

INSTRUCTION MANUAL

COBRA 21

SOLID STATE CITIZENS BAND
2-WAY RADIO



A PRODUCT OF

DYNASCAN CORPORATION

1801 WEST BELLE PLAINE AVENUE, CHICAGO, ILLINOIS 60613

INSTRUCTION MANUAL

FOR

COBRA 21 CITIZENS BAND SOLID STATE 2-WAY RADIO

COBRA 21

specifications

GENERAL

Channels	23
Frequency Range	26.965 to 27.255 MHz
Frequency Control	Crystal synthesizer
Frequency Tolerance	0.005%
Operating Temperature Range	-30°C to +50°C
Microphone	Plug-in type; dynamic
Input Voltage	13.8 VDC nom. (Reversible ground)
Current Drain	<i>Transmit:</i> AM full mod., 1.5A; <i>Receive:</i> Squelched, 0.3A; full audio output, .65A
Size	8½" L. x 5-7/8" W. x 2¼" H.
Weight	3½ pounds
Antenna Connector	UHF, SO239
Semiconductors	20 Transistors, 11 Diodes
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% — Adjustable with Microphone Gain Control
Frequency Response	300 — 2500 Hz
Output Impedance	50 Ohms, unbalanced

RECEIVER

Sensitivity	Less than 1 μ V for 10 DB (S+N)/N
Selectivity	6 db @ 4 KHz, 40 db @ 20 KHz.
Image Rejection	30 db
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 μ 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 21 instruction manual

introduction

The Cobra 21 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 21 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 \$2.00 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 radiotelephone License.

section I

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 21 is supplied with a universal mounting bracket. The transceiver is held in the bracket by two 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. After you have determined the most convenient location in your vehicle, hold the Cobra 21 with mounting bracket in the exact location desired. If nothing will interfere with mounting it in the desired position, remove the mounting bracket and use it as a template to mark the location for the mounting bolts. Before drilling the holes, make sure nothing will interfere with the installation of the mounting bolts.
2. Connect the antenna cable plug to the standard receptacle on the rear panel. Most CB antennas are terminated with a type PL-259 plug and mate with the receptacle.
3. 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 accessory contact on most ignition switches by tracing the power wire from the AM broadcast receiver in the car.

4. Connect the black leads to -12V DC. This is usually the chassis of the car. Any convenient location with good electrical contact (remove paint) may be used.
5. 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.

Ignition Noise Interference

Use of a mobile receiver at low signal levels is normally limited by the presence of electrical noise. The primary source of noise in automobile installations 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 21 has a selectable automatic noise limiter, in some installations ignition interference may be high enough to make good communications impossible. The electrical noise may come from several sources. Many possibilities exist and variations between vehicles require different solutions to reduce the noise. Consult your COBRA dealer or a 2-way radio technician for help in locating and correcting the source of severe noise.

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 50 Ohm transmission line to the radiating element. In mobile installations (cars, trucks, boats, etc.), an antenna system that is non-directional should be used.

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

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 that delivers the required 12-volt d-c power for operation of the transceiver. The PAC-24 operates from 120-volt 60 Hz 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.

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

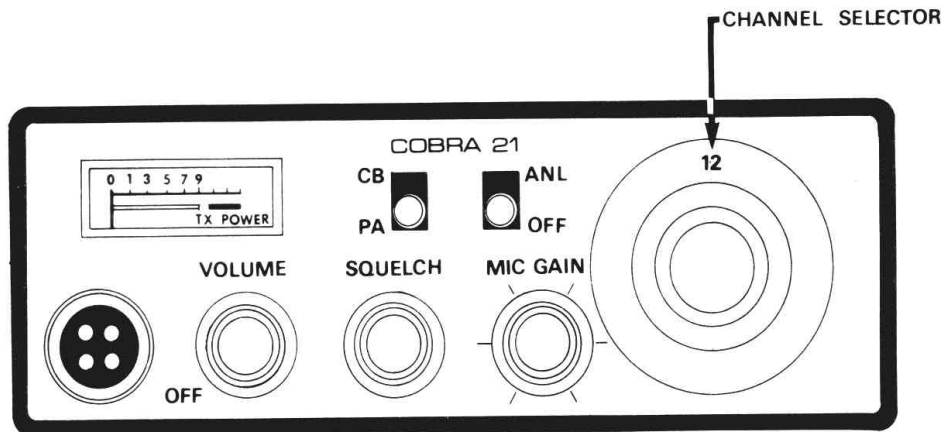
Public Address

An external 8 Ohm, 3 watt speaker must be connected to the EXT. SPKR. 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 is important when operating the PA at high output levels.

section II operation

CONTROLS AND INDICATORS

There are six controls and one indicator on the front panel of your Cobra 21.



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 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. **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 immediate safety of life of individuals or immediate protection of property. Channel 9 may also be used to render assistance to a motorist.
4. **ANL SWITCH.** In the ANL position the automatic noise limiter in the audio circuits is activated.

5. **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.
6. **MIKE GAIN.** This control is used to vary the amount of modulation in transmit. In the public address function the control functions as the volume control.

B. PWR/S METER. Shows relative transmitter power when transmitting and input signal strength when receiving. Illuminated when power is on.

C. 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 radio comes complete with the low impedance dynamic microphone.

D. 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.
NOTE: Microphone must be plugged in for receiver to operate.
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.

E. 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.

F. 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. 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.

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.

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.

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
1801 West Belle Plaine
Chicago, Illinois 60613

LIMITED 90-DAY WARRANTY

"DYNASCAN warrants that each product manufactured by it will be free from defects in material and workmanship under conditions of normal use and service for a period of ninety (90) days from the date of purchase from an authorized DYNASCAN distributor. DYNASCAN will, at its option, repair or replace any product or component not conforming with the foregoing warranty and which is returned, transportation prepaid, to our factory or our authorized service contractor. DYNASCAN shall not otherwise be liable for any damages, consequential or otherwise. DYNASCAN makes no other express warranties. Any implied warranties (including any warranty of merchantability) are limited in duration to ninety (90) days from the date of purchase. This warranty does not apply to (i) damage resulting from unauthorized alterations and repairs, misuse, negligence or accident; or (ii) damage resulting from improper installation, connection or adjustment otherwise than in accordance with DYNASCAN's product instructions. This warranty is void if the serial number has been altered, defaced or removed. DYNASCAN reserves the right to discontinue any model at any time or change specifications or design without notice and without incurring any obligation. To register this warranty, the enclosed DYNASCAN warranty registration card should be completed and mailed to DYNASCAN, 1801 W. Belle Plaine Avenue, Chicago, Illinois 60613, within five (5) days after date of purchase.

DYNASCAN CORPORATION

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