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# Product Support Bulletin

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## M-1 and M-2 Integrated Radio Transceiver and Fire Alarm Control Panel Ground Fault Troubleshooting Guide

*This procedure has been prepared to help isolate the causes of Ground Fault conditions on the M-1 and M-2 Integrated Radio Transceiver and Fire Alarm Control Panel. This procedure is provided in two parts. Part One provides troubleshooting for the Main Panel and Part Two deals with the Backplane and Zone Expansion Cards (ZEC). It is important that the Troubleshooting be performed in order — Part One first and then proceeding on to Part Two.*

### Notes and Warnings:

1. Warning!! Do not connect (or disconnect) the ribbon cable to the main board (or a backplane) with ANY power applied. Connecting (or disconnecting) this cable with power on (ac or battery) will damage the panel. This damage would be outside Monaco's warranty terms.
2. During this procedure, you will receive several troubles and or COM fails indications. These are associated with the wiring and or expansion cards that you have been required to remove. This is a normal condition due to the zone supervision circuitry.
3. Tools Required:
  - a. Digital Voltmeter (DVOM)
  - b. Small Flat Blade Screw Drive

### Part One: Troubleshooting the Main Panel

1. Remove ac power (F2 fuse), then battery power (F4 fuse) from the panel. (Fuses are located in the top left hand corner of the M Panel.)
2. Disconnect the ribbon cable from J6 on the main board. This is the cable that connects to the backplane(s).

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3. Re-insert fuses F2 and F4. Acknowledge the troubles (COM fails) that occur because of the disconnected backplane(s).
4. Wait for two minutes to see if the ground fault condition returns. If the ground fault recurs, remove power (fuses F2 & F4) and proceed to step 5. If no ground fault occurs go to Part Two: Troubleshooting the Backplane and Zone Expansion Cards (ZEC).
5. Remove and label all field wiring (Auxiliary Inputs, Zone 1 and 2, Bell 1 & 2, Auxiliary Out, Auxiliary Power, and K1 & K2 connections), noting polarity, from the main board.
6. Re-insert fuses F2 and F4.
7. Acknowledge all of the troubles that are annunciated because the Backplane(s), On-Board Zones and Bell circuits have been disconnected.
8. If the ground fault occurs with all of the field wiring disconnected contact Monaco Enterprises for a return authorization number.
9. If no ground fault occurs, perform the following:
  - a. Connect the field wiring to the main panel, one circuit at a time (Auxiliary Inputs, Zone 1 and 2, Bell 1 & 2, Auxiliary Out, Auxiliary Power, and K1 & K2 connections).
  - b. Wait for two minutes to see if a ground fault occurs.
  - c. If a ground fault occurs, a ground fault condition exists in the field wiring that was just connected and/or the devices connected to it. Correct the ground fault in the field wiring. Note: A Ground Fault condition on zone wiring can be caused by conditions such as 1) wire insulation being exposed where the conductors are making contact with the conduit, 2) induced ac noise where the zone wire is run next to or over ac power wiring, or 3) faulty devices.

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**Additional Troubleshooting:** With the suspect ground fault field wiring disconnected from the zone. Measure the resistance of each leg to earth ground. If a short to ground is detected, divide the circuit in half and re-measure until the source of the short to ground is located.

If a short to ground cannot be detected check the wires for induced AC noise. Set the DVOM to measure AC. Measure each leg to ground and across the legs. If the AC measures 50 VAC or above the source of the induced AC noise must be located. This normally occurs when AC and DC circuits are run in the same conduit or twisted wire pair has not been used on the field wiring. To reduce the AC noise, separate the wiring or install twisted wire pair and ensure all conduit runs are bonded to earth ground.

- d. If no ground fault occurs, then re-connect the next circuit.
- e. Continue until all of the main panel circuits have been re-connected. If no ground fault occurs contact Product Support at Monaco Enterprises for assistance.

## Part Two: Troubleshooting the Backplane and Zone Expansion Cards (ZEC)

1. Remove ac power (F2 fuse), then battery power (F4 fuse) from the panel. (Fuses are located in the top left hand corner of the M Panel.)

**Note:** Do not remove any field wiring attached to the backplane at this time.

2. Re-connect the ribbon cable to J6 on the main board.
3. Re-insert fuses F2 and F4. If a ground fault occurs remove fuses F2 and F4 and remove all of the expansion cards installed in the backplane(s).
4. Re-insert fuses F2 and F4 and acknowledge all Troubles.

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5. If a ground fault does not occur within two minutes, remove fuses F2 and F4 and install one expansion card in the backplane. Re-insert fuses F2 & F4 acknowledge all troubles and wait two minutes to see if a ground fault occurs.
6. Repeat Step 5, adding one expansion card at a time until a ground fault occurs. When a ground fault occurs, proceed to Step 7.
7. Remove fuses F2 and F4 and replace the expansion card associated with the ground fault with a known good one. Do not re-install the suspected faulty expansion card.
8. Re-insert fuses F2 and F4.
9. If the ground fault does not occur then contact Monaco Enterprises for a return authorization number for the expansion card.
10. If the ground fault occurs then remove fuses F2 and F4.
11. Remove the field wiring that is associated with the expansion card that shows a ground fault.
12. Re-insert fuses F2 and F4.
13. If a ground fault occurs then contact Monaco Enterprises for a return authorization number for backplane.
14. If no ground fault occurs then re-install the field wiring, one zone at a time until the zone with the ground fault is found. Troubleshoot that zone and its associated field wiring.

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