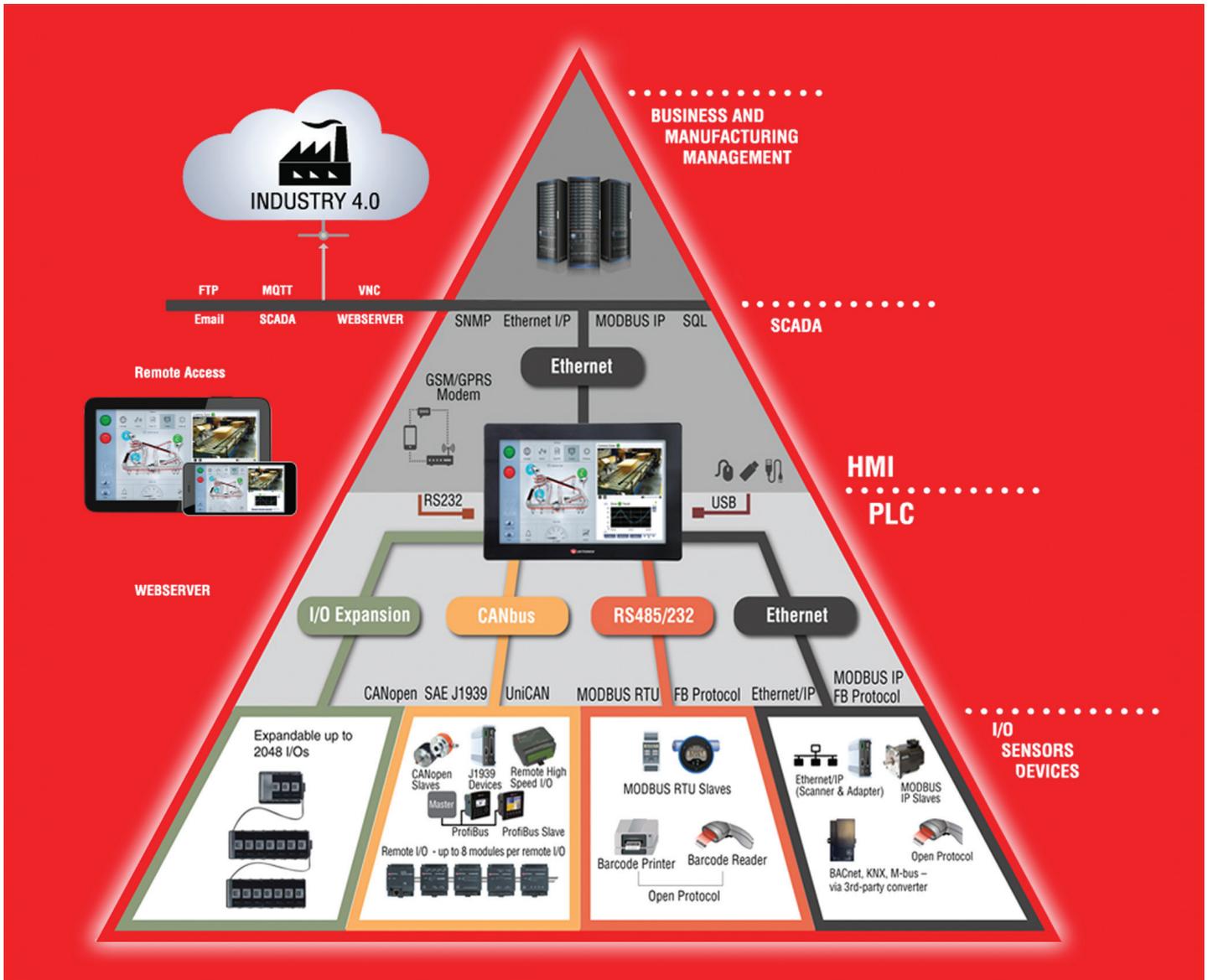


# PLC + HMI: the heart of your Industry 4.0 Factory

## Factory Communications: Benefits of the PLC + HMI Controller in the Age of Industry 4.0



The unique features of Unitronics All-in-One PLC + HMI controllers enable them to play a central role in production factory and manufacturing enterprises.

The pyramid in the accompanying illustration shows the communication layers in the traditional factory. Each layer has a specific set of functions and functionality. Each layer communicates with the one above and/or below it through different communication networks and protocols.

The **bottom** layer of the pyramid is the factory floor. This is where the manufacturing machines live. They manufacture the products that have been ordered from the factory. The manufacturing process incorporates various technologies, communication networks, and protocols that connect peripheral devices such as sensors, barcode readers, and other devices to the manufacturing machines.

At the **top** of the pyramid is the factory management system, generally referred to as the Manufacturing Execution System (MES). This includes servers, software, and services that communicate with the factory floor to:

- Inform the manufacturing staff/system what needs to be manufactured, based on customer orders.
- Coordinate all of the front-end and back-end factory logistics to fill those orders, based on available data, including manufacturing times and raw material inventory management.
- Enable monitoring. Therefore, this is where you will typically find a human machine interface (HMI) that allows access to machine/process status, as well as SCADA systems which show an overall picture of the manufacturing facility, generally allowing a drill down per device.

The **middle** of the pyramid is traditionally called the **control** layer. Here are the devices that control the machines that perform the manufacturing; in other words, **here is the PLC**. The PLC:

- Receives the instructions from the layers above it: what to manufacture and how to manufacture it.
- Starts the process on the machines, executes the instructions, and monitors the running condition of the process.
- Reports data –process data, production data, and of course errors, up through the layers.
- The PLC may modify the manufacturing process, based on the data from the application or instructions received from the top layer – the MES Manufacturing Execution System.
- **Unitronics All-in-One PLC + HMI** controllers are uniquely positioned to cut across these layers.

The controller's embedded PLC communicates directly with the machines executing the process and the peripheral devices. Unitronics UniStream line, for example, is supplied with embedded CANbus, serial, and Ethernet ports, as well as plug-and-play support for a broad range of field net protocols such as CANopen, MODBUS, and Ethernet/IP.

The controller's embedded HMI Panel and the HMI application enable users to view and track machine processes, input data and the status of peripheral devices, as well as edit data and issue commands.

The ability to cut across the layers brings you a number of advantages, such as the ability to:

- Communicate directly with the facilities' backend systems. Existing Ethernet infrastructure allows advanced communication protocol support for SQL interfaces to factory ERP/MRP servers.
- Use remote control applications like VNC so that you can control your PLC from a remote location (either in the factory or from outside). Ethernet interfaces and TCP/IP support also provide access to the PLC for file transfers (FTP) and email support, so that the PLC can send messages directly to personnel. Lastly, and most important, a built in webserver provides another form of HMI access, and our simple easy to use, robust development environment (UniLogic) can convert your HMI screens to web pages very quickly and easily with just a click of a button.
- Employ SNMP to integrate a PLC into the IT infrastructure, and manage it as an IT asset.

The capability of the PLC to harvest data directly from the control process is leveraged by Unitronics' powerful embedded data tools.

These enable Unitronics PLCs to:

- Record and create logs of dynamic application data, and send them via email or FTP.
- Display run-time data on the HMI screen as Trend graphs, bar graphs, and gauges. In the case of UniStream, live Trends may also be displayed on the built-in webserver.
- Organize data in tables, and then manipulate the data via Ladder functions and HMI or webserver elements.
- Implement Data Recipes to easily implement dynamic, complex production processes.

### **Is Industry 4.0/Smart Factory, and the 'Cloud' relevant for small to mid-size OEMs and system integrators?**

The answer is yes—when it comes to choosing a PLC. Large-scale complex industries, such as the automotive industry, are ramping up to, or have already implemented, the vision of the Industry 4.0/Smart Factory. It is clear that this is the way forward.

For this reason, smaller enterprises should consider selecting a PLC with a feature set that both benefits applications in the present, and that supports the future: Industry 4.0/Smart Factory.

