

TROUBLESHOOTING (cont'd)

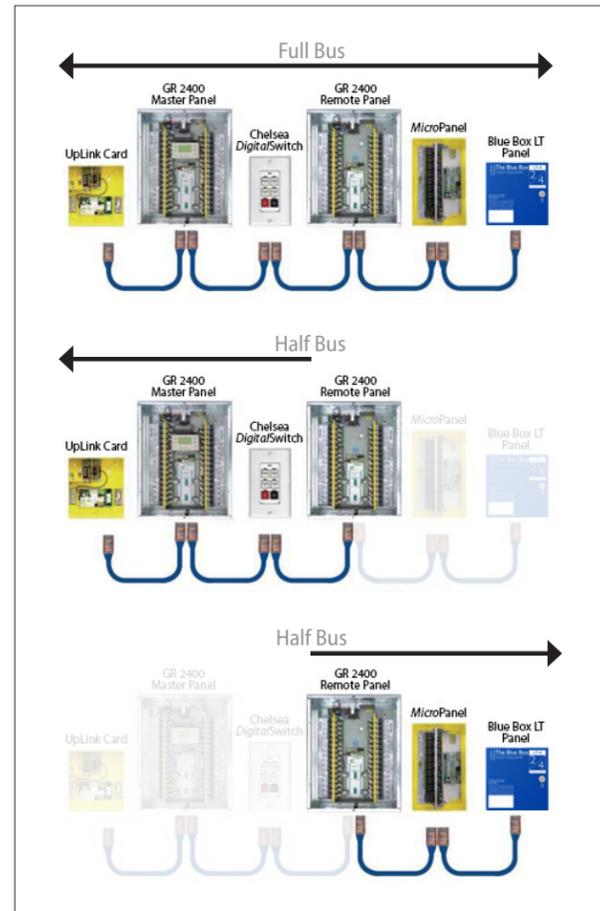
Bus-Splitting Technique

To speed up troubleshooting when readings are less than 200Ω on the Continuity Test or Short-Circuit Test, refer to the Continuity Test Results Chart earlier in this checklist before splitting the bus.

This can provide an approximate distance to a shorted pair or extra terminator from the test point.

1. On the middle device of the bus, disconnect one Cat. 5 cable to create two smaller "half buses."
2. Test each "half bus" to find the side with out-of-range values.
3. Repeat steps 1 and 2 on the out-of-range "half bus" to create another "half bus" until the cable, crimp or device creating the out-of-range measurement is located.

The idea is to split a bus in half and then half again—over and over until the bad area has been located. Visual inspection can also be used.



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Complete the *Quick-Start Guide* before doing this checklist

GR 2400 FINAL ACTIVATION CHECKLIST



System Installer Read This First

Follow the Release Package (provided with your shipment) and cut your installation time in half.

For specific product manuals and installation guides, visit www.acuitycontrols.com or call Tech Support at 800-535-2465 prior to equipment start-up and turn-over.

SYSTEM START-UP CHECKLIST

IMPORTANT NOTE:

This checklist can save you many hours of work, if followed carefully, by preventing common problems encountered in networked installations.

Even if each cable length checks out with a Local Area Network (LAN) cable tester, it is still possible for the entire cable structure to become problematic once connected.

The following are just some of the scenarios that may cause this problem:

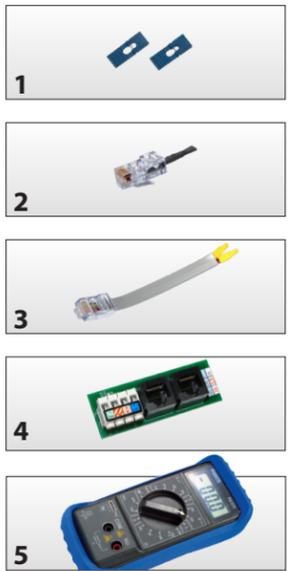
- Dirt/dust in the RJ45 socket
- Strain on the Cat. 5 cable
- Damaged springs in the RJ45 sockets, caused by strain on the cable
- Damaged conductors, caused by nicks while cable is being stripped
- Bus length exceeding 4,000 feet

Tools You Will Need

You have been provided with the following devices (located in the master panel) to assist with testing your system.

Have them on-hand along with your meter:

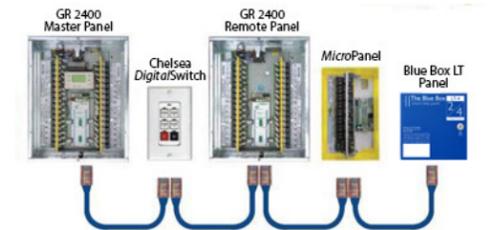
1. GR 2400 Terminators
2. XPoint Terminators (if applicable)
3. Data/Power Jumper
4. Bus Checker
5. Multi-Meter



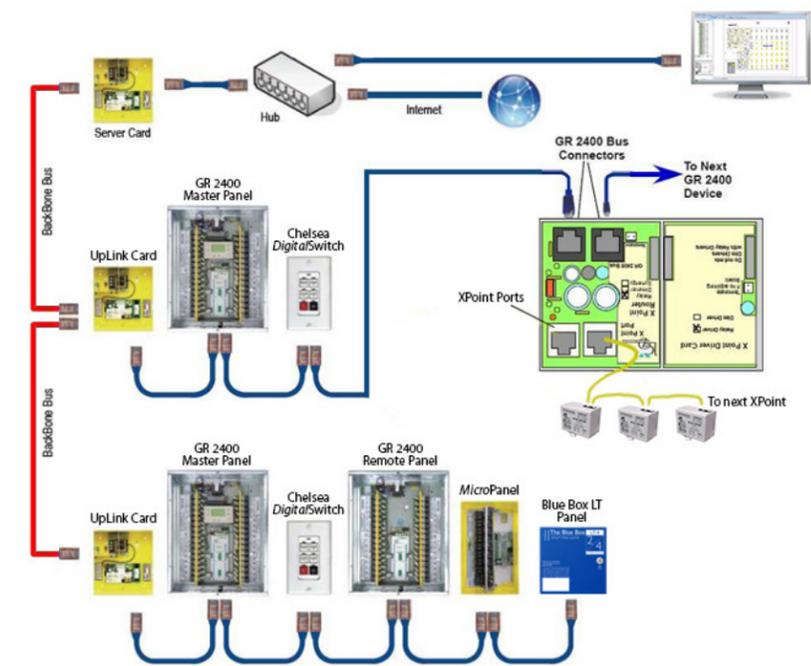
IMPORTANT NOTE:

Please refer to the inset diagrams to understand cable structure and placement of bus terminators, as these vary slightly for each bus type.

GR 2400 OR GR 1400 (SINGLE BUS)



XPOINT OR GR 2400 (MULTI-BUS)



Note: MetaServer - 1 per system, UpLink - 1 per bus

HARDWARE ACTIVATION TESTS

Before starting, please note the approximate total bus cable length for each bus:

Bus 1:	Bus 2:	Bus 3:	Bus 4:

The following steps should be performed on each bus separately:

For example, on a GR 2400 system these steps are followed for each bus in addition to, but separate from, the backbone bus (bus allowing all buses to communicate with each other).

For an XPoint system, this checklist would be completed for each of the XPoint buses in addition to, but separate from, the GR 2400 bus it's connected to.

When doing this checklist, the Cat. 5 connecting the GR 2400 system to the XPoint Routers should be disconnected.

Each test must be passed before moving onto the next. If any readings obtained are out of range, refer to the Troubleshooting section (later in this checklist) or call Tech Support at 800-535-2465.

Continuity Test

Purpose: To verify bus length, continuity and detect crossed data-pair wires. Do the following:

1. De-power every item on the bus and check the voltage at both ends to ensure a reading of 0V. Remove any terminators.
2. At one bus end, plug in the Data/Power Jumper.
3. At the other end, plug in the Bus Checker Card and measure resistance across these terminals:

Gnd to A	_____ohms	B to +12	_____ohms
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4. All test values must be within 10% of the values in the chart below to be considered valid.

Continuity Test Results Chart (Gnd to A & B to +12)

Length:	Ohms:	Length:	Ohms:
100 ft.	3Ω to 6Ω	2,000 ft.	68Ω to 80Ω
500 ft.	12Ω to 20Ω	3,000 ft.	102Ω to 120Ω
1,000 ft.	34Ω to 40Ω	4,000 ft.	130Ω to 160Ω

Short Circuit Test

Purpose: to detect any short circuits along the bus. Please use the 1K ohms or equivalent range setting on your multi-meter. DO NOT use a "beep" test.

5. Remove the Data/Power Jumper.
6. Measure the resistance across the following terminals on the Bus Checker Card:

Gnd to A	_____ohms	A to B	_____ohms
Gnd to B	_____ohms	A to +12	_____ohms
Gnd to +12	_____ohms	B to +12	_____ohms

NOTE: All test values should be greater than 1K ohms.

Earth Ground Test

Purpose: to detect any pathways to earth ground:

7. Measure resistance between the terminals below and earth ground (metallic enclosure or conduit):

Ground	_____ohms	A	_____ohms
+12	_____ohms	B	_____ohms

NOTE: Readings between each terminal and earth ground should be infinite or "open."

Terminator Test

Purpose: To ensure that only two terminators exist; one at each end of the bus. Readings out of range would indicate a missing, misplaced or extra terminator on the bus. Terminators are provided in a labeled bag inside the DTC master panel.

8. Add a terminator on the first and last device.
9. Measure the resistance across the following terminal on the Bus Checker Card:

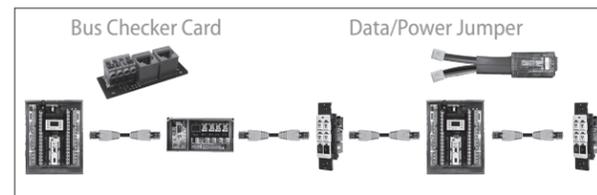
A to B	_____ohms:
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NOTE: For an XPoint bus, plug one terminator in at one end of the bus and the Bus Checker Card at the other. Plug the second terminator into one of the RJ45 ports on the Bus Checker Card and measure the above.

10. Remove the Bus Checker Card.

NOTE: For an XPoint bus, remove the Bus Checker Card and plug the XPoint Terminator into the device.

11. Call Tech Support at 800-535-2465 with your results.



TROUBLESHOOTING

Always re-check "failed" results. A meter that is improperly set or connected can display unusual readings and lead to failed testing.

The Bus-Splitting Technique is the fastest way to find a bad cable and/or damaged device. Be sure to document the cable path.

Cat. 5 cables that pass a Local Area Network (LAN) cable test can still short or break from stress and strain during installation.

If re-testing a suspected cable, wiggle and tug on the conductors near the RJ45 connector while keeping an eye on the LAN tester—conductors should remain engaged during the testing.

Continuity Test Troubleshooting

1. Fluctuating resistance readings indicate one or more active devices that are still "hot." De-power all of the devices and re-test.
2. High resistance readings indicate broken or resistive connections. The following are just some of the scenarios that may cause this problem:
 - RJ45 connectors that are not properly seated with a "click" in the sockets
 - RJ45 connectors improperly crimped (bowed, wires extended beyond the end of the connector)
 - Cable strain breaking or pulling conductors out of RJ45 contacts (visually inspect cable and connector)
 - Damaged device
 - Dirt or paint in RJ45 sockets or on connectors
 - Bad Data/Power Jumper

For assistance in troubleshooting any of the above scenarios, refer to the Bus-Splitting Technique later in this checklist.

NOTE: Complete the Continuity Test after the problem has been resolved.

Short Circuit Test Troubleshooting

1. A low-resistance reading indicates a crossed or shorted pair or a damaged device. Cable strain when pushing switches into a wall can short circuit nicked conductors. Use the Bus-Splitting Technique to find the bad cable, crimp or device.
2. Resistance readings below 300Ω on A-B indicate an extra terminator. Use the Bus-Splitting Technique to find the short or extra terminator.

NOTE: After the problem has been resolved, please complete the Continuity Test.

Earth Ground Troubleshooting

LAN-tested cables can still have paths to earth ground.

1. An abraded or "folded" cable inside the conduit will cause a short to earth ground.

2. Other low-/high-voltage wires touching devices on a bus will cause continuity to earth ground.

Use the Bus-Splitting Technique to find the problem.

Terminator Troubleshooting

1. Ensure that the Data/Power Jumper is removed.
2. Visually inspect both terminators are present and properly seated on each bus-end device.

NOTE: Refer to the *Quick-Start Guide* or the *Making Up Cat. 5 Cable With RJ45 Connections Manual* on running low-voltage cables across, or parallel to, line-voltage cables or exposing low-voltage cables to EMF or RF sources (e.g. welders, ballasts, improperly grounded wireless devices, etc.); any of which can interfere with the bus operation and stability.

A digital device can also become damaged and create signal noise. An oscilloscope can also be used to locate the source of the bus failure.

Important Note:

If you need help or if you get stuck, contact Tech Support at 800-535-2465.