



X18s
10 High-Current Relay Expansion Module

USERS MANUAL

Revision 1.0

For models: X-18s

High-Current, Line-Voltage-Rated Relays • 1/4" Tab Terminals



- ▶ **Lights**
- ▶ **Door Locks**
- ▶ **Remote Gate Control**
- ▶ **Motor Control**
- ▶ **Pumps**

CONTROL by **WEB**™
www.ControlByWeb.com

a division of Xytronix Research & Design, Inc.
located in Nibley, Utah, USA

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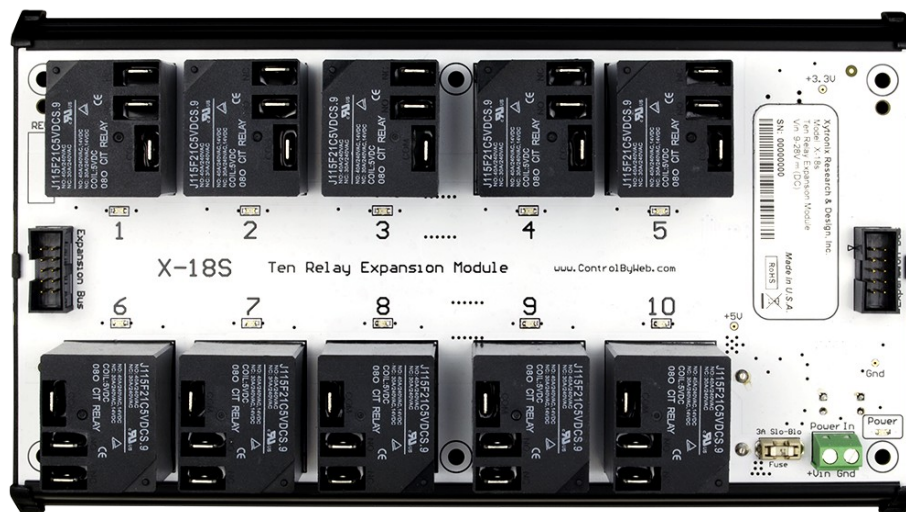
| X-18s User Manual Revisions | |
|------------------------------------|--------------------|
| Revision | Description |
| 1.0 | Initial release |

Section 1: Introduction

The X-18s™ expansion module is used with the X-600M controller. The X-18s has ten, high-current relays, each with Form-C contacts (SPDT). Wiring connections are made to the relays using 1/4" tab terminals located on top of the relays. One or more X-18s expansion modules can be connected to an X-600M controller with ribbon cables.

The X-600M is a multifunction web-enabled industrial I/O controller. It performs control, logic, and monitoring functions similar to that of a Programmable Logic Controller (PLC). However, unlike a PLC, the X-600M is designed for web-based applications from the ground up. No add-on software or hardware is required. The X-600M can be fully configured, programmed and tested using its built-in web server. The web setup pages are intuitive and easy to use and do not require special programming skills.

The X-600M together with expansion modules such as the X-18s provide an easy, flexible and reliable way to monitor and control systems and devices over a network. The X-18s is suitable for use with security systems and industrial controls. It can control relatively heavy loads such as motors, solenoid valves, and lights.



1.1 Features and Connectors

Relays (10)

The X-18s has ten high-current relays. 1/4" tab terminals are provided for the *Common*, *Normally Open* and *Normally Closed* contacts of each relay. The tab terminal connections on the relays have no internal fuse or other over current protection. The relays are isolated from all other circuits.

Expansion Bus

The expansion bus allows for a family of expansion modules to be connected directly to the X-600M without the need for an Ethernet switch. The communications cable can be a daisy chain with multiple connectors. The X-18s has two expansion bus connectors (one on each end) which allow the use of short ribbon cables to connect from one module to the next.

Power Supply

The X-18s has screw terminal connections for making direct connections to a 9 to 28VDC power supply. See *Section 2.3.2* for more details. The X-18s employs a modern switch-mode power supply. With this type of power supply the current draw decreases as the voltage increases.

Indicators

Each relay has a green LED indicator which is illuminated when the respective relay is active. The power LED indicator is illuminated whenever the module is powered. To identify the module during installation the X-600M can send a blink command from the X-600M which will cause the power LED to blink for three seconds.

1.2 Part Numbers and Accessories

| Device | Description | Part Number |
|--------------|---|-------------|
| X-18s | 10-Relay expansion module | X-18s |
| Jumper cable | 5-inch x 10 conductor ribbon cable (included) | EXPCBL-5in |

Section 2: Installation and Connections

Installation consists of mounting the X-18s and connecting it to an X-600M controller with a 10-conductor ribbon cable. Connect a 9-28VDC power source to the X-18s. Programming and testing is done by using a web browser to configure the web pages and outputs for your specific needs.

2.1 Installation Guidelines

- This unit must be installed by qualified personnel.
- This unit must not be installed in unprotected outdoor locations.
- This unit must not be used for medical, life saving purposes, or for any purpose where its failure could cause serious injury or the loss of life.
- This unit must not be used in any way where its function or failure could cause significant loss or property damage.

The X-18s is tested to safety requirements for equipment to be supplied from the building wiring (i.e. thru a circuit breaker). It is not rated for installation within or as part of the circuit breaker panel. When used to control AC line voltages the X-18s must be mounted and protected in a suitable electrical enclosure.

2.2 Mounting

Expansion modules are normally mounted to the left side of the X-600M controller (embossed logo side) so that the ribbon cable doesn't cover the power connector. The X-18s must be located in a clean, dry location where it is protected from the elements. See *Appendix E: Mechanical Dimensions* for additional mechanical details.

The X-18s can be mounted to a standard (35mm by 7.55mm) DIN-Rail. Attach the module to the DIN-Rail by placing the top hooks on the back of the PCB tray to the DIN-Rail and then snap the bottom hooks into place. To remove the module insert a flat-head screw driver into the notch in the release tab and pry against the bracket to release the bottom hook. Unhook both brackets.



2.3 Making Connections

CAUTION: Make sure the power is shut off before making connections

CAUTION: This unit should be installed by a qualified technician.

CAUTION: Miswiring or misconfiguration could cause permanent damage to the X-18s, the equipment to which it is connected, or both.

Screw terminal connectors are provided for making the DC power connections. Connections to the relays require 1/4" push on tab terminals. The Com, NC, and NO terminals are marked on the relay housing. Use wire rated for 75°C (min) for connections to the relays. Make certain the tab terminals are tightly crimped with a suitable wire terminal crimper.

It is recommended that any load (device to be controlled) not be connected to the expansion modules until after the X-600M has been configured and tested. By doing this, wiring and configuration mistakes will not cause the load device to turn on unexpectedly.

2.3.1 Expansion Bus

The expansion bus allows for a family of expansion modules to be connected directly to the X-600M without the need for an Ethernet switch. The expansion bus carries both communications and power and is connected in a 'daisy-chain' configuration.

Expansion modules come in two different enclosure configurations:

- Small modules, such as the X-11s, X-12s, etc., are 1.4" wide, fully enclosed, and have a single expansion bus connector. These modules are connected to each other with a single ribbon cable which has multiple connectors, one connector for each module. Power is supplied to these small modules from the X-600M through the expansion cable.
- Larger modules, such as the X-18s, are packaged using a DIN-rail circuit-board tray and have two expansion bus connectors, one on each end. These modules are connected to each other using a 5-inch "jumper" ribbon-cable connector which has one connector on each end. The larger modules require power to be supplied through a separate power connector.

The X-18s comes with a 5-inch jumper type ribbon cable for making connections to the X-600M. These jumper cables are also used to connect additional larger modules such as additional X-18s units. When making connections between the X-18s and the smaller expansion modules, a ribbon cable with multiple connectors can be used. These cables are available from ControlByWeb.com and can be purchased with the correct number of connectors to accommodate the number of expansion modules needed.

Due to the height difference between the larger modules, such as the X-18s, and the smaller modules, purchase a cable with one extra connector to allow the required spacing between the X-18s and the adjacent module. The photo in in section 2.2 (above) illustrates how to connect the X-18s. The photo shows an X-600M (on the right) connected to an X-18s module using the ribbon cable that came with the X-18s. To the left of the X-18s are two additional "small" expansion modules (X-12s and X15s). The X-18s is connected to these modules using a multi-connector ribbon cable with four connectors. Due to the height difference between the X-18s and the X-15s one connector is not used.

2.3.2 Power Supply

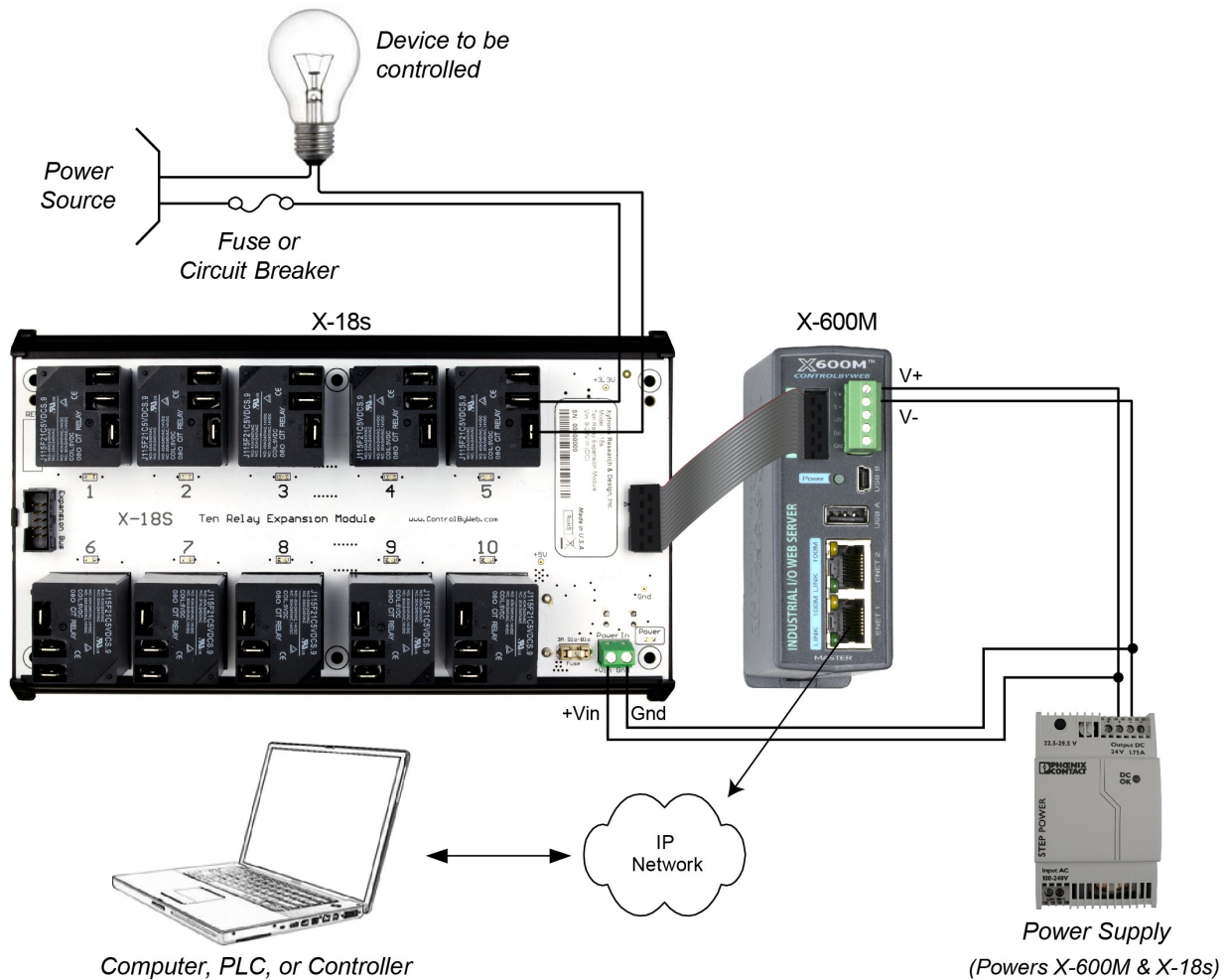
The X-600 expansion bus normally provides both power and communications to the expansion modules. This method however, is not workable with the X-18s because it has large relays and the ribbon cable cannot reliably provide sufficient DC power. Instead the X-18s has two dedicated screw terminal connections for making direct connections to a 9 to 28VDC power supply. It is recommended to connect these two terminals to the same power supply that powers the X-600M master. The 10-pin ribbon cable has connections which allow the X-600M to power X-11s, X-12s etc modules. These power connections flow thru the X-18s from one ribbon cable connector to the other, but are not connected to its internal power supply.

Section 3: Example Applications

3.1 Control a device over an IP network

The illustration below shows a simple example of using the X-18s to control a device over an IP network. The device to be controlled is wired in series with the relay contacts.

Note: Use a fuse or circuit breaker provide over current protection.



Section 4: Configuration and Setup

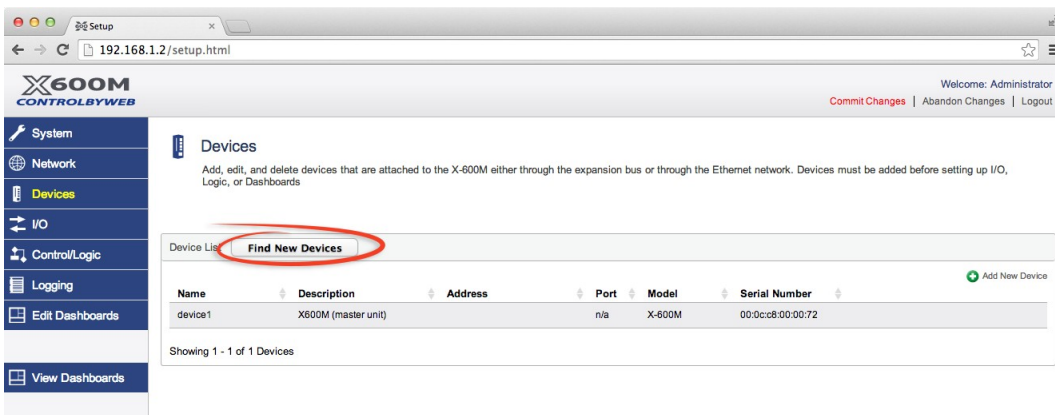
4.1 Setup Example

The Quick Start Demo

After making the power and Ethernet connections, the X-600M can automatically scan for the presence of any ControlByWeb™ Ethernet devices (on the same sub-net) and also for any expansion modules connected to the X-600M via the ribbon-cable connector. It can also automatically create a dashboard web page and populate it with all of the resources (components) supported by the Ethernet devices and expansion modules if specified while adding the device. This makes it easy to start experimenting with the web page's user interface and to try out the relays.

To quickly add a device do the following:

1. Click on the **Devices** menu tab to pull up the *Devices Overview* page. Then click on the **Find New Devices** button to scan the expansion bus and the local network for ControlByWeb devices and expansion modules.

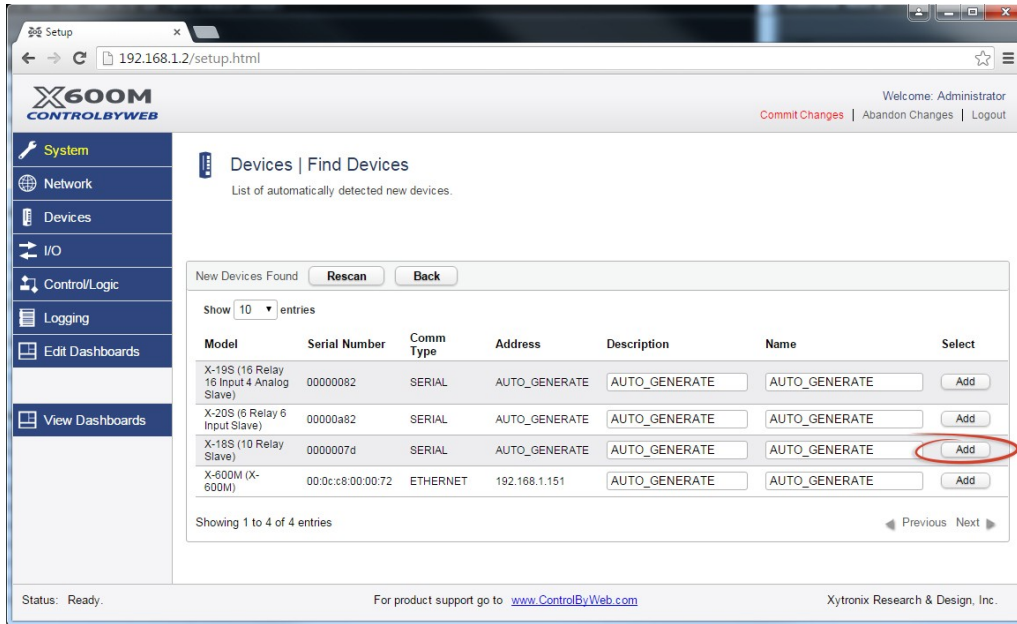


The screenshot shows a web browser window displaying the X-600M ControlByWeb interface. The browser address bar shows the URL `192.168.1.2/setup.html`. The page title is "X-600M CONTROLBYWEB". The user is logged in as "Administrator". The main navigation menu on the left includes System, Network, Devices, I/O, Control/Logic, Logging, Edit Dashboards, and View Dashboards. The "Devices" menu item is selected. The main content area is titled "Devices" and contains the instruction: "Add, edit, and delete devices that are attached to the X-600M either through the expansion bus or through the Ethernet network. Devices must be added before setting up I/O, Logic, or Dashboards". Below this instruction is a "Device List" section with a "Find New Devices" button circled in red. To the right of the button is an "Add New Device" link. Below the button is a table with the following data:

| Name | Description | Address | Port | Model | Serial Number |
|---------|---------------------|---------|------|--------|-------------------|
| device1 | X600M (master unit) | | n/a | X-600M | 00:0c:c8:00:00:72 |

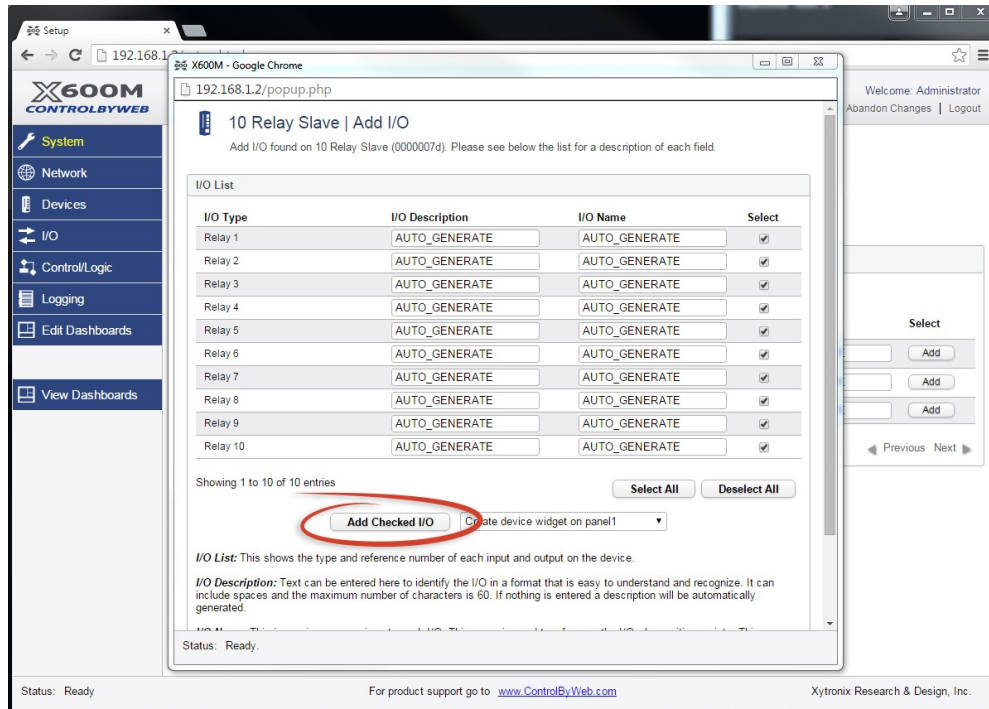
At the bottom of the table, it says "Showing 1 - 1 of 1 Devices".

2. In this example we are going to add an X-18s expansion module. Click the **Add** button for the X-18s.

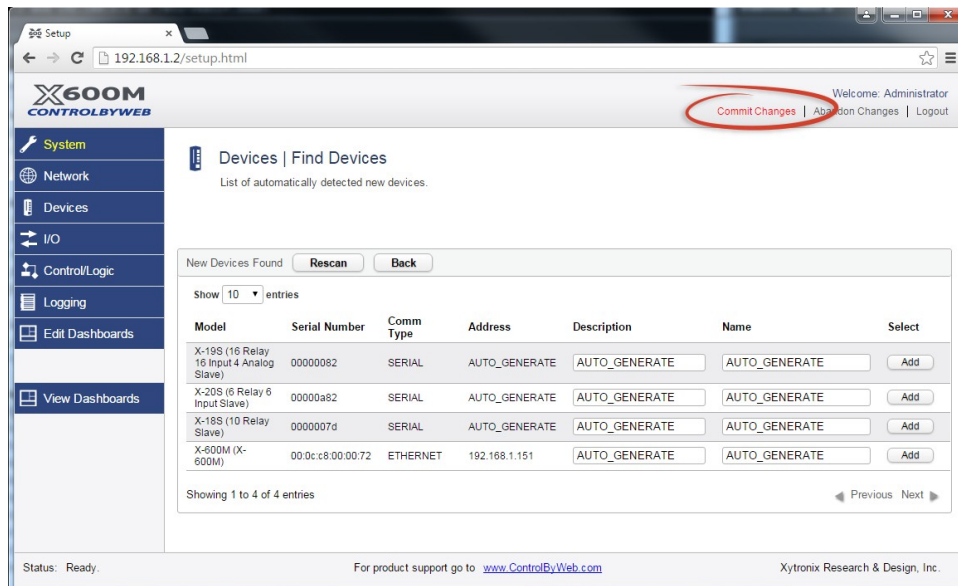


3. In the *Select* column, click the checkboxes of the I/O components you would like to configure and select the **Create Device Widget** option (This will display the status of the I/O on the Dashboard).

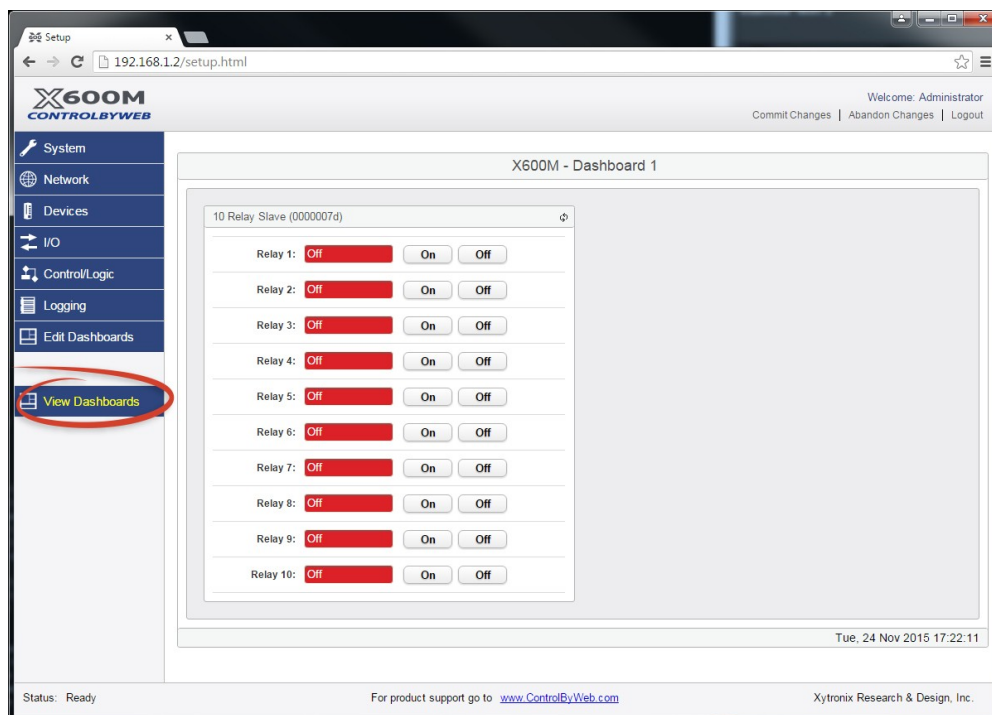
Click **Add Checked I/O** to submit these changes.



4. Click **Commit Changes** - Once clicked, the X-600M begins to monitor the newly added device.



5. On the main menu, click the **View Dashboards** menu tab. The **View Dashboards** page shows a display similar to what users will see when accessing the X-600M's control page. Use this page to test and debug the dashboards, panels, widgets and components in real time. A pull-down menu allows access to other dashboards. Within minutes you can experience the power and flexibility of the dashboard's user interface and experiment/test the buttons, sliders, and data entry boxes to meet your needs for your specific application.



Appendix A: Specifications

Power Requirements

Input Voltage: 9-28 VDC (24V recommended)
 Current: See table below for typical values at 25°C

| Power Supply | Relays OFF | Relays ON |
|--------------|------------|-----------|
| 9 VDC | 18 mA | 1200 mA |
| 12 VDC | 14 mA | 880 mA |
| 24 VDC | 11 mA | 450 mA |

Relays

Number of relays: 10

Relay Contacts

Load Type: General purpose
 Contact Form: SPDT (form C)
 Contact Rating:

| | |
|------|---|
| N.O. | 40A @ 240VAC resistive (40°C) 30A @ 277VAC General Purpose 2hp @ 250VAC (40°C) |
| N.C. | 30A @ 240VAC resistive (40°C) 20A @ 277VAC General Purpose 1½ hp @ 250VAC 30A @ 30VDC (40°C) |

Contact Resistance: <30 milliohms initial
 Contact Material: AgSnO₂
 Max Switching Voltage: 277VAC, 30VDC
 Max Switching Current: 30A
 Electrical Life @ Rated Load: 100K cycles, typical
 Mechanical Life: 10M cycles, typical

Environmental Rating: Over voltage Category II, Pollution Degree 2

Control Options: On/Off or Pulsed
 Pulse Timer Duration: 100ms to 86400 Seconds (1-day)

Relay Connections

Type: 1/4" Tab Connectors
 Wire: Use wire rated for 75°C (min) for connections to the relays

Expansion Connector:

Connector: Ribbon cable, 2x5-position, polarized 0.100" pitch
 Communications: RS-485

LED Indicators

Green: Power On, Relay 1-10

Environmental

| | |
|------------------------|---|
| Rating: | Indoor use or NEMA-4 protected location |
| Altitude: | up to 2000m |
| Operating Temperature: | -40°C to 65°C (-40°F to 150°F) |
| Storage Temperature: | -40°C to 85°C (-40°F to 185°F) |
| Humidity: | 5-95%, non-condensing |

Mechanical

| | |
|-------------------------|---|
| Mount: | Snaps onto a 35mm by 7.55mm DIN rail |
| Size: | 8.6" x 4.95" x 2.46" (218.44 x 125.73 x 62.48 mm) |
| Weight: | 20 oz (566 g) |
| Enclosure Material: | PVC |
| Enclosure Flame Rating: | UL94 V1 |

Electromagnetic Compliance

IEC CISPR 22, CISPR 24
FCC 47CFR15 (Class B)
EN55024 ITE Immunity (2010)
EN55022 Emissions (2010)

Product Safety Compliance

Appendix B: Trademark and Copyright Information

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Appendix C: Warranty

This Xytronix Research & Design, Inc. product is warrantied against defects in material and workmanship for a period of five years from the date of shipment for products purchased on or after May 1, 2016 (one year for products purchased before May 1, 2016). During the warranty period, Xytronix Research & Design, Inc. will, at its option, either repair or replace products that prove to be defective. This warranty is extended to the original purchaser of the equipment only.

For warranty service or repair, customer must contact Xytronix Research & Design, Inc. technical support (support@ControlByWeb.com) and obtain a Return Authorization number (RA#). Before issuing an RA#, a support technician will work with customer to try to resolve the issue without returning the product. If technician determines that product must be returned for service an RA# will be issued. Next, the product must be properly packaged and returned to Xytronix Research & Design, Inc. with the RA# clearly marked on the package. The purchaser shall prepay all charges for shipping to Xytronix Research & Design, Inc. For warranty repairs of products less than one year old, Xytronix Research & Design, Inc. will pay the shipping charges to return the product to the purchaser as long as the product is shipped within the continental United States. If the product is shipped outside of the continental United States or the product was shipped more than one year earlier, the purchaser shall pay all shipping charges, duties, and taxes.

Limitation

The foregoing warranty shall not apply to defects or damage resulting from improper use or misuse, unauthorized repair, tampering, modification, improper connection, or operation outside the electrical/environmental specifications for the product. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes, and tornadoes. This warranty does not cover damage to property, equipment, direct, indirect, consequential, or incidental damage (including damage for loss of business profit, business interruption, loss of data, and the like) arising out of the use or misuse of this product.

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Appendix D: FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause interference to radio communications. There is no guarantee, however, that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to a circuit different from where the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Appendix E: Mechanical Dimensions

