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Cobra 87GTL Owner's Manual

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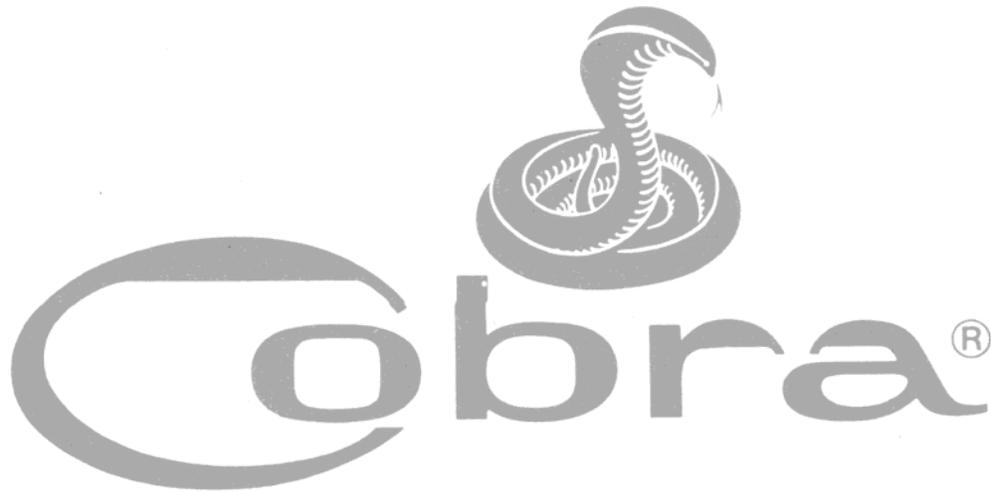
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Cobra 87GTL

40-Channel

**Solid State Citizens Band
2-Way Radio Base Station**



Cobra Communications Product Group

DYNASCAN CORPORATION

6460 W. Cortland Street
Chicago, Illinois 60635



Dear CB'er:

Welcome to the expanding family of users of Cobra Communications equipment.

I hope you will find your Two-Way Radio Communications experience to be as exciting as it is practical. Whatever the purpose of your radio system, Cobra equipment is reliable and a pleasure to use. Dynascan takes special care to provide you with equipment that is compact, handsomely styled, and thoroughly dependable. Many years of valuable experience designing test equipment and other electronic products are behind our two-way communications systems. Premium quality solid-state components and integrated circuits are incorporated into Cobra radios to assure high performance and long life. Special attention is given to each detail to bring you the finest CB radio on the market today because we know that you take pride in your communication equipment.

If you have any comments or suggestions about Cobra, please send them to us. Communications is our business, and it is very important that we communicate with you.

Thank you for your confidence in Cobra two-way radio equipment. We hope you will consider our other fine Cobra products as the need arises.

Sincerely,

A handwritten signature in cursive script that reads "Carl Korn". The signature is written in dark ink and is positioned above the printed name.

Carl Korn
President

INSTRUCTION MANUAL
for
Cobra 87GTL
40-Channel
Citizens Band Solid State
2-Way Radio
Base Station



Cobra Communications Product Group

DYNASCAN CORPORATION

6460 W. Cortland Street

Chicago, Illinois 60635

WARNING – TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

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THE CB STORY

The Citizens Band lies between the shortwave broadcast and 10-meter amateur radio bands, and was established by law in 1949. The Class D two-way communications service was opened in 1959. (CB also includes a Class A business band and Class C remote control frequencies.) Acquiring the CB license requires no detailed technical or Morse-code knowledge that is required for a "Ham" license.

Although the FCC has eliminated the requirement for the \$4.00 CB license fee, a license is still required. Filing procedure remains unchanged. One license can be good for any number of sets used by a given family or business. Once you receive your CB license for your equipment, any one may use it.

For example, though the equipment must be licensed to someone over 18 years of age, a child can use the equipment to talk to another child, or an employee can use the equipment as part of his or her routine services. However, final responsibility of legal operation rests with the CB licensee.

NOTE

FCC regulations permit only "transmissions" (one party to another) rather than "broadcasts" (to a wide audience). Thus, advertising is not allowed on CB channels because it is broadcasting.

**HAVE
A GOOD DAY
TODAY
AND
A BETTER DAY
TOMORROW!**

Section I

Introduction

FREQUENCY RANGE

The COBRA 87GTL provides high level trouble-free performance in the Citizens Radio Service which is comprised of the following frequency assignments:

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

To obtain maximum performance from your COBRA 87GTL, please read carefully the following descriptions and operation instructions.

These frequencies are generated and accurately controlled by a phase lock loop (PLL) circuit, comprised of the latest state-of-the-art integrated circuit technology, thereby ensuring high reliability and excellent frequency stability on the above channels.

WARNING

1. Operation of this equipment requires a valid Station License issued by the Federal Communications Commission. Do not transmit with your equipment until you have received your License or complied with procedures explained on FCC Temporary License Form 555-B. A copy of FCC Application Form 505, FCC Temporary License Form 555-B, and Part 95 of the Commission Rules, are packed with this combination transceiver for your convenience.
2. You are required to complete FCC License Application Form 505 and submit it to the FCC, Gettysburg, Pa. 17362, in order to receive your license.
3. You are required to read and understand Part 95 of the FCC Plain English Rules, before operating your station. FCC Rules require you to always have on hand a current copy of Part 95 of the FCC Rules, as part of your Station Records.
4. All transmitter adjustments other than those supplied by the manufacturer as front panel operating controls, must be made by, or under the supervision of, the holder of an FCC-issued 1st or 2nd Class Radio Operator License.
5. Replacement or substitution of crystals, transistors, regular diodes or other part of a unique nature, with parts other than those recommended by Dynascan, may cause violation of the technical regulations of Part 95 of the FCC Rules, or violation of the Type Acceptance requirements of Part 2 of the Rules.

Section II

Specifications

GENERAL

Channels	40.
Frequency Range	26.965 to 27.405 MHz.
Frequency Control	Phase Lock Loop (PLL) synthesizer.
Frequency Tolerance	0.002%.
Operating Temperature Range	-30°C to +50°C.
Microphone	Plug-in type; dynamic
Power Source	120V AC nominal. 13.8V DC nominal. (Positive or negative ground.)
Power Consumption (120V AC)	<i>Transmit:</i> AM full mod., 60 watts (nominal). <i>Receive:</i> Full audio output, 40 watts (nominal). Squelched, 20 watts. (maximum).
Current Drain (13.8V DC)	<i>Transmit:</i> AM full mod., 2.0A DC (nominal). <i>Receive:</i> Full audio output, 1.0A DC (nominal). No signal 0.4A DC (maximum).
Size	4-3/4"H x 13-3/8"W x 11-3/8"D.
Weight	10 pounds.
Antenna	UHF, SO239.
Semiconductors	20 transistors, 22 diodes, 4 integrated circuits, 1 Light Emitting Diode, 2 Field Effect Transistors.
Meter	Illuminated; indicates relative power output and received signal strength.

TRANSMITTER

Power Output	4 watts.
Modulation	High and low-level Class B amplitude modulation.
Frequency Response	300 to 2500 Hz.
Output Impedance	50 ohms, unbalanced.
Output Indicators	Meter indicates relative RF output power and ON THE AIR indicator.

RECEIVER

Sensitivity	Less than $1\mu\text{V}$ for 10 dB (S+N)/N.
Selectivity	6 dB @7 KHz, 60 dB @10 KHz.
Image Rejection	80 dB.
IF Frequencies	Double conversion, 1st: 10.695 MHz. 2nd: 455 KHz.
Adjacent Channel Rejection	60 dB.
RF Gain Control	Variable type.
Automatic Gain Control (AGC)	Less than 10 dB change in audio output for inputs from 10 to 500,000 microvolts.
Squelch	Adjustable, threshold less than $1\mu\text{V}$.
Audio Output Power	5 watts.
Frequency Response	300 to 2500 Hz.
Distortion	Less than 10% @4 watts @1000 Hz.
Built-in Speaker	8 ohms.
External Speaker (Not Supplied)	8 ohms; disables internal speaker when connected.
Indicator	RECEIVE and Signal strength indicators.

Section III

Installation

LOCATION

Prior to beginning operation of the transceiver, a basic installation must be prepared. Installation of the transceiver itself is a rather simple procedure.

In selecting the location for the unit, two basic factors must be considered.

1. Access to a 120V, 60 Hz power source.
2. The location must be convenient for running the antenna lead-in cable if an outside antenna installation is proposed.

BASE STATION ANTENNA

Since the maximum allowable power output of the transmitter is limited by the FCC, the antenna is the most important factor affecting transmission distance. Only a properly matched antenna system will allow maximum power transfer from the 50-ohm transmission line to the radiating element.

The recommended method of antenna tuning is to use an in-line watt-meter or VSWR bridge to adjust the antenna tuning for minimum reflected power on channel 21.

The radio may be used with any type of 50-ohm base station antenna. 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 directional beam will usually increase communicating 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 for base station antenna height are:

1. Omni-directional antennas may not be higher than 60 feet above the ground when using a tower, mast or pole, and no higher than 20 feet above an existing structure.
2. Beam antennas may not be higher than 20 feet above the ground when using a tower, mast, pole, or an existing structure.

These are only general regulations applicable to most but not all parts of the nation. Locations near airports and some military installations are subject to different rules; therefore, it is best to contact your nearest Federal Communications Commission office for information regarding your specific area.

MOBILE OPERATION/EMERGENCY POWER OPERATION

It is possible to operate the COBRA 87GTL from an external 13.8 VDC power supply for emergency power conditions or from an automobile battery for mobile operation. The COBRA 87GTL is supplied with a polarized plug for operation on an external DC supply.

The negative lead is black.

The positive lead is red and has an in-line fuse holder as an integral part of the positive lead.

NOTE

AC-DC switch on rear panel-use "AC" for 120 volt operation and "DC" for battery operation.

EXTERNAL SPEAKER

The external speaker jack (EXT. SPK.) 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.

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 characteristic. 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/receive control and the fourth lead is the speaker return lead which disables the speaker during transmit. The microphone should provide the functions shown in Fig. 4.

4-Wire Mic Cable

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

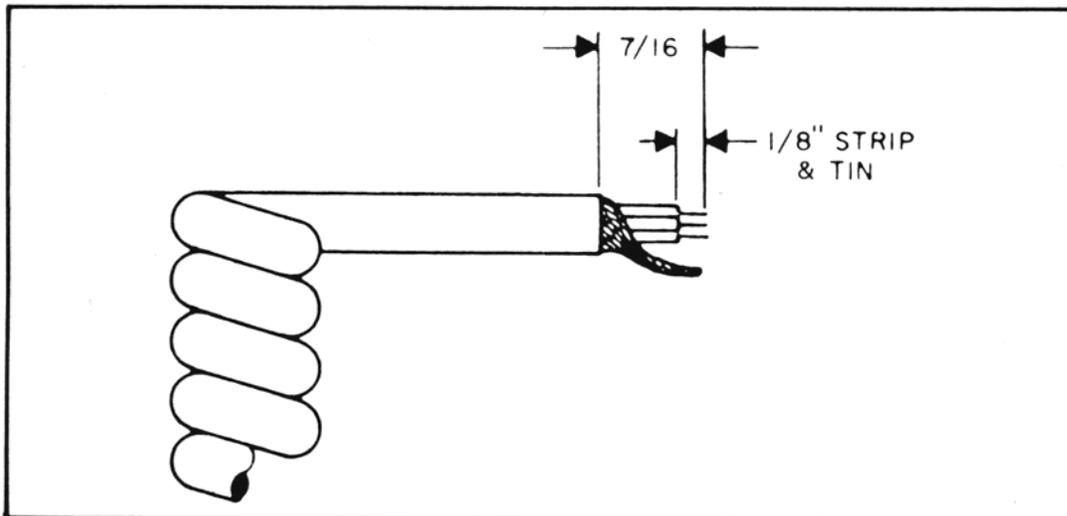


Fig. 1. Microphone cable preparation.

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

1. Cut leads so that they extend $7/16$ " beyond the plastic insulating jacket of the microphone cable. (See Fig. 1.)

2. All leads should be cut to the same length. Strip the ends of each wire 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 Fig. 2):

1. Loosen the two cable clamp retainer screws.
2. Remove the retaining screw.
3. Unscrew the housing from the pin receptacle body.
4. Feed the microphone cable through the housing, knurled ring and washer as shown in Fig. 2B.

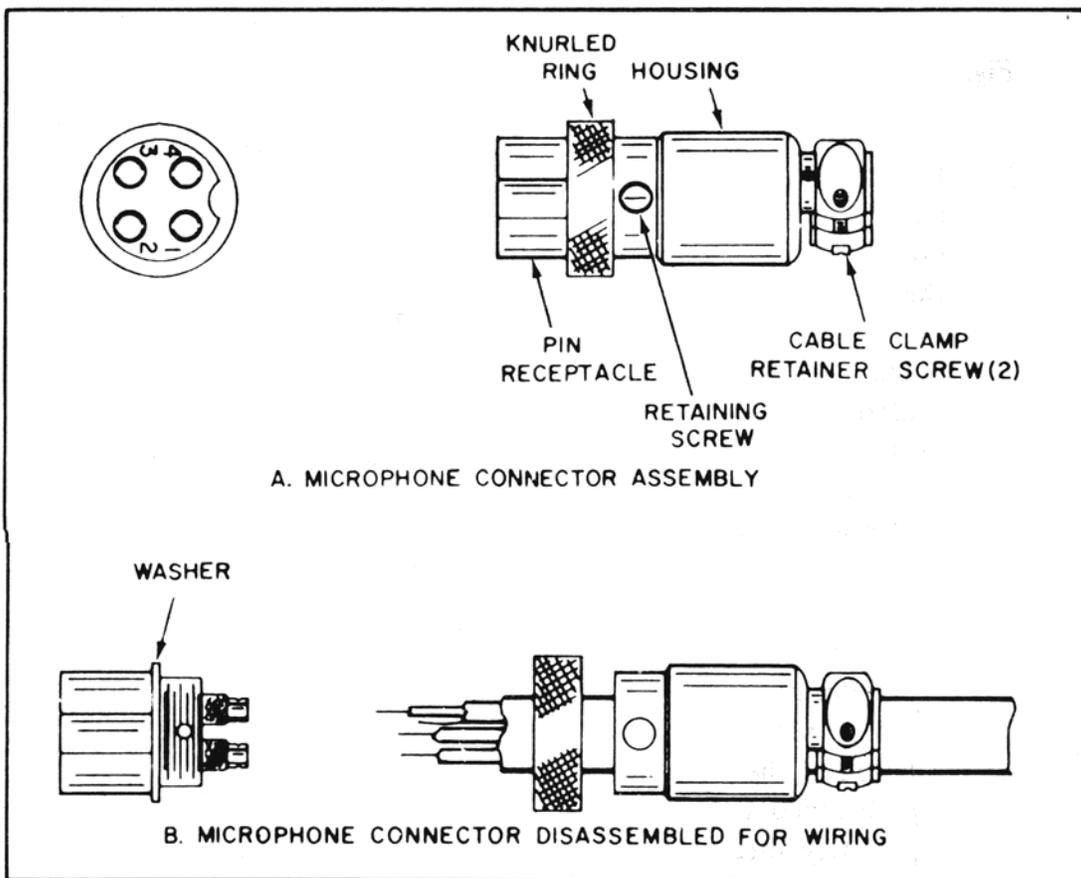


Fig. 2. Microphone plug wiring.

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 Fig. 3, as viewed from the back of the plug. Before soldering the wire to the pins, pre-tin the wire receptacle of each pin of the plug.

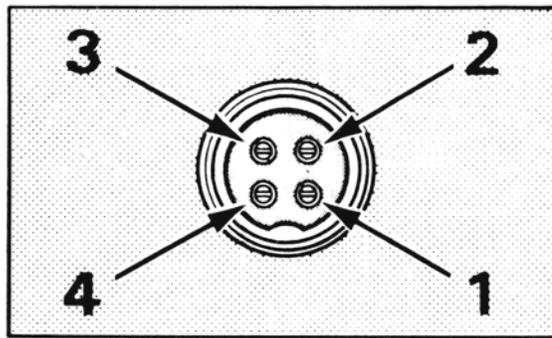


Fig. 3. Microphone plug pin numbers viewed from rear of pin receptacle.

Be sure that the housing and the knurled ring of Fig. 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 when 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 pins, which could 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 counterclockwise may be required to align the

screw hole with the threaded hole in the pin receptacle body. When these are aligned, the retaining screw is then screwed into place to secure the housing to the pin receptacle body.

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, connect and secure the microphone plug in the transceiver.

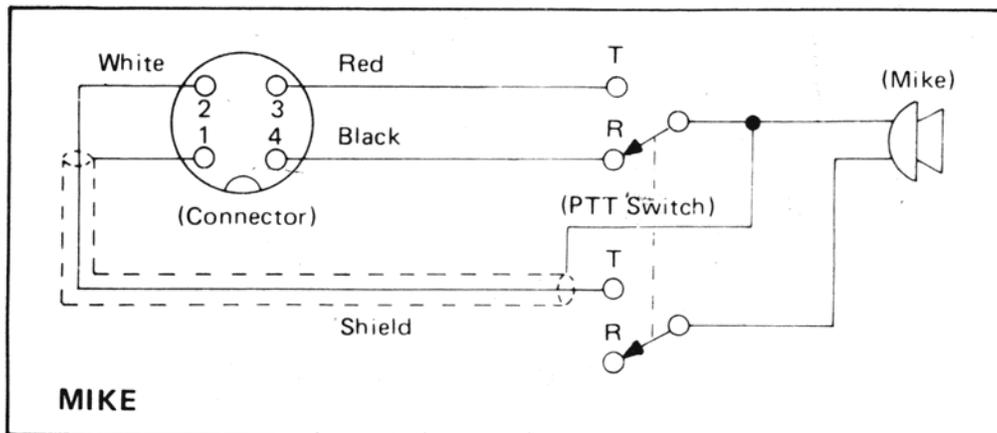
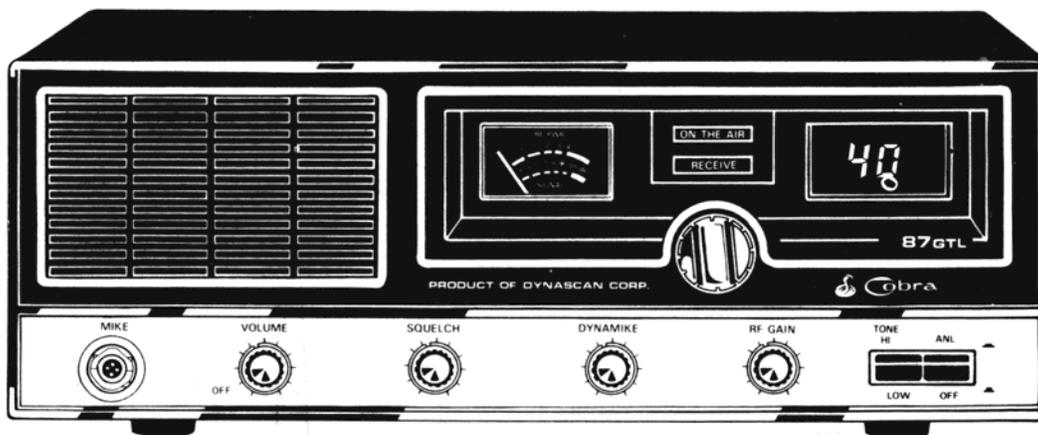


Fig. 4. Microphone and connector wiring diagram.

Section IV Operation

CONTROLS AND INDICATORS

There are 7 controls, 1 meter, 1 LED display 2 indicators and microphone connector on the front panel of your COBRA 87GTL.



A. CONTROL FUNCTIONS

1. **OFF/ON VOLUME.** Turn clockwise to apply power to the unit and to set the desired listening level.
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 the control should be adjusted only to the point where the receiver background noise or ambient background noise is eliminated. Turn fully counterclockwise then slowly clockwise until 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. **DYNAMIKE.** Adjusts the microphone gain, in the transmit. This controls the gain to the extent that full talk power is available several inches away from the microphone.

4. **RF GAIN.** Adjust as required to optimize the signal. This control is used primarily to optimize reception in strong signal areas. Gain is reduced by counterclockwise rotation of the control.
5. **TONE HI/LOW.** This control is used to shape the audio response to the operators preference.
6. **OFF/ANL SWITCH.** In the ANL position, the noise reduction circuits of the Automatic Noise Limiter are activated.
7. **CHANNEL SELECTOR.** This switch selects any one of the forty Citizens Band channels desired. The selected channel appears on the LED readout directly to the right of the Channel Selector knob. Channel 9 has been reserved by the FCC for emergency communications involving the immediate safety of life of individuals or immediate protection of property. Channel 9 may also be used to render assistance to a motorist.
8. **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 a low-impedance 500-ohm dynamic microphone. For installation instructions on other microphones, see "ALTERNATE MICROPHONES AND INSTALLATION"

B. INDICATOR FUNCTIONS

S-METER. Swings proportionally to the strength of the incoming signal.

RF-METER. Swings proportionally to the RF output power when transmitting.

CHANNEL SELECTOR. The selected channel appears on the LED readout directly to the right of the channel selector knob.

ON THE AIR INDICATOR. This indicator shows red in the transmit mode.

RECEIVE INDICATOR. This indicator shows green in the receive mode.

C. OPERATING PROCEDURE TO RECEIVE

1. Turn the set ON by turning the VOLUME control clockwise, until a click is heard.
2. Set the VOLUME for a comfortable listening level.
3. Set the Channel selector switch to the desired channel.
4. Set the RF GAIN fully clockwise.
5. 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.

D. OPERATING PROCEDURE TO TRANSMIT

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

The S-RF meter will indicate relative power output.

CAUTION

Be sure the antenna is properly connected to the radio before transmitting. Prolonged transmitting without an antenna or a poorly matched antenna could cause damage to the transmitter.

Section V

Maintenance and Adjustment

The COBRA 87GTL transceiver is designed specifically for use as a base station and may also be used in mobile installation. The use of all solid state circuitry and 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.

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 WARRANTY SERVICE INSTRUCTIONS on the last page of this manual.

FCC WARNING

Federal law required 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 section of this transceiver, per FCC Plain English CB Rule 41.

Section VI

Appendix

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

10 CODE

Code	Meaning	Code	Meaning
10-1	Receiving poorly	10-29	Time is up for contact
10-2	Receiving well	10-30	Does not conform to FCC rules
10-3	Stop transmitting	10-32	I will give you a radio check
10-4	OK, message received	10-33	EMERGENCY TRAFFIC
10-5	Relay message	10-34	Trouble at this station
10-6	Busy, stand by	10-35	Confidential information
10-7	Out of service, leaving air	10-36	Correct time is
10-8	In service, subject to call	10-37	Wrecker needed at
10-9	Repeat message	10-38	Ambulance needed at
10-10	Transmission completed, standing by	10-39	Your message delivered
10-11	Talking too rapidly	10-41	Please turn to channel
10-12	Visitors present	10-42	Traffic accident at
10-13	Advise Weather/Road conditions	10-43	Traffic Tie up at
10-16	Make pick up at	10-44	I have a message for you
10-17	Urgent business	10-45	All units within range please report
10-18	Anything for us?		
10-19	Nothing for you, return to base	10-50	Break channel
10-20	My location is	10-60	What is next message number?
10-21	Call by telephone	10-62	Unable to copy, use phone
10-22	Report in person to	10-63	Net directed to
10-23	Stand by	10-64	Net clear
10-24	Completed last assignment	10-65	Awaiting your next message/assignment
10-25	Can you contact	10-67	All units comply
10-26	Disregard last information		
10-27	I am moving to channel	10-70	Fire at
10-28	Identify your station		

10 CODE (Continued)

Code	Meaning	Code	Meaning
10-71	Proceed with transmission in sequence	10-91	Talk closer to mike
10-77	Negative contact	10-93	Check my frequency on this channel
10-81	Reserve hotel room for	10-94	Please give me a long count
10-82	Reserve room for	10-99	Mission completed, all units secure
10-84	My telephone number is		
10-85	My address is	10-200	Police needed at

A FEW RULES THAT SHOULD BE OBEYED

1. You must identify your official licensed call sign at the beginning and end of every conversation.
2. You are not allowed to carry on a conversation with another station for more than five minutes at a time without taking a one-minute break, to give others a chance to use the channel.
3. You are not allowed to blast others off the air by over-powering them with illegally amplified transmitter power, or illegally high antennas.
4. You can't use CB to promote illegal activities.
5. You are not allowed to use profanity.
6. You may not play music in your CB.
7. You may not use your CB to sell merchandise or professional services.

HOW YOUR CB CAN SERVE YOU

- Warn of traffic tie ups ahead.
- Provide weather and road information.
- Provide help fast in event of emergency or breakdown.
- Suggest good spots to eat and sleep.
- Make long trips more interesting, and help keep you awake.
- Provide direct contact with your office or home.
- Make friends for you as you travel.
- Provide “local information” to find your destination.
- Help law enforcement officers by reporting drunk and reckless drivers.

Colonel Samuel S. Smith of the Missouri Highway Patrol called the number of drunken drivers, wrong-way drivers and speeders reported by CBers as “amazing.” He said, that even the “Smokey Bear” warnings don’t shake their beliefs that “the potential benefits of CB radio to law enforcement are so great that they far outweigh the disadvantages.” In regards to CB radar warnings to other CBers, Colonel Smith said cheerfully that “We’ve overheard warnings being relayed to truckers long after our operations have been discontinued . . . so we actually receive a residual benefit from these warnings.”

USE CHANNEL 9 FOR EMERGENCY MESSAGES ONLY

FCC gives the following examples of permitted and prohibited types of communications for use on Channel 9. These are guidelines and are not intended to be all-inclusive.

Permitted	Example Message
Yes	“A tornado sighted six miles north of town.”
No	“This is observation post number 10. No tornado sighted.”
Yes	“I am out of gas on Interstate 95.”
No	“I am out of gas in my driveway.”
Yes	“There is a four-car collision at Exit 10 on the Beltway, send police and ambulance.”
No	“Traffic is moving smoothly on the Beltway.”
Yes	“Base to Unit 1, the Weather Bureau has just issued a thunderstorm warning. Bring the sailboat into port.”
No	“Attention all motorists. The Weather Bureau advises that the snow tomorrow will accumulate 4 to 6 inches.”
Yes	“There is a fire in the building on the corner of 6th and Main Streets.”
No	“This is Halloween patrol unit number 3. Everything is quiet here.”

WARRANTY SERVICE INSTRUCTIONS

1. Refer to the MAINTENANCE section of your Cobra instruction manual for adjustments that may be applicable.
2. If the above-mentioned procedures do not correct the problem you are experiencing with your unit, pack it securely (preferably in the original carton or double-packed). Enclose a letter describing the problem and include your name and address. Deliver to, or ship PREPAID (UPS preferred) to the nearest Cobra authorized service agency (see list enclosed with unit).

If your list of authorized Cobra service agencies has been misplaced, contact your local dealer for the name of your nearest service agency, or write to:

Service Department

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

LIMITED 90-DAY WARRANTY

DYNASCAN CORPORATION warrants to the original purchaser that its COBRA Citizens Band Radios, and the component parts thereof, will be free from defects in workmanship and materials for a period of ninety (90) days from the date of purchase.

DYNASCAN will, without charge, repair or replace, at its option, defective radios or component parts upon delivery to an authorized COBRA service contractor or the factory service department, accompanied by proof of the date of purchase in the form of a sales receipt.

To obtain warranty coverage, this CB radio must be registered by completing and mailing the enclosed warranty registration card to DYNASCAN Cobra Communications, P.O. Box 35148, Chicago, Illinois 60635 within five (5) days from the date of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is altered, defaced or removed.

As indicated in your product instruction booklet, certain COBRA models are suitable for dash board installation without modification of the dash. In other cases professional installation is recommended. In either event, DYNASCAN is not responsible for damages to the product or the automobile resulting from improper installation.

DYNASCAN shall not be liable for any consequential damages, including without limitation damages resulting from loss of use or cost of installation. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific rights and you may also have other rights which vary from state to state.

For your convenience we suggest you contact your dealer, who may be authorized to make repairs or can refer you to the nearest service contractor. If warranty service cannot be obtained locally, please send the unit to Cobra Communications Service, 2815 West Irving Park Road, Chicago, Illinois 60618, properly packaged to avoid damage in shipment.

NOTE

For future reference, jot down the serial number (shown on the FCC identification plate of your COBRA 87GTL) below:

SERIAL NO. _____



Cobra[®]

Cobra Communications Product Group

DYNASCAN CORPORATION

6460 W. Cortland Street

Chicago, Illinois 60635 •