



SERVICE MANUAL

VHF AIR BAND TRANSCEIVER

IC-A200

S-14227MZ-C1

Apr. 2006

INTRODUCTION

This service manual describes the latest service information for the following transceivers at the time of publication.

| MODEL | VERSION NO. | VERSION | SYMBOL |
|----------|-------------|----------------|--------|
| IC-A200 | #01 | U.S.A. | USA |
| IC-A200F | #02 | France | FRA |
| IC-A200 | #03 | United Kingdom | UK |
| | #04 | Germany | FRG |
| | #05 | Australia | AUS |

CAUTION

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 16 V. This will ruin the transceiver.

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

DO NOT reverse the polarities of the power supply when connecting the transceiver.

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



ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

- 10-digit order numbers
- Component part number and name
- Equipment model name and unit name
- Quantity required

<SAMPLE ORDER>

1120002170 IC M5223FP IC-A200 MAIN UNIT 5 pieces
8810006840 Screw FH M2.6×4 IC-A200 Top cover 10 pieces

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

REPAIR NOTES

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

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency range : 118.000–136.975 MHz
- Mode : AM (6K00A3E)
- Tuning steps : 25 kHz, 50 kHz or 1 MHz
- Number of memory channels : 9
- Frequency stability : $\pm 0.0015\%$ (-20°C to $+55^{\circ}\text{C}$)
- Antenna impedance : $50\ \Omega$
- Power supply requirement : 13.75 V DC $\pm 15\%$ (negative ground)
- Current drain (at 13.8 V DC) :

| | | |
|----------|-------------------|--------|
| Transmit | | 2.6 A |
| Receive | Max. audio output | 600 mA |
| | Squelched | 320 mA |
- Usable temperature range : -20°C to $+55^{\circ}\text{C}$; -4°F to $+131^{\circ}\text{F}$
- Dimensions : 160 (W) \times 34 (H) \times 271 (D) mm; 6.3 (W) \times 1.3 (H) \times 10.7 (D) in
(Projections not included)
- Weight (approx.) : 1.1 kg; 2.4 lb

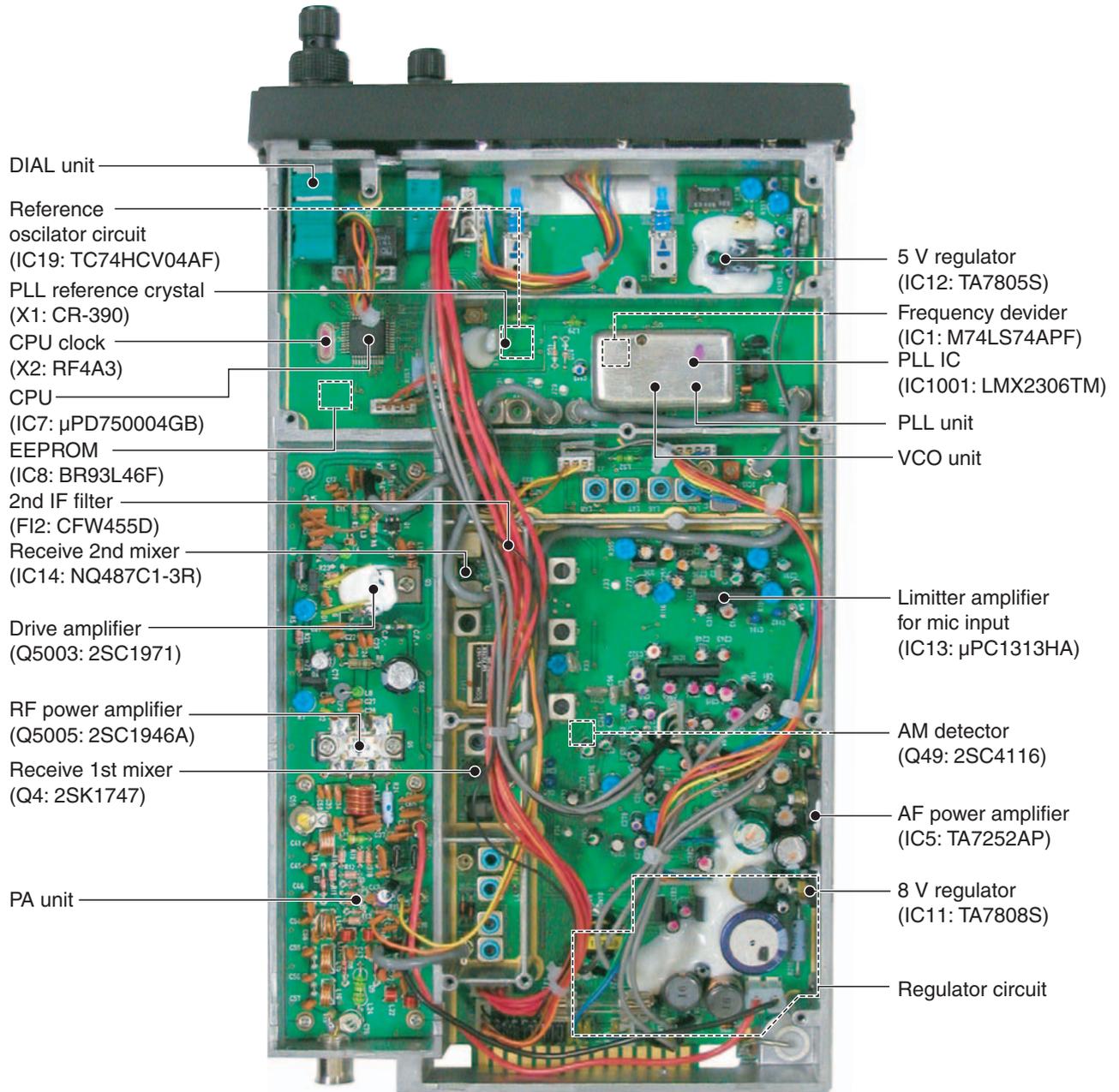
■ TRANSMITTER

- Output power (at 13.8 V DC) : 7 W (Carrier power)
- Modulation : 70% (Max 98%)
- Microphone impedance : $600\ \Omega$
- Modulation system : Low level modulation
- Spurious emissions : Less than $-60\ \text{dB}$

■ RECEIVER

- Receive system : Double-conversion superheterodyne
- Sensitivity : $2\ \mu\text{V}$ for 6 dB S/N (with 1 kHz, 30% modulation)
- Spurious rejection : 70 dB
- Selectivity : $\pm 8\ \text{kHz}/6\ \text{dB}$ (min.)
 $\pm 17\ \text{kHz}/40\ \text{dB}$
 $\pm 22\ \text{kHz}/60\ \text{dB}$
- Intermediate frequencies : 1st 32.455 MHz
2nd 455 kHz
- Audio output power : 5 W with a $4\ \Omega$ load
60 mW with a $500\ \Omega$ load

SECTION 2 INSIDE VIEWS



SECTION 3 CIRCUIT DESCRIPTION

3-1 RECEIVER CIRCUITS

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

The antenna switching circuit functions as a low-pass filter while transmitting and as a resonator circuit while receiving.

Received signals enter the PA unit from the antenna connector and pass through the low-pass filter (C54–C57, C66, L14–L16), the antenna switching circuit (D7–D9) and the bandpass filter (C71–C75, L21–L23). The signals are then applied to the MAIN unit.

3-1-2 RF CIRCUIT (MAIN UNIT)

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

The signals from the PA unit pass through the attenuator circuit (D6, D7). The attenuation level is controlled by AGC voltages. The signals are passed through a bandpass filter and are then amplified at the RF amplifier (Q1). The amplified signals are passed through a bandpass filter again and are then applied to the 1st mixer circuit (Q4).

The bandpass filters employ tuned-type filters using varactor diodes (D1–D4) with PLL lock voltages to suppress the out-of-band signals (especially FM broad band signals) and to obtain high image response rejection.

AGC voltage is applied to Q1 as the bias voltage to obtain wide range characteristics of signal strength.

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

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

The signals from the bandpass filter are mixed with a 1st LO signals from D25 at the 1st mixer (Q4) to produce a 32.455 MHz 1st IF signal. The 1st IF signal passes through the crystal filter (FI1) and is then applied to the IF amplifier (Q6).

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

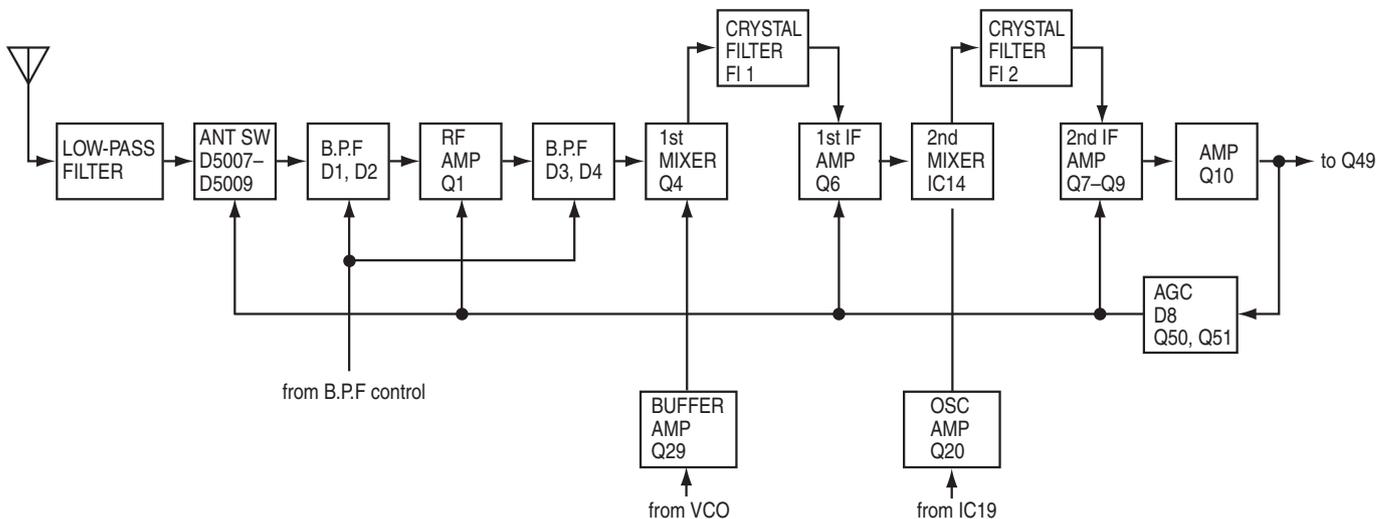
The 2nd mixer circuit converts the 1st IF signal to a 455 kHz 2nd IF signal. A double superheterodyne system (which converts the received signal twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the 1st IF amplifier (Q6), is applied to the 2nd mixer (IC14) and mixed with a 32.000 MHz 2nd LO signal from Q20 to be converted to a 455 kHz of signals. The 2nd LO signal is commonly used with the PLL reference oscillator.

The 2nd IF signal is applied to an IF filter (F12) to suppress out-of-band signals. The 2nd IF signal is amplified at the IF amplifiers (Q7–Q9) and is then applied to the AM detector circuit (Q49).

The thermistor (R33) is used for Q9 bias voltage to obtain stable amplifier gain during temperature fluctuations.

RECEIVER CIRCUIT BLOCK DIAGRAM



3-1-5 AM DETECTOR CIRCUIT (MAIN UNIT)

The AM detector circuit demodulates the 2nd IF signal to AF signals.

The 2nd IF signal from Q10 is detected at the AM detector (Q49) for conversion to AF signals. A PN junction construction inside Q49 is used for AM detection to obtain low output impedance. High frequency components are removed by capacitors (C239, C241, C242) and passed AF signals are applied to the AF circuits.

3-1-6 AF CIRCUIT (MAIN UNIT)

The AF signals are passed through the active low-pass filter (Q13) and are amplified at the limiter amplifier (IC16, pin 2). The amplified signals from IC16 (pin 3) pass through the volume control (R89) on the front panel and are then applied to the AF preamplifier (IC17, pin 3).

The limiter amplifier (IC16) has an ALC limiter circuit that maintains the audio level even when receiving shallow or deeply modulated signals. The AF signal level is detected at D40 and is fed back to IC16 (pin 4) to control the amplifier gain.

The amplified signals from the AF preamplifier (IC17) are passed through the active low-pass filter (Q39) and the speaker switch (Q38) and are then applied to the AF power amplifier (IC5). IC5 amplifies the signals to a level needed to drive a 4 Ω external speaker.

3-1-7 SQUELCH CIRCUIT (MAIN UNIT)

The squelch circuit cuts out AF signals when receiving no modulated signal. When no voice modulation is included in the signal, the squelch circuit cuts out the AF signal by comparing voice audio and noise audio components in the AF detected signals.

The AF detected signals from Q49 are separately applied to the active low-pass filter (IC3b) and active high-pass filter (IC3a) to amplify voice components (lower than approx. 3 kHz) and noise components (higher than approx. 4 kHz) respectively. Both outputs are applied to the comparator (IC4a). When noise components are larger than audio components, the comparator outputs "HIGH" to turn Q14 ON. Hence Q14 grounds the audio detected line and the AF signal is cut out.

3-1-8 AGC CIRCUIT (MAIN UNIT)

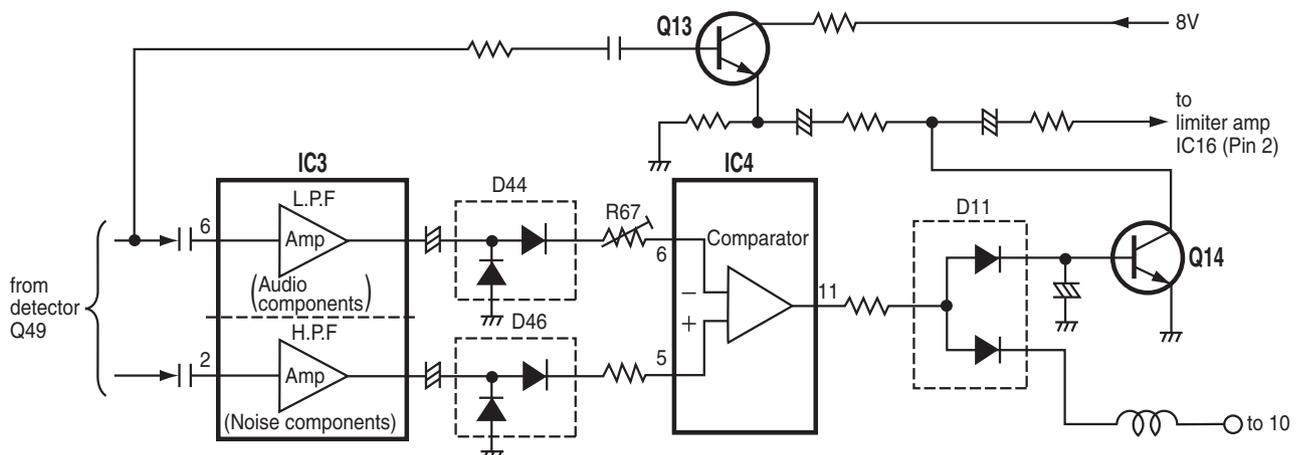
The AGC (Automatic Gain Control) circuit reduces RF and IF amplifier gain and activates the RF attenuator (D6, D7) by decreasing the bias voltage to prevent distortion from strong signals.

The signal from the 2nd IF amplifier (Q10) is detected at D8, and applied to the base of Q50. When receiving a strong signal, Q50 is turned ON to decrease the bias voltage.

Minus voltages are applied to the emitter of Q50 to operate the AGC at low signal levels. The PLL reference oscillation frequency (32.00 MHz) is rectified by the detector (D20, D21, C116, C117) to obtain minus voltages (-4.5 V approx.).

The AGC release time is determined by C49 and R310. Q51 activates for strong signals.

SQUELCH CIRCUIT



3-2 TRANSMITTER CIRCUITS

3-2-1 MIC AMPLIFIER CIRCUIT (MAIN UNIT)

The mic amplifier circuit amplifies the mic audio with the limiter circuit to a level needed for the AM modulator.

Mic audio signals pass through the mic switch (Q4) and are then applied to the limiter amplifier (IC13, pin 2). The mic switch cuts out the mic audio signal while receiving.

IC13 has an ALC limiter circuit that controls the amplifier gain to prevent signal distortion. A portion of the output signals from IC13 (pin 3) is detected by D18 and its detected voltages feed back to IC13 (pin 4) to control the gain.

The output signals from IC13 (pin 3) pass through the active low-pass filter (Q47) to cut out components higher than 2.5 kHz and are then amplified at the mic amplifier (Q40). The signals are then applied to the AM modulator (Q36, Q31).

3-2-2 MODULATOR CIRCUIT (MAIN UNIT)

The modulator circuit controls the collector voltage of the transmitter linear amplifier to obtain amplitude modulation.

The modulator circuit consists of a current amplifier and a linear amplifier. Amplified audio signals are applied to the current amplifier (Q36) which controls the collector voltage of the linear amplifier (Q31). The LO signal is amplified at Q31 with variable voltage related to the mic input level so that the LO signal level is varied as an AM modulation.

3-2-3 LOCAL SIGNAL AMPLIFIER CIRCUIT (MAIN UNIT)

The LO signal (118.00–136.975 MHz) is obtained by mixing the PLL output frequency (150.00–168.975 MHz) and reference oscillator signal (32.00 MHz).

The PLL output and the reference oscillator signals are amplified at Q29 and Q20 respectively and are then applied to the transmitter mixer circuit (IC15). The mixed signal is passed through the transmitter bandpass filter to remove the out-of-band signals. Q30 is a buffer amplifier to compensate for bandpass filter attenuation.

The passed signal is modulated at Q31 and amplified at Q44. The attenuator-type ALC control circuit (D33, D34, R356) reduces the signal level when a mismatched load occurs.

3-2-4 DRIVE AND POWER AMPLIFIERS (PA UNIT)

The signal from the MAIN unit is amplified at 3 amplifiers, the pre-driver (Q5001), the driver (Q5003) and the final amplifier (Q5005) in the PA unit to obtain the stable 7 W output power.

The amplified signal passes through the matching circuit (C34, C35, C59–C61), the ALC detector circuit (L13, D3–D6), the antenna switching circuit (D7), and the low-pass filter (L14–L16, C54–C57, C66). The signal is then applied to the antenna connector.

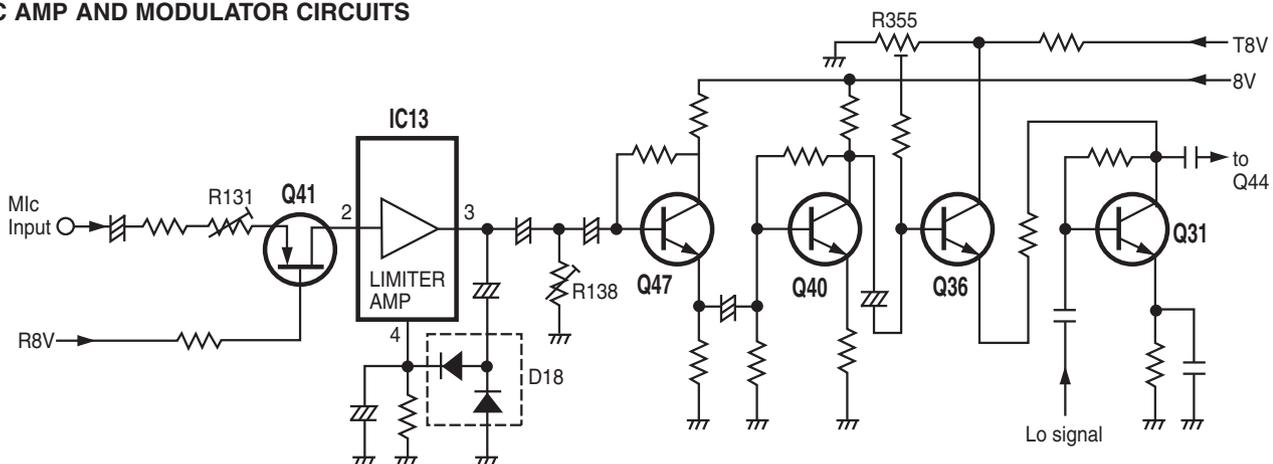
3-2-5 ALC CIRCUIT (MAIN AND PA UNITS)

The RF ALC circuit protects the final amplifier (Q5005) from a mismatched output load.

A portion of the output power from the final amplifier (Q5005) is detected at the ALC detector (D5003–D5005) on the PA unit. This detected voltage is set at a minimum value when the output load is correct. However, when mismatching occurs the detected voltage is increased.

The detected voltage is applied to the MAIN unit as an ALC signal. The comparator (IC18) in the MAIN unit compares the difference between the detected voltage (pin 5) and reference voltage (pin 6). The comparator outputs "HIGH" when mismatching occurs. The output current flows through the attenuator-type ALC circuit (D33, D34, R356) to change the attenuation ratio and to decrease the RF signal level.

MIC AMP AND MODULATOR CIRCUITS



3-3 PLL CIRCUITS

3-3-1 GENERAL (PLL UNIT)

The PLL circuit steadily oscillates the transmit and receive local frequencies while comparing the phase of the divided VCO frequency and reference frequency. Therefore, the PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

The oscillated signal in the VCO circuit is divided by N-data at a programmable divider and is phase detected with the reference frequency at a phase comparator. The detected signal (pulse-type signal) is rectified by a loop filter and converted to DC voltage (PLL lock voltage). This voltage is applied to varactor diodes in the VCO unit to control the oscillating frequency. Hence, this loop provides a variable and stable oscillating frequency.

IC2001 includes the prescaler, programmable divider, phase comparator, etc. in one chip.

3-3-2 REFERENCE OSCILLATOR CIRCUIT (MAIN UNIT)

The reference frequency oscillator oscillates at a stable 32.000 MHz which is used for the PLL reference frequency, receive and transmit LO frequency. AGC minus voltages are used to detect this frequency.

The reference frequency (32.000 MHz) is generated by the oscillator circuit of IC19 and X1. The reference frequency is divided by 4 at IC1 and is then applied to the PLL board. The frequency is divided again in PLL IC (IC2001) by 1/320 to obtain the PLL reference frequency of 25 kHz.

3-3-3 VCO CIRCUIT (VCO UNIT)

The VCO circuits oscillate the PLL output frequency by controlling varactor diodes (D2001–D2003).

The VCO circuits (Q2004) employs a clap oscillator circuit. The signal generated at the VCO is buffer-amplified at Q2001 or Q2002. The amplified signals are used for a receive/transmit LO signal as PLL output (OUT2) or used for a feedback signal (OUT1) to the PLL circuit.

3-3-4 PHASE DETECTOR CIRCUITS (PLL UNIT)

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

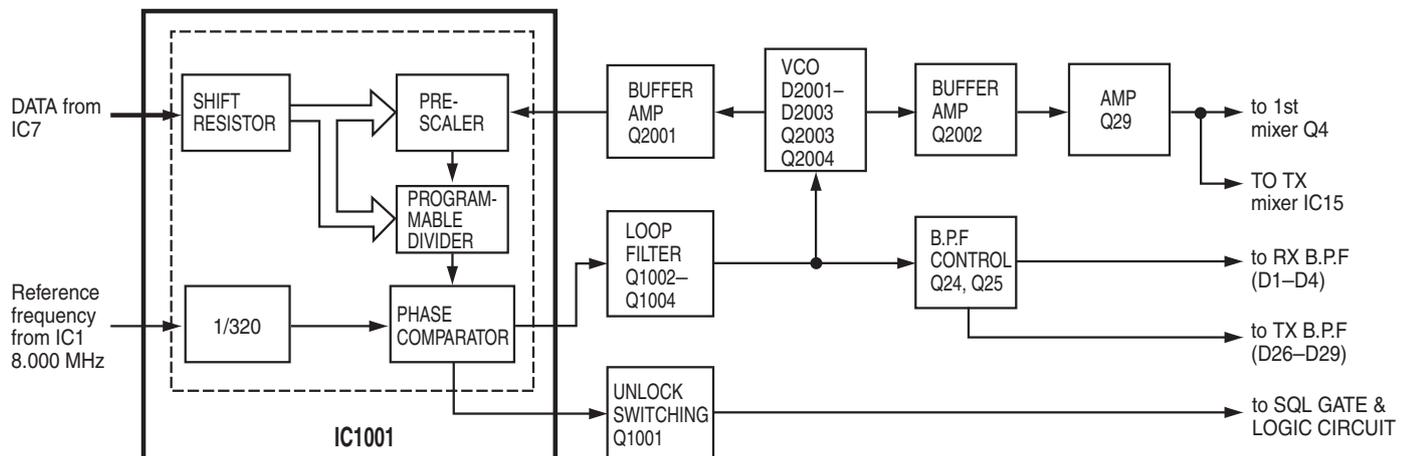
The PLL IC (IC1001) contains a prescaler, programmable divider, high-speed phase detector and shift register. The oscillated signal comes from the VCO board and enters IC1001 (pin 11). Then, it is divided at the prescaler and divided again at the programmable divider. The divided signal is applied to a phase detector to compare it with a reference frequency (25 kHz). The detected signal exits IC1001 (pin 7).

3-3-5 LOOP FILTER CIRCUIT

An active loop filter circuit is adopted for this PLL circuit to convert the phase-detected signal to DC voltage (PLL lock voltage) and to obtain needed levels to control the VCO circuit.

The active loop filter (Q1002–Q1004) converts the phase-detected signal (pulse-type signal) to DC voltage (PLL lock voltage) to control the VCO oscillating signal. The PLL lock voltage changes the reactance of varactor diodes in the VCO circuit.

PLL VCO CIRCUIT



3-4 VOLTAGE LINES

| LINE | DESCRIPTION |
|-----------------|--|
| V _{cc} | A voltage line from the external DC power connector. |
| T8V | Used for the transmitter circuit. Produced by the T8V regulator (Q34, Q35, D32) and controlled by the T/R switching circuit (IC10a–IC10c). |
| R8V | Used for the receiver circuit. Produced by the R8V regulator (Q32, Q33, D30). |
| 8V | A common 8 V line from the 8V regulator (IC11). |
| 5V | A common 5 V line from the 5V regulator (IC12). |
| –4.5V | Used for the AGC circuit. Produced at D20, D21 by detecting the reference oscillation signal. |

3-5 CPU PORT ALLOCATIONS

| Pin No. | Port No. | Description |
|---------|----------|--|
| 1 | P72 | Input port for the frequency exchange switch. |
| 2 | P71 | Input port for the channel switch. |
| 3 | P70 | Input port for tuning step selection LOW: 25 kHz HIGH: 50 kHz |
| 4, 5 | P63, P62 | Input ports for the large tuning control. P63: MHz down P62: MHz up |
| 6, 7 | P61, P60 | Input ports for the small tuning control. P61: kHz down P60: kHz up |
| 15 | P41 | Outputs the protect register enable signal. |
| 16 | P40 | Outputs the program enable signal. |
| 20 | RESET | When receiving the reset signal "HIGH" to "LOW", the CPU starts its operation. |
| 21 | X1 | Oscillator input port for the CPU clock frequency. |
| 22 | X2 | Oscillator output port connected in parallel with the X1 port. |
| 23 | P33 | Outputs the chip select signal to IC8. |
| 24 | P32 | Outputs the serial clock to IC8. |
| 25 | P31 | Serial data output to IC8. |
| 26 | P30 | Serial data input from IC8. |
| 27 | P81 | Input port for a remote exchange switch. |
| 28 | P80 | Input port for a remote channel switch. |
| 30 | SO | Outputs PLL serial data. |
| 31 | SCK | Outputs serial clock to the PLL. |
| 40 | P23 | Outputs beep tones. |
| 41 | P22 | Outputs a PLL strobe signal. |
| 42 | P21 | Outputs the chip enable signal to an LCD driver. |
| 43 | P20 | Outputs an inhibit signal to an LCD driver. |
| 44 | P73 | Input port for PTT control. |

SECTION 4 MEMORY PROTECTION

To prevent accidental changes, required memory channels can be specified as protect channels. The contents of protect channels **CANNOT** be changed by a user.

4-1 MEMORY PROTECTION PROGRAMMING

NOTE: DO NOT push and hold [↔] in steps 4), 7) and 9), or other functions are activated.

1) Before setting or cancelling, extract the transceiver from the mounting rack and open the top cover. Then connect appropriate connector to the transceiver for operation.

2) Push and hold [CH] until the memory channel number blinks.



3) Rotate the large or small tuning knob to select a memory channel to be programmed as a protect channel.



4) Push [↔].

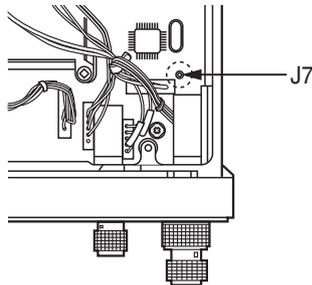
- Frequency content or “- - - -” blinks.



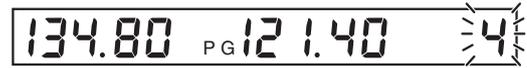
5) Rotate the large and small tuning knobs to select a desired frequency.



6) Ground the memory protection pin (J7 on the MAIN UNIT).



7) Push [↔].



8) Unground the memory protection pin.

- The memory channel is now programmed as a protect channel.

9) Confirm that the frequency content **DOES NOT** blink even when [↔] is pushed.



4-2 MEMORY PROTECTION CANCELLING

NOTE: DO NOT push and hold [↔] in steps 4), 6) and 7), or other functions are activated.

1) Push and hold [CH] until the memory channel number blinks.



2) Rotate the large or small tuning knob to select a protect channel to be cancelled.



3) Ground the memory protection pin as shown in the diagram at left below.

4) Push [↔].

- Frequency content blinks.



5) Unground the memory protection pin.

6) Push [↔].

- The memory protection is now cancelled.

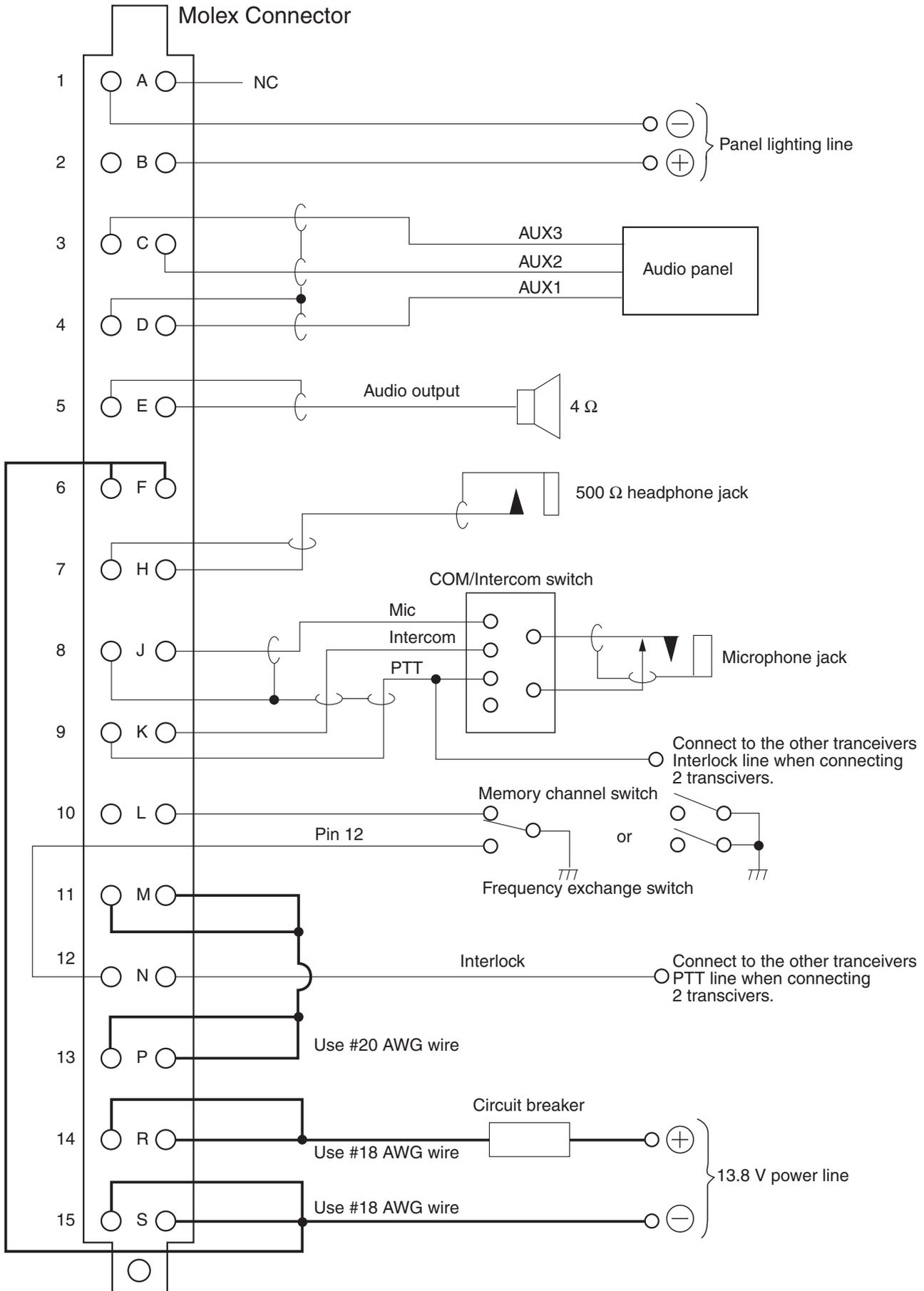


7) Confirm that the frequency content blinks when [↔] is pushed.



SECTION 5 CONNECTIONS

5-1 WIRING CONNECTION



■AUDIO WIRING

Use #24 AWG wires for connectors.

■MEMORY CHANNEL AND FREQUENCY EXCHANGE SWITCHES

For the memory channel switch and frequency exchange switch, use a 2-position rocker switch or 2 separate momentary push switches.

■POWER CABLE WIRING

Use 2 pairs of #18 AWG wires for power and power grounding wiring.

• Circuit breaker

To prevent physical damage, a 10 A circuit breaker **MUST** be installed in the aircraft. Mount the circuit breaker in the aircraft breaker panel or instrument panel to ensure easy access during flight.

• Ground

The transceiver power ground is the airframe ground.

• jumpers

Pins 11, M, P, 13 **MUST** be jumped together with AWG #20 wires or thicker.

■TRANSMIT/RECEIVE INTERLOCK WIRING

When 2 transceivers are installed and both communication antennas are top mounted, pin N **MUST** be connected to pin 9 of each another transceiver.

■INTERNAL FUSE

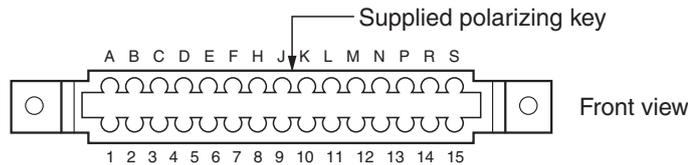
The IC-A200 has a 5 A internal fuse. If the power does not turn ON, open the top cover and check the fuse.

■DIMMER SELECTION

Connect pin B to the Instrument panel lighting line.

When the instrument panel lighting switch is placed to dimmer position, the transceiver backlighting is reduced to half brightness.

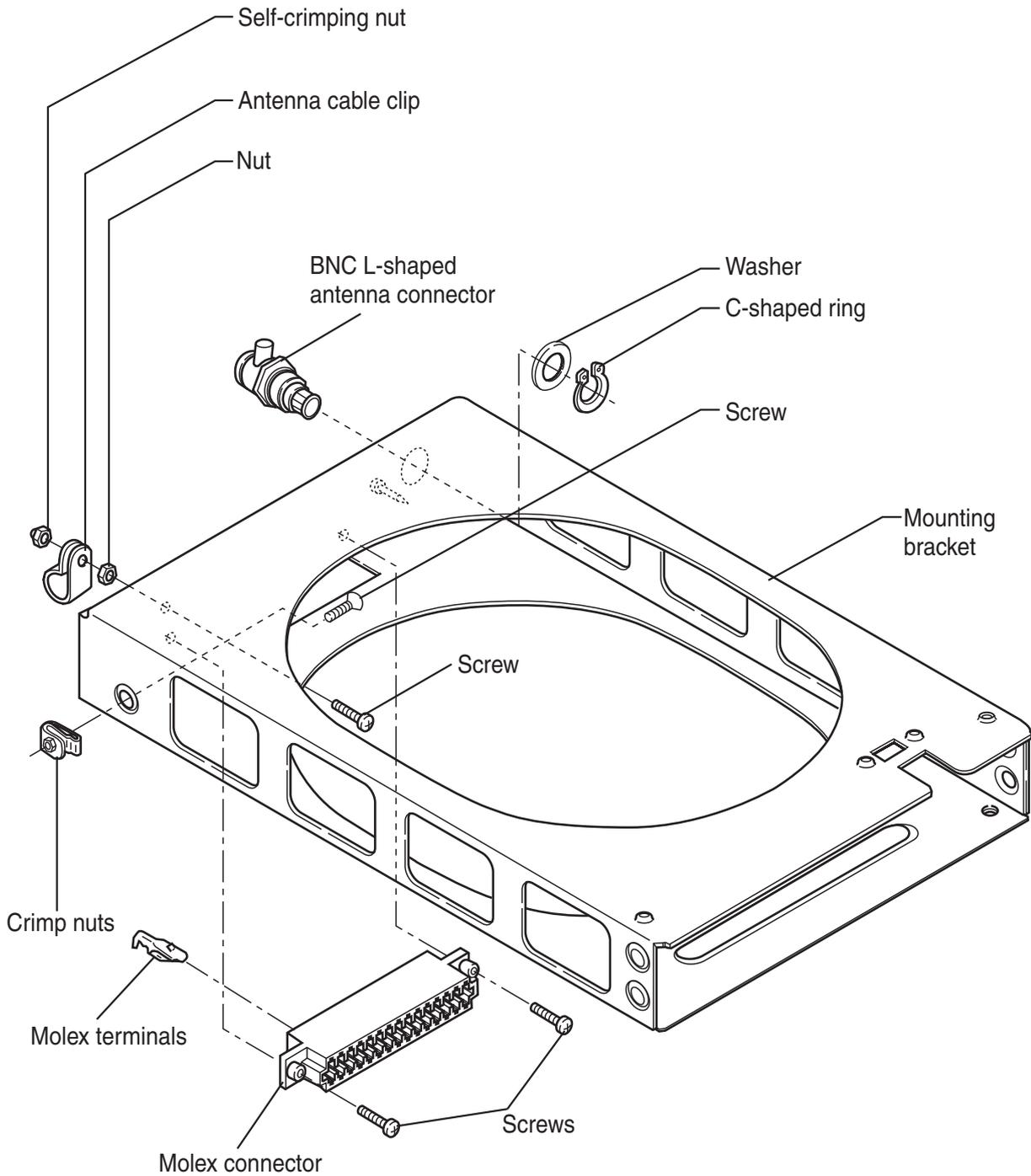
5-2 MOLEX CONNECTOR



| | | | |
|----------|----------------------------------|-----------|----------------------------------|
| A | No connection | 1 | Ground for pin B |
| B | +14 V lighting (input) | 2 | Detected audio (output) |
| C | Auxiliary audio 2 (input) | 3 | Auxiliary audio 3 (input) |
| D | Auxiliary audio 1 (input) | 4 | Ground for pins D, C, 3 |
| E | 4 Ω audio (output) | 5 | Ground for pin E |
| F | Power ground | 6 | Power ground |
| H | 500 Ω audio (output) | 7 | Ground for pin H |
| J | Comm microphone (input) | 8 | Ground for pins J, K, 9 |
| K | Intercom microphone (input) | 9 | PTT* |
| L | Memory channel switch* | 10 | Squelch cancel* |
| M | + 13.8 V power (input) | 11 | +13.8 V power (input) |
| N | Transmit/receive interlock | 12 | Frequency exchange switch* |
| P | Switched aircraft power (output) | 13 | Switched aircraft power (output) |
| R | Aircraft (input) | 14 | Aircraft power (input) |
| S | Power ground | 15 | Power ground |

*Ground to activate.

5-3 RACK MOUNT ASSEMBLY



SECTION 6 ADJUSTMENT PROCEDURES

6-1 PREPARATION BEFORE SERVICING

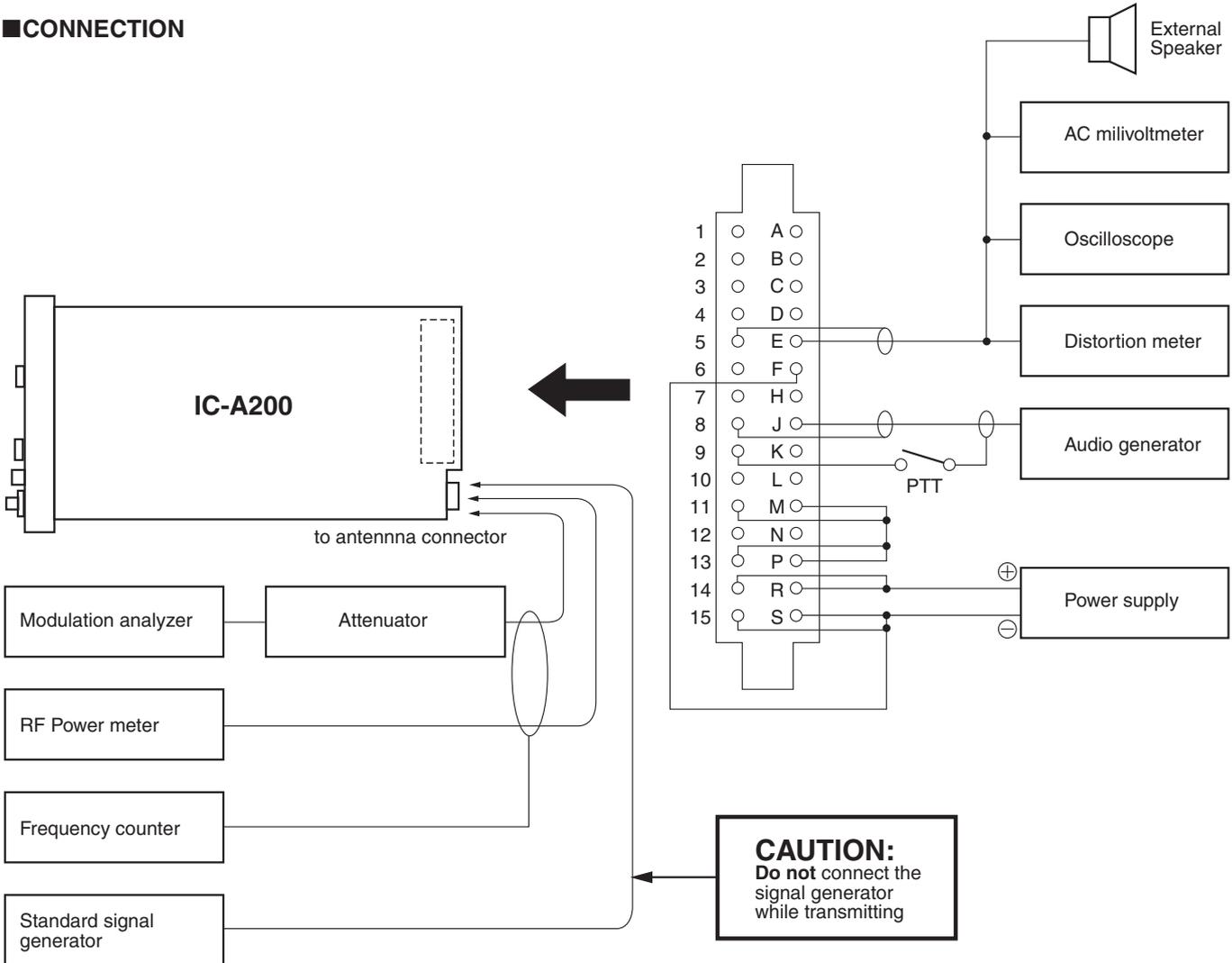
■ REQUIRED TEST EQUIPMENTS

| EQUIPMENT | GRADE AND RANGE |
|---------------------------------|--|
| DC power supply | Output voltage : 13.2 V DC Current capacity : 2 A or more |
| RF power meter | Measuring range : 1–10W Frequency range : 100–180 MHz Impedance : 500 SWR : Less than 1.2:1 |
| Frequency counter | Frequency range : 0.1–180 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better |
| Standard signal generator (SSG) | Frequency range : 0.1–180 MHz Output Level : 0.1 μV–32 mV (–127 to –17 dBm) |
| Distortion meter | Frequency range : 1 kHz ±10 Hz Measuring range : 1–20% |

| EQUIPMENT | GRADE AND RANGE |
|----------------------|--|
| Oscilloscope | Frequency range : DC–20 MHz |
| DC voltmeter | Input impedance : 50 kΩ/DC or better |
| AC millivoltmeter | Measuring range : 10 mV to 10 V |
| External speaker | Impedance : 8 Ω |
| Ammeter | Measuring range : 200 mA |
| Audio generator (AG) | Frequency range : 200–2000 Hz Output level : 1–200 mV |
| Attenuator | Power attenuation : 40 or 50 dB Capacity : 10 W or more |
| Modulation analyzer | Frequency minimum : 180 MHz Measuring range : 0–100% |

CW: clockwise CCW: counterclockwise CP: check point

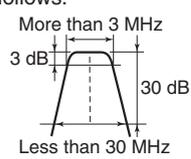
■ CONNECTION



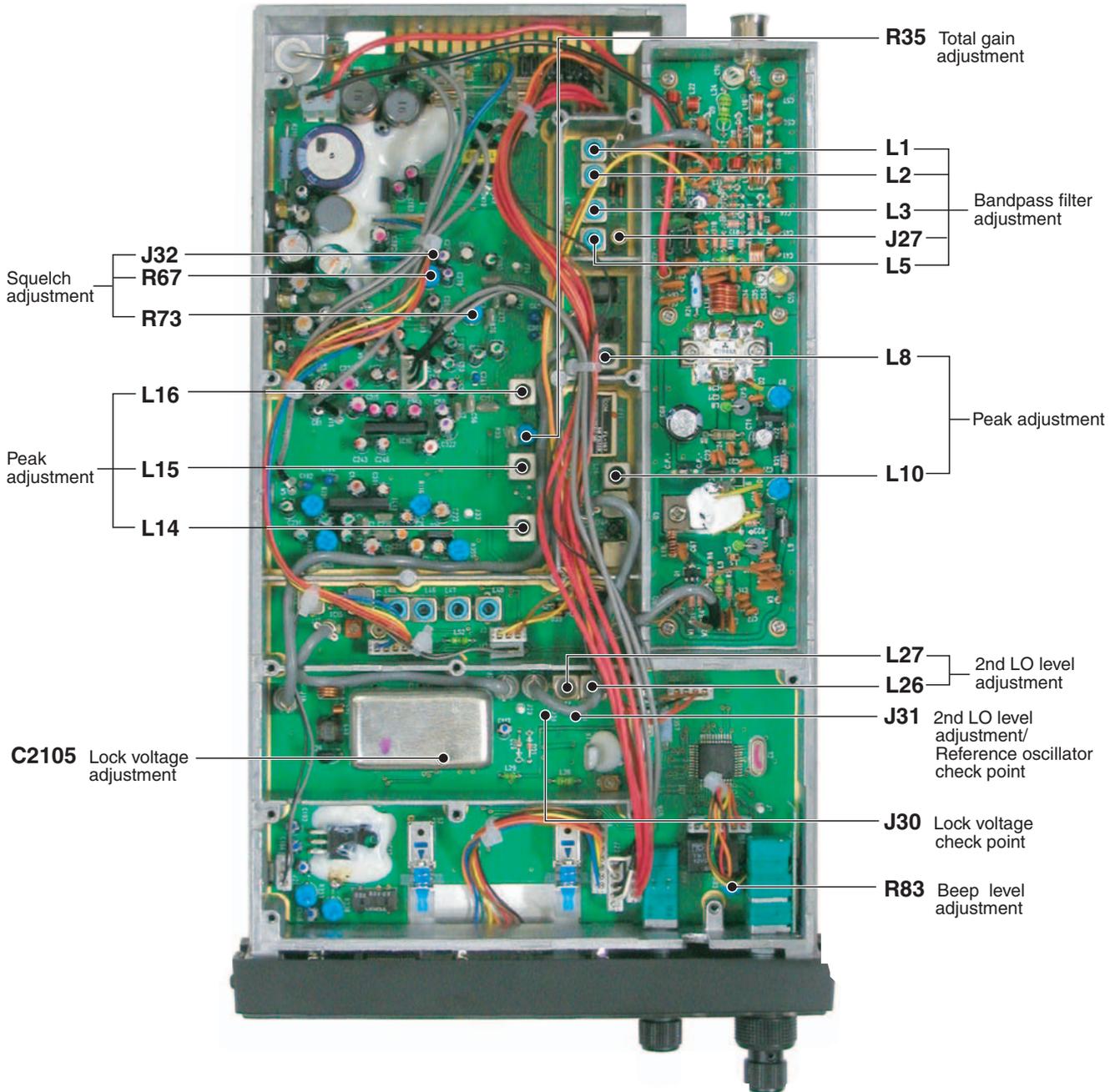
6-2 PLL ADJUSTMENT

| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|----------------------|---|-------------|---------------------------------------|-----------------|------------------|--------|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| REFERENCE OSCILLATOR | 1 • Frequency display: 118.000 MHz • Receiving | MAIN | Connect the frequency counter to J31. | 32.000000 MHz | MAIN | C199 |
| LOCK VOLTAGE | 1 • Frequency display: 118.000 MHz • Receiving | MAIN | Connect the DC voltmeter to J30. | 2 V \pm 0.1 V | VCO | C2015 |
| | 2 • Frequency display: 136.975 MHz | | | More than 5 V | | Verify |

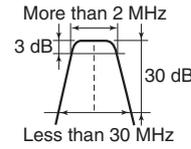
6-3 RECEIVER ADJUSTMENT

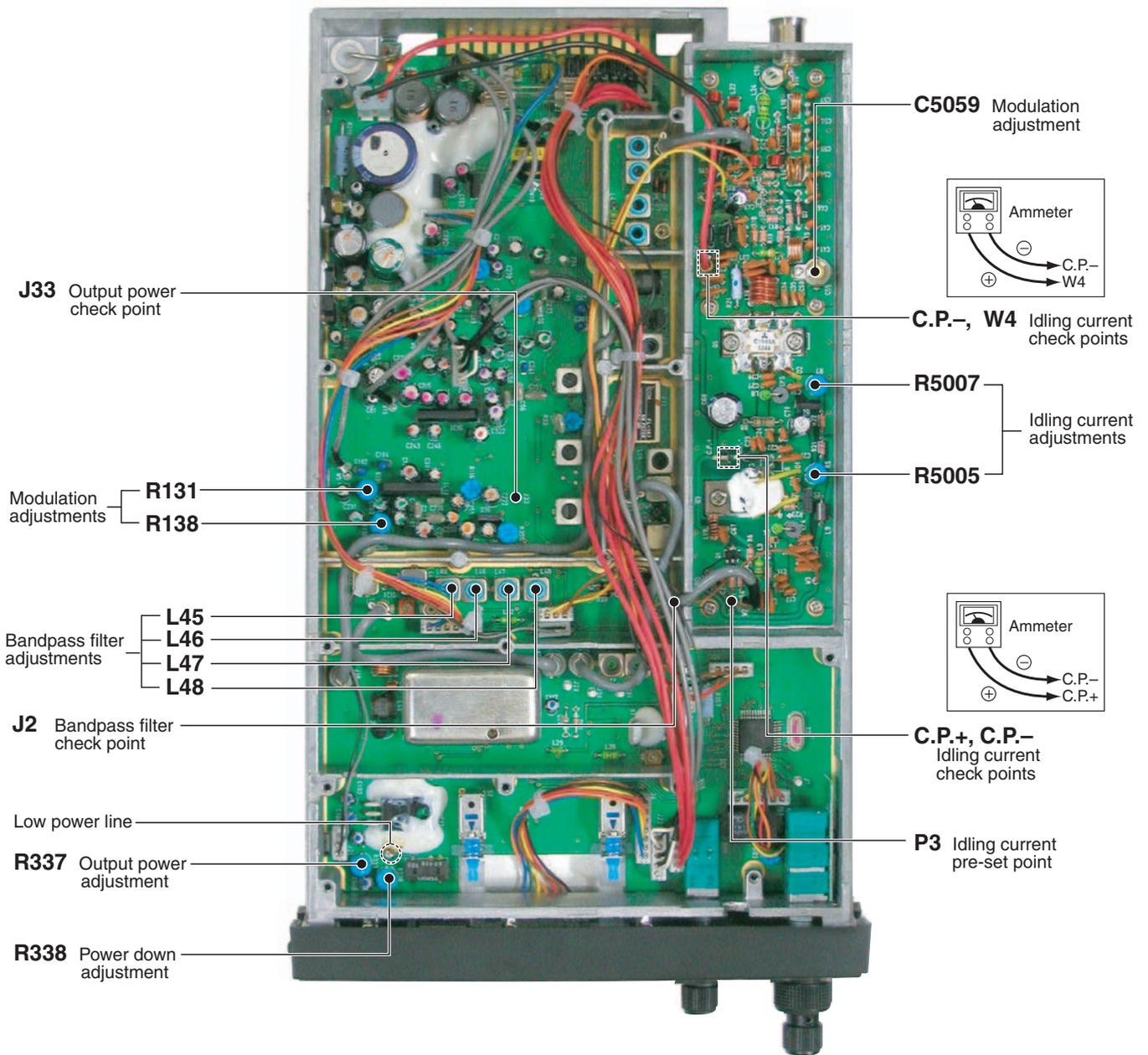
| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|-----------------|---|-------------|---|--|------------------|------------------------|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| 2nd LO LEVEL | 1 • Frequency display: 118.000 MHz • Receiving | MAIN | Connect the RF voltmeter to J31. | Maximum level (more than -3 dBm) | MAIN | L26, L27 |
| BANDPASS FILTER | 1 • Frequency display: 118.000 MHz • J13: disconnected • Connect the RF sweep generator to J1 and set as: Center frequency : 118.025 MHz Sweep band width: \pm 10 MHz • Receiving | MAIN | Connect the spectrum analyzer to J27. | Set the band width as follows.  | MAIN | L1, L2, L3, L5 |
| | NOTE: After adjustment, connect the J13. | | | | | |
| PEAK | 1 • Frequency display: 118.000 MHz • Connect the SSG to the antenna connector and set as: Modulation : 1 kHz 30% Level : 1.0 μ V *(-107 dBm) • R35: Max. Counterclockwise • R73: Max. Clockwise • Squelch: Open (Pull OUT the volume control.) • Receiving | Rear panel | Connect the AC millivoltmeter to the AF output terminal with a 4 Ω load. | Maximum level | MAIN | L16, L15, L14, L10, L8 |
| TOTAL GAIN | 1 • Frequency display: 118.000 MHz • Connect the SSG to the antenna connector and set as: Modulation : 1 kHz 30% Level : 1 mV *(-47 dBm) • Receiving | Rear panel | Connect the AC millivoltmeter to the AF output terminal with a 4 Ω load. | 0 dB on the meter | Front Panel | Volume control |
| | 2 • Apply no signal to the antenna connector. | | | Adjust R35 to a point where the noise level is 8 dB down. | MAIN | R35 |
| SQUELCH | 1 • Frequency display: 118.000 MHz • R67: Max. Counterclockwise • Receiving | MAIN | Connect the DC voltmeter to J32. | 2.5 V \pm 0.1 V | MAIN | R73 |
| | 2 • Connect the SSG to the antenna connector and set as: Modulation : 1 kHz 30% Level : 1.0 μ V *(-107 dBm) • Squelch: Close (Push IN the volume control.) | Rear Panel | Connect a speaker to the AF output terminal. | Squelch just opens. | | R67 |
| BEEP | 1 • Push the frequency exchange switch. | Rear panel | Connect a speaker to the AF output terminal. | Desired level | MAIN | R83 |

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



6-4 TRANSMITTER ADJUSTMENT

| ADJUSTMENT | ADJUSTMENT CONDITIONS | MEASUREMENT | | VALUE | ADJUSTMENT POINT | |
|---|--|-------------|--|---|------------------|--------------------|
| | | UNIT | LOCATION | | UNIT | ADJUST |
| IDLING CURRENT | 1 <ul style="list-style-type: none"> • Disconnect P3 • Unsolder C.P. + and C.P. -. • Frequency display : 127.000 MHz • Transmitting | PA | Connect the DC ammeter (1 A) to point between C.P.+ and C.P.-. | 150 mA | PA | R5005 |
| | NOTE: After adjustment, re-solder between C.P. + and C.P. -. | | | | | |
| | 2 <ul style="list-style-type: none"> • Unsolder C.P. - and W4. | PA | Connect the DC ammeter (1 A) to point between C.P.- and W4. | 200 mA | PA | R5007 |
| NOTE: After adjustment, re-solder between C.P. - and W4 and connect the P3. | | | | | | |
| BANDPASS FILTER | 1 <ul style="list-style-type: none"> • Frequency display : 118.000 MHz • Connect the RF sweep generator to J28 and set as : Center frequency : 118.025 MHz Sweep band width : ±10 MHz • Transmitting | MAIN | Connect the spectrum analyzer to J2. | Set the band width as follows.  | MAIN | L45, L46, L47, L48 |
| OUTPUT POWER | 1 <ul style="list-style-type: none"> • Frequency display: 118.025 MHz • Transmitting | MAIN | Connect the DC voltmeter to J33. | 3.2 V ±0.1 V | MAIN | R355 |
| | 2 <ul style="list-style-type: none"> • Frequency display: 136.975 MHz | Rear panel | Connect the RF power meter to the antenna connector. | 7.5 W | | R337 |
| | NOTE: If the output power is less than 7.5 W in step 2, adjust R337 again so that the output power is 7.5 W on both 118.025 MHz and 136.975 MHz. | | | | | |
| MODULATION | 1 <ul style="list-style-type: none"> • Frequency display: 127.500 MHz • R131, R138: Center • Connect the audio generator to the mic input terminal and set as: Level : 300 mV Frequency : 1 kHz • Transmitting | Rear panel | Connect the modulation analyzer to the antenna connector. | 80% ($\frac{P-P}{2}$) | MAIN | R138 |
| | 2 <ul style="list-style-type: none"> • Set the audio generator as: Level: 30 mV | | | 35% ($\frac{P-P}{2}$) | | R131 |
| | 3 <ul style="list-style-type: none"> • Frequency display : 136.975 MHz • Set the audio generator as: Level: 300 mV | | | Minimum distortion level | PA | C5059 |
| | 4 <ul style="list-style-type: none"> • Frequency display : 118.025 MHz | | | More than 75% ($\frac{P-P}{2}$) on each frequency | MAIN | Verify |
| | 5 <ul style="list-style-type: none"> • Frequency display : 127.500 MHz | | | | | |
| | 6 <ul style="list-style-type: none"> • Frequency display : 136.975 MHz | | | | | |
| POWER DOWN | 1 <ul style="list-style-type: none"> • Frequency display : 136.975 MHz • Unsolder low power line • Apply no signal to the mic input terminal. • Transmitting | Rear panel | Connect the RF power meter to the antenna connector. | 3.5 W | MAIN | R338 |
| | 2 <ul style="list-style-type: none"> • Frequency display : 118.025 MHz | | | More than 3 W | | Verify |
| | 3 <ul style="list-style-type: none"> • Frequency display : 127.500 MHz | | | | | |
| | NOTE: After adjustment, re-solder low power line. | | | | | |

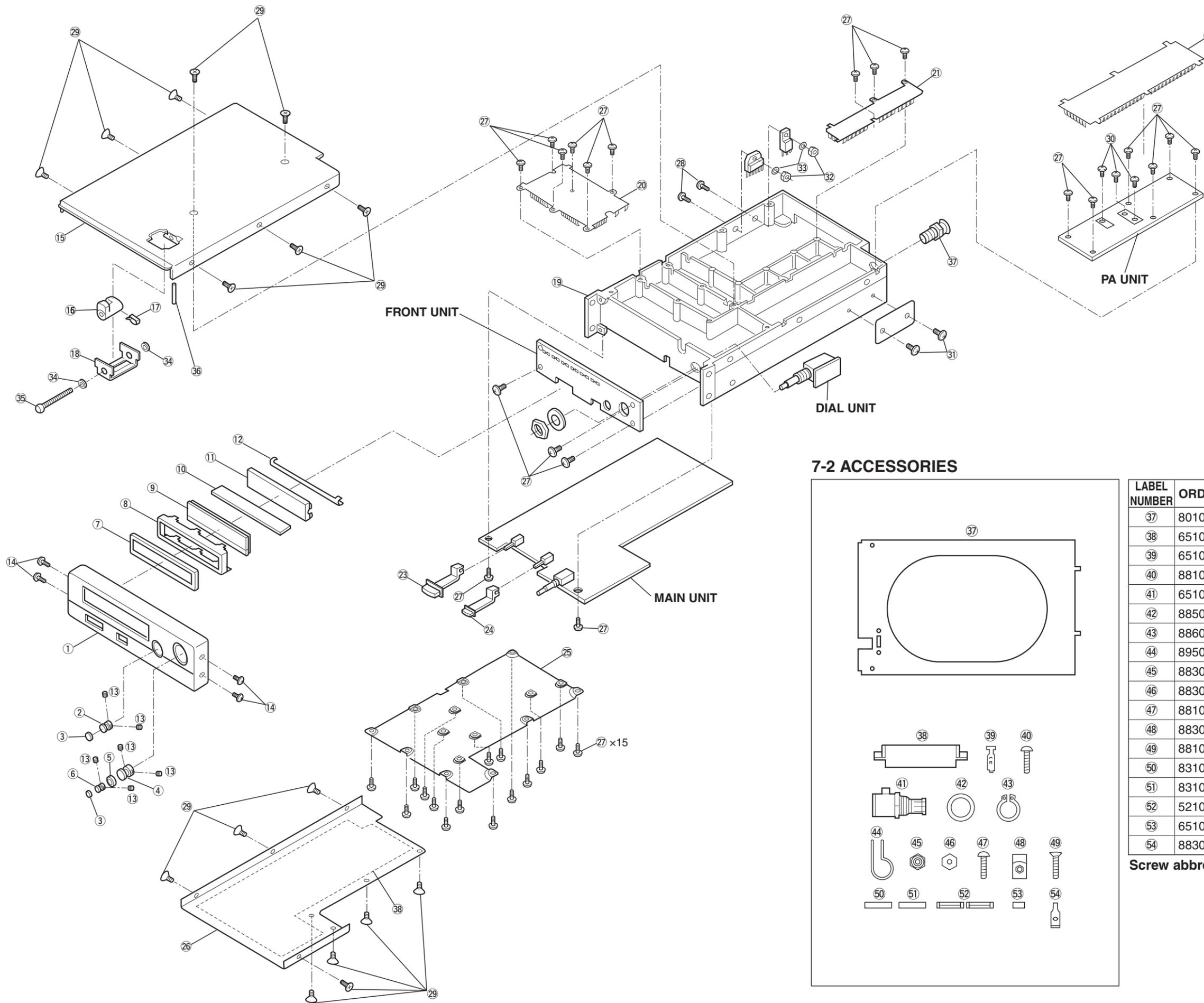


SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

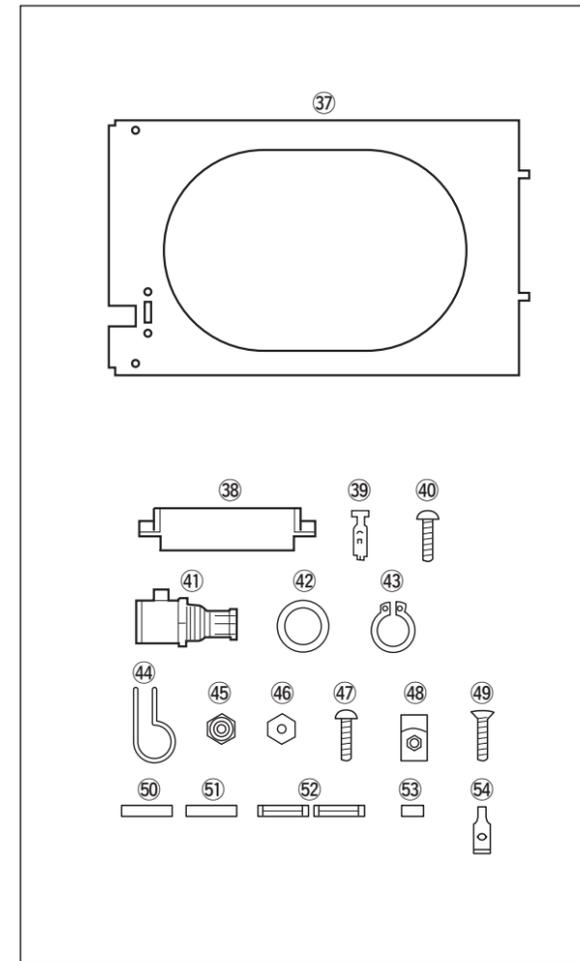
7-1 MECHANICAL PARTS

| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. | LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------|---------------------------------|------|--------------|------------|------------------------------|------|
| ① | 8210006550 | 867 Front panel | 1 | ⑳ | 8930022671 | 867 F shield plate | 1 |
| ② | 8610007601 | Knob N174(A)-1 | 1 | ㉑ | 8930022660 | 867 R shield plate | 1 |
| ③ | 8010001170 | Knob cover for N174/(A) | 2 | ㉒ | 8010011710 | 867 PA cover | 1 |
| ④ | 8610007613 | Knob N175-3 | 1 | ㉓ | 8610007630 | Knob K182 | 1 |
| ⑤ | 8010011600 | Knob cover for N175 | 1 | ㉔ | 8610007620 | Knob K181 | 1 |
| ⑥ | 8610007591 | Knob N174-1 | 1 | ㉕ | 8930022681 | 867 B shield plate | 1 |
| ⑦ | 8930022090 | 867 LCD rubber | 1 | ㉖ | 8110004551 | 867 B cover | 1 |
| ⑧ | 8930022470 | LCD holder | 1 | ㉗ | 8810006810 | Screw PH M2.6 × 6 | 35 |
| ⑨ | 5030000731 | LCD FSD-10394AAH-1 | 1 | ㉘ | 8810000590 | Screw PH M3 × 8 | 2 |
| ⑩ | 8930023170 | LCD contact SRCN-867W | 1 | ㉙ | 8810006840 | Screw FH M2.6 × 4 SUS | 16 |
| ⑪ | 8010011750 | 867 Reflector | 1 | ㉚ | 8810006370 | Set-screw (A) | 3 |
| ⑫ | 8930023260 | 867 Mask plate | 1 | ㉛ | 8810005380 | Screw M2 × 3 Ni | 2 |
| ⑬ | 8810003520 | Hexagon socket set-screw M3 × 3 | 6 | ㉜ | 8830000101 | Nut M3 ZC3 | 2 |
| ⑭ | 8810006831 | Screw PH M2.6 × 4 SUS | 4 | ㉝ | 8850000371 | Spring washer M3 ZC3 | 2 |
| ⑮ | 8110004542 | 867 T cover-2 | 1 | ㉞ | 8850000690 | Flat washer M3 (3 × 7 × 0.5) | 2 |
| ⑯ | 8930022571 | 867 stopper | 1 | ㉟ | 8820000691 | 867 cup screw-1 | 1 |
| ⑰ | 8930024080 | 867 spring | 1 | ㊱ | 8860000740 | Spring pin M 1.2 × 6 SUS | 1 |
| ⑱ | 8930022461 | 867 stopper plate-1 | 1 | ㊲ | 6510014210 | Connector BNC-BJ | 1 |
| ⑲ | 8010011763 | 867 chassis-3 | 1 | ㊳ | 8930023720 | 867 Insulation sheet_ | 1 |

Screw abbreviations PH: Pan head FH: Flat head Ni: Nickel ZK: Black



7-2 ACCESSORIES



| LABEL NUMBER | ORDER NO. | DESCRIPTION | QTY. |
|--------------|------------|-----------------------------|------|
| 37 | 8010011621 | 867 bracket | 1 |
| 38 | 6510013840 | Connector 4338-15 | 1 |
| 39 | 6510013850 | Pin 4366-GL | 30 |
| 40 | 8810007070 | Screw Bind UNC No. 4 x 12.7 | 2 |
| 41 | 6510014200 | Connector BNC-LP | 1 |
| 42 | 8850001210 | ICOM washer (V) | 1 |
| 43 | 8860000720 | C ring-S | 1 |
| 44 | 8950002550 | Nylon clip SL-9N | 1 |
| 45 | 8830000740 | Nut UNC No. 6 | 1 |
| 46 | 8830000750 | Nylon nut UNC No. 6 | 1 |
| 47 | 8810007080 | Screw BiH UNC No. 6 x 12.7 | 1 |
| 48 | 8830000760 | Climp nut UNC No. 6 | 6 |
| 49 | 8810007060 | Screw FH UNC No. 6 x 12.7 | 6 |
| 50 | 8310023870 | 867 O.P label | 1 |
| 51 | 8310023880 | 867 O.P label (A) | 1 |
| 52 | 5210000061 | Fuse FGB 5A | 2 |
| 53 | 6510014430 | DS-6532 | 1 |
| 54 | 8830000770 | Speed nut UNC No.6 | 4 |

Screw abbreviations FH: Flat head BiH: Bind head

SECTION 8 PARTS LIST

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | | |
|---------|------------|-------------|------------------------------|--------------|
| IC5 | 1110002550 | IC | TA7252AP | |
| IC6 | 1120002900 | S.IC | M5223AFP | |
| IC7 | 1140009120 | S.IC | μ PD750004GB-F10-3BS-MTX | |
| IC8 | 1130012670 | S.IC | BR93L46F | |
| IC9 | 1110005711 | S.IC | S-80842CLUA-B63 G | |
| IC10 | 1130011190 | S.IC | BU4011BF | |
| IC11 | 1110002030 | IC | TA7808S | |
| IC12 | 1110002020 | IC | TA7805S | |
| IC13 | 1110002440 | IC | μ PC1313HA | |
| IC14 | 1790000050 | IC | ND487C1-3R | |
| IC15 | 1790000050 | IC | ND487C1-3R | |
| IC16 | 1110002440 | IC | μ PC1313HA | |
| Q4 | 1560000620 | FET | 2SK937 | except [USA] |
| | 1560000630 | FET | 2SK1747 | [USA] |
| Q5 | 1560000620 | FET | 2SK937 | |
| Q6 | 1560000431 | S.FET | 2SK302 GR F | |
| Q7 | 1560000271 | S.FET | 2SK302 Y F | |
| Q8 | 1560000431 | S.FET | 2SK302 GR F | |
| Q9 | 1560000431 | S.FET | 2SK302 GR F | |
| Q10 | 1530002691 | S.TR | 2SC4116 GR F | |
| Q11 | 1530002691 | S.TR | 2SC4116 GR F | |
| Q13 | 1530002691 | S.TR | 2SC4116 GR F | |
| Q14 | 1530002551 | S.TR | 2SC326 B F | |
| Q17 | 1510000501 | S.TR | 2SA1162 GR F | |
| Q20 | 1530002601 | S.TR | 2SC4215 O F | |
| Q24 | 1530002691 | S.TR | 2SC4116 GR F | |
| Q25 | 1510000501 | S.TR | 2SA1162 GR F | |
| Q29 | 1530000811 | TR | 2SC2053-101 | |
| Q33 | 1540000150 | TR | 2SD1225M R | |
| Q35 | 1540000150 | TR | 2SD1225M R | |
| Q36 | 1540000150 | TR | 2SD1225M R | |
| Q44 | 1530000811 | TR | 2SC2053-101 | |
| D6 | 1710001081 | DIO | L308CCB | |
| D7 | 1710001081 | DIO | L308CCB | |
| D8 | 1790000690 | S.DIO | HSM88ASR | |
| D11 | 1160000050 | S.DIO | DAP202U | |
| D19 | 1790001280 | S.DIO | MA111 | |
| D20 | 1790001780 | DIO | MA700 | |
| D21 | 1790001780 | DIO | MA700 | |
| D33 | 1710001081 | DIO | L308CCB | |
| D34 | 1710001081 | DIO | L308CCB | |
| D35 | 1730000521 | ZEN | RD20E-AZ B2 | |
| F11 | 2010001380 | FIL | 32M20B (FL-167) | |
| F12 | 2020000690 | CER | CFW455D | [USA] |
| F13 | 2040000480 | CER | CFWLA455K DFA-B0 | except [USA] |
| F14 | 2040000480 | FIL | TU08M | |
| F15 | 2040000480 | FIL | TU08M | |
| F16 | 2040000480 | FIL | TU08M | |
| F17 | 2040000480 | FIL | TU08M | |
| X1 | 6050007970 | XTL | CR-390 (32.00000 MHz) | [USA] |
| | 6050007971 | XTL | CR-390A (32.0000 MHz) | except [USA] |
| X2 | 6050003110 | XTL | RF-4A3 FAC NKD (4.194304M) | |
| L1 | 6150003820 | COL | LS-440 | |
| L2 | 6150003820 | COL | LS-440 | |
| L3 | 6150003820 | COL | LS-440 | |
| L4 | 6180000900 | COL | LAL 03NA 101K | |
| L5 | 6150003820 | COL | LS-440 | |
| L6 | 6140001200 | COL | LR-145 | |
| L7 | 6180000830 | COL | LAL 03NA 3R3K | |
| L8 | 6150004270 | COL | LS-483A (C-14924) | |
| L9 | 6180001510 | COL | LAL 02NA 101K | |
| L10 | 6150000991 | COL | LS-424 | |
| L11 | 6140002060 | COL | LR-225 (RIB3X6.5X3 3A6) | |
| L12 | 6140002060 | COL | LR-225 (RIB3X6.5X3 3A6) | |
| L13 | 6180001510 | COL | LAL 02NA 101K | |
| L14 | 6150005370 | COL | LS-238A | |
| L15 | 6150005370 | COL | LS-238A | |
| L16 | 6150005370 | COL | LS-238A | |
| L19 | 2040000490 | COL | EXC-ELDR25C | |
| L20 | 6170000140 | COL | LW-15 | |
| L26 | 6150003340 | COL | LS-366 | |
| L27 | 6150003340 | COL | LS-366 | |
| L28 | 6180000900 | COL | LAL 03NA 101K | |
| L29 | 6180001510 | COL | LAL 02NA 101K | |

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|-------------------------|
| L40 | 6140001200 | COL | LR-145 |
| L41 | 6110002000 | COL | LA-226 |
| L42 | 6110001670 | COL | LA-253 |
| L43 | 6140002060 | COL | LR-225 (RIB3X6.5X3 3A6) |
| L44 | 6140002060 | COL | LR-225 (RIB3X6.5X3 3A6) |
| L45 | 6150003820 | COL | LS-440 |
| L46 | 6150003820 | COL | LS-440 |
| L47 | 6150003820 | COL | LS-440 |
| L48 | 6150003820 | COL | LS-440 |
| L52 | 6180000880 | COL | LAL 03NA 100K |
| L53 | 6180000880 | COL | LAL 03NA 100K |
| L57 | 2040000490 | COL | EXC-ELDR25C |
| L58 | 2040000490 | COL | EXC-ELDR25C |
| L59 | 2040000490 | COL | EXC-ELDR25C |
| L60 | 2040000490 | COL | EXC-ELDR25C |
| L61 | 2040000490 | COL | EXC-ELDR25C |
| L62 | 2040000490 | COL | EXC-ELDR25C |
| L63 | 2040000490 | COL | EXC-ELDR25C |
| L65 | 2040000490 | COL | EXC-ELDR25C |
| L66 | 6170000150 | COL | LW-16 |
| L67 | 6170000150 | COL | LW-16 |
| R1 | 7030003680 | S.RES | 100K ERJ3GE |
| R2 | 7030003680 | S.RES | 100K ERJ3GE |
| R3 | 7030003560 | S.RES | 10K ERJ3GE |
| R4 | 7030003320 | S.RES | 100 ERJ3GE |
| R5 | 7030003280 | S.RES | 47 ERJ3GE |
| R6 | 7030003280 | S.RES | 47 ERJ3GE |
| R7 | 7030003320 | S.RES | 100 ERJ3GE |
| R8 | 7030003320 | S.RES | 100 ERJ3GE |
| R9 | 7030003680 | S.RES | 100K ERJ3GE |
| R10 | 7030003680 | S.RES | 100K ERJ3GE |
| R11 | 7030003560 | S.RES | 10K ERJ3GE |
| R12 | 7030003400 | S.RES | 470 ERJ3GE |
| R13 | 7030003400 | S.RES | 470 ERJ3GE |
| R14 | 7030003490 | S.RES | 2.7K ERJ3GE |
| R16 | 7030003560 | S.RES | 10K ERJ3GE |
| R17 | 7030003440 | S.RES | 1K ERJ3GE |
| R18 | 7030003320 | S.RES | 100 ERJ3GE |
| R19 | 7030003520 | S.RES | 4.7K ERJ3GE |
| R20 | 7030003320 | S.RES | 100 ERJ3GE |
| R21 | 7030003270 | S.RES | 39 ERJ3GE |
| R22 | 7030003340 | S.RES | 150 ERJ3GE |
| R23 | 7030003340 | S.RES | 150 ERJ3GE |
| R24 | 7030003560 | S.RES | 10K ERJ3GE |
| R25 | 7030003440 | S.RES | 1K ERJ3GE |
| R27 | 7030003320 | S.RES | 100 ERJ3GE |
| R29 | 7030003460 | S.RES | 1.5K ERJ3GE |
| R30 | 7030003440 | S.RES | 1K ERJ3GE |
| R32 | 7030003320 | S.RES | 100 ERJ3GE |
| R33 | 7510000330 | TMR | ERT-D2ZIL 154S |
| R35 | 7310000750 | TRI | RH0651C14J2WA (103) |
| R37 | 7030003320 | S.RES | 100 ERJ3GE |
| R38 | 7030003680 | S.RES | 100K ERJ3GE |
| R39 | 7030003320 | S.RES | 100 ERJ3GE |
| R40 | 7030003660 | S.RES | 68K ERJ3GE |
| R41 | 7030003680 | S.RES | 100K ERJ3GE |
| R42 | 7030003430 | S.RES | 820 ERJ3GE |
| R43 | 7030003620 | S.RES | 33K ERJ3GE |
| R45 | 7030003440 | S.RES | 1K ERJ3GE |
| R50 | 7030003460 | S.RES | 1.5K ERJ3GE |
| R51 | 7030003500 | S.RES | 3.3K ERJ3GE |
| R52 | 7030003320 | S.RES | 100 ERJ3GE |
| R53 | 7030003320 | S.RES | 100 ERJ3GE |
| R60 | 7030003560 | S.RES | 10K ERJ3GE |
| R61 | 7030003320 | S.RES | 100 ERJ3GE |
| R62 | 7030003440 | S.RES | 1K ERJ3GE |
| R63 | 7030003580 | S.RES | 15K ERJ3GE |
| R64 | 7030003600 | S.RES | 22K ERJ3GE |
| R65 | 7030003600 | S.RES | 22K ERJ3GE |
| R66 | 7030003770 | S.RES | 560K ERJ3GE |
| R67 | 7310001680 | TRI | RH0621CJ5J2FA |
| R73 | 7310001910 | TRI | RH0621CJ4J52A |
| R83 | 7310000750 | TRI | RH0651C14J2WA (103) |
| R89 | 7210002160 | VAR | RV-270 (RK0971116) 10KB |
| R90 | 7030003560 | S.RES | 10K ERJ3GE |
| R91 | 7030003460 | S.RES | 1.5K ERJ3GE |
| R100 | 7030003440 | S.RES | 1K ERJ3GE |
| R101 | 7030003680 | S.RES | 100K ERJ3GE |
| R102 | 7030000370 | S.RES | 820 MCR10 |
| R103 | 7030003640 | S.RES | 47K ERJ3GE |
| R105 | 7030003570 | S.RES | 12K ERJ3GE |
| R106 | 7030003520 | S.RES | 4.7K ERJ3GE |
| R107 | 7030003520 | S.RES | 4.7K ERJ3GE |

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|-------------------------|
| R108 | 7030003540 | S.RES 6.8K ERJ3GE |
| R109 | 7030003540 | S.RES 6.8K ERJ3GE |
| R110 | 7030003440 | S.RES 1K ERJ3GE |
| R111 | 7030003440 | S.RES 1K ERJ3GE |
| R112 | 7030000080 | S.RES 3.3 MCR10 |
| R113 | 7030000020 | S.RES 1 MCR10 |
| R114 | 7030003600 | S.RES 22K ERJ3GE |
| R115 | 7030003560 | S.RES 10K ERJ3GE |
| R116 | 7310000750 | TRI RH0651C14J2WA (103) |
| R117 | 7030003400 | S.RES 470 ERJ3GE |
| R118 | 7030003580 | S.RES 15K ERJ3GE |
| R119 | 7030003400 | S.RES 470 ERJ3GE |
| R120 | 7030003580 | S.RES 15K ERJ3GE |
| R121 | 7030003400 | S.RES 470 ERJ3GE |
| R122 | 7030003580 | S.RES 15K ERJ3GE |
| R123 | 7030003670 | S.RES 82K ERJ3GE |
| R124 | 7030003660 | S.RES 68K ERJ3GE |
| R125 | 7030003480 | S.RES 2.2K ERJ3GE |
| R126 | 7030003580 | S.RES 15K ERJ3GE |
| R127 | 7030003400 | S.RES 470 ERJ3GE |
| R128 | 7030003320 | S.RES 100 ERJ3GE |
| R129 | 7030003400 | S.RES 470 ERJ3GE |
| R130 | 7030003320 | S.RES 100 ERJ3GE |
| R131 | 7310001090 | TRI RH0621C13J1TA |
| R138 | 7310000640 | TRI RH0621CJ3J1GA |
| R139 | 7030003660 | S.RES 68K ERJ3GE |
| R140 | 7030003680 | S.RES 100K ERJ3GE |
| R141 | 7030003600 | S.RES 22K ERJ3GE |
| R142 | 7030003500 | S.RES 3.3K ERJ3GE |
| R143 | 7030003400 | S.RES 470 ERJ3GE |
| R144 | 7030003800 | S.RES 1M ERJ3GE |
| R147 | 7030003530 | S.RES 5.6K ERJ3GE |
| R148 | 7030003440 | S.RES 1K ERJ3GE |
| R149 | 7030003520 | S.RES 4.7K ERJ3GE |
| R150 | 7030003320 | S.RES 100 ERJ3GE |
| R152 | 7030003450 | S.RES 1.2K ERJ3GE |
| R153 | 7030003320 | S.RES 100 ERJ3GE |
| R154 | 7030003400 | S.RES 470 ERJ3GE |
| R155 | 7030003400 | S.RES 470 ERJ3GE |
| R156 | 7030003440 | S.RES 1K ERJ3GE |
| R163 | 7030003560 | S.RES 10K ERJ3GE |
| R164 | 7030003560 | S.RES 10K ERJ3GE |
| R182 | 7030003450 | S.RES 1.2K ERJ3GE |
| R183 | 7030003520 | S.RES 4.7K ERJ3GE |
| R184 | 7030003240 | S.RES 22 ERJ3GE |
| R187 | 7030003320 | S.RES 100 ERJ3GE |
| R188 | 7030003440 | S.RES 1K ERJ3GE |
| R189 | 7030003370 | S.RES 270 ERJ3GE |
| R190 | 7030003230 | S.RES 18 ERJ3GE |
| R191 | 7030003370 | S.RES 270 ERJ3GE |
| R192 | 7030003330 | S.RES 120 ERJ3GE |
| R193 | 7030003290 | S.RES 56 ERJ3GE |
| R194 | 7030003330 | S.RES 120 ERJ3GE |
| R195 | 7030003680 | S.RES 100K ERJ3GE |
| R196 | 7030003680 | S.RES 100K ERJ3GE |
| R198 | 7030003320 | S.RES 100 ERJ3GE |
| R199 | 7030003320 | S.RES 100 ERJ3GE |
| R200 | 7030003240 | S.RES 22 ERJ3GE |
| R201 | 7030003680 | S.RES 100K ERJ3GE |
| R202 | 7030003680 | S.RES 100K ERJ3GE |
| R203 | 7030003680 | S.RES 100K ERJ3GE |
| R204 | 7030003500 | S.RES 3.3K ERJ3GE |
| R205 | 7030003430 | S.RES 820 ERJ3GE |
| R206 | 7030003220 | S.RES 15 ERJ3GE |
| R207 | 7030003240 | S.RES 22 ERJ3GE |
| R208 | 7030003760 | S.RES 470K ERJ3GE |
| R209 | 7030003560 | S.RES 10K ERJ3GE |
| R210 | 7030003400 | S.RES 470 ERJ3GE |
| R211 | 7030003270 | S.RES 39 ERJ3GE |
| R212 | 7030003760 | S.RES 470K ERJ3GE |
| R213 | 7030003560 | S.RES 10K ERJ3GE |
| R214 | 7030003400 | S.RES 470 ERJ3GE |
| R215 | 7030003270 | S.RES 39 ERJ3GE |
| R216 | 7070000251 | RES ERX2SJ 4R7 (4.7) |
| R217 | 7010004660 | RES R50XJ 15 |
| R218 | 7030003440 | S.RES 1K ERJ3GE |
| R219 | 7030003440 | S.RES 1K ERJ3GE |
| R220 | 7030003440 | S.RES 1K ERJ3GE |
| R221 | 7030003440 | S.RES 1K ERJ3GE |
| R222 | 7030003440 | S.RES 1K ERJ3GE |
| R223 | 7030003640 | S.RES 47K ERJ3GE |
| R224 | 7030003640 | S.RES 47K ERJ3GE |
| R225 | 7030003640 | S.RES 47K ERJ3GE |
| R226 | 7030003640 | S.RES 47K ERJ3GE |
| R227 | 7030003640 | S.RES 47K ERJ3GE |
| R228 | 7030003440 | S.RES 1K ERJ3GE |
| R229 | 7030003440 | S.RES 1K ERJ3GE |
| R230 | 7030003440 | S.RES 1K ERJ3GE |
| R231 | 7030003440 | S.RES 1K ERJ3GE |
| R232 | 7030003640 | S.RES 47K ERJ3GE |
| R233 | 7030003640 | S.RES 47K ERJ3GE |

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|-------------------------|
| R234 | 7030003640 | S.RES 47K ERJ3GE |
| R235 | 7030003640 | S.RES 47K ERJ3GE |
| R236 | 7030003640 | S.RES 47K ERJ3GE |
| R237 | 7030003640 | S.RES 47K ERJ3GE |
| R238 | 7030003640 | S.RES 47K ERJ3GE |
| R239 | 7030003640 | S.RES 47K ERJ3GE |
| R240 | 7030003640 | S.RES 47K ERJ3GE |
| R241 | 7030003440 | S.RES 1K ERJ3GE |
| R242 | 7030003440 | S.RES 1K ERJ3GE |
| R243 | 7030003440 | S.RES 1K ERJ3GE |
| R248 | 7030003490 | S.RES 2.7K ERJ3GE |
| R249 | 7030003330 | S.RES 120 ERJ3GE |
| R250 | 7030003490 | S.RES 2.7K ERJ3GE |
| R254 | 7030003320 | S.RES 100 ERJ3GE |
| R256 | 7030003200 | S.RES 10 ERJ3GE |
| R257 | 7030003440 | S.RES 1K ERJ3GE |
| R259 | 7030003560 | S.RES 10K ERJ3GE |
| R260 | 7030003560 | S.RES 10K ERJ3GE |
| R261 | 7030000260 | S.RES 100 MCR10 |
| R265 | 7030003230 | S.RES 18 ERJ3GE |
| R266 | 7030003360 | S.RES 220 ERJ3GE |
| R267 | 7030003370 | S.RES 270 ERJ3GE |
| R270 | 7030003320 | S.RES 100 ERJ3GE |
| R274 | 7030003510 | S.RES 3.9K ERJ3GE |
| R275 | 7030003510 | S.RES 3.9K ERJ3GE |
| R276 | 7030003320 | S.RES 100 ERJ3GE |
| R277 | 7030003560 | S.RES 10K ERJ3GE |
| R278 | 7030003560 | S.RES 10K ERJ3GE |
| R279 | 7030003450 | S.RES 1.2K ERJ3GE |
| R280 | 7030003560 | S.RES 10K ERJ3GE |
| R281 | 7030003560 | S.RES 10K ERJ3GE |
| R282 | 7030003440 | S.RES 1K ERJ3GE |
| R283 | 7030003440 | S.RES 1K ERJ3GE |
| R284 | 7030003640 | S.RES 47K ERJ3GE |
| R285 | 7030003640 | S.RES 47K ERJ3GE |
| R286 | 7030003480 | S.RES 2.2K ERJ3GE |
| R287 | 7030003320 | S.RES 100 ERJ3GE |
| R288 | 7030003440 | S.RES 1K ERJ3GE |
| R290 | 7030003560 | S.RES 10K ERJ3GE |
| R291 | 7030003560 | S.RES 10K ERJ3GE |
| R292 | 7030003560 | S.RES 10K ERJ3GE |
| R293 | 7030003480 | S.RES 2.2K ERJ3GE |
| R296 | 7030003690 | S.RES 120K ERJ3GE |
| R300 | 7030003320 | S.RES 100 ERJ3GE |
| R307 | 7030003440 | S.RES 1K ERJ3GE |
| R310 | 7030003490 | S.RES 2.7K ERJ3GE |
| R311 | 7030003760 | S.RES 470K ERJ3GE |
| R312 | 7030000220 | S.RES 47 MCR10 |
| R315 | 7030003320 | S.RES 100 ERJ3GE |
| R320 | 7030003320 | S.RES 100 ERJ3GE |
| R321 | 7030003270 | S.RES 39 ERJ3GE |
| R322 | 7030003270 | S.RES 39 ERJ3GE |
| R323 | 7030003270 | S.RES 39 ERJ3GE |
| R324 | 7030003510 | S.RES 3.9K ERJ3GE |
| R325 | 7030003510 | S.RES 3.9K ERJ3GE |
| R326 | 7030003510 | S.RES 3.9K ERJ3GE |
| R327 | 7030003270 | S.RES 39 ERJ3GE |
| R328 | 7030003270 | S.RES 39 ERJ3GE |
| R329 | 7030003270 | S.RES 39 ERJ3GE |
| R330 | 7030003510 | S.RES 3.9K ERJ3GE |
| R331 | 7030003510 | S.RES 3.9K ERJ3GE |
| R332 | 7030003510 | S.RES 3.9K ERJ3GE |
| R333 | 7030003520 | S.RES 4.7K ERJ3GE |
| R334 | 7030003580 | S.RES 15K ERJ3GE |
| R335 | 7030003640 | S.RES 47K ERJ3GE |
| R336 | 7030003440 | S.RES 1K ERJ3GE |
| R337 | 7310000750 | TRI RH0651C14J2WA (103) |
| R338 | 7310000750 | TRI RH0651C14J2WA (103) |
| R339 | 7030003560 | S.RES 10K ERJ3GE |
| R340 | 7030003320 | S.RES 100 ERJ3GE |
| R341 | 7030003320 | S.RES 100 ERJ3GE |
| R342 | 7030003440 | S.RES 1K ERJ3GE |
| R343 | 7030003820 | S.RES 1.5M ERJ3GE |
| R344 | 7030003640 | S.RES 47K ERJ3GE |
| R345 | 7030003320 | S.RES 100 ERJ3GE |
| R346 | 7030003320 | S.RES 100 ERJ3GE |
| R347 | 7030003520 | S.RES 4.7K ERJ3GE |
| R348 | 7030003280 | S.RES 47 ERJ3GE |
| R349 | 7030003280 | S.RES 47 ERJ3GE |
| R350 | 7030003400 | S.RES 470 ERJ3GE |
| R351 | 7030003640 | S.RES 47K ERJ3GE |
| R353 | 7030003510 | S.RES 3.9K ERJ3GE |
| R354 | 7030003640 | S.RES 47K ERJ3GE |
| R355 | 7310001250 | TRI RH0621CS3J2NA |
| R357 | 7070000511 | RES ERG1SJ 180 (18) |
| R359 | 7010000900 | RES R25XJ 8.2 |
| R363 | 7510000071 | TMR ERT-D2ZHL 503S |
| R365 | 7510000240 | TMR ERT-D2ZGL 332S |
| R366 | 7030003440 | S.RES 1K ERJ3GE |
| R367 | 7030003520 | S.RES 4.7K ERJ3GE |
| R368 | 7030003350 | S.RES 180 ERJ3GE |

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|-------------------------|
| R369 | 7030003610 | S.RES 27K ERJ3GE |
| R370 | 7030003440 | S.RES 1K ERJ3GE |
| R371 | 7030003480 | S.RES 2.2K ERJ3GE |
| R372 | 7030003580 | S.RES 15K ERJ3GE |
| R373 | 7030003440 | S.RES 1K ERJ3GE |
| R374 | 7030003330 | S.RES 120 ERJ3GE |
| R375 | 7030003420 | S.RES 680 ERJ3GE |
| | | |
| C1 | 4030006860 | S.CER 0.001 C1608 B |
| C2 | 4030006970 | S.CER 6P C1608 CH |
| C3 | 4030008570 | S.CER 0.75P C1608 |
| C4 | 4030006590 | S.CER 8P C1608 |
| C5 | 4030006860 | S.CER 0.001 C1608 B |
| C6 | 4030006860 | S.CER 0.001 C1608 B |
| C7 | 4030006880 | S.CER 0.0047 C1608 B |
| C8 | 4030006860 | S.CER 0.001 C1608 B |
| C9 | 4030006860 | S.CER 0.001 C1608 B |
| C10 | 4030006880 | S.CER 0.0047 C1608 B |
| C11 | 4030006860 | S.CER 0.001 C1608 B |
| C12 | 4030008570 | S.CER 0.75P C1608 |
| C13 | 4030006510 | S.CER 0.5P C1608 |
| C14 | 4030006860 | S.CER 0.001 C1608 B |
| C15 | 4030006860 | S.CER 0.001 C1608 B |
| C16 | 4030006860 | S.CER 0.001 C1608 B |
| C17 | 4030006860 | S.CER 0.001 C1608 B |
| C18 | 4030006860 | S.CER 0.001 C1608 B |
| C19 | 4030006670 | S.CER 27P C1608 |
| C20 | 4030006880 | S.CER 0.0047 C1608 B |
| C21 | 4030006880 | S.CER 0.0047 C1608 B |
| C22 | 4030006550 | S.CER 4P C1608 |
| C23 | 4030006880 | S.CER 0.0047 C1608 B |
| C24 | 4030006880 | S.CER 0.0047 C1608 B |
| C25 | 4030006710 | S.CER 47P C1608 |
| C27 | 4030006850 | S.CER 470P C1608 B |
| C28 | 4030008920 | S.CER 0.047 C1608 16V B |
| C29 | 4030006860 | S.CER 0.001 C1608 B |
| C30 | 4030011600 | S.CER 0.1 C1608 16V B |
| C32 | 4030008920 | S.CER 0.047 C1608 16V B |
| C33 | 4030006860 | S.CER 0.001 C1608 B |
| C34 | 4030011600 | S.CER 0.1 C1608 16V B |
| C36 | 4030008920 | S.CER 0.047 C1608 16V B |
| C37 | 4030006900 | S.CER 0.01 C1608 25V B |
| C38 | 4030008920 | S.CER 0.047 C1608 16V B |
| C39 | 4030011600 | S.CER 0.1 C1608 16V B |
| C41 | 4030006710 | S.CER 47P C1608 |
| C42 | 4030011600 | S.CER 0.1 C1608 16V B |
| C44 | 4030011600 | S.CER 0.1 C1608 16V B |
| C47 | 4030006880 | S.CER 0.0047 C1608 B |
| C49 | 4550002030 | TAN DN 1A 220M |
| C50 | 4510003820 | ELE 50 ME R22 SWB |
| C52 | 4510003790 | ELE 16 ME 10 SWB |
| C53 | 4510003840 | ELE 50 ME 1 SWB |
| C56 | 4310000400 | MLR 50 F2D 223J |
| C57 | 4310000570 | MLR 50 F2D 222J |
| C58 | 4510003790 | ELE 16 ME 10 SWB |
| C59 | 4510003800 | ELE 25 ME 4R7 SWB |
| C60 | 4510003820 | ELE 50 ME R22 SWB |
| C72 | 4510003810 | ELE 50 ME R1 SWB |
| C73 | 4510003840 | ELE 50 ME 1 SWB |
| C77 | 4510005120 | ELE 16 ME 47 HC |
| C81 | 4510003820 | ELE 50 ME R22 SWB |
| C82 | 4310000400 | MLR 50 F2D 223J |
| C83 | 4310000570 | MLR 50 F2D 222J |
| C85 | 4510003840 | ELE 50 ME 1 SWB |
| C86 | 4510005040 | ELE 25 ME 1000 HC |
| C87 | 4510005000 | ELE 16 ME 220 HC |
| C88 | 4510004320 | ELE 25 ME 47 SWB |
| C89 | 4510004320 | ELE 25 ME 47 SWB |
| C90 | 4510008470 | ELE 10 ME 1000 CX |
| C91 | 4310000480 | MLR 50 F2D 104J |
| C95 | 4510003790 | ELE 16 ME 10 SWB |
| C97 | 4510003840 | ELE 50 ME 1 SWB |
| C98 | 4510003790 | ELE 16 ME 10 SWB |
| C99 | 4510003830 | ELE 50 ME R47 SWB |
| C101 | 4510003790 | ELE 16 ME 10 SWB |
| C102 | 4550000010 | TAN DN 1C 4R7M |
| C103 | 4510003840 | ELE 50 ME 1 SWB |
| C104 | 4550000010 | TAN DN 1C 4R7M |
| C106 | 4510003820 | ELE 50 ME R22 SWB |
| C107 | 4510003840 | ELE 50 ME 1 SWB |
| C108 | 4510003800 | ELE 25 ME 4R7 SWB |
| C109 | 4510005110 | ELE 16 ME 33 HC |
| C111 | 4510005120 | ELE 16 ME 47 HC |
| C117 | 4510003800 | ELE 25 ME 4R7 SWB |
| C118 | 4030006850 | S.CER 470P C1608 B |
| C119 | 4030006850 | S.CER 470P C1608 B |
| C120 | 4030006880 | S.CER 0.0047 C1608 B |
| C122 | 4030006580 | S.CER 7P C1608 |
| C123 | 4030006530 | S.CER 2P C1608 |
| C124 | 4030006580 | S.CER 7P C1608 |

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|--------------------------|
| C125 | 4030006880 | S.CER 0.0047 C1608 B |
| C127 | 4030006880 | S.CER 0.0047 C1608 B |
| C129 | 4030006800 | S.CER 220P C1608 |
| C135 | 4030006880 | S.CER 0.0047 C1608 B |
| C153 | 4030006710 | S.CER 47P C1608 |
| C155 | 4030006880 | S.CER 0.0047 C1608 B |
| C156 | 4030006850 | S.CER 470P C1608 B |
| C157 | 4030006660 | S.CER 22P C1608 |
| C158 | 4030006560 | S.CER 5P C1608 |
| C159 | 4030006630 | S.CER 15P C1608 |
| C160 | 4030006880 | S.CER 0.0047 C1608 B |
| C161 | 4030006540 | S.CER 3P C1608 |
| C162 | 4030006860 | S.CER 0.001 C1608 B |
| C163 | 4030006540 | S.CER 3P C1608 |
| C164 | 4030008570 | S.CER 0.75P C1608 |
| C166 | 4030006860 | S.CER 0.001 C1608 B |
| C167 | 4030006860 | S.CER 0.001 C1608 B |
| C168 | 4030006660 | S.CER 22P C1608 |
| C169 | 4030006860 | S.CER 0.001 C1608 B |
| C170 | 4030006860 | S.CER 0.001 C1608 B |
| C171 | 4030006880 | S.CER 0.0047 C1608 B |
| C172 | 4030008570 | S.CER 0.75P C1608 |
| C173 | 4030006540 | S.CER 3P C1608 |
| C174 | 4030006860 | S.CER 0.001 C1608 B |
| C175 | 4030006860 | S.CER 0.001 C1608 B |
| C176 | 4030006610 | S.CER 10P C1608 |
| C179 | 4030006860 | S.CER 0.001 C1608 B |
| C180 | 4030006890 | S.CER 0.01 C1608 F |
| C181 | 4030006860 | S.CER 0.001 C1608 B |
| C182 | 4030008650 | S.CER 0.0033 C1608 B |
| C183 | 4510003790 | ELE 16 ME 10 SWB |
| C185 | 4510003790 | ELE 16 ME 10 SWB |
| C187 | 4510005190 | ELE ECEA1ESS222 |
| C189 | 4510004330 | ELE 35 ME 10 SWB |
| C190 | 4510003790 | ELE 16 ME 10 SWB |
| C193 | 4510003790 | ELE 16 ME 10 SWB |
| C194 | 4510003790 | ELE 16 ME 10 SWB |
| C205 | 4610002020 | TRI ECR-HA020D41 |
| C218 | 4510005140 | ELE 25 ME 100 HC |
| C222 | 4510005120 | ELE 16 ME 47 HC |
| C223 | 4510004320 | ELE 25 ME 47 SWB |
| C224 | 4510003790 | ELE 16 ME 10 SWB |
| C230 | 4510003790 | ELE 16 ME 10 SWB |
| C231 | 4510003820 | ELE 50 ME R22 SWB |
| C234 | 4310000580 | MLR 50 F2D 272J |
| C235 | 4310000400 | MLR 50 F2D 223J |
| C236 | 4310000570 | MLR 50 F2D 222J |
| C237 | 4510004990 | ELE 16 ME 100 HC |
| C238 | 4510003840 | ELE 50 ME 1 SWB |
| C240 | 4510003790 | ELE 16 ME 10 SWB |
| C241 | 4550000390 | TAN DN 1V R22M |
| C243 | 4510003790 | ELE 16 ME 10 SWB |
| C244 | 4510003810 | ELE 50 ME R1 SWB |
| C246 | 4510003800 | ELE 25 ME 4R7 SWB |
| C247 | 4510003800 | ELE 25 ME 4R7 SWB |
| C249 | 4510005120 | ELE 16 ME 47 HC |
| C250 | 4510003800 | ELE 25 ME 4R7 SWB |
| C251 | 4310000440 | MLR 50 F2D 473J |
| C253 | 4020000980 | CYR UP050 B 104K-NA-CZ |
| | 4040000260 | BAR UZE 08X 104M |
| C254 | 4510003830 | ELE 50 ME R47 SWB |
| C255 | 4510003810 | ELE 50 ME R1 SWB |
| C272 | 4510005020 | ELE 50 ME R1 SWN |
| C273 | 4310000400 | MLR 50 F2D 223J |
| C274 | 4510005020 | ELE 50 ME R1 SWN |
| C275 | 4510003800 | ELE 25 ME 4R7 SWB |
| C276 | 4310000570 | MLR 50 F2D 222J |
| C277 | 4310000570 | MLR 50 F2D 222J |
| C278 | 4510003790 | ELE 16 ME 10 SWB |
| C280 | 4510003830 | ELE 50 ME R47 SWB |
| C291 | 4510003790 | ELE 16 ME 10 SWB |
| C292 | 4510003790 | ELE 16 ME 10 SWB |
| C293 | 4510003790 | ELE 16 ME 10 SWB |
| C300 | 4550000360 | TAN DN 1V R47M |
| C301 | 4510003790 | ELE 16 ME 10 SWB |
| C302 | 4510005150 | ELE 50 ME 10 HC |
| C308 | 4510003820 | ELE 50 ME R22 SWB |
| C309 | 4510003830 | ELE 50 ME R47 SWB |
| C313 | 4510003820 | ELE 50 ME R22 SWB |
| C314 | 4510004910 | ELE 16 ME 10 SWN |
| C315 | 4510003790 | ELE 16 ME 10 SWB |
| C317 | 4010000520 | CER DD107-601 B 472K 50V |
| C322 | 4510005120 | ELE 16 ME 47 HC |
| | | |
| RL1 | 6330001510 | RLY TB1-160 |
| | | |
| J1 | 6510007020 | CNR TMP-J01X-V6 |
| J2 | 6510007020 | CNR TMP-J01X-V6 |
| J3 | 6510003390 | CNR B03B-EH-S |

except [USA] only

[Others]
[USA]

[USA] only

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|--|------------|-------------|------------------------|
| J4 | 6510003430 | CNR | B07B-EH-S |
| J5 | 6510003420 | CNR | B06B-EH-S |
| J6 | 6510010020 | CNR | RTB-1.5-2F |
| J7 | 6910001040 | CNR | IPS-1136 |
| J13 | 6510007020 | CNR | TMP-J01X-V6 |
| J14 | 6510007020 | CNR | TMP-J01X-V6 |
| J15 | 6510007020 | CNR | TMP-J01X-V6 |
| J21 | 6510003390 | CNR | B03B-EH-S |
| J22 | 6510003400 | CNR | B04B-EH-S |
| J23 | 6510003410 | CNR | B05B-EH-S |
| J24 | 6510003400 | CNR | B04B-EH-S |
| J26 | 6510003420 | CNR | B06B-EH-S |
| J27 | 6510007020 | CNR | TMP-J01X-V6 |
| J28 | 6510007020 | CNR | TMP-J01X-V6 |
| J29 | 6910001040 | CNR | IPS-1136 |
| J30 | 6910001040 | CNR | IPS-1136 |
| J31 | 6910001040 | CNR | IPS-1136 |
| J32 | 6910001040 | CNR | IPS-1136 |
| J33 | 6910001040 | CNR | IPS-1136 |
| J34 | 6910001040 | CNR | IPS-1136 |
| except [USA] only | | | |
| F1 | 5210000061 | FUS | FGB 5A PBF (FGB0 125V) |
| F2 | 5220000020 | HOL | S-N5051 |
| DS1 | 5080000190 | LMP | HRS-3110A |
| DS2 | 5080000190 | LMP | HRS-3110A |
| S1 | 2230000130 | SW | SPPJ22588A |
| S2 | 2230000130 | SW | SPPJ22588A |
| S3 | 6910006800 | TML | OHD-5D 60B |
| | 6910006840 | SW | TR-60B50 |
| except [USA] [USA] | | | |
| T1 | 5910000740 | TSM | 12T03 |
| W11 | 7120000380 | JMP | JPW 01 R-01 |
| W46 | 7120000490 | JMP | ERD25T0 |
| [USA], [FRG] only except [USA] only | | | |

[PLL UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|--------------------|
| IC1001 | 1130009230 | S.IC | LMX2306TM |
| Q1001 | 1510000620 | S.TR | 2SA1576 S |
| Q1002 | 1560000540 | S.FET | 2SK880 Y |
| Q1003 | 1530002050 | S.TR | 2SC3661 TA |
| Q1004 | 1530002050 | S.TR | 2SC3661 TA |
| D1001 | 1790001280 | S.DIO | MA111 |
| L1001 | 6200000970 | S.COIL | NL322522T 100K 10U |
| R1001 | 7030000380 | S.RES | 1K MCR10 |
| R1002 | 7030000380 | S.RES | 1K MCR10 |
| R1003 | 7030000380 | S.RES | 1K MCR10 |
| R1004 | 7030000220 | S.RES | 47 MCR10 |
| R1005 | 7030000540 | S.RES | 22K MCR10 |
| R1006 | 7030000530 | S.RES | 18K MCR10 |
| R1007 | 7030000260 | S.RES | 100 MCR10 |
| R1008 | 7030000380 | S.RES | 1K MCR10 |
| R1009 | 7030000350 | S.RES | 560 MCR10 |
| R1011 | 7030000500 | S.RES | 10K MCR10 |
| R1012 | 7030000380 | S.RES | 1K MCR10 |
| R1013 | 7030000380 | S.RES | 1K MCR10 |
| R1014 | 7030000380 | S.RES | 1K MCR10 |
| R1015 | 7030000380 | S.RES | 1K MCR10 |
| R1016 | 7030000560 | S.RES | 33K MCR10 |
| R1017 | 7030000140 | S.RES | 10 MCR10 |
| C1001 | 4030004740 | S.CER | 0.0047 C2012 B |
| C1002 | 4030004740 | S.CER | 0.0047 C2012 B |
| C1003 | 4030004740 | S.CER | 0.0047 C2012 B |
| C1004 | 4030004760 | S.CER | 0.1 C2012 25V F |
| C1005 | 4550004010 | S.TAN | 1 10V MSVA2 |
| C1006 | 4550004010 | S.TAN | 1 10V MSVA2 |

[PLL UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|-----------------|
| C1007 | 4030004720 | S.CER | 0.001 C2012 B |
| C1008 | 4510008490 | S.ELE | 10 16V EEE-S A |
| C1009 | 4550000560 | S.TAN | 0.33 35V SVA |
| C1010 | 4030004710 | S.CER | 470P C2012 B |
| C1011 | 4030004760 | S.CER | 0.1 C2012 25V F |
| C1012 | 4030004740 | S.CER | 0.0047 C2012 B |
| C1016 | 4030004710 | S.CER | 470P C2012 B |
| J1001 | 6510000770 | S.TAN | 3022-04A |
| J1002 | 6510004900 | CNTR | 3022-05A |

[VCO UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|------------------------|
| Q2001 | 1530002031 | S.TR | 2SC3772 3 E |
| Q2002 | 1530002022 | S.TR | 2SC3770 3 E |
| Q2003 | 1530002022 | S.TR | 2SC3770 3 E |
| Q2004 | 1560000341 | S.FET | 2SK210 Y F |
| D2001 | 1720000320 | S.VAR | 1T32 |
| D2002 | 1720000320 | S.VAR | 1T32 |
| D2003 | 1720000320 | S.VAR | 1T32 |
| L2001 | 6200001470 | S.COIL | NL322522T R12J-3 0.12U |
| L2002 | 6200001470 | S.COIL | NL322522T R12J-3 0.12U |
| L2003 | 6200000910 | S.COIL | LQN2A 82NM 82N |
| L2004 | 6200000910 | S.COIL | LQN2A 82NM 82N |
| L2005 | 6200003330 | S.COIL | NL322522T 1R0J-3 1U |
| L2006 | 6130002581 | COIL | LB-282-LF |
| L2007 | 6200003320 | S.COIL | NL322522T 3R3J-3 3.3U |
| L2008 | 6200001830 | S.COIL | NL322522T 100J 10U |
| R2001 | 7030000260 | S.RES | 100 MCR10 |
| R2002 | 7030000460 | S.RES | 4.7K MCR10 |
| R2003 | 7030000360 | S.RES | 680 MCR10 |
| R2004 | 7030000260 | S.RES | 100 MCR10 |
| R2005 | 7030000460 | S.RES | 4.7K MCR10 |
| R2006 | 7030000360 | S.RES | 680 MCR10 |
| R2007 | 7030000160 | S.RES | 15 MCR10 |
| R2008 | 7030000160 | S.RES | 15 MCR10 |
| R2009 | 7030000470 | S.RES | 5.6K MCR10 |
| R2010 | 7030000220 | S.RES | 47 MCR10 |
| R2011 | 7030000280 | S.RES | 150 MCR10 |
| R2012 | 7030000390 | S.RES | 1.2K MCR10 |
| R2013 | 7030000260 | S.RES | 100 MCR10 |
| R2014 | 7030000250 | S.RES | 82 MCR10 |
| R2015 | 7030000620 | S.RES | 100K MCR10 |
| R2016 | 7030000620 | S.RES | 100K MCR10 |
| R2017 | 7030000380 | S.RES | 1K MCR10 |
| R2018 | 7030000380 | S.RES | 1K MCR10 |
| C2001 | 4010006210 | CER | 47P 50V HE |
| C2002 | 4030004710 | S.CER | 470P C2012 B |
| C2003 | 4030004520 | S.CER | 22P C2012 |
| C2004 | 4010006210 | CER | 47P 50V HE |
| C2005 | 4030004710 | S.CER | 470P C2012 B |
| C2006 | 4030004520 | S.CER | 22P C2012 |
| C2007 | 4030004500 | S.CER | 18P C2012 |
| C2009 | 4030004740 | S.CER | 0.0047 C2012 B |
| C2010 | 4030004380 | S.CER | 1P C2012 |
| C2011 | 4030004740 | S.CER | 0.0047 C2012 B |
| C2012 | 4030004810 | S.CER | 4P C2012 CH |
| C2013 | 4030004820 | S.CER | 5P C2012 CH |
| C2014 | 4030004900 | S.CER | 18P C2012 CH |
| C2015 | 4610001270 | S.TRI | ECR-JA010A12W 10P |
| C2016 | 4030004740 | S.CER | 0.0047 C2012 B |
| C2017 | 4030004740 | S.CER | 0.0047 C2012 B |
| J2001 | 6510005210 | CNR | 3022-03A |

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[DIAL UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|--------------------|
| S3001 | 2260001620 | SW | SW-133 (RK09720HM) |

[FRONT UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|----------------|
| R4003 | 7310000650 | TRI | RH0621CN3J0SA |
| DS4001 | 5030000731 | LCD | FSD-10394AAH-1 |
| DS4002 | 5080000260 | LMP | HRS-7152A=L21 |
| DS4003 | 5080000260 | LMP | HRS-7152A=L21 |
| DS4004 | 5080000260 | LMP | HRS-7152A=L21 |
| DS4005 | 5080000260 | LMP | HRS-7152A=L21 |
| DS4006 | 5080000260 | LMP | HRS-7152A=L21 |
| DS4007 | 5080000260 | LMP | HRS-7152A=L21 |
| EP4002 | 8930023170 | LCT | SRCN-867W |

[PA UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|-------------|-------------|----------------------------|
| Q5002 | 1540000650 | TR | 2SD1858TV2 R |
| Q5003 | 1530000791 | TR | 2SC1971-01 |
| Q5004 | 1540000650 | TR | 2SD1858TV2 R |
| Q5005 | 15300002950 | TR | 2SC1946A |
| D5001 | 1790000720 | DIO | MA29W-B |
| D5002 | 1790000720 | DIO | MA29W-B |
| D5003 | 1790001780 | DIO | MA700 |
| D5004 | 1790001780 | DIO | MA700 |
| D5005 | 1790001780 | DIO | MA700 |
| D5006 | 1790001780 | DIO | MA700 |
| D5007 | 1710001081 | DIO | L308CCB |
| D5008 | 1710001081 | DIO | L308CCB |
| D5009 | 1710001081 | DIO | L308CCB |
| L5001 | 2040000490 | COL | EXC-ELDR25C |
| L5002 | 2040000490 | COL | EXC-ELDR25C |
| L5003 | 6180000730 | COL | LAL 03NA R47M |
| L5004 | 6180000810 | COL | LAL 03NA 2R2M |
| L5005 | 6110001990 | COL | LA-223 |
| L5006 | 6140002450 | COL | LR-283 |
| L5008 | 6180000810 | COL | LAL 03NA 2R2M |
| L5009 | 6910000670 | COL | BL01RN1A1D2B (BL01RN1-A62) |
| L5010 | 6110002620 | COL | LA-458 |
| L5011 | 6180000840 | COL | LAL 03NA 3R9K |
| L5013 | 6110001680 | COL | LA-254 |
| L5014 | 6110001740 | COL | LA-263 |
| L5015 | 6110001740 | COL | LA-263 |
| L5016 | 6110001670 | COL | LA-253 |
| L5017 | 6110001550 | COL | LA-235 |
| L5018 | 6110001550 | COL | LA-235 |
| L5019 | 6140002220 | COL | LR-270 (TR6X3X2 3A9) |
| L5020 | 2040000490 | COL | EXC-ELDR25C |
| L5021 | 6110001540 | COL | LA-234 |
| L5022 | 6110001550 | COL | LA-235 |
| L5023 | 6110001550 | COL | LA-235 |
| R5001 | 7010004190 | RES | R20J 1 k |
| R5002 | 7010004250 | RES | R20J 3.3 k |
| R5003 | 7010004110 | RES | R20J 220 |
| R5004 | 7010003990 | RES | R20J 22 |
| R5005 | 7310000640 | TRI | RH0621CJ3J1GA |
| R5006 | 7010004030 | RES | R20J 47 |
| R5007 | 7310000640 | TRI | RH0621CJ3J1GA |
| R5008 | 7010001030 | RES | R25XJ 100 |
| R5010 | 7010004270 | RES | R20J 4.7 k |
| R5011 | 7010004270 | RES | R20J 4.7 k |
| R5012 | 7010004270 | RES | R20J 4.7 k |
| R5013 | 7010004270 | RES | R20J 4.7 k |
| R5014 | 7010004270 | RES | R20J 4.7 k |
| R5015 | 7010004270 | RES | R20J 4.7 k |
| R5018 | 7010004130 | RES | R20J 330 |
| R5019 | 7010004130 | RES | R20J 330 |

[PA UNIT]

| REF NO. | ORDER NO. | DESCRIPTION | |
|---------|------------|-------------|------------------------------|
| R5021 | 7010004070 | RES | R20J 100 |
| R5022 | 7010004110 | RES | R20J 220 |
| R5023 | 7010004070 | RES | R20J 100 |
| R5024 | 7070000210 | RES | CRH100X R-02J 47 |
| C5001 | 4010006280 | CER | HE50SJ SL 101J 50V |
| C5002 | 4010006060 | CER | HE40SJ SL 100D 50V |
| C5004 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5008 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5009 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5010 | 4010006210 | CER | HE40SJ SL 470J 50V |
| C5011 | 4010006230 | CER | HE40SJ SL 560J 50V |
| C5012 | 4010006170 | CER | HE40SJ SL 330J 50V |
| C5015 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5016 | 4010000410 | CER | DD107 SL 331J 50V |
| C5018 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5021 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5022 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5023 | 4010006230 | CER | HE40SJ SL 560J 50V |
| C5024 | 4010006280 | CER | HE50SJ SL 101J 50V |
| C5025 | 4010006250 | CER | HE40SJ SL 680J 50V |
| C5026 | 4010006130 | CER | HE40SJ SL 220J 50V |
| C5027 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5028 | 4010006230 | CER | HE40SJ SL 560J 50V |
| C5030 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5032 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5033 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5034 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5035 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5036 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5037 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5038 | 4510005500 | ELE | 16 ME 10 HC |
| C5039 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5040 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5041 | 4010006110 | CER | HE40SJ SL 180J 50V |
| C5042 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5043 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5044 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5045 | 4010006180 | CER | HE40SJ SL 360J 50V |
| C5046 | 4010006080 | CER | HE40SJ SL 120J 50V |
| C5047 | 4010006070 | CER | HE40SJ SL 110J 50V |
| C5048 | 4010006130 | CER | HE40SJ SL 220J 50V |
| C5049 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5053 | 4010006880 | CER | HE50SJ YB 102K 50V |
| C5054 | 4010006100 | CER | HE40SJ SL 150J 50V |
| C5055 | 4010006190 | CER | HE40SJ SL 390J 50V |
| C5056 | 4010006170 | CER | HE40SJ SL 330J 50V |
| C5057 | 4010006100 | CER | HE40SJ SL 150J 50V |
| C5058 | 4010006100 | CER | HE40SJ SL 150J 50V |
| C5059 | 4610001580 | TRI | CVD30-41 30P |
| C5060 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5061 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5062 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5063 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5064 | 4010006900 | CER | HE80SJ YB 472K 50V |
| C5065 | 4010006330 | CER | HE70SJ SL 221J 50V |
| C5066 | 4010006060 | CER | HE40SJ SL 100D 50V |
| C5067 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5068 | 4510004600 | ELE | 16 MV 1000 HC |
| C5070 | 4510005090 | ELE | 6.3 ME 470 HC |
| C5071 | 4010006130 | CER | HE40SJ SL 220J 50V |
| C5072 | 4010006240 | CER | HE40SJ SL 620J 50V |
| C5073 | 4010006130 | CER | HE40SJ SL 220J 50V |
| C5074 | 4010006290 | CER | HE50SJ SL 121J 50V |
| C5075 | 4010006210 | CER | HE40SJ SL 470J 50V |
| C5076 | 4010006880 | CER | HE50SJ YB 102K 50V |
| W5010 | 7120000490 | JMP | ERD25T0 |
| EP5002 | 9036505001 | TUB | IRRAX 0.7 (d) L=15 mm |
| EP5003 | 9036505001 | TUB | IRRAX 0.7 (d) L=15 mm |
| EP5004 | 6910000600 | BEA | FSRH050050RN000B (FSOH050RN) |
| EP5005 | 6910000600 | BEA | FSRH050050RN000B (FSOH050RN) |

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[CHASSIS PARTS]

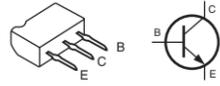
| REF NO. | ORDER NO. | DESCRIPTION |
|---------|------------|-------------|
| D6001 | 1710000010 | DIO 15CD11 |
| J6001 | 6510014210 | CNR BNC-BJ |

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

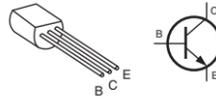
SECTION 9 BOARD LAYOUTS

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

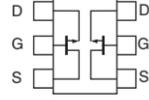
2SD1858R
Q33, Q35, Q36



2SC2053
Q29, Q44

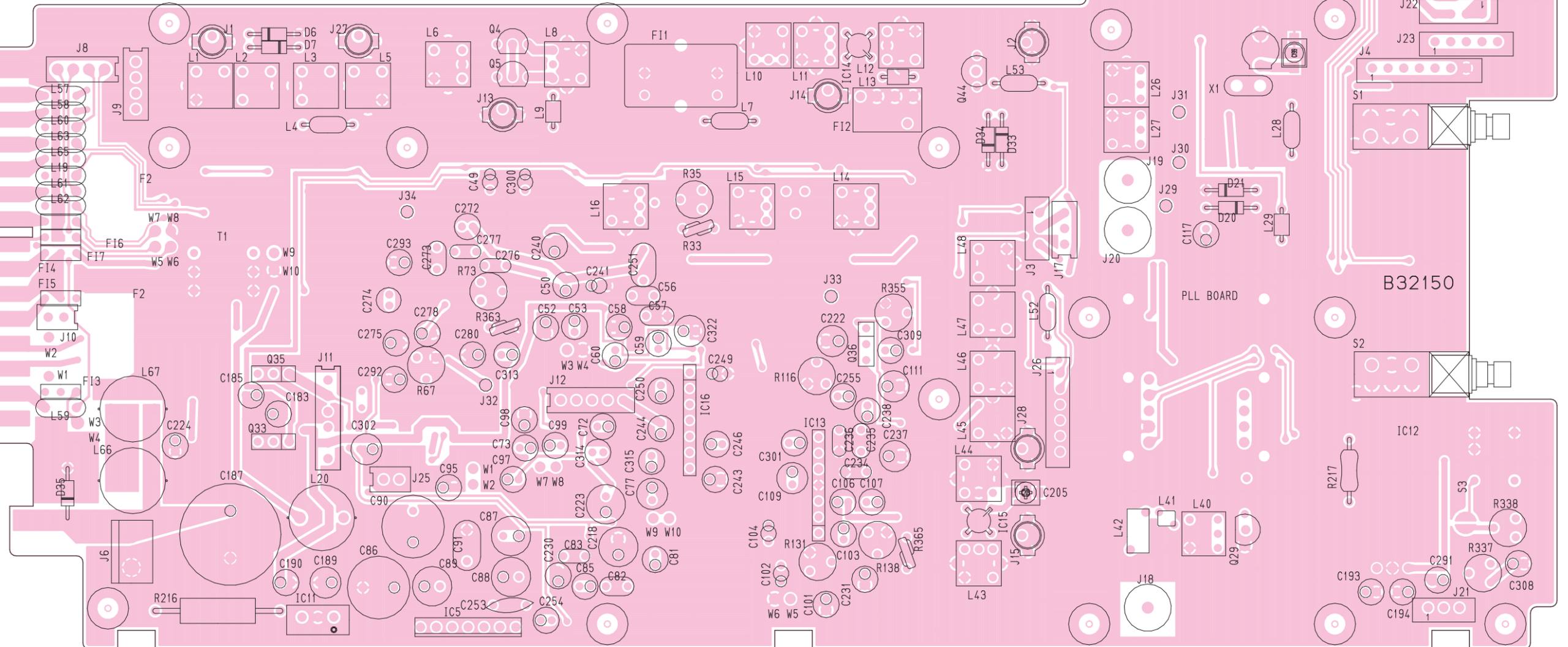


2SK1747
Q4



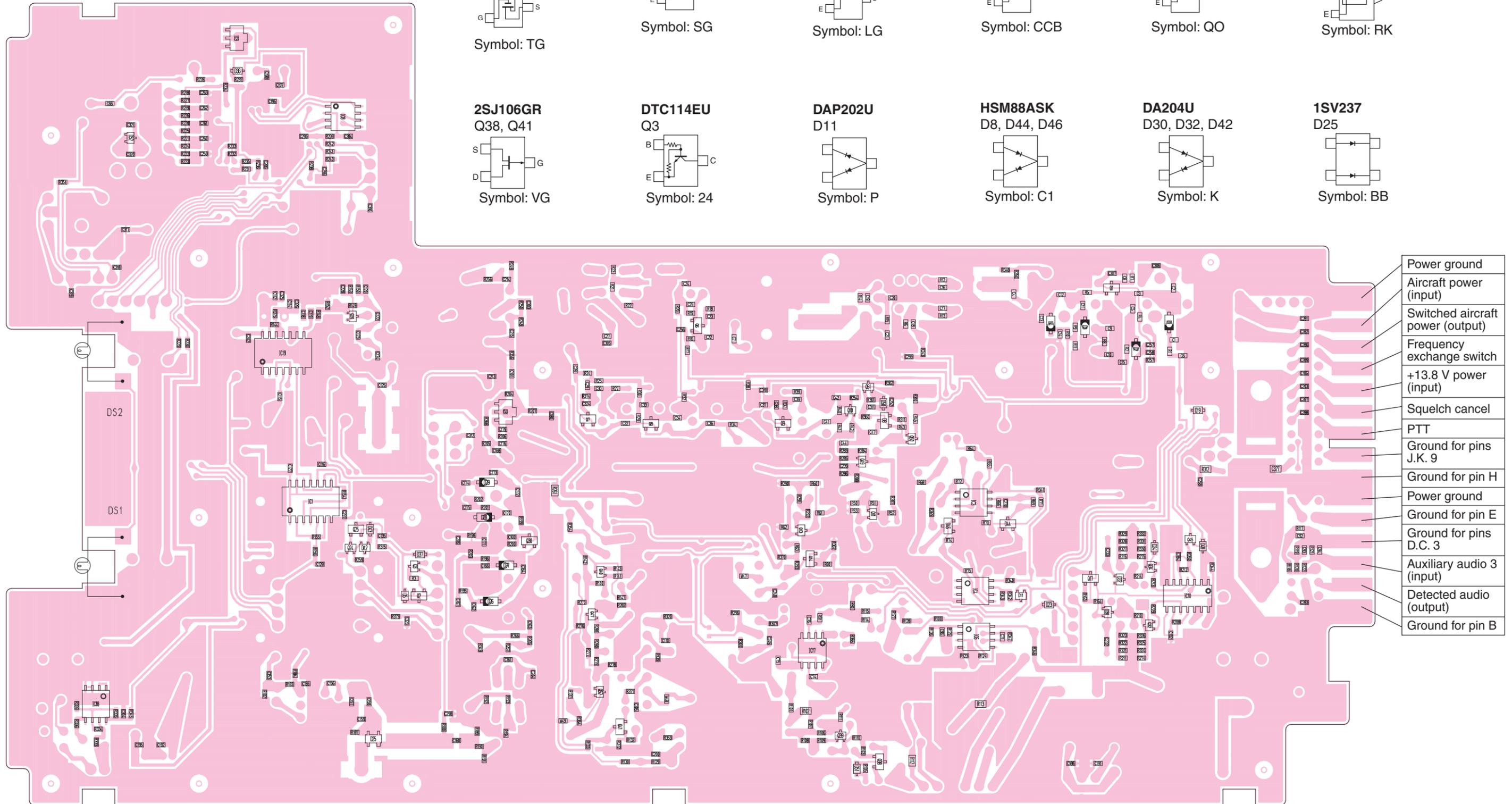
9-1 MAIN UNIT (TOP VIEW)

| |
|----------------------------------|
| Power ground |
| Aircraft power (input) |
| Switched aircraft power (output) |
| Transmit/receive interlock |
| +13.8 V power (input) |
| Memory channel switch |
| Intercom microphone (input) |
| Comm microphone (input) |
| 500Ω audio (output) |
| Power ground |
| 4Ω audio (output) |
| Auxiliary audio 1 (input) |
| Auxiliary audio 2 (input) |
| +14 V lighting (input) |
| No connection |



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

MAIN UNIT (BOTTOM VIEW)



2SK302GR
Q1, Q7, Q8
Q9, Q30
Symbol: TG

2SA1162GR
Q2, Q17, Q25
Symbol: SG

2SC4116GR
Q10, Q11, Q13, Q24,
Q32, Q34, Q39, Q40,
Q45, Q47, Q49, Q50, Q51
Symbol: LG

2SC3326B
Q14
Symbol: CCB

2SC4215 O
Q20
Symbol: QO

2SC3357
Q31
Symbol: RK

2SJ106GR
Q38, Q41
Symbol: VG

DTC114EU
Q3
Symbol: 24

DAP202U
D11
Symbol: P

HSM88ASK
D8, D44, D46
Symbol: C1

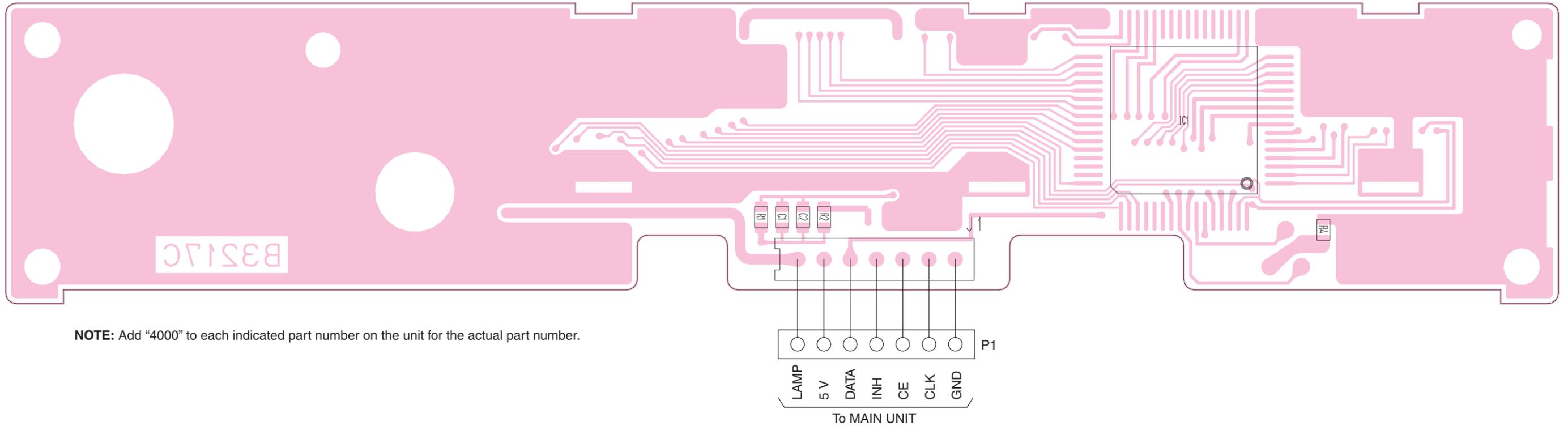
DA204U
D30, D32, D42
Symbol: K

1SV237
D25
Symbol: BB

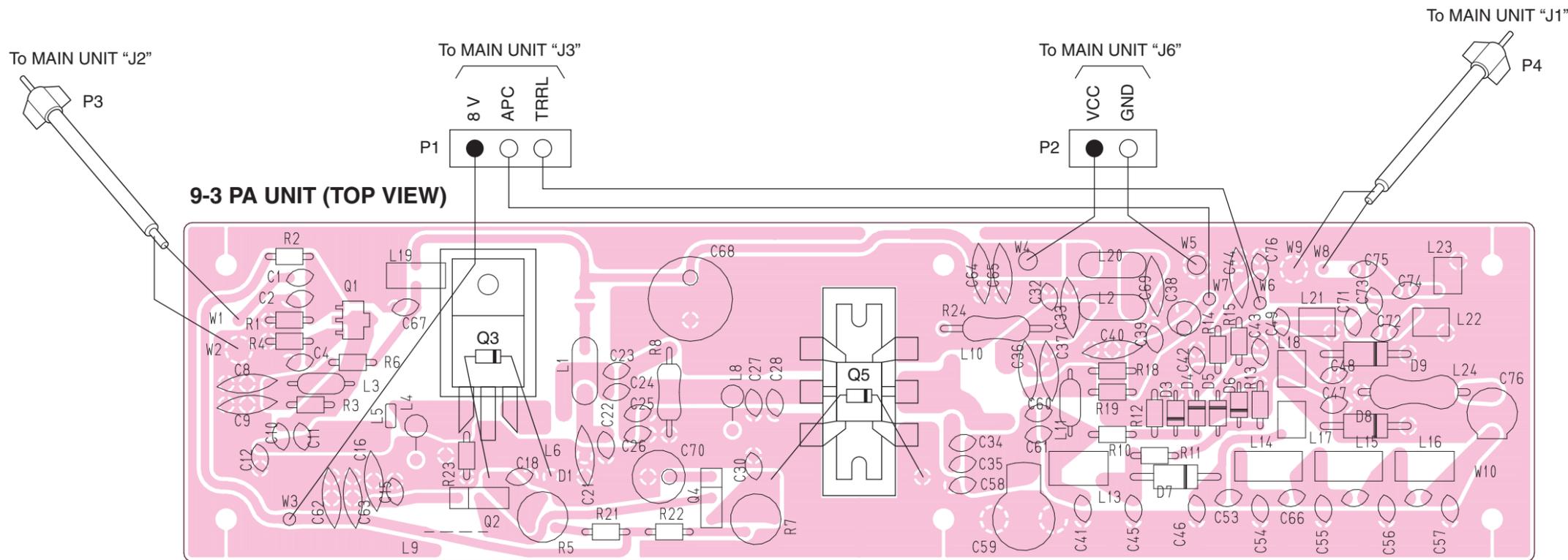
- Power ground
- Aircraft power (input)
- Switched aircraft power (output)
- Frequency exchange switch
- +13.8 V power (input)
- Squelch cancel
- PTT
- Ground for pins J.K. 9
- Ground for pin H
- Power ground
- Ground for pin E
- Ground for pins D.C. 3
- Auxiliary audio 3 (input)
- Detected audio (output)
- Ground for pin B

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

9-2 FRONT UNIT (TOP VIEW)



NOTE: Add "4000" to each indicated part number on the unit for the actual part number.

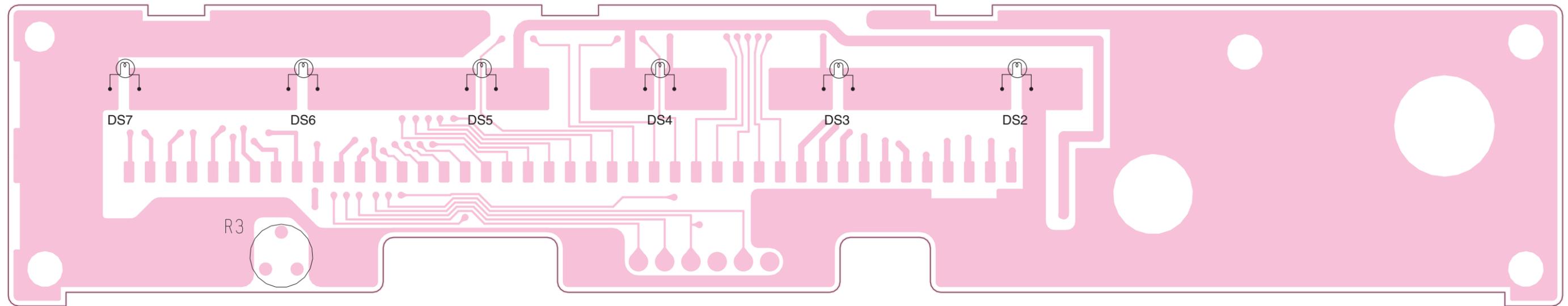


9-3 PA UNIT (TOP VIEW)

NOTE: Add "5000" to each indicated part number on the unit for the actual part number.

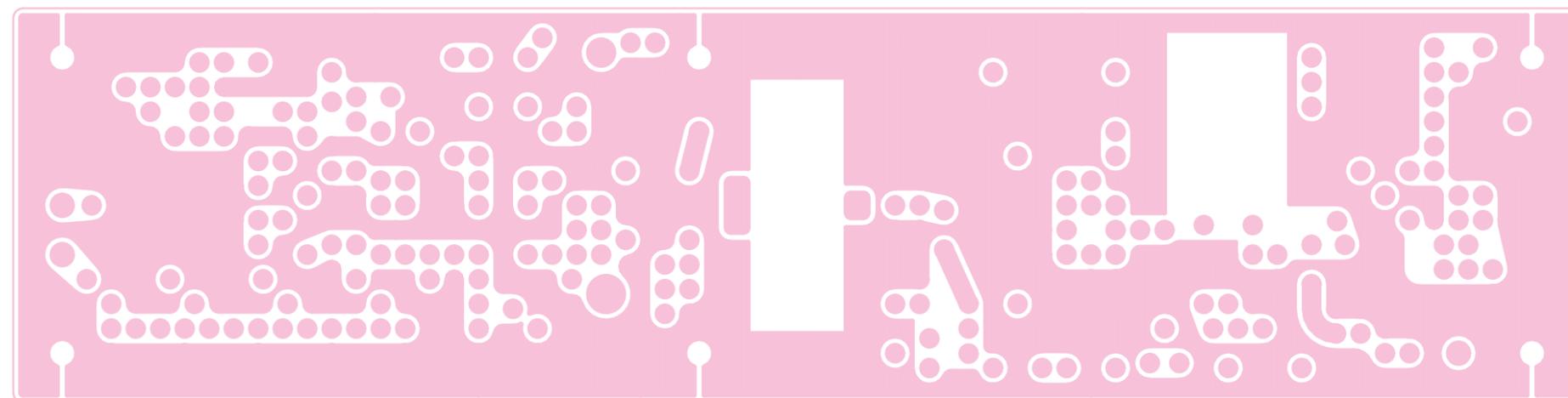
The combination of this page and the previous page shows the unit layout in the same configuration as the actual P.C. Board.

FRONT UNIT (BOTTOM VIEW)



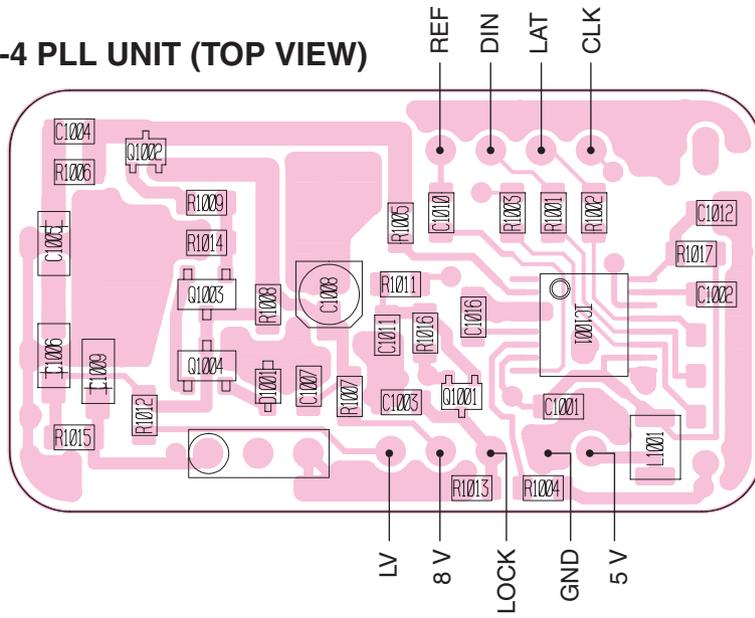
NOTE: Add "4000" to each indicated part number on the unit for the actual part number.

PA UNIT (BOTTOM VIEW)

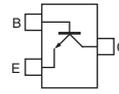


The combination of this page and the next page shows the unit layout in the same configuration as the actual P.C. Board.

9-4 PLL UNIT (TOP VIEW)

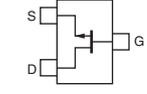


2SC4116GR
Q1001



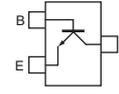
Symbol: LG

2SK880Y
Q1002



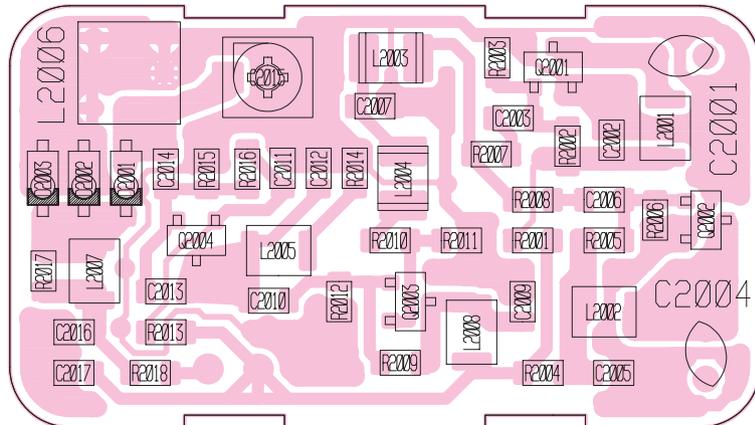
Symbol: XY

2SC3661TA
Q1003, Q1004

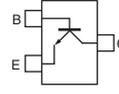


Symbol: SG

9-5 VCO UNIT (TOP VIEW)

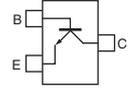


2SC3772 TA
Q2001



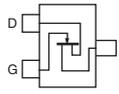
Symbol: LY3

2SC3770 3TA
Q2002, Q2003



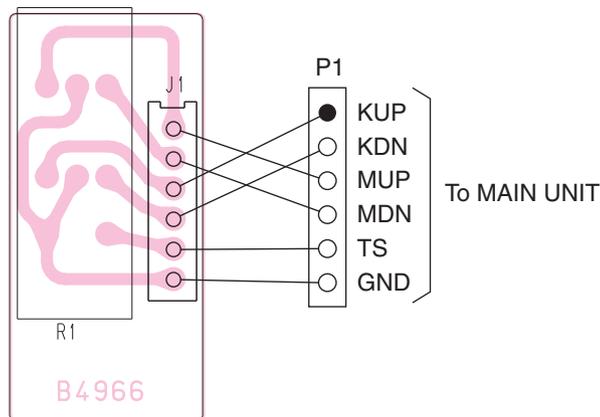
Symbol: JY3

2SK210Y
Q2004



Symbol: YY

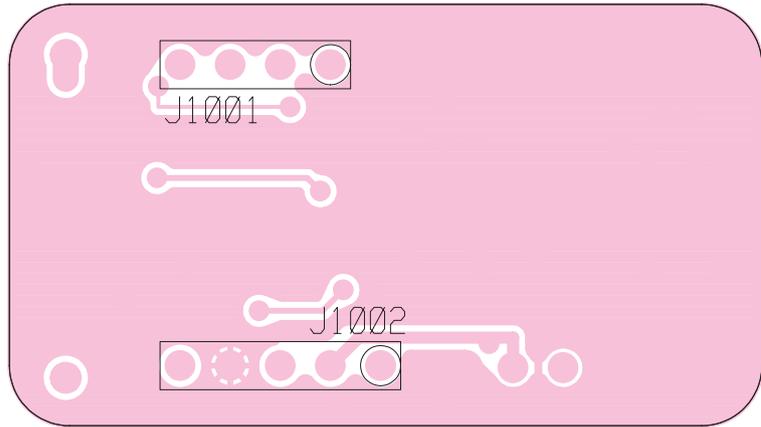
9-6 DIAL UNIT (TOP VIEW)



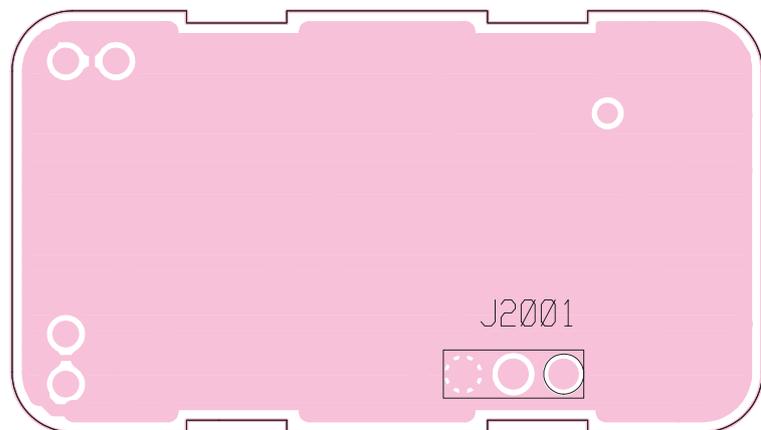
NOTE: Add "3000" to each indicated part number on the unit for the actual part number.

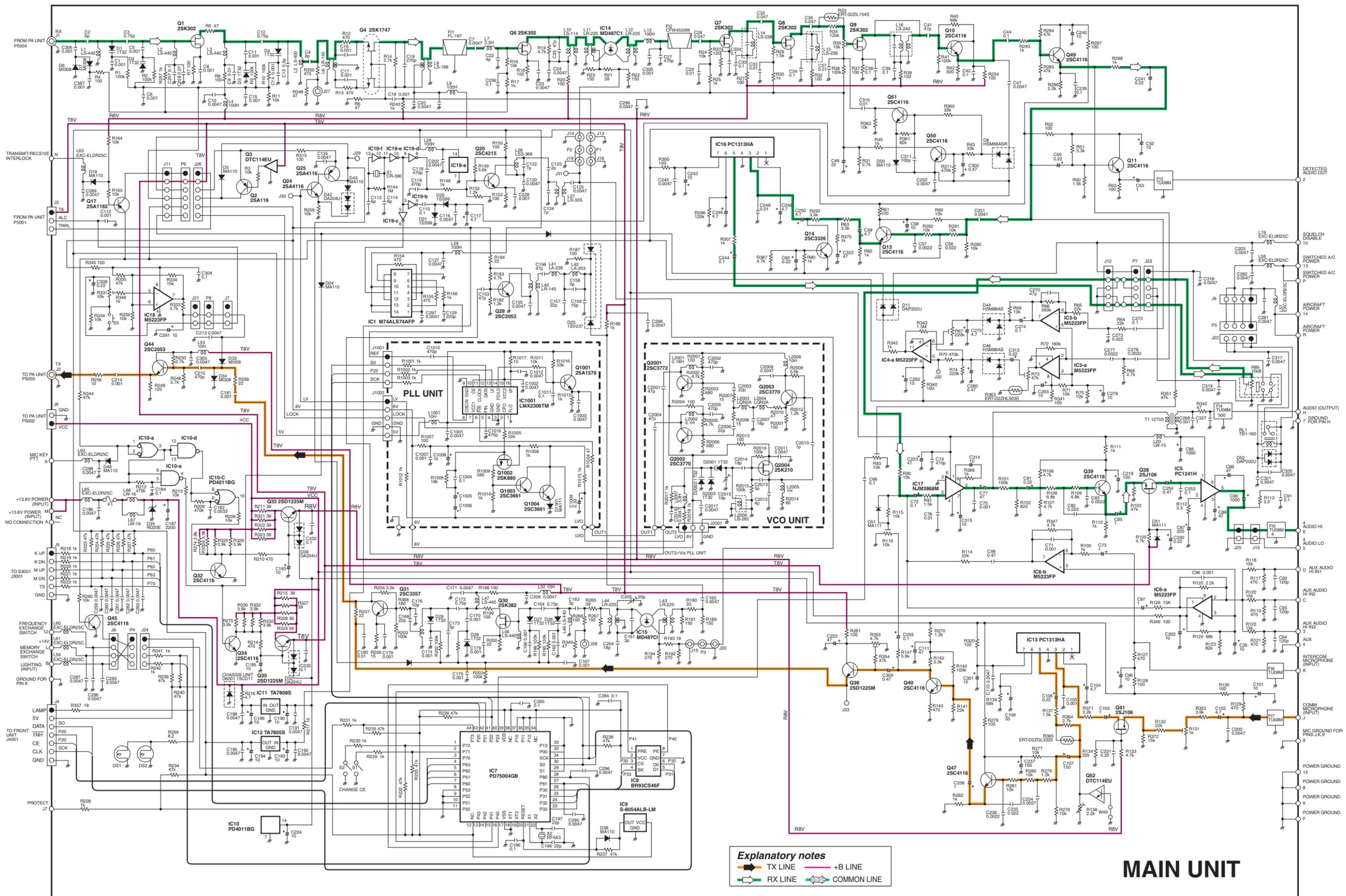
The combination of this page and the previous page shows the unit layout in the same configuration as the actual P.C. Board.

PLL UNIT (BOTTOM VIEW)



VCO UNIT (BOTTOM VIEW)





Explanatory notes
 TX LINE
 RX LINE
 +B LINE
 COMMON LINE

MAIN UNIT

Icom Inc.

1-1-32, Kamiminami, Hirano-ku, Osaka 547-0003, Japan
Phone : +81 (06) 6793 5302
Fax : +81 (06) 6793 0013
URL : <http://www.icom.co.jp/world/index.html>

Icom America Inc.

<Corporate Headquarters>
2380 116th Avenue N.E., Bellevue, WA 98004, U.S.A.
Phone : +1 (425) 454-8155 Fax : +1 (425) 454-1509
URL : <http://www.icomamerica.com>
E-mail : sales@icomamerica.com
<Customer Service>
Phone : +1 (425) 454-7619

Icom Canada

Glenwood Centre #150-6165
Highway 17 Delta, B.C., V4K 5B8, Canada
Phone : +1 (604) 952-4266 Fax : +1 (604) 952-0090
URL : <http://www.icomcanada.com>
E-mail : info@icomcanada.com

Icom (Australia) Pty. Ltd.

A.B.N. 88 006 092 575
Unit 1 / 103 Garden Road, Clayton VIC 3168 Australia
Phone : +61 (03) 9549-7500 Fax : +61 (03) 9549-7505
URL : <http://www.icom.net.au>
E-mail : sales@icom.net.au

Icom New Zealand

146A Harris Road, East Tamaki,
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