



# Service Bulletin

SERVICE BULLETIN #7003 - SEPTEMBER, 1987

TO: ALL HARMAN KARDON WARRANTY STATIONS  
MODEL: CXO-1 ACTIVE CROSSOVER  
SUBJECT: ELECTRICAL NOISE

In complex car audio installations there is the possibility of "ground loops". Ground loops are created by multiple ground connections of various electrical components installed in different locations of the car. Currents flowing through the connecting wires and the metal chassis of the car can generate voltages and due to the "ground loops" DC and AC voltages will develop between the chassis and the ground side of input terminals of electronic components. Gain stages in amplifiers amplify these signals and as a result, electrical noise, generated by electrical components in the car such as a fan motor, wiper motor, ignition coil and the alternator, etc., can become audible in loudspeakers. When installing audio components in cars, special care must be taken to avoid "ground loops".

In the event you receive from a customer a CXO-1 active car crossover with the complaint "electrical noise", we recommend you perform the modification indicated in this bulletin. This modification will improve the car power supply noise-rejection of the CXO-1 for automotive audio systems which have a moderate amount of "ground loop" related electrical interference.

#### Modification Procedure:

1. Remove the main printed circuit board from the CXO-1.
2. Cut the foil at points "A" and "B".
3. Insert from the component side of the printed circuit board a jumper wire into the existing holes "C" and "D". Solder this jumper wire.
4. Solder on the foil side of the printed circuit board an insulated wire between points "D" and "E".
5. Re-assemble and test the CXO-1.

## WIRING DIAGRAM

