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**SOLID STATE CITIZENS BAND  
AM MOBILE TRANSCEIVER**

**OWNER'S MANUAL**

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## CHAPTER 1 SPECIFICATIONS

### GENERAL

Frequency Range	26.965 - 27.405 MHz
Emission	AM
Frequency Control	Phase-Lock-Loop (PLL) Synthesizer
Frequency Stability	0.001%
Temperature Range	-30°C to +50°C
Input Voltage	13.8V DC
Antenna Impedance	50 Ohms
Size	7 7/8" (W) x 9 1/4" (D) x 2 3/8" (H)
Weight	5.0 lbs.

### TRANSMITTER

RF Power Output	4W
Spurious Emission	-55 dB
Audio Distortion	10%
Frequency Response	300 to 2500 Hz
Microphone	Dynamic

### RECEIVER

Sensitivity for 10 dB (S+N)/N	< 0.5 uV
Squelch Sensitivity	< 0.5uV
Audio Power Output	2W at 10% THD
Image Rejection	More than 65 dB
AGC Figure of Merit	100 mV for 10 dB Change in Audio Output
Audio Response	300 to 2500 Hz

(SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE)

## CHAPTER 2 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 driver or passengers. In automobiles, the transceiver is usually mounted below 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. Also, provide a good electrical grounding 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 ANT 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 prevents 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 or near the transceiver, using two screws supplied. When mounting in an automobile, place the bracket under the dash so that the 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 installations 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. Also, when extremely low level signals are being received, the transceiver may be operated with vehicle engine turned off. The unit requires very little current and therefore will not significantly discharge the vehicle battery.

Even though the transceiver has ANL and NB controls, in some installations 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. Also, the loaded whips do not present the problems of height 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 purposes, 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 a 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 SWR

Since there is such a wide variety of base and mobile antennas, 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 a lower frequency. 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 adjustable screws (set screws).

1. Start with the antenna extended and tighten the set screw 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 the same 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.

If you are having difficulties in adjusting your antenna, check the followings :

- 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 on 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 or lamp post, fences, etc.)

#### NOTE

*The transceiver will operate into an SWR of 2 to 1 indefinitely and sustain an SWR of 20 : 1 for a maximum of 5 minutes at rated operating conditions .*

## EXTERNAL SPEAKER

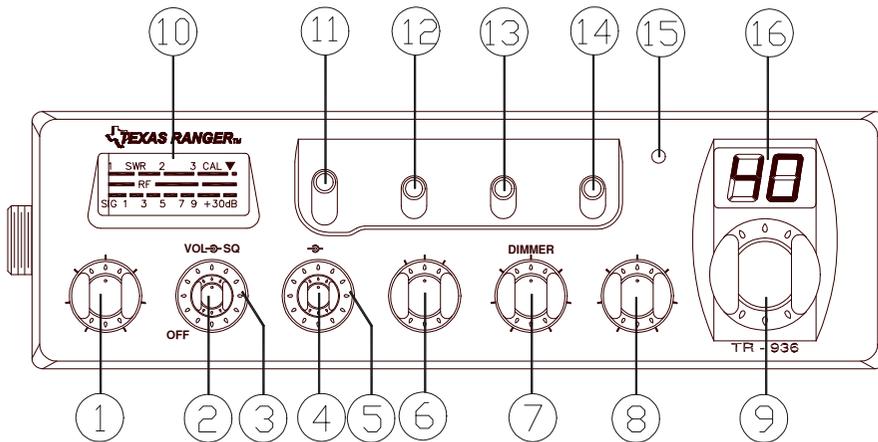
The external speaker jack (EXT. SP.) on the rear panel is used for remote receiver monitoring. The external speaker should have 8 ohms impedance and be able to handle at least 4 watts. When the external speaker is plugged in, the internal speaker is disconnected.

## PUBLIC ADDRESS

To use the transceiver as a public address system, connect an external 8 ohms speaker (4 watts minimum) to the PA. SP. jack located on the rear panel. Direct speaker 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.

## CHAPTER 3 OPERATION

### FRONT PANEL

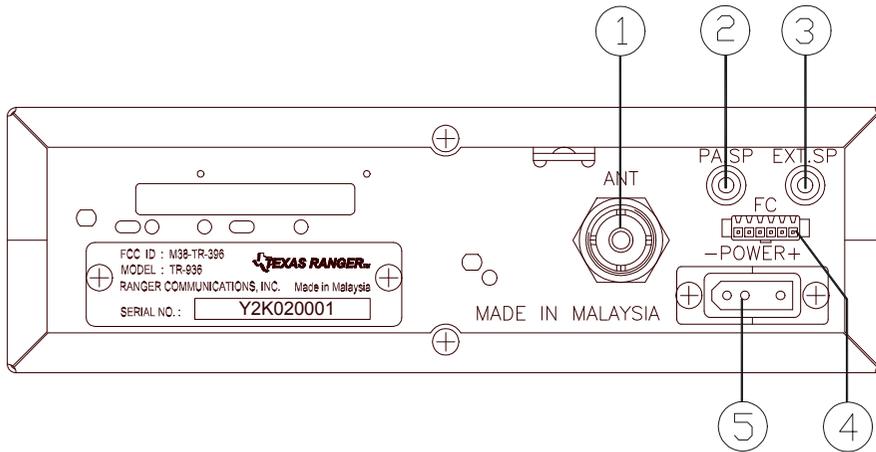


1. **MIC GAIN/ANF CONTROL** : This is a multi function switch which controls both the gain to the microphone as well as the ANF (Advanced Noise Filter). In the outer position, the switch controls the ANF which improves the signal to noise ratio when receiving a marginal signal. When the switch is in the inner position it controls the amount of gain to the microphone.
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. **SQUELCH CONTROL** : This switch is used to eliminate background noise being heard through the receiver which can be disturbing when no transmission are being received. To use this feature, turn the switch fully counterclockwise and then turn clockwise slowly until the background noise is just eliminated. Further clockwise rotation will increase the threshold level which a signal must overcome in order to be heard. Only strong signals will be heard at a maximum clockwise setting.
4. **RF GAIN CONTROL** : This control is used to reduce the gain of the RF amplifier under strong signal conditions.
5. **SWR CAL CONTROL** : This SWR CAL control allows the user to calibrate the SWR meter.

6. **S-RF/CAL/SWR SWITCH** : In the S-RF position, the meter will indicate the strength of the signal being received, as well as the relative RF output of transmission. When calibrating the SWR meter, you need to put this switch in the CAL position. To use the meter to measure the standing wave ratio, turn the switch to the SWR position.
7. **DIMMER CONTROL** : This knob controls the level of brightness for the meter lamp and channel display.
8. **TONE CONTROL** : This control changes tone quality in receive only. In clockwise rotation, treble is increased and in counter clockwise rotation, bass is increased.
9. **CHANNEL SELECTOR** : This control is used to select a desired transmit and receive channel.
10. **FRONT PANEL METER** : The front panel meter allows the user to monitor signal strength, RF output power and SWR level.
11. **NB/ANL/OFF SWITCH** : This is a three position switch. Move the switch all the way up to activate the Noise Blanker (NB) and Automatic Noise Limiter (ANL). The Noise Blanker is very effective in eliminating repetitive impulse noise such as ignition interference. When the switch is moved to the middle position, only the Automatic Noise Limiter (ANL) is engaged. Move the switch to the bottom position to turn off the ANL and NB.
12. **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.
13. **R.B./OFF SWITCH** : In the Roger Beep position, the radio transmits an audio tone at the end of your transmission to indicates that transmission has ended. As a courtesy to others, use the Roger Beep only when necessary.
14. **CH19/OFF SWITCH** : The Channel 19 switch is used for instant access to Channel 19, which is often used by truckers for transmission of traffic and weather conditions.
15. **TX/RX LED** : The red LED indicates the unit is in the transmit mode. The green LED indicates the unit is in the receive mode.

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

**REAR PANEL**



- 1. ANTENNA :** This jack accepts 50 ohm coaxial cable with a PL-259 type plug.
- 2. PA. SP. :** This jack is used for PA operation. Before operating, you must first connect a PA speaker (8 ohms, 4W) to this jack.
- 3. EXT. SP. :** This jack accepts 4 to 8 ohms, 5 watts external speaker. When the external speaker is connected to this jack, the built-in speaker will be disabled.
- 4. F.C. :** This connector is used for an external frequency counter which indicates the frequency of the selected channel.
- 5. POWER :** This accepts 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 the red goes to positive.

**FREQUENCY CHART**

Channel	Channel Frequency	Channel	Channel Frequency
1	26.965 MHz	21	27.215 MHz
2	26.975 MHz	22	27.225 MHz
3	26.985 MHz	23	27.255 MHz
4	27.005 MHz	24	27.235 MHz
5	27.015 MHz	25	27.245 MHz
6	27.025 MHz	26	27.265 MHz
7	27.035 MHz	27	27.275 MHz
8	27.055 MHz	28	27.285 MHz
9	27.065 MHz	29	27.295 MHz
10	27.075 MHz	30	27.305 MHz
11	27.085 MHz	31	27.315 MHz
12	27.105 MHz	32	27.325 MHz
13	27.115 MHz	33	27.335 MHz
14	27.125 MHz	34	27.345 MHz
15	27.135 MHz	35	27.355 MHz
16	27.155 MHz	36	27.365 MHz
17	27.165 MHz	37	27.375 MHz
18	27.175 MHz	38	27.385 MHz
19	27.185 MHz	39	27.395 MHz
20	27.205 MHz	40	27.405 MHz

## PROCEDURE TO RECEIVE AND TRANSMIT

### A. 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 inches from the mouth and speak clearly in a normal voice. The transceiver comes complete with a low impedance dynamic 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 or some of weaker signals will not be heard.
6. Set the **CHANNEL** selector switch to the desired channel.
7. Set the **RF GAIN** control fully clockwise for maximum RF gain.

### C. PROCEDURE TO TRANSMIT

1. Select the desired channel of transmission
2. Set the **MIC GAIN** control fully clockwise.
3. If the channel is clear, depress the push-to-talk switch on the microphone and speak in a normal voice.

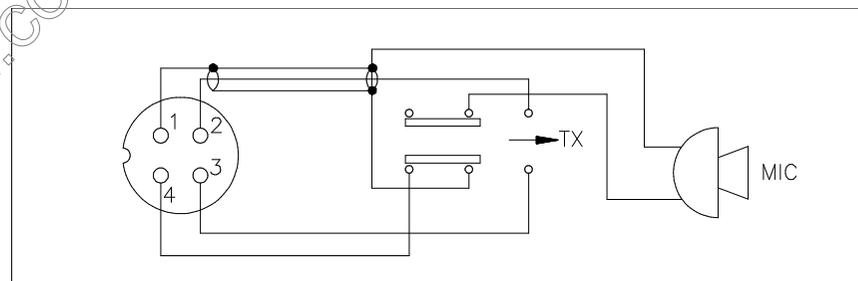
## ALTERNATE MICROPHONES AND INSTALLATION

For best results, the user should select a low-impedance dynamic type microphone or a transistorized microphone. Transistorized type microphones have a low output impedance characteristics. 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 the fourth is for receiving control.

The microphone should provide the functions shown in schematic below.

### 4 WIRE MIC CABLE

<u>Pin Number</u>	<u>Mic Cable Lead</u>
1	Audio Shield
2	Audio Lead
3	Transmit Control
4	Receive Control



**Fig. 1** Your transceiver microphone schematic.

