ICOM

SERVICE MANUAL

800 MHz TRUNKED TRANSCEIVER

IC-U81T

Icom Inc.

INTRODUCTION

This service manual describes the latest service information for the **IC-U81T** 800 MHz TRUNKED TRANSCEIVER at the time of publication.

To upgrade quality, all electrical or 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〉

1150001130	IC	SC1140	IC-U81T	RF UNIT	5 pieces
8810006190	Screw	PH B0 M2 × 23 ZK	IC-U81T	Rear panel	10 pieces

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

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits 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	:	CM-98 BATTERY PACK
• Current drain (at 7.5 V DC)	:	Transmit 2.2 A (2.5 W High output power) 1.7 A (1.0 W Low output power) Receive squelched 120 mA Max. audio output 350 mA
• Dimensions (with CM-98)	:	60 (W) × 159 (H) × 44 (D) mm 2.4 (W) × 6.3 (H) × 1.7 (D) in (Projections not included)
• Weight (with CM-98)	:	540 g (1.2 lb)

■ TRANSMITTER

• Output power (at 7.5 V DC)	:	High: 2.5 W Low: 1.0 W
• Modulation system	:	Variable reactance frequency modulation
• Spurious emissions	:	Less than −60 dB
• Audio frequency response	:	+1 dB to −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	:	2 kΩ

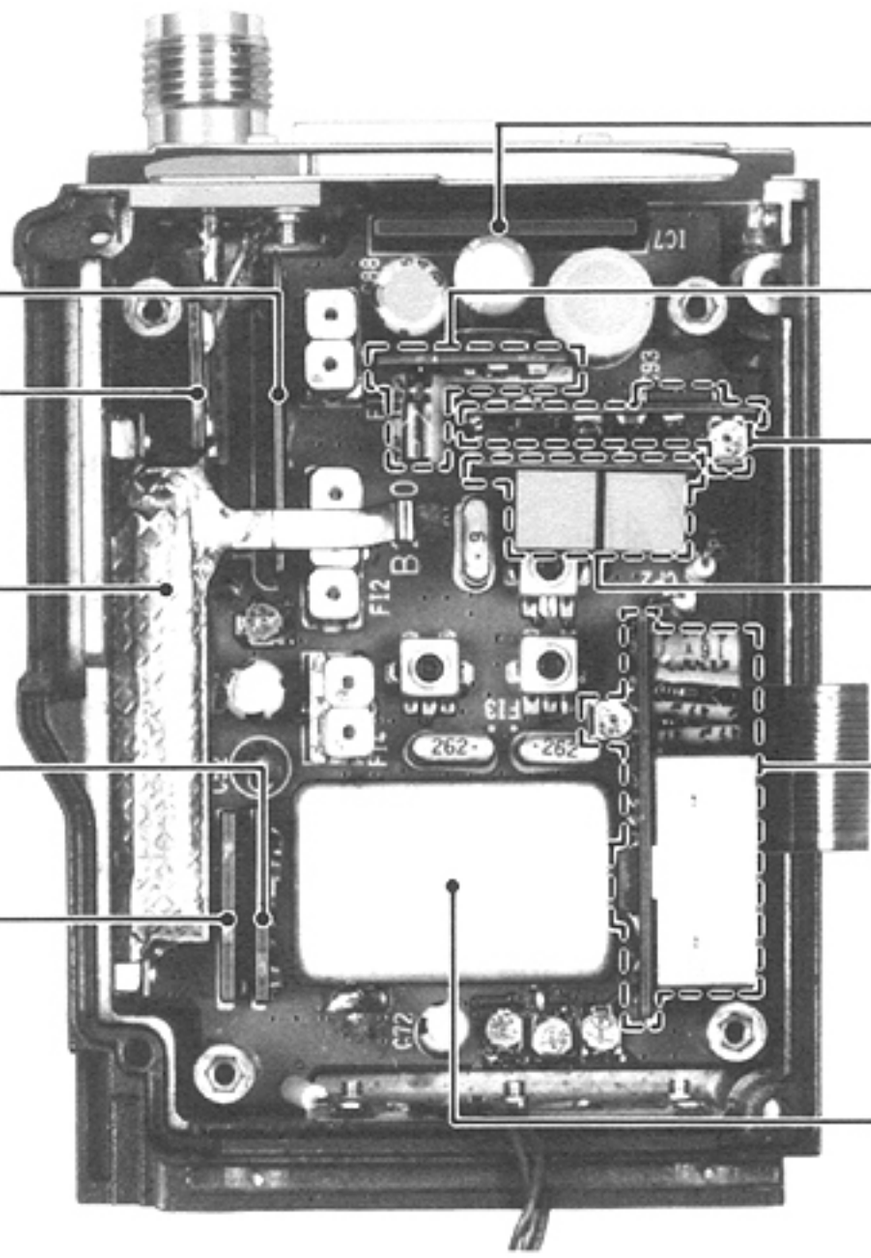
■ RECEIVER

• Sensitivity	:	0.32 µV for 12 dB SINAD
• Intermediate frequency	:	1st 45.175 MHz 2nd 455 kHz
• Squelch sensitivity (Threshold level)	:	0.32 µV
• Adjacent channel selectivity	:	−60 dB
• Intermodulation rejection	:	−60 dB
• Spurious response rejection	:	−65 dB (−60 dB at 1/2 IF)
• Blocking and desensitization	:	90 dBµ e.m.f.
• Noise and hum	:	40 dB
• Audio frequency response	:	+1 dB to −3 dB of +6 dB/octave with 300 Hz to 3000 Hz deviation
• Audio output power	:	More than 500 mW
• Audio output impedance	:	8 Ω

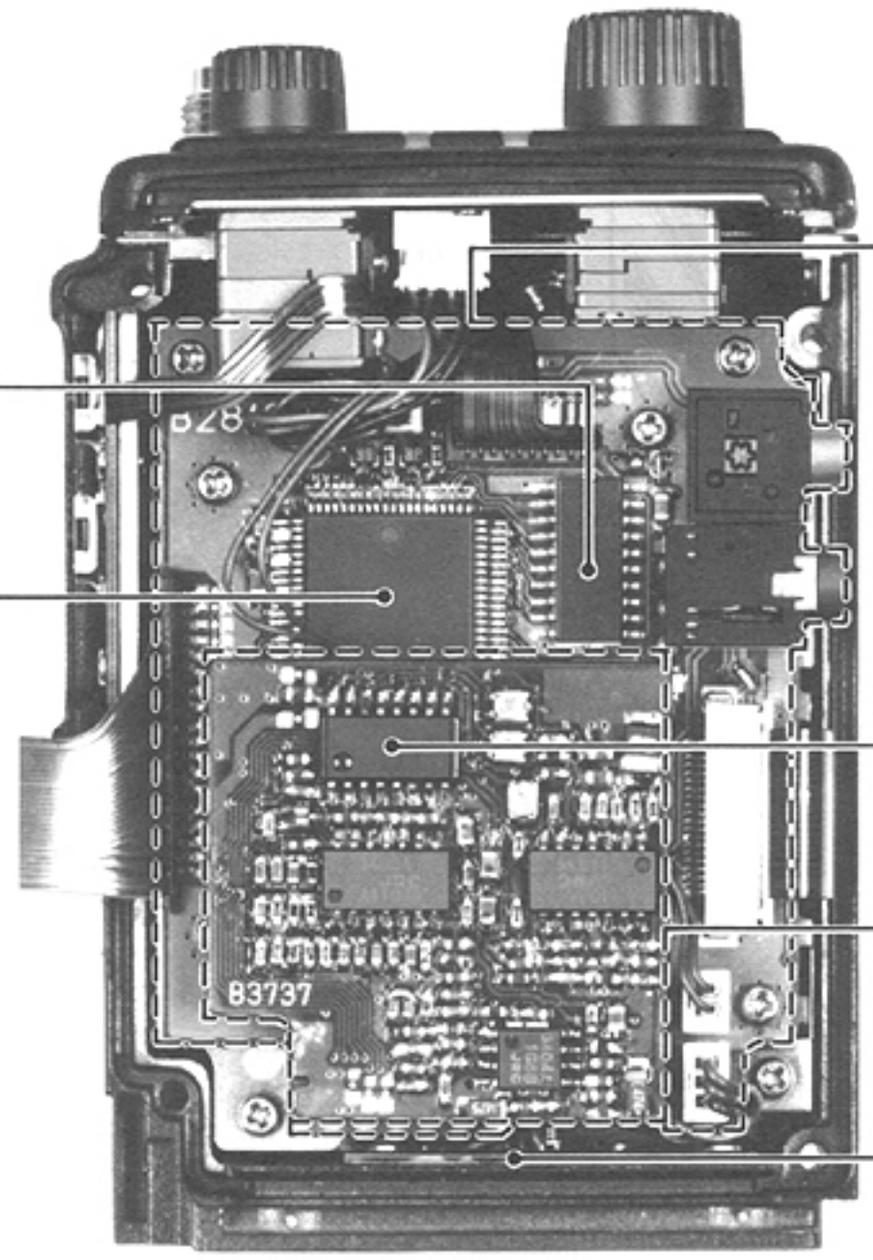
All stated specifications are approximate and subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

• RF UNIT

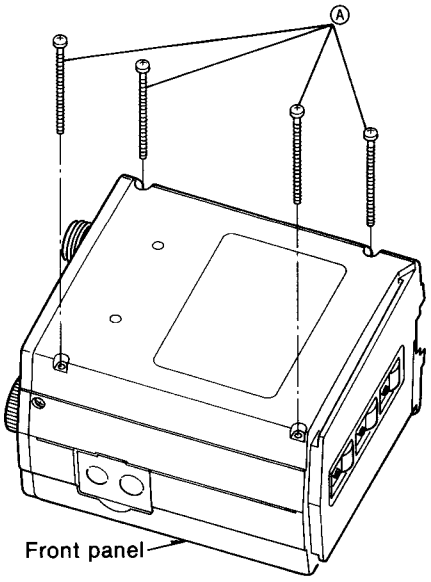


• LOGIC, DFIL AND PRT UNITS



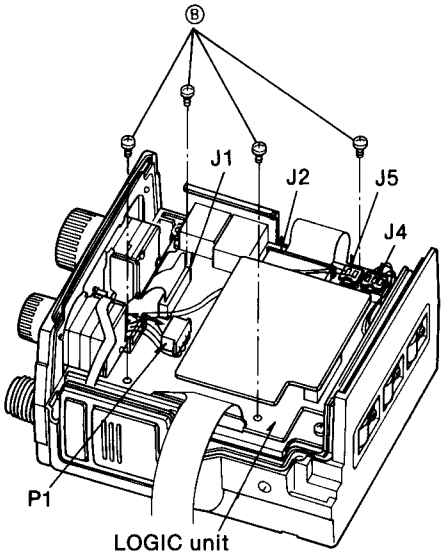
SECTION 3 DISASSEMBLY INSTRUCTIONS

Fig. 1



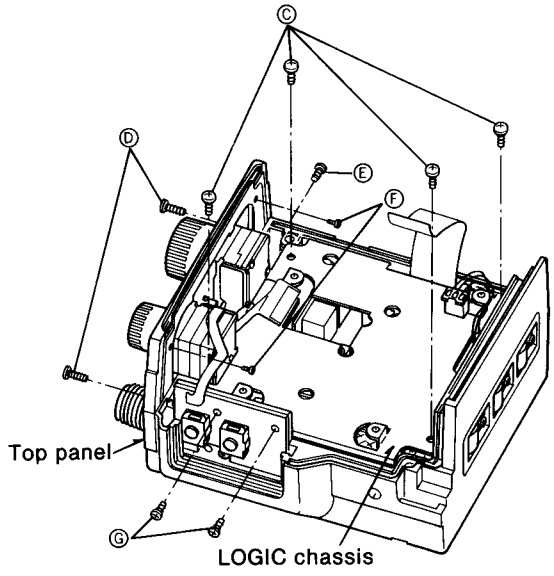
① Remove 4 screws, Ⓐ (black, 23 mm), to open the front panel.

Fig. 2



② Remove 4 screws, Ⓑ (3 mm), then unplug J1, J2, J4, J5 and P1 to remove the LOGIC unit.

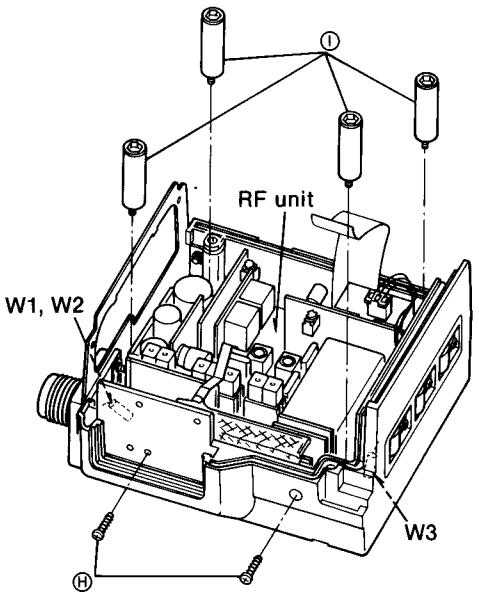
Fig. 3



③ Remove 4 screws, Ⓒ (4 mm), to remove the LOGIC chassis.

④ Remove 2 screws, Ⓓ (black 6 mm), 1 screw, Ⓔ (black 3 mm), 2 screws, Ⓕ (2.5 mm), and 2 screws, Ⓖ (silver 3 mm), to remove the top panel.

Fig. 4



⑤ Remove 2 screws, Ⓗ (black 6 mm), and 4 stand-offs, Ⓘ.

⑥ Unsolder jumpers W1, W2 and W3 to remove the RF unit.

SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 RF CIRCUIT (LPF BOARD AND 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, C1~C5) on the LPF board and are then applied to an RF switching IC (IC1, pin 5) on the RF unit. While receiving, pin 4 of IC1 becomes "LOW" and the signals are applied to a bandpass filter (FI1) to suppress out-of-band signals. The filtered signals are applied to RF amplifiers (Q1, Q2).

The RF amplifiers (Q1, Q2) amplify the RF signals with low noise/high gain transistors (2SC4095). The amplified signals pass through a bandpass filter (FI2) to suppress unwanted signals and are then applied to a 1st mixer circuit.

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

The 1st mixer circuit (Q3) 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 Q3 with a 1st LO signal coming from the PLL/VCO IC (IC4) to produce a 1st IF signal.

The 1st LO signal from the PLL/VCO IC (IC4, pin 6) passes through the attenuator (R42~R44) and is then buffer-amplified at Q10. The amplified signal passes through the transmit/receive switching circuit (D3) and is then applied to the 1st mixer circuit (Q3) through a bandpass filter (FI4).

The 45.175 MHz 1st IF signal is obtained at L2 and is then applied to a pair of crystal filters (FI3) in order to obtain wide selection capability and to pass only the desired signals. The filtered signal passes through a 1st IF amplifier (Q4). The amplified signal is applied to a 2nd IF circuit.

4-1-3 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 Q4 is applied to a 2nd mixer section of IC2 (pin 16) and is then mixed with a 2nd LO signal for conversion to a 455 kHz 2nd IF signal.

IC2 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 (IC2, pin 3) passes through high-quality ceramic filters (IFFIL board FI1, FI2) to suppress unwanted heterodyned frequency signals. It is then amplified at the limiter amplifier section (IC2, pin 5) and applied to the quadrature detector section (IC2, pin 7). A portion of signal output from IC2 (pin 7) is detected at the ceramic discriminator (IFFIL board X1) and is then applied to the quadrature detector section (IC2, pin 8) to demodulate the 2nd IF signal into AF signals.

The AF signals are output from IC2 (pin 9) and are then applied to the AF filter circuit on the SQL board and the low-speed/high-speed data switching circuit on the DFIL unit via the LOGIC unit.

• 2ND IF AND DEMODULATOR CIRCUITS

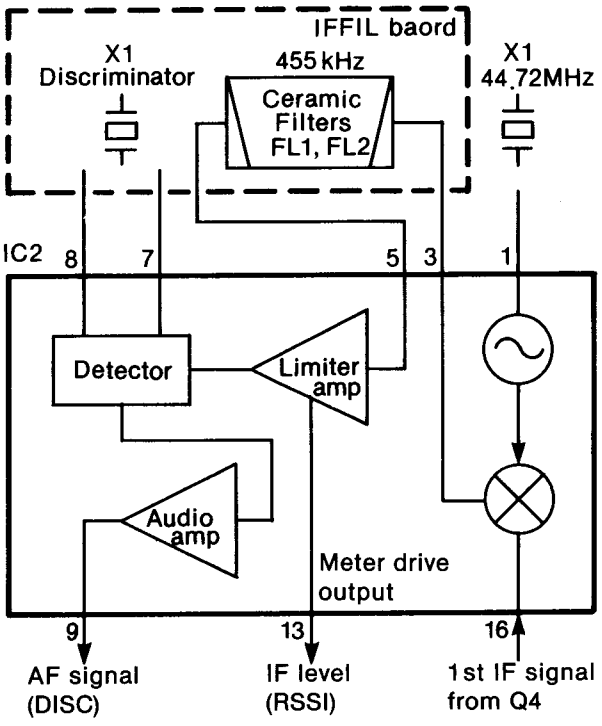


Fig. 1

4-1-4 AF FILTER CIRCUIT (SQL AND AFFIL BOARDS)

The AF filter circuit de-emphasizes the AF signals with −6 dB/octave and filters out-of-band signals.

The AF signals (DISC) from the RF unit are applied to the de-emphasis circuit (R15, C9) on the SQL board. This de-emphasis circuit is an integrated circuit with frequency characteristics of −6 dB/octave. The resulting signals pass through a low-pass filter (Q2, R12, R13, C5, C6) and are then applied to a high-pass filter (IC2a, R16~R18, C10~C12). The filtered signals are amplified at an AF amplifier (IC2b) and are then applied to the AFFIL board.

The AFFIL board contains the notch filter (IC1a, R4~R9, C6~C9) and the high-pass filter (IC1b, R10~R12, C11 ~C13) to suppress low-speed data components in the AF signals. The filtered signals are then applied to the AF mute circuit on the LOGIC unit.

4-1-5 AF AMPLIFIER CIRCUIT (LOGIC AND RF UNITS)

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

The AF mute circuit (Q3, Q12, IC10 on the LOGIC unit) controls a speaker using an "RMUTE" signal from the CPU (IC1, pin 19) and a "CDET" signal from Q1 on the SQL board. The "RMUTE" signal from the CPU (IC1, pin 19) becomes "HIGH" when either low-speed or high-speed data matches the programmed message in the CPU (IC1). The "CDET" signal from Q1 on the SQL board becomes "HIGH" when a squelch opens. Therefore, a NAND gate IC (IC10) becomes "LOW" to unmute the AF mute switch (Q3).

The signals are then applied to the AF power amplifier (IC7: on the RF unit) through the [PWR/VOL] control (R1) on the VR unit. The AF power amplifier (IC7) amplifies the AF signals to drive the speaker.

4-1-6 SQUELCH CIRCUIT (SQL BOARD)

By detecting IF signal level, the squelch circuit cuts out AF signals when no RF signal is received.

The IF level signal (RSSI), output from IC2 (pin 13) on the RF unit, passes through the squelch level setting volume control (R1) and is then amplified at IC1a. The amplified signal is applied to the comparator (IC1b, pin 6). The comparator outputs "HIGH" or "LOW" when the IF level is lower or higher than the reference voltage (IC1b, pin 5) respectively. The comparator output is inverted by Q1. Thus, the SQL board outputs "HIGH" or "LOW" via the CDET terminal to open or close the squelch respectively. The signal is applied to the CPU (IC1, pin 71) and a NAND gate IC (IC10) on the LOGIC unit.

When pin 71 of the CPU (IC1) receives the "LOW" signal, pin 19 of the CPU (IC1) supplies a speaker mute signal to the AF mute circuit (Q3, Q12, IC10) according to the received signals.

4-1-7 LOW-SPEED/HIGH-SPEED DATA SWITCHING CIRCUIT (DFIL UNIT)

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

The AF signals (DISC) from the RF unit are buffer-amplified at IC6a 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 (IC6a) isolates the RF unit and DFIL unit.

• AF FILTER AND AF AMPLIFIER CIRCUITS

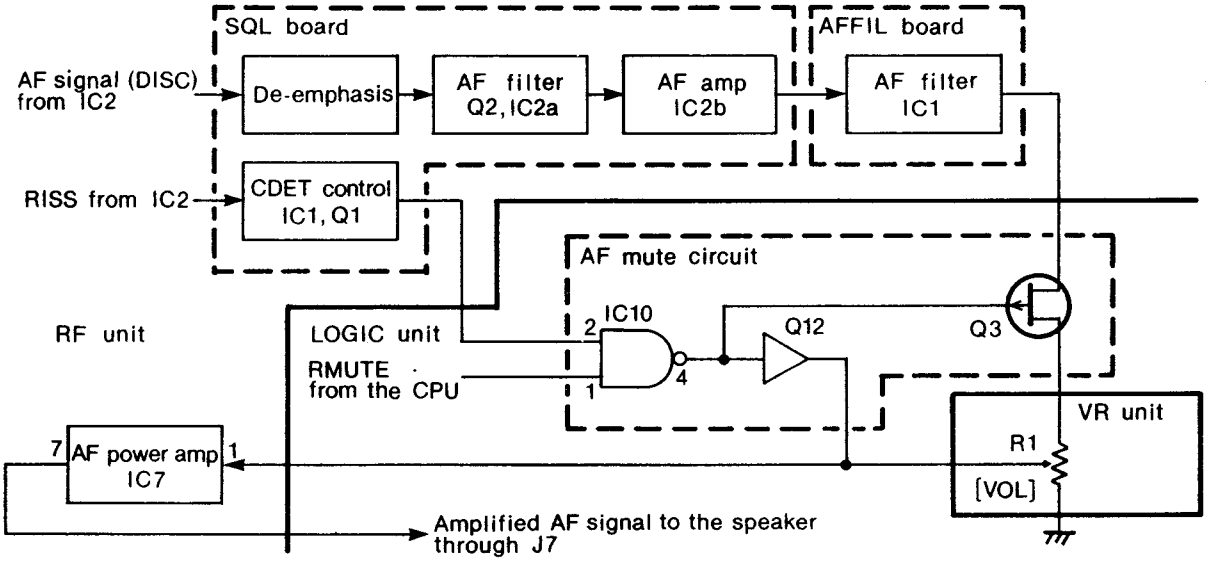


Fig. 2

An LTR low-speed data signal, obtained at the low-pass filters (IC4a and IC4b), is applied to the rectifier circuit (IC5a, IC5b, D1~D3), for conversion to DC voltage, and to the multiplexer (IC7, pin 12). The low-pass filter (IC4a and IC4b) is controlled by a band-width control signal (BWC) from the CPU (LOGIC unit IC1, pin 47) via Q2.

When the LTR low-speed data signal is detected, the rectified voltage passes through the multiplexer (IC7, pins 2, 15) and is then applied to a comparator (IC8, pin 2) as a reference voltage.

A high-speed data signal, obtained at the low-pass filter (IC6b and IC6c) and the high-pass filter (IC6d), is then applied to the multiplexer (IC7, pin 13).

The multiplexer (IC7) selects the low-speed data or the high-speed data signal using the "HS/LS" signal from the CPU (LOGIC unit IC1, pin 27).

The data signal is output from pin 14 of IC7 and is then applied to the comparator (IC8, pin 3). At the same time, the reference voltage is output from pin 15 of IC7 and is then applied to the comparator (IC8, pin 2). The comparator (IC8) sharpens the waveform and converts the signals for a logic circuit. The output signal from pin 1 of IC8 is applied to the CPU (IC1, pin 75) as an "RDATA" signal.

• MULTIPLEXER (IC7)

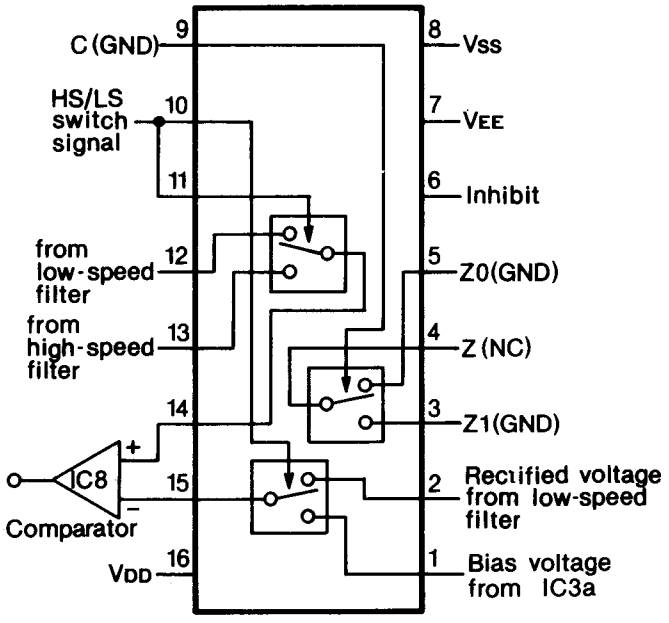


Fig. 3

4-2 TRANSMITTER CIRCUITS

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

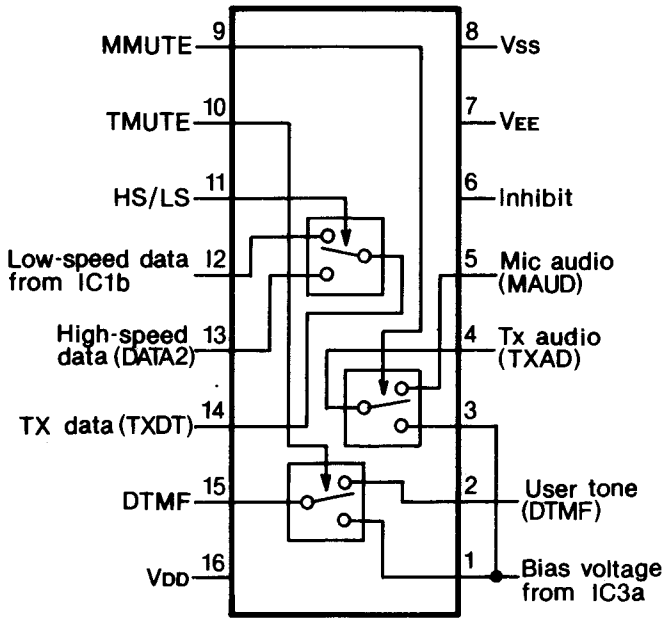
The microphone amplifier circuit amplifies audio signals from the microphone to a level needed for the modulation circuit.

The AF signals from the built-in condenser microphone or from the [SP/MIC] connector pass through a pre-amplifier (IC10), a high-pass filter (IC9a) and are then amplified at a limiter amplifier (IC9b). The output signals from IC9b (pin 7) are applied to the analog adder (IC3b) via the multiplexer (IC2, pins 5, 4).

The multiplexer (IC2) outputs 3 signals (Tx audio, DTMF, Tx data) using controlling signals (MMUTE, TMUTE, HS/LS) from the CPU.

IC3a produces a bias voltage for the splatter/limiter amplifier (IC3c, IC3d).

• MULTIPLEXER (IC2)



CONTROL SIGNAL			OUTPUT		
MMUTE	TMUTE	HS/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

4-2-2 LOW-SPEED, HIGH-SPEED DATA AND USER TONE (DFIL UNIT)

Ports DATA1, DATA2, TONE1 and TONE2 of the CPU (LOGIC unit IC1, pins 3~6) output low-speed, high-speed and user tone signals.

When the operating channel is programmed with LTR low-speed data, ports DATA1 and DATA2 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 (IC3b) via the multiplexer (IC2, pins 12, 14).

When the operating channel is programmed with high-speed data, port DATA2 outputs the high-speed data. The data signal passes through the multiplexer (IC2, pins 13, 14) and is then applied to the analog adder (IC3b).

When the CPU outputs DTMF signals as a user tone, ports TONE1 and TONE2 are used. The signals pass through the multiplexer (IC2, pins 2, 15) and are then applied to the analog adder (IC3b).

4-2-3 MODULATION CIRCUIT (RF UNIT AND TCXO BOARD)

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 (DFIL unit IC3b) adds the 3 signals (TXAD, DTMF, TXDT) from the multiplexer (DFIL unit IC2) and outputs an "MOD" signal from pin 1. The "MOD" signal passes through a splatter filter (DFIL unit IC3c and IC3d), which eliminates signal components greater than 3 kHz, and is then applied to the VCO section of the PLL/VCO IC (IC4, pin 5) on the RF unit and an inverter (IC2, pin 6) on the TCXO board. The inverted signal at IC2 is applied to the VC-TCXO (X1).

A talk-around control (RF unit Q18) attenuates the "MOD" signal to prevent deep modulation on the low transmit frequency by a shift signal (T/A) from the CPU (LOGIC unit IC1, pin 52).

The oscillated signal at the VCO section of IC4, amplified at a buffer amplifier section inside IC4, is then output from pin 6. The signal passes through the attenuator (R42~R44) and is then buffer-amplified at Q10. The resulting signal passes through the transmit/receive switching circuit (D3) and is then applied to the drive amplifier circuit.

4-2-4 DRIVE AMPLIFIER CIRCUIT (YGRA AND YGRB BOARDS)

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

The signal from the the transmit/receive switching circuit (RF unit D3) is buffer-amplified at (Q1) on the YGRA board and is then re-amplified at the pre-drive amplifier (Q2). The amplified signal is amplified at a drive amplifier (Q1) on the YGRB board to obtain 100 mW of RF power.

4-2-5 POWER AMPLIFIER CIRCUIT (RF UNIT)

IC3 is a power module which provides a stable 3 W of output power.

The RF signal from the drive amplifier (Q1 YGRB board) 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 RF switching IC (IC1), the APC circuit and the low-pass filter circuit.

4-2-6 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 5 V of regulated voltage. Thus stable RF output power is obtained even when the supplied voltage is changed.

The output power from the power module (IC3, pin 5) is applied to the RF switching IC (IC1) and is then detected at the APC detector (D2). The detected voltage is applied to a differential amplifier circuit (Q5b). The APC reference voltage is adjusted at R27 and is then applied to the base of Q5.

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 (Q5) is a constant voltage, so that the output voltage from Q5 increases. The output voltage is integrated by R30 and C43 and is then applied to the current controller (Q6, Q7). The current controller increases the supplied current to obtain the fixed RF power.

- **APC CIRCUIT**

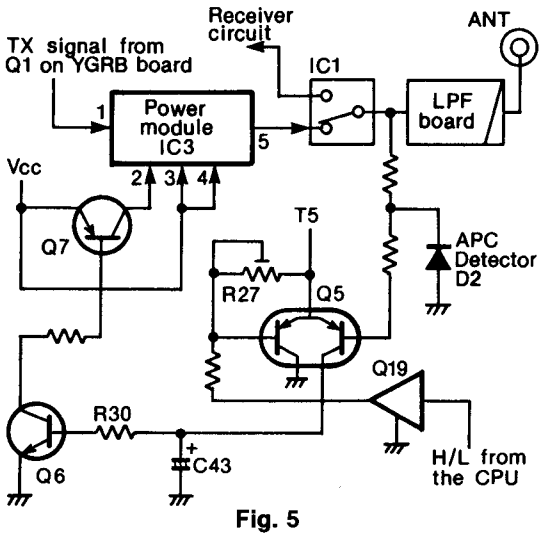


Fig. 5

4-3 PLL CIRCUITS

4-3-1 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.

4-3-2 PLL AND VCO CIRCUITS (RF UNIT)

The PLL/VCO IC (IC4), 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 (LOGIC unit IC1) and compares the phase of the VCO signal with the reference oscillator frequency. A reference frequency is oscillated at X1 on the TCXO board.

The VCO section of IC4 selects a trunking band or a talk-around band by a "T/A" signal from the CPU (LOGIC unit IC1, pin 52). The "T/A" signal is applied to a switching transistor (Q18) to control pin 4 of IC4. When pin 4 of IC4 becomes "HIGH" or "LOW," the trunking band or the talk-around band is selected respectively.

4-3-3 REFERENCE OSCILLATOR CIRCUIT (TCXO BOARD)

A reference frequency (12.8 MHz) is produced by X1. The frequency is applied to the PLL/VCO IC (IC4, pin 1) on the RF unit. X1 adopts VC-TCXO to ensure stable operation over a wide temperature range.

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

When the PLL circuit is unlocked, a "LOCK" signal is output from pin 3 of IC4. The "LOCK" signal is smoothed at D6, R59, R60 and C79 and is then applied to the CPU (IC1, pin 61) on the LOGIC unit through an unlock switch (Q17).

• PLL AND VCO CIRCUIT

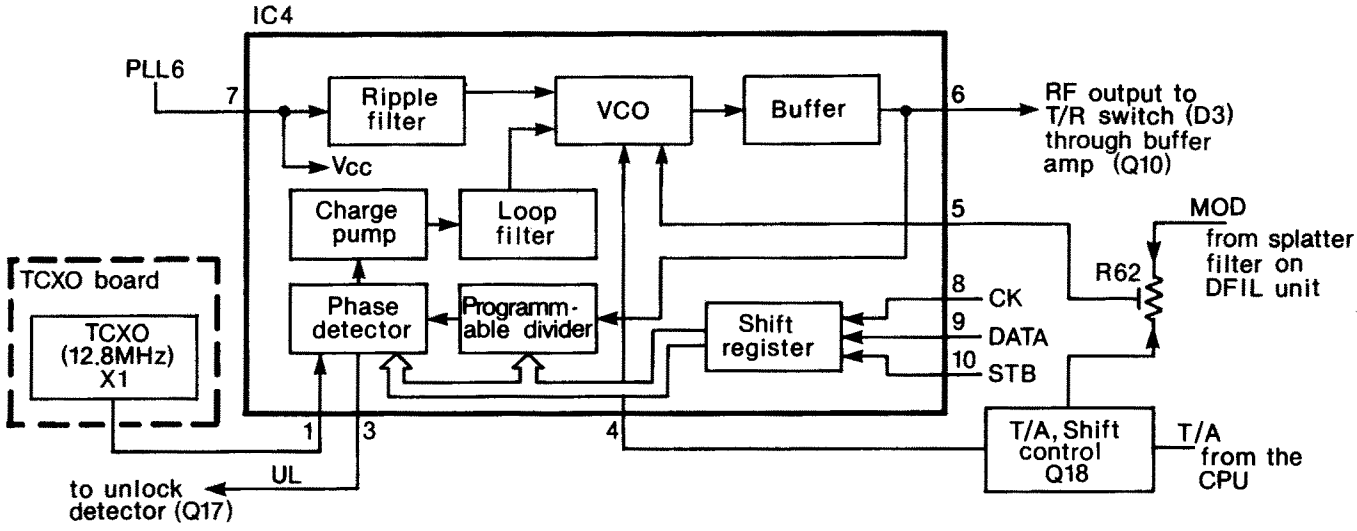


Fig. 6

4-4 POWER SUPPLY CIRCUITS

4-4-1 VOLTAGE LINES (RF UNIT)

LINE	DESCRIPTION
HV	The attached battery pack voltage (CM-98: 7.2 V). This voltage is applied to the [VOL/PWR] control knob (R1) on the VR unit.
VCC	The attached battery pack voltage (CM-98: 7.2 V) passed through the [VOL/PWR] control knob (R1) on the VR unit.
+5C	Common 5 V converted from the VCC line at the 5 V regulator circuit (IC1) on the TCXO board.
+5	Continuous 5 V converted from the VCC line at Q4, Q5 and D4 on the LOGIC unit using IC1 output (+5C line) as the reference voltage.
R+5	Receive 5 V controlled by a "T/A" signal from the CPU (IC1, pin 24) on the LOGIC unit. This voltage is converted from the VCC line at IC6, Q13, Q14 and D5 using IC1 output (+5C line) as the reference voltage.
T5	Transmit 5 V controlled by a "T/A" signal from the CPU (IC1, pin 24) on the LOGIC unit. This voltage is converted from the VCC line at IC5, Q11, Q12 and D4 using IC1 output (+5C line) as the reference voltage.
PLL6V	PLL6V converted from the VCC line at Q15 and Q16 using IC1 output (+5C line) as the reference voltage.

4-4-2 RESET AND MEMORY BACKUP CIRCUITS (LOGIC UNIT)

This circuit resets the CPU (IC1) with a reset IC (IC4). The reset IC (IC4) detects the increase and decrease of the 5 V line to control the RST port of the CPU (IC1, pin 7) when the [PWR/VOL] control knob is turned ON and OFF.

When the [PWR/VOL] control knob is turned ON, the RST port of the CPU (IC1, pin 7) becomes "HIGH." The CPU (IC1) starts operation.

When the [PWR/VOL] control knob is turned OFF, the RST port of the CPU (IC1, pin 7) 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 (IC2, pin 28) via R4 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).

4-5 LOGIC CIRCUITS

4-5-1 GENERAL

The LOGIC circuit consists of an 8-bit CMOS CPU (IC1), an address expander (IC3), an EEPROM (IC5), a 64 k-bit SRAM (IC2). IC1 oscillates the 11.0592 MHz system clock signal with X1.

4-5-2 PORT ALLOCATIONS (LOGIC UNIT)

• IC1 (CPU)

PORT NAME	PIN NUMBER	DESCRIPTION
SCK	1	Outputs clock signal. Applied to the LCD driver on the DISPLAY unit and to the EEPROM (IC5).
DATA	2	Outputs serial data. Applied to the LCD driver on the DISPLAY unit and to the EEPROM (IC5).
DATA2	3	Outputs a portion of the low-speed data or high-speed data.
DATA1	4	Outputs a portion of the low-speed data.
TONE2	5	Outputs a portion of the user/1 kHz tone.
TONE1	6	Outputs a portion of the user/1 kHz tone.
RST	7	Input port for the CPU reset signal. The CPU enters standby mode when this port becomes "LOW."
+5	8	Power source
X2	9	This port is connected to the system clock crystal (X1).
X1	10	Input port for the system clock signal.
G	11	Ground
KEYE~ KEYH	12~15	Input ports for the key matrix.
C/D	16	Outputs a command/data switching signal for the LCD driver (IC1, pin 26) on the DISPLAY unit. Command mode: HIGH Data mode: LOW
LCS	17	Outputs a chip select signal to the LCD driver (DISPLAY unit IC1, pin 24).
STB	18	Outputs a strobe signal to the PLL/VCO (RF unit IC4, pin 10).
RMUTE	19	Outputs a speaker muting signal when the received data message matches the programmed one in the CPU. Speaker mute: LOW Speaker unmute: HIGH
WATCH	20	Outputs a strobe signal for a reset timer (IC11, pin 1).
RCCB	21	Outputs a read/write permission signal for an EEPROM (IC5, pin 1). Active: HIGH
WR	22	Outputs a write strobe signal for the external memory. Data output: HIGH Data input: LOW
RD	23	Outputs a permission signal for an SRAM (IC2, pin 22). Active: LOW

PORT NAME	PIN NUMBER	DESCRIPTION
TX	24	Outputs a send signal while transmitting. Active: HIGH
MMUTE	25	Outputs a microphone muting signal for the DFIL unit. Active: LOW
TMUTE	26	Outputs a tone muting signal signal for the DFIL unit. Active: LOW
HS/LS	27	Outputs a high-speed/low-speed data switching signal for the DFIL unit. High-speed: HIGH Low-speed: LOW
A15~A13	28~30	Not used
A15~A8	31~35	Output the address busses for the SRAM (IC2).
AD7~AD0	36~43	Input and output ports of time divided address/data buses for the SRAM (IC2).
ASTB	44	Outputs a strobe signal for the address expander (IC3, A0~A7).
G	45, 46	Ground
BWC	47	Outputs a band-width range switching signal to the DFIL unit. Active: HIGH
H/L	48	Outputs an output power switching signal. High power: LOW
BUY	49	Outputs a switching signal for the [BUSY] light (DS1) on the LED unit. Active: HIGH
CALL	50	Outputs a switching signal for the [CALL] light (DS2) on the LED unit. Active: HIGH
DM	51	Output control signals for the dimmer circuit on the DISPLAY unit. Light on: HIGH
T/A	52	Outputs the PLL shift signal. During talk-around transmission: HIGH
NC	53, 54	Not used
+5	55	Power source
KEYA~ KEYD	56~59	Input ports for the key matrix.
LBUS	60	Input port for a "BUSY" signal from the LCD driver (DISPLAY unit IC1, pin 25). Busy: LOW
LOCK	61	Input port for the PLL unlock signal (UL) from PLL/VCO IC (RF unit IC4, pin 3). PLL locked: HIGH PLL unlocked: LOW
G	62, 63	Ground
+5	64	Power source
G	65, 66	Ground
NC	67, 68	Not used
G	69, 70	Ground
CDET	71	Input port for a noise squelch signal from Q1 on the SQL board. Squelch open: LOW
PTT	72	Input port for the [PTT] switch. PTT pushed: LOW
CW	73	Inputs a clockwise signal from the [SELECT] knob. Active: LOW
CCW	74	Inputs a counterclockwise signal from the [SELECT] knob. Active: LOW
RDATA	75	Decodes a data signal from the comparator (IC8, pin 1) on the DFIL unit.
LIGHT3	76	Input port for the [LIGHT] switch. Switch pushed: LOW
KEYLIGHT	77	Inputs an interrupt signal from an AND gate IC (IC6). Active: LOW
SDTIN	78	Reads the RCCB number from the EEPROM (IC5).
RXD1	79	Input port for serial data from the accessory jack (J6).
TXD1	80	Outputs serial data to the accessory jack (J6).

4-6 OTHER CIRCUIT

4-6-1 DIMMER CIRCUIT (DISPLAY UNIT)

The dimmer circuit (Q1, Q2) 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 CPU (LOGIC unit IC1, pin 51).

SECTION 5 ADJUSTMENT PROCEDURES

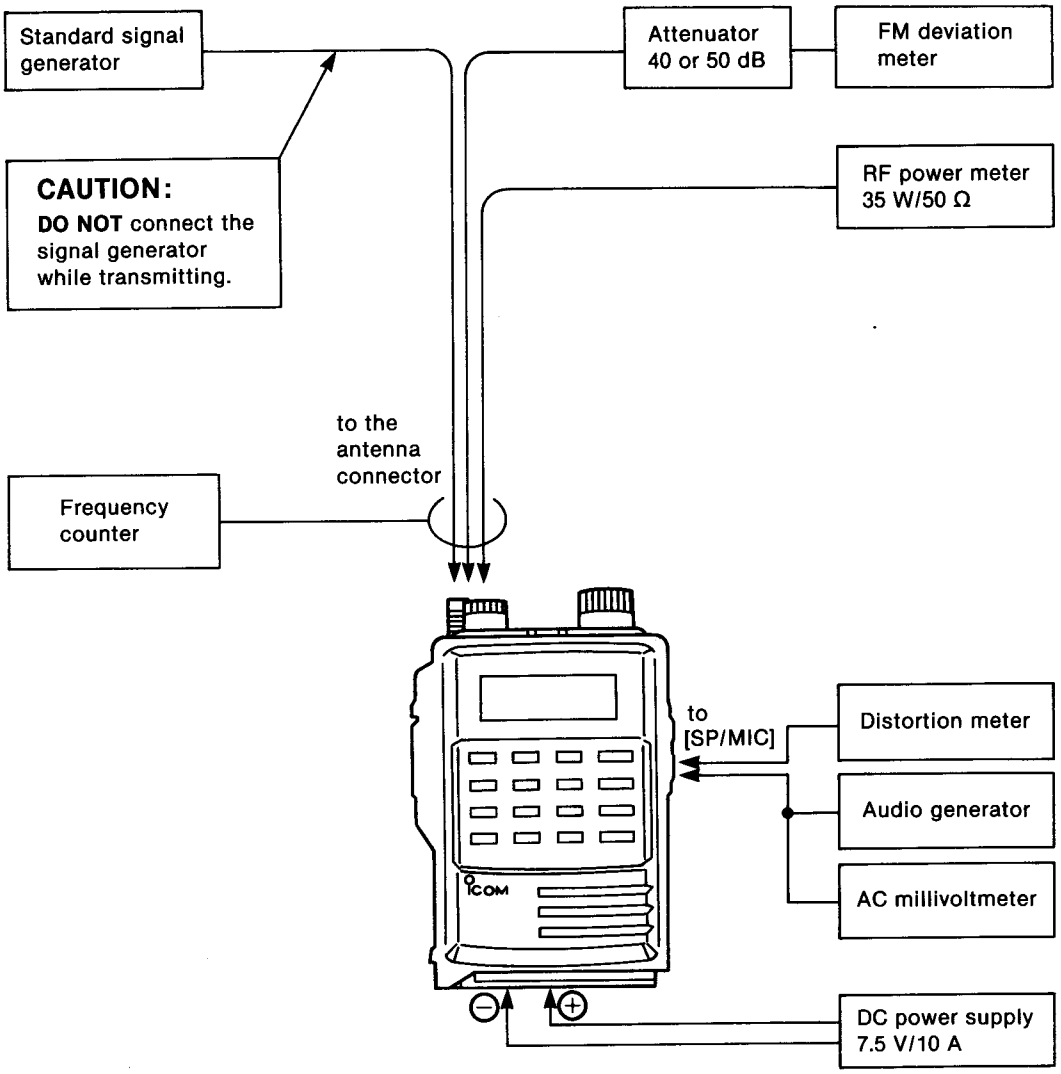
5-1 PREPARATION BEFORE SERVICING

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 7.5 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
		AC millivoltmeter	Measuring range : 2~2000 mVrms
Frequency counter	Frequency range : 10~900 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Oscilloscope	Frequency range : DC~20 MHz Measuring range : 0.01~10 V
		DC voltmeter	Input impedance : 50 kΩ/DC or better
Distortion meter	Frequency range : 1 kHz±10 Hz Measuring range : 1~100 %	FM deviation meter	Frequency minimum : 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)		

CP: Check point CW: Clockwise CCW: Counterclockwise

■ CONNECTION



5-2 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.

■ ENTERING THE TEST MODE

1) While pushing the [LIGHT] 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 [S/G] button and [SELECT] knob to set the Group/System number.

■ 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.

■ 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	—	—	—	—	—

■ 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.

5-3 PLL ADJUSTMENT

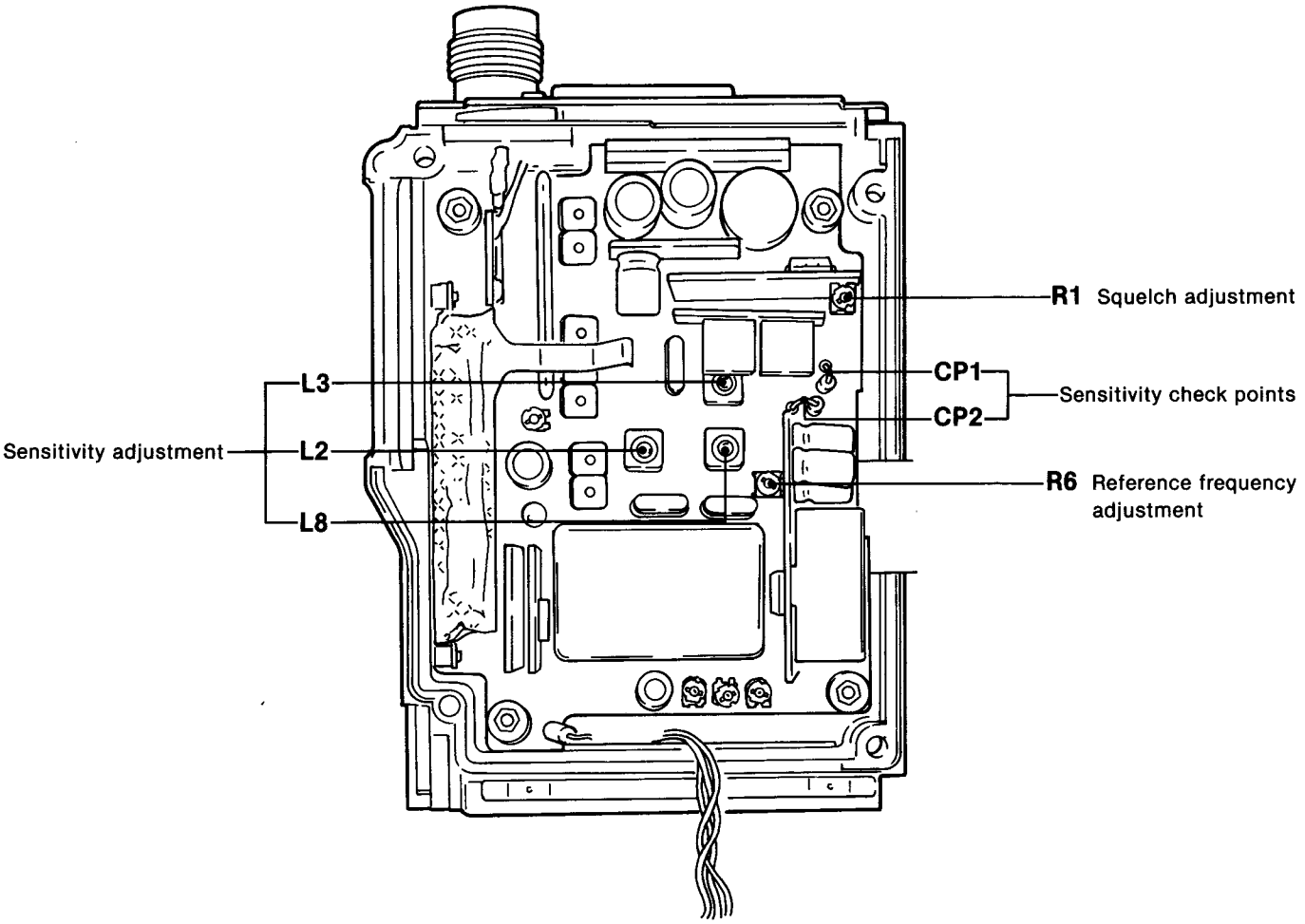
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
REFERENCE FREQUENCY	1	• Be sure the transceiver is in the test mode. • Operating channel: System No. 03 Group No. 1 • Connect the RF power meter or a 50 Ω dummy load to the antenna connector. • Transmitting	Top panel	Loosely couple the frequency counter to the [ANT] connector.	820.9875 MHz	TCXO	R6

5-4 RECEIVER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Be sure the transceiver is in the test mode. • Operating channel: System No. 02 Group No. 1 • Receiving	RF	Connect the oscilloscope to CP1.	Maximum waveform	RF	Adjust in sequence L2, L8, L3
	2	• Connect the SSG to the antenna connector and set as: Frequency : 858.5125 MHz Level : 1 mV* (−47 dBm) Modulation: 3 kHz Deviation : ±3.5 kHz		Connect the distortion meter to CP2.	Minimum distortion level		L2, L8
SQUELCH	1	• Operating channel: System No. 02 Group No. 1 • R1 (SQL board) : Max. CW • Connect the SSG to the antenna connector and set as: Frequency : 858.5125 MHz Modulation: 3 kHz Deviation : ±3.5 kHz • Receiving	Side panel	Connect the distortion meter to the [SP/MIC] connector with an 8 Ω load.	4 dB SINAD		SSG level
	2				Squelch just opens. (Turn R1 CCW until squelch closes, then turn R1 again to CW.)	SQL	R1

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

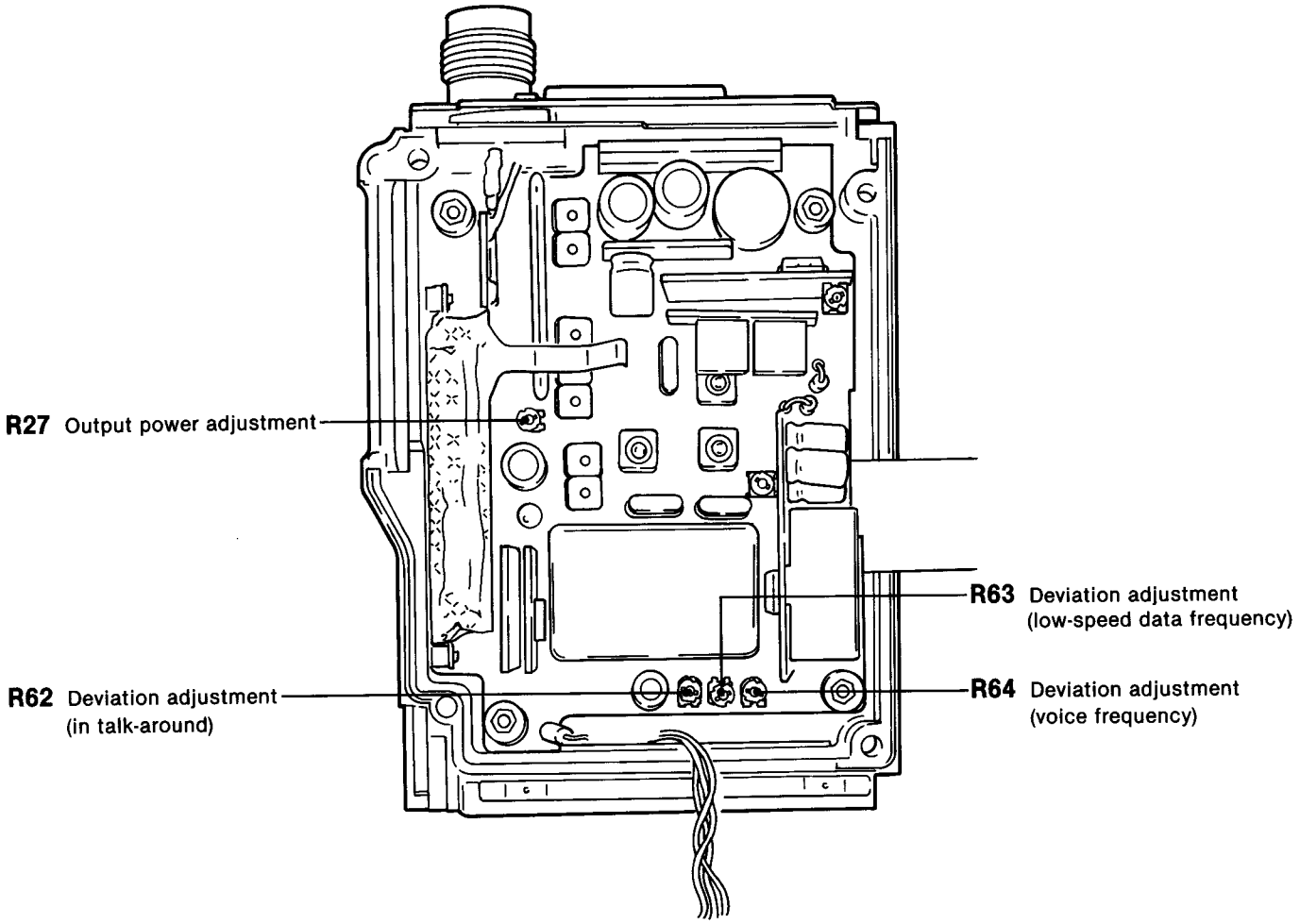
• **RF UNIT**


R1 Squelch adjustment
CP1
CP2
Sensitivity check points
L3
Sensitivity adjustment
L2
L8
R6 Reference frequency adjustment

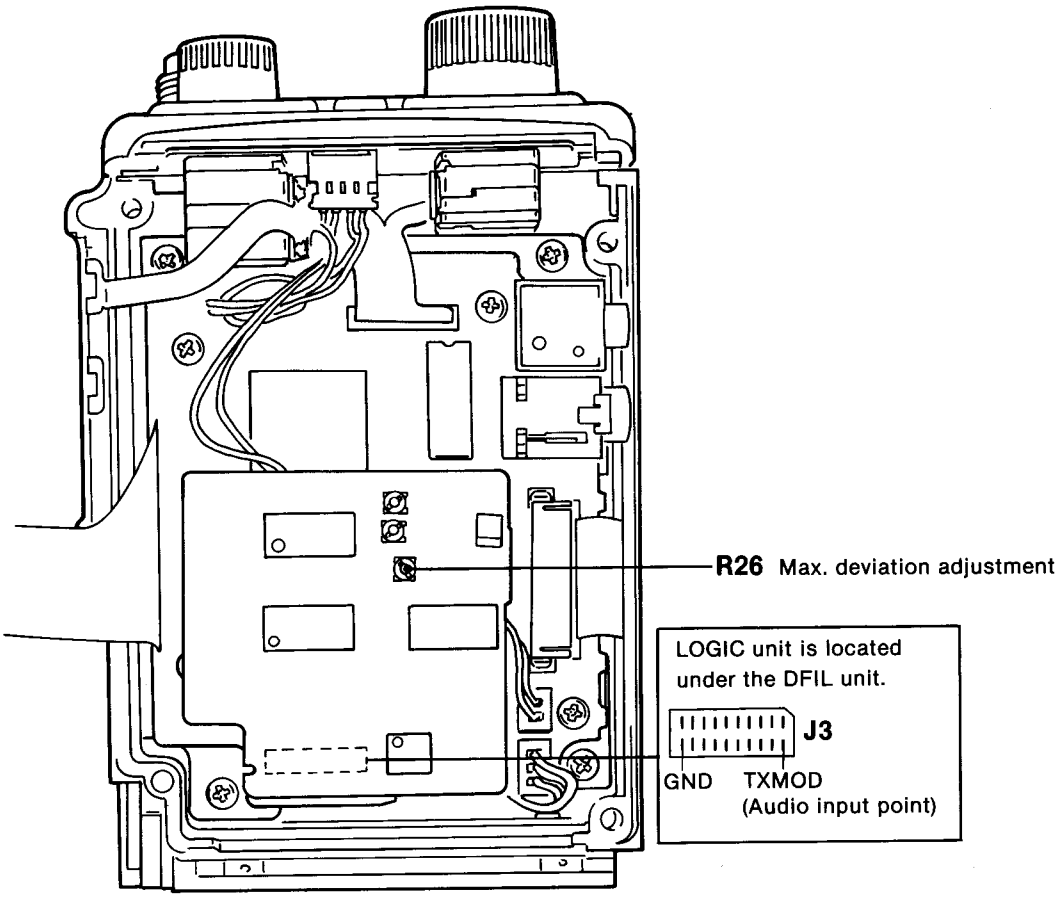
5-5 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Be sure the transceiver is in the test mode. • Operating channel: System No. 03 Group No. 2 • Output power : LOW (Push [SET] some times to indicate "TXPWR" and then rotate the [SELECT] knob to select the lower power.) • Transmitting	Top panel	Connect the RF power meter to the [ANT] connector.	1 W	RF	R27
DEVIATION	1	• Operating channel: System No. 02 Group No. 2 • Unplug J3 on the LOGIC unit. • Connect the audio generator between J3 (TXMOD terminal; p. 5-6 for details.) and GND on the LOGIC unit. • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P−P)/2 • Set the audio generator as: Level : 600 mVrms Frequency : 1.0 kHz • Transmitting	Top panel	Connect the FM deviation meter to the [ANT] connector via the attenuator.	±3.5 kHz	RF	R62
	2	• Operating channel: System No. 02 Group No. 1			±3.5 kHz		R63
	3	• Set the audio generator as: Level : 600 mVrms Frequency : 100 Hz			±3.5 kHz		R64
	4	Repeat steps 2 and 3 several times.					
	5	Disconnect the all equipments from J3 and re-plug the DFIL unit.					
	6	• Operating channel: System No. 03 Group No. 1 • Connect the audio generator to the [SP/MIC] connector and set as: Level : 300 mVrms Frequency : 1.0 kHz • Set the FM deviation meter as: HPF : OFF LPF: 20 kHz De-emphasis: OFF Detector : (P−P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the [ANT] connector via the attenuator.	±3.7 kHz	DFIL	R26

• **RF UNIT**



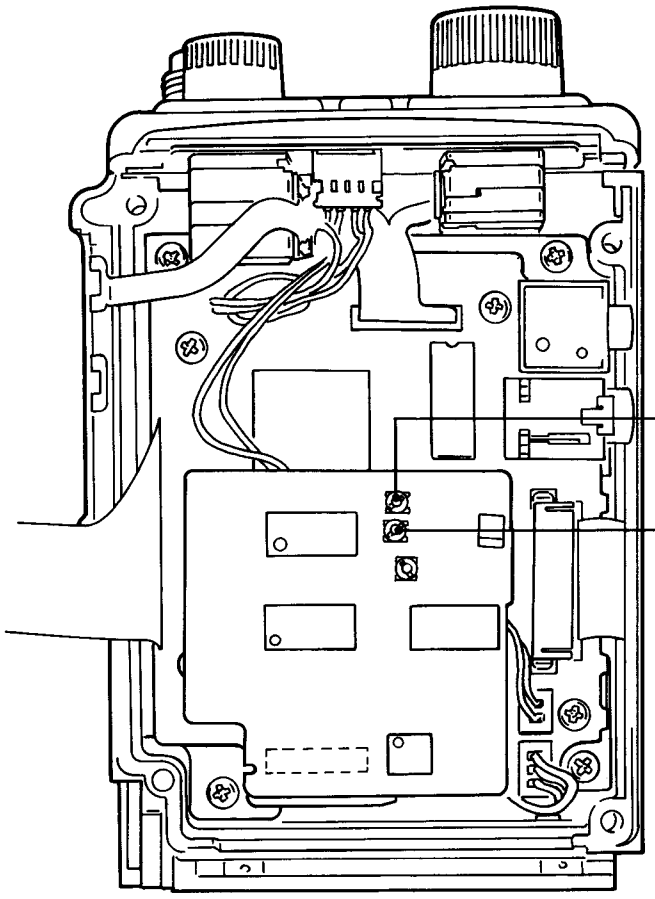
• **DFIL UNIT**



TRANSMITTER ADJUSTMENT (CONTINUED)

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
1 kHz TONE MODULATION	1	• Be sure the transceiver is in the test mode. • Operating channel: System No. 03 Group No. 3 • Set the FM deviation as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P−P)/2 • Transmitting	Top panel	Connect the FM deviation meter to the [ANT] connector via the attenuator.	±2.6 kHz	DFIL	R83
HIGH-SPEED DATA MODULATION	1	• 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	Top panel	Connect the FM deviation meter to the [ANT] connector via the attenuator.	±3.5 kHz	DFIL	R82

• DFIL UNIT



R83 1 kHz tone modulation adjustment

R82 High-speed data modulation adjustment

SECTION 6 PARTS LIST

[LED UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R2	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R3	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
DS1	5040001110	S. LED	SLM-23VMWS T97B [TX/BUSY]
DS2	5040000960	S. LED	SLM-13YW T97 [CALL]
J1	6510007090	CONNECTOR	PI28A-04M
EP1	0910035973	PCB	B 3605C (LED)

[CHASSIS PART]

REF. NO.	ORDER NO.	DESCRIPTION	
J1	6510013790	CONNECTOR	TNC-R113-02 [ANT]

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	6910006180	IC	MD003
IC2	1110002200	S. IC	MC3372MR
IC3	1150001130	IC	SC1140
IC4	6910007190	IC	ENF-PW386P01
IC5	1130003760	S. IC	TC4S81F (TE85R)
IC6	1130004170	S. IC	TC4S01F (TE85R)
IC7	1110002330	IC	TA7368P
Q1	1530003040	S. TRANSISTOR	2SC4095 R47-T2
Q2	1530003040	S. TRANSISTOR	2SC4095 R47-T2
Q3	1580000360	S. FET	3SK177-T2B U73
Q4	1560000430	S. FET	2SK302-GR (TE85R)
Q5	1590000620	S. TRANSISTOR	FMS1 T148
Q6	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q7	1520000200	S. TRANSISTOR	2SB798-T2 DK
Q8	1520000200	S. TRANSISTOR	2SB798-T2 DK
Q9	1590000430	S. TRANSISTOR	DTC144EU T107
Q10	1530002920	S. TRANSISTOR	2SC4226-T2 R25
Q11	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q12	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q13	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q14	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q15	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q16	1590000670	S. TRANSISTOR	FMW1 T148
Q17	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q18	1590000830	S. TRANSISTOR	FMG2 T149
Q19	1590000430	S. TRANSISTOR	DTC144EU T107
Q20	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q22	1590000430	S. TRANSISTOR	DTC144EU T107
Q23	1520000200	S. TRANSISTOR	2SB798-T2 DK
Q24	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q25	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q26	1590000430	S. TRANSISTOR	DTC144EU T107

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D1	1790000660	S. DIODE	MA728 (TW)
D2	1790000660	S. DIODE	MA728 (TW)
D3	1790000450	S. DIODE	MA862 (TX)
D4	1750000160	S. DIODE	DA114 T107
D5	1750000160	S. DIODE	DA114 T107
D6	1790000590	S. DIODE	MA110 (TW)
X1	6050008030	XTAL	CR-392 UM-1 44.720MHz
FI1	2040000430	DIELECTR	EZF-M860 AT12
FI2	2040000440	DIELECTR	EZF-M860 BT12
FI3	2010001430	MONOLITHIC	FL-176 45M15BC 45.175MHz
FI4	2040000660	DIELECTR	EZF-M815 AT12
L1	6200000100	S. COIL	LQN 2A 22NM
L2	6150003920	S. COIL	LS-446
L3	6150003840	S. COIL	LS-434
L4	6200000720	S. COIL	LQN 2A 10NM
L5	6200000720	S. COIL	LQN 2A 10NM
L6	6200000720	S. COIL	LQN 2A 10NM
L7	6200000090	S. COIL	LQN 2A 18NM
L8	6150003920	S. COIL	LS-446
R1	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R3	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R4	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R5	7030003410	S. RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R6	7030003490	S. RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R7	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R8	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R10	7030003430	S. RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R11	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R12	7030003340	S. RESISTOR	ERJ3GEYJ 151 V (150 Ω)
R13	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R14	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R15	7030003510	S. RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R16	7030003470	S. RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R17	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R20	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R21	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R22	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R23	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R25	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R26	7030003630	S. RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R27	7310002580	S. TRIMMER	RV-108 (RH03A3A15X05A) 104
R28	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R30	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R31	7030003770	S. RESISTOR	ERJ3GEYJ 564 V (560 kΩ)
R32	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R33	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R34	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R35	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R36	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R37	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R38	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R39	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R40	7030003320	S. RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R41	7030003590	S. RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R42	7030003350	S. RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R43	7030003260	S. RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R44	7030003350	S. RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R45	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)

S. = Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R46	7030003230	S. RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R47	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R48	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R49	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R50	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R51	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R52	7030003580	S. RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R53	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R54	7030003540	S. RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R55	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R56	7030003500	S. RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R57	7030003590	S. RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R58	7030003510	S. RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R59	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R60	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R61	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R62	7310002580	S. TRIMMER	RV-108 (RH03A3A15X05A) 104
R63	7310002580	S. TRIMMER	RV-108 (RH03A3A15X05A) 104
R64	7310002840	S. TRIMMER	RV-160 (RH03A3A16) 105
R65	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R66	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R67	7030003230	S. RESISTOR	ERJ3GEYJ 180 V (18 Ω)
R68	7030003580	S. RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R69	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R70	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R71	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R72	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R73	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R74	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R75	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R76	7030003500	S. RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R77	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R78	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R79	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R80	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R81	7030003350	S. RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R82	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
C3	4030006940	S. CERAMIC	C1608 CH 1H 030C-T-A
C4	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030009350	S. CERAMIC	C1608 CH 1H 3R5B-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C9	4030009560	S. CERAMIC	C1608 CH 1H R75B-T-A
C10	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C11	4030009560	S. CERAMIC	C1608 CH 1H R75B-T-A
C12	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C13	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C14	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C15	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C16	4030007020	S. CERAMIC	C1608 CH 1H 120J-T-A
C17	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C18	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C19	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C20	4030009650	S. CERAMIC	C1608 CH 1H 240J-T-A
C21	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C22	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C23	4030006690	S. CERAMIC	C1608 SL 1H 330J-T-A
C24	4030006660	S. CERAMIC	C1608 SL 1H 220J-T-A
C25	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C26	4030008630	S. CERAMIC	C1608 JF 1C 104Z-T-A
C27	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C28	4030006690	S. CERAMIC	C1608 SL 1H 330J-T-A
C29	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C30	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C31	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C32	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C33	4030006530	S. CERAMIC	C1608 SL 1H 020C-T-A
C34	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C37	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C38	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C39	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C40	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C41	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C42	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C43	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C44	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C45	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C46	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C47	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C48	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C50	4510003170	ELECTROLYTIC	16 RC2 47 µF (D=5.0)
C51	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C52	4550001040	TANTALUM	DN 1C 3R3M
C53	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C54	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C55	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C56	4030006540	S. CERAMIC	C1608 SL 1H 030C-T-A
C57	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C58	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C59	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C60	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C61	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C62	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C63	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C64	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C65	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C66	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C71	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C72	4510003190	ELECTROLYTIC	6.3 RC2 47 µF (D=4.0)
C73	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C74	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C75	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C76	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C77	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C78	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C79	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C80	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C81	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C82	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C83	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C84	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C86	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C87	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C88	4510003760	ELECTROLYTIC	16 RC2 100 µF
C89	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C90	4510003280	ELECTROLYTIC	10 SA 68 M
C91	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C92	4550000530	S. TANTALUM	TESVA 1V 104M1-8L
C93	4510004730	ELECTROLYTIC	6 SA 150 M
C94	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C96	4030007060	S. CERAMIC	C1608 CH 1H 270J-T-A
C97	4030008560	S. CERAMIC	C1608 CH 1H 300J-T-A
C98	4030009500	S. CERAMIC	C1608 CH 1H 0R5B-T-A
C100	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C101	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C103	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C104	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C105	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C106	4030008880	S. CERAMIC	C1608 JB 1C 223K-T-A
C107	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C108	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C109	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C110	4550005980	S. TANTALUM	TEMSVA 1A 475M-8L
C111	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C112	4550000550	S. TANTALUM	TESVA 1V 224M1-8L
W1	7120000380	JUMPER	JPW 01 R-01
W2	7120000010	JUMPER	JPW 02A
W3	7120000010	JUMPER	JPW 02A
W4	7120000380	JUMPER	JPW 01 R-01
W5	7030003860	S. JUMPER	ERJ3GE JPW V
W7	7120000380	JUMPER	JPW 01 R-01

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
EP1	0910029024	PCB	B 2809D (RF)
EP2	0910031582	FPC	B 3185B

[YGRA BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530000371	S. TRANSISTOR	2SC3356 R25-T2B
Q2	1530002680	S. TRANSISTOR	2SC3357-T2
R1	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R2	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R3	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R4	7030003460	S. RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R5	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R6	7030003220	S. RESISTOR	ERJ3GEYJ 150 V (15 Ω)
R7	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C4	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030009550	S. CERAMIC	C1608 CH 1H 2R5B-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
EP1	0910028112	PCB	B 2810B (YGRA)
EP2	6910006550	LEADFRAME	HFB2.0-0.9-8 (N)

[YGRB BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
Q1	1530002680	S. TRANSISTOR	2SC3357-T2
D1	1750000170	S. DIODE	DA115 T107
L1	6200001270	S. COIL	MLF2012A 2R2M-T
R1	7030003460	S. RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R2	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R3	7030003200	S. RESISTOR	ERJ3GEYJ 100 V (10 Ω)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006540	S. CERAMIC	C1608 SL 1H 030C-T-A
C6	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
EP1	0910029871	PCB	B 3045A (YGRB)
EP2	6910006550	LEADFRAME	HFB2.0-0.9-8 (N)

[LPF BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030009530	S. CERAMIC	C1608 CH 1H 030B-T-A
C2	4030009560	S. CERAMIC	C1608 CH 1H R75B-T-A
C3	4030006960	S. CERAMIC	C1608 CH 1H 050C-T-A
C4	4030009500	S. CERAMIC	C1608 CH 1H 0R5B-T-A
C5	4030009530	S. CERAMIC	C1608 CH 1H 030B-T-A
EP1	0910031731	PCB	B 3204A (LPF)
EP2	6910006550	LEADFRAME	HFB2.0-0.9-8 (N)

[AFFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002700	S. IC	NJM2904M-T1
R1	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R2	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R4	7030003630	S. RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R5	7030003630	S. RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R6	7030003580	S. RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R7	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R8	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R9	7030003490	S. RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R10	7030003590	S. RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R11	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R12	7030003820	S. RESISTOR	ERJ3GEYJ 155 V (1.5 MΩ)
C1	4510003180	ELECTROLYTIC	6.3 RC2 100 µF (D=5.0)
C3	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C7	4030008900	S. CERAMIC	C1608 JB 1C 333K-T-A
C8	4030008900	S. CERAMIC	C1608 JB 1C 333K-T-A
C9	4030008900	S. CERAMIC	C1608 JB 1C 333K-T-A
C10	4030008900	S. CERAMIC	C1608 JB 1C 333K-T-A
C11	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C12	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C13	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
EP1	0910031441	PCB	B 3175A (AFFIL)
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[SQL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110002700	S. IC	NJM2904M-T1
IC2	1110002700	S. IC	NJM2904M-T1
Q1	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q2	1530002060	S. TRANSISTOR	2SC4081 T107 R
D1	1790000590	S. DIODE	MA110 (TW)
D2	1790000590	S. DIODE	MA110 (TW)

S.=Surface mount

[SQL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7310003520	S. TRIMMER	RV-224 (RH03AVA15) 104
R2	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R4	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R5	7030003610	S. RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R6	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R7	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R8	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R9	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R11	7030003480	S. RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R12	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R13	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R14	7030003650	S. RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R15	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R16	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R17	7030005200	S. RESISTOR	ERJ3GEYJ 752 V (7.5 kΩ)
R18	7030003750	S. RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R19	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R20	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R21	7030003530	S. RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R22	7510000420	S. THERMISTOR	DTN-T203W472LS (T)
R23	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R24	7030003540	S. RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R25	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R26	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R27	7030003650	S. RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R28	7030003570	S. RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R29	7510000420	S. THERMISTOR	DTN-T203W472LS (T)
R30	7030003710	S. RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C7	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C8	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C9	4550000510	S. TANTALUM	TESVA 1V 473M1-8L
C10	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C11	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C12	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C13	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
EP1	0910033064	PCB	B 3377D (SQL)
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[IFFIL BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
X1	6070000080	DISCRIMINATOR	CDBM455C16
FI1	2020000850	CERAMIC	SFGM455D
FI2	2020000850	CERAMIC	SFGM455D
R1	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R2	7030003530	S. RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R3	7030003430	S. RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R4	7030003530	S. RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
C1	4030006860	S. CERAMIC	C1608 JB 1H 102K-T-A
C2	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
EP1	0910028983	PCB	B 2811C (IFFIL)
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[TCXO BOARD]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1180000530	S. IC	S-81250HG-RD-T1
IC2	1110002700	S. IC	NJM2904M-T1
X1	6050008020	XTAL	CR-391 NTO-781C 12.8000MHz
R1	7030003380	S. RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R2	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R5	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R6	7310003520	S. TRIMMER	RV-224 (RH03AVA15) 104
R7	7030003660	S. RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R8	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R9	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4510003170	ELECTROLYTIC	16 RC2 47 µF (D=5.0)
C3	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4510003190	ELECTROLYTIC	6.3 RC2 47 µF (D=4.0)
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4510003190	ELECTROLYTIC	6.3 RC2 47 µF (D=4.0)
C7	4030006550	S. CERAMIC	C1608 SL 1H 040C-T-A
C8	4030006750	S. CERAMIC	C1608 SL 1H 101J-T-A
C9	4030006700	S. CERAMIC	C1608 SL 1H 390J-T-A
C10	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C11	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C12	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
EP1	0910034194	PCB	B 3433D (TCXO)
EP2	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)
EP3	6910003110	LEADFRAME	HFB2.0-0.7-8 (N)

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1140003090	S. IC	µPD78P238GC-3B9
IC2	1130006190	S. IC	LC3564PML-12-TRM
IC3	1130005480	S. IC	TC74HC573AF
IC4	1110001550	S. IC	S-8054ALB-LM-T1
IC5	1130006620	S. IC	ST93C06M6
IC6	1130006440	S. IC	TC7S08F (TE85R)
IC8	1130006440	S. IC	TC7S08F (TE85R)
IC9	1130006440	S. IC	TC7S08F (TE85R)
IC10	1130006200	S. IC	TC7S00F (TE85R)
IC11	1130006750	S. IC	µPD74HC123AG
Q1	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q2	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q3	1590000520	S. FET	2SJ106-GR (TE85R)
Q4	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q5	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q6	1590000430	S. TRANSISTOR	DTC144EU T107
Q7	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q9	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q10	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q11	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q12	1590000430	S. TRANSISTOR	DTC144EU T107
Q13	1590001770	S. TRANSISTOR	XP1213
Q14	1590001770	S. TRANSISTOR	XP1213
D1	1790000590	S. DIODE	MA110 (TW)
D2	1790000590	S. DIODE	MA110 (TW)
D3	1790000590	S. DIODE	MA110 (TW)

S.=Surface mount

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
D4	1750000160	S. DIODE	DA114 T107
D5	1790000590	S. DIODE	MA110 (TW)
D6	1790000950	S. ZENER	MA8056-M (TX)
D7	1790000950	S. ZENER	MA8056-M (TX)
X1	6050004960	XTAL	RF-4A3 FAL NKD (CR-237)
R1	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R2	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R5	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R6	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R7	7030003580	S. RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R8	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R9	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R10	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R11	7030003720	S. RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R12	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R13	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R20	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R21	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R22	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R23	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R24	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R25	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R26	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R27	7030003400	S. RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R28	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R29	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R30	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R31	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R32	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R33	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R36	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R37	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R39	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R40	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R42	7030003360	S. RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R43	7030003370	S. RESISTOR	ERJ3GEYJ 271 V (270 Ω)
R44	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R45	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R46	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R47	7030003700	S. RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
C1	4550002890	S. TANTALUM	TESVA 1A 225M1-8L
C3	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C9	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C10	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C13	4030007030	S. CERAMIC	C1608 CH 1H 150J-T-A
C14	4030007030	S. CERAMIC	C1608 CH 1H 150J-T-A
C15	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C16	4550000460	S. TANTALUM	TESVA 1C 105M1-8L
C17	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C18	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C19	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C20	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C21	4550002890	S. TANTALUM	TESVA 1A 225M1-8L
C22	4550002890	S. TANTALUM	TESVA 1A 225M1-8L
C23	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C24	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C25	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C26	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C27	4030006710	S. CERAMIC	C1608 SL 1H 470J-T-A
C28	4550000270	S. TANTALUM	TESVA 1E 474M1-8L

[LOGIC UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C29	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C30	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C31	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
BT1	3020000200	LITHIUM	CR2032-1F4
J1	6510013610	CONNECTOR	10FM-1.0BP
J2	6510014310	S. CONNECTOR	52396-2090 (2017)
J3	6510013990	S. CONNECTOR	2-175643-0
J4	6510007170	CONNECTOR	PI28A-03M
J5	6510007080	CONNECTOR	PI28A-02M
J6	6450000130	CONNECTOR	HSJ1102-01-540
J7	6450001060	CONNECTOR	HSJ1493-01-010 [SP/MIC]
W5	7030003860	S. JUMPER	ERJ3GE JPW V
W6	7030003860	S. JUMPER	ERJ3GE JPW V
W7	7030003860	S. JUMPER	ERJ3GE JPW V
W8	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910034137	PCB	B 2813G (LOGIC)
EP2	0910033704	FPC	B 3395D

[DFIL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110001340	S. IC	NJM3403AM
IC2	1110002660	S. IC	MC14053 BF
IC3	1110001340	S. IC	NJM3403AM
IC4	1110002700	S. IC	NJM2904M-T1
IC5	1110002700	S. IC	NJM2904M-T1
IC6	1110001340	S. IC	NJM3403AM
IC7	1110002660	S. IC	MC14053 BF
IC8	1110002690	S. IC	NJM2903M-T1
IC9	1110002710	S. IC	NJM3404AM-T1
IC10	1110002750	S. IC	TA75S01F (TE85R)
Q1	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q2	1530002060	S. TRANSISTOR	2SC4081 T107 R
Q3	1590000430	S. TRANSISTOR	DTC144EU T107
Q4	1590000720	S. TRANSISTOR	DTA144EU T107
D1	1790000590	S. DIODE	MA110 (TW)
D2	1790000590	S. DIODE	MA110 (TW)
D3	1790000590	S. DIODE	MA110 (TW)
R1	7030004870	S. RESISTOR	ERJ3GEYF 224 V (220 kΩ)
R2	7030004900	S. RESISTOR	ERJ3GEYF 105 V (1 MΩ)
R3	7030004880	S. RESISTOR	ERJ3GEYF 274 V (270 kΩ)
R4	7030004860	S. RESISTOR	ERJ3GEYF 184 V (180 kΩ)
R5	7030003940	S. RESISTOR	ERJ3GEYF 104 V (100 kΩ)
R6	7030004820	S. RESISTOR	ERJ3GEYF 473 V (47 kΩ)
R7	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R8	7030004110	S. RESISTOR	ERJ3GEYJ 163 V (16 kΩ)
R9	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R10	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R11	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R12	7030004880	S. RESISTOR	ERJ3GEYF 274 V (270 kΩ)
R13	7030004740	S. RESISTOR	ERJ3GEYF 392 V (3.9 kΩ)
R14	7030004720	S. RESISTOR	ERJ3GEYF 102 V (1 kΩ)
R15	7030004830	S. RESISTOR	ERJ3GEYF 513 V (51 kΩ)
R16	7030004820	S. RESISTOR	ERJ3GEYF 473 V (47 kΩ)

S.=Surface mount

[DFIL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R17	7030004820	S. RESISTOR	ERJ3GEYF 473 V (47 kΩ)
R18	7030004910	S. RESISTOR	ERJ3GEYF 332 V (3.3 kΩ)
R19	7030004730	S. RESISTOR	ERJ3GEYF 222 V (2.2 kΩ)
R20	7030004850	S. RESISTOR	ERJ3GEYF 913 V (91 kΩ)
R21	7030004850	S. RESISTOR	ERJ3GEYF 913 V (91 kΩ)
R22	7030004810	S. RESISTOR	ERJ3GEYF 433 V (43 kΩ)
R23	7030004800	S. RESISTOR	ERJ3GEYF 393 V (39 kΩ)
R24	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R25	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R26	7310003660	S. TRIMMER	EVM-1XSX50 B55 (504)
R27	7030003740	S. RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R28	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R29	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R31	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R32	7030005250	S. RESISTOR	ERJ3GEYF 103 V (10 kΩ)
R33	7030005250	S. RESISTOR	ERJ3GEYF 103 V (10 kΩ)
R34	7030004800	S. RESISTOR	ERJ3GEYF 393 V (39 kΩ)
R35	7030004750	S. RESISTOR	ERJ3GEYF 562 V (5.6 kΩ)
R36	7030004760	S. RESISTOR	ERJ3GEYF 822 V (8.2 kΩ)
R37	7030004760	S. RESISTOR	ERJ3GEYF 822 V (8.2 kΩ)
R38	7030004800	S. RESISTOR	ERJ3GEYF 393 V (39 kΩ)
R39	7030004820	S. RESISTOR	ERJ3GEYF 473 V (47 kΩ)
R40	7030003460	S. RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R41	7030004760	S. RESISTOR	ERJ3GEYF 822 V (8.2 kΩ)
R42	7030004760	S. RESISTOR	ERJ3GEYF 822 V (8.2 kΩ)
R43	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R44	7030003570	S. RESISTOR	ERJ3GEYJ 123 V (12 kΩ)
R45	7030003560	S. RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R46	7030004120	S. RESISTOR	ERJ3GEYJ 203 V (20 kΩ)
R47	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R48	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R49	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R50	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R51	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R52	7030004840	S. RESISTOR	ERJ3GEYF 563 V (56 kΩ)
R53	7030004880	S. RESISTOR	ERJ3GEYF 274 V (270 kΩ)
R54	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R55	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R56	7030004750	S. RESISTOR	ERJ3GEYF 562 V (5.6 kΩ)
R57	7030004750	S. RESISTOR	ERJ3GEYF 562 V (5.6 kΩ)
R58	7030004750	S. RESISTOR	ERJ3GEYF 562 V (5.6 kΩ)
R59	7030004750	S. RESISTOR	ERJ3GEYF 562 V (5.6 kΩ)
R60	7030004790	S. RESISTOR	ERJ3GEYF 243 V (24 kΩ)
R61	7030004790	S. RESISTOR	ERJ3GEYF 243 V (24 kΩ)
R62	7030004780	S. RESISTOR	ERJ3GEYF 123 V (12 kΩ)
R63	7030004130	S. RESISTOR	ERJ3GEYJ 433 V (43 kΩ)
R64	7030004130	S. RESISTOR	ERJ3GEYJ 433 V (43 kΩ)
R65	7030003800	S. RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R66	7030003430	S. RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R67	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R68	7030003760	S. RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R69	7030003440	S. RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R70	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R71	7030003610	S. RESISTOR	ERJ3GEYJ 273 V (27 kΩ)
R72	7030003330	S. RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R73	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R74	7030003840	S. RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R75	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R76	7030003450	S. RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R77	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R79	7030003330	S. RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R80	7030003330	S. RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R82	7310003660	S. TRIMMER	EVM-1XSX50 B55 (504)
R83	7310003660	S. TRIMMER	EVM-1XSX50 B55 (504)
R84	7030003470	S. RESISTOR	ERJ3GEYJ 182 V (1.8 kΩ)
R85	7510000570	S. THERMISTOR	DTN-T204D154LS (T)
R86	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R87	7030003640	S. RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R88	7030003670	S. RESISTOR	ERJ3GEYJ 823 V (82 kΩ)
R89	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
C1	4030008880	S. CERAMIC	C1608 JB 1C 223K-T-A
C2	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C3	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A

[DFIL UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C4	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C5	4030006870	S. CERAMIC	C1608 JB 1H 222K-T-A
C6	4030008470	S. CERAMIC	C1608 JB 1H 272K-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C9	4030008880	S. CERAMIC	C1608 JB 1C 223K-T-A
C10	4030006810	S. CERAMIC	C1608 SL 1H 271J-T-A
C11	4030008650	S. CERAMIC	C1608 JB 1H 332K-T-A
C12	4030008860	S. CERAMIC	C1608 JB 1C 153K-T-A
C13	4030006800	S. CERAMIC	C1608 SL 1H 221J-T-A
C14	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C15	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C16	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C17	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C18	4030006880	S. CERAMIC	C1608 JB 1H 472K-T-A
C19	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C20	4030008870	S. CERAMIC	C1608 JB 1C 183K-T-A
C21	4030008870	S. CERAMIC	C1608 JB 1C 183K-T-A
C22	4030006870	S. CERAMIC	C1608 JB 1H 222K-T-A
C23	4030008940	S. CERAMIC	C2012 JB 1C 683K-T-A
C24	4030008470	S. CERAMIC	C1608 JB 1H 272K-T-A
C25	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C26	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C27	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C28	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C29	4030006900	S. CERAMIC	C1608 JB 1E 103K-T-A
C30	4030009630	S. CERAMIC	C1608 JB 1E 822K-T-A
C31	4030008880	S. CERAMIC	C1608 JB 1C 223K-T-A
C32	4030006870	S. CERAMIC	C1608 JB 1H 222K-T-A
C33	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C34	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C35	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C36	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C37	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C38	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C39	4550003040	S. TANTALUM	TEMSVB2 0J 106M-8L
C40	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C41	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C42	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C43	4550003030	S. TANTALUM	TEMSVA 0J 475M-8L
C44	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C45	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C46	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C47	4550000270	S. TANTALUM	TESVA 1E 474M1-8L
C49	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C50	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C51	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C53	4030006730	S. CERAMIC	C1608 SL 1H 680J-T-A
C54	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C55	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C56	4030008920	S. CERAMIC	C1608 JB 1C 473K-T-A
C57	4030009000	S. CERAMIC	C2012 JB 1C 224K-T-A
C58	4030009000	S. CERAMIC	C2012 JB 1C 224K-T-A
J1	6510014230	S. CONNECTOR	5-175638-0
W1	7030003860	S. JUMPER	ERJ3GE JPW V
EP1	0910037841	PCB	B 3737A (DFIL)

S. = Surface mount

[DISPLAY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130004930	S. IC	μPD7225GB-3B7
Q1	1510000620	S. TRANSISTOR	2SA1576 T107 S
Q2	1590000670	S. TRANSISTOR	FMW1 T148
D3	1160000050	S. DIODE	DAP202U T107
D4	1160000050	S. DIODE	DAP202U T107
D5	1790000590	S. DIODE	MA110 (TW)
D6	1790000590	S. DIODE	MA110 (TW)
D7	1790000590	S. DIODE	MA110 (TW)
D8	1790000590	S. DIODE	MA110 (TW)
R1	7030003710	S. RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R2	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R3	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R5	7030003490	S. RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R6	7510000200	S. THERMISTOR	DTN-T203U473LS (T)
R11	7030003620	S. RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R12	7030003350	S. RESISTOR	ERJ3GEYJ 181 V (180 Ω)
R14	7030003410	S. RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R15	7030003410	S. RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R16	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R17	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R18	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R19	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R20	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R21	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R22	7030003600	S. RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R23	7030003550	S. RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R24	7030003520	S. RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R25	7030003500	S. RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R26	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R27	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R28	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R29	7030003680	S. RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C3	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C4	4030008960	S. CERAMIC	C2012 JB 1C 104K-T-A
C6	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C7	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C9	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
DS1	5030000800	LCD	LD-BU5462J (E-5369-1) [DISPLAY PANEL]
DS2	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
DS3	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
MC1	7700000861	MICROPHONE	WM-62A103
SP1	2510000530	SPEAKER	T028S14I0810
J1	6510014490	S. CONNECTOR	52204-2590 (2517)
EP1	0910034106	PCB	B 3396F (DISPLAY)
EP2	8930023910	CONTACT	SRCN-929 GN-TYPE
EP3	8930023950	LCD CONTACT	SRCN-929 SSW-TYPE

[10 KEY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
DS1	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
DS2	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
DS3	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
DS4	5010000070	S. LED	LT1E73A (GL1EG73 TAPING)
EP1	0910034111	PCB	B 3397A (10KEY)

[PTT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
S1	2260001560	S. SWITCH	SW-131 (SKHMPU) [PTT]
S2	2260001560	S. SWITCH	SW-131 (SKHMPU) [LIGHT]
EP1	0910033733	PCB	B 3410C (PTT)

[VR UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R1	7210001440	VARIABLE	RK097111101NA (10KA) [VOL/PWR]
S1	2260001670	ENCODER	SW-135 (RK09710HH) [SELECT]
EP1	0910033763	FPC	B 3409C

[PRT UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C1	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
C2	4030006850	S. CERAMIC	C1608 JB 1H 471K-T-A
EP1	0910034120	PCB	B 3414 (PRT)

S.=Surface mount

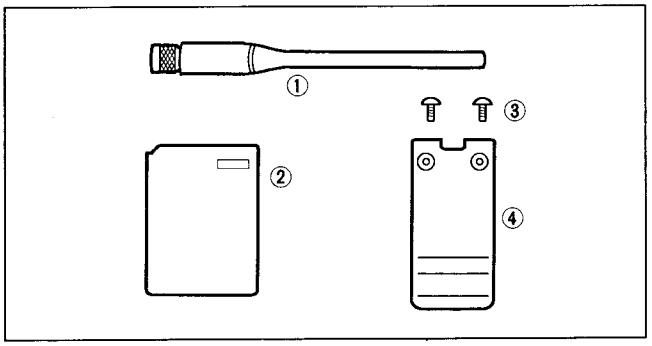
SECTION 7 MECHANICAL PARTS

• CHASSIS PARTS

LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.	LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	8610004230	Knob N126 [PWR/VOL]	1	㉛	8930023480	929 10-key plate	1
②	8830000550	VR nut (E)	2	㉜	8210008060	929 front panel (incl. window plate)	1
③	8610004290	Knob N128 [SELECT]	1	㉝	8930020490	PTT rubber	1
④	8810004890	Screw PH No. 0 M2×6 ZK	4	㉞	8930020080	Release button	1
⑤	8210007110	929 top panel	1	㉟	8930012640	Push spring (K)	1
⑥	8930023410	929 lens	2	㊱	8810004210	Screw PH M2×3	4
⑦	8930023420	929 top seal	1	㊲	8930022870	Battery sheet	2
⑧	8810001700	Screw PH B0 No. 0-3 M1.4×3	1	㊳	6450000130	Connector HSJ1102-01-540	1
⑨	8810006660	Screw FH No. 0-3 M2×6	3	㊴	6450001060	Connector HSJ1493-01-010 [SP/MIC]	1
⑩	6510013790	Antenna connector TNC-R113-02	1	㊵	8930026620	951 C-angle	1
⑪	8510007130	ANT shield	1	㊶	8930020960	Connector seal	1
⑫	8010012120	929 top chassis	1	㊷	8810000010	Screw PH M2×4	4
⑬	8810003850	Screw PH B0 No. 0-3 M1.4×2.5 NI	7	㊸	8010012110	929 LOGIC chassis	1
⑭	7210001440	RK097111101NA (10KA) [PWR/VOL]	1	㊹	8930012083	573 stand-off -3	4
⑮	2260001670	SW-135 (RK09710HH) [SELECT]	1	㊺	8950002470	Electrical tape No. 1245 42×13	1
⑯	8810001710	Screw PH B0 No. 0-3 M1.4×3.5 ZK	11	㊻	8010013390	929 shield	1
⑰	8930023490	929 speaker holder	1	㊼	8930012150	Module plate	1
⑱	8930024220	O ring (J)	1	㊽	8930026400	929 M. spring	1
⑲	8930023530	929 spring	1	㊾	8930020460	Center seal	1
⑳	2510000530	Speaker T028S14I0810	1	㊿	8930020450	Front seal	1
㉑	7700000861	Microphone WM-62A103	1	(51)	8810005860	Screw PH No. 0 M2×3 NI	2
㉒	8930021570	873 microphone holder	1	(52)	8860000010	Screw lug M2	4
㉓	8010012170	929 reflector	1	(53)	8010013430	Rear panel (A)	1
㉔	8930023950	LCD contact SRCN-929 SSW type	2	(54)	8810006190	Screw PH B0 M2×23 ZK	4
㉕	5030000800	LCD LD-BU5462J (E-5369-1)	1	(55)	8810005360	Screw PH No. 0 M2×3 ZK	1
㉖	8930023500	929 LCD holder	1	(56)	8930020100	Contact holder	1
㉗	8930023430	929 LCD rubber	1	(57)	8930020480	Contact rubber	3
㉘	8930023960	Fiber insulate plate (G)	1	(58)	8930020290	Contact spring	3
㉙	8930023910	Contact SRCN-929 GN type	1	(59)	8810001790	Screw PH M2×8 NI BS	3
㉚	8210006800	929 10-key	1				

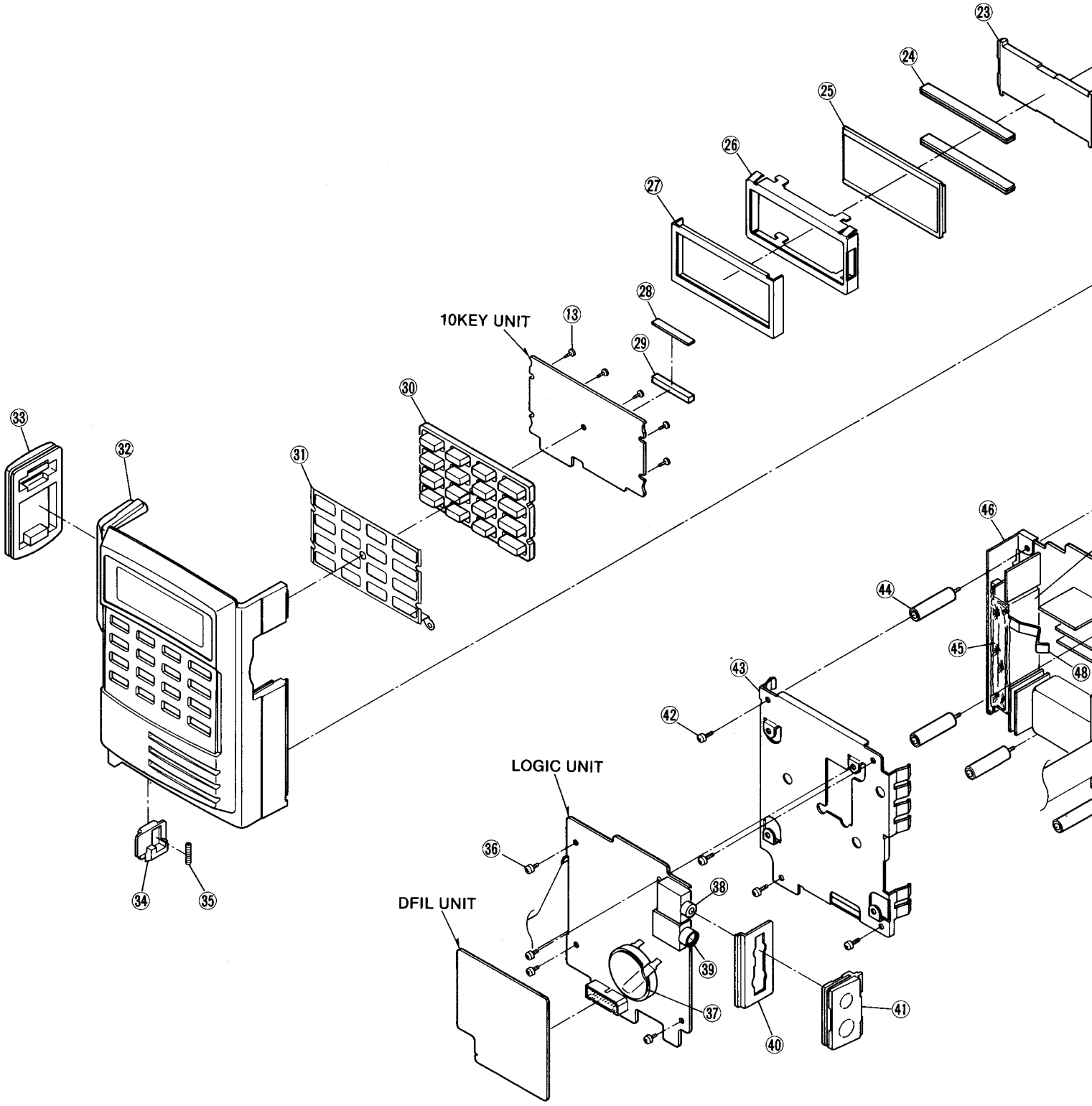
Screw abbreviations B0: Self-tapping screw PH: Pan head FH: Flat head NI: Nickel BS: Brass ZK: Black

• ACCESSORIES



LABEL NUMBER	ORDER NO.	DESCRIPTION	QTY.
①	Optional product	AH-19 FLEXIBLE ANTENNA	1
②	Optional product	CM-98 BATTERY PACK	1
③	8810005730	Screw BuH M3×3 ZK BS	2
④	8010005710	Belt clip	1

Screw abbreviations BuH: Button head BS: Brass ZK: Black


10KEY UNIT
LOGIC UNIT
DFIL UNIT
13
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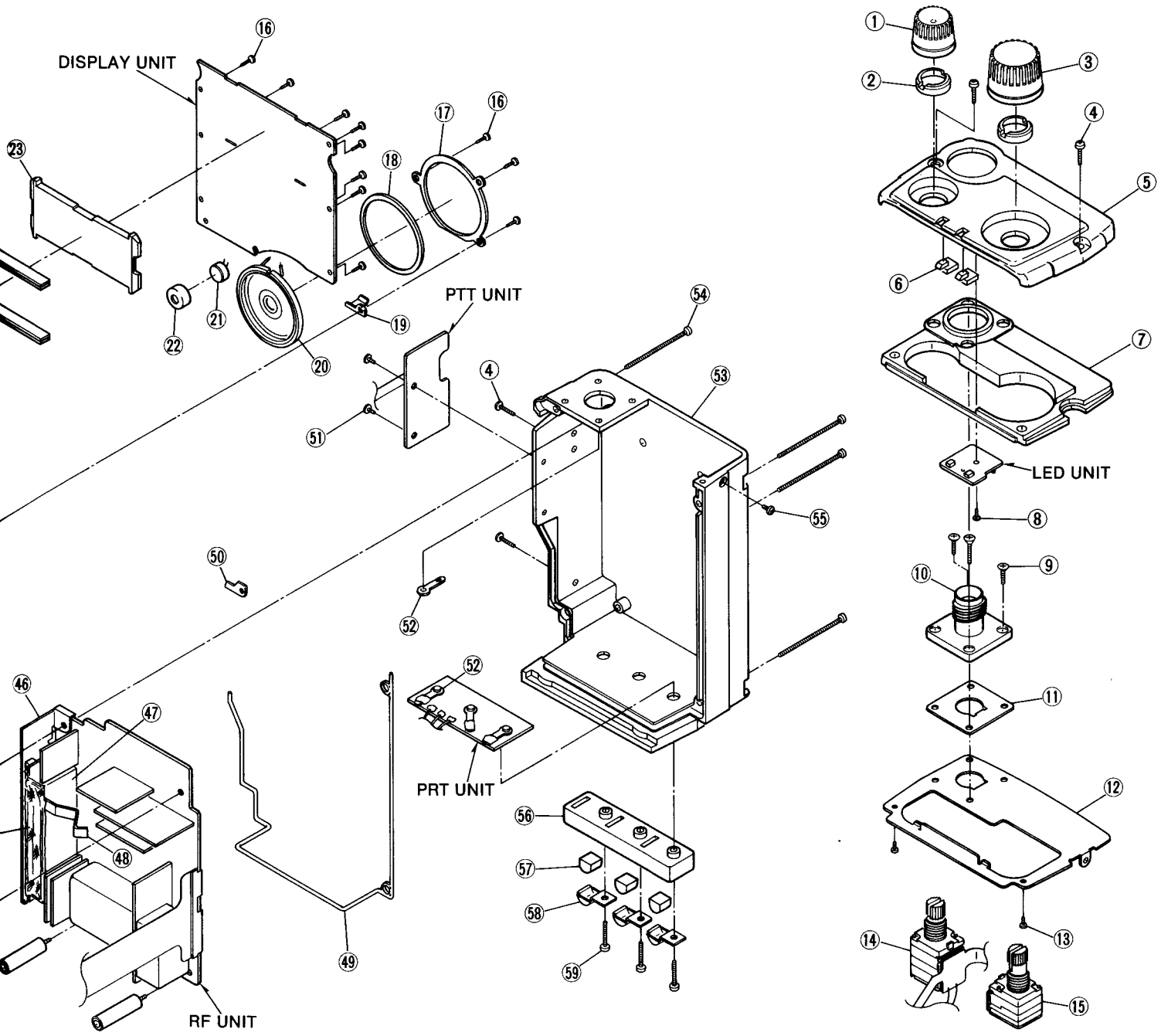
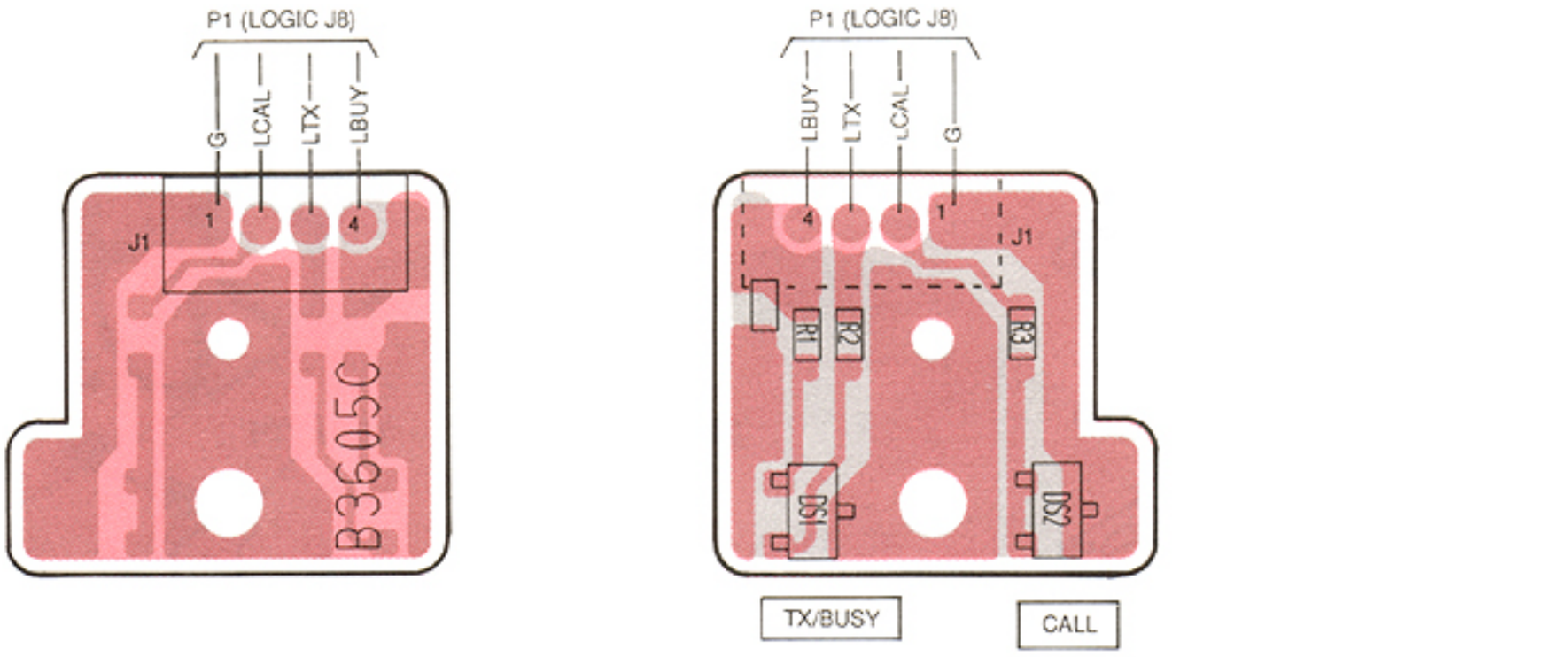

DISPLAY UNIT
PTT UNIT
PRT UNIT
RF UNIT
LED UNIT

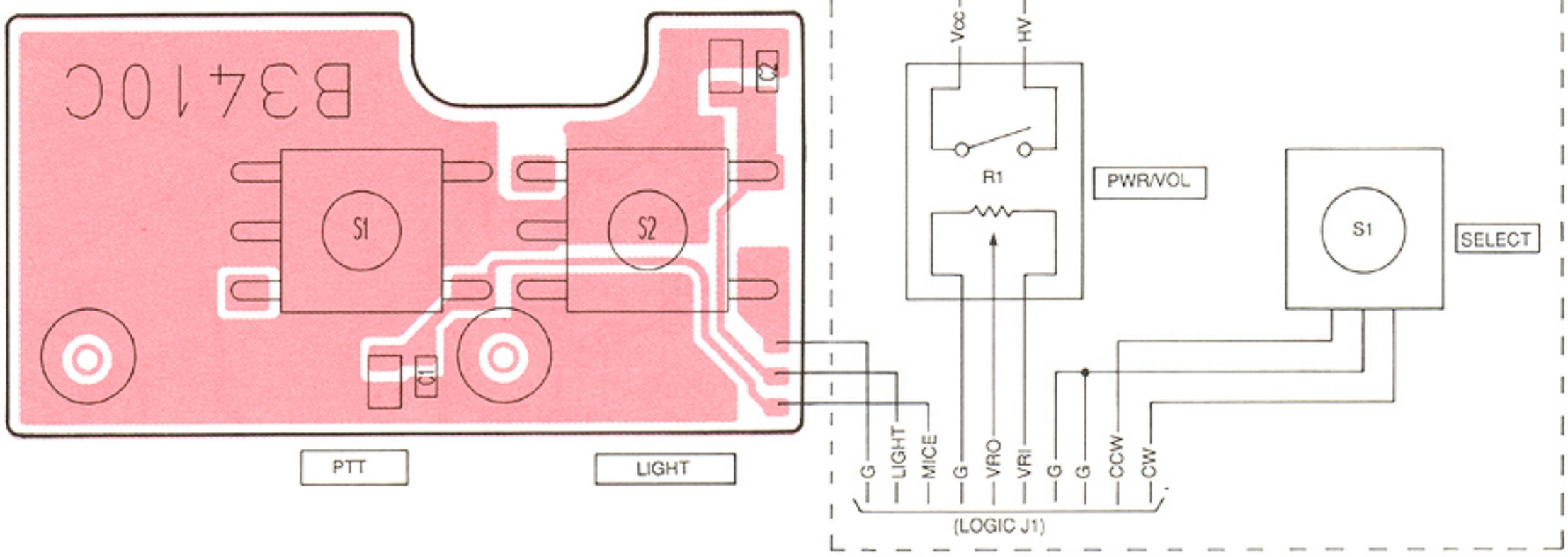
SECTION 8 BOARD LAYOUTS

8-1 LED, PTT AND 10KEY UNITS

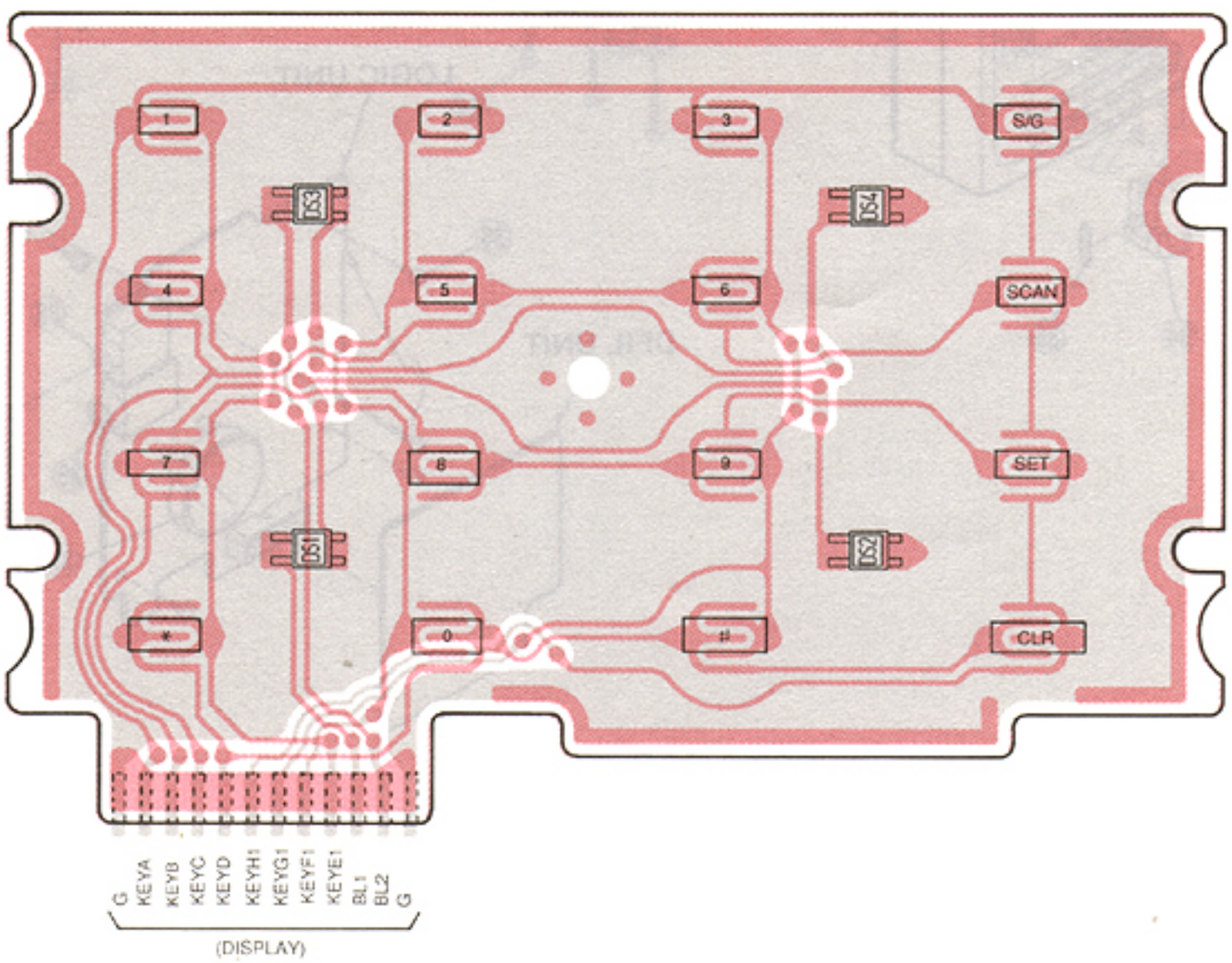
• LED UNIT



• PTT UNIT



• 10KEY UNIT



8-2 DISPLAY UNIT

• DISPLAY UNIT

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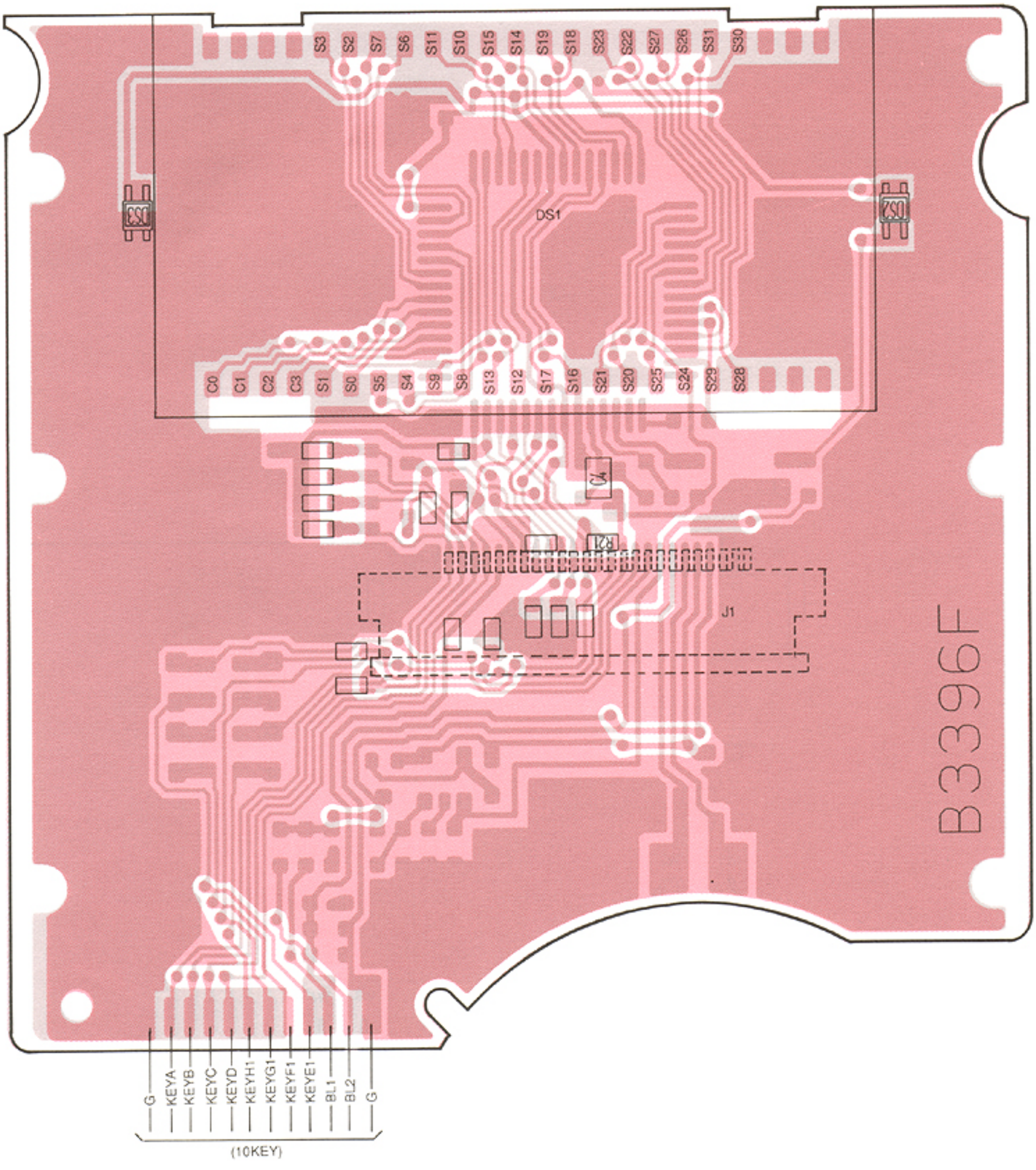
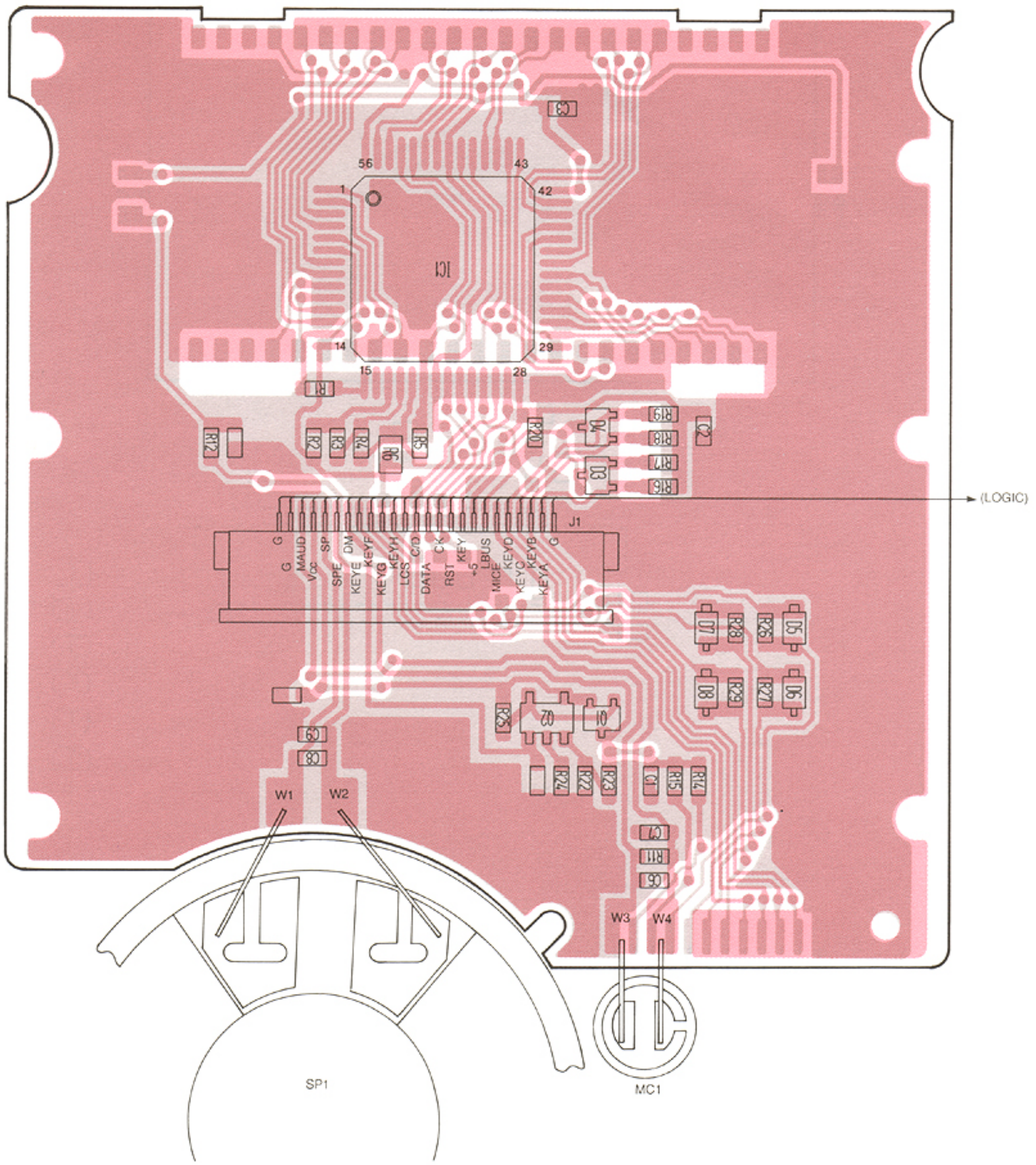
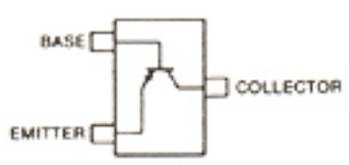


• DISPALY UNIT

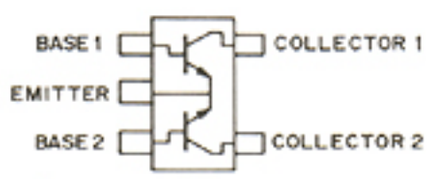


2SA1576 S
(Symbol: FS)



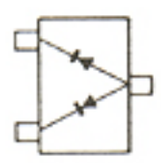
Q1

FMW1
(Symbol: W1)



Q2

DAP202U
(Symbol: P)



D3, D4

8-3 DFIL UNIT

• DFIL UNIT

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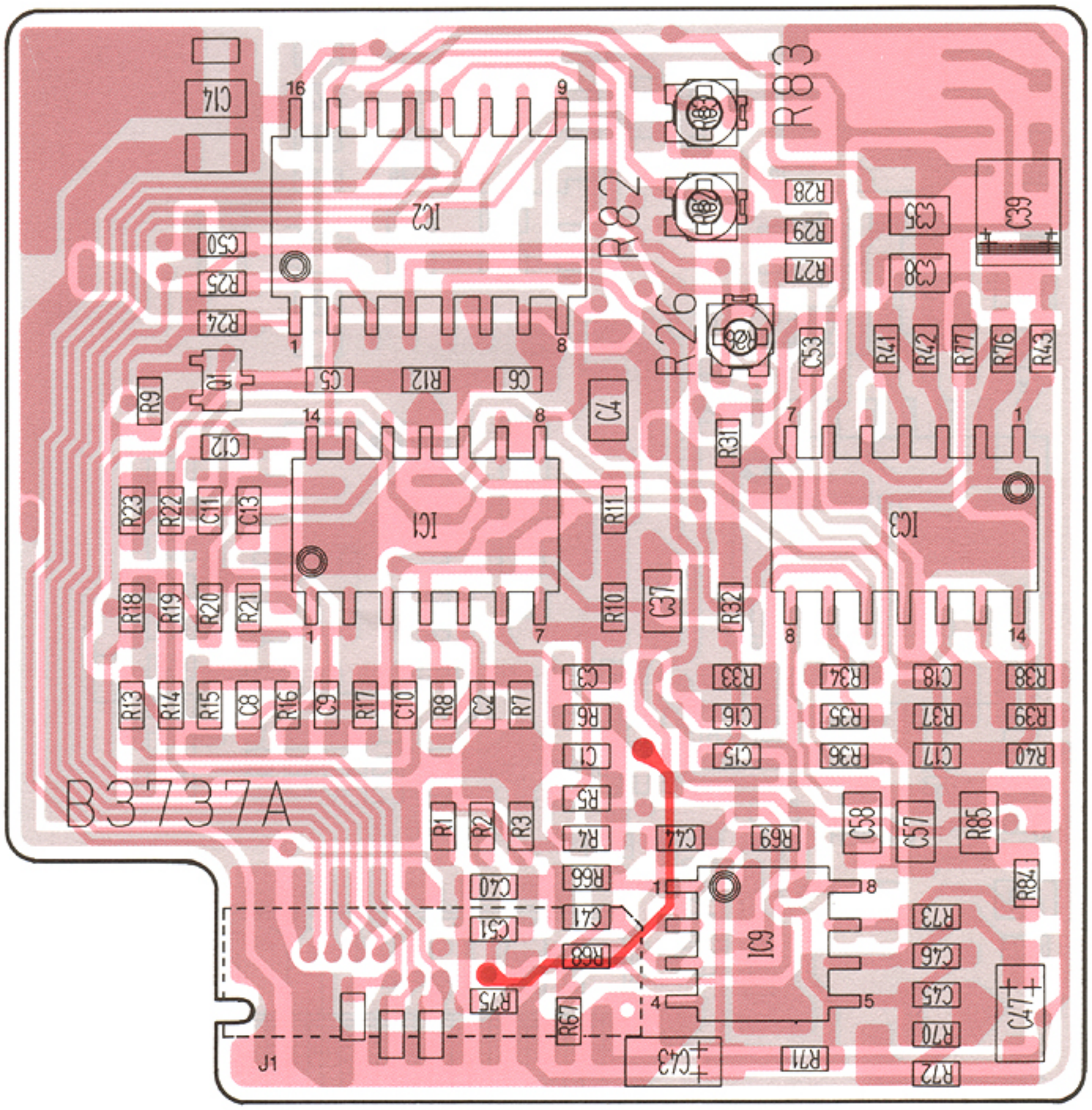
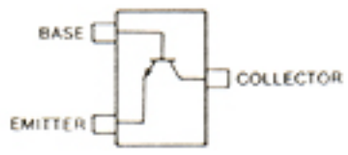
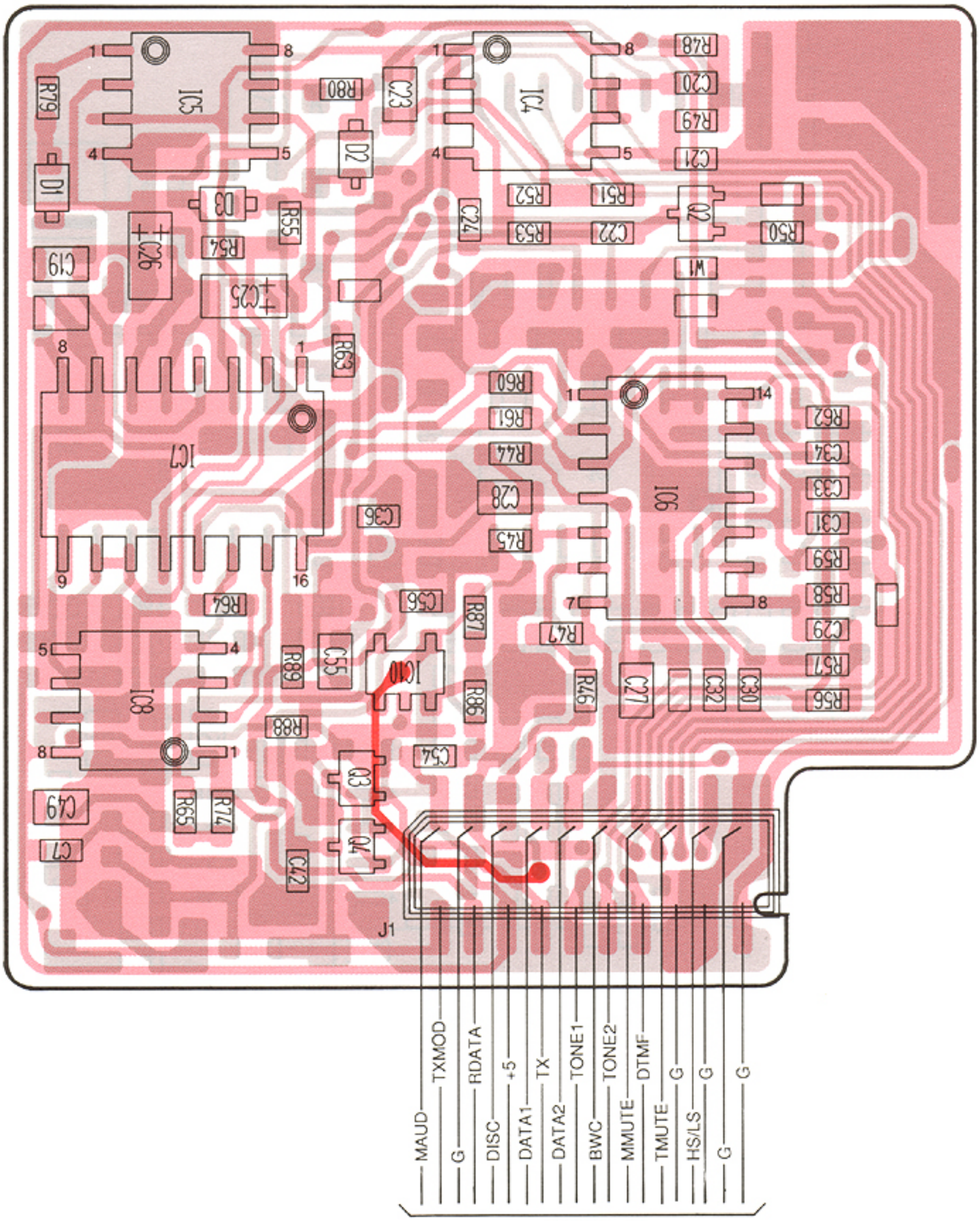


2SC4081 R
(Symbol: BR)



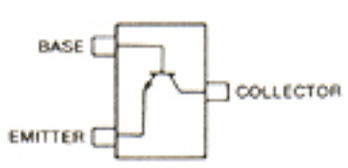
Q1

• DFIL UNIT



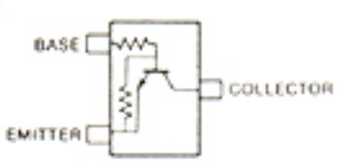
(LOGIC J3)

2SC4081 R
(Symbol: BR)



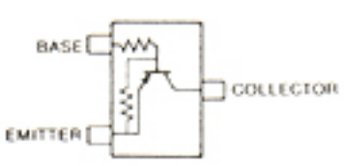
Q2

DTC144EU
(Symbol: 26)



Q3

DTA144EU
(Symbol: 16)



Q4

8-4 LOGIC UNIT

• LOGIC UNIT

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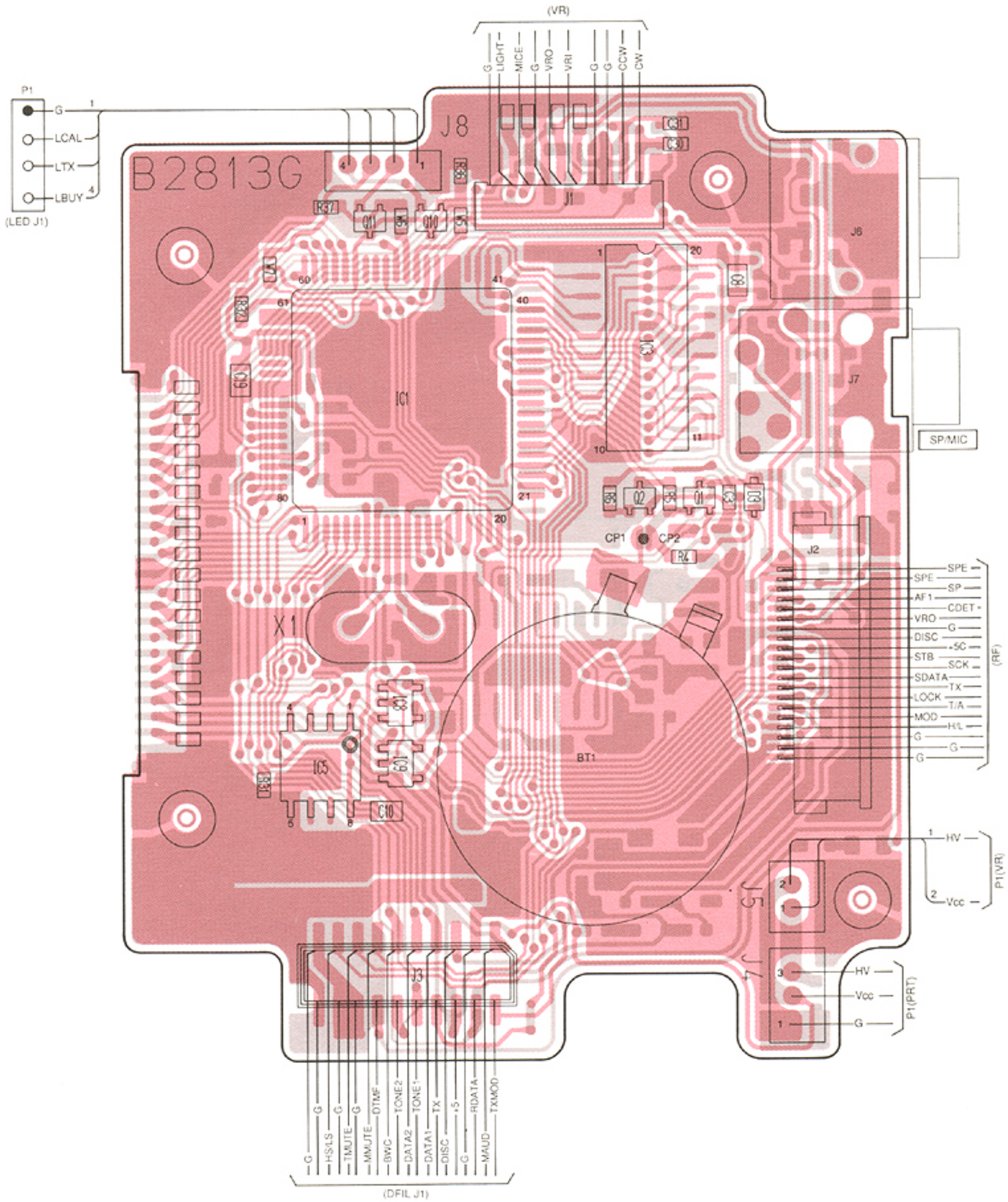
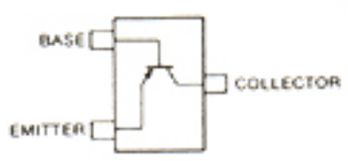
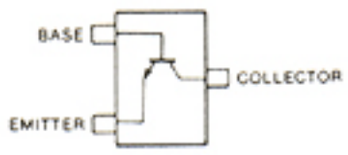


2SA1576 S
(Symbol: FS)



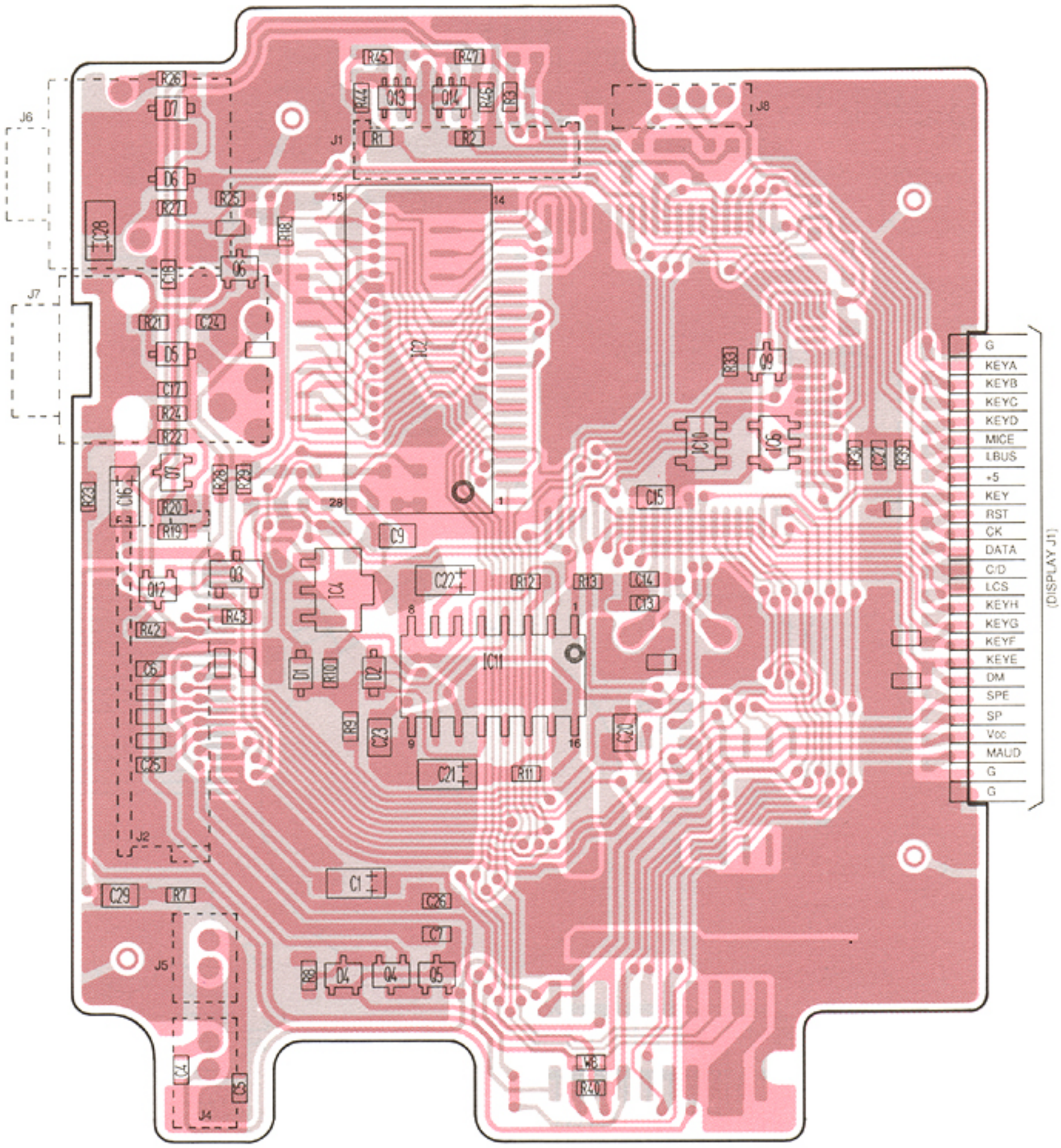
Q1

2SC4081 R
(Symbol: BR)



Q2, Q10, Q11

• LOGIC UNIT



2SJ106 GR
(Symbol: VG)

Q3

2SC4081 R
(Symbol: BR)

Q4, Q9

2SA1576 S
(Symbol: FS)

Q5, Q7

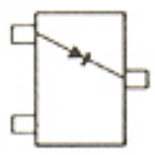
DTC144EU
(Symbol: 26)

Q6, Q12

XP1213
(Symbol: 9L)

Q13, Q14

DA114
(Symbol: AV)

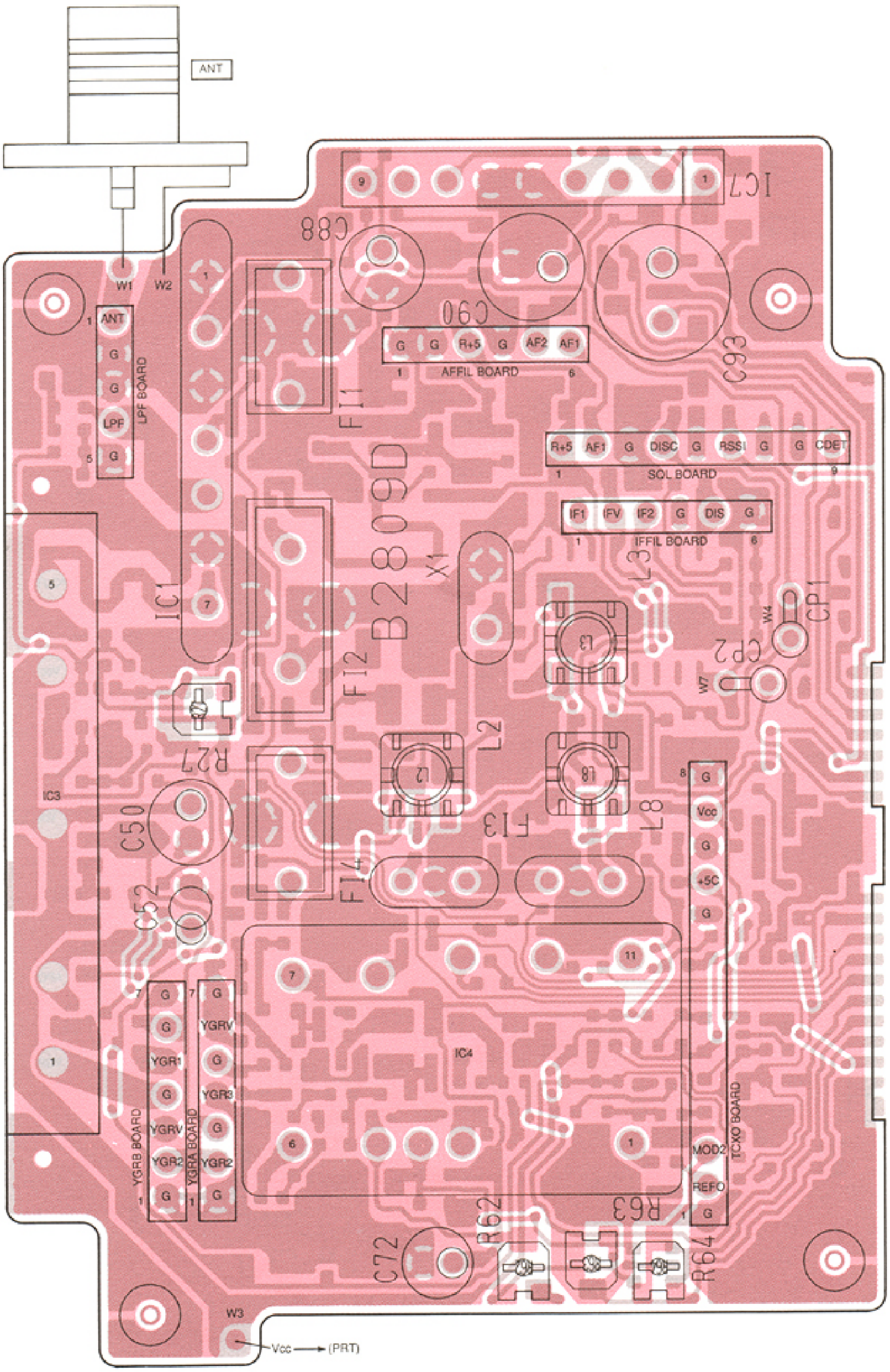


D4

8-5 RF UNIT

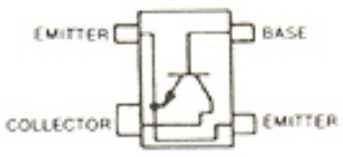
• RF UNIT

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



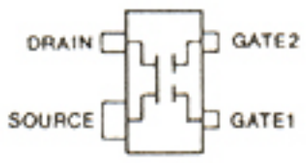
• RF UNIT

2SC4095 R47
(Symbol: R47)



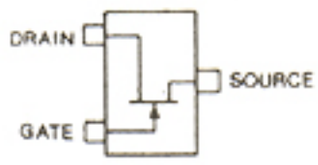
Q1, Q2

3SK177 U73
(Symbol: U73)



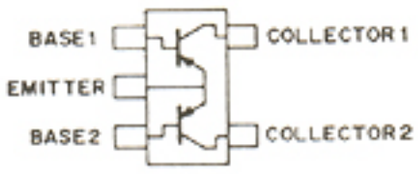
Q3

2SK302 GR
(Symbol: TG)



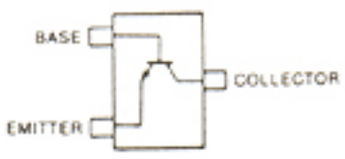
Q4

FMS1
(Symbol: SI)



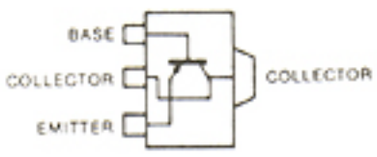
Q5

2SC4081 R
(Symbol: BR)



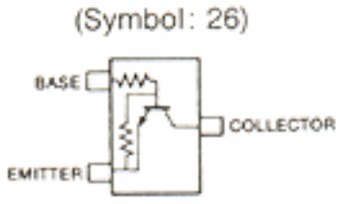
Q6, Q12, Q13, Q20,
Q24, Q25

2SB798 DK
(Symbol: DK)

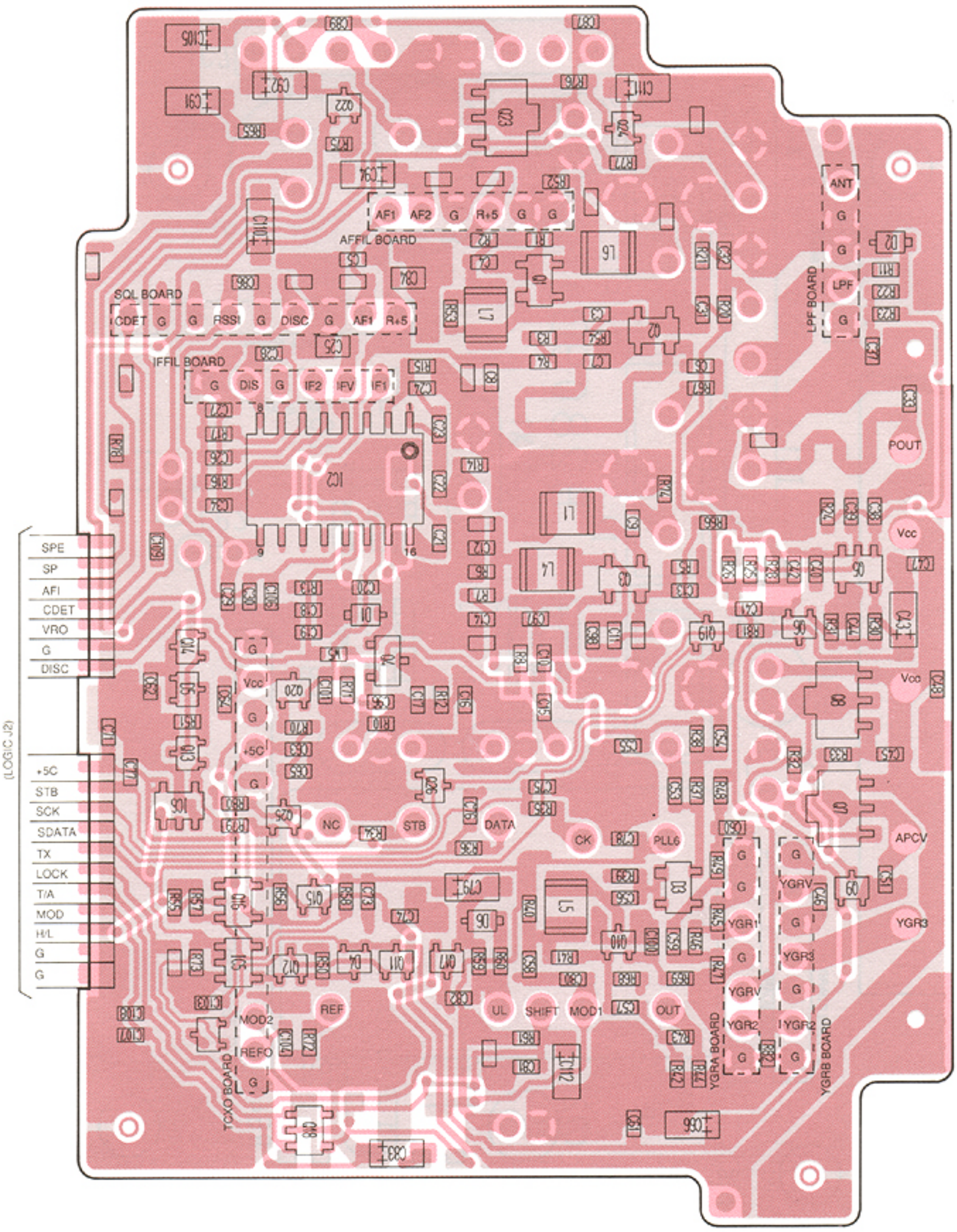


Q7, Q8, Q23

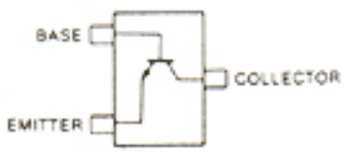
DTC144EU
(Symbol: 26)



Q9, Q19, Q22, Q26

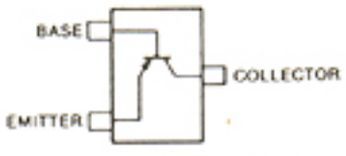


2SC4226 R25
(Symbol: R25)



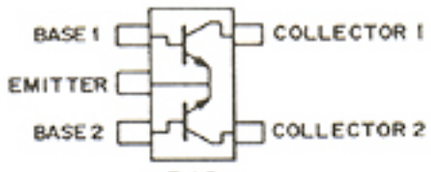
Q10

2SA1576 S
(Symbol: FS)



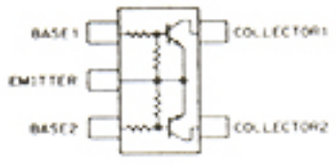
Q11, Q14, Q15, Q17

FMW1
(Symbol: W1)



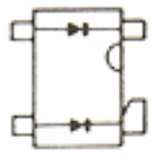
Q16

FMG2
(Symbol: G2)



Q18

MA862
(Symbol: M1I)



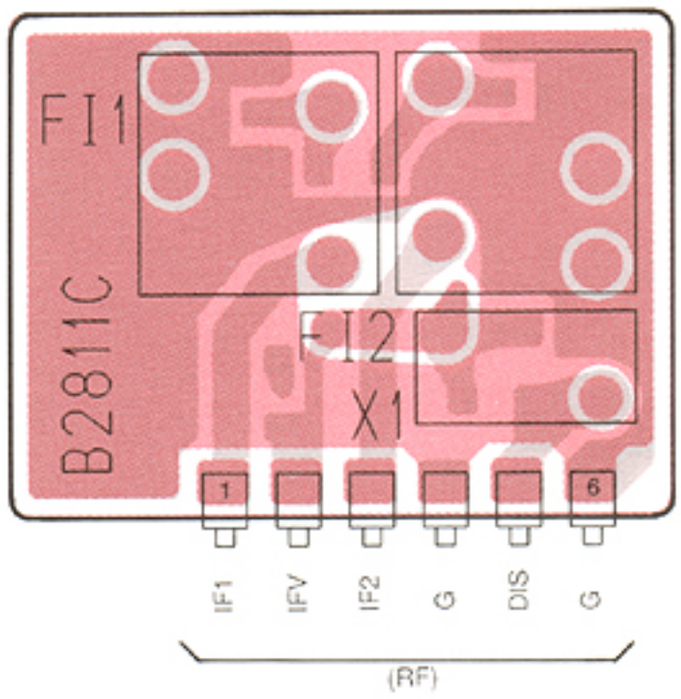
D3

DA114
(Symbol: AV)

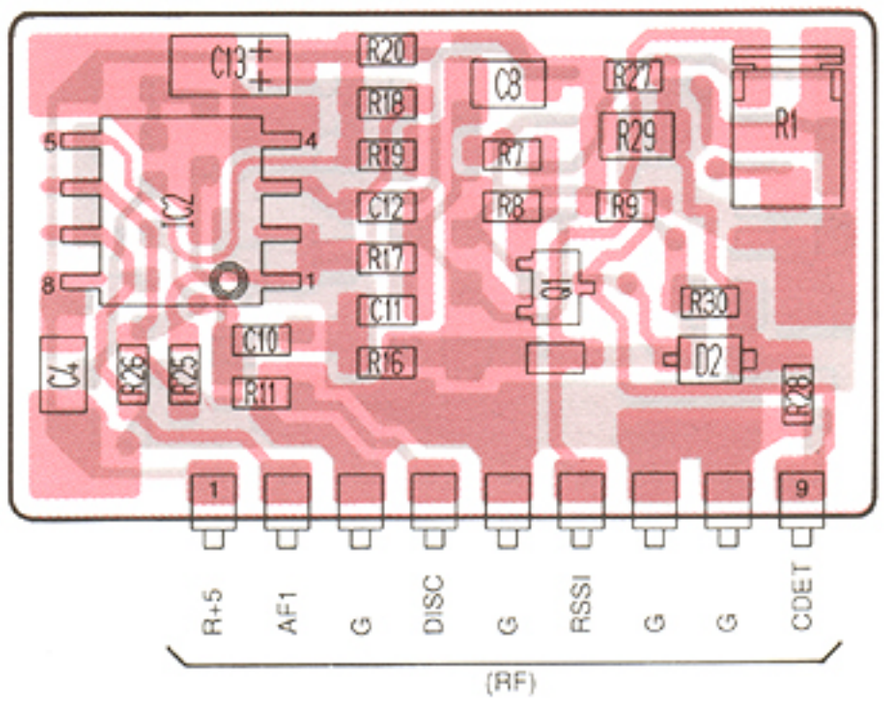
D4, D5

8-6 IFFIL, SQL, AFFIL, TCXO, LPF, YGRA AND YGRB BOARDS

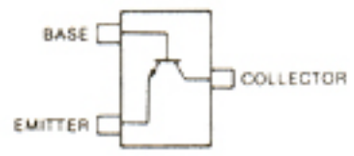
• IFFIL BOARD



• SQL BOARD

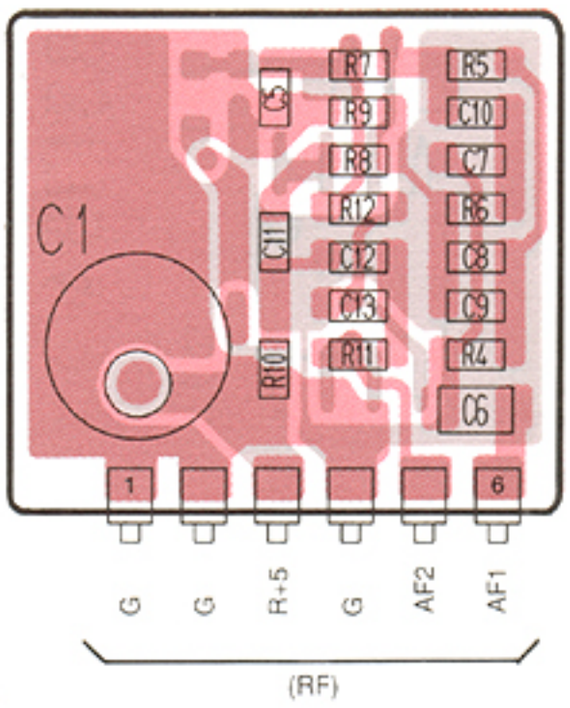


2SC4081 R
(Symbol: BR)

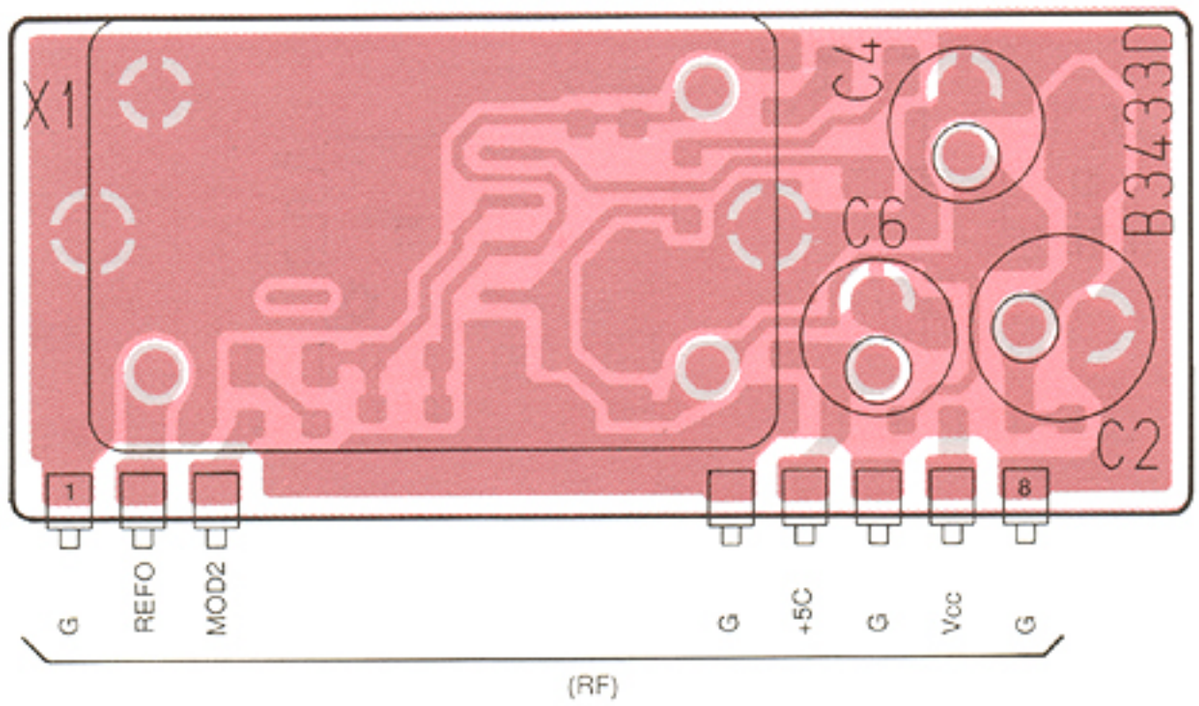


Q1

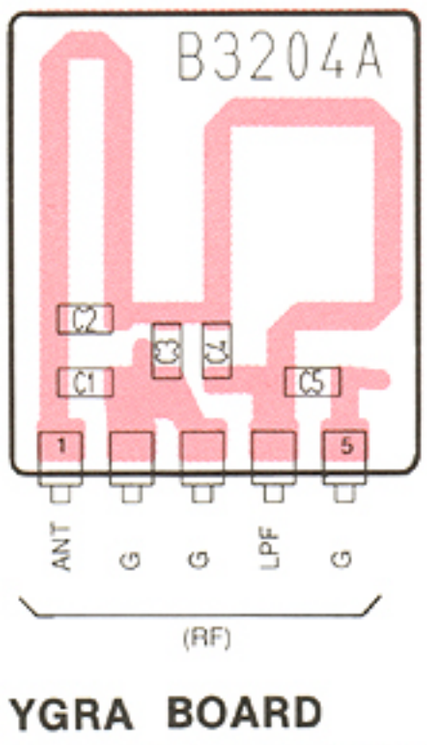
• AFFIL BOARD



• TCXO BOARD

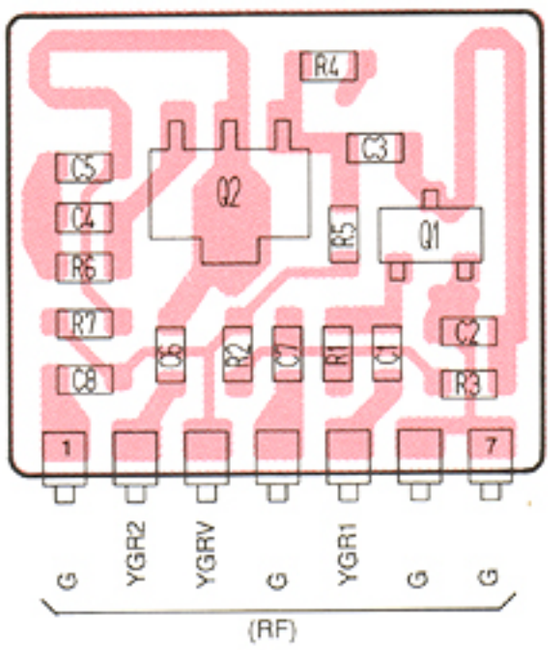


• LPF BOARD

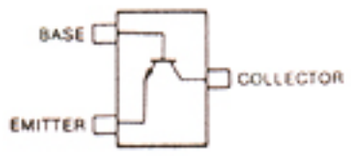


The combination of this page and the next page show the IFFIL, SQL, AFFIL and TCXO boards layout in the same configuration as the actual P.C. Board.

• YGRA BOARD

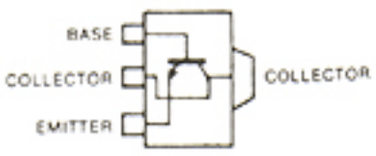


2SC3356 R25
(Symbol: R25)



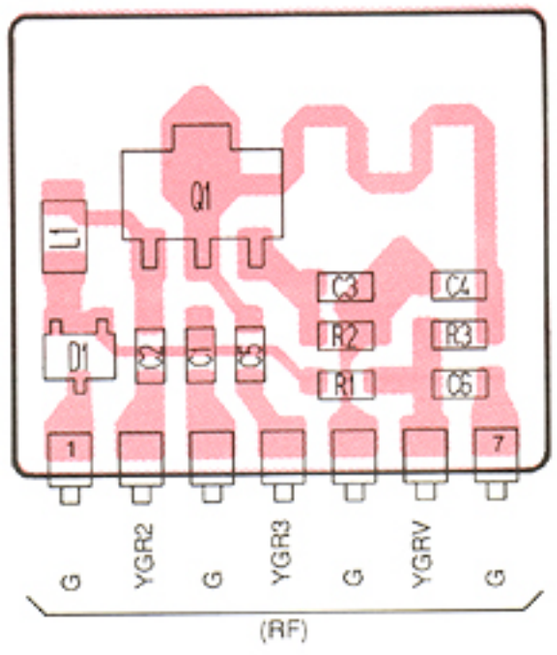
Q1

2SC3357
(Symbol: RK)

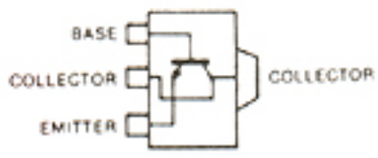


Q2

• YGRB BOARD

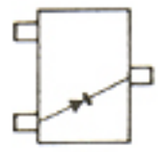


2SC3357
(Symbol: RK)



Q1

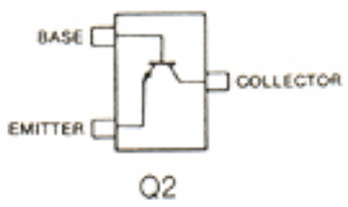
DA115
(Symbol: AU)



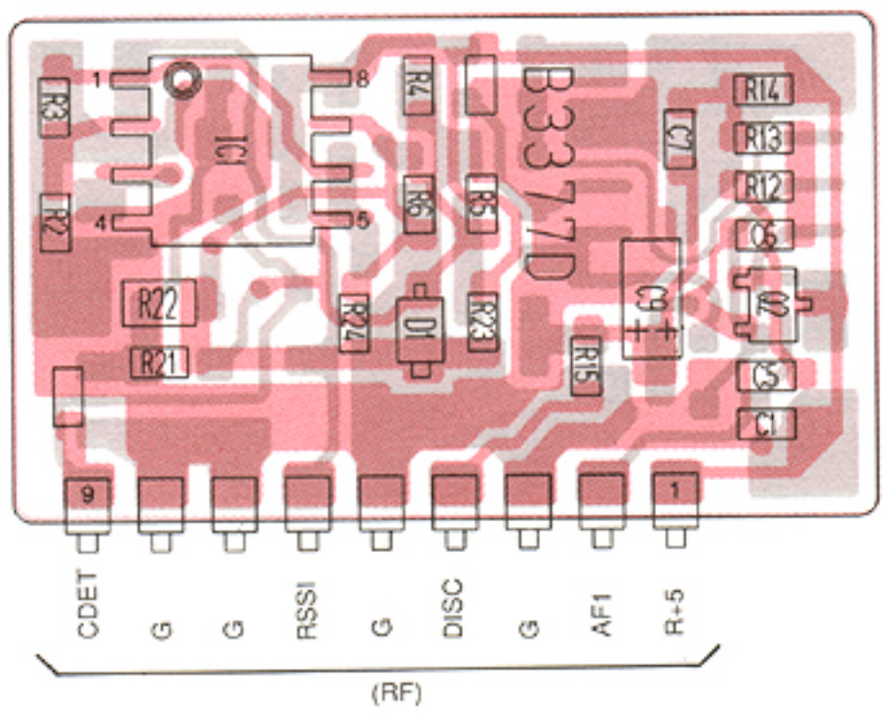
D1

• SQL BOARD

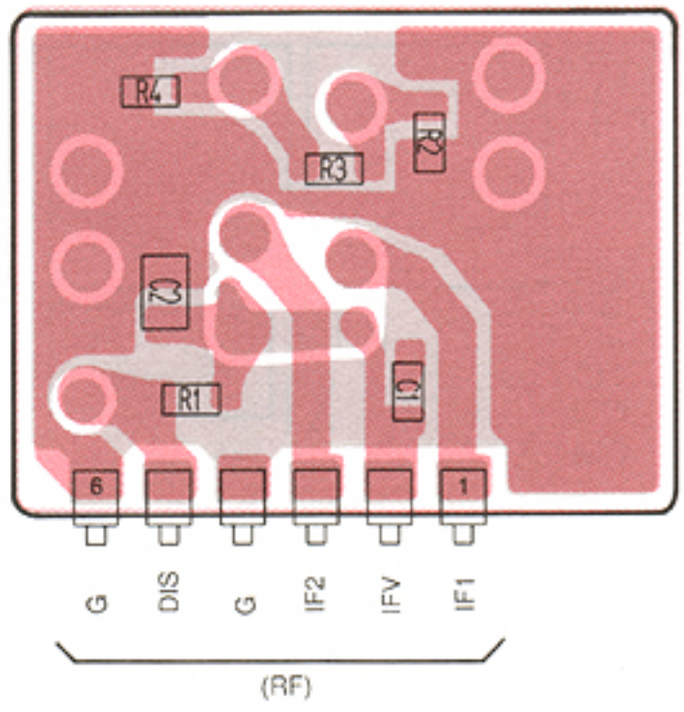
2SC4081 R
(Symbol: BR)



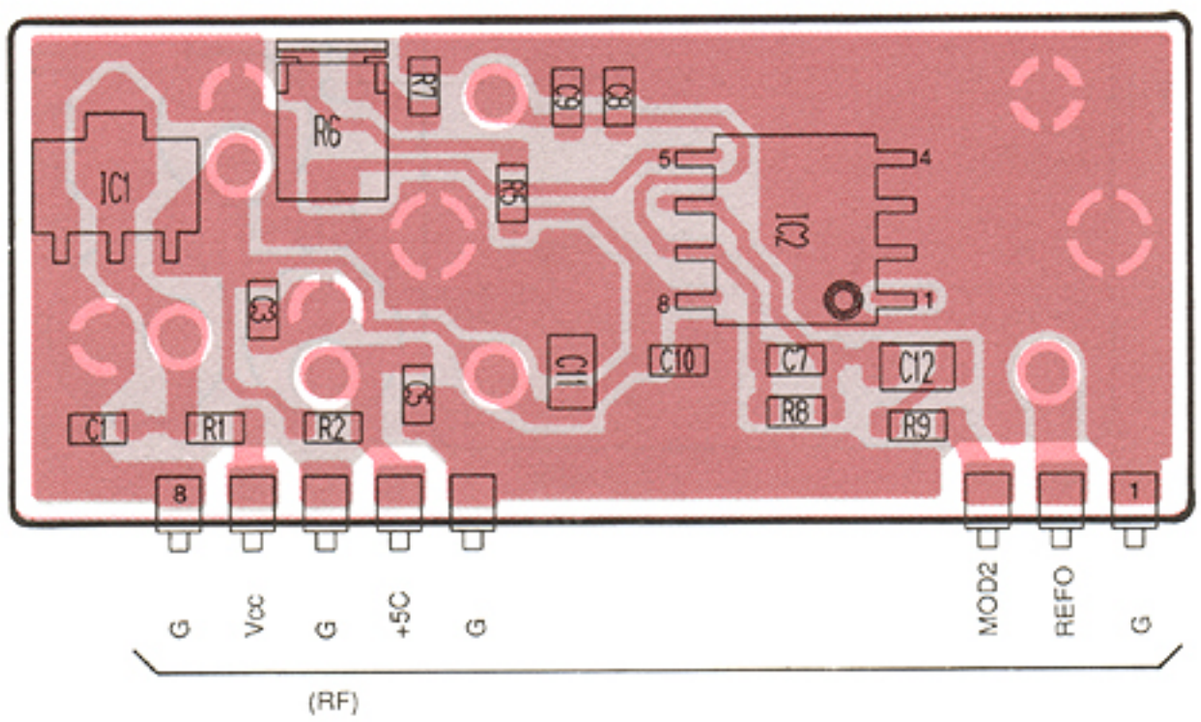
Q2



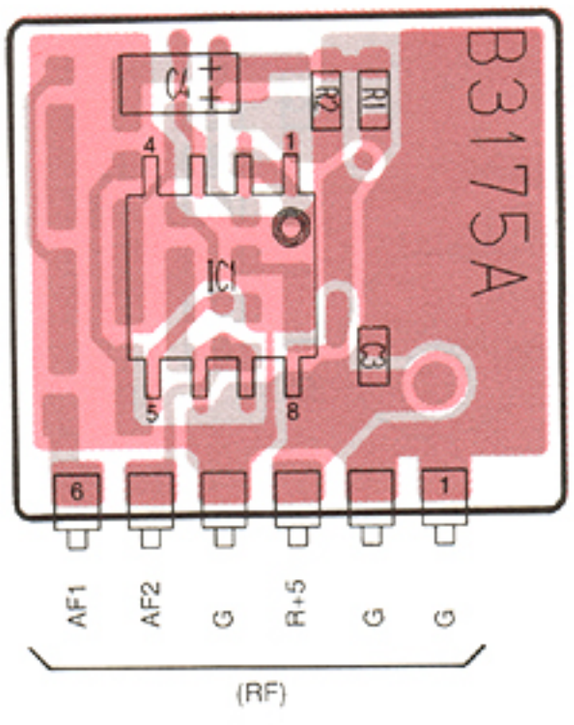
• IFFIL BOARD



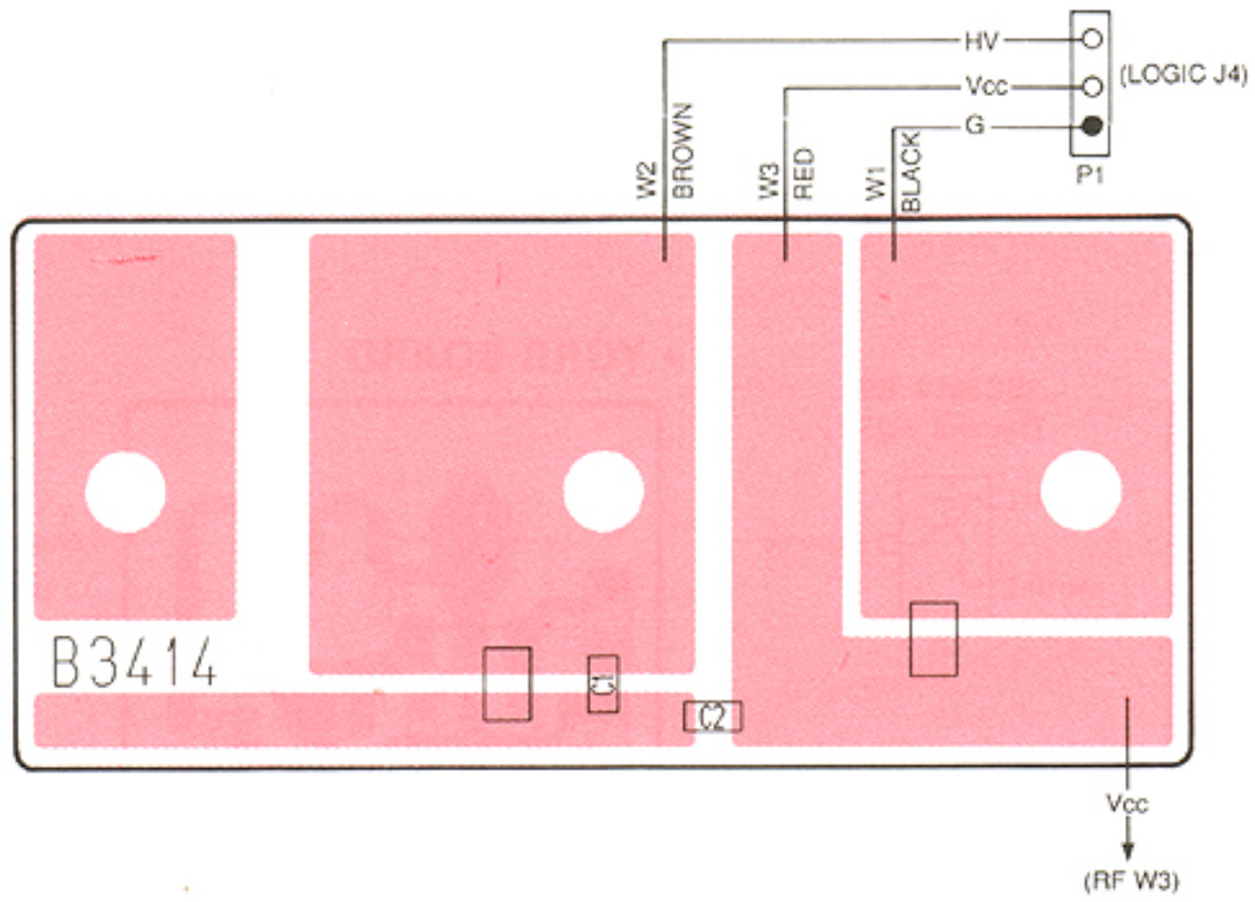
• TCXO BOARD



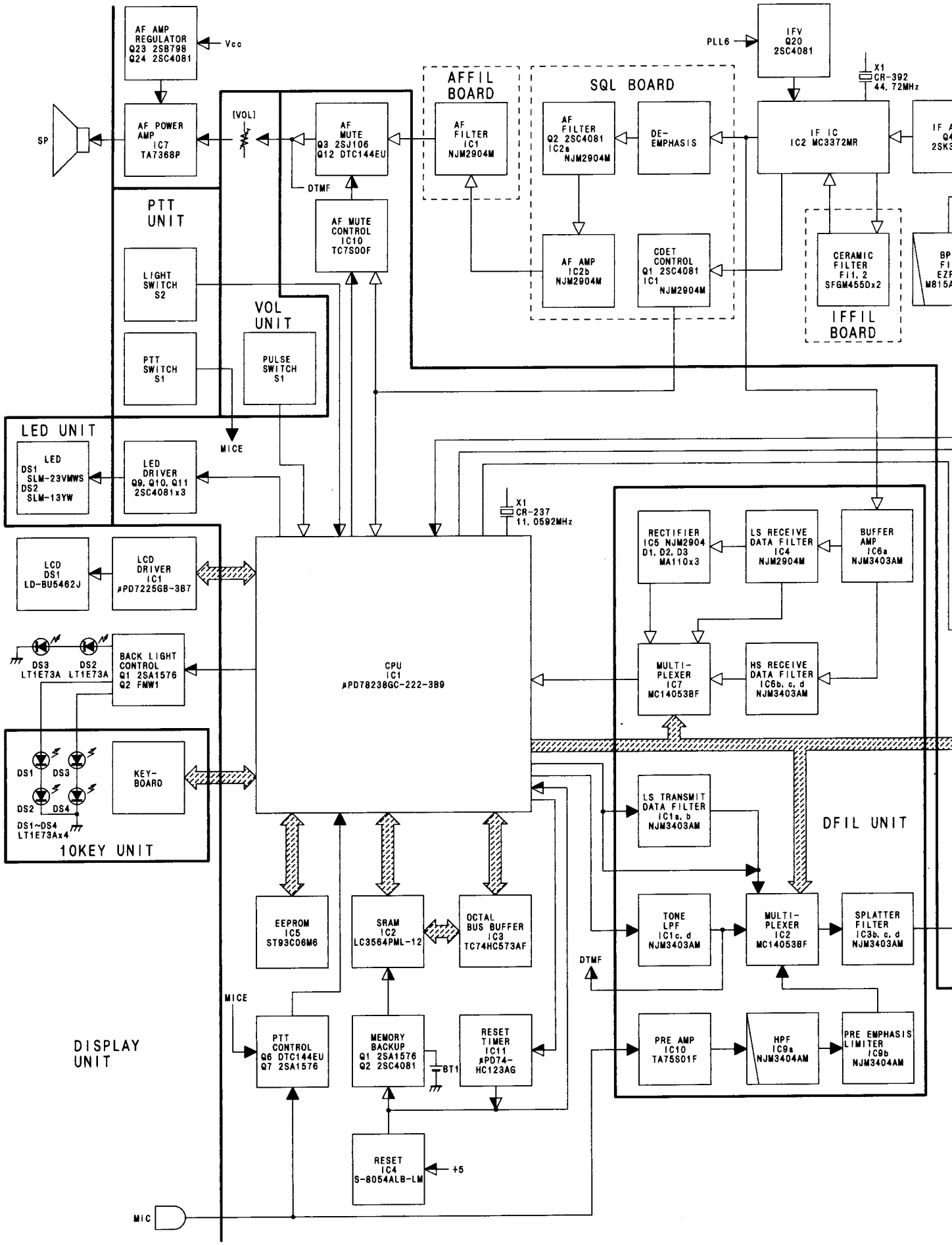
• AFFIL BOARD

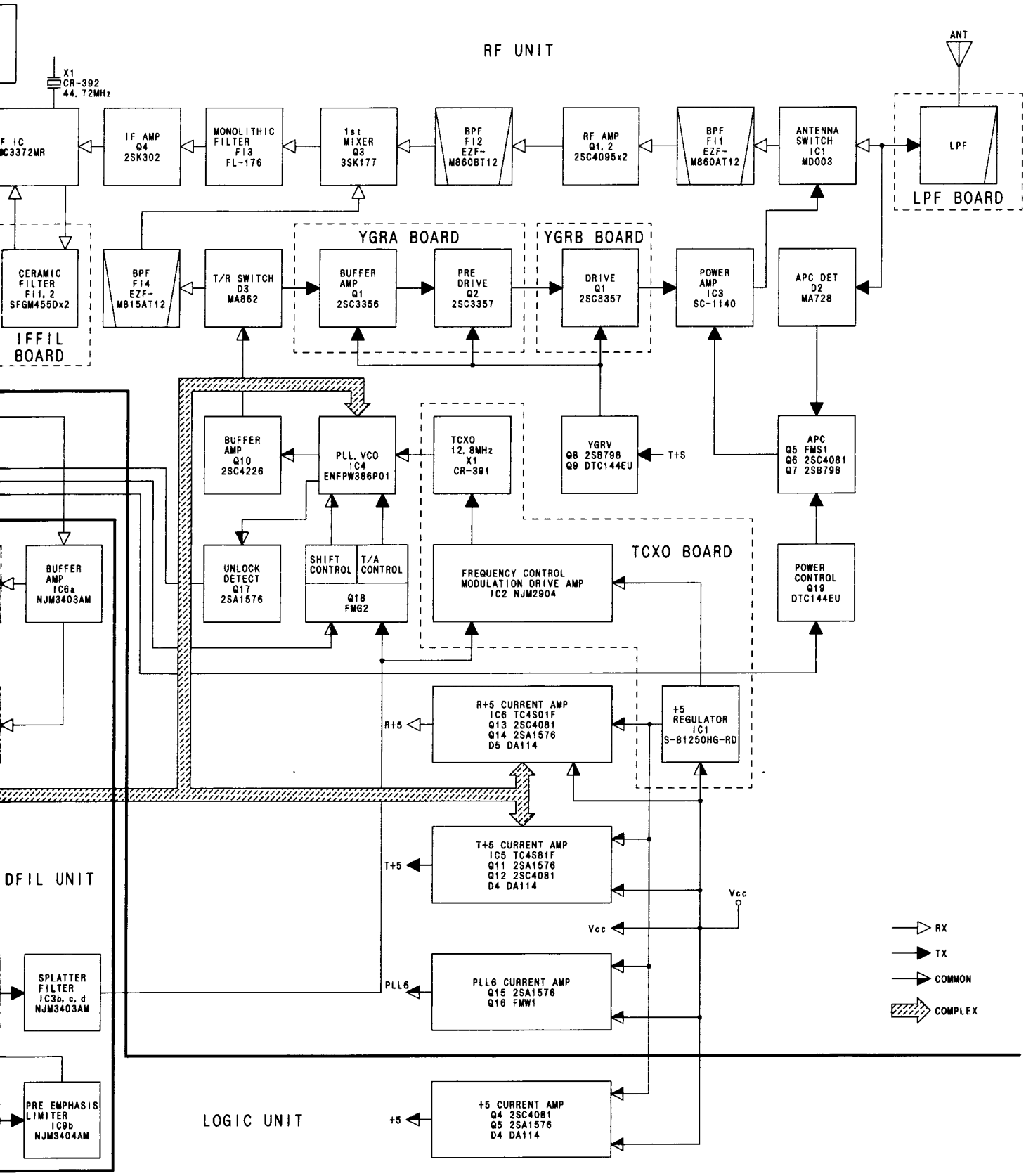


8-7 PRT UNIT

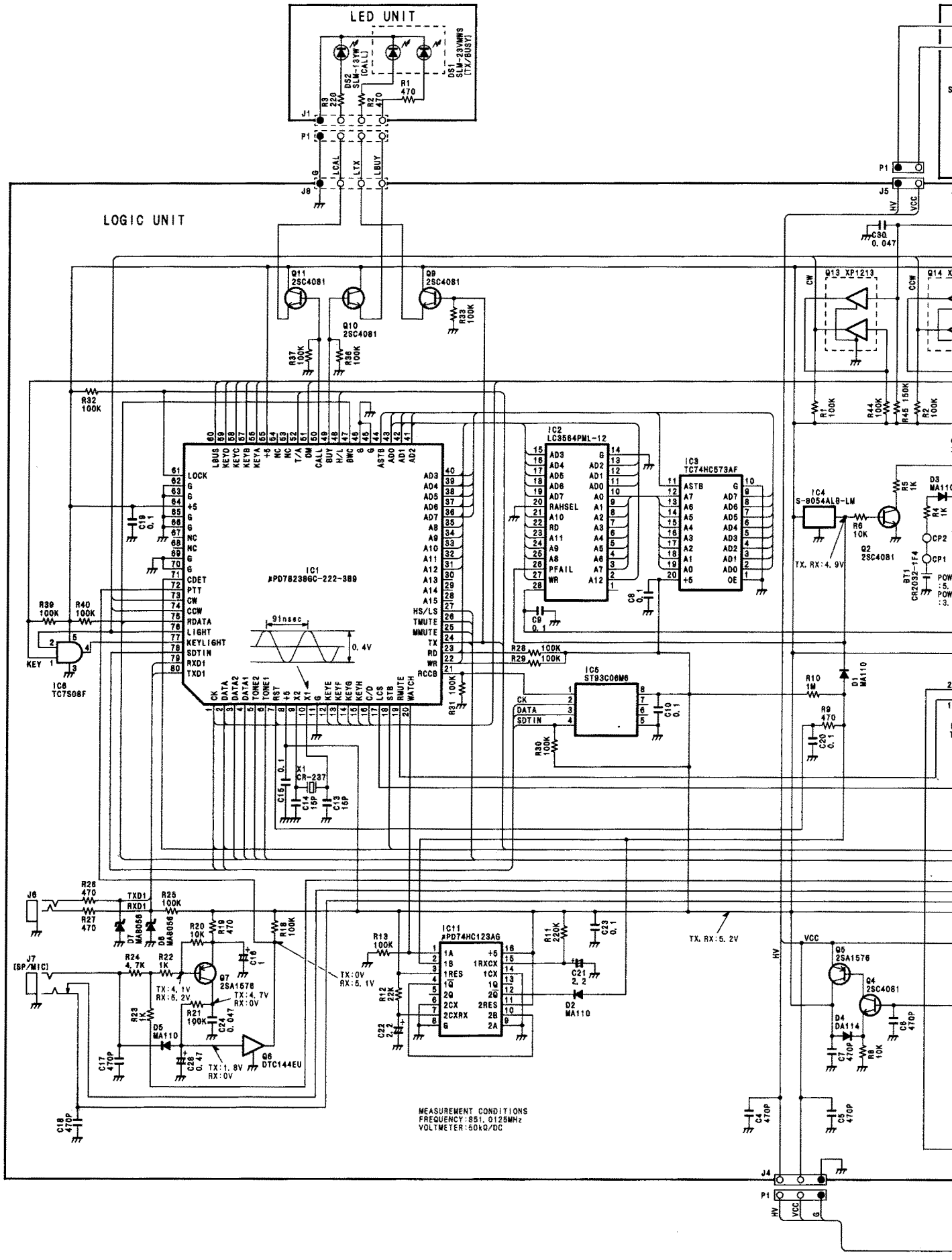


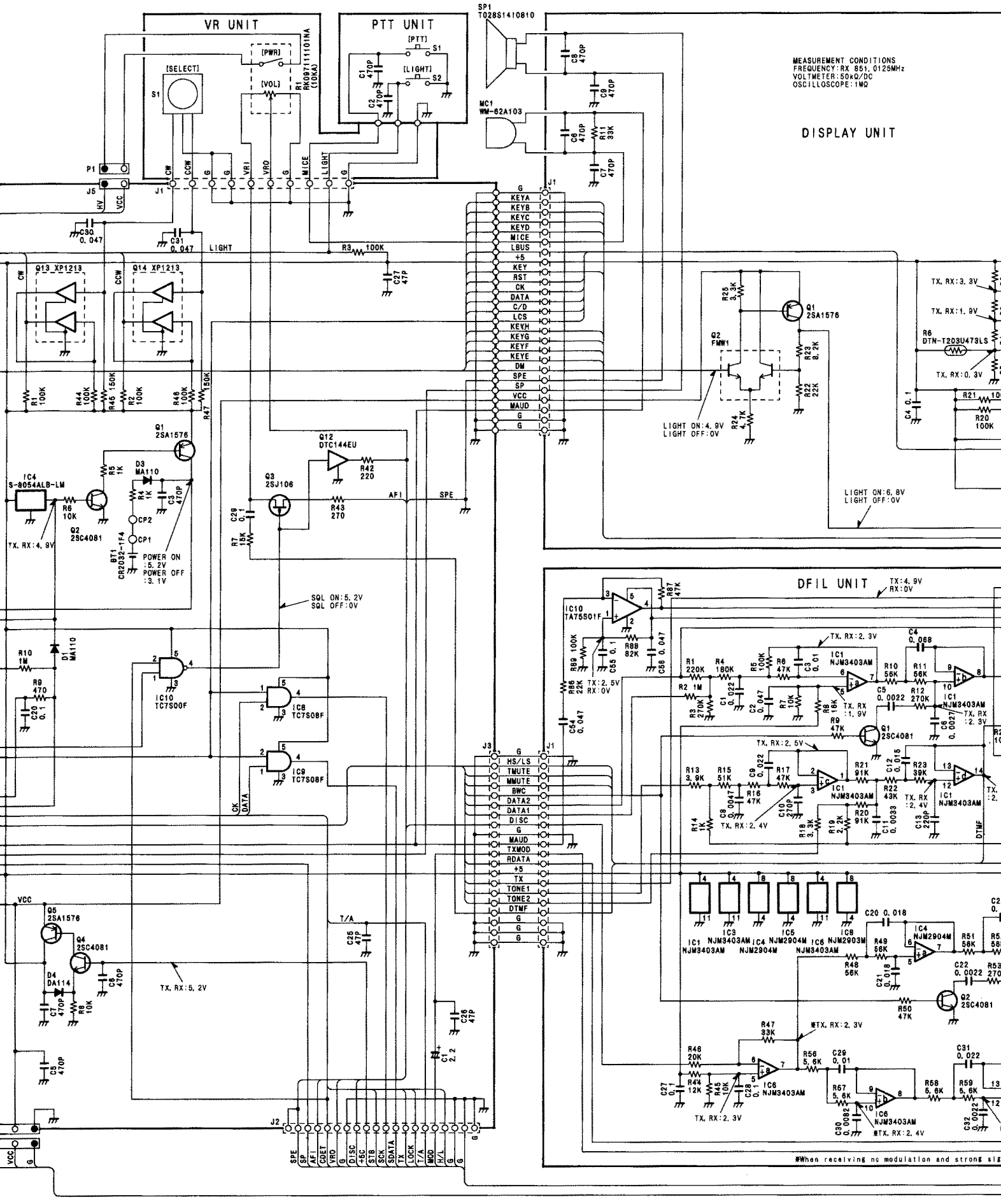
SECTION 9 BLOCK DIAGRAM

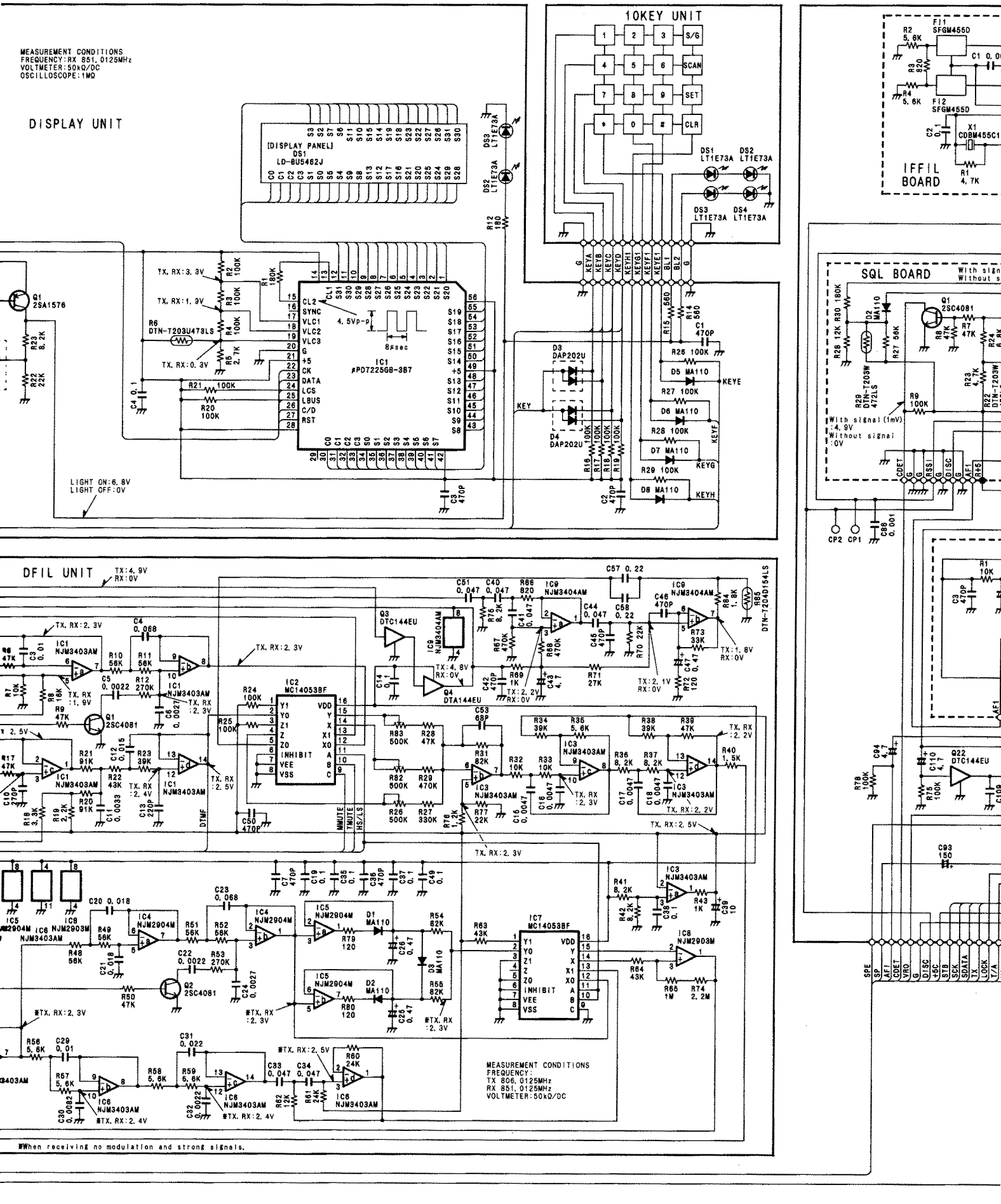


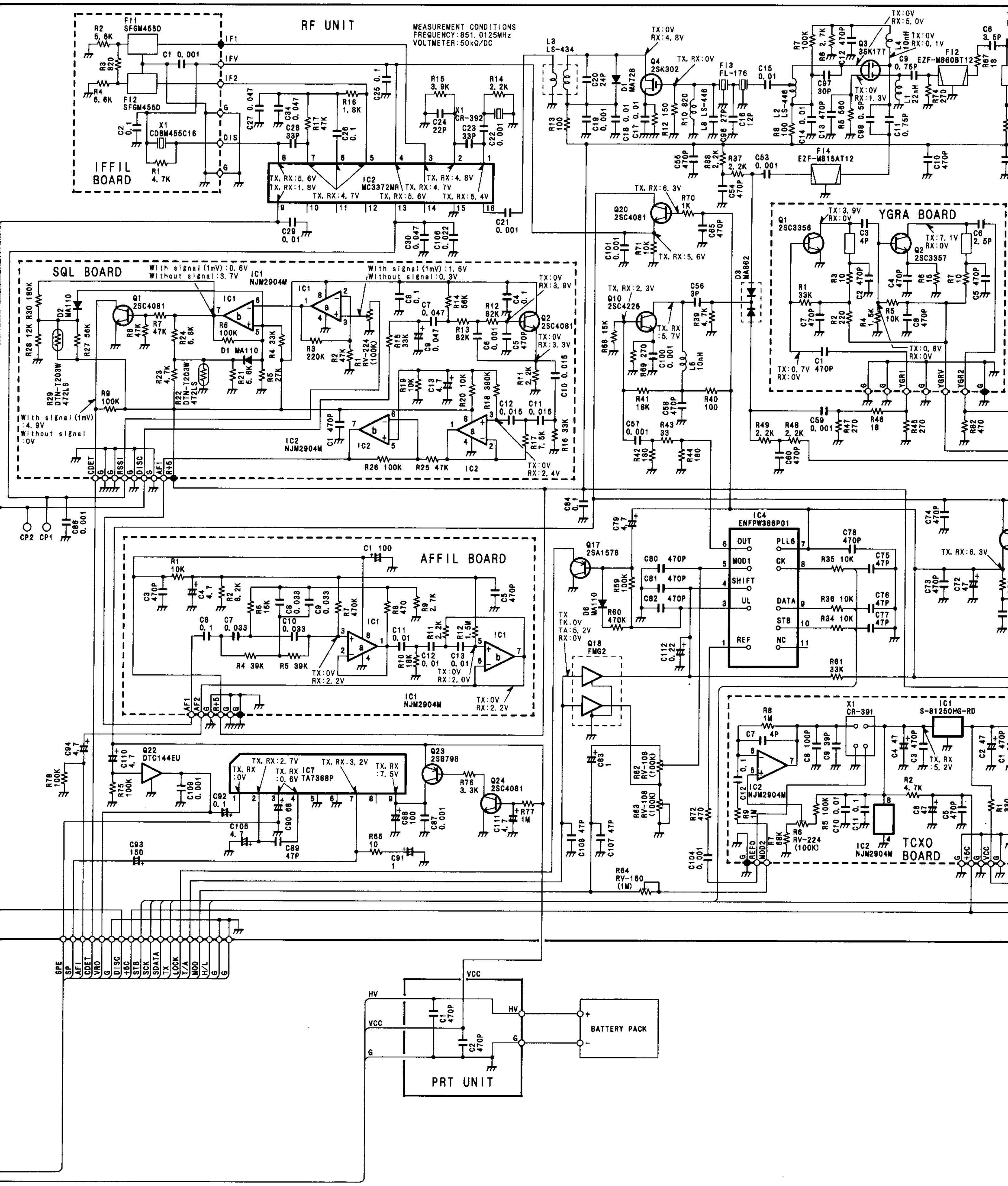

RF UNIT
ANT
X1
CR-392
44.72MHz
F IC
C3372MR
IF AMP
Q4
2SK302
MONOLITHIC
FILTER
FI3
FL-176
1st
MIXER
Q3
3SK177
BPF
FI2
EZF-
M860BT12
RF AMP
Q1, 2
2SC4095x2
BPF
FI1
EZF-
M860AT12
ANTENNA
SWITCH
IC1
MD003
LPF
LPF BOARD
CERAMIC
FILTER
FI1, 2
SFGM455Dx2
IFFIL
BOARD
BPF
FI4
EZF-
M815AT12
T/R SWITCH
D3
MA862
YGRA BOARD
BUFFER
AMP
Q1
2SC3356
PRE
DRIVE
Q2
2SC3357
YGRB BOARD
DRIVE
Q1
2SC3357
POWER
AMP
IC3
SC-1140
APC DET
D2
MA728
BUFFER
AMP
Q10
2SC4226
PLL, VCO
IC4
ENFPW386P01
TCXO
12.8MHz
X1
CR-391
YGRV
Q8 2SB798
Q9 DTC144EU
T+S
APC
Q5 FMS1
Q6 2SC4081
Q7 2SB798
BUFFER
AMP
IC6a
NJM3403AM
UNLOCK
DETECT
Q17
2SA1576
SHIFT
CONTROL
T/A
CONTROL
Q18
FMG2
FREQUENCY CONTROL
MODULATION DRIVE AMP
IC2 NJM2904
TCXO BOARD
POWER
CONTROL
Q19
DTC144EU
R+5
R+5 CURRENT AMP
IC6 TC4S01F
Q13 2SC4081
Q14 2SA1576
D5 DA114
+5
REGULATOR
IC1
S-81250HG-RD
DFIL UNIT
T+5
T+5 CURRENT AMP
IC5 TC4S81F
Q11 2SA1576
Q12 2SC4081
D4 DA114
Vcc
Vcc
SPLATTER
FILTER
IC3b, c, d
NJM3403AM
PLL6
PLL6 CURRENT AMP
Q15 2SA1576
Q16 FMW1
RX
TX
COMMON
COMPLEX
PRE EMPHASIS
LIMITER
IC9b
NJM3404AM
LOGIC UNIT
+5
+5 CURRENT AMP
Q4 2SC4081
Q5 2SA1576
D4 DA114

SECTION 10 VOLTAGE DIAGRAM

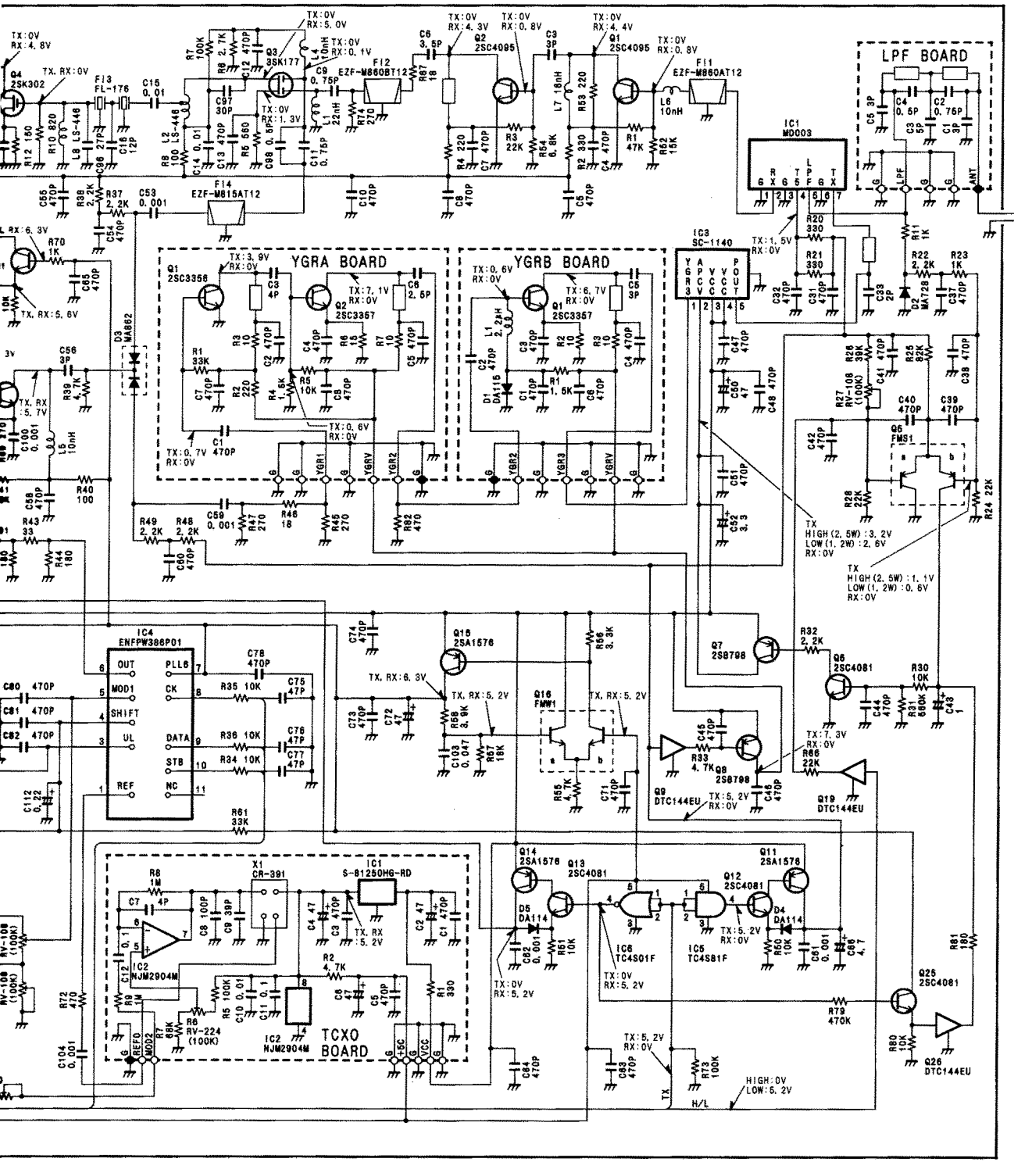



VR UNIT
PTT UNIT
DISPLAY UNIT
DFIL UNIT
[SELECT]
[PWR]
[VOL]
[PTT]
[LIGHT]
S1
S2
SP1 T0288141081O
MC1 WM-62A103
MEASUREMENT CONDITIONS
FREQUENCY: RX 851.0125MHz
VOLTMETER: 50kΩ/DC
OSCILLOSCOPE: 1MΩ
Q13 XP1213
Q14 XP1213
CW
CCW
LIGHT
Q1 2SA1576
Q2 FMW1
Q12 DTC144EU
Q3 2SJ106
Q2 2SC4081
IC4 S-8054ALB-LM
D3 MA110
D1 MA110
BT1 CR2032-1F4
POWER ON :5.2V
POWER OFF :3.1V
LIGHT ON: 4.9V
LIGHT OFF: 0V
LIGHT ON: 6.8V
LIGHT OFF: 0V
TX, RX: 4.9V
SQL ON: 5.2V
SQL OFF: 0V
AFI
SPE
IC10 TC7S00F
IC8 TC7S08F
IC9 TC7S08F
IC10 TA75S01F
IC1 NJM3403AM
IC3 NJM3403AM
IC4 NJM2904M
IC5 NJM2904M
IC6 NJM3403AM
IC8 NJM2903M
Q5 2SA1576
Q4 2SC4081
D4 DA114
T/A
TX, RX: 5.2V
TX, RX: 2.5V
RX: 0V
TX, RX: 2.3V
TX, RX: 1.9V
TX, RX: 2.5V
TX, RX: 2.4V
TX, RX: 2.3V
TX, RX: 2.4V
TX, RX: 2.3V
TX, RX: 2.4V
TX: 4.9V
RX: 0V
DTMF
VCC
G
KEYA
KEYB
KEYC
KEYD
MICE
LBUS
+5
KEY
RST
CK
DATA
C/D
LCS
KEYH
KEYG
KEYF
KEYE
DM
SPE
SP
VCC
MAUD
HS/LS
TMUTE
MMUTE
BWC
DATA2
DATA1
DISC
TXMOD
RDATA
TX
TONE1
TONE2
DTMF
SPE
SP
AFI
GDET
VRO
DISC
+5C
STB
SCK
SDATA
TX
LOCK
T/A
MOD
H/L
*When receiving no modulation and strong sig


MEASUREMENT CONDITIONS
FREQUENCY:RX 851.0125MHz
VOLTMETER:50kΩ/DC
OSCILLOSCOPE:1MΩ
DISPLAY UNIT
[DISPLAY PANEL]
DS1
LD-8U5462J
10KEY UNIT
1
2
3
S/G
4
5
6
SCAN
7
8
9
SET
*
0
#
CLR
DS1 LT1E73A
DS2 LT1E73A
DS3 LT1E73A
DS4 LT1E73A
IC1
μPD7225GB-387
CL2
SYNC
VLC1
VLC2
VLC3
G
+5
CK
DATA
LCS
LBUS
C/D
RST
4.5Vp-p
8μsec
TX, RX:3.3V
TX, RX:1.9V
TX, RX:0.3V
LIGHT ON:6.8V
LIGHT OFF:0V
KEY
KEYA
KEYB
KEYC
KEYD
KEYG1
KEYF1
KEYE1
BL1
BL2
D3 DAP202U
D4 DAP202U
D5 MA110
D6 MA110
D7 MA110
D8 MA110
KEYE
KEYF
KEYG
KEYH
IFFIL BOARD
F11 SFGM455D
F12 SFGM455D
X1 CDBM455C1
SQL BOARD
Q1 2SC4081
D2 MA110
With signal(1mV):4.9V
Without signal:0V
CDET
RSSI
DISC
AF1
CP2
CP1
DFIL UNIT
TX:4.9V
RX:0V
IC1 NJM3403AM
IC2 MC14053BF
IC3 NJM3403AM
IC4 NJM2904M
IC5 NJM2904M
IC6 NJM3403AM
IC7 MC14053BF
IC8 NJM2903M
IC9 NJM3404AM
Q3 DTC144EU
Q4 DTA144EU
Q22 DTC144EU
DTMF
MMUTE
TMUTE
HS/LS
MEASUREMENT CONDITIONS
FREQUENCY:
TX 806.0125MHz
RX 851.0125MHz
VOLTMETER:50kΩ/DC
#When receiving no modulation and strong signals.



RF UNIT
MEASUREMENT CONDITIONS
FREQUENCY:851.0125MHz
VOLTMETER:50kΩ/DC
IFFIL BOARD
F11 SFGM455D
F12 SFGM455D
X1 CDBM455C16
IC2 MC3372MR
SQL BOARD
IC1 NJM2904M
IC2 NJM2904M
With signal (1mV):0.6V
Without signal:3.7V
With signal (1mV):1.6V
Without signal:0.3V
With signal (1mV):4.9V
Without signal:0V
AFFIL BOARD
YGRA BOARD
Q1 2SC3356
Q2 2SC3357
IC4 ENFPW386P01
OUT
MOD1
SHIFT
UL
REF
PLL6
CK
DATA
STB
NC
TCXO BOARD
X1 CR-391
IC1 S-81250HG-RD
IC2 NJM2904M
Q17 2SA1576
Q18 FMG2
Q20 2SC4081
Q10 2SC4226
Q4 2SK302
Q3 3SK177
F13 FL-176
F14 EZF-M815AT12
F12 EZF-M860BT12
IC7 TA7368P
Q22 DTC144EU
Q23 2SB798
Q24 2SC4081
SPE
AFI
CDET
VRO
G
DISC
+5C
STB
SCK
SDATA
TX
LOCK
T/A
MOD
H/L
G
G
CP2
CP1
HV
VCC
G
PRT UNIT
BATTERY PACK


LPF BOARD
YGRA BOARD
YGRB BOARD
TCXO BOARD
IC1 MD003
IC3 SC-1140
IC4 ENFPW386P01
[ANT]
J1 (CHASSIS)
TX: 0V RX: 4. 8V
TX: 0V RX: 5. 0V
TX: 0V RX: 4. 3V
TX: 0V RX: 0. 8V
TX: 0V RX: 4. 4V
TX: 0V RX: 0. 8V
TX: 0V RX: 0. 1V
TX: 0V RX: 1. 3V
TX: 3. 9V RX: 0V
TX: 7. 1V RX: 0V
TX: 0. 6V RX: 0V
TX: 6. 7V RX: 0V
TX: 0. 7V RX: 0V
TX: 1. 5V RX: 0V
TX: 6. 3V
TX, RX: 5. 6V
TX, RX: 5. 7V
TX, RX: 6. 3V
TX, RX: 5. 2V
TX: 7. 3V RX: 0V
TX: 5. 2V RX: 0V
TX: 0V RX: 5. 2V
TX: 5. 2V RX: 0V
TX HIGH (2. 5W) : 3. 2V LOW (1. 2W) : 2. 6V RX: 0V
TX HIGH (2. 5W) : 1. 1V LOW (1. 2W) : 0. 6V RX: 0V
HIGH: 0V LOW: 5. 2V
TX
H/L

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