

ICOM

**SERVICE
MANUAL**

VHF TRANSCEIVER
IC-H21T

INTRODUCTION

This service manual describes the latest service information for the **IC-H21T** VHF TRANSCEIVER at the time of publication.

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>

1140002220	IC	μPB585G	IC-H21T	TPLL UNIT	5 pieces
8810002310	Screw	FH M2×4 NI	IC-H21T	CHASSIS UNIT	10 pieces

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

REPAIR NOTES

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



VERSIONS

VERSION NUMBER	REGION	SYMBOL	FREQUENCY RANGE	CHANNEL SPACING	5-TONE IC
#01	General	GEN	146~174 MHz	12.5 kHz	SC-1084
#02	General	GEN-1	146~174 MHz	25 kHz	SC-1084
#03	United Kingdom	UK	146~174 MHz	12.5 kHz	SC-1093
#04	Sweden	SWE	146~174 MHz	25 kHz	SC-1084
#05	Italy	ITA	146~174 MHz	12.5 kHz	SC-1084
#06	Italy	ITA-1	146~174 MHz	25 kHz	SC-1084
#07	Greece	GRE	146~174 MHz	12.5 kHz	SC-1084
#08	France	FRA	146~174 MHz	12.5 kHz	SC-1093
#09	France	FRA-1	146~174 MHz	25 kHz	SC-1093
#10	Holland	HOL	146~174 MHz	20 kHz	SC-1084
#11	General	GEN-2	135~160 MHz	12.5 kHz	SC-1084
#12	General	GEN-3	135~160 MHz	12.5 kHz	SC-1084

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

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 135~174 MHz
Ask your Icom Dealer about the permitted frequency range in your area.
- Mode : 16K0F3E (#02, #04, #06, #09)
14K0F3E (#10)
8K50F3E (#01, #03, #05, #07, #08, #11, #12)
- Number of channels : Up to 100 operating channels
Up to 30 5-Tone memory channels
- Channel spacing : 25 kHz (#02, #04, #06, #09)
20 kHz (#10)
12.5 kHz (#01, #03, #05, #07, #08, #11, #12)
- Usable battery pack : CM-72, CM-73 or CM-3G~CM-12G
- Antenna impedance : 50 Ω (unbalanced)
- Usable temperature range : $-25^{\circ}\text{C}\sim+55^{\circ}\text{C}$ ($-13^{\circ}\text{F}\sim+131^{\circ}\text{F}$)
- Frequency stability : ± 1.5 kHz ($-25^{\circ}\text{C}\sim+55^{\circ}\text{C}$)
- Dimensions (with CM-72) : 65 (W) \times 205 (H) \times 35 (D) mm; 2.6 (W) \times 8.1 (H) \times 1.4 (D) in
- Weight (with CM-72) : 660 g (1.5 lbs)

■ TRANSMITTER

- Output power : High: 5 W (with CM-73)
2 W (with CM-72)
Low: 800 mW
- Spurious emissions : 0.25 μW
- Harmonic emissions : 0.25 μW
- FM noise and hum : -40 dB
- Microphone impedance : 600 Ω
- Audio response : $+1$ dB \sim -3 dB of $+6$ dB/octave with 300 Hz to 3000 Hz input

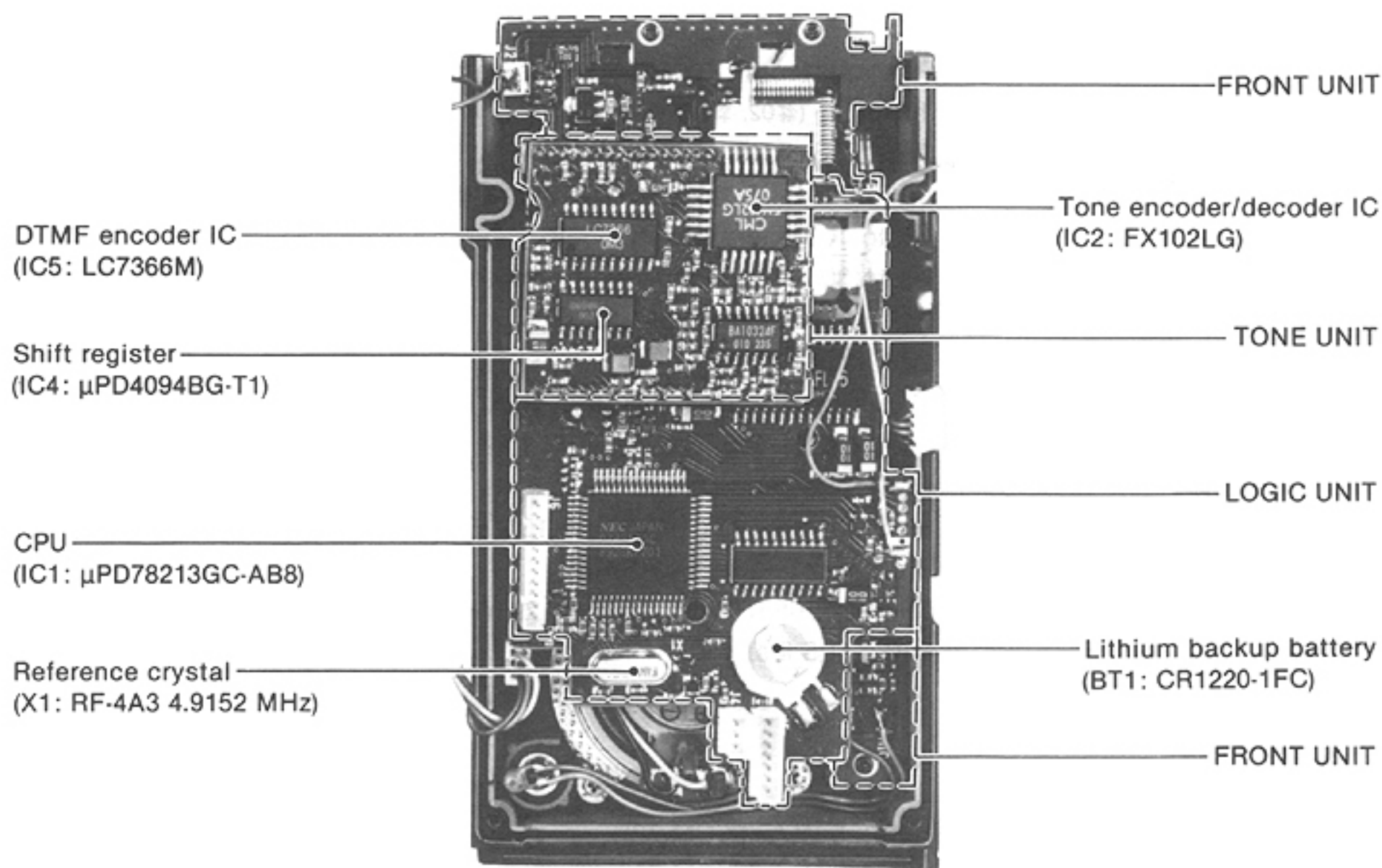
■ RECEIVER

- Sensitivity : 0.35 μV for 12 dB SINAD
- Intermediate frequencies : 1st 30.875 MHz
2nd 455 kHz
- Squelch sensitivity (threshold) : 0.3 μV
- Adjacent channel selectivity : -70 dB (#02, #04, #06, #09)
 -60 dB (#01, #03, #05, #07, #08, #11, #12)
- Intermodulation rejection : -70 dB
- Spurious rejection : -70 dB
- Audio output power : 500 mW with an 8 Ω load
- Audio response : $+1$ dB \sim -3 dB of $+6$ dB/octave with 300 Hz to 3000 Hz input

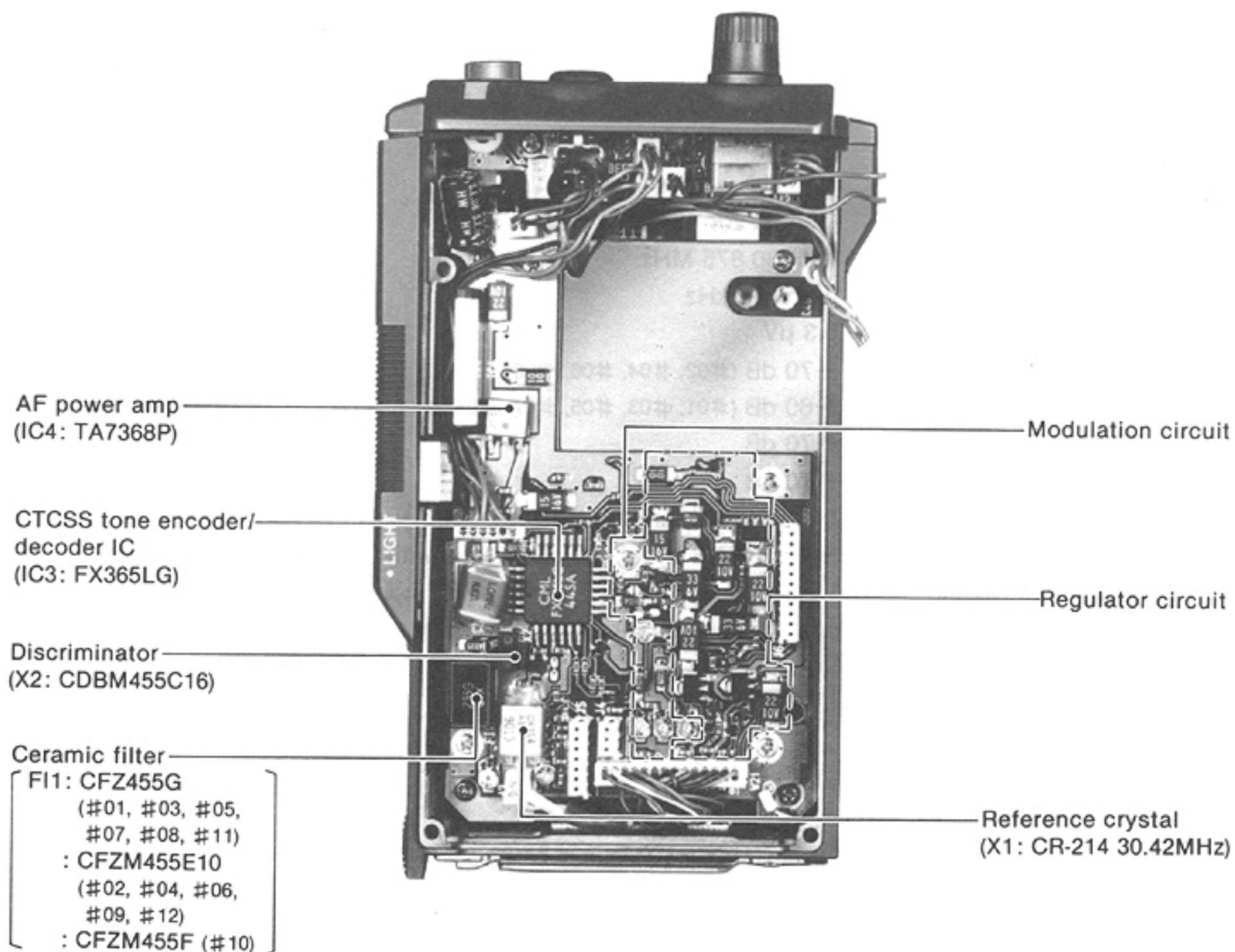
All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

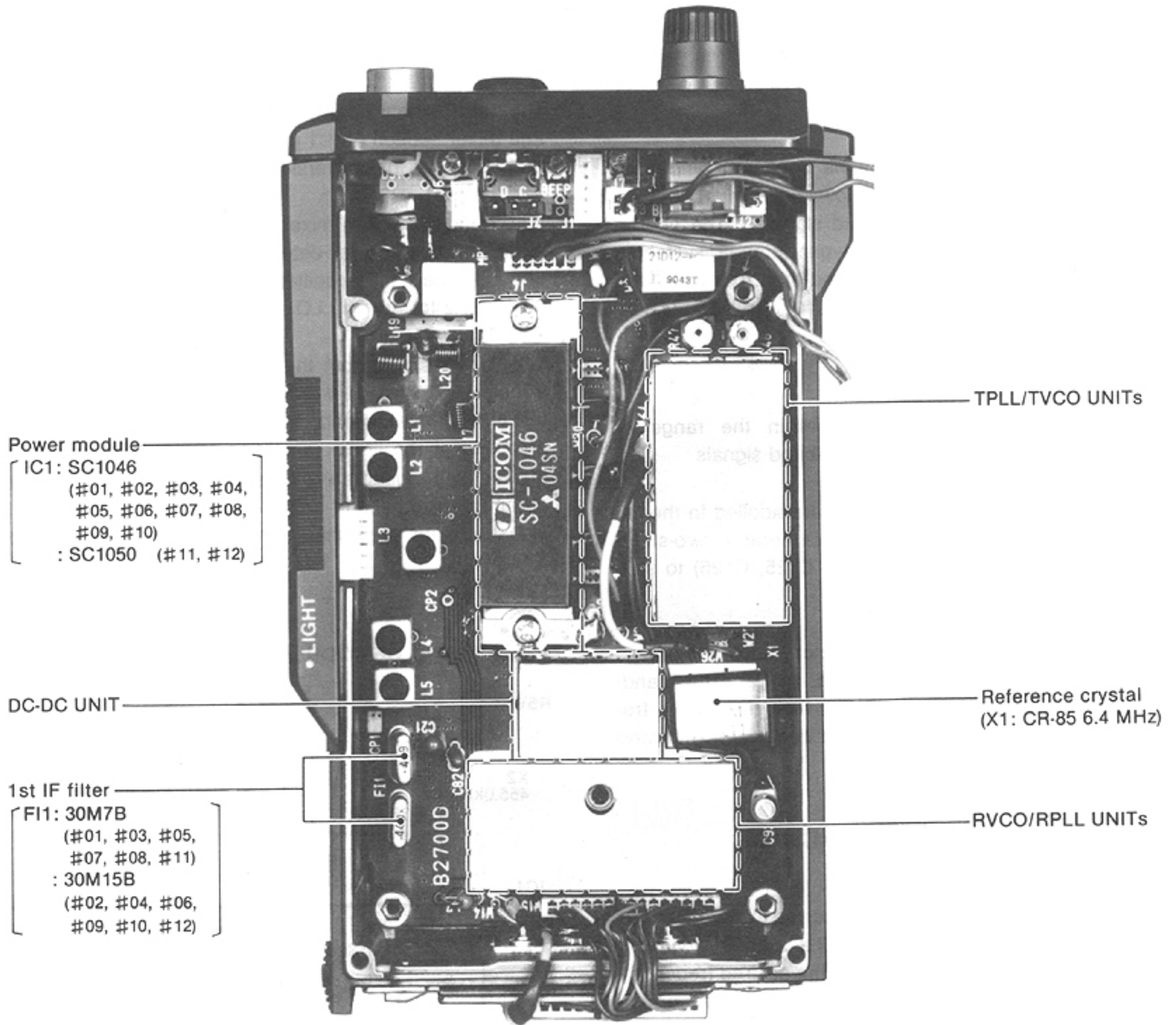
• TONE, LOGIC AND FRONT UNITS



• MAIN UNIT



• RF UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

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

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

Received signals enter the antenna connector and pass through a two-stage Chebyshev low-pass filter (L20, L21, C40~C44) to suppress out-of-band signals. The filtered signals are applied to the $\lambda/4$ type antenna switching circuit (D15, D16, L19, C38, C39) and then to a two-stage bandpass filter (L1, L2, D1, D3, C3, C123, C124).

3-1-2 RF CIRCUIT (RF UNIT)

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

The signals from the bandpass filter are applied to the RF amplifier (Q1). The amplified signals enter a two-stage bandpass filter (L3, L4, D6, D7, C7, C125, C126) to suppress unwanted signals.

D1, D3, D6 and D7 employ varactor diodes, that are controlled by the RPLL lock voltage, to track the bandpass filters. These varactor diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image response rejection.

3-1-3 1st MIXER AND IF CIRCUITS (RF UNIT)

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

The signals from the RF circuit are mixed at Q2 with a 1st LO signal coming from the RVCO circuit to produce a 1st IF signal. The 1st IF signal is applied to L5 and then to a pair of crystal filters (F11) in order to obtain wide selection capability and to pass only the desired signals. The filtered signal passes through a 1st IF amplifier (Q3). The amplified signal is applied to a 2nd IF circuit.

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

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

The 1st IF signal from Q3 on the RF UNIT is applied to a 2nd mixer section of IC1 (pin 16) and is then mixed with a 2nd LO signal for conversion to a 455 kHz 2nd IF signal.

IC1 contains the 2nd mixer, local oscillator circuit, limiter amplifier, quadrature detector circuit and active filter circuit. The local oscillator section and X1 generate 30.42 MHz for the 2nd LO signal.

The 2nd IF signal from the 2nd mixer (IC1, pin 3) passes through a high-quality ceramic filter (F11) to suppress unwanted heterodyned frequency signals. It is then amplified at the limiter amplifier section (IC1, pin 5) and applied to the quadrature detector section (IC1, pin 8 and ceramic discriminator X2) to demodulate the 2nd IF signal into an AF signal. The AF signal is output from IC1 (pin 9).

• 2nd IF AND DEMODULATOR CIRCUITS

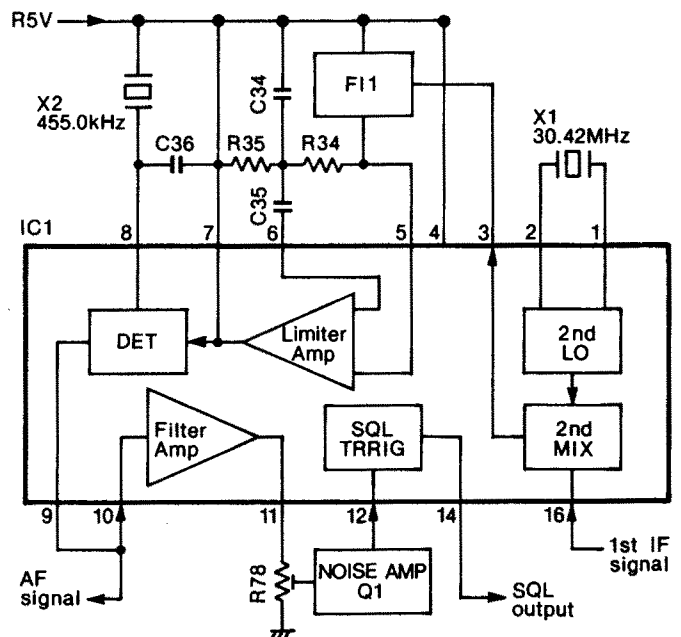


Fig. 1

3-1-5 AF CIRCUIT (MAIN AND VR UNITS)

The AF circuit de-emphasizes the demodulated signal with -6 dB/octave and power-amplifies the AF signal to drive a speaker. The AF circuit includes an AF mute circuit to mute the AF signal with a noise squelch and a tone squelch.

The AF signal output from IC1 (pin 9) is applied to the AF pre-amplifier (IC2a, pin 2). The AF signal obtains -6 dB/octave de-emphasis at R18 and C113, which are connected to pin 2, and is then applied to IC3 (pin 23).

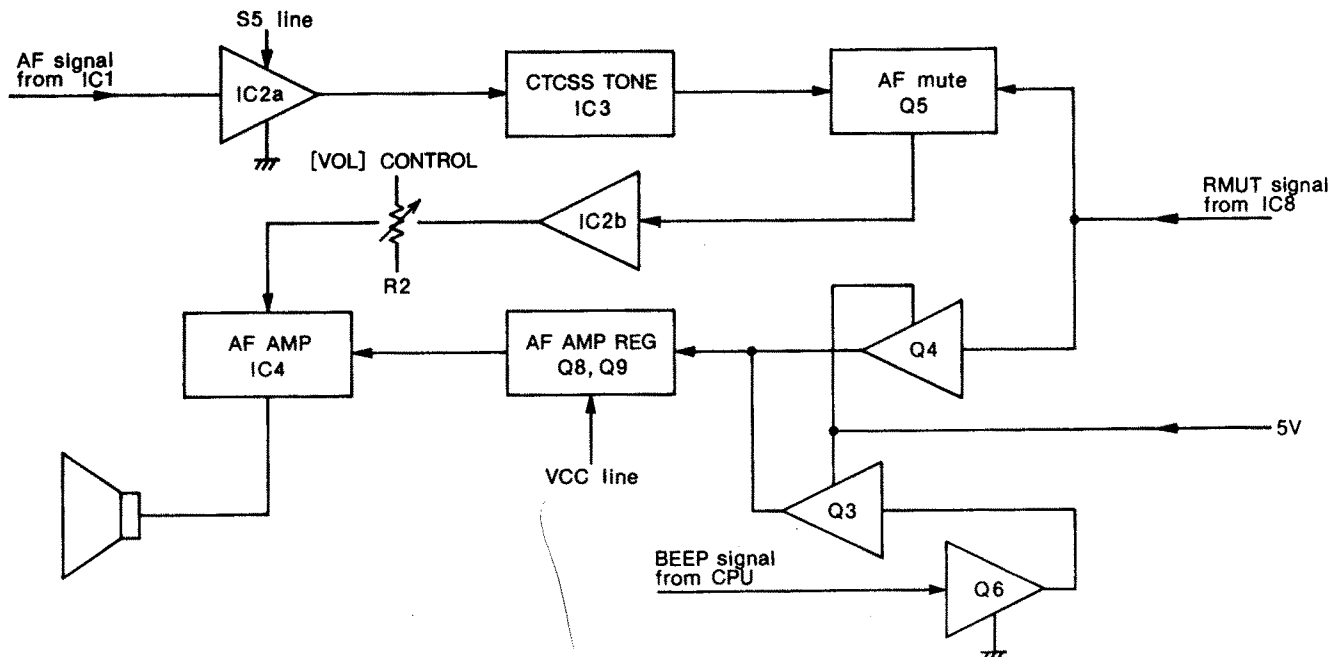
The input signal from IC3 (pin 23) passes through the speech path high-pass filter in IC3 to attenuate a CTCSS tone signal. The filtered signal is output from IC3 (pin 19) and is then applied to the AF preamplifier (IC2b) through an AF mute circuit (Q5). When the squelch is closed, Q5 cuts off the AF signal as an AF mute switch. The amplified signal is applied to the [VOL] control (R2) on the VR UNIT and is then power-amplified at an AF power amplifier (IC4) to drive a speaker.

3-1-6 SQUELCH CIRCUIT (RF, MAIN, VR AND LOGIC UNITS)

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

Some noise components in the AF signal from IC1 (pin 9) are applied to an active filter section (IC1, pin 10). It amplifies the noise components of frequencies 20 kHz and above. The noise signals are output from IC1 (pin 11) and are then applied to the squelch level setting volume control (R78) to adjust the IC1 (pin 10) input level. The signals are amplified at Q1 and are then applied to a squelch trigger circuit section of IC1 (pin 12).

• AF SIGNAL CURRENT



D3 and R9 compensate for temperature and adjust the bias voltage for the squelch trigger circuit. Pin 14 of IC1 outputs a pulse-type signal which contains the hysteresis components. The signal is applied to IC12 (pin 2).

IC12 is a squelch IC that controls attack/release timing. When an operating channel is changed (the "RSTB" signal is received), fast attack timing is selected.

The output signal from IC12 (pin 6) is applied to the CPU (IC1, pin 33) on the LOGIC UNIT as an "SQL" signal. The [S] SWITCH on the VR UNIT will supply the squelch signal to the CPU by controlling Q2.

When the CPU (IC1, pin 33) receives the "SQL" signal, the shift register (IC8, pin 7) on the MAIN UNIT outputs an "RMUT" signal. The AF mute circuit (Q5) is deactivated if the "RMUT" signal is "LOW." At this time, Q4 is turned ON. The AF amplifier regulator (Q8, Q9) supplies sufficient voltage to drive an AF power amplifier (IC4). D5 and R42 suppress the increase output voltage from the AF power amplifier (IC4).

Q6 detects DC voltage included in the beep and DTMF signals in the monitor condition. When Q3 is turned ON, the AF power amplifier (IC4, pin 9) is turned ON while the AF mute circuit (Q5) is activated.

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT (FRONT, LOGIC AND MAIN UNITS)

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 AF signals from the microphone pass through the microphone mute switch circuit (IC2). The CPU (IC1, pin 37) supplies an "MMUT" to IC2. The AF signals are then applied to IC9a (pin 3) in the MAIN UNIT and pass through the +6 dB pre-emphasis circuit (C71, R53) which is connected to pin 2. IC9a includes a low level amplifier with pre-emphasis and a limiter amplifier. The output signals from IC9a (pin 1) pass through a splatter filter circuit (IC9b) which eliminates signal components greater than 3 kHz. Pin 7 of IC9b outputs a "MOD" signal. The "MOD" signal is applied to the TVCO UNIT as the "MOD1" signal.

3-2-2 MODULATION CIRCUIT (TVCO AND TPLL UNITS)

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

The "MOD1" signal changes the reactance of varactor diode (D7) to modulate the oscillated signal at TVCO (Q1). The oscillated signal is buffer-amplified at Q2 and Q3.

The signal passes through the low-pass filter and is divided by 4 at a prescaler (IC2, pin 2) on the TPLL UNIT. The resulting signal is output from IC2 (pin 7) and is then applied to the drive amplifier circuit.

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

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

The signal from IC2 (pin 7) on the TPLL UNIT passes through the 3-stage low-pass filter consisting of L14~L16 and C78~C81. The filtered signal is amplified at a pre-drive amplifier (Q7) and re-amplified at a drive amplifier (Q6) to obtain 20 mW.

The control voltage from the APC circuit is applied to the collector of Q6 for stable RF output power from a power amplifier (IC1).

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

IC1 is a power module which provides a stable 5 W (DC 13.8 V) of output power.

The RF signal from the drive amplifier (Q6) is applied to the power amplifier (IC1, pin 1). The amplified signal is output from IC1 (pin 5). The output signal is applied to the antenna connector through the APC circuit, the antenna switching circuit and the low-pass filter circuit.

• MICROPHONE AMPLIFIER CIRCUIT

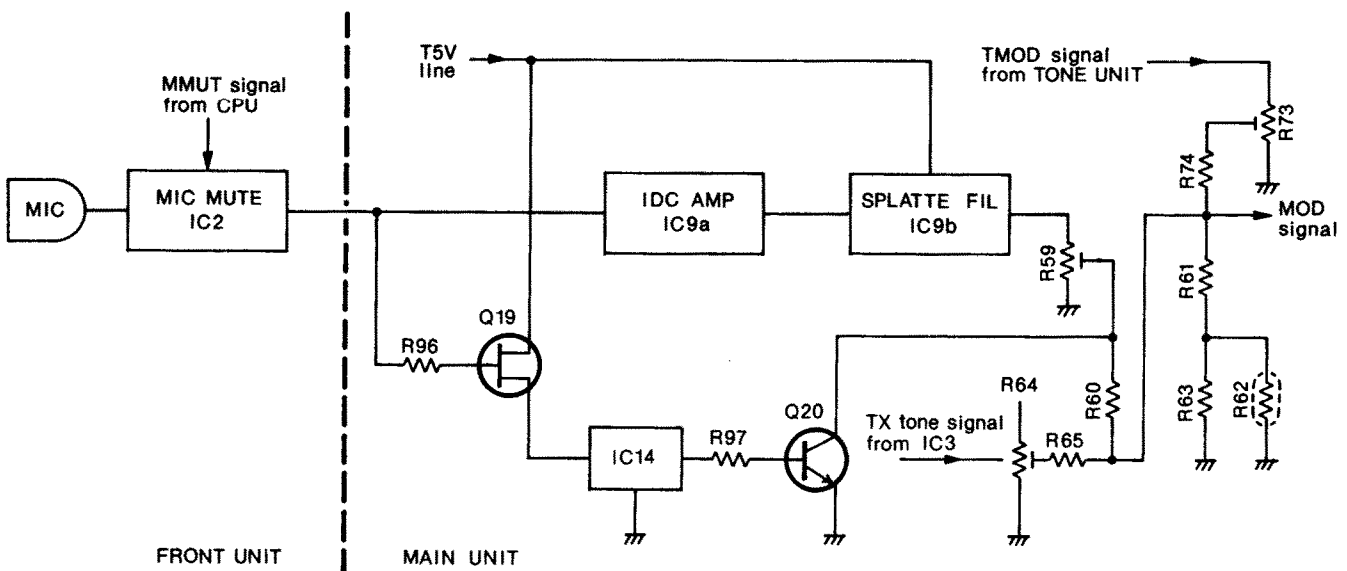


Fig. 3

3-2-5 APC CIRCUIT (RF UNIT)

The APC circuit protects the power module (IC1) from a mismatched output load and selects HIGH or LOW output power.

The output power from the power module (IC1, pin 5) is applied to the APC mismatch detector circuit (L17, R59, R60, C46, C47) to divide high-frequency components for conversion to DC voltage at the APC detector (D13, D14). When the antenna impedance is matched at 50 Ω, the detected voltage is at its minimum. However, when antenna impedance is mismatched, the detected voltage is higher than when it is matched.

The detected voltage is applied to a differential amplifier circuit (Q15, Q16). The APC reference voltage is determined by the power output control circuit (R46~R50) and is then applied to the base of Q15.

When the antenna impedance is mismatched, the base voltage of Q16 exceeds the reference voltage. The collector voltage of Q16 decreases.

The current from the differential amplifier circuit (Q15, Q16) is amplified at Q14 to control Q11 and Q12. The control voltage changes the supply voltage to IC1 and Q6. This decreases the output power from the drive amplifier (Q6) and power module (IC1) until the base voltage of Q16 reaches the same level as the voltage of Q15.

Q19 and Q20 are turned ON when DC 8.4 V is supplied. They control the output power.

• APC CIRCUIT

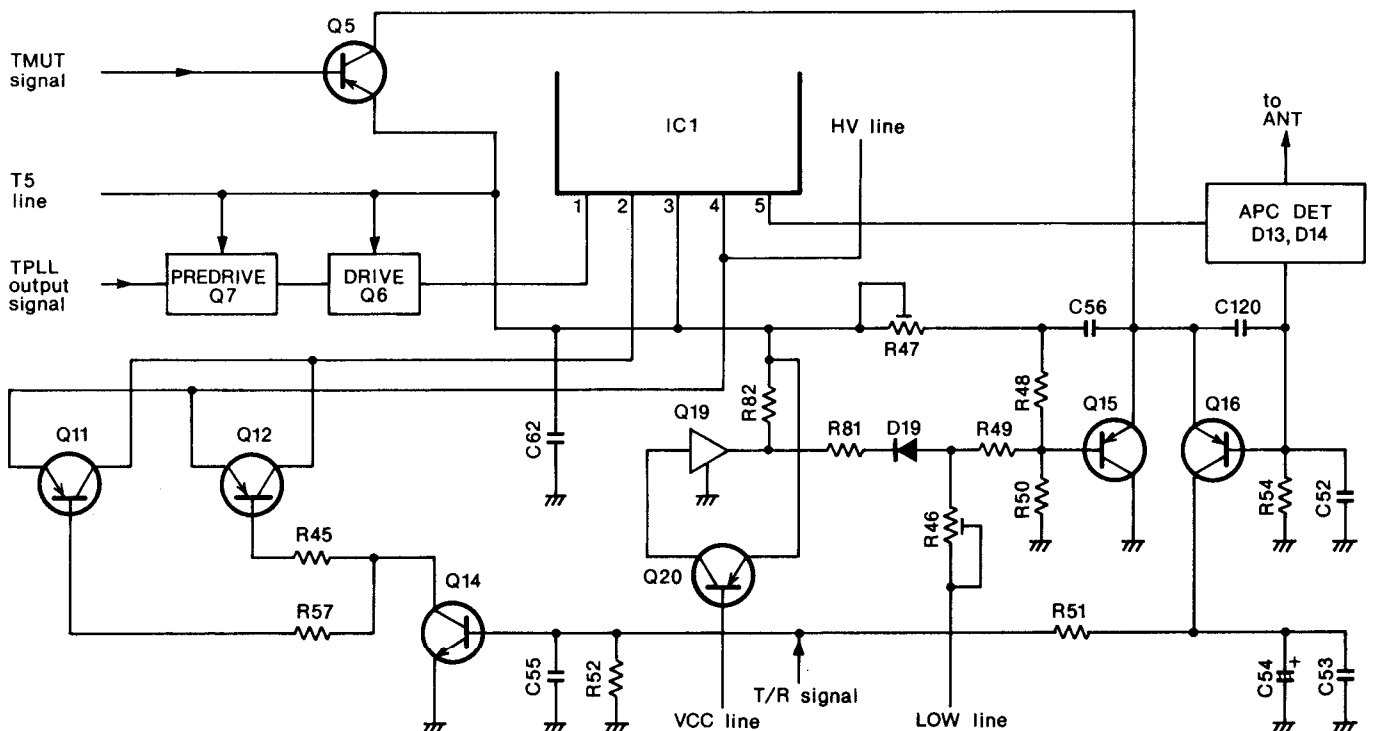


Fig. 4

3-2-6 POWER OUTPUT CONTROL CIRCUIT (RF UNIT)

The power output control circuit (R46~R50) selects "HIGH" or "LOW" output power levels and controls the RF output power with the APC reference voltage.

When "HIGH" output power is selected, the APC reference voltage is determined by R47, R48 and R50. The RF output power is adjusted with R47.

When "LOW" output power is selected, the "LOW" signal from the shift register (IC8, pin 4) on the MAIN UNIT is applied to R46. The APC reference voltage is determined by R46, R49 and R50. The RF output power is adjusted with R46.

3-2-7 TX MUTE CIRCUIT (RF UNIT)

When a "TMUT" signal from the shift register (IC8, pin 6) on the MAIN UNIT turns Q5 OFF to interrupt the transmission, the bias voltages are prevented from entering Q6, Q7 and IC1.

3-2-8 ANTENNA SWITCHING CIRCUIT (RF UNIT)

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

Q17, D15 and D16 are turned ON to form a parallel resonant circuit (L19, C38, C39) while transmitting. The parallel resonant circuit does not allow the RF output signal from IC1 to enter the receiver circuit. The RF output signal from IC1 passes through L17, D15, C45 and C129. The signal is applied to a low-pass filter (L20, L21, C40~C44) and then to an antenna connector. The impedance of the parallel resonant circuit increases. The signal leakage from the resonant circuit is bypassed at D16 and Q17.

3-3 PLL CIRCUITS

3-3-1 GENERAL

This transceiver has an independent PLL circuit (RPLL for the receiver and TPLL for the transmitter) to facilitate high speed changing from receive to transmit.

PLL circuits steadily oscillate the transmit frequency and the 1st LO receive frequency. The PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

3-3-2 RECEIVER PLL CIRCUIT (RPLL UNIT)

The PLL circuit, using a one-chip modulus prescaler (IC1), directly generates the 1st LO receive frequency with the RVCO (Q2) on the RVCO UNIT. The modulus prescaler (IC1) sets the dividing ratio based on serial data from the CPU (IC1) on the LOGIC UNIT and compares the phase of the RVCO signal with the reference oscillator frequency. The PLL IC (IC1) detects the out-of-step phase and outputs it from IC1 (pins 15 and 16). A reference frequency is oscillated at X1 on the RF UNIT.

3-3-3 REFERENCE OSCILLATOR CIRCUIT (RF UNIT)

A 6.4 MHz reference frequency is produced by Q10 and X1 on the RF UNIT. The frequency is adjusted with C93. D12, R38 and R41 compensate for temperature to maintain frequency stability within ± 5 ppm ($-30^{\circ}\text{C} \sim +60^{\circ}\text{C}$; $-22^{\circ}\text{F} \sim +140^{\circ}\text{F}$). The reference frequency is applied to both the RPLL and TPLL circuits.

3-3-4 RECEIVER VCO CIRCUIT (RVCO UNIT)

The RVCO circuit (Q2, D2) generates the 1st LO receive frequency. The varactor diode (D2) provide frequency control. The output signal from the RVCO circuit is applied to a buffer amplifier (Q1, Q3, Q4) which amplifies VCO oscillation and does not permit the latter circuit to affect the VCO oscillation. The amplified signal enters either PLL IC (IC1, pin 8) on the RPLL UNIT or a buffer amplifier (Q4) on the RF UNIT.

• RPLL CIRCUIT

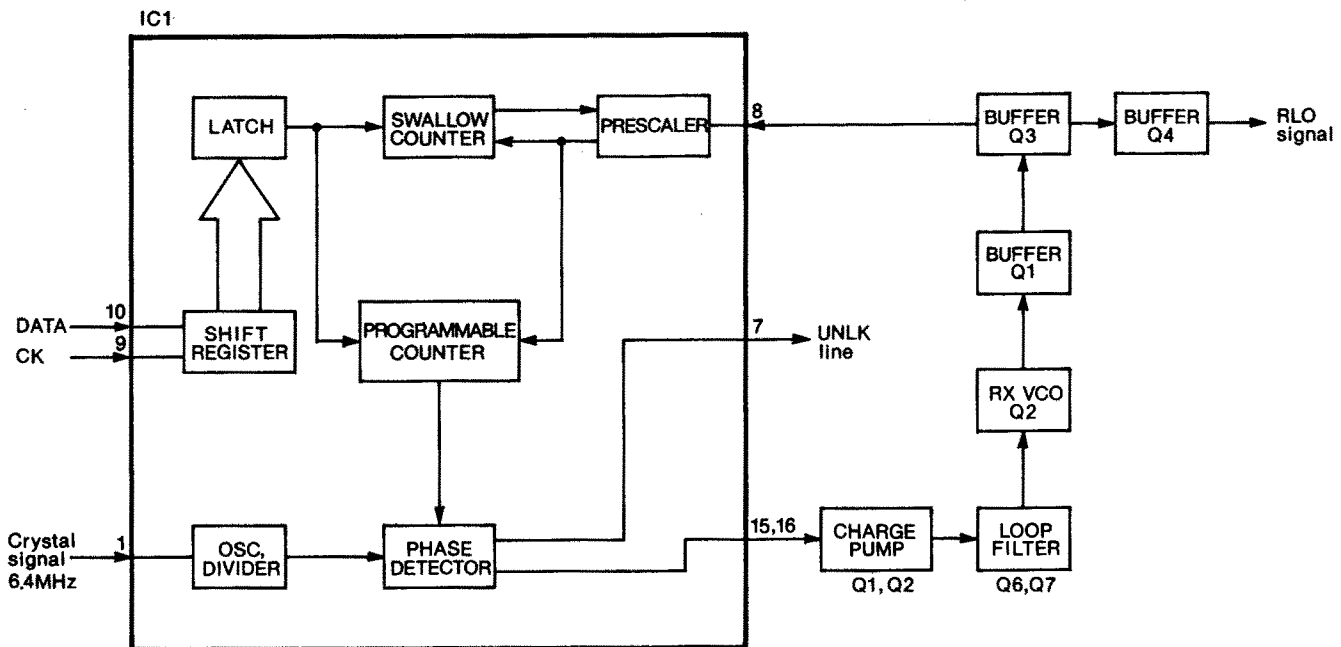


Fig. 5

3-3-5 RECEIVER PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (RPLL UNIT)

The programmable divider shifts the dividing ratio with a prescaler depending on the operating frequency and determines the VCO oscillating frequency.

The phase detector circuit detects the off-phase components of the VCO frequency using a stable reference frequency.

IC1 is a one-chip PLL IC that contains a two-modulus prescaler, a swallow counter, a programmable divider and a phase detector. IC1 accepts up to 520 MHz inputs.

The input signal from the PLL IC (IC1, pin 8) passes through the two-modulus prescaler and the programmable counter sections of IC1. A 6.4 MHz reference frequency from X1 on the RF UNIT is applied to IC1 (pin 1) and passes through a programmable reference counter section of IC1. Both of the divided signals are compared at a phase detector section of IC1. The phase-detected signal (pulse signal) is output from IC1 (pins 15 and 16).

3-3-6 RECEIVER CHARGE PUMP AND LOOP FILTER CIRCUITS (RVCO AND RPLL UNITS)

The phase-detected signal (pulse signal) from IC1 (pins 15 and 16) passes through the charge pump (Q1, Q2) and is then applied to an active loop filter (Q6, Q7) on the RVCO UNIT. The pulse signal is converted to DC voltage (PLL voltage) to control the oscillation from the RVCO UNIT. A charge pump (Q1, Q2) is used to expand the range of the PLL lock voltage. The PLL lock voltage changes the reactance of a varactor diode (D2) in the RVCO circuit.

When transmitting, T5 is applied to D4 on the RVCO UNIT to cut off the receiver 1st LO output from the RVCO UNIT.

• TPLL CIRCUIT

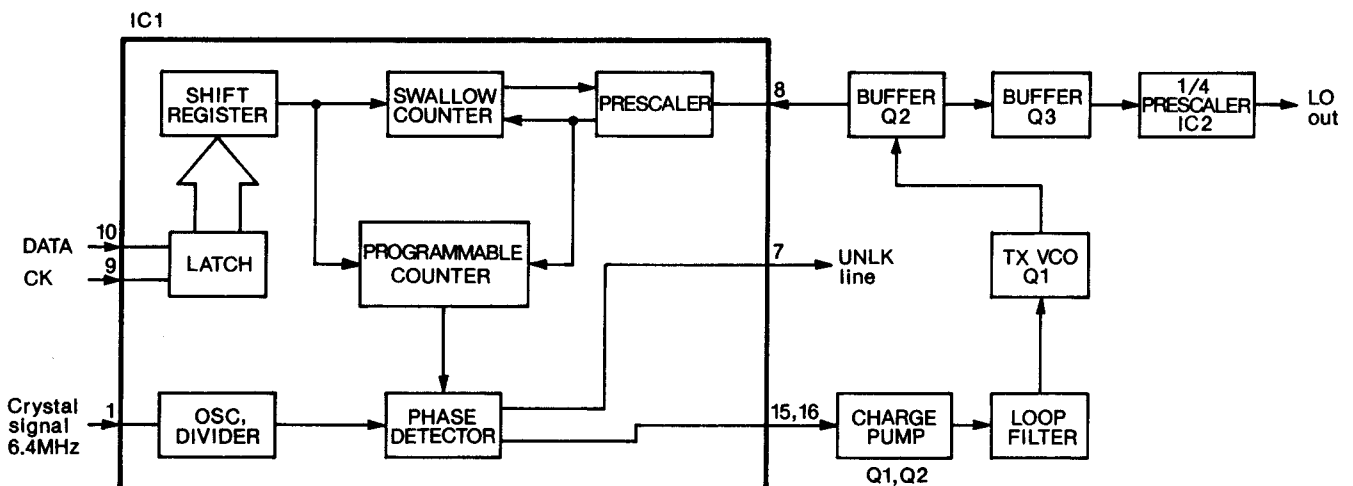


Fig. 6

3-3-7 RECEIVER UNLOCK SENSOR CIRCUIT (RPLL, RF AND LOGIC UNITS)

When the PLL circuit is unlocked, pin 7 of IC1 outputs a pulse signal. The signal is inverted at IC2 on the RF UNIT and is then applied to a time constant (R32, C95). Therefore, the "HIGH" signal is applied to the CPU (IC1, pin 34) as an unlock signal on the LOGIC UNIT.

3-3-8 TRANSMITTER PLL CIRCUIT (TPLL UNIT)

The PLL circuit, using a one-chip modulus prescaler (IC1), directly generates the transmit frequency with a Clapp VCO (Q1) on the TVCO UNIT. The modulus prescaler (IC1) sets the dividing ratio based on serial data from the CPU (IC1) on the LOGIC UNIT and compares the phase of the TVCO signal with the reference oscillator frequency. The PLL IC (IC1) detects the out-of-step phase and outputs it from IC1 (pins 15 and 16). A reference frequency is oscillated at X1 on the RF UNIT.

3-3-9 TRANSMITTER VCO CIRCUIT (TVCO UNIT)

The TVCO circuit (Q1, D1~D4) generates the transmit frequency. Varactor diodes (D1~D4) provide frequency control. Modulation is directly performed by the varactor diode (D7). The output signal from the TVCO circuit is applied to a buffer amplifier (Q2, Q3) which amplifies the VCO oscillation and does not permit the latter circuit to affect the VCO oscillation. The amplified signal enters either PLL IC (IC1, pin 8) or a divide-by-4 prescaler (IC2, pin 2) on the TPLL UNIT.

3-3-10 TRANSMITTER PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (TPLL UNIT)

The programmable divider shifts the dividing ratio with a prescaler, depending on the operating frequency, and determines the VCO oscillating frequency.

The phase detector circuit detects the off-phase components of the VCO frequency using a stable reference frequency.

IC1 is a one-chip PLL IC that contains a two-modulus prescaler, a swallow counter, a programmable divider and a phase detector. IC1 accepts up to 1 GHz inputs.

The input signal from the PLL IC (IC1, pin 8) passes through the two-modulus prescaler and the programmable counter sections of IC1. A 6.4 MHz reference frequency from X1 on the RF UNIT is applied to IC1 (pin 1) and passes through a programmable reference counter section of IC1. Therefore, the reference frequency (5 kHz or 6.25 kHz) is set by the dividing data from the CPU. Both of the divided signals are compared at a phase detector section of IC1. The phase-detected signal (pulse signal) is output from IC1 (pins 15 and 16).

3-3-11 TRANSMITTER CHARGE PUMP AND LOOP FILTER CIRCUITS (TVCO AND TPLL UNITS)

The phase-detected signal (pulse signal) from IC1 (pins 15 and 16) passes through the charge pump (Q1, Q2) and is then applied to a lag-lead loop filter (C1, C2, R1, R2). The pulse signal is converted to DC voltage (PLL voltage) to control the oscillation from the TVCO UNIT. A charge pump (Q1, Q2) is used to expand the range of the PLL lock voltage. The PLL lock voltage changes the reactance of a varactor diode (D1~D4) in the TVCO circuit.

3-3-12 TRANSMITTER UNLOCK SENSOR CIRCUIT (TPLL, RF AND LOGIC UNITS)

When the PLL circuit is unlocked, pin 7 of IC1 outputs a pulse signal. The signal is inverted at IC2 on the RF UNIT and is then applied to a time constant (R32, C95). Therefore, the "HIGH" signal is applied to the CPU (IC1, pin 34) as an unlock signal on the LOGIC UNIT.

3-4 POWER SUPPLY CIRCUITS

3-4-1 VOLTAGE LINES

LINE	DESCRIPTION
HV	The external DC power from the DC power connector.
VCC	This voltage passes through [VOL] control (R2) on the VR UNIT and is then applied to the 5 V regulator circuit (IC5) on the MAIN UNIT. This voltage line changes depending on the battery pack type: 8.4 V (CM-72), 13.8 V (CM-73).
+5 V	Common 5 V converted from the VCC line at the 5 V regulator circuit (Q10, Q11, D6) using IC5 output as the reference voltage on the MAIN UNIT. This regulator circuit is composed of a complementary connection to ensure high current amplification and supplies stable output voltage continuously with good temperature characteristics in all modes.
S5 V	5 V controlled by the power saver function. When the power save is turned ON, a "PSAV" signal from the CPU (IC1, pin 61) on the LOGIC UNIT interrupts the "S5 V" line intermittently to save power. This voltage is converted from the VCC line at Q12, Q13 and D7 using IC11 output as the reference voltage on the MAIN UNIT. This regulator circuit forms a complementary circuit.
R5 V	Receive 5 V controlled by an "S5 V" signal from the S5 V regulator and a "T/R" signal from the shift register (IC8, pin 14) on the MAIN UNIT. This voltage is converted from the VCC line at Q14, Q15 and D8 using IC6 output as the reference voltage. This regulator circuit forms a complementary circuit.
T5 V	Transmit 5 V controlled by a "TMUT" signal from the shift register (IC8, pin 6) on the MAIN UNIT. This voltage is converted from the VCC line at Q16, Q17 and D9 using IC7 output as the reference voltage. This regulator circuit forms a complementary circuit.

3-4-2 CPU POWER SUPPLY CIRCUIT (LOGIC UNIT)

The DC voltage is applied to the 64 K-byte CMOS RAM (IC3, pin 28) via D5 from the lithium backup battery (BT1) to provide backup for the memory contents regardless of the power switch supply.

• CPU POWER SUPPLY CIRCUIT

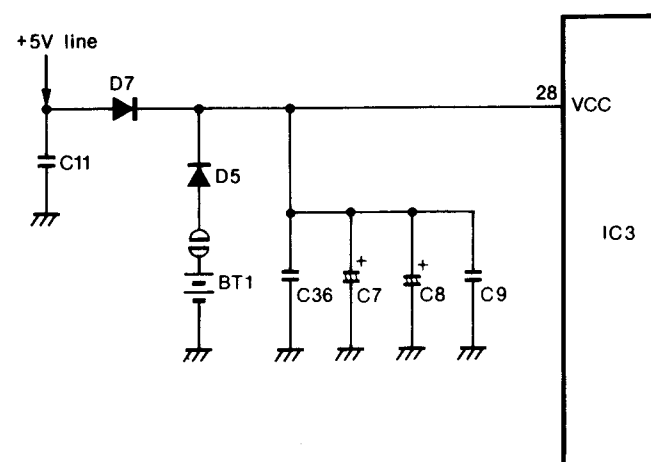
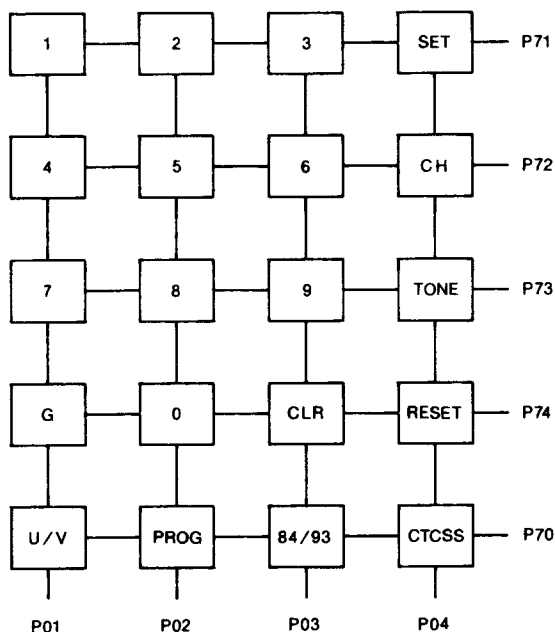


Fig. 7

3-5 LOGIC CIRCUITS

The logic circuit section consists of an 8-bit CPU, an EPROM and a 64 K-byte CMOS RAM. A 5-TONE encoder/decoder unit is equipped on the LOGIC UNIT.

3-5-1 KEY MATRIX FOR CPU INPUT



3-5-2 PORT ALLOCATIONS

• IC1 CPU (LOGIC UNIT)

PORT NAME	PIN NUMBER	DESCRIPTION
LIGHT [P22]	31	Input port for the [LIGHT] switch.
CSTB [P62]	3	Outputs strobe signals for CTCSS.
TSTB [P61]	4	Outputs strobe signals for TX PLL.
RSTB [P60]	5	Outputs strobe signals for RX PLL.
INT1 [P21]	29	Accepts 5-tone data input when this port becomes "HIGH".
FUNC [P24]	32	Input port for the [FUNC] switch. "L": When the scan starts or stops. "H": When the scan function is deactivated. Input port for the cloning switch when the cloning mode is selected.
SQL [P25]	33	Input port for the squelch signal.
UNLK [P26]	34	Input port for the PLL unlock signal.

PORT NAME	PIN NUMBER	DESCRIPTION
BUSY [P27]	35	Input port for the "BUSY" signal from the LCD driver.
SEND [P30]	36	Input port for T/R switching. "L": When transmitting. "H": When receiving. Input port for the receive signal when the cloning mode is selected.
MMUT [P31]	37	Output port for microphone muting. "L": When this function is deactivated. "H": When this function is activated. Outputs the cloning data when the cloning mode is selected.
CK [P32]	38	Outputs a clock signal for PLL, CTCSS and LCD.
DATA [P33]	39	Outputs a data signal for PLL, CTCSS and LCD.
CALL [P75]	44	Input port for the [CALL] switch. "L": When transmitting. "H": When receiving. Input port for the function switch when the SET mode is selected.
S0~S3 [P34~P37]	50~53	I/O ports for 5-tone data.
\bar{C}/D [P05]	59	Outputs a data/command designation signal for the LCD driver.
DET [P67]	62	Input port for the CTCSS tone decoded signal. "L": When this function is deactivated. "H": When decoding a CTCSS tone.
BEEP [P66]	63	Outputs a beep tone signal.
$\bar{W}R$ [P65]	64	Outputs a RAM writing signal.

• IC4 SHIFT REGISTER (TONE UNIT)

PORT NAME	PIN NUMBER	DESCRIPTION
LOW	4	Output port for output power condition. "L": When high power is selected. "H": When low power is selected.
V1, V2	12, 11	Outputs a selecting signal for a 5-tone system.
5STB	13	Outputs strobe signals for a 5-tone IC.
\bar{T}/R	14	Outputs a 5-tone control signal. "L": When encoding. "H": When decoding.

• IC8 SHIFT REGISTER (MAIN UNIT)

PORT NAME	PIN NUMBER	DESCRIPTION
LOW	4	Output port for output power condition. "L": When high power is selected. "H": When low power is selected.
EXC	5	The port becomes "HIGH" when the received 5-tone code matches the programmed 5-tone code.
TMUTE	6	Output port for the transmit muting signal which mutes RF power. "L": When this function is deactivated. "H": When this function is activated.
RMUTE	7	Output port for the receive muting signal which mutes audio power. "L": When this function is deactivated. "H": When this function is activated.
T/R	14	Output port for a transmit/receive signal. The port becomes "LOW" when transmitting.

3-6 5-TONE CIRCUITS

3-6-1 5-TONE IC (TONE UNIT)

IC1* is a gate-array IC consisting of a 5-tone encoder/decoder, a data selector for controlling the CPU, a serial-parallel converter and a divider and inverter for resetting. The following I/O ports are equipped.

*IC1

SC-1093 for the U.K. and France versions.

SC-1084 for all other versions.

PORT NAME	PIN NUMBER	DESCRIPTION
IO0~IO3	61~64	I/O ports for the 5-tone encoder/decoder data.
CON1	60	Output/input control port for the IO0~IO3.
RX	59	Control port which activates either the encoder or decoder.
TO1, TO2	44, 45	Ports which change the 5-tone system. (See below)
ST1	57	Port for a 5-tone encoder strobe signal.
EC0~EC2	41~43	Output ports for the encoder/decoder.
DS	21	Input port for the decoder signal.
ST3	8	Port for a decoder strobe signal.
IN1, IN2	9, 11	Input ports for an inverter.
OUT1, OUT2	10, 12	Output ports for an inverter.
KO3	22	Output port for 560 kHz.
OSC1, OSC2	34,35	Ports for a crystal oscillator.

The 5-tone system depends on the transceiver version and signals from the shift register (IC4), V1 (TO1) and V2 (TO2) as follows:

V1	V2	SC-1084	SC-1093
L	L	EIA	DZVEI
H	L	CCIR	CCIR
L	H	EEA	EEA
H	H	ZVEI	DAPL

The receive audio signal output from IC1 (pin 9) on the MAIN UNIT is applied to the tone encoder/decoder (IC2, pin 20) on the TONE UNIT through the "DISC" signal line. IC2 distinguishes regular signals from those with noise interference. The decode signal is applied to IC1 (pin 21).

3-6-2 5-TONE TRANSMISSION (TONE UNIT)

The data from IC1 is converted from digital to analog at R3~R8 to produce a 5-tone signal. The 5-tone signal is amplified at IC3b. The amplified signal is then applied to an active low-pass filter (IC3a) to eliminate its digital and high harmonic components. The active low-pass filter (IC3a) produces an encode signal without distortion. The output signal from IC3a is applied to the TVCO UNIT as a "TMOD" signal.

Q3 prevents the reference clock signal from entering the tone encoder/decoder while a 5-tone signal is decoding. On the other hand, Q2 turns Q1 ON to supply a voltage to IC3 while a 5-tone signal is encoding.

3-6-3 5-TONE FREQUENCY TABLE

5-TONE CODE	EIA	CCIR	EEA	ZVEI	DZVEI	DAPL
0	600	1981	1981	2400	2200	1981
1	741	1124	1124	1060	970	1124
2	882	1197	1197	1160	1060	1197
3	1023	1275	1275	1270	1160	1275
4	1164	1358	1358	1400	1270	1358
5	1305	1446	1446	1530	1400	1446
6	1446	1540	1540	1670	1530	1540
7	1587	1640	1640	1830	1670	1640
8	1728	1747	1747	2000	1830	1747
9	1869	1860	1860	2200	2000	1860
A=Group	2151	2400	1055	2800	885	2400
B	2433	930	930	810	810	2548
C	2010	2247	2247	970	2600	2247
D	2292	991	991	886	2800	770
E=Repeat	459	2110	2110	2600	2400	2110
F	No tone	No tone	No tone	No tone	No tone	No tone

3-6-4 DTMF ENCODER CIRCUIT (TONE UNIT)

The DTMF encoder (IC5) is controlled by the serial data from the CPU (IC1) on the LOGIC UNIT. The serial data from the CPU (IC1) is converted to the parallel signal in the 5-tone IC (IC1) to activate the DTMF encoder (IC5).

When the DTMF signal is encoded, the DTMF encoded signal is output from IC5 (pin 20) and is then applied to the amplifier (IC3c). The amplified signal is buffer-amplified at IC3d and is then re-amplified at IC3b. The resulting signal is applied to TVCO UNIT as "TMOD" signal via IC3a. The DTMF encoded signal from IC3c is output from the "DTMF" signal line in the monitor condition.

Pin 12 of IC5 outputs a mute signal to deactivate IC3c and IC3d while a 5-tone signal is encoding.

3-7 OTHER CIRCUITS

3-7-1 CTCSS TONE ENCODER/DECODER CIRCUIT (MAIN UNIT)

The CTCSS tone encoder/decoder (IC3) encodes and decodes 67.0 Hz~250.3 Hz tone frequencies which are set by the serial data from the CPU on the LOGIC UNIT.

IC3 contains a CTCSS tone encoder/decoder, a speech path high-pass filter and a CTCSS tone detector. The tone decoder and speech path high-pass filter have separate inputs and both are protected against the effect of incident RF voltage. The speech high-pass filter has low pass-band ripple, low output noise and a cut-off frequency of 300 Hz regardless of the programmed CTCSS tone.

The AF signal from IC2a (pin 1) is applied to either IC3 (pin 23) or the low-pass filter (IC2c, IC2d). The AF signal input from IC3 (pin 23) passes through the speech pass high-pass filter in IC3 to attenuate a CTCSS tone signal and is then output from IC3 (pin 19).

The low-pass filter (IC2c, IC2d) attenuates the AF signal to obtain a CTCSS tone signal. The tone signal is applied to IC3 (pin 24). Pin 14 of IC3 becomes "HIGH" during a successful decode. Therefore, Q7 supplies a CTCSS tone decoded signal to the CPU (IC1, pin 62).

The tone encoded signal is output from IC3 (pin 16) and is then applied to R64 for modulation adjustment.

3-7-2 T/R CONTROL CIRCUIT (RF UNIT)

A T/R signal from the shift register (IC8, pin 14) on the MAIN UNIT controls Q21 and Q8 to supply a voltage for the TPLL UNIT through the "TS5" signal line and to turn Q14 OFF while receiving.

3-7-3 DC-DC CONVERTER (DC-DC UNIT)

A DC-DC converter (IC1) and L1 form a blocking oscillator circuit which supplies a stable output voltage to the RPLL and TPLL UNITS. The DC voltage is used to obtain wide range lock voltage for the PLL circuits.

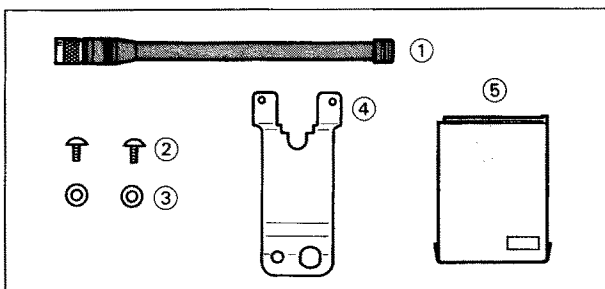
SECTION 4 MECHANICAL PARTS AND DISASSEMBLY

• CHASSIS PARTS

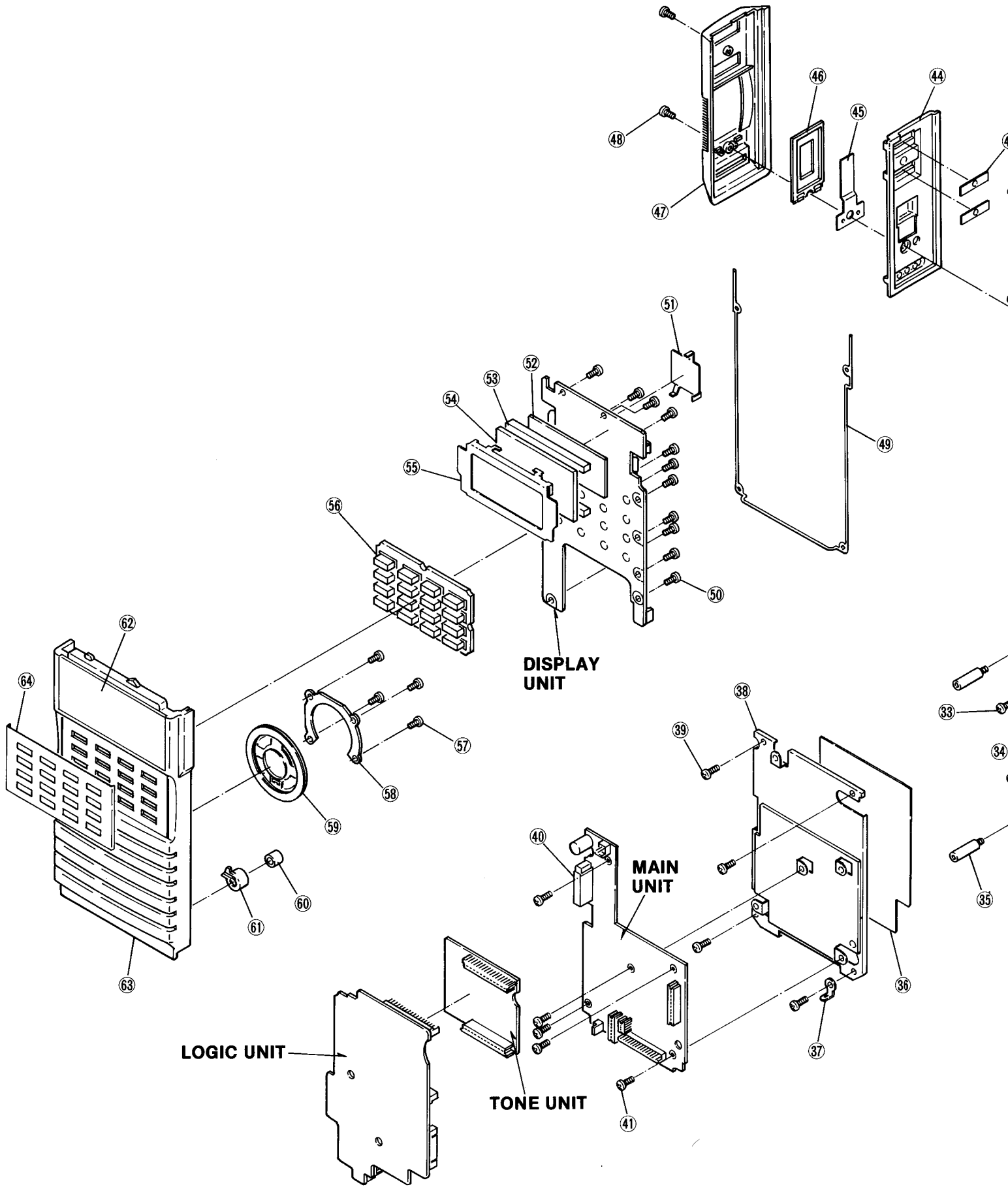
LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8610004310	Knob N133 [VOL]	1	③①	6450000110	Connector HSJ0836-01-010 [EXT SP]	1
②	8830000550	VR nut (E)	1	③②	8930019640	859 Module plate	1
③	8930019530	859 connector seal	1	③③	8810001840	Screw PH M2.6×6 NI BS	2
④	8930019880	DC rubber	1	③④	8860000100	Ground lug B2 (M2.6) AG BS	1
⑤	8810004860	Screw PH M2×6 ZK	3	③⑤	8930020720	573 Standoff (A)-3	4
⑥	8210005930	859 Top panel	1	③⑥	8930021860	859 Insulate plate	1
	8210006510	859 Top panel (A) (#04 version only)		③⑦	8860000090	Ground lug B1 (M2) AG BS	1
⑦	8930019540	859 lens	1	③⑧	8510006830	859 MAIN Shield plate	1
⑧	8930019190	Switch rubber	1	③⑨	8810000010	Screw PH M2×4	4
⑨	8930019520	859 Top seal	1	④①	8510000440	IC Shield plate	1
⑩	8930019170	Switch plate	1	④②	8810005860	Screw PH No. 0-1 M2×3 NI	5
⑪	8810001760	Screw PH M2×4 NI BS	1	④③	8810004870	Screw PH No. 0-1 M2×2.5	2
⑫	7210001440	Variable resistor RK09711101NA [VOL]	1	④④	8930011600	PTT plate	2
				④⑤	8930018650	575 PTT rubber (A)	1
⑬	2230000840	Switch EVQ-QBW 06T [S]	1	④⑥	8930011611	PTT spring-1	1
⑭	6510007120	Antenna connector TNC-R106	1	④⑦	8930019510	PTT button (A)	1
⑮	8850001010	Icom washer (O)	1	④⑧	8930018640	575 PTT holder (A)-1	1
⑯	8810004000	Screw PH B0 M2×31.5 ZK	4	④⑨	8810004890	Screw PH No. 0-1 M2×6 ZK	2
⑰	8010010480	575 Rear panel (A)	1	⑤①	8930021490	575 Center seal (A)	1
⑱	8930011880	Contact holder	1	⑤②	8810005900	Screw PH B0 No. 0-3 M1.4×3.5	11
⑲	8010007602	Bushing (A)-2	1	⑤③	8510006270	758 CPU Shield plate	1
⑳	8930005980	Contact spring	1	⑤④	6910002060	Reflector ALF 40×20×0.58	1
㉑	8810001770	Screw PH M2×5 NI BS	1	⑤⑤	8930012750	LCD contact SRCN-575	2
㉒	8810002580	Screw BuH M2×6 NI BS	1	⑤⑥	5030000590	LCD LD-B5093J (E-5208)	1
㉓	8930013430	LOCK plate (B)	1	⑤⑦	8930012190	LCD holder	1
㉔	8010006990	Sliding plate	1	⑤⑧	8010010190	562 Keyboard (C)-1	1
㉕	8810002310	Screw FH M2×4 NI BS	4	⑤⑨	8810004800	Screw PH B0 No. 0-1 M2×4	4
㉖	8930008610	Release button (A)	1	⑥①	8930012101	SP plate-1	1
㉗	8860000010	Screw lug M2	2	⑥②	2510000450	Speaker EAS-3P123D	1
㉘	8410001560	Module heatsink plate	1	⑥③	7700000480	Microphone KUC2023-01-006	1
㉙	6450001080	Connector HEC3800-01-010 [DC IN 13.8 V]	1	⑥④	8930011930	573 Mic holder	1
				⑥⑤	8310020680	575 Window plate (A)	1
③①	6450000130	Connector HSJ1102-01-540 [MIC]	1	⑥⑥	8210005860	575 Front panel (F)	1
				⑥⑦	8930019300	575 10 keyboard (A)	1

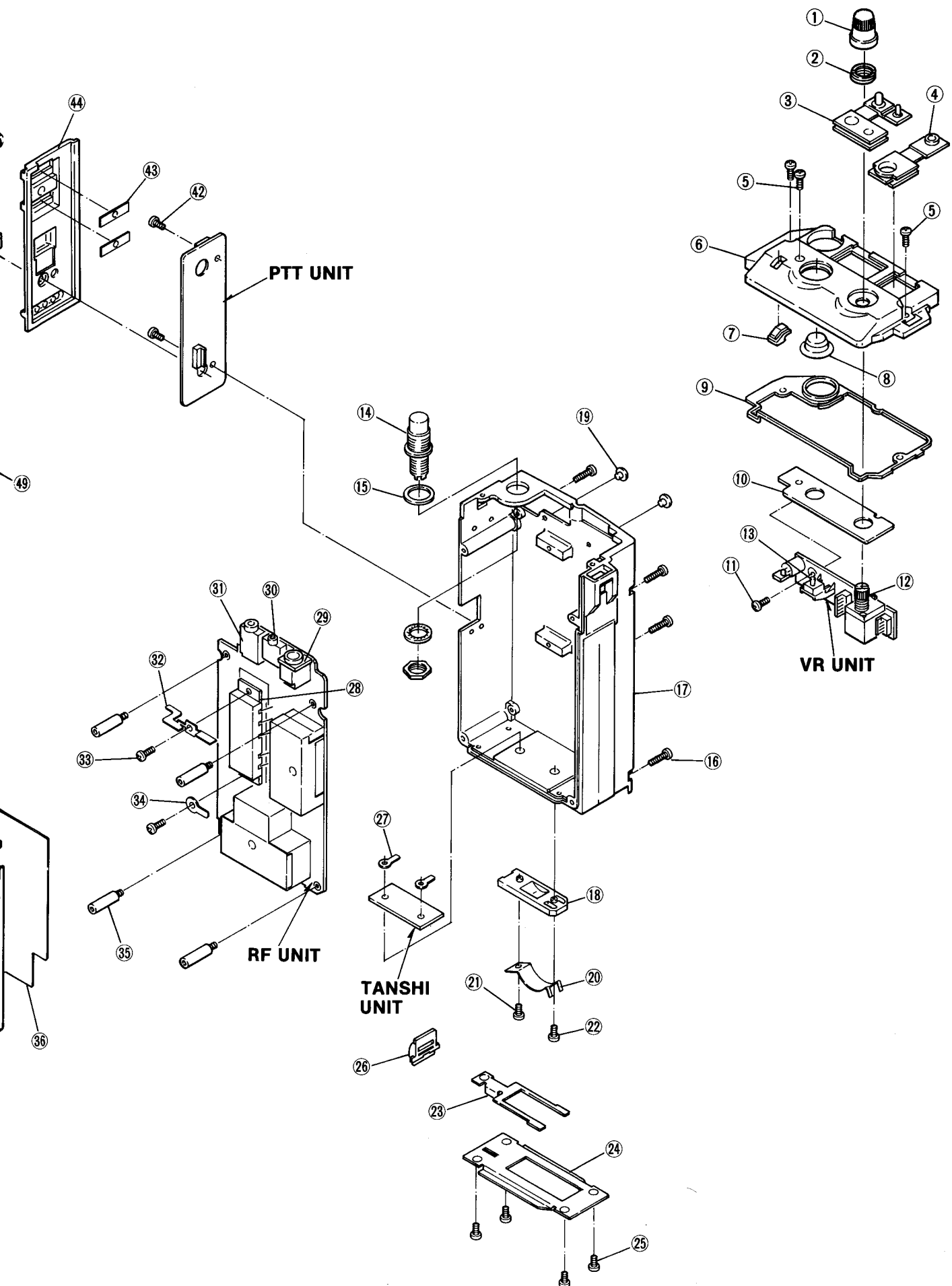
Screw abbreviations B0: Self-tapping PH: Pan head FH: Flat head BS: Brass BuH: Button head
NI: Nickel ZK: Black

• ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	Optional product	FA-155T Flexible antenna	1
②	8810003650	Icom screw A4	2
③	8850000640	Nylon washer B M3	2
④	8010005710	Belt clip	1
⑤	Optional product	Battery pack CM-72	1





SECTION 5 PARTS LIST

[PTT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
S1	2280001580	Switch	SW-131 (SKHMPU) [FUNC]
S2	2280001580	Switch	SW-131 (SKHMPU) [CALL]
S3	2280001580	Switch	SW-131 (SKHMPU) [PTT]
EP1	0910029081	P.C. Board	B 2709A (PTT)

[TANSHI UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030008880	Ceramic	C1608 JB 1H 102K-T-A
C2	4030008880	Ceramic	C1608 JB 1H 102K-T-A
EP1	0910029071	P.C. Board	B 2708A (TANSHI)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1150000400	IC	SC1048 (#01,#02,#03,#04,#05, #06,#07,#08,#09,#10) SC1050 (#11,#12)
	1150000440	IC	SC1050 (#11,#12)
IC2	1130003810	IC	TC4SU89F (TE85R)
Q1	1580000430	FET	2SK302-GR (TE85R)
Q2	1580000400	FET	3SK151-Y (TE85R)
Q3	1530002800	Transistor	2SC4215-O (TE85R)
Q4	1530002030	Transistor	2SC3772-3-TA
Q5	1510000500	Transistor	2SA1182-GR (TE85R)
Q6	1530002340	Transistor	2SC2954-T2B
Q7	1530002620	Transistor	2SC3585 R44-T2B
Q8	1510000510	Transistor	2SA1578 T107 R
Q10	1530001940	Transistor	2SC2712-BL (TE85R)
Q11	1520000200	Transistor	2SB798-T2 DK
Q12	1520000200	Transistor	2SB798-T2 DK
Q14	1530001950	Transistor	2SC2712-GR (TE85R)
Q15	1510000500	Transistor	2SA1182-GR (TE85R)
Q16	1510000500	Transistor	2SA1182-GR (TE85R)
Q17	1530001940	Transistor	2SC2712-BL (TE85R)
Q18	1580000360	FET	2SK209-Y (TE85R)
Q19	1590000680	Transistor	DTC114EU T107
Q20	1510000510	Transistor	2SA1578 T107 R
Q21	1590000680	Transistor	DTC114EU T107
D1	1790000460	Varicap	MA334B (TX)
D3	1790000460	Varicap	MA334B (TX)
D4	1790000590	Diode	MA110 (TW)
D5	1730001050	Zener	RD20M-T2B1
D6	1790000460	Varicap	MA334B (TX)
D7	1790000460	Varicap	MA334B (TX)
D8	1160000050	Diode	DAP202U T107
D10	1750000070	Diode	1SS228 (TE85R)
D12	1720000220	Varicap	1SV166-T2B
D13	1750000090	Diode	1SS154 (TE85R)
D14	1750000090	Diode	1SS154 (TE85R)
D15	1750000080	Diode	1SS153-T2
D16	1750000080	Diode	1SS153-T2
D17	1730001050	Zener	RD20M-T2B1

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D18	1750000040	Diode	1SS190 (TE85R)
D19	1750000160	Diode	DA114 T107
X1	8050002150	Crystal	CR-85
F11	2010000940	Filter	30M 7B (FL-107) (#01,#03,#05,#07,#08,#11)
	2010000230	Filter	30M15B (FL-76) (#02,#04,#06,#09,#10,#12)
L1	6150002780	Coil	LS-295
L2	6150002780	Coil	LS-295
L3	6150002800	Coil	LS-296
L4	6150002780	Coil	LS-295
L5	6150003210	Coil	LS-319
L6	6170000180	Coil	LW-17
L7	6180000900	Coil	LAL 03NA 101K
L8	6200000140	Coil	LQH 3N 1R0M
L9	6200000070	Coil	LQN 2A R15K
L10	6200000770	Coil	LQN 2A 68NM
L11	6200000110	Coil	LQN 2A 33NM
L12	6200000770	Coil	LQN 2A 68NM
L13	6200000910	Coil	LQN 2A 82NM
L14	6200000120	Coil	LQN 2A 39NM
L15	6200000770	Coil	LQN 2A 68NM
L16	6200000770	Coil	LQN 2A 68NM
L17	6110002070	Coil	LA-227
L18	6200000750	Coil	LQH 3N 4R7M
L19	6110001570	Coil	LA-237
L20	6110002070	Coil	LA-227
L21	6110001540	Coil	LA-234
L23	6200001450	Coil	LQH 3N 221K
L24	6200001450	Coil	LQH 3N 221K
R1	7030003700	Resistor	ERJ3GEYJ 154 V (150 k Ω)
R2	7030003700	Resistor	ERJ3GEYJ 154 V (150 k Ω)
R3	7030003230	Resistor	ERJ3GEYJ 180 V (18 Ω)
R4	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R5	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R6	7030003700	Resistor	ERJ3GEYJ 154 V (150 k Ω)
R7	7030003700	Resistor	ERJ3GEYJ 154 V (150 k Ω)
R8	7030003710	Resistor	ERJ3GEYJ 184 V (180 k Ω)
R9	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R10	7030003720	Resistor	ERJ3GEYJ 224 V (22 k Ω)
R11	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R12	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R13	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R14	7030003800	Resistor	ERJ3GEYJ 223 V (22 k Ω)
R15	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R16	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R17	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 k Ω)
R18	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R19	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R23	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R24	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 k Ω)
R25	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R26	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 k Ω)
R27	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R28	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R29	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R30	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R31	7030003230	Resistor	ERJ3GEYJ 180 V (18 Ω)
R32	7030003600	Resistor	ERJ3GEYJ 223 V (22 k Ω)
R33	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R34	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R35	7030003660	Resistor	ERJ3GEYJ 883 V (88 k Ω)
R36	7030003690	Resistor	ERJ3GEYJ 124 V (120 k Ω)
R37	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 k Ω)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R38	7510000430	Thermistor	DTN-T203K202LS (T)
R39	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 k Ω)
R40	7030003560	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R41	7510000430	Thermistor	DTN-T203K202LS (T)
R42	7030003580	Resistor	ERJ3GEYJ 153 V (15 k Ω)
R45	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 k Ω)
R46	7310003540	Trimmer	RH0421CW3J (882)
R47	7310001850	Trimmer	RH0421CS4J08A (473)
R48	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 k Ω)
R49	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R50	7030003610	Resistor	ERJ3GEYJ 273 V (27 k Ω)
R51	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R52	7030003770	Resistor	ERJ3GEYJ 564 V (560 k Ω)
R53	7030003670	Resistor	ERJ3GEYJ 823 V (82 k Ω)
R54	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 k Ω)
R57	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 k Ω)
R58	7030003560	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R59	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 k Ω)
R60	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 k Ω)
R61	7030003560	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R62	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R63	7030003800	Resistor	ERJ3GEYJ 105 V (1 M Ω)
R64	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R65	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 k Ω)
R66	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R67	7030003560	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R68	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R69	7030003720	Resistor	ERJ3GEYJ 224 V (220 k Ω)
R70	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R71	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R72	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R73	7030003580	Resistor	ERJ3GEYJ 153 V (15 k Ω)
R74	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R75	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R76	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R77	7030003350	Resistor	ERJ3GEYJ 181 V (180 Ω)
R78	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R79	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R80	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R81	7030003570	Resistor	ERJ3GEYJ 123 V (12 k Ω)
R82	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R83	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R84	7030003660	Resistor	ERJ3GEYJ 683 V (68 k Ω)
R85	7030003650	Resistor	ERJ3GEYJ 563 V (56 k Ω)
C1	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C2	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C3	4030006570	Ceramic	C1608 SL 1H R75C-T-A
C5	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C6	4030006530	Ceramic	C1608 SL 1H 020C-T-A
C7	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C8	4030006570	Ceramic	C1608 SL 1H 060D-T-A
C9	4030006530	Ceramic	C1608 SL 1H 020C-T-A
C10	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C11	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C12	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C13	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C14	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C15	4030006870	Ceramic	C1608 SL 1H 270J-T-A (#01,#03,#05,#07,#08,#11)
	4030006820	Ceramic	C1608 SL 1H 120J-T-A (#02,#04,#06,#09,#10,#12)
C16	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C17	4030006570	Ceramic	C1608 SL 1H 060D-T-A
C18	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C19	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C20	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C21	4550000310	Tantalum	DN 1V 2R2M
C22	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C23	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C24	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C25	4030006530	Ceramic	C1608 SL 1H 020C-T-A
C26	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C27	4030006810	Ceramic	C1608 SL 1H 100D-T-A
C28	4030006890	Ceramic	C1608 SL 1H 330J-T-A
C29	4030006860	Ceramic	C1608 SL 1H 220J-T-A
C30	4030006860	Ceramic	C1608 SL 1H 220J-T-A

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C31	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C32	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C33	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C35	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C36	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C37	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C38	4030006630	Ceramic	C1608 SL 1H 150J-T-A
C39	4030006630	Ceramic	C1608 SL 1H 150J-T-A
C40	4030006600	Ceramic	C1608 SL 1H 090D-T-A
C41	4030006600	Ceramic	C1608 SL 1H 090D-T-A
C42	4030006670	Ceramic	C1608 SL 1H 270J-T-A
C43	4030006540	Ceramic	C1608 SL 1H 030C-T-A
C44	4030006610	Ceramic	C1608 SL 1H 100D-T-A
C45	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C46	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C47	4030006640	Ceramic	C1608 SL 1H 180J-T-A
C48	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C49	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C50	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C51	4030006760	Ceramic	C1608 SL 1H 121J-T-A
C52	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C53	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C54	4550000420	Tantalum	TESVA 1A 105M1-8L
C55	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C56	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C58	4550003200	Tantalum	TEMSVC 1D 106M-12 L
C59	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C60	4030006630	Ceramic	C1608 JF 1C 104Z-T-A
C61	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C62	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C63	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C64	4030006630	Ceramic	C1608 JF 1C 104Z-T-A
C66	4030006620	Ceramic	C1608 SL 1H 120J-T-A
C68	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C69	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C70	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C71	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C72	4030006610	Ceramic	C1608 SL 1H 100D-T-A
C73	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C74	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C75	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C76	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C77	4030006560	Ceramic	C1608 SL 1H 050C-T-A
C78	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C79	4030006570	Ceramic	C1608 SL 1H 060D-T-A
C80	4030006690	Ceramic	C1608 SL 1H 330J-T-A
C81	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C82	4550000320	Tantalum	DN 1V 0R1M
C83	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C84	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C85	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C86	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C87	4030006630	Ceramic	C1608 JF 1C 104Z-T-A
C88	4030006750	Ceramic	C1608 SL 1H 101J-T-A
C89	4030006860	Ceramic	C1608 SL 1H 221J-T-A
C90	4030006960	Ceramic	C1608 CH 1H 050C-T-A
C91	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C92	4030007060	Ceramic	C1608 CH 1H 270J-T-A
C93	4610001480	Trimmer	CV38E 3001E
C94	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C95	4550003080	Tantalum	TEMSVA 1A 335M-8L
C97	4550002860	Tantalum	TESVA 1V 224K1-8L
C98	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C99	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C100	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C101	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C102	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C103	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C104	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C107	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C108	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C111	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C112	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C113	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C114	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C115	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C116	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C118	4030006860	Ceramic	C1608 JB 1H 102K-T-A

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C119	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C120	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C121	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C122	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C123	4030006860	Ceramic	C1808 SL 1H 330J-T-A
C124	4030006860	Ceramic	C1808 SL 1H 330J-T-A
C125	4030006860	Ceramic	C1808 SL 1H 330J-T-A
C126	4030006860	Ceramic	C1808 SL 1H 330J-T-A
C127	4550003130	Tantalum	TEMSVB2 1C 475M-8 L
C128	4550003130	Tantalum	TEMSVB2 1C 475M-8 L
C129	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C131	4030006860	Ceramic	C1808 JF 1C 104Z-T-A
C132	4550003030	Tantalum	TEMSVA 0J 475M-8L
C133	4550003030	Tantalum	TEMSVA 0J 475M-8L
C134	4550003030	Tantalum	TEMSVA 0J 475M-8L
C135	4550003030	Tantalum	TEMSVA 0J 475M-8L
C136	4030006860	Ceramic	C1808 JF 1C 104Z-T-A
C137	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C138	4550003230	Tantalum	TEMSVB2 1E 225M-8 L
C140	4550002980	Tantalum	TEMSVA 1C 225M-8L
C141	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C142	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C143	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C144	4030006850	Ceramic	C1808 JB 1H 471K-T-A
RL1	6330000070	Relay	FBR21D12-P
EP1	0910027424	P.C. Board	B 2700D (RF)
EP2	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP3	6910000850	Lead Frame	FSOH081RL
EP4	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP5	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP6	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP6	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP7	6910000970	Bead Core	DL 20P 2.6-3-1.2H
EP8	6910000970	Bead Core	DL 20P 2.6-3-1.2H

[TVCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002620	Transistor	2SC3585 R44-T2B
Q2	1530002620	Transistor	2SC3585 R44-T2B
Q3	1530002620	Transistor	2SC3585 R44-T2B
D1	1720000320	Varicap	1T32-T8-V
D2	1720000320	Varicap	1T32-T8-V
D3	1720000320	Varicap	1T32-T8-V
D4	1720000320	Varicap	1T32-T8-V
D7	1720000320	Varicap	1T32-T8-V
L1	6200000140	Coil	LQH 3N 1R0M
L2	6200000100	Coil	LQN 2A 22NM
L3	6200000100	Coil	LQN 2A 22NM
L4	6200000720	Coil	LQN 2A 10NM
L5	6200000140	Coil	LQH 3N 1R0M
L6	6200000140	Coil	LQH 3N 1R0M
L7	6200000140	Coil	LQH 3N 1R0M
L8	6200000100	Coil	LQN 2A 22NM

[TVCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R2	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 kΩ)
R3	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R4	7030003370	Resistor	ERJ3GEYJ 271 V (270 Ω)
R5	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R6	7030003510	Resistor	ERJ3GEYJ 392 V (3.9 kΩ)
R7	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R8	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R9	7030003240	Resistor	ERJ3GEYJ 220 V (22 Ω)
R10	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R11	7030003510	Resistor	ERJ3GEYJ 392 V (3.9 kΩ)
R12	7030003430	Resistor	ERJ3GEYJ 821 V (820 Ω)
R13	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R21	7030003330	Resistor	ERJ3GEYJ 121 V (120 Ω)
R22	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R23	7030003330	Resistor	ERJ3GEYJ 121 V (120 Ω)
R27	7030004040	Resistor	ERJ3GEYJ 4R7 V (4.7 Ω)
R28	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R30	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 kΩ)
R31	7030003290	Resistor	ERJ3GEYJ 560 V (56 Ω)
R34	7030003290	Resistor	ERJ3GEYJ 560 V (56 Ω)
C1	4030006930	Ceramic	C1808 CH 1H 020C-T-A
C2	4030007090	Ceramic	C1808 CH 1H 470J-T-A
C3	4030006970	Ceramic	C1808 CH 1H 080D-T-A
C4	4030006960	Ceramic	C1808 CH 1H 050C-T-A
C5	4030006940	Ceramic	C1808 CH 1H 030C-T-A
C6	4030006750	Ceramic	C1808 SL 1H 101J-T-A
C7	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C8	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C9	4030006510	Ceramic	C1808 SL 1H 0R5C-T-A
C10	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C11	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C12	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C13	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C15	4030006440	Ceramic	C1808 SL 1H 1R5C-T-A
C16	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C17	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C18	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C19	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C20	4030006440	Ceramic	C1808 SL 1H 1R5C-T-A
C21	4030006530	Ceramic	C1808 SL 1H 020C-T-A
C22	4030006520	Ceramic	C1808 SL 1H 010C-T-A
C25	4030006550	Ceramic	C1808 SL 1H 040C-T-A
C26	4030006530	Ceramic	C1808 SL 1H 020C-T-A
C27	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C28	4030006540	Ceramic	C1808 SL 1H 030C-T-A
C29	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C30	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C31	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C33	4550003220	Tantalum	TEMSVA 1E 105M-8L
C34	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C35	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C36	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C37	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C38	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C39	4030006710	Ceramic	C1808 SL 1H 470J-T-A
C40	4030006850	Ceramic	C1808 JB 1H 471K-T-A
C41	4550003220	Tantalum	TEMSVA 1E 105M-8L
C44	4030006860	Ceramic	C1808 JB 1H 102K-T-A
C45	4030006860	Ceramic	C1808 SL 1H 220J-T-A
C46	4030006710	Ceramic	C1808 SL 1H 470J-T-A
EP1	0910032492	P.C. Board	B 3112B (TVCO)

[TPLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001890	IC	MB1502PF-G-BND
IC2	1110002220	IC	μ PB585G
Q1	1510000730	Transistor	2SA1037K WT T147 R
Q2	1530002820	Transistor	2SC2412K WT T147 R
D1	1730001010	Zener	RD16M-T2B3
D3	1750000070	Diode	1SS226 (TE85R)
L2	6200000140	Coil	LQH 3N 1R0M
R1	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 kΩ)
R2	7030003470	Resistor	ERJ3GEYJ 182 V (1.8 kΩ)
R3	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 kΩ)
R4	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R6	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R13	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 kΩ)
R20	7030003240	Resistor	ERJ3GEYJ 220 V (22 Ω)
C1	4550003230	Tantalum	TEMSVB2 1E 225M-8 L
C2	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C3	4550002860	Tantalum	TESVA 1V 224K1-8L
C6	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C7	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C8	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C9	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C13	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C14	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C15	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C16	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C17	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C18	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C19	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C20	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C21	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C22	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C23	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C24	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C26	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C27	4550003100	Tantalum	TEMSVB 1A 108M-12 L
C28	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP1	0910027214	P.C. Board	B 2707D (TPLL)

[RVCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530000371	Transistor	2SC3356 R25-T2B
Q2	1530000371	Transistor	2SC3356 R25-T2B
Q3	1590000780	Transistor	IMX5 T109
Q4	1590000780	Transistor	IMX5 T109
Q5	1560000360	FET	2SK209-Y (TE85R)
Q6	1560000360	FET	2SK209-Y (TE85R)
Q7	1530001950	Transistor	2SC2712-GR (TE85R)
D2	1790000460	Varicap	MA334B (TX)
D3	1720000310	Diode	1SV128 (TE85R)
D4	1720000310	Diode	1SV128 (TE85R)

[RVCO UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L1	6200000820	Coil	LQH 3N R82M
L2	6130002380	Coil	LB-263
L3	6200001440	Coil	LQH 3N R18M
L4	6200000140	Coil	LQH 3N 1R0M
L5	6200000140	Coil	LQH 3N 1R0M
R1	7030003280	Resistor	ERJ3GEYJ 470 V (47 Ω)
R2	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R3	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R4	7030003530	Resistor	ERJ3GEYJ 562 V (5.6 kΩ)
R5	7030003530	Resistor	ERJ3GEYJ 562 V (5.6 kΩ)
R6	7030003570	Resistor	ERJ3GEYJ 123 V (12 kΩ)
R7	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R8	7030003360	Resistor	ERJ3GEYJ 221 V (220 Ω)
R9	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R10	7030003570	Resistor	ERJ3GEYJ 123 V (12 kΩ)
R11	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R12	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R14	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R15	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R16	7030003570	Resistor	ERJ3GEYJ 123 V (12 kΩ)
R17	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R18	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R19	7030003380	Resistor	ERJ3GEYJ 331 V (330 Ω)
R20	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R21	7030003510	Resistor	ERJ3GEYJ 392 V (3.9 kΩ)
R22	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R23	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R25	7030003690	Resistor	ERJ3GEYJ 124 V (120 kΩ)
R26	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R27	7030003410	Resistor	ERJ3GEYJ 561 V (560 Ω)
C1	4550003030	Tantalum	TEMSVA 0J 475M-8L
C2	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C3	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C4	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5	4030007140	Ceramic	C1608 CH 1H 121J-T-A
C6	4030006930	Ceramic	C1608 CH 1H 020C-T-A
C7	4030006520	Ceramic	C1608 SL 1H 010C-T-A
C8	4030006520	Ceramic	C1608 SL 1H 010C-T-A
C9	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C10	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C11	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C12	4030006510	Ceramic	C1608 SL 1H 0R5C-T-A
C13	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C14	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C15	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C16	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C17	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C18	4030006560	Ceramic	C1608 SL 1H 050C-T-A
C19	4030006810	Ceramic	C1608 SL 1H 100D-T-A
C20	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C21	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C22	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C23	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C24	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C25	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C26	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C27	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C28	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C29	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C30	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C31	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C32	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C34	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP1	0910028613	P.C. Board	B 2909C (RVCO)

[RPLL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001310	IC	MB1504PF-G-BND
Q1	1510000730	Transistor	2SA1037K WT T147 R
Q2	1530002820	Transistor	2SC2412K WT T147 R
R1	7030003550	Resistor	ERJ3GEYJ 822 V (8.2 k Ω)
R2	7030003620	Resistor	ERJ3GEYJ 333 V (33 k Ω)
R3	7030003570	Resistor	ERJ3GEYJ 123 V (12 k Ω)
R4	7030003570	Resistor	ERJ3GEYJ 123 V (12 k Ω)
R5	7030003440	Resistor	ERJ3GEYJ 102 V (1 k Ω)
C1	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C6	4550003030	Tantalum	TEMSVA OJ 475M-8L
C7	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C8	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C9	4030006810	Ceramic	C1608 SL 1H 100D-T-A
C10	4550001030	Tantalum	TESVD 1E 106M-12L
EP1	0910027104	P.C. Board	B 2708D (RPLL)

[DC-DC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002350	IC	BA8161F
D1	1750000040	Diode	1SS190 (TE85R)
L1	6180002850	Coil	RCR-875D-472K
R1	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 k Ω)
C1	4550000410	Tantalum	DN 1V 4R7M
C2	4550000410	Tantalum	DN 1V 4R7M
EP1	0910028521	P.C. Board	B 2885A (DC-DC)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002200	IC	MC3372MR
IC2	1110002150	IC	BA10324F-T1
IC3	1130005100	IC	FX365LG
IC4	1110002330	IC	TA7368P
IC5	1180000530	IC	S-81250HG-RD-T1
IC6	1130003760	IC	TC4S81F (TE85R)
IC7	1130003810	IC	TC4SU69F (TE85R)
IC8	1130000830	IC	μ PD4094BG-T1
IC9	1110001220	IC	BA4558F T1
IC10	1130003760	IC	TC4S81F (TE85R)
IC11	1130003760	IC	TC4S81F (TE85R)
IC12	1140001660	IC	μ PD7554AG-511
IC14	1110001500	IC	S-8054ALR-LN-T1

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002080	Transistor	2SC4081 T107 R
Q2	1590000720	Transistor	DTA144EU T107
Q3	1590000720	Transistor	DTA144EU T107
Q4	1590000720	Transistor	DTA144EU T107
Q5	1590000380	FET	2SJ106-Y (TE85R)
Q6	1590001320	Transistor	DTC143ZU T107
Q7	1530002080	Transistor	2SC4081 T107 R
Q8	1530002080	Transistor	2SC4081 T107 R
Q9	1520000350	Transistor	2SB1182 Q
Q10	1530002080	Transistor	2SC4081 T107 R
Q11	1520000200	Transistor	2SB798-T2 DK
Q12	1530002080	Transistor	2SC4081 T107 R
Q13	1520000200	Transistor	2SB798-T2 DK
Q14	1530002080	Transistor	2SC4081 T107 R
Q15	1520000200	Transistor	2SB798-T2 DK
Q16	1530002080	Transistor	2SC4081 T107 R
Q17	1520000200	Transistor	2SB798-T2 DK
Q18	1590000430	Transistor	DTC144EU T107
Q19	1560000420	FET	2SK209-GR (TE85R)
Q20	1530002080	Transistor	2SC4081 T107 R
Q22	1590000910	Transistor	IMZ2 T108
Q23	1520000200	Transistor	2SB798-T2 DK
Q24	1520000200	Transistor	2SB798-T2 DK
D1	1750000160	Diode	DA114 T107
D2	1750000160	Diode	DA114 T107
D3	1790000590	Diode	MA110 (TW)
D4	1750000160	Diode	DA114 T107
D5	1730000650	Zener	RD4.3M-T2B2
D6	1750000160	Diode	DA114 T107
D7	1750000160	Diode	DA114 T107
D8	1750000160	Diode	DA114 T107
D9	1750000160	Diode	DA114 T107
D10	1750000160	Diode	DA114 T107
D14	1790000870	Diode	MA1S121 (TX)
D15	1750000160	Diode	DA114 T107
X1	6050005010	Crystal	CR-214
X2	6070000080	Discriminator	CDBM455C16
X3	6050000130	Crystal	UM-1 1.0000M
FI1	2020000770	Ceramic Filter	CFZM455G (#01,#03,#05,#07,#08,#11)
	2020000490	Ceramic Filter	CFZM455E10 (#02,#04,#06,#09,#12)
	2020000830	Ceramic Filter	CFZM455F (#10)
R1	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 k Ω)
R2	7030003410	Resistor	ERJ3GEYJ 561 V (560 Ω)
R3	7030003660	Resistor	ERJ3GEYJ 683 V (68 k Ω)
R4	7030003420	Resistor	ERJ3GEYJ 681 V (680 Ω)
R6	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R7	7030003740	Resistor	ERJ3GEYJ 334 V (330 k Ω)
R8	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 k Ω)
R9	7310002580	Trimmer	RV-108 (RH03 A3A15X05A)104
R10	7030003720	Resistor	ERJ3GEYJ 224 V (220 k Ω)
R11	7030003460	Resistor	ERJ3GEYJ 152 V (1.5 k Ω)
R13	7030003650	Resistor	ERJ3GEYJ 563 V (56 k Ω)
R14	7030003660	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R15	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R16	7030003640	Resistor	ERJ3GEYJ 473 V (47 k Ω)
R17	7030003580	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R18	7030003740	Resistor	ERJ3GEYJ 334 V (330 k Ω)
R19	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R20	7030003720	Resistor	ERJ3GEYJ 224 V (220 k Ω)
R21	7030003730	Resistor	ERJ3GEYJ 274 V (270 k Ω)
R22	7030003720	Resistor	ERJ3GEYJ 224 V (220 k Ω)
R23	7030003710	Resistor	ERJ3GEYJ 184 V (180 k Ω)
R24	7030003560	Resistor	ERJ3GEYJ 103 V (10 k Ω)
R25	7030003800	Resistor	ERJ3GEYJ 105 V (1 M Ω)
R26	7030003680	Resistor	ERJ3GEYJ 104 V (100 k Ω)
R27	7030003800	Resistor	ERJ3GEYJ 105 V (1 M Ω)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
R28	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R29	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R30	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R31	7030003340	Resistor ERJ3GEYJ 151 V (150 Ω)
R32	7030003200	Resistor ERJ3GEYJ 100 V (10 Ω)
R33	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R34	7030003480	Resistor ERJ3GEYJ 152 V (1.5 kΩ)
R35	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R36	7030003530	Resistor ERJ3GEYJ 562 V (5.6 kΩ)
R37	7030003870	Resistor ERJ3GEYJ 823 V (82 kΩ)
R38	7030003800	Resistor ERJ3GEYJ 105 V (1 MΩ)
R39	7030003740	Resistor ERJ3GEYJ 334 V (330 kΩ)
R40	7030003790	Resistor ERJ3GEYJ 824 V (820 kΩ)
R41	7030003640	Resistor ERJ3GEYJ 473 V (47 kΩ)
R42	7030003420	Resistor ERJ3GEYJ 681 V (680 Ω)
R43	7030003650	Resistor ERJ3GEYJ 583 V (58 kΩ)
R44	7030003400	Resistor ERJ3GEYJ 471 V (470 Ω)
R45	7030003520	Resistor ERJ3GEYJ 472 V (4.7 kΩ)
R46	7030003550	Resistor ERJ3GEYJ 822 V (8.2 kΩ)
R47	7030003450	Resistor ERJ3GEYJ 122 V (1.2 kΩ)
R48	7030003480	Resistor ERJ3GEYJ 222 V (2.2 kΩ)
R49	7030003580	Resistor ERJ3GEYJ 103 V (10 kΩ)
R50	7030003470	Resistor ERJ3GEYJ 182 V (1.8 kΩ)
R51	7030003650	Resistor ERJ3GEYJ 583 V (58 kΩ)
R52	7310002810	Trimmer RV-157 (RH03 A3AN5X01A)334
R53	7030003370	Resistor ERJ3GEYJ 271 V (270 Ω)
R54	7030003710	Resistor ERJ3GEYJ 184 V (180 kΩ)
R55	7030003870	Resistor ERJ3GEYJ 823 V (82 kΩ)
R56	7030003700	Resistor ERJ3GEYJ 154 V (150 kΩ)
R57	7030003830	Resistor ERJ3GEYJ 393 V (39 kΩ)
R58	7030003830	Resistor ERJ3GEYJ 393 V (39 kΩ)
R59	7310002800	Trimmer RV-110 (RH03 A3AS4X0AA)473
R60	7030003600	Resistor ERJ3GEYJ 223 V (22 kΩ)
R61	7030003540	Resistor ERJ3GEYJ 682 V (6.8 kΩ)
R62	7510000180	Thermistor DTN-T203S223LS (T)
R63	7030003570	Resistor ERJ3GEYJ 123 V (12 kΩ)
R64	7310002800	Trimmer RV-110 (RH03 A3AS4X0AA)473
R65	7030003730	Resistor ERJ3GEYJ 274 V (270 kΩ)
R66	7030003200	Resistor ERJ3GEYJ 100 V (10 Ω)
R67	7030003400	Resistor ERJ3GEYJ 471 V (470 Ω)
R68	7030003400	Resistor ERJ3GEYJ 471 V (470 Ω)
R69	7030003580	Resistor ERJ3GEYJ 103 V (10 kΩ)
R70	7030003680	Resistor ERJ3GEYJ 104 V (100 kΩ)
R71	7030003720	Resistor ERJ3GEYJ 224 V (220 kΩ)
R72	7030003700	Resistor ERJ3GEYJ 154 V (150 kΩ)
R73	7310002800	Trimmer RV-110 (RH03 A3AS4X0AA)473
R74	7030003680	Resistor ERJ3GEYJ 104 V (100 kΩ)
R75	7030003680	Resistor ERJ3GEYJ 104 V (100 kΩ)
R76	7030003680	Resistor ERJ3GEYJ 104 V (100 kΩ)
R78	7310002800	Trimmer RV-110 (RH03 A3AS4X0AA)473
R81	7030003520	Resistor ERJ3GEYJ 472 V (4.7 kΩ)
R82	7030003440	Resistor ERJ3GEYJ 102 V (1 kΩ)
R83	7030003780	Resistor ERJ3GEYJ 474 V (470 kΩ)
R84	7030003480	Resistor ERJ3GEYJ 222 V (2.2 kΩ)
R85	7030003680	Resistor ERJ3GEYJ 104 V (100 kΩ)
R87	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R88	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R89	7030003520	Resistor ERJ3GEYJ 472 V (4.7 kΩ)
R92	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R93	7030003320	Resistor ERJ3GEYJ 101 V (100 Ω)
R95	7030003280	Resistor ERJ3GEYJ 470 V (47 Ω)
R96	7030003800	Resistor ERJ3GEYJ 105 V (1 MΩ)
R97	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R98	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R103	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R104	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
R105	7030003560	Resistor ERJ3GEYJ 103 V (10 kΩ)
C1	4030006860	Ceramic C1608 JB 1H 102K-T-A
C2	4030008770	Ceramic C1608 JB 1H 562K-T-A
C3	4030008770	Ceramic C1608 JB 1H 562K-T-A
C4	4030006850	Ceramic C1608 JB 1H 471K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C5	4030006860	Ceramic C1608 JB 1H 102K-T-A
C6	4030006870	Ceramic C1608 JB 1H 222K-T-A
C7	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C8	4030006900	Ceramic C1608 JB 1E 103K-T-A
C9	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C10	4030006860	Ceramic C1608 JB 1H 102K-T-A
C11	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C12	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C13	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C14	4030006900	Ceramic C1608 JB 1E 103K-T-A
C15	4030008430	Ceramic C1608 JF 1H 223Z-T-A
C16	4030006850	Ceramic C1608 JB 1H 471K-T-A
C17	4030006900	Ceramic C1608 JB 1C 333K-T-A
C18	4030006810	Ceramic C1608 SL 1H 271J-T-A
C19	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C20	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C23	4550003080	Tantalum TEMSVA 1A 335M-8L
C24	4030006850	Ceramic C1608 JB 1H 471K-T-A
C25	4030006710	Ceramic C1608 SL 1H 470J-T-A
C26	4030006860	Ceramic C1608 JB 1H 102K-T-A
C27	4550003080	Tantalum TEMSVA 1A 335M-8L
C28	4030006860	Ceramic C1608 JB 1H 102K-T-A
C29	4550003100	Tantalum TEMSVB 1A 106M-12 L
C30	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C31	4510003780	Electrolytic 10 MV 100 SW
C32	4030006860	Ceramic C1608 SL 1H 220J-T-A
C33	4030006720	Ceramic C1608 SL 1H 560J-T-A
C34	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C35	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C36	4030006890	Ceramic C1608 SL 1H 330J-T-A
C37	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C38	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C39	4550003080	Tantalum TEMSVA 1A 335M-8L
C40	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C41	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C42	4550003220	Tantalum TEMSVA 1E 105M-8L
C43	4550003040	Tantalum TEMSVB2 0J 106M-8 L
C44	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C45	4030006730	Ceramic C1608 SL 1H 680J-T-A
C46	4030006690	Ceramic C1608 SL 1H 330J-T-A
C47	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C48	4030006850	Ceramic C1608 JB 1H 471K-T-A
C49	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C50	4550003110	Tantalum TEMSVC 1A 226M-12 L
C51	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C54	4550002980	Tantalum TEMSVA 1C 225M-8L
C55	4030006850	Ceramic C1608 JB 1H 471K-T-A
C56	4550003150	Tantalum TEMSVC 1C 156M-12 L
C57	4030006850	Ceramic C1608 JB 1H 471K-T-A
C58	4550003060	Tantalum TEMSVC 0J 336M-12 L
C59	4030006850	Ceramic C1608 JB 1H 471K-T-A
C60	4550003060	Tantalum TEMSVC 0J 336M-12 L
C61	4550003110	Tantalum TEMSVC 1A 226M-12 L
C62	4030006850	Ceramic C1608 JB 1H 471K-T-A
C63	4550003110	Tantalum TEMSVC 1A 226M-12 L
C64	4030006850	Ceramic C1608 JB 1H 471K-T-A
C65	4550003110	Tantalum TEMSVC 1A 226M-12 L
C66	4030006850	Ceramic C1608 JB 1H 471K-T-A
C67	4550003110	Tantalum TEMSVC 1A 226M-12 L
C68	4030006850	Ceramic C1608 JB 1H 471K-T-A
C69	4030006900	Ceramic C1608 JB 1E 103K-T-A
C70	4030006860	Ceramic C1608 JB 1H 102K-T-A
C71	4550002850	Tantalum TESVA 1V 104K1-8L
C72	4030006850	Ceramic C1608 JB 1H 471K-T-A
C73	4030006850	Ceramic C1608 JB 1H 471K-T-A
C74	4030006850	Ceramic C1608 JB 1H 471K-T-A
C75	4030006870	Ceramic C1608 JB 1H 222K-T-A
C76	4030006900	Ceramic C1608 JB 1E 103K-T-A
C77	4030006710	Ceramic C1608 SL 1H 470J-T-A
C78	4030007140	Ceramic C1608 CH 1H 121J-T-A
C79	4550002980	Tantalum TEMSVA 1C 225M-8L
C80	4030006830	Ceramic C1608 JF 1C 104Z-T-A
C81	4550002980	Tantalum TEMSVA 1C 225M-8L
C82	4030006860	Ceramic C1608 JB 1H 102K-T-A
C83	4030006860	Ceramic C1608 JB 1H 102K-T-A
C84	4030006860	Ceramic C1608 JB 1H 102K-T-A
C85	4030006860	Ceramic C1608 JB 1H 102K-T-A
C86	4030006860	Ceramic C1608 JB 1H 102K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C87	4550003150	Tantalum	TEMSVC 1C 158M-12 L
C88	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C89	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C90	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C91	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C92	4030008600	Ceramic	C1608 JB 1E 103K-T-A
C93	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C94	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C95	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C96	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C97	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C101	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C102	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C103	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C104	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C105	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C106	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C107	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C108	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C109	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C110	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C111	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C112	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C113	4030008670	Ceramic	C1608 JB 1H 222K-T-A
C114	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C117	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C118	4550000530	Tantalum	TESVA 1V 104M1-8L
C119	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C120	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C121	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C128	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C130	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C132	4550003040	Tantalum	TEMSVB2 0J 106M-8 L
C133	4030008680	Ceramic	C1608 JB 1H 472K-T-A
C134	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C135	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C136	4550003100	Tantalum	TEMSVB 1A 106M-12 L
EP1	0910027344	P.C. Board	B 2701D (MAIN)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001480	IC	μ PD78213GC-AB8
IC2	1130003800	IC	MBM27C256A-25-TV- G
IC3	1130004910	IC	TC5584AFL-15 (TP1)
IC4	1130004900	IC	MC74HC373F
IC5	1130004830	IC	TC7SU04F (TE85R)
IC6	1130003610	IC	TC4SU69F (TE85R)
IC7	1130003610	IC	TC4SU69F (TE85R)
IC9	1110001550	IC	S-8054ALB-LM-T1
Q1	1530002060	Transistor	2SC4081 T107 R
Q2	1530002060	Transistor	2SC4081 T107 R
Q5	1590000430	Transistor	DTC144EU T107
Q6	1590000430	Transistor	DTC144EU T107
D1	1750000160	Diode	DA114 T107
D2	1750000160	Diode	DA114 T107
D4	1750000160	Diode	DA114 T107 (#03,#08,#09)
D5	1750000190	Diode	1SS322 (TE85R)
D6	1160000060	Diode	DAN202U T107
D7	1750000190	Diode	1SS322 (TE85R)
D8	1160000060	Diode	DAN202U T107
X1	6050007450	Crystal	RF-4A3 FAM NKD (4.9152M)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R3	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R4	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R5	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R6	7030003780	Resistor	ERJ3GEYJ 684 V (680 kΩ)
R8	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R9	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R10	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R11	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R12	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R13	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R14	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R15	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R16	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R17	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R21	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R22	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R23	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R24	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R25	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R26	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R27	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R28	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R29	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R30	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R31	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R32	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R33	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R34	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
C1	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C2	4550000270	Tantalum	TESVA 1E 474M1-8L
C3	4030007060	Ceramic	C1608 CH 1H 270J-T-A
C4	4030006960	Ceramic	C1608 CH 1H 050C-T-A
C5	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C6	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C7	4550003100	Tantalum	TEMSVB 1A 106M-12 L
C8	4550003100	Tantalum	TEMSVB 1A 106M-12 L
C9	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C10	4550003100	Tantalum	TEMSVB 1A 106M-12 L
C11	4030008660	Ceramic	C1608 JB 1H 102K-T-A
C12	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C13	4550003100	Tantalum	TEMSVB 1A 106M-12 L
C14	4030008650	Ceramic	C1608 JB 1H 471K-T-A
C15	4030008690	Ceramic	C1608 JF 1H 103Z-T-A
C16	4030008690	Ceramic	C1608 JF 1H 103Z-T-A
C18	4030006720	Ceramic	C1608 SL 1H 560J-T-A
C19	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C20	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C29	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C30	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C31	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C32	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C34	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C35	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C36	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C37	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C38	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C40	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
BT1	3020000190	Lithium Battery	CR1220-1FC
EP1	0910030472	P.C. Board	B 2941B (LOGIC)
EP2	0910030491	F.P.C. Board	B 3101A

[FRONT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130004930	IC	μ PD7225GB-3B7
IC2	1130004200	IC	TC4S86F (TE85R)
Q1	1520000200	Transistor	2SB798-T2 DK
Q2	1530002080	Transistor	2SC4081 T107 R
Q3	1590000720	Transistor	DTA144EU T107
Q4	1530002080	Transistor	2SC4081 T107 R
Q5	1510000510	Transistor	2SA1578 T107 R
Q6	1510000510	Transistor	2SA1578 T107 R
Q7	1590000430	Transistor	DTC144EU T107
Q9	1530002080	Transistor	2SC4081 T107 R
Q10	1510000510	Transistor	2SA1578 T107 R
D1	1730000580	Zener	RD3.0M-T2B1
D2	1730000490	Zener	RD6.8M-T2B2
D5	1750000160	Diode	DA114 T107
D6	1750000120	Diode	DWA010-TE
D7	1750000120	Diode	DWA010-TE
R1	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R2	7030003310	Resistor	ERJ3GEYJ 820 V (82 Ω)
R3	7030003310	Resistor	ERJ3GEYJ 820 V (82 Ω)
R4	7010003910	Resistor	R20J 4.7 Ω
R5	7030003710	Resistor	ERJ3GEYJ 184 V (180 kΩ)
R6	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R7	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R8	7030003250	Resistor	ERJ3GEYJ 270 V (27 Ω)
R9	7030003530	Resistor	ERJ3GEYJ 562 V (5.6 kΩ)
R10	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R11	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R12	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R13	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R14	7030003620	Resistor	ERJ3GEYJ 333 V (33 kΩ)
R15	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R16	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R17	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R18	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R21	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R22	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R23	7030003400	Resistor	ERJ3GEYJ 471 V (470 Ω)
R24	7030003450	Resistor	ERJ3GEYJ 122 V (1.2 kΩ)
R25	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R26	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R27	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R28	7510000380	Thermistor	DTN-T203T333LS (T)
R29	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R30	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R32	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R33	7030003260	Resistor	ERJ3GEYJ 330 V (33 Ω)
R34	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R35	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R36	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
C1	4550003030	Tantalum	TEMSVA 0J 475M-8L
C2	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C3	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C4	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C6	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C7	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C8	4030006860	Ceramic	C1608 JF 1C 104Z-T-A
C9	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C11	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C12	4010000480	Ceramic	DD104 B 471K 50V
C13	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C14	4550003030	Tantalum	TEMSVA 0J 475M-8L
C15	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C16	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C17	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C18	4030006710	Ceramic	C1608 SL 1H 470J-T-A

[FRONT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C19	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C20	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C21	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C22	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C23	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C24	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C25	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C26	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C27	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C28	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C29	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C30	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C31	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C32	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C33	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C34	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C35	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C36	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C37	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C38	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C39	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C40	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C41	4010000500	Ceramic	DD104 B 102K 50V
C42	4550003040	Tantalum	TEMSVB2 0J 106M-8 L
DS1	5030000590	LCD	LD-B5093J (E-5208)
DS2	5080000200	LED	HRS-3060A-G40
DS3	5080000200	LED	HRS-3060A-G40
DS4	5040000980	LED	SLM-13YW T97
DS5	5040000980	LED	SLM-13YW T97
DS6	5040000980	LED	SLM-13YW T97
DS7	5040000980	LED	SLM-13YW T97
MC1	7700000480	Microphone	KUC2023-01-006
SP1	2510000450	Speaker	EAS-3P123D
EP2	8930012750	LCD contact strip	SRCN-575
EP1	0910027005	P.C. Board	B 2717E (FRONT)
EP4	0910027442	F.P.C. Board	B 2773B

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R2	7210001440	Variable Resistor	RK097111101NA (10KA) [VOL]
R3	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
R4	7310002840	Trimmer	RV-160 (RH03 A3A16J)105
R5	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R6	7310002720	Trimmer	RV-148 (RH03 A3AS3X0DA)472
R7	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R8	7030003520	Resistor	ERJ3GEYJ 472 V (4.7 kΩ)
C1	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C2	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C3	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C4	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C5	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C6	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C7	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C9	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C11	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C12	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C13	4030006850	Ceramic	C1608 JB 1H 471K-T-A
DS1	5040001040	LED	TLR224 [TX]
S1	2230000840	Switch	EVQ-QBW 06T [S]
EP1	0910027284	P.C. Board	B 2710D (VR)

[TONE UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140000640	IC	SC1084 (#01,#02,#04,#05, #06,#07,#10,#11,#12)
	1140000840	IC	SC1093 (#03,#08,#09)
IC2	1140000620	IC	FX102LG
IC3	1110002150	IC	BA10324F-T1
IC4	1130000830	IC	μ PD4094BG-T1
IC5	1130004230	IC	LC7366M
Q1	1510000510	Transistor	2SA1576 T107 R
Q2	1590000430	Transistor	DTC144EU T107
Q3	1590000430	Transistor	DTC144EU T107
Q4	1590000430	Transistor	DTC144EU T107
D1	1750000130	Diode	DA204U T107
X1	6050003450	Crystal	RF-4A3 FAG NKD (4.480000M)
X2	6060000150	Crystal	CSAC3.58MGC300CD
L1	6200000780	Coil	LQH 3N 100K
L2	6200000780	Coil	LQH 3N 100K
L3	6200000780	Coil	LQH 3N 100K
L4	6200000780	Coil	LQH 3N 100K
R1	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R2	7030003580	Resistor	ERJ3GEYJ 153 V (15 kΩ)
R3	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R4	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)

[TONE UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R5	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R6	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R8	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R9	7030003240	Resistor	ERJ3GEYJ 220 V (22 Ω)
R10	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R11	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R12	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R13	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R14	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R15	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R16	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R17	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R19	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R20	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R21	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R22	7030003480	Resistor	ERJ3GEYJ 222 V (2.2 kΩ)
R23	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R24	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R25	7030003390	Resistor	ERJ3GEYJ 391 V (390 Ω)
R26	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
R27	7030003660	Resistor	ERJ3GEYJ 683 V (68 kΩ)
R28	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R29	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R30	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003200	Resistor	ERJ3GEYJ 100 V (10 Ω)
R32	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R33	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R34	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R37	7030003580	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R38	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
C1	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C6	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C7	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C10	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C11	4550000420	Tantalum	TESVA 1A 105M1-8L
C12	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C13	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C14	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C15	4030006830	Ceramic	C1608 SL 1H 331J-T-A
C16	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C18	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C19	4030006760	Ceramic	C1608 SL 1H 121J-T-A
C20	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C21	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C22	4550000420	Tantalum	TESVA 1A 105M1-8L
C23	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C25	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C26	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C27	4550003040	Tantalum	TEMSVB2 0J 106M-8 L
C28	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C29	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C31	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C32	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C33	4030007010	Ceramic	C1608 CH 1H 100D-T-A
C34	4030007030	Ceramic	C1608 CH 1H 150J-T-A
C36	4030007030	Ceramic	C1608 CH 1H 150J-T-A
C37	4030007030	Ceramic	C1608 CH 1H 150J-T-A
C38	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C39	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C40	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C42	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C43	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C44	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C45	4030006830	Ceramic	C1608 JF 1C 104Z-T-A
C46	4550003030	Tantalum	TEMSVA 0J 475M-8L
C47	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C48	4030006860	Ceramic	C1608 JB 1H 102K-T-A
EP1	0910029063	P.C. Board	B 2940C (TONE)

SECTION 6 ADJUSTMENT PROCEDURES

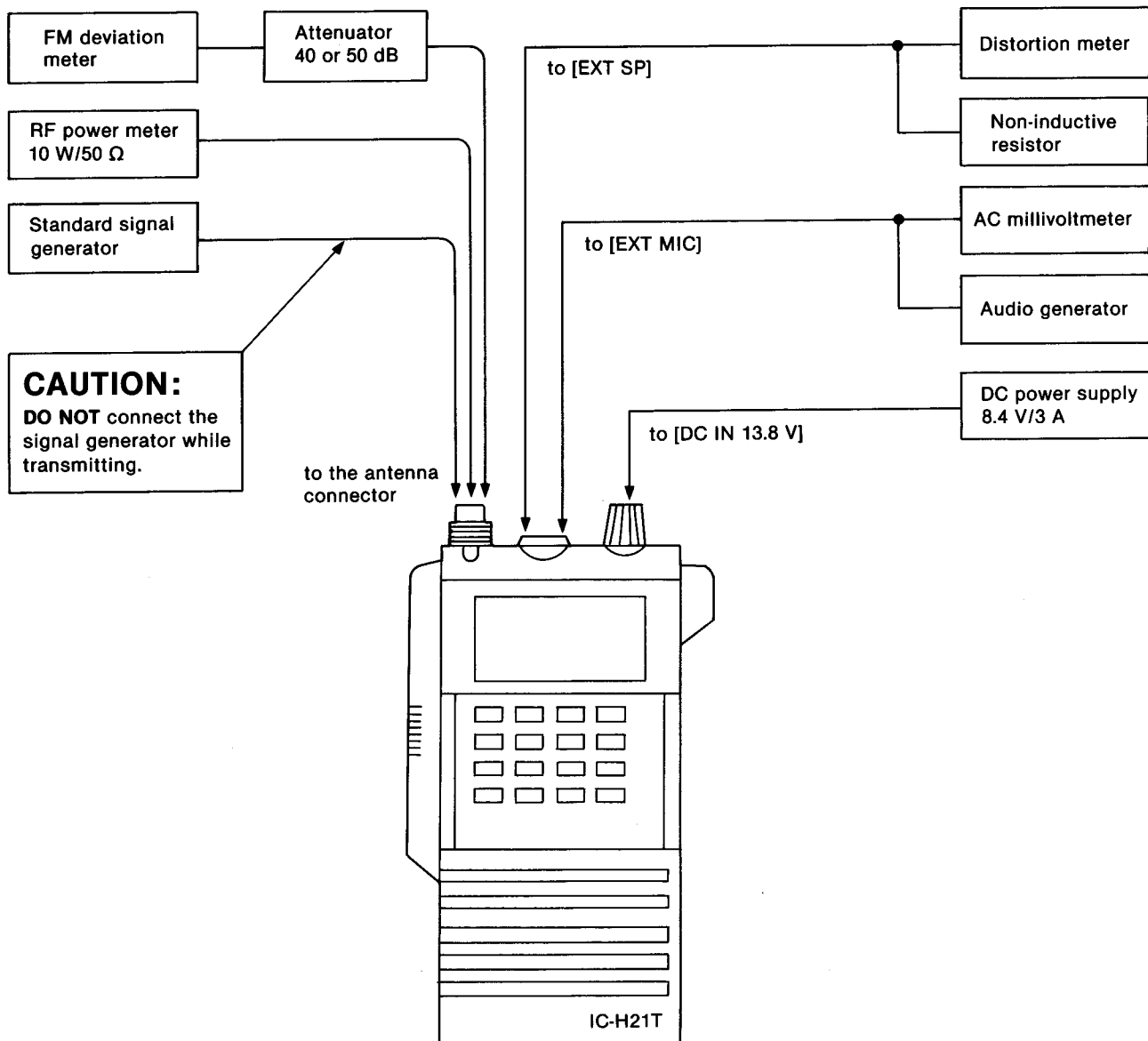
6-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 8.4 V DC Current capacity : 3 A or more	Audio generator	Frequency range : 300~3000 Hz Output level : 1~200 mV
RF power meter (terminated type)	Measuring range : 1~10 W Frequency range : 120~180 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Attenuator	Power attenuation : 30 or 40 dB Capacity : 10 W or more
Frequency counter	Frequency range : 0.1~180 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	AC millivoltmeter	Measuring range : 2~200 mV
		Non-inductive resistor	Impedance : 8 Ω
Distortion meter	Frequency range : 1 kHz ± 10 Hz Measuring range : 1~100 %	DC voltmeter	Input impedance : 50 kΩ/DC or better
		FM deviation meter	Frequency minimum : 480 MHz Measuring range : 0~±5 kHz
Standard signal generator (SSG)	Frequency range : 0.1~180 MHz Output level : -127~-17 dBm (0.1 μV~32 mV)	Digital multimeter or oscilloscope	Input impedance : 1 MΩ/DC or better

CW: clockwise CCW: counterclockwise CP: check point

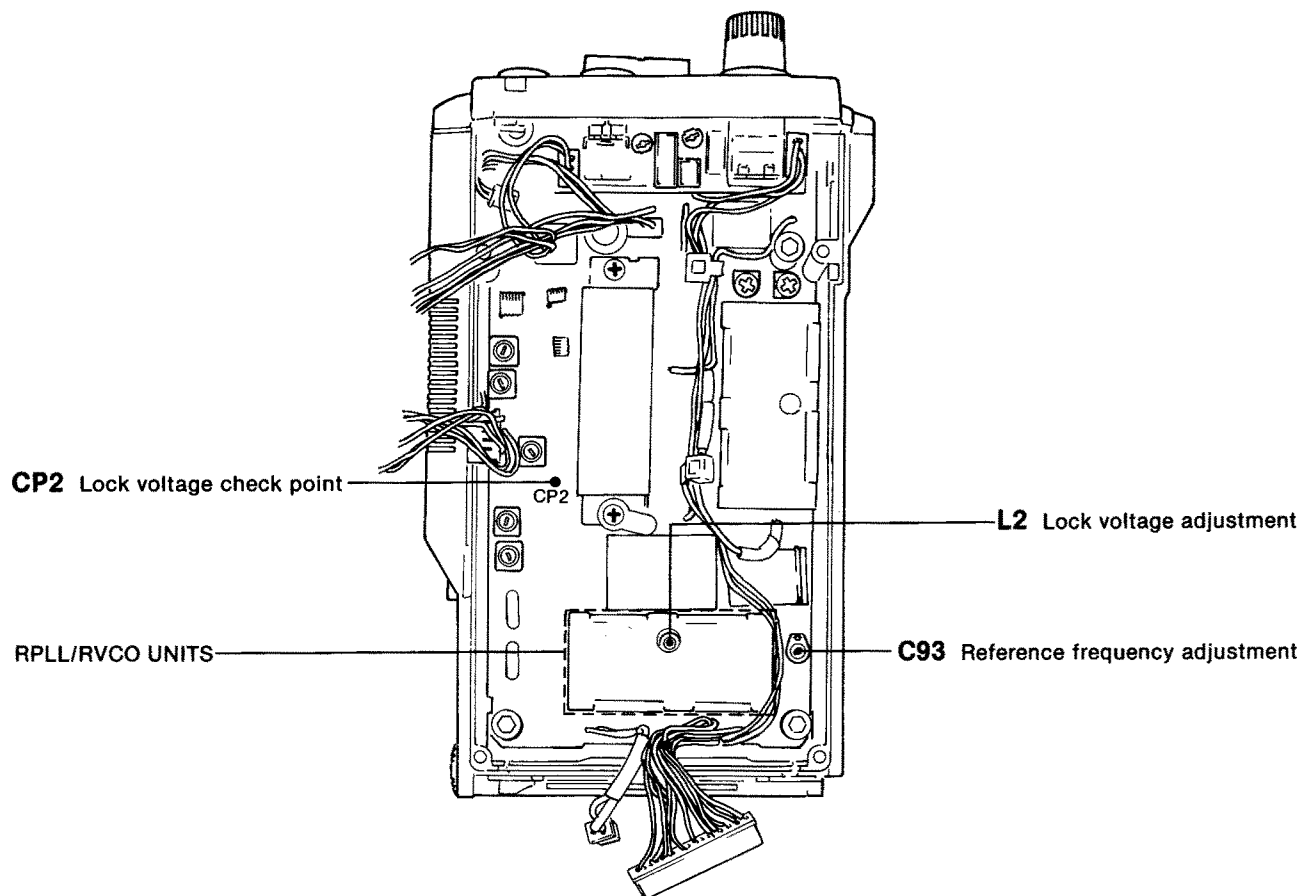
■ CONNECTION



6-2 PLL ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1 <ul style="list-style-type: none"> • Select any channel. • Connect the RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting 	Top panel	Loosely couple the frequency counter to the antenna connector.	Same frequency as the programmed one. To check the programmed frequency, use the EX-704.	RF	C93
LOCK VOLTAGE	NOTE: Lock voltage affects the C/N ratio. If you adjust the lock voltage, set the frequency with the EX-704.					
	1 <ul style="list-style-type: none"> • Operating frequency: 135.0000 MHz • Receiving 	RF	Connect the digital multimeter or oscilloscope to CP2.	3.0 V	R-VCO	L2

• RF UNIT

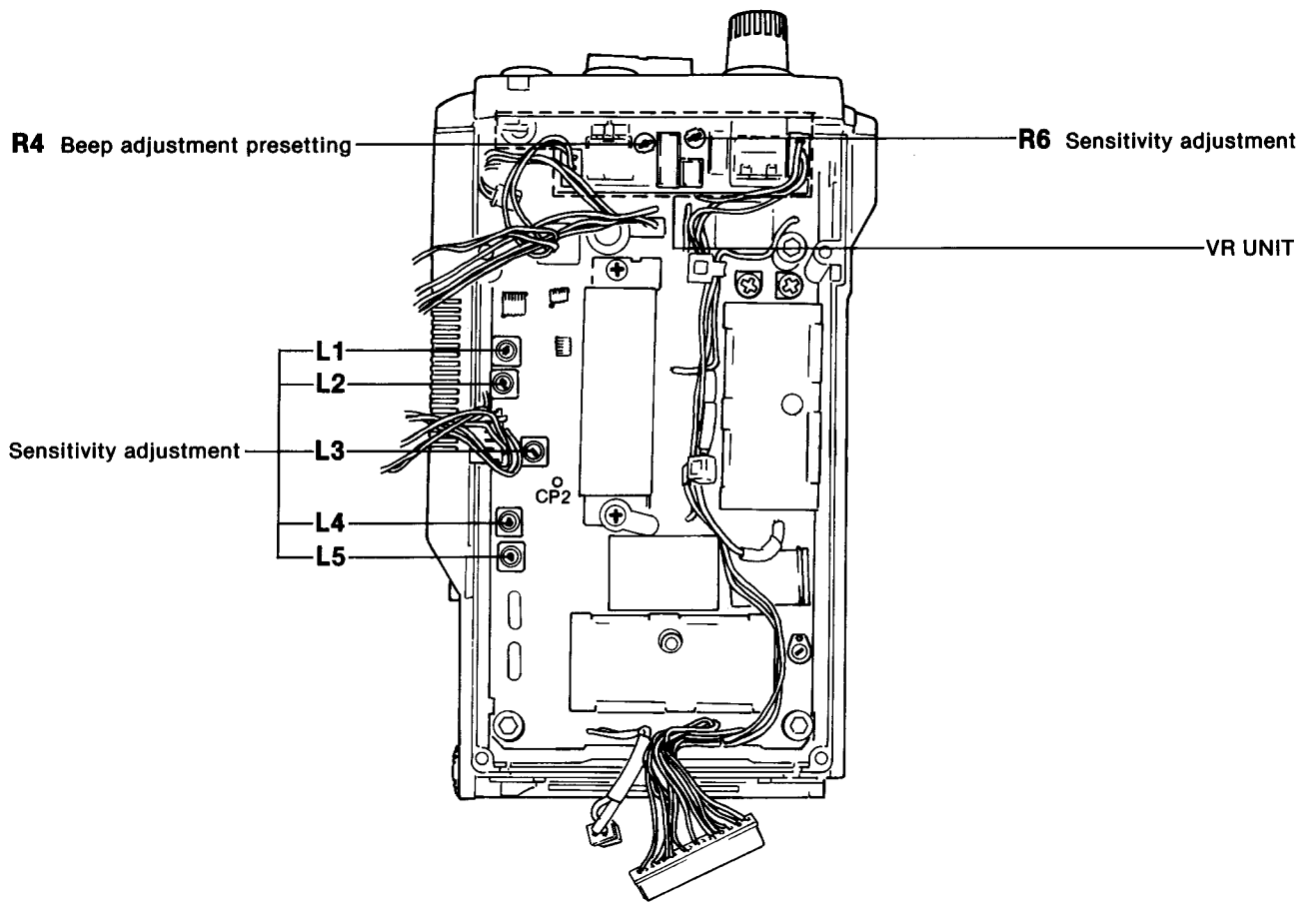


6-3 RECEIVER ADJUSTMENT

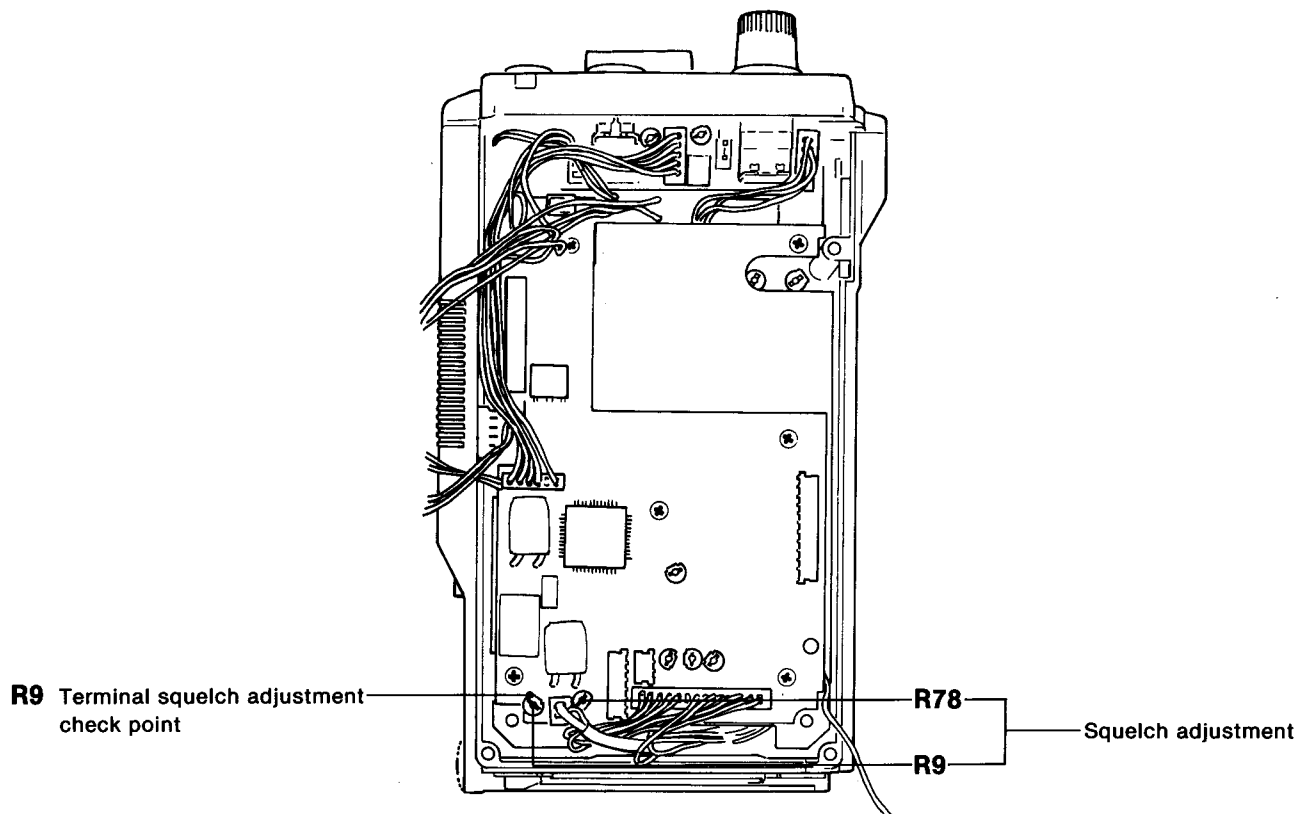
ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
SENSITIVITY	<p>NOTE: When the sensitivity is less than 0.35 μV (12 dB SINAD) on every channel, the following sensitivity adjustment is not necessary. Skip to squelch adjustment below.</p> <p>This transceiver automatically transmits an answer back code when a 5-tone code is received. Be careful when connecting the SSG to the antenna connector.</p>						
	1	<ul style="list-style-type: none"> Operating frequency: Center of the frequency range. Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Level : 0.35 μV^* (-116 dBm) Modulation: 1 kHz Deviation : ± 3.0 kHz (#02, #04, #06, #09) ± 2.4 kHz (#10) ± 1.5 kHz (All other versions) Receiving 	Top panel	Connect the distortion meter to the [EXT SP] jack with an 8 Ω load.	Minimum distortion level	RF	Adjust in sequence L5, L1, L2, L3, L4
SQUELCH	1	<ul style="list-style-type: none"> Select any channel. Apply no signal to the antenna connector. Receiving 	MAIN	Connect the DC voltmeter to R9 terminal.	1.2 V	MAIN	R9
	2	<ul style="list-style-type: none"> Connect the SSG to the antenna connector and set as: <ul style="list-style-type: none"> Level : 0.18 μV^* (-122 dBm) Modulation: 1 kHz Deviation : ± 3.0 kHz (#02, #04, #06, #09) ± 2.4 kHz (#10) ± 1.5 kHz (All other versions) 	Front panel	Speaker	Squelch just opens.		R78
BEEP	1	<ul style="list-style-type: none"> Select any channel. [VOL] control: Center R4 (VR): CW Receiving 	Front panel	Speaker	Verify that the level of the beep sound is adjustable.	Front panel	[VOL] control

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

• RF AND VR UNITS



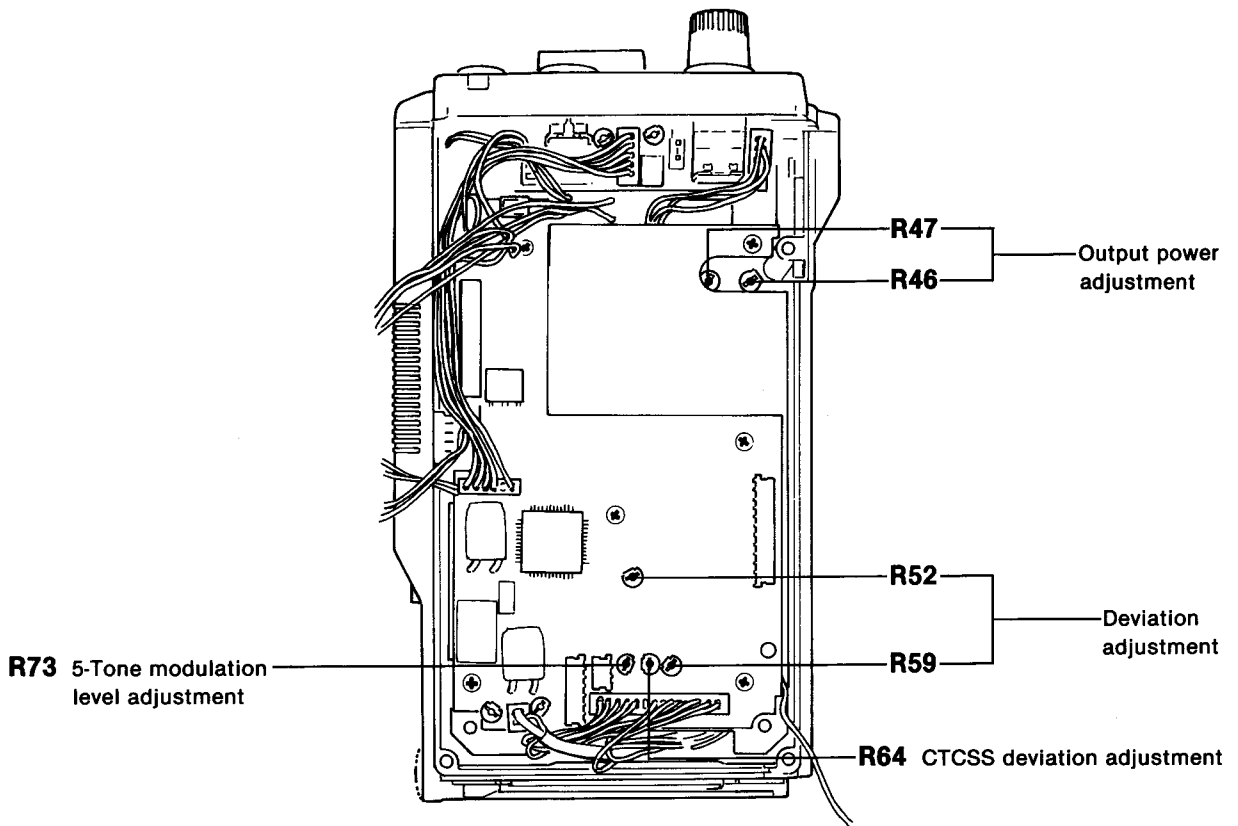
• MAIN UNIT



6-4 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	<ul style="list-style-type: none"> Select any channel. Output power: HIGH Transmitting 	Top panel	Connect the RF power meter to the antenna connector.	2.0 W	RF	R47
	2	<ul style="list-style-type: none"> Output power: LOW (if programmed) 			800 mV		R46
DEVIATION	1	<ul style="list-style-type: none"> Select any channel. Connect the audio generator to the microphone connector with an AC millivoltmeter and set as: Level : 170 mV Modulation : 1.0 kHz Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 Transmitting 	Top panel	Connect the FM deviation meter to the antenna connector via the attenuator.	± 4.2 kHz (#02, #04, #06, #09) ± 3.4 kHz (#10) ± 2.1 kHz (All other versions)	MAIN	R59
	2	<ul style="list-style-type: none"> Set the FM deviation meter as: Detector : P and -P 			Symmetrical deviation level		R52
CTCSS DEVIATION	1	<ul style="list-style-type: none"> Select a tone encoder programmed channel (67 Hz). Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 Apply no signal to the [MIC] connector. Transmitting 	Top panel	Connect the FM deviation meter to the antenna connector via the attenuator.	± 0.75 kHz (#02, #04, #06, #09) ± 0.5 kHz (#10) ± 0.3 kHz (All other versions)	MAIN	R64
5-TONE DEVIATION	1	<ul style="list-style-type: none"> Select a 5-tone programmed channel. (The long-tone programmed channel is easy to adjust.) Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 Apply no signal to the [MIC] connector. [CALL] switch: ON Transmitting 	Top panel	Connect the FM deviation meter to the antenna connector via the attenuator.	± 4.8 kHz (#02, #04, #06, #09) ± 3.8 kHz (#10) ± 2.1 kHz (All other versions)	MAIN	R73

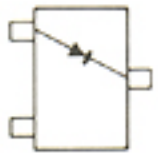
• RF AND MAIN UNITS



7-2 FRONT UNIT

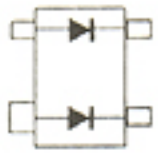
The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.

DA114
(Symbol: AV)



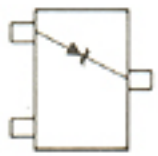
D5

DWA010
(Symbol: W8)



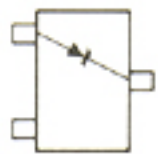
D6, D7

RD3.0M-T2B1
(Symbol: 301)

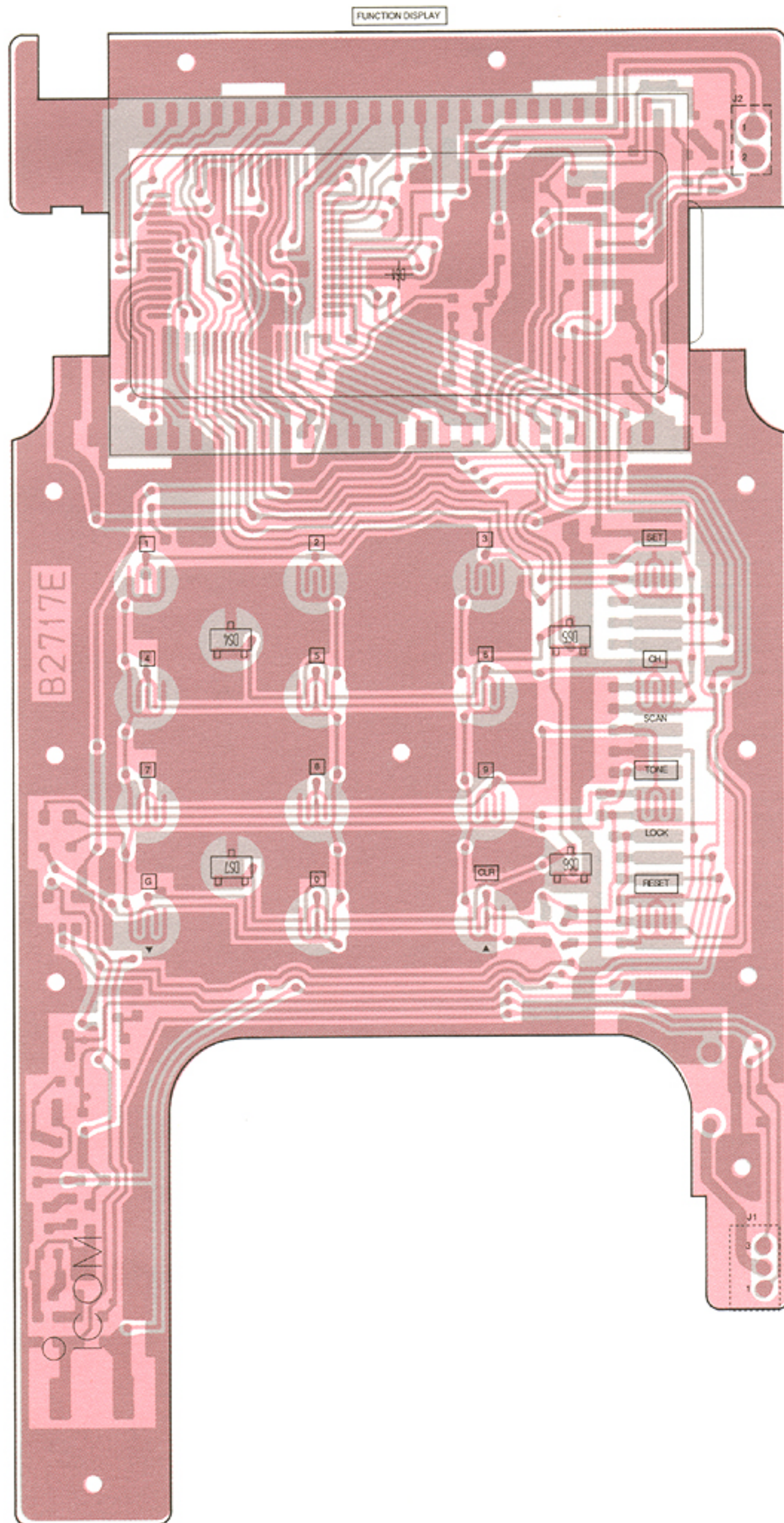


D1

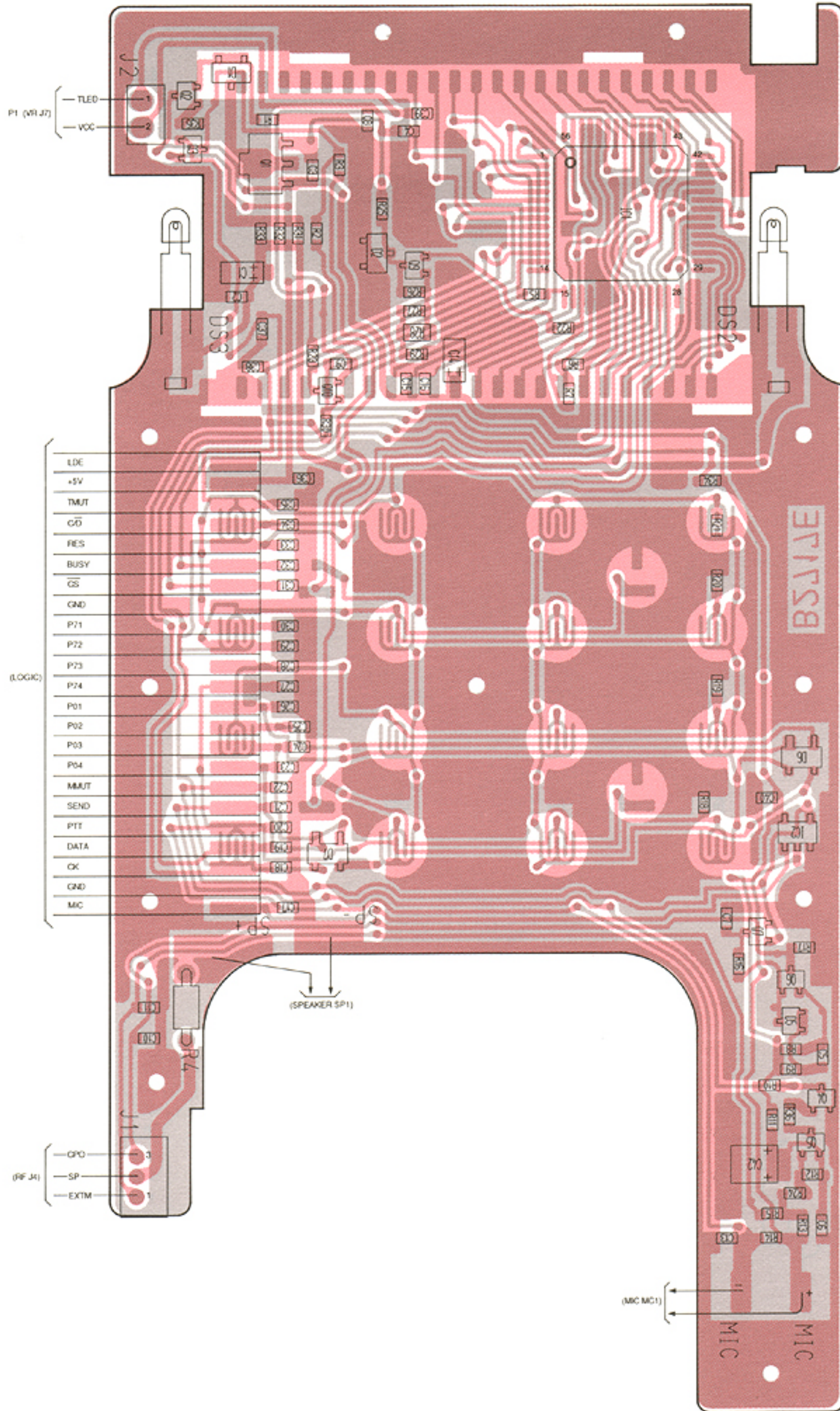
RD6.8M B2
(Symbol: 682)



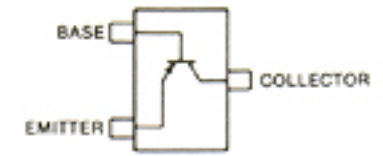
D2



• FRONT UNIT



2SA1576 R
(Symbol: FR)



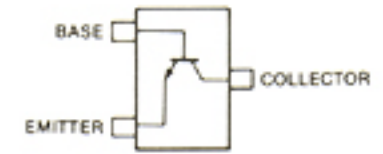
Q5, Q6, Q10

2SB798 DK
(Symbol: DK)



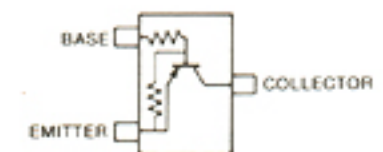
Q1

2SC4081 R
(Symbol: BR)



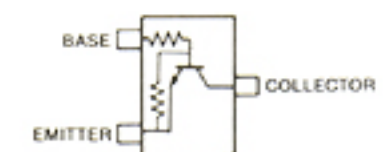
Q2, Q4, Q9

DTA144EU
(Symbol: 16)



Q3

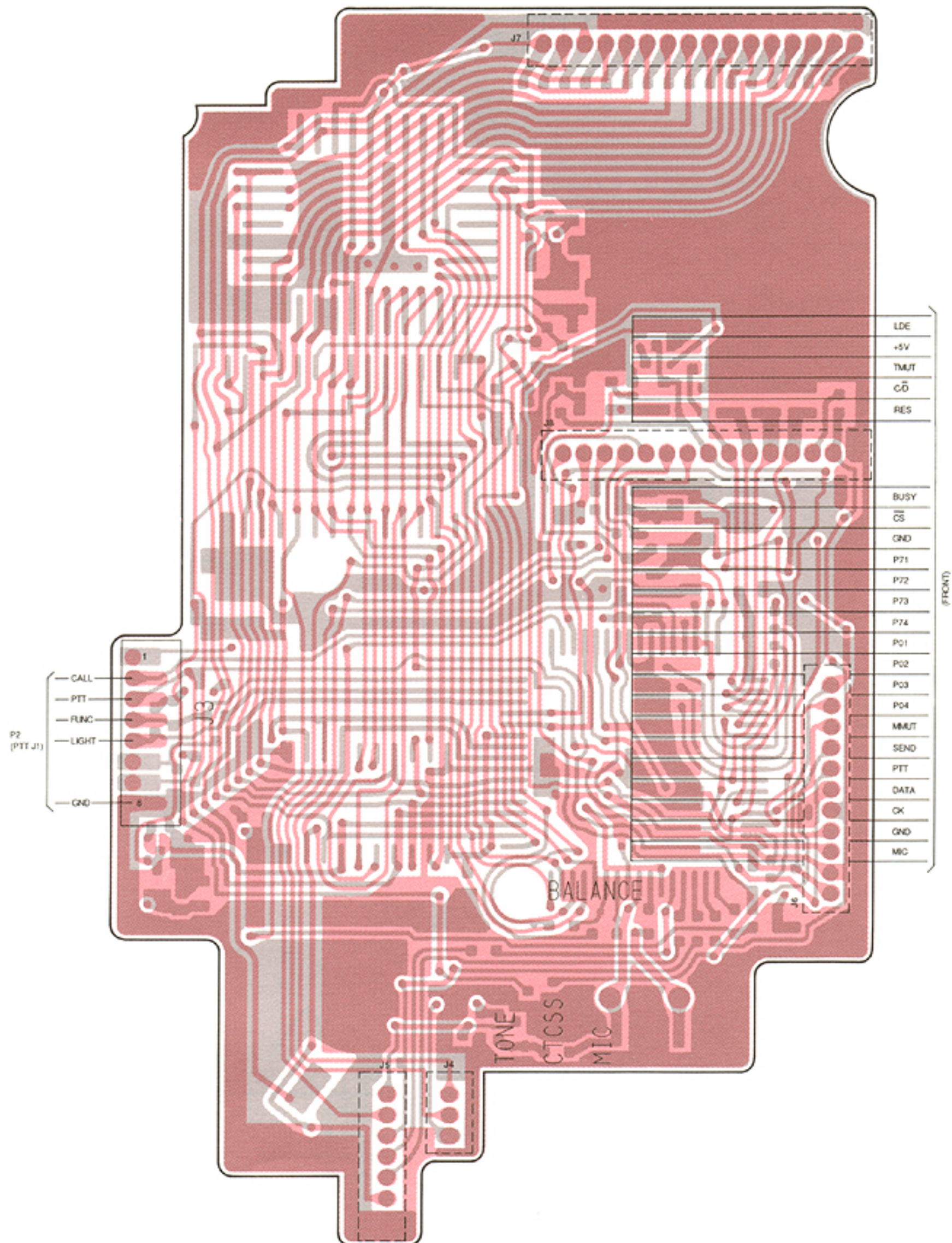
DTC144EU
(Symbol: 26)



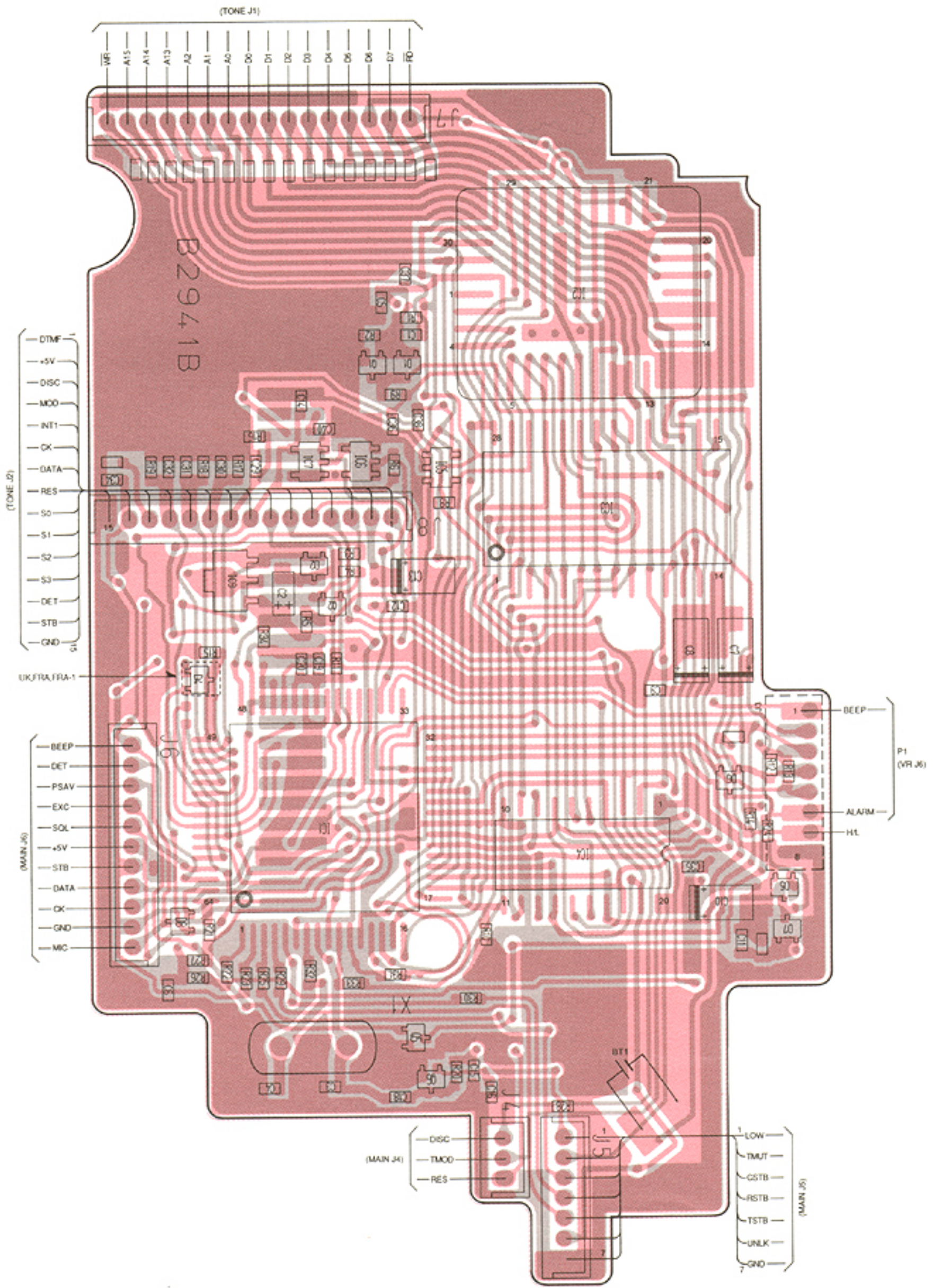
Q7

7-3 LOGIC UNIT

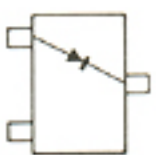
The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.



• LOGIC UNIT

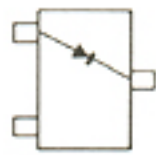


1SS322
(Symbol: A9)



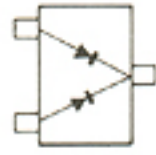
D5, D7

DA114
(Symbol: AV)



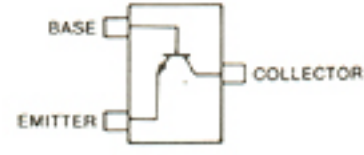
D1, D2
D4 (UK, FRA, FRA-1)

DAN202U
(Symbol: N)



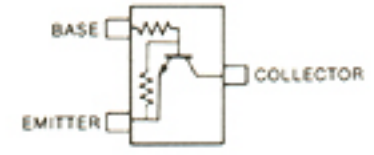
D6, D8

2SC4081 R
(Symbol: BR)



Q1, Q2

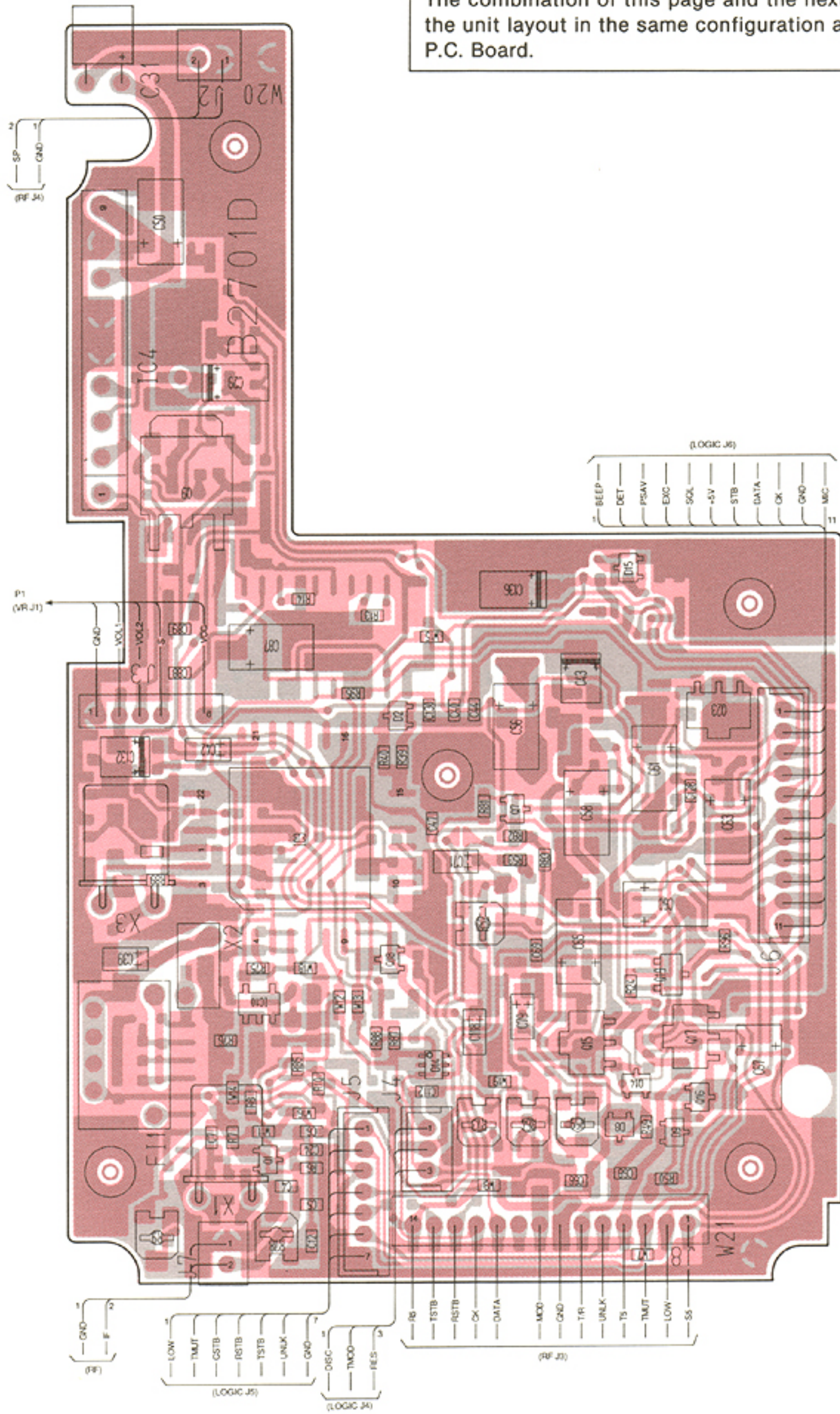
DTC144EU
(Symbol: 26)



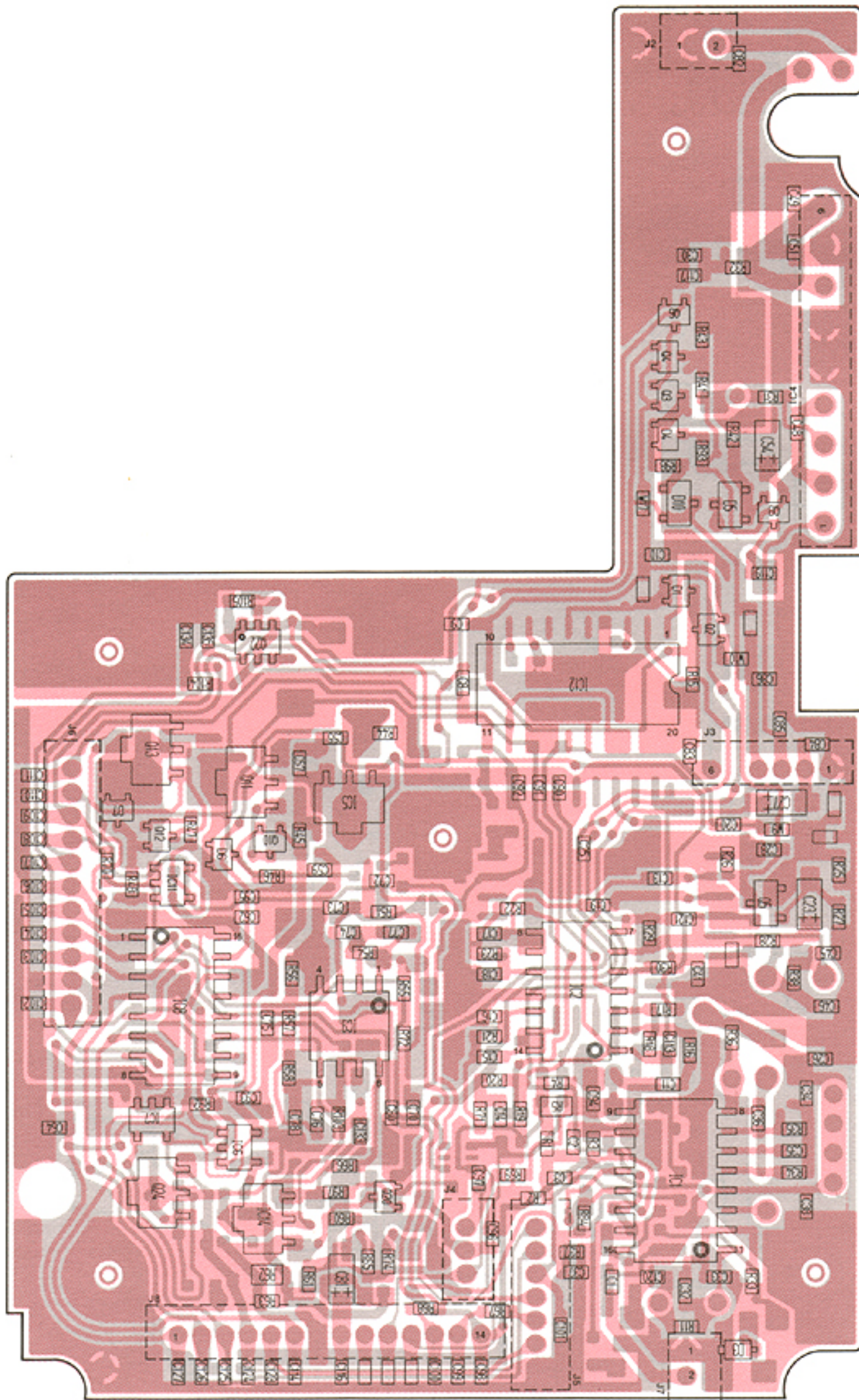
Q5, Q6

7-4 MAIN UNIT

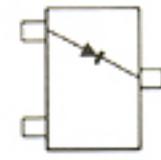
The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.



• MAIN UNIT

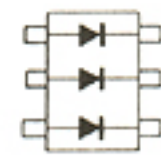


DA114
(Symbol: AV)



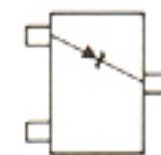
D1, D2, D4, D6
D7, D8, D9
D10, D15

MA1S121
(Symbol: M2D)



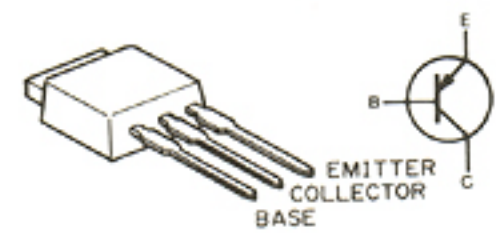
D14

RD4.3M-T2B2
(Symbol: 432)



D5

2SB1182 Q



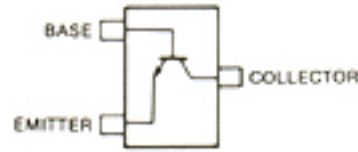
Q9

2SB798 DK
(Symbol: DK)



Q11, Q13, Q15
Q17, Q23, Q24

2SC4081 R
(Symbol: BR)



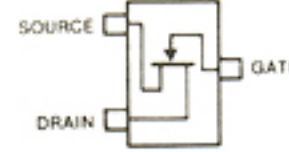
Q1, Q7, Q8, Q10, Q12
Q14, Q16, Q20

2SJ106 Y
(Symbol: VY)



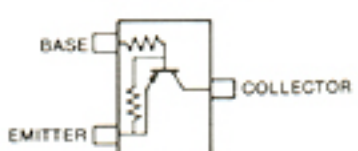
Q5

2SK209 GR
(Symbol: XG)



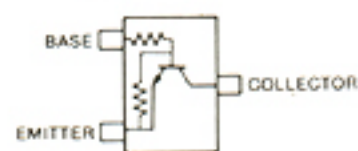
Q19

DTA114EU
(Symbol: 16)



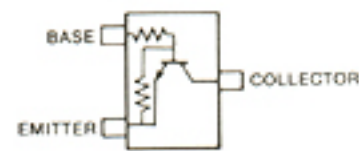
Q2, Q3, Q4

DTC143ZU
(Symbol: 123)



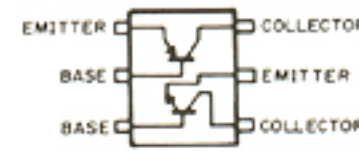
Q6

DTC144EU
(Symbol: 26)



Q18

IMZ2
(Symbol: Z2)

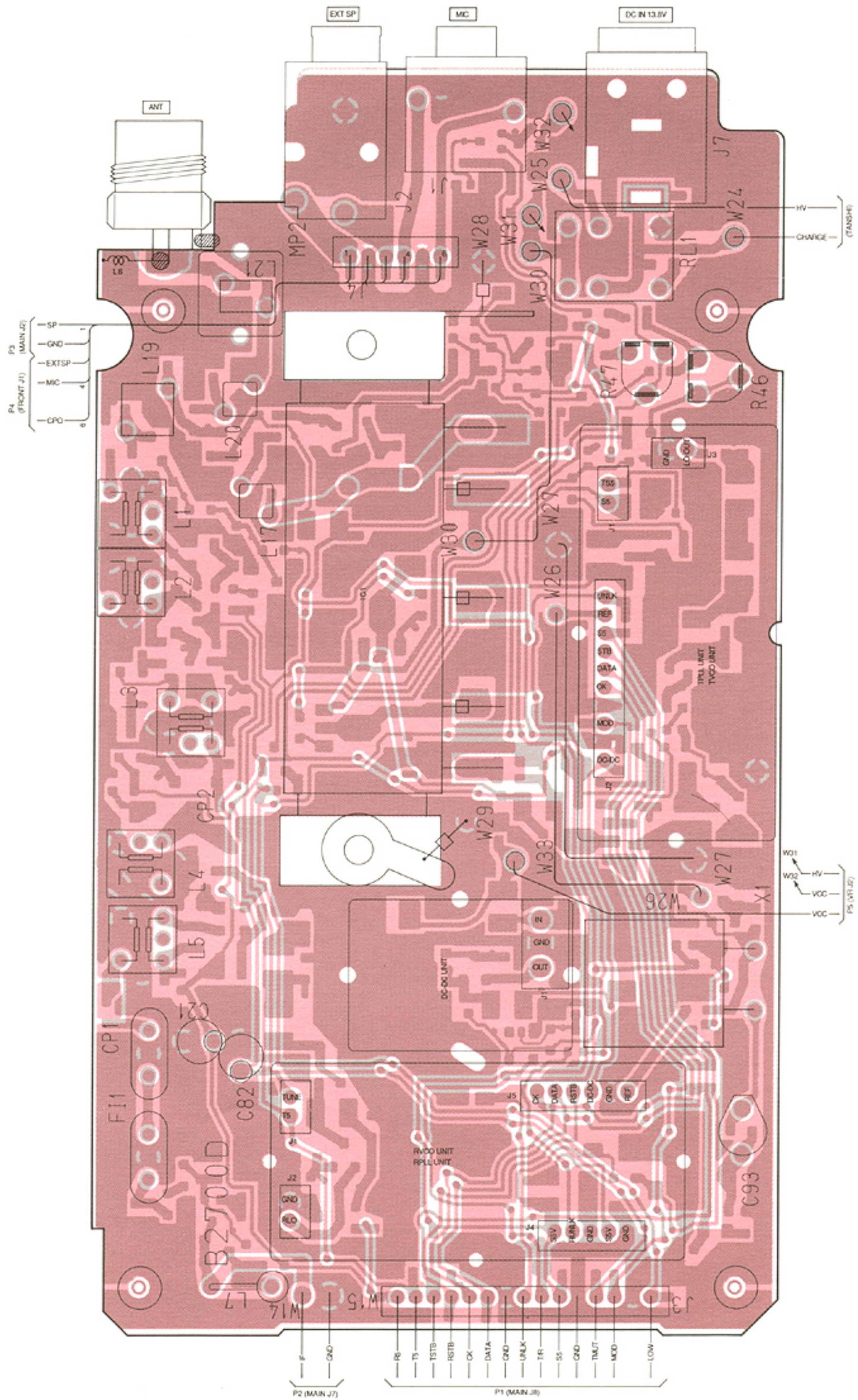


Q22

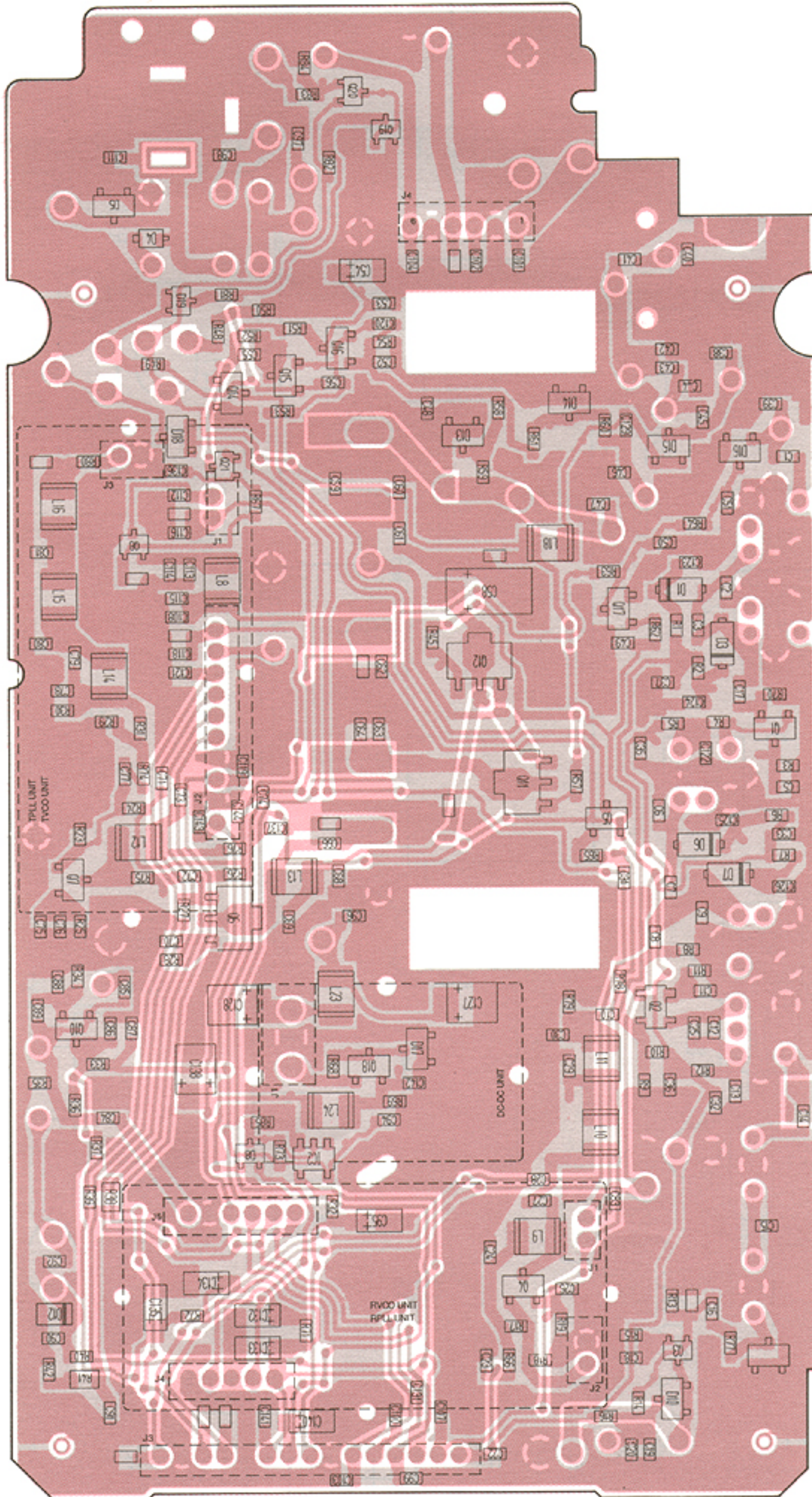
7-5 RF UNIT (1)

• RF UNIT

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

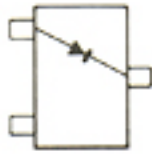


• RF UNIT



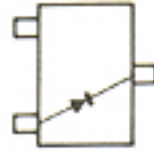
• RF UNIT

1SS153
(Symbol: A9)



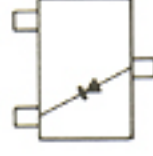
D15, D16

1SS154
(Symbol: BA)



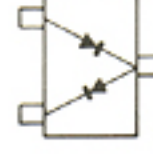
D13, D14

1SS190
(Symbol: E3)



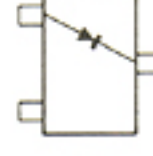
D18

1SS226
(Symbol: C3)



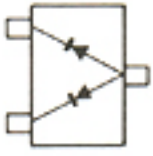
D10

DA114
(Symbol: AV)



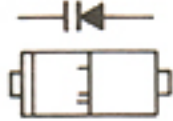
D19

DAP202U
(Symbol: P)



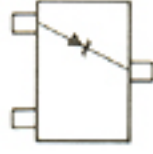
D8

MA334B



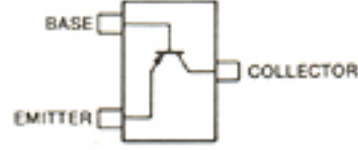
D1, D3, D6, D7

RD20M-T2B1
(Symbol: 201)



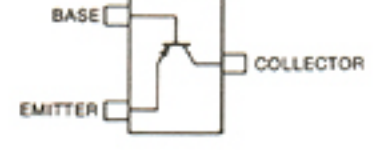
D5, D17

2SA1162 GR
(Symbol: SG)



Q5, Q15, Q16

2SA1576 R
(Symbol: FR)



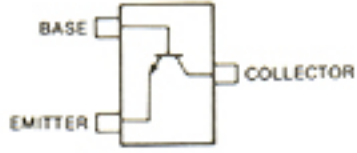
Q8, Q20

2SB798 DK
(Symbol: DK)



Q11, Q12

2SC2712 BL
(Symbol: LL)
2SC2712 GR
(Symbol: LG)



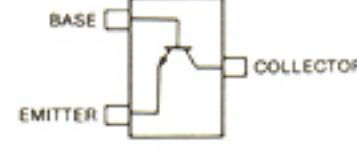
2SC2712 BL: Q10, Q17
2SC2712 GR: Q14

2SC2954
(Symbol: QK)



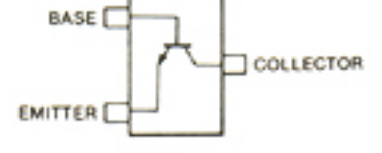
Q6

2SC3585
(Symbol: R42)



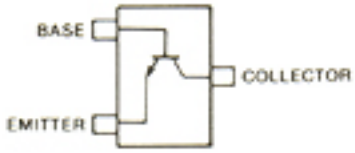
Q7

2SC3772 3
(Symbol: LY3)



Q4

2SC4215-O
(Symbol: QO)



Q3

2SK209 Y
(Symbol: XY)



Q18

2SK302 GR
(Symbol: TG)



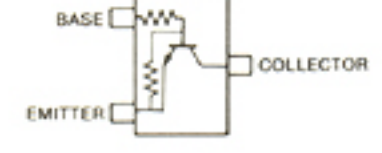
Q1

3SK151 Y
(Symbol: UH)



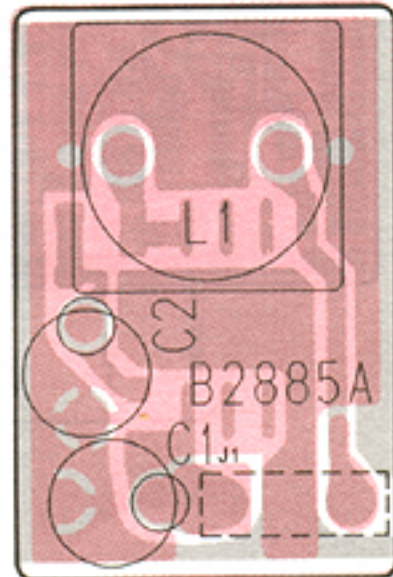
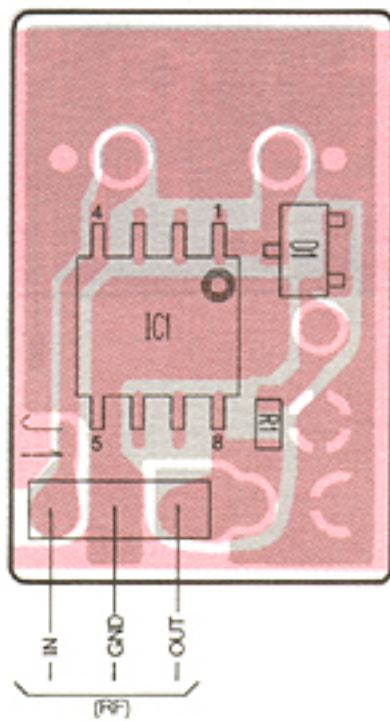
Q2

DTC114EU
(Symbol: 24)

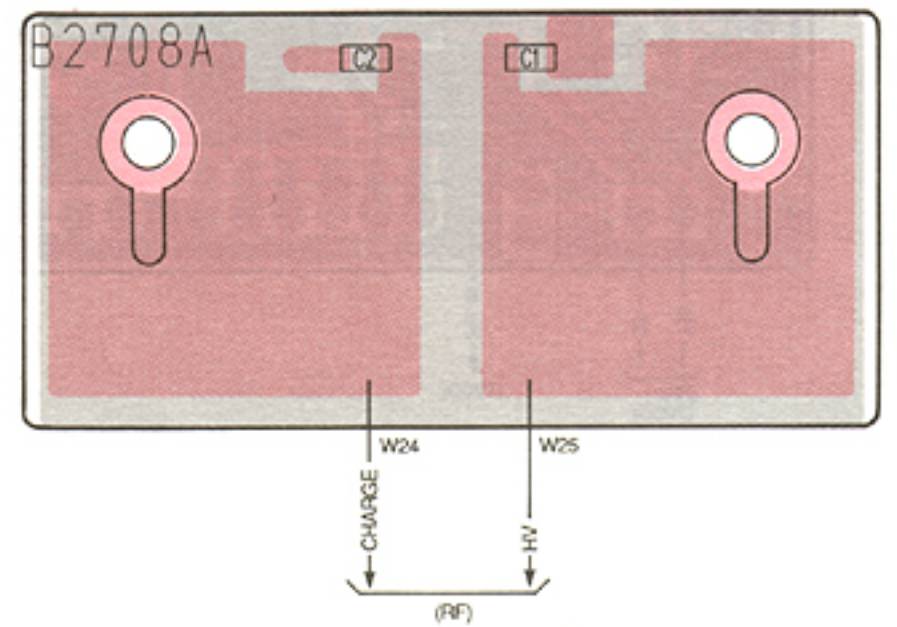


Q19, Q21

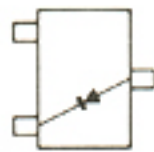
• DC-DC UNIT



• TANSHI UNIT



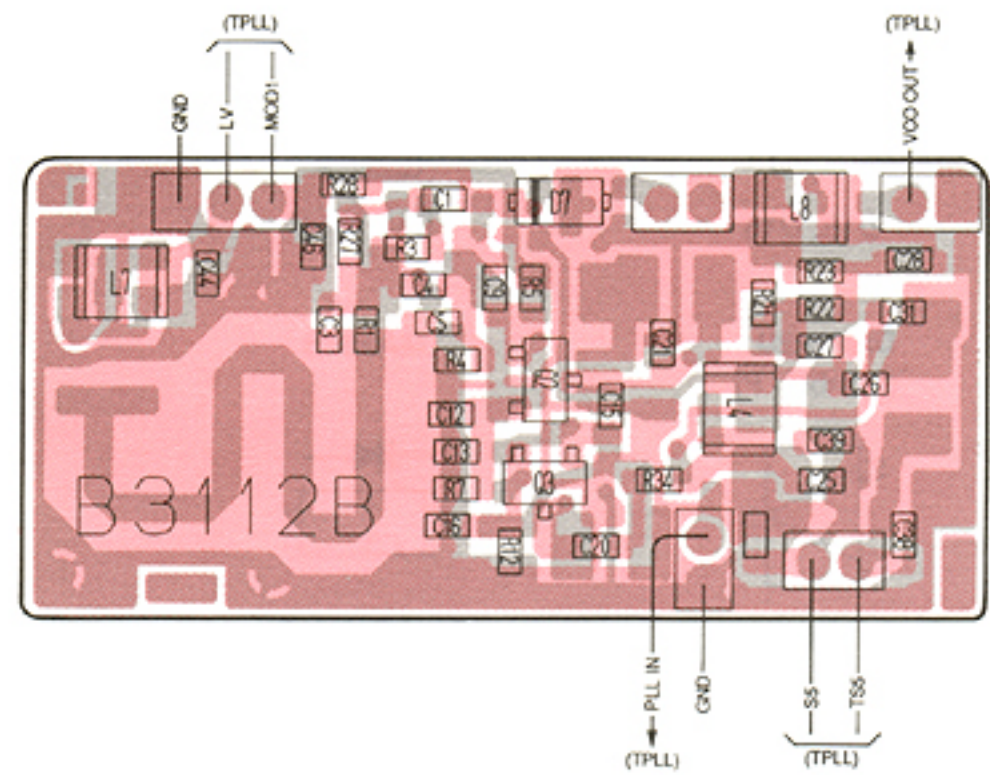
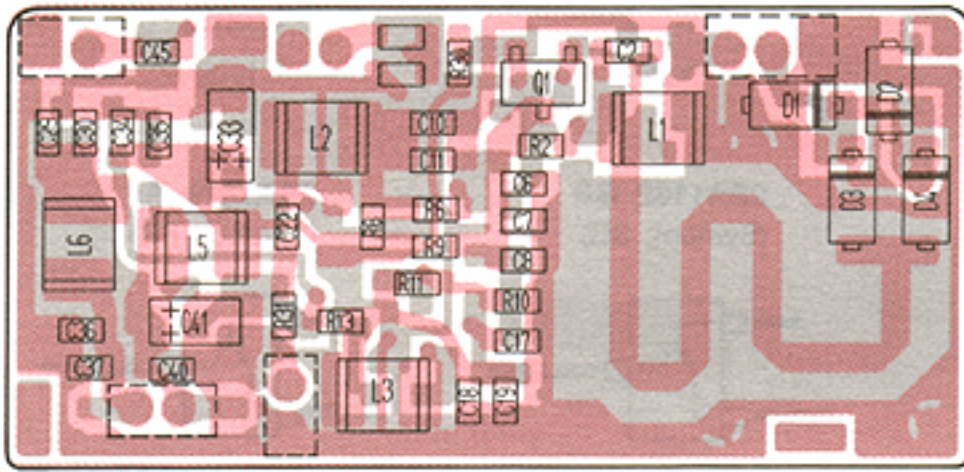
1SS190
(Symbol: E3)



D1

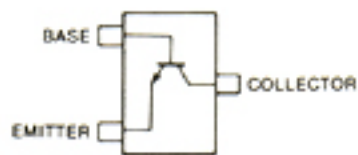
7-6 RF UNIT (2)

• TVCO UNIT



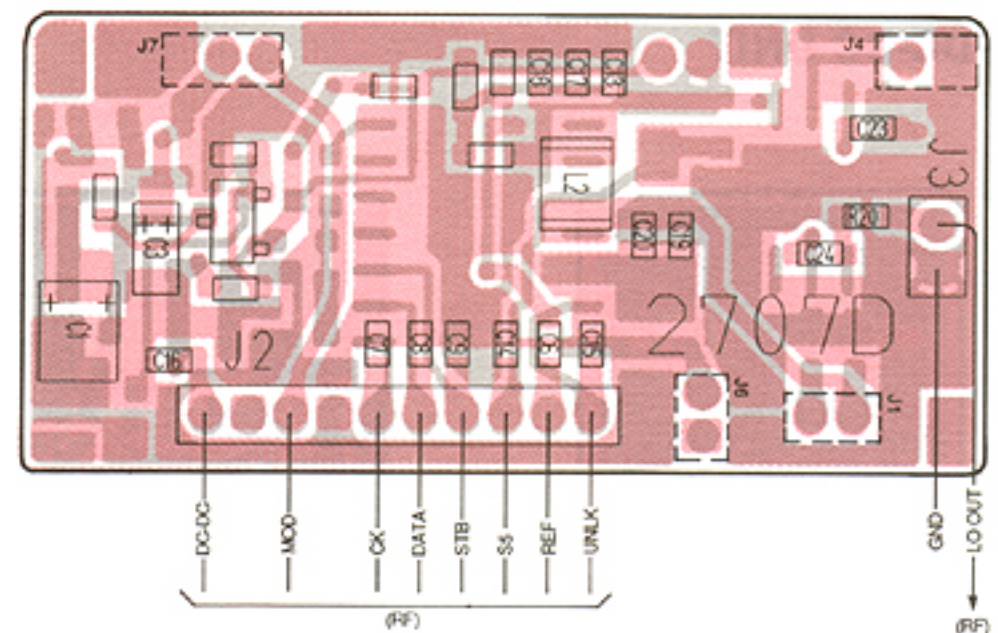
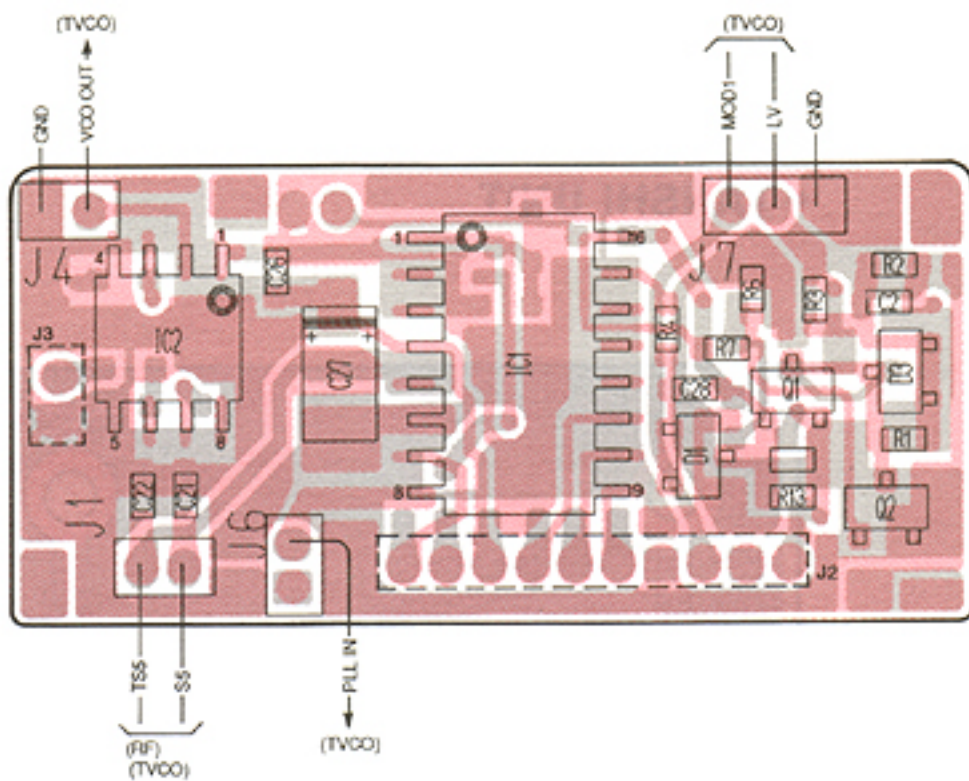
2SC3585

(Symbol: R42)

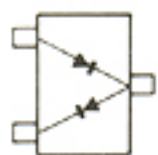


Q1, Q2, Q3

• TPLL UNIT

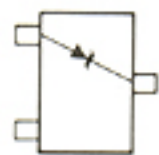


1SS226
(Symbol: C3)



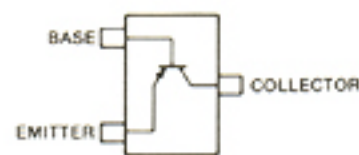
D3

RD16M-T2B3
(Symbol: 163)



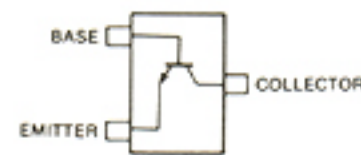
D1

2SA1037K R
(Symbol: FR)



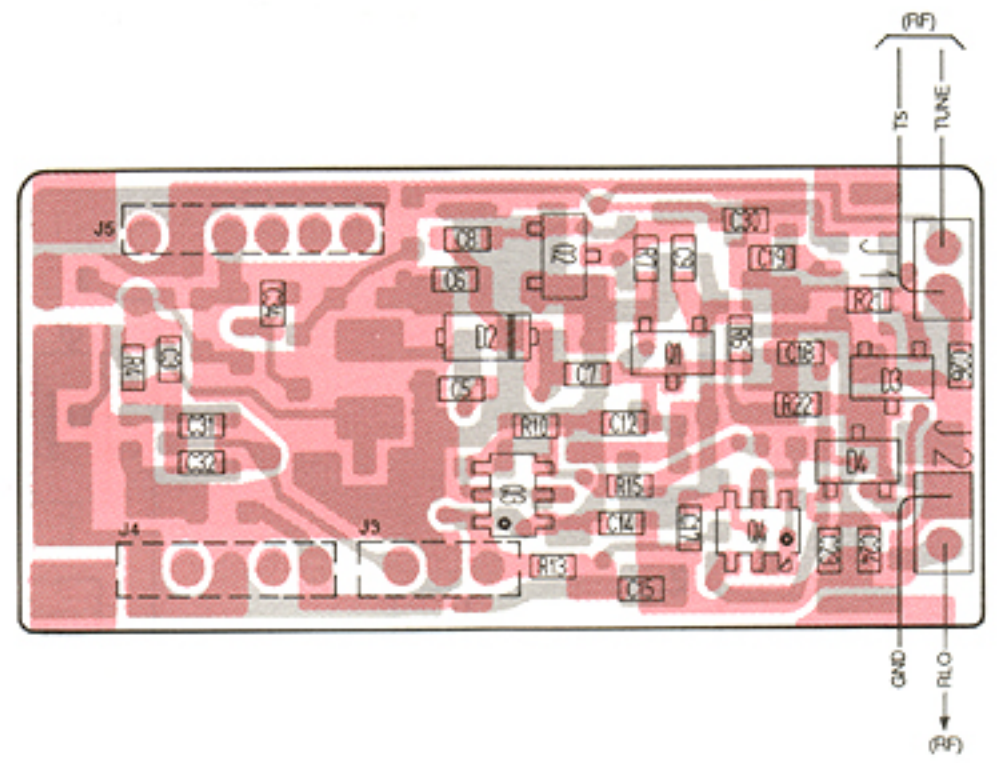
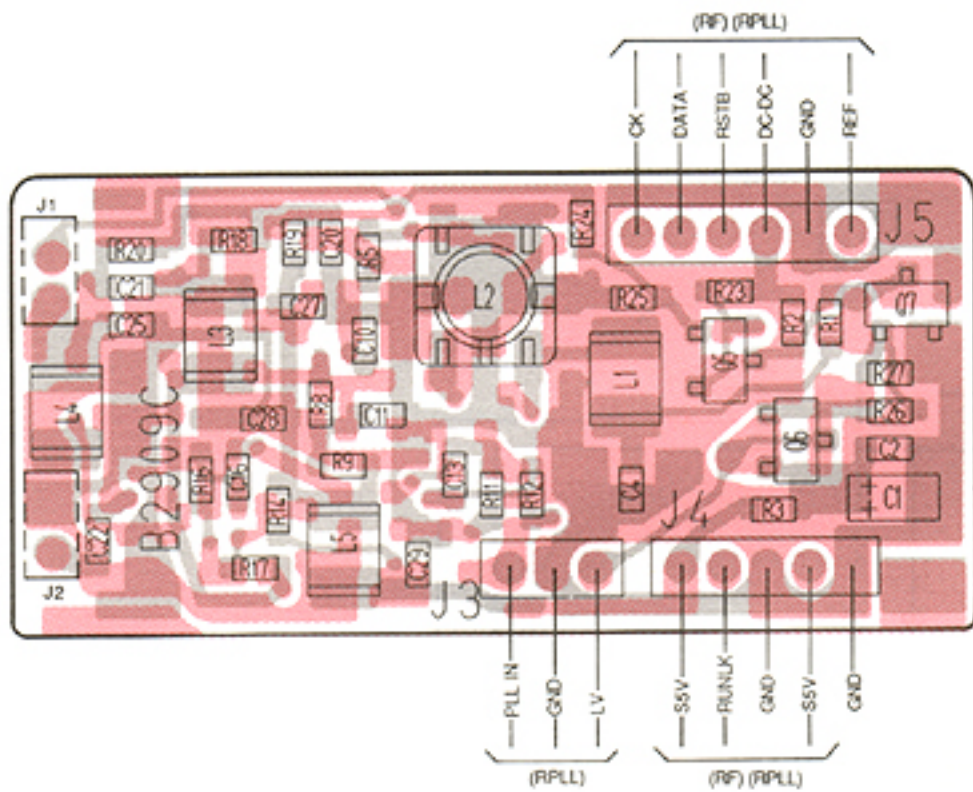
Q1

2SC2412K R
(Symbol: BR)



Q2

• RVCO UNIT

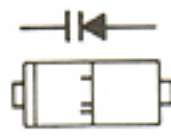


1SV128
(Symbol: BB)



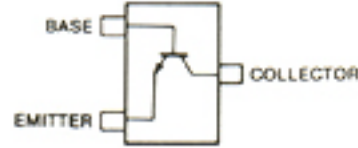
D3, D4

MA334B



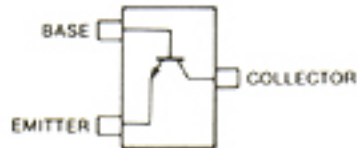
D2

2SC2712 GR
(Symbol: LG)



Q7

2SC3356 R25
(Symbol: R25)



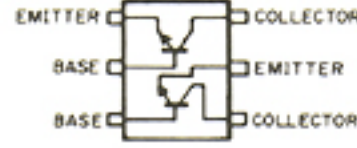
Q1, Q2

2SK209 Y
(Symbol: XY)



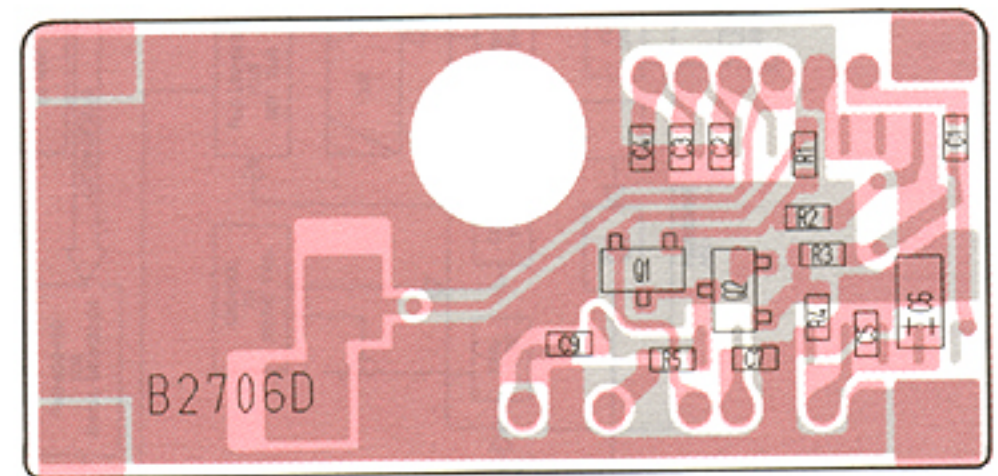
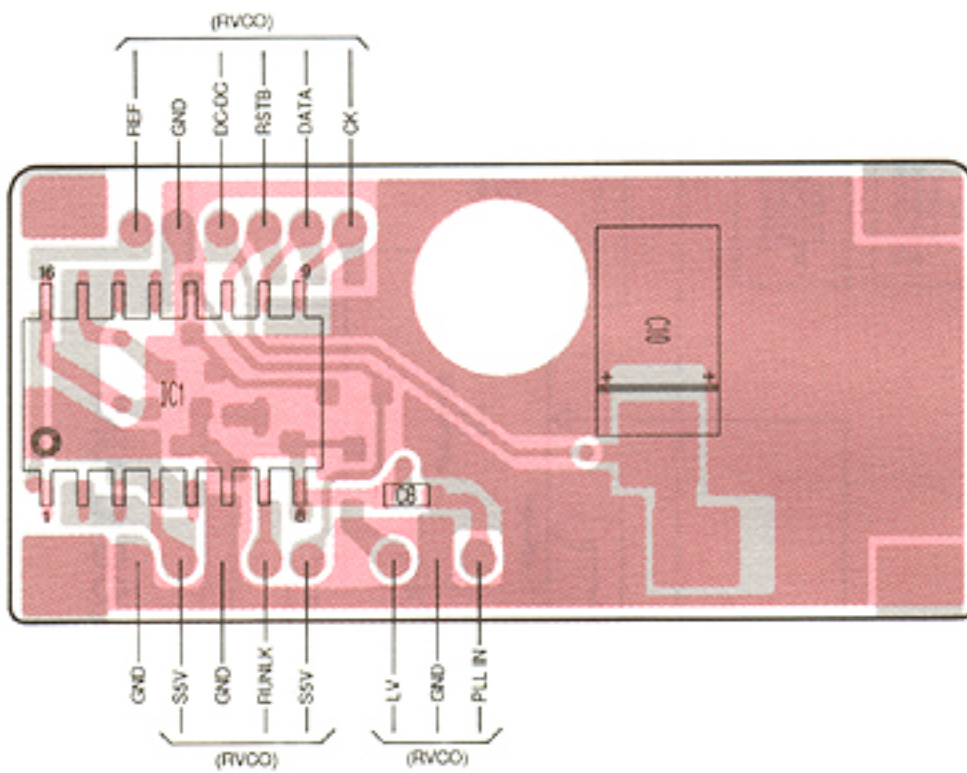
Q5, Q6

IMX5
(Symbol: X5)

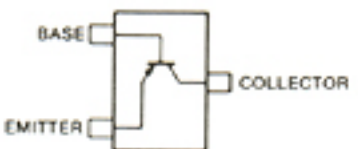


Q3, Q4

• RPLL UNIT

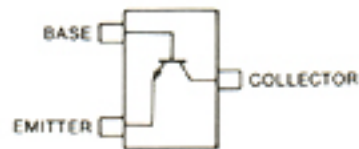


2SA1037K R
(Symbol: FR)



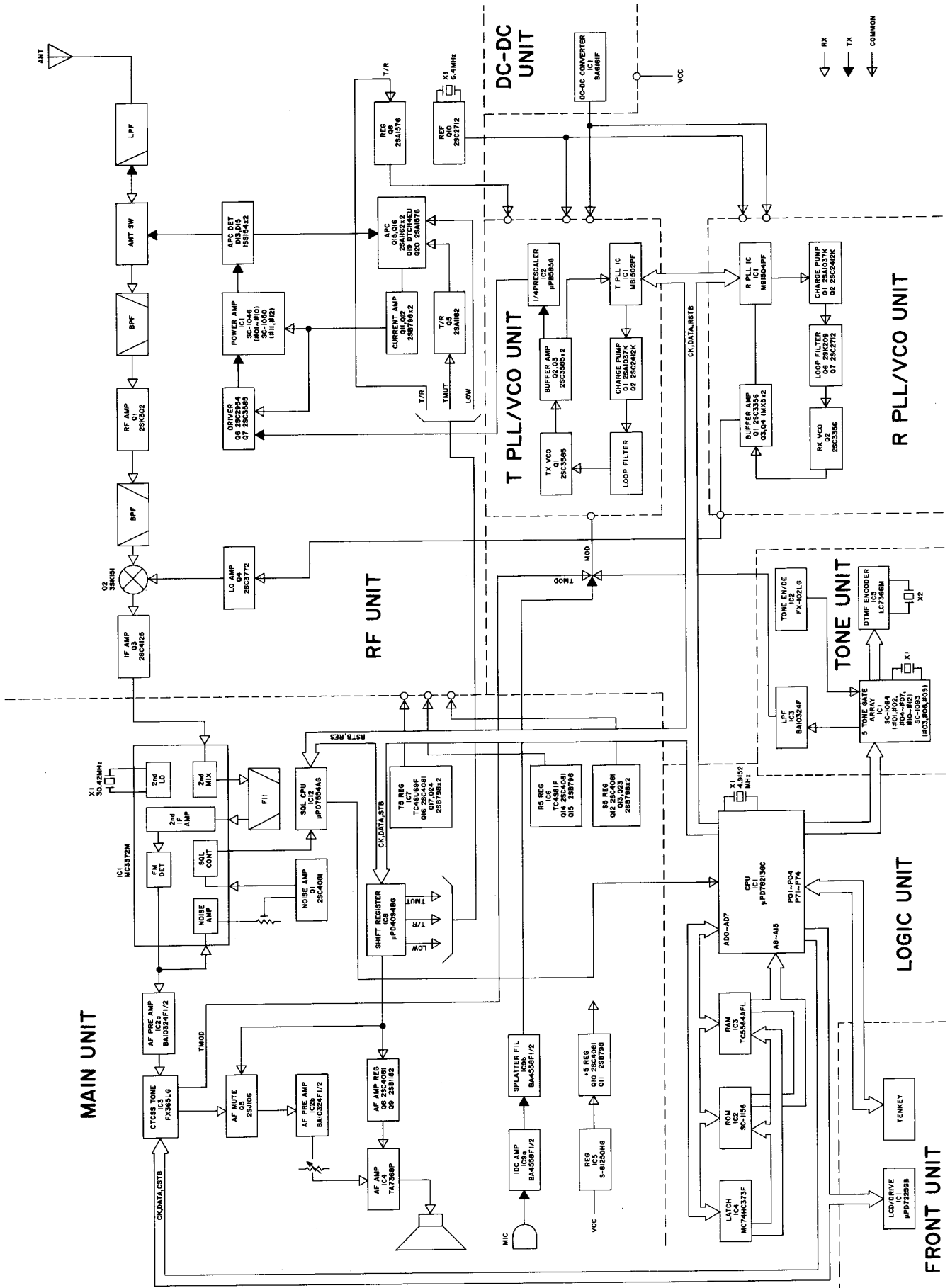
Q1

2SC2412K R
(Symbol: BR)

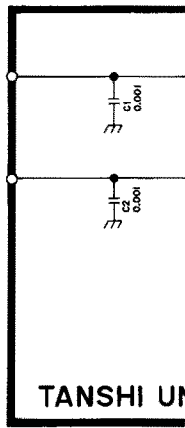
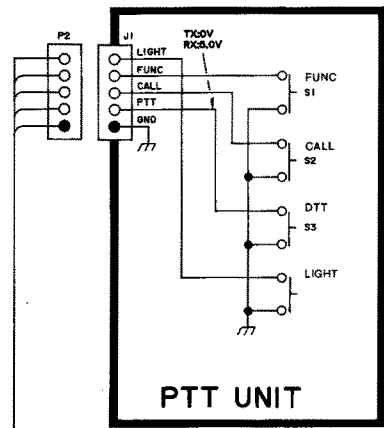
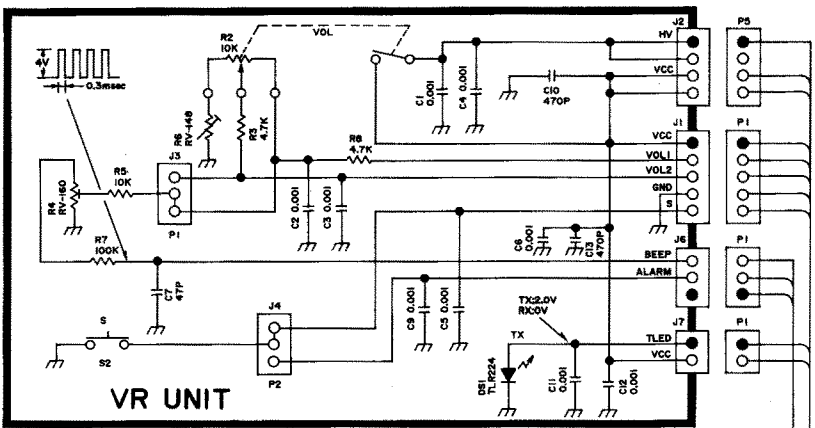
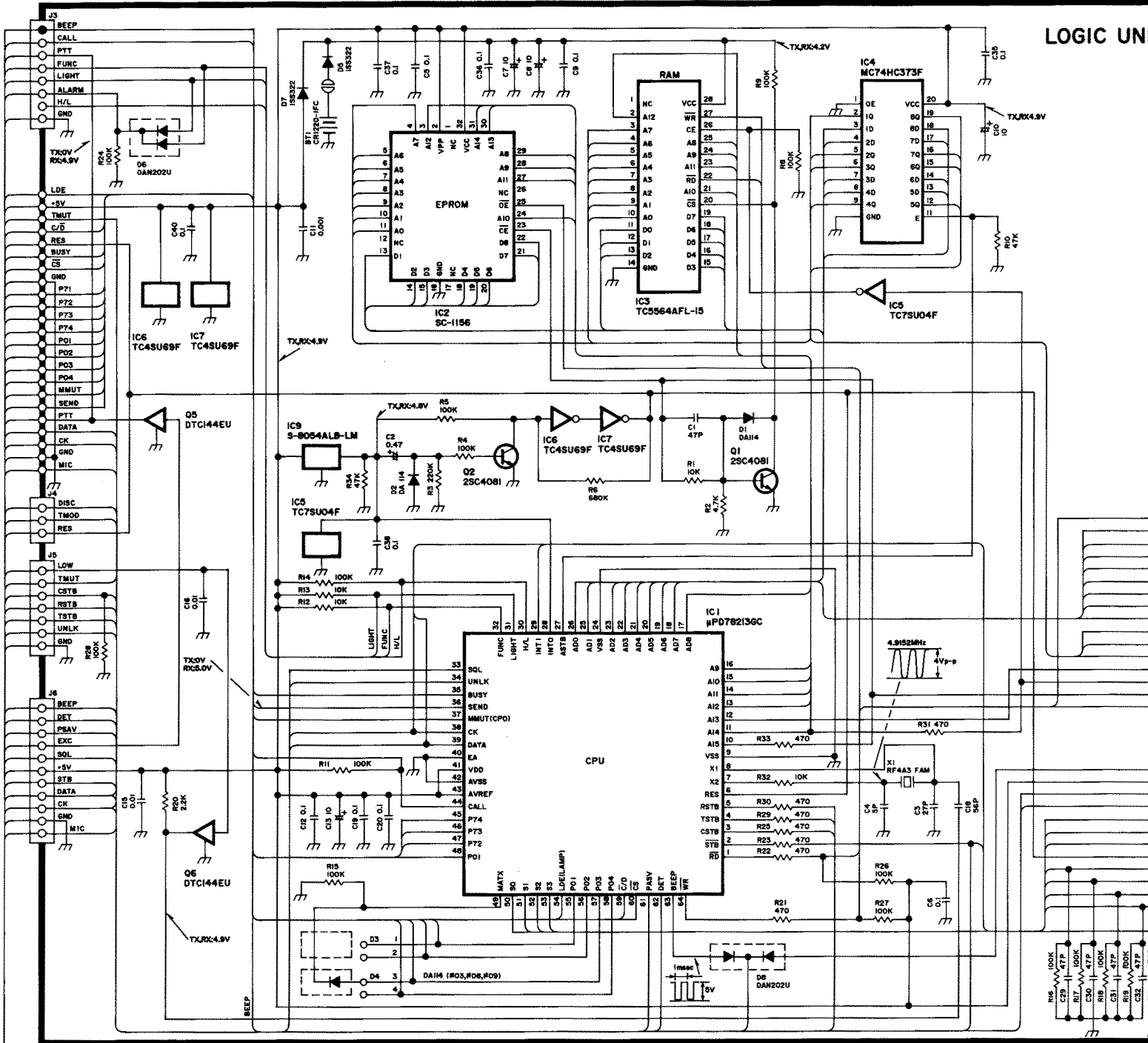


Q2

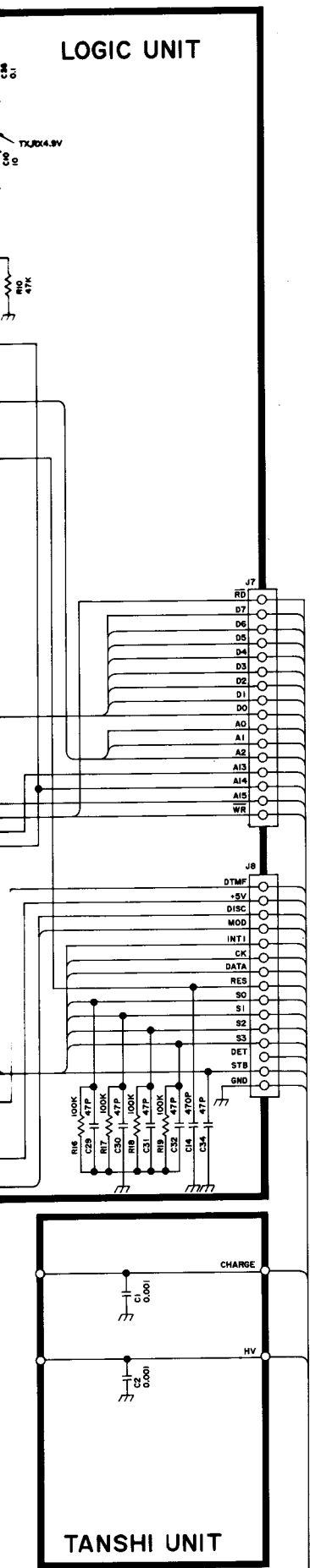
SECTION 8 BLOCK DIAGRAM



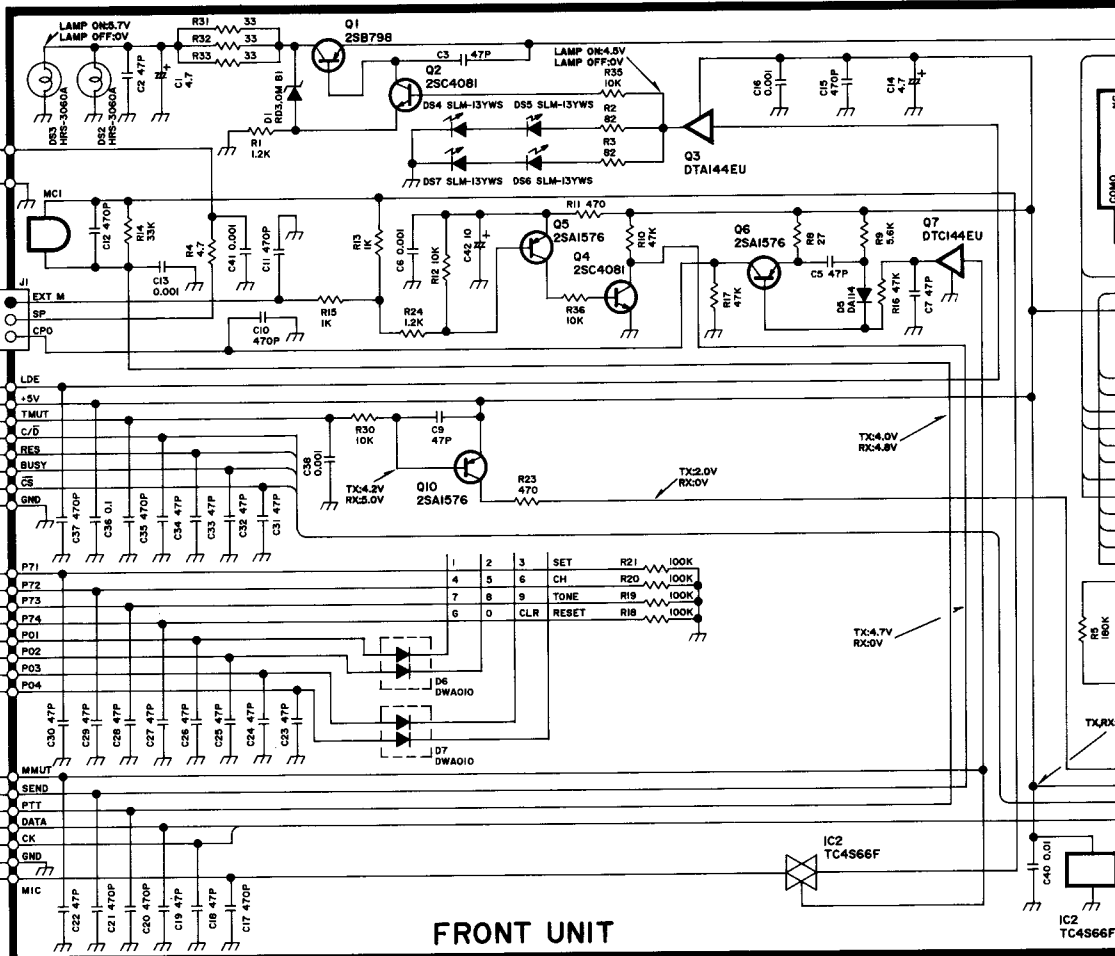
SECTION 9 VOLTAGE DIAGRAM



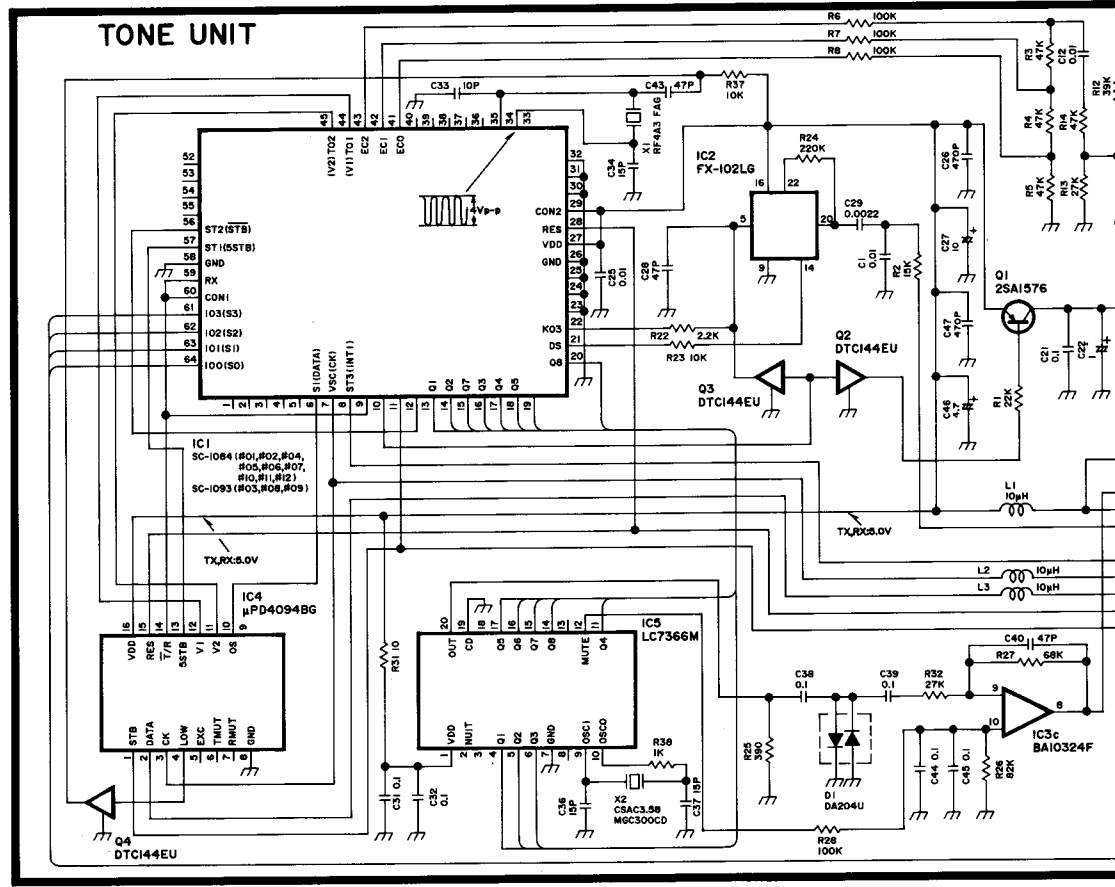
LOGIC UNIT



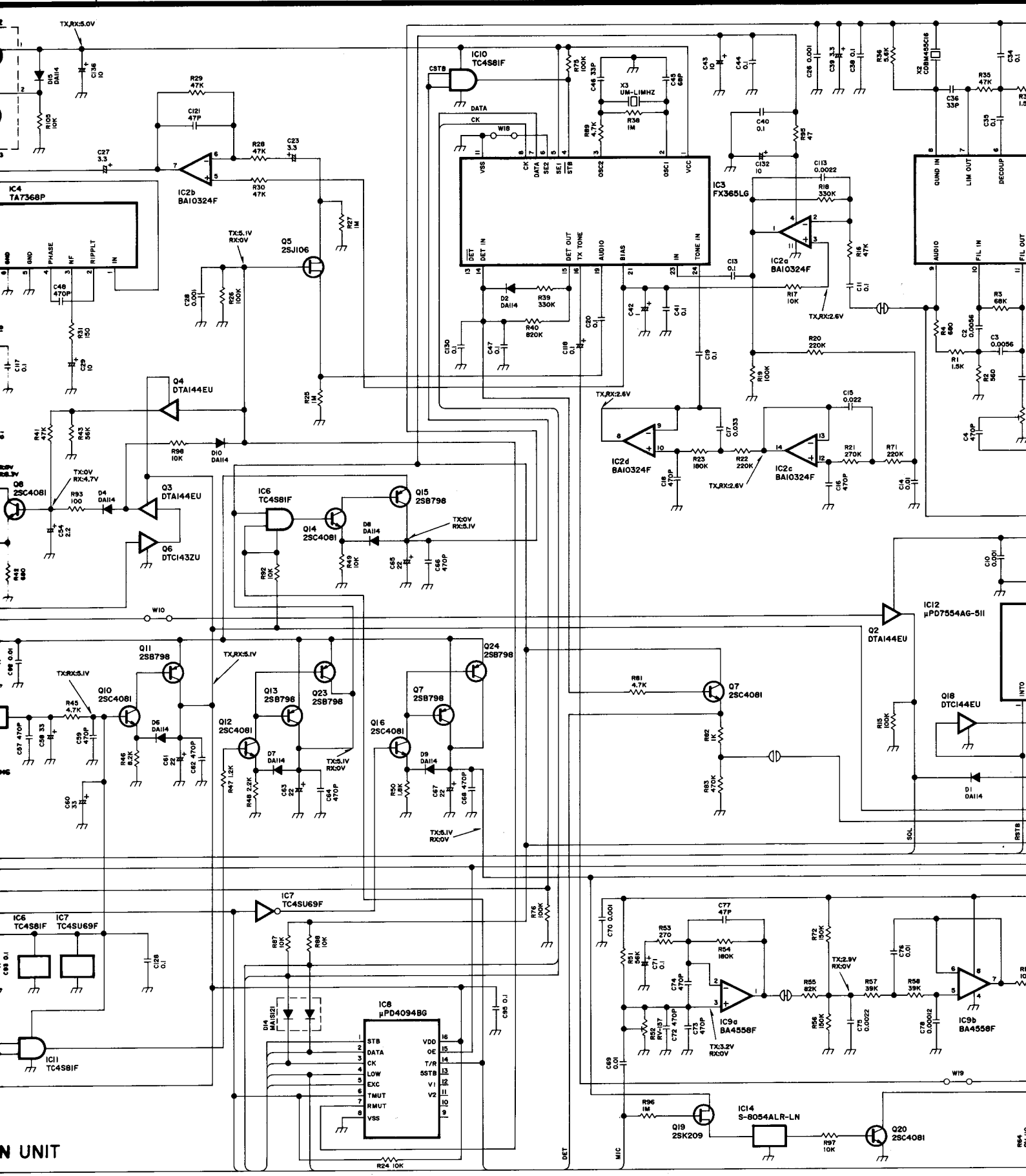
TANSI UNIT



FRONT UNIT



TONE UNIT

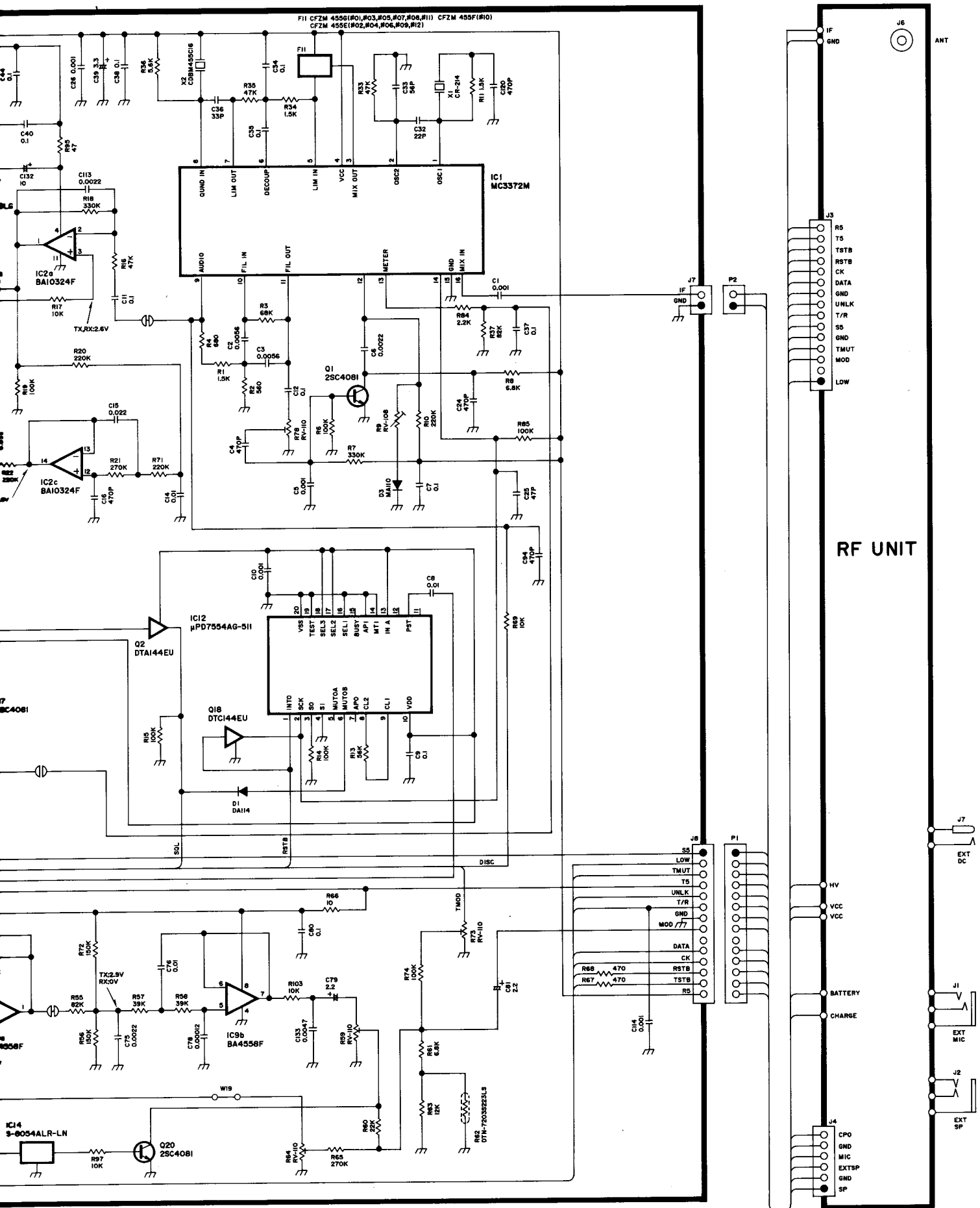


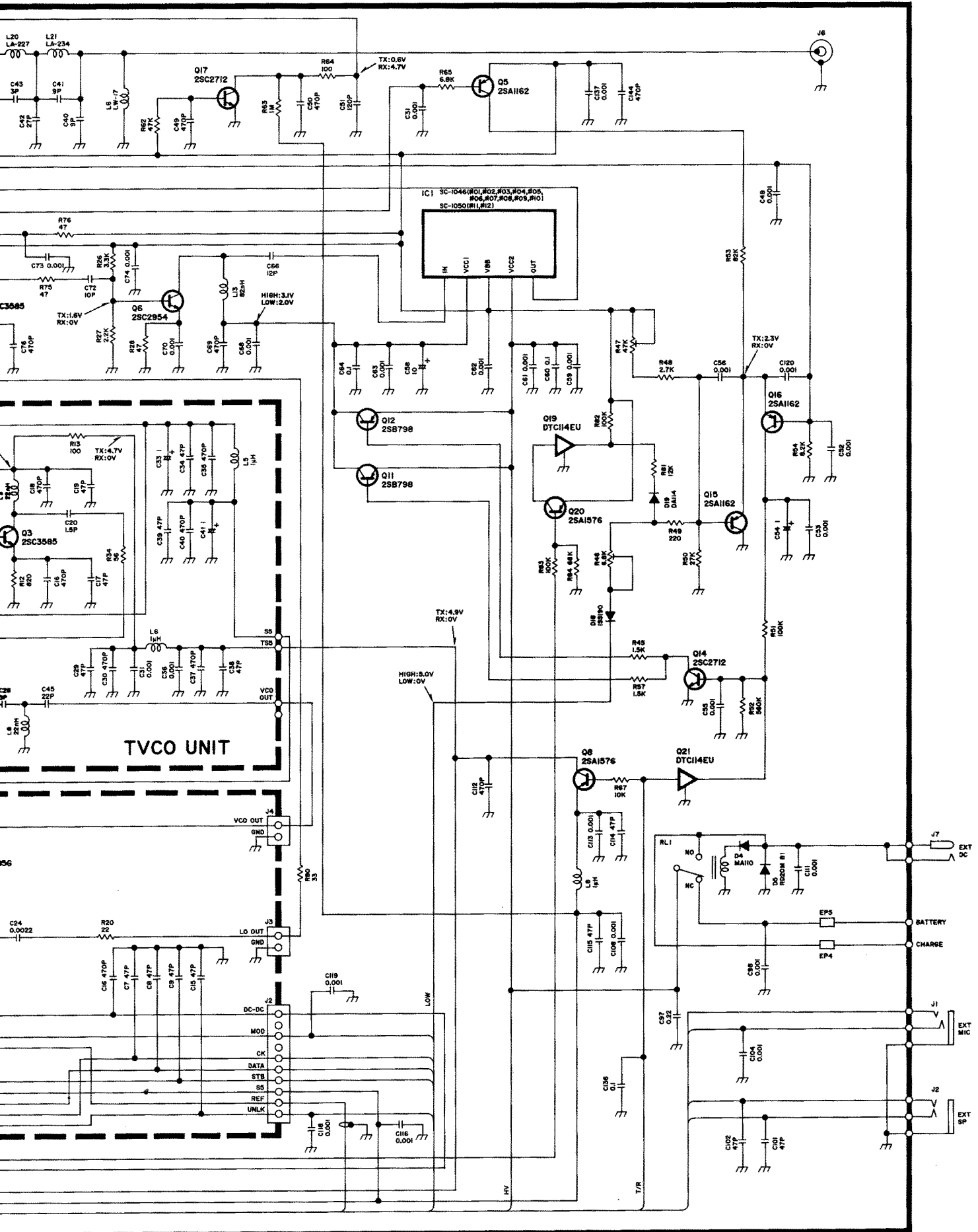
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