



## Larus Intelligent Sensor and Actuator (LISA) Networking Product Family

An intelligent sensor or actuator provides transducers with the ability to be augmented and enhanced by providing the necessary controls, connections, and protocols required by the ensuing ad-hoc mesh network. This allows the user to simultaneously visualize and monitor an area of concern (e.g. a border crossing) with minimal delay and human interaction. For current commercial and military sensors to become intelligent, ready to be integrated into a unified network, a hardware and software solution must be provided. The **LISA Networking Product** family is such a solution; it comprises embedded computer products consisting of hardware interface controllers and integrated software intelligence that provide the following:

1. *Local intelligence*: Provides the intelligence that allows the sensor or actuator to augment their behaviour by conforming to environmental and operational requirements of the network and sensor/actuator; and
2. *Sensor and actuator interface*: The physical interface and processor which augments the sensors and actuators with embedded processing abilities and unique interfaces that integrate each sensor/actuator into the network, while providing them with computational resources for autonomy and local intelligence.

The **LISANET**, a LISA Network, is a proprietary network solution that works with existing interfaces and protocols, as well as with LISA Products to maximize overall network productivity, by providing the following:

1. *Distributed resource management*: This framework provides a flexible, extensible and open mechanism allowing for interoperability and seamless integration of the sensor/actuator into an open network. This module provides the network-centric strategic capabilities of the sensor and actuator network (SANET) (e.g. turning off some sensors to conserve energy);
2. *Network communication*: A wireless/wired network sensor and actuator protocol, required to allow for the efficient utilization of the available network channels and sensing and actuating capabilities. This ability allows SANET protocols that have been provided by deployed sensors and actuators to be integrated within the network and translated to other systems which require a user defined protocol;

Larus Technologies Networking Products are compatible with most off the shelf sensors or actuators. Larus is manufacturer independent – we do not make sensors or actuators but rather work with companies and customers to add value to sensors, actuators and other data acquisition devices through our proprietary networking products.

*How can Larus Technologies help **you** better serve **your** customer?*

58 Antares Drive Unit 1  
Ottawa, ON  
Phone: +1.613.244.8916 | Fax: +1.613.244.9941 | [info@larus.com](mailto:info@larus.com)

*www.larus.com*



## **Larus Embedded Products**

Larus Technologies has developed a number of smart interface and networking products known as LISA Networking Products to connect to a broad range of sensors and actuators, resulting in reduced set-up and configuration effort and improving overall scalability.

The Larus Technologies Sensor Interface and Networking product family, known as LISA Networking Products, includes:

- **Larus Interface Node (LIN):** designed to simplify embedded system designs; it connects to a broad range of peripherals including sensors, actuators, communication modules and memory, resulting in reduced interfacing effort and increased system development time
- **Larus Interface Gateway (LIG):** designed to offload interfacing hardware and software from host systems; it improves overall system performance and scalability
- **Peripheral Interface Modules (PIMs):** designed to provide a custom interface to a specific peripheral; it manipulates data to perform filtering, unit conversion and other low-level functions

*The LISA Networking Product line improves the quality, usability and compatibility of off-the-shelf or proprietary sensors or actuators. LISA products make sensors and actuators smarter and easier to use.*

LISA Networking Products support various components, most notably the following types of industry recognized sensors and actuators prevalent in autonomous robotic systems:

- *Distance & Orientation*
- *Temperature, Pressure & Humidity*
- *Power*
- *Positional*
- *Acoustic*
- *Gas and air pollutants*
- *Motor*
- *Buzzer*
- *Magnetic, Infrared & Motion*
- *Smoke & Fire*

The unique plug-and-play feature allows new peripherals to be plugged into the system at anytime; providing immediate access to the controller and discovery by the network - no configuration is required.

***PIMs & LINs are, respectively, the USB devices & hubs of today's SANETs***

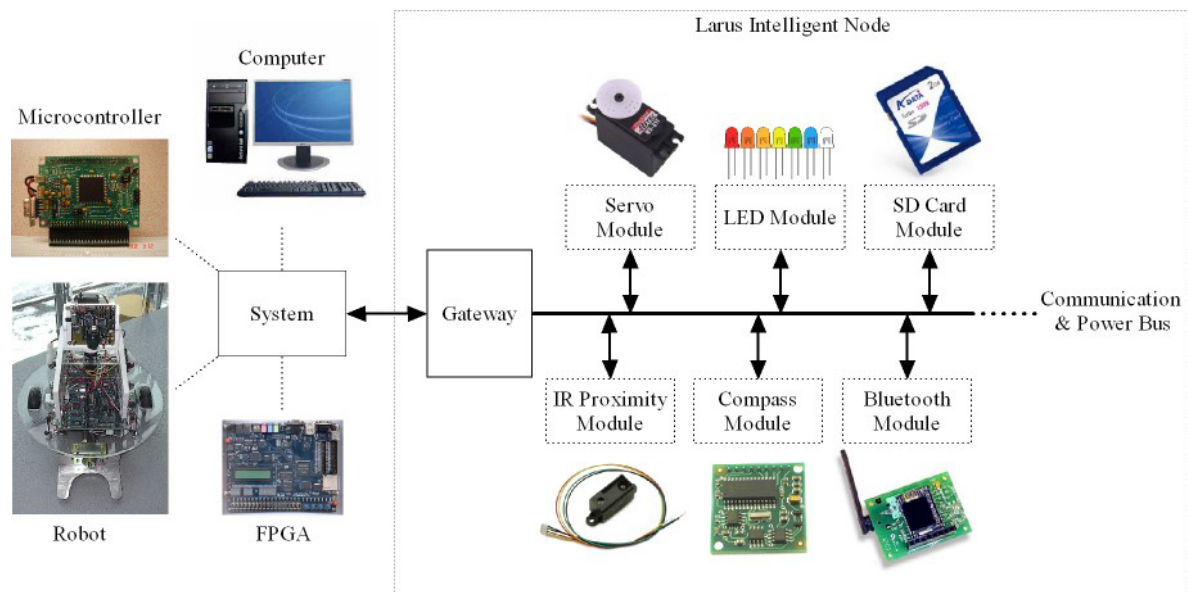
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## Product Features

- Uses a simple serial interface for the Plug and Play of peripherals, including sensors, actuators, motors, custom peripherals and communications hardware
- LISA Networking Products are designed to have low power consumption and an expandable bandwidth of 1 Mbps
- Hot plug and play peripheral interface modules
- Expandable to connect up to 112 peripheral interface modules
- Data processing capabilities on the interface modules
- Gateway serial interface via RS232 or 3.3V UART
- Auto baud rate detect hardware, tested between 0.3 k to 2,000 k Baud
- On the fly firmware upgradeable – future proof
- Student proof design with a resettable fuse, and key shape connectors
- A high level protocol has been developed for the LISA Networking Products providing the ability to manipulate all system components
- LISA Networking Products are designed to offload interfacing hardware and software from host systems, improving overall system performance and scalability
- A Graphical User Interface (GUI) allows users to access registers and provides a visual display of sensor streams in real time
- Supporting component documentation is provided



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## ***How can LISA Networking Products Help?***

### **If you are a Manufacturer of Robotic Platforms, Controllers or Sensors**

Commercial robotic platforms or controllers can be quickly enhanced through the seamless introduction of new sensors, actuators or other peripherals

### **If you are in the Academic sector or participate in Robotic Competitions**

Computer Science and Engineering programs or courses at University, College and High School can use LISA Networking Products to turn single-use robotic platforms into a multi-use teaching aid. Students can focus on core course requirements and not on the time-consuming integration issues.

### **If you are an Innovator & Hobbyist**

Need a gateway to test your prototype? Have a product or tool that can be enhanced if it could 'talk' to another device – LISA Networking Products can provide you with an easy-to-use interface solution.

## ***Available Documentation***

### **LIN Hardware Quick Start Guide**

This guide provides the following information with respect to the LIN:

- Connectors
- Powering the LIN
- Communication
- Connecting Modules to the LIN



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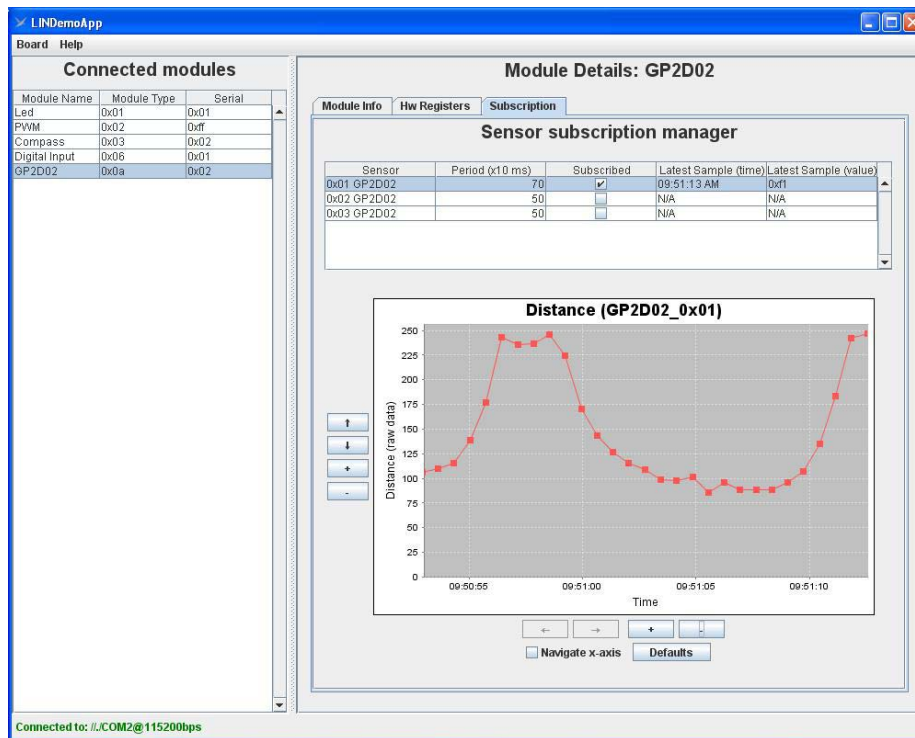
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## LIN Demo Application Quick Start Guide

The LIN DemoApp application allows you to efficiently explore the LIG and all its associated modules through a graphical user interface. This guide provides the following information with respect to the LIN DemoApp:

- Hardware and Software Requirements
- Installation and Execution
- Interface Description
- Connection to the LIN
- Accessing Module Information
- Reading and Writing to Hardware Registers
- Subscribing to Receive and Display Sensor Data
- Disconnection from the LIN



## LIN Communication Guide

This document provides the necessary information to perform various communications tasks with the LIN from an embedded system.

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### ***Interested in Getting More Information?***

For more information on pricing, packaging options, custom solutions (including peripheral interface modules and additional features), delivery details as well as on our other products (e.g. LISANET), please feel free to contact us at [info@larus.com](mailto:info@larus.com).

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### **About Larus Technologies**

Larus Technologies Corporation is a wholly-owned Canadian engineering and software development company, incorporated in August 1995. Larus is Ottawa-based with three core business areas, *Sensor Networking Solutions*, *Software Engineering Consulting*, primarily in the public security and defense sector, and *Professional Services Consulting*, working in partnership with Hays Recruitment Specialists. Larus was established by a group of software and hardware engineers to research and develop end-to-end real-time applications and data acquisition systems for the defence and aerospace industry. Larus also has capabilities in developing defence/security applications, intelligent systems and engineering simulations, through the development of advanced systems for multi-sensor data collection, aggregation, display, exploitation and fusion.



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