

# Mini FX Evaluation Kit

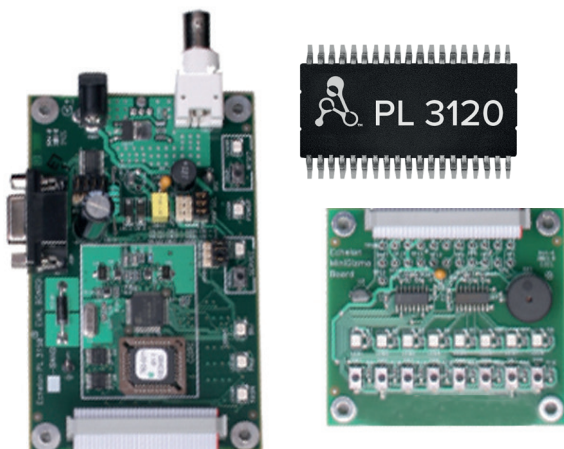



Figure 1. PL evaluation board (left) based on the Adesto PL 3120 chip (top right); MiniGizmo I/O board (bottom right). The Mini FX Evaluation Kit contains two of each of these boards.

## Introduction

Designed for control system developers, integrators, specifying engineers, educators and students, Mini FX is a low-cost tool for evaluating and developing LON® devices for control networks. It combines a flexible hardware platform with sample Neuron® C applications and a Neuron C compiler.

In just a matter of minutes, you can easily set up and demonstrate twisted pair or power line control networks, as well as write, compile, and load new applications of your own design.

## Description

Mini FX makes it affordable for anyone to understand and harness the power of the popular LonWorks® platform, and to develop new devices for the rapidly growing, price-sensitive sensor/actuator mass market. Use Mini FX standalone to create devices that install themselves, or use Mini FX with a network installation tool such as the IzoT® Commissioning Tool (CT) to create devices that are installed in managed networks. If you need a more full-featured development environment, upgrade to the IzoT NodeBuilder® Development Tool, which uses the same Neuron C programming language, includes the IzoT Commissioning Tool, and also includes many productivity enhancements such as a debugger, project manager, integrated development environment, code editor, code wizard, plug-in framework, and network management API.

Mini FX includes two PL EVB evaluation boards and two MiniGizmo I/O Boards for use with the two EVBs. The PL EVB includes a PL 3170 Smart Transceiver with an integrated power line transceiver,

## Features

- Introduces developers to LON control networking using ISO/IEC 14908-1
- Includes example applications for device networking
- Can be used without any separate network installation tools for running self-installed examples or creating self-installed devices
- Can be used with the IzoT Commissioning Tool to develop and test devices for managed networks
- Speeds development of control networks with the powerful Neuron C programming language and a compiler
- Downloads compiled Neuron C applications to target hardware over the control network
- Provides easy resource and hardware definition and editing with built-in resource and hardware template editors
- Includes two PL evaluation boards, I/O hardware, and USB interface for fast plug-and-play setup
- Provides easy migration to the powerful NodeBuilder Development Tool



## PRODUCT DESCRIPTION

on-chip ROM with Neuron firmware and self-installation support, an external 10MHz crystal (for an internal system clock speed of 5MHz), and a 5V power source. The power line transceivers implement the ISO/IEC 14908-3 communication standard for PL-20 C-Band channels and provide network communication by signaling over any AC or DC power circuit, eliminating the need for any new wires for communication. 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. You can create a network with the Mini FX by simply plugging the evaluation boards into electrical outlets.

Mini FX includes two MiniGizmo I/O boards that provide I/O components that you can use to develop prototype and production devices and test the PL EVB example applications. The MiniGizmo I/O boards include eight push buttons, eight LEDs, a temperature sensor, and a piezo transducer.

Mini FX also includes a U20 USB Network Interface. This connects to a PL-20 C-Band power line LON channel through an included power supply with integrated power line coupler. The U20 USB Network Interface can also be connected directly to 10.8-18VDC power systems (such as those in automobiles, trucks, and buses) without a coupling circuit, or to virtually any powered line through a customer-supplied coupler/power supply.

### Simplify Your Development

Mini FX includes software for Windows that lets you create and test applications for LON devices based on a PL 3120 Smart Transceiver.

Using the Mini FX software, you write your device applications using the Neuron C programming language, a high-level language based on ANSI C with extensions to simplify network communication, hardware I/O, and event-driven processing.

You can use the Neuron C compiler included with Mini FX to compile applications with up to 32 network variables. To develop applications that require more network variables, you can upgrade to the NodeBuilder tool, which includes support for up to 254 static network variables and up to 127 network variable aliases.

If the standard resource files do not include the resources you need, a powerful resource editor lets you view standard types and functional profiles, and create user-defined types and profiles.

### Built-in Examples Shorten Design Time

Mini FX includes working example applications that let you evaluate the benefits of the LonWorks platform without writing any code. These applications demonstrate how control devices can interact with I/O hardware and exchange data over a control network. They also demonstrate how control networks can be created without the use of any installation tools through a simple process called self-installation. The applications are compatible with standard LON

installation tools such as the IzoT Commissioning Tool, letting you evaluate the capability of devices to be used in control networks with or without network installation tools.

All examples are provided in both executable images and source code. An example application is pre-loaded into each PL EVB, allowing new users to get a control network up and running within minutes.

You can use the Mini FX software to modify the Neuron C examples, create new applications based on the Mini FX examples, or create new examples from scratch. You can use the powerful self-installation library (included with the examples) in custom applications that do not require the use of any installation tools, and yet are fully compatible with standard LON installation tools such as the IzoT Commissioning Tool.

### Specifications

#### Operating System

Microsoft Windows 10 (64-bit and 32-bit) or Windows 8.1 (64-bit and 32-bit), Windows Server 2016 (64-bit), or Windows Server 2012 (64-bit).

#### Minimum Hardware

1 gigahertz (GHz) or faster x86-bit or x64-bit processor with SSE2 instruction set; 2 GB RAM; 1280 x 800 screen resolution display.

# SPECIFICATIONS AND ORDERING

## Neuron C I/O Objects

Bit, byte, nibble input/output  
Bitshift input/output  
Dallas Touch input/output  
Dual slope input (for low-cost A/D)  
Edge divide output  
Edgelog input  
Frequency output  
Infrared input  
Infrared pattern output  
I<sub>2</sub>C input/output  
Level detect input  
Magcard bitstream input  
Magcard track 1 and 2 input (for ISO 7811 input)  
Muxbus input/output (multiplexed address/data)  
Neurowire input/output (National Semiconductor Microwire and Motorola SPI compatible)  
Oneshot output, ontime input, period input, pulsewidth output  
Parallel input/output  
Pulsecount input/output  
Quadrature input  
SCI (UART) serial input/output  
SPI serial input/output  
Serial input/output  
Total count input.  
Touch input/output (Maxim/Dallas 1-Wire protocol-compatible)  
Triac and stretched triac output  
Triggeredcount output  
Wiegand input

## Neuron C Network Communication

### Extensions

Functional blocks  
Network variables  
Configuration properties  
Application and foreign-frame messages

### Hardware (PL EVB)

#### Processor

PL 3170 Smart Transceiver

#### Processor Input Clock

10MHz (5MHz to system clock)

#### Processor Memory

4KB on-chip flash memory and 2KB on-chip RAM

#### Operating Input Voltage

+11 to 17.8VDC unregulated

#### Operating Input Current

250 mA max, not including external I/O

#### External I/O Power

+5V current not to exceed 100mA

#### External Power Supply

100 to 240VAC; 50 or 60Hz with power line coupler

#### Operating Temperature

0° to +40°C

#### Non-operating Temperature

-20° to +65°C

#### Dimensions

114mm x 70mm x 32mm (excluding connectors)

## EMC Compliance

EN 55022 Class A

## Documentation

I/O Model Reference for Smart Transceivers and Neuron Chips  
Introduction to the LonWorks Platform  
ISI Programmer's Guide  
ISI Protocol Specification  
LonWorks USB Interfaces User's Guide  
Mini FX Examples Guide  
Mini FX Hardware Guide  
Mini FX Quick Start Guide  
Mini FX User's Guide  
Neuron Assembly Language Reference  
Neuron C Programmer's Guide  
Neuron C Reference Guide  
Neuron Tools Error Guide  
NodeBuilder Resource Editor User's Guide  
NodeBuilder Resource Report Generator User's Guide  
PL 3120/PL 3150/PL 3170 Smart Transceiver Data Book  
**Documentation available at [docs.adestotech.com](https://docs.adestotech.com)**

Model #	Product Name	Product Description
10000R-40-27	Mini FX Evaluation Kit	Hardware and software development kit

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