

Experion LX Specification Fault Tolerant Ethernet



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1. Product Introduction

1.1. Experion LX System

As a member of Honeywell's Experion family, Experion LX is specifically designed to meet the customer needs in mid-tier markets (Chemicals, Industrial Power, F&B, Bio-fuels, ...), through integrating state-of-the-art technology from the award-winning Experion Process Knowledge System (PKS) with innovative design of Series 8 I/O modules and cabinets, validated wider range of COTS options, easier engineering and maintenance capabilities, and integrator-friendly programs and tools. Experion LX is the perfect platform for process, asset and business management, and enables customers to increase their profitability and productivity and accessibility to local support without sacrificing quality and reliability in an increasingly competitive environment.

1.2. Architecture Overview

The Experion LX system comprises many different integrated hardware and software solutions depending upon the needs of the application. The pictured architecture is a representation of many of the possible nodes that can be used in the Experion LX architecture. Note that the architecture is highly scalable and not all nodes are necessary or required.

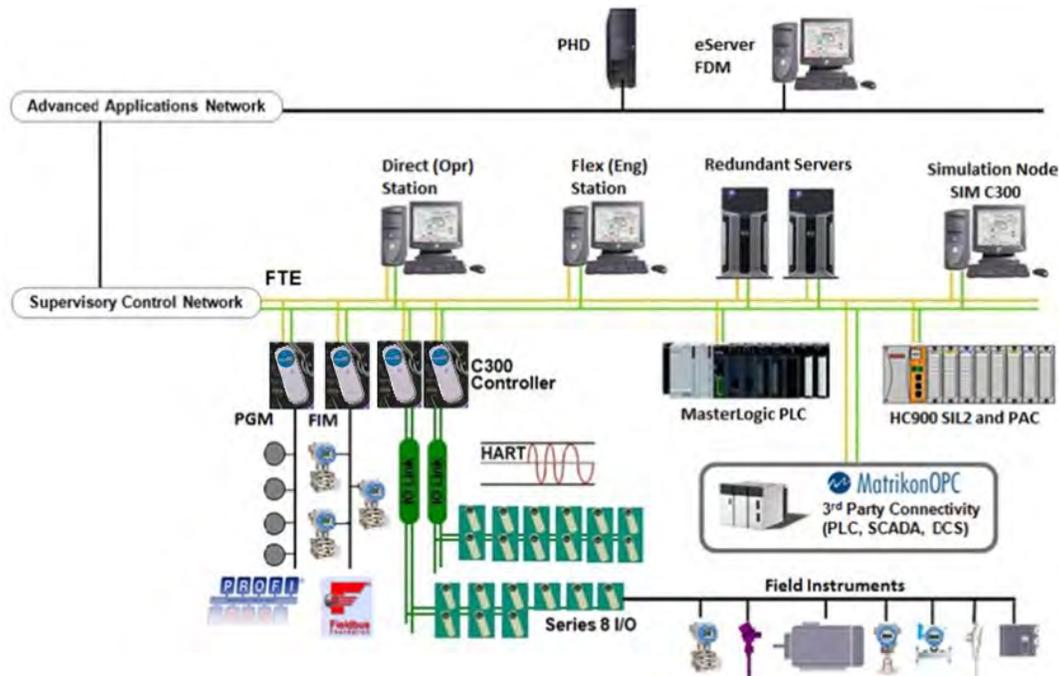


Figure 1 - Sample Experion LX Architecture

1.3. Experion LX Fault Tolerant Ethernet Overview

FTE is the control network for Experion family systems. FTE provides multiple communication paths between nodes, enabling an FTE network to tolerate all single faults and many multiple faults. FTE is dedicated to the control mission-providing not only fault tolerance but also the performance, determinism, and security required for industrial control applications.

FTE unites Honeywell's expertise in designing robust control networks with commercial Ethernet technology in a patented advanced networking solution. While FTE is not a general purpose Information Technology (IT) network due to its control mission, it leverages commercial Ethernet technology to lower the costs of the FTE network infrastructure, connections to IT networks, connections to 3rd party Ethernet devices, and on-going maintenance and support.

An FTE network is implemented through FTE nodes and appropriately configured switches. Normal Ethernet nodes can also connect to an FTE network and benefit from its highly available communications environment.

2. Specifications

2.1. FTE Architecture Overview

A Experion LX system has one or more clusters--a group of nodes associated with the same Experion LX Server, e.g., Level 1 nodes like controllers, and Level 2 nodes like Direct Stations and Experion LX Servers. FTE provides multiple communication paths through two parallel trees of switches and cables; an FTE node connects to each tree. FTE nodes form a fault-tolerant community whose members can communicate if at least one path exists between them. FTE nodes detect Ethernet nodes and use any available path to communicate with them also. FTE status can also be displayed by the FTE status Auxiliary Display in Experion LX system.

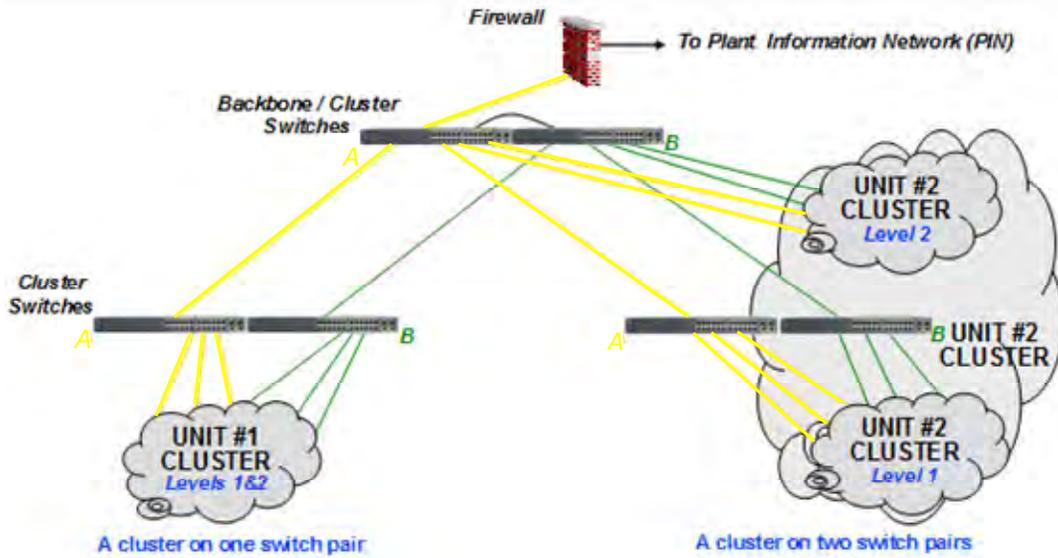


Figure 2 - Basic FTE Network Architecture

For reliable operation in high noise industrial environments, Honeywell recommends fiber optic cables and shielded copper cables. FTE network security is designed in, layer by layer, through switch configuration files, and best practice recommendations.

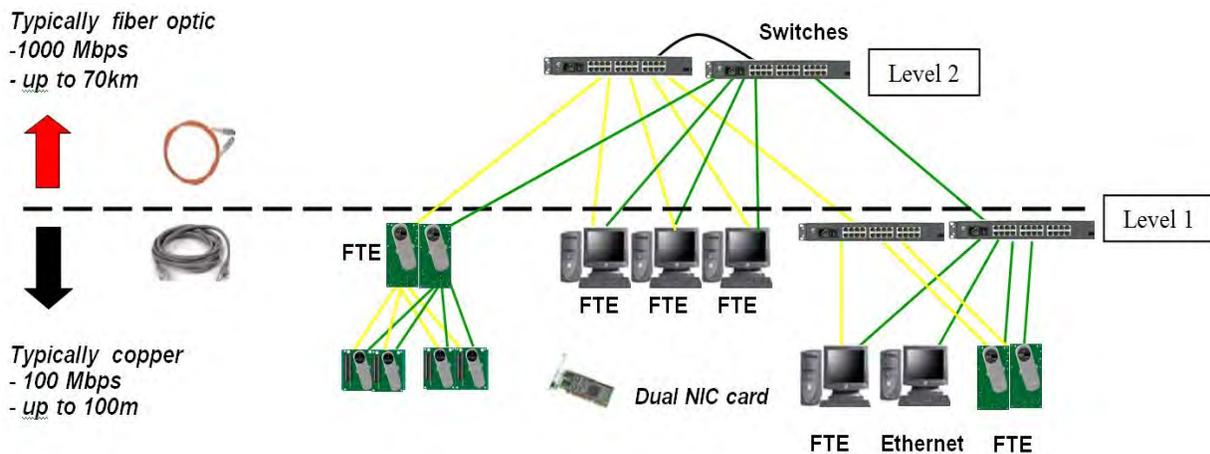


Figure 3 - FTE Network Equipment

2.2. Product Specifications

2.2.1. Network Capacity

The following Table specifies FTE Network capacity limits for Experion LX system.

Network Media	FTE
Supervisory Networks per Experion LX Server:	1 redundant network serviced by 1 or more redundant or non-redundant Experion LX Servers up to the max FTE Nodes allowed per FTE Community
Maximum Number of Nodes allowed:	330 FTE Nodes per FTE Community ¹
Maximum Ethernet (non-FTE) Connections	100
Transmission Rate	100 Mbits/sec
Media Redundancy	Redundant only
1. SCADA PLCs do not count as “Controllers” against this limit on FTE	

2.2.2. Ethernet Cables

Honeywell recommends fiber optic cables or shielded CAT5e copper cables, either ScTP (Screened Twisted Pair), which consists of multiple pairs with an overall shield, or STP (Shielded Twisted Pair), which consists of multiple pairs with individual shields plus an overall shield.

Experion LX nodes operate at 10 or 100Mbps. CAT5e cable provides operation up to 1Gbps. Shielded CAT6 cable, which provides operation up to 10Gbps, is also acceptable.

2.2.3. Network Switches

Switches have ports for devices plus uplink ports. Switches can be interconnected using either device ports or uplink ports. Some uplink ports use SFP (Small Form Pluggable) modules, which provide several types of fiber optic connections.

For ease of installation, Honeywell provides several types of downloadable switch configuration files for implementing best security practices: all L1 devices, all L2 devices, or both L1 and L2 devices in a “split” configuration of separate L1 and L2 sections.

Switch with 24 Ports, 2 T Uplinks

EA-SWHWX1-CN Specifications 	
Model	HuaWei LS-S2326TP-EI-AC
Number of Ports	(24) 10/100 BASE-TX ports (2) combo ports (10/100/1000 BASE-T or 100/1000 BASE-TX)
Connector Type	RJ-45
Power	100-240V AC (auto-ranging), 50-60 Hz
Operating Temperature	-5°C to 50°C (23 to 122°F)
Qualified Software Version in Experion LX System	Version 5.70 (S2300 V100R005C01)

For further information, see Huawei data sheet.

Switch with 24 Ports, 2 SFP/T Uplinks

EA-SWDLX1-CN Specifications	
Model	Dlink DES-3528
Number of Ports	(24) 10/100 BASE-TX ports (2) 10/100/1000 BASE-T Stacking ports (2) Combo SFP Slots
Connector Type	RJ-45
Power	100-240V AC (auto-ranging), 50-60 Hz
Operating Temperature	0 to 50 °C (32 to 122 °F)
Qualified Software Version in Experion LX System	Version 2.60.017

For further information, see D-Link data sheet.

Switch with 24 Ports, 2 SFP/T Uplinks

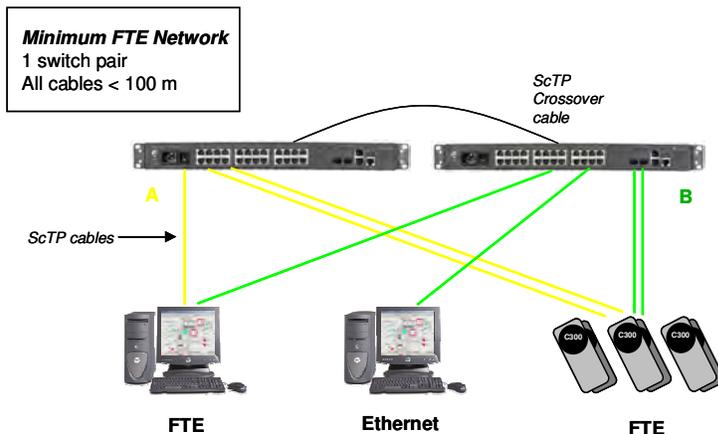
EA-SWIEX1-CN Specifications	
Model	IEI RES-3242GC
Number of Ports	(24) 10/100 BASE-TX ports (2) Combo ports, 10/100/1000 BASE-TX and 1000 Base-X SFP
Connector Type	RJ-45
Power	100-240V AC (auto-ranging), 50-60 Hz
Operating Temperature	-10 to 60 °C (-14 to 140 °F)

For further information, see IEI data sheet.

2.3. Topologies and Configuration Examples

The following examples illustrate typical component model numbers for an FTE network. They do not include COTS items like fiber optic cables, media converters, cables, and are not intended as the basis for placing an order.

Figure 4 shows the simplest FTE topology—one pair of switches, cabling to FTE and Ethernet nodes, and a crossover cable. All distances from nodes to switches are less than 100 meters, so copper equipment and cabling can be used.



Any of the switch types can be used in the backbone role (top level switches with crossover cables). However, it's highly recommended that the EA-SWHWX1-CN switch be used because it offers an integrated firewall for maximum protection.

Figure 4 - Minimum FTE Network

Figure 5 shows an FTE network with three pairs of switches. One node and one pair of switches are over 100m from the backbone switches, so they are connected using multi-mode fiber optic cables and 100 Mbps media converters. Otherwise, copper equipment and cabling are used. The 100 Mbps switches are sufficient for this system but it is also acceptable to use 1000 Mbps SFP modules.

Media converters may be a more economical solution than SFPs, depending on the distances involved and other site factors. There are many media converters on the market for different speeds, distances, and cable types. Media converters may be selected on a project basis; no certification is required since they do not affect FTE or Experion LX functions.

Currently Supported Combination of Backbone Switches

Item	L1 Network	L2 Network
1	HuaWei LS-S2326TP-EI-AC	HuaWei LS-S2326TP-EI-AC
2	HuaWei LS-S2326TP-EI-AC	Dlink DES-3528
3	IEI RES-3242GC	IEI RES-3242GC

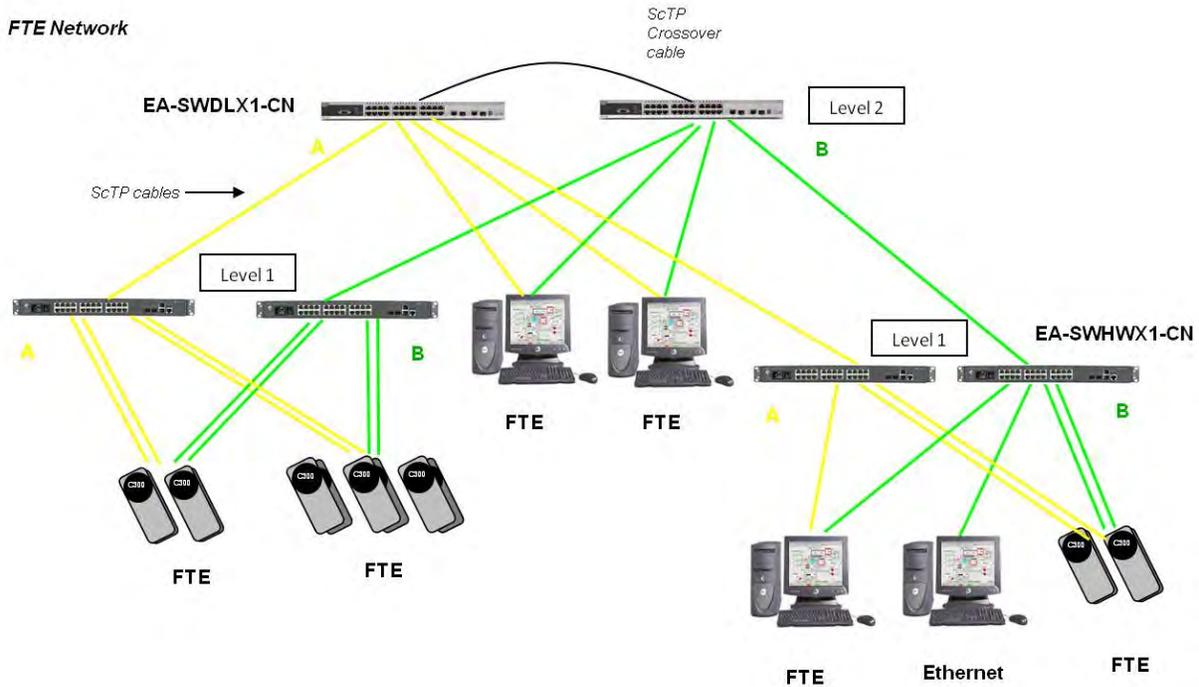


Figure 5 - FTE Network

2.4. Recommended FTE Switches

The following switches have been tested and qualified by Honeywell to operate in an Experion LX system. Non-qualified switches should not be used and could result in degraded performance or loss of communication.

Description
Huawei LS-S2326TP-EI-AC
Dlink DES-3528
IEI RES-3242GC

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