Simplex®

Fire Control Panel Accessories

*FM Approved; CSFM Listed**

4120 Network TCP/IP Physical Bridge Modules for 4100ES, 4010ES, 4100U, and 4100 Fire Alarm Control Panels

Features

Compatible with Simplex 4120 Network Interconnect Simplex® 4120 Network nodes using facility Ethernet LAN (Local Area Network) communications:

- Converts 4120 network fire alarm 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:

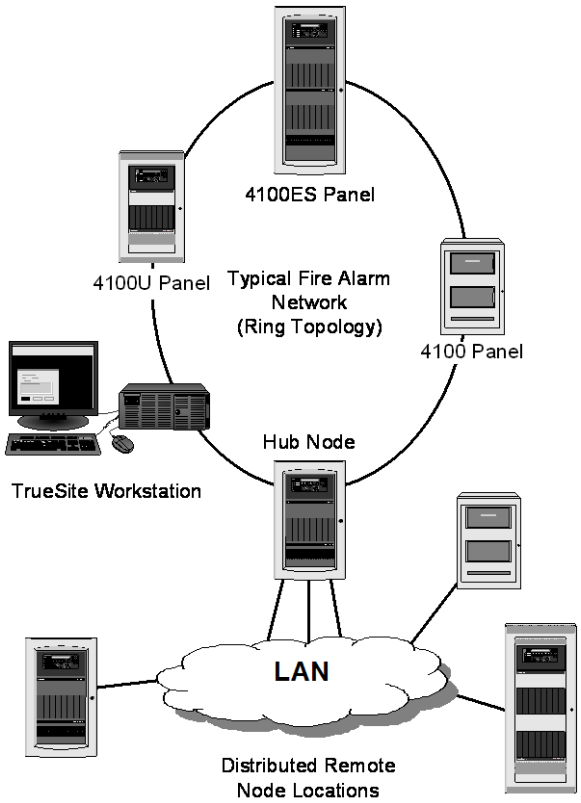
- Mounting requires 2 slots (4") of module space, one 2" slot for the TCP/IP Physical Bridge and one 2" slot for the NET232 converter mounting plate (see page 3 for 4010ES mounting information)
- The TCP/IP Physical Bridge connects to a standard Simplex 4120 network interface card (ordered separately if not already present)

Description

Enhanced Connection Flexibility. TCP/IP physical bridge modules provide a network interface link that increases the flexibility of Simplex 4120 networks. Communications pass from the node's network interface card 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 4120 network loops into one network, creating hub nodes to form star configuration systems, and combinations of these connections, providing convenient networking flexibility.



4120 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.

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.

Product Selection

Modules for 4100ES and 4100U; 4120 Network TCP/IP Physical Bridge Interface Kits for 4100ES and 4100U

Model	Description	Additional Details	Mounting Space Requirements	Alarm/Supv.
4100-9863	Class B Operation	Includes: TCP/IP Physical Bridge module with motherboard, NET232 Ethernet Interface with programming CD, and mounting hardware	Requires 2 slots (4") of module space; module requires up to two media cards ordered separately. Physical bridge typically uses wired media cards (see below).	198 mA
4100-9864	Class X Operation	The same as above for 4100-9863 except includes **two** NET232 Ethernet Interfaces and mounting hardware		236 mA

4120 Network Modular Interface Card and Media Cards for 4100ES and 4100U (one required per Node)

Model	Description	Mounting Space Requirements	
4100-6078	Modular Network Interface card (requires two media cards ordered separately, see below)	Mount in Slot 3 of Master Controller bay; single 2" slot module	46 mA

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

Model	Media Type	Additional Details		
4100-6056	Wired	Select as required; mounts on modular network interface card and physical bridge modules listed above. Maximum of 2 media cards per modular network interface or physical bridge module.		55 mA
4100-6301	Fiber	Left port, single-mode 4120 duplex fiber media card	Mounts on modular network interface card and physical bridge modules listed above. Maximum of 1 left port and 1 right port duplex fiber media card per modular network interface card or physical bridge module. Field connections require left port to right port pairing. Order fiber media service kits for retrofit jobs where ST connectors are already installed (refer to data sheet S4100-0056 for full fiber media module specifications and retrofit information)	55 mA
4100-6302		Right port, single-mode 4120 duplex fiber media card		55 mA
4100-6303		Right port, multi-mode 4120 duplex fiber media card		55 mA
4100-6304		Right port, multi-mode 4120 duplex fiber media card		55 mA
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)			N/A

Product Selection *(Continued)*

Modules for 4010ES; 4120 Network TCP/IP Physical Bridge Interface Kits for 4010ES

Model	Description	Additional Details	Mounting Space	Alarm/Supv.
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); module requires up to two media modules ordered separately. Physical bridge typically uses wired media modules (see below)	196 mA
4010-9927	Class X operation	The same as above for 4010-9926, except includes **two** NET232 Ethernet Interfaces and mounting hardware		236 mA

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

Model	Description	Mounting Space	
4010-9922	Modular network interface card (requires two media cards ordered separately, see below)	Requires 2 vertical blocks	30 mA

Fire Alarm Network Media Cards for 4010ES

Model	Media Type	Additional Details		
4010-9818	Wired	Select as required, mounts on modular network interface card and physical bridge modules listed above. Maximum of 2 media cards per modular network interface or physical bridge module.		
4010-6301	Fiber	Left port, single-mode 4120 duplex fiber media card	Mounts on modular network interface card and physical bridge modules listed above. Maximum of 1 left port and 1 right port duplex fiber media card per modular network interface card or physical bridge module. Field connections require left port to right port pairing. Order fiber media service kits for retrofit jobs where ST connectors are already installed (refer to data sheet S4100-0056 for full fiber media card specifications and retrofit information)	55 mA
4010-6302		Right port, single-mode 4120 duplex fiber media card		
4010-6303		Left port, multi-mode 4120 duplex fiber media card		
4010-6304		Right port, multi-mode 4120 duplex fiber media card		

Specifications

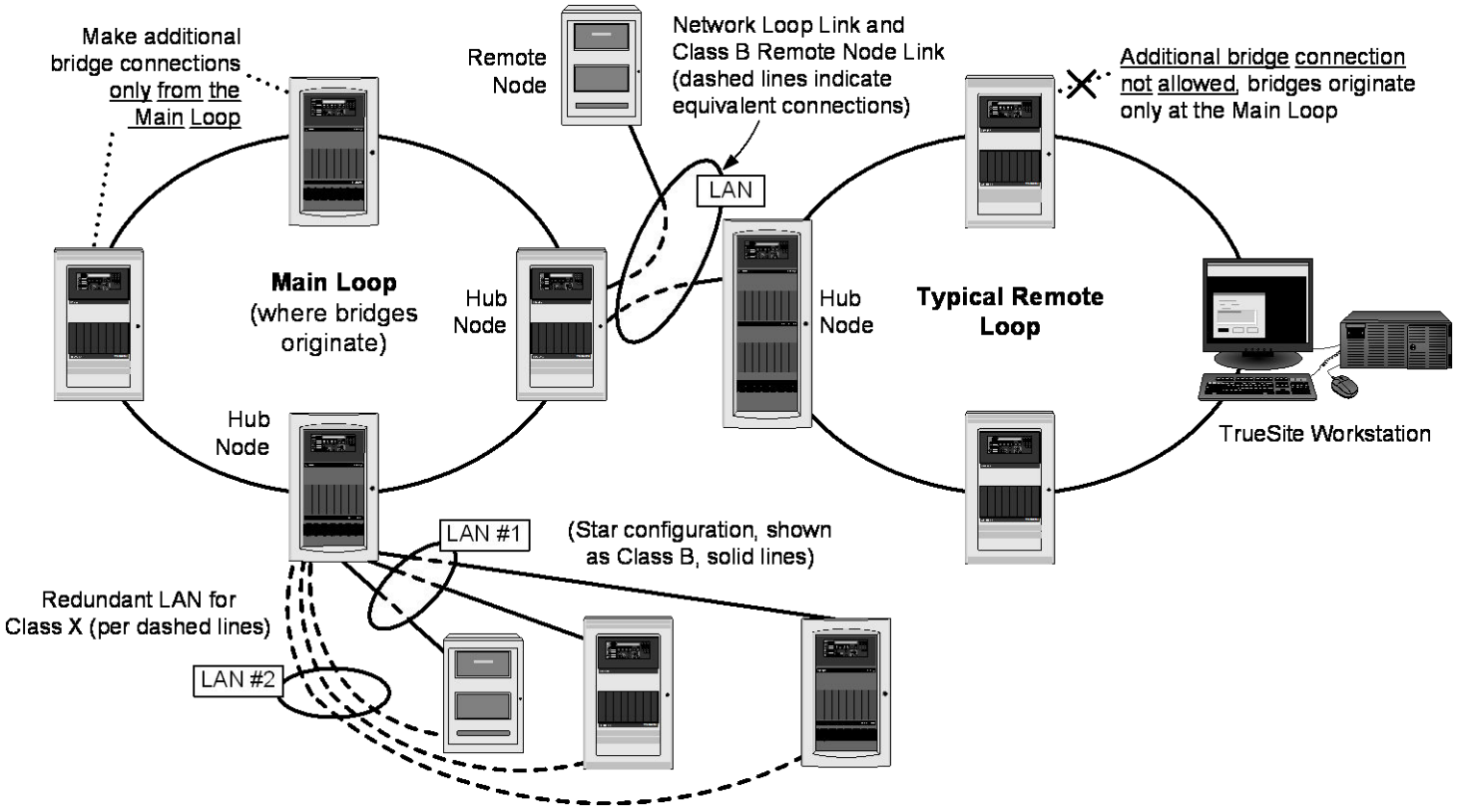
Fire Alarm Network Data Rate Supported		9600 bps; 8 Bit
Ethernet Data Rates Supported		NET232 supports 10 Mbps or 100 Mbps
TCP/IP Physical Bridge Connections		Communications may pass through up to two (2) TCP/IP links maximum; Class X Hub Node connections count as one (1) link
Mounting Information*	NET232 Mounting Plate	Dimensions = 11 $\frac{9}{16}$" H x 4 $\frac{1}{16}$" 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.

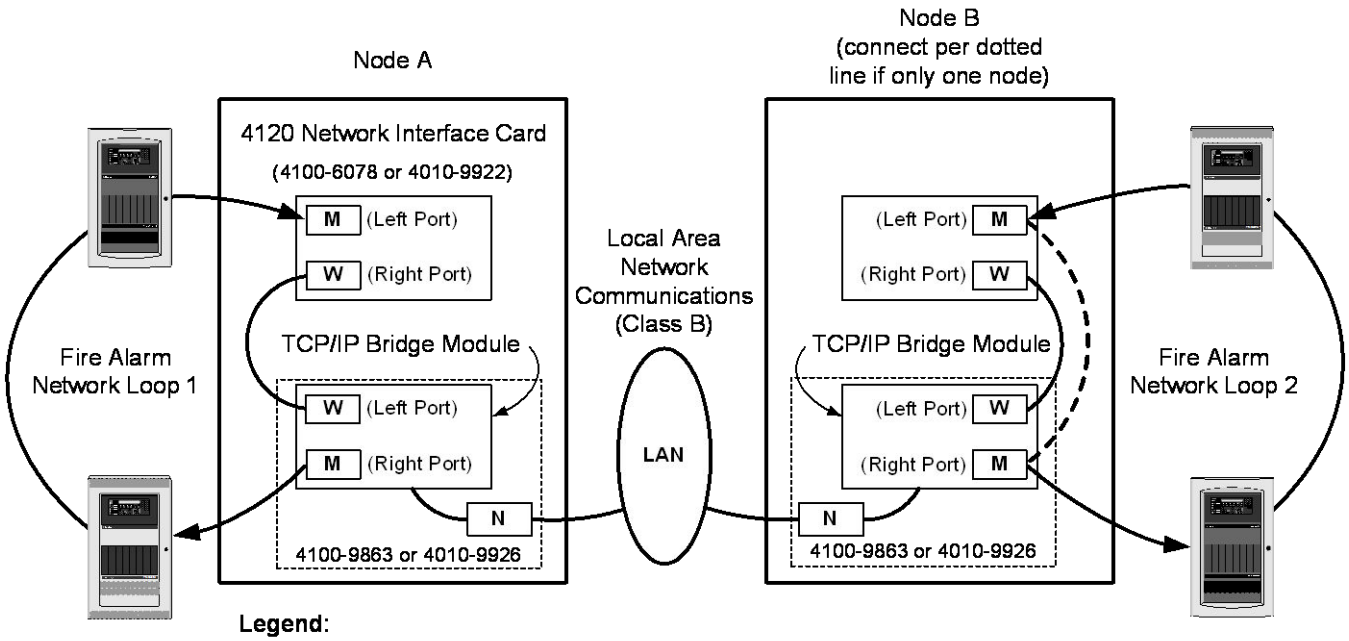
Multiple 4120 Network Loop Connection Application Diagram

Multiple Loop Considerations. Multiple 4120 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.

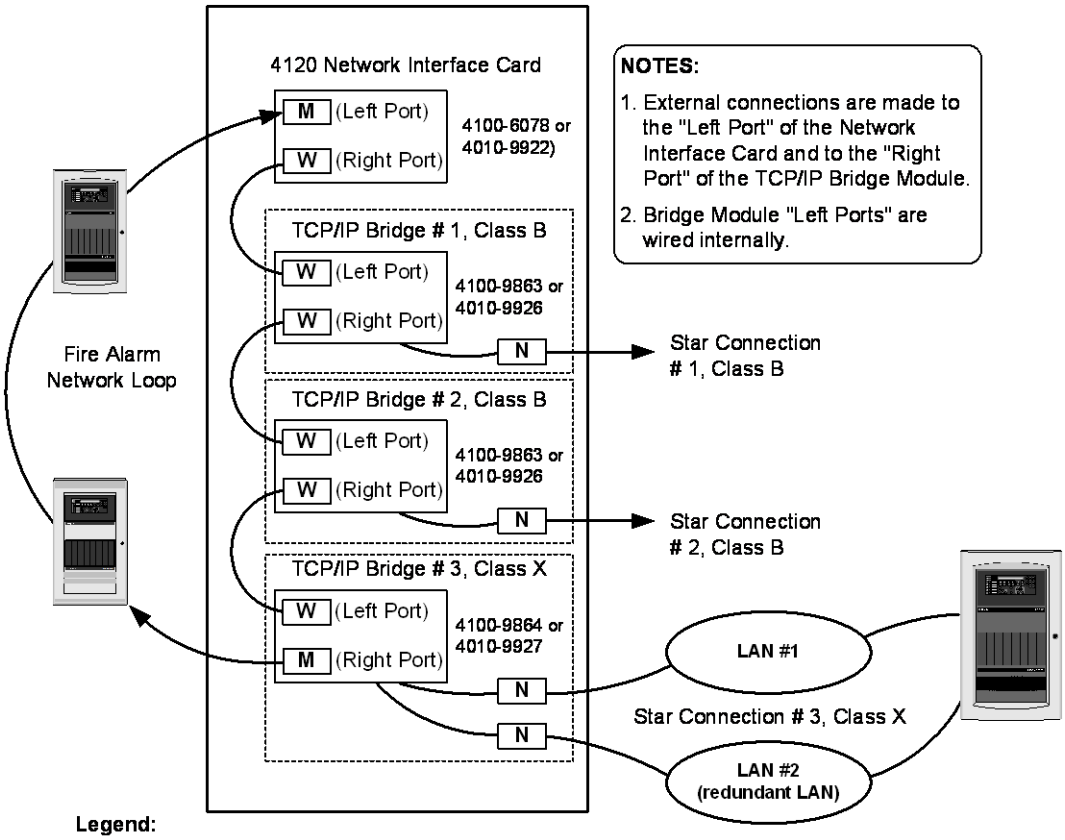


TCP/IP Physical Bridge Basic Connection Reference



Legend:
W = Wired media module (4100-6056 or 4010-9818)
M = Wired or fiber optic media module (4100-6057 or 4010-9819)
per application requirement
N = NET232 Ethernet Interface (supplied with TCP/IP module)

TCP/IP Physical Bridge Multiple Star Connection Reference



Legend:
W = Wired media module (4100-6056 or 4010-9818)
M = Wired or fiber optic media module (4100-6057 or 4010-9819)
per application requirement
N = NET232 Ethernet Interface (supplied with TCP/IP module)

Additional 4120 Network Product Reference

Subject	Data Sheet
4010ES Panels with Conventional Notification	S4010-0004
4010ES Panels with Conventional Notification (INTL)	S4010-0006
4010ES Panels with Addressable Notification	S4010-0011
4010ES Panels with Addressable Notification (INTL)	S4010-0012
4100ES Basic Panels with SPS Power Supplies	S4100-0031
NDU with SPS Power Supplies for 4120 Network	S4100-0036
InfoAlarm Command Center with SPS Power Supplies	S4100-0045
4120 Network Products and Specifications	S4100-0056
Physical Bridge Modules for 4120 Networks	S4100-0057
4100ES Basic Panels with EPS Power Supplies	S4100-0100
InfoAlarm Command Center with EPS Power Supplies	S4100-0101
NDU with EPS Power Supplies for 4120 Network	S4100-0102

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