FBII Polling Loop troubleshooting guide

General notes:
1) The key to any troubleshooting process is isolation. Isolate individual devices until you have a basic sub-system that works properly. Then add more of the total system piece-by-piece, until everything works.
2) Selecting MUX1 in programming for expansion type means that the panel will scan the polling loop bus for devices that are connected to the system. Any device that is connected at that time is considered to be a system zone. What zones are enabled or disabled in programming is irrelevant.
3) Selecting MUX2 in programming for expansion type means that the panel will consider any zone that is enabled in programming to be a system zone. There are 4 questions in each zone’s attributes: alarm on open, alarm on short, trouble on open, trouble on short. If any one (or more) of these is set as “YES” the zone is enabled. If all 4 of these questions are “NO”, the zone is disabled.
4) It is often helpful to set the system to MUX1, then MUX2 and check a zone directory by keying “#4” both ways. Comparing this directory will isolate how the zones are programmed versus what is actually connected. The “#4” must be enabled in programming “Enable zone directory” in system attributes.
5) Always check the event log. These panels log everything. This is an invaluable tool.
6) As a last resort, replace the RPM and/or control panel, or default the panel and start.
7) Abbreviations: RPM = remote point module, multiplex/mux = polling loop

Chk log & reset! MPX zone errors
This means that the control panel has detected multiplex devices connected to the system that are not enabled in programming, or zones that are enabled but not present. As the keypad display suggests, the smart place to start is to check the event log. Zones that are causing the error will display as “Extra zone XX” or “Supervosor XX” where “XX” is the zone number. This error will only be seen if using MUX2.

Trouble or supervision on zones
1) Verify that all devices are wired correctly. It is often easy to misinterpret our instructions and connect devices incorrectly. This includes panel connections, RPM connections, and field wiring.
2) Zone Trouble (open or short): If a zone is programmed for trouble on open or trouble on short, see if the zone has an open or short status. In simple terms, if a zone is a 24-hour trouble, and is faulted, it will show trouble. Verify the zones are wired correctly and on the correct terminals. Check voltage on the zone terminals. This should be approximately 5-6 volts DC on any panel zone, or expansion zone when the sensor loop and end-of-line-resistor are normal. (Note: a “right loop” zone will be 0VDC when normal because it does not use an end-of-line resistor.) If you don’t see correct voltage on the zone terminals when the device is closed, the zone loop is not correct.
3) Check all the dip-switches. Make sure that they are not backwards, that the correct chart was used, and that the installer didn’t start on switch 1 when the chart started on switch 2.
4) Polling Loop Voltage: this should be fluctuating between 8-11VDC. This should be tested at the panel and at the module. Verify that the wires are the correct polarity and on the correct terminals. If it is not fluctuating, you probably do not have polling loop zones enabled. If you have low voltage, remove devices until it improves, or check panel voltages in step 5 then see the Troubleshooting the 7120 section.
5) Panel voltages: With a meter check: AC, auxiliary power, and battery (with and without AC).
6) Polling loop Wiring: Verify that all wire runs are within specifications and do not run near sources of induced noises. Realize that capacitance on the wire, not resistance, is our real enemy. Consult page 3.
7) Check the cover tamper on XL-4702 and XL-4722 devices.
8) Verify that you do not have any 2 zones set for the same address. If a 4708 is operating in dip-switch mode, and has only some of it’s zones in use, you may not use other modules to overlap the unused zones.
9) Verify that the zone is programmed correctly: see zones will not fault section.
10) Review the “Enable zone tamper” and “Troubleshooting the 7120” sections below.
11) Isolate the zone by removing all other polling loop devices, connect a single module directly to the panel.

TTTTTTTTTTTTTTTT
This is a default alpha descriptor for a trouble type. The Ts simply mean trouble.

Enable zone tamper
Question 083 on the XL4 version 4.0+ is titled “enable zone tamper”. With this set to “YES”, even number zones are interpreted as a tamper for the previous zone. For example, if zone 10 is violated, a trouble condition will be activated for zone 9. Zone 10 will have no indication of activation. This feature is most useful if using XL4702s with the “right loop” wired as a tamper switch for the device.

**Polling loop Smoke Detectors**

1) There is not a base tamper on our multiplex smoke detectors.
2) When first connected, the LED will latch in the ON state. This is normal. Once the panel has polled the device it will reset. This will happen only after the zone has been programmed.
3) XL-4750sd switches are often set backwards because “on” looks like “off”. These devices will operate on any version of the XL4/XL4C control panels.
4) XL-4760sd smoke detectors are compatible only with XL4 rev 4.2 and higher and XL4C rev 1.5 and higher. Switch 8 must be ON to disable maintenance signals.
5) XL4 rev 4.3AD and XL4C rev 1.6AD support Ademco dip-switch polling loop devices only. This was an intermediate release when the XL4750 was discontinued before the XL-4760 was available.

**Troubleshooting the 7120 expansion module.**

1) Mux Voltage: The polling loop voltage should be fluctuating between 8-11VDC on the screw terminals of the 7120. This will read 10.5 VDC while in programming, or if no multiplex zones are active.
2) Panel voltages: With a meter check: AC, auxiliary power, and battery (with and without AC).
3) Verify that the 7120 is plugged in correctly. The screw terminals should be at the bottom left. Be sure that all 12 pins make contact.
4) Verify that expansion type is set for either MUX1 or MUX2.
5) Check voltage on the pins of the 7120 with reference to a panel negative (terminal 16):

<table>
<thead>
<tr>
<th>Pin #</th>
<th>panel default</th>
<th>in programming</th>
<th>mux zones active</th>
<th>during bus check</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(XL4)</td>
<td>1.58VDC</td>
<td>1.58VDC</td>
<td>1.58VDC</td>
<td>1.58VDC</td>
</tr>
<tr>
<td>1(XL4)</td>
<td>~6VDC</td>
<td>~6VDC</td>
<td>~5-8VDC</td>
<td>~6-7VDC</td>
</tr>
<tr>
<td>2</td>
<td>3VDC</td>
<td>3VDC</td>
<td>~5-8VDC</td>
<td>~6-7VDC</td>
</tr>
<tr>
<td>3</td>
<td>9-10VDC</td>
<td>5VDC</td>
<td>~3-4VDC</td>
<td>~0-13VDC</td>
</tr>
<tr>
<td>4</td>
<td>9-10VDC</td>
<td>11.5VDC</td>
<td>~3-4VDC</td>
<td>11.5VDC</td>
</tr>
<tr>
<td>5</td>
<td>3VDC</td>
<td>3VDC</td>
<td>~6-8VDC</td>
<td>3VDC</td>
</tr>
<tr>
<td>6</td>
<td>4.7VDC</td>
<td>5VDC</td>
<td>4.8VDC</td>
<td>4.8VDC</td>
</tr>
<tr>
<td>7</td>
<td>5VDC</td>
<td>5VDC</td>
<td>~3-4VDC</td>
<td>4VDC</td>
</tr>
<tr>
<td>8</td>
<td>0.5VDC</td>
<td>0.5VDC</td>
<td>~5-6VDC</td>
<td>5VDC</td>
</tr>
<tr>
<td>9</td>
<td>13.6VDC</td>
<td>13.6VDC</td>
<td>13.6VDC</td>
<td>13.6VDC</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>5VDC</td>
<td>5VDC</td>
<td>3VDC</td>
<td>3VDC</td>
</tr>
<tr>
<td>screws</td>
<td>10.4VDC</td>
<td>10.4VDC</td>
<td>~8-11VDC</td>
<td>~8-11VDC</td>
</tr>
</tbody>
</table>

(~ indicates fluctuating voltage.)

**Zones will not fault**

1) Make sure the zone is enabled. Disconnect polling loop module from the polling loop. The zone should go into trouble. If not, the zone is not enabled. There are 4 questions in each zone’s attributes: alarm on open, alarm on short, trouble on open, trouble on short. If any one (or more) of these is set to “YES” the zone is enabled. If all 4 of these questions are “NO”, the zone is disabled.
2) Verify the partition the zone is assigned to as well as the partition of the keypad you are working on.
3) See if the zone is in the panel’s zone directory by pressing #4 from outside programming.
4) Look at the alarm type and trouble type for the zone. Make sure that “display” and “buzzer” are “YES”.
5) Try making the zone a 24-hour alarm/trouble and then check the event log.
6) If using MUX1, make sure the device is connected when the panel is reset/does a bus scan. If not, the
system will not consider this a zone regardless of programming. Check a directory by keying “# 4”.
7) See “Enable Zone Tamper” below.
8) If the zones go into trouble in step 1 above, verify field loop wiring and connections. Then trouble-shoot
the device itself.

**Limitations of multiplex Cable runs**

The FBII Polling Loop has the following limitations:

1) Each individual cable run has the following limitations based on the wire gauge:

<table>
<thead>
<tr>
<th>Wire gauge</th>
<th>Max wire length</th>
<th>If shielded or in conduit*</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 AWG</td>
<td>650 feet</td>
<td>325 feet</td>
</tr>
<tr>
<td>20 AWG</td>
<td>950 feet</td>
<td>475 feet</td>
</tr>
<tr>
<td>18 AWG</td>
<td>1500 feet</td>
<td>750 feet</td>
</tr>
<tr>
<td>16 AWG</td>
<td>2400 feet</td>
<td>1200 feet</td>
</tr>
</tbody>
</table>

2) The maximum amount of cable that is wired directly to the control panel is limited to 4000 feet. Also if an
extender is used, it is also limited to 4000 feet of cable to its output. Of course this assumes that you have
multiple runs in a “star” network. For example you may have three 1200-foot runs from the control
panel using 18 AWG cable – this is 3600 total feet on the control panel. The 4000-foot limitation assumes
non-shielded cable. If using shielded cable, or metal conduit, this is reduced to 2000 feet.

3) The TOTAL system wiring is limited as follows: The amount of multiplex loop cable for the entire system
is limited to 6400 feet. This includes all wires connected directly to the control and wires on the
XLMXEXT. Of course this is still subject to limitations 1 and 2. If using shielded cable, or metal conduit,
this is reduced to 3200 feet.

4) The Polling Loop is limited by current capability to 75mA. An XLMXEXT should be added if you need
additional current.

*Shielded cable and/or metallic conduit increase the capacitance of the wire run, which limits distances.
Avoid running the cable near keypad wiring, intercom, or AC power lines.
Twisted, stranded, non-shielded cable is recommended.
Limit current to 64mA per wire run.
Avoid sharp bends in the wire.