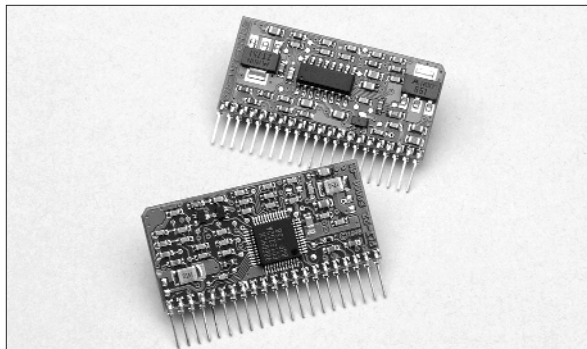


## PLT-22 Power Line Transceiver Model 50090-03



### Overview

The PLT-22 Power Line Transceiver provides a simple, cost-effective method of adding LONWORKS® power line technology to any control system. Network data are broadcast through the power mains, eliminating the need for dedicated wiring and greatly reducing installation costs. A backward compatible replacement for Echelon's popular PLT-21 Power Line Transceiver, the PLT-22 transceiver includes several new features to significantly improve communications reliability and lower node cost.

### A Global Product

The PLT-22 transceiver complies with FCC, Industry Canada, Japan MPT, and European CENELEC EN50065-1 regulations for signaling in the 125kHz to 140kHz and 95kHz to 125kHz frequency bands. The transceiver implements the CENELEC access protocol, which can be enabled or disabled by the user. By incorporating the access protocol into the power line transceiver, Echelon has eliminated the need for users to independently develop the complex timing and access algorithms mandated by the CENELEC EN50065-1 regulation. The PLT-22 transceiver is also EIA 709.2 compliant.

### Advanced Communications

Intermittent noise sources, impedance changes, and attenuation make the power line a hostile signal path. The PLT-22 transceiver operates reliably in this harsh environment through a novel Dual Carrier Frequency mode as well as custom digital signal processing (DSP) which provides adaptive carrier and data correlation, impulse noise cancellation, tone rejection, and low overhead error correction. These innovations permit the transceiver to operate reliably in the presence of consumer electronics, power line intercoms, motor noise, electronic ballasts, dimmers, and other typical sources of interference.

- ▼ A reliable power line communications solution that can be used worldwide
- ▼ Backward compatible<sup>1</sup> replacement for Echelon's PLT-21 transceiver
- ▼ Dual Carrier Frequency mode and Digital Signal Processing
- ▼ Communicates over virtually any AC or DC power mains and un-powered twisted pair
- ▼ Uses low cost coupling circuits and power supplies
- ▼ FCC, Industry Canada, Japan MPT, EIA 709.2, and European CENELEC EN50065-1 compliant
- ▼ Supports optional PLA-21 external amplifier
- ▼ Supports CENELEC A-band operation

### Unsurpassed Performance

When the PLT-22 transceiver's dual carrier frequency mode is activated, PLT-22-based nodes are able to communicate even when their primary frequency range (125kHz–140kHz) is blocked by noise. With dual carrier frequency mode, a PLT-22 transceiver begins each transmission by sending packets in the primary frequency range – these packets may be received by PLT-20, PLT-21, or PLT-22-based nodes. If impairments prevent communication in this frequency range, the PLT-22 will automatically switch to a secondary frequency range (110kHz–125kHz) in order to complete the transaction with other PLT-22-based nodes.

The transceiver communicates at a raw bit rate of 5kbps. With the CENELEC protocol disabled, the transceiver has a maximum packet rate of 20 packets per second. With the CENELEC protocol enabled, the transceiver has a maximum packet rate of 18 packets per second. This high throughput makes the transceiver well suited for residential, commercial, and industrial automation applications.

The transceiver's power amplifier includes a selectable 3.5V peak-to-peak (p-p) or 7V p-p mode for maximum communication performance. The 1Ω output impedance and 1A p-p current capability of the amplifier allow it to drive high output levels into low impedance circuits, while the highly efficient design draws less total current than the previous transceivers. This increased output power improves signaling in all applications and eliminates the expense of installing a phase coupler in typical residential applications. The net cost savings can be significant for home automation applications.

## Powered Or Unpowered Lines

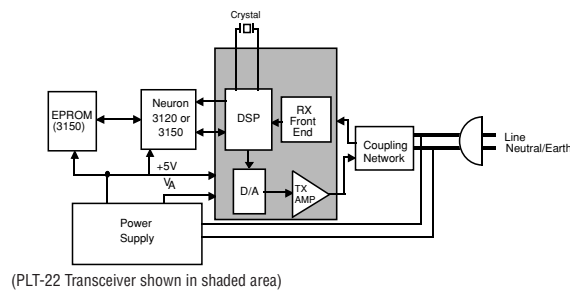
The transceiver uses a low cost external coupling circuit and can communicate over virtually any AC or DC power mains, as well as unpowered twisted pair. The PLT-22 transceiver can use all of the same coupling circuits as the PLT-21 transceiver.

## Inexpensive Power Supply

The PLT-22 transceiver is powered by user-supplied +8.5 to +16VDC and +5VDC power supplies. The wide power supply range is a key benefit when designing inexpensive power supplies. If a battery-backed power supply is used, the transceiver will continue signaling even during a power failure on the power mains.

The PLT-22 transceiver incorporates a power management feature that constantly monitors the status of the node's power supply. If during transmission the power supply voltage falls to a level that is insufficient to ensure reliable signaling, the transceiver tells the Neuron<sup>®</sup> Chip to stop transmitting until the power supply voltage rises to an acceptable level. This allows the use of a power supply with 1/3 the current capacity otherwise required (100mA versus 300mA). The net result is a reduction in the size, cost, and thermal dissipation of the power supply. Power management is especially useful for high volume, low cost consumer products such as electrical switches, outlets, and dimmers.

PLT-22 Power Line Node Block Diagram



## Flexible And Backward Compatible

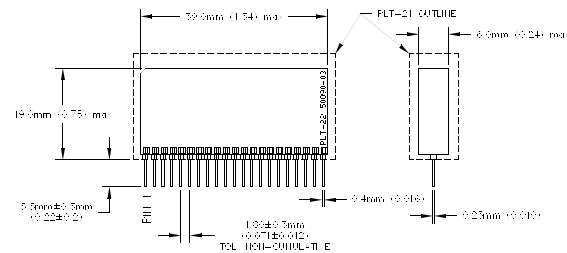
Supplied as a miniature, uncoated Single In-Line Package (SIP), the PLT-22 transceiver can be mounted on or inside an OEM product, directly adjacent to the Neuron Chip with which it is used. When connected to an external crystal, the transceiver can supply either a 1.25, 2.5, 5, or 10MHz clock signal to the Neuron Chip, eliminating the need for a separate Neuron Chip crystal (note: Dual Carrier Frequency mode requires a 2.5MHz or higher Neuron chip clock).

With pin-for-pin compatibility with the PLT-20 and PLT-21 transceivers, the PLT-22 transceiver can be used in existing designs and networks. At the same time, the PLT-22 provides smaller package dimensions to more easily fit tight enclosures.

For commercial and industrial applications in high rises, manufacturing plants, utility substations, and other large facilities, the PLT-22 transceiver can be used with Echelon's PLA-21 Power Line Amplifier. Capable of transmitting a 10V p-p signal with 2A p-p current drive, the PLA-21 amplifier is ideal for driving multiple phase coupling circuits, high attenuation power circuits, and very low impedance loads near circuit breaker panels and distribution transformers.

## Helping You Succeed

To simplify the task of designing and commissioning products using the PLT-22 transceiver, Echelon offers a diagnostic tool, the PLCA-22 Power Line Communications Analyzer, as well as a comprehensive range of development tools, network interfaces, routers, and network services tools. Technical support, design reviews and node verification for the transceiver are all available through Echelon's LonSupport<sup>™</sup> technical assistance program.



NOTE: Solid lines are the PLT-22 outline; Dashed lines are the PLT-21 outline

PLT-22 Power Line Transceiver Dimensions

## Specifications

*For operation in the 125kHz to 140kHz and 110kHz to 125kHz frequency ranges (C-band mode)*

Function	Description
Microprocessor	Requires external Neuron Chip <sup>2</sup>
Emissions compliance	Compliant with FCC, Industry Canada, Japan MPT, and CENELEC EN50065-1 specification for low-voltage signaling
Safety agency recognition	U.L. 1950, cU.L. C22.2 No. 950, TÜV EN60950
Bit rate	5kbps raw bit rate
Communication technique	BPSK with DSP-enhanced receiver
Carrier frequencies	132kHz (primary) and 115kHz (secondary)
Input voltage	+8.5 to +16VDC @ 250mA, maximum transmit +5VDC ±5% @ 23mA, maximum
Connector pins	0.25mm (0.010") x 0.4mm (0.016") on 1.8mm (0.071") centers
Operating temperature	-40 to +85°C
Non-operating temperature	-40 to +85°C
Operating humidity	25-90% RH @ 50° C, non-condensing
Non-operating humidity (24 hour)	95% RH @ 70° C, non-condensing
Dimensions	39mm L x 19.0mm H x 6mm W (approximately: 1.54" x 0.75" x 0.24")
Packaging	Uncoated single in-line package

## Ordering Information

Product	Echelon Model Number
PLT-22 Power Line Transceiver	50090-03
LONWORKS PLT-22 Power Line Transceiver User's Guide	078-0175-01 (order separately — not shipped with product)

### Notes:

1. The PLT-22 transceiver is a replacement for the PLT-21 transceiver, and can communicate with PLT-21 and PLT-20 transceivers.
2. Refer to the Neuron Chip Data Book from Motorola or Toshiba for Neuron Chip specifications and design information.

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