



Cobra 78X
40-Channel
Citizens Band 2-Way
Mobile Radio



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 and title.

Carl Korn
President

Instruction Manual
for
Cobra 78X
40-Channel
Citizens Band Solid State
2-Way Mobile Radio



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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 Class D 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 Class D license for your equipment, anyone 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!**

TABLE OF CONTENTS

	Page
Section I: Introduction	
Frequency Range	4
FCC Warning	5
Section II: Specifications	6
Section III: Installation	
Location	8
Mounting and Connection	8
Ignition Noise Interference	9
Antenna	9
Tuning the Antenna for Optimum SWR	10
Base Station Operation	12
Remote Speaker	12
Public Address	12
Section IV: Operation	
Controls and Indicators	13
Control Functions	13
Meter Functions	15
Operating Procedure to Receive	15
Operating Procedure to Transmit	15
Alternate Microphones and Installation	16
Section V: Maintenance and Adjustment	20
Section VI: Appendix	
Ten Code	21
A Few Rules That Should Be Obeyed	22
How Your CB Can Serve You	23
Use Channel 9 for Emergency Messages Only	24
Warranty Service Instructions	25
Limited 90-Day Warranty	26

Section I

Introduction

FREQUENCY RANGE

The Cobra 78X 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	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

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.

To insure that you obtain the maximum performance from your Cobra 78X please read carefully the following control descriptions and operating instructions.

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 Rules and Regulations, 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).
Frequency Tolerance	0.005%.
Operating Temperature Range	-30°C to +50°C.
Microphone	Plug-in type; dynamic.
Input Voltage	13.8 V DC nom. (reversible ground).
Current Drain	<i>Transmit:</i> AM full mod., 1.5A (maximum). <i>Receive:</i> Squelched, 0.25A. Full audio output, 1A (nominal).
Size	6"W x 7-3/8"D x 2-1/8"H.
Weight	2.8 lbs.
Antenna Connector	UHF, SO239.
Semiconductors	15 transistors, 17 Diodes, 3 integrated circuits.
Meter	Illuminated, indicates relative power output and received signal strength.

TRANSMITTER

Power Output	4 watts.
Modulation	High and low-level Class B.
Frequency Response	300 to 3000 Hz.
Output Impedance	50 ohms, unbalanced.

RECEIVER

Sensitivity	Less than 0.5 μ V for 10 dB(S+N)/N.
Selectivity	6 dB @7 KHz, 60 dB @10 KHz.
Image Rejection	70 dB typical.
Adjacent-Channel Rejection	60 dB typical.
I.F. Frequencies	Double conversion, 1st: 10.695 MHz. 2nd: 455 KHz.
Automatic Gain Control (AGC)	Less than 10 dB change in audio output for inputs from 10 to 50,000 microvolts.
Squelch	Adjustable; threshold less than 1 μ V.
Audio Output Power	4 watts.
Frequency Response	300 to 3000 Hz.
Distortion	Less than 7 % @ 3 watts @ 1000 Hz.
Built-in Speaker	16 ohms, round.
External Speaker (Not Supplied)	8 ohms; disables internal speaker when connected.

PA SYSTEM

Power Output	4 watts into external speaker.
External Speaker for PA (Not Supplied)	8 ohms; when PA-CB switch in PA, the PA speaker also monitors the receiver.

Section III

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 78X is supplied with a universal mounting bracket and hardware. 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 78X 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 red DC power input wire with the fuse to +13.8 VDC. This wire extends from the rear panel. In automobile installation, +13.8 VDC is usually obtained from the accessory contact on the ignition switch. This prevents the set from 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.

NOTE

In positive ground automobiles the red wire goes to the chassis and the black wire is connected to the ignition switch.

4. Connect the black leads to -13.8V 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 left 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 78X 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.

TUNING THE ANTENNA FOR OPTIMUM SWR

Since there is such a wide variety of base and mobile antennas, this section will strictly concern itself to the various types of mobile adjustable antennas.

Because the antenna length is directly related to the channel frequency, it must be tuned to resonate optimally all 40 channels of the transceiver. Channel 1 requires a longer antenna than Channel 40 because it is lower in frequency.

Due to the various methods of adjusting antennas for proper SWR we have chosen what we think is the optimum method:

A. Antennas with adjustment screws (set screws).

1. Start with the antenna extended and tighten the set screw lightly enough so that the antenna can be lightly tapped with your finger for easy adjustment.
2. Set your COBRA 78X to Channel 21. Press the PTT (push-to-talk) switch, and tap the antenna (making it shorter). The SWR meter will show a lower reading each time the antenna is tapped. By continuing to shorten the antenna you will notice the SWR reading will reach a low point and then start rising again. This means that you have passed the optimum point for Channel 21. Extend the antenna a short distance and again follow the procedure above.

When the lowest point has been reached, switch to Channel 1 and then to Channel 40 and compare SWR readings. They should be almost equal.

B. Antennas which must be cut to proper lengths.

1. Follow the same procedure as above, but adjust the length by cutting in 1/8" increments until a good match is obtained.

Be very careful not to cut too much at one time, as once it is cut, it can no longer be lengthened.

The whip is easily cut by filing a notch all the way around and breaking the piece off with pliers.

NOTE

THE PROPER SETTING IS ACHIEVED WHEN THE SWR IS 1.5 OR BELOW, AND WHEN IT HAS THE SAME READING FOR CHANNELS 1 AND 40.

If you are having difficulties in adjusting your antenna, check the following:

- A. All doors must be closed when adjusting the antenna.
- B. Make sure the antenna base is grounded.
- C. Check your coaxial cable routing (it may be pinched when routed into the car).
- D. Try a different location on your car (keeping in mind the radiation pattern you wish).
- E. Is the antenna perfectly vertical?
- F. Try a different location in your neighborhood. Stay away from large metal objects when adjusting (metal telephone or light posts, fences, etc.)

BASE STATION OPERATION

(Operation from 120 VAC, 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 Model CA-20 Power Pak 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 power for the operation of the transceiver. The CA-20 operates from any 120-volt, 60 Hz power source. Simply connect the red (+) and black (-) leads of the transceiver to the corresponding terminals of the CA-20.

NOTE

Do not attempt to operate this transceiver by connecting directly to 120 VAC.

When the CA-20 Power Pak 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. 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 4 watts. When the external speaker is plugged in, the internal speaker is disconnected.

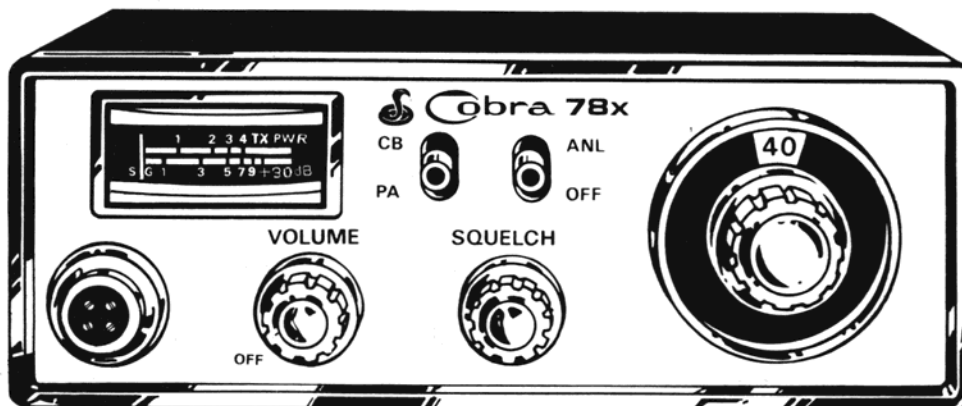
PUBLIC ADDRESS

An external 8-ohm, 4-watt speaker must be connected to the PA 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 IV Operation

CONTROLS AND INDICATORS

There are 5 controls, channel indicator, meter, and microphone connector on the front panel of your COBRA 78X.



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 forty Citizen Band Channels desired. The selected channel is illuminated in the circle portion of the Channel Selector dial directly above 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.

4. **PA/CB SWITCH.** Selects the mode of operation. In the CB position, the PA function is disabled and the unit will transmit and receive on the selected frequency. *The PA function should not be used unless a PA speaker is connected.* In the PA mode, incoming CB transmission will be heard through the PA speaker. This allows you to monitor message while outside of your vehicle.

To use this PA feature, a speaker having a voice coil impedance of 8 ohms and a power handling capability of at least four 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 COBRA 78X. 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.

NOTE

PA volume is controlled by adjusting the VOLUME knob to the desired volume.

5. **ANL SWITCH.** In the ANL position the automatic noise limiter in the audio circuits is activated.

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 next section, **ALTERNATE MICROPHONES AND INSTALLATION**.

B. METER FUNCTIONS

1. **S-METER.** Swings proportionally to the strength of the incoming signal.
2. **RF METER.** Swings proportionally to the RF output power.

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.

OPERATING PROCEDURE TO TRANSMIT

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

CAUTION

Be sure the antenna is properly connected to the unit before transmitting. Prolonged transmitting without an antenna or with a poorly matched antenna (high SWR; over 3) can cause damage to the transmitter.

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 control and the fourth lead is ground (see schematic, Fig. 3). The microphone should provide the functions shown below:

4-Wire Mic Cable

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

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 $7/16''$ beyond the plastic insulating jacket of the microphone cable. See Fig. 1 below.
2. All leads should be cut to the same length. Strip the ends of each wire $1/8''$ and tin the exposed wire.

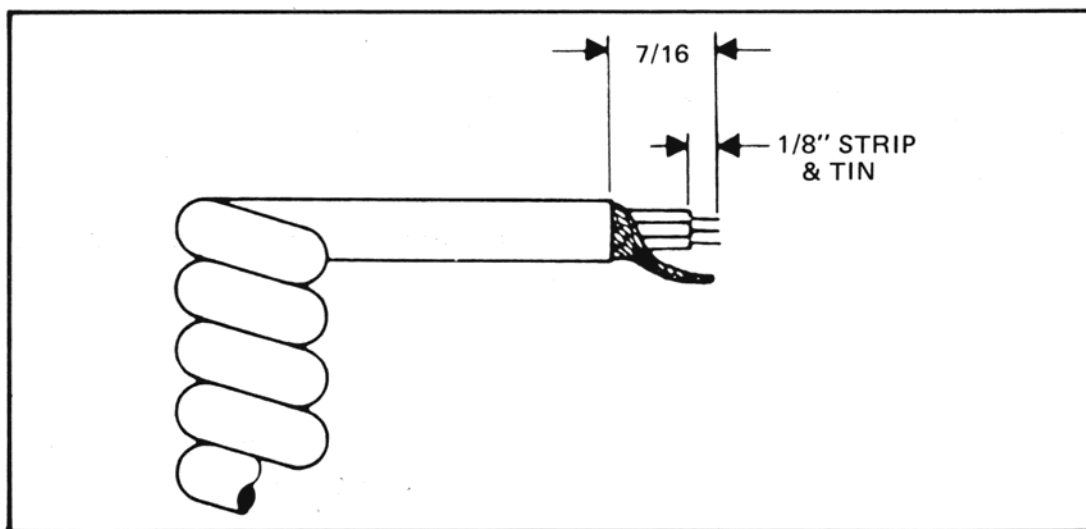


Fig. 1. Microphone cable preparation.

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 below.

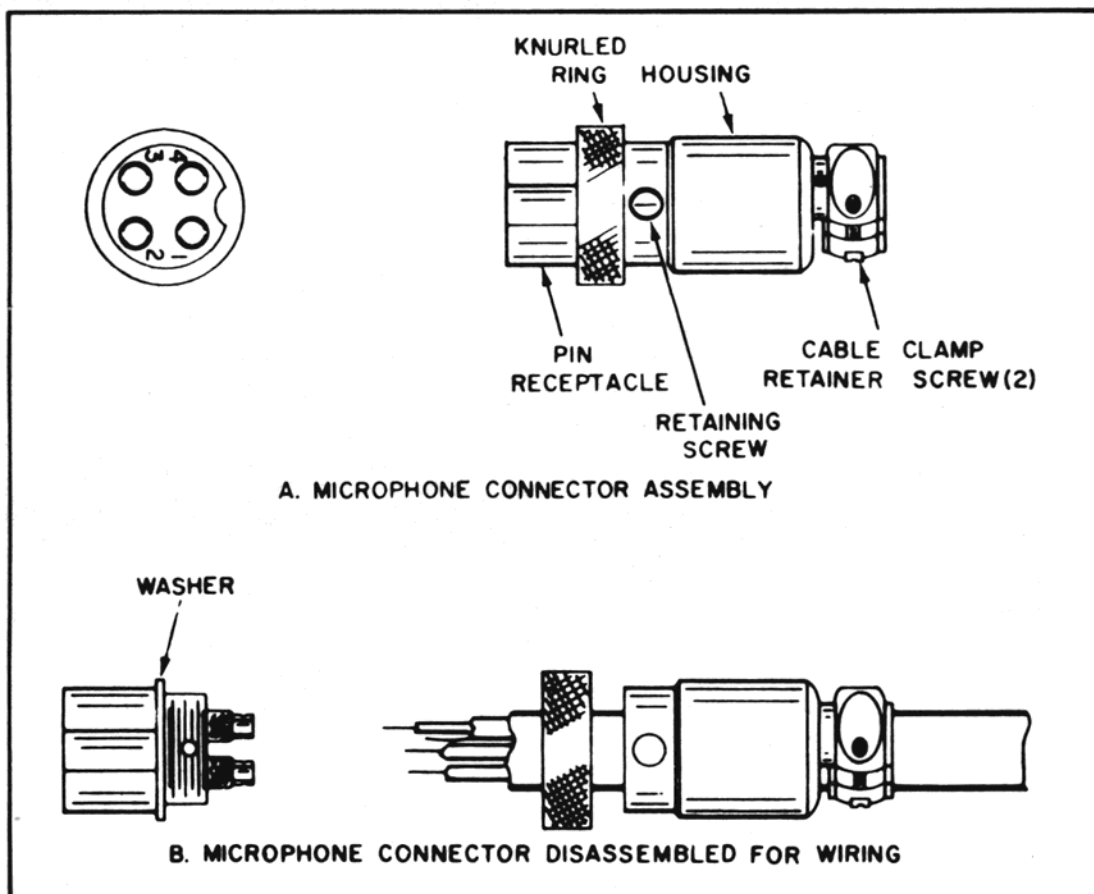


Fig. 2. Microphone plug wiring.

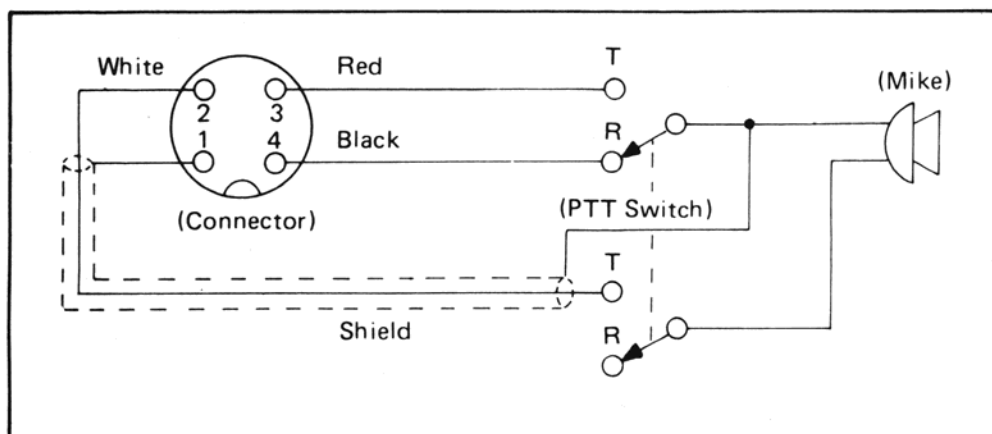


Fig. 3. Microphone and connector wiring diagram.

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. 4, 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.

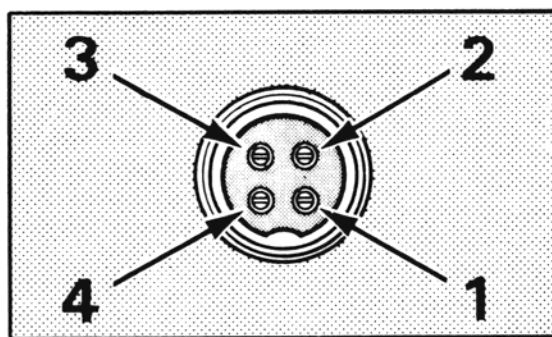


Fig. 4. Microphone plug pin numbers viewed from rear of pin receptacle.

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 the 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 retainers 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.

Section V

Maintenance and Adjustment

The COBRA 78X 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.

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 elsewhere in 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 part 95 section 95.97d.

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 MESSAGE 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).
- 3 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 78X) below:

SERIAL NO. _____

BILL OF MATERIAL FOR COBRA 78X

CIRCUIT SYMBOL	DESCRIPTION	DYNASCAN PART NO.
SEMICONDUCTORS		
IC-1	Integrated Circuit, MB3712	307-151-9-001
IC-2	Integrated Circuit, TA7310P	307-133-9-004
IC-3	Integrated Circuit, TC9109P	307-151-9-002
TR-8,10	Transistor, 2SA733P	177-020-9-001
TR-6,7,9,12	Transistor, 2SC945A-Q	176-062-9-001
TR-1,2	Transistor, 2SC1342-B	176-074-9-001
TR-3,4,5,11	Transistor, 2SC1675-M	176-060-9-002
TR-14	Transistor, 2SC2028-B/20	172-038-9-001
TR-15	Transistor, 2SC2029-B/10	172-038-9-002
TR-13	Transistor, 2SC2076-C	176-060-9-004
D-7	Diode, 1S2075-K	151-028-9-001
D-1,2,3,8,9,13,14	Diode, 1S2076	151-067-9-001
D-4,5	Diode, 1N60-AM	150-014-9-001
D-10,17	Diode, 3RIK-1	151-040-9-003
D-6	Diode, 1S34	150-016-9-001
D-15	Diode, Zener, CZ-094	152-093-9-001
D-11	Diode, Zener, WZ-071	152-075-9-001
D-16	Diode, Zener, 05Z7.5-UNI	152-090-9-001
D-12	Diode, Vari-Cap, 1S2688-EA	154-004-9-001
INDUCTORS		
L-7	Coil, LA-204	046-024-9-003
L-8	Coil, LA-207	046-025-9-001
L-11	Coil, LA-208	060-029-9-004
L-1	Coil, LA-279	046-027-9-001
L-2	Coil, LA-280	046-027-9-002
L-6	Coil, LA-281	046-027-9-003
L-9	Coil, LA-282	046-027-9-004
L-10	Coil, LA-283	046-027-9-005
L-3	Coil, LB-118	046-027-9-006
L-4	Coil, LB-119	046-027-9-007
L-12,15,18	Coil, LC-018	041-056-9-003
L-14	Coil, LD-012	041-069-9-004
L-19	Ferrite Bead Core, LD-087	044-048-9-003
L-20	Ferrite Bead Core, LD-088	044-051-9-001
L-16	Coil, LE-088	041-104-9-001
L-17	Coil, LE-089	041-104-9-002
L-13	Inductor, Molded, LZ-002 (4.7 μ H)	041-093-9-004
L-5	Inductor, Molded, LZ-002 (10 μ H)	041-062-9-001
T-2	Coil AF Choke, TF-017	042-014-9-001
T-1	Transformer, Output, TF-120	061-041-9-001
SEMI-FIXED & VARIABLE RESISTORS		
VR-1	Resistor, Variable, RV-320 50K ohm A	008-347-9-002
VR-2	Resistor, Variable, RV-331 50K ohm B	008-347-9-003
VR-7	Resistor, Semi-fixed, RV-189 300 ohm B	008-345-9-001
VR-4,6	Resistor, Semi-fixed, RV-189 20K ohm B	008-316-9-003

**CIRCUIT
SYMBOL**

DESCRIPTION

**DYNASCAN
PART NO.**

SEMI-FIXED & VARIABLE RESISTORS (Continued)

VR-3,5 Resistor, Semi-fixed, RV-189 50K ohm B 008-316-9-002

FIXED RESISTORS

R-41	Resistor, Metal Oxide,	100 ohm	2W	±10%	..	426-043-9-001
R-39,60	Resistor, Metal Oxide,	47 ohm	1W	±10%	..	013-038-9-002
R-58	Resistor, Carbon, Axial Lead	2.2K ohm	1/4W	±5%	..	002-104-5-222
R-13	Resistor, Carbon, Axial Lead	100 ohm	1/8W	±5%	..	002-108-5-101
R-9,80	Resistor, Carbon, Axial Lead	220 ohm	1/8W	±5%	..	002-108-5-221
R-40	Resistor, Carbon, Axial Lead	1K ohm	1/8W	±5%	..	002-108-5-102
R-11,36	Resistor, Carbon, Axial Lead	2.2K ohm	1/8W	±5%	..	002-108-5-222
R-51	Resistor, Carbon, Axial Lead	4.7K ohm	1/8W	±5%	..	002-108-5-472
R-30,42	Resistor, Carbon, Axial Lead	10K ohm	1/8W	±5%	..	002-108-5-103
R-27	Resistor, Carbon, Axial Lead	22K ohm	1/8W	±5%	..	002-108-5-223
R-28	Resistor, Carbon, Axial Lead	100K ohm	1/8W	±5%	..	002-108-5-104
R-91	Resistor, Carbon, Formed VERT	1 ohm	1/8W	±5%	..	002-108-5-109
R-14	Resistor, Carbon, Formed VERT	10 ohm	1/8W	±5%	..	002-108-5-100
R-53	Resistor, Carbon, Formed VERT	12 ohm	1/8W	±5%	..	002-108-5-120
R-56,61,81	Resistor, Carbon, Formed VERT	22 ohm	1/8W	±5%	..	002-108-5-220
R-62,77,78	Resistor, Carbon, Formed VERT	47 ohm	1/8W	±5%	..	002-108-5-470
R-12	Resistor, Carbon, Formed VERT	150 ohm	1/8W	±5%	..	002-108-5-151
R-79	Resistor, Carbon, Formed VERT	220 ohm	1/8W	±5%	..	002-108-5-221
R-1,5,44,59	Resistor, Carbon, Formed VERT	330 ohm	1/8W	±5%	..	002-108-5-331
R-89	Resistor, Carbon, Formed VERT	470 ohm	1/8W	±5%	..	002-108-5-471
R-55	Resistor, Carbon, Formed VERT	820 ohm	1/8W	±5%	..	002-108-5-821
R-6,8,38	Resistor, Carbon, Formed VERT	1K ohm	1/8W	±5%	..	002-108-5-102
R-3,46,47	Resistor, Carbon, Formed VERT	1.5K ohm	1/8W	±5%	..	002-108-5-152
R-7,49,34	Resistor, Carbon, Formed VERT	2.2K ohm	1/8W	±5%	..	002-108-5-222
R-2,4,23	Resistor, Carbon, Formed VERT	3.3K ohm	1/8W	±5%	..	002-108-5-332
R-26,50,54	Resistor, Carbon, Formed VERT	4.7K ohm	1/8W	±5%	..	002-108-5-472
R-10,31	Resistor, Carbon, Formed VERT	5.6K ohm	1/8W	±5%	..	002-108-5-562
R-24,35,37,94,95	Resistor, Carbon, Formed VERT	10K ohm	1/8W	±5%	..	002-108-5-103
R-48	Resistor, Carbon, Formed VERT	15K ohm	1/8W	±5%	..	002-108-5-153
R-16,43,52	Resistor, Carbon, Formed VERT	22K ohm	1/8W	±5%	..	002-108-5-223
R-25	Resistor, Carbon, Formed VERT	27K ohm	1/8W	±5%	..	002-108-5-273
R-15,19,22	Resistor, Carbon, Formed VERT	47K ohm	1/8W	±5%	..	002-108-5-473
R-18,20,21	Resistor, Carbon, Formed VERT	56K ohm	1/8W	±5%	..	002-108-5-563
R-45	Resistor, Carbon, Formed VERT	82K ohm	1/8W	±5%	..	002-108-5-823
R-33	Resistor, Carbon, Formed VERT	100K ohm	1/8W	±5%	..	002-108-5-104
R-32	Resistor, Carbon, Formed VERT	220K ohm	1/8W	±5%	..	002-108-5-224
R-17	Resistor, Carbon, Formed VERT	680K ohm	1/8W	±5%	..	002-108-5-684
R-92	Resistor, Carbon, Formed VERT	560K ohm	1/8W	±5%	..	002-108-5-564
R-93	Resistor, Carbon, Formed VERT	3.9M ohm	1/8W	±5%	..	002-108-5-395
R-90	Resistor, Carbon, Formed VERT	560 ohm	1/8W	±5%	..	002-108-5-561

CAPACITORS

C-36	Capacitor, Tantalum,	2.2μF	25V	±20%	.....	027-031-9-001
C-73,74,50	Capacitor, Tantalum,	4.7μF	10V	±20%	.....	027-026-9-005
C-5	Capacitor, Tantalum,	10μF	10V	±20%	.....	027-025-9-001
C-42	Capacitor, Al Solid,	0.22μF	16V	±20%	.....	022-158-9-001
C-30,33,49	Capacitor, Electrolytic,	1μF	50V	.....	.....	022-157-9-002
C-21	Capacitor, Electrolytic,	4.7μF	35V	.....	.....	022-182-9-001
C-24,34,48	Capacitor, Electrolytic,	10μF	16V	.....	.....	002-157-9-004
C-45	Capacitor, Electrolytic,	47μF	10V	.....	.....	022-160-9-002

CIRCUIT
SYMBOL

DESCRIPTION

DYNASCAN
PART NO.

CAPACITORS (Continued)

C-119,51	Capacitor, Electrolytic,	33 μ F	10V	.....	022-158-9-005
C-11,37	Capacitor, Electrolytic,	33 μ F	16V	.....	022-157-9-006
C-54	Capacitor, Electrolytic,	100 μ F	10V	.....	022-157-9-008
C-26	Capacitor, Electrolytic,	100 μ F	16V	.....	022-157-9-009
C-101	Capacitor, Electrolytic,	100 μ F	25V	.....	022-173-9-001
C-96	Capacitor, Electrolytic,	220 μ F	10V	.....	022-171-9-002
C-98	Capacitor, Electrolytic,	470 μ F	10V	.....	022-160-9-001
C-41,94	Capacitor, Electrolytic,	470 μ F	16V	.....	022-076-9-008
C-31,40	Capacitor, Mylar,	0.001 μ F	25V \pm 20%	.....	025-134-9-001
C-32	Capacitor, Mylar,	0.0022 μ F	25V \pm 20%	.....	025-134-9-002
C-29,47	Capacitor, Mylar,	0.0047 μ F	25V \pm 20%	.....	025-134-9-003
C-38,72	Capacitor, Mylar,	0.022 μ F	25V \pm 20%	.....	025-137-9-006
C-46	Capacitor, Mylar,	0.033 μ F	25V \pm 20%	.....	025-137-9-003
C-18,22	Capacitor, Mylar,	0.039 μ F	25V \pm 20%	.....	025-134-9-006
C-75	Capacitor, Mylar,	0.047 μ F	25V \pm 20%	.....	025-137-9-004
C-116	Capacitor, Mylar,	0.1 μ F	25V \pm 20%	.....	025-137-9-005
C-15	Capacitor, Ceramic,	47pF	50V \pm 10%	CH ..	020-180-9-006
C-60	Capacitor, Ceramic,	10pF	50V \pm 10%	RH ..	020-220-9-001
C-57	Capacitor, Ceramic,	18pF	50V \pm 10%	RH ..	020-220-9-002
C-1	Capacitor, Ceramic,	27pF	50V \pm 10%	RH ..	020-210-9-006
C-58	Capacitor, Ceramic,	33pF	50V \pm 10%	RH ..	020-205-9-003
C-67	Capacitor, Ceramic,	56pF	50V \pm 10%	RH ..	020-208-9-002
C-61,66	Capacitor, Ceramic,	150pF	50V \pm 10%	RH ..	020-207-9-008
C-68	Capacitor, Ceramic,	180pF	50V \pm 10%	RH ..	020-204-9-011
C-59	Capacitor, Ceramic,	47pF	50V \pm 10%	UJ ..	020-207-9-002
C-17	Capacitor, Ceramic,	1pF	50V \pm 0.25pF	SL ..	020-190-9-001
C-14	Capacitor, Ceramic,	2pF	50V \pm 0.25pF	SL ..	020-187-9-001
C-92	Capacitor, Ceramic,	3pF	50V \pm 0.25pF	SL ..	020-190-9-003
C-63	Capacitor, Ceramic,	5pF	50V \pm 0.25pF	SL ..	020-180-9-009
C-118	Capacitor, Ceramic,	10pF	50V \pm 10%	SL ..	020-181-9-004
C-71	Capacitor, Ceramic,	22pF	50V \pm 10%	SL ..	020-180-9-011
C-82	Capacitor, Ceramic,	33pF	50V \pm 10%	SL ..	020-180-9-012
C-86,90,91,136	Capacitor, Ceramic,	56pF	50V \pm 10%	SL ..	020-196-9-004
C-117	Capacitor, Ceramic,	82pF	50V \pm 10%	SL ..	020-220-9-003
C-62	Capacitor, Ceramic,	100pF	50V \pm 10%	SL ..	020-180-9-016
C-76	Capacitor, Ceramic,	220pF	50V \pm 10%	SL ..	020-180-9-019
C-88,89,134	Capacitor, Ceramic,	330pF	50V \pm 10%	SL ..	020-181-9-008
C-20	Capacitor, Ceramic,	680pF	50V \pm 10%	SL ..	020-187-9-007
C-83	Capacitor, Ceramic,	200pF	50V \pm 10%	SL ..	020-180-9-017
C-103,113,114,129	Capacitor, Ceramic,	0.001 μ F	50V \pm 80%	YF ..	020-190-9-012
C-28	Capacitor, Ceramic,	0.0047 μ F	50V \pm 80%	YF ..	020-190-9-014
C-2,3,4,6,7,8,9,10,12,13, 43,44,52,53,55,56,64, 65,70,78,79,80,87,95, 97,99,100,102,104,105, 106,107,108,109,110, 111,112,120,121,123, 124,126,127,135,137	Capacitor, Ceramic,	0.01 μ F	50V \pm 80%	YF ..	020-190-9-015
C-16,19,23,25,27,93	Capacitor, Ceramic,	0.039 μ F	25V \pm 80%	ZF ..	020-206-9-001
C-85	Capacitor, Ceramic,	0.039 μ F	50V \pm 80%	YF ..	020-220-9-004
C-69	Capacitor, Ceramic,	560pF	50V \pm 10%	YB ..	020-190-9-020
C-35	Capacitor, Ceramic,	0.001 μ F	50V \pm 10%	YB ..	020-210-9-007
C-77,81	Capacitor, Ceramic,	0.01 μ F	50V \pm 10%	YB ..	020-177-9-024
C-39	Capacitor, Semiconductor,	0.1 μ F	25V \pm 80%	BC ..	020-210-9-008

**CIRCUIT
SYMBOL**

DESCRIPTION

**DYNASCAN
PART NO.**

CRYSTAL

X-1	Crystal,	10.240 MHz,	QX-074 ...	132-027-9-001
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MISCELLANEOUS

	PC Board, Main PCB	PC-437 AB	302-355-9-001
	PC Board, CH SW PCB	PC-449AA	302-356-9-001
FL-1	Filter, Ceramic,	FL-048	.....	140-020-9-001
FL-2	Filter, Ceramic,	FL-066	.....	140-022-9-001
S-4	Switch, Rotary,	SR-227	.....	083-247-9-001
S-2,3	Switch, Slide,	SW-054	.....	084-051-9-001
SP-1	Speaker,	SP-052	.....	580-028-9-001
M-1	Meter,	MT-134	.....	320-095-9-001
	Microphone,	MK-075	.....	562-025-9-001
PL- 2	Pilot Lamp,	PL-005	.....	400-033-9-001
J-1	Connector, M Type, ANT,	JK-035	.....	772-027-9-001
J-2	Jack, Microphone,	JK-058	.....	773-073-9-001
J-5	Receptacle, DC Power,	JK-052	.....	762-020-9-001
J-3,4	Jack,	JK-089	.....	773-086-9-001
TP-1,2	Terminal, Check Point,	TP-029	.....	757-033-9-001
F-1	Fuse,	FS-012	.....	191-251-3-002
	Insulation sheet, TR-15	YY-027	.....	342-039-9-001
	Insulation sheet, IC-1	YD-046	.....	342-060-9-001
	Clamper, Wire,	YY-047	.....	380-278-9-001
FC-1	Flat Cable,	WF-104	.....	426-053-9-001
	DC Power Cord,	W-070088	.....	426-020-9-001
	Chassis	SPCC t=1	ZMC	257-111-9-001
	Cover, Top	SB-K08	Black	253-070-9-001
	Cover, Bottom	SB-K08	Black	252-028-9-001
	Mounting Bracket	SPCC t=1.6	ZMC	251-236-9-001
	Heat Sink	AIP t=1.5	.....	747-067-9-001
	Hanger, Microphone	SPCC t=1	Ni	741-074-9-001
	Panel, Front	ABS	Cr-1	255-142-9-001
	Knob, Channel	ABS	Cr-1	751-170-9-001
	Knob	ABS	Cr-1	751-095-9-002
	Channel Disk	.....	.....	763-120-9-001
	Nameplate, Front	AIP t=0.5	.....	600-053-9-001
	ID Plate, FCC	AIP t=1	.....	600-053-9-002
	Label, Serial No	.....	.....	.....
	Label, Serial No	.....	.....	483-338-9-001
	Label, Warning, DC Cord	.....	.....	484-035-9-001
	Mounting Screw	BsBM	Ni	634-101-9-001
	Illumination Plate	t=1	.....	763-069-9-001
	Wool-coated Paper, Wool Tack	.....	.....	769-086-9-001
	Washer, Rubber	t=2	.....	347-074-9-003
	Screw, Pan Hd,	Plastic, M 3 x 6	.....	634-051-9-001
	Screw, Pan Hd,	Plastic, M 3 x 8	.....	634-101-9-002
	Screw, Flat Hd,	Ni, M 3 x 5	.....	634-067-9-004
	Screw, Bind Hd,	Ni, M 2 x 4	.....	634-069-9-002
	Screw, Bind Hd,	Ni, M 3 x 6	.....	634-053-9-001
	Screw, Bind Hd,	Ni, M3 x 8	.....	634-067-9-001
	Tapping Screw, Round Hd,	ZMC, 3.5 x 8	.....	710-020-9-001
	Tapping Screw, Round Hd,	ZMC, 5 x 10	.....	710-021-9-002
	Taptite Screw Bind Hd,	ZMC M3 x 6	.....	710-021-9-004
	Nut, Hex, Ni, M2	.....	.....	653-026-9-001
	Nut, Hex, Ni, M3	.....	.....	634-024-9-001

CIRCUIT
SYMBOL

DESCRIPTION

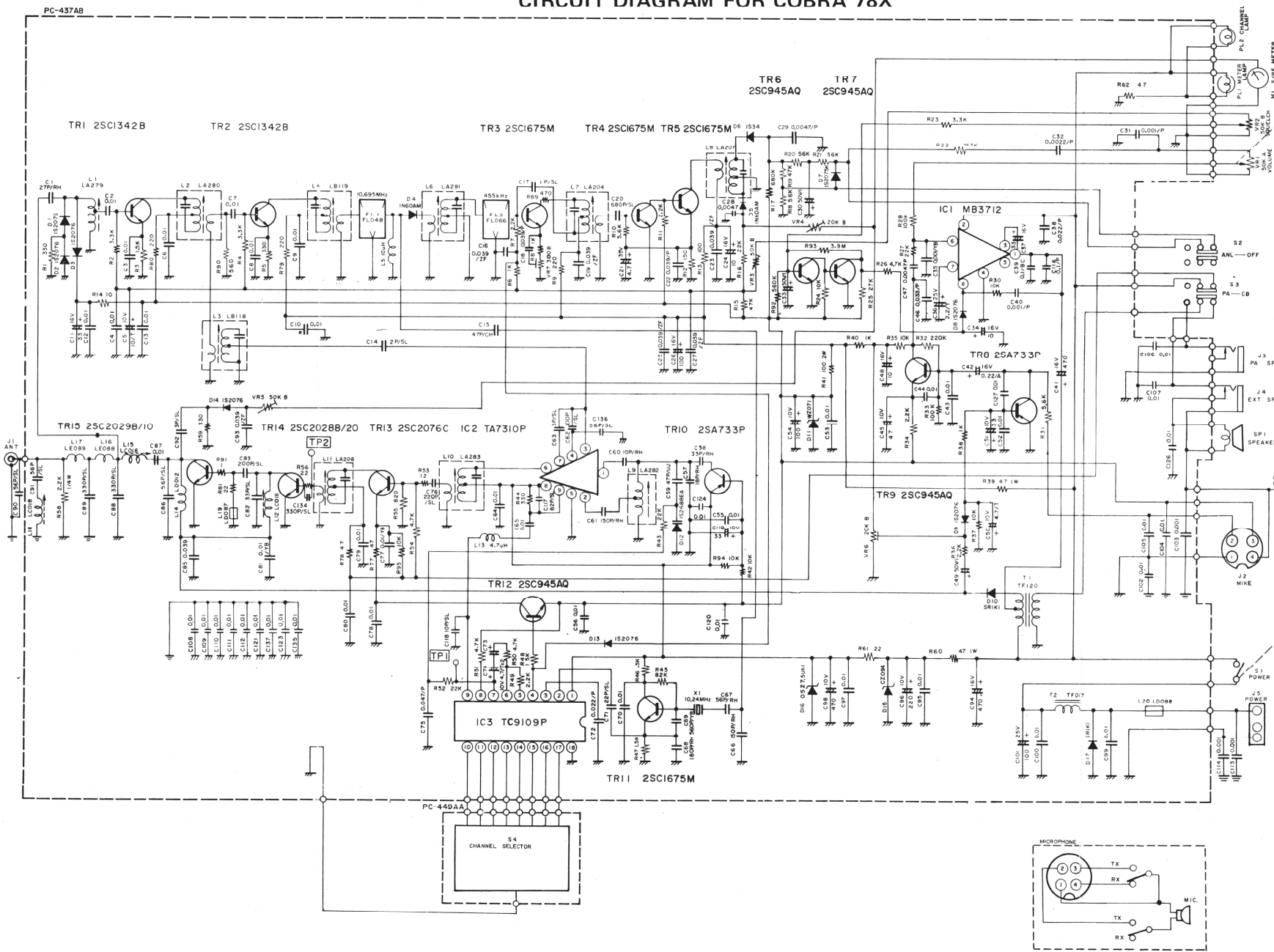
DYNASCAN
PART NO.

MISCELLANEOUS (Continued)

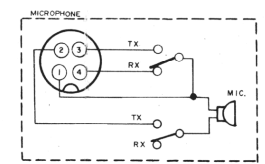
Nut, Flange, ZMC, M3	653-026-9-002
Washer, Lock, ZMC 3.5 ϕ	731-041-9-001
Washer, Star, ZMC 5 ϕ	731-041-9-002
Retainer Ring, CS Type, 10 ϕ	731-041-9-003
Bushing, Rubber	381-087-9-001
Knob Spring	763-084-9-004
Rivet, AL, ID Plate	733-022-9-001
Styrofoam Pad	503-160-9-001
Styrofoam Pad	503-160-9-002
Display Box	500-397-9-001
Shipping Carton Box	500-397-9-002
Owners Manual	480-239-9-001
Bill of Material/ Schematic Diagram	499-145-9-001
Warranty Card	491-191-9-001
Service Station Card	492-042-0-000
FCC Application Form 505	492-041-9-001
Temporary Permit Form 555-B	492-046-9-001
FCC Rules Part 95	492-047-9-001

499-145-9-001

CIRCUIT DIAGRAM FOR COBRA 78X



- NOTES:
1. RESISTANCE VALUES ARE SHOWN IN OHMS UNLESS OTHERWISE NOTED. (K=KILLO OHM M=MEG OHM)
 2. RESISTOR WATTAGES ARE 1/8W UNLESS OTHERWISE SPECIFIED.
 3. CAPACITANCE VALUES ARE INDICATED IN MICROFARADS UNLESS OTHERWISE SPECIFIED. (P=MICRO-MICROFARAD)
 4. ALL CAPACITORS TEMPERATURE CHARACTERISTICS ARE YG UNLESS OTHERWISE NOTED.





Cobra Communications Product Group
DYNASCAN CORPORATION
6460 W. Cortland Street
Chicago, Illinois 60635