# ECHELON®

▼ Enables devices to be developed that do not require instal-
lation tools

▼ Supports plug-and-play and plug-press-and-play device
installation

▼ Provides an ideal installation solution for home automa-
tion applications

▼ Leverages LONMARK standards for interoperable device
operation—expanding the market for self-installed
devices

▼ Supports logical isolation of power line networks using an
optional domain address server

▼ Supports up to 32 devices for simple networks, or up to
200 devices with a simple domain address server

▼ Requires minimal, deterministic, network overhead

▼ Enables self-installed networks to be transitioned to a
managed network using an LNS® based tool

▼ No royalties when used with Echelon's power line, free
topology, and link power transceivers

## Description

The ISI Developer's Kit is a library for Neuron® C that
supports development of devices that can be installed in net-
works without the use of a network management server or tool.
Devices developed with the ISI Developer's Kit communicate
using the LONWORKS® Interoperable Self-installation (ISI)
Protocol. This protocol leverages LONMARK standards to
enable ISI devices from different manufacturers to interoper-
ate. Devices offer connections with LONMARK information
including functional profile, member ID, and SNVT ID.

Networks can start out as self-installed networks using ISI
and, as size or complexity grows beyond the ISI limits, can be
upgraded into a managed network. For example, a self-
installed network may also be transitioned to a managed net-
work to add non-ISI devices or to take advantage of the
additional flexibility and capability provided by a network
management tool and server. When the network is
transitioned, the network management tool can automatically
recover all the installed devices in the network as well as all
the connections created in the network—saving the effort of
installing the devices a second time.

The ISI protocol supports logical isolation of different
networks that may be within earshot of each other. For exam-
ple, devices in adjacent apartments are typically installed into
separate networks to prevent interference between the apart-
ments. To provide this type of isolation, the ISI protocol
defines a simple domain address server that can be used to
assign and distribute a unique domain identifier for all the
devices in a network. In the case of adjacent apartments, each
apartment will have its own domain address server. When a
new device is installed in a network with a domain address
server, a simple push-press-and-play push button sequence is
followed to assign the device to the correct domain. The ISI
protocol ensures that a new device is not mistakenly assigned
to a neighbor's network.

The ISI protocol introduces a small, tightly-controlled,
deterministic, number of status messages to maintain the self-
installed network. The network overhead is controlled on the
entire media. For example, if two adjacent apartments use two
logically isolated power line networks on the same physically
connected power line, each of the two networks adjusts the
network maintenance packet rate to the total number of devices
in earshot.

The ISI protocol uses a patent-pending fire-and-forget
protocol to assign network resources such as network address-
es and connection identifiers. This protocol detects and repairs
any resource conflicts, without requiring all devices in a net-
work to be on all the time and without requiring the use of a
central server to maintain resource information.

The ISI protocol supports most common types of connec-
tions, including one-to-one, one-to-many, many-to-one, and
many-to-many. Every ISI device may support multiple con-
nections per device. Connections may be fully automatic. For
example, an appliance application may automatically connect
to a gateway application. Alternatively, connections may be
manual. For example, a group of switches may be manually
connected to a group of lights by pressing a button on each of
the switches and lights to be connected.

## Contents

The ISI Developer's Kit includes the following components:

▼ A full version of the ISI library—this version implements all ISI functionality, and is suitable for applications developed for 3150® chips

▼ Two smaller versions of the ISI library—one that supports only automatic connections and one that supports only manual connections. The small versions are both suitable for applications developed for 3120® chips. These versions leave approximately 1 KByte for the application on a 3120 chip with 4 Kbytes on-chip flash.

▼ Documentation for the ISI library and the ISI protocol, including example Neuron C code that demonstrates how the ISI library can be used to create self-installed applications.

## Usage

The ISI library included with the ISI Developer's Kit implements most of the ISI protocol, simplifying development of Neuron C applications for ISI devices. To use the library, NodeBuilder® and Mini EVK developers link to the ISI library and specify the types of connections to be offered and accepted by the device, and define the actions used to initiate connections.

## Specifications

| Function | Description |
|---|---|
| Development tool | NodeBuilder 3.1 Development Tool or Mini EVK 1.0 or 1.01 Evaluation Kit, or newer. |
| Devices per network | Up to 32 devices for simple networks, or up to 200 devices with a simple domain address server—limits apply to all devices within earshot of each other, including devices in different domains. |
| Connections per device | Up to 254 connections per device. |
| Connections per network | Up to 8128 (32*254) connections for simple networks, or up to 50800 (200*254) connections per domain with a simple domain address server. |
| Commonly Used API Functions | Accept a connection invitation |
| | Extend, create, or leave a connection |
| | Send a manual or automatic connection invitation |
| | Start or stop the ISI engine |
| | Start or cancel domain ID acquisition |
| Commonly Used API Callback Functions | Create a connection invitation |
| | Get a network variable within an assembly |
| | Return a matching assembly for a connection invitation, or return the next matching assembly |
| | Update the optional user interface |

## Documentation

The following documentation is included with the ISI Developer's Kit. The documentation provides an overview of the development of ISI applications, and describes the ISI protocol.

| Document | Echelon Part Number |
|---|---|
| ISI Programmer's Guide | 078-0299-01 |
| ISI Protocol Specification | 078-0300-01 |

## Ordering Information

The ISI Developer's Kit is available for free download from www.echelon.com/isi. A free introduction to ISI training course is available as part of Echelon's eTraining courses. See www.echelon.com/training for more information. Other support and training options are available. Contact your local Echelon representative or distributor for details.

The ISI protocol is a licensed protocol. The ISI Developer's Kit and Mini EVK Evaluation Kit both include a royalty-free license for development use of the ISI library with Echelon transceivers for the TP/FT-10 and PL-20 channels. By signing a Revision J or newer OEM License Agreement, manufacturers can acquire a royalty-free license to produce devices incorporating the ISI library and using these transceivers.

| Product | Echelon Model Number |
| --- | --- |
| ISI Developer's Kit | 23500 |

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