STANDARD

144 MHz FM Transceiver

C1208

C1208D/C1208DS/C1208DA/C1208DM

SERVICE MANUAL

CONTENTS

1. INTRODUCTION

This service manual is for use with the C1208D, C1208DS, and C1208DA transceivers.

- The C1208D/C1208DS/C1208DA is a mobile transceiver capable of transmitting and receiving in the 144 MHz band and receiving in the 430 MHz band.
- The usable frequency range of the C1208D is 144.000 MHz — 147.995 MHz (430.000 MHz — 439.995 MHz receiving only).
- The usable frequency range of the C1208DS is 144.000 MHz — 145.995 MHz (430.000 MHz — 439.995 MHz receiving only).
- The usable frequency range of the C1208DA is 144.000 MHz — 147.995 MHz (420.000 MHz — 449.995 MHz receiving only).
- All of the transceiver's operations are performed using the full remote control microphone (CMP844/CMP844A).
  The CMP844 is compatible with the C1208D and C1208DS.
  The CMP844A is compatible with the C1208DA.
  The full remote control microphone (CMP844/CMP844A) is equipped with a built-in speaker.
- Key operations using the full remote control microphone (CMP844/CMP844A) are performed either by pressing keys directly, or by pressing keys when in the function or direct modes.
- The accessories and options listed below are available for the C1208D/C1208DS/C1208DA.
  The C1208DA comes with the DTMF unit (CTD1200) and tone squelch unit (CTN1200) already installed.

Accessories

- Owner's manual
- Warranty card
- List of Standard locations
- Block diagram
- User's card
- Power supply cable (3 m)
- Transceiver mounting bracket
- Microphone hanger
- Extra fuses (12 A)
- Mobile bracket mounting screws
  - Bolts (M4 x 8 mm) x 4
  - Bolts (M5 x 20 mm) x 4
  - Nuts (M5) x 4
  - Washers (M5) x 8
  - Spring washers (M5) x 4
  - Tapping screws (M5 x 15 mm) x 4
  - Hexagonal wrench

Options

CTD1200 : DTMF unit
CTN1200 : Tone squelch unit
CSK12 : External speaker
CAW560 : Dual microphone cable
CAW561 : Microphone extension cable (2 m)
CAW562 : Microphone extension cable (4 m)
CAW575 : Extension power supply cable (5 m)
CAW576 : Relay power supply cable (3 m)

NOTE: Information on the C1208DM is contained on the pages listed below.

2. CONTROLS AND CONNECTIONS

2.1 Transceiver

Figure 2-1 Front

① External speaker socket
② Packet data output socket (9600 bps)
③ Packet data input socket (9600 bps)
④ Microphone plug

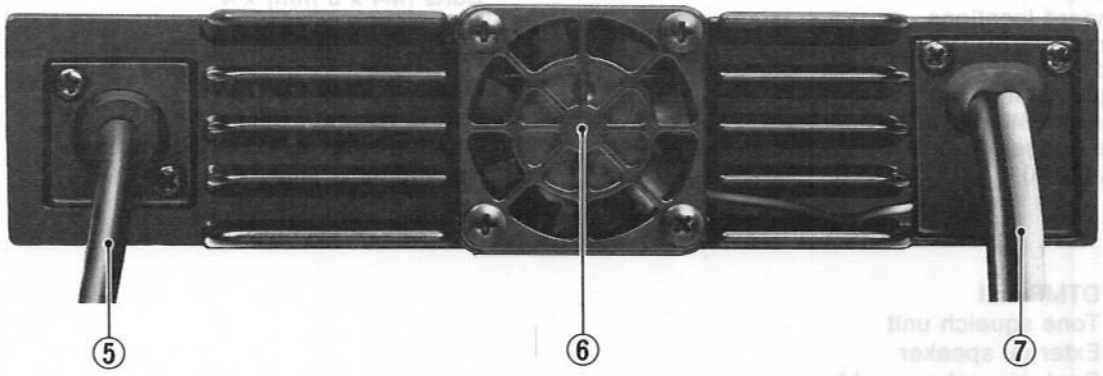


Figure 2-2 Rear

⑤ Antenna cable
⑥ Cooling blower
⑦ DC power cable (DC 13.8 V)

2.2 Full Remote Control Microphone (CMP844/CMP844A)

NOTE: Photo shows full remote control microphone model CMP844.

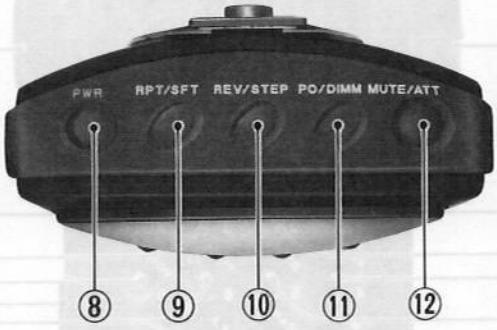


Figure 2-3 Top of Full Remote Control Microphone

⑧ PWR (power switch)
Press this switch to turn transceiver power on.

⑨ RPT/SFT (repeater/shift)
Pressing this key activates the transceiver's repeater mode.
Pressing this key with the 0/FUNC key held down permits the user to change the repeater shift frequency.

⑩ REV/STEP (reverse/step)
Pressing this switch when the transceiver is in the repeater mode reverses the transmission and reception frequencies.
Pressing this key in the function mode (0/FUNC key held down) permits the user to change the frequency steps.

⑪ PO/DIMM (power/dimmer)
Pressing this key changes the transceiver's transmission output power level.
Pressing this key in the function mode activates the dimmer mode (the mode used to switch the brightness of the display).

⑫ MUTE/ATT (mute/attenuator)
Pressing this key mutes audio from the speaker.
Pressing this key in the function mode permits the user to alter the attenuator settings.

Figure 2-4 Front of Full Remote Control Microphone

⑬ PTT (PTT switch)
Pressing this switch activates transmission status in the VHF band.
On the CMP844A, this key functions as the squelch off switch.

⑭ 1/CALL
Pressing this key sets the transceiver's call frequency.
Pressing this key in the direct mode (✻ ENT · DIRECT key held down) inputs a 1.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 1.

⑮ 2/DOWN
Pressing this key lowers the frequency, address number, etc.
Pressing this key in the direct mode inputs a 2.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 2.

⑯ 4/PG-C
Pressing this key once switches the transceiver to the paging mode.
Pressing this key while in the paging mode switches the transceiver to the code squelch mode.
Pressing this key in the direct mode inputs a 4.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 4.

⑰ 5/DTMF
Pressing this key switches the transceiver to the DTMF mode.
Pressing this key in the direct mode inputs a 5.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 5.

⑱ 7/MS
Pressing this key causes the transceiver to scan the frequencies stored in memory.
Pressing this key in the direct mode inputs a 7.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 7.

⑲ 8/SCAN
Pressing this key initiates 1 MHz scan or all scan.
Pressing this key in the direct mode inputs a 8.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 8.

⑳ ✻ ENT · DIRECT
Pressing this key switches the transceiver to the direct mode, in which numeric characters can be input directly.
This key is also used to determine the input number.
Pressing this key inputs the DTMF signal ✻.
Pressing this key when the transceiver is in transmit status sends the DTMF signal ✻.

㉑ 0/FUNC
Pressing this key switches the transceiver to the function mode.
Pressing this key in the direct mode inputs a 0.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 0.

㉒ SQL OFF (squelch off switch)
Pressing this switch cancels the transceiver's squelch function.
On the CMP844A, this key functions as a PTT switch.

㉓ A/VO-SQ ▲
When adjusting the volume or squelch, pressing this key raises the volume or squelch level.
Pressing this key inputs the DTMF signal A.
Pressing this key when the transceiver is in transmit status sends the DTMF signal A.

㉔ 3/UP
Pressing this key raises the frequency, address number, etc.
Pressing this key in the direct mode inputs a 3.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 3.

㉕ B/VO-SQ ▼
When adjusting the volume or squelch, pressing this key lowers the volume or squelch level.
Pressing this key inputs the DTMF signal B.
Pressing this key when the transceiver is in transmit status sends the DTMF signal B.

㉖ K-LOCK (key lock)
Lowering this key to the bottom position disables the keys of the full remote control microphone.

㉗ 6/T-SQL
Pressing this key switches the transceiver to the tone encode mode.
While in the tone encode mode, pressing this key switches the transceiver to the tone squelch mode.
Pressing this key in the direct mode inputs a 6.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 6.

㉘ C/SQL
Pressing this key switches between volume and squelch adjustment.
Pressing this key inputs the DTMF signal C.
Pressing this key when the transceiver is in transmit status sends the DTMF signal C.

㉙ 9/P.S
Pressing this key initiates program scan operation.
Pressing this key in the direct mode inputs a 9.
Pressing this key when the transceiver is in transmit status sends the DTMF signal 9.

㉚ D/BAND
Pressing this key switches the transceiver's frequency band (144 MHz and 430 MHz bands).
Pressing this key while holding down the 0/FUNC key switches the transceiver to the set mode.
Pressing this key inputs the DTMF signal D.
Pressing this key when the transceiver is in transmit status sends the DTMF signal D.

㉛ #/V-M
Pressing this key switches the transceiver between VFO status (the status in which the 2/DOWN and 3/UP keys, or the numeric keys, can be used to change the frequency setting) and memory status.
Pressing this key inputs the DTMF signal #.
Pressing this key when the transceiver is in transmit status sends the DTMF signal #.

3. THEORY OF OPERATION

3.1 PLL Block

The PLL block comprises VCO unit KP01, reference signal generator XP01, VHF PLL buffers QP14 and QP15, and UHF PLL buffers QP11 and QP12.
VCO unit KP01 is a hybrid IC comprising a PLL IC, VHF VCO, and UHF VCO. VCO output for the VHF and UHF bands is obtained from VCO unit KP01.

The PLL circuit works as follows: clock, data, and strobe signals from microprocessor QL01 are input to pins 21, 20, and 19 of VCO unit KP01. Based on this input data, the PLL IC built into VCO unit determines the frequency dividing ratio and frequency.

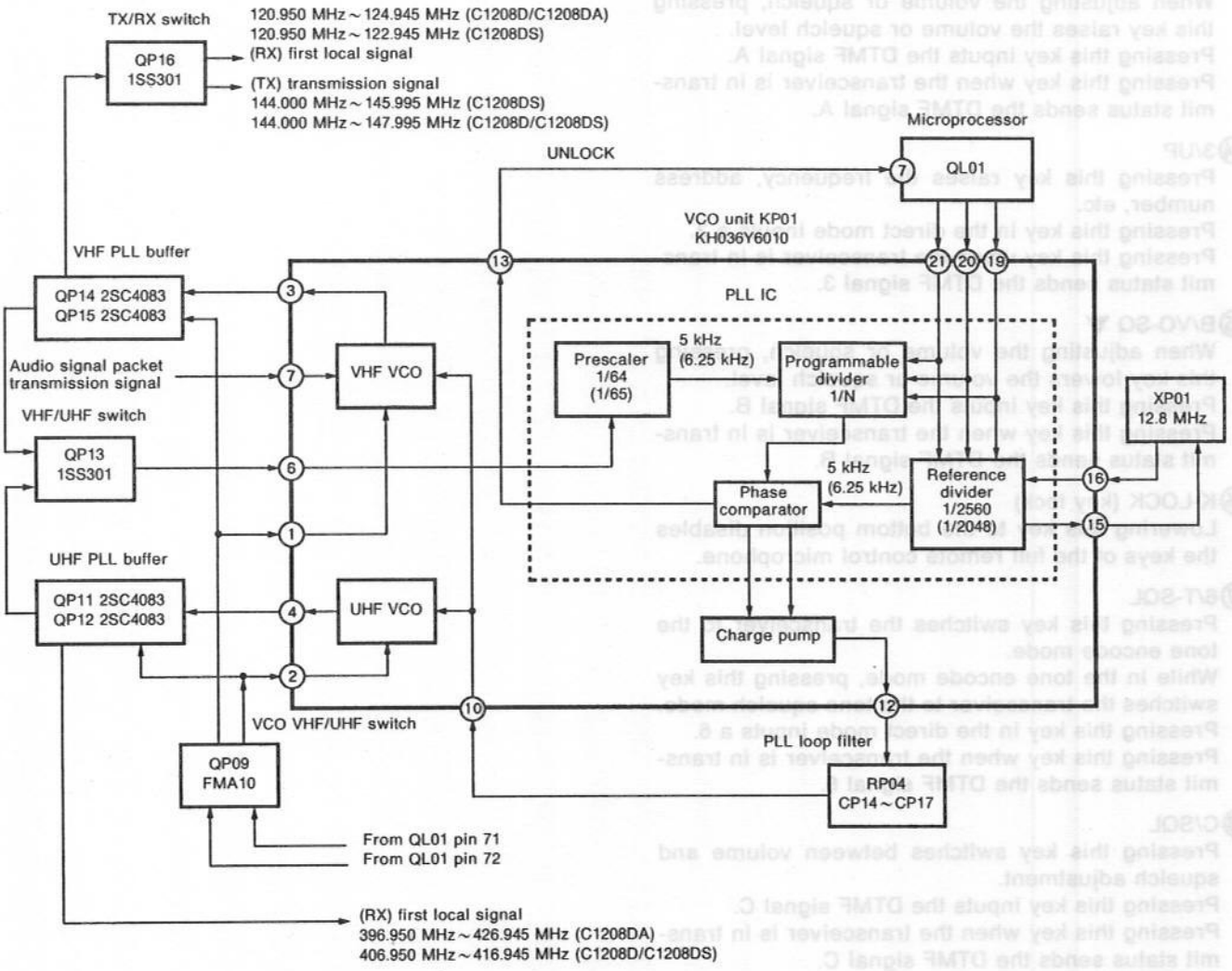


Figure 3-1 PLL Block Diagram

3.1.1 PLL Circuit

When the display of the full remote control microphone (CMP844/CMP844A) indicates that the transceiver is set to the VHF band, the oscillation frequency from the VHF VCO built into VCO unit KP01 passes through pin 3 of KP01 and is input to VHF PLL buffers QP14 and QP15. The input oscillation frequency is amplified by VHF PLL buffers QP14 and QP15 and then input to VHF/UHF switch QP13.
Alternately, if the display of the full remote control microphone (CMP844/CMP844A) indicates that the transceiver is set to the UHF band, the oscillation frequency from the UHF VCO built into VCO unit KP01 passes through pin 4 of KP01 and is input to UHF PLL buffers QP11 and QP12. The input oscillation frequency is amplified by UHF PLL buffers QP11 and QP12 and then input to VHF/UHF switch QP13.
QP13 is controlled by the output voltage from pins 71 and 72 of microprocessor QL01.
If a low level signal is output from pin 71 of QL01, VHF-VCO + B is output from VCO VHF/UHF switch QP09. This VHF-VCO + B signal is input to VHF PLL buffers QP14 and QP15, and QP13 is switched to the VHF band. Alternately, if a low level signal is output from pin 72 of QL01, UHF-VCO + B is output from VCO VHF/UHF switch QP09. This UHF-VCO + B signal is input to UHF PLL buffers QP11 and QP12, and QP13 is switched to the UHF band.
The oscillation frequency from QP13 passes through pin 6 of VCO unit KP01 and is input to the PLL IC built into KP01.

— Programmable Divider Built into PLL IC —

The oscillation frequency from VHF/UHF switch QP13 passes through pin 6 of VCO unit KP01 and is input to the prescaler built into the PLL IC. The input oscillation frequency is frequency divided by the dividing ratio (1/64, 1/65) determined by the prescaler. Then the frequency divided oscillation frequency is input to the programmable divider built into the PLL IC. The programmable divider frequency divides the oscillation frequency to 1/N, based on the data from microprocessor QL01 reflecting the frequency setting, to create a comparison frequency (fp) of 5 kHz or 6.25 kHz.
This frequency (fp) is then input to the phase comparator built into PLL IC.

— Reference Divider Built into PLL IC —

The reference divider is a circuit that generates the reference frequency (fr) of 5 kHz or 6.25 kHz based on the data from microprocessor QL01.
The oscillation frequency of 12.8 MHz from crystal resonator XP01 passes through pin 16 of VCO unit KP01 and is input to the reference divider built into the PLL IC.
At this point, if the tuning step is set to 5, 10, 15, 20, 50, or 100 kHz, the 12.8 MHz oscillation frequency is divided to 1/2,560 to create a reference frequency of 5 kHz.
If the tuning step is set to 12.5 or 25 kHz, the 12.8 MHz oscillation frequency is divided to 1/2,048 to create a reference frequency of 6.25 kHz.
This frequency divided reference frequency (fr) is then input to the phase comparator built into the PLL IC.

— Phase Comparator Built into PLL IC —

The phase comparator built into the PLL IC compares the phase of the comparison frequency (fp), which was frequency divided by the programmable divider, and the reference frequency (fr), which was frequency divided by the reference divider. The phase difference signal produced by the phase comparator is input to the charge pump built into VCO unit KP01.

— Charge Pump Built into VCO Unit —

The phase difference signal output from the phase comparator built into the PLL IC is input to the charge pump built into the VCO unit. The charge pump circuit's power supply voltage of approximately 26 V is produced by a DC/DC converter consisting of QP01 and LP01, and a voltage limiting circuit consisting of CP03, CP04, RP01, RP02, QP03, QP04, QP05, and QP06.
The charge pump converts the input phase difference signal into a pulse signal. (See Table 3-1.)

Table 3-1

Output relationship	Charge pump output
fr > fp	High
fr = fp	High (high impedance)
fr < fp	Low

fr: Reference frequency
fp: Comparison frequency

The pulse signal converted by the charge pump is then input to a PLL loop filter consisting of RP04, CP14, CP15, CP16, and CP17.

— PLL Loop Filter (Low-Pass Filter) —

The PLL loop filter, which consists of RP04, CP14, CP15, CP16, and CP17, integrates the pulse signal output from the charge pump built into VCO unit KP01, converting it into a DC voltage (VHF band: 3.3 V – 3.6 V during reception, 7.3 V – 7.6 V during transmission/ UHF band: 9.4 V – 10.4 V during reception).
The converted DC voltage is input to either the VHF VCO or the UHF VCO built into VCO unit KP01.

— VHF VCO Built into VCO Unit—

When the display of the full remote control microphone (CMP844/CMP844A) indicates that the transceiver is set to the VHF band, a power supply voltage is delivered to the VHF VCO built into VCO unit KP01 because a low output signal from pin 71 of microprocessor QL01 causes the VHF side of VCO VHF/UHF switch QP09 to turn on. When the VHF side of QP09 is on, a power supply voltage of 8 V is supplied to the VHF VCO.

The DC voltage (3.3 V – 3.6 V during reception, 7.3 V – 7.6 V during transmission) output by the PLL loop filter, which consists of RP04, CP14, CP15, CP16, and CP17, is input to the VHF VCO varicap diode built into VCO unit KP01. This DC voltage changes the capacitance between the electrodes of the varicap diode, thereby controlling the oscillation frequency produced by the VHF VCO.

When the transceiver is in receive status, the oscillation frequency from the VHF VCO passes through pin 3 of VCO unit KP01 and is input to VHF PLL buffers QP14 and QP15. The input oscillation frequency is amplified to approximately +3 dBm by the VHF PLL buffers and input to TX/RX switch QP16.

QP16 is controlled by a low level output from pin 70 of microprocessor QL01. The low level output from pin 70 of QL01 is input to UHF/RX + B switch QU06, turning it on. When QU06 is on, QP16 switches to the receive side.

After passing through QP16, the oscillation frequency is input to first mixer QF11 as an approximately 3 dBm first local signal (fvco-v).

When the transceiver is in transmit status, the audio signal from the microphone passes through VCO deviation adjuster RP06 (semi-fixed resistor) and is input to pin 7 of VCO unit KP01.

The audio signal input to pin 7 of KP01 is input to the VHF VCO modulation varicap diode built into KP01. There frequency modulation takes place.

The frequency modulated oscillation frequency is then output from the VHF VCO as the transmission signal.

The transmission signal from the VHF VCO passes through pin 3 of KP01 and is input to VHF PLL buffers QP14 and QP15.

The input oscillation frequency is amplified to approximately +3 dBm by the VHF PLL buffers and input to TX/RX switch QP16.

QP16 is controlled by a low level output from pin 66 of microprocessor QL01. The low level output from QL01 is input to TX + B switch QL12, turning it on. When QL12 is on, QP16 switches to the transmit side.

The transmission signal then passes through QP16 and is input to the transmitter circuit.

— UHF VCO Built into VCO Unit —

When the display of the full remote control microphone (CMP844/CMP844A) indicates that the transceiver is set to the UHF band, a power supply voltage is delivered to the UHF VCO built into VCO unit KP01 because a low output signal from pin 71 of microprocessor QL01 causes the UHF side of VCO VHF/UHF switch QP09 to turn on. When the UHF side of QP09 is on, a power supply voltage of 8 V is supplied to the UHF VCO.

The DC voltage (9.4 V – 10.4 V) output by the PLL loop filter, which consists of RP04, CP14, CP15, CP16, and CP17, is input to the UHF VCO varicap diode built into VCO unit KP01.

This DC voltage changes the capacitance between the electrodes of the varicap diode, thereby controlling the oscillation frequency produced by the UHF VCO.

The oscillation frequency from the UHF VCO passes through pin 3 of VCO unit KP01 and is input to UHF PLL buffers QP11 and QP12. The input oscillation frequency is amplified to approximately +3 dBm by the UHF PLL buffers.

The amplified oscillation frequency is input to first mixer QF11 as an approximately +3 dBm first local signal (fvco-u).

— Unlock Detect Circuit —

The unlock detect circuit determines whether the PLL circuit status is locked or unlocked using the output to pin 7 of microprocessor QL01 from pin 13 of VCO unit KP01.

If the phase comparator inside the PLL IC built into VCO unit KP01 detects no phase difference (PLL circuit locked), it outputs a low level signal. This low level output passes through pin 13 of KP01 and is input to pin 7 of microprocessor QL01. When microprocessor QL01 receives this low level input, it determines that the PLL circuit is locked.

If a phase difference is detected (PLL circuit unlocked), the phase comparator outputs a high level signal.

This high level output passes through pin 13 of KP01 and is input to pin 7 of microprocessor QL01.

When microprocessor QL01 receives this high level input, it determines that the PLL circuit is unlocked.

3.2 Receiver Block

The transceiver uses the double conversion super heterodyne method with a first intermediate frequency of 23.05 MHz (lower) and a second intermediate frequency of 455 kHz (lower).

The receiver block comprises a RF amplifier circuit, a first mixer circuit, a first IF amplifier circuit, a second IF circuit, and an audio circuit.

3.2.1 VHF Band

— RF Amplifier Circuit —

The reception frequency (fRX-V) from antenna cable W001 passes through a low-pass filter consisting of LT15, LT16, LT17, CT45, CT46, LT09, LT10, LT11, CT33, and CT34 and is input to the VHF band receiver circuit via an antenna switch comprising QT08, QT09, and QT10. At this point, the collector voltage of QT10 in the antenna switch (QT08, QT09, QT10) is high level, causing pin diodes QT08 and QT09 to turn off. The reception frequency (fRX-V) input to the VHF band receiver circuit passes through a low-pass filter consisting of LF08 and CF47, and is input to excess input protection circuit QF01. At this point, if the RF attenuator function has been turned on using the full remote control microphone (CMP844/CMP844A), a high level output from pin 9 of microprocessor QL01 causes attenuator QF21 to turn on. When QF21 is on, the reception sensitivity is reduced by approximately 8 dB. If the RF attenuator function has been turned off using the full remote control microphone (CMP844/CMP844A), QF21 remains off and reception sensitivity is normal.

The reception frequency (fRX-V) from excess input protection circuit QF01 passes through a band-pass filter consisting of LF01, QF02, QF03, and QF23, and is input to RF amplifier QF04.

The input reception frequency (fRX-V) is amplified approximately 15 dB by QF04. Then it is input to a band-pass filter consisting of LF02 – LF04 and QF05 – QF10.

Varicap tuning is performed on the band-pass filter of the RF amplifier circuit.

The band-pass filter's varicap diodes QF02, QF03, and QF05 – QF10 change the pass band frequency based on the voltage from DC voltage amplifier QP08. The voltage from this DC voltage amplifier is output based on data from microprocessor QL01 that corresponds to the frequency setting. It is converted into a DC voltage by a D/A converter QP07.

— First Mixer Circuit —

After being amplified by approximately 15 dB by RF amplifier QF04, the reception frequency (fRX-V) passes through a band-pass filter consisting of LF02 – LF04 and QF05 – QF10, and is input to the first gate of first mixer QF11.

Also, the first local signal (fVCO-V) from the VHF VCO built into VCO unit KP01 is input to the second gate. The reception frequency (fRX-V) and first local signal (fVCO-V) are mixed by QF11, and their difference creates the 23.05 MHz first IF signal.

fRX-V – fVCO-V = 23.05 (MHz)

fRX-V: Reception frequency

fVCO-V: First local signal

— First IF Amplifier Circuit —

The 23.05 MHz first IF signal created by first mixer QF11 passes through a VHF/UHF switch consisting of QF12 and QF18, and is input to a band-pass filter comprising FU01 and FU02 (bandwidth –3 dB ±7.5 kHz). After adjacent signal elements are eliminated from the input first IF signal by FU01 and FU02, it is input to a first IF amplifier consisting of QU01 and QU02. After being amplified by approximately 10 dB by QU01 and QU02, the first IF signal is input to pin 24 of second IF IC QU03.

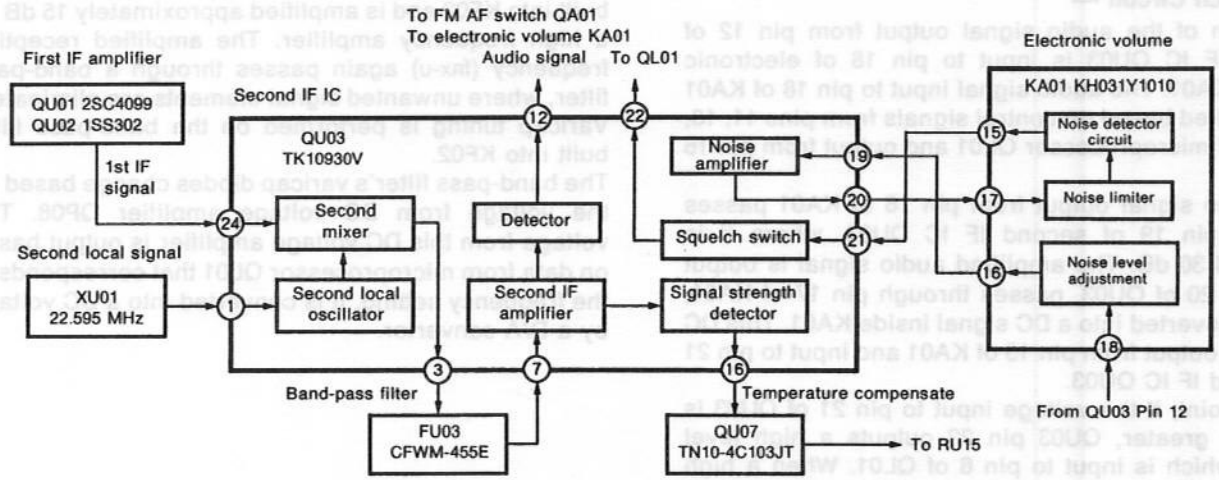


Figure 3-2 Second IF IC Block Diagram

— Second IF Circuit —

After being amplified by the first IF amplifier, the first IF signal passes through pin 24 of second IF IC QU03 and is input to the second mixer inside QU03. Also, the 22.595 MHz second local signal from local oscillator circuit XU01 passes through pin 1 of QU03 and is input to the second mixer.

The first IF signal and second local signal are mixed by the second mixer built into QU03, converting the first IF signal into a 455 kHz second IF signal. After conversion to 455 kHz, the second IF signal passes through pin 3 of QU03 and, after adjacent signal elements are eliminated by band-pass filter FU03 (bandwidth –6 dB ±7.5 kHz or greater; –50 dB ±15 kHz or less), it is input to QU03 pin 7.

The input second IF signal is converted into an audio signal by the second IF amplifier and a quadrature detector, and then output via pin 12 of QU03.

— Audio Circuit —

A portion of the audio signal output from pin 12 of second IF IC QU03 passes through FM AF switch QA01 and is input to a de-emphasis circuit consisting of QA02 and QA03. This de-emphasis circuit comprising QA02 and QA03 has frequency characteristics of –6 dB/oct., and it performs audio signal correction.

After passing through the de-emphasis circuit, the audio signal is input to pin 13 of electronic volume KA01. There it is converted into an attenuated output signal based on the settings of microprocessor QL01 and output via pin 14 of KA01. The audio signal output from pin 14 of KA01 is input to pin 1 of audio power amplifier IC QA04, where it is amplified 30 dB. The amplified audio signal is output from pin 4 of QA04 and passes through external speaker socket JA01. After passing through external speaker socket JA01, the audio signal passes through pin 3 of JL04 and is output from pin 3 of microphone plug JL05. After being output from pin 3 of microphone plug JL05, the audio signal is output from the speaker (ER01) of the full remote control microphone.

— Squelch Circuit —

A portion of the audio signal output from pin 12 of second IF IC QU03 is input to pin 18 of electronic volume KA01. The audio signal input to pin 18 of KA01 is controlled based on control signals from pins 11, 18, and 19 of microprocessor QL01 and output from pin 16 of KA01.

The audio signal output from pin 16 of KA01 passes through pin 19 of second IF IC QU03, where it is amplified 30 dB. The amplified audio signal is output from pin 20 of QU03, passes through pin 17 of KA01, and is converted into a DC signal inside KA01. This DC signal is output from pin 15 of KA01 and input to pin 21 of second IF IC QU03.

At this point, if the voltage input to pin 21 of QU03 is 0.7 V or greater, QU03 pin 22 outputs a high level signal, which is input to pin 6 of QL01. When a high level input is applied to pin 6 of QL01, squelch action turns on. On the other hand, if the voltage input to pin 21 of QU03 is less than 0.7 V, QU03 pin 22 outputs a low level signal, which is input to pin 6 of QL01. When a low level input is applied to pin 6, squelch action turns off.

— Signal Strength Meter Circuit —

A portion of the second IF signal is input to the signal strength detector circuit built into second IF IC QU03, and a DC voltage between 0 V and 1.7 V and corresponding to the strength of the reception signal is output from pin 16 of QU03. This DC voltage passes through temperature compensate QU07 and is input to signal strength meter adjuster RU15 (semi-fixed resistor). After being adjusted by RU15, the DC voltage is input to pin 1 of microprocessor QL01, where it undergoes A/D conversion.

After A/D conversion, the digital signal is sent from microprocessor QL01 to full remote control microphone (CMP844/CMP844A), where it controls the signal strength meter indication on the display.

(Refer to 3.4 Control Block for information on data output to the full remote control microphone.)

3.2.2 UHF Band

— RF Amplifier Circuit —

The reception frequency (fRX-U) from antenna cable W001 passes through a low-pass filter consisting of LT15, LT16, LT17, CT45, and CT46, and a high-pass filter comprising LT13, LT14, CT42, CT43, and CT44, and is input to the UHF band receiver circuit. The reception frequency (fRX-U) input to the UHF band receiver circuit passes through attenuator QF20 and is input to pin 2 of UHF band sub-front end base KF02.

At this point, if the RF attenuator function has been turned on using the full remote control microphone (CMP844/CMP844A), a high level output from pin 9 of microprocessor QL01 causes attenuator QF20 to turn on.

When QF20 is on, the reception sensitivity is reduced by approximately 8 dB.

If the RF attenuator function has been turned off using the full remote control microphone (CMP844/CMP844A), QF20 remains off and reception sensitivity is normal.

The reception frequency (fRX-U) from pin 2 of UHF band sub-front end base KF02 / through a band-pass filter built into KF02 and is amplified approximately 15 dB by a high frequency amplifier. The amplified reception frequency (fRX-U) again passes through a band-pass filter, where unwanted signal elements are eliminated. Varicap tuning is performed on the band-pass filter built into KF02.

The band-pass filter's varicap diodes change based on the voltage from DC voltage amplifier QP08. The voltage from this DC voltage amplifier is output based on data from microprocessor QL01 that corresponds to the frequency setting. It is converted into a DC voltage by a D/A converter.

— First Mixer Circuit —

The reception frequency (f_{RX-U}) output from pin 7 of UHF band sub-front end base KF02 is input to the first gate of first mixer QF14.
Also, the first local signal (f_{VCO-U}) from the UHF VCO built into VCO unit KP01 is input to the second gate of first mixer QF14.
The reception frequency (f_{RX-U}) and first local signal (f_{VCO-U}) are mixed by QF14, and their difference creates the 23.05 MHz first IF signal.

$f_{RX-U} - f_{VCO-U} = 23.05$ (MHz)

f_{RX-U}: Reception frequency
f_{VCO-U}: First local signal

— First IF Amplifier Circuit —

The 23.05 MHz first IF signal created by first mixer QF14 passes through a VHF/UHF switch consisting of QF12 and QF18, and is input to a band-pass filter comprising FU01 and FU02 (bandwidth –3 dB ±7.5 kHz). After adjacent signal elements are eliminated from the input first IF signal by FU01 and FU02, it is input to a first IF amplifier consisting of QU01 and QU02. After being amplified by approximately 10 dB by QU01 and QU02, the first IF signal is input to pin 24 of second IF IC QU03.
After this, circuit operation is identical to that described for the VHF band from the second IF circuit through the signal strength meter circuit.

3.3 Transmitter Block

3.3.1 Microphone Amplifier

When the user holds down the PTT switch of the full remote control microphone (CMP844/CMP844A) and speaks into it, the resulting audio signal passes through pin 1 of microphone plug JL05 and is input to audio deviation adjuster RM11 (semi-fixed resistor). After level adjustment by RM11, the audio signal is input to pin 1 of microphone switch QM03.
When the transceiver is in transmit status, a high level signal is output from pin 62 of microprocessor QL01, causing microphone switch QM03 to turn on.
The audio signal output from pin 2 of QM03 is input to microphone amplifier QM04, where it is amplified approximately 62 dB. At the same time, pre-emphasis (6 dB/oct. frequency characteristics) is applied by CM13. The amplified audio signal passes through modulation limiter QM05 and is input to a low-pass filter consisting of QM06, RM26 – RM28, CM18, CM20, and CM21.
At this point, unwanted signal elements above 3 kHz are eliminated by the low-pass filter. The audio signal, with unwanted signal elements attenuated, passes through VCO deviation adjuster RP06 (semi-fixed resistor) and is input to pin 7 of VCO unit KP01.

3.3.2 Younger Amplifier

The audio signal is input to pin 7 of VCO unit KP01. It is then output from pin 3 of KP01 as the transmission signal. The transmission signal output from pin 3 of KP01 at a level of approximately 0 dBm is input to VHF PLL buffers QP14 and QP15, where it is amplified to approximately 3 dBm.
The amplified transmission signal is input to TX/RX switch QP16. When the transceiver is in transmit status, a low level signal is output from pin 66 of microprocessor QL01 and TX + B switch QL12 is turned on, causing QP16 to switch to the transmit side.
When the transceiver is in receive status, a low level signal is output from pin 70 of microprocessor QL01 and UHF/RX + B switch QU06 is turned on, causing QP16 to switch to the receive side.
After passing through QP16, the transmission signal is input to Younger amplifiers QT01 and QT02. QT01 amplifies the 2 mW transmission signal by 13 dB to approximately 40 mW. Next, QT02 further amplifies the transmission signal to approximately 400 mW. The power amplification of the Younger amplifier is approximately 23 dB.
After being amplified by QT01 and QT02, the transmission signal is input to pin 1 of final amplifier QT04.

3.3.3 Final Amplifier

After being amplified by QT01 and QT02, the transmission signal is input to pin 1 of final amplifier QT04.
QT04 amplifies the transmission signal to approximately 60 W.
QT04 consists internally of two amplifier stages. Pin 1 of QT04 is the transmission signal input, pin 2 is the APC voltage input, pin 3 is the power supply voltage (13.8 V) input for the second stage, and pin 4 is the transmission signal output.
QT04 controls the transmission power using the APC voltage from pin 12 of APC unit KT01. The transmission signal output from pin 4 of final amplifier QT04 passes through antenna switch QT08 and is input to a low-pass filter consisting of LT09, LT10, LT11, CT33, and CT34. At this point, TX + B is input to the base of antenna switch QT10, causing the QT10 connector to become low level. This makes pin diodes QT08 and QT09 turn on.
After having second and third order harmonics thoroughly attenuated by the low-pass filter, the transmission signal is supplied to antenna cable W001.

3.3.4 Auto Power Control (APC)/Power Protector

Auto power control (APC) unit KT01 is of the RF detector type.
The transmission signal from pin 4 of final amplifier QT04 is input to a standing wave detector consisting of QT06 and QT11, where it is monitored as a wave detection voltage. This wave detection voltage passes through pin 11 of APC unit KT01 and is input to pin 2 of the APC amplifier built into KT01. The APC amplifier built into KT01 is a differential amplifier circuit that employs an op-amp.
Also, the output voltage from pins 29 and 30 of microprocessor QL01 passes through transmission output adjusters RT18, RT19, and RT20 (semi-fixed resistors), and is input to pin 3 of APC unit KT01 as the reference voltage.
At this point, if the wave detection voltage at pin 2 of the APC amplifier is higher than that of the reference voltage at pin 3 of the APC amplifier, the APC voltage from pin 1 of the APC amplifier passes through KT01 pin 12 and is input to the base of power controller QT05. This reduces the APC voltage input to pin 2 of final amplifier QT04 from the collector of QT05.
Conversely, if the wave detection voltage at pin 2 of the APC amplifier is lower than that of the reference voltage at pin 3 of the APC amplifier, the APC voltage input to pin 2 of QT04 increases. In this way the transmission output of the transceiver is maintained at a constant level.
If the SWR (standing wave ratio) worsens, the wave detection voltage from standing wave detector QT06 rises.
In this way the APC voltage from pin 12 of APC unit KT01 passes through power controller QT05 and the APC voltage input to pin 2 of final amplifier QT04 is reduced. By reducing this APC voltage, the transmission output level is lowered and the final amplifier is protected.

3.3.5 High/Middle/Low Power Switching

A transmission output power indication appears on the display only when the full remote control microphone (CMP844/CMP844A) is set to low or middle power.
Switching between high, middle, and low power is accomplished based on data corresponding to the power mode setting of the full remote control microphone (CMP844/CMP844A) that is sent to microprocessor QL01.
Based on the data from the full remote control microphone, output voltages are output from pins 29 and 30 of microprocessor QL01.
When the low power mode is selected, a low level signal is output from pin 29 of microprocessor QL01. Transmission output adjuster RT18 (semi-fixed resistor) is used to adjust the level. The level adjusted low output is input to pin 3 of APC unit KT01 as the reference voltage.
When the middle power mode is selected, a low level signal is output from pin 30 of microprocessor QL01. Transmission output adjuster RT19 (semi-fixed resistor) is used to adjust the level. The level adjusted low output is input to pin 3 of APC unit KT01 as the reference voltage.
When the high power mode is selected, high level signals are output from pins 29 and 30 of microprocessor QL01. Transmission output adjuster RT20 (semi-fixed resistor) is used to adjust the level. The level adjusted high output is input to pin 3 of APC unit KT01 as the reference voltage.

3.3.6 Tone Burst

The full remote control microphone (CMP844/ CMP844A) is used to put the transceiver into transmit status.
In this status, a 1,750 Hz tone burst (square wave) is output from pin 45 of microprocessor QL01 if the squelch off switch on the full remote control microphone is depressed. The tone burst output by microprocessor QL01 passes through a tone filter circuit consisting of QM01, RM02 – RM05, and CM02 – CM05, where it is converted into a sine wave. After being converted into a sine wave, the tone burst is level adjusted by tone burst deviation adjuster RM06 (semi- fixed resistor) and input to pin 7 of VCO unit KP01.

3.3.7 Transmission Signal Strength Meter (TX Meter)

The transmission signal from pin 4 of final amplifier QT04 is input to a standing wave detector consisting of QT06 and QT11, where it is detected as a wave detection voltage. This wave detection voltage passes through pin 11 of APC unit KT01 and is input to pin 5 of the APC amplifier built into KT01. The APC amplifier inside KT01 functions as a comparator.
If the voltage input to pin 5 of the APC amplifier is approximately 0.5 V or greater, approximately 6 V is output from pin 7 of the APC amplifier to KT01 pin 13. This 6 V voltage is input to pin 8 of microprocessor QL01, allowing it to determine that transmission power is being output.
When QL01 determines that transmission power is being output, it makes the full scale indication appear on the display of the full remote control microphone (CMP844/CMP844A) in the high power mode. In the middle power mode, S5 is displayed, and S3 is displayed in the low power mode.
If the voltage input to pin 5 of the APC amplifier is less than approximately 0.5 V, 0 V is output from pin 7 of the APC amplifier. When 0 V is output, microprocessor QL01 determines that transmission power is not being output and no indication appears on the full remote control microphone.

3.3.8 Cooling Blower

The C1208D/C1208DS/C1208DA is equipped with a cooling blower to lower the temperature of the heat sink.
If the temperature of the transceiver's heat sink rises above approximately 60°C, thermo sensor QT12 detects that the unit is heating up. A detection voltage is input from QT12 to pin 80 of microprocessor QL01 and A/D converted. A high level signal is output from pin 14 of microprocessor QL01, turning on fan switches QL09, QL21, and QL22. When QL09, QL21, and QL22 are switched on, the cooling blower operates.

3.4 Control Block

3.4.1 Table of Microprocessor In/Out Ports

— Microprocessor QL01 (Transceiver) —

Table of QL01 In/Out Ports

Table 3-2

Pin no.	Port name	Port no.	In/Out	Function
1	S-METER	AN0	In	Signal strength meter voltage input (A/D)
2	AV_{REF}	AV_{REF}	—	A/D converter reference voltage input terminal
3	V_{DD}	V_{DD}	—	Positive power supply terminal
4	V_{DD}	V_{DD}	—	Connected to V_{DD}
5	NC	P113	In	NC
6	$\overline{\text{BUSY}}$	P112	In	BUSY signal input Low: BUSY
7	UL	P111	In	Input for lock signal from PLL LOCK: low, UNLOCK: high
8	TX PWR	P110	In	RF-POWER output detector
9	RF-ATT	P103	Out	RF attenuator on/off ON: high
10	PWR-ON	P102	Out	Low when power is off High: SW13.8V-ON
11	VOL-STB	P101	Out	Strobe output to E-VOL (MB87078)
12	VOL-WR	P100	Out	Light signal output to E-VOL (MB87078)
13	D/A-STB	P93	Out	Strobe output to D/A converter (MB88364)
14	FAN-SW	P92	Out	Cooling fan on/off ON: high
15	PLL-STB	P91	Out	Strobe output to PLL-IC (MB1511)
16	MUTE	P90	Out	Audio mute on/off ON: high
17	NC	P83	In	GND
18	DATA	S01	Out	Serial data output
19	CLK	$\overline{\text{SCK1}}$	Out	Serial clock output
20	BEEP	P80	Out	Beep tone output
21	CTD-D3	P73	In	DTMF decode DATA3
22	CTD-D2	P72	In	DTMF decode DATA2
23	CTD-D1	P71	In	DTMF decode DATA1
24	CTD-D0	P70	In	DTMF decode DATA0
25	$\overline{\text{CTD-CHK}}$	P63	In	Detects CTD1200 mounting Low: mounted High: not mounted
26	CTD-SQL	P62	In	DTMF decode DV signal High: valid tone received
27	CTD-STB	P61	Out	Strobe output to CTD1200
28	PAC-PTT	P60	Out	Packet PTT input ON: low
29	$\overline{\text{LOW-PWR}}$	P53	Out	Outputs low during low power
30	$\overline{\text{MID-PWR}}$	P52	Out	Outputs low during medium power
31	NC	P51	In	NC
32	NC	P50	In	NC
33	Vss	Vss	—	Ground potential terminal
34	NC	P43	In	GND
35	NC	P42	In	GND
36	NC	P41	In	GND
37	DATA (COMM)	P40	In/Out	Sub-CPU communications data input
38	SCL	P33	Out	EE-PROM serial clock output (I^2C-BUS)
39	SDA	P32	In/Out	EE-PROM serial data input/output (I^2C-BUS)
40	DET-OUT	P31	In	Tone decode match signal Low: match
41	CLK (COMM)	P30	Out	Sub-CPU communications clock output
42	NC	P23	In	NC
43	SQL	P22	Out	Packet data output High: BUSY
44	CTN-STB	P21	Out	Strobe output to CTN1200
45	TONE	PT00	Out	Tone burst (1750 Hz)
46	NC	P13	In	GND
47	NC	P12	In	NC
48	NC	P11	In	NC
49	DATA (COMM)	INT0	In	Sub-CPU communications interrupt terminal
50	NC	P03	In	NC
51	NC	P02	In	NC

Pin no.	Port name	Port no.	In/Out	Function
52	$\overline{\text{CTN-CHK}}$	P01	In	CTN1200 present/absent Low: present
53	INT4	INT4	In	Reduced voltage interrupt terminal
54	Vss	Vss	—	Ground potential terminal
55	XT1	XT1	In	GND
56	XT2	XT2	—	NC
57	IC	IC	In	GND
58	X1	X1	In	Main system clock terminal 4.19 MHz
59	X2	X2	—	Main system clock terminal 4.19 MHz
60	$\overline{\text{RESET}}$	$\overline{\text{RESET}}$	In	System reset input terminal
61	$\overline{\text{SELF-RESET}}$	P143	Out	Self-reset terminal Low: reset
62	MIC-SW	P142	Out	Microphone switch High: ON
63	NC	P141	Out	NC
64	$\overline{\text{DATA-SHUNT}}$	P140	Out	Serial out HI-Z cancel port
65	NC	P133	Out	NC
66	$\overline{\text{TX + B}}$	P132	Out	TX power supply on/off Low: ON
67	$\overline{\text{V - RX + B}}$	P131	Out	VHF RX power supply on/off ON: low
68	$\overline{\text{U - RX + B}}$	P130	Out	UHF RX power supply on/off ON: low
69	NC	P123	Out	NC
70	$\overline{\text{RX + B}}$	P122	Out	RX power supply ON: low
71	$\overline{\text{V - VCO + B}}$	P121	Out	VHF VCO power supply ON: low
72	$\overline{\text{U - VCO + B}}$	P120	Out	UHF VCO power supply ON: low
73	AVss	AVss	—	A/D converter base ground terminal
74	PTT	P153	In	PTT key input ON: low
75	ON/OFF	P152	In	POWER key input ON: low
76	NC	AN5	In	GND
77	NC	AN4	In	GND
78	NC	AN3	In	GND
79	HV-PROTECT	AN2	In	Excess voltage determination input terminal (A/D)
80	THERMO	AN1	In	Cooling fan control temperature sensor voltage input (A/D)

— Microprocessor QR01 (Full Remote Control Microphone) —

Table of QR01 In/Out Ports

Table 3-3

Pin no.	Port name	Port no.	In/Out	Function
1	AVcc	AVcc	—	A/D converter power supply terminal
2	NC	AN_0	In	NC
3	NC	AN_1	In	NC
4	NC	AN_2	In	NC
5	NC	AN_3	In	NC
6	AVss	AVss	—	A/D converter ground terminal
7	TEST	$\overline{TEST}$	In	Connected to Vcc potential
8	OSC1	OSC_1	In	Main system clock input (4.19 MHz)
9	OSC2	OSC_2	Out	Main system clock output (4.19 MHz)
10	RESET	RESET	In	System reset terminal High: reset
11	X1	X1	In	Pull up
12	X2	X2	Out	NC
13	GND	GND	—	Ground potential terminal
14	KEYMT0	D_0	Out	Key scan matrix port output 0
15	KEYMT1	D_1	Out	Key scan matrix port output 1
16	KEYMT2	D_2	Out	Key scan matrix port output 2
17	KEYMT3	D_3	Out	Key scan matrix port output 3
18	KEYMT4	D_4	Out	Key scan matrix port output 4
19	NC	D_5	In	NC
20	NC	D_6	In	NC
21	DIMMER	D_7	Out	Dimmer switch output Normal: high, dimmer on: low
22	K.L	D_8	In	Key lock switch input Key lock on: low
23	FUNC/0	D_9	In	FUNC/0 key switch input ON: low
24	NC	D_{10}	In	NC
25	DATA	INT_0	In	Serial interface interrupt port
26	NC	$R0_0/INT_1$	In	NC
27	NC	$R0_1/INT_2$	In	NC
28	NC	$R0_2/INT_3$	In	NC
29	NC	$R0_3/INT_4$	In	NC
30	KEYSC0	$R1_0$	In	Key scan matrix port input 0
31	KEYSC1	$R1_1$	In	Key scan matrix port input 1
32	KEYSC2	$R1_2$	In	Key scan matrix port input 2
33	KEYSC3	$R1_3$	In	Key scan matrix port input 3
34	CLK	EVND	In	Serial interface clock count terminal
35	CLK	SCK	In	Serial interface clock input terminal
36	NC	SI	In	NC
37	DATA	SO	In/Out	Serial interface data input/output terminal
38 – 89	SEG1 – 52	SEG1 – 52	Out	LCD segment signal terminals
90	COM1	COM1	Out	LCD common signal terminal 1
91	COM2	COM2	Out	LCD common signal terminal 2
92	NC	COM3	Out	NC
93	NC	COM4	Out	NC
94	V1	V_1	—	LCD driver power supply input terminal (5.0 V)
95	V2	V_2	—	LCD driver power supply input terminal (2.5 V)
96	V3	V_3	—	LCD driver power supply input terminal (2.5 V)
97	Vcc	Vcc	—	Positive power supply terminal
98	NC	NUMO	—	NC
99	NC	NUMO	—	NC
100	NC	NUMG	—	Connected to ground potential

3.4.2 Communication Bus Lines Between Microprocessors (QL01 and QR01)

The bus lines linking the microprocessor (QL01) of the transceiver and the microprocessor (QR01) of the full remote control microphone (CMP844/CMP844A) are diagrammed below.

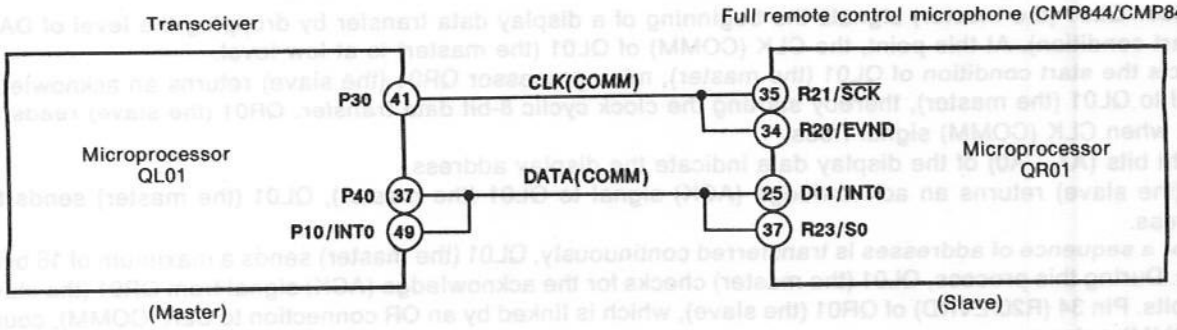


Figure 3-3 Communication Bus Lines Between Microprocessors (QL01 and QR01)

3.4.3 Sending Key Commands

When key commands (key operation data) are sent from the full remote control microphone to the transceiver, they are sent with the timing shown in the diagram below.
Microprocessor QL01 (the master) outputs a CLK (COMM) signal, and microprocessor QR01 (the slave) outputs the key command DATA (COMM) to QL01. Intervals T1 and T2 shown below are measured by QL01 (the master). T1 and T2 last between approximately 50 μs and approximately 60 μs. By combining T1 and T2 in different ways, 256 different key commands can be output. In actual fact, only about 100 key commands are used.

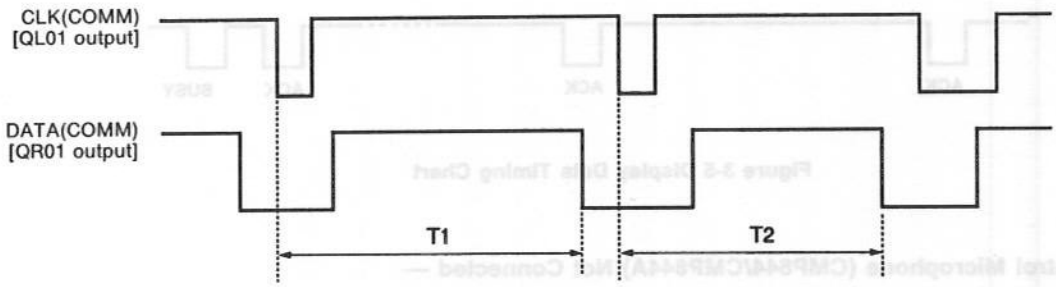


Figure 3-4 Key Command Timing Chart

3.4.4 Sending Display Data

— Full Remote Control Microphone (CMP844/CMP844A) Connected —

When display data is sent from the transceiver to the full remote control microphone, it is sent with the timing shown in the diagram below.

Microprocessor QL01 (the master) signals the beginning of a display data transfer by dropping the level of DATA (COMM) (start condition). At this point, the CLK (COMM) of QL01 (the master) is at low level.

After it detects the start condition of QL01 (the master), microprocessor QR01 (the slave) returns an acknowledge (ACK) signal to QL01 (the master), thereby starting the clock cyclic 8-bit data transfer. QR01 (the slave) reads the display data when CLK (COMM) signal rises.

The first eight bits (A7 – A0) of the display data indicate the display address.

After QR01 (the slave) returns an acknowledge (ACK) signal to QL01 (the master), QL01 (the master) sends the display address.

When data for a sequence of addresses is transferred continuously, QL01 (the master) sends a maximum of 16 bytes in one string. During this process, QL01 (the master) checks for the acknowledge (ACK) signal from QR01 (the slave) every eight bits. Pin 34 (R20/EVND) of QR01 (the slave), which is linked by an OR connection to CLK (COMM), counts the CLK (COMM) pulses.

The transfer of display data ends when QL01 (the master) raises DATA (COMM) at the same time CLK (COMM) is high level (stop condition).

After QR01 (the slave) detects the stop condition, it processes the data it received for output to the LCD. While this is occurring, QR01 (the slave) keeps DATA (COMM) at low level (busy status). This busy status prevents QL01 (the master) from sending the next string of display data.

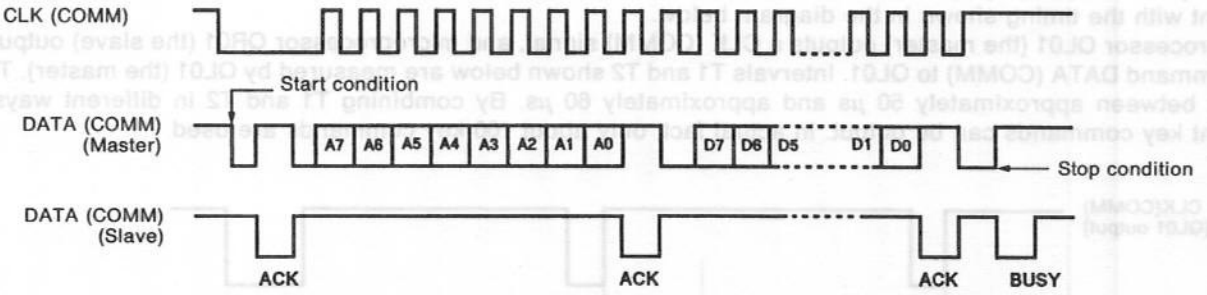


Figure 3-5 Display Data Timing Chart

— Full Remote Control Microphone (CMP844/CMP844A) Not Connected —

If no full remote control microphone (CMP844/CMP844A) is connected, no acknowledge (ACK) signal is returned by QR01 (the slave) when QL01 (the master) sends display data. This triggers the watchdog function (a function that causes the microprocessor to reset itself if a given signal is not input within a specified period of time).

After the watchdog function is triggered, QL01 (the master) sends all the display data. Then, after all the display data has been sent repeatedly seven times in a row, the transceiver's power supply automatically switches to off status. However, if the full remote control microphone (CMP844/CMP844A) was disconnected while the transceiver's power supply is on, the above operation does not occur until QL01 (the master) has sent the display data. Consequently, the transceiver's power supply remains on.

3.4.5 Sending Signal Strength Meter Display Data

When the transceiver receives a signal, pin 6 of microprocessor QL01 (the master) drops to low level, indicating a busy condition. When QL01 (the master) determines that a busy condition exists, a DC voltage corresponding to the strength of the reception signal is input to pin 1 of QL01 (the master).
The input DC voltage is A/D converted at output from QL01 pins 37, 41, and 49 as a digital signal. This digital signal forms the basis for the signal strength meter display on the full remote control microphone (CMP844/CMP844A). The voltages and their corresponding display indications are listed in the figure below.

Display start voltage	Signal strength meter indication
Less than 0.58 V	1
0.58 V — 0.60 V	1
0.60 V — 0.62 V	1 3
0.62 V — 0.64 V	1 3
0.64 V — 0.66 V	1 3 5
0.66 V — 0.70 V	1 3 5
0.70 V — 0.74 V	1 3 5 9
More than 0.74 V	1 3 5 9 +

Figure 3-6 Signal Strength Meter Display

3.4.6 Sending Electronic Volume Control Data

When the UP/DOWN keys on the full remote control microphone (CMP844/CMP844A) are used to change the volume/squelch output level, UP/DOWN data is sent from QR01 (the slave) to QL01 (the master).
QL01 (the master) converts the UP/DOWN data into serial data and sends it to electronic volume control KA01.
AF volume control is accomplished using two circuits connected in series to allow for very fine adjustments. The amount of attenuation is the same for each circuit, and the minimum step size is 1 dB.

3.4.7 Full Remote Control Microphone (CMP844/CMP844A) Control Block

— K.L (Pin 22) —

When the key lock switch on the full remote control microphone is in the lowered position, a low level signal is input to pin 22 of microprocessor QR01. The low level signal input puts the full remote control microphone into key lock status. When the key lock switch on the full remote control microphone is in the raised position, a high level signal is input to pin 22 of QR01. The high level signal input releases key lock on the full remote control microphone.

— DATA IN (Pin 25), CLK (Pins 34 and 35), DATA IN/OUT (Pin 37) —

These ports are used for data transfer between the transceiver's microprocessor QL01 and the full remote control microphone's microprocessor QR01.

— OSC1 (Pin 8), OSC2 (Pin 9) —

This is the system clock terminal of the full remote control microphone's microprocessor QR01.
The 4.19 MHz signal from crystal XR01 is used as the main clock, which is input to pin 8 of QR01.

— Key Scan Circuit —

Keys on the full remote control microphone other than 0/FUNC, key lock, power switch, and PTT switch are arranged on a matrix, and read by the key scan operation.
The key scan circuit consists of a matrix of the sort diagrammed below. It is pulled up internally by QR01.
KEYSC0 – KEYSC3 are the input setting ports, and KEYMT0 – KEYMT4 are the output setting ports. Normally, KEYMT0 – KEYMT4 are low level. Microprocessor QR01 reads the low level input to KEYSC0 – KEYSC3 at 14.3 ms intervals. If a key is pressed, QR01 once raises KEYMT0 – KEYMT4 to high level, then switches them back to low level in sequence, beginning with KEYMT0. This low level signal is input to one of the ports between KEYSC0 and KEYSC3, allowing QR01 to determine which key was pressed.

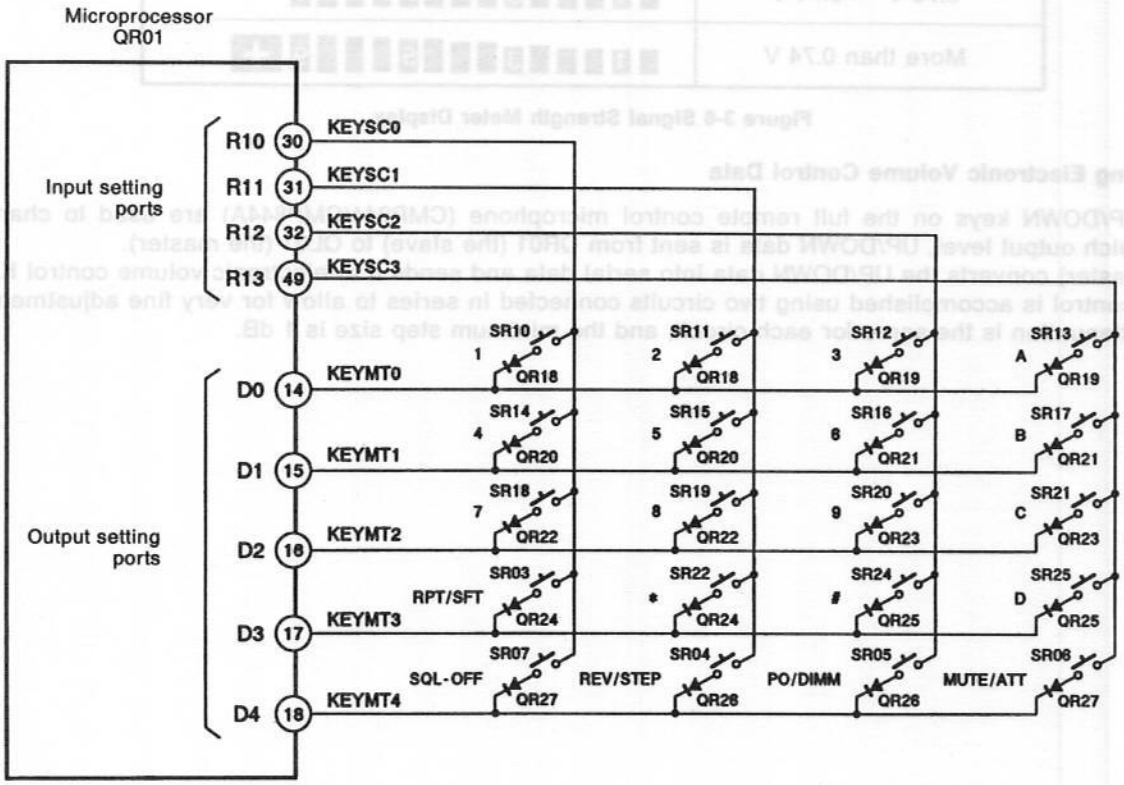


Figure 3-7 Key Scan Circuit

— Display Block (LCD) —

With reference to the display block of full remote control microphone (CMP844/CMP844A), a table listing the pin correspondences between microprocessor QR01 and LCD QR04, and a diagram of the display segments, appear below.

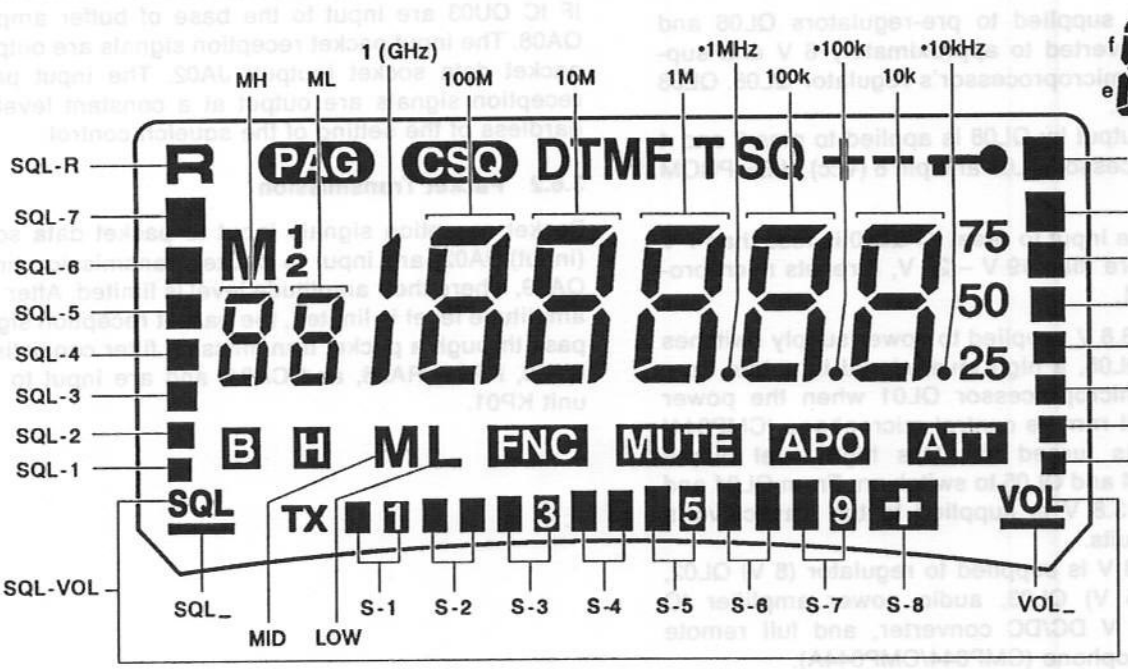


Figure 3-8 Display Segments

LCD Pin Assignment Table (CMP844/CMP844A)

Table 3-4

LCD lower terminal				
LCD pin no.	Microprocessor		Segment	
	Pin no.	Segment	COM1	COM2
1				
2				
3	90		COM1	
4	91			COM2
5	68	31	SQL-	SQL-7
6	69	32	SQL-5	SQL-6
7	70	33	SQL-4	SQL-3
8	71	34	SQL-1	SQL-2
9	67	30	SQL-VOL	SQL__
10	72	35	B	H
11	73	36	1 (GHz)	
12	74	37	MID	LOW
13	75	38	S-1	TX
14	76	39	S-2	S-3
15	77	40	FUNC	MUTE
16	78	41	S-4	S-5
17	79	42	· 1 MHz	(T) SQ
18	80	43	S-6	S-7
19	81	44	· 100 kHz	(+) -
20	82	45	APO	S-8
21	83	46	· 10 kHz	RIT
22	84	47	25	50
23	85	48	75	VOL__
24	67	30	SQL-VOL	
25	86	49	VOL-2	VOL-1
26	87	50	VOL-3	VOL-4
27	88	51	VOL-6	VOL-5
28	89	52	VOL-7	VOL-8
29	90		COM1	
30	91			COM2
31				
32				
33				

LCD upper terminal				
LCD pin no.	Microprocessor		Segment	
	Pin no.	Segment	COM1	COM2
34	90		COM1	
35	91			COM2
36	65	28	10K-c	10K-b
37	64	27	10K-a	KEY
38	63	26	10K-f	10K-g
39	62	25	10K-e	10K-d
40	61	24	100K-c	100K-b
41	60	23	100K-a	+ (–)
42	59	22	100K-f	100K-g
43	58	21	100K-e	100K-d
44	57	20	1M-c	1M-b
45	56	19	1M-a	T (SQ)
46	55	18	1M-f	1M-g
47	54	17	1M-e	1M-d
48	53	16	10M-c	10M-b
49	52	15	10M-a	DTMF
50	51	14	10M-f	10M-g
51	50	13	10M-e	10M-d
52	49	12	100M-c	100M-b
53	48	11	100M-a	CSQ
54	47	10	100M-f	100M-g
55	46	9	100M-e	100M-d
56	45	8	ML-c	ML-d
57	44	7	ML-b	PAG
58	43	6	ML-f	ML-a
59	42	5	ML-e	ML-g
60	66	29	M-2	M-1
61	41	4	MH-c	MH-d
62	40	3	MH-b	MEMORY
63	39	2	MH-f	MH-a
64	38	1	MH-e	MH-g
65	90		COM1	
66	91			COM2

3.5 Power Supply Block

- The 13.8 V supplied via the DC power cable (W002) is supplied to pre-regulators QL06 and QL07, reset IC QL10, and power supply switches QL04 and QL05.
- The 13.8 V supplied to pre-regulators QL06 and QL07 is converted to approximately 6 V and supplied to the microprocessor's regulator QL08. QL08 outputs +5 V.
  The +5 V output by QL08 is applied to pins 3 and 4 of microprocessor QL01 and pin 8 (Vcc) of EE-PROM QL13.
- If the voltage input to reset IC QL10 is less than 7 V – 8 V or more than 19 V – 20 V, it resets microprocessor QL01.
- As for the 13.8 V supplied to power supply switches QL04 and QL05, a high level signal is output from pin 10 of microprocessor QL01 when the power switch of full remote control microphone (CMP844/CMP844A) is turned on. This high level output causes QL04 and QL05 to switch on. From QL04 and QL05, SW 13.8 V is supplied to the transceiver's various circuits.
  The SW 13.8 V is supplied to regulator (8 V) QL02, regulator (5 V) QL03, audio power amplifier IC QA04, a 26 V DC/DC converter, and full remote control microphone (CMP844/CMP844A).
- From regulator (8 V) QL02 is output +8 V. QL02 supplies the +8 V to VCO VHF/UHF switch QP09, UHF/RX + B switch QU06, VHF + B switch QU08, TX + B switch QL12, and FM AF switch QA01.
- VCO VHF/UHF switch QP09 switches its output between VHF-VCO + B and UHF-VCO + B based on the output level of pins 71 and 72 of microprocessor QL01.
  UHF/RX + B switch QU06 switches its output between UHF-RX + B and RX + B based on the output level of pins 68 and 70 of microprocessor QL01.
  VHF + B switch QU08 outputs to VHF-RX + B based on the output level of pin 67 of microprocessor QL01.
  TX + B switch QL12 outputs to TX + B based on the output level of pin 66 of microprocessor QL01.
- From regulator (5 V) QL03 is output +5 V. QL03 supplies this +5 V to D/A converter QP07, VCO unit KP01, electronic volume KA01, thermo sensor QT12, the CTD1200, and the CTN1200.
- Figure 3-9 is a block diagram of the power supply block.

3.6 Packet Block (9600 bps)

3.6.1 Packet Reception

Packet reception signals output from pin 12 of second IF IC QU03 are input to the base of buffer amplifier QA08. The input packet reception signals are output to packet data socket (output) JA02. The input packet reception signals are output at a constant level, regardless of the setting of the squelch control.

3.6.2 Packet Transmission

Packet reception signals input to packet data socket (input) JA02, are input to packet transmission limiter QA09, where their amplitude level is limited. After their amplitude level is limited, the packet reception signals pass through a packet transmission filter consisting of QA10, RA25, RA26, and CA24, and are input to VCO unit KP01.

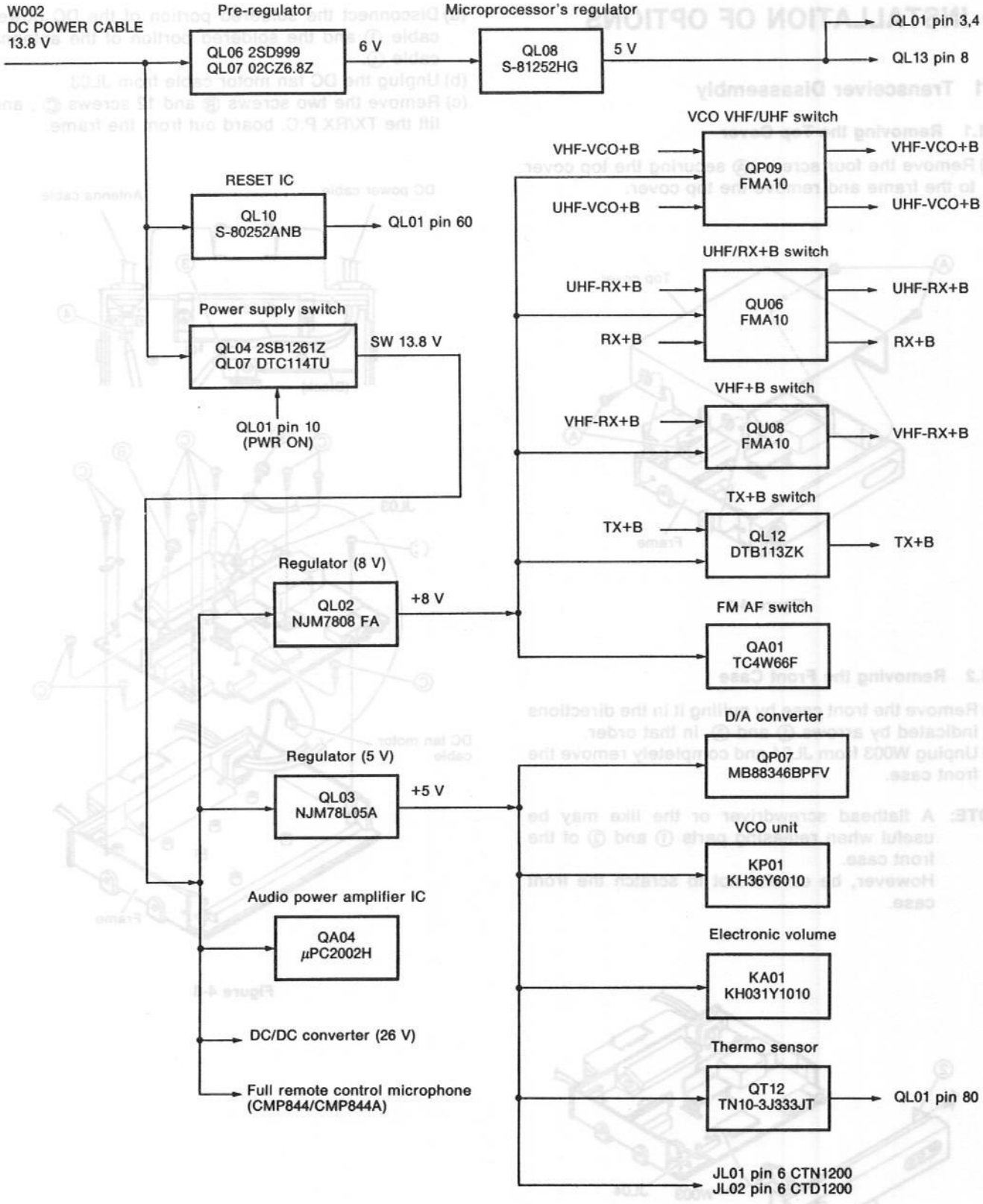


Figure 3-9 Power Supply Block Diagram

4. DISASSEMBLY AND INSTALLATION OF OPTIONS

4.1 Transceiver Disassembly

4.1.1 Removing the Top Cover

(a) Remove the four screws Ⓐ securing the top cover to the frame and remove the top cover.

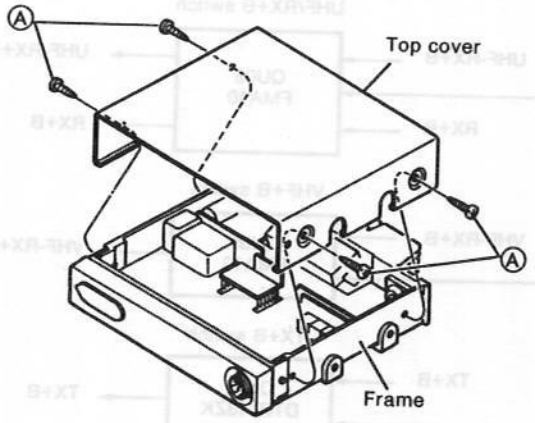


Figure 4-1

4.1.2 Removing the Front Case

(a) Remove the front case by pulling it in the directions indicated by arrows ① and ②, in that order.
(b) Unplug W003 from JL04 and completely remove the front case.

NOTE: A flathead screwdriver or the like may be useful when releasing parts ① and ② of the front case.
However, be careful not to scratch the front case.

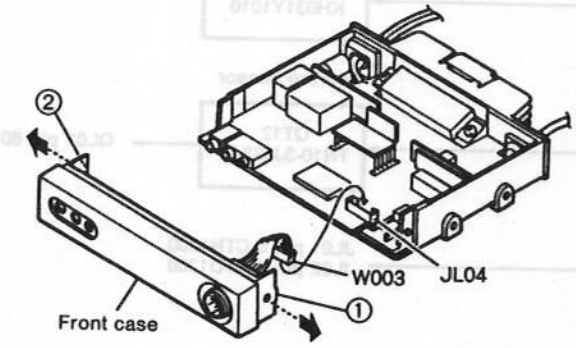


Figure 4-2

4.1.3 Removing the TX/RX P.C. Board

(a) Disconnect the soldered portion of the DC power cable ③ and the soldered portion of the antenna cable ④.
(b) Unplug the DC fan motor cable from JL03.
(c) Remove the two screws Ⓑ and 12 screws Ⓒ , and lift the TX/RX P.C. board out from the frame.

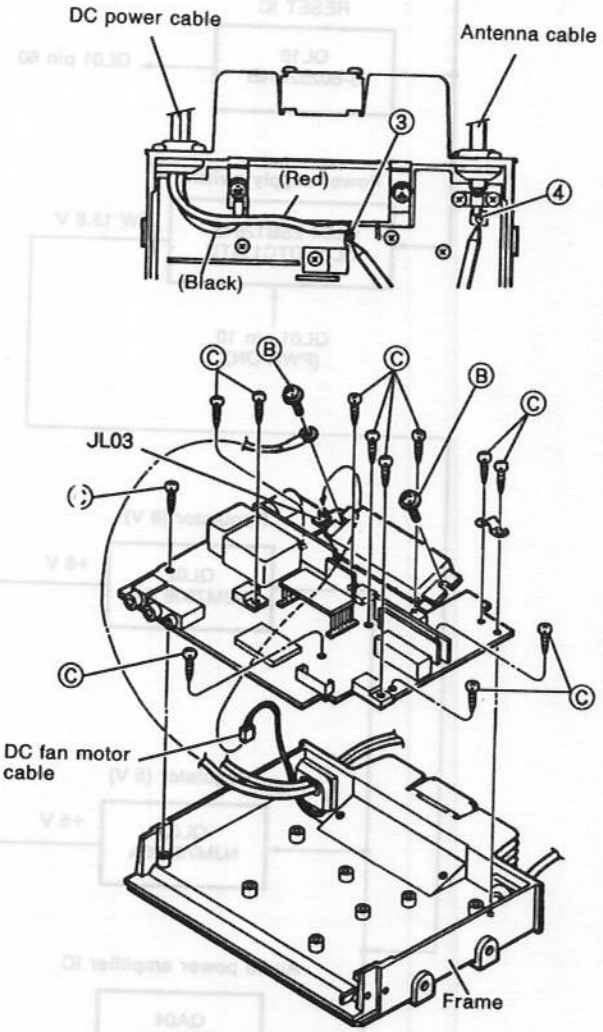


Figure 4-3

4.2 DTMF Unit (CTD1200) Installation

(a) Remove the four screws Ⓐ securing the top cover to the frame and remove the top cover.

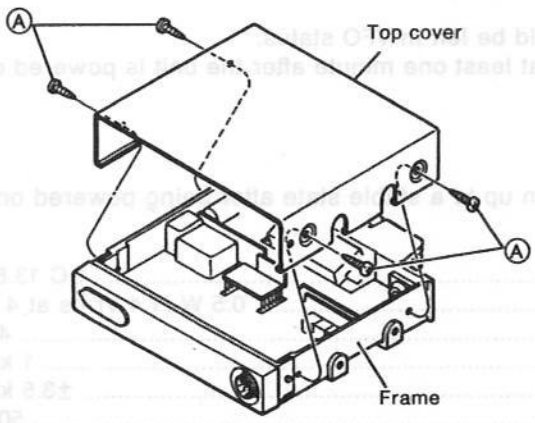


Figure 4-4

(b) Remove the protective paper from the double-sided tape on the CTD1200.

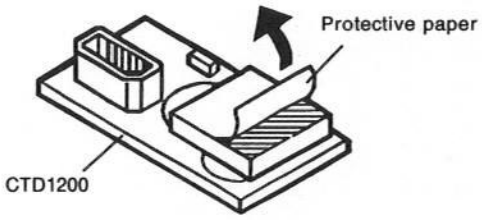


Figure 4-5

(c) Plug the DTMF unit (CTD1200) into JL02.
(d) Close the top cover and secure it in place with the four screws Ⓐ .
This completes the CTD1200 installation procedure.

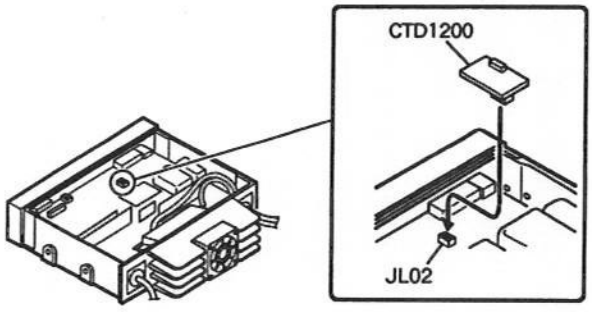


Figure 4-6

4.3 Tone Squelch Unit (CTN1200) Installation

(a) Remove the four screws Ⓐ securing the top cover to the frame and remove the top cover.

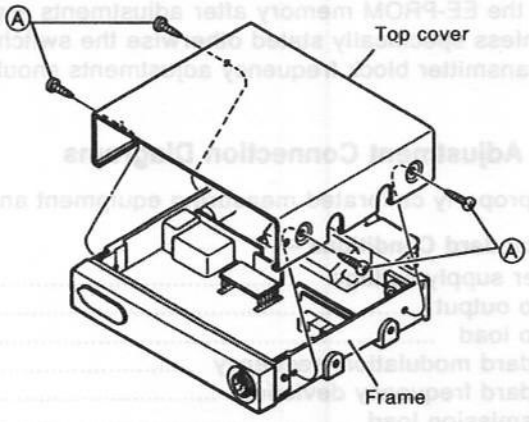


Figure 4-7

(b) Remove the protective paper from the double-sided tape on the CTN1200.

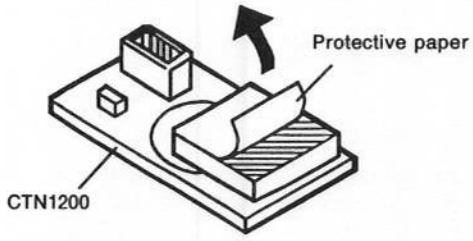


Figure 4-8

(c) Plug the tone squelch unit (CTN1200) into JL01.
(d) Close the top cover and secure it in place with the four screws Ⓐ .
This completes the CTN1200 installation procedure.

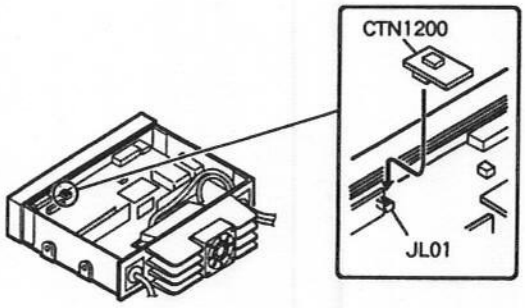


Figure 4-9

5. ADJUSTMENT

NOTE: Pay attention to the following points when performing adjustments.

- The PTT switch should not be depressed unless specifically stated otherwise.
- The transceiver's microprocessor is constantly backed up in EE- PROM. Therefore, be sure to erase the contents of the EE-PROM memory after adjustments are completed.
- Unless specifically stated otherwise the switches (modes) should be left in VFO status.
- Transmitter block frequency adjustments should be performed at least one minute after the unit is powered on.

5.1 Adjustment Connection Diagrams

Use properly calibrated measuring equipment and allow it to warm up to a stable state after being powered on.

— Standard Conditions —

Power supply voltage ..... DC 13.8 V
Audio output ..... 0.5 W (1.4 Vrms at 4 Ω)
Audio load ..... 4 Ω
Standard modulation frequency ..... 1 kHz
Standard frequency deviation ..... ±3.5 kHz
Transmission load ..... 50 Ω
Adjustment frequencies
C1208D/C1208DA
Reception frequency ..... 144.00 MHz
Transmission frequency ..... 146.10 MHz
C1208DS/C1208DM
Reception frequency ..... 145.02 MHz
Transmission frequency ..... 145.10 MHz

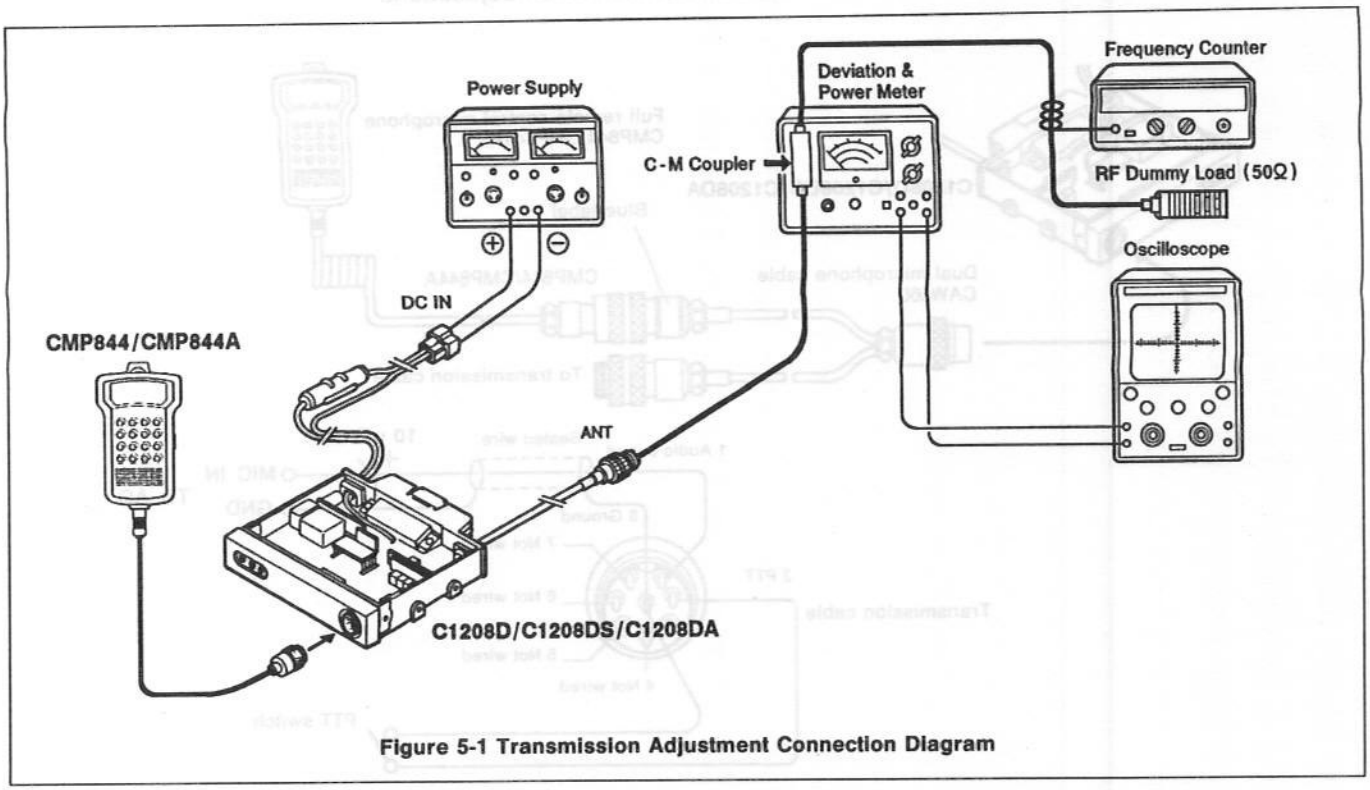


Figure 5-1 Transmission Adjustment Connection Diagram

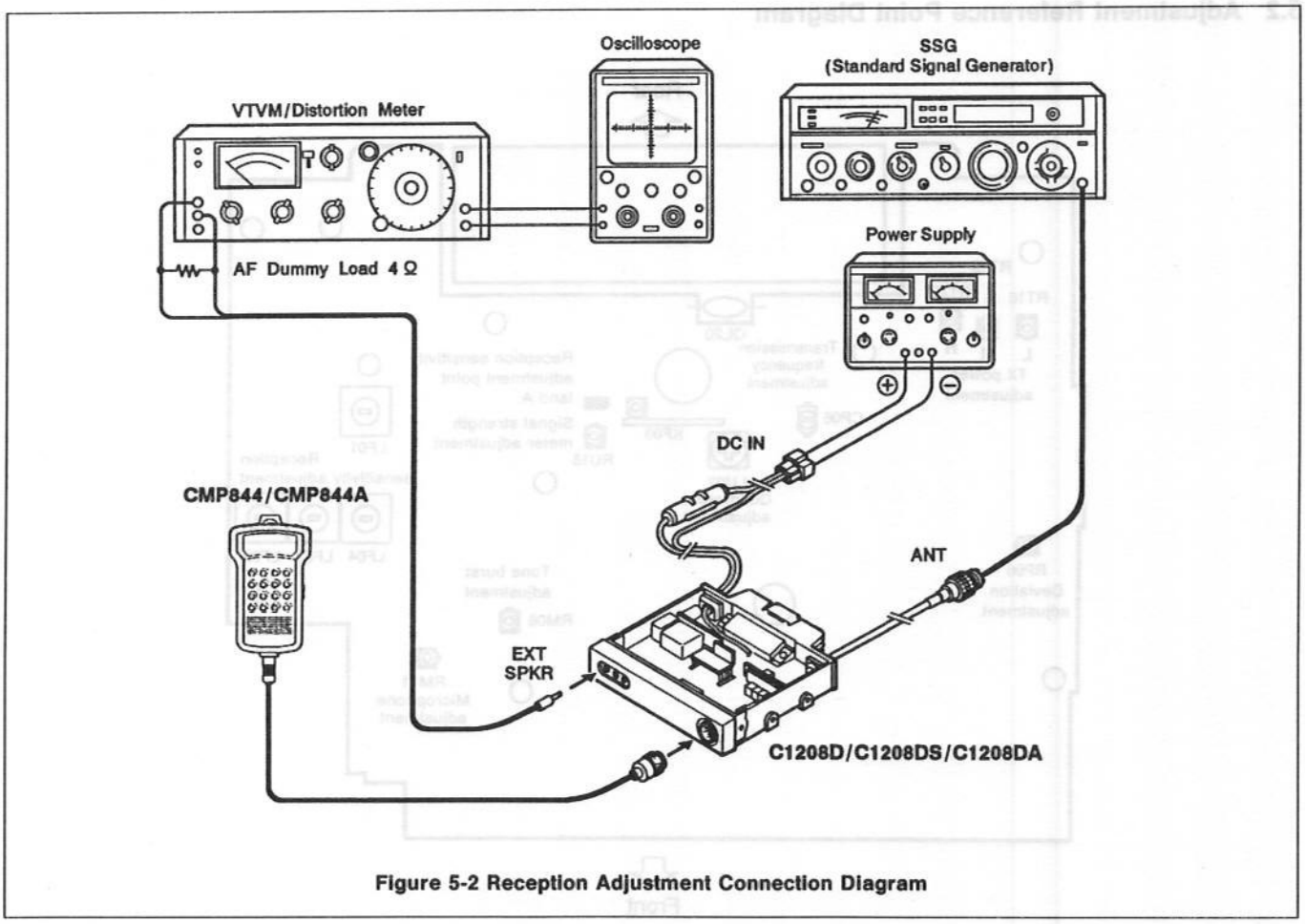


Figure 5-2 Reception Adjustment Connection Diagram

NOTE: Make connections as shown below for transmission deviation adjustment.

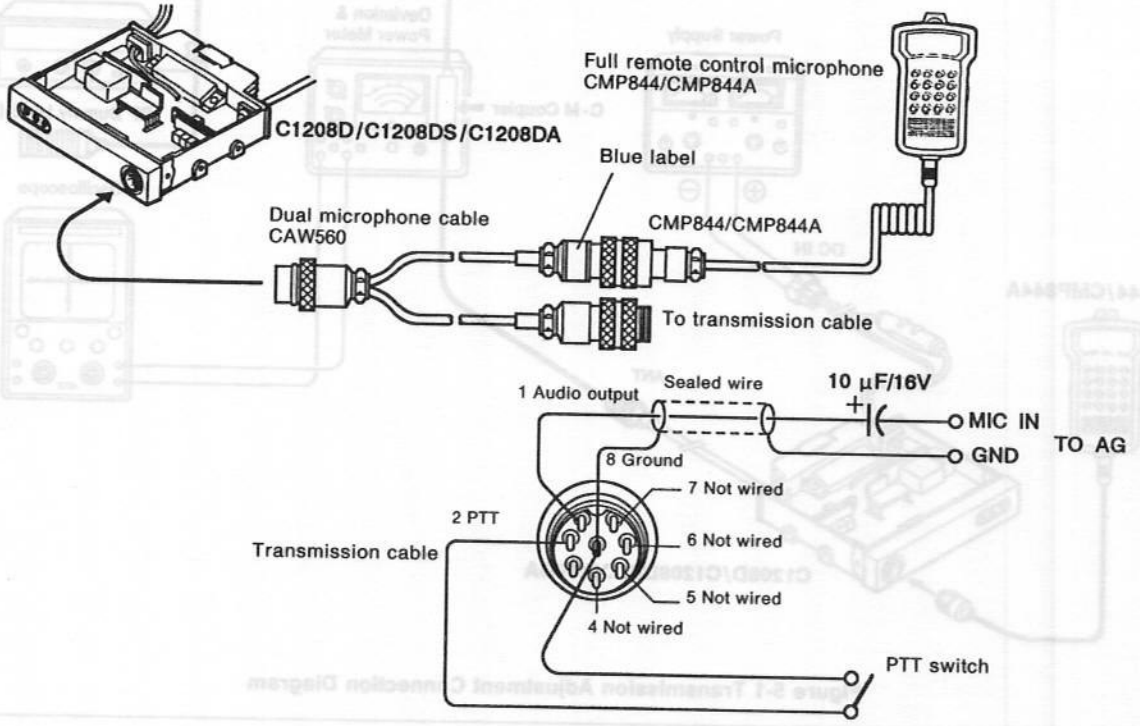


Figure 5-3 Transmission Cable

5.2 Adjustment Reference Point Diagram

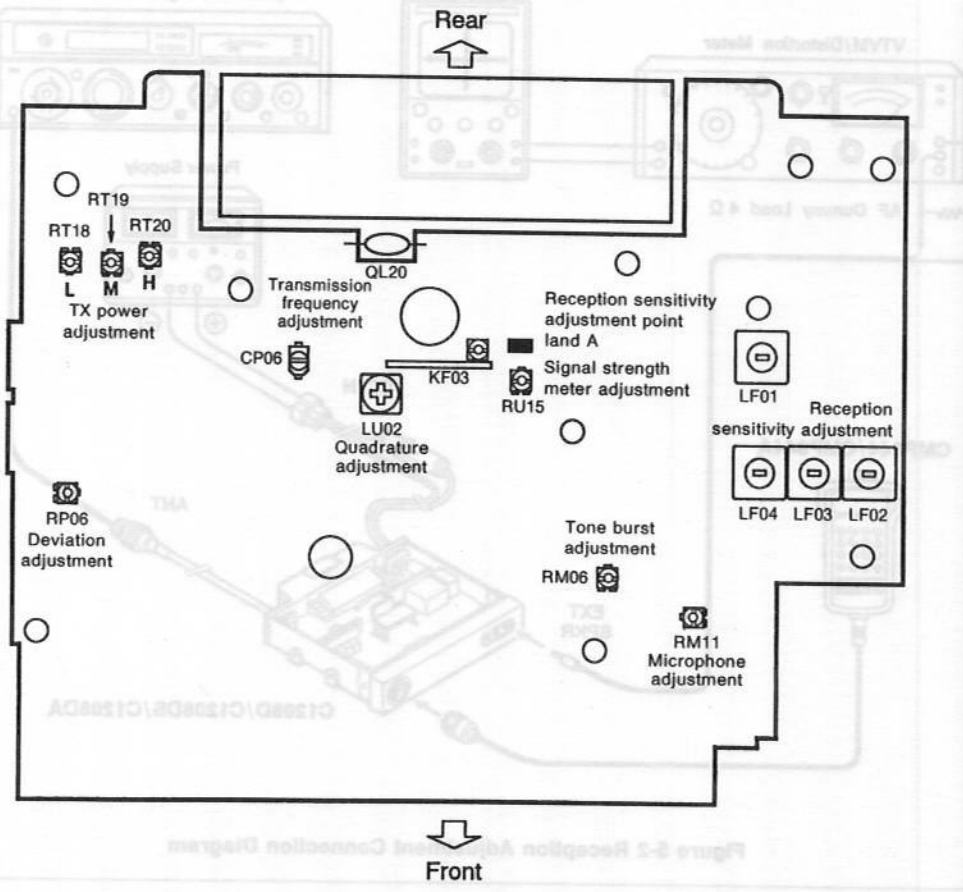


Figure 5-4 Adjustment Reference Point Diagram (Top View)

5.3 Adjustment

5.3.1 PLL Block

Conditions

- Transceiver frequency
  C1208D/C1208DA ..... 146.00 MHz (reception)
  C1208DS ..... 145.00 MHz (reception)
- Squelch level ..... Minimum
  (display: no level indication)
- Volume level ..... Minimum
  (display: no level indication)
- Repeater mode ..... Simplex
- Power supply voltage ..... DC 13.8 V

— Lock Confirmation —

(a) Power on the transceiver. (Receive status.)
(b) At this point, confirm that the frequency indication on the display of the full remote control microphone (CMP844/CMP844A) is not blinking.

NOTE: The indication blinks if the VCO circuit is in unlocked status.

5.3.2 Transmitter Block

Conditions

- Transceiver frequency
  C1208D/C1208DA ..... 146.10 MHz (transmission)
  C1208DS ..... 145.10 MHz (transmission)
- Squelch level ..... Minimum
  (display: no level indication)
- Volume level ..... Minimum
  (display: no level indication)
- Repeater mode ..... Simplex
- Power supply voltage ..... DC 13.8 V

— Transmission Power Adjustment —

NOTE: Always perform transmission power adjustments in the following order: low power, middle power, high power. Also, since it is necessary to switch the transceiver to the transmit mode for these adjustments, they should be performed as quickly as possible.

(a) Set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(b) Press the Po key on the full remote control microphone (CMP844/CMP844A) to select low power (L indication displayed).
Press the PTT switch to activate the transmit mode.
(c) At this point, adjust RT18 so that the transceiver's transmission power is 3.0 W.
After making adjustments, release the PTT switch to return the transceiver to the receive mode.
(d) Once again press the Po key on the full remote control microphone (CMP844/CMP844A) to select medium power (M indication displayed).
Press the PTT switch to activate the transmit mode.
(e) At this point, adjust RT19 so that the transceiver's transmission power is 10.0 W.
After making adjustments, release the PTT switch to return the transceiver to the receive mode.
(f) Once again press the Po key on the full remote control microphone (CMP844/CMP844A) to select high power (L and M indications disappear).
Press the PTT switch to activate the transmit mode.
(g) At this point, adjust RT20 so that the transceiver's transmission power is 53.0 W.
After making adjustments, release the PTT switch to return the transceiver to the receive mode.
(h) Once again, check the transmission power levels in the low, middle, and high settings to ensure that the adjustments are not off.

— Transmission Signal Strength Meter Confirmation —

(a) Press the Po key on the full remote control microphone (CMP844/CMP844A) to select low power (L indication displayed).
Press the PTT switch to activate the transmit mode.
(b) At this point, confirm that the transmission signal strength meter on the full remote control microphone (CMP844/CMP844A) registers as far as S3.
(c) Press the Po key on the full remote control microphone (CMP844/CMP844A) to select middle power (M indication displayed).
Press the PTT switch to activate the transmit mode.
(d) At this point, confirm that the transmission signal strength meter on the full remote control microphone (CMP844/CMP844A) registers as far as S5.
(e) Press the Po key on the full remote control microphone (CMP844/CMP844A) to select high power (L and M indications disappear).
Press the PTT switch to activate the transmit mode.
(f) At this point, confirm that the transmission signal strength meter on the full remote control microphone (CMP844/CMP844A) registers full scale.

— Power Protector Confirmation —

(a) Connect a through-type power meter to the transceiver via a coaxial cable with a total length of 50 cm. The load should be set to OPEN on the through-type power meter.
(b) Set the transceiver transmission power to high.
At this point, confirm that transceiver's transmission power is 30 W or less.

— Transmission Frequency Adjustment —

(a) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(b) Switch the transceiver to transmit mode. At this point, for the C1208D/C1208DA, adjust CP06 so that the frequency counter reads 146.100 MHz (±5 ppm).
For the C1208DS, adjust CP06 so that the frequency counter reads 145.100 MHz.

NOTE: Perform this adjustment as accurately as possible.

— Deviation Adjustment —

NOTE: A dual microphone cable (CAW560) is required in order to perform the deviation adjustment.

(a) Input a 1 kHz, 50 mV (OPEN) sine wave to the transceiver from the audio generator (AG).
(b) Press the PTT switch to put the transceiver into the transmit mode. At this point, adjust RP06 so that the maximum deviation is ±5.0 kHz.
After making adjustments, release the PTT switch to return the transceiver to the receive mode.
(c) Input a 1 kHz, 5 mV (OPEN) sine wave to the transceiver from the audio generator (AG).
(d) Press the PTT switch to put the transceiver into the transmit mode. At this point, adjust RM11 so that the standard deviation is ±3.5 kHz.
After making adjustments, release the PTT switch to return the transceiver to the receive mode.
(e) Once again, input a 1 kHz, 50 mV (OPEN) sine wave to the transceiver from the audio generator (AG).
(f) Press the PTT switch to put the transceiver into the transmit mode. At this point, confirm that the maximum deviation is ±5.0 kHz.
After confirmation, release the PTT switch to return the transceiver to the receive mode.
(g) If the maximum deviation value in step (f) is outside specification, repeat adjustments (b) through (d).

— Tone Burst Adjustment —

(a) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(b) Press the PTT switch on the full remote control microphone (CMP844/CMP844A) to activate the transmission mode.
At this point, press the SQL OFF switch.
(c) Adjust RM06 so that tone deviation is ±3.5 kHz.

— DTMF Deviation Confirmation (CTD1200) —

(a) Install the CTD1200 in the transceiver.
The CTD1200 is already installed in the C1208DA.
(b) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(c) Press the PTT switch on the full remote control microphone (CMP844/CMP844A) to activate the transmission mode.
Then press the 8 key.
(d) At this point, confirm that deviation is between ±2.5 kHz and ±4.5 kHz.

— DTMF Deviation Adjustment (CTD1200) —

Deviation adjustment is performed on the CTD1200.

NOTE: The CTD1200 is adjusted at the factory to produce the optimum deviation level. It is not normally necessary to adjust it after installation. Should adjustment be necessary, however, the procedure is as follows.

(a) Install the CTD1200 in the transceiver.
The CTD1200 is already installed in the C1208DA.
(b) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(c) Press the PTT switch on the full remote control microphone (CMP844/CMP844A) to activate the transmission mode.
Then press the 8 key.
(d) Adjust the semi-fixed resistor on the CTD1200 so that deviation is ±3.2 kHz.

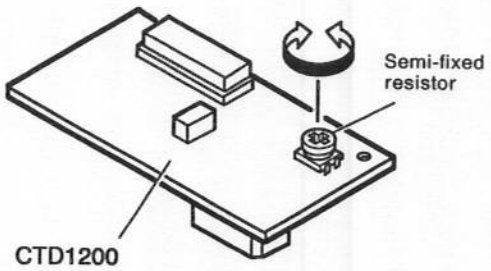


Figure 5-5

— Tone Deviation Confirmation (CTN1200) —

(a) Install the CTN1200 in the transceiver.
The CTN1200 is already installed in the C1208DA.
(b) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(c) Use the full remote control microphone (CMP844/CMP844A) to activate the tone encode mode (T).
(d) Press the PTT switch on the full remote control microphone to activate the transmission mode.

NOTE: Ensure that no external noise is picked up by the microphone while the transceiver is in the transmit mode.

(e) At this point, confirm that deviation is between ±0.5 kHz and ±1.0 kHz.

— Tone Deviation Adjustment (CTN1200) —

Deviation adjustment is performed on the CTN1200.

NOTE: The CTN1200 is adjusted at the factory to produce the optimum deviation level. It is not normally necessary to adjust it after installation. Should adjustment be necessary, however, the procedure is as follows.

(a) Install the CTN1200 in the transceiver.
The CTN1200 is already installed in the C1208DA.
(b) For the C1208D/C1208DA, set the transceiver frequency to 146.10 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.10 MHz.
(c) Use the full remote control microphone (CMP844/CMP844A) to activate the tone encode mode (T).
(d) Press the PTT switch on the full remote control microphone to activate the transmission mode.

NOTE: Ensure that no external noise is picked up by the microphone while the transceiver is in the transmit mode.

(e) Adjust the semi-fixed resistor on the CTN1200 so that tone deviation is ±0.7 kHz.

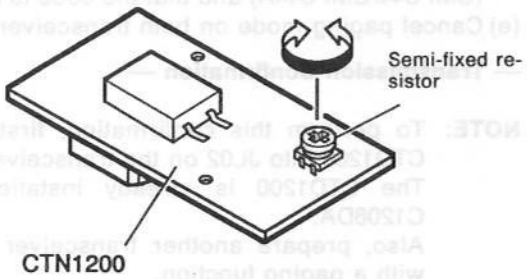


Figure 5-6

5.3.3 Receiver Block

Conditions
- Transceiver frequency
  VHF band
  C1208D/C1208DA ... 144.00 MHz (reception)
  C1208DS/C1208DM . 145.02 MHz (reception)
  UHF band ..... 435.02 MHz (reception)
  C1208D/C1208DA/C1208DS .....
  435.02 MHz (reception)
  C1208DM ..... 438.02 MHz (reception)
- Squelch level ..... Minimum
  (display: no level indication)
- Volume level ..... Any setting
- Repeater mode ..... Simplex
- Power supply voltage ..... DC 13.8 V

— VHF Band Reception Sensitivity Adjustment —

(a) For the C1208D/C1208DA, set the transceiver frequency to 144.00 MHz (receive mode).
For the C1208DS, set the transceiver frequency to 145.02 MHz.
(b) Make the following settings on the standard signal generator (SSG):
Frequency
C1208D/C1208DA ..... 144.00 MHz
C1208DS ..... 145.02 MHz
Standard modulation frequency ..... 1 kHz
Standard frequency deviation ..... ±3.5 kHz
(c) Connect the tester to the output side of RU15 (land A). Input a signal from the SSG to the transceiver using the settings in (b) above.
At this point, adjust LF01, LF02, LF03, and LF04, in that order, so that the RU15 output side voltage (signal strength meter voltage) is maximized.
(d) Repeat the adjustment (c) two or three times.

NOTE: When performing the reception sensitivity adjustment, adjust the SSG output level as required to prevent the RU15 output side voltage (signal strength meter voltage) from becoming saturated.

(e) Also, adjust LU02 so that the audio output voltage is maximized (maximum sine wave amplitude on oscilloscope).
At this point, confirm that 12 dB SINAD is approximately –8 dBμ.
(f) While holding down the function key on the full remote control microphone (CMP844/CMP844A), press the MUTE/ATT key. (RF-attenuator is activated.)
After setting the SSG output level to +7 dBμ, confirm that SINAD is 12 dB or greater.

— Signal Strength Meter Adjustment —

(a) For the C1208D/C1208DA, apply a frequency 146.00 MHz, output level +10 dBμ, unmodulated signal to the transceiver.
For the C1208DS, apply a frequency 145.02 MHz, output level +10 dBμ, unmodulated signal to the transceiver.
(b) Adjust RU15 so that the signal strength meter on the full remote control microphone (CMP844/CMP844A) registers as far as S5.
(c) Confirm that when the SSG output level is changed to +40 dBμ, the signal strength meter on the full remote control microphone registers full scale.

— UHF Band Reception Sensitivity Adjustment —

(a) For the C1208D/C1208DS/C1208DA, set the transceiver frequency to 435.02 MHz (receive mode).
For the C1208DM, set the transceiver frequency to 438.02 MHz (receive mode).
Confirm that 12 dB SINAD is –7 dBμ or less.
(b) While holding down the function key on the full remote control microphone (CMP844/CMP844A), press the MUTE/ATT key. (RF-attenuator is activated.)
After setting the SSG output level to +5 dBμ, confirm that SINAD is 12 dB or greater.

5.4 Confirmation

5.4.1 Full Remote Control Microphone (CMP844/CMP844A) Operation

NOTE: The PTT switch and SQL OFF switch are in opposite locations on the CMP844 and CMP844A. Keep this in mind when performing the following confirmations.

— Confirmation of Power On/Off Operation with Optional Cable Connected —

(a) Connect five 4 m microphone extension cables (CAW562) between the transceiver and the full remote control microphone (CMP844/CMP844A).
(b) Press the power switch on the full remote control microphone and confirm that the transceiver turns on. Perform the confirmations described below with the unit in this status.

— Key and Display Confirmation —

(a) Press the various keys on the full remote control microphone and confirm that the proper display indications appear.
(b) Activate the set mode (hold down the 0/FUNC key and press the D/BAND key).
Press the A/VO-SQ ▲ key to make all of the display segments appear. Confirm that there are no segments that are not showing. Also confirm that the display illumination is not uneven.
Once again hold down the 0/FUNC key and press the D/BAND key to cancel the set mode.

— Audio Modulation Confirmation —

(a) Prepare a receiver for use as a monitor. (Put it into receive status.)
(b) Press the PTT switch on the CMP844/CMP844A and talk into the microphone. (This puts the C1208D/C1208DS/C1208DA into transmit status.)
(c) Confirm that sound issues from the speaker of the monitor transceiver.

— Speaker Output Confirmation —

(a) Put the transceiver into receive status and set the volume level to maximum. Confirm that sufficient volume issues from the speaker at this point. Also, tune to a channel with no signal and confirm that there is no buzzing when squelch is turned off and the volume is set to maximum.
(b) Once again press the power switch on the full remote control microphone. Confirm that the power switches off.

5.4.2 Microprocessor Reset Voltage

(a) Lower the power supply voltage of the transceiver starting from 13.8 V and confirm that the voltage at the point where the display goes blank is between 7 V and 8 V.
(b) Raise the power supply voltage of the transceiver starting from 13.8 V and confirm that the voltage at the point where the display goes blank is between 19 V and 20 V.

5.4.3 Paging Mode Operation

— Reception Confirmation —

NOTE: To perform this confirmation, first plug the CTD1200 into JL02 on the transceiver.
The CTD1200 is already installed in the C1208DA.
Also, prepare another transceiver equipped with a paging function.

(a) Set a paging code for the C1208D/C1208DS/C1208DA and the other transceiver.
(Switch to the paging mode and press the 0/FUNC key, followed by the 4/PG-C key. Next, press the * ENT · DIRECT key to enter the code setting mode.)
(b) Switch both transceivers into the paging mode. (Press the 4/PG- C key.)
Confirm that no noise issues from the speaker.
(c) Switch the other transceiver to the transmit mode. (Leave the C1208D/C1208DS/C1208DA in the receive mode.)
(d) Confirm that three short beeps issue from the C1208D/C1208DS/C1208DA.
Confirm that at this point the indication PAG flashes on the display of the full remote control microphone (CMP844/CMP844A) and that the code is displayed.
(e) Cancel paging mode on both transceivers.

— Transmission Confirmation —

NOTE: To perform this confirmation, first plug the CTD1200 into JL02 on the transceiver.
The CTD1200 is already installed in the C1208DA.
Also, prepare another transceiver equipped with a paging function.

(a) Set a paging code for the C1208D/C1208DS/C1208DA and the other transceiver.
(Switch to the paging mode and press the 0/FUNC key, followed by the 4/PG-C key. Next, press the * ENT · DIRECT key to enter the code setting mode.)
(b) Switch both transceivers into the paging mode. (Press the 4/PG- C key.)
Confirm that no noise issues from the speaker.
(c) Switch the C1208D/C1208DS/C1208DA to the transmit mode.
Confirm at this point that DTMF tones issue from the speaker of the full remote control microphone (CMP844/CMP844A).
(d) Confirm that DTMF tones are received by the other transceiver.
(e) Cancel paging mode on both transceivers.

5.4.4 Tone Squelch (CTCSS) Operation

— Reception Confirmation —

NOTE: To perform this confirmation, first plug the CTN1200 into JL01 on the transceiver.
The CTN1200 is already installed in the C1208DA.
Also, prepare another transceiver equipped with a tone squelch function.

(a) Set the same tone frequency for the C1208D/C1208DS/C1208DA and the other transceiver.
(Switch to the tone frequency setting mode by pressing the 0/FUNC key, followed by the 6/T-SQL key.)
(b) Switch the C1208D/C1208DS/C1208DA to the tone squelch mode.
(The indication TSQ appears on the display of the C1208D/C1208DS/C1208DA.)
(c) Switch the other transceiver to the transmit mode and confirm that squelch does not open when the C1208D/C1208DS/C1208DA receives the signal.
(d) Switch the other transceiver to the tone squelch mode.
(e) Switch the other transceiver to the transmit mode and confirm that squelch opens (the tone frequencies match) when the C1208D/C1208DS/C1208DA receives the signal.
(f) Cancel tone squelch mode on both transceivers.

— Transmission Confirmation —

NOTE: To perform this confirmation, first plug the CTN1200 into JL01 on the transceiver.
The CTN1200 is already installed in the C1208DA.
Also, prepare another transceiver equipped with a tone squelch function.

(a) Set the same tone frequency for the C1208D/C1208DS/C1208DA and the other transceiver.
(Switch to the tone frequency setting mode by pressing the 0/FUNC key, followed by the 6/T-SQL key.)
(b) Switch the both transceivers to the tone squelch mode.
(The indication TSQ appears on the display of the C1208D/C1208DS/C1208DA.)
(c) Switch the C1208D/C1208DS/C1208DA to the transmit mode.
Confirm at this point that squelch opens on the other (monitor) transceiver.
(d) Cancel tone squelch mode on both transceivers.

5.4.5 Beep Level

(a) Connect an oscilloscope to the transceiver's external speaker socket via a 4 Ω dummy.
(b) Press the 2/DOWN and 3/UP keys.
Confirm that the voltage of the waveform on the oscilloscope display is between 0.3 Vp-p and 0.5 Vp-p the moment the keys are pressed.

5.4.6 Audio Mute Operation

(a) Connect an oscilloscope to the transceiver's external speaker socket via a 4 Ω dummy.
(b) Press the squelch off switch so that white noise issues from the speaker.
Make the white noise level at this point 0 dB.
(c) Press the MUTE/ATT key to put the transceivers into mute status.
At this point, confirm that the white noise level is between –17 dB and –23 dB.

5.4.7 Packet Operation

— Reception Confirmation —

(a) Make the following settings on the standard signal generator (SSG):

Frequency ..... 145.02 MHz
Modulation frequency ..... 4,800 Hz
Frequency deviation ..... ±2.5 kHz
Output level ..... 60 dBμ

(b) Connect an oscilloscope to the transceiver's external speaker socket via a packet plug (Figure 5-7). Confirm that the packet data output socket output level (RX audio) at this point is between 0.1 V and 0.3 V.

(c) Next, connect a tester (resistance meter) between SQL and GND of the packet plug. At this point, confirm that a current is flowing (low impedance).

(d) Confirm that the current flow in the tester (resistance meter) between SQL and GND of the packet plug stops (high impedance) when the input signal from the SSG is cut off.

— Transmission Confirmation —

(a) Apply a 4,800 Hz, 0.7 V (rms) sine wave from the AG to the packet data input socket via the packet plug.

(b) Short the packet PTT terminal to a ground to switch the transceiver to transmit status.

(c) Confirm that the deviation of the packet transmission signal at this point is between ±2.0 and ±3.0 kHz.

5.4.8 All-Reset Operation

NOTE: Performing the all-reset operation will erase all data stored in the transceiver's memory.

(a) While holding down the 0/FUNC key, press the power switch to enter reset status.

(b) Use the 2/DOWN and 3/UP keys to select [AL res C] as the reset method.
Next, press the C/SQL key to perform all-reset.

(c) At this point, for the C1208D/C1208DA, confirm that the display of the full remote control microphone reads 146.000 MHz. For the C1208DS, confirm that the display of the full remote control microphone reads 146.520 MHz. For the C1208DM, confirm that the display of the full remote control microphone reads 145.000 MHz.
Performing all-reset deletes all data from memory and puts the transceiver into the VFO mode.

5.4.9 Cooling Blower Operation

NOTE: Remove the top case of the C1208D/C1208DS/C1208DA before performing the following confirmations.

(a) Use a hair dryer or the like to heat the area around QL20 on the P.C. board and confirm that fan motor M801 begins to operate.

(b) While fan motor M801 is operating, apply quick cool spray to the area around QL20 on the P.C. board. Confirm that the fan motor shuts off.

NOTE: Fan motor M801 should start to operate when the area around QL20 reaches a temperature of approximately 50 degrees.

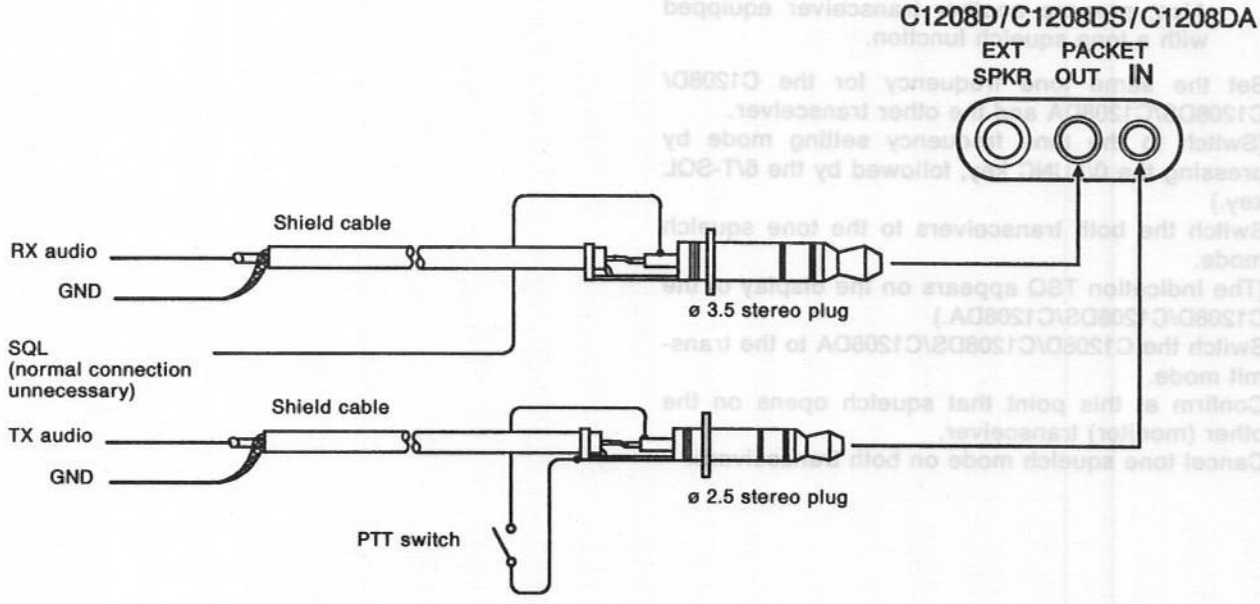


Figure 5-7 Packet Plug

6. SPECIFICATIONS

6.1 General

Transmission frequency range	
C1208D/C1208DA	144.000 MHz — 147.995 MHz
C1208DS/C1208DM	144.000 MHz — 145.995 MHz
Reception frequency range	
C1208D/C1208DA	144.000 MHz — 147.995 MHz
C1208DS/C1208DM	144.000 MHz — 145.995 MHz
C1208D/C1208DS	430.000 MHz — 439.995 MHz
C1208DA	420.000 MHz — 449.995 MHz
C1208DM	436.000 MHz — 439.995 MHz
Frequency types	F1, F2, F3
Rated voltage	DC 13.8 V ±15%
Current consumption	
Transmission (high power)	11.0 A
Transmission (middle power)	5.2 A
Transmission (low power)	3.8 A
Battery-save operation	0.5 A
Microphone input impedance	600 Ω
Low-frequency output impedance	4 Ω
Antenna impedance	50 Ω
Operating temperature range	–20°C — +60°C
Frequency stability	±10 ppm
Antenna connector	M-type (includes cable)
Ground type	Negative ground
Transceiver dimensions	(W x H x D) 140 x 30 x 147 mm
Weight	750 g

6.2 Receiver

— Measurements are made in accordance with EIA RS204-B —

Receiving method	Double super heterodyne
Intermediate frequencies	
First IF	23.05 MHz (lower)
Second IF	455 kHz (lower)
Receiving sensitivity (12 dB SINAD)	–8 dB (0.201 μV)
Selectivity	12 kHz or better (–6 dB)
	24 kHz or better (–60 dB)
Squelch open sensitivity	–11 dBμ (0.141 mV)
Audio output	3.0 W (10% distortion)
S/N ratio at 0.5 μV input	30 dB or greater

6.3 Transmitter

— Measurements are made in accordance with EIA RS152-B —

Transmission output power	
High power	50 W
Middle power	10 W
Low power	3 W
Modulation method	Reactance modulation
Maximum frequency deviation	±5 kHz
Spurious ratio	–60 dB
Modulation distortion	3% or less (at 70% modulation)

6.4 Full Remote Control Microphone (CMP844/CMP844A)

Input impedance	600 Ω
Power supply voltage	DC 13.8 V ±15%
Operating temperature range	–20°C — +60°C
Dimensions	(W x H x D) 57x 110 x 29 mm
Spiral cord length	3.5 m
Weight	Approx. 170 g
Speaker impedance	8 Ω
Speaker diameter	40 mm

6.5 DTMF Unit (CTD1200)

Standard oscillation frequency	3.579545 MHz
Output frequencies	Dual tone (697 Hz — 1,633 Hz)
Output level	13 mV (RMS) at 10 kΩ load
Tone distortion	10% or less
Input sensitivity	60 mV (RMS) or less

6.6 Tone Squelch Unit (CTCSS)

Standard oscillation frequency	1.0 MHz
Output frequencies	38 (67.0 Hz — 250.3 Hz)
Output level	680 mV (RMS) at 22 kΩ load
Tone distortion	10% or less
Input sensitivity	30 mV (RMS) or less

Specifications are subject to change without notice due to product improvements.

7. PARTS LIST

- Parts List
  The parts list contains information on electrical parts.
  Parts used only in the C1208D are indicated by the notation [D] in the description column.
  Parts used only in the C1208DS are indicated by the notation [DS] in the description column.
  Parts used only in the C1208DA are indicated by the notation [DA] in the description column.

- Chip Parts
  Part numbers whose first three characters correspond to the following codes indicate chip parts.

— Capacitors —	— Resistors —	— Semiconductors —	— Coils —
DD4.....	NI.....	BA.....	LU.....
DD5.....	NN.....	HX.....	
DD9.....	NY.....	HY.....	
DF9.....	RI.....	HZ.....	
DK4.....			
DK5.....			
DK9.....			
EY.....			

- Ordering Replacement Parts
  Please supply the following information when ordering:
  Part symbol (4 characters)
  Part number (10 characters)
  "Description"
  Model name and product number

[D] - - - C1208D
[DS] - - C1208DS
[DA] - - C1208DA

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
PM01	1	WG183B1012	P.C.BOARD FOR TX/RX/CONTROL
CA01	1	DK56473200	0.047 μF ± 10 %
CA02	1	DK56473200	0.047 μF ± 10 %
CA03	1	EY15601020	TANTAL.CAP. 15 μF/10 V
CA04	1	EY47601020	TANTAL.CAP. 47 μF/10 V
CA05	1	DK96103200	0.01 μF ± 10 %
CA06	1	DK96102300	1000 pF ± 10 %
CA07	1	DK56473200	0.047 μF ± 10 %
CA08	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CA09	1	DK56104200	0.1 μF ± 10 %
CA10	1	DK96102300	1000 pF ± 10 %
CA11	1	EA33702580	ELECT.CAP. 330 μF/25 V
CA12	1	EA10701010	ELECT.CAP. 100 μF/10 V
CA13	1	EJ22701010	ELECT.CAP. 220 μF/10 V
CA14	1	DF95104060	0.1 μF ± 5 %
CA17	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CA18	1	DK56104200	0.1 μF ± 10 %
CA19	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CA21	1	DK56104200	0.1 μF ± 10 %
CA22	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CA24	1	DK96222300	2200 pF ± 10 %
CA25	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CA26	1	DK96102300	1000 pF ± 10 %
CA27	1	DK96102300	1000 pF ± 10 %
CA28	1	DK96102300	1000 pF ± 10 %
CA29	1	DK96102300	1000 pF ± 10 %
CF01	1	DK96102300	1000 pF ± 10 %
CF02	1	DK96102300	1000 pF ± 10 %
CF03	1	DK96102300	1000 pF ± 10 %
CF04	1	DK96102300	1000 pF ± 10 %
CF05	1	DK96102300	1000 pF ± 10 %
CF06	1	DK96102300	1000 pF ± 10 %
CF07	1	DK96102300	1000 pF ± 10 %
CF08	1	DK96103200	0.01 μF ± 10 %
CF09	1	DK96102300	1000 pF ± 10 %
CF10	1	DK96102300	1000 pF ± 10 %
CF11	1	DK96102300	1000 pF ± 10 %
CF12	1	DK96102300	1000 pF ± 10 %
CF13	1	DD90010300	1 pF ± 0.25 pF (CK)
CF14	1	DK96102300	1000 pF ± 10 %
CF15	1	DK96103200	0.01 μF ± 10 %
CF16	1	DD90010300	1 pF ± 0.25 pF (CK)
CF17	1	DK96102300	1000 pF ± 10 %
CF18	1	DD90020300	2 pF ± 0.25 pF (CK)
CF19	1	DK96102300	1000 pF ± 10 %
CF20	1	DD95220300	22 pF ± 5 % (CG)
CF21	1	DK96103200	0.01 μF ± 10 %
CF22	1	DK96102300	1000 pF ± 10 %
CF23	1	DD90020300	2 pF ± 0.25 pF (CK)
CF24	1	DK96102300	1000 pF ± 10 %
CF25	1	DK96103200	0.01 μF ± 10 %
CF26	1	DK96103200	0.01 μF ± 10 %
CF27	1	DK96103200	0.01 μF ± 10 %
CF28	1	DD95101300	100 pF ± 5 % (CG)
CF29	1	DK96102300	1000 pF ± 10 %

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
CF30	1	DK96103200	0.01 μF ± 10 %
CF31	1	DK96102300	1000 pF ± 10 %
CF33	1	DD90020300	2 pF ± 0.25 pF (CK)
CF34	1	DK96103200	0.01 μF ± 10 %
CF35	1	DD95101300	100 pF ± 5 % (CG)
CF36	1	DK96102300	1000 pF ± 10 %
CF37	1	DK96102300	1000 pF ± 10 %
CF38	1	DK96102300	1000 pF ± 10 %
CF39	1	DK96102300	1000 pF ± 10 %
CF42	1	DD95101300	100 pF ± 5 % (CG)
CF44	1	DK96102300	1000 pF ± 10 %
CF45	1	EY33601020	TANTAL.CAP. 33 μF/10 V
CF46	1	EY47500630	TANTAL.CAP. 4.7 μF/6.3 V
CF47	1	DD95180300	18 pF ± 5 % (CG)
CF48	1	DK96103200	0.01 μF ± 10 %
CF49	1	DD90040300	4 pF ± 0.25 pF (CH)
CL01	1	DD95220300	22 pF ± 5 % (CG)
CL02	1	DD95220300	22 pF ± 5 % (CG)
CL03	1	DK96103200	0.01 μF ± 10 %
CL04	1	DK96102300	1000 pF ± 10 %
CL05	1	EY10602520	TANTAL.CAP. 10 μF/25 V
CL06	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CL07	1	DK96102300	1000 pF ± 10 %
CL08	1	DK96102300	1000 pF ± 10 %
CL10	1	DK96102300	1000 pF ± 10 %
CL11	1	EY22601620	TANTAL.CAP. 22 μF/16 V
CL12	1	DK96102300	1000 pF ± 10 %
CL13	1	EY47601020	TANTAL.CAP. 47 μF/10 V
CL14	1	DK96102300	1000 pF ± 10 %
CL15	1	EY33601020	TANTAL.CAP. 33 μF/10 V
CL16	1	DK96102300	1000 pF ± 10 %
CL17	1	EY10602520	TANTAL.CAP. 10 μF/25 V
CL18	1	DK96102300	1000 pF ± 10 %
CL19	1	DK96102300	1000 pF ± 10 %
CL20	1	EY10601620	TANTAL.CAP. 10 μF/16 V
CL21	1	DK96103200	0.01 μF ± 10 %
CL22	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CL23	1	DK96102300	1000 pF ± 10 %
CL24	1	DK96102300	1000 pF ± 10 %
CL26	1	DK96103200	0.01 μF ± 10 %
CL27	1	DK98104200	0.1 μF
CL28	1	DK96102300	1000 pF ± 10 %
CL29	1	DK96102300	1000 pF ± 10 %
CL30	1	DK96102300	1000 pF ± 10 %
CL31	1	DK96102300	1000 pF ± 10 %
CL32	1	DK96102300	1000 pF ± 10 %
CL33	1	DK96102300	1000 pF ± 10 %
CL34	1	DK96103200	0.01 μF ± 10 %
CL35	1	EA10801680	ELECT.CAP. 1000 μF/16 V
CL36	1	DK96102300	1000 pF ± 10 %
CL37	1	EA22701610	ELECT.CAP. 220 μF/16 V
CL38	1	DK96102300	1000 pF ± 10 %
CL39	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CL40	1	DK96102300	1000 pF ± 10 %

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
CM02	1	DK56472300	4700 pF ± 10 %
CM03	1	DK56472300	4700 pF ± 10 %
CM04	1	DK56472300	4700 pF ± 10 %
CM05	1	DD95221300	220 pF ± 5 % (CG)
CM06	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CM07	1	EY10601620	TANTAL.CAP. 10 μF/16 V
CM08	1	DK96102300	1000 pF ± 10 %
CM09	1	DK96102300	1000 pF ± 10 %
CM10	1	DK46224200	0.22 μF
CM11	1	EY47501630	TANTAL.CAP. 4.7 μF/16 V
CM12	1	DD95470300	47 pF ± 5 % (CG)
CM13	1	DK96472300	4700 pF ± 10 %
CM14	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CM15	1	DD95360300	36 pF ± 5 % (CG)
CM16	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CM17	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CM18	1	DK96472300	4700 pF ± 10 %
CM19	1	DK96102300	1000 pF ± 10 %
CM20	1	DK96392300	3900 pF ± 10 %
CM21	1	DD95221300	220 pF ± 5 % (CG)
CM22	1	EY22501630	TANTAL.CAP. 2.2 μF/16 V
CM23	1	DK96102300	1000 pF ± 10 %
CP01	1	DK96102300	1000 pF ± 10 %
CP02	1	EY47503520	TANTAL.CAP. 4.7 μF/35 V
CP03	1	EA22603510	ELECT.CAP. 22 μF/35 V
CP04	1	EY22505020	TANTAL.CAP. 2.2 μF/50 V
CP05	1	DK96102300	1000 pF ± 10 %
CP06	1	CX12000020	TRIMM.CAP. 20 pF CTZ20C
CP07	1	DD91100300	10 pF ± 0.5 pF (CH)
CP08	1	DD95330300	33 pF ± 5 % (CG)
CP09	1	EY22503530	TANTAL.CAP. 2.2 μF/35 V
CP10	1	EY10501610	TANTAL.CAP. 1 μF/16 V
CP11	1	DK96102300	1000 pF ± 10 %
CP12	1	DK96102300	1000 pF ± 10 %
CP13	1	DK96102300	1000 pF ± 10 %
CP14	1	EV22603560	ELECT.CAP. 22 μF/35 V
CP15	1	EV10505060	ELECT.CAP. 1 μF/50 V
CP16	1	EY22403510	TANTAL.CAP. 0.22 μF/35 V
CP17	1	EY22403510	TANTAL.CAP. 0.22 μF/35 V
CP18	1	DK96102300	1000 pF ± 10 %
CP19	1	DK96102300	1000 pF ± 10 %
CP20	1	DK98104200	0.1 μF
CP21	1	DK96102300	1000 pF ± 10 %
CP22	1	DK96102300	1000 pF ± 10 %
CP23	1	DK96102300	1000 pF ± 10 %
CP24	1	DD91100300	10 pF ± 0.5 pF (CH)
CP25	1	DK96102300	1000 pF ± 10 %
CP26	1	DD90050300	5 pF ± 0.25 pF (CH)
CP27	1	DD90030300	3 pF ± 0.25 pF (CJ)
CP28	1	DK96102300	1000 pF ± 10 %
CP29	1	DK96102300	1000 pF ± 10 %

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
CP30	1	DD90030300	3 pF ± 0.25 pF (CJ)
CP31	1	DK96102300	1000 pF ± 10 %
CP32	1	DK96102300	1000 pF ± 10 %
CP33	1	DK98104200	0.1 μF
CP34	1	DK98104200	0.1 μF
CP35	1	DD90005300	0.5 pF ± 0.25 pF (CK)
CP36	1	DD90020300	2 pF ± 0.25 pF (CK)
CP37	1	DK96102300	1000 pF ± 10 %
CP38	1	DK96102300	1000 pF ± 10 %
CP39	1	DD95180300	18 pF ± 5 % (CG)
CP40	1	DD95220300	22 pF ± 5 % (CG)
CP41	1	DK96102300	1000 pF ± 10 %
CP42	1	DK96102300	1000 pF ± 10 %
CP43	1	DD95220300	22 pF ± 5 % (CG)
CP44	1	DK96102300	1000 pF ± 10 %
CP45	1	DK96102300	1000 pF ± 10 %
CT02	1	DK96102300	1000 pF ± 10 %
CT03	1	DK96102300	1000 pF ± 10 %
CT04	1	DK96102300	1000 pF ± 10 %
CT05	1	EY10601620	TANTAL.CAP. 10 μF/16 V
CT06	1	DD95120300	12 pF ± 5 % (CG)
CT07	1	DD95680300	68 pF ± 5 % (CG)
CT08	1	DK96103200	0.01 μF ± 10 %
CT09	1	DK96103200	0.01 μF ± 10 %
CT10	1	EY10601620	TANTAL.CAP. 10 μF/16 V
CT11	1	DD95220300	22 pF ± 5 % (CG)
CT12	1	DD95220300	22 pF ± 5 % (CG)
CT13	1	DD95220300	22 pF ± 5 % (CG)
CT14	1	DK96102300	1000 pF ± 10 %
CT15	1	EA22701610	ELECT.CAP. 220 μF/16 V
CT16	1	DK96102300	1000 pF ± 10 %
CT17	1	EV10603560	ELECT.CAP. 10 μF/35 V
CT18	1	EA47603510	ELECT.CAP. 47 μF/35 V
CT19	1	DK96102300	1000 pF ± 10 %
CT20	1	DK96103200	0.01 μF ± 10 %
CT21	1	DD90005300	0.5 pF ± 0.25 pF (CK)
CT22	1	DK96102300	1000 pF ± 10 %
CT23	1	DK56104200	0.1 μF ± 10 %
CT24	1	DD15200550	20 pF ± 5 %
CT25	1	DD90010300	1 pF ± 0.25 pF (CK)
CT26	1	DK96102300	1000 pF ± 10 %
CT27	1	DK96102300	1000 pF ± 10 %
CT28	1	DD15200550	20 pF ± 5 %
CT29	1	DK96102300	1000 pF ± 10 %
CT30	1	DD95470300	47 pF ± 5 % (CG)
CT31	1	DK16102300	1000 pF ± 10 %
CT32	1	DD15240550	24 pF ± 5 %
CT33	1	DD15120550	12 pF ± 5 %
CT34	1	DD15120550	12 pF ± 5 %
CT35	1	DK96102300	1000 pF ± 10 %
CT36	1	DK96102300	1000 pF ± 10 %
CT37	1	DK96102300	1000 pF ± 10 %
CT38	1	DK96102300	1000 pF ± 10 %
CT39	1	DK96102300	1000 pF ± 10 %

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
CT40	1	DK96102300	1000 pF ± 10 %
CT41	1	DD90005300	0.5 pF ± 0.25 pF (CK)
CT42	1	DD11070550	7 pF ± 0.5 pF
CT43	1	DD10050550	5 pF ± 0.25 pF
CT44	1	DD11070550	7 pF ± 0.5 pF
CT45	1	DD11060550	6 pF ± 0.5 pF
CT46	1	DD10050550	5 pF ± 0.25 pF
CT47	1	DD90020300	2 pF ± 0.25 pF (CK)
CT48	1	DD90020300	2 pF ± 0.25 pF (CK)
CT49	1	DD90020300	2 pF ± 0.25 pF (CK)
CT50	1	DK96102300	1000 pF ± 10 %
CT51	1	DK96102300	1000 pF ± 10 %
CT52	1	DD90010300	1 pF ± 0.25 pF (CK)
CT53	1	DD95221300	220 pF ± 5 % (CG)
CU01	1	DK96103200	0.01 μF ± 10 %
CU02	1	DD90020300	2 pF ± 0.25 pF (CK)
CU03	1	DD91080300	8 pF ± 0.5 pF (CH)
CU06	1	DK96103200	0.01 μF ± 10 %
CU07	1	DK96103200	0.01 μF ± 10 %
CU08	1	DK96103200	0.01 μF ± 10 %
CU09	1	DK96102300	1000 pF ± 10 %
CU10	1	DK96333200	0.033 μF ± 10 %
CU11	1	DK96223200	0.022 μF ± 10 %
CU12	1	DD95470300	47 pF ± 5 % (CG)
CU13	1	DD95560300	56 pF ± 5 % (CG)
CU14	1	DK56104200	0.1 μF ± 10 %
CU15	1	DK56104200	0.1 μF ± 10 %
CU16	1	DK56104200	0.1 μF ± 10 %
CU17	1	DK56104200	0.1 μF ± 10 %
CU18	1	DK56104200	0.1 μF ± 10 %
CU19	1	DK96223200	0.022 μF ± 10 %
CU20	1	EY15601020	TANTAL.CAP. 15 μF/10 V
CU21	1	DK96102300	1000 pF ± 10 %
CU22	1	DK96102300	1000 pF ± 10 %
CU23	1	EY22403510	TANTAL.CAP. 0.22 μF/35 V
CU24	1	DD90040300	4 pF ± 0.25 pF (CH)
CU25	1	DK96102300	1000 pF ± 10 %
CU26	1	EY47501630	TANTAL.CAP. 4.7 μF/16 V
CU27	1	EV47403560	0.47 μF 35V
FU01	1	XU723050N2	CRYSTAL FILTER DFM-230-15BD1
FU02	1	XU723050N2	CRYSTAL FILTER DFM-230-15BD1
FU03	1	FG455306E2	CERAMIC FILTER CFWM-455E
FS01	1	FS11200030	MF60-NM12 FUSE 12A
JA01	1	YJ01003820	SOCKET HSJ0836-01-500
JA02	1	YJ01003670	SOCKET HSJ1468-01-010
JL01	1	YP07000470	PLUG CPB8110-0110
JL02	1	YP07000430	PLUG CPB8114-0110
JL03	1	YJ06006220	SOCKET B2B-PH-K-S
JL04	1	YJ06006280	SOCKET B8B-PH-K-S
KA01	1	KH031Y1010	ELECTRIC VOLUME UNIT
KF01	1	KH033Y7020	UNIT
KF02	1	KH033Y7030	UHF FRONT END
KF03	1	KH030Y8020	UNIT
KL01	1	KH038Y8010	CTD 1200 [DA]
KL02	1	KH037Y8010	CTN 1200 [DA]

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
KP01	1	KH036Y6010	VCO UNIT
KT01	1	KH032Y7030	APC UNIT
LF01	1	LA70438120	COIL M7T1/33302 HK-2081-2
LF02	1	LA70438120	COIL M7T1/33302 HK-2081-2
LF03	1	LA70438120	COIL M7T1/33302 HK-2081-2
LF04	1	LA70438120	COIL M7T1/33302 HK-2081-2
LF05	1	LU22472010	COIL 4.7 μH
LF06	1	LU22472010	COIL 4.7 μH
LF08	1	LU21470010	COIL 47 nH LQN2A47nH
LL01	1	LC24830010	COIL 48 μH SN5-400 (LINE FILTER)
LM01	1	LU22102010	COIL 1 μH LQH3N1ROM-QS
LP01	1	LC24750050	COIL 4.7 mH (DC-DC CONVERTER)
LP02	1	LU21180010	COIL 18 nH
LP03	1	LU21100010	COIL 10 nH
LP04	1	LU21101010	COIL 100 nH
LP05	1	LU21680010	COIL 68 nH
LP06	1	LU21390010	COIL 39 nH LQN2A39NM
LT01	1	LU21180010	COIL 18 nH
LT02	1	LL635006A0	COIL 6T
LT03	1	LC12000040	CHOKE COIL 1T
LT04	1	LL635004A0	COIL 4T
LT05	1	ML030050K0	COIL 4.5T
LT06	1	LL22411040	COIL 4T
LT07	1	LC11510090	CHOKE COIL 10T
LT08	1	LL22411040	COIL 4T
LT09	1	LL22411050	COIL 5T
LT10	1	LL635007A0	COIL 7T
LT11	1	LL635006A0	COIL 6T
LT12	1	LC12010010	CHOKE COIL
LT13	1	ML03610020	COIL 1.5T
LT14	1	ML03610020	COIL 1.5T
LT15	1	ML04510020	COIL 1.5T
LT16	1	ML03910030	COIL 2.5T
LT17	1	ML03410030	COIL 2.5T
LT18	1	LU24090010	COIL 8.8 nH LQN1A8N8
LT19	1	LU24090010	COIL 8.8 nH LQN1A8N8
LU01	1	LU22334010	COIL 330 μH LQH3N331K
LU02	1	LI55016330	DISC.COIL FOR TK10930V
LU03	1	LU22472010	COIL 4.7 μH
M801	1	MM01200250	DC FAN
QA01	1	HC000105Z0	IC TC4W66F
QA02	1	HX340811C0	TRANSISTOR 2SC4081
QA03	1	HX340811C0	TRANSISTOR 2SC4081
QA04	1	HC10259060	IC UPC2002H +INSULATOR
QA05	1	HZ20018050	DIODE 1SS302
QA07	1	BA20019210	DIGITAL TRANSISTOR DTC114TU
QA08	1	HX340811C0	TRANSISTOR 2SC4081
QA09	1	HZ20018050	DIODE 1SS302
QA10	1	HX340811C0	TRANSISTOR 2SC4081
QA11	1	BA20019210	DIGITAL TRANSISTOR DTC114TU
QA12	1	HX340811C0	TRANSISTOR 2SC4081

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
QF01	1	HZ20018050	DIODE 1SS302
QF02	1	HZ40010050	DIODE 1SV214
QF03	1	HZ40010050	DIODE 1SV214
QF04	1	HY40241000	FET 3SK241
QF05	1	HZ40010050	DIODE 1SV214
QF06	1	HZ40010050	DIODE 1SV214
QF07	1	HZ40010050	DIODE 1SV214
QF08	1	HZ40010050	DIODE 1SV214
QF09	1	HZ40010050	DIODE 1SV214
QF10	1	HZ40010050	DIODE 1SV214
QF11	1	HY40241000	FET 3SK241
QF12	1	HZ20010050	DIODE 1SS226
QF13	1	HZ20035020	DIODE MA77
QF14	1	HY40241000	FET 3SK241
QF15	1	HZ20028050	DIODE 1SS301
QF16	1	HZ20028050	DIODE 1SS301
QF17	1	HZ20028050	DIODE 1SS301
QF18	1	HZ20010050	DIODE 1SS226
QF19	1	HZ20018050	DIODE 1SS302
QF20	1	HZ20018050	DIODE 1SS302
QF21	1	HZ20019210	DIODE DAN235U
QF22	1	HZ20018050	DIODE 1SS302
QF23	1	HZ40001060	DIODE 1SV221
QL01	1	HU183BN10F	MICROPROCESSOR UPD75518GF [D/DS]
QL01	1	HS183BN10F	MICROPROCESSOR UPD75P518GF[DA]
QL02	1	HC3890809F	IC NJM7808FA +8V 1A REGULATOR
QL03	1	HC38105090	IC NJM78L05A
QL04	1	HX212611A0	TRANSISTOR 2SB1261Z(K)
QL05	1	BA20019210	DIGITAL TRANSISTOR DTC114TU
QL06	1	HX409992A0	TRANSISTOR 2SD999(CL.CM)
QL07	1	HZ30005050	DIODE 02CZ6.8
QL08	1	HC98A52530	IC S-81252HG
QL09	1	HX340811C0	TRANSISTOR 2SC4081(BS)
QL10	1	HC10011530	IC S8052ANB
QL12	1	BA10033210	DIGITAL TRANSISTOR DTB113ZK
QL13	1	HC10020700	IC X24C08S8-2.7
QL14	1	HZ20028050	DIODE 1SS301
QL15	1	HZ20018050	DIODE 1SS302
QL16	1	HZ20018050	DIODE 1SS302
QL17	1	HZ20018050	DIODE 1SS302
QL18	1	HZ30005050	DIODE 02CZ6.8
QL20	1	HD20029290	DIODE S3V20
QL21	1	HX110362B0	TRANSISTOR 2SA1036K(Q.R)
QL22	1	BA20019210	DIGITAL TRANSISTOR DTC114TU
QM01	1	HX340811C0	TRANSISTOR 2SC4081
QM02	1	HZ20009020	DIODE MA116
QM03	1	HC466005B0	IC TC4S66F
QM04	1	HC10071210	IC BA4558F
QM05	1	HZ20013210	DIODE DAP202U
QM06	1	HX340811C0	TRANSISTOR 2SC4081(BS)

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
QP01	1	HC10161210	IC BA6161F
QP02	1	HZ20028050	DIODE 1SS301
QP03	1	HX340811C0	TRANSISTOR 2SC4081(BS)
QP04	1	HV00190020	VARISTOR MA28TA
QP05	1	HZ20010050	DIODE 1SS226
QP06	1	HZ30020020	DIODE MA8240H
QP07	1	HC10101180	IC MB88346BPFV DC-AC CONVERTER
QP08	1	HC10036090	IC NJM2904M
QP09	1	BA10021210	TRANSISTOR FMA10
QP10	1	HH50004780	THERMISTOR 1.5 k TN10-3I152JT
QP11	1	HX340832C0	TRANSISTOR 2SC4083(N.P)
QP12	1	HX340832C0	TRANSISTOR 2SC4083(N.P)
QP13	1	HZ20028050	DIODE 1SS301
QP14	1	HX340832C0	TRANSISTOR 2SC4083(N.P)
QP15	1	HX340832C0	TRANSISTOR 2SC4083(N.P)
QP16	1	HZ20028050	DIODE 1SS301
QP17	1	HZ40010050	DIODE 1SV214
QT01	1	HX33124010	TRANSISTOR 2SC3124
QT02	1	HT325381O0	TRANSISTOR 2SC2538
QT03	1	HZ20028050	DIODE 1SS301
QT04	1	HC10177050	IC SAV17 VHF 50W
QT05	1	HT209452B0	TRANSISTOR 2SB945(Q.P)
QT06	1	HZ20006020	DIODE MA714
QT08	1	HD20001450	DIODE UM9401
QT09	1	HD20006200	DIODE MI308
QT10	1	HX419491C0	TRANSISTOR 2SD1949(R)
QT11	1	HV00190020	VARISTOR MA28TA
QT12	1	HH50006780	THERMISTOR 33 k TN10-3J333JT
QU01	1	HX340992B0	TRANSISTOR 2SC4099(JN.JP)
QU02	1	HZ20018050	DIODE 1SS302
QU03	1	HC10029420	IC TK10930V
QU04	1	BA20036210	DIGITAL TRANSISTOR DTC124EU
QU05	1	BA20036210	DIGITAL TRANSISTOR DTC124EU
QU06	1	BA10021210	TRANSISTOR FMA10
QU07	1	HH50005780	THERMISTOR 10 k TN10-4C103JT
QU08	1	BA10021210	TRANSISTOR FMA10
QU09	1	BA10025210	DIGITAL TRANSISTOR DTA113ZU
RA01	1	NN05333610	33 kΩ ± 5 % 1/16 W
RA02	1	NN05102610	1 kΩ ± 5 % 1/16 W
RA03	1	NN05473610	47 kΩ ± 5 % 1/16 W
RA04	1	NN05153610	15 kΩ ± 5 % 1/16 W
RA05	1	NN05331610	330 Ω ± 5 % 1/16 W
RA06	1	NN05222610	2.2 kΩ ± 5 % 1/16 W
RA07	1	NN05472610	4.7 kΩ ± 5 % 1/16 W
RA08	1	NN05102610	1 kΩ ± 5 % 1/16 W
RA09	1	NN05563610	56 kΩ ± 5 % 1/16 W
RA10	1	NN05562610	5.6 kΩ ± 5 % 1/16 W
RA11	1	NN05103610	10 kΩ ± 5 % 1/16 W
RA12	1	NN05102610	1 kΩ ± 5 % 1/16 W
RA13	1	NN05103610	10 kΩ ± 5 % 1/16 W
RA14	1	NI05471110	470 Ω ± 5 % 1/10 W
RA15	1	NI05471110	470 Ω ± 5 % 1/10 W
RA16	1	NI05082110	8.2 Ω ± 5 % 1/10 W
RA17	1	NI05022110	2.2 Ω ± 5 % 1/10 W
RA18	1	NN05223610	22 kΩ ± 5 % 1/16 W
RA19	1	NN05153610	15 kΩ ± 5 % 1/16 W

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION			
			PM01 TX/RX/CONTROL P.C.BOARD			
RA20	1	NN05221610	220 Ω	± 5 %	1/16 W	
RA21	1	NN05684610	680 kΩ	± 5 %	1/16 W	
RA22	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RA23	1	NN05682610	6.8 kΩ	± 5 %	1/16 W	
RA24	1	NN05332610	3.3 kΩ	± 5 %	1/16 W	
RA25	1	NN05682610	6.8 kΩ	± 5 %	1/16 W	
RA26	1	NN05000610	0 Ω	± 5 %	1/16 W	
RA27	1	NN05684610	680 kΩ	± 5 %	1/16 W	
RA28	1	NN05221610	220 Ω	± 5 %	1/16 W	
RA29	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RA30	1	NN05102610	1 kΩ	± 5 %	1/16 W	
RA31	1	RI05000180	0 Ω	± 5 %	1/8 W	
RA32	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RA33	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RF01	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RF02	1	NN05474610	470 kΩ	± 5 %	1/16 W	
RF03	1	NN05474610	470 kΩ	± 5 %	1/16 W	
RF04	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RF05	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RF06	1	NN05473610	47 kΩ	± 5 %	1/16 W	
RF07	1	NN05101610	100 Ω	± 5 %	1/16 W	
RF08	1	NN05470610	47 Ω	± 5 %	1/16 W	
RF09	1	NN05474610	470 kΩ	± 5 %	1/16 W	
RF10	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RF11	1	NN05470610	47 Ω	± 5 %	1/16 W	
RF12	1	NN05474610	470 kΩ	± 5 %	1/16 W	
RF13	1	NN05474610	470 kΩ	± 5 %	1/16 W	
RF14	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RF15	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RF16	1	NN05101610	100 Ω	± 5%	1/16 W	
RF17	1	NN05222610	2.2 kΩ	± 5 %	1/16 W	
RF18	1	NN05470610	47 Ω	± 5 %	1/16 W	
RF20	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RF21	1	NN05331610	330 Ω	± 5 %	1/16 W	
RF22	1	NN05470610	47 Ω	± 5 %	1/16 W	
RF23	1	NN05152610	1.5 kΩ	± 5 %	1/16 W	
RF24	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RF25	1	NN05221610	220 Ω	± 5 %	1/16 W	
RF26	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RF27	1	NN05100610	10 Ω	± 5 %	1/16 W	
RF28	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RF29	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RF30	1	NN05152610	1.5 kΩ	± 5 %	1/16 W	
RF31	1	NN05152610	1.5 kΩ	± 5 %	1/16 W	
RF33	1	NN05331610	330 Ω	± 5 %	1/16 W	
RF36	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RL01	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL02	1	RI05471120	470 Ω	± 5 %	1/2 W	
RL03	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL04	1	NN05823610	82 kΩ	± 5 %	1/16 W	
RL05	1	NN05333610	33 kΩ	± 5 %	1/16 W	
RL06	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL07	1	NN05100610	10 Ω	± 5 %	1/16 W	
RL08	1	NN05101610	100 Ω	± 5%	1/16 W	
RL09	1	NN05103610	10 kΩ	± 5 %	1/16 W	

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION			
			PM01 TX/RX/CONTROL P.C.BOARD			
RL10	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL11	1	NN05000610	0 Ω	± 5 %	1/16 W	[D/DM]
RL12	1	NN05000610	0 Ω	± 5 %	1/16 W	[DS]
RL13	1	NN05000610	0 Ω	± 5 %	1/16 W	[DA]
RL14	1	NN05000610	0 Ω	± 5 %	1/16 W	
RL15	1	NN05000610	0 Ω	± 5 %	1/16 W	[D/DS]
RL16	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL17	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL18	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL19	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL20	1	NN05471610	470 Ω	± 5 %	1/16 W	
RL21	1	NN05101610	100 Ω	± 5%	1/16 W	
RL22	1	NN05105610	1 MΩ	± 5 %	1/16 W	
RL23	1	NN05101610	100 Ω	± 5%	1/16 W	
RL24	1	NN05105610	1 MΩ	± 5 %	1/16 W	
RL25	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL26	1	NN05224610	220 kΩ	± 5 %	1/16 W	
RL27	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL28	1	NN05102610	1 kΩ	± 5 %	1/16 W	
RL29	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL30	1	NN05272610	2.7 kΩ	± 5 %	1/16 W	
RL31	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL32	1	NN05154610	150 kΩ	± 5 %	1/16 W	
RL33	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RL34	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL35	1	NN05471610	470 Ω	± 5 %	1/16 W	
RL36	1	NN05222610	2.2 kΩ	± 5 %	1/16 W	
RL37	1	NN05682610	6.8 kΩ	± 5 %	1/16 W	
RL38	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RL39	1	NN05471610	470 Ω	± 5 %	1/16 W	
RL40	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RM02	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RM03	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RM04	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RM05	1	NN05473610	47 kΩ	± 5 %	1/16 W	
RM06	1	NY01030160	TRIMM.RESISTOR 10 kΩ EVM-1S			
RM07	1	NN05223610	22 kΩ	± 5 %	1/16 W	
RM08	1	NN05221610	220 Ω	± 5 %	1/16 W	
RM09	1	NN05102610	1 kΩ	± 5 %	1/16 W	
RM10	1	NN05182610	1.8 kΩ	± 5 %	1/16 W	
RM11	1	NY01030160	TRIMM.RESISTOR 10 kΩ EVM-1S			
RM12	1	NN05104610	100 kΩ	± 5 %	1/16 W	
RM14	1	NN05224610	220 kΩ	± 5 %	1/16 W	
RM15	1	NN05682610	6.8 kΩ	± 5 %	1/16 W	
RM16	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RM17	1	NN05562610	5.6 kΩ	± 5 %	1/16 W	
RM18	1	NN05334610	330 kΩ	± 5 %	1/16 W	
RM19	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	
RM20	1	NN05564610	560 kΩ	± 5 %	1/16 W	
RM21	1	NN05182610	1.8 kΩ	± 5 %	1/16 W	
RM22	1	NN05562610	5.6 kΩ	± 5 %	1/16 W	
RM23	1	NN05822610	8.2 kΩ	± 5 %	1/16 W	
RM24	1	NN05473610	47 kΩ	± 5 %	1/16 W	
RM25	1	NN05563610	56 kΩ	± 5 %	1/16 W	
RM26	1	NN05103610	10 kΩ	± 5 %	1/16 W	
RM27	1	NN05823610	82 kΩ	± 5 %	1/16 W	
RM28	1	NN05473610	47 kΩ	± 5 %	1/16 W	
RM29	1	NN05472610	4.7 kΩ	± 5 %	1/16 W	

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
RM30	1	NN05333610	33 kΩ ± 5 % 1/16 W
RM31	1	RI05000180	0 Ω ± 5 % 1/8 W
RP01	1	NN05221610	220 Ω ± 5 % 1/16 W
RP02	1	NN05103610	10 kΩ ± 5 % 1/16 W
RP03	1	NN05103610	10 kΩ ± 5 % 1/16 W
RP04	1	NN05221610	220 Ω ± 5 % 1/16 W
RP05	1	NN05123610	12 kΩ ± 5 % 1/16 W
RP06	1	NY05020160	TRMM.RESISTOR 5 kΩ EVM-1S
RP07	1	NN05471610	470 Ω ± 5 % 1/16 W
RP08	1	NN05683610	68 kΩ ± 5 % 1/16 W
RP09	1	NN05123610	12 kΩ ± 5 % 1/16 W
RP10	1	NN05101610	100 Ω ± 5% 1/16 W
RP11	1	NN05470610	47 Ω ± 5 % 1/16 W
RP12	1	NN05102610	1 kΩ ± 5 % 1/16 W
RP13	1	NN05101610	100 Ω ± 5% 1/16 W
RP14	1	NN05682610	6.8 kΩ ± 5 % 1/16 W
RP15	1	NN05682610	6.8 kΩ ± 5 % 1/16 W
RP16	1	NN05102610	1 kΩ ± 5 % 1/16 W
RP17	1	NN05101610	100 Ω ± 5% 1/16 W
RP18	1	NN05470610	47 Ω ± 5 % 1/16 W
RP19	1	NN05101610	100 Ω ± 5% 1/16 W
RP20	1	NN05470610	47 Ω ± 5 % 1/16 W
RP21	1	NN05682610	6.8 kΩ ± 5 % 1/16 W
RP22	1	NN05102610	1 kΩ ± 5 % 1/16 W
RP23	1	NN05682610	6.8 kΩ ± 5 % 1/16 W
RP24	1	NN05102610	1 kΩ ± 5 % 1/16 W
RP25	1	NN05101610	100 Ω ± 5% 1/16 W
RP26	1	NN05000610	0 Ω ± 5 % 1/16 W
RP27	1	NN05470610	47 Ω ± 5 % 1/16 W
RP28	1	NN05152610	1.5 kΩ ± 5 % 1/16 W
RP29	1	NN05152610	1.5 kΩ ± 5 % 1/16 W
RP30	1	NN05152610	1.5 kΩ ± 5 % 1/16 W
RP31	1	NN05104610	100 kΩ ± 5 % 1/16 W
RP32	1	NN05102610	1 kΩ ± 5 % 1/16 W
RT01	1	NN05332610	3.3 kΩ ± 5 % 1/16 W
RT02	1	NN05681610	680 Ω ± 5 % 1/16 W
RT03	1	NN05470610	47 Ω ± 5 % 1/16 W
RT04	1	NN05102610	1 kΩ ± 5 % 1/16 W
RT05	1	NN05470610	47 Ω ± 5 % 1/16 W
RT06	1	NN05221610	220 Ω ± 5 % 1/16 W
RT07	1	NN05152610	1.5 kΩ ± 5 % 1/16 W
RT09	1	RI05330120	33 Ω ± 5 % 1 W
RT10	1	RI05331010	330 Ω ± 5 % 1 W
RT11	1	NN05472610	4.7 kΩ ± 5 % 1/16 W
RT12	1	NN05472610	4.7 kΩ ± 5 % 1/16 W
RT13	1	NN05000610	0 Ω ± 5 % 1/16 W
RT14	1	NN05222610	2.2 kΩ ± 5 % 1/16 W
RT15	1	NN05102610	1 kΩ ± 5 % 1/16 W
RT16	1	RI05390010	39 Ω ± 5 % 1 W
RT17	1	NN05102610	1 kΩ ± 5 % 1/16 W
RT18	1	NY01020160	TRIMM.RESISTOR 1kΩ EVM-1S
RT19	1	NY01020160	TRIMM.RESISTOR 1kΩ EVM-1S
RT20	1	NY01030160	TRIMM.RESISTOR 10 kΩ EVM-1S
RT21	1	NN05103610	10 kΩ ± 5 % 1/16 W
RT22	1	NN05473610	47 kΩ ± 5 % 1/16 W

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			PM01 TX/RX/CONTROL P.C.BOARD
RU01	1	NN05152610	1.5 kΩ ± 5 % 1/16 W
RU02	1	NN05471610	470 Ω ± 5 % 1/16 W
RU03	1	NN05000610	0 Ω ± 5 % 1/16 W
RU04	1	NN05223610	22 kΩ ± 5 % 1/16 W
RU05	1	NN05104610	100 kΩ ± 5 % 1/16 W
RU06	1	NN05470610	47 Ω ± 5 % 1/16 W
RU08	1	NN05101610	100 Ω ± 5% 1/16 W
RU09	1	NN05000610	0 Ω ± 5 % 1/16 W
RU10	1	NN05472610	4.7 kΩ ± 5 % 1/16 W
RU11	1	NN05222610	2.2 kΩ ± 5 % 1/16 W
RU12	1	NN05393610	39 kΩ ± 5 % 1/16 W
RU13	1	NN05102610	1 kΩ ± 5 % 1/16 W
RU14	1	NN05104610	100 kΩ ± 5 % 1/16 W
RU15	1	NY03030160	TRIMM.RESISTOR 30 kΩ EVM-1S
RU16	1	NN05683610	68 kΩ ± 5 % 1/16 W
RU17	1	NI05000110	0 Ω ± 5 % 1/10 W
RU18	1	NN05000610	0 Ω ± 5 % 1/16 W
XL01	1	JX04001210	CRYSTAL 4.19 MHz (AT-38)
XP01	1	JX12003270	CRYSTAL 12.8 MHz UM-5
XU01	1	JX22002270	CRYSTAL 22.595 MHz UM-5
W001	1	YB00250370	ANT CABLE (M TYPE)
W002	1	YC00640020	DC CABLE
W003	1	YB00550670	8P WIRE FOR MIC CONNECTOR
			PL01 MIC CONNECTOR P.C.BOARD
PL01	1	WG183B1022	P.C.BOARD FOR MIC CONNECTOR
JL05	1	YJ10002060	SOCKET 8PIN FM214 8SBM

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			P801 MIC CONTROL P.C.BOARD
P801	1	WG183B2020	P.C.BOARD FOR MIC CONTROL
CR01	1	DD95300300	30 pF ± 5 % (CG)
CR02	1	DD95300300	30 pF ± 5 % (CG)
CR03	1	DD95101300	100 pF ± 5 % (CG)
CR04	1	EY15501010	TANTAL.CAP. 1.5 μF/10 V
CR05	1	DK58104200	0.1 μF ± 10 %
CR06	1	DK58104200	0.1 μF ± 10 %
CR08	1	DK96103200	0.01 μF ± 10 %
CR17	1	DD95101300	100 pF ± 5 % (CG)
CR18	1	DD95101300	100 pF ± 5 % (CG)
CR19	1	DD95101300	100 pF ± 5 % (CG)
CR20	1	DD95101300	100 pF ± 5 % (CG)
JR01	1	YJ07007220	SOCKET IL-WZ 12S-VF JAE
JR03	1	YJ07007220	SOCKET IL-WZ 12S-VF JAE
QR01	1	HU183BH00F	MICROPROCESSOR HD404829H
QR02	1	BA90001210	DIGITAL TRANSISTOR IMD3
QR03	1	HZ20028050	DIODE 1SS301
QR04	1	KZ05006300	LCD KIT FOR CMP844/CMP844A
QR05	1	BA20019210	DIGITAL TRANSISTOR DTC114TU
QR06	1	HI10004690	L.E.D. FOR BACK LIGHT LED KIT
RR01	1	NN05105610	1 M Ω ± 5 % 1/16 W
RR02	1	NN05104610	100 k Ω ± 5 % 1/16 W
RR03	1	NN05104610	100 k Ω ± 5 % 1/16 W
RR04	1	NN05103610	10 k Ω ± 5 % 1/16 W
RR05	1	NN05103610	10 k Ω ± 5 % 1/16 W
RR07	1	NN05104610	100 k Ω ± 5 % 1/16 W
RR08	1	RI05330140	33 Ω ± 5 % 1 W
RR09	1	NI05151110	150 Ω ± 5 % 1/10 W
RR10	1	NI05151110	150 Ω ± 5 % 1/10 W
RR23	1	NI05151110	150 Ω ± 5 % 1/10 W
RR24	1	NI05151110	150 Ω ± 5 % 1/10 W
XR01	1	JX04001210	CRYSTAL 4.19 MHz (AT-38)
			P802 KEY BOARD P.C.BOARD
P802	1	WG183B2010	P.C.BOARD FOR KEY BOARD
JR02	1	YP07000460	PLUG IL-WZ 12P-VF JAE
QR10	1	HI10066300	L.E.D. AY1101W
QR11	1	HI10066300	L.E.D. AY1101W
QR12	1	HI10066300	L.E.D. AY1101W
QR13	1	HI10066300	L.E.D. AY1101W
QR14	1	HI10066300	L.E.D. AY1101W
QR15	1	HI10066300	L.E.D. AY1101W
QR16	1	HI10066300	L.E.D. AY1101W
QR17	1	HI10066300	L.E.D. AY1101W
QR18	1	HZ20028050	DIODE 1SS301
QR19	1	HZ20028050	DIODE 1SS301
QR20	1	HZ20028050	DIODE 1SS301
QR21	1	HZ20028050	DIODE 1SS301
QR22	1	HZ20028050	DIODE 1SS301
QR23	1	HZ20028050	DIODE 1SS301
QR24	1	HZ20028050	DIODE 1SS301
QR25	1	HZ20028050	DIODE 1SS301

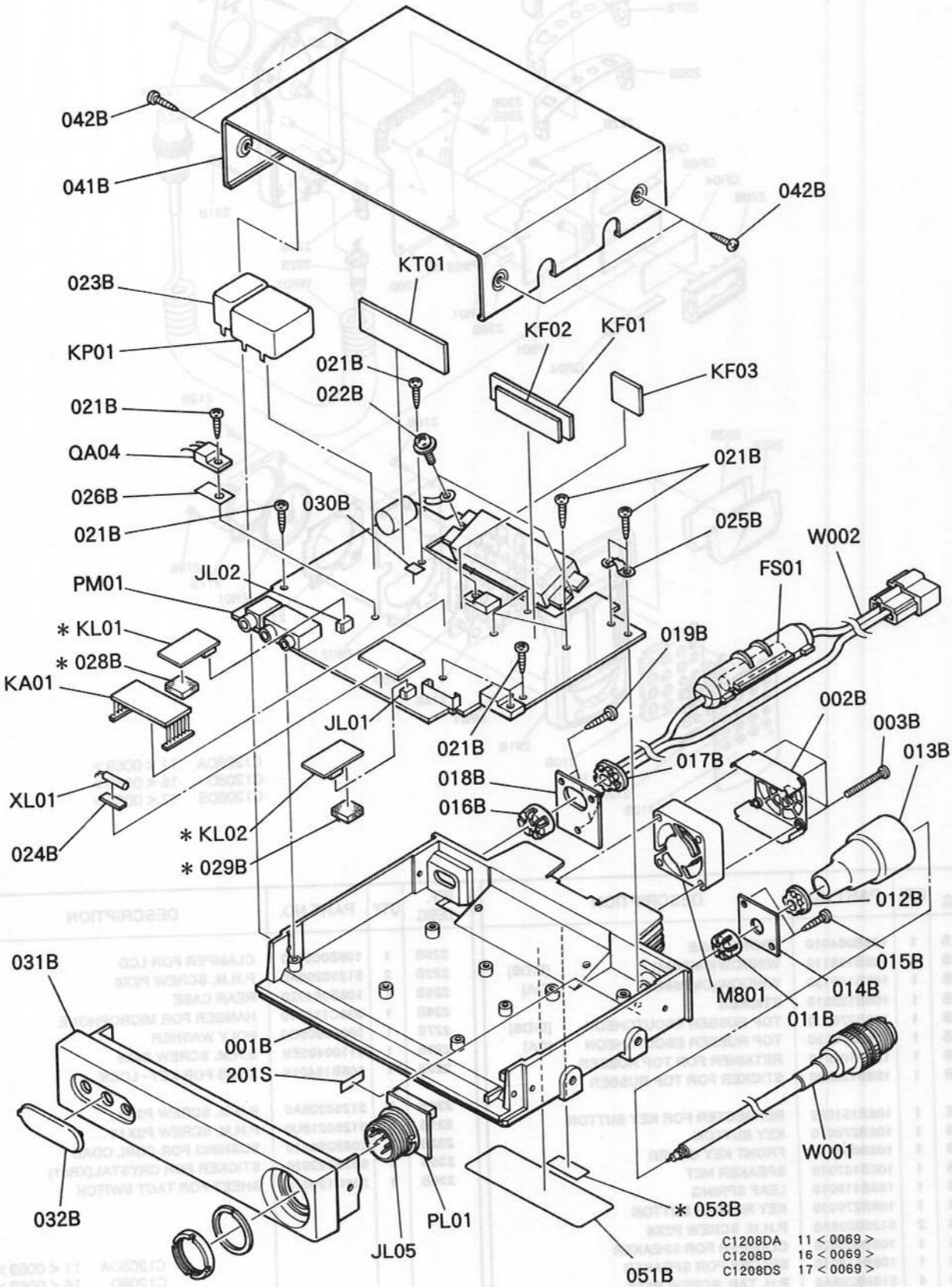
REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
P802	1	WG183B2010	P.C.BOARD FOR KEY BOARD
RR11	1	NI05151110	150 Ω ± 5 % 1/10 W
RR12	1	NI05151110	150 Ω ± 5 % 1/10 W
RR13	1	NI05151110	150 Ω ± 5 % 1/10 W
RR14	1	NI05151110	150 Ω ± 5 % 1/10 W
RR29	1	RI05220140	22 Ω ± 5 % 1/4 W
			P803 SPEAKER/MIC P.C.BOARD
P803	1	WG183B2030	P.C.BOARD FOR SPEAKER/MIC
CR09	1	DK96103200	0.01 μF ± 10 %
CR10	1	EY10700620	TANTAL.CAP. 100 μF/6.3 V
CR11	1	EY47601620	TANTAL.CAP. 47 μF/16 V
CR12	1	DK96103200	0.01 μF ± 10 %
CR13	1	DK58473200	0.047 μF ± 10 %
CR14	1	DK58104200	0.1 μF ± 10 %
CR15	1	DK96102300	1000 pF ± 10 %
CR16	1	DK96103200	0.01 μF ± 10 %
CR21	1	DK96102300	1000 pF ± 10 %
CR22	1	DK96102300	1000 pF ± 10 %
ER01	1	QK00407020	SPEAKER 40MM TL-40W0831A
JR04	1	YP07000460	PLUG IL-WZ 12P-VF JAE
NR01	1	MS50000150	MICROPHONE UNIT
QR26	1	HZ20028050	DIODE 1SS301
QR27	1	HZ20028050	DIODE 1SS301
QR28	1	HC90005090	IC NJM78L05UA REGULATOR
QR29	1	HZ20028050	DIODE 1SS301
QR30	1	HZ30009050	DIODE 02CZ9.1Z
QR33	1	HZ30009050	DIODE 02CZ9.1Z
RR15	1	NN05104610	100 k Ω ± 5 % 1/16 W
RR20	1	NN05153610	15 k Ω ± 5 % 1/16 W
RR21	1	RI05120010	12 Ω ± 5 % 1W
RR22	1	NN05682610	6.8 k Ω ± 5 % 1/16 W
RR25	1	RI05330010	33 Ω ± 5 % 1 W
RR30	1	NN05000610	0 Ω ± 5 % 1/16 W [D/DS]
RR31	1	NN05000610	0 Ω ± 5 % 1/16 W [D/DS]
RR32	1	NN05000610	0 Ω ± 5 % 1/16 W [D/DS]
RR33	1	NN05000610	0 Ω ± 5 % 1/16 W [D/DS]
RR34	1	NN05000610	0 Ω ± 5 % 1/16 W [DA]
RR35	1	NN05000610	0 Ω ± 5 % 1/16 W [DA]
RR36	1	NN05000610	0 Ω ± 5 % 1/16 W [DA]
RR37	1	NN05000610	0 Ω ± 5 % 1/16 W [DA]
SR01	1	SP01012040	PUSH SWITCH
SR02	1	SP01012040	PUSH SWITCH
SR03	1	SP01012040	PUSH SWITCH
SR04	1	SP01012040	PUSH SWITCH
SR05	1	SP01012040	PUSH SWITCH
SR06	1	SP01012040	PUSH SWITCH
SR07	1	SP01012040	PUSH SWITCH
SR08	1	SS01020780	SLIDE SWITCH
WR01	1	YB01300350	CONNECTIVE CORD

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
			MECHANISM
001B	1	182B401010	DIECAST FRAME
002B	1	182B053020	COVER FOR FAN
003B	4	51102620U0	B.H.M. SCREW M2.6X20
011B	1	262C005020	CLAMPER FOR ANTENNA CABLE
012B	1	262C259030	BUSHING FOR ANTENNA CABLE
013B	1	292C053110	COVER FOR ANTENNA CABLE
014B	1	182B160020	BRACKET FOR ANTENNA CABLE
015B	2	51302606U0	P.H. TAP. SCREW P2.6X6
016B	1	262C005030	CLAMPER FOR DC CABLE
017B	1	262C259040	BUSHING FOR DC CABLE
018B	1	182B160010	BRACKET FOR DC CABLE
019B	3	51302606U0	P.H. TAP. SCREW P2.6X6
021B	12	51282606A0	B.H. TAP. SCREW B2.6X6
022B	2	51490308A9	L.WASHER SCREW
023B	1	021B109040	SHIELD FOR DC-DC CONVERTER
024B	1	156C122010	STICKER FOR CRYSTAL(XL01)
025B	1	021B005010	CLAMPER FOR ANTENNA CABLE
026B	1	182B120010	INSULATOR FOR AF AMP(QA04)
028B	1	188B056010	BUFFER FOR CTD1200 [DA]
029B	1	170S056060	BUFFER FOR CTN1200 [DA]
030B	1	096B120050	INSULATOR
031B	1	182B064040	FRONT CASE
032B	1	182B053010	COVER FOR SPEAKER & PACKET SOCKE
041B	1	182B257010	LID (TOP COVER)
042B	4	51282606U0	B.H. TAP. SCREW B2.6X6
051B	1	182B861070	MODEL LABEL [D]
051B	1	182B861080	MODEL LABEL [DS]
051B	1	182B861090	MODEL LABEL [DA]
051B	1	182B861110	MODEL LABEL [DM]
053B	1	1000861010	HYATT PATENT LABEL [DA]
201S	1	159C861020	MITSUBAN LABEL

C1208DA 11 < 0069 >
C1208D 16 < 0069 >
C1208DS 17 < 0069 >

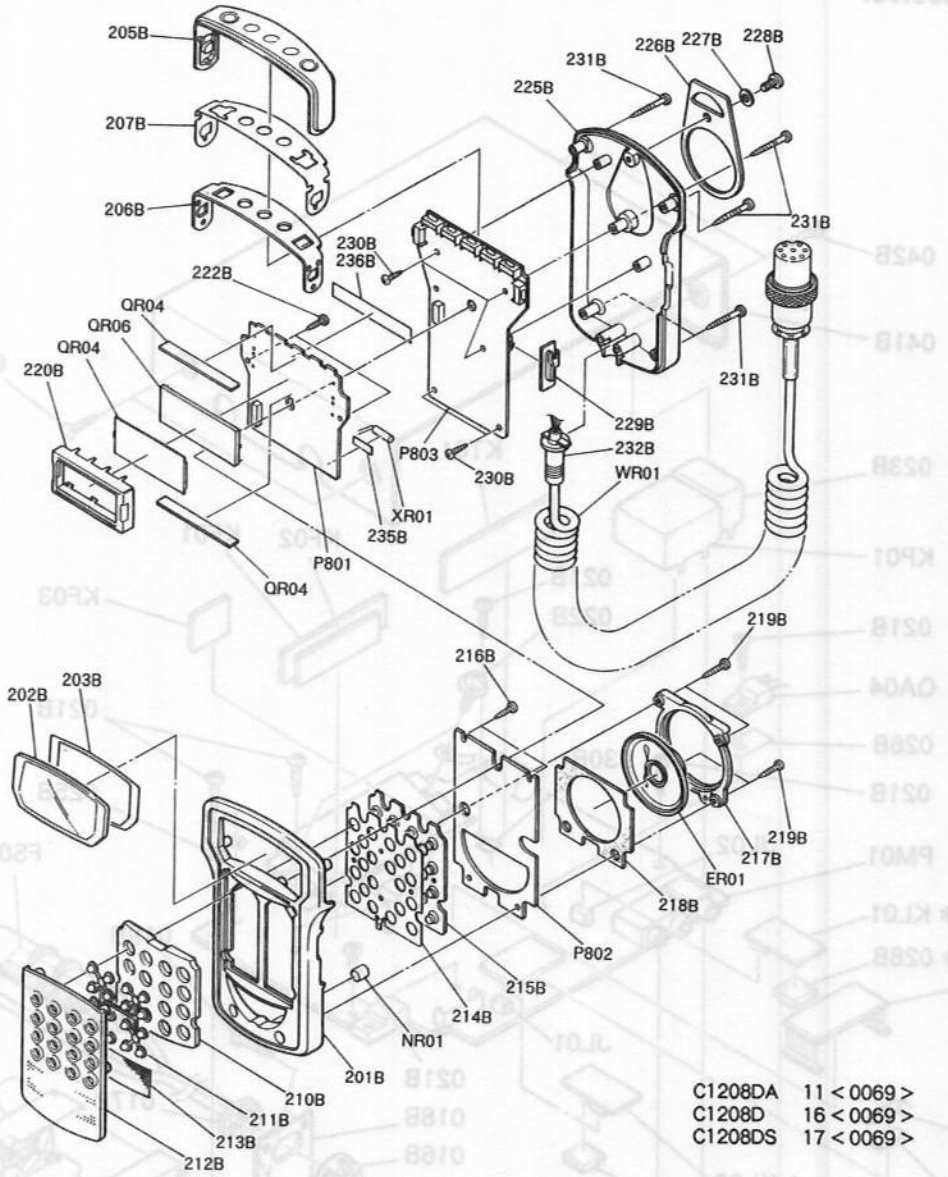
8. EXPLODED PARTS VIEW

8.1 Transceiver



* THE PARTS WHICH ARE USED FOR ONLY C1208DA.

8.2 CMP844/CMP844A



C1208DA 11 < 0069 >
C1208D 16 < 0069 >
C1208DS 17 < 0069 >

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION	
201B	1	108B064010	FRONT CASE	
202B	1	108B158110	WINDOW(CMP844)	[D/DS]
202B	1	108B158130	WINDOW(CMP844A)	[DA]
203B	1	108B122010	STICKER	
205B	1	108B270110	TOP RUBBER ESCUTCHEON	[D/DS]
205B	1	108B270130	TOP RUBBER ESCUTCHEON	[DA]
206B	1	108B104010	RETAINER FOR TOP RUBBER	
207B	1	108B122030	STICKER FOR TOP RUBBER	
210B	1	108B151020	REFRECTER FOR KEY BUTTON	
211B	1	108B270010	KEY BUTTON	
212B	1	108B053110	FRONT KEY COVER	
213B	1	108B107010	SPEAKER NET	
214B	1	108B116010	LEAF SPRING	
215B	1	108B270030	KEY RUBBER BUTTON	
216B	2	51250206A0	P.H.M. SCREW P2X6	
217B	1	108B005020	CLAMPER FOR SPEAKER	
218B	1	108B118010	SPACER FOR SPEAKER	
219B	4	51380208A0	P.H. TAP. SCREW P2X8	

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
220B	1	108B005010	CLAMPER FOR LCD
222B	2	51250206A0	P.H.M. SCREW P2X6
225B	1	108B064020	REAR CASE
226B	1	398C155010	HANGER FOR MICROPHONE
227B	1	59050805G9	POLY WASHER
228B	1	51100405E9	B.H.M. SCREW B4X5
229B	1	108B154010	KNOB FOR KEY - LOCK
230B	5	51250206A0	P.H.M. SCREW P2X6
231B	5	51250216U0	P.H.M. SCREW P2X16
232B	1	108B259010	BUSHING FOR CURL COAD
235B	1	003B122020	STICKER FOR CRYSTAL(XR01)
236B	1	338C120010	SHEET FOR TACT SWITCH

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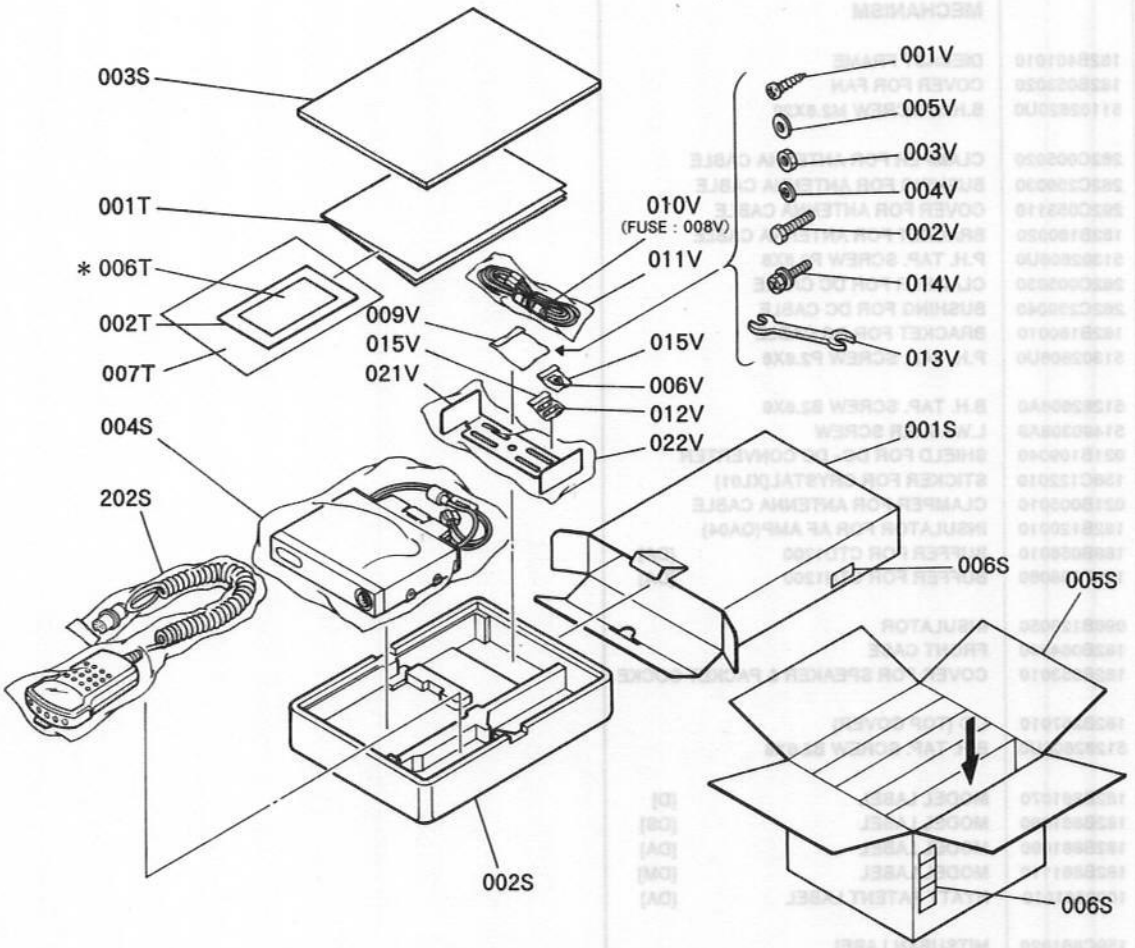
C1208D 16 < 0069 >
C1208DS 17 < 0069 >

9. PACKING DIAGRAM

9.1 Transceiver



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C1208D 16 < 0069 >
C1208DS 17 < 0069 >

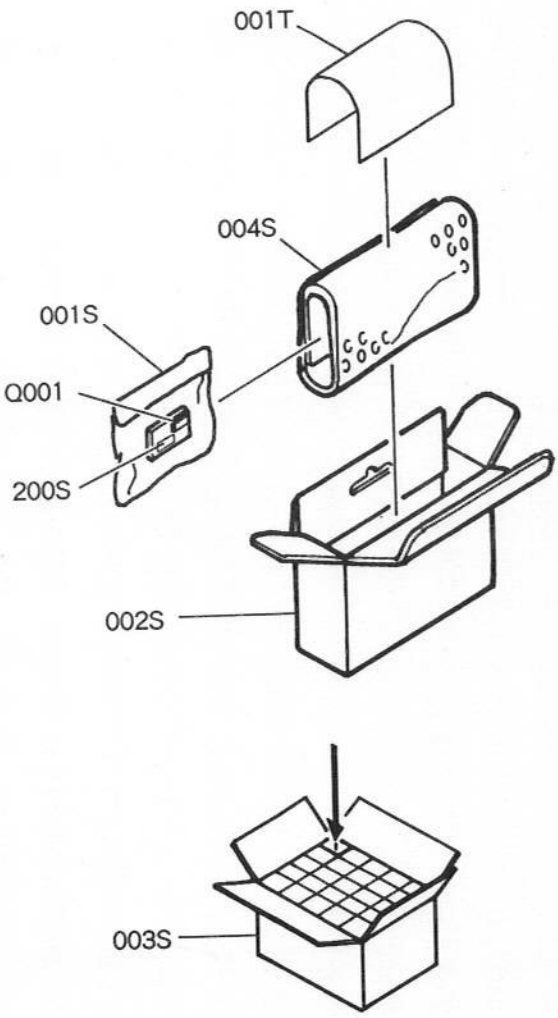
REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
001S	1	183B801030	PACKING CASE [D]
001S	1	183B801040	PACKING CASE [DS]
001S	1	183B801050	PACKING CASE [DA]
001S	1	183B801060	PACKING CASE [DM]
002S	1	182B809010	CUSHION FOR TRANSCIVER
003S	1	182B807010	REINFORCE FOR TRANSCIVER
004S	1	9012540010	POLYETHELENE BAG FOR TRANSCIVER
005S	1	183B805030	MASTER CARTON [D/DM]
005S	1	183B805040	MASTER CARTON [DS]
005S	1	183B805050	MASTER CARTON [DA]
006S	2	9524520010	SERIAL NUMBER LABEL
202S	1	011C811010	POLYETHELENE BAG FOR MICROPHONE
001T	1	182B851010	USER MANUAL
002T	1	183B859020	BLOCK DIAGRAM
006T	1	183B854010	WARRANTY CARD [DA]
007T	1	183B851010	FLY SHEET [DM]

REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
001V	4	51380515A0	P.H. TAP. SCREW P5X15
002V	4	52030520A9	H.HEAD BOLT,P5X20
003V	4	53110503A9	HEXAGON NUT FOR MOBILE BRACKET
004V	4	54040502A0	SPRING WASHER FOR MOBILE BRACKET
005V	8	54020501A0	FLAT WASHER, P.
006V	1	214C155010	HANGER FOR MICROPHONE
008V	2	FS11200030	FUSE 12 A MF60 - NM12
009V	1	9011020010	POLYETHELENE BAG FOR ACCESSORIES
010V	1	YC03000080	DC COARD
011V	1	9011020010	POLYETHELENE BAG FOR DC COARD
012V	2	FS11200030	FUSE 12 A MF60 - NM12
013V	1	021B164010	SPANNER FOR MOBILE BRACKET
014V	4	52490408U0	SCREW FOR MOBILE BRACKET
015V	2	9010510010	POLYETHELENE BAG FOR HANGER,FUSE
021V	1	182B160030	BRACKET FOR TRANSCIVER
022V	1	9011035010	POLYETHELENE BAG FOR BRACKET

C1208DA 11 < 0069 >
C1208D 16 < 0069 >
C1208DS 17 < 0069 >

9.2 Option (CTD1200/CTN1200)

CTD1200



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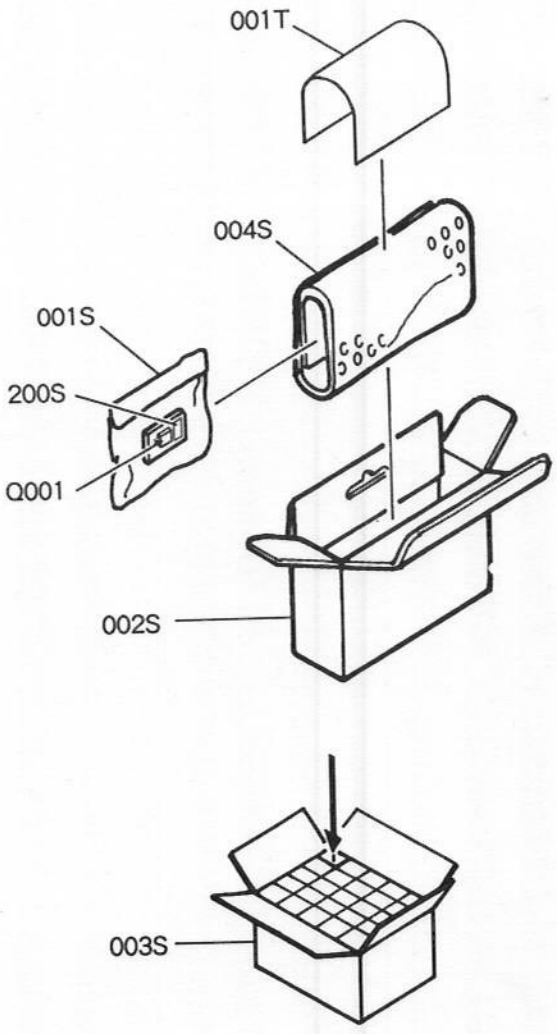
CTN1200



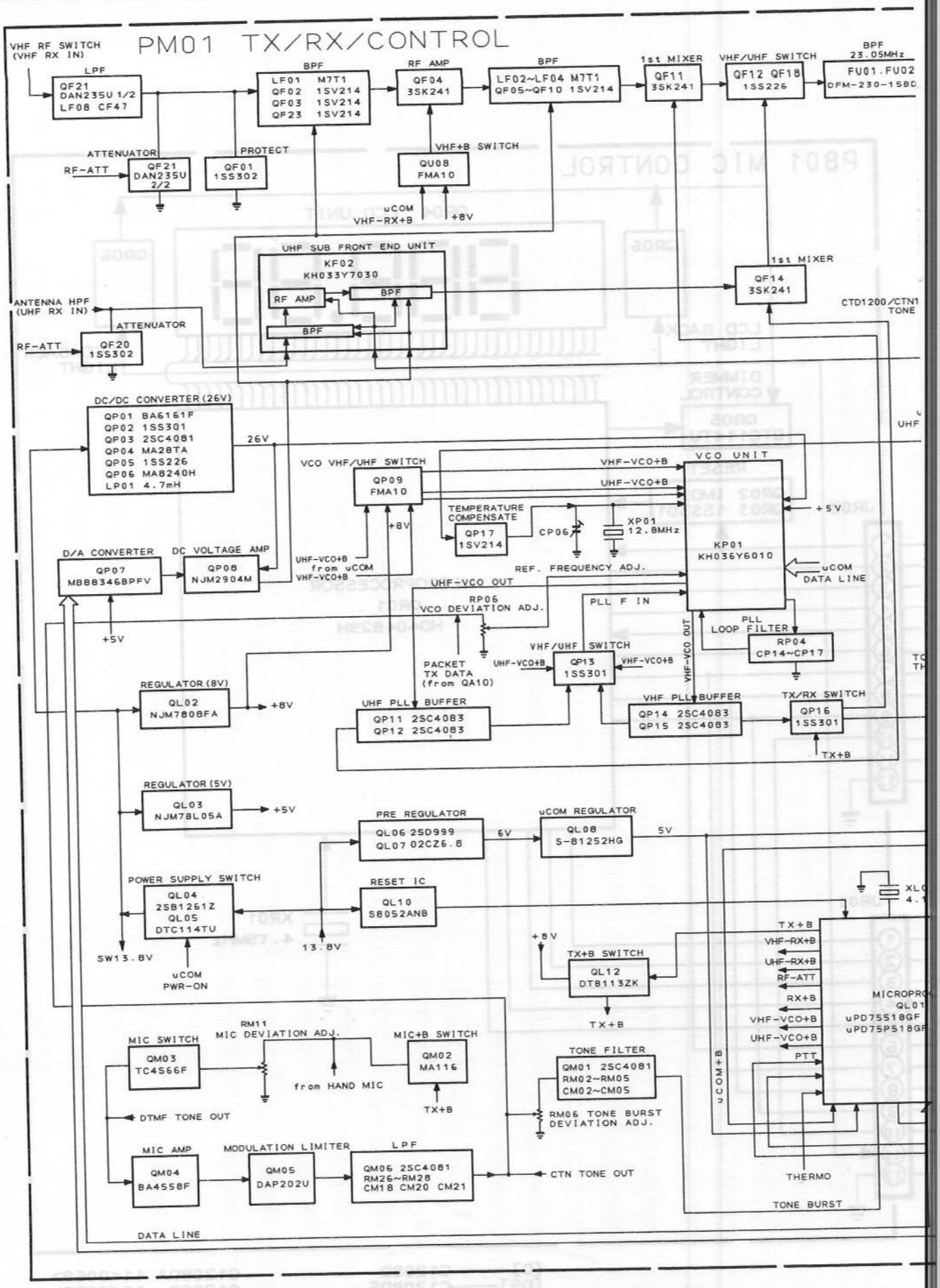
01 〈 0000 〉

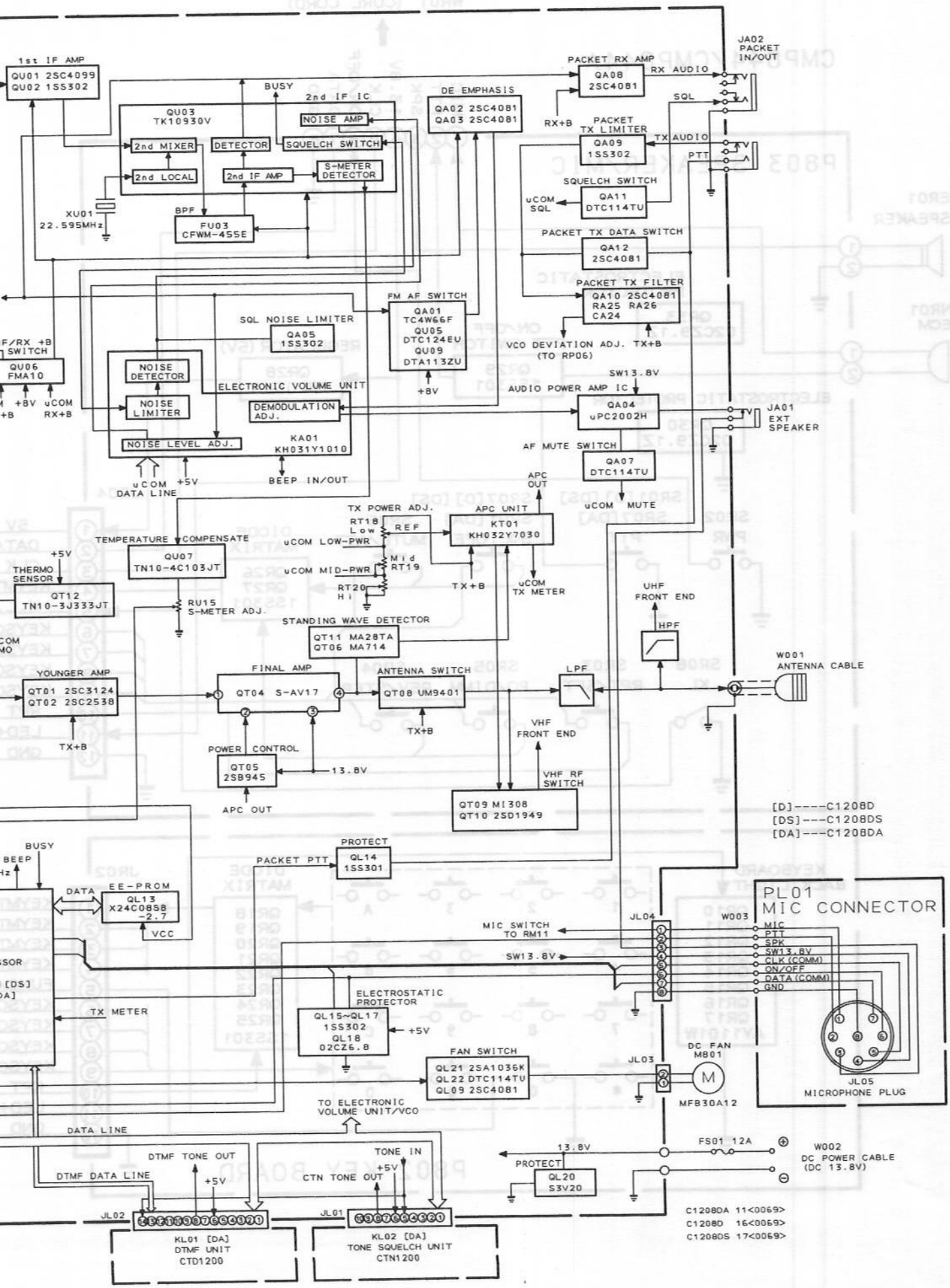
REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
Q001	1	KH038Y8010	IC FOR CTD1200
001S	1	041B811010	POLYETHYLENE BAG FOR CTD1200
002S	1	188B801010	PACKING CASE FOR CTD1200
003S	1	188B805010	MASTER CARTON FOR CTD1200
200S	1	9510901190	MONTHLY PRODUCTION LABEL
001T	1	188B851210	USER'S MANUAL

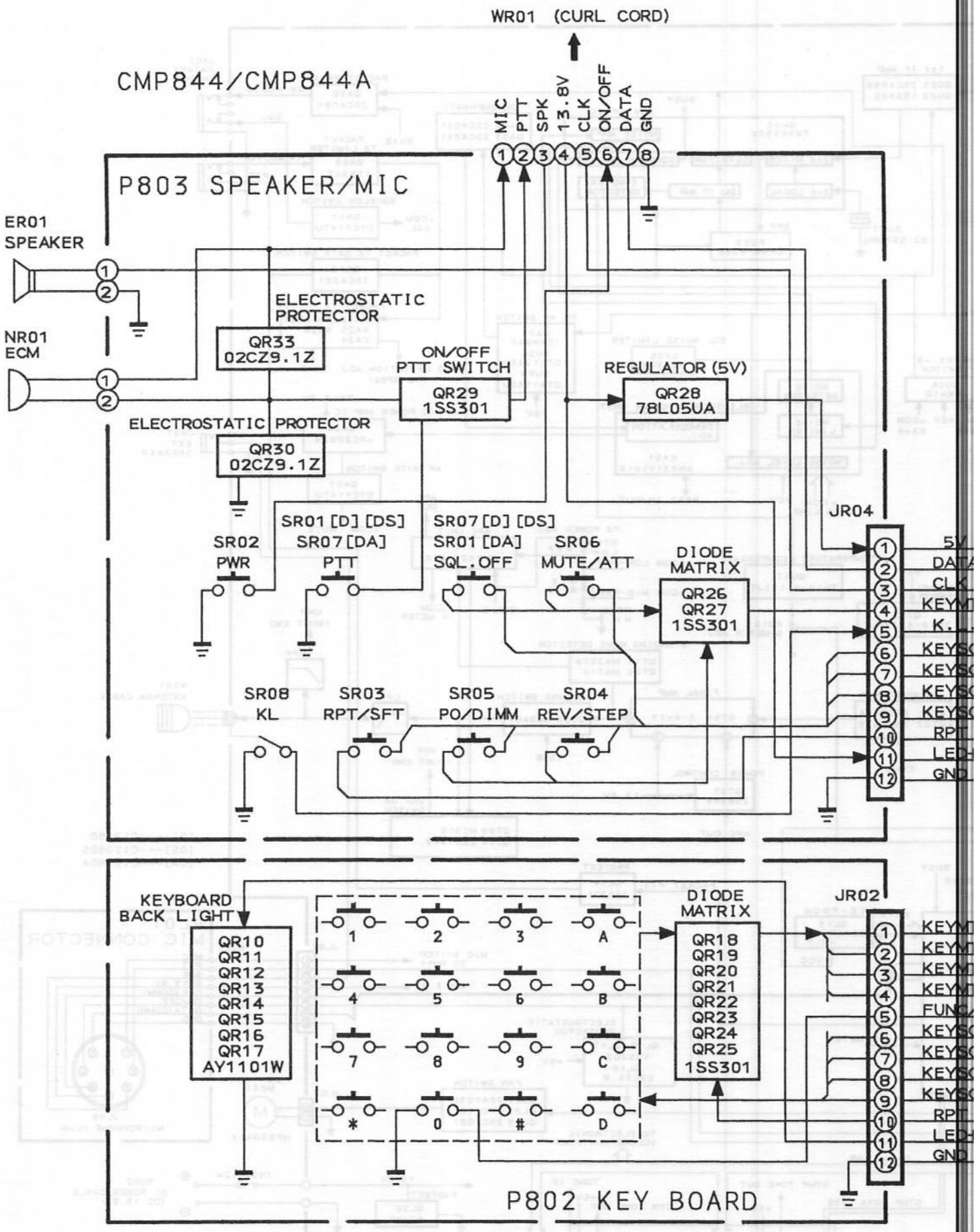
REF. DESIG.	Q'TY	PART NO.	DESCRIPTION
Q001	1	KH037Y8010	IC FOR CTN1200
001S	1	041B811010	POLYETHYLENE BAG FOR CTN1200
002S	1	189B801010	PACKING CASE FOR CTN1200
003S	1	189B805010	MASTER CARTON FOR CTN1200
200S	1	9510901190	MONTHLY PRODUCTION LABEL
001T	1	189B851210	USER'S MANUAL

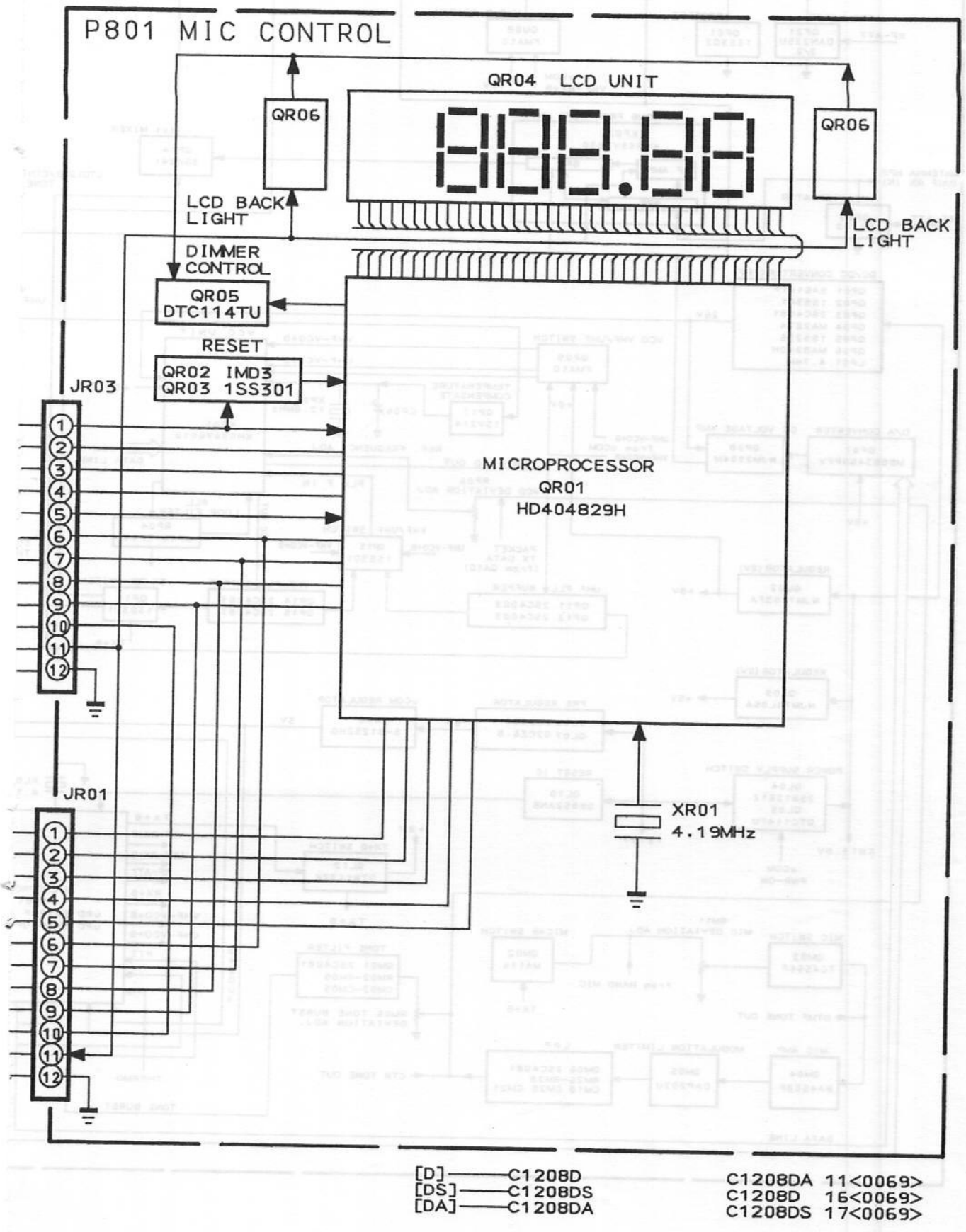
NOTES.

10. BLOCK DIAGRAM









Model: C1208

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C1208D/C1208DS/C1208DA/C1208DM

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