

# Tealware I/O

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## Overview

SoftPLC Corporation's Tealware™ is a high density, modular I/O system, suitable for applications requiring as few as 16 digital and/or 4 analog points up through thousands of I/O points. The same I/O modules, racks, adapters, and other equipment can be used regardless of application size or physical configuration.

With a [Smart SoftPLC](#), local I/O interfaces are available that support up to thousands of points. With any SoftPLC CPU or other vendor's system that can act as a ModbusTCP master, Tealware can be used as remote I/O on Ethernet for flexible, distributed I/O configurations.

I/O modules available in the Tealware system include digital, analog, and specialty modules, with a range of signal types. Many common features of all modules make the system robust, and simplify installation and maintenance:

- Detachable front-end terminal block for easy module replacement without re-wiring (*some modules utilize a wiring cable connection, which is also easily detachable*)
- Front Panel LED display for status monitoring/troubleshooting
- High noise immunity
- Automatic Configuration - Module addressing based on location (*not DIP switch*) for easy system configuration & maintenance (*manual configuration option also supported*)
- Most modules are hot swappable under power
- Low power consumption means all module configurations are possible - no power calculations required

# Specifications

Individual module specifications are available from the Tealware Modules section, or from the Tealware User Manual link in the Resources section.

All Tealware components conform to the general specifications below:

|                              |   |
|------------------------------|---|
| <b>Dimensions (HxWxD)</b>    | <b>I/O Modules:</b> 141 x 38 x 110mm (5.5 x 1.5 x 4.3in)<br><b>Power Supply Modules:</b> 141 x 55 x 110mm (5.5 x 2.2 x 4.3in)<br><b>Rack: IOBase06 (6 modules + P/S):</b> 141 x 345mm (5.5 x 13.6in)<br><b>Rack: IOBase08 (8 modules + P/S):</b> 141 x 421mm (5.5 x 16.6in) |
| <b>External Connections</b>  | 20-screw Terminal Block Connector, max wire size #14 AWG<br>or<br>D-sub connector to cable ( <i>HDIO-CBL</i> ) to DIN-rail mounted terminal block   |
| <b>Operating Temperature</b> | -20 to 70°C, -4 to 158°F  |
| <b>Storage Temperature</b>   | -40 to 85°C, -40 to 185°F   |
| <b>Airflow Clearance</b>     | 50.8mm (2 inches) above and below unit for recommended ambient airflow  |
| <b>Humidity</b>              | 5 to 95% non-condensing   |
| <b>Noise Immunity</b>        | 1,500 volts peak to peak, 1 µs noise width at 30 to 100Hz   |
| <b>Vibration Resistance</b>  | 10 to 55Hz, amplitude 0.075mm for 60 minutes  |
| <b>Shock Resistance</b>      | 10g 3 times 3d directions   |
| <b>Dielectric Withstand</b>  | 1500VAC for 1 minute across AC external terminals & ground  |
| <b>Impedance</b>             | 75 MOhms at 500VDC  |
| <b>Electrical Safety</b>     | Class 2 protection  |
| <b>Operating Atmosphere</b>  | Non-corrosive atmosphere, with minimum dust   |
| <b>Certifications</b>        | UL, CE  |

# System Configurations

## Local I/O Configurations

A **Smart SoftPLC** provides a high speed local interface to Tealware I/O. A Smart SoftPLC supports up to 12 I/O Bases (*96 I/O modules*) for a maximum of 3072 points. You can scan thousands of points in under 1 msec!

## Remote I/O Configurations

**Smart Adapters** provide a Tealware I/O Interface for remote I/O drops over Ethernet. Where more I/O is required than a local system supports, if the I/O needs to be distributed over a distance, or where the control system CPU is not a Smart SoftPLC (*eg: a SoftPLC Hardbook or non-SoftPLC controller*), then Tealware modules can be used with Smart Adapters on ModbusTCP Ethernet in a variety of configurations, with up to 127 remote I/O drops of up to 24 modules (*up to 768 I/O points*) per drop - tens of thousands of I/O in a single system.

## Module Mounting

Tealware I/O modules mount onto a backplane. There are 2 module mounting interface options available for a Smart SoftPLC / Smart Adapter:

### Backplane3 Interface



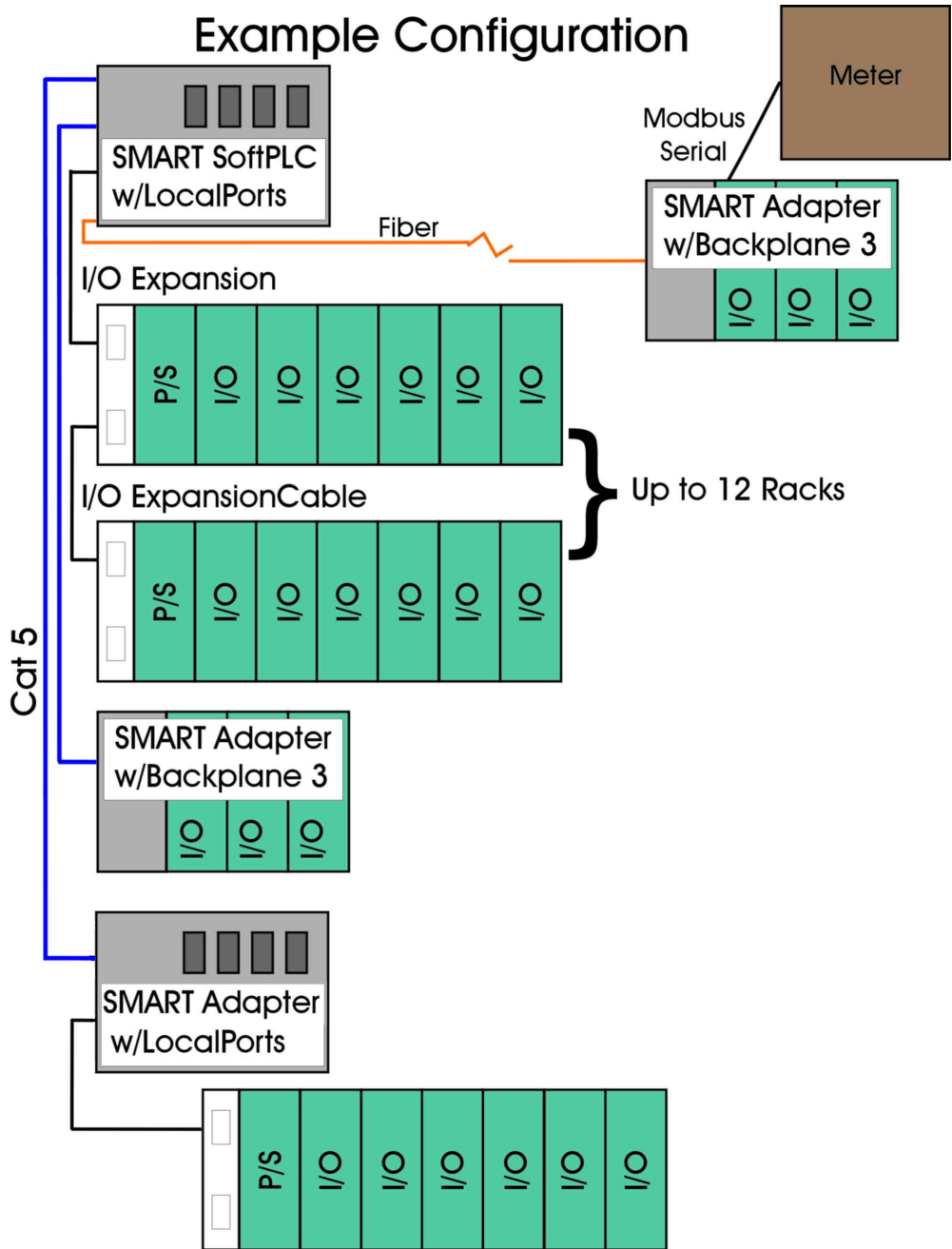
Any three (3) Tealware modules can mount directly onto a Smart SoftPLC or Smart Adapter equipped with a Backplane3 Interface.

### LocalPorts Interface



If more than (3) modules are needed at a location, a Smart SoftPLC or Smart Adapter equipped with a LocalPorts Interface is used to connect I/O Base(s). The LocalPorts Interface has 4 I/O Base ports. A Smart SoftPLC can utilize all 4 ports, a Smart Adapter can utilize just 1 of the ports. I/O Bases can hold (6) or (8) modules plus a Tealware Power Supply Module. Bases connect via an Expansion I/O Cable, available in 2' or 4' lengths, from the Smart's I/O Base Port to an Expansion I/O Base (*as well as from I/O Base to I/O Base*). Up to (3) I/O Bases can be connected to each I/O Base Port.

# Example Configuration



# Tealware Modules

A comprehensive range of Tealware I/O modules is available - digital, analog, and special purpose modules. Combined with other components (*eg: bases, adapters, power supplies*), Tealware offers an expandable I/O system for both local and distributed control systems, big and small.

Most modules include as standard the wiring terminal block. Some high density modules require a cable and terminal block to be ordered separately, as indicated in the tables below.



Detailed data sheets are linked at each module's catalog number.

## DIGITAL INPUT MODULES

| Type                   | Operating Voltage | # of Points | Rated Current/ Point      | Cat No                  |
|------------------------|-------------------|-------------|---------------------------|-------------------------|
| DC Input Sink/Source   | 9-28 VDC          | 16, 8/com   | 3 mA@12VDC<br>7 mA@24VDC  | <a href="#">SXDC10</a>  |
| DC Input Sink/Source ^ | 9-28 VDC          | 32, 32/com  | 3 mA@12 VDC<br>7 mA@24VDC | <a href="#">SXDC20</a>  |
| DC Input Sink/Source   | 5 VDC (TTL)       | 16, 8/com   | 3 mA@4 VDC<br>4 mA@6 VDC  | <a href="#">SXTTL10</a> |
| AC Input Photocoupler  | 85-132 VAC        | 16, 8/com   | 15 mA                     | <a href="#">SXAC10</a>  |
| AC Input Photocoupler  | 24 VAC            | 16, 8/com   | 15 mA                     | <a href="#">SXAC24</a>  |

^ Requires Terminal Block (*Cat No XDC20-TB*) and Cable (*Cat No HDIO-CBL*)

## DIGITAL OUTPUT MODULES

| Type   | Operating Voltage       | # of Points                    | Rated Current/<br>Point | Cat No                 |
|--|-------------------------|--------------------------------|-------------------------|------------------------|
| DC Output Sink/NPN   | 10-35 VDC               | 16, 8/com Fused,<br>(2) at 2A  | 0.1 A                   | <a href="#">SYDC10</a> |
| DC Output Source/PNP   | 10-35 VDC               | 16, 8/com Fused,<br>(2) at 2A  | 0.1 A                   | <a href="#">SYDC20</a> |
| DC Output Sink /NPN ^  | 10-35 VDC               | 32, 32/com Fused,<br>(4) at 2A | 0.1 A                   | <a href="#">SYDC30</a> |
| DC Output Source /PNP ^  | 10-35 VDC               | 32, 32/com Fused,<br>(4) at 2A | 0.1 A                   | <a href="#">SYDC40</a> |
| AC Output Triac SSR  | 85-264 VAC              | 16, 8/com Fused,<br>(2) at 5A  | 0.6 A                   | <a href="#">SYAC10</a> |
| Relay Output Dry*  | 5-125 VDC<br>12-250 VAC | 16, 8/com                      | 2 A                     | <a href="#">SYRY10</a> |
| Relay Output Dry*  | 5-125 VDC<br>12-250 VAC | 16, Isolated                   | 2 A                     | <a href="#">SYRY20</a> |
| Relay Output Dry*  | 5-125 VDC<br>12-250 VAC | 8, Isolated                    | 2 A                     | <a href="#">SYRY21</a> |
| * External 24VDC Power required<br>^ Requires Terminal Block ( <i>Cat No XDC20-TB</i> ) and Cable ( <i>Cat No HDIO-CBL</i> ) |                         |                                |                         |                        |

## ANALOG INPUT

| Type   | Operating Range                      | # of Channels | Resolution | Cat No                 |
|--|--------------------------------------|---------------|------------|------------------------|
| Analog Input   | 1-5, 0-10, ±10V<br>0-20, 4-20, ±20mA | 4             | 15 bits    | <a href="#">AD020</a>  |
| Analog Input   | 1-5, 0-10V                           | 8             | 12 bits    | <a href="#">AD030A</a> |
| Analog Input   | 0-20,4-20mA                          | 8             | 12 bits    | <a href="#">AD031A</a> |
| Analog Input^  | 0-10, 1-5, ±10V                      | 16 isolated   | 12 bits    | <a href="#">AD046</a>  |
| Analog Input^  | 0-20, 4-20, ±20mA                    | 16 isolated   | 12 bits    | <a href="#">AD047</a>  |
| RTD+   | PT-100/1000, Ni-120                  | 4 (4 DO)      | 15 bits    | <a href="#">RTD10</a>  |
| Thermocouple+  | B, E, J, K, R, S, T                  | 5 (5 DO)      | 15 bits    | <a href="#">THM10</a>  |
| + External 24VDC Power optional<br>^ Requires Terminal Block ( <i>Cat No AD04x-TB</i> ) and Cable ( <i>Cat No HDIO-CBL</i> ) |                                      |               |            |                        |

## ANALOG OUTPUT MODULES

| Type           | Operating Range                                | # of Channels | Resolution | Cat No                |
|----------------|--|---------------|------------|-----------------------|
| Analog Output* | 1-5, 0-10, $\pm 10V$<br>0-20, 4-20, $\pm 20mA$ | 4             | 14 bits    | <a href="#">DA020</a> |
| Analog Output* | 1-5, 0-10, $\pm 10V$                           | 8             | 14 bits    | <a href="#">DA030</a> |
| Analog Output* | 0-20, 10-20mA,<br>$\pm 20mA$                   | 8             | 14 bits    | <a href="#">DA031</a> |

\* External 24VDC Power required

## SPECIAL PURPOSE MODULES

| Type                              | Operating Voltage             | # of Channels | Resolution             | Cat No                |
|-----------------------------------|-------------------------------|---------------|------------------------|-----------------------|
| High Speed Counter/<br>Frequency+ | 5 or 24VDC, Phase<br>or Pulse | 3 (3 DO)      | 32 bits, 50 KHz<br>max | <a href="#">HSC11</a> |

+ External 24VDC Power optional

## ACCESSORIES

| Type   | Catalog Number |
|--|----------------|
| Dummy Module for blank I/O slots                     | DUM10          |
| High Density module cable to terminal block, 3 feet  | HDIO-CBL       |
| Terminal block for 32 pt digital modules             | XDC20-TB       |
| Terminal block for high density analog input modules | AD04x-TB       |

# I/O Bases, Adapters, Power Supplies

The tables below list the components which are used with Tealware I/O modules to create complete systems.



Where applicable, data sheets are linked at each item's catalog number.

## **BASES / CABLES**

| <b>Description</b>                                       | <b>Catalog Number</b>    |
|--|--------------------------|
| Local I/O Expansion Base for P/S and up to 6 I/O Modules | <a href="#">IOBASE06</a> |
| Local I/O Expansion Base for P/S and up to 8 I/O Modules | <a href="#">IOBASE08</a> |
| Local Expansion I/O cable, 2 ft                          | <a href="#">EXCBL02</a>  |
| Local Expansion I/O cable, 4 ft                          | <a href="#">EXCBL04</a>  |

## **POWER SUPPLIES**

| <b>Description</b>                          | <b>Catalog Number</b>  |
|---|------------------------|
| AC Power Supply, Input voltage 85 to 260VAC | <a href="#">PWS11</a>  |
| DC Power Supply, Input voltage 12 to 24VDC  | <a href="#">PWS20C</a> |

## **ETHERNET REMOTE I/O ADAPTERS (ModbusTCP)**

| <b>Description</b>                             | <b>Catalog Number</b>   |
|--|-------------------------|
| Smart Adapter w/ Tealware Backplane3 Interface | <a href="#">SMA4-B</a>  |
| Smart Adapter w/ Tealware LocalPorts Interface | <a href="#">SMA4-L</a>  |
| Panel Mount Bracket ( <i>optional</i> )        | <a href="#">SM-VBKT</a> |



# Resources

## Manual

### [Tealware I/O User's Guide](#)

Tealware I/O Hardware manual, includes installation, module specifications, and analog module programming.

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## Data Sheets

### [Tealware Datasheet](#)

Overview features/specifications of the Tealware I/O family of products.

### [Tealware Bases & Configurations](#)

Specifications and Dimensions for Tealware I/O System components.

### [Smart Adapter Datasheet](#)

Smart Tealware Adapter information, used for remote ModbusTCP Ethernet I/O drops.