ICOM

SERVICE MANUAL

UHF TRANSCEIVER

IC-U210T

Icom Inc.

INTRODUCTION

This service manual describes the latest information for the **IC-U210T** UHF TRANSCEIVER at the time of publication.

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

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 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>

1110002770	IC	μPB584G	IC-U210T	MAIN UNIT	5 pieces
8810003840	Screw	BiH M3 × 6 ZK SUS	IC-U210T	Top cover	10 pieces

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

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 40 dB~50 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to the transceiver.

VERSIONS

VERSION NUMBER	DESTINATION	FREQUENCY RANGE	OUTPUT POWER	CHANNEL SPACING	5-TONE IC
#01	General	400~420 MHz	25 W	12.5 kHz	SC-1084
#02	General	400~420 MHz	25 W	25 kHz	SC-1084
#03	General	450~470 MHz	25 W	12.5 kHz	SC-1084
#04	General	450~470 MHz	25 W	25 kHz	SC-1084
#05	General	400~420 MHz	10 W	12.5 kHz	SC-1084
#06	General	400~420 MHz	10 W	25 kHz	SC-1084
#07	General	450~470 MHz	10 W	12.5 kHz	SC-1084
#08	General	450~470 MHz	10 W	25 kHz	SC-1084
#09	Greece	450~470 MHz	25 W	25 kHz	SC-1084
#10	Italy	450~470 MHz	10 W	25 kHz	SC-1084
#11	United Kingdom	450~470 MHz	10 W	12.5 kHz	SC-1093
#12	France	400~420 MHz	25 W	12.5 kHz	SC-1093
#13	France	450~470 MHz	25 W	12.5 kHz	SC-1093
#14	Sweden	450~470 MHz	25 W	25 kHz	SC-1084
#15	Australia	470~490 MHz	25 W	12.5 kHz	SC-1084
#16	Australia	490~520 MHz	25 W	12.5 kHz	SC-1084

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : See VERSIONS on the right page of inside front cover.
- Type of emission : 16K0F3E (#02, #04, #06, #08, #09, #10, #14)
  8K50F3E (#01, #03, #05, #07, #11, #12, #13, #15, #16)
- Antenna impedance : 50 Ω unbalanced
- Usable temperature range : −25 °C~+55 °C (−13 °F~+131 °F)
- Frequency stability : ±1.5 kHz (−25 °C~+55 °C)
- Power supply requirement : 13.8 V DC±15 % (negative ground)
- Current drain (at 13.8 V DC) :

Transmit	10 W versions	5 A
	25 W versions	8 A
Receive	Squelched	700 mA
	Max. audio output	1.2 A

- Dimensions : 140 (W)×50 (H)×182 (D) mm
  5.5 (W)×2.0 (H)×7.2 (D) in
  (Projections not included)
- Weight : 1.7 kg
- 5-Tone system : CCIR, DAPL, DZVEI, EEA, EIA, or ZVEI

■ TRANSMITTER

- Output power : 10 W (#05~#08, #10, #11)
  25 W (#01~#04, #09, #12~#16)
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ±5 kHz (#02, #04, #06, #08, #09, #10, #14)
  ±2.5 kHz (#01, #03, #05, #07, #11, #12, #13, #15, #16)
- Spurious emissions : 0.25 µW
- Harmonic emissions : 0.25 µW
- Audio response : +1 dB, −3 dB of +6 dB/octave from 300 Hz to 3000 Hz
- Microphone impedance : 600 Ω

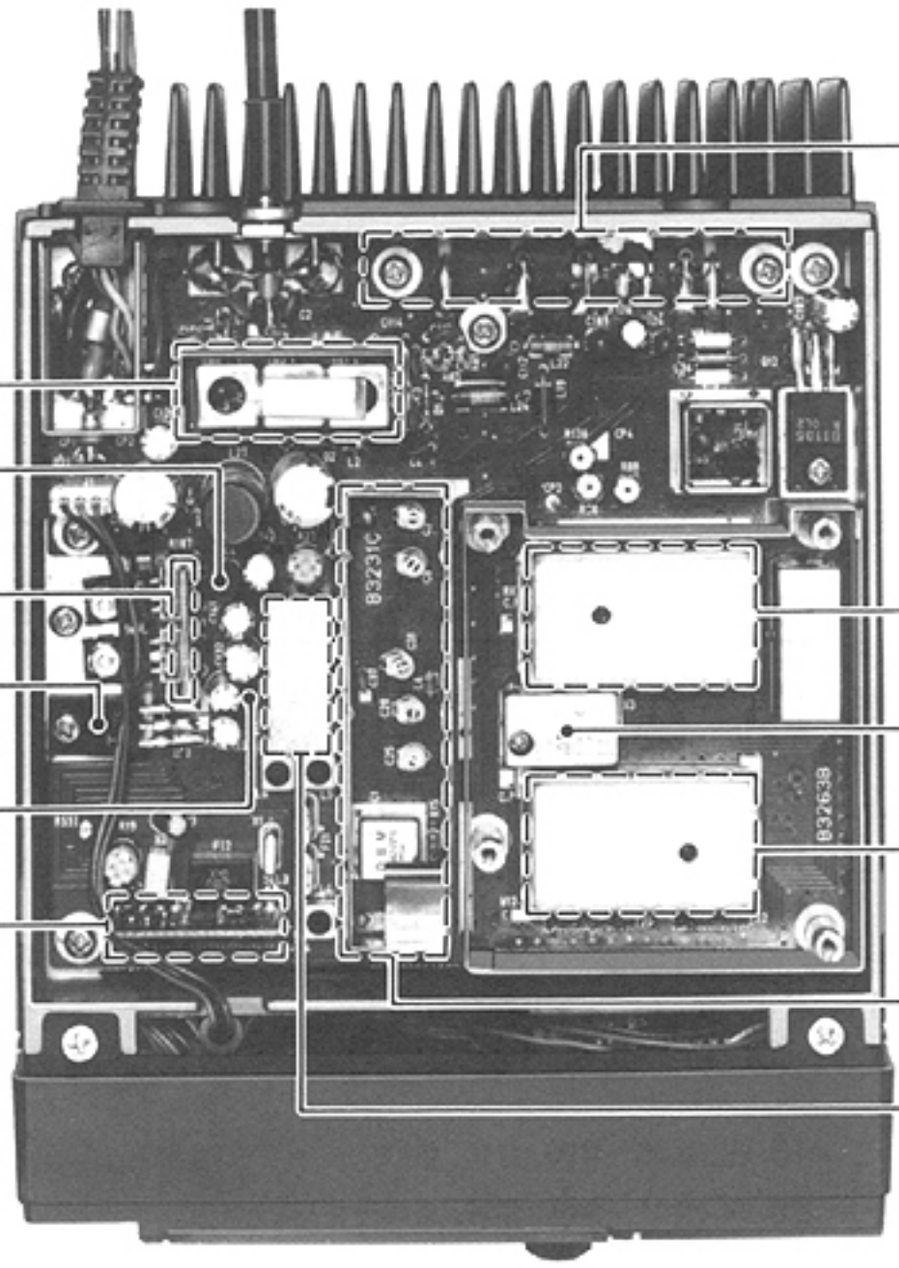
■ RECEIVER

- Sensitivity : 0.35 µV for 12 dB SINAD
- Intermediate frequency : 1st 30.875 MHz
  2nd 455 kHz
- Squelch sensitivity (Threshold level) : 0.3 µV
- Adjacent channel selectivity : −70 dB (#02, #04, #06, #08, #09, #10, #14)
  −60 dB (#01, #03, #05, #07, #11, #12, #13, #15, #16)
- Intermodulation rejection : −70 dB
- Spurious response rejection : −70 dB
- Audio response : +1 dB, −3 dB of −6 dB/octave from 300 Hz to 3000 Hz
- Audio output impedance : 4 Ω
- Audio output power : 3 W at 10 % distortion with a 4 Ω load

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

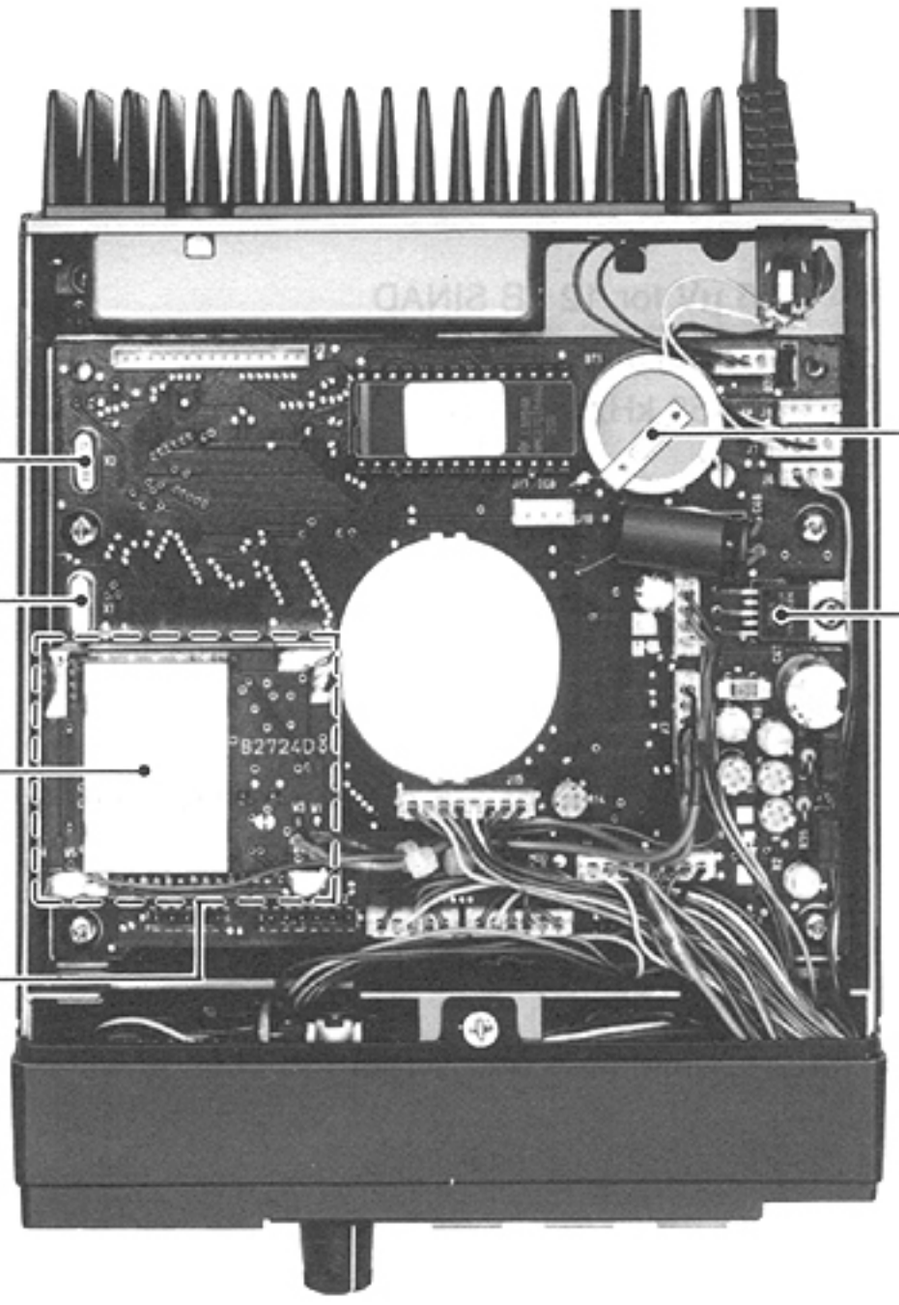
SECTION 2 INSIDE VIEWS

• MAIN UNIT



M57729L	#01, #02, #12
SC-1056	#03, #04, #09, #13, #14
M57704L	#05, #06
M57704H	#07, #08, #10, #11
SC-1057	#15
SC-1122	#16

• LOGIC UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 ANTENNA SWITCHING CIRCUIT (MAIN AND LPF UNITS)

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

Received signals enter the antenna connector and then pass through a low-pass filter (L1, C1, C2, C156) on the MAIN UNIT. The filtered signals are applied to a three-stage low-pass filter (L1~L3, C1~C6) on the LPF UNIT. The filtered signals then pass through an antenna switching circuit (D1~D3) which functions as a π-type low-pass filter (L2, L3, C4~C6) while receiving. While receiving, the antenna switching circuit (D1~D3) turns OFF and the signals are applied to an RF circuit on the RF UNIT.

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 antenna switching circuit pass through a two-stage bandpass filter (L1, L2, C1~C10, D1, D2) and are then applied to an RF amplifier (Q1). The RF amplifier (Q1) employs an FET (3SK177) which expands the dynamic range with low noise. The amplified signals pass through a three-stage bandpass filter (L3, L5, L6, C16~C27, C31, D3~D5) to suppress unwanted signals and are then applied to the 1st mixer circuit.

D1~D5 employ varactor diodes controlled by the PLL 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. The PLL lock voltage from the PLL-A UNIT is buffer-amplified at IC3 on the MAIN UNIT and is then applied to the varactor diodes.

3-1-3 1st MIXER AND IF CIRCUITS (RF AND MAIN UNITS)

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 IC1 on the RF UNIT with a 1st LO signal coming from the VCO-A circuit to produce a 30.875 MHz 1st IF signal.

IC1 is a DBM (Double Balanced Mixer). The 30.875 MHz 1st IF signal is buffer-amplified at Q2 on the RF UNIT. The buffer amplifier (Q2) employs an FET (2SK1771) which has excellent two-signal characteristics.

The amplified signal passes through a matching circuit (L4) on the MAIN UNIT and is then applied to a pair of crystal filters (FI1) in order to obtain wide selection capability and to pass only the desired signal. The filtered signal is applied to a matching circuit (L5) and is then amplified at the 1st IF amplifier (Q1). The amplified signal is applied to the 2nd IF circuit through a matching circuit (L6).

• RF CIRCUIT

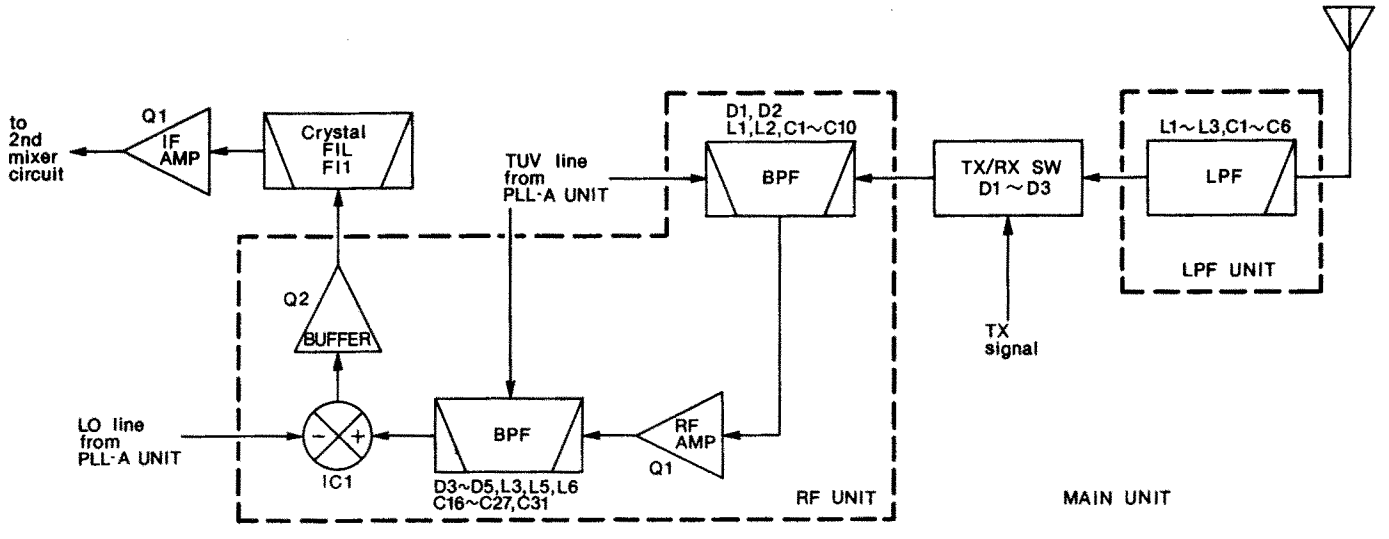


Fig. 1

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 the 1st IF circuit is applied to the 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 (FI2) 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, output from IC1 (pin 9), is applied to an AF circuit on the LOGIC UNIT.

3-1-5 AF CIRCUIT (LOGIC UNIT)

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) on the MAIN UNIT passes through a de-emphasis circuit (R182, C81) and is then applied to an AF amplifier (IC6, pin 6). The de-emphasis circuit is an integrator circuit which has 6 dB/octave frequency characteristics. The amplified signal is applied to either an AF mute circuit or a CTCSS encoder/decoder, IC (IC4), through a low-pass filter (IC5).

The AF mute circuit consists of two squelch switches (Q22, Q24) which reduce voice leakage. The AF signal from Q24 passes through a highpass filter (IC6, pin 3) to attenuate CTCSS tones.

The filtered signal passes through Q22 and is then applied to the AF power amplifier (IC7) through the [VOL] control (R1) on the VR UNIT. The AF amplifier (IC7) amplifies the AF signal to drive the speaker.

The AF signal from IC6 (pin 7) passes through a low-pass filter (IC5) to protect CTCSS tones from voice malfunctions and is then applied to a CTCSS encoder/decoder IC (IC4).

3-1-6 SQUELCH CIRCUIT (MAIN AND SQL UNITS)

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

Some noise components in the AF signal from IC1 (pin 9) are applied to an active filter section (IC1, pin 10). This amplifies the noise components of frequencies 20 kHz and above. The noise signals are output from pin 11 and are then applied to the low gain amplifier (IC1, pin 3) on the SQL UNIT. This is accomplished through the squelch level setting volume control (R19) which adjusts the pin 10 input level. The amplified signals are converted to a digital signal at the comparator (IC1, pin 6) which is applied to IC2 (pin 2).

IC2 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 IC2 (pin 6) passes through a squelch gate IC (IC16) on the LOGIC UNIT and is then applied to the CPU (IC11, pin 33) as an "SQL" signal. Pushing the [VOL] control (R1) on the VR UNIT supplies the squelch signal to the CPU through IC16.

When the CPU (IC11, pin 33) receives the "SQL" signal, the shift register (IC12, pin 7) outputs an "RMUT" signal. The AF mute circuit (Q22, Q24) is deactivated if the "RMUT" signal is "LOW."

• 2nd IF AND DEMODULATOR CIRCUITS

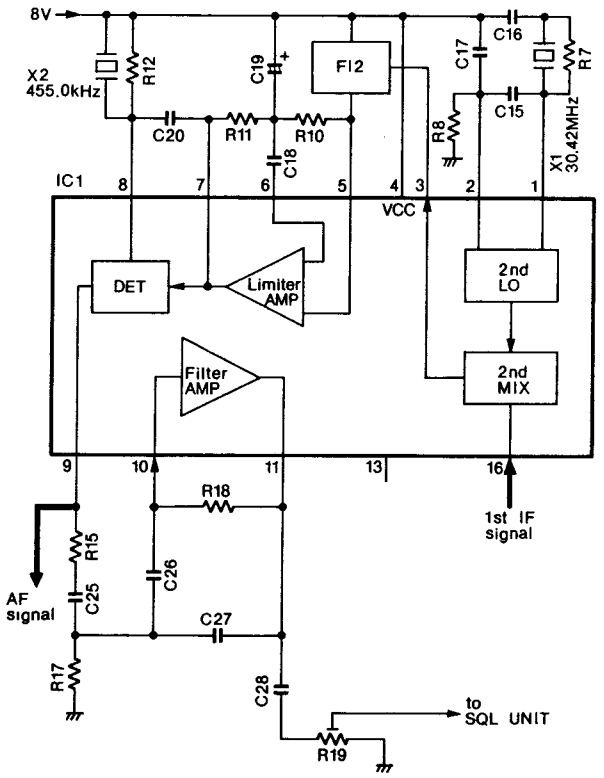


Fig. 2

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT (LOGIC, MAIN, PLL-B AND VCO-B 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 are applied to the AF amplifier (IC1a). The amplified signals are applied to IC1b (pin 3) and pass through the +6 dB pre-emphasis circuit (C4, R6) which is connected to pin 2. IC1b includes a low level amplifier with a pre-emphasis and a limiter amplifier. The output signals from IC1b (pin 1) pass through a splatter filter (IC2) which eliminates signal components greater than 3 kHz. Pin 7 of IC2 outputs an "MOD" signal. The "MOD" signal is applied to the modulation circuit on the VCO-B UNIT through the PLL-B UNIT in the MAIN UNIT.

3-2-2 MODULATION CIRCUIT (PLL-B AND VCO-B UNITS)

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

The "MOD" signal changes the reactance of varactor diode (D5) to modulate the oscillated signal at VCO (Q1). The oscillated signal passes through the buffer amplifiers (Q2, Q3) and is then applied to the PLL-B UNIT.

The signal passes through D1 and is then applied to the low-pass filter (L2, C15, C16).

D1 prevents the VCO output from entering the MAIN UNIT while receiving. The filtered signal is divided by 2 at a prescaler (IC2, pin 2) on the MAIN 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 (MAIN UNIT)

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

The signal from the prescaler IC2 (pin 7) passes through a three-stage low-pass filter consisting of L13~L15 and C64~C68. The filtered signal is buffer-amplified at Q8 and is then applied to the pre-drive amplifiers (Q9, Q10). The amplified signal is re-amplified at a drive amplifier (Q11) to obtain 300 mW.

The control voltage from the APC circuit is applied to the collector of Q11 for stable RF output power from a power amplifier (IC9).

3-2-4 POWER AMPLIFIER CIRCUIT (MAIN UNIT)

IC9 is a power module which provides a stable 10 W (25 W : 25 W versions) of output power.

The RF signal from the drive amplifier (Q11) is applied to the power amplifier (IC9, pin 1). The amplified signal is output from IC9 (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

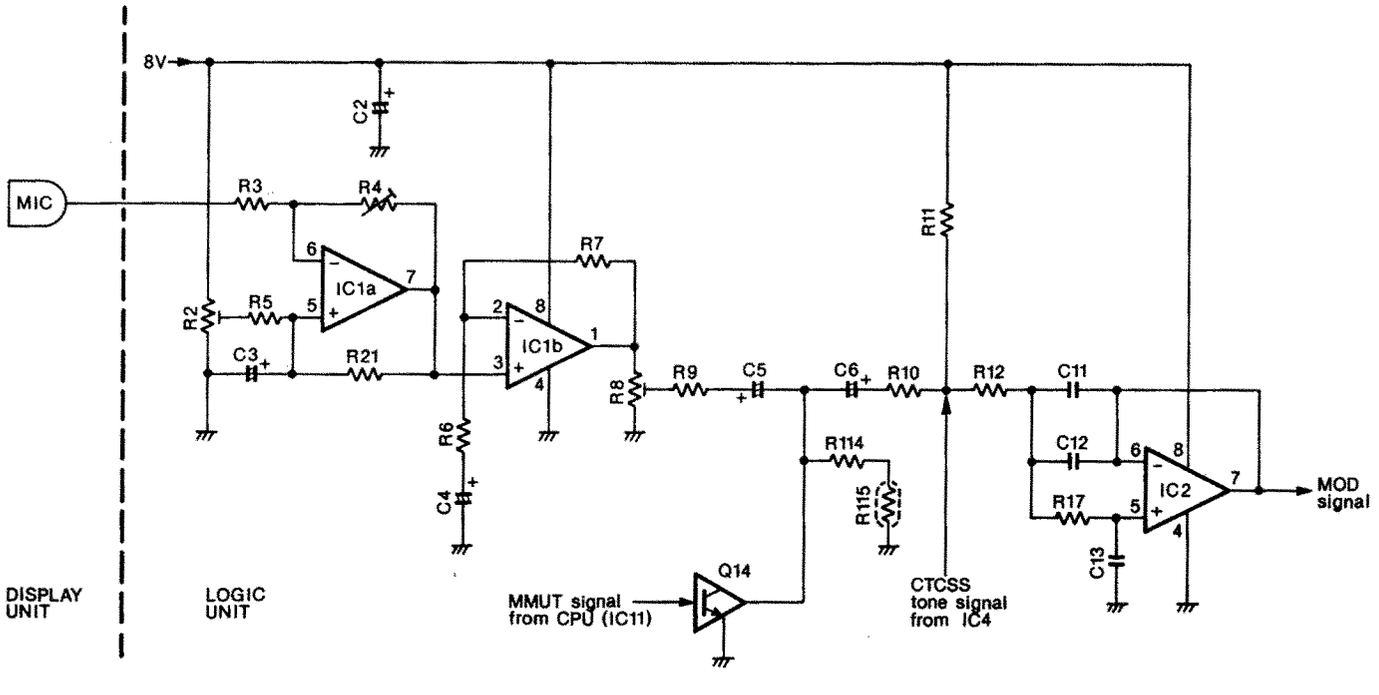


Fig. 3

3-2-5 APC CIRCUIT (MAIN UNIT)

This circuit controls current at the power module's first stage and current at the driver amplifier to obtain stable RF output power.

The output power from the power module (IC9, pin 5) is applied to the APC mismatch detector circuit (L23, R80~R83, C113, C114) to divide high-frequency components for conversion to DC voltage at the APC detector (D14, D15). 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 increases.

The detected voltage is applied to a differential amplifier circuit (IC7, pin 2). The APC reference voltage is adjusted at R88 and is then applied to IC9 (pin 3).

When the antenna impedance is mismatched, the voltage of IC7 (pin 2) exceeds the reference voltage of IC7 (pin 3) and the output level from IC7 (pin 1) decreases. Q13 amplifies the current from the differential amplifier (IC7) which controls Q12. Q12 changes the supply voltage to Q11 and IC9.

This decreases the output power from the drive amplifier (Q11) and power module (IC9) until the input voltage in pin 2 of IC7 reaches the same level as pin 3 of IC7.

When LOW output power is selected, the "H/L" signal from the shift register (IC12, pin 4) on the LOGIC UNIT is applied to Q15.

This controls the input current of IC9 (pin 2) through the reference voltage of IC7 (pin 3). R90 sets the LOW output power level.

R128 detects the temperature around the power module (IC9) and decreases the output power using Q14, to protect the transceiver from high temperatures during continuous transmitting.

3-2-6 TX MUTE CIRCUIT (MAIN UNIT)

When a "TMUT" signal from the shift register (IC12, pin 6) on the LOGIC UNIT becomes "HIGH," Q7 turns OFF. The bias voltage for Q8~Q11 is cut off to interrupt the transmission.

3-2-7 ANTENNA SWITCHING CIRCUIT (MAIN UNIT)

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

While transmitting, D1~D3 are turned ON. The RF output signal from IC9 is not permitted to enter the receiver circuit. The RF output signal from IC9 passes through L23, C115, D1 and is then applied to a low-pass filter (L1~L3, C1~C6) on the LPF UNIT. Each of the coils (L1~L3) are shielded for maximum attenuation of the high harmonic components. The filtered signal is applied to an antenna connector.

• APC CIRCUIT

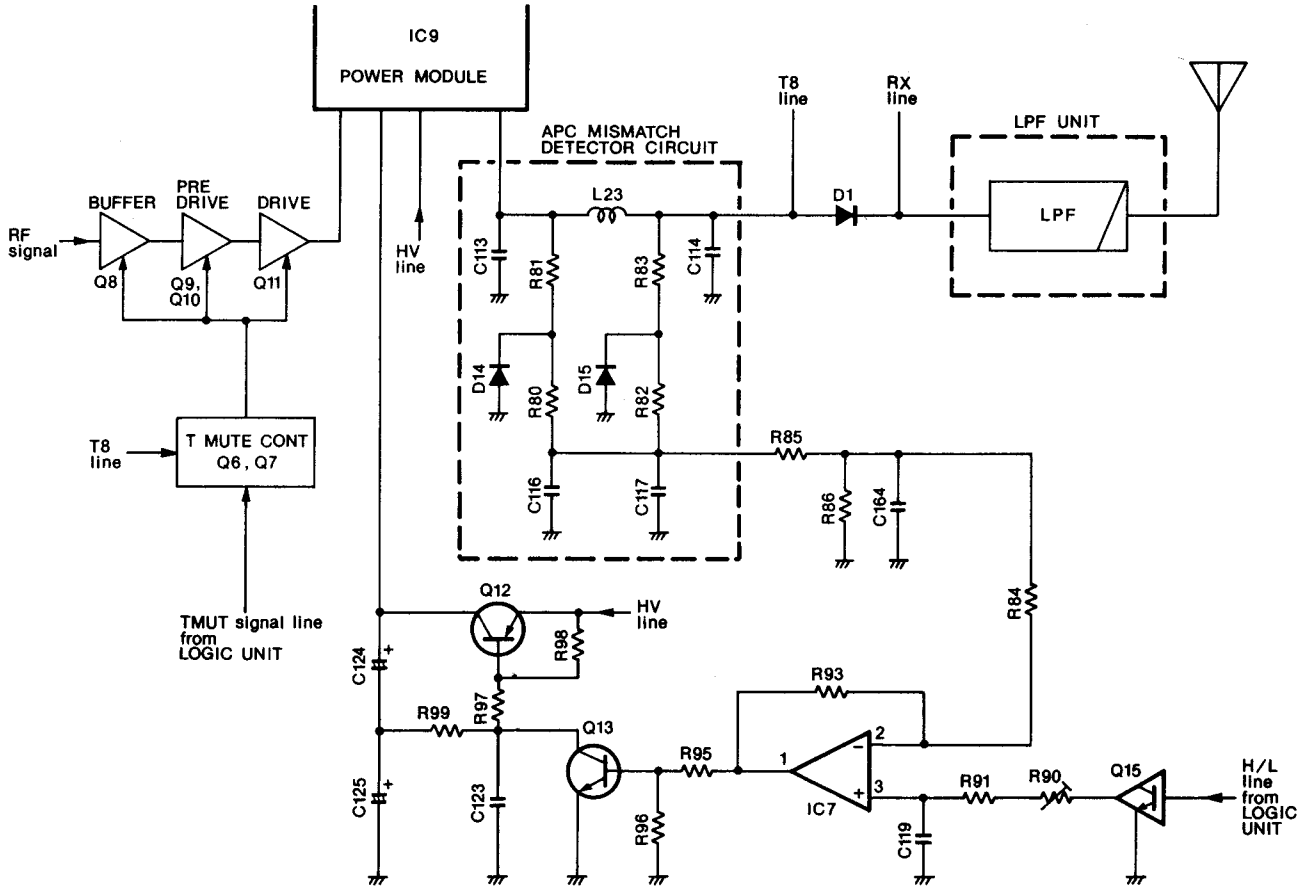


Fig. 4

3-3 PLL CIRCUITS

3-3-1 GENERAL

This transceiver has an independent PLL circuit (PLL-A for the receiver and PLL-B for the transmitter) to facilitate high speed switching 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.

$$\text{RX Nt} = \frac{(\text{RX frequency}) - (30.875\ \text{MHz})}{(\text{RX reference frequency})}$$

$$\text{TX Nt} = \frac{(\text{TX frequency}) \times 2}{(\text{TX reference frequency})}$$

RX Nt: Receive N-data
TX Nt: Transmit N-data
RX reference frequency = 5 kHz or 6.25 kHz
TX reference frequency = 10 kHz or 12.5 kHz

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

The PLL circuit, using a one-chip modulus prescaler (IC1), directly generates the 1st LO receive frequency with a Colpitts VCO (Q1) on the VCO-A UNIT.

The modulus prescaler (IC1) sets the dividing ratio based on serial data from the CPU (IC11) on the LOGIC UNIT and compares the phase of the VCO 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 X3 on the MAIN UNIT.

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

A reference frequency (12.8 MHz) is produced by X3. The frequency is applied to both the PLL-A and PLL-B circuits. X3 adopts TCXO to ensure stable operation over a wide temperature range.

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

The VCO-A circuit oscillates a 369.125 MHz~489.125 MHz 1st LO signal with a Colpitts oscillator circuit (strip line, Q1, D1, D2, C2~C6). The varactor diodes (D1, D2) provide frequency control. The output signal from the VCO-A circuit is applied to a buffer amplifier (Q2) 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) or a low-pass filter (L2, C15, C16) through D1 on the PLL-A UNIT.

D1 prevents the 1st LO receive frequency from entering the MAIN UNIT while transmitting. The filtered signal is applied to a buffer amplifier (Q5) on the MAIN UNIT. The buffer-amplified signal passes through a low-pass filter (L11, L12, C55~C58) and is then applied to a 1st mixer circuit (IC1) on the RF UNIT.

• RECEIVER PLL CIRCUIT

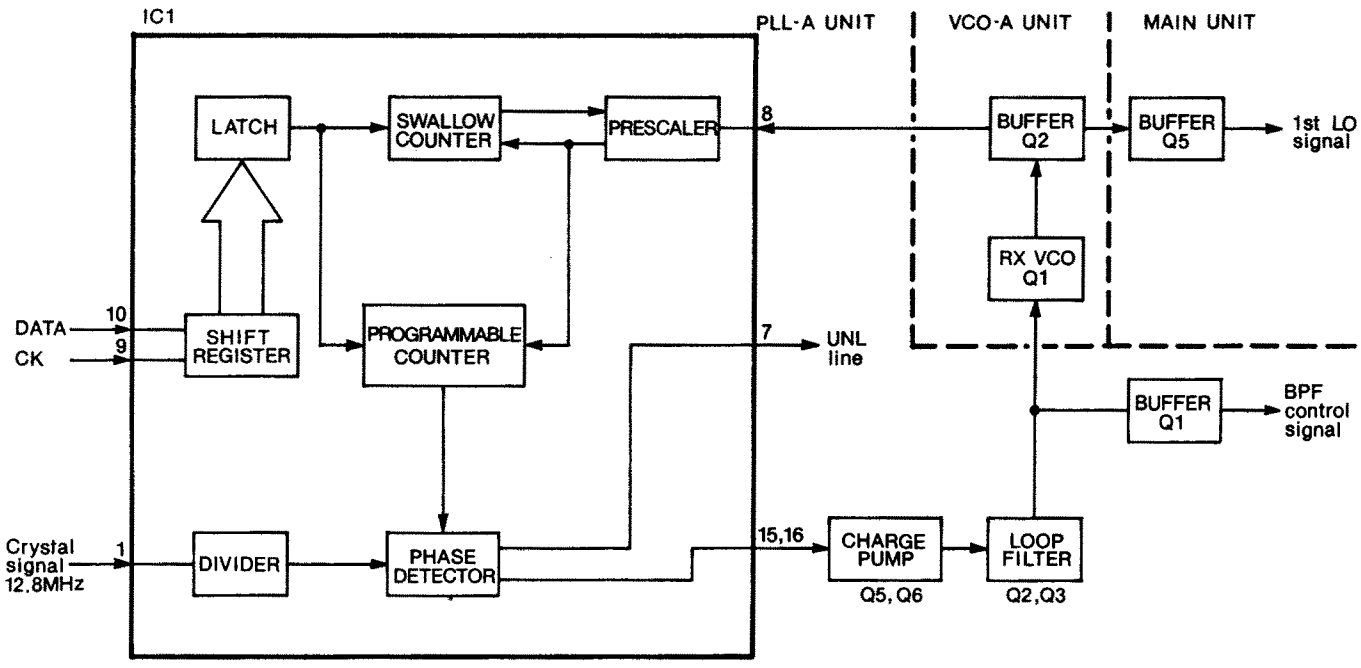


Fig. 5

3-3-5 RECEIVER PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (PLL-A 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 out-of-phase components of the VCO frequency using a stable reference frequency.

IC1 is a one-chip PLL IC that contains a dual-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 dual-modulus prescaler and the programmable counter sections of IC1. A 12.8 MHz reference frequency from X3 on the MAIN UNIT is applied to IC1 (pin 1) on the PLL-A UNIT and passes through the programmable reference counter section of IC1. Both of the divided signals are compared at the 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 (VCO-A AND PLL-A UNITS)

The phase-detected signal (pulse signal) from IC1 (pins 15 and 16) passes through a charge pump (Q5, Q6) and is then applied to an active loop filter (Q2, Q3). The pulse signal is converted to DC voltage (PLL lock voltage) to control the oscillation from the VCO-A UNIT. The charge pump (Q5, Q6) is used to expand the range of the PLL lock voltage. The PLL lock voltage changes the reactance of the varactor diodes (D1, D2) in the VCO-A circuit.

A portion of the PLL lock voltage from Q3 is buffer-amplified at Q1 and is then applied to the MAIN UNIT. This voltage is buffer-amplified at IC3 and is then applied to the varactor diodes (D1~D5) on the RF UNIT.

3-3-7 RECEIVER UNLOCK SENSOR CIRCUIT (PLL-A, MAIN AND LOGIC UNITS)

IC2 provides swift lockup time by shorting R9 when the receiver PLL is unlocked. When the PLL is unlocked, a "UNL" signal is sent from IC1 (pin 7) to Q4 on the MAIN UNIT. The signal is inverted at Q4 on the MAIN UNIT. Q4 supplies a "UNLK" signal (an unlock signal) to the CPU (IC11, pin 34) on the LOGIC UNIT.

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

The PLL circuit, using a one-chip modulus prescaler (IC1), directly generates the transmit frequency with a Colpitts VCO (Q1) on the VCO-B 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 VCO 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 X3 on the MAIN UNIT.

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

The VCO-B circuit oscillates an 800 MHz~1040 MHz transmit frequency with a Colpitts oscillator circuit (strip line, Q1, D1~D4, C2, C5, C6, C18). Varactor diodes (D1~D4) provide frequency control. Modulation is directly performed by the varactor diode (D5). The output signal from the VCO-B circuit is applied to buffer amplifiers (Q2, Q3) which amplify the VCO oscillation and do not permit the latter circuit to affect the VCO oscillation. The amplified signal enters either PLL IC (IC1, pin 8) or a low-pass filter (L2, C15, C16) through D1 on the PLL-B UNIT.

• TRANSMITTER PLL CIRCUIT

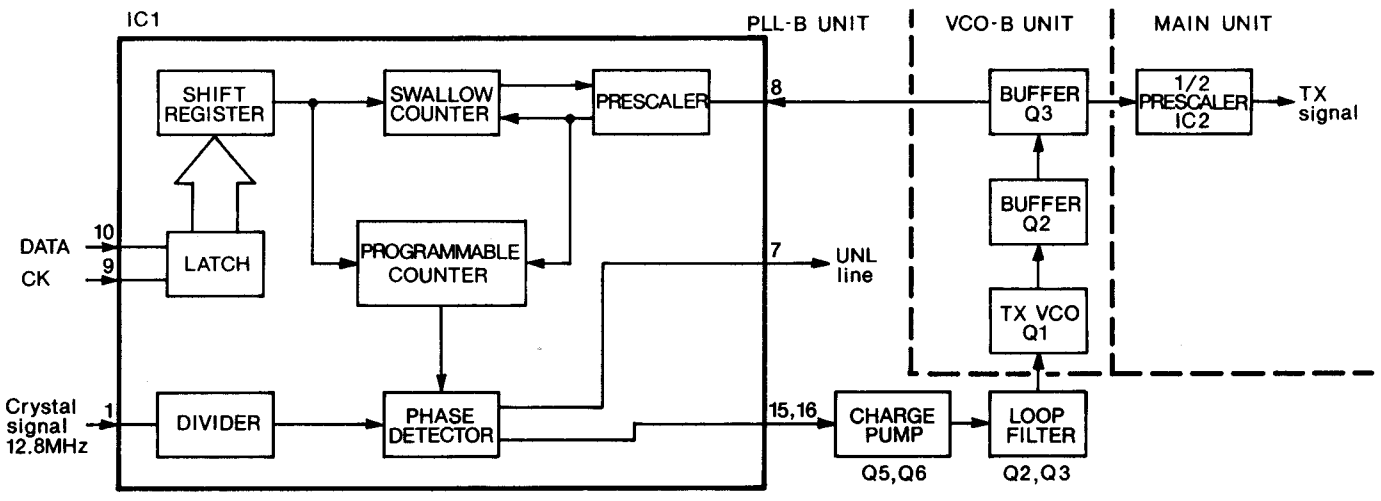


Fig. 6

D1 prevents the VCO output from entering the MAIN UNIT while receiving. The filtered signal is divided by 2 at a prescaler (IC2, pin 2) on the MAIN UNIT. The resulting signal is output from IC2 (pin 7) and is then applied to the drive amplifier circuit.

3-3-10 TRANSMITTER PROGRAMMABLE DIVIDER AND PHASE DETECTOR CIRCUITS (PLL-B 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 out-of-phase components of the VCO frequency using a stable reference frequency.

IC1 is a one-chip PLL IC that contains a dual-modulus prescaler, a swallow counter, a programmable divider and a phase detector. IC1 accepts up to 1100 MHz inputs.

The input signal from the PLL IC (IC1, pin 8) passes through the dual-modulus prescaler and the programmable counter sections of IC1. A 12.8 MHz reference frequency from X3 on the MAIN UNIT is applied to IC1 (pin 1) and passes through the programmable reference counter section of IC1. Therefore, the reference frequency (10 kHz or 12.5 kHz) is set by the dividing data from the CPU. Both of the divided signals are compared at the 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 (VCO-B AND PLL-B UNITS)

The phase-detected signal (pulse signal) from IC1 (pins 15 and 16) passes through a charge pump (Q5, Q6) and is then applied to an active loop filter (Q2, Q3). The pulse signal is converted to DC voltage (PLL lock voltage) to control the oscillation from the VCO-B UNIT. The charge pump (Q5, Q6) is used to expand the range of the PLL lock voltage. The PLL lock voltage changes the reactance of the varactor diodes (D1~D4) in the VCO-B circuit.

3-3-12 TRANSMITTER UNLOCK SENSOR CIRCUIT (PLL-B, MAIN AND LOGIC UNITS)

IC2 provides swift lockup time by shorting R9 when the transmitter PLL is unlocked. When the PLL is unlocked, a "UNL" signal is sent from IC1 (pin 7) to Q4 on the MAIN UNIT. The signal is inverted at Q4 on the MAIN UNIT. Q4 supplies a "UNLK" signal (an unlock signal) to the CPU (IC11, pin 34) on the LOGIC UNIT.

3-4 VOLTAGE LINES (MAIN UNIT)

LINE	DESCRIPTION
HV	The external DC power from the DC power connector.
13.8	13.8 V DC pass through the power switch ([VOL] control, R1) on the VR UNIT.
5V	Common 5 V converted from 13.8 V line at IC6.
8V	Common 8 V converted from 13.8 V line at IC8.
T8	Transmit 8 V converted from 13.8 V line at Q17.
R8	Receive 8 V converted from 13.8 V line at Q16.

3-5 LOGIC CIRCUITS

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

3-5-1 KEY MATRIX FOR CPU INPUT

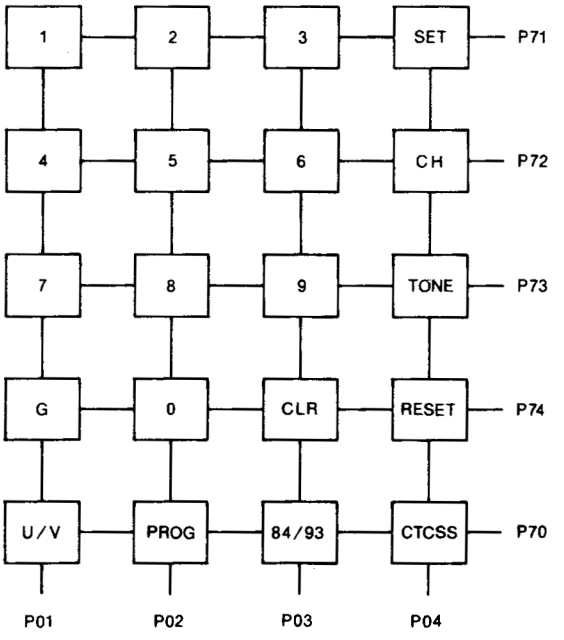


Fig. 7

3-5-2 PORT DESCRIPTIONS (LOGIC UNIT)

• IC11 (CPU)

PORT NAME	PIN NUMBER	DESCRIPTION
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."

• **IC11 (CPU)**

PORT NAME	PIN NUMBER	DESCRIPTION
HANG [P22]	30	Detects the microphone hanger condition. "L": When the microphone is on the hanger. "H": When the microphone is not on the hanger.
SCAN [P24]	32	Input port for the [SCAN] 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.
SQLS [P25]	33	Input port for the squelch signal.
UNLK [P26]	34	Input port for the PLL unlock signal.
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 cloning mode is selected.
CK [P32]	38	Outputs a clock signal for PLL, CTCSS and LCD.
SO [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 SET mode is selected.
S0~S3 [P34~P37]	50~53	I/O ports for 5-tone data.
DIM	54	Outputs an LCD brightness signal. Pin 54 / J2, Pin 1 — "L": Bright; "H": Dark "L": Bright "H": Dark
C/D [P05]	59	Outputs a data/command designation signal for the LCD driver.
CS1, CS2 [P06, P07]	60, 61	Output LCD chip selecting signals.
DOUT [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.
WR [P65]	64	Outputs a RAM writing signal.

• **IC12 (I/O expander)**

PORT NAME	PIN NUMBER	DESCRIPTION
H/L	4	Output port for output power condition. "L": When high power is selected. "H": When low power is selected.
EXC (HORN)	5	The port becomes "HIGH" when the received 5-tone code matches the programmed 5-tone code.
TMUT	6	Output port for the transmit muting signal which mutes RF power. "L": When this function is deactivated. "H": When this function is activated.
RMUT	7	Output port for the receive muting signal which mutes audio power. "L": When this function is deactivated. "H": When this function is activated.
V1 (TO1), V2 (TO2)	12, 11	Outputs a selecting signal for a 5-tone system.
5STB	13	Outputs strobe signals for a 5-tone IC.
T/R	14	Outputs a 5-tone control signal. "L": When encoding. "H": When decoding.

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, a divider and an 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 the table at right.)
ST1	57	Port for a 5-tone encoder strobe signal.
EC0~EC2	41~43	Output ports for the encoder.
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 (IC12) , 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 an audio filter (IC2, pin 20) on the TONE UNIT through the "RAF" signal line. IC2 distinguishes regular signals from those with noise interference. The filtered signal is applied to IC1 (pin 21).

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

The data from IC1 pins 41~43 is converted from digital to analog at R1~R6 to produce a 5-tone signal. The 5-tone signal is limiter-amplified at IC3a. The amplified signal is then applied to an active low-pass filter (IC3b) to eliminate its digital and high harmonic components. The active low-pass filter (IC3b) produces an undistorted encode signal. The output signal from IC3b is applied to the VCO-B UNIT as a "TMOD" signal.

Q3 prevents the reference clock signal from entering the tone encoder/decoder while a 5-tone signal is decoding.

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

3-7 OTHER CIRCUITS

3-7-1 DTMF ENCODER CIRCUIT (DTMF UNIT)

The DTMF encoder (IC1) is controlled by serial data from the CPU (IC11) on the LOGIC UNIT. The serial data from the CPU (IC11) is converted to parallel data at the shift register (IC2) for the DTMF encoder (IC1).

When transmitting a DTMF signal, the DTMF signal is output from IC1 (pin 20) and is then applied to the amplifier (Q1). The amplified signal passes through the limiter amplifier (IC3a) on the TONE UNIT and is then applied to the active low-pass filter (IC3b). The filtered signal is applied to VCO-B UNIT as the "TMOD" signal. A portion of the DTMF signal is applied to the AF power amplifier to monitor the DTMF signal via the "DTMF" signal line.

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

High-speed voltage changes on the T8 and R8 lines are made possible with the T/R control circuit, consisting of Q1~Q3, D1 and D2.

The shift register (IC12, pin 14) outputs a "HIGH" signal while receiving and a "LOW" signal while transmitting.

When transmitting, the base voltage of Q1 becomes "LOW." The collector voltages of Q1 and the "TXV" terminal become 8.7 V. Therefore, the base voltage of Q2 becomes "HIGH." The collector voltages of Q2 and the "RXV" terminal become "LOW." The remaining voltage is rapidly led from the R8 line by D18 on the MAIN UNIT.

When receiving, the base voltage of Q2 becomes "LOW." The collector voltage of Q2 and the "RXV" terminal become 8.7 V. Therefore, the base voltage of Q1 becomes "HIGH." The collector voltage of Q1 and the "TXV" terminal become "LOW." The remaining voltage is rapidly led from the T8 line by D19 on the MAIN UNIT.

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

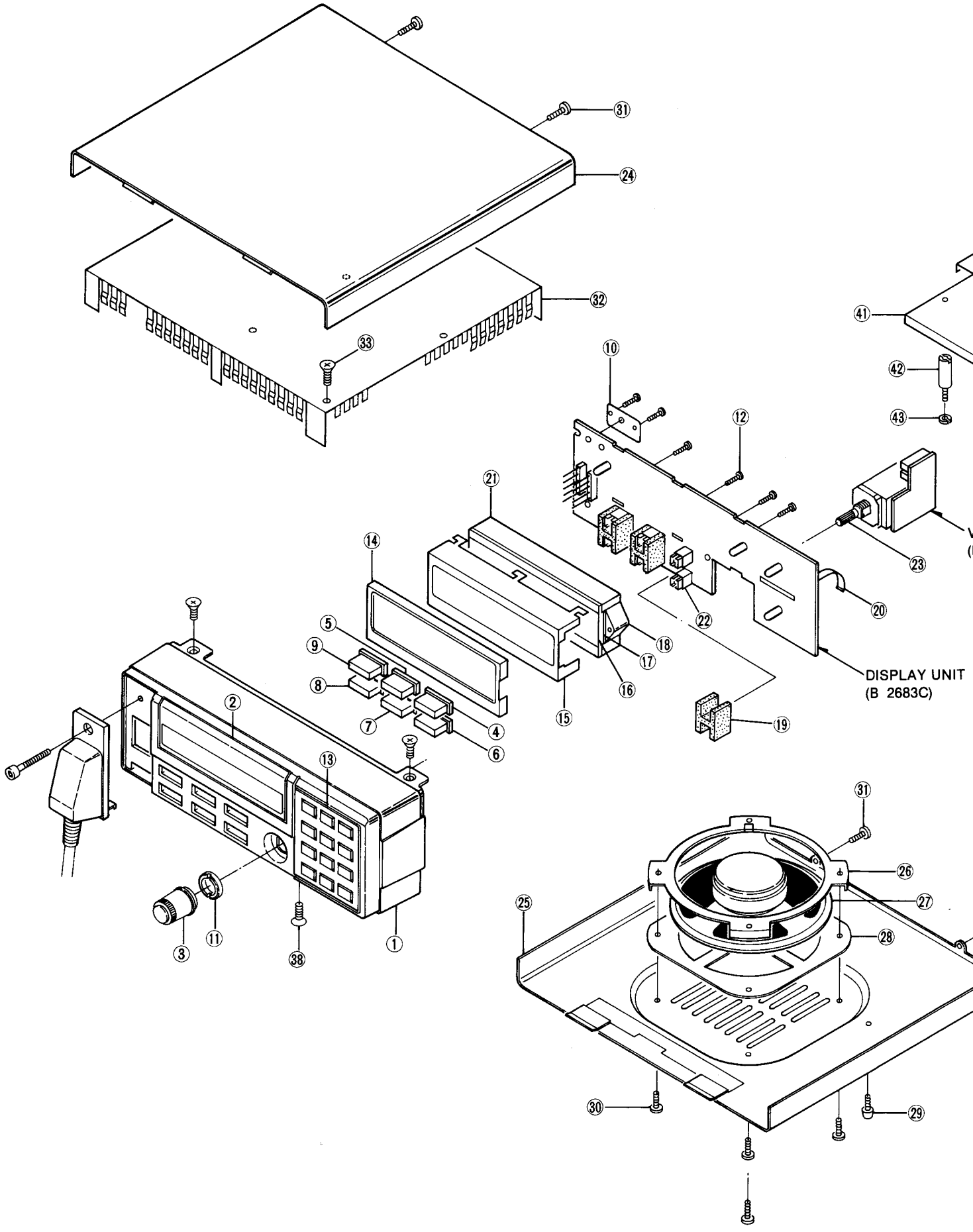
IC5 is a DC-DC converter which converts 5 V DC to 22 V DC. The 22 V DC is converted to a stable 18 V DC at a voltage regulator (IC4). This 18 V DC obtains lock voltages for the PLL circuit and a voltage range of 1~18 V DC for bandpass tuning operation of the RF circuit.

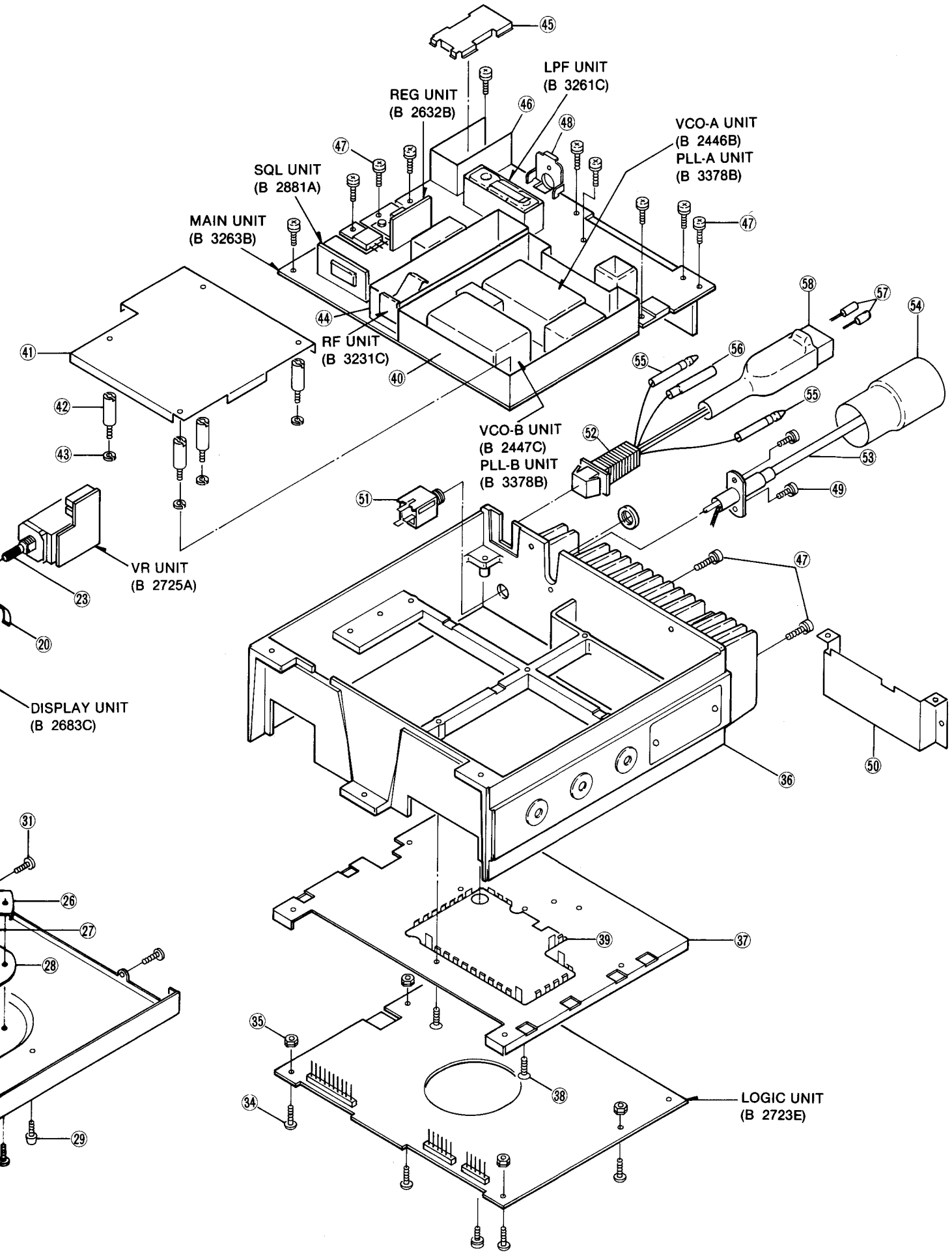
SECTION 4 MECHANICAL PARTS AND DISASSEMBLY

4-1 FRONT PANEL AND CHASSIS PARTS

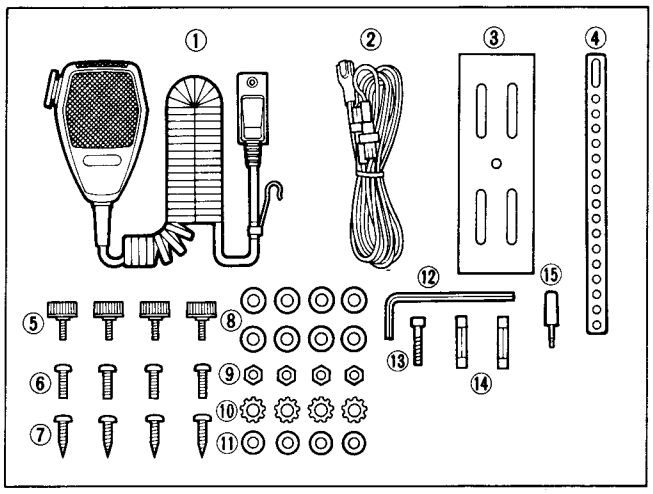
LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8210006660	331 Front panel (D)	1
②	8310020450	331 Window panel (A)	1
③	8610003370	Knob N115 [VOL]	1
④	8610006720	Button K50 (P)-2 [TONE]	1
⑤	8610006710	Button K50 (Q)-2 [SCAN]	1
⑥	8610006730	Button K50 (R)-2 [CH]	1
⑦	8610006740	Button K50 (S)-2 [SET]	1
⑧	8610006750	Button K50 (T)-2 [RESET]	1
⑨	8610006760	Button K50 (U)-2 [CALL]	1
⑩	8930010860	331 Microphone base plate	1
⑪	8830000050	VR nut (B)	1
⑫	8810001000	Screw PH B0 M2×6	6
⑬	8010010130	Keyboard (C)	1
⑭	8930010430	331 LCD cover	1
⑮	8930018950	863 LCD holder	1
⑯	5030000580	LCD LD-BU5031E-1	1
⑰	8930018980	863 LCD filter	1
⑱	8930018960	863 Reflector	1
⑲	8930010440	331 SW seat	3
⑳	8930017190	Grounding spring (F)	1
㉑	8930018970	LCD contact SRCN-863-W	2
㉒	2260000861	Switch SKHQFB015B [CALL], [RESET], etc.	6
㉓	7210001280	Variable resistor EVK-QVB 315 A14 [VOL]	1
㉔	8110004200	622 Top cover (A)	1
㉕	8110004630	Bottom cover (F)	1
㉖	8930006390	Speaker plate	1
㉗	2510000200	Speaker 66F09N-7 4 Ω	1
㉘	8930004950	57 Speaker spacer (incl.net)	1
㉙	8810000560	Polyester screw PH M4×6	1
㉚	8810003840	Screw BiH M3×8 ZK SUS	4
㉛	8810002960	Screw BiH M3×6 ZK SUS	4
㉜	8110003811	855 Shield case cover-1	1
㉝	8810002120	Screw FH M2.6×6	4
㉞	8810003750	Icom screw C9	4
㉟	8930006080	Screw spacer-C	4
㊱	8010010460	452 Chassis (C)-1	1
㊲	8010009610	Chassis spacer (A)-1	1
㊳	8810002170	Screw FH M3×6	5
㊴	8510006770	331 Antenna shield plate	1
㊵	8010001590	856 Case	1
㊶	8110004470	856 Case cover	1
㊷	8930018280	Standoff (A)	4
㊸	8850000370	Spring washer M3	4
㊹	8510007360	RF shield case	1
㊺	8510006730	DC shield case cover	1
㊻	8510006740	DC shield case	1
㊼	8810003160	Setscrew A M3×6	12
㊽	8930017490	Cable stopper	1
㊾	8810003140	Setscrew A M2.6×8	2
㊿	8930006470	Module plate	1
(51)	6450000420	Connector HSJ0780-01-010 [EXT SP]	1
(52)	8900002780	DC cable OPC-274 (incl. (55), (56), (57), (58))	1
(53)	8900001050	Antenna cable OPC-103	1
(54)	6950000040	M-type cap (black)	1
(55)	6510009110	Pin SGM-51-4	2
(56)	6510008830	Pin SGF-41-4	1
(57)	6510005150	Pin LLM61T-2.0	2
(58)	6510013250	Connector LR-02F-1V	1

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


DISPLAY UNIT
(B 2683C)


LPF UNIT
(B 3261C)
REG UNIT
(B 2632B)
VCO-A UNIT
(B 2446B)
PLL-A UNIT
(B 3378B)
SQL UNIT
(B 2881A)
MAIN UNIT
(B 3263B)
RF UNIT
(B 3231C)
VCO-B UNIT
(B 2447C)
PLL-B UNIT
(B 3378B)
VR UNIT
(B 2725A)
DISPLAY UNIT
(B 2683C)
LOGIC UNIT
(B 2723E)

4-2 ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	Optional product	Microphone EM-63	1
②	Optional product	DC power cable OPC-044A	1
③	8010004060	Mounting bracket	1
④	8010004050	Mounting support plate (B) ZK	1
⑤	8820000461	Mounting bolt (B)-1 M4 × 8 ZK	4
⑥	8810000700	Screw PH M5 × 20 SUS	4
⑦	8810000950	Screw PH A M5 × 16	4
⑧	8850000150	Flat washer M5 NI BS	8
⑨	8830000120	Nut M5	4
⑩	8850000590	Star washer M5	4
⑪	8850000220	Flat washer M4 ZN	4
⑫	8860000640	Allen key wrench 2.5M/M	1
⑬	8820000510	Allen head screw M3 × 18 ZK	1
⑭	5210000070	Fuse FGB 10A	2
⑮	5610000020	AP313 3.5φ CS plug	1

Screw abbreviations BS: Brass NI: Nickel
PH: Pan head ZK: Black

SECTION 5 PARTS LIST

[TONE UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140000640	IC	SC1084 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #14, #15, #16)
	1140000840	IC	SC1093 (#11, #12, #13)
IC2	1140000620	IC	FX102LG
IC3	1110002210	IC	TA75358CF (TP1)
Q3	1590000420	Transistor	RN1404 (TE85R)
X1	6050003450	Crystal	RF-4A3 FAG NKD (4.480000M)
L2	6200000070	Coil	LQN 2A R15K
R1	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R2	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R5	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R6	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R7	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R8	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R9	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R10	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R11	7030003610	Resistor	ERJ3GEYJ 273 V (27 kΩ)
R12	7030003700	Resistor	ERJ3GEYJ 154 V (150 kΩ)
R13	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R14	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R15	7030003630	Resistor	ERJ3GEYJ 393 V (39 kΩ)
R16	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R17	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R18	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 kΩ)
R19	7030003490	Resistor	ERJ3GEYJ 272 V (2.7 kΩ)
R21	7030003800	Resistor	ERJ3GEYJ 105 V (1 MΩ)
R22	7030003690	Resistor	ERJ3GEYJ 124 V (120 kΩ)
R23	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R25	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R26	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R27	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R28	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R29	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R30	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R31	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R32	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R33	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R34	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R35	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
R36	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R37	7030003600	Resistor	ERJ3GEYJ 223 V (22 kΩ)
C1	4030006680	Ceramic	C1608 SL 1H 300J-T-A
C2	4030006610	Ceramic	C1608 SL 1H 100D-T-A
C3	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C5	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C6	4550002890	Tantalum	TESVA 1A 225M1-8L
C7	4030006870	Ceramic	C1608 JB 1H 222K-T-A
C8	4550002890	Tantalum	TESVA 1A 225M1-8L
C9	4550000270	Tantalum	TESVA 1E 474M1-8L
C10	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C11	4030006860	Ceramic	C1608 JB 1H 102K-T-A
C12	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C13	4030006850	Ceramic	C1608 JB 1H 471K-T-A

[TONE UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C14	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C15	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C16	4030006900	Ceramic	C1608 JB 1E 103K-T-A
C18	4030006760	Ceramic	C1608 SL 1H 121J-T-A
C19	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C20	4030006710	Ceramic	C1608 SL 1H 470J-T-A
C21	4030006660	Ceramic	C1608 SL 1H 220J-T-A
C22	4030008630	Ceramic	C1608 JF 1C 104Z-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	4030006880	Ceramic	C1608 JB 1H 472K-T-A
C35	4030006710	Ceramic	C1608 SL 1H 470J-T-A
EP1	0910027364	P.C. Board	B 2724D (TONE)

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210001280	Variable Resistor	EVK-QVB 315 A14 (10KA) [VOL]
EP1	0910027161	P.C. Board	B 2725A (VR)
EP2	6910000630	Bead core	FSOH070RN

[DTMF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130004230	IC	LC7366NM
IC2	1130000830	IC	μPD4094BG-T1
Q1	1530001950	Transistor	2SC2712-GR (TE85R)
D1	1750000070	Diode	1SS226 (TE85R)
X1	6050006020	Crystal	CR-288
R1	7030003320	Resistor	ERJ3GEYJ 101 V (100 Ω)
R2	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R3	7030003760	Resistor	ERJ3GEYJ 474 V (470 kΩ)

[DTMF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R4	7030003590	Resistor	ERJ3GEYJ 183 V (18 kΩ)
R5	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R6	7030003500	Resistor	ERJ3GEYJ 332 V (3.3 kΩ)
R8	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
C1	4550002890	Tantalum	TESVA 1A 225M1-8L
C2	4550000460	Tantalum	TESVA 1C 105M1-8L
C3	4550000460	Tantalum	TESVA 1C 105M1-8L
C5	4030005110	Ceramic	C2012 JB 1E 473K-T-A
C6	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C8	4030006630	Ceramic	C1608 SL 1H 150J-T-A
C10	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
EP1	0910029791	P.C. Board	B 3025A (DTMF)

[DISPLAY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130004930	IC	μPD7225GB-3B7
IC2	1130004930	IC	μPD7225GB-3B7
Q1	1530000160	Transistor	2SC2712-Y (TE85RTEM)
D1	1750000050	Diode	1SS193 (TE85R)
D2	1750000050	Diode	1SS193 (TE85R)
D3	1750000050	Diode	1SS193 (TE85R)
D4	1750000050	Diode	1SS193 (TE85R)
D5	1730002150	Zener	02CZ6.8-X (TE85R)
D6	1730002150	Zener	02CZ6.8-X (TE85R)
D7	1730002150	Zener	02CZ6.8-X (TE85R)
D8	1730002150	Zener	02CZ6.8-X (TE85R)
D9	1730002150	Zener	02CZ6.8-X (TE85R)
D10	1730002150	Zener	02CZ6.8-X (TE85R)
D11	1730002150	Zener	02CZ6.8-X (TE85R)
R1	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R2	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R3	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R4	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R5	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R6	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R7	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R8	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R9	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R10	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R11	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R12	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R13	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R14	7510000370	Thermistor	DTN-T203I152LS (T)
R15	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R16	7010004340	Resistor	R20J 15 kΩ
C1	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C2	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C3	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C4	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C5	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C6	4030008500	Ceramic	ECWV 1E 103JS9
C10	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C11	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C12	4030004710	Ceramic	C2012 JB 1H 471K-T-A

[DISPLAY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C13	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C14	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C15	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C16	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C17	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C18	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C19	4550000320	Tantalum	DN 1V 0R1M
DS1	5030000580	LCD	LD-BU5031E-1 (E-5168-1)
DS2	5080000130	LED	HRS-7219A-G40
DS3	5080000130	LED	HRS-7219A-G40
DS4	5080000130	LED	HRS-7219A-G40
DS5	5080000130	LED	HRS-7219A-G40
S1	2260000861	Switch	SKHQFB015B [RESET]
S2	2260000861	Switch	SKHQFB015B [CALL]
S3	2260000861	Switch	SKHQFB015B [TONE]
S4	2260000861	Switch	SKHQFB015B [CH]
S5	2260000861	Switch	SKHQFB015B [SCAN]
S6	2260000861	Switch	SKHQFB015B [SET]
EP1	0910026663	P.C. Board	B 2683C (DISPLAY)
EP2	8930018970	LCD contact strip	SRCN-863-W

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110000960	IC	NJM4558M (T1)
IC2	1110002210	IC	TA75358CF (TP1)
IC3	1130003830	IC	TC7S04F (TE85R)
IC4	1130001830	IC	MN6520
IC5	1110002210	IC	TA75358CF (TP1)
IC6	1110002210	IC	TA75358CF (TP1)
IC7	1110000210	IC	μPC2002H
IC8	1130004951	IC	SC-1133-1
IC9	1130004900	IC	MC74HC373F
IC10	1130004910	IC	TC5564AFL-15 (TP1)
IC11	1140001480	IC	μPD78213GC-AB8
IC12	1130000830	IC	μPD4094BG-T1
IC13	1130000830	IC	μPD4094BG-T1
IC14	1130005230	IC	TC74HCU04AF
IC15	1110001550	IC	S-8054ALB-LM-T1
IC16	1130003710	IC	TC4S71F (TE85R)
Q1	1590000420	Transistor	RN1404 (TE85R)
Q2	1510000110	Transistor	2SA1162-Y (TE85R)
Q3	1510000110	Transistor	2SA1162-Y (TE85R)
Q4	1590000420	Transistor	RN1404 (TE85R)
Q5	1590000460	Transistor	RN1402 (TE85R)
Q6	1590000480	Transistor	RN2402 (TE85R)
Q7	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q8	1510000110	Transistor	2SA1162-Y (TE85R)
Q9	1590000510	Transistor	RN1409 (TE85R)
Q10	1590000460	Transistor	RN1402 (TE85R)
Q11	1590000460	Transistor	RN1402 (TE85R)
Q12	1510000370	Transistor	2SA1359-Y
Q13	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q14	1590000460	Transistor	RN1402 (TE85R)
Q15	1590000420	Transistor	RN1404 (TE85R)
Q16	1530001950	Transistor	2SC2712-GR (TE85R)
Q17	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q18	1590000480	Transistor	RN2402 (TE85R)
Q19	1590000420	Transistor	RN1404 (TE85R)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q20	1540000300	Transistor	2SD1286 K
Q22	1590000380	FET	2SJ106-Y (TE85R)
Q23	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q24	1590000380	FET	2SJ106-Y (TE85R)
Q25	1510000370	Transistor	2SA1359-Y
Q26	1590000410	Transistor	RN2404 (TE85R)
Q27	1590000420	Transistor	RN1404 (TE85R)
Q28	1590000460	Transistor	RN1402 (TE85R)
D1	1750000050	Diode	1SS193 (TE85R)
D2	1750000050	Diode	1SS193 (TE85R)
D3	1750000050	Diode	1SS193 (TE85R)
D6	1750000060	Diode	1SS196 (TE85R)
D7	1750000040	Diode	1SS190 (TE85R)
D8	1750000010	Diode	1SS181 (TE85R)
D10	1750000020	Diode	1SS184 (TE85R)
D11	1730000070	Zener	RD3.9E B2
D14	1750000010	Diode	1SS181 (TE85R)
D16	1750000050	Diode	1SS193 (TE85R)
D17	1750000060	Diode	1SS196 (TE85R) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	1750000020	Diode	1SS184 (TE85R) (#15, #16)
D18	1750000050	Diode	1SS193 (TE85R) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #14, #15, #16)
	1750000020	Diode	1SS184 (TE85R) (#11, #12, #13)
D21	1750000050	Diode	1SS193 (TE85R)
D22	1750000040	Diode	1SS190 (TE85R)
X1	6050003110	Crystal	RF-4A3 FAC NKD (4.194304M)
X2	6050007450	Crystal	RF-4A3 FAM NKD (4.9152M)
L1	6200000970	Coil	NL 322522T-100K
L2	6200000970	Coil	NL 322522T-100K
L3	6180000960	Coil	LAL 03NA 102K
R1	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R2	7310003200	Trimmer	EVN-2ACA00 B14 (103)
R3	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R4	7310000810	Trimmer	RH0651CS5J10A (474)
R5	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R6	7030000480	Resistor	MCR10EZHJ 6.8 kΩ (682)
R7	7030000700	Resistor	MCR10EZHJ 470 kΩ (474)
R8	7310000740	Trimmer	RH0651CS3J2KA (472)
R9	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R10	7030000650	Resistor	MCR10EZHJ 180 kΩ (184)
R11	7030000630	Resistor	MCR10EZHJ 120 kΩ (124)
R12	7030000570	Resistor	MCR10EZHJ 39 kΩ (393)
R13	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R14	7310000810	Trimmer	RH0651CS5J10A (474)
R15	7030000530	Resistor	MCR10EZHJ 18 kΩ (183)
R16	7310000740	Trimmer	RH0651CS3J2KA (472)
R17	7030000550	Resistor	MCR10EZHJ 27 kΩ (273)
R18	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R19	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R20	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R21	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R22	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)
R23	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R24	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R25	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R26	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332)
R30	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R31	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R32	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R33	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R34	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R35	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R36	7030000480	Resistor	MCR10EZHJ 6.8 kΩ (682)
R37	7030000430	Resistor	MCR10EZHJ 2.7 kΩ (272)
R38	7030000480	Resistor	MCR10EZHJ 6.8 kΩ (682)
R41	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R42	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R43	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R44	7030000530	Resistor	MCR10EZHJ 18 kΩ (183)
R45	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R46	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R47	7030000640	Resistor	MCR10EZHJ 150 kΩ (154)
R48	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R49	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R50	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R51	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R52	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R53	7030000700	Resistor	MCR10EZHJ 470 kΩ (474)
R54	7030000600	Resistor	MCR10EZHJ 68 kΩ (683)
R55	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R56	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R57	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R58	7030000650	Resistor	MCR10EZHJ 180 kΩ (184)
R59	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R60	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R61	7030000490	Resistor	MCR10EZHJ 8.2 kΩ (822)
R62	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R63	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R64	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R65	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R66	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R67	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R68	7030000740	Resistor	MCR10EZHJ 1 MΩ (105)
R69	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R70	7030000490	Resistor	MCR10EZHJ 8.2 kΩ (822)
R71	7030000710	Resistor	MCR10EZHJ 560 kΩ (564)
R72	7030000550	Resistor	MCR10EZHJ 27 kΩ (273)
R73	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R74	7030000490	Resistor	MCR10EZHJ 8.2 kΩ (822)
R75	7030000570	Resistor	MCR10EZHJ 39 kΩ (393)
R76	7310003240	Trimmer	EVN-2ACA00 B23 (202)
R77	7030000020	Resistor	MCR10EZHJ 1 Ω (010)
R78	7030000330	Resistor	MCR10EZHJ 390 Ω (391)
R79	7030000060	Resistor	MCR10EZHJ 2.2 Ω (2R2)
R80	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R81	7310003210	Trimmer	EVN-2ACA00 B54 (503)
R82	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R83	7030000740	Resistor	MCR10EZHJ 1 MΩ (105)
R84	7030000740	Resistor	MCR10EZHJ 1 MΩ (105)
R85	7030000740	Resistor	MCR10EZHJ 1 MΩ (105)
R86	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R87	7030000730	Resistor	MCR10EZHJ 820 kΩ (824)
R88	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R89	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R90	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R91	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R92	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R93	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R94	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R95	7030000640	Resistor	MCR10EZHJ 150 kΩ (154)
R96	7030000510	Resistor	MCR10EZHJ 12 kΩ (123)
R97	7030000720	Resistor	MCR10EZHJ 680 kΩ (684)
R98	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R99	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R100	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R101	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R102	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R103	7030000560	Resistor	MCR10EZHJ 33 kΩ (333)
R104	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R105	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R106	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R107	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R108	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R109	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R110	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R111	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R112	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R113	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R114	7030000670	Resistor	MCR10EZHJ 270 kΩ (274)
R115	7510000570	Thermistor	DTN-T204D154LS (T)
R127	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R128	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R129	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R130	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R131	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R132	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R133	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R134	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R135	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R137	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R138	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R139	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R140	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R141	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R142	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R143	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R144	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R145	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R146	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R147	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R148	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R149	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R150	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R151	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R152	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R153	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R154	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R155	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R156	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R157	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R158	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R159	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R160	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R161	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R162	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R163	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R164	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R165	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R166	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R167	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R168	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R169	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R170	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R171	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R172	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R173	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R174	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R175	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R176	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R177	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R178	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R179	7030000590	Resistor	MCR10EZHJ 56 kΩ (563)
R180	7030000700	Resistor	MCR10EZHJ 470 kΩ (474)
R181	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R182	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)
R183	7030000500	Resistor	MCR10EZHJ 10 kΩ (103) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472) (#02, #04, #06, #08, #09, #10, #14)
R184	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R186	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R187	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R188	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R189	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C2	4550000280	Tantalum	TESVB2 1A 475M-8L
C3	4550000450	Tantalum	TESVC 1C 106M-12L
C4	4550000530	Tantalum	TESVA 1V 104M1-8L
C5	4550000280	Tantalum	TESVB2 1A 475M-8L
C6	4550000280	Tantalum	TESVB2 1A 475M-8L
C7	4030004730	Ceramic	C2012 JB 1H 222K-T-A
C8	4030008760	Ceramic	C2012 X7R 1C 104K -T-A
C9	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C10	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C11	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C12	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C13	4030009480	Ceramic	C2012 CH 1H 201J-T-A (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	4030004990	Ceramic	C2012 CH 1H 101J-T-A (#02, #04, #06, #08, #09, #10, #14)
C14	4550000460	Tantalum	TESVA 1C 105M1-8L
C17	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C19	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C20	4030004580	Ceramic	C2012 SL 1H 560J-T-A
C21	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C22	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C23	4550002720	Tantalum	TESVD2 0J 476M-12 L
C24	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C25	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C26	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C27	4030004490	Ceramic	C2012 SL 1H 150J-T-A
C28	4030004500	Ceramic	C2012 SL 1H 180J-T-A
C29	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C30	4030005090	Ceramic	C2012 JB 1H 223K-T-A
C31	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C32	4550000280	Tantalum	TESVB2 1A 475M-8L
C33	4030003320	Ceramic	GRM40 F 333Z 50PT
C34	4030004670	Ceramic	C2012 SL 1H 271J-T-A
C35	4550000270	Tantalum	TESVA 1E 474M1-8L
C36	4550000550	Tantalum	TESVA 1V 224M1-8L
C37	4550000270	Tantalum	TESVA 1E 474M1-8L
C38	4550000460	Tantalum	TESVA 1C 105M1-8L
C39	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C40	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C41	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C42	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C43	4550000550	Tantalum	TESVA 1V 224M1-8L
C44	4550002890	Tantalum	TESVA 1A 225M1-8L
C45	4550000270	Tantalum	TESVA 1E 474M1-8L
C46	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C47	4510002380	Electrolytic	16 SS 470 µF (10X12.5)
C48	4510004550	Electrolytic	16 YXB 1000 µF
C49	4030008760	Ceramic	C2012 X7R 1C 104K-T-A
C50	4550000870	Tantalum	TESVD 1A 336M-12L
C51	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C52	4550000280	Tantalum	TESVB2 1A 475M-8L
C53	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C54	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C55	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C56	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C57	4030004540	Ceramic	C2012 SL 1H 300J-T-A
C58	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C59	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C60	4030004660	Ceramic	C2012 SL 1H 221J-T-A
C61	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C62	4550000270	Tantalum	TESVA 1E 474M1-8L
C63	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C64	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C65	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C66	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C67	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C69	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C70	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C71	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C72	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C73	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C74	4030008760	Ceramic	C2012 X7R 1C 104K-T-A
C75	4030006450	Ceramic	C2012 JF 1H 103Z-T-A

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C76	4550000850	Tantalum	TESVC 1A 156M-12L
C77	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C78	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C79	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C80	4550000530	Tantalum	TESVA 1V 104M1-8L
C81	4550000530	Tantalum	TESVA 1V 104M1-8L
C82	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C83	4510002740	Electrolytic	10 SS 220 µF
S1	2220000360	Switch	ESD-1111212
BT1	3020000040	Lithium Battery	BR2325-1HC
EP1	0910027355	P.C. Board	B 2723E (LOGIC)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002200	IC	MC3372MR
IC2	1110002770	IC	µPB584G
IC3	1110002210	IC	TA75358CF (TP1)
IC4	1180000660	IC	TA78L018AP
IC5	1110000900	IC	TL499ACP
IC6	1110002020	IC	TA7805S
IC7	1110002210	IC	TA75358CF (TP1)
IC8	1180000030	IC	TA78L008AP
IC9	1150000520	IC	M57729L (#01, #02, #12)
	1150000490	IC	SC1056 (#03, #04, #09, #13, #14)
	1150000240	IC	M57704L (#05, #06)
	1150000230	IC	M57704H (#07, #08, #10, #11)
	1150000500	IC	SC1057 (#15)
	1150000890	IC	SC1122 (#16)
Q1	1560000430	FET	2SK302-GR (TE85R)
Q2	1530002050	Transistor	2SC3661-TA
Q3	1530002050	Transistor	2SC3661-TA
Q4	1510000110	Transistor	2SA1162-Y (TE85R)
Q5	1530002240	Transistor	2SC3775-3-TA
Q6	1590000460	Transistor	RN1402 (TE85R)
Q7	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q8	1530000370	Transistor	2SC3356-T2B
Q9	1530000370	Transistor	2SC3356-T2B
Q10	1530002680	Transistor	2SC3357 T2B
Q11	1590000390	Transistor	MRF-559
Q12	1520000390	Transistor	2SB1135 R
Q16	1530002590	Transistor	2SC3422-Y
Q17	1530002590	Transistor	2SC3422-Y
D1	1710000290	Diode	MI308
D2	1710000290	Diode	MI308
D3	1710000290	Diode	MI308
D4	1790000490	Diode	HSM88AS-TR
D5	1730000730	Zener	RD6.2M-T2B2
D6	1750000020	Diode	1SS184 (TE85R)
D7	1750000210	Diode	1SV237 (TE85R)
D8	1750000260	Diode	1SS352 (TPH3)
D9	1750000210	Diode	1SV237 (TE85R)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D10	1750000260	Diode	1SS352 (TPH3)
D11	1750000010	Diode	1SS181 (TE85R)
D12	1750000260	Diode	1SS352 (TPH3)
D13	1750000160	Diode	DA114 T107
D14	1790000660	Diode	MA728 (TW)
D15	1790000660	Diode	MA728 (TW)
D18	1750000260	Diode	1SS352 (TPH3)
D19	1750000260	Diode	1SS352 (TPH3)
D20	1710000040	Diode	1S953
D21	1730000520	Zener	RD20E B2
D22	1710000010	Diode	15CD11
D23	1750000260	Diode	1SS352 (TPH3)
X1	6050005010	Crystal	CR-214
X2	6070000090	Discriminator	CDB455C16
X3	6050007410	Crystal	CR-335
FI1	2010000940	Filter	30M7B (FL-107) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	2010000230	Filter	30M15B (FL-76) (#02, #04, #06, #08, #09, #10, #14)
FI2	2020000770	Ceramic Filter	CFZM455G (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	2020000490	Ceramic Filter	CFZM455E10 (#02, #04, #06, #08, #09, #10, #14)
L1	6110002110	Coil	LA-382
L2	6110001520	Coil	LA-232
L3	6200001080	Coil	NL 322522T-015M
L4	6150003210	Coil	LS-319
L5	6150003210	Coil	LS-319
L6	6150003220	Coil	LS-320
L7	6180000960	Coil	LAL 03NA 102K
L8	6200000140	Coil	LQH 3N 1R0M
L9	6200000140	Coil	LQH 3N 1R0M
L10	6200000090	Coil	LQN 2A 18NM
L11	6200000090	Coil	LQN 2A 18NM
L12	6200000090	Coil	LQN 2A 18NM
L13	6200000090	Coil	LQN 2A 18NM
L14	6200000090	Coil	LQN 2A 18NM
L15	6200000720	Coil	LQN 2A 10NM
L16	6110001520	Coil	LA-232
L17	6110001530	Coil	LA-233
L18	6110001540	Coil	LA-234
L19	6910000670	Coil	BT01RN1-A61-001
L20	6110001530	Coil	LA-233
L21	6110001530	Coil	LA-233
L22	6170000320	Coil	LW-29
L23	6110001150	Coil	LA-153 (#01, #02, #05, #06, #12)
	6110000950	Coil	LA-126 (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
L24	6170000050	Coil	LW-7
L25	6180001440	Coil	RFC S4 101K
L26	6180001120	Coil	FL 5H 101K
L27	6170000150	Coil	LW-16
L28	6200000140	Coil	LQH 3N 1R0M
L29	6200000140	Coil	LQH 3N 1R0M
L30	6200000870	Coil	NL 322522T-2R2M
L31	6200000870	Coil	NL 322522T-2R2M
L32	6200000870	Coil	NL 322522T-2R2M
L33	6200001260	Coil	MLF2012A 1R8M-T
L34	6910000670	Coil	BT01RN1-A61-001
L35	6200000140	Coil	LQH 3N 1R0M
L36	6200000750	Coil	LQH 3N 4R7M
L37	6200000140	Coil	LQH 3N 1R0M

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L38	6200001260	Coil	MLF2012A 1R8M-T
R1	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R2	7030000320	Resistor	MCR10EZHJ 330 Ω (331) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000310	Resistor	MCR10EZHJ 270 Ω (271) (#02, #04, #06, #08, #09, #10, #14)
R4	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R5	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R6	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R7	7030000400	Resistor	MCR10EZHJ 1.5 kΩ (152)
R8	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R9	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R10	7030000400	Resistor	MCR10EZHJ 1.5 kΩ (152) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000410	Resistor	MCR10EZHJ 1.8 kΩ (182) (#02, #04, #06, #08, #09, #10, #14)
R11	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R12	7030000430	Resistor	MCR10EZHJ 2.7 kΩ (272) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122) (#02, #04, #06, #08, #09, #10, #14)
R13	7030000280	Resistor	MCR10EZHJ 150 Ω (151)
R14	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R15	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R16	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R17	7030000370	Resistor	MCR10EZHJ 820 Ω (821) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000340	Resistor	MCR10EZHJ 470 Ω (471) (#02, #04, #06, #08, #09, #10, #14)
R18	7030000690	Resistor	MCR10EZHJ 390 kΩ (394) (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	7030000590	Resistor	MCR10EZHJ 56 kΩ (563) (#02, #04, #06, #08, #09, #10, #14)
R19	7310000740	Trimmer	RH0651CS3J2KA (472)
R20	7030000610	Resistor	MCR10EZHJ 82 kΩ (823)
R21	7030000530	Resistor	MCR10EZHJ 18 kΩ (183)
R22	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R23	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R24	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R25	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)
R26	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R27	7310000720	Trimmer	RH0651CJ3J0CA (222) (#01, #02, #05, #06, #12)
	7310000760	Trimmer	RH0651CJ4J01A (223) (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15)
	7310000780	Trimmer	RH0651CS4J25A (473) (#16)
R28	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R29	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R30	7030000710	Resistor	MCR10EZHJ 560 kΩ (564) (#01, #02, #05, #06, #12)
	7030000720	Resistor	MCR10EZHJ 680 kΩ (684) (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15)
	7030000690	Resistor	MCR10EZHJ 390 kΩ (394) (#16)
R31	7030000220	Resistor	MCR10EZHJ 47 Ω (470)
R32	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R33	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R34	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R35	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R36	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R37	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R38	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R39	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R40	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R41	7030000370	Resistor	MCR10EZHJ 820 Ω (821)
R42	7030000110	Resistor	MCR10EZHJ 5.6 Ω (5R6)
R43	7030000370	Resistor	MCR10EZHJ 820 Ω (821)
R44	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R45	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332)
R46	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R47	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R48	7030000300	Resistor	MCR10EZHJ 220 Ω (221) (#01, #02, #05, #06, #12)
	7030000510	Resistor	MCR10EZHJ 12 kΩ (123) (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	7030000540	Resistor	MCR10EZHJ 22 kΩ (223) (#15, #16)
R49	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R50	7030000170	Resistor	MCR10EZHJ 18 Ω (180)
R51	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R52	7030000280	Resistor	MCR10EZHJ 150 Ω (151)
R53	7030000310	Resistor	MCR10EZHJ 270 Ω (271)
R54	7030000170	Resistor	MCR10EZHJ 18 Ω (180)
R55	7030000310	Resistor	MCR10EZHJ 270 Ω (271)
R56	7030000350	Resistor	MCR10EZHJ 560 Ω (561)
R57	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R58	7030000200	Resistor	MCR10EZHJ 33 Ω (330)
R59	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R60	7030000330	Resistor	MCR10EZHJ 390 Ω (391)
R61	7030000400	Resistor	MCR10EZHJ 1.5 kΩ (152)
R62	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R63	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R64	7030000320	Resistor	MCR10EZHJ 330 Ω (331)
R65	7030000400	Resistor	MCR10EZHJ 1.5 kΩ (152)
R66	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R67	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R68	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R69	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R70	7030000320	Resistor	MCR10EZHJ 330 Ω (331)
R71	7030000320	Resistor	MCR10EZHJ 330 Ω (331)
R72	7030000320	Resistor	MCR10EZHJ 330 Ω (331)
R73	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R74	7030000220	Resistor	MCR10EZHJ 47 Ω (470)
R75	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R76	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R78	7030001030	Resistor	MCR50JZHJ 15 Ω (150)
R79	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R80	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R81	7010003470	Resistor	ELR20J 3.9 kΩ
R82	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R83	7010003480	Resistor	ELR20J 4.7 kΩ
R84	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)
R85	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R86	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R87	7030000600	Resistor	MCR10EZHJ 68 kΩ (683)
R88	7310001720	Trimmer	RH0421C15J06A (104)
R89	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R90	7310001850	Trimmer	RH0421CS4J08A (473)
R91	7030000520	Resistor	MCR10EZHJ 15 kΩ (153)
R93	7030000560	Resistor	MCR10EZHJ 33 kΩ (333)
R95	7030000470	Resistor	MCR10EZHJ 5.6 kΩ (562)
R96	7030000470	Resistor	MCR10EZHJ 5.6 kΩ (562)
R97	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R98	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R99	7030000280	Resistor	MCR10EZHJ 150 Ω (151)
R103	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R104	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R105	7030000470	Resistor	MCR10EZHJ 5.6 kΩ (562)
R106	7030000350	Resistor	MCR10EZHJ 560 Ω (561)
R107	7010000050	Resistor	ELR25J 2.2 Ω
R108	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R109	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R110	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R111	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R112	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R113	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R114	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R118	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R119	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R120	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R121	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R122	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R123	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R124	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R125	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R126	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R127	7510000200	Thermistor	DTN-T203U473LS (T)
R128	7520000060	Posistor	PTH59F04BE222TS
R129	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R130	7310001720	Trimmer	RH0421C15J06A (104)
R131	7030000560	Resistor	MCR10EZHJ 33 kΩ (333)
C1	4010003780	Ceramic	DD06 SL 010C 500V
C2	4010003800	Ceramic	DD06 SL 030C 500V (#01, #02, #05, #06, #12)
	4010003780	Ceramic	DD06 SL 010C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C3	4010003930	Ceramic	DD06 SL 270K 500V (#01, #02, #05, #06, #12)
	4010003890	Ceramic	DD06 SL 180K 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C4	4010003820	Ceramic	DD06 SL 050C 500V (#01, #02, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C5	4030004450	Ceramic	C2012 SL 1H 080D-T-A
C6	4030004400	Ceramic	C2012 SL 1H 030C-T-A
C7	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C8	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C9	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C10	4030004520	Ceramic	C2012 SL 1H 220J-T-A (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	4030004480	Ceramic	C2012 SL 1H 120J-T-A (#02, #04, #06, #08, #09, #10, #14)
C11	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C12	4030004560	Ceramic	C2012 SL 1H 390J-T-A
C13	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C14	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C15	4030004580	Ceramic	C2012 SL 1H 560J-T-A
C16	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C17	4030004500	Ceramic	C2012 SL 1H 180J-T-A
C18	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C19	4550000530	Tantalum	TESVA 1V 104M1-8L
C20	4030004620	Ceramic	C2012 SL 1H 121J-T-A (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	4030004610	Ceramic	C2012 SL 1H 101J-T-A (#02, #04, #06, #08, #09, #10, #14)
C21	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C22	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C23	4510001100	Electrolytic	16 MS7 10 µF
C24	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C25	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C26	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C27	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C28	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C29	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C30	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C31	4030004720	Ceramic	C2012 JB 1H 102K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C32	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C33	4550000270	Tantalum	TESVA 1E 474M1-8L
C34	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C35	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C36	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C37	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C38	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C39	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C40	4550000450	Tantalum	TESVC 1C 106M-12L
C41	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C42	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C43	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C44	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C45	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C46	4550000450	Tantalum	TESVC 1C 106M-12L
C47	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C48	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C49	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C50	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C51	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C52	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C53	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C54	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C55	4030004450	Ceramic	C2012 SL 1H 080D-T-A
C56	4030004420	Ceramic	C2012 SL 1H 050C-T-A
C57	4030004490	Ceramic	C2012 SL 1H 150J-T-A
C58	4030004450	Ceramic	C2012 SL 1H 080D-T-A
C59	4550002890	Tantalum	TESVA 1A 225M1-8L
C60	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C61	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C62	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C63	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C64	4030004410	Ceramic	C2012 SL 1H 040C-T-A
C65	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C66	4030004460	Ceramic	C2012 SL 1H 090D-T-A
C67	4030004410	Ceramic	C2012 SL 1H 040C-T-A
C68	4030004410	Ceramic	C2012 SL 1H 040C-T-A
C69	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C70	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C71	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C72	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C73	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C74	4030004400	Ceramic	C2012 SL 1H 030C-T-A
C75	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C76	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C77	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C78	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C79	4030004430	Ceramic	C2012 SL 1H 060D-T-A
C80	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C81	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C82	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C83	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C84	4030004430	Ceramic	C2012 SL 1H 060D-T-A
C85	4030004460	Ceramic	C2012 SL 1H 090D-T-A
C86	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C87	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C88	4030004750	Ceramic	C2012 JB 1H 103K-T-A
C89	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C90	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C91	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C92	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C93	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C94	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C95	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C96	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C97	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C98	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C99	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C100	4030004400	Ceramic	C2012 SL 1H 030C-T-A
C101	4030004490	Ceramic	C2012 SL 1H 150J-T-A
C104	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C105	4550000260	Tantalum	DN 1V 100M
C106	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C107	4510003040	Electrolytic	16 SS 100 µF
C108	4030004710	Ceramic	C2012 JB 1H 471K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C109	4550000260	Tantalum	DN 1V 100M
C110	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C111	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C112	4550000260	Tantalum	DN 1V 100M
C113	4010003820	Ceramic	DD06 SL 050C 500V (#01, #02, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C114	4010003820	Ceramic	DD06 SL 050C 500V (#01, #02, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C115	4010004110	Ceramic	DD05 B 471K 500V
C116	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C117	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C118	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C119	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C120	4510002870	Electrolytic	25 SS 100 µF
C121	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C122	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C123	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C124	4510004530	Electrolytic	25 MV 4R7 NPDW
C125	4550000450	Tantalum	TESVC 1C 106M-12L
C127	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C128	4510002380	Electrolytic	16 SS 470 µF (10X12.5)
C129	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C130	4510002380	Electrolytic	16 SS 470 µF (10X12.5)
C131	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C132	4510003040	Electrolytic	16 SS 100 µF
C133	4510002640	Electrolytic	25 SS 47 µF
C134	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C135	4510002730	Electrolytic	10 SS 100 µF
C136	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C137	4550003110	Tantalum	TEMSVC 1A 226M-12 L
C138	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C139	4550000530	Tantalum	TESVA 1V 104M1-8L
C140	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C141	4510004920	Electrolytic	35 MV 47 AG
C142	4510004890	Electrolytic	25 MV 100 AG
C143	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C144	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C146	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C147	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C148	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C149	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C150	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C151	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C152	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C153	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C154	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C156	4010003790	Ceramic	DD06 SL 020C 500V (#01, #02, #05, #06, #12)
	4010003780	Ceramic	DD06 SL 010C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C157	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C158	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C159	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C160	4030004470	Ceramic	C2012 SL 1H 100D-T-A
C161	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C162	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C163	4030004470	Ceramic	C2012 SL 1H 100D-T-A (#01, #03, #05, #07, #11, #12, #13, #15, #16)
	4030004430	Ceramic	C2012 SL 1H 060D-T-A (#02, #04, #06, #08, #09, #10, #14)
C164	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C165	4550000260	Tantalum	DN 1V 100M
C166	4030004710	Ceramic	C2012 JB 1H 471K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C167	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C168	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C169	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C170	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C171	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C172	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C173	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C174	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C175	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C176	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C177	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C178	4030004440	Ceramic	C2012 SL 1H 070D-T-A
C179	4030004520	Ceramic	C2012 SL 1H 220J-T-A
CP1	6510003100	Check Point	RT01T-1.3B
CP2	6510003100	Check Point	RT01T-1.3B
CP3	6510003080	Check Point	RT01T-1.0B
EP1	0910032742	P.C. Board	B 3263B (MAIN)
EP2	6910000970	Lead Frame	DL 2OP 2.6-3-1.2H
EP3	6910000970	Lead Frame	DL 2OP 2.6-3-1.2H
EP4	6910000970	Lead Frame	DL 2OP 2.6-3-1.2H
EP5	6910006290	Lead Frame	HF70BB9X5X4.5

[SQL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002490	IC	M5218FP-73A
IC2	1140001660	IC	µPD7554AG-511
R1	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R2	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003560	Resistor	ERJ3GEYJ 103 V (10 kΩ)
R4	7030003720	Resistor	ERJ3GEYJ 224 V (220 kΩ)
R5	7030003440	Resistor	ERJ3GEYJ 102 V (1 kΩ)
R6	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003690	Resistor	ERJ3GEYJ 124 V (120 kΩ)
R8	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R9	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R10	7030003540	Resistor	ERJ3GEYJ 682 V (6.8 kΩ)
R11	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R12	7030003650	Resistor	ERJ3GEYJ 563 V (56 kΩ)
R13	7030003680	Resistor	ERJ3GEYJ 104 V (100 kΩ)
R14	7030003640	Resistor	ERJ3GEYJ 473 V (47 kΩ)
R15	7030003670	Resistor	ERJ3GEYJ 823 V (82 kΩ)
C1	4030006850	Ceramic	C1608 JB 1H 471K-T-A
C2	4550000420	Tantalum	TESVA 1A 105M1-8L
C3	4550003030	Tantalum	TEMSVA 0J 475M-8L
C4	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
C5	4030008630	Ceramic	C1608 JF 1C 104Z-T-A
C6	4030006890	Ceramic	C1608 JF 1H 103Z-T-A
EP1	0910028441	P.C. Board	B 2881A (SQL)
EP2	6910002720	Lead Frame	HFB2.54-0.9-8 (N)

[REG UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q2	1530000160	Transistor	2SC2712-Y (TE85RTEM)
Q3	1590000420	Transistor	RN1404 (TE85R)
D1	1750000050	Diode	1SS193 (TE85R)
D2	1750000050	Diode	1SS193 (TE85R)
R1	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R2	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R3	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R4	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
C1	4550000270	Tantalum	TESVA 1E 474M1-8L
C2	4550000270	Tantalum	TESVA 1E 474M1-8L
EP1	0910026142	P.C. Board	B 2632B (REG)
EP2	6910002720	Lead Frame	HFB2.54-0.9-8 (N)

[PLL-A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001310	IC	MB1504PF-G-BND
IC2	1130004200	IC	TC4S66F (TE85R)
Q1	1560000360	FET	2SK209-Y (TE85R)
Q2	1560000360	FET	2SK209-Y (TE85R)
Q3	1530001950	Transistor	2SC2712-GR (TE85R)
Q4	1590000410	Transistor	RN2404 (TE85R)
Q5	1510000620	Transistor	2SA1576 T107 S
Q6	1530002280	Transistor	2SC4081 T107 S
D1	1720000310	Varicap	1SV128 (TE85R)
D2	1750000050	Diode	1SS193 (TE85R)
L1	6200000780	Coil	LQH 3N 100K
L2	6200000090	Coil	LQN 2A 18NM
R1	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R2	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R3	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R4	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R5	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332)
R6	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R7	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R8	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R9	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R10	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R11	7030000160	Resistor	MCR10EZHJ 15 Ω (150)
R12	7030000020	Resistor	MCR10EZHJ 1 Ω (010)
R13	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R14	7030000220	Resistor	MCR10EZHJ 47 Ω (470)
R15	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R16	7030000550	Resistor	MCR10EZHJ 27 kΩ (273)
R17	7030000510	Resistor	MCR10EZHJ 12 kΩ (123)
R18	7030000550	Resistor	MCR10EZHJ 27 kΩ (273)
R19	7030000510	Resistor	MCR10EZHJ 12 kΩ (123)
R20	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)

[PLL-A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R21	7030000740	Resistor	MCR10EZHJ 1 MΩ (105)
C2	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C3	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C4	4030005090	Ceramic	C2012 JB 1H 223K-T-A
C5	4550000590	Tantalum	TESVB2 1V 105M-8L
C6	4550000550	Tantalum	TESVA 1V 224M1-8L
C7	4550000280	Tantalum	TESVB2 1A 475M-8L
C8	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C9	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C10	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C11	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C12	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C13	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C14	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C15	4030004440	Ceramic	C2012 SL 1H 070D-T-A
C16	4030004440	Ceramic	C2012 SL 1H 070D-T-A
C17	4550000590	Tantalum	TESVB2 1V 105M-8L
C18	4550000460	Tantalum	TESVA 1C 105M1-8L
EP1	0910033182	P.C. Board	B 3378B (PLL-A)

[VCO-A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530000370	Transistor	2SC3356-T2B
Q2	1530000370	Transistor	2SC3356-T2B
D1	1720000220	Varicap	1SV166-T2B
D2	1720000220	Varicap	1SV166-T2B
L1	6200000050	Coil	LQH 3N R39M
L2	6200000070	Coil	LQN 2A R15K
L3	6200000720	Coil	LQN 2A 10NM
L4	6200000140	Coil	LQH 3N 1R0M
R1	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R2	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R3	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R4	7030000300	Resistor	MCR10EZHJ 220 Ω (221)
R5	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R6	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R7	7030000290	Resistor	MCR10EZHJ 180 Ω (181)
R8	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332)
R9	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R10	7030000140	Resistor	MCR10EZHJ 10 Ω (100)
R11	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
R12	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R13	7030000160	Resistor	MCR10EZHJ 15 Ω (150)
R14	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
C1	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C2	4030002570	Ceramic	GRM40 UJ 040C 50PT
C3	4030002570	Ceramic	GRM40 UJ 040C 50PT
C4	4030002760	Ceramic	GRM40 UJ 101J 50PT
C5	4030002630	Ceramic	GRM40 UJ 120J 50PT
C6	4030002640	Ceramic	GRM40 UJ 150J 50PT
C7	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C8	4030004720	Ceramic	C2012 JB 1H 102K-T-A

[VCO-A UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C9	4550000280	Tantalum	TESVB2 1A 475M-8L
C10	4550003110	Tantalum	TEMSVC 1A 226M-12 L
C11	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C12	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A
C13	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C14	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C15	4030004430	Ceramic	C2012 SL 1H 060D-T-A
C16	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C17	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C18	4030004720	Ceramic	C2012 JB 1H 102K-T-A
EP1	0910025282	P.C. Board	B 2446B (VCO-A)

[PLL-B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140001280	IC	MB1501PF-G-BND
IC2	1130004200	IC	TC4S66F (TE85R)
Q1	1560000360	FET	2SK209-Y (TE85R)
Q2	1560000360	FET	2SK209-Y (TE85R)
Q3	1530001950	Transistor	2SC2712-GR (TE85R)
Q4	1590000410	Transistor	RN2404 (TE85R)
Q5	1510000620	Transistor	2SA1576 T107 S
Q6	1530002280	Transistor	2SC4081 T107 S
D1	1720000310	Varicap	1SV128 (TE85R)
D2	1750000050	Diode	1SS193 (TE85R)
L1	6200000780	Coil	LQH 3N 100K
L2	6200000720	Coil	LQN 2A 10NM
R1	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R2	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R3	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R4	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	7030000400	Resistor	MCR10EZHJ 1.5 kΩ (152) (#15, #16)
R5	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122) (#15, #16)
R6	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R7	7030000390	Resistor	MCR10EZHJ 1.2 kΩ (122)
R8	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R9	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R10	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R11	7030000160	Resistor	MCR10EZHJ 15 Ω (150)
R12	7030000160	Resistor	MCR10EZHJ 15 Ω (150)
R13	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R14	7030000220	Resistor	MCR10EZHJ 47 Ω (470)
R15	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R16	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)
R17	7030000500	Resistor	MCR10EZHJ 10 kΩ (103)
R18	7030000550	Resistor	MCR10EZHJ 27 kΩ (273)
R19	7030000540	Resistor	MCR10EZHJ 22 kΩ (223)

[PLL-B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R20	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R21	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
C1	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C2	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C3	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C4	4030005090	Ceramic	C2012 JB 1H 223K-T-A
C5	4550000940	Tantalum	TESVB2 1D 225M-8L
C6	4550000530	Tantalum	TESVA 1V 104M1-8L
C7	4550000280	Tantalum	TESVB2 1A 475M-8L
C8	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C9	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C10	4030004760	Ceramic	C2012 JF 1E 104Z-T-A
C11	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C12	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C13	4030006450	Ceramic	C2012 JF 1H 103Z-T-A
C14	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C15	4030004390	Ceramic	C2012 SL 1H 020C-T-A
C16	4030004390	Ceramic	C2012 SL 1H 020C-T-A
C17	4550000940	Tantalum	TESVB2 1D 225M-8L
C18	4550000460	Tantalum	TESVA 1C 105M1-8L
C19	4030004570	Ceramic	C2012 SL 1H 470J-T-A (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030004410	Ceramic	C2012 SL 1H 040C-T-A (#15, #16)
EP1	0910033182	P.C. Board	B 3378B (PLL-B)

[VCO-B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530000370	Transistor	2SC3356-T2B
Q2	1530000370	Transistor	2SC3356-T2B
Q3	1530000370	Transistor	2SC3356-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
D5	1720000320	Varicap	1T32-T8-V
L1	6200000070	Coil	LQN 2A R15K
L2	6200001440	Coil	LQH 3N R18M (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000260	Coil	LQN 2A R10K (#15, #16)
L3	6200000720	Coil	LQN 2A 10NM
L4	6200000140	Coil	LQH 3N 1R0M
L5	6200001260	Coil	MLF2012A 1R8M-T
R1	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R2	7030000620	Resistor	MCR10EZHJ 100 kΩ (104) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	7030000650	Resistor	MCR10EZHJ 180 kΩ (184) (#15, #16)

[VCO-B UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R3	7030000190	Resistor	MCR10EZHJ 27 Ω (270)
R4	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R5	7030000100	Resistor	MCR10EZHJ 4.7 Ω (4R7)
R6	7030000450	Resistor	MCR10EZHJ 3.9 kΩ (392)
R7	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R8	7030000310	Resistor	MCR10EZHJ 270 Ω (271) (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	7030000300	Resistor	MCR10EZHJ 220 Ω (221) (#15, #16)
R9	7030000420	Resistor	MCR10EZHJ 2.2 kΩ (222)
R10	7030000440	Resistor	MCR10EZHJ 3.3 kΩ (332)
R11	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R12	7030000260	Resistor	MCR10EZHJ 100 Ω (101)
R13	7030000180	Resistor	MCR10EZHJ 22 Ω (220)
R15	7030000380	Resistor	MCR10EZHJ 1 kΩ (102)
R16	7030000340	Resistor	MCR10EZHJ 470 Ω (471)
C1	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C2	4030002720	Ceramic	GRM40 UJ 560J 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030002740	Ceramic	GRM40 UJ 680J 50PT (#15, #16)
C3	4030000820	Ceramic	GRM40 CK 010C 50PT
C4	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C5	4030002570	Ceramic	GRM40 UJ 040C 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030002560	Ceramic	GRM40 UJ 030C 50PT (#15, #16)
C6	4030002570	Ceramic	GRM40 UJ 040C 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030002560	Ceramic	GRM40 UJ 030C 50PT (#15, #16)
C7	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C8	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C9	4550003110	Tantalum	TEMSVC 1A 226M-12 L
C10	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C11	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A
C12	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C13	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C14	4030004400	Ceramic	C2012 SL 1H 030C-T-A
C15	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C16	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C17	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C18	4030000890	Ceramic	GRM40 CH 080D 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030000850	Ceramic	GRM40 CH 040C 50PT (#15, #16)
C19	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C20	4030004410	Ceramic	C2012 SL 1H 040C-T-A
EP1	0910025293	P.C. Board	B 2447C (VCO-B)

[LPF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L1	6110001150	Coil	LA-153 (#01, #02, #05, #06, #12)
	6110000950	Coil	LA-126 (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
L2	6110001590	Coil	LA-242 (#01, #02, #05, #06, #12)
	6110001150	Coil	LA-153 (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
L3	6110001150	Coil	LA-153 (#01, #02, #05, #06, #12)
	6110000950	Coil	LA-126 (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C1	4010003820	Ceramic	DD06 SL 050C 500V (#01, #02, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C2	4010003840	Ceramic	DD06 SL 070D 500V (#01, #02, #05, #06, #12)
	4010003800	Ceramic	DD06 SL 030C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C3	4010003790	Ceramic	DD06 SL 020C 500V (#01, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C4	4010003830	Ceramic	DD06 SL 060D 500V (#01, #02, #05, #06, #12)
	4010003800	Ceramic	DD06 SL 030C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
C5	4010003810	Ceramic	DD06 SL 040C 500V
C6	4010003820	Ceramic	DD06 SL 050C 500V (#01, #02, #05, #06, #12)
	4010003810	Ceramic	DD06 SL 040C 500V (#03, #04, #07, #08, #09, #10, #11, #13, #14, #15, #16)
EP4	0910032443	P.C. Board	B 3261C (LPF)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	6910005740	IC	CB424M1R
Q1	1580000360	FET	3SK177-T2B U73
Q2	1560000670	FET	2SK1771 (TE85R)
D1	1720000180	Varicap	1SV164-T2B
D2	1720000180	Varicap	1SV164-T2B
D3	1720000180	Varicap	1SV164-T2B
D4	1720000180	Varicap	1SV164-T2B
D5	1720000180	Varicap	1SV164-T2B
L1	6200000090	Coil	LQN 2A 18NM #01 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000720	Coil	LQN 2A 10NM (#15, #16)
L2	6200000090	Coil	LQN 2A 18NM #01 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000720	Coil	LQN 2A 10NM (#15, #16)
L3	6200000090	Coil	LQN 2A 18NM #01 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000720	Coil	LQN 2A 10NM (#15, #16)
L5	6200000090	Coil	LQN 2A 18NM #01 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000720	Coil	LQN 2A 10NM (#15, #16)
L6	6200000090	Coil	LQN 2A 18NM #01 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	6200000720	Coil	LQN 2A 10NM (#15, #16)
L7	6200000140	Coil	LQH 3N 1R0M
R1	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R2	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R3	7030000460	Resistor	MCR10EZHJ 4.7 kΩ (472)
R4	7030000580	Resistor	MCR10EZHJ 47 kΩ (473)
R5	7030000620	Resistor	MCR10EZHJ 100 kΩ (104)
R6	7030000270	Resistor	MCR10EZHJ 120 Ω (121)
R8	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R9	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R10	7030000660	Resistor	MCR10EZHJ 220 kΩ (224)
R11	7030000280	Resistor	MCR10EZHJ 150 Ω (151)
R12	7030000530	Resistor	MCR10EZHJ 18 kΩ (183)
R13	7030000570	Resistor	MCR10EZHJ 39 kΩ (393)
R14	7030000200	Resistor	MCR10EZHJ 33 Ω (330)
R15	7010004090	Resistor	R20J 150 Ω
R16	7010004570	Resistor	R20J 1 MΩ
C1	4040000470	Barrier Layer	RAU 04AK R35C
C2	4030004380	Ceramic	C2012 SL 1H 010C-T-A (#01, #02, #05, #06, #12, #15, #16)
	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14)
C3	4610001440	Trimmer	CV38A 0301E

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C4	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#15)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#16)
C5	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#01, #02, #05, #06, #12)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	4030004420	Ceramic	C2012 SL 1H 050C-T-A (#16)
C6	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030003870	Ceramic	GRM40 SL 0R3B 50PT (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	4030004380	Ceramic	C2012 SL 1H 010C-T-A (#15, #16)
C7	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A
C8	4610001440	Trimmer	CV38A 0301E
C9	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#15)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#16)
C10	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#01, #02, #05, #06, #12)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	4030004410	Ceramic	C2012 SL 1H 040C-T-A (#15, #16)
C11	4030004390	Ceramic	C2012 SL 1H 020C-T-A
C12	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C13	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C14	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C15	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C16	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#15)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#16)
C17	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#01, #02, #05, #06, #12)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	4030004410	Ceramic	C2012 SL 1H 040C-T-A (#15)
	4030004420	Ceramic	C2012 SL 1H 050C-T-A (#16)
C18	4030003870	Ceramic	GRM40 SL 0R3B 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#15, #16)
C19	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A
C20	4610001440	Trimmer	CV38A 0301E
C21	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#15)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#16)
C22	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #13, #14)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#12)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
	4030004410	Ceramic	C2012 SL 1H 040C-T-A (#15)
	4030004420	Ceramic	C2012 SL 1H 050C-T-A (#16)
C23	4030003870	Ceramic	GRM40 SL 0R3B 50PT (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14)
	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#15, #16)
C24	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A
C25	4610001440	Trimmer	CV38A 0301E
C26	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#01, #02, #05, #06, #12)
	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#15)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#16)
C27	4030004400	Ceramic	C2012 SL 1H 030C-T-A (#01, #02, #05, #06, #12)
	4030004390	Ceramic	C2012 SL 1H 020C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14)
	4030004410	Ceramic	C2012 SL 1H 040C-T-A (#15)
	4030004420	Ceramic	C2012 SL 1H 050C-T-A (#16)
C28	4030004380	Ceramic	C2012 SL 1H 010C-T-A (#01, #02, #05, #06, #12, #15)
	4030004370	Ceramic	C2012 SL 1H 0R5C-T-A (#03, #04, #07, #08, #09, #10, #11, #13, #14, #16)
C29	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C30	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C31	4610001440	Trimmer	CV38A 0301E
C32	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C33	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C34	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C35	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C36	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C37	4010000260	Ceramic	DD104 SL 470J 50V
C38	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C39	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C40	4030004710	Ceramic	C2012 JB 1H 471K-T-A
C41	4030004720	Ceramic	C2012 JB 1H 102K-T-A
C42	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C43	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C44	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C45	4030004520	Ceramic	C2012 SL 1H 220J-T-A
C46	4030004740	Ceramic	C2012 JB 1H 472K-T-A
C47	4030004570	Ceramic	C2012 SL 1H 470J-T-A
C48	4030004710	Ceramic	C2012 JB 1H 471K-T-A
EP1	0910032103	P.C. Board	B 3231C (RF)

[CHASSIS UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4010000520	Ceramic	DD108 B 472K 50V

[ACC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
F1	5210000070	Fuse	FGB 10A

SECTION 6 ADJUSTMENT PROCEDURES

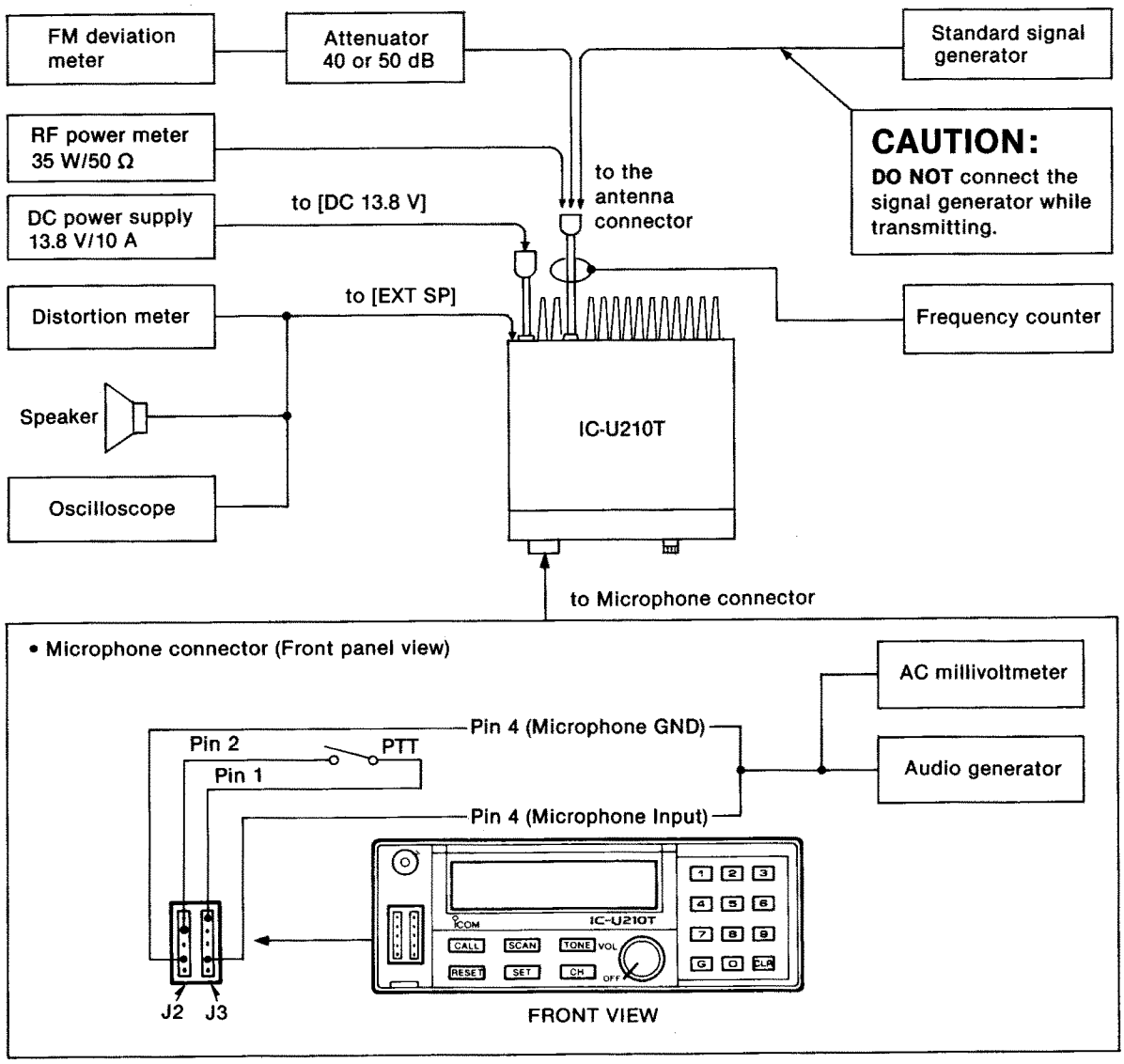
6-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 13.8 V DC Current capacity : 10 A or more	Audio generator	Frequency range : 300~3000 Hz Output level : 1~100 mV
RF power meter (terminated type)	Measuring range : 1~35 W Frequency range : 400~600 MHz Impedance : 50 Ω SWR : Less than 1.2:1	Attenuator	Power attenuation : 40 or 50 dB Capacity : 35 W or more
		AC millivoltmeter	Measuring range : 2~200 mV
Frequency counter	Frequency range : 0.1~600 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Oscilloscope	Frequency range : DC~20 MHz Measuring range : 0.01~10 V
		DC voltmeter	Input impedance : 50 kΩ/DC or better
Distortion meter	Frequency range : 1 kHz±10 Hz Measuring range : 1~100 %	FM deviation meter	Frequency minimum : 600 MHz Measuring range : 0~±5 kHz
Standard signal generator (SSG)	Frequency range : 0.1~600 MHz Output level : −127~−17 dBm (0.1 μV~32 mV)	External speaker	Impedance : 4 Ω

CP: Check point

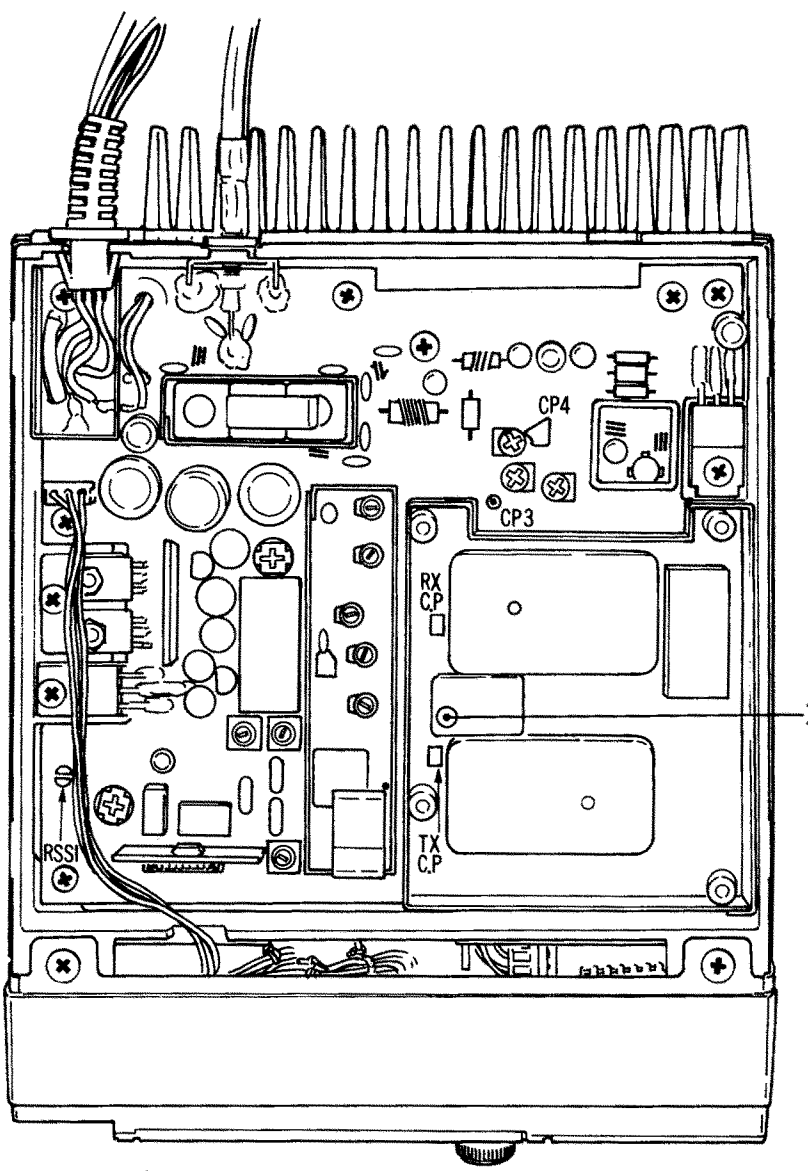
■ CONNECTION



6-2 PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1	• Select any channel. • Connect the RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting	Rear 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.	MAIN	X3

• MAIN UNIT

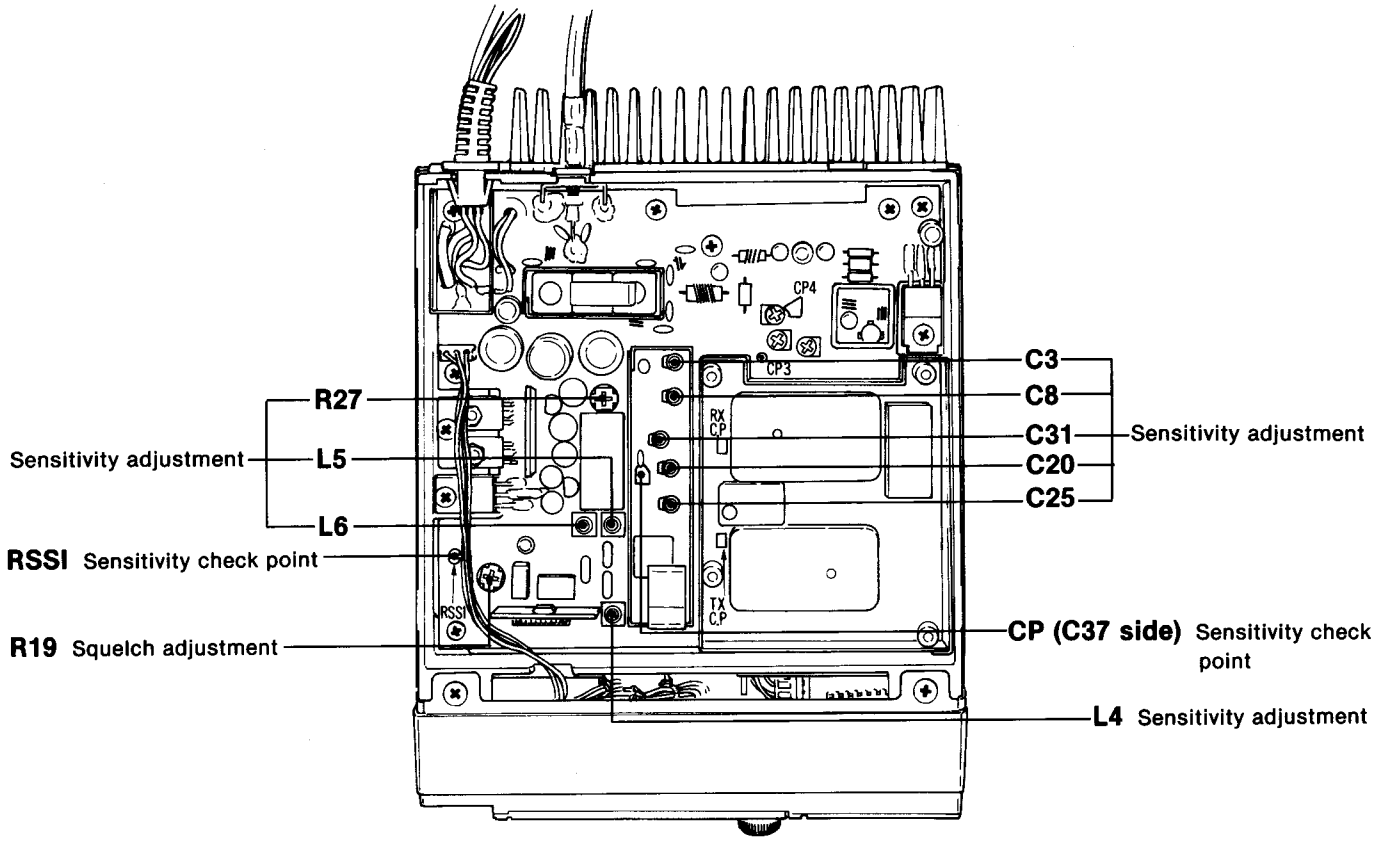


6-3 RECEIVER ADJUSTMENT

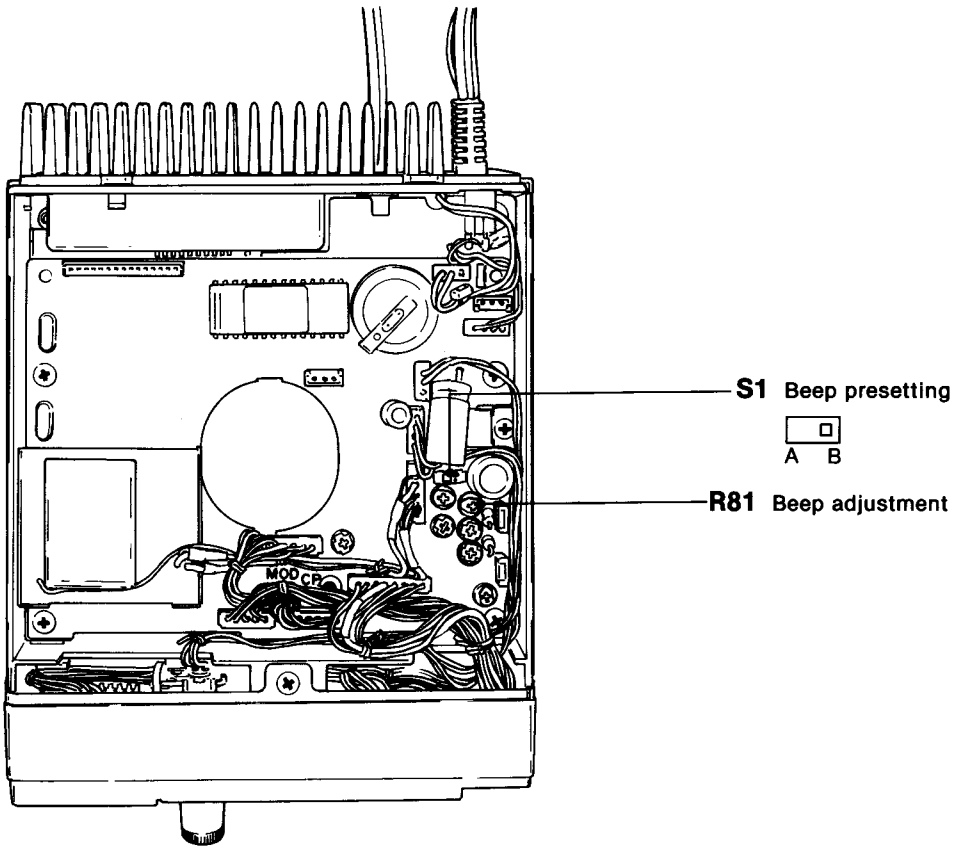
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY		NOTE: When the sensitivity is less than 0.35 μV (12 dB SINAD) on every channel, the following sensitivity adjustment is not necessary. Skip to squelch adjustment below. This transceiver automatically transmits an answer back code when a 5-tone code is received. Be careful when connecting the SSG to the antenna connector.					
	1	• Operating frequency: 400.000 MHz (#01, #02, #05, #06, #12) 450.000 MHz (#03, #04, #07~#11, #13, #14) 470.000 MHz (#15) 490.000 MHz (#16) • Connect the SSG to the antenna connector and set as: Level : 10 μV* (−87 dBm) Modulation: 1 kHz Deviation : ±3.5 kHz (#02, #04, #06, #08, #09, #10, #14) ±1.75 kHz (All other versions) • [RESET] switch: ON • [VOL] control: PULL • Receiving	RF	Connect the DC voltmeter to CP (C37 side).	4 V	MAIN	R27
	2		MAIN	Connect the DC voltmeter to RSSI.	Maximum level	RF	Adjust in sequence C3, C8, C31, C20, C25
	3					MAIN	Adjust in sequence L4, L5, L6
	4	• Set the SSG as: Level : 32 μV* (−77 dBm)	Rear panel	Connect the distortion meter to the [EXT SP] jack with a 4 Ω load.	Minimum distortion level		Adjust in sequence L4, L5
	5	• Set the SSG as: Level : 0.35 μV* (−116 dBm)				RF	Adjust in sequence C3, C8, C31, C20, C25
SQUELCH		NOTE: Before squelch adjustment, be sure that the sensitivity on every channel is less than 0.35 μV (12 dB SINAD).					
	1	• Select any channel. • Connect the SSG to the antenna connector. • [RESET] switch: ON • [VOL] control: PULL • Receiving	MAIN	Connect the distortion meter to the [EXT SP] jack with a 4 Ω load.	8 dB SINAD (40 % distortion)		SSG level
	2	• [VOL] control: PUSH	Bottom cover	Speaker	Squelch closes.	MAIN	R19
	3	• Adjust SSG's level so that SINAD level becomes 12 dB (12 % distortion).			Squelch opens.		Verify
BEEP	1	• Select any channel. • [RESET] switch: ON • [VOL] control: Center • S1 (LOGIC UNIT): B side • Receiving	Rear panel	Connect the oscilloscope to the [EXT SP] jack with a 4 Ω load.	1.5 Vp-p	LOGIC	R81
	2	• S1 (LOGIC UNIT): A side	Bottom cover	Speaker	Verify that the level of the beep sound is adjustable.	Front panel	[VOL] control
		NOTE: Reset S1 to the step 1 position after the above verification.					

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

• MAIN UNIT



• LOGIC UNIT

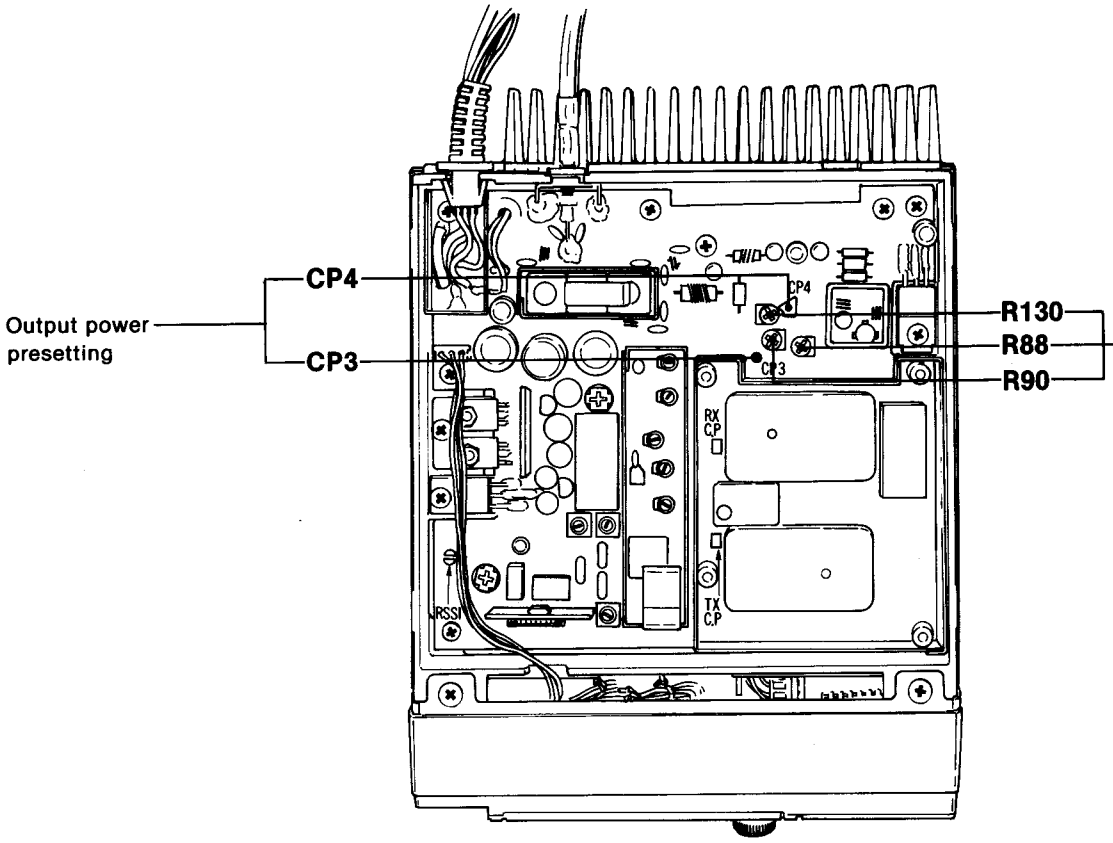


6-4 TRANSMITTER ADJUSTMENT

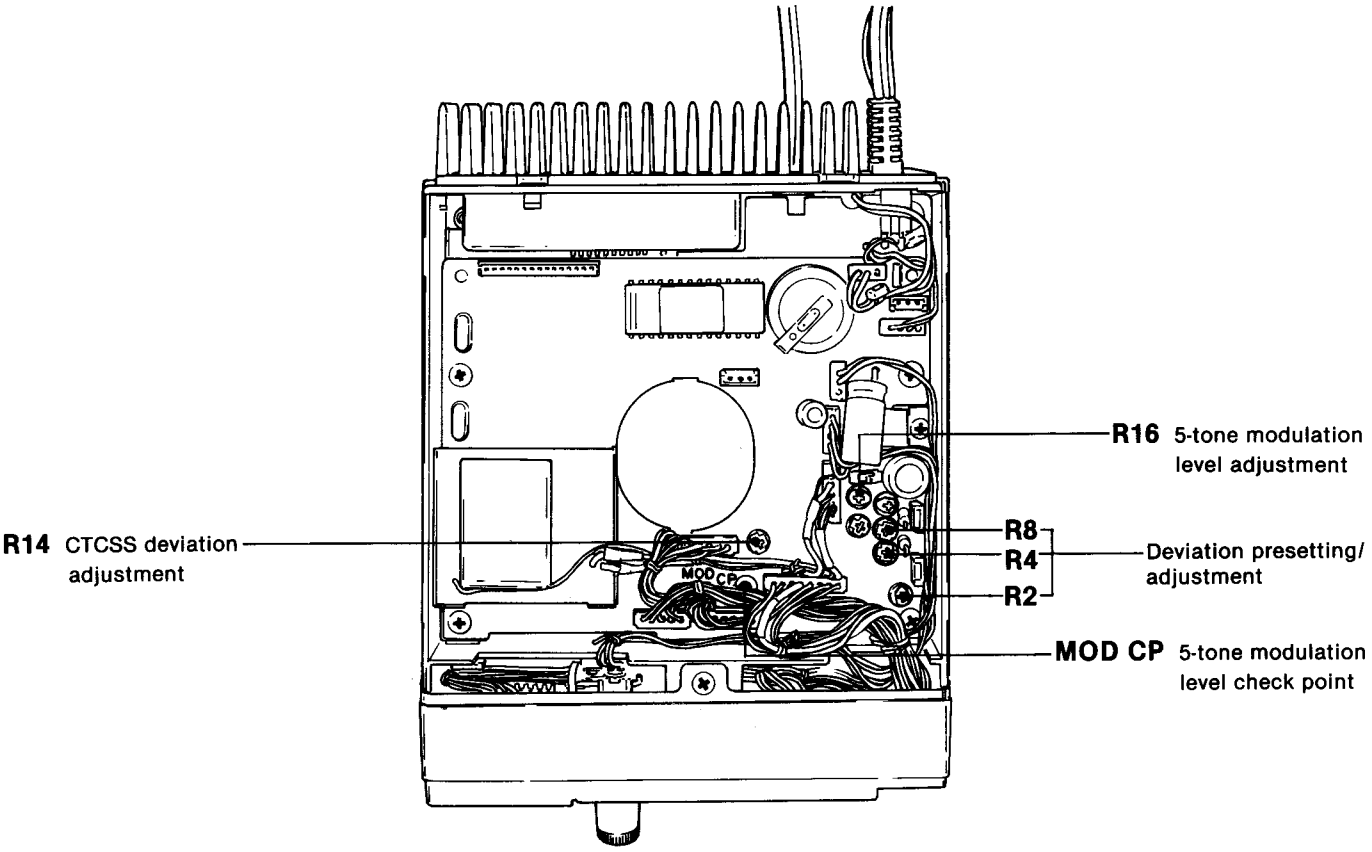
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Select any high-power channel. • Transmitting	Rear panel	Connect the RF power meter to the antenna connector.	10 W (10 W version) 25 W (25 W version)	MAIN	R88
	2	• Ground CP3 (MAIN UNIT).			1 W (10 W verion) 2.5 W (25 W version)		R90
	3	• Ground CP4 (MAIN UNIT).			15 W (25 W version) 6 W (10 W version)		R130
DEVIATION	1	• Select any channel. • Connect the audio generator to the microphone connector* with an AC millivoltmeter and set as: Level : 50mV Modulation : 1.0 kHz • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	Preset to the center.	LOGIC	R2, R4, R8
	2				Maximum deviation level		R4
	3				±4.3 kHz (#02, #04, #06, #08, #09, #10, #14) ±2.0 kHz (All other versions)		R8
	4	• Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : P and −P			Symmetrical deviation level		R2
	5	• Set the audio generator as: Level : 5.0 mV Modulation : 1.0 kHz			±3.0 kHz (#02, #04, #06, #08, #09, #10, #14) ±1.5 kHz (All other versions)		R4
	6	Repeat steps 3~5 several times for precision.					
CTCSS DEVIATION	1	• Select a tone encoder programmed channel (88.5 Hz). • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Apply no signal to the microphone connector. • Transmitting	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	±0.5 kHz (#02, #04, #06, #08, #09, #10, #14) ±0.3 kHz (All other versions)	LOGIC	R14
5-TONE MODULATION LEVEL	1	• Select a 5-tone programmed channel. • Connect the audio generator to the microphone connector* with an AC millivoltmeter and set as: Level : 5.0mV Modulation : 1.0 kHz • Transmitting	LOGIC	Connect the oscilloscope to MOD CP.			Verify
	2	• Apply no signal to the microphone connector. • [CALL] switch: ON			Same level as above	LOGIC	R16

*See p. 6-1 for connection.

• MAIN UNIT



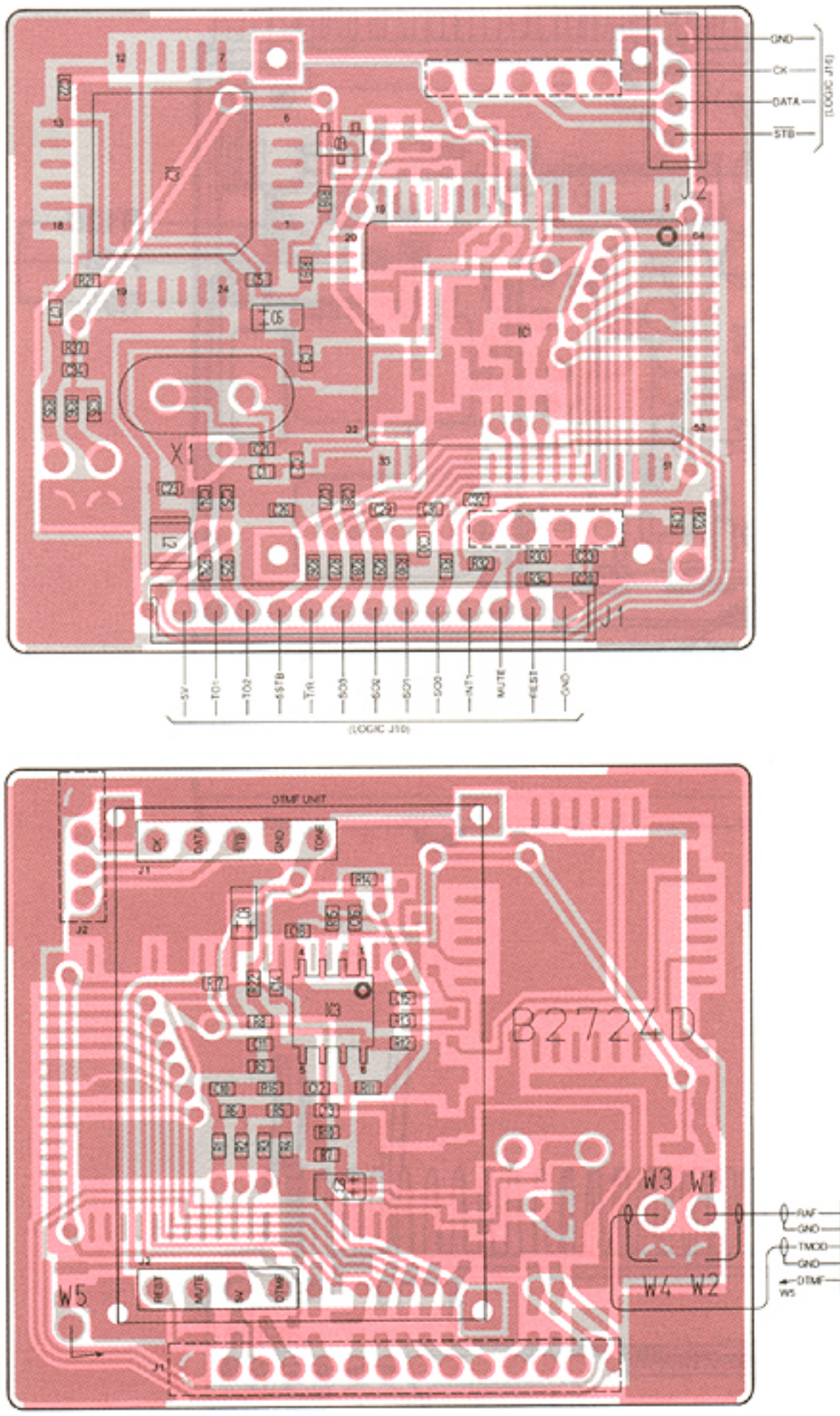
• LOGIC UNIT



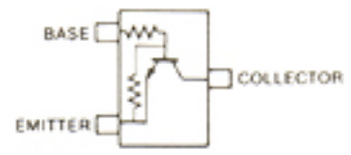
SECTION 7 BOARD LAYOUTS

7-1 TONE, VR AND DTMF UNITS

• TONE UNIT

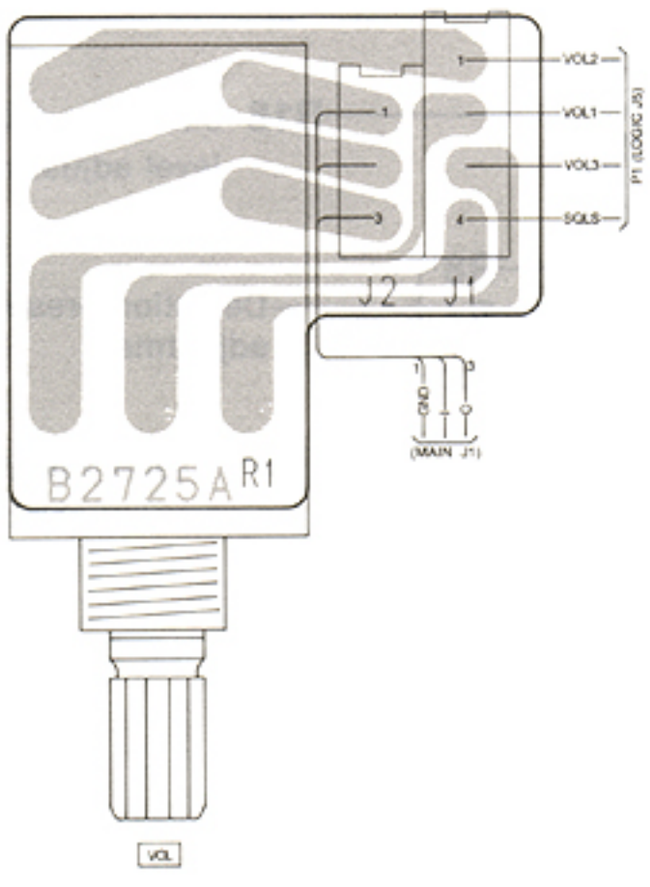


RN1404
(Symbol : XD)

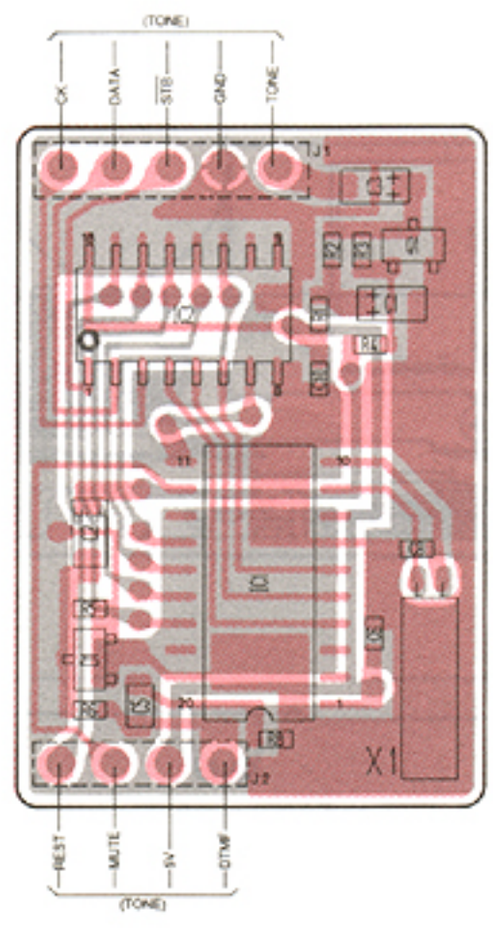


Q3

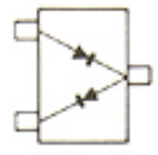
• VR UNIT



• DTMF UNIT

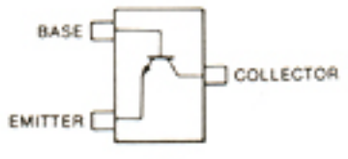


1SS226
(Symbol : C3)



D1

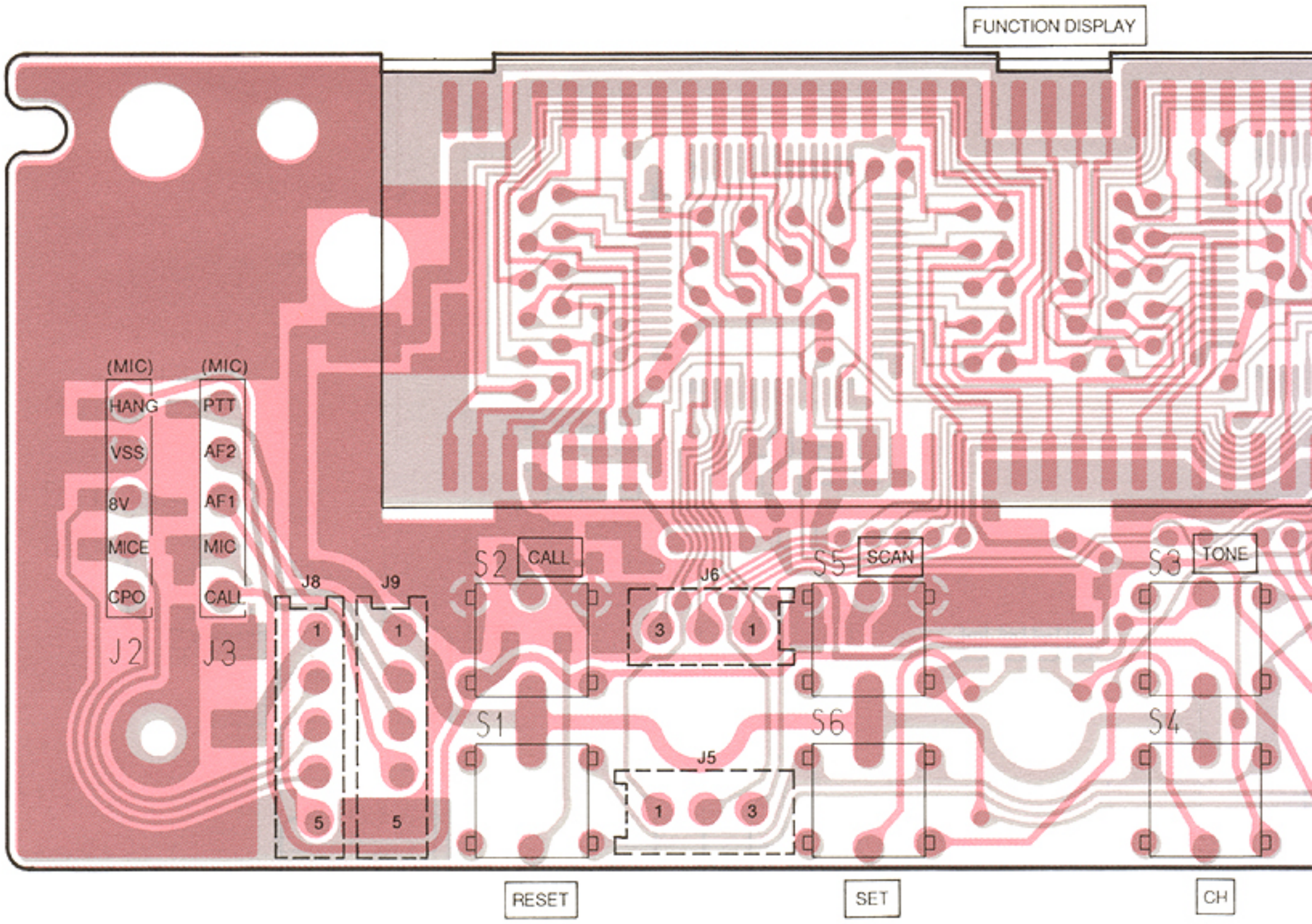
2SC2712 GR
(Symbol : LG)



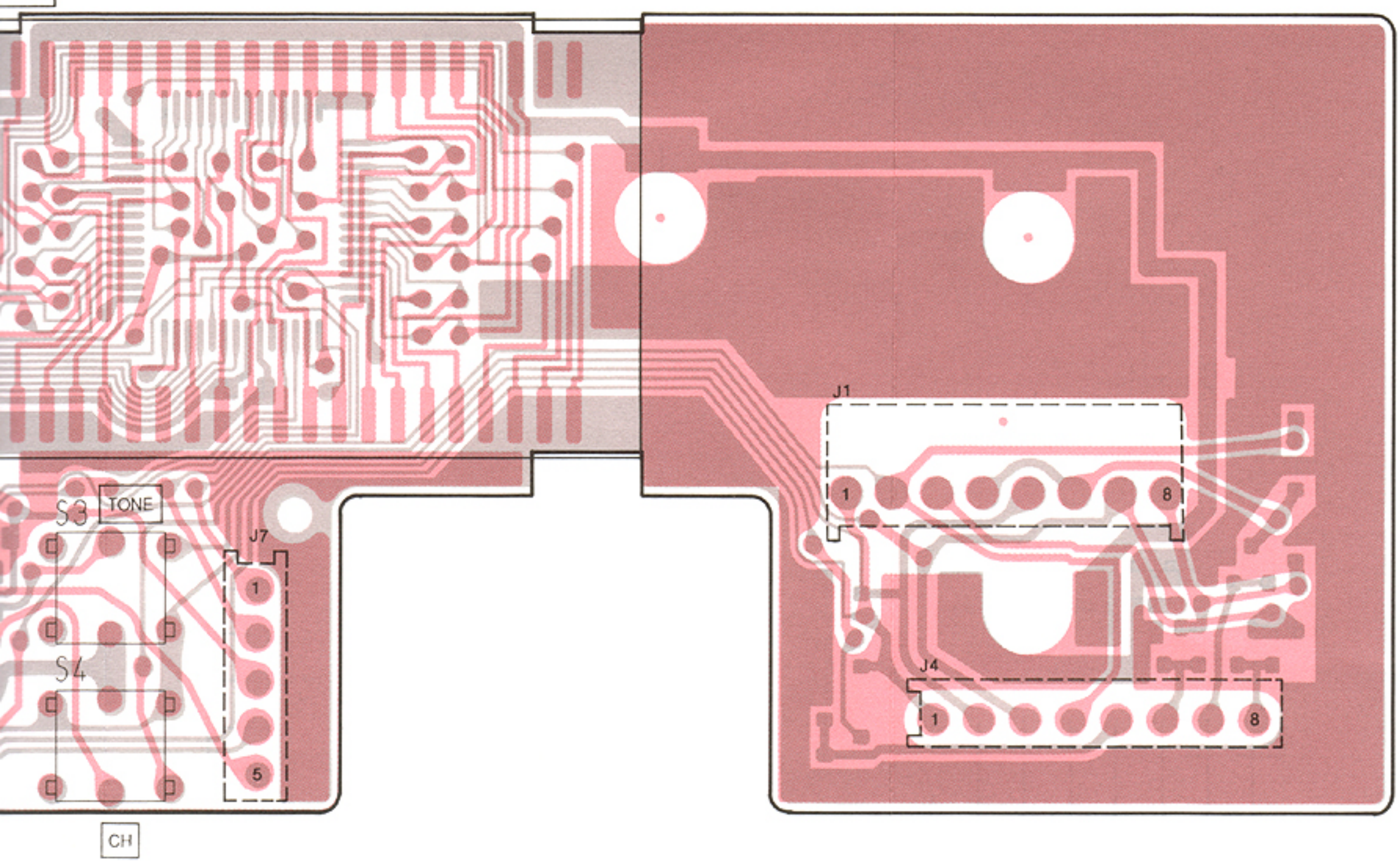
Q1

7-2 DISPLAY UNIT

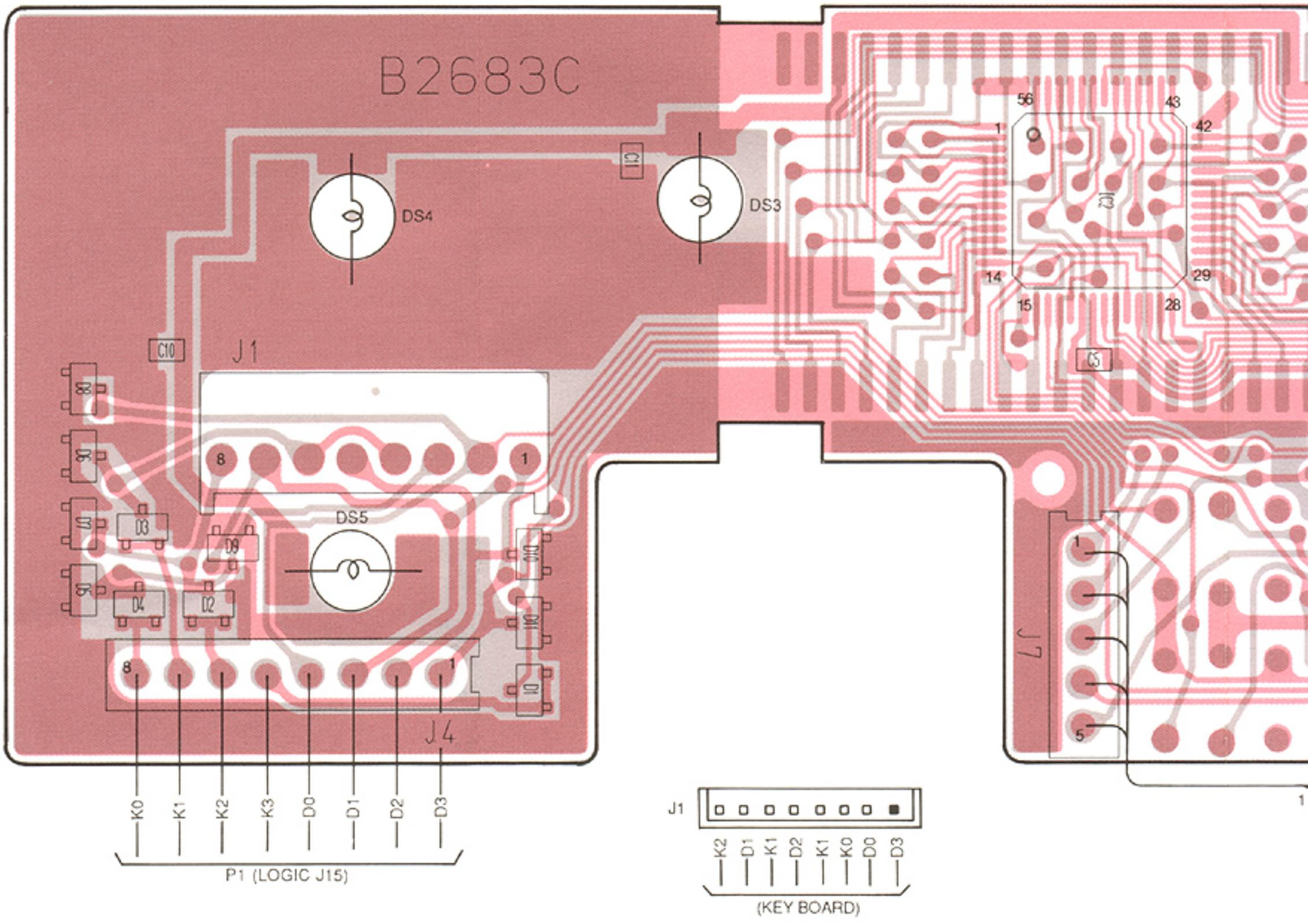
• DISPLAY UNIT



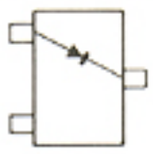
The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.



• DISPLAY UNIT

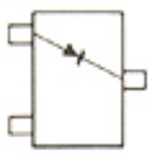


1SS193
(Symbol: F3)



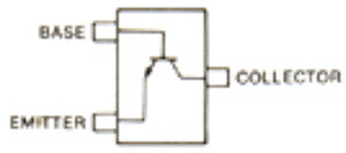
D1, D2, D3, D4

02CZ6.8-X
(Symbol: 6.8X)

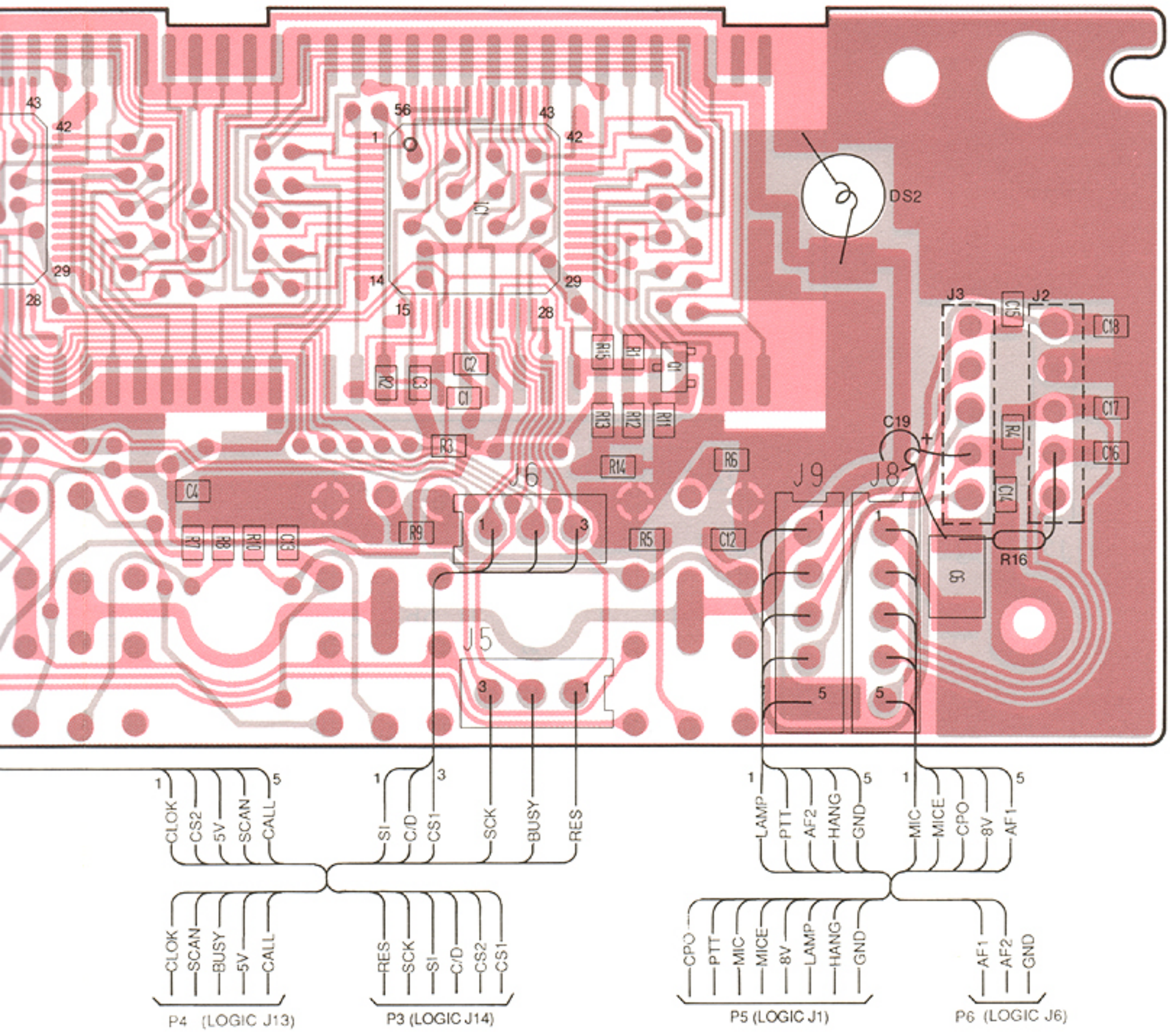


D5, D6, D7, D8,
D9, D10, D11

2SC2712 Y
(Symbol: LY)

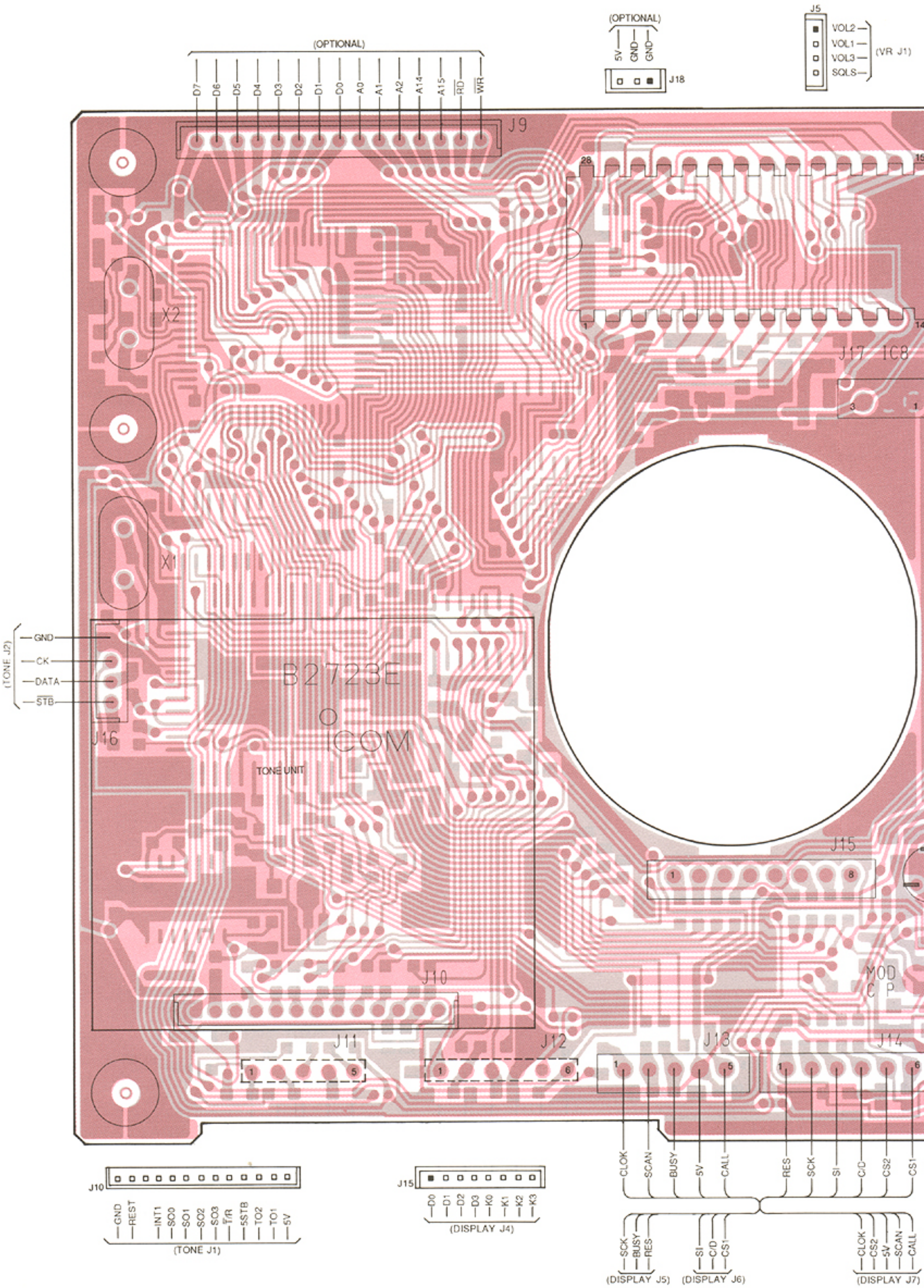


Q1

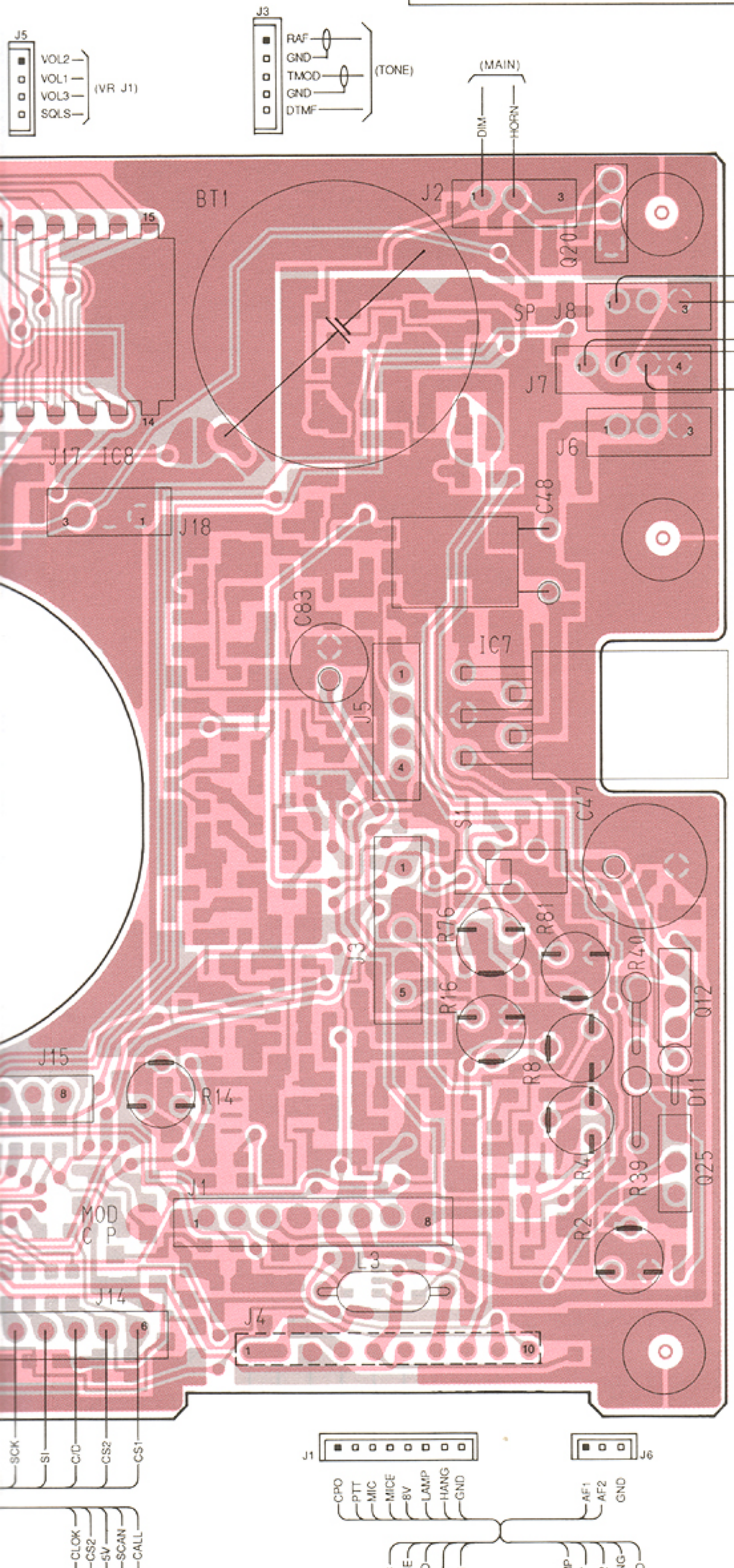

43
42
29
28
56
1
43
42
14
15
29
28
IC1
DS2
J3
J2
C15
C18
C17
C16
C14
R4
C19
R16
C5
J6
J9
J8
J5
C4
R7
R8
R10
C13
R9
R5
C12
R6
R14
R15
R1
C11
R13
R12
R11
R3
C2
C3
C1
R2
1
3
5
CLOK
CS2
5V
SCAN
CALL
SI
C/D
CS1
SCK
BUSY
RES
LAMP
PTT
AF2
HANG
GND
MIC
MICE
CPO
8V
AF1
P4 (LOGIC J13)
P3 (LOGIC J14)
P5 (LOGIC J1)
P6 (LOGIC J6)

7-3 LOGIC UNIT

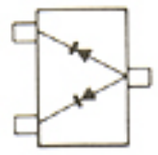
• LOGIC UNIT



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

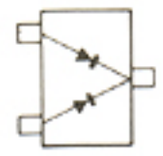


1SS181
(Symbol: A3)



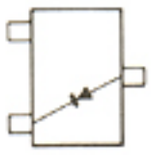
D8, D14

1SS184
(Symbol: B3)



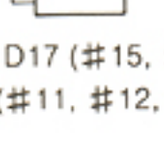
D10, D17 (#15, #16)
D18 (#11, #12, #13)

1SS190
(Symbol: E3)



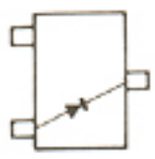
D7, D22

1SS193
(Symbol: F3)



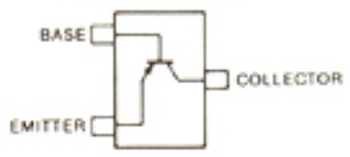
D1, D2, D3, D16, D21,
D18 (#01, #02, #03, #04, #05,
#06, #07, #08, #09, #10,
#14, #15, #16)

1SS196
(Symbol: G3)



D6,
D17 (#01, #02, #03, #04, #05,#06,
#07, #08, #09, #10, #11, #12,
#13, #14)

2SA1162 Y
(Symbol: SY)



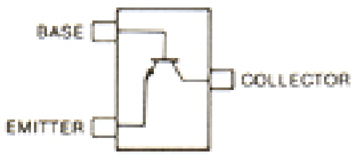
Q2, Q3, Q8

2SA1359 Y

Q12, Q25

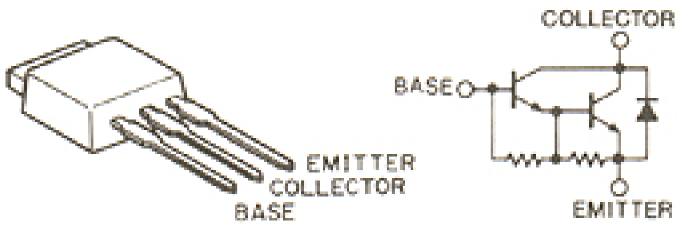
• LOGIC UNIT

2SC2712 GR
(Symbol: LG)
2SC2712 Y
(Symbol: LY)



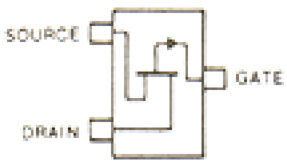
2SC2712 GR: Q16
2SC2712 Y: Q7, Q13, Q17, Q23

2SD1286 K



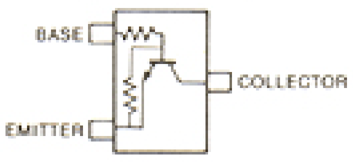
Q20

2SJ106 Y
(Symbol: VY)



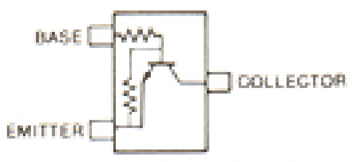
Q22, Q24

RN1402
(Symbol: XB)



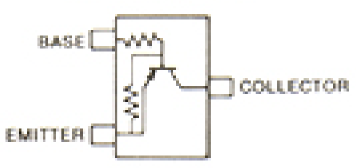
Q5, Q10, Q11,
Q14, Q28

RN1404
(Symbol: XD)
RN1409
(Symbol: XJ)



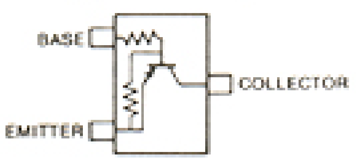
RN1404: Q1, Q4, Q15, Q19, Q27
RN1409: Q9

RN2402
(Symbol: YB)

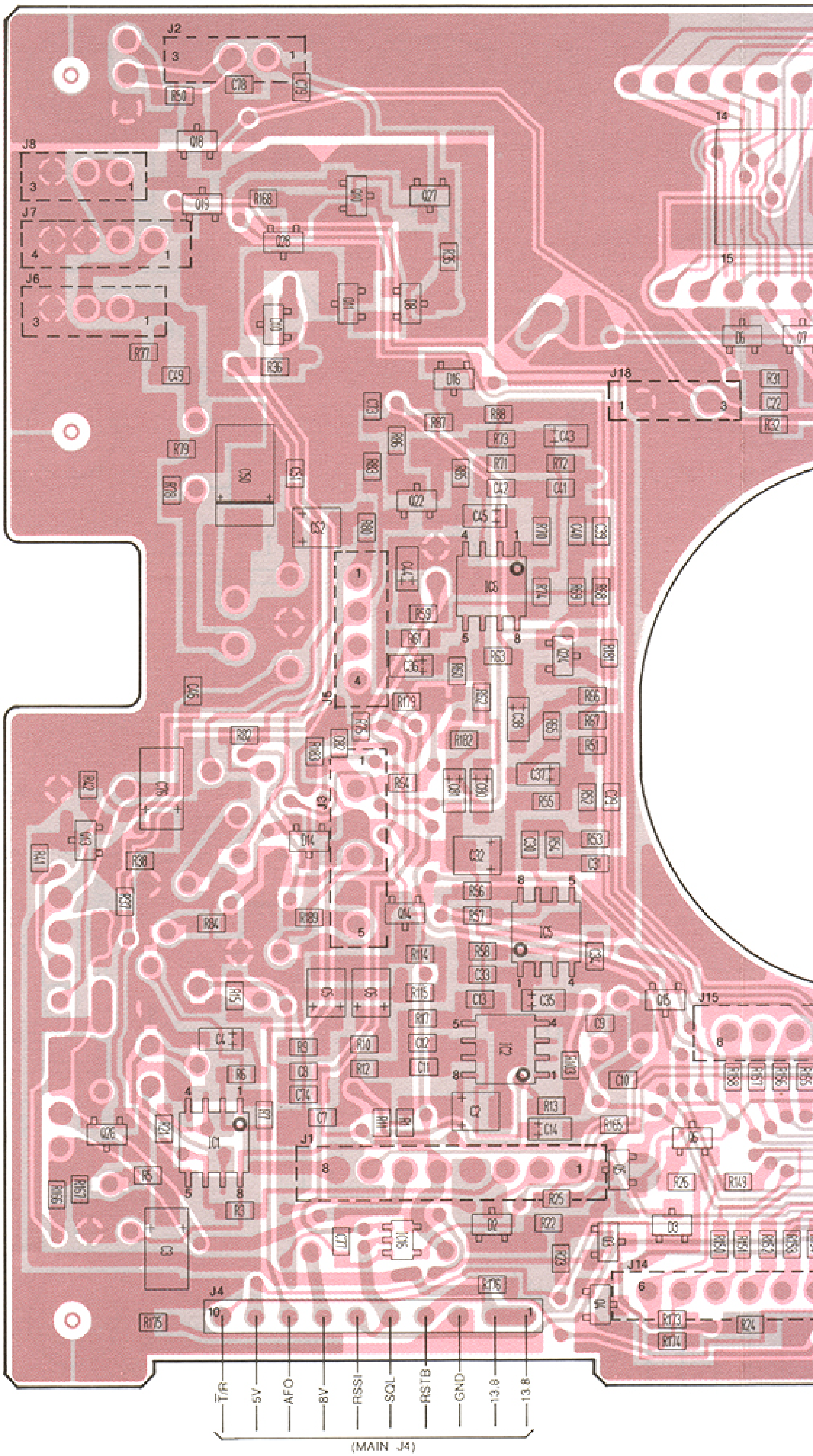


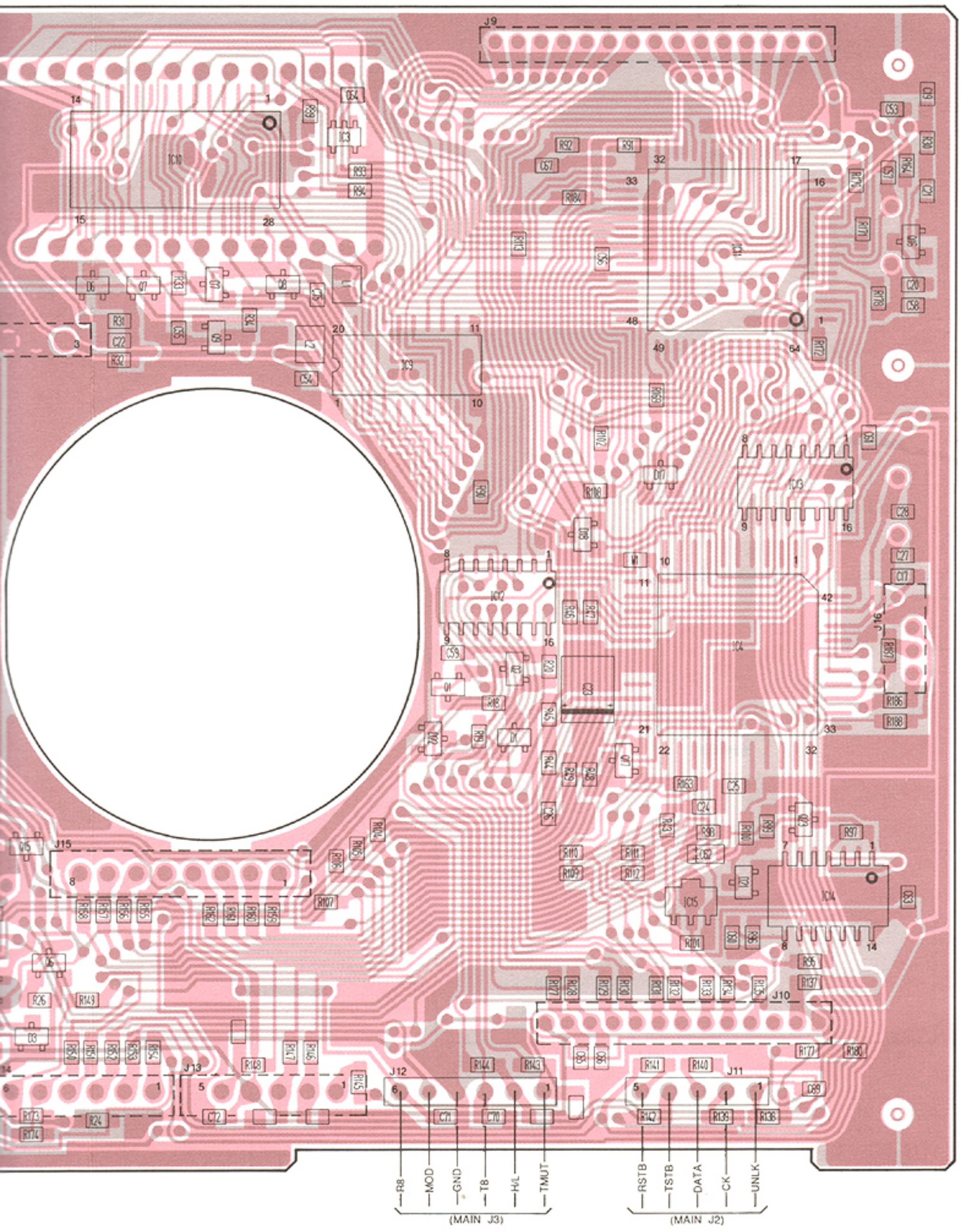
Q6, Q18

RN2404
(Symbol: YD)



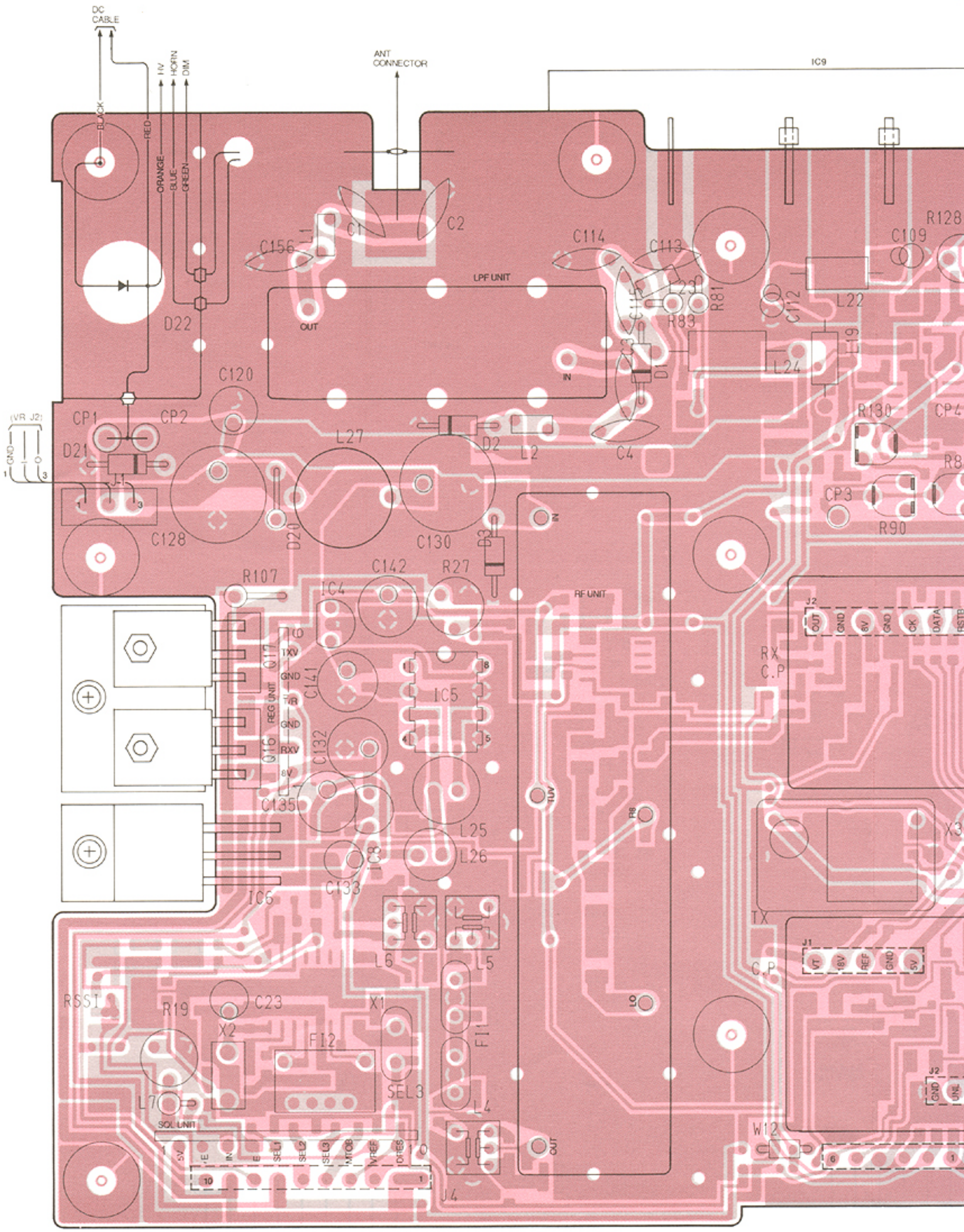
Q26



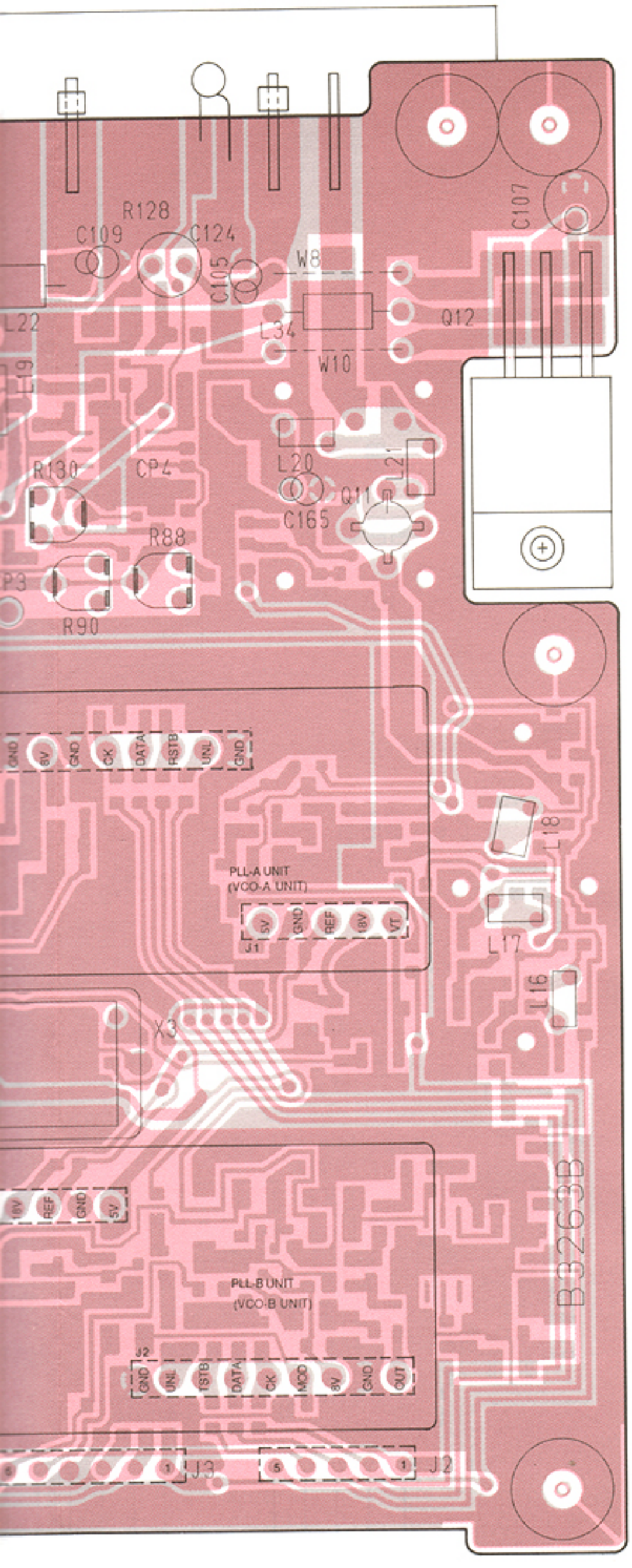

J9
IC10
IC3
IC9
IC31
IC32
IC4
IC15
IC14
J15
J16
J10
J13
J12
J11
(MAIN J3)
(MAIN J2)
R8
MOD
GND
TB
H/L
TMUT
RSTB
TSTB
DATA
CK
UNLK

7-4 MAIN, SQL, REG, LPF AND RF UNITS

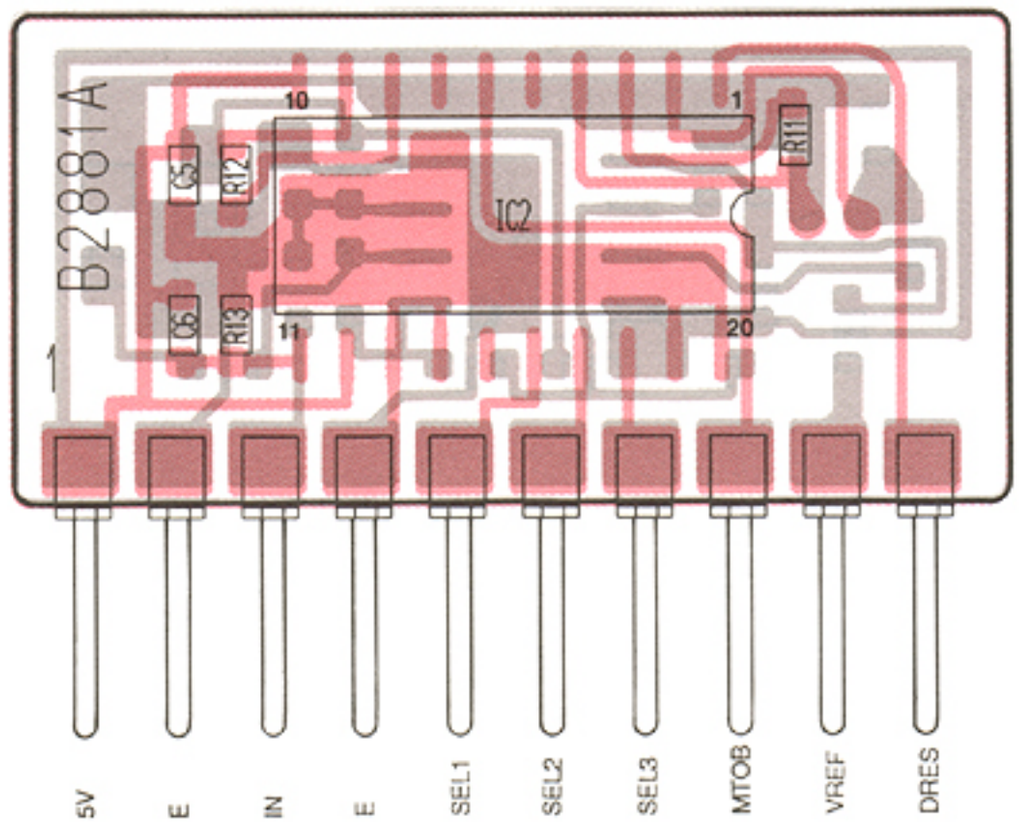
• MAIN UNIT



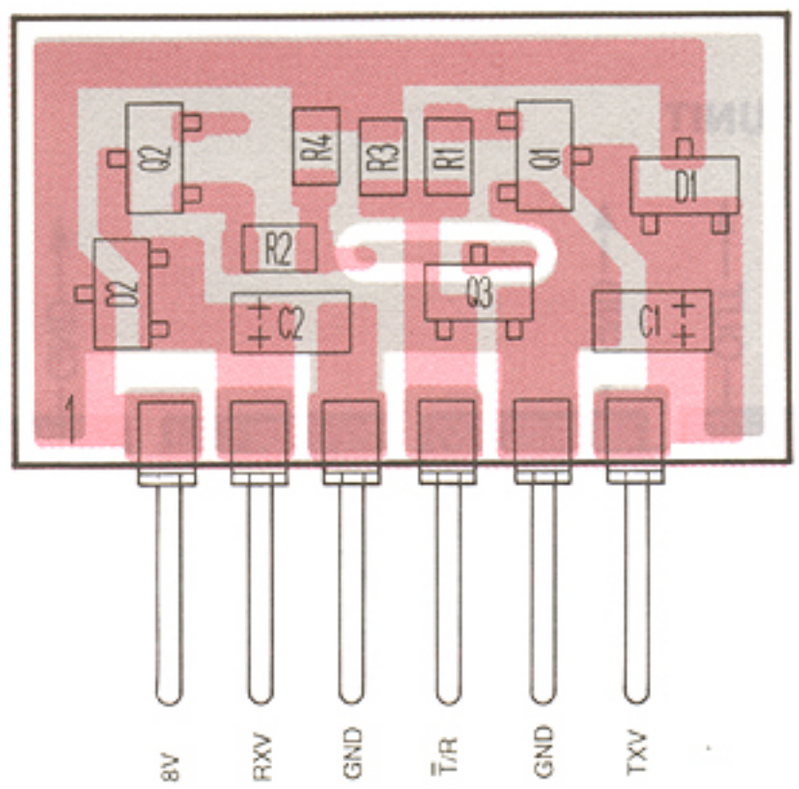
The combination of this page and the next page show the unit layout in the same configuration as the actual P.C. Board.



• SQL UNIT



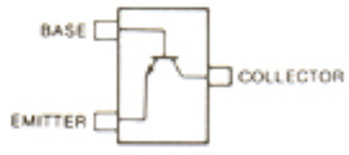
• REG UNIT



1SS193
(Symbol: F3)

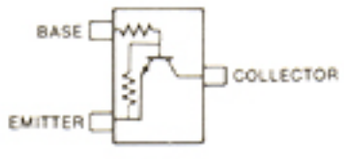
D1, D2

2SC2712 Y
(Symbol: LY)



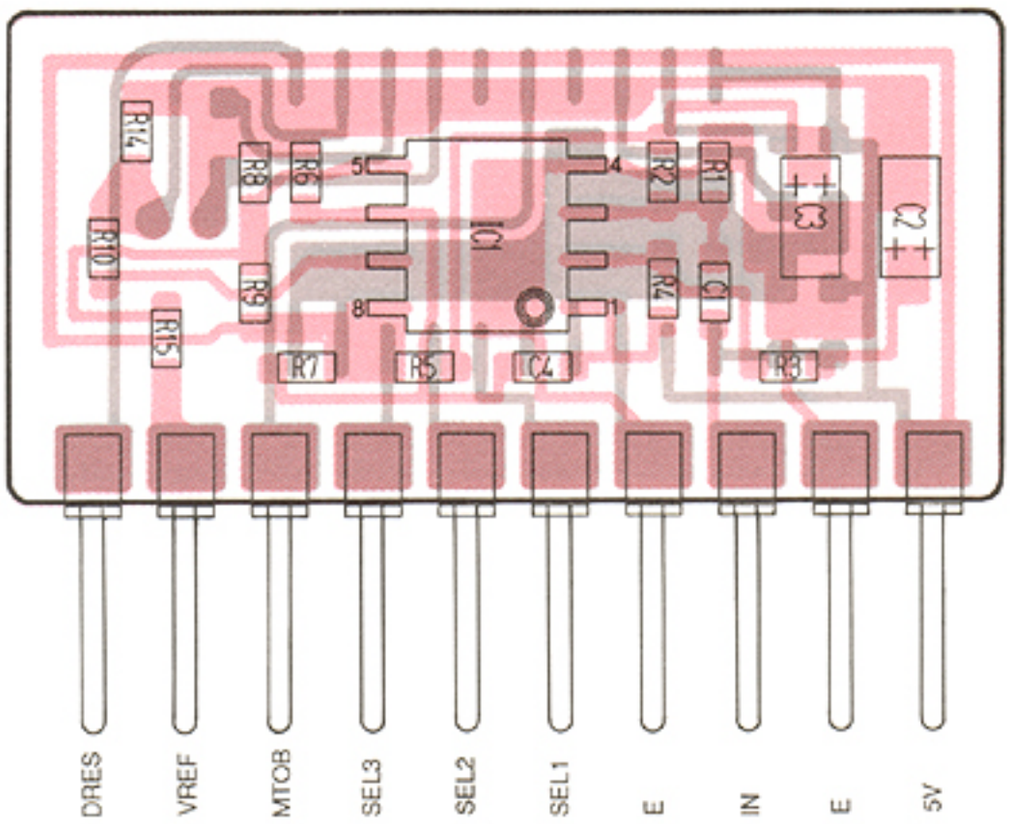
Q1, Q2

RN1404
(Symbol: XD)



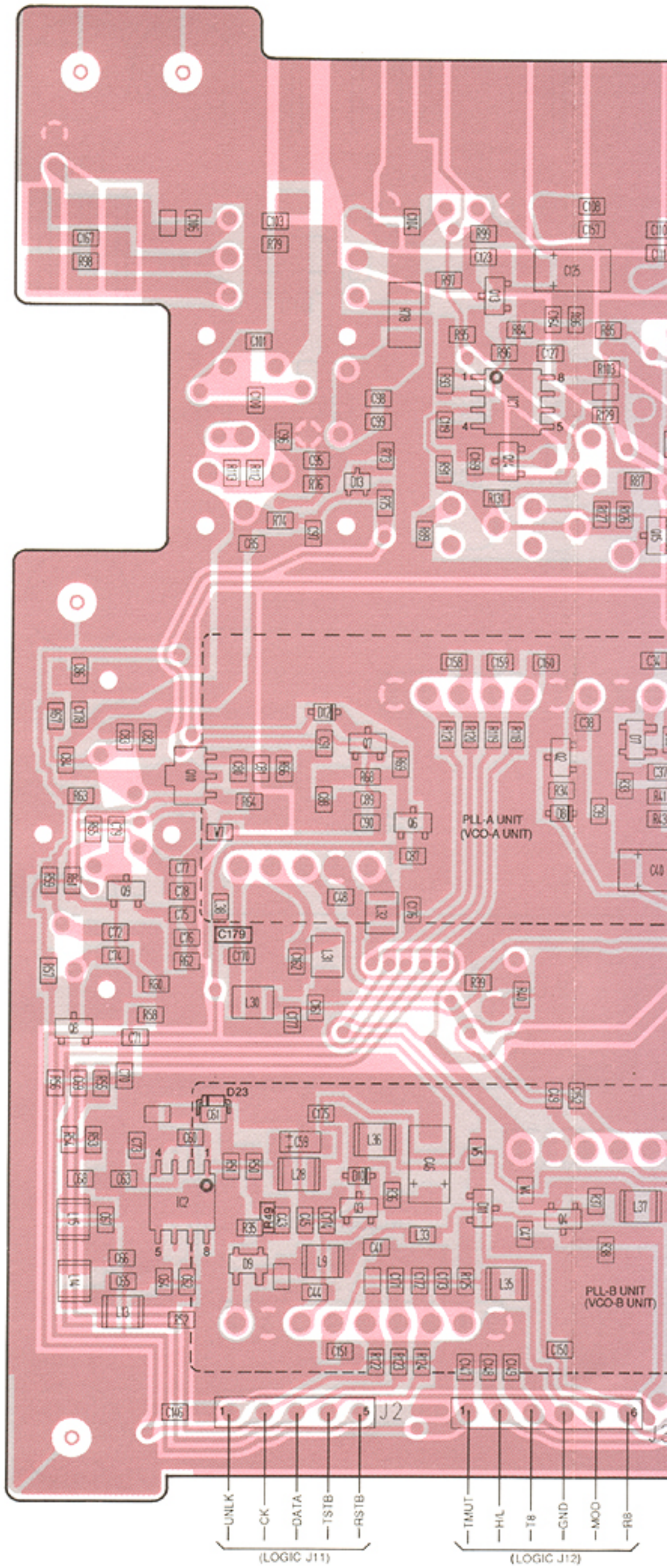
Q3

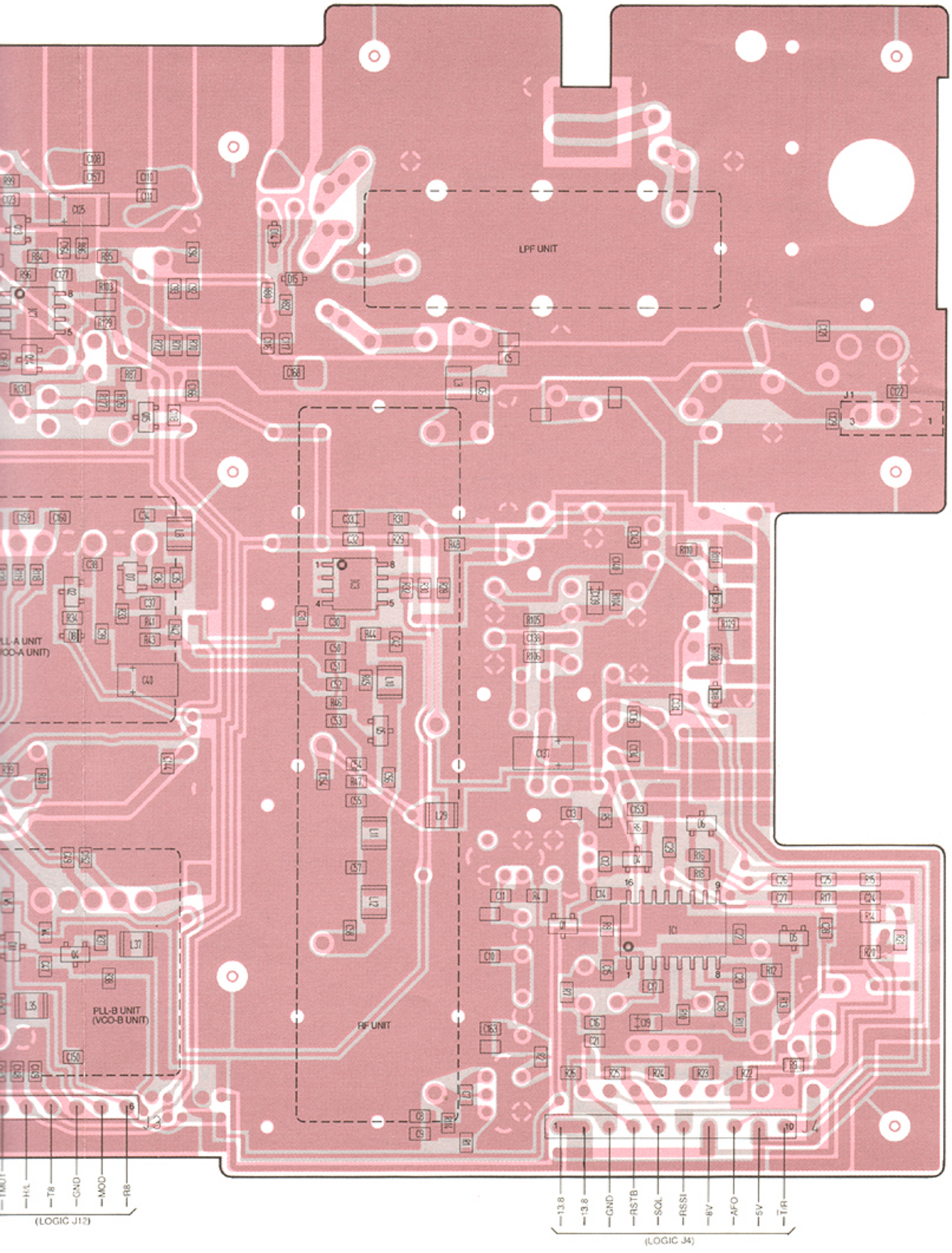
• SQL UNIT



• LPF UNIT

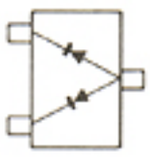
• MAIN UNIT




LPF UNIT
PLL-A UNIT
(VCO-A UNIT)
RF UNIT
PLL-B UNIT
(VCO-B UNIT)
J1
J3
J4
IC1
TMUT
H/L
T8
GND
MOD
R8
(LOGIC J12)
13.8
13.8
GND
RSTB
SCKL
RSSI
8V
AFO
5V
TRX
(LOGIC J4)

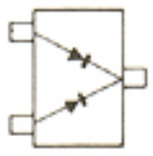
• MAIN UNIT

1SS181
(Symbol: A3)



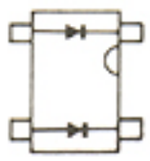
D11

1SS184
(Symbol: B3)



D6

1SV237
(Symbol: BB)

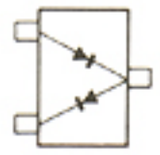


D7, D9

DA114
(Symbol: AV)

D13

HSM88AS
(Symbol: C1)

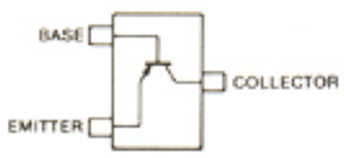


D4

RD6.2M B2
(Symbol: 622)

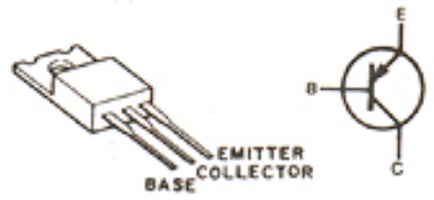
D5

2SA1162 Y
(Symbol: SY)



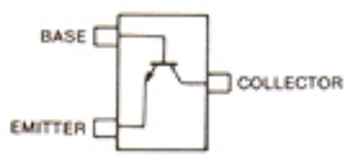
Q4

2SB1135 R



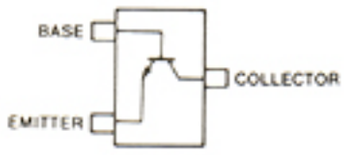
Q12

2SC2712 Y
(Symbol: LY)



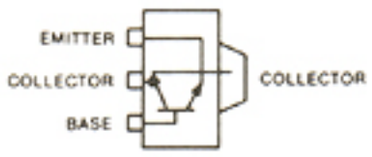
Q7

2SC3356
(Symbol: R22)



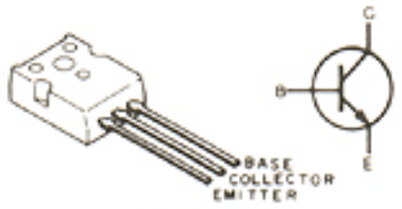
Q8, Q9

2SC3357
(Symbol: RK)



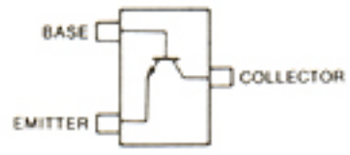
Q10

2SC3422 Y



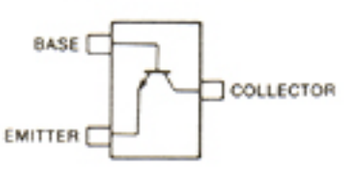
Q16, Q17

2SC3661 TA
(Symbol: FY)



Q2, Q3

2SC3775 3
(Symbol: OY3)

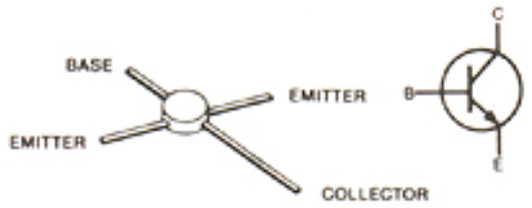


Q5

2SK302 GR
(Symbol: TG)

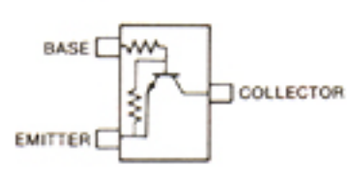
Q1

MRF559



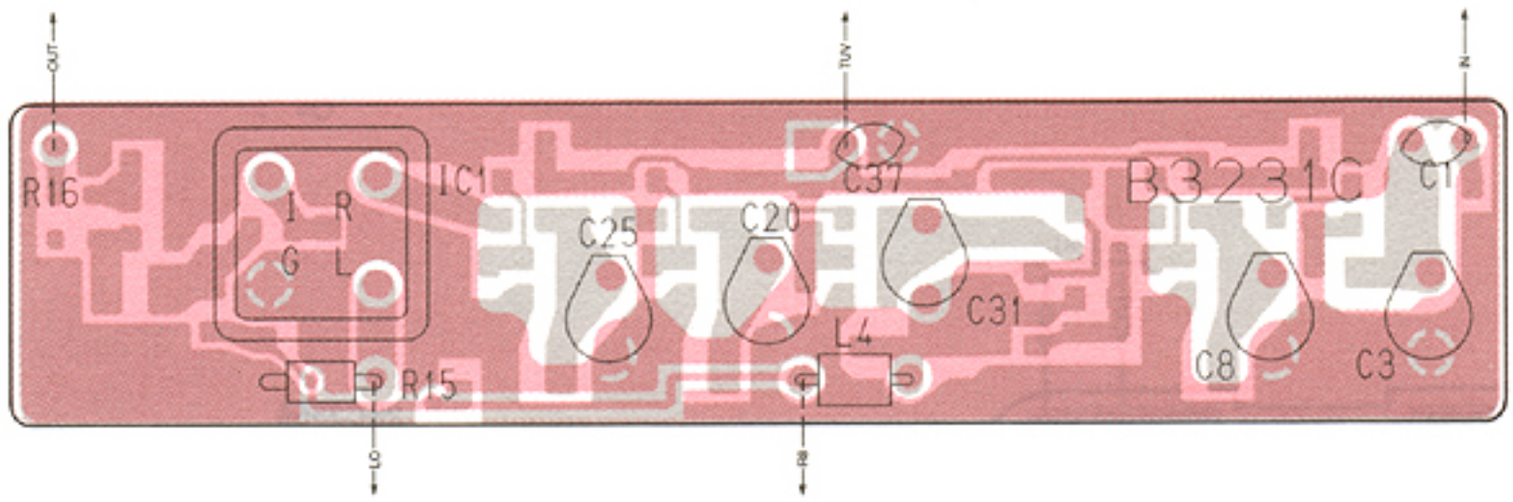
Q11

RN1402
(Symbol: XB)

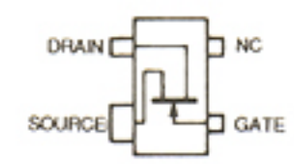


Q6

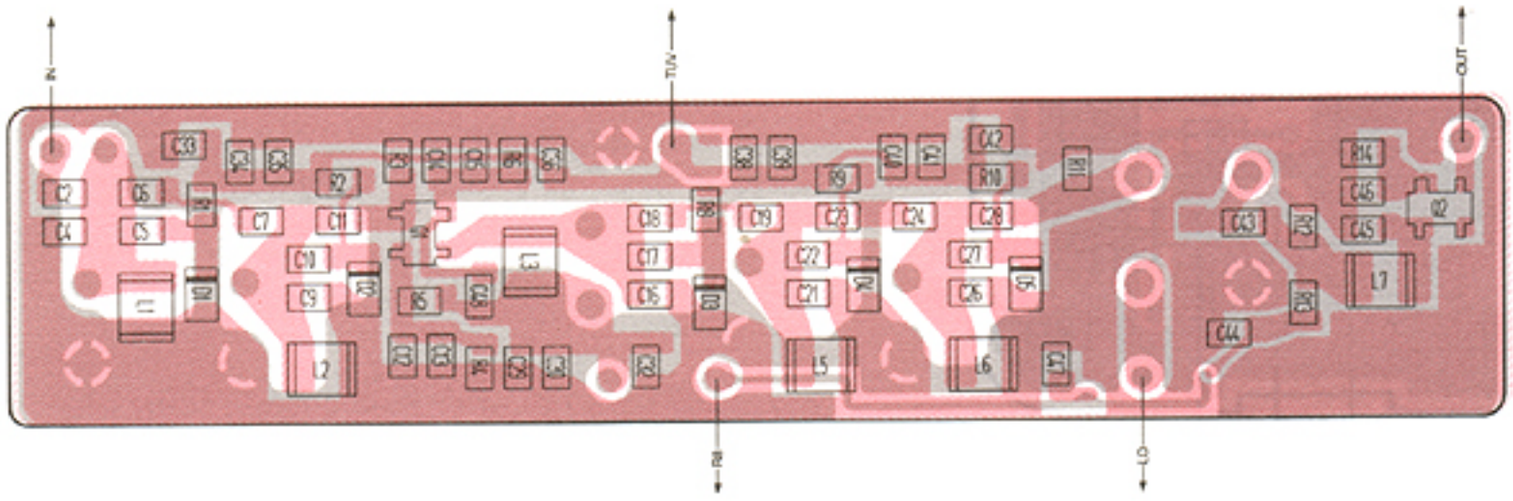
• RF UNIT



2SK1771
(Symbol: UB)



Q2

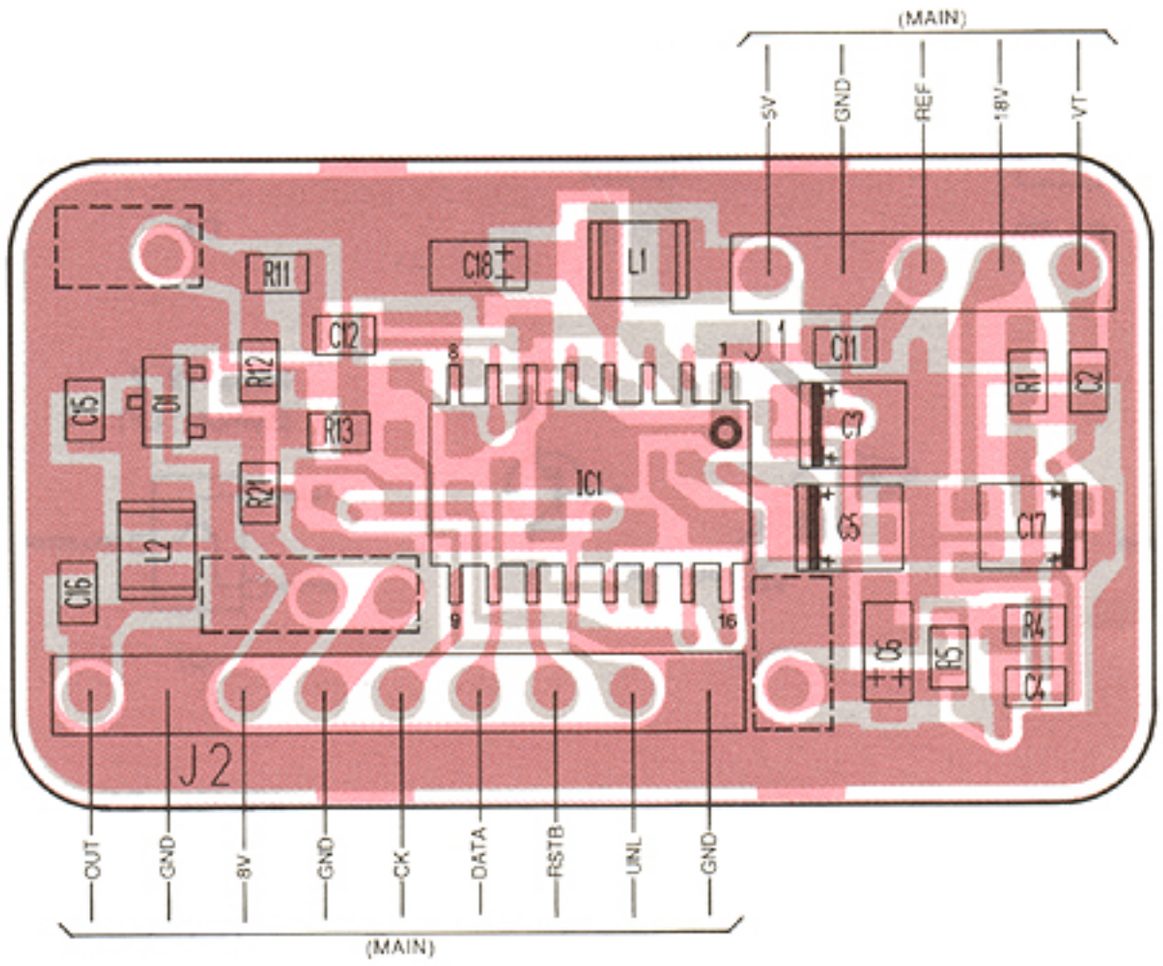


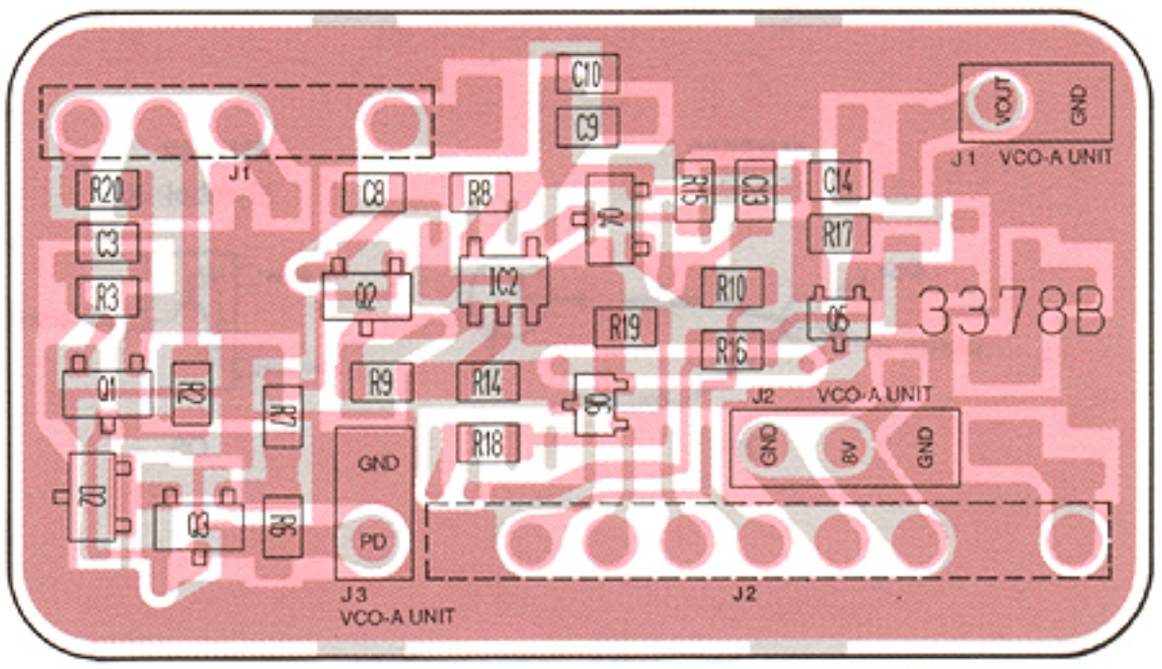
3SK177 U73
(Symbol: U73)

Q1

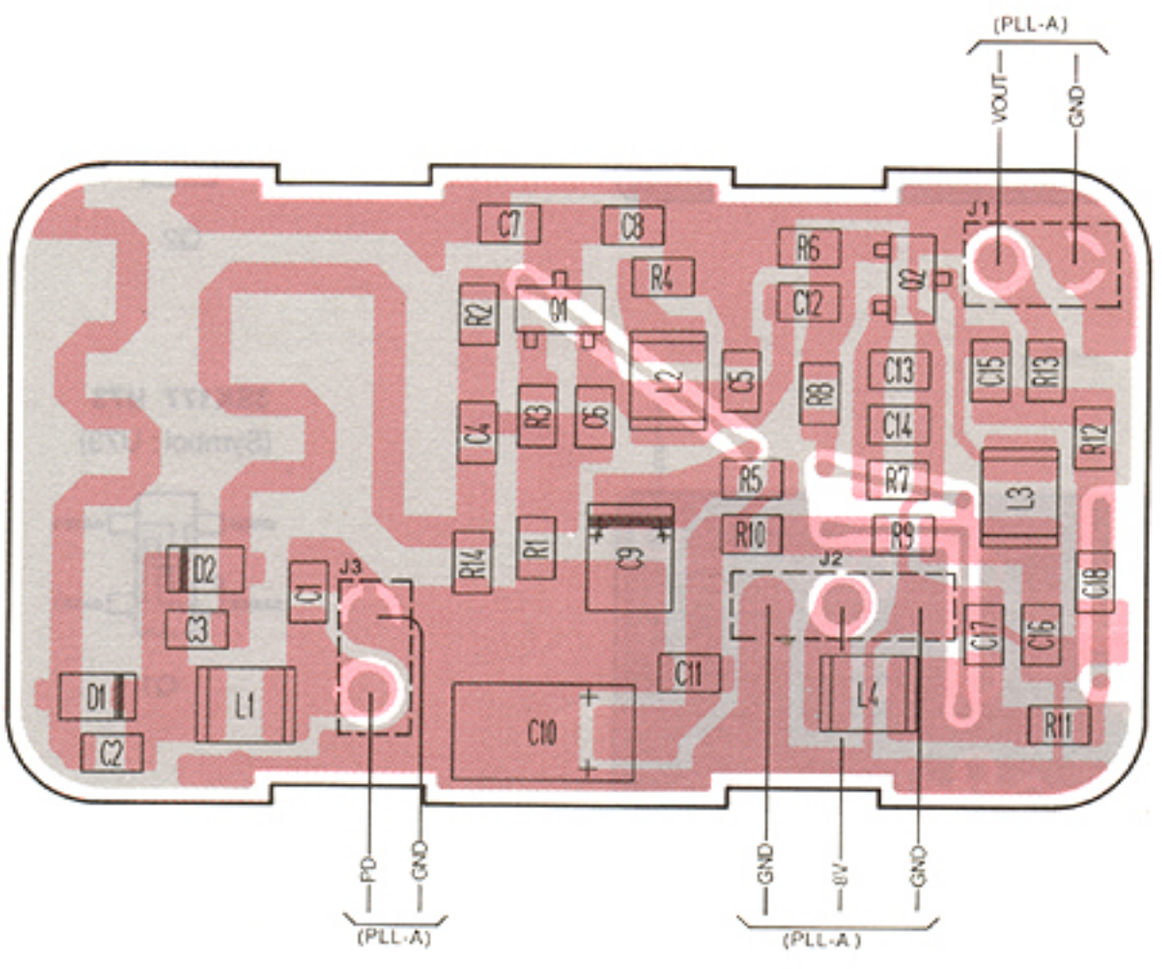
7-5 PLL-A, VCO-A, PLL-B AND VCO-B UNITS

• PLL-A UNIT

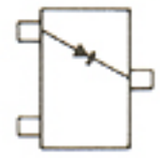




• VCO-A UNIT

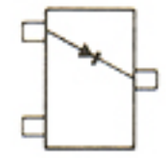


1SS193
(Symbol: F3)



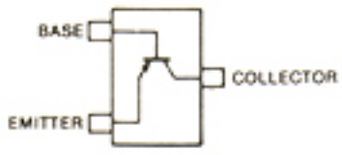
D2

1SV128
(Symbol: BB)



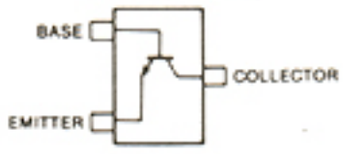
D1

2SA1576 S
(Symbol: FS)



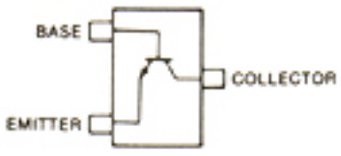
Q5

2SC2712 GR
(Symbol: LG)



Q3

2SC4081 S
(Symbol: BS)

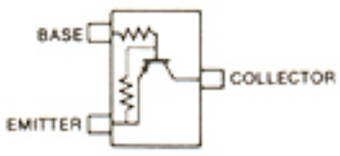


Q6

2SK209 Y
(Symbol: XY)

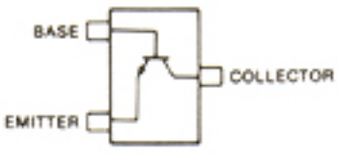
Q1, Q2

RN2404
(Symbol: YD)



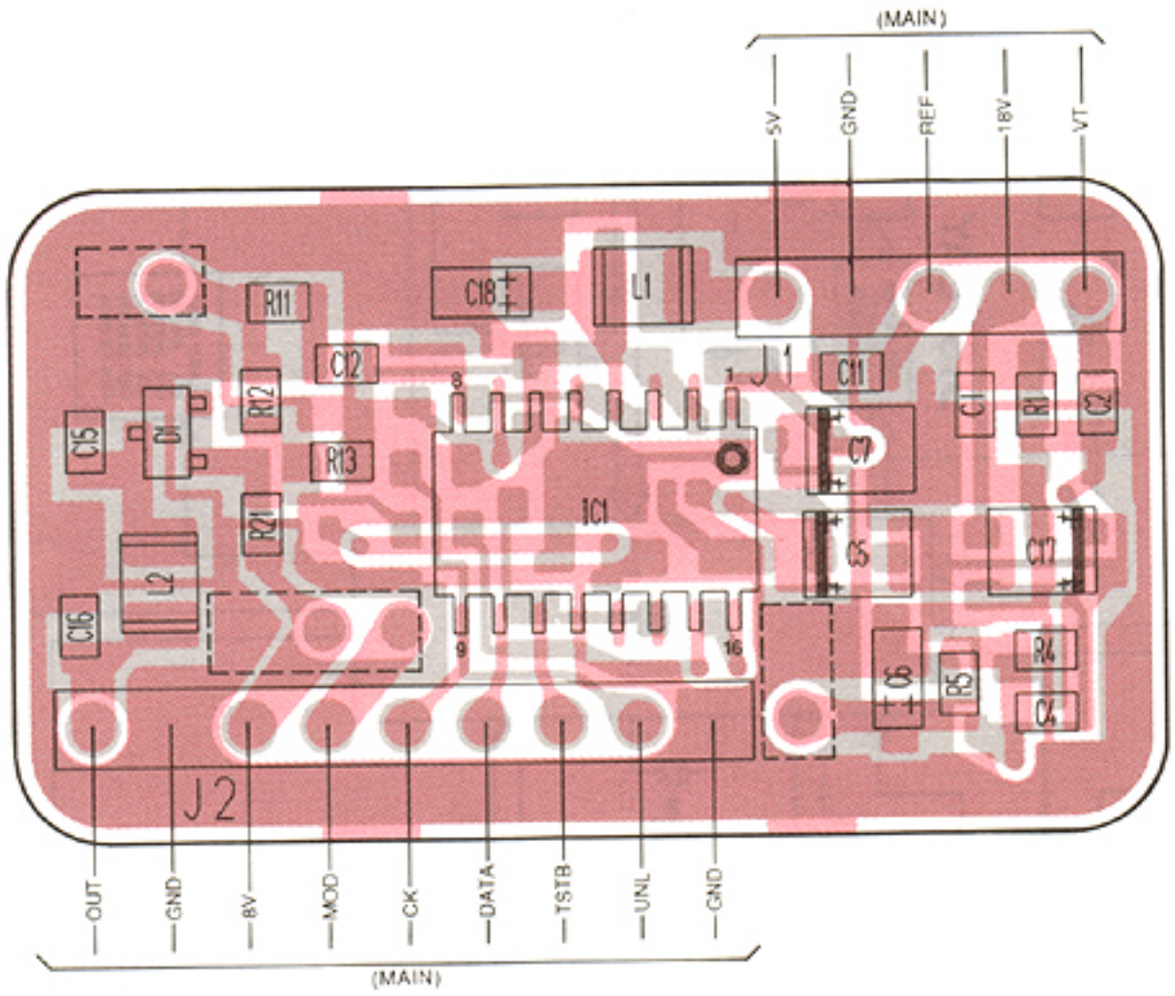
Q4

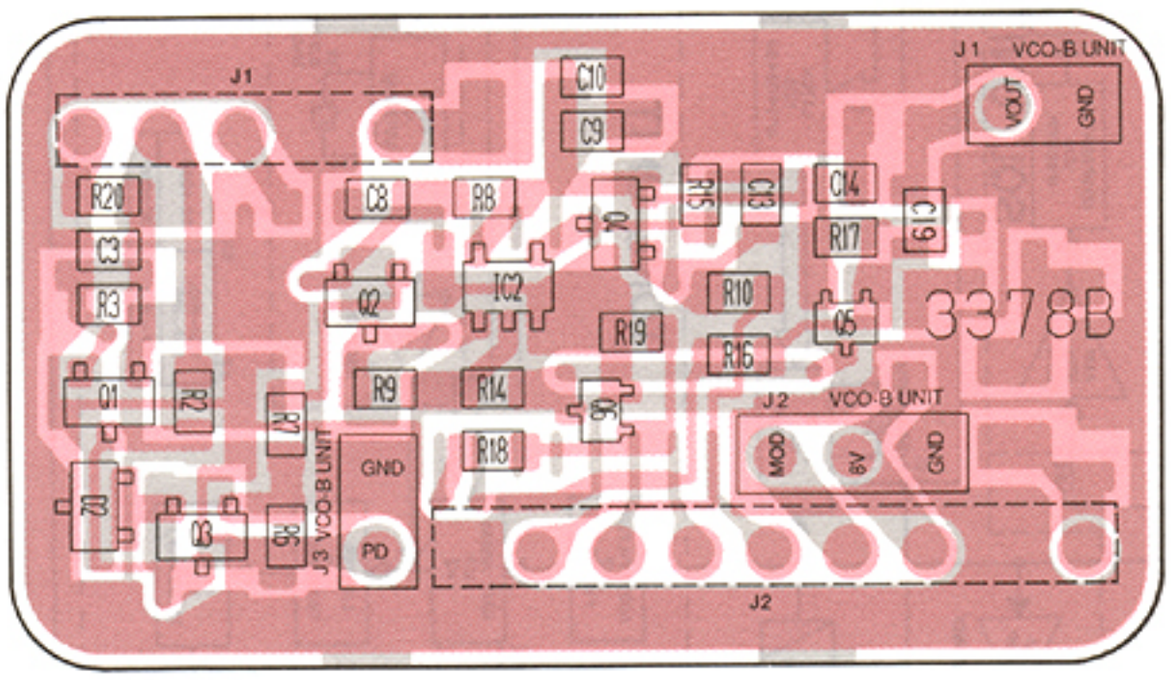
2SC3356
(Symbol: R22)



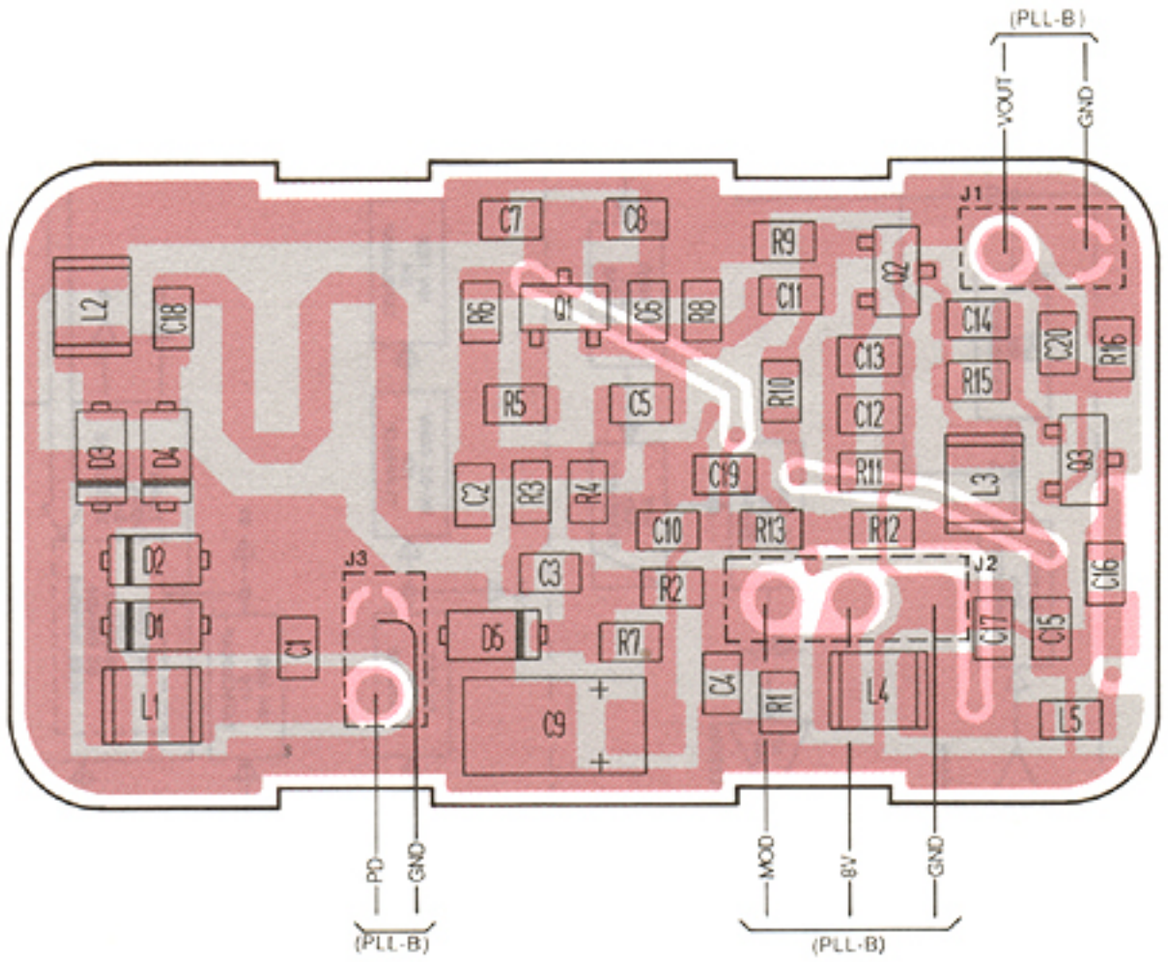
Q1, Q2

• PLL-B UNIT

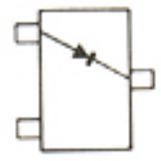




• VCO-B UNIT

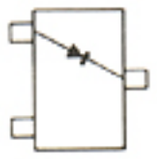


1SS193
(Symbol: F3)



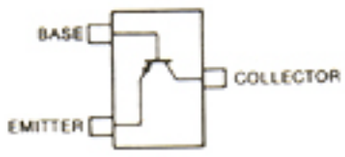
D2

1SV128
(Symbol: BB)



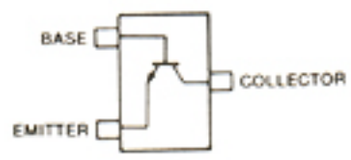
D1

2SA1576 S
(Symbol: FS)



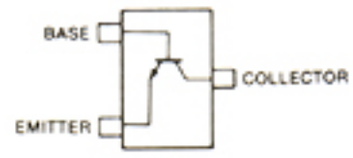
Q5

2SC2712 GR
(Symbol: LG)



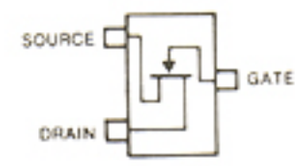
Q3

2SC4081 S
(Symbol: BS)



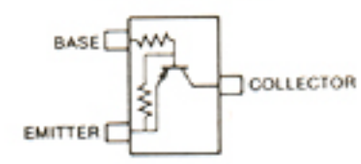
Q6

2SK209 Y
(Symbol: XY)



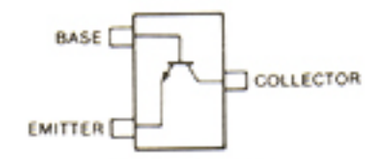
Q1, Q2

RN2404
(Symbol: YD)



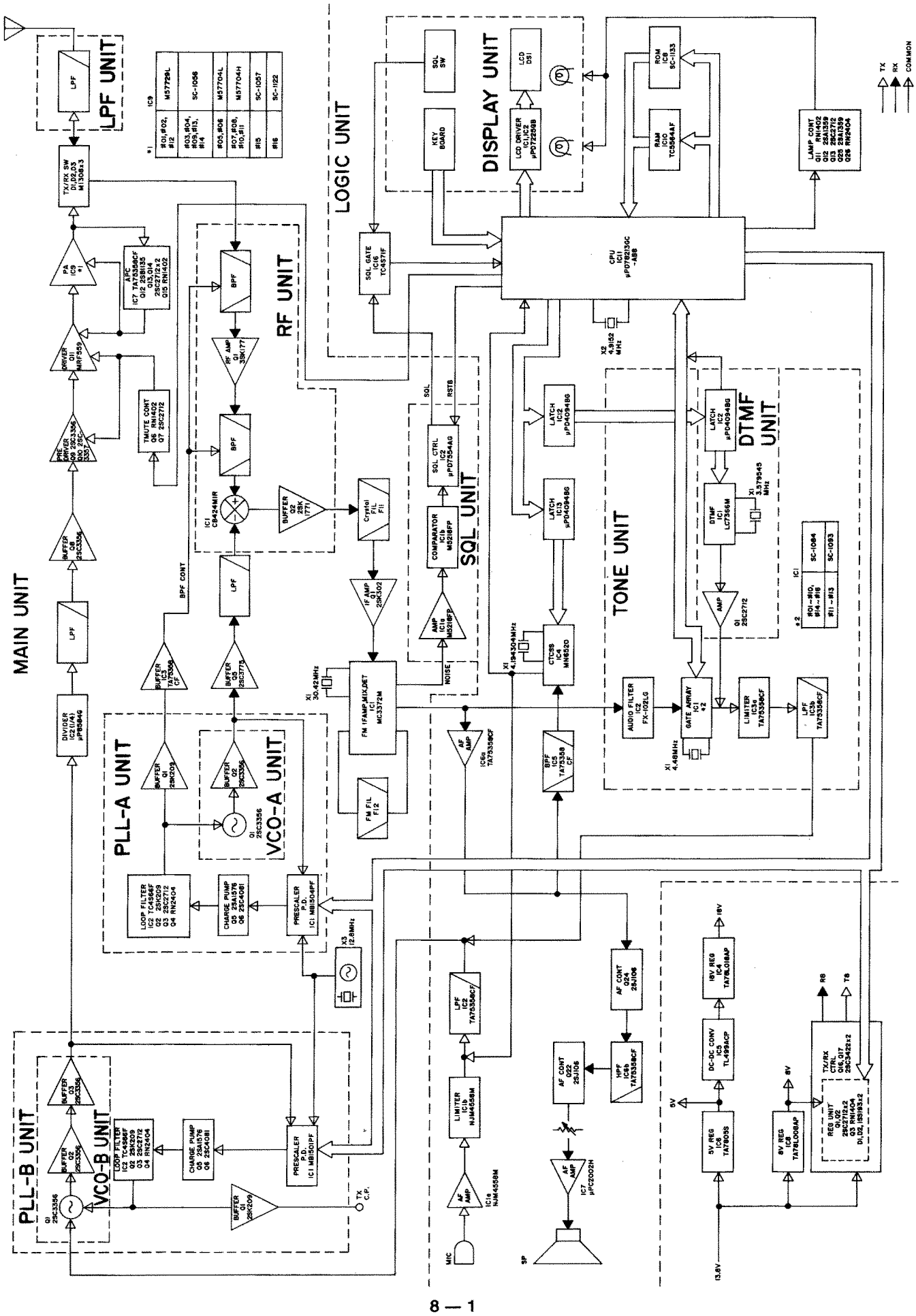
Q4

2SC3356
(Symbol: R22)

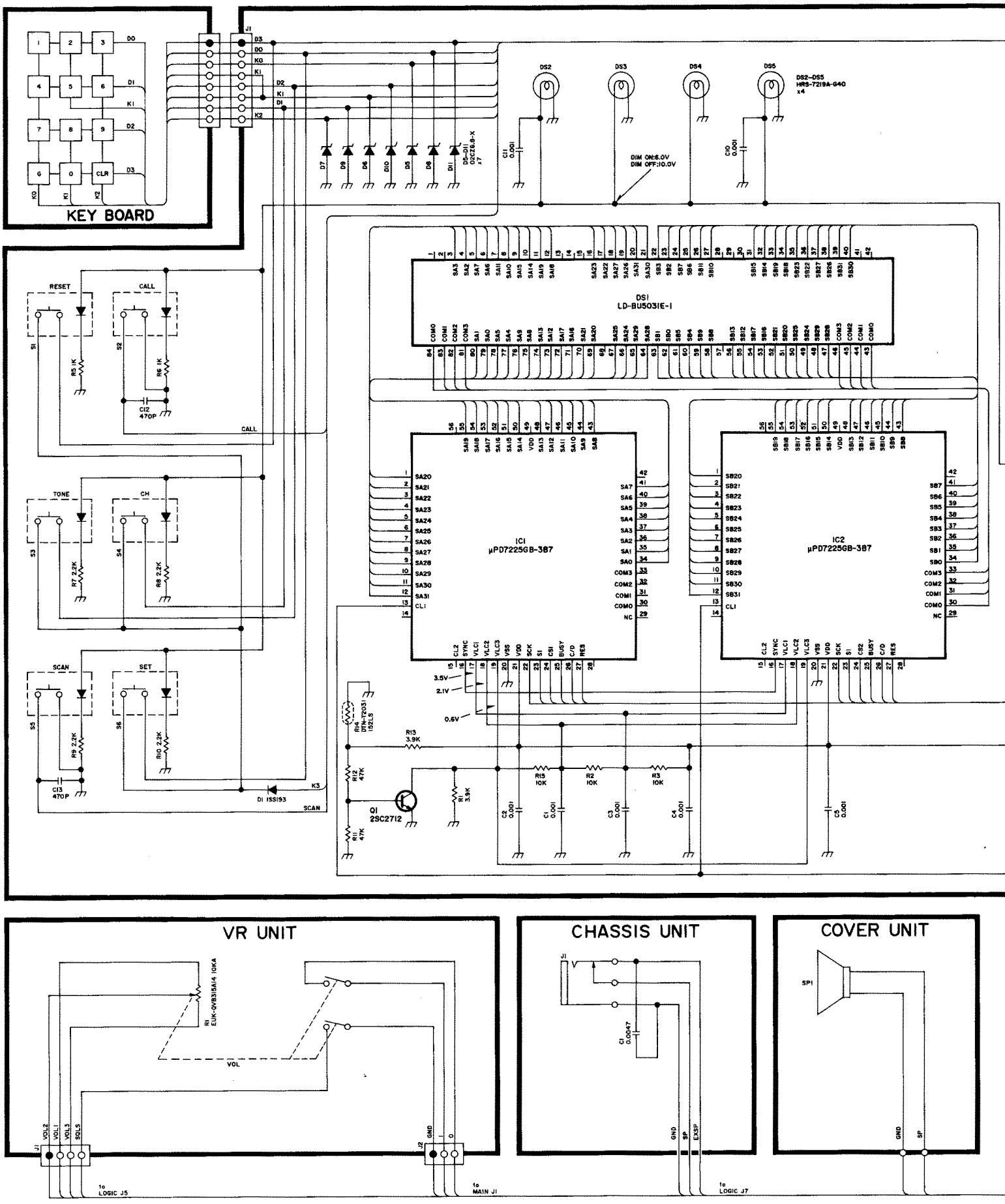


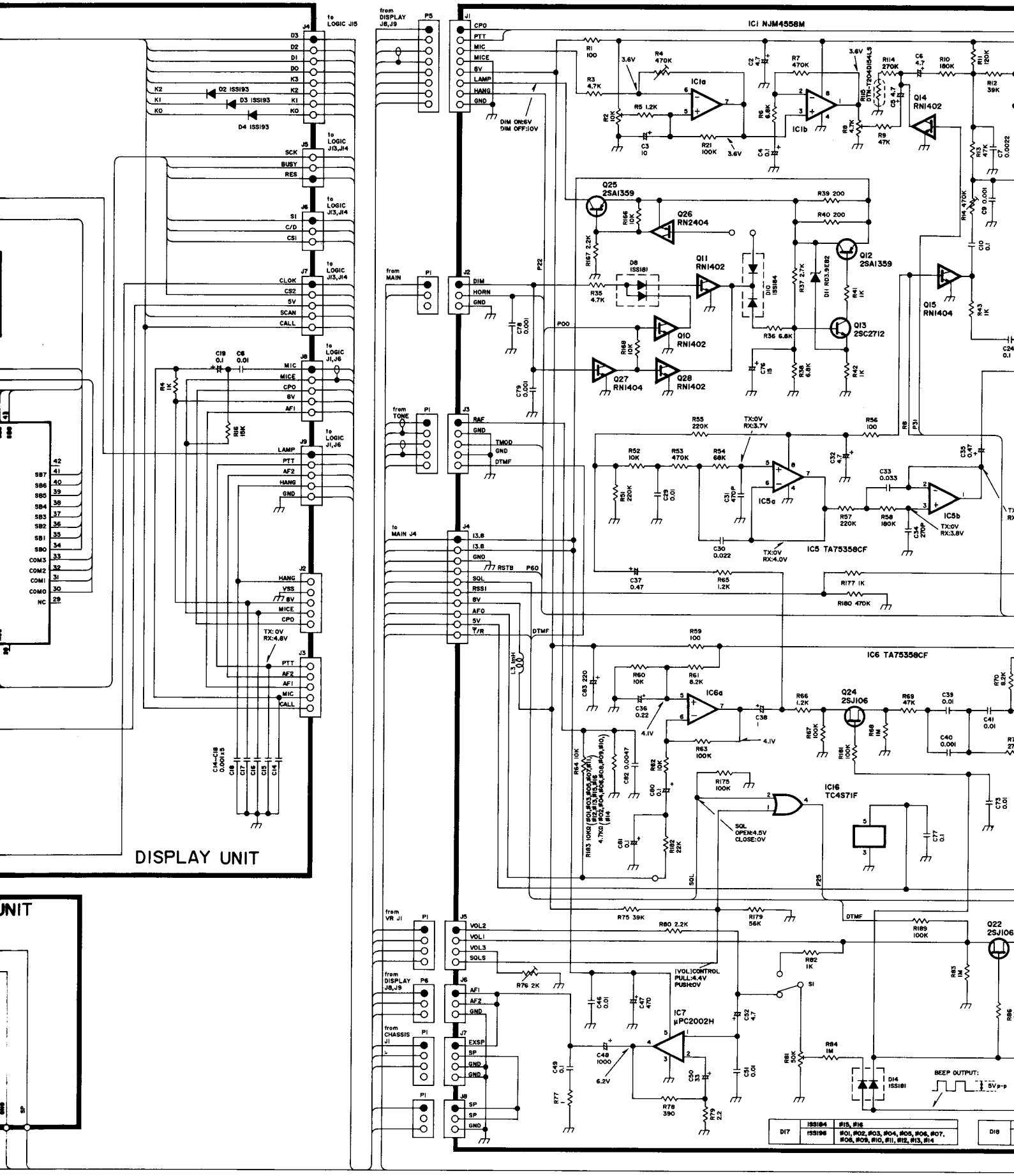
Q1, Q2, Q3

SECTION 8 BLOCK DIAGRAM

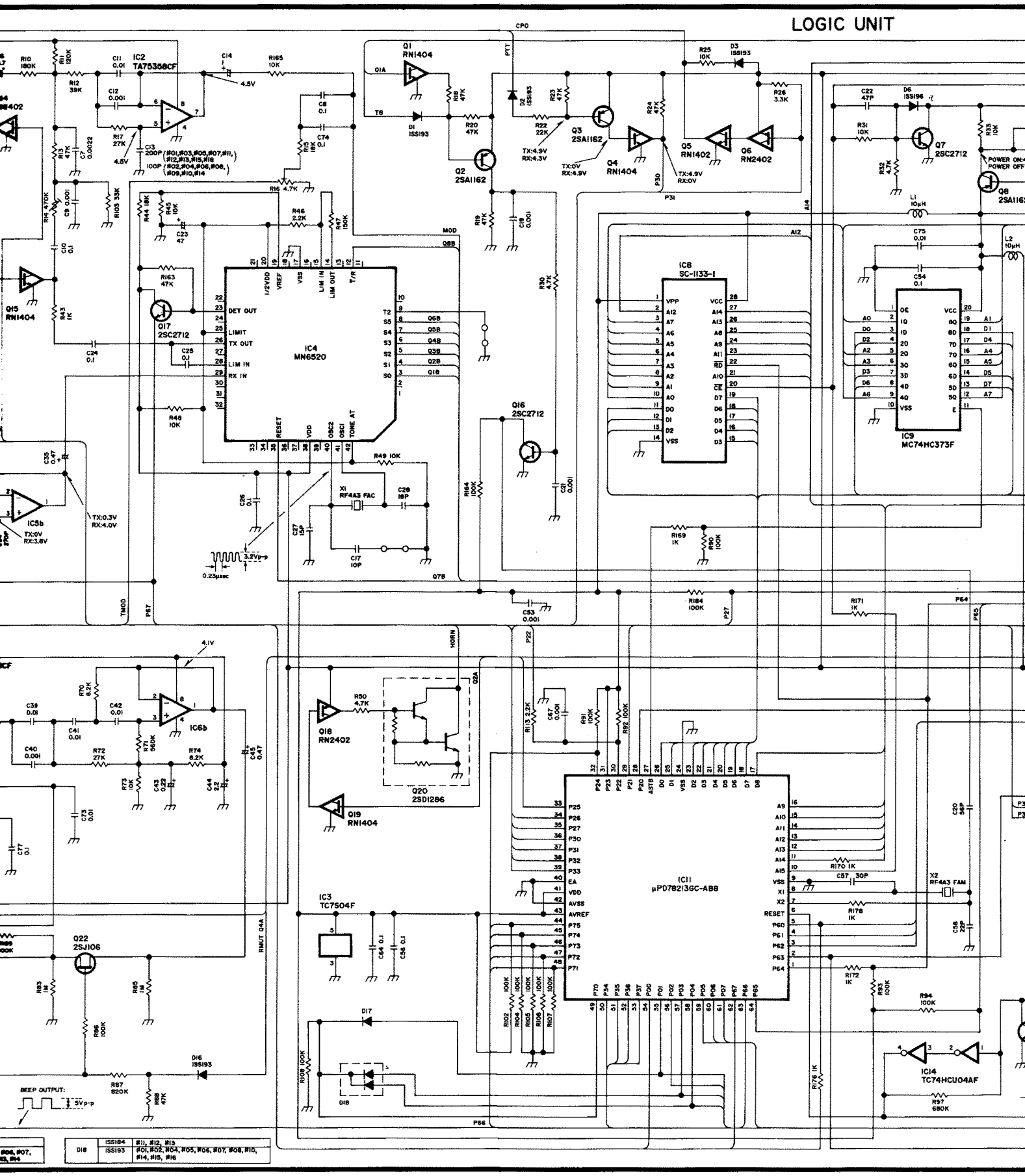


SECTION 9 VOLTAGE DIAGRAM

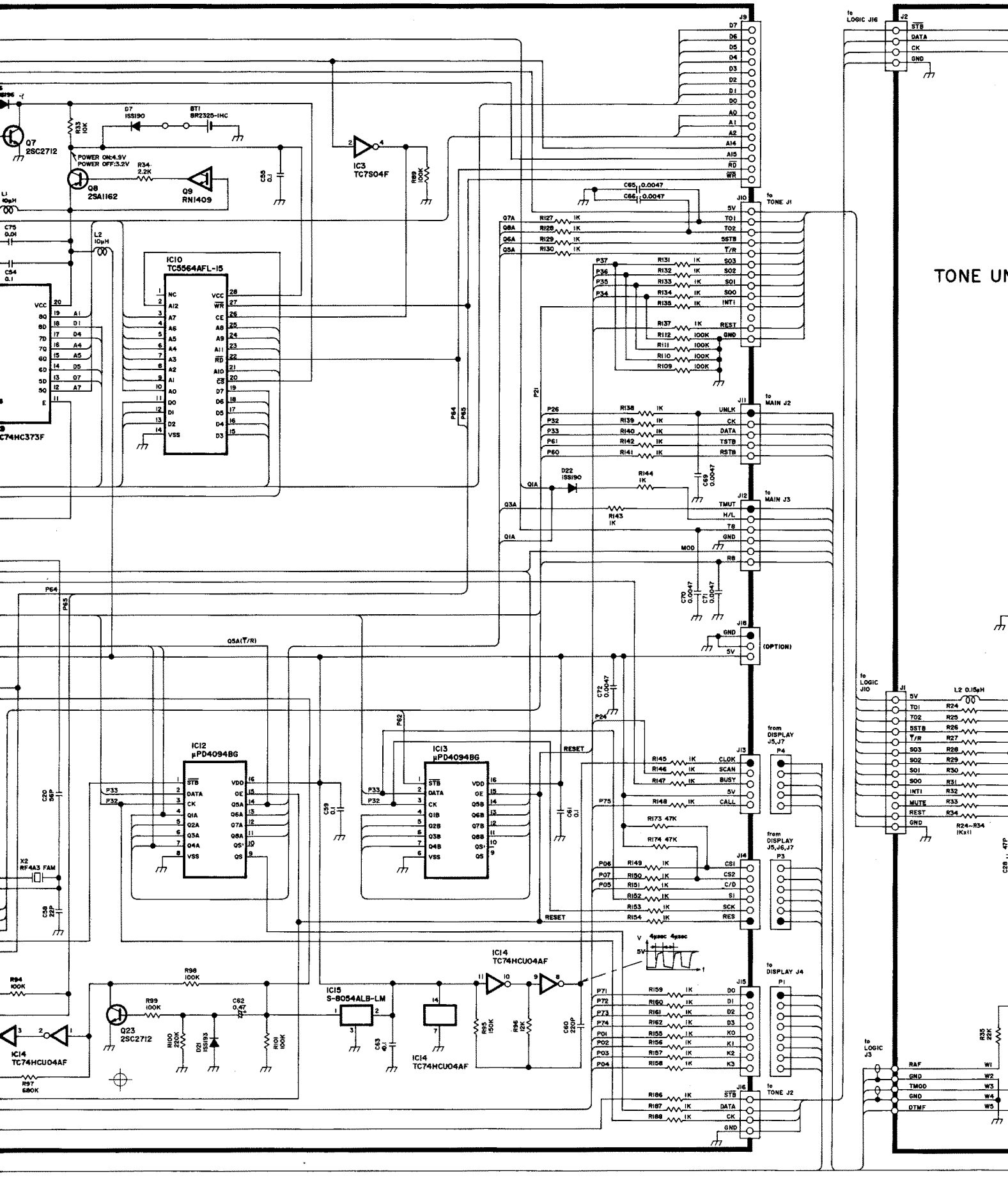


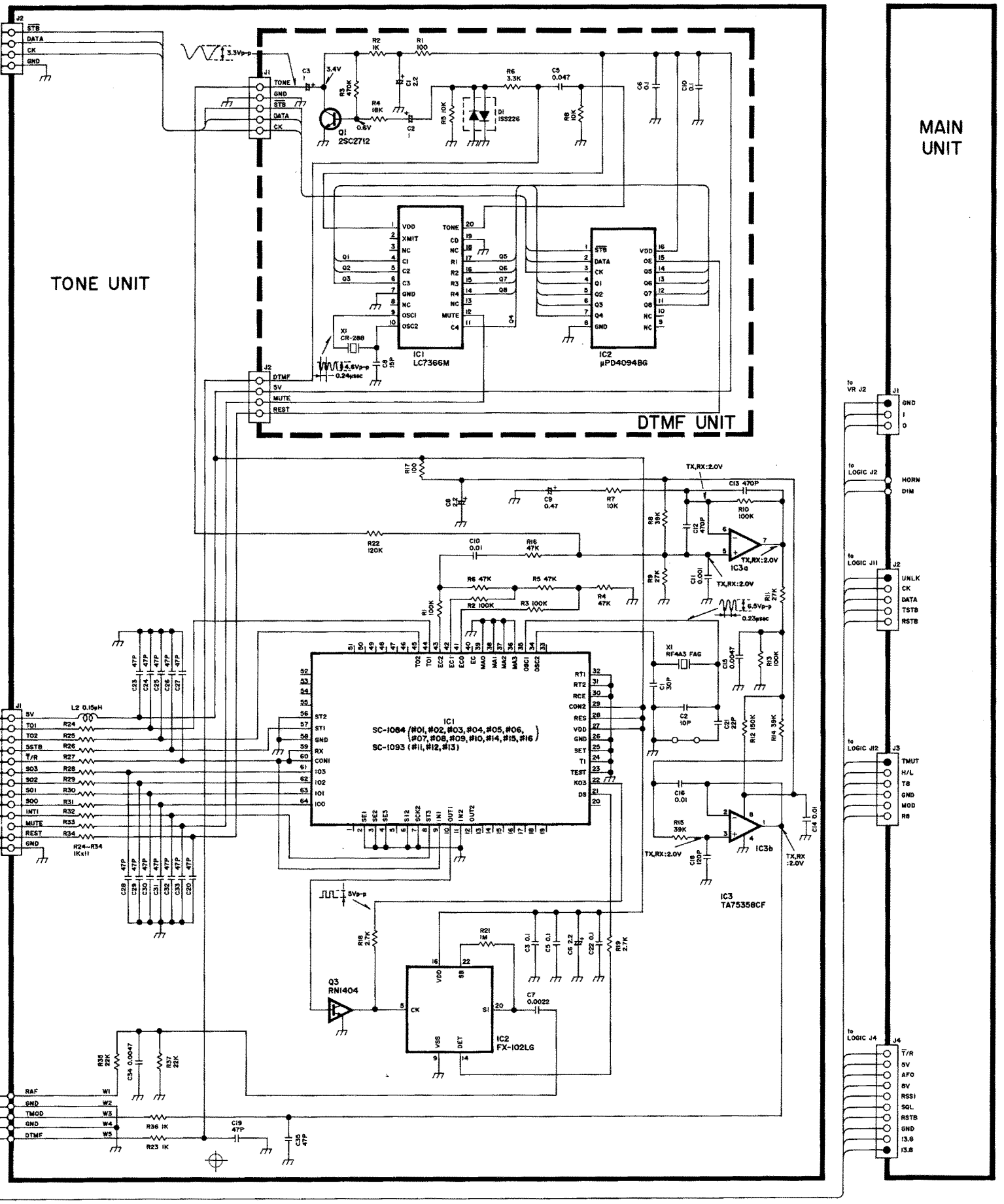

DISPLAY UNIT
IC1 NJM4558M
IC5 TA75358CF
IC6 TA75358CF
IC7 μPC2002H
IC16 TC4S71F
IC1a
IC1b
IC5a
IC5b
IC6a
Q10 RN1402
Q11 RN1402
Q12 2SA1359
Q13 2SC2712
Q14 RN1402
Q15 RN1404
Q22 2SJ106
Q24 2SJ106
Q25 2SA1359
Q26 RN2404
Q27 RN1404
Q28 RN1402
D2 ISS193
D3 ISS193
D4 ISS193
D8 ISS181
D10 ISS184
D11 RD3.9EB2
D14 ISS181
DIM ON:6V
DIM OFF:10V
TX:0V
RX:4.8V
TX:0V
RX:3.7V
TX:0V
RX:4.0V
TX:0V
RX:3.8V
SQL
OPEN:4.5V
CLOSE:0V
[VOL]CONTROL
PULL:4.4V
PUSH:0V
BEEP OUTPUT:
5Vp-p
to LOGIC J15
to LOGIC J13,J14
to LOGIC J1,J6
from DISPLAY J8,J9
from MAIN
from TONE
to MAIN J4
from VR J1
from CHASSIS J1
D17 ISS184 #15, #16
ISS196 #01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #11, #12, #13, #14
D18

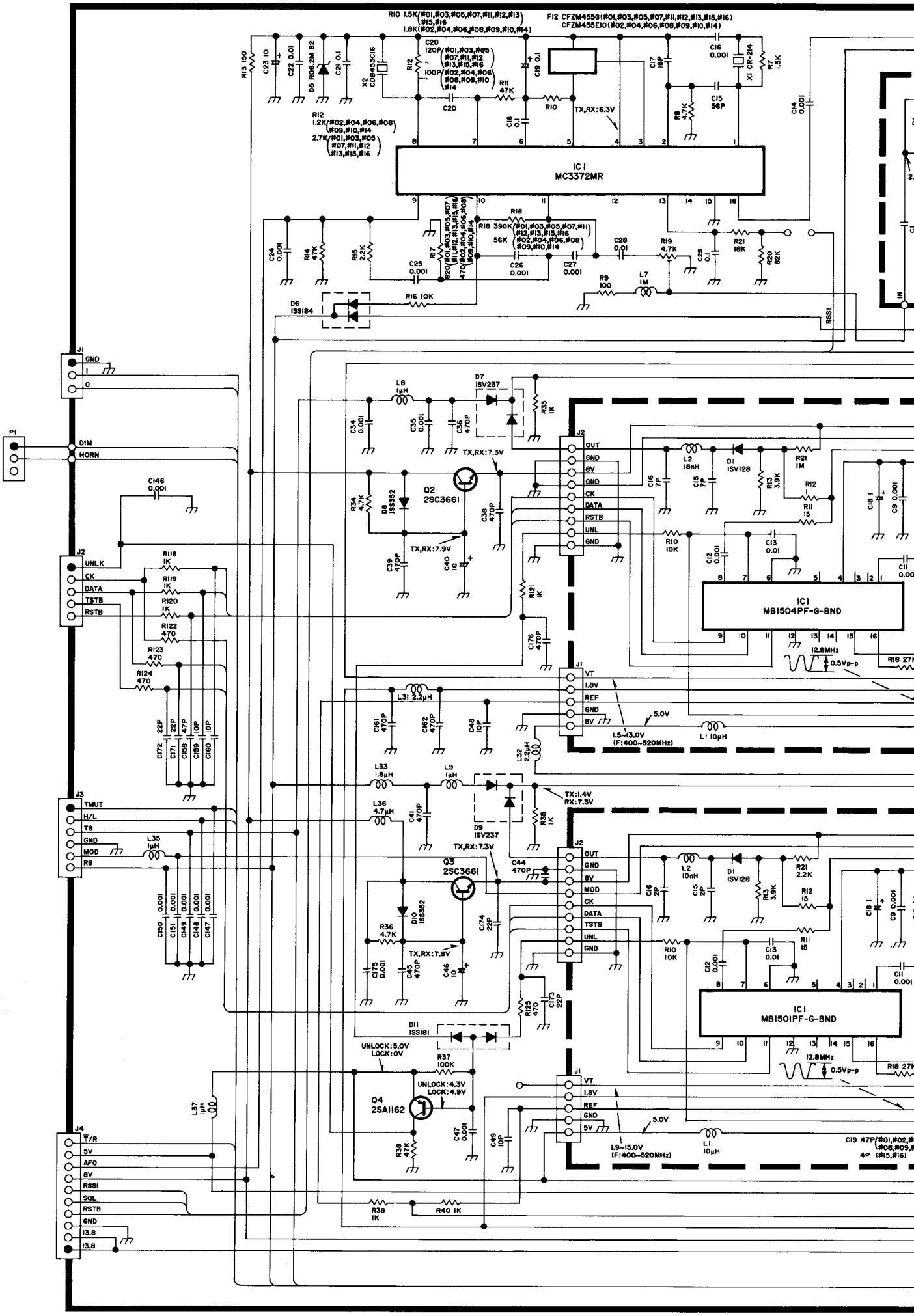
LOGIC UNIT

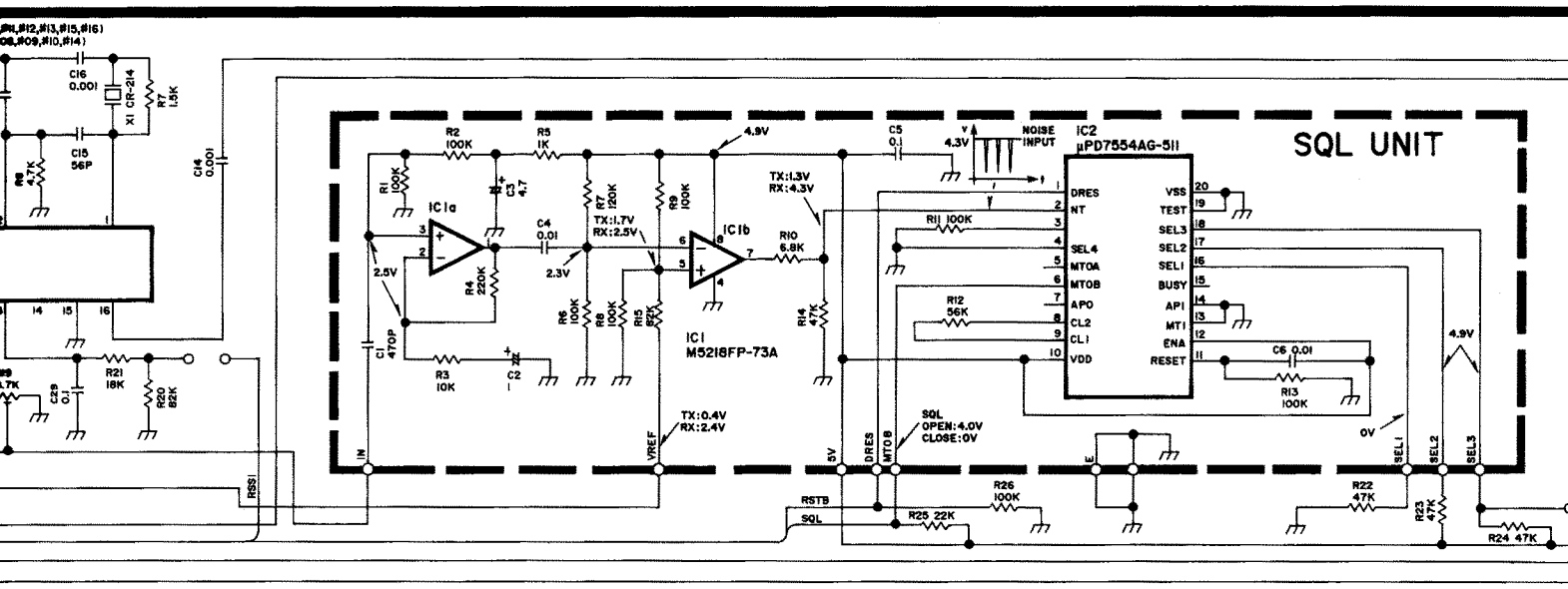


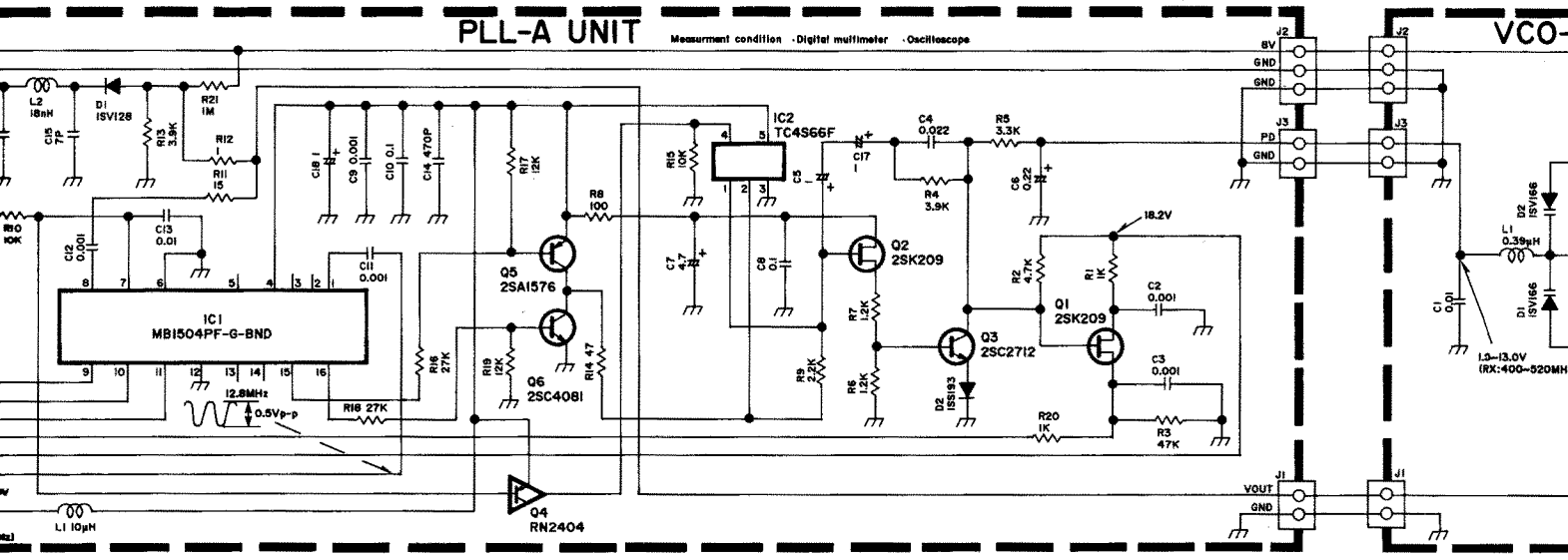
D18	ISS184	#11, #12, #13
	ISS193	#01, #02, #04, #05, #06, #07, #08, #10, #14, #15, #16

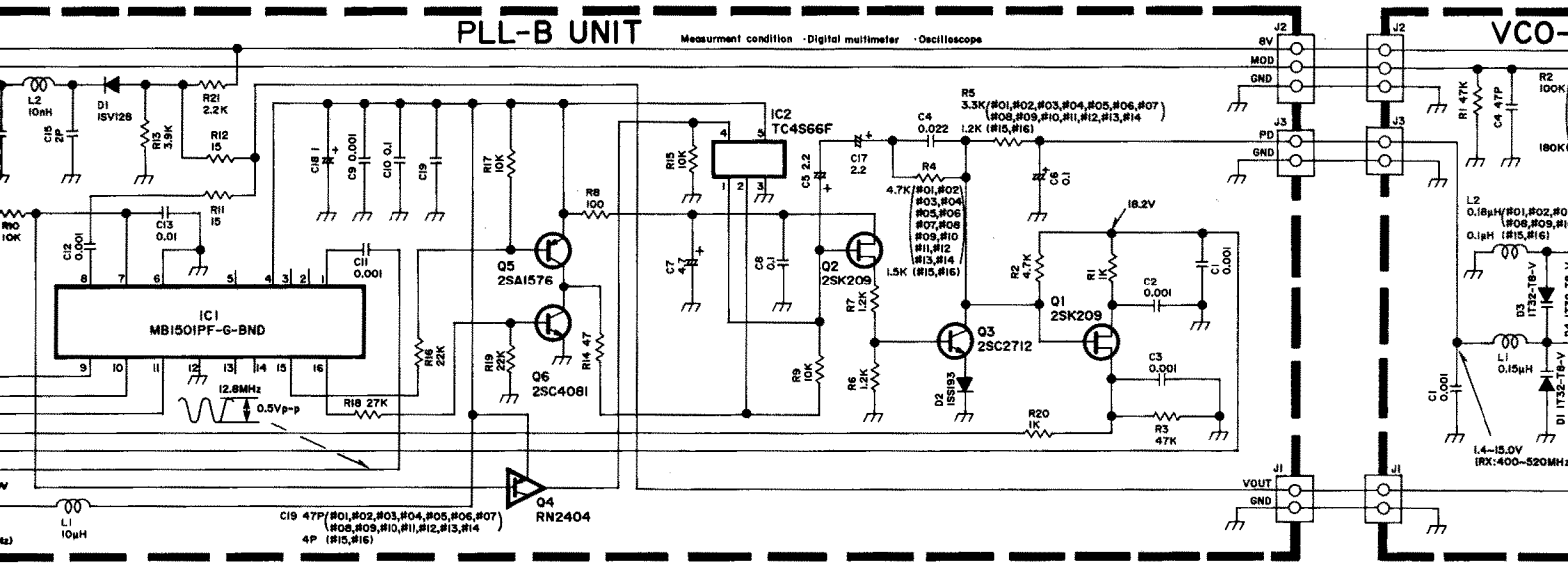

TONE UN
IC10
TC5564AFL-15
IC12
μPD4094BG
IC13
μPD4094BG
IC14
TC74HCU04AF
IC15
S-8054ALB-LM
IC3
TC7S04F
Q7
2SC2712
Q8
2SA1162
Q9
RN1409
Q23
2SC2712
D7
1SS190
D22
1SS190
BT1
BR2325-IMC
X2
RF4A3 FAM
L2
10μH
L2 0.15μH
POWER ON:4.9V
POWER OFF:3.2V
to LOGIC J16
to TONE J1
to MAIN J2
to MAIN J3
(OPTION)
from DISPLAY J5,J7
from DISPLAY J5,J6,J7
to DISPLAY J4
to TONE J2
to LOGIC J10
to LOGIC J3
RESET
Q5A(T/R)
4μsec 4μsec
5V
R24–R34
(1K×11)

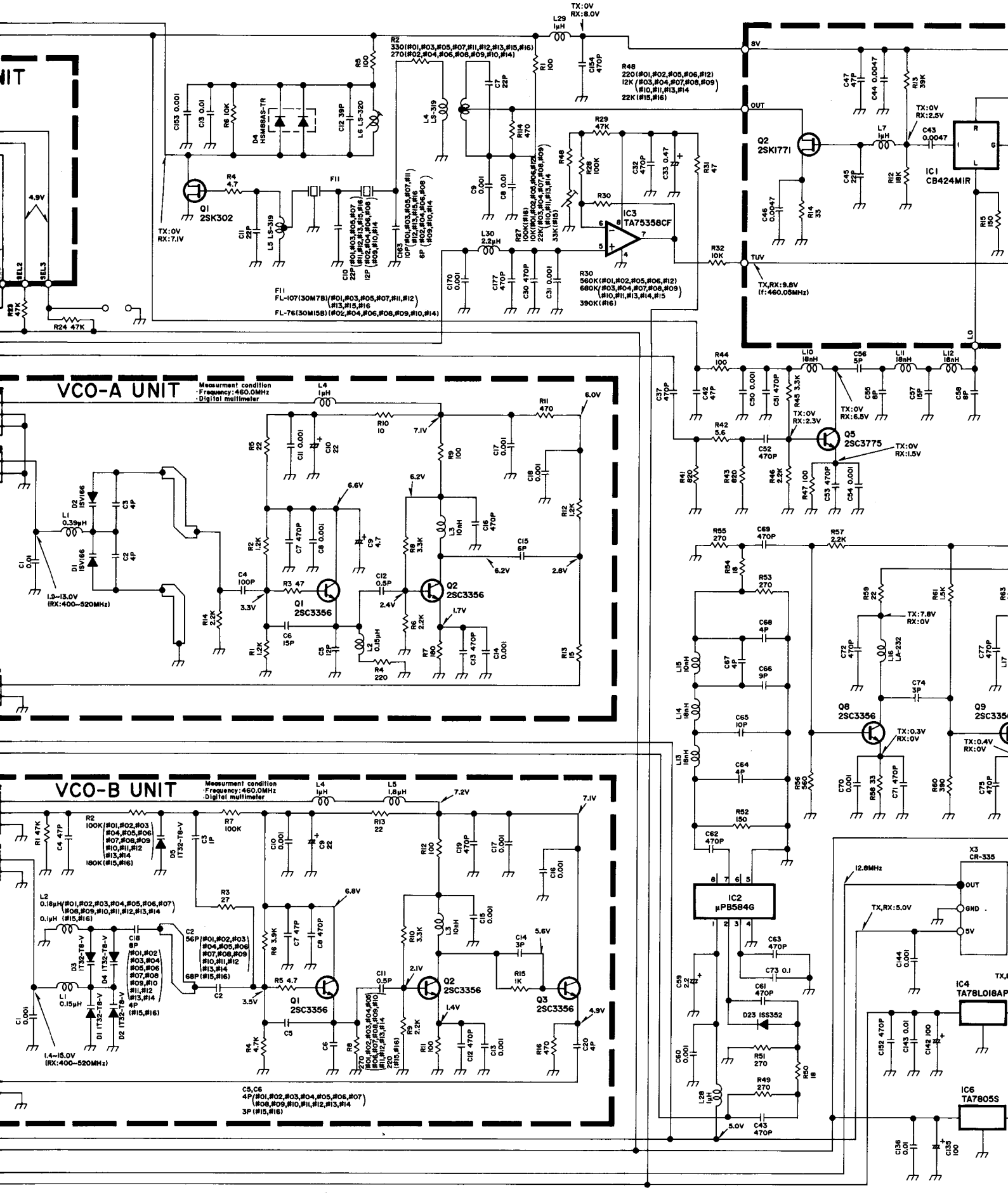

TONE UNIT
DTMF UNIT
MAIN UNIT
IC1 LC7366M
IC2 μPD4094BG
IC1 SC-1084 (#01, #02, #03, #04, #05, #06, #07, #08, #09, #10, #14, #15, #16) SC-1093 (#11, #12, #13)
IC3a
IC3b
IC3 TA75358CF
IC2 FX-102LG
Q1 2SC2712
Q3 RN1404
D1 1SS226
XI CR-288
XI RF4A3 FAG
J2 STB DATA CK GND
J1 TONE GND STB DATA CK
J2 DTMF 5V MUTE REST
J1 5V TO1 TO2 SSTB T/R S03 S02 S01 S00 INT1 MUTE REST GND
RAF GND TMOD GND DTMF
W1 W2 W3 W4 W5
to VR J2
to LOGIC J2
to LOGIC J11
to LOGIC J12
to LOGIC J4
J1 GND I O
HORN DIM
UNLK CK DATA TSTB RSTB
TMUT H/L TB GND MOD RB
T/R 5V AFO 8V RSSI SQL RSTB GND 13.8 13.8
TX,RX:2.0V
3.3Vp-p
3.4V
0.6V
6.5Vp-p 0.23μsec
4.6Vp-p 0.24μsec
5Vp-p

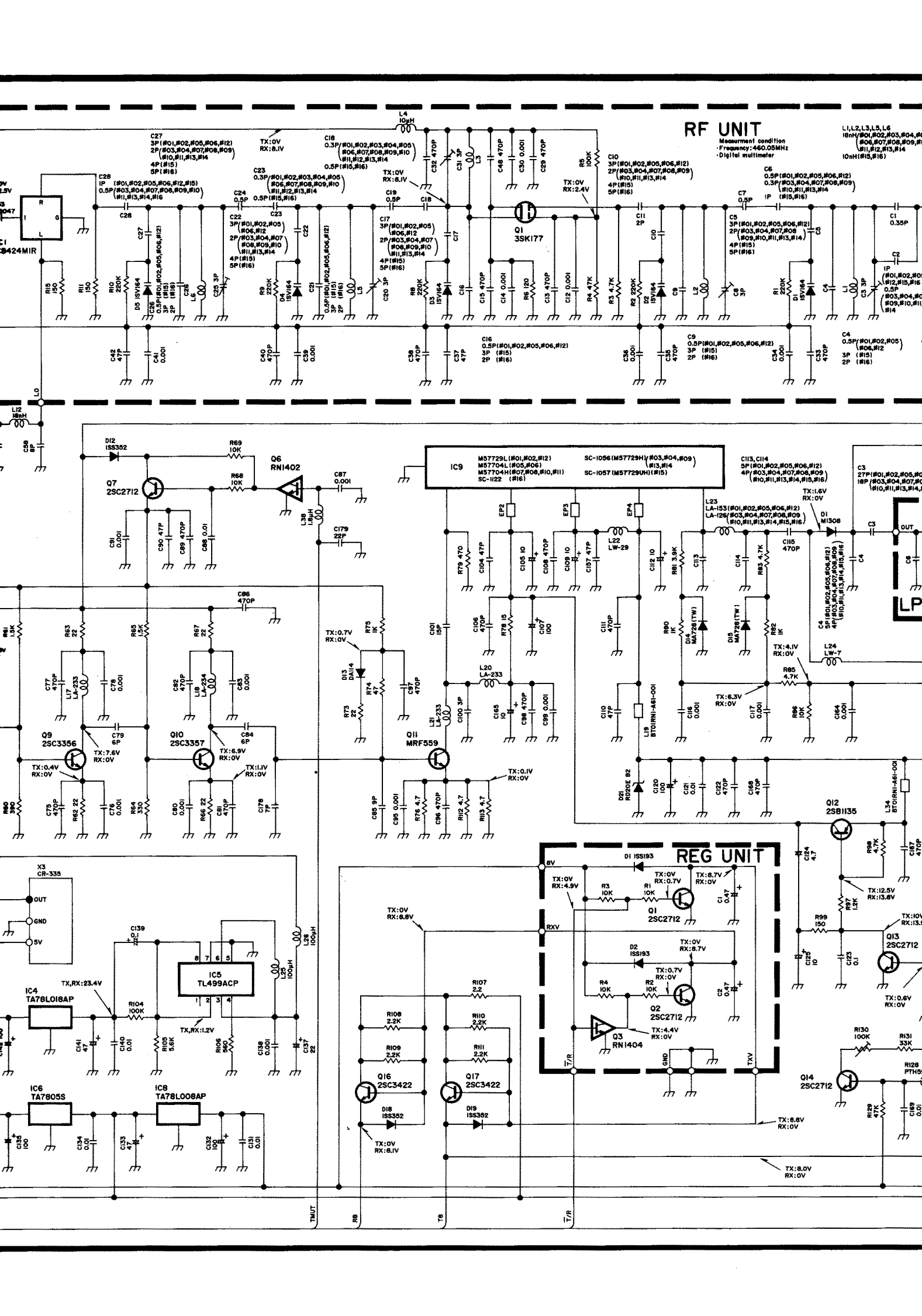

IC1
MC3372MR
IC1
MB1504PF-G-BND
IC1
MB1501PF-G-BND
Q2
2SC3661
Q3
2SC3661
Q4
2SA1162
D6
ISS184
D7
ISV237
D8
ISS352
D9
ISV237
D10
ISS352
D11
ISS181
D1
ISV128
X1 CR-214
X2 CDB455C16
F12 CFZM455G(#01,#03,#05,#07,#11,#12,#13,#15,#16)
CFZM455E10(#02,#04,#06,#08,#09,#10,#14)
J1
J2
J3
J4
P1
GND
DIM
HORN
UNLK
CK
DATA
TSTB
RSTB
TMUT
H/L
T8
MOD
R8
T/R
5V
AFO
8V
RSSI
SQL
13.8
OUT
VT
1.8V
REF
TX,RX:6.3V
TX,RX:7.3V
TX,RX:7.9V
TX:1.4V
RX:7.3V
UNLOCK:5.0V
LOCK:0V
UNLOCK:4.3V
LOCK:4.9V
5.0V
1.5~13.0V
(F:400~520MHz)
1.9~15.0V
(F:400~520MHz)
12.8MHz
0.5Vp-p
RSSI
IN

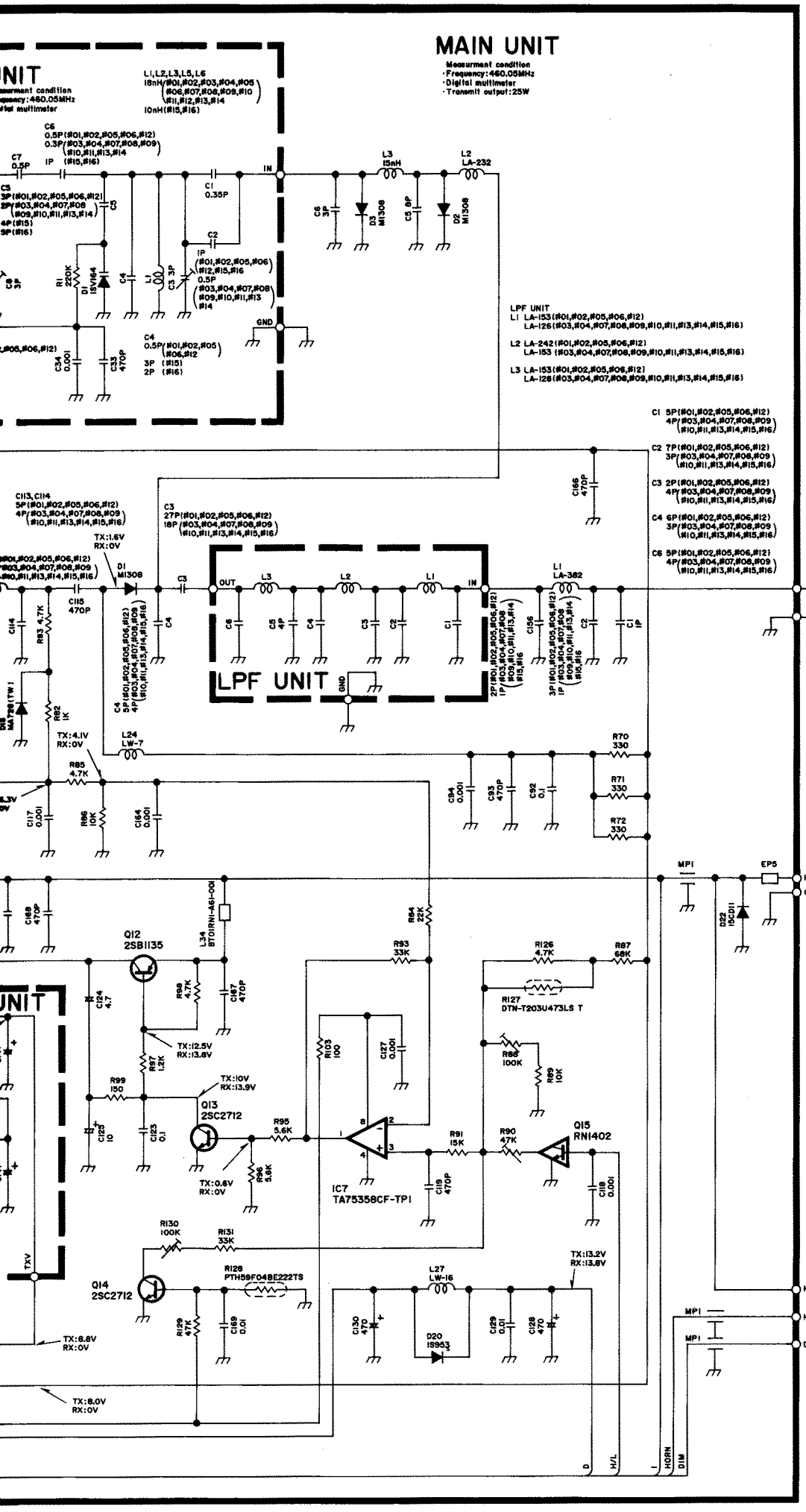

SQL UNIT
IC1
M52188FP-73A
IC2
μPD7554AG-511
NOISE INPUT
4.9V
4.3V
2.5V
2.3V
TX:1.7V
RX:2.5V
TX:1.3V
RX:4.3V
TX:0.4V
RX:2.4V
SQL
OPEN:4.0V
CLOSE:0V
RSTB
SQL
DRES
NT
SEL4
MTOA
MTOB
APO
CL2
CL1
VDD
VSS
TEST
SEL3
SEL2
SEL1
BUSY
API
MTI
ENA
RESET
VREF
5V
0V
IN
RSSI


PLL-A UNIT
Measurment condition ·Digital multimeter ·Oscilloscope
IC1
MB1504PF-G-BND
IC2
TC4S66F
Q1
2SK209
Q2
2SK209
Q3
2SC2712
Q4
RN2404
Q5
2SA1576
Q6
2SC4081
12.8MHz
0.5Vp-p
18.2V
8V
GND
PD
VOUT
VCO-
1.0~13.0V
(RX:400~520MH


PLL-B UNIT
Measurment condition ·Digital multimeter ·Oscilloscope
IC1
MB1501PF-G-BND
IC2
TC4S66F
Q1
2SK209
Q2
2SK209
Q3
2SC2712
Q4
RN2404
Q5
2SA1576
Q6
2SC4081
12.8MHz
0.5Vp-p
18.2V
8V
MOD
GND
PD
VOUT
VCO-
1.4~15.0V
(RX:400~520MH


VCO-A UNIT
Measurment condition
·Frequency:460.0MHz
·Digital multimeter
VCO-B UNIT
Measurment condition
·Frequency:460.0MHz
·Digital multimeter
Q1 2SK302
Q2 2SK1771
IC1 CB424MIR
IC3 TA75358CF
Q1 2SC3356
Q2 2SC3356
Q3 2SC3356
Q5 2SC3775
Q8 2SC3356
IC2 μPB5846
IC4 TA78L018AP
IC6 TA7805S
X3 CR-335
12.8MHz
TX,RX:9.8V
(f:460.05MHz)
TX,RX:5.0V
TX:0V RX:8.0V
TX:0V RX:7.1V
TX:0V RX:2.5V
TX:0V RX:6.5V
TX:0V RX:2.3V
TX:0V RX:1.5V
TX:7.8V RX:0V
TX:0.3V RX:0V
TX:0.4V RX:0V
1.0~13.0V (RX:400~520MHz)
1.4~15.0V (RX:400~520MHz)
FI1
FL-107(30M7B)/(#01,#03,#05,#07,#11,#12,#13,#15,#16)
FL-76(30M15B)/(#02,#04,#06,#08,#09,#10,#14)
R30
560K(#01,#02,#05,#06,#12)
680K(#03,#04,#07,#08,#09)
390K(#10,#11,#13,#14,#15)
390K(#16)
R48
220(#01,#02,#05,#06,#12)
12K(#03,#04,#07,#08,#09)
(#10,#11,#13,#14
22K(#15,#16)
R2
330(#01,#03,#05,#07,#11,#12,#13,#15,#16)
270(#02,#04,#06,#08,#09,#10,#14)
R2
100K(#01,#02,#03,#04,#05,#06,#07,#08,#09,#10,#11,#12,#13,#14
180K(#15,#16)
L2
0.18μH(#01,#02,#03,#04,#05,#06,#07,#08,#09,#10,#11,#12,#13,#14
0.1μH (#15,#16)
C2
56P(#01,#02,#03,#04,#05,#06,#07,#08,#09,#10,#11,#12,#13,#14
68P(#15,#16)
C5,C6
4P/(#01,#02,#03,#04,#05,#06,#07,#08,#09,#10,#11,#12,#13,#14
3P (#15,#16)


RF UNIT
Measurment condition
·Frequency:460.05MHz
·Digital multimeter
REG UNIT
IC9
M57729L(#01,#02,#12)
M57704L(#05,#06)
M57704H(#07,#08,#10,#11)
SC-1122 (#16)
SC-1056(M57729H)(#03,#04,#09)(#13,#14)
SC-1057(M57729UH)(#15)
Q1 3SK177
Q2 2SC2712
Q3 RN1404
Q4 RN1402
Q5 2SC2712
Q6 RN1402
Q7 2SC2712
Q9 2SC3356
Q10 2SC3357
Q11 MRF559
Q12 2SB1135
Q13 2SC2712
Q14 2SC2712
Q16 2SC3422
Q17 2SC3422
IC4 TA78L018AP
IC5 TL499ACP
IC6 TA7805S
IC8 TA78L008AP
X3 CR-335
TX:0V RX:8.1V
TX:0V RX:2.4V
TX:0V RX:4.9V
TX:0V RX:6.8V
TX:0V RX:0.7V
TX:8.7V RX:0V
TX:4.4V RX:0V
TX:0.7V RX:0V
TX:4.1V RX:0V
TX:6.3V RX:0V
TX:7.6V RX:0V
TX:6.9V RX:0V
TX:0.4V RX:0V
TX:1.1V RX:0V
TX:0.1V RX:0V
TX:1.6V RX:0V
TX:12.5V RX:13.8V
TX:0.6V RX:0V
TX:8.8V RX:0V
TX:8.0V RX:0V
TX,RX:23.4V
TX,RX:1.2V
TMUT
RB
TB
T/R


MAIN UNIT
Measurment condition
·Frequency:460.05MHz
·Digital multimeter
·Transmit output:25W
LPF UNIT
LPF UNIT
L1 LA-153(#01,#02,#05,#06,#12)
LA-126(#03,#04,#07,#08,#09,#10,#11,#13,#14,#15,#16)
L2 LA-242(#01,#02,#05,#06,#12)
LA-153 (#03,#04,#07,#08,#09,#10,#11,#13,#14,#15,#16)
L3 LA-153(#01,#02,#05,#06,#12)
LA-126(#03,#04,#07,#08,#09,#10,#11,#13,#14,#15,#16)
C1 5P(#01,#02,#05,#06,#12)
4P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C2 7P(#01,#02,#05,#06,#12)
3P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C3 2P(#01,#02,#05,#06,#12)
4P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C4 6P(#01,#02,#05,#06,#12)
3P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C6 5P(#01,#02,#05,#06,#12)
4P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
L1,L2,L3,L5,L6
15nH(#01,#02,#03,#04,#05
#06,#07,#08,#09,#10
#11,#12,#13,#14
10nH(#15,#16)
C6
0.5P(#01,#02,#05,#06,#12)
0.3P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14
(#15,#16)
C7
0.5P
IP
C1
0.35P
C2
IP
(#01,#02,#05,#06)
#12,#15,#16
0.5P
(#03,#04,#07,#08
#09,#10,#11,#13
#14
C3 3P
C4
0.5P(#01,#02,#05
#06,#12
3P (#15)
2P (#16)
C5 8P
C6
3P
L3
15nH
L2
LA-232
D1
1SV164
D2
MI308
D3
MI308
R1
220K
C34
0.001
C35
470P
GND
IN
C113,C114
5P(#01,#02,#05,#06,#12)
4P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C115
470P
C116
470P
TX:1.6V
RX:0V
D1
MI308
C3
27P(#01,#02,#05,#06,#12)
18P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
OUT
L3
L2
L1
IN
L1
LA-382
ANT
C114
R83 4.7K
D3
MA728(TW)
R82
1K
C4
3P(#01,#02,#05,#06,#12)
4P(#03,#04,#07,#08,#09)
(#10,#11,#13,#14,#15,#16)
C6
C5 4P
C4
C3
C2
C1
C156
2P(#01,#02,#05,#06,#12)
IP(#03,#04,#07,#08
#09,#10,#11,#13,#14
#15,#16
3P(#01,#02,#05,#06,#12)
IP(#03,#04,#07,#08
#09,#10,#11,#13,#14
#15,#16
C2
C1
IP
LPF UNIT
GND
TX:4.1V
RX:0V
L24
LW-7
R70
330
R71
330
R72
330
R85
4.7K
C117
0.001
R86
10K
C164
0.001
C94
0.001
C93
470P
C92
0.1
MPI
EP5
HV
GND
D22
1SC311
C168
470P
Q12
2SB1135
L34
BTO1RN1-461-001
R84
22K
R93
33K
RI26
4.7K
R87
68K
RI27
DTN-T203U473LS T
R98
4.7K
C167
470P
C124
4.7
TX:12.5V
RX:13.8V
R97
1.2K
R103
100
C127
0.001
R88
100K
R89
10K
TX:10V
RX:13.9V
R99
150
Q13
2SC2712
C123
0.1
C122
10
R95
5.6K
R96
5.6K
TX:0.6V
RX:0V
IC7
TA75358CF-TP1
R91
15K
R90
47K
Q15
RN1402
C119
470P
C118
0.001
RI30
100K
RI31
33K
TX:13.2V
RX:13.8V
Q14
2SC2712
RI28
PTH59F04BE222TS
L27
LW-16
R129
47K
C169
0.01
C130
470
D20
1S953
C129
0.01
C128
470
TX:6.8V
RX:0V
TX:8.0V
RX:0V
HV
MPI
HORN
MPI
DIM
B
H/L
HORN
DIM

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