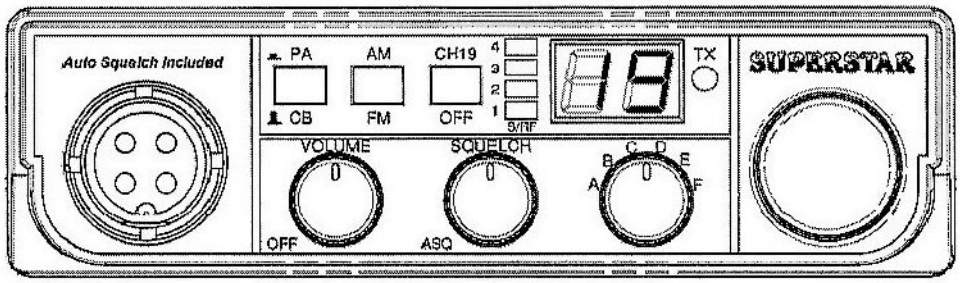
SUPERSTAR

AM/FM 10 Meter
Amateur Mobile Transceiver



SUPER STAR 3

User's Manual

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SPECIFICATIONS

GENERAL

Model	SUPER STAR 3
Frequency Range	28.015 ~ 28.465 MHz
Emission	AM/FM
Frequency Control	Phase-Lock-loop (PLL) Synthesizer
Frequency Stability	0.001%
Temperature Range	-20°C to +50°C
Antenna Impedance	50 Ohms
Antenna Connectors	Standard SO-239 type
Input Voltage	13.8V DC
Size	190 (W) x 120 (D) x 31 (H) m/m
Weight	1 kg.

TRANSMITTER

RF Power Output	FM: 4W, AM: 4W (PEP)
Spurious Emission	More than -60 dB
Audio Distortion	<10%
Frequency Response	300 to 2500 Hz
Microphone	Piezoelectric Mic

RECEIVER

Sensitivity	AM: 0.5 uV for 10dB Sinad FM: 0.5 uV for 20dB Sinad
Squelch Sensitivity	< 0.5 uV
Image Rejection	More than 60 dB
Audio Power Output	3W @ 10% Distortion
Audio Response	300 to 2500 Hz

(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)

INSTALLATION

LOCATION

Plan the location of the transceiver and microphone bracket before starting the installation. Select a location that is convenient for operation and does not interfere with the drive or passengers in the automobiles, the transceiver is usually mounted the dash panel with the microphone bracket beside it.

MOUNTING THE RADIO

The transceiver is supplied with a universal mounting bracket. When mounting the bracket and radio to your car, make sure it is mechanically strong. In addition, provide a good electrical connection to the chassis of the vehicle. Proceed as follows to mount the transceiver:

1. After you have determined the most convenient location in your vehicle, hold the transceiver with mounting bracket in the exact location desired. If nothing will interfere with mounting it in the desired position remove the mounting bolts. Before drilling the holes, make sure nothing will interfere with the installation of the mounting bolts.

2. Connect the antenna cable plug to the standard receptacle on the rear panel. Most transceiver antennas are terminated with a type PL-259 plug and mate with the receptacle.

3. Connect the red DC power input wire (with the fuse) to +13.8V DC. This wire extends from the rear panel. In automobile installation, +13.8V DC is usually obtained from the accessory contact on the ignition switch. This prevent the set being left on accidentally when the driver leaves the car and also permits operating the unit without the engine running. Locate the accessory contact on most ignition switches by tracing the power wire from the AM broadcast receiver in the car.

4. Connect the black lead to –13.8V DC. This is usually the chassis of the car. Any convenient location with good electrical contact (remove paint) may be used.

5. Mount the microphone bracket on the right side of the transceiver, using two screws supplied. When mounting in an automobile, place the bracket under the dash so that microphone is readily accessible.

IGNITION NOISE INTERFERENCE

Use of a mobile receiver at low signal levels is normally limited by the presence of electrical noise. The primary source of noise in automobile installation is from the generator and ignition system in the vehicle. Under most operating conditions, when signal level is adequate, the background noise does not present a serious problem. In addition, when extremely low-level signals are being received, the transceiver may be operated with vehicles engine turned off. The unit requires very little current and therefore will not significantly discharge the vehicle's battery.

In some installation, ignition interference may be high enough to make good communications impossible. The electrical noise may come from several sources. Many possibilities exist, as variations between vehicles require different solutions to reduce the noise.

ANTENNA

A vertically polarized, quarter-wavelength whip antenna provides the most reliable operation and greatest range. Shorter, loaded-type whip antennas are more attractive, compact and adequate for applications where the maximum possible distance is not required. In addition, loaded whips do not present the problems of high wind resistant imposed by a full quarter-wavelength whip.

Mobile whip antennas utilize the metal body of the vehicle as a ground plane. When mounted at a corner of the vehicle they are slightly directional, in the direction of the body of the vehicle. For all practical purpose, however, the radiation pattern is non-directional. The slight directional characteristic will be observed only at extreme distances. A standard antenna connector (type SO-239) is provided on the transceiver for easy connection to a standard PL-259 cable termination.

If the transceiver is not mounted on a metal surface, it is necessary to run a separate ground wire from the unit to good metal electrical ground in the vehicle. When installed in a boat, the transceiver will not operate at maximum efficiency without a ground plate, unless the vessel has a steel hull.

Before installing the transceiver in a boat, consult your dealer for information regarding an adequate grounding system and prevention of electrolysis between fittings in the hull and water.

TUNING THE ANTENNA FOR OPTIMUM S.W.R

Since there is such a wide variety of a base and mobile antenna, this section will strictly concern itself to the various types of mobile adjustable antennas.

Because the antenna length is directly related to the channel frequency, it must be tuned to resonate optimally on all channels of the transceiver. Channel 1 requires a longer antenna than Channel 40 because it is lower in its frequency of operation.

Due to the various methods of adjusting antennas for proper S.W.R. we have chosen what we think is the optimum method:

A. Antenna with adjustment screws (set screws).

1. Starts with the antenna extended and tighten the setscrew lightly enough so that the antenna can be lightly tapped with your finger for easy adjustment.

2. Set your transceiver to Channel 20. Press the PTT (push-to-talk) switch, and tap the antenna (making it shorter). The S.W.R meter will show a lower reading each time the antenna is tapped. By continuing to shorten the antenna, you will notice the S.W.R reading will reach a low point and then start rising again. This means that you have passed the optimum point for Channel 20.

Extend the antenna a short distance and again follow the procedure above. When the lowest point has been reached, switch to Channel 1 and then to Channel 40 and compare S.W.R readings. They should be almost equal.

> **NOTE**
> ***The proper setting is achieved when the SWR is 1.5 or below, and when it has similar reading for channels 1 and 40.***

B. Antennas which must be cut to proper length

1. Follow the same procedure as above but adjust the length by cutting in 1/8" increments until a good match is obtained.

2. *Be very careful not to cut too much at one time, as once it is cut, it can no longer be lengthened.*

3. The whip is easily cut by filing a notch all the way around and breaking the piece off with pliers.

4. If you are having difficulties in adjusting your antenna, check the following:

a. All doors must be closed when adjusting the antenna
b. Make sure the antenna base is grounded.
c. Check your coaxial cable routing (it may be pinched when routed into the car)
d. Try a different location in your car (keeping in mind the radiation pattern you wish.)
e. Is the antenna perfectly vertical?
f. Try a different location in your neighborhood. Stay away from large metal objects when adjusting (metal telephone polls or light post, fences, etc.)

NOTE

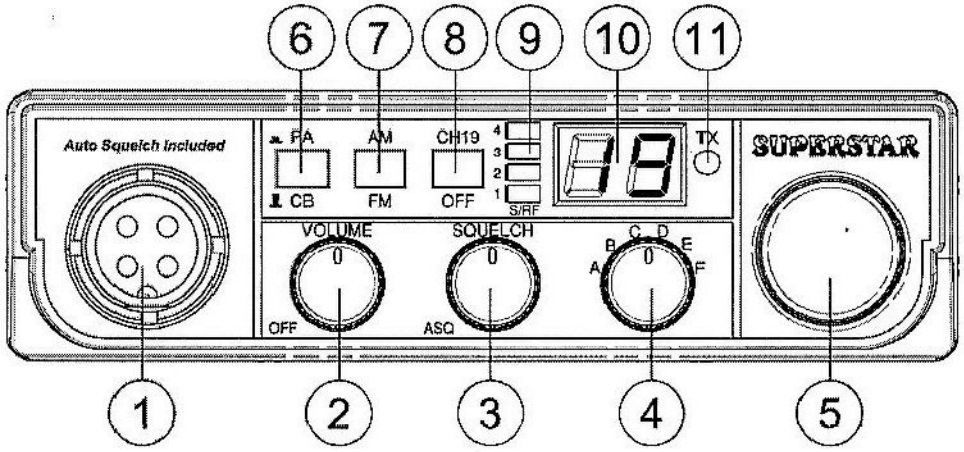
The transceiver will operate into an SWR of 2 to 1 indefinitely and sustain an SWR of 2 : 1 for a maximum of 5 minutes at rated operating conditions.

EXTERNAL 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 4 watts. When the external speaker is plugged in, the internal speaker is disabled.

OPERATION

FRONT PANEL



1. **MICROPHONE JACK:** Used to connect microphone for voice source.

2. **ON/OFF VOLUME CONTROL:** This knob controls the volume and power to the radio. To turn radio on, rotate the knob clockwise. Turning the knob further will increase the volume of the receiver.

3. **ASQ/SQUELCH CONTROL:** This knob is used to select one of the two features: ASQ (Auto Squelch) or Squelch. Squelch eliminates background noise being heard from the speaker, which can be disturbing when no transmissions are being received through the receiver. To use this feature, turn the knob fully counterclockwise and then slowly turn clockwise until the background noise is just eliminated. Further clockwise rotation will increase the threshold level that a signal must overcome in order to be heard. Only strong signals will be heard at a maximum clockwise setting. ASQ shuts off weak transmissions and unwanted noise due to terrain and conditions, it slightly reduces the maximum range at which signals can be heard.

4. **BAND SELECTOR:** This switch selects A, B, C, D, E, or F band of operation.

5. **CHANNEL SELECTOR:** This switch is used to select the desired transmit and receive channel.

6. **PA/CB SWITCH:** Select the mode of operation. In the PA position, the radio acts as public address amplifier. Your voice will come out of the speaker that is plugged into the PA. SP.

Jack on the rear panel. The radio does not operate when you are in the PA mode. In the CB position, the PA function is disabled and the radio will transmit and receive on the speaker that is connected.

7. **MODE SWITCH**: This switch allows you to select one of following operating modes: AM or FM.

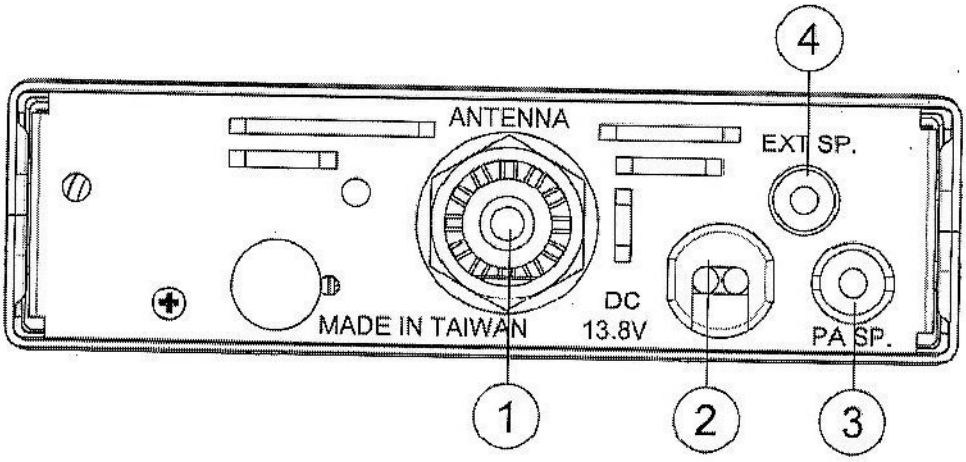
8. **CH19/OFF SWITCH:** Channel 19 switch is used for instant access to information channel 19.

9. **S/RF INDICATOR:** Allows the user to monitor the signal strength and RF power output level. When in low level, the S/RF indicator will be light green. When in high level, the S/RF indicator will be light red.

10. **CHANNEL DISPLAY:** The channel display indicates the current selected channel.

11. **TX LED**: The red LED indicates the unit is in the transmit mode.

REAR PANEL



1. **ANTENNA:** This jack accepts a 50 ohm coaxial cable with a PL-259 type plug.

2. **DC POWER:** This jack accepts the 13.8V DC power cable with built-in fuse. The power cord provided with the radio has a black and red wire. The black goes to negative and red goes to positive.

3. **PA SP:** This jack is for PA operation. Before operating, you must first connect an external PA speaker (8 ohm, 4W) to this jack.

4. **EXT. SP:** This jack accepts a 4 to 8 Ohm, 5-watt external speaker. When the external speaker is connected to this jack, the built-in speaker will be disabled.

PROCEDURE TO RECEIVE AND TRANSMIT

A. MICROPHONE

The push-to-talk switch on the microphone controls the receiver and transmitter. Press the switch the transmitter is activated, release switch to receive. When transmitting, hold the microphone two inches from the mouth and speak clearly in a normal voice. This transceiver comes complete with a low impedance piezoelectric microphone.

B. PROCEDURE TO RECEIVE

1. Be sure that power source, microphone and antenna are connected to the proper connectors before going to the next step.

2. Turn **VOL** knob clockwise to apply power to the radio.

3. Set the **VOL** for a comfortable listening level.

4. Set the **MODE** switch to the desired mode.

5. Listen to the background noise from the speaker. Turn the **SQ** knob slowly clockwise until the noise just disappears. The **SQ** is now properly adjusted. The receiver will remain quiet until a signal is actually received. Do not advance the control too far as weaker signals may not be heard.

6. Set the **CHANNEL** selector switch to the desired channel.

C. PROCEDURE TO TRANSMIT

1. Select the desired channel of transmission

2. If the channel is clear, press the push-to-talk switch on the microphone and speak in a normal voice.

ALTERNATE MICROPHONES AND INSTALLATION

For best results, the user should select a low-impedance dynamic type microphone or a transistorized microphone. The microphones must be provided with a four-lead cable. The audio conductor and its shielded lead comprise two of the leads. The third lead is for transmit control and fourth is for receiving Control .

The microphone should provide the functions shown in the schematic below.

4 WIRE MIC CABLE

Pin Number	Mic Cable Lead
1	Audio Shield
2	Audio Lead
3	Transmit Control
4	Receive Control

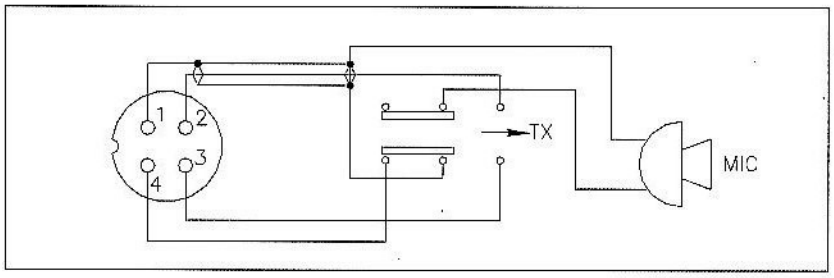


Fig. 1 Microphone Schematic

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.

OPERATION

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

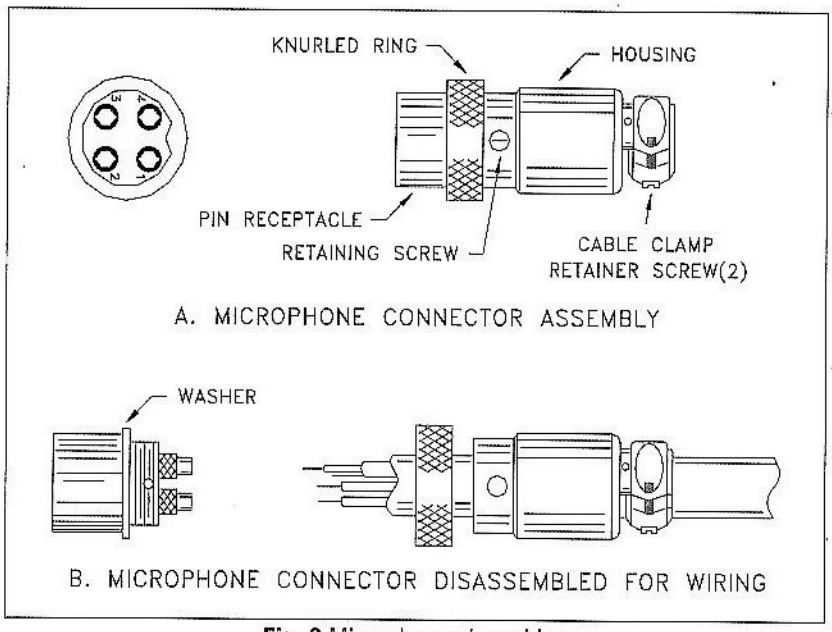


Fig. 2 Microphone plug wiring

To wire the microphone cable to the plug provided, proceed as follows:

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 in Figure 2.

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 on the front panel. The numbers of the microphone plug are shown in Fig. 3, 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.

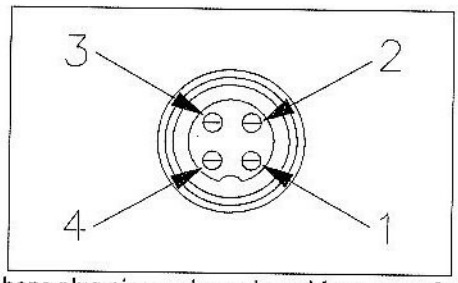


Fig. 3 Microphone plug pin numbers viewed from rear of pin receptacle.

6. Be sure that the housing and the knurled ring of Figure 2 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.

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

8. When all soldering connections to the pins of the microphone are completed, 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 place to secure the housing to the pin receptacle body.

9. 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 insulation jacket of the microphone cable.

10. Upon completion of the microphone plug wiring, connect and secure the microphone plug in the transceiver.