

P5 Processors

HomeWorks® Processors comprise the major communication hub of a *HomeWorks* system. Each processor has communication links, which allow the processor to interact with various system components. System components communicate with a processor through low-voltage wiring or radio frequency. Some components must be connected to the processor through an interface. These interfaces are available as stand-alone components or as built-in components in specific models of processors.

8 SERIES

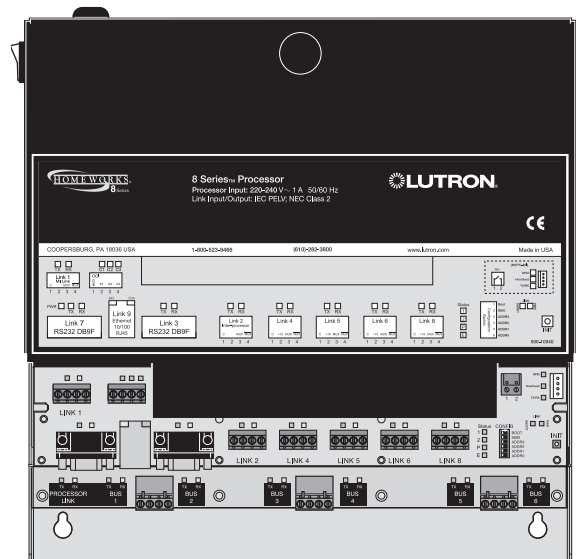
8 series processors may be used with any and all *HomeWorks* products, providing the most style and finish options. Remote power modules can only be used with the 8 series processor. The processor includes an ethernet link, two RS-232 links, a hybrid signal repeater link, and is capable of powering 350 keypad LEDs.

4 SERIES

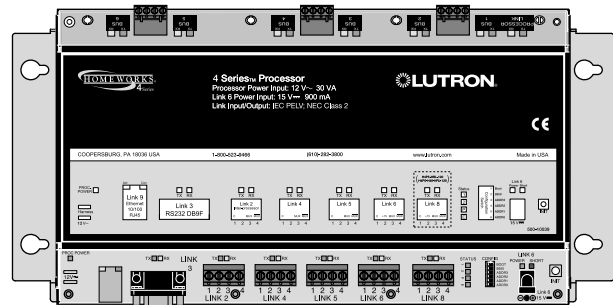
4 series processors cannot be used with Remote Power Modules. Dimming is accomplished via Maestro lighting controls, wallbox power modules, or GRAFIK Eye® controls units. The processor includes an ethernet link, an RS-232 link, an optional hybrid signal repeater link, and is capable of powering 150 keypad LEDs.

4 AND 8 SERIES

Both 4 and 8 series processors can control Sivoia QED™ blinds and curtains with an interface. Each processor can control up to 256 lighting or *Sivoia QED* zones. A maximum of 16 processors can be used together in a single system. The 4 series and 8 series are compatible with each other and can be combined on the same system.



**8 Series Processor
(H8P5-MI-H48-CE shown)**



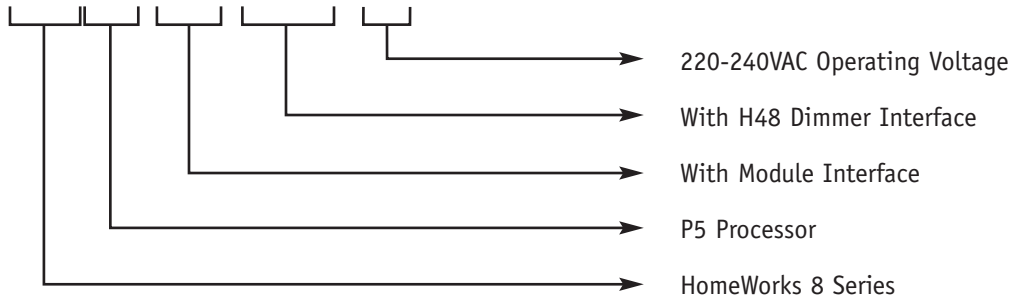
**4 Series Processor
(H4P5-H48-HRL-CE shown)**

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<i>Model Number</i>	<i>Module Interface</i>	<i>H48 Dimmer Interface</i>	<i># Configurable Links</i>	<i>Hybrid Signal Repeater Link</i>	<i># RS-232 Ports</i>	<i># Keypad LEDs</i>	<i># Integral CCTs</i>	<i>Panel/Enclosure</i>
H8P5-CE	External	External	4	Yes	2	350	3	HWI-LV32-CE
H8P5-MI-CE	Included	External	4	Yes	2	350	3	HWI-PNL-8-CE
H8P5-H48-CE	External	Included	4	Yes	2	350	3	HWI-LV32-CE
H8P5-MI-H48-CE	Included	Included	4	Yes	2	350	3	HWI-PNL-8-CE
H4P5-CE	Not Available	External	3	No	1	150	0	HWI-LV24-CE
H4P5-HRL-CE	Not Available	External	3	Yes	1	150	0	HWI-LV24-CE
H4P5-H48-CE	Not Available	Included	3	No	1	150	0	HWI-LV24-CE
H4P5-H48-HRL-CE	Not Available	Included	3	Yes	1	150	0	HWI-LV24-CE

Example Model Number

H8P5-MI-H48-CE



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PROCESSOR LINKS

Each Processor has several communication links, which allow the processor to interact with other system equipment. Some links are designated for specific components, and other links are configurable through the HomeWorks® Illumination Software, allowing the system to be customised to meet the needs of the project.

Communication Link 1 (8 series processor only): This link is designated for communication with Module Interfaces. It must be wired in a daisy-chain configuration and requires a link terminator at the last Module Interface when the total cable length exceeds 15m (50 feet).

Communication Link 2: This link is designated for communication between multiple processors. It must be wired in a daisy-chain configuration and requires terminators at both ends of the link when the total cable length exceeds 15m (50 feet).

Communication Links 3 and 7 (Link 7 is only available on the 8 series processor): These links are multipurpose RS-232 ports. One port is initially used for programming the processor. When a port is not being used for programming, the RS-232 ports can be used for two-way serial communications with A/V equipment, touch screens, security systems, HVAC, and home automation controls. Maximum cable length is 15m (50 feet).

Communication Links 4, 5, and 6: Each of these links can be configured to communicate with one of the following: keypads and interfaces, Maestro® local lighting controls (via an H48 dimmer interface), Sivoia QED™ drives (via HW-Q96 interface) or GRAFIK Eye® preset local lighting controls and Wallbox Power Modules.

Communication Link 8: On an 8 series processor, this link may be configured for any of the functions listed for links 4, 5, and 6 or as a hybrid signal repeater link. On a 4 series processor, this is an optional link only for hybrid signal repeaters.

Communication Link 9:

This link is an ethernet port. The ethernet port can be used for uploading programming information or communication with other systems, such as A/V equipment, security systems, HVAC, and home automation equipment. Maximum cable length is 100m (328 feet).

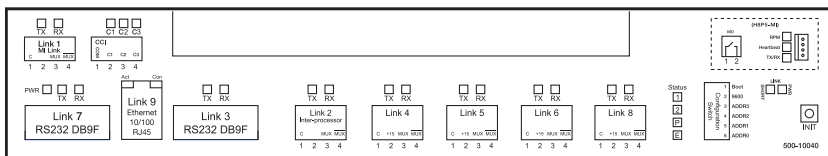


Figure 1 - 8 Series Processor Link Identification

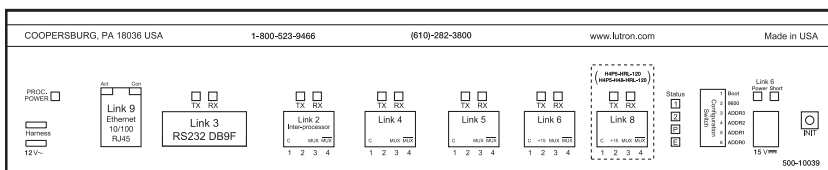


Figure 2 - 4 Series Processor Link Identification

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Communication link information					
Non-configurable links	Function	Link capacity	Wiring configuration	Terminators?	Maximum wire length and type
link 1 (8 series only)	link to Remote Power Modules	16 Module Interfaces, each controlling maximum 8 RPMs	daisy-chain	at last Module Interface ²	305m (1,000 feet) total ¹ , type A
link 2	link to other processors	16 processors	daisy-chain	at first and last processor ²	305m (1,000 feet) total ¹ , type A
links 3 and 7 (7 available on the 8 series only)	RS-232 port	n/a	point-to-point	No	15m (50 feet) maximum, type B
Configurable links	Possible function	Link capacity	Wiring configuration	Terminators?	Maximum wire length and type
links 4*, 5, and 6 (configure each link to communicate with one of the following: keypads and contact closure interfaces, Maestro® controls, or GRAFIK Eye® controls and WPMs).	link to keypads and Contact Closure Interfaces	32 devices	any (Daisy-chain, Star, T-tap, etc.)	no	305m (1,000 feet) per home run, type A ³ 1220m (4,000 feet) total
	link to H48 dimmer interface and Sivoia QED™ interfaces	4 H48s (each controlling up to 48 Wired Maestro Controls) and Q96s (each controlling up to 96 Sivoia QEDs)	daisy-chain	at processor and last Dimmer Interface ²	305m (1,000 feet) total, type A
	link to GRAFIK Eye/WPM	8 GRAFIK Eye/WPMs	daisy-chain	no	610m (2,000 feet) total, type A
	any function of link 4, 5, 6	see above	see above	see above	see above
link 8 (8 series)	or hybrid signal repeater link	5	any	no	305m (1,000 feet) per home run, type A ³ 1220m (4,000 feet) total
link 8 (4 series)	hybrid signal repeater link	5	any	no	305m (1,000 feet) per home run, type A ³ 1220m (4,000 feet) total
link 9	ethernet	-	point-to-point	no	100m (328 feet)

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Notes from previous page

Wire type A = two pair [one pair 1.0mm² (#18 AWG), one pair 0.5-1.0mm² (#18-22 AWG) twisted shielded] Class 2/PELV wire. *Lutron* wire GRX-CBL-346S-500 may be used.

Wire type B = standard RS-232 cable.

¹ To increase link distance, *see page 10.2* of the TRG rev. E - Link Extender specifications.

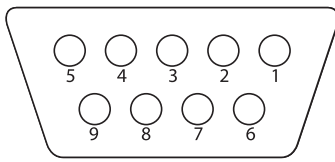
² Terminators required if total cable length exceeds 15m (50 feet).

³ Maximum ten keypads recommended per 305m (1,000 feet) wire run; maximum 1220m (4,000 feet) total wire length.

Important processor note:

*If the processor has an integral H48 interface, Link 4 **MUST** be configured for H48 interfaces.

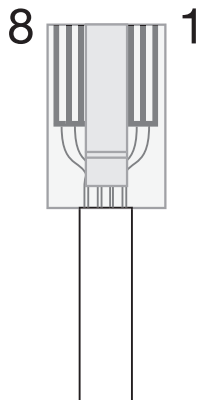
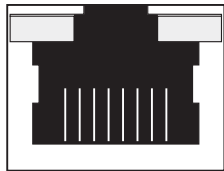
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DB9 female connector for RS-232 communication

Pin Number	Pin Name	Description for Processor Connector	Required for Hardware Handshaking	Required for Simple Communications (Hardware Handshaking Disabled)
1	DCD	Data Carrier Detect (input)		
2	TXD	Transmit Data (output)	X	X
3	RXD	Receive Data (input)	X	X
4	DSR	Data Set Ready (input)	X	
5	GND	Ground	X	X
6	DTR	Data Terminal Ready (output)	X	
7	CTS	Clear To Send (input)	X	
8	RTS	Request To Send (output)	X	
9	RI	Ring Indicate (input)		

Figure 3 - RS-232 Port Specifications



PIN	Processor	Ethernet Hub/Switch
1	Transmit +Ve	Receive +Ve
2	Transmit -Ve	Receive -Ve
3	Receive +Ve	Transmit +Ve
4	No Connection	No Connection
5	No Connection	No Connection
6	Receive -Ve	Transmit -Ve
7	No Connection	No Connection
8	No Connection	No Connection

Crossover Cable Configuration

A crossover cable is used when connecting the processor directly to a laptop or other non-hub device (A/V systems, HVAC, etc.)

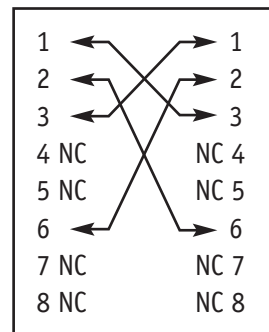


Figure 4 - Ethernet Port and Cable Configuration

8 Series P5 Processors

Model Numbers	H8P5-CE: Processor without integral interfaces H8P5-MI-CE: Processor with integral Module Interface (MI) H8P5-H48-CE: Processor with integral Dimmer Interface (H48) H8P5-MI-H48-CE: Processor with integral Module Interface (MI) and integral Dimmer Interface (H48)
Input Voltage	220-240VAC, 50/60Hz
Regulatory Approvals	CE, C-Tick, VDE
Environment	Ambient operating temperature: 0-40°C, 32-104°F Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.
Cooling Method	Passive cooling.
Line-Voltage Connections	Mates with Lutron-provided 2-pin pigtail on DIN-rail terminal block. Power switch provided on top left of processor. Terminal blocks should be tightened to .40-.57nM (3.5-5.0 inches-pounds).
Low-Voltage Wire Type	Two pair [one pair 1.0mm ² (#18 AWG), one pair 1.0-0.5mm ² (#18-22) twisted shielded] Class 2 cable.
Low-Voltage Wiring Configuration	All processors on the same system must have the inter-processor communication links connected in a daisy-chain configuration.
Low-Voltage Connections	One 4-pin removable terminal block. Each of the four terminals will accept up to two 1.0mm ² (#18 AWG) wires. Up to two standard female DB-9 serial RS-232 connections.
ESD Protection	Meets or exceeds the IEC 61000-4-2 standard.
Surge Protection	Meets or exceeds ANSI/IEEE standard c62.41.
Miswire Protection	All terminal block inputs are over-voltage and miswire protected against wire reversals and shorts. 15V communications link power is short-circuit protected.
Power-Failure Memory	Lithium battery provides ten years of data retention.
Internal Timeclock	Accuracy ± 1 minute per year.
Shipping Weight (all model numbers)	4.1kg (9 pounds)

8 Series P5 Processors – Mounting Locations

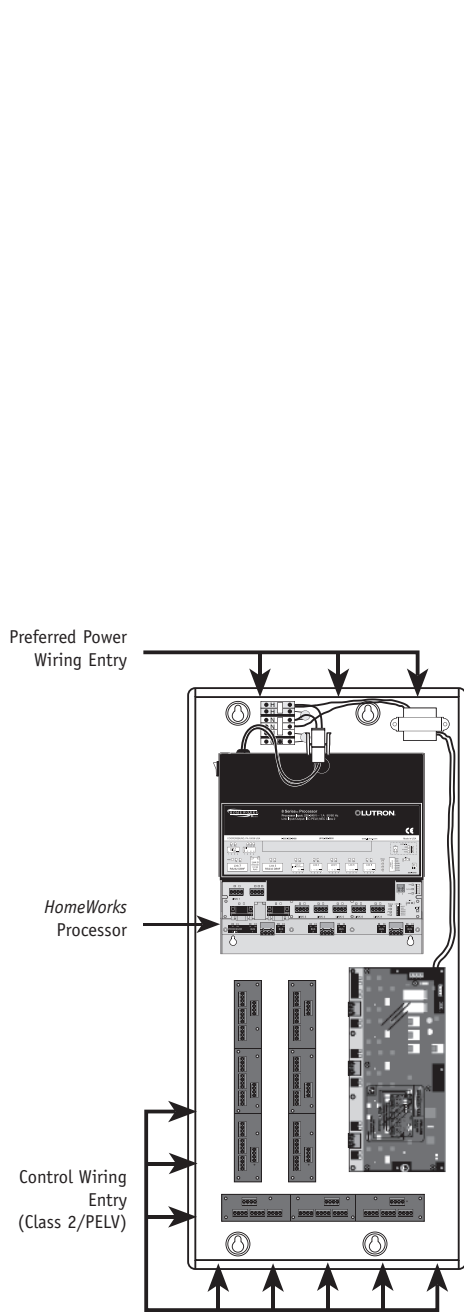


Figure 5 – Mounting Location in an HWI-LV32-CE

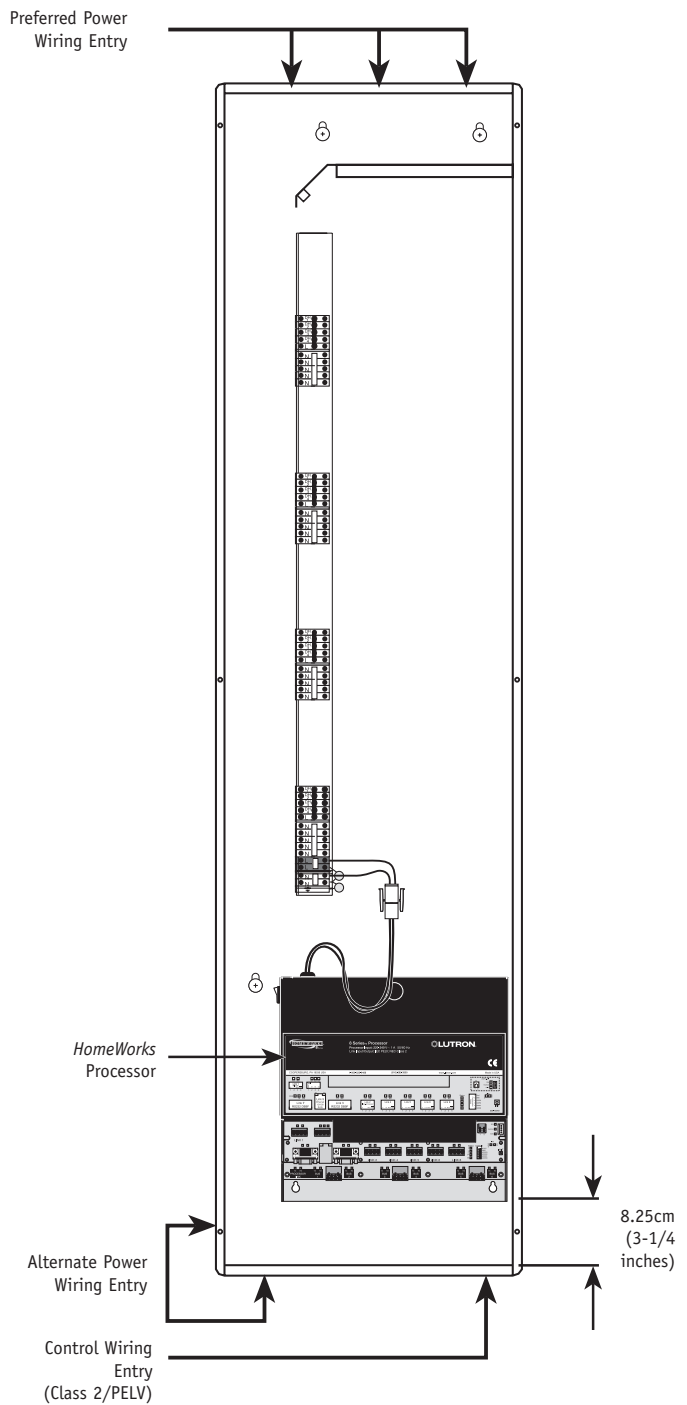


Figure 6 – Mounting Location in an HWI-PNL-8-CE

COMPONENTS

8 Series P5 Processors

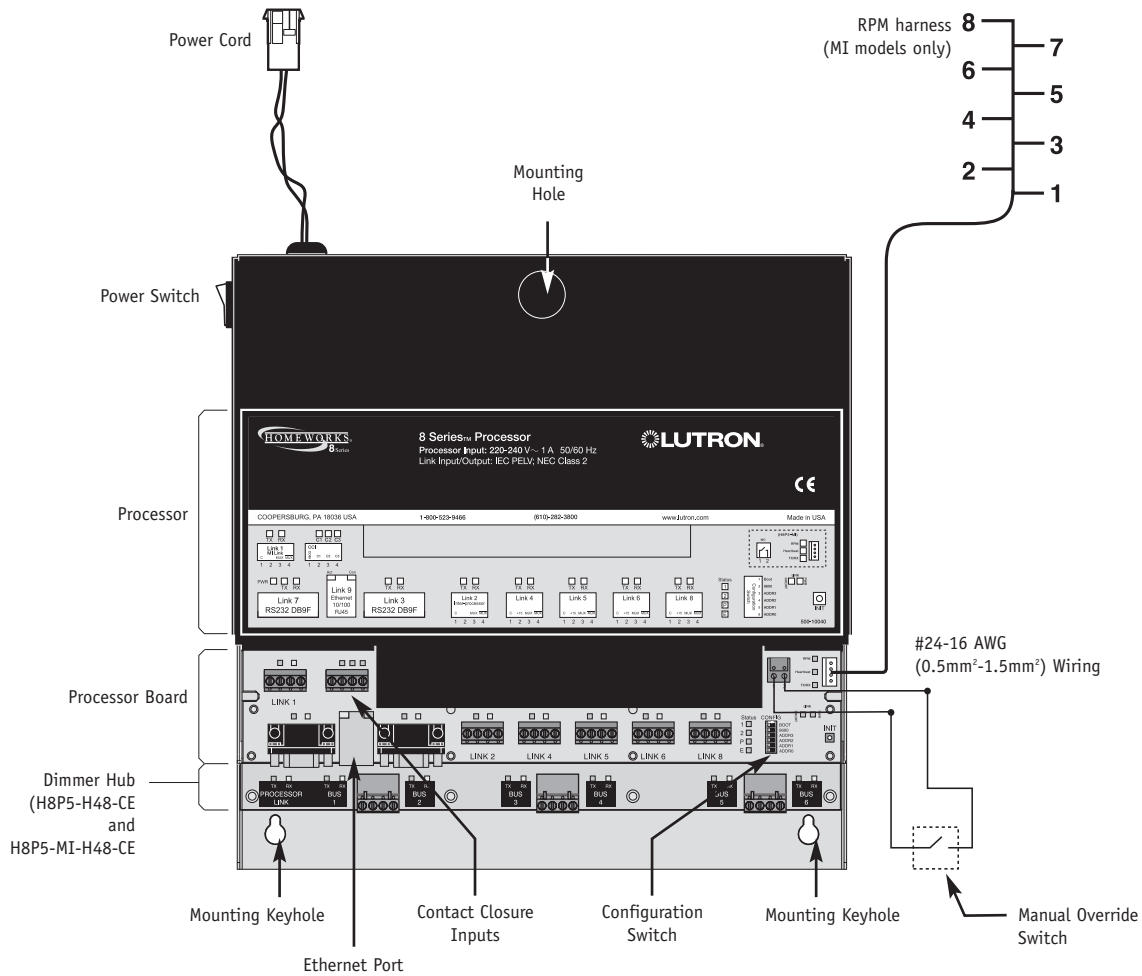
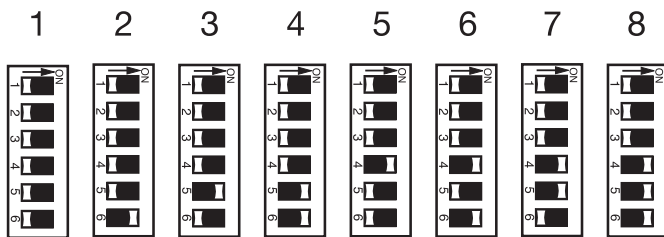


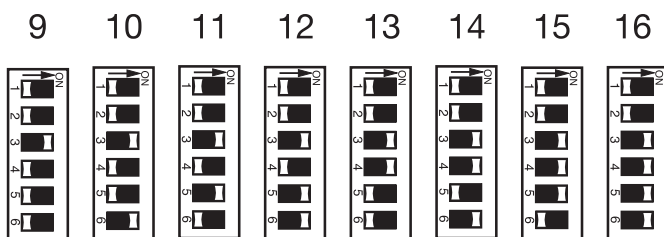
Figure 7 - 8 Series Processor (H8P5-MI-H48-120 shown)

Address #



Example: Setting Switch #6 ON.

← OFF - Left
← ON - Right



Configuration DIP Switches

DIP Switch	OFF	ON
1	Normal Mode	Boot Mode
2	User-Configured Baud Rate	9600 Baud
3-6	Address	



4 Series P5 Processors

Model Numbers	H4P5-CE: Processor without integral interfaces H4P5-HRL-CE: Processor with Hybrid Signal Repeater Link. H4P5-H48-CE: Processor with integral Dimmer Interface (H48). H4P5-H48-HRL-CE: Processor with integral Dimmer Interface (H48) and a Hybrid Signal Repeater Link.
Input Voltage	220-240VAC, 50/60Hz
Regulatory Approvals	CE, C-Tick, VDE
Environment	Ambient operating temperature: 0-40°C, 32-104°F Ambient operating humidity: 0-90% humidity, non-condensing. Indoor use only.
Cooling Method	Passive cooling.
Line-Voltage Connections	Mates with Lutron-provided 2-pin pigtail on DIN-rail terminal block. Power switch provided on top left of processor. Terminal blocks should be tightened to .40-.57nM (3.5-5.0 inches-pounds).
Low-Voltage Wire Type	Two pair [one pair 1.0mm ² (#18 AWG), one pair 1.0-0.5mm ² (#18-22) twisted shielded] Class 2 cable.
Low-Voltage Wiring Configuration	All processors on the same system must have the inter-processor communication links connected in a daisy-chain configuration.
Low-Voltage Connections	One 4-pin removable terminal block. Each of the four terminals will accept up to two #18 AWG (1.0mm ²) wires. Up to two standard female DB-9 serial RS-232 connections.
ESD Protection	Meets or exceeds the IEC 61000-4-2 standard.
Surge Protection	Meets or exceeds ANSI/IEEE standard c62.41.
Miswire Protection	All terminal block inputs are over-voltage and miswire protected against wire reversals and shorts. 15V communications link power is short-circuit protected.
Power-Failure Memory	Lithium battery provides ten years of data retention.
Internal Timeclock	Accuracy ± 1 minute per year.
Shipping Weight	2.5kg (5.5 pounds)

4 Series P5 Processors

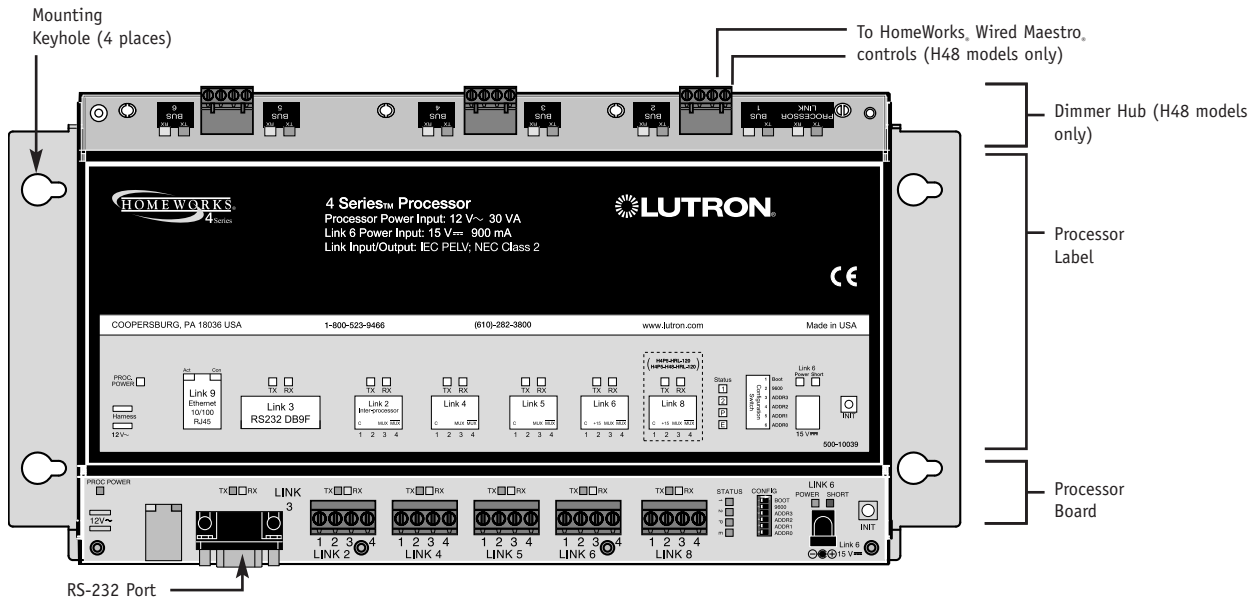


Figure 8 – 4 Series Processor (H4P5-H48-HRL-CE shown)

Configuration Switch Functions

DIP Switch	Function
1	Boot Mode. Unless prompted by the HomeWorks Utility, this switch should always be in the DOWN position.
2	UP = 9600 Baud, DOWN = User selected Baud.
3-6	Processor Address. See Figure 3, below.

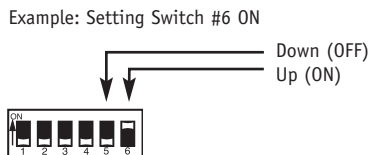
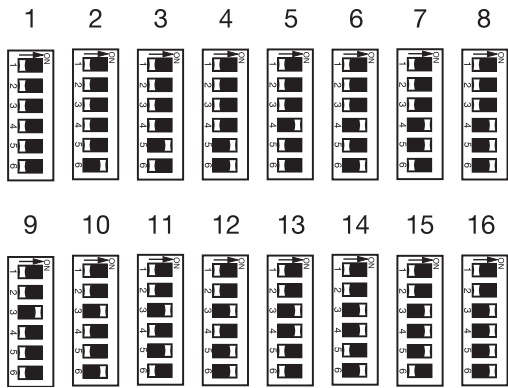


Figure 9 – Address DIP Switch Settings

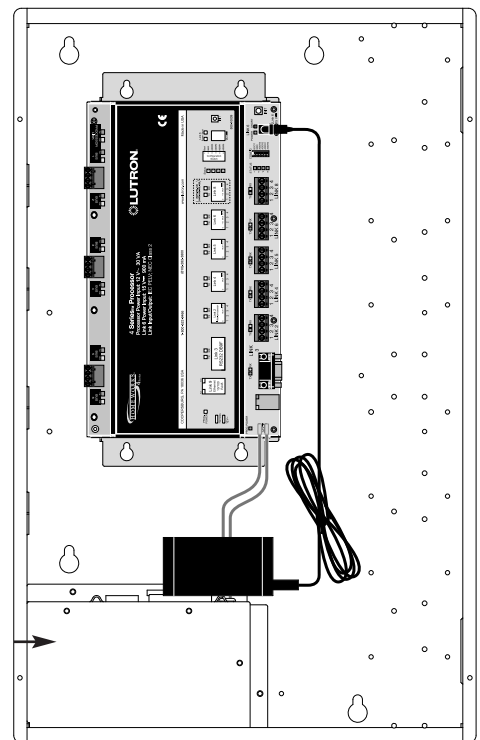


Figure 10 – Mounting Location in an HWI-LV24-CE

Connecting Multiple Processors

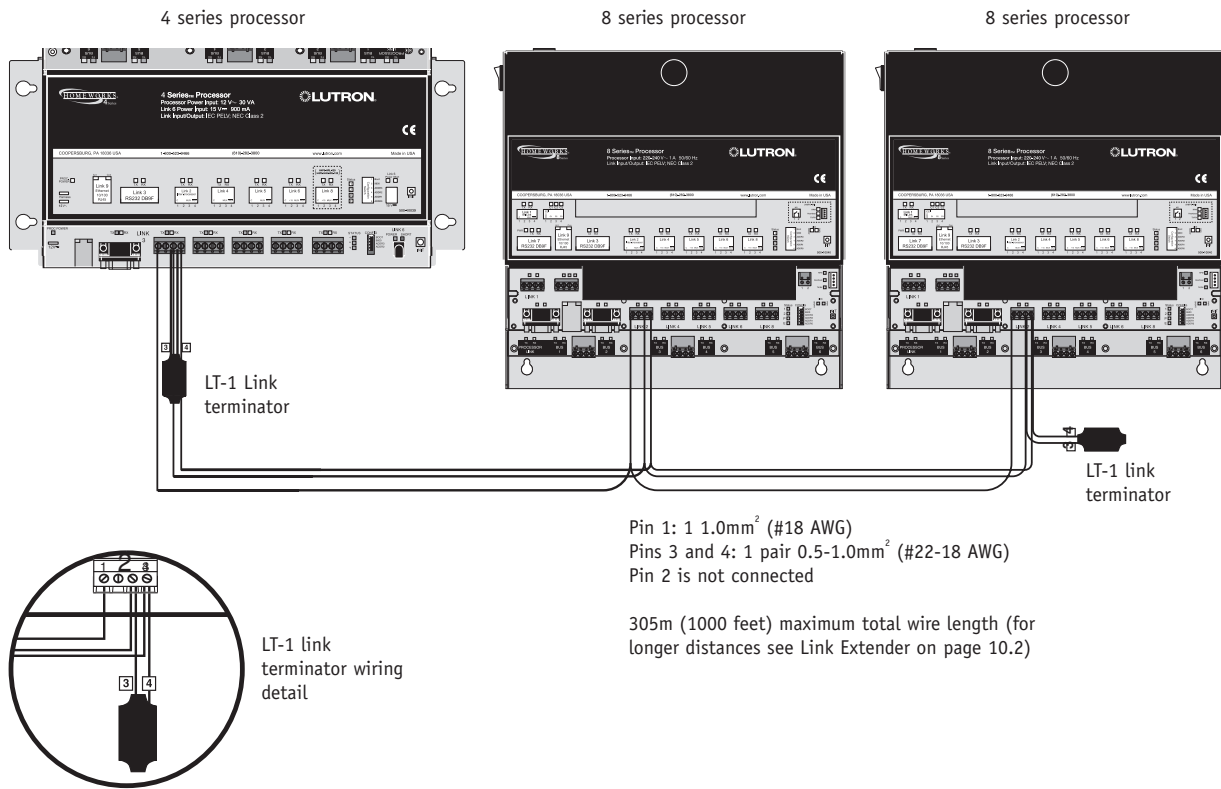


Figure 3 – daisy-chained HomeWorks® processors

System Specifications

8 series processor communication link specifications

Link type	Maximum per processor	Baud rates	Wiring configuration	Termination required
Module Interface	1	125K	daisy-chain	yes, at last MI on link ¹
inter-processor	1	125K	daisy-chain	yes, at both ends of link ¹
GRAFIK Eye [®] /WPM	3	31.25K	daisy-chain	no
RS-232	2	9600-115.2K	point-to-point	no
keypad	3	10.42K-41.67K	any	no
H48 and Q96 interface	1	125K	daisy-chain	yes, at both ends of link ¹
Hybrid Signal Repeater	1	62.5K	see page 10.4	no

¹ Terminators required if total cable length exceeds 15m (50 feet).

4 series processor communication link specifications

Link type	Maximum per processor	Baud rates	Wiring configuration	Termination required
inter-processor	1	125K	daisy-chain	yes, at both ends of link ¹
RS-232	1	9600-115.2K	point-to-point	no
keypads	3	10.42-41.67K	point-to-point	no
GRAFIK Eye [®] /WPM	3	31.25K	daisy-chain	no
H48 and Q96 interface	1	125K	daisy-chain	yes, at both ends of link ¹
Hybrid Signal Repeater	1	62.5K	see page 10.4	no

¹ Terminators required if total cable length exceeds 15m (50 feet).

Remote Power Module (RPM) capacities

Number of zones per RPM	4
Maximum number of RPMs per Module Interface (MI)	8
Maximum number of MIs per MI link	16
Maximum number of MI links per processor (8 series only)	1
Maximum number of RPMs per processor (8 series only)	128
Maximum number of RPM zones per processor (8 series only)	256
Maximum number of processors per system	16
Maximum number of RPMs per system	2,048
Maximum number of RPM zones per system	4,096

GRAFIK Eye[®]/WPM capacities

Maximum number of GRAFIK Eye control units/WPM per GRAFIK Eye link	8
Maximum number of GRAFIK Eye accessory controls per GRAFIK Eye link	15
Maximum number of GRAFIK Eye links per processor	3
Maximum number of GRAFIK Eye control units/WPM per processor	24
Maximum number of GRAFIK Eye accessory controls per processor	45
Maximum number of processors per system	16
Maximum number of GRAFIK Eye control units/WPM per system	384
Maximum number of GRAFIK Eye accessory controls per system	720

System Specifications

Maestro® local lighting controls capacities

Maximum number of <i>Maestro</i> Local lighting controls per dimmer interface (H48) bus	8
Number of buses per H48	6
Maximum number of <i>Maestro</i> Local lighting controls per H48	48
Maximum number of H48 and Q96 interfaces per processor link	4
Maximum number of <i>Maestro</i> local lighting controls per processor H48 link	192
Maximum number of H48 links per processor	1
Maximum number of <i>Maestro</i> Local lighting controls per processor	192
Maximum number of processors per system	16
Maximum number of <i>Maestro</i> Local lighting controls per system	3,072

Wired Keypad capacities

Maximum number of devices per keypad link	32
Maximum number of keypad links per processor	3
Maximum number of keypads per processor	96
Maximum number of processors per system	16
Maximum number of keypads per system	1,536

Wireless capacities

Maximum number of Hybrid signal repeaters per processor	5
Maximum number of tabletop keypads per system	32

Sivoia QED capacities

Maximum number of H48 and QED interfaces per processor link	4
Maximum number of Sivoia QED drives per Q96 interface	96
Maximum number of Sivoia QED drives per system	4096