



SERVICE MANUAL

UHF REPEATER

IC-RP4520

INTRODUCTION

This service manual describes the latest service information for the **IC-RP4520** UHF REPEATER at the time of publication.

DANGER

NEVER connect the repeater to a DC backup battery that uses more than 16 V. This will ruin the repeater.

DO NOT expose the repeater to rain, snow or any liquids.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the repeater'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>

| | | | | | |
|------------|-------|----------------|-----------|-----------|-----------|
| 1110001000 | IC | μPC1651G | IC-RP4520 | TX UNIT | 5 pieces |
| 8810004690 | Screw | BiH M4×5 ZK BS | IC-RP4520 | Top cover | 10 pieces |

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

REPAIR NOTE

1. Make sure a problem is internal before disassembling the repeater.
2. **DO NOT** open the repeater until the repeater 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 repeater 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 repeater 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 repeater.

VERSIONS

| VERSION NUMBER | REGION | SYMBOL | MODE | OUTPUT POWER |
|----------------|--------|--------|---------|--------------|
| #01 | Italy | ITA | 16K0F3E | 10 W |
| #02 | Europe | EUR | 16K0F3E | 25 W |
| #03 | U.S.A. | USA | 16K0F3E | 25 W |
| #04 | Europe | EUR-1 | 16K0F3E | 50 W |
| #05 | U.S.A. | USA-1 | 16K0F3E | 50 W |
| #06 | Italy | ITA-1 | 8K50F3E | 10 W |
| #07 | Europe | EUR-2 | 8K50F3E | 25 W |
| #08 | U.S.A. | USA-2 | 8K50F3E | 25 W |
| #09 | Europe | EUR-3 | 8K50F3E | 50 W |
| #10 | U.S.A. | USA-3 | 8K50F3E | 50 W |
| #21 | U.S.A. | USA-20 | 16K0F3E | 25 W |
| #22 | Europe | EUR-20 | 16K0F3E | 25 W |
| #23 | Europe | EUR-21 | 16K0F3E | 25 W |
| #24 | U.S.A. | USA-21 | 8K50F3E | 25 W |
| #25 | Europe | EUR-22 | 8K50F3E | 25 W |
| #26 | Europe | EUR-23 | 8K50F3E | 25 W |

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

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 400~430 MHz (low frequency versions)
450~470 MHz (high frequency versions)
- Mode : FM (16K0F3E) (#01~#05, #21~#23)
FM (8K50F3E) (#06~#10, #24~#26)
- Initial tuning step : 5 or 12.5 kHz (selectable)
- Antenna impedance : 50 Ω unbalanced
- Power supply requirement :

| VERSION | VOLTAGE |
|---------|--|
| U.S.A. | 117 V AC or 13.8 V DC \pm 15 % (negative ground) |
| Europe | 240 V AC or 13.8 V DC \pm 15 % (negative ground) |
| Italy | 220 V AC or 13.8 V DC \pm 15 % (negative ground) |

- Power consumption and current drain :

| Version | Power consumption*1 | Current drain*2 | | |
|---------|---------------------|-----------------|-----------|-------------------|
| | | Transmit | Squelched | Max. audio output |
| 10 W | 125 VA | 7.0 A | 1.0 A | 1.2 A |
| 25 W | 160 VA | 10.0 A | | |
| 50 W | 245 VA | 17.0 A | | |

*1 with AC power, *2 at 13.8 V DC

- Usable temperature range : $-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ($+14^{\circ}\text{F} \sim +140^{\circ}\text{F}$)
- Frequency stability : $\pm 0.0001\%$ ($-10^{\circ}\text{C} \sim +60^{\circ}\text{C}$; $+14^{\circ}\text{F} \sim +140^{\circ}\text{F}$)
- Dimensions : 425 (W) \times 149 (H) \times 368 (D) mm; 16.7 (W) \times 5.9 (H) \times 14.5 (D) in
(Projections not included)
- Weight : 17 kg (37.5 lb)

■ TRANSMITTER

- Output power : 10 W (#01, #06)
25 W (#02, #03, #07, #08, #21~#26)
50 W (#04, #05, #09, #10)
- Modulation system : Variable reactance frequency modulation
- Max. frequency deviation : ± 5.0 kHz (#01~#05, #21~#23)
 ± 2.5 kHz (#06~#10, #24~#26)
- Spurious emissions : -70 dB
- Microphone impedance : 600 Ω

■ RECEIVER

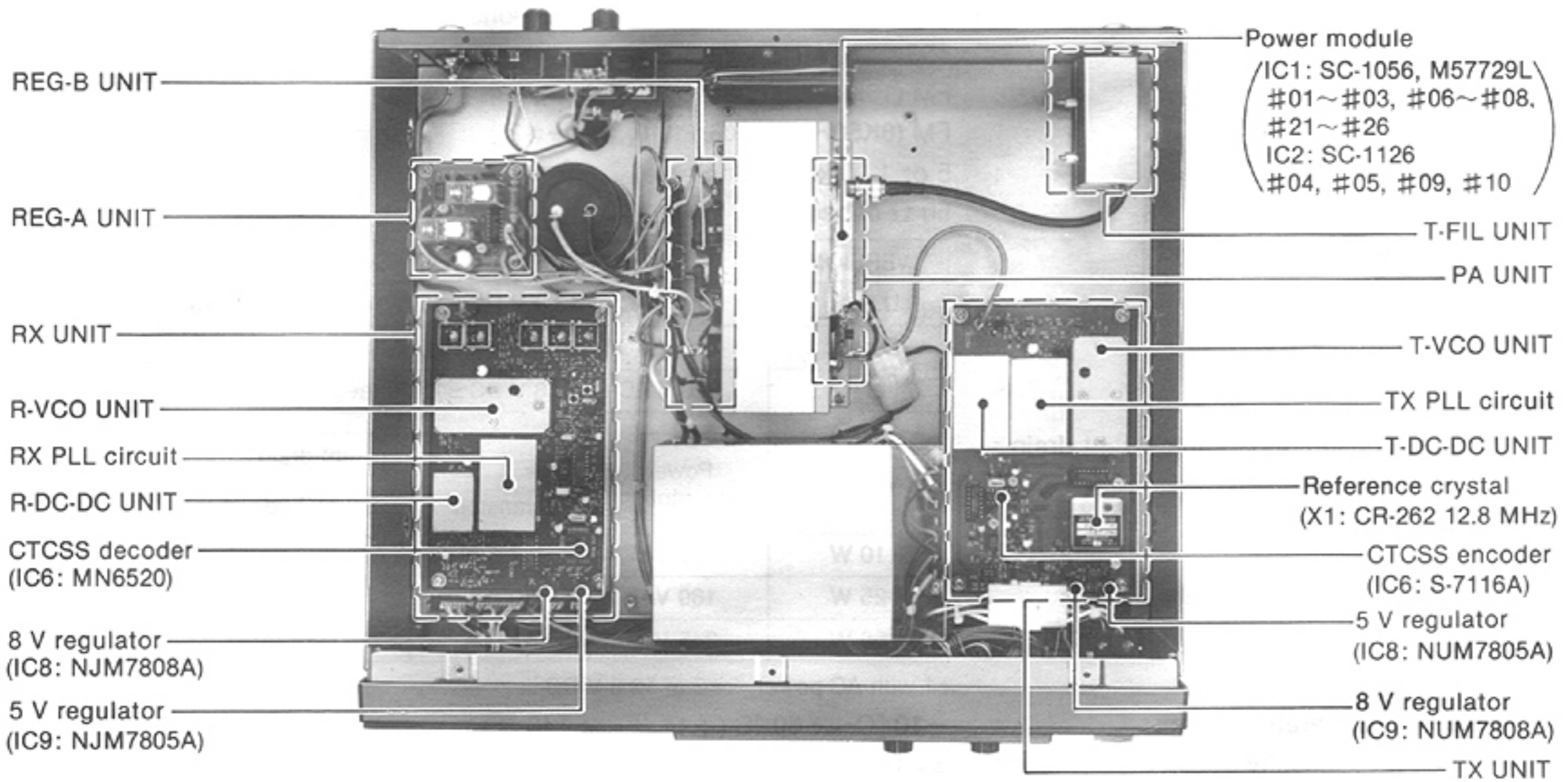
- Receive system : Double-conversion superheterodyne
- Intermediate frequencies : 1st 30.875 MHz
2nd 455 kHz
- Sensitivity : 1.0 μV for 12 dB SINAD
- Tight squelch sensitivity : 1.4 μV
- Adjacent channel selectivity : -70 dB (#01~#05, #21~#23)
 -60 dB (#06~#10, #24~#26)
- Spurious rejection : -70 dB
- Audio output power : 1.7 W at 10 % distortion with an 8 Ω load
- Audio output impedance : 8 Ω

A duplexer is separately required when only one antenna is used for operation.

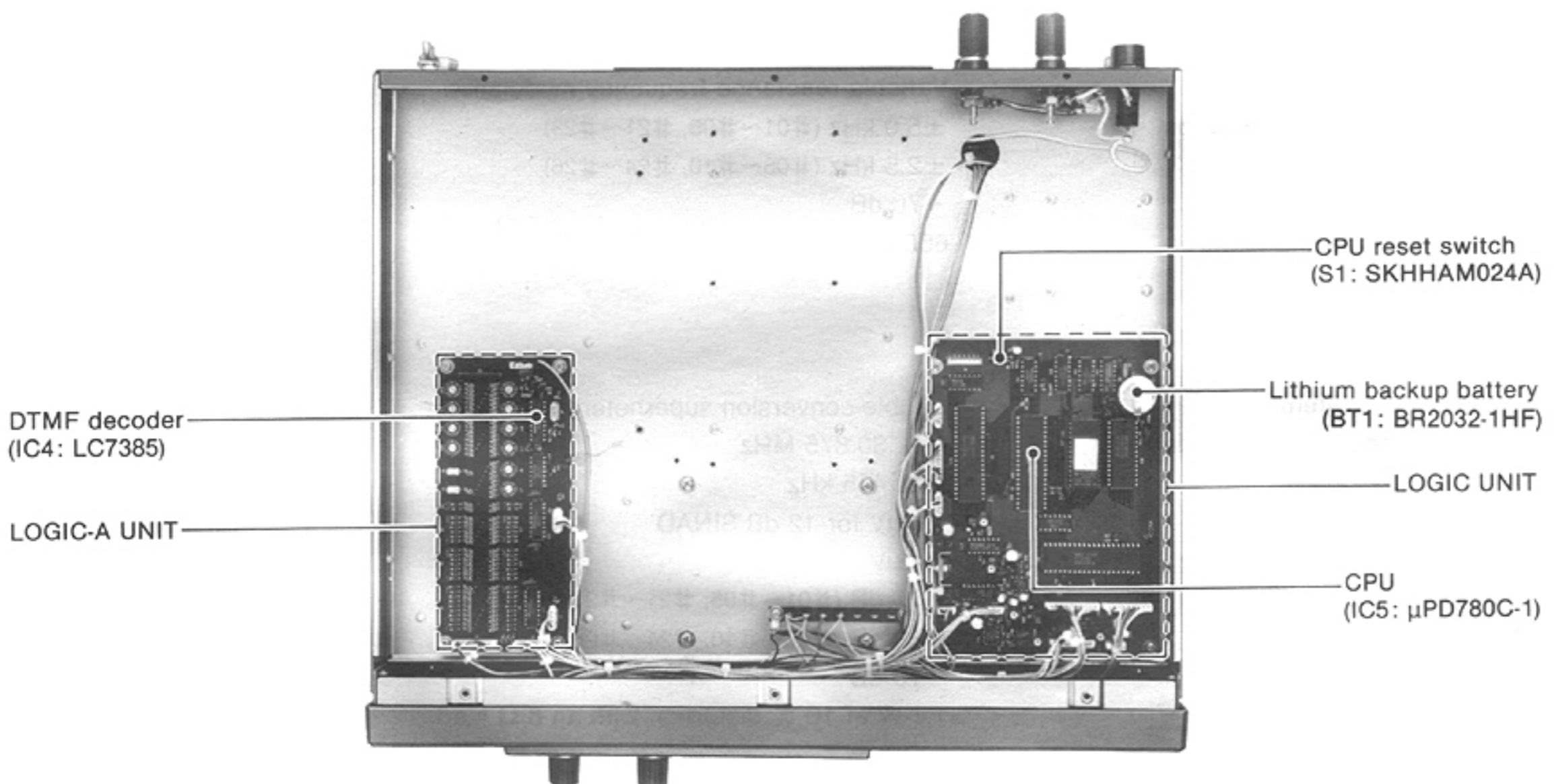
All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

• TOP VIEW



• BOTTOM VIEW



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

3-1-1 RF CIRCUIT (RX UNIT)

Received signals enter the antenna connector (J6) and pass through a bandpass filter (C1, C2, C4~C6, C8, L1, L2). The filtered signals are applied to an RF amplifier (Q1). The RF amplifier (Q1) employs an FET (3SK121) which expands the dynamic range with low noise. The RF signals are applied to a bandpass filter (C14, C15, C17~C19, C21~C23, C25, L4~L6).

3-1-2 1st MIXER AND 1st IF CIRCUITS (RX UNIT)

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

The filtered signals are applied to a 1st mixer (Q2) and are then mixed with a 419.125 MHz~439.125 MHz (high frequency versions) or a 369.125 MHz~399.125 MHz (low frequency versions) 1st LO signal from the PLL circuit to produce a 30.875 MHz 1st IF signal.

The 30.875 MHz 1st IF signal is applied to F11. F11 is an MCF (Monolithic Crystal Filter) which suppresses out-of-band signals. The 1st IF signal is applied to a 1st IF amplifier (Q3).

3-1-3 2nd IF AND DEMODULATOR CIRCUITS (RX 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 amplified signal is applied to a 2nd mixer (Q4) and is then mixed with a 30.42 MHz 2nd LO signal to produce a 455 kHz 2nd IF signal.

The 455 kHz 2nd IF signal is applied to a ceramic filter (F12) where unwanted signals are suppressed and then to a limiter amplifier section in pin 5 of IC1.

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

The 2nd IF signal from the limiter amplifier (IC1, pin 5) is applied to the quadrature detector section (IC1, pin 8) and ceramic discriminator X2 to demodulate the 2nd IF signal into an AF signal. The AF signal is output from pin 9 of IC1.

3-1-4 SQUELCH CIRCUIT (RX AND LOGIC UNITS)

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

Some noise components in the AF signal from pin 9 of IC1 are applied to an active filter section (IC1, pin 10) via a de-emphasis circuit (R26, C51~C53). This circuit is an integrated circuit with frequency characteristics of -6 dB/octave. The [SQUELCH] control (R2) on the FRONT PANEL adjusts the input level of pin 10 of IC1.

The active filter section amplifies noise components of frequencies of 20 kHz and above and outputs the resulting signals from pin 11. Output signals are rectified by D4 and D5 and are then converted to DC voltage.

When the rectified noise voltage is "HIGH", Q5 turns ON. The collector of Q5 outputs the squelch signal. The signal is applied to pin 16 of IC9 on the LOGIC UNIT through the "SQL-S" signal line.

When the rectified noise voltage is "LOW", Q5 turns OFF. The collector of Q9 outputs the busy signal. The signal is applied to the [BUSY] indicator on the LED UNIT through the "BUSY" signal line. The [BUSY] indicator lights up in green.

• 2nd IF AND DEMODULATOR CIRCUITS

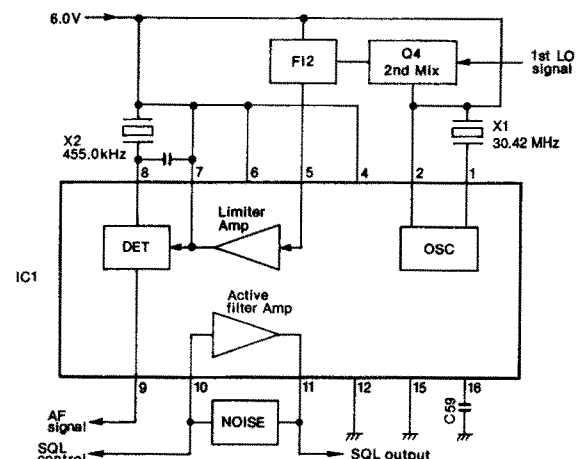


Fig. 1

3-1-5 AF AMPLIFIER CIRCUIT (RX AND AF UNITS)

The AF signal output from pin 9 of IC1 is applied to a monolithic IC (IC2, pin 3) which functions as a high-pass and low-pass filter. The filtered signal is output from pin 7 of IC2 and is then applied to the [VOLUME] control (R1) on the FRONT PANEL through an AF mute switch (Q6). When the squelch is closed, Q6 cuts off the AF signal as an AF mute switch. The AF signal is power-amplified at an AF power amplifier (IC1) on the AF UNIT to drive a speaker.

3-2 TRANSMITTER CIRCUITS

3-2-1 MICROPHONE AMPLIFIER CIRCUIT (TX AND T-VCO UNITS)

The AF signal from the microphone is applied to a microphone amplifier (IC10, pin 6). The amplified signal is output from pin 7 of IC10 and applied to pin 2 of IC10 to mix with the "MOD" signal from IC15 on the LOGIC UNIT. The signal is output from pin 1 of IC10 and applied to a limiter (IC7, pin 3). The AF signal obtains +6 dB/octave pre-emphasis at C53 and R51 which are connected to pin 2.

The output signal from pin 1 of IC7 is applied to the splatter filter circuit (IC7, R55, R59, R60, C56, C61, C62) which attenuates the components of frequencies of 3 kHz and above. Pin 7 of IC7 outputs a "MOD" signal. The "MOD" signal is applied to the T-VCO UNIT.

3-2-2 MODULATION CIRCUIT (T-VCO AND TX UNITS)

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

The "MOD" signal from pin 7 of IC7 changes the reactance of varactor diodes (D3) to modulate the oscillated signal at T-VCO (Q1). The oscillated signal is buffer-amplified at Q2.

The signal passes through the buffer-amplifiers (IC1 and Q2) on the TX UNIT and then is applied to the drive amplifier circuit depending on the output power.

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

(1) 10 W AND 25 W TYPES

The drive amplifier (Q1) amplifies the signal to obtain 200 mW.

The control voltage from the APC circuit is applied to the collector of Q1 for stable RF output power from a power amplifier (IC1).

(2) 50 W TYPE

The drive amplifier (IC1) amplifies the signal to obtain 7 W.

The control voltage from the APC circuit is applied to IC1 (pin 2) for stable RF output power from a power amplifier (IC2).

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

(1) 10 W AND 25 W TYPES

IC1 is a power module which provides a stable 10 W or 25 W (DC 13.8V) of output power.

An RF signal from the drive amplifier (Q1) is applied to pin 1 of IC1. The amplified signal is output from pin 4 of IC1 and is applied to the RF detector circuit and low-pass filter circuit. Then, the filtered signal is applied to the T-FIL UNIT through J3 and the antenna connector.

(2) 50 W TYPE

IC2 is a power module which provides a stable 50 W (DC 13.8 V) of output power.

An RF signal from the drive amplifier (IC1, pin 4) is applied to pin 1 of IC2. The amplified signal is output from pin 4 of IC2 and applied to the antenna connector through the RF detector circuit and low-pass filter circuit. Then, the filtered signal is applied to the T-FIL UNIT through J3 and the antenna connector.

• MICROPHONE AMPLIFIER CIRCUIT

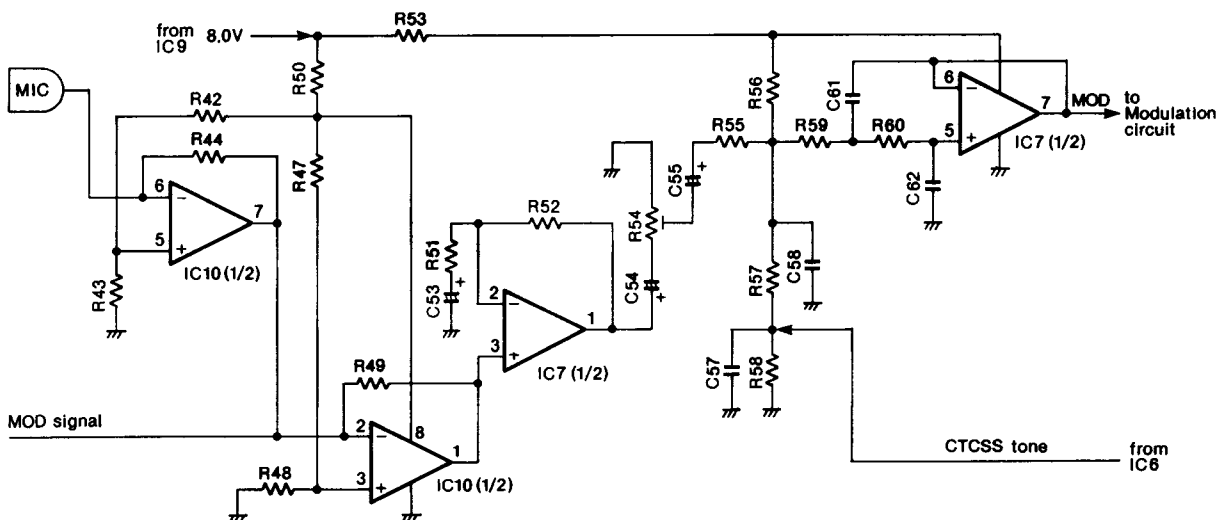


Fig. 2

3-2-5 APC CIRCUIT (PA UNIT)

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

(1) 10 W AND 25 W TYPES

The APC mismatch detector circuit consists of C13, C14, C17, C18, C25, D2, D3, L3, R8 and R9. When the antenna impedance is matched at 50 Ω , the detected voltage by D2 and D3 is at its minimum. The detected voltage is applied to a differential amplifier (IC2, pin 6). The APC reference voltage is applied to pin 5 of IC2.

When the antenna impedance is mismatched, the voltage of IC2 (pin 6) exceeds the reference voltage of IC2 (pin 5). The output level from IC2 (pin 7) decreases. Q2 amplifies the current from the differential amplifier (IC2) which controls Q3. Q3 changes the supply voltage to Q1 and IC1.

This decreases the output power from the drive amplifier (Q1) and power amplifier (IC1) until the input voltage of IC2 (pin 6) reaches the same level as pin 5 of IC2.

• APC CIRCUIT

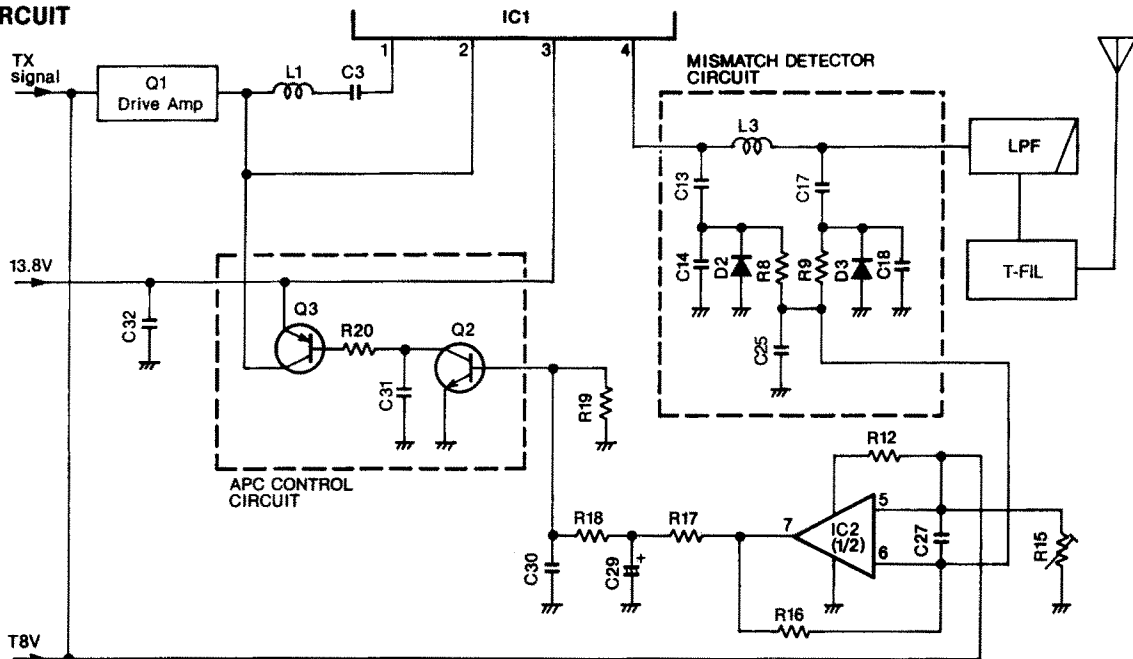


Fig. 3

(2) 50 W TYPE

The APC mismatch detector circuit consists of C18, C19, C22, C23, C30, D1, D2, L1, R5 and R6. When the antenna impedance is matched at 50 Ω , the detected voltage by D1 and D2 is at its minimum. The detected voltage is applied to a differential amplifier (IC4, pin 6). The APC reference voltage is applied to pin 5 of IC4.

When the antenna impedance is mismatched, the voltage in pin 6 of IC4 exceeds the reference voltage in pin 5 of IC4. The output level from pin 7 of IC4 decreases. Q1 amplifies the current from the differential amplifier (IC4) which controls Q2. Q2 changes the supply voltage to IC1 and IC2.

This decreases the output power from the drive amplifier (IC1) and power amplifier (IC2) until the input voltage in pin 6 of IC4 reaches the same level as pin 5 of IC4.

• APC CIRCUIT

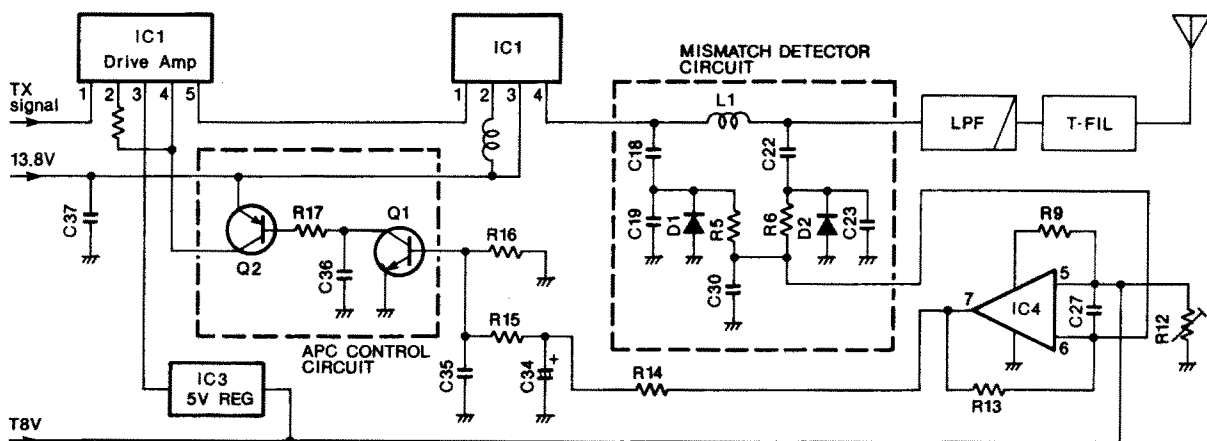


Fig. 4

3-3 PLL CIRCUITS

3-3-1 GENERAL

Each receiver and transmitter circuit has an independent PLL circuit for controlling frequencies. All PLL circuits are shielded and installed on the RX and TX UNITS.

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

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

The PLL circuit, using a PLL IC (IC3) and dual modulus prescaler (IC4) on the RX UNIT, generates the 1st LO frequency with a Colpitts VCO (Q1) on the R-VCO UNIT. The PLL IC sets the dividing ratio based on serial data from the CPU and controls the dual modulus prescaler. The PLL IC compares the phases of a VCO signal with the reference oscillator frequency and detects the out-of-step phase. Then, the VCO signal is output from the PLL IC (pins 16 and 17).

3-3-3 RECEIVER REFERENCE OSCILLATOR CIRCUIT (RX AND TX UNITS)

A 12.8 MHz reference frequency is produced by the oscillator (X1) on the TX UNIT. The frequency is adjusted with R24. The reference frequency is buffer-amplified at Q5 and applied to the PLL IC (IC3, pin 2) on the RX UNIT.

3-3-4 RECEIVER LOOP FILTER AND DC-DC CONVERTER CIRCUITS (RX AND R-DC-DC UNITS)

Phase-detected signals from IC3 (pins 16 and 17) are converted to DC voltage by a loop filter consisting of an active filter (Q10, Q11).

The frequency at which the VCO oscillates is controlled by varactor diodes (D1, D2) on the R-VCO UNIT. DC voltage (PLL lock voltage) is provided through the integrator circuit (R32, C110).

The DC-DC converter circuit (IC1 and Q1) on the R-DC-DC UNIT creates approximately 20 V DC from 5 V DC to obtain a wide range of lock voltages for the PLL circuits.

3-3-5 RECEIVER VCO CIRCUIT (R-VCO UNIT)

The VCO circuit (Q1, D1, D2) generates the receive frequency. Strip lines are used for stable oscillation over a wide frequency range. Varactor diodes (D1, D2) provide frequency control. The buffer amplifier (Q2) amplifies VCO oscillation and does not permit the latter circuit to affect the VCO oscillation. The signal is divided by 64 or 65 in the dual modulus prescaler (IC4). The phase-divided signal is output from pin 5 of IC4 and applied to the PLL IC (IC3, pin 6).

3-3-6 RECEIVER UNLOCK SENSOR CIRCUIT (RX AND LOGIC UNITS)

When the PLL circuit is unlocked, pin 13 of IC3 becomes "HIGH". The "HIGH" signal is applied to pin 14 of IC9 as an unlock signal on the LOGIC UNIT.

• PLL CIRCUITS

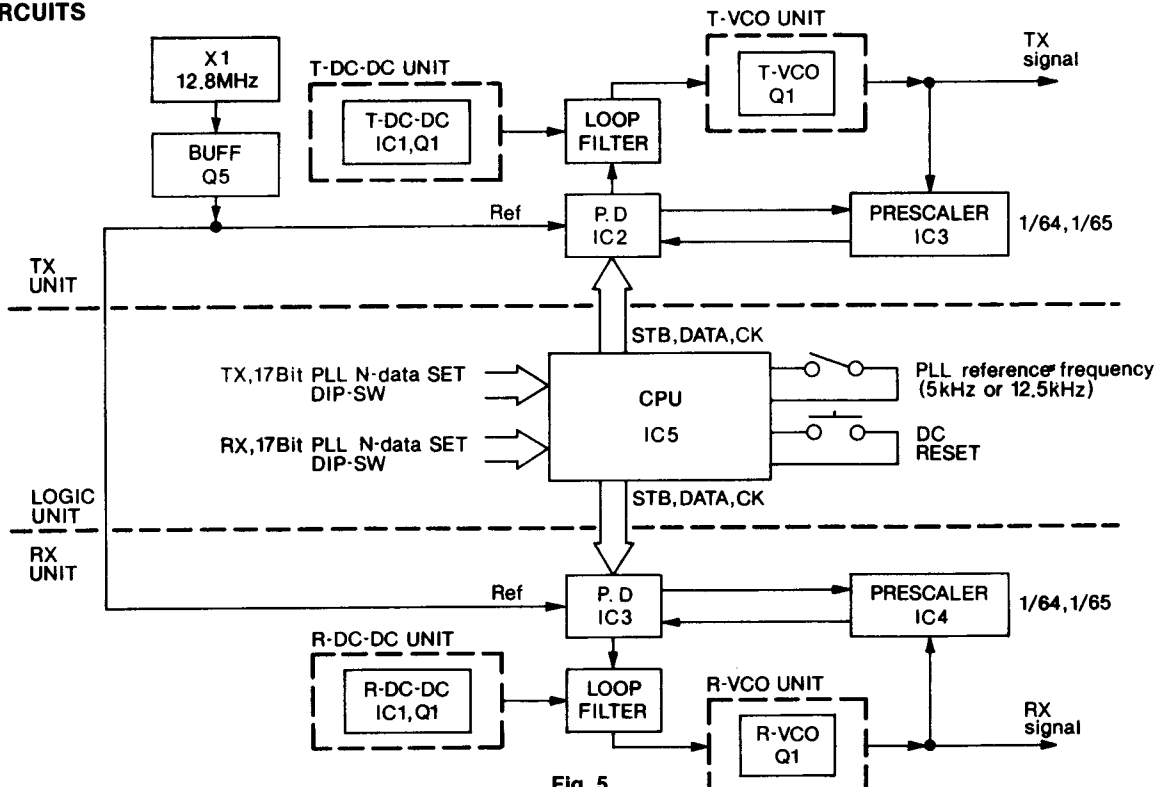


Fig. 5

3-3-7 TRANSMITTER PLL CIRCUIT (TX UNIT)

The PLL circuit, using a PLL IC (IC2) and dual modulus prescaler (IC3) on the TX UNIT, generates the transmit frequency with a Colpitts VCO (Q1) on the T-VCO UNIT. The PLL IC sets the dividing ratio based on serial data from the CPU and controls the dual modulus prescaler. The PLL IC compares the phases of a VCO signal with the reference oscillator frequency and detects the out-of-step phase. Then, the VCO is output from the PLL IC (IC2, pins 16 and 17).

3-3-8 TRANSMITTER REFERENCE OSCILLATOR CIRCUIT (TX UNIT)

A 12.8 MHz reference frequency is produced by the oscillator (X1). The frequency is adjusted with R24. The reference frequency is buffer-amplified at Q5 and applied to the PLL IC (IC2, pin 2).

3-3-9 TRANSMITTER LOOP FILTER AND DC-DC CONVERTER CIRCUITS (TX AND T-DC-DC UNITS)

Phase-detected signals from IC2 (pins 16 and 17) are converted to DC voltage by a loop filter consisting of an active filter (Q3, Q4).

The frequency at which the VCO oscillates is controlled by varactor diodes (D1, D2) on the T-VCO UNIT. DC voltage (PLL lock voltage) is provided through the integrator circuit (R15, C70).

The DC-DC converter circuit (IC1 and Q1) on the T-DC-DC UNIT creates approximately 20 V DC from 5 V DC to obtain a wide range of lock voltages for the PLL circuits.

3-3-10 TRANSMITTER VCO CIRCUIT (T-VCO UNIT)

The VCO circuit (Q1, D1, D2) generates the transmit frequency and produces FM modulation. Strip lines are used for stable oscillation over a wide frequency range. Varactor diodes (D1, D2) provide frequency control. The buffer amplifier (Q2) amplifies VCO oscillation and does not permit the latter circuit to affect the VCO oscillation. The signal is divided by 64 or 65 in the dual modulus prescaler (IC3). The phase-divided signal is output from IC3 (pin 5) and is applied to the PLL IC (IC2, pin 6).

• DTMF DECODER CIRCUIT

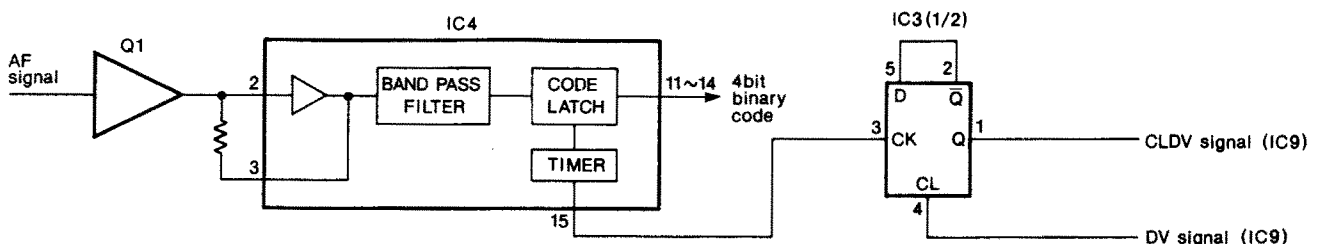


Fig. 6

3-3-11 TRANSCEIVER UNLOCK SENSOR CIRCUIT (TX AND LOGIC UNITS)

When the PLL circuit is unlocked, IC2 (pin 13) becomes "HIGH". The "HIGH" signal is applied to IC9 (pin 15) as an unlock signal on the LOGIC UNIT.

3-4 VOLTAGE LINES

| LINE | DESCRIPTION |
|--------|--|
| 13.8 V | This voltage is generated at REG-A and REG-B UNITS. |
| 5 V | Common 5 V converted from the 13.8 V line at IC9 on the RX UNIT, IC8 on the TX UNIT and IC16 on the LOGIC UNIT. These switching regulators convert the IC1 output level on the R-DC-DC or T-DC-DC UNIT into approximately 20 V DC. |
| 8 V | 8 V DC converted from the 13.8 V line at IC8 on the RX and IC9 on the TX UNIT. |
| T8 | Transmit 8 V. When the "MIC, PTT" line is grounded or the "SEND" line becomes "HIGH", Q7 turns on. The collector voltage (Q7) on the TX UNIT lights up the [TRANSMIT] INDICATOR. This voltage controls the drive amplifier (Q1: 10 W and 25 W types, IC1: 50 W type) and then is applied to the differential amplifier (IC2 for 10 W/25 W types and IC4 for 50 W type) on the PA UNIT. |

3-5 REGULATOR CIRCUITS

The DC voltages are supplied from regulator circuits corresponding to the voltages. They are regulated at the following circuits using 13.8 V DC.

(1) 5 V REGULATOR

5 V DC are regulated by the following three-terminal voltage regulators.

| REGULATOR | IC8 | IC9 | IC3 | IC16 | IC2 |
|-----------|-----|-----|-----------|-------|-------|
| UNIT | TX | RX | PA (50 W) | LOGIC | REG-A |

(2) 8 V regulator

8 V DC are regulated by the three-terminal voltage regulators (IC9: RX UNIT and IC8: TX UNIT).

3-6 DTMF DECODER CIRCUIT

AF signals from the RX UNIT are applied to Q1 on the LOGIC-A UNIT through J5 and signals are amplified.

IC4 is an IC chip for the DTMF detector. An applied double-tone signal is detected at IC4 and outputs signals as a 4-bit binary code.

3-7 OTHER CIRCUITS

3-7-1 CTCSS DECODER CIRCUIT (RX UNIT)

IC6 contains a CTCSS tone encoder/decoder, an AF amplifier circuit and a two-stage AF filter. The encoder is not used in this circuit.

The AF signal from pin 9 of IC1 is applied to Q12. Q12 is an active filter which functions as a low-pass filter. The filtered signals are applied to a programmable CTCSS tone decoder (IC6, pin 29) which decodes 67.0 Hz ~250.3 Hz tone frequencies. The tone frequency is set by the dip switches (S3) on the LOGIC-A UNIT.

The AF signal from IC6 (pin 29) is applied to the AF amplifier circuit and then to the two-stage AF filter. The filtered signal is output as a tone squelch signal from pin 23 of IC6. The tone squelch signal is applied to pin 17 of IC9 on the LOGIC UNIT through the "T-SQL" signal line.

IC7 functions as a serial/parallel converter and supplies 8-bit parallel data to pins 3~6 of IC6. The following table shows the relation between the input data and output frequency from IC6.

• CTCSS TONE DECODER FREQUENCY TABLE

| TONE NUMBER | TONE FREQUENCY (Hz) | S3 | | | | | | TONE NUMBER | TONE FREQUENCY (Hz) | S3 | | | | | | TONE NUMBER | TONE FREQUENCY (Hz) | S3 | | | | | |
|-------------|---------------------|-------------|----|----|----|---|---|-------------|---------------------|----|----|----|----|----|---|-------------|---------------------|----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | | 1 | 2 | 3 | 4 | 5 | 6 | | | 1 | 2 | 3 | 4 | 5 | 6 |
| 01 | 67.0 | ON | — | — | — | — | — | 14 | 107.2 | — | ON | ON | ON | — | — | 27 | 167.9 | ON | ON | — | ON | ON | — |
| 02 | 71.9 | — | ON | — | — | — | — | 15 | 110.9 | ON | ON | ON | ON | — | — | 28 | 173.8 | — | — | ON | ON | ON | — |
| 03 | 74.4 | ON | ON | — | — | — | — | 16 | 114.8 | — | — | — | — | ON | — | 29 | 179.9 | ON | — | ON | ON | ON | — |
| 04 | 77.0 | — | — | ON | — | — | — | 17 | 118.8 | ON | — | — | — | ON | — | 30 | 186.2 | — | ON | ON | ON | ON | — |
| 05 | 79.7 | ON | — | ON | — | — | — | 18 | 123.0 | — | ON | — | — | ON | — | 31 | 192.8 | ON | ON | ON | ON | ON | — |
| 06 | 82.5 | — | ON | ON | — | — | — | 19 | 127.3 | ON | ON | — | — | ON | — | 32 | 203.5 | — | — | — | — | — | ON |
| 07 | 85.4 | ON | ON | ON | — | — | — | 20 | 131.8 | — | — | ON | — | ON | — | 33 | 210.7 | ON | — | — | — | — | ON |
| 08 | 88.5 | — | — | — | ON | — | — | 21 | 136.5 | ON | — | ON | — | ON | — | 34 | 218.1 | — | ON | — | — | — | ON |
| 09 | 91.5 | ON | — | — | ON | — | — | 22 | 141.3 | — | ON | ON | — | ON | — | 35 | 225.7 | ON | ON | — | — | — | ON |
| 10 | 94.8 | — | ON | — | ON | — | — | 23 | 146.2 | ON | ON | ON | — | ON | — | 36 | 233.6 | — | — | ON | — | — | ON |
| 11 | 97.4 | No assigned | | | | | | 24 | 151.4 | — | — | — | ON | ON | — | 37 | 241.8 | ON | — | ON | — | — | ON |
| 12 | 100.0 | — | — | ON | ON | — | — | 25 | 156.7 | ON | — | — | ON | ON | — | 38 | 250.3 | — | ON | ON | — | — | ON |
| 13 | 103.5 | ON | — | ON | ON | — | — | 26 | 162.2 | — | ON | — | ON | ON | — | | | | | | | | |

—: OFF

3-7-2 CTCSS ENCODER CIRCUIT (TX UNIT)

The CTCSS encoder (IC6) encodes 67.0 Hz~250.3 Hz tone frequencies which are set by the dip switches (S11) on the LOGIC-A UNIT. The tone frequency is output from IC6 (pin 1) and is then applied to R32 for the deviation adjustment.

IC5 functions as a serial/parallel converter and supplies 8-bit parallel data to IC6. The following table shows the relation between input data and the output frequency from IC6.

• CTCSS TONE ENCODER FREQUENCY TABLE

| TONE NUMBER | TONE FREQUENCY (Hz) | S11 | | | | | | TONE NUMBER | TONE FREQUENCY (Hz) | S11 | | | | | | TONE NUMBER | TONE FREQUENCY (Hz) | S11 | | | | | |
|-------------|---------------------|-----|----|----|----|---|---|-------------|---------------------|-----|----|----|----|----|---|-------------|---------------------|-----|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | | 1 | 2 | 3 | 4 | 5 | 6 | | | 1 | 2 | 3 | 4 | 5 | 6 |
| 01 | 67.0 | ON | — | — | — | — | — | 14 | 107.2 | — | ON | ON | ON | — | — | 27 | 167.9 | ON | ON | — | ON | ON | — |
| 02 | 71.9 | — | ON | — | — | — | — | 15 | 110.9 | ON | ON | ON | ON | — | — | 28 | 173.8 | — | — | ON | ON | ON | — |
| 03 | 74.4 | ON | ON | — | — | — | — | 16 | 114.8 | — | — | — | — | ON | — | 29 | 179.9 | ON | — | ON | ON | ON | — |
| 04 | 77.0 | — | — | ON | — | — | — | 17 | 118.8 | ON | — | — | — | ON | — | 30 | 186.2 | — | ON | ON | ON | ON | — |
| 05 | 79.7 | ON | — | ON | — | — | — | 18 | 123.0 | — | ON | — | — | ON | — | 31 | 192.8 | ON | ON | ON | ON | ON | — |
| 06 | 82.5 | — | ON | ON | — | — | — | 19 | 127.3 | ON | ON | — | — | ON | — | 32 | 203.5 | — | — | — | — | — | ON |
| 07 | 85.4 | ON | ON | ON | — | — | — | 20 | 131.8 | — | — | ON | — | ON | — | 33 | 210.7 | ON | — | — | — | — | ON |
| 08 | 88.5 | — | — | — | ON | — | — | 21 | 136.5 | ON | — | ON | — | ON | — | 34 | 218.1 | — | ON | — | — | — | ON |
| 09 | 91.5 | ON | — | — | ON | — | — | 22 | 141.3 | — | ON | ON | — | ON | — | 35 | 225.7 | ON | ON | — | — | — | ON |
| 10 | 94.8 | — | ON | — | ON | — | — | 23 | 146.2 | ON | ON | ON | — | ON | — | 36 | 233.6 | — | — | ON | — | — | ON |
| 11 | 97.4 | ON | ON | — | ON | — | — | 24 | 151.4 | — | — | — | ON | ON | — | 37 | 241.8 | ON | — | ON | — | — | ON |
| 12 | 100.0 | — | — | ON | ON | — | — | 25 | 156.7 | ON | — | — | ON | ON | — | 38 | 250.3 | — | ON | ON | — | — | ON |
| 13 | 103.5 | ON | — | ON | ON | — | — | 26 | 162.2 | — | ON | — | ON | ON | — | | | | | | | | |

—: OFF

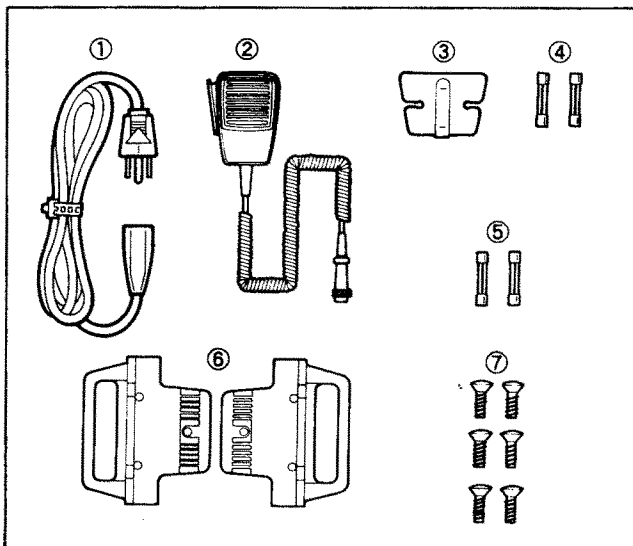
SECTION 4 MECHANICAL PARTS AND DISASSEMBLY

4-1 FRONT PARTS

| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------|--|------|
| ① | 8210005590 | Front panel (F) | 1 |
| ② | 8310017750 | Front plate | 1 |
| ③ | 8010008901 | 695 sub chassis-1 | 1 |
| ④ | 8930015660 | 695 speaker plate | 1 |
| ⑤ | 8810001110 | Screw PH B0 M3×6 | 13 |
| ⑥ | 8850000130 | Flat washer M3 (3×8×0.5) NI BS | 9 |
| ⑦ | 8930000070 | Standoff (D) | 2 |
| ⑧ | 8850000420 | Spring washer M3 NI | 2 |
| ⑨ | 8810003160 | Setscrew A M3×6 | 5 |
| ⑩ | 8810004270 | Screw BiH M4×6 ZK BS | 4 |
| ⑪ | 8810003360 | Setscrew C M3×6 | 2 |
| ⑫ | 2230000120 | Switch SDDSA3159A [POWER] | 1 |
| ⑬ | 2510000040 | Speaker C065K1210810 | 1 |
| ⑭ | 8610004170 | Knob N122 [VOLUME], [SQUELCH] | 2 |
| ⑮ | 8610002840 | Button K79 [POWER] | 1 |
| ⑯ | 8610005840 | Button K89 (B) [CTCSS], [LOCAL INHIBIT], etc. | 4 |
| ⑰ | 8810005290 | Spring washer for FM 214 | 1 |
| ⑱ | 2230000380 | Switch SPUE44067A [CTCSS], [LOCAL INHIBIT], etc. | 1 |
| ⑲ | 5040000470 | LED SPB-26MUW F [POWER] | 1 |
| ⑳ | 5040001310 | LED SLB-26UR 3F [TRANSMIT] | 1 |
| ㉑ | 5040001130 | LED SLB-26MG 3F [BUSY] | 1 |
| ㉒ | 5040001360 | LED TLG205 [CTCSS] | 1 |
| ㉓ | 5040000650 | LED TLY205 [LOCAL INHIBIT] | 1 |
| ㉔ | 5040000640 | LED TLR205 [MANUAL ID] | 1 |
| ㉕ | 5040000650 | LED TLY205 [COR SIMULATE] | 1 |
| ㉖ | 8410000030 | AF heatsink | 1 |
| ㉗ | 7210000140 | Variable resistor RK1631110D9DA [VOLUME] | 1 |
| ㉘ | 7210000690 | Variable resistor RK1631110D9CA [SQUELCH] | 1 |
| ㉙ | 6510004820 | Mic connector FM14RS-7SS [MICROPHONE] | 1 |

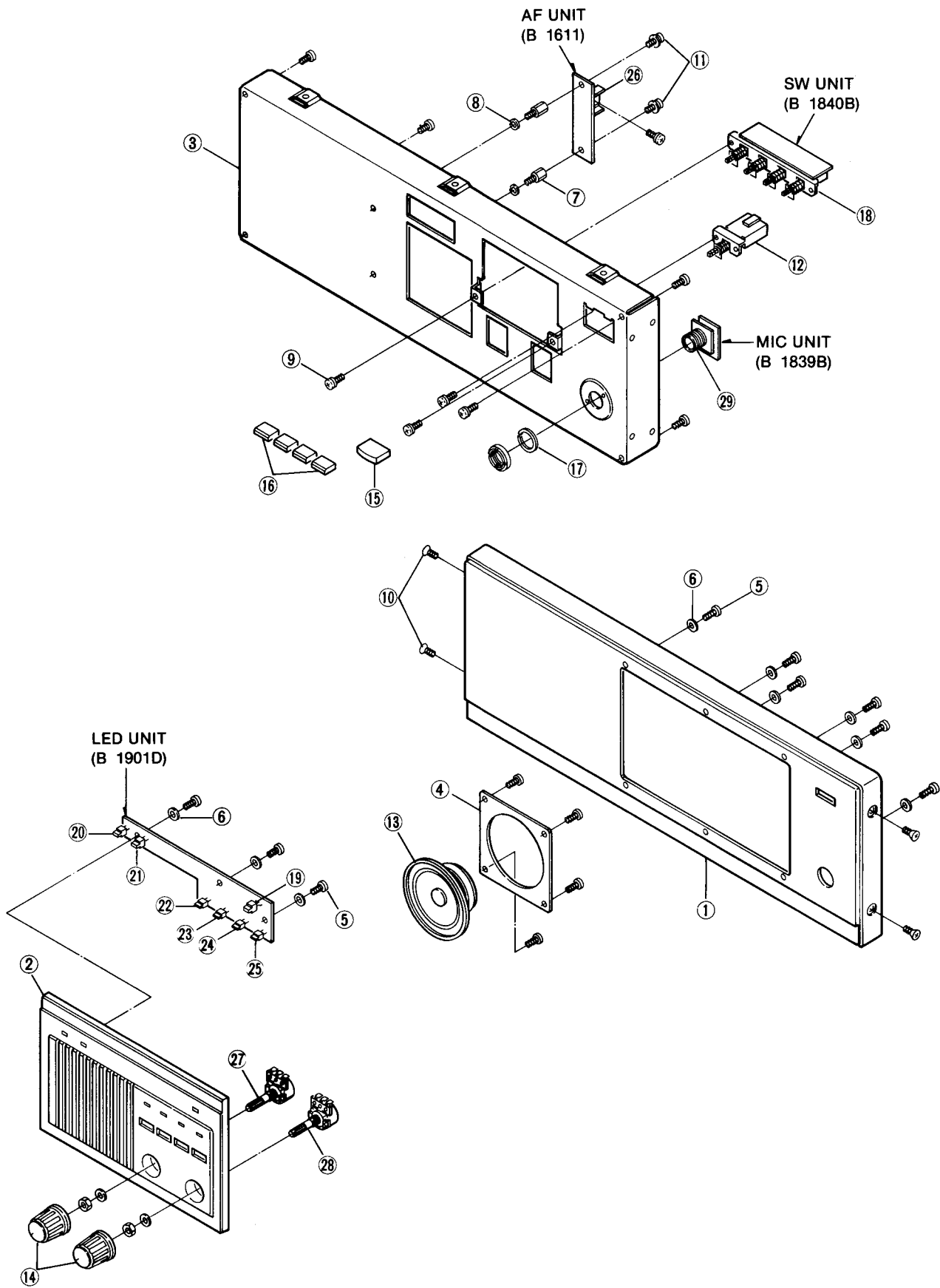
Screw abbreviations B0: Self-tapping screw BiH: Binding head PH: Pan head BS: Brass
 NI: Nickel ZK: Black

4-2 ACCESSORIES



| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------------|---|------|
| ① | 8900000710 | AC power cable OPC-048 A (#01, #02, #04, #06, #07, #09, #22, #23, #25, #26) | 1 |
| | 8900000330 | AC power cable OPC-034 (#03, #05, #08, #10, #21, #24) | 1 |
| ② | Optional product | Microphone (HM-4) | 1 |
| ③ | 8930007300 | Microphone hook | 1 |
| ④ | 5210000050 | Spare fuse for AC line FGB 3A (#01, #02, #03, #06, #07, #08, #21, #22, #23, #24, #25, #26) | 2 |
| | 5210000060 | Spare fuse for AC line FGB 5A (#04, #05, #09, #10) | 2 |
| ⑤ | 5210000070 | Spare fuse for DC line FGB 10A (#01, #02, #03, #06, #07, #08, #21, #22, #23, #24, #25, #26) | 2 |
| | 5210000080 | Spare fuse for DC line FGB 20A (#04, #05, #09, #10) | 2 |
| ⑥ | 8010006700 | Rack mounting handle | 2 |
| ⑦ | 8810006110 | Screw OH M4×9 ZK | 6 |

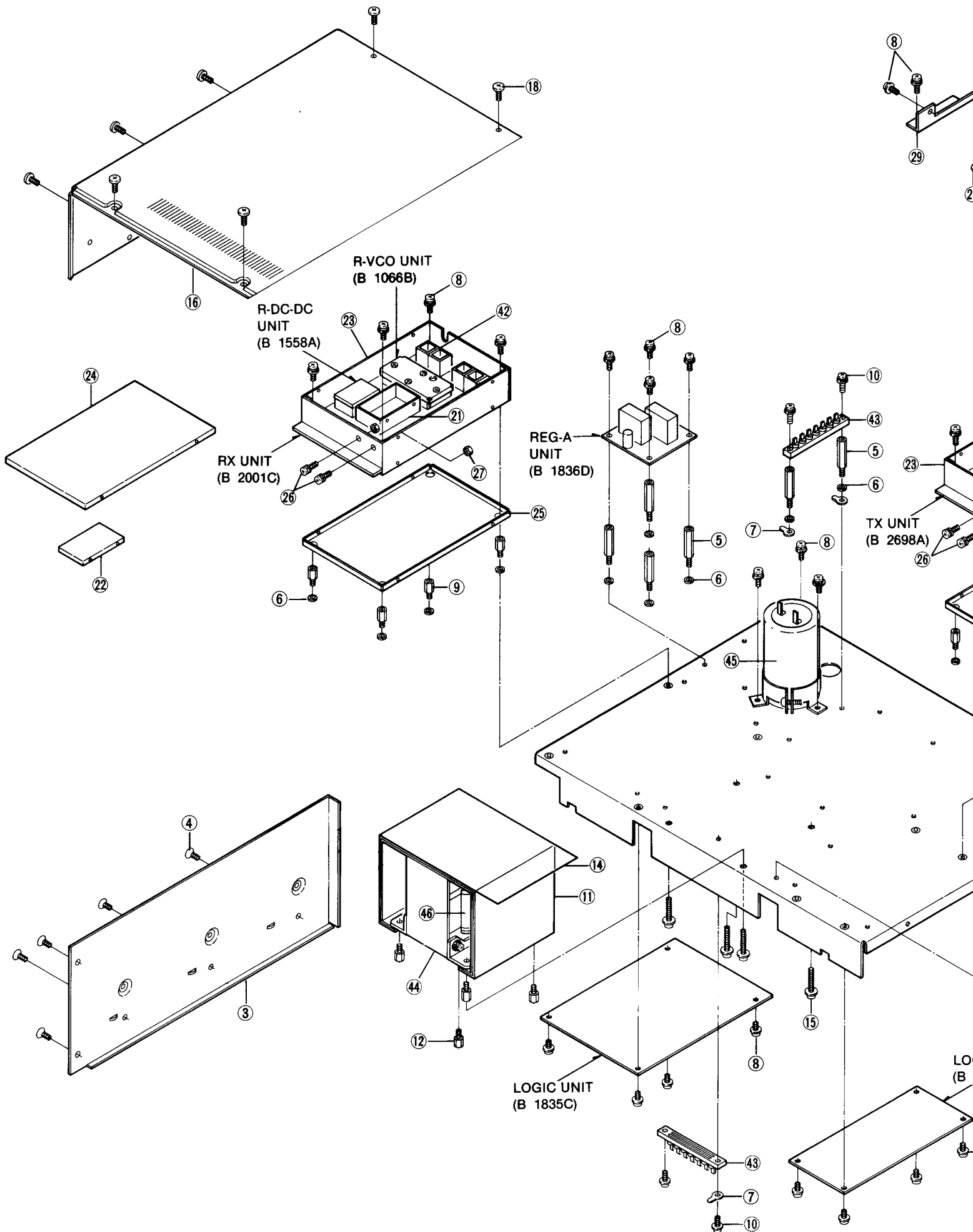
Screw abbreviations OH: Oval countersunk head
 ZK: Black

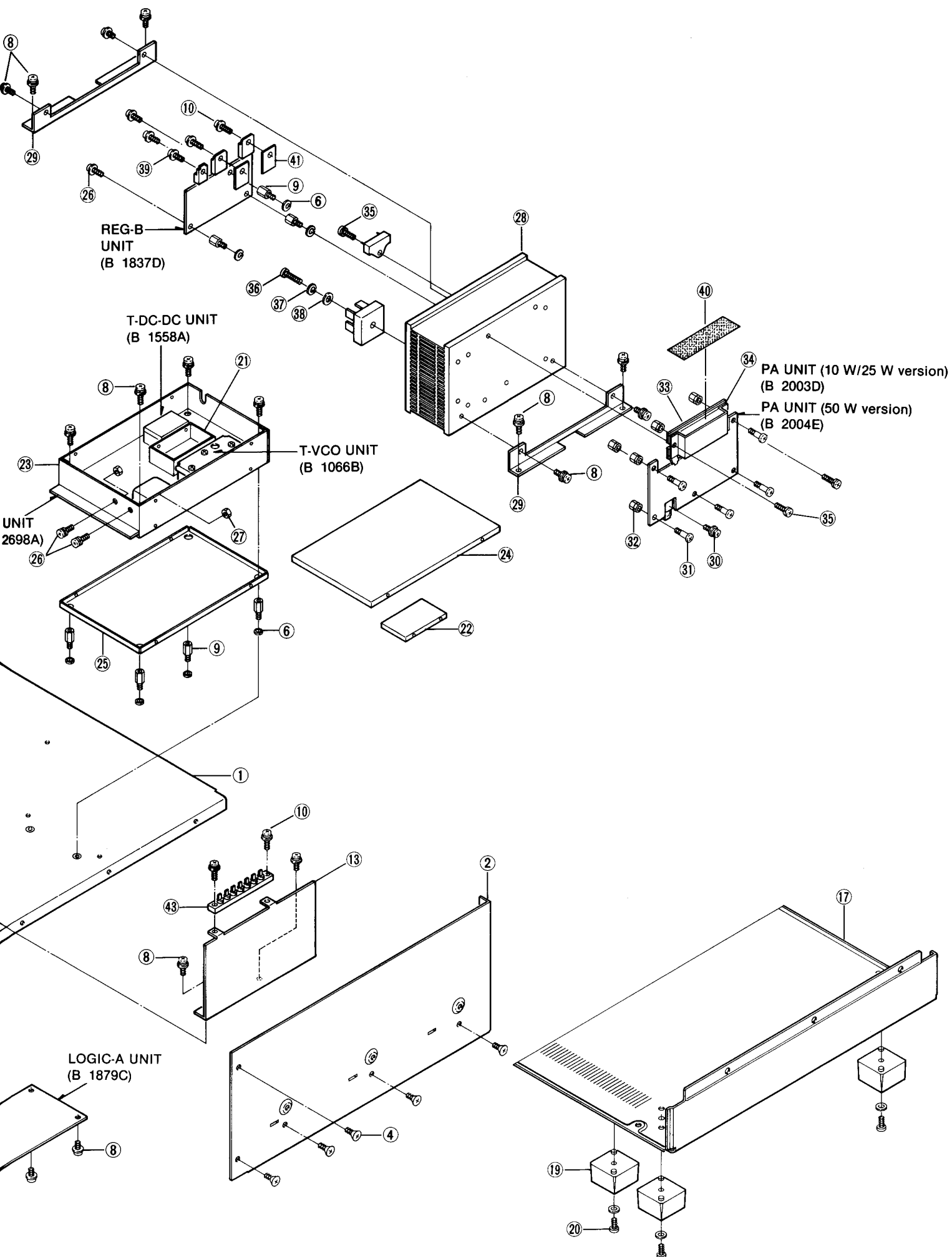


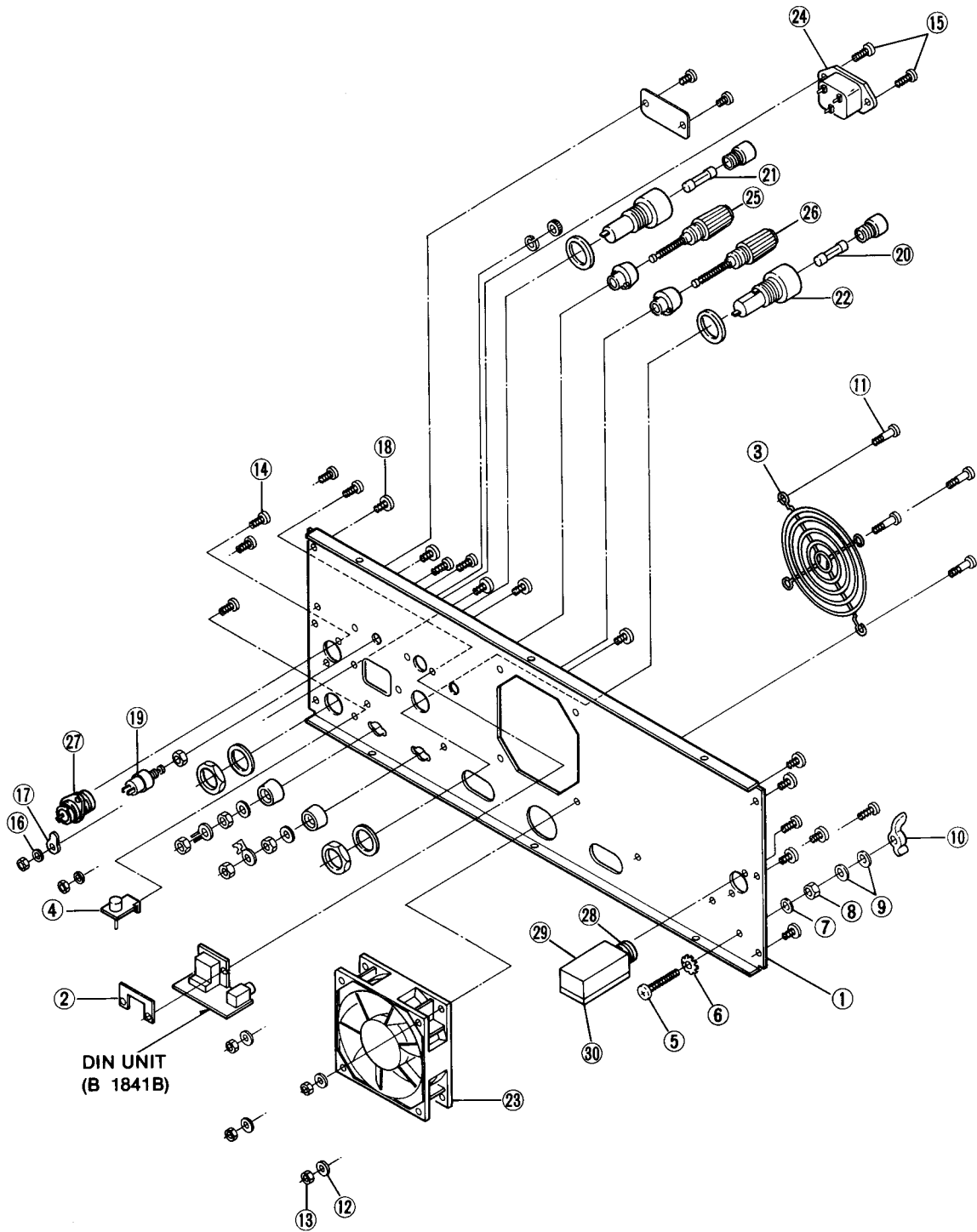
4-3 CHASSIS PARTS

| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------|---|------|
| ① | 8010008911 | 695 chassis-1 | 1 |
| ② | 8010008920 | 695 chassis (right side) | 1 |
| ③ | 8010008930 | 695 chassis (left side) | 1 |
| ④ | 8810002210 | Screw FH M4 × 6 | 10 |
| ⑤ | 8930000230 | Standoff (S) | 6 |
| ⑥ | 8850000420 | Spring washer M3 NI | 17 |
| ⑦ | 8860000130 | Grounding lug B5 (M3) AG BS | 3 |
| ⑧ | 8810003360 | Setscrew C M3 × 6 | 33 |
| ⑨ | 8930000070 | Standoff (D) | 11 |
| ⑩ | 8810003380 | Setscrew C M3 × 10 | 8 |
| ⑪ | 8510006020 | 695 transformer shield plate | 1 |
| ⑫ | 8930016040 | Standoff (AZ) | 4 |
| ⑬ | 8510006300 | 695 shield plate (A) | 1 |
| ⑭ | 8110003790 | 695 transformer shield cover | 1 |
| ⑮ | 8810003390 | Setscrew C M4 × 8 | 4 |
| ⑯ | 8110003430 | 695 top cover | 1 |
| ⑰ | 8110003441 | 695 bottom cover-1 | 1 |
| ⑱ | 8810004690 | Screw BiH M4 × 5 ZK BS | 18 |
| ⑲ | 8930011680 | Rubber foot (G) | 4 |
| ⑳ | 8810000390 | Screw PH M4 × 12 | 4 |
| ㉑ | 8510001080 | Shield case (A) | 2 |
| ㉒ | 8510001101 | Shield case (A) cover (A)-1 | 2 |
| ㉓ | 8510005870 | 695 shield case | 2 |
| ㉔ | 8510005880 | 695 shield case top cover | 2 |
| ㉕ | 8510005890 | 695 shield case bottom cover | 2 |
| ㉖ | 8810003160 | Setscrew A M3 × 6 | 7 |
| ㉗ | 8830000100 | Nut M3 | 4 |
| ㉘ | 8410001460 | 696-10 heatsink | 1 |
| ㉙ | 8410001360 | 695 heatsink BKT | 2 |
| ㉚ | 8810003370 | Setscrew C M3 × 8 | 1 |
| ㉛ | 8810003760 | Icom screw C10 | 5 |
| ㉜ | 8930006080 | Screw spacer-C | 5 |
| ㉝ | 8510004181 | 443 10W module shield plate-2 | 1 |
| ㉞ | 8930011460 | 566 PA module plate | 1 |
| ㉟ | 8810003170 | Setscrew A M3 × 8 | 3 |
| ㊱ | 8810000420 | Screw PH M4 × 18 | 1 |
| ㊲ | 8850000430 | Spring washer M4 NI | 1 |
| ㊳ | 8850000140 | Flat washer M4 NI BS | 1 |
| ㊴ | 8810003370 | Setscrew C M3 × 8 | 1 |
| ㊵ | 8950001760 | Electrical tape NO. 1245 L=70 | 1 |
| ㊶ | 8930011250 | Transistor sheet TO-3P | 2 |
| ㊷ | 8510000020 | 194 shield case | 5 |
| ㊸ | 6510000570 | Terminal ML-18 7P | 3 |
| ㊹ | 8510006300 | 695 shield plate (A) | 1 |
| ㊺ | 4510000360 | Electrolytic condenser HCG5A1E563Y (25L56000UF) | 1 |
| ㊻ | 5910000600 | Transformer TP-52 | 1 |

Screw abbreviations FH: Flat head BiH: Binding head PH: Pan head BS: Brass
 NI: Nickel ZK: Black







4-4 REAR PARTS

| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------|---|------|
| ① | 8010008941 | 695 rear panel-1 | 1 |
| ② | 8930008230 | DIN plate | 1 |
| ③ | 6910003290 | Finger guard B-1 | 1 |
| ④ | 8930002360 | Diode plate | 1 |
| ⑤ | 8810001990 | Screw PH M5 x 18 NI BS | 1 |
| ⑥ | 8850000590 | Star washer M5 | 1 |
| ⑦ | 8850000440 | Spring washer M5 NI | 1 |
| ⑧ | 8830000210 | Nut M5 NI BS | 1 |
| ⑨ | 8850000150 | Flat washer M5 NI BS | 2 |
| ⑩ | 8830000360 | Wing nut M5 NI | 1 |
| ⑪ | 8810003770 | Icom screw C12 | 4 |
| ⑫ | 8850000130 | Flat washer M3 (3 x 8 x 0.5) NI BS | 4 |
| ⑬ | 8830000100 | Nut M3 | 6 |
| ⑭ | 8810003720 | Icom screw B6 | 7 |
| ⑮ | 8810003740 | Icom screw B10 | 2 |
| ⑯ | 8850000420 | Spring washer M3 NI | 2 |
| ⑰ | 8860000130 | Grounding lug B5 (M3) AG BS | 1 |
| ⑱ | 8810004270 | Screw BiH M4 x 6 ZK BS | 10 |
| ⑲ | 2230000710 | Switch DS-102-R [DC RESET] | 1 |
| ⑳ | 5210000050 | Fuse FGB 3A [AC FUSE] (#01, #02, #03, #06, #07, #08, #21, #22, #23, #24, #25, #26) | 1 |
| | 5210000060 | Fuse FGB 5A [AC FUSE] (#04, #05, #09, #10) | 1 |
| ㉑ | 5210000070 | Fuse FGB 10A [DC FUSE] (#01, #02, #03, #06, #07, #08, #21, #22, #23, #24, #25, #26) | 1 |
| | 5210000080 | Fuse FGB 20A [DC FUSE] (#04, #05, #09, #10) | 1 |
| ㉒ | 5220000051 | Fuse holder FH-032CT | 2 |
| ㉓ | 2710000280 | Fan MD1208PTS-1 | 1 |
| ㉔ | 6450000770 | Jack CM-11 [AC] | 1 |
| ㉕ | 6510000460 | Terminal T3830 R [BACKUP BATTERY (+)] | 1 |
| ㉖ | 6510000470 | Terminal T3830 K [BACKUP BATTERY (-)] | 1 |
| ㉗ | 6510000360 | ANT.connector NR-DS-E 02 [RX ANT] | 1 |
| ㉘ | 6510000330 | ANT.connector NR-DS [TX ANT] | 1 |
| ㉙ | 8510006390 | Filter case (A) | 1 |
| ㉚ | 8510001780 | Filter case cover | 1 |

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

SECTION 5 PARTS LIST

[FRONT UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------------|--------------------------------|
| R1 | 7210000140 | Variable Resistor | RK1831110D9DA (10KA) [VOLUME] |
| R2 | 7210000690 | Variable Resistor | RK1831110D9CA (10KB) [SQUELCH] |
| S1 | 2230000120 | Switch | SDDSA3159A [POWER] |
| SP1 | 2510000040 | Speaker | C065K1210810 [SPEAKER] |

[MIC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|---------------|
| EP1 | 0910019801 | P.C. Board | B-1839B (MIC) |

[AF UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|-----------------------|
| IC1 | 1110000200 | IC | μ PC2002V |
| R1 | 7010003280 | Resistor | ELR20J 100 Ω |
| R2 | 7010003080 | Resistor | ELR20J 2.2 Ω |
| R3 | 7010003320 | Resistor | ELR20J 220 Ω |
| R4 | 7010003480 | Resistor | ELR20J 4.7 k Ω |
| C1 | 4510000830 | Electrolytic | 18 RE 220 μ F |
| C2 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C3 | 4510000830 | Electrolytic | 18 RE 220 μ F |
| C4 | 4510000820 | Electrolytic | 18 RE 100 μ F |
| C5 | 4010000520 | Ceramic | DD108 B 472K 50V |
| C6 | 4510000890 | Electrolytic | 50 RE 0.47 μ F |
| EP1 | 0910017010 | P.C. Board | B-1811 (AF) |

[SW UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|--------------------------|
| S1 | 2230000380 | Switch | SPUE44067A [CTCSS, etc.] |
| EP1 | 0910019832 | P.C. Board | B-1840B (SW) |

[LED UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|------------------------|
| R1 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R2 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R3 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R4 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R5 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R6 | 7010003400 | Resistor | ELR20J 1 k Ω |
| DS1 | 5040000470 | LED | SPB-28MUW F [POWER] |
| DS2 | 5040001310 | LED | SLB-28UR 3F [TRANSMIT] |
| DS3 | 5040001130 | LED | SLB-28MG 3F [BUSY] |
| DS4 | 5040001360 | LED | TLG205 [CTCSS] |
| DS5 | 5040000650 | LED | TLY205 [LOCAL INHIBIT] |

[LED UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|-----------------------|
| DS6 | 5040000640 | LED | TLR205 [MANUAL ID] |
| DS7 | 5040000650 | LED | TLY205 [COR SIMULATE] |
| EP1 | 0910020104 | P.C. Board | B-1901D (LED) |

[CHASSIS UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|--------------|---|
| D1 | 1710000010 | Diode | 15CD11 |
| D2 | 1730000070 | Zener | RD3.9E B2 |
| R1 | 7010004650 | Resistor | R50XJ 10 Ω |
| C1 | 4510000380 | Electrolytic | HCG5A1E563Y (25V 56000 μ F) |
| C2 | 4010004440 | Ceramic | DE7090 B 102K VA1-KC |
| C3 | 4010004440 | Ceramic | DE7090 B 102K VA1-KC |
| S1 | 2230000710 | Switch | DS-102-R |
| F1 | 5220000051 | Holder | FH-032CT |
| F2 | 5220000051 | Holder | FH-032CT |
| T1 | 5910000600 | Transformer | TP-52 |
| EP1 | 5210000050 | Fuse | FGB 3A (#01 #02 #03 #06 #07 #08 #21 #22 #23 #24 #25 #26) |
| | 5210000060 | Fuse | FGB 5A (#04 #05 #09 #10) |
| EP2 | 5210000070 | Fuse | FGB 10A (#01 #02 #03 #06 #07 #08 #21 #22 #23 #24 #25 #26) |
| | 5210000080 | Fuse | FGB 20A (#04 #05 #09 #10) |
| EP3 | 6510000570 | Lead Frame | ML-18 7P |
| EP4 | 6510000570 | Lead Frame | ML-18 7P |
| EP5 | 6510000570 | Lead Frame | ML-18 7P |

[LOGIC-A UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|------------------|
| IC1 | 1130003960 | IC | μ PD74HC238C |
| IC2 | 1130003960 | IC | μ PD74HC238C |
| IC3 | 1130000750 | IC | μ PD4013BC |
| IC4 | 1130004680 | IC | LC7385 (DIP) |
| Q1 | 1530000040 | Transistor | 2SC1815-Y |
| D1 | 1710000160 | Diode | 1SS133 |
| D2 | 1710000160 | Diode | 1SS133 |
| D3 | 1710000160 | Diode | 1SS133 |
| D4 | 1710000160 | Diode | 1SS133 |
| D5 | 1710000160 | Diode | 1SS133 |
| D6 | 1710000160 | Diode | 1SS133 |
| D7 | 1710000160 | Diode | 1SS133 |
| D8 | 1710000160 | Diode | 1SS133 |
| D9 | 1710000160 | Diode | 1SS133 |
| D10 | 1710000160 | Diode | 1SS133 |
| D11 | 1710000160 | Diode | 1SS133 |
| D12 | 1710000160 | Diode | 1SS133 |
| D13 | 1710000160 | Diode | 1SS133 |

[LOGIC-A UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION |
|----------|------------|--------------|
| D14 | 1710000160 | Diode 1SS133 |
| D15 | 1710000160 | Diode 1SS133 |
| D16 | 1710000160 | Diode 1SS133 |
| D17 | 1710000160 | Diode 1SS133 |
| D18 | 1710000160 | Diode 1SS133 |
| D19 | 1710000160 | Diode 1SS133 |
| D20 | 1710000160 | Diode 1SS133 |
| D21 | 1710000160 | Diode 1SS133 |
| D22 | 1710000160 | Diode 1SS133 |
| D23 | 1710000160 | Diode 1SS133 |
| D24 | 1710000160 | Diode 1SS133 |
| D25 | 1710000160 | Diode 1SS133 |
| D26 | 1710000160 | Diode 1SS133 |
| D27 | 1710000160 | Diode 1SS133 |
| D28 | 1710000160 | Diode 1SS133 |
| D29 | 1710000160 | Diode 1SS133 |
| D30 | 1710000160 | Diode 1SS133 |
| D31 | 1710000160 | Diode 1SS133 |
| D32 | 1710000160 | Diode 1SS133 |
| D33 | 1710000160 | Diode 1SS133 |
| D34 | 1710000160 | Diode 1SS133 |
| D35 | 1710000160 | Diode 1SS133 |
| D36 | 1710000160 | Diode 1SS133 |
| D37 | 1710000160 | Diode 1SS133 |
| D38 | 1710000160 | Diode 1SS133 |
| D39 | 1710000160 | Diode 1SS133 |
| D40 | 1710000160 | Diode 1SS133 |
| D41 | 1710000160 | Diode 1SS133 |
| D42 | 1710000160 | Diode 1SS133 |
| D43 | 1710000160 | Diode 1SS133 |
| D44 | 1710000160 | Diode 1SS133 |
| D45 | 1710000160 | Diode 1SS133 |
| D46 | 1710000160 | Diode 1SS133 |
| D47 | 1710000160 | Diode 1SS133 |
| D48 | 1710000160 | Diode 1SS133 |
| D49 | 1710000160 | Diode 1SS133 |
| D50 | 1710000160 | Diode 1SS133 |
| D51 | 1710000160 | Diode 1SS133 |
| D52 | 1710000160 | Diode 1SS133 |
| D53 | 1710000160 | Diode 1SS133 |
| D54 | 1710000160 | Diode 1SS133 |
| D55 | 1710000160 | Diode 1SS133 |
| D56 | 1710000160 | Diode 1SS133 |
| D57 | 1710000160 | Diode 1SS133 |
| D58 | 1710000160 | Diode 1SS133 |
| D59 | 1710000160 | Diode 1SS133 |
| D60 | 1710000160 | Diode 1SS133 |
| D61 | 1710000160 | Diode 1SS133 |
| D62 | 1710000160 | Diode 1SS133 |
| D63 | 1710000160 | Diode 1SS133 |
| D64 | 1710000160 | Diode 1SS133 |
| D65 | 1710000160 | Diode 1SS133 |
| D66 | 1710000160 | Diode 1SS133 |
| D67 | 1710000160 | Diode 1SS133 |
| D68 | 1710000160 | Diode 1SS133 |
| D69 | 1710000160 | Diode 1SS133 |
| D70 | 1710000160 | Diode 1SS133 |
| D71 | 1710000160 | Diode 1SS133 |
| D72 | 1710000160 | Diode 1SS133 |
| D73 | 1710000160 | Diode 1SS133 |
| D74 | 1710000160 | Diode 1SS133 |
| D75 | 1710000160 | Diode 1SS133 |
| D76 | 1710000160 | Diode 1SS133 |
| D77 | 1710000160 | Diode 1SS133 |
| D78 | 1710000160 | Diode 1SS133 |
| D79 | 1710000160 | Diode 1SS133 |
| D80 | 1710000160 | Diode 1SS133 |
| D81 | 1710000160 | Diode 1SS133 |
| D82 | 1710000160 | Diode 1SS133 |
| D83 | 1710000160 | Diode 1SS133 |
| D84 | 1710000160 | Diode 1SS133 |
| D85 | 1710000160 | Diode 1SS133 |
| D86 | 1710000160 | Diode 1SS133 |
| D87 | 1710000160 | Diode 1SS133 |
| D88 | 1710000160 | Diode 1SS133 |
| D89 | 1710000160 | Diode 1SS133 |
| D90 | 1710000160 | Diode 1SS133 |
| D91 | 1710000160 | Diode 1SS133 |

[LOGIC-A UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION |
|----------|------------|--------------------------------------|
| D92 | 1710000160 | Diode 1SS133 |
| D93 | 1710000160 | Diode 1SS133 |
| D94 | 1710000160 | Diode 1SS133 |
| D95 | 1710000160 | Diode 1SS133 |
| D96 | 1710000160 | Diode 1SS133 |
| D97 | 1710000160 | Diode 1SS133 |
| X1 | 6050003120 | Crystal RF-4A3 FAA NKD (3.579545MHZ) |
| R1 | 7010003620 | Resistor ELR20J 47 kΩ |
| R2 | 7010003630 | Resistor ELR20J 56 kΩ |
| R3 | 7010003620 | Resistor ELR20J 47 kΩ |
| R4 | 7010003360 | Resistor ELR20J 470 Ω |
| R5 | 7010003620 | Resistor ELR20J 47 kΩ |
| R6 | 7010003530 | Resistor ELR20J 10 kΩ |
| R7 | 7010003400 | Resistor ELR20J 1 kΩ |
| R8 | 7010003320 | Resistor ELR20J 220 Ω |
| R9 | 7410000210 | Resistor Array RMX- 8 472K |
| R10 | 7010003700 | Resistor ELR20J 220 kΩ |
| R11 | 7010003620 | Resistor ELR20J 47 kΩ |
| C1 | 4040000260 | Barrier Layer UZE 08X 104M |
| C2 | 4040000260 | Barrier Layer UZE 08X 104M |
| C3 | 4010000220 | Ceramic DD104 SL 330J 50V |
| C4 | 4010000220 | Ceramic DD104 SL 330J 50V |
| C5 | 4040000260 | Barrier Layer UZE 08X 104M |
| C6 | 4310000020 | Mylar F2D 50V 103K |
| C7 | 4550000320 | Tantalum DN 1V 0R1M |
| C8 | 4010000500 | Ceramic DD104 B 102K 50V |
| C9 | 4040000260 | Barrier Layer UZE 08X 104M |
| S1 | 2260001100 | Switch SSGM1A031A |
| S2 | 2260000610 | Switch SSGM17012A |
| S3 | 2260000820 | Switch SSGM16034A |
| S4 | 2260000790 | Switch SSGM12026A |
| S5 | 2260000580 | Switch SKHLAD035A |
| S6 | 2260000580 | Switch SKHLAD035A |
| S7 | 2260001090 | Switch DRS3016 |
| S8 | 2260001090 | Switch DRS3016 |
| S9 | 2260001100 | Switch SSGM1A031A |
| S10 | 2260000610 | Switch SSGM17012A |
| S11 | 2260000820 | Switch SSGM16034A |
| S12 | 2260000790 | Switch SSGM12026A |
| S13 | 2260001090 | Switch DRS3016 |
| S14 | 2260001090 | Switch DRS3016 |
| S15 | 2260001090 | Switch DRS3016 |
| S16 | 2260001090 | Switch DRS3016 |
| S17 | 2260001090 | Switch DRS3016 |
| S18 | 2260001090 | Switch DRS3016 |
| S19 | 2260001090 | Switch DRS3016 |
| S20 | 2260001090 | Switch DRS3016 |
| EP1 | 0910019533 | P.C. Board B-1879C (LOGIC-A) |

[LOGIC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION |
|----------|------------|------------------|
| IC1 | 1130001270 | IC μ PD4069UBC |
| IC2 | 1130003970 | IC μ PD74HC393C |
| IC3 | 1130003320 | IC μ PD74HC4040C |
| IC4 | 1130003950 | IC μ PD74HC14C |
| IC5 | 1140000490 | IC μ PD780C-1 |
| IC6 | 1130003620 | IC μ PD74HC32C |
| IC7 | 1130003700 | IC μ PD27C256AD |
| IC8 | 1130003930 | IC μ PD4464C |
| IC9 | 1130002840 | IC μ PD71055C |
| IC10 | 1130002840 | IC μ PD71055C |
| IC11 | 1110001750 | IC BA614 |
| IC12 | 1110001750 | IC BA614 |
| IC13 | 1130000040 | IC TC4011UBP |
| IC14 | 1110000540 | IC NJM4558D |
| IC15 | 1110000540 | IC NJM4558D |
| IC16 | 1180000190 | IC NJM7805A |

[LOGIC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|----------------|---------------------|
| IC17 | 1110001680 | IC | S-8054ALB |
| Q1 | 1530000960 | Transistor | 2SC3399 |
| Q2 | 1530000960 | Transistor | 2SC3399 |
| Q3 | 1530000110 | Transistor | 2SC2458-GR |
| Q4 | 1530000960 | Transistor | 2SC3399 |
| Q5 | 1530000960 | Transistor | 2SC3399 |
| Q6 | 1590000310 | FET | 2SJ105-GR |
| D2 | 1710000160 | Diode | 1SS133 |
| D3 | 1710000160 | Diode | 1SS133 |
| D4 | 1710000160 | Diode | 1SS133 |
| D5 | 1710000160 | Diode | 1SS133 |
| X1 | 6060000380 | Crystal | CSA4.00MG |
| R1 | 7010003780 | Resistor | ELR20J 1 MΩ |
| R4 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R5 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R6 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R7 | 7010003280 | Resistor | ELR20J 100 Ω |
| R8 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R9 | 7410000180 | Resistor Array | RMX- 8 103K |
| R10 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R11 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R12 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R14 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R15 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R16 | 7010003460 | Resistor | ELR20J 3.3 kΩ |
| R17 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R18 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R19 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R20 | 7010003700 | Resistor | ELR20J 220 kΩ |
| R21 | 7310001850 | Trimmer | RH0421CS4J08A (473) |
| R22 | 7010004340 | Resistor | R20J 15 kΩ |
| R23 | 7310001850 | Trimmer | RH0421CS4J08A (473) |
| R24 | 7010003340 | Resistor | ELR20J 330 Ω |
| R25 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R26 | 7010003550 | Resistor | ELR20J 15 kΩ |
| R27 | 7010003320 | Resistor | ELR20J 220 Ω |
| R28 | 7010003550 | Resistor | ELR20J 15 kΩ |
| R29 | 7010003800 | Resistor | ELR20J 33 kΩ |
| R30 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R31 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R32 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R33 | 7310001710 | Trimmer | RH0421C14J0KA (103) |
| R34 | 7010004450 | Resistor | R20J 100 kΩ |
| R35 | 7010003340 | Resistor | ELR20J 330 Ω |
| R36 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R37 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R38 | 7310001710 | Trimmer | RH0421C14J0KA (103) |
| R39 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R40 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R41 | 7010004130 | Resistor | R20J 330 Ω |
| R42 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R43 | 7010003670 | Resistor | ELR20J 120 kΩ |
| R44 | 7010003490 | Resistor | ELR20J 5.6 kΩ |
| R45 | 7310001710 | Trimmer | RH0421C14J0KA (103) |
| R46 | 7010004410 | Resistor | R20J 47 kΩ |
| R47 | 7010004320 | Resistor | R20J 10 kΩ |
| R48 | 7010003600 | Resistor | ELR20J 33 kΩ |
| C1 | 4010000810 | Ceramic | DD105 CH 300J 50V |
| C2 | 4010000810 | Ceramic | DD105 CH 300J 50V |
| C3 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C4 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C5 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C6 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C7 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C8 | 4510001300 | Electrolytic | 50 RC2 3.3 μF |
| C9 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C10 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C11 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C12 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C13 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C14 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C15 | 4310000060 | Mylar | F2D 50V 223K |
| C16 | 4040000260 | Barrier Layer | UZE 08X 104M |

[LOGIC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-----------------|-----------------------|
| C17 | 4510003160 | Electrolytic | 16 RC2 22 μF (D =4.0) |
| C18 | 4510001240 | Electrolytic | 25 RC2 47 μF |
| C19 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C20 | 4310000010 | Mylar | F2D 50V 102K |
| C21 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C22 | 4510001280 | Electrolytic | 50 RC2 1 μF |
| C23 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C24 | 4510003760 | Electrolytic | 16 RC2 100 μF |
| C25 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C26 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C27 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C28 | 4510003160 | Electrolytic | 16 RC2 22 μF (D =4.0) |
| C29 | 4510001280 | Electrolytic | 50 RC2 1 μF |
| C30 | 4510001280 | Electrolytic | 50 RC2 1 μF |
| C31 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C32 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C33 | 4550002430 | Tantalum | DN 1V R33M |
| C34 | 4550000320 | Tantalum | DN 1V 0R1M |
| C35 | 4510001210 | Electrolytic | 10 RC2 100 μF |
| C36 | 4510001280 | Electrolytic | 50 RC2 1 μF |
| DS1 | 5040000810 | LED | SLN-210VC |
| S1 | 2260000080 | Switch | SKHHAM024A |
| BT1 | 3020000070 | Lithium Battery | BR2032-1HF |
| EP1 | 0910020193 | P.C. Board | B-1835C (LOGIC) |

[RX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|----------------------------|
| IC1 | 1110000630 | IC | MC3357P |
| IC2 | 1110000580 | IC | BA4558 |
| IC3 | 1130002960 | IC | TC9181P |
| IC4 | 1130003500 | IC | TD6128P |
| IC5 | 1110001000 | IC | μPC1851G |
| IC6 | 1130001830 | IC | MN6520 |
| IC7 | 1130000180 | IC | TC4094BP |
| IC8 | 1180000470 | IC | NJM7808A |
| IC9 | 1180000190 | IC | NJM7805A |
| Q1 | 1580000050 | FET | 3SK121-Y |
| Q2 | 1580000050 | FET | 3SK121-Y |
| Q3 | 1530002210 | Transistor | 2SC3776-D |
| Q4 | 1530000150 | Transistor | 2SC2668-O |
| Q5 | 1530000110 | Transistor | 2SC2458-GR |
| Q6 | 1590000280 | FET | 2SJ105-Y |
| Q7 | 1530000960 | Transistor | 2SC3399 |
| Q8 | 1530000960 | Transistor | 2SC3399 |
| Q9 | 1530000660 | Transistor | 2SC1645B |
| Q10 | 1580000010 | FET | 2SK184-Y |
| Q11 | 1530000110 | Transistor | 2SC2458-GR |
| Q12 | 1530000110 | Transistor | 2SC2458-GR |
| Q13 | 1530000660 | Transistor | 2SC1645B |
| D1 | 1790000250 | Diode | 1SS97 |
| D2 | 1790000250 | Diode | 1SS97 |
| D3 | 1730000120 | Zener | RD6.2E B2 |
| D4 | 1710000040 | Diode | 1S953 |
| D5 | 1710000040 | Diode | 1S953 |
| D6 | 1710000160 | Diode | 1SS133 |
| D7 | 1730000100 | Zener | RD5.1E B2 |
| X1 | 6050005010 | Crystal | CR-214 |
| X2 | 6070000010 | Discriminator | CDB455C7A |
| X3 | 6050003110 | Crystal | RF-4A3 FAC NKD (4.194304M) |

[RX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|--|
| F11 | 201000230 | Filter | 30M15B (FL-76) (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 201000940 | Filter | 30M 7B (FL-107) (#06 #07 #08 #09 #10 #24 #25 #26) |
| F12 | 202000120 | Ceramic | CFW455E (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 202000150 | Ceramic | CFW455HT (#06 #07 #08 #09 #10 #24 #25 #26) |
| L1 | 6110001520 | Coil | LA-232 |
| L2 | 6110001520 | Coil | LA-232 |
| L3 | 6170000230 | Coil | LW-25 |
| L4 | 6110001520 | Coil | LA-232 |
| L5 | 6110001520 | Coil | LA-232 |
| L6 | 6110001520 | Coil | LA-232 |
| L7 | 6110001540 | Coil | LA-234 |
| L8 | 6150003220 | Coil | LS-320 |
| L9 | 6150003220 | Coil | LS-320 |
| L10 | 6180000900 | Coil | LAL 03NA 101K |
| L11 | 6180000770 | Coil | LAL 03NA 1R0M |
| L12 | 6180001300 | Coil | LAL 02NA 100K |
| R1 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R2 | 7010004070 | Resistor | R20J 100 Ω |
| R3 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R4 | 7010003660 | Resistor | ELR20J 100 kΩ |
| R5 | 7010003360 | Resistor | ELR20J 470 Ω |
| R6 | 7010003650 | Resistor | ELR20J 82 kΩ |
| R7 | 7010003280 | Resistor | ELR20J 100 Ω |
| R8 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R9 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R10 | 7010003360 | Resistor | ELR20J 470 Ω |
| R11 | 7010003580 | Resistor | ELR20J 22 kΩ |
| R12 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R13 | 7010003340 | Resistor | ELR20J 330 Ω |
| R14 | 7010004070 | Resistor | R20J 100 Ω |
| R15 | 7010003560 | Resistor | ELR20J 18 kΩ |
| R16 | 7010003280 | Resistor | ELR20J 100 Ω |
| R17 | 7010003280 | Resistor | ELR20J 100 Ω |
| R18 | 7010004210 | Resistor | R20J 1.5 kΩ (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 7010004230 | Resistor | R20J 2.2 kΩ (#06 #07 #08 #09 #10 #24 #25 #26) |
| R19 | 7010003630 | Resistor | ELR20J 56 kΩ |
| R20 | 7010003420 | Resistor | ELR20J 1.5 kΩ |
| R21 | 7010004270 | Resistor | R20J 4.7 kΩ |
| R22 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R23 | 7010003420 | Resistor | ELR20J 1.5 kΩ (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 7010003440 | Resistor | ELR20J 2.2 kΩ (#06 #07 #08 #09 #10 #24 #25 #26) |
| R24 | 7010004410 | Resistor | R20J 47 kΩ |
| R25 | 7010004210 | Resistor | R20J 1.5 kΩ |
| R26 | 7010003360 | Resistor | ELR20J 470 Ω |
| R27 | 7010003720 | Resistor | ELR20J 330 kΩ (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 7010003750 | Resistor | ELR20J 560 kΩ (#06 #07 #08 #09 #10 #24 #25 #26) |
| R28 | 7010003490 | Resistor | ELR20J 5.6 kΩ |
| R29 | 7010004230 | Resistor | R20J 2.2 kΩ |
| R30 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R31 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R32 | 7010004270 | Resistor | R20J 4.7 kΩ |
| R33 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R34 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R35 | 7010003370 | Resistor | ELR20J 560 Ω |
| R36 | 7010003280 | Resistor | ELR20J 100 Ω |
| R37 | 7010004210 | Resistor | R20J 1.5 kΩ |

[RX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|--|
| R38 | 7010004210 | Resistor | R20J 1.5 kΩ |
| R39 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R40 | 7010003950 | Resistor | R20J 10 Ω |
| R41 | 7010004090 | Resistor | R20J 150 Ω |
| R42 | 7010003950 | Resistor | R20J 10 Ω |
| R43 | 7010003160 | Resistor | ELR20J 10 Ω |
| R44 | 7010003300 | Resistor | ELR20J 150 Ω |
| R45 | 7010003160 | Resistor | ELR20J 10 Ω |
| R46 | 7010003330 | Resistor | ELR20J 270 Ω |
| R47 | 7010003980 | Resistor | R20J 18 Ω |
| R48 | 7010003330 | Resistor | ELR20J 270 Ω |
| R49 | 7010003300 | Resistor | ELR20J 150 Ω |
| R50 | 7010003150 | Resistor | ELR20J 8.2 Ω |
| R51 | 7010003300 | Resistor | ELR20J 150 Ω |
| R52 | 7010003150 | Resistor | ELR20J 8.2 Ω |
| R53 | 7010003630 | Resistor | ELR20J 56 kΩ |
| R54 | 7010003630 | Resistor | ELR20J 56 kΩ |
| R55 | 7010003720 | Resistor | ELR20J 330 kΩ |
| R56 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R57 | 7010003280 | Resistor | ELR20J 100 Ω |
| R58 | 7010003550 | Resistor | ELR20J 15 kΩ |
| R59 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R60 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R61 | 7010003740 | Resistor | ELR20J 470 kΩ |
| R62 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R63 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R64 | 7010003360 | Resistor | ELR20J 470 Ω |
| R65 | 7010003580 | Resistor | ELR20J 22 kΩ |
| R66 | 7010003510 | Resistor | ELR20J 6.8 kΩ |
| R67 | 7010003790 | Resistor | ELR20J 1.2 MΩ |
| R68 | 7010003790 | Resistor | ELR20J 1.2 MΩ |
| R69 | 7010003280 | Resistor | ELR20J 100 Ω |
| R70 | 7010003510 | Resistor | ELR20J 6.8 kΩ |
| R71 | 7010003510 | Resistor | ELR20J 6.8 kΩ |
| R72 | 7010003450 | Resistor | ELR20J 2.7 kΩ |
| R73 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R74 | 7010003620 | Resistor | ELR20J 47 kΩ |
| R75 | 7010003600 | Resistor | ELR20J 33 kΩ |
| R76 | 7010003610 | Resistor | ELR20J 39 kΩ |
| R77 | 7010004190 | Resistor | R20J 1 kΩ |
| R78 | 7010004410 | Resistor | R20J 47 kΩ |
| C1 | 4010000020 | Ceramic | DD104 SL 010C 50V |
| C2 | 4610000100 | Trimmer | CV05A0601 |
| C4 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C5 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C6 | 4610000100 | Trimmer | CV05A0601 |
| C8 | 4010000020 | Ceramic | DD104 SL 010C 50V |
| C9 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C10 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C12 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C13 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C14 | 4010000050 | Ceramic | DD104 SL 030C 50V |
| C15 | 4610000100 | Trimmer | CV05A0601 |
| C17 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C18 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C19 | 4610000100 | Trimmer | CV05A0601 |
| C21 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C22 | 4010005140 | Ceramic | DD104 SL R75C 50V |
| C23 | 4610000100 | Trimmer | CV05A0601 |
| C25 | 4010000050 | Ceramic | DD104 SL 030C 50V (#01 #02 #03 #04 #05 #06 #07 #08 #09 #10) |
| | 4010000070 | Ceramic | DD104 SL 050C 50V (#21 #22 #23 #24 #25 #26) |
| C26 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C27 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C29 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C30 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C31 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C32 | 4010000330 | Ceramic | DD105 SL 101J 50V |
| C33 | 4010000140 | Ceramic | DD104 SL 120J 50V (#01 #02 #03 #04 #05 #21 #22 #23) |
| | 4010000200 | Ceramic | DD104 SL 270J 50V #24 (#06 #07 #08 #09 #10 #24 #25 #26) |

[RX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|---|
| C34 | 4010000340 | Ceramic | DD105 SL 121J 50V |
| C35 | 4010000300 | Ceramic | DD104 SL 680J 50V |
| C36 | 4010000480 | Ceramic | DD104 B 471K 50V |
| C37 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C38 | 4040000150 | Barrier Layer | UAT 05X 472K |
| C39 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C40 | 4550000320 | Tantalum | DN 1V 0R1M |
| C41 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C42 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C43 | 4010000160 | Ceramic | DD104 SL 180J 50V |
| C44 | 4010000070 | Ceramic | DD104 SL 050C 50V |
| C45 | 4510001230 | Electrolytic | 25 RC2 4.7 μ F |
| C46 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C47 | 4510001230 | Electrolytic | 25 RC2 4.7 μ F |
| C48 | 4550000320 | Tantalum | DN 1V 0R1M |
| C49 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C50 | 4010000320 | Ceramic | DD104 SL 820J 50V |
| C51 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C52 | 4040000110 | Barrier Layer | UAT 04X 222K (#01 #02 #03 #04 #05 #21 #22 #23) 4040000170 Barrier Layer UAT 05X 682K (#06 #07 #08 #09 #10 #24 #25 #26) |
| C53 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C54 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C55 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C56 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C57 | 4010000220 | Ceramic | DD104 SL 330J 50V |
| C58 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C59 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C60 | 4550001040 | Tantalum | DN 1C 3R3M |
| C61 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C62 | 4510001210 | Electrolytic | 10 RC2 100 μ F |
| C63 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C64 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C65 | 4550002460 | Tantalum | DN 1V 3R3M |
| C66 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C67 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C68 | 4510002270 | Electrolytic | 6.3 RC2 47 μ F |
| C69 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C70 | 4510001220 | Electrolytic | 16 RC2 10 μ F |
| C71 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C72 | 4510001220 | Electrolytic | 16 RC2 10 μ F |
| C73 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C74 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C75 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C76 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C77 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C78 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C79 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C80 | 4550000350 | Tantalum | DN 1V 010M |
| C81 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C82 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C83 | 4010000150 | Ceramic | DD104 SL 150J 50V |
| C84 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C85 | 4510001230 | Electrolytic | 25 RC2 4.7 μ F |
| C86 | 4310000380 | Mylar | F2D 50V 153J (#01 #02 #03 #04 #05 #06 #07 #08 #09 #10) 4310000200 Mylar F2D 50V 153K (#21 #22 #23 #24 #25 #26) |
| C87 | 4310000340 | Mylar | F2D 50V 682J (#21 #22 #23 #24 #25 #26) 4310000170 Mylar F2D 50V 682K |
| C88 | 4510001280 | Electrolytic | 50 RC2 1 μ F |
| C89 | 4510001220 | Electrolytic | 16 RC2 10 μ F |
| C90 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C91 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C92 | 4010000180 | Ceramic | DD104 SL 180J 50V |
| C93 | 4010000180 | Ceramic | DD104 SL 180J 50V |
| C94 | 4510002270 | Electrolytic | 6.3 RC2 47 μ F |
| C95 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C96 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C97 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C98 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C99 | 4040000190 | Barrier Layer | UAT 05X 103K |
| C100 | 4040000130 | Barrier Layer | UAT 05X 332K |

[RX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|---------------------|
| C101 | 4510002010 | Electrolytic | 50 RC2 0.33 μ F |
| C102 | 4510001270 | Electrolytic | 50 RC2 0.47 μ F |
| C103 | 4510001270 | Electrolytic | 50 RC2 0.47 μ F |
| C104 | 4510001270 | Electrolytic | 50 RC2 0.47 μ F |
| C105 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C106 | 4550000350 | Tantalum | DN 1V 010M |
| C107 | 4550000340 | Tantalum | DN 1C 100M |
| C108 | 4550000350 | Tantalum | DN 1V 010M |
| C109 | 4550000340 | Tantalum | DN 1C 100M |
| C110 | 4550000320 | Tantalum | DN 1V 0R1M |
| EP1 | 0910024313 | P.C. Board | B-2001C (RX) |

[R-VCO UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|-----------------------|
| Q1 | 1580000130 | FET | 2SK125 |
| Q2 | 1530002210 | Transistor | 2SC3776-D |
| D1 | 1720000080 | Varicap | 1SV50 (1)E |
| D2 | 1720000080 | Varicap | 1SV50 (1)E |
| D3 | 1720000080 | Varicap | 1T25 |
| L1 | 6180000730 | Coil | LAL 03NA R47M |
| L2 | 6180000770 | Coil | LAL 03NA 1R0M |
| L3 | 6180000770 | Coil | LAL 03NA 1R0M |
| L4 | 6180000730 | Coil | LAL 03NA R47M |
| L5 | 6110001530 | Coil | LA-233 |
| R1 | 7010003680 | Resistor | ELR20J 100 k Ω |
| R4 | 7010004120 | Resistor | R20J 270 Ω |
| R5 | 7010003620 | Resistor | ELR20J 47 k Ω |
| R6 | 7010003160 | Resistor | ELR20J 10 Ω |
| R7 | 7010003280 | Resistor | ELR20J 100 Ω |
| R8 | 7010003240 | Resistor | ELR20J 47 Ω |
| R9 | 7010003480 | Resistor | ELR20J 3.3 k Ω |
| R10 | 7010003440 | Resistor | ELR20J 2.2 k Ω |
| R11 | 7010003320 | Resistor | ELR20J 220 Ω |
| R12 | 7010003280 | Resistor | ELR20J 100 Ω |
| R13 | 7010003200 | Resistor | ELR20J 22 Ω |
| C1 | 4030000290 | Ceramic | GRM42-6 SL 020C 50PT |
| C4 | 4030000120 | Ceramic | GRM42-8 CH 150J 50PT |
| C5 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C6 | 4010000010 | Ceramic | DD104 SL 0R5C 50V |
| C7 | 4010000630 | Ceramic | DD104 CJ 030C 50V |
| C8 | 4010000340 | Ceramic | DD105 SL 121J 50V |
| C9 | 4010000630 | Ceramic | DD104 CJ 030C 50V |
| C10 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C12 | 4010000020 | Ceramic | DD104 SL 010C 50V |
| C13 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C14 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C15 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C16 | 4010000080 | Ceramic | DD104 SL 040C 50V |
| C17 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C18 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C19 | 4510001210 | Electrolytic | 10 RC2 100 μ F |
| C20 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C21 | 4010000460 | Ceramic | DD104 B 471K 50V |
| EP1 | 0910011812 | P.C. Board | B-1066B (R-VCO) |

[R-DC-DC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|----------|
| IC1 | 1110000900 | IC | TL499ACP |
| Q1 | 1530000860 | Transistor | 2SC1645B |

[R-DC-DC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|--------------|------------------------|
| D1 | 1730000520 | Zener | RD20E B2 |
| L1 | 6190000220 | Coil | S0971136-101K |
| L2 | 6180001120 | Coil | FL 5H 101K |
| R1 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R2 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R3 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R4 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R5 | 7030000610 | Resistor | MCR10EZHZ 82 kΩ (823) |
| R6 | 7030000460 | Resistor | MCR10EZHZ 4.7 kΩ (472) |
| R7 | 7030000340 | Resistor | MCR10EZHZ 4.7 kΩ (471) |
| C1 | 4030001090 | Ceramic | GRM40 B 471K 50PT |
| C2 | 4510001120 | Electrolytic | 25 MS7 4R7 μF |
| C3 | 4510001120 | Electrolytic | 25 MS7 4R7 μF |
| C4 | 4510001120 | Electrolytic | 25 MS7 4R7 μF |
| C5 | 4510002020 | Electrolytic | 25 MS7 47 μF |
| C6 | 4550000320 | Tantalum | DN 1V 0R1M |
| C7 | 4510002410 | Electrolytic | 6R3 MS7 100 μF (6.3X7) |
| C8 | 4510004400 | Electrolytic | 6R3 MS7 330 μF |
| C9 | 4510001100 | Electrolytic | 18 MS7 10 μF |
| EP1 | 0810016901 | P.C. Board | B-1558A (R-DC-DC) |

[TX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|------------------------------|
| IC1 | 1110001000 | IC | μPC1651G |
| IC2 | 1130002960 | IC | TC9181P |
| IC3 | 1130003500 | IC | TD6128P |
| IC4 | 1130000180 | IC | TC4094BP |
| IC5 | 1130000180 | IC | TC4094BP |
| IC6 | 1130000950 | IC | S-7116A |
| IC7 | 1110000580 | IC | BA4558 |
| IC8 | 1180000190 | IC | NJM7805A |
| IC9 | 1180000470 | IC | NJM7808A |
| IC10 | 1110000580 | IC | BA4558 |
| Q1 | 1530000660 | Transistor | 2SC1845B |
| Q2 | 1530001810 | Transistor | 2SC3355 |
| Q3 | 1530000110 | Transistor | 2SC2458-GR |
| Q4 | 1560000010 | FET | 2SK184-Y |
| Q5 | 1530000591 | Transistor | 2SC2785 EL |
| Q6 | 1530000960 | Transistor | 2SC3399 |
| Q7 | 1520000080 | Transistor | 2SB909M R |
| D1 | 1710000160 | Diode | 1SS133 |
| D2 | 1710000160 | Diode | 1SS133 |
| D3 | 1710000160 | Diode | 1SS133 |
| X1 | 6050005960 | Crystal | CR-262 |
| X2 | 6050003120 | Crystal | RF-4A3 FAA NKD (3.579545MHz) |
| L1 | 6180000770 | Coil | LAL 03NA 1R0M |
| L2 | 6110001530 | Coil | LA-233 |
| L3 | 6180001300 | Coil | LAL 02NA 100K |
| L4 | 6910000670 | Coil | BT01RN1-A61-001 |
| L5 | 6180001510 | Coil | LAL 02NA 101K |
| L6 | 6180002530 | Coil | LAL 02NA R68K |
| L7 | 6180001740 | Coil | LAL 02NA R82K |
| R1 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R2 | 7010003160 | Resistor | ELR20J 10 Ω |
| R3 | 7010003300 | Resistor | ELR20J 150 Ω |
| R4 | 7010003160 | Resistor | ELR20J 10 Ω |
| R5 | 7010003330 | Resistor | ELR20J 270 Ω |
| R6 | 7010003980 | Resistor | R20J 18 Ω |
| R7 | 7010003330 | Resistor | ELR20J 270 Ω |
| R8 | 7010003300 | Resistor | ELR20J 150 Ω |
| R9 | 7010004010 | Resistor | R20J 33 Ω |
| R10 | 7010003510 | Resistor | ELR20J 6.8 kΩ |

[TX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|----------------|---------------------|
| R11 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R12 | 7010003950 | Resistor | R20J 10 Ω |
| R13 | 7010003300 | Resistor | ELR20J 150 Ω |
| R14 | 7010003950 | Resistor | R20J 10 Ω |
| R15 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R16 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R17 | 7010003280 | Resistor | ELR20J 100 Ω |
| R18 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R19 | 7010003370 | Resistor | ELR20J 560 Ω |
| R20 | 7010004210 | Resistor | R20J 1.5 kΩ |
| R21 | 7010004210 | Resistor | R20J 1.5 kΩ |
| R22 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R23 | 7410000540 | Resistor Array | RKM5LW 222J |
| R24 | 7310000750 | Trimmer | RH0651C14J2WA (103) |
| R25 | 7010003510 | Resistor | ELR20J 6.8 kΩ |
| R26 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R27 | 7010003280 | Resistor | ELR20J 100 Ω |
| R28 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R29 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R30 | 7010004110 | Resistor | R20J 220 Ω |
| R31 | 7010004070 | Resistor | R20J 100 Ω |
| R32 | 7310000780 | Trimmer | RH0651CS4J25A (473) |
| R33 | 7010004500 | Resistor | R20J 270 kΩ |
| R34 | 7010004320 | Resistor | R20J 10 kΩ |
| R35 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R36 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R37 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R38 | 7010003280 | Resistor | ELR20J 100 Ω |
| R41 | 7010003380 | Resistor | ELR20J 680 Ω |
| R42 | 7010003520 | Resistor | ELR20J 8.2 kΩ |
| R43 | 7010004320 | Resistor | R20J 10 kΩ |
| R44 | 7010003590 | Resistor | ELR20J 27 kΩ |
| R45 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R46 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R47 | 7010004330 | Resistor | R20J 12 kΩ |
| R48 | 7010003550 | Resistor | ELR20J 15 kΩ |
| R49 | 7010003590 | Resistor | ELR20J 27 kΩ |
| R50 | 7010003320 | Resistor | ELR20J 220 Ω |
| R51 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R52 | 7010003740 | Resistor | ELR20J 470 kΩ |
| R53 | 7010004110 | Resistor | R20J 220 Ω |
| R54 | 7310000740 | Trimmer | RH0651CS3J2KA (472) |
| R55 | 7010003710 | Resistor | ELR20J 270 kΩ |
| R56 | 7010003680 | Resistor | ELR20J 150 kΩ |
| R57 | 7010004410 | Resistor | R20J 47 kΩ |
| R58 | 7010003680 | Resistor | ELR20J 100 kΩ |
| R59 | 7010004440 | Resistor | R20J 82 kΩ |
| R60 | 7010003650 | Resistor | ELR20J 82 kΩ |
| R61 | 7010004270 | Resistor | R20J 4.7 kΩ |
| C1 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C2 | 4510001210 | Electrolytic | 10 RC2 100 μF |
| C3 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C4 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C5 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C6 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C7 | 4550000350 | Tantalum | DN 1V 010M |
| C8 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C9 | 4010000180 | Ceramic | DD104 SL 220J 50V |
| C10 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C12 | 4010000060 | Ceramic | DD104 SL 040C 50V |
| C13 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C14 | 4550002460 | Tantalum | DN 1V 3R3M |
| C15 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C16 | 4510002270 | Electrolytic | 6.3 RC2 47 μF |
| C17 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C18 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C19 | 4510001220 | Electrolytic | 16 RC2 10 μF |
| C20 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C21 | 4510001220 | Electrolytic | 16 RC2 10 μF |
| C22 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C23 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C24 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C25 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C26 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C27 | 4510001240 | Electrolytic | 25 RC2 47 μF |
| C28 | 4040000150 | Barrier Layer | UAT 05X 472K |

[TX UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|---------------------|
| C29 | 4040000150 | Barrier Layer | UAT 05X 472K |
| C30 | 4010000560 | Ceramic | DD106 F 103Z 50V |
| C31 | 4010000520 | Ceramic | DD108 B 472K 50V |
| C32 | 4010000560 | Ceramic | DD106 F 103Z 50V |
| C33 | 4010000380 | Ceramic | DD107 SL 221J 50V |
| C34 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C35 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C36 | 4010000160 | Ceramic | DD104 SL 180J 50V |
| C37 | 4010000390 | Ceramic | DD107 SL 271J 50V |
| C38 | 4010000330 | Ceramic | DD105 SL 101J 50V |
| C39 | 4010000330 | Ceramic | DD105 SL 101J 50V |
| C40 | 4510001220 | Electrolytic | 16 RC2 10 μ F |
| C41 | 4010000820 | Ceramic | DD105 CH 330J 50V |
| C42 | 4010000820 | Ceramic | DD105 CH 330J 50V |
| C43 | 4510001270 | Electrolytic | 50 RC2 0.47 μ F |
| C44 | 4510001230 | Electrolytic | 25 RC2 4.7 μ F |
| C46 | 4510002420 | Electrolytic | 16 RC2 22 μ F |
| C47 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C50 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C51 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C53 | 4550000320 | Tantalum | DN 1V 0R1M |
| C54 | 4510001290 | Electrolytic | 50 RC2 2.2 μ F |
| C55 | 4510001290 | Electrolytic | 50 RC2 2.2 μ F |
| C56 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C57 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C58 | 4510002420 | Electrolytic | 16 RC2 22 μ F |
| C59 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C61 | 4310000050 | Mylar | F2D 50V 222K |
| C62 | 4010000340 | Ceramic | DD105 SL 121J 50V |
| C63 | 4510001290 | Electrolytic | 50 RC2 2.2 μ F |
| C64 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C65 | 4550000350 | Tantalum | DN 1V 010M |
| C66 | 4550000340 | Tantalum | DN 1C 100M |
| C67 | 4550000350 | Tantalum | DN 1V 010M |
| C68 | 4550000340 | Tantalum | DN 1C 100M |
| C69 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C70 | 4550002430 | Tantalum | DN 1V R33M |
| EP1 | 0910028011 | P.C. Board | B-2698A (TX) |

[T-VCO UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|-----------------------|
| Q1 | 1560000130 | FET | 2SK125 |
| Q2 | 1530002210 | Transistor | 2SC3776-D |
| D1 | 1720000080 | Varicap | 1SV50 (1)E |
| D2 | 1720000060 | Varicap | 1SV50 (1)E |
| D3 | 1720000090 | Varicap | 1T25 |
| L1 | 6180000730 | Coil | LAL 03NA R47M |
| L2 | 6180000770 | Coil | LAL 03NA 1R0M |
| L3 | 6180000770 | Coil | LAL 03NA 1R0M |
| L4 | 6180000730 | Coil | LAL 03NA R47M |
| L5 | 6110001530 | Coil | LA-233 |
| R1 | 7010003660 | Resistor | ELR20J 100 k Ω |
| R4 | 7010004120 | Resistor | R20J 270 Ω |
| R5 | 7010003620 | Resistor | ELR20J 47 k Ω |
| R6 | 7010003160 | Resistor | ELR20J 10 Ω |
| R7 | 7010003280 | Resistor | ELR20J 100 Ω |
| R8 | 7010003240 | Resistor | ELR20J 47 Ω |
| R9 | 7010003460 | Resistor | ELR20J 3.3 k Ω |
| R10 | 7010003440 | Resistor | ELR20J 2.2 k Ω |
| R11 | 7010003320 | Resistor | ELR20J 220 Ω |
| R12 | 7010003280 | Resistor | ELR20J 100 Ω |
| R13 | 7010003200 | Resistor | ELR20J 22 Ω |
| C1 | 4030000290 | Ceramic | GRM42-6 SL 020C 50PT |
| C4 | 4030000120 | Ceramic | GRM42-6 CH 150J 50PT |
| C5 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C6 | 4010000010 | Ceramic | DD104 SL 0R5C 50V |
| C7 | 4010000830 | Ceramic | DD104 CJ 030C 50V |
| C8 | 4010000340 | Ceramic | DD105 SL 121J 50V |

[T-VCO UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|--------------------|
| C9 | 4010000830 | Ceramic | DD104 CJ 030C 50V |
| C10 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C12 | 4010000020 | Ceramic | DD104 SL 010C 50V |
| C13 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C14 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C15 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C16 | 4010000060 | Ceramic | DD104 SL 040C 50V |
| C17 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C18 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C19 | 4510001210 | Electrolytic | 10 RC2 100 μ F |
| C20 | 4040000260 | Barrier Layer | UZE 08X 104M |
| C21 | 4010000460 | Ceramic | DD104 B 471K 50V |
| EP1 | 0910011812 | P.C. Board | B-1066B (T-VCO) |

[T-DC-DC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|--------------|--------------------------------|
| IC1 | 1110000900 | IC | TL499ACP |
| Q1 | 1530000660 | Transistor | 2SC1645B |
| D1 | 1730000520 | Zener | RD20E B2 |
| L1 | 6190000220 | Coil | S0971136-101K |
| L2 | 6180001120 | Coil | FL 5H 101K |
| R1 | 7010003400 | Resistor | ELR20J 1 k Ω |
| R2 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R3 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R4 | 7030000300 | Resistor | MCR10EZHZ 220 Ω (221) |
| R5 | 7030000610 | Resistor | MCR10EZHZ 82 k Ω (823) |
| R6 | 7030000460 | Resistor | MCR10EZHZ 4.7 k Ω (472) |
| R7 | 7030000340 | Resistor | MCR10EZHZ 470 Ω (471) |
| C1 | 4030001090 | Ceramic | GRM40 B 471K 50PT |
| C2 | 4510001120 | Electrolytic | 25 MS7 4R7 μ F |
| C3 | 4510001120 | Electrolytic | 25 MS7 4R7 μ F |
| C4 | 4510001120 | Electrolytic | 25 MS7 4R7 μ F |
| C5 | 4510002020 | Electrolytic | 25 MS7 47 μ F |
| C6 | 4550000320 | Tantalum | DN 1V 0R1M |
| C7 | 4510002410 | Electrolytic | 6R3 MS7 100 μ F (6.3X7) |
| C8 | 4510004400 | Electrolytic | 6R3 MS7 330 μ F |
| C9 | 4510001100 | Electrolytic | 16 MS7 10 μ F |
| EP1 | 0910016901 | P.C. Board | B-1558A (T-DC-DC) |

[DIN UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|---------------|
| EP1 | 0910019162 | P.C. Board | B-1841B (DIN) |

[REG-A UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|-----------|
| IC1 | 1110001040 | IC | MB3752M-G |
| IC2 | 1180000080 | IC | NJM78L05A |
| IC3 | 1110002000 | IC | BA10393 |
| Q1 | 1520000080 | Transistor | 2SB909M R |
| D1 | 1710000350 | Diode | 1N4002 |
| D2 | 1710000140 | Diode | U05G |
| D3 | 1710000350 | Diode | 1N4002 |
| D4 | 1710000350 | Diode | 1N4002 |

[REG-A UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|--------------|------------------------|
| D5 | 1710000350 | Diode | 1N4002 |
| R1 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R2 | 7010003440 | Resistor | ELR20J 2.2 kΩ |
| R3 | 7310000730 | Trimmer | RH0651CN3J01A (332) |
| R4 | 7010004190 | Resistor | R20J 1 kΩ |
| R5 | 7010003240 | Resistor | ELR20J 47 Ω |
| R6 | 7100000160 | Resistor | SRW2P 100 Ω (101) |
| R7 | 7310000800 | Trimmer | RH0651CJ5J01A (224) |
| R8 | 7010003690 | Resistor | ELR20J 180 kΩ |
| R9 | 7010004320 | Resistor | R20J 10 kΩ |
| C1 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C2 | 4510002900 | Electrolytic | 25 SS 470 μF |
| C3 | 4550000320 | Tantalum | DN 1V 0R1M |
| C4 | 4550002430 | Tantalum | DN 1V R33M |
| RL1 | 8330000710 | Relay | G2R-117P-V-RP-US DC12V |
| RL2 | 8330000710 | Relay | G2R-117P-V-RP-US DC12V |
| EP1 | 0910019154 | P.C. Board | B-1836D (REG-A) |

[T-FIL UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|------------|
| L1 | 8110001230 | Coil | LA-163 |
| L2 | 8110001240 | Coil | LA-164 |
| C1 | 4610001330 | Trimmer | CT-S3-E |
| C2 | 4610001330 | Trimmer | CT-S3-E |
| C3 | 4020000320 | Cylinder | CGM-A-027K |

[ACC UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|---|
| F1 | 5210000050 | Fuse | FGB 3A (#01 #02 #03 #06 #07 #08 #21 #22 #23 #24 #25 #26) |
| | 5210000060 | Fuse | FGB 5A (#04 #05 #09 #10) |
| F2 | 5210000070 | Fuse | FGB 10A (#01 #02 #03 #06 #07 #08 #21 #22 #23 #24) #25 #26) |
| | 5210000080 | Fuse | FGB 20A (#04 #05 #09 #10) |

[PA UNIT] (10W/25W version)

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|--------------------------------------|
| IC1 | 1150000490 | IC | SC1056 (#01 #02 #03 #06 #07 #08) |
| | 1150000520 | IC | M57729L (#21 #22 #23 #24 #25 #26) |
| IC2 | 1110000070 | IC | μPC358C |
| Q1 | 1530000640 | Transistor | 2SC2407 (A) |
| Q2 | 1530000110 | Transistor | 2SC2458-GR |
| Q3 | 1520000220 | Transistor | 2SB1019-Y |
| D1 | 1710000160 | Diode | 1SS133 |
| D2 | 1790000250 | Diode | 1SS97 |
| D3 | 1790000250 | Diode | 1SS97 |
| L1 | 8110001520 | Coil | LA-232 |
| L2 | 8110001520 | Coil | LA-232 |
| L3 | 8110001520 | Coil | LA-232 |
| L4 | 8110001520 | Coil | LA-232 |

[PA UNIT] (10W/25W version)

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|--|
| L5 | 8110001520 | Coil | LA-232 |
| R1 | 7010003940 | Resistor | R20J 8.2 Ω |
| R2 | 7010003300 | Resistor | ELR20J 150 Ω |
| R3 | 7010003940 | Resistor | R20J 8.2 Ω |
| R4 | 7010004190 | Resistor | R20J 1 kΩ |
| R5 | 7010004070 | Resistor | R20J 100 Ω |
| R6 | 7010003400 | Resistor | ELR20J 1 kΩ |
| R7 | 7010003990 | Resistor | R20J 22 Ω |
| R8 | 7010004270 | Resistor | R20J 4.7 kΩ |
| R9 | 7010004270 | Resistor | R20J 4.7 kΩ |
| R10 | 7010003480 | Resistor | ELR20J 4.7 kΩ |
| R11 | 7010004370 | Resistor | R20J 22 kΩ |
| R12 | 7010003280 | Resistor | ELR20J 100 Ω |
| R13 | 7010003550 | Resistor | ELR20J 15 kΩ |
| R14 | 7010003420 | Resistor | ELR20J 1.5 kΩ (#01 #02 #03 #06 #07 #08) ELR20J 2.2 kΩ (#21 #22 #23 #24 #25 #26) |
| | 7010003440 | Resistor | ELR20J 2.2 kΩ (#21 #22 #23 #24 #25 #26) |
| R15 | 7310000740 | Trimmer | RH0651CS3J2KA (472) |
| R16 | 7010003770 | Resistor | ELR20J 820 kΩ |
| R17 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R18 | 7010004390 | Resistor | R20J 33 kΩ |
| R19 | 7010003530 | Resistor | ELR20J 10 kΩ |
| R20 | 7010004130 | Resistor | R20J 330 Ω |
| C1 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C2 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C3 | 4010000050 | Ceramic | DD104 SL 030C 50V |
| C4 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C5 | 4510001220 | Electrolytic | 16 RC2 10 μF |
| C6 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C7 | 4550000260 | Tantalum | DN 1V 100M |
| C8 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C9 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C10 | 4010000460 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C12 | 4510001220 | Electrolytic | 16 RC2 10 μF |
| C13 | 4010003770 | Ceramic | DD08 SL 0R5C 500V |
| C14 | 4010000090 | Ceramic | DD104 SL 070D 50V |
| C15 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C16 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C17 | 4010003770 | Ceramic | DD08 SL 0R5C 500V |
| C18 | 4010000090 | Ceramic | DD104 SL 070D 50V |
| C20 | 4010003830 | Ceramic | DD08 SL 060D 500V |
| C21 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C22 | 4010003810 | Ceramic | DD08 SL 040C 500V (#01 #02 #03 #06 #07 #08) DD08 SL 060D 500V (#21 #22 #23 #24 #25 #26) |
| | 4010003830 | Ceramic | DD08 SL 060D 500V (#21 #22 #23 #24 #25 #26) |
| C23 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C24 | 4010003790 | Ceramic | DD08 SL 020C 500V (#01 #02 #03 #06 #07 #08) |
| C25 | 4010000260 | Ceramic | DD104 SL 470J 50V |
| C26 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C27 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C28 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C29 | 4510001220 | Electrolytic | 16 RC2 10 μF |
| C30 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C31 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C32 | 4040000280 | Barrier Layer | UZE 08X 104M |
| C33 | 4010003790 | Ceramic | DD08 SL 020C 500V (#21 #22 #23 #24 #25 #26) |
| EP1 | 0910020664 | P.C. Board | B-2003D (PA) |

[PA UNIT] (50W version)

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|---------------|---------------------|
| IC1 | 1150000540 | IC | SC1055 |
| IC2 | 1150000870 | IC | SC1128 |
| IC3 | 1180000080 | IC | NJM78L05A |
| IC4 | 1110000070 | IC | μ PC358C |
| Q1 | 1530000110 | Transistor | 2SC2458-GR |
| Q2 | 1520000220 | Transistor | 2SB1019-Y |
| D1 | 1790000250 | Diode | 1SS97 |
| D2 | 1790000250 | Diode | 1SS97 |
| L1 | 6110001520 | Coil | LA-232 |
| L2 | 6110001520 | Coil | LA-232 |
| L3 | 6110001520 | Coil | LA-232 |
| L4 | 6170000350 | Coil | LW-34 |
| R1 | 7010003150 | Resistor | ELR20J 8.2 Ω |
| R2 | 7010003300 | Resistor | ELR20J 150 Ω |
| R3 | 7010003150 | Resistor | ELR20J 8.2 Ω |
| R4 | 7010003990 | Resistor | R20J 22 Ω |
| R5 | 7010004270 | Resistor | R20J 4.7 k Ω |
| R6 | 7010004270 | Resistor | R20J 4.7 k Ω |
| R7 | 7010003480 | Resistor | ELR20J 4.7 k Ω |
| R8 | 7010004370 | Resistor | R20J 22 k Ω |
| R9 | 7010003280 | Resistor | ELR20J 100 Ω |
| R10 | 7010003550 | Resistor | ELR20J 15 k Ω |
| R11 | 7010003480 | Resistor | ELR20J 3.3 k Ω |
| R12 | 7310000730 | Trimmer | RH0651CN3J01A (332) |
| R13 | 7010003770 | Resistor | ELR20J 820 k Ω |
| R14 | 7010003530 | Resistor | ELR20J 10 k Ω |
| R15 | 7010004390 | Resistor | R20J 33 k Ω |
| R16 | 7010003530 | Resistor | ELR20J 10 k Ω |
| R17 | 7010004130 | Resistor | R20J 330 Ω |
| C1 | 4550000260 | Tantalum | DN 1V 100M |
| C2 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C3 | 4010000480 | Ceramic | DD104 B 471K 50V |
| C4 | 4010000480 | Ceramic | DD104 B 471K 50V |
| C5 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C6 | 4510001220 | Electrolytic | 18 RC2 10 μ F |
| C7 | 4550000260 | Tantalum | DN 1V 100M |
| C8 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C9 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C10 | 4010000480 | Ceramic | DD104 B 471K 50V |
| C11 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C12 | 4510001220 | Electrolytic | 18 RC2 10 μ F |
| C13 | 4010000480 | Ceramic | DD104 B 471K 50V |
| C14 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C15 | 4510001220 | Electrolytic | 18 RC2 10 μ F |
| C16 | 4550000320 | Tantalum | DN 1V 0R1M |
| C17 | 4550002430 | Tantalum | DN 1V R33M |
| C18 | 4010003770 | Ceramic | DD08 SL 0R5C 500V |
| C19 | 4010000120 | Ceramic | DD104 SL 100D 50V |
| C20 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C21 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C22 | 4010003770 | Ceramic | DD08 SL 0R5C 500V |
| C23 | 4010000120 | Ceramic | DD104 SL 100D 50V |
| C25 | 4010003830 | Ceramic | DD08 SL 080D 500V |
| C26 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C27 | 4010003830 | Ceramic | DD08 SL 080D 500V |
| C28 | 4010003820 | Ceramic | DD08 SL 050C 500V |
| C30 | 4010000280 | Ceramic | DD104 SL 470J 50V |
| C31 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C32 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C33 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C34 | 4510001220 | Electrolytic | 18 RC2 10 μ F |
| C35 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C36 | 4010000500 | Ceramic | DD104 B 102K 50V |
| C37 | 4040000260 | Barrier Layer | UZE 08X 104M |
| EP1 | 0910020875 | P.C. Board | B-2004E (50W-PA) |
| EP2 | 6910000970 | Lead Frame | DL 2OP 2.6-3-1.2H |

[REG-B UNIT]

| REF. NO. | ORDER NO. | DESCRIPTION | |
|----------|------------|-------------|--------------------|
| Q1 | 1520000100 | Transistor | 2SB883-O |
| Q2 | 1520000100 | Transistor | 2SB883-O |
| Q3 | 1540000200 | Transistor | 2SD1406 Y |
| D1 | 1790000130 | Diode | S25VB20 |
| R1 | 7010004070 | Resistor | R20J 100 Ω |
| R2 | 7010004150 | Resistor | R20J 470 Ω |
| R3 | 7100000190 | Resistor | SRW3P 0R03 Ω (R03) |
| R4 | 7100000190 | Resistor | SRW3P 0R03 Ω (R03) |
| R5 | 7100000190 | Resistor | SRW3P 0R03 Ω (R03) |
| R6 | 7100000190 | Resistor | SRW3P 0R03 Ω (R03) |
| C1 | 4010000530 | Ceramic | DD112 B 103K 50V |
| C2 | 4010000530 | Ceramic | DD112 B 103K 50V |
| C3 | 4010000530 | Ceramic | DD112 B 103K 50V |
| C4 | 4010000530 | Ceramic | DD112 B 103K 50V |
| S1 | 6910000030 | Thermostat | OHD 50M |
| EP1 | 0910019114 | P.C. Board | B-1837D (REG-B) |

SECTION 6 ADJUSTMENT PROCEDURES

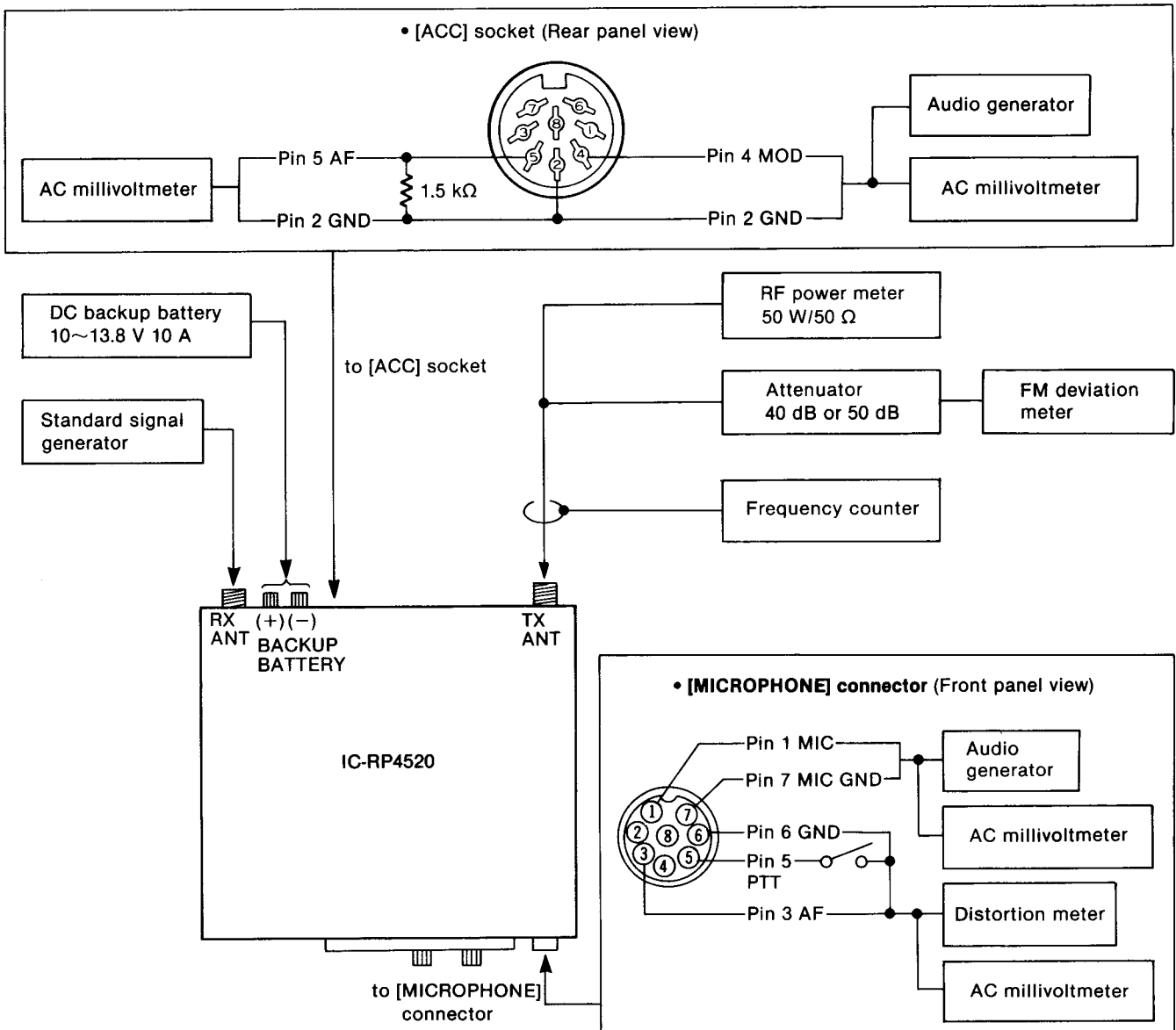
6-1 PREPARATION BEFORE SERVICING

REQUIRED TEST EQUIPMENT

| EQUIPMENT | GRADE AND RANGE | EQUIPMENT | GRADE AND RANGE |
|----------------------------------|--|--------------------|--|
| DC backup battery | Output voltage : 10~13.8 V DC Current capacity : 10 A or more | AC millivoltmeter | Measuring range : 10 mV~3 V |
| RF power meter (terminated type) | Measuring range : 1~50 W Frequency range : 400~500 MHz Impedance : 50 Ω SWR : Less than 1.2: 1 | Audio generator | Frequency range : 300~3000 Hz Output level : 1~300 mV |
| Frequency counter | Frequency range : 0.1~500 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better | Attenuator | Power attenuation : 40 or 50 dB Capacity : 60 W or more |
| Oscilloscope | Frequency range : DC~20 MHz Measuring range : 0.01~10 V | Distortion meter | Frequency range : 1 kHz±10 Hz Measuring range : 1~20 % |
| Standard signal generator (SSG) | Frequency range : 0.1~500 MHz Output level : -127~-17 dBm (0.1 μV~32 mV) | FM deviation meter | Frequency minimum : 500 MHz Measuring range : 0~±10 kHz |
| | | DC voltmeter | Input impedance : 50 kΩ/DC or better |
| | | RF voltmeter | Frequency range : 0.1~500 MHz Measuring range : 0.01~10 V |

CW: Clockwise CCW: Counterclockwise

CONNECTION



6-2 TX PLL ADJUSTMENT

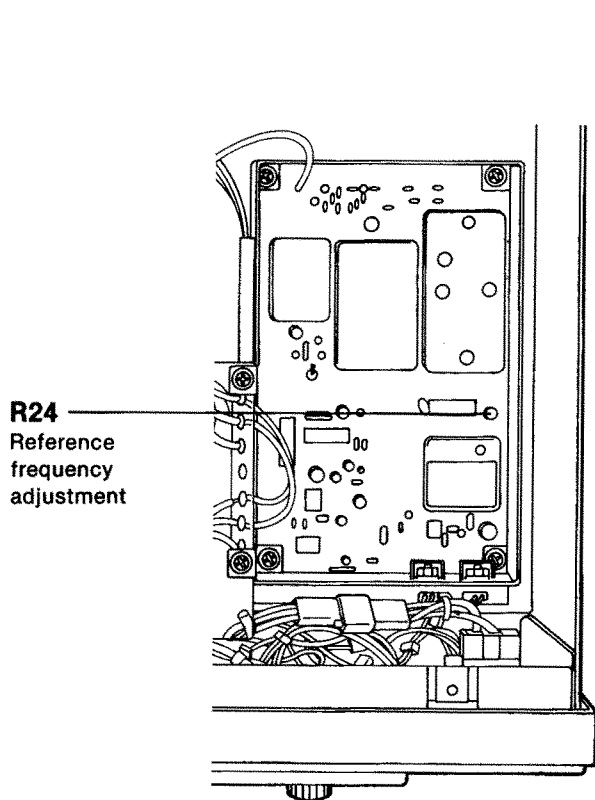
| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|---------------------|--|-------------|---|---------------------------------------|------------------|--------|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| REFERENCE FREQUENCY | 1 <ul style="list-style-type: none"> • Connect the RF power meter or a 50 Ω dummy load to the [TX ANT] connector. • Transmitting | Rear panel | Loosely couple the frequency counter to the [TX ANT] connector. | Same as the identification frequency. | TX | R24 |

6-3 RECEIVER ADJUSTMENT

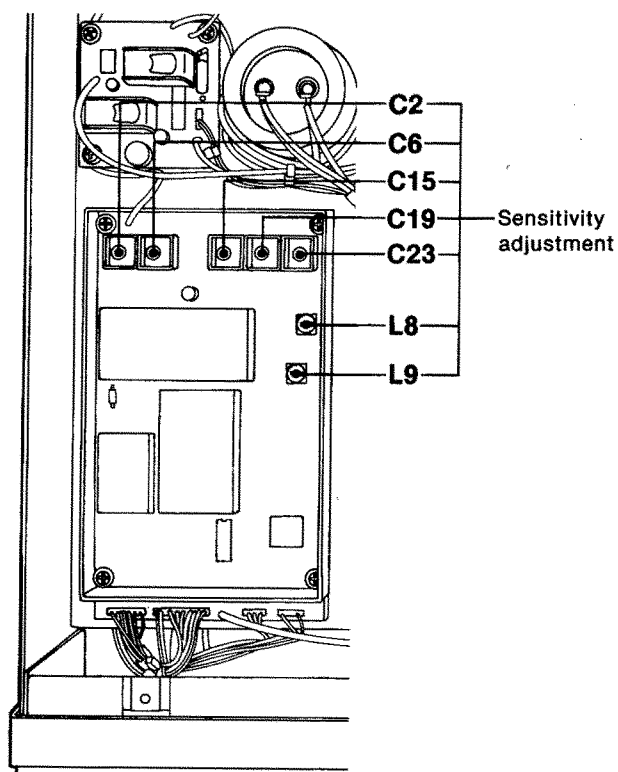
| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|-------------|---|-------------|---|--------------------------|------------------|--|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| SENSITIVITY | 1 <ul style="list-style-type: none"> • [LOCAL INHIBIT] switch: ON • Connect the SSG to the [RX ANT] connector and set as: <ul style="list-style-type: none"> Level : 1.0 μV* (-107 dBm) Modulation: 1 kHz Deviation : ±3.5 kHz (#01~#05, #21~#23) ±1.75 kHz (#06~#10, #24~#26) • Receiving | RX | Connect the distortion meter to the [MICROPHONE] connector, pin 3 (AF) and pin 6 (GND) with an AC millivoltmeter. | Minimum distortion level | RX | Adjust in sequence C2, C6, C15, C19, C23, L8, L9 |

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

• TX UNIT



• RX UNIT

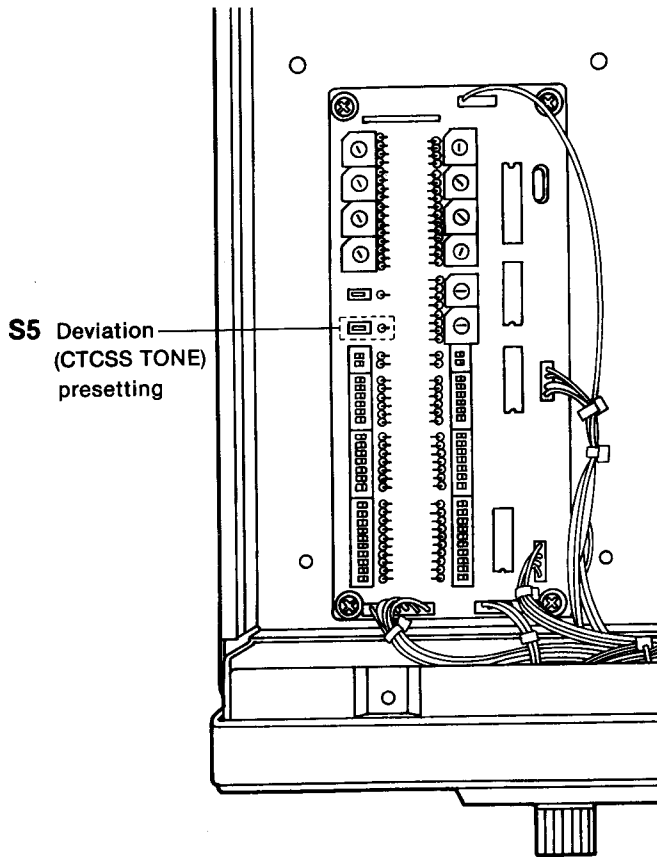


6-4 TRANSMITTER ADJUSTMENT

| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | | | | |
|------------------------------|-----------------------|--|---------------|--|---|--------|---------|---|--------|
| | | UNIT | LOCATION | | UNIT | ADJUST | | | |
| DEVIATION (CTCSS TONE) | 1 | <ul style="list-style-type: none"> • [LOCAL INHIBIT] switch: ON • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting (Ground the [MICROPHONE] connector (pin 5).) | Rear panel | Connect the FM deviation meter to the [TX ANT] connector via the attenuator. | | | | | |
| | 2 | <ul style="list-style-type: none"> • S5 (LOGIC-A UNIT) switch: push once | | | | | 0.8 kHz | TX | R32 |
| | 3 | After adjustment, turn the [LOCAL INHIBIT] switch OFF, and push S5 again. | | | | | | | |
| DEVIATION (MICROPHONE) | 1 | <ul style="list-style-type: none"> • [LOCAL INHIBIT] switch: ON • Connect the audio generator to the [MICROPHONE] connector and set as: Level : 4 mV Modulation : 1.0 kHz • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting | Rear panel | Connect the FM deviation meter to the [TX ANT] connector via the attenuator. | 4.2 kHz (#01~#05, #21~#23) 2.1 kHz (#06~#10, #24~#26) | TX | R54 | | |
| | 2 | <ul style="list-style-type: none"> • Set the audio generator as: Level : 40 mV | | | | | | 4.0~5.0 kHz (#01~#05, #21~#23) 2.0~2.5 kHz (#06~#10, #24~#26) | Verify |
| | 3 | After adjustment, turn the [LOCAL INHIBIT] switch OFF. | | | | | | | |
| DEVIATION (REPEATER) | 1 | <ul style="list-style-type: none"> • Connect the SSG to the [RX ANT] connector and set as: Level : 1.0 mV* (-47 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz (#01~#05, #21~#23) ±1.75 kHz (#06~#10, #24~#26) • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting | Rear panel | Connect the FM deviation meter to the [TX ANT] connector via the attenuator. | 3.5 kHz (#01~#05, #21~#23) 1.75 kHz (#06~#10, #24~#26) | LOGIC | R33 | | |
| | 2 | <ul style="list-style-type: none"> • Set the SSG as: Level : 1.0 mV* (-47 dBm) Modulation : 1 kHz Deviation : ±5.0 kHz (#01~#05, #21~#23) ±2.5 kHz (#06~#10, #24~#26) | | | | | | 3.5~5.0 kHz (#01~#05, #21~#23) 1.75~2.5 kHz (#06~#10, #24~#26) | Verify |

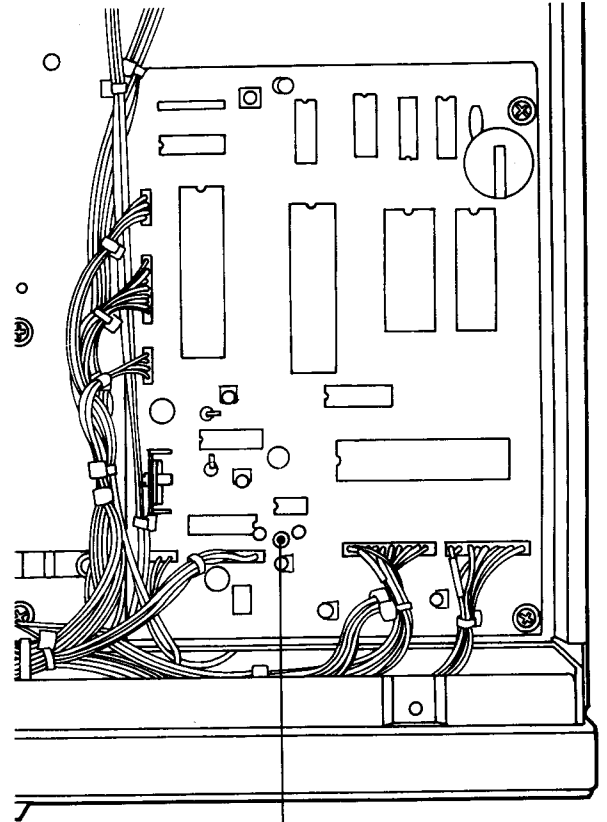
* This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

• LOGIC-A UNIT



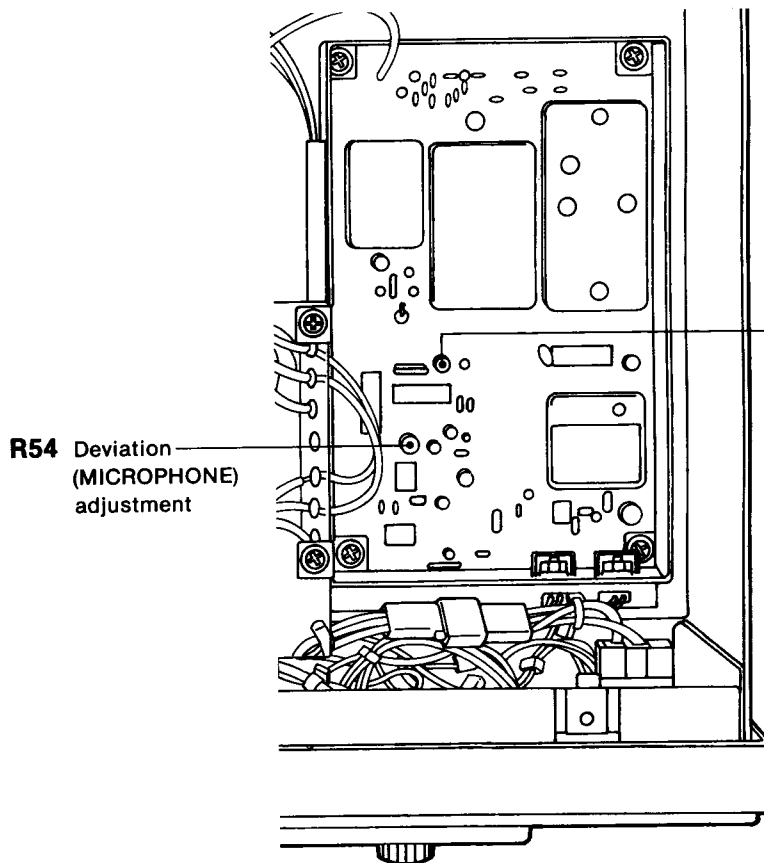
S5 Deviation
(CTCSS TONE)
presetting

• LOGIC UNIT



R33 Deviation
(REPEATER)
adjustment

• TX UNIT



R54 Deviation
(MICROPHONE)
adjustment

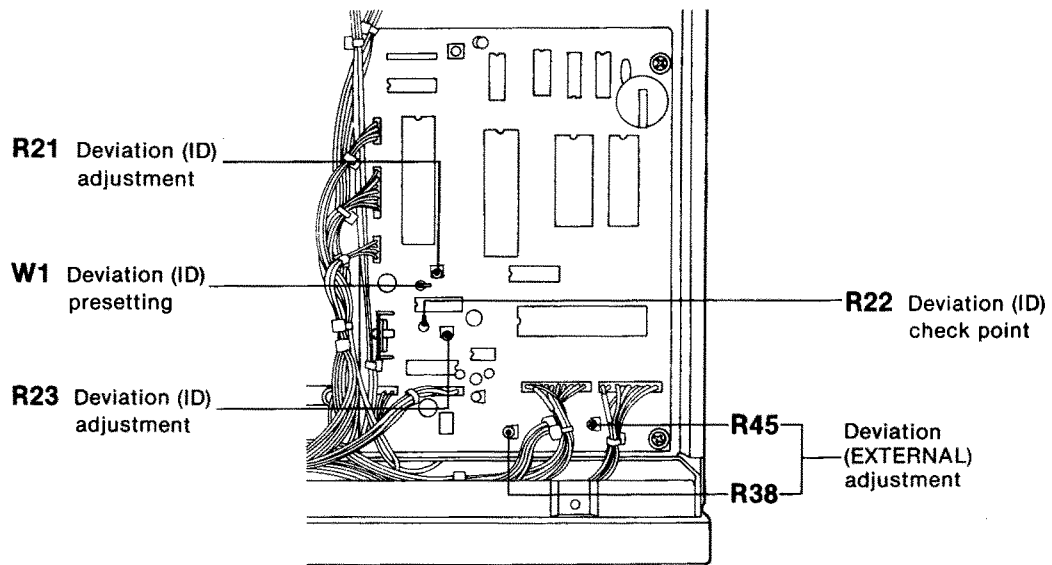
R32 Deviation
(CTCSS TONE)
adjustment

TRANSMITTER ADJUSTMENT (CONTINUED)

| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|----------------------|--|----------------------------------|--|--|------------------|--------|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| DEVIATION (ID) | <ul style="list-style-type: none"> • Connect W1 (LOGIC UNIT). • Connect the FM deviation meter to the [TX ANT] connector via the attenuator and set as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 • Transmitting (Ground the [MICROPHONE] connector (pin 5).) | LOGIC | Connect the frequency counter to R22. | 800 Hz | LOGIC | R21 |
| | | Rear panel | FM deviation meter | 1 kHz | | R23 |
| | 3 | After adjustment, disconnect W1. | | | | |
| DEVIATION (EXTERNAL) | <ul style="list-style-type: none"> • Connect the SSG to the [RX ANT] connector and set as: Level : 1.0 mV* (-47 dBm) Modulation : 1 kHz Deviation : ±3.5 kHz (#01~#10, #21~#23) ±1.75 kHz (#24~#26) | Rear panel | Connect the AC millivoltmeter to the [ACC] socket, pin 5 (AF) and pin 2 (GND). | 20 mV | LOGIC | R45 |
| | <ul style="list-style-type: none"> • Connect the audio generator to the [ACC] socket, pin 4 (MOD) and pin 2 (GND) and set as: Level : 500 mV Modulation : 1 kHz • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis: OFF Detector : (P-P)/2 | | Connect the FM deviation meter to the [TX ANT] connector via the attenuator. | 3.5 kHz (#01~#10, #21~#23) 1.75 kHz (#24~#26) | | |

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

• LOGIC UNIT

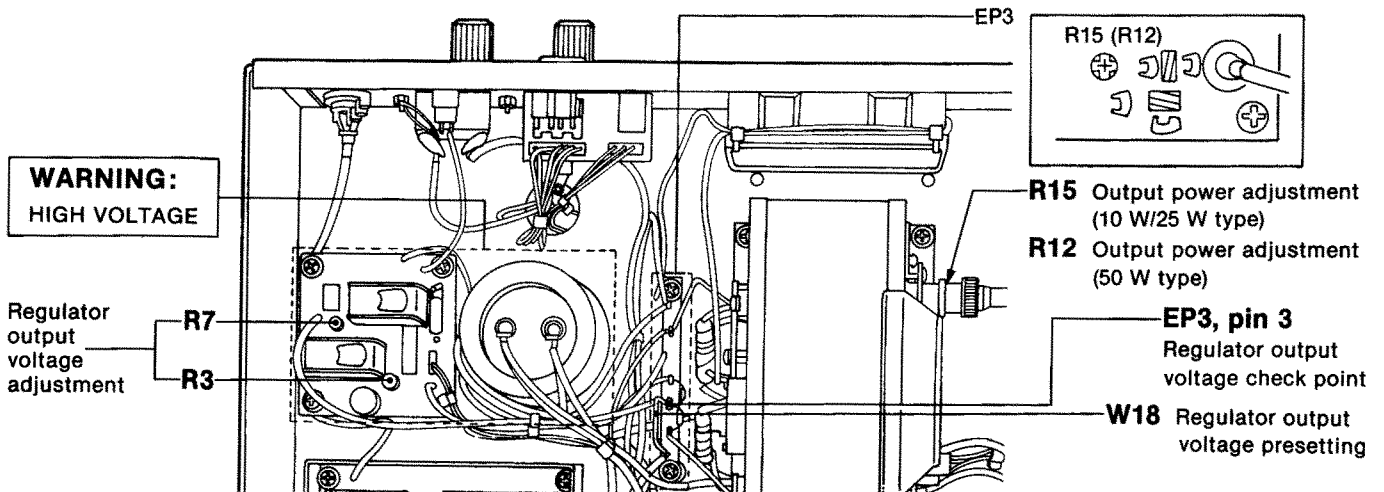


TRANSMITTER ADJUSTMENT (CONTINUED)

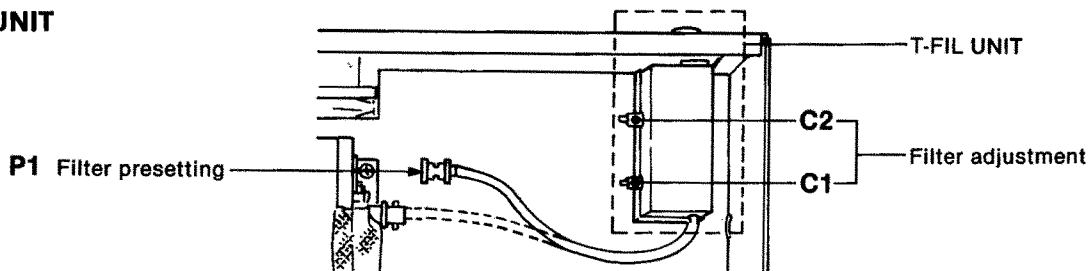
| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | | |
|--------------------------|---|---|---|--|--------------------|----------------|------------------|
| | | UNIT | LOCATION | | UNIT | ADJUST | |
| FILTER | 1 <ul style="list-style-type: none"> • Connect the SSG to P1 and set as: Frequency : transmit frequency Level : 0.22 V* (0 dBm) • Receiving | Rear panel | Connect the RF voltmeter to the [TX ANT] connector. | Maximum | T-FIL | C1 C2 | |
| OUTPUT POWER | 1 <ul style="list-style-type: none"> • [LOCAL INHIBIT] switch: ON • Transmitting (Ground the [MICROPHONE] connector (pin 5).) | Rear panel | Connect the RF power meter to the [TX ANT] connector. | 10 W (#01, #06) 25 W (#02, #03, #07, #08, #21~#26) | PA | R15 R12 | |
| | | | | 50 W (#04, #05, #09, #10) | | | |
| REGULATOR OUTPUT VOLTAGE | 1 <ul style="list-style-type: none"> • Apply AC voltage to the [AC] connector. • Remove W18 (EP3). • Transmitting | REG-A | Connect the DC voltmeter to EP3, pin 3. | 14 V | REG-A | R3 | |
| | | 2 | Front panel | [POWER] indicator | Lights up in green | Front panel | Verify |
| | 3 | After adjustment, disconnect AC voltage. | | | | | |
| | 4 | <ul style="list-style-type: none"> • Apply DC voltage (10 V). • [DC RESET] switch: ON | REG-A | Connect the DC voltmeter to EP3, pin 3. | 0 V | REG-A | R7 Verify |
| | 5 | | | | 12 V | | |
| | 6 | <ul style="list-style-type: none"> • Apply DC voltage (12 V). • [DC RESET] switch: ON | Front panel | [POWER] indicator | Lights up in red. | Front panel | Verify |
| | 7 | After adjustment, reconnect W18. | | | | | |

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

• PA AND REG-A UNITS



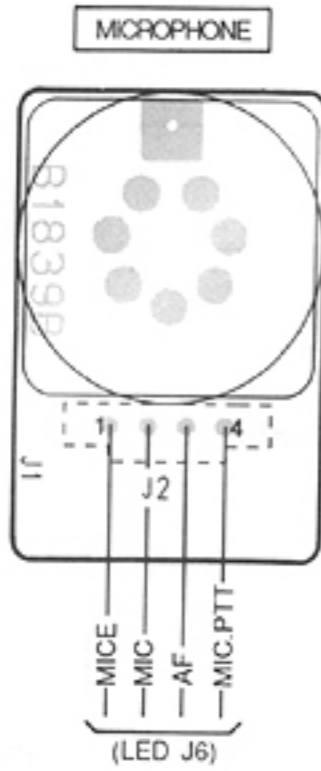
• T-FIL UNIT



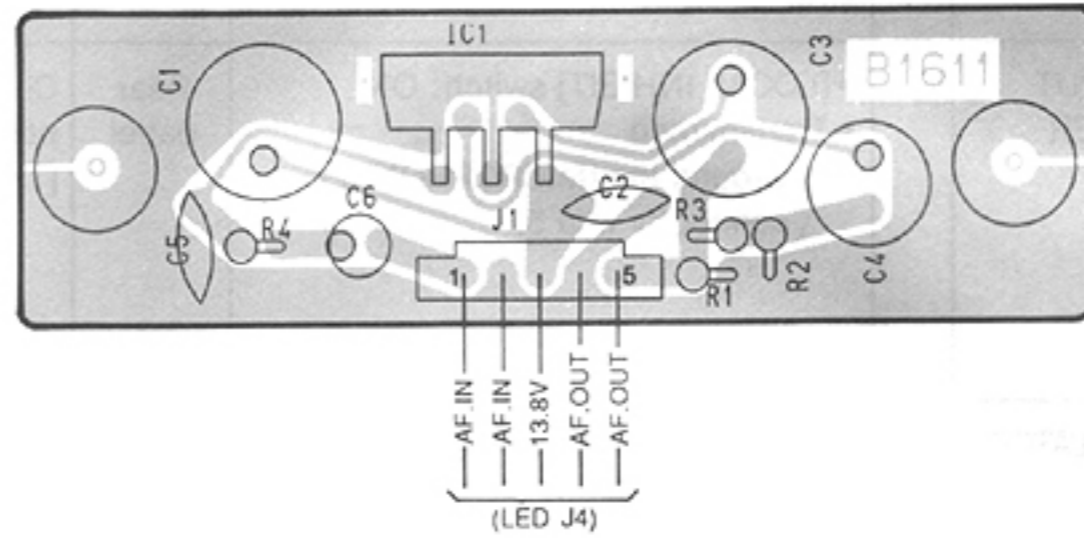
SECTION 7 BOARD LAYOUTS

7-1 FRONT UNIT

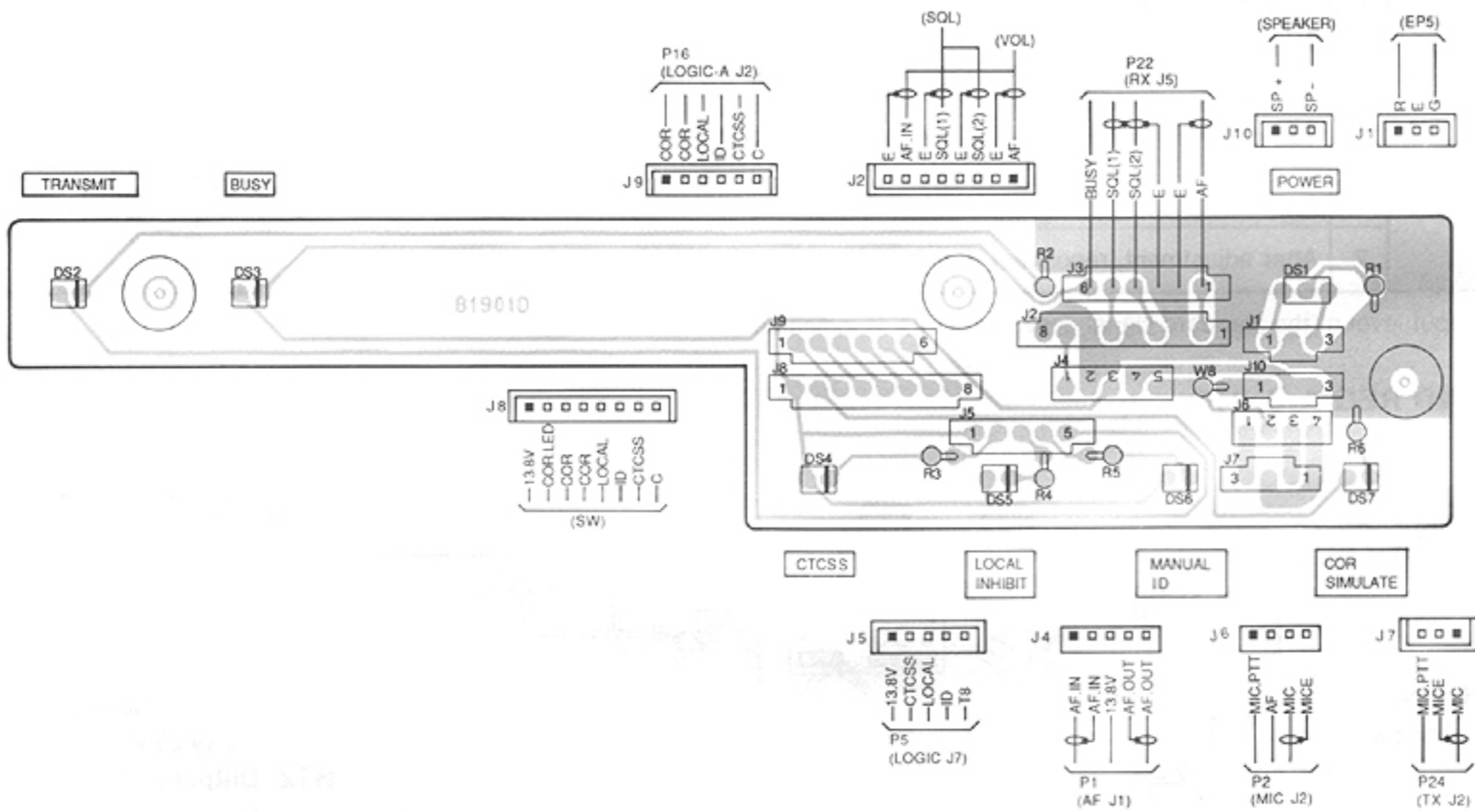
• MIC UNIT



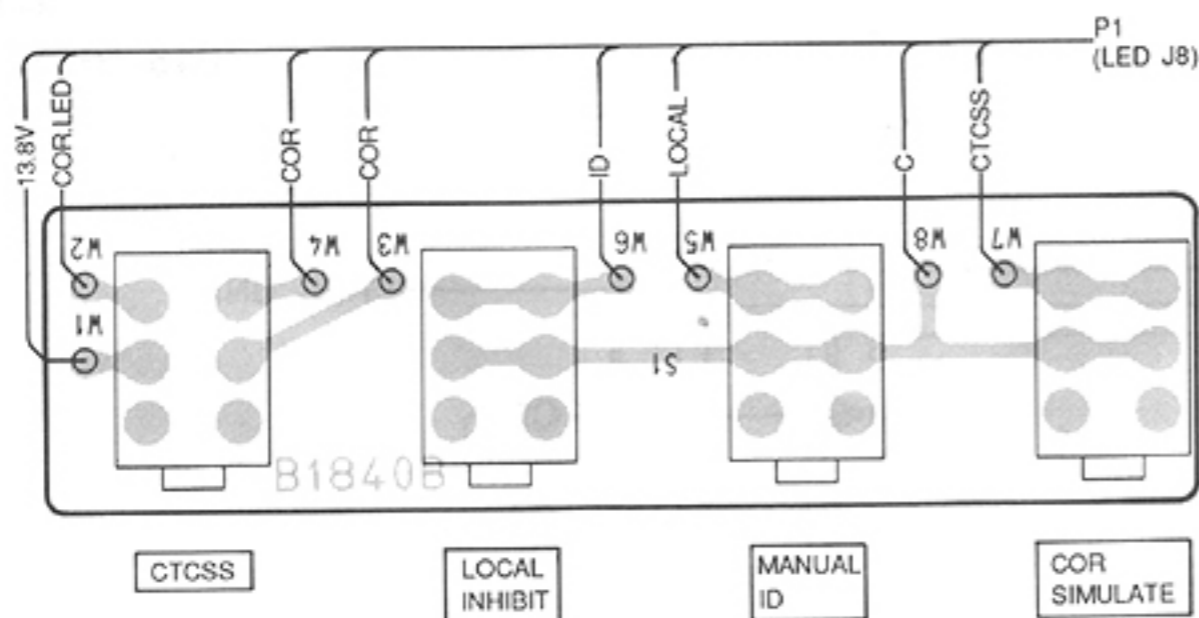
• AF UNIT



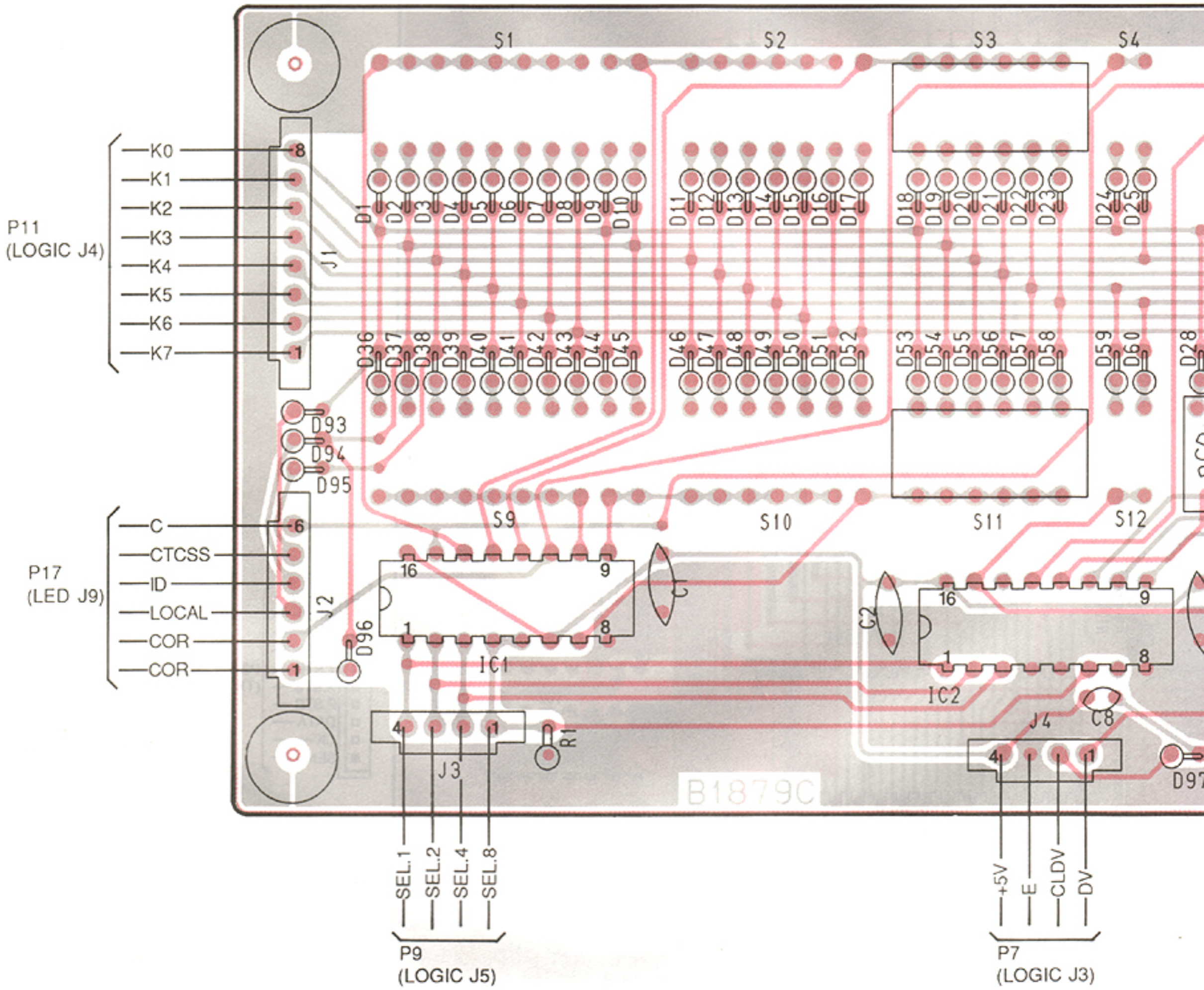
• LED UNIT



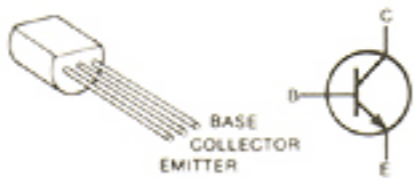
• SW UNIT



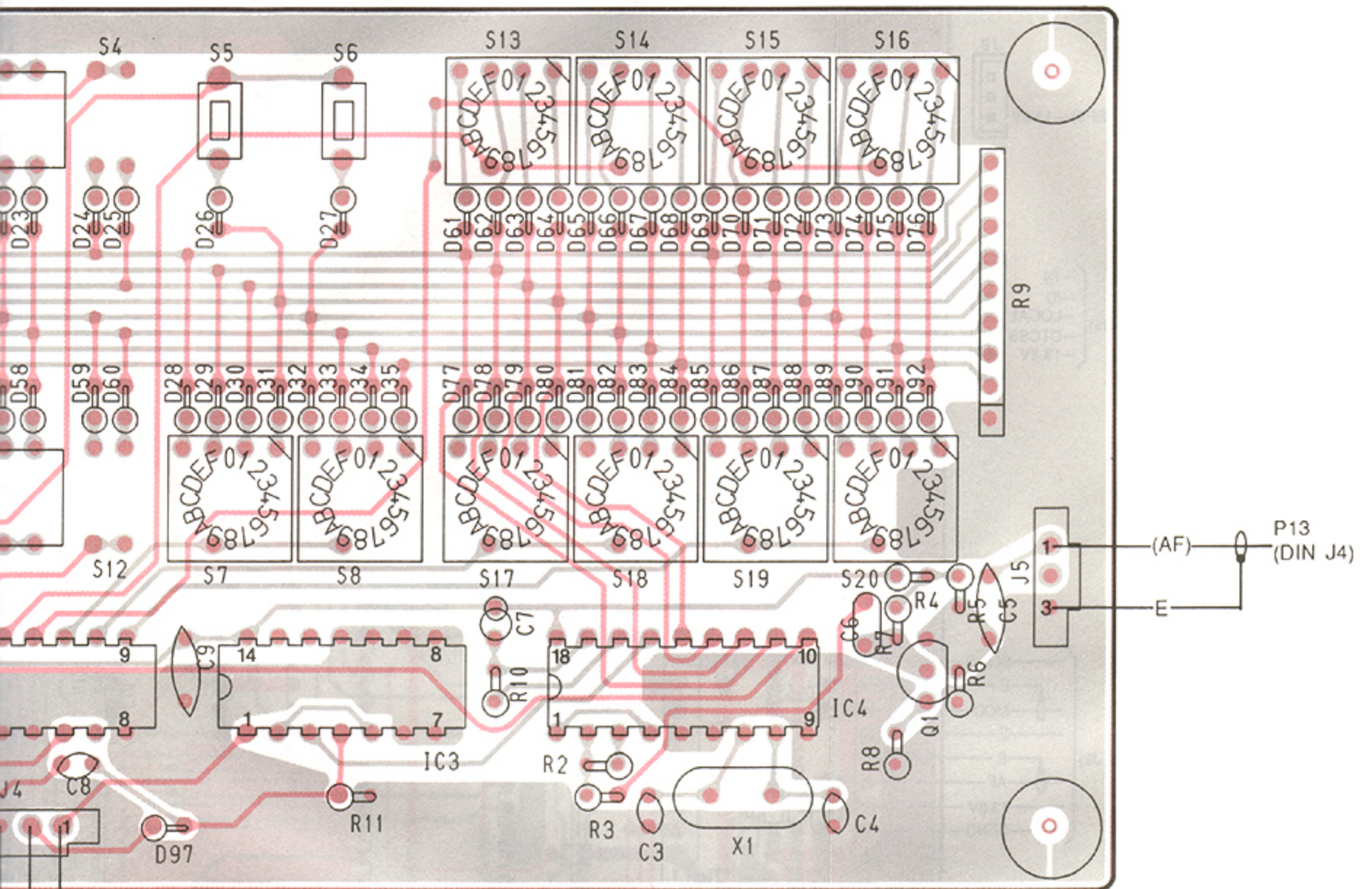
7-2 LOGIC-A UNIT



2SC1815-Y

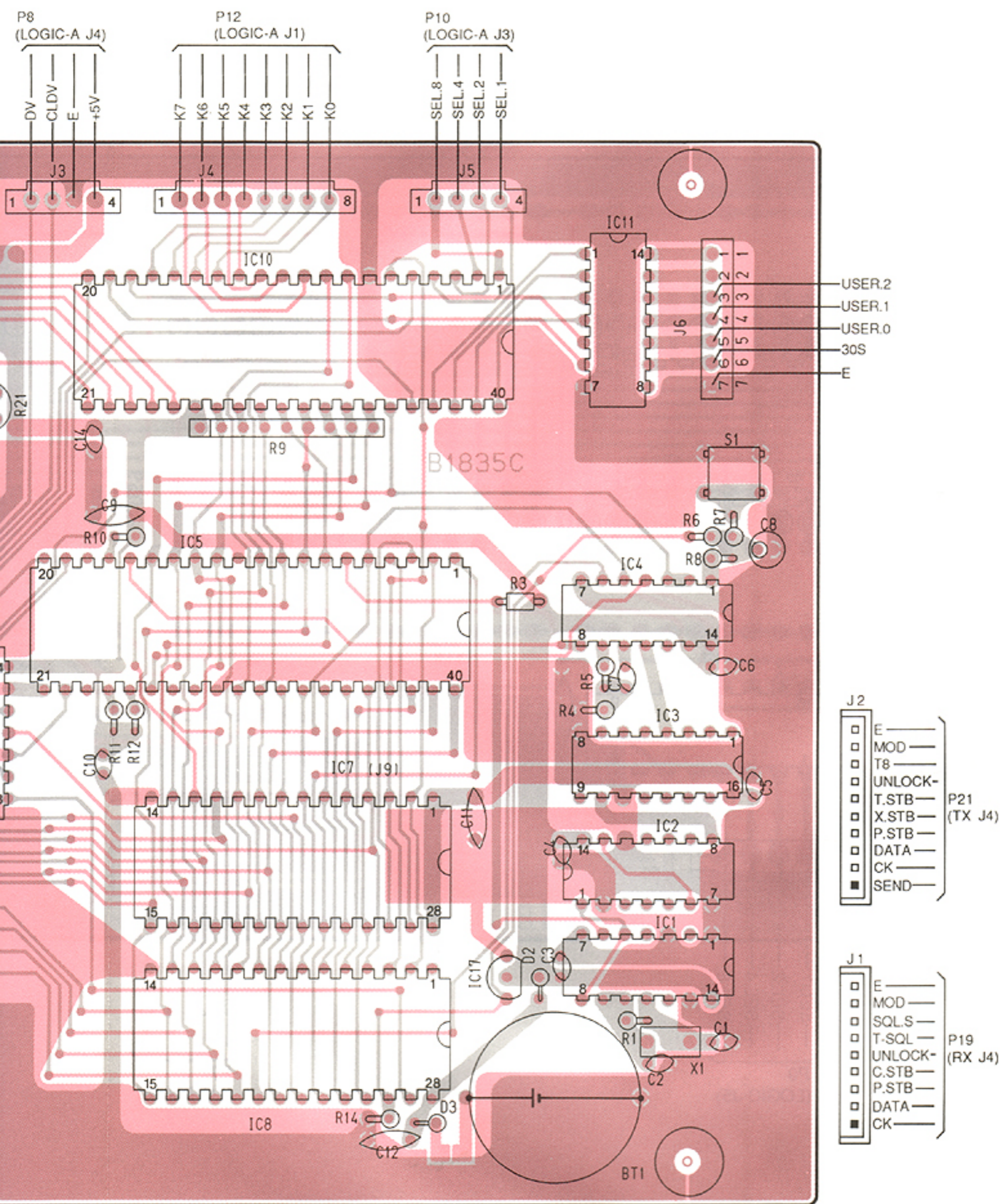


Q1



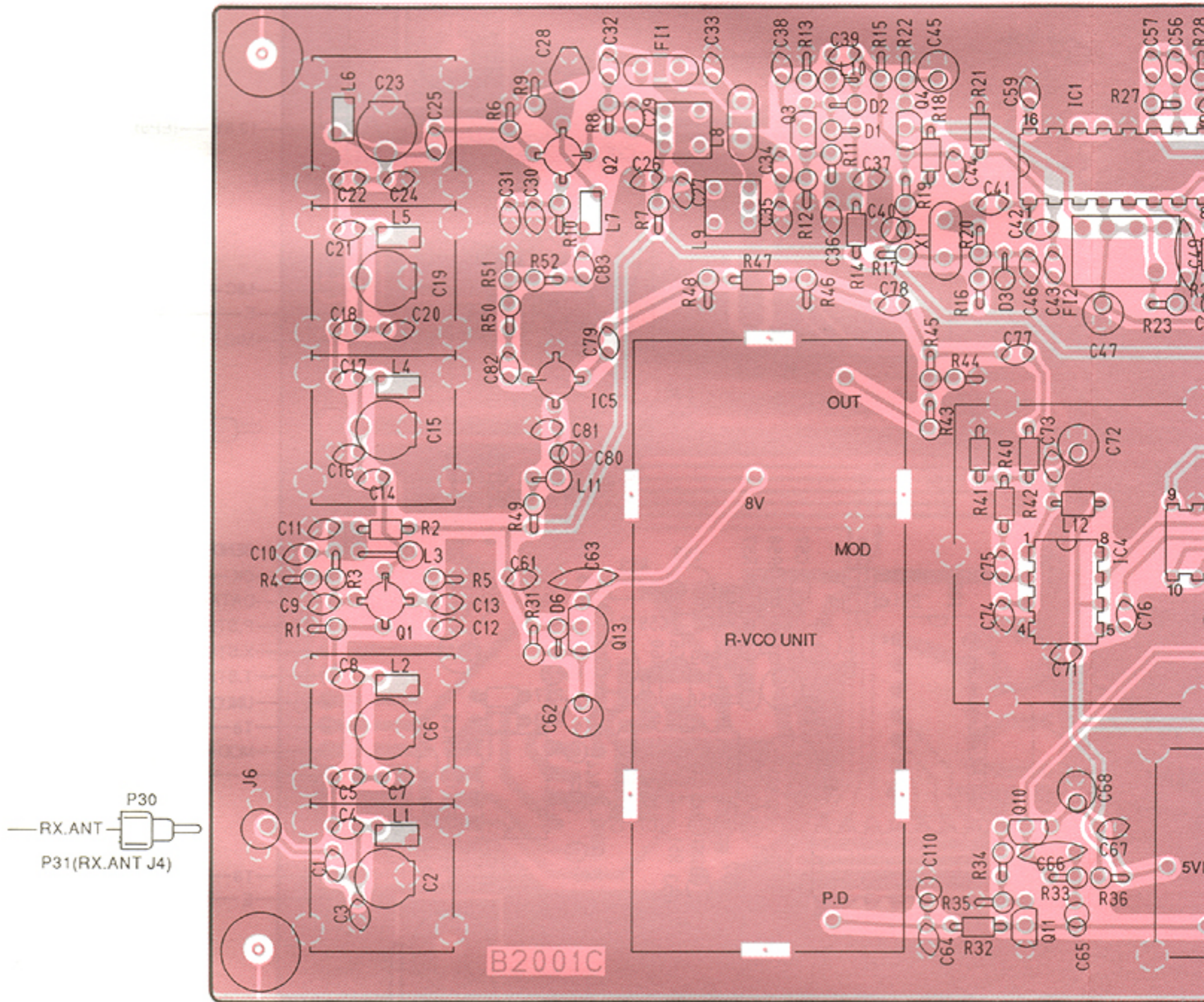
—CLDV—
—DV—

(GIC J3)

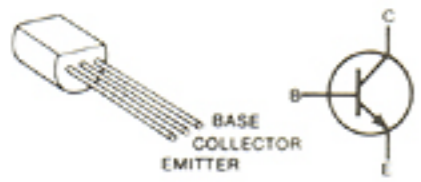


7-4 RX, R-VCO AND T-VCO UNITS

• RX UNIT



2SC1645B



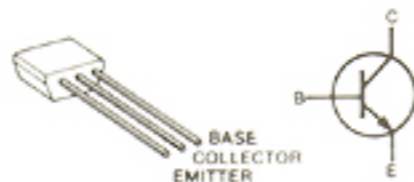
Q9, Q13

2SC2458-GR



Q5, Q11, Q12

2SC2668 O



Q4

2SC3399



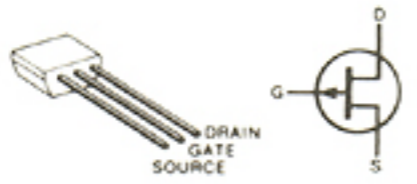
Q7, Q8

2SC3776-D



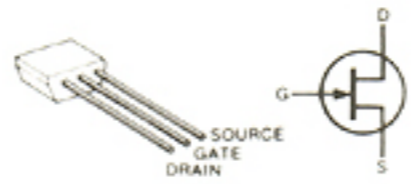
Q3

2SJ105-Y



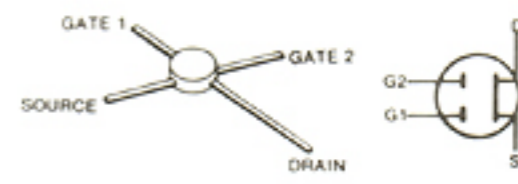
Q6

2SK184-Y

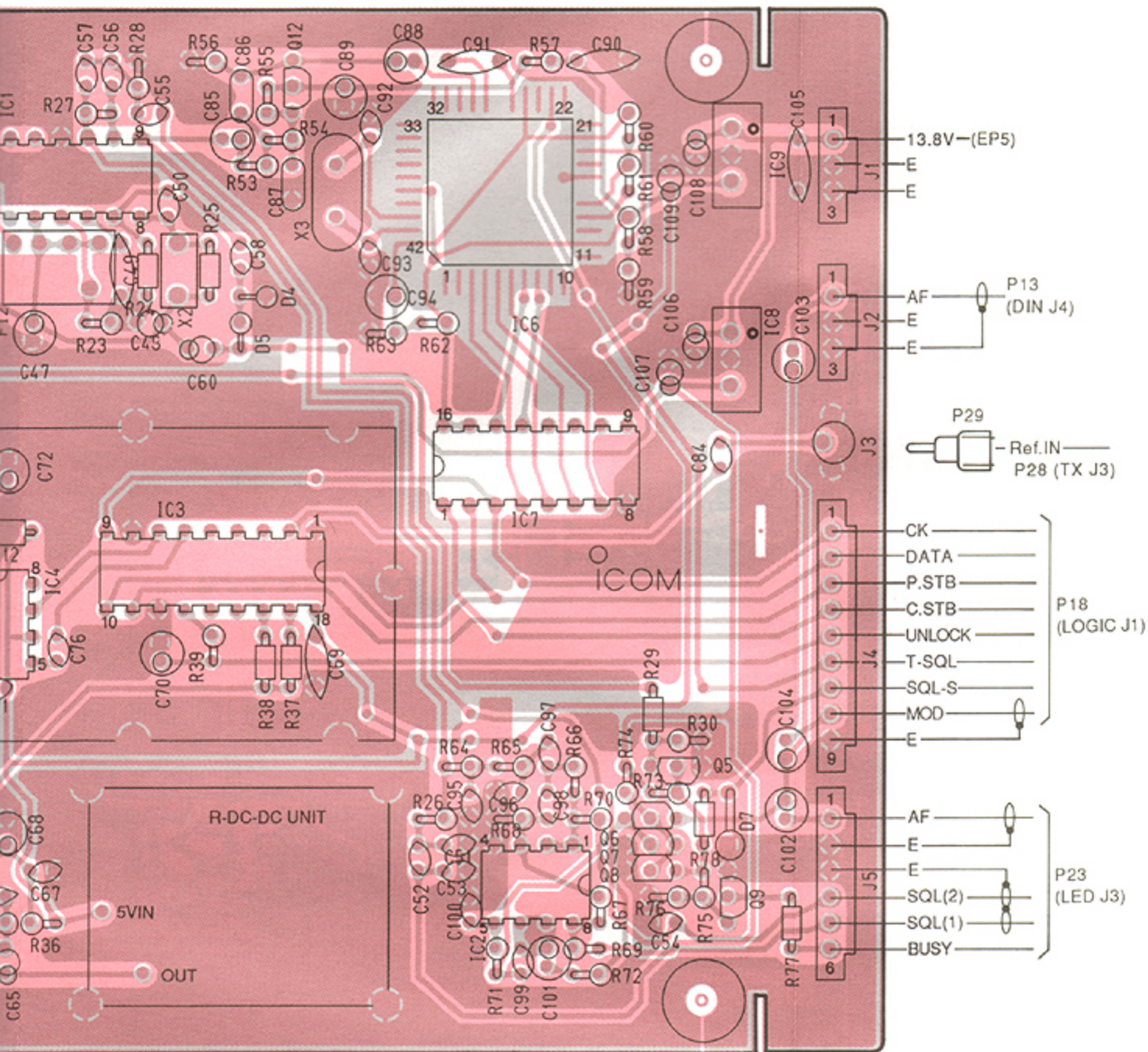


Q10

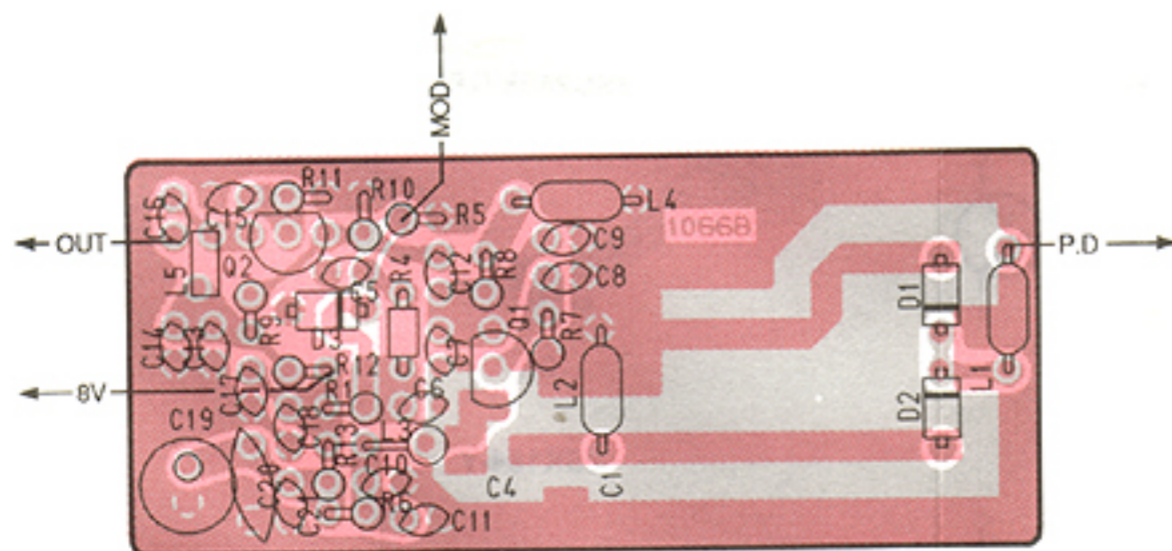
3SK121 Y



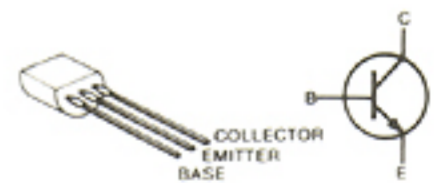
Q1, Q2



• R-VCO AND T-VCO UNITS

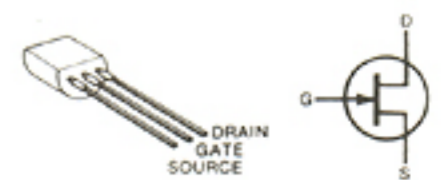


2SC3776-D



Q2

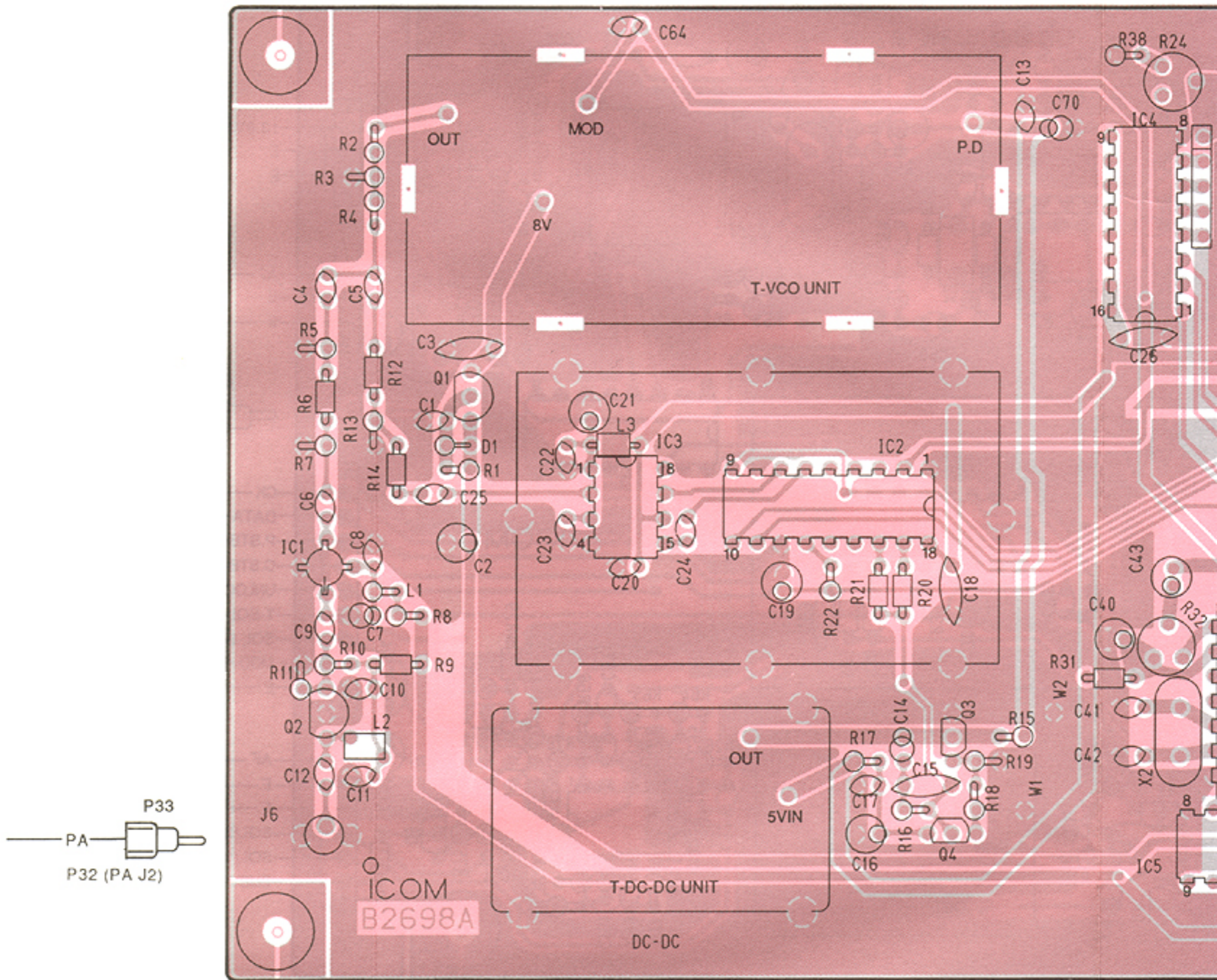
2SK125



Q1

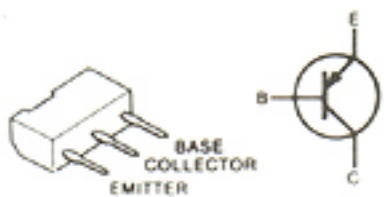
7-5 TX, R-DC-DC AND T-DC-DC UNITS

• TX UNIT



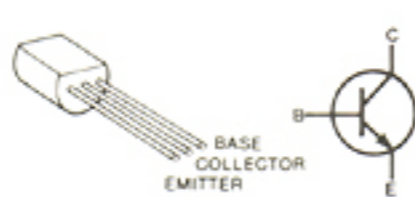
• R-DC

2SB909M R



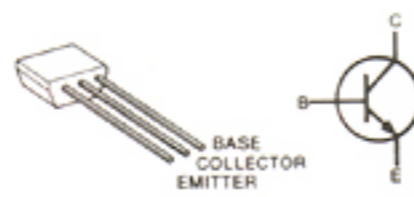
Q7

2SC1645B



Q1

2SC2458-GR



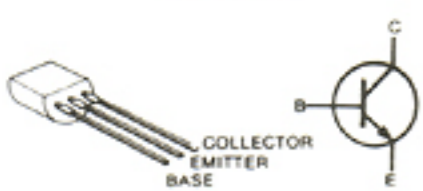
Q3

2SC2785 EL



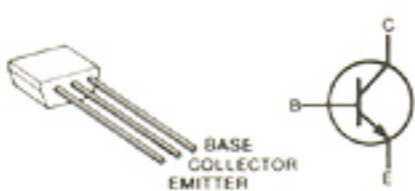
Q5

2SC3355



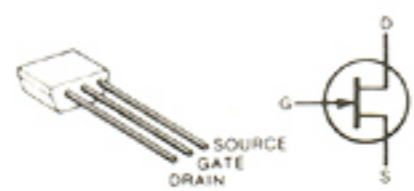
Q2

2SC3399

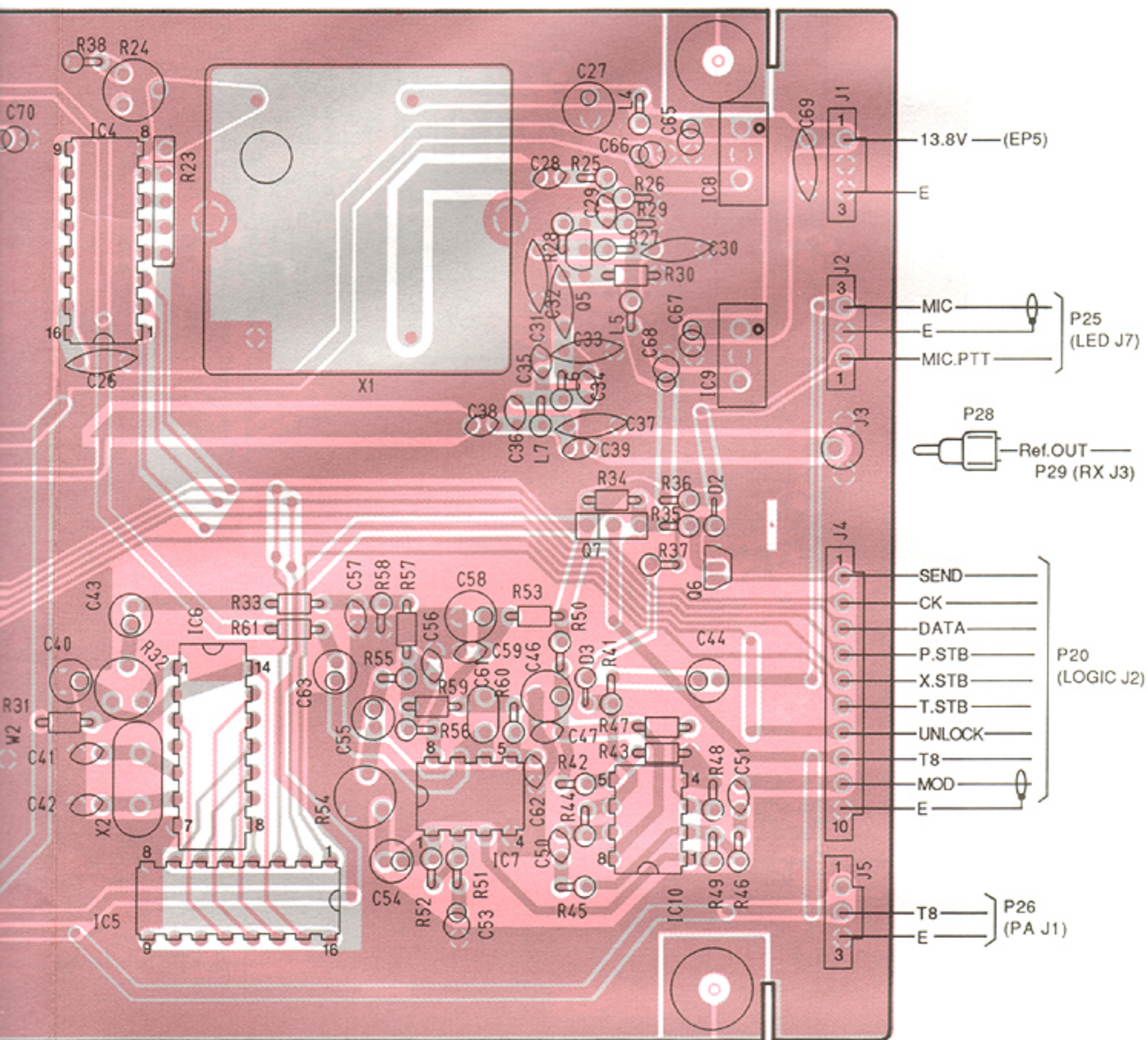


Q6

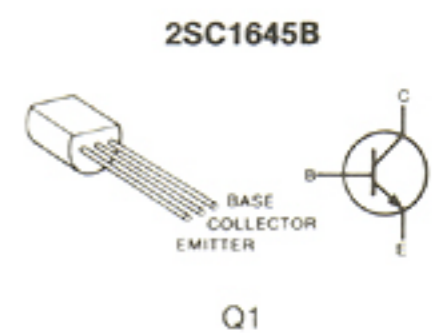
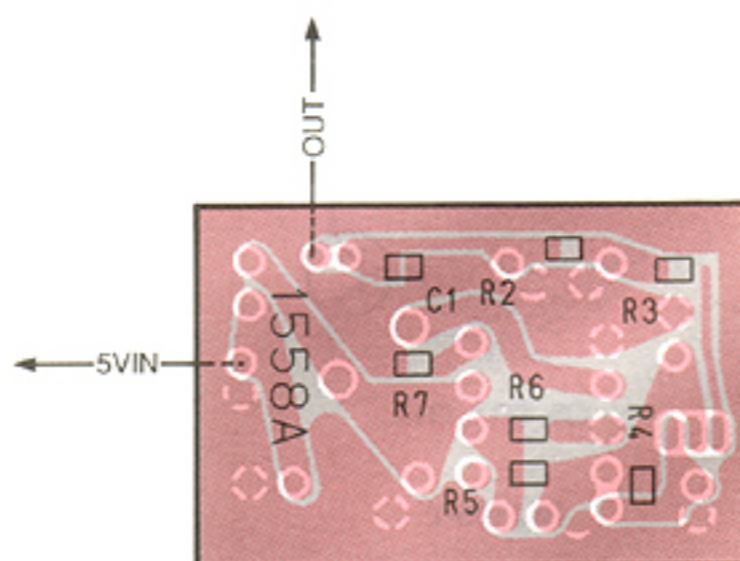
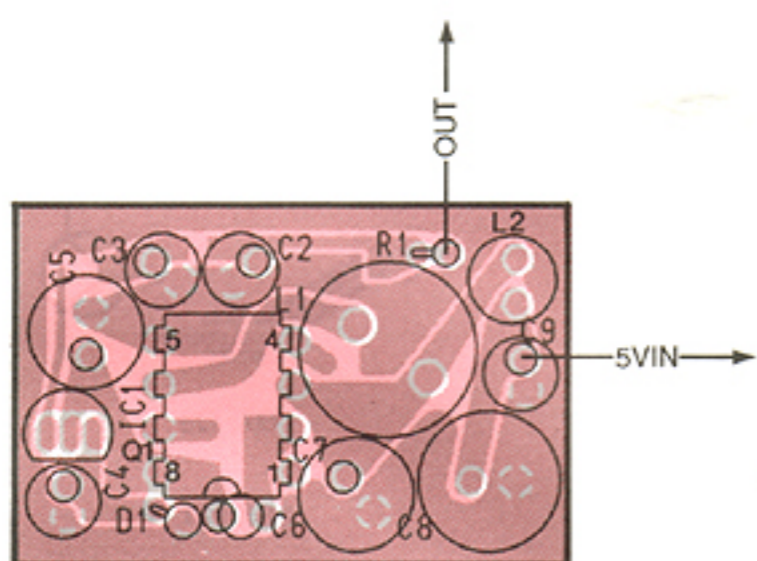
2SK184-Y



Q4

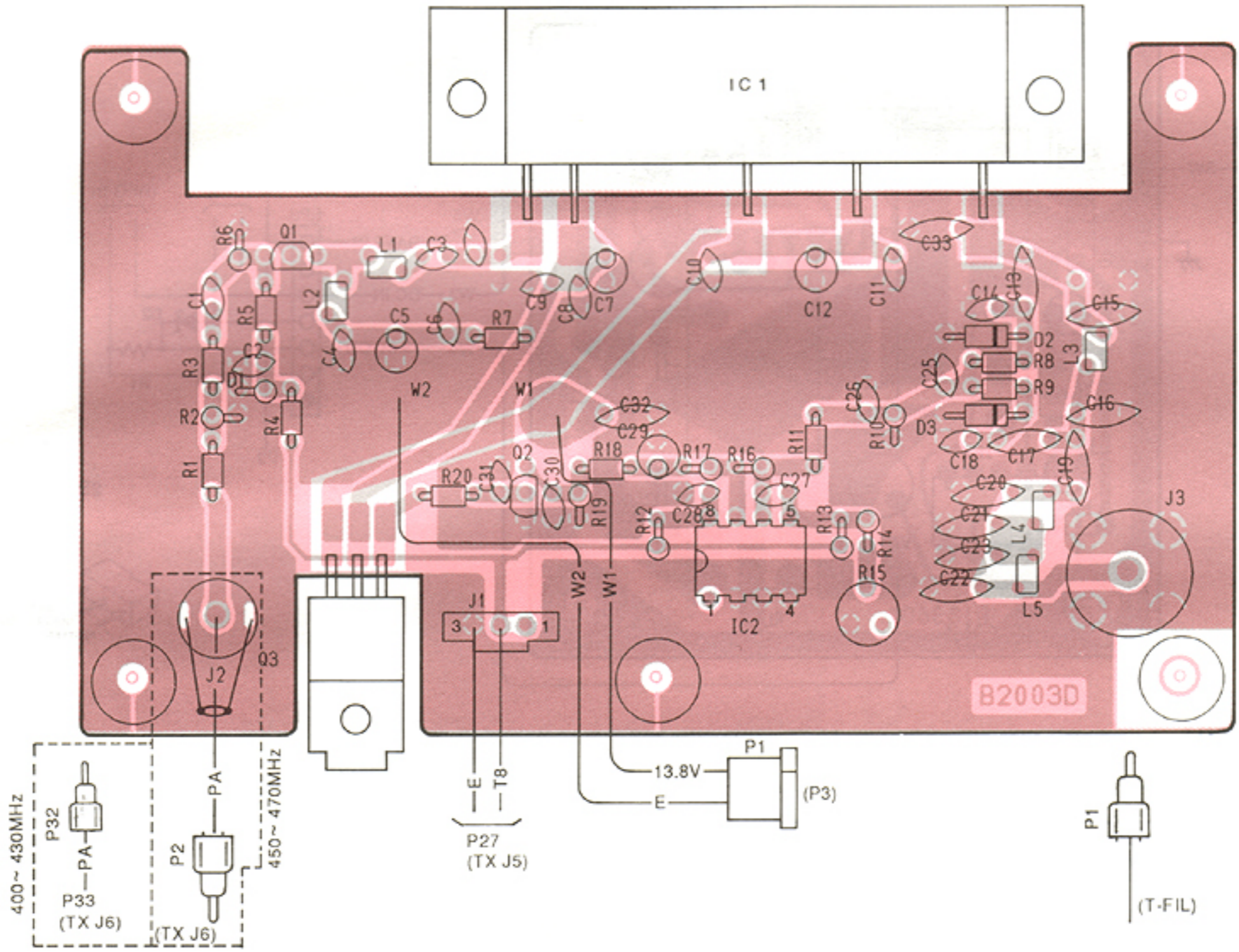


• R-DC-DC AND T-DC-DC UNITS

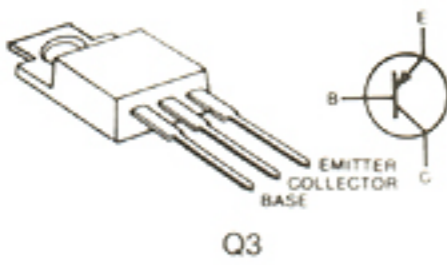


7-6 PA AND DIN UNITS

• PA UNIT (10 W/25 W)



2SB1019-Y



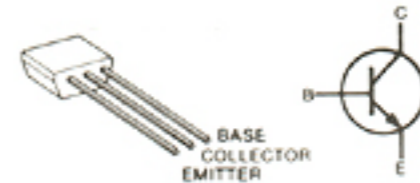
Q3

2SC2407 (A)



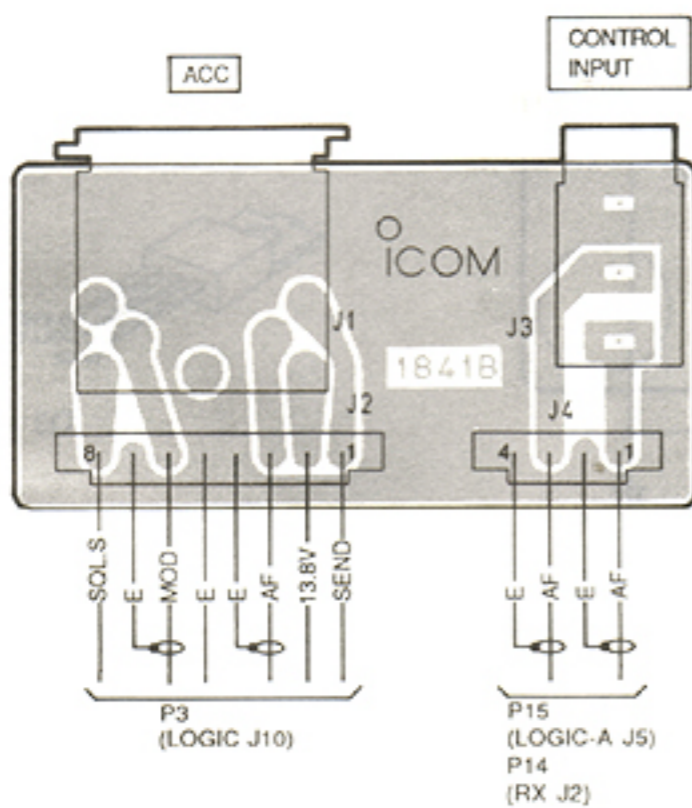
Q1

2SC2458-GR

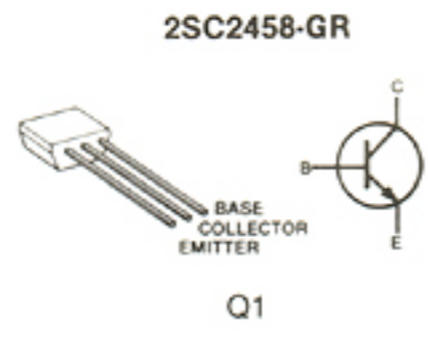
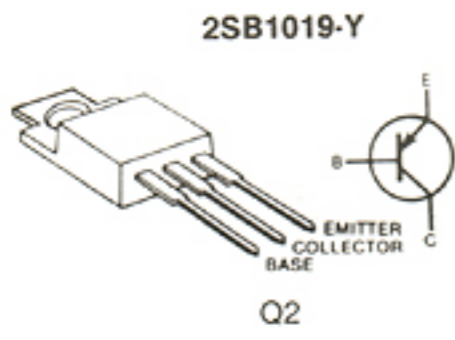
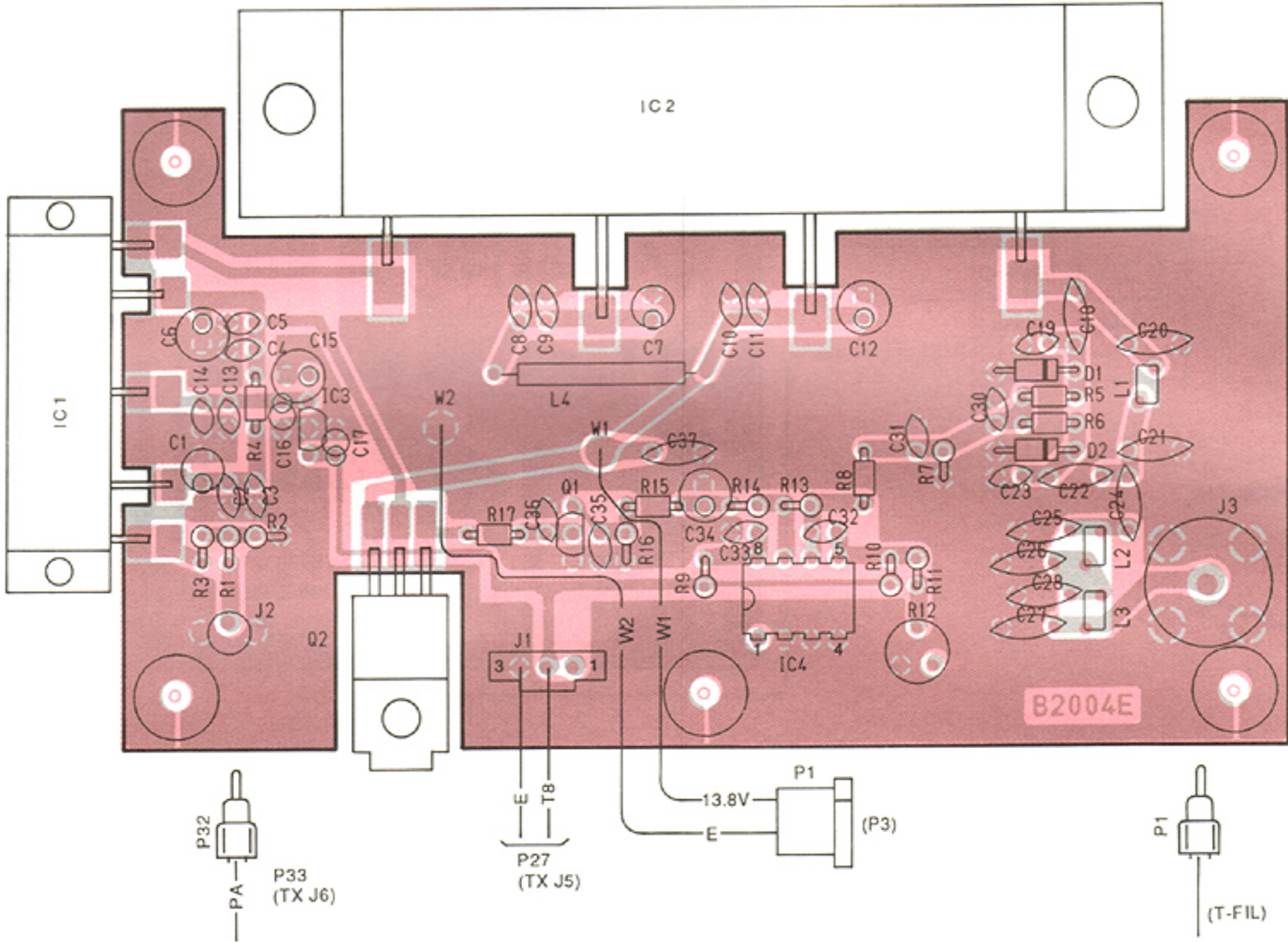


Q2

• DIN UNIT

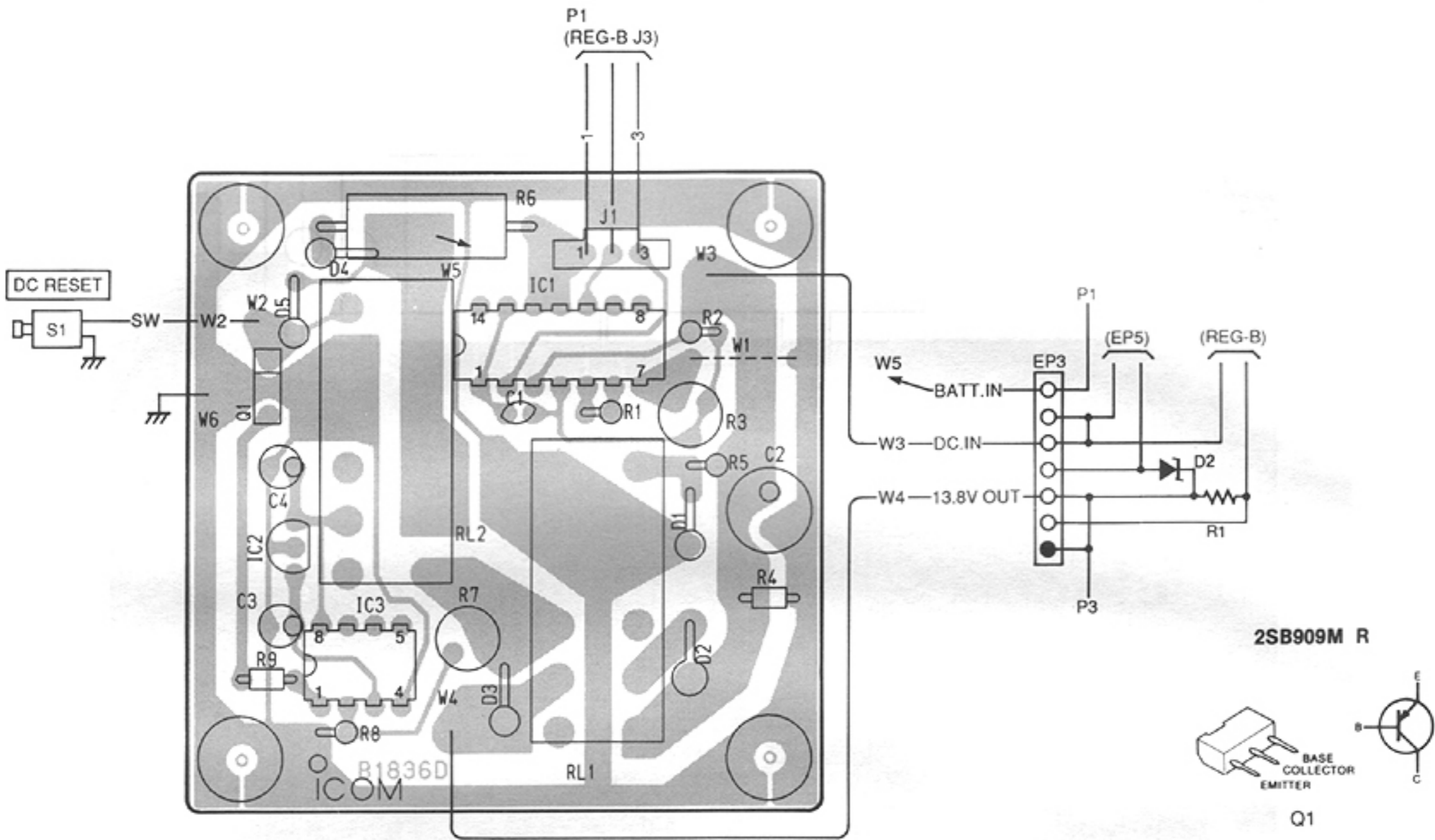


• PA UNIT (50 W)

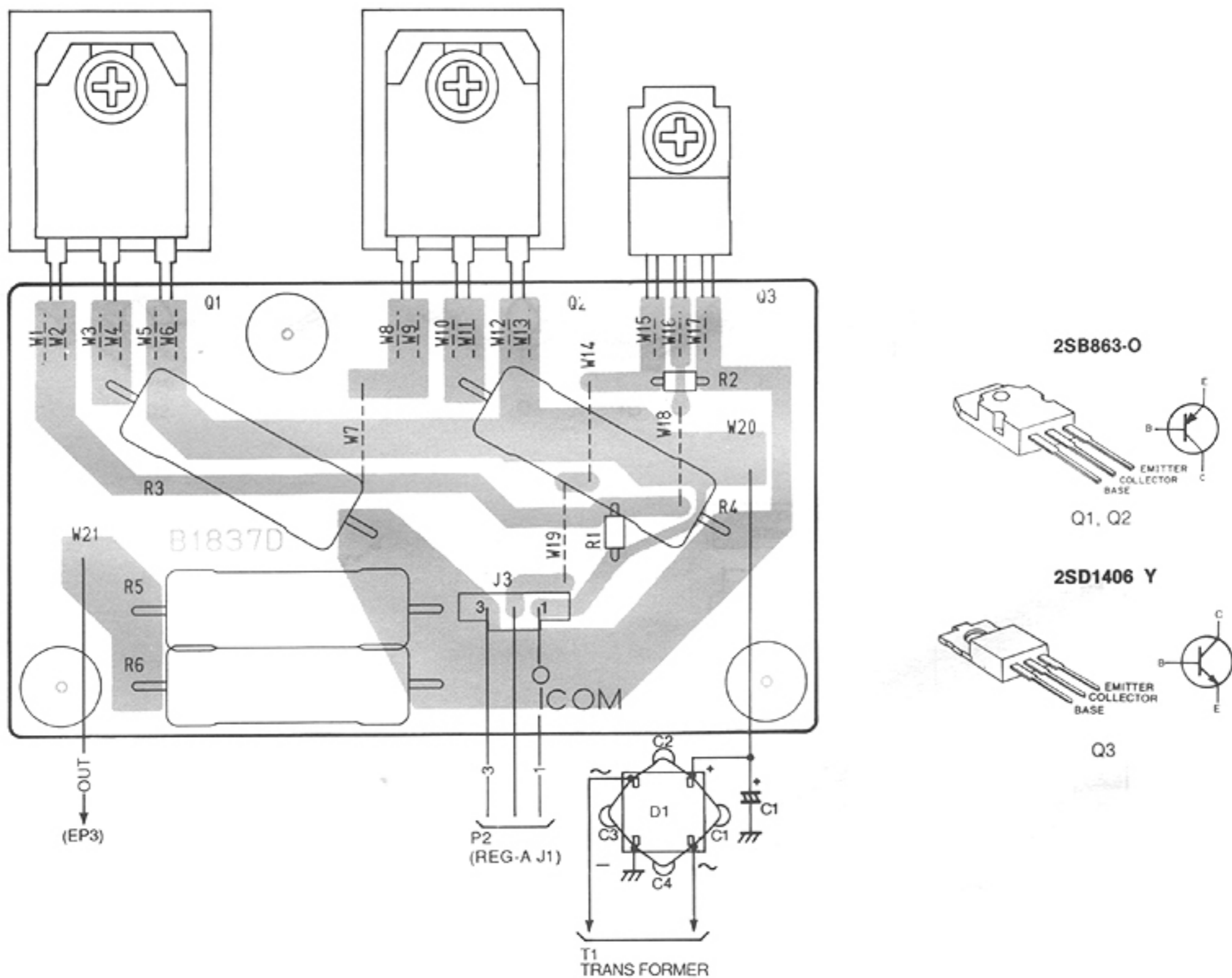


7-7 REG-A AND REG-B UNITS

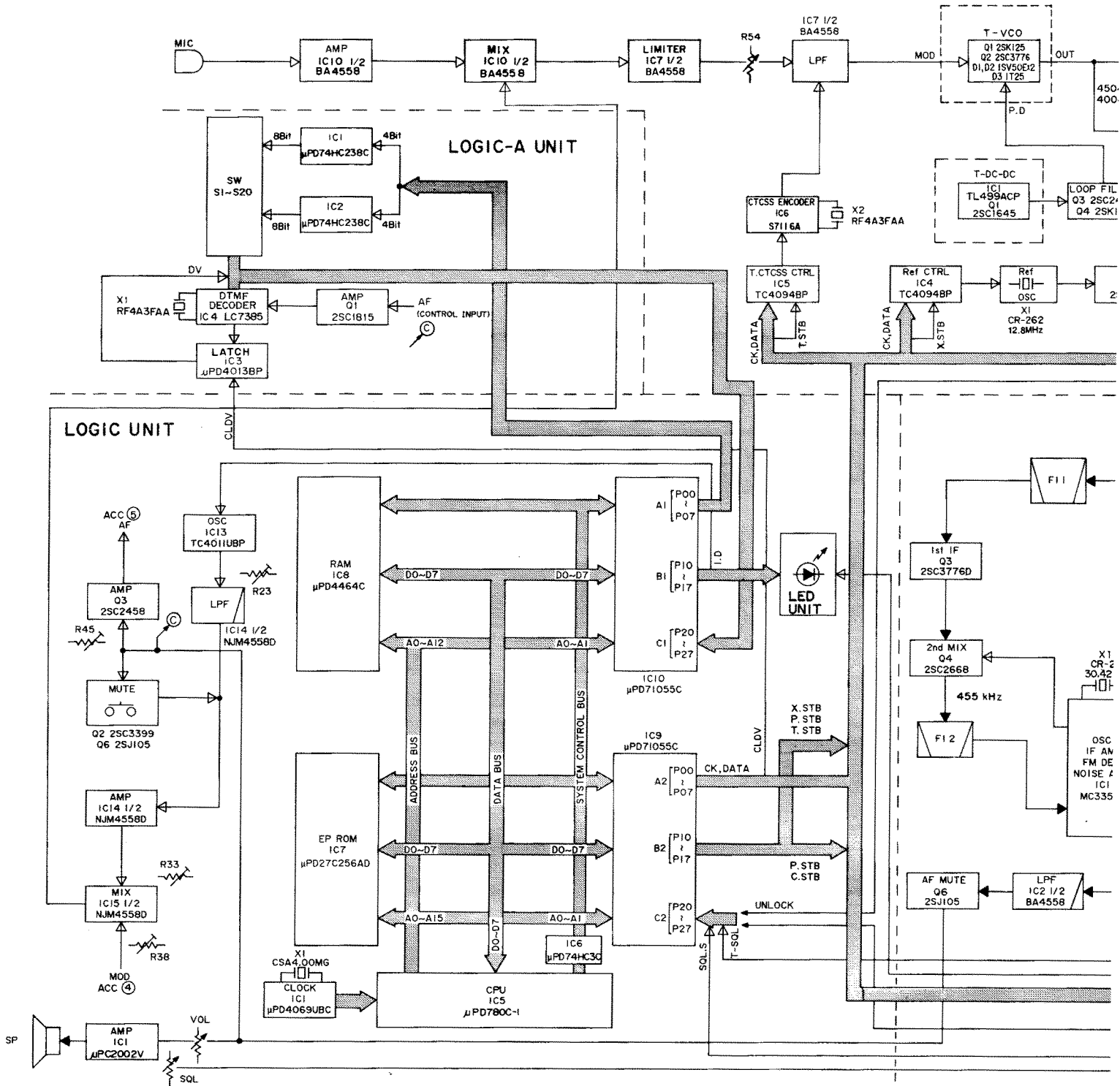
• REG-A UNIT

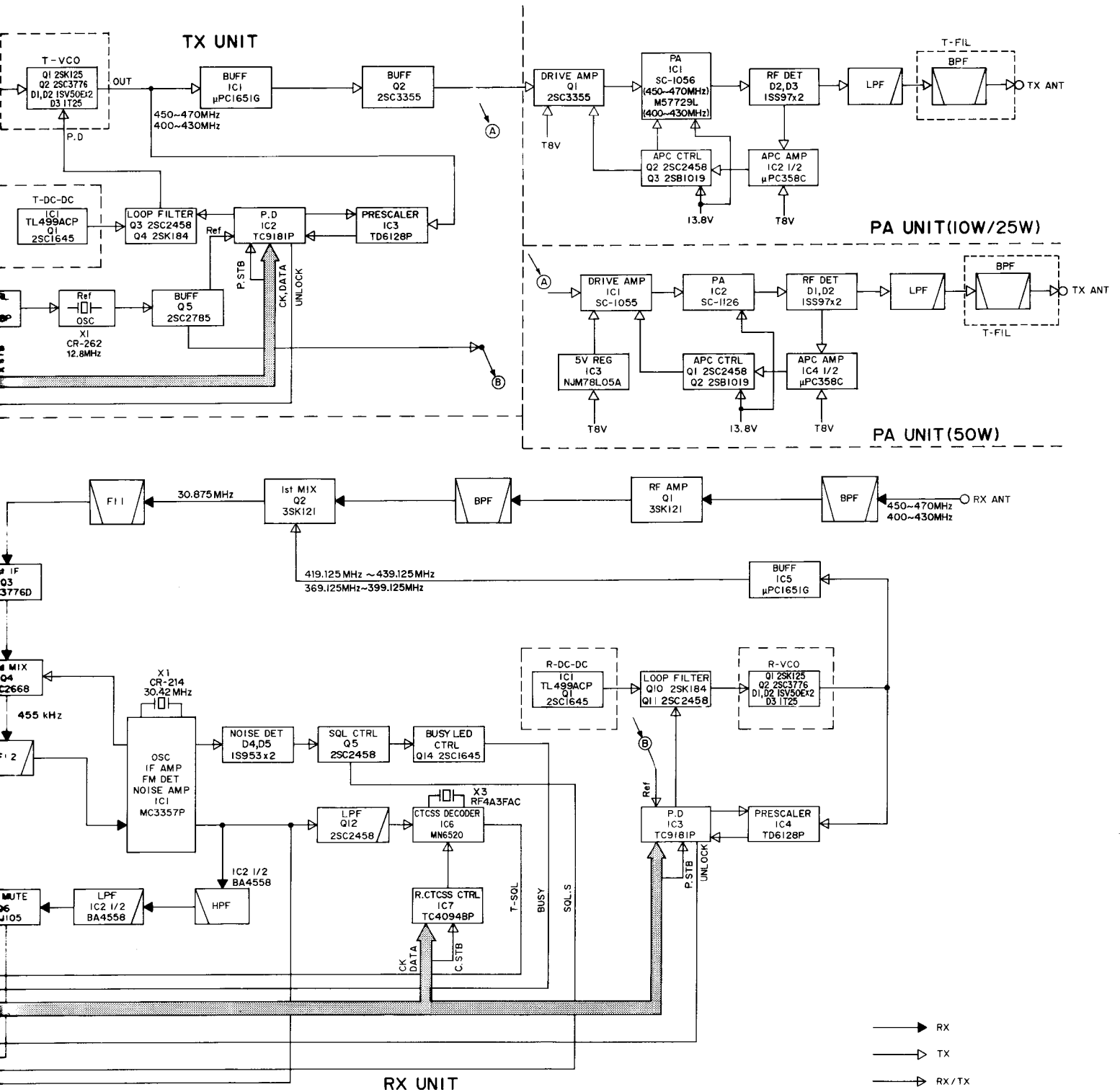


• REG-B UNIT

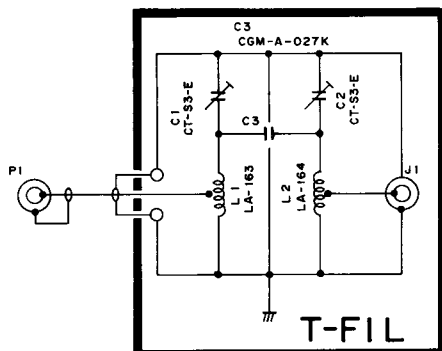
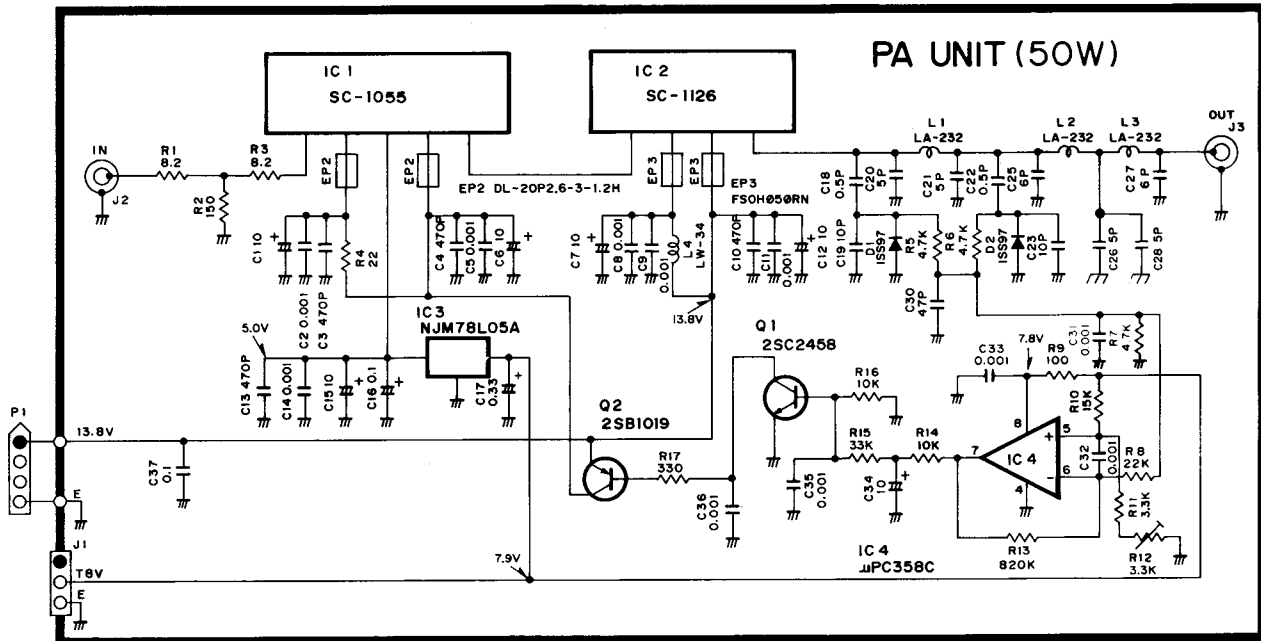
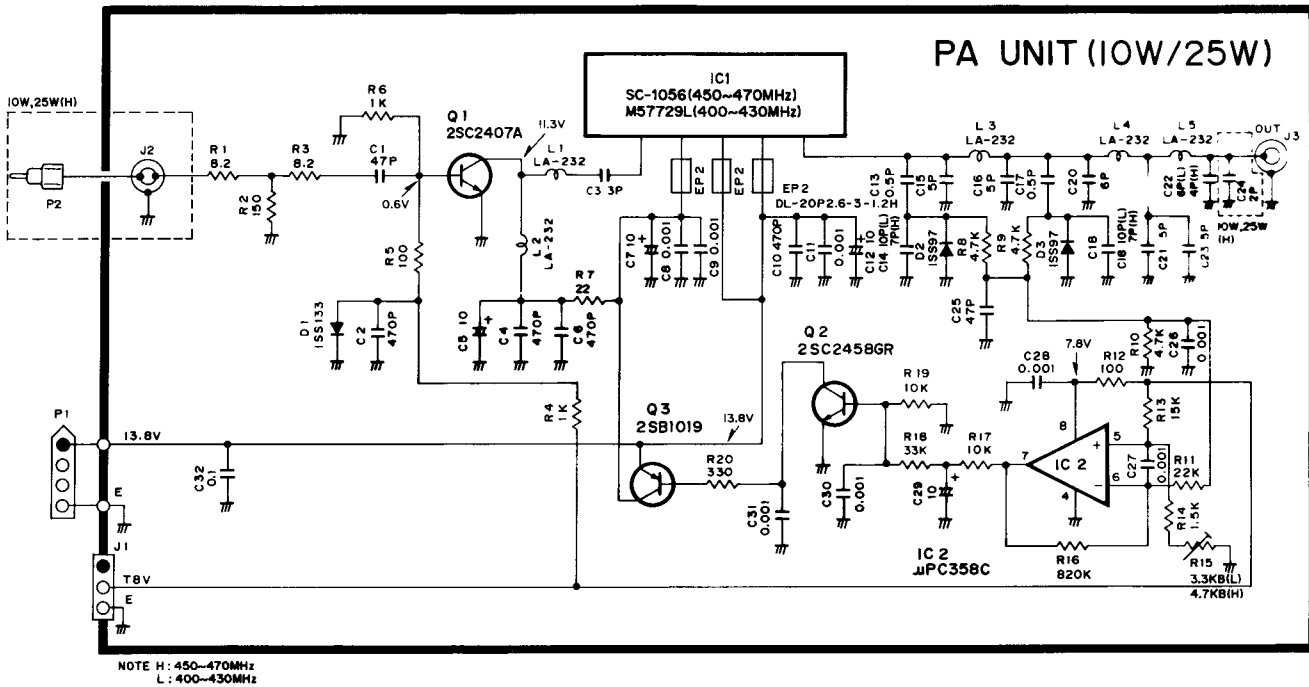


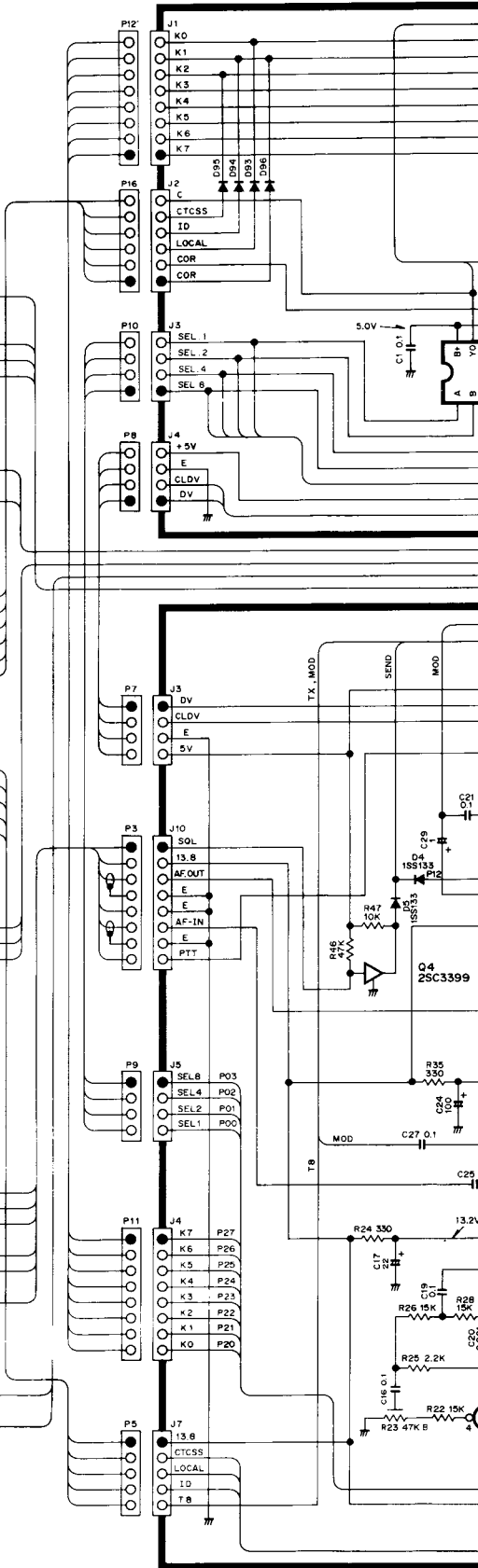
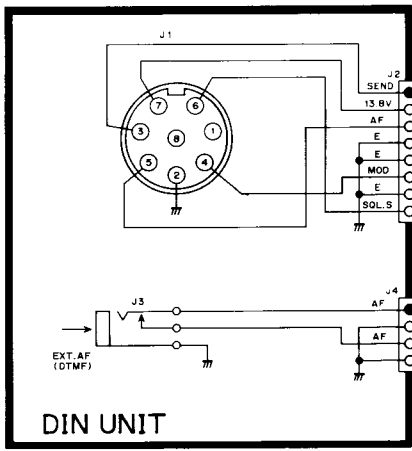
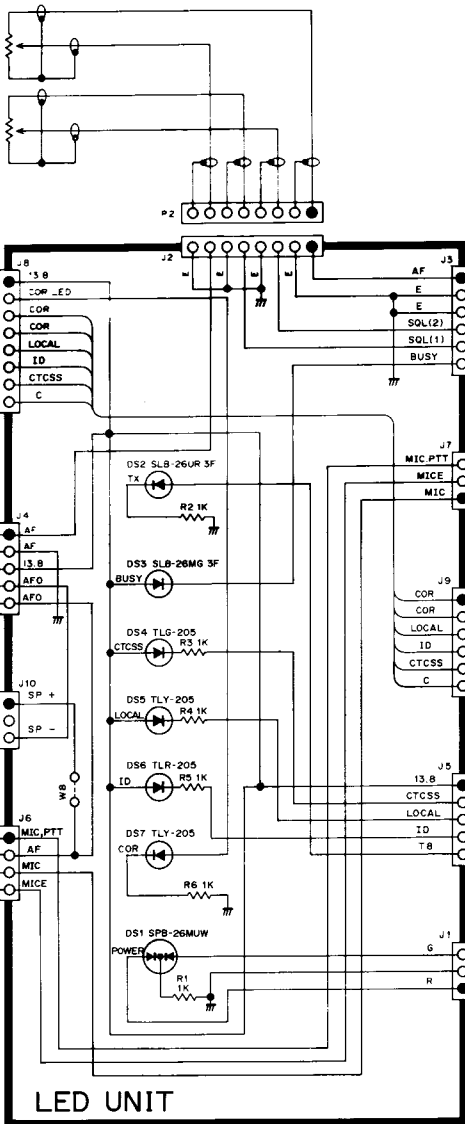
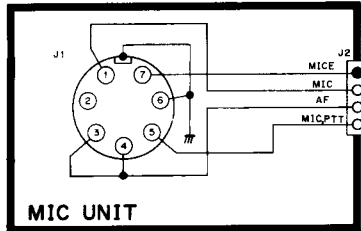
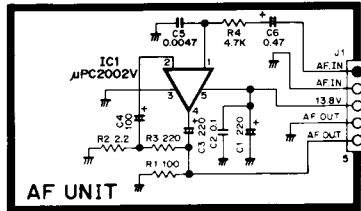
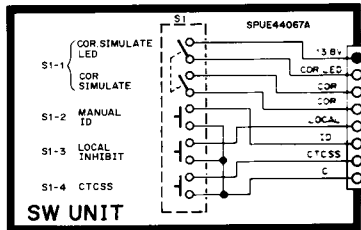
SECTION 8 BLOCK DIAGRAM

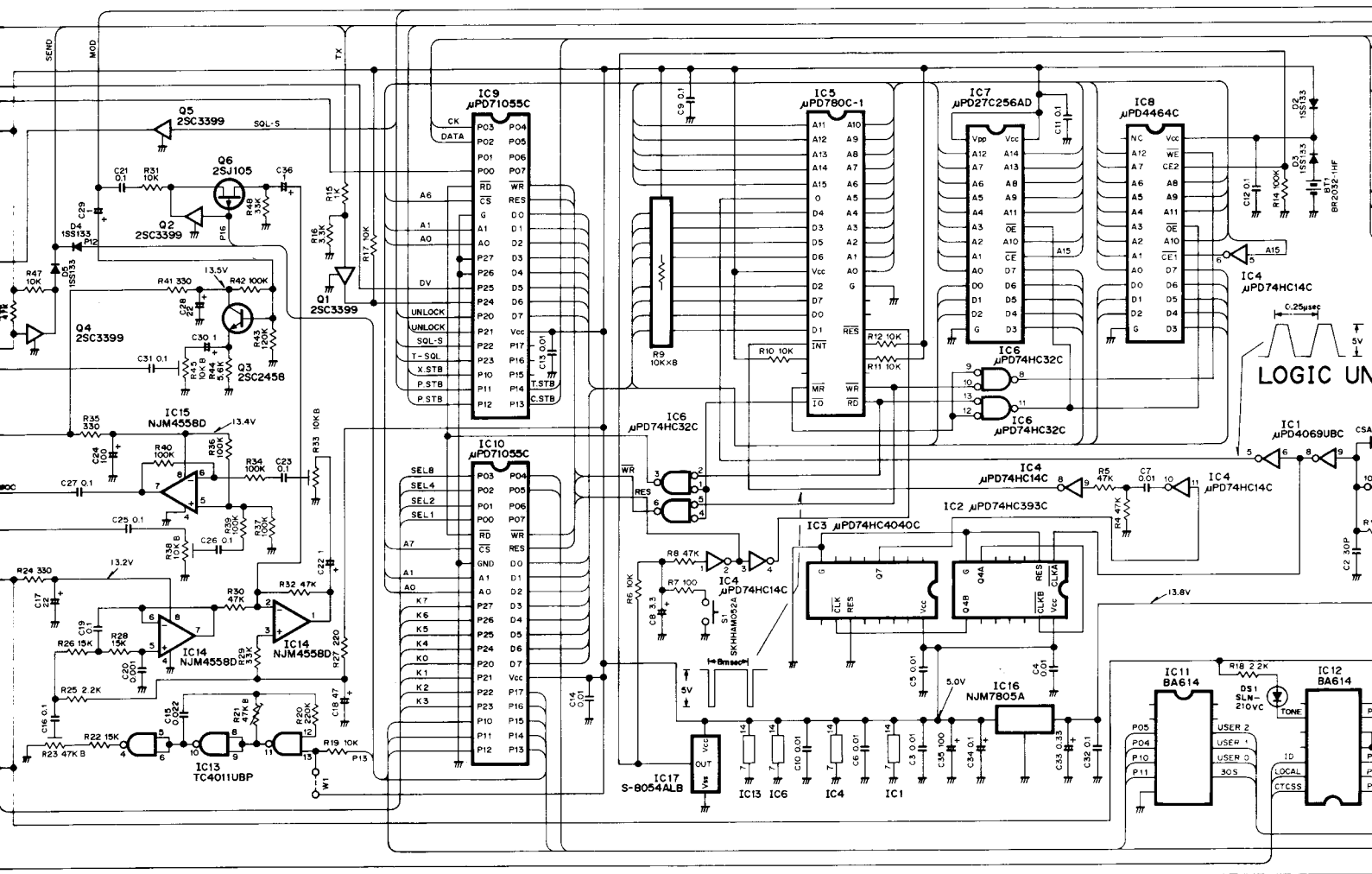
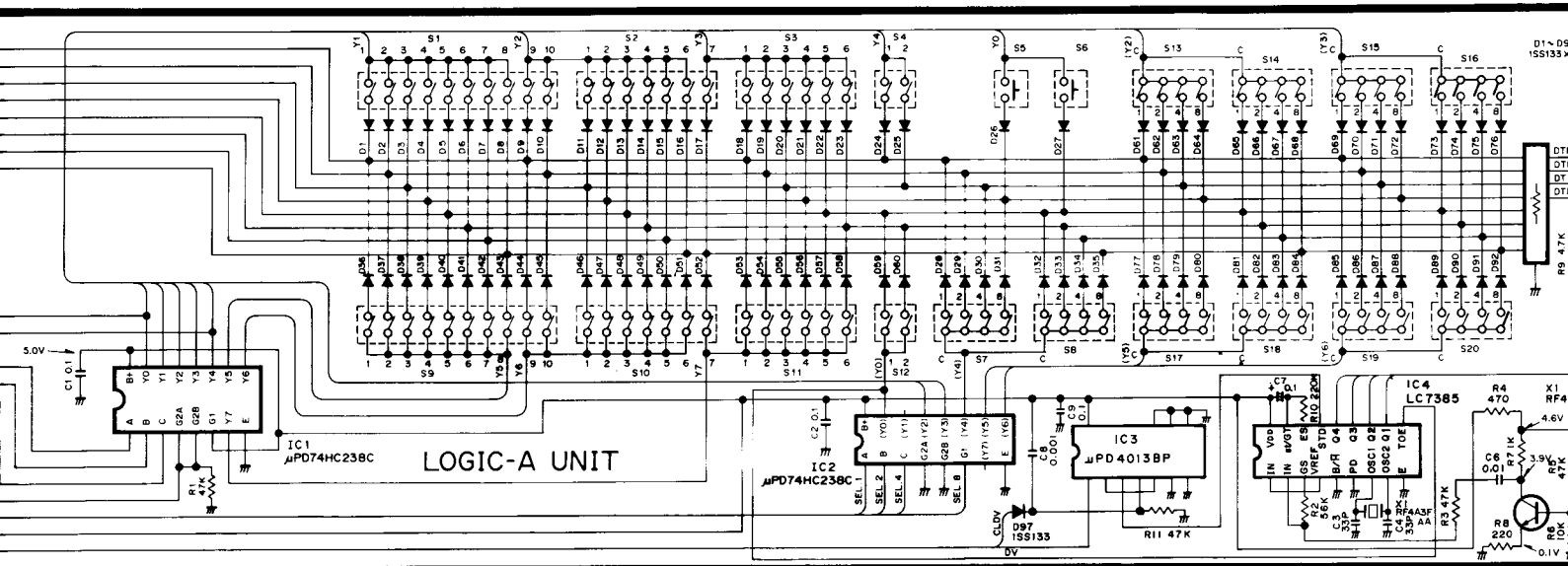


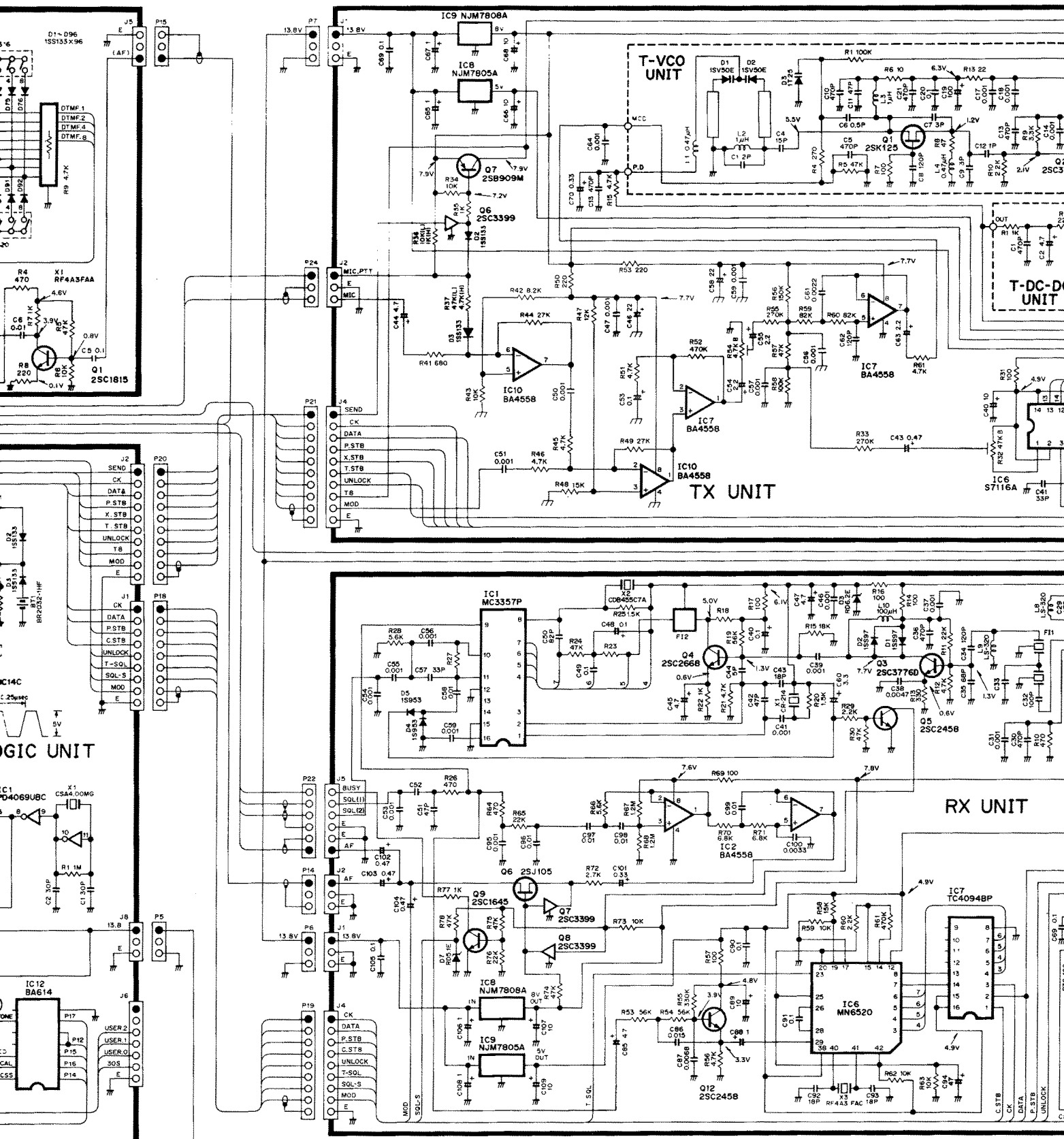


SECTION 9 VOLTAGE DIAGRAM



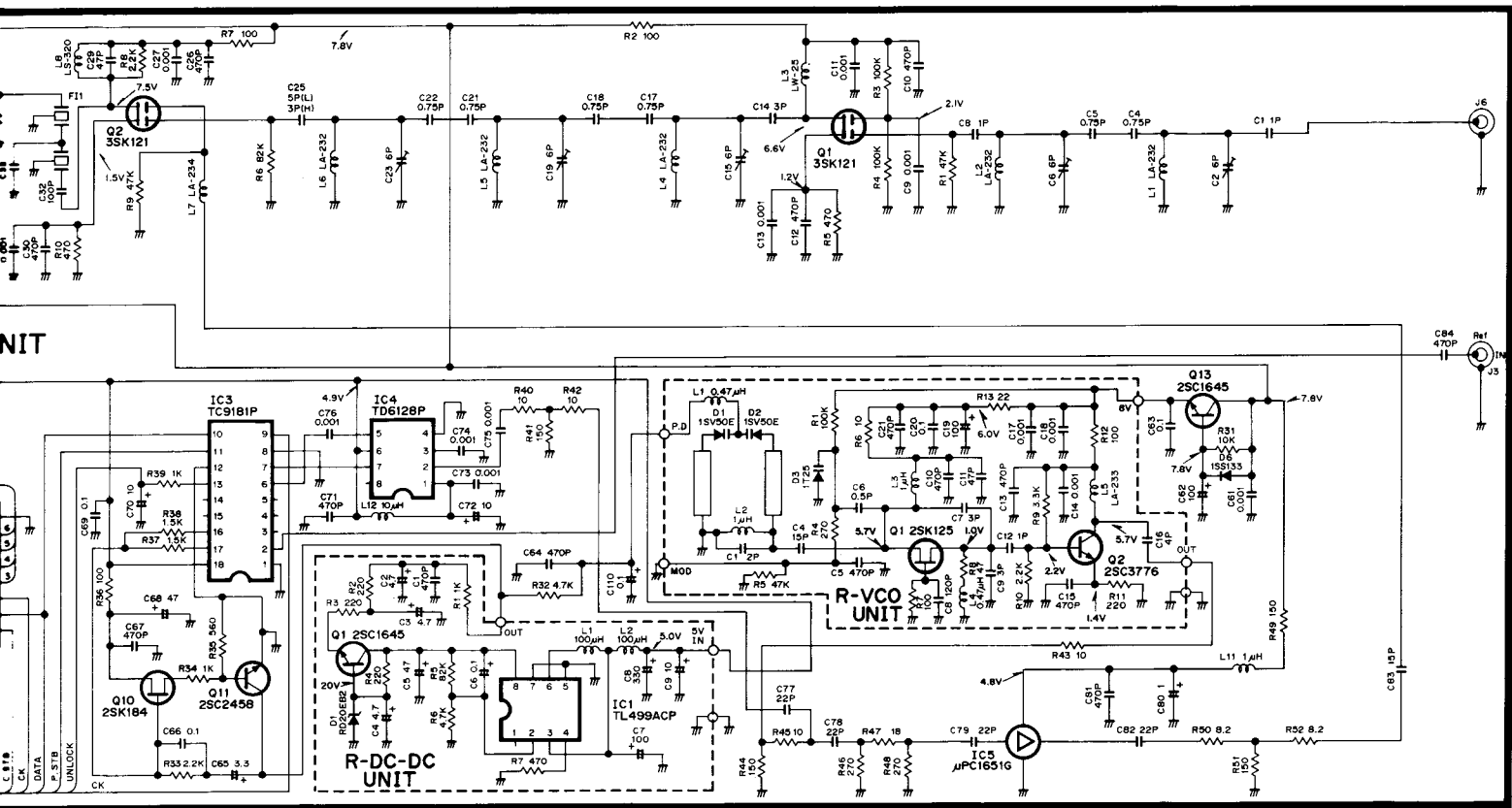
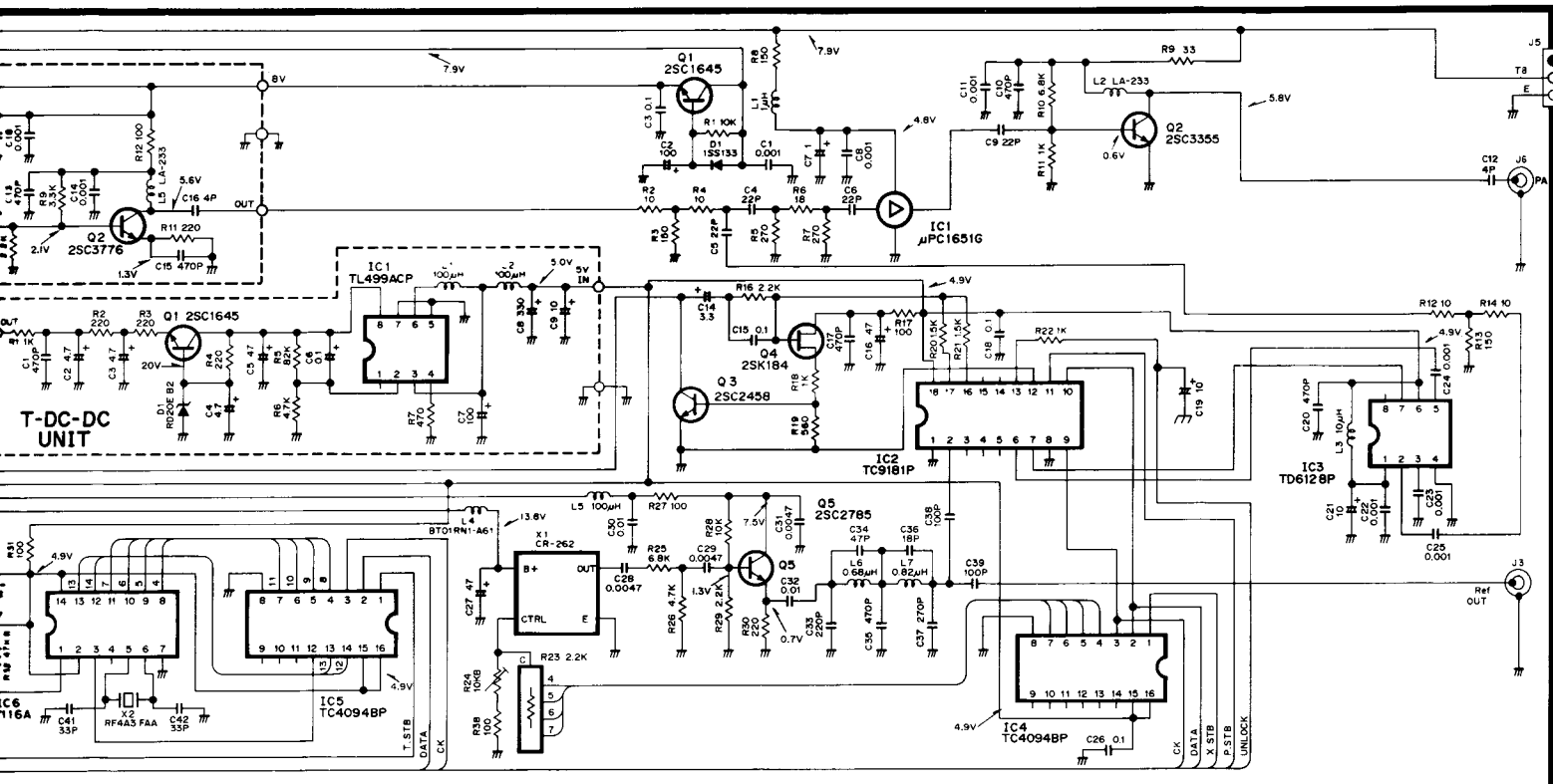






| | | |
|-----|----------|---|
| F11 | 30M15B | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 30M7B | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |
| F12 | CFW455E | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | CFW455HT | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |

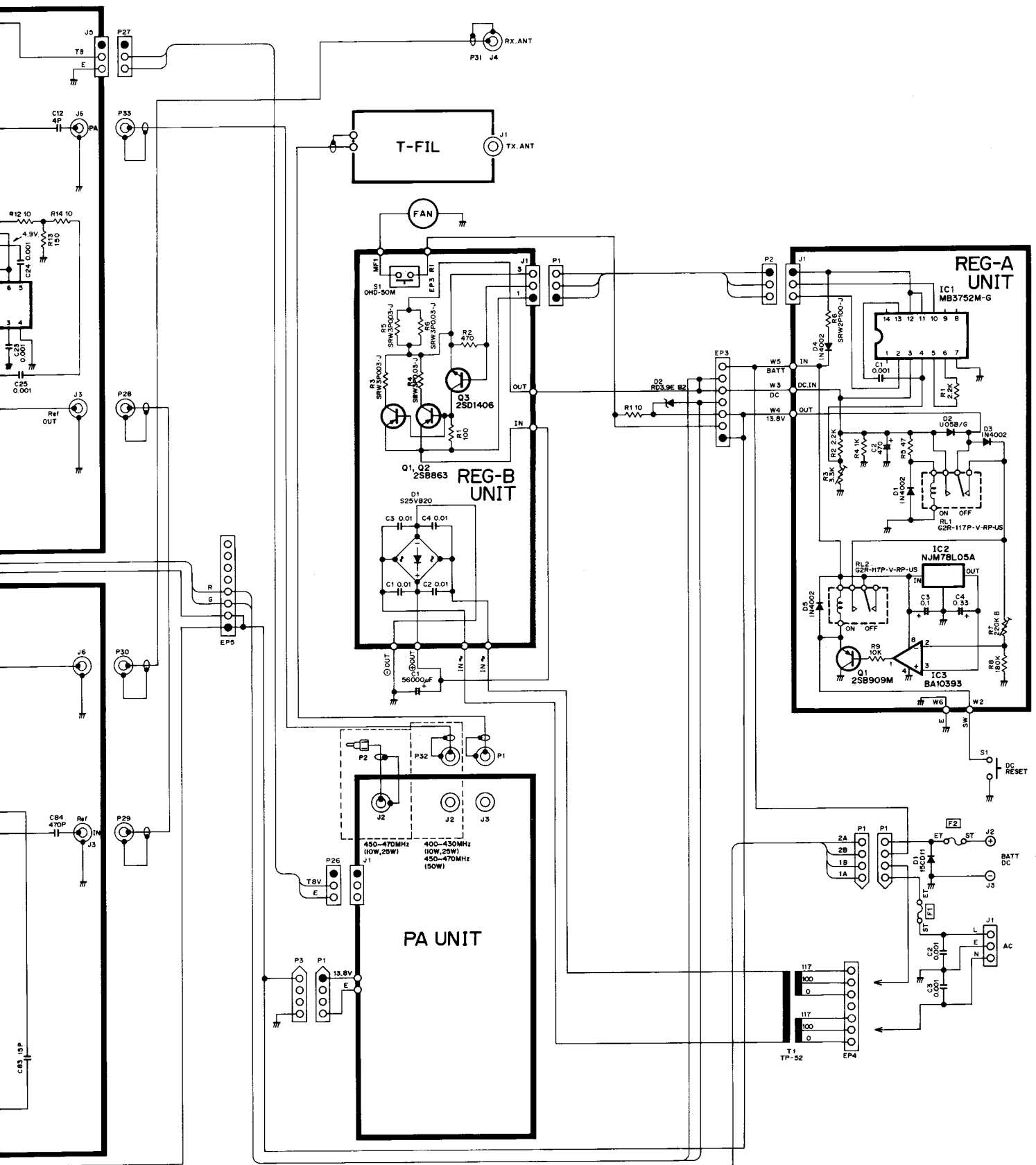
| | | |
|-----|------|---|
| R18 | 1.5K | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 2.2K | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |
| R23 | 1.5K | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 2.2K | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |



| |
|---|
| ITA(10W),EUR(25W/50W),USA(25W/50W) |
| ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |
| ITA(10W),EUR(25W/50W),USA(25W/50W) |
| ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |

| | | |
|-----|------|---|
| R27 | 330K | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 560K | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |
| C33 | 12P | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 27P | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |

| | | |
|-----|--------|---|
| C52 | 0.0022 | ITA(10W),EUR(25W/50W),USA(25W/50W) |
| | 0.0068 | ITA(NARROW 10W),EUR(NARROW 25W/50W),USA(NARROW 25W/50W) |



| | | |
|----|-----|-------------------------|
| F1 | 3A | ITA, EUR(25W), USA(25W) |
| | 5A | EUR(50W), USA(50W) |
| F2 | 10A | ITA, EUR(25W), USA(25W) |
| | 20A | EUR(50W), USA(50W) |

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