

# INSTRUCTION MANUAL

# COBRA CAM 89

**SOLID STATE CITIZENS BAND  
2-WAY RADIO**



A PRODUCT OF  
**DYNASCAN CORPORATION**  
1801 WEST BELLE PLAINE AVENUE, CHICAGO, ILLINOIS 60618



Dear CB'er:

Welcome to the expanding family of Cobra Communications users.

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 fluid and elegant, with a long, sweeping underline.

Carl Korn  
President

**INSTRUCTION MANUAL**  
**FOR**  
**MODEL CAM 89**  
**CITIZENS BAND SOLID STATE**  
**2-WAY RADIO**

**PRODUCT OF DYNASCAN CORPORATION**  
6460 WEST CORTLAND ST.  
CHICAGO ILL. 60635

# COBRA CAM 89

## specifications

### GENERAL

Channels	23
Frequency Range	26.965 to 27.255 MHz
Frequency Control	Crystal synthesizer
Frequency Tolerance	0.005%
Operating Temperature Range	-20°C to +40°C
Microphone	Plug-in type; dynamic
Input Voltage	120 VAC, 60 Hz nominal 13.8 VDC nominal (Positive or negative ground)
Power Consumption (120 VAC)	Transmit: AM full mod., 55 watts Receive: <b>Squelched, 25 watts</b> Full audio, 25 watts
Current Drain (13.8 VDC)	Transmit: AM full mod., 1.6A Receive: Squelched, 0.4A Full audio, 1.0A
Size	5¾" H x 13⅜" W x 12⅝" D
Weight	10 pounds
Antenna Connector	UHF, SO239
Semiconductors	23 Transistors, 20 Diodes
Meter 1	Illuminated, indicates relative power output and received signal strength
Meter 2	Illuminated, indicates level of modulation

### TRANSMITTER

Power Input	5 watts
Modulation	High and low level Class B
Modulation Capability	100% — Adjustable with Dynamike Microphone Gain Control
Frequency Response	300- <del>2500</del> 500 Hz
Output Impedance	50 Ohms, unbalanced

## RECEIVER

Sensitivity	Less than $1\mu\text{V}$ for 10 db (S+N)/N
Selectivity	6 db @ 4 kHz, 40 db @ 20 kHz
Image Rejection	30db
I.F. Frequencies	Double conversion, 1st: 11.275 MHz 2nd: 455 kHz
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	2.5 Watts into 8 Ohms
Frequency Response	300-3000 Hz
Distortion	Less than 10% @ 2.5 Watts @ 1000 Hz
Built-in Speaker	8 Ohms, round
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



# COBRA CAM 89 instruction manual

## introduction

The Cobra CAM 89 has been designed to provide 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	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 Cobra CAM 89 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 are 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 Citizens Band Radio Service) include Part 95 and are available for \$3.50 from the Division of Public Documents, U.S. Government Printing Office, Washington, D.C. 20402. You also are 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 radio-telephone License.

# section I

## installation

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 52 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 11.

The radio may be used with any type of 52 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 limit antenna height to 20 feet above an existing structure.

## **MOBILE OPERATION/EMERGENCY POWER OPERATION**

It is possible to operate the Cobra CAM 89 from an external 13.8 VDC power supply for emergency power conditions or from an automobile battery for mobile operation. The Cobra CAM 89 is supplied with a polarized plug for operation on external DC supply.

The plug is coded as follows:

Negative lead is black.

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

## **PUBLIC ADDRESS**

An external 8 Ohm, 3.5 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 feed-back. 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. SPKR.) 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 3.5 watts.

When the external speaker is plugged in, the internal speaker is disconnected.



## section II

# operation

NOTE: Refer to Figure 1 paragraph numbers correspond to the numbers on the figure.

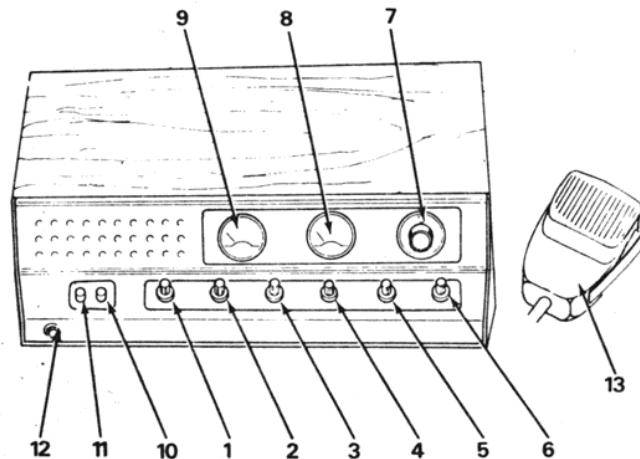


FIG. 1

### A. CONTROL FUNCTIONS

1. **DYNAMIKE.** This control is used to vary the amount of modulation in transmit. In PA operation this control sets the PA volume.
2. **OFF/ON VOLUME.** Turn clockwise to apply power to the unit and to set the desired listening level.
3. **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 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.
4. **TONE.** This control is used to shape the audio response to the operators preference. Base is increased by counterclockwise rotation and treble is increased by clockwise rotation.
5. **RF GAIN.** Adjust as required to optimize signal. This control is used primarily to optimize reception in strong signal areas. Gain is reduced by counterclockwise rotation of the control.

6. **DELTA TUNE.** Allows variation of the receiver operating frequencies above and below the assigned frequency and is used to optimize AM signals as described in the Operating Procedure paragraphs.
7. **CHANNEL SELECTOR.** This switch selects the desired channel for transmission and reception on both AM and SSB. Channels 10 thru 15 and 23 may be used for communications between stations operating under different licenses whereas all other channels, except Channel 9, may be used only between units operating under the same license. 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. **MODULATION METER.** The percent of modulation while transmitting can be observed on this meter. This meter is also used with the *Dynamike* control to set modulation.
9. **TRANSMIT POWER/S METER.** When the transceiver is in the receive mode, relative signal strength is indicated in the S units on the lower scale of this meter. When transmitting, relative power output is indicated on the upper scale of this meter.
10. **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.
11. **ANL SWITCH.** In the ANL position the automatic noise limiter in the audio circuits is activated.
12. **MIC JACK.** The microphone is connected to this jack. A matching connector is supplied attached to the microphone. The following chart shows the pin functions:

Pin Number	Function
1	Auto Shield (Ground)
2	Audio Lead
3	Transmit
4	Speaker

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 the 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 dynamic microphone.

## **B. OPERATING PROCEDURE TO RECEIVE**

1. Be sure that power source and antenna are connected to the proper

- connections before going to the next step.
2. Set PA-CB Switch to the CB position and turn unit on by turning VOL control clockwise.
  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 RF gain control full clockwise for the maximum RF gain.
  7. Adjust the DELTA-TUNE CONTROL to optimize AM signals.

#### **C. OPERATING PROCEDURE TO TRANSMIT**

1. Select the desired channel.
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.

**CAUTION:** Be sure the antenna is properly connected to the unit before transmitting. Transmitting without an antenna or a poorly matched antenna (high SWR; over 2:1) can cause damage to the transmitter.

#### **D. ACCESSORY CIRCUIT OPERATION**

1. **ANL OPERATING.** Slide the ANL switch to ANL position. It activates the noise reduction circuits of the automatic noise limiter.
2. **RF GAIN.** If the signal is very strong reduce the RF gain by moving the SSB RF gain control counterclockwise to optimize the quality of the received signal. Note that the SQUELCH control may require some readjustment with reduced RF Gain.
3. **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. Connect speaker to PA SPKR. jack on rear panel.  
Complete elimination of outside signals can be obtained by disconnecting the antenna cable from the transceiver. With the PA speaker connected, 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.

**NOTE:** Sound level is adjusted with the DYNAMIKE control.

## **section III**

# **maintenance and adjustment**

The Transceiver is specifically designed for the environment encountered in base station and 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. 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.

**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.



### **WARRANTY SERVICE INSTRUCTIONS**

1. Refer to instruction manual for adjustments that may be applicable.
2. Check common electrical parts. Always check instruction manual for applicable adjustments after such replacement.
3. 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.
4. 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 communication service agency.

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

Service Department  
**DYNASCAN CORPORATION**  
2815 Irving Park Road  
Chicago, Illinois 60618



### WARRANTY

"DYNASCAN warrants that each product manufactured by it will be free from defects in material and workmanship under normal usage and service for a period of ninety days after its purchase new from an authorized DYNASCAN 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 five days after the purchase of the product new from an authorized DYNASCAN distributor.*

### DYNASCAN CORPORATION

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