

Soft-I/O[®]

The revolutionary way to connect sensors and actuators and do industrial control that is so new, it's patented many times over!

- ◆ Directly connect thermocouples, RTD's, load cells, relays, pumps, motors, switches and thousands of devices with a single part number Soft-I/O[®] module: Don't stock hundreds of parts.
- ◆ Measure and control: Keep track of alarms, control temperature, flow, pH, or any process parameter.
- ◆ Cycle pumps, even read RFID devices with *one* Soft-I/O module: Only one spare part.
- ◆ All-in-one, user configurable device controller and distributed I/O module.
- ◆ Control complex devices like thermal systems and light towers—with no programming!
- ◆ The “magic box” that can electrically connect virtually any mix of sensors and actuators to your network.
- ◆ 25 pins of configurable I/O—*any* pin can be an input or an output, analog or digital, or even supply power and ground.
- ◆ Peer-to-peer connection over Ethernet provides real distributed control—with no programming.



Actual size:
80 mm (3 in) x 100 mm (4 in)

“Unlike any product in the world”

Traditional Approach

Machines and factories are full of sensors and actuators that have dozens of different electrical formats. Many narrowly-purposed Input/Output, or I/O modules are required to hook them up.

The challenge is to connect all these devices to I/O modules, to power supplies, and to a host controller. Often significant programming is required to provide seemingly simple functionality.

The resulting systems are typically complex, costly to program and build, and hard to maintain.

A Better Way

In a new way to design and build machines and factories, wiring is simplified, fewer parts are used, software is simplified, and build times shortened.

Soft-I/O technology is the innovation that makes this possible. Only palm-sized, the Soft-I/O module is a uniquely flexible, low cost, device controller and distributed I/O module.

With no programming: Soft-I/O is easily configured to provide a mix of analog and digital I/O—with “any signal, on any pin” connection flexibility.

With no programming: Soft-Devices™ enable unique and powerful device control capabilities.



XiO is a new company founded by automation professionals with a broad and successful background in some of the most complex machines and processes in the world. Soft-I/O is the result of a search for a better way to connect sensors and actuators, and Soft-I/O represents the most significant breakthrough since the development of the Programmable Logic Controller (PLC) more than 50 years ago. XiO has a legacy but—more importantly—a disruptively new focus on the problem of connecting sensors and actuators to your networks. To learn more about XiO, please visit www.XiOio.com

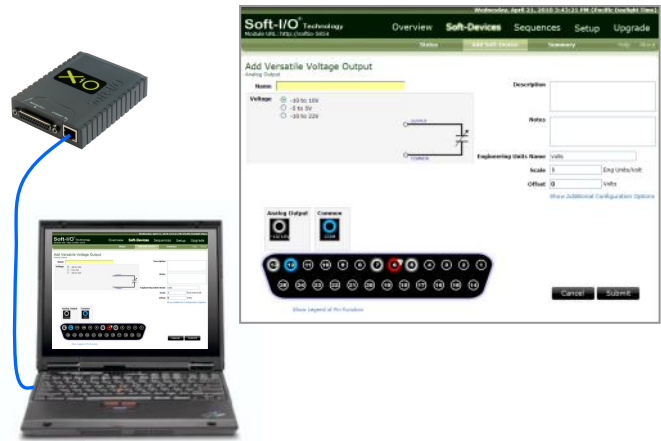
Soft-I/O technology

One part number...No programming

Configurability

The *single* part number Soft-I/O module is totally configurable. Each of the module's 25 I/O pins can be configured as an input or output, analog or digital, sourcing or sinking, even to supply power or ground to a connected I/O device. Imagine hooking up a thermocouple to two pins in one application and then hooking up a motor starter to the same pins in another application! Configurability means: fewer parts, less wiring, more efficient use of your input/output parts.

Soft-I/O configuration is easy: It has its own embedded web server just like every modern product. You simply connect Soft-I/O to a PC with standard web browser, using an ordinary Ethernet cable. The embedded web server provides configuration pages for everything hooked up to the Soft-I/O module. Mouse clicks and drag-and-drops are all it takes to configure Soft-Devices and assign I/O pins. **There is never any programming. And once it's configured, Soft-I/O can operate by itself or slave to your host system.**

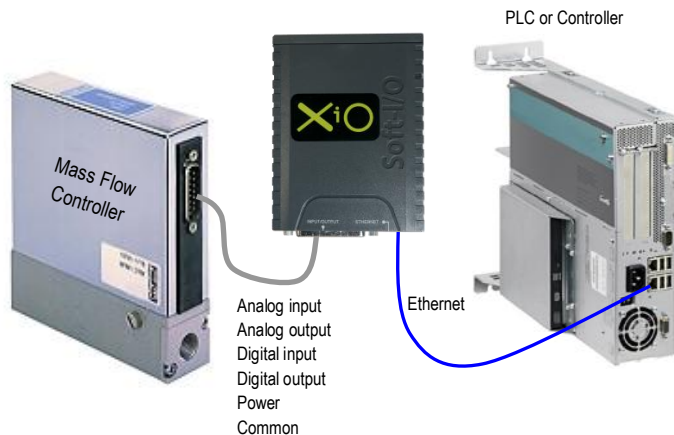


Distributed I/O

As distributed I/O, Soft-I/O technology offers:

- ◆ A tiny package that goes where the sensors and actuators are—no long cables to a “central box”.
- ◆ Many Soft-I/O modules connected via a super fast network—making your system modular.
- ◆ An I/O technology designed from the get-go to be part of a distributed system.
- ◆ The ubiquity and low cost of Ethernet networking.

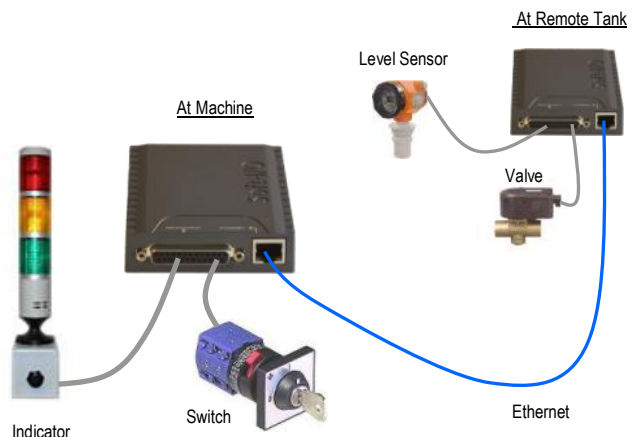
Configurability on a high-speed network enables a new way to build machines in which wiring is greatly simplified, fewer parts are used, and build times shortened. And you can visualize your system anywhere you have a network connection because every Soft-I/O module hosts its own website viewable from anywhere in the world (where you give it permission).



Peer-to-peer I/O

Soft-Link™ technology enables easy implementation of peer-to-peer, distributed control using two or more Soft-I/O modules. When you configure a device connection with Soft-Link technology, it's as if the two devices were hooked up to the same Soft-I/O module—but they are distributed.

In an application example (right):
The output of an ultrasonic level sensor at a remote storage tank is communicated to a warning indicator at a process machine. And, a switch at that process machine controls a valve at the remote storage tank. All with no programming.



Soft-I/O technology

Soft-Devices

Soft-Devices let you see what is connected to Soft-I/O. But there's much more. Unlike a PLC where you connect a wire to a terminal block, **Soft-I/O understands what you are connecting and why.** A warning light is very different than a solenoid; a load cell is nothing like an RTD, but to a PLC, they are just wires. To Soft-I/O, they are *Devices*. Devices often require power, calibration, engineering units and perhaps sequencing at power up. Soft-Devices allow you to set up your own devices simply and quickly with drag-and-drop: there is never any programming.

A Soft-Device solves a specific problem. It might be simple, like connecting a lighted pushbutton, debouncing the switch, and flashing the light.

It might be more complex, like doing closed loop plasma control using a mass flow controller, or running an advanced setpoint ramped temperature controller, or just controlling an industrial machine's light tower.

There's never any programming.

A Soft-Device provides I/O configuration, logic and loop-control, error handling, and monitoring for a specific hardware device, or combination of devices.

Soft-Devices are configurable software components delivered ready to go. A number are included with the Soft-I/O module while a large, and growing, spectrum of Soft-Devices are quickly downloadable—some are free, most inexpensive.

Soft-Devices enable the extraordinarily configurable, single part number, Soft-I/O module to be flexibly customized to efficiently deliver task-matched control and I/O solutions.

Sequences

The Soft-I/O module provides on-board sequence storage and execution. Sequences allow a Soft-I/O module to autonomously respond to events, such as digital input state changes or analog input thresholds—without the delays associated with communication and host computer processing. You get millisecond-level response.

Sequences are easily configured. As with all Soft-I/O configuration data, sequences are stored in non-volatile memory within the module and can automatically run—event driven!

Light Tower Soft-Device Example



A light tower is an annunciating device typically made up of multiple light bulbs and perhaps a buzzer. In a production environment a light tower allows operators and supervisors to check machine state from some distance away on the production floor. A flashing light can indicate that a machine needs attention.

The pre-programmed Light Tower Soft-Device provides user configurable support of:

- ◆ 5 outputs to drive lights on any common light tower
- ◆ digital output for a buzzer
- ◆ analog input for flash rate
- ◆ digital input for alarm acknowledgement
- ◆ up to 3 digital inputs to receive machine state (8 max.)
- ◆ host connection for complete light tower control
- ◆ light tower response to machine state, host commands, and operator acknowledgement—all completely configurable
- ◆ remote visualization anywhere on the network to “see” the light tower

Machine state can be input via the Soft-I/O TCP/IP network connection, or the Soft-Link peer-to-peer network. That same connection supports all module configuration (using only a web browser), as well as Light Tower status, fault monitoring, and diagnostics.

And a Soft-I/O module running the Light Tower Soft-Device can simultaneously support other machine I/O, and additional Soft-Devices on unused pins.



100 mm
(4 in)

80 mm
(3 in)

Soft-I/O technology

General Operation and Performance Specifications

I/O capabilities	
I/O Pins:	25
I/O Connector:	25-Pin D-Sub Female
Pin configuration	
<ul style="list-style-type: none">Any pin can be configured. All pins are equal. Any pin can be an input, output or power.Using Soft-I/O embedded web server configuration pages; accessed by PC with standard web browser.Pins individually configurable as Inputs or Outputs, and Analog or Digital, in any combination.Pins individually configurable to supply Power or Common, in any combination.	
Input range (each pin separately configurable)	
Digital logic:	5 VDC or 24 VDC (selectable: pull-up or pull-down, at 1 mA or 5 mA; or Hi Z)
Analog voltage:	(-20 mV to +20 mV), (0 to 40 mV), (-75 mV to +75 mV), (0 to 150 mV), (-5 V to +5 V), (0 to 10 V), (-10 V to +10 V), (0 to 24 V) DC
Analog current:	(0 to 20 mA), (4 mA to 20 mA), (-20 mA to +20 mA)
Thermocouple type:	J, K, T, E, R, S, B, N
RTD:	Pt 100 Ω , Alpha = 0.00385 or Alpha = 0.003916; Choice of 2-, 3-, or 4-wire RTD connections
Output range (each pin separately configurable)	
Digital logic:	5 VDC or 24 VDC
Analog voltage:	(-5 V to +5 V), (-10 V to +10 V), (-10 V to +24 V) DC
Analog current:	(0 to 100 μ A), (0 to 1.5 mA), (0 to 20 mA)
Device Power Sourcing (each pin separately configurable):	24 VDC at ~ 500 mA per pin, or 5 VDC at ~ 500 mA per pin (subject to module total input power limit of 4 A at 24 VDC)
Network communication	
Connector:	RJ-45 (Ethernet); auto-crossover
Ethernet protocol:	TCP/IP, HTTP, DHCP (client & server), NetBIOS, ICMP
Data rate:	Auto-sensed, 10 Mbps or 100 Mbps
Industrial protocol:	Modbus TCP/IP
Operation Modes	
Network-driven:	Mail protocol
Network Standard Protocol-driven:	e.g. Modbus TCP
Stand Alone:	Network optional for observation: all module operation stand alone
Other	
Dimensions:	108 mm (4.25 in) x 79 mm (3.10 in) x 23 mm (0.90 in) (LxWxH)
Mounting:	Direct; optional DIN Rail
Power requirement:	24 \pm 10% VDC @ 4 A maximum
Operating:	0 $^{\circ}$ C to 55 $^{\circ}$ C; 5% to 95%, non-condensing
Isolation:	Network to I/O and Power isolation in compliance with IEEE 802.3 specifications, including 1500 V rms for 60 seconds.
Numeric Precision:	IEEE 754 Double Precision Floating Point 16 decimal digit precision
Ingress protection:	P40, NEMA 1
Compliance:	UL 61010-01, CE, CSA, VCCI



Input/Output Reinvented

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