

VHF MARINE RADIOTELEPHONE

IC-M55

MAINTENANCE MANUAL



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FORWORD

Thank you for purchasing the IC-M55, one of the finest VHF Marine transceivers on the market today. It was designed and built by **ICOM INCORPORATED**, a long-time leader in the field of VHF communications. This transceiver incorporates state-of-the-art technology and was built specifically for Marine applications using experience gained over a long period of time.



ASSISTANCE

There are four different versions of the IC-M55, including the U.S.A., EUROPE, FRANCE, and U.K. models. This maintenance manual is designed to cover every version. Each model is assigned a particular number as follows:

- # 01 : U.S.A. version
- # 02 : ERUOPE version
- # 03 : FRANCE version
- # 05 : U.K. version

Please contact your nearest ICOM Service Center if you require assistance or information regarding the operation and capabilities of the IC-M55. Addresses are provided on the title page of this manual.

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SECTION 1 SPECIFICATIONS

GENERAL

Number of channels	: All marine channels (See specific programming for each version in the Marine Channel Tables beginning on page 15-1.)
Memory channels	: 10 channels plus 10 weather channels
Mode of operation	: F3E 16K0 (16F3) Simplex, semi-duplex
Frequency stability	: 0.001%
Antenna impedance	: 50 ohms unbalanced
Power supply requirement	: DC 13.8V \pm 15% (negative ground)
Usable temperature range	: $-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ ($+14^{\circ}\text{F} \sim +140^{\circ}\text{F}$)
Dimensions	: 50.5mm(H) x 140mm(W) x 163mm(D)
Weight	: 1.3kg

RECEIVER

Frequency range	: 156 ~ 163MHz
Receiving system	: Double superheterodyne
Intermediate frequencies	: 1st IF : 21.4MHz 2nd IF : 455kHz
Sensitivity	: Less than $0.3\mu\text{V}$ for 12dB SINAD
Selectivity	: -70dB at 25kHz (EIA SINAD)
Spurious & image rejection	: 75dB
Threshold squelch sensitivity	: $0.4\mu\text{V}$
Tight squelch sensitivity	: $0.6\mu\text{V}$
Audio output	: 3W to a 4 ohm speaker at 10% distortion
Current drain	: Maximum : 0.65A (LCD light ON) Standby : 0.18A (LCD light OFF)

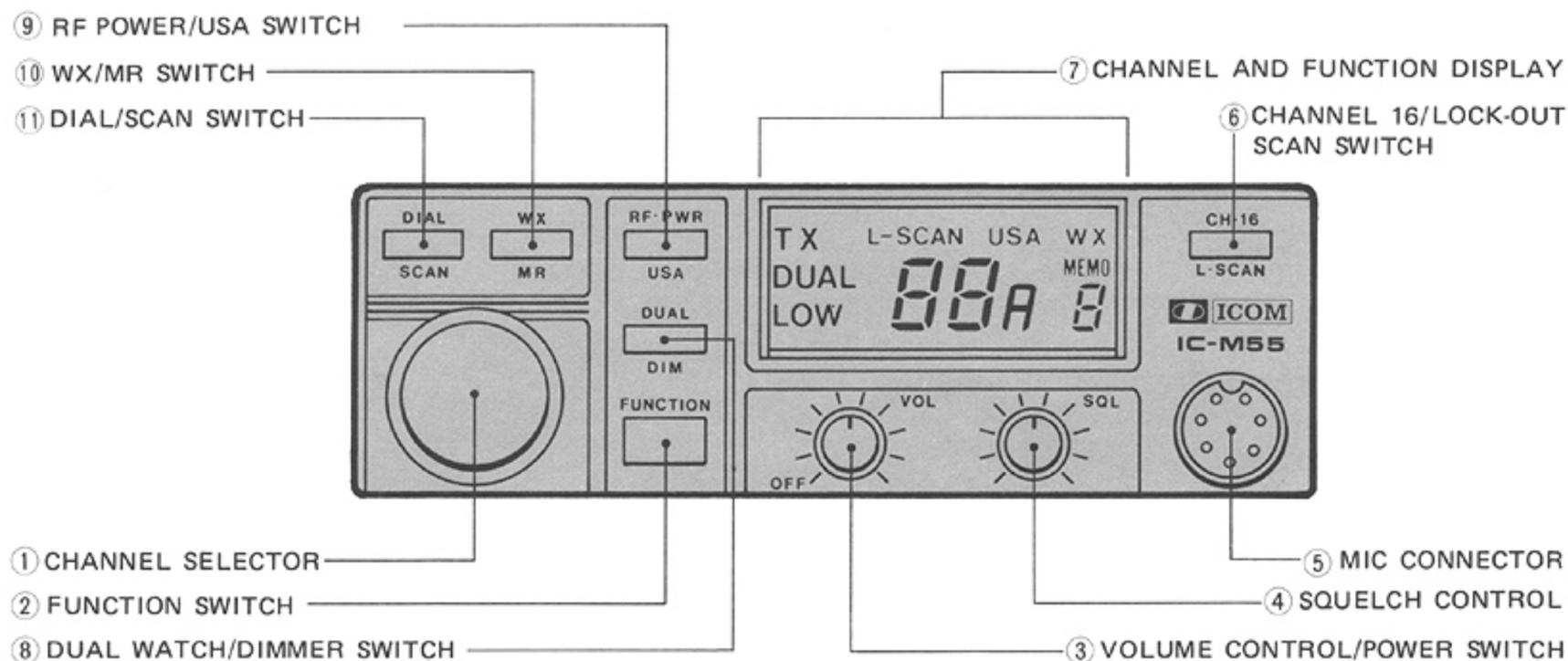
TRANSMITTER

Frequency range	: 156 ~ 157.5MHz
RF power output	: High : 25W Low : 1W
Maximum deviation	: $\pm 5\text{kHz}$
Spurious emissions	: 70dB below carrier
Harmonic emissions	: 60dB below carrier
Audio frequency response	: +1, -3dB of 6dB/octave pre-emphasis characteristic from 300 to 3000Hz with a 1000Hz reference
Audio distortion	: Less than 7% at 1000Hz for $\pm 3\text{kHz}$ deviation
Microphone impedance	: 600 ohms
Current drain	: Maximum 5.5A (High power, LCD light ON) Minimum 1.3A (Low power, LCD light OFF)

SECTION 2 CONTROL FUNCTIONS

2-1 U.S.A. VERSION

2-1-1 FRONT PANEL

**① CHANNEL SELECTOR**

Selects a programmed channel, memory channel or weather channel. Rotate clockwise or counterclockwise to change the operating channel in any mode.

② FUNCTION SWITCH

Activates the secondary function of each dual function switch on the front panel. Push this switch first, and then push the SCAN, MR, USA, DIM or L-SCAN switches to activate their respective functions. After pushing the FUNCTION switch, you have 3 seconds to push dual function switches before they return to their primary functions.

③ VOLUME CONTROL/POWER SWITCH

Varies the audio output level from the speaker in the receive mode, including the level of the switch BEEP tones as each panel switch is operated. Rotate clockwise to increase the sound level.

Also, a power switch for turning the transceiver ON and OFF.

④ SQUELCH CONTROL

Varies the squelch threshold level for quiet monitoring when no receive signal is present. Rotate completely counterclockwise to turn OFF the squelch function, and clockwise to increase the threshold level.

⑤ MIC CONNECTOR

Connect the supplied microphone to this connector.

⑥ CHANNEL 16/LOCK-OUT SCAN SWITCH

Selects the channel 16 auto-monitor mode. This function overrides all other switch functions. Each time the microphone is replaced in the microphone hanger, the transceiver switches to the channel 16 auto-monitor mode. This switch also starts and stops the lock-out scan function.

⑦ CHANNEL AND FUNCTION DISPLAY

Displays the operating channel and status of the transceiver using an illuminated liquid-crystal display(LCD).

See page 2-2 for detailed information.

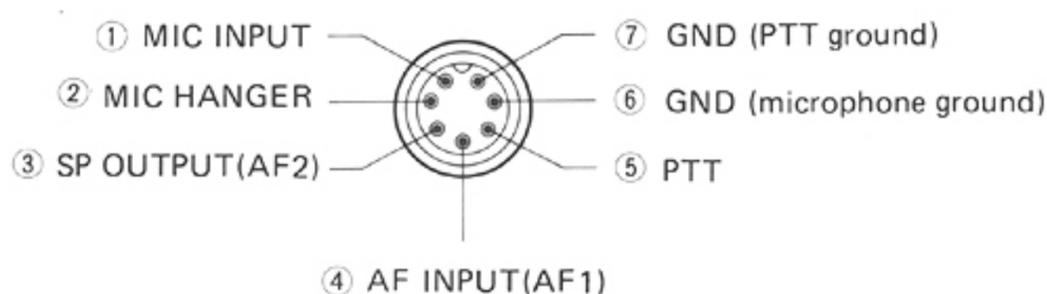
⑧ DUAL WATCH/DIMMER SWITCH

Activates the dual watch (sea watch) function. This function permits monitoring of channel 16 while listening on a different channel. Also, controls the illumination of the CHANNEL and FUNCTION DISPLAY.

⑨ RF POWER SWITCH

Alternately changes the transmit output power between the HIGH (25 watts) and the LOW (1 watt) positions. HIGH power is useful for long distance communication whereas LOW power is best for contacting stations nearby.

This switch also, selects the International and U.S.A. channel systems alternately.



FRONT VIEW

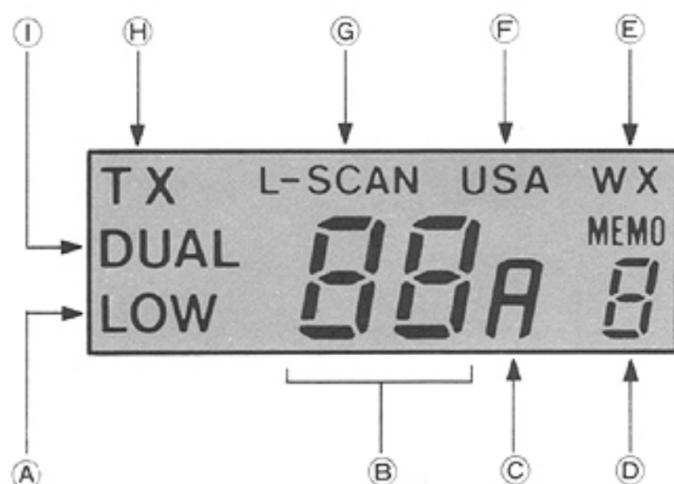
⑩ WX/MR SWITCH

Selects the weather mode. Rotate the CHANNEL SELECTOR to choose the desired weather channel. This switch also selects the memory mode.

⑪ DIAL/SCAN SWITCH

Selects the dial mode. Rotate the CHANNEL SELECTOR to choose an operating channel. Also, starts/stops the scanning functions.

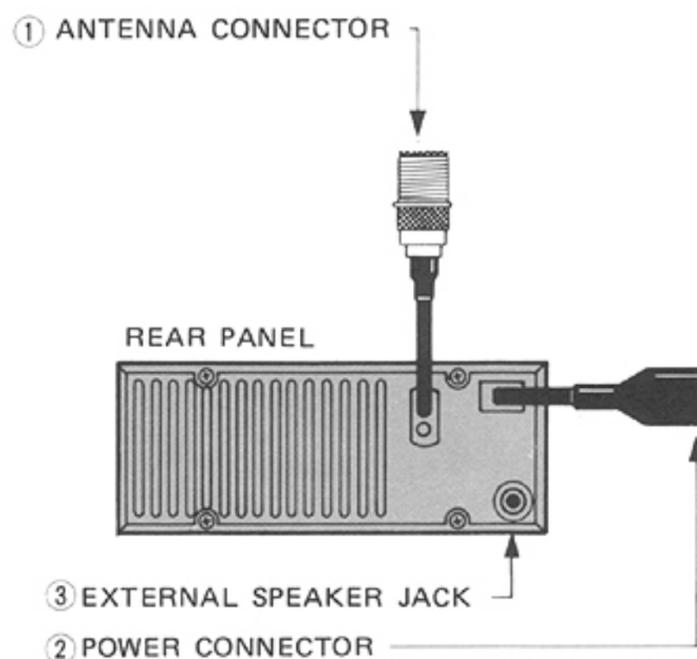
2-1-2 CHANNEL AND FUNCTION DISPLAY



The letters and numbers on the display represent the following:

- ① **TRANSMIT POWER indicator**: "LOW" appears when the LOW(1W) transmit power position is selected. No indicator appears when the HIGH(25W) power position is selected.
- ② **CHANNEL NUMBER indicator**: Indicates the operating channel number with two digits.
- ③ **U.S.A. CHANNEL indicator**: "A" appears when a U.S.A. channel is selected.
- ④ **MEMORY CHANNEL indicator**: "MEMO" and the selected memory channel number appear when in the memory mode.
- ⑤ **WEATHER indicator**: "WX" appears when a weather channel is selected.
- ⑥ **CHANNEL SYSTEM indicator**: "USA" appears when the U.S.A. channel system is selected. No indicator appears if the International channel system is selected.
- ⑦ **LOCK-OUT SCAN indicator**: "L-SCAN" appears when the set is scanning channels which are not locked out.
- ⑧ **TRANSMIT indicator**: "TX" appears when the transceiver is transmitting.
- ⑨ **DUAL WATCH (SEA WATCH) indicator**: "DUAL" appears when the dual watch function is operating.

2-1-3 REAR PANEL



① ANTENNA CONNECTOR

Connect a 50 ohm impedance antenna to this connector. The connector matches with a PL-259 plug.

② POWER CONNECTOR

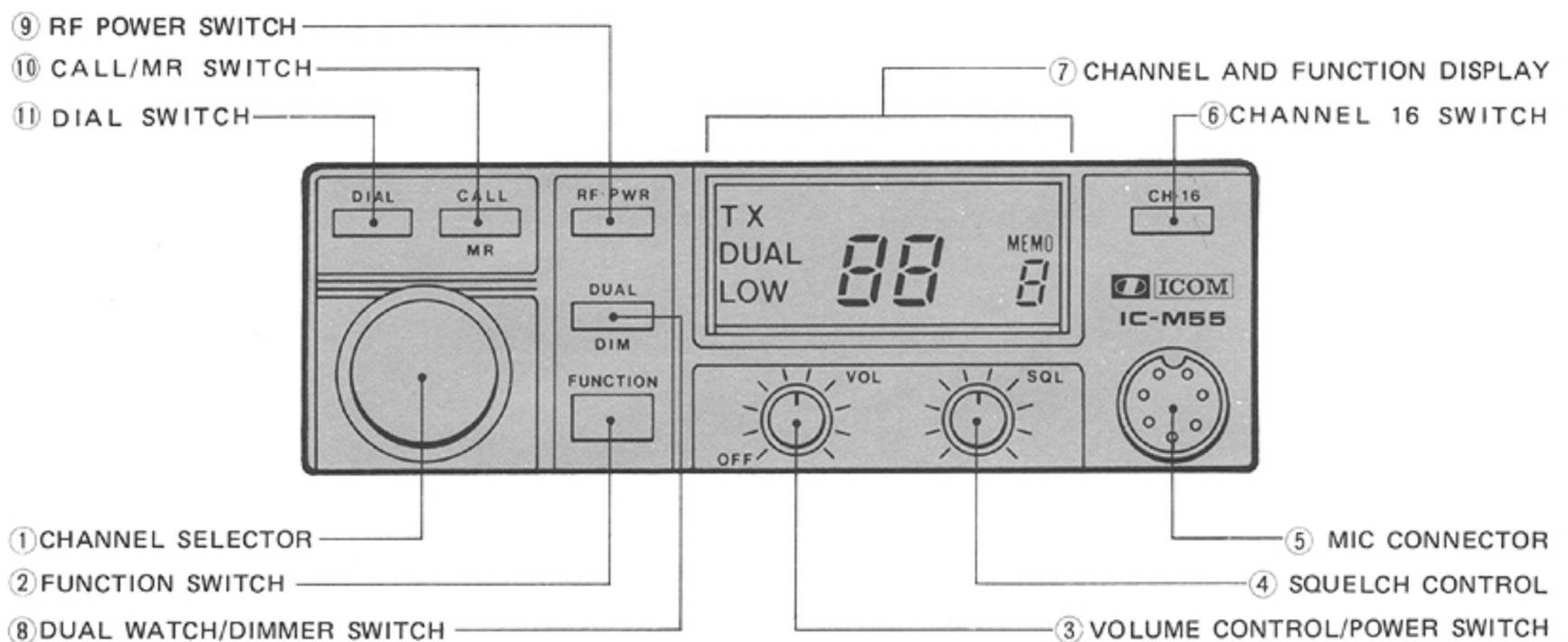
Connect the DC power cord from a 12V battery or other suitable power supply at this connector.

③ EXTERNAL SPEAKER JACK

Connect an external speaker to this jack, if required. Use a speaker with an impedance of 4 ~ 16 ohms and remember, the built-in speaker does not function when using the EXTERNAL SPEAKER JACK is being used.

2-2 EUROPE AND FRANCE VERSIONS

2-2-1 FRONT PANEL



① CHANNEL SELECTOR

Selects a programmed channel, memory channel or weather channel. Rotate clockwise or counterclockwise to change the operating channel in any mode.

② FUNCTION SWITCH

Activates the secondary function of each dual function switch on the front panel. Push this switch first, and then push the SCAN, MR, USA, DIM or L-SCAN switches to activate their respective functions. After pushing the FUNCTION switch, you have 3 seconds to push dual function switches before they return to their primary functions.

③ VOLUME CONTROL/POWER SWITCH

Varies the audio output level from the speaker in the receive mode, including the level of the switch BEEP tones as each panel switch is operated. Rotate clockwise to increase the sound level. This control also turns the transceiver ON and OFF.

④ SQUELCH CONTROL

Varies the squelch threshold level for quiet monitoring when no receive signal is present. Rotate completely counterclockwise to turn OFF the squelch function, and clockwise to increase the threshold level.

⑤ MIC CONNECTOR

Connect the supplied microphone to this connector.

⑥ CHANNEL 16 SWITCH

Selects the channel 16 auto-monitor mode. This function overrides all other switch functions. Each time the microphone is replaced in the microphone hanger, the transceiver switches to the channel 16 auto-monitor mode.

⑦ CHANNEL AND FUNCTION DISPLAY

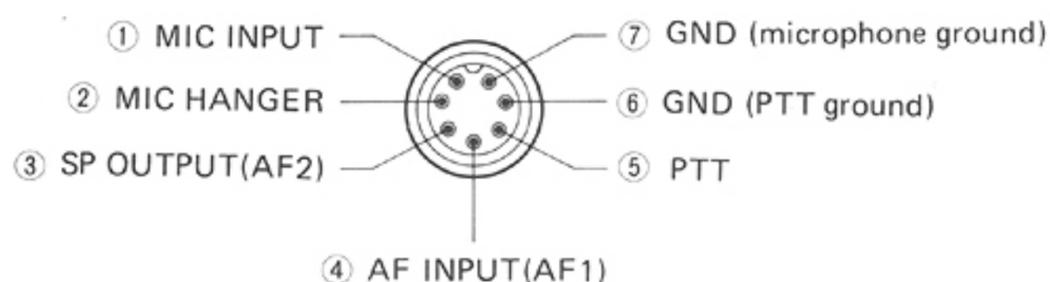
Displays the operating channel and status of the transceiver using an illuminated liquid-crystal display(LCD). See page 2-4 for more information.

⑧ DUAL WATCH/DIMMER SWITCH

Activates the dual watch(sea watch) function. This function permits monitoring of channel 16 while listening on a different channel. This switch also controls the illumination of the CHANNEL and FUNCTION DISPLAY.

⑨ RF POWER/USA SWITCH

Alternately changes the transmit output power between the HIGH(25 watts) and the LOW(1 watt) positions. HIGH power is useful for long distance communication whereas LOW power is best for contacting stations nearby.



FRONT VIEW

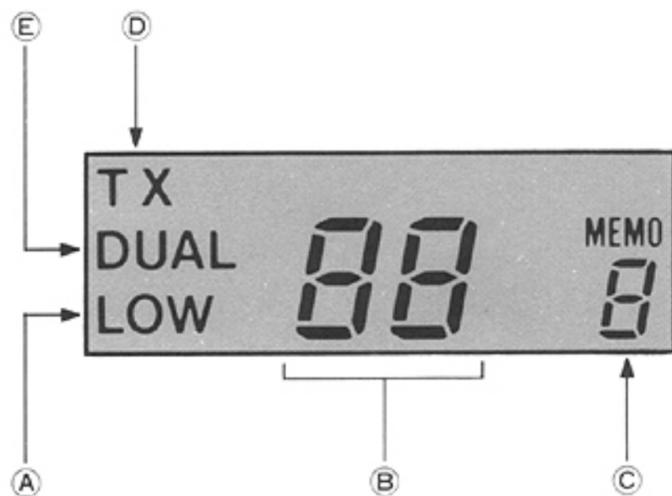
⑩ CALL/MR SWITCH

Selects the programmed calling channel.
Also, selects the memory mode.

⑪ DIAL SWITCH

Selects the dial mode. Rotate the CHANNEL SELECTOR to choose an operating channel.

2-2-2 CHANNEL AND FUNCTION DISPLAY

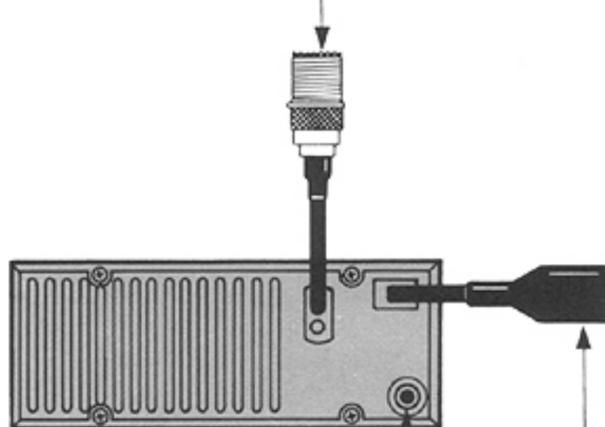


The letters and numbers on the display represent the following:

- ① **TRANSMIT POWER indicator** : "LOW" appears when the LOW(1W) transmit power position is selected. No indicator appears when the HIGH (25W) power position is selected.
- ② **CHANNEL NUMBER indicator** : Indicates the operating channel number with two digits.
- ③ **MEMORY CHANNEL indicator** : "MEMO" and the selected memory channel number appear when in the memory mode.
- ④ **TRANSMIT indicator** : "TX" appears when the transceiver is transmitting.
- ⑤ **DUAL WATCH(SEA WATCH) indicator** : "DUAL" appears when the dual watch function is operating.

2-2-3 REAR PANEL

① ANTENNA CONNECTOR



③ EXTERNAL SPEAKER JACK

② POWER CONNECTOR

① ANTENNA CONNECTOR

Connect a 50 ohm impedance antenna to this connector. The connector matches with a PL-259 plug.

② POWER CONNECTOR

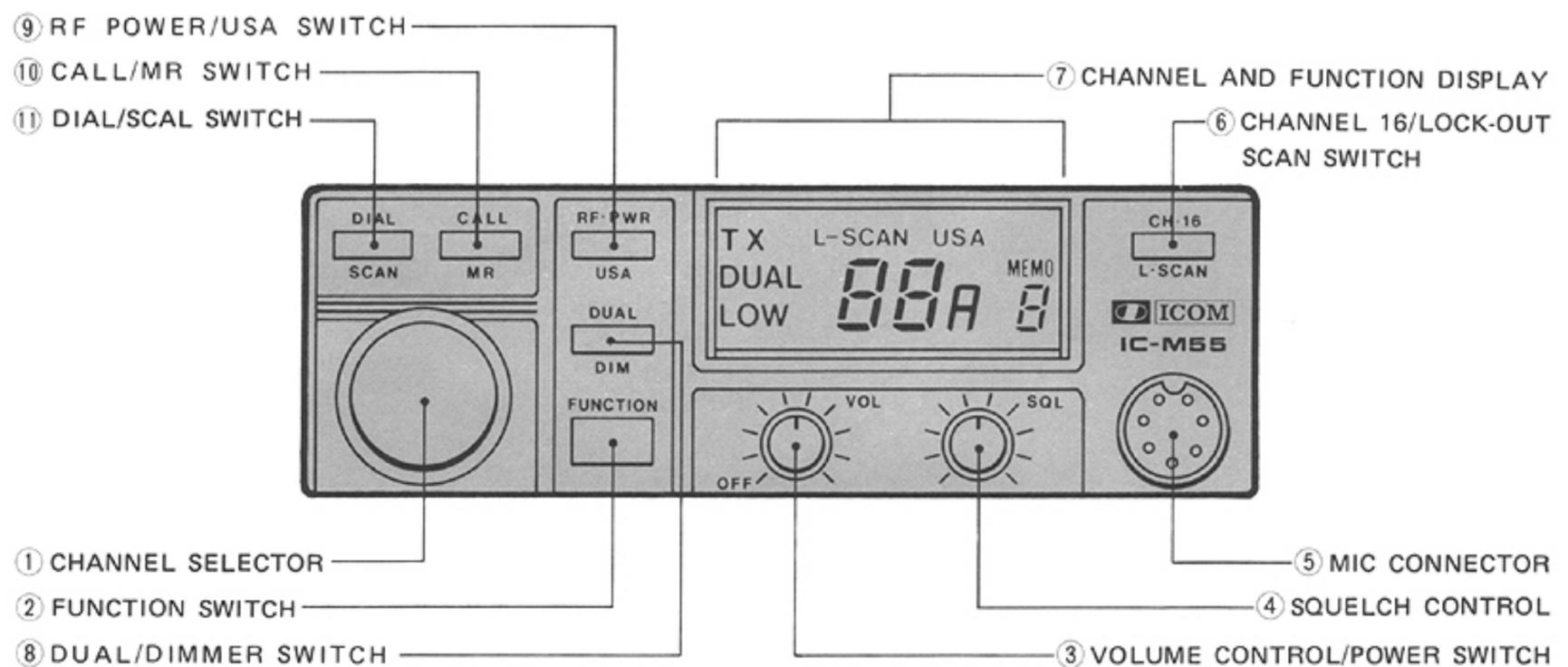
Connect the DC power cord from a 12V battery or other suitable power supply to this connector.

③ EXTERNAL SPEAKER JACK

Connect an external speaker to this jack, if required. Use a speaker with an impedance of 4 ~ 16 ohms and remember, the built-in speaker does not function when using the EXTERNAL SPEAKER JACK is being used.

2-3 U. K. VERSION

2-3-1 FRONT PANEL



① CHANNEL SELECTOR

Selects a programmed channel, memory channel or weather channel. Rotate clockwise or counterclockwise to change the operating channel in any mode.

② FUNCTION SWITCH

Activates the secondary function of each dual function switch on the front panel. Push this switch first, and then push the SCAN, MR, USA, DIM or L-SCAN switches to activate their respective functions. After pushing the FUNCTION switch, you have 3 seconds to push dual function switches before they return to their primary functions.

③ VOLUME CONTROL/POWER SWITCH

Varies the audio output level from the speaker in the receive mode, including the level of the switch BEEP tones as each panel switch is operated. Rotate clockwise to increase the sound level. This control also turns the transceiver ON and OFF.

④ SQUELCH CONTROL

Varies the squelch threshold level for quiet monitoring when no receive signal is present. Rotate completely counterclockwise to turn OFF the squelch function, and clockwise to increase the threshold level.

⑤ MIC CONNECTOR

Connect the supplied microphone to this connector.

⑥ CHANNEL 16/LOCK-OUT SCAN SWITCH

Selects the channel 16 auto-monitor mode. This function overrides all other switch functions. Each time the microphone is replaced in the microphone hanger, the transceiver switches to the channel 16 auto-monitor mode. This switch also starts and stops lock-out scan function.

⑦ CHANNEL AND FUNCTION DISPLAY

Displays the operating channel and status of the transceiver using an illuminated liquid-crystal display (LCD). See page 2-6 for more information.

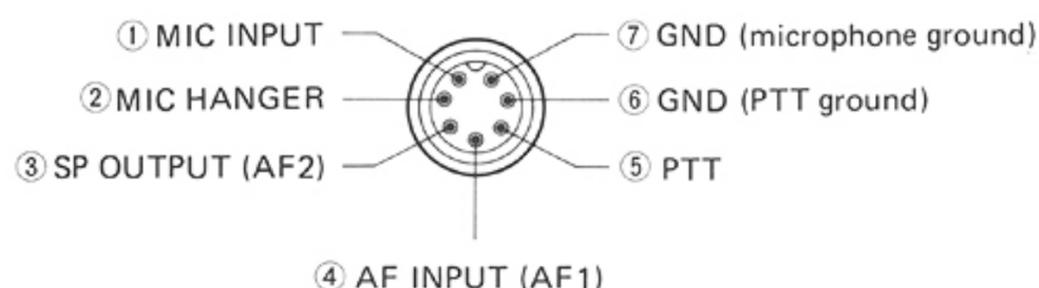
⑧ DIMMER SWITCH

Controls the illumination of the CHANNEL and FUNCTION DISPLAY.

⑨ RF POWER SWITCH

Alternately changes the transmit output power between the HIGH (25 watts) and the LOW (1 watt) positions. HIGH power is useful for long distance communication whereas LOW power is best for contacting stations nearby.

FRONT VIEW



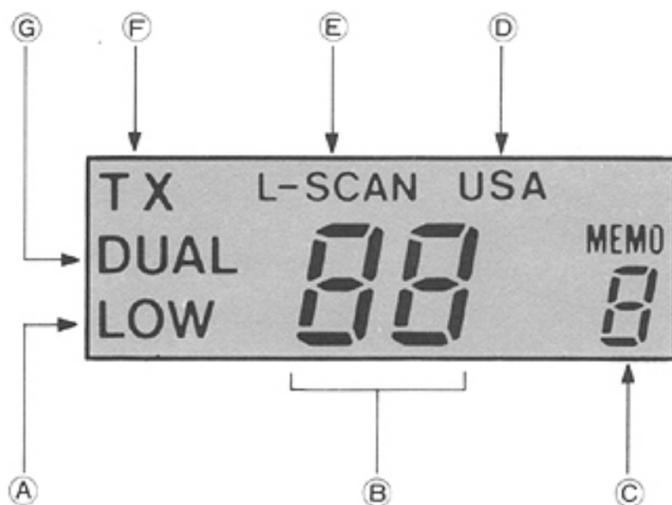
⑩ CALL/MR SWITCH

Selects the programmed calling channel.

⑪ DIAL/SCAN SWITCH

Selects the dial mode. Rotate the CHANNEL SELECTOR to choose an operation channel.

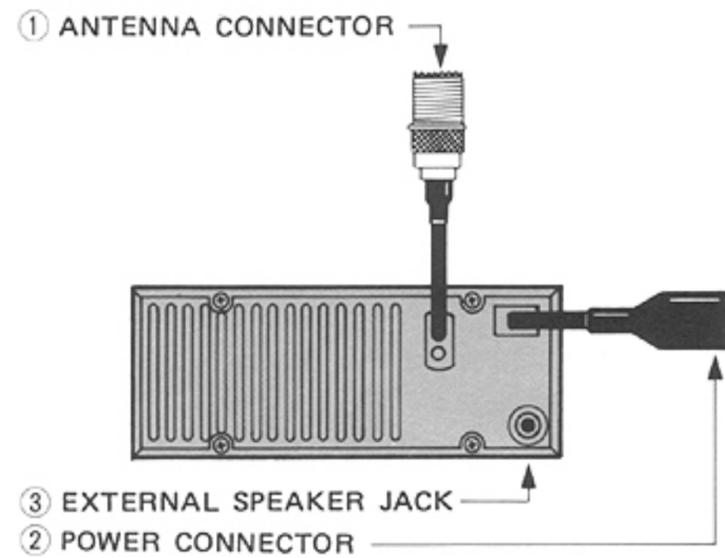
2-3-2 CHANNEL AND FUNCTION DISPLAY



The letters and numbers on the display represent the following:

- ① **TRANSMIT POWER indicator:** "LOW" appears when the LOW (1W) transmit power position is selected. No indicator appears when the HIGH (25W) power position is selected.
- ② **CHANNEL NUMBER indicator:** Indicates the operating channel number with two digits.
- ③ **memory channel indicator:** "MEMO" and the selected memory channel number appear when in the memory mode.
- ④ **CHANNEL SYSTEM indicator:** "USA" appears when the U.S.A. channel system is selected. No indicator appears if the International channel system is selected.
- ⑤ **LOCK-OUT SCAN indicator:** "L-SCAN" appears when the transceiver is scanning those channels which are not locked out.
- ⑥ **TRANSMIT indicator:** "TX" appears when the transceiver is transmitting.
- ⑦ **DUAL WATCH (SEA WATCH) indicator:** "DUAL" appears when the dual watch function is operating.

2-3-3 REAR PANEL



① ANTENNA CONNECTOR

Connect a 50 ohm impedance antenna to this connector. The connector matches with a PL-259 plug.

② POWER CONNECTOR

Connect the DC power cord from a 12V battery or other suitable power supply to this connector.

③ EXTERNAL SPEAKER JACK

Connect an external speaker to this jack, if required. Use a speaker with an impedance of 4~16 ohms and remember, built-in speaker does not function when the EXTERNAL SPEAKER JACK is being used.

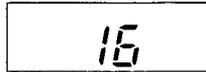
SECTION 3 OPERATION

3-1 U.S.A. VERSION

3-1-1 RECEIVING

1. POWER ON

- Rotate the VOLUME control/POWER switch clockwise to approximately the 9 o'clock position. The number "16" appears on the CHANNEL and FUNCTION DISPLAY indicating the power is ON, and the transceiver is receiving channel 16.

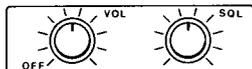


2. ADJUST VOLUME

- Rotate the SQUELCH control completely counter-clockwise.
- Rotate the VOLUME control clockwise for a suitable noise level from the speaker if no signal is present, or a suitable audio level if there is a signal on the channel.

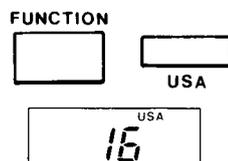
3. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.



4. SELECT INTERNATIONAL or U.S.A. CHANNELS

- The transceiver is presently in the International mode and will tune any of these channels.
- If a U.S.A. channel is required, push the FUNCTION switch, and then push the USA switch. The U.S.A. mode is now selected as indicated by the letters "USA" on the CHANNEL and FUNCTION DISPLAY.
- To change back to the International mode, push the FUNCTION switch, and then the USA switch.



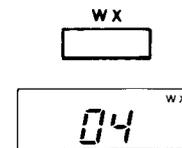
5. SELECT CHANNEL

- Push the DIAL switch.
- Rotate the CHANNEL SELECTOR to choose the required operating channel. The selected channel number appears on the CHANNEL and FUNCTION DISPLAY, and the transceiver is now receiving the indicated channel.



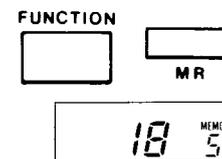
6. WEATHER MODE

- Push the WX switch. The letters "WX" appear on the CHANNEL and FUNCTION DISPLAY indicating the transceiver is in the weather mode.
- Rotate the CHANNEL SELECTOR to choose the desired weather channel. The channel number of the selected weather channel (1 ~ 10) appears on the CHANNEL and FUNCTION DISPLAY.
- The transceiver only operates in the receive mode when the weather channels are selected. Pushing the push-to-talk switch on the microphone mutes the receiver audio, but no signal is transmitted. Consequently, the letters "TX" DO NOT appear on the CHANNEL and FUNCTION DISPLAY.



7. MEMORY CHANNEL MODE

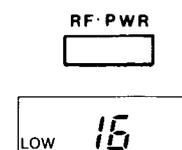
- Push the FUNCTION switch, and then push the MR switch.
- Rotate the CHANNEL SELECTOR to choose a memory channel (0 ~ 9).
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



3-1-2 TRANSMITTING

1. SELECT OUTPUT POWER

- The IC-M55 automatically resets to the HIGH (25W) power position when the transceiver is turned ON.
- Push the RF POWER switch to select the LOW (1W) power position. The letters "LOW" appear on the CHANNEL and FUNCTION DISPLAY when LOW power is selected.
- Push the RF POWER switch again to change back to the HIGH power position, if required. There is no "HIGH" power indicator on the CHANNEL and FUNCTION DISPLAY.

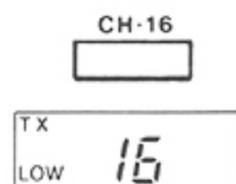


2. SELECT OPERATING CHANNEL

- Push the DIAL switch.
- Rotate the CHANNEL SELECTOR to choose a channel suitable for the type of communication intended.
- Listen carefully to be sure the channel is clear.

3. MOVE TO CALLING CHANNEL

- Push the CH 16 switch, and wait until the channel is clear.
- Push the push-to-talk (PTT) switch on the microphone and call the party you are trying to contact. Hold the microphone fairly close to your mouth and speak in a clear, natural voice. When finished speaking, release the PTT switch, and the transceiver automatically changes back to the receive mode.



4. MOVE TO OPERATING CHANNEL

- After establishing contact with the desired party, push the DIAL switch to move to the channel previously selected in step 2.
- Resume your conversation.
- When your conversation is completely finished, return the microphone to the hanger, and the transceiver automatically changes to channel 16.



3-1-3 MEMORY CHANNEL OPERATION

--- Programming the Memory Channels ---

1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push and hold the MR switch for approximately 2 seconds until the word "MEMO" on the CHANNEL and FUNCTION DISPLAY begins to blink.



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel.

3. SELECT CHANNEL SYSTEM (INTERNATIONAL/U.S.A.)

- Push the FUNCTION switch, and then push the USA switch to choose the opposite channel system (International/U.S.A.), if required. DO NOT push the USA switch if the correct channel system is already selected. The previously programmed channel number begins to blink after pushing the FUNCTION switch. If no channel has been programmed before, then channel number 16 begins to blink.



4. SELECT CHANNEL NUMBER

- Rotate the CHANNEL SELECTOR to choose the desired channel to be stored in the memory channel.
- Push the FUNCTION switch to store the selected channel in the memory channel.



NOTE: The weather channels cannot be stored in the memory channels. Also, remember, all channels programmed in the memory channels are saved even if the transceiver is turned OFF or disconnected from a power source since the set has an internal battery specifically for this purpose.

--- Using the Memory Channels ---

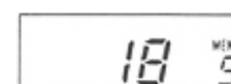
1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push the MR switch.



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel (0 ~ 9). Memory channels which have not been programmed cannot be selected. Refer to "Programming the Memory Channels" for instructions explaining how to store channels in the memories.
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



3-1-4 LOCK-OUT FUNCTION

The purpose of the lock-out function is to disable specific channels so, when in the All Channel Scan mode, the transceiver does not stop on these channels. This feature allows you to customize the scanning characteristics of the transceiver to your exact requirements.

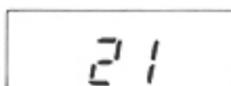
--- Locking-Out a Channel ---

1. SELECT DIAL MODE

- Push the DIAL switch.

2. SELECT CHANNEL

- Rotate the CHANNEL SELECTOR to choose the channel to be locked-out.



3. LOCK-OUT CHANNEL

- Push and hold the FUNCTION switch, and then push the L-SCAN switch. The "L—" symbol appears.
- Release the FUNCTION switch. The "L—" symbol disappears.



NOTE : Locking-out an International channel simultaneously locks out the U.S.A. channel with the same number and vice versa. For example, locking out channel 21 also locks out channel 21A.

- The channel is now locked-out. If you wish to have the "L—" symbol appear as a reminder that the channel is locked-out, turn the CHANNEL SELECTOR to select an adjacent channel and then shift back to the original channel.

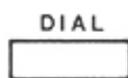
--- Cancelling a Locked-Out Channel ---

1. VERIFICATION

- Confirm the channel of interest is skipped in the All Channel Scan mode.

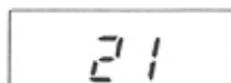
2. SELECT DIAL MODE

- Push the DIAL switch.



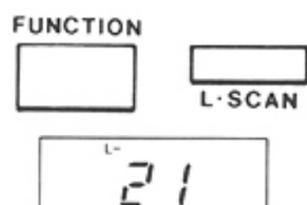
3. SELECT CHANNEL

- Rotate the CHANNEL SELECTOR to choose the channel you no longer wish locked-out.



4. CANCEL LOCK-OUT

- Push and hold the FUNCTION switch, and then push the L-SCAN switch.
- Release the FUNCTION switch. The "L—" symbol appears.



--- Cancelling All Locked-Out Channels --- (Resetting the CPU)

WARNING: DO NOT perform this procedure if you wish to keep the channels stored in the memories. This procedure erases all memory channels.

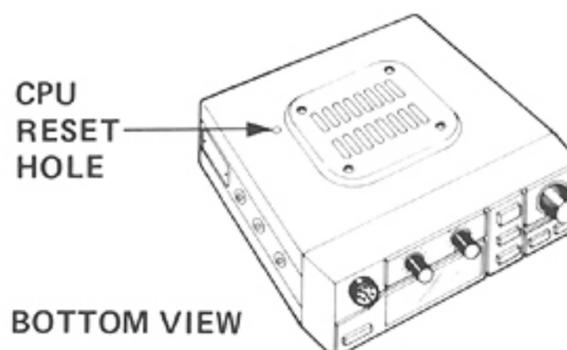
1. POWER ON

- If the transceiver is not ON, rotate the VOLUME control/POWER switch clockwise to approximately the 12 o'clock position. The number "16" appears on the CHANNEL and FUNCTION DISPLAY indicating the power is ON.



2. RESET CPU

- Locate the small hole in the bottom cover of the IC-M55.
- Insert a plastic or insulated probe into the hole. Push the small reset switch lightly.
- The CPU is now reset. All channels are clear of the lockout function and all memories are vacant except MEMO 0 (CH16).



3 - 1 - 5 SCANNING

--- All Channel Scanning ---

The following procedure explains how to automatically scan all marine channels.

1. SELECT DIAL MODE

- Push the DIAL switch.

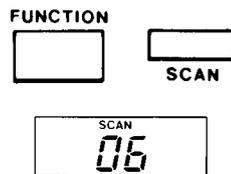


2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.

3. ACTIVATE SCAN

- Push the FUNCTION switch, and then push the SCAN switch.
- The letters "SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed channel and moves upwards through all channels of the particular channel system selected (either International or U.S.A.). On reaching the highest channel, the scan continues upwards from the lowest channel in a continuous loop.
- Each time the set reaches a channel with a signal, the scan stops as long as the signal is present. When the channel is clear, the scan resumes upwards.



4. STOPPING THE SCAN

- Push any one of the DIAL, WX, CH 16 or FUNCTION switches to stop the scanning function.

--- Memory Channel Scanning ---

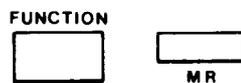
The following procedure explains how to automatically scan the memory channels.

1. PROGRAM CHANNELS

- Program the desired channels to be monitored in memory channels 0 ~ 9. Follow the instructions in "Programming the Memory Channels".

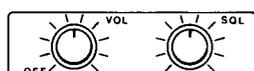
2. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push the MR switch.
- A memory channel and a channel number appear on the CHANNEL and FUNCTION DISPLAY.



3. ADJUST SQUELCH

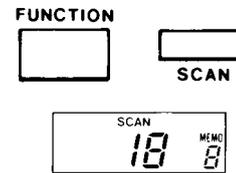
- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.



4. ACTIVATE SCAN

- Push the FUNCTION switch, and then push the SCAN switch.
- The letters "SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.

- The scan begins from the displayed memory channel and moves upwards through all programmed memories. On reaching the highest programmed memory, the scan skips to the lowest programmed memory and moves upwards in a continuous loop.
- Each time the transceiver reaches a channel with a signal, the scan stops as long as the signal is present



5. STOPPING THE SCAN

- Push any one of the DIAL, WX, CH 16 or FUNCTION switches to stop the scanning function.

--- Weather Channel Scanning ---

The following procedure explains how to automatically scan the weather channels:

1. SELECT WEATHER MODE

- Push the WX switch.
- A weather channel number appears on the CHANNEL and FUNCTION DISPLAY.

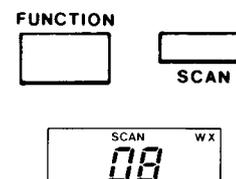


2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.

3. ACTIVATE SCAN

- Push the FUNCTION switch, and then push the SCAN switch.
- The letters "SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed weather channel and moves upwards through all the weather channels. On reaching WX channel 10, the scan skips to WX channel 1 and moves upwards again in a continuous loop.
- Each time the transceiver reaches a channel with a signal, the scan stops as long as the signal is present. When the channel is clear, the scan resumes upwards.



4. STOPPING THE SCAN

- Push any one of the DIAL, WX, Ch 16 or FUNCTION switches to stop the scanning function.

--- Lock-Out Scanning ---

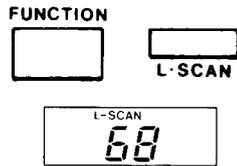
The following procedure explains how to automatically scan only those channels which are not disabled by the lock-out function.

1. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.

2. ACTIVATE LOCK-OUT SCAN

- Push the FUNCTION switch, and then push the L-SCAN switch.
- The letters "L-SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed channel and moves upwards in the same manner as the All Channel Scan except that those channels which are locked-out are skipped over, and the scan does not stop on these channels even if a signal is present.



3. STOPPING THE LOCK-OUT SCAN

- Push any one of the DIAL, WX, CH16 or FUNCTION switches to stop lock-out scanning.

3 - 1 - 6 DUAL WATCH (SEA WATCH)

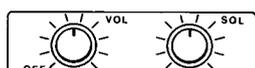
This function allows a check of channel 16 while listening on another channel. When a signal appears on channel 16, the transceiver automatically switches to channel 16 until this signal has cleared, then the transceiver returns to the original channel.

1. SELECT CHANNEL

- Choose the desired operating channel using the dial, memory or weather modes. See the RECEIVING and MEMORY CHANNEL sections for further details.

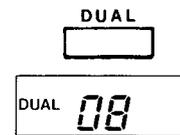
2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.



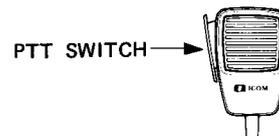
3. SELECT DUAL WATCH MODE

- Push the DUAL switch.
- The letters "DUAL" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the dual watch function has started.
- The transceiver now alternates between the channel selected in step 1 and channel 16. The transceiver monitors the selected channel for approximately 2 or 3 seconds, and then checks channel 16 for a moment before switching back to the selected channel again.
- When a signal appears on either channel, that channel is monitored. However, if a signal appears on both channels simultaneously, then channel 16 has priority. The transceiver remains locked on channel 16 until it is clear, and then switches to monitor the other signal.



4. TRANSMITTING ON SELECTED CHANNEL

- Push the push-to-talk (PTT) switch on the microphone and begin speaking.



5. TRANSMITTING ON CHANNEL 16

- Push the CH 16 switch.
- Push the push-to-talk (PTT) switch on the microphone and begin speaking.
- Push the DUAL switch to engage the DUAL WATCH operation again when your communication on channel 16 is completed.

6. CANCELLING DUAL WATCH MODE

- Push any one of the DIAL, WX, CH16 or FUNCTION switches or rotate the CHANNEL SELECTOR to stop the dual watch.

3 - 1 - 7 CHANNEL 16 AUTO-MONITOR

The channel 16 auto-monitor circuit simplifies operation of the transceiver by automatically switching to channel 16 when the microphone is replaced in its hanger. However, even with the microphone in its hanger, any channel (including the weather channels) may be monitored simply by pushing the appropriate switches.

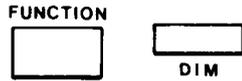


3-1-8 DISPLAY LIGHT and LIGHT DIMMER

The IC-M55 has an illuminated CHANNEL and FUNCTION DISPLAY for easy reading in dim or no light situations. The light may be turned ON and OFF, and also the intensity may be varied to suit the ambient light conditions.

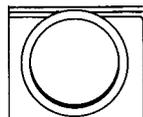
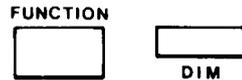
1. LIGHT ON/OFF

- Push the FUNCTION switch, and then push the DIM switch to turn the light ON or OFF.



2. LIGHT INTENSITY

- Push and hold the FUNCTION switch, and then push the DIM switch.
- Rotate the CHANNEL SELECTOR to vary the light intensity.
- Release the FUNCTION switch.



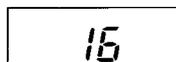
CHANNEL SELECTOR

3-2 EUROPE AND FRANCE VERSIONS

3-2-1 RECEIVING

1. POWER ON

- Rotate the VOLUME control/POWER switch clockwise to approximately the 9 o'clock position. The number "16" appears on the CHANNEL and FUNCTION DISPLAY indicating the power is ON, and the transceiver is receiving channel 16.

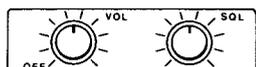


2. ADJUST VOLUME

- Rotate the SQUELCH control completely counter-clockwise.
- Rotate the VOLUME control clockwise for a suitable noise level from the speaker if no signal is present, or a suitable audio level if there is a signal on the channel.

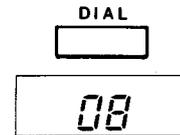
3. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.



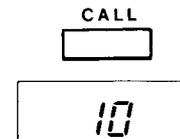
4. SELECT CHANNEL

- Push the DIAL switch
- Rotate the CHANNEL SELECTOR to choose the required operating channel. The selected channel number appears on the CHANNEL and FUNCTION DISPLAY, and the transceiver is now receiving the indicated channel.



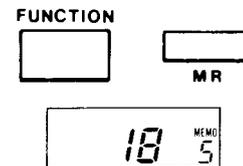
5. MOVE TO PROGRAMMED CALLING CHANNEL

- Push the CALL switch. The programmed calling channel appears on the display, and the transceiver is now receiving the indicated channel.



6. MEMORY CHANNEL MODE

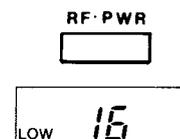
- Push the FUNCTION switch, and then push the MR switch.
- Rotate the CHANNEL SELECTOR to choose a memory channel (0 ~ 9).
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



3-2-2 TRANSMITTING

1. SELECT OUTPUT POWER

- The IC-M55 automatically resets to the HIGH (25W) power position when the transceiver is turned ON.
- Push the RF POWER switch to select the LOW (1W) power position. The letters "LOW" appear on the CHANNEL and FUNCTION DISPLAY when LOW power is selected.
- Push the RF POWER switch again to change back to the HIGH power position, if required. There is no "HIGH" power indicator on the CHANNEL and FUNCTION DISPLAY.

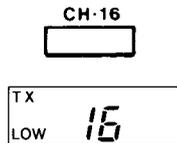


2. SELECT OPERATING CHANNEL

- Push the DIAL switch.
- Rotate the CHANNEL SELECTOR to choose a channel suitable for the type of communication intended.
- Listen carefully to make sure the channel is clear.

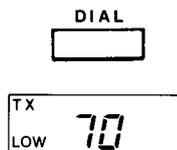
3. MOVE TO CALLING CHANNEL

- Push the CH 16 switch, and wait until the channel is clear.
- Push the push-to-talk (PTT) switch on the microphone and call the party you are trying to contact. Hold the microphone fairly close to your mouth and speak in a clear, natural voice. When finished speaking, release the PTT switch, and the transceiver automatically changes back to the receive mode.



4. MOVE TO OPERATING CHANNEL

- After establishing contact with the desired party, push the DIAL switch to move to the channel previously selected in step 2.
- Resume your conversation.
- When your conversation is completely finished, return the microphone to the hanger, and the transceiver automatically changes to channel 16.



3 - 2 - 3 MEMORY CHANNELS

--- Programming the Memory Channels ---

1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push and hold the MR switch for approximately 2 seconds until the word "MEMO" on the CHANNEL and FUNCTION DISPLAY begins to blink.



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel.

3. SELECT CHANNEL NUMBER

- Rotate the CHANNEL SELECTOR to choose the desired channel to be stored in the memory channel.
- Push the FUNCTION switch to store the selected channel in the memory channel.



--- Using the Memory Channels ---

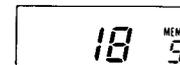
1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push the MR switch.



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel (0 ~ 9). Memory channels which have not been programmed cannot be selected. Refer to "Programming the Memory Channels" for instructions explaining how to store channels in the memories.
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



--- Programming the Call Channel ---

1. SELECT CALL MODE

- Push and hold the CALL switch for approximately 2 seconds until the letters "CH" on the display begin to blink.
- Release the CALL switch.



2. SELECT CHANNEL NUMBER

- Rotate the CHANNEL SELECTOR to choose the desired channel to be stored in the calling channel.
- Push the CALL switch to store this channel.

3 - 2 - 4 DUAL WATCH (SEA WATCH)

This function allows a check of channel 16 while listening on another channel. When a signal appears on channel 16, the transceiver automatically switches to channel 16 until this signal has cleared, then the set returns to the original channel.

1. SELECT CHANNEL

- Choose the desired operating channel using the dial, memory or weather modes. See the RECEIVING and MEMORY CHANNEL sections for further details.

2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.

3. SELECT DUAL WATCH MODE

- Push the DUAL switch.
- The letters "DUAL" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the dual watch function has started.
- The transceiver now alternates between the channel selected in step 1 and channel 16. The transceiver monitors the selected channel for approximately 2 or 3 seconds, and then checks channel 16 for a moment before switching back to the selected channel again.
- When a signal appears on either channel, that channel is monitored. However, if a signal appears on both channels simultaneously, then channel 16 has priority. The set remains locked on channel 16 until it is clear, and then switches to monitor the other signal.

4. TRANSMITTING ON SELECTED CHANNEL

- Push the push-to-talk (PTT) switch on the microphone and begin speaking.



5. TRANSMITTING ON CHANNEL 16

- Push the CH 16 switch.
- Push the push-to-talk (PTT) switch on the microphone and begin speaking.
- Push the DUAL switch to engage the DUAL WATCH operation again when your communication on channel 16 is completed.



6. CANCELLING DUAL WATCH MODE

- Push any one of the DIAL, CALL, CH 16 or FUNCTION switches or rotate the CHANNEL SELECTOR to stop the dual watch.

3 - 2 - 5 CHANNEL 16 AUTO-MONITOR

The channel 16 auto-monitor circuit simplifies operation of the transceiver by automatically switching to channel 16 when the microphone is replaced in its hanger. However, even with the microphone in its hanger, any channel may be monitored.



3 - 2 - 5 DISPLAY LIGHT and LIGHT DIMMER

The IC-M55 has an illuminated CHANNEL and FUNCTION DISPLAY for easy reading in dim or no light situations. The light may be turned ON and OFF, and also the intensity may be varied to suit the ambient light conditions.

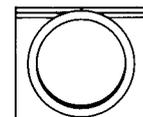
1. LIGHT ON/LIGHT OFF

- Push the FUNCTION switch, and then push the DIM switch to turn the light ON/OFF. Repeat to change the state of the light.



2. LIGHT INTENSITY

- Push and hold the FUNCTION switch, and then push the DIM switch.
- Rotate the CHANNEL SELECTOR to vary the light intensity.
- Release the FUNCTION switch.

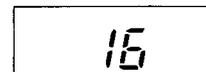


3 - 3 U.K. VERSION

3 - 3 - 1 RECEIVING

1. POWER ON

- Rotate the VOLUME control/POWER switch clockwise to approximately the 9 o'clock position.
- The number "16" appears on the CHANNEL and FUNCTION DISPLAY indicating the power is ON, and the transceiver is receiving channel 16.

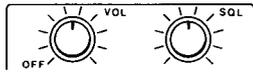


2. ADJUST VOLUME

- Rotate the SQUELCH control completely counter-clockwise.
- Rotate the VOLUME control clockwise for a suitable noise level from the speaker if no signal is present, or a suitable audio level if there is a signal on the channel.

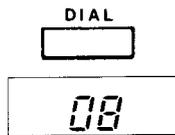
3. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.



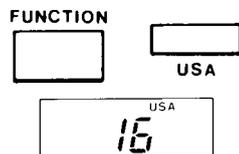
4. SELECT CHANNEL

- Push the DIAL switch.
- Rotate the CHANNEL SELECTOR to choose the required operating channel. The selected channel number appears on the CHANNEL and FUNCTION DISPLAY, and the set is now receiving the indicated channel.



5. SELECT INTERNATIONAL or U.S.A. CHANNELS

- The transceiver is presently in the International Mode and will tune any of these channels.
- If a U.S.A. channel is required, push the FUNCTION switch, and then push the USA switch. The U.S.A. mode is now selected as indicated by the letters "USA" on the CHANNEL and FUNCTION DISPLAY.
- To change back to the International mode, push the FUNCTION switch, and then the USA switch.



6. SELECT CHANNEL

- Push the DIAL switch. Rotate the CHANNEL SELECTOR to choose the required operating channel. The selected channel number appears on the CHANNEL and FUNCTION DISPLAY, and the transceiver is now receiving the indicated channel.



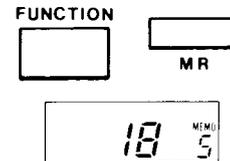
7. MOVE TO PROGRAMMED CALLING CHANNEL

- Push the CALL switch. The programmed calling channel appears on the display, and the set is now receiving the indicated channel.



8. MEMORY CHANNEL MODE

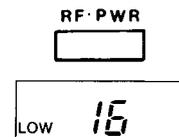
- Push the FUNCTION switch, and then push the MR switch.
- Rotate the CHANNEL SELECTOR to choose a memory channel (0 ~ 9).
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



3-3-2 TRANSMITTING

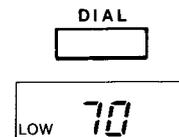
1. SELECT OUTPUT POWER

- The IC-M55 automatically resets to the HIGH (25W) power position when the set is turned ON.
- Push the RF POWER switch to select the LOW (1W) power position. The letters "LOW" appear on the CHANNEL and FUNCTION DISPLAY when LOW power is selected.
- Push the RF POWER switch again to change back to the HIGH power position, if required. There is no "HIGH" power indicator on the CHANNEL and FUNCTION DISPLAY.



2. SELECT OPERATING CHANNEL

- Push the DIAL switch.
- Rotate the CHANNEL SELECTOR to choose a channel suitable for the type of communication intended.
- Listen carefully to be sure the channel is clear.

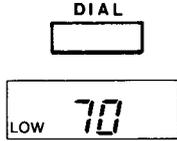


3. MOVE TO CALLING CHANNEL

- Push the CH 16 switch, and wait until the channel is clear.
- Push the push-to-talk (PTT) switch on the microphone and call the party you are trying to contact. Hold the microphone fairly close to your mouth and speak in a clear, natural voice. When finished speaking, release the PTT switch, and the transceiver automatically changes back to the receive mode.

4. MOVE TO AN OPERATING CHANNEL

- After establishing contact with the desired party, push the DIAL switch to move to the channel previously selected in step 2.
- Resume your conversation.
- When your conversation is completely finished, return the microphone to the hanger, and the transceiver automatically changes to channel 16.

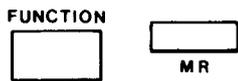


3-3-3 MEMORY CHANNEL OPERATION

--- Programming the Memory Channels ---

1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push and hold the MR switch for approximately 2 seconds until the word "MEMO" on the CHANNEL and FUNCTION DISPLAY begins to blink.



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel.

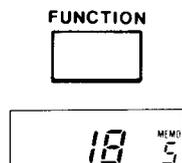
3. SELECT CHANNEL SYSTEM (INTERNATIONAL/U.S.A.)

- Push the FUNCTION switch, and then push the USA switch to choose the opposite channel system (International/U.S.A.), if required. DO NOT push the USA switch if the correct channel system is already selected. The previously programmed channel number begins to blink after pushing the FUNCTION switch. If no channel has been programmed before, then channel number 16 begins to blink.



4. SELECT CHANNEL NUMBER

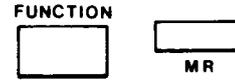
- Rotate the CHANNEL SELECTOR to choose the desired channel to be stored in the memory channel.
- Push the FUNCTION switch to store the selected channel in the memory channel.



--- Using the Memory Channels ---

1. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push the MR switch



2. SELECT MEMORY CHANNEL

- Rotate the CHANNEL SELECTOR to choose a memory channel (0~9). Memory channels which have not been programmed cannot be selected. Refer to Programming the Memory Channels" for instructions explaining how to store channels in the memories.
- The channel number and memory number selected appear on the CHANNEL and FUNCTION DISPLAY.



3-3-4 LOCK-OUT FUNCTION

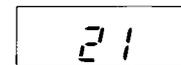
The purpose of the lock-out function is to disable specific channels so, when in the All Channel Scan mode, the transceiver does not stop on these channels. This feature allows you to customize the scanning characteristics of the transceiver to your exact requirements.

1. SELECT DIAL MODE

- Push the DIAL switch.

2. SELECT CHANNEL

- Rotate the CHANNEL SELECTOR to choose the channel to be locked-out.



3. LOCK-OUT CHANNEL

- Push and hold the FUNCTION switch, and then push the L-SCAN switch. The "L—" symbol appears.
- Release the FUNCTION switch. The "L—" symbol disappears.



- The channel is now locked-out. If you wish to have the "L—" symbol appear as a reminder that the channel is locked-out, turn the CHANNEL SELECTOR to select an adjacent channel and then shift back to the original channel.

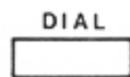
--- Cancelling a Locked-out Channel ---

1. VERIFICATION

- Confirm the channel of interest is skipped in the All Channel Scan mode.

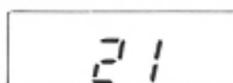
2. SELECT DIAL MODE

- Push the DIAL switch.



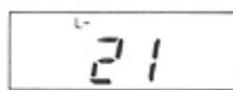
3. SELECT CHANNEL

- Rotate the CHANNEL SELECTOR to choose the channel you no longer wish locked-out.



4. CANCEL LOCK-OUT

- Push and hold the FUNCTION switch, and then push the L-SCAN switch.
- Release the FUNCTION switch. The "L—" symbol appears.



--- Cancelling All Locked-out Channels --- (Resetting the CPU)

WARNING: DO NOT perform this procedure if you wish to keep the channels stored in the memories. This procedure erases all memory channels.

1. POWER ON

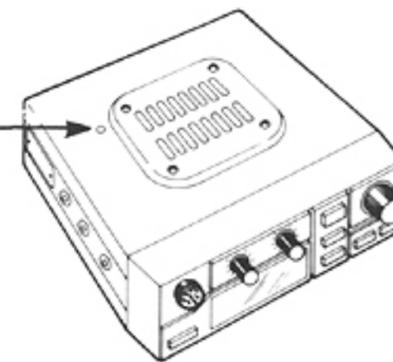
- If the transceiver is not ON, rotate the VOLUME control/POWER switch clockwise to approximately the 12 o'clock position. The number "16" appears on the CHANNEL and FUNCTION DISPLAY indicating the power is ON.



2. RESET CPU

- Locate the small hole in the bottom cover of the IC-M55.
- Insert a plastic or insulated probe into the hole. Push the small reset switch lightly.
- The CPU is now reset. All channels are clear of the lock-out function and all memories are vacant except MEMO 0 (CH16).

CPU
RESET
HOLE



BOTTOM VIEW

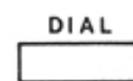
3 - 3 - 5 SCANNING

--- All Channel Scanning ---

The following procedure explains how to automatically scan all marine channels.

1. SELECT DIAL MODE

- Push the DIAL switch.

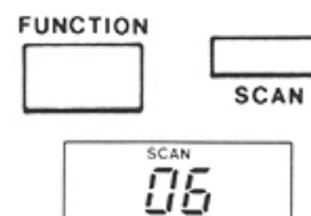


2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.

3. ACTIVATE SCAN

- Push the FUNCTION switch, and then push the SCAN switch.
- The letters "SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed channel and moves upwards through all channels of the particular channel system selected (either International or U.S.A.). On reaching the highest channel, the scan continues upwards from the lowest channel in a continuous loop.
- Each time the set reaches a channel with a signal, the scan stops as long as the signal is present. When the channel is clear, the scan resumes upwards.



4. STOPPING THE SCAN

- Push any one of the DIAL, WX, CH16 or FUNCTION switches to stop the scanning function.

--- Memory Channel Scanning ---

The following procedure explain how to automatically scan the memory channels.

1. PROGRAM CHANNELS

- Program the desired channels to be monitored in memory channels 0 ~ 9. Follow the instructions in "Programming the Memory Channels".

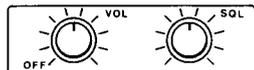
2. SELECT MEMORY MODE

- Push the FUNCTION switch, and then push the MR switch.
- A memory channel and a channel number appear on the CHANNEL and FUNCTION DISPLAY.



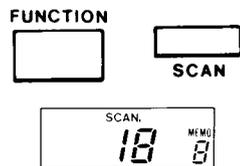
3. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.



4. ACTIVATE SCAN

- Push the FUNCTION switch, and then push the SCAN switch.
- The letters "SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed memory channel and moves upwards through all programmed memories. On reaching the highest programmed memory, the scan skips to the lowest programmed memory and moves upwards in a continuous loop.
- Each time the transceiver reaches a channel with a signal, the scan stops as long as the signal is present.



5. STOPPING THE SCAN

- Push any one of the DIAL, WX, CH16 or FUNCTION switches to stop the scanning function.

--- Lock-Out Scanning ---

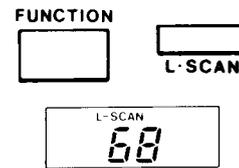
The following procedure explains how to automatically scan only those channels which are not disabled by the lock-out function.

1. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel being monitored.

2. ACTIVATE LOCK-OUT SCAN

- Push the FUNCTION switch, and then push the L-SCAN switch.
- The letters "L-SCAN" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the scan has started.
- The scan begins from the displayed channel and moves upwards in the same manner as the All Channel Scan except that those channels which are locked-out are skipped over, and the scan does not stop on these channels even if a signal is present.



3. STOPPING THE LOCK-OUT SCAN

- Push any one of the DIAL, WX, CH16 or FUNCTION switches to stop lock-out scanning.

3-3-6 DUAL WATCH (SEA WATCH)

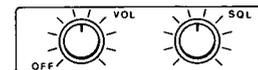
This function allows a check of channel 16 while listening on another channel. When a signal appears on channel 16, the transceiver automatically switches to channel 16 until this signal has cleared, then the transceiver returns to the original channel.

1. SELECT CHANNEL

- Choose the desired operating channel using the dial, memory or weather modes. See the RECEIVING and MEMORY CHANNEL sections for further details.

2. ADJUST SQUELCH

- Rotate the SQUELCH control clockwise until the channel noise just disappears. Perform this setting when there is no signal present on the channel.



3. SELECT DUAL WATCH MODE

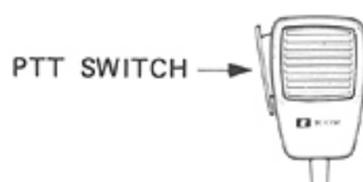
- Push the DUAL switch.
- The letters "DUAL" appear on the CHANNEL and FUNCTION DISPLAY, and begin to blink to indicate the dual watch function has started.

- The transceiver now alternates between the channel selected in step 1 and channel 16. The transceiver monitors the selected channel for approximately 2 or 3 seconds, and then checks channel 16 for a moment before switching back to the selected channel again.
- When a signal appears on either channel, that channel is monitored. However, if a signal appears on both channels simultaneously, then channel 16 has priority. The transceiver remains locked on channel 16 until it is clear, and then switches to monitor the other signal.



4. TRANSMITTING ON SELECTED CHANNEL

- Push the push-to-talk (PTT) switch on the microphone and begin speaking.



5. TRANSMITTING ON CHANNEL 16

- Push the CH 16 switch.
- Push the push-to-talk (PTT) switch on the microphone and begin speaking.
- Push the DUAL switch to engage the DUAL WATCH operation again when your communication on channel 16 is completed.

6. CANCELLING DUAL WATCH MODE

Push any one of the DIAL, WX, CH16 or FUNCTION switches or rotate the CHANNEL SELECTOR to stop the dual watch.

3 - 3 - 7 CHANNEL 16 AUTO-MONITOR

The channel 16 auto-monitor circuit simplifies operation of the transceiver by automatically switching to channel 16 when the microphone is replaced in its hanger. However, even with the microphone in its hanger, any channel may be monitored.



3 - 3 - 8 DISPLAY LIGHT and LIGHT DIMMER

The IC-M55 has an illuminated CHANNEL and FUNCTION DISPLAY for easy reading in dim or no light situations. The light may be turned ON and OFF, and also the intensity may be varied to suit the ambient light conditions.

1. LIGHT ON/LIGHT OFF

- Push the FUNCTION switch, and then push the DIM switch to turn the light ON.

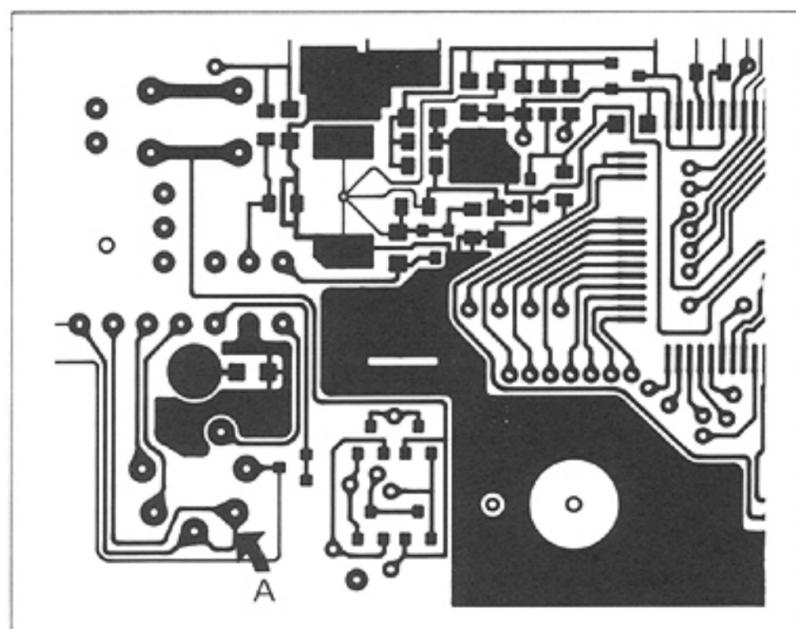


2. LIGHT INTENSITY

- Push and hold the FUNCTION switch, and then push the DIM switch.
- Rotate the CHANNEL SELECTOR to vary the light intensity.
- Release the FUNCTION switch.

3 - 4 OPERATION WITH OPTIONAL HS-1 HANDSET

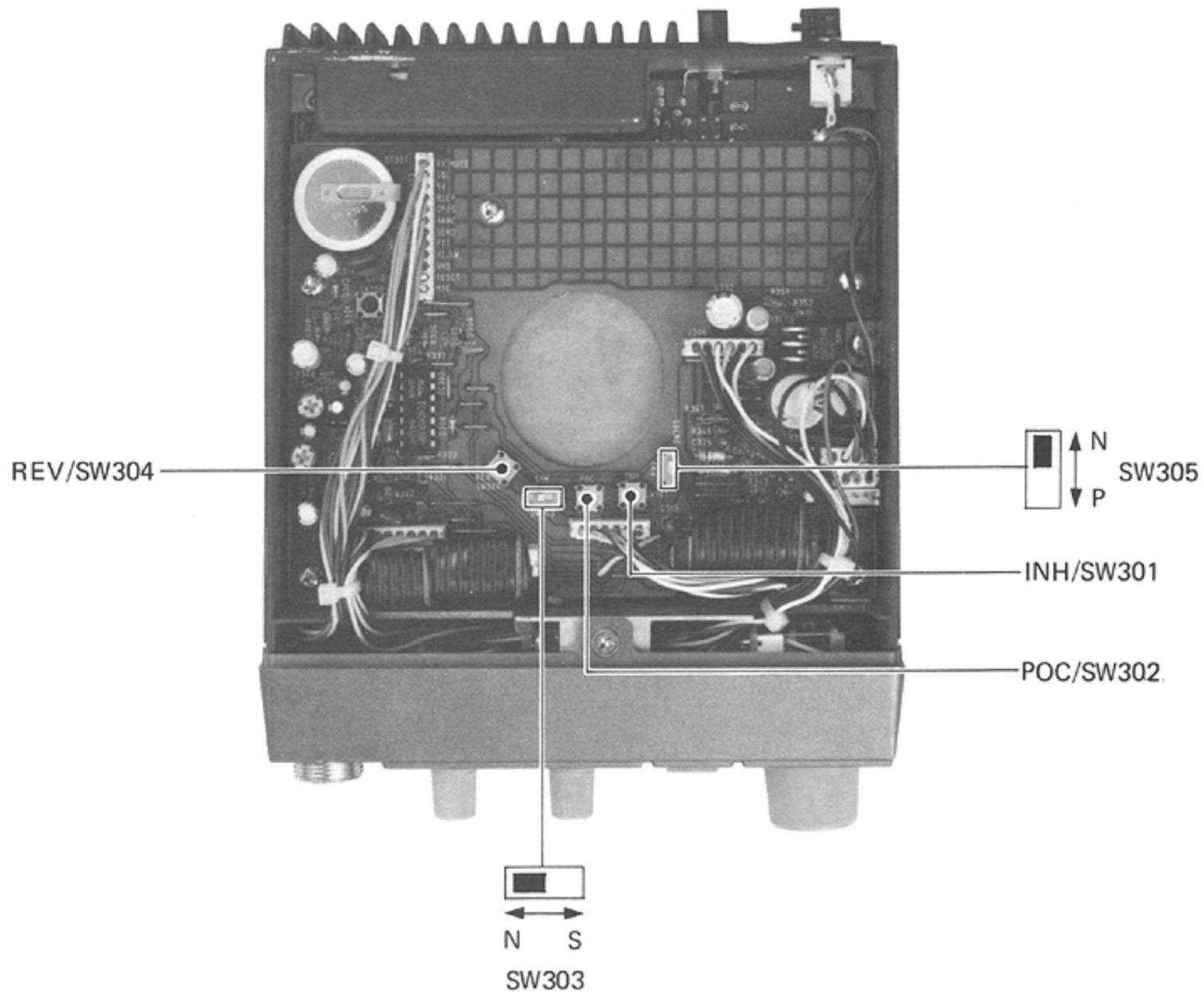
Before using the optional HS-1 handset, it is necessary to cut the printed circuit trace on the EF UNIT as indicated below at point A.



The EF UNIT is located just behind the front panel.

NOTE: The optional HS-5 HANDSET is also available for use with the IC-M55. For more information, see page 16-1.

SECTION 4 OPERATION OF INTERNAL SWITCHES

**4 - 1 HOW TO INHIBIT OPERATION ON A CHANNEL.**

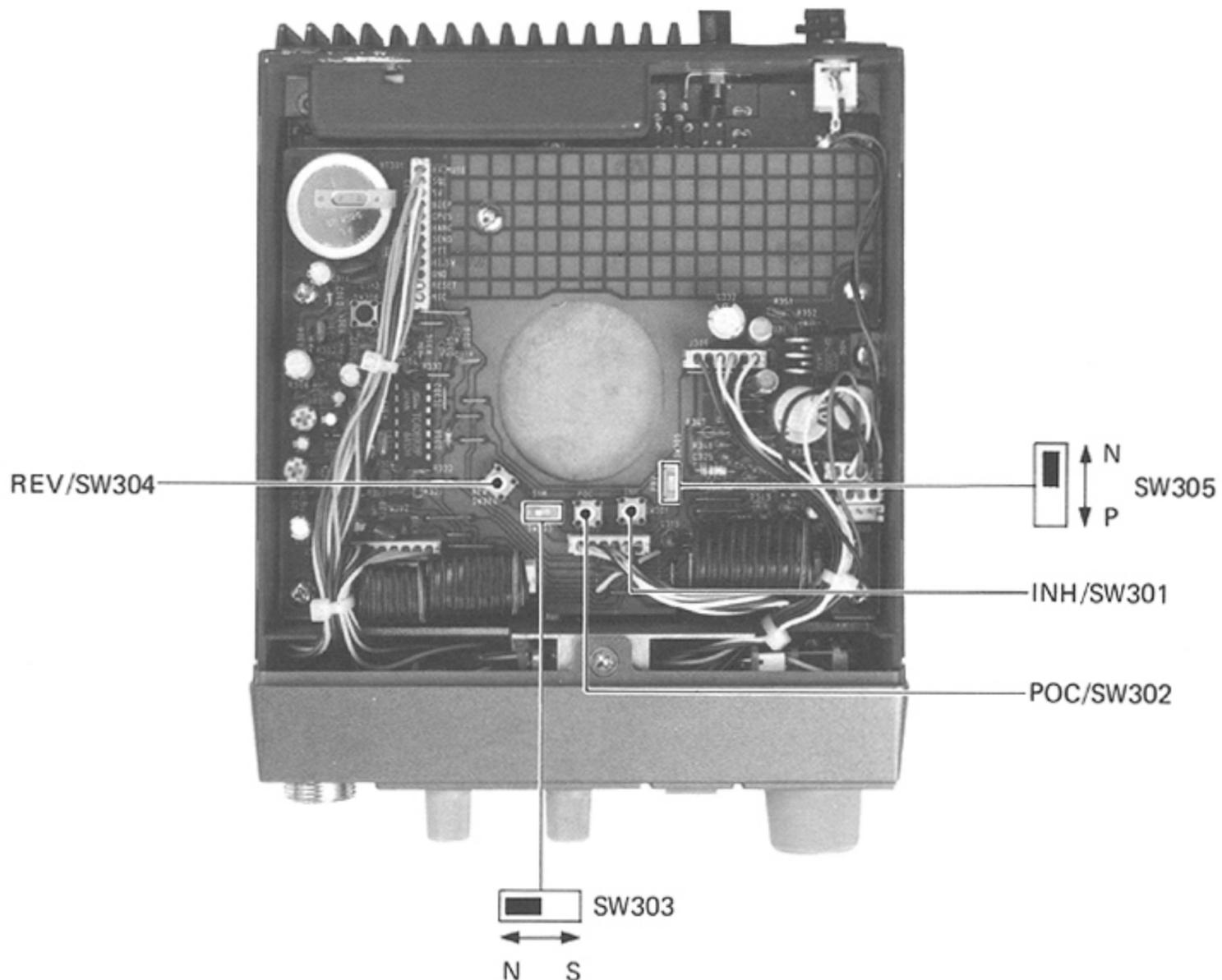
1. Place the PRV (SW305) switch at the "N" (normal) position.
2. Select the channel with the CHANNEL SELECTOR after pushing the DIAL switch.
3. Push the INH (SW301) switch. The symbol "—" appears on the display, and operation on this channel is now inhibited.

If you wish to activate an inhibited channel.

1. Place the PRV (SW305) switch at the "P" (private) position.
2. Select the channel of operation with the CHANNEL SELECTOR after pushing the DIAL switch.
3. Push the INH (SW301) switch, and return the PRV (SW305) switch to the "N" (normal) position.

4 - 2 HOW TO STORE PRIVATE CHANNELS INTO A MEMORY CHANNEL.

1. Place the PRV (SW305) switch at the "P" (private) position.
2. Push the FUNCTION switch, and push and hold the MR switch for more than 2 seconds. The letters "MEMO" must be blinking on the display.
3. Select the memory channel with the CHANNEL SELECTOR.
4. Push the FUNCTION switch. The channel number must be blinking.
5. Select the desired channel number with the CHANNEL SELECTOR.
6. Push the FUNCTION switch.
7. Return the PRV (SW305) switch to the "N" (normal) position.



4 - 3 HOW TO PROGRAM THE RF OUTPUT POWER ON A CHANNEL.

1. Select the channel with the CHANNEL SELECTOR after pushing the DIAL switch.
2. Push the POC (SW302) switch. The letters "LOW" appear on the display, and the transceiver is in the low power mode. The RF PWR switch on the front panel does not alter this programming.
3. If you wish to cancel this function, push the POC switch again. The letters "LOW" disappear from the display, and the RF PWR switch can be used to set the power.

4 - 4 HOW TO CHANGE THE DUPLEX CHANNEL TO SIMPLEX CHANNEL, AND STORE INTO A MEMORY CHANNEL.

1. Push the FUNCTION switch, and push and hold the MR switch for more than 2 seconds.
2. Select the memory channel with the CHANNEL SELECTOR.
3. Push the FUNCTION switch. The channel number must be blinking.
4. Select the channel number with the CHANNEL SELECTOR.

5. Place the SIM (SW303) switch to the "N" (normal) position.

4 - 5 HOW TO REVERSE THE TX OFFSET ON THE DUPLEX CHANNELS, AND STORE INTO A MEMORY CHANNEL.

1. Selects the desired duplex channel with the CHANNEL SELECTOR after pushing the DIAL switch.
2. Push and hold the REV (SW304) switch.
3. Push the FUNCTION switch, and push and hold the MR switch for more than 2 seconds. The letters "MEMO" must be blinking.
4. Select the memory channel with the CHANNEL SELECTOR.
5. Push the FUNCTION switch. The channel number must be blinking.
6. Select the desired channel number with the CHANNEL SELECTOR.
7. Push the FUNCTION switch and release the REV (SW304) switch.

To change the offset back to the normal condition, simply program the memory channel with the desired duplex channel following the procedure in your owner's manual.

SECTION 5 CIRCUIT DESCRIPTION

5 - 1 RECEIVER CIRCUITS

5 - 1 - 1 ANTENNA SWITCHING CIRCUIT

The signal from the antenna is fed to the antenna switching circuit consisting of D114 and D117 through the low-pass filter consisting of L123 L125, C199 C204 and C195. This switching circuit is controlled by T8V which supplies 8 volts to D114 and D115 in the transmit mode. In the receive mode, D114 and D115 are turned OFF, and the incoming signal is fed to an RF amplifier through D117, D101 and a bandpass filter consisting of L101, L102, C215 and C103 C105.

5 - 1 - 2 RF AMPLIFIER AND FIRST MIXER CIRCUIT

The output signal from the antenna switching circuit is amplified by MOSFET Q101 with low noise and high sensitivity characteristics. The amplified signal is input into the second gate of dual gate FET Q102 through a bandpass filter consisting of L103 and L104. This filter reduces interference and intermodulation from out-of-band signals. The input signal to the second gate is mixed with a local oscillator frequency (135MHz range) from the PLL circuit to obtain the first LF signal (21.4MHz).

5 - 1 - 3 LF AMPLIFIER CIRCUIT

The first LF signal is fed to the monolithic crystal filter F1101 and amplified by Q103 and Q104. The amplified signal is fed to IC101 (pin 16) which contains a local oscillator, a mixer, a limiter amplifier and an FM demodulator. The local oscillator oscillates at 20.945MHz with crystal X102. The two signals are then mixed to obtain the second LF signal (455kHz) which is fed to the limiter amplifier through the ceramic filter F1102. There are two identical outputs from the limiter amplifier. One output is fed directly to the demodulator and the other is delayed 90° by ceramic resonator X101 before it reaches the demodulator which produces the AF signal.

5 - 1 - 4 SQUELCH CIRCUIT

Noise components from IC101 (pin 9) are fed to the active high-pass filter and amplifier IC303. Frequencies greater than 20kHz are detected by D307 and smoothed by R338, R339, C319 and C320. When this voltage is higher than the threshold level of IC302(D), the output level of IC302(C) becomes high. Consequently, the AF amplifier Q306 is turned OFF. In transmit mode, a voltage is supplied to IC302(D) (pin 13), and Q306 is again turned OFF.

5 - 1 - 5 AF AMPLIFIER CIRCUIT

The AF signal from IC101 (pin 9) is amplified by Q306 via a low-pass filter (R117 and C129) and an integrator circuit (R345 and C329) which has a 6dB/octave deemphasis characteristic. Q306 also functions as a high-pass

filter with C326, C327 and R326, and blocks signals less than 300Hz. The amplified signal is fed to IC304 which boosts the signal to 3 watts.

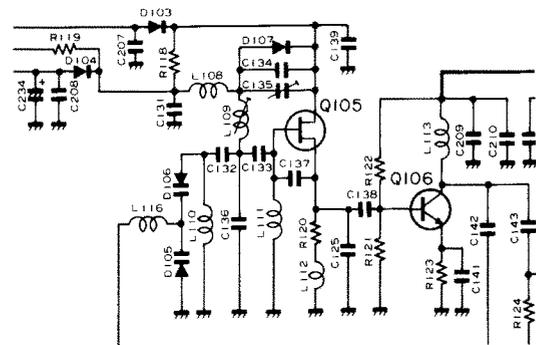
5 - 2 TRANSMITTER CIRCUITS

5 - 2 - 1 AF AMPLIFIER AND LIMITER CIRCUIT

Audio signals from the microphone are amplified by Q308, then fed to IC301(A) which is a limiter amplifier with a 6dB/octave response between 300Hz and 3kHz. The output is kept symmetrical about the horizontal base line by R311, and is fed to the splatter filter consisting of IC301(B), C307, C309, R313, and R315 to remove components above 3kHz. Next, the output is adjusted with R316 to obtain a fixed frequency deviation, and then is fed to D107 for FM modulation.

5 - 2 - 2 FM MODULATOR CIRCUIT

The amplified audio signal applied to the D107 anode varies the capacitance between the diode terminals. As a result, the VCO output is an FM modulated signal.



5 - 2 - 3 DRIVER AMPLIFIER AND POWER AMPLIFIER CIRCUITS

The 156MHz signal is amplified to 200 milliwatts by Q106 and Q108, which are fixed-gain, wideband amplifiers, and is fed to power amplifier IC106. This IC is also a high-gain, high-performance, wideband amplifier which produces 25 watts of RF power. The output signal from IC106 is fed to the antenna terminal through the T/R switching circuit and the low-pass filter.

5 - 2 - 4 AUTOMATIC LEVEL CONTROL (ALC) CIRCUIT

This circuit stabilizes the RF output power, even when the power supply voltage or the antenna load is fluctuating. The variation of the output from IC106 is detected by D116, and is amplified by differential amplifier IC105 in the MAIN UNIT. The output voltage from IC105 is fed to Q117 and Q118, and the voltage of pin 2 is controlled to keep the same RF output power. The output power can be adjusted by R157 (for high power) and R156 (for low power).

5 - 3 PHASE-LOCKED LOOP (PLL) CIRCUIT

This PLL is designed so the desired frequency is generated directly by the VCO, adopting the dual modulus prescaler system. The PLL is composed of prescaler IC102 and a PLL-IC (IC103). These circuits receive N-DATA from the MPU in order to determine the operating frequency. N-DATA is the number of times the desired frequency (the transmit frequency in the transmit mode and the first local oscillator frequency in the receive mode) is divided by the reference frequency.

$$N = \frac{\text{Desired frequency}}{\text{Reference frequency}}$$

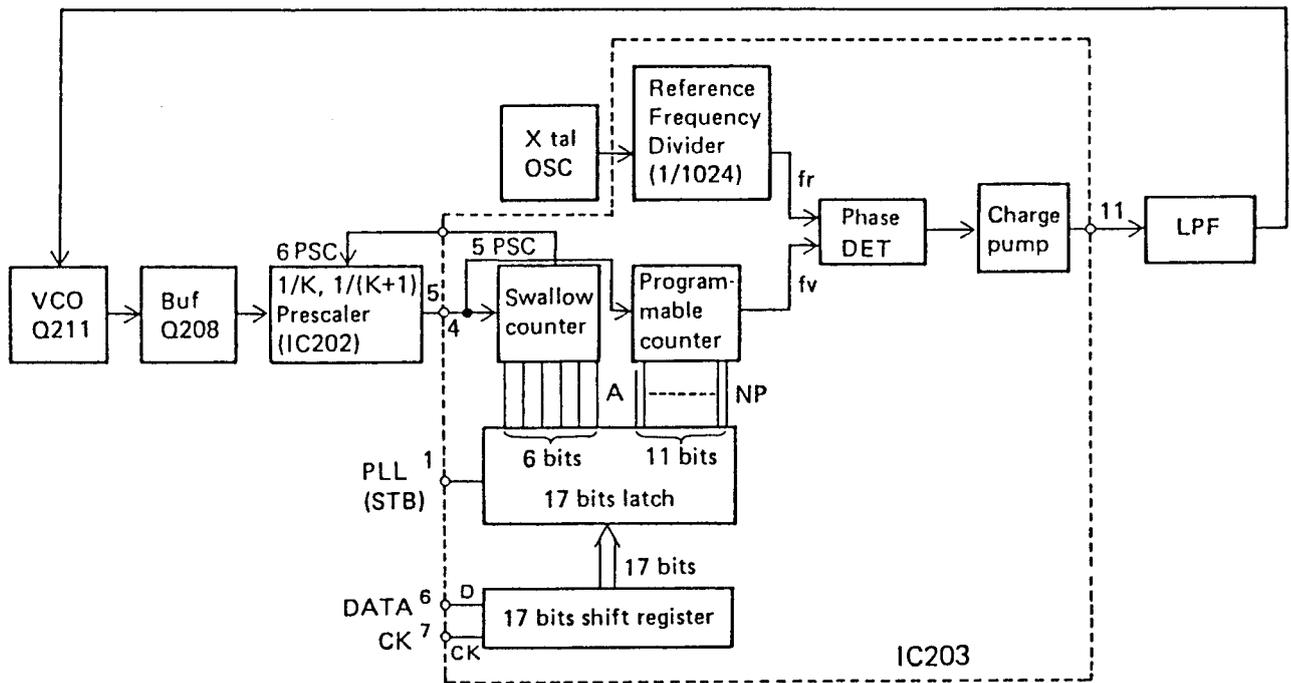
The 25kHz reference frequency is obtained by dividing the Q109 oscillator output (crystal X103) by IC103. The signal from the VCO, that is amplified by buffer Q106, is divided N times by IC102 and IC103. The signal is phase-detected and the detected signal is applied to varactor diodes D105 and D106 of the VCO via the loop filter to control the VCO frequency.

5 - 3 - 1 DUAL MODULUS PRESCALER

IC102 is a dual modulus prescaler that divides the RF signal generated by the VCO by a factor of 64 or 65. IC103 is a CMOS LSI circuit which incorporates a 6-bit swallow counter, an 11-bit programmable counter, a phase comparator, a charge pump, and a frequency divider for the reference frequency. The reference frequency is obtained from crystal oscillator Q109 with crystal X103, and is fed to IC103 (pin 17). It divides the frequency by a factor of 512 to obtain the 25kHz reference frequency that is fed to IC103 (pin8).

5 - 3 - 2 UNLOCK CIRCUIT

When the PLL is unlocked, IC103 (pin 10) is LOW and the unlocked signal is fed to pin 70 of the MPU through the R138 and C158 time constant circuit. The MPU inhibits the transmitter, preventing spurious signals from being transmitted, and also changes the LCD indication to [—] in the transmit mode.



Dual Modulus Prescaler System

5 - 3 - 3 LOOP FILTER AND VCO CIRCUITS

The output from IC103 (pin 11) determines the characteristics of the PLL through the lead-lag loop filter consisting of R134, R135 and C155, and controls varactor diodes D105 and D106 through the R133 and C154 integrator circuit. The Q105 VCO employs a Clapp oscillator circuit. D107 switches ON in the receive mode when TS5V is 0 and RS5V is 5 volts.

This condition shorts C275 and C276 in such a way that the receive VCO frequency is shifted lower than the transmit frequency. The frequency shift is eliminated in the transmit mode since TS5V is 5 volts and RS5V is 0. This condition forces D107 OFF. C134 and C135 are then in series with L108, and the VCO free-run frequency is higher.

5 - 4 POWER SUPPLY CIRCUITS

5 - 4 - 1 8V REGULATOR CIRCUIT

IC107 is an 8-volt regulator which has three output terminals (pins 2, 6 and 8) and a control terminal (pin 5). In the receive mode, pin 5 receives a HIGH from Q304, and 8 volts is output from pin 6. When transmitting, the voltage of pin 5 becomes 0, and 8 volts is output from pin 8. Pin 1 is an independent terminal which has no relation to pin 5 and outputs 8 volts.

5 - 4 - 2 5V REGULATOR CIRCUIT

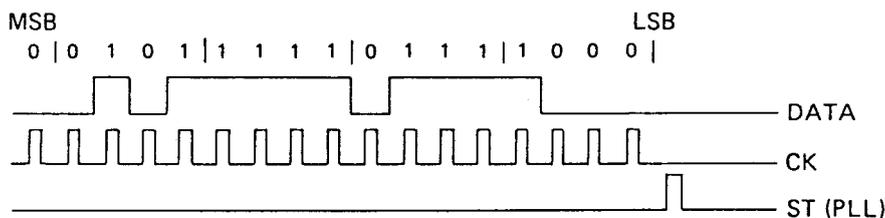
IC104 is a 5-volt regulator which supplies a regulated 5 volts to IC102, IC103 and the VCO circuit. The necessary voltages for the VCO (TS5V, RS5V) are switched by Q302 and Q303.

5 - 4 - 3 MPU POWER SUPPLY

The MPU requires many memory elements to store frequencies, memory channels, etc. Removal of the MPU power source normally erases this information. Therefore, the MPU has a lithium battery to supply backup power when the power source fails or is removed. A new battery maintains the memories for about 5 years.

5 - 5 LOGIC CIRCUITS

The major component is a single-chip microprocessor which includes a 4kB ROM, a 256 bit RAM and a driver for the LCD (Liquid-Crystal Display). The following is a summary of MPU operation.



5 - 5 - 5 D4 (pin 2) STROBE

This is an output port for a pulse which latches the N-DATA after these data are transferred to the PLL. The PLL IC receives the data on the rising edge, and latches the data on the falling edge of the pulse.

5 - 5 - 6 D5 (pin 3) RX MUTE

This is an output port used while the radio is in the SEA (DUAL WATCH) mode. The D5 port outputs an approximately 5 millisecond pulse beginning 1 millisecond before the N-DATA is sent. This signal mutes the pop noise of the squelch caused by a frequency change.

5 - 5 - 1 DO (pin 78) HI/LOW CONTROL

This is an output port which selects either HIGH or LOW RF power. When this port is LOW, RF power is selected.

5 - 5 - 2 DI (pin 79) TX MUTE

This is an output port which is HIGH for about 40 milliseconds, inhibiting transmitting when changing from receive to transmit.

5 - 5 - 3 D2 (pin 80) CK

This port feeds out clock pulses for serial data which are transferred simultaneously with N-DATA for the PLL. Shift register IC103 converts these serial data into parallel data. The shift register shifts the data at each leading edge of the clock pulses.

5 - 5 - 4 D3 (pin 1) DATA

This is an output port for the serial N-DATA. The serial transfer begins with the most significant bit (MSB) and ends with the least significant bit (LSB). The data transfer is in binary code. For example, the N-DATA for 156MHz are:

$$\text{N-DATA} = \frac{156}{0.025} = 6240$$

This number in hexadecimal is 1860.

5 - 5 - 7 D6 (pin 4) HALT CONTROL

This is an output port for a short LOW pulse to store the MPU program execution address when the user turns the set OFF. This address is used again when the transceiver is turned ON.

5 - 5 - 8 D7 (pin 5) EXTERNAL CONTROL

This is an output port for the RAMM data. The data passes from this port when you push and hold the function key, and then push the MPU RESET SWITCH and dual key consecutively.

5 - 5 - 9 D8 (pin 6) AF MUTE

This is an output port to control the AF amplifier.

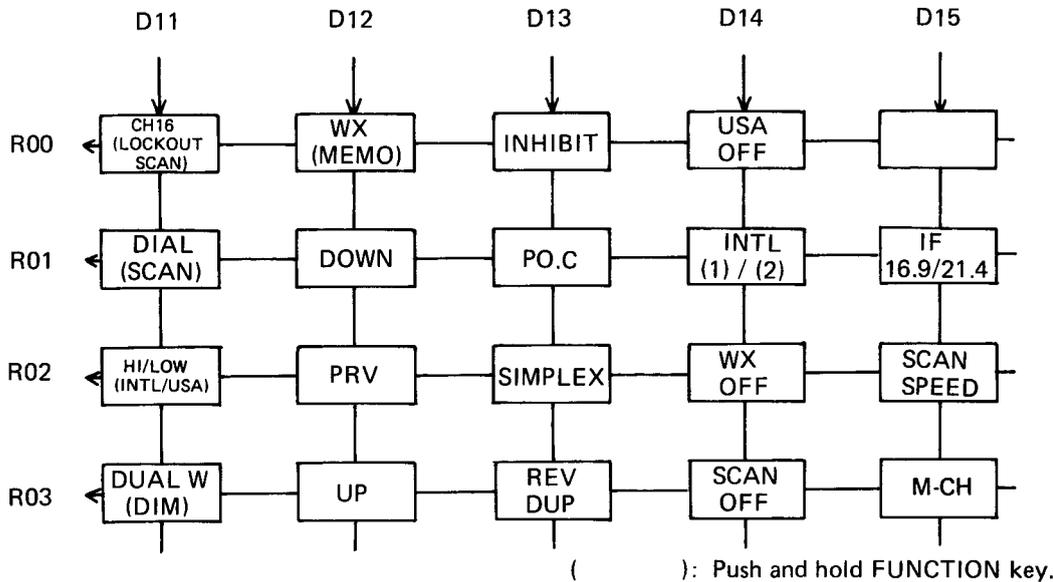
5 - 5 - 10 D9 (pin 7) TX/RX CONTROL

This is an output port for switching between the transmit mode and the receive mode. When the mode changes to the opposite one, this signal is delayed 20 milliseconds for stabilization of the VCO.

5 - 5 - 11 D10 (pin 8) SEND

This is an input port which the MPU pulls up. A LOW input selects the transmit mode and inhibits any input from the key entry. The MPU passes out frequency control data and determines whether to generate a MUTE signal at each leading and trailing edge.

5 - 5 - 12 D11 to D15 (pins 9 to 13), R00 to R03 (pins 14 to 17) MPU INPUT MATRIX



D11-R00 (S404)

Selects channel 16 or the lock-out scan mode with the function key.

D11-R01 (S402)

Changes the RF output power, or the channel mode (International – U.S.A.) with the FUNCTION SWITCH.

D11-R03 (S401)

Selects dual watch (sea watch), or switches the dimmer with the FUNCTION key.

D12-R00 (S405)

Selects the WX or CALL mode, or the memory mode with the FUNCTION key.

D12-R01 (S407)

Decrements the operating channel.

D12-R02 (SW305)

Allows private channel programming.

D12-R03 (S407)

Increments the operating channel.

D13-R00 (SW301)

Writes the operating channel to RAM as an inhibited channel.

D13-R01 (SW302)

Reduces the RF output to LOW power.

D13-R02 (SW303)

Changes the transceiver to the simplex mode.

D13-R03 (SW304)

Changes the transceiver to the reverse duplex mode.

D14-R00 (D403 1/2)

Inhibits transmitting on all U.S.A. channels and disables the INTL/USA switch.

D14-R01 (D403 1/2)

Selects the International (1) version of the transceiver.

D14-R02 (D402 1/2)

Inhibits receiving of the WX channels.

D14-R03 (D402 1/2)

Inhibits the scan function.

D15-R00 (D405 1/2)

Selects the other version of the transceiver.

D15-R01 (D404 1/2)

Sets the IF to 21.4MHz from 16.9MHz.

D15-R02 (D404 1/2)

Shifts the scan speed between 150 milliseconds and 200 milliseconds.

D15-R03 (D404 1/2)

Switches the number of memories between 10 and 16 channels.

5 - 5 - 13 R10 (pin 66) SQL

This is an active LOW input port which the MPU pulls up. It provides the scan stop signal for SEA WATCH and other modes.

5 - 5 - 14 R11 (pin 67) TX DISPLAY

This is an active LOW input port which the MPU pulls up. It causes an output pulse for the "TX" indicator on the LCD display.

5 - 5 - 15 R12 (pin 68) FUNCTION

This is an input port which the MPU pulls up. It becomes LOW when the FUNCTION SWITCH is pressed, and the secondary functions of the keypad become operational.

5 - 5 - 16 R13 (pin 69) HAILER

This is an active LOW input port which the MPU pulls up. It inhibits the transmit mode and enables the hailer mode.

5 - 5 - 17 R20 (pin 70) UNLOCK

This is an input port which the MPU pulls up. A LOW causes the MPU to force the D1 port to LOW. Also, the LCD flashes to indicate the PLL is unlocked.

INTENSITY PORTS	1	2	3	4	5	6	7	8
R30	L	H	L	H	L	H	L	H
R31	L	L	H	H	L	L	H	H
R32	L	L	L	L	H	H	H	H

5 - 5 - 18 R21 (pin 71) SET/RESET

This is an input port which controls the output port, D8.

5 - 5 - 19 R22 (pin 72) SET

This is also an input port which controls D8.

5 - 5 - 20 R23 (pin 73) CH16

This is an input port which the MPU pulls up. The falling edge of an input signal selects channel 16.

5 - 5 - 21 R30 to R32 (pins 74 to 76) DIMMER

These are output ports which control the LCD lamp intensity.

5 - 5 - 22 R33 (pin 77) BEEP

This is an output port for a 50 millisecond HIGH pulse after a key is pressed.

5 - 5 - 23 INT 0 (pin 64) HALT

This port is active LOW. The MPU follows a backup procedure when the transceiver is turned OFF or the power supply voltage drops. It sets the HALT CONT terminal at HIGH and the MPU rests in the HALT state.

5 - 5 - 24 INT 1 (pin 65) EXTERNAL CONTROL

This is an input port for writing data to the RAM. Push and hold the FUNCTION SWITCH, and then push the MPU reset switch to change the MPU to the write mode.

5 - 5 - 25 RESET (pin 18)

This terminal is active HIGH. S306 (Reset switch) resets the MPU if pressed while the power switch is ON.

5 - 5 - 26 COM 1, SEG 1 to 32 (pin 29, pins 31 to 62)

These are output terminals for driving the LCD display.

5 - 5 - 27 OSC 1, OSC 2 (pins 20, 21)

These are output terminals for driving the LCD display.

5 - 6 OTHER CIRCUITS**5 - 6 - 1 LAMP CIRCUIT**

The output from the MPU (R30 to R32) is transformed by a D/A converter consisting of Q403 to Q408, and R416 to R425. The analog signal varies the intensity of the lamp.

5 - 6 - 2 BEEP CIRCUIT

This is a phase shift oscillator consisting of IC302 (B), R334 to R336, and C315 to C317. The circuit begins oscillating when a HIGH voltage appears at the cathode of D304. The frequency is about 2500Hz.

5 - 6 - 3 TRANSMIT/RECEIVE SWITCHING CIRCUIT

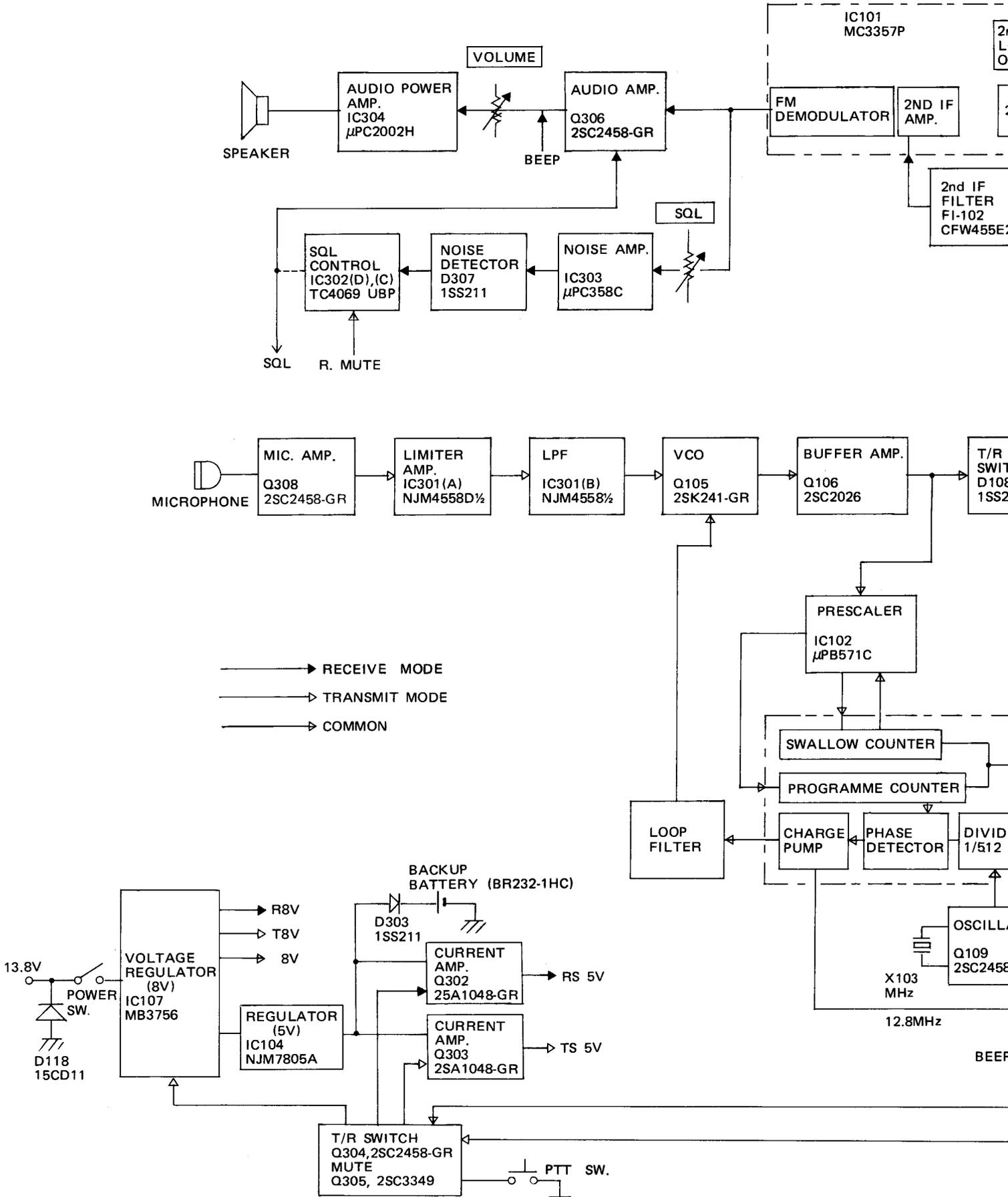
Pushing the PTT (push-to-talk) switch causes D10 (pin 8) of the MPU to go LOW, and D9 changes to HIGH. This D9 voltage controls power supply IC107 which supplies the signal to shift to the transmit mode.

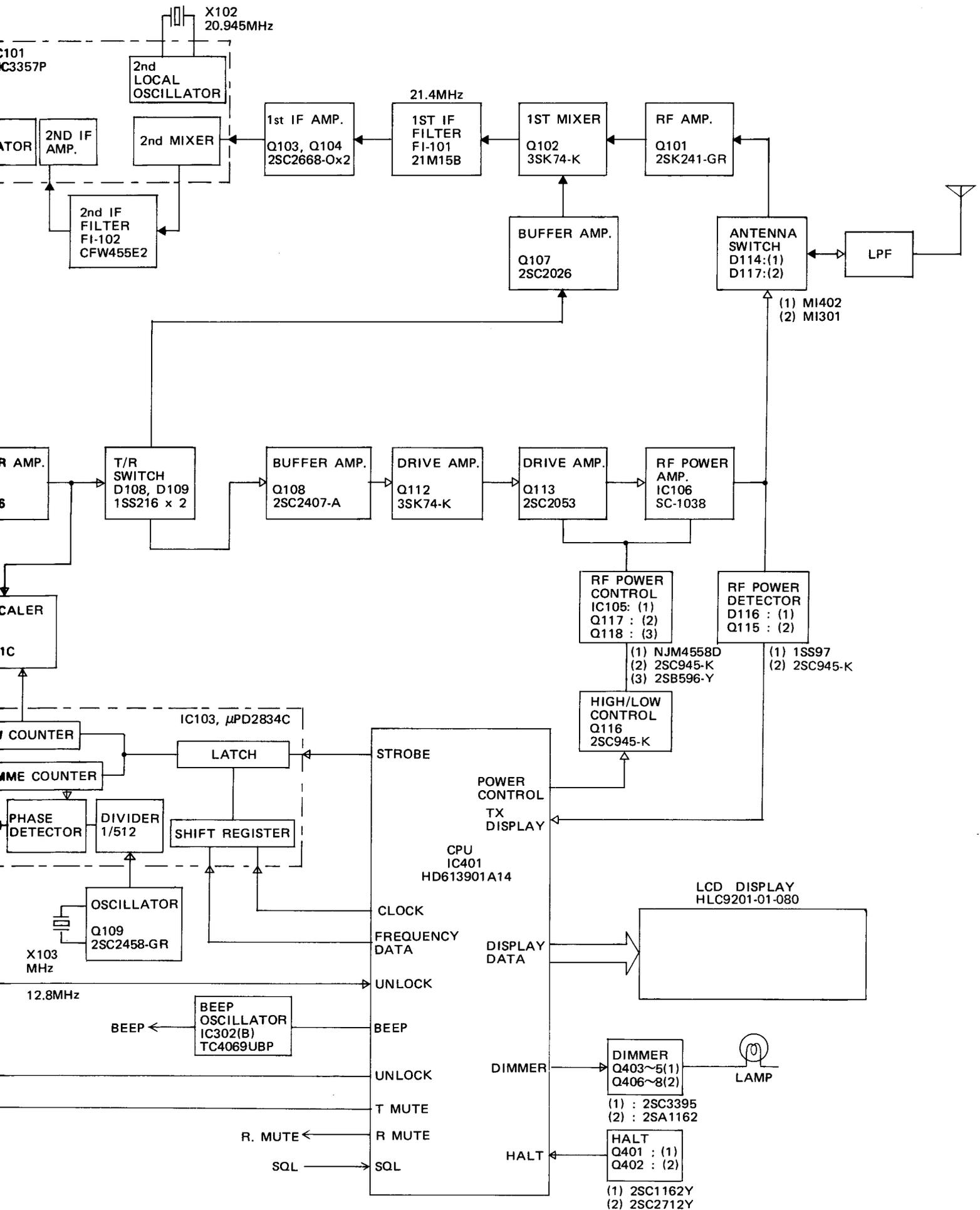
5 - 7 TRANSFERRING RAM DATA BETWEEN TRANSCEIVERS

This description explains the procedure for copying data from transceiver (A) RAM to transceiver (B) RAM.

1. Connect the D7 (pin 5) port of transceiver (A) to the INT 1 (pin 6) port of transceiver (B).
2. Push and hold the FUNCTION key, and then push the MPU RESET SWITCH of transceiver (B). Release the FUNCTION key. The transceiver is now in the data receive mode.
3. Push and hold the FUNCTION key, and then push the MPU reset switch and dual key of transceiver (A). Release the FUNCTION key. Transceiver (A) starts to transfer the data to transceiver (B).

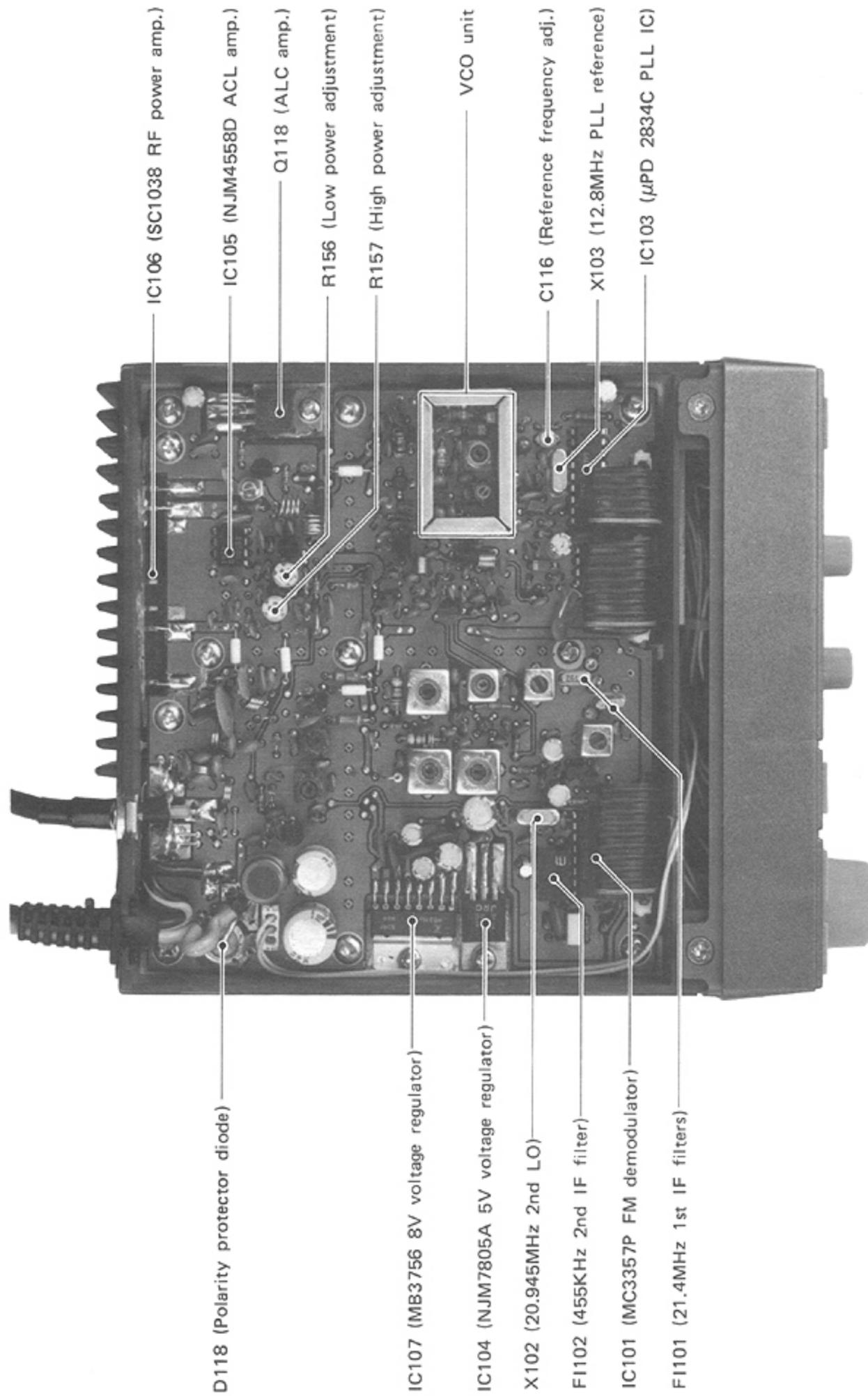
SECTION 6 BLOCK DIAGRAM



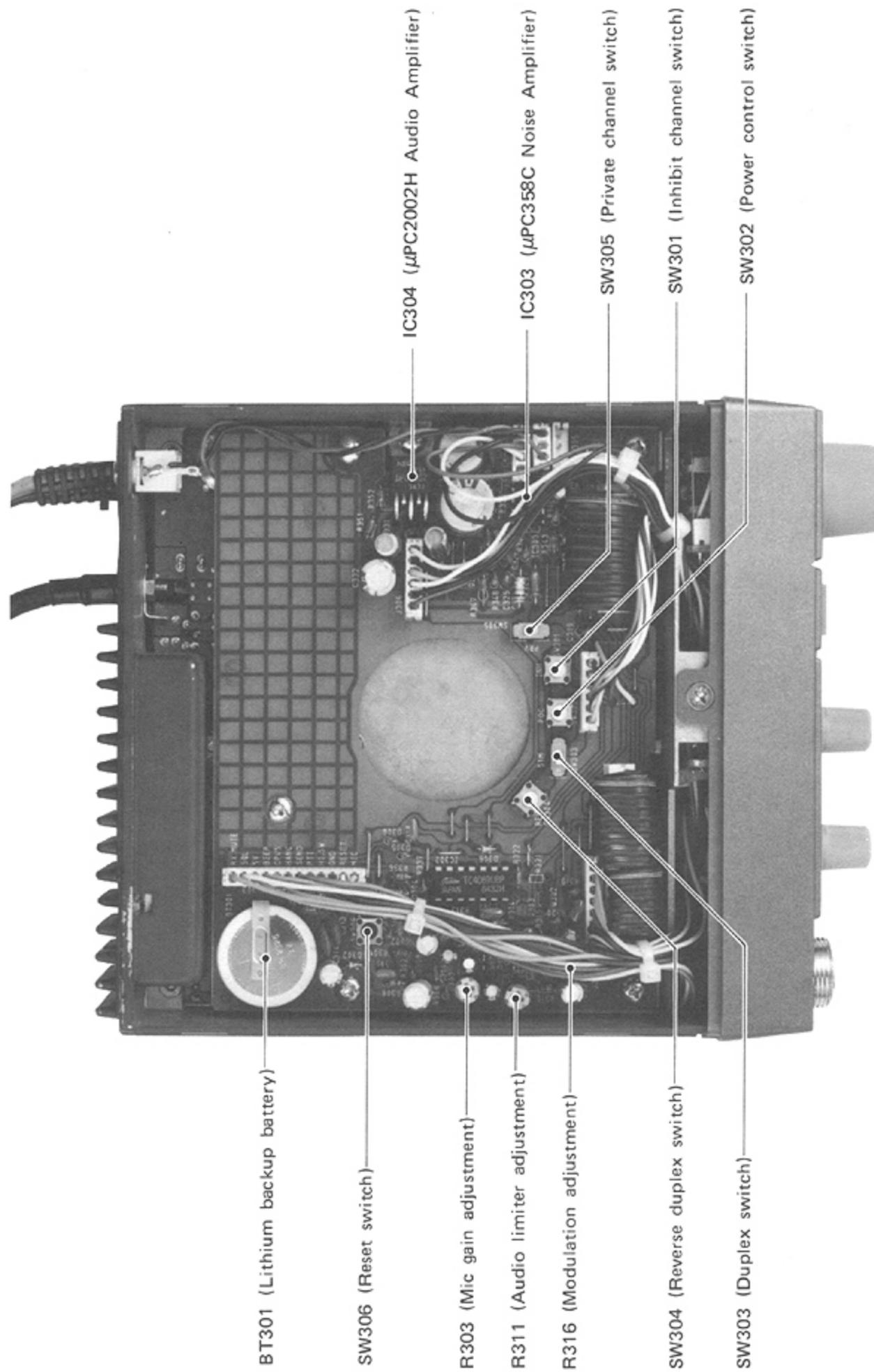


SECTION 7 INSIDE VIEWS

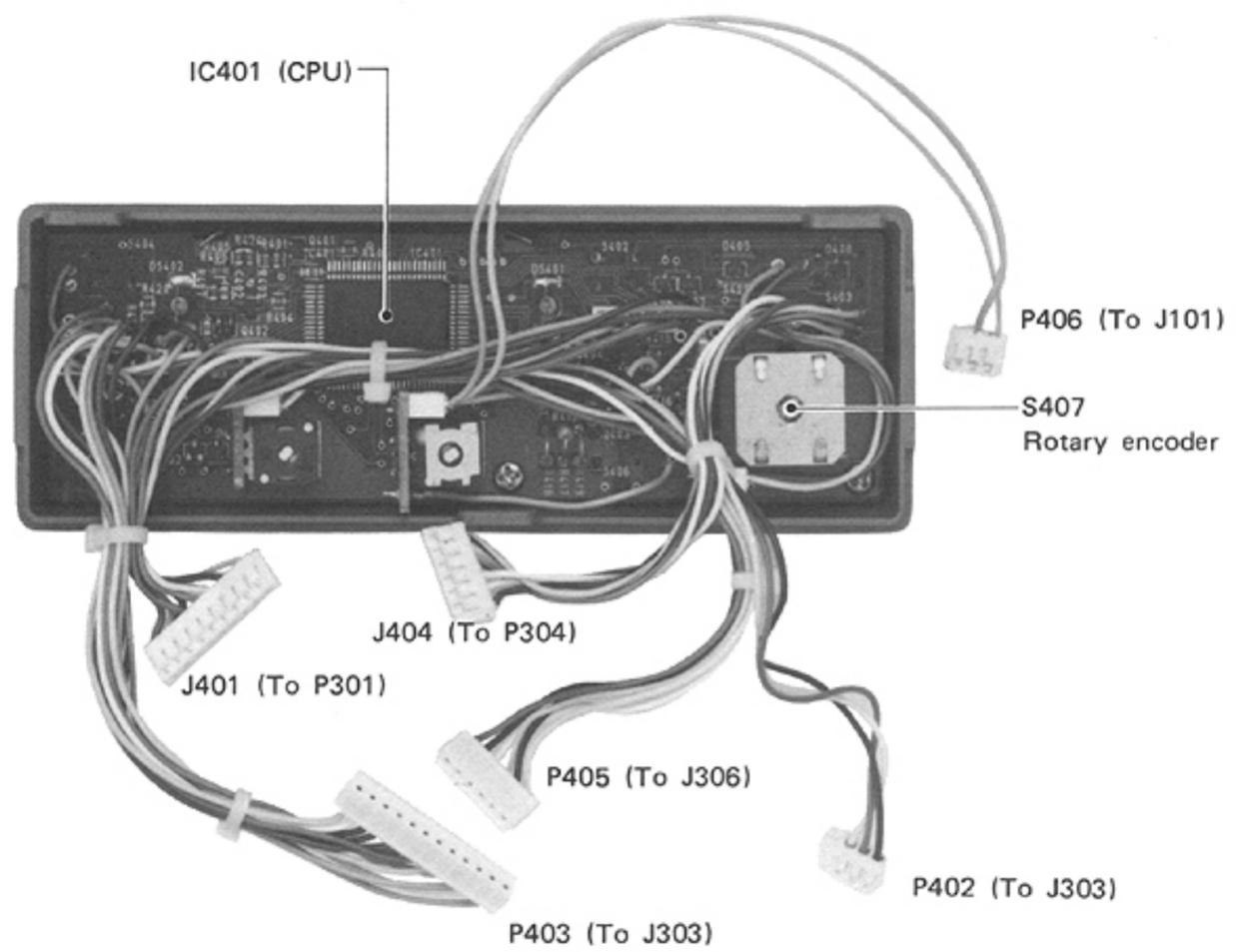
7-1 MAIN UNIT



7-2 AUDIO UNIT

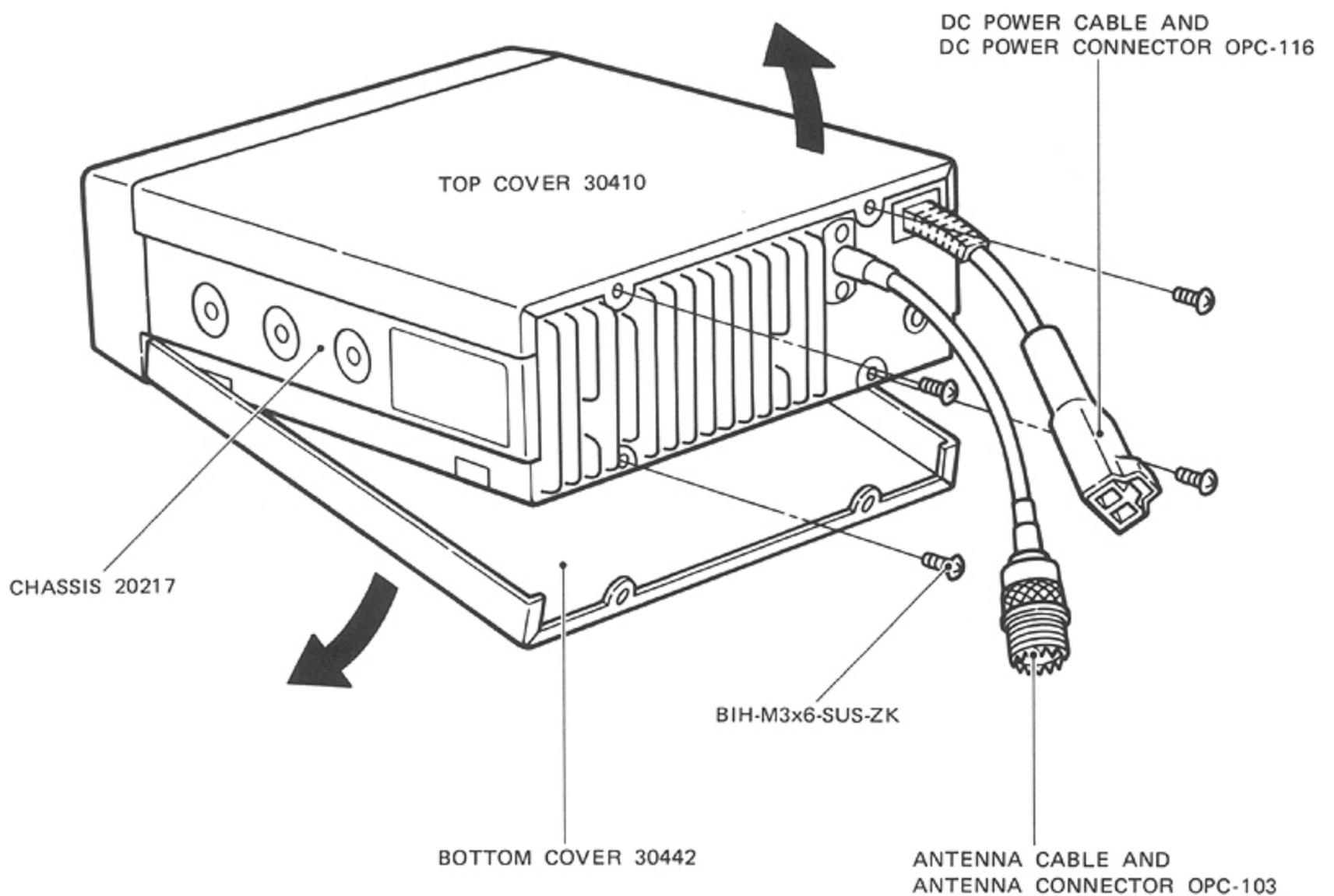


7-3 LOGIC UNIT



SECTION 8 MECHANICAL PARTS AND DISASSEMBLY

8 - 1 COVER REMOVAL



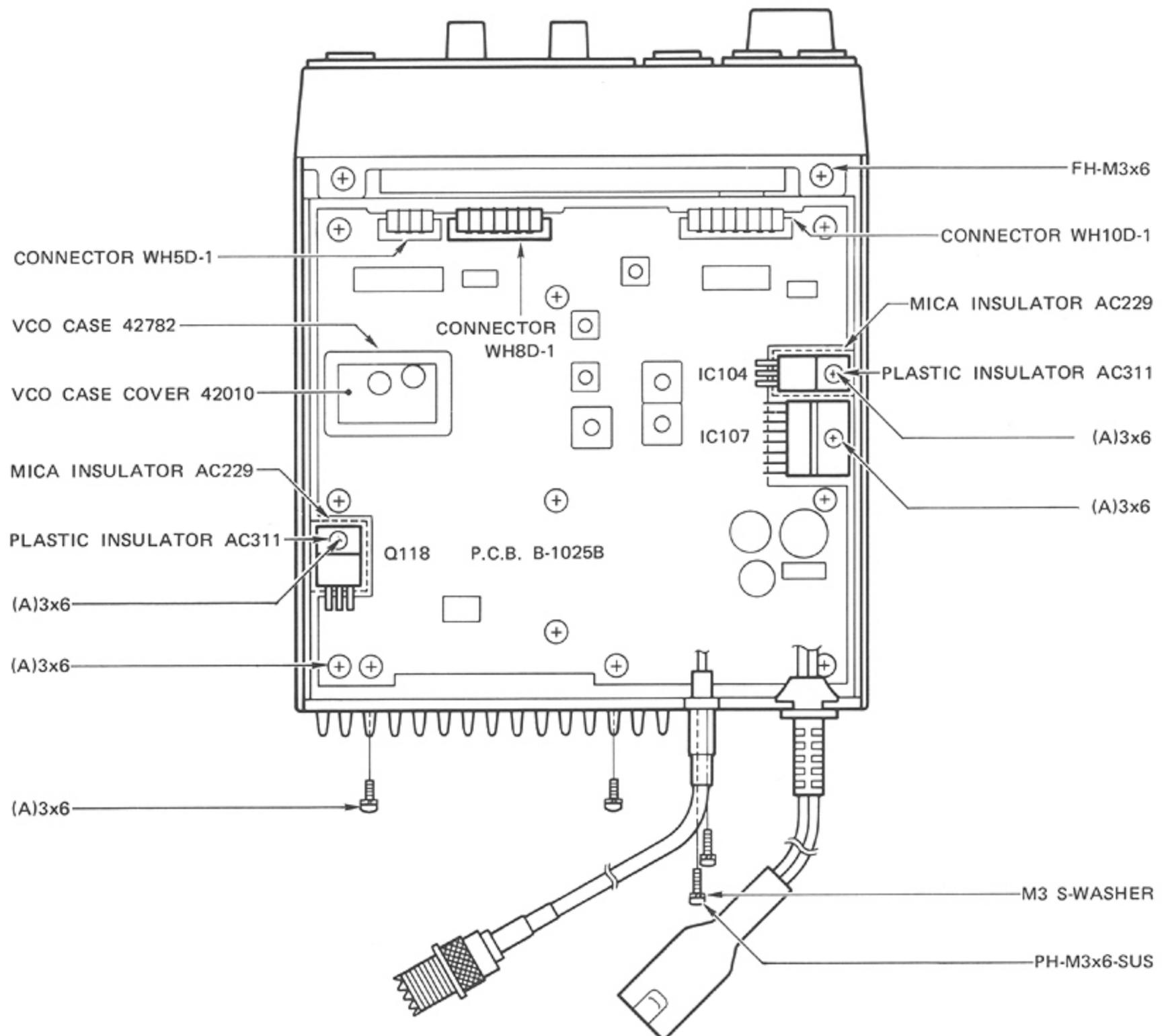
HOW TO REMOVE TOP AND BOTTOM COVERS

1. Remove the four screws on the rear panel as shown in the diagram.
2. Lift the top and bottom covers up and remove them.

NOTE: Be careful not to cut the speaker wires when the bottom cover is removed.

3. The MAIN unit is located on the top cover side and the AUDIO unit is located on the bottom cover side.

8-2 MAIN UNIT REMOVAL



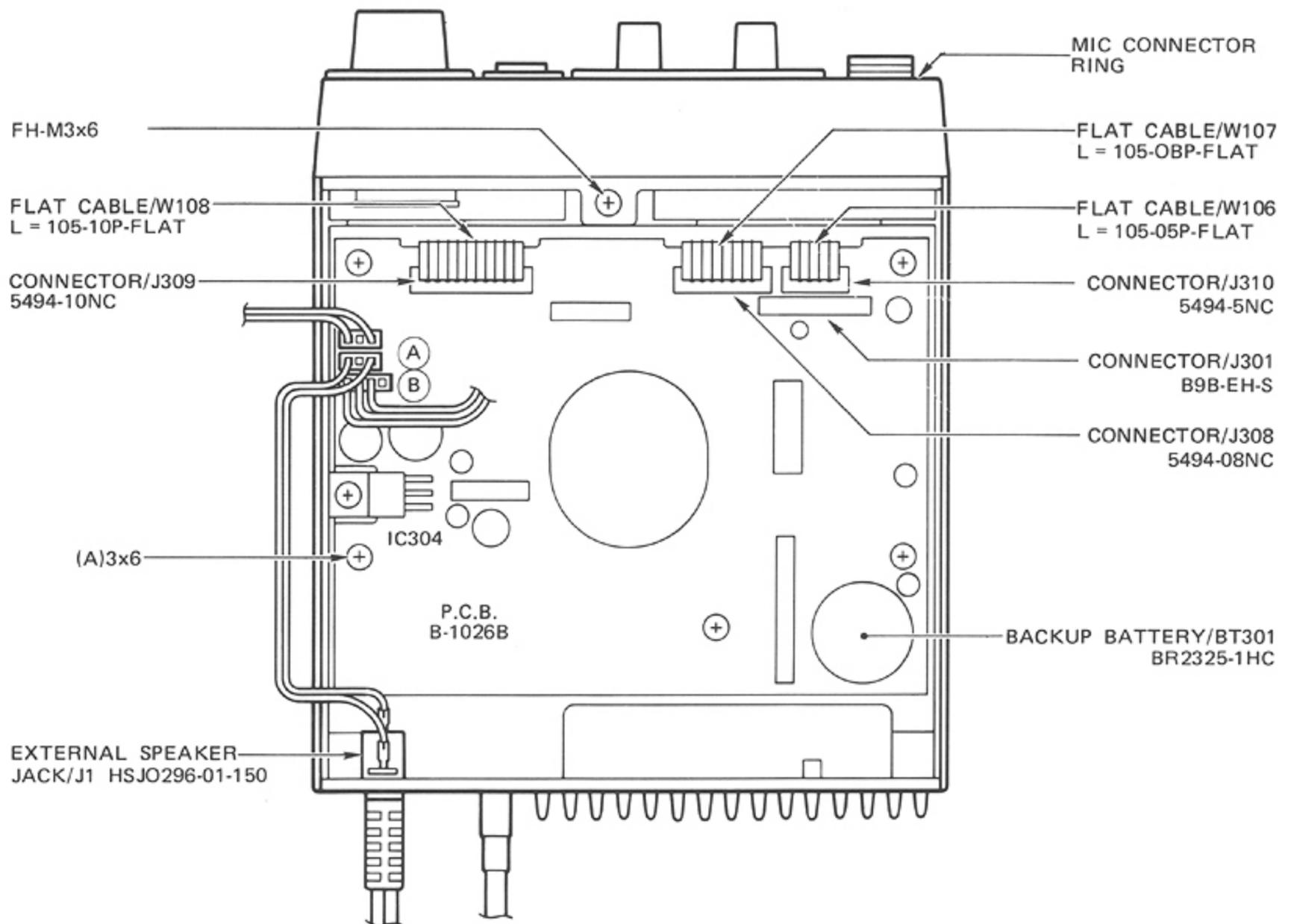
HOW TO REMOVE THE MAIN UNIT

1. Removal all the (A) 3x6 screws on the MAIN unit.
2. Be sure to remove those at IC104, IC107 and Q118 as well.
3. Remove the two screws which attach the antenna coaxial cable to the rear panel.
4. Unsolder the four leads from the PA module on the MAIN unit.
5. Unsolder the red and black DC power cable wires on the MAIN unit.

6. Lift the unit up.

NOTE: DO NOT forget to insert the mica and plastic insulators when the MAIN unit is placed back.

8-3 AUDIO UNIT REMOVAL

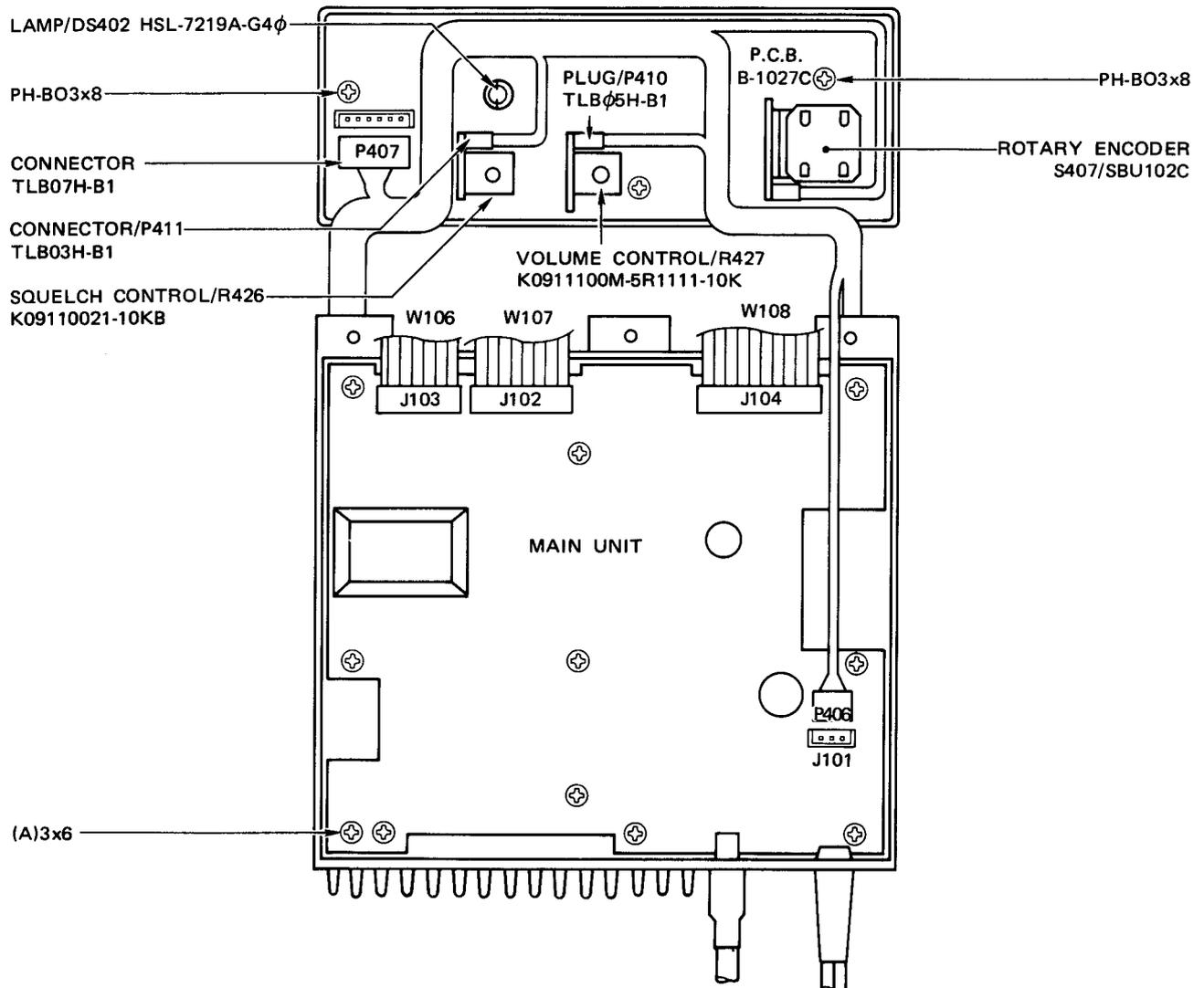


HOW TO REMOVE THE AUDIO UNIT

1. Remove the six (A) 3 x 6 screws on the AUDIO unit.
2. Unplug the two plugs marked (A) and (B).
3. Lift the unit up.

NOTE: Refer to SECTION 8-7 FLAT CABLE REMOVAL for information regarding removal and connection of flat cables W106, W107 and W108 from the connectors.

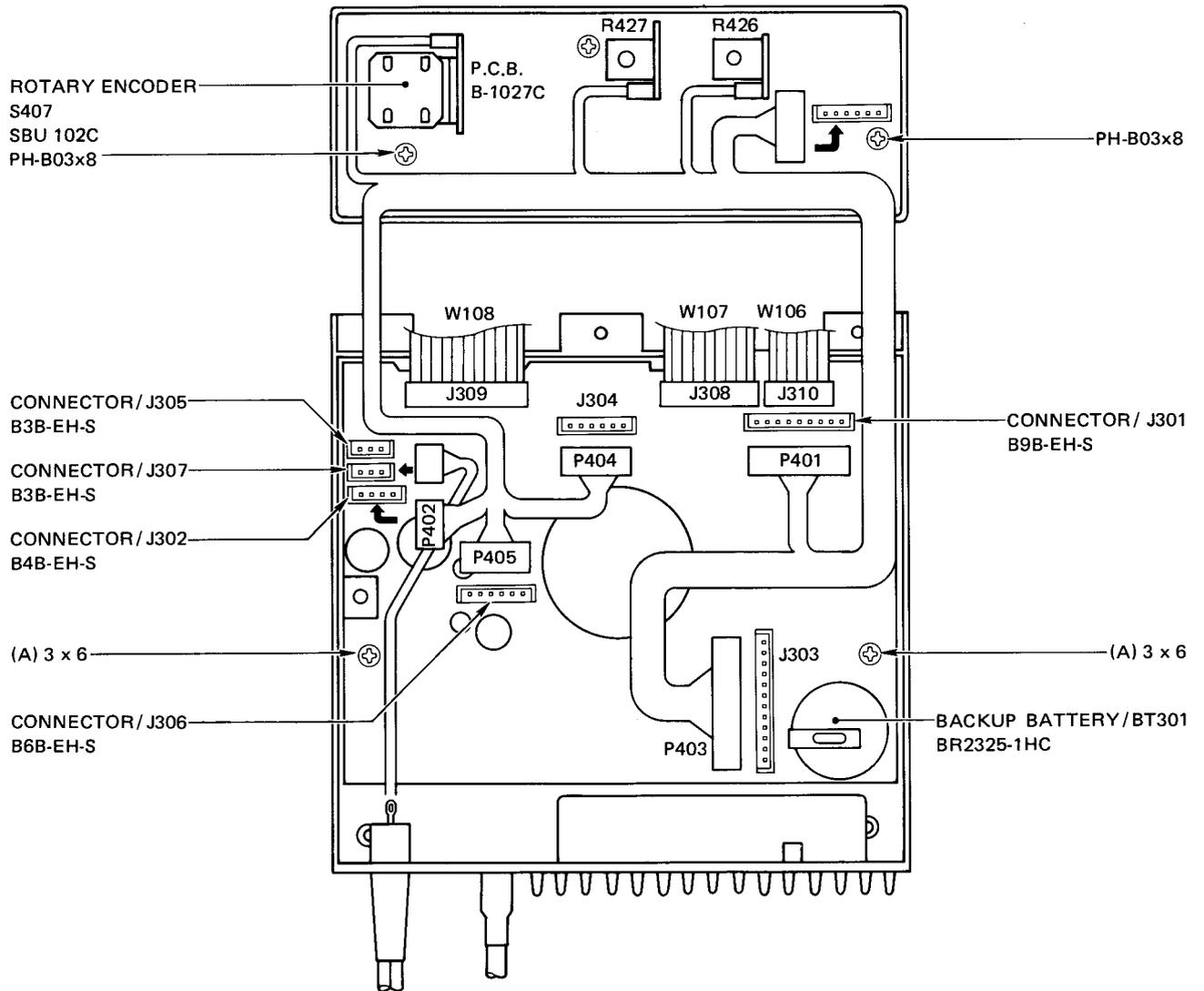
8-4 LOGIC UNIT REMOVAL (1)



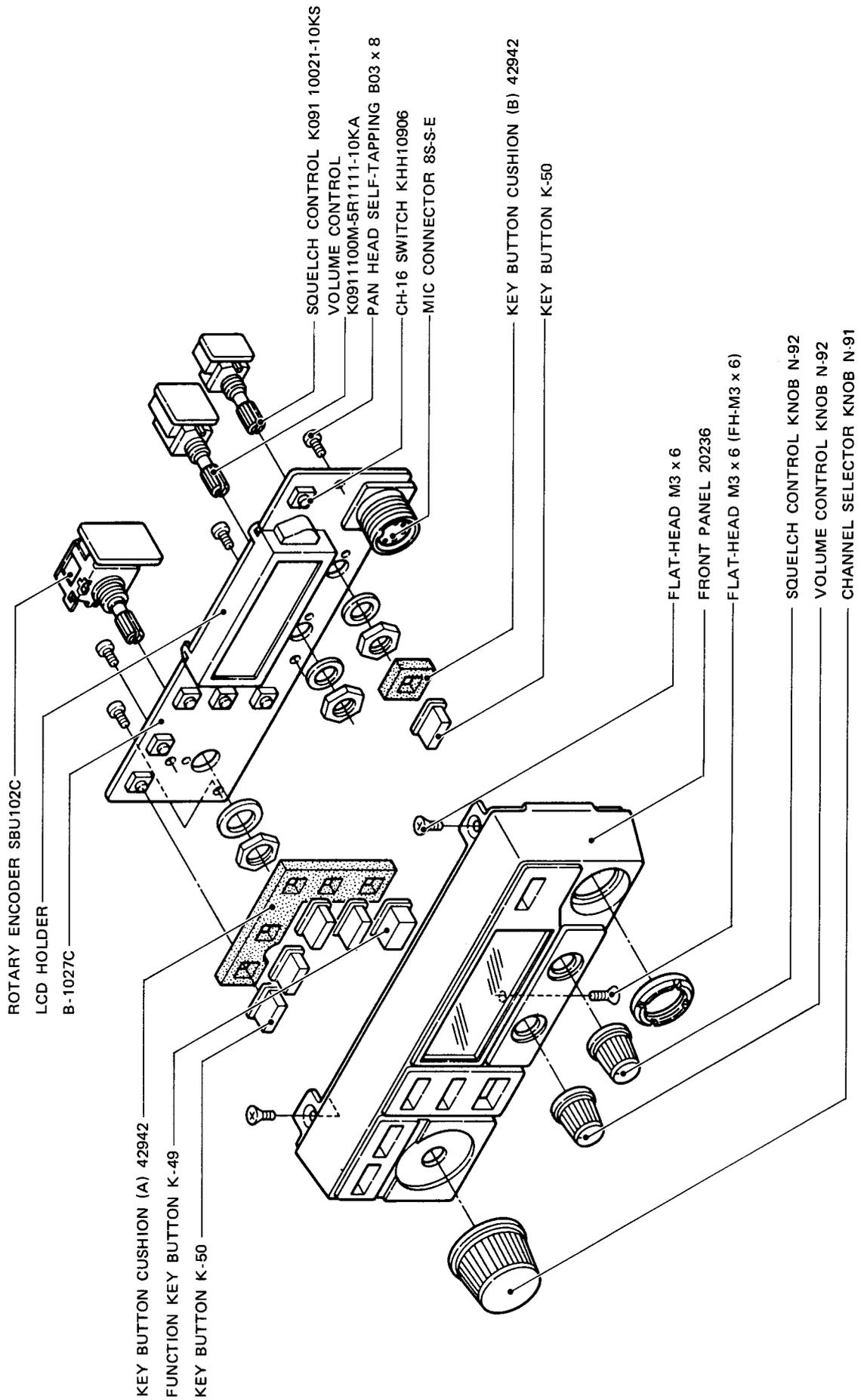
HOW TO REMOVE THE LOGIC UNIT

1. Pull out the TUNING CONTROL, VOLUME CONTROL and SQUELCH CONTROL knobs.
2. Unscrew the three FH-M3x6 flat-head screws on the front panel (see pages 8-2 and 8-3 for location).
3. Unscrew the mic connector ring on the front panel (see page 8-3 for location).
4. Unscrew the four PH-B03x8 pan head self-tapping screws on the LOGIC unit.
5. Remove the LOGIC unit from the front panel.

8 - 5 LOGIC UNIT REMOVAL (2)

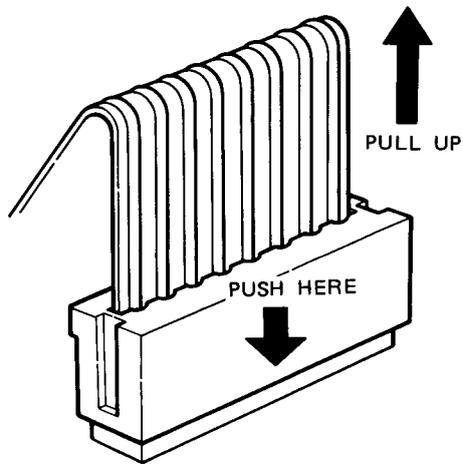


8-6 FRONT UNIT DISASSEMBLY



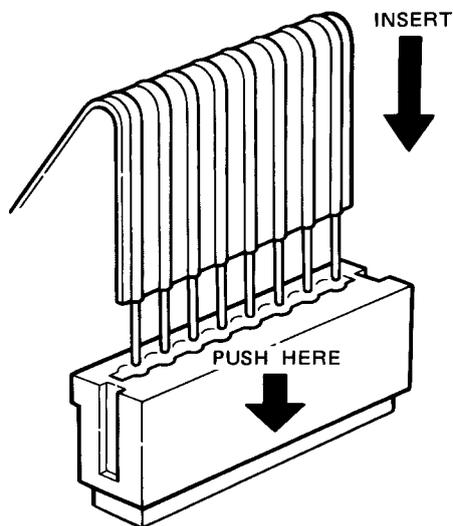
8 - 7 HOW TO REMOVE AND CONNECT THE FLAT CABLE

8-5-1 REMOVING THE FLAT CABLE



1. Push and hold the connector harness down as shown in the diagram.
2. Pull the flat cable upward.

8-5-2 INSERTING THE FLAT CABLE



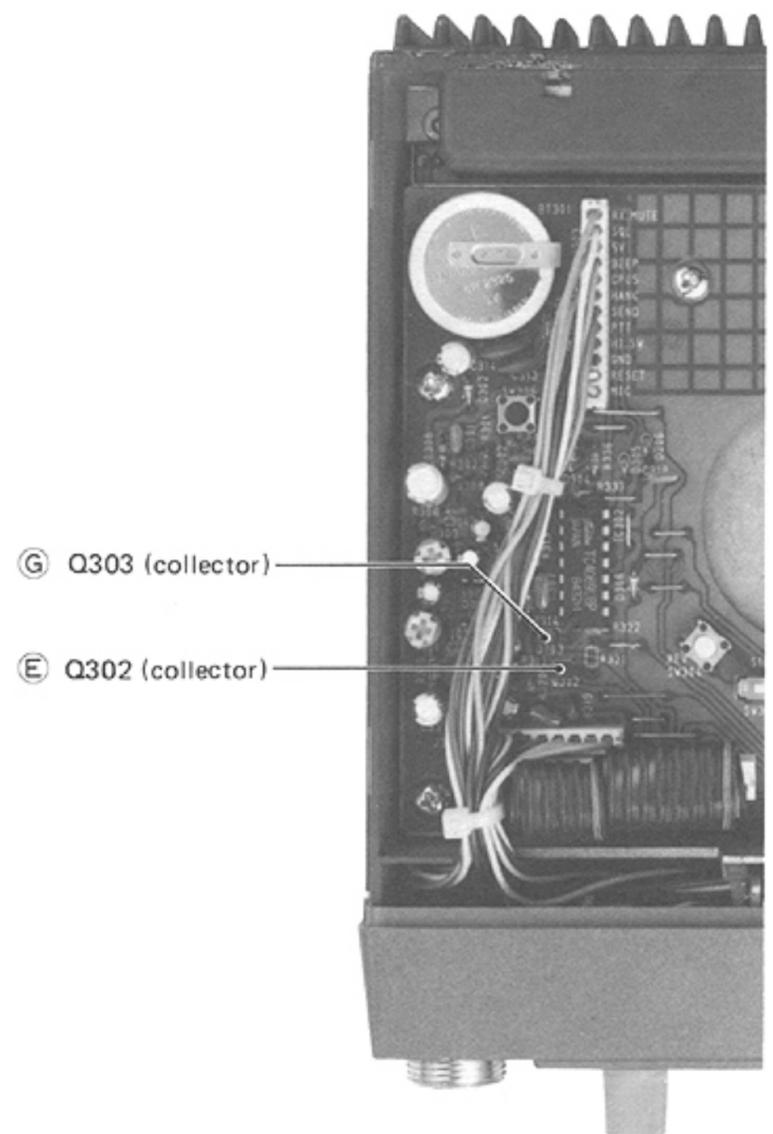
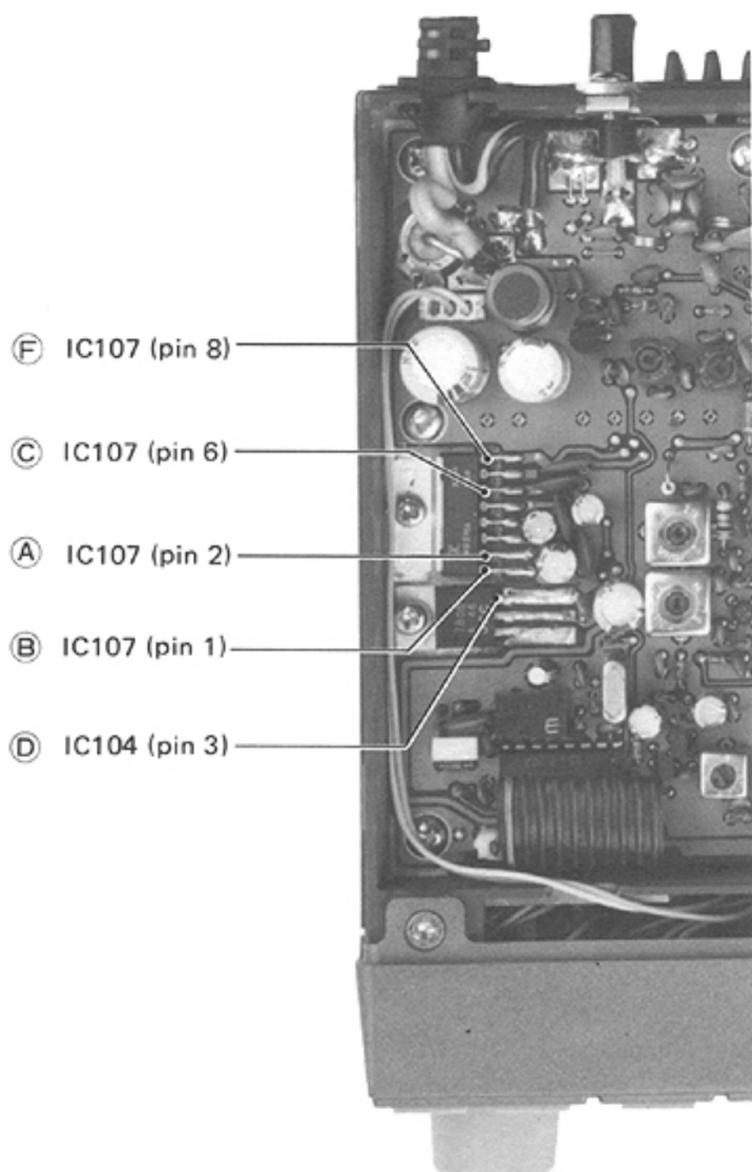
1. Push and hold the connector harness down.
2. Insert each wire of the cable into the connector holes then release pressure.

SECTION 9 MAINTENANCE AND ADJUSTMENT**9 - 1 PREPARATION BEFORE SERVICING**

1. Detach the power cable and turn OFF the power switch before performing any work on the transceiver.
2. Do not short circuit components while making adjustments.
3. Use an insulated tuning tool for all adjustments.
4. Do not force any of the variable components. Tune them slowly and smoothly.
5. Follow the instructions exactly. If an indicated result is not obtained, repeat the instruction until the correct result is obtained.
6. Check the condition of connectors, solder joints, and screws when adjustments are complete. Confirm that components do not touch each other.
7. Confirm defective operation of the transceiver first when checking an out-of-service unit. Verify that external sources do not cause the problem.
8. Use the correct tools and test equipment.
9. Remove the transceiver case as shown in SECTION 8 - 1.
10. Attach a 13.8 volt DC external power source to the power supply connector. Be sure to check the polarity.
11. For transmitting problems, attach a dummy load to the antenna connector. For receiving problems, attach an antenna or signal generator to the antenna connector. DO NOT transmit into the signal generator.
12. Recheck the suspected malfunction with the power switch ON.
13. Check the defective circuit. Measure the DC voltages of the collector, base and emitter of each transistor.

9 - 2 VOLTAGE REGULATOR CHECKS

INSTRUMENTS REQUIRED			CONNECTIONS			
(1) VOLTAGE REGULATED POWER SUPPLY OUTPUT VOLTAGE : DC 13.8V CURRENT CAPACITY : 5A (2) RF POWER METER (TERMINATED) MEASURING RANGE : 30W FREQUENCY RANGE : 140 ~ 170MHz IMPEDANCE : 50 OHMS SWR : LESS THAN 1 : 1 (3) MULTIMETER INPUT IMPEDANCE : 50k OHMS/VOLT or BETTER						
Adjustment	Adjustment Conditions	Unit	Measurement Location	Value	Unit	Adjust
POWER SUPPLY VOLTAGES	1 • Select the receive mode.	MAIN	Connect a multimeter to: Point (A)	13.8V		Verify voltage
	2 • Select the receive mode.		Point (B)	8.2V		
	3 • Select the receive mode.		Point (C)	8.2V		
	4 • Select the receive mode.		Point (D)	5.5V		
	5 • Select the receive mode.		Point (E)	5.5V		
	6 • Select the transmit mode.		Point (F)	8.2V		
	7 • Select the transmit mode.		Point (G)	5.5V		

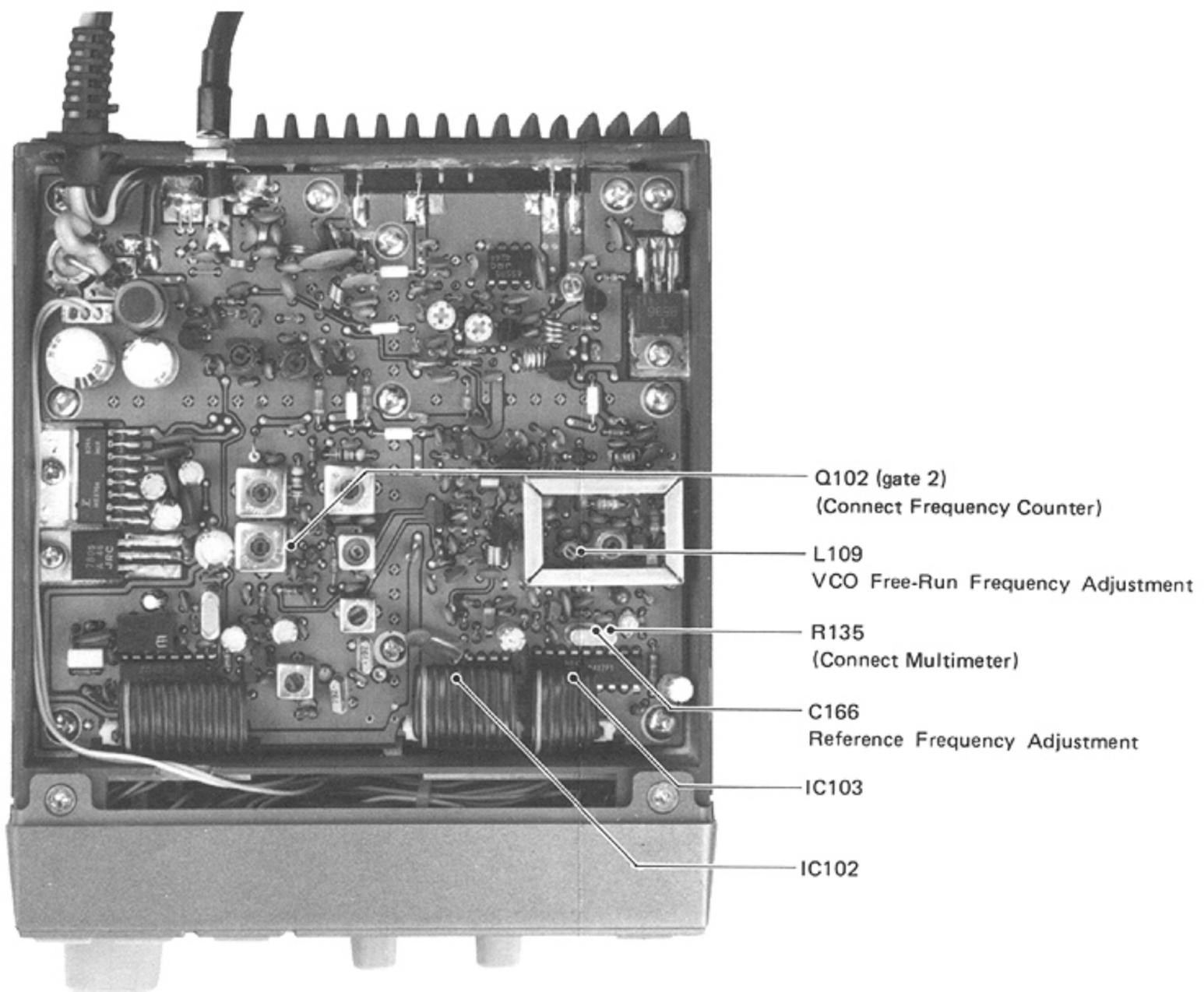


9 - 3 PLL ADJUSTMENT

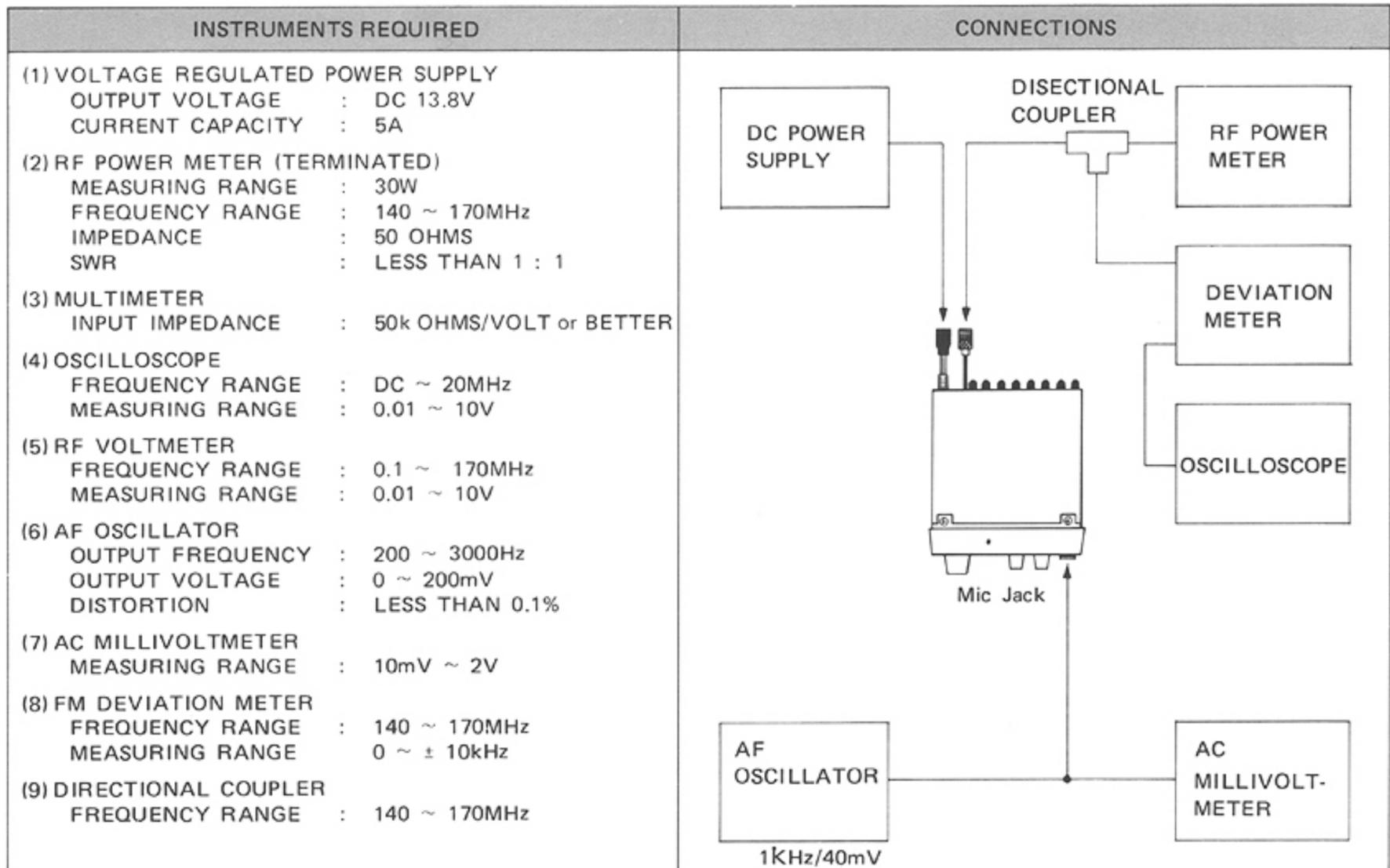
INSTRUMENTS REQUIRED	CONNECTIONS
(1) VOLTAGE REGULATED POWER SUPPLY OUTPUT VOLTAGE : DC 13.8V CURRENT CAPACITY : 5A (2) RF POWER METER (TERMINATED) MEASURING RANGE : 30W FREQUENCY RANGE : 140 ~ 170MHz IMPEDANCE : 50 OHMS SWR : LESS THAN 1 : 1 (3) MULTIMETER INPUT IMPEDANCE : 50k OHMS/VOLT or BETTER (4) FREQUENCY COUNTER FREQUENCY RANGE : 0.1 ~ 170MHz ACCURACY : BETTER THAN ± 1 PPM SENSITIVITY : 100mV or BETTER (5) OSCILLOSCOPE FREQUENCY RANGE : DC ~ 20MHz MEASURING RANGE : 0.01 ~ 10V	

Adjustment	Adjustment Conditions	Unit	Measurement Location	Value	Unit	Adjust
PRELIMINARY	1	<ul style="list-style-type: none"> Check for a PLL lock failure. Unstable or no waveform indicates lock failure. 	MAIN	Connect an oscilloscope to pin 5 of IC102.	Verify waveform is present	
	2	<ul style="list-style-type: none"> Check the divided reference frequency. 	MAIN	Connect an oscilloscope to pin 16 of IC103.	25kHz 5Vp-p square-wave	
	3	<ul style="list-style-type: none"> Perform this step if a squarewave is not observed above. 	MAIN	Connect a multimeter to pin 18 of IC103.	5V	
	4	<ul style="list-style-type: none"> Check the master oscillator frequency. 	MAIN	Connect an oscilloscope to pin 17 of IC103.	12.8MHz waveform	
	5	<ul style="list-style-type: none"> Check the transistor voltages. 	MAIN	Connect a multimeter to Q105, Q106 and Q109.	See the voltage diagram in SECTION 12.	
	6	<ul style="list-style-type: none"> Check the DATA signal. Perform this step if the TX/RX frequency is different from the display. 	MAIN	Connect an oscilloscope to pin 6 of IC103.		
PLL LOCK	1	<ul style="list-style-type: none"> Switch the PRV switch (SW305) towards the LOGIC UNIT. Select channel F6. The PLL is normally locked with a voltage range of 0 to 5 volts. Select the receive mode. 	MAIN	Connect a multimeter to R135.	1.3V DC	MAIN L109
	2	<ul style="list-style-type: none"> Select the transmit mode. 	MAIN		1.7V DC	C135
	NOTE: Repeat steps 1 and 2 several times.					
	3	<ul style="list-style-type: none"> Measure the voltage of R135 on channel 16. 	MAIN		About 3.8V DC in receive mode and 2.8V DC in transmit mode.	MAIN

Adjustment	Adjustment Conditions	Unit	Measurement Location	Value	Unit	Adjust
REFERENCE FREQUENCY	1 <ul style="list-style-type: none"> • Select channel 16. • Select the receive mode. 	MAIN	Connect a frequency counter to point ⑤ Q102 (gate 2) via a 0.001 μ F capacitor.	135.4MHz \pm 300Hz		C166
<p>Note: If the PLL does not lock, check the voltages of RS5V, TS5V, R8V, T8V, +8V and +5V. Refer to SECTION 12 - 1. Also, check the PLL L.O. and reference frequency. Refer to the PRELIMINARY section above.</p>						



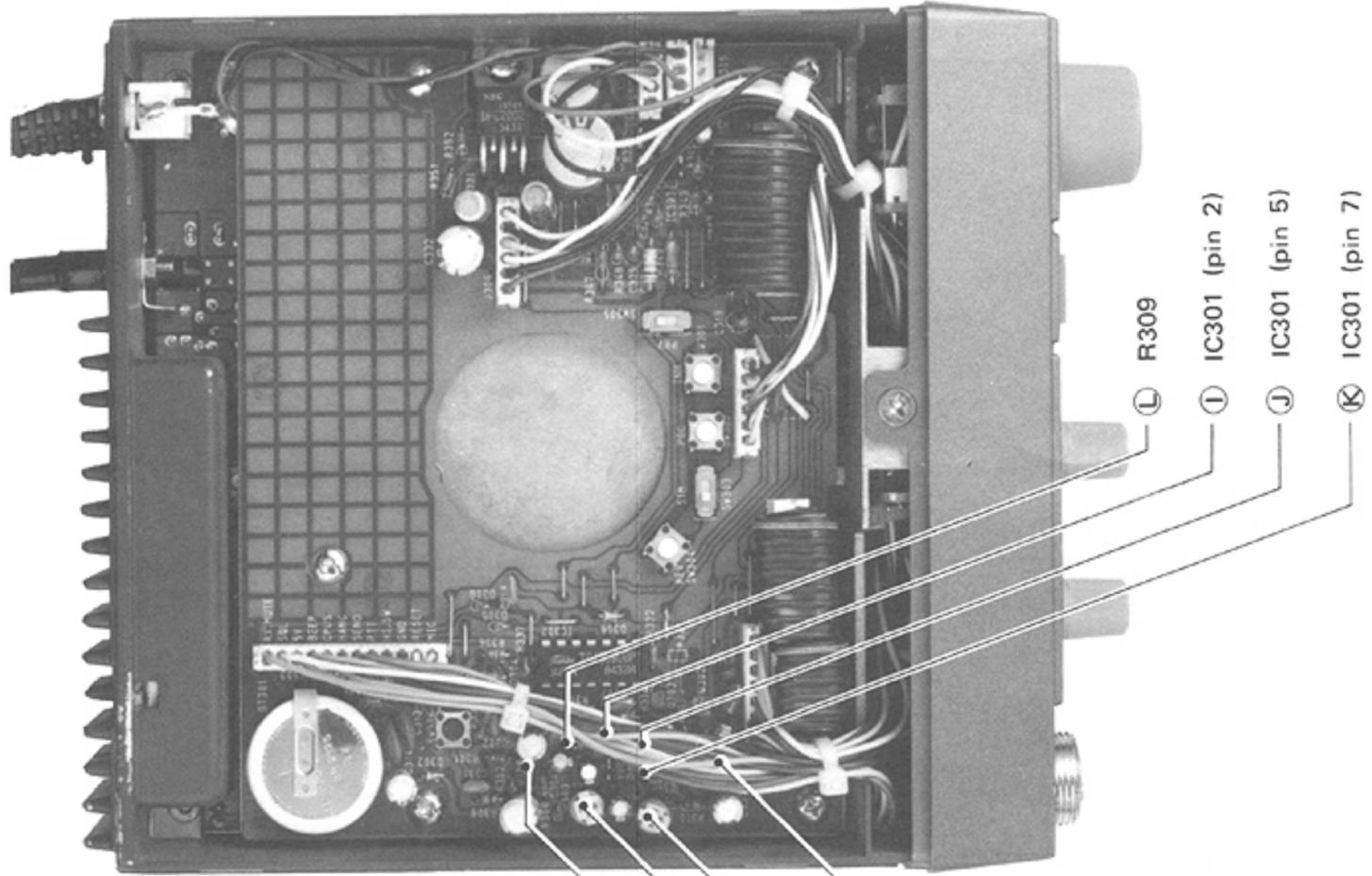
9 - 4 TRANSMITTER ADJUSTMENT



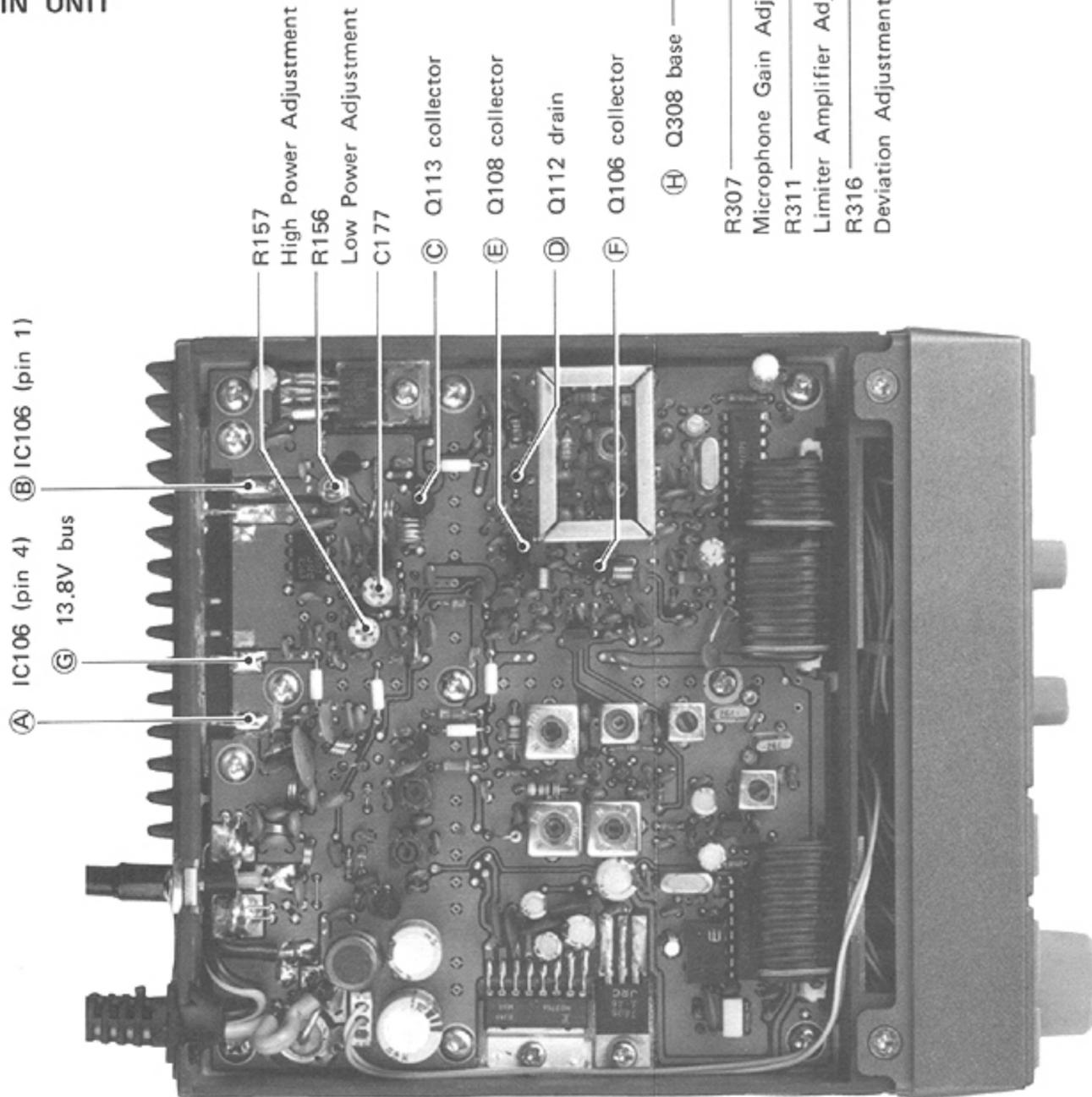
Adjustment	No.	Adjustment Conditions	Unit	Measurement Location	Value	Unit	Adjust
PRELIMINARY	1	<ul style="list-style-type: none"> • Check the RF output power. • RF POWER switch: HIGH • Select the transmit mode. 	PEAR PANEL	Connect an RF power meter to the ANTENNA CONNECTOR.	25W		
	2	<ul style="list-style-type: none"> • RF POWER switch: LOW • Select the transmit mode. 	REAR PANEL		1W		
	3	<ul style="list-style-type: none"> • Check the main points in the transmission path. • Select the transmit mode. 	REAR PANEL	Connect the RF voltmeter to: (A) IC106 (pin 4) (B) IC106 (pin 1) (C) Q113 (collector) (D) Q112 (drain) (E) Q108 (collector) (F) Q106 (collector)	Verify RF is present.		
	4	<ul style="list-style-type: none"> • If the output power is low, check the regulated power supply voltage. • Do not adjust the coils. 	MAIN	Connect a multimeter to point: (C) 13.8V bus	13.8V		
	5	<ul style="list-style-type: none"> • Check the main audio voltages. • Select the transmit mode. 	AUDIO	Connect a 1kHz 40mV signal to the MIC CONNECTOR pin 1. Connect at oscilloscope to points: (H) Q308 base (I) IC301 (pin 2) (J) IC301 (pin 5) (K) IC301 (pin 7) (L) R309	Verify AF is present.		

Adjustment	Adjustment Condition	Unit	Measurement Location	Value	Unit	Adjust			
OUTPUT POWER	1	<ul style="list-style-type: none"> RF POWER switch: HIGH CHANNEL SELECTOR: CH16 Select the transmit mode. 	MAIN	Connect the RF power meter to the ANTENNA CONNECTOR.	Maximum RF power.	MAIN	C177 R157		
	2	<ul style="list-style-type: none"> Set the HIGH RF output power. Select the transmit mode. 			25W at 13.8V		R157		
	3	<ul style="list-style-type: none"> Set the LOW RF output power. Select the transmit mode. 			1W		R156		
	4	<ul style="list-style-type: none"> Verify current drain and power are within limits at the band edges. 			Connect an ammeter in series between the power supply and the transceiver.		Less than 5.5A at 25W, 1.5A at 1W		
DEVIATION	1	<ul style="list-style-type: none"> Adjust the transmit deviation. CHANNEL SELECTOR: CH16 RF POWER switch: HIGH R307: Center Deviation meter de-emphasis: OFF Select the transmit mode. 	FRONT and REAR PANELS	Connect a 1kHz 40mV signal to the MIC CONNECTOR (pin 1). Connect the RF power meter and the deviation meter to the ANTENNA CONNECTOR using a directional coupler.	AUDIO	R316	±4.3kHz deviation ±10%		
MODULATION SENSITIVITY	2						Connect an oscilloscope to the output of the deviation meter.	Symmetrical signal about the horizontal base-line.	R311
	3						Adjust the AF oscillator for 1kHz, 4mV.	±3.5kHz deviation	R307
S/N RATIO	4	<ul style="list-style-type: none"> Check the transmit signal-to-noise ratio. No audio input. Select the transmit mode. 		Remove the oscillator signal. Connect the millivoltmeter to the deviation meter output.			Record the reading.		
	5	<ul style="list-style-type: none"> Select the transmit mode. 		Connect a 1kHz, 40mV signal to the MIC CONNECTOR (pin 1) Connect the millivoltmeter to the deviation meter output.			Record the reading.		
Note : The ratio of the readings taken in steps 4 and 5 must be greater than 40dB.									
SPURIOUS EMISSIONS	1	<ul style="list-style-type: none"> Measure the spurious signals. Select the transmit mode. 	REAR PANEL	Connect a spectrum analyzer to the ANTENNA CONNECTOR using a suitable attenuator. Adjust the attenuator until the noise level just appears.	Greater than 60dB below the fundamental frequency level.				

AUDIO UNIT



MAIN UNIT

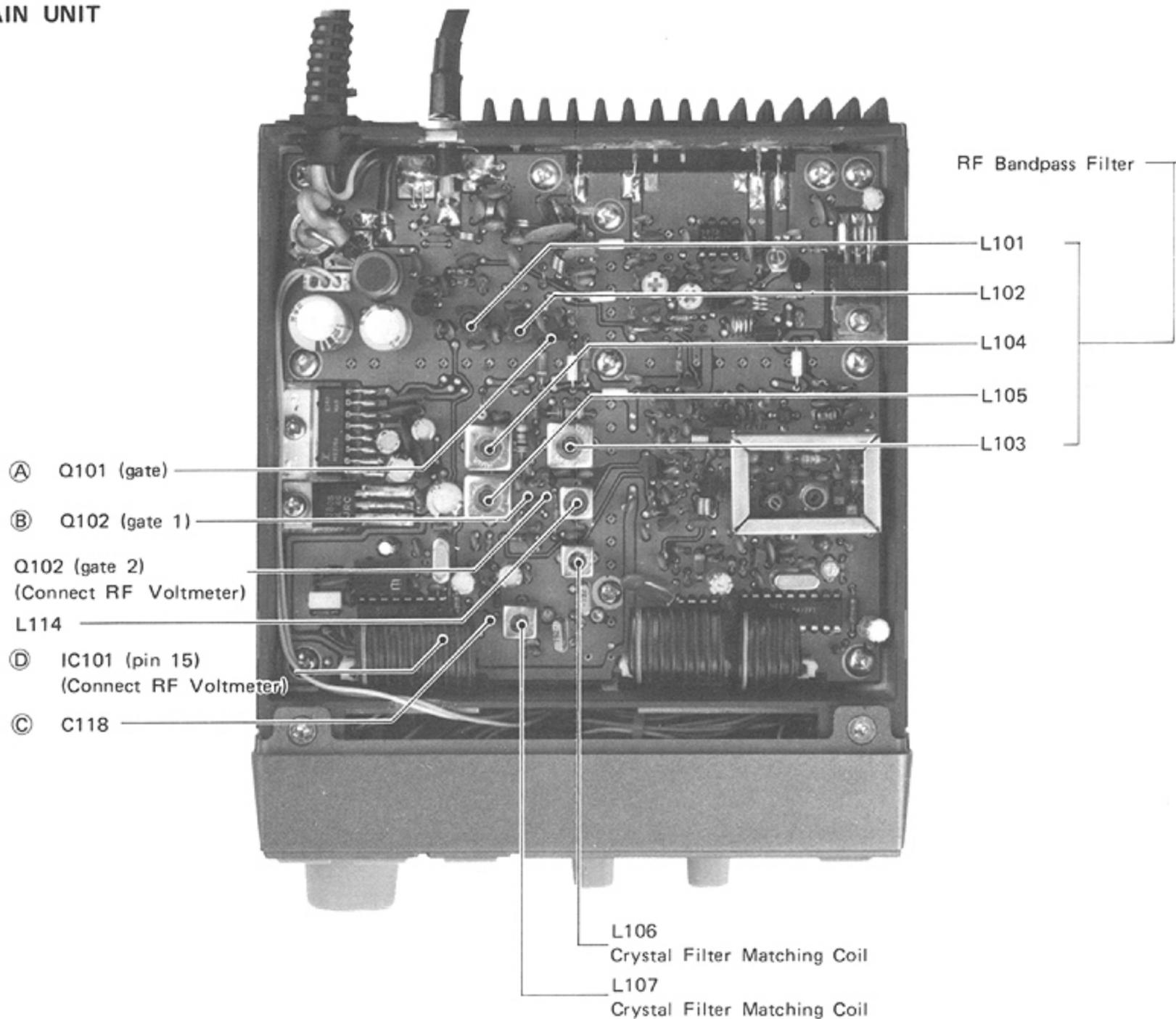


9 - 5 RECEIVER ADJUSTMENT

INSTRUMENTS REQUIRED			CONNECTIONS				
(1) VOLTAGE REGULATED POWER SUPPLY OUTPUT VOLTAGE : DC 13.8V CURRENT CAPACITY : 5A (2) OSCILLOSCOPE FREQUENCY RANGE : DC ~ 20MHz MEASURING RANGE : 0.01 ~ 10V (3) RF VOLTMETER FREQUENCY RANGE : 0.1 ~ 170MHz MEASURING RANGE : 0.01 ~ 10V (4) AC MILLIVOLTMETER MEASURING RANGE : 10mV ~ 2V (5) SIGNAL GENERATOR (SSG) FREQUENCY RANGE : 0.1 ~ 170MHz OUTPUT VOLTAGE : -20 ~ +90dBu (6) FREQUENCY COUNTER FREQUENCY RANGE : 0.1 ~ 170MHz ACCURACY : BETTER THAN ± 1 PPM (7) DISTORTION METER (8) EXTERNAL SPEAKER IMPEDANCE : 8 OHMS							
Adjustment	Adjustment Conditions	Unit	Measurement Location	Value	Unit	Adjust	
PRELIMINARY	1	<ul style="list-style-type: none"> Check the 20dB noise quieting. CHANNEL SELECTOR: CH16 SQUELCH control: counterclockwise No audio input to the ANTENNA CONNECTOR from the signal generator. 	REAR PANEL	Connect an AC millivoltmeter and an external speaker to the EXT SPEAKER jack.	Full Scale	FRONT PANEL	VOLUME CONTROL
	Note: DO NOT readjust the VOLUME CONTROL after this step.						
	2	<ul style="list-style-type: none"> Set the signal generator to 156.8MHz. 	REAR PANEL	Connect a signal generator to the ANTENNA CONNECTOR.	20dB decrease in level.		Generator level
	Note: The signal generator output voltage should be at a 20dB quieting.						
3	<ul style="list-style-type: none"> Confirm that the PLL works correctly. 		See SECTION 8-3 PLL ADJUSTMENT				
4	<ul style="list-style-type: none"> Check the receive path continuity. Set the oscillator for an FM test signal with 1kHz modulation. Inject the test signal through a 0.01μF capacitor to: <ul style="list-style-type: none"> (A) Q101 gate inject: 156.8MHz (B) Q102 gate 1 inject: 156.8MHz (C) C118 inject: 21.4MHz (D) IC101 pin 16 inject: 21.4MHz 	MAIN	Monitor the receiver speaker. Connect an oscilloscope to point: (E) DET bus (R117)	Check for an AF output.			

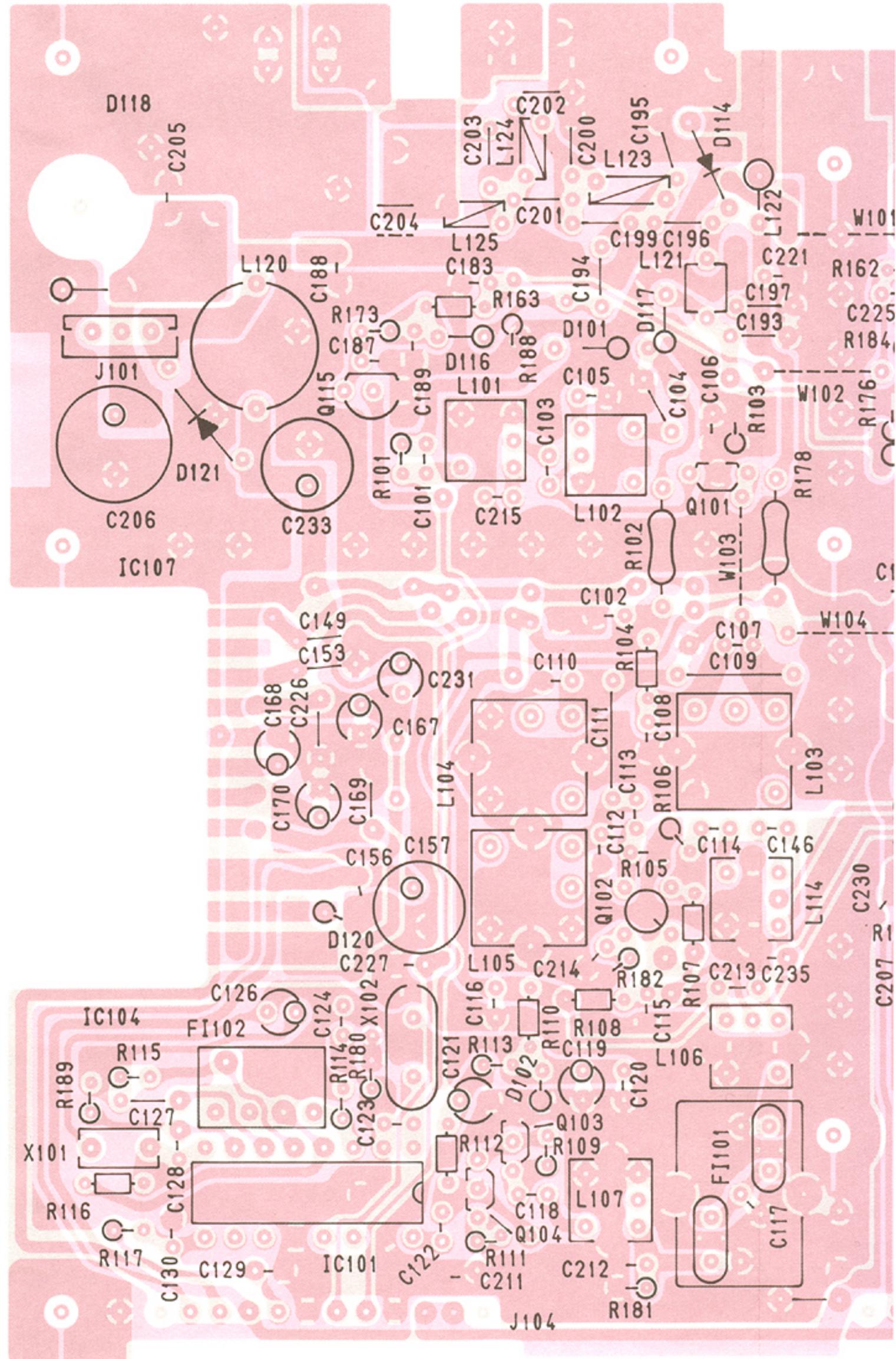
Adjustment		Adjustment Condition	Unit	Measurement Location	Value	Unit	Adjust
LOCAL OSCILLATOR OUTPUT	1	<ul style="list-style-type: none"> CHANNEL SELECTOR: CH16 	MAIN	Connect an RF voltmeter to the Q102 gate 2.	Maximum	MAIN	L114
RF/IF STAGES	1	<ul style="list-style-type: none"> CHANNEL SELECTOR: CH16 Set the SSG to 156.8MHz, 30dBu, 1kHz modulation, ± 3.5kHz deviation. 	FRONT PANEL & MAIN	Connect an SSG to the ANTENNA CONNECTOR. Connect an RF voltmeter to IC101 (pin 16).	Maximum RF voltmeter reading.	MAIN	L106 L107
	2	<ul style="list-style-type: none"> CHANNEL SELECTOR: Ch16 Set the SSG for 20dBu. 					L101 L102 L103 L104 L105
	3	<ul style="list-style-type: none"> CHANNEL SELECTOR: CH18 Set the SSG to 162MHz. 					L101 L102 L103 L104 L105
<p>Note: Repeat steps 2 and 3 several times.</p> <p>Final settings should produce 20dB quieting for a -10dBμ (0.3μV) signal.</p>							

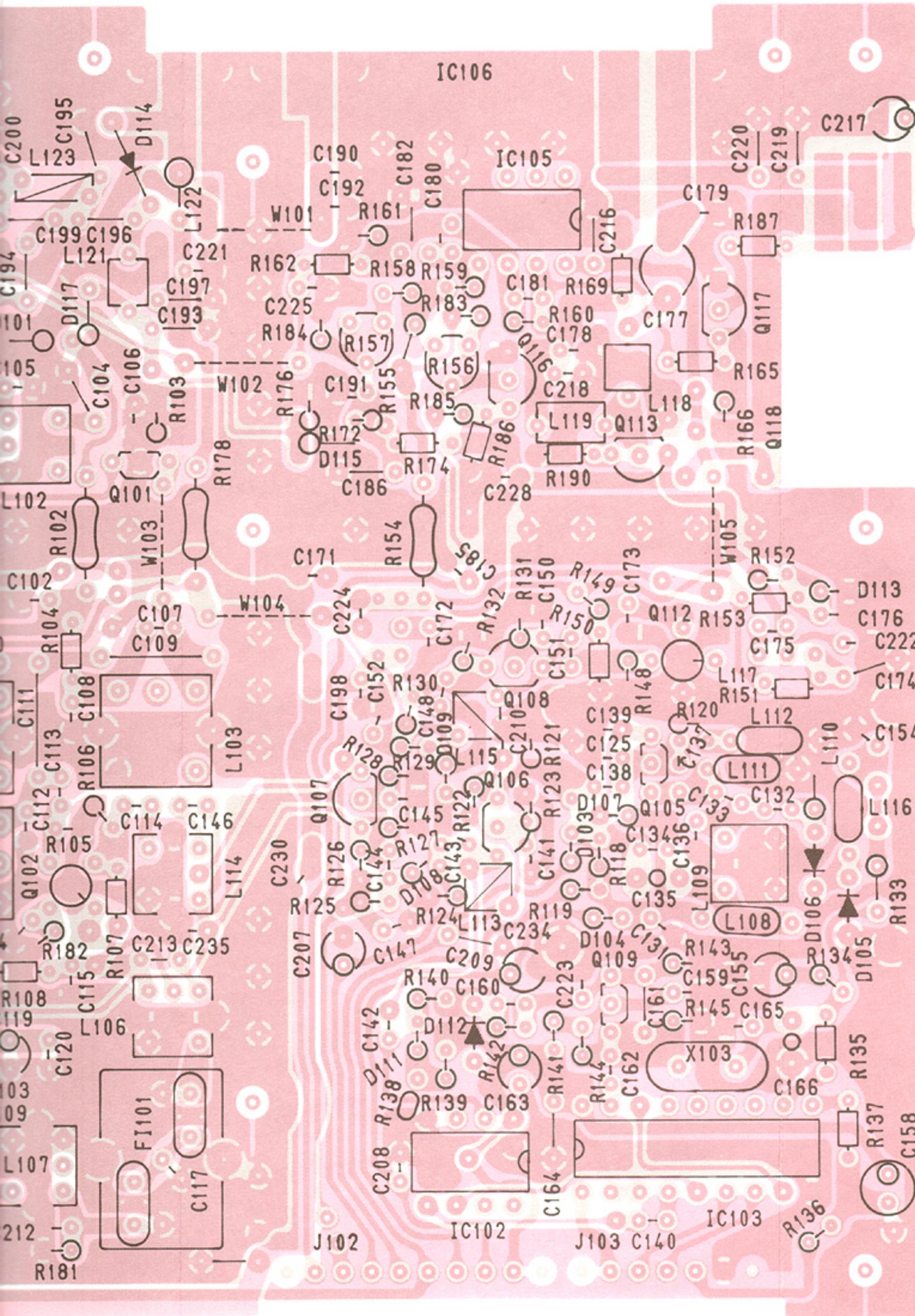
MAIN UNIT



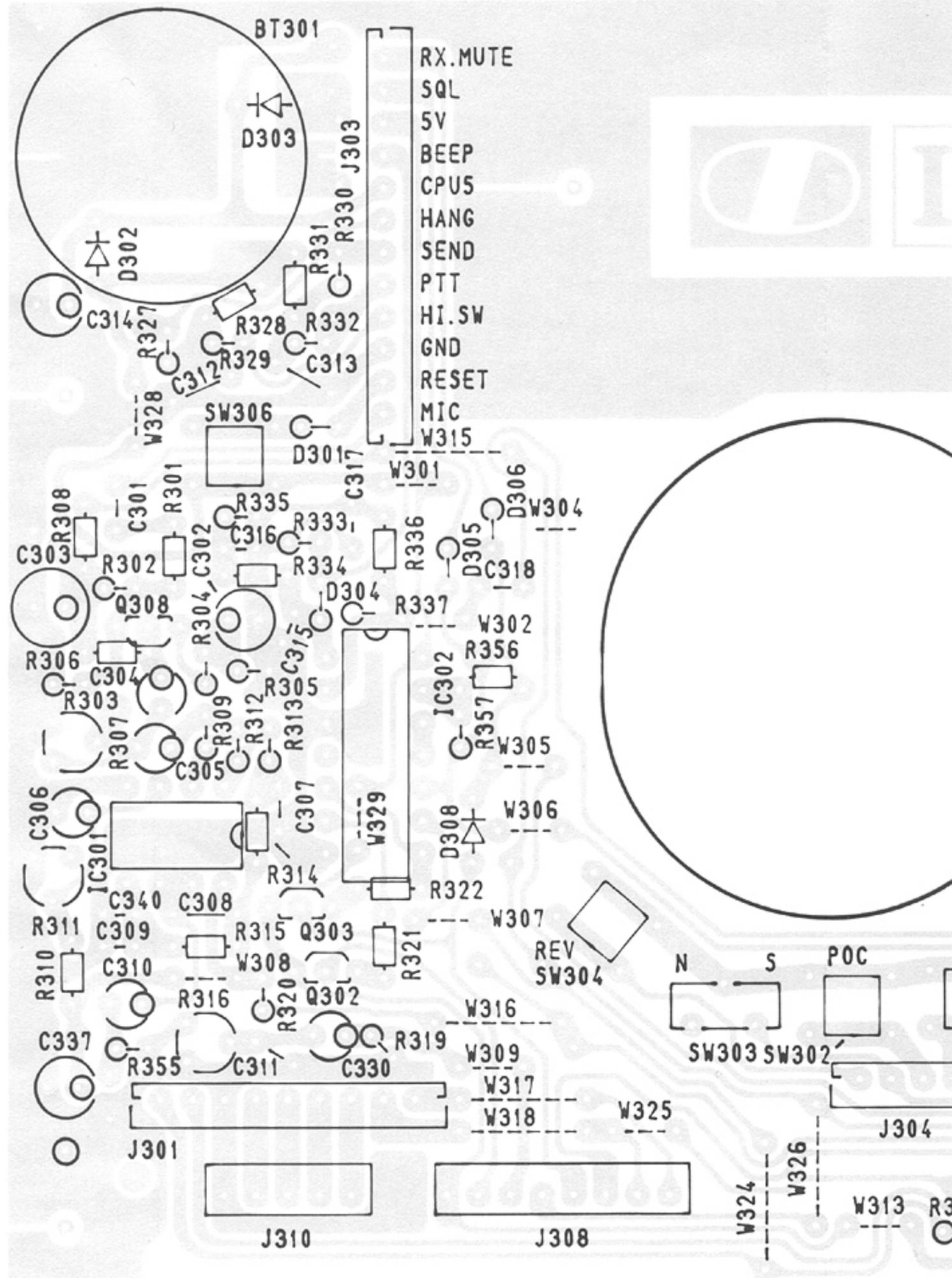
SECTION 10 BOARD LAYOUTS

10-1 MAIN UNIT



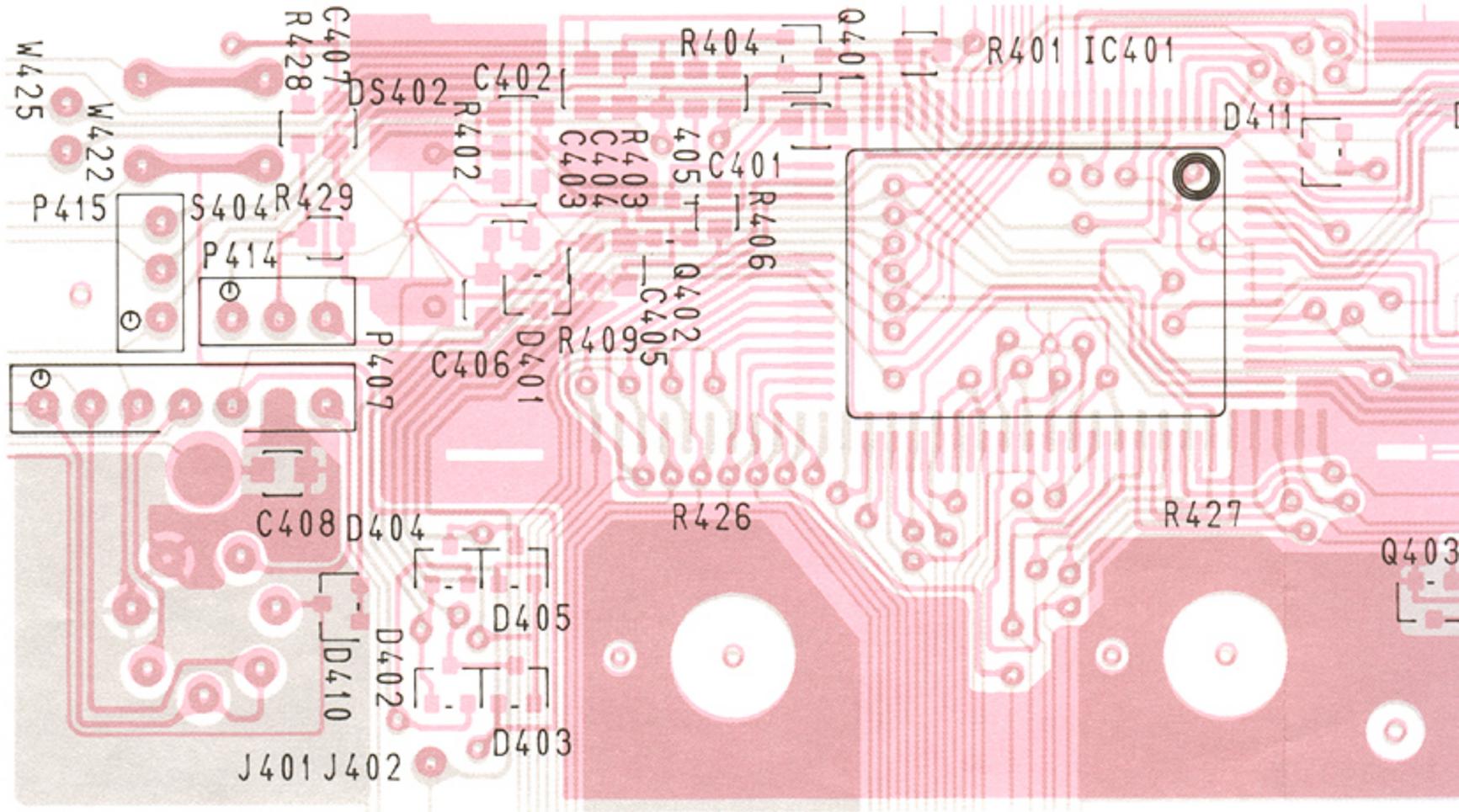


10-2 AUDIO UNIT

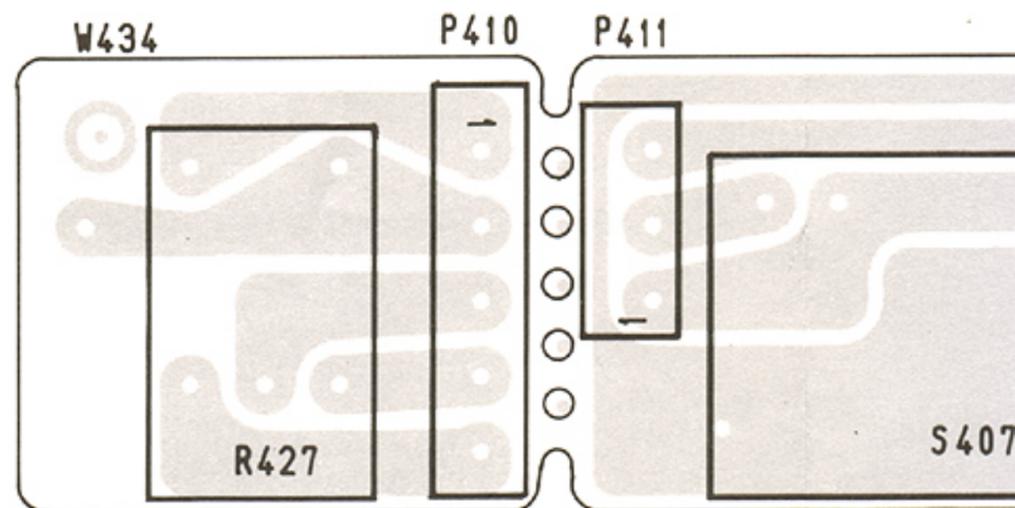


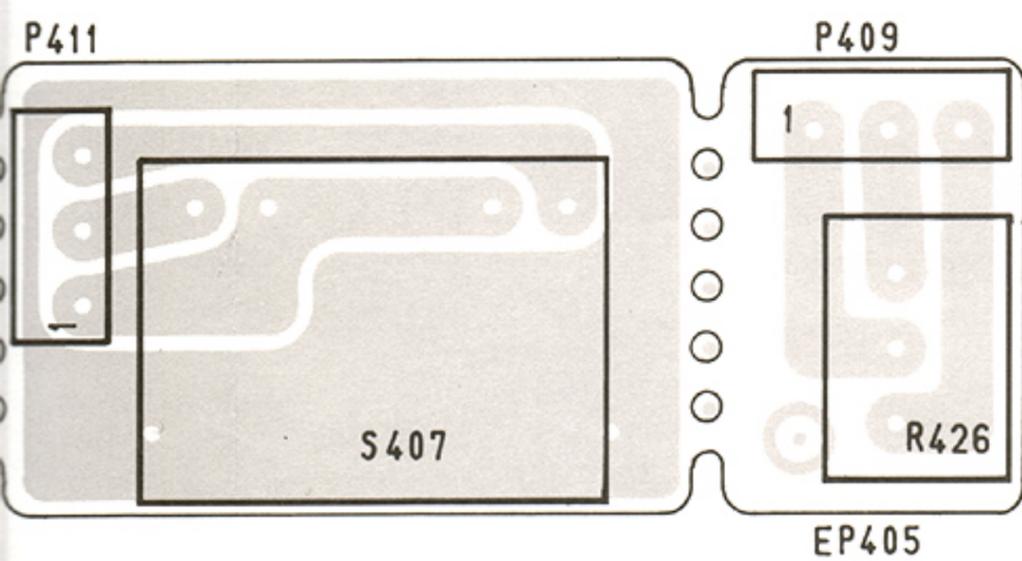
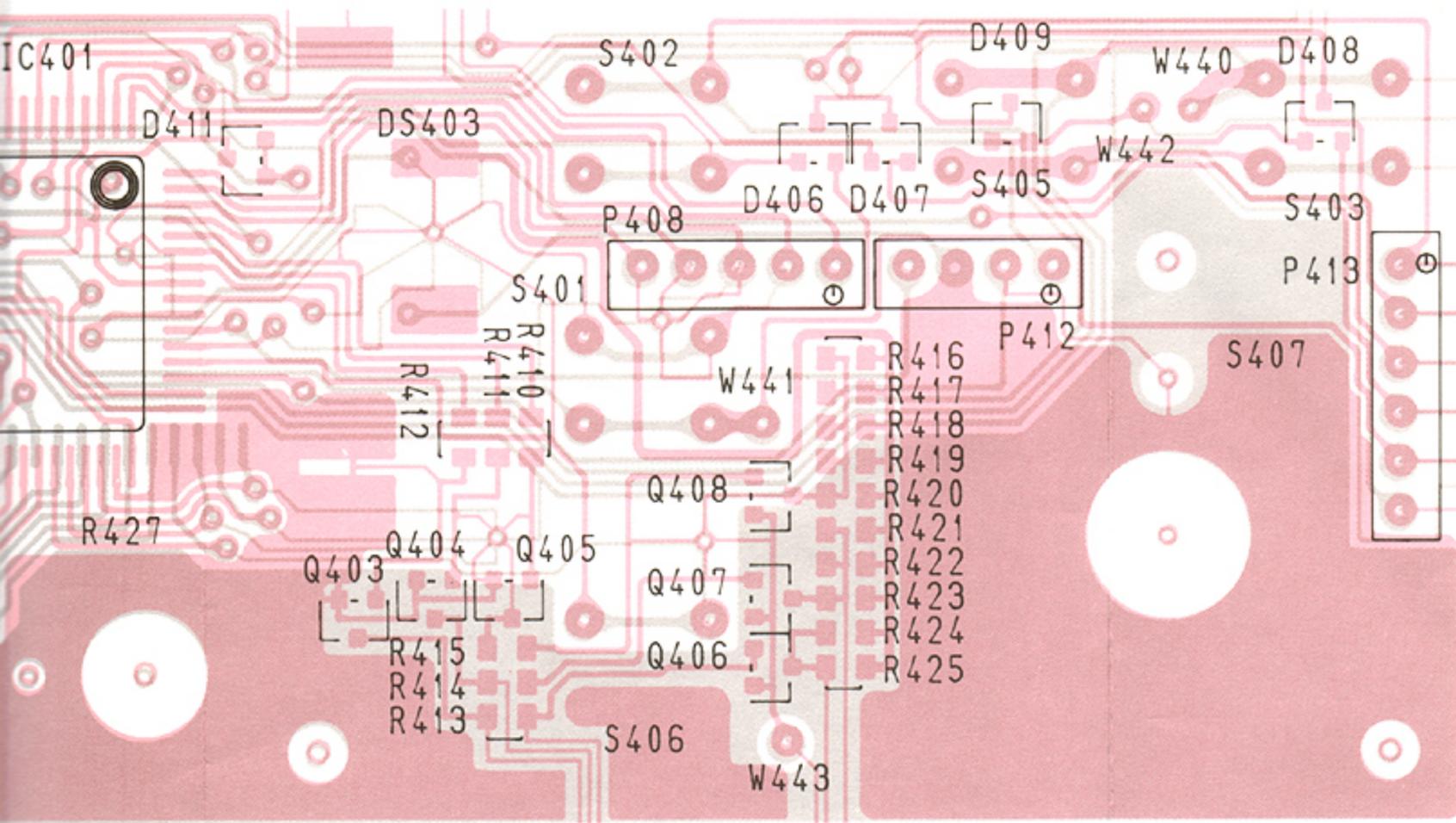
10-3 LOGIC UNIT AND VR UNIT

LOGIC UNIT



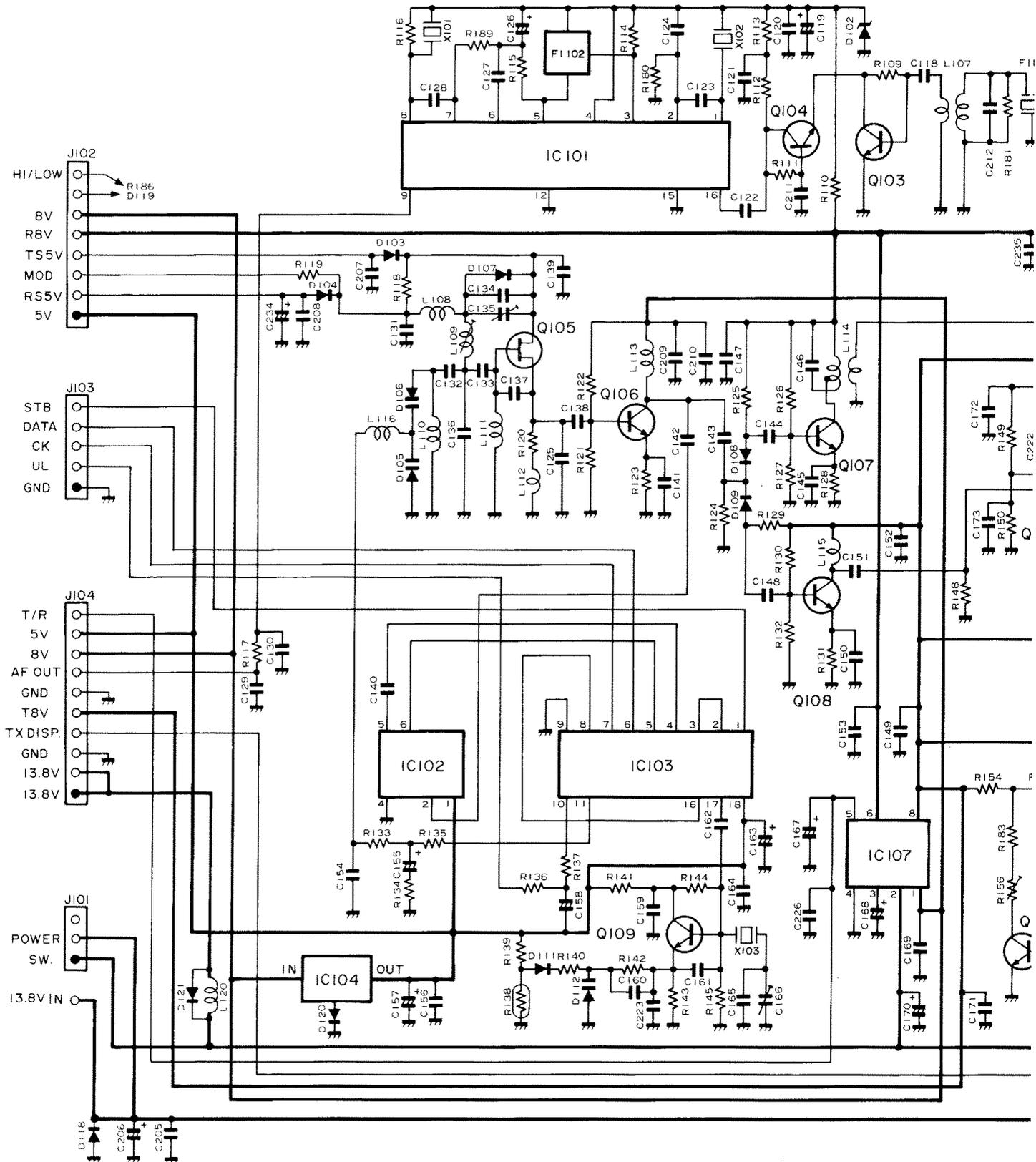
VR UNIT

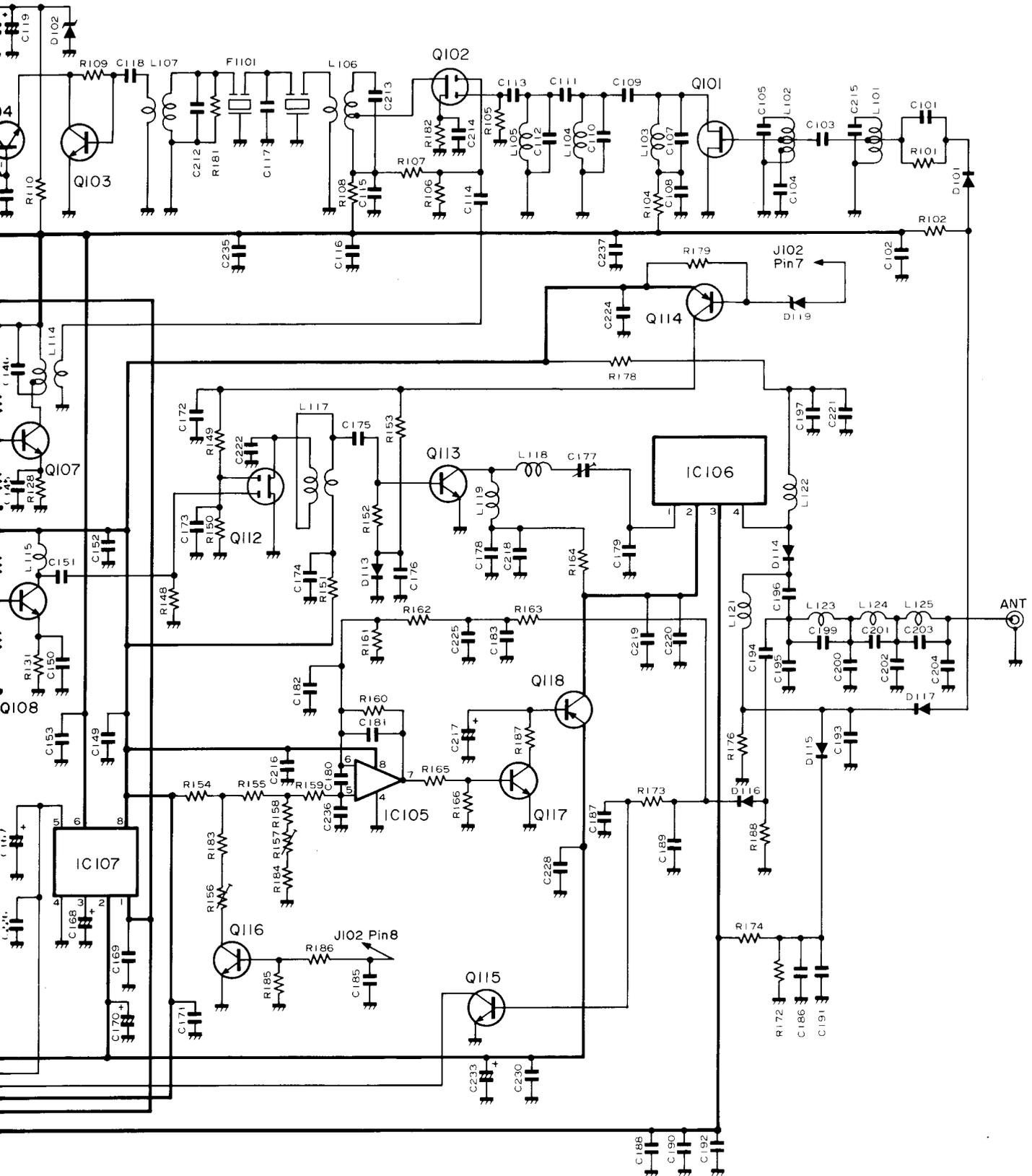




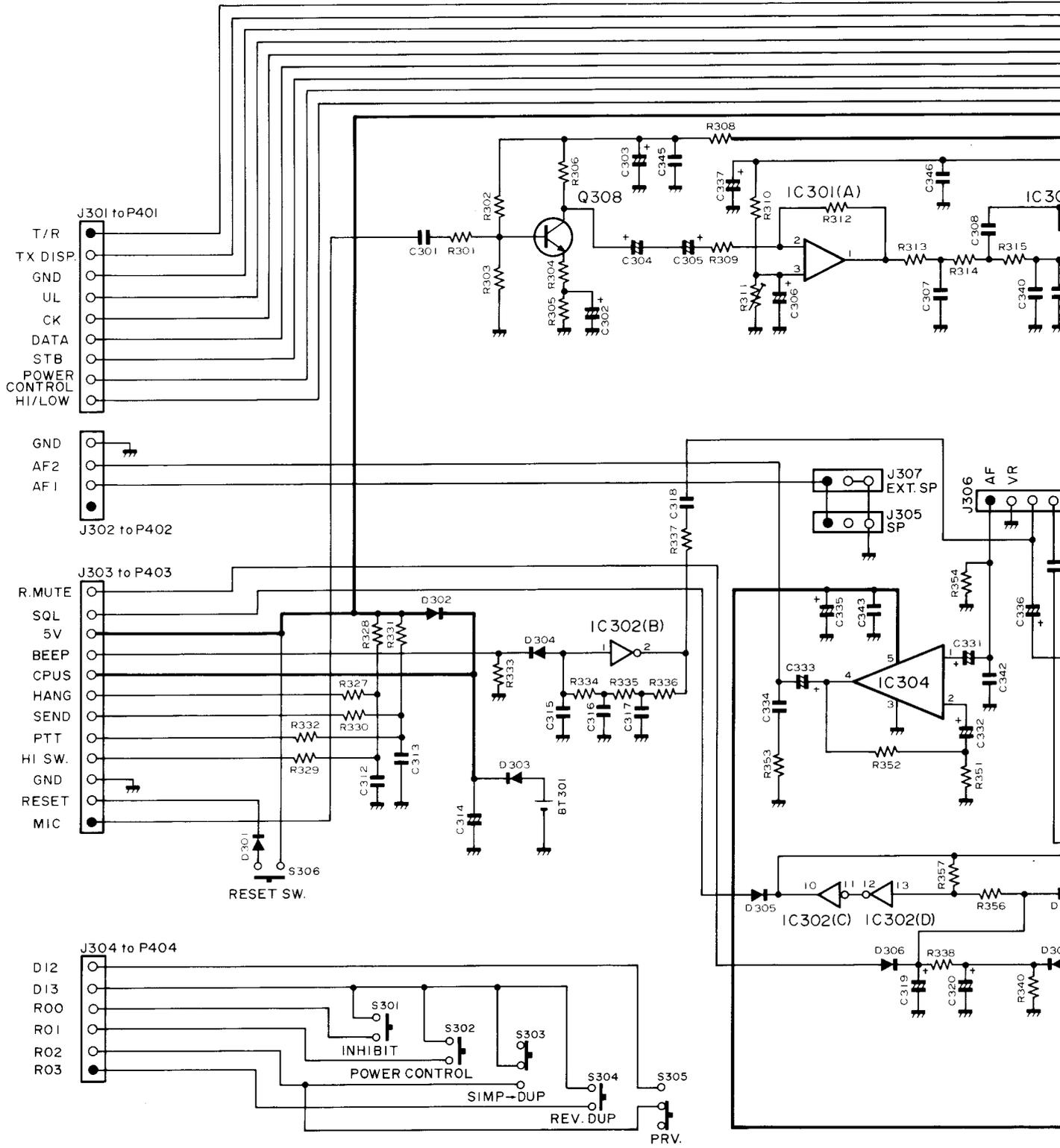
SECTION 11 CIRCUIT DIAGRAMS

11-1 MAIN UNIT

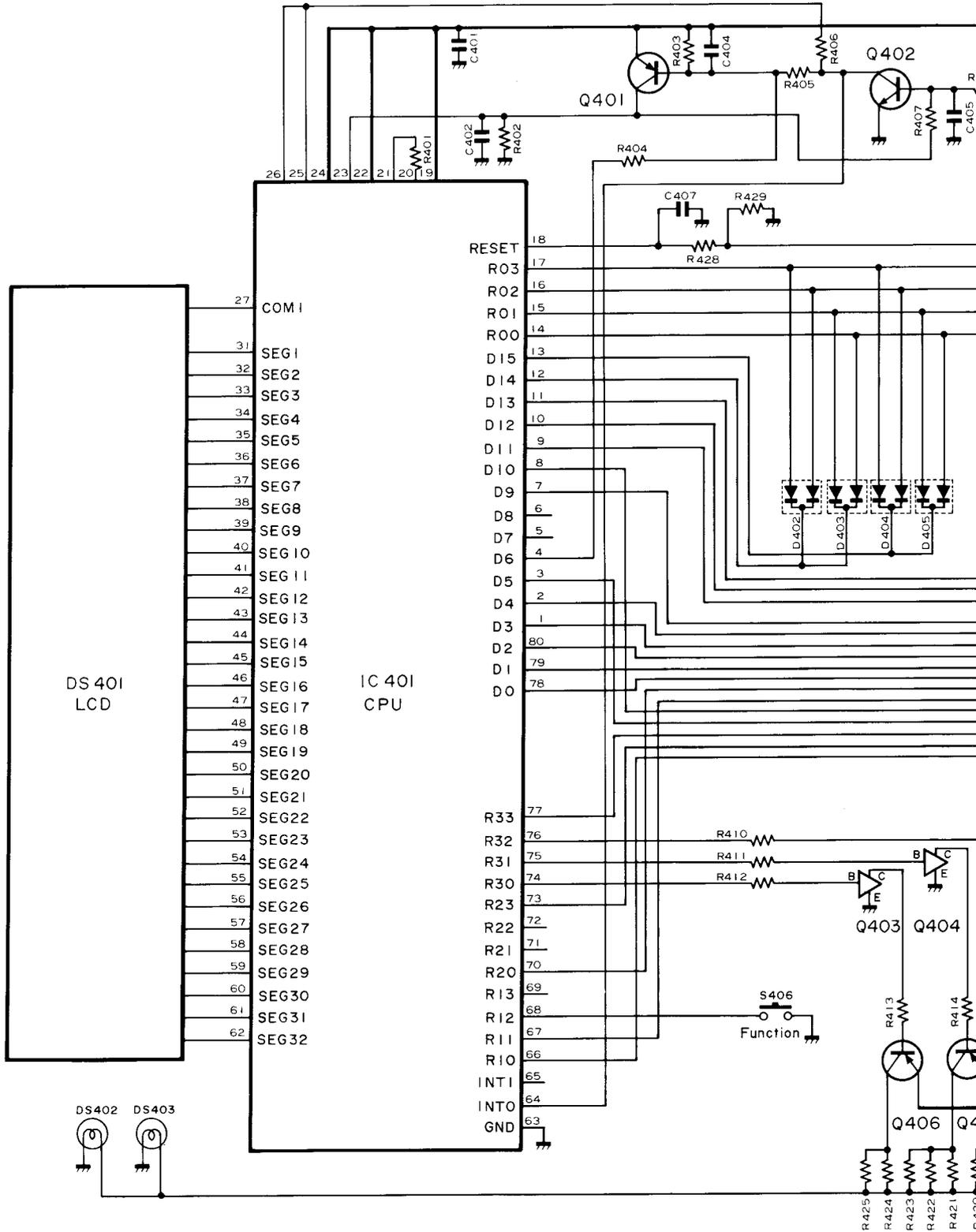


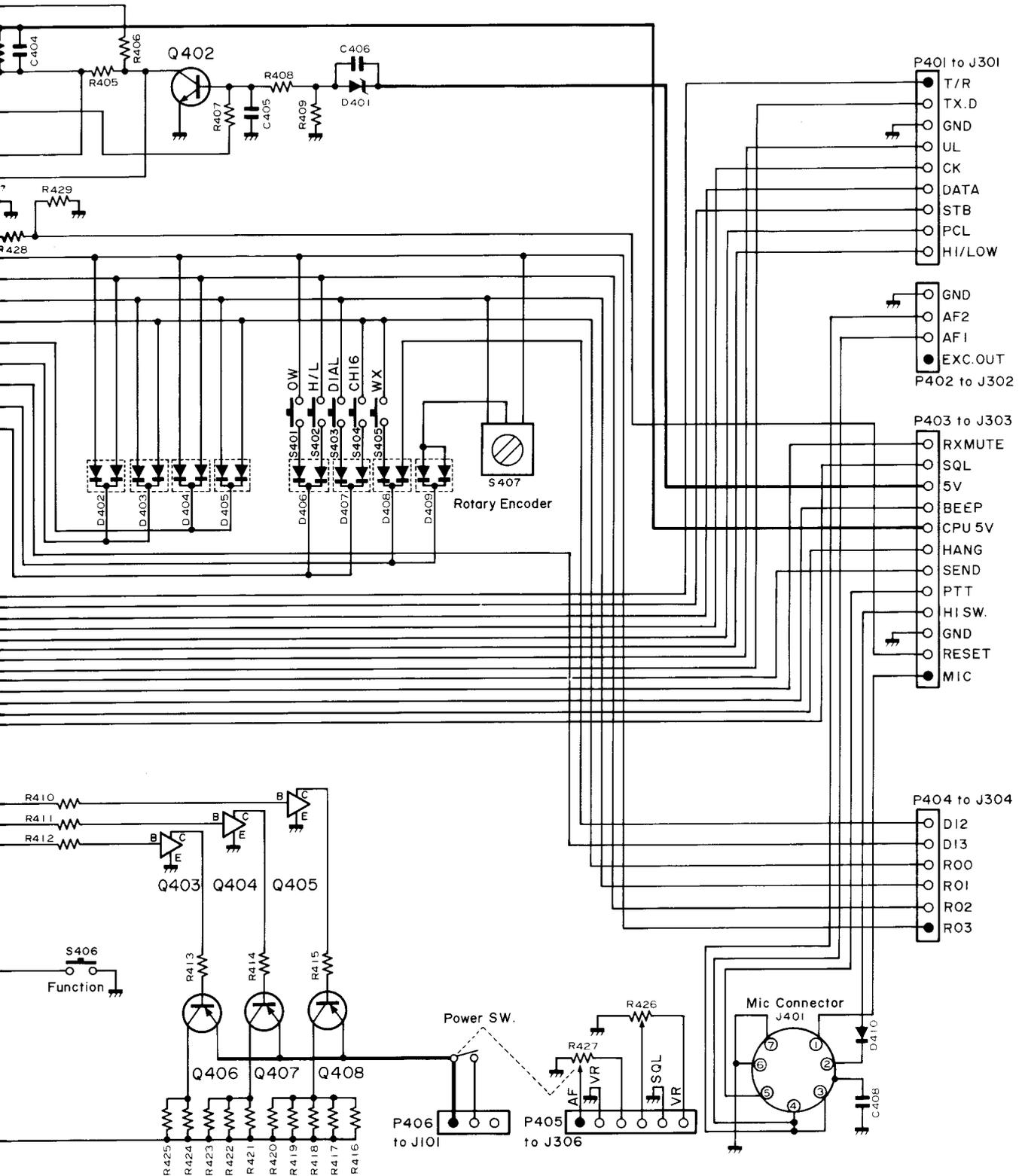


11 - 2 AUDIO UNIT



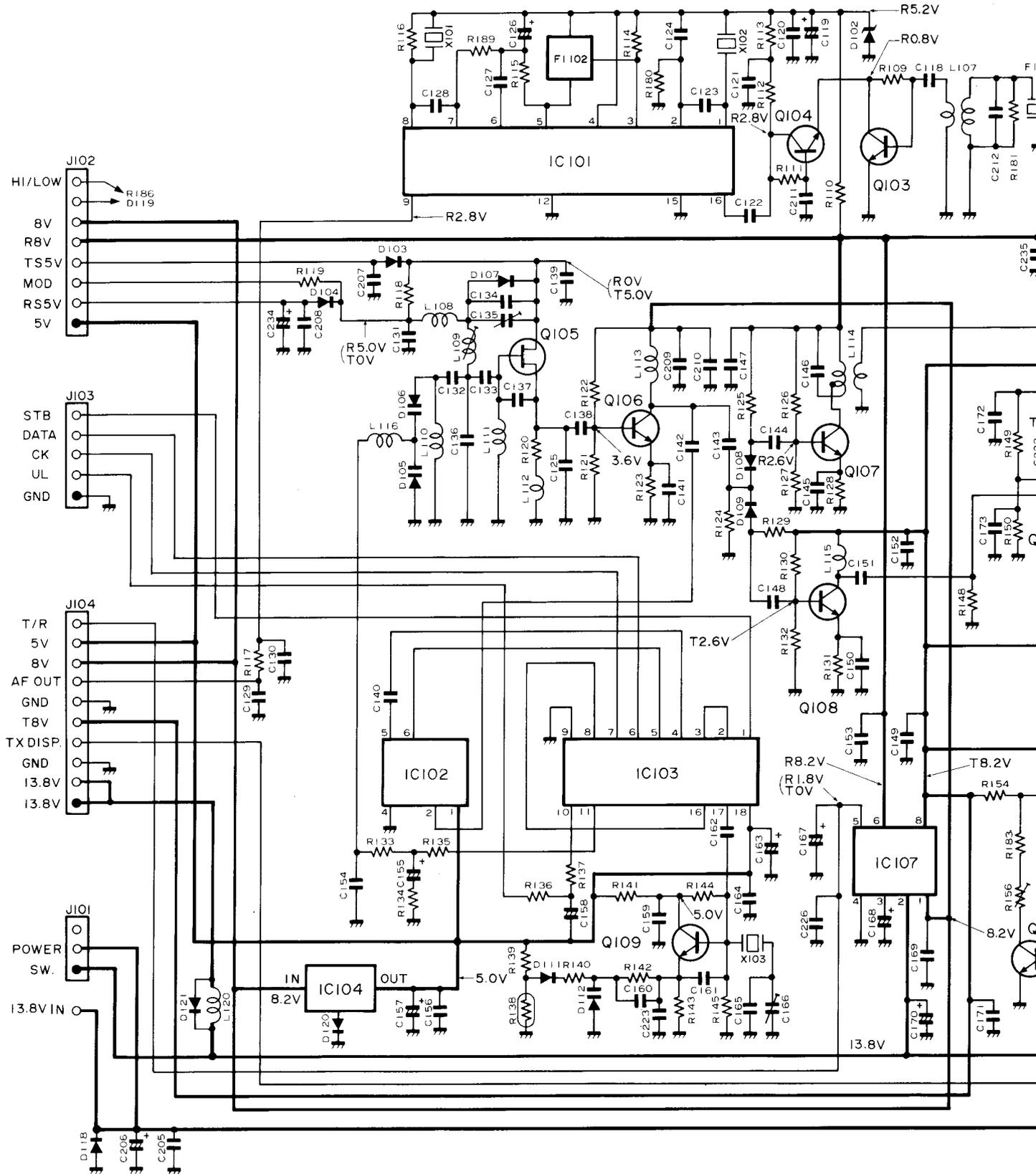
11-3 LOGIC UNIT



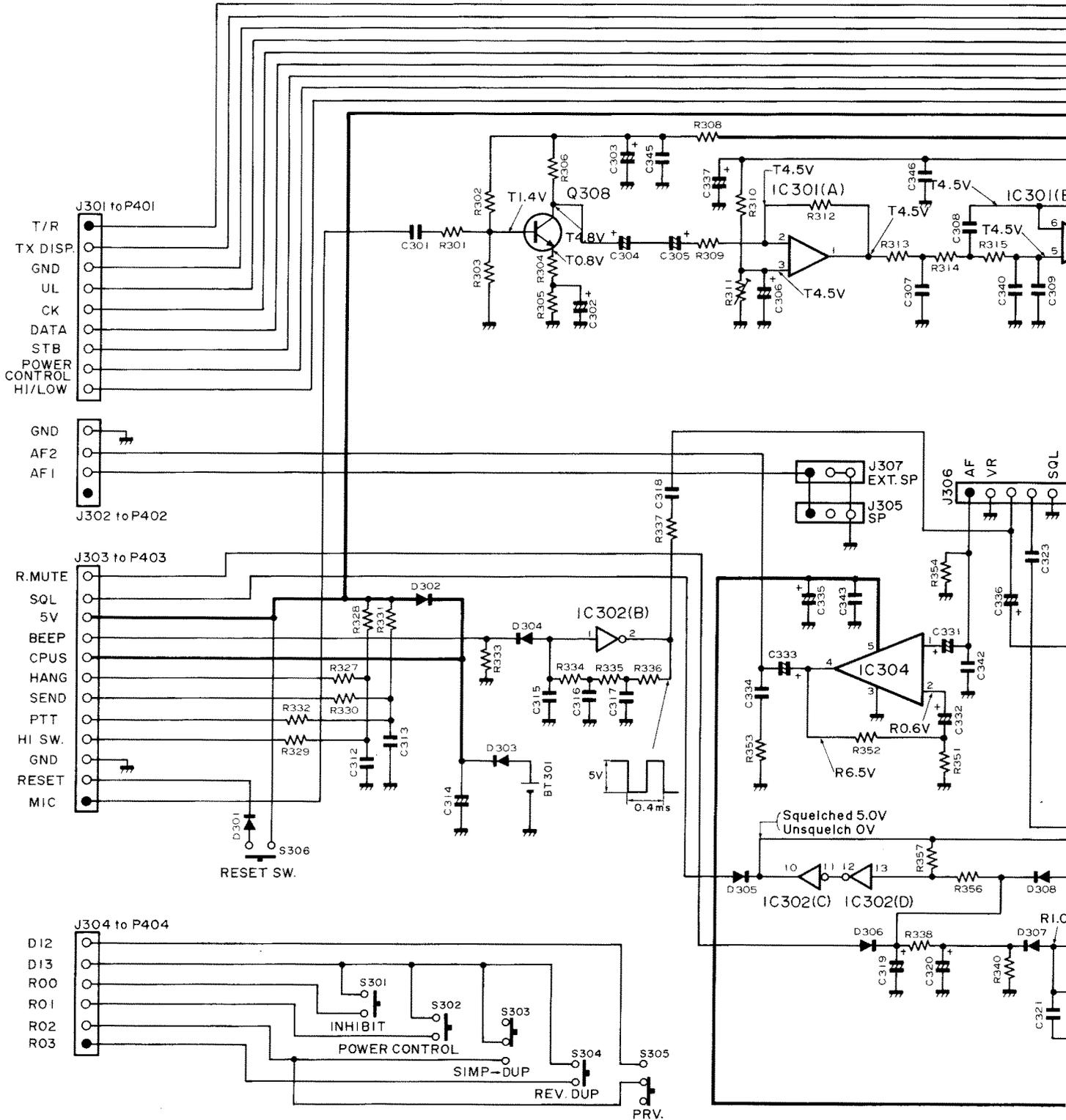


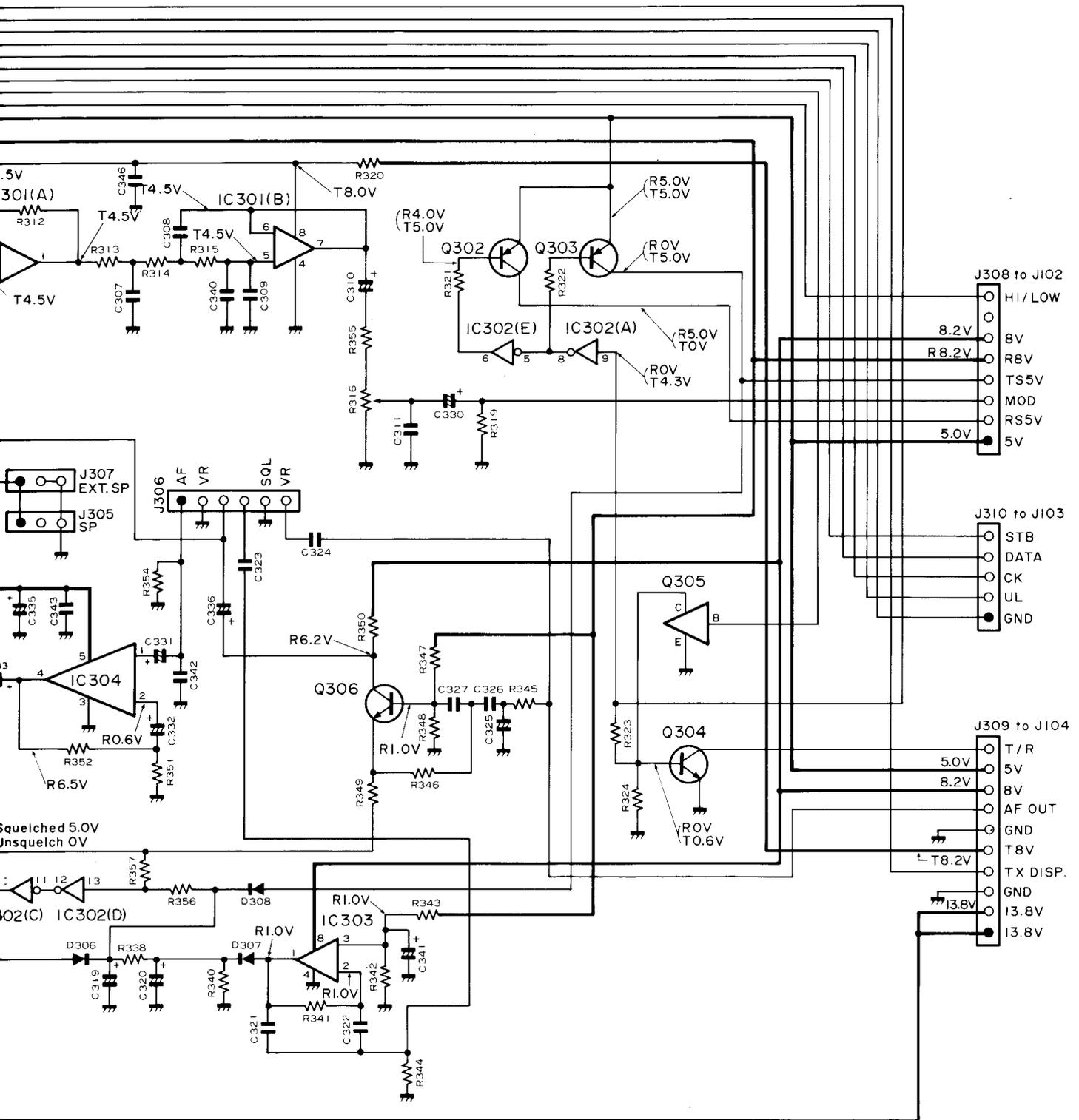
SECTION 12 VOLTAGE CHARTS

12-1 MAIN UNIT



12-2 AUDIO UNIT





SECTION 13 PARTS LIST

13 - 1 MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	REF. NO.	DESCRIPTION	PART NO.
IC101	IC	MC3357P	L109	Coil	LB-174
IC102	IC	μ PB571C	L110	Coil	LAL03NA4R7
IC103	IC	μ PD2834C	L111	Coil	LAL03NA1R5
IC104	IC	NJM7805A	L112	Coil	LAL03NA4R7
IC105	IC	NJM4558D	L113	Coil	LA-237
IC106	IC	SC-1038	L114	Coil	LS-145
IC107	IC	MB3756	L115	Coil	LA-237
			L116	Coil	LAL03NAR56
			L117	Coil	LR-132
Q101	FET	2SK241-GR	L118	Coil	LA-71
Q102	FET	3SK74-K	L119	Coil	LA-71
Q103	Transistor	2SC2668-O	L120	Coil	LW-16
Q104	Transistor	2SC2668-O	L121	Coil	LA-121
Q105	FET	2SK241-GR	L122	Coil	LW-19
Q106	Transistor	2SC2026	L123	Coil	LA252
Q107	Transistor	2SC2026	L124	Coil	LA-243
Q108	Transistor	2SC2407-A	L125	Coil	LA-243
Q109	Transistor	2SC2458-GR			
Q112	FET	3SK74-K	R101	Resistor	2.2k ELR20
Q113	Transistor	2SC2053	R102	Resistor	6.8k R25
Q114	Transistor	2SB561	R104	Resistor	56 R20
Q115	Transistor	2SC945-K	R105	Resistor	47k ELR20
Q116	Transistor	2SC945-K	R106	Resistor	47k ELR20
Q117	Transistor	2SC945-K	R107	Resistor	270k R20
Q118	Transistor	2SB596-Y	R108	Resistor	100 R20
			R109	Resistor	47k ELR20
D101	Diode	1SS53	R110	Resistor	220 R20
D102	Zener	RD5.1EB(3)	R111	Resistor	330k ELR20
D103	Diode	1SS211	R112	Resistor	4.7k R20
D104	Diode	1SS211	R113	Resistor	2.2k ELR20
D105	Varactor	1T25	R114	Resistor	1.5k ELR20
D106	Varactor	1T25	R115	Resistor	1.5k ELR20
D107	Diode	1SS216	R116	Resistor	1.5k R20
D108	Diode	1SS216	R117	Resistor	470 ELR20
D109	Diode	1SS216	R118	Resistor	100k ELR20
D111	Diode	1SS211	R119	Resistor	47k ELR20
D112	Varactor	1SV50E	R120	Resistor	82 ELR20
D113	Diode	1S1555	R121	Resistor	4.7k R20
D114	Diode	MI402	R122	Resistor	5.6k ELR20
D115	Diode	MI402	R123	Resistor	470 ELR20
D116	Diode	1SS97	R124	Resistor	22k ELR20
D117	Diode	MI301	R125	Resistor	10k ELR20
D118	Diode	15CD11	R126	Resistor	1.2k ELR20
D119	Diode	RD4.7EB(3)	R127	Resistor	560 ELR20
D120	Diode	1SS211	R128	Resistor	100 ELR20
D121	Diode	1S953	R129	Resistor	10k ELR20
			R130	Resistor	1.2k ELR20
F1101	Crystal Filter	21M15B	R131	Resistor	100 ELR20
F1102	Ceramic Filter	CFW455E2	R132	Resistor	560 ELR20
			R133	Resistor	15k ELR20
X101	Discriminator	CDB455C7A	R134	Resistor	120 R20
X102	Crystal	CR52	R135	Resistor	1k R20
X103	Crystal	CR69	R136	Resistor	100k ELR20
			R137	Resistor	82k R20
L101	Coil	LB-173	R138	Thermistor	33D28
L102	Coil	LB-173	R139	Resistor	10k ELR20
L103	Coil	LS-281	R140	Resistor	10k ELR20
L104	Coil	LS-281	R141	Resistor	100 ELR20
L105	Coil	LS-281	R142	Resistor	1M ELR20
L106	Coil	LS-147	R143	Resistor	6.8k R20
L107	Coil	LS-147	R144	Resistor	47k ELR20
L108	Coil	LAL03NA2R2			

REF. No.	DESCRIPTION	PART NO.	REF. NO.	DESCRIPTION	PART NO.	REF. NO.	DESCRIPTION	PART NO.
R145	Resistor	220k	ELR20	C129	Barrier Layer	0.0033	25V	
R148	Resistor	47k	ELR20	C130	Ceramic	0.001	50V	
R149	Resistor	22k	ELR20	C131	Ceramic	470p	50V	
R150	Resistor	22k	R20	C132	Ceramic	47p	50V	
R151	Resistor	10	R20	C133	Ceramic	18p	50V	
R152	Resistor	47	R20	C134	Ceramic	47p	50V	
R153	Resistor	1.8k	R20	C135	Trimmer	20p	ECR-GA020E30	
R154	Resistor	8.2k	R25	C136	Ceramic	4p	50V UJ	
R155	Resistor	120k	ELR20	C137	Ceramic	3p	50V UJ	
R156	Trimmer	4.7k	H0651A	C138	Ceramic	1p	50V	
R157	Trimmer	470k	H0651A	C139	Ceramic	0.001	50V	
R158	Resistor	33k	ELR20	C140	Ceramic	0.001	50V	
R159	Resistor	15k	ELR20	C141	Ceramic	0.001	50V	
R160	Resistor	1M	ELR20	C142	Ceramic	4p	50V	
R161	Resistor	220k	ELR20	C143	Ceramic	22p	50V	
R162	Resistor	47k	R20	C144	Ceramic	22p	50V	
R163	Resistor	1k	R20	C145	Ceramic	0.001	50V	
R164	Resistor	47	R20	C146	Ceramic	3p	50V	
R165	Resistor	10k	R20	C147	Barrier Layer	0.0047	25V	
R166	Resistor	2.2k	ELR20	C148	Ceramic	33p	50V	
R172	Resistor	220	ELR20	C149	Barrier Layer	0.1	16V	
R173	Resistor	100k	ELR20	C150	Ceramic	0.001	50V	
R174	Resistor	1.5k	R20	C151	Ceramic	18p	50V	
R176	Resistor	1k	ELR20	C152	Ceramic	470p	50V	
R178	Resistor	220	R25	C153	Barrier Layer	0.1	16V	
R179	Resistor	10k	R20	C154	Barrier Layer	0.01	25V	
R180	Resistor	56k	ELR20	C155	Tantalum	10	16V	
R181	Resistor	1k	ELR20	C156	Ceramic	0.001	50V	
R182	Resistor	10	ELR20	C157	Electrolytic	470	6.3V SS	
R183	Resistor	1.2k	ELR20	C158	Electrolytic	1	50V	
R184	Resistor	68k	ELR20	C159	Barrier Layer	0.01	25V	
R185	Resistor	22k	ELR20	C160	Barrier Layer	0.01	25V	
R186	Resistor	22k	R20	C161	Ceramic	220p	50V	
R187	Resistor	1k	R20	C162	Ceramic	0.001	50V	
R188	Resistor	1.2k	R20	C163	Electrolytic	22	10V	
R189	Resistor	47k	ELR20	C164	Barrier Layer	0.1	16V	
R190	Resistor	10	R20	C165	Ceramic	18p	50V	
				C166	Trimmer	10p	ECR0GA010D30	
C101	Ceramic	0.001	50V	C167	Electrolytic	2.2	50V	
C102	Ceramic	0.001	50V	C168	Electrolytic	4.7	25V	
C103	Ceramic	6p	50V	C169	Barrier Layer	0.1	16V	
C104	Ceramic	220p	50V	C170	Electrolytic	47	16V	
C105	Ceramic	6p	50V	C171	Ceramic	0.001	50V	
C107	Ceramic	8p	50V	C172	Ceramic	0.001	50V	
C108	Ceramic	0.001	50V	C173	Ceramic	0.001	50V	
C109	Cylinder	1p	UP125SL 010M	C174	Ceramic	0.0047	50V	
C110	Ceramic	10p	50V	C175	Ceramic	100p	50V	
C111	Cylinder	1p	UP125SL 010M	C176	Barrier Layer	0.0047	25V	
C112	Cylinder	6p	50V	C177	Trimmer	20p	CV05D2001	
C113	Ceramic	47p	50V	C178	Barrier Layer	0.0047	25V	
C114	Ceramic	8p	50V	C179	Ceramic	22p	50V	
C115	Barrier Layer	0.01	25V	C180	Ceramic	0.001	50V	
C116	Ceramic	0.001	50V	C181	Ceramic	0.01	50V FZ	
C117	Ceramic	8p	50V	C182	Ceramic	0.0047	50V	
C118	Ceramic	0.001	50V	C183	Barrier Layer	0.0047	25V	
C119	Electrolytic	10	16V	C185	Barrier Layer	0.0047	25V	
C120	Ceramic	0.001	50V	C186	Ceramic	220p	50V	
C121	Electrolytic	1	50V	C187	Barrier Layer	0.0047	25V	
C122	Ceramic	0.001	50V	C188	Barrier Layer	0.0047	50V	
C123	Ceramic	120p	50V	C189	Barrier Layer	0.01	25V	
C124	Ceramic	68p	50V	C190	Ceramic	470p	50V	
C125	Ceramic	3p	50V UJ	C191	Barrier Layer	0.0047	25V	
C126	Electrolytic	0.1	50V	C192	Barrier Layer	0.0047	25V	
C127	Barrier Layer	0.1	16V	C193	Ceramic	15p	500V	
C128	Ceramic	82p	50V	C194	Ceramic	0.5p	500V	

REF. NO. DESCRIPTION PART NO.

13 - 2 AUDIO UNIT

REF. NO.	DESCRIPTION	PART NO.	REF. No.	DESCRIPTION	PART NO.
C195	Ceramic	22P	500V	IC301	IC NJM4558D
C196	Ceramic	220p	500V	IC302	IC TC4069UBP
C197	Ceramic	220p	50V	IC303	IC μ PC358C
C199	Ceramic	10p	500V	IC304	IC μ PC2002H
C200	Ceramic	15p	500V		
C201	Ceramic	3p	500V		
C202	Ceramic	27p	500V	Q302	Transistor 2SA1048-GR
C203	Ceramic	6p	500V	Q303	Transistor 2SA1048-GR
C204	Ceramic	18p	500V	Q304	Transistor 2SC2458-GR
C205	Barrier Layer	0.01	25V	Q306	Transistor 2SC2458-GR
C206	Electrolytic	470	16V MS16	Q308	Transistor 2SC2458-GR
C207	Electrolytic	1	50V MS5		
C208	Ceramic	470p	50V	D301	Diode 1SS211
C209	Ceramic	0.0047	50V	D302	Diode 1SS211
C210	Ceramic	470p	50V	D303	Diode 1SS211
C211	Ceramic	0.001	50V	D304	Diode 1SS211
C212	Ceramic	5p	50V	D305	Diode 1SS211
C213	Ceramic	5p	50V	D306	Diode 1SS211
C214	Ceramic	0.001	50V	D307	Diode 1SS211
C215	Ceramic	3p	50V	D308	Diode 1SS211
C216	Ceramic	0.0047	50V		
C217	Electrolytic	10	16V MS7	R301	Resistor 4.7k R20
C218	Electrolytic	470p	50V	R302	Resistor 100k ELR20
C219	Ceramic	0.0047	50V	R303	Resistor 22k ELR20
C220	Ceramic	220p	50V	R304	Resistor 100 ELR20
C221	Ceramic	0.001	50V	R305	Resistor 1.2k ELR20
C222	Ceramic	7p	50V	R306	Resistor 5.6k R20
C223	Ceramic	68p	50V	R308	Resistor 47 R20
C224	Ceramic	0.001	50V	R309	Resistor 2.2k R20
C225	Ceramic	0.001	50V	R310	Resistor 100k R20
C226	Barrier Layer	0.1	16V	R311	Trimmer 470k H0651A
C227	Ceramic	470p	50V	R312	Resistor 470k ELR20
C228	Barrier Layer	0.01	25V	R313	Resistor 6.8k ELR20
C230	Ceramic	0.001	50V	R314	Resistor 12k R20
C233	Electrolytic	220	16V	R315	Resistor 12k R20
C234	Electrolytic	2.2	50V MS5	R316	Trimmer 10k H0651A
C235	Ceramic	470p	50V	R319	Resistor 100k ELR20
C236	Ceramic	220p	50V	R320	Resistor 47 ELR20
C237	Barrier Layer	0.01	25V	R321	Resistor 33k R20
				R322	Resistor 33k R20
J101	Connector	B3B-EH-S		R323	Resistor 47k R20
J102	Connector	WH8D-1		R327	Resistor 10k ELR20
J103	Connector	WH5D-1		R328	Resistor 47k R20
J104	Connector	WH10D-1		R329	Resistor 1k ELR20
J105	Connector	171255-1		R330	Resistor 10k ELR20
				R331	Resistor 47k R20
EP101	P.C. Board	B - 1025B		R332	Resistor 1k ELR20
				R333	Resistor 470k ELR20
W101	Jumper	JPW-02A		R334	Resistor 1M R20
W102	Jumper	JPW-02A		R335	Resistor 220k ELR20
W103	Jumper	JPW-02A		R336	Resistor 39k R20
W104	Jumper	JPW-02A		R337	Resistor 270k ELR20
W105	Jumper	JPW-02A		R338	Resistor 120k R25
W106	Flat cable	2468 AWG26 VW-1 E43172(5)		R340	Resistor 100k R20
W107	Flat cable	2468 AWG24 VW-1 E43172(8)		R341	Resistor 2.2M ELR20
W108	Flat cable	2468 AWG26 VW-1 E43172(10)		R342	Resistor 68k ELR20
W110	Jumper	IPS-1041-2		R343	Resistor 330k R20
W111	Jumper	IPS-1041-2		R344	Resistor 5.6k R20
W112	Jumper	IPS-1041-2		R345	Resistor 4.7k ELR20
W113	Jumper	IPS-1041-2		R346	Resistor 33k ELR20
				R347	Resistor 2.2M R25
				R348	Resistor 470k ELR20

REF. No.	DESCRIPTION	PART NO.		REF. NO.	DESCRIPTION	PART NO.
D401	Zener	RD4.7M-B3		P409	Connector	TLB03H-B1
D402	Diode	1SS184 (#02, 03, only)		P410	Connector	TLB05H-B1
		1SS193 (#05 only)		P411	Connector	TLB03H-B1
D403	Diode	1SS196 (#01 only)		P412	Connector	TLB04H-B1
		1SS193 (#02, 03, 05 only)		P413	Connector	TLB06H-B1
D404	Diode	1SS196		P414	Connector	TLB03H-B1
D405	Diode	1SS196 (#01, 02, 03, 05 only)		DS401	LCD	HLC9201-01-080
D406	Diode	1SS184		DS402	Lamp	HLS-7219A-G40
D407	Diode	1SS184		DS403	Lamp	HLS-7219A-G40
D408	Diode	1SS184		S401	Switch	KHH10906
D409	Diode	1SS193		S402	Switch	KHH10906
D410	Diode	1SS193		S403	Switch	KHH10906
R401	Monolithic	62k	MCR10	S404	Switch	KHH10906
R402	Monolithic	15k	MCR10	S405	Switch	KHH10906
R403	Monolithic	100k	MCR10	S406	Switch	KHH10906
R404	Monolithic	100k	MCR10	S407	Switch	SUBU102C
R405	Monolithic	100k	MCR10	EP404	P.C. Board	B-1027C
R406	Monolithic	15k	MCR10	EP405	P.C. Board	B-1062A
R407	Monolithic	1M	MCR10			
R408	Monolithic	15k	MCR10			
R409	Monolithic	6.8k	MCR10			
R410	Monolithic	22k	MCR10			
R411	Monolithic	22k	MCR10			
R412	Monolithic	22k	MCR10			
R413	Monolithic	10k	MCR10			
R414	Monolithic	10k	MCR10			
R415	Monolithic	10k	MCR10			
R416	Monolithic	270	MCR10			
R417	Monolithic	270	MCR10			
R418	Monolithic	270	MCR10			
R419	Monolithic	270	MCR10			
R420	Monolithic	270	MCR10			
R421	Monolithic	330	MCR10			
R422	Monolithic	330	MCR10			
R423	Monolithic	330	MCR10			
R424	Monolithic	390	MCR10			
R425	Monolithic	390	MCR10			
R426	Variable	K09110021-10KB				
R427	Variable	K0911100M-5R1111-10KA				
R428	Monolithic	100k	MCR10			
R429	Monolithic	100k	MCR10			
C401	Monolithic	0.1	GRM40			
C402	Monolithic	47k	GRM40			
C403	Monolithic	470k	GRM40			
C404	Monolithic	470k	GRM40			
C405	Monolithic	470k	GRM40			
C406	Monolithic	0.001	GRM40			
C407	Monolithic	0.001	GRM40			
C408	Monolithic	0.001	GRM40			
J401	Connector	FM14RS-7SS				
P401	Connector	EHR-9				
P402	Connector	EHR-4				
P403	Connector	EHR-12				
P404	Connector	EHR-6				
P405	Connector	EHR-6				
P406	Connector	EHR-3				
P407	Connector	TLB07H-B1				
P408	Connector	TLB05H-B1				

SECTION 14 IC SPECIFICATIONS

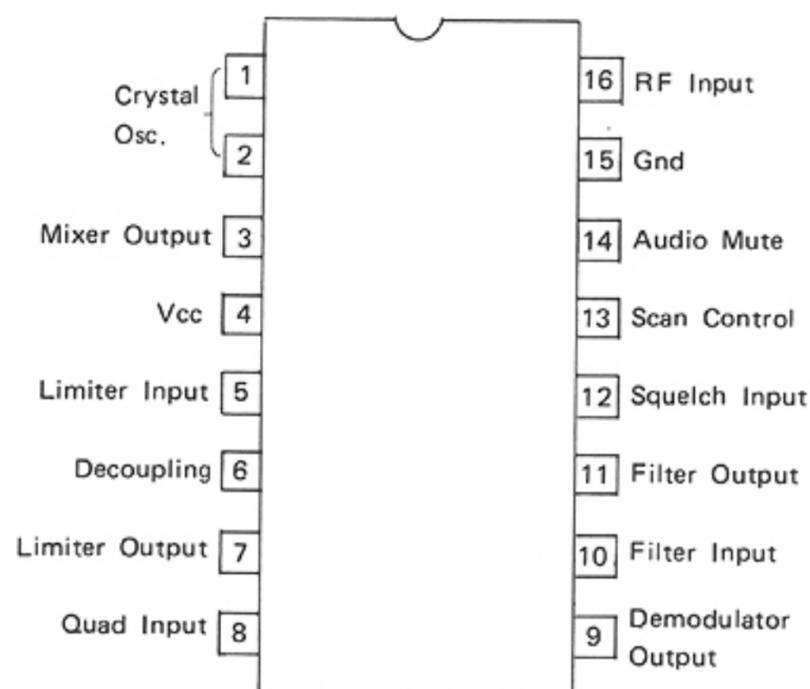
MC3357P(IC101, MAIN UNIT)	14 - 2
μPB571C(IC102, MAIN UNIT).....	14 - 3
uPD2834C(IC103, MAIN UNIT).....	14 - 4
NJM7805A(IC104, MAIN UNIT)	14 - 5
NJM4558D(IC105, IC301, MAIN & AUDIO UNIT)	14 - 5
SC-1038(IC106, MAIN UNIT).....	14 - 6
MB3756(IC107, MAIN UNIT).....	14 - 7
TC4069UBP(IC302, AUDIO UNIT).....	14 - 7
μPC358C(IC303, AUDIO UNIT)	14 - 8
μPC2002H(IC304, AUDIO UNIT).....	14 - 8
HD613901A14(IC401, LOGIC UNIT).....	14 - 9

MC3357 (LOW POWER FM IF)

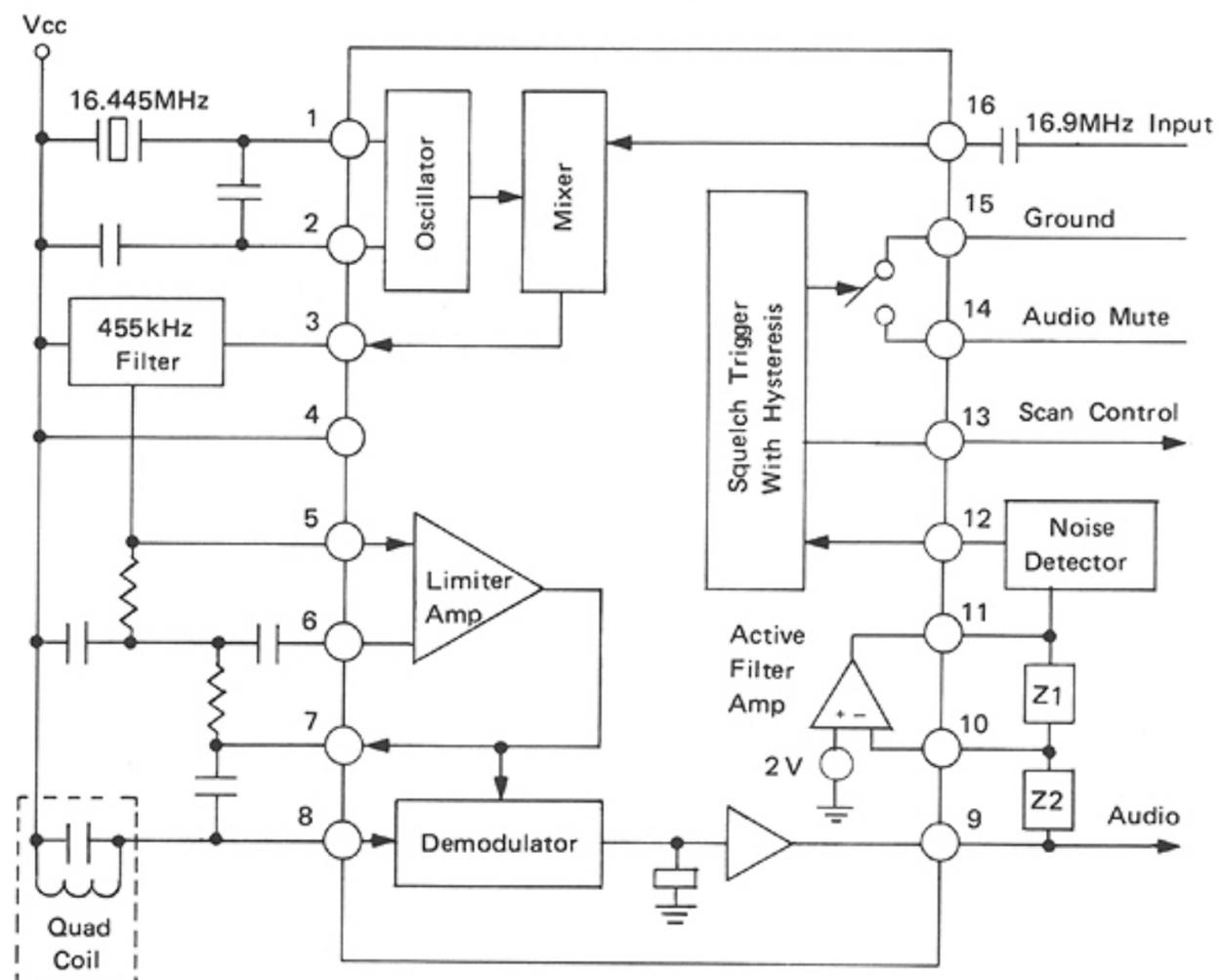
● MAXIMUM RATINGS

SYMBOL	DESCRIPTION	RATINGS	UNIT
VCC(max)	Power Supply Voltage	12	Vdc
VCC	Operating Supply Voltage	4 or 8	Vdc
—	Detector Input Voltage	1.0	Vp-p
V ₁₆	Input Voltage (VCC ≥ 6.0 Volts)	1.0	VRMS
V ₁₄	Mute Function	-0.5 to 5.0	Vpk
TJ	Junction Temperature	150	°C
TA	Operating Ambient Temperature Range	-30 to +70	°C
TSTG	Storage Temperature Range	-65 to +150	°C

● PIN CONNECTION



● BLOCK DIAGRAM

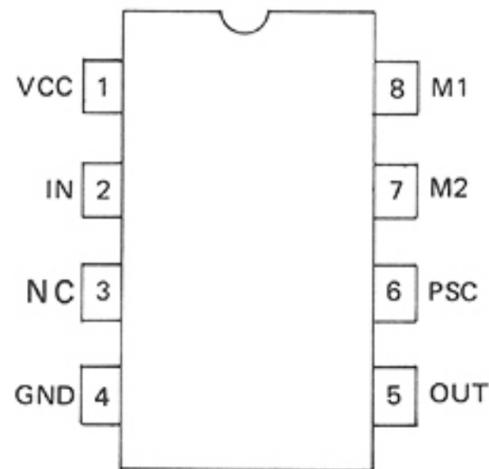


μPB571C (LOW POWER PRESCALER)

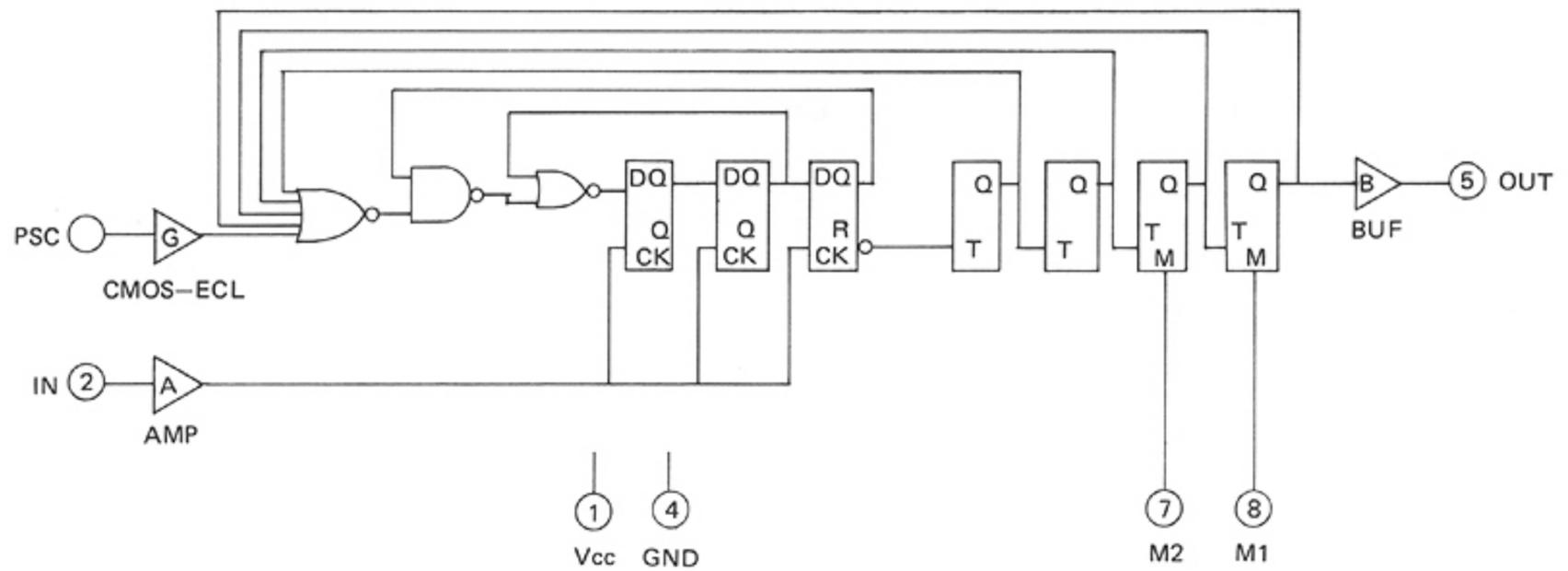
● **MAXIMUM RATINGS** (ta = 25°C)

SYMBOL	DESCRIPTION	RATINGS	UNIT
VCC	Supply Voltage (MAX)	-0.5 ~ +6.0	V
VIN	Input Voltage	-0.5 ~ +VCC +0.5	V
IO	Output Current	-10	mA
TSTG	Storage Temperature	-55 ~ +125	°C

● **PIN CONNECTION**



● **BLOCK DIAGRAM**

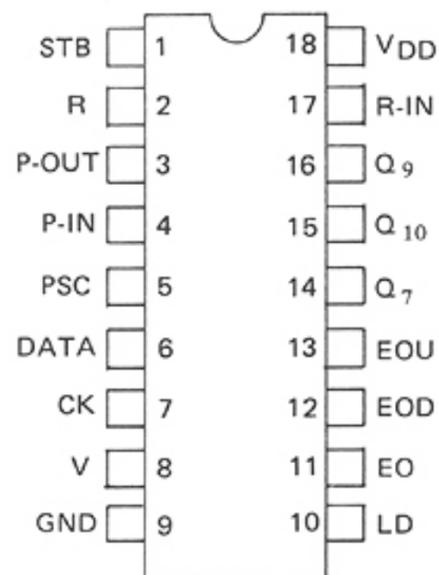


NOTE : When M1 and M2 are high (Vcc), FF is equal to buffer.

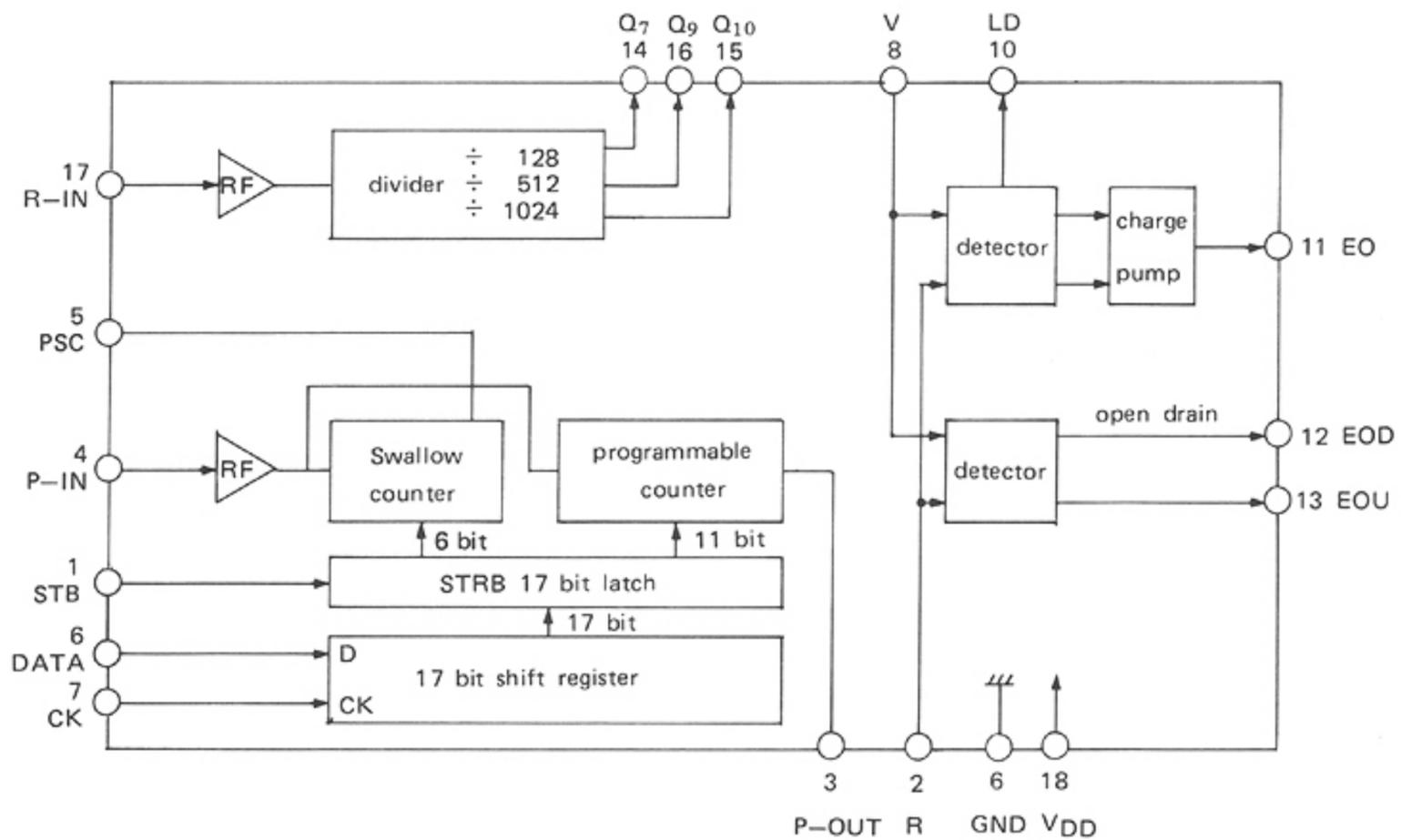
μ PD2834C (PLL FREQUENCY SYNTHESIZER)• MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

SYMBOL	DESCRIPTION	RATINGS	UNIT	REMARKS
VDD	Supply Voltage	-0.3 ~ +7.0	V	
VIN	Input Voltage	-0.5 ~ +VDD +0.5	V	
VOUT	Output Voltage	-0.5 ~ +VDD +0.5	V	
VOUT	Output Voltage	-0.5 ~ +VDD +3.0	V	EOU pins only
TOPR	Operating Temperature	-40 ~ +85	$^\circ\text{C}$	
TSTR	Storage Temperature	-65 ~ +150	$^\circ\text{C}$	

• PIN CONNECTION

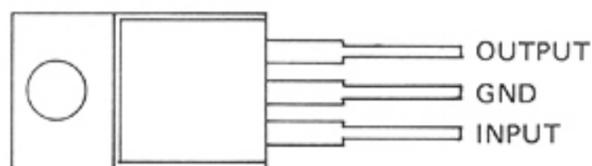


• BLOCK DIAGRAM

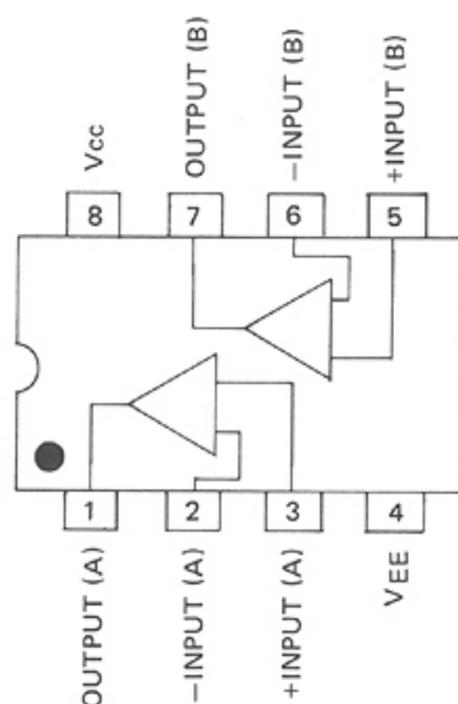


NJM7805A (5V VOLTAGE REGULATOR)● **MAXIMUM RATINGS** ($T_a = 25^\circ\text{C}$)

SYMBOL	DESCRIPTION	RATINGS	UNIT
V_I	Input Voltage	30	V
V_O	Output Voltage	5 ± 0.2	V
$T_{opt(a)}$	Operating Temperature	$-30 \sim +75$	$^\circ\text{C}$
T_{stg}	Storage Temperature	$-40 \sim +125$	$^\circ\text{C}$
PD	Power Dissipation	16	W

● **PIN CONNECTION****NJM4558D (DUAL OPERATIONAL AMPLIFIER)**● **MAXIMUM RATINGS** ($T_a = 25^\circ\text{C}$)

SYMBOL	DESCRIPTION	RATINGS	UNIT
V_{DD}/V_{EE}	Supply Voltage	± 18	V
V_I	Input Voltage	± 15	V
V_{ID}	Differential Input Voltage	± 30	V
PD	Power Dissipation	500	mW
T_{opr}	Operating Temperature	$-20 \sim +75$	$^\circ\text{C}$

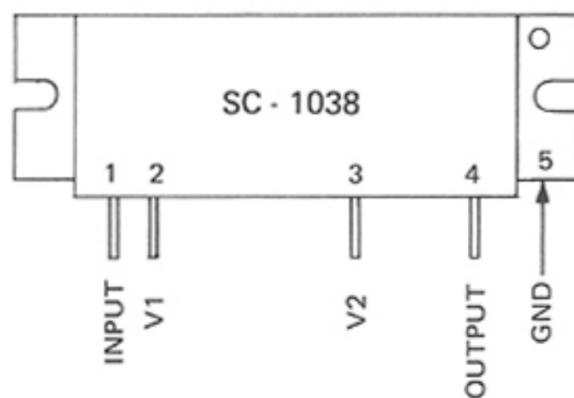
● **PIN CONNECTION**

SC-1038 (VHF POWER AMPLIFIER MODULE)

● MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

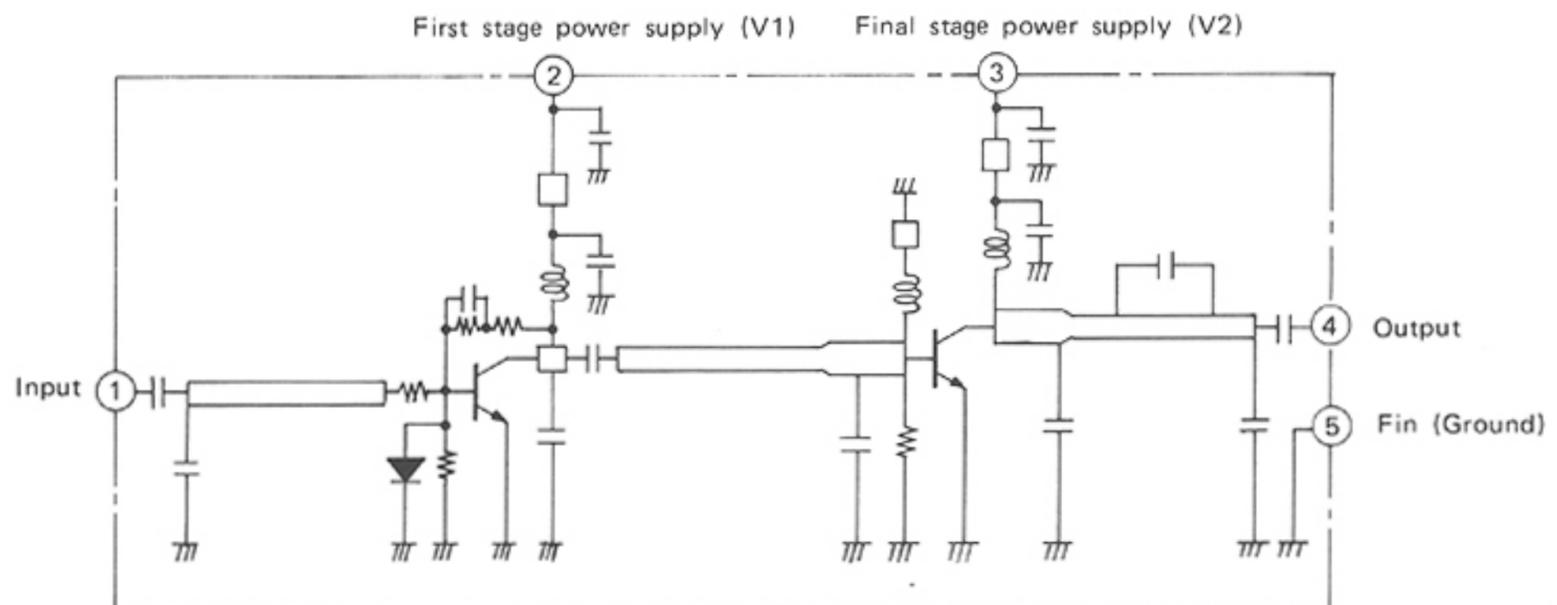
SYMBOL	DESCRIPTION	RATINGS	UNIT
VCC	Supply Voltage	17	V
ICC	Current Drain	7	A
Pin	Input Power	0.4	W
PO	Output Power	40	W
Tstg	Storage Temperature	-40 ~ +110	$^\circ\text{C}$

● PIN CONNECTION



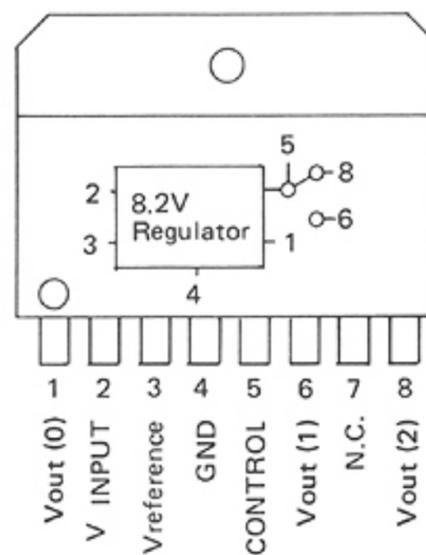
Pin No.	Electrical Connection
1	Input
2	First stage power supply (V1)
3	Final stage power supply (V2)
4	Output
5	Fin (Ground)

● SCHEMATIC DIAGRAM

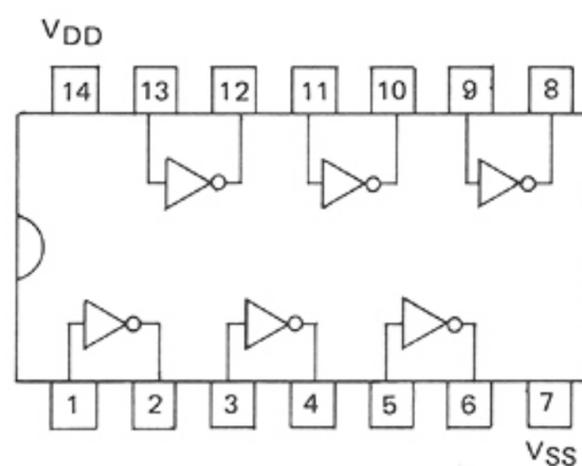


MB3756 (2-OUTPUT 8.2V VOLTAGE REGULATOR)● **MAXIMUM RATINGS**

SYMBOL	DESCRIPTION	RATINGS	UNIT
V _{IN}	Input Voltage	18	V
I _{out}	Output Current	V _{out} (0), V _{out} (1) : 100 V _{out} (2) : 200	mA
T _{opr}	Operating Temperature	-20 ~ +75	°C

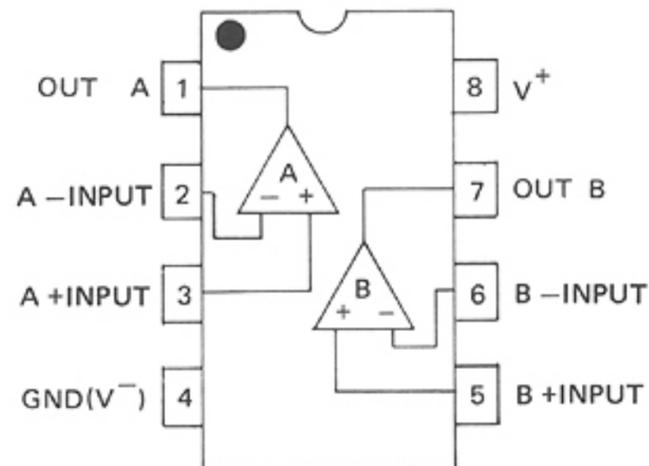
● **PIN CONNECTION****TC4069UBP (HEX INVERTER)**● **MAXIMUM RATINGS**

SYMBOL	DESCRIPTION	RATINGS	UNIT
V _{DD}	Supply Voltage	V _{SS} -0.5 ~ V _{SS} +20	V
V _{IN}	Input Voltage	V _{SS} -0.5 ~ V _{DD} +0.5	V
V _{out}	Output Voltage	V _{SS} -0.5 ~ V _{DD} +0.5	V
I _{IN}	Current Drain	± 10	mA
PD	Power Consumption	300	mW

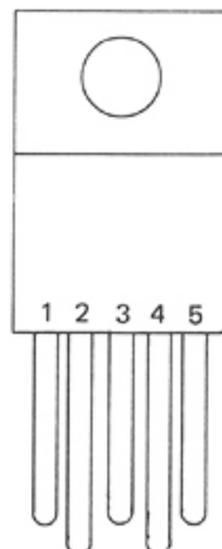
● **BLOCK DIAGRAM**

μPC358C (DUAL OPERATIONAL AMPLIFIER)● **MAXIMUM RATINGS (Ta = 25°C)**

SYMBOL	DESCRIPTION	RATINGS	UNIT
V ⁺	Supply Voltage	32	V
V _{ID}	Differential Input Voltage	32	V
V _{ICM}	Input Voltage	-0.3 ~ +32	V
P _T	Power Consumption	350	mW
T _{opt}	Operating Voltage	0 ~ +70	°C

● **BLOCK DIAGRAM****uPC2002H (5.4W AUDIO POWER AMPLIFIER)**● **MAXIMUM RATINGS (Ta = 25°C)**

SYMBOL	DESCRIPTION	RATINGS	UNIT
V _{CC}	Supply Voltage (operational)	18	V
I _{CC(peak)1}	Output Peak Current (repetitive)	3.5	A
I _{CC(peak)2}	Output Peak Current(non repetitive)	4.5	A
P _D	Package Dissipation (T _{case} =90°C)	15	W
T _{opt}	Operating Temperature	-30 ~ +75	°C

● **PIN CONNECTION**

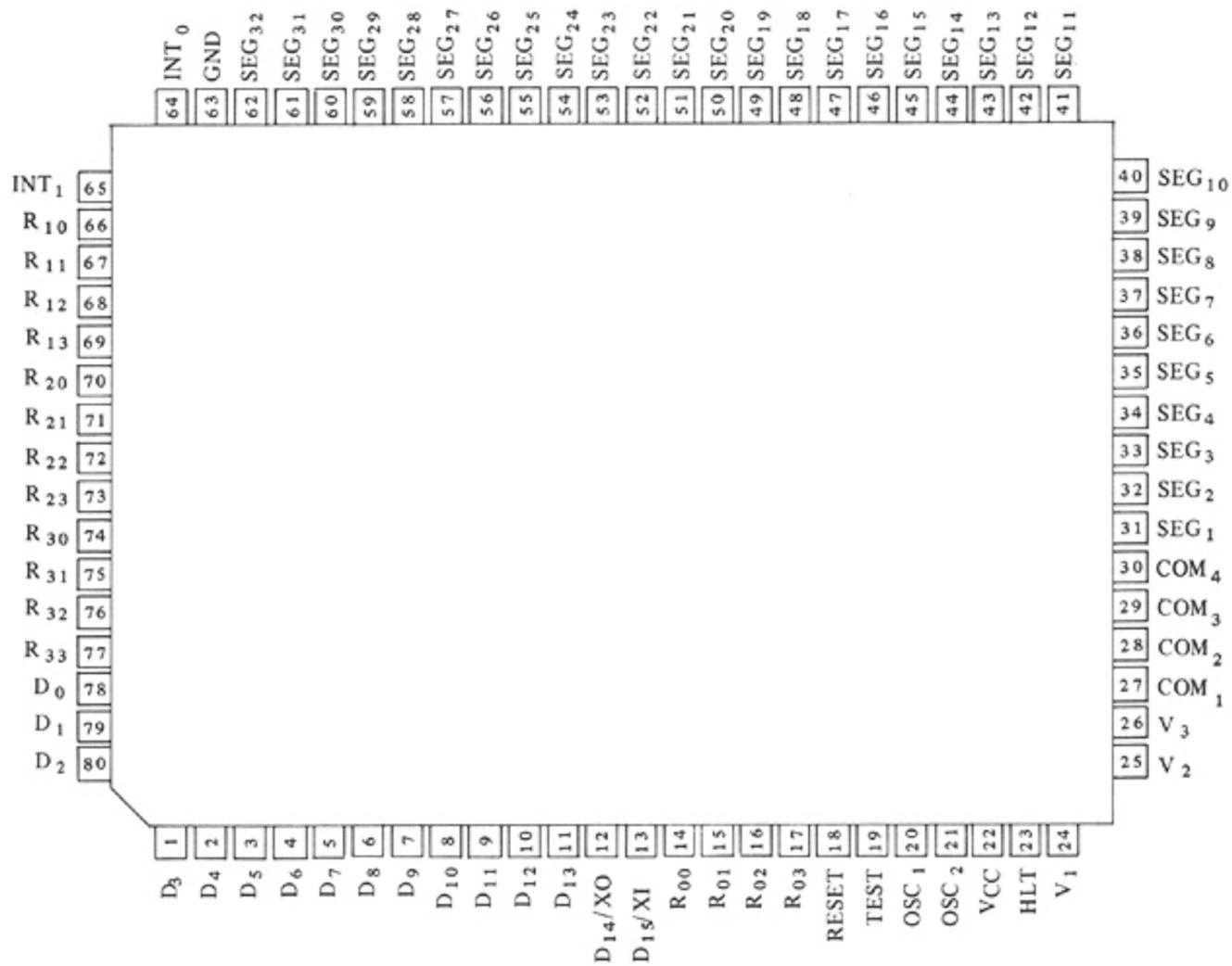
Pin No.	Electrical Connection
1	Non inverting input
2	Inverting input
3	Ground
4	Output
5	Power supply

HD613901A14 (MPU)

● MAXIMUM RATINGS

SYMBOL	DESCRIPTION	RATINGS	UNIT
VCC	Supply Voltage	-0.3 ~ +7.0	V
VT	Terminal Voltage	-0.3 ~ VCC+0.3	V
ΣIO	Current Drain	25	mA
Topr	Operation Temperature	-20 ~ +75	°C

● PIN CONNECTION



SECTION 15 FREQUENCY CHARTS

15 - 1 U. S. A. MARINE CHANNELS

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
01	156.050	160.650	25W & 1W
02	156.100	160.700	25W & 1W
03	156.150	160.750	25W & 1W
04	156.200	160.800	25W & 1W
05	156.250	160.850	25W & 1W
06	156.300	156.300	25W & 1W
07	156.350	150.950	25W & 1W
07A	—	—	
08	156.400	156.400	25W & 1W
09	156.450	156.450	25W & 1W
10	156.500	156.500	25W & 1W
11	156.550	156.550	25W & 1W
12	156.600	156.600	25W & 1W
13	156.650	156.650	25W & 1W
14	156.700	156.700	25W & 1W
15	156.750	156.750	25W & 1W
16	156.800	156.800	25W & 1W
17	156.850	156.850	25W & 1W
18	156.900	161.500	25W & 1W
18A	—	—	
19	156.950	161.550	25W & 1W
19A	—	—	
20	157.000	161.600	25W & 1W
21	157.050	161.650	25W & 1W
21A	—	—	
22	157.100	161.700	25W & 1W
22A	—	—	
23	157.150	161.750	25W & 1W
23A	—	—	
24	157.200	161.800	25W & 1W
25	157.250	161.850	25W & 1W
26	157.300	161.900	25W & 1W
27	157.350	161.950	25W & 1W
28	157.400	162.000	25W & 1W
60	156.025	160.625	25W & 1W
61	156.075	160.675	25W & 1W
62	156.125	160.725	25W & 1W
63	156.175	160.775	25W & 1W

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
64	156.225	160.825	25W & 1W
65	156.275	160.875	25W & 1W
65A	—	—	
66	156.325	160.925	25W & 1W
66A	—	—	
67	156.375	156.375	25W & 1W
68	156.425	156.425	25W & 1W
69	156.475	156.475	25W & 1W
70	156.525	156.525	25W & 1W
71	156.575	156.575	25W & 1W
72	156.625	156.625	25W & 1W
73	156.675	156.675	25W & 1W
74	156.725	156.725	25W & 1W
75	—	—	
76	—	—	
77	156.875	156.875	25W & 1W
78	156.925	161.525	25W & 1W
78A	—	—	
79	156.975	161.575	25W & 1W
79A	—	—	
80	157.025	161.625	25W & 1W
80A	—	—	
81	157.075	161.675	25W & 1W
81A	—	—	
82	157.125	161.725	25W & 1W
83	157.175	161.775	25W & 1W
83A	—	—	
84	157.225	161.825	25W & 1W
85	157.275	161.875	25W & 1W
86	157.325	161.925	25W & 1W
87	157.375	161.975	25W & 1W
88	157.425	162.025	25W & 1W
88A	—	—	
WX1	—	162.550	RX only
WX2	—	162.400	RX only
WX3	—	161.650	RX only
WX4	—	162.475	RX only

15 - 2 HOLLAND MARINE CHANNELS

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
01	156.050	160.650	1W only
02	156.100	160.700	1W only
03	156.150	160.750	1W only
04	156.200	160.800	1W only
05	156.250	160.850	1W only
06	156.300	156.300	1W only
07	156.350	160.950	1W only
08	156.400	156.400	1W only
09	156.450	156.450	1W only
10	156.500	156.500	1W only
11	156.550	156.550	1W only
12	156.600	156.600	1W only
13	156.650	156.650	1W only
14	156.700	156.700	1W only
15	156.750	156.750	1W only
16	156.800	156.800	25W & 1W
17	156.850	156.850	1W only
18	156.900	161.500	1W only
19	156.950	161.550	1W only
20	157.000	161.600	1W only
21	157.050	161.650	1W only
22	157.100	161.700	1W only
23	157.150	161.750	25W & 1W
24	157.200	161.800	25W & 1W
25	157.250	161.850	25W & 1W
26	157.300	161.900	25W & 1W
27	157.350	161.900	25W & 1W
28	157.400	162.000	25W & 1W

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
60	156.025	160.625	1W only
61	156.075	160.675	1W only
62	156.125	160.725	1W only
63	156.175	160.775	1W only
64	156.225	160.825	1W only
65	156.275	160.875	1W only
66	156.325	160.925	1W only
67	156.375	156.375	1W only
68	156.425	156.425	1W only
69	156.475	156.475	1W only
70	156.525	156.525	1W only
71	156.575	156.575	1W only
72	156.625	156.625	1W only
73	156.675	156.675	1W only
74	156.725	156.725	1W only
75	—	—	Guard
76	—	—	Guard
77	156.875	156.875	1W only
78	156.925	161.525	1W only
79	156.975	161.575	1W only
80	157.025	161.625	1W only
81	157.075	161.675	1W only
82	157.125	161.725	25W & 1W
83	157.175	161.775	25W & 1W
84	157.225	161.825	25W & 1W
85	157.275	161.875	25W & 1W
86	157.325	161.925	25W & 1W
87	157.375	161.975	25W & 1W
88	157.425	162.025	25W & 1W

15 - 3 INTERNATIONAL MARINE CHANNELS FOR U. S. A. VERSION

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
01	156.050	160.650	25W & 1W
01A	156.050	156.050	25W & 1W
02	156.100	160.700	25W & 1W
02A	156.100	156.100	25W & 1W
03	156.150	160.750	25W & 1W
03A	156.150	156.150	25W & 1W
04	156.200	160.800	25W & 1W
04A	156.200	156.200	25W & 1W
05	156.250	160.850	25W & 1W
05A	156.250	156.250	25W & 1W
06	156.300	156.300	25W & 1W
07	156.350	160.950	25W & 1W
07A	156.350	156.300	25W & 1W
08	156.400	156.400	25W & 1W
09	156.450	156.450	25W & 1W
10	156.500	156.500	25W & 1W
11	155.550	156.550	25W & 1W
12	156.600	156.600	25W & 1W
13	156.650	156.650	25W & 1W
14	156.700	156.700	25W & 1W
15	156.750	156.750	1W only
16	156.800	156.800	25W & 1W
17	156.850	156.850	1W only
18	156.900	161.500	25W & 1W
18A	156.900	156.900	25W & 1W
19	156.950	161.550	25W & 1W
19A	156.950	156.950	25W & 1W
20	157.000	161.600	25W & 1W
20A	157.000	157.000	25W & 1W
21	157.050	161.650	25W & 1W
21A	157.050	157.050	25W & 1W
22	157.100	161.700	25W & 1W
22A	157.100	157.100	25W & 1W
23	157.150	161.750	25W & 1W
23A	157.150	157.150	25W & 1W
24	157.200	161.800	25W & 1W
25	157.250	161.850	25W & 1W
26	157.300	161.900	25W & 1W
27	157.350	161.950	25W & 1W
28	157.400	162.000	25W & 1W
60	156.025	160.025	25W & 1W
60A	156.025	156.025	25W & 1W
61	156.075	160.675	25W & 1W
61A	156.075	156.075	25W & 1W
62	156.125	160.725	25W & 1W
62A	156.125	156.125	25W & 1W
63	156.175	160.775	25W & 1W
63A	156.175	156.125	25W & 1W
64	156.225	160.825	25W & 1W

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
64A	156.225	156.225	25W & 1W
65	156.275	160.875	25W & 1W
65A	156.275	156.275	25W & 1W
66	156.325	160.925	25W & 1W
66A	156.325	156.325	25W & 1W
67	156.375	156.375	25W & 1W
68	156.425	156.425	25W & 1W
69	156.475	156.475	25W & 1W
70	156.525	156.525	25W & 1W
71	156.575	156.575	25W & 1W
72	156.625	156.625	25W & 1W
73	156.675	156.675	25W & 1W
74	156.725	156.725	25W & 1W
75	—	—	Guard
76	—	—	Guard
77	156.875	156.875	25W & 1W
78	156.925	161.525	25W & 1W
78A	156.925	156.925	25W & 1W
79	156.975	161.575	25W & 1W
79A	156.975	156.975	25W & 1W
80	157.025	161.625	25W & 1W
80A	157.025	157.025	25W & 1W
81	157.075	161.675	25W & 1W
81A	157.075	157.075	25W & 1W
82	157.125	161.725	25W & 1W
82A	157.125	157.125	25W & 1W
83	157.175	161.775	25W & 1W
83A	157.175	157.175	25W & 1W
84	157.225	161.825	25W & 1W
84A	157.225	157.225	25W & 1W
85	157.275	161.875	25W & 1W
85A	157.275	157.275	25W & 1W
86	157.325	161.925	25W & 1W
86A	157.325	152.325	25W & 1W
87	157.375	161.975	25W & 1W
87A	157.375	157.375	25W & 1W
88	157.425	162.025	25W & 1W
88A	157.425	157.425	25W & 1W
WX1	—	162.550	RX. only
WX2	—	162.440	RX. only
WX3	—	161.650	RX. only
WX4	—	162.475	RX. only
WX5	—	162.425	RX. only
WX6	—	162.500	RX. only
WX7	—	162.525	RX. only
WX8	—	162.450	RX. only
WX9	—	161.775	RX. only
WX0	—	163.275	RX. only

15 - 4 INTERNATIONAL MARINE CHANNELS FOR EUROPE, FRANCE AND U.K.

VERSIONS

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
01	156.050	160.650	25W & 1W
02	156.100	160.700	25W & 1W
03	156.150	160.750	25W & 1W
04	156.200	160.800	25W & 1W
05	156.250	160.850	25W & 1W
06	156.300	156.300	25W & 1W
07	156.350	160.950	25W & 1W
08	156.400	156.400	25W & 1W
09	156.450	156.450	25W & 1W
10	156.500	156.500	25W & 1W
11	156.550	156.550	25W & 1W
12	156.600	156.600	25W & 1W
13	156.650	156.650	25W & 1W
14	156.700	156.700	25W & 1W
15	156.750	156.750	1W only
16	156.800	156.800	25W & 1W
17	156.850	156.850	1W only
18	156.900	161.500	25W & 1W
19	156.950	161.550	25W & 1W
20	157.000	161.600	25W & 1W
21	157.050	161.750	25W & 1W
22	157.100	161.700	25W & 1W
23	157.150	161.750	25W & 1W
24	157.200	161.800	25W & 1W
25	157.250	161.850	25W & 1W
26	157.300	161.900	25W & 1W
27	157.350	161.950	25W & 1W
28	157.400	162.000	25W & 1W
60	156.025	160.625	25W & 1W
61	156.075	160.675	25W & 1W
62	156.125	160.725	25W & 1W
63	156.175	160.775	25W & 1W
64	156.225	160.825	25W & 1W
65	156.275	160.875	25W & 1W

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
66	156.325	160.925	25W & 1W
67	156.375	156.375	25W & 1W
68	156.425	156.425	25W & 1W
69	156.475	156.475	25W & 1W
70	156.525	156.525	25W & 1W
71	156.575	156.575	25W & 1W
72	156.625	156.625	25W & 1W
73	156.675	156.675	25W & 1W
74	156.725	156.725	25W & 1W
75	—	—	Guard
76	—	—	Guard
77	156.875	156.875	25W & 1W
78	156.925	161.525	25W & 1W
79	156.975	161.575	25W & 1W
80	157.025	161.725	25W & 1W
81	157.075	161.675	25W & 1W
82	157.125	161.725	25W & 1W
83	157.175	161.775	25W & 1W
84	157.225	151.825	25W & 1W
85	157.275	161.875	25W & 1W
86	157.325	161.925	25W & 1W
87	157.375	161.975	25W & 1W
88	157.425	162.025	25W & 1W

15 - 5 PRIVATE MARINE CHANNELS

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
00	156.000	156.000	25W & 1W
29	157.450	162.050	25W & 1W
30	157.500	162.100	25W & 1W
31	157.550	162.150	25W & 1W
32	157.600	162.200	25W & 1W
33	157.650	162.250	25W & 1W
34	157.700	162.300	25W & 1W
35	157.750	162.350	25W & 1W
36	157.800	162.400	25W & 1W
37	157.850	162.450	25W & 1W
38	157.900	162.500	25W & 1W
39	157.950	162.550	25W & 1W
40	158.000	162.600	25W & 1W
41	158.050	162.650	25W & 1W
42	158.100	162.700	25W & 1W
43	158.150	162.750	25W & 1W
44	158.200	162.800	25W & 1W
45	158.250	162.850	25W & 1W
46	158.300	162.900	25W & 1W
47	158.350	162.950	25W & 1W
48	158.400	163.000	25W & 1W
49	158.450	163.050	25W & 1W
50	158.500	163.100	25W & 1W
51	158.550	163.150	25W & 1W
52	158.600	163.200	25W & 1W
53	158.650	163.250	25W & 1W
54	158.700	163.300	25W & 1W
55	158.750	163.350	25W & 1W
56	158.800	163.400	25W & 1W
89	157.475	162.075	25W & 1W
90	157.525	162.125	25W & 1W
91	157.575	162.175	25W & 1W
92	157.625	162.225	25W & 1W
93	157.675	162.275	25W & 1W
94	157.725	162.325	25W & 1W
95	157.775	162.375	25W & 1W

Channel No.	Frequency (MHz)		Transmitter RF Power
	Transmitter	Receiver	
96	157.825	162.425	25W & 1W
97	157.875	162.475	25W & 1W
98	157.925	162.525	25W & 1W
99	157.975	162.575	25W & 1W
100	158.025	162.625	25W & 1W
101	158.075	162.675	25W & 1W
102	158.125	162.725	25W & 1W
103	158.175	162.775	25W & 1W
104	158.225	162.825	25W & 1W
105	158.275	162.875	25W & 1W
106	158.325	162.925	25W & 1W
107	158.375	162.975	25W & 1W
108	158.425	163.025	25W & 1W
109	158.475	163.075	25W & 1W
110	158.525	163.125	25W & 1W
111	158.575	163.175	25W & 1W
112	158.625	163.225	25W & 1W
113	158.675	163.275	25W & 1W
114	158.725	163.325	25W & 1W
115	158.775	163.375	25W & 1W
116	158.825	163.425	25W & 1W
F1	155.975	155.975	25W & 1W
F2	155.925	155.925	25W & 1W
F3	155.175	155.175	25W & 1W
F4	155.150	155.150	25W & 1W
F5	155.125	155.125	25W & 1W
F6	155.100	155.100	25W & 1W
F7	157.375	157.375	25W & 1W
1P	155.625	155.625	25W & 1W
2P	155.775	155.775	25W & 1W
3P	155.825	155.825	25W & 1W
1L	155.500	155.500	25W & 1W
2L	155.525	155.525	25W & 1W

* The channels on this table can be used when the frequency on the channel only is programmed on the radio.

* The radio then has either duplex or simplex capability.

If the user want to use either duplex or simplex this capability can be chosen when programming.

* An "A" is displayed next to the channel number when in simplex mode.

SECTION 16 OPTION

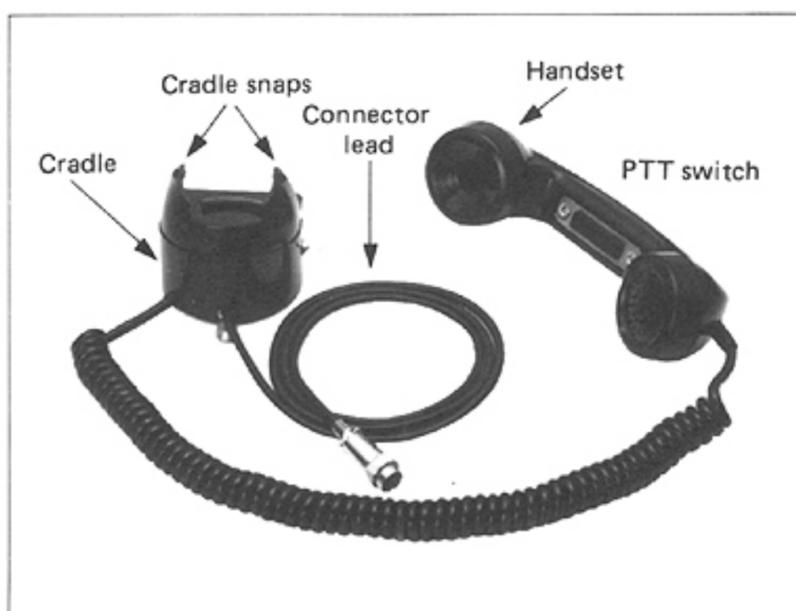
HS-5 HANDSET KIT

Not only will this handset allow for better audio reception during offshore conditions that are often less than ideal for hearing: the HS-5 will also come in handy when you require greater listening privacy onboard.

Be sure to read these instructions carefully prior to installing the HS-5.

(1) DESCRIPTION

As shown in the picture below, the two main components in the HS-5 kit are the handset and cradle.



- The handset has a Push-To-Talk switch (PTT) that is located in an easy-to-grip position on the inner side of the handset handle.
- The cradle is designed with a double-snap device to ensure that the handset will always stay in place. Even in rough seas.
- The connector lead from the cradle plugs directly into the MIC jack on the IC-M55 front panel.

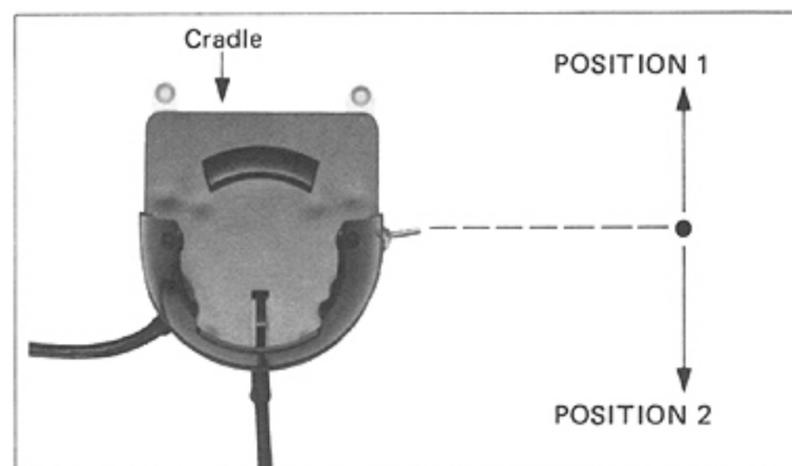
(2) INSTALLATION

As shown in the picture below, the HS-5 unit should be mounted against a flat surface in a vertical position to the right of the transceiver using the supplied screws. Installing the unit this way will ensure that the connector lead will not obstruct use of the transceiver.



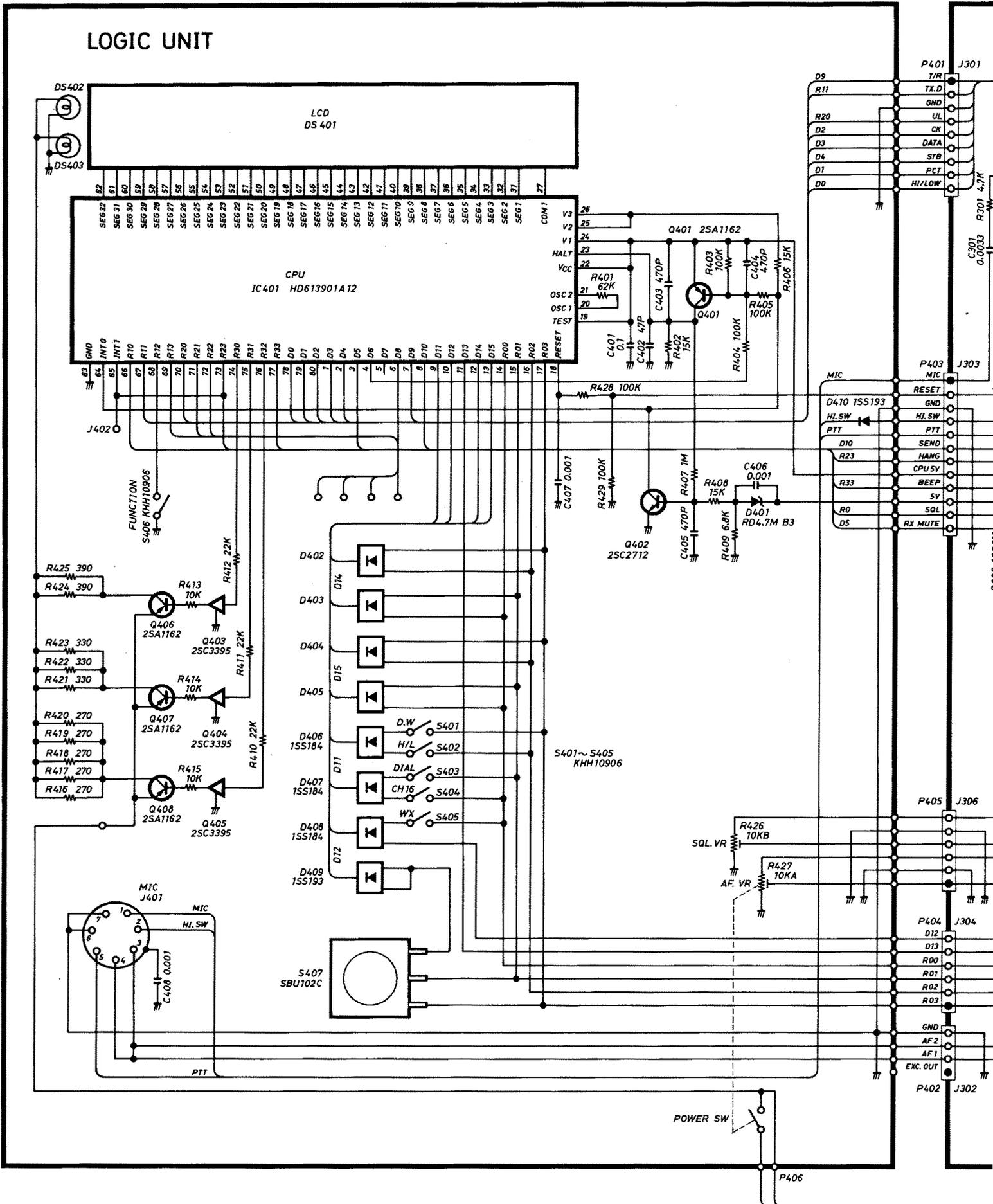
(3) OPERATION

1. When the toggle switch on the cradle is in POSITION 1, the speaker in the earpiece of the handset is activated. When the toggle switch is in POSITION 2, the handset speaker and transceiver speaker are both activated.
2. When the handset is placed in the cradle, the transceiver automatically reverts to the Channel 16 Auto-Monitor function.
3. To transmit, push the PTT switch on the handset and speak into the mouthpiece of the handset.



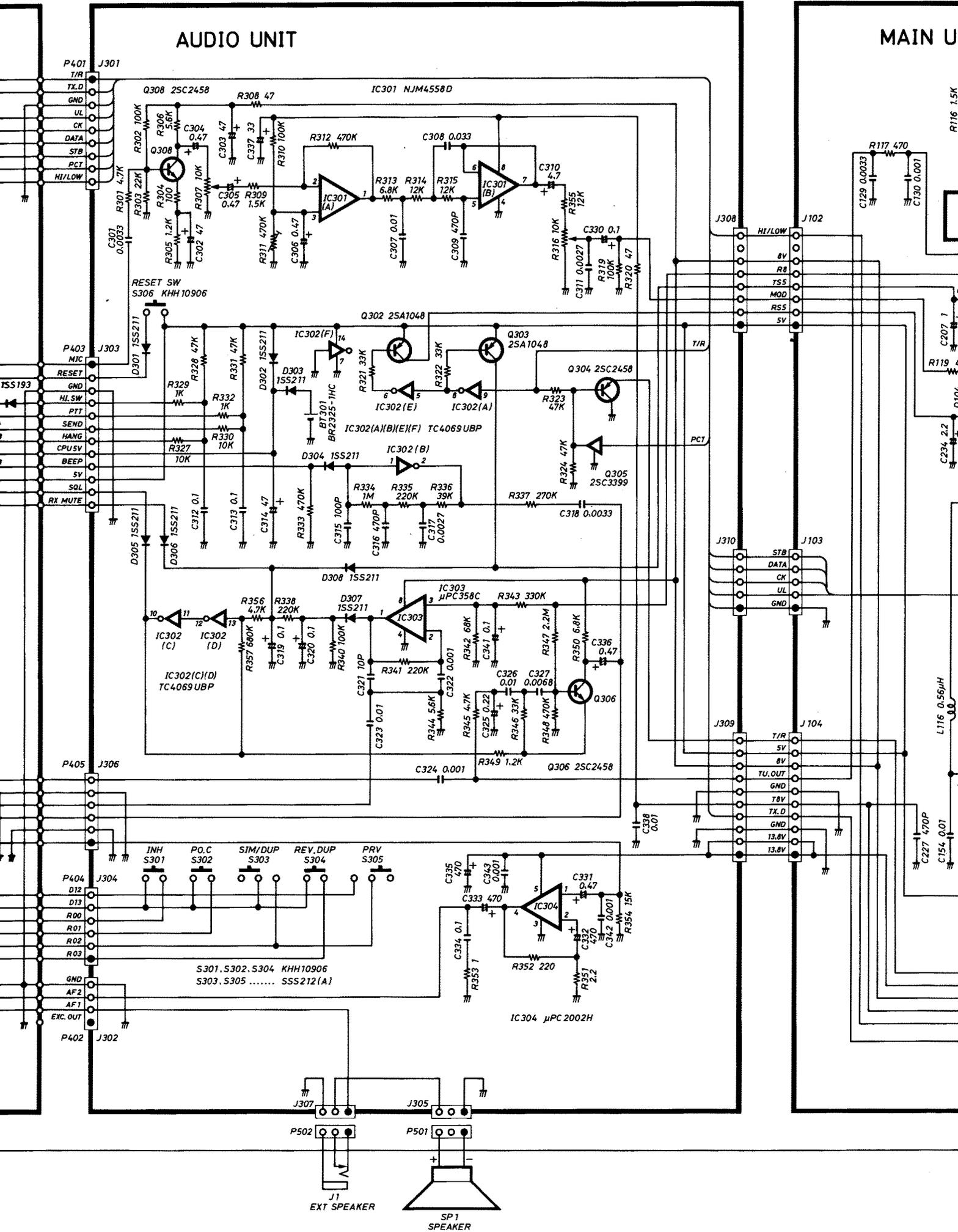
IC-M55

SCHEMATIC DIAGRAM



AUDIO UNIT

MAIN U



MAIN UNIT

