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**Courier Rangler 40D Owner's Manual**

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# **RANGLER 40D**

**PHASE LOCKED LOOP**

**40 CHANNEL**

**MOBILE CITIZENS BAND TRANSCEIVER**



**DOC APPROVED**



**INSTRUCTION  
MANUAL**

## STANDARD WARRANTY

### **Adopted and Recommended by Electronic Industries Association**

COURIER COMMUNICATIONS warrants each new electronic product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part (at the Company's option) in exchange for any part of any unit of its manufacture which under normal installation, use and service disclosed such defect; provided the unit is delivered by the owner to us or to our authorized distributor from whom purchased, or authorized service station, intact, for our examination, with all transportation charges prepaid to our factory, within 1 year from the date of sale to original purchaser and provided that such examination discloses, in our judgment, that it is thus defective.

The above warranty applies also to changed ownership in the first year and to everyone in the second and third year from original purchase date, except that a \$ 10.00 fee will be charged for each repair.

Written authorization must be obtained before any merchandise is returned to the factory.

This warranty does not extend to any of our electronic products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, unauthorized modifications, or to use in violation of instructions furnished by us, nor units which have been repaired or altered outside of our factory, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

This warranty is in lieu of all warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our electronic products.

**WARRANTY NOT VALID UNLESS WARRANTY CARD RETURNED.**

#### D. O. C. LICENSING

Before operating your RANGLER 40D you must obtain a license from the Department of Communications (DOC). A license application form can be obtained from your nearest DOC Radio Regulations Office, some of which are listed below:

St. John's Nfld. Sir Humphrey Gilbert Building, Room 614, Duckworth St., P. O. Box 5273	Toronto, Ont. 55 St. Clair Ave E, 9th Floor
Sidney, N. S. 206A Federal Building Dorchester St., P. O. Box 281	Sault Ste. Marie, Ont. 118 March St. P. O. Box 1026
Halifax, N. S. Sir John Thompson Building, Room 512, 1256 Barrington St.	Winnipeg, Man. G. P. O. Building, Room 600 266 Graham Ave.
Quebec, P. Q. 390 Dorchester St.	Regina, Sask. New Post Office Building, Room 414
Montreal, P. Q. Port of Montreal Building, Room 256 Wing No. 21, Cite du Havre	Calgary, Alta. 803-205-8th Ave SE
Ottawa, Ont. Trebla Building, Room 100B 473 Albert St.	Edmonton, Alta. Financial Building Room 300 10621-100 Ave SE
Kingston, Ont. 273 Federal Building Clarence St. P. O. Box 633	Vancouver, B. C. 325 Granville St., Room 320
	Victoria, B. C. 816 Government St., Room 116
	Prince-Rupert, B. C. Federal Building, Room 327

Address all correspondence to "Inspector, Radio Regulations". For DOC offices not listed here, consult your local telephone directory under "Government-Canada-Communications".

#### WARNING

This transceiver, designed and adjusted at the factory to meet the DOC rules and regulations, requires no further adjustments. The transmitter and receiver section can be adjusted only by a qualified technician. Replacement or substitution of crystals or other components, to adjust or tune the internal circuits which influence the characteristics of the transmitter section and the unwanted radiations of the receiver are especially prohibited.

## WARNING

1. When you accept your CB station license you agree to tolerate all interference to the operation of your station which is caused by other stations or equipment operating in accordance with applicable laws, treaties, and regulations.
2. It is your responsibility to see that the station is properly operated at all times.
3. Discontinue operation immediately if the equipment fails to function in the normal manner. Do not tamper with the equipment. A licensed commercial operator is required for any adjustments that might affect the proper operation of the station.
4. There are height restrictions on any antenna that may be used at a fixed location by this station.
5. You should notify the D.O.C. promptly of changes in your mailing address. This may be done by letter addressed to the Department of Communications 300 Slater St, Ottawa, Ontario. Give station call sign, your name and mailing address as they appear on your license, your new mailing address, including postal code, and your signature. NO acknowledgment of such notification will be sent to you.
6. Keep informed. Your license may be revoked and/or monetary forfeitures may be imposed for failure to comply with the law and the D.O.C. Rules.
7. Only the licensee and members of his immediate family living in his household or his employees while acting within their scope of their employment may operate under his individual license. Operation under licenses issued to partnerships, associations, corporations, or governmental entities is limited to employees or members for communications relating to the business of the organization.

8. Do not make unnecessary transmissions. Remember that Citizens Radio frequencies are available only on a shared basis which requires the cooperation of all users.
9. The transmission of profane, indecent, or obscene language is prohibited by law, and severe penalties are provided for violators.
10. You may not engage in any form of broadcasting or providing communications for hire.
11. Do not transmit unless there is a definite need in a situation which requires the use of radio.
12. Your station may not be used for engaging in radio communications as a hobby or diversion, that is, operating the station as an activity in and of itself.
13. Your station must be made available for inspection upon the request of an authorized D.O.C. representative.

## PLL FREQUENCY SYNTHESIZER

Most Citizens Band Transceivers in the past used Frequency Synthesizers utilizing 12 or more quartz crystals to generate the various radio signals for receiving and transmitting the assigned CB channels. The frequency stability of each channel, when receiving or transmitting, was dependent largely upon the crystals used to generate the frequencies for that channel. The frequency accuracy and stability of one channel was often better than another.

Citizens Band transceivers of recent design, such as the transceiver you have purchased, utilize the most advanced design of frequency synthesizers called Phase Locked Loop (PLL) Frequency Synthesizers. These synthesizers utilize a minimal number of crystals as reference frequencies from which transmitting and receiving frequencies are developed. The transmitting and receiving frequencies are stabilized by phase comparing to the reference frequency and thus providing a phase-locked loop.

There are several types of PLL circuits in use; the one your transceiver uses incorporates the best features of these designs. Your transceiver uses crystal controlled standards with digital type programmable frequency dividers for selection of the channel frequencies, which are always locked to the reference frequency. If for any reason the PLL is not "locked" the transmitter will not transmit.

## SECTION II, INSTALLATION

### A. Mobile Station

CAREFULLY READ ALL INSTALLATION INFORMATION IN THIS MANUAL BEFORE ATTEMPTING TO INSTALL THE TRANSCEIVER IN A VEHICLE OR AS A BASE STATION.

#### 1. Location

- a) Locate the transceiver under the dash or on the hump of the vehicle. DO NOT POSITION ON TOP OF THE DASH OR ANY LOCATION THAT WILL INTERFERE WITH THE OPERATION OF THE VEHICLE.
- b) Use the VEHICLE MOUNTING BRACKET as a template to locate and mark the mounting holes. Refer to fig. 1 for identification of the mounting hardware.
- c) Position the transceiver in the mounting bracket for best view and accessibility to the front panel controls.

#### 2. Power Connections

- a) CAUTION: Be sure the transceiver POWER SWITCH is in the OFF position before making any connections to the power source. ROTATE THE VOLUME CONTROL FULLY TO THE COUNTERCLOCKWISE POSITION.
- b) The transceiver has a polarity reversal protection diode across the power input circuit. If the polarity of the power source is reversed, the fuse in the positive power lead will burn out. CHECK CAREFULLY THE POLARITY OF THE POWER SOURCE BEFORE CONNECTING TO THE TRANSCEIVER.
- c) UNDER NO CIRCUMSTANCES SHOULD A FUSE OF GREATER AMPERAGE THAN 2 AMPERES BE USED TO REPLACE A BURNED OUT FUSE. ALSO, NEVER BYPASS THE FUSE WITH A JUMPER WIRE. IN EITHER CASE SEVERE DAMAGE WILL RESULT TO THE TRANSCEIVER AND VOID THE WARRANTY.



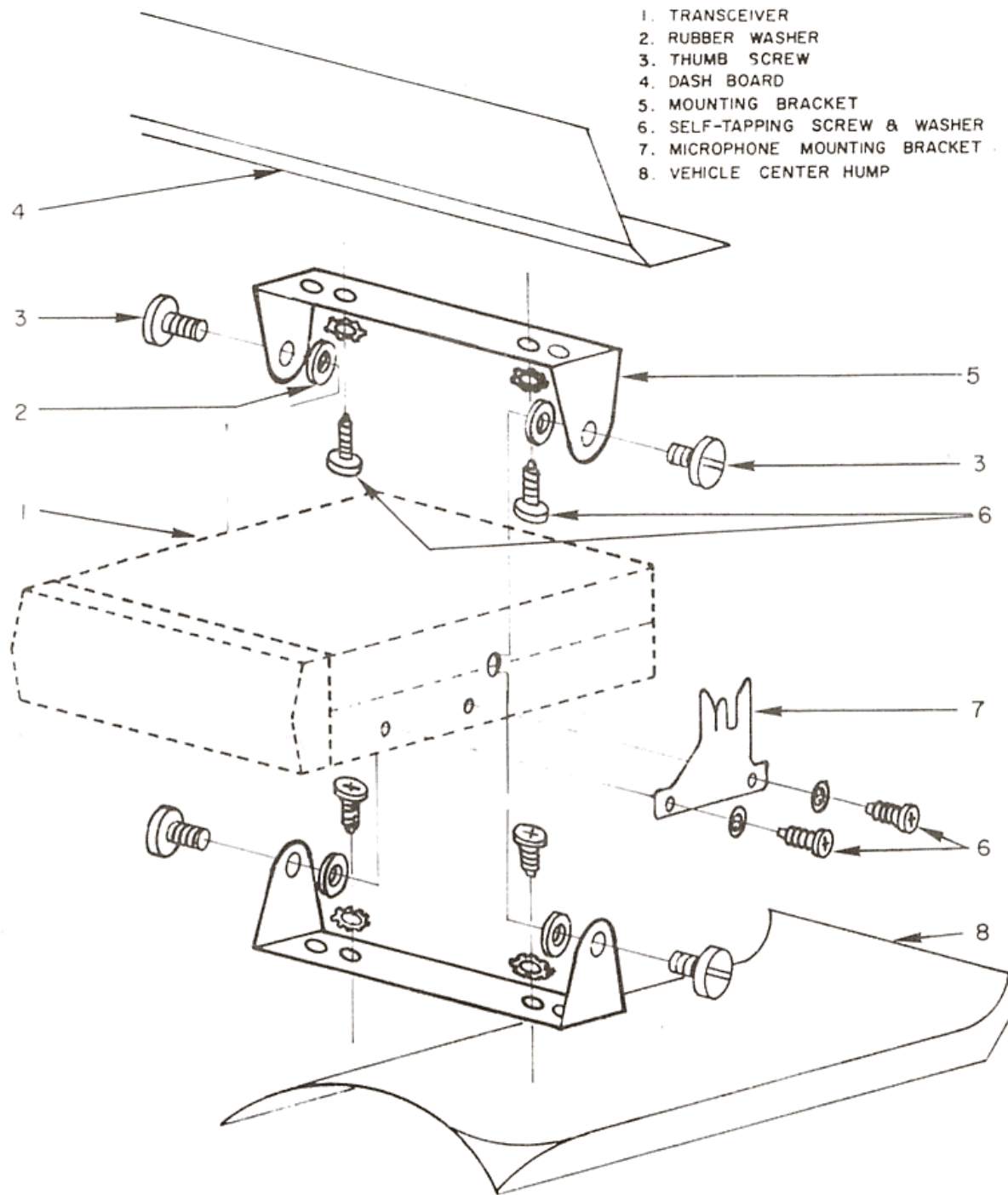


FIGURE 1, TYPICAL VEHICLE MOUNTING BRACKET INSTALLATION

d) Negative Grounded Power System Connections

Connect the FUSED power lead (RED) to the POSITIVE (+) terminal of the power source (a battery in most vehicles) or to the accessory terminal on the ignition switch or to the accessory fuse on the fuse block (refer to fig. 2).

Connect the other power lead (BLACK) to the NEGATIVE (-) terminal of the power source or to the frame of the vehicle or to the COMMON (-) ground connection.

e) Positive Grounded Power System Connections

Connect the FUSED power lead to the FRAME of the vehicle or to the POSITIVE (+) terminal of the power source (refer to fig. 2).

Connect the other lead (NEGATIVE) to the NEGATIVE terminal of the power source or to the accessory terminal on the ignition switch or to the accessory fuse on the fuse block.

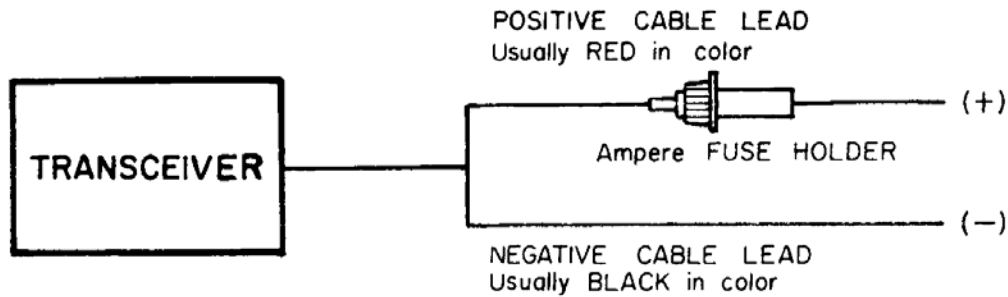


FIGURE 2, POWER CABLE, LEAD IDENTIFICATION DIAGRAM

### 3. Microphone

Connect microphone plug into transceiver jack and mount microphone hanger as follows:

- a) In the package containing the mounting hardware, there are screws and the microphone hanging bracket. For convenience, locate the hanger on the dashboard within easy reach of the operator, so that the microphone may be grasped without the operator having to take his eyes off the road.
- b) When an approximate location has been chosen, use the hanger as a template and center punch the centers of the two #30 (.120 Dia.) holes, drill and mount the hanger with the two #6 self-tapping screws.

### 4. Mobile Station Antennas

**CAUTION: NEVER OPERATE YOUR TRANSCEIVER WITHOUT A PROPERLY MATCHED ANTENNA.**

Many styles and types of mobile antennas are available for installation on just about every type of vehicle, including boats and aircraft. You should discuss this with your dealer.

#### Location

The position of the antenna on a vehicle is very important as it will affect the directional characteristics (radiation pattern). Figure 3 shows four possible locations for a standard "quarter wave" antenna. The ROOFTOP is usually considered the best location.

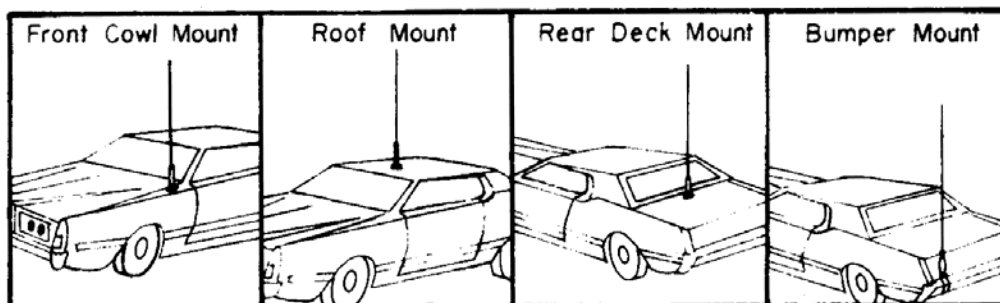


FIGURE 3, MOBILE ANTENNA LOCATION DIAGRAM

## B. Base Station Installation

1. The unit was basically designed for mobile operation; however, it may be used as a base station by the addition of a 13.8VDC External Power Supply. Models are available from your local FANON/COURIER dealer.
2. Locate the transceiver on a shelf or table out of the path of foot traffic and near a 117VAC/60Hz power outlet.
3. An external rooftop antenna may be used or a simple whip type which connects directly to the antenna connector on the transceiver. See your FANON/COURIER dealer for details.
4. Refer to fig. 2 for the proper connections to the external power supply.

## C. Antenna and Cable Information

1. The antenna is a very important part of your radio station, whether it is a mobile or base station. Antenna height is of prime importance. Refer to the FCC Rules and Regulations for the maximum height from the ground or building you are allowed. The higher the terrain or structure on which the antenna is mounted, the greater the range of communication will be.
2. The unit is designed to operate with any good quality Citizens Band mobile or base station antenna. The type of antenna you should use depends in large measure upon WHERE the antenna is to be mounted and the radiation pattern you require. All FANON/COURIER dealers are well qualified to assist you in selecting the proper type.

### 3. Transmission Cable Requirements

In most cases the coaxial cable supplied with mobile CB antennas are of the proper length for connecting directly to the antenna connector on the rear panel of the transceiver; however, if it is necessary to change the length, type RG58/U is recommended for lengths up to 50 feet.

### 4. Length Calculations

The length of the transmission cable is very important, as the length will vary according to the transmission "velocity factor" of the cable. The length of cables with a velocity factor of 0.66 (regular type cable) should be in odd multiples of 6 feet for a frequency of 27 MHz.

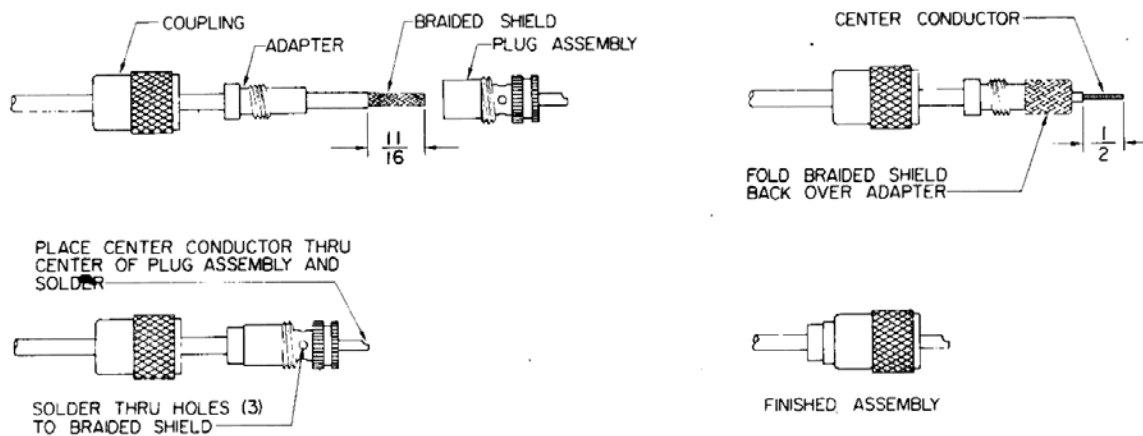
Cables with a velocity factor of 0.82 (foam type dielectric) should be in odd multiples of 7.5 feet for 27 MHz installations.

5. The formula for determining the length in feet of the cable you may use, is as follows:

$$\text{Cable length} = \frac{246 V}{f}$$

Where V = Transmission Velocity Factor of the cable

f = Frequency in Megahertz



**FIGURE 4, CABLE CONNECTOR ASSEMBLY DIAGRAM**

#### D. Voltage Standing Wave Ratio (VSWR) Measurements

The VSWR of the antenna system should not be greater than 1.5 to 1. Use a COURIER Model Port-A-Lab 500 D Voltage Standing Wave Ratio Meter, or equivalent instrument; follow the instructions given with the instrument.

#### E. External Speaker Connections (Figure 5)

##### 1. External Speaker

Prepare an 8 ohm speaker as shown in fig. 5 and plug into the EXT-SPK jack on the rear panel. The internal speaker will be bypassed when the external speaker plug is inserted.

CAUTION: POWER SWITCH MUST BE IN THE OFF POSITION BEFORE INSERTING THE SPEAKER PLUG INTO THE JACK ON THE REAR PANEL. THE SPEAKER LEADS MUST NOT BE CONNECTED IN ANY WAY TO THE VEHICLE CHASSIS OR TO THE TRANSCEIVER CASE, AS SHORTING MAY OCCUR AND CAUSE DAMAGE TO THE SPEAKER AND TRANSCEIVER COMPONENTS.

##### 2. Public Address Speaker

The transceiver volume control will control the volume level of the PA speaker. Prepare an 8 ohm horn or speaker with an insulated cable. Insert the miniature phone plug into the PA SPK jack. (Refer to fig. 6).

CAUTION: BE SURE THAT THE EXTERNAL SPEAKER OR THE PUBLIC ADDRESS SPEAKER CABLE, DO NOT MAKE AN ELECTRICAL CONNECTION IN ANY WAY TO THE TRANSCEIVER CASE, AS THE UNIT MAY BE SHORTED AND CAUSE DAMAGE TO THE TRANSCEIVER COMPONENTS.

Set the Channel Selector to the PA position and press the microphone switch. Adjust the transceiver volume control for the proper audio level at the PA speaker or horn.

When the CB/PA switch is in the PA position, all other functions of the transceiver are turned off.

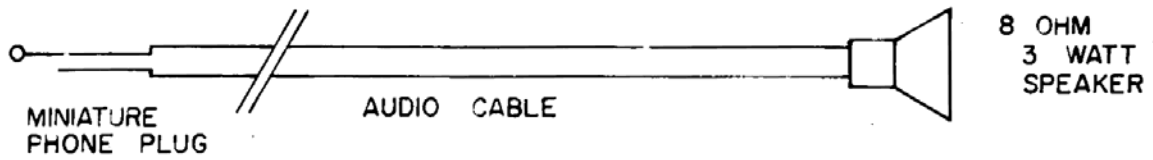


FIGURE 5, EXTERNAL SPEAKER CABLE DIAGRAM

## SECTION III, STATION OPERATION

### A. Function of the Controls, Indicators and Connectors (Figure 6)

#### VOLUME CONTROL - POWER ON/OFF SWITCH

When this control is turned fully counterclockwise, the power switch is in the OFF position. Turning the control clockwise turns the power ON and controls the volume level.

#### CHANNEL SELECTOR

The Channel Selector sets the channel frequencies simultaneously for the receiving and transmitting modes. Refer to the FCC Rules and Regulations for complete information on the use of the various channels.

#### TRANSMIT INDICATOR (XMIT)

A light emitting diode (LED) is provided, indicating when transmitter is "On the Air".

#### DIGITAL CHANNEL INDICATOR

The selected transmit/receive channel is displayed digitally by light emitting diodes (LED) when transceiver is switched on.

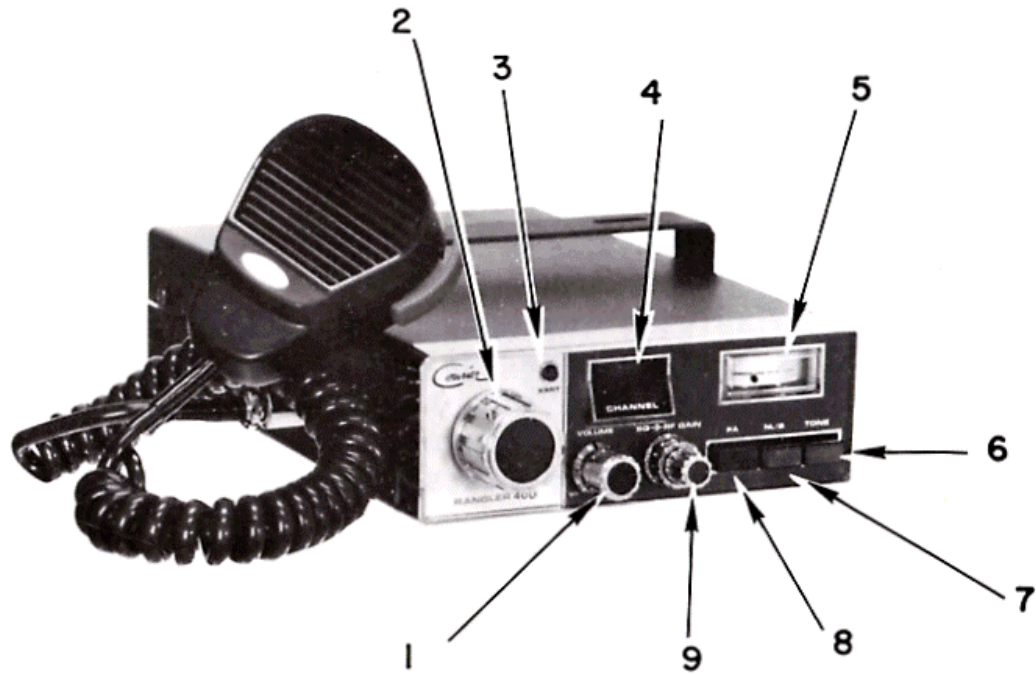
#### "S"/RF METER

Meter indicates relative signal strength of incoming signals from 1 through 9. A reading of 1 indicates a weak or distant station and a reading of 9 would indicate a local or higher power station. The RF power scale indicates the relative RF power in watts being transmitted by your transmitter.

#### TONE SWITCH

This switch operates a filter enabling a clarification of voice frequency signals.





- |   |                              |    |                             |
|---|------------------------------|----|-----------------------------|
| 1 | Volume ON/OFF Switch         | 8  | PA/CB Selector Switch       |
| 2 | Channel Selector             | 9  | Squelch and RF Gain Control |
| 3 | Transmit Indicator           | 10 | Power Cable                 |
| 4 | Channel Indicator            | 11 | PA Speaker Jack             |
| 5 | S/RF Power Meter             | 12 | External Speaker Jack       |
| 6 | Tone Switch                  | 13 | Antenna Connection          |
| 7 | Noise Limiter/Blanker Switch |    |                             |

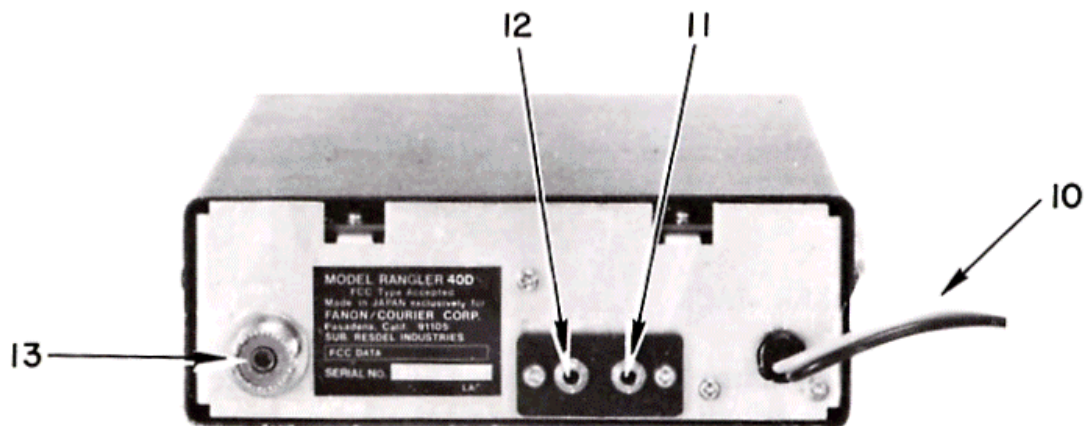


FIGURE 6, CONTROLS, INDICATORS AND CONNECTIONS

## NOISE LIMITER/BLANKER SWITCH (NL/B)

Push this switch "in" to blank-out large electrical pulse pulse interference, such as electric motors, ignition or lightning static discharges.

## PA SELECTOR SWITCH

This switch selects the mode of operation. When switch is "out", the transceiver will function as a Citizens Band Radio. When set "in", the PA position, and an EXTERNAL PA SPEAKER is connected to the PA jack on the rear panel, the unit operates as a public address amplifier.

## SQUELCH CONTROL

The word "squench" means to silence; therefore, the function of the control is to silence the atmospheric noise (hash) usually present in all high frequency AM radio communication. The maximum squench is obtained when the control is in full CLOCKWISE position, minimum squench when in COUNTERCLOCKWISE position.

## RF GAIN CONTROL

This control is used to increase the sensitivity of the receiver so that distant stations may be received more clearly, or to decrease the sensitivity so that very strong stations may be received more clearly.

## POWER CABLE

The DC power cable supplied with the transceiver has a fuse holder in the positive lead containing a 2 ampere fuse.

## EXTERNAL SPEAKER JACK

A standard miniature phone plug fits this jack on the rear panel. When an external speaker is connected, the internal speaker is disconnected.