

SIEMENS

Installation Instructions Model HUB-4

Communication Card for NCC WAN/PMI-2 Concentrator

INTRODUCTION

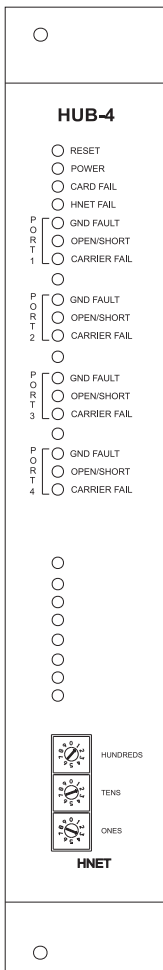


Figure 1
HUB-4 Communication Card

The Model HUB-4 Communication Card from Siemens Industry, Inc., mounts in the CC-5 Card Cage and provides up to four independent data channels, which can be wired as either Style 4 or Style 7 for communication to the remote XLS, MXL, XL3 or other UL864 listed local fire alarm panel providing dry relay contacts that can be used for event monitoring.

The HUB-4 consists of a single Main-2 board on which two COM-2 boards are installed. In turn, up to two modem or RS-485 Interface blocks can be installed on each COM-2 board. Each modem block installed provides a single FSK data channel. Each RS-485 Interface block installed provides a proprietary RS-485 interface channel.

Either a RS-485 Interface or a Modem Block module can be used, dependent on application. Table 1 describes the connections that can be made.

| PANEL | RS-485 | | MODEM | | |
|----------------|-------------------|-------------------|---------------------------|-------------------|-------------------------------|
| | Class B (Style 4) | Class A (Style 7) | Class B (Style 4) | Class A (Style 7) | |
| XL3 | N/A | N/A | MMX | MMX | NCC WAN only |
| MXL | N/A | N/A | CMI-300 | CMI-300 | |
| FSI-MXL | NIM-1W | N/A | NIM-1W/1M and Modem Block | N/A | NCC WAN or PMI-2 Concentrator |
| FSI-XLS | HUB/RPM | HUB | HUB | N/A | |
| Other | WAIOS (1-16) | WAIOS (1-16) | N/A | N/A | NCC WAN only |

Each of the four data channels is controlled by a separate micro-controller which provides all background supervision of the data lines (to the remote panel) as well as sending and receiving Fire Panel information to the primary micro-controller. The information from these four channels is concentrated into a single data stream and sent to the NCC WAN via the NIC-C or the PMI-2 Concentrator via HNET. On NCC WAN, the HUB-4 communicates on each of four ports with either the MMX (XL3 Modem), the CMI-300 (MXL modem), NIM-1 FSI (MXL FSI modem), NIM-1W (MXL RS-485), RPM (XLS RS-485), HUB-4 (XLS RS-485), HUB-4 (XLS modem) or up to 16 WAIOS (Wide Area Input Output) boards. On the PMI-2 Concentrator, the HUB-4 communicates on each of the four ports with either the NIM-1W/NIM-1M (MXL Modem), NIM-1W (MXL RS-485), RPM (XLS RS-485), HUB-4 (XLS RS-485), or HUB-4 (XLS modem).

Using the Modem Block module, communication distance is 8 miles (CMI-300/MMX-1) or 10 miles (HUB-4 to HUB-4) over 18 gauge twisted pair lines depending on the quality of the communication wires (attenuation cannot exceed -23 dBm [CMI-300/MMX-1] or

-38dBm [HUB-4 to HUB-4] @ 2.5KHz), however, using conditioned data grade leased lines from the phone company, the distance is unlimited.

Using the RS-485 Interface module, the communication distance is 12,000 feet using 18 gauge twisted pair lines.

OPERATION

On NCC WAN, the HUB-4 can communicate using either the CMI-300, MMX, NIM-1W/ NIM-1M or HUB-4 slave Modem supervising the data circuit as well as the connected MXL or XL3 Control Panel. Each of the four independent HUB-4 channels provides the means to transmit data to and from the XLS, MXL or XL3 and the NCC WAN Head-End System. The HUB-4 can also communicate with up to 16 WAIO cards, supervising the data circuit for them as well as their inputs. Each of the four independent HUB-4 channels provides the means to transmit data to and from the WAIOs and the NCC WAN head end system. In addition, the HUB-4 can support FSI protocol to communicate to an MXL using a NIM-1W or to an XLS using a HUB-4 slave so that an NCC or a Desigo CC via the PMI-2 Concentrator will act as the remote management system. Similarly, the HUB-4 can support FSI protocol to an RPM in an XLS fire system.

The HUB-4 Card is divided into five main sections: four external link sections and a control section. The control section provides supervision of the HNET data channel (Connection to the NCC WAN/PMI-2 Concentrator) and receives data from each of the external links for transmission to the NCC WAN/PMI-2 Concentrator. The control section also provides on board processor and integrity supervision. When installed in the XLS system, the HUB-4 operates in slave mode.

Controls and Indicators

The front panel of the HUB-4 contains one reset switch, 15 LEDs and three HNET address switches as shown in Figure 1.

A reset switch is located on the top of the front panel. Pushing the reset switch re-initializes the HUB-4 operation.

The LEDs follow the reset switch and their functions are defined as follows:

| | | |
|-------------|----------|--|
| POWER | (Green) | Normally ON. When illuminated, indicates that power for the HUB-4 is applied to the card. |
| CARD FAIL | (Yellow) | Normally OFF. When illuminated, indicates that the card microprocessor has failed. May illuminate for 2-4 seconds when initially powered. |
| HNET FAIL | (Yellow) | When consistently illuminated, the HUB-4 has detected an HNET loss of supervision of the NCC. When the HUB-4 detects an HNET failure, it will cause all configured ports to shut down communication to remote units. The muted ports will be indicated by a flashing OPEN/SHORT LED. When flashing rapidly, the HUB-4 has been addressed via the front panel HNET address select switches with an inappropriate address, i.e., address zero, or addressed above 252 decimal. |
| PORTS 1 – 4 | | The LEDs for each independent modem block module or RS-485 Interface module are referred to as ports. When all three LEDs are flashing for a specific port, |

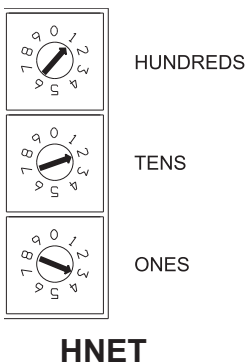
that port is considered to be an unspecified, unconfigured port that has detected a modem originate signal or RS-485 data from a remote unit.

| | | |
|--------------|----------|--|
| GND FAULT | (Yellow) | Normally OFF. When illuminated, indicates that the HUB-4 has detected either a negative or positive ground fault on its field wiring. |
| OPEN/SHORT | (Yellow) | Normally OFF. When consistently illuminated, the HUB-4 has detected an OPEN/SHORT in either the primary or secondary wired communications line. When flashing, there is a loss of communications between the HUB-4 main module, and the specific HUB-4 communication port. If the HNET FAIL LED is also illuminated, this port has been muted. |
| CARRIER FAIL | (Yellow) | Normally OFF. When consistently illuminated, the HUB-4 has detected CARRIER FAIL with a modem block or a polling supervision fail with a RS-485 Interface card between the HUB-4 and the remote device. When flashing, there is a loss of communications between the modem or RS-485 Interface card and the communications controller of the HUB-4 or loss of communications between the HUB-4 and the remote fire system. |

Three rotary dial switches at the bottom of the front panel are used to set the HNET network address of the HUB-4.

PRE-INSTALLATION

Switch and Jumper Settings are required only on HUB-4, Main-2 and HUB-4, COM-2 boards that are not factory preassembled.



1. **Network Address Switches:** Set the three-digit HNET network address for the HUB-4 using the three rotary dial switches located near the bottom of the front panel. (Refer to Figure 1 for the location of the switches.) The address for the HUB-4 must be the same as the address selected for it in the NCC WAN/PMI-2 Concentrator. To set the address, turn the pointers on each of the three dials to the numbers for the selected address. For example, if the address is 123, set the pointer for the HUNDREDS dial to "1," set the pointer for the TENS dial to "2," and set the pointer for the ONES dial to "3." The range of allowable addresses is from 001 to 251 (leading zeros must be used).
2. **HUB-4, Main-2 Board (Switch S2):** Currently Not Used. All switches must be set to the ON position.

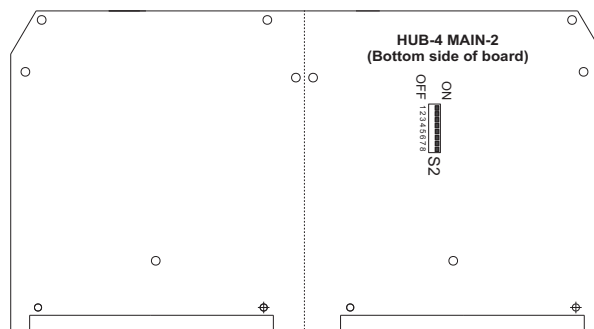


Figure 2
Location of S2 On HUB-4 Main-2

- HUB-4, COM-2 Board:** Make sure that the jumper settings are correct for the desired application (either Modem Block or RS-485 Interface Module). Refer to Table 2 and Figure 3 for the correct placement of jumpers on P5 and P6.

| TABLE 2 COM2 JUMPER SETTINGS | | | |
|---------------------------------|--------|--------------------------------|-------------------------------------|
| Port* | Jumper | Modem Block Module Application | RS-485 Interface Module Application |
| Port 1 | P5 | 1-2, 3-4 | 3-5, 4-6 |
| Port 2 | P6 | 1-2, 3-4 | 3-5, 4-6 |
| Port 3 | P5 | 1-2, 3-4 | 3-5, 4-6 |
| Port 4 | P6 | 1-2, 3-4 | 3-5, 4-6 |

* Refer to Figure 4 for the location of Ports 1-4 on the HUB-4, Main 2 board.

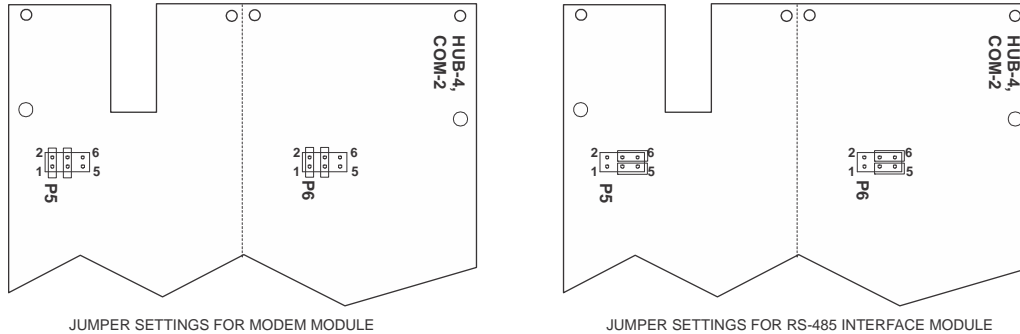


Figure 3
Jumper Settings of P5 and P6 on HUB-4, COM-2

HUB-4 Configuration

The HUB-4 can be configured to support from one to four independent communication channels (Modem Block or RS-485 Interface modules). Refer to Table 3 to determine the required modules for the desired configuration. Modem Block and RS-485 Interface modules can not be mixed on a single COM-2 card.

| TABLE 3 HUB-4 CONFIGURATION | |
|--------------------------------|--|
| Number of Channels | Required Modules |
| 1 | 1 HUB-4 Main-2, 1 HUB-4 COM-2, 1 Modem Block or 1 RS-485 Interface Module |
| 2 | 1 HUB-4 Main-2, 1 HUB-4 COM-2, 2 Modem Blocks or 2 RS-485 Interface Modules |
| 3 | 1 HUB-4 Main-2, 2 HUB-4 COM-2, 3 Modem Blocks or 2 Modem Blocks and 1 RS-485 Interface Modules or 1 Modem Block and 2 RS-485 Interface Modules or 3 RS-485 Interface Modules |
| 4 | 1 HUB-4 Main-2, 2 HUB-4 COM-2, 4 Modem Blocks or 2 Modem Blocks and 2 RS-485 Interface Modules or 4 RS-485 Interface Modules. |

HUB-4 Assembly

The HUB-4 Assembly consists of the HUB-4 Main-2, two COM-2 boards, and from one to four Modem Block or RS-485 Interface modules, depending on your desired configuration. If your HUB-4 is preassembled, complete Steps 1 and 2 below and then go to Step 9. Refer to Table 4 for correct placement of modem block or RS-485 Interface modules on the HUB-4 Main -2.



When assembling the HUB-4, note that P1, the 2 X 15 receptacle on the HUB-4, Main-2, connects to Port 1, P2 connects to Port 2, P3 connects to Port 3, and P4 connects to Port 4.

- Begin connecting the components by following the instructions for the Modem Block module, P/N 315-099356, or the RS-485 Interface module, P/N 315-049930.
- Determine the number of channels (from one to four) that your system will require. Install the HUB-4 COM-2 and Modem Block or RS-485 Interface modules on the HUB-4 Main-2 according to Table 4, page 6.

3. Using the three nylon spacers provided with each HUB-4, COM-2, place the screw end of the spacers through the holes in the top of the HUB-4, Main-2 board. (Refer to Figure 4, page 5.)
4. Secure the spacers in place on the underside of the HUB-4, Main-2 board with the nylon nuts provided.
5. Connect the HUB-4, COM-2 to the HUB-4, Main-2 by lining up the 2x15 connectors on the HUB-4 COM-2 to the 2x15 receptacles on the HUB-4, Main-2. Keep in mind that Port 1 is the P1 receptacle, etc. Gently insert the connectors into the receptacles being careful not to bend the connectors.
6. Note that the spacer holes on the HUB-4, COM-2 board line up with the spacers on the HUB-4 Main-2 board. (Refer to Figure 5, page 6.)
7. Insert the 3 nylon screws (packaged with the HUB-4, COM-2) through the holes in the HUB-4, COM-2 into the spacers in the HUB-4, Main-2 and secure them in place. (Refer to Figure 5, page 6.)
8. If a second HUB-4, COM-2 is required, install it now by following the previous steps.



When installing Modem Block or RS-485 Interface modules, refer to Table 4 for correct placement on HUB-4 Main-2.

9. Connect the Modem Block or RS-485 Interface module to the HUB-4, COM-2 by lining up the 2x10 connector on the Modem Block or RS-485 Interface module to the 2x10 receptacle on the HUB-4, COM-2. Gently insert the connector into the receptacle being careful not to bend the connector.
10. Note that the spacer holes on the Modem Block or RS-485 Interface module line up with the spacers on the HUB-4 COM-2. (Refer to Figure 5, page 6.)
11. Insert the 3 nylon screws (packaged with the Modem Block or RS-485 Interface module) through the holes in the Modem Block module or RS-485 Interface module into the spacers in the HUB-4, COM-2 and secure them in place. (Refer to Figure 5, page 6.)
12. If additional Modem Block or RS-485 Interface modules are required, install them now by following steps 9-11 above.

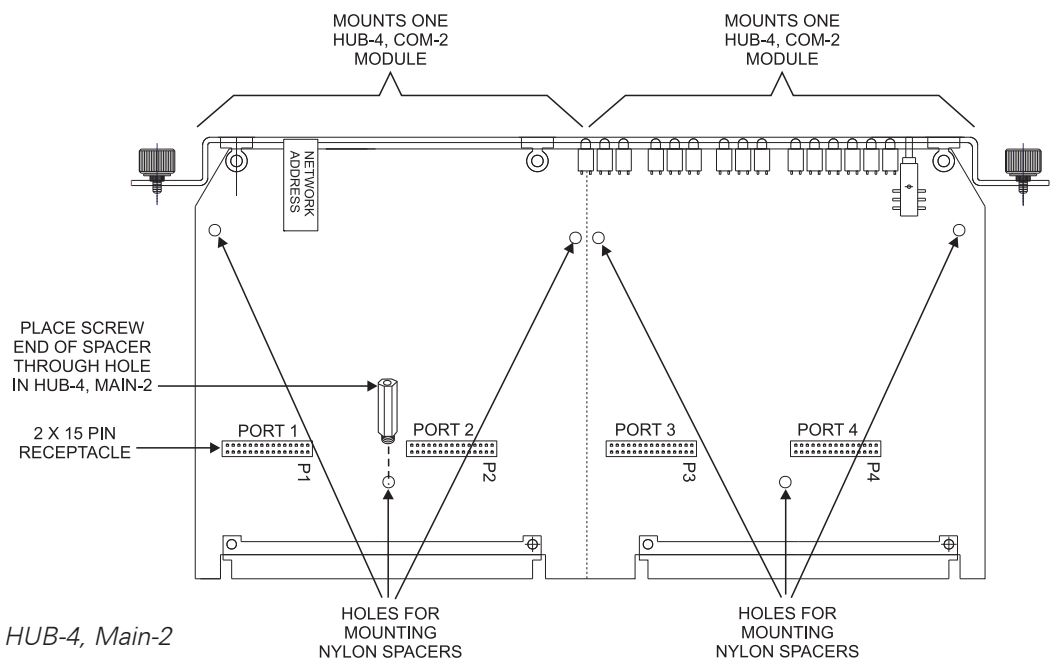
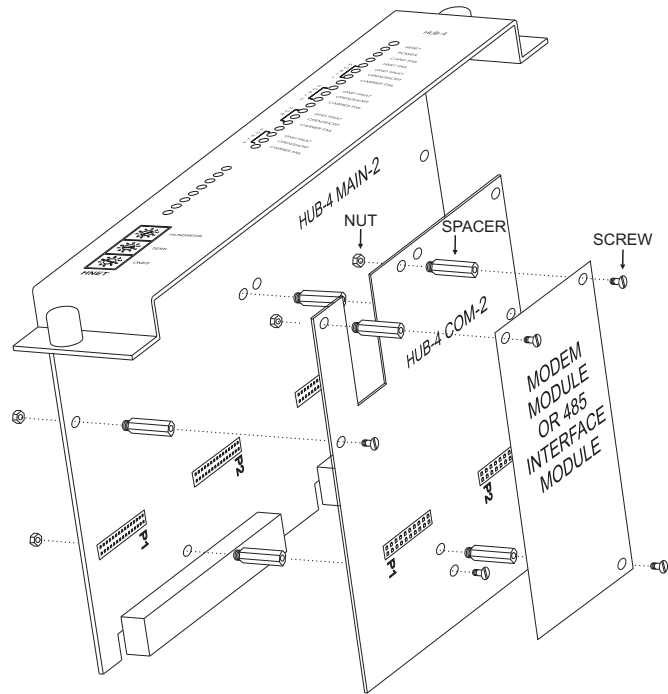


Figure 4
Spacer Placement on HUB-4, Main-2



**TABLE 4
HUB-4 MODULE PLACEMENT**

| Number of Channels | HUB-4 COM-2 PLACEMENT | MODEM BLOCK OR RS-485 INTERFACE MODULE PLACEMENT | PORT |
|--------------------|--|---|------------------|
| 1 | Place HUB-4 COM-2 on P1 of HUB-4 Main-2 | Place Modem Block or RS-485 Interface Module on P1 of HUB-4 COM-2 | 1 |
| 2 | Place HUB-4 COM-2 on P1 of HUB-4 Main-2 | Place first Modem Block or RS-485 Interface Module on P1 of HUB-4 COM-2; Place second Modem Block or RS-485 Interface Module on P2 of HUB-4 COM-2 | 1 2 |
| 3 | Place first HUB-4 COM-2 on P1 of HUB-4 Main-2; Place second HUB-4 COM-2 on P3 of HUB-4 Main-2 | Place first Modem Block or RS-485 Interface Module on P1 of first HUB-4 COM-2; Place second Modem Block or RS-485 Interface Module on P2 of first HUB-4 COM-2; Place third Modem Block or RS-485 Interface Module on P1 of second HUB-4 COM-2 | 1 2 3 |
| 4 | Place first HUB-4 COM-2 on P1 of HUB-4 Main-2; Place second HUB-4 COM-2 on P3 of HUB-4 Main-2 | Place first Modem Block or RS-485 Interface Module on P1 of first HUB-4 COM-2; Place second Modem Block or RS-485 Interface Module on P2 of first HUB-4 COM-2; Place third Modem Block or RS-485 Interface Module on P1 of second HUB-4 COM-2; Place fourth Modem Block or RS-485 Interface Module on P2 of second HUB-4 COM-2 | 1 2 3 4 |

*Figure 5
Connecting the HUB-4 Assembly*

Prior to installing the modem or RS-485 interface modules on the COM-2 card, configure them as indicated in Figures 6 and 7.

RS-485 INTERFACE MODULE JUMPER SETTINGS

The RS-485 Interface module has two configuration jumpers: J2 and J3. Refer to Figure 6 for the location of the jumpers.

- For Style 7 (Class A) wiring, leave the jumper plugs in place on J2 and J3.
- For Style 4 (Class B) wiring, remove the jumper plugs from J2 and J3.

Refer to the RS-485 Interface Installation Instructions, P/N 315-049930, for additional information.

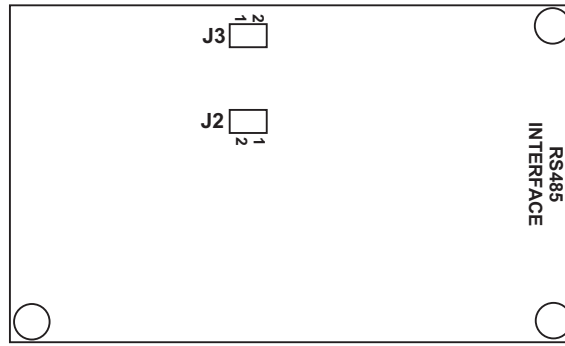
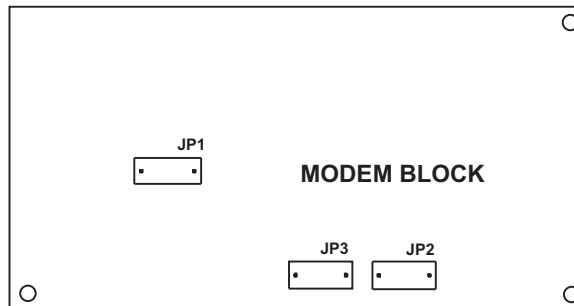


Figure 6
RS-485 Interface Module

MODEM BLOCK MODULE JUMPER SETTINGS

The Modem Block module has three configuration jumpers: JP1, JP2, and JP3. Refer to Figure 7 for the location of the jumpers. Set the jumpers to the configuration shown in Table 5.

Refer to the Modem Block Installation Instructions, P/N 315-099356, for further information.



| TABLE 5 MODEM BLOCK JUMPER SETTINGS | |
|---|-----|
| JP1 | ON |
| JP2 | OFF |
| JP3 | OFF |

NOTE:
"ON" IS WHEN THE JUMPER
IS IN THE PROPER POSITION
OVER PLUGS JP1, JP2, OR JP3.

Figure 7
Module Block Module

INSTALLATION



Remove all system power before installation, first battery then AC. (To power up, connect the AC first, then the battery.)

The HUB-4 assembly plugs perpendicularly into one slot in the CC-5 card-cage via two 96-pin DIN connectors and can occupy any slot in the card cage. (Refer to Figure 8.)

Insert the HUB-4 card into the card guides rightside up (lettering on the front panel is legible)

Slide the card in until the card edge connectors contact the receptacles on the motherboard.

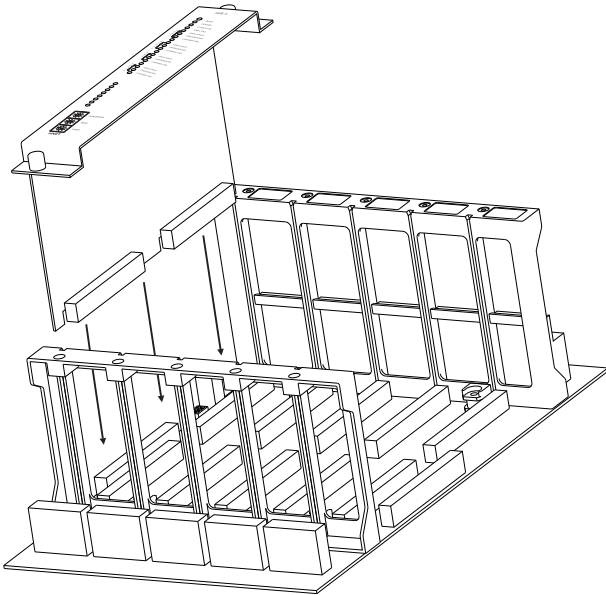


Figure 8
Installing The HUB-4

Verify that the DIN connectors of the card and the card-cage aligned properly. The card can only plug in one direction to the card cage, if it does not align, DO NOT FORCE the card.

Place thumbs on the front panel adjacent to the captive screws and gently apply even pressure on the card until the connectors seat in the receptacles on the motherboard.

Secure with the captive screws.

Connect the modem or RS-485 Interface transmission lines to the correct CC-5 screw terminal connectors on the HUB-4 board. Power up the system and verify that the HUB-4 LED turns on.

WIRING

All field wiring to the HUB-4 is connected to the terminal blocks of the CC-5 card cage slot in which it is installed.

To Connect External Wiring

1. Loosen the screw of the terminal by turning it counterclockwise.
2. Insert the wire into the side of the terminal block
3. Tighten the screw of the terminal block by turning it clockwise.

The HUB-4 can be connected in three ways. (Refer to Figures 7 - 11.)

- As a single supervised Style 4 connection.
- As a linked, supervised Style 7 connection with the HUB-4 controlling switching between the two connections.

POST-INSTALLATION

Communication Troubleshooting:

To verify that communication exists between the HUB-4 and MXL, XL3 or WAIO (NCC WAN only), set the address of the HUB-4 to zero. This option shuts off communications (HNET) from the COM-1 to the NCC WAN/PMI-2 Concentrator. This option also turns on all ports (1-4). In the case where a port or ports are not used, the carrier fail LED will activate.

SPARE EQUIPMENT

A minimum of one spare HUB-4 per NCC WAN/PMI-2 Concentrator system is recommended.

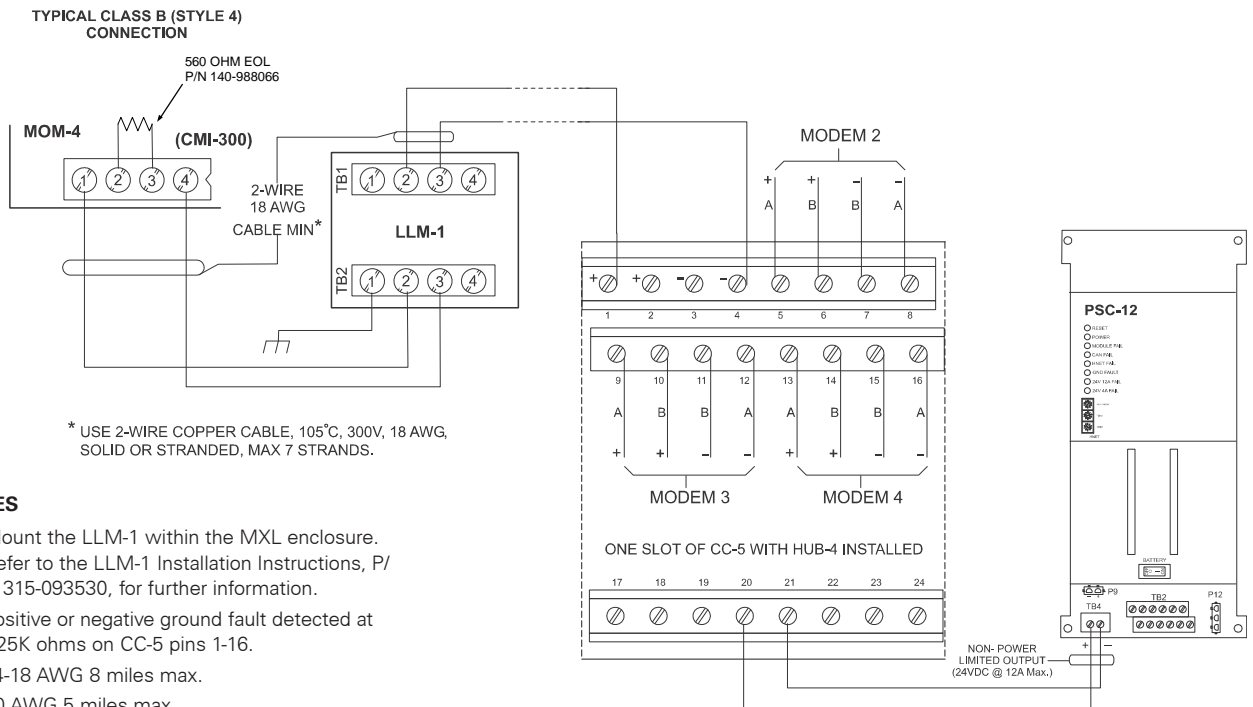
ELECTRICAL RATINGS

Input Power

| | |
|----------------------------|-------|
| 24V Back Plane Current | 0 |
| Screw Terminal 24V Current | 400mA |
| 6.2V Back Plane Current | 30mA |
| 24V Standby Current | 400mA |

Output Power

| | |
|-----------------------|--|
| Each modem | 2V peak-to-peak max |
| Channel pair | 1.3mA max |
| | Maximum line attenuation -23dbm @ 2.5KHz |
| Each RS-485 Interface | 8V peak-to-peak |
| RS-485 output pair | 75mA during message transmission |



NOTES

1. Mount the LLM-1 within the MXL enclosure. Refer to the LLM-1 Installation Instructions, P/N 315-093530, for further information.
2. Positive or negative ground fault detected at <25K ohms on CC-5 pins 1-16.
3. 14-18 AWG 8 miles max.
20 AWG 5 miles max.
22 AWG 3 miles max.
0.6 µF max line to line.

Figure 9
Typical Class B (Style 4) HUB-4 Wiring Connection to CMI-300 on MXL

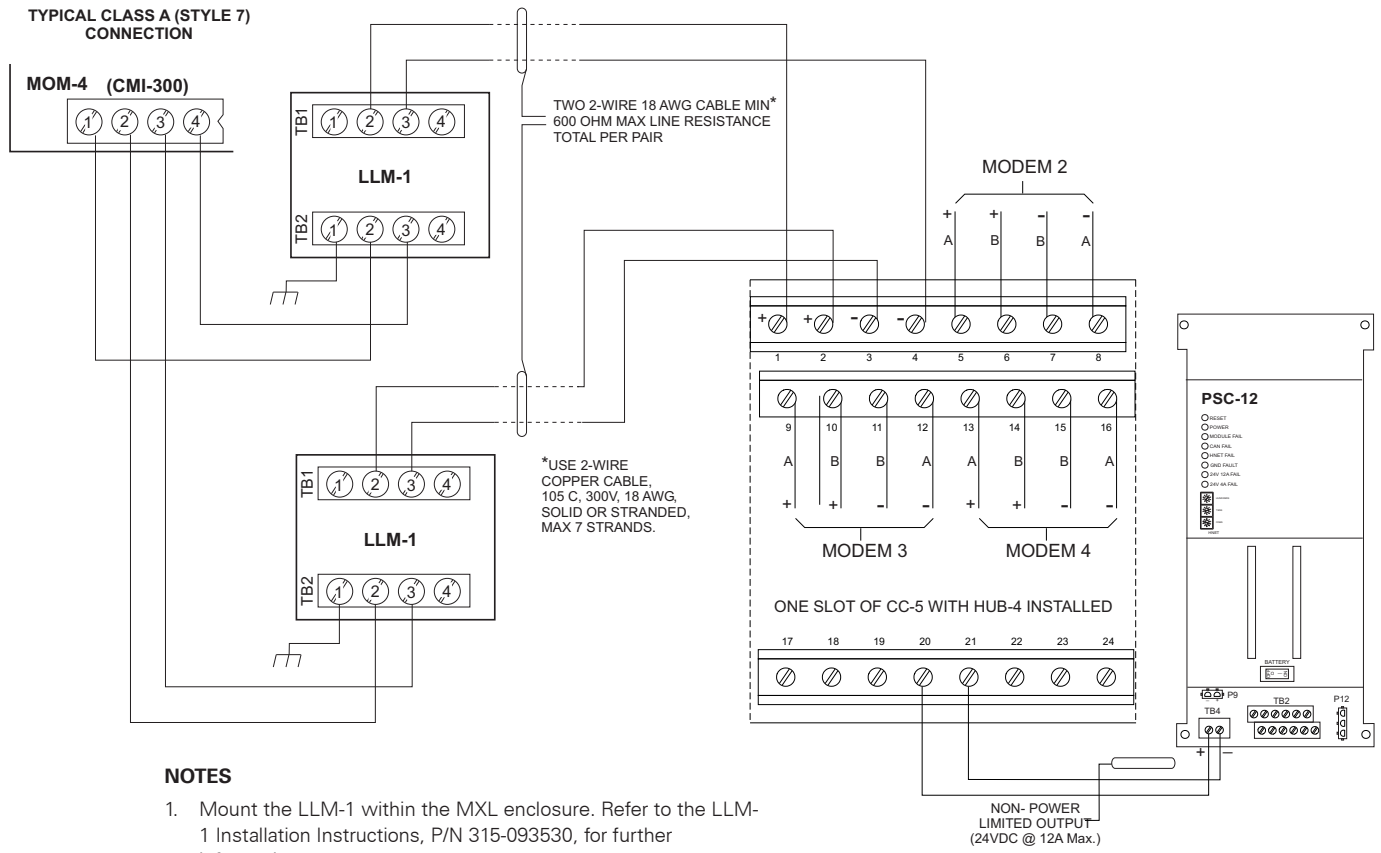
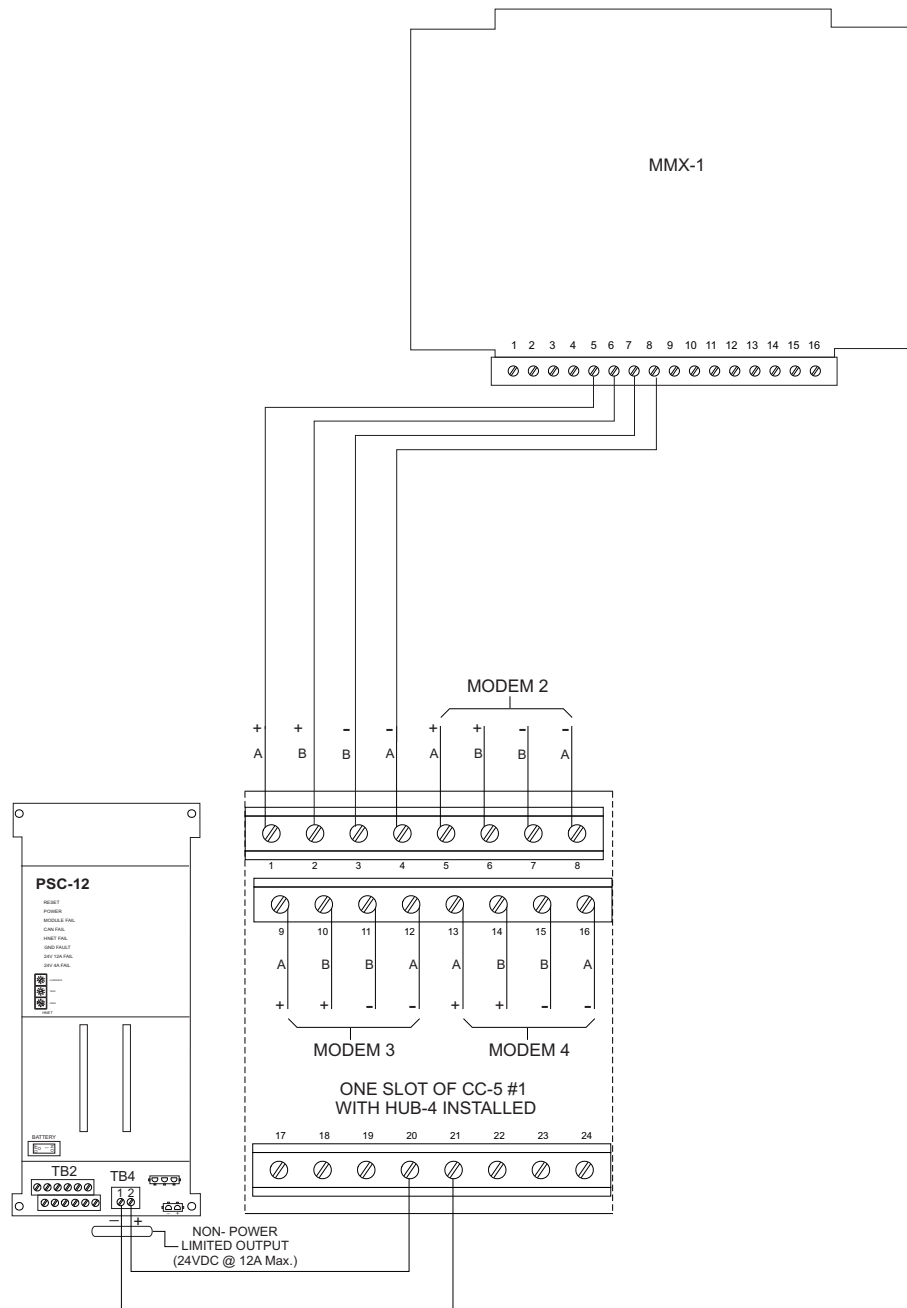


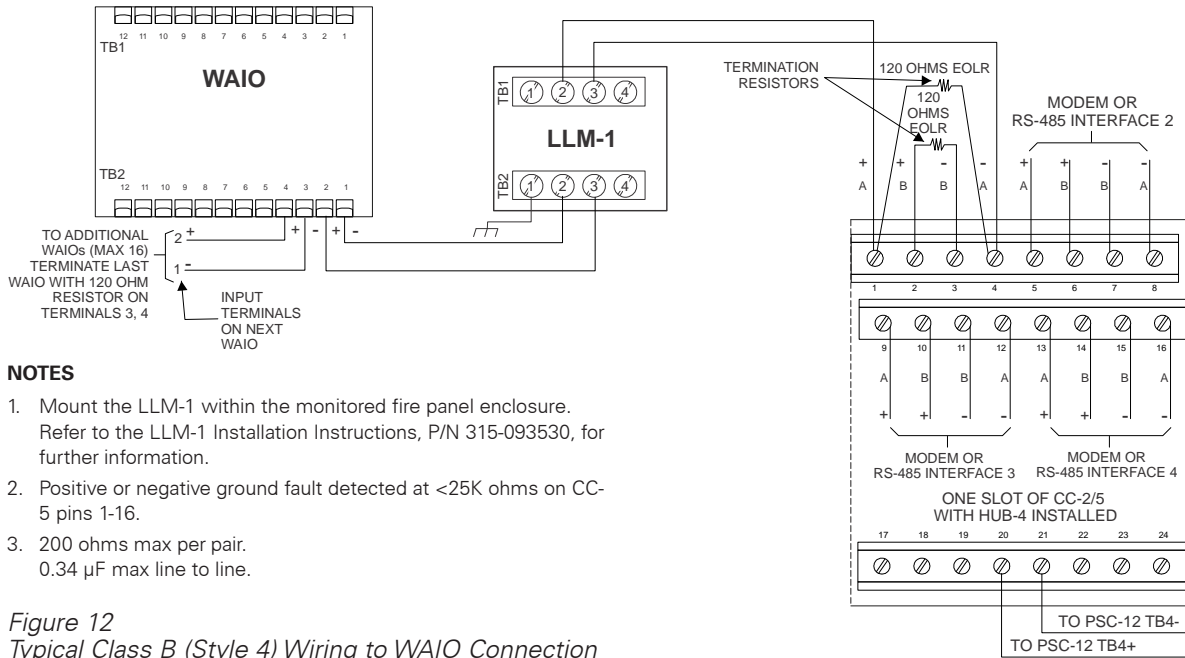
Figure 10
Typical Class A (Style 7) HUB-4 Wiring Connection to CMI-300 on MXL



NOTES

1. The communication level from the MMX as measured from the HUB-4 terminals should not exceed -4dBm.
2. Positive or negative ground fault detected at <25K ohms on CC-5 pins 1-16.
3. 14-18 AWG 8 miles max.
 20 AWG 5 miles max.
 22 AWG 3 miles max.
 0.6 μF max line to line.

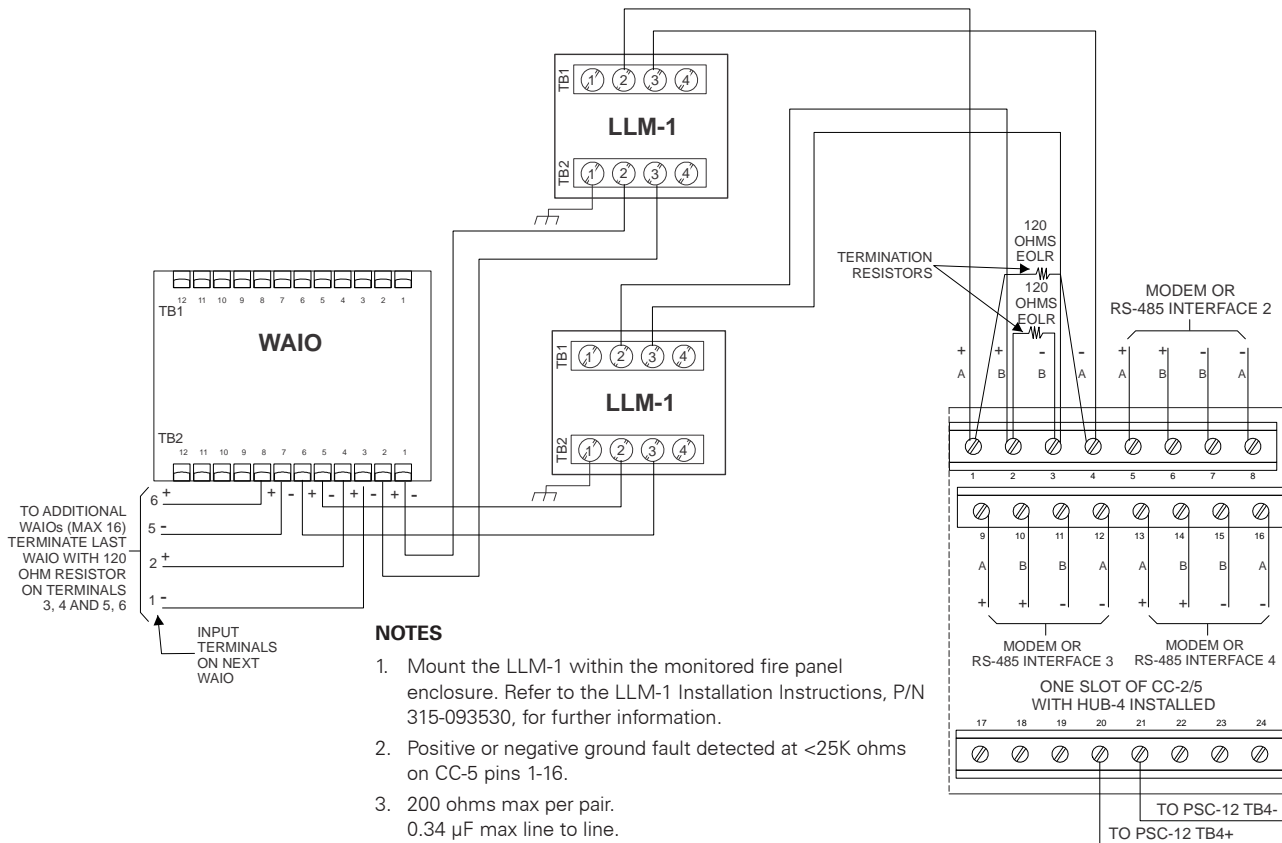
Figure 11
 HUB-4 Wiring To XL3 System (MMX-1)



NOTES

1. Mount the LLM-1 within the monitored fire panel enclosure. Refer to the LLM-1 Installation Instructions, P/N 315-093530, for further information.
2. Positive or negative ground fault detected at <25K ohms on CC-5 pins 1-16.
3. 200 ohms max per pair.
0.34 μ F max line to line.

Figure 12
Typical Class B (Style 4) Wiring to WAIO Connection



NOTES

1. Mount the LLM-1 within the monitored fire panel enclosure. Refer to the LLM-1 Installation Instructions, P/N 315-093530, for further information.
2. Positive or negative ground fault detected at <25K ohms on CC-5 pins 1-16.
3. 200 ohms max per pair.
0.34 μ F max line to line.

Figure 13
Typical Class A (Style 7) Wiring to WAIO Connection

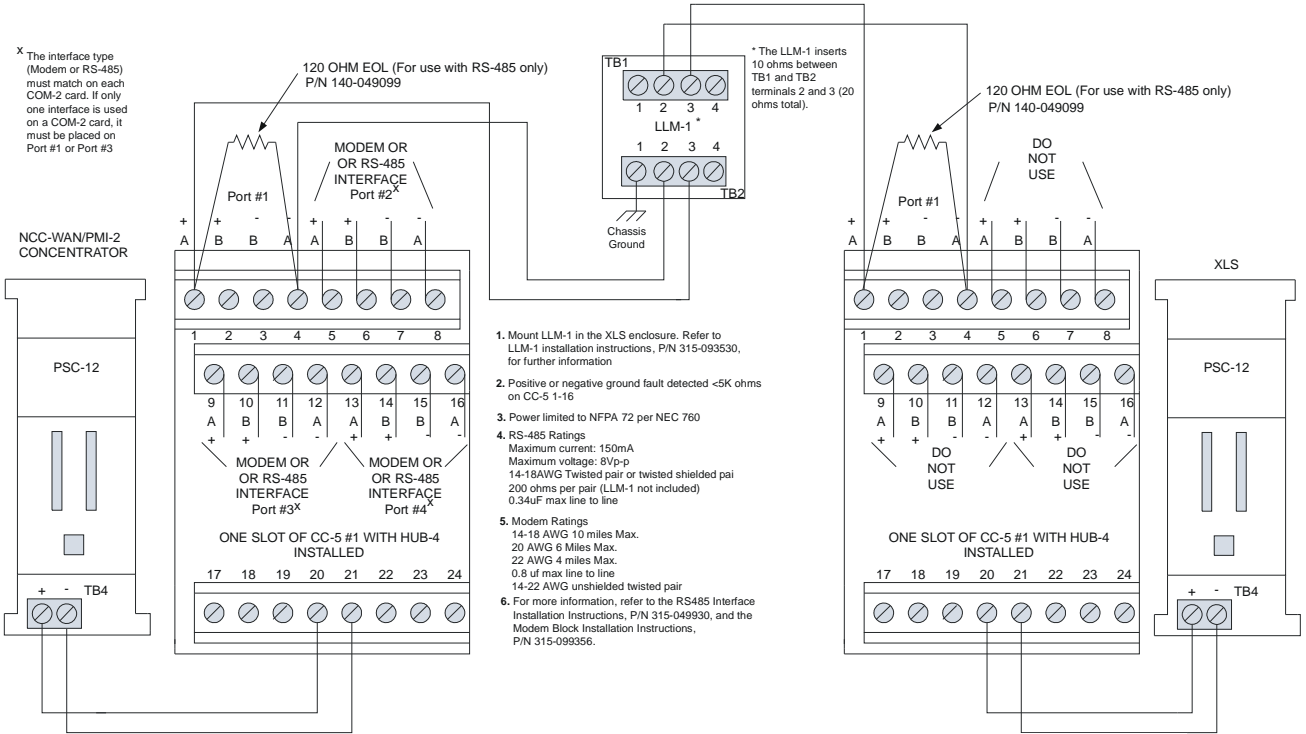


Figure 14
Style 4 Wiring Between HUB-4's (with RS-485 interface or Modem Block)

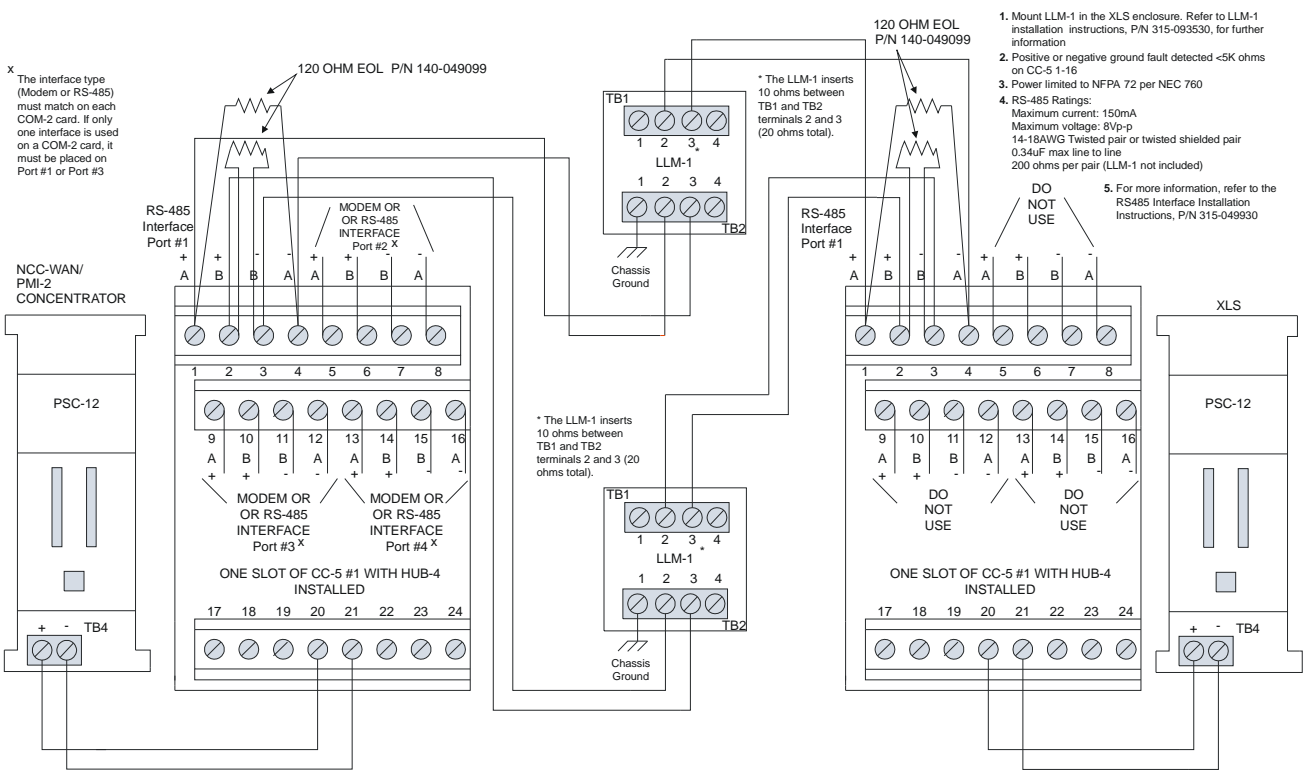


Figure 15
Style 7 Wiring Between HUB-4's (with RS-485 interface)

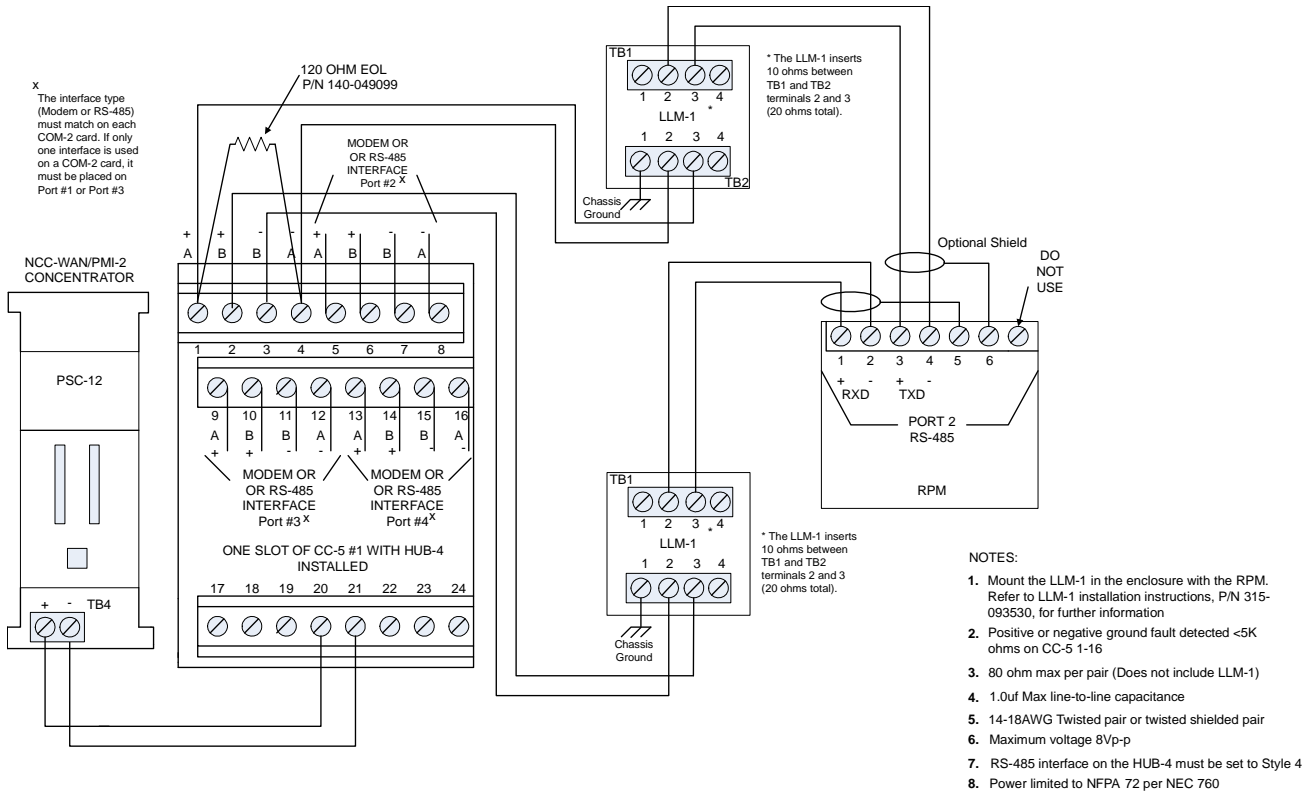


Figure 16
Style 4 Wiring Between HUB-4's (with RS-485 interface) to RPM

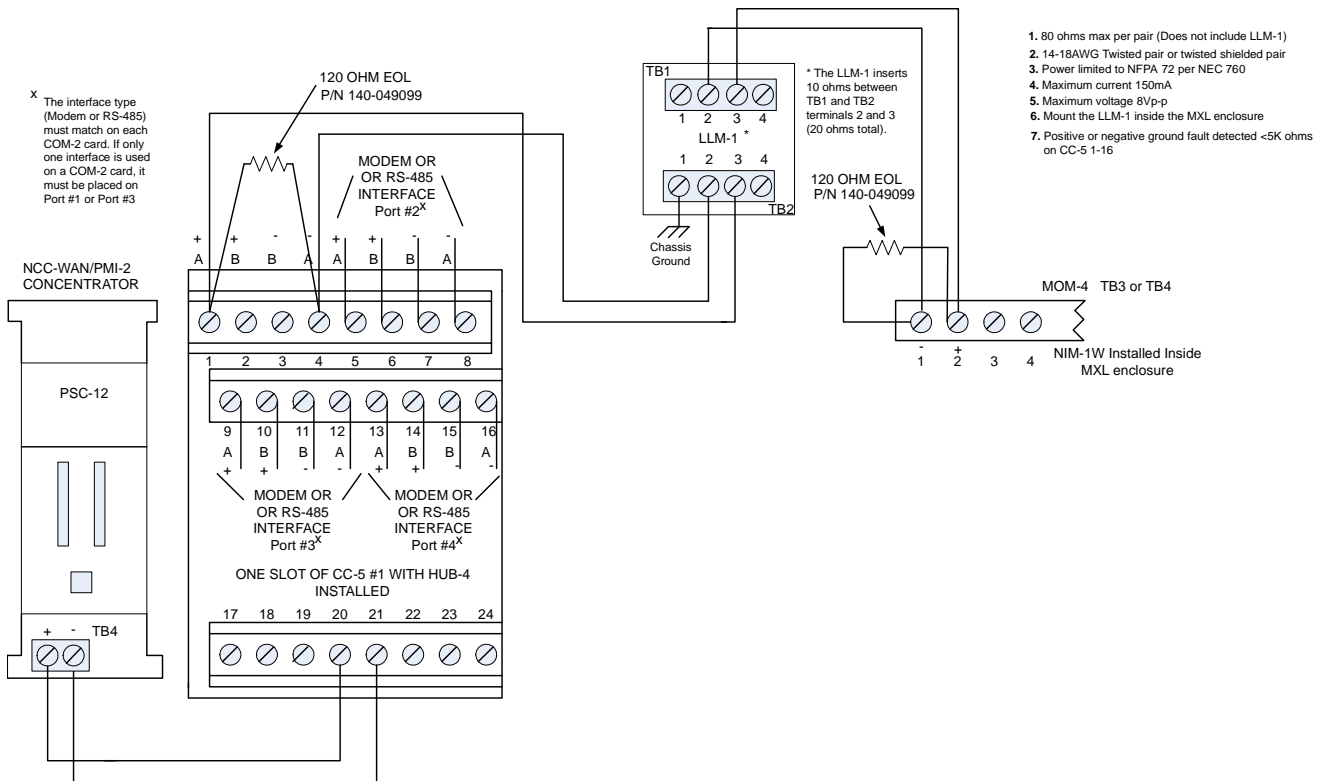


Figure 17
Style 4 Wiring to NIM-1W (with RS-485 interface)

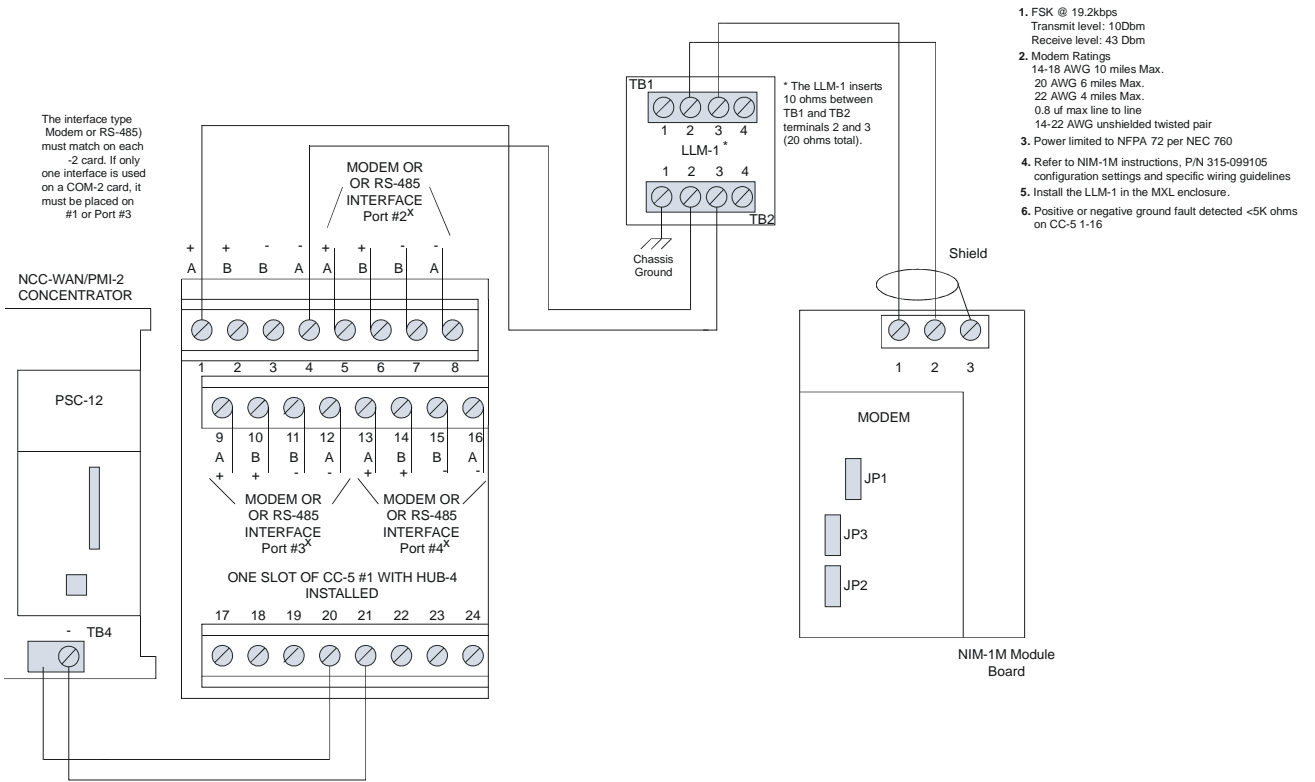


Figure 18
Style 4 Wiring to NIM-1M (with Modem Block)

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