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Everclear ® Intercom Troubleshooting

CAUTION: Avoid damaging circuit boards with static. Always discharge static by touching a grounded object before handling circuit boards.

Theory of Operation: Everything on a multicar or multi-master intercom wires to the selector board. It takes power from the power supply and distributes it to the master stations. It routes the audio from master station to car or master station to master station. The master stations supply power to the appropriate car amplifier when they are communicating with it. Master stations control communication to the car, and operation in the car is totally hands-free. Master station priority is established by which terminal the master is wired into at the selector board. Turning on a higher priority master station removes power from the lower priority master stations, including the display. The display board in the master station displays the number of the car selected *and* sends a signal to the selector board to make that connection.

The power supply is the only component that wires to 120 VAC. Connect the power supply to the rest of the intercom LAST to avoid working with hot wires and blowing fuses.

THREE KEY THINGS TO CHECK:
(1) Make sure the power supply is connected to 120 VAC
(2) The power supply switch turned on,
(3) BOTH black and red power supply leads are connected to the battery. This is required to condition the power and keep the battery charged. Power issues can cause difficult-to-diagnose problems throughout the system.

For developing a troubleshooting sequence:

POWER FLOWS FROM	AUDIO FLOWS FROM
Power supply	Master station
To Selector board	To Selector board
To Master station	To Car amplifier OR
Back to Selector board	From Car amplifier
To Car amplifier	To Selector board
	To Master station

For 1-car 1-master intercoms, just delete the selector board from Flow Chart above.

TROUBLESHOOTING

First: Are the symptoms constant or intermittent.

Intermittent implies that there is probably a loose wire or possibly a cold solder joint on a circuit board.
(1) Is the power supply providing approximately 12 volts D.C. at each of the master stations, each of the car amplifiers, and (on multicar intercoms) to the selector board? See below for meter points

If not, check for 120 VAC to the power supply.

Also check the 3 fuses on the power supply.

(2) Check the select function
Is each master station selecting each of the cars and is each car number displaying correctly at each master station?

Both the display board in the master stations and the selector board in the machine room are involved in the selection function.

(3). Can you hear sound at each of the master stations from each of the cars? If not, which ones?

(4) Can you hear sound in each car from each master station? If not, which ones?

METERING PROCEDURES
Meter the power between these points. You should have approx 12 VDC:

On Power Supply board meter from 12 VDC (+) to 12 VDC (-)
On Master Amplifier meter from 12 V (+) to 12 V (-)
On Car Amplifier Board meter from PWR to COM with a master turned on and car selected

On Selector Board Terminals
(In standby, the master stations should have 12 VDC power present. Turning on a higher priority master station removes power from the lower priority master stations, including the display.
Power Terminal strip Meter from 12V Power (+) to (-) *for input power*
Master 1 Terminal strip Meter from 12 V (+) to 12 V (-) *for output power*
Master 2 Terminal strip Meter from 12 V (+) to 12 V (-) *for output power*

(2) Test the select function on multicar intercoms

The select signal is generated at the master station display board, and the selector board in the machine room makes the connection between the active master and the correct car amplifier.

For this selector board test a voltage of 10.6 or less will be considered a zero. A zero at a select terminal = OFF or not selected. A voltage of approx. 10.8 or higher = ON, or that car is selected.

The car select output of the master station display board is a negative signal. That is, it switches the (-) side of the circuit instead of the (+) side as most other switches do.

To test the car select output of the master station display board, hold the red meter lead on 12 V (+) of the master amplifier board and the black lead on the display board Select output being tested.

To test the select signal at the Selector board

Put the red meter lead on a 12 V(+) terminal and the black lead on the select terminal being tested. (the one not working). Should read 12 VDC. (10.8 or higher)

SPEAKER/MIC Combination
A damaged speaker/mic can prevent communications in both directions between the car and the master stations.

The speaker/mic should have approx. 8 ohms resistance (and coincidentally 8 ohm impedance).
Disconnect one of the speaker leads from the amplifier board and meter the resistance across the speaker solder tabs or speaker leads. Check for dead short (close to 0 ohms), or wide open (very high number). Both indicate a bad speaker.

An approx 8 ohm reading doesn't guarantee that the speaker is good, but large variations in either direction indicate a bad speaker.

POWER ISSUES (Power Supply, Battery, Incoming 120 VAC)
When 120 VAC has been disconnected for an extended period, the battery leads should have been disconnected and the On/Off switch on the battery charger left On. Check this.

Check all 3 fuses on the battery charger
F1 is the incoming 120 VAC fuse. F1 is 125 milliamp slow blow. (GMC)
F2 is a 2 amp battery output fuse. (GMA 2)
F3 is a 1 amp battery charger fuse. (GMA 1)

Meter the battery for 12 – 12.5 volts
Disconnect the battery wires and meter across the battery terminals for approx 12.5 VDC.
Meter on DC voltage scale for 12 volt level – 20 is ideal setting.

Meter output of battery charger for 13.5 volts
Meter the unloaded output of the battery charger by metering the wires to the battery after they're disconnected. Output should be about 13.5 volts.

Meter the output from the power supply to the intercom for 12 VDC
Meter the 12V(+) & 12V(-) that connect to the selector board (or the master station on 1-car 1-master systems). Should be approx. 12 to 13.5 VDC.

HEARING SOUND FROM MORE THAN ONE CAR AT ONCE (Multicar Intercom Only)
On the selector board in the machine room, the jumper JB1 should be set on Multicar. Leaving it on the 1-Car setting can have this effect.

MASTER STATION DISPLAYS THE INCORRECT NUMBER OF CARS (too many or too few)
On the display board in the master station, check that the jumper JB1 is on the pin whose number corresponds to the number of cars you want to turn on and display. Reset as necessary.

DISPLAY SET FOR INCORRECT CAR NUMBER
These are field-programmable with the switches on the display board in the master station. Refer to the template that is printed on the display board to determine which switches to turn on. Or see Setting the 7-Segment Display document in your print package or available at www.everclear-intercom.com.

BUTTONS AND SWITCHES
Lift off one of the wires at the terminal strip and meter on the ohm scale:

Buttons for Push to Talk and Push to Select:
When a button is pushed, it should be a dead short. When not pushed, it should be wide open.

On/Off Switch:
When a switch is turned ON, it should be a dead short. When turned OFF it should be wide open.

CHECK FIELD WIRING
Possible connection problems can be caused by:
Broken wires, particularly if you are reusing old wiring, which is NOT recommended
Splices and T-connectors,
Improper or short stripping leaving insulation that prevents a good connection
Failure to secure the wire under the shorting bar of a terminal

TROUBLESHOOTING TIPS
Disconnect and take all the components of the intercom to the machine room and re-connect them with short wire.

USING THE PRINTS, Connect 12 V power from the power supply to a master station, and the 4 audio wires (PWR, COM, TL, AUDIO) from the master amplifier board to the same terminals on a car amplifier.
Turn it on and see if it works.
You may have to turn the volume down or take the car amplifier around the corner to prevent feedback.

If the intercom works and you have a multicar intercom, disconnect the wiring and wire the selector board into the system (see wiring diagrams) and see if it works. If it works, check the other car amplifiers and master stations.

If it all works, the problem is not the intercom parts. If it doesn't, you should be able to tell if a board is bad.

Prints and other technical information are available in the Prints & Specs section of www.everclear-intercom.com.