Unimetrics Dolphone Owner's Manual

UNIMETRICS, INC.

DOLPHONE

23 CHANNEL
FREQUENCY SYNTHESIZED
SOLID STATE 5-WATTS
2-WAY CB RADIO

OPERATING & SERVICING MANUAL

UNIMETRICS, INC.
1534 OLD COUNTRY ROAD, PLAINVIEW, N.Y., U.S.A. 11803

CONTENTS

SPECIFICATIONS

RECEIVER SECTION

CIRCUIT TYPE	Dual conversion superheterodyne with RF stage and 455 KHz ceramic filter.
FREQUENCY	Up to 23 crystal-controlled channels in the 27 MHz Citizens Band
SENSITIVITY	1 μV for 10 dB S/N
SQUELCH RANGE	0 — 5 mV
SELECTIVITY	40 dB down at ±10 KHz
IF FREQUENCY	1st IF: 10.595 — 10.635 MHz; 2nd IF: 455 KHz
IF BANDWIDTH —6 dB	8 KHz
IMAGE REJECTION	55 dB
AUTOMATIC NOISE LIMITER	Series Type
AUDIO OUTPUT	2.5 W maximum at 16 ohm load
CURRENT DRAIN	100 mA on standby [no signal]

TRANSMITTER SECTION

POWER INPUT	5 Watts
EMISSION	8A3
SPURIOUS RESPONSE REJECTION	All harmonic and spurious suppression greater than FCC and D.O.T. requirements
MODULATION	AM, 90% typical
RANGE BOOST	Yields high average modulation at average voice levels
CURRENT DRAIN	1A
ANTENNA	Nominal 50 ohms impedance
POWER SOURCE	Operates from nominal 12 volts DC [Positive or Negative ground systems]
DIMENSIONS [OVERALL]	5-3/8"[W] x 10"[D] x 3-1/2"[H]
NET WEIGHT	3 lbs. 4 oz.

THIS TRANSCEIVER IS FCC TYPE ACCEPTED
FOR USE IN CITIZENS CLASS D SERVICE

LICENSING REQUIREMENTS

WARNING: YOU ARE NOT ALLOWED TO TRANSMIT UNTIL YOU HAVE RECEIVED YOUR LICENSE FROM THE FCC.

This transceiver is designed to operate under FCC Rules and Regulations Part 95. Operation of this unit is therefore not permitted until you have obtained the necessary license. The Class D Citizens Band License may be obtained by any citizen over 18 years of age by filling out the FCC license application form 505 [included]. Before going on the air, you are also required to read and understand the applicable FCC rules and regulations. These can be obtained for a nominal fee by writing to the Superintendent of Documents, Government Printing Office, Washington 25, D. C., and requesting Volume VI of FCC Rules and Regulations [which includes Part 95]. Remember, when you sign the application form, you certify under oath that you have read the rules and regulations.

TRANSMITTER IDENTIFICATIONS CARD

When you have received your license, you are required to fill out the Transmitter Identification Card, FCC Form 452-C, which will be found with the unit. Fill out the card as indicated below:

1. Enter your call sign which is on the left hand corner of your license. The unit designation should agree with the number of stations licensed to you.
2. Enter the name of the license.
3. Enter the home address of individual or address of business if license is kept at a business location.
4. Already answered.
5. The date of expiration on the license should be entered here.
6. Sign the card in this space.

The card should then be affixed to the unit.

GENERAL DESCRIPTION

The UNIMETRICS Dolphone is an all-transistor CB Handset designed specifically for mobile operation. It employs a frequency synthesizer circuit to provide 23 crystal-controlled transmit and receive channels in the 27 MHz Citizens Band.

Besides its good looks and durable finish, the Handset was designed and built for reliable, trouble-free performance and uses rugged, heat resistant transistors in all critical areas. Current drain on 12 volts DC is exceptionally low, permitting continuous mobile operation for long periods of time . . . even with the automobile's motor switched off. A heavy duty mounting bracket is provided with the Handset that permits a wide variety of mounting positions.

This transceiver is designed to operate from a nominal 12 volts DC [positive or negative ground], but may also be operated from 105 — 120 volts, 50/60 Hz AC when used with optional AC power supply unit.

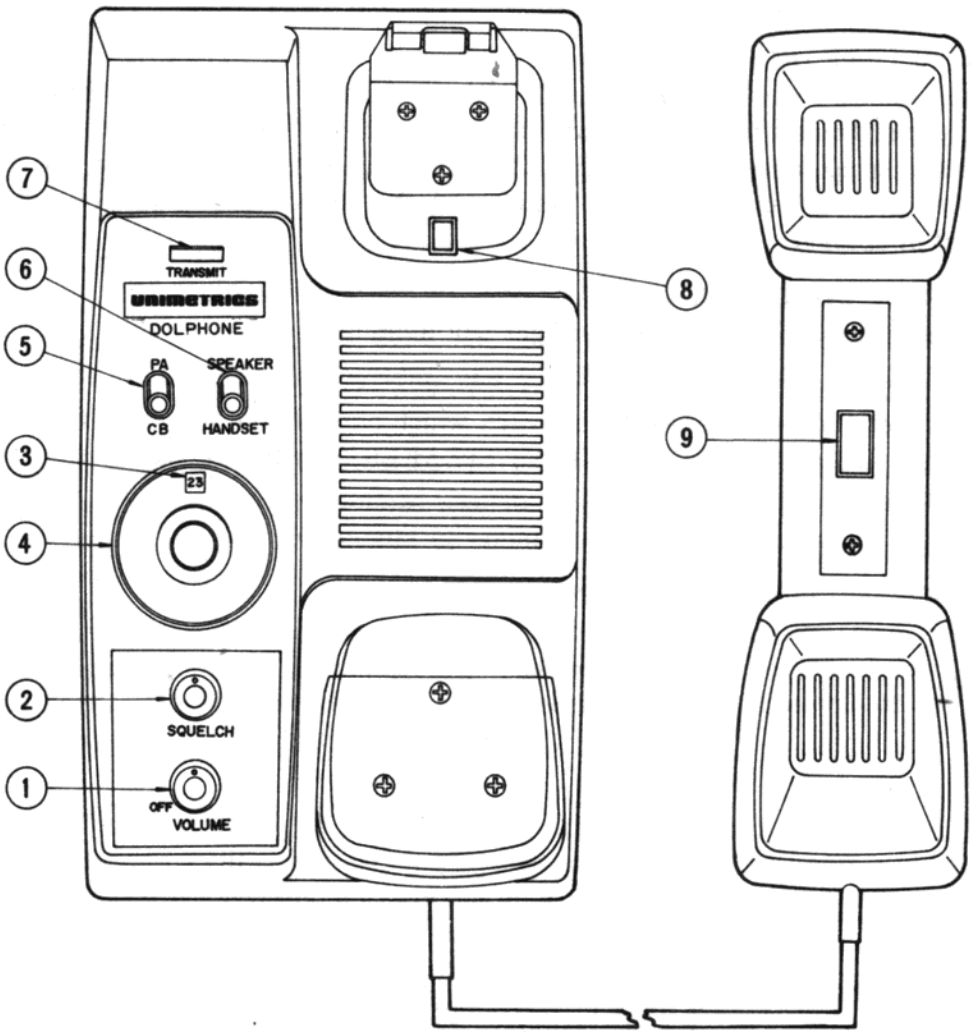
A special feature of this unit is that you may listen to a transmission privately as you would on a telephone or you may listen to a transmission simultaneously on the Handset and on the built-in speaker.

A feature of the multi-stage transmitter is the full-time "Range-Boost" circuit which concentrates more audio power into the sidebands by providing high average modulation on all syllables. This results in a greater effective range of the transmitted signal. The sensitive superheterodyne receiver with RF amplifier includes many features -- an efficient Squelch control circuit which can be used to silence the receiver when no signals are being received, push-pull audio for high output and undistorted sound, AGC [automatic gain control] to prevent overloading on strong signals and maintain uniform sound output, Automatic Noise Limiter to reduce ignition noise, plus provision for PA [public address] operation.

The Dolphone will provide economical and reliable radio communication in its intended application if installed and operated in accordance with instructions contained herein.

OPERATING CONTROLS AND FEATURES

FRONT PANEL VIEW



[1] VOLUME/ON-OFF . . . . . .

Varies the sound output from the Handset, built-in speaker, or any external speaker connected to the "EXT SP/PA" jack [located at the rear of the transceiver]. Also incorporates an "ON-OFF" power switch at the extreme counter-clockwise position.

[2] SQUELCH CONTROL . . . . . .

This control is used to eliminate any annoying background noise when no signals are present. The degree of sensitivity to incoming signals is adjustable. When the control is rotated to the extreme right position [clockwise], it provides maximum squelch; in the extreme left position [counter clockwise], it provides minimum squelch.

[3] CHANNEL INDICATOR . . . . . .

Illuminated dial in window indicates which channel is selected [1 through 23].

[4] CHANNEL SELECTOR SWITCH . . . . . .

Rotary switch selects one of 23 channels for transmit and receive operation. Illuminated window above indicates the channel selected.

[5] PA/CB SWITCH . . . . . .
In the "PA" position, the transceiver is used as a PA amplifier, providing an external speaker is connected to the "EXT SP/PA" jack [located at the rear of the unit]. Set switch to "CB" for CB operation.

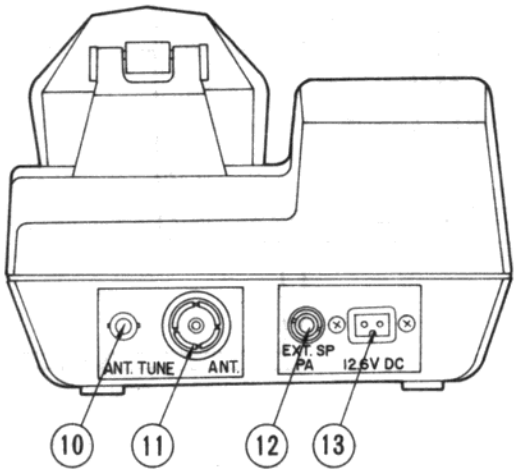
[6] HANDSET/SPEAKER SWITCH . . . . . .
With Handset removed from Cradle and this switch set to the "HANDSET" position, only the Handset is operative; with switch set to the "SPEAKER" position, handset and built-in speaker are both operative. When the Handset is in the Cradle, the AUTO switch overrides the Handset/Speaker switch and the sound output will be heard from the built-in speaker.

[7] TRANSMIT INDICATOR LIGHT . . . . . .
When transmitting, the indicator light will illuminate.

[8] AUTO SWITCH . . . . . .
Lifting of Handset releases Auto switch which cuts off the sound from the main built-in speaker, providing the "HANDSET/SPEAKER" switch is set to the "HANDSET" position.

[9] HANDSET PUSH-TO-TALK BAR . . . . . .
To transmit, fully depress the push-to-talk bar.

REAR VIEW



[10] ANTENNA TUNE . . . . . .
Adjustment for matching unit to the antenna assures maximum radiated output.

[11] ANTENNA RECEPTACLE . . . . . .
For connection of antenna lead-in cable [RG-58/U or RG-8U] with matching PL-259 type coaxial connector.

[12] EXT SP/PA JACK . . . . . .
Connection of an external speaker to this jack [8-32 ohms] permits external speaker or PA operation.

[13] 12.6 V DC POWER SOCKET . . . . . .
DC power for the transceiver is supplied through this socket.

MOBILE INSTALLATION

DC POWER CONNECTIONS

The Dolphone may be operated from a nominal 12 volts DC battery source on Negative or Positive Ground systems.

NOTE: Before making any power connections, you must determine whether the vehicle has a negative or positive ground electrical system, then make the following connections:

1. Connect the two-pin female connector on one end of the DC power cable to the "DC 12.6 V" power socket at the rear of the transceiver.
   WARNING: Do not force this connector into the power socket. It will go in only one way as indicated by the keyway on plug.

2. Using the other end of the DC power cable, connect the fused Red lead to the vehicle "+", (positive) side of the electrical system, and the Black lead to the vehicle "—" (negative) side of the electrical system.

   In the case of Negative Ground Vehicles, the Red lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The black lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis [ground].

   In the case of Positive Ground Vehicles, the Black lead should be connected to the accessory post on the ignition switch, the voltage regulator side of the ammeter or the accessory side of the fuse block. The Red lead should be connected to the metal firewall or any other point that is connected to the vehicle chassis [ground].

TRANSCEIVER MOUNTING

Before installing the transceiver in a car, truck, boat, etc., be sure to choose a location which is convenient to the operating controls, and will not interfere with the normal functions of the driver. A heavy duty universal mounting bracket is supplied with the unit. This mounting bracket permits a wide variety of mounting options. The most popular mounting location in a car is on the transmission hump; on larger vehicles such a trucks, motorhomes, etc., the handset may be mounted on top of the dash, or any other desired location.

Figure 1 illustrates the complete assembly of the universal mounting bracket. Bracket A attaches directly to the handset unit with four Phillips-head machine screws and Bracket B to the mounting surface with six self-tapping screws. Two knurled thumbscrews are used to secure the two brackets together. Two additional black anodized Phillips-head machine screws with washers are provided which pass through the slots in Bracket A and engage in the tapped holes in Bracket B. Prior to the tightening of the two thumbscrews and the two black Phillips-head screws and washers, the handset unit should be tilted to the desired angle to suit the location; these screws should then be tightened to secure the handset at the selected angle. Note that Brackets A and/or B can be reversed, thus permitting a total of four different mounting configurations, as shown in Figures 2 through 5. The configurations shown in Figures 2 and 3 are the most desirable [particularly for mounting on a horizontal surface] since the handset will be supported at its center and thus result in a slightly more rigid mounting. However, in some locations, these may not be suitable and you may have to use the configuration shown in either Figure 4 or 5 [these are particularly suitable for mounting on a vertical surface].

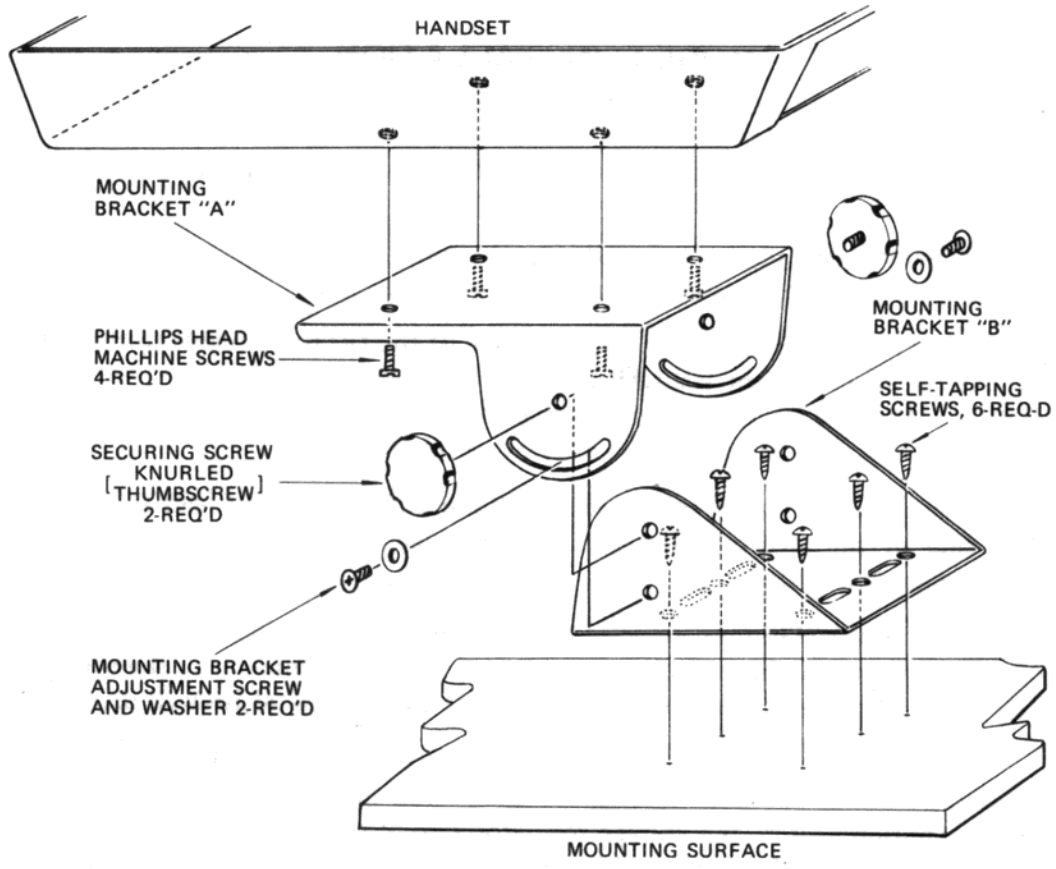


FIGURE 1. TRANSCEIVER MOUNTING, EXPLODED VIEW

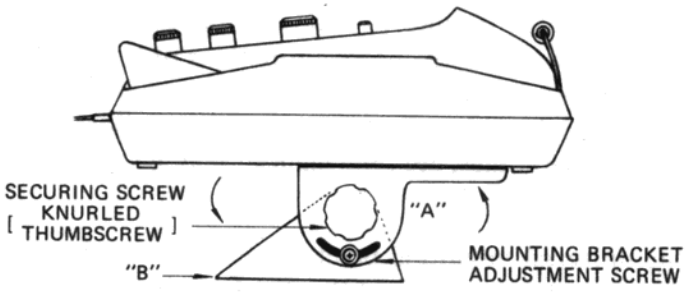


FIGURE 2.

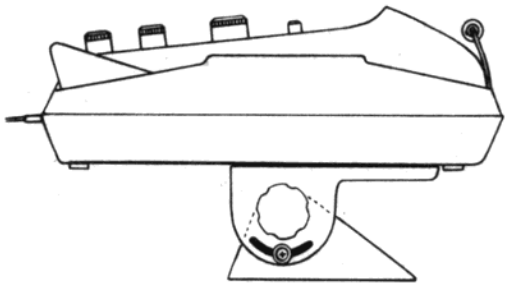


FIGURE 3.

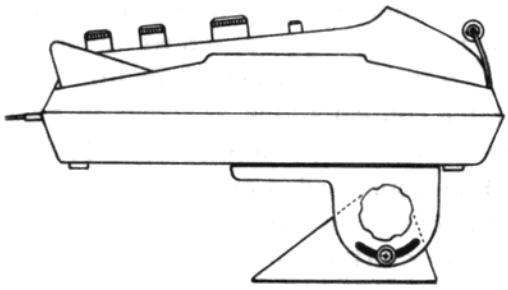


FIGURE 4.

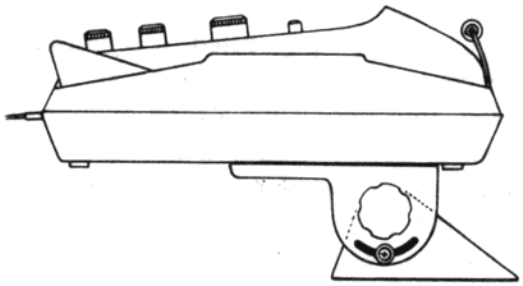


FIGURE 5.

In order to properly determine the best mounting arrangement, we suggest you temporarily position the handset in the desired location, with the brackets assembled to the handset as in Figure 1 [but do not attach Bracket B to the mounting surface with screws]. Try different bracket configurations if necessary, as illustrated in Figures 2, 3, 4 or 5. When you have selected the configuration which appears to be best for the particular location you have chosen, proceed as follows:

1. Remove the two knurled thumbscrews and the two Phillips-head machine angle adjustment screws and washers and detach Bracket B [Bracket A should be left attached securely to the handset unit in the desired manner].

2. Now attach Bracket B to the mounting surface in the selected location, using the six self-tapping screws supplied. Tighten the screws firmly so that the bracket is secure.

3. Assemble Bracket A [which is attached to the handset] to Bracket B as before, using the two knurled thumbscrews and the two angle adjustment screws. Tighten these screws securely after you have tilted the handset to the desired angle.

WALL MOUNTING IN A HOME

To mount transceiver vertically on a wall in a home, simply attach the two small mounting brackets to the back of the unit as shown in Figure 6, using two Phillips-head machine screws supplied. Then attach transceiver with brackets to wall using the two wood screws supplied.

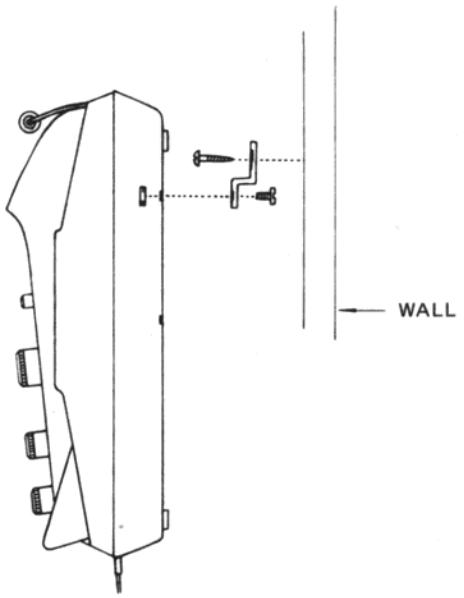


FIGURE 6.

ANTENNA CONNECTING

The antenna lead-in cable should be terminated with a PL-259 type male connector. Attach to the matching antenna input connector at the rear of the transceiver.

AC OPERATION

As supplied, the Dolphone Transceiver is designed to operate from a 12 volt DC battery source as stated previously. See section titled "DC Power Connections". For AC operation [house current], the solid state AC power supply unit and the interconnecting DC output cable are required. The AC line cord from the power supply unit should be connected to an outlet supplying 105 — 120 volts, 50/60 Hz AC, and the DC output cable [from the AC power supply] plugged into the "DC 12.6V" power socket at the rear of the transceiver.

AUTO IGNITION INTERFERENCE SUPPRESSION

Your transceiver is equipped with a full-time Automatic Noise Limiter designed to provide efficient reduction of ignition noise. Ignition interference should not therefore be a problem in most cases. However, sufficient noise may be generated by some vehicles to make it necessary to install additional suppression. Several noise suppressor kits are available which include all necessary parts and instructions. Alternatively, you can take the vehicle to a skilled auto radio technician who will be able to carry out the suppression for you.

ANTENNAS

The results obtained with your Dolphone transceiver will be greatly determined by the efficiency of the antenna system used.

Due to the complexity of the subject, it is not within the scope of this manual to provide detailed information on antenna systems. Although this section does contain some general information which may be of value to the beginning CB enthusiast, we suggest you purchase one of the numerous books available which covers this subject in greater detail.

MOBILE ANTENNAS

The type of antenna best suited for mobile service is a vertically polarized whip antenna. The vertical whip is non-directional and can be of the loaded type [top, center or base loaded], or a full quarter-wave, the latter usually being more efficient. Both types use the metal body of the vehicle as a "ground plane". There are a number of locations that may be used for the installation of an antenna on a car. Four of the most popular locations are those shown in Figure 7.

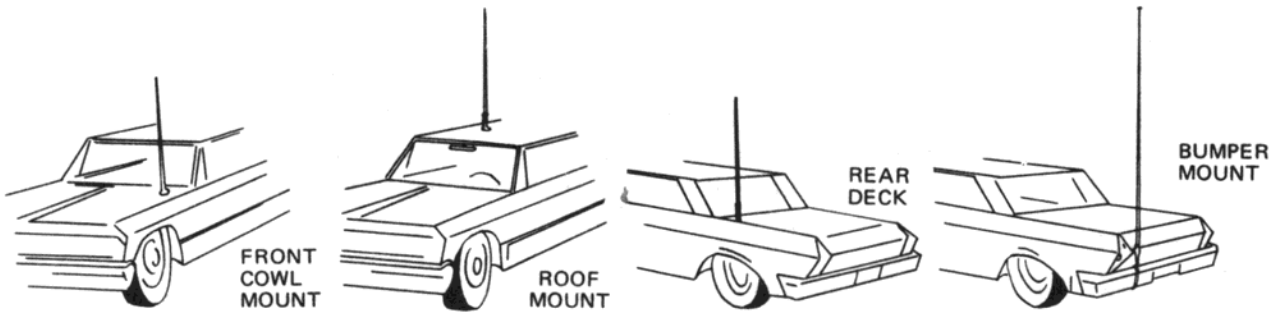


FIGURE 7. MOBILE ANTENNA MOUNTING

FRONT COWL MOUNTING

Front cowl mounting offers a number of advantages. The CB antenna can be mounted in place of the regular auto radio antenna and will thus provide the minimum of installation problems. The antenna can then be used for both the CB and standard auto radio by employing any of the commercially made two-way couplers available. In this location you can install a short loaded whip, with only a small loss of efficiency.

The horizontal radiation pattern in such a location is slightly irregular, radiation being slightly greater in the direction of the rear fender opposite to the side on which the front cowl antenna is mounted.

ROOF MOUNTING

Roof mounting is usually the best location because it provides an almost perfect omnidirectional radiation pattern. However, the use of a full 108-inch quarter-wave antenna on the roof of a vehicle is fairly impractical and a shorter, loaded whip is usually installed in this location, even through this type offers lower efficiency.

REAR DECK MOUNTING

Rear deck mounting permits the use of a full quarter-wave antenna or a shorter, loaded whip. The radiation pattern in such a location is somewhat irregular, radiation being slightly greater in the direction of the front fender opposite to the side on which the rear deck antenna is mounted.

BUMPER MOUNTING

This arrangement uses the rear bumper of the car and is by far the most practical for use with full 108-inch quarter-wave whips. Another advantage is that removal of the antenna is simple and leaves no holes in the car body. The radiation pattern produced by an antenna mounted on the left rear bumper is fairly irregular, with greatest radiation being in two directions -- one to the right and forward slightly, the other to the rear and left slightly.

BASE STATION ANTENNAS

SHORT RANGE

A short, center-loaded whip antenna is available from UNIMETRICS.
This antenna mounts directly onto the antenna connector on the transceiver and is ideally suited for short-range communications within buildings, or from building to building.

LONG RANGE

There are two basic types of long-range antennas as shown in Figure 8.

FIGURE 8. BASE STATION ANTENNAS

A. Vertical Ground Plane Antennas. These are omni-directional antennas that provide optimum performance for contacting other fixed stations using vertical type antennas in additional to all mobile stations. For medium-long range communications work.
B. Directional Beam Antennas. Highly efficient and directional antennas generally intended for fixed-to-fixed long range communications.

OPERATING INSTRUCTIONS

IMPORTANT: FCC REGULATIONS REQUIRE THAT THE DC INPUT TO THE FINAL OUTPUT STAGE BE LIMITED TO 5 WATTS FOR CB OPERATION. REMEMBER, IT IS YOUR RESPONSIBILITY TO SEE THAT THIS FIGURE IS NOT EXCEEDED.

Make sure the transceiver is properly installed as indicated previously, and that the antenna and power source are connected.

CAUTION: NEVER ATTEMPT TO TRANSMIT WITHOUT AN ANTENNA CONNECTED TO THE TRANSCEIVER.

RECEIVING

1. Rotate the "SQUELCH" control to the extreme counter-clockwise position.
2. Select desired channel by rotating the channel Selector Switch to the desired position as indicated by the channel indicator.
3. Set the "PA/CB" switch to the "CB" position.
4. Rotate the "VOLUME/ON-OFF" switch clockwise to apply power to the transceiver. Since the transceiver is fully transistorized, operation will be instantaneous.

5. With Handset in the Cradle, set the "HANDSET/SPEAKER" switch to the "HANDSET" position [the main built-in speaker will still be operative]. To listen privately, lift Handset from Cradle and listen as with a telephone. The main built-in speaker is now cut off and only the Handset speaker may be heard. Adjust volume for desired level in Handset. If you wish to switch the sound to the main built-in speaker [so that others can also hear], set the "HANDSET/SPEAKER" switch to the "SPEAKER" position.

HANDSET/SPEAKER SWITCH

When the Handset is in the Cradle, the AUTO switch overrides the Handset/Speaker switch and the sound output will be heard from the main built-in speaker.

Lifting of the Handset from the Cradle releases the AUTO switch which cuts off the sound from the main built-in speaker, providing the "HANDSET/SPEAKER" switch is set to the "HANDSET" position. When the "HANDSET/SPEAKER" switch is in the "SPEAKER" position, the sound output will be heard from the Handset speaker and main built-in speaker simultaneously.

When returning the handset to the cradle, always insert the mouthpiece end into the holder first, then push the earpiece end down into position firmly so that the handset is locked securely in position and will not come loose.

The Handset/Speaker Switch is inoperative in the Transmit Mode of Operation.

SQUELCH ADJUSTMENT

The Squelch control is used to eliminate any annoying background noise when no signals are present. To adjust the receiver Squelch control properly during reception, turn up volume until background noise is heard [no signals should be present]. Rotate the Squelch slowly clockwise until the background noise disappears. At this point, the receiver will be quiet under "no-signal" conditions, but an incoming signals will overcome the squelch action and be heard. Since this control is variable, it can be used to provide varying degrees of sensitivity to incoming signals are needed to overcome it. To receive extremely weak signals or to disable the sauelch circuit, simply turn the control fully counter-clockwise.

NOTE: In areas of high noise, you may have to slightly increase the setting of the "Squelch" in order to achieve a "quiet" condition. However, under these conditions and extremely weak signal may not be able to overcome the squelch action and will not be heard. If severe noise is generated by your own vehicle, proper vehicle ignition suppression should be carried out.

TRANSMITTING

To transmit, lift the handset from the Cradle and depress the Handset Push-To-Talk Bar. The "TRANSMIT" Indicator light will illuminate, indicating that you are in the Transmit mode of operation. The Handset is as easy to use as your telephone; simply speak into the handset mouthpiece in your normal tone of voice. Shouting will not increase the range of your transmission in any way and may actually cause distortion. When you are transmitting, the receiver is silenced and reception is therefore impossible. In the same way, your signal cannot be heard by another station when he is transmitting -- each must take turns. To receive again, simply release the Handset Push-To-Talk Bar. After you have finished your communications with another station, replace the handset in the cradle securely.

RANGE-BOOST

Range-Boost circuitry increases the modulation density in the sidebands and increases the average audio in your signal, permitting it to be heard under conditions which might otherwise make its reception impossible. Never shout or raise your voice since this will not increase the range of your transmission in any way.

PUBLIC ADDRESS OPERATION

Special provision has been made for Public Address [PA] operation utilizing the Handset and audio stages in the transceiver. For PA operation, you should use an external 8 — 32 ohm speaker connected to the "EXT. SP/PA" jack [located at the rear of the transceiver]. Set the "PA/CB" switch to the "PA" position, press the push-to-talk bar on the handset and talk into it -- your voice will be heard from the external speaker [which may be mounted on the exterior of a car or building]. The recommended plug for the "EXT. SP/PA" jack is a "TINI-PLUG" subminiature phone plug. When the handset push-to-talk bar is released, the transceiver will return to the CB receiver mode.

NOTE: During PA operation, the VOLUME control on the transceiver is inoperative.

Remember, if you wish to transmit on CB once again, set the "PA/CB" switch to the "CB" position.

OPERATING PROCEDURE

A Citizens Band station is NOT intended to be a replacement for a "ham" station. Transmission of a "CQ" [calling any station] to alert any station that might be listening is in violation of Citizens Band Regulations [except in an emergency]. For information on permissible types of communications, you should always refer to Part 95 of the FCC Rules and Regulations.

MAXIMUM RF OUTPUT POWER

The transceiver should be peaked for maximum RF power output at the actual installation with the antenna connected. This can be done by adjusting the ANT TUNE trimmer [at rear] for maximum radiated power on an RF field strength meter. Depress the push-to-talk button with the channel selector on channel 11 for this adjustment and be sure to place the meter at least 20 feet from the antenna to ensure accurate results [you may otherwise obtain erroneous readings due to radiation from the antenna cable]. This adjustment should be done by a properly licensed technician.

CHANNEL	CHANNEL FREQUENCY
1	26.965
2	26.975
3	26.985
4	27.005
5	27.015
6	27.025
7	27.035
8	27.055
9	27.065
10	27.075
11	27.085
12	27.105
13	27.115
14	27.125
15	27.135
16	27.155
17	27.165
18	27.175
19	27.185
20	27.205
21	27.215
22	27.225
23*	27.255

* Channel 23 is shared with Class C Radio Control.