**Fire Alarm System Limitations**

*While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!*

**An automatic fire alarm system**—typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel with remote notification capability—can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons:

**Smoke detectors** may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

**Particles of combustion or “smoke”** from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become “cold,” stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of “smoke” present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectric sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

**Heat detectors** do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

**IMPORTANT! Smoke detectors** must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

**Audible warning devices** such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication. Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.

In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A **fire alarm system** will not operate without any electrical power. If AC power fails, the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

**Equipment used in the system** may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

**Telephone lines** needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

**The most common cause** of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of Chapter 7 of NFPA 72 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly or as required by National and/or local fire codes and should be performed by authorized professional fire alarm installers only. Adequate written records of all inspections should be kept.
Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. The control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

CAUTION - System Reacceptance Test after Software Changes. To ensure proper system operation, this product must be tested in accordance with NFPA 72-1999 Chapter 7 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0°C to 49°C (32°F to 120°F); and at a relative humidity (noncondensing) of 85% at 30°C (86°F) per NFPA, and 93% ± 2% at 32°C ± 2°C (89.6°F ± 1.1°F) per UL. However, the useful life of the system’s standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and all peripherals be installed in an environment with a nominal room temperature of 15-27°C/60-80°F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning-induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, and printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

Though designed to last many years, system components can fail at any time. This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static-suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACP operation and reliability depend upon proper installation by authorized personnel.

---

FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n’emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Reglement sur le brouillage radioelectric edicte par le ministere des Communications du Canada.

---

10% I.R. drop from the specified device voltage.

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Using This Manual

This manual provides a system design overview for **NOTI•FIRE•NET™** version 4.0 and higher. It describes compatible fire alarm devices that can be linked to the network; network requirements and limitations; and configuration details, including those for NFPA Style 4 and Style 7.

⚠️ **CAUTION:** All equipment on the network must be running the same version of the network software.

For **NOTI•FIRE•NET™** networks prior to version 4.0, refer to manual 50257.

Related Documentation

This table lists equipment that connects directly to **NOTI•FIRE•NET™**; for information about connecting non-network devices to these network nodes, refer to the installation manual(s) for your system. To obtain a complete understanding of specific features within the network, or to become familiar with the network functions in general, make use of the documentation listed in Table 1. The Notifier Document chart (DOC-NOT) provides the current document revision. A copy of this document is included with each shipment of NOTIFIER® products.

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<tr>
<td>Compatible Devices</td>
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**Table 1 Network Related Documentation**
Section 1  Network Nodes & Features

1.1 Network Description

**NOTI•FIRE•NET™** is a series of modules and products which allow a group of Fire Alarm Control Panels (FACPs) and other control equipment to connect, forming a true peer-to-peer network. Equipment that connects to **NOTI•FIRE•NET™** and communicates with other equipment using the network may be referred to as a network node. The minimum hardware requirement for **NOTI•FIRE•NET™** is two nodes connected via wire or fiber optic cable. **NOTI•FIRE•NET™** supports up to 103 nodes with a maximum capacity of 201,960 points. Each network node requires a unique node address; the node communicates with other nodes via a network interface board. This section provides network-level requirements for these devices; refer to the specific manuals for details on requirements for individual components such as FACPs. See “Network Node Features” in Section 1.2 for a discussion of network nodes and “Network Interface Boards” in Section 1.3 for a discussion of interface boards.

**NOTI•FIRE•NET™** requires its FACP nodes use addressable initiating devices or connect non-addressable initiating devices to the device through addressable modules. Compatible devices include initiating & control modules, manual pull stations, and intelligent detectors; refer to the control panel installation manuals listed in Table 1 for model numbers.

The network supports communications over twisted pair wire and fiber optic media, through a proprietary communications protocol. Both wire and fiber may exist in the same network when routed through MIB-W/F or RPT-WF.

When properly configured, **NOTI•FIRE•NET™** is suitable for use as a Protected Premises Fire Alarm System as defined in the National Fire Protection Association (NFPA) 72 documentation.

1.2 Network Node Features

On each fire alarm control panel or intelligent annunciator, a network interface board (listed below in italics) provides the physical connection; see “Network Interface Boards” in Section 1.3.  

**AFP-200, AFP-300, AFP-400. With NAM-232W/F**

The NAM-232 connects to the AFP-200 or AFP-300/400 through the EIA-232 serial communications port. The network has the ability to send acknowledge, signal silence, drill, and reset commands to the AFP-200 or AFP-300/400. Some NCS functions are not supported in this configuration. Cooperative Control-by-Event programming enables the panel to react to or trigger events on other network nodes.

*Note for AFP-200 only:* Use of the NAM-232 prevents use of a printer or CRT at the panel.

*Note for AFP-300/400 only:* Use of NAM-232 limits the functions of CRT-2 to display only; it cannot control the panel.

The minimum requirements for an AFP-200, AFP-300, or AFP-400 node are the FACP’s CPU board with power supply, cabinet, and a NAM-232W or NAM-232F running the same version of **NOTI•FIRE•NET™** as the rest of the network (4.0 or higher). See “Network Version Upgrades” in Section 1.4.

**AM2020, AFP-1010. With SIB-NET and MIB-W/F/WF**

The AM2020/AFP-1010 collects information about modules and peripherals connected to the network and makes this information accessible to all nodes connected to the network. Information from the panel may include the following signals: fire alarm, security alarm, trouble, and supervisory. Cooperative Control-by-Event programming enables the panel to react to or trigger events on other network nodes.

The minimum requirements for an AM2020/AFP-1010 node are the basic equipment package for
network use (BE-2020N/1010N), loop interface board (LIB-200, LIB-200A, or LIB-400), power supply, cabinet, and SIB-NET with MIB-W/F/WF running the same version of NOTI•FIRE•NET™ as the rest of the network (network version 4.0 or higher). See “Network Version Upgrades” in Section 1.4.

The basic equipment package includes CPU and display assembly (DIA). Refer to AM2020/ AFP-1010 documentation for a more detailed account of these applications:

- Additional requirement for NFPA 72 Local Fire Alarm Systems Applications: A control module is installed on Signal Loop Circuit (SLC) 1 in every AM2020/AFP-1010 network and set to module address 96. Refer to AM2020/AFP-1010 documentation for a more detailed account of this installation.

- Additional requirement for NFPA 72 Central Station and Proprietary Fire Alarm Systems Protected Premises Units Applications: A non-networked AM2020/AFP-1010 receiving unit communicates with a network node via a NIB-96 network interface board.

**NFS-3030. With NCM-W or NCM-F**

The NFS-3030 occupies a single node address on the network. The NCM cable plugs into the CPU-3030. The network has the ability to send acknowledge, signal silence, drill, and system reset commands to the NFS-3030. Cooperative Control-by-Event programming enables the panel to react to or trigger events on other network nodes.

The minimum requirements for an NFS-3030 node are the central processing unit (CPU-3030D or CPU-3030ND), AMPS-24/E main power supply, LCM-320, a cabinet, and a network connection module NCM-W or NCM-F running network version 5.0 or higher.

Note: Choose the CPU-3030ND version of NFS-3030’s CPU only when the unit is to be entirely controlled by another node on NOTI•FIRE•NET™ (such as NCS); programming requires VeriFire™.

**NFS-640. With NCM-W or NCM-F**

The NFS-640 occupies a single node address on the network. The NCM cable plugs into the main circuit board of the NFS-640. The network has the ability to send acknowledge, signal silence, drill, and reset commands to the NFS-640. Cooperative Control-by-Event programming enables the panel to react to or trigger events on other network nodes.

The minimum requirements for an NFS-640 node are the basic equipment package (includes CPU board with integral power supply), a cabinet, and a network connection module NCM-W or NCM-F running the same version of NOTI•FIRE•NET™ as the rest of the network (version 4.0 or higher). NFS-640 also requires a primary display be installed if it is not to be entirely controlled and programmed by another node on NOTI•FIRE•NET™ (such as NCS). See “Network Version Upgrades” in Section 1.4.

**Network Control Annunciator (NCA). With NCM-W or NCM-F**

The Network Control Annunciator provides a text-based display and control device for a NOTI•FIRE•NET™ system. The NCM enables the NCA to display all events from FACPs on a NOTI•FIRE•NET™ system. It can co-exist with other NCAs, or it can be the sole interface on the network; it can be used to break the network into desirable groups of nodes. The NCA also supports the use of optional devices such as annunciators, printers and CRTs. The NCA is capable of interfacing with the NFS-3030, NFS-640 and legacy panels such as the AFP-200, AFP-300/ AFP-400, and AM2020/AFP-1010.

NCA requires cabinet mounting, a network connection module NCM-W or NCM-F running the same version of NOTI•FIRE•NET™ as the rest of the network (NOTI•FIRE•NET™ 4.0 or higher), and a +24 VDC filtered power source. This power can come from the control panel or from a remote power supply. If local ground-fault detection is required, an MPS-24 series power supply must be used. See “Network Version Upgrades” in Section 1.4.
**Network Control Station (NCS 2.0 or higher).** *Available as NCS-W-ONYX or NCS-F-ONYX; compatible with NCS-W or NCS-F.*

The NCS provides a PC-based graphical interface for monitoring and controlling activity of multiple nodes on a network. It allows the user to program network nodes, display network information, and break the network into desirable groups of nodes. It can perform resets, signal silence, and acknowledge on sets of nodes. It also contains a history buffer which can record events and actions which have occurred in the network.

NCS is a personal computer (UL listed for fire control applications) with interface board installed and with specific software provided. **Do not install third-party software such as office applications or games on this PC.** See your NCS Manual for operating requirements.

<table>
<thead>
<tr>
<th>NCS Version</th>
<th>Compatible Noti•Fire•Net™ Version</th>
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<td>NCS4-W-ONYX, NCS4-F-ONYX</td>
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</table>

**Table 2 NCS/Network Version Compatibility**

Note: NCS version number is found on the CD label, and under the NCS Help menu: About NCS; see “Network Version Upgrades” in Section 1.4.

### 1.3 Network Interface Boards

This section discusses the boards that are physically connected together to form the network. “Network Node Features” in Section 1.2 specifies the **NOTI•FIRE•NET™** version compatible with each node/board combination.

**NAM-232W, NAM-232F**

The NAM-232 provides a physical communication interface between the AFP-200 or AFP-300/AFP-400 to the wire or fiber-optic cable which connects the node to another node on the network. Each NAM-232 has two communication ports, in two possible media combinations:

- NAM-232W: Two twisted pair wire ports.
- NAM-232F: Two fiber optic cable ports.

NAM-232W or NAM-232F must be running the same version of **NOTI•FIRE•NET™** as the rest of the network (version 4.0 or higher). See “Network Version Upgrades” in Section 1.4.

**NCM-W, NCM-F**

The Network Communications Module (NCM) provides a physical communication interface between the NFS-3030, NFS-640 or NCA and the wire or fiber-optic cable which connects the node to another node on the network. Each NCM has two communication ports, in two possible media combinations:

- NCM-W: Two twisted pair wire ports.
- NCM-F: Two fiber optic cable ports.

NCM-W or NCM-F must be running the same version of **NOTI•FIRE•NET™** as the rest of the network (version 4.0 or higher). See “Network Version Upgrades” in Section 1.4.

**NCS-NCW, NCS-NCF**

NCS-NCW and NCS-NCF are component boards; NCS ships with one of these internal boards already installed. They are included here because they perform a similar function to other boards.
listed in this section. These boards provide a physical communication interface between the NCS and the wire or fiber-optic cable which connects the node to another node on the network. Each board has two communication ports, in two possible media combinations:

- NCS-NCW: Two twisted pair wire ports. (Part of NCS-W-ONYX, NCS3-W-ONYX, NCS4-W-ONYX, and NCS-W)
- NCS-NCF: Two fiber optic cable ports. (Part of NCS-F-ONYX, NCS3-F-ONYX, NCS4-F-ONYX, and NCS-F)

Note: NCS versions prior to 2.0 are not supported on \texttt{NOTIFIRENET}™ version 4.0. NCS versions prior to 3.0 are not supported on \texttt{NOTIFIRENET}™ version 5.0 or higher. NCS version number is found on the CD label, and under the NCS Help menu: About NCS. See “Network Version Upgrades” in Section 1.4.

**RPT-W, RPT-F, RPT-WF**

The Repeaters (RPT) boost data signals between network nodes extending communication distances. RPT-WF can be used to pass data transmissions between two differently configured network segments when wire and fiber-optic cable co-exist on the network. Each RPT has two communication ports, in three possible media combinations:

- RPT-W: Two twisted pair wire ports.
- RPT-F: Two fiber optic cable ports.
- RPT-WF: One twisted pair wire port and one fiber optic cable port.

**SIB-NET with MIB-W, MIB-F, or MIB-WF**

The Serial Interface Board for \texttt{NOTIFIRENET}™ (SIB-NET) works with the Media Interface Board (MIB) to provide a physical communication interface between the AM2020/AFP-1010 and the wire or fiber-optic cable which connects the node to another node on the network. This configuration supports annunciators, printers, and CRTs. Each MIB has two communication ports, in three possible media combinations:

- MIB-W: Two twisted pair wire ports.
- MIB-F: Two fiber optic cable ports.
- MIB-WF: One twisted pair wire port and one fiber optic cable port.

SIB-NET must be running the same version of \texttt{NOTIFIRENET}™ as the rest of the network (Network version 4.0 or higher); see “Network Version Upgrades” in Section 1.4.

### 1.4 Network Version Upgrades

- **NAM Upgrade Kit**
  - Network 3.0 to 4.0: NROM-NAM4.0M
  - Network 3.0/4.0 to 5.0: NROM-NAM5.0M

- **NCA Software upgrade**
  - Network 4.0 to 5.0: No kit required: Web-upgrade to NCA-2.0.x (or higher)

- **NCM Upgrade**
  - Network 4.0 to 5.0: No kit required: Web-upgrade to NCM-2.0.x (or higher)

- **NCS Upgrade from NCS version 1 to NCS version 2 (for Network 4.0)**
  - Cards: NCSKIT-NCW, NCSKIT-NCF

- **NCS Upgrade from NCS version 1 to NCS version 3 (for Network 5.0)**
  - Software: NCSCDUG-US-3
  - Cards: NCSKIT-NCW, NCSKIT-NCF

- **NCS Upgrade from NCS version 2 to NCS version 3 (for Network 5.0)**
  - Software: NCSCDUG-US-3
  - Cards: n/a

- **NFS-640 Software Upgrade**
Network 4.0 to 5.0    No kit required: Web-upgrade to 640-2.0.x.

- **SIB-NET Software upgrade kits**
  - Network 3.0 to 4.0    AROM4.0M-SIB
  - Network 3.0/4.0 to 5.0    AROM5.0M-SIB
Section 2  Network Configurations

2.1 NFPA Style 4 Configurations

**NOTI•FIRE•NET™** is capable of communicating using an NFPA Style 4 SLC (refer to Figure 1). Under this style of operation, a single open, wire-to-wire short, wire-to-wire short and open, wire-to-wire short and ground, or open and ground results in fragmentation of the network. A single ground does not affect communication, but is detected. Each fragment of the network reconfigures to permit communication among the nodes within the fragment.

NFPA Style 4 SLC Without Regeneration:
A wire-to-wire short in this segment would result in loss of communication between all four nodes/repeaters on this bus connection as well as fragmentation of the network. Bus connections should be no longer than 100 feet within conduit or located within the same enclosure.

**Figure 1 Style 4 Configurations**

In an NFPA Style 4 fiber-optic system, a single break will result in loss of communication between network nodes within the fragment of the network that can only receive signals from the other fragment (refer to Figure 2). In Figure 2, the fragment to the left of the break cannot receive information from the fragment to the right of the break. However, the fragment to the right of the break can receive information from the fragment to the left of the break.

Note: **NOTI•FIRE•NET™** network wiring is power-limited.
2.2 NFPA Style 7 Configurations

NOTI•FIRE•NET™ is capable of communicating using an NFPA Style 7 SLC (refer to Figure 3). Under this style of operation, a single open, wire-to-wire short, wire-to-wire short and open, wire-to-wire short and ground, or open and ground will not result in fragmentation of the network. Communication will continue throughout any of the aforementioned circumstances, while the system displays a trouble condition. A single ground does not affect communication, but is detected. Style 7 operation may also be achieved using fiber optic cable or mixed media (wire and fiber).

Note: Bus connections are not permitted in a Style 7 system.

Figure 2 Fiber-Optic Style 4 System Break

Figure 3 Style 7 Configurations

Note: NOTI•FIRE•NET™ network wiring is power-limited.
2.3 Configuration Definitions

2.3.1 Point-to-Point Configuration

A point-to-point wiring configuration is defined as a twisted-pair wire segment with only two nodes/repeaters attached to it. Terminating resistors are required at each end of every twisted-pair wire segment. They are built into each MIB-W, MIB-WF, NAM-232W, RPT-W, and RPT-WF; and they are a selectable option on the NCM-W and NCS-NCW. Refer to “Terminating Point-to-Point and Bus Configurations” on page 15 for more information.

In a point-to-point configuration, two nodes/repeaters are interconnected by a single circuit that is terminated at each port (refer to Figure 4).

Characteristic Impedance in a Point-to-Point Configuration

The wire segment of each point-to-point connection is a transmission line. The physical construction of the twisted-pair cable used for a segment determines the characteristic impedance of that segment. To minimize unwanted data reflections, never mix more than one brand name, gauge, or type of wire within a point-to-point segment.

If a network employs point-to-point wiring only, a separate pair of wires must be run between each node/repeater port (refer to Figure 4).

Figure 4 Point-to-Point Configuration for NFPA Style 4 or Style 7

2.3.2 Bus Configuration

A bus wiring configuration is defined as a twisted pair network with more than two nodes. Terminating resistors are only needed for the first and last nodes of the bus configuration, all other terminating resistors must be removed.

In a bus configuration, more than one node/repeater shares the same circuit (refer to Figure 5). A fault anywhere along the bus will affect the rest of the nodes/repeaters on the bus. Because of their inherent weakness, bus configurations are best employed for wiring between nodes/repeaters local to each other (within the same cabinet or room).

Figure 5 Bus Configuration (NFPA Style 4 Only)
Wiring Distances Between Nodes On a Bus
In a bus configuration, data is shared between all ports on the twisted pair, thereby reducing the allowable transmission distance to a maximum of 100 feet (refer to Table 4 through Table 6).

Characteristic Impedance In a Bus Configuration
The wire segment of each bus connection is a transmission line. The physical construction of the twisted-pair cable used for a segment determines the characteristic impedance of that segment. To minimize unwanted data reflections, never mix more than one brand name, gauge, or type of wire within a bus segment. Always make bus connections at the module terminals provided. Do not make branch connections at other points.

A combination configuration can be used to distribute the network circuit from a central facility, saving on wiring run lengths. In Figure 6, a repeater was bus-wired to two existing nodes in each central facility (located within the same room) to support point-to-point connections to the remaining buildings in the system.

2.4 Terminating Point-to-Point and Bus Configurations
Both point-to-point and bus configurations require end-of-line resistor termination at each end of the respective circuit. Whereas a point-to-point circuit has a terminating resistor at each node/repeater port (refer to Figure 7), a bus circuit spans multiple nodes/repeaters, with termination only on the associated port of the first and last (end) nodes on the segment (refer to Figure 8).
**Terminating Resistors**

There must be a functioning terminating resistor on the first and last node/repeater of a wire segment. The terminating resistor must be disabled or removed for all other nodes/repeaters connected to the same bus segment. See Table 3.

Disable terminating resistors with a slide switch on the NCM-W and NCS-NCW (open NCS-W-ONYX or NCS-W to access this PC card). Cut and remove the factory-installed terminating resistors for the MIB-W, MIB-WF, NAM-232W, RPT-W, and RPT-WF as shown in Figure 7 and Figure 8.

### Table 3 On-Board Terminating Resistors

<table>
<thead>
<tr>
<th>Port A</th>
<th>Port B</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPT-W</td>
<td>R40</td>
</tr>
<tr>
<td>RPT-WF</td>
<td>R41</td>
</tr>
<tr>
<td>MIB-W</td>
<td>R20</td>
</tr>
<tr>
<td>MIB-WF</td>
<td>R21</td>
</tr>
<tr>
<td>NAM-232W</td>
<td>R69</td>
</tr>
<tr>
<td>NCM-W</td>
<td>SW100</td>
</tr>
<tr>
<td>NCS-NCW</td>
<td>SW100</td>
</tr>
</tbody>
</table>

**Figure 7 Point-to-Point Termination**

A point-to-point circuit, terminated at each end with a resistor.

**Figure 8 Bus Termination**

A bus circuit spans multiple nodes/repeaters with a terminating resistor at each end of the circuit segment.
2.5 Network Wiring for Ground Fault Detection

Because the twisted pair communication link between adjacent nodes can be isolated from the nodes through the NCM, MIB, or NAM-232 (transformer coupling), a single ground fault on one of the wires will have no effect on circuit operation. For this reason, ground fault detection for the isolated link is not necessary unless required by the Authority Having Jurisdiction.

Ground fault detection from a node power supply may be fed-through or disabled with switches on the MIB-W, MIB-WF, NAM-232W, RPT-W, NCM-W, NCS-W-ONYX and NCS-W. Set switch to ENABLE/ON as shown in Figure 9. In the examples that follow, the MIB-W is used as an example; refer to Figure 9 for equivalent switch orientation of other boards used in its place.

Ground fault detection may be provided by the following nodes:

- Fire alarm control panel node powered by a Main Power Supply (MPS-24A)
- NFS-3030 node powered by AMPS-24/E
- NFS-640 node (own power supply)
- AFP-200 node (own power supply)
- NCA node powered by Main Power Supply (MPS-24 series)
- AFP-300/AFP-400 with MPS-400

Note: NCS does not detect ground-fault, but NCS-W-ONYX can pass the signal between network nodes on either side of NCS. Disabling ground fault detection will prevent signal feed-through.

The following paragraphs highlight ground fault detection considerations for point-to-point and bus wire configurations.
SW2 corresponds to Channel B
SW1 corresponds to Channel A
SW3 corresponds to Channel B
SW1 corresponds to Channel A
SW3 is used to enable or disable the ground fault detection feed-through

Media Interface Board
MIB-W

Media Interface Board
MIB-WF

Repeater
RPT-W

Network Adaptor Module
NAM-232W

NCM-W

Channel A Switches*
(Shown enabled)
Termination Resistor:
Term A (SW100)
Earth Fault:
EF A (SW103)

Channel B Switches*
(Shown disabled)
Termination Resistor:
Term B (SW102)
Earth Fault:
EF B (SW101)

Note: NCS does not detect ground-fault, but NCS-W-ONYX can pass the signal between network nodes on either side of NCS. Disabling ground fault detection will prevent signal feed-through.

Figure 9 Ground Fault Switches
**Point-to-Point Configuration**

In a point-to-point configuration without repeaters, enable ground fault detection in only one of the two nodes. In Figure 10, the left node provides the ground fault detection, and thus must be one of the ground-fault detection nodes defined on page 17. SW2 is set to the ON position to enable ground fault feed-through detection on the left MIB-W Port B. The corresponding Port A switch of the right MIB-W is set to the OFF position, disabling ground fault detection feed-through from the node on the right. The node on the right can be any network node.

**Note:** This drawing is a sample; all boards shown in Figure 9 may be used in place of the MIB-W. Refer to Figure 9 for equivalent switch settings, and to the board's manual (see Table 1).

![Figure 10 Point-to-Point Ground Fault Detection](image)

If an RPT-W is employed, two ground fault detection schemes are possible within a point-to-point configuration. One or both nodes (refer to Figure 11 and Figure 12) may provide ground fault detection, depending on the number of repeaters and the setting of the repeater pass-through switch (SW3) at each repeater (refer to EXAMPLES 1 and 2).

**EXAMPLE 1:** In this example, the node on the left provides the ground fault detection, and thus must be one of the ground-fault detection nodes defined on page 17. SW2 (Port B) of the MIB on the left is set to the ON position to enable ground fault detection on Port B. The RPT-W pass-through switch (SW3) is ON, allowing the left node to provide ground fault detection for the two point-to-point wire connections on the left and right of the repeater. The Port A switch on the right MIB-W is set to the OFF position, disabling ground fault detection feed-through from the node on the right. The node on the right can be any network node.

**Note:** This drawing is a sample; all boards shown in Figure 9 may be used in place of the MIB-W. Refer to Figure 9 for equivalent switch settings, and to the board’s manual (see Table 1).

![Figure 11 Point-to-Point (EXAMPLE 1)](image)

**EXAMPLE 2:** By setting the pass-through switch (SW3) on the RPT-W to the OFF position, both nodes may provide their own ground fault detection (refer to Figure 12). The left node provides ground fault detection up to the RPT-W, and thus must be one of the ground-fault detection nodes defined on page 17. SW2 (Port B) is set to the ON position to enable ground fault detection pass-through on the left MIB-W.

The Port A switch on the right MIB-W is also set to the ON position, providing ground fault detection feed-through to the node on the right.
Network Configurations

detection pass-through up to the RPT-W. This node must also be one of the ground-fault detection nodes defined on page 17.

Note: This drawing is a sample; all boards shown in Figure 9 may be used in place of the MIB-W. Refer to Figure 9 for equivalent switch settings, and to the board's manual (see Table 1).

**EXAMPLE 3:** Ground fault detection feed-through is effective for a maximum of two serially connected (point-to-point) repeaters. Therefore, a maximum of five repeaters can be connected in series when ground fault detection is required. Figure 13 shows how the ground fault detection feed-through switches must be arranged in order to achieve this maximum configuration.

![Figure 12 Point-to-Point (EXAMPLE 2)](image)

**Figure 12 Point-to-Point (EXAMPLE 2)**

**Bus Configuration**

In a bus configuration, as in point-to-point, only one node can provide ground fault detection along the bus. The primary difference is that one node can provide ground fault detection for multiple nodes along the bus (refer to EXAMPLE 1 and 2).

**EXAMPLE 1:** The node second from the right in Figure 14 provides the ground fault detection, and thus must be one of the ground-fault detection nodes defined on page 17. SW1 (Port A) is set to the ON position to enable ground fault detection feed-through from the MIB on this node. All other nodes have ground fault detection on the MIB disabled. This includes the node on the far left of the figure, since ground fault detection has been passed through the RPT-W from the node second from the right.

![Figure 13 Maximum Point-to-Point Series Repeater Ground Fault Feed-Through Configuration (EXAMPLE 3)](image)

**Figure 13 Maximum Point-to-Point Series Repeater Ground Fault Feed-Through Configuration (EXAMPLE 3)**

![Figure 14 Bus (EXAMPLE 1)](image)

**Figure 14 Bus (EXAMPLE 1)**
**Note:** On remotely powered nodes, ground fault detection is processed through the main power supply.

**EXAMPLE 2:** If the repeater pass-through switch is set to the OFF position (refer to Figure 15), isolating the three wires on the right from the wires on the left, separate ground fault detection circuits must be fed through. The node second from the right continues to provide ground fault detection up to the RPT-W Port B, and thus must be one of the ground-fault detection nodes defined on page 17. The node on the far left of the figure provides ground fault detection up to the RPT-W Port A, and also must be one of these types of nodes.

![Figure 15 Bus (EXAMPLE 2)](image-url)
Section 3  Network Wiring Requirements

When designing the wiring layout of a NOTI•FIRE•NET™ system, the following distance limitations must be considered:

1. The length of each individual twisted pair or fiber optic network communication circuit segment is limited.
2. The system path length is limited.

Note: Bus configurations have additional distance limits; see “Bus Configuration” in Section 2.3.2.

NOTE: NOTI•FIRE•NET™ network wiring is power-limited.

3.1 Limit on Circuit Segment Length

The length of each individual twisted pair or fiber optic network communication circuit segment is limited. A segment is defined as either a point-to-point connection with two nodes/repeaters, or a bus circuit encompassing multiple nodes. As illustrated in Figure 16, Example 1 segments 1, 2, and 3 are point-to-point circuits and Example 2 is a bus circuit encompassing five nodes. The procedures differ to determine the maximum permissible segment length for a twisted pair and a fiber-optic segment. The following paragraphs detail each procedure.

3.1.1 Limit for Twisted Pair Circuits

The length of cable for each segment in the system must fall within the range specified in Table 4. If the distance required for a circuit segment is greater than permitted, a Repeater module (RPT-W) must be inserted into the circuit at intervals less than, or equal to, the length restriction.

Cable type should be selected to satisfy the code requirements specific to a particular application. Refer to Table 4 through Table 6 for descriptions of specific cable types used with NOTI•FIRE•NET™.

Note: The use of more than one type of cable within any point-to-point or bus connection is not permitted. When utilizing existing cable, be sure to eliminate any cable branches or spurs.
<table>
<thead>
<tr>
<th>Cable Manufacturer, Part Number, and Number of Gauges/Conductors</th>
<th>Manufacturer's Specifications</th>
<th>Data Threshold: All Nodes And/OR Repeaters On A Cable Segment</th>
<th>Permissible Single Twisted Pair Range (In Feet) For Each Cable Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE Wire 61401SSL, 14 AWG, 1 Pair Shielded</td>
<td>FPLP, NEC Article 760</td>
<td>High: 1-1000</td>
<td>Point-to-Point 1-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 800-1400</td>
<td>Bus Configuration N/A</td>
</tr>
<tr>
<td>ATLAS 228-18-1-1STP-2, 18 AWG, 1 Pair Unshielded</td>
<td>Low Cap., FPL, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-800</td>
<td>2 Nodes/Repeaters 1-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 800-1600</td>
<td>N/A</td>
</tr>
<tr>
<td>ATLAS 228-18-1-1TP-2, 18 AWG, 1 Pair Unshielded</td>
<td>Low Cap., FPL, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-1200</td>
<td>3 to 7 Nodes/Repeaters 1-100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1000-3000</td>
<td>N/A</td>
</tr>
<tr>
<td>BELDEN 9583, 12 AWG, 1 Pair Shielded</td>
<td>FPLR, NEC Article 760, UL 1424</td>
<td>High: 1-600</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 600-1200</td>
<td></td>
</tr>
<tr>
<td>BELDEN 9580, 14 AWG, 1 Pair Unshielded</td>
<td>FPLR, NEC Article 760, UL 1424</td>
<td>High: 1-1400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1300-3000</td>
<td></td>
</tr>
<tr>
<td>BELDEN 9581, 14 AWG, 1 Pair Shielded</td>
<td>FPLR, NEC Article 760, UL 1424</td>
<td>High: 1-600</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 600-1200</td>
<td></td>
</tr>
<tr>
<td>BELDEN 9572, 16 AWG, 1 Pair Unshielded</td>
<td>FPLR, NEC Article 760, UL 1424</td>
<td>High: 1-1300</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1200-3000</td>
<td></td>
</tr>
<tr>
<td>BELDEN 9575, 16 AWG, 1 Pair Shielded</td>
<td>FPLR, NEC Article 760, UL 1424</td>
<td>High: 1-600</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 600-1200</td>
<td></td>
</tr>
<tr>
<td>BICC BM-D64-02, 16 AWG, 1 Pair Shielded</td>
<td>Contact Manufacturer</td>
<td>High: 1-1200</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1000-1600</td>
<td></td>
</tr>
<tr>
<td>BICC BM-D51-23, 16 AWG, 1 Pair Shielded</td>
<td>Contact Manufacturer</td>
<td>High: 1-1400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1200-2000</td>
<td></td>
</tr>
<tr>
<td>BRAND-REX 93782-01, 16 AWG, 1 Pair Shielded</td>
<td>Contact Manufacturer</td>
<td>High: 1-1400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 1200-2000</td>
<td></td>
</tr>
<tr>
<td>Genesis GJ-854020514, 14 AWG, 1 Pair Shielded</td>
<td>FPLP, NEC Article 760</td>
<td>High: 1-400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 400-800</td>
<td></td>
</tr>
<tr>
<td>Genesis 46065004, 16 AWG, 1 Pair Shielded</td>
<td>FPLP, NEC Article 760</td>
<td>High: 1-500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 500-1000</td>
<td></td>
</tr>
<tr>
<td>Genesis WG 78188, 18 AWG, 1 Pair Shielded</td>
<td>FPLP, NEC Article 760</td>
<td>High: 1-500</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 500-1000</td>
<td></td>
</tr>
<tr>
<td>GUARDIAN E2582S, 18 AWG, 1 Pair Shielded</td>
<td>Mid-Cap., FPL, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-800</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low: 800-1400</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 Twisted Pair Cable Lengths per Cable Segment (1 of 3)
<table>
<thead>
<tr>
<th>Cable Manufacturer, Part Number, and Number of Gauges/Conductors</th>
<th>Manufacturer’s Specifications</th>
<th>Data Threshold: All Nodes And/Or Repeaters On A Cable Segment</th>
<th>Permissible Single Twisted Pair Range (In Feet) For Each Cable Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUARDIAN E2572S, 18 AWG, 1 Pair Unshielded</td>
<td>Mid Cap., FPL, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-1200 Low: 1000-3000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>NORDX/CDT 24572200, 22 AWG, 4 Pair Unshielded</td>
<td>CMR</td>
<td>High: 1-1800 Low: 1400-2400</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>NORDX/CDT 24570036, 24 AWG, 4 Pair Unshielded</td>
<td>CMR</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>NYC Fire Cable 51602SLL, 16 AWG, 1 Pair Shielded</td>
<td>Contact Manufacturer</td>
<td>High: 1-800 Low: 800-1000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>PAIGE ELECTRIC NOTIFIER® Cable 182LN 18 AWG, 1 Pair Unshielded</td>
<td>FPL</td>
<td>High: 1-1200 Low: 1000-3000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>PAIGE ELECTRIC NOTIFIER® Cable 182MRN 18 AWG, 1 Pair Unshielded</td>
<td>FPLR</td>
<td>High: 1-1200 Low: 1000-2800</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>PAIGE ELECTRIC NOTIFIER® Cable 182MPN 18 AWG, 1 Pair Unshielded</td>
<td>FPLP</td>
<td>High: 1-1200 Low: 1000-2800</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>PAIGE ELECTRIC NOTIFIER® Cable 182SMN 18 AWG, 1 Pair Shielded</td>
<td>FPL</td>
<td>High: 1-800 Low: 800-1400</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>PAIGE ELECTRIC NOTIFIER® Cable 182SLN 18 AWG, 1 Pair Shielded</td>
<td>FPL</td>
<td>High: 1-800 Low: 800-1600</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>REMEE Products, NY5145HHIRHPHB, 14 AWG, 1 Pair Shielded</td>
<td>FPLP, NEC Article 760</td>
<td>High: 1-1000 Low: 800-1400</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 84743-06-14, 18 AWG, 1 Pair Shielded</td>
<td>Mid-Cap., FPLP, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-600 Low: 600-1200</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 98281-06-04, 18 AWG, 1 Pair Shielded</td>
<td>Mid-Cap., FPLP, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-600 Low: 600-1200</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 82802-06-14, 18 AWG, 1 Pair Unshielded</td>
<td>Mid-Cap., FPLP, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-1200 Low: 1000-2800</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 98181-06-04, 18 AWG, 1 Pair Unshielded</td>
<td>Mid-Cap., FPLP, PVC, NEC Article 760, UL 1424</td>
<td>High: 1-1200 Low: 1000-2800</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 962034619, 24 AWG, 3 Pair Unshielded</td>
<td>CLZ/CMR</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
</tbody>
</table>

Table 5 Twisted Pair Cable Lengths per Cable Segment (2 of 3)
## Table 6  Twisted Pair Cable Lengths per Cable Segment (3 of 3)

<table>
<thead>
<tr>
<th>Cable Manufacturer, Part Number, and Number of Gauges/Conductors</th>
<th>Manufacturer’s Specifications</th>
<th>Data Threshold: All Nodes And/Or Repeaters On A Cable Segment</th>
<th>Permissible Single Twisted Pair Range (In Feet) For Each Cable Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNAL 962044619, 24 AWG, 4 Pair Unshielded</td>
<td>CLZ/CMR</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 962064619, 24 AWG, 6 Pair Unshielded</td>
<td>CLZ/CMR</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 962624619, 24 AWG, 4 Pair Unshielded</td>
<td>CMR/MRP</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>SIGNAL 9669544623, 24 AWG, 4 Pair Unshielded</td>
<td>CMP/MPP</td>
<td>High: 1-1400 Low: 1200-2000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE D999, 12 AWG, 1 Pair Shielded</td>
<td>FPL, PVC, NEC, Article 760, UL 1424 and 1581</td>
<td>High: 1-800 Low: 800-1400</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE 991, 14 AWG, 1 Pair Shielded</td>
<td>FPLR, UL 1424 and UL 1666</td>
<td>High: 1-800 Low: 600-1000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE D995, 14 AWG, 1 Pair Shielded</td>
<td>FPL, PVC, NEC, Article 760, UL 1424 and 1581</td>
<td>High: 1-800 Low: 800-1400</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE AQ225, 16 AWG, 1 Pair Unshielded</td>
<td>FPL or PLTC Direct Burial Water Blocked</td>
<td>High: 1-1400 Low: 1200-2800</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE AQ294, 16 AWG, 1 Pair Shielded</td>
<td>FPL or PLTC Direct Burial Water Blocked</td>
<td>High: 1-1000 Low: 1000-1600</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE D980, 18 AWG, 1 Pair Unshielded</td>
<td>FPL, PVC, NEC Article 760, UL 1424 and 1581</td>
<td>High: 1-1200 Low: 1000-3000</td>
<td>1-100 N/A</td>
</tr>
<tr>
<td>WEST PENN WIRE D975, 18 AWG, 1 Pair Shielded</td>
<td>FPL, PVC, NEC Article 760, UL 1424 and 1581</td>
<td>High: 1-800 Low: 800-1400</td>
<td>1-100 N/A</td>
</tr>
</tbody>
</table>

### Note:
In the event of a panel failure at a wire node, the data is not regenerated locally. The node may be manually bypassed using the NBB-1 Assembly. In this case, the total length of wire becomes the sum of both lengths of wire between operating nodes. If the total length exceeds the maximum allowable length for a given threshold, the network may lose communication. Separately powered repeater(s) may be employed at each node in a point-to-point connection to ensure data regeneration.
3.1.2 Limit for Fiber Optic Circuits

The attenuation of cabling between two nodes/repeaters (fiber optic circuits are point-to-point) is limited by cable choice. If the distance required for a circuit segment is greater than permitted, a Repeater module (RPT-F) must be inserted into the circuit at intervals less than, or equal to, the attenuation length restriction.

These attenuation figures apply to the MIB-F, MIB-WF, RPT-WF, RPT-F, RPT-WF, NCM-F, NCS-F-ONYX, NCS-F, and NAM-232F (multimode fiber):

- 62.5/125µm cable  8dB limit
- 50/125µm cable  4.2dB limit

The actual attenuation can be measured end-to-end with fiber-optic industry standard equipment using a test wavelength of 850 nanometers. For a quick approximation, perform the following calculations:

a. **Calculate loss due to cable.** Look up the rated dB loss per foot within the cable manufacturer's specifications. Multiply this by the length of cable between the two nodes/repeaters to determine loss due to cable: Loss = (loss/ft.) x (length in feet).

b. **Calculate loss due to connectors/splices.** Look up the dB loss for each connector and splice, and add all figures to determine loss due to connectors/splices.

c. **Calculate total loss.** Add the attenuation factors obtained in steps a. and b. This will provide an approximate attenuation total.

3.2 Limit on System Path Length

The total system path length is the distance a signal would have to travel from one end of the network to the other end along wire/cable or through nodes/repeaters as shown in Figure 17. Because it takes real time for a signal to travel along a wire or through a device, there is a propagation delay that becomes significant only if dealing with extremely large networks. The network communications protocol defines a time-out threshold beyond which the propagation delay appears to be a broken wire/cable.

![Figure 17 NOTI•FIRE•NET™ Circuit Paths](CIRCTPATH2001.400x400.png)
Figure 18 shows the time-out threshold in the section where it might be crossed by the values for an extremely large network that uses maximum system segment length between all segments. Plot your proposed number of nodes/repeaters against your proposed total system path length; this plot point must remain under the time-out threshold. The dotted line in Figure 18 demonstrates where these values for a NOTIFI·FIRE·NET™ network might be, given wire that permits 2000 feet between nodes. Any point in the gray area would be valid for this wire. Use the maximum distance values in Tables 4–6 to check your system. The overall distance in feet divided by the number of nodes/repeaters must be less than the maximum distance permitted in Tables 4–6 for each cable segment.
Appendix A  FCC Considerations

In order to comply with FCC regulations regarding radio frequency emissions, a ferrite cylinder (NOTIFIER PN 29087) must be installed on every twisted pair circuit connected to a MIB-W (Two cylinders included) and MIB-WF (one cylinder included).

**Installation on SIB-NET**

The following steps must be completed to install the ferrite cylinder on the SIB-NET (refer to Figure 19):

1. Thread the twisted pair (two pairs for a bus connection) through the ferrite cylinder.
2. Slide the cylinder along the pair(s) toward the entrance point on the cabinet (not toward the MIB) so that the edge of the cylinder and the cabinet are separated by no more that three inches.
3. Secure the ferrite cylinder to the wiring with the supplied tie wrap at each end of the cylinder.
4. If used, repeat for the remaining twisted pair(s) on a MIB-W (second port).

![Figure 19  Installation of the Ferrite Cylinder on SIB-NET](Ferrite2.cdr)
Limited Warranty

NOTIFIER® warrants its products to be free from defects in materials and workmanship for eighteen (18) months from the date of manufacture, under normal use and service. Products are date stamped at time of manufacture. The sole and exclusive obligation of NOTIFIER® is to repair or replace, at its option, free of charge for parts and labor, any part which is defective in materials or workmanship under normal use and service. For products not under NOTIFIER® manufacturing date-stamp control, the warranty is eighteen (18) months from date of original purchase by NOTIFIER®'s distributor unless the installation instructions or catalog sets forth a shorter period, in which case the shorter period shall apply. This warranty is void if the product is altered, repaired or serviced by anyone other than NOTIFIER® or its authorized distributors or if there is a failure to maintain the products and systems in which they operate in a proper and workable manner. In case of defect, secure a Return Material Authorization form from our customer service department. Return product, transportation prepaid, to NOTIFIER®, 12 Clintonville Road, Northford, Connecticut 06472-1653.

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NOTIFIER® GIVES NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. UNDER NO CIRCUMSTANCES SHALL NOTIFIER® BE LIABLE FOR ANY LOSS OF OR DAMAGE TO PROPERTY, DIRECT, INCIDENTAL OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR INABILITY TO USE NOTIFIER® PRODUCTS. FURTHERMORE, NOTIFIER® SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY OR DEATH WHICH MAY ARISE IN THE COURSE OF, OR AS A RESULT OF, PERSONAL, COMMERCIAL OR INDUSTRIAL USE OF ITS PRODUCTS.

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