



SERVICE MANUAL

800MHz TRUNKED TRANSCEIVER

IC-U810T

INTRODUCTION

This service manual describes the latest information for the **IC-U810T** 800 MHz TRUNKED TRANCEIVER 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>

1180000190	IC	NJM7805A	IC-U810T	MAIN UNIT	5 pieces
8810006530	Screw	FHM2.6×6 ZKBS	IC-U810T	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.

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SECTION 1 SPECIFICATIONS

GENERAL

- Frequency coverage : 806~821 MHz (transmit)
851~866 MHz (receiver, transmit in talk-around)
- Transmit shift frequency : -45 MHz (trunked operation)
0 MHz (talk-around operation)
- Mode : FM (16K0F3E, 15K0F1D)
- Antenna impedance : 50 Ω nominal
- Usable temperature range : -30 °C~+60 °C (-22 °F~+140 °F)
- Frequency stability : Less than ± 0.00025 %
- Power supply requirement : 13.8 V DC ± 15 % (negative ground)
- Current drain (at 13.8 V DC) : Transmit 7 A
Receive squelched 500 mA
Max. audio output 1.5 A
- Dimensions : 151 (W) \times 53 (H) \times 189 (D) mm
5.9 (W) \times 2.1 (H) \times 7.4 (D) in
(Projections not included)
- Weight : 1.8 kg (4.0 lb)

TRANSMITTER

- Output power : 15 W (trunked operation)
10 W (talk-around operation)
- Modulation system : Variable reactance frequency modulation
- Spurious emissions : Less than -60 dB
- Audio frequency response : +1 dB, -3 dB of +6 dB/octave with 300 Hz to 3000 Hz input
- Noise and hum : 40 dB (Trunked operation) without data signal
35 dB (Talked-around operation)
- Microphone impedance : 600 Ω

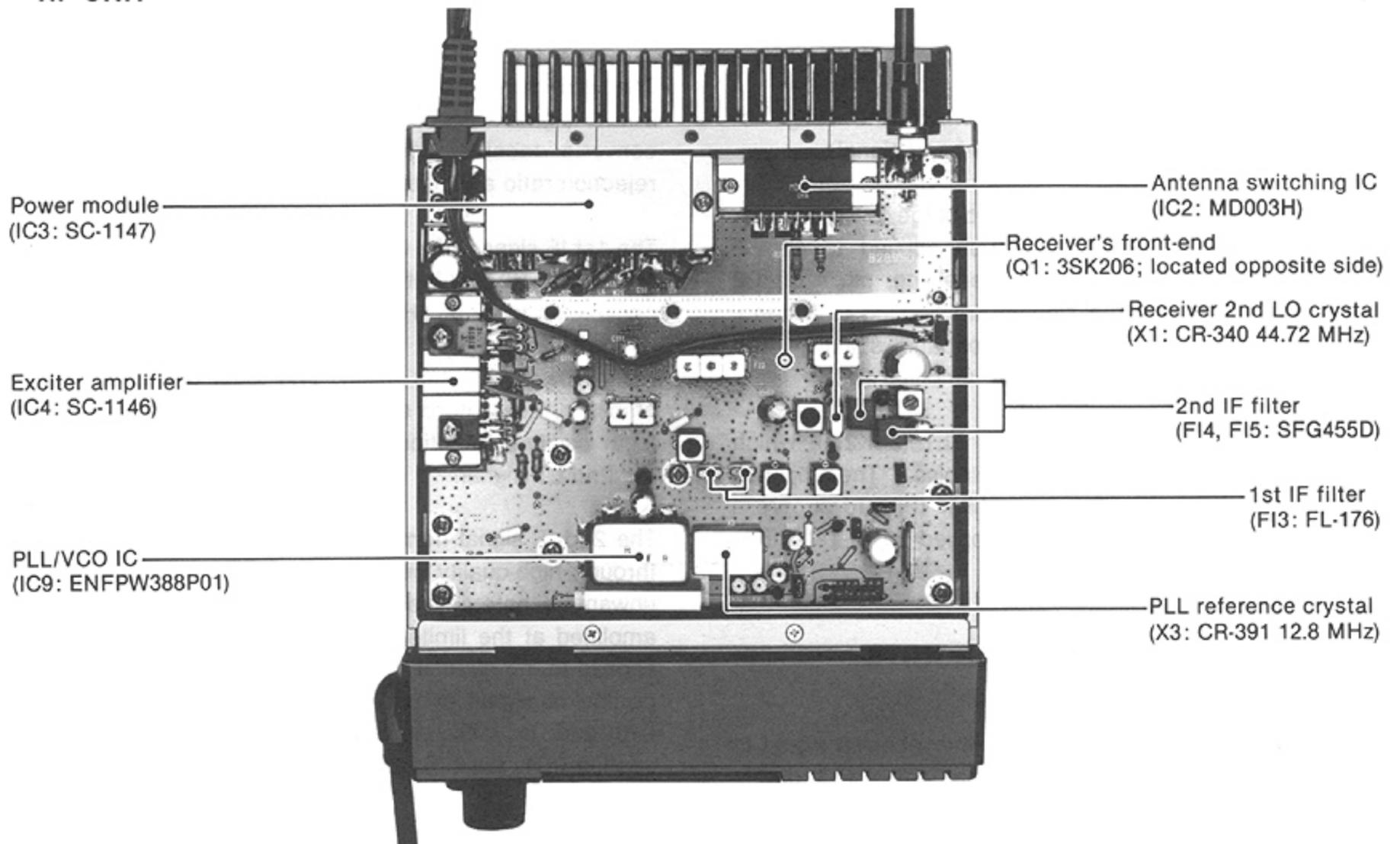
RECEIVER

- Sensitivity : 0.35 μ V for 12 dB SINAD
- Intermediate frequency : 1st 45.175 MHz
2nd 455 kHz
- Squelch sensitivity : 0.35 μ V
(Threshold level)
- Adjacent channel selectivity : -65 dB
- Intermodulation rejection : -65 dB
- Spurious response rejection : -70 dB
- Blocking and desensitization : 90 dB μ e.m.f.
- Noise and hum : 40 dB without data signal
- Audio frequency response : +1 dB, -3 dB of +6 dB/octave with 300 Hz to 3000 Hz deviation
- Audio output power : More than 4.5 W
- Audio output impedance : 4 Ω

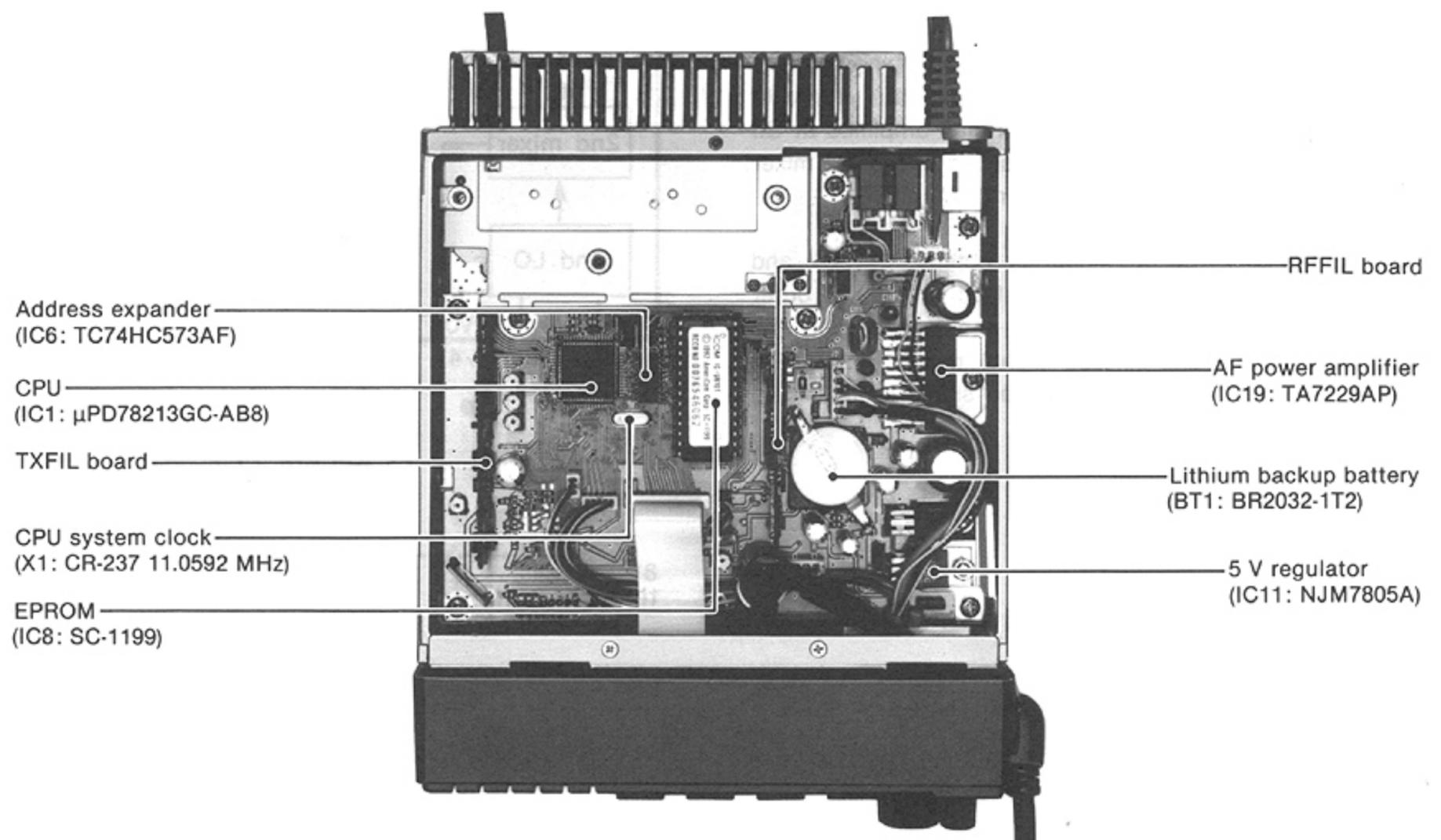
All stated specifications are approximate and subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

• RF UNIT



• MAIN UNIT



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 RF CIRCUIT (RF UNIT)

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

Received signals pass through a two-stage low-pass filter (strip line, C79~C85) and are then applied to an RF switching IC (IC2, pin 3). While receiving, pin 4 of IC2 becomes "LOW" and the signals are applied to a band-pass filter (F11) to suppress out-of-band signals. The filtered signals are applied to an RF amplifier (Q1).

The RF amplifier (Q1) employs an FET (3SK206) which expands the dynamic range with low noise. The amplified signals pass through a bandpass filter (F12) to suppress unwanted signals and are then applied to a 1st mixer circuit.

3-1-2 1ST MIXER AND IF CIRCUITS (RF UNIT)

The 1st mixer circuit (Q2) converts the received signal to a fixed frequency of the 1st IF signal with a PLL output frequency. By changing the PLL frequency, only the desired frequency will be passed through a pair of crystal filters at the next stage of the 1st mixer.

The signals from the RF circuit are mixed at Q2 with a 1st LO signal from the PLL/VCO IC (IC9) to produce a 1st IF signal.

The 1st LO signal from the PLL/VCO IC (IC9, pin 6) passes through the attenuator (R78~R80) and the transmit/receive switching circuit (D5) and is then amplified at Q6 and Q5. The amplified signal is applied to the 1st mixer circuit (Q2) through a bandpass filter (F16).

The 45.175 MHz 1st IF signal is obtained at L1 and is then applied to a pair of crystal filters (F13) in order to obtain wide selection capability and to pass only the desired signals. The filtered signal passes through a 1st IF amplifier (Q3). The amplified signal is applied to a 2nd IF circuit.

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

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

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

IC1 contains the 2nd mixer, 2nd local oscillator, limiter amplifier, quadrature detector and audio amplifier. The local oscillator section and X1 generate 44.72 MHz for the 2nd LO signal.

The 2nd IF signal from the 2nd mixer (IC1, pin 3) passes through high-quality ceramic filters (F14, F15) 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 7). A portion of signal output from IC1 (pin 7) is detected at L10 and is then applied to the quadrature detector section (IC1, pin 8) to demodulate the 2nd IF signal into AF signals.

• 2ND IF AND DEMODULATOR CIRCUITS

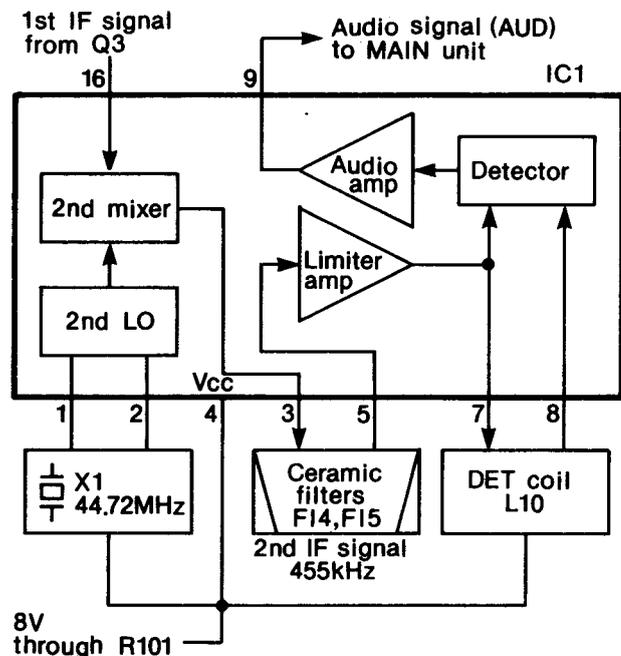


Fig. 1

The AF signals are output from IC1 (pin 9) and are then applied to the AF amplifier circuit on the MAIN unit and the low-speed/high-speed data switching circuit on the RXFIL board.

3-1-4 AF AMPLIFIER CIRCUIT (MAIN UNIT)

The AF amplifier circuit, which includes an AF mute circuit, amplifies the demodulated signals to drive a speaker.

The AF signals (AUD) from the RF unit pass through a notch filter (IC17a) and are then applied to a high-pass filter (IC17b) to suppress low-speed data components. The filtered signals are amplified at the pre-drive amplifier (Q16) and are then passed through the AF mute switch (IC18).

The AF mute circuit (Q17, Q18, IC18, IC28) controls a speaker using a "P07" signal from the CPU (IC1, pin 61) and an "NMI" signal from IC27. The "P07" signal from the CPU (IC1, pin 61) becomes "HIGH" when either low-speed or high-speed data matches the programmed message in the CPU (IC1). The "NMI" signal from IC27 becomes "HIGH" when a squelch opens. Therefore, an AND gate IC (IC28) becomes "HIGH" to turn IC18 ON.

The signals are then applied to the AF power amplifier (IC19) through the [VOL/PWR] control (R1) on the VOL unit. The AF amplifier (IC19) amplifies the AF signals to drive the speaker.

A user tone signal, such as beep signal, comes from the TXFIL board and is added to the audio line before the volume control.

3-1-5 SQUELCH CIRCUIT (MAIN UNIT)

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 signals (AUD) from the RF unit are applied to an active filter (IC13b). This amplifies the noise components of frequencies 20 kHz and above. The noise signal, output from IC13b (pin 7), passes through the squelch level setting volume control (R43) and is then amplified at IC14a. IC13a produces a bias voltage from 8 V line and supplies the voltage to IC13b and IC14a.

The amplified signal is converted to DC voltage at a noise rectifier (D7, D8, C73, C74, R46) and is then applied to a comparator (IC14b).

The output signal from IC14b (pin 7) triggers the squelch switch (Q13). A squelch signal from the collector of Q13 is applied to the CPU (pin 28) and an inverter IC (IC27). The inverted signal at IC27 is applied to the CPU (pin 28) and to an AND gate IC (IC28).

When pins 28 and 49 of the CPU (IC1) receive the squelch signal, pin 61 of the CPU (IC1) supplies a speaker mute signal to the AF mute circuit (Q17, Q18, IC18, IC28) according to the received signals.

3-1-6 LOW-SPEED/HIGH-SPEED DATA SWITCHING CIRCUIT (RXFIL BOARD)

The RXFIL board separates the high-speed data and LTR low-speed data from the audio components; and sharpens the waveform for data acknowledgement on the CPU (MAIN unit IC1).

The AF signals (AUD) from the RF unit are buffer-amplified at IC2a and are then applied to a low-pass filter or high-pass filter for the low-speed and high-speed data respectively. The buffer amplifier (IC2a) isolates the MAIN unit and RXFIL board.

• AF AMPLIFIER CIRCUIT

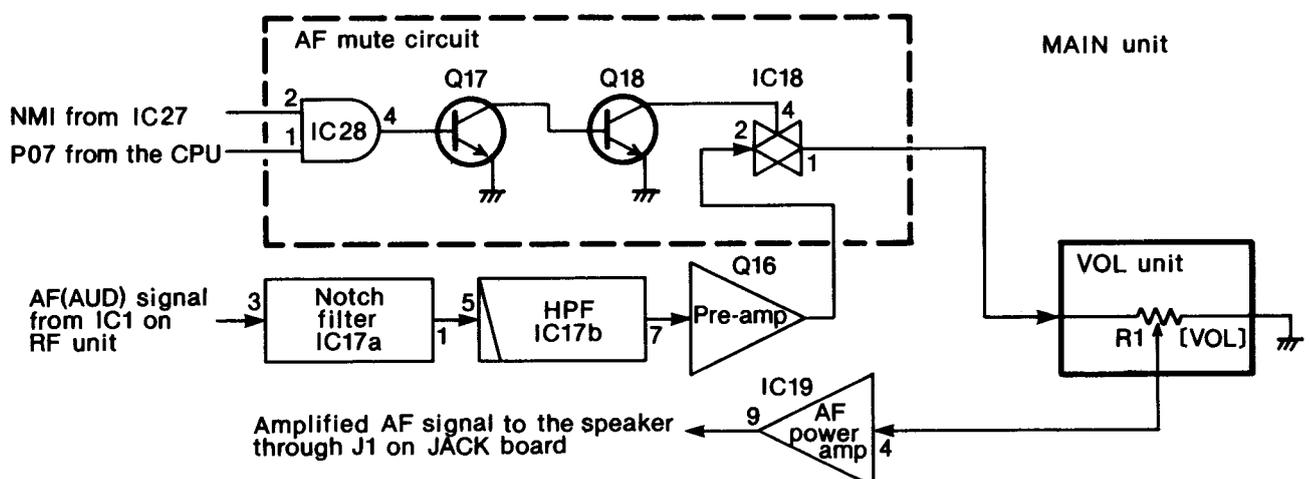


Fig. 2

An LTR low-speed data signal, obtained at the low-pass filters (IC3a and IC3d), is applied to the rectifier circuit (IC3b, IC3c, D1~D3), for conversion to DC voltage, and to the multiplexer (IC4, pin 12). The low-pass filter (IC3a and IC3d) is controlled by a band-width control signal (BWC) from the I/O expander (MAIN unit IC9, pin 7) via Q1.

When the LTR low-speed data signal is detected, the rectified voltage passes through the multiplexer (IC4, pins 2, 15) and is then applied to a comparator (IC1b, pin 6) as a reference voltage.

A high-speed data signal, obtained at the low-pass filter (IC2b and IC2c) and the high-pass filter (IC2d), is then applied to the multiplexer (IC4, pin 13).

The "BIAS" voltage is produced on the TXFIL board and is used for the high-pass filter (IC2d).

The multiplexer (IC4) selects the low-speed data or the high-speed data signal using the "H/LS" signal from the CPU (MAIN unit IC1, pin 5).

The data signal is output from pin 14 of IC4 and is then applied to the comparator (IC1b, pin 5). At the same time, the reference voltage is output from pin 15 of IC4 and is then applied to the comparator (IC1b, pin 6). The comparator (IC1b) sharpens the waveform and converts the signals for a logic circuit. The output signal from pin 7 of IC1b is applied to the CPU (IC1, pin 32) as an "RXDT" signal.

• MULTIPLEXER (IC4) ON THE RXFIL BOARD

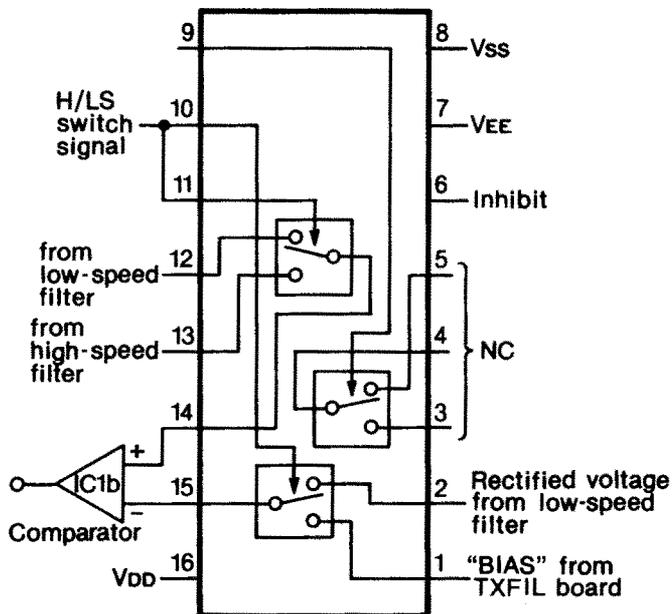


Fig. 3

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT (TXFIL BOARD)

The microphone amplifier circuit amplifies audio signals from the microphone to a level needed for the modulation circuit.

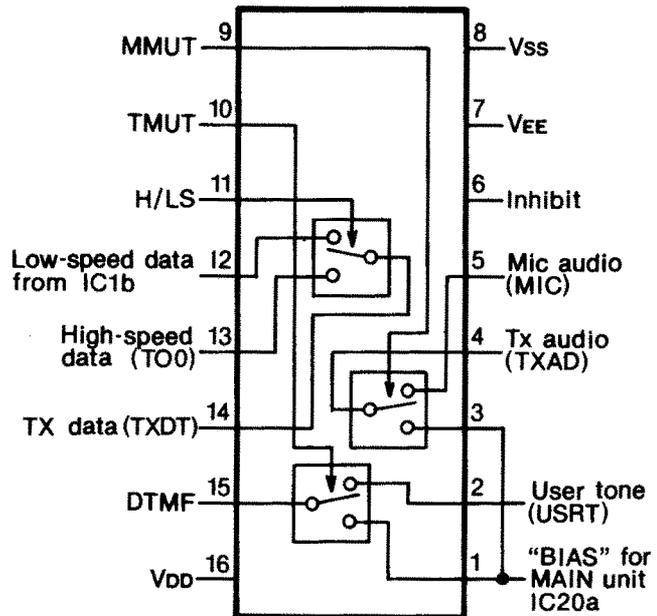
The AF signals from the microphone pass through a notch filter (IC2b), a high-pass filter (IC2a, IC3a) and are then amplified at a limiter amplifier (IC3b). The output signals from IC3b (pin 1) are applied to the analog adder (MAIN unit IC20a) via the multiplexer (IC4, pins 5, 4).

The notch filter suppresses the audio components near the low-speed data frequency to prevent false detection by the other parties' transceiver.

The multiplexer (IC4) outputs 3 signals (Tx audio, DTMF, Tx data) using controlling signals (MMUT, TMUT, H/LS) from the CPU.

IC5 produces a bias voltage for the splatter/limiter amplifier on the MAIN unit and for the reference voltage of the comparator on the RXFIL board.

• MULTIPLEXER (IC4) ON THE TXFIL BOARD



CONTROL SIGNAL			OUTPUT		
MMUT	TMUT	H/LS	TXAD	DTMF	TXDT
L	H	L	Microphone	Bias voltage	Low-speed data
H	L	L	Bias voltage	User tone	Low-speed data
H	H	L	Bias voltage	Bias voltage	Low-speed data
H	H	H	Bias voltage	Bias voltage	High-speed data

Fig. 4

3-2-2 LOW-SPEED, HIGH-SPEED DATA AND USER TONE (TXFIL BOARD)

Ports TO0~TO3 of the CPU (MAIN unit IC1, pins 50~53) output low-speed, high-speed and user tone signals.

When the operating channel is programmed with LTR low-speed data, ports TO0 and TO1 output the low-speed data. The data signals are passed through the low-pass filter (IC1a, IC1b) and are then applied to the analog adder (MAIN unit IC20a) via the multiplexer (IC4, pins 12, 14).

When the operating channel is programmed with high-speed data, port TO0 outputs the high-speed data. The data signal passes through the multiplexer (IC4, pins 13, 14) and is then applied to the analog adder (MAIN unit IC20a).

When the CPU outputs DTMF signals as a user tone, ports TO2 and TO3 are used. The signals pass through the multiplexer (IC4, pins 2, 15) and are then applied to the analog adder (MAIN unit IC20a).

3-2-3 MODULATION CIRCUIT (MAIN AND RF UNITS)

The modulation circuit modulates the VCO oscillating signal or reference oscillator using audio or data signals. The transceiver's modulation circuit adopts a 2 modulation system to obtain low frequency (low-speed data) to high frequency (microphone audio) equality in modulation levels.

The analog adder (IC20a) adds the 3 signals (TXAD, TDMF, TXDT) from the multiplexer (TXFIL board IC4) and outputs an "MOD" signal from pin 1. The "MOD" signal passes through a splatter filter (IC20d and IC20c), which eliminates signal components greater than 3 kHz, and is then buffer-amplified at IC26a.

The amplified signal is applied to the VCO section of the PLL/VCO IC (IC9, pin 5) and an inverter (IC6, pin 6) on the RF unit. The inverted signal at IC6 is applied to the VC-TCXO (X3).

A talk-around control (Q17) attenuates the "MOD" signal to prevent deep modulation on the low transmit frequency by a shift signal (SFT) from the I/O expander IC (MAIN unit IC9, pin 9).

The oscillated signal at the VCO section of IC9, amplified at a buffer amplifier section inside IC9, is then output from pin 6. The signal passes through the attenuator (R78~R80), the transmit/receive switching circuit (D5) and is then applied to the drive amplifier circuit.

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

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

The signal from the transmit/receive switching circuit (D5) is amplified at the pre-drive amplifier (Q13) and is then re-amplified at a drive amplifier (Q12). The amplified signal is amplified at an exciter amplifier (IC4) to obtain 400 mW of RF power.

3-2-5 POWER AMPLIFIER CIRCUIT (RF UNIT)

IC3 is a power module which provides a stable 15 W of output power.

The RF signal from the exciter amplifier (IC4) is applied to the power amplifier (IC3, pin 1). The amplified signal is output from pin 5. The output signal is applied to the antenna connector through the APC circuit, the RF switching IC (IC2) and the low-pass filter circuit.

3-2-6 APC CIRCUIT (RF UNIT)

This circuit stabilizes the transmit power. A differential amplifier is used for the APC circuit and compares the output power level and 8 V of regulated voltage. Thus stable RF output power is obtained even when the supplied voltage is changed.

• APC CIRCUIT

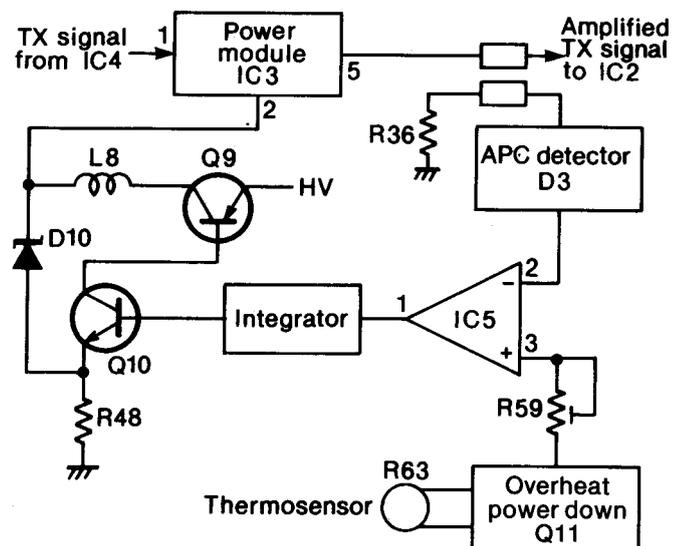


Fig. 5

The output power from the power module (IC3, pin 5) is detected at the APC detector (D3). The detected voltage is applied to a differential amplifier circuit (IC5, pin 2). The APC reference voltage is adjusted at R59 and is then applied to IC5 (pin 3).

When power voltage is decreased, the total gain of the transmitter circuit is reduced and RF power is also reduced. At this time, the APC detected voltage goes down. However the reference voltage of the differential amplifier (IC5) is a constant voltage, so that the output voltage from IC5 increases. The output voltage is integrated by R52 and C114 and is then applied to the current controller (Q7~Q10). The current controller increases the supplied current to obtain the fixed RF power.

A thermistor (R63) detects the temperature around the power module (IC3) and decreases the reference voltage of the differential amplifier (IC5) using Q11 to protect the transceiver from high temperatures during continuous transmitting.

3-3 PLL CIRCUITS

3-3-1 GENERAL

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

3-3-2 PLL AND VCO CIRCUITS (RF UNIT)

The PLL/VCO IC (IC9), which contains the VCO circuit, programmable divider, phase detector, loop-filter and ripple filter, directly generates the transmit frequency and the receive 1st LO frequency with the VCO section and outputs them from pin 6. The programmable divider section sets the dividing ratio based on serial data from the CPU (MAIN unit IC1) and compares the phase of the VCO signal with the reference oscillator frequency. A reference frequency is oscillated at X3.

The VCO section of IC9 selects a trunking band or a talk-around band by an "SFT" signal from the I/O expander IC (MAIN unit IC9, pin 4). The "SFT" signal is applied to a switching transistor (Q16) to control pin 4 of IC9. When pin 4 of IC9 becomes "HIGH" or "LOW," the trunking band or the talk-around band is selected respectively.

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

A reference frequency (12.8 MHz) is produced by X3. The frequency is applied to the PLL/VCO IC (IC9, pin 1). X3 adopts VC-TCXO to ensure stable operation over a wide temperature range.

• PLL AND VCO CIRCUIT

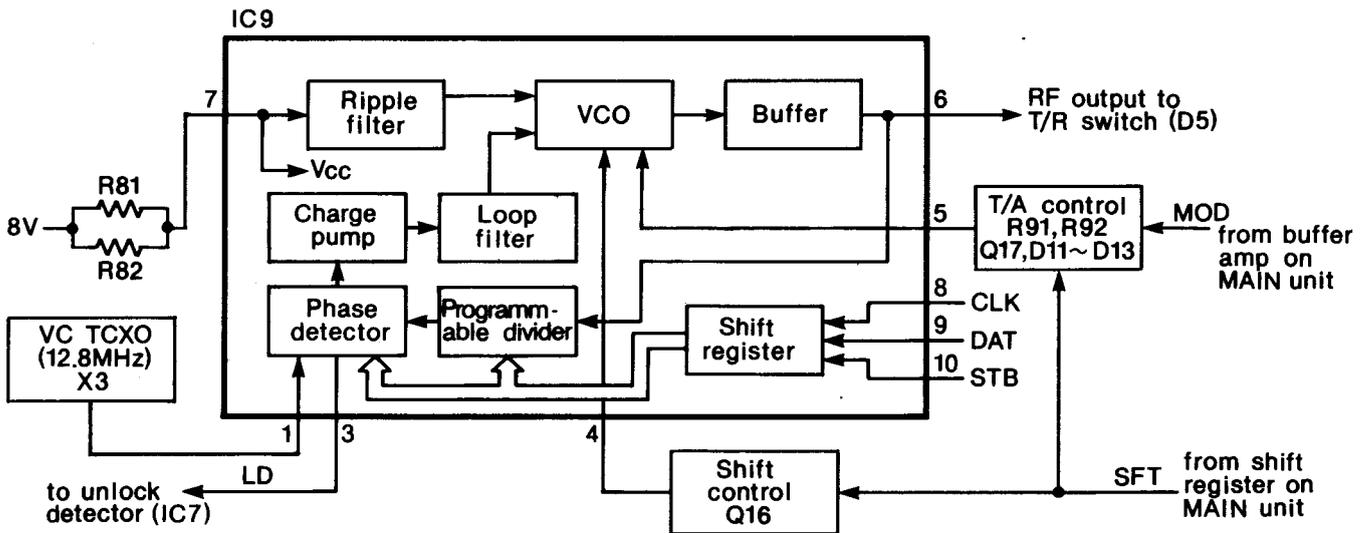


Fig. 6

3-3-4 UNLOCK SENSOR CIRCUIT (RF AND MAIN UNITS)

When the PLL circuit is unlocked, an "LD" signal is output from pin 3 of IC9 and is then inverted at IC7. The inverted signal, smoothed at D6, R84, R85 and C151, passes through an unlock switch (Q15) and is then applied to the CPU (IC1, pin 34) on the MAIN unit.

3-4 POWER SUPPLY CIRCUITS

3-4-1 VOLTAGE LINES (MAIN UNIT)

LINE	DESCRIPTION
HV	The external DC power from the DC power cable. Directly applied to the RF power module and APC control circuit. The HV voltage is applied to all circuits when the ignition sense line (SEN) is at "HIGH" as described in Section 3-4-2 below.
8V	Common 8 V converted from the HV line at the 8 V regulator circuit (Q8, IC12).
5V	Common 5 V converted from the common 8 V line at the 5 V regulator (IC11).
R8	Receive 8 V controlled by an "A19" signal from the CPU (IC1, pin 2). Pin 2 of IC1 becomes "LOW" while receiving. At this time, Q3 and Q6 are turned OFF. Therefore, Q5 is turned OFF and Q4 outputs the "R8" voltage.
T8	Transmit 8 V controlled by an "A19" signal from the CPU (IC1, pin 2). Pin 2 of IC1 becomes "HIGH" while transmitting. At this time, Q3 and Q6 are turned ON. Therefore, Q4 is turned OFF and Q5 outputs the "T8" voltage.
T5V	Transmit 5 V converted from the T8 line at Q15. Q15 is turned ON while transmitting. This voltage is applied to the TXFIL board.

3-4-2 POWER CONTROL SWITCH CIRCUIT (MAIN UNIT)

When the ignition sense voltage (SEN) from the ignition sense cable is applied to the power control switch (Q11), Q11 turns Q12 ON. Q12 collector (SW2) and Q10 base (SW1) is connected by the [PWR] switch, therefore, Q10 is turned ON while the ignition sense voltage appears.

The power control switch (Q11) also turns Q7 ON to set the "AN4" line to "HIGH." When the CPU receives the signal that the "AN4" line is at "HIGH," the CPU turns Q9 ON via the "P06" line. Thus Q9 sets the SW2 line to "LOW" until the auto-power down function activates, even when the ignition sense voltage disappears.

3-4-3 RESET AND MEMORY BACKUP CIRCUITS (MAIN UNIT)

This circuit resets the CPU (IC1) with a reset IC (IC10). The reset IC (IC10) detects the increase and decrease of the 5 V line to control the RESET port of the CPU (IC1, pin 6) when the [PWR] switch is turned ON and OFF.

When the [PWR] switch is turned ON, the RESET port of the CPU (IC1, pin 6) becomes "HIGH." The CPU (IC1) starts operation.

When the [PWR] switch is turned OFF, the RESET port of the CPU (IC1, pin 6) becomes "LOW" before the 5 V line becomes 0 V. The CPU (IC1) stops operation. At this time, DC voltage is applied to the SRAM (IC7, pin 28) via R182 from the lithium backup battery (BT1) installed in the transceiver to provide backup for the memory contents. BT1 is charged by the current regulator (Q1 and Q2).

3-5 LOGIC CIRCUITS

3-5-1 GENERAL

The LOGIC circuit consists of an 8-bit CMOS CPU (IC1), an address expander (IC6), a 256 k-bit EPROM (IC8), a 64 k-bit SRAM (IC7) and an I/O expander (IC9). IC1 oscillates the 11.0592 MHz system clock signal with X1.

3-5-2 PORT ALLOCATIONS (MAIN UNIT)

• IC1 (CPU)

PORT NAME	PIN NUMBER	DESCRIPTION
RD	1	Outputs a permission signal for an EPROM (IC8, pin 22). Active: LOW
A19	2	Outputs a send signal while transmitting. Active: HIGH
A18	3	Outputs a microphone muting signal (MMUT) for the TXFIL board. Active: LOW
A17	4	Outputs a tone muting signal (TMUT) for the TXFIL board. Active: LOW
A16	5	Outputs a high-speed/low-speed data switching signal (H/LS) for the RXFIL and TXFIL boards. High-speed: HIGH Low-speed: LOW
RESET	6	Input port for the CPU reset signal. The CPU enters standby mode when this port becomes "LOW."
X2	7	This port is connected to the system clock crystal (X1).
X1	8	Input port for the system clock signal.
Vss	9	Ground

PORT NAME	PIN NUMBER	DESCRIPTION
A15~A8	10~17	Output the address busses for the EPROM (IC8).
AD7~AD2, AD1, AD0	18~23, 25, 26	Input and output ports of time divided address/data buses for the EPROM (IC8).
Vss	24	Ground
ASTB	27	Outputs a strobe signal for the address expander (IC6, A0~A7).
NMI	28	Input port for an interrupt signal from a noise squelch (Q13, IC27). Squelch open: HIGH
INT0	29	Input port for the [PTT] switch. PTT pushed: LOW
INT1	30	Inputs a clockwise signal from the [SELECT] knob. Active: LOW
INT2	31	Inputs a counterclockwise signal from the [SELECT] knob. Active: LOW
INT3	32	Input port for an "RXDT" signal from the RXFIL board.
INT4	33	Input port for the [SET] switch. Switch pushed: LOW
INT5	34	Input port for the PLL unlock signal (LD) from PLL/VCO IC (RF unit IC9, pin 3). PLL locked: HIGH PLL unlocked: LOW
SI	35	Input port for the [CLR] switch. Switch pushed: LOW
RXD	36	Input port for serial data from the accessory jack, pin 7.
TXD	37	Outputs serial data to the accessory jack, pin 6.
SCK	38	Outputs clock signal. Applied to the PLL/VCO as an "SCK" signal and to the RF unit as a "CK" signal.
S0	39	Outputs serial data. Applied to the RF unit as a "DAT" signal and to the FRONT unit as an "SDT" signal.
EA	40	Ground
Vdd	41	Voltage input terminal
AVss	42	Ground
AVref	43	Power source
AN5	44	Input port for the [SYS/GRP] switch. Switch pushed: LOW
AN4	45	Input port for the ignition sense. When ignition voltage disappears: LOW
AN3	46	Input port for the microphone hook. ON hook: LOW OFF hook: HIGH
AN2	47	Input port for the [SCAN] switch. Switch pushed: LOW
AN1	48	Input port for a "BUSY" signal from the LCD driver (FRONT unit IC1, pin 25). Busy: LOW
AN0	49	Input port for a noise squelch signal from Q13. Squelch open: LOW
T00	50	Outputs a portion of the low-speed data or high-speed data.

PORT NAME	PIN NUMBER	DESCRIPTION
T01	51	Outputs a portion of the low-speed data.
T02	52	Outputs a portion of the user/1 kHz tone.
T03	53	Outputs a portion of the user/1 kHz tone.
P00	54	Outputs a control signal storage register for the I/O expander (IC9). Active: HIGH
P01	55	Outputs a control signal for the I/O expander (IC9). Output: LOW High impedance: HIGH
P02	56	Not used
P03	57	Outputs a strobe signal to the PLL/VCO (RF unit IC9, pin 11).
P04	58	Outputs a permission signal (CTS) for data transmission to the accessory jack, pin 4.
P05	59	Outputs a chip select signal to the LCD driver (FRONT unit IC1, pin 24).
P06	60	Outputs a power holding signal until the automatic power down function activates. Power hold: HIGH Power down: LOW
P07	61	Outputs a speaker muting signal when the received data message matches the programmed one in the CPU. Speaker mute: LOW Speaker unmute: HIGH
AN7	62	Input port for a data transmission request signal (RTS) from the accessory jack, pin 5.
AN6	63	Ground
WR	64	Outputs a write strobe signal for the external memory. Data output: HIGH Data input: LOW

• IC9 (I/O expander)

PORT NAME	PIN NUMBER	DESCRIPTION
DIM1, DIM2	1, 2	Output control signals for the dimmer circuit on the FRONT unit.
CAL	3	Outputs a switching signal for the [CALL] light (DS1) on the LED unit. Active: HIGH
BUY	4	Outputs a switching signal for the [BUSY] light (DS2) on the LED unit. Active: HIGH
SFT	5	Outputs the PLL shift signal. During talk-around transmission: HIGH
ALT	6	Outputs the external alert signal. Function activates: HIGH
Qh	7	Outputs a band-width range switching signal (BWC) to the RXFIL and the TXFIL boards. Active: HIGH
C/D	15	Outputs a command/data switching signal for the LCD driver (IC1, pin 26) on the FRONT unit. Command mode: HIGH Data mode: LOW

3-6 OTHER CIRCUITS

3-6-1 DIMMER CIRCUIT (FRONT UNIT)

The dimmer circuit (IC2, IC3, Q2~Q7) drives the backlights (DS2, DS3) and ensures that brightness does not change even with a change in the power supply. This circuit is controlled by the control signals from the I/O expander (MAIN unit IC9, pins 1 and 2).

3-6-2 HORN ALERT CIRCUIT (LED UNIT)

An "ALT" signal from the I/O expander (MAIN unit IC9, pin 6) is applied to a horn alert switch (Q18). Q18 is turned ON when the "ALT" signal is "HIGH." The optional UX-11 HORN-HONK DRIVER UNIT drives a signaling device such as a car horn to alert the operator to specific calls received.

SECTION 4 ADJUSTMENT PROCEDURES

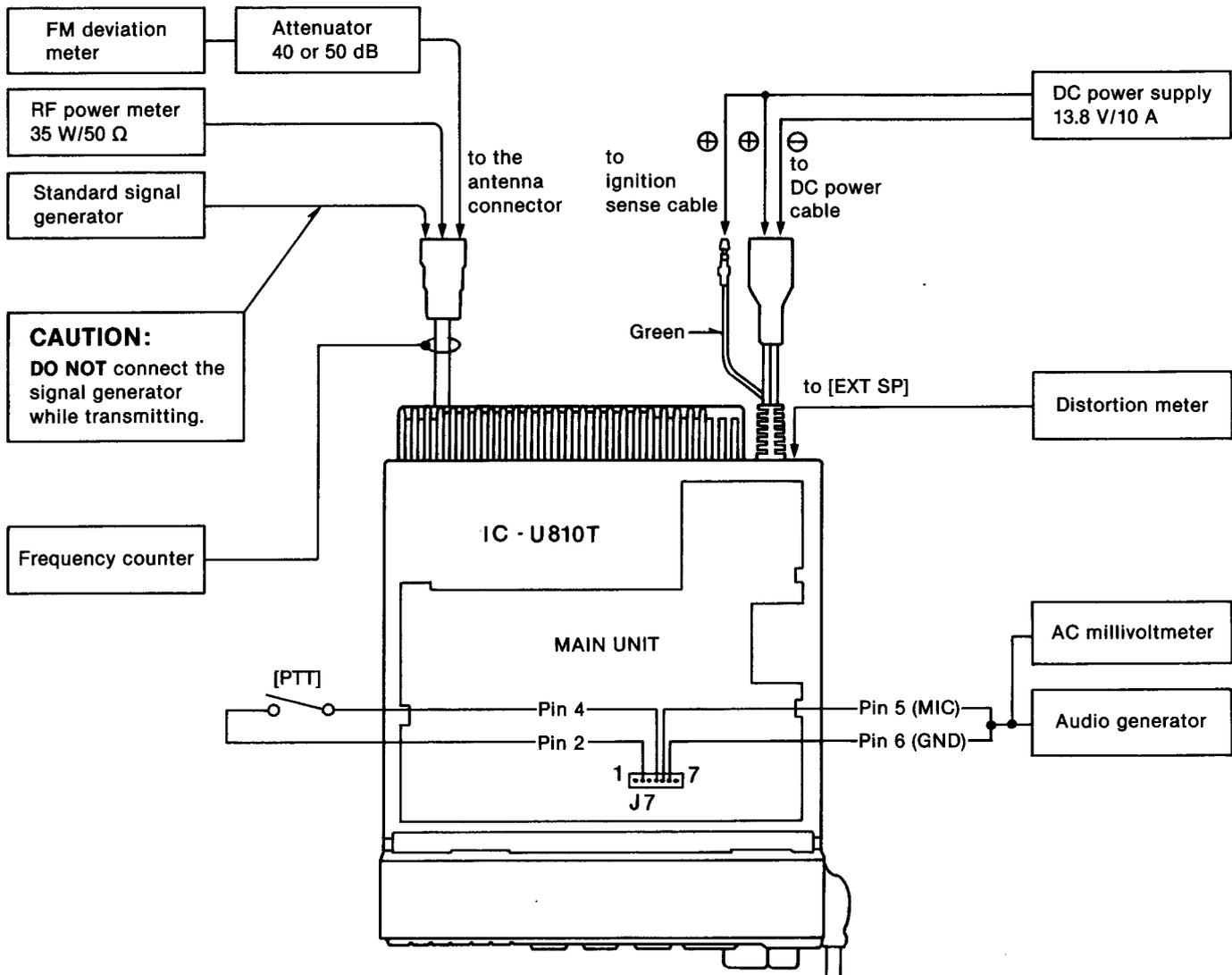
4-1 PREPARATION BEFORE SERVICING

■ 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 : 1~1000 mVrms
RF power meter (terminated type)	Measuring range : 1~35 W Frequency range : 800~900 MHz Impedance : 50 Ω SWR : Less than 1.2:1	Attenuator	Power attenuation : 40 or 50 dB Capacity : 35 W or more
Frequency counter	Frequency range : 10~900 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	AC millivoltmeter	Measuring range : 2~2000 mVrms
		Oscilloscope	Frequency range : DC~20 MHz Measuring range : 0.01~10 V
Distortion meter	Frequency range : 1 kHz±10 Hz Measuring range : 1~100 %	DC voltmeter	Input impedance : 50 kΩ/DC or better
		FM deviation meter	Frequency minimum : 900 MHz Measuring range : 0~±5 kHz
Standard signal generator (SSG)	Frequency range : 100~900 MHz Output level : -127~-17 dBm (0.1 μV~32 mV)		

CW: Clockwise CCW: Counterclockwise

■ CONNECTION



4-2 TEST MODE

Some frequency and settings which are needed for this "adjustment procedure" are pre-programmed in the transceiver's test mode. This "adjustment procedure" uses the System No. and Group No. for each adjustment, based on the pre-programmed settings.

NOTE: The settings in the test mode are re-programmed by the "Diagnostic frequency" setting. If you changed the test mode contents, re-program the System numbers 01~03 and Group numbers 1~4 as following table.

■ TEST FREQUENCY (EPROM frequency)

System No.	Built-in frequency	System No.	Built-in frequency
01	851.0125 MHz	11	858.4875 MHz
02	858.5125 MHz	12	865.8625 MHz
03	865.9875 MHz	13	851.0875 MHz
04	851.1875 MHz	14	858.5375 MHz
05	858.1875 MHz	15	865.8875 MHz
06	865.5625 MHz	16	851.1125 MHz
07	851.0375 MHz	17	858.5625 MHz
08	858.4625 MHz	18	865.9125 MHz
09	865.8375 MHz	19	851.1375 MHz
10	851.0625 MHz	20	851.1625 MHz

NOTE: Above frequency shows the receive or Talk-around frequency in the test mode. Subtract 45 MHz from this frequency for the Trunking transmit frequency.

■ FREQUENCY INDICATION

The receive frequency can be indicated in the test mode. If you need to check the frequency, push and hold the [SCAN] button.

■ ENTERING THE TEST MODE

- 1) While pushing the [SET] and [SCAN] buttons, turn the [VOL/PWR] switch ON.
- 2) Continue pushing the buttons for 3 sec.
 - All characters in the LCD appear and [BUSY]/[CALL] indicators light up.
- 3) Release the buttons.
 - The transceiver is in the test mode now.
 - Use the [SYS/GRP] button and [SELECT] knob to set the Group/System number.

■ PRE-PROGRAMMED CONTENTS

Group No.	Talk-around	Voice	1 kHz/ tone	Low-speed	High-speed
1	No	Yes	No	No	No
2	Yes	Yes	No	No	No
3	No	No	Yes	No	No
4	No	No	No	No	Yes
5	No	No	No	Yes	No
6	Yes	No	No	Yes	No
7	No	Yes	No	Yes	No
8	Yes	Yes	No	Yes	No
9	No	No	Yes	Yes	No
10 (0)	—	—	—	—	—

4-3 PLL ADJUSTMENT

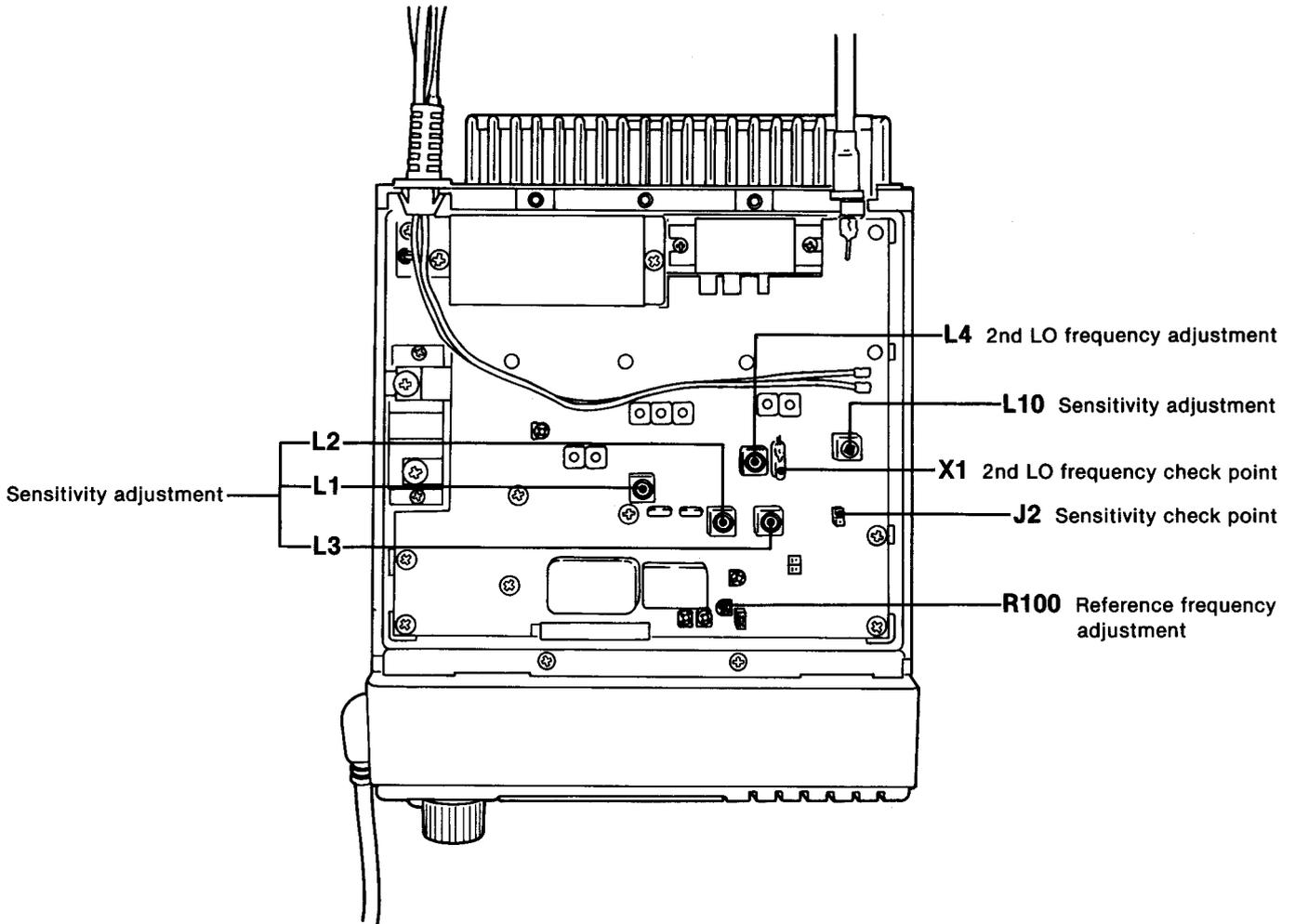
ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1 <ul style="list-style-type: none"> • Be sure the transceiver is in the test mode. • Operating channel: System No. 03 Group No. 1 • Connect the RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting 	Rear panel	Loosely couple the frequency counter to the antenna connector.	820.9875 MHz	RF	R100

4-4 RECEIVER ADJUSTMENT

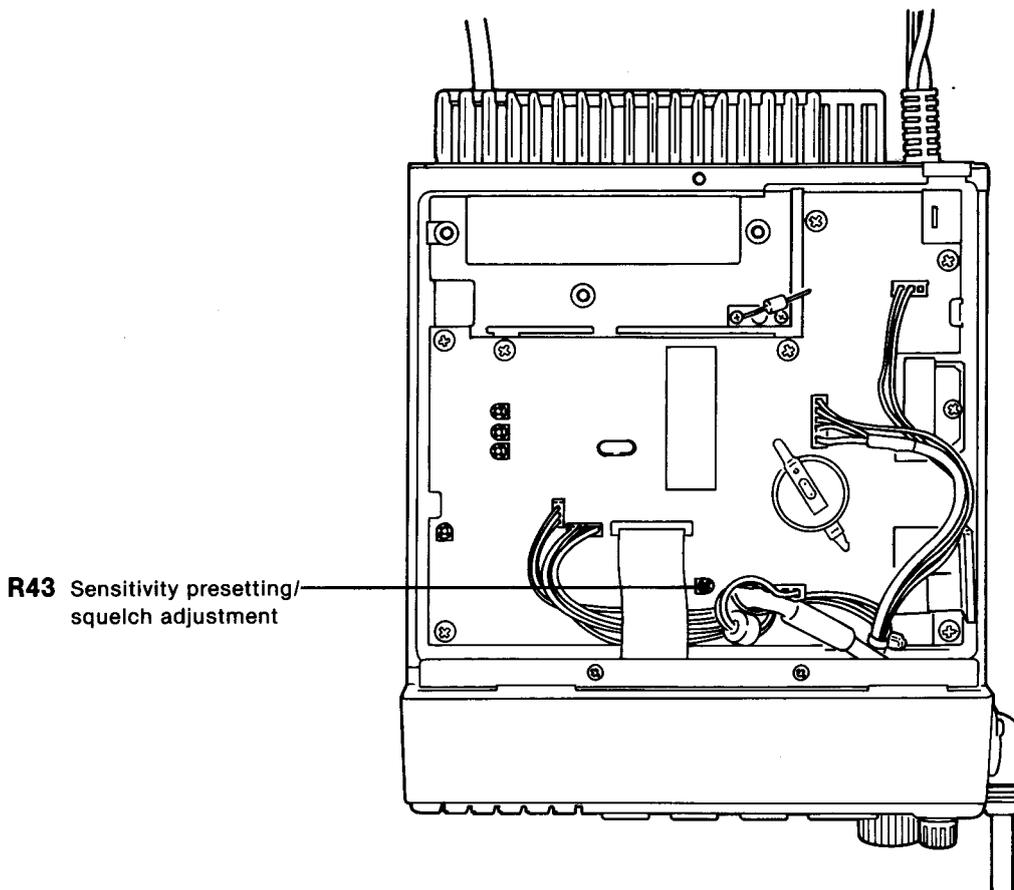
ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
2ND LO FREQUENCY	1 <ul style="list-style-type: none"> • Be sure the transceiver is in the test mode. • Operating channel: System No. 01 Group No. 1 • Receiving 	RF	Loosely couple the frequency counter to X1.	44.72000 MHz	RF	L4	
SENSITIVITY	1 <ul style="list-style-type: none"> • Operating channel: System No. 01 Group No. 1 • Connect the SSG to the antenna connector and set as: Frequency : 851.0125 MHz Level : 1 mV* (-47 dBm) Modulation : 1 kHz Deviation : 3.5 kHz • R43 (MAIN unit) : Max. CW • Receiving 	RF	Connect the oscilloscope between J2 and GND.	Maximum waveform	RF	L10	
	2 <ul style="list-style-type: none"> • Set the SSG as: Modulation : 3 kHz 		Connect the distortion meter between J2 and GND.	Minimum distortion level			L1, L2 alternately
	3 <ul style="list-style-type: none"> • Disconnect the all equipments from J2. • Set the SSG as: Level : 0.35 μV* (-116 dBm) Modulation : 1 kHz 		Rear panel	Connect the distortion meter to the [EXT SP] jack with a 4 Ω load.			Minimum distortion level
SQUELCH	1 <ul style="list-style-type: none"> • Operating channel: System No. 01 Group No. 1 • Connect the SSG to the antenna connector and set as: Frequency : 851.0125 MHz Modulation : 1 kHz Deviation : 3.5 kHz • Receiving 	Rear panel	Connect the distortion meter to the [EXT SP] jack with a 4 Ω load.	-6 dB SINAD		SSG level	
	2 <ul style="list-style-type: none"> • R43 (MAIN unit) : Max. CW 	Front panel	Speaker	Squelch just closes	MAIN	R43	

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

• RF UNIT



• MAIN UNIT

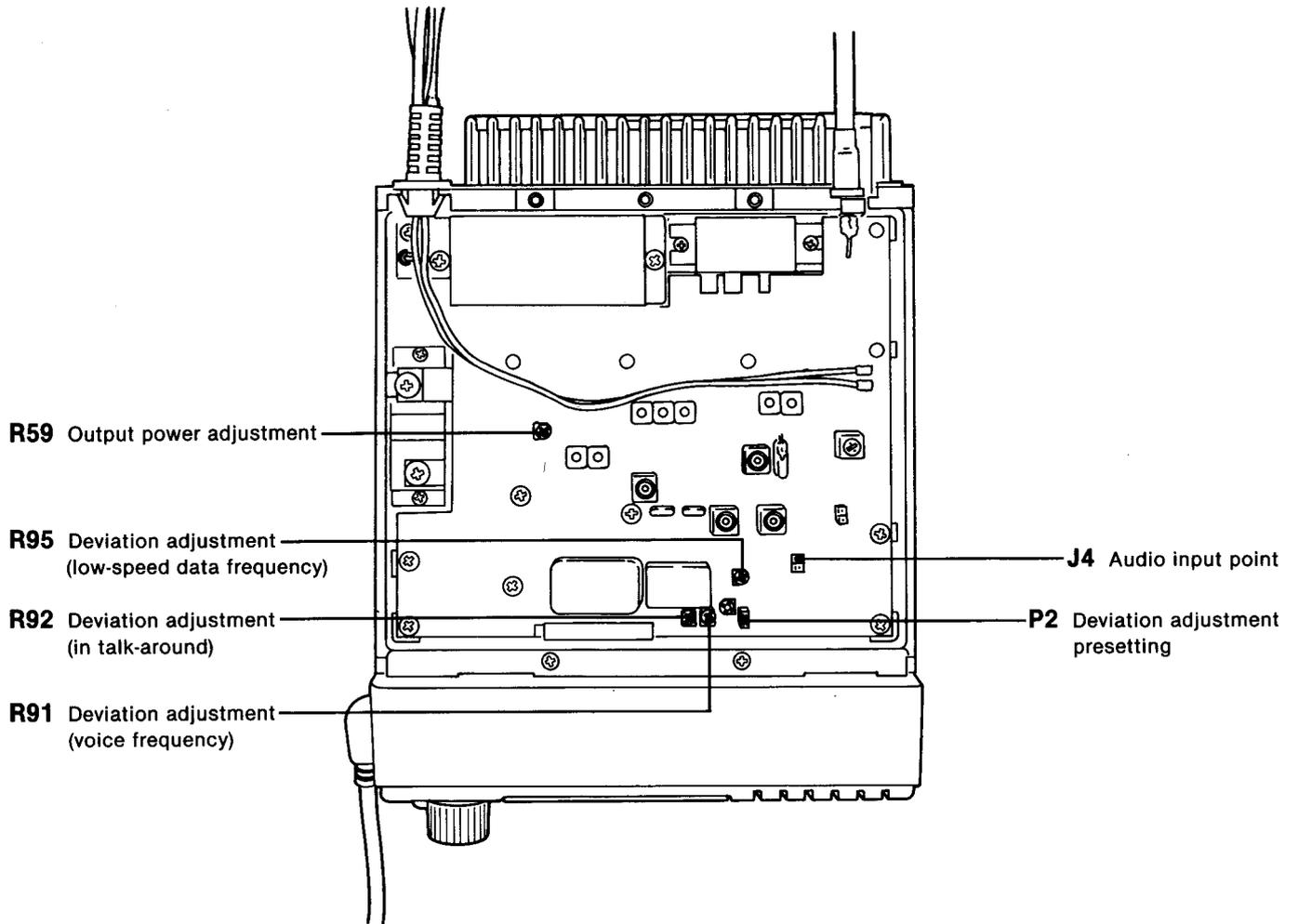


4-5 TRANSMITTER ADJUSTMENT

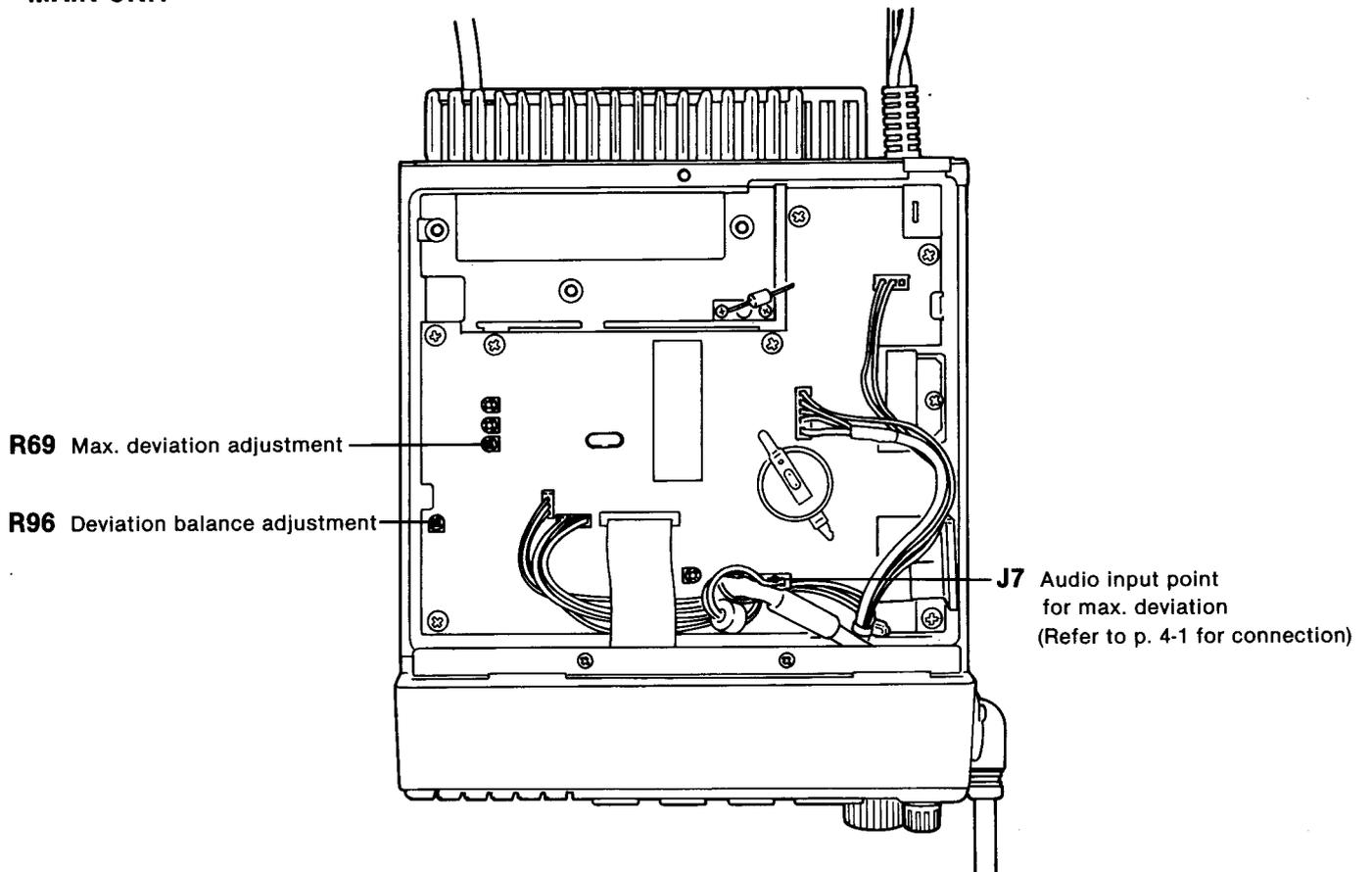
ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT		
		UNIT	LOCATION		UNIT	ADJUST	
OUTPUT POWER	1	<ul style="list-style-type: none"> • Be sure the transceiver is in the test mode. • Operating channel: System No. 02 Group No. 1 • Transmitting 	Rear panel	Connect the RF power meter to the antenna connector.	15 W	RF	R59
DEVIATION	1	<ul style="list-style-type: none"> • Operating channel: System No. 02 Group No. 1 • Unplug P2 (J5 on the RF unit). • Connect the audio generator to J4 (RF unit) and GND. • 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	RF	R91, R92, R95
	2	<ul style="list-style-type: none"> • Set the audio generator as: Level : 1 Vrms Frequency : 1.0 kHz 			± 3.5 kHz		R91
	3	<ul style="list-style-type: none"> • Set the audio generator as: Level : 1 Vrms Frequency : 100 Hz 			± 3.5 kHz		R95
	4	Repeat steps 2 and 3 several times.					
	5	<ul style="list-style-type: none"> • Operating channel: System No. 02 Group No. 2 • Set the audio generator as: Level : 1 Vrms Frequency : 1.0 kHz • Transmitting 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	± 3.5 kHz	RF	R92
6	Re-plug P2 to J5 and disconnect the all equipments from J4 (RF unit).						
	7	<ul style="list-style-type: none"> • Operating channel: System No. 1 Group No. 1 • Connect the audio generator between *J7 (Pin 5) and GND on the MAIN unit and set as: Level : 50 mVrms Frequency : 1.0 kHz 	Rear panel	Connect the FM deviation meter to the antenna connector via the attenuator.	± 3.7 kHz	MAIN	R69
	8	<ul style="list-style-type: none"> • Set the FM deviation as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : P and -P • Transmitting 			Symmetrical deviation level		R96

*See p. 4-1 for connection.

• RF UNIT



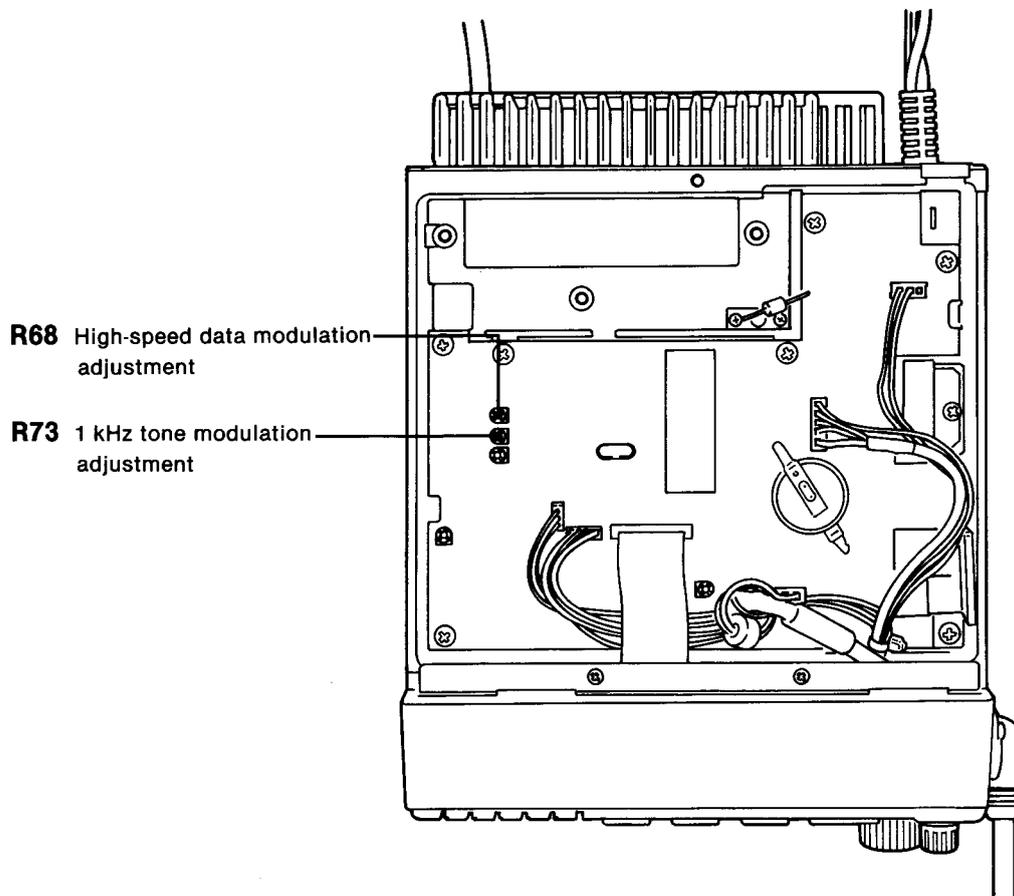
• MAIN UNIT



TRANSMITTER ADJUSTMENT (CONTINUED)

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
		UNIT	LOCATION		UNIT	ADJUST
1 kHz TONE MODULATION	1 <ul style="list-style-type: none"> • Be sure the transceiver is in the test mode. • Operating channel: System No. 01 Group No. 3 • Set the FM deviation 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.	± 2.6 kHz	MAIN	R73
HIGH-SPEED DATA MODULATION	1 <ul style="list-style-type: none"> • Operating channel: System No. 02 Group No. 4 • Set the FM deviation 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.	± 3.5 kHz	MAIN	R68

• MAIN UNIT



SECTION 5 PARTS LIST

[CHASSIS PART]

REF. NO.	ORDER NO.	DESCRIPTION
MP2	8930015040	FEED THROUGH AS-309

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
D13	1730000030	S. ZENER RD5.6M-T2B2
D14	1730000030	S. ZENER RD5.6M-T2B2
D15	1730000030	S. ZENER RD5.6M-T2B2
D16	1730000030	S. ZENER RD5.6M-T2B2
D17	1730000030	S. ZENER RD5.6M-T2B2
X1	6050004960	CRYSTAL RF-4A3 FAL NKD (CR-237)
L1	6910000670	COIL BT01RN1-A61-001
R1	7030000380	S. RESISTOR MCR10EZHZ 1 kΩ (102)
R3	7030000500	S. RESISTOR MCR10EZHZ 10 kΩ (103)
R4	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R5	7030001550	S. RESISTOR MCR10EZHZ 200 kΩ (204)
R6	7030000550	S. RESISTOR MCR10EZHZ 27 kΩ (273)
R7	7030000460	S. RESISTOR MCR10EZHZ 4.7 kΩ (472)
R8	7030000340	S. RESISTOR MCR10EZHZ 470 Ω (471)
R9	7030000300	S. RESISTOR MCR10EZHZ 220 Ω (221)
R10	7030000570	S. RESISTOR MCR10EZHZ 39 kΩ (393)
R11	7030000500	S. RESISTOR MCR10EZHZ 10 kΩ (103)
R12	7030000350	S. RESISTOR MCR10EZHZ 560 Ω (561)
R13	7030000310	S. RESISTOR MCR10EZHZ 270 Ω (271)
R14	7030000390	S. RESISTOR MCR10EZHZ 1.2 kΩ (122)
R15	7030000510	S. RESISTOR MCR10EZHZ 12 kΩ (123)
R16	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R17	7030000500	S. RESISTOR MCR10EZHZ 10 kΩ (103)
R18	7030000360	S. RESISTOR MCR10EZHZ 680 Ω (681)
R19	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R20	7030000340	S. RESISTOR MCR10EZHZ 470 Ω (471)
R21	7030000580	S. RESISTOR MCR10EZHZ 47 kΩ (473)
R22	7030000580	S. RESISTOR MCR10EZHZ 47 kΩ (473)
R23	7030000380	S. RESISTOR MCR10EZHZ 1 kΩ (102)
R25	7030000300	S. RESISTOR MCR10EZHZ 220 Ω (221)
R26	7030000460	S. RESISTOR MCR10EZHZ 4.7 kΩ (472)
R27	7030000580	S. RESISTOR MCR10EZHZ 47 kΩ (473)
R28	7030000580	S. RESISTOR MCR10EZHZ 47 kΩ (473)
R29	7030000400	S. RESISTOR MCR10EZHZ 1.5 kΩ (152)
R30	7030000610	S. RESISTOR MCR10EZHZ 82 kΩ (823)
R31	7030000490	S. RESISTOR MCR10EZHZ 8.2 kΩ (822)
R32	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R33	7030000540	S. RESISTOR MCR10EZHZ 22 kΩ (223)
R34	7030000500	S. RESISTOR MCR10EZHZ 10 kΩ (103)
R35	7030000540	S. RESISTOR MCR10EZHZ 22 kΩ (223)
R36	7030000570	S. RESISTOR MCR10EZHZ 39 kΩ (393)
R37	7030000560	S. RESISTOR MCR10EZHZ 33 kΩ (333)
R38	7030000640	S. RESISTOR MCR10EZHZ 150 kΩ (154)
R39	7030000610	S. RESISTOR MCR10EZHZ 82 kΩ (823)
R40	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R41	7030000400	S. RESISTOR MCR10EZHZ 1.5 kΩ (152)
R42	7030000700	S. RESISTOR MCR10EZHZ 470 kΩ (474)
R43	7310001730	TRIMMER RH0421C16J02A (105)
R44	7510000080	THERMISTOR ERT-D2FHL 153S
R45	7030000630	S. RESISTOR MCR10EZHZ 120 kΩ (124)
R46	7030000630	S. RESISTOR MCR10EZHZ 120 kΩ (124)
R47	7030000550	S. RESISTOR MCR10EZHZ 27 kΩ (273)
R48	7030000630	S. RESISTOR MCR10EZHZ 120 kΩ (124)
R49	7030000540	S. RESISTOR MCR10EZHZ 22 kΩ (223)
R50	7030000500	S. RESISTOR MCR10EZHZ 10 kΩ (103)
R51	7030000620	S. RESISTOR MCR10EZHZ 100 kΩ (104)
R52	7030004550	S. RESISTOR MCR10EZHF 47.5 kΩ
R53	7030004470	S. RESISTOR MCR10EZHF 9.31 kΩ
R54	7030004520	S. RESISTOR MCR10EZHF 39.2 kΩ

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
IC1	1140001480	S. IC μPD78213GC-AB8
IC5	1130003830	S. IC TC7S04F (TE85R)
IC6	1130005480	S. IC TC74HC573AF
IC7	1130006190	S. IC LC3564PML-12-TRM
IC8	1130006430	IC SC-1199 (NMC27C256Q150)
IC9	1130006140	S. IC TC74HC595AF (TP1)
IC10	1110001550	S. IC S-8054ALB-LM-T1
IC11	1180000190	IC NJM7805A
IC12	1150001170	S. IC M5237ML
IC13	1110002560	S. IC NJM4560M-T1
IC14	1110002560	S. IC NJM4560M-T1
IC15	1130004200	S. IC TC4S66F (TE85R)
IC17	1110002700	S. IC NJM2904M-T1
IC18	1130004200	S. IC TC4S66F (TE85R)
IC19	1110002910	IC TA7222AP (2)
IC20	1110001340	S. IC NJM3403AM
IC26	1110002710	S. IC NJM3404AM-T1
IC27	1130003830	S. IC TC7S04F (TE85R)
IC28	1130003760	S. IC TC4S81F (TE85R)
Q1	1510000500	S. TRANSISTOR 2SA1162-GR (TE85R)
Q2	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q3	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q4	1540000150	TRANSISTOR 2SD1225M R
Q5	1520000230	TRANSISTOR 2SB909M Q
Q6	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q7	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q8	1520000510	TRANSISTOR 2SB1133 R
Q9	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q10	1520000380	TRANSISTOR 2SB1143 S
Q11	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q12	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q13	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q15	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q16	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q17	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
Q18	1530001950	S. TRANSISTOR 2SC2712-GR (TE85R)
D1	1750000060	S. DIODE 1SS196 (TE85R)
D2	1750000060	S. DIODE 1SS196 (TE85R)
D3	1750000050	S. DIODE 1SS193 (TE85R)
D4	1750000050	S. DIODE 1SS193 (TE85R)
D5	1730000030	S. ZENER RD5.6M-T2B2
D6	1750000050	S. DIODE 1SS193 (TE85R)
D7	1790000250	DIODE 1SS97
D8	1790000250	DIODE 1SS97
D12	1730000030	S. ZENER RD5.6M-T2B2

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R55	7030004480	S. RESISTOR	MCR10EZHFX 11.3 kΩ
R56	7030004450	S. RESISTOR	MCR10EZHFX 5.9 kΩ
R57	7030004480	S. RESISTOR	MCR10EZHFX 11.3 kΩ
R58	7030004520	S. RESISTOR	MCR10EZHFX 39.2 kΩ
R59	7030004480	S. RESISTOR	MCR10EZHFX 11.3 kΩ
R60	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R65	7030000700	S. RESISTOR	MCR10EZHJ 470 kΩ (474)
R66	7030000640	S. RESISTOR	MCR10EZHJ 150 kΩ (154)
R67	7030000630	S. RESISTOR	MCR10EZHJ 120 kΩ (124)
R68	7310001730	TRIMMER	RH0421C16J02A (105)
R69	7310001860	TRIMMER	RH0421CS5J02A (474)
R73	7310001770	TRIMMER	RH0421CJ5J06A (224)
R96	7310001850	TRIMMER	RH0421CS4J08A (473)
R97	7030000640	S. RESISTOR	MCR10EZHJ 150 kΩ (154)
R105	7030000540	S. RESISTOR	MCR10EZHJ 22 kΩ (223)
R106	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R108	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R113	7030000650	S. RESISTOR	MCR10EZHJ 180 kΩ (184)
R114	7030000440	S. RESISTOR	MCR10EZHJ 3.3 kΩ (332)
R115	7030000480	S. RESISTOR	MCR10EZHJ 6.8 kΩ (682)
R116	7030001560	S. RESISTOR	MCR10EZHJ 1.5 MΩ (155)
R117	7030000700	S. RESISTOR	MCR10EZHJ 470 kΩ (474)
R118	7030000560	S. RESISTOR	MCR10EZHJ 33 kΩ (333)
R119	7030000630	S. RESISTOR	MCR10EZHJ 120 kΩ (124)
R120	7030000420	S. RESISTOR	MCR10EZHJ 2.2 kΩ (222)
R121	7030004680	S. RESISTOR	MCR10EZHJ 20 kΩ (203)
R122	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R123	7030000540	S. RESISTOR	MCR10EZHJ 22 kΩ (223)
R125	7030000540	S. RESISTOR	MCR10EZHJ 22 kΩ (223)
R126	7030000490	S. RESISTOR	MCR10EZHJ 8.2 kΩ (822)
R127	7030000500	S. RESISTOR	MCR10EZHJ 10 kΩ (103)
R129	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R130	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R131	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R132	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R135	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R136	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R137	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R139	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R140	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R141	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R142	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R166	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R167	7030000400	S. RESISTOR	MCR10EZHJ 1.5 kΩ (152)
R169	7030000560	S. RESISTOR	MCR10EZHJ 33 kΩ (333)
R170	7030000540	S. RESISTOR	MCR10EZHJ 22 kΩ (223)
R171	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R172	7030000560	S. RESISTOR	MCR10EZHJ 33 kΩ (333)
R173	7010000280	RESISTOR	CRH100X 2.2 Ω
R174	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R175	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R176	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R182	7030000380	S. RESISTOR	MCR10EZHJ 1 kΩ (102)
R184	7030000420	S. RESISTOR	MCR10EZHJ 2.2 kΩ (222)
R185	7030000640	S. RESISTOR	MCR10EZHJ 150 kΩ (154)
R186	7510000160	THERMISTOR	ERT-D2FGL 301S
R187	7030000340	S. RESISTOR	MCR10EZHJ 470 Ω (471)
R188	7030000530	S. RESISTOR	MCR10EZHJ 18 kΩ (183)
C1	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C2	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C3	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C4	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C5	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C6	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C7	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C8	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C9	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C10	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C11	4030001100	S. CERAMIC	GRM40 B 102K 50PT

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C12	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C13	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C14	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C15	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C16	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C17	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C18	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C19	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C20	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C21	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C22	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C23	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C24	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C25	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C26	4510003040	ELECTROLYTIC	16 SS 100 μF
C27	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C28	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C29	4510003040	ELECTROLYTIC	16 SS 100 μF
C30	4550002960	S. TANTALUM	TESVA 1C 155M1-8L
C31	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C32	4510002870	ELECTROLYTIC	25 SS 100 μF
C33	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C34	4510002870	ELECTROLYTIC	25 SS 100 μF
C35	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C36	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C37	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C38	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C39	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C41	4550000790	S. TANTALUM	TESVD 0J 476M-12L
C42	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C43	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C45	4030000920	S. CERAMIC	GRM40 CH 150J 50PT
C46	4030000920	S. CERAMIC	GRM40 CH 150J 50PT
C61	4030000720	S. CERAMIC	GRM40 SL 680J 50PT
C62	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C63	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C64	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C65	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C66	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C67	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C69	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C70	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C71	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C72	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C73	4310000460	MYLER	50 F2D 683J
C74	4030003670	S. CERAMIC	GRM40 B 821K 50PT
C75	4030008700	S. CERAMIC	GRM40 B 473K 50PT
C76	4030009260	S. CERAMIC	GRM40 CH 471J 50PT
C77	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C78	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C79	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C81	4030001030	S. CERAMIC	GRM40 CH 151J 50PT
C82	4030001030	S. CERAMIC	GRM40 CH 151J 50PT
C83	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C84	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C86	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C87	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C88	4510002780	ELECTROLYTIC	16 SS 10 μF
C89	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C90	4030008700	S. CERAMIC	GRM40 B 473K 50PT
C91	4030008700	S. CERAMIC	GRM40 B 473K 50PT
C92	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C93	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C94	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C95	4550002680	S. TANTALUM	TESVB 1C 225M-12L
C96	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C97	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C98	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C99	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C100	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C101	4550000270	S. TANTALUM	TESVA 1E 474M1-8L

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C102	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C103	4510004520	ELECTROLYTIC	25 MV 1000 HCS (12.5X16)
C104	4310000360	MYLER	50 F2D 103J
C105	4550001920	TANTALUM	DN 0J 330M
C106	4550003490	TANTALUM	DSB 0J 686M
C107	4550000010	TANTALUM	DN 1C 4R7M
C110	4550002050	TANTALUM	DN 1A 470M
C111	4310000520	MYLER	50 F2D 224J
C112	4510004930	ELECTROLYTIC	16 YK 1000 µF
C115	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C134	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C136	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C141	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C158	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C159	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C160	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C161	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C162	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C163	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C164	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C165	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C166	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C167	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C168	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C169	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C170	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C171	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C172	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C173	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C174	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C175	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C176	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C177	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C178	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C179	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C180	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C181	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C182	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C183	4030000720	S. CERAMIC	GRM40 SL 680J 50PT
C184	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C185	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C186	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C187	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C188	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C189	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C190	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C191	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C192	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C193	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C194	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C195	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C196	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C198	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C199	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C200	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C201	4550000350	TANTALUM	DN 1V 010M
C204	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C205	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C206	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C207	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C208	4510002320	ELECTROLYTIC	6R3 SS 470 µF
C209	4030001100	S. CERAMIC	GRM40 B 102K 50PT
BT1	3020000020	LITHIUM	BR2032-1T2
J1	6510003390	CONNECTOR	B03B-EH-S
J2	6510003410	CONNECTOR	B05B-EH-S
J3	6510014300	CONNECTOR	52030-1610

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
J4	6510007170	CONNECTOR	PI28A-03M
J5	6510007180	CONNECTOR	PI28A-05M
J7	6510003430	CONNECTOR	B07B-EH-S
J8	6450000170	CONNECTOR	TCS4480-01-1111 [ACC]
J9	6510012910	CONNECTOR	BTK16P-2S
J10	2610000200	CONNECTOR	ICC05-028 360T
W1	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W3	7120000010	JUMPER	JPW 02A
W4	7120000010	JUMPER	JPW 02A
W8	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
EP3	0910031754	PCB	B 3184D (MAIN)

[JACK BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
J1	6450000110	CONNECTOR	HSJ0836-01-010 [EXT SP]
J2	6450000130	CONNECTOR	HSJ1102-01-540 [PROGRAMMING]
EP1	0910029811	PCB	B 2923A (JACK)

[TXFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002700	S. IC	NJM2904M-T1
IC2	1110002670	S. IC	NJM2068MD-T1
IC3	1110002710	S. IC	NJM3404AM-T1
IC4	1110002840	S. IC	MC14053 BFR2
IC5	1110002700	S. IC	NJM2904M-T1
IC6	1110002700	S. IC	NJM2904M-T1
Q1	1530001950	S. TRANSISTOR	2SC2712-GR (TE85R)
R1	7030004630	S. RESISTOR	MCR10EZHF 267 kΩ
R2	7030004580	S. RESISTOR	MCR10EZHF 56.2 kΩ
R3	7030004580	S. RESISTOR	MCR10EZHF 56.2 kΩ
R4	7030004670	S. RESISTOR	MCR10EZHZ 16 kΩ (163)
R5	7030000500	S. RESISTOR	MCR10EZHZ 10 kΩ (103)
R6	7030004550	S. RESISTOR	MCR10EZHF 47.5 kΩ

S.=Surface mount

[TXFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
R7	7030002960	S. RESISTOR	MCR10EZHFH 100 kΩ (104)
R8	7030004610	S. RESISTOR	MCR10EZHFH 182 kΩ
R9	7030004620	S. RESISTOR	MCR10EZHFH 221 kΩ
R10	7030003890	S. RESISTOR	MCR10EZHFH 1 MΩ (105)
R11	7030000680	S. RESISTOR	MCR10EZHJ 330 kΩ (334)
R12	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R13	7030000500	S. RESISTOR	MCR10EZHJ 10 kΩ (103)
R14	7030000650	S. RESISTOR	MCR10EZHJ 180 kΩ (184)
R16	7030000650	S. RESISTOR	MCR10EZHJ 180 kΩ (184)
R17	7030000530	S. RESISTOR	MCR10EZHJ 18 kΩ (183)
R18	7030001560	S. RESISTOR	MCR10EZHJ 1.5 MΩ (155)
R19	7030000500	S. RESISTOR	MCR10EZHJ 10 kΩ (103)
R20	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R21	7030000620	S. RESISTOR	MCR10EZHJ 100 kΩ (104)
R22	7030000440	S. RESISTOR	MCR10EZHJ 3.3 kΩ (332)
R23	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R24	7030004430	S. RESISTOR	MCR10EZHFH 4.12 kΩ
R25	7030004650	S. RESISTOR	MCR10EZHFH 953 Ω
R26	7030004460	S. RESISTOR	MCR10EZHFH 8.25 kΩ
R27	7030004460	S. RESISTOR	MCR10EZHFH 8.25 kΩ
R28	7030004690	S. RESISTOR	MCR10EZHJ 43 kΩ (433)
R29	7030004690	S. RESISTOR	MCR10EZHJ 43 kΩ (433)
R30	7030004600	S. RESISTOR	MCR10EZHFH 93.1 kΩ
R31	7030004420	S. RESISTOR	MCR10EZHFH 3.4 kΩ
R32	7030004560	S. RESISTOR	MCR10EZHFH 48.7 kΩ
R33	7030004540	S. RESISTOR	MCR10EZHFH 46.4 kΩ
R34	7030000380	S. RESISTOR	MCR10EZHJ 1 kΩ (102)
R35	7030004670	S. RESISTOR	MCR10EZHJ 16 kΩ (163)
R36	7030000560	S. RESISTOR	MCR10EZHJ 33 kΩ (333)
R37	7030000560	S. RESISTOR	MCR10EZHJ 33 kΩ (333)
R38	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R39	7030000700	S. RESISTOR	MCR10EZHJ 470 kΩ (474)
R40	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R41	7030000400	S. RESISTOR	MCR10EZHJ 1.5 kΩ (152)
R42	7030000240	S. RESISTOR	MCR10EZHJ 68 Ω (680)
R43	7030000660	S. RESISTOR	MCR10EZHJ 220 kΩ (224)
R44	7030000660	S. RESISTOR	MCR10EZHJ 220 kΩ (224)
R45	7030000540	S. RESISTOR	MCR10EZHJ 22 kΩ (223)
R46	7030004570	S. RESISTOR	MCR10EZHFH 49.9 kΩ
R47	7030004410	S. RESISTOR	MCR10EZHFH 2.26 kΩ
R48	7030004530	S. RESISTOR	MCR10EZHFH 43.2 kΩ
R49	7030004510	S. RESISTOR	MCR10EZHFH 38.3 kΩ
R50	7030004590	S. RESISTOR	MCR10EZHFH 90.9 kΩ
R51	7510000220	S. THERMISTOR	DTN-T203S332LS (T)
C1	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C2	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C3	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C4	4030001110	S. CERAMIC	GRM40 B 222K 50PT
C5	4030003350	S. CERAMIC	GRM40 B 272K 50PT
C6	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C7	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C8	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C9	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C10	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C11	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C12	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C13	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C14	4030001090	S. CERAMIC	GRM40 B 471K 50PT
C16	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C17	4030009430	S. CERAMIC	GRM42-6 CH 152K 50PT
C18	4030009610	S. CERAMIC	GRM40 CH 271J 50PT
C19	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C20	4030000780	S. CERAMIC	GRM40 SL 221J 50PT
C21	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C22	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C23	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C24	4550002670	S. TANTALUM	TESVB2 1C 335M-8L
C25	4030003330	S. CERAMIC	GRM40 B 223K 50PT

[TXFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
C26	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C27	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C28	4030001110	S. CERAMIC	GRM40 B 222K 50PT
C30	4550003250	S. TANTALUM	TEMSVA 1V 474M-8L
C31	4030000720	S. CERAMIC	GRM40 SL 680J 50PT
C32	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C33	4550003100	S. TANTALUM	TEMSVB 1A 106M-12L
C34	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C35	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C36	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C37	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C38	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C39	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C40	4030003340	S. CERAMIC	GRM40 B 332K 50PT
C41	4030001120	S. CERAMIC	GRM40 B 472K 50PT
C42	4030001130	S. CERAMIC	GRM40 B 103K 50PT
C43	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C44	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
EP1	0910031566	PCB	B 3171F (TXFIL)
EP2	6910002240	LEADFRAME	HSD2.54-0.9-8 (L)
EP3	6910002240	LEADFRAME	HSD2.54-0.9-8 (L)

[RXFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002690	S. IC	NJM2903M-T1
IC2	1110002680	S. IC	NJM2902M-T1
IC3	1110002680	S. IC	NJM2902M-T1
IC4	1110002840	S. IC	MC14053 BFR2
Q1	1530001950	S. TRANSISTOR	2SC2712-GR (TE85R)
D1	1750000050	S. DIODE	1SS193 (TE85R)
D2	1750000030	S. DIODE	1SS187 (TE85R)
D3	1750000050	S. DIODE	1SS193 (TE85R)
R1	7030004680	S. RESISTOR	MCR10EZHJ 20 kΩ (203)
R2	7030004470	S. RESISTOR	MCR10EZHFH 9.31 kΩ
R3	7030000500	S. RESISTOR	MCR10EZHJ 10 kΩ (103)
R4	7030004680	S. RESISTOR	MCR10EZHJ 20 kΩ (203)
R6	7030004580	S. RESISTOR	MCR10EZHFH 56.2 kΩ
R7	7030004580	S. RESISTOR	MCR10EZHFH 56.2 kΩ
R8	7030004580	S. RESISTOR	MCR10EZHFH 56.2 kΩ
R9	7030004580	S. RESISTOR	MCR10EZHFH 56.2 kΩ
R10	7030004630	S. RESISTOR	MCR10EZHFH 267 kΩ
R11	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R12	7030000610	S. RESISTOR	MCR10EZHJ 82 kΩ (823)
R13	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R16	7030004440	S. RESISTOR	MCR10EZHFH 5.62 kΩ
R17	7030004440	S. RESISTOR	MCR10EZHFH 5.62 kΩ
R18	7030004440	S. RESISTOR	MCR10EZHFH 5.62 kΩ
R19	7030004440	S. RESISTOR	MCR10EZHFH 5.62 kΩ
R20	7030004490	S. RESISTOR	MCR10EZHFH 12.1 kΩ
R21	7030004500	S. RESISTOR	MCR10EZHFH 24.3 kΩ

S.=Surface mount

[RXFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
R22	7030004500	S. RESISTOR	MCR10EZHFX 24.3 kΩ
R24	7030001630	S. RESISTOR	MCR10EZHJ 3.3 MΩ (335)
R25	7030004690	S. RESISTOR	MCR10EZHJ 43 kΩ (433)
R26	7030004690	S. RESISTOR	MCR10EZHJ 43 kΩ (433)
C1	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C2	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C3	4030008580	S. CERAMIC	GRM40 B 183K 50PT
C4	4030008580	S. CERAMIC	GRM40 B 183K 50PT
C5	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C6	4030003350	S. CERAMIC	GRM40 B 272K 50PT
C7	4030001110	S. CERAMIC	GRM40 B 222K 50PT
C8	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C9	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C10	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C11	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C12	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C13	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C14	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C15	4030009420	S. CERAMIC	GRM40 B 822K 50PT
C16	4030003330	S. CERAMIC	GRM40 B 223K 50PT
C17	4030001110	S. CERAMIC	GRM40 B 222K 50PT
C18	4030008700	S. CERAMIC	GRM40 B 473K 50PT
C19	4030008700	S. CERAMIC	GRM40 B 473K 50PT
C20	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C21	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
C22	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C23	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C24	4550004180	S. TANTALUM	TEMSVA 1V 474K1-8L
C25	4550004180	S. TANTALUM	TEMSVA 1V 474K1-8L
C26	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C27	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
W1	7030000010	S. JUMPER	MCR10EZHJ JPW (000)
EP1	0910031592	PCB	B 3172B (RXFIL)
EP2	6910002240	LEADFRAME	HSD2.54-0.9-8 (L)
EP3	6910002240	LEADFRAME	HSD2.54-0.9-8 (L)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q3	1560000430	S. FET	2SK302-GR (TE85R)
Q5	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q6	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q7	1520000220	TRANSISTOR	2SB1019-Y
Q8	1530001950	S. TRANSISTOR	2SC2712-GR (TE85R)
Q9	1520000380	TRANSISTOR	2SB1143 S
Q10	1530001950	S. TRANSISTOR	2SC2712-GR (TE85R)
Q11	1530000160	S. TRANSISTOR	2SC2712-Y (TE85RTEM)
Q12	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q13	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q15	1530001950	S. TRANSISTOR	2SC2712-GR (TE85R)
Q16	1590000700	S. TRANSISTOR	DTC144EK T147
Q17	1590000700	S. TRANSISTOR	DTC144EK T147
Q18	1540000300	TRANSISTOR	2SD1286 K
D3	1790000480	DIODE	1SS101
D4	1730000730	S. ZENER	RD6.2M-T2B2
D5	1790000450	S. DIODE	MA862 (TX)
D6	1160000070	S. DIODE	DAN202K T146
D7	1730000220	ZENER	RD10E B2
D8	1790000700	DIODE	DSA3A1
D9	1730000520	ZENER	RD20E B2
D10	1730000250	ZENER	RD12E B2
D11	1750000070	S. DIODE	1SS226 (TE85R)
D12	1750000070	S. DIODE	1SS226 (TE85R)
D13	1750000070	S. DIODE	1SS226 (TE85R)
X1	6050007710	CRYSTAL	CR-340 HC-49/T 44.720
X3	6050008020	CRYSTAL	CR-391 NTO-781C 12.8000 MHz
F11	2040000450	DIELECTR	EZF-E865 AT11
F12	2040000620	DIELECTR	EZF-E865 BT13
F13	2010001430	MONOLITHIC	FL-176 45M15BC 45.175 MHz
F14	2020000840	CERAMIC	SFG455D
F15	2020000840	CERAMIC	SFG455D
F16	2040000420	DIELECTR	EZF-E815 AT12
L1	6150000991	COIL	LS-424
L2	6150000991	COIL	LS-424
L3	6150000991	COIL	LS-424
L4	6150001341	COIL	LS-447
L6	6170000320	COIL	LW-29
L7	6170000320	COIL	LW-29
L8	6170000030	COIL	LW-4
L9	6180000690	COIL	LAL 03NA R22M
L10	6150001060	COIL	LS-121
L11	6910000670	COIL	BT01RN1-A61-001
R1	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)
R2	7030000570	S. RESISTOR	MCR10EZHJ 39 kΩ (393)
R3	7030000220	S. RESISTOR	MCR10EZHJ 47 Ω (470)
R4	7030000220	S. RESISTOR	MCR10EZHJ 47 Ω (470)
R5	7030000490	S. RESISTOR	MCR10EZHJ 8.2 kΩ (822)
R6	7030000330	S. RESISTOR	MCR10EZHJ 390 Ω (391)
R7	7030000260	S. RESISTOR	MCR10EZHJ 100 Ω (101)
R8	7030000230	S. RESISTOR	MCR10EZHJ 56 Ω (560)
R9	7030000380	S. RESISTOR	MCR10EZHJ 1 kΩ (102)
R10	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R11	7030000230	S. RESISTOR	MCR10EZHJ 56 Ω (560)
R12	7030000260	S. RESISTOR	MCR10EZHJ 100 Ω (101)
R13	7030000480	S. RESISTOR	MCR10EZHJ 6.8 kΩ (682)
R14	7030000590	S. RESISTOR	MCR10EZHJ 56 kΩ (563)
R15	7030000410	S. RESISTOR	MCR10EZHJ 1.8 kΩ (182)
R16	7030000580	S. RESISTOR	MCR10EZHJ 47 kΩ (473)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002200	S. IC	MC3372MR
IC2	6910005930	IC	MD003 H
IC3	1150001150	IC	SC1147
IC4	1150001160	IC	SC1146
IC5	1110001240	S. IC	μPC358G2-T1
IC6	1110002700	S. IC	NJM2904M-T1
IC7	1130003830	S. IC	TC7S04F (TE85R)
IC8	1180000420	S. IC	TA78L05F (TE12R)
IC9	6910007070	IC	ENF-PW388P01
Q1	1580000470	S. FET	3SK206-T1 U79
Q2	1580000430	S. FET	3SK206-T1 U78

S. = Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
R17	7030000470	S. RESISTOR MCR10EZHJ 5.6 kΩ (562)
R18	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R19	7030000580	S. RESISTOR MCR10EZHJ 47 kΩ (473)
R21	7030000130	S. RESISTOR MCR10EZHJ 8.2 Ω (8R2)
R22	7030000350	S. RESISTOR MCR10EZHJ 560 Ω (561)
R23	7030000350	S. RESISTOR MCR10EZHJ 560 Ω (561)
R25	7030000210	S. RESISTOR MCR10EZHJ 39 Ω (390)
R26	7030000230	S. RESISTOR MCR10EZHJ 56 Ω (560)
R27	7030000400	S. RESISTOR MCR10EZHJ 1.5 kΩ (152)
R28	7030000360	S. RESISTOR MCR10EZHJ 680 Ω (681)
R29	7030000230	S. RESISTOR MCR10EZHJ 56 Ω (560)
R30	7030000210	S. RESISTOR MCR10EZHJ 39 Ω (390)
R32	7030000400	S. RESISTOR MCR10EZHJ 1.5 kΩ (152)
R33	7030000360	S. RESISTOR MCR10EZHJ 680 Ω (681)
R34	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R35	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R36	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
R37	7070000690	RESISTOR CRH100X R-02J 220 Ω (221)
R39	7010004830	RESISTOR R50XJ 4.7 Ω
R40	7010004830	RESISTOR R50XJ 4.7 Ω
R41	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
R42	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
R43	7030000220	S. RESISTOR MCR10EZHJ 47 Ω (470)
R46	7030000230	S. RESISTOR MCR10EZHJ 56 Ω (560)
R47	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R48	7030000350	S. RESISTOR MCR10EZHJ 560 Ω (561)
R49	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
R50	7030000550	S. RESISTOR MCR10EZHJ 27 kΩ (273)
R51	7030000190	S. RESISTOR MCR10EZHJ 27 Ω (270)
R52	7030000550	S. RESISTOR MCR10EZHJ 27 kΩ (273)
R53	7030000600	S. RESISTOR MCR10EZHJ 68 kΩ (683)
R54	7030000600	S. RESISTOR MCR10EZHJ 68 kΩ (683)
R55	7030000610	S. RESISTOR MCR10EZHJ 82 kΩ (823)
R56	7030000970	S. RESISTOR MCR10EZHJ 2.2 MΩ (225)
R57	7030000590	S. RESISTOR MCR10EZHJ 56 kΩ (563)
R58	7030000520	S. RESISTOR MCR10EZHJ 15 kΩ (153)
R59	7310001750	TRIMMER RH0421CJ3J09A (222)
R60	7030000410	S. RESISTOR MCR10EZHJ 1.8 kΩ (182)
R61	7030000460	S. RESISTOR MCR10EZHJ 4.7 kΩ (472)
R62	7030000560	S. RESISTOR MCR10EZHJ 33 kΩ (333)
R63	7520000030	POSISTOR PTH59F04BG222TS
R64	7030000420	S. RESISTOR MCR10EZHJ 2.2 kΩ (222)
R65	7030000140	S. RESISTOR MCR10EZHJ 10 Ω (100)
R66	7030000210	S. RESISTOR MCR10EZHJ 39 Ω (390)
R67	7030000230	S. RESISTOR MCR10EZHJ 56 Ω (560)
R68	7030000400	S. RESISTOR MCR10EZHJ 1.5 kΩ (152)
R69	7030000360	S. RESISTOR MCR10EZHJ 680 Ω (681)
R70	7030000140	S. RESISTOR MCR10EZHJ 10 Ω (100)
R71	7030000210	S. RESISTOR MCR10EZHJ 39 Ω (390)
R72	7030000230	S. RESISTOR MCR10EZHJ 56 Ω (560)
R73	7030000400	S. RESISTOR MCR10EZHJ 1.5 kΩ (152)
R74	7030000360	S. RESISTOR MCR10EZHJ 680 Ω (681)
R75	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R76	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R77	7030000380	S. RESISTOR MCR10EZHJ 1 kΩ (102)
R78	7030000180	S. RESISTOR MCR10EZHJ 22 Ω (220)
R79	7030000300	S. RESISTOR MCR10EZHJ 220 Ω (221)
R80	7030000300	S. RESISTOR MCR10EZHJ 220 Ω (221)
R81	7030000180	S. RESISTOR MCR10EZHJ 22 Ω (220)
R82	7030000180	S. RESISTOR MCR10EZHJ 22 Ω (220)
R83	7030000660	S. RESISTOR MCR10EZHJ 220 kΩ (224)
R84	7030000700	S. RESISTOR MCR10EZHJ 470 kΩ (474)
R85	7030000620	S. RESISTOR MCR10EZHJ 100 kΩ (104)
R86	7030000340	S. RESISTOR MCR10EZHJ 470 Ω (471)
R90	7030000700	S. RESISTOR MCR10EZHJ 470 kΩ (474)
R91	7310001720	TRIMMER RH0421C15J06A (104)
R92	7310001720	TRIMMER RH0421C15J06A (104)
R93	7030000660	S. RESISTOR MCR10EZHJ 220 kΩ (224)
R94	7030000350	S. RESISTOR MCR10EZHJ 560 Ω (561)
R95	7310001730	TRIMMER RH0421C16J02A (105)

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
R96	7030000700	S. RESISTOR MCR10EZHJ 470 kΩ (474)
R97	7030000470	S. RESISTOR MCR10EZHJ 5.6 kΩ (562)
R98	7030000620	S. RESISTOR MCR10EZHJ 100 kΩ (104)
R99	7030000670	S. RESISTOR MCR10EZHJ 270 kΩ (274)
R100	7310001850	TRIMMER RH0421CS4J08A (473)
R101	7030000330	S. RESISTOR MCR10EZHJ 390 Ω (391)
R102	7030000500	S. RESISTOR MCR10EZHJ 10 kΩ (103)
R103	7030000680	S. RESISTOR MCR10EZHJ 330 kΩ (334)
R105	7030000620	S. RESISTOR MCR10EZHJ 100 kΩ (104)
R106	7030000620	S. RESISTOR MCR10EZHJ 100 kΩ (104)
R107	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
R108	7030000260	S. RESISTOR MCR10EZHJ 100 Ω (101)
C1	4030000830	S. CERAMIC GRM40 CK 020C 50PT
C2	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C3	4030001100	S. CERAMIC GRM40 B 102K 50PT
C4	4030000850	S. CERAMIC GRM40 CH 040C 50PT
C5	4030001100	S. CERAMIC GRM40 B 102K 50PT
C6	4030001100	S. CERAMIC GRM40 B 102K 50PT
C7	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C8	4030000900	S. CERAMIC GRM40 CH 100D 50PT
C9	4030000960	S. CERAMIC GRM40 CK 1R5C 50PT
C10	4030000850	S. CERAMIC GRM40 CH 040C 50PT
C12	4030001100	S. CERAMIC GRM40 B 102K 50PT
C14	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C15	4030001100	S. CERAMIC GRM40 B 102K 50PT
C16	4030001100	S. CERAMIC GRM40 B 102K 50PT
C17	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C18	4030000850	S. CERAMIC GRM40 CH 040C 50PT
C19	4030001800	S. CERAMIC GRM40 RH 150J 50PT
C20	4030000920	S. CERAMIC GRM40 CH 150J 50PT
C21	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C22	4030001100	S. CERAMIC GRM40 B 102K 50PT
C23	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C24	4030001100	S. CERAMIC GRM40 B 102K 50PT
C25	4030003620	S. CERAMIC GRM40 B 103K 25PT
C26	4030000920	S. CERAMIC GRM40 CH 150J 50PT
C27	4030001820	S. CERAMIC GRM40 RH 220J 50PT
C28	4030003620	S. CERAMIC GRM40 B 103K 25PT
C29	4030000950	S. CERAMIC GRM40 CH 330J 50PT
C30	4030003620	S. CERAMIC GRM40 B 103K 25PT
C31	4030001100	S. CERAMIC GRM40 B 102K 50PT
C32	4030001100	S. CERAMIC GRM40 B 102K 50PT
C33	4030003620	S. CERAMIC GRM40 B 103K 25PT
C34	4030001800	S. CERAMIC GRM40 RH 150J 50PT
C35	4030000830	S. CERAMIC GRM40 CK 020C 50PT
C36	4030000950	S. CERAMIC GRM40 CH 330J 50PT
C37	4030000980	S. CERAMIC GRM40 CH 560J 50PT
C38	4030001100	S. CERAMIC GRM40 B 102K 50PT
C39	4030000960	S. CERAMIC GRM40 CH 390J 50PT
C40	4030001120	S. CERAMIC GRM40 B 472K 50PT
C41	4030000840	S. CERAMIC GRM40 CJ 030C 50PT
C42	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C43	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C44	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C45	4030008580	S. CERAMIC GRM40 B 183K 50PT
C46	4030009870	S. CERAMIC GRM40 RK 020C 50PT
C47	4030003620	S. CERAMIC GRM40 B 103K 25PT
C48	4030001100	S. CERAMIC GRM40 B 102K 50PT
C49	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C50	4030003620	S. CERAMIC GRM40 B 103K 25PT
C51	4550003580	TANTALUM DSB 1A 476M
C52	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C53	4510002730	ELECTROLYTIC 10 SS 100 μF
C56	4020000080	CYLINDER UP125 SL 100J
C57	4030001100	S. CERAMIC GRM40 B 102K 50PT
C59	4030001100	S. CERAMIC GRM40 B 102K 50PT
C61	4030001100	S. CERAMIC GRM40 B 102K 50PT
C62	4030000850	S. CERAMIC GRM40 CH 040C 50PT
C64	4030000990	S. CERAMIC GRM40 CH 680J 50PT

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C65	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C66	4030001100	S. CERAMIC GRM40 B 102K 50PT
C67	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C68	4030000900	S. CERAMIC GRM40 CH 100D 50PT
C70	4030001090	S. CERAMIC GRM40 B 471K 50PT
C71	4030001100	S. CERAMIC GRM40 B 102K 50PT
C72	4030000990	S. CERAMIC GRM40 CH 680J 50PT
C73	4030001100	S. CERAMIC GRM40 B 102K 50PT
C74	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C75	4030001100	S. CERAMIC GRM40 B 102K 50PT
C76	4030001100	S. CERAMIC GRM40 B 102K 50PT
C77	4030001100	S. CERAMIC GRM40 B 102K 50PT
C78	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C79	4030009360	S. CERAMIC GRH708 CK 0R75C 200
C80	4030009370	S. CERAMIC GRH708 CK 010C 200
C81	4030009390	S. CERAMIC GRH708 CJ 030C 200
C82	4030009380	S. CERAMIC GRH708 CK 020C 200
C83	4030009390	S. CERAMIC GRH708 CJ 030C 200
C84	4030009400	S. CERAMIC GRH708 CH 040C 200
C85	4030009410	S. CERAMIC GRH708 CK 1R5C 200
C86	4030000650	S. CERAMIC GRM40 SL 150J 50PT
C87	4030003170	S. CERAMIC GRM40 SL 0R75C 50PT
C88	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C89	4030001100	S. CERAMIC GRM40 B 102K 50PT
C90	4550000260	TANTALUM DN 1V 100M
C91	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C92	4030001100	S. CERAMIC GRM40 B 102K 50PT
C93	4550000340	TANTALUM DN 1C 100M
C94	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C95	4030001100	S. CERAMIC GRM40 B 102K 50PT
C96	4550000340	TANTALUM DN 1C 100M
C97	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C98	4030001100	S. CERAMIC GRM40 B 102K 50PT
C99	4550000340	TANTALUM DN 1C 100M
C100	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C101	4030001100	S. CERAMIC GRM40 B 102K 50PT
C102	4550000340	TANTALUM DN 1C 100M
C103	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C104	4030001100	S. CERAMIC GRM40 B 102K 50PT
C105	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C106	4510002940	ELECTROLYTIC 50 SS 1 μ F
C107	4030001100	S. CERAMIC GRM40 B 102K 50PT
C108	4030001090	S. CERAMIC GRM40 B 471K 50PT
C109	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C110	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C111	4510002940	ELECTROLYTIC 50 SS 1 μ F
C112	4030001090	S. CERAMIC GRM40 B 471K 50PT
C113	4030001100	S. CERAMIC GRM40 B 102K 50PT
C114	4510002940	ELECTROLYTIC 50 SS 1 μ F
C115	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C116	4030001100	S. CERAMIC GRM40 B 102K 50PT
C117	4030001090	S. CERAMIC GRM40 B 471K 50PT
C118	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C119	4030001100	S. CERAMIC GRM40 B 102K 50PT
C120	4030000830	S. CERAMIC GRM40 CK 020C 50PT
C122	4030000830	S. CERAMIC GRM40 CK 020C 50PT
C123	4030001090	S. CERAMIC GRM40 B 471K 50PT
C124	4030000920	S. CERAMIC GRM40 CH 150J 50PT
C125	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C127	4030001100	S. CERAMIC GRM40 B 102K 50PT
C128	4030001100	S. CERAMIC GRM40 B 102K 50PT
C129	4030001100	S. CERAMIC GRM40 B 102K 50PT
C130	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C131	4030000840	S. CERAMIC GRM40 CJ 030C 50PT
C132	4030000830	S. CERAMIC GRM40 CK 020C 50PT
C133	4030001090	S. CERAMIC GRM40 B 471K 50PT
C134	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C135	4030001100	S. CERAMIC GRM40 B 102K 50PT
C136	4030000990	S. CERAMIC GRM40 CH 680J 50PT
C137	4030001100	S. CERAMIC GRM40 B 102K 50PT
C138	4030001100	S. CERAMIC GRM40 B 102K 50PT

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION
C139	4030001100	S. CERAMIC GRM40 B 102K 50PT
C140	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C141	4030000990	S. CERAMIC GRM40 CH 680J 50PT
C142	4510002740	ELECTROLYTIC 10 SS 220 μ F
C143	40300006490	S. CERAMIC GRM40 B 153K 50PT
C144	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C145	40300003620	S. CERAMIC GRM40 B 103K 25PT
C146	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C147	4030001100	S. CERAMIC GRM40 B 102K 50PT
C148	45500002040	TANTALUM DN 1A 330M
C149	4510001720	ELECTROLYTIC 16 SS 330 μ F (8X12.5)
C150	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C151	4550000280	S. TANTALUM TESVB2 1A 475M-8L
C152	45500002890	S. TANTALUM TESVA 1A 225M1-8L
C153	4030000740	S. CERAMIC GRM40 SL 101J 50PT
C154	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C155	4030000740	S. CERAMIC GRM40 SL 101J 50PT
C156	4030000690	S. CERAMIC GRM40 SL 390J 50PT
C157	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C158	4030000630	S. CERAMIC GRM40 SL 100D 50PT
C160	4030000630	S. CERAMIC GRM40 SL 100D 50PT
C161	4030001100	S. CERAMIC GRM40 B 102K 50PT
C162	4510003040	ELECTROLYTIC 16 SS 100 μ F
C163	4030000700	S. CERAMIC GRM40 SL 470J 50PT
C164	4030001100	S. CERAMIC GRM40 B 102K 50PT
C165	4030001100	S. CERAMIC GRM40 B 102K 50PT
C166	4030000630	S. CERAMIC GRM40 SL 100D 50PT
C167	4510004510	ELECTROLYTIC 25 MV 470 HC
C168	4030001100	S. CERAMIC GRM40 B 102K 50PT
C169	4030001100	S. CERAMIC GRM40 B 102K 50PT
C170	4030001100	S. CERAMIC GRM40 B 102K 50PT
C172	4510002380	ELECTROLYTIC 16 SS 470 μ F (10X12.5)
C173	4030001100	S. CERAMIC GRM40 B 102K 50PT
C174	4030001100	S. CERAMIC GRM40 B 102K 50PT
C175	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C177	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C178	40300009620	S. CERAMIC GRM40 CK 1R5C 50PT
C179	40300003620	S. CERAMIC GRM40 B 103K 25PT
C180	4030000860	S. CERAMIC GRM40 CH 050C 50PT
C181	4030001100	S. CERAMIC GRM40 B 102K 50PT
C182	4030001100	S. CERAMIC GRM40 B 102K 50PT
C183	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C184	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C185	4030000850	S. CERAMIC GRM40 CH 040C 50PT
C186	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C187	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C188	4030001150	S. CERAMIC GRM40 F 104Z 25PT
C189	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C190	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C192	4030000720	S. CERAMIC GRM40 SL 680J 50PT
C193	4550000350	TANTALUM DN 1V 010M
C194	4550000350	TANTALUM DN 1V 010M
C197	4550003090	S. TANTALUM TEMSVB2 1A 685M-8L
C198	4030001730	S. CERAMIC GRM40 RH 040C 50PT
C200	4030001090	S. CERAMIC GRM40 B 471K 50PT
C201	4550004000	S. TANTALUM TEMSVD 0J 686M-12L
C202	4030000580	S. CERAMIC GRM40 SL 040C 50PT
C204	4030002770	S. CERAMIC GRM40 UJ 121J 50PT
C206	40300008960	S. CERAMIC C2012 JB 1C 104K-T-A
C207	4030001140	S. CERAMIC GRM40 F 103Z 50PT
J1	6510014250	CONNECTOR BTK16S-2S
J2	6910003140	CONNECTOR IMSA-9202B-1-02T
J3	6910003140	CONNECTOR IMSA-9202B-1-02T
J4	6910003140	CONNECTOR IMSA-9202B-1-02T
J5	6910003140	CONNECTOR IMSA-9202B-1-02T
P1	6910003120	CONNECTOR IMSA-9206H-T
P2	6910003120	CONNECTOR IMSA-9206H-T

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
W1	8900002940	CABLE	OPC-290 [ANT]
W2	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W3	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W4	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W5	7120000380	JUMPER	JPW 01 R-01
W6	7120000380	JUMPER	JPW 01 R-01
W7	7120000380	JUMPER	JPW 01 R-01
W8	7120000380	JUMPER	JPW 01 R-01
W9	7120000380	JUMPER	JPW 01 R-01
W10	7120000380	JUMPER	JPW 01 R-01
W13	7120000380	JUMPER	JPW 01 R-01
W15	7120000010	JUMPER	JPW 02A
W16	7120000010	JUMPER	JPW 02A
W17	7120000010	JUMPER	JPW 02A
W18	7120000010	JUMPER	JPW 02A
W19	7120000380	JUMPER	JPW 01 R-01
W20	7120000380	JUMPER	JPW 01 R-01
W21	8900003830	CABLE	OPC-380
W23	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W25	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W28	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
W29	7030000010	S. JUMPER	MCR10EZHZ JPW (000)
EP2	6910000970	BEAD	DL 20P 2.6-3-1.2H
EP3	6910000970	BEAD	DL 20P 2.6-3-1.2H
EP10	0910028674	PCB	B 2899D (RF)
MP1	8930015030	FEED THROUGH	AS-308

[FRONT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130004930	S. IC	μ PD7225GB-3B7
IC2	1130003710	S. IC	TC4S71F (TE85R)
IC3	1130003760	S. IC	TC4S81F (TE85R)
Q1	1530002820	S. TRANSISTOR	2SC2412K WT T147 R
Q2	1510000500	S. TRANSISTOR	2SA1162-GR (TE85R)
Q3	1510000500	S. TRANSISTOR	2SA1162-GR (TE85R)
Q4	1510000500	S. TRANSISTOR	2SA1162-GR (TE85R)
Q5	1590000700	S. TRANSISTOR	DTC144EK T147
Q6	1590000700	S. TRANSISTOR	DTC144EK T147
Q7	1590000700	S. TRANSISTOR	DTC144EK T147
D1	1730000730	S. ZENER	RD6.2M-T2B2
R1	7030000500	S. RESISTOR	MCR10EZHZ 10 k Ω (103)
R2	7030000500	S. RESISTOR	MCR10EZHZ 10 k Ω (103)
R3	7030000580	S. RESISTOR	MCR10EZHZ 47 k Ω (473)
R4	7030000500	S. RESISTOR	MCR10EZHZ 10 k Ω (103)
R5	7510000130	THERMISTOR	ERT-D2FHL 333S
R6	7030000590	S. RESISTOR	MCR10EZHZ 56 k Ω (563)
R7	7030000660	S. RESISTOR	MCR10EZHZ 220 k Ω (224)
R8	7030000500	S. RESISTOR	MCR10EZHZ 10 k Ω (103)
R9	7030000440	S. RESISTOR	MCR10EZHZ 3.3 k Ω (332)

[FRONT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R10	7030000060	S. RESISTOR	MCR10EZHZ 2.2 Ω (2R2)
R11	7030000060	S. RESISTOR	MCR10EZHZ 2.2 Ω (2R2)
R12	7030000230	S. RESISTOR	MCR10EZHZ 56 Ω (560)
R13	7030000230	S. RESISTOR	MCR10EZHZ 56 Ω (560)
R14	7030001100	S. RESISTOR	MCR50JZHZ 56 Ω (560)
R15	7030001100	S. RESISTOR	MCR50JZHZ 56 Ω (560)
R16	7030000490	S. RESISTOR	MCR10EZHZ 8.2 k Ω (822)
R17	7030000490	S. RESISTOR	MCR10EZHZ 8.2 k Ω (822)
R18	7030000490	S. RESISTOR	MCR10EZHZ 8.2 k Ω (822)
R19	7030000670	S. RESISTOR	MCR10EZHZ 270 k Ω (274)
C1	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C2	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C3	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C4	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C5	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C6	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C7	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C8	4030001090	S. CERAMIC	GRM40 B 471K 50PT
C9	4030001090	S. CERAMIC	GRM40 B 471K 50PT
C10	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C11	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C12	4550003130	S. TANTALUM	TEMSVB2 1C 475M-8L
C13	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C14	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C15	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C16	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C17	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C18	4030000700	S. CERAMIC	GRM40 SL 470J 50PT
C19	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C20	4030001100	S. CERAMIC	GRM40 B 102K 50PT
C21	4030003620	S. CERAMIC	GRM40 B 103K 25PT
C22	4550003130	S. TANTALUM	TEMSVB2 1C 475M-8L
DS1	5030000670	LCD	LD-BU5231E (E-5360) [DISPLAY PANEL]
DS2	5080000200	LAMP	HRS-3060A-G40
DS3	5080000200	LAMP	HRS-3060A-G40
S1	2260000580	SWITCH	SKHLAD035A [SET]
S2	2260000580	SWITCH	SKHLAD035A [CLR]
S3	2260000580	SWITCH	SKHLAD035A [SCAN]
S4	2260000580	SWITCH	SKHLAD035A [SYS/GRP]
MC1	7700000890	MICROPHONE	M204D40I0816 (EM51)
SP1	2510000550	SPEAKER	SME-45U0104
J1	6510014300	CONNECTOR	52030-1610
W1	8900003250	CABLE	OPC-325
EP2	8930023200	LCD CONTACT	SRCN-946W
EP3	0910030993	PCB	B 3135C (FRONT)

S.=Surface mount

[LED UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1590000430	S. TRANSISTOR	DTC144EU T107
Q2	1590000430	S. TRANSISTOR	DTC144EU T107
Q3	1590000430	S. TRANSISTOR	DTC144EU T107
R1	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R2	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R3	7030003390	S. RESISTOR	ERJ3GEYJ 391 V (390 Ω)
DS1	5040001570	LED	SLC-22YY 3F [CALL]
DS2	5040001560	LED	SLC-22MG 3F [BUSY]
DS3	5040001470	LED	SLC-22VR 3F [TX]
EP1	0910030961	PCB	B 3132A (LED)

[SENSOR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
S1	2260001600	SWITCH	SW-132 (RK09710HH) [SELECT]
EP1	0910030971	PCB	B 3133A (SENSOR)

[VOL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210002150	VARIABLE	RV-267 (RK0971111 L=16) 10KB [VOL/PWR]
C1	4030001150	S. CERAMIC	GRM40 F 104Z 25PT
EP1	0910030983	PCB	B 3134C (VOL)

S. = Surface mount

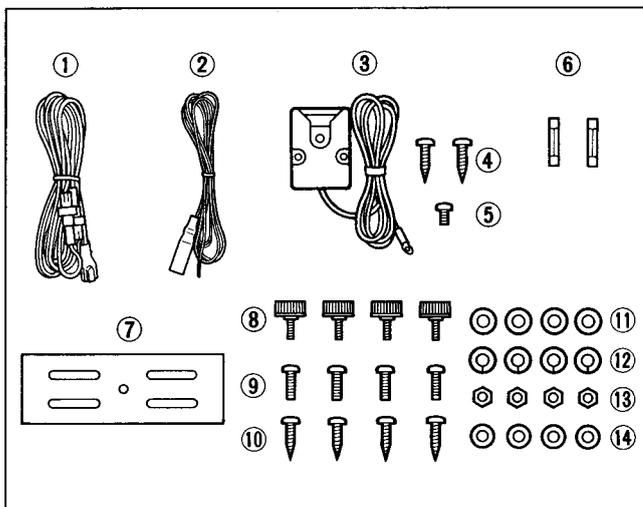
SECTION 6 MECHANICAL PARTS AND DISASSEMBLY

• FRONT PANEL AND CHASSIS PARTS

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8610006850	Knob N165 [VOL/PWR]	1	②⑨	8810003160	Setscrew A M3×6	20
②	8610007520	Knob N173 [SELECT]	1	③⑩	8930008120	Ground plate (A)	1
③	7700000890	Microphone EM51	1	④⑪	8810003660	Icom screw A 5	2
④	8810005560	Screw PH M3×8 SUS ZK	2	⑤⑫	8810001850	Screw PH M2.6×8 NI BS	2
⑤	8210006410	Front panel	1	⑥⑬	8930023030	IC holder-1	1
⑥	8610007500	Button K180	1	⑦⑭	8930015030	Feed through AS-308	1
⑦	8810006770	Screw PH B0 2×4 ZK	3	⑧⑮	8810001920	Screw PH M3×8 NI BS	2
⑧	8110004410	Cover (complete)	2	⑨⑯	8930015180	PA module holder	1
⑨	8810006530	Screw FH M2.6×6 ZK BS	10	⑩⑰	8810001840	Screw PH M2.6×6 NI BS	2
⑩	2510000550	Speaker SME-45U0104	1	⑪⑱	8930015720	Terminal insulate plate	1
⑪	8930023090	LCD cover	1	⑫⑲	8930020010	ANT plate	1
⑫	8810000010	Screw PH M2×4	2	⑬⑳	8810001910	Screw PH M3×6 NI BS	2
⑬	8930023100	LED spacer	1	⑭㉑	8900003830	RF cable OPC-380	1
⑭	2260001600	Switch SW-132 [SELECT] (incl. nut, washer)	1	⑮㉒	8930025090	946 connector cap	1
⑮	7210002150	Volume RV-267 10kB [VOL/PWR] (incl. nut, washer)	1	⑯㉓	8010011970	Chassis (A)	1
⑯	8010011310	Sub chassis	1	⑰㉔	8930015040	Feed through AS-309	1
⑰	8810002060	Screw FH M2×5	4	⑱㉕	8810001230	Screw PH B1 M2×4	2
⑱	8810001030	Screw PH B0 M2.6×5	6	⑲㉖	8930025060	946 IC spacer	1
⑲	8930021480	LCD holder	1	㉑㉗	8810000260	Screw PH M3×12	1
⑳	5030000670	LCD LD-BU5231E (E-5360)	1	㉒㉘	8810000250	Screw PH M3×10	1
㉑	8930023200	LCD contact SRCN-946W	2	㉓㉙	8850000570	Star washer M3	2
㉒	8930025320	LCD filter	1	㉔㉚	8930001160	Ground spring	2
㉓	8010011160	LCD reflector	1	㉕㉛	8930008680	Insulate plate AH	1
㉔	8810004750	Setscrew A M2.6×4	4	㉖㉜	8410001630	REG heatsink	1
㉕	8950001840	Electrical tape No.1245 L=120	1	㉗㉝	8810003250	Setscrew A M3×8 NI	1
㉖	8930018620	Sheet Y	1	㉘㉞	8850000370	Spring washer M3	2
㉗	8010010800	PA shield cover	1	㉙㉟	8830000100	Nut M3	2
㉘	8810002110	Screw FH M2.6×5	2	㉚㊱	8810003170	Setscrew A M3×8	1
				㉛㊲	8930021450	Jack holder	1

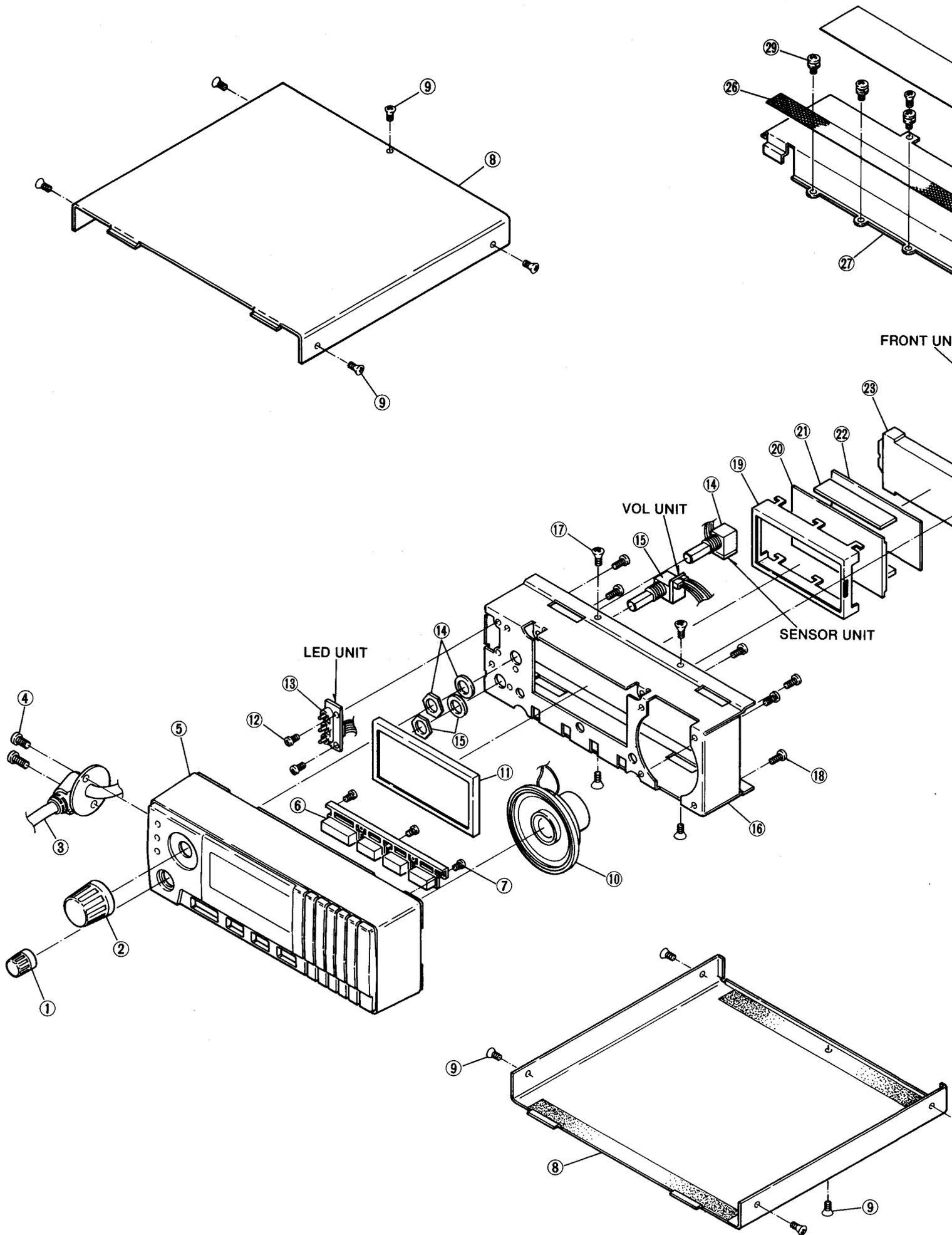
Screw abbreviations B0: Self-tapping PH: Pan head FH: Flat head BS: Brass NI: Nickel ZK: Black

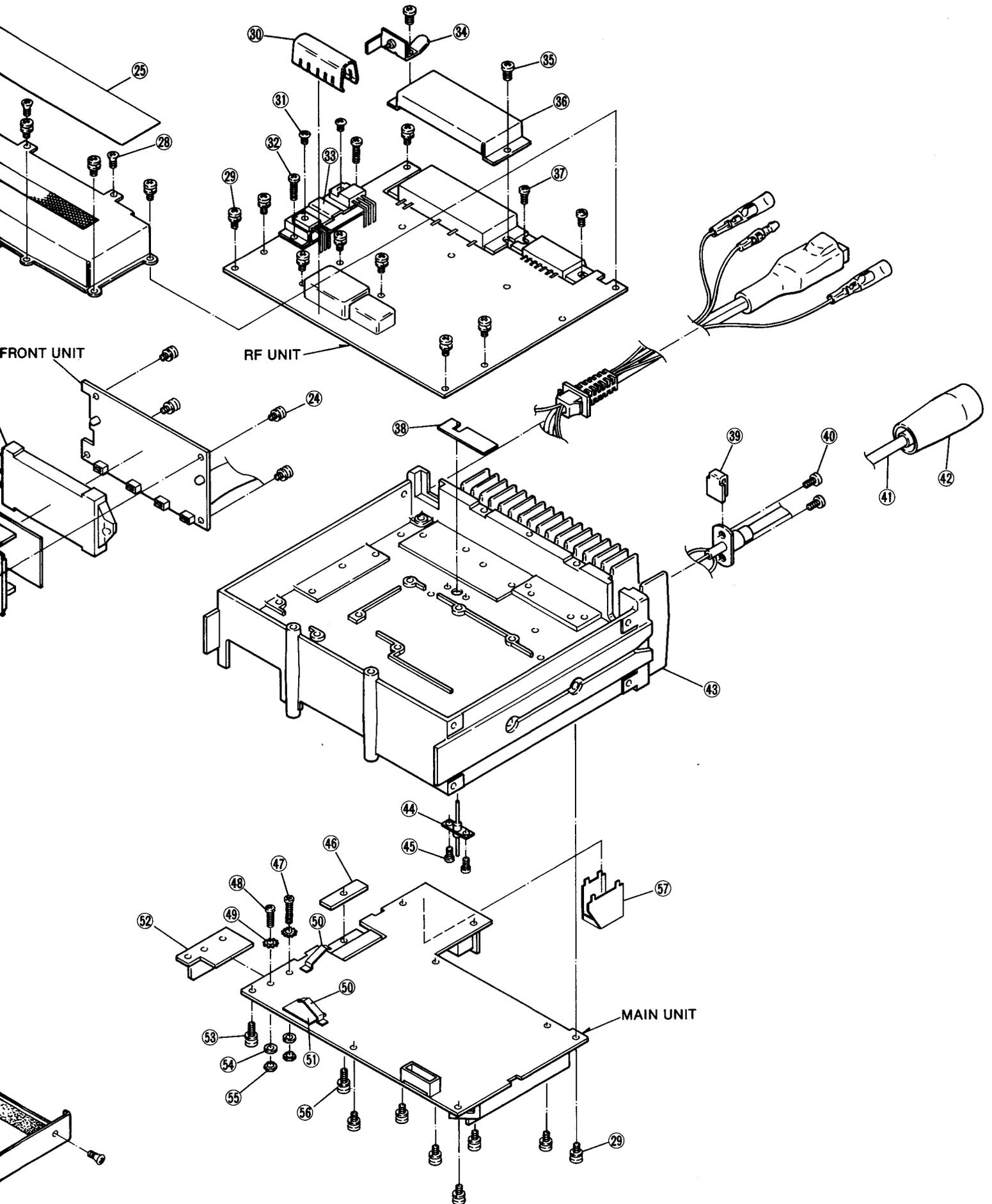
• ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8900000640	DC power cable (OPC-044A)	1
②	8900003840	Ignition cable (OPC-381)	1
③	8900003400	Microphone hanger with cable (OPC-326)	1
④	8810001460	Screw PH A M3.5×20 SUS	2
⑤	8810000360	Screw PH M4×6	1
⑥	5210000070	Fuse FGB 10A	2
⑦	8010008710	150 mounting bracket	1
⑧	8820000461	Mounting bolt (B)-1 M4×8 ZK	4
⑨	8810000470	Screw PH M5×12 (+ -)	4
⑩	8810000950	Screw PH A M5×16	4
⑪	8850000150	Flat washer M5 NI BS	4
⑫	8850000440	Spring washer M5 NI	4
⑬	8830000120	Nut M5	4
⑭	8850000140	Flat washer M4 NI BS	4

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

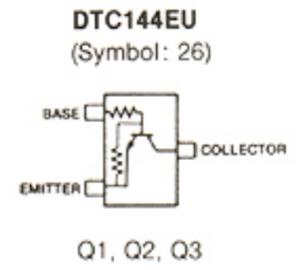
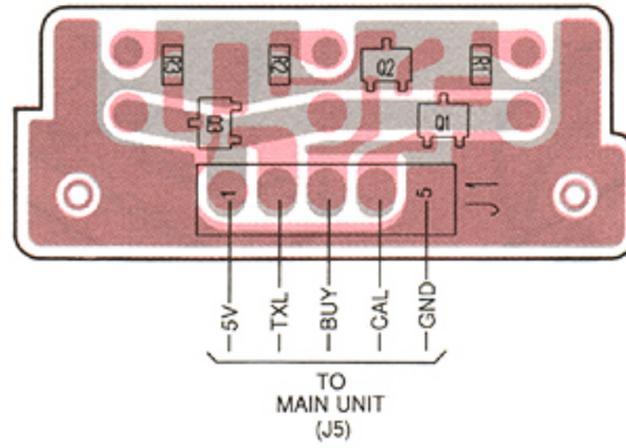
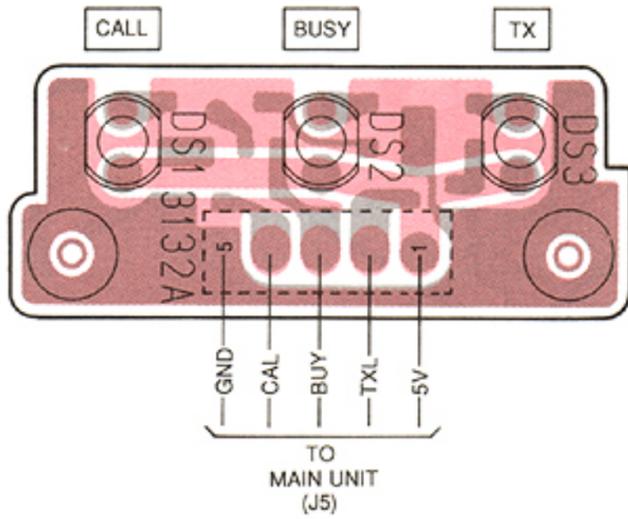




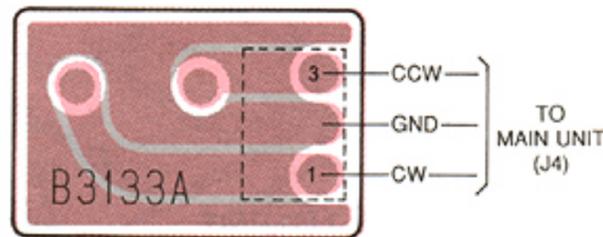
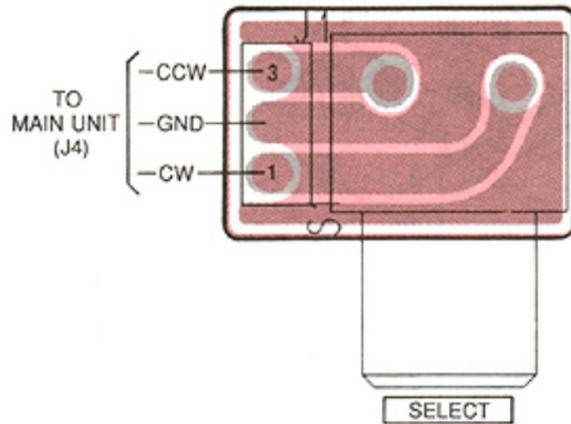
SECTION 7 BOARD LAYOUTS

7-1 LED, SENSOR AND VOL UNITS

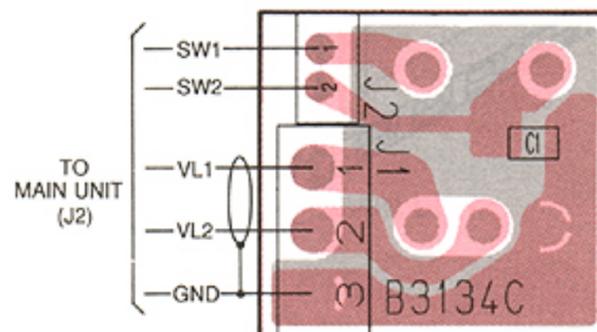
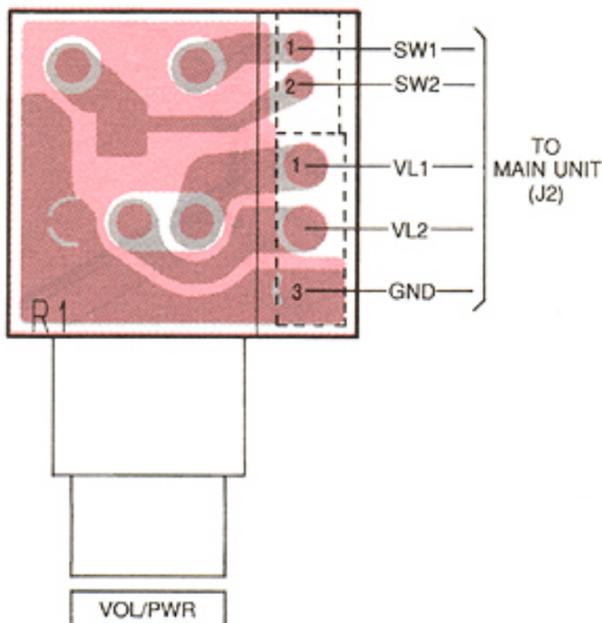
• LED UNIT



• SENSOR UNIT



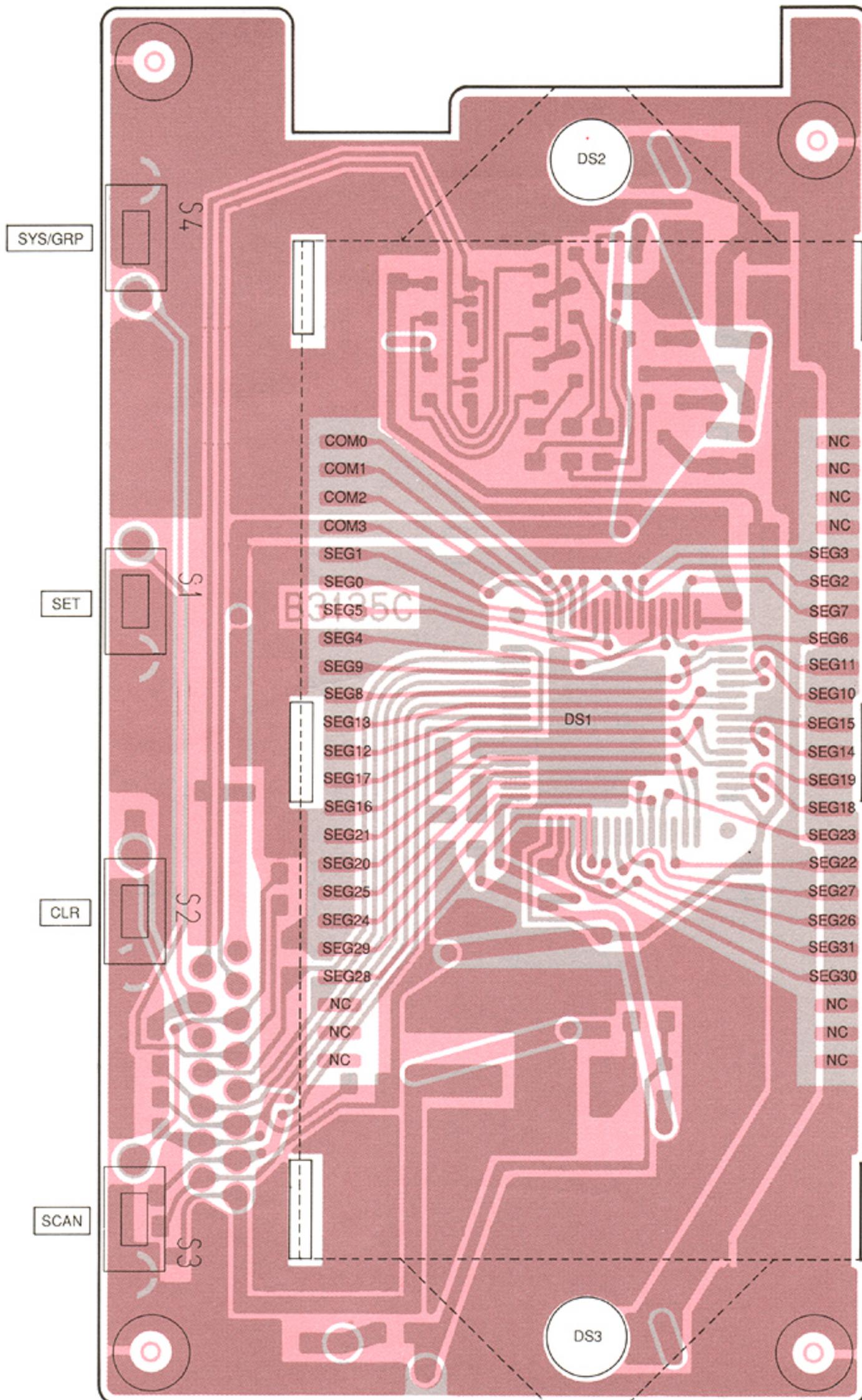
• VOL UNIT



7-2 FRONT UNIT

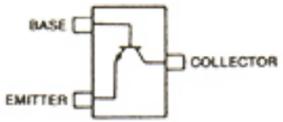
• FRONT UNIT

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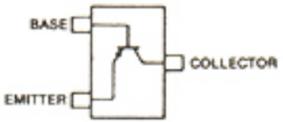
• FRONT UNIT

2SC2412K WT R
(Symbol: BR)



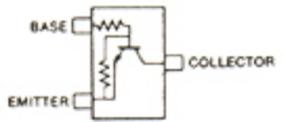
Q1

2SA1162 GR
(Symbol: SG)



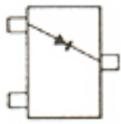
Q2, Q3, Q4

DTC144EK
(Symbol: 26)

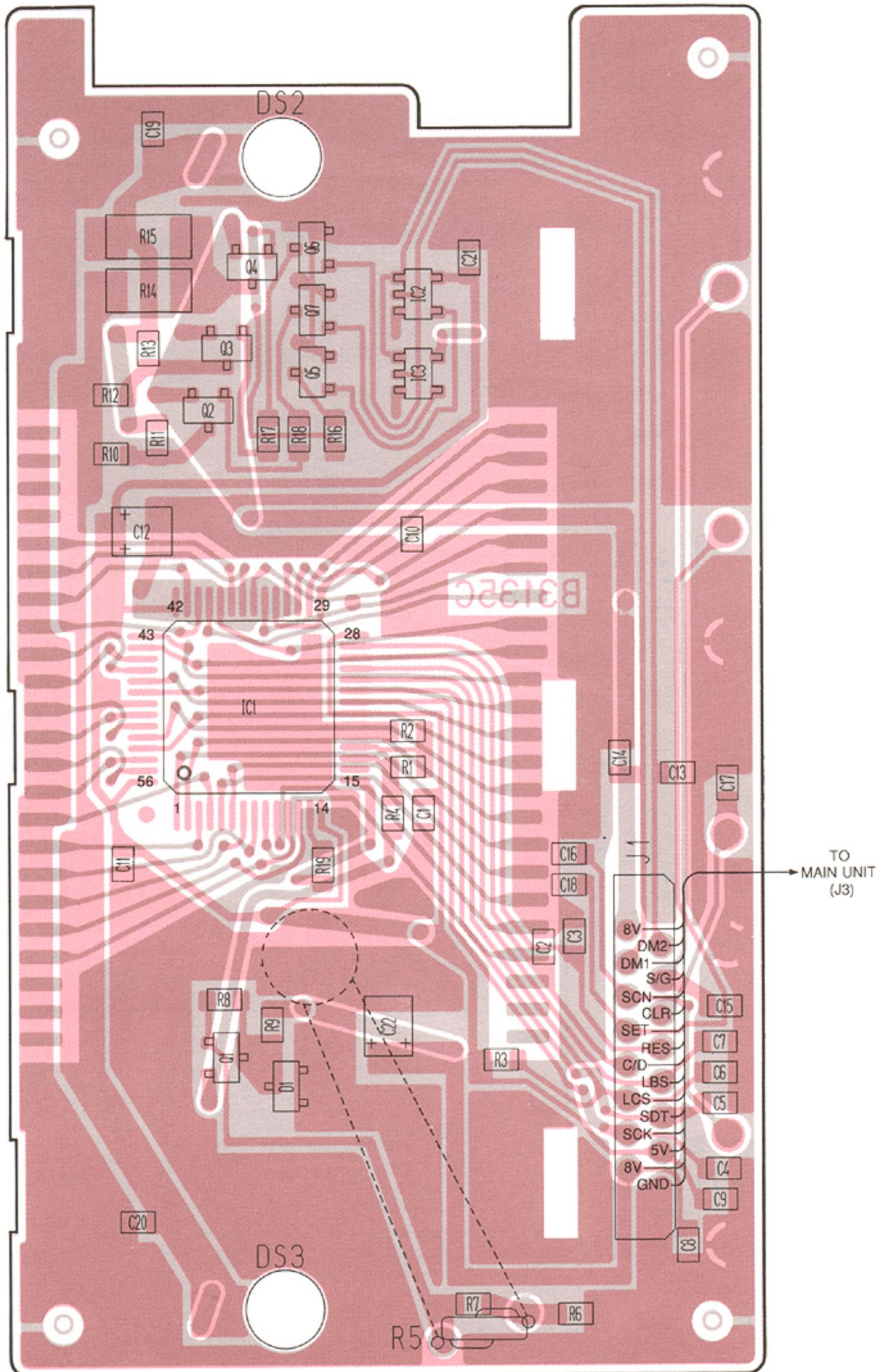


Q5, Q6, Q7

RD6.2M B2
(Symbol: 622)

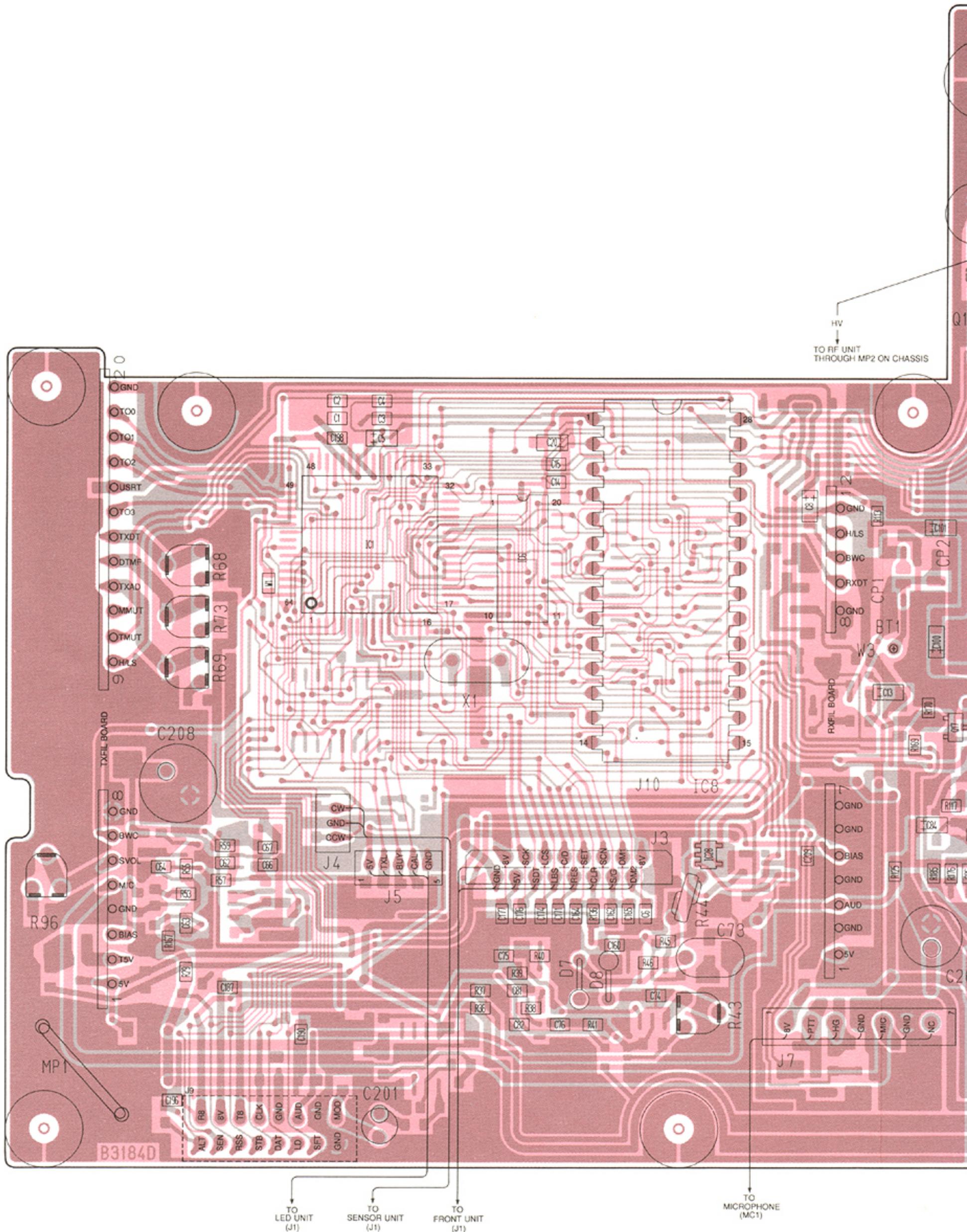


D1

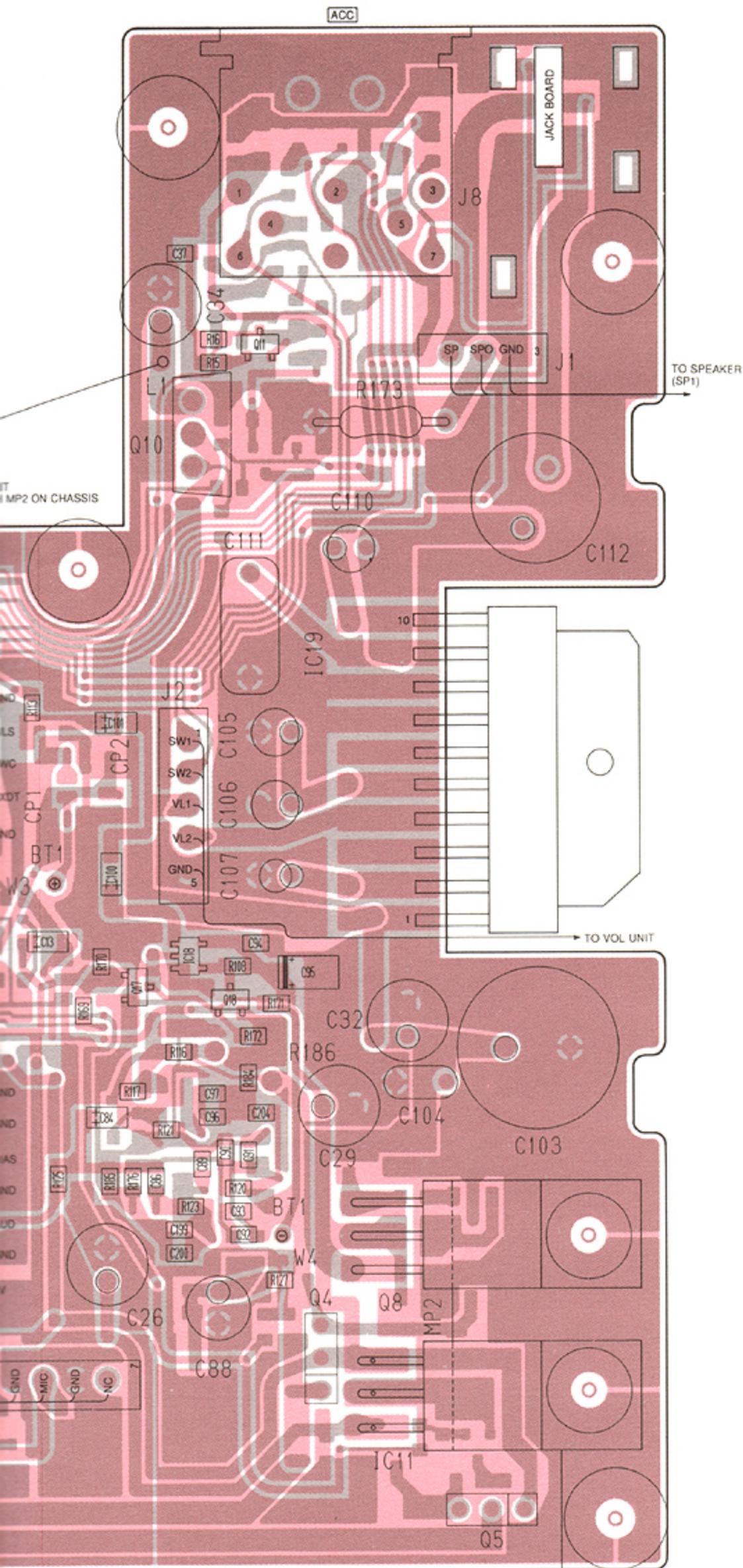


7-3 MAIN UNIT

• MAIN UNIT



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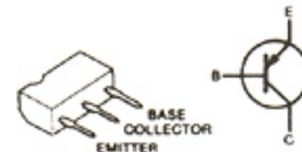


2SD1225M R



Q4

2SB909M Q



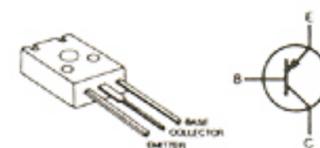
Q5

2SB1133 R



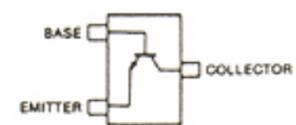
Q8

2SB1143 S



Q10

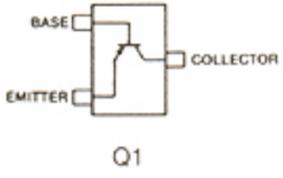
2SC2712 GR
(Symbol: LG)



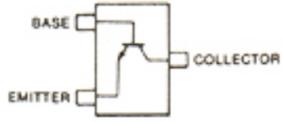
Q11, Q17, Q18

• MAIN UNIT

2SA1162 GR
(Symbol: SG)

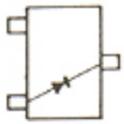


2SC2712 GR
(Symbol: LG)



Q2, Q3, Q6, Q7, Q9,
Q12, Q13, Q15, Q16

1SS196
(Symbol: G3)



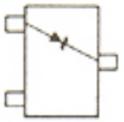
D1, D2

1SS193
(Symbol: F3)

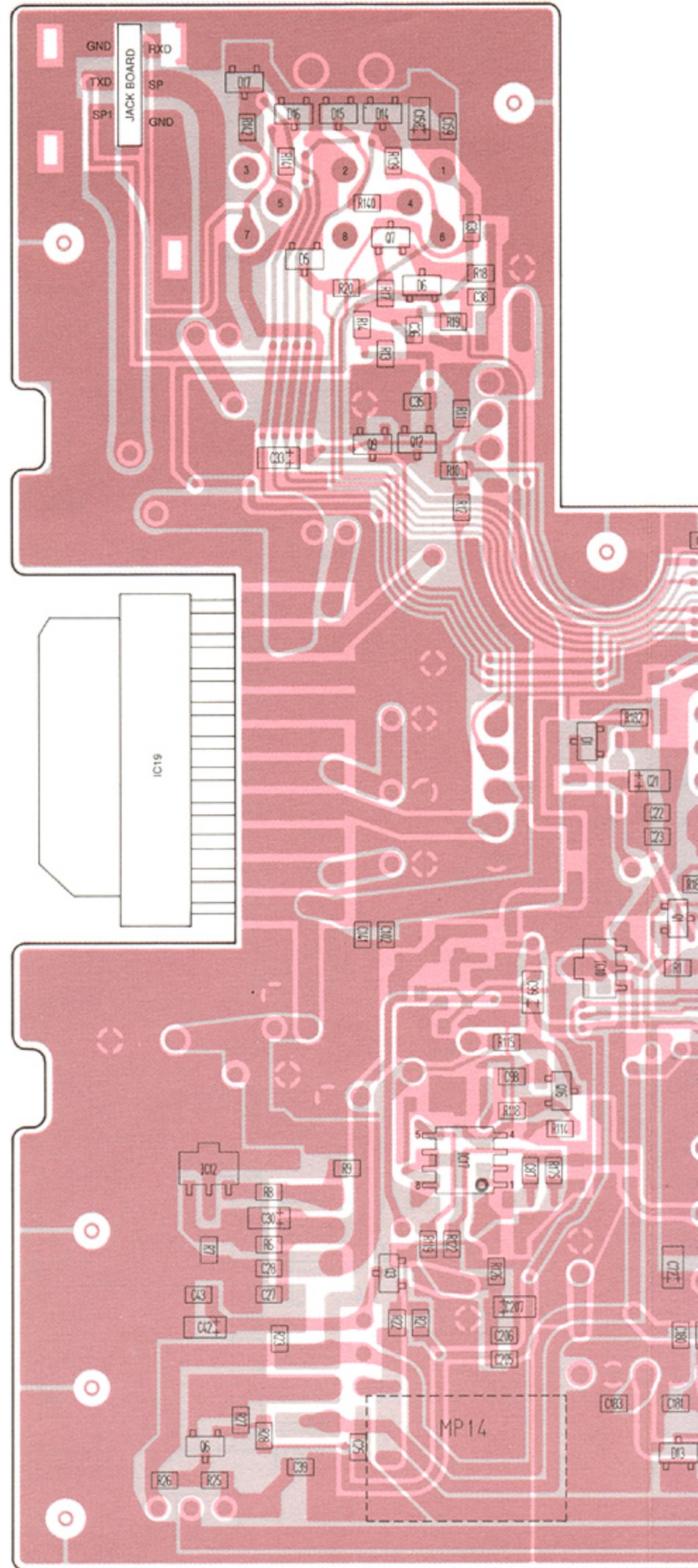


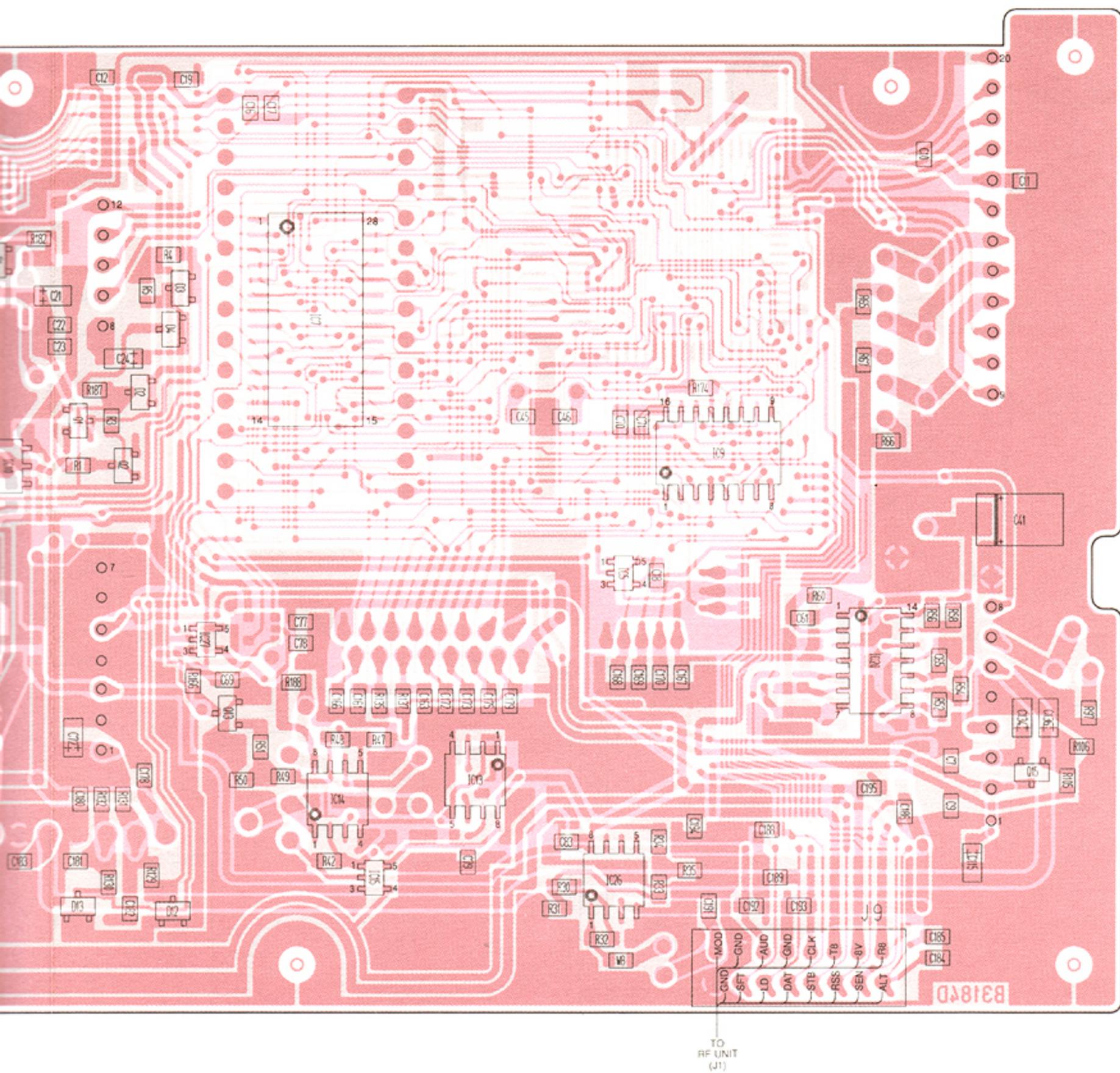
D3, D4, D6

RD5.6M B2
(Symbol: 562)



D5, D12, D13, D14,
D15, D16, D17

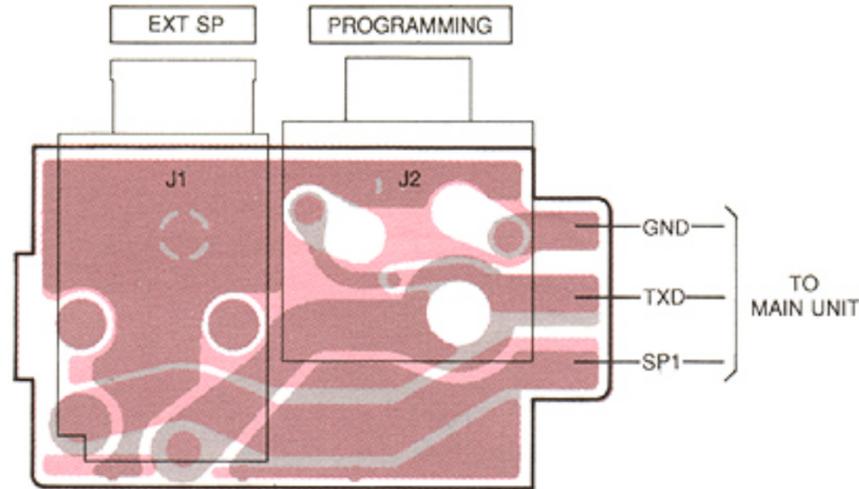




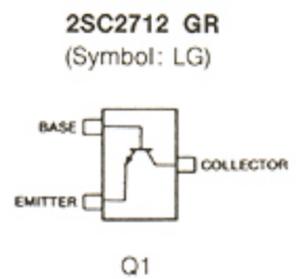
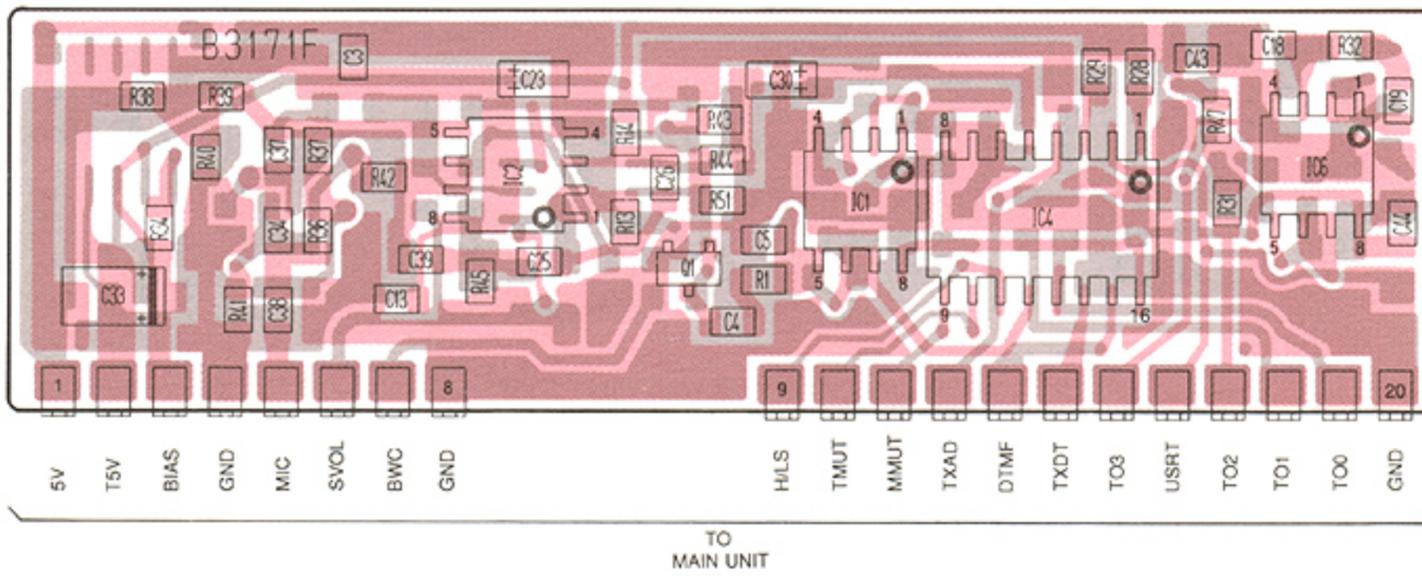
7-4 JACK, TXFIL AND RXFIL BOARDS

• JACK BOARD

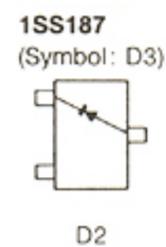
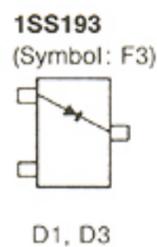
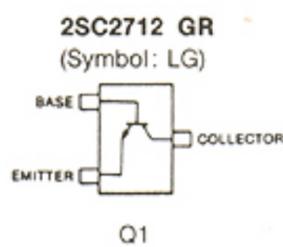
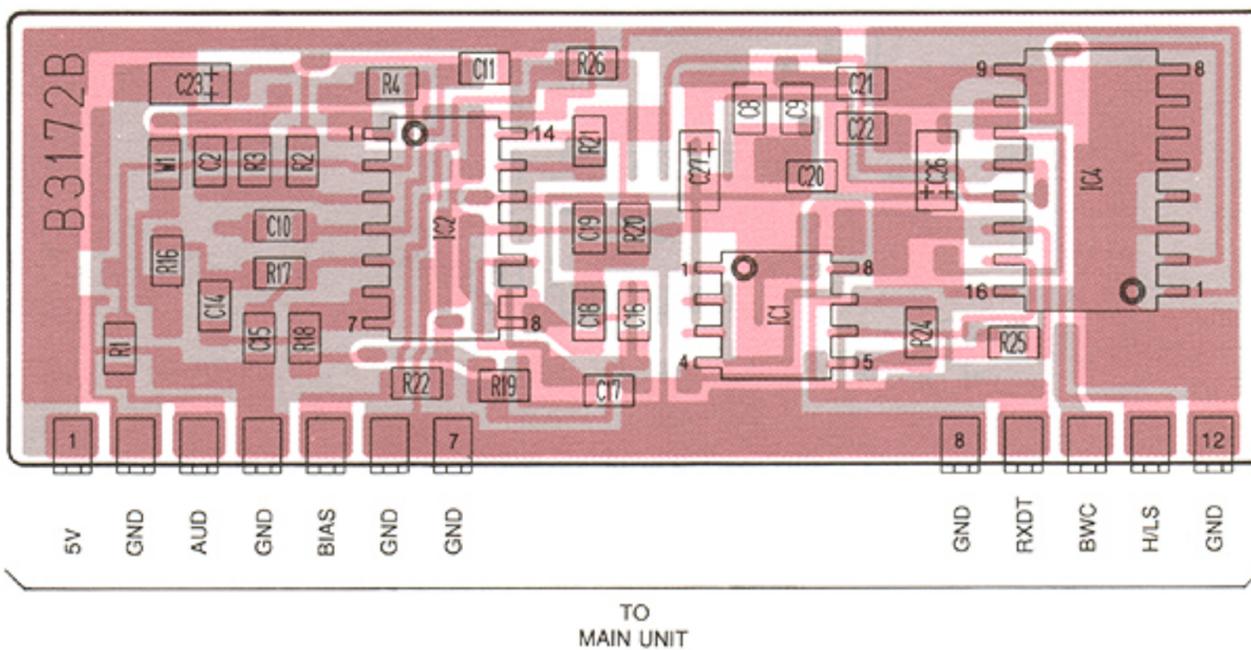
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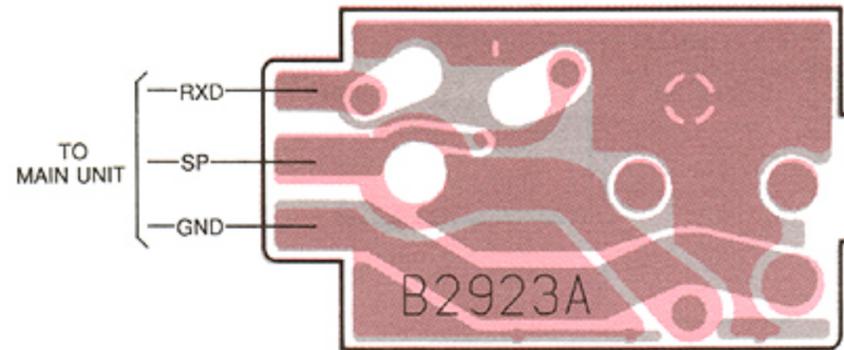
• TXFIL BOARD



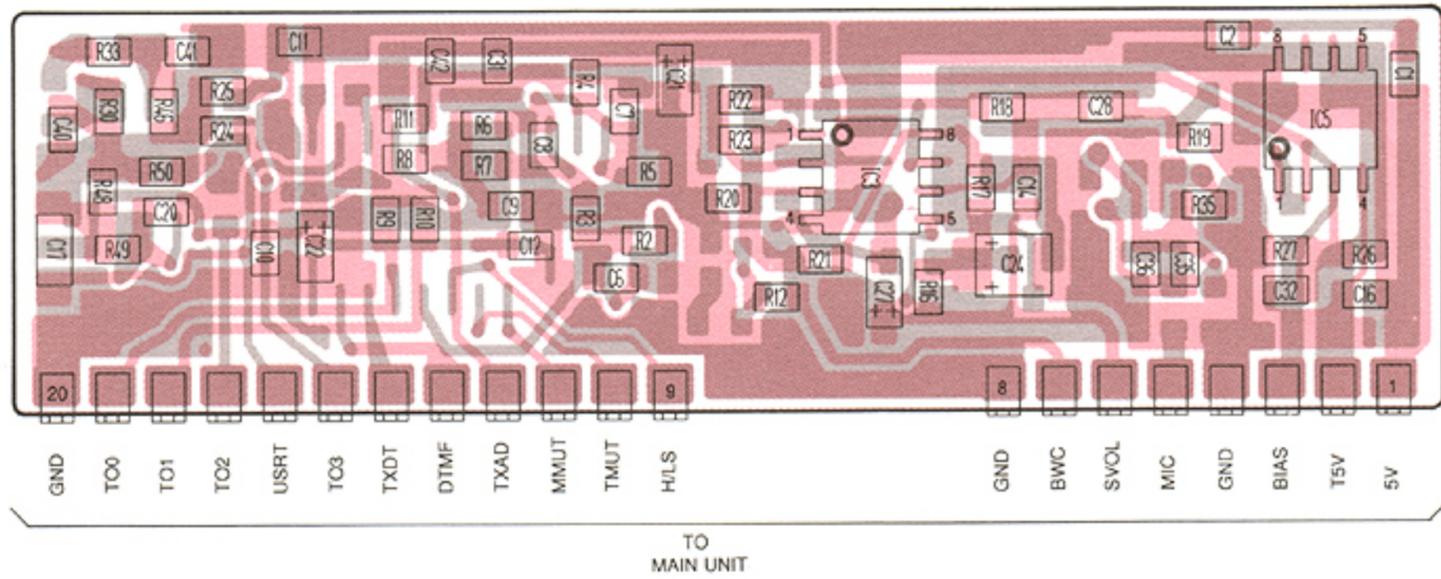
• RXFIL BOARD



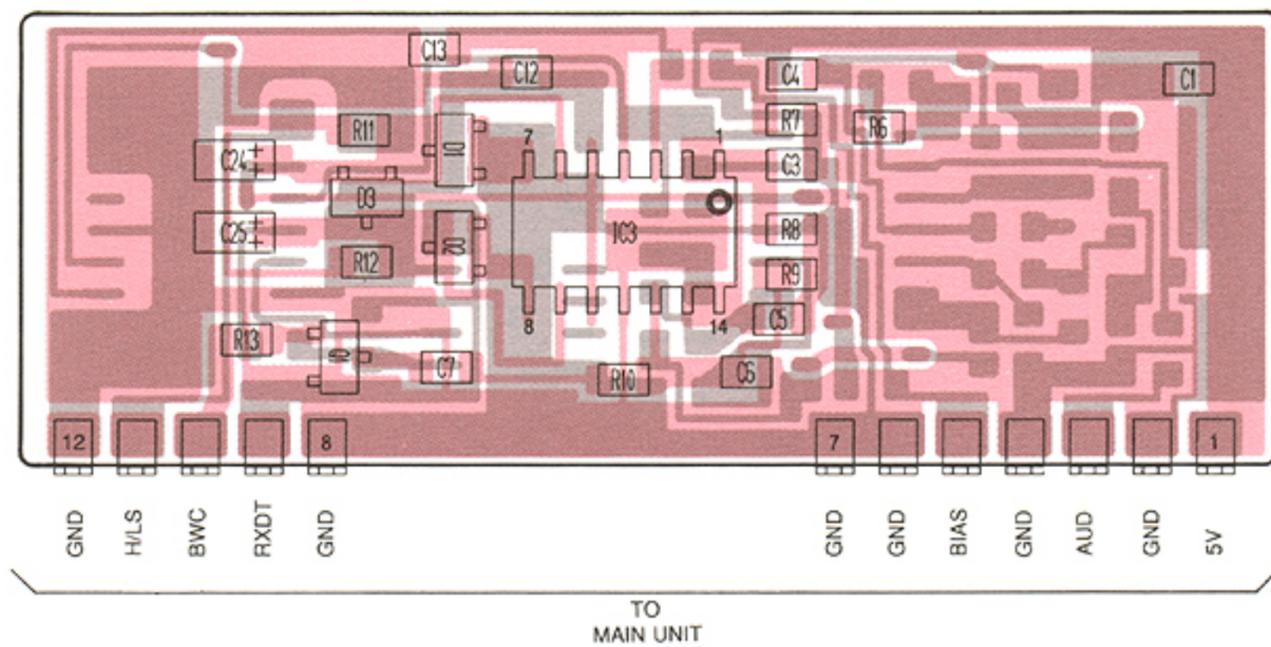
• JACK BOARD



• TXFIL BOARD

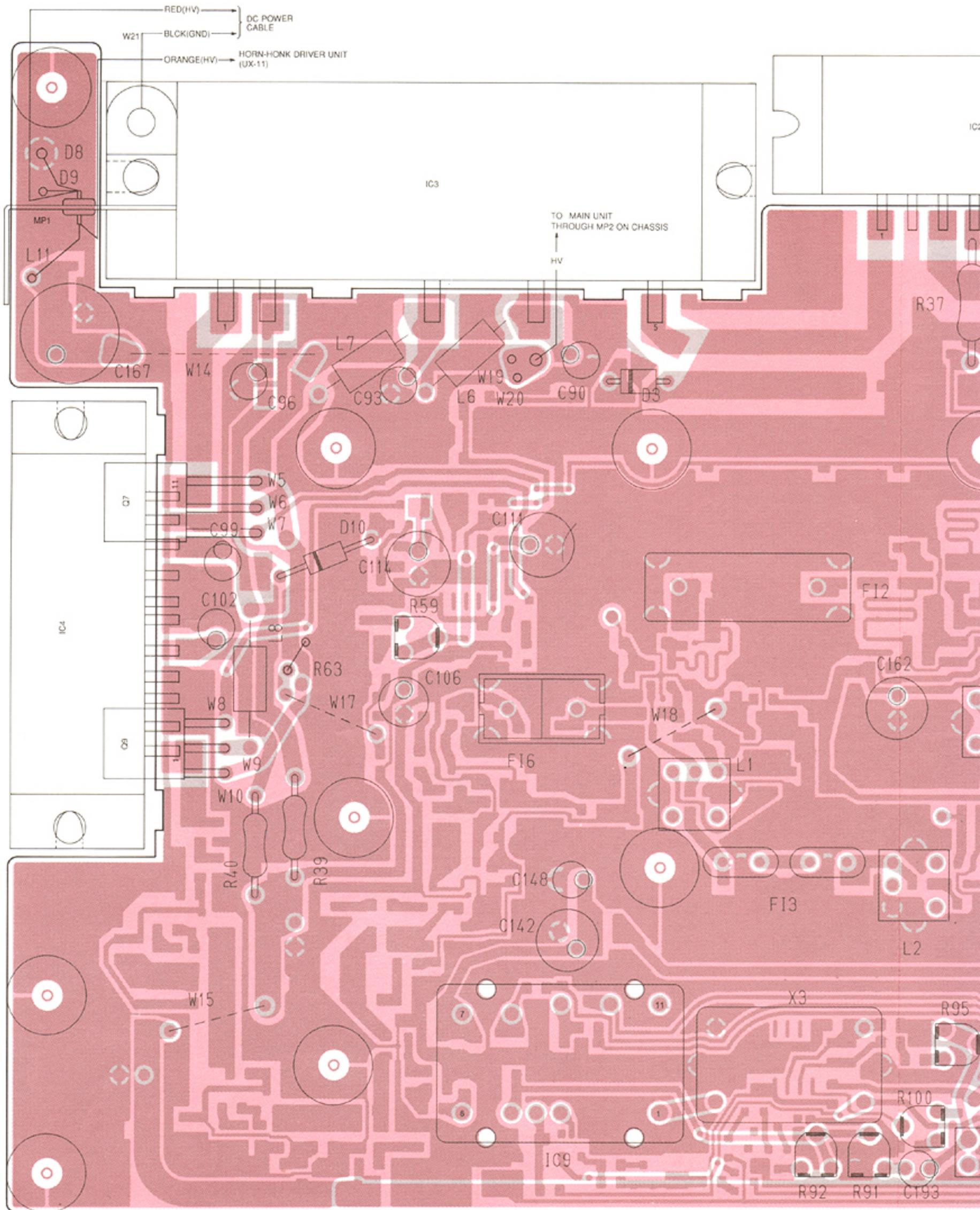


• RXFIL BOARD

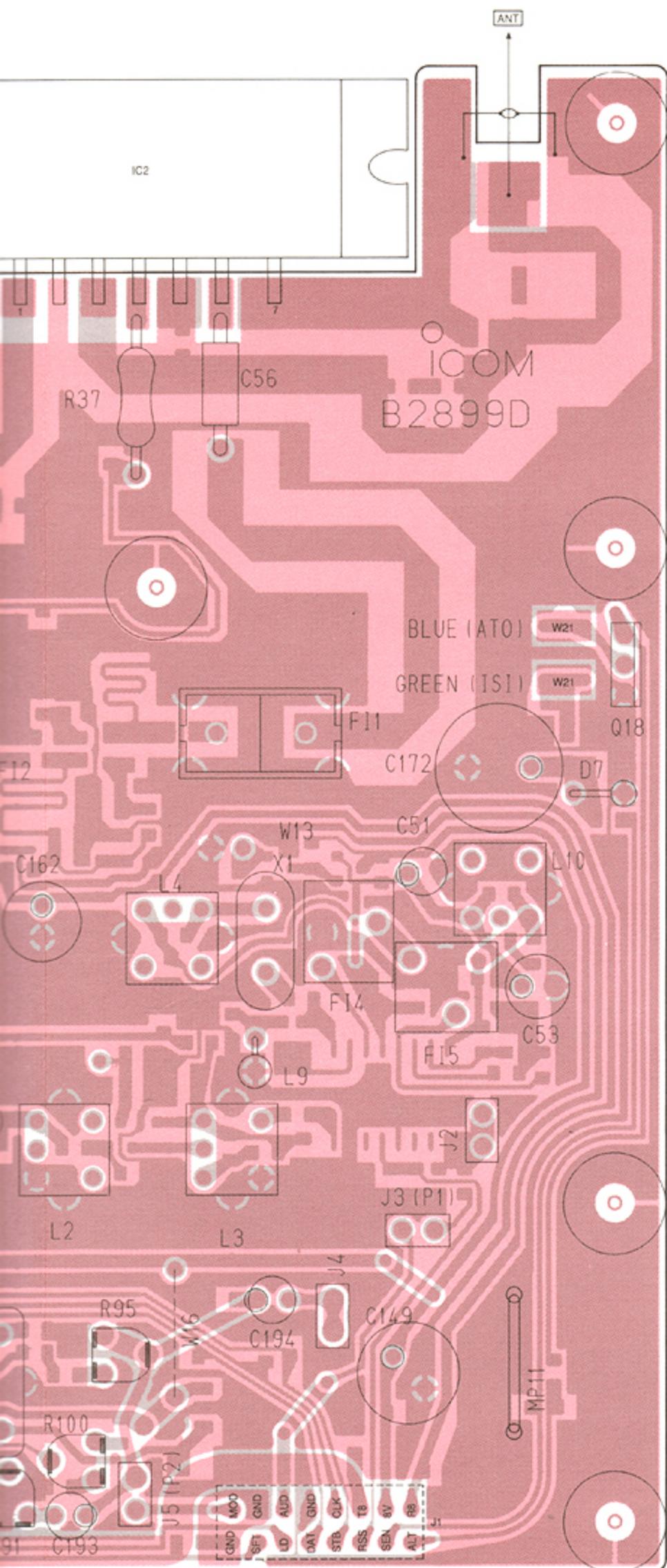


7-5 RF UNIT

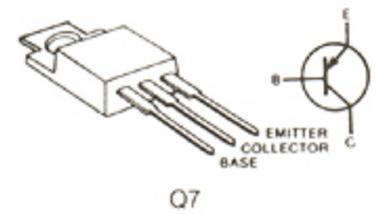
• RF UNIT



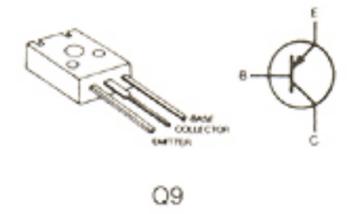
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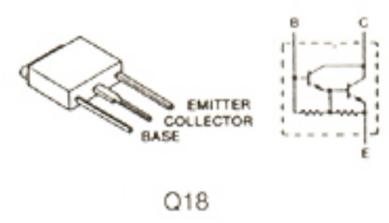
2SB1019 Y



2SB1143 S

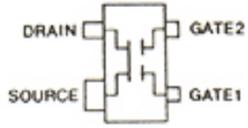


2SD1286



• RF UNIT

3SK206 T1 U79
(Symbol: U79)



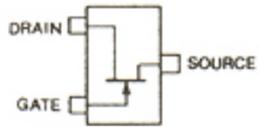
Q1

3SK206 T1 U78
(Symbol: U78)



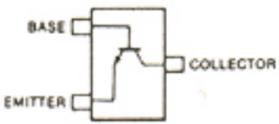
Q2

2SK302 GR
(Symbol: TG)



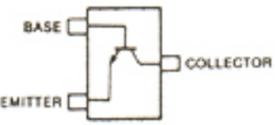
Q3

2SC3356 R25
(Symbol: R25)



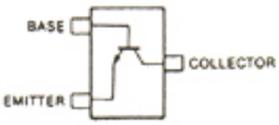
Q5, Q6, Q12, Q13

2SC2712 GR
(Symbol: LG)



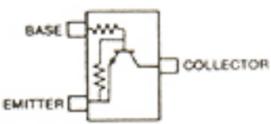
Q8, Q10, Q15

2SC2712 Y
(Symbol: LY)



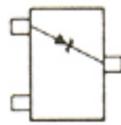
Q11

DTC144EK
(Symbol: 26)



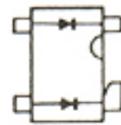
Q16, Q17

RD6.2M B2
(Symbol: 622)



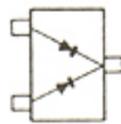
D4

MA862
(Symbol: M11)



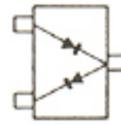
D5

DAN202K
(Symbol: N)

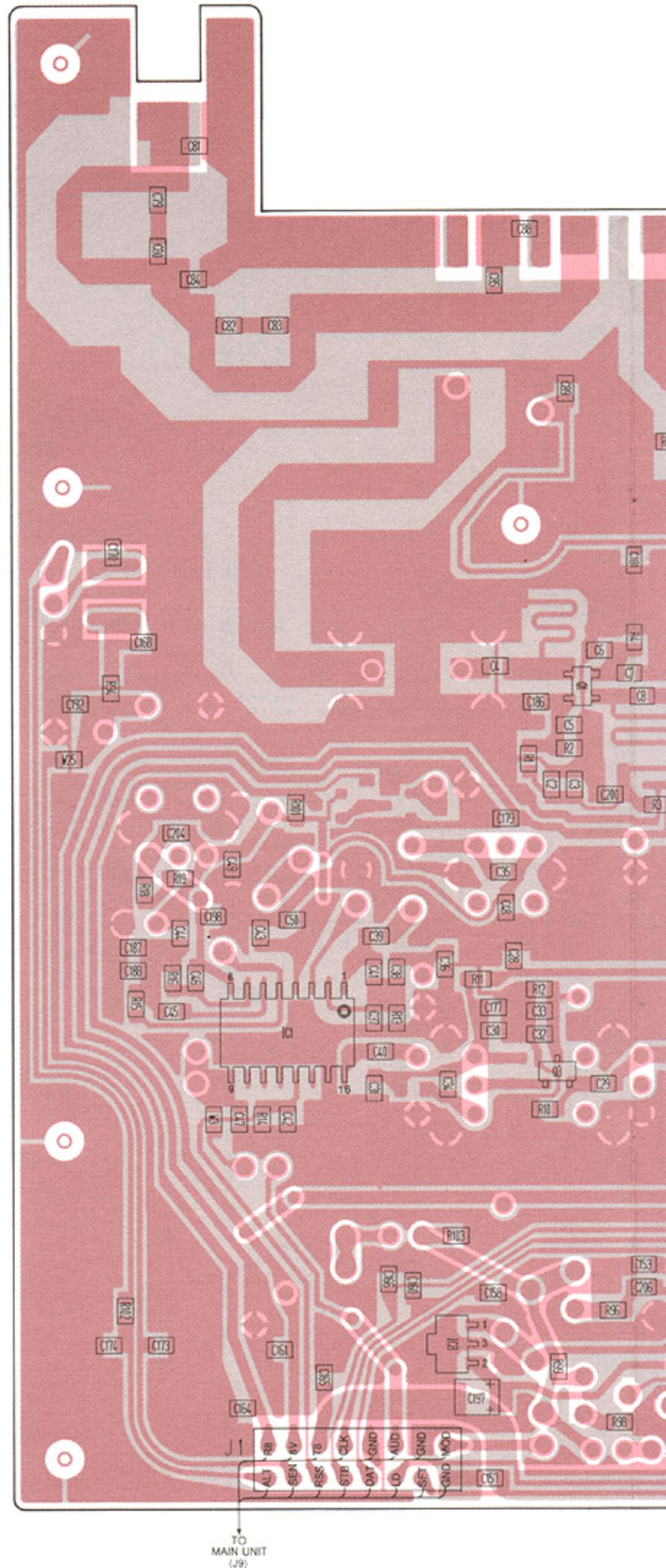


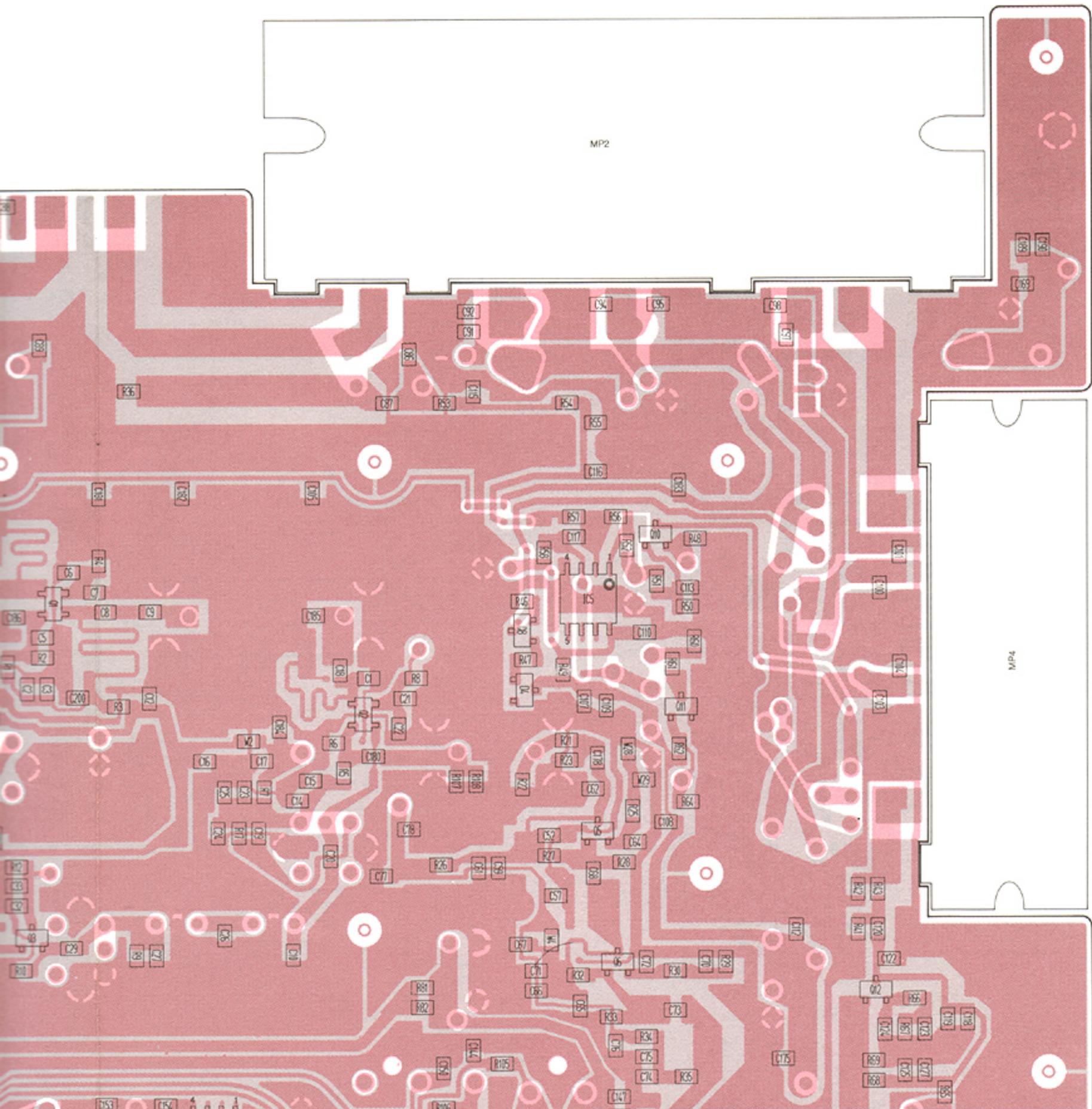
D6

1SS226
(Symbol: C3)

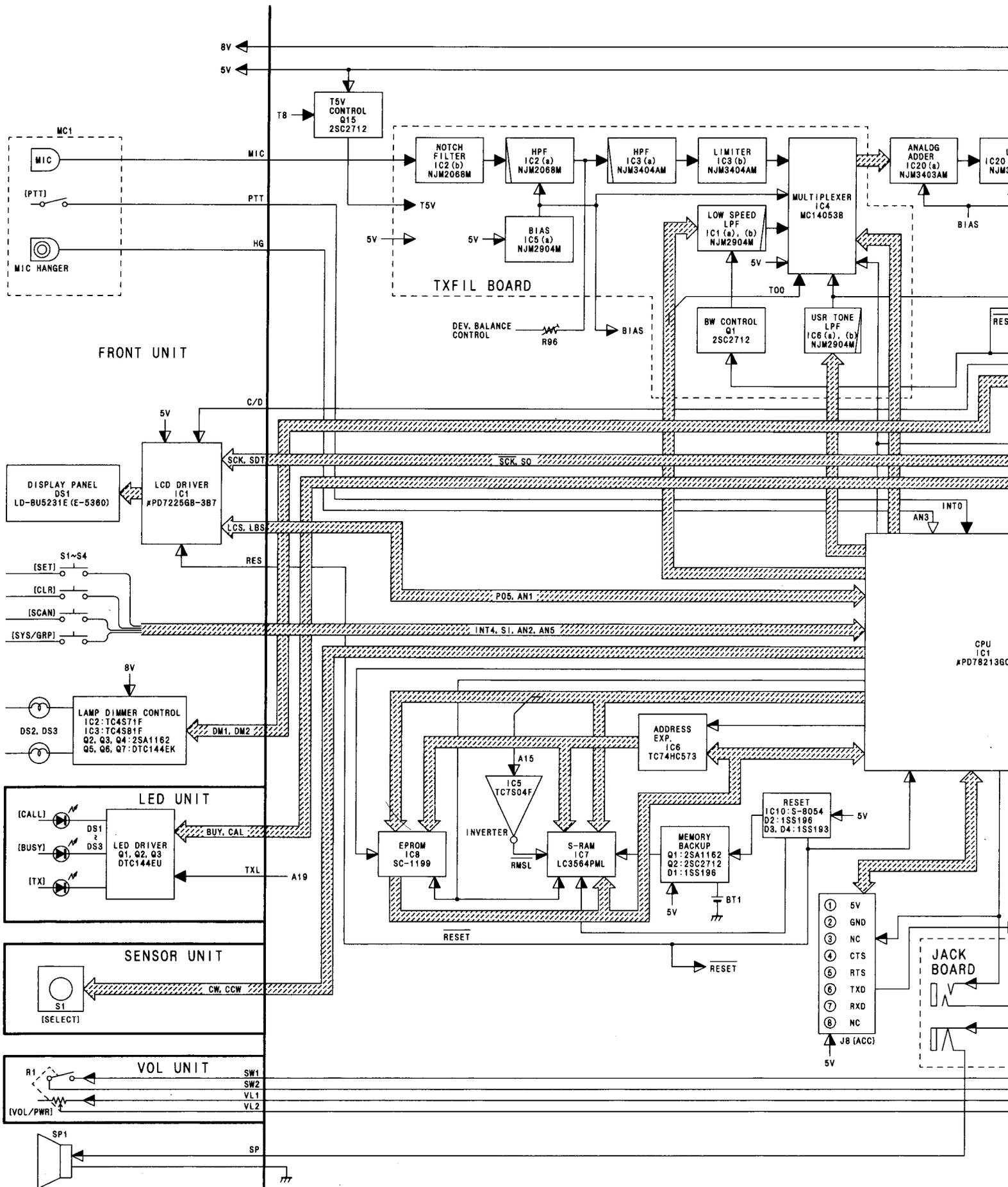


D11, D12, D13

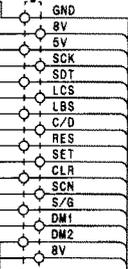
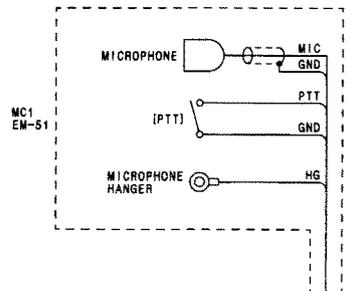
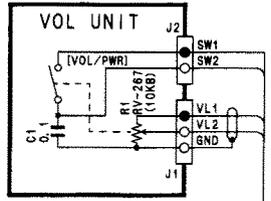
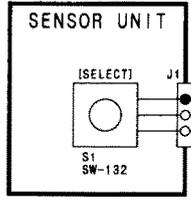
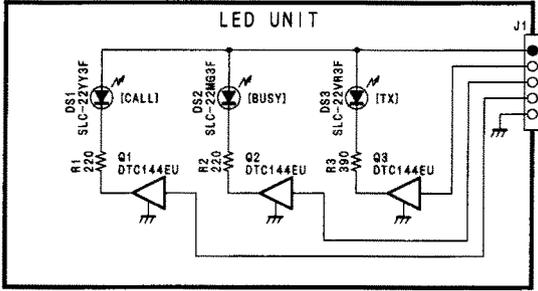
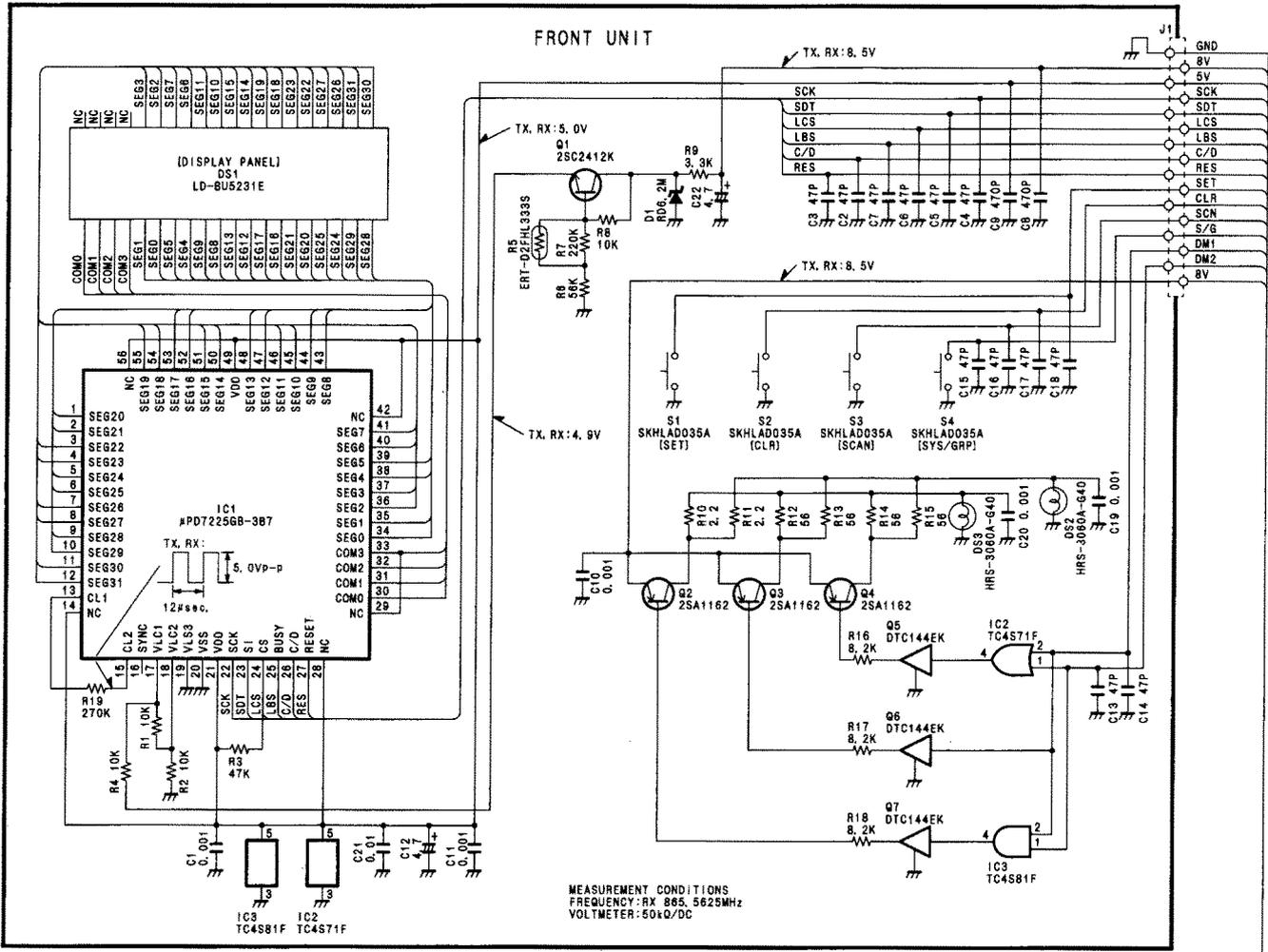


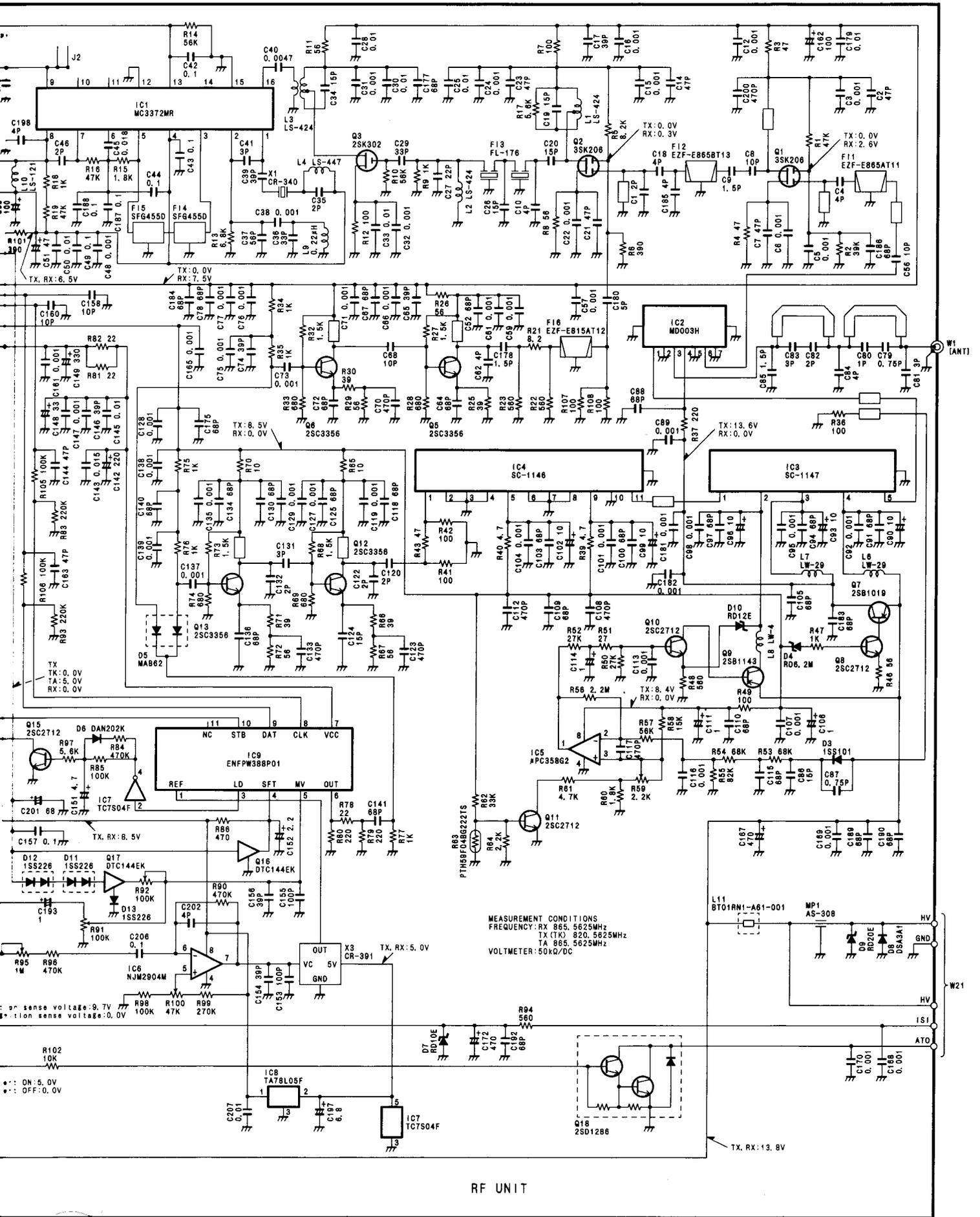


SECTION 8 BLOCK DIAGRAM



SECTION 9 VOLTAGE DIAGRAM





RF UNIT

MEASUREMENT CONDITIONS
 FREQUENCY: RX 865.5625MHz
 TX (TX) 820.5625MHz
 TX 865.5625MHz
 VOLTMETER: 50KΩ/DC

Icom Inc.

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

Icom America Inc.

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

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

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

1777 Phoenix Parkway, Suite 201, Atlanta, GA 30349, U.S.A.
Phone: (404) 991-6166
Fax : (404) 991-6327

Icom Canada

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

Icom (Europe) GmbH

Communication Equipment
Himmelgeister Str. 100, 4000 Düsseldorf 1, F.R.G.
Phone: 0211 346047
Fax : 0211 333639
Telex : 8588082 ICOM D

Icom (Australia) Pty. Ltd.

A.C.N 006 092 575
7 Duke Street, Windsor, Victoria, 3181, Australia
Phone: 03 529 7582
Fax : 03 529 8485
Telex : AA 35521 ICOM AS

Icom (UK) Ltd.

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

Icom France S.a

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

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Icom Inc.

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