



## Description

The Power Line Smart Transceiver Development Support Kit (PL DSK) is a must-buy to get started with designs based on PL 3120® / 3150® / 3170 Smart Transceivers. It includes a variety of resources to reduce your development time and engineering effort. The key features and enhancements of PL DSK v2.2 include:

- **Instantaneously evaluate Power Line technology in real-life environments** — This kit contains two evaluation boards (one based on PL 3120 Smart Transceiver and the other based on PL 3150 Smart Transceiver) that come with a simple-to-use, pre-loaded application. Plug in the test kit and you're ready to begin.
- **Reference designs** — The reference designs included in the PL DSK provide the schematics and layouts for the external discrete interface circuitry that needs to be implemented with the Power Line Smart Transceiver IC. PL DSK v2.2 contains 8 reference designs. The latest design includes a PL 3120 / PL 3170 single in-line package (SIP) even smaller than the previous one available. Now, design engineers have the flexibility to pick a design that has been commonly used and tested for their application.
- **Expanded layout tool support** — PL DSK v2.2 provides binary layout files for all layout tools supported, and has added support for the Altium layout tool in addition to P-CAD®, OrCAD®, and PADS® PowerPCB. This means you can port your reference designs faster and more accurately. Technical details on these tools can be found in the latest version of the *PL 3120 / PL 3150 / PL 3170 Power Line Smart Transceiver Data Book*.

## Hardware

The PL DSK v2.2 hardware includes evaluation boards, input/output (I/O) boards, power supplies, and ten samples each for the PL 3120 Smart Transceivers (model 15311R-1000) and PL 3150 Smart Transceivers (model 15321R-960) ICs. One evaluation board is based on the PL 3120 Smart Transceiver that

## Power Line Development Support Kit (PL DSK v2.2) Model 17050R-22-27

- ▼ Reduces design time for customers designing products with Power Line communications
  - Helps to get it right the very first time
  - Helps implement the design correctly to ensure reliable communication over the power line network
- ▼ Includes reference designs with support for various schematic and layout tools
- ▼ Includes hardware for evaluation of Power Line (PL) technology in real life environments
- ▼ Avoids making mistakes causing potential problems that customer may not find until the product is in the field.

includes flash memory, RAM, a transceiver, and 3 CPUs all on one chip; the other board is based on PL 3150 Smart Transceiver that supports external memory — 64Kbytes of external flash memory are provided.

The evaluation boards utilize Echelon's Power Line (PL) Smart Transceivers to signal over any AC or DC power circuit, eliminating the need for any new wires. The plug-in power supplies provided with the power line evaluation boards pass the network signals directly into the AC power lines over the same two wires that power the evaluation boards. The universal input (100 to 240VAC) power supplies work across the world and come with US/Japan and European plug types. The evaluation boards allow a control network to be created by simply plugging the evaluation boards into electrical outlets.

Two MiniGizmo™ I/O boards are also included with every Mini EVK, one for use with each evaluation board. The MiniGizmo boards include eight push buttons, eight LEDs, a temperature sensor, and a piezo transducer.

To develop a new application or modify the examples that come with the evaluation boards, you need a LONWORKS® PL network interface and a Neuron C compiler. Echelon's U20 Power Line USB Network Interface and the software for compiling Neuron C applications are both provided as a part of the PL Mini Evaluation Kit (model number 10000R-32-27).

## Reference Designs

Power Line Development Support Kit (PL DSK v2.2) includes a number of reference designs that have been implemented to take care of critical factors such as

- Managing Heat Dissipation by properly designed traces, component selection & placement
- Proper circuit operation by controlling trace capacitances with crystal's oscillation frequency
- Communications performance verification for Receive sensitivity & Transmit power
- Dealing with for Interference & noise impairments

The variety of reference designs enable designing solutions for various combinations of 2/4 layered and one or two sided PCB designs. The table below lists the approximate PCB area required for the Power Line Smart Transceiver and its discrete interface circuitry:

Power Line Smart Transceiver	Type of PCB	Approximate Dimensions
PL 3120 / PL 3170 Power Line Smart Transceiver	2 layer 1 sided (rectangular format)	0.9 in x 2.5 in (23 mm x 63 mm)
	2 layer 1 sided (square format)	1.3 in x 1.5 in (33 mm x 38 mm)
	4 layer 2 sided (SIP design)	0.7 in x 1.5 in (17 mm x 38 mm)
	4 layer 2 sided	0.8 in x 1.5 in (20 mm x 38 mm)
	4 layer 2 sided with 2A p-p transmit amplifier	1.2 in x 2.1 in (31mm x 53mm)
	4 layer 2 sided (SIP design)	0.7 in x 1.1 in (17 mm x 28 mm)
PL 3150 Power Line Smart Transceiver	4 layer 2 sided	1.4 in x 1.9 in (36 mm x 49 mm)
	4 layer 2 sided with 2A p-p transmit amplifier	1.9 in x 2.6 in (48 mm x 66 mm)

Each reference design includes the Bill of Materials, schematics in OrCAD & pdf format and layout design files and plots in P-CAD, OrCAD, PADS/PowerPCB, Altium, pdf (Adobe), PDIF, ASCII and Gerber formats.

of the PL DSK enhances the layout support and adds a new reference design providing further reduction in size relative to the previous smallest SIP design.

## Summary

The Power Line Development Support Kit includes evaluation boards to test real life environments and various reference designs (schematics and layouts) to speed up the development effort for designs based on Power Line Smart Transceivers. The latest version

## Evaluation Board Specifications

<i>Function</i>	<i>Description</i>
Processor	One PL 3150 Smart Transceiver or one PL 3120 Smart Transceiver
Processor Input Clock	10MHz
Processor Memory	56Kbyte flash memory and 2Kbyte on-chip RAM (Neuron 3150 core) and 4Kbyte on-chip flash memory and 2Kbyte on-chip RAM (Neuron 3120 core)
Operating Input Voltage	
— Evaluation Board	+11 to 17.8VDC unregulated (PL)
— Power Supply (included)	100-240VAC. Includes power line coupler for power line version. Comes with US/Japan and European plug types.
Operating Input Current	250mA max (PL) — not including user I/O Temperature
— Operating	0 to +40°C
— Non-operating	-20 to +65°C
Dimensions	114mm x 70mm x 32mm (excluding connectors)
EMI Compliance	FCC Level A; En55022 Level A

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## MiniGizmo I/O Board Specifications

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<i>Function</i>	<i>Description</i>
Digital Inputs	8 push buttons
Digital Outputs	8 LEDs
Analog Input	Temperature sensor
Analog Output	Piezo transducer

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## Documentation

The following documentation is included with the PL DSK v2.2. The brief Quick Start Guide provides a quick introduction to how to install and use the PL DSK. It is included in printed and on-line PDF format. All other documents are included only in on-line PDF format on the CD.

<b>Document</b>	<b>Echelon Part Number</b>
<i>Setting up your PL DSK 2.0 Evaluation Boards</i>	<i>078-0298-02</i>
<i>Introduction to the LONWORKS System</i>	<i>078-0183-01</i>
<i>PL 3120 / PL 3150 / PL 3170 Power Line Smart Transceiver Datasheet</i>	<i>003-0378-01</i>
<i>PL 3120 / PL 3150 / PL 3170 Power Line Smart Transceiver Data Book</i>	<i>005-0193-01</i>
<i>PL 3120 Evaluation Board Schematic</i>	<i>N/A</i>
<i>PL 3150 Evaluation Board Schematic</i>	<i>N/A</i>
<i>MiniGizmo Board Schematic</i>	<i>N/A</i>
<i>PL 3170 Power Line Smart Transceiver Datasheet</i>	<i>003-0431-01</i>
<i>PL DSK v2.2 Datasheet</i>	<i>003-0449-01</i>

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## Ordering Information

<b>Product</b>	<b>Echelon Model Number</b>
<i>Power Line Development support Kit v2.2 (100-240V AC 50/60Hz power supply, includes both US/Japan and European Plugs)</i>	<i>17050R-22-27</i>

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