



Experion Local Control Network

Technical Specification

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Revision History

Revision	Description	Date
A	Initial version.	August 2017
B	Addition of ELCN EPLCG, EHB, and redundant AM.	September 2018
C	Addition of ELCN NG.	October 2019
D	Included information about support for 30 ELCN ES-Ts per ESVT cluster in section "Experion LCN System Requirements".	March 2020

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Acronyms and Definitions

Table 1 Acronyms and Definitions

Term	Definition
ACE-T	Application Control Environment - TotalPlant™ Solution
AM	Application Module
CF9	Control Firewall (9 ports including the Uplink port)
E-APP	Experion Application Processing Platform
EHB	Experion Hiway Bridge
ELCN	Experion Local Control Network
ENIM	Enhanced Network Interface Module
EPLCG	Enhanced Programmable Logic Controller Gateway
ES-CE	Experion Station – Console Extension
ES-F	Experion Station – Flex
ES-T	Experion Station - TotalPlant™ Solution
ESVT	Experion Server TotalPlant™ Solution
EUCN	Enhanced Universal Control Network
FIM	Fieldbus Interface Module
FTE	Fault Tolerant Ethernet
FTEB	Fault Tolerant Ethernet Bridge
GUS	Global Universal Station
HM	History Module
LCN	Local Control Network
LCNE	Local Control Network Extender
MAU	Media Access Unit
NG	Network Gateway
O/S	Operating System
PIN	Plant Information Network
PHY	Physical Layer
TPN	TPS Process Network
TPS	TotalPlant™ Solution
UCN	Universal Control Network
US	Universal Station
UxS	Universal StationX

1 Product Introduction

Experion LCN further continues innovation for Honeywell customers. Using the proven Experion Fault Tolerant Ethernet (FTE) infrastructure, a new Experion Local Control Network (ELCN) Bridge connects Experion to Classic COAX LCN. Once this connection is established, Classic LCN COAX-based nodes can be replaced with FTE-based Experion LCN nodes, allowing the removal of these LCN nodes as they are migrated one at a time.

With Experion LCN, existing control strategy, field terminations, applications, history and graphics can be retained, allowing users to focus on high value improvements. It minimizes operating disruptions, maintains overall consistency and delivers optional lifecycle advantages with virtualization.

1.1 Experion Local Control Network System Overview

The Experion LCN is the Fault Tolerant Ethernet (FTE) version of the classic coaxial cable-based LCN. The objective of the ELCN is to convert Classic LCN COAX-based nodes to FTE-based Experion LCN nodes. This conversion can occur incrementally, over time, without shutting down LCN nodes. Ultimately, all LCN nodes may be migrated to ELCN, allowing for a complete elimination of the LCN-based system.

ELCN is divided into two general parts. The first part is the ELCN Bridge product which has a singular purpose or operating as a bridge between the LCN and FTE. The second part is the conversion of LCN nodes to Experion LCN nodes. An Experion LCN node is a hardware/software entity that performs the same function as its LCN equivalent node where an FTE network replaces the COAX network.

Migration to the ELCN requires an ELCN Bridge node to connect the Classic LCN to the Experion LCN, creating a single logical hybrid network. The ELCN Bridge must be installed as a redundant pair.

The ELCN Bridge translates LCN messages into Ethernet messages and vice versa. The ELCN Bridge provides a means for legacy LCN functions and the Experion version of those functions to co-exist and inter-operate during migration of the classic LCN nodes to Experion LCN nodes. Once an LCN Bridge creates a communication path between the LCN and the FTE, classic LCN nodes can be upgraded one at a time. During the upgrade process the node number, such that the node's logical role in the system remains unchanged. The legacy node that migrates from a physical LCN segment to the ELCN network appears unchanged in configuration to its operating peer nodes.

Upgrade process may occur over an extended period of time until no nodes remain connected to LCN, other than the ELCN Bridge. At this time the ELCN Bridge may be removed (as the final step of the upgrade) and reused as a spare part (Experion LCN node or bridge).

Before migration to ELCN can be accomplished, an Experion system with an ESVT, Microsoft 10 O/S and Server 2016, are required. The following is a summary of the Experion LCN nodes and their platforms:

Table 2 Summary of the Experion LCN Nodes and Platforms

	Physical		Virtual	Available in Experion R501.2 and TPN R687	Available in Experion R501.4 / TPN R688.1	Available in Experion R501.6 / TPN R688.3
	COTS PC/x86 (Dell or HP)*	UEA	Virtual Machine/x86 (Essentials or Premium)			
ELCN Bridge		X		X	X	X
ELCN TPS Nodes:						
ESVT	Windows Server 2016		Windows Server 2016	X	X	X
ES-T	Windows 10 or Windows Server 2016		Windows Server 2016	X	X	X
ACE-T	Windows Server 2016		Windows Server 2016	X	X	X
E-APP	Windows Server 2016		Windows Server 2016	X	X	X
HM	Windows Server 2016		Windows Server 2016	X	X	X
ELCN Appliance and Virtual Nodes:						
ENIM		X	Linux	X	X	X
Non-redundant AM EPLCG**		X	Linux	X	X	X
Redundant EPLCG		X	Linux**			X
EHB		X	Linux		X	X
Redundant AM NG		X	Linux		X	X
		X	Linux			X

* For a list of supported DELL and HP hardware platforms, refer to the *Experion PKS Software Installation Guide*.

** Virtual EPLCG will not be available for a production application, but only for Open VEP (Virtual Engineering Platform). The virtual EPLCG may be used for configuration or training purposes.

1.2 Universal Embedded Appliance (UEA) Overview

The Universal Embedded Appliance is a hardware component of ELCN. The UEA can be configured to be a bridge between LCN and ELCN, and also configured to be an ELCN appliance (node), which allows for LCN nodes to be replaced by their ELCN equivalent nodes.

1.2.1 Experion LCN Bridge

The ELCN Bridge is a new node that enables upgrade of classic LCN nodes to Experion LCN nodes and allows for Experion LCN nodes to coexist with a classic LCN network. The UEA is used to function as an ELCN bridge. The LCN connection to an ELCN bridge is made via Media Access Unit (MAU) cables. The MAU cables contain electronics that convert LCN analog signals to digital signals, which are then processed by the ELCN Bridge to be made compatible with ELCN FTE. The reverse occurs when ELCN FTE signals are sent to LCN nodes. This two-way process allows for full two-way LCN-ELCN communication.

The ELCN Bridge is not seen on the LCN system status, but on Experion. The ELCN Bridge is monitored and operated from Experion.

ELCN Bridge Requirements:

The following requirements must be in place prior to implementing an ELCN Bridge for LCN to Experion LCN node migration:

- TPN/LCN Release R688.1 or later.
- Experion PKS for ELCN Bridge is Experion Release R501.4 or later.
- Experion TPS Nodes (ES-T, ESVT, E-APP, ACE-T) must be running Windows 10 or Server 2016 Operating System
- The redundant pair of ESVTs must be running Windows Server 2016
- The Experion Base IP address must be configured
- The BOOTP Server service must be running on ESVT
- NCF clock must be configured on ESVT server

ELCN Bridge Configuration:

Configuration of the ELCN Bridge requires the following Experion applications:

- Firmware Manager Tool (to load ELCN Bridge or Appliance firmware)
- Control Builder (to configure ELCN Bridge or Appliance)

1.2.2 Experion LCN Appliance Nodes

An ELCN Appliance node is a UEA-based TPN personality that communicates through its legacy LCN interface (which now communicates over FTE). An Experion LCN node has the same personality image as its LCN equivalent – no modifications are needed to load the personality. ELCN nodes can be pure virtual machines, hardware-based (UEA), or a mixture of both.

When all LCN nodes are converted to ELCN, the ELCN Bridge (UEA) can be decommissioned and used as a spare part (an ELCN appliance, or bridge).

Experion Release 501 introduces the ELCN Bridge and functionality for Experion TPS nodes which only needs an FTE connection (no LCNP4 card, MAU connection, or COAX cabling).

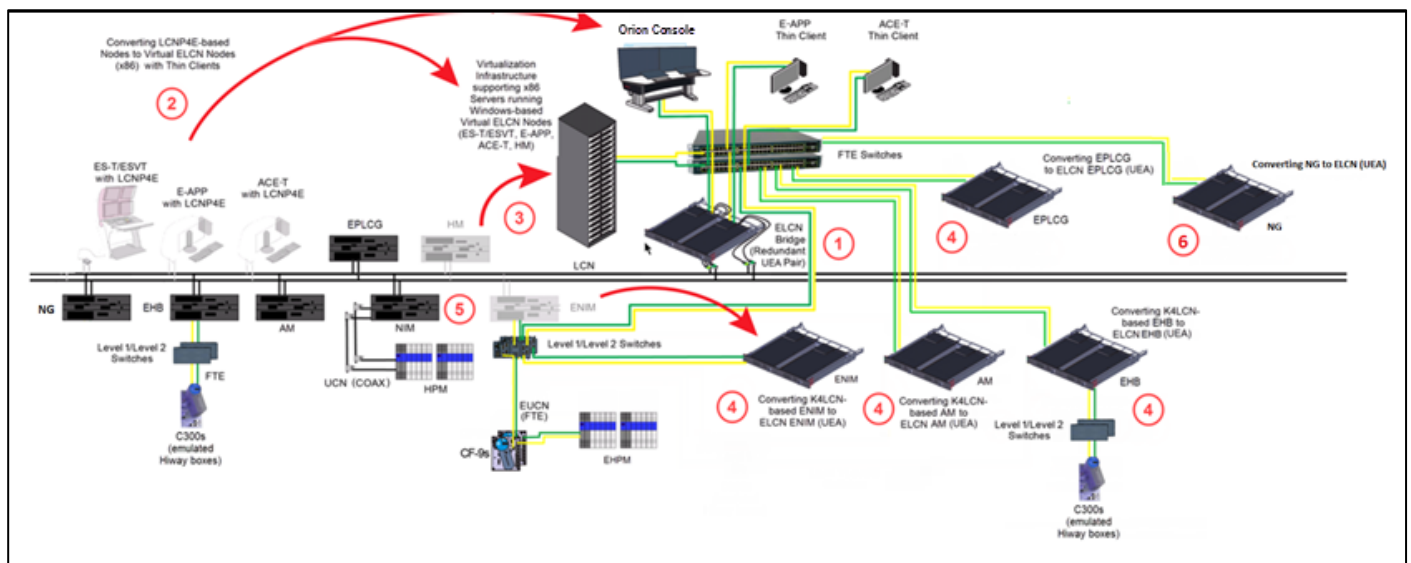
2 Experion LCN Architecture

2.1 Experion LCN System Architecture Overview

The diagram that follows is an example of a basic ELCN system that includes the following migration scenario:

1. A redundant pair of ELCN Bridge UEA boxes has been installed and connected to the LCN and FTE networks.
2. The Microsoft Windows based nodes (ESVT, ES-T, ACE-T, and E-APP) have been converted from LCNP4E-based nodes to run as Virtual Machines on x86 servers running Microsoft Windows operating system. These Virtual Machines have been provided with thin clients. The diagram shows a Honeywell Orion Console used for the control room thin clients.
3. The History Module has been virtualized to run as a Virtual Machine on an x86 server platform. The History Module can be Physical on x86 server platform with Server 2016.
4. The K4LCN-based ENIM has been converted to UEA hardware. Note that the LCN NIM, AM, EPLCG, NG and EHB with C300s can also be migrated to equivalent ELCN UEA nodes.
5. This example system requires the ELCN Bridge to get data from the remaining LCN NIM, AM, EPLCG, EHB and NG for the Experion System.
6. The K4LCN-based NG has been converted to UEA hardware. Note the details of the NG Planning, Installation, and Service are covered in the *Experion Local Control Network Gateway Planning, Installation and Service Guide (HWDOC-X608-en-A)*.

Figure 1 Example of Experion LCN System Architecture Overview



Some LCN nodes that provide Man Machine Interface (MMI) are US, GUS and UxS. These will be converted to ELCN variants (ES-T, ACE-T and E-APP nodes). ACE-T and E-APP not used for graphics or MMI. only ES-T or Flex can be used to replace US, GUS and UxS.

These Experion LCN nodes can be either virtual nodes in VMware or the personality will be contained in a stand-alone PC (bare-metal node), but there will be no LCN-connected (LCNP4E2) hardware.

Legacy LCN based user interface nodes (also called MMI nodes) such as the Universal Station (US), the UxS (third party user interface), and the GUS, must be converted to forms of ES-T.

Classically, all Windows based user interface nodes on the LCN used LCNP electronics (LCNP, LCNP4, LCNP4M, LCNP4E and LCNP4E2) to attach to the LCN COAX. As these nodes are converted from the LCN COAX to FTE, the LCNP electronics must be removed. Two options are available:

- The user interface node (ES-T, ESVT, E-APP or ACE-T) PC-based (Experion) software must be upgraded to use both encapsulated LCN communication and the legacy LCN communication. This can be done if the hardware platform of the bare-metal PC is still supported by the OS platform of Windows 10 (for ES-T) and Server 2016 (for ACE-T, E-APP and ESVT). The upgraded user interface node may be used in the same manner as before.
- Virtualize the user interface node and remove the old PC platform. This requires the use of a thin client and peripherals (video, keyboard, cursor control, removable media, etc.) to provide user interface functions.
- ELCN Bridge (must be installed as a redundant pair)
- ACE-T (Application Control Environment - TPN connected, Physical and Virtual)
- ES-T (Experion Station - TPN connected, physical and virtual platforms)
- ESVT (Experion Server for TPS, physical and virtual platforms)
- E-APP (Experion APP node, physical and virtual platforms)
- HM (physical and virtual platforms)
- ENIM (UEA-based and virtual platforms)
- AM (UEA-based and virtual platforms)
- EPLCG (UEA-based and virtual platforms)
Note: Virtual EPLCG is not supported for production environment
- EHB (UEA-based and virtual platforms)
- NG (UEA-based and virtual platforms)

2.2 Experion LCN Hardware Overview

The Universal Embedded Appliance (UEA) is the hardware platform used for the ELCN Bridge and ELCN Appliance nodes. It is a multipurpose platform, having a 1U high rack-mount enclosure. It has two major subassemblies that mate together; a processor module (front box) and a termination assembly (rear box). These subassemblies mate together and reside in a 19-inch 1U rack mounting shelf. The shelf can house two side-by-side UEAs. Two UEAs can be installed in a redundant configuration using redundancy cables that interconnect the primary and backup UEA boxes.

2.2.1 Universal Embedded Appliance Installation

UEAs are rack-mounted in Honeywell LCN cabinets or 19-inch rack mount server cabinets. Front and rear cabinet access is required to accomplish cabinet mounting and module cabling. The UEA processor modules are removable from the front of the rack by loosening two captivated retaining screws located behind “flip-up” latches. The termination assembly may remain installed during the processor module removal or installation.

ELCN redundant module dimensions are shown below:

Figure 2 Dual UEA Installation Front View

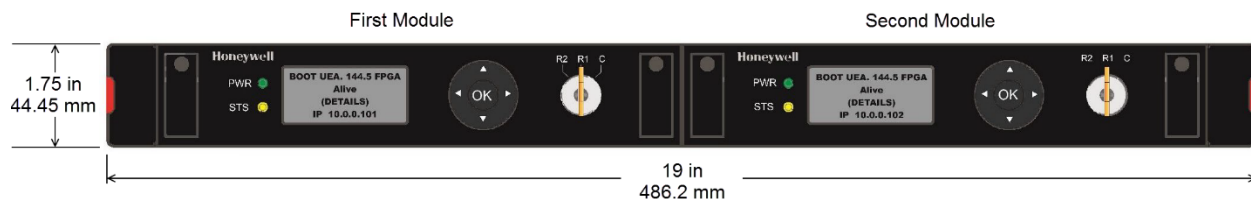
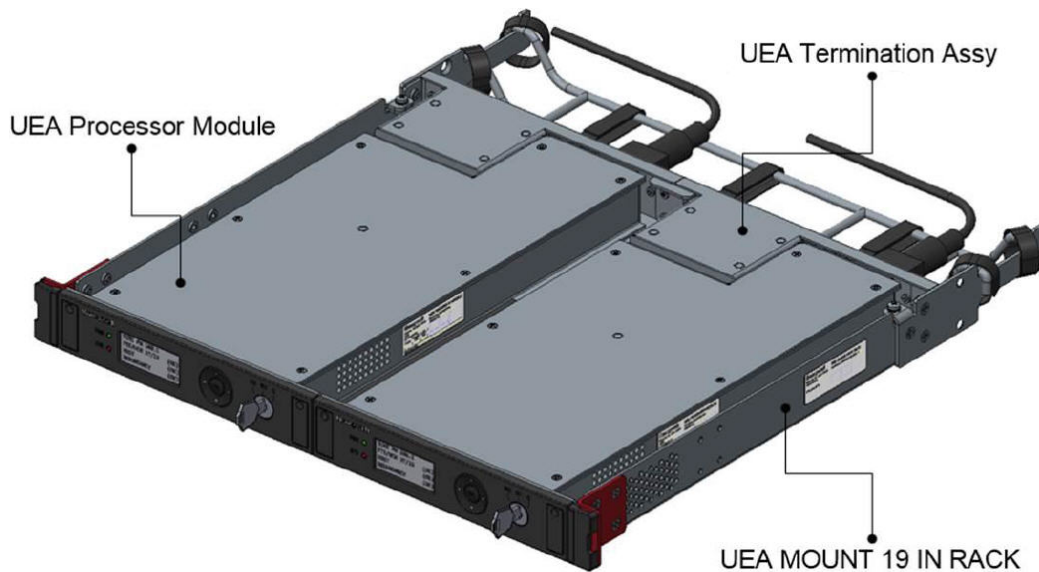
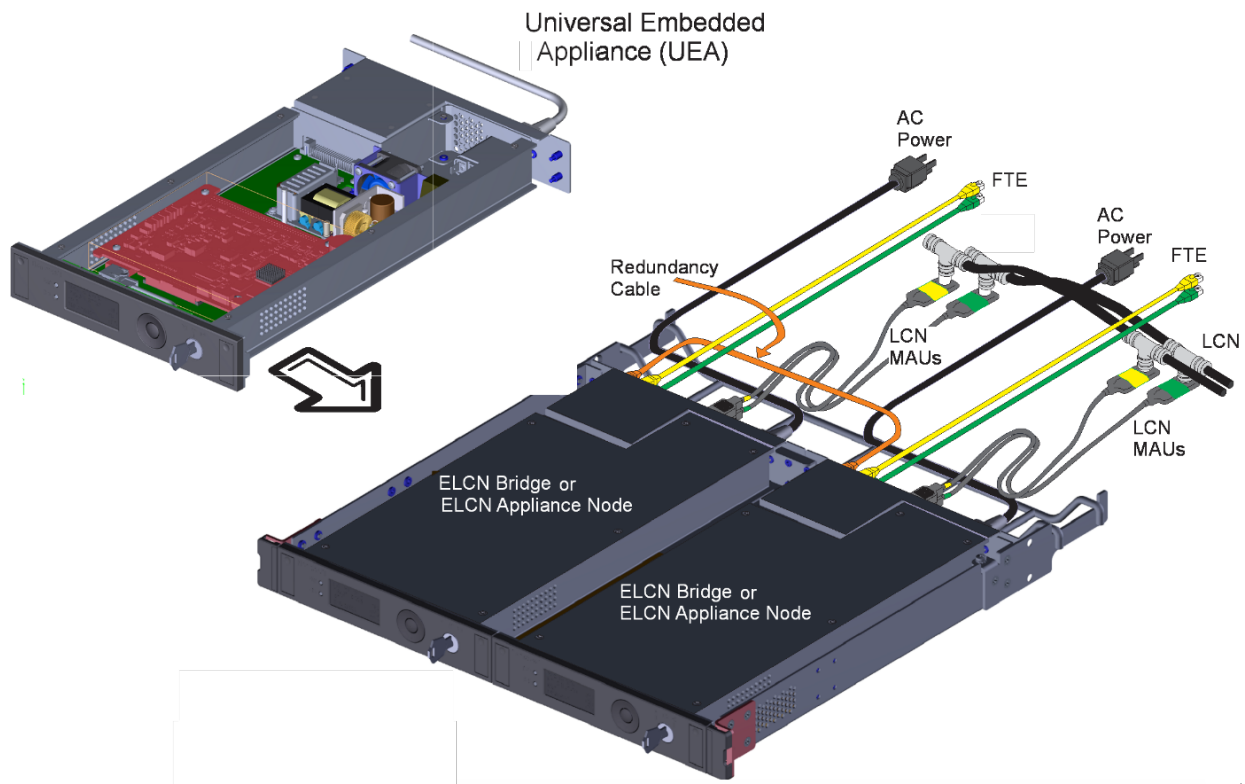


Figure 3 Dual ELCN UEA Installation in Rack



The following diagram illustrates the installed UEA cable connections for the ELCN Bridge and ENIM/AM/EHB/NG Appliances:

Figure 4 Dual ELCN UEA Installation Cabling for ELCN Bridge and ENIM/AM/EHB/NG

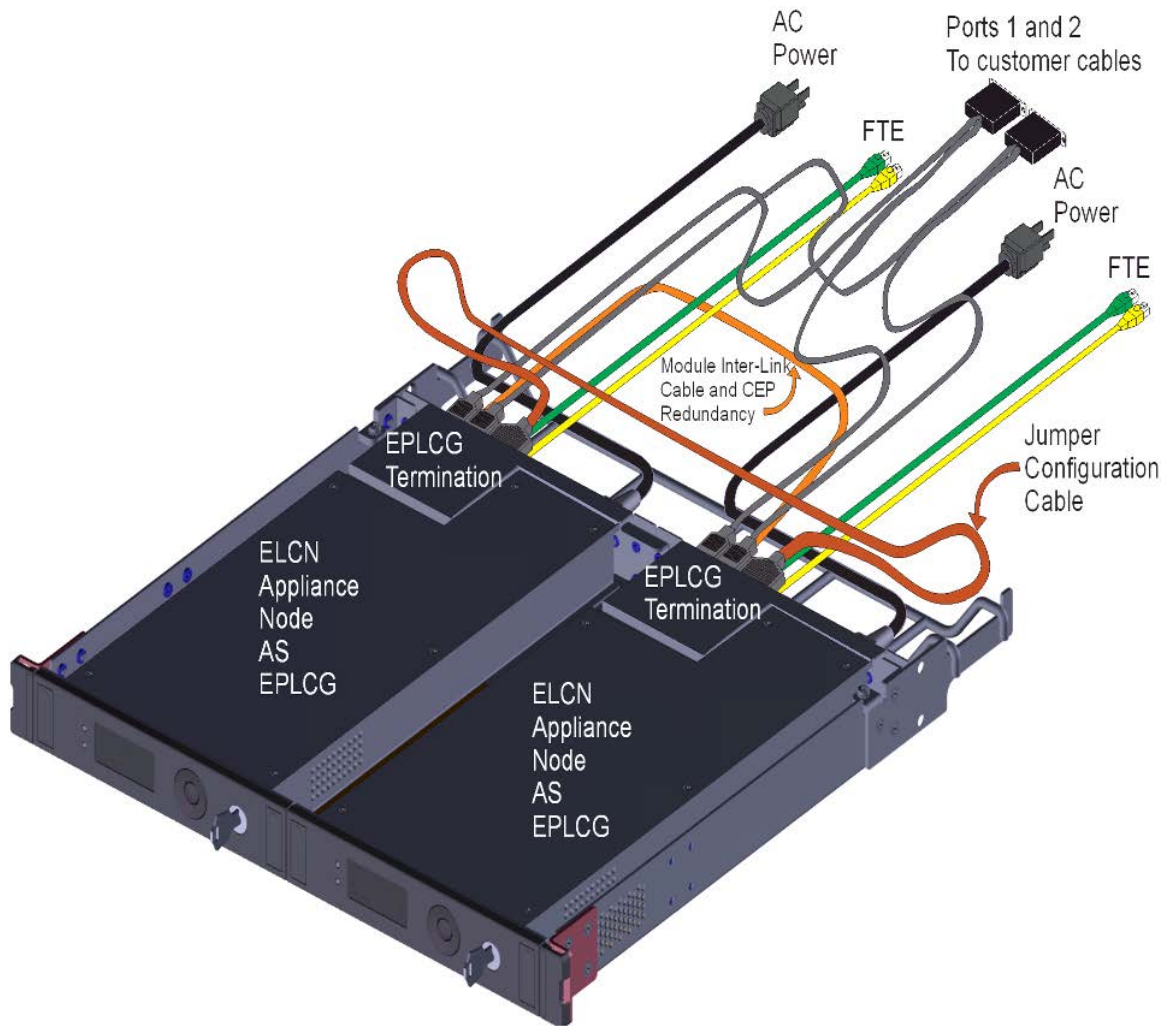


Only the ELCN Bridge UEA uses the MAU cables to connect to the LCN coax cables. Non-bridge UEAs (Appliances) only interface directly with other FTE nodes. The MAU electronics convert LCN analog signals to digital signals, which are then processed by the ELCN Bridge to be made compatible with ELCN FTE. The reverse occurs when ELCN FTE signals are sent to LCN nodes. This two-way process allows for full two-way LCN-ELCN communication.

The ELCN Bridge must be deployed as a redundant pair of UEAs. Redundant UEAs (the local UEA and the partner UEA) have a redundancy port cable connected between them.

The following diagram illustrates an example of installed UEA cable connections for the ELCN EPLCG:

Figure 5 Dual ELCN UEA Installation Cabling for ELCN EPLCG



Note: The EPLCG cabling will differ according to various customer system configurations.

2.2.2 Universal Embedded Appliance Processor Module

The processor module is a core component of the UEA. It has a processor, user interface display, push button controls, power supply and fan. This module contains no user serviceable parts and must be replaced as a unit. The processor ships with a base image that supports test capability and loading of an image that provides application functionality.

Figure 6 Processor Module (with front panel)



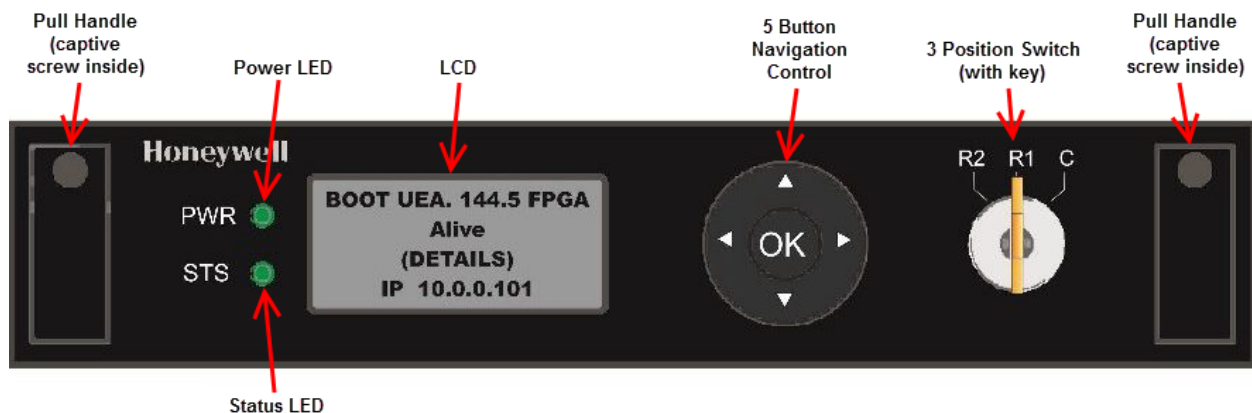
2.2.3 Universal Embedded Appliance Front Panel

The front panel provides power and status LEDs, and a 4-line, 20-character display. This display is used to show more detailed status information and provide a means of configuring the running application. A five key navigation control is used to manipulate cursor position and enter configuration information. A general purpose 3 position key switch provides the ability to lockout front panel configuration entry and select run modes as defined by the installed application. The key is removable in any position with the UEA powered or unpowered.

The key switch C position allows configuration of device and restart from the front panel. The R1 and R2 positions are application runtime options. In the R1 or R2 positions, the navigation display will show the UEA IP address and current application status.

The front panel is used to assign the UEA FTE Device Index, which is required for the module to be assigned an FTE IP Address.

Figure 7 Front Panel



The front panel main components are:

- Power LED (illuminates when 3.3V display power is applied)

- Status LED, which may display 3 colors:
 - **Red**: failure
 - **Amber**: warning
 - **Green**: normal operating state
 - **Blue**: the node state is NotConfig or NotLoaded
- LCD display (4 lines, 20 characters per line)
- 5-button navigation control, which provides the user interface for:
 - Choosing items on the display screen (for example, highlighting/selecting)
 - Modifying items (as applicable) on the display screen (for example, entering a new value for a highlighted item)
 - Navigation among display screens (for example, pressing OK to enter a different screen)
- 3-position key switch, which is used to select:
 - C: Configure the UEA (node configuration mode, including options to reboot or restore to factory image)
 - R1: Runtime 1 (read-only control mode, no write access to the process)
 - R2: Runtime 2 (read-write control mode, allows writes to the process)
- Captive screws for securing to the rack mount shelf assembly

2.2.4 Universal Embedded Appliance Termination Assembly

The termination assembly (rear box) provides all external cable connections to the processor assembly. This separate assembly allows the processor box to be replaced while keeping all cables connected to the connector assembly. The termination assembly contains no user serviceable parts and must be replaced if damaged.

The rear port connector usage is application dependent. Refer to application documentation for correct assignment/usage of connectors.

2.2.4.1 ELCN Bridge, ENIM, AM, EHB and NG Termination Assembly

The connector ports include:

- 5 Ethernet connectors (2 sets of paired, 1 single)
- 2 Local Control Network (LCN) Media Access Unit (MAU) mini D connectors

Figure 8 ELCN Bridge, ENIM, AM, EHB and NG Termination Assembly

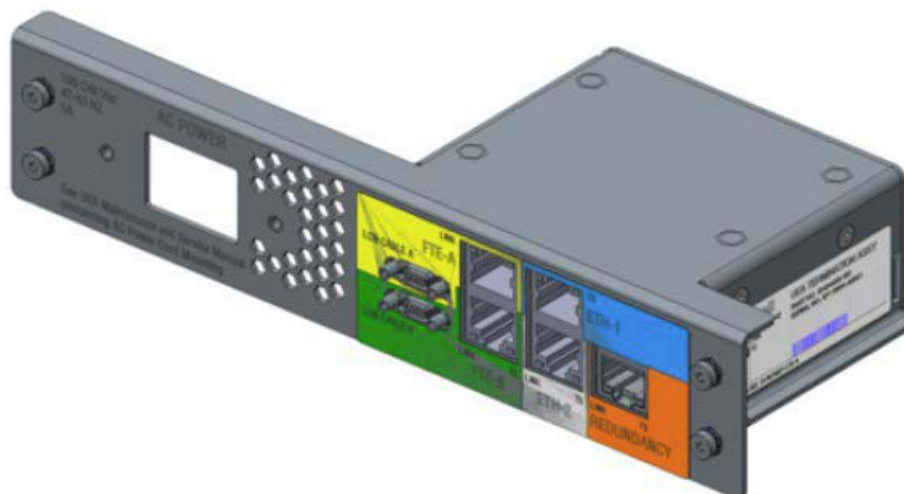
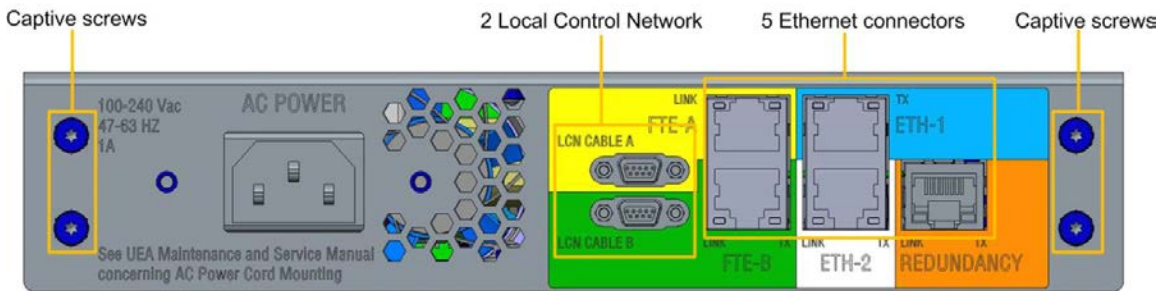


Figure 9 ELCN Bridge, ENIM, AM, EHB and NG Termination Assembly Detail



Note: The 5 Ethernet ports are for downlink, FTE A and B, and redundancy connections.

Note: For Network Gateway ETH-1 is used for PIN Cable A and that (optionally) ETH-2 is used for PIN Cable A.

The following figure and table describe the LED indicators of Ethernet ports:

Figure 10 Bridge, ENIM, AM, EHB and NG Termination Assembly Ethernet Port LED Indicators

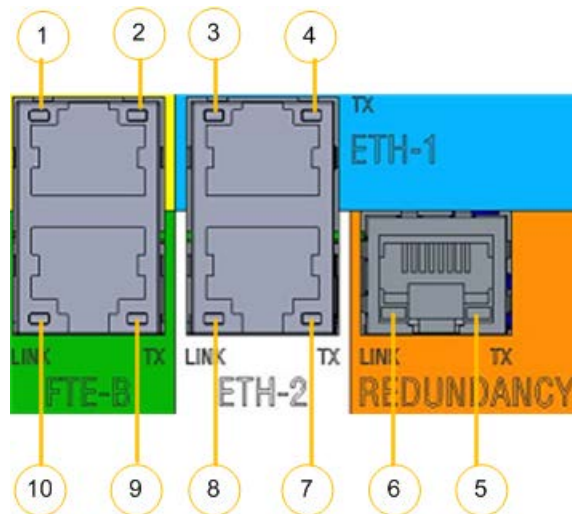


Table 3 Bridge, ENIM, AM, EHB and NG Termination Assembly Ethernet Port LED Definition

Item No.	Indication	LED Color/State	Description
1, 3, 5, 7, 9	Ethernet Port Link/ Active	Green On/Off/Blinking	On for connection; Off for no connection; and blinking for activity
2, 4, 6, 8, 10	Ethernet Port Speed	Yellow On/Off	OFF for 10Base ON for 100Base

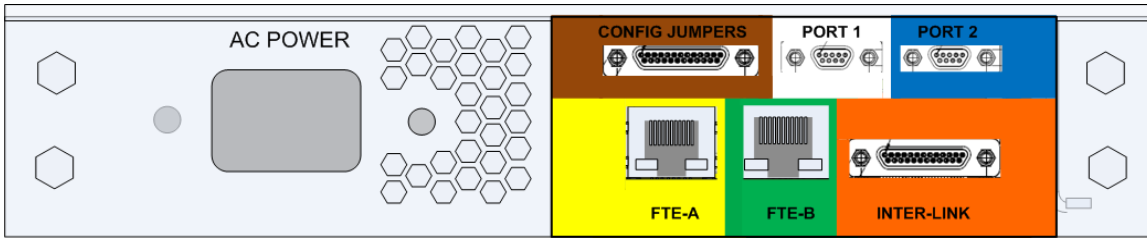
2.2.4.2 ELCN EPLCG Termination Assembly

The connector ports include:

- 2 Ethernet connectors (FTE A and FTE B)
- 2 isolated RS-232 field ports used for serial communication with PLCs and communication interfaces (PORT 1 and PORT 2)

- 1 a non-isolated RS-232 port used for protocol selection (CONFIG JUMPERS)
- 1 RS-422 port used for redundancy communication between ELCN EPLCGs, and Ethernet communication signals (used for Experion redundancy) (INTER-LINK)

Figure 11 EPLCG Termination Assembly Rear Ports



The following figure and table describe the LED indicators of Ethernet ports:

Figure 12 EPLCG Termination Assembly Ethernet Port LED Indicators

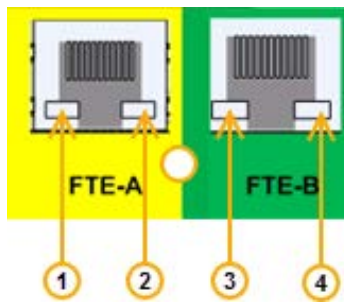


Table 4 EPLCG Termination Assembly Ethernet Port LED Definition

Item No.	Indication	LED Color/State	Description
2,4	Ethernet Port Link/ Active	Green On/Off/Blinking	On for connection; Off for no connection; and blinking for activity
1, 3	Ethernet Port Speed	Yellow On/Off	OFF for 10Base-T; ON for 100Base-TX

3 Experion LCN Requirements

3.1 Experion LCN System Requirements

The following ELCN system requirements apply to the deployment of ELCN:

- All ELCN systems require at least one redundant Bridge pair prior to adding any ELCN Appliance node.
- A minimum ELCN system consists of a redundant ESVT pair. If LCN nodes are present, a minimum ELCN system then must also have one redundant UEA ELCN Bridge pair.
- If two UEA modules are installed in the same/common/single UEA mounting rack, they can be any combination of node types
- A maximum ELCN system is determined by the number of TPS nodes allowed on a given Local Control Network (LCN). For a network without LCN extenders, 64 nodes (includes ELCN Bridges) are allowed. For a network with LCN extenders, 96 nodes are allowed per system. Only one ELCN Bridge redundant pair is permitted per LCN.
- A maximum of 40 LCN loads are permitted per LCN COAX segment. A Dual Node Module counts as one LCN electrical node load towards the 40-node limit irrespective of whether one or two nodes are installed in the DNCF.
- Only one FTE Community is permitted per ELCN. If multiple ESVTs within the LCN to be converted to ELCN have been assigned to multiple communities, then those communities would need to collapse into one FTE community before migrating to ELCN.
- If, having K2LCN cards can impact performance. Must upgrade all K2LCN boards with K4LCN board before executing the ELCN migration.

Table 5 Summary of LCN/ELCN limits (assuming no FTEBs with C200, C200E or FIM2).

LCN/ELCN Capacity Limits	Qty	Notes
Maximum number of ELCN Bridge pairs per LCN/ELCN	1	Redundant pair
Maximum number of nodes per LCN/ELCN, without LCN Extenders	64	ELCN bridge does not contribute to the total number of LCN nodes
Maximum number of nodes per LCN/ELCN, with LCN Extenders	96	ELCN bridge does not contribute to the total number of LCN nodes
Maximum number of nodes per COAX LCN segment	40	ELCN bridge does contribute to the COAX segment total (+2)
Maximum number of ESVT server pairs (clusters) per LCN	5	Redundant pairs
Maximum number of ES-Ts per ESVT cluster*	20*	
Maximum number of ES-Ts + ES-CE per ESVT cluster*	30*	
Maximum number of ES-Ts + ES-CE + ES-F per ESVT cluster	40	
Maximum number of AM personality instances (AM, ESVT, ACE-T and E-APP) per LCN	-	
The maximum number of ELCN NGs per LCN is limited to 2 (One Responsible and One Alternate		There is no need for more than 2 NGs since one NG can access data from all other nodes on a PIN (the second NG is to act as a “hot spare” or Alternate NG in case the responsible NG fails)
The maximum number of NGs on a PIN is 63		The limit is set to limit the data throughput on the new Ethernet PIN.

Minimum number of LCN nodes per integrated LCN/ELCN system	3	Errors may occur when fiber optic cable is broken, or when LCNEs are powered off, if only two nodes exist on a remote segment. During LCNE failure, these nodes form their own token ring. If one node fails both nodes are lost.
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* Maximum number of ELCN ES-Ts per ELCN ESVT cluster – Beginning with Experion R501.6 and TPN R688.3, you can configure up to 30 ELCN ES-Ts per ELCN ESVT cluster without impacting the system performance, however, ensure that the following conditions are met, if not, configuration of **up to** 20 ELCN ES-Ts is supported per ESVT cluster:

- This enhancement is **not** supported if there are C300 controllers integrated with your system, this includes products such as, Experion Hiway Bridge (EHB) and C300 controller based Enhanced Logic Manager Module (ELMM).
- While using the increased number of ELCN ES-Ts, enough care must be taken to ensure that the data owners and controllers in the LCN are not loaded beyond their documented limits.
- When you are migrating GUS or US stations to ES-Ts, you must consider the number of ES-Ts which already exist in the network.
 - After migrating existing GUS or US stations to ES-Ts, do not create additional load on the data owners by invoking displays such as, HMIWeb, GUS and US displays.
 - If you are using HMIWeb display instead of US/GUS display after configuring up to 30 ES-Ts and this causes additional load on the data owners, examine the station and display update rates, and check that the default station update rate is not set at 1 second.

ATTENTION



If the ELCN System Management Dashboard feature is configured in Station and you are trying to configure more than 20 ELCN ES-Ts, this results in high PARSEC load on the ENIMs in the LCN and may lead to an undesirable behavior. The PARSEC value approximately increases by 20 per ELCN ES-T configured under the network. Therefore, it is important that you consider the existing load on an ENIM before you configure more ELCN ES-Ts with the ELCN System Management Dashboard feature configured in the network.

3.2 System Software Requirements

The table in this section identifies the system software that is required for proper operation of ELCN systems.

Table 6 System Software

System Software	Minimum Software Release Level is R501.4
Honeywell Experion	R501 or later (depending on functionality needed).
Honeywell TPN/LCN	R688.1 or later (depending on functionality needed).
Windows 10 O/S for Experion Station TPS (can also run on Windows Server 2016)	Initial
Windows Server 2016 for Experion Server TPS, Experion APP, ACE-T, and History Module	Initial

4 Experion LCN Functional Overview

4.1 General Overview

The ELCN is the Fault Tolerant Ethernet (FTE) version of the coaxial cable-based Classic LCN. ELCN architecture runs an existing, unmodified LCN system on a new platform. An Experion LCN node uses an emulated LCN personality and Ethernet encapsulated LCN communications. There is no coaxial cabling or LCNI device; instead, an emulated LCNI device is presented to the personality. This allows for a range of new deployment options for K4LCN-based subsystems (AM, ENIM, HM, PCLG/EPLCG, EHB and NG) and LCNP4-based subsystems (ES-T, ESVT, ACE-T, E-APP). Deployments may be virtual or hardware platforms.

The Universal Embedded Appliance, when used as an ELCN Bridge, provides access from the ELCN FTE networking environment to the legacy Classic LCN COAX networking environment during the migration process. ELCN Bridge redundancy enables either of the paired bridges to assume the role of primary device. A redundant bridge pair occupies consecutive LCN node numbers. The ELCN Bridge also includes security controls provided by the UEA platform on which it is based.

The ELCN Bridge supports the following features:

- Transfer of LCN protocol traffic between ELCN and COAX LCN network segments
- Physical address filtering
- Rate limiting to prevent congestion

After establishing the ELCN Bridge, you can migrate each Classic LCN node to the new architecture, one at a time, and then remove its LCN coaxial connection. All existing user-created LCN data objects (such as checkpoints, button configuration files, display objects, and CL/AM objects) run on all ELCN platforms, without recompile, rebuild, or reconstruction. For any given user-created data object source file, there will be only one compiled object file.

The LCN to ELCN migration process may need to occur over an extended period of time, but at the end of the migration, no nodes remain connected to the Classic LCN network other than the ELCN Bridge. You remove the ELCN Bridge as the final step of the upgrade and repurpose its hardware as spare parts.

5 Experion LCN Specifications

Table 7 General Experion LCN Specifications

Item	Specification
Maximum length of copper cable	100 meters
Maximum length of fiber optic cable	2 kilometers With the help of SFP port of switch this can be support 2 Kilometer. current UEA based FTE port not supported fiber optic.
Network type	Fault Tolerant Ethernet
Data throughput speed	100 Mbit/sec (100 Base T)
Corrosive environment	G4 (Severe)

Table 8 General ELCN Bridge/Appliance Specifications

Item	Specification
Processor	XILINX INC XC7Z020-1CLG400I
Configurable Memory	1G DDR3 SDRAM, 256MB NOR FLASH
Input Voltage	90 to 264 V AC, 47 to 63 Hz
Power consumption	12W @80% efficiency
Heat Dissipation	9W @80% efficiency
Dimensions	Process module: 8.66" (W) x 14.79" (D) x 1.72" (H) 220mm (W) x 375.6mm (D) x 43.65mm (H) Termination assembly: 8.66" (W) x 3.57" (D) x 1.72" (H) 220mm (W) x 90.8mm (D) x 43.65mm (H)
Weight	Process module: 2000g (4.41lb) Termination assembly: 500g (1.10lb)
Mounting	2 screws, Mounting on the UEA 19" Rack*
*For Rack details, see UEA Mount 19" Rack General Specifications	

Table 9 MAU Power (from UEA)

Item	Specification
Input Voltage	3.3V DC +/- 5%
Input Current	Typical 50 mA, Maximum 70 mA

Table 10 ELCN Bridge/Appliance Environmental Requirements

Item	Specification						
Operating Temperature	Operating Temperature (Cabinet- External)		0°C ~50°C (32°F ~122°F)				
	Operating Temperature (Cabinet- Internal)		0°C ~70°C (32°F ~158°F)				
	Operational Transient (0.25C/Min. for 1hr. Max)		15°C				
Storage/Shipment Temperature	-40°C ~80°C (31°F ~158°F)						
Humidity(R-H) (All Classes)	(non-condensing) Operating – 10-90% Storage – 5-95%						
	Max Wet Bulb	32					
Altitude (Feet) (All Classes)	Operating – Maximum		7500 ft				
	Shipping/Storage Maximum		35000 ft				
Dust (All Chasses)	Filters are effective down to		10 Microns				
Operating Vibration (Sinusoidal)			Equipment mounted/set on the floor		Equipment mounted/set other than on the floor		
	(5-20Hz)		0.3mm/.012in		0.7mm/0.028in		
	(20-150Hz)		0.25g		0.5g		
	Notice! All three axes, 60 minutes each axis, 5 minutes/range (Six sweeps: 5-150-5) (20 Hz is approximate, extract crossover frequency is determined by the intersection of displacement and acceleration.)						
Shipping Vibration (Random)	(10-500Hz)		See curves All three axes, 60minutes each axis, random spectrum				
Shock	Site Induced		4g @25ms 10g @ 11ms				
	Shipping/Storage		0-10kg	10-20kg	20-30kg	30-50kg	>50kg
	Not packaged for shipping Least of rotational drop height from intended installed orientation of 45 degrees about all edges		100mm	100m	100mm	100mm	100mm
	Packaged for shipping Vertical drop height		900mm	750mm	600mm	450mm	200mm

Table 11 ELCN Bridge/Appliance Front Panel General Specifications

Item	Specification
LCD Type	FSTN/Tranflective/Positive
LCD View Area	52.0mm *23.4mm
LCD Character array	20 characters *4 rows
LCD Backlight	Write LED, adjustable
LCD View Direction	12O'clock
LED	2 LEDs
	Power Indicator with Green Status Indicator with the following colors: Red Amber Green Blue
Key Switch ¹	3 positions (R2, R1, C)
Navigation (Keypad)	4 Direction key + 1 Enter Key
Note ¹ Each Package has 2 keys	

Table 12 ELCN Bridge/ENIM/AM/EHB/NG Termination Assembly General Specifications

Item	Specification
Replacement	Detachable
Ethernet Ports	5(2 Uplink, 2 Downlink, 1 Redundancy)
Supplementary Information on Ports ETH-1 and ETH-2	<p>Main purpose for the ports ETH-1 and ETH-2 to act as network interfaces for the Network Gateway Plant Information Network (PIN).</p> <p>*Redundancy of network interfaces is not required but is optional.</p> <ul style="list-style-type: none"> • If the PIN is not redundant than ETH-1 should be used for the interface. • If the PIN is redundant than ETH-1 and ETH-2 are used.
Network Ports	100Mbps
Network Connection	Shielded RJ45 connector, auto-crossover
Maximum Ethernet Cable Lengths	100m
Diagnostic LEDs On Each Port	Yes
Media Access Unit (MAU) Cable	<p>2 MAU Cable connect to MAU Port:</p> <ul style="list-style-type: none"> • Length: 1.8 meters • Part number:51307692-100 for “A” cable, 51307692-200 for “B” cable

Table 13 UEA Mount (19” Rack) General Specifications

Item	Specification
Module number	EH-UMT010
Slots for UEA	2
Dimensions	<p>1U: 19” (W) x 15.18” (D) x 1.72” (H) 482.6mm (W) x 385.5mm (D) x 43.65mm (H)</p> <p>Include Cable Tray: 19” (W) x 19.21” (D) x 1.72” (H) 482.6mm (W) x 488mm (D) x 43.65mm (H)</p>
Weight	3870g (8.53lb)
Mounting	19” Rack, 8 screws (4 for front, 4 for rear)

Table 14 Weights and Dimensions

Description	Height mm/[inch]	Width mm/[inch]	Depth mm/[inch]	Weight Kg/[lb]
Processor Module	43,2/[1.70]	220,0/[8.66]	375,7/[14.79]	2,0/[4.41]
Termination Assembly	43,2/[1.70]	220,0/[8.66]	90,7/[3.57]	0,53/[1.17]
UEA Mount 19 Inch Rack (with cable tray)	43,7/[1.72]	482,6/[19.0]	487,9/[19.21]	3,87/[8.53]
UEA Mount 19 Inch Rack (without cable tray)	43,7/[1.72]	482,6/[19.0]	401,6/[15.81]	3,0/[6.61]
Dual UEA Assembly (in Rack with cable tray)	43,7/[1.72]	482,6/[19.0]	487,9/[19.21]	8.9/[19,5]

6 Models and Parts

There are two types of available models; one for new system builds (Section 6.1), and one for ELCN upgrade kits (Section 6.2). Available spare parts are listed in Section 6.3.

6.1 Experion LCN Model Numbers

The following are available for ELCN.

Table 15 Experion LCN Model Numbers

Model	Description
EH-LCN100	1 ELCN Bridge 1 MAU pair & 1 Shelf
EH-LCN200	2 ELCN Bridge 2 MAU pair & 1 Shelf
EH-LCN110	1 ELCN Appliance & 1 Rack
EH-LCN210	2 Experion LCN Appliance & 1 Rack
EH-UMT020	UEA Mounting for Dell Cabinet
EP-LCN001	ELCN USAGE LICENSE
EP-LCN005	Experion LCN 5 USAGE LICENSE
EP-LCN010	Experion LCN 10 USAGE LICENSE
EP-LCNV01	Experion LCN VIRT APPLIANCE USAGE LIC
EP-LCNV05	Experion LCN 5 VIRT APPLIANCE USAGE LIC
EP-LCNV10	Experion LCN 10 VIRT APPLIANCE USAGE LIC
TC-LNIM10	ELCN NIM USAGE LICENSE
TC-LNIM20	ELCN NIM RED USAGE LICENSE
TC-LHM010	ELCN HM LICENSE
TC-LAM010	ELCN AM LICENSE
TC-LAM020	ELCN AM RED LICENSE
TC-LHB010	ELCN EHB USAGE LICENSE
TC-LHB010	ELCN EHB RED USAGE LICENSE
TC-LNG010	ELCN NG USAGE LICENSE
TC-LPLG10	ELCN XPLCG LICENSE
TC-LPLG20	ELCN XPLCG RED LICENSE

*The ELCN Bridge must be installed as a redundant pair, prior to operating an ELCN system. A single Bridge (with mounting shelf and hardware) may be installed if another Bridge (with mounting shelf and hardware) is installed and available for use as a redundant pair (at another location in the cabinet or in another cabinet).

6.2 Experion LCN Upgrade Kits

An upgrade kit is required to perform an LCN to ELCN upgrade. There are two types of upgrades:

- Upgrade from pure LCN to LCN-connected ELCN Bridge. This translates LCN to ELCN communication
- Conversion of an LCN node to an equivalent Experion LCN node. This Experion LCN node does not reside on the LCN network but is connected through the ELCN Bridge to the LCN network

The following upgrade kit models are available to perform upgrades to ELCN:

Table 16 Upgrade Kit Models Available To Perform Upgrades To ELCN

Model #	Description
EH-ZLCN11	Upgrade to 1 ELCN BRIDGE 1 MAU 1 SHELF
EH-ZLCN21	Upgrade to 2 ELCN BRIDGE 2 MAU 1 SHELF
EH-ZLCN12	Upgrade to 1 ELCN Appliance 1 SHELF
EH-ZLCN22	Upgrade to 2 ELCN Appliance 1 SHELF
EP-ZLCN01	UPG TO ELCN USAGE
EP-ZLCN05	UPG TO ELCN 5 USAGE LICENSE
EP-ZLCN10	UPG TO ELCN 10 USAGE LICENSE
EP-ZLCNX1	UPG ETN ENIM EHB to ELCN Usage
EP-ZLCV01	UPG TO ELCN VIRT APPLIANCE USAGE LIC
EP-ZLCV05	UPG TO ELCN 5 VIRT APPLIANCE USAGE LIC
EP-ZLCV10	UPG TO ELCN 10 VIRT APPLIANCE USAGE LIC
EP-ZLCVX1	UPG ETN ENIM EHB TO VIRT APPLIANCE LIC

* The ELCN Bridge must be installed as a redundant pair, prior to performing any LCN to Experion LCN node upgrade. A single Bridge may be installed if an existing Bridge is installed and available for use as a redundant pair.

6.3 Experion LCN Replacement Parts

This section identifies available Optimum Replacement Units (ORU). These parts may be required for replacement during the life of the ELCN system.

Internal UEA processor module and termination assembly components are not field-replaceable. Field-replaceable parts are listed in the table that follows.

Table 17 Optimum Replacement Parts

Name	Part Number	Description
UEA Processor Module	51454832-100	A core component of UEA, providing all application features. The application depends on the specific firmware.
UEA Termination Assembly	51454833-100	For ELCN Bridge/ENIM/AM/EHB only. Provides multiple communication connectors.
UEA Termination Assembly	51454991-100	For ELCN EPLCG only. Provides multiple communication connectors.
Media Access Unit (MAU) (yellow/green)	51307692 (-100/-200)	Contains electronics that process LCN COAX signals to be compatible with FTE (via the UEA Bridge), and vice versa.
Crossover Cable	51307693	Ethernet, orange, for ELCN EPLCG only.
Port cable	51308284-100	ELCN EPLCG only.
Interlink cable	51308285-100	ELCN EPLCG only.
Allen Bradley configuration cable	51308285-200	ELCN EPLCG only.
Modbus configuration cable	51308285-300	ELCN EPLCG only.
UEA Mount 19" Rack Shelf	51454831-100	A mounted shelf used to install a UEA in a 19-inch rack. It has two side-by-side slots for two UEA modules, and a cable tray.
UEA Processor Key	51307732-200	A key used to control the 3 position switch.
UEA Power Cable	51305451	Cables with type C-14 connector (Rittal, Third-Party).
UEA Power Cable	51308093	Classic Module AC power cable, 120 V AC.
UEA Power Cable	51308094	Classic Module AC power cable, 240 V AC.
UEA Blank Front Face Assembly	51203168-100	Used to cover the slot if no processor module is installed.
UEA Termination Blank Rear Cover Assembly	51307738-200	Used to cover the slot if no termination assembly is installed.

7 Regulatory Compliance

European Compliance (CE):

- Low Voltage Directive 2014/35/EU
 - IEC/EN 61010-1:2010
 - IEC/EN 61010-2-201, Ed. 1, 2013
- EMC Directive 2014/30/EU
 - IEC/EN 61326-1:2012/2013 (Basic Levels)

CSA General Purpose Locations (cCSAus):

- CAN/CSA-C22.2 No. 61010-1-12, 3rd Ed.
- IEC/EN 61010-2-201, Ed. 1, 2013

Korean Radio Research Agency (KCC):

- Technical Requirements EMC NRRRA Notice 2016-26 (2016.12.19)
- Test Methods EMC NRRRA Notice 2016-79 (2016.12.19)
- Conformity Evaluation for Broadcast & Communication Equipment NRRRA Notice 2017-14 (2017.12.05)
- Korea EMC Standard KN 61326-1

7.1 Regulatory Compliance Statements

Regulatory and agency approvals for the product described in this document do not extend to the final integrated system. It is the responsibility of the system owner and the local authority having jurisdiction (AHJ) to ensure the suitability of the installation of this product and to assess the impact to the installed base certification with regard to all regulatory requirements. This statement applies to all regulatory and agency approvals applicable to this product.

The product described in this document must be installed within an enclosure providing adequate protection for the intended environment and meeting all local regulatory requirements. Refer to all installation instructions provided with the product. It is the responsibility of the system owner and the local authority having jurisdiction (AHJ) to ensure the suitability of the enclosure.

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