ES Net features

ES Network (ES Net) is a high bandwidth (100 Mbps) IP based fire alarm network. It supports up to 99 nodes and uses industry standard network technology and infrastructure for greater design and installation flexibility.

Network wide system upgrades from a single point

ES Net allows you to apply software updates to all network nodes through a single download. The high bandwidth ES Net network can perform software updates to all 99 nodes from a single location at any node on the network in minutes, increasing system up-time and reducing business interruptions.

Simplex 4120 fire network migrations

Use the TrueSite Workstation to integrate ES Net installations with existing 4120 networks. This allows a phased migration path for existing installations. In some cases you may reuse existing network infrastructure and cabling to lower the migration cost of ES Net migrations.

Network appliance synchronization

Use the Network Sync feature to synchronize all notification appliances within a single loop of up to 99 nodes.

Note: Network Sync requires a network topology where all sync nodes must be within a maximum distance of 30 nodes from the designated Master Sync Node (MSN) if using Ethernet or Fiber and 10 nodes if using DSL. Refer to your control unit's programmer manual for further information.

Advanced diagnostics

ES Net provides advanced network diagnostic tools and reports that are easy to read. Detailed information about network communication health and status is available, allowing technicians to pinpoint problems and reduce the time required to troubleshoot network communication issues.

Greatly increased bandwidth and traffic speeds compared to traditional fire networks

ES Net is an IP based network that has greatly increased bandwidth compared to traditional fire networks. Every node that is part of a network can be notified about network events.

Table 1: Typical ES Net traffic speeds

Media	Data traffic rate
Ethernet	100 megabits per second (Mbps), CAT5e or better
Fiber cable	100 Mbps, single mode or multi-mode fiber media
DSL	2 Mbps to 12 Mbps depending on distance, with 18 AWG cabling Maximum 2 Mbps in ULC mode

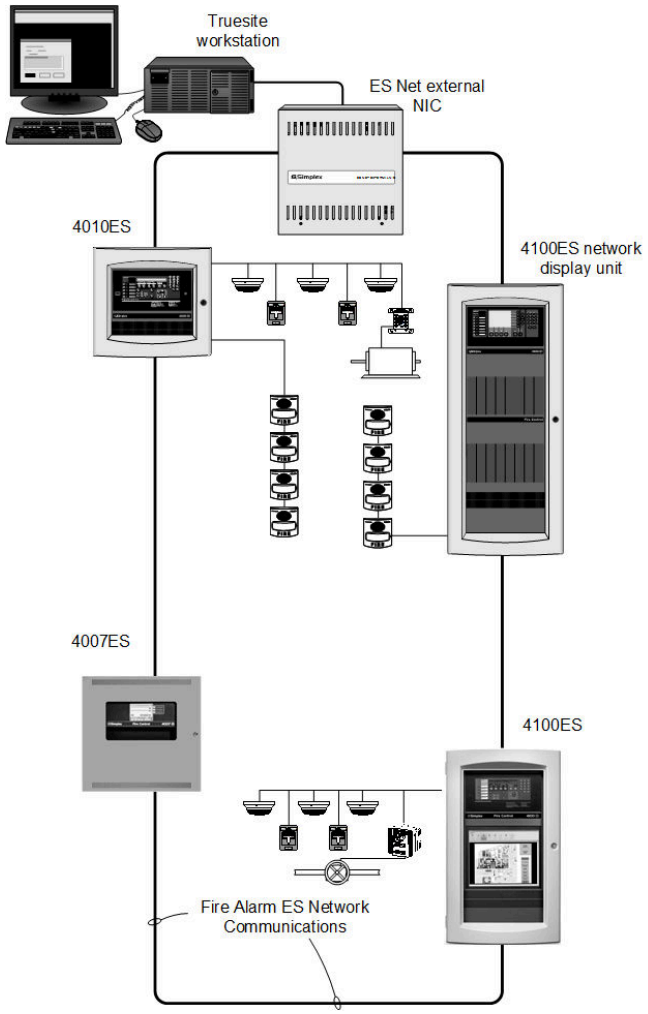


Figure 1: ES Net example

ES Net overview

ES Net fire alarm control units (FACUs) provide extensive installation, operator, and service features with point and module capacities suitable for a wide range of system applications and large multi-site installations.

Supported FACUs and devices

- 4100ES, 4010ES, and 4007ES series FACUs
- 4100ES network display units (NDU)
- 4190 series TrueSite Workstations and Incident Commanders

ES Net network configuration

ES Net supports multiple Class X loops or Class B linear network topologies. See ES Net network multi-topology support.

Each ES Net node requires an ES Net Network Interface Card (NIC) to send and receive data on the network. In some cases optional network media cards may be required. You can configure the network to share information and control functions between nodes.

The ES NICs on each node connect in a point-to-point arrangement, providing security and fault-tolerance to the network.

* 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 Listings 7300-0026:0323, 7300-0026:0506, 7165-0026:0251, 7165-0026:0369 and 7165-0026:0378 for allowable values and/or conditions concerning material presented in this document. Additional listings may be applicable; contact your local Simplex product supplier for the latest status. Refer to Product Selection tables for specific UL and ULC listing details. Listings and approvals under Simplex Time Recorder Co. are the property of Tyco Fire Protection Products.

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Network resilience

ES Net is resilient to failures and can detect degraded and non-replicated paths between any two connected nodes.

Flexible network options

- Support for multiple Class X loops or multiple Class B linear network topologies
- Ethernet communications with Cat-5e cable or better, for runs of 328 ft (100 m) or less
- Fiber media communications with multi-mode or single-mode fiber connections providing increased noise immunity and longer distances for runs of up to 82,000 ft (25 km) with single-mode fiber
- Wired communications with a single wire pair between nodes using lower bandwidth DSL media cards, for existing installations where Ethernet or fiber are not available, up to 15,000 ft (4572 m) with 18 AWG unshielded twisted pair wire

TrueSite Workstation and Incident Commander nodes

A TrueSite Workstation or Incident Commander supports multiple ES Net loops of up to 99 nodes.

A TrueSite Workstation node can attach to seven network loops in any combination of ES Net and 4120 loops.

An Incident Commander node can attach to seven network loops; up to five ES Net loops and two 4120 loops.

Listings information

- UL 864, Fire Detection and Control (UOJZ), Smoke Control Service (UUKL), Releasing Device Service (SYZV)
- UL 1076, Proprietary Alarm Units - Burglar (APOU)
- UL 2017, Process Management Equipment (QVAX), Emergency Alarm System Control Units (FSZI)
- UL 1730, Smoke Detector Monitor (UULH)
- UL 2572, Mass Notification Systems (PGWM)
- CAN/ULC-S527 Control Units for Fire Alarm Systems (UOJZ7), Releasing Device Service (SYZV7)
- ULC/ORD-C1076 Proprietary Burglar Alarm Units and Systems (APOU7)
- ULC/ORD-C100 Smoke Control System Equipment (UUKL7)
- UL 1610 as Central Station Burglar Alarm Control Unit (AMCX)

ES Net software features

Network Programmer

ES Net communications allows technicians to build and download a network job from one location to all FACUs on the network in a single operation. Typical download time to a full ring of 99 nodes is 5 minutes or less and requires ethernet or fiber optics media.

IP file transfer

Executive and firmware updates are critically important on a FACU network. The IP file transfer tool automatically discovers ES Net NIC cards connected to the ES Net network and suggests executive and firmware updates where applicable. You can update ES FACU runtime application and secondary cards from anywhere on the network.

Network diagnostics

An advanced network diagnostic tool allows simple and accurate pinpointing of network communication issues, performance issues, and faulty connections from any node on the ES network. You can run test reports for any control unit from any point on the network.

The network diagnostic tool supports multiple remote terminal sessions to ES control unit nodes and provides information on network status and topology and attendance in the ES network. Historical port statistics such as operational parameters and errors for each port are stored for analysis. Error reporting and historical data on some error conditions is also available.

The network diagnostics tool diagnoses the following errors on the ES network from an ES control unit or TSW:

- Link down
- Mis-wired links
- Ground fault
- Version control mismatch between nodes
- Extra node in network
- Duplicate node in network
- Missing node
- Non-sync nodes

ES Net and 4120 network comparison

Use Table 2 to determine when to select ES Net versus 4120 network fire alarm products based on the key features of each network. For additional 4120 network equipment reference refer to datasheet ***4120 Network Applications, Communications, Options and Specifications (S4100-0056)*** and associated network product datasheets.

Table 2: ES Net and 4120 network feature comparison

Feature	ES Net	4120
High bandwidth IP based network (100 Mbps)	Yes	-
High speed download to all nodes	Yes	-
Advanced network diagnostics	Yes	-
Single connection download to all nodes	Yes	-
TSW, 4100ES, 4010ES, 4007ES, and NSI node support	Yes	Yes
Legacy node support	-	Yes
Notification appliance synchronization over the network	Yes, see note	Yes
Notification appliance synchronization within a control unit	Yes	Yes
Maximum number of ES Net versus 4120 network loops for each TSW **Note:** TrueSite Workstation supports up to seven ES Net loops, or up to seven 4120 loops, or up to seven loops total in any combination of ES Net and 4120 loops.	7	7
Class X network communications	Yes	Yes
Class B network communications, no T-tapping	Yes	Yes
Class B network communications with T-tapping	-	-
Multi-topologies support	Yes	No
Physical bridge support	-	Yes
Multi-signal fiber modem support	-	Yes
TSW supports both dedicated fire alarm LAN and customer LAN connections	-	Yes
4100ES redundant CPU support	-	Yes
Supplemental traffic support	Yes	-
Note: For ES Net networks, the maximum number of nodes between an MSN and a sync node must not exceed 30 nodes if using Ethernet or Fiber and 10 nodes if using DSL. Refer to your control unit's programmer manual for further information.		

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Basic ES Net network operation

Simplex fire alarm ES Net networks communicate information among distributed Simplex FACUs. Systems composed of similar capability control units can share information, or specific nodes can perform dedicated network functions. Illustrations on the following pages provide a summary of a variety of ES Net network applications.

Nodes

Each fire alarm system with direct communications on the network is defined as a node. Each node can be a large or small FACU, Network System Integrator, TrueSite Workstation, TrueSite Incident Commander.

Communications process

When the network topology is automatically discovered, network messages are sequentially transmitted directly from one node to another. This ability to transmit messages directly, without the need to circulate through the entire network, makes the communication process more efficient when using the ES Net network.

Survivability

If a node goes off-line or if the connection between nodes either shorts, opens, or has any other form of communication problem, that section of wiring becomes isolated. In this instance, the ES Net network automatically reconfigures the network to use alternative paths, maintaining communication between nodes and notifying the network of the wiring faults. In the event of multiple wiring faults, the remaining nodes regroup and establish new, smaller sub-networks that maintain communications among the active nodes. When all the wiring faults are fixed, the network automatically reverts to its original configuration and clears the related network troubles.

Communications options

Figure 12 shows a multiple node network interconnected with a variety of communications means for reference.

- Ethernet and Fiber offer high bandwidth (100 Mbps) network communications.
- Fiber media communications support longer distances, are available for single or multi-mode fiber and only require a single fiber for node-to-node connections.
- DSL communications use a single wire pair between nodes using lower bandwidth DSL media cards. Due to lower bandwidth, DSL is recommended primarily for retrofit installations where you must reuse the existing wiring.

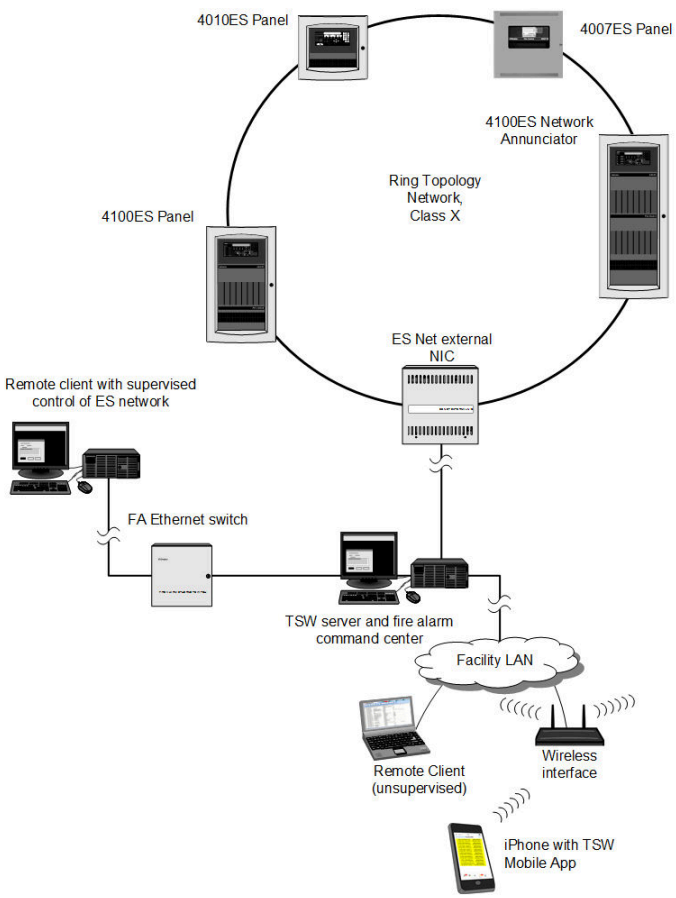


Figure 2: ES Net ring topology example

Note: The arrangement shown is for reference only. Wiring pairs are shown as one-line for typical reference only. The TrueSite Workstation PC has two Ethernet ports. The ES Net NIC connection uses one Ethernet port leaving one Ethernet port available for a connection to either a dedicated agency

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listed fire alarm LAN or a customer's LAN, not both. Refer to datasheet *Fire Alarm Network Annunciators; Fire Alarm Ethernet Switches (S4190-0018)* for additional information on fire alarm network Ethernet switches.

ES Net network multi-topology support

Depending on local code requirements regarding the use of redundant pathways for specific segments of a network, you can deploy and interconnect nodes on a single ES Net loop using the following topologies:

- Class X topology
- Class B topology
- A combination of Class X and Class B using different topologies

Refer to *ES Net Operations and Troubleshooting Manual (579-1272)* for more information about network configuration using multi-topology.

Class X network topologies

If local code requires redundant pathways on network segments, it is possible to configure a loop using the following topologies:

- Simple ring
- Multiple cascading rings using bridges
- Other ring-based topologies

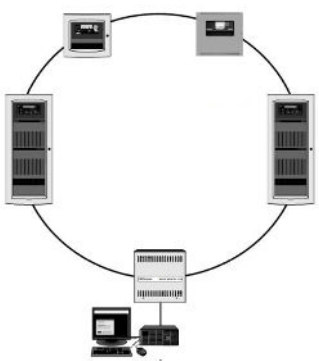


Figure 3: Simple ring topology

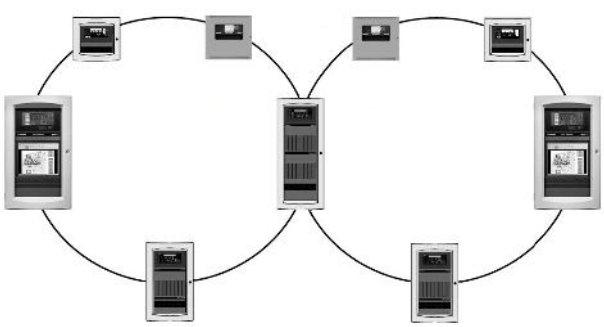


Figure 4: Multiple rings with central node topology

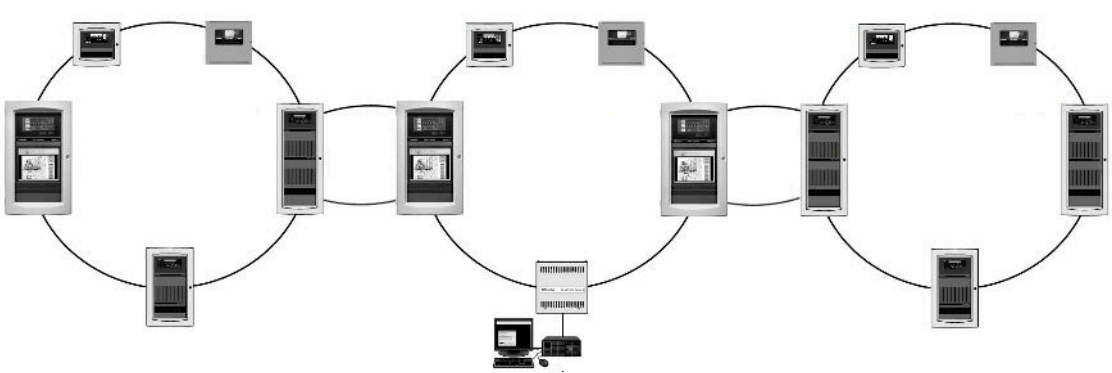


Figure 5: Bridged rings topology

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Class B network topologies

If local code does not require redundant pathways on all network segments, it is possible to connect nodes without having redundancy in topologies using single run, spurs, or in topologies that are combination of Class B and Class X.



Figure 6: Single run linear network topology. No T-tapping.

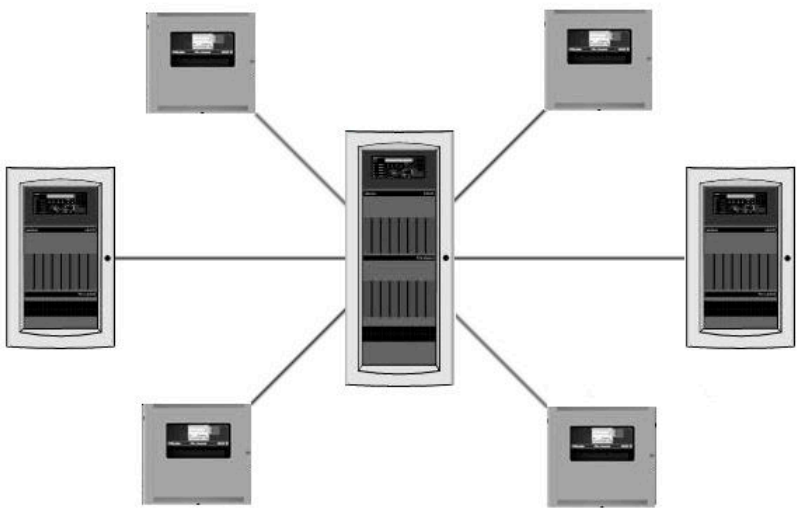


Figure 7: Simple star topology

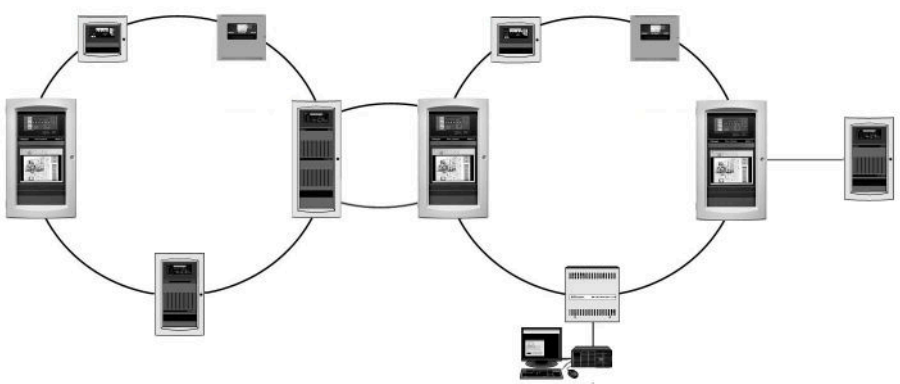


Figure 8: Bridged rings topology with spur

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Multiple-loop network operation using a TrueSite Workstation or Incident Commander

ES Net network loop

Use the TrueSite Workstation or the Incident Commander to interface up to seven ES Net loops.

4120 network loops

Use the TrueSite Workstation to interface up to seven 4120 network loops for extensive network expansion or interconnection of existing, separate networks. Use the Incident Commander to interface up to two 4120 network loops.

Multiple-loop 4120 and ES Net networks

A TrueSite Workstation node can attach to as many as seven network loops; up to seven ES Net loops, or up to seven 4120 loops, or up to seven loops total in any combination of ES Net and 4120 loops. An Incident Commander node can attach to as many as seven network loops; up to seven ES Net loops, or up to five ES Net loops and two 4120 loops.

Each network loop connects to its own NIC allowing the workstation to appear as a node in each individual loop. With the workstation as a network loop interface, information from all nodes on the network, up to seven loops, can be annunciated on a central workstation.

With a multi-loop network connection, the TrueSite Workstation and Incident Commander are member nodes of each network loop with up to 98 additional nodes for each loop. You can interconnect up to 686 total nodes and the TrueSite Workstation Server, 687 in total.

Multi-loop operation features

Improved survivability

- Individual network loops operate independently.
- In the event of the loss of one or more loops, the remaining loops continue to operate.

Loop independence

You can add new loops without impacting existing loops.

Assists with phased-in system expansion

- You can install each loop as a stand-alone network allowing local node programming to evolve as required.
- When construction or renovation reaches completion, you can consolidate loops for coordinated facility protection.

Multi loop requirements

- Each loop requires a dedicated network interface card.
- Supports up to seven ES Net loops, or up to seven 4120 loops, or up to seven loops total in any combination of ES Net and 4120 loops.
- For multi-loop ES Net networks, the TSW requires a UL listed fire alarm Ethernet switch to connect to the network interface cards. Refer to data sheet *Fire Alarm Network Annunciators; Fire Alarm Ethernet Switches (S4190-0018)* for details.

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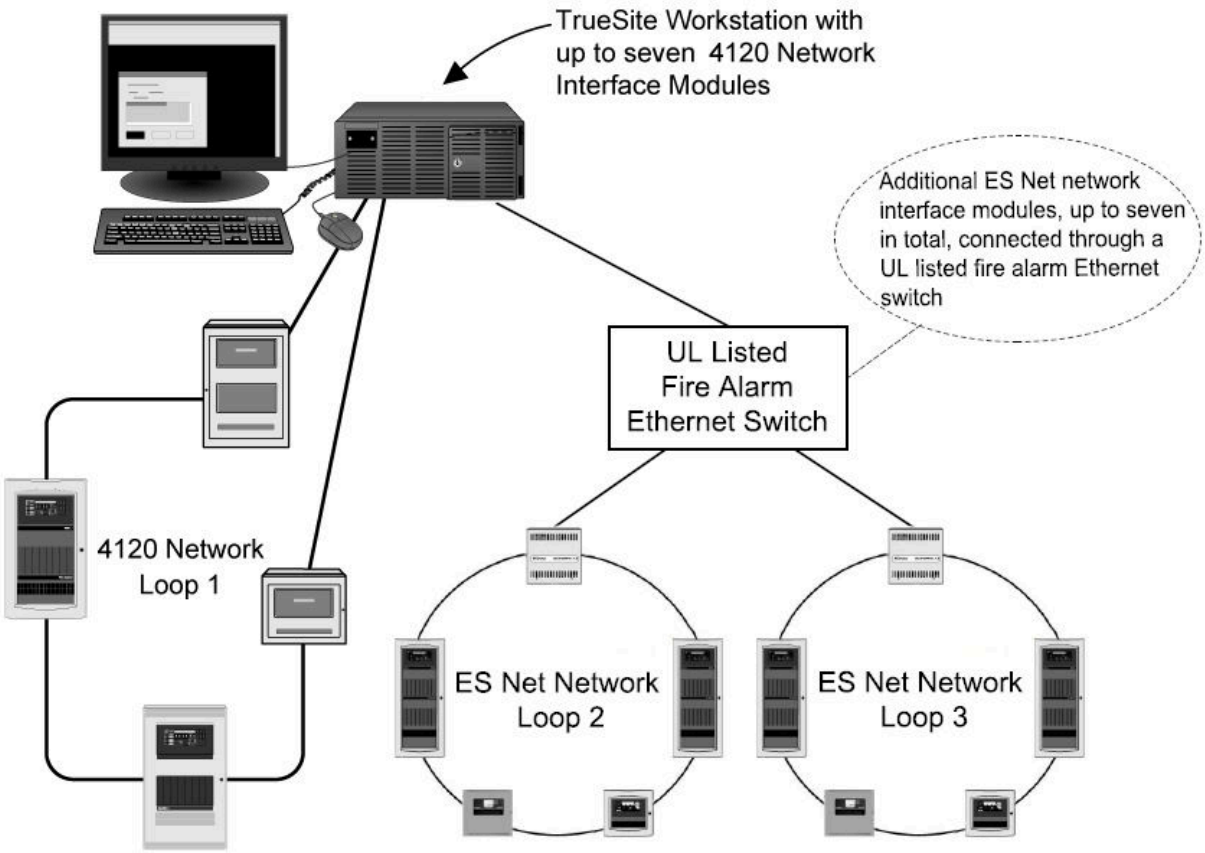


Figure 9: Typical interface of multiple network loops using a TrueSite Workstation

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ES Net network high rise example

Fire alarm network principles apply equally to high rise applications, see Figure 10.

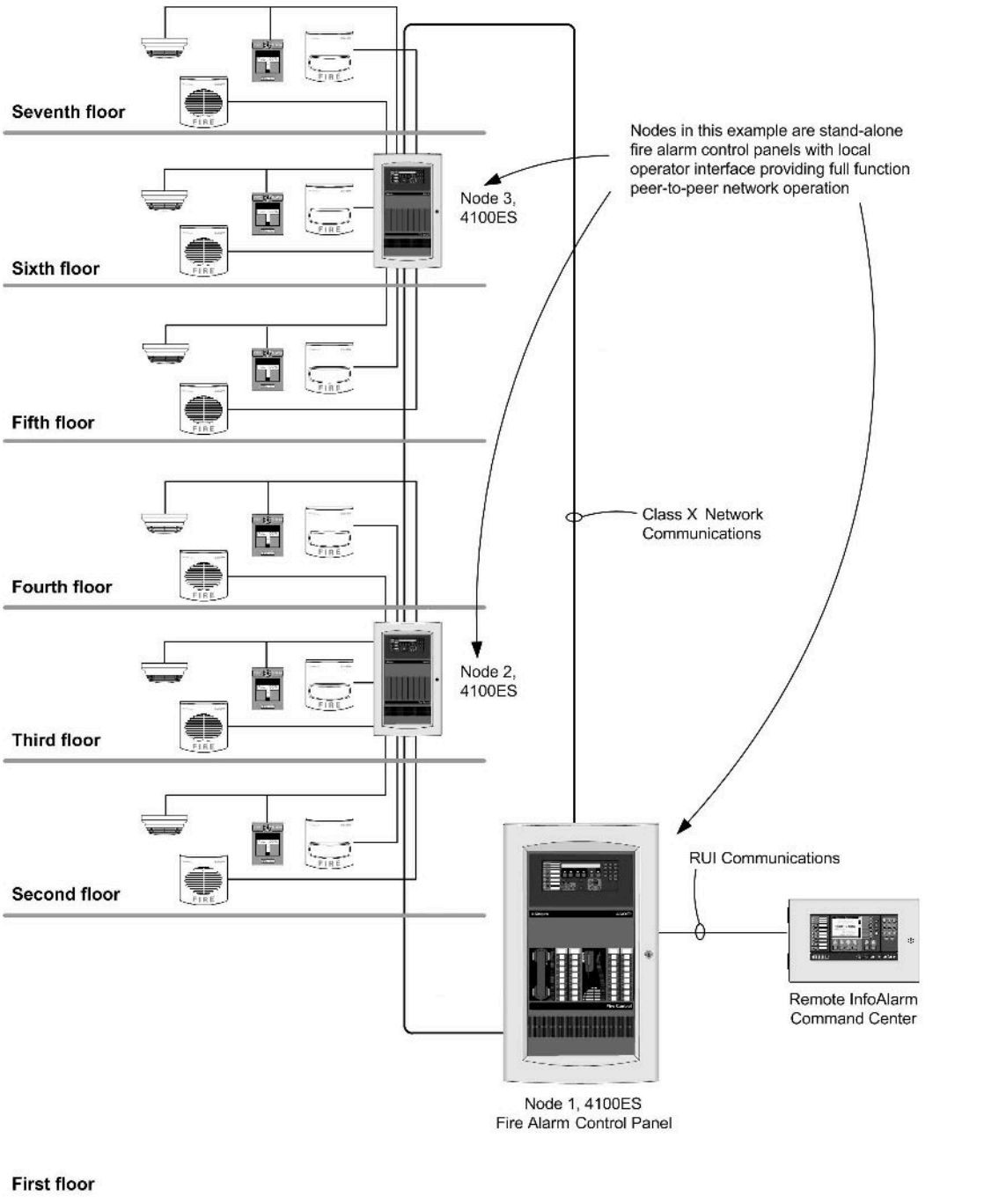


Figure 10: ES Net network high rise audio example

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Multiple building ES Net network example

Multiple building or campus network

Figure 11 represents a multiple building or campus network with duplicate InfoAlarm Command Center network display unit (NDU) locations. The security office is the main command center in the event of an emergency. The facility maintenance building can take control if needed.

Network oversight

System activity recording occurs at both of the NDU locations with each capable of manually investigating and operating the same network points. Access to the operation is pass-code controlled such that only authorized operators have access to override the automatic operation.

Support for in control command centers

In control network operation allows a prioritization to establish which command center is in control.

In control functions include:

- Annunciation of which command center is in control
- Establishing whether command centers have equal access to control or are prioritized
- Allowing a request control command to be accepted where a specific command center takes control over other equal priority command centers, for example, due to the location of the incident of concern.

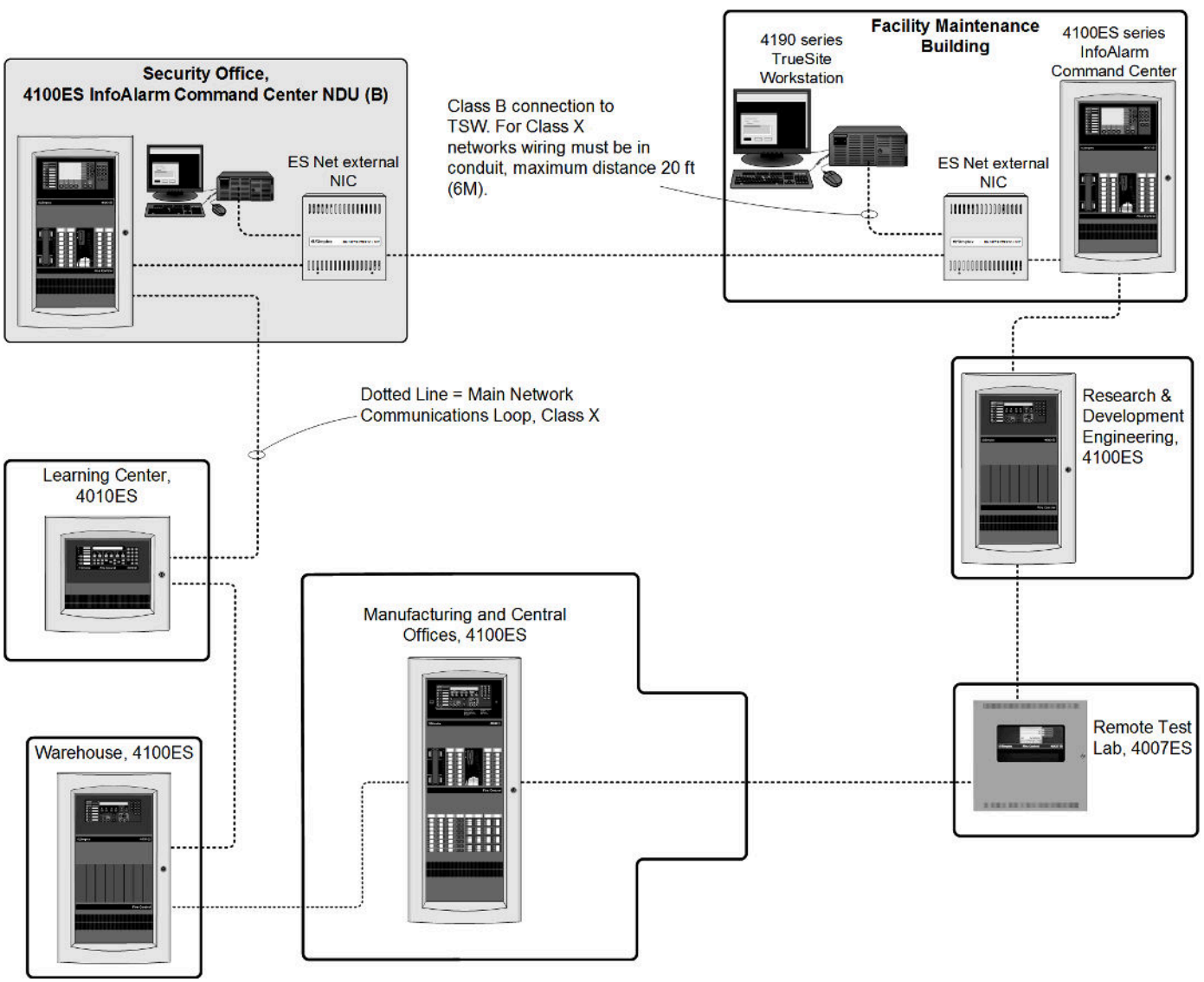


Figure 11: Multiple building ES Net network application

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Fire alarm network example with multiple communication media

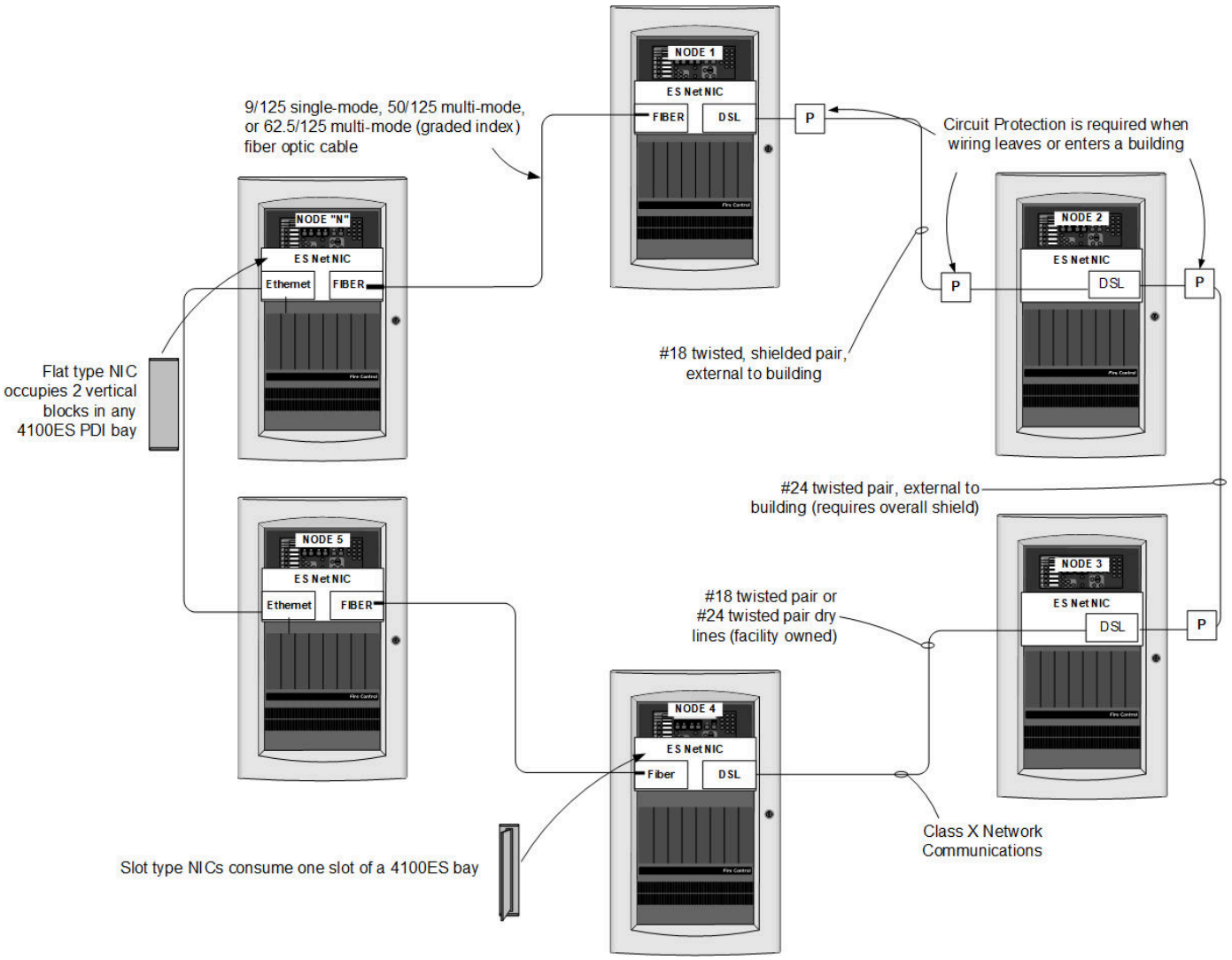


Figure 12: Fire alarm network example with multiple communication media

Notes:

1. Refer to NFPA 70 (NEC) or other applicable local codes for shielded wiring and protective device requirements when wiring enters and leaves a building.
2. For additional details on network audio requirements refer to datasheet *Addressable Fire Detection and Control Emergency Voice/Alarm Communications Equipment (S4100-0034)*.

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Supplemental traffic support

With ES Net using only a fraction of the available bandwidth for fire traffic and control data, extra bandwidth is available for connecting third party or ancillary devices such as TrueSite Workstation Remote Clients or video systems. Fire related traffic is totally segregated from supplemental traffic to ensure highest priority for fire traffic and control data. Supplemental traffic is available only for Ethernet or fiber media and is limited to a maximum of 80 Mbps, but provides a robust channel using redundant network and is battery-backed to ensure the highest reliability.

Refer to ***ES Panel Programmers manual (574-849)*** for information about configuring supplemental traffic.

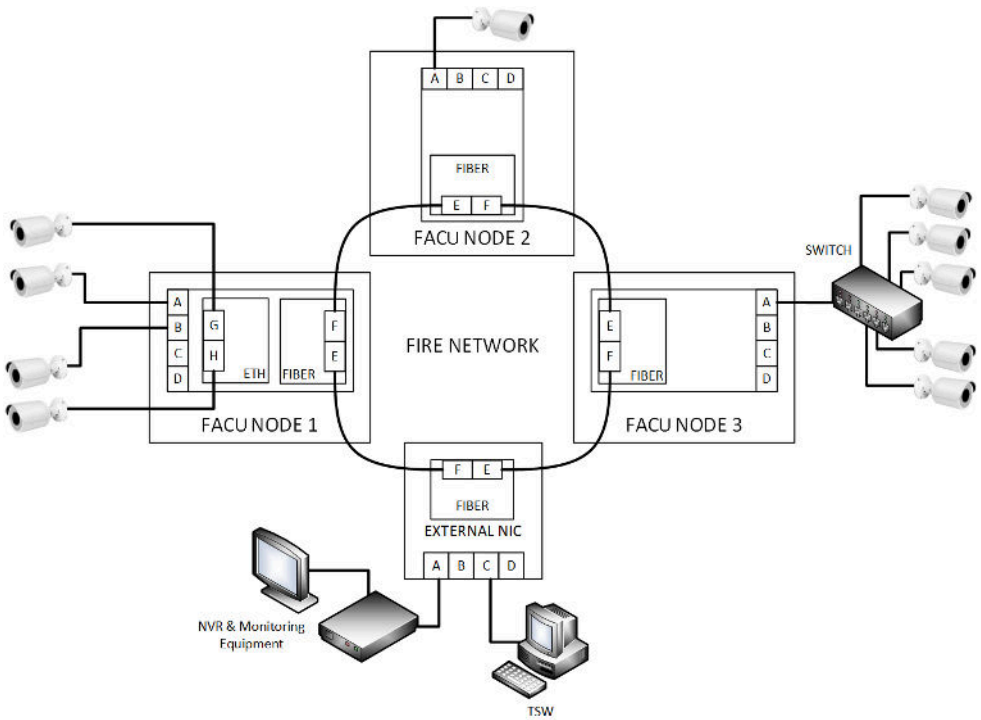


Figure 13: Example of video system using supplemental traffic

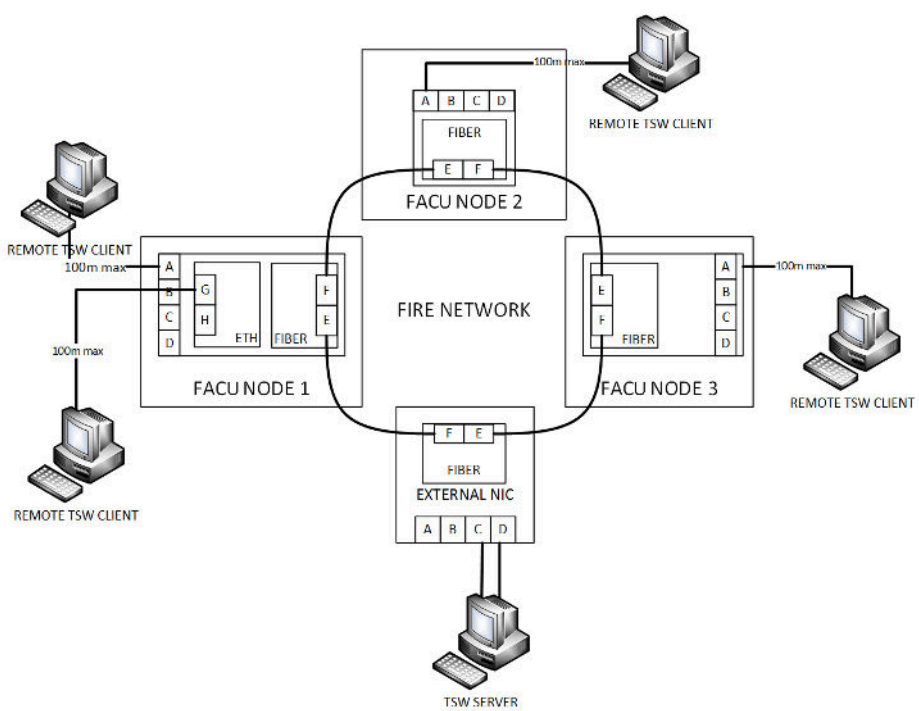


Figure 14: Example of Remote TSW Clients using supplemental traffic

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Audio and Firefighter's Telephone support

The ES Net network supports both Digital Audio (8 channels) and Firefighter's Telephone. You can activate both of these functions on the ES Net network at the same time. The ES Net network designates this traffic as fire traffic and prioritizes this traffic above any other supplemental traffic on the network.

The benefits of these features include the following:

- Digital Audio supports up to 99 nodes.
- A single infrastructure (Ethernet or fiber) supports ESNet, Digital Audio, and Firefighter's Telephone. You do not need to install separate risers for each of these functions.
- You can install the Firefighter's Telephone in a fiber network.

Note: You cannot implement Digitial Audio and Firefighter's Telephone on an ES Net network if any link on the ES Net network uses DSL.

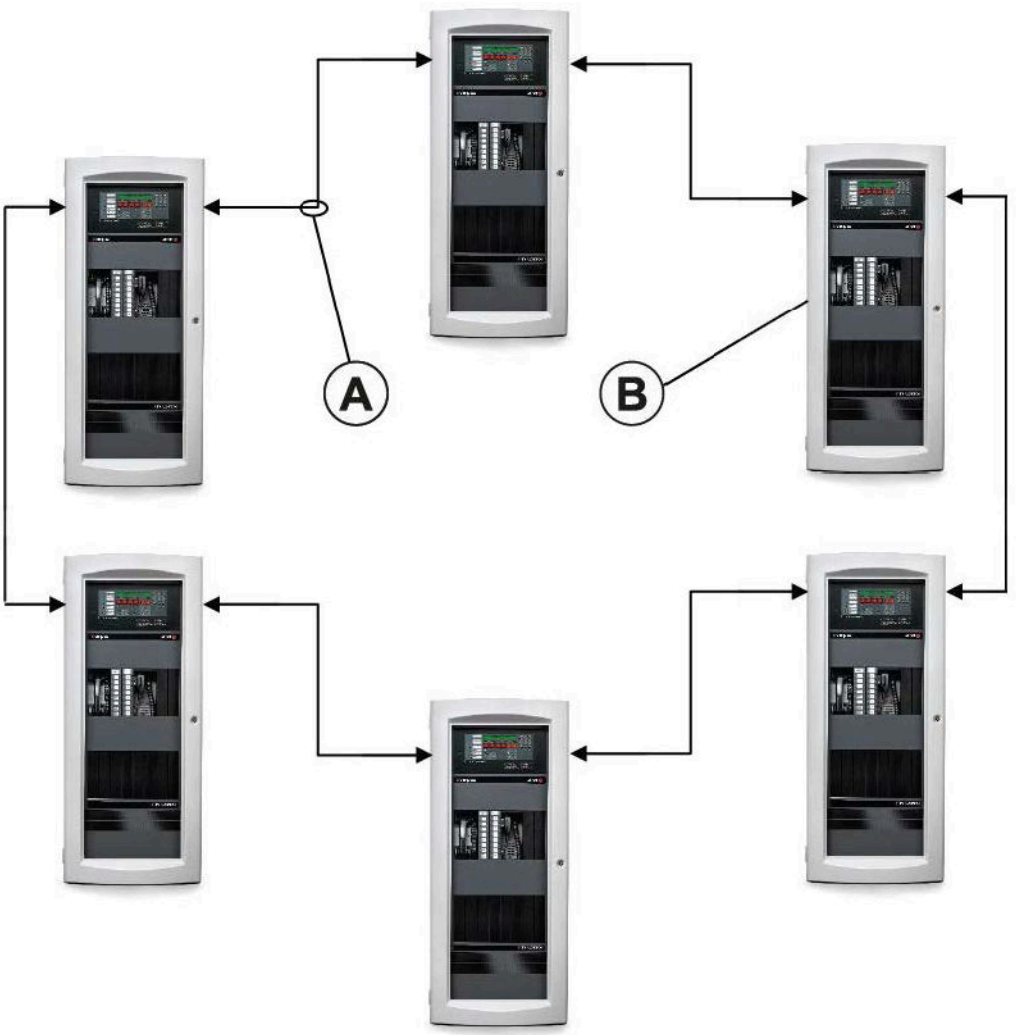


Figure 15: Audio over ES Net

Callout	Description
A	Ethernet, 9/125 single-mode, 50/125 multi-mode, or 62.5/125 multi-mode fiber, graded index, supported on all network connections
B	4100ES FACU with voice and firefighter's telephone options

Note:

1. Refer to NFPA 70 (NEC) or other applicable local codes for shielded wiring and protective device requirements when wiring enters and leaves a building.
2. For additional details on Network Audio requirements refer to data sheet *Addressable Fire Detection and Control Emergency Voice/Alarm Communications Equipment (S4100-0034)*.

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ES Net NIC and media cards for 4100ES, TrueSite Workstation, or Incident Commander

Table 3: ES Net NIC cards for 4100ES, TrueSite Workstation, or Incident Commander

Model	Card type	Description	Size	Alarm/Supv.
4100-6104	Slot - install to a single slot in a 4100ES bay	Mounts in 4100ES cabinet. Connects a 4100ES FACU, TrueSite Workstation, or Incident Commander to an ES Net Network. Supports Class B or Class X operation. Includes four built in Ethernet ports that you can install to a single slot in a 4100ES bay. Supports up to two additional media cards. You can configure ports A and C for earth fault detection.	One slot of a 4100ES bay	120 mA
4100-6310	Flat - install to any two vertical block space in a 4100ES bay		Two vertical blocks	120 mA

Notes:

1. NICs include built-in Ethernet network communication ports, order up to two optional media cards as required.
2. TrueSite Workstation connection is Class B. For Class X networks, TSW connection must be 20 ft (6 M) maximum in conduit.
3. For TSW or Incident Commander UL 1610 Central Station Burglar Alarm Control Unit applications, use the 4190 series External NIC.
4. For vertical mounting of the ES Net Flat NIC in a 4100ES or expansion bay, use the 4100-9834 ES Net Flat NIC Vertical Mounting Bracket. Refer to *Flat Type ES Net NIC Installation Instructions (579-1257)* for more information.

Table 4: ES Net dual channel media cards for 4100ES mounted NICs

Model	Media card type	Description	Size	Alarm/Supv.
4100-6306	ES Net NIC dual channel Ethernet media card	Select for each network connection requirements; mounts on the supplied ES Net NIC; up to two media cards for each slot type and flat type NIC. Dual Channel Media Cards provide two ports for input and output connections. Field connections require proper port pairing. Refer to ***ES Net Dual Channel Fiber, Ethernet, and DSL Media Card Installation Instructions (579-1258)*** for additional information.	N/A	20 mA
4100-6308	ES Net NIC dual channel single-mode fiber media card		N/A	135 mA
4100-6309	ES Net NIC dual channel multi-mode fiber media card		N/A	135 mA
4100-6307	ES Net NIC dual channel DSL media card		N/A	155 mA

Note: Order fiber media service kits for retrofit jobs where ST connectors are already installed. Refer to Fiber media card service kits for additional information.

ES Net NIC and media cards for 4010ES

Table 5: ES Net NICs for 4010ES

Model	Card type	Description	Size	Alarm/Supv.
4010-6310	Flat	Connects a 4010ES FACU to an ES network. Supports Class B or Class X operation. Includes four built in Ethernet ports, supports up to two additional media cards. You can configure ports A and C for earth fault detection.	Two vertical blocks	120 mA

Note:

1. NICs include built-in Ethernet network communication ports, order up to two optional media cards as required.
2. For vertical mounting of the ES Net Flat NIC in a 4010ES or expansion bay use the 4010-9934 ES Net Flat NIC Vertical Mounting Bracket. Refer to *Flat Type ES Net NIC Installation Instructions (579-1257)* for more information.

Table 6: ES Net dual channel media modules for 4010ES

Model	Media card type	Description	Size	Alarm/Supv.
4010-6306	ES Net NIC dual channel Ethernet media card	Select for each network connection requirements; mounts on the supplied ES Net NICs; two media cards for each flat type NIC. Dual Channel Media Cards provide two ports for input and output connections. Field connections require proper port pairing. Refer to ***ES Net Dual Channel Fiber, Ethernet, and DSL Media Card Installation Instructions (579-1258)*** for additional information.	N/A	20 mA
4010-6308	ES Net NIC Dual Channel Single-mode Fiber Media Card		N/A	135 mA
4010-6309	ES Net NIC Dual Channel Multi-mode Fiber Media Card		N/A	135 mA
4010-6307	ES Net NIC Dual Channel DSL Media Card		N/A	155 mA

Note: Order fiber media service kits for retrofit jobs where ST connectors are already installed. Refer to Fiber media card service kits for additional information.

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ES Net NIC and media cards for 4007ES

Table 7: ES Net NICs for 4007ES

Model	Card type	Description	Size	Alarm/Supv.
4007-9817	Flat	Connects a 4007ES FACU to an ES network. Supports Class B or Class X operation. Includes four built in Ethernet ports, supports up to two additional media cards. You can configure ports A and C for earth fault detection.	Two vertical blocks, only in Block L	120 mA

Note: NICs include built-in Ethernet network communication ports, order up to two optional media cards as required.

Table 8: ES Net dual channel media modules for 4007ES

Model	Media card type	Description	Size	Alarm/Supv.
4007-6306	ES Net NIC dual channel Ethernet media card	Select for each network connection requirements; mounts on the supplied ES Net NICs; two media cards for each slot type and flat type NIC. Dual Channel Media Cards provide two ports for input and output connections. Field connections require proper port pairing. Refer to ***ES Net Dual Channel Fiber, Ethernet, and DSL Media Card Installation Instructions (579-1258)*** for additional information.	N/A	20 mA
4007-6308	ES Net NIC Dual Channel Single-mode Fiber Media Card		N/A	135 mA
4007-6309	ES Net NIC Dual Channel Multi-mode Fiber Media Card		N/A	135 mA
4007-6307	ES Net NIC Dual Channel DSL Media Card		N/A	155 mA

Note: Order fiber media service kits for retrofit jobs where ST connectors are already installed. See Fiber media card service kits for additional information.

ES Net external NIC and media cards for TSW

Table 9: ES Net external NIC for TSW product selection

Model	Enclosure	Description	Power	Current consumption
4190-9832	Red	Connects a TSW or Incident Commander to the ES Network. ES control unit network supports Class B or Class X operation, TSW connections are Class B. Includes four built in Ethernet ports, supports one additional media card. You can configure ports A and C for earth fault detection. Wall mount enclosure measures 10 in. x 10 in. x 2.5 in.	120/240 VAC	75 mA max at 120 VAC
4190-9833	Platinum		120/240 VAC	69 mA max at 240 VAC
4190-9834	Red		24 VDC	120 mA nominal at 24 VDC
4190-9835	Platinum		24 VDC	

Note:

1. The ES Net external NIC includes built-in Ethernet network communication ports, order up to one optional media card as required.
2. The 4190 series external NIC is required for TSW or Incident Commander UL 1610 Central Station Burglar Alarm Control Unit applications.

Table 10: ES Net dual channel media modules for external NIC

Model	Media card type	Description	Size	Alarm/Supv.
4190-9856	ES Net NIC dual channel Ethernet media card	Select for each network connection requirements; mounts on the supplied ES NICs; one media card for each external NIC. Dual Channel Media Cards provide two ports for input and output connections. Field connections require proper port pairing. Refer to ***ES Net Dual Channel Fiber, Ethernet, and DSL Media Card Installation Instructions (579-1258)*** for additional information.	N/A	20 mA
4190-9858	ES Net NIC dual channel single-mode fiber media card		N/A	135 mA
4190-9859	ES Net NIC dual channel multi-mode fiber media card		N/A	135 mA
4190-9857	ES Net NIC dual channel DSL media card		N/A	155 mA

Note: Order fiber media service kits for retrofit jobs where ST connectors are already installed. See Fiber media card service kits for additional information.

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Fiber media card service kits

Table 11: ES Net fiber media card service kits

Model	Fiber type	Description
4100-6412	50/125 µm multi-mode	For use in retrofit jobs where fiber optic cables with ST connectors are already installed. Includes one ST to SC 18 in. (45.7 cm) fiber optic patch cord, one ST-ST coupler, one wire clamp, and one insulating sleeve.
4100-6413	62.5/125 µm multi-mode	
4100-6414	9/125 µm single-mode	

Note: Fiber optic media cards must be of the same type on each end of the fiber link. When replacing a media card with a different type, you must replace the card on the other end of the link with a fiber optic media card of the same type.

DSL retrofit harness

Table 12: DSL retrofit harness

Model	Description
4100-6415	DSL Retrofit Harness. When upgrading a 4120 network control unit to ES Net use this harness to eliminate the need to relocate the existing network field wiring connections from the CPU motherboard to the DSL media card.

ES Net supporting software and firmware requirements

ES Net requires updated versions of the Network Programmer, ES Programmer and TSW Configurator software. Firmware and application software updates for ES control units and ES Net NIC cards are also required.

Table 13: ES Net software requirements

Software	Required software version
Network Programmer	2.04 or above
Diagnostic Service	2.01 or above
ES Programmer	6.01.01 or above
TrueSite Workstation	6.01 or above
TrueSite Incident Commander	6.01 or above

Table 14: ES Net firmware requirements

Component	Required firmware version
4100ES FACU	6.01 or above
4010ES FACU	6.01 or above
4007ES FACU	6.01 or above
ES Net NIC Application	1.04 or above
ES Net NIC EOS	1.04 or above

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ES Net Ethernet specifications

Use the ES Net NIC built-in Ethernet ports or ES Net dual channel Ethernet media cards when the maximum distance between nodes is less than 328 ft (100 m).

Table 15: Ethernet media specifications

Maximum bandwidth	Maximum distance	Port type	Recommended cable
100 Mbps	328 ft (100 m) with Cat-5e cable	10 BASE-T/100 BASE-TX	CAT5e/CAT6 or better

Note: For UL 1610 TrueSite Workstation or Incident Commander system installations, the Ethernet circuit pathway to TrueSite Workstation or Incident Commander must also be in conduit, no greater than 20 ft (6 m), and located within the same secured room.

Note: Earth fault detection is available on port A only.

ES Net fiber media specifications

Use ES Net dual channel fiber media cards when a fiber-optic cable is required to link nodes.

Table 16: ES Net dual channel fiber media card specifications

Specification		Rating	
Compatible fiber	Single-mode	Nominal 9/125 µm	
	Multi-mode	50/125 µm or 62.5/125 µm graded index	
Power		135 mA at 24 VDC	
Port type		100BASE-BX bidirectional fiber optic port	
Fiber connector		Type SC-UPC	
Transmit and receive wavelengths	Single-mode media card	Port A: Transmit = 1310 nm, Receive = 1550 nm Port B: Transmit = 1550 nm, Receive = 1310 nm	Optical launch power; -9 dBm (126 uW) minimum, -3 dBm (501 uW) maximum
	Multi-mode media card	Port A: Transmit = 1310 nm, Receive = 1550 nm Port B: Transmit = 1550 nm, Receive = 1310 nm	Optical launch power; -8 dBm (159 uW) minimum, 0dBm (1000 uW) maximum
Transmission distances for single-mode 9/125 µm fiber		Maximum distance = 82,000 ft (25 km) Maximum total attenuation = 22 dB	
Transmission distances for multi-mode 50/125 µm and 62.5/125 µm fiber		Maximum distance = 16,400 ft (5 km) Maximum total attenuation = 18 dB	

Table 17: ES Net fiber media distance and optical power specifications

Fiber type	MIFL	Power margin	Safety margin	Maximum distance	Power budget	Coupler/splice loss
Multi-mode 50/125 or 62.5/125, numerical aperture = 0.275	1.5 dB/km at 1300 nm	15 db	-3 dB	16400 ft (5 km)	18 dB	.75 dB max for each mated pair connection, .30 dB max for each fusion splice
Single-mode 9/125, numerical aperture = 0.2	1 dB/km at 1310 nm	19 db	-3 dB	82000 ft (25 km)	22 dB	

Fiber media notes:

1. **Fiber type** cable specifications are for 50 or 62.5 micron core with 125 micron cladding multi-mode graded index fiber or nine micron core with 125 micron cladding single-mode fiber.
2. **MIFL:** maximum individual fiber loss. Numbers shown are industry standard reference; refer to specific cable for exact specifications.
3. **Distance:** The maximum distance between nodes is determined by the total loss from the transmitter to the associated receiver, such as fiber loss, connector loss, splice loss and power margin, or the maximum distance listed, whichever is smaller.
4. **Power budget:** Use attenuation measurements at the following wavelengths: Multi-mode at 1310 nm, Single-mode at 1550 nm.

Table 18: Fiber media environmental specifications

Operating temperature	Humidity
32°F to 120°F (0°C to 49°C)	10% to 93% relative humidity at 90°F (32°C)

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ES Net dual channel DSL media specifications

Use DSL dual channel media cards for retrofit applications, or where Ethernet or fiber optic media are not available. DSL only supports 2 Mbps to 12 Mbps data rates, 2 Mbps maximum in ULC mode. High bandwidth 100 Mbps data rates and features such as high speed network downloads require Ethernet or fiber optics.

Table 19: ES Net dual channel DSL media wiring and distance specifications

Wire size and specifications	DSL link data rate (baud)	Max distance without isolated loop protector or over-voltage protectors	Max distance with isolated loop protector or over-voltage protectors	Max distance for ULC mode with over-voltage protectors
18 AWG, unshielded twisted pair	2 Mbps minimum, 12 Mbps maximum	15,000 ft (4,572 m)	13,000 ft (3,962 m)	9,000 ft (2743 m)
18 AWG, shielded twisted pair		3,000 ft (914 m)	2,000 ft (609 m)	2,000 ft (609 m)
24 AWG, unshielded twisted pair		10,000 ft (3,048 m)	8,000 ft (2,438 m)	5,000 ft (1524 m)
24 AWG, shielded twisted pair		8,000 ft (2,438 m)	6,000 ft (1,829 m)	4,000 ft (1219 m)
Note: DSL media is recommended for retrofit installation and where only copper cable is available to link nodes. 18 AWG unshielded, twisted pair cable is recommended for all installations. Shielded cable and circuit protection is required when wiring leaves the building. Use 2081-9044 over-voltage protectors when wiring leaves the building. **Note:** To meet requirements for UL/ULC 1076 Proprietary Burglar Alarm System Units (APOU/APOUC) or UL 1610 Central Station Burglar Alarm Control Units (AMCX) with DSL media, shielded cable is required for all DSL circuit pathway connections.				

Table 20: ES Net dual channel DSL media card electrical specifications

Current consumption	Maximum bandwidth	Maximum distances	Port type
155 mA maximum at 24 VDC	Up to 12 Mbps Up to 2 Mbps in ULC mode	Up to 15000 ft (4572 m) with 18 AWG, unshielded cable Up to 9000 ft in ULC mode with over-voltage protectors	SHDSL

Table 21: ES Net dual channel DSL media card environmental specifications

Operating temperature	Humidity
Operating temperature 32°F to 120°F (0°C to 49°C)	10% to 93% relative humidity at 90°F (32°C)

Acceptance test requirements for fiber optic installations

An initial acceptance test of each fiber link shall be performed in accordance with NFPA 72, Chapter 14 Inspection, Testing, and Maintenance (or other applicable local code) requirements. A fiber link is defined as all fiber segments, including patch cords, which create a fiber path from one fiber media board to another. Test result data must meet or exceed ANSI/TIA 568-C.3 (or newer) Optical Fiber Cabling Components Standard related to fiber optic lines and connection/splice losses and the manufacturer's published specifications.

1. OTDR Launch and Receive cables of appropriate length shall be used. If a single cable is used, each link shall be tested in both directions.
2. Multi-mode fiber links shall be measured at 850 nm and 1300 nm.
3. Single-mode fiber links shall be measured at 1310 nm and 1550 nm.

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Additional ES Net network reference

Table 22: Additional ES Net network reference

Subject	Datasheet
4007ES FACUs with Conventional Notification	*S4007-0001*
4007ES FACUs with Addressable Notification	*S4007-0002*
4010ES FACUs with Conventional Notification	*S4010-0004*
4010ES FACUs with Conventional Notification (INTL)	*S4010-0006*
4010ES FACUs with Addressable Notification	*S4010-0011*
4010ES FACUs with Addressable Notification (INTL)	*S4010-0012*
Building Network Interface Card (BNIC)	*S4100-0061*
4100ES Basic Control Units with ES-PS Power Supplies	*S4100-1031*
NDU with ES-PS Power Supplies for ES Net	*S4100-1077*
TrueSite Workstation	*S4190-0016*
Fire Alarm Ethernet Switches for TrueSite Workstation	*S4190-0018*
TrueSite Incident Commander	*S4190-0020*
TrueSite Graphic Annunciator	*S4190-0022*
TrueSite Graphic Annunciator Incident Commander	*S4190-0023*
Truesite Mobile Client	*S4190-0024*
Network System Integrator (NSI)	*S4190-0026*

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