

OWNER'S MANUAL
Deluxe Base Station Transceiver
Full Channels AM/FM/SSB/CW

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Section 1: Specification

Thank you for your confidence in selecting base station two-way radio equipment. We know you'll find your transceiver as exciting as it is practical. Many years of valuable experience designing electronic products are behind our two-way communications systems. Only the highest quality components are incorporated into base station radios to assure reliability and maximum performance.

Installing and operating the base station radio is not complicated, but the flexibility provided by its numerous operating features may not be fully appreciated until a little time is spent becoming familiar with its controls and connections. It will be to your advantage to save all the packing materials—cartons, fillers, cushioning, etc., they will prove valuable in preventing damage should you ever have occasion to transport or ship the your base station radio Dealer.

Specifications

General

Modulation Modes	CW, FM, AM, USB, LSB, PA
Frequency Range	28.0000-29.6999 MHz
Frequency Control	Phase-locked synthesizer
Frequency Tolerance	± 0.005%
Frequency Stability	± 0.003%
Operating Temperature Range	- 30 ° C to + 50 ° C
Microphone	Plug-in [6-pin], 600 Ohm dynamic type
AC Input Voltage	110V 60Hz (220V 50Hz)
AC Power Consumption	300W
Antenna Connectors	Standard SO-239 type
Meter # 1	Indicates relative RF power output/antenna SWR
Meter # 2	Indicators received signal strength

Transmitter

Power Output	CW/AM/FM 10W LSB/USB 25W
SSB Generation	Dual-balanced modulation
AM Modulation	Class B amplitude, collectors modulation
AM Modulation Capability	Up to 100%
FM Deviation	± 1.5 KHz @ 1,250 Hz 20mV audio
Clarifier Range	± 5 KHz
Harmonic and Spurious Emission	Better than 60 dB
AM/FM Frequency Response	400 to 5,000 Hz
SSB Frequency Response	400 to 3,000 Hz
Output Impedance	50 Ohms unbalanced
Output Indicators	RF Meter shows relative RF output power.

Receiver

AM Sensitivity	1 μV for 10 dB S/N
FM Sensitivity	1 μV for 20 dB S/N
SSB Sensitivity	0.2 μV for 10 dB S/N
AM/FM Selectivity	5 dB at 4 kHz, 50 dB at 10 kHz
SSB Selectivity	5 dB at 2 kHz
Image Rejection	More than 50 dB
IF Rejection	More than 80 dB at 455 kHz
AGC	Change in audio output less than 12 dB: from 10μV to 0.4V
Squelch	Adjustable-threshold less than 0.7 μV
Audio Frequency Response	400 to 2,500 Hz
Distortion	Less than 10% at 2 watts output into 8 Ohms
Cross Modulation	> 50 dB
Intermediate Frequency	10.695 MHz [AM-1st, SSB], 455 KHz [AM-2nd]
Clarifier Range	± 5 KHz
Noise blanker	IF single gate type
Audio Output Power	More than 3 watts into 8 Ohms
Built-in Speaker	8 Ohms, dynamic
External Speaker (optional)	Disables internal speaker when connected

Section 2: Installation

Location/Connection

The transceiver should be placed in a convenient operating location close to an AC power outlet and the antenna leadin cable(s).

The transceiver is attached with the AC power cord set. Proceed as follows to complete all necessary connections to the transceiver.

- 1) Your transceiver has standard antenna connectors of type SO-239 both located on rear panel; for easy connection to standard PL-259 coax plugs. If the coax antenna cable must be made longer, use coax cable with impedance of 50 ohms, frequency ratings for 27 MHz, and use only enough cable to suit your needs. This will insure a proper impedance match and maximum power transfer from the transmitter to the antenna.
- 2) **AC Power Operation:** Use 110 (220) volts AC power for the base station.

Noise Interference

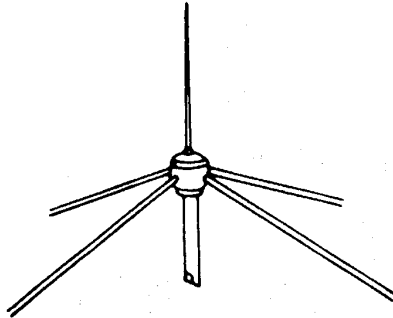
There are several kinds of noise interfering you may encounter in base station operation. Some of these noise sources are; fluorescent buzz, nearby commercial broadcast, electrical appliance, lawnmower, and electrical storms, etc. Commercial products are available to reduce interference from these sources. Consult your dealer or professional amateur radio supply shops.

Antennas

For best transmission and reception, your transceiver should use an antenna especially designed for a frequency of 28 MHz. Antennas are purchased separately and include installation instructions. Numerous types of antennas are available that range from emphasis on ease of installation to emphasis on performance. Often the difference in performance between many of the antenna is modest.

1) Vertical Ground Plane Antennas

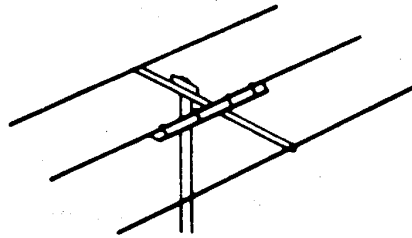
These are omnidirectional antennas that provide optimum performance for contacting other fixed stations using vertical type antennas in addition to all mobile stations. For mediumlong range communications work.



Ground Plane

2) Directional Beam Antennas

Highly efficient and directional antennas generally intended for fixed-to-fixed very long range communications.



Directional Beam
Antenna

Remote Speaker

The external speaker jack (EXT. SP) on the rear panel is used for remote receiver monitoring. The external speaker should have 8 ohms impedance and be able to handle at least 3 watts. When the external speaker is plugged in, the internal speaker is disconnected.

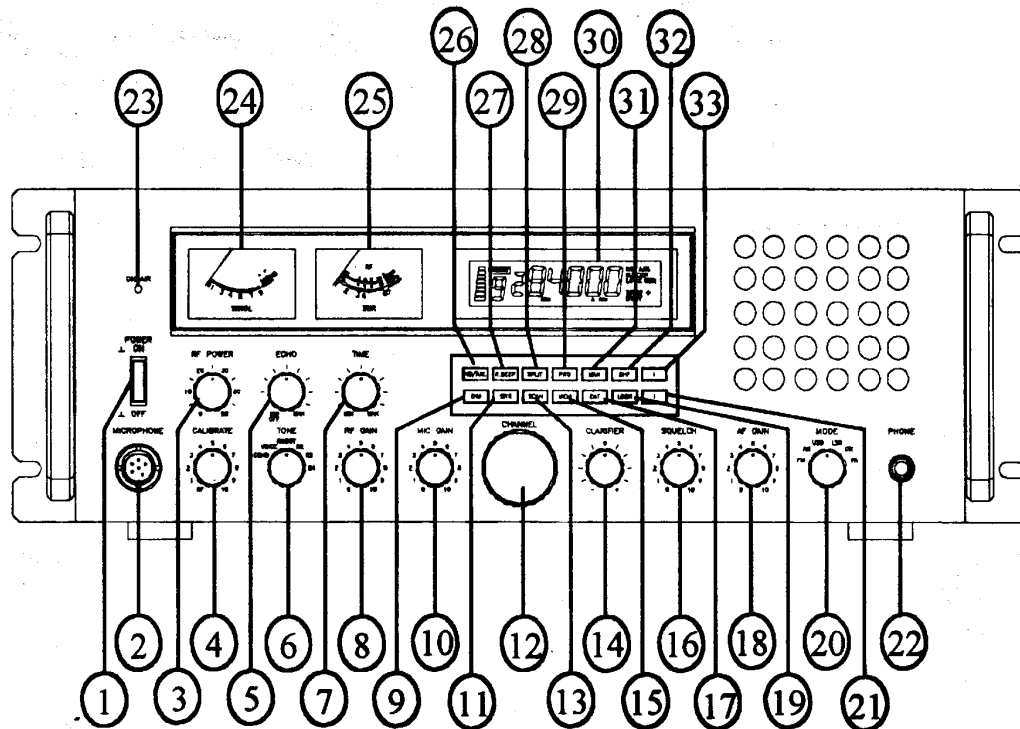
Note: The PHONE jack on the front panel overrides both external and internal speakers. When the plug from a headphone is plugged to the PHONE jack, both internal and external speakers are silenced simultaneously.

Public Address

An external 8 ohm, 3 watt speaker must be connected to the PA jack located on the rear panel when the transceiver is used as a public address system. The speaker should be directed away from the microphone to prevent acoustic feedback. Physical separation or isolation of the microphone and speaker is important when operating the PA at high output levels.

Section 3 : Operation

Controls/Indicators



1.0 INTRODUCTION

This section explains the basic operating procedures for the base station

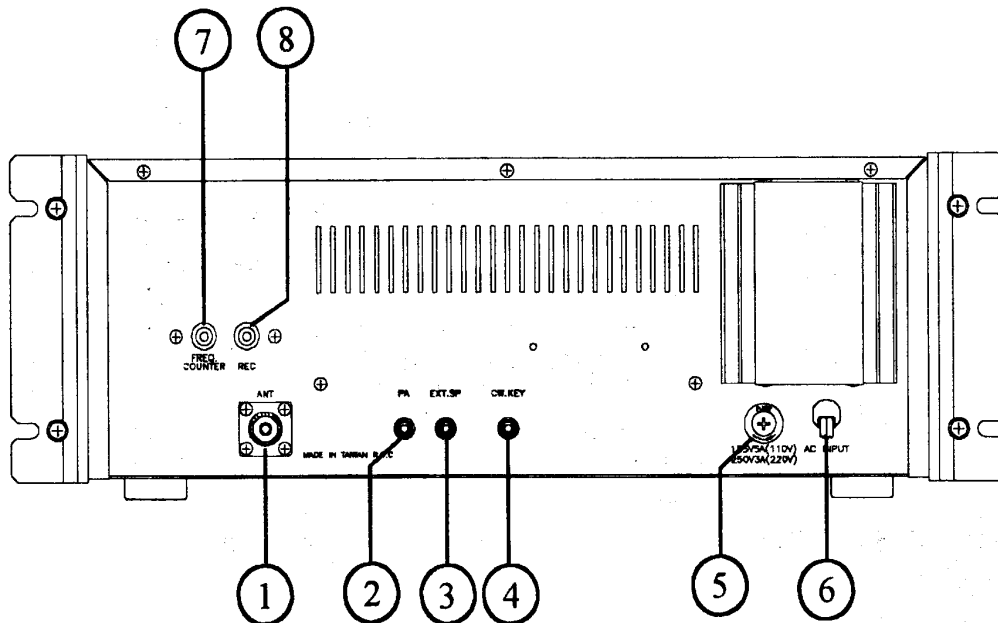
1.1 CONTROL & CONNECTIONS

1. POWER ON/OFF CONTROL : Push on to apply power to the unit.
2. MICROPHONE JACK : Use to connect microphone for voice source.
3. RF POWER CONTROL : This control that to adjust the RF power output level you want in AM or FM transmission.
4. CALIBRATE CONTROL : This control allows the user to calibrate the SWR meter.
5. ECHO : This control is used to ECHO effect.
6. ECHO/VOICE/ROBOT SWITCH : This SW is used to select special sound effect, you can transmit your message in a echo, robot sound and voice change to change your tone.

7. **TIME** :Set this control to your desired echo delay .
8. **RF GAIN CONTROL** : This control is used to reduce the gain of the RF amplifier under strong signal conditions.
9. **DIM SWITCH** : This switch adjust the display backlighting in four different steps to best match environment.
- 10.**MIC GAIN CONTROL** : This control adjusts the microphone gain in the transmit mode. This feature is designed for use in a high-ambient noise environment or to maximize talk power.
- 11.**SWR SWITCH** : This switch is used to check SWR.
- 12.**CHANNEL SELECTOR** : This control is used to select a desired channel or frequency.
- 13.**SCAN SWITCH** : This switch is used to scan frequencies in each band segment. The operation section of this manual provides detailed information on using this scan control.
- 14.**CLARIFIER CONTROL** : Allows variation of the receiver operating frequency above and below the assigned frequency. Although this control is intended primarily to tune in SSB signal, it may be used to optimize AM/FM signals as described in the operating procedure paragraphs.
- 15.**MEMORY SWITCH** : This is used program memory channels.
- 16.**SQUELCH CONTROL** : This control is used to control or eliminate receiver background noise in the absence of incoming signal. For maximum receiver sensitivity, it is desired that the control be adjusted only to the point where the receiver background noise is eliminated. Turn fully counterclockwise, then slowly clockwise until the receiver noise disappears. Any signal to be received must now be slightly stronger than the average received noise. Further clockwise rotation will increase the threshold level which a signal must overcome in order to be heard. Only strong signal will be heard at a maximum clockwise setting.
17. **ENTER SWITCH** : This is used program frequencies in memory.
18. **AF GAIN** : Permits you to adjust the listening level when receiving.
19. **LOCK SWITCH** : This switch is used to lock a selected frequency.

20. **MODE CONTROL** : This control allows you to select one of six following operating modes : CW/FM/AM/LSB/USB/PA.
21. **▲ UP SWITCH** : This switch is used to move frequency upward to select a desired frequency.
22. **PHONE JACK** : Used to connect earphone to listening.
23. **POWER LED** : The RED LED indicate the unit is power on.
24. **SIGNAL METER**: The left hand meter provide indication of the signal strength of a received signal in S units during reception.
25. **RF/SWR METER** : Used for two purpose, to indicate relative transmitter power when transmitting and to indicate antenna SWR.
26. **NB/ANL SWITCH** : The noise blacker is very effective in eliminating repetitive impulse noise such as ignition interference. In the ANL position, the automatic noise limited in the audio circuits is activate.
27. **ROGER BEEP SWITCH** : When this switch is placed in the ROGER BEEP position, you radio automatically transmit the audio sign at the end of you transmission. The listener can note easily your transmission is over through the sign.
28. **SPLIT SWITCH** : This switch enables you to split and operating frequency for FM repeater operation.
29. **PROGRAM SWITCH** : This switch is used to program operating or scanning frequency into memory.
30. **FREQUENCY COUNTER** : The frequency counter indicates the frequency of the selected channel you wish to operate on.
31. **MANUAL SWITCH** : This is used to return to the manual mode.
32. **SHIFT SWITCH** : This is used to select 100Hz, 1KHz, 10KHz, 100KHz or 1MHz frequency steps.
33. **▼ UP SWITCH** : This switch is used to move frequency down ward to select a desired frequency.

1.2 REAR PANEL CONNECTOR



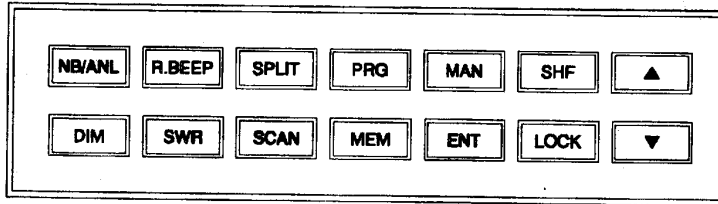
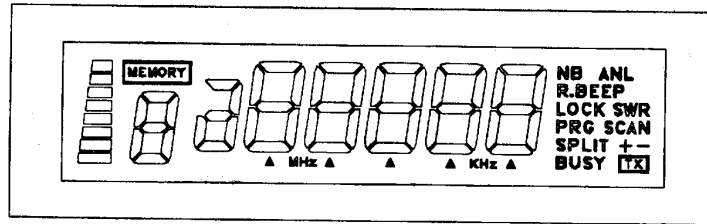
1. ANTENNA : This jack accepts 50 ohm coaxial cable with a PL-259 type plug.
2. PA SP : Used to connect a PA speaker (8 ohm 4W) for PA operation. Before operating PA you must first connect a PA speaker to this jack.
3. EXTERNAL SPEAKER : This jack accepts 4 to 8 ohm, 5 watt external speaker. When the external speaker is connected to this jack, the built-in speaker will be disabled.
4. CW KEY : This is used for Morse Code operation. To operate this mode, connect a CW key to this jack and place the mode switch in the CW position.
5. FUSE : Accommodates a fuse for AC input circuit protection. use 125V 5A or 250V 3A fuse for replacement.
6. AC POWER CORD : Connects to AC power outlet for AC mains supply.
7. FREQUENCY COUNTER JACK : The RCA type jack is used to connect an optional frequency counter so that you can watch channel frequency digitally. The frequency counter readout will be possible on transmit only.

8. RECORDING OUTPUT JACK : The RCA type jack provides output for connection to a tape recorder to permit recording of receiver signals or you modulating voice.

1.3 MICROPHONE

The receiver and transmitter are controlled by the push-to-talk switch on the microphone. Press the switch and the transmitter is activated, release switch to receive. When transmitting, hold the microphone two inch from the mouth and speak clearly in a normal "voice". The radios come complete with low impedance dynamic microphone.

PROGRAMMING



2.0 INTRODUCTION

This section explains the basic programming procedures for the **base station**.

2.1 FREQUENCY SELECTION

Frequency selection in the radio can be accomplished using three of the following methods :

1. The first method of frequency selection is through the use of the **SHF** key and the **UP** and **DOWN** arrows. To accomplish this, press the **SHF** button until the cursor arrow is position under the digit of the frequency that is to be changed. Then use the **UP** arrow to increase the number. If a decrease in frequency is desired, press the **DOWN** arrow. Perform the steps described above for each digit of the frequency until the desired frequency is displayed in the **LCD** display windows.
2. The second method of frequency selection is accomplished using the **SHF** button and the channel select knob located above the front panel. Use the **SHF** button in the manner described above to select the digit to be changed. Then proceed to rotate the channel select knob clockwise to increase the frequency. Rotate the channel select knob counterclockwise to decrease the frequency.
3. The third method of selecting the operating frequency of the radio is through the use of the **SHF** button and the channel **UP** and **DOWN** button located on the microphone. Frequency selection by this method is accomplished in the same manner as

with the **UP** and **DOWN** arrows on the key pad. The only difference is that the channel **UP** and **DOWN** buttons on the microphone are used. While in receive mode, once a signal has been detected on a particular frequency, It may be necessary to slightly change the frequency to provide the best audio through the speaker. This can be accomplished by rotating the clarifier control to fine tuning has been accomplished, press the **LOCK** button to lock in the frequency at the point of best reception.

2.2 FREQUENCY SCANNING

Frequency scanning can be achieved using one of two methods: the first method involves the scanning of pre-programmed memory channels; the second method will permit the user to scan all frequency between a pre-set upper and lower scan limit. Both methods frequency scanning follow.

2.2.1 ALL FREQUENCY SCANNING

To allow all frequency scanning, one must first program the upper and lower scanning limits. The scan limits are simply the highest and lowest frequencies that will be scanned. to program these limits, perform the following steps;

1. Press the **PRG** (program) key.
2. Press the **SCAN** key ("**PRG SCAN +**" should appear in the lower right corner of the display window.)
3. Using the **SHF** key and **UP** and **DOWN** arrows, select the upper scan limit, then press **ENT**.
4. Press the **SCAN** key again. ("**SCAN -**" should appear in the display window.)
5. Using the **SHF** key and the **UP** and **DOWN** arrows, select the lower scan limit, then press **ENT**.

The upper and lower scan limits have now been programmed. To activate the scan feature, return the radio to manual operation and press the **SCAN** button. If the display shows "**SCAN +**", The radio will scan from the lower limit to the upper limit. If "**SCAN -**" is display, the unit will scan from the upper limit to the lower limit. To change from "**SCAN +**" to "**SCAN -**" or vice versa, press **SCAN**.

NOTE : When programmed, the upper and lower scan limits will also act the upper and lower operating limits of the radio. The radio cannot now be programmed to operate above or below the scan limits.

2.2.2 MEMORY SCANNING

The **base station** has 10 nonvolatile (i.e, memory resident) memory locations which can be programmed with any available frequency whit in the operating band of the radio. The scan function of the unit can be programmed to scan these memory channels. The radio will then scan only those memory channels which have been programmed.

The first step in utilizing the memory scan function is to program the desired frequency into the radio memory. This can be accomplished by performing the following steps.

1. With the radio operating in the manual mode press the **PRG** (program) key
2. Press the **MEM** key. " **PRG** " should be display in the lower right-hand corner of the **LCD** display window. In the upper left portion of the display. " **MEMORY** " should be displayed. Directly below **MEMORY**, a number between 0 and 9 will be displayed. This number represents the memory location currently being displayed. Pressing the **MEM** key will increase the memory counter to the next memory location and contents of that memory location will be displayed.
3. Using the **SHF** key and the **UP** and **DOWN** arrows, enter the frequency to be stored in the memory location displayed. After the desired frequency has been entered, press **ENT**.
4. Repeat steps 2 and 3 for all of the memory locations to be programmed.
5. After all desired memory locations have been programmed with frequencies, return the unit to the manual mode of operation by pressing the **MAN** key.
6. To initiate memory scanning, press **MEM** and then press **SCAN**. As previously discussed, the display will show " **SCAN +** " or " **SCAN -** " to indicate whether the radio is scanning from the lowest the highest memory location or vice versa.
7. To return the radio to normal (non-scanning) operation, press the **MAN** key.

2.3 offset frequency. operation

The **base station** has an offset or split frequency feature that will permit the radio to be operated in a half-duplex mode. This will allow the user to talk on FM repeaters operating in the 10 meter band. This split frequency function offsets the transmitter frequency either above or below the receive frequency by a user programmable amount. In the following example, programming of a 100KHz offset will be described. Before attempting to program the offset frequency, ensure that the radio is operating in the manual mode by pressing the **MAN** key.

1. Press the **PRG** key.
2. Press the **SPLIT** key. The **LCD** display window will display " 00000 " with " **PRG** " and " **SPLIT** " being displayed in the lower left-hand corner.
3. Using the **SHF** key and the **UP** and **DOWN** arrows as described earlier, program the display to read " 01000 ".
4. Press **ENT**. A 100KHz offset has now been programmed into the radio.
5. Return the radio to manual operation by pressing the **MAN** key.
6. Using the **SHF** key and the **UP** and **DOWN** arrows as described previously, set the radio for the desired receive frequency.
7. Press **SPLIT**. In the lower right corner of the display, either " **SPLIT +**" or " **SPLIT -**" will be displayed. If " **SPLIT +**" is display, the transmitter will be offset 100KHz above the receive frequency when keyed. If " **SPLIT -**" is displayed, the transmitter will be offset 100KHz below the receive frequency.

NOTE : When the transmitter is keyed, the frequency display will change to show the frequency being transmitted.

8. To return the radio simplex operation (i.e, same transmit and receive frequency), press the **MAN** key.

Operating Procedure To Receive

IMPORTANT: Make sure that the antenna, power source, and microphone are connected before you operate.

- 1) Set the **ECHO** switch to **OFF** position.
- 2) Turn the unit on by setting the **Power Switch** to **On** position. Now the meters, **Channel Indicator**, and **Function Indicators** will be illuminated.
- 3) Temporarily, set the **Mode Switch** in **AM** position.
- 4) Set the **Squelch Control** in fully counterclockwise position and a just the **AF Gain** control for a comfortable listening level.

- 5) Listen to the background noise from the speaker. Turn the Squelch Control slowly clockwise until the noise just disappears (no signal should be present). Leave the Squelch Control at this setting. The Squelch Control is now properly adjusted. The receiver will remain quiet until a signal is actually received. Do not advance the Squelch Control too far clockwise or some of the weaker signals will not be heard.
- 6) Set the Clarifier to the center (12 o'clock) position.
- 7) Select a desired mode of operation, CW, FM, AM, USB or LSB and adjust the Clarifier.
- 8) Select a channel you desire by the Channel Selector or control key pad.

Operating Procedure To Transmit

- 1) Select the desired channel and mode of transmission.
- 2) If the channel is clear, depress the Push-to-Talk switch on the microphone. Speak in a normal tone of voice.

Standby-Beep

A special provision has been built in your radio to give other stations a sign which tells that you are turning to receive. Without needing switching operation to activate this feature, a beep tone is automatically transmitted at each time you release the push-to-talk switch on the microphone to turn to receive mode.

Microphone gain control

A preamplifier circuit is built into the radio to increase the microphone gain. Experiment with the control for setting that will best suit your individual use.

Note: When the microphone gain control is set to maximum, ambient noise

may also be picked up by the microphone. In high noise situations, low microphone gain setting may produce the best results.

The microphone gain control is also used to adjust PA loudness.

Public Address Operation

To use this feature of the transceiver, a speaker having a voice coil impedance of 8 to 16 ohms and a power handling capability of at least 3 watts should be connected to the PA SP jack on the rear panel. Be sure that there is physical separation between the microphone and the PA speaker itself. If the PA speaker is located very close to the microphone, acoustic feedback will result when the PA amplifier is operated at high volume (or when PA is used indoors). Adjustment of PA volume is made with the MIC GAIN control.

SWR Measurement

Most antennas are factory tuned, but the antenna efficiency may be peaked by slightly adjusting the length of antenna using the SWR meter built into the unit. This adjustment may improve the antenna standing wave ratio (SWR). The SWR permits you to determine how well matched the antenna and its cables are to your transceiver.

- 1) Set the unit in the receive mode as instructed under the Operating Procedure to Receive section.
- 2) Set the Mode switch to AM position and push SWR switch.
- 3) Press the Push-to-Talk switch on the microphone and turn the Calibrate Control clockwise (past click) so that the SWR meter pointer exactly coincides with the Set mark on the scale. Release the Push-to-Talk switch.
- 4) Press the Push-to-Talk switch again. The SWR of your antenna is read directly on the scale.

Note: An SWR below 2 or less is desired as this indicates that over 95% of the transmitted power is broadcast into the air.

ALTERNATE MICROPHONES AND INSTALLATION

For best results, the user should select a low-impedance **dynamic type microphone** or a transistorized microphone. Transistorized type microphones have a low output impedance characteristic. The microphones must be provided with a four-lead cable. The audio conductor and its shielded lead comprise two of the leads. The fourth lead is for receive control, and third is for transmit control. The microphone should provide the functions shown in schematic below.

6 WIRE MIC CABLE

Pin Number	Mic Cable Lead
1	Audio Shield
2	Audio Lead
3	Transmit Control
4	Receive Control
5	Up Control
6	Down Control

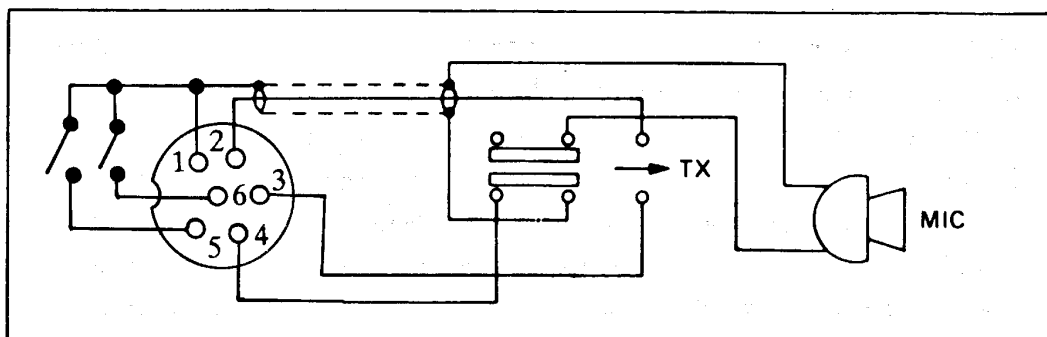


Fig. 3. Your transceiver microphone schematic.

If the microphone to be used is provided with pre-cut leads, they must be revised as follows.

1. Cut leads so that they extend $7/16$ " beyond the plastic insulating jacket of the microphone cable.
2. All leads should be cut to the same length. Strip the ends of each wire $1/8$ " and tin the exposed wire.

Before beginning the actual wiring read carefully, the circuit and wiring information provided with the microphone you select. Use the minimum head required in soldering the connections. Keep the exposed wire lengths to a minimum to avoid shorting when the microphone plug is reassembled.

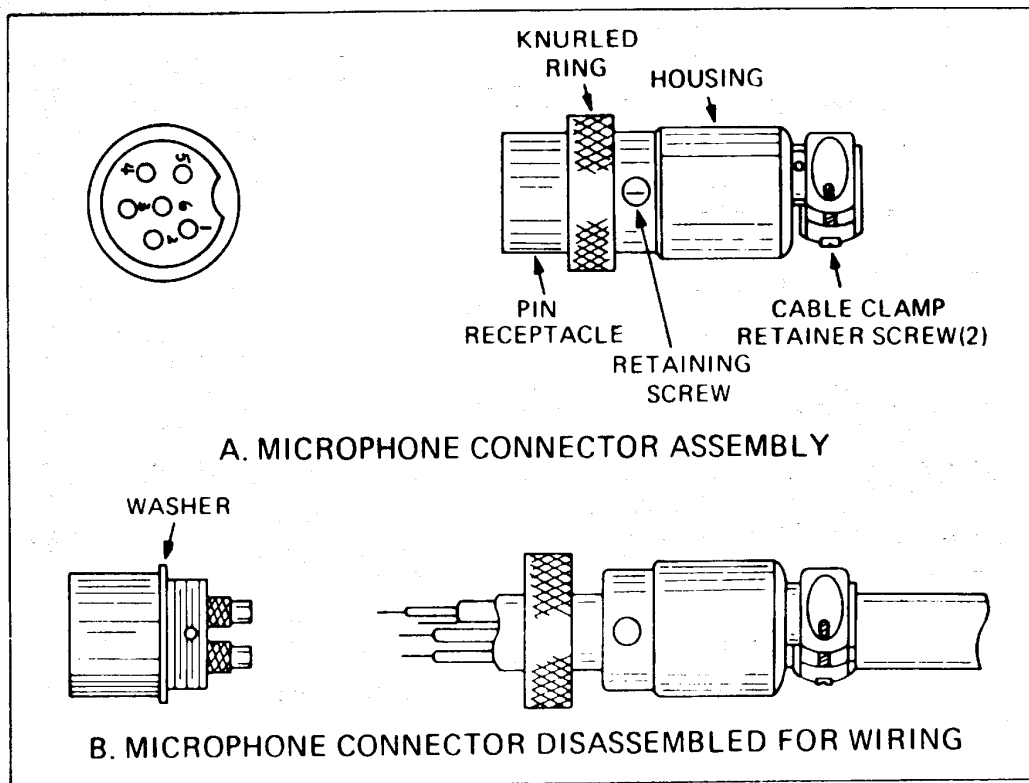


Fig. 4. Microphone plug wiring.

1. Remove the retaining screw.
2. Unscrew the housing from the pin receptacle body.
3. Loosen the two cable clamp retainer screws.
4. Feed the microphone cable through the housing, knurled ring and washer as shown Fig. 4.
5. The wires must now be soldered to the pins as indicated in the above wiring tables. If a vise or clamping tool is available it should be used to hold the pin receptacle body during the soldering operation, so that both hands are free to perform the soldering. If a vise or clamping tool is not available, the pin receptacle body can be held in a stationary position by inserting it into the microphone jack of the front panel. The numbers of the pins of the microphone plug are shown in Fig. 5, as viewed from the back of the plug. Before soldering the wire to the pins, pre-tin the wire receptacle of each pin of the plug.

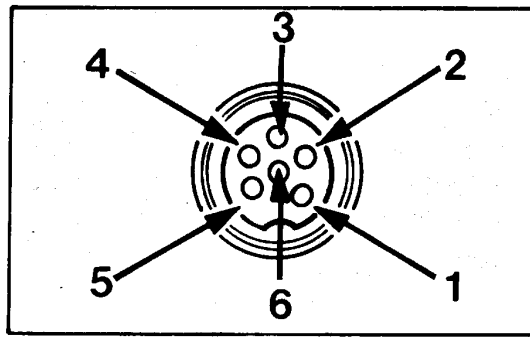


Fig. 5. Microphone plug pin numbers viewed from rear of pin receptacle.

Be sure that the housing and the knurled ring of Fig. 3 are pushed back onto the microphone cable before starting to solder. If the washer is not captive to the pin receptacle body, make sure that it is placed on the threaded portion of the pin receptacle body before soldering.

If the microphone jack is used to hold the pin receptacle during the soldering operation, best results are obtained when the connections to pins 1 and 3 are made first and then the connections to pins 2 and 4. Use a minimum amount of solder and be careful to prevent excessive solder accumulation on pins, which could cause a short between the pin and the microphone plug housing.

6. When all soldering connections to the pins of the microphone plug are complete, push the knurled ring and the housing forward and screw the housing onto the threaded portion of the pin receptacle body. Note the location of the screw clearance hole in the plug housing with respect to the threaded hole in the pin receptacle body. When the housing is completely threaded into the pin receptacle body, a final fraction of a turn either clockwise or counterclockwise may be required to align the screw hole with the threaded hole in the pin receptacle body. When these are aligned, the retaining screw is then screwed into the place to secure the housing to the pin receptacle body.
7. The two cable clamp retainer screws should now be tightened to secure the housing to the microphone cord. If the cutting directions have been carefully followed, the cable clamp should secure to the insulating jacket of the microphone cable.
8. Upon completion of the microphone plug wiring, connect and secure the microphone plug in the transceiver.

A FEW RULES THAT SHOULD BE OBEYED

- 1. You must identify your official licensed call sign at the beginning and end of every conversation.**
- 2. You are not allowed to carry on a conversation with another station for more than five minutes at a time without taking a one-minute break, to give others a chance to use the channel.**
- 3. You are not allowed to blast others off the air by over-powering them with illegally amplified transmitter power, or illegally high antennas.**
- 4. You can't use CB to promote illegal activities.**
- 5. You are not allowed to use profanity.**
- 6. You may not play music in your CB.**
- 7. You may not use your CB to sell merchandise or professional services.**

