Honeywell

TPN

R690.1

ControlEdge PLC

R172.1.15.1 (R172.1 HF1)

Enhanced Logic Manager Module with ControlEdge PLC User's Guide

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August 2022

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Table of contents

1 Introduction

1.1 Revision history

Revision	Date	Description
A	April 2019	Initial release of the document.
B	November 2019	Removed section “ELMM with ControlEdge PLC FTE Switchover operations”.
C	November 2020	Updated section “PLC Inputs Outputs” to include 621-0020R, 621-0025R, and 621-6551R modules.
D	February 2021	Updated to include information as per ControlEdge PLC R170 changes/enhancements.
E	August 2022	Updated to include information as per ControlEdge PLC R172.1.15.1 (R172.1 HF1) changes/enhancements.

1.1.1 Related documents

Sl. No.	Document Name
1	UCN Planning Guide
2	ControlEdge PLC and ControlEdge RTU Getting Started Guide
3	ControlEdge 900 Platform Hardware Planning and Installation Guide
4	Engineer’s Reference Manual
5	LM Service manual
6	Data Entity Builder Manual
7	Logic Manager Service (LM13-685)
8	Experion Network Best Practices

Sl. No.	Document Name
9	Universal Control Network Planning UN02501
10	Universal Control Network Installation UN20500
11	Fault Tolerant Ethernet Installation and Service Guide
12	Fault Tolerant Ethernet Bridge Implementation Guide
13	ControlEdge Builder User Guide
14	ControlEdge Builder Software Installation User's Guide
15	Ladder Logic Migration User's Guide

1.2 Overview

1.2.1 Purpose

This document provides necessary information to plan, install, configure, operate, and troubleshoot the Enhanced Logic Manager Module (ELMM) with ControlEdge® PLC. Instructions specific to ELMM are provided in this document. The referenced documents must be consulted to perform certain tasks mentioned in this document.

1.2.2 Scope

This document covers the information needed to replace Logic Manager (LM) with ELMM. This includes planning information about activities to be performed on existing LM modules before you shut them down

1. Disassemble the LM hardware
2. Replace the LM cabinet
3. Connect the new ELMM with ControlEdge PLC that come pre-loaded in the ControlEdge PLC cabinet
4. Power up and configure ELMM to continue working with the restored checkpoints
5. Configure ControlEdge PLC logic.

IO wiring and reconfiguration of I/O is beyond the scope of this document. Contact Honeywell Project Engineering for planning IO wiring and reconfiguration.

ATTENTION	**ELMM with ControlEdge PLC is not supported in a non-redundant configuration.**

1.2.3 Abbreviations

The following table lists the various acronyms and abbreviations used in this document.

Acronyms	Meaning
DEB	Data Entity Builder
.EB files	Entity Builder files
EHPM	Enhanced High–Performance Process Manager
ELMM	Enhanced Logic Manager Module
ENIM	Enhanced Network Interface Module
EUCN	Enhanced Universal Control Network
FOE	Fiber Optic Extender
FTE	Fault Tolerant Ethernet
IOP	Input/Output Processor (module)
LCN	Local Control Network
LM	Logic Manager
MAC	Media Access Control
NIM	Network Interface Module
UCN	Universal Control Network
PMIO	Process Manager IO
AM	Application Module

Acronyms	Meaning
APM	Advanced Process Manager Module
Audit	System Audit Tool: The AUDIT overlay is called from the Command Processor and produces output identical to LVRLOG
CPM	Control Processor Module
EPM	Expansion Processor Module
SIOM	Serial Input/Output Module

1.3 Solution Overview

1.3.1 Modernization

Enhanced Logic Manager Module with ControlEdge PLC is for users who want to modernize and migrate Logic Managers on their TDC 3000, TPS or Experion TPS systems with an IEC 61131-3 based controller. The existing IPC/LCS 620 controller and I/O module is replaced with the ControlEdge 900 Platform controllers and I/O module, improving control performance while offering greater flexibility and lower costs.

1.3.2 Benefits

Migrating from the obsolete LM platform to an Experion PKS hardware platform with the latest ControlEdge PLC ensures facilities of better lifecycle support. Additional benefits include:

- Replace obsolete IPC620 processor along with its I/O module by the ControlEdge PLC along with its I/O module.
- Replace the LMM by the ControlEdge PLC and enable connectivity to EUCN network by adding EUCN protocol support on the PLC.
- Convert all the ladder logics in the IPC620 processor to its equivalent ladder logics/function blocks on the ControlEdge PLC.
- Retain the user's intellectual property and user experience intact, by allowing a restore of existing checkpoint, thereby enabling the usage of all existing graphics, trends, and control groups.

1.3.3 The Solution

The solution includes two major components:

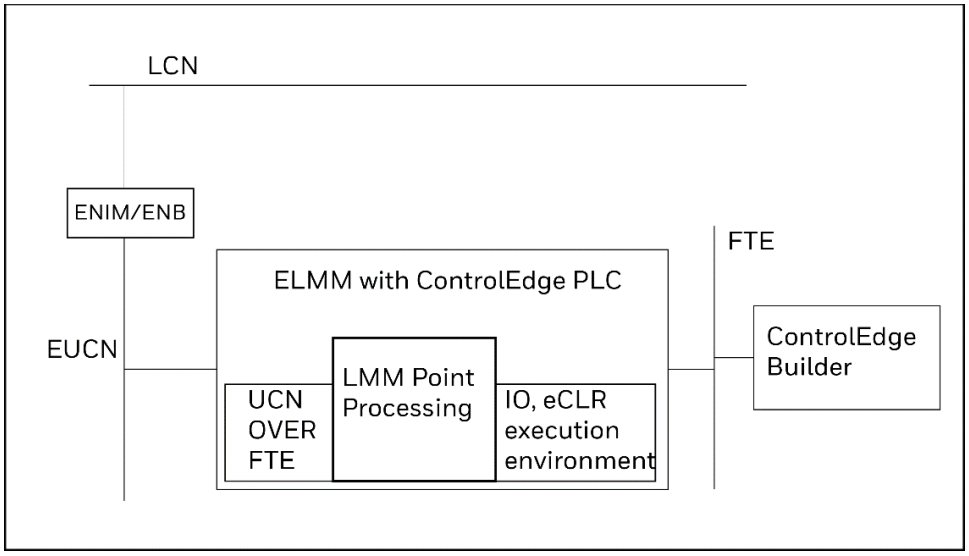
1. ELMM
2. ControlEdge PLC with ControlEdge 900 I/O modules or UIOs
3. LM Ladder Logic Migration Tool
4. ControlEdge Builder

Honeywell's Enhanced Logic Manager Module with ControlEdge PLC hosts all LMM functions. The ControlEdge PLC replaces the LM's IPC 620 controller and uses a proprietary tool called LM Ladder Logic Migration Tool to migrate the LM database and ladder programs to ControlEdge PLC function blocks. The ELMM is virtualized and operates on the ControlEdge PLC platform. ControlEdge Builder is used to configure ELMM with ControlEdge.

ELMM is connected to the Enhanced Universal Control Network (UCN over FTE) and Experion technology. You can also migrate the Logic Manager database to ControlEdge PLC ladder logic/function blocks, retain TPN graphics and AM applications, and even retain peer access to HPMs.

Note: This solution only supports off-process migration and requires shutdown. The backward migration from ELMM with ControlEdge PLC to ELMM is not supported.

The below illustration depicts the ELMM with ControlEdge PLC architecture.



1.4 Hardware and Software Requirements

1.4.1 Supported Software Release

Software	Requirement
TPN	TPN688.1 or later
ControlEdge PLC	R152.1 or later
ControlEdge Builder	R152.1 or later
LM Ladder Logic Migration Tool	R200.1

1.4.2 Hardware Requirements

The following list provides hardware components required to set up an ELMM system. Based on your existing LM configuration, hardware requirements will vary depending on the existing installation . At a minimum, you will need:

Hardware	Description/Model Number
ControlEdge PLC	ELMM with ControlEdge PLC is supported only for redundant ControlEdge PLC.
ENIM/ENB	You must have ENIM/ENB based network.
Honeywell FTE-compliant EUCN with spare ports on an L2 switch	One redundant pair is a minimum requirement. FTE A and FTE B L2 switch is required to connect ControlEdge PLC controller to connect on L2 FTE network.

Cables	• Grounding cables • Power cables • FTE cables Note: If you are retaining the field wiring, use the additional Weidmuller connector or third-party connector with custom cable.

1.4.3 Model Numbers

Model Number	Description
900RR0-0200	Redundant CPM Rack
900R04-0200	I/O Rack (4-slot)
900R08R-0200	I/O Rack (8-slot) can include either a redundant power supply or non-redundant power supply. A Power Status Module (PSM) is required with redundant power supplies. The diagram shows the rack with a redundant power supply. The model number of the rack with a non-redundant power supply is 900R08-0200.
900R12R-0200	I/O Rack (12-slot) can include either a redundant power supply or non-redundant power supply. A Power Status Module (PSM) is required with redundant power supplies. The diagram shows the rack with a redundant power supply. The model number of the rack with a non-redundant power supply is 900R12-0200.
SP-CELMMP	ELMM With ControlEdge License Redn/NR

2 ELMM with ControlEdge PLC Planning and Design

2.1 Planning Considerations

Implementing an ELMM solution begins by planning for the following:

- **Network topology**: Understand how ELMM with ControlEdge PLC connects to EUCN. For information about ControlEdge PLC I/O, see *ControlEdge 900 Platform Hardware Planning and Installation Guide*.
- **EUCN Planning**: ELMM connects to EUCN (UCN over FTE). See *UCN Planning Guide* for more details.
- **Back migration from ControlEdge PLC to Classic LM or C300**: Backward migration from ControlEdge PLC to Classic LM or C300 is not supported.
- **ELMM with ControlEdge PLC:** The number of modules needed based on your requirements, or based on the number of LM processors being replaced. ELMM with ControlEdge PLC supports redundancy. Plan the number of controllers and ELMMs required if you want redundancy, or if the LMs being replaced are redundant.
- **I/O:** ControlEdge 900 I/O
- **IO Network Topology:** ELMM with ControlEdge PLC supports both Star, Ring, and DLR topologies like PLCs do. For more information on topologies, see Section "I/O Network Topology" in the *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).
- **Process wiring techniques**: Study the wiring and grounding requirements of PLC cabinet, ControlEdge PLC I/O, and Remote I/O, if any.
- **Additional customer responsibilities:** In general, you are responsible for preparing your facility as outlined in this guide and references to other guides provided. In addition:
    - Install this equipment in accordance with applicable statutory requirements such as National Electrical Code (NEC), ANSI/NFPA 70, or the Canadian Electrical Code (CEC), C22.1.
    - Furnish and install (at your expense and sole responsibility) all internal building wiring (including power and signal cables) in accordance applicable standards such as NEC or the CEC.

- Install any power and signal cables according to the applicable standards such as NEC, CEC, and other local regulations and requirements.

- Note: If the Control Edge PLC is used as a replacement for LM/IPC620 by enabling the “EUCN Protocol” and “Modbus Slave” options, then, the MODBUS Slave protocol cannot be used for any external or third-party communication. If the Control Edge PLC is used as an ELMM, no other external MODBUS devices can be connected or configured. All other protocols are supported.

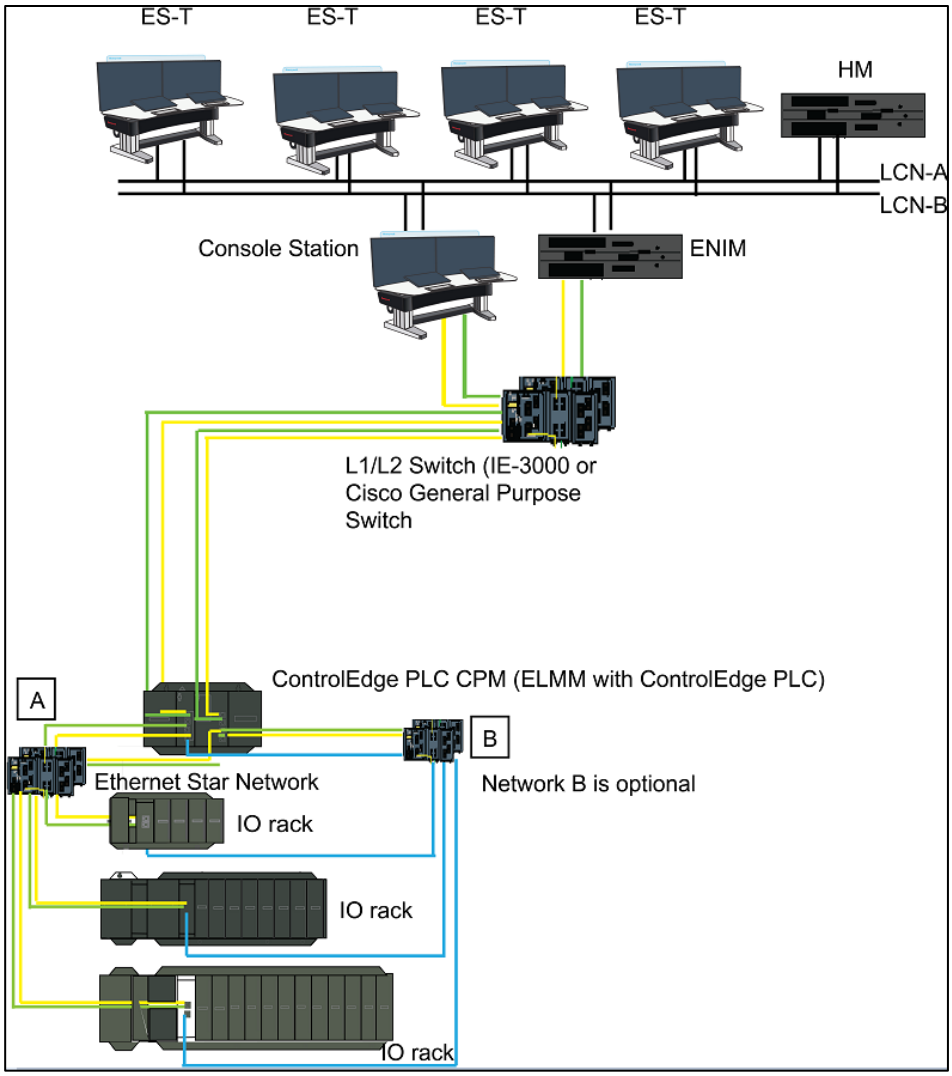
2.2 Network Planning

Level 1 nodes are the heart of the control system. This network segment contains ENIM, EHPM, SM, and ENB.

Level 2 nodes are the primary server, view and advanced control nodes for the process control system. Examples of Level 2 nodes include ACE, ACE-T, ES-T, ESVT, E-APP, PHD, and TCMI. These nodes are essential for operation of the process, but not as critical to control as the Level 1 nodes.

The following illustration depicts the ELMM with ControlEdge PLC network topology.

To communicate with the EUCN network, ELMM with ControlEdge PLCs are connected to FTE L2 network switches which in turn are connected to ENIMs.



ControlEdge PLCs on an FTE network connect to Experion-qualified FTE L2 network switches. ControlEdge PLC has a built-in firewall, so a separate Control Firewall switch is not required. For more information, see *Experion Best Practices Document*.

2.3 Site Selection

2.3.1 Space assessment for PLC hardware

LM cabinet dimensions		
Dual Access Cabinet		
Height (mm)	Width (mm)	Depth (mm)
2100	800	800
Single Access Cabinet		
Height (mm)	Width (mm)	Depth (mm)
2000	800	500
LM rack size		
Full Rack Size		
Height (mm)	Width (mm)	Depth (mm)
266.7	482.6	188
Half Rack Size		
Height (mm)	**Width (mm)**	**Depth (mm)**
266.7	301.2	188

Follow the guidelines mandated at your site for mounting ControlEdge PLC racks in an existing LM cabinet. In addition, consider the following:

New I/O modules can be mounted in the space of removed LM processor racks. Three 12-slot ControlEdge PLC racks can be mounted as shown in the following figure. A LM rack has 14 slots including one slot each for a power supply module, communication module, and, EDM, and 10 slots for IO modules (maximum). this totals to 40 slots of IO in the cabinet. Three 12-slot IO racks of ControlEdge are needed to replace LM I/O modules.

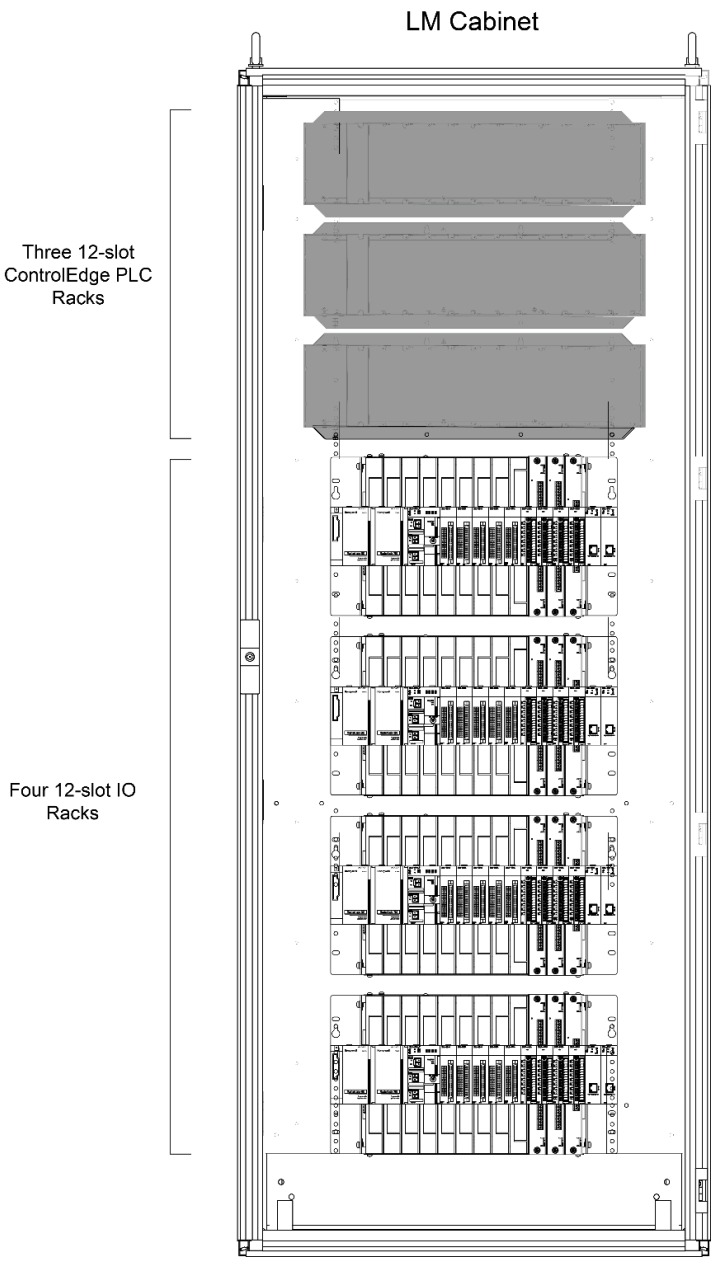
The racks are mounted on a bracket which will bring the IO rack by 100 mm to the front to conveniently use the space over cable trays on both the ends. Take care to ensure the access and visibility of the cables behind the bracket are not hindered. As the higher density ControlEdge IO modules are mapped

against the LM I/O modules, this reduces the count of new IO modules required, resulting in an option of 8-slot ControlEdge IO racks. This will also eliminate the need for a bracket.

The other cabinets will have a maximum of two racks and finding additional space for two new IO racks will not be a problem. Take care that the earthing is not disconnected on the introduction of a bracket. The routing and the space of the existing power cables can be reused.

There are two possible scenarios for installing ControlEdge IO modules in an existing LM cabinet as follows:

- **Scenario 1 (existing IO racks having four spare slots)** – in this scenario, there are four spare slots to install IO modules in an existing rack, the remaining 36 can be accommodated in the three racks added to the cabinet as shown in the following figure.
- **Scenario 2 (existing IO racks having three or fewer spare slots)** – in this scenario, as the higher density ControlEdge IO modules are mapped against the LM IO modules, for example, 16 ControlEdge modules in place of 8 LM IO modules, this reduces the count of new IO modules required and so the IO modules can be accommodated in the same cabinet.



Honeywell recommends you to use third party cable connectors, with the aid of cable connectors, the problem of replacing older PLC systems with ELMM can be solved easily and safely, you can maintain the existing field cabling.

2.4 PLC Inputs Outputs

Module Type	LM module	LM module description	Channels	ControlEdge Equivalent	ControlEdge Description	Channels	Notes
AI	621-0020R	Universal Analog Input Module	16	900A01-0202	Universal Analog Input -RTD, TC, V	8	Sensor type and PV low range must be configured suitably for 4 - 20 mA.
AI	621-0025R	Resistance Temperature Detector Module	8	900A01-0202	Universal Analog Input -RTD, TC, V	8	Sensor type and PV low range must be configured suitably for 4 - 20 mA.
AI	621-0022-AR	4-20 mA Isolated Analog Input	8	900A01-0202	Universal Analog Input -RTD, TC, V	8	Sensor type and PV low range must be configured suitably for 4 - 20 mA.
AI	621-0022-VR	0-10 V Isolated Analog Input	8	900A01-0202	Universal Analog Input -RTD, TC, V	8	Sensor type and PV low range must be configured suitably for 0 - 10V.
AO	621-0010-AR	4-20 mA Analog Output	4	900B01-0301	Analog Output Module	4	4-20 mA needs low range configuration.
AO	621-0010-VR	0-10 V Analog Output	4	900B01-0301	Analog Output Module	4	Voltage output needs conversion from mA with suitable load resistor.

Module Type	LM module	LM module description	Channels	ControlEdge Equivalent	ControlEdge Description	Channels	Notes
Counter	621-0307RC	High-Speed Counter module with PFQ	4	PFQ 900K01	Pulse & Frequency Input, Pulse Output	4	
DI	621-4500R	12-24VDC Source Input	8	900G32-0101	Digital Input 24 VDC	32	
DI	621-1180	115 VAC Discrete Input	32	900G03-0202	Digital Input 120/240 VAC	16	
DI	621-1100R	115 VAC/VDC Discrete Input	8	900G03-0202	Digital Input 120/240 VAC	16	
DI	621-1101R	115 VAC/VDC Isolated Discrete Input	6	900G04-0101	Digital Input 120/240 VAC-125VDC (individually isolated)	16	Group the channels as per signals, for example, start, stop, and trip status of the same motor together. This will eliminate isolation need.
DI	621-1160R	115 VAC Discrete Input	16	900G03-0202	Digital Input 120/240 VAC	16	
DI	621-1500R	24 VAC/VDC Discrete Input	8	900G32-0101	Digital Input 24 VDC	32	
DI	621-3552R	24 VDC Sink Fast Response Discrete Input	16	900G32-0101	Digital Input 24 VDC	32	

Module Type	LM module	LM module description	Channels	ControlEdge Equivalent	ControlEdge Description	Channels	Notes
DI	621-3560R	12-24 VDC Sink Discrete Input	16	900G32-0101	Digital Input 12-24 VDC	32	
DI	621-1250R	240 VAC Discrete Input	16	900G03-0202	Digital Input 120/240 VAC	16	
DI	621-3580	24Vdc Discrete input	32	900G32-0101	Digital Input 24 VDC	32	
DI	621-3580R	12-24Vdc Discrete input	32	900G32-0101	Digital Input 12-24 VDC	32	
DO	621-6500R	Discrete Output 24 VDC	8	900H32-0102	Digital Output 24 VDC	32	
DO	621-6503R	24 Vdc Source Self-Protected Discrete Output	8	900H32-0102	Digital Output 24 VDC	32	
DO	621-0007R	Reed Relay Output	6	900H01-0202	Relay Output Module	8	
DO	621-2100R	115 VAC Discrete Output	8	900H03-0202	Digital Output 120/240 VAC	8	

Module Type	LM module	LM module description	Channels	ControlEdge Equivalent	ControlEdge Description	Channels	Notes
DO	621-2101R	115 VAC Isolated Discrete Output	6	900H03-0202	Digital Output 120/240 VAC	8	Group the channels as per signals, for example, start, stop, and trip command of the same motor together. This will eliminate isolation need. Use relay module if channel isolation is still a need.
DO	621-2150R	115 VAC Discrete Output	16	900H03-0202	Digital Output 120/240 VAC	8	
DO	621-6550R	24 VDC Source Discrete Output	16	900H32-0202	Digital Output 24 VDC	32	
DO	621-2102R	115 VAC Self-Protected Discrete Output	8	900H03-0202	Digital Output 120/240 VAC	8	
DO	621-2200R	230 VAC Discrete Output	8	900H03-0202	Digital Output 120/240 VAC	8	
DO	621-6575	24Vdc Discrete output	32	900H32-0102	Digital Output 24 VDC		If current ratings are more – use relay module 621-0007R.
DO	621-6551R	Low Power Discrete Output 24 VDC	16	900H32-0102	Digital Output 24 VDC	32	

2.5 Process wiring techniques

2.5.1 Cabling considerations for ControlEdge PLC Components

See the section “Wiring and Cabling” in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).

2.5.2 Grounding requirements

See the section “Wiring and Cabling” in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).

2.5.3 Power entry guidelines for PLC

See the section “Power Supply” in *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en).

2.6 Estimated Time

The estimated time required to install ControlEdge PLC is 8 hours. The estimated time does not include system reconfiguration or startup time. It also does not take into consideration time required for IO wiring and reconfiguration of I/O.

3 ELMM with ControlEdge PLC Installation

3.1 Overview

Before ELMM installation can begin, you must disassemble existing LM equipment and safely transport it away from the site. Exercise caution to power down equipment – cabinet, card files, I/O, remote IO racks - and follow all instructions provided in this guide and the guides referenced herein when uninstalling LM equipment.

Label field wiring with new module and channel identification prior to removal. Some IO modules have terminal blocks with friction fit connectors. Others have screw terminals. Determine if the field wiring is of appropriate size and length for the new module connections.

3.1.1 Overview of tasks

After a plan to replace LM with ELMM is in place, begin to shut down and disassemble LM hardware. The sequence of steps to power down and disassemble LM hardware is provided here.

Step	Action
1	Prepare the LM for shutdown. Record the existing UCN address information for NIMs and LMs in section “Appendix A: EUCN Configuration Data Checklist” on page 160 for reference purposes.
2	Checkpoint LMs in HM and Emulated Drive.
3	Record the switch settings of the existing LM for future reference.
4	Generate ladder logic files.
5	Generate EB files for LM box using Node-specific configuration page and for all the points in the respective configuration pages.
6	Shutdown LM from Native Window.
7	Power down LM hardware and remove wiring.
8	Remove card files and modules from the cabinet.
9	Remove the cabinet.

3.1.2 Preparing the LM for shutdown

Ensure the following checklist items are completed to prepare the LM for shutdown.

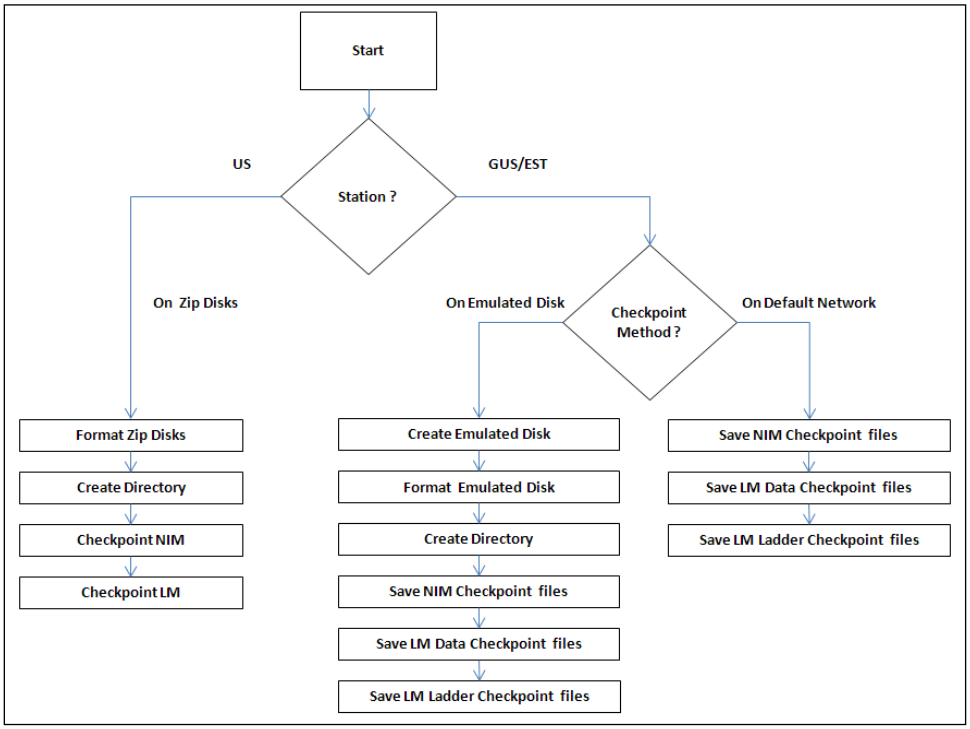
Item	Reference
Record the existing UCN address information for NIMs and LMs, and LM node numbers in section "Appendix A: EUCN Configuration Data Checklist" on page 160 for reference purposes.	
Checkpoint and take a backup of LM checkpoint files.	See Section "Checkpointing" of *Engineer's Reference Manual (SW09-605)* for more details.
Generate EB files for LM box using Node-specific configuration page and for all the points in the respective configuration pages.	
Record DIP switch settings on the existing LMs for future reference.	
Record the DIP switch settings on the Serial IO Module.	
Generate LM I/O configuration details (.xls or .csv).	
Generate and save Ladder logic files (.PRN).	
Repeat the earlier task for all LMs on the UCN.	See Section "Checkpointing" of *Engineer's Reference Manual (SW09-605)* for more details.

3.1.3 Checkpoint LM

Data checkpointing is performed to maintain up-to-date device settings in the event a device is taken out of service. Prior to replacing LM with ELMM, checkpoint NIM and LM to save existing data.

ATTENTION	**It is always recommended that you preserve the LM checkpoint in an Emulated Drive.**

The following diagram gives a snapshot of the checkpointing process.



See Section 21 of the Engineer's Reference Manual for more details.

3.1.4 Record Current LM Card File Configuration

It is important you record the switch settings of the existing LM for future reference. Ensure you complete this activity before disassembling the LM hardware.

See chapter 2 of the LM Service manual LM13500 for information about switch settings on the LM card file.

3.1.5 Generate Ladder Logic files

Generate and save the following files before shutting down the LM.

- PRN file
- Label File
- Force List (Force function and data change function are not supported for ELMM with ControlEdge PLC)

See the *Data Entity Builder Manual (SW11-611)* and the *620 WinLoader, Version 5.4*, User Manual for additional information.

3.1.6 Generate UCN & Node specific EB files

See the *Data Entity Builder Manual (SW11-611)* for additional information about Print entities.

Generate EB files for LM box using Node-specific configuration page and for all the points in the respective configuration pages.

See Appendix D (for Exception Building) and Appendix E (for Creating Exception Build Files from IDFs) of *the System Startup Guide CD-ROM (SW-11600).*

3.1.7 Shut down LM from Native Window

After checkpointing LMs and backing up ladder logic and EB files, proceed to shutdown LMs.

From an R6xx LCN station – for instance, US, GUS, ES-T, or PCUS, perform the following procedure to shut down the R6xx LM. For information about Displays, see the *Logic Manager Service (LM13-685*).

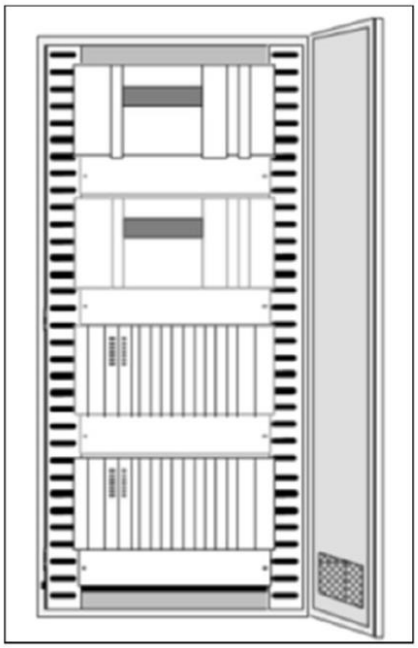
The following tasks must be performed in the given order for a safe and successful shutdown of LM.

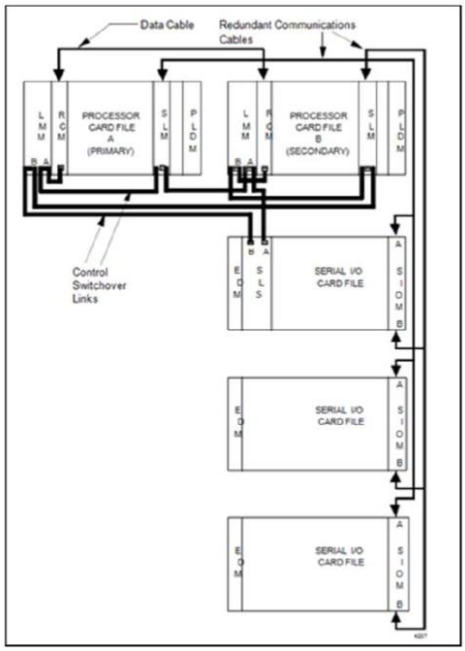
Step	Action
1	Depress the <**SYST STAT**> (System Status) key on the system console to invoke the System Status display.
2	Choose the NIM node in the display grid that the LM is resident on and then select the **NTWK/HWY STATUS** target to invoke the UCN Status display.
3	Choose the LM of interest on the display grid and then select the DETAIL STATUS target on the UCN Status display.
For redundant nodes, perform steps 4 and 5. For a non-redundant node, skip to step 6.	
4	Choose the secondary LM (Status shows BACKUP) and then select **RUN STATES** target.
5	Choose the **SHUTDOWN** target and execute the command by selecting the **ENTER** target. The secondary LM enters the **ALIVE** state.
6	Choose the primary LM (Status shows OK) and then select **RUN STATES** target.
7	Choose the **IDLE** target and execute the command by selecting the **ENTER** target. The LM enters the **IDLE** state.
8	Choose the **SHUTDOWN** target and execute the command by selecting the **ENTER** target. The LM enters the **ALIVE** state.

3.1.8 Power-off LM

You can now proceed to shut down the LM by isolating power to the LM hardware and cabinet. To isolate power, remove power from a particular LM card file by placing the power breakers in the off-position.

Typically, the Logic Manager card files are installed in the single or dual access cabinets as depicted in the following diagram. The redundant IPC 620 processors sit at the top of the cabinet followed by the Serial IO card files underneath. Follow a bottom-up approach when isolating power to the LM system. Power is isolated to the bottom most IO card file followed by the one above it and so on. When isolating power to the IPC 620 processors, shut down the secondary processor before the primary. If remote IO racks are present, isolate power and remove the Serial Link cable.





Assumptions and Cautions

Before you work on any electronic equipment, read and follow the safety guidelines to help protect the system from potential damage and ensure personal safety.

TIP	• Only qualified personnel must perform this upgrade. • When disconnecting a cable, pull on its connector or on its strain-relief loop, not on the cable itself. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Ensure that both connectors are correctly oriented and aligned.

ELECTRICAL SHOCK	To guard against electrical shock, always turn off any electronic equipment before removing any covers or boards.

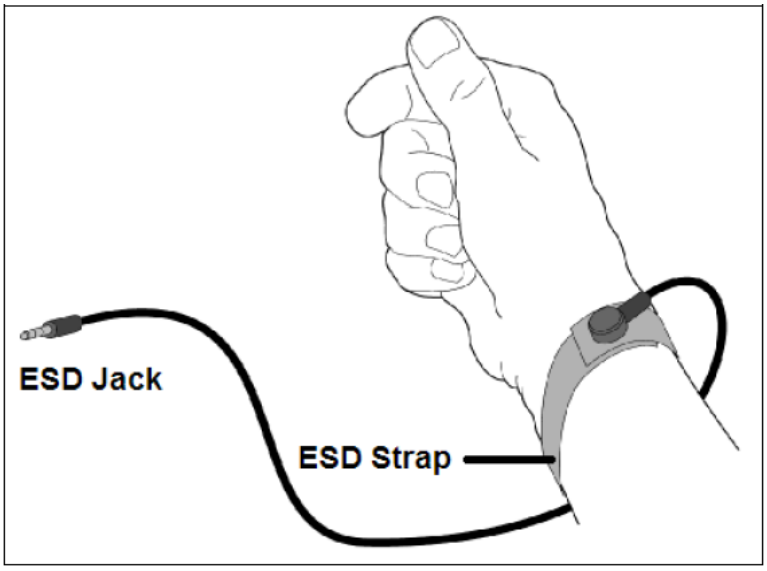
Electrostatic Discharge Protection

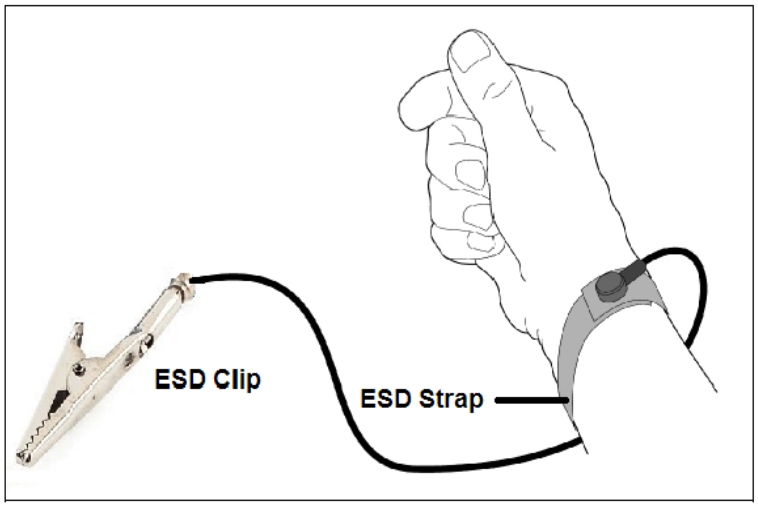
ESD HAZARD

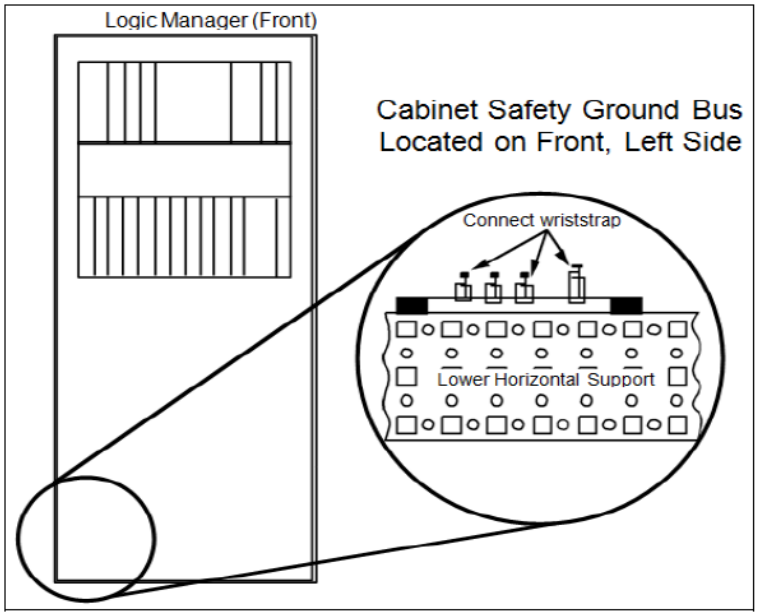
Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its mounting bracket.

While removing, handling, and installing Logic Manager System components, it is extremely important that you wear an Electrostatic Discharge (ESD) wrist strap that is properly connected to ground. Be sure power to the equipment is off. Slip the strap on your wrist like a wristwatch and connect its clip to the ground bus located inside the front, left side of the cabinet.

Wearing an approved ESD wrist strap does not increase the danger of electrical shock.







ESD Wrist strap Connection in the Logic Manager Cabinet

Be sure to store any electronic component in a static-safe carrying pouch whenever it is not in use.

An ESD kit is available through Honeywell. Contact your Honeywell representative and ask for part number 30185-H.

3.1.9 Remove LM hardware

LM hardware removal can proceed in one of two ways.

1. Disassemble IO files from each IO card file and then remove the card files.
2. Remove the card files directly.

If you plan to reuse cables, tag them and safely store them so they can be identified.

Identity Components for Disassembly

- **Logic Manager Processor Card File**
- **Logic Manager Redundant Processor Card File**
- **I/O Card Files**
- **Remote IO racks**
- **Power cables**
- **IO cables**
- **UCN cables**
- **UCN taps**

Disassembly Procedure

Use the following procedure to disassemble the LM hardware.

Step	Action
1	Shut down power supply to the LM processor, LM redundant processor, and all IO racks (local and remote). Tip: Make sure no LED is lit up in any of the racks signifying power has been isolated from the racks. Use proper voltage measurement device to verify that there is no potential/voltage in the module which is being replaced.
2	Disconnect the power cables to remove power from the LM Processor card file, LM Redundant Processor card file, and I/O Card Files. 

Step	Action
3	Disconnect the I/O Link Interface cables from the card files. Note that some IO modules have terminal blocks with friction fit connectors while others have screw terminals. The I/O Link Interface cables can be reused. 
4	Remove any unused UCN drop cables, taps, and tap mounting brackets.  

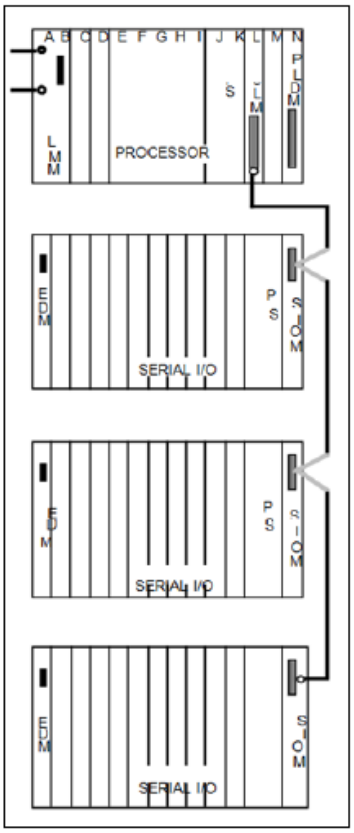
Step	Action
5	Loosen, but do not remove the four screws holding the card file to its support. 
6	Grasp the card file firmly and lift it about 1 cm (1/2 in.) to release the file into your hands.
7	If you have remote IO racks, isolate power and remove the Serial Link cable. Note: See *Logic Manager Service Guide LM13-400* for more details on Remote IO racks and Serial link cable configuration.
8	Record switch settings of primary and secondary LM processor cards.
9	Record switch settings of SIOM/PLDM cards.
10	Isolate power to remote I/O and record switch settings of SIOM.

3.1.10 Remove Module

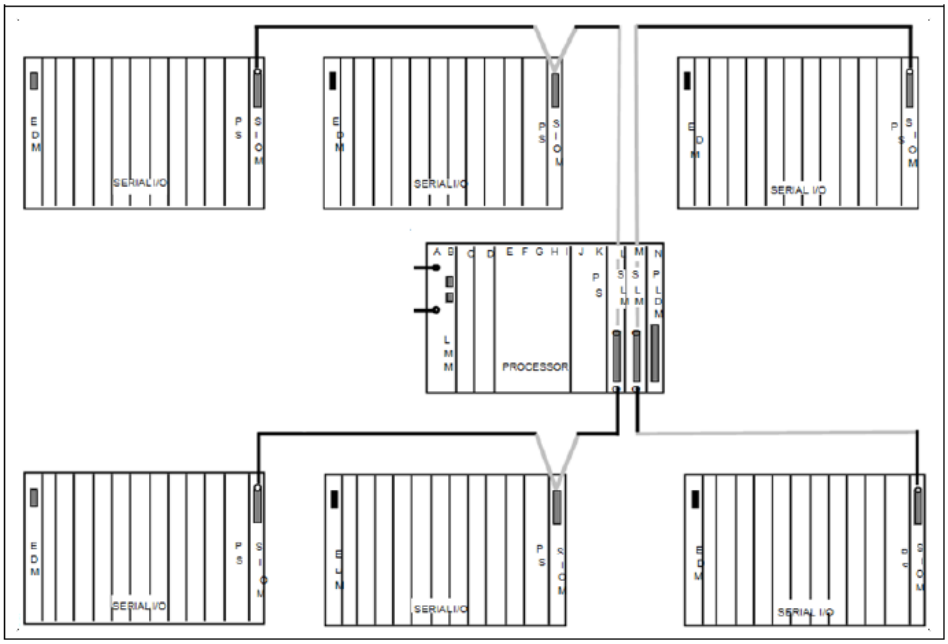
Use the following procedure to remove the Logic Manager System module.

Step	Action
1	Remove power from the Logic Manager processor card file by placing the power breakers in the off position. Warning: Do not use the power supply module fuse as a means of disconnecting power from the card file. Each card file must have its own individual circuit breaker for this purpose.
2	Before removing a Logic Manager System module, connect your ESD wrist strap to the cabinet ground bar, or if the equipment is panel mounted, connect your ESD wrist strap to the panel ground.

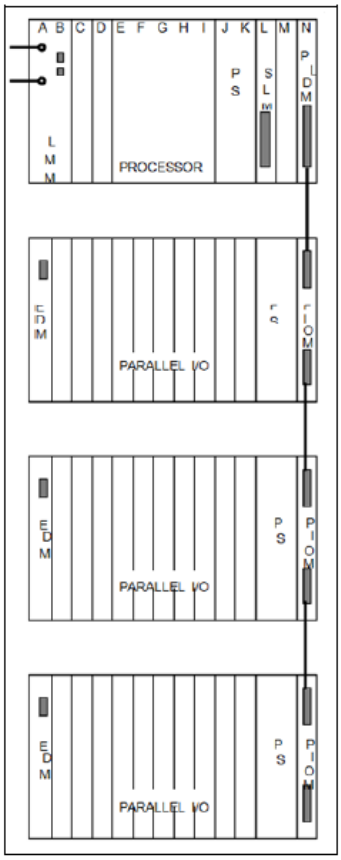
3	Cabling must first be disconnected from the front of the module to be removed. The connection method varies. Power supply module cable disconnection requires the removal of individual wires from its terminal strip. Control modules are connected to cables with friction fit connectors, requiring a small amount of pulling force to release the cable. The illustration following this table namely: 1. Non-redundant Single Channel Serial I/O Multidrop Cable Configuration 2. Non-redundant Four Channel Serial I/O Multidrop Cable Configuration 3. Non-redundant Parallel I/O Cable Configuration 4. Redundant Serial I/O Cable Configuration 5. Redundant Parallel I/O Cable Configuration show various typical system cable configurations for both redundant and non-redundant serial or parallel I/O. The I/O point modules in the I/O card file employ terminal block connectors which pivot away from the front of the module and thereby eliminate the need to disconnect each individual terminal block wire. A) I/O modules may be removed from an I/O card file while power is applied to the card file IF: i) The I/O system is a serial I/O configuration. ii) A 621-9938R SIOM is used in each of the I/O car files. iii) the I/O module has an “R” suffix in the model number
4	Modules are released and removed by two different methods. Five modules, those behind a five module wide metal cover plate on the Processor card file, are removed by simultaneously pulling on the upper and lower extractor levers. The metal cover plate is first removed by loosening the four thumbscrews that hold the plate in place. All other modules are removed by loosening their thumbscrews and pulling the module gently forward. Very little force is required.
5	When the module is free from its connector, carefully slide it out on the card rails and into your hands. Immediately place the module in a static safe pouch for transport.



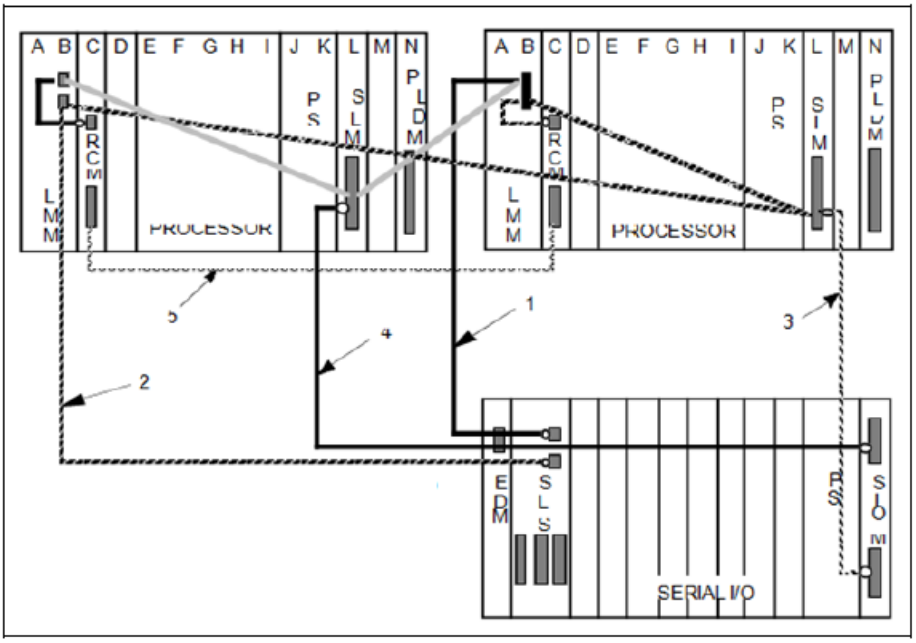
Nonredundant Single Channel Serial I/O Multidrop Cable Configuration



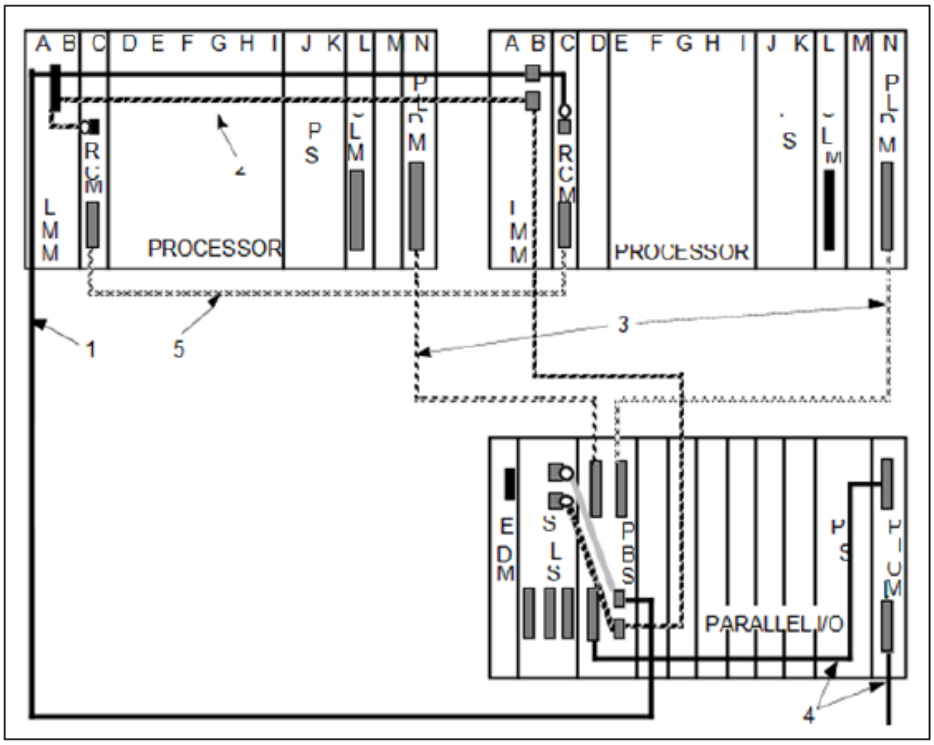
Nonredundant Four Channel Serial I/O Multidrop Cable Configuration



Nonredundant Parallel I/O Cable Configuration



Redundant Serial I/O Cable Configuration



3.1.11 Remove Card File

Use the following procedure to remove the card file.

Step	Action
1	Remove power from the equipment.
2	Disconnect all cables attached to the card file modules.
3	Loosen, but do not remove the four screws holding the card file to its support.
4	Grasp the card file firmly and lift it about 1 cm (1/2 in.) to release the file into your hands.

3.1.12 Remove Cabinet

See the chapter “ELMM with ControlEdge PLC Planning and Design”, and read the following additional guidelines to ensure you have made adequate preparations for installing the new ControlEdge PLC cabinet.

- Perform a space assessment to ensure you have adequate space for the new cabinet.
- Use the tips provided for wiring changes provided in the engineering guidelines document to ensure power, grounding, IO cabling, and other safety precautions are followed before isolating power to the cabinet and moving it.

3.1.13 Install ELMM with ControlEdge PLC

This section provides information about cabling and connecting the ControlEdge PLC hardware. IO and Marshaling cabling information is not in the scope of this document. The ControlEdge PLC configuration you ordered is assembled and mounted in the cabinet by Honeywell.

After you have selected a suitable location for your system equipment, use the following checklist to monitor the events that must occur prior to the actual delivery and installation of your system.

To install:

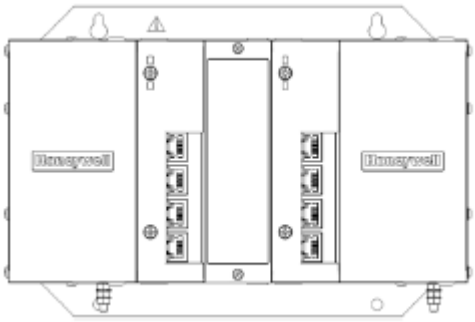
1. Mount the rack in the enclosure.

2. To insert new CPMs, perform the following procedure:

   a. Insert the power supplies in the slots in the rack.

   b. Insert the CPMs in the rack, adjacent to the power supplies.

   c. Insert the filler block cover in the middle slot.



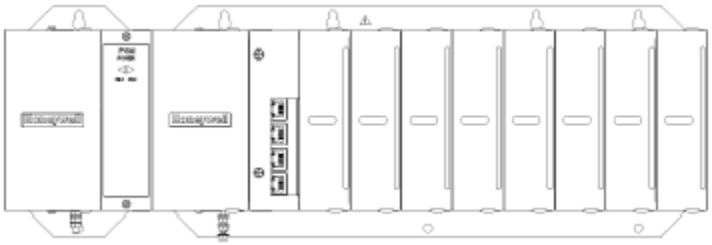
- If no, assemble I/O racks, take the 8-slot I/O rack as an example.

  a. Insert the power supply.

  b. Insert the PSM between the two power supplies.

  c. If a EPM will be inserted, set the EPM address and network topology for the I/O rack using the rotary switch.

  d. Insert EPM as required.



3. Install I/O modules.

ATTENTION	**For each configured and labeled I/O module, ONLY break off the "key-tabs" in the pattern that matches that module type. For more information, see "Installing I/O modules" in the *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en).**

Assumptions and Cautions

Before you work on any electronic equipment, read and follow the safety guidelines to help protect the system from potential damage and ensure personal safety.

 TIP	**Only qualified personnel with working knowledge of ControlEdge PLC must perform this upgrade.** **When disconnecting a cable, pull on its connector or on its strain-relief loop, not on the cable itself. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Ensure that both connectors are correctly oriented and aligned.**

 ELECTRICAL SHOCK	**To guard against electrical shock, always turn off any electronic equipment before removing any covers or boards.**

 ESD HAZARD	**Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its mounting bracket.**

ControlEdge PLC Hardware Installation

See chapter “ControlEdge 900 Common Reference Information” in *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en).

Overview of Tasks

Task	Go to	Done?
Replace LM cabinet with ControlEdge PLC cabinet.	"Overview" *section in ELMM with ControlEdge PLC chapter of this document.*	
Install the assembly in the ControlEdge PLC cabinet.	*ControlEdge RTU Getting Started* (RTDOC-X283-en)	
Mount the Cisco Level 2 FTE switch on the backplane.	*ControlEdge RTU Getting Started* (RTDOC-X283-en)	
Mount the PLC-CPM and PLC-EPM modules on the backplane.	*Hardware Planning and Installation Guide* (HWDOC-X430-en)	
Mount the ControlEdge 900 Platform on the backplane.	*Hardware Planning and Installation Guide (*HWDOC-X430-en*)*	
Mount the backplane on the carrier in the cabinet.	Hardware Planning and Installation Guide (HWDOC-X430-en)	
IO cabinet cabling for ControlEdge 900 Platform or UIO.	*Hardware Planning and Installation Guide* (HWDOC-X430-en)	
ControlEdge 900 Platform components cabling.	*Hardware Planning and Installation Guide* (HWDOC-X430-en)	
Power and Grounding requirements.	*Hardware Planning and Installation Guide and ControlEdge PLC* (HWDOC-X430-en) *and ControlEdge RTU Getting Started* (RTDOC-X283-en)	

Use the instructions provided in section “Hardware Configuration of PLC-CPM” in *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en).

3.2 Replace LM cabinets with PLC cabinet

This section provides information about replacing LM cabinet with ControlEdge PLC cabinet.

3.2.1 Pre-replacement checklist

The existing configuration and the vital information residing on LM must be preserved before shutdown, and suitably reapplied after the ControlEdge PLC installation. The following checklist assists you in this task.

Step	Task
1	Understand all the standard conventions of your plant and collect the relevant documents so that the newly added information is in synchronization with the old data. Collect the standard conventions for the following: • Ferrule nomenclature • Cable tags nomenclature • Tag naming conventions for I/O For more information about wiring, see the section "Wiring and Cabling" in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).
2	Collect the control system specification document (write-up) of the plant to know the existing control configuration of the plant.
3	Collect the relevant drawings for the existing LM configuration.
4	Collect the existing I/O database details of the LM.
5	Collect the peer connection list and peer to peer design concepts of the LM.
6	Collect the list of all displays/graphics containing the LM points.
7	Verify the existing TPN release number. TPN/TPS Standalone System: The minimum supported TPN release is TPN R688.1 Experion-TPN/TPS Hybrid System: The minimum supported Experion release is Experion R510.1 and TPN release is TPN R688.1.
8	Extract the EB files of the LM identified for replacement. The EB files are required to obtain the point details, I/O module details, and node specific configuration details of the LM.

9	Identify the mode of communication: RS232 or RS485.
10	Checkpoint the LM nodes identified to be involved in the migration process. For more information about checkpointing, see the *Process Operations Manual SW11-601*.
11	Extract the LM Printable Ladder (.prn) files for logics.
12	From the EB files, extract the I/O details and the node specific configuration details of the LM.
13	Convert the existing I/O and the LM points into suitable ControlEdge PLC points, ladder configuration.
14	Identify the LM modules that are excluded in the migration and leave them untouched, until otherwise alternates are stated in Honeywell references or guided by Honeywell personnel.
15	Ensure that the LM is ready for an offline migration.
16	Completely delete the LM database from the system to avoid existence of ghost points.
17	Shutdown the LM and proceed with the migration.

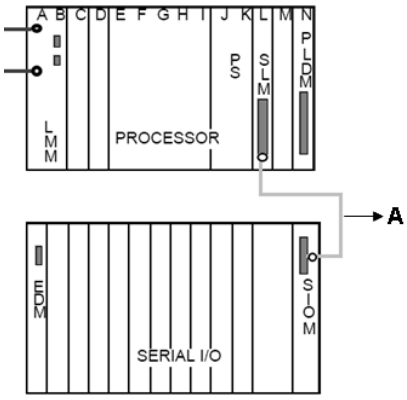
3.2.2 Replacing LM processor

The plant must be shut down before performing the migration procedure. As the Wiring Kit retains the field wiring intact, the shutdown time for this migration is minimal.

Replacing the LM processor with the ControlEdge PLC processor

Perform the following steps to remove the LM processor and replace the ControlEdge PLC processor.

WARNING	**Ensure that the identified LM, which is to be replaced, is shutdown, turned off and disconnected from the power supply.**

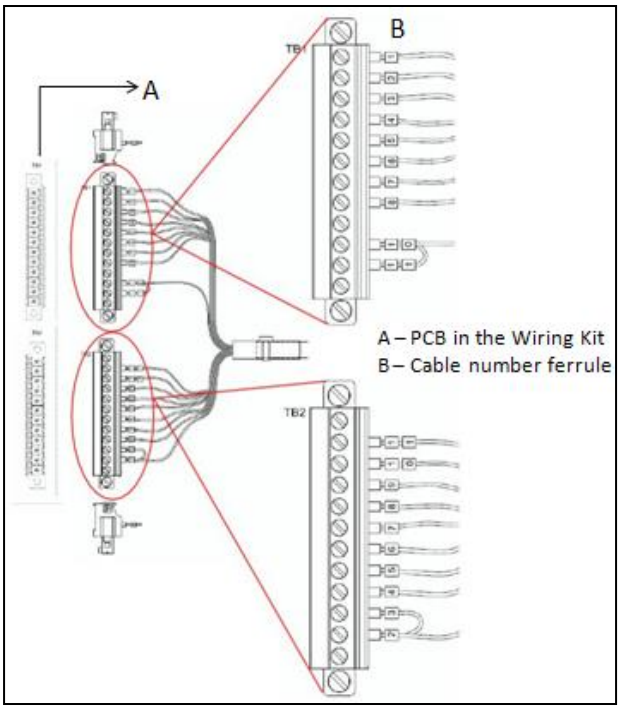
Step	Task
Remove the LM Processor Rack	
1	Remove the serial communication connection between the LM I/O module and the LM processor module.  **A – I/O wiring communication between the LM processor and the LM I/O module** **Tip:** Preserve the Serial communication module with the rack installation as this module has all the address settings applicable to that particular rack. The switches will be configured for particular applications and needs to be preserved. For more information, refer to the *Serial Link Module section* of *Logic Manager Service Manual*, LM13-500.
2	Remove UCN Drop Cables.
3	If the LM is redundant, remove the LM Redundancy wiring from the LMM and RCM modules, and the redundancy cable from the RCM module. For more information, refer to the *Universal Control Network Planning*, UN02-501.
4	Unscrew the mounting screws and remove the LM processor.
For more information about ControlEdge PLC Processor Rack installation, see section “Install ELMM with ControlEdge PLC” on page 40.	

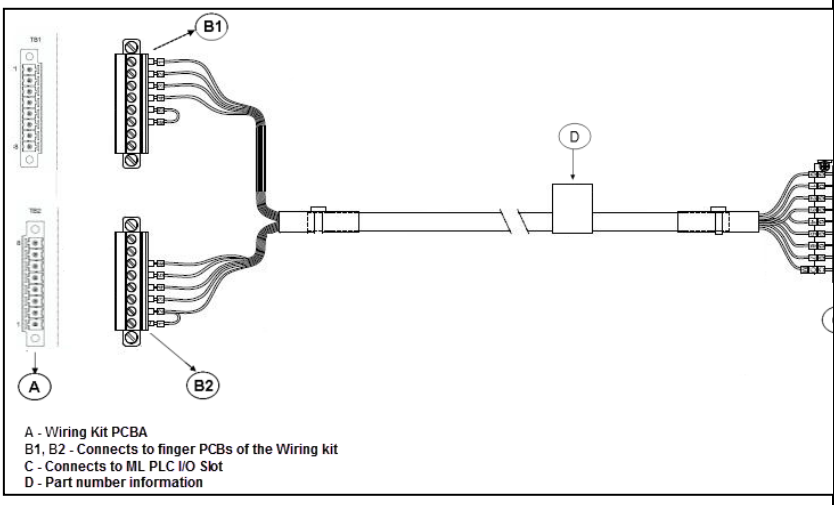
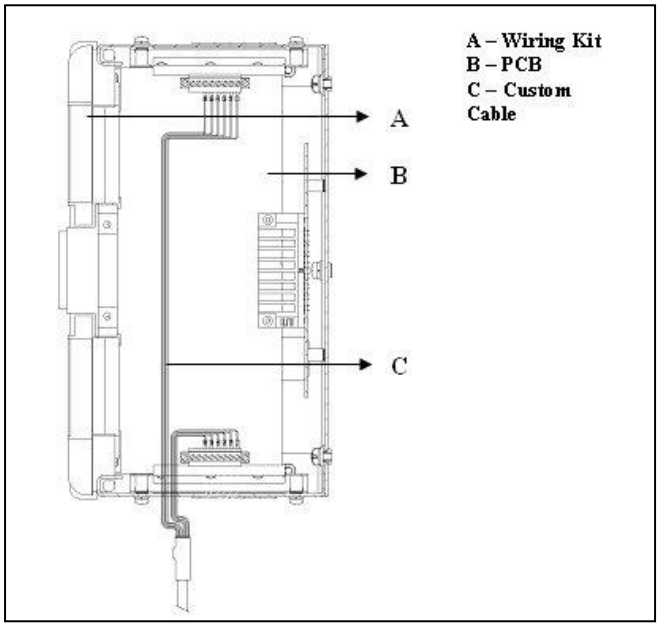
3.2.3 Replacing LM I/O rack

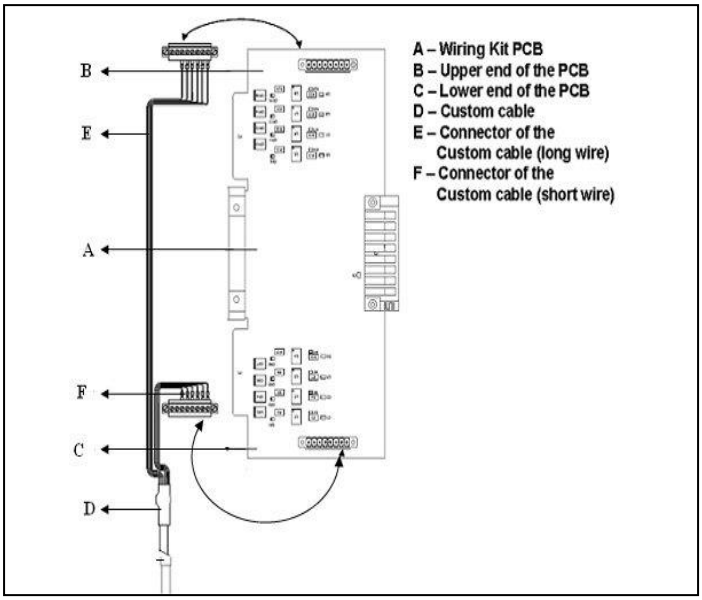
Perform the following steps to remove the LM I/O rack.

Note: The figures used in this procedure are for representational purpose only.

Step	Task
Removing the LM I/O rack	
ATTENTION	**Before performing the following procedure, disconnect the power cord to the LM I/O rack Power Supply module from the power source. Ensure that the communication wiring between the LM processor and the LM I/O module is removed.**
1	Identify the field cables to be removed. CAUTION: **Verify the field cable tags and ferrules to ensure that they match with the wiring diagrams.**
2	Remove the LM I/O serial communication module from the LM I/O rack.
3	Mark the I/O rack details (from where the module is removed) on the module for reference.
4	Remove the power supply module, EDM, SLM/PDLM
5	Open the swing arm connectors or terminal block connectors of the field cables sequentially from the first IO module.
6	Remove the I/O module.

Step	Task
7	Mount the Weidmüller connector and reconnect the swing arm connectors.
8	Complete the replacement for all the I/O modules in that rack.
Mounting the ControlEdge PLC I/O Rack	
1	Mount the ControlEdge I/O rack in the space released by the LM processor racks one below the other.
2	Refer to the cable tags and the ferrules to identify the finger PCBs to be inserted in the Wiring Kit.  **Tip:** If the cable tags are not available, identify the finger PCBs with the help of the I/O card details.

Step	Task
3	Identify the custom cables to be connected to the finger PCBs. **Tip:** The Finger PCB and Custom cable mapping helps in identifying the following: • The finger PCBs to be inserted in the Wiring Kit. • The custom cables to be connected to the finger PCBs.  A - Wiring Kit PCBA B1, B2 - Connects to finger PCBs of the Wiring kit C - Connects to ML PLC I/O Slot D - Part number information One end of the custom cable (B1, B2) is connected to the finger PCB. The other end of the custom cable (C) is connected to the ControlEdge PLC I/O rack.
4	Insert the custom cable through the bottom of the Wiring Kit. 

Step	Task
5	Connect the lengthier wire of the Connectors to the upper end of the finger PCB and the shorter wire of the Connectors to the lower end of the finger PCB. **CAUTION** **Avoid direct contact with the exposed pins of the finger PCBs or the Terminal Blocks, while connecting or removing the custom cables.**
6	Once the cables are connected, close the bottom cover with the ESD cover, P/N 51306728-100 for Full Rack and P/N 51306729-100 for Half Rack. 

3.3 Provide strain-relief to FTE cables

You must provide proper strain-relief to the FTE cables that are connected to the Ethernet switches. Not providing adequate strain relief to the FTE cables can cause intermittent connections.

The FTE cables must be of an appropriate length. Ensure that there is sufficient cable length to provide the minimum required bend radii. However, excess cable length must be minimized such that it is easy to manage inside the FTA tray cable channel.

For more information, see *Experion Network Best Practices*.

3.4 Cabling Considerations for PLC Components

3.4.1 Installation Declarations

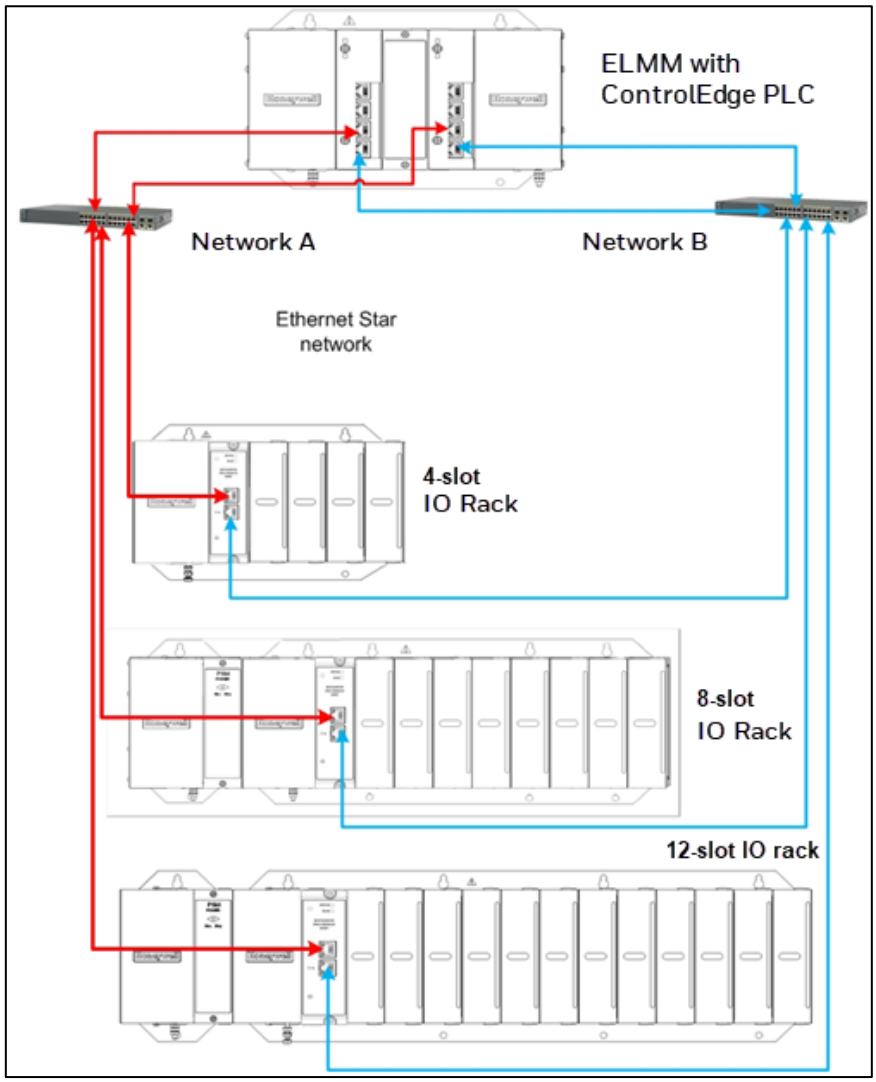
ATTENTION	This equipment shall be installed in accordance with the standard requirements such as National Electrical Code (NEC), ANSI/NFPA 70, or the Canadian Electrical Code (CEC), C22.1. It is supplied as "open equipment" that is intended to be mounted on a sub-panel within an enclosure. The suitability of the enclosure and installed system shall be acceptable to the local "authority having jurisdiction," as defined in the NEC, or "authorized person" as defined in the CEC.

ESD HAZARD	Electrostatic discharge can damage integrated circuits or semiconductors if you touch connector pins or tracks on a printed wiring board. • Touch a grounded object to discharge static potential • Wear an approved wrist-strap grounding device • Do not touch the wire connector or connector pins • Do not touch circuit components • If available, use a static safe workstation • When not in use, keep the component in its static shield box or bag.

WARNING	Unless the location is known to be non-hazardous, do not: • Connect or disconnect cables • Install or remove components • Install or remove isolators While the control system is powered.

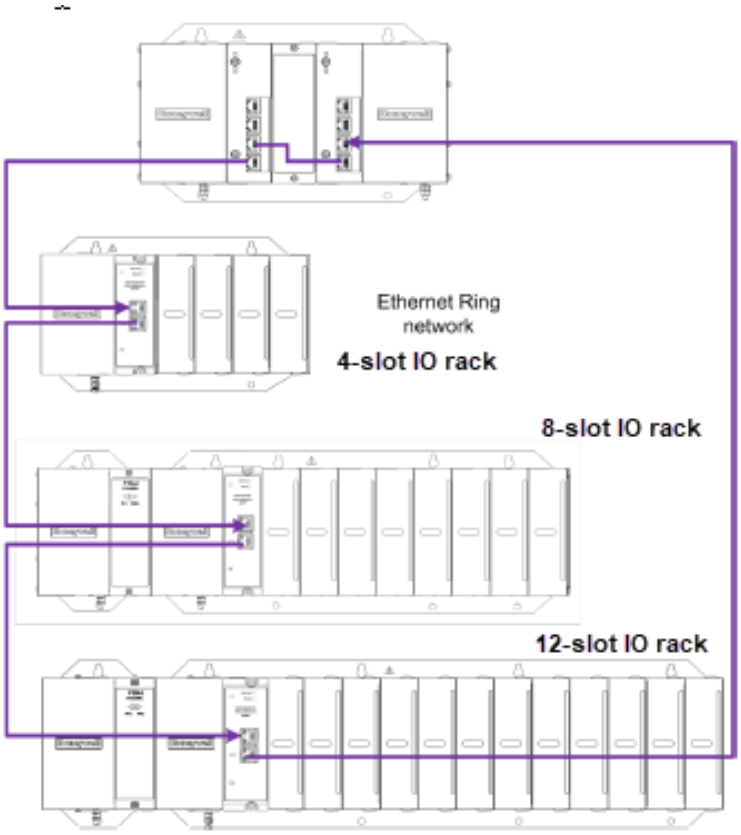
3.4.2 FTE and IOLINK Cabling

The following diagram shows an example of a redundant star topology.



For information on I/O link cabling, see section “Wiring and cabling” in the *ControlEdge PLC and ControlEdge RTU Getting Started Guide (RTDOC-X283-en)*.

The following diagram shows an example of a redundant ring topology.



3.4.3 Connecting I/O modules and field devices through I/O Termination Assemblies

See chapter “ControlEdge 900 platform” in the *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).

3.4.4 Grounding and power considerations - IOTA boards

See chapters “ControlEdge 900 Common Reference Information” and “Wiring and Cabling Planning” in the *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en).

3.5 EUCN Installation Hardware

This section provides references to documentation available for installing the hardware and software for completing the EUCN installation.

3.5.1 Network Hardware Installation and Planning

For hardware installation procedures and cabling information, see the following documents.

For information about	See
Topology	Network Planning section of this document.
FTE network and planning	See chapters “Enhanced Universal Control Network” and “Planning an FTE network” in *Universal Control Network Planning UN02501*.

For information about	See
Cabling information	See sections: EUCN Cable Construction and Installation, Selecting copper cables for the EUCN, Terminating copper cables, Grounding the copper cables, Selecting fiber cables for the EUCN, Routing fiber optic cables, Identifying network cables, Splicing and connecting fiber optic cables, and Testing EUCN cables of *Universal Control Network Installation UN20500*
EUCN Power-On Test	See "EUCN Power-On Test" section in *Universal Control Network Installation UN20500*
Ethernet switch installation & configuration	*Fault Tolerant Ethernet Installation and Service Guide* (EPDOC-XX36-en)

3.5.2 Redundant ELMM with ControlEdge PLC considerations

Primary ELMM must be configured with an odd number between 1-509. Secondary will be the following even number.

3.6 For information on redundancy operations, see "Verifying ELMM with ControlEdge PLC Hardware and Firmware versions

For an ELMM, the Hardware Version (H/W) and Firmware Version (F/W) fields on the LM Detailed Status Display do not display correct information, you can instead go to ControlEdge Builder to verify this information. To know the H/W and F/W information,

1. From the **Start** Page, select **Connect** to connect the target controller.
2. From the **Home** page, make sure that you have selected ELMM as the controller type under Controller and Programming.

3. From the **Home** page, select **View Diagnostics** under Diagnostics.
4. Go to **System** > **Platform**.

   The View Diagnostics page is displayed, verify the hardware and firmware versions.

ELMM with ControlEdge PLC Redundancy operations" on page 153.

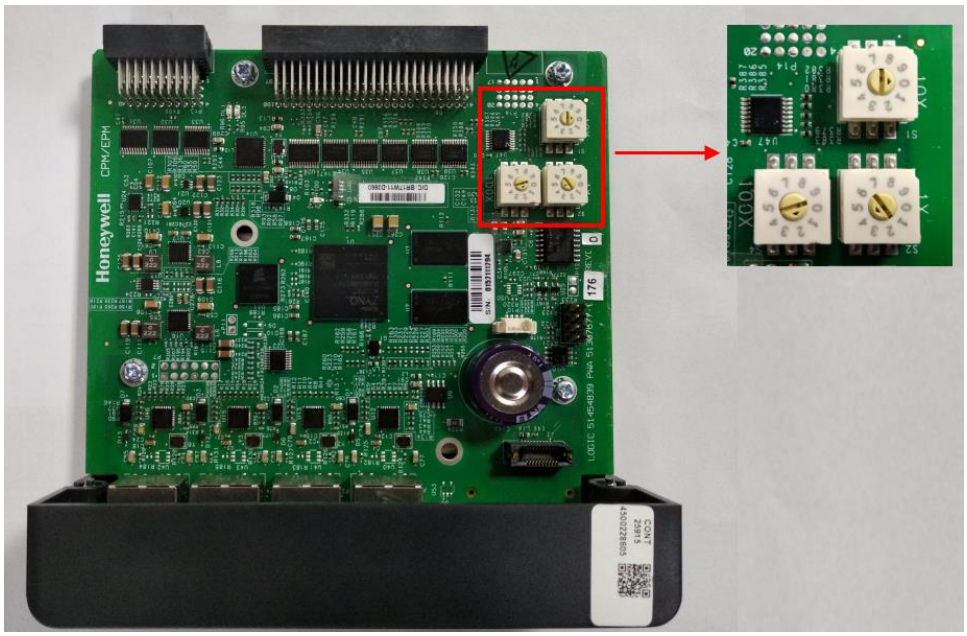
3.7 Setting Device Index on ControlEdge PLC CPM

The FTE Device Index uniquely identifies the controller on the FTE Network. The FTE Device Index is configured in two places. First, the CPM rotary switches are used to set the FTE device index of the UOC. Second, ControlEdge Builder is used to configure the same FTE Device Index that is set using the CPM rotary switches in the ELMM with ControlEdge PLC Platform Function Block.

The CPM rotary switches are used to set the FTE device index of the controller.

In the following example, “204” is set as the device index for the node, **100X2** + **10X0** + **1X4** = 200 + 0 + 4 = 204.

Tip: Use a flat blade screwdriver and rotate the screw head to the desired number. The arrow on the switch should point to the number that needs to be set for the FTE address.

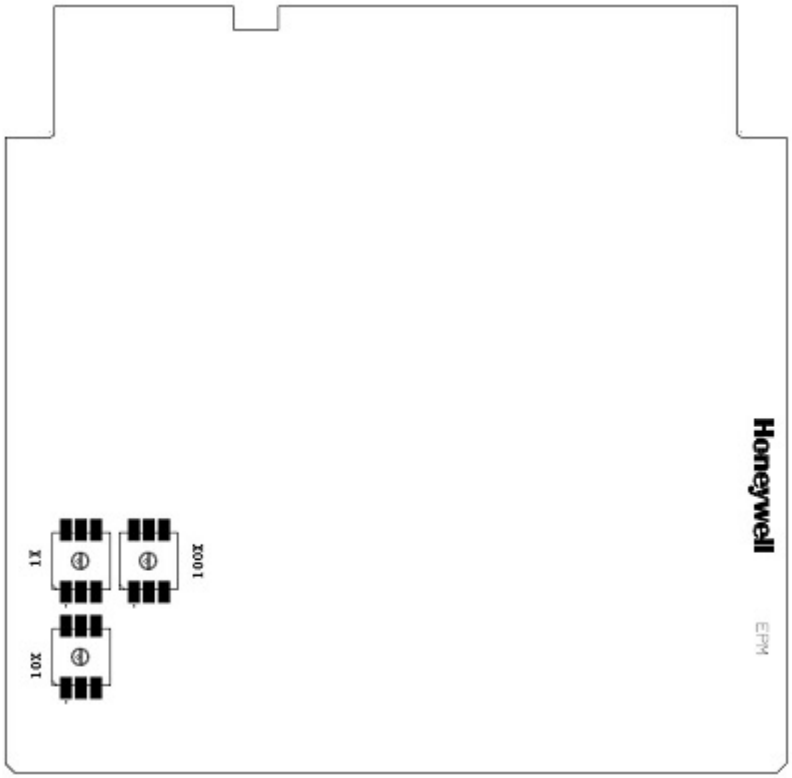


3.8 Setting Address and Network Topology on ControlEdge PLC EPM

The EPM rotary switches are used to set the EPM address and network topology for the I/O rack as shown in the following image.

- Set the 10x and 1x switches to the two-digit address ranging from 01 to 99. The lower switch (10x) is used to set the tens digit and the upper switch (1x) sets the ones digit.
- Set the network topology using the 100x switch. 3 is for Ring network topology, 4 is for Star network topology and 5 is for DLR network topology.

Tip: Use a flat blade screwdriver and rotate the screw head to the desired number. The arrow on the switch should point to the number that needs to be set for the address.



4 ELMM with ControlEdge PLC Configuration and Operations

4.1 Pre-configuration checklist

Step	Task
1	Ensure LM checkpoint backup is taken on an emulated drive.
2	Complete configuration of I/Os.
3	Check cable connections.
4	Ensure that all the Migrated XML files, Modbus Mapping files, and ControlEdge IO Configuration details are available to load into ELMM ControlEdge PLC.
5	Ensure that the ControlEdge Builder station is available on the same FTE network. For installing ControlEdge Builder, see the ControlEdge Builder Software Installation User's Guide (RTDOC-X285-en).

4.2 Configuration Overview

After installing the hardware, you are now ready to power up the ELMM hardware and perform the configuration. This section provides information about providing Ethernet IP addresses, powering up ELMM, performing diagnostic checks, and configuring ELMM. The major tasks involved in configuring ControlEdge PLC are as follows.

Step	Task
1	Startup Experion Server and BOOTP server.
2	Power on ENIM/ENB and ELMM.
3	Perform hardware diagnostics tests.
4	Load the redundant ELMM with LM personality and database.

4.3 FTE configurations on PLC

4.3.1 BOOTP Server

The BOOTP is a low-level protocol that provides configuration to other nodes on a TCP/IP network with the Windows operating system. The BOOTP configuration files let you automatically assign IP addresses to the Ethernet module. You can also obtain subnet masks and gateway addresses from BOOTP.

Ensure BOOTP Server service is running. See section "Checking status of BOOTP server service" in the *Fault Tolerant Ethernet Bridge Implementation Guide* (EPDOC-XX35-en) for details about starting the service in case it is not running.

The Ethernet module factory default setting is BOOTP enabled. Upon power up, the Ethernet module sends a message to the BOOTP server on the network with its physical (or MAC) address. The server compares the MAC address to those in its look-up table in the configuration file and sends a message back to the module with the appropriate IP address.

Base IP address

The base IP address consists of the following:

- The first number in the address represents the network number.
- The second number in the address represents the community number.
- The third number is user-defined.
- The last number represents the Device Index of the embedded node which is usually 0.

The IP address consists of the base IP address + device index (configured on the rotary switches of the node).

- The rotary switches are located on the CPM.

 CAUTION	**Changing the base IP address of BOOTP server and rebooting the ELMM with ControlEdge PLC results in a mismatch in the base IP address settings. This mismatch might result in a loss of view to the EUCN nodes.**

- A valid Device Index has a range from 1-509.

TIP	**If a board obtains an IP address from a BOOTP server, then that IP address is retained in memory. The IP is maintained even if the server is not present on subsequent reboots.** **If the default IP address in the BOOTP server is changed or if the Device Index is changed on the node, then the IP is overwritten on node reboot.** **To clear the IP information from memory, set the device index to 0.**

4.3.2 Non-BOOTP Server

In the case of BOOTP server unavailability, you must configure the Base IP Address (BIP) and subnet mask (MSK). Set the Base IP Address (BIP) and Subnet Mask Address (MSK).

Base IP Address configuration:

Base IP Address format	Description
<First IP address octet>	The first octet of the IP Address.
<Second IP address octet>	The second octet of the IP Address.
<Third IP address octet>	The third octet of the IP Address.
<Fourth IP address octet>	The fourth octet of the IP Address. Note: The Node IP Address is the sum of the Base IP Address and FTE Device Index. This is calculated by the UEA during startup. For example, • If the FTE Device Index is 45 and the base IP address is 10.0.0.0, then the node would be assigned with 10.0.0.45 as the IP address. Or • If the FTE Device Index is greater than 255, in this case “346” and the Base IP address is 10.0.0.0, the third octet is assigned as "1" and the fourth octet will be FTE Device Index minus 255, then the node would be assigned with 10.0.1.91 as the IP address. Subnet Mask configuration: The Subnet Mask address is provided by the Experion BOOTP server. If BOOTP? =N, and the default address 255.255.255.0 is incorrect, then the Subnet Mask Address must be configured.

4.3.3 Base IP Address configuration on ControlEdge Builder

ControlEdge Builder is used to configure the Base IP Address in the ELMM with ControlEdge PLC Platform Function Block.

Step	Action
1	Open ControlEdge Builder.
2	Select **Open Project** and browse to the project.
3	Under Controller and Programming, select **Configure Ethernet Port ETH 1**.
4	Perform one of the following tasks depending on BOOTP Server availability/unavailability. • Under FTE Setting, select **Yes** from the BOOTP Available drop-down list in the case of BOOTP Server availability. OR • Under FTE Setting, select **No** from the BOOTP Available drop-down list in the case of BOOTP Server unavailability and then select **Use the following IP address** option to configure the Base IP Address manually.

4.3.4 EUCN Protocol selection

In ControlEdge Builder's Configure Ethernet Port ETH 1 section, under Protocol Binding, ensure that the **EUCN** check box is selected to startup the PLC module as an ELMM. Note that each time there is a change in this option, the module needs a reboot to pick up the changes in configuration.

4.3.5 Controller Type configuration for ELMM

Beginning with ControlEdge PLC RTUPLC_172.1-15.1, in ControlEdge Builder's Configure Controller Type section, **PLC_FTE** should be selected as the PLC variant, this is required for the ELMM functionality to work.

4.3.6 Device Index configuration

Beginning with ControlEdge PLC RTUPLC_172.1-15.1, there is no option to configure the FTE Device Index in ControlEdge Builder. The FTE Device Index is derived from the CPM rotary switches setting. For authentication needs of ELMM, the Device Index configuration is available on the Native Window Box Specific Configuration page.

NOTE	**When BootP Availabe is set to Yes, any engineering operations for communication with the controller always recognizes the CPM rotary switches setting, the IP configuration in ControlEdge Builder is no longer effective for FTE ports (ETH1/ETH2).**

4.3.7 EUCN Connection

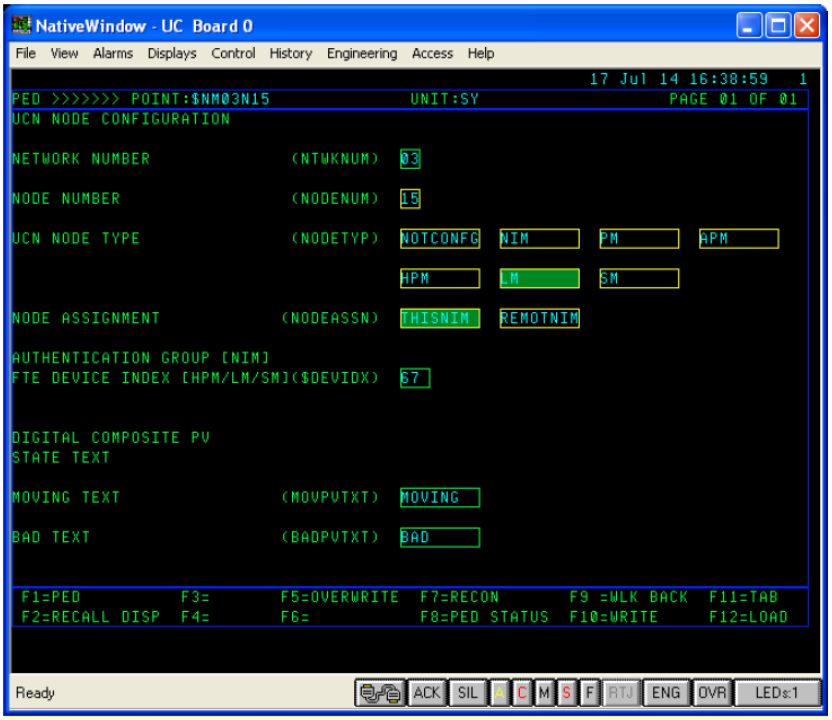
This section describes the procedure for connecting ELMM with ControlEdge PLC, non-redundant or redundant, to the Enhanced Universal Control Network (EUCN).

Configure EUCN Node

With ELMM, DIP switches are no longer used to provide the node address. Instead, you can set the node address from the Station's Engineering Main menu.

To specify a node address:

Step	Action
1	On the Engineering Main menu, select **Network Interface Module**.
2	Select **UCN Node Configuration**.
3	Specify the **FTE Device Index ($DEVIDX)** setting. This must be the same odd numbered address you entered on the ELMM's CPM as described in the previous section.

4	Specify the following details to configure the UCN node: • Network Number • Node Number • UCN Node Type. Select LM • Node Assignment – Select ThisNIM • Device Index from rotary switch setting 
5	Press Ctrl + (F12) on the key board to load the changes.

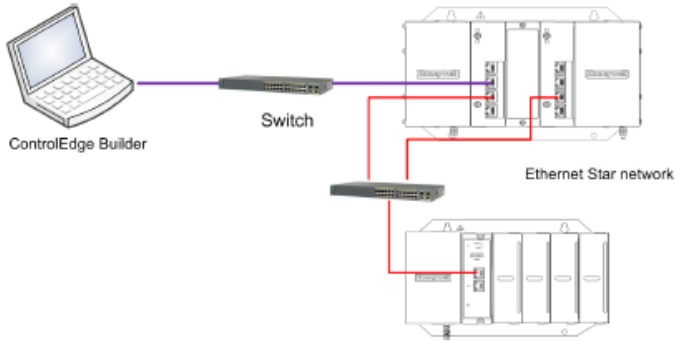
To modify a node address:

1	Reboot LMM.
2	Set the UCN node number using the same procedure as Specifying a node address. It is recommended to retain the same UCN node address..

4.4 Power on ELMM with ControlEdge PLC

4.4.1 ELMM startup

NOTE	**Both AC power supply and DC power supply can be used in ControlEdge PLC. Based on existing wiring, choose the type of power supply.**

Step	Action
1	Connect 24 VDC supply or 120/240 VAC power supply to the controller.
2	Connect an Ethernet cable to the CPM port most appropriate for your situation.
3	Connect the other end of the Ethernet cable to the PC installed ControlEdge Builder directly or through a switch. 

4.4.2 Compiling and downloading a project

See sections “Compiling a project” and “Downloading a project to the controller” in the *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en).

ATTENTION	**Ensure successful compilation of a project before downloading the same.**

ATTENTION	**ELMM points can be activated irrespective of the PLC address configuration on the project downloaded onto the controller, unlike in the case of a LM. However, write operations on a PV value onto these points fail if the Modbus mapping is not configured.**

4.4.3 Downloading all xml files using Ladder Logic Migration Tool

Download all xml files for the translated LM logics, IOP configuration details, and MODBUS mapping details after startup using the LM Ladder Logic Migration Tool.

For more information, refer to the *Ladder Logic Migration User's Guide* (XXDOC-X339-en-100).

4.4.4 Configuring date/time

Setting time source

The section introduces how to synchronize the controller time to the LCN time source.

For ELMM with ControlEdge PLC, even though ControlEdge PLC supports SNTP time source, the ELMM component within ControlEdge PLC requires time synchronization with the TPN/LCN network. Honeywell recommends that you always use the LCN time source for ELMM with ControlEdge PLC.

To set time source:

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the Home Page, under Miscellaneous, select **Configure Date/Time**.

3	On the Set Time Source page, uncheck the **Enable** checkbox. RESULT: The ELMM time is now synchronized to the LCN time source.
4	Select **Set Time Zone** tab and select **UTC + 00:00** from the Time Zone drop-down list.
5	Select **Automatically Switch to Daylight Saving Time** if it is applicable.

4.4.5 Configuring hardware in ControlEdge Builder

Setting Controller name

You can set a new name for a controller.

1. From the Home Page, under **Controller and Communications**, select **Set Controller Name**.
2. Enter the desired name for the controller, and select **Save**.

Configuring the controller IP address

The first thing you will normally want to do is set the IP address for the controller. The following steps describe how to configure a fixed IP address starting with creating a new project.

The following table lists the factory default network settings for non-redundant controller. If your controller has been previously configured, these settings may have been changed.

Port	Default setting
ETH1	IP address is dynamically assigned from a DHCP server. If no DHCP server is found by the controller, an IPv4 link-local address will be assigned (169.254.x.x).
ETH2	ETH2 configuration is a replica of ETH1 configuration since they represent FTE A and FTE B respectively.

The following table lists the factory default network settings for the redundant controller.

Port	Default setting
ETH1	IP address is dynamically assigned from a DHCP server. If no DHCP server is found by the controller, an IPv4 link-local address will be assigned (169.254.x.x). The secondary controller IP address is incremented by 1 from the primary controller IP address.
ETH2	The primary controller static IP address: 192.168.1.50 The secondary controller static IP address: 192.168.1.51

To configure IP address:

Step	Action
1	From the **Home** page, make sure that you have selected **PLC_FTE** as the controller type under Controller and Programming.
2	From the Home Page, select the arrow beside **Configure Ethernet Ports**, and select **ETH1**.
3	Under **Network Setting**, configure the IP address of the Ethernet port for the controller.
4	Under the **Protocol Binding**, select the protocol which you want to bind to the port. Ensure that the **EUCN** check box is selected, this is required for the ELMM functionality to work.

5	Select **Save** to complete the Ethernet port configuration.
6	Select **Back** to return to the Home Page. TIP: **If new IP settings are compiled and downloaded, the controller will be disconnected from the configuring device.**

Configuring controller redundancy

To disable redundancy:

Step	Action
1	From the **Home** page, make sure that you have selected ELMM as the controller type under Controller and Programming.
2	Under **Controller and Communications**, select **Configure Controller Redundancy**.
3	Select **Disable Redundancy** to disable the redundancy function.
4	Select **OK**. Redundancy has been disabled. The IP address configured for the secondary controller will be disabled.

To enable redundancy:

Step	Action
1	From the **Home** page, make sure that you have selected ELMM as the controller type under Controller and Programming.
2	Under **Controller and Communications**, select **Configure Controller Redundancy**.
3	Select **Enable Controller Redundancy**, and then select **OK**. The configuration of I/O modules in the rack local to the controller will be removed and a static IP address must be configured for the secondary controller.

4	Configure the IP address of the controllers. • Select the BOOTP option as YES or NO depending on the network topology. If the BOOTP option is set to YES, the **Obtain an IP Address Automatically** option is enabled. Configure the **Primary Controller IP Address** and **Secondary Controller IP Address** manually. If the BOOTP option is set to NO, then you must manually configure the IP addresses.

Configuring an I/O module for ControlEdge PLC

Step	Action
1	From the Home Page, under **Programming and I/O** and select **Configure I/O**.
2	Select **Add I/O Module**. The **Add I/O Module** dialog appears.
3	Select the **Type**, assign the **Rack** and **Slot**, and set the **IOM Scan Time** for the Module.
4	Select **OK** to add the I/O module.
5	Select the corresponding I/O module, configure I/O channels.

4.4.6 ELMM with ControlEdge PLC states in boot mode

At the conclusion of POST, the ELMM determines whether or not there is a valid Application Image present in the controller and whether it should then transition to executing this Application image (Application mode) or to continue in the Boot mode.

- If the controller remains in the Boot mode, the controller then enters one of the states listed in Controller in Boot mode table and joins the FTE network on which it resides. See Display indications when controller is in boot mode table for a description of the faceplate indications when the controller is operating in the boot mode.
- If the controller transitions to the Application mode, the controller then joins the FTE network and enters one of the operating states described in ELMM in Application mode table.

ELMM State	Description
READY	The controller received a command to remain in the boot mode to allow upgrading ControlEdge PLC firmware. See section Firmware Upgrade on page 95.
FAIL	The controller detected a failure during startup.

ATTENTION	**Do not power off when upgrading firmware.**

Before flashing ELMM firmware into ELMM with ControlEdge PLC, it is required to:

- Log in as the Administrator to connect the target controller. For more information, see "Connecting a controller" in *ControlEdge Builder User Guide* (RTDOC-X283-en).
- Ensure that the latest ControlEdge Builder is installed on your computer. See the *ControlEdge Builder Software Installation User's Guide* (RTDOC-X285-en) for details.
- Make sure the CPM version is same as or newer than the EPM version. In this case:
  - No specific upgrade sequence
  - Downgrade EPM before CPM

4.4.7 Upgrading firmware for a redundant controller

ATTENTION	**It is recommended to upgrade the firmware without opening a project.**

There are two scenarios for the firmware upgrade of an redundant controller.

- On-process - The primary CPM is synced with the secondary CPM.
- Off-process - The primary CPM is not synced with the secondary CPM.

The migration from LM to ControlEdge PLC must be performed off-process. Any future firmware upgrades will support on-process and off-process upgrades.

Prerequisites

- Assume the primary CPM is at slot A and the secondary CPM is at slot B.
- Both primary (slot A) and secondary (slot B) CPMs are powered on.

To upgrade the firmware On-process

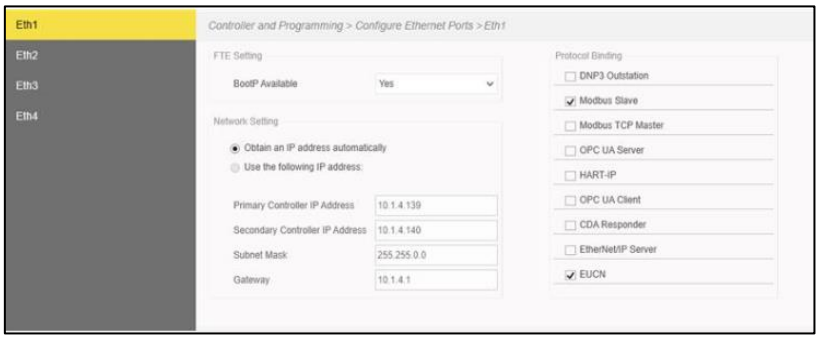
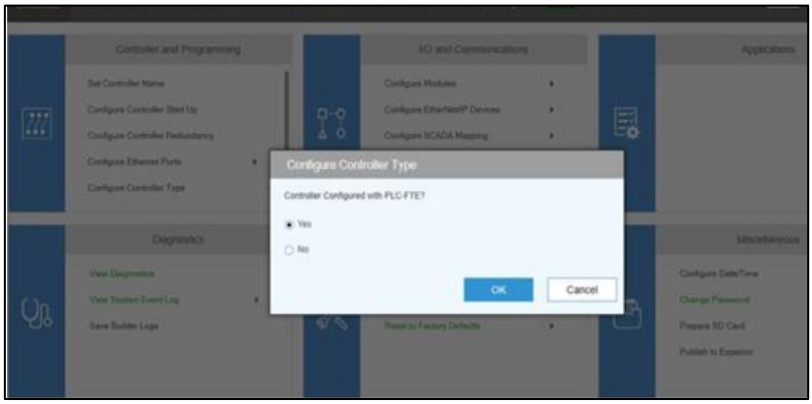
ATTENTION	**If you are upgrading from RTUPLC_160.2-03.14 to RTUPLC_172.1-15.1, it is mandatory to install HotFix 2 with “special image” before performing this upgrade operation.**

Prerequisites

- Install ControlEdge builder **RTUPLC_172.1-15.1** before performing the below upgrade procedure.

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target primary CPM (slot A).
3	From the **Home** Page, select **Upgrade Firmware under Maintenance**, and select the CPM you want to upgrade.
4	Click **Upgrade**. The **Upgrade firmware** dialog appears.
5	From the **Release Number** list, select the target release module as R160.2 HotFix 2. The target firmware version RTUPLC_160.2-03.14 is displayed. **TIP** **If you want to use a controller as an FTE node, you must select "Release number_FTE".**
6	Click **Next**. The target firmware name, state, and version are displayed.
7	Click **Next** to transfer and upgrade the firmware.
8	After the boot and application firmware is upgraded, enter the password to re-connect the controller.
9	Click **Go Back** to revert to the previous firmware version, or click **Proceed** to complete the upgrade.
10	The primary CPM is synchronizing with the secondary CPM. Click OK to complete the firmware upgrade. The secondary CPM (slot B) becomes the primary one and the original primary CPM (slot A) becomes the secondary one.
11	On the Native window, ensure that the ELMM shows OK/BACKUP state and the secondary controller is fully synchronized with the primary controller.
12	Repeat the steps from 1 to 10 to upgrade RTUPLC_160.2-03.14(special image) to RTUPLC_172.1-15.1. by choosing an appropriate release number from the Release target List in Step 5.

Post-upgrade procedure

Step	Action
1	Upgrade the **Project** to the latest **RTUPLC_172.1-15.1** release.
2	Enable **EUCN** option under **ETH1.** A failure to enable this option, may cause the ELMM functionality to be disabled. 
3	Ensure PLC-FTE is selected as the controller type 

To upgrade the firmware Off-process

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target primary CPM (slot A).
3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the **Home** Page, select Upgrade Firmware under Maintenance, and select the CPM you want to upgrade.
6	Select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, we provide the interactive mode to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select Next to upgrade the firmware, and the controller is stopped. You can also select Cancel to quit the upgrade process. If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.

7	Select **Proceed with Upgrade** to continue.
8	From the **Release Number** list, select the target release module. The target firmware version is displayed.
9	Select **Next**. The target firmware name, state and version are displayed.
10	Select **Next** to transfer and upgrade the firmware.
11	After the boot firmware is upgraded, enter the password to reconnect the controller. The application firmware is transferred and upgraded.
12	After the application has been upgraded, enter the password to reconnect the controller. The firmware upgrades.

4.4.8 Upgrading EPM firmware

EPM firmware upgrade is ONLY allowed in **Stop Locked**, **Stopped, or Remote** operating modes.

You can rotate the mode switch on CPM to change operating modes, see "CPM mode switch" in *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en). If the mode switch is in REMOTE position, see "Setting operating modes" in *ControlEdge PLC and ControlEdge RTU Getting Started* (RTDOC-X283-en).

ATTENTION	**If the EPM is being upgraded, all I/O modules in the same rack will keep in failsafe state until the firmware upgrade is completed.**

To upgrade EPM:

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target controller.

3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the Home Page, select **Upgrade Firmware** under **Maintenance**, The **Upgrade Firmware** dialog appears.
6	Select **EPM** tab, all available EPMs are displayed. At least one I/O module, which is in the same rack with the target EPM, must be added in the Configure I/O page, then the target EPM will be displayed here. See "Configuring an I/O module" in Software Chapter in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-x283-en).
7	Select or multiselect the target EPMs and select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, interactive mode is provided to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select **Next** to upgrade the firmware, and the controller is stopped. You can also select **Cancel** to quit the upgrade process. • If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.
8	Select **Proceed with Upgrade** to continue.
9	From the **Release Number** list, select the target release module. The target firmware version is displayed.
10	Select **Next**. The target firmware name, state and version are displayed.
11	Select **Next** to transfer and upgrade the firmware. After the upgrade is completed, a dialog appears. You can check which EPM is upgraded successfully, which one is failed.
12	Select **OK**.

4.4.9 Upgrading I/O module firmware

I/O module firmware upgrade is ONLY allowed in **Stop Locked**, **Stopped, or Remote** operating modes.

ATTENTION	**The target I/O module must be added in the Configure I/O page. See "Configuring I/O modules and channels" in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en*).***

To upgrade I/O module

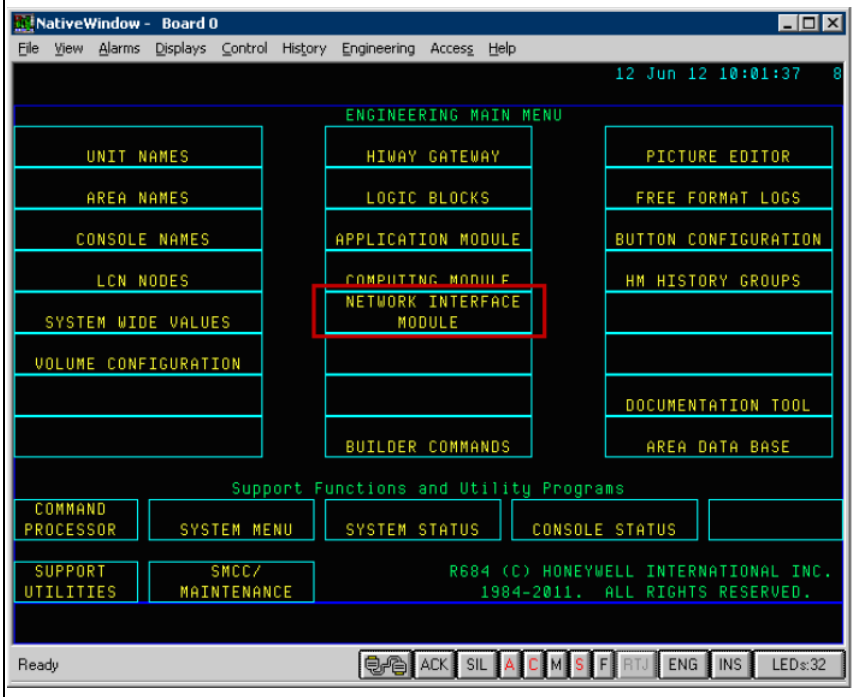
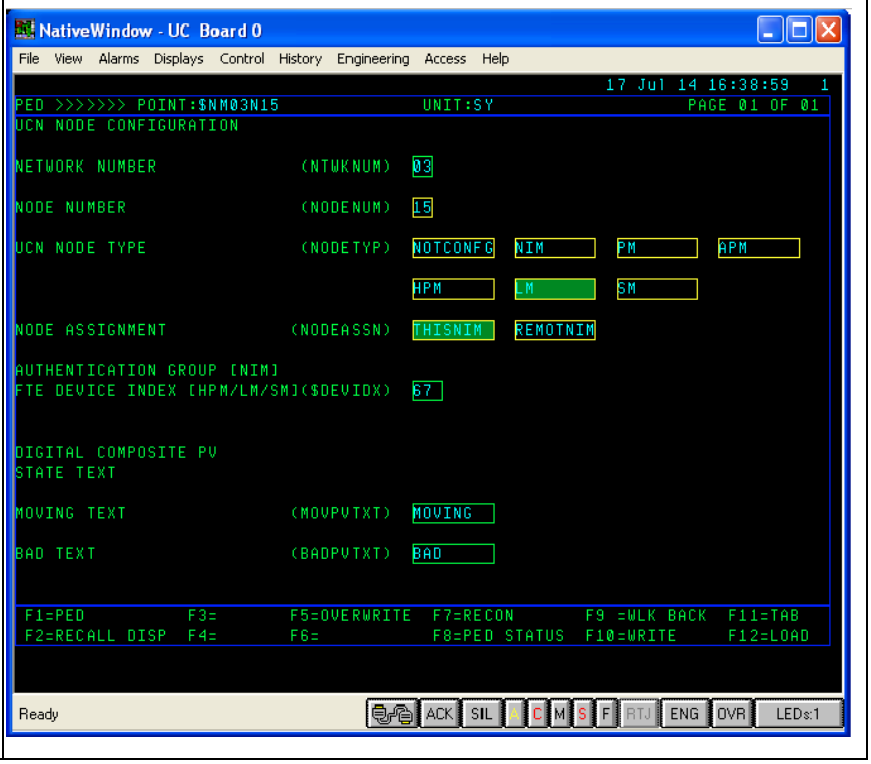
Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target controller.
3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the **Home** Page, select **Upgrade Firmware** under **Maintenance**. The Upgrade Firmware dialog appears.
6	Select the **UIO 16** tab, all available I/O modules are displayed.

7	Select or multiselect the target I/O modules and select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, we provide the interactive mode to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select **Next** to upgrade the firmware, and the controller is stopped. You can also select **Cancel** to quit the upgrade process. • If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.
8	Select **Proceed with Upgrade** to continue.
9	From the **Release Number** list, select the target release module. The target firmware version is displayed.
10	Select **Next**, the target firmware name, state and version are displayed.
11	Select **Next** to transfer and upgrade the firmware. After the upgrade is completed, a dialog appears. You can check which module is upgraded successfully, which one is failed.
12	Select **OK**.

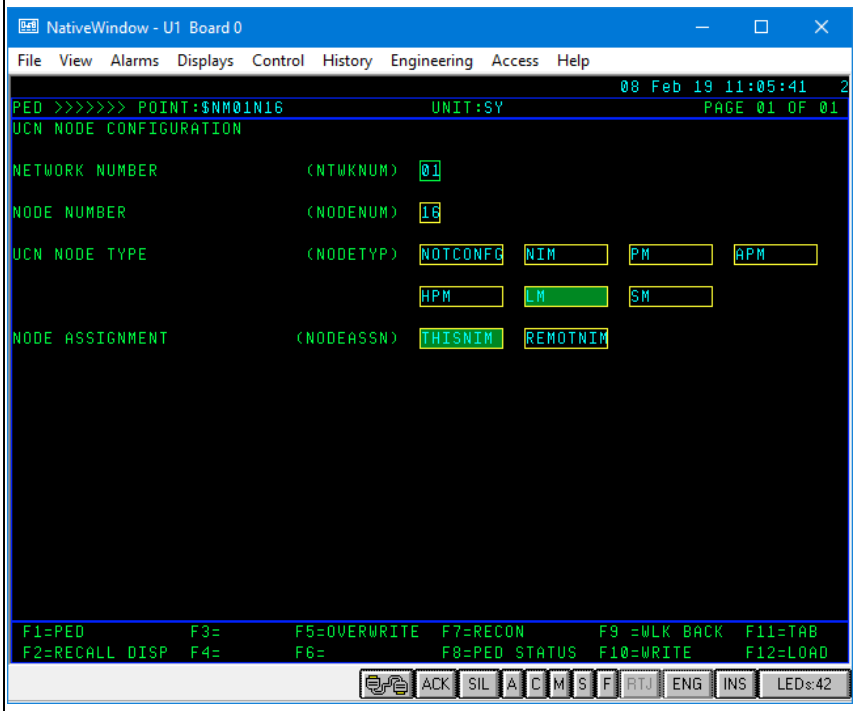
4.5 ELMM with ControlEdge PLC Configuration

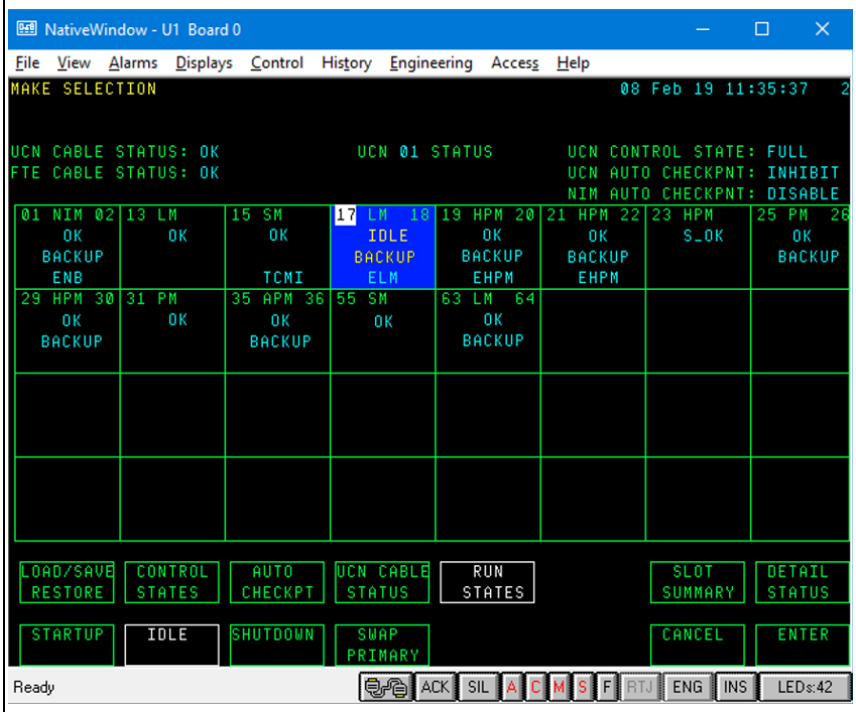
Use the following procedure to load the redundant ELMM with LM personality and database.

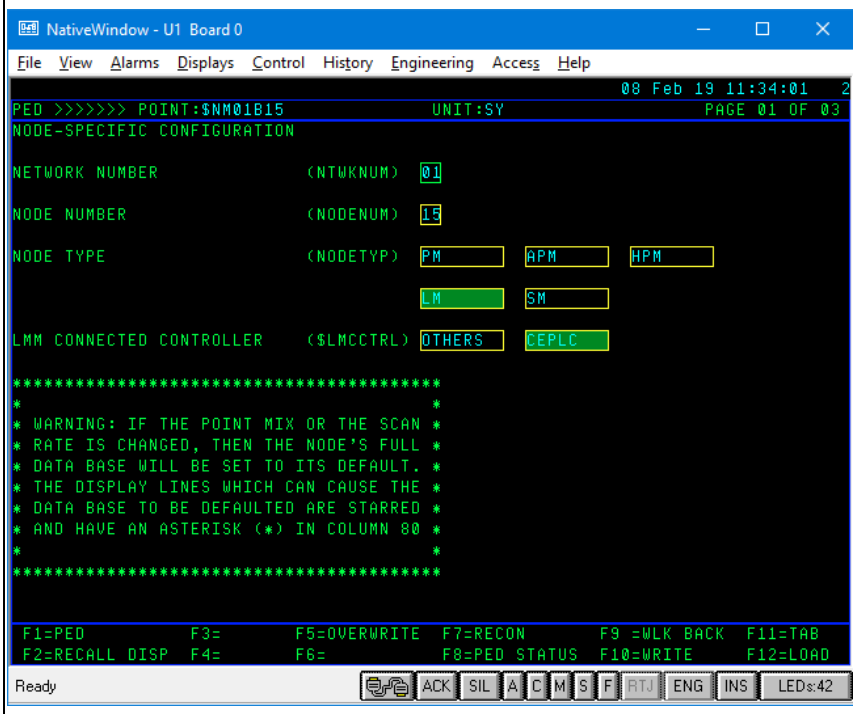
Step	Action
1	Invoke the **Engineering Main Menu** display by pressing the <**CONTROL**> and <**HELP**> keys on the keyboard.

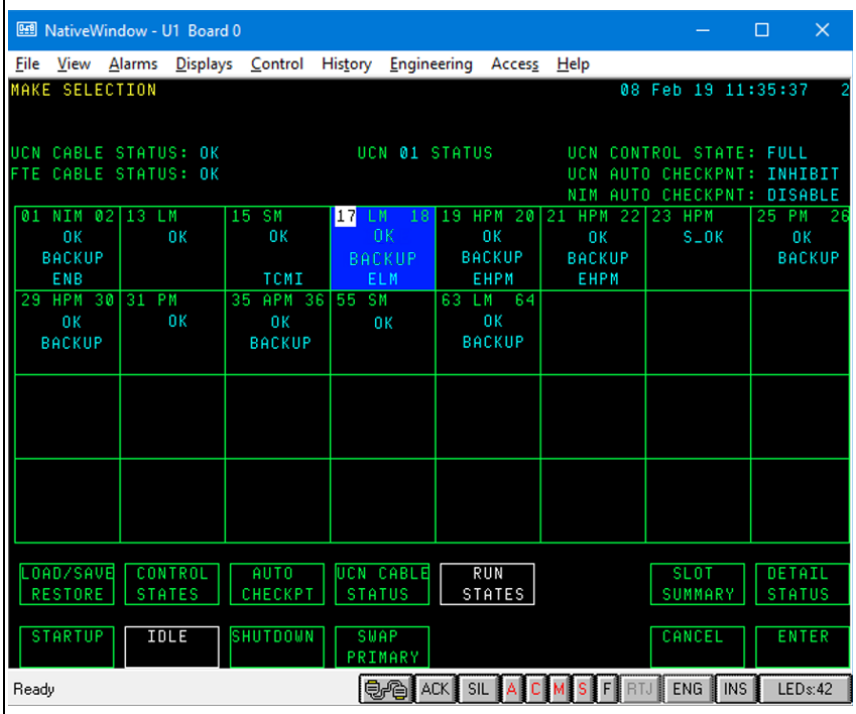
2	Start the process by selecting the **NETWORK INTERFACE MODULE** target on the **Engineering Main Menu** display. This invokes the **NIM Build Type Select Menu** display. 
3	Select the **UCN NODE CONFIGURATION** target to invoke the **UCN Node Configuration** display. 

4	Reconstitute the LM by entering the **UCN NETWORK NUMBER**, **NODE NUMBER**, **UCN NODE TYPE**, and pressing the <**CONTROL**> and <**F7**> keys. Note: As a better engineering practice, remove all Secondary ELMMs from the network and reconfigure it after Primary ELMMs are running. For removing Secondary ELMMs, use UCN Node configuration, change the BACKUP ELMM to NOT CONF and load by pressing Ctrl + F12.
5	Ensure that the node type is LM and then press enter.

6	Enter the FTE Device Index and press **ENTER**. NOTE: • Use the FTE Device Index assigned to this ELMM in section “Appendix A: EUCN Configuration Data Checklist” on page 158. Ensure that there are no errors. • The FTE Device Index entered must be the same as the FTE Device Index physically set in the rotary switches of the ELMM FTE Interface Module. **Note**: Initially, the **$DEVIDX** parameter will be 0. After you change the value from 0 to a non-zero value, a warning message is received, “WARNING: CHANGING $DEVIDX WHILE IN A RUNNING STATE MAY CAUSE LOSS OF VIEW. $NMuuNnn EXISTS – SELECT OVERWRITE OPTION IF DESIRED”. Where “uu” is the UCN Network Number and “nn” is the Primary LM’s UCN Node Number. For the redundant ELMM, the Secondary ELMM FTE Device Index is automatically set to the Primary ELMM Device Index plus one. 
7	Press the <**CONTROL**> and <**F12**> keys to load. RESULT: The Primary ELMM transitions to **IDLE** state.
8	From the UCN Status Display, checkpoint the NIM to save the FTE Device Index information in the NIM checkpoint.

9	Make sure that the PLC CPM hardware is connected to the power supply. The PLC CPM's status must indicate IDLE on the UCN Status display with ELMM on the Auxiliary status line. **ATTENTION** **After the LM is migrated to ControlEdge PLC, the personality download procedure is obsolete and hence the module starts up from the IDLE state with no database.**
10	For the redundant ELMM, repeat steps 4, 5 and 7 for the secondary ELMM to come to the **BACKUP (yellow)** state indicative of IDLE status. 
11	Restore the LM checkpoint taken earlier. Select the **Primary ELMM** > **LOAD/SAVE RESTORE** > **RESTORE DATA** and then press **ENTER** and choose **DEFAULT SOURCE**. NOTE: As the ELMM transitions to IDLE state directly, there is no need to download the TPN personality.

12	Reconstitute ELMM's UCN node-specific configuration and choose LMM CONNECTED CONTROLLER type as **CEPLC** and then press **ENTER**. 
13	Reload the configuration by pressing **Ctrl + F12.**
14	Select **RUN STATES** > **STARTUP** to perform a startup of the ELMM. RESULT: The Primary ELMM transitions from IDLE to OK state.

15	On a successful database sync, ensure that the Secondary ELMM transitions to the **BACKUP (cyan)** state indicative of OK/RUN state. 
16	Checkpoint ENIM and ELMM, once onto the HM and once onto the emulated drive.
17	All LM to ELMM upgrade activities are complete for this EUCN.

4.5.1 ELMM with ControlEdge PLC states in application mode

The following table describes the controller states of the ELMM after it transitions to the application mode after the LCN personality download. See Faceplate display information for a description of the faceplate indications when the controller is operating in the application mode.

ELMM State	Description
IDLE	The ELMM is configured as non-redundant or as redundant and has assumed the primary redundancy role. And... Starts up with no database onto which a valid database can be created/retained if restored from previous checkpoint file.
OK	The ELMM is configured as non-redundant, or as redundant and has assumed the primary redundancy role, And... Has retained a valid database from previous operations prior to startup.
BKUP	The ELMM is configured as redundant and has assumed the secondary redundancy role. The ELMM moves to the BACKUP state.
Primary Fail	Check whether both Primary & Secondary ControlEdge PLC's are in Sync. If both are in Sync, then Select Primary ELMM from UCN status display and Startup the Controller to initiate resync.

4.6 Firmware Upgrade

ATTENTION	**Do not power off when upgrading firmware.**

Before flashing ELMM firmware into ELMM with ControlEdge PLC, it is required to:

- Log in as the Administrator to connect the target controller. For more information, see "Connecting a controller" in *ControlEdge Builder User Guide* (RTDOC-X283-en).
- Ensure that the latest ControlEdge Builder is installed on your computer. See the *ControlEdge Builder Software Installation User's Guide* (RTDOC-X285-en) for details.
- Make sure the CPM version is same as or newer than the EPM version. In this case:
  - No specific upgrade sequence
  - Downgrade EPM before CPM

4.6.1 Upgrading firmware for a redundant controller

ATTENTION	**It is recommended to upgrade the firmware without opening a project.**

There are two scenarios for the firmware upgrade of an redundant controller.

- On-process - The primary CPM is synced with the secondary CPM.
- Off-process - The primary CPM is not synced with the secondary CPM.

The migration from LM to ControlEdge PLC must be performed off-process. Any future firmware upgrades will support on-process and off-process upgrades.

Prerequisites

- Assume the primary CPM is at slot A and the secondary CPM is at slot B.
- Both primary (slot A) and secondary (slot B) CPMs are powered on.

To upgrade the firmware On-process

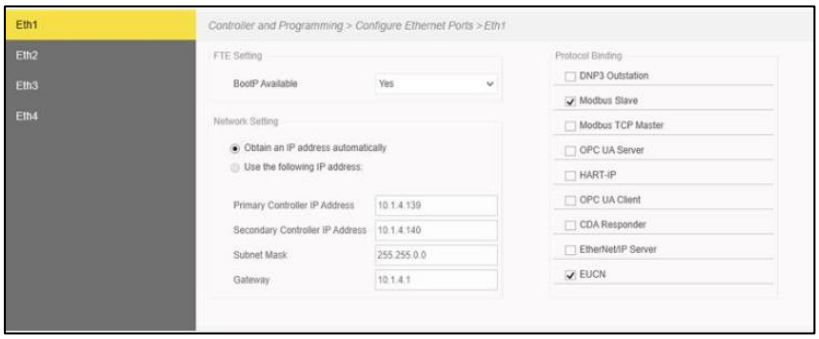
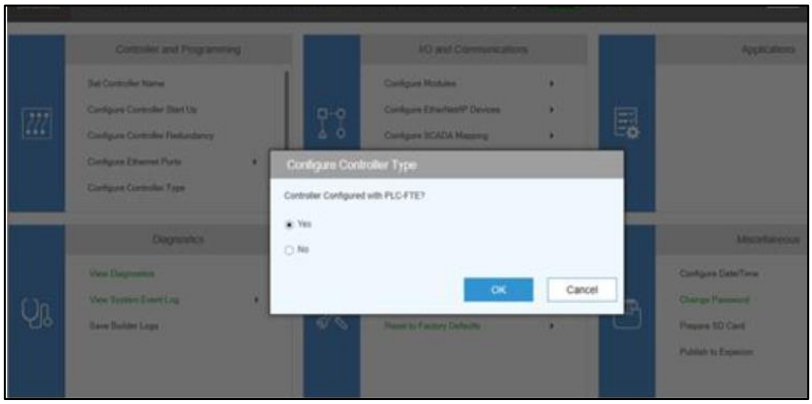
ATTENTION	**If you are upgrading from RTUPLC_160.2-03.14 to RTUPLC_172.1-15.1, it is mandatory to install HotFix 2 with “special image” before performing this upgrade operation.**

Prerequisites

- Install ControlEdge builder **RTUPLC_172.1-15.1** before performing the below upgrade procedure.

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target primary CPM (slot A).
3	From the **Home** Page, select **Upgrade Firmware under Maintenance**, and select the CPM you want to upgrade.
4	Click **Upgrade**. The **Upgrade firmware** dialog appears.
5	From the **Release Number** list, select the target release module as R160.2 HotFix 2. The target firmware version RTUPLC_160.2-03.14 is displayed. **TIP** **If you want to use a controller as an FTE node, you must select "Release number_FTE".**
6	Click **Next**. The target firmware name, state, and version are displayed.
7	Click **Next** to transfer and upgrade the firmware.
8	After the boot and application firmware is upgraded, enter the password to re-connect the controller.
9	Click **Go Back** to revert to the previous firmware version, or click **Proceed** to complete the upgrade.
10	The primary CPM is synchronizing with the secondary CPM. Click OK to complete the firmware upgrade. The secondary CPM (slot B) becomes the primary one and the original primary CPM (slot A) becomes the secondary one.
11	On the Native window, ensure that the ELMM shows OK/BACKUP state and the secondary controller is fully synchronized with the primary controller.
12	Repeat the steps from 1 to 10 to upgrade RTUPLC_160.2-03.14(special image) to RTUPLC_172.1-15.1. by choosing an appropriate release number from the Release target List in Step 5.

Post-upgrade procedure

Step	Action
1	Upgrade the **Project** to the latest **RTUPLC_172.1-15.1** release.
2	Enable **EUCN** option under **ETH1**. A failure to enable this option, may cause the ELMM functionality to be disabled. 
3	Ensure PLC-FTE is selected as the controller type 

To upgrade the firmware Off-process

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target primary CPM (slot A).
3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the **Home** Page, select Upgrade Firmware under Maintenance, and select the CPM you want to upgrade.
6	Select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, we provide the interactive mode to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select Next to upgrade the firmware, and the controller is stopped. You can also select Cancel to quit the upgrade process. If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.

7	Select **Proceed with Upgrade** to continue.
8	From the **Release Number** list, select the target release module. The target firmware version is displayed.
9	Select **Next**. The target firmware name, state and version are displayed.
10	Select **Next** to transfer and upgrade the firmware.
11	After the boot firmware is upgraded, enter the password to reconnect the controller. The application firmware is transferred and upgraded.
12	After the application has been upgraded, enter the password to reconnect the controller. The firmware upgrades.

4.6.2 Upgrading EPM firmware

EPM firmware upgrade is ONLY allowed in **Stop Locked**, **Stopped, or Remote** operating modes.

You can rotate the mode switch on CPM to change operating modes, see "CPM mode switch" in *ControlEdge 900 Platform Hardware Planning and Installation Guide* (HWDOC-X430-en). If the mode switch is in REMOTE position, see "Setting operating modes" in *ControlEdge PLC and ControlEdge RTU Getting Started* (RTDOC-X283-en).

ATTENTION	**If the EPM is being upgraded, all I/O modules in the same rack will keep in failsafe state until the firmware upgrade is completed.**

To upgrade EPM:

Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target controller.

3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the Home Page, select **Upgrade Firmware** under **Maintenance**, The **Upgrade Firmware** dialog appears.
6	Select **EPM** tab, all available EPMs are displayed. At least one I/O module, which is in the same rack with the target EPM, must be added in the Configure I/O page, then the target EPM will be displayed here. See "Configuring an I/O module" in Software Chapter in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-x283-en).
7	Select or multiselect the target EPMs and select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, interactive mode is provided to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select **Next** to upgrade the firmware, and the controller is stopped. You can also select **Cancel** to quit the upgrade process. • If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.
8	Select **Proceed with Upgrade** to continue.
9	From the **Release Number** list, select the target release module. The target firmware version is displayed.
10	Select **Next**. The target firmware name, state and version are displayed.
11	Select **Next** to transfer and upgrade the firmware. After the upgrade is completed, a dialog appears. You can check which EPM is upgraded successfully, which one is failed.
12	Select **OK**.

4.6.3 Upgrading I/O module firmware

I/O module firmware upgrade is ONLY allowed in **Stop Locked**, **Stopped, or Remote** operating modes.

ATTENTION	**The target I/O module must be added in the Configure I/O page. See "Configuring I/O modules and channels" in *ControlEdge PLC and ControlEdge RTU Getting Started Guide* (RTDOC-X283-en*).***

To upgrade I/O module

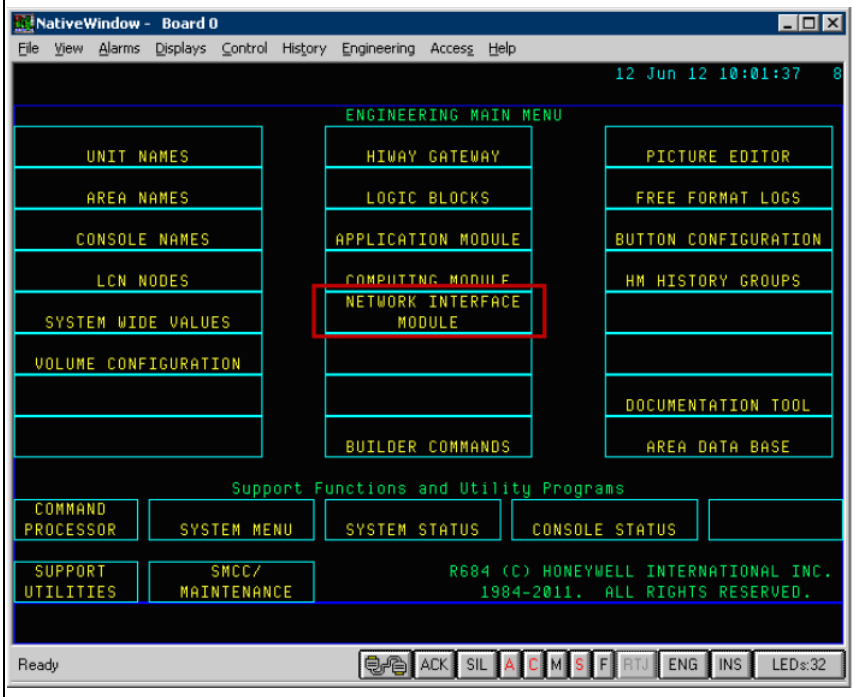
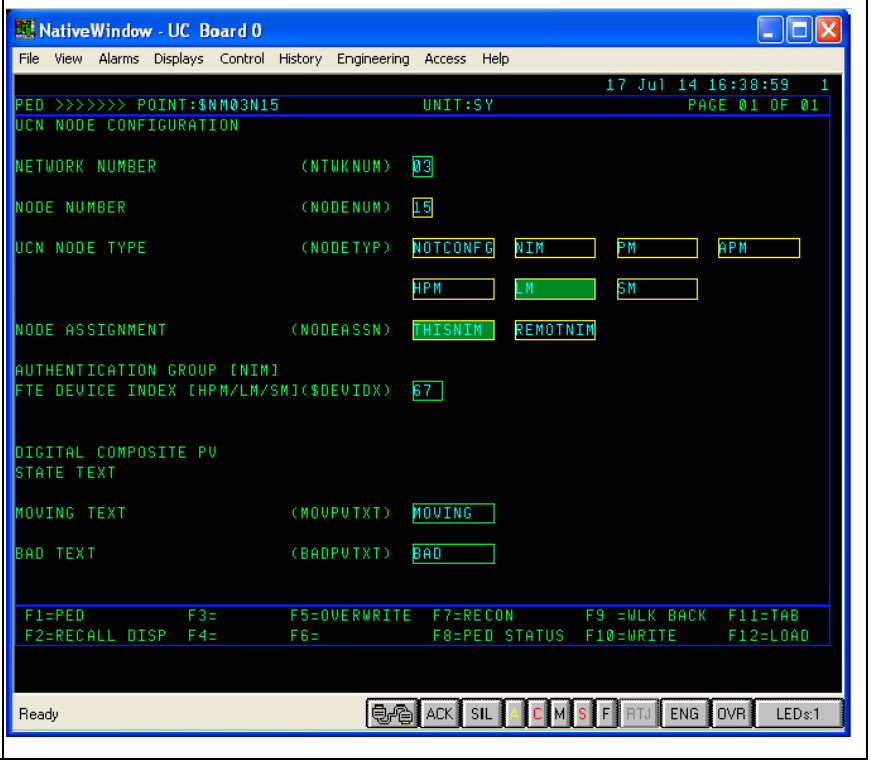
Step	Action
1	Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2	From the **Start** Page, select **Connect** to connect the target controller.
3	From the **Home** page, select Configure Controller Type under Controller and Programming. The **Configure Controller Type** dialog box is displayed.
4	Choose **Yes** and then select **OK**.
5	From the **Home** Page, select **Upgrade Firmware** under **Maintenance**. The Upgrade Firmware dialog appears.
6	Select the **UIO 16** tab, all available I/O modules are displayed.

7	Select or multiselect the target I/O modules and select **Upgrade**. The **Upgrade firmware** dialog appears. The controller is running when you transfer the firmware to the controller and will be stopped when you upgrade the firmware. So, when the controller is running, we provide the interactive mode to control when the controller stops. • If you select the Interactive mode, a dialog appears confirming that the transfer is complete. Select **Next** to upgrade the firmware, and the controller is stopped. You can also select **Cancel** to quit the upgrade process. • If you do not select the Interactive mode, the firmware will be upgraded directly after the transfer. The controller will be stopped without any prompt.
8	Select **Proceed with Upgrade** to continue.
9	From the **Release Number** list, select the target release module. The target firmware version is displayed.
10	Select **Next**, the target firmware name, state and version are displayed.
11	Select **Next** to transfer and upgrade the firmware. After the upgrade is completed, a dialog appears. You can check which module is upgraded successfully, which one is failed.
12	Select **OK**.

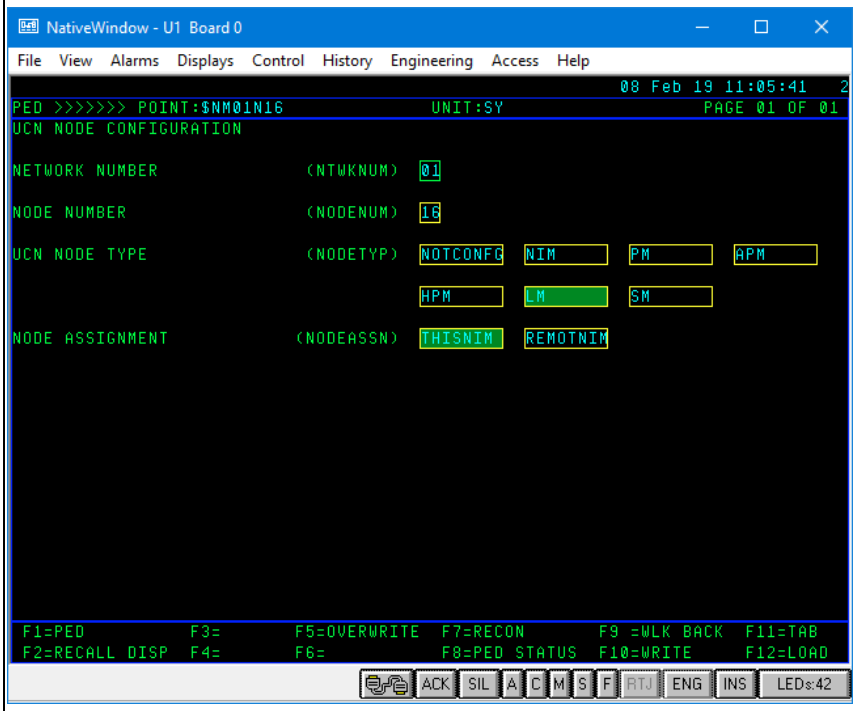
4.7 ELMM with ControlEdge PLC Configuration

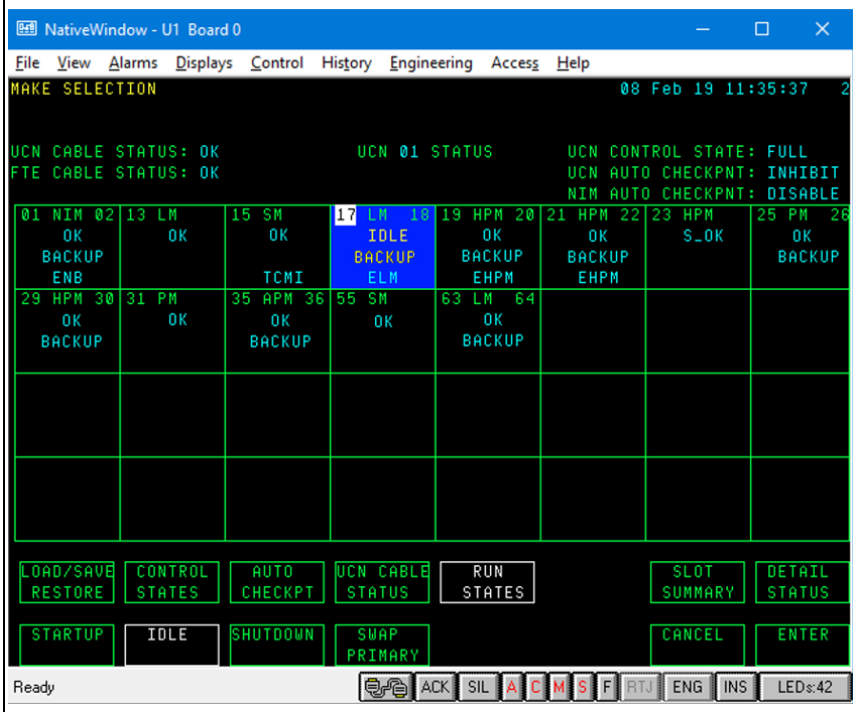
Use the following procedure to load the redundant ELMM with LM personality and database.

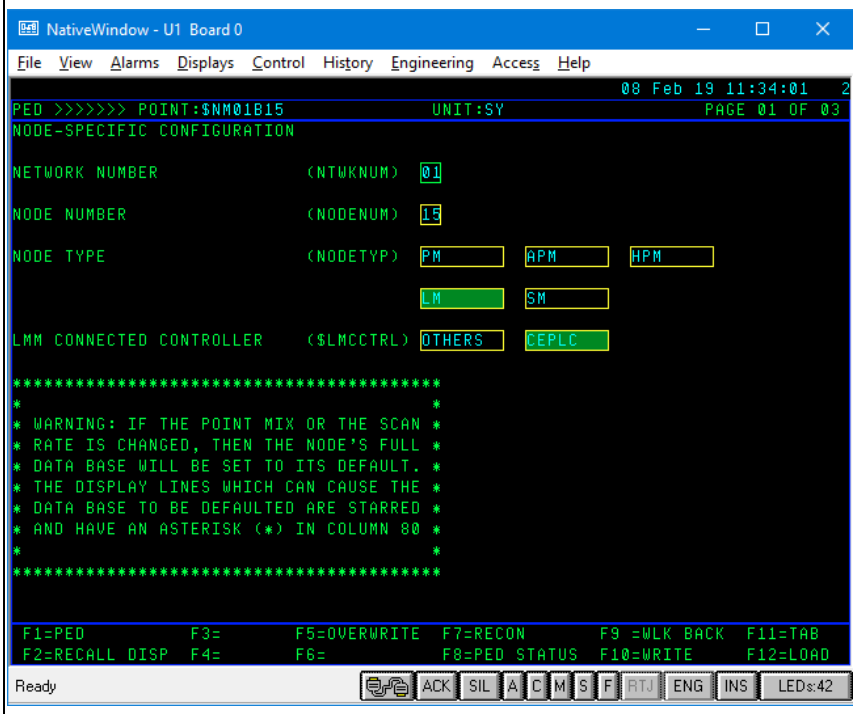
Step	Action
1	Invoke the **Engineering Main Menu** display by pressing the <**CONTROL**> and <**HELP**> keys on the keyboard.

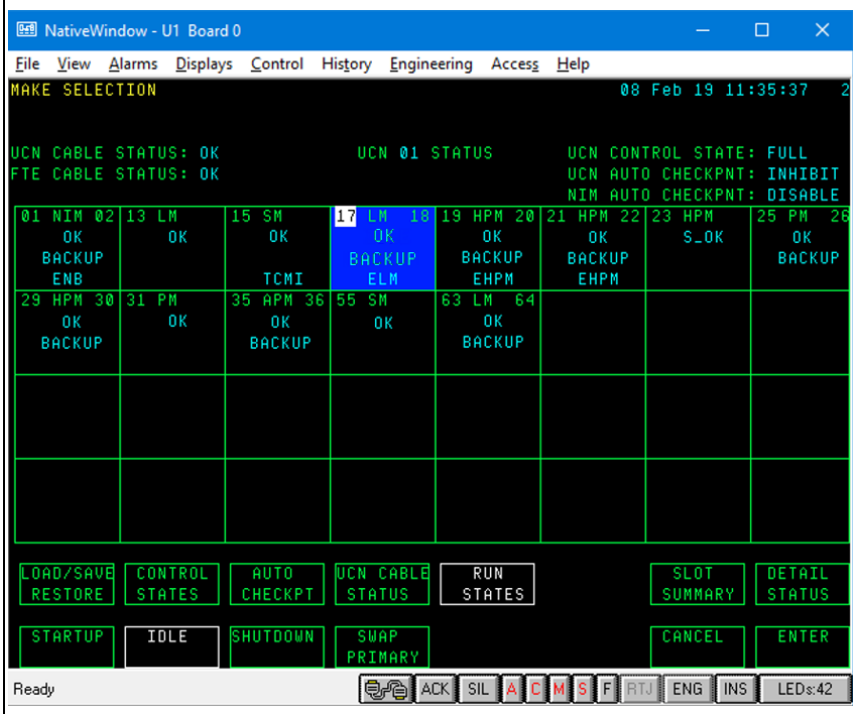
2	Start the process by selecting the **NETWORK INTERFACE MODULE** target on the **Engineering Main Menu** display. This invokes the **NIM Build Type Select Menu** display. 
3	Select the **UCN NODE CONFIGURATION** target to invoke the **UCN Node Configuration** display. 

4	Reconstitute the LM by entering the **UCN NETWORK NUMBER**, **NODE NUMBER**, **UCN NODE TYPE**, and pressing the <**CONTROL**> and <**F7**> keys. Note: As a better engineering practice, remove all Secondary ELMMs from the network and reconfigure it after Primary ELMMs are running. For removing Secondary ELMMs, use UCN Node configuration, change the BACKUP ELMM to NOT CONF and load by pressing Ctrl + F12.
5	Ensure that the node type is LM and then press enter.

6	Enter the FTE Device Index and press **ENTER**. NOTE: • Use the FTE Device Index assigned to this ELMM in section “Appendix A: EUCN Configuration Data Checklist” on page 160. Ensure that there are no errors. • The FTE Device Index entered must be the same as the FTE Device Index physically set in the rotary switches of the ELMM FTE Interface Module. **Note**: Initially, the **$DEVIDX** parameter will be 0. After you change the value from 0 to a non-zero value, a warning message is received, “WARNING: CHANGING $DEVIDX WHILE IN A RUNNING STATE MAY CAUSE LOSS OF VIEW. $NMuuNnn EXISTS – SELECT OVERWRITE OPTION IF DESIRED”. Where “uu” is the UCN Network Number and “nn” is the Primary LM’s UCN Node Number. For the redundant ELMM, the Secondary ELMM FTE Device Index is automatically set to the Primary ELMM Device Index plus one. 
7	Press the <**CONTROL**> and <**F12**> keys to load. RESULT: The Primary ELMM transitions to **IDLE** state.
8	From the UCN Status Display, checkpoint the NIM to save the FTE Device Index information in the NIM checkpoint.

9	Make sure that the PLC CPM hardware is connected to the power supply. The PLC CPM's status must indicate IDLE on the UCN Status display with ELMM on the Auxiliary status line. **ATTENTION** **After the LM is migrated to ControlEdge PLC, the personality download procedure is obsolete and hence the module starts up from the IDLE state with no database.**
10	For the redundant ELMM, repeat steps 4, 5 and 7 for the secondary ELMM to come to the **BACKUP (yellow)** state indicative of IDLE status. 
11	Restore the LM checkpoint taken earlier. Select the **Primary ELMM** > **LOAD/SAVE RESTORE** > **RESTORE DATA** and then press **ENTER** and choose **DEFAULT SOURCE**. NOTE: As the ELMM transitions to IDLE state directly, there is no need to download the TPN personality.

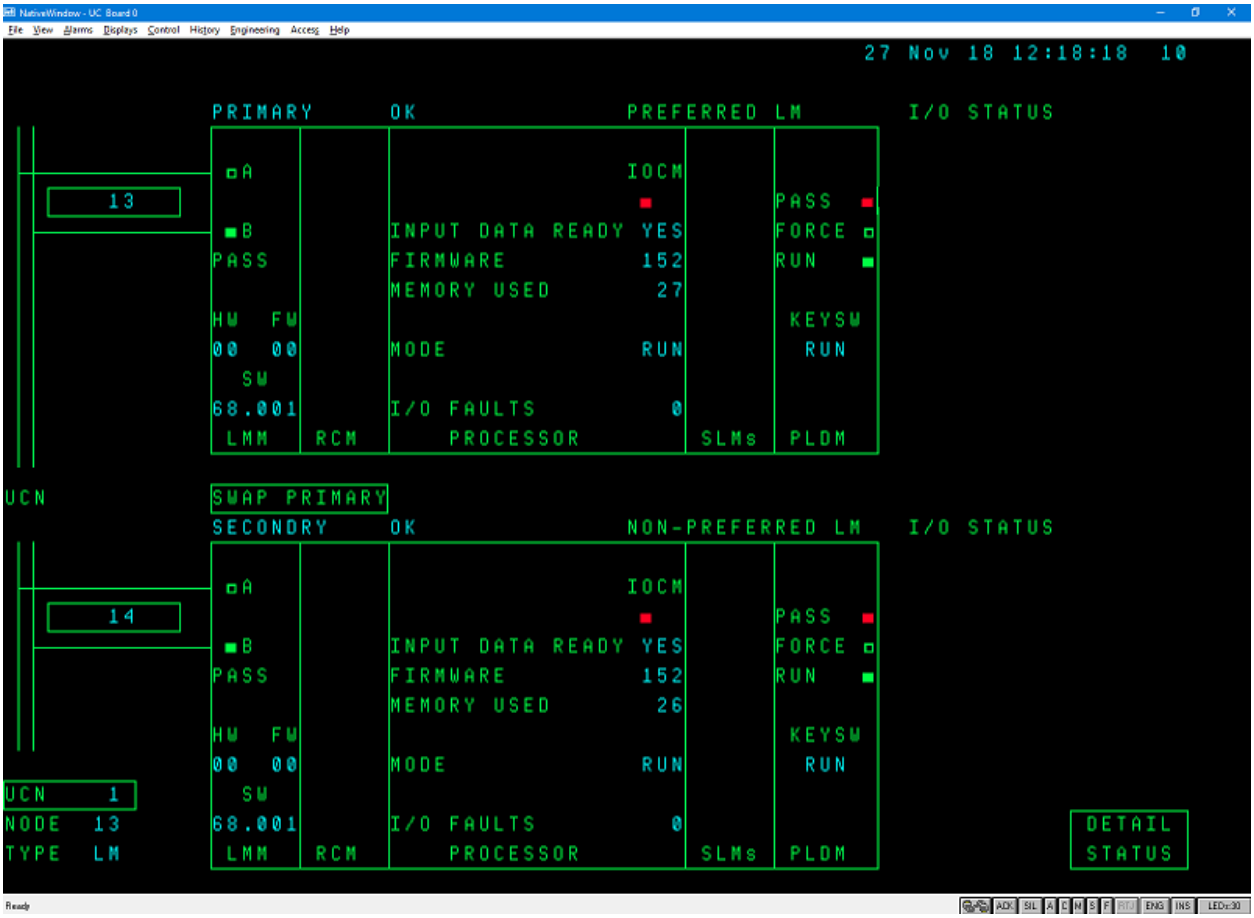
12	Reconstitute ELMM's UCN node-specific configuration and choose LMM CONNECTED CONTROLLER type as **CEPLC** and then press **ENTER**. 
13	Reload the configuration by pressing **Ctrl + F12**.
14	Select **RUN STATES** > **STARTUP** to perform a startup of the ELMM. RESULT: The Primary ELMM transitions from IDLE to OK state.

15	On a successful database sync, ensure that the Secondary ELMM transitions to the **BACKUP (cyan)** state indicative of OK/RUN state. 
16	Checkpoint ENIM and ELMM, once onto the HM and once onto the emulated drive.
17	All LM to ELMM upgrade activities are complete for this EUCN.

4.9 Displays

4.9.1 Enhanced Logic Manager with ControlEdge PLC Detailed Status Display

ControlEdge PLC detail status display is a modified version of the existing LMM Detail status display. All the information which is essential for PLC maintenance is retained on this display removing all unwanted parameters. The **SCANTIME, REG, SCM and PRC LEDS** for the PLC shall not be displayed on this display. The offline SIOM Starting address information shall be removed from this display. Option module information shall be removed since it does not apply to ControlEdge PLC.



Targets:

Swap Primary

This target provides the operator with a mechanism for requesting a redundancy switchover. It is functionally equivalent to a target on the UCN Status display. It is visible when NODESTS is not equal to OFFNET for both chassis. An ENTER is exposed to the right of this target that completes the request.

UCN nn - Displays UCN network number and acts as a target for calling up (returning to) UCN STATUS display.

System Parameter: NTWKNUM

Range: 1 – 20

NN - Identifies node number (1-64) and acts as a target to select the chassis for calling additional detailed status displays.

Detail Status - Acts in conjunction with the NN targets for calling up additional detailed status displays.

Node Status fields:

NODE nn – Node number of the ELMM.

System Parameter: NODENUM

Range: 1 – 64

TYPE tt – UCN Node Type.

System Parameter: NODETYP

Range: NotConfg, LM

(red.status) - Current redundancy status of the ELMM.

System Parameter: PMMOPER

Range: NON-REDUNDANT, PRIMARY, SECONDARY

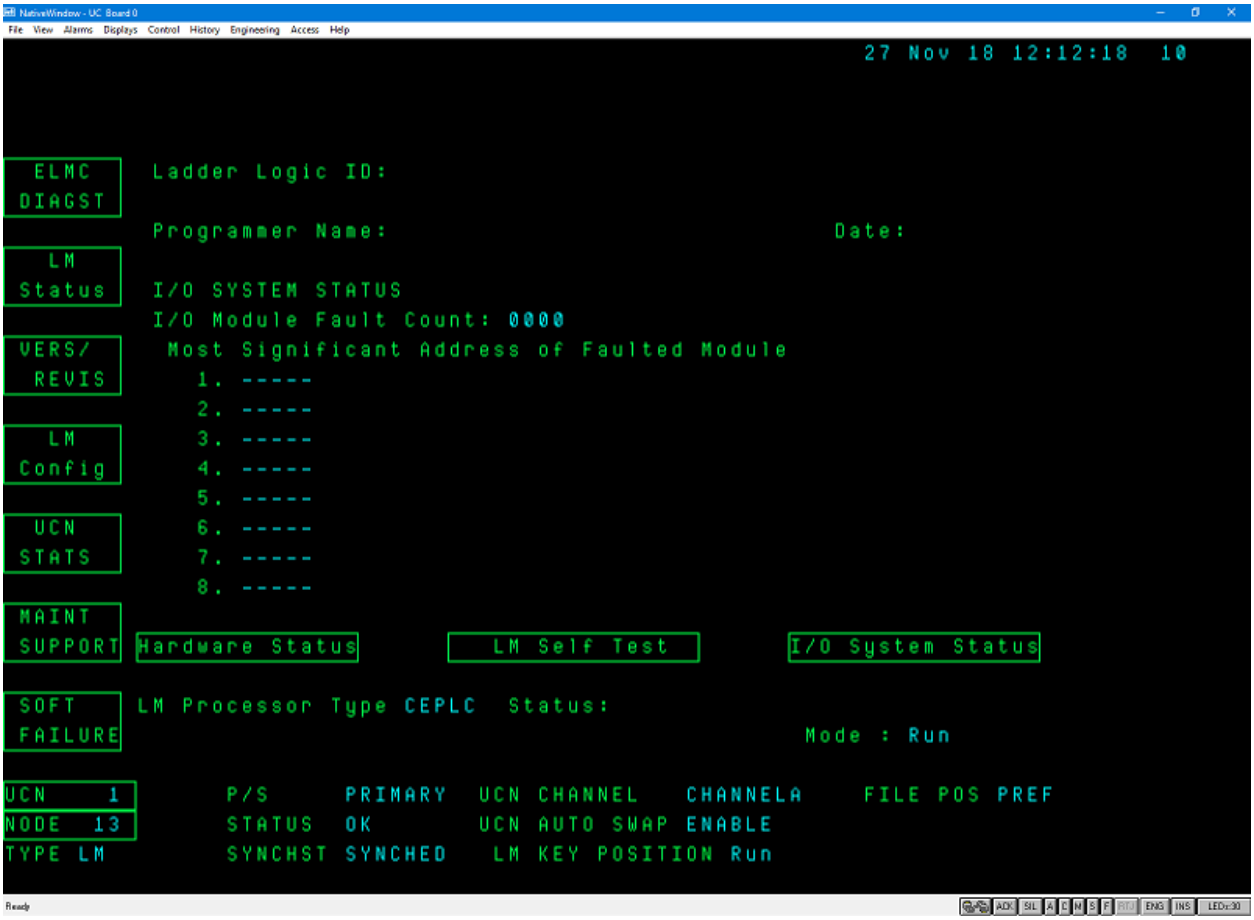
(node status) - Current node status of the ELMM.

System Parameter: NODESTS

Range: IDLE, OK, PARTFAIL

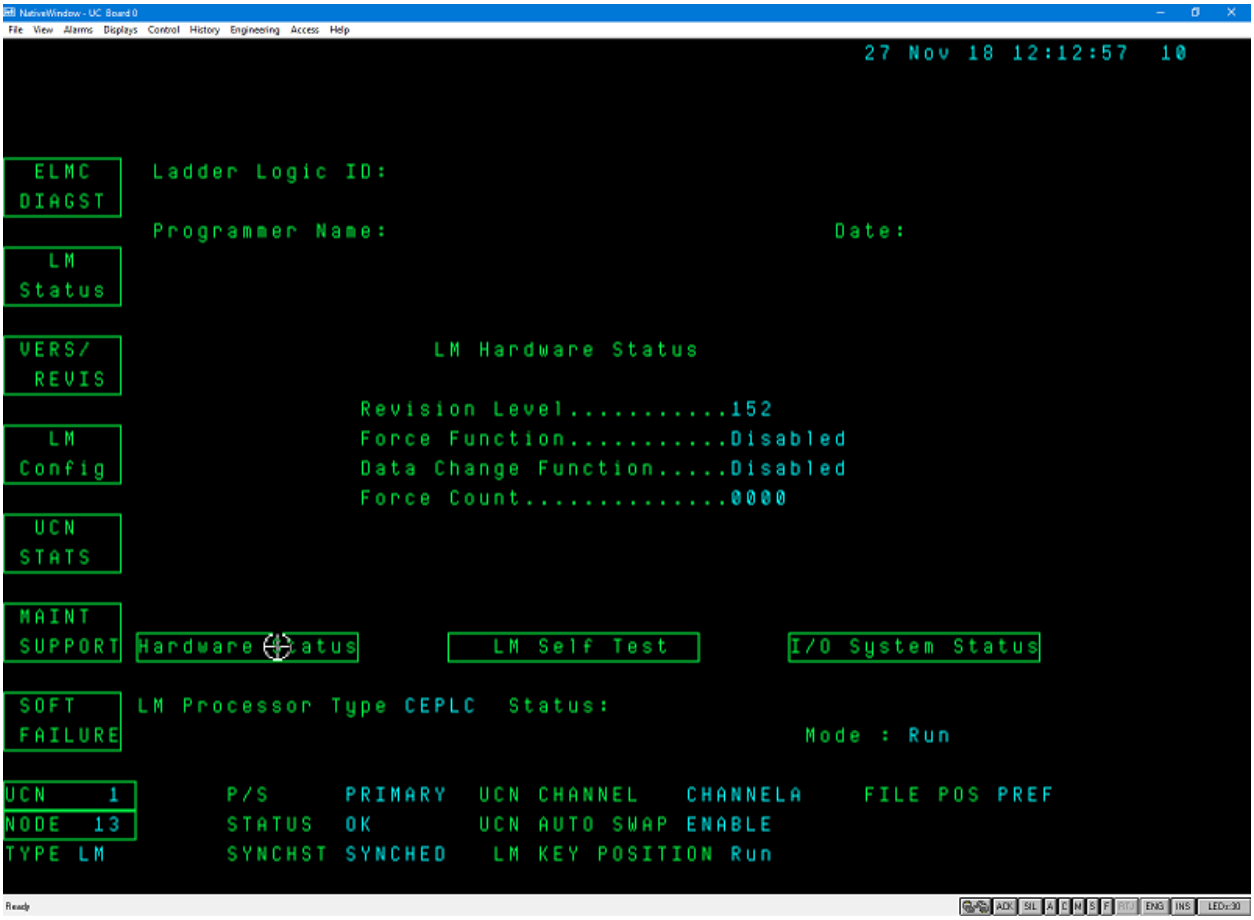
4.9.2 Enhanced Logic Manager with ControlEdge PLC I/O System Status Display

ControlEdge PLC IO status display is a modified version of the existing LMM IO status display. All the information which is essential for PLC maintenance is retained on this display removing all unwanted parameters. LM Processor Type information will be removed from this display. All the SIOM related information will be removed from this display.



4.9.3 Enhanced Logic Manager with ControlEdge PLC Hardware Status Display

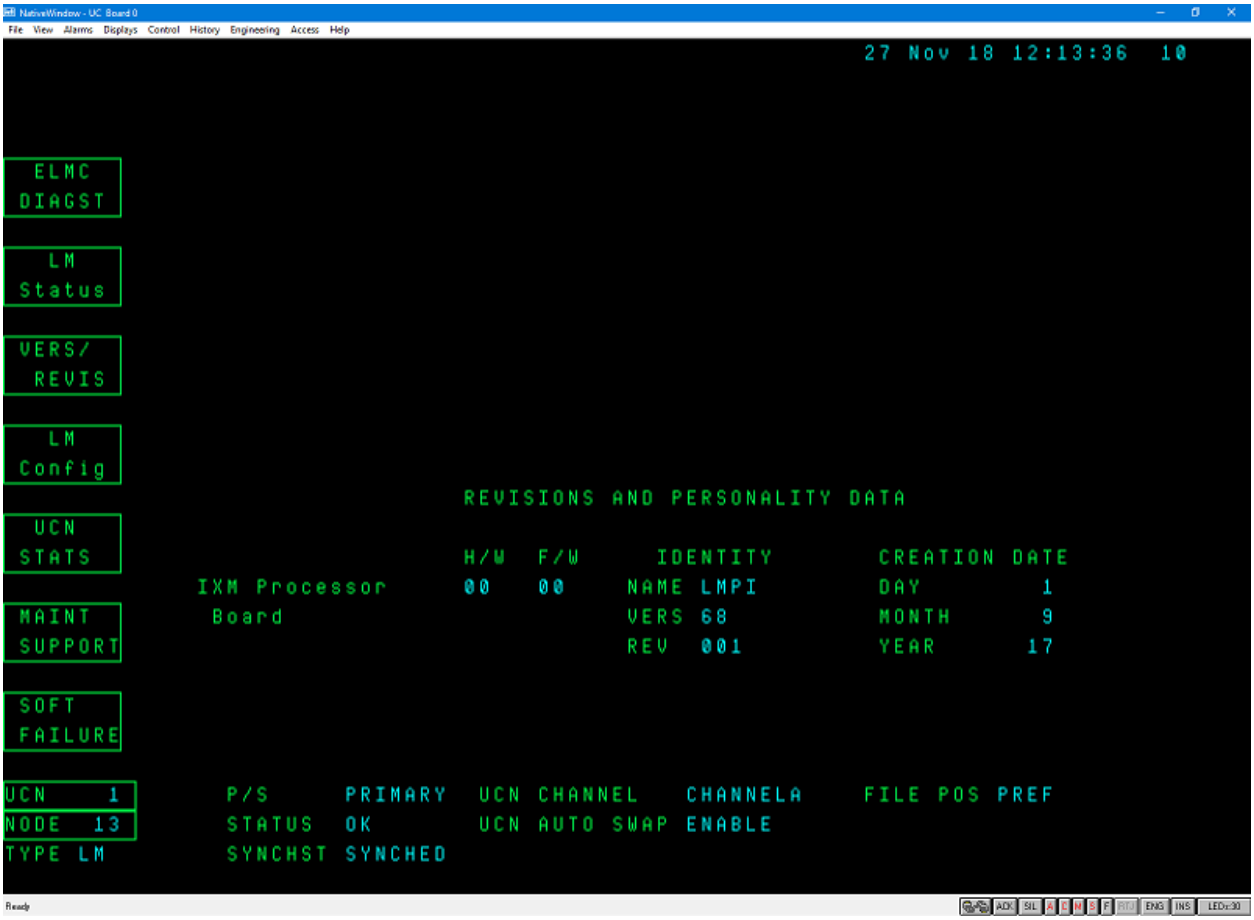
ControlEdge PLC hardware status display is a modified version of the existing LMM hardware status display. All the information that is essential for PLC maintenance is retained on this display removing all unwanted parameters.



ATTENTION	For an ELMM, the Force Count field always shows ‘0000’ and the Force Function and Data Change Function fields on the LM Hardware Status Display always show ‘DISABLED’, you can ignore these values.

4.9.4 Enhanced Logic Manager with ControlEdge PLC Revisions and Personality Display

This display is called up from the **VERS/REVIS** target of the Enhanced LM Detailed Status Displays.



The targets along the left side and the textual status information along the bottom are standard for all ELMM Detailed Status Displays.

The display presents identification information for the ELMM hardware, firmware, and Personality.

Targets:

ELMC Diagst, LM Status, VERS/REVIS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxx –

Fields:

H/W – LMM Processor Board hardware version.

F/W – LMM Processor Board firmware version.

NAME – Personality name (always LMPI).

VERS – Personality version.

REV – Personality revision.

DAY – Personality creation day.

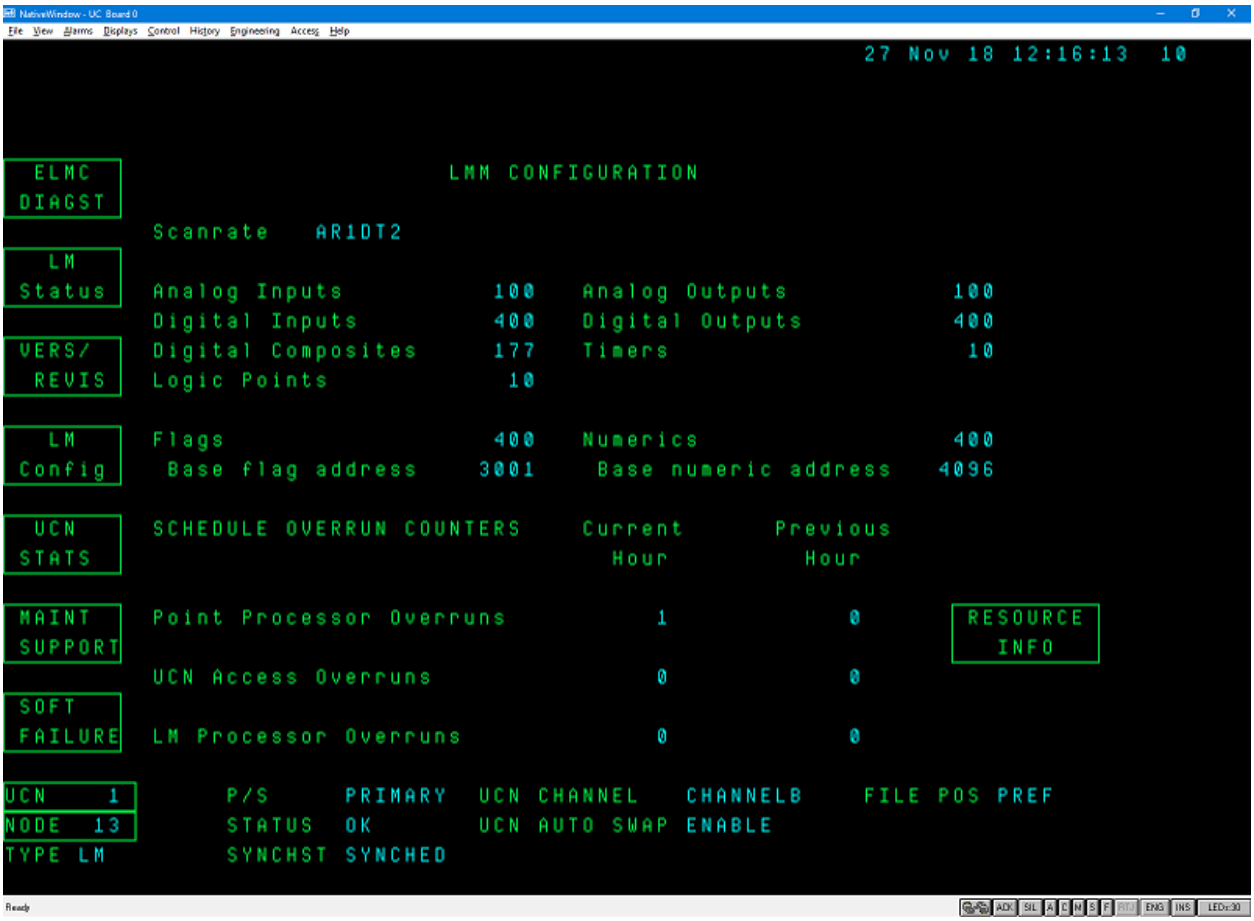
MONTH - Personality creation month.

YEAR - Personality creation year.

ATTENTION	**For an ELMM, the Hardware Version (H/W) field on the Revisions and Personality Data Display does not display correct information, you can instead go to ControlEdge Builder to verify this information.** **To know the H/W and F/W information, perform the following procedure.** 1. **From the Start Page, click Connect to connect the target controller.** 2. **From the Home page, make sure that you have selected ELMM as the controller type under Controller and Programming.** 3. **From the Home page, select View Diagnostics under Diagnostics.** 4. **Go to System > Platform.** **The View Diagnostics page is displayed, verify the hardware and firmware versions.**

4.9.5 Enhanced Logic Manager with ControlEdge PLC Configuration Display

This display is called up from the **LM Config** target of ELM Detailed Status Display.



The targets along the left side and the textual status information along the bottom are standard for all Enhanced LM Detailed Status Displays.

The display summarizes the ELMM's Point Mix and the data access overrun statistics.

Targets:

ELMC Diagst, LM Status, VERS/REVIS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxx –

Fields:

Scanrate – ELMM Point Processor scan rate AR represents analog point scans, with the number following being 1 or 2 (once or twice per second). DT represents digital, timer, and logic point scans, with only the value of 2 available for ELM.

System parameter: SCANRATE

Range: AR1DT2, AR2DT2

Analog Inputs - Number of AI points available.

System Parameter: NAISLOT

Range: 0-127/254

Analog Outputs - Number of AO points available.

System parameter: NAOSLOT

Range: 0-482/965

Digital Inputs - Number of DI points available.

System parameter: NDISLOT

Range: 0-1866

Digital Outputs - Number of DO points available.

System parameter: NDOSLOT

Range: 0-4000

Digital Composites - Number of DC points available.

System parameter: NDCSLOT

Range: 0-304

Timers - Number of Timer points available.

System parameter: NTIMER

Range: 0-700

Logic Points - Number of Logic points available.

System parameter: NLOGSLOT

Range: 0-14

Flags - Number of Flag points available.

System parameter: NFLAG

Range: 0-1024

Base Flag address - Starting address (least significant) of the block of flags.

System parameter: FLLSBA

Range: -1 (not configured), 0-4095

Numerics - Number of Numeric points available.

System parameter: NNUMERICS

Range: 0-1024

Base numeric address - Starting address (least significant) of the block of numerics.

System parameter: NNLSBA

Range: -1 (not configured), 4096 to 8191

Point Processor Overruns - Number of times ELMM was unable to complete a full scan of its points within the allotted 1/2 or 1 second. Such overruns are usually caused by a burst of activity (e.g., alarms or parameter requests) and should only be a cause for concern if they occur frequently. If this number accumulates steadily, it usually means the ELMM is receiving an excessive amount of parameter requests.

System parameter: CRPPXORN, LSPPXORN

UCN Access Overrun - Number of times ELMM was unable to collect UCN data in time to start its next scan. This involves Logic Point inputs connected to points on other UCN nodes. Such overruns are usually caused by a burst of activity (e.g., alarms or parameter requests) and should only be a cause for concern if they occur frequently.

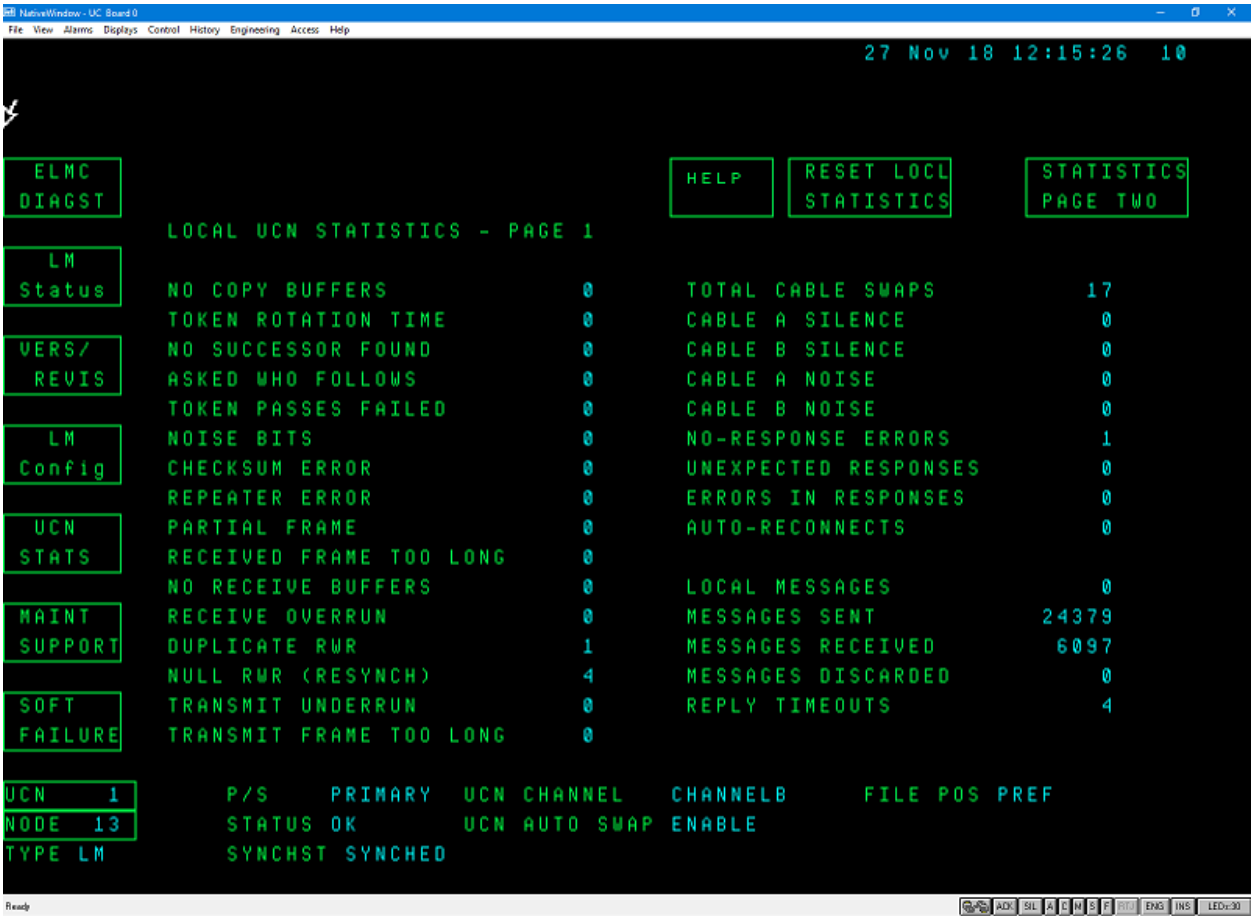
Excessive loading at the ELMM or at one or more remote nodes could cause frequent overruns, a situation which should be corrected.

System parameter: CRUCNORN, LSUCNORN

LM Processor Overruns - Number of times ELMM was unable to collect fresh Logic Controller (ControlEdge PLC) data in time to start its next scan. Such overruns are usually caused by a burst of activity (e.g., alarms or parameter requests) and should only be a cause for concern if they occur frequently. Excessive logic controller (ControlEdge PLC) scan times (approaching ELMM scan time) could cause such overruns.

4.9.6 Enhanced Logic Manager with ControlEdge PLC UCN Stats Display

This display is called up from the **UCN STATS** target of any ELM Detailed Status Display. The display may also be called up from the **UCN STATS** display, Page 2, by selecting the **STATISTICS PAGE ONE** target.



The targets along the left side and the textual status information along the bottom are standard for all ELM Detailed Status Displays.

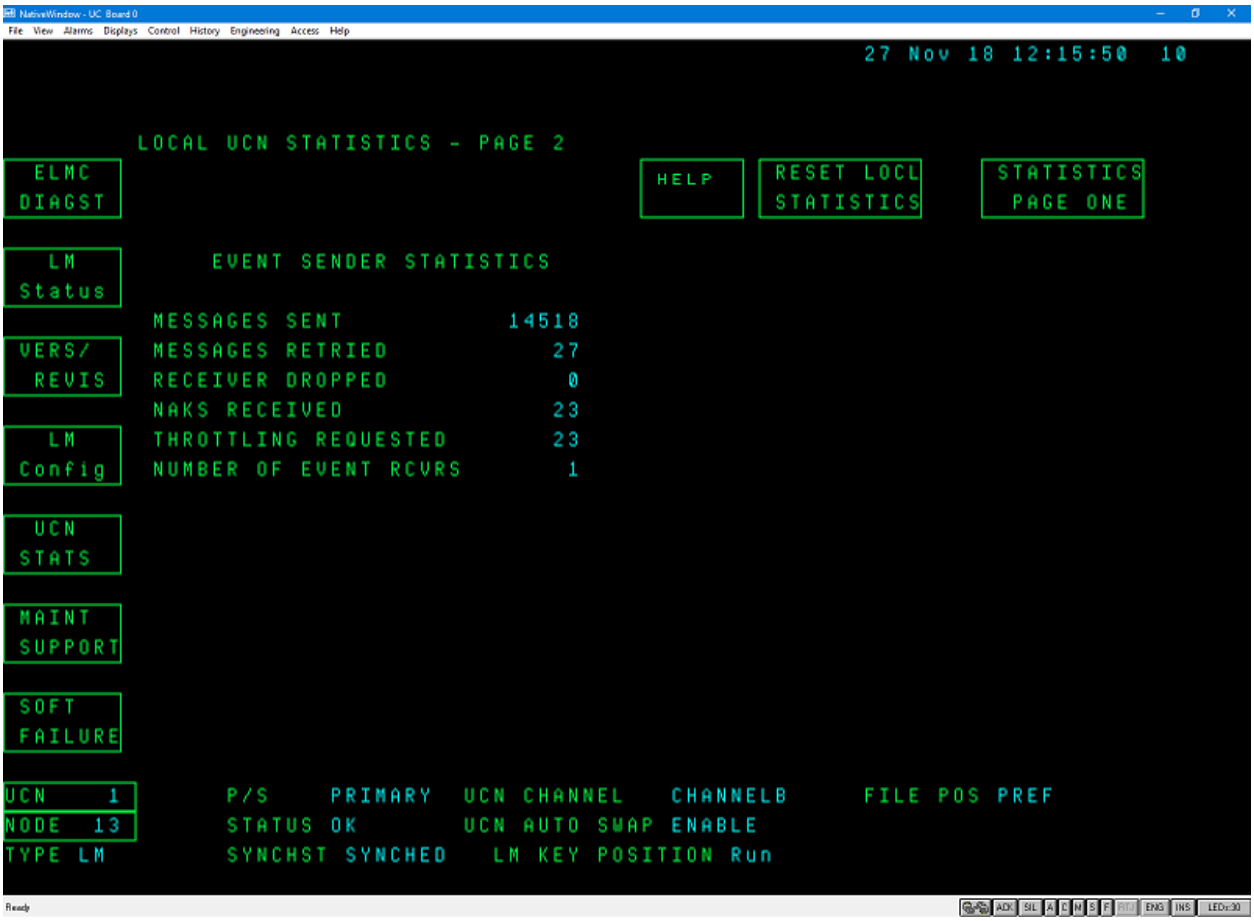
The display, in conjunction with PAGE 2, summarizes the ELMM's UCN Error statistics.

Targets:

ELMC Diagst, LM Status, VERS/REVIS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxxx

Page 2 is selected by touching the **STATISTICS PAGE TWO** target.

This display is called up from the UCN STATUS target of any ELM Detailed Status Display, followed by the selection of the **STATISTICS PAGE TWO** target.



The targets along the left side and the textual status information along the bottom are standard for all ELM Detailed Status Displays.

The display, in conjunction with PAGE 1, summarizes the ELMM's UCN error statistics.

Targets:

ELMC Diagst, LM Status, VERS/REVIS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxx

Descriptions of the ELM Local UCN Statistics Display's statistics are found in following two tables respectively.

Local UCN Statistics Descriptions

Statistic	Description
No Copy Buffers	The number of times no buffers on the LCN side of PNI/EPNI for copying received messages (NIM only) were available. The count is normally zero. Increasing counts indicate extreme NIM congestion. The LLC increments the count. The situation can lead to a “No Receive Buffers” count.
Token Rotation Time	NIM only. Sampled, the averaged token rotation time in 0.1 millisecond units. This is not an absolute measurement, and only roughly correlates to the Concord Token Scope. A 2-node UCN with no traffic will be in the 0.1 millisecond range, while a moderately-loaded 64-node UCN will be in the 4-6 millisecond range. OFFNET nodes and heavy traffic will increase the observed token rotation time. The nominal token rotation time for the system should be recorded when there are no errors and the load is moderate. Deviations from the count noted in a smoothly operating system should be investigated. An abnormally slow token rotation time may be caused by a level of trunk noise not quite high enough to cause a cable swap.
No Successor Found	The ring collapsed, and token-passing was lost. The count is incremented once in most nodes for a ring collapse. It is preceded by an “Asked Who Follows” count in the node that had the token. The count is incremented by the TBC.
Asked Who Follows	The number of times the successor node dropped out of the ring, temporarily or permanently (shutdown, failure, failover). It does not change in a system that is running normally. The count is incremented by the TBC.
Token Passes Failed	The number of times a token pass to successor node was retried. The count is normally zero. This does not change in a smoothly operating system. The cause can show up as noise, checksum error, or frame fragment count in the successor node. The count is incremented by the TBC.

Statistic	Description
Noise Bits	Noise periods or bursts are detected by the TBC. This may be caused by physical network problems. It can occur without the loss of any messages. A count of zero is expected, but low counts are acceptable. A burst of noise, frame fragment counts over 25, three successive 300 millisecond periods of noise counts of 3, and/or partial frames of 2, will cause noise to be reported, the “Cable A/B Noise” count to be incremented, and the cable to be swapped. These low thresholds are empirically derived from introducing various types of trunk faults.
Checksum Error	The number of times message corruption was detected by the TBC. The theoretical bit error rate for errors not detected by the modem and noted as noise or frame fragments is 1 x 10E-9. This works out to approximately three checksum errors per hour, per network. The observed rate is much less, and because messages are tokens, real messages are seldom lost. If frequent checksum errors occur, there may be a physical network or modem problem. If the predecessor to a node with checksum errors indicates a corresponding increase in the “Token Pass Failed” count, the problem is likely to be in the node with the checksum errors.
Repeater Error	The number of times the TBC detected that the error bit in the message end delimiter was set, indicating that a repeater received a message with a bad checksum, then retransmitted it. Because the UCN does not use repeaters, this means corruption in the end delimiter of the message. A count of zero is expected, but occasional counts are acceptable.
Partial Frame	The number of times message corruption was detected by the TBC. This may be caused by physical network problems. It can occur without loss of messages. See the “Noise” description.

Statistic	Description
Received Frame Too Long	The number of times the received message exceeded the 8 Kbyte IEEE 802.4 limit. Note that UCN messages are limited to 1 Kbyte in length. A count of zero is expected. The count is incremented by the TBC.
No Receive Buffers	The number of times no buffers were available for the TBC to store received messages. Zero is the expected count, but an occasional count under continuous, very heavy demand is acceptable. The count is incremented by the TBC.
Receive Overrun	The number of times there was insufficient local processor DMA bandwidth for the TBC to copy a received message into memory. A count of zero is expected. The count is incremented by the LLC based on the transmit status.
Duplicate RWR	The number of times a duplicate Type 3 message was received. This could be caused by the TBC retrying a message because an ACK was lost. A count of zero is expected, but a small number is acceptable. A count here can sometimes be explained by an increase in one of the other error statistics. The count is incremented by the LLC based on the transmit status.
Null RWR (Resynch)	The number of times the Null RWR messages were used by other nodes to resynchronize with this node upon startup or after an error. A node that leaves and reenters a running UCN will probably show and cause some counts. The count is incremented by the LLC based on the transmit status.
Transmit Underrun	The number of times there was insufficient local processor DMA bandwidth for the TBC to transmit a message. A count of zero is expected. The count is incremented by the LLC based on the transmit status.

Statistic	Description
Transmit Frame Too Long	The number of times there was a discrepancy between the frame length and the sum of the data block lengths given to the TBC. A count of zero is expected. The count is incremented by the LLC based on the transmit status.
Total Cable Swaps	A count of the operator, periodic, or fault-induced cable swaps. The periodic swap is every 15 minutes.
Cable A Silence	The number of times Cable A was found silent. A count of zero is expected. Normally, a silent cable is a broken or disconnected drop cable, or a bad tap. Certain types of trunk cable problems, such as a short in the middle of a trunk cable segment, can also cause silence to be reported, perhaps by multiple nodes.
Cable B Silence	The number of times Cable B was found silent. A count of zero is expected.
Cable A Noise	The number of times Cable A was found noisy. A count of zero is expected.
Cable B Noise	The number of times Cable B was found noisy. A count of zero is expected.
No Response Errors	The number of times one or more nodes did not respond to RDR messages. One or more nodes can be OFFNET or can be temporarily overloaded. The count is normally zero, but will increase when access to an OFFNET node is attempted. The count is incremented by the LLC based on the transmit status. The count is not incremented if the TBC is successful on its automatic retry.

Statistic	Description
Unexpected Responses	The number of times MAC control was not correct for an RWR response message (such as the wrong node number in a response). This indicates network contention or corruption within a node. A count of zero is expected. It also indicates the number of times SAPs were not as expected. The count is incremented by the LLC based on the transmit status and/or message header contents.
Errors In Responses	The number of times the LLC part of an RWR response was incorrect. This can indicate corruption in a node, or network contention. A count of zero is expected. The count is incremented by the LLC based on the transmit status and/or message size, or header contents.
Auto- Reconnects	The number of times this node attempted to reconnect to the UCN after a serious UCN communication fault.
Local Messages	The number of messages between tasks in this node. The count is always incrementing in a NIM, zero in a LM.
Messages Sent	The number of messages sent from this node. The count does not include automatic TBC retries or driver retries.
Messages Received	The number of messages received by this node.
Messages Discarded	The number of messages discarded by this node. Normally zero, but may occasionally count occurrences of: A reply received after the reply timeout period expired; 1. A duplicate reply message caused by retry because the immediate ACK of a reply message was not received by the node sending the reply message. 2. A bad protocol version. 3. A message for an inactive function. 4. A message from a non-configured node (NIM only)

Statistic	Description
Reply Timeouts	The number of times a reply was not received during the user-specified timeout interval. If a Type 3 request, the request was received and ACK'd, but the reply was not received. It may be caused by receive buffer overload in the local node, or the remote node failed after the ACK but before sending the reply.

Event Sender Statistics Descriptions

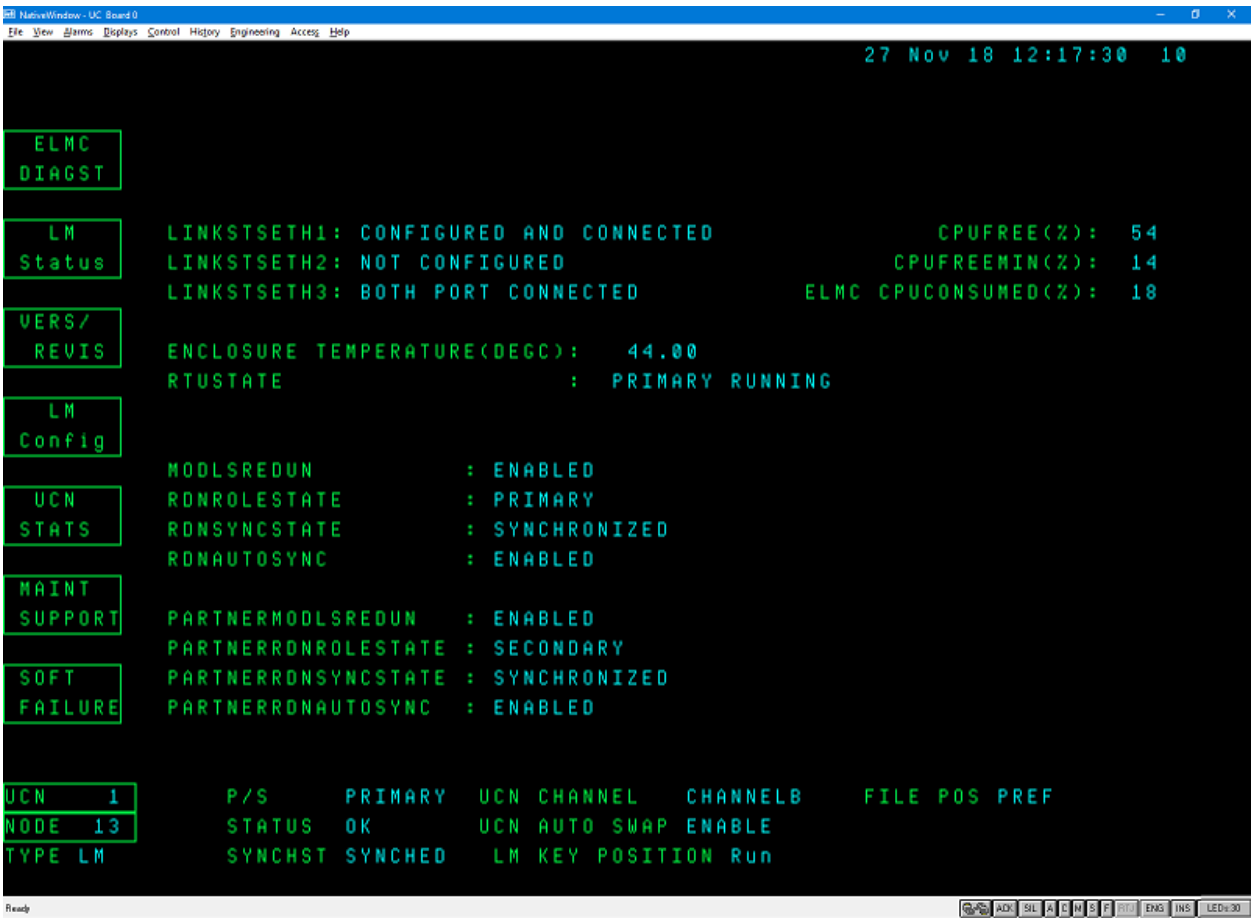
Statistics	Description
Messages Sent	The number of messages sent, not including retries. When an idle or running event sender has no new events to send, it resends the last message every 10 seconds so that the NIM can watchdog event delivery.
Messages Retried	The number of messages retried caused by no response, lost ACK, or NAK. The count is normally zero unless event overload has occurred. The count normally correlates with the “NAKs Received” count in the event senders.
Receiver Dropped	The number of times any event receiver failed to respond to a message after retries, and thus was removed from the retry list. Retries are no longer performed to nonresponding event receivers. The count is normally zero in NIMs. A single count in each event sender can accompany a NIM failure (primary and secondary).
NAKs Received	The number of times a message was temporarily not accepted by an event receiver. Retries are performed after a delay. The count is normally zero, except under heavy event traffic.
Throttling Requested	The number of times this node was requested to delay before sending another message. A count of zero is normal, except under heavy event traffic. The count corresponds to the “At Node Throttle Threshold” statistic in the event senders.
Number Of Event Rcvrs	The number of event receivers that are currently acknowledging events from this event sender. In LMs this count is normally the number of primary NIMs.

4.9.7 Maintenance Support Displays Communications Error Block Display for Enhanced Logic Manager with ControlEdge PLC

This display is not applicable to ELMM with ControlEdge PLC, use ControlEdge Builder to capture and upload diagnostic information, see section “Using ControlEdge Builder to capture diagnostic data” on page 152.

4.9.8 ELMM with ControlEdge PLC ELMC Diagst Display

This is a new display that provides extended diagnostics of the ControlEdge PLC from the Native Window. This display provides all the EUCN communication statistics information and redundancy status of both the modules along with the hardware temperature and platform status.



The targets along the left side and the textual status information along the bottom are standard for all Enhanced LM Detailed Status Displays.

Targets:

ELMC Diagst, LM Status, VERS/REVIS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxx –

Fields:

Field	Description
LINKSTSETH1	ETH1 cable connection status 0 - not configured 1 - configured and connected 2 - configured but not connected
LINKSTSETH2	ETH2 cable connection status 0 - not configured 1 - configured and connected 2 - configured but not connected
LINKSTSETH3	ETH3 cable connection status 0 - not configured 1 - configured and connected 2 - configured but not connected
CPUFREE (%)	CPU free (%)
CPUFREEMIN (%)	Minimum CPU free (%)
ELMC CPUCONSUMED (%)	Time of last program compilation
ENCLOSURE TEMPERATURE (DEGC)	Hardware temperature

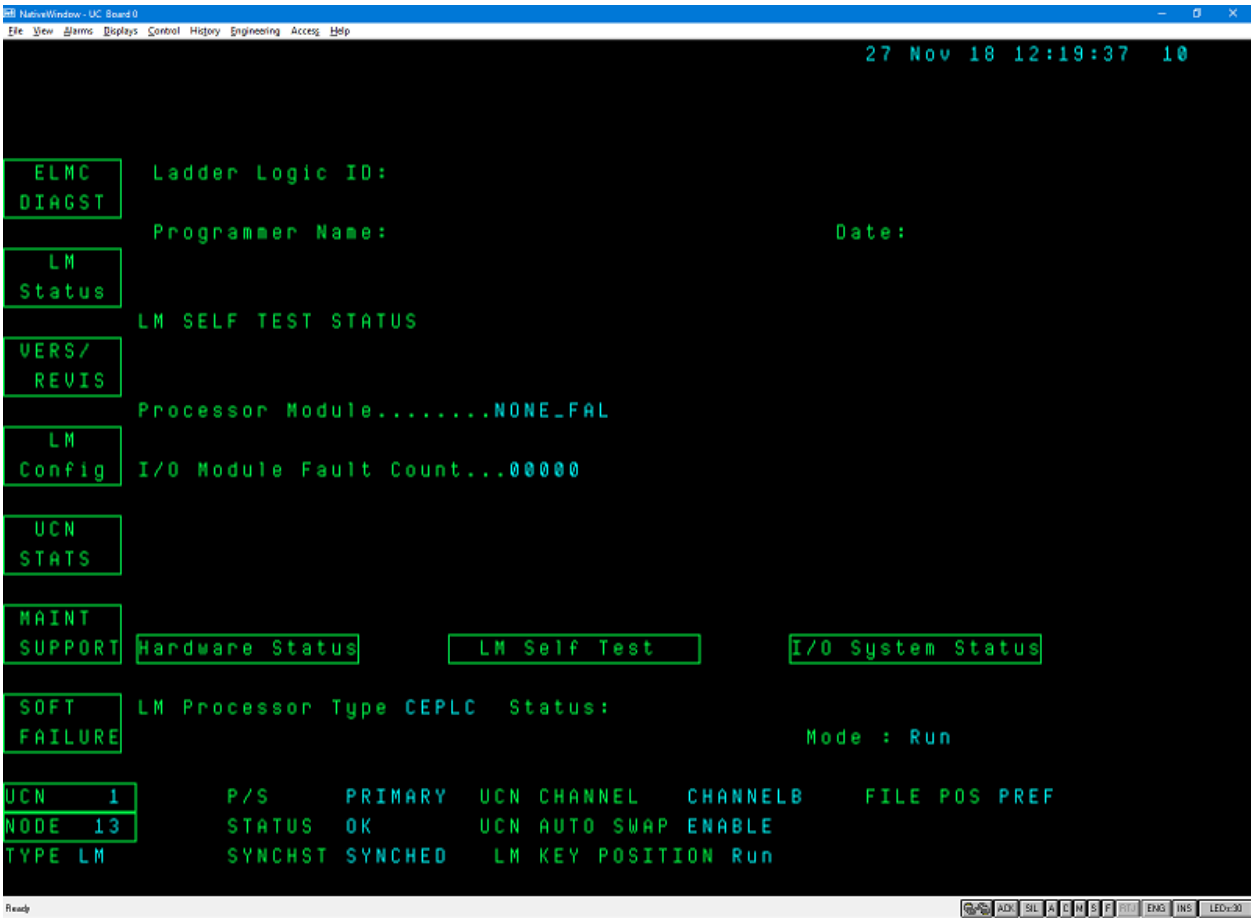
Field	Description
RTUSTATE	RTU state 0 - startup 1 - primary Running 2 - primary Stopped 3 - primary no program 4 - secondary synchronized 5 - secondary synchronizing 6 - secondary not synchronized 7 - system error 8 - primary in firmware upgrade 9 - primary formatting SD card 10 - primary in engineering mode 11 - secondary in firmware upgrade 12 - secondary formatting SD card 13 - secondary in engineering mode
MODLSREDUN	Redundancy configuration status TRUE - redundancy is enabled FALSE - redundancy is disabled
RDNROLESTATE	Redundancy role 0 - initial redundancy role not yet determined 1 - configured as non-redundant 2- primary 3 - secondary

Field	Description
RDNSYNCSTATE	Synchronization state 0 - not determined 1 - not synchronized and the partner is visible 2- initial-synch is in progress 3 - synchronized 4 - standby 5 - not applicable because redundancy is disabled 6 - not synchronized and the partner is absent 7- not synchronized due to incompatible partner 8 - synchronized but performing post-initial-sync of non-critical data
RDNAUTOSYNC	Auto-synchronization state 0 - Auto synchronization disabled either due to 'Disable synchronization command' or due to persistent synchronization fault 1 - Auto synchronization enabled by the Enable Synchronization command 2 - configured as non-redundant
PARTNERMODLSREDUN	Redundancy configuration status TRUE - redundancy is enabled FALSE - redundancy is disabled.
PARTNERRDNROLESTATE	Redundancy role 0 - initial redundancy role not yet determined 1 - configured as non-redundant 2 – primary 3 - secondary

Field	Description
PARTNERRDNSYNCSTATE	Synchronization state 0 - not determined 1 - not synchronized and the partner is visible 2 - initial-synch is in progress 3 – synchronized 4 - standby 5 - not applicable because redundancy is disabled 6 - not synchronized and the partner is absent 7 - not synchronized due to incompatible partner 8 - synchronized but performing post-initial-sync of non-critical data
PARTNERRDNAUTOSYNC	Auto-synchronization state 0 - Auto synchronization disabled either due to 'Disable synchronization command' or due to persistent synchronization fault 1 - Auto synchronization enabled by the Enable Synchronization command 2 - configured as non-redundant

4.9.9 ELMM with ControlEdge PLC Self-test Display

ControlEdge PLC Self-test status display is a modified version of the existing LMM Self-test status display. All the information which is essential for PLC maintenance is retained on this display removing all unwanted parameters. All the four Option Module Information and IO information (real and control) will be removed from this display.



5 ELMM with ControlEdge PLC Troubleshooting

5.1 Hardware Diagnostics

5.1.1 Start-up Self-Test

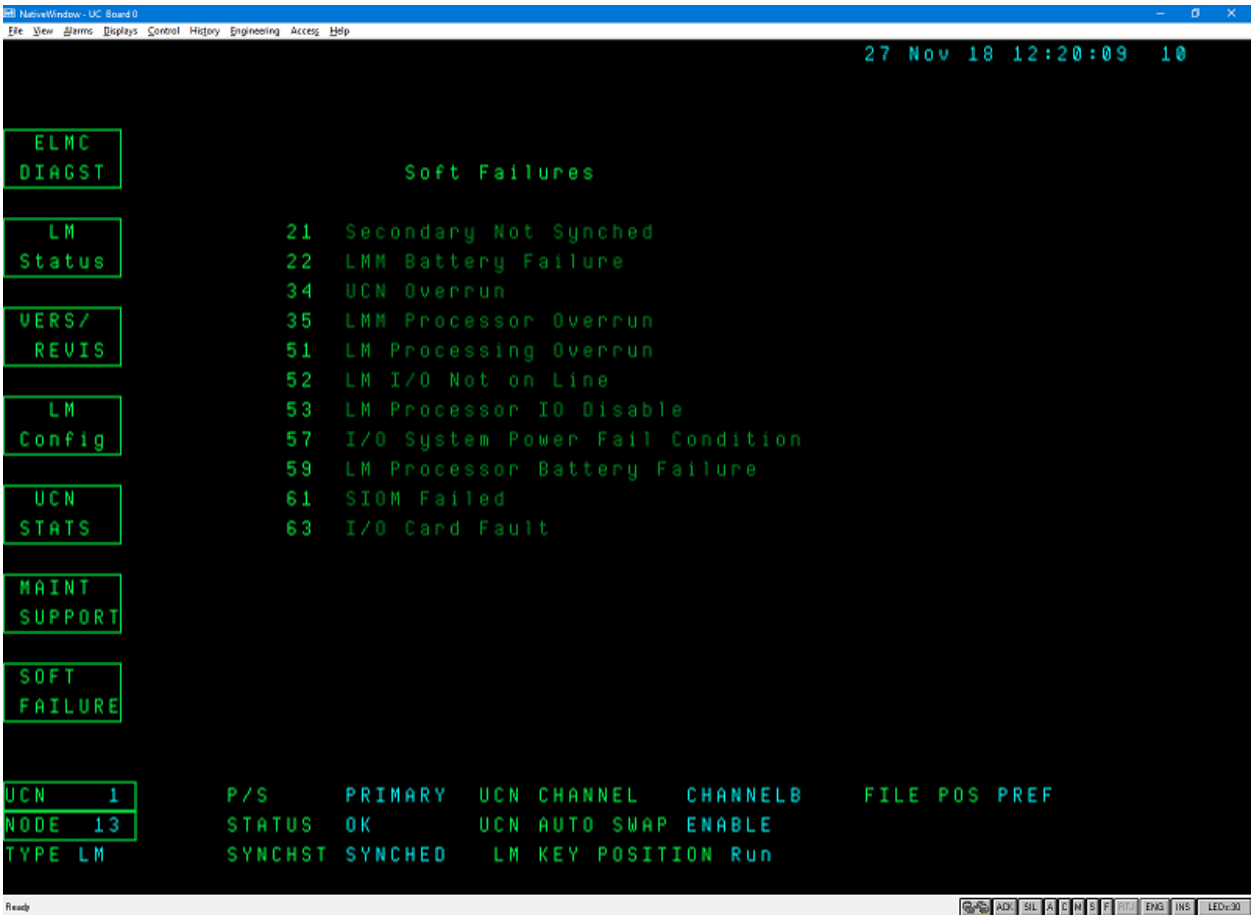
A power on self-test (POST) is performed when the ELMM is powered on. See section “Power on ELMM with ControlEdge PLC” on page 70 and ensure the sequence of steps is correctly performed.

5.2 Troubleshooting scenarios

5.2.1 Soft Failure Display for Enhanced Logic Manager with ControlEdge PLC

All of the LMM Soft Fail indications are applicable for ELMM with ControlEdge PLC except for the soft fail “Not Scanning ladder logic Program” since ladder logic program runs in the same processor as that of the ELMM process and if the ladder logic fails to run then ELMM process may fail too. All the journal event mapping remain same as that of the LMM.

This display is called up from the **SOFT FAILURE** target of any ELM Detailed Status Display.



The targets along the left side and the textual status information along the bottom are standard for all ELM Detailed Status Displays.

The display lists all Soft Fails supported by the ELMM, and highlights all which are currently active.

Targets:

ELMC Diagst, LM Status, VERS/REVS, LM Config, UCN STATS, MAINT SUPPORT, SOFT FAILURE, UCN xxx.

5.3 ELMM with ControlEdge PLC Diagnostics

This section describes the Enhanced Logic Manager's self-diagnostics and error reporting.

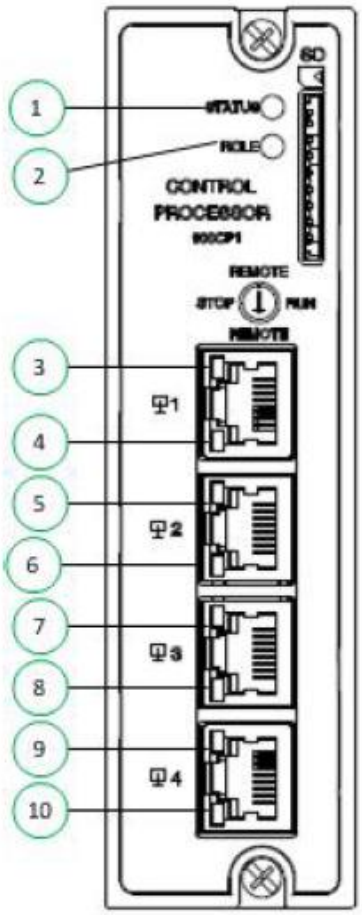
5.3.1 Checking faceplate display and LEDs

Hardware Light Emitting Diodes (LEDs) that assist with troubleshooting activities solely at the controller. LEDs are also useful for verifying indications viewed as screen items. LED indicators are provided for the following hardware components:

- CPM
- EPM
- IOM

CPM Indicators

The following diagram displays the location of the LED indicators on the CPM.



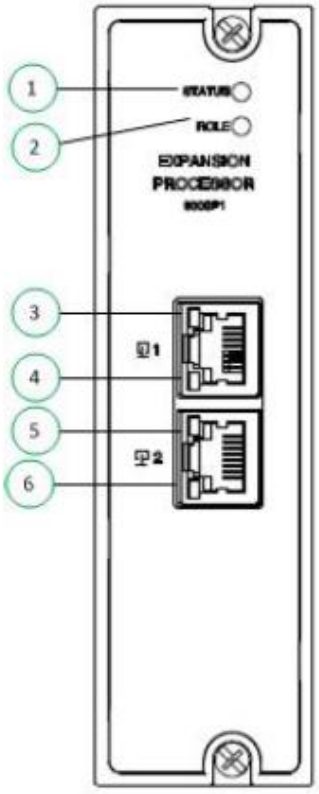
The following table explains the meaning of each LED state.

Item	LED	LED State/Color	Description
1	Status	OFF	No Power is applied to CPM.
		On/Green	The controller is working normally.
		On/Red	The controller is stopped.
		On/Orange	The controller is in power-up process.
		Blinking Red @ 1HZ	The controller is running with error.
		Blinking Red @ 0.5HZ	The controller is accessible via online communication, but no application is loaded.
		Blinking Red @ 5HZ	IP address is in conflict.
		Blink @ 1HZ / Green & Orange	The controller is upgrading firmware.

2	Role	OFF	It is a non-redundant system or;
		On/Green	The controller is in primary role and the system is synchronized, or;
		On/Orange	The controller is in secondary role and the system is synchronized.
		Blinking Green @ 1HZ	The controller is in primary role and the system is synchronizing.
		Blinking Orange @ 1HZ	The controller is in secondary role and the system is synchronizing.
		Blinking Green @ 0.5HZ	The controller is in primary role and the system is unsynchronized.
		Blink Red @ 0.5HZ	The controller is in secondary role and the system is unsynchronized.
3, 5, 7, 9	Ethernet Port Speed (Upper LED)	Yellow On/Off	OFF for 10Base-T; ON for 100Base-TX.
4,6, 8,10	Ethernet Port Link/ Active (Lower LED)	Green On/Off/ Blinking	On for connection; Off for no connection; and blinking for activity

EPM Indicators

The following diagram displays the location of the LED indicators on the EPM.

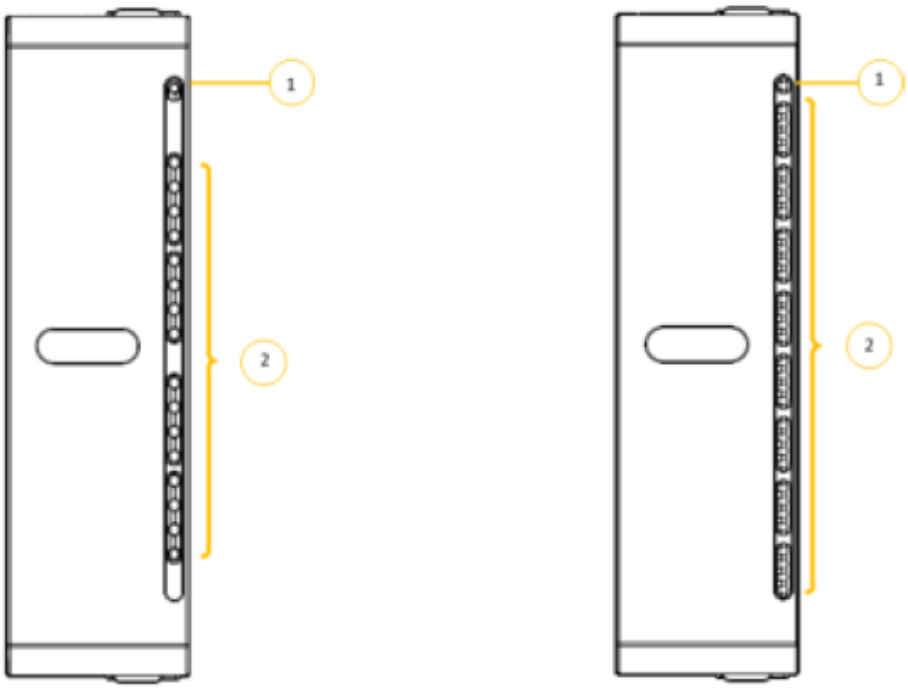


The following table explains the meaning of each LED state.

Item	LED	LED State/Color	Description
1	Status	OFF	No power is applied to EPM.
		On/Green	EPM is working normally.
		On/Orange	EPM is in power-up process.
		Blink Red @ 1 HZ	EPM is running with error.
		Blink Red @ 0.5 HZ	EPM is not configured.
		Blink Red @ 5 HZ	Communication error
		Blink @ 1 HZ / Green & Orange	EPM is upgrading firmware.
2	Role	Green	Other situation except botting.
		OFF	EPM is booting.
3,5	Ethernet Port Speed (Upper LED)	Yellow On/Off	OFF for 10Base-T; ON for 100Base-TX.
4,6	Ethernet Port Link/ Active (Lower LED)	Green On/Off/ Blinking	OFF for no connection; ON for connection; Blinking for toggle

I/O Indicators

The following diagram displays the location of the LED indicators on the I/O modules.



The following table below explains the meaning of each LED state.

Item	LED	LED State/Color	Description
1	Module Status LED	OFF	No Power
		Solid Red	Hardware Failure
		Blinking Red	See LED Failure Definition section
		Solid Green	Cold start with passing diagnostics
		Blinking Green	Normal scanning
2	Channel LEDs	Green ON	For Inputs, indicates On status of the field input even if forced to the opposite state.
		Green OFF	For Inputs, indicates Off status of the field input even if forced to the opposite state.

To indicate the type of diagnostic failure, the module's status LED is flashed red with a number of quick strobes followed by a long off time. The table below outlines the potential module diagnostics. The following table outlines the potential module diagnostics.

LED Failure Definition

Number of strobes	Failure	Description	User Action	Applies to
1	Failsafe	The module is in the failsafe state because it is not receiving message requests from the CPU or the whole system is in exception stop.	1. If expansion I/O rack, go to step 2. If non-expansion I/O rack, go to step 3. 2. Check the Scanner status LED If it's flashing 6 times, proceed with step 3. If it's flashing some other red status code, refer to Table 29 to solve that problem first. If it's flashing green, the module probably is not required in the configuration. If it's not on or steady, cycle power to the scanner. 3. Make sure the module is the correct one for the configuration. 4. Remove the module and check for a bent pin, then reinsert the module. 5. Replace the module. 6. Remove other modules and replace one at a time until the problem reoccurs. Most likely the last module inserted needs to be replaced. 7. Replace the rack.	All modules

2	HW/SW Key	The software residing on the module does not match the module type. This diagnostic should only result in the factory.	Replace module	DI and Relay DO and DC DO

Bad I/O Channel Diagnostics

Individual channels on I/O modules indicate their diagnostics by 6 flashes on the EPM and CPM; the channel's LED does not indicate a diagnostic. The following table lists the conditions that can cause a bad channel diagnostic.

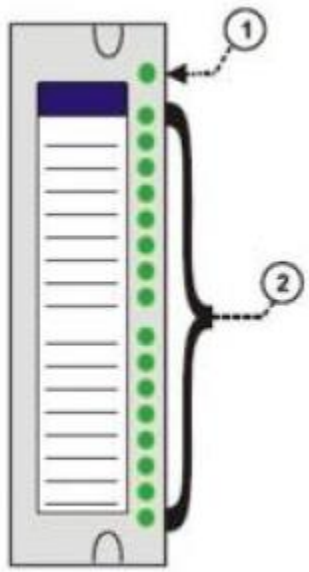
Module Type	Failure message indicated on configuration tool	Description	User Action
AI	Burnout Failure	The sensor – T/C, RTD, or mV source – is failing burnout checks.	Check terminal block connections.
	Under range	The signal at the terminals is less than 10% below the range of the sensor.	Check the signal level being applied to the terminals.
	Over range	The signal at the terminals is more than 10% over the range of the sensor.	Check the signal level being applied to the terminals.
	Failing to convert	When attempting to take a reading, the ADC fails. This could result if the incoming signal is either too large or small. It also could result if the ADC circuit is failing. If the problem is the ADC circuit, most likely other channels will have the same failure.	Check the signal level being applied to the terminals.
AO	Bad Channel	The board indicates that the channel is failing to output the correct value.	Check terminal connections.

Module Type	Failure message indicated on configuration tool	Description	User Action
DO	Bad Channel	The number of configured channels in the DO function block exceeds the number of hardware channels on the DO card.	Reconfigure the DO function block.

Refer section "I/O module diagnostics" of *ControlEdge Builder User Guide* for conditions that can cause a bad channel diagnostic and corresponding action.

UIO Indicators

The following diagram displays the location of the LED indicators on the UIO.



The following table explains the meaning of each LED state.

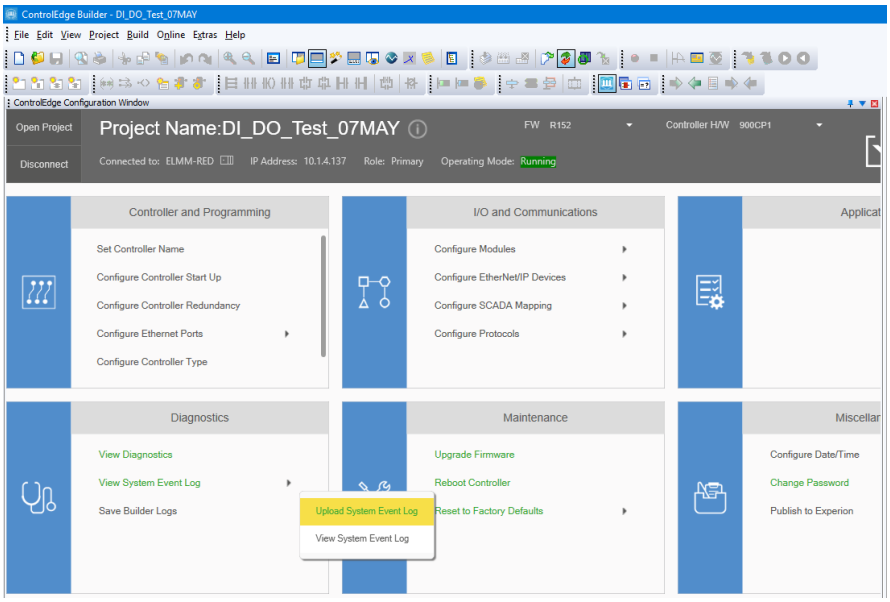
Item	LED	LED State/Color	Description
1	Module Status	Solid Green	Power on with self-test passed
		Solid Red	In power-up process or hardware failure or firmware corrupt
		Blink Green (@ 4 Hz)	Normal scanning
		Blink Red (@ 0.5 Hz)	Firmware upgrade
		Blink Red (@ 1 strobe)	Communication error
		Blink Red (@ 3 strobe)	Running with error for module diagnostic and channel diagnostics (detected by the module itself)

2	Channel LEDs	Digital Input:	
		OFF	Channel disabled or State 0
		On/Green	State 1
		Digital Output	
		OFF	Channel disabled or State 0
		On/Green	State 1
		Analog Input	
		OFF	NA
		Analog Output	
		OFF	NA

5.4 Using ControlEdge Builder to capture diagnostic data

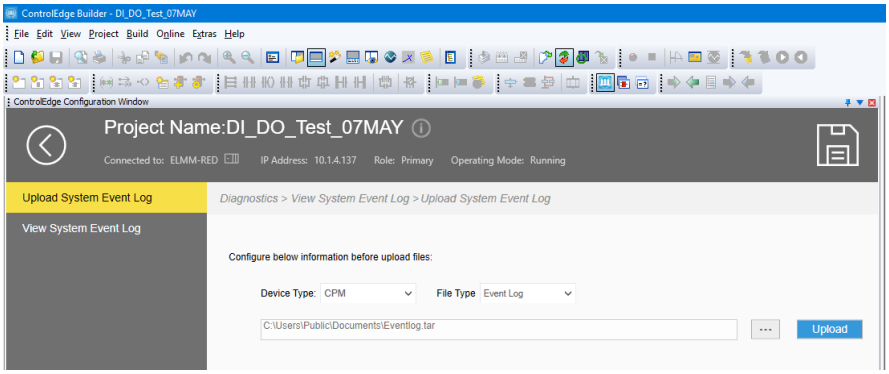
Use the following procedure to capture and upload diagnostic information using ControlEdge Builder.

1. Select **Start** > **All Programs** > **Honeywell** > **ControlEdge Builder** > **ControlEdge Builder** to launch ControlEdge Builder. The **Start** Page appears.
2. From the **Start** Page, select **Connect** to connect the target controller.
3. From the **Home** page, make sure that you have selected ELMM as the controller type under Controller and Programming.
4. From the **Home** page, select **View System Event Log** under Diagnostics.



5. Select **Upload System Event Log**.

   The **Upload System Event Log** page appears.



6. Select **CPM** from the Device Type drop-down list and **Event Log** from the File Type drop-down list.
7. Provide the path where you want to upload the event log file and then select **Upload**.

   The diagnostic information is uploaded to the path for further analysis.

5.5 Verifying ELMM with ControlEdge PLC Hardware and Firmware versions

For an ELMM, the Hardware Version (H/W) and Firmware Version (F/W) fields on the LM Detailed Status Display do not display correct information, you can instead go to ControlEdge Builder to verify this information. To know the H/W and F/W information,

8. From the **Start** Page, select **Connect** to connect the target controller.
9. From the **Home** page, make sure that you have selected ELMM as the controller type under Controller and Programming.
10. From the **Home** page, select **View Diagnostics** under Diagnostics.
11. Go to **System** > **Platform**.

    The View Diagnostics page is displayed, verify the hardware and firmware versions.

5.6 ELMM with ControlEdge PLC Redundancy operations

The ELMM with ControlEdge PLC redundancy operations are described in the following table.

Connection /Failure	ELMM Node Behavior		Switchover	Description
	Primary	Secondary		
Controller connection	OK	OK	No	
	OK	FAIL	No	
	FAIL	OK	Yes	If the primary node fails, the secondary node will take over as primary. The new secondary node transitions to the FAIL state. Use ControlEdge Builder to capture diagnostic information and then select RECOVER on the Native Window.
Downlink port connection	OK	OK	No	
	OK	FAIL	No	
	FAIL	OK	Yes	If the downlink port connection goes bad for the primary CPM, the secondary node will take over as primary. The new secondary node transitions to the FAIL state.

Node failure due to any unhandled exceptions (if the redundant nodes are SYNCHED)	OK	FAIL	No	Indicates secondary node failure.
	FAIL	OK	Yes	Secondary node will take over as primary and failed node will come back as secondary. The new secondary node transitions to the FAIL state. Use ControlEdge Builder to capture diagnostic information and then select RECOVER on the Native Window.
Node failure due to any unhandled exceptions (if the redundant nodes are not SYNCHED)	FAIL	OK	No	Switchover does not occur, however, the secondary will show a BAD state. Perform the following procedure to recover: 1. From ControlEdge Builder, connect to the Secondary ELMM. 2. From the Home page, select **View Diagnostics**. 3. Select **System** > **Redundancy** > **Become Primary**. The Secondary ELMM takes over as the primary and transitions from BAD state to IDLE state. 4. From Native Window, restore the checkpoint by selecting the **Primary ELMM** > **LOAD/SAVE RESTORE** > **RESTORE DATA** and then press **ENTER** and choose **DEFAULT SOURCE**. 5. Select **RUN STATES** > **STARTUP**. The new Primary ELMM transitions from IDLE to OK state.

5.7 FTESTS Cable Error scenarios for Enhanced Logic Manager with ControlEdge PLC

This section shows how the FTE cable faults are reported on the $FTESTS displays.

ATTENTION	**The term "$FTESTS displays" include both $FTESTS1 and $FTESTS2 displays.** • **$FTESTS1 display shows the FTE status of the UCN nodes assigned to the selected ENIM, and is filtered by the UCN Node Number, which has a range of 01-64.** • **$FTESTS2 display shows the status of all the FTE devices in the FTE community and is filtered by the FTE Device Index, which has a range of 01-509.**

ELMM Cable Faults:

Error Scenario	$FTESTS display (this ELMM)	$FTESTS display (all other EUCN nodes)
No FTE cable problems		
If FTE cable A on an ELMM node has a problem		
If FTE cable B on an ELMM node has a problem		
If both FTE cable A and FTE cable B on an ELMM node have a problem		

ATTENTION	If you come across an LCN system alarm that can be traced to a UCN cable failure (indicated by the word “FAIL” next to the text UCN CABLE STATUS on the UCN Status Display) and the ELMM's A/B cables are backlit/red. To resolve this, perform the following procedure: 1. Go to the $FTESTS2 display and then check the FTE composite status. 2. If the composite status for cables is not OK, then scroll through all the 8 pages of $FTESTS2 display to determine the node that is causing cable problems and then resolve. Note: Select the RESET STATS target to reset either disjoined or force-failed nodes before the FTE composite status can be resolved. LCN system alarm can also be caused by a switch uplink failure, check your upper-level network topology to confirm this.

5.8 BOOTP scenarios for ELMM with ControlEdge PLC

The following table describes the various BOOTP scenarios and the associated ELMM with ControlEdge behavior.

BOOTP setting in ControlEdge Builder	BOOTP status in Experion Server	ELMM with ControlEdge behavior
BOOTP set to YES	BOOTP Server running	BOOTP server provides the IP address on every reboot, based on the FTE Device Index setting on the hardware.
BOOTP set to YES	BOOTP Server running and change FTE Device Index on the hardware which is different from ControlEdge Builder setting. Reboot the module	BOOTP server provides the IP address on every reboot, based on the FTE Device Index setting on the hardware.
BOOTP set to YES	BOOTP Server stopped	ELMM IP address will drop to last heard IP address from the BOOTP Server, on a timeout of 60 seconds waiting for the BOOTP service to recover after a reboot. So, for any change in device index on the hardware, ensure that the BOOTP service is running.
BOOTP set to NO	BOOTP Server running	After restart, the ELMM shows the IP address defined in ControlEdge Builder.
BOOTP set to NO	BOOTP Server stopped and change the FTE Device Index on the hardware	Any change in device index in ControlEdge Builder will be validated with hardware device index setting and IP address set in ControlEdge Builder will be used for communication purposes.

6 Appendix A: EUCN Configuration Data Checklist

The information in the following sections should be collected or assigned prior to performing a EUCN upgrade.

Note: You can add additional equipment if required.

6.1 Considerations

Before you perform a EUCN upgrade, consider the following:

- IP addresses must be unique within a network.
- FTE device indexes must be unique within an FTE Community.
- When assigning IP addresses, you should consider that the addresses may be integrated into an Experion network in the future.
- Use the fourth octet of the assigned IP address when assigning FTE Device indexes.
- FTE device indexes are configured using the front panel display of the UEA.
- If a BOOTP server is not present on the network, you must configure the Base IP address.
- If the FTE Device Index is > 255, the third octet is assigned as "1" and the fourth octet will be FTE Device Index minus 256 (for example, if the Base IP address is 10.0.0.0 and the FTE Device Index configured is “267”, then the third octet will be “1” and the fourth octet will be “11”, that is, 10.0.1.11).

6.2 EUCN Configuration Data Checklist

Date checklist last updated:	

Section 1 - EUCN Number

Current UCN number. (Do not change or will need to reload all EUCN nodes and points.)

Example:

13

Section 2 - FTE Switch Configuration
(applicable to EHPM, ENI, ELMMand ENB)

The following information must be assigned for each pair of FTE switches:

Consult with network administrator if available.

The FTE Switches should be configured as split switches, with Level 1 and Level 2 ports.

The 8 ports on the Base switch are Level 1 ports.

The 8 ports on the Expansion switch are Level 2 ports.

References: *FTE Switch used with LCN Cabinet Upgrade Kit Instructions (51195195-384)*
TPN System Installation (SW20-600), Sections 16 & 17
Utilities & Load Modules SCN, section on "IE3000 Switch Configuration"

Section 2a - IP Addresses and FTE Device Indexes

The FTE A switch should be assigned an odd IP address.

The FTE B switch should be assigned the next higher even IP address.

FTE SWITCH	IP ADDRESS	SUBNET MASK	FTE DEVICE INDEX
FTE A (Yellow)			
FTE B (Green)			

Example:

FTE A (Yellow)	*10.0.0.155*	*255.255.255.0*	*155*
FTE B (Green)	*10.0.0.156*	*255.255.255.0*	*156*

Section 2b - Port Assignments

FTE SWITCH	LEVEL 1 PORT NUMBER	CONNECTION	LEVEL 2 PORT NUMBER	CONNECTION
FTE A (Yellow)	1		1	
	2		2	
	3		3	
	4		4	
	5		5	

	6		6	
	7		7	
	8		8	
FTE B (Green)	1		1	
	2		2	
	3		3	
	4		4	
	5		5	
	6		6	
	7		7	
	8		8	

Example:

FTE SWITCH	LEVEL 1 PORT NUMBER	CONNECTION	LEVEL 2 PORT NUMBER	CONNECTION
FTE A (Yellow)	1	*NIM 54*	1	*L1/L2 Crossover*
	2	*NIM 55*	2	*CF9 Cluster 1*
	3	*Spare*	3	*Spare*
	4	*Spare*	4	*Spare*
	5	*Spare*	5	*Spare*
	6	*Spare*	6	*PC*
	7	*Spare*	7	*Spare*
	8	*L1/L2 Crossover*	8	*Spare*
FTE B (Green)	1	*NIM 54*	1	*L1/L2 Crossover*
	2	*NIM 55*	2	*CF9 Cluster 1*
	3	*Spare*	3	*Spare*
	4	*Spare*	4	*Spare*
	5	*Spare*	5	*Spare*
	6	*Spare*	6	*Spare*
	7	*Spare*	7	*Spare*
	8	*L1/L2 Crossover*	8	*Spare*

Section 2c - Switch Passwords

Consult with network administrator if available.

References: *TPN System Installation (SW20-600), Section 17.2*

FTE SWITCH	HOST NAME	ENABLE SECRET PASSWORD	VIRTUAL TERMINAL PASSWORD	ENABLE PASSWORD
FTE A (Yellow)				
FTE B (Green)				

Example:

FTE A (Yellow)	*EUCN13_FTEA*	*FTEA_ESP*	*FTEA_VTP*	*FTEA_ENB*
FTE B (Green)	*EUCN13_FTEB*	*FTEB_ESP*	*FTEB_VTP*	*FTEB_ENB*

Section 2d - Switch Configuration File

Consult with network administrator if available.

References: *TPN System Installation (SW20-600), Section 17.1*

Example:

eucn_8base_8expansion_ie3000_split

Section 2e - Switch Interface Configuration Options

Consult with network administrator if available.

References: *TPN System Installation (SW20-600), Section 17.2*

Configure SNMP Network Management?	
Configure FTP Server?	
Configure vlan1 interface?	
Configure IP on this interface?	
Enable as cluster command switch?	

Configure vlan101 interface?	
Configure NTP Time Server?	

Example:

Configure SNMP Network Management?	*No*
Configure FTP Server?	*No*
Configure vlan1 interface?	*Yes*
Configure IP on this interface?	*No*
Enable as cluster command switch?	*No*
Configure vlan101 interface?	*No*
Configure NTP Time Server?	*No*

Section 3 – L2 Switch Configuration (ELMM and TCMI)

References: *FTE Switch used with LCN Cabinet Upgrade Kit Instructions (51195195-384)*
TPN System Installation (SW20-600), Sections 16 & 17
Utilities & Load Modules SCN, section on "IE3000 Switch Configuration"

Section 3a – Switch configuration file

References: *TPN System Installation (SW20-600), section 17.1*

Example:

Eucn_8base_8expansion_ie3000_split

Section 3b - Switch Interface Configuration Options

Consult with network administrator if available.

References: *TPN System Installation (SW20-600), Section 17.2*

Configure SNMP Network Management?	
Configure FTP Server?	
Configure vlan1 interface?	
Configure IP on this interface?	
Enable as cluster command switch?	
Configure vlan101 interface?	
Configure NTP Time Server?	

Example:

Configure SNMP Network Management?	*No*
Configure FTP Server?	*No*
Configure vLAN1 interface?	*Yes*
Configure IP on this interface?	*No*
Enable as cluster command switch?	*No*
Configure vLAN101 interface?	*No*
Configure NTP Time Server?	*No*

Section 4 - CF9 Ethernet Switch Configuration (applicable to EHPM)

The following information must be assigned or collected for each CF9 Ethernet Switch cluster.

A CF9 Switch cluster allows connections for up to four redundant or 8 non-redundant EHPMs.

The EHPMs connected to the CF9 Switch must have maximum cable length of 100 meters.

The MAC Address is used to identify specific CF9 switches, since they do not have an IP address.

The MAC Address information should be collected when the CF9 switches are installed in the A and B positions.

The MAC Address is listed on the label on the left side of the CF9 switch.

The CF9 Ethernet Switches must be connected to Level 2 ports on a split switch.

The CF9 has two upgradable firmware components, FPGA and microprocessor.
The CF9 Hardware Rev. C should be flashed with firmware version **JJ** and CF9 Hardware Rev. D should be flashed with firmware version **PP**.

Following is an example for assigning FTE device indexes:

$DEVIDX = UCN Node Number + UCN Address, where UCN Address is 32.

So, for LCN1,

UCN 1, NIM 01 $DEVIDX = 01

UCN 2, NIM 01 $DEXIDX = 33

UCN 3, NIM 01 $DEVIDX = 65

References: *FTE Switch used with LCN Cabinet Upgrade Kit Instructions (51195195-384)*
HPM Installation Manual (HP20-600), Section 7.10 & 7.11

CF9 SWITCH	CF9 SWITCH CLUSTER	MAC ADDRESS	FPGA FIRMWARE REVISION/ BUILD	MICRO FIRMWARE REVISION	FTE A UPLINK PORT	FTE B UPLINK PORT

CF9 A (Yellow)						*N/A*
CF9 B (Green)					*N/A*	

Example:

CF9 A (Yellow)	*1*	*00-42-81-1A-4B-2D*	*JJ / 2*	*JJ*	*Y-L2-2*	*N/A*
CF9 B (Green)	*1*	*00-42-81-1E-5C-4F*	*JJ / 2*	*JJ*	*N/A*	*G-L2-2*

Section 4a - CF9/EHPM Port Connections

CF9 SWITCH CLUSTER	PORT	EHPM
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	

Example:

CF9 SWITCH CLUSTER	PORT	EHPM
1	1	*7 - File 1*
	2	*7 - File 2*
	3	*9 - Left*
	4	*9 - Right*
	5	*Spare*
	6	*Spare*
	7	*Spare*
	8	*Spare*

Section 5 – FTE Device Index Number (ELMM and TCMI)

Number assigned to identify TCMI on the FTE network

Must be an odd number

Recommend using FTE Device Index of Primary TCMI

References:
TCMI Installation and Upgrade Guide (51195766-040)
ELMM User's Guide
ELMM with ControlEdge PLC User's Guide

Example:

157

Section 6 - ENIM Configuration

The following information must be assigned or collected for each NIM pair to be upgraded to ENIMs.

Consult with network administrator if available.

The Primary ENIM should be assigned an odd IP address.

The Secondary ENIM should be assigned the next higher even IP address.

The ENIMs must be connected to Level 1 ports on a split switch.

The ENIM has upgradable firmware, which must meet required minimum revision levels, refer to the *ULM SCN 301.15* or later to upgrade the firmware to the required version.

References:
NIM to ENIM Upgrade Kit Instructions (51195195-383)
HPM Installation Manual (HP20-600), Section 7.10 & 7.11

ENIM	IP ADDRESS	SUBNET MASK	FTE DEVICE INDEX	LCN NODE ADDRESS	UCN NODE ADDRESS	ENIM FIRMWARE REVISION	FTE A PORT	FTE B PORT
Primary								
Secondary								

Example:

Primary	*10.0.0.157*	*255.255.255.0*	*157*	*54*	*1*	*2.4*	*Y-L1-1*	*G-L1-1*
Secondary	*10.0.0.158*	*255.255.255.0*	*158*	*55*	*2*	*2.4*	*Y-L1-2*	*G-L1-2*

Section 6a - Authentication Group Number

Number assigned to NIM to identify all EUCN nodes on this EUCN

Must be unique to this EUCN on the LCN

Must be an odd number from 1 - 509

Recommend using FTE Device Index of Primary NIM

References: *NIM to ENIM Upgrade Kit Instructions (51195195-383)*
HPM Installation Manual (HP20-600), Section 7.5 ENIM UCN Node Address Selection

Example:

157

Section 7 - EHPM Configuration

The following information must be assigned or collected for each HPM pair to be upgraded to EHPMs.

Consult with network administrator if available.

The Primary EHPM should be assigned an odd IP address.

The Secondary EHPM should be assigned the next higher even IP address.

The EHPM Comm/Ctl card has upgradable firmware, which must meet required minimum revision levels, refer to the *ULM SCN 301.15* or later to upgrade the firmware to the required version.

References: *HPM to EHPM Upgrade Kit Instructions (51195766-035)*
HPM Installation Manual (HP20-600), Section 7.13

EHPM	IP ADDRESS	SUBNET MASK	FTE DEVICE INDEX	UCN NODE ADDRESS	EHPM FIRMWARE REVISION	CF9 SWITCH CLUSTER	CF9 A PORT	CF9 B PORT
Primary								
Secondary								

Example:

Primary	*10.0.0.161*	*255.255.255.0*	*161*	*9*	*2.4*	*1*	*1*	*1*
Secondary	*10.0.0.162*	*255.255.255.0*	*162*	*10*	*2.4*	*1*	*2*	*2*

Section 8 – ELMM/TCMI Configuration

The following information must be assigned or collected for each LM/SMM pair to be upgraded to ELMMs/TCMIs.

Consult with network administrator if available.

The Primary node should be assigned an odd IP address.

The Secondary node should be assigned the next higher even IP address.

References:

TCMI Installation and Upgrade Guide (51195766-040)
ELMM User's Guide
ELMM with ControlEdge PLC User's Guide

TCMI	IP ADDRESS	SUBNET MASK	FTE DEVICE INDEX	UCN NODE ADDRESS	NODE FIRMWARE REVISION	L1/L2 SWITCH CLUSTER	FTE A PORT	FTE B PORT
Primary								
Secondary								

Example:

Primary	*10.0.0.161*	*255.255.255.0*	*161*	*9*	*1.0*	*1*	*1*	*2*
Secondary	*10.0.0.162*	*255.255.255.0*	*162*	*10*	*1.0*	*1*	*2*	*2*

Section 9 - TCM Configuration

The following information must be assigned or collected for each TCM.
Consult with network administrator if available.
The Primary TCM should be assigned an odd IP address.
The Secondary TCM should be assigned the next higher even IP address.

References: *TCMI Installation and Upgrade Guide (51195766-040)*

TCM	NET IP ADDRESS	TRICON NODE NUMBER	SUBNET MASK
Primary			
Secondary			

Example:

Primary	*10.0.0.171*	*11*	*255.255.255.0*
Secondary	*10.0.0.172*	*12*	*255.255.255.0*

Section 10 – Stand-alone PC Configuration (applicable to ENIM, EHPM)

A stand-alone PC is required if EUCN is not connected to an Experion network.
Required for configuring FTE switches, and upgrading firmware on ENIMs, CF9s, and EHPMs.
The following information must be assigned for the stand-alone PC.
Consult with network administrator if available.
The PC can be connected to either FTE switch.

References: *NIM to ENIM Upgrade Kit Instructions (51195195-383)*
HPM Installation Manual (HP20-600), Sections 7.12 & 7.13
Utilities & Load Modules SCN, section on "Installation of EUCN Tools"

IP ADDRESS	SUBNET MASK	FTE DEVICE INDEX	FTE A PORT	FTE B PORT

Example:

10.0.0.150	*255.255.255.0*	*150*	*Y-L2-6*	*N/A*

Note: For TCMI nodes, a stand-alone PC with Firmware Manager installed is required to flash TCMI Application firmware.

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