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Cobra 28 Owner's Manual

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INSTRUCTION MANUAL

COBRA 28

**SOLID STATE CITIZENS BAND
2 WAY RADIO**



A PRODUCT OF

DYNASCAN CORPORATION

1801 W. BELLE PLAINE AVE., CHICAGO, ILLINOIS 60613

INSTRUCTION MANUAL

FOR

COBRA 28

CITIZENS BAND

SOLID STATE

2 WAY RADIO

WITH EXCLUSIVE

CHANNEL ⑨ SCAN-ALERT

PRODUCT OF DYNASCAN CORPORATION

6460 W. Cortland Street

Chicago, Illinois 60635

MODEL COBRA 28

SPECIFICATIONS

GENERAL

Channels	23
Frequency Range	26.965 to 27.255 MHz
Frequency Control	Synthesizer
Frequency Tolerance	0.005%
Operating Temperature Range	-30°C to +50°C
Humidity	90% Relative
Microphone	Plug-in type; dynamic with push to talk switch and coiled cord
Input Voltage	13.8 VDC nom. 15.9 V max. 11.7 V min. (Reversible ground)
Current Drain	Transmit: AM full mod., 1.8A; Receive: Squelched, 0.3A, Full audio output, 1.3A.
Size	2.36" H, 6.0" W, 8.46" D.
Weight	4.5 pounds
Antenna Connector	UHF, SO239
Semiconductors	35 transistors, 1 Field Effect Transistor, 2 Integrated Circuits, 31 Diodes, 1 Thermistors
Meter	Illuminated, indicates relative power output and received signal strength

TRANSMITTER

Power Input	5 Watts
Modulation	High and low level Class B
Modulation Capability	100%
Frequency Response	300-2500 Hz
Output Impedance	50 Ohms, unbalanced

Output Indicators

Meter shows relative RF output; transmit light indication proportional to modulation.

RECEIVER

Sensitivity

Less than .5 μ V for 10 DB
(S+N)/N

Selectivity

6 db @ 4 KHz, 50 db @ 20 KHz.

Image Rejection

40 db

I.F. Frequencies

Double conversion, 1st: 10.595 to 10.635 MHz; 2nd: 455 KHz

Automatic Gain Control

(AGC): Less than 12 db change in audio output for inputs from 10 to 500,000 microvolts

Squelch

Adjustable. Threshold less than 1 μ V.

Noise Blanker

RF, balanced diode gate

Delta Tune Range

\pm 1.5 KHz

Audio Output Power

2.5 Watts into 8 Ohms

Frequency Response

500-2000 Hz; +3 db, -12 db

Distortion

Less than 10% @ 2.5 Watts
@ 1000 Hz

Built-in Speaker

16 Ohms, 6.3" \times 2.35"

External Speaker(Not Supplied)

8 Ohms. Disables internal speaker when connected

PA SYSTEM

Power Output

3 Watts into external speaker

External Speaker for PA
(Not Supplied)

8 Ohms. When PA-CB switch is in PA, the PA speaker also monitors the receiver

MODEL COBRA 28 INSTRUCTION MANUAL

Introduction

The Model Cobra 28 has been designed to provide high level trouble-free performance in the Citizens Radio Service which is comprised of the following frequency assignments:

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

To insure that you obtain the maximum performance from your Model Cobra 28 please read carefully the following control descriptions and operating instructions.

NOTE: These transceivers have been designed for use in Class "D" operation in the 11 meter citizens radio service. They are designed to meet the Federal Communications Commission requirements applicable to equipment operating in Class "D" service, and not to be used for any other purpose. Part 95, (formerly Part 19) of the F.C.C. regulations defines operation in this service, and you are required to read and understand these regulations prior to operating this equipment. Copies of Manual VI (covering the F.C.C. regulations for Amateur and Citizen's Band Radio Service) include Part 95 and are available for \$2.00 from the Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20402. You are also required to submit a completed copy of F.C.C. Form 505 prior to operating this equipment on the air. **YOU WILL BE IN VIOLATION OF PART 95 OF THE REGULATIONS IF YOU OPERATE THIS EQUIPMENT ON THE AIR PRIOR TO RECEIVING YOUR LICENSE AND CALL SIGNS.**

Warning: Transmitter section adjustments must be performed by a qualified technician holding a valid first or second class FCC radiotelephone License.

SECTION 1

COBRA 28 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 the vehicle. In automobiles, the transceiver is usually mounted to the underneath of the dash panel, with the microphone bracket beside it.

Mounting and Connection

The Cobra 28 is supplied with a universal mounting bracket. The transceiver is held in the bracket by four hex-head bolts, permitting adjustment at the most convenient angle.

The bracket must be mounted with the machine screws and nuts supplied. The mounting must be mechanically strong and also provide a good electrical connection to the chassis of the vehicle. Proceed as follows to mount the transceiver:

1. Use the mounting bracket as a template to locate the position for mounting the transceiver.
2. Mark the mounting hole locations to correspond with the bolts in the bracket.
3. Drill two $\frac{1}{4}$ inch diameter holes, being careful not to damage any wiring in the area. Clean the area around each hole and scrape free of paint to provide a good electrical connection between the bracket and mounting surface.
4. Mount the bracket with machine screws and nuts supplied.
5. Slide the transceiver into the mounting bracket. Adjust for the desired angle and insert the four $\frac{1}{4}$ inch- $20 \times \frac{5}{16}$ " long hex head bolts with $\frac{1}{4}$ inch external tooth lockwashers into the tapped holes on each side of the case. Tighten the four hex head bolts using a wrench.
6. Connect the antenna cable plug to the standard receptacle on the rear panel. Most citizen band antennas are terminated with a type PL-259 plug and mate with the receptacle.
7. Connect the DC power input wire with the fuse to +12V DC. This wire extends from the rear panel. In automobile installation +12V 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 ac-

cessory contact on most ignition switches by tracing the power wire from the AM broadcast receiver in the car.

8. Connect the black leads to -12 V DC. This is usually the chassis of the car. Any convenient location with good electrical contact (remove paint) may be used.
9. 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 the microphone is readily accessible.

Antenna

Since the maximum allowable power output of the transmitter is limited by the FCC the antenna is one important factor affecting transmission distance. Only a properly matched antenna system will allow maximum power transfer from the 52 Ohm transmission line to the radiating element. In mobile installations (cars, trucks, boats, etc.,) an antenna system that is nondirectional should be used.

A vertically polarized quarter-wavelength whip antenna provides the most reliable operation and greatest range. The shorter, loaded-type whip antennae 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 the full quarter wavelength whip.

Mobile whip antennae 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 nondirectional. 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.

Ignition Noise Interference

The usability of a mobile receiver at low signal levels is normally limited by the presence of electrical noise. The primary source of noise in automobile in-

stallations 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 Cobra 28 has a selectable automatic noise limiter and a selectable noise blanker in some installations ignition interference may be high enough to make good communication impossible.

The electrical noise may come from several sources. Many possibilities exist and variations between vehicles require different solutions to reduce the noise. Consult a skilled 2-way radio technician for help in locating and correcting the source of severe noise.

Unfortunately, there is no herd and fast rule for the elimination of noise. The worst offender will be the ignition system of gasoline engine powered boats. Generators on both gasoline and diesel engines, auxiliary generators, electric motors on refrigerators, bilge pumps, fans, etc., must be filtered by the use of a "spark shield" made to fit most common gasoline marine engines. These shields are easily installed and can be removed for spark plug and point servicing in less than a minute.

Auxiliary generators on cars and boats are quieted by installing capacitors. Use capacitors in metal cans and of the highest quality. We recommend that a 1.0 μ fd capacitor be used. This is larger than normally used in automobile installations, but the same capacitor can be used to filter other motors. Install capacitors at the generator armature terminal or, in extreme cases, directly on each brush holder. The metal can is connected to the generator frame. NEVER CONNECT A CAPACITOR TO THE FIELD TERMINAL OF A GENERATOR.

Voltage regulators on the generators are frequently a source of troublesome noise. Before attempting any filtering on the regulator have it cleaned and adjusted by an expert. If noise is still present, install capacitors on the field terminal.

Base Station Operation

(Operation from 110-120V AC, house current)

To operate your transceiver from your home or office, using the regular house current as the power source, you will require the DYNASCAN PAC-24 Power Station which has been specially designed for the purpose. It is available as optional equipment from your dealer. It consists of a precision built AC-DC power converter which delivers the required 12-volt d-c power for op-

eration of the transceiver. The PAC-24 operates from 120 volt 60-hertz power source. Simply connect the red (+) and black (-) leads of the transceiver to the corresponding terminals of the PAC-24.

NOTE

Do not attempt to operate this transceiver by connecting directly to 110 Volts AC.

When the PAC-24 AC Power Station is used with the transceiver for base station operation, any Citizens Band beam, dipole, ground plane or vertical antenna may be used. A ground plane vertical antenna will provide the most uniform horizontal coverage.

This type of antenna is best suited for communication with a mobile unit. For point-to-point operation where both stations are fixed, a directionally beam will usually increase communication range since this type of antenna concentrates transmitted energy in one direction. The beam antenna also allows the receiver to "listen" in only one direction thus reducing interfering signals.

Antenna height is an important factor when maximum range is desired. Keep the antenna clear of surrounding structures or foliage. FCC regulations limit antenna height to 20 feet above an existing structure. Use the minimum length of lead-in cable to minimize line losses.

Public Address

An external 8 Ohm, 3 watt speaker may be connected to the PA speaker 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 must be used when operating the PA at high output levels.

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.

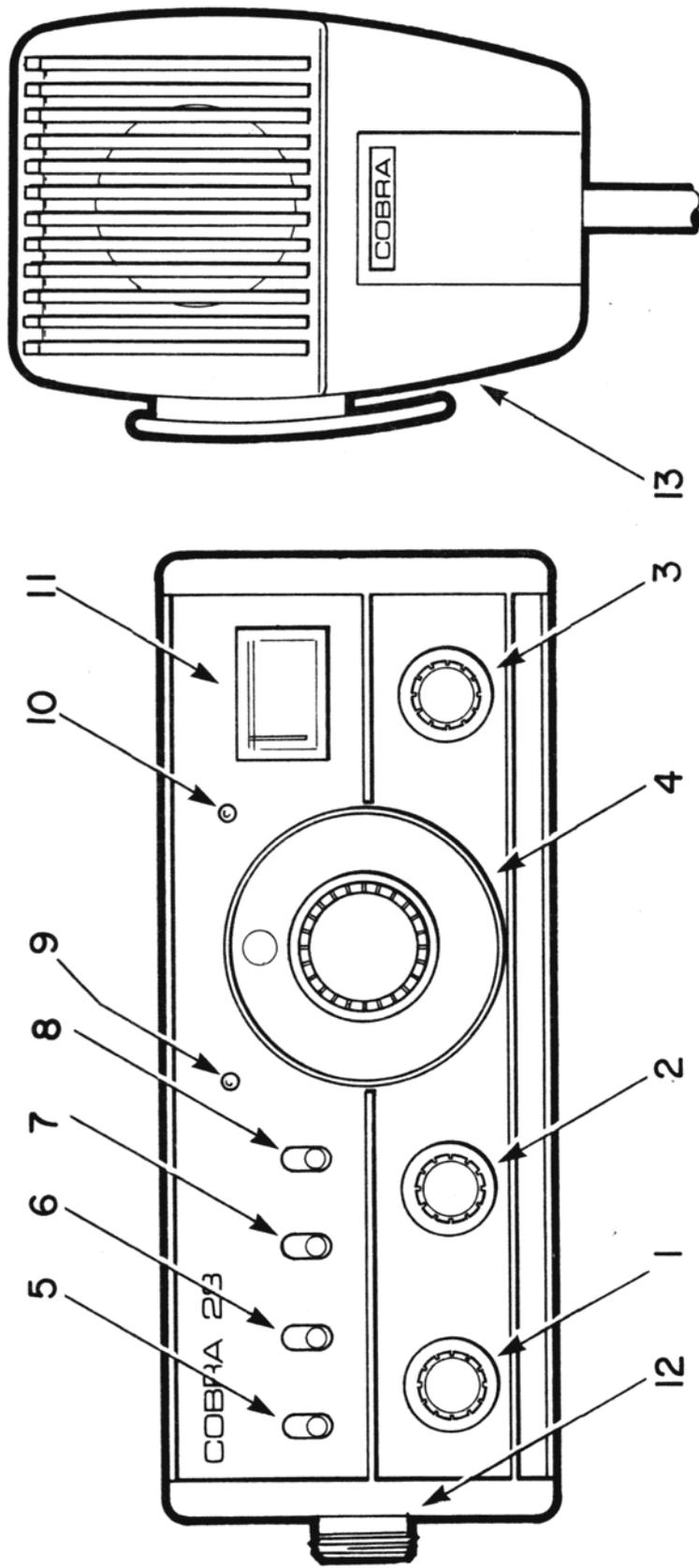


FIGURE 1. COBRA 28 OPERATOR'S CONTROLS

SECTION II

OPERATION

NOTE: Refer to Figure 1, "Cobra 28 Operator's Controls" Paragraph numbers correspond to the numbered controls on figure.

A. Control Functions

- 1. OFF/ON VOLUME.** Turn clockwise to apply power to the unit and to set the desired listening level. During normal CB or PA operation the VOLUME control is used to adjust the output level obtained either at the transceiver front panel speaker, the external speaker, if used, or the external PA speaker.
- 2. SQUELCH.** This control is used to cut off or eliminate receiver background noise in the absence of an incoming signal. For maximum receiver sensitivity it is desired that the control be adjusted only to the point where the receiver background noise or ambient 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 signals will be heard at a maximum clockwise setting.
- 3. DELTA-TUNE.** For normal operation set the control to the center "click-stop" position. This feature has several uses and can greatly enhance receiver operation. First, if a received signal is slightly off frequency, the Delta-Tune control can be operated as required to optimize the received signal level. The effectiveness of the Delta-Tune feature under these conditions can be observed either by listening for a more readable signal at the speaker or by noting the S-meter reading when the Delta-Tune control is operated. Another effective application of this control is in eliminating adjacent channel interference. If it is verified that an exceptionally high level signal from an adjacent channel is creating interference on the channel being used, the Delta-Tune can be used to minimize or eliminate the interference. Operate the control as required to obtain minimum adjacent channel interference.
- 4. CHANNEL SELECTOR.** This switch selects any one of the twenty-three Citizens Band channels desired. The selected channel is illuminated in the circle portion of the Channel Selector dial directly above the Channel Selector knob. Channels 10 thru 15 and 23 may be used for communications between stations operating under the same license. Channel 9 has been reserved by the FCC for emergency communications involving the imme-

diate safety of life of individuals or immediate protection of property. Channel 9 may also be used to render assistance to a motorist.

5. **ANL/NB SWITCH.** In the ANL position only the automatic noise limiter in the audio circuits is activated. When the switch is placed in the NB position the RF noise blanker is also activated. The RF noise blanker is very effective for repetitive impulse noise such as ignition interference.
6. **PA-CB SWITCH.** Selects the mode of operation. The PA function should not be used unless an external speaker is connected as described in Installation Section of this manual. In the CB position, the PA function is disabled and the unit will transmit and receive on the selected frequency.
7. **EMERGENCY CH 9 SCAN.** This switch activates the automatic scanning circuitry to alternately change the frequency of the receiver between Ch. 9 and the channel indicated on the CHANNEL SELECTOR (#4). The squelch control must be advanced clockwise until receiver noise disappears to start the scanning action.
8. **EMERGENCY CH 9 HOLD.** When operating in the SCAN position, use the Hold switch when it is desired to lock the unit to Ch 9 operation independently of the CHANNEL SELECTOR (#4).
9. **CH 9 INDICATOR.** Light glows red when receiver is on Ch 9 in the SCAN mode or when the transceiver is locked in the HOLD position.
10. **OUTPUT INDICATOR LAMP.** The green jeweled lamp located above the channel selector is a proportional output indicating device. When the transmitter is keyed, the lamp will be illuminated to approximately 60% of full brightness and will brighten as the transmitter is modulated. The first brightness level is indicative of the AM carrier output strength and full brightness is achieved when voice modulation is applied to the carrier since the carrier peak output is increased with modulation.
11. **PWR/S METER.** Shows relative transmitter power when transmitting and input signal strength when receiving. Illuminated when power is on.
12. **MICROPHONE JACK.** The microphone is connected to this jack. A matching four pin connector is supplied attached to the microphone. The following chart shows the pin functions:

Pin Number	Function
1	Audio Shield
2	Audio Lead
3	Relay Control (PTT)
4	Relay Control Ground

13. **PRESS-TO-TALK MICROPHONE.** The receiver and transmitter are

controlled by the press-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 radios come complete with the low impedance dynamic microphone, see Appendix A for installation instructions on other microphones.

B. OPERATING PROCEDURE TO RECEIVE.

1. Place CB-PA switch in CB position.
2. Turn the set ON by turning the VOLUME control clockwise, until a click is heard.
3. Set the VOLUME for a comfortable listening level.
4. 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 control at this setting. The SQUELCH 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 the weaker signals will not be heard.
5. Set the CHANNEL selector switch to the desired channel.
6. Set the DELTA TUNE control to the click stop position (the center position of the control knob).
7. Set the ANL-NB switch to the ANL.

C. OPERATING PROCEDURE TO TRANSMIT.

1. Select the desired channel of transmission.
2. If the channel is clear, depress the push-to-talk switch on the microphone and speak in a normal voice. The output lamp will light, indicating proportional output power.

D. ACCESSORY CIRCUIT OPERATION

1. DELTA TUNE OPERATION

DELTA TUNE control is used to control the receiver frequency. It can be continuously varied over ± 1.5 KHz of channel center frequency.

2. ANL-NB OPERATION

Slide the ANL-NB switch to NB position. It activates the noise reduction circuits of the automatic noise limiter plus RF noise blanker.

3. CHANNEL 9 SCAN OPERATION

Slide CH 9 SCAN switch to SCAN position and turn the SQUELCH con-

trol slowly clockwise until the noise disappears. The CH 9 indicator light and the Channel Indicator light will then flash alternately. An incoming signal on either CH 9 or the selected channel will cause the receiver to lock automatically on the active channel and the received message can be monitored.

When the received transmission is completed, the receiver will resume scanning between Channel 9 and the operating channel selected. If the operator wishes to transmit upon completion of the received message, the transmitter output will always be on the illuminated CHANNEL selector frequency.

4. CHANNEL 9 HOLD OPERATION

With the CH 9 SCAN switch in the CH 9 SCAN position, the CH 9 HOLD switch is used to lock both the transmitter and receiver to CH 9 operation independently of the Channel Selector switch. The operator can now transmit and receive on Channel 9 without having to reset the Channel Selector switch to Channel 9.

E. PUBLIC ADDRESS (PA) OPERATION

To use this feature, a speaker having a voice coil impedance of 8 ohms and a power handling capability of at least three watts should be used. This speaker must be plugged into the PA SPKR jack at the rear of the transceiver. If the public address feature is to be used primarily for outdoor applications, the use of a weatherproof horn type public address speaker is recommended. The durability of this type speaker plus the inherent efficiency of such a speaker will provide more than adequate results when combined with the high audio output level available from the Model Cobra 28. To operate the public address function, proceed as follows:

Place the PA-CB switch to the PA position.

If it is not desired to monitor receiver output when using the public address feature, turn the SQUELCH control fully clockwise. This will permit only high level received signals to be heard. Complete elimination of outside signals can be obtained by disconnecting the antenna cable from the transceiver. With the PA speaker connected as outlined previously, be sure that there is physical separation between the microphone and the speaker itself. If the speaker is located close to the microphone, acoustic feedback will result when the public address system is operated at high volume. A directional type outdoor speaker reduces the amount of isolation required. Some experimentation will determine the minimum amount of isolation required for a given sound level from the public address system.

SECTION III

MAINTENANCE AND ADJUSTMENT

The Transceiver is specifically designed for the environment encountered in mobile installations. The use of all solid state circuitry and its light weight result in high-reliability. Should a failure occur, however, replace parts only with identical parts. Do not substitute. Refer to the schematic diagram and parts list.

WARNING

Federal law requires that adjustment of the radio frequency section of this transceiver may not be made by a citizens band operator. Only a United States licensed first or second class commercial license holder may tune the transmitter sections of this transceiver, FCC part 95D section 95.97d.

ADJUSTMENT

The transceiver is factory aligned and should not require any adjustments when used with a 50 ohm antenna. If an antenna other than 50 ohms impedance is used, adjustment of the transmitter output circuit may be made to obtain optimum power transfer to the antenna. This adjustment should be made only by qualified personnel using a high quality in-line r-f wattmeter which will not produce standing waves when inserted in the antenna cable. There are two adjustments involved in peaking the output of the transmitter into the antenna proceed as follows.

- (1) Connect the r-f wattmeter into the antenna connector on the rear of the transceiver. Connect the antenna cable to the r-f wattmeter.
- (2) Using an insulated screw driver tool, adjust slug-tuned coil for maximum r-f output. This coil is accessible through the hole at the bottom of the transceiver.

NOTE: If the performance described in the OPERATION and MAINTENANCE AND ADJUSTMENT sections is not obtained, review the operating instructions to insure that proper procedures were followed. If a problem still exists, refer to the WARRANTY SERVICE INSTRUCTIONS on the last page of this manual.

APPENDIX A

ALTERNATE MICROPHONES AND INSTALLATION

For best results the user should select a low impedance dynamic type micro-

phone or a transistorized microphone. The transistorized type microphones have a low output impedance characteristic. Some microphones are provided with a four-lead cable. The audio conductor and its shielded lead comprise two of the leads. The third lead is the push-to-talk lead for the transceiver keying circuit, and the fourth lead is the push-to-talk ground return. The following table indicates the wiring arrangement for both types of microphone cables.

3 Wire Mic Cable		4 Wire Mic Cable	
Pin Number	Mic Cable Lead	Pin Number	Mic Cable Lead
1	Audio Shield	1	Audio Shield
2	Audio Lead	2	Audio Lead
3	Relay Control (PTT)	3	Relay Control (PTT)
4	Connect to Pin 1	4	Relay Control Ground

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

1. The leads should be cut so that they extend $\frac{7}{16}$ " beyond the plastic insulating jacket of the microphone cable. See Figure 1 below.

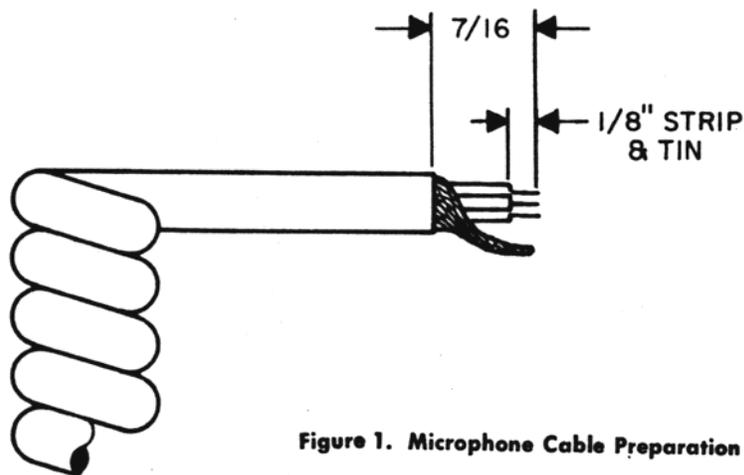


Figure 1. Microphone Cable Preparation

2. All leads should be cut to the same length. Strip the ends of each wire $\frac{1}{8}$ " 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 heat required in soldering the connections. Keep the exposed wire lengths to a minimum to avoid shorting when the microphone plug is reassembled.

To wire the microphone cable to the plug provided, proceed as follows (see Figure 2):

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 2B.

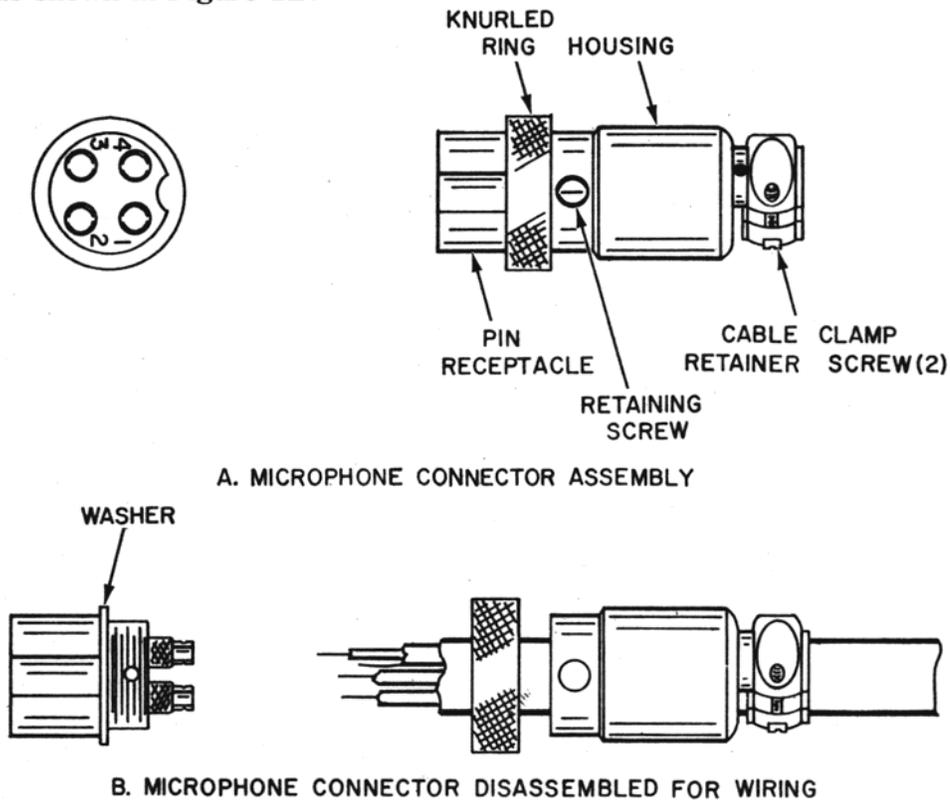


Figure 2. Microphone Plug Wiring.

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 Figure 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.

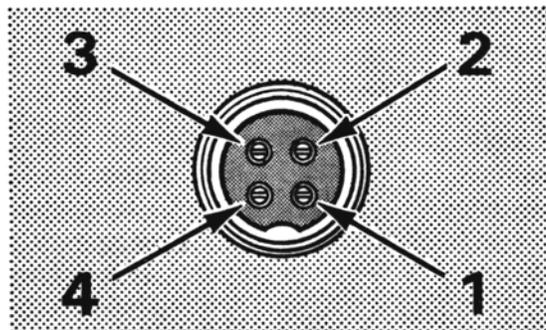


Figure 3. Microphone Plug Pin Numbers Viewed from Rear of Pin Receptacle

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.

If the microphone jack is used to hold the pin receptacle during the soldering operation, best results are obtained if the connections to pins 1 and 4 are made first and then the connections to pins 2 and 3. Use a minimum amount of solder and be careful to prevent excessive solder accumulation on the pins. This may 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 onto the pin receptacle body, a final fraction of a turn either clockwise or counter clockwise 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.
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, the microphone plug is then secured to the front panel MIC connector.

APPENDIX B

10-CODE

Citizen band radio operators have largely adopted the 10-code for standard questions and answers. Its use permits faster communication and better understanding in noisy areas. The following table lists some of the more common codes and their meanings.

<u>Code</u>	<u>Meaning</u>	<u>Code</u>	<u>Meaning</u>
10-1	Receiving poorly	10-10	Standing by
10-2	Receiving well	10-13	Advise road/weather conditions
10-3	Stop Transmitting	10-20	What is you location ?
10-4	OK	10-33	Emergency traffic
10-7	Out of Service	10-36	Correct Time
10-8	In Service	10-41	Switch to Channel
10-9	Repeat	10-99	Cannot copy you

WARRANTY SERVICE INSTRUCTIONS

1. Refer to instruction manual for adjustments that may be applicable.
2. Defective parts removed from units which are within the warranty period should be sent to the factory prepaid with model and serial number of product from which removed and date of product purchase. These parts will be exchanged at no charge.
3. If the above-mentioned procedures do not correct the difficulty, pack the product securely using the same packaging arrangement as supplied by the manufacturer. A detailed list of troubles encountered must be enclosed as well as your name and address. Forward prepaid (express preferred) to the nearest Dynascan-authorized Cobra Communications service agency.

Contact your local Dynascan Distributor for the name and location of your nearest Cobra service agency, or write to:

Service Department

**Cobra Communications Product Group
DYNASCAN CORPORATION
2815 West Irving Park Road
Chicago, Illinois 60618**

90-DAY LIMITED WARRANTY

"DYNASCAN warrants that each product manufactured by it will be free from defects in materials and workmanship under normal usage and service for a period of ninety days after its purchase new from an authorized COBRA distributor. Our obligation under this warranty is limited to repairing or replacing any product or component which we are satisfied does not conform with the foregoing warranty and which is returned to our factory or our authorized service contractor, transportation prepaid, and we shall not otherwise be liable for any damages, consequential or otherwise. *The foregoing warranty is exclusive and in lieu of all other warranties (including any warranty of merchantability), whether expressed or implied.* Such warranty shall not apply to any product or component (i) repaired or altered by anyone other than DYNASCAN or its authorized service contractor (except normal tube replacement) without DYNASCAN's prior written approval; (ii) tampered with or altered in any way or subjected to misuse, negligence or accident, (iii) which has the serial number altered, defaced or removed; or (iv) which has been improperly connected, installed or adjusted otherwise than in accordance with DYNASCAN's instructions. DYNASCAN reserves the right to discontinue any model at any time or change specifications or design without notice and without incurring any obligation. *The warranty shall be void and there shall be no warranty of any product or component if a DYNASCAN warranty registration card is not properly completed and postmarked to the DYNASCAN factory within ten days after the purchase of the product new from an authorized COBRA distributor.*

DYNASCAN CORPORATION

1801 W. BELLE PLAIN AVE.

CHICAGO, ILL. 60613