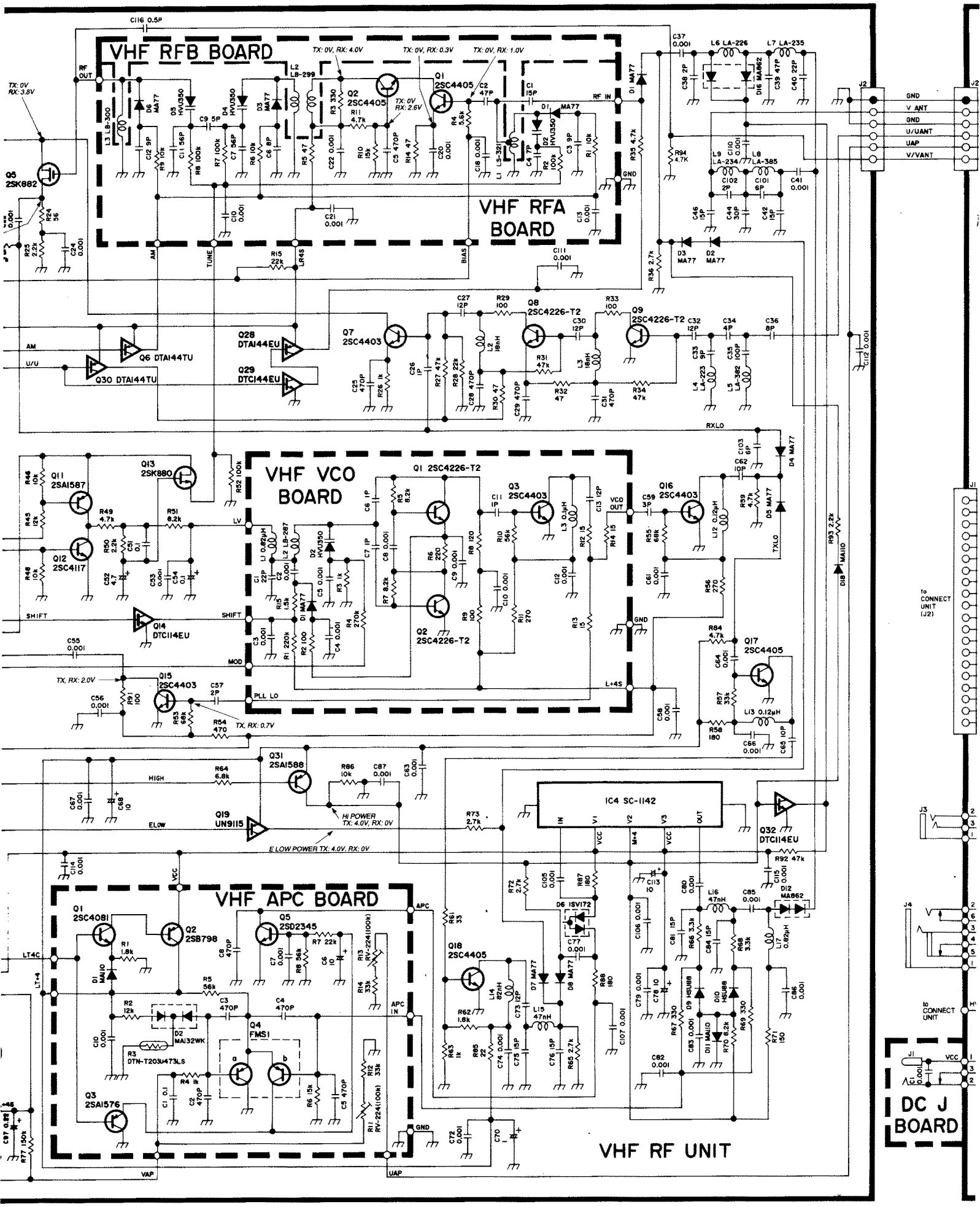

KEYBOARD UNIT
IC24 TC7W08FU
Q34 XP6214
IC4 LC7385M
IC5 TC4W53FU
IC23 TC7S66FU
IC6a TC7W02FU
IC6b TC7W02FU
IC7 NJM2107F
IC10 NJM2107F
IC19 TC4W53FU
IC21 TC4W53FU
IC22 TC4W53FU
IC8 TC4W53FU
IC11 TC4W53FU
IC18 TC4W53FU
IC17a M5218FP-73A
IC17b M5218 73A
Q4 XP5501
Q20 2SD2216
Q21 2SD2216
Q22 2SD2216
Q23 2SD2216
Q11a XP6501
Q11b XP6501
Q8 XP1215
Q13 XP1215
Q10a XP1501
Q10b XP1501
Q17a XP6501
Q17b XP6501
Q12a XP6501
Q12b XP6501
Q8 UN9211
Q7 UN9110
Q3 2SB1462
Q6 XP1501
Q1~Q6 2SD2216
D1 MA132WA
D2 MA132WA
DS1~DS6 LTIE73A
DS2 SLM-23VMWS
X3 CSAC3.58
BUSYLED
LIGHT
TXLED
CLOCK
DATA
LOAD
LCK
LDC
LDATA
HTSOL
LTSOL
PD
LMUTE
LMONI
INSEL
STD
TOE
MICC
LBUSY
HMUTE
HMONI
HBUSY
REMOTE
HMOD
PTT
TONE
TCALL
LVOL
HVOL
BEEP
DTMF
OPTSOL
KR0
KR1
KR2
KR3
KR4
KR5
K3
K2
K1
K0
LIGHT
VCC
GND
INT
PO
POWER
EXTMIC
OMC
MICI
MICM
INRPT
HDET
LDET
DDM
DUP
FOUP
HAFC
HAO
LAFC
LAO
HAI
LAI
HAF
LAF
TX, RX: 4.0V
TX: 0V RX: 4.1V
TX: 0V RX: 2.4V
TX: 0V RX: 2.1V
TX: 0V RX: 2.0V
TX: 0V RX: 3.6V
TX: 0V RX: 1.6V
TX: 0V RX: 2.8V
TX: 0V RX: 0.8V
TX: 0.4V RX: 2.0V
TX: 0.5V RX: 2.0V
TX: 0.2V, RX: 1.6V
TX: 3.6V RX: 0V
TX: 4.0V RX: 0V
TX: 0V RX: 4.1V
TX: 3.1V RX: 4.1V
TX: 2.4V RX: 0V
TX: 4.4V RX: 4.1V
TX: 1.3V RX: 1.7V
TX: 0V RX: 1.5V
R46 330(USA) 150(All other versions)
C36 0.1(USA) 0.22(All other versions)
R47 47K(EUR,UK,ITA, DEN)
R58 470k(EUR,UK,ITA,DEN)

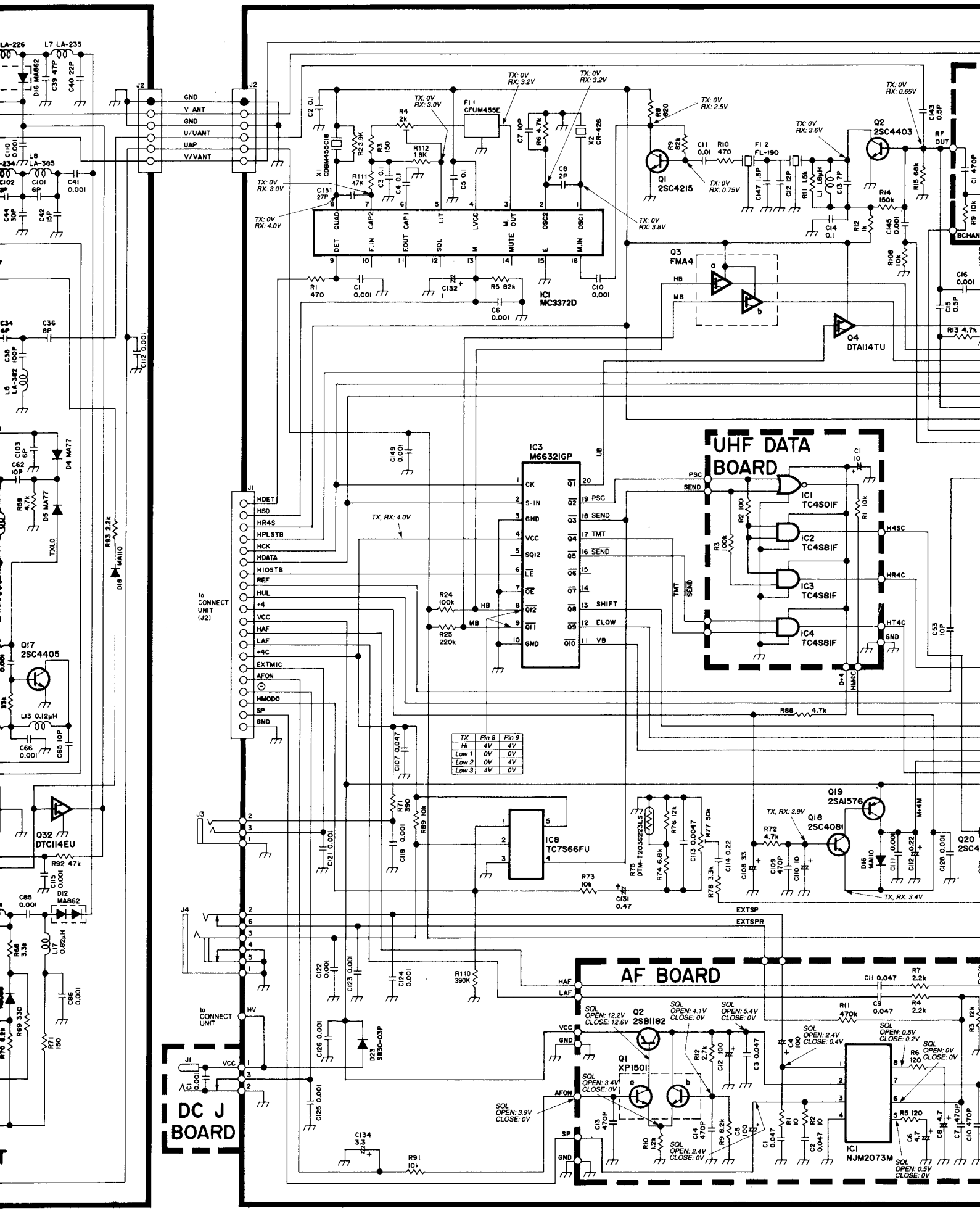

TSQL UNIT(USA only)
IC1 FX365LG
IC2 FX365LG
IC3 TC4SU69F
IC21 TC4W53FU
IC22 TC4W53FU
IC8 TC4W53FU
IC11 TC4W53FU
IC18 TC4W53FU
IC17b M52118FP-73A
Q1 DTC144EU
Q2 2SAI362
Q3 DTC144EU
Q4 2SAI362
Q5 2SC4081
Q6 2SC4081
Q7 2SC4081
Q6 XP1501
V-L BOARD
SP
SPGND
LDATA
LCK
HDATA
HCK
HTSQLSTB
LTSQLSTB
HTSQL
LTSQL
OPTSQL
TONE
HDEF
LDEF
+4C
GND
LDET
LSD
LPLSTB
LIOSTB
LR4S
+4
LUL
VCC
LMOD
HSD
HPLSTB
HIOSTB
HR4S
HUL
HMOD
AFON
EXTMIC
LAF
HAF
OMC
MIC1
PTT
HSQL
HAO
LAO
HVOL
LVOL
DDN
DUP
INRPT
TX, RX: 0.57V
TX, RX: 4.1V
TX, RX: 3.60V
TX, RX: 0V
TX, RX: 4.0V
TX, RX: 2.8V
TX, RX: 13.4V
TX: 0V RX: 0.8V
TX: 2.4V RX: 0V
TX: 4.4V RX: 4.1V
TX: 2.5V RX: 0V
TX: 0V RX: 1.5V
1.0μs
3.2V
0V

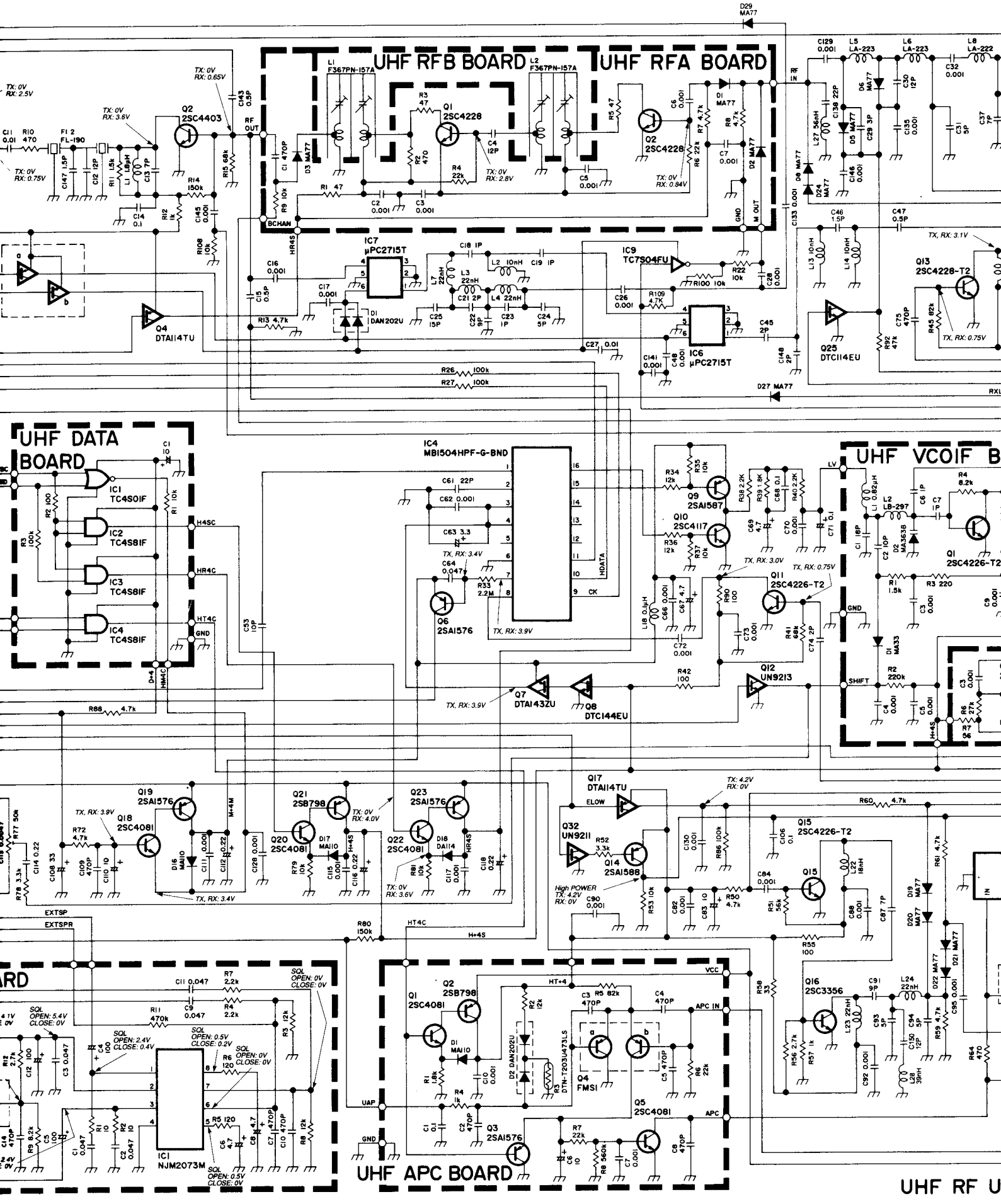


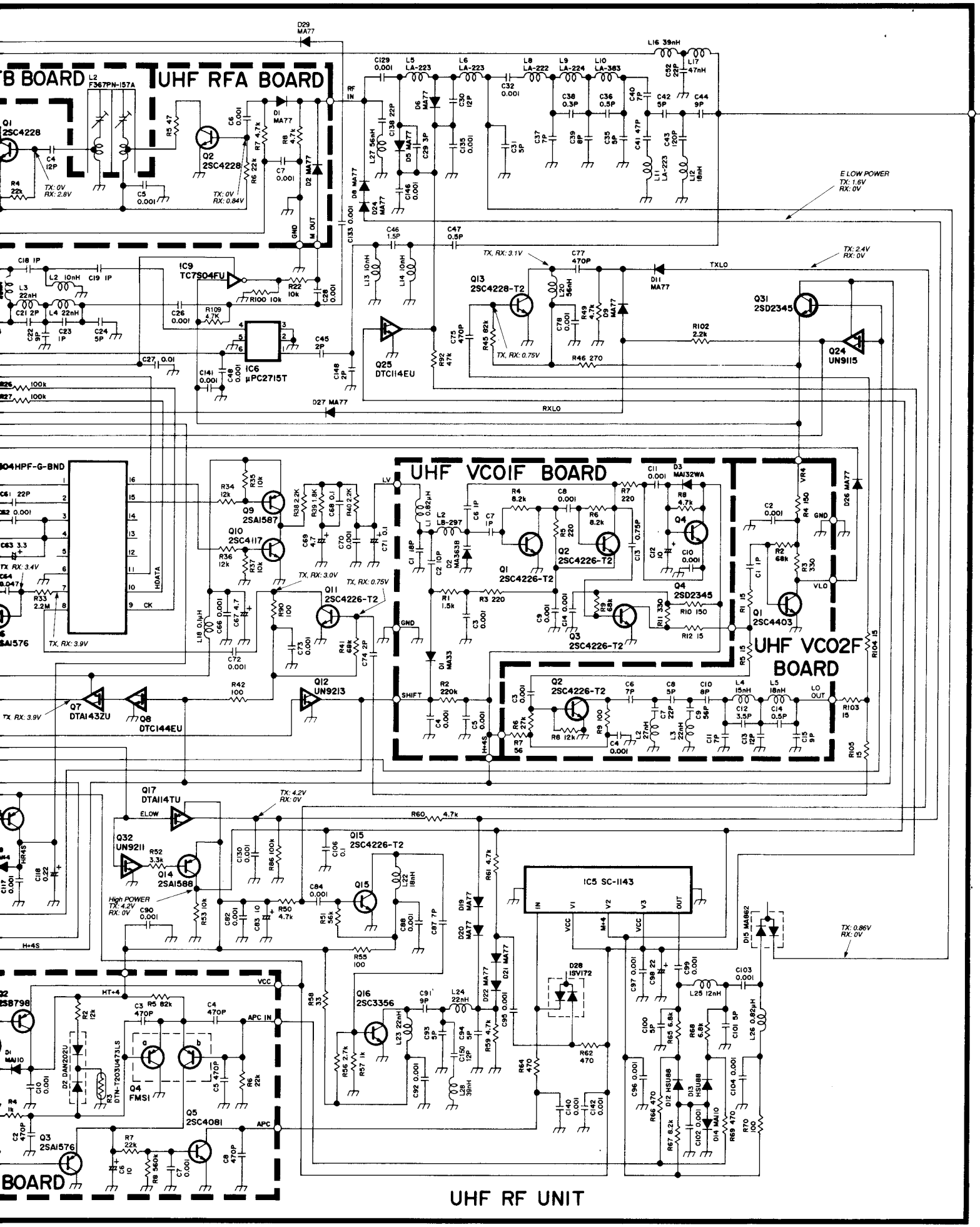
Note: Don't connect the battery between ⊕ and ⊖ terminal.
+13.5V is applied to the HV terminal.


VHF RFB
VHF XT BOARD
X1 CR-428(12.8MHz)
VHF DATA BOARD
IC1 TKI0487MTR
IC2 M66321GP
IC3 MBI504HPF-G-BND
Q1 2SC4081
Q2 2SC4081
Q3 XP1210
Q4 2SC4215
Q5 2SK882
Q6 DTAI44TU
Q30 DTAI44TU
Q10 2SAI576
Q11 2SAI587
Q12 2SC4117
Q13 2SK880
Q14 DTCII4EU
Q15 2SC4403
Q20 2SC4081
Q21 2SAI576
Q22 DTCI44EU
Q23 DTAI43ZU
Q24 2SC4081
Q25 2SAI576
Q26 2SC4081
Q27 2SB798
Q33 UN9211
J1
LDET
LSD
+4C
REF
LPLSTB
LCK
LDATA
LIOSTB
LUL
+4
VCC
GND
LR4S
LMOD
TX: 0V RX: 4.0V
TX: 0V RX: 3.0V
TX: 0V RX: 3.4V
TX: 0V RX: 2.5V
TX: 0V RX: 0.85V
TX: 0V RX: 3.8V
TX: 0V RX: 0.68V
TX: 0V RX: 1.25V
TX, RX: 2.0V
TX, RX: 3.6V
TX, RX: 4.0V
AM
U/U
SHIFT
HIGH
ELOW
VAP


VHF RFB BOARD
VHF RFA BOARD
VHF VCO BOARD
VHF APC BOARD
VHF RF UNIT
DC J BOARD
IC4 SC-1142
TX: 0V, RX: 4.0V
TX: 0V, RX: 0.3V
TX: 0V, RX: 1.0V
TX: 0V, RX: 2.6V
TX: 0V, RX: 3.8V
TX, RX: 2.0V
TX, RX: 0.7V
HI POWER TX: 4.0V, RX: 0V
E LOW POWER TX: 4.0V, RX: 0V
RF OUT
RF IN
GND
V ANT
U/UANT
UAP
V/VANT
AM
U/U
TUNE
BIAS
SHIFT
MOD
PLL LO
VCO OUT
RXLO
TXLO
LV
HIGH
ELOW
APC
APC IN
VAP
UAP
to CONNECT UNIT (J2)
to CONNECT UNIT
Q1 2SC4405
Q2 2SC4405
Q5 2SK882
Q6 DTAI44TU
Q7 2SC4403
Q8 2SC4226-T2
Q9 2SC4226-T2
Q28 DTAI44EU
Q29 DTCI44EU
Q30 DTAI44TU
Q11 2SAI587
Q12 2SC4117
Q13 2SK880
Q14 DTCI14EU
Q15 2SC4403
Q16 2SC4403
Q17 2SC4405
Q18 2SC4405
Q19 UN9115
Q31 2SAI588
Q32 DTCI14EU
Q1 2SC4081
Q2 2SB798
Q3 2SAI576
Q4 FMS1
Q5 2SD2345
L1 LB-287
L2 LB-299
L3 LB-300
L4 LA-223
L5 LA-382
L6 LA-226
L7 LA-235
L8 LA-385
L9 LA-234
J1
J2
J3
J4
J5


UHF DATA BOARD
AF BOARD
DC J BOARD
IC1 MC3372D
IC3 M66321GP
IC8 TC7S66FU
IC1 TC4S01F
IC2 TC4S81F
IC3 TC4S81F
IC4 TC4S81F
IC1 NJM2073M
Q1 2SC4215
Q2 2SC4403
Q3 FMA4
Q4 DTA114TU
Q17 2SC4405
Q32 DTC114EU
Q1 XP1501
Q2 2SB1182
Q18 2SC4081
Q19 2SA1576
GND
V ANT
U/UANT
UAP
V/VANT
HDET
HSD
HR4S
HPLSTB
HCK
HDATA
HIOSTB
REF
HUL
+4
VCC
HAF
LAF
+4C
EXTMIC
AFON
HMODO
SP
HV
to CONNECT UNIT (J2)
to CONNECT UNIT
TX: 0V RX: 3.2V
TX: 0V RX: 3.0V
TX: 0V RX: 2.5V
TX: 0V RX: 0.75V
TX: 0V RX: 3.6V
TX: 0V RX: 0.65V
TX: 0V RX: 3.8V
TX: 0V RX: 4.0V
TX, RX: 4.0V
TX, RX: 3.9V
TX, RX: 3.4V
SQL OPEN: 12.2V CLOSE: 12.6V
SQL OPEN: 4.1V CLOSE: 0V
SQL OPEN: 5.4V CLOSE: 0V
SQL OPEN: 3.4V CLOSE: 0V
SQL OPEN: 3.9V CLOSE: 0V
SQL OPEN: 2.4V CLOSE: 0V
SQL OPEN: 2.4V CLOSE: 0.4V
SQL OPEN: 0.5V CLOSE: 0.2V
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 0.5V CLOSE: 0V
TX | Pin 8 | Pin 9
Hi | 4V | 4V
Low 1 | 0V | 0V
Low 2 | 0V | 4V
Low 3 | 4V | 0V
EXTSP
EXTSPR


UHF RFB BOARD
UHF RFA BOARD
UHF DATA BOARD
UHF VCOIF B
UHF APC BOARD
UHF RF U
IC1 TC4S01F
IC2 TC4S81F
IC3 TC4S81F
IC4 TC4S81F
IC4 MBI504HPF-G-BND
IC7 µPC2715T
IC6 µPC2715T
IC9 TC7S04FU
IC1 NJM2073M
Q1 2SC4228
Q2 2SC4403
Q2 2SC4228
Q4 DTA114TU
Q25 DTC114EU
Q13 2SC4228-T2
Q9 2SA1587
Q10 2SC4117
Q11 2SC4226-T2
Q6 2SA1576
Q7 DTA143ZU
Q8 DTC144EU
Q12 UN9213
Q1 2SC4226-T2
Q19 2SA1576
Q18 2SC4081
Q21 2SB798
Q20 2SC4081
Q23 2SA1576
Q22 2SC4081
Q17 DTA114TU
Q32 UN9211
Q14 2SA1588
Q15 2SC4226-T2
Q15
Q16 2SC3356
Q1 2SC4081
Q2 2SB798
Q4 FMS1
Q5 2SC4081
Q3 2SA1576
D1 MA110
D2 DAN202U
D1 DAN202U
D1 MA77
D2 MA77
D3 MA77
D4 MA77
D5 MA77
D6 MA77
D24 MA77
D29 MA77
D27 MA77
D1 MA33
D2 MA3638
D16 MA110
D17 MA110
D18 DA114
D19 MA77
D20 MA77
D21 MA77
D22 MA77
L1 F367PN-157A
L2 F367PN-157A
L5 LA-223
L6 LA-223
L8 LA-222
L2 LB-297
TX: 0V RX: 2.5V
TX: 0V RX: 0.75V
TX: 0V RX: 3.6V
TX: 0V RX: 0.65V
TX: 0V RX: 2.8V
TX: 0V RX: 0.84V
TX, RX: 3.1V
TX, RX: 0.75V
TX, RX: 3.4V
TX, RX: 3.0V
TX, RX: 3.9V
TX, RX: 0.75V
TX, RX: 3.9V
TX: 0V RX: 4.0V
TX, RX: 3.4V
TX: 0V RX: 3.6V
TX: 4.2V RX: 0V
High POWER TX: 4.2V RX: 0V
SQL OPEN: 5.4V CLOSE: 0V
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 2.4V CLOSE: 0.4V
SQL OPEN: 0.5V CLOSE: 0.2V
SQL OPEN: 0V CLOSE: 0V
SQL OPEN: 0.5V CLOSE: 0V
RF OUT
BCHAN
M OUT
IN
EXTSP
EXTSPR
HT4C
H+4S
HR4S
H4SC
HR4C
HT4C
HDATA
CK
SHIFT
ELOW
UAP
APC IN
APC
VCC
GND
LV


UHF RFA BOARD
UHF VCOIF BOARD
UHF VCO2F BOARD
UHF RF UNIT
IC9 TC7S04FU
IC6 µPC2715T
IC5 SC-1143
Q13 2SC4228-T2
Q25 DTC114EU
Q24 UN9115
Q31 2SD2345
Q1 2SC4226-T2
Q2 2SC4226-T2
Q3 2SC4226-T2
Q4 2SD2345
Q1 2SC4403
Q9 2SA1587
Q10 2SC4117
Q11 2SC4226-T2
Q12 UN9213
Q7 DTA143ZU
Q8 DTC144EU
Q17 DTA114TU
Q32 UN9211
Q14 2SA1588
Q15 2SC4226-T2
Q16 2SC3356
Q4 FMS1
Q5 2SC4081
Q3 2SA1576
D28 1SV172
TXLO
RXLO
ELOW
SHIFT
APC
APC IN
VCC
HDATA
CK
LO OUT
VLO
High POWER
TX: 4.2V
RX: 0V
E LOW POWER
TX: 1.6V
RX: 0V
TX: 2.4V
RX: 0V
TX: 0.86V
RX: 0V
TX, RX: 3.1V
TX, RX: 0.75V
TX, RX: 3.0V
TX, RX: 3.9V
TX: 0V
RX: 2.8V
TX: 0V
RX: 0.84V
TX: 3.4V
TX, RX: 3.9V
TX: 4.2V
RX: 0V

Icom Inc.

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

Icom America Inc.

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

<Customer Service>
Phone : (206) 454-7619

<Regional Customer Service Center>
18102 Sky Park South, Suite 52-B, Irvine, CA 92714, U.S.A.
Phone : (714) 852-8026
Fax : (714) 852-8716

Icom Canada

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

Icom (Europe) GmbH

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

Icom (Australia) Pty. Ltd.

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

Icom (UK) Ltd.

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

Icom France S.a

Zac de la Plaine, Rue Brindejonc des Moulinais
BP 5804, 31505 Toulouse Cedex, France
Phone : 61. 36. 03. 03
Fax : 61. 34. 05. 91
Telex : 521515 ICOM FRA

Count on us!

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

A-5239MC-S
Printed in Japan