

Features

Interconnect Simplex® Fire Alarm Network nodes using facility Ethernet LAN (Local Area Network) communications:

- Converts fire alarm Network communications into Transmission Control Protocol (TCP) using Internet Protocol (IP) formatting to connect between destination and source IP addresses
- Network communications from any node to any other node can pass through up to two (2) TCP/IP links
- Network topologies include ring (loop), star (hub), interconnection of Network loops, and combinations
- Hub Nodes act as data proxies allowing multiple Hub Nodes with Remote Nodes per Network loop (refer to page 3 for additional details)
- Class X (Style 7) pathway connections from Hub Nodes to Remote Nodes are compatible with redundant LANs for increased communications integrity

TCP/IP Physical Bridge Interface Kit details:

- TCP/IP Physical Bridge Interface Kits are available for Class B (Style 4) or Class X (Style 7) pathways
- Each kit includes a physical bridge module, NET232 Ethernet converter(s), power and communications cables, and mounting plate for the NET232 converter(s)
- Two media modules are required, order separately as wired or fiber optic

Mounts into Simplex 4100ES, 4010ES, and Legacy 4100U/4120/4100 Series Fire Alarm Control Panels:

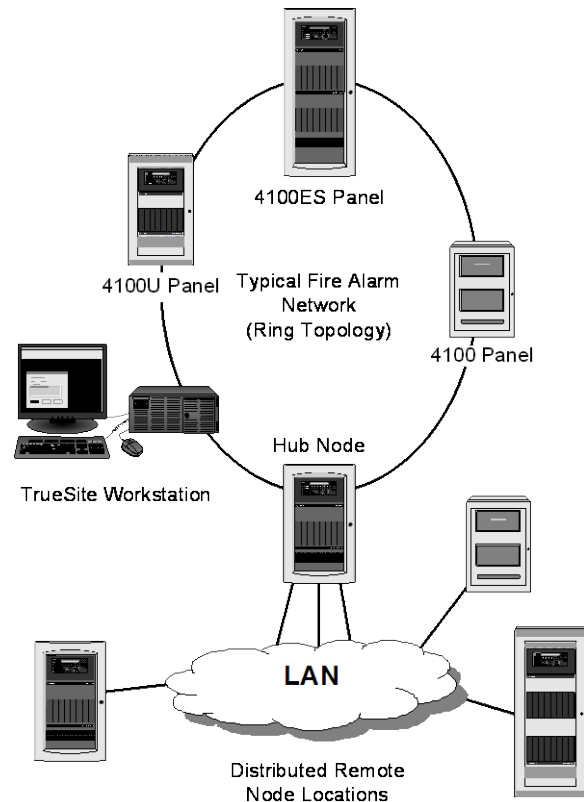
- Mounting requires 2 slots (4") of module space, one 2" slot for the TCP/IP Physical Bridge and one 2" slot for the NET232 converter mounting plate (see page 3 for 4010ES mounting information)
- The TCP/IP Physical Bridge connects to a standard Simplex fire alarm Network communications interface module (ordered separately if not already present)

Description

Enhanced Connection Flexibility. TCP/IP Physical Bridge modules provide a Network interface link that increases the flexibility of Simplex Fire Alarm Networks. Communications pass from the node's fire alarm Network interface module to the TCP/IP module and then to a NET232 Ethernet interface module powered by the local fire alarm control panel. Class X pathway connections use two, NET232 modules for redundant Ethernet links.

Physical Bridge Function. Each physical bridge module functions as a "proxy" for its Remote Node information to maintain overall network performance.

Application Types. Connection options include linking of network loops into one network, creating hub nodes to form star configuration systems, and combinations of these connections, providing convenient networking flexibility.



Fire Alarm Network with TCP/IP Interconnection of Hub Node to Star Connection

Description (Continued)

Class X (Style 7) Hub Node (Star) Connections.

When connecting from a Hub Node to Remote Nodes with Class X communications, the connections function as a primary and secondary and only one would be in use at a time, typically the primary. The secondary is monitored for integrity by the bridge.

System Size Considerations:

- Each TCP/IP Physical Bridge Interface Kit provides a connection between one fire alarm network node and the LAN; **two kits are required for a complete bridge link**; multiple kits are required for multiple connections

System Size Considerations:

- The maximum TCP/IP bridge links allowed per network is twelve (12); this requires 24 Interface Kits
- The maximum number of fire alarm network nodes allowed on a remote bridge loop is fifteen (15)
- For systems requiring more than 23 total nodes connected via TCP/IP bridges to the main loop, please coordinate system details with Simplex Product Sales Engineering Support

* Use of this product is subject to approval of the Local Authority Having Jurisdiction. This product has been approved by the California State Fire Marshal (CSFM) pursuant to Section 13144.1 of the California Health and Safety Code. See CSFM Listing 7165-0026:0251 (4100ES) or 7165-0026:0369 (4010ES) for allowable values and/or conditions concerning material presented in this document. It is subject to re-examination, revision, and possible cancellation. This product was not listed by UL or ULC as of document revision date. MEA (NYC) Acceptance is not applicable for this product category. Additional listings may be applicable, contact your local Simplex product supplier for the latest status.

Local IP Address Requirements

Obtaining Addresses. Before installation of the TCP/IP Physical Bridge, Static or Reserved IP addresses and possibly Netmasks will be required from the facility IT department. This will not be necessary if an Isolated Network is used.

Contact your local IT department. The facility IT department will make the decision as to whether a Static or a Reserved address is required. If a Static IP address, or possibly a Netmask is required, those addresses will have to be manually programmed into the NET232 module. If a Reserved IP address is assigned, the DHCP (Dynamic Host Configuration Protocol) server will automatically assign and track the required addresses.

For more information, refer to Instructions 579-818. Appendix A contains a configuration worksheet that defines the information required for the facility IT department.

Network Utilization Reference

Network utilization is a measurement of how much bandwidth is used during a specific time period. Utilization is commonly specified as a percentage of capacity. For example, a network-monitoring tool might state that network utilization on an Ethernet segment is 30%, meaning that 30% of the capacity is in use.

Communications Reference. TCP/IP physical bridge modules communicate with the fire alarm Network at 9600 bps and communicate with the LAN at 38.4 kbps. To gather network utilization data, a corporate network system operating at 512 kbps was measured with TCP/IP physical bridge modules connected.

Product Selection

Modules for 4100ES and 4100U; TCP/IP Physical Bridge Interface Kits for 4100ES and 4100U

Model	Description	Additional Details	Mounting Space Requirements
4100-9863	Class B Operation	Includes: TCP/IP Physical Bridge module with motherboard, NET232 Ethernet Interface with programming CD, and mounting hardware	Require 2 slots (4") of module space; order two media modules separately per below
4100-9864	Class X Operation	The same as above for 4100-9863 except includes two NET232 Ethernet Interfaces and mounting hardware	

Fire Alarm Network Modular Interface Module and Media Modules for 4100ES and 4100U (one required per Node)

Model	Description	Mounting Space Requirements
4100-6078	Modular Network Interface Module (requires two media modules, see below)	Mount in Slot 3 of Master Controller bay; single 2" slot module

Fire Alarm Network Media Modules and Accessories for 4100ES and 4100U

Model	Media Type	Additional Details
4100-6056	Wired	Select as required; typically TCP/IP Physical Bridge Module and Network Interface Module are connected to each other with Wired media modules; fire alarm Network connections may be either Wired or Fiber Optic
4100-6057	Fiber Optic	
4100-0156	8 V DC-DC Converter Module; required when using more than (3) 4100-9863 Class B Bridges, or (3) 4100-9864 Class X Bridges; or if required for adequate 8 VDC power; (not applicable for 4010ES applications)	

Modules for 4010ES; TCP/IP Physical Bridge Interface Kits for 4010ES*

Model	Description	Additional Details	Mounting Space
4010-9926	Class B operation	Includes: TCP/IP Physical Bridge module with motherboard, NET232 Ethernet Interface with programming CD, and mounting hardware	Requires 3 Block "L" Shape (2 vertical, one next to bottom); order two media modules separately per below*
4010-9927	Class X operation	The same as above for 4010-9926, except includes two NET232 Ethernet Interfaces and mounting hardware	

Fire Alarm Network Modular Interface Module for 4010ES (one required per Node)

Model	Description	Mounting Space
4010-9922	Modular Network Interface Module (requires two media modules, see below)	Requires 2 vertical blocks*

Fire Alarm Network Media Modules for 4010ES

Model	Media Type	Additional Details
4010-9818	Wired	Select as required; typically TCP/IP Physical Bridge Module and Network Interface Module are connected to each other with Wired media modules; fire alarm Network connections may be either Wired or Fiber Optic
4010-9819	Fiber Optic	

* Refer to data sheet S4010-0004 for additional mounting details. (For international applications; refer to data sheet S4010-0006.)

Network Utilization Reference (Continued)

Test Details. The test conducted consisted of 150 points being activated to repeatedly change state which resulted in approximately 10,000 point state changes being initiated over a 15 minute period. Measured results are listed in the table below under Measured Peak Utilization and Measured Average Utilization.

Utilization Versus Data Rates. Based upon the measured test results, extrapolated Peak and Average Utilization for higher data rates was calculated and are listed in the table below. These results illustrate that use of TCP/IP Physical Bridge Modules requires minimal LAN resource allocation.

(Please note that calculated Worst Case information is based upon a constant data transmission condition which would not be a normal fire alarm network communication condition but is presented for reference.)

Network Utilization Reference Table

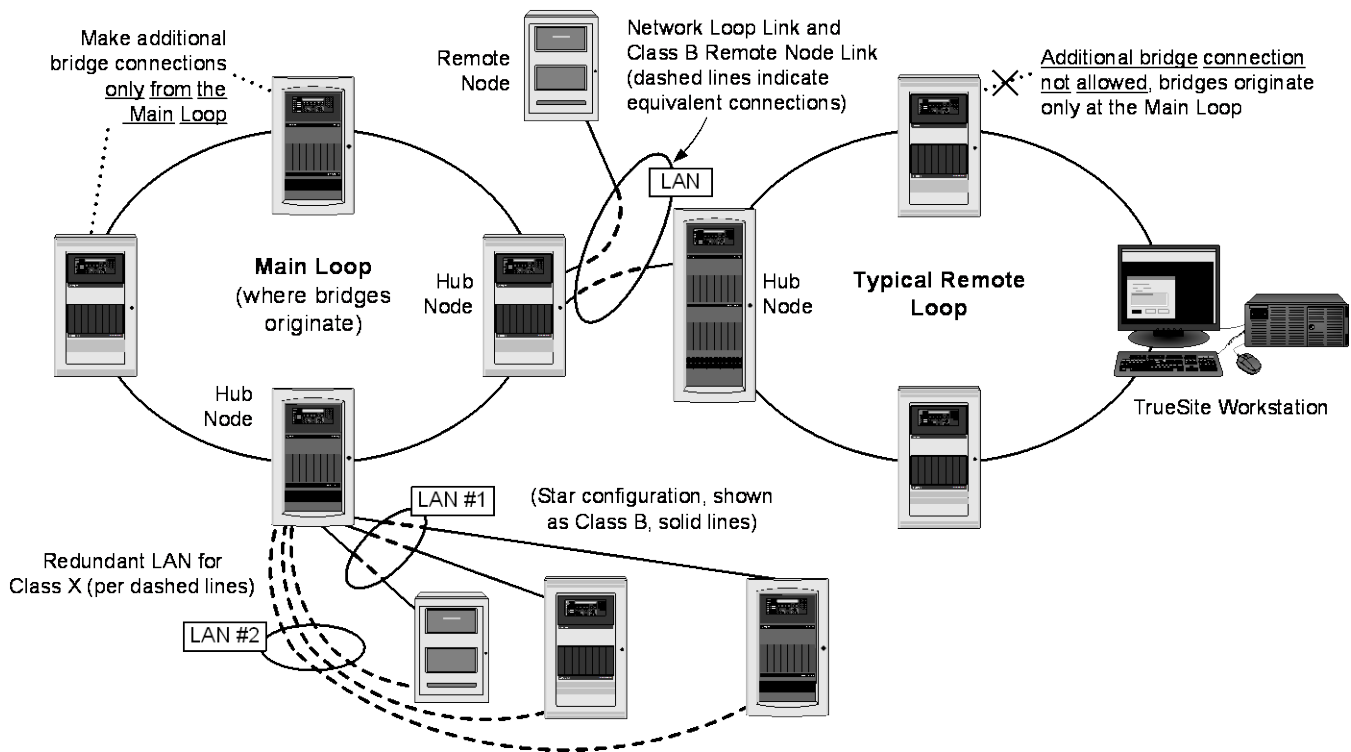
Network Speed	Calculated Worst Case Utilization (constant data transmission)	Measured Peak Utilization	Measured Average Utilization
512 kbps	7.5%	0.9%	0.09%
Network Speed	Calculated Worst Case Utilization (constant data transmission)	Extrapolated Peak Utilization*	Extrapolated Average Utilization*
10 Mbps	0.38%	0.05%	0.005%
100 Mbps	0.038%	0.005%	0.0005%

* Extrapolated from measurements taken at 512 kbps.

Multiple Network Loop Connection Application Diagram

Multiple Loop Considerations. Multiple fire alarm Network loops can be connected using TCP/IP Physical Bridges (see example below). TCP/IP bridge connections **must all originate from the same loop** (the Main Loop).

This diagram also shows a Hub Node in the Main Loop with Class X star configuration connections, and a second Hub Node connected to both a Remote Node and connected to a typical remote loop, both using separate TCP/IP Bridges.



Specifications

Fire Alarm Network Data Rate Supported	9600 bps; 8 Bit	
Ethernet Data Rates Supported	NET232 supports 10 Mbps or 100 Mbps	
TCP/IP Physical Bridge Connections	Communications may pass through up to two (2) TCP/IP links maximum; Class X Hub Node connections count as one (1) link	
Battery Currents	Class B (4100-9863 and 4010-9926), 196 mA @ 24 VDC	
	Class X (4100-9864 and 4010-9927), 236 mA @ 24 VDC	
Mounting Information*	NET232 Mounting Plate	Dimensions = 11 ⁹ / ₁₆ " H x 4 ¹ / ₁₆ " W (294 mm x 103 mm); with 2" wide (51mm) mounting flange
	4100ES/4100U Mounting	Requires 2 slots (4") of module space; one 2" slot for the TCP/IP Physical Bridge Module and one 2" slot for the NET232 mounting plate which is mounted to the left of the TCP/IP Physical Bridge Module; mount the first plate to the leftmost location in a panel bay; additional plates and Bridge Modules mount in available space
	4010ES Panels	4010ES modules require 3 "L" shaped blocks of space
	4100 Legacy Panels	Requires 2 slots (4") of module space; mount in existing space, within harness connection capability
Connections	TCP/IP Bridge Module to NET232	Cable part no. 734-211, 12" long (305 mm) plus connector; connects to NET232 output data cable
	NET232 Power	Connect from system power to removable terminal strip at NET232 module, use harness 733-909, supplied, 48" long (1.2 m)
	LAN Connection	Ethernet RJ-45 terminating connector on NET232 module
Environmental Ratings	Temperature	32° to 120°F (0° to 49° C)
	Humidity	Up to 90% RH, non-condensing @ 100° F (38° C) maximum

* Refer to Installation Instructions 579-818 for detailed installation information.

