

**Honeywell**

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**Honeywell Process Solutions**

**Experion**  
**LIOM Planning and Installation Guide**

EP-DCX414

R300

11/05

**Release R300**

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## About This Document

This document provides information for planning and installing the Honeywell Legacy I/O Link Module.

### Release Information

Document Name	Document ID	Release Number	Publication Date
Experion LIOM Planning and Installation Guide	EP-DCX414	R300	11/05

### References

The following list identifies all documents that may be sources of reference for material discussed in this document:

- Honeywell LCS621 I/O Integration Guide
- Experion R300 Knowledge Builder

### Acronyms and Definitions



#### REFERENCE - INTERNAL

For a list of Acronyms and Definitions, see *Experion LIOM Parameter Reference Dictionary* in LCS 621 IO Integration Knowledge Builder.

## Contacts

### World Wide Web

The following Honeywell web sites may be of interest to Industry Solutions customers.

<b>Honeywell Organization</b>	<b>WWW Address (URL)</b>
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## Symbol Definitions

The following table lists those symbols used in this document to denote certain conditions.

Symbol	Definition
	<b>ATTENTION:</b> Identifies information that requires special consideration.
	<b>TIP:</b> Identifies advice or hints for the user, often in terms of performing a task.
	<b>REFERENCE - EXTERNAL:</b> Identifies an additional source of information outside of the bookset.
	<b>REFERENCE - INTERNAL:</b> Identifies an additional source of information within the bookset.
<b>CAUTION</b>	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
	<b>CAUTION:</b> Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.  <b>CAUTION</b> symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.
	<b>WARNING:</b> Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.  <b>WARNING</b> symbol on the equipment refers the user to the product manual for additional information. The symbol appears next to required information in the manual.

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Symbol Definitions

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<b>Symbol</b>	<b>Definition</b>
	<b>WARNING, Risk of electrical shock:</b> Potential shock hazard where HAZARDOUS LIVE voltages greater than 30 Vrms, 42.4 Vpeak, or 60 VDC may be accessible.
	<b>ESD HAZARD:</b> Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices.
	<b>Protective Earth (PE) terminal:</b> Provided for connection of the protective earth (green or green/yellow) supply system conductor.
	<b>Functional earth terminal:</b> Used for non-safety purposes such as noise immunity improvement. NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national local electrical code requirements.
	<b>Earth Ground. Functional earth connection.</b> NOTE: This connection shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.
	<b>Chassis Ground:</b> Identifies a connection to the chassis or frame of the equipment shall be bonded to Protective Earth at the source of supply in accordance with national and local electrical code requirements.

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# 1. LIOM Planning

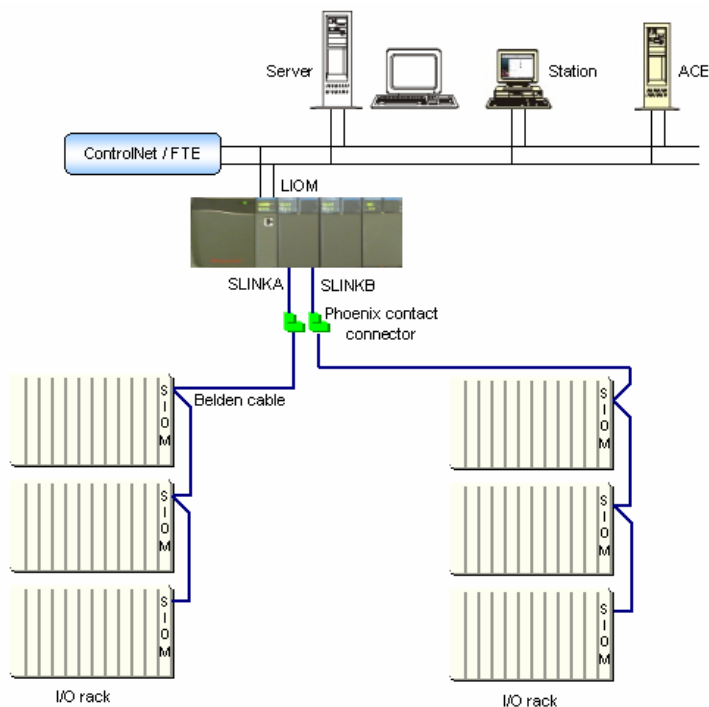
## 1.1 Overview of LIOM

### LIOM as an integration solution

The Legacy Input/Output Link Module (LIOM) is an integration Controller designed for integrating the LCS621 serial I/Os with the Experion Process Knowledge System (EPKS). The LIOM resides in the Experion PKS chassis, replacing the LCS620 processor rack. As an integration solution, the LCS620 ladder logic programming has been replaced with the LIOM function block programming. The Experion Control Builder has replaced the Loader tool used in LCS620 for building control strategies. The LCS621 serial I/O subsystem has been reused in LIOM without any modifications. For information about I/O modules, see I/O Modules supported by LIOM.

### Architecture of LIOM

The following illustration depicts the non-redundant architecture of LIOM with C200:

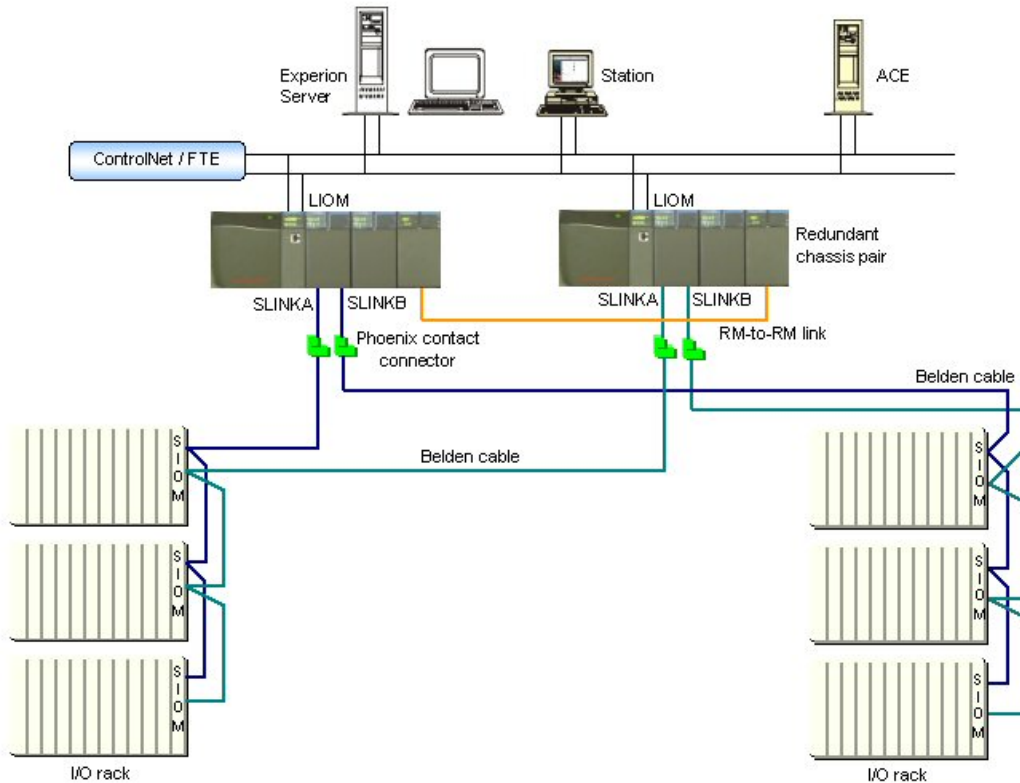


## 1. LIOM Planning

### 1.1. Overview of LIOM

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The following illustration depicts the redundant architecture of LIOM with C200:



#### ATTENTION

The architecture diagrams of LIOM are only examples for non-redundant and redundant configuration. Although the number of SIOMs shown in these diagrams is less than 16, LIOM supports a maximum of 16 SIOMs/I/O racks per serial link.

LIOM is a doublewide, two-slot module in the EPKS chassis. The LIOM together with other standard modules in the EPKS chassis replaces the LCS620 processor rack. By performing a dual role of a Controller and a serial link interface, the LIOM replaces the LCS620 processor and the Serial Link Module (SLM) in the LCS620 processor rack. The LCS621 I/O subsystem has been integrated with EPKS without any modifications.

For serial interfacing, the LIOM module has two serial ports through which communication with the serial I/O subsystem is established. As illustrated in the architecture diagram, the serial link from LIOM begins with the RJ-45 cable that terminates at one end of the Phoenix Contact RJ-45 connector. The Belden cable from the Serial I/O Module (SIOM) in the I/O rack terminates at the other end of the Phoenix Contact RJ-45 connector. The serial communication continues from SIOM-to-SIOM through the Belden cable.

The supervisory network communication is established through the ControlNet Interface (CNI) or the Fault Tolerant Ethernet Bridge (FTEB) module that resides in the EPKS chassis with LIOM.

### **Peer-to-peer functionality**

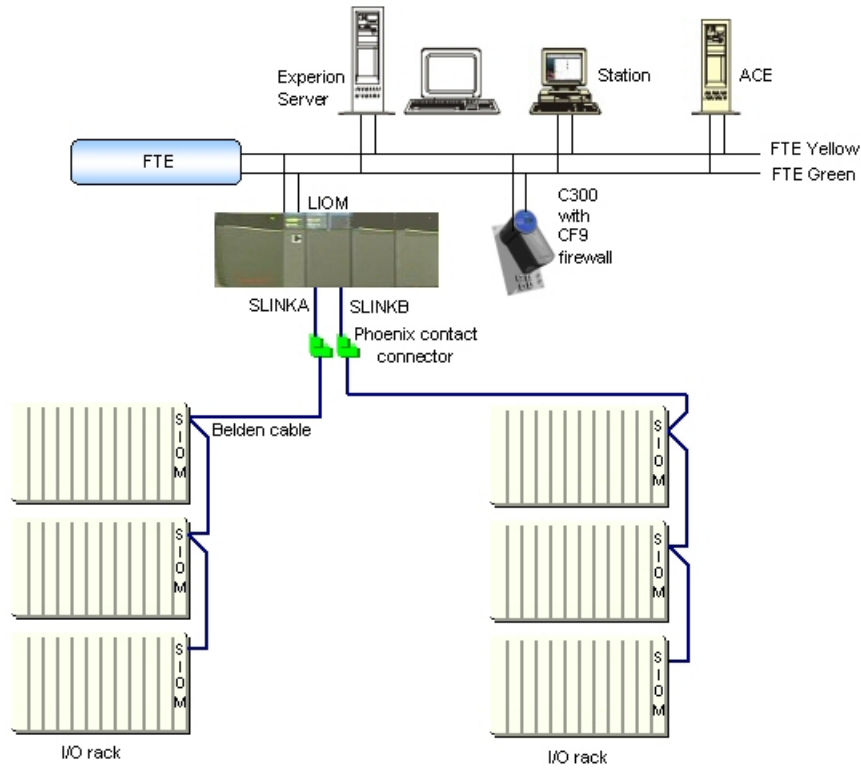
LIOM has the capability to establish peer-to-peer communication with the C200/C300 Processor Module (CPM) and with another LIOM.

The following illustration depicts the non-redundant architecture of LIOM with C300:

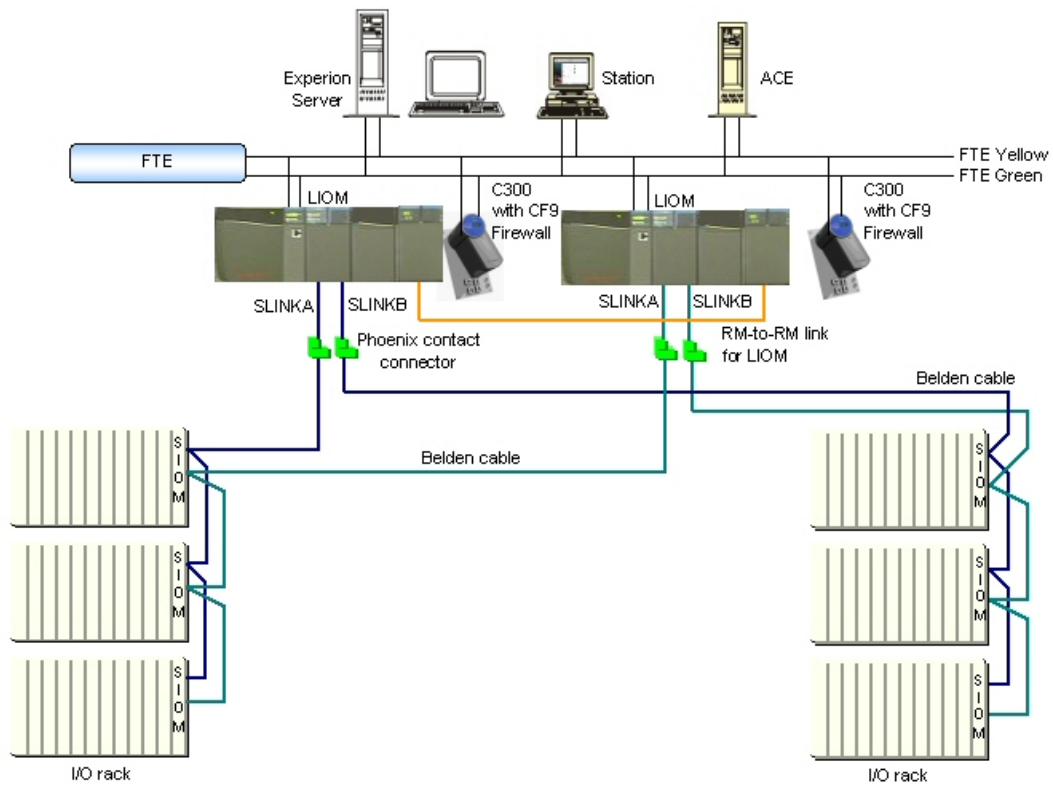
# 1. LIOM Planning

## 1.1. Overview of LIOM

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The following illustration depicts the redundant architecture of LIOM with C300:



#### ATTENTION

The C300 resides in the FTE network and communicates with LIOM as a peer through the FTE connection.

#### Benefits of LIOM

The following are the main benefits of LIOM:

- Integration into EPKS
- No additional cost or effort required for field wiring
- Bumpless transfer of control to a redundant processor
- Capacity to execute logic control as fast as 100 mS

## 1. LIOM Planning

### 1.1. Overview of LIOM

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- Peer-to-Peer communication with C200 and C300 controllers
- One database (EPKS Server) for Controller, Human Machine Interface (HMI), alarms, and events
- Windows-based user interface

#### Limitations

The following are the limitations of LIOM:

- LIOM does not have Proportional Integral Derivative (PID) function blocks and hence does not support PID control. The LIOM, however, can indirectly support PID control by establishing peer-to-peer communication with Controllers like C200/C300, which support PID control.
- LIOM does not support all the I/Os supported by LCS620.
- LIOM supports a maximum of 255 retentive timers and counters.
- Control strategies can occupy a maximum memory of 2 MB.
- LIOM does not support the 0.01msec timer supported by LCS620.
- LIOM does not support a redundancy switchover from logic program.
- LIOM supports only serial communication and thus interfaces only with the SIOM on the I/O Rack. The parallel and slave I/O subsystems are not supported by LIOM.
- LIOM does not support the SIOM model - 621-9935.

#### Program retention capability

LIOM supports automatic restoration of the control strategies when the LIOM is power-cycled. An 8 MB Flash memory that resides on the processor board of the LIOM is used for saving and restoring the control strategies. In the event of a power-cycle to the LIOM, the retention startup feature enables LIOM to execute with the last saved control strategies without having to reload the LIOM and its associated FBs.



#### ATTENTION

For more information about program retention and restoration, see [Experion R300 Knowledge Builder > LCS 621 IO Integration \(Limited Release\) LCS 621 IO Integration Guide](#).

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### **Support for Checkpoint operations**

LIOM supports the Experion Checkpoint functionality, which enables to save and restore configuration, and operational data associated with a control strategy. This enables to minimize downtime caused by anomalies in the process.



#### **REFERENCE – INTERNAL**

For more information about Checkpoint, See the Control Building User Guide in Experion R300 Knowledge Builder.

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## 1. LIOM Planning

### 1.2. Planning Prerequisites

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## 1.2 Planning Prerequisites

### EPKS capabilities

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#### REFERENCE - INTERNAL

To understand the EPKS capabilities, see the following in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Initial Planning and Design Activities](#)
- 


### Planning order

Honeywell recommends you to design your LIOM system on paper before installing it. The following table lists the high-level task checklist for planning and installing your LIOM:

Task	Completed (Yes/No)
Planning the Supervisory Network Infrastructure	
Planning the Control Hardware	
Planning for Grounding	
Planning the Serial I/O Subsystem	
Installing the EPKS Server	
Installing the Experion PKS Station	
Installing the ControlNet/FTE	
Installing the Enclosure	
Installing the EPKS chassis	
Installing the serial I/O subsystem	
LIOM Software Installation	

### Site specifications

The following table provides the site specifications for LIOM:

Description	Quantity
Maximum number of LIOMs per EPKS chassis	2
Maximum number of CPMs per EPKS chassis	1
Maximum number of LIOMs per Supervisory Network   The maximum number of CPMs per Supervisory Network is 10. Since the maximum number of LIOMs per EPKS chassis is 2, and each EPKS chassis with an LIOM has a CPM, the maximum number of LIOMs per Supervisory Network is 20.	20
Maximum number of CPMs (C200) per Supervisory Network	10
Maximum number of CPMs (C300) per Supervisory Network	16
Maximum number of EPKS Servers per Supervisory Network	2
Maximum number of serial links per LIOM	2
Maximum number of drops per serial link	16
Maximum number of SIOMs per LIOM	32
Maximum number of I/Os per LIOM	2040
Maximum number of IOMs per I/O rack	12
Maximum number of IOMs per LIOM	384

### Planning guidelines

The following table provides information on the LIOM components needed for planning your LIOM:

Component	Description	Quantity	Model Number
EPKS Controller chassis type	7-slot, 10-slot, or 13-slot chassis (Use the 10-slot/13-slot chassis if your configuration)	1 per configuration	7-slot (TC-FXX072) 10-slot (TC-FXX102) TK-FXX102 coated

## 1. LIOM Planning

### 1.2. Planning Prerequisites

Component	Description	Quantity	Model Number
	includes two LIOMs)		
<b>LIOM – Controller chassis components</b>			
LIOM	Legacy I/O Link Module	Maximum of 2 per chassis	TK-ZLCSR1
CNI/FTEB	ControlNet Interface/Fault Tolerant Ethernet Bridge	1 per chassis	CNI: TC-CCR013/TK-CCR013/TC-CCN013  FTEB: TC-FTEB01/TK-FTEB01
CPM	C200 Process Module	1 per chassis	TC-PRS021/TK-PRS021
RM	Redundancy Module  (This module is required only for redundant Controller configuration)	1 per chassis	TK-PRR021/TC-PRR021
RM-to-RM link	This link is required only for redundant Controller configuration	1 per Redundant Chassis Pair	GN-KRR011/GN-KRR031/GN-KRR101  Optical fiber, full duplex with Xmt/Rcv fibers  1, 3, and 10 meter standard lengths
SLINK	Serial link	Maximum of 2 per LIOM	CAT5 cable of maximum 1 meter length
<b>LIOM – Serial I/O subsystem components</b>			

**1. LIOM Planning**  
1.2. Planning Prerequisites

Component	Description	Quantity	Model Number
I/O rack		Maximum of 16 per serial link	Full I/O rack – 621-9933 Half I/O rack – 621-9934
SIOM	Serial I/O Module	1 per I/O rack	Dual port SIOM – 621-9938/621-9938R Single port SIOM – 621-9940 Note that LIOM supports SIOM version 2.0 and above only.
Phoenix Contact RJ-45 Connector		1 per serial link	FLKM-RJ-45
Belden cable		1 per serial link	Belden 9729 (4000 feet long) or Belden 9182 (10000 feet long)
I/Os	Input/Output points	Maximum of 2040 per LIOM	See I/O Modules supported by LIOM
DIN rail (To mount ControlNet taps and Phoenix Contact RJ-45 Connectors)		1 per Redundant Chassis Pair	

## 1. LIOM Planning

### 1.2. Planning Prerequisites

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#### ATTENTION

If you are using ControlNet for supervisory network communication then see the following topic in Knowledge Builder for the cables, taps, connectors, and terminators required:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > ControlNet Configuration](#)

If you are using FTE for supervisory network then see the *Fault Tolerant Ethernet Overview and Implementation Guide* in the Experion R300 Knowledge Builder for the Network Interface Cards (NIC), drivers, and cables required.

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#### I/O Modules supported by LIOM

The following table lists the regular and special Input/Output modules supported by LIOM:

Module type	Model number	Module description
<b>Regular IOMs</b>		
	621-0010-ARC	Analog Output Module, 4 pt
	621-0010-VRC	Analog Output Module, 4 pt
	621-0022AR	Isolated Analog Input Module, 8 pt
	621-0022VR	Isolated Analog Input Module, 8pt
	621-1101RC	Digital Input, 115 VAC/DC Isolated Input, 6-pt
	621-1160RC	Digital Input, 115VAC Input, 16 pt
	621-1250RC	Digital Input, 240 VAC Input, 16 pt
	621-2101RC	Digital Output, 115 VAC Isolated Output, 6 pt
	621-2150RC	Digital Output, 115 VAC Output, 16 pt
	621-2200RC	Digital Output, 230 VAC Output, 8 pt
	621-3300RC	Digital Input, 5 VDC Sink Input, 8 pt
	621-3560RC	Digital Input, 24 VDC Sink Input, 16 pt
	621-3580RC	Digital Input, 24 VDC Sink Input, 32 pt

Module type	Model number	Module description
	621-6550R	Digital Output, 24 VDC Source Output, 16 pt
	621-6575R	Digital Output, 24 VDC Source Output, 32 pt
	621-0007RC	Digital Output, Reed Relay Module, 6pt
	621-4350RC	Digital Input, 5 V TTL, 16 pt
	621-2175RC	Digital Output, 115 VAC Output, 32 pt
	621-2102R	Digital Output, 115 VAC Self Protected, 8 pt
	621-6503RC	Digital Output, 24 VDC Self protected, 8 pt
<b>Special modules</b>		
	621-0020RC	Universal Analog Input Module (UAIM), 16 pt
	621-0021RC	Enhanced Diagnostic Module (EDM)
	621-0018R	Absolute Encoder Module (AEM)
	621-0025RC	Resistance Temperature Detector Module, 8 pt
	621-0019R	Pulse Quadrature Input Module, 3 pt
	621-0012RC	ASCII Communication Module
	621-0024RC	Pulse Input Module, 4 pt

**Planning considerations**



**REFERENCE - INTERNAL**

See the following topics in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Site Selection and Planning > Planning for General Considerations](#)
- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Control Network Configuration](#)

## 1.3 LIOM System Specifications

### Physical requirements

The following table describes the physical requirements for LIOM:

Parameter	Operative and storage limits	Transportation band
Ambient Temperature range	0 to +60°C no fans (1)	-40 to 85°C
Rate of change of temperature	≤ 1°C/min	≤5°C/min
Relative Humidity (2)	5% to 95%, non-condensing	5% to 95%, non-condensing
Vibration (3 axes) <ul style="list-style-type: none"> <li>• Frequency</li> <li>• Acceleration</li> <li>• Displacement</li> </ul>	10 Hz to 60 Hz 0.5 g maximum 0.1 inch	10 Hz to 60 Hz 1 g maximum 0.1 inch
Mechanical shock <ul style="list-style-type: none"> <li>• Acceleration</li> <li>• Duration</li> </ul>	5 g maximum 30 ms maximum	20 g maximum 30 ms maximum
Barometric Pressure <ul style="list-style-type: none"> <li>• Altitude</li> </ul>	-300 to +3000 m	Any
Corrosives	G2 std, G3 option (ISA S71.04)	G3
Electromagnetic Interference	15 v/m, SAMA Std. PMC 33.3 - 1978 Class 2 or same as CE Mark (whichever is more severe)	

**1. LIOM Planning**  
1.3. LIOM System Specifications

Parameter	Operative and storage limits	Transportation band
Electrostatic Discharge	CE Mark, IEC1000-4-2, plus 15 KV to enclosure, Controller surfaces and a minimum 10 KV to all field wires	N/A
Surge Protection	CE Mark, IEC1000-4-4 and 5 or IEEE SWC 472-1989 (whichever is more severe)	N/A
CE Mark Standard Compliance	89/336/EEC, EMC Directive EN 50081-2, Emissions, Industrial EN 50082-2, Immunity, Industrial	N/A
Certifications UL (Unclassified Locations) CSA & FM Class 1, Div. 2 (4)	UL 508, Industrial Control Equipment (3) Mounting (Maintenance may require a hot work permit)	
N/A – Not applicable		

**Power consumption**

The power consumption of LIOM is 10 Watts.

**Serial link specifications**

The following table describes the serial link specifications for LIOM:

Parameter	Specification/Description
Data Transfer Medium	Serial 4-wire full duplex (asynchronous to processor scan)
Data Rate	115.2 kbaud
Electrical Format	RS422
Serial channel scan rate	Function of the number of I/O racks per link, the number of I/O racks containing PUSH/PULL slots, and the number of PUSH/PULL slots updated per scan (all or 1 per scan)

## 1. LIOM Planning

### 1.3. LIOM System Specifications

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Parameter	Specification/Description
Maximum drops per serial channel	16
Maximum number of I/Os per serial channel	2040
Maximum channel length	4,000 ft. (Belden 9729 with 200 ohm terminating resistor) or 10,000 ft. (Belden 9182 with 300 ohm terminating resistor)
Error checking	Cyclical redundancy check plus data-receive timeout
Operating current Serial I/O Module (SIOM), model 621-9940 Serial I/O Module (SIOM), model 621-9938R	2.03 A (+5 Vdc typical) 2.06 A (+5 Vdc typical)

#### Belden cable specifications

The following table lists the specifications of the Belden cable used for serial communication:

Parameter	Belden Datalene 9182	Belden Datalene 9729
Standard Length	500 and 1000 feet	100, 500, and 1000 feet
Wire Diameter	22 AWG (0.79 mm) tinned copper drain wire	24 AWG (0.61 mm) tinned copper drain wire
Impedance	150 ohms nominal	100 ohms nominal
Propagation	1.3 nsec/ft. or 4.27 nsec/m 78% of the speed of light	1.3 nsec/ft. or 4.27 nsec/m (78% of the speed of light)
Capacitance	28.9 pF/m (8.8 pF/ft.)	41 pF/m (12.5 pF/ft.)

## 1. LIOM Planning

### 1.3. LIOM System Specifications

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Parameter	Belden Datalene 9182	Belden Datalene 9729
Cable Type	One pair with shield and tinned copper drain wire (2 cables required)	Two shielded pairs with individual tinned copper drain wire
Lay/Twists per foot	11	11

## 1. LIOM Planning

### 1.4. Planning the Supervisory Network Infrastructure

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## 1.4 Planning the Supervisory Network Infrastructure

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### REFERENCE – INTERNAL

To understand the Experion PKS architecture, see the following chapter in Knowledge Builder:

- [Experion R300 > Purpose > Overview](#)
- 

### EPKS Server

The EPKS server is a Windows 2003 Server-based system that contains the supervisory control functions. It is the central repository for all system data and runs core functions like data acquisition and processing, alarm and event management, history collection and trending, and so on. Control Builder, the tool used for configuring control strategies may be hosted on the server, or hosted on a client machine. The EPKS server can be a redundant or a non-redundant node.

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### REFERENCE – INTERNAL

For more information about the EPKS Server, see the following topic in Knowledge Builder:

- [Experion R300 > Purpose > Overview > Server](#)

For information about installing the EPKS Server, see the *Experion Software Installation and Upgrade Guide*.

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### Station

The Station is Experion PKS' main human interface. It presents information in web-style displays.

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### REFERENCE - INTERNAL

For more information about the EPKS Station, see the following topic in Knowledge Builder:

- [Experion R300 > Purpose > Overview > Station](#)

For information about installing the EPKS Station, see the *Experion Software Installation and Upgrade Guide*.

---

**Supervisory Network**

The supervisory network is used for communication between EPKS servers and controllers (LIOM/C200/C300). In the case of LIOM, this network is dedicated for the following communication:

- Server to LIOM communication
- Peer-to-peer communication between two LIOMs
- Peer-to-peer communication between LIOM and C200/C300

The communication is established through the Control Net connection or Fault Tolerant Ethernet (FTE) connection. For peer-to-peer communication between LIOM and C300, FTE connection is required.

**REFERENCE - INTERNAL**

For planning your supervisory network, see the following topic in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Control Network Considerations > Supervisory Network](#)

**Communication media****REFERENCE – INTERNAL**

For planning your communication media, see the following topic in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Control Network Considerations > Communication Media](#)
-

## 1.5 Planning the Control Hardware

### Controller chassis



#### REFERENCE - INTERNAL

Before you begin, see the following topics in the Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Planning your chassis configurations > Background](#)
- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Planning your chassis configurations > Power supplies](#)

---

The control hardware resides in the EPKS chassis. This chassis includes the power supply module, communication module, and the control hardware modules. The control hardware modules include the LIOM, CPM, and RM. The RM is required only in a redundant Controller configuration.



#### REFERENCE - INTERNAL

For more information about the EPKS control hardware infrastructure, see the following topic in Knowledge Builder:

- [Experion R300 > Purpose > Overview > Process Control Hardware](#)

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The following table lists the hardware modules in the EPKS chassis and the number of slots occupied by these modules:

Hardware component	Number of slots occupied	Typical Slot Number
CNI/FTEB	1	0
LIOM	2	1
CPM (C200)	2	3
RM	2	5



#### ATTENTION

In a 10-slot EPKS chassis, the LIOM can reside in any slot from 1 to 9.

---

### Type of Controller configuration

You can install LIOM in a redundant or a non-redundant configuration. The redundant configuration includes a second chassis with a matching hardware configuration. As the redundant configuration provides more security and reliability, it should be used, wherever possible.

The following table lists the compatible modules for LIOM:

If Controller configuration is...	Then, these modules are Controller Chassis compatible...
Redundant	Fault Tolerant Ethernet (FTE) Bridge module ControlNet Interface Module (CNI, latest version) Control Processor Module (CPM, C200 Version) Legacy I/O Link Module (LIOM) Redundancy Module (RM)
Non-redundant	Fault Tolerant Ethernet (FTE) Bridge module ControlNet Interface Module (CNI, latest version) Control Processor Module (CPM, C200 Version) Legacy I/O Link Module (LIOM)

### Module and slot configuration

The factory default size for a redundant LIOM chassis is 10 slots. This provides room for the minimum necessary modules, typical option modules, and several spare slots. Other chassis sizes are also permitted. Your selection is ultimately dependent on the mounting space available and the number of slots desired for other modules. The 10-slot chassis provides sufficient space for the minimum necessary modules and is more economical, when expansion of the Controller chassis' module set is not anticipated.

Slot numbers are labeled on the chassis as zero through N-1. For example, slots are labeled zero through nine for a 10-slot chassis. The following table defines the recommended slot numbers for the modules:

## 1. LIOM Planning

### 1.5. Planning the Control Hardware

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Rules	Slot number in a10-slot or 17-slot EPKS chassis
Fault Tolerant Ethernet Bridge module for connection to the Supervisory FTE network. (The module can be installed in any slot and only one module is allowed per LIOM Controller chassis.)  ControlNet Interface (CNI) module for connection to the Supervisory ControlNet.  Non-Redundant media version TC-CCN013 must be used if network cable redundancy is not required.  Redundant Media version TC/TK-CCR013 is the default and is recommended when using redundant controllers.	0
Double-wide Legacy I/O Link Module (LIOM). (Two modules per Controller chassis are allowed.)	1 & 2
Double-wide Control Processor module (CPM) TC-PRS021. (Only one CPM per Controller chassis.)	3 & 4
Double-wide Redundancy Module (RM)	5 & 6
Placement of the optional Battery Extension Module is dependent on the chassis used.	7
Additional Legacy I/O Link Modules	8 and higher

---

#### CAUTION

When planning your redundant process Controller configuration, be aware of the following:

- Each Controller chassis must be identical in configuration.
  - I/O modules are not permitted in the Controller chassis, as their points could fail in the event of a fail-over or switchover to the backup Controller.
  - Any unused slot of any chassis must have a Blank Cover Module installed. Two Blank Cover Modules are provided with modules TC-PRS021 and TC-PNX021.
-

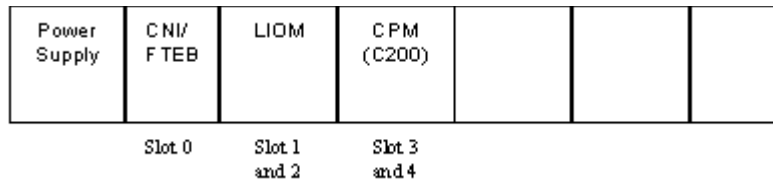


**WARNING**

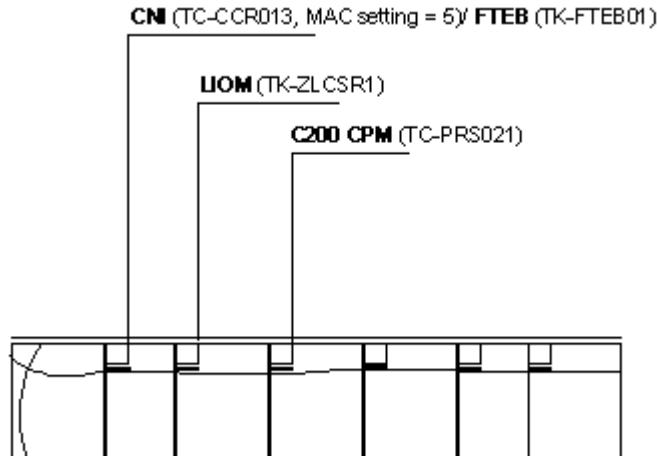
Before considering Removal and Insertion under Power (RIUP) on any module, see the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Removal and Insertion Under Power \(RIUP\) function guidelines](#)

**Typical module placement for a 10-slot non-redundant controller chassis (with C200)**



The following figure illustrates the typical hardware configuration (with C200) in a non-redundant Controller setup:

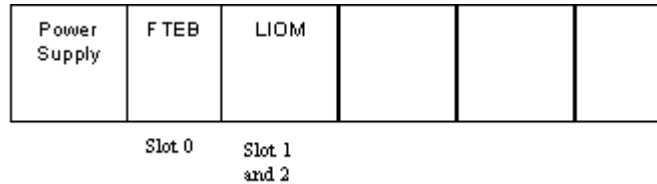


## 1. LIOM Planning

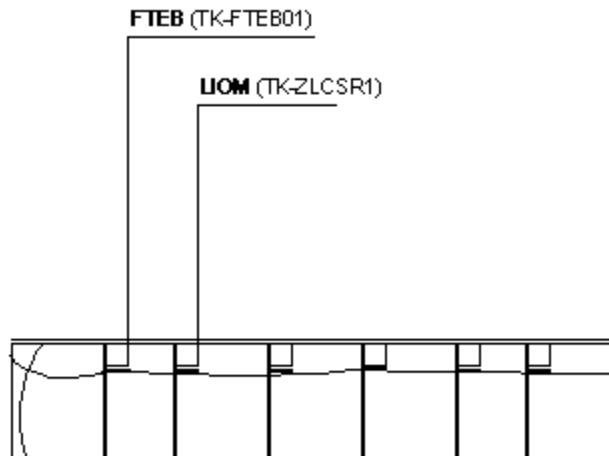
### 1.5. Planning the Control Hardware

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#### Typical module placement for a 10-slot non-redundant controller chassis (with C300)



The following figure illustrates the typical hardware configuration (with C300) in a non-redundant Controller setup:



#### ATTENTION

In the EPKS chassis, there is no restriction on the module placement for LIOM. In a 10-slot EPKS chassis, LIOM can occupy any slot from 1 to 9.

The C300 resides in the FTE network and communicates with LIOM as a peer through the FTE connection.



#### REFERENCE - INTERNAL

For an example of a non-redundant LIOM configuration (with C200/C300), see Architecture of LIOM and Peer-to-peer functionality.

---

### Minimum requirements for a redundant Controller setup

LIOM supports redundancy for Controller chassis only. It does not support I/O level redundancy. The redundant Controller operation is setup through a Redundant Chassis Pair (RCP). The goal of an RCP is to improve the availability of the Controller to perform its functions by providing a pair of Controller chassis. An RCP consists of two Controller chassis which include identical redundancy compliant modules in matching slot positions within their given chassis. The assigned control functions, however, are performed only by either of the chassis. The chassis that is assigned control functions is known as the primary chassis and the Controller executing the assigned functions is known as the primary Controller. The other chassis is known as the secondary chassis. The Controller in the secondary chassis is in a state of readiness to assume responsibilities of the primary Controller. In case of a component failure in the primary chassis, the Secondary assumes the role of the Primary and executes the assigned control functions. The RCP setup requires an additional module called Redundancy Module. This module serves as a chassis-to-chassis communications bridge.



#### REFERENCE - INTERNAL

For information about Controller redundancy, and the role of RM, see the following topic in Knowledge Builder:

- [Experion R300 > Reference > Control Builder Components Theory > Controller Redundancy Functionality > Basic Redundancy Design Concepts](#)

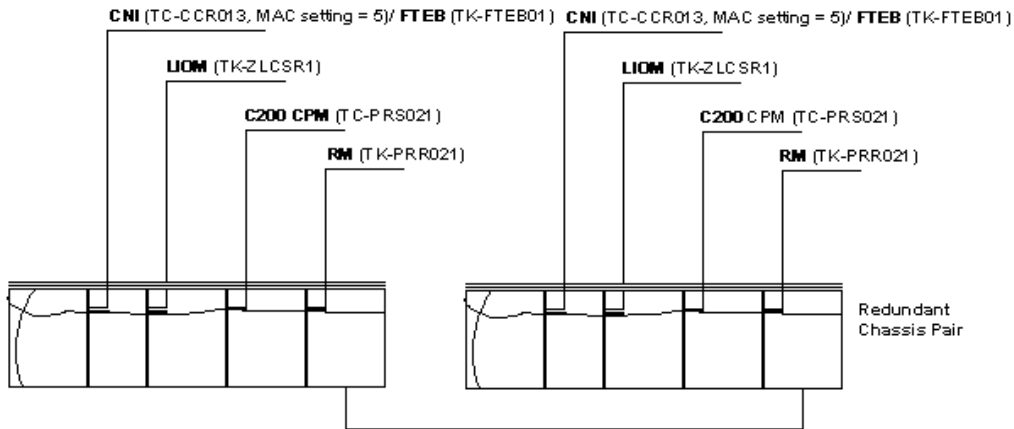
### Typical module placement for a 10-slot redundant controller chassis (with C200)

Power Supply	CNI/ FTEB	LIOM	CPM (C200)	RM	
Slot 0	Slot 1 and 2	Slot 3 and 4	Slot 5 and 6		

**1. LIOM Planning**  
**1.5. Planning the Control Hardware**

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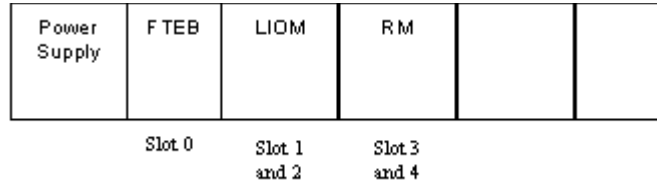
The following figure illustrates the typical hardware configuration (with C200) for a redundant LIOM setup:



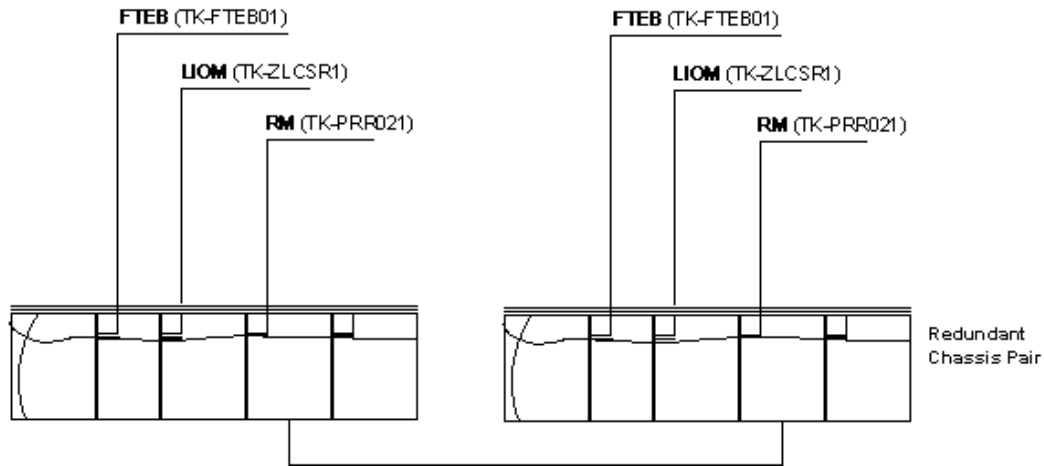
**ATTENTION**

The partner RMs in an RCP are connected by an optic fiber cable of 4 meters in length. Hence, the redundant Controller chassis must be installed within the proximity of this cable.

**Typical module placement for a 10-slot redundant controller chassis (with C300)**



The following figure illustrates the typical hardware configuration (with C300) for a redundant LIOM setup:



**REFERENCE - INTERNAL**

For an example of a redundant LIOM configuration (with C200/C300), see [Architecture of LIOM and Peer-to-peer functionality](#).

**Power supply**

The power supply module is always attached to the left-end of the Experion chassis and does not occupy a slot in the chassis. In a redundant configuration, Honeywell recommends to have different power supply sources for the Primary and Secondary chassis. The following power supply modules are supported by LIOM:

Voltage Type	Model Number	Nominal Power Rating
Vac	TC-FPCXX2	120/240Vac



**REFERENCE – INTERNAL**

For planning your power supply module, see the following topic in Knowledge Builder:

- [Experion R300 > Planning and Installation > Control Hardware Planning Guide > Site Selection and Planning > Planning for Power and Grounding](#)

## 1. LIOM Planning

### 1.5. Planning the Control Hardware

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#### CNI/FTEB

On the Supervisory Network, LIOM communicates only with the EPKS server. This interface is established through the CNI/FTEB module in the LIOM Controller chassis. The CNI/FTEB module occupies one slot in the EPKS chassis.

The following are the CNI/FTEB models supported by Experion systems:

- CNI - TC-CCN013 and TC-CCR013 or TK-CCR013
- FTEB - TC-FTEB01/TK-FTEB01

Honeywell recommends you to use the CNI model with an “R,” as they support redundant ControlNet cables and have greater network security. In addition, the CNI/FTEB models that prefix with “TK” are the coated version of the modules. Note that only one CNI/FTEB can exist per chassis that connects to the Server.



#### ATTENTION

If you are using C300, you must use FTE as the supervisory network media and use FTEB in the Experion chassis.

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#### REFERENCE – INTERNAL

For information about configuring the CNI/FTEB, see the following chapter in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Control Hardware Configuration](#)
- 

#### CPM

The Control Processor Module (C200 version) coexists with LIOM on the EPKS chassis as a peer. This module occupies two slots in the EPKS chassis. The maximum number of CPMs in the EPKS chassis is restricted to one. The C300 CPM resides on the FTE network and LIOM can communicate as a peer through the FTE connection.



#### REFERENCE – INTERNAL

For information about configuring the CPM C200 module, see the following chapter in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Control Hardware Configuration](#)

For information about configuring the CPM C300 module, see [Experion R300 Knowledge Builder](#):

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### LIOM

LIOM performs the role of a logic Controller and the role of an I/O link interface. The module has two ports for serial communication and occupies two slots in the EPKS chassis. The maximum number of LIOMs in the EPKS chassis is restricted to two. LIOM can communicate with the following modules as a peer:

- CPM (C200/C300)
- Another LIOM

For information on the combination of LIOM, C200/C300, and EPKS servers that can coexist, see [Site specifications](#).

### Serial link cables

LIOM requires two RJ-45 cables, each 1meter in length, for serial communication.

### RM

Redundancy Module (RM) is required only in a redundant Controller configuration. It serves as a communications bridge in an RCP. The RM provides a path for the modules in an RCP to synchronize and coordinate the synchronization process. The communication path is established through the chassis' backplane and RM-to-RM private path. This private path is installed by connecting a full duplex optic fiber cable (GN-KRR011) between the RMs in the RCP. RM occupies two slots in the chassis and can reside in any slot from 1 to 8 in a 10-slot EPKS chassis.

---



#### REFERENCE - INTERNAL

For information about the role of RM in a redundant Controller configuration, see the following topic in Knowledge Builder:

- [Experion R300 > Reference > Control Builder Components Theory > Controller Redundancy Functionality > Basic Redundancy Design Concepts](#)
-

## 1.6 Planning for Grounding

### Overview

After you have established the layout of your EPKS chassis, you can begin defining the grounding for the chassis.



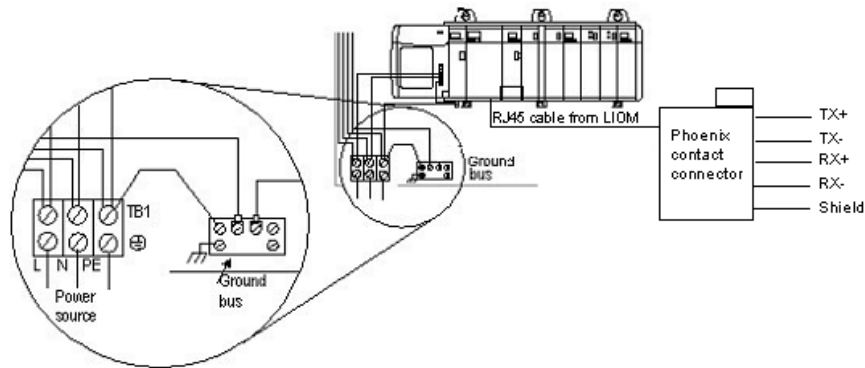
#### REFERENCE - INTERNAL

For power supply grounding, see the following topic in Knowledge Builder:

- [Experion R300 > Planning and Design > Control Hardware Planning Guide > Site Selection and Planning > Planning for Bonding and Grounding](#)

### Grounding for LIOM

Apart from the EPKS chassis grounding, LIOM does not require any special grounding. The following figure illustrates the grounding for LIOM:



The serial ports on the LIOM are grounded internally. Hence, the Shield wires of the Phoenix Contact RJ-45 connector need not be grounded. The A shield and B shield jumpers on the LIOM serial interface slot should always be installed.



#### REFERENCE - INTERNAL

For more information about EPKS chassis grounding, see the *Control Hardware Planning Guide* in the Experion R300 Knowledge Builder.

## 1.7 Planning the Serial I/O Subsystem

### Background



#### REFERENCE - INTERNAL

The serial I/O subsystem used in LCS621 has been reused in LIOM without any modifications. Hence, this section provides only a high-level description of the serial I/O subsystem. For a detailed description of the serial I/O subsystem, see the *LCS621 I/O Installation and Communication Guide*.

The serial I/O subsystem consists of I/O racks setup in a multidrop configuration. The serial interface control module in the I/O rack is known as the Serial I/O Module (SIOM). The LIOM is the serial link interface in the Controller rack. It sequentially communicates with each SIOM in its serial link. The serial I/O subsystem requires two twisted-pair Belden cables with each pair individually shielded for the communication.



#### REFERENCE - INTERNAL

For information about serial link specifications and Belden cable specifications, see *LIOM System Specifications*.

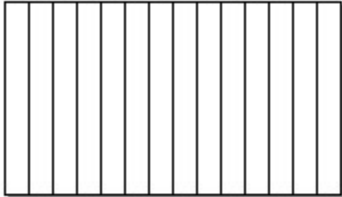
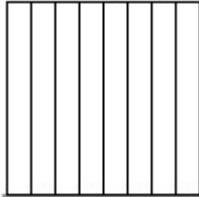
### I/O rack

The I/O rack includes the chassis; backplane, I/O interface module (SIOM), I/O modules, a power supply module, and front cover plates for the unused module slots. The I/O rack has two physical sizes, full-size and half-size. The full-size (621-9933) has fourteen module slots, identified as A through N, with slot A on the left side when facing the I/O rack. The half-size rack (621-9934) has eight module slots, identified as A through H. A maximum of 12 and 6 slots are available for I/O modules in the full and half-size I/O racks. Standard modules are required for both sizes. The other modules are optional and depend on the serial I/O subsystem requirements.

## 1. LIOM Planning

### 1.7. Planning the Serial I/O Subsystem

The following table describes the standard configuration for both full-size and half-size I/O racks:

Serial I/O full rack		Serial I/O half rack	
<p>A B C D E F G H I J K L M N</p>  <p>Full rack: 621-9933</p>		<p>A B C D E F G H</p>  <p>Half rack: 621-9934</p>	
A-L	I/O Modules	A-F	I/O Modules
L and M	Power supply Module – 621-9933 (115/230VAC, 15A)	F and G	Power supply Module – 621-9933 (115/230VAC, 15A)
M	Power supply Module – 621-9934 (115/230VAC, 8A)	G	Power supply Module – 621-9934 (115/230VAC, 8A)
N	Dual port SIOM – 621-9938/621-9938R  Single port SIOM – 621-9940	H	Dual port SIOM – 621-9938/621-9938R  Single port SIOM – 621-9940

### SIOM

The SIOM is the interface module in the I/O rack that resides in the rightmost slot of the I/O rack. It is located in the slot N of a full-size I/O rack or slot H of a half-size I/O rack. LIOM supports 621-9938/621-9938R and 621-9940 SIOM models. 621-9940 is a single port SIOM, whereas 621-9938 and 621-9938R are dual port SIOMs. The SIOM allows each I/O slot to be configured for 0, 8, 16, or 32 points, provided the total number of I/O points stays within the I/O capacity of the LIOM.



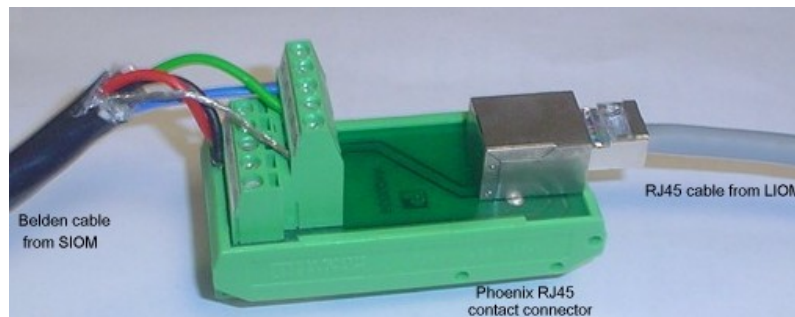
#### ATTENTION

LIOM supports SIOM version 2.0 and above only.

### LIOM to SIOM communication

The LIOM to SIOM communication is established using a Phoenix Contact RJ-45 connector. At one end of the contact connector is an RJ-45 terminal port at which the RJ-45 cable from one of the LIOM serial channels is terminated. At the other end of the contact connector is a set of terminal screws at which the wires of the Belden cable from the SIOM are terminated.

The following picture illustrates the LIOM to SIOM communication:



### Terminating resistors and jumpers

A set of 2-pin jumpers is supplied with the LIOM. These jumpers are used for terminating the multidrop serial I/O link. At the SIOM end, terminating resistors are installed. The jumpers for the LIOM and terminating resistors for the SIOM are installed depending on the type of Belden cable, and the type of LIOM-to-SIOM connection.

For installations using Belden 9729, use the Tx200 and Rx200 jumpers in the LIOM and use the 200-Ohm resistors in the SIOM. For installations using Belden 9182, use Tx300 and Rx300 jumpers in the LIOM and use the 300-Ohm resistors in the SIOM. If the LIOM is installed at one end of the serial communication channel, then a terminating resistor must be installed for that serial channel. Two terminating resistors are required in the SIOM communication port if the port is at either end of the serial communication channel.



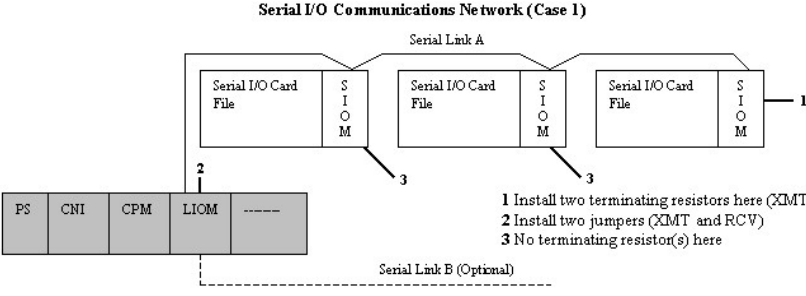
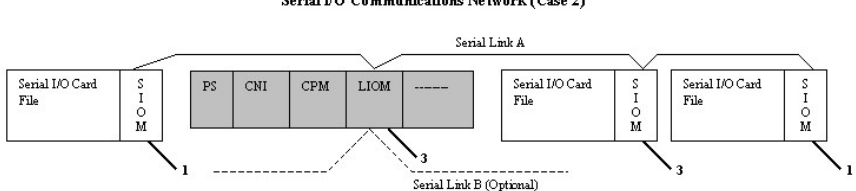
#### ATTENTION

In the LIOM, Shield jumpers have to be installed regardless of the type of Belden cable used and the type of LIOM-to-SIOM connection.

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**1. LIOM Planning**  
**1.7. Planning the Serial I/O Subsystem**

The following table helps you in identifying the terminating resistors and jumpers to be installed:

If...	Then...
LIOM is at the end of the daisy chain	<p>Install the terminating resistors as illustrated in the following figure:</p> <p style="text-align: center;"><b>Serial I/O Communications Network (Case 1)</b></p>  <p>1 Install two terminating resistors here (XMT/RCV)            2 Install two jumpers (XMT and RCV)            3 No terminating resistor(s) here</p>
LIOM is in the middle of the daisy chain	<p>Install the terminating resistors as illustrated in the following figure:</p> <p style="text-align: center;"><b>Serial I/O Communications Network (Case 2)</b></p>  <p>1 Install two terminating resistors here (XMT/RCV)            2 Install one terminating resistor here (RCV)            3 Install only Shield jumpers here</p>



**ATTENTION**

For identifying the location of jumpers in LIOM and installing them in LIOM, see [LIOM Installation](#).

**Serial I/O scan time**

The serial I/O scan time is computed based on the following conditions:

- Number of drops per serial channel
- Number of I/Os per serial channel

- Number of analog I/Os per serial channel
- Type of scan configuration – all analog inputs per scan or one analog input per scan
- Type of Controller configuration – redundant or non-redundant

The following table lists the formula for calculating the I/O scan time:

Type of scan configuration	I/O scan time for a non-redundant configuration	I/O scan time for a redundant configuration
One analog input per rack per scan	$T_t = 3.14N_r + 0.016N_a + 2.02N_{rp} + 7$	$T_t = 3.14N_r + 0.016N_a + 2.02N_{rp} + 12$
All analog inputs per rack per scan	$T_t = 3.14N_r + 0.016N_a + 1.92N_{rp} + 23$	$T_t = 3.14N_r + 0.016N_a + 1.92N_{rp} + 35$
<p><math>T_t</math> = Total serial I/O scan rate in milliseconds  <math>N_r</math> = Number of I/O racks on the serial link  <math>N_a</math> = Number of addresses on the serial link  <math>N_{rp}</math> = Number of I/O racks on the serial link with PUSH/PULL slots  <math>N_p</math> = Number of PUSH/PULL slots on the serial link</p>		

**Example 1**

For a non-redundant system with four I/O racks, each containing 8-point I/O modules and no PUSH/PULL slots, the total serial I/O scan rate is calculated as follows:

$$N_r = 4$$

$$N_a = 32$$

$$N_{rp} = 0$$

$$N_p = 0$$

$$T_t = 3.14 * 4 + (0.016 * 32 * 8 * 4) + 2.02 * 0 + 7 = 12.56 + 6.144 + 7 = 25.7 \text{ msec}$$

## 1. LIOM Planning

### 1.7. Planning the Serial I/O Subsystem

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#### **Example 2**

Consider a redundant system with eight I/O racks, each containing 16-point I/O modules. Three of the I/O racks contain two PUSH/PULL slots each. The total serial I/O scan rate in milliseconds to update one PULL/PUSH slot per I/O scan is calculated as follows:

$$N_r = 8$$

$$N_a = 8 \times 16 \times 12 = 1536$$

$$N_{rp} = 2$$

$$N_p = 4$$

$$T_t = 3.14 * 8 + (0.016 * 12 * 8 * 16) + 1.92 * 2 + 12 = 25.12 + 24.576 + 2.02 * 2 * 3 + 12$$

$$T_t = 73.82 \text{ msec}$$

#### **Example 3**

Consider a redundant system with three I/O racks, each containing six 16-point I/O modules. Two of the I/O racks contain three PUSH/PULL slots each. The total serial I/O scan rate in milliseconds to update ALL PUSH/PULL slots is calculated as follows:

$$T_t = 3.14 * 3 + 0.016 * (3 * (8 * 6)) + 1.92 * 2 * 3 + 35 = 9.42 + 6.144 + 11.52 + 35$$

$$T_t = 62.084 \text{ msec}$$

## 1.8 Control Processing Considerations

### Control Processor load performance

#### ***CPU utilization – limits and estimates***

To determine how much your LIOM can control the process, the execution period of the processor, Processor Usage and Memory Usage are considered. The available Control Processing Unit (CPU) and memory resources determine the number of modules or blocks an LIOM can execute. Other constraints, such as the number of peer-to-peer connections, and total number of CMs are also considered. In summary, 60 percent of the CPU can be used for the configuration load with a 50 ms EE.

#### ***LIOM capacity performance specifications***


The following table provides a summary of the LIOM capacity performance specifications:

Resource	Quantity
<b><i>Communication</i></b>	
Maximum parameter total response rate	1500 PPS
Maximum initiator node Pull/Get request rate	500 PPS
Maximum target node response rate to Pull/Get request rate	500 PPS
Maximum initiator node Push/Store request rate (to all target nodes)	50 PPS
Maximum target node response rate to Push/Store requests (from all initiator nodes)	50 PPS
Maximum number of Display parameters	1000 PPS
<b><i>Processing</i></b>	
50 ms EE – Non-redundant configuration	2400 PU/sec
50 ms EE – Redundant configuration	1000 PU/sec

## 1. LIOM Planning

### 1.8. Control Processing Considerations

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Resource	Quantity
<b>Memory Resources</b>	
Maximum number of IOCs per LIOM	2040
MU capacity of LIOM	2000 MU
 1 MU = 1024 bytes	



#### ATTENTION

In a redundant configuration, when the number of Control Modules containing LCSSR, LCSRS, LCSSELECT, LCSSEL, LCSTIMER, and LCSCOUNTER FBs is doubled and the LIOM is re-loaded, it is observed that the CPU load is also doubled.

In a redundant configuration, when the LIOM is loaded with a CM containing twenty NUMERICARRAY or FLAGARRAY FBs, it is observed that CPU load increases approximately by 17%. Hence, Honeywell recommends the usage of LCSFLAG and LCSNUMERIC FBs in such scenarios.

When one Control Module with 20 FLAGARRAYS (all with 16 pins) is loaded, the CPU load increases by 12%.

When one Control Module with 20 NNARRAYS, (all with 16 pins), is loaded, the CPU load increases by 17%.

In a non-redundant configuration, after loading 40 CMs each with 20 EQ FBs, the CPU free percentage reduces to 72.76%.



#### REFERENCE – INTERNAL

For more information about the LIOM Memory Usage details, see Experion R300 Knowledge Builder > LCS 621 IO Integration (Limited Release) LCS 621 IO Integration Guide.

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## 1.9 Migrating from LCS620 to LIOM

### Overview of LCS620 system

The LCS620 system is a logic Controller designed to service high-speed sequential logic applications. It includes a compatible line of controllers that are designed for various purposes. The system includes a Controller, universal I/O system, and a programming device. The control strategies are developed using ladder logic programming.

### Commonalities between LCS620 and LIOM

The following are the commonalities between the LCS620 and the LIOM:

- Both systems consist a processor rack and I/Os reside in separate racks
- Both systems support redundant and non-redundant Controller configuration
- Both systems use identical formulas for computing the scan time for serial links

### Differences between LCS620 and LIOM

The following table illustrates the differences between the LCS620 and LIOM:

In LCS620...	In LIOM...
Serial, parallel, and slave I/O subsystems are supported.	Only serial I/O subsystems are supported.
Processor rack contains a separate serial interface module for serial communication. This module is known as the Serial Link Module (SLM).	There is no separate module in the Controller chassis for serial communication. The LIOM performs a dual role of a Controller and a serial link interface.
I/O modules can also reside in processor racks.	The EPKS Controller chassis can contain only LIOM, CNI/FTEB, CPM, and RM. Although other standard modules are permitted in the EPKS chassis, LIOM does not support them.
Ladder logic programming is used for building control strategies. Loader is the tool used for building the control strategies.	EPKS function block programming is used for building control strategies. Control Builder is the tool used for building the control strategies.

## 1. LIOM Planning

### 1.9. Migrating from LCS620 to LIOM

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In LCS620...	In LIOM...
The processor rack can contain a maximum of two SLMs per processor, thereby processing four serial links through a single ladder logic program.	Although the EPKS Controller chassis can consist of two LIOMs, these LIOMs function as independent Controllers. Hence, the maximum number of serial links per Controller is two only.
PID algorithms are executed through ladder logic programming.	LIOM does not directly support PID control. PID algorithms are configured using C200/C300 function blocks and executed using C200/C300 Controller. In such a scenario, the LIOM fetches the data from C200/C300 through peer-to-peer communication.
The user-initiated switchover in a redundant configuration is accomplished through the press of a PUSH button provided on the LCS620 hardware.	The user-initiated switchover in a redundant configuration is accomplished through a command on the LIOM FB configuration form in Control Builder.
The scheduling of ladder logic instructions is based on top-down approach.	The scheduling of function blocks is accomplished through base cycle execution. LIOM supports a 50 msec base cycle for function block execution.
Data retention is accomplished using separate instructions like retentive timers and retentive outputs.	Data retention is accomplished by setting an option during control configuration for output channels and function blocks.
In a redundant configuration, a separate logic program can be loaded on the secondary Controller.	In a redundant configuration, the EPKS architecture does not support separate control strategies to be configured in a secondary Controller.
To configure special I/O modules like Universal Analog Input Module (UAIM) and Resistance Temperature Detector Module (RTDM), the I/O configuration utility is used.	There is no separate utility for configuring special I/O modules. All I/O modules are configured using Control Builder.



**REFERENCE – INTERNAL**

- For information about the differences in control strategy building, see Experion R300 Knowledge Builder > LCS 621 IO Integration (Limited Release) LCS 621 IO Integration Guide.
- For information about migrating the UAIM/RTDM I/O database, see Experion R300 Knowledge Builder > LCS 621 IO Integration (Limited Release) LCS 621 IO Integration Guide.

**Migration considerations**

Honeywell recommends you to plan and design the new system on paper before migrating from LCS620 to LIOM. The following table describes the migration considerations:

Analyze the existing LCS620 system	Migration consideration
Identify the number of SLMs in the processor rack	<p>It is not necessary that two LIOMs should replace two SLMs in the processor rack.</p> <p>In the existing system, compute the I/O scan time for each serial link using the I/O scan time formula.</p> <p>Design the new system with one LIOM and all I/Os shared between the two serial links.</p> <p>Recompute the I/O scan time for the serial links in the new system.</p> <p>If the new I/O scan time adds to the serial response time latency, then redesign the new system with two LIOMs replacing the two SLMs in the existing LCS620 processor rack.</p>
Identify the type of I/Os in the existing system	<p>If the existing system has any I/O modules that are not supported by LIOM, then replace them with possible alternative I/O modules supported by LIOM. This can be accomplished by selecting the alternative I/O module based on the module type, inputs, and signal range. Note that replacement is possible only for simple IOMs.</p> <p>For information about I/O modules, see I/O Modules supported by LIOM.</p>

## 1. LIOM Planning

### 1.9. Migrating from LCS620 to LIOM

---

Analyze the existing LCS620 system	Migration consideration
Are there any I/Os in the processor rack?	LIOM does not support any I/Os in the processor rack. Design the new system with the I/Os in processor rack removed and accommodated in existing or separate I/O racks.
Are there any I/Os in parallel or slave I/O subsystems?	LIOM supports only serial I/O subsystems. Design the new system by reengineering the parallel and slave I/Os using serial I/Os.



#### ATTENTION

In LCS620 systems, recognition of communication fault in the serial link is accomplished by setting the dip-switches in SLM. In LIOM, these settings are configured through software. In a migration scenario, you need to note down the SLM dip-switch settings for serial link fault recognition and appropriately configure them in LIOM.

---



#### REFERENCE - INTERNAL

For information about considerations for migrating control strategies, see [Experion R300 Knowledge Builder > LCS 621 IO Integration \(Limited Release\) LCS 621 IO Integration Guide](#).

---

### Migration process

The following lists the high-level process for migrating from LCS620 to LIOM:

- Identify the type of existing configuration
- Identify the number of LIOMs required per chassis
- Setup the EPKS Server and Station
- Setup the EPKS chassis for the existing configuration – The RCP chassis can be mounted in a separate cabinet or can be mounted in the existing LCS system cabinet
- Power-off the LCS processor rack and redesign the I/Os in the processor rack
- Redesign the I/Os in parallel or slave I/O configuration
- Redesign the I/Os in LCS to the I/Os in LIOM based on the IOMs used in LCS

- Install the necessary jumpers in LIOM
- Install the EPKS chassis with the necessary hardware modules (PSM, CNI/FTEB, CPM, LIOM, RM)
- Install the supervisory communication media FTE/ControlNet
- Complete the grounding installation for the EPKS chassis
- Install the serial links and the corresponding Phoenix Contact RJ-45 connectors
- Install the redundancy cable in case of an RCP setup
- Note down the SLM dip-switch settings in the LCS system. LIOM does not have dip-switch settings for communication fault recognition. This is accomplished through software configuration in Control Builder. For information about configuring the serial links, see Experion R300 Knowledge Builder > LCS 621 IO Integration (Limited Release) LCS 621 IO Integration Guide.
- Power-on the EPKS chassis and allow the modules to complete the self-tests
- Install the LIOM firmware through N-tools
- Configure and load the LIOM in Control Builder
- Configure the control strategies and download them

**REFERENCE - INTERNAL**

For information about LIOM control configuration and loading, see Experion R300 Knowledge Builder > LCS 621 IO Integration (Limited Release) LCS 621 IO Integration Guide.

---



## 2. LIOM Installation

### 2.1 LIOM Hardware Installation

#### Installation Considerations

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#### REFERENCE - INTERNAL

See the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Preinstallation Considerations](#)
- 

#### Installing the EPKS Server

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#### REFERENCE - INTERNAL

See the *Experion Software Installation and Upgrade Guide*.

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#### Installing the Experion PKS Station

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#### REFERENCE - INTERNAL

See the *Experion Software Installation and Upgrade Guide*.

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#### Installing the ControlNet/FTE

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#### REFERENCE - INTERNAL

If your communication media is ControlNet, then see the *ControlNet Installation Guide* in the Experion R300 Knowledge Builder. If your communication media is FTE, then see the *Fault Tolerant Ethernet Installation and Service Guide* in the Experion R300 Knowledge Builder.

---

#### Installing the Enclosure

---



#### REFERENCE - INTERNAL

See the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Enclosure Installation](#)
-

## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

---

#### **Considerations**

If the EPKS chassis is to be mounted in the existing LCS cabinet, then consider the following:

- Dimensions of the EPKS chassis
- Power supply requirement for EPKS chassis
- Grounding for EPKS chassis
- Additional internal infrastructure required for EPKS chassis
- I/Os in the LCS processor rack

#### **Dimensions of the EPKS chassis**

In the LCS cabinet, a 7-slot EPKS chassis can be mounted in place of the LCS620 processor rack.



#### **REFERENCE - INTERNAL**

Before mounting a 10-slot or a 13-slot EPKS chassis, see the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Chassis Installation > Chassis Mounting Dimensions](#)
- 

#### **Power supply requirement for EPKS chassis**

The power supply requirement for the EPKS chassis is 120/240 Vac and LIOM supports the power supply model - TC-FPCXX2.



#### **REFERENCE - INTERNAL**

For the type of power supply models supported by EPKS chassis, see the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Power Supply Installation and Removal > Preparing to Install the Power Supply](#)
-

### **Grounding for EPKS chassis**

---



#### **REFERENCE - INTERNAL**

See the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Preinstallation Considerations > General Control Hardware Installation Requirements > Protective Earth \(PE\) ground guidelines.](#)
  - [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Preinstallation Considerations > General Control Hardware Installation Requirements > Ground bus connection guidelines.](#)
- 

### **Additional internal infrastructure required for EPKS chassis**

The EPKS chassis requires DIN-rails for mounting ControlNet taps and Phoenix Contact RJ-45 connectors.

---



#### **REFERENCE - INTERNAL**

For installing the DIN-rails, see the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Enclosure Installation > Installing the Internal Infrastructure](#)
- 



#### **TIP**

Honeywell recommends mounting of the Phoenix Contact RJ-45 connectors on the marshalling cabinet since the RJ-45 cable length is 1 meter.

---

### **I/Os in the LCS processor rack**

LIOM does not support IOMs in the Controller chassis. Hence, the I/Os in the existing LCS processor rack have to be redesigned before installing the EPKS chassis.

## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

---

#### Installing the EPKS chassis

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#### REFERENCE – INTERNAL

For installing the DIN-rails, see the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Chassis Installation](#)
- 

#### Power Supply Installation and Removal

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#### REFERENCE – INTERNAL

See the following topic in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Power Supply Installation](#)
- 

#### CNI/FTEB Installation and Removal

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#### REFERENCE – INTERNAL

If you are using CNI as the communication interface module in the Controller chassis, then see the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > ControlNet Communication Module Installation and Removal](#)

If you are using FTEB as the communication interface module in the Controller chassis, then see the *Fault Tolerant Ethernet Bridge Implementation Guide* in the Experion R300 Knowledge Builder.

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#### CPM Installation and Removal

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#### REFERENCE - INTERNAL

See the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Controller Module Installation and Removal](#)
-

## LIOM Installation and Removal

### *Before you begin*

The installation and removal of LIOM is similar to the installation and removal of the CPM. Before you begin installation, ensure the following:

- Confirm that you have taken steps to minimize Electrostatic Discharge (ESD).



#### **ATTENTION**

See the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Preinstallation Considerations](#)
- 

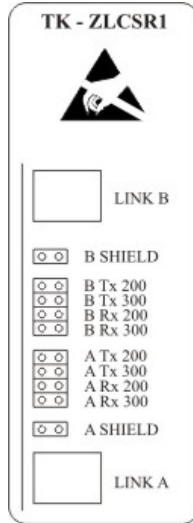
- Confirm that no power is applied to the chassis.
- Verify you have a Legacy I/O Link Module (LIOM) model TK-ZLCSR1.
- Verify you have all the other modules required in the EPKS chassis.
- Confirm the selected chassis slot location for mounting the LIOM.
- Verify that your planned chassis configuration complies with the configuration rules outlined in Planning the Control Hardware.

### *Installing jumpers in LIOM*

Jumpers are located on the serial interface slot of the LIOM. The location of these jumpers is listed on the module's front-door sticker. The following picture illustrates the location of the jumpers:


**2. LIOM Installation**  
**2.1. LIOM Hardware Installation**

---



Depending on the LIOM-to-SIOM connection and the type of Belden cable used, install the jumpers as illustrated in the following table:

LIOM-to-SIOM connection	Belden cable	Jumper settings for SLINKA	Jumper settings for SLINKB
If LIOM is at the end of the daisy chain...	Belden 9182	Install the jumpers ATx300 and ARx300 to include the 300E and 1/2W resistor in the circuit	Install the jumpers BTx300 and BRx300
	Belden 9729	Install the jumpers ATx200 and ARx200 to include the 200E and 1/2W resistor in the circuit	Install the jumpers BTx200 and BRx200
	Install A Shield and B Shield jumpers for both type of Belden cables.		

LIOM-to-SIOM connection	Belden cable	Jumper settings for SLINKA	Jumper settings for SLINKB
If LIOM is in the middle of the daisy chain...(See Connecting SIOM to Phoenix Contact RJ-45 Connector in Installing the serial I/O subsystem)	Install only Shield jumpers – A Shield and B Shield		
	A Shield and B Shield jumpers are used for connecting the cable shield to the chassis. These jumpers should always be installed, regardless of the type of Belden cable used and the LIOM-to-SIOM connection.		

***Installing the LIOM in the chassis***

To install the LIOM in an unpowered chassis, perform the following steps:

Step	Action
1	Position the module at the desired chassis slot locations. There is no default slot location for the LIOM. Remember that slot numbering is zero-based and leftmost slot is numbered “0.”
2	Align the module’s circuit board with the top and bottom chassis guides.

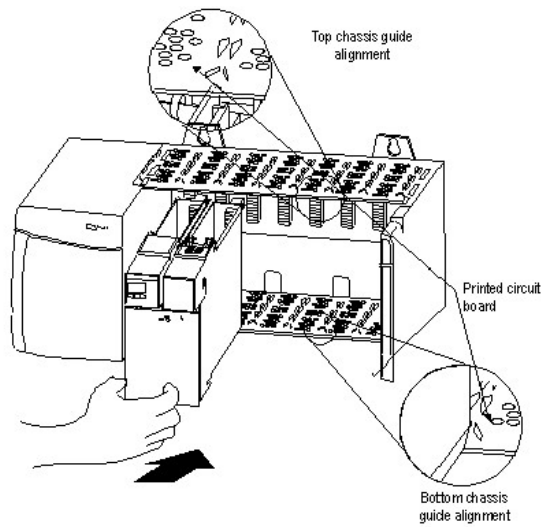
## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

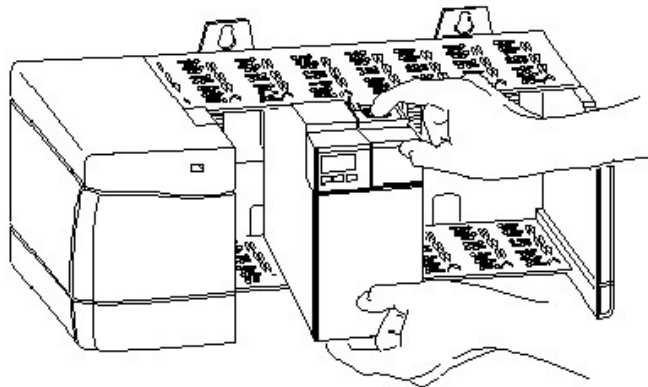
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Step	Action
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- 3 Slide the module into the chassis until the module tabs "click" into position.



- 4 If you are configuring an RCP, repeat this procedure to install the second LIOM in the other chassis of the redundant pair.
-

### ***Installing the serial link cables***

To install the serial link cables in the LIOM, perform the following steps:

<b>Step</b>	<b>Action</b>
1	Open the front cover of the LIOM to access the serial ports on the LIOM. Connect the RJ-45 connectors marked "A" and "B" to the appropriate port marked LINKA and LINKB on the LIOM.
2	Connect the other end of the RJ-45 connectors to the serial port on the Phoenix Contact RJ-45 connector.
3	If you are configuring an RCP, repeat this procedure to install the serial link cables in the redundant LIOM.

---

### ***Post LIOM installation checks***

Install the other modules planned for the chassis configuration as outlined in the applicable sections of this guide. For more information about chassis configuration, including default module placement and redundant Controller considerations, see Planning the Control Hardware.



#### **ATTENTION**

If the LIOM is not installed and pre-configured by the factory, users must load the LIOM's personality image (firmware) to make it operational. This is also true for any replacement LIOM ordered separately from the factory.

---

After you have installed all the modules, powered-on the chassis and system communication is complete, see Upgrading LIOM Firmware using N-tools to load the LIOM personality image.

### ***Removing the LIOM from the chassis***

To remove the LIOM from an unpowered chassis, perform the following steps:

<b>Step</b>	<b>Action</b>
1	Open the door on the power supply and flip the power switch to its OFF position.
2	Push in the top and bottom locking tabs.

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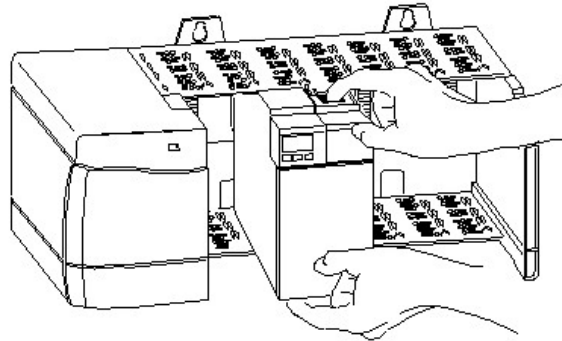
## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

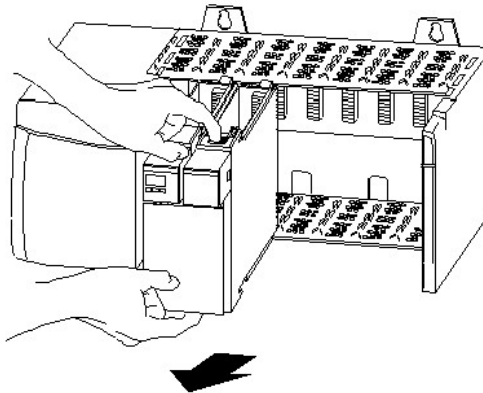
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Step	Action
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3 Pull the module out of the chassis.



#### ***Installing replacement LIOM***

See Installing the LIOM in the chassis to install the replacement LIOM into the chassis. After you have installed the replacement LIOM, see Upgrading LIOM Firmware using N-tools.



#### **ATTENTION**

Users are responsible for checking that replacement modules have the appropriate firmware. This includes verifying that the replacement modules pass their powerup diagnostics.

---

## Redundancy Module Installation and Removal



### REFERENCE - INTERNAL

See the following chapter in Knowledge Builder:

- [Experion R300 > Installation and Upgrades > Control Hardware Installation Guide > Redundancy Module Installation and Removal](#)

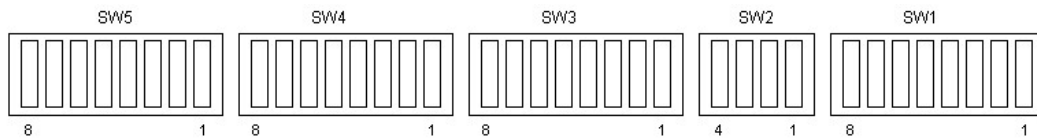
## Installing the serial I/O subsystem

### Serial I/O addressing

The serial I/O addressing is accomplished by setting the SIOM dip-switches. SIOM has five dip-switches located on the top edge of its circuit board. These dip-switches are used for setting the module's starting address, card fault recognition, communication fault responses, normal or test mode operation, and the number of I/O points in each I/O slot.

On start-up, LIOM queries all SIOMs for their starting addresses and the number of allocated addresses in the I/O rack. The LIOM also determines the sequence in which the I/O racks on the serial link are accessed, based on the starting address of each SIOM.

The following figure illustrates the dip-switches in SIOM:



The following table describes the dip-switches in SIOM 621-9938R and their use:

Switch	Type	Purpose
SW1	8-position	Used for selecting SIOM starting address.
SW2	4-position	Used for recognizing card faults, communication fault responses, and normal or test mode operation.
SW3	8-position	Used for setting the number of I/O points per slot. (I, J, K, L)

## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

---

Switch	Type	Purpose
SW4	8-position	Used for setting the number of I/O points per slot. (E, F, G, H)
SW5	8-position	Used for setting the number of I/O points per slot. (A, B, C, D)



#### REFERENCE – INTERNAL

For setting the SIOM DIP switches, see *LCS 620 Installation and 621 I/O Communication* guide.

---

The following are the general guidelines for serial I/O addressing:

- The SIOM starting address is selected from a range of 0 through 2032, in increments of 8.
- SIOMs cannot share the same starting address or have overlapping I/O addresses. The LIOM does not recognize duplicate SIOM starting addresses or addresses greater than 2032. Overlapping addresses are indicated by overlap alarms that are notified on the Station.
- I/O addresses can be skipped between racks or the first rack on the serial link can have a higher starting address than the second rack.

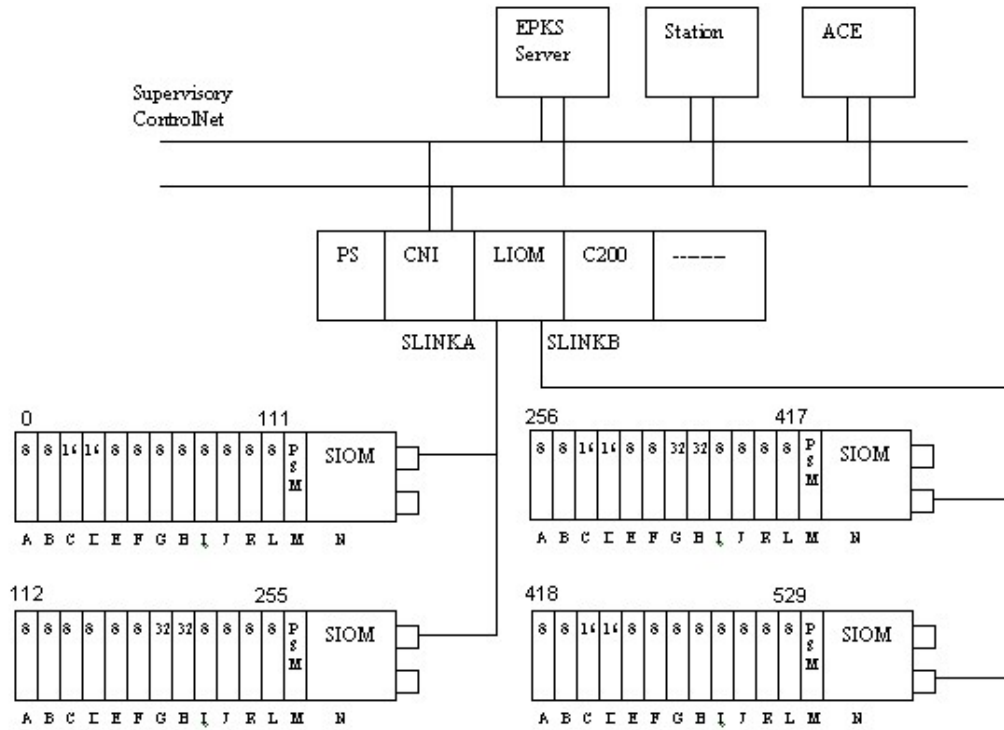
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#### CAUTION

Duplicate SIOM starting addresses are not detected by LIOM. Hence, if two or more SIOMs share the same starting addresses, then the serial I/O communication is unpredictable.

---

The following figure illustrates the serial I/O addressing:



### Installing terminating resistors in SIOM



#### REFERENCE - INTERNAL

For installing terminating resistors in the SIOM, see *LCS 620 Installation and 621 I/O Communication* guide.

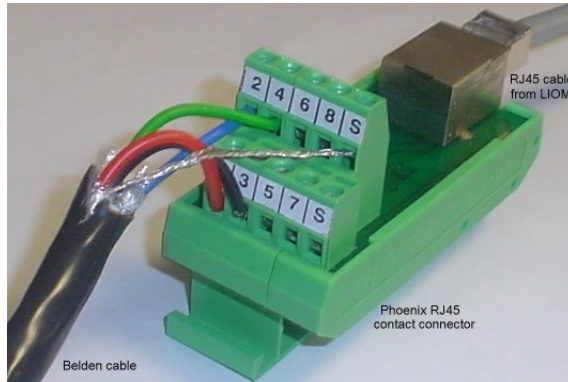
### Connecting SIOM to Phoenix Contact RJ-45 connector

The SIOM to Phoenix Contact RJ-45 connector connection is established through the Belden cable. Belden 9729 consists of XMT+, XMT-, RCV+, RCV- wires, and shield. The shield wire is always connected to the terminal screw marked “S” on the Phoenix Contact RJ-45 connector.

**2. LIOM Installation**  
**2.1. LIOM Hardware Installation**

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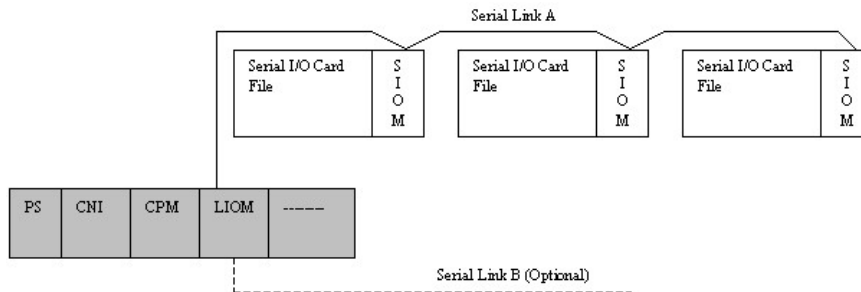
The XMT+, XMT-, RCV-, and RCV+ wires are connected as illustrated in the following picture:



Belden 9182 consists of two cables. While one of cables has Tx+, Tx-, shield wires, the other cable has Rx+, Rx-, and the shield wires. The shield wires of both the cables are always connected to the terminal screws marked “S” on the Phoenix Contact RJ-45 connector.

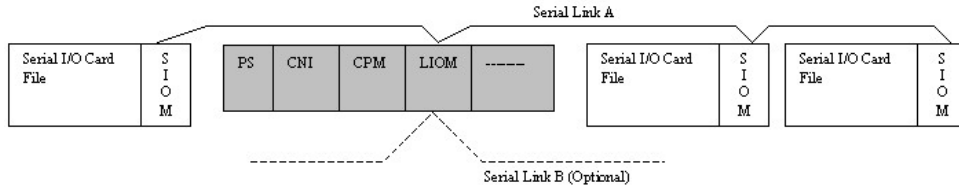
The wiring at the SIOM end depends on the type of LIOM-to-SIOM connection. The following are the two types of LIOM-to-SIOM connection:

- **LIOM at the end of a daisy chain (type 1)** – In this type of connection, the LIOM is at one end of the serial communication and the SIOM is at the other end of the serial communication. The following figure illustrates this type of connection:



- **LIOM in the middle of a daisy chain (type 2)** – In this type of connection, the LIOM is in the middle of the serial communication. This implies that SIOMs are at both ends of the serial communication, and the LIOM is in-between two SIOMs. The following figure illustrates this type of connection:

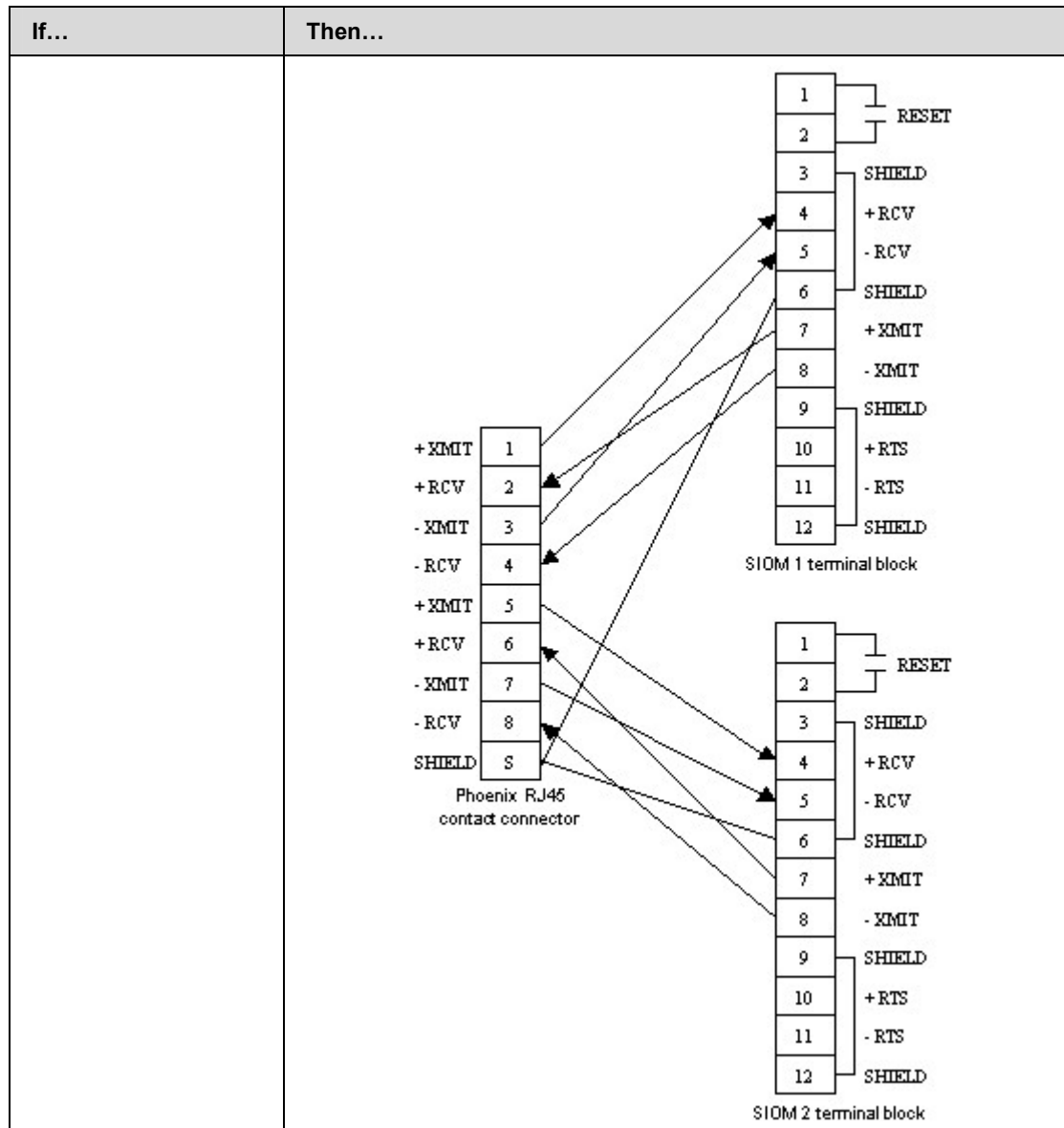
**2. LIOM Installation**  
**2.1. LIOM Hardware Installation**



Depending on the type of connection, use the following table to make the wiring at the SIOM end:

If...	Then...
LIOM is at the end of the daisy chain	<p>Make the wiring at the SIOM terminal block as illustrated in the following figure:</p> <p>Phoenix RJ45 contact connector</p> <p>SIOM terminal block</p>
LIOM is in the middle of the daisy chain	<p>Make the wiring at the SIOM terminal blocks as illustrated in the following figure:</p>

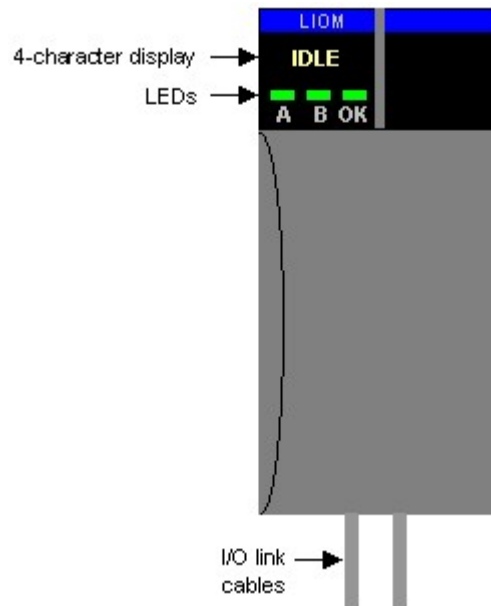
**2. LIOM Installation**  
**2.1. LIOM Hardware Installation**



## Power-on and startup

### *LIOM front panel and LED display*

The front panel of the LIOM module has three LEDs labeled A, B, and OK. The module also has a four-character display that indicates the state of the module. The LED labeled A indicates the state of the serial link A and the LED labeled B indicates the state of the serial link B. The LED labeled OK indicates the health of the module. The following picture illustrates the location of the front-panel displays and LEDs:



### *LIOM startup*

When the module is powered-on, it performs a series of self-tests. During this period, the health LED (OK) is solid red, and the display indicates, "T###," where "###" is the test number. The serial link LEDs remain off until the module successfully completes the self-tests and the firmware is downloaded. The following are the default states for the module after a successful startup:

- ALIV – This state indicates that no application is loaded for the module.
- RDY – This state indicates that the module is ready for firmware upgrade.

## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

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- NODB – This state indicates that no database is loaded. It means that the module is ready for control configuration and load.

In an RCP setup, the secondary LIOM does not have a “NODB” state. The default state for a secondary LIOM is “BKUP.”

#### **LIOM module status**

The following table summarizes the typical indications of the OK LED:

If OK LED is...	And, 4-character display shows...	Then LIOM is...
Solid Red	TEST	Factory test mode
	T###	Executing hardware diagnostic tests (display shows T###, ### is the test number)
Solid Green	BOOT	Booting firmware
Flashing Green/off	ALIV	No application loaded
	RDY	Ready for firmware upgrade
	LOAD	Loading firmware
Solid Red	PROG	Downloaded firmware is being programmed into Flash ROM
	FAIL	Hardware/firmware failure in the module
Solid Green	BKUP	Secondary LIOM (synchronized)
Flashing Green	BKUP	Secondary LIOM (not synchronized)
Solid Green	NODB	No database
Flashing Green	NODB	No database, no CDA connections to the module
Flashing Green	NOEE	LIOM loaded, EE not loaded

If OK LED is...	And, 4-character display shows...	Then LIOM is...
Flashing Green	IDLE	LIOM and EE loaded, EE not activated
Solid Green	RUN	LIOM and EE loaded, EE activated

***Serial link status***

The following table summarizes the typical indications of serial link LEDs:

If A/B LED is...	And, 4-character display shows...	Then...
Solid Green	RUN	LIOM is communicating with the SIOMs on the serial link.  OR  There are no SIOMs online.
Solid Green	IDLE	LIOM is not communicating with the SIOMs since EE is in IDLE state.
Flashing Red	NODB	No database loaded.
Flashing Red	RUN	Communication fault occurred on the link.  OR  One or more SIOMs on the serial link was taken offline.

***SIOM power-on and startup***

The SIOM's front-plate has a 12-point connector to which the serial communication lines are wired. It also has three LEDs that indicate the status of the module. The green LED, labeled ACTV indicates that the port is transmitting and receiving data properly. The light is ON when the port is transmitting data. The green PASS LED indicates that the SIOM has successfully completed its self-test which occurs on power-up and when the

## 2. LIOM Installation

### 2.1. LIOM Hardware Installation

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SIOM reset terminals are closed. The yellow RACK FAULT LED indicates that a data fault has occurred on an output module.

The dual port SIOM (621-9938/621-9938R) has six LEDs. This includes the green PASS LED, the ACTV LED (one for each port), the yellow RACK FAULT LED, and a green LEAD LED (one for each port). In a redundant configuration, the green LEAD LED indicates that the port is connected to the primary LIOM and is successfully communicating with it. The following table describes the SIOM module states and LED states for 621-9940/621-9938:

Module State	LED States			
	PASS	LEAD	RACK FAULT	ACTV
Power-up/RESET	OFF	ON	ON	OFF
SIOM is performing a self-test				
SIOM is waiting to establish communication with LIOM	ON	OFF	OFF	OFF
Normal operation – The serial link is working.	ON	Lead port: ON Backup port: OFF	OFF	ON
Rack fault – A card fault occurred in this rack. To return the SIOM to normal operation, perform a reset or recycle the power.	ON	Lead port: ON Backup port: OFF	ON	Link is operating: ON Link is not operating: OFF
Link fault – A fault occurred on the serial link. To return the serial links to normal operation, reset serial links from the LIOM configuration form on the Control Builder.	ON	OFF	Rack fault: ON No rack fault: OFF	

## 2.2 LIOM Software Installation

### Before you begin



#### REFERENCE – INTERNAL

Before you begin LIOM software installation, please read through, and complete the necessary procedures in *Experion PKS Software Installation and Upgrade Guide (EP-DCSX33 R300)*.

---

### Using the checklists

Before you begin an installation or upgrade, complete the related checklists for a successful installation.



#### REFERENCE – INTERNAL

For more details about using checklists, see Information about the specification forms and checklists in the *Experion PKS Software Installation and Upgrade Guide (EP-DCSX33 R300)*.

---

### Important information before starting



#### ATTENTION

You must *not* install new Microsoft hot fixes or service packs on your Experion PKS system without consulting your local Honeywell Technical Assistance Center for compatibility. Installation of unqualified patches may cause the system to become unstable.

Only upgrade paths that have checklists defined in the *Software Installation and Upgrade Guide* are supported. These upgrade paths support only the currently implemented level 2-network topology. That is, these upgrade paths do not support changing the level 2-network topology as part of the upgrade. If you want to complete an upgrade path that is not defined in this *Software Installation and Upgrade Guide*, you must complete a clean installation.

Many virus attacks gain access through default or common passwords. Once you have installed or upgraded to Experion PKS, you should change the default Experion PKS Windows account passwords.

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## 2. LIOM Installation

### 2.2. LIOM Software Installation

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Before installing, please check the Solution Support Online website for updates. If you are a new user, you can register for access to the website at the following URL:  
<http://www.acs.honeywell.com>

To check the Solution Support Online site:

Step	Action
1	In your Web browser application, type the following URL: <a href="http://www.acs.honeywell.com">http://www.acs.honeywell.com</a>
2	Click <b>Login</b> .
3	Type your user name and password, and then click <b>Login</b> .
4	Choose <b>Support &gt; Online Support &gt; Solution Support Online</b> .
5	Select <b>SSOL</b> .
6	In the <b>Your Entitled Products</b> section, choose <b>Experion PKS</b> .  <i>Software Installation and Upgrade Guide</i> updates are listed in the <b>Experion PKS</b> home page.

---

**STOP** You have completed this task.

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#### LIOM software installation checklist

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#### ATTENTION

Make a copy of this checklist so that it is easier to keep track of the installation.

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#### Prerequisites

- Experion LIOM R300 software media (51153655-300).
- Experion R300 software is already installed on the Experion Server.
- Experion LIOM R300 Knowledge Builder CD.

**Tasks**

Complete the tasks in the following order:

Task	Source	Reference	Completed – Yes/No
Installing LIOM software on the server	Experion LIOM R300 software media	Installing LIOM Software on the Experion Server	
Installing the LIOM Knowledge Builder on the Server	Experion LIOM R300 Knowledge Builder CD	Installing the LIOM Knowledge Builder on the Server	
Upgrading firmware using N-tools		Upgrading LIOM Firmware using N-tools	

**Installing LIOM Software on the Experion Server**

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**ATTENTION**

Ensure that all the modules on the chassis have a compatible firmware. For example, if the Experion PKS build 51 firmware is used on one Controller, then all other modules (including the CNI) should be on Experion PKS build 51 firmware.

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**Prerequisites**

- Experion R300 software is already installed on the Experion Server.
- Experion LIOM R300 software media (51153655-300).

## 2. LIOM Installation

### 2.2. LIOM Software Installation

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#### ***Installing LIOM software in a non-redundant configuration setup on the Server***

To install the LIOM software in a non-redundant configuration setup, perform the following steps:

<b>Step</b>	<b>Action</b>
1	Log on to the system using a Windows account with administrator rights.
2	Insert the LIOM software CD-ROM in the CD-ROM drive.
3	In Windows Explorer, browse to the CD-ROM, and double-click the LIOMsetup.exe file.  The InstallShield(R) Wizard appears.
4	Click <b>Next</b> to continue.
5	On the License Agreement screen, read and understand the license agreement. If you accept the agreement, click <b>Yes</b> to continue.
6	On the Start copying files screen, click <b>Next</b> to install LIOM software. If you want to make any changes, click <b>Back</b> .
7	On the InstallShield Wizard Completed screen, click <b>Finish</b> to complete the installation of LIOM software on the Server.

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<b>STOP</b>	You have completed this task. LIOM software installation in a non-redundant setup is complete. Return to the checklist that led to this task.
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#### ***Installing the LIOM software in a redundant configuration setup on the Server***

To install the LIOM software in a redundant configuration setup, perform the following steps:

<b>Step</b>	<b>Action</b>
1	Log on to the system using a Windows account with administrator rights.
2	Insert the LIOM software CD-ROM in the CD-ROM drive in the Primary Server.

Step	Action
3	In Windows Explorer, browse to the CD-ROM, and double-click the LIOMsetup.exe file.  The InstallShield(R) Wizard appears.
4	Click <b>Next</b> to continue.
5	On the License Agreement screen, read and understand the license agreement. If you accept the agreement, click <b>Yes</b> to continue.
6	On the Start copying files screen, click <b>Next</b> to install LIOM software. If you want to make any changes, click <b>Back</b> .
7	On the InstallShield Wizard Completed screen, click <b>Finish</b> to complete the installation of LIOM software on the Primary Server.
	 <b>ATTENTION</b> Before replicating the ERDB, ensure that LIOM is successfully installed on the Primary Server
8	Run the DBAdmin utility.
9	Replicate the ERDB (ps_erdb) from the tasks listed in the DBAdmin utility.

---



**REFERENCE - INTERNAL**

For details on the DBAdmin Utility, see *Experion PKS R300 Software Installation and Upgrade Guide*.

---

**STOP** You have completed this task. LIOM software installation on a redundant setup is complete. Return to the checklist that led to this task.

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## 2. LIOM Installation

### 2.2. LIOM Software Installation

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#### Installing LIOM Software on Experion Client

After installing the LIOM software on the Experion Server, you can access the LIOM through the Experion client and perform all operations.



#### REFERENCE – INTERNAL

For more details about installing the LIOM software on the Experion server, see [Installing LIOM Software on the Experion Server](#).

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#### Installing the LIOM Knowledge Builder on the Server

##### Prerequisites

- Experion LIOM R300 Knowledge Builder CD (51153656-300).
- Experion R300 Knowledge Builder is already installed on the Experion Server.

##### Considerations



#### REFERENCE – INTERNAL

Before you begin, see [Installing and Managing Knowledge Builder PKS in the Experion PKS Software Installation and Upgrade Guide \(EP-DCSX33 R300\)](#).

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#### Installing the LIOM Knowledge Builder

To install the LIOM Knowledge Builder, perform the following steps:

Step	Action
1	Log on to the Server using a Windows account with administrator rights.
2	Insert the Experion LIOM R300 Knowledge Builder CD into the CD-ROM drive.
3	In Windows Explorer, browse to the CD-ROM, and double-click the <code>setup.exe</code> file in the <code>Knowledge_Builder</code> folder.

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Step	Action
4	In the Knowledge Builder Installation – Maintenance page, select <b>Repair</b> and click <b>Next</b> .
5	In the Bookset Selection page, select the <b>LCS621 IO Integration R300 On Process Beta</b> check box in the Bookset list and then click <b>Next</b> .
6	In the Start Copy page, click <b>Next</b> .
7	The installation takes a few minutes. Click <b>Finish</b> on the Maintenance Complete page to complete LIOM Knowledge Builder installation.

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**STOP**    [You have completed this task. Return to the checklist that led to this task.](#)

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### Upgrading LIOM Firmware using N-tools

#### *Prerequisites*

- LIOM software is already installed on the Experion Server.

#### **Installing LIOM boot and personality images**

Use the following instructions to install the boot code and personality images in Experion PKS process Controller LIOM modules.

#### *Considerations*

- You must repeat these instructions for all LIOM nodes in your system.
- When you update LIOM nodes in a Redundant Chassis Pair (RCP), it is recommended that you power off one of the Controller chassis in the RCP. This allows the firmware in the selected node to be updated in the powered Controller chassis while it is in a primary state with no partner. Once the node is updated in the powered chassis, switch the power off the chassis and power on the redundant Controller chassis and repeat the firmware update. This avoids possible confusion caused by logical change in network addresses in response to a Controller switchover.


#### **Loading the LIOM boot and personality images**

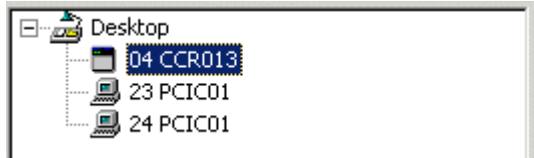
To load the LIOM boot and personality images, perform the following steps:

**2. LIOM Installation**  
 2.2. LIOM Software Installation

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Step	Action						
1	<p>If this is the first time you have used NetworkTools on this computer, complete the NetworkTools setup instructions (See Setting Up Network Tools (NTOOLS) in the <i>Experion PKS Software Installation and Upgrade Guide (EP-DCSX33 R300)</i>) and then continue to step 9.</p> <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">If...</th> <th style="text-align: left;">Then, go to...</th> </tr> </thead> <tbody> <tr> <td>You are using Configuration Studio</td> <td>Step 2</td> </tr> <tr> <td>You are NOT using Configuration Studio</td> <td>Step 5</td> </tr> </tbody> </table>	If...	Then, go to...	You are using Configuration Studio	Step 2	You are NOT using Configuration Studio	Step 5
If...	Then, go to...						
You are using Configuration Studio	Step 2						
You are NOT using Configuration Studio	Step 5						
2	<p>Start the Configuration Studio, and connect to the system that contains the server.</p>						
3	<p>In the Configuration Explorer, click the system name, and then choose <b>Control Strategy</b> from the left-navigation pane, and click <b>Maintain control system firmware</b> task.</p> <p>The RSLinx and PCIC driver services for system communications are started in ControlNet mode, if they are not already running.</p>						
4	<p>Click <b>OK</b> to acknowledge the warning dialog box about monitoring through Engineering Tools.</p> <p>Go to step 9 to continue with the loading of LIOM boot and personality images.</p>						
5	<p>Choose <b>Start &gt; Run</b>.</p>						
6	<p>In the <b>Open</b> box, type <code>ntools -c -u -pg</code>.</p>						
7	<p>Click <b>OK</b> to launch the Network Tools application.</p> <p>The RSLinx and PCIC driver services for system communications are started in ControlNet mode, if they are not already running.</p>						
8	<p>Click <b>OK</b> to acknowledge the warning dialog box about monitoring through Engineering Tools.</p> <p>Go to step 9 to continue with the loading of LIOM boot and personality images.</p>						

Step	Action
9	Click the  [Resume] button on the toolbar to initiate a network scan.
10	In the Desktop tree, click the required LIOM item.



Wait for the chassis details to display in the Detail pane. The following table describes the module colors.

Color	Description
Red	The module type is recognized, however, the device firmware version/revision is <i>not</i> known.
Green	The module type is recognized and the device firmware version/revision is associated with the current release of Experion PKS.
Cyan	The module type is recognized and the device firmware version/revision is interoperable with the current release of Experion PKS, however, it is <i>not</i> the most recent version/revision of the firmware.
Yellow	The module type is <i>not</i> recognized.

## 2. LIOM Installation

### 2.2. LIOM Software Installation

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#### Loading the boot image

To load the boot image, perform the following steps:

Step	Action
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- 1 Click the device's graphic representation in the details pane.

0	1	2	3	4	5	6	7	8	9	10	11	12
CCR013	MP-ZLCSNC											
ACTIVE	RUN											
K Master												
V 5.43	AVEXP210.0-TL.1											
AR04	BVEXP210.0-SIT6.0											

- 2 Choose **Device > Update Firmware from File**.
  - 3 Click **Yes** to acknowledge the warning message.
  - 4 Look at the device's LED display. If the device is *not* in the Ready (**RDY**) state, click **Yes** to issue a stop (shutdown) command to the device and wait for the device to reboot to the RDY state.
  - 5 Typically, the location of the boot firmware update image files (liomboot.pcm and liomboot.nvs) is:  
C:\Program Files\Honeywell\Experion EPKS\Engineering Tools\System\Firmware\LIOM  
Browse to the folder and click the boot image file – liomboot.nvs.
  - 6 Click **Open** to start the firmware load.
  - 7 Click **Yes** to confirm the firmware load.  
  
Wait for the load to complete and the device to reboot to the Alive (**ALIV**) or Ready (**RDY**) state. The Status field in the lower portion of the Network Tools dialog box displays the load progress.
  - 8 Click **OK** to acknowledge the firmware load completed with no errors.
-

### **Loading the personality image**

Before you begin, ensure that LIOM boot image is already loaded. To load the personality image, perform the following steps:

<b>Step</b>	<b>Action</b>
1	When the device is in the Alive or Ready state, click the device's graphic representation in the detail pane.
2	Choose <b>Device &gt; Update Firmware from File</b> .
3	Click <b>Yes</b> to acknowledge the warning message dialog box.
4	Typically, the location of the personality (application) firmware files is: C:\Program Files\Honeywell\Experion EPKS\Engineering Tools\System\Firmware\LIOM  Browse to the folder and click the required application image file (liomapp.nvs).
5	Click <b>Open</b> to start the firmware load.
6	Click <b>Yes</b> to confirm the firmware load.  Wait for the load to complete and the device to reboot to the <b>NODB</b> state. The Status field in the lower portion of the Network Tools dialog box displays the load progress.
7	Click <b>OK</b> to acknowledge the firmware load completed with no errors.

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**STOP**    You have completed this task. [Return to the checklist that led to this task.](#)

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## 2.3 Removing LIOM software

### Overview

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- CAUTION**
- You must back up all LIOM database files before removing the LIOM software because the removal process destroys the database.
  - Initializing the DB removes the LIOM software.
- 



#### REFERENCE - INTERNAL

LIOM software is removed when Experion is removed. LIOM software cannot be removed explicitly. See *Experion R300 Software Installation and Upgrade Guide* to remove Experion.

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# **Honeywell**

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