



## *Installation and Operation Manual*



### **Relay Sentinel® 16**

***Web enabled sixteen open collector-solid state relay module.***

Manual update: 11/05/2013

If you need a firmware upgrade, contact Broadcast Tools®

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ALL SPECIFICATIONS AND FEATURES FOR THIS PRODUCT ARE SUBJECT TO  
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**NOTE: We recommend the use of Chrome, Firefox or Safari as your browser.**

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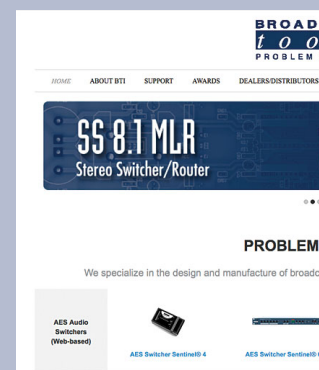
Visit [www.broadcasttools.com](http://www.broadcasttools.com) for important product update information.

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## INTRODUCTION

Thank you for your purchase of a Broadcast Tools® Relay Sentinel® 16 Web enabled sixteen high-voltage, high-current Darlington transistor arrays (referred to as solid state relays through-out this manual) module. We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the Broadcast Tools® Relay Sentinel® 16.

## SAFETY INFORMATION

Only qualified technical personnel should install the Relay Sentinel® 16. Any attempt to install this device by a person who is not technically qualified could result in a hazardous condition to the installer or other personnel or damage to the Relay Sentinel® 16 or other equipment. Please ensure that proper safety precautions have been taken before installing this device. If you are unfamiliar with this type of equipment, please contact a properly qualified engineer to handle the installation and setup of the Relay Sentinel® 16.

Broadcast Tools, Inc., is unable to support NON-Broadcast Tools software, hardware or NON-Broadcast Tools computer/hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturers technical support department.

## WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

### Broadcast Tools, Inc.

131 State Street

Sedro-Woolley, WA 98284-1540 USA

Voice: 360.854.9559

Fax: 866.783.1742

Internet Home Page: [www.broadcasttools.com](http://www.broadcasttools.com)

E-mail: [support@broadcasttools.com](mailto:support@broadcasttools.com)

## THANK YOU FOR CHOOSING BROADCAST TOOLS® BRAND PRODUCTS!

Broadcast Tools is a Veteran Owned Business



Designed, Assembled and Supported in WA State, USA



## CAUTION!

**Broadcast Tools®** Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

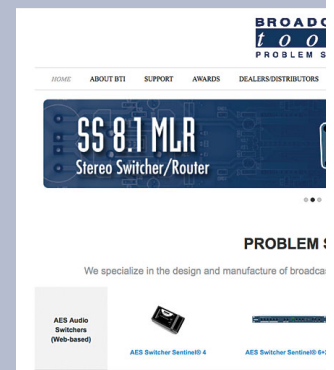


## NOTE:

This manual should be read thoroughly before installation and operation.

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## INTRODUCTION

### **Product Overview**

The Relay Sentinel® 16 is the fastest, easiest, least expensive, and most reliable way to remotely control and/or monitor equipment over any IP network including private networks, IP-based industrial control networks, and the Internet. The Relay Sentinel® 16 is equipped with sixteen high-voltage, high-current Darlington transistor arrays (solid state relays) that can individually switch up to 500ma at 50 volts DC. Each solid state relay can be turned on, off, pulsed or timed latched using the built in web pages. Users can operate the product using a web browser or web-enabled mobile device, while email notification may be configured to alert up to eight recipients when alarms are detected. The user may also enable a sound effect to play when an alarm is generated. Logging of system status, along with the site ID may be emailed in time spans from once an hour to once a day. We have also provided SNMP capabilities to allow multiple units to be monitored with any SNMP manager software package. SMTP username and passwords are also supported. The Relay Sentinel® 16 may be paired with the Status Sentinel® 16 to form a “16 channel Relay Extension Cord”.

### **Features & Benefits**

- Front panel led indicators are provided to monitor each output.
- Logging of all relay status, along with the site ID may be emailed in time spans from once an hour to once a day.
- Each relay may be configured to operate (sync) at any minute and second throughout the hour.
- 16 channel high-voltage, high-current Darlington transistor array. The output devices consist of 16 npn Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads (may be disabled). The collector-current rating of each Darlington pair is 500mA at 50 volts DC.
- Plug-in euro-block screw terminals for all SS relay outputs.
- Rear panel RJ-45, 10/100base-T LAN/Ethernet interface.
- Fully RFI proofed.
- Surge protected power supply. Domestic supply provided.
- Four units may be mounted on one RA-1 1-RU shelf.

### **Applications**

- Web-enabled back-up transmitter ON/OFF control system.
- Solid state relay end of a 16 channel web-enabled relay extension cord.
- Relay control and status monitoring via a web browser and/or user defined PC application.

### **Inspection**

Please examine your Relay Sentinel® 16 carefully for any damage that may have been sustained during shipping. If any damage is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the Relay Sentinel® 16, this manual and/or CD, 7 foot BLUE straight-through CAT 5 cable, 7 foot GRAY crossover CAT 5 cable, and the 7.5 VDC @ 1 amp wall transformer.

## Installation

### Surge Protection

The Relay Sentinel® 16 has built-in resistance to voltage changes; we recommend that you use a power surge protector or line conditioner on the incoming AC line. Lightning strikes and/or other high voltage surges may damage your Relay Sentinel® 16 and connected equipment if it is not properly protected. For lightning protection devices, check out [www.polyphaser.com](http://www.polyphaser.com) and [www.itwlinx.com](http://www.itwlinx.com).

### UPS Standby Power System

We recommend that you connect your Relay Sentinel® 16 to a UPS system. A UPS helps minimize the risk to the Relay Sentinel® 16 and provides power during a power outage.

### “NET” network RJ45 connector

Connect one end of the supplied CAT5 (straight or crossover) cable to the desired ETHERNET (WAN/LAN) or PC port.

### POWER 7.5 VDC connector

This is the connector used to power the unit. Never use any type of power supply other than the specified power supply.

### OC/Solid state relay connections

All Relay Sentinel® 16's, solid state relay outputs are connected through removable euro-block screw terminals. Refer to the label attached to the top of the unit for the correct OC/SS relay output and ground connections. The fractional schematic in the appendix shows the internal configuration of the outputs, along with the jumper “JPR1” used to disable the common-cathode clamp diodes associated with all sixteen NPN Darlington pairs. With the jumper installed, up to 6 volts DC may be used. With the jumper removed, the maximum of 50 volts DC may be used. Verify that the ground potential of the Relay Sentinel® 16 is at the same potential as the external equipment's ground.

**NOTE:** The collector-current rating of each Darlington pair is 500mA at 50 volts DC.

### OC/SS Relay LED's

Illuminates when the appropriate solid state relay is activated.

### Power/HB LED

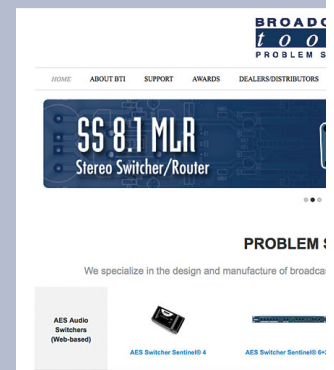
The flashing LED Indicates valid power and that the control processor is operating.



*Installation of the Relay Sentinel™ in high RF environments should be performed with care. The station ground should be connected to the designated chassis ground terminal or chassis ground screw using a 20 to 24-gauge wire.*

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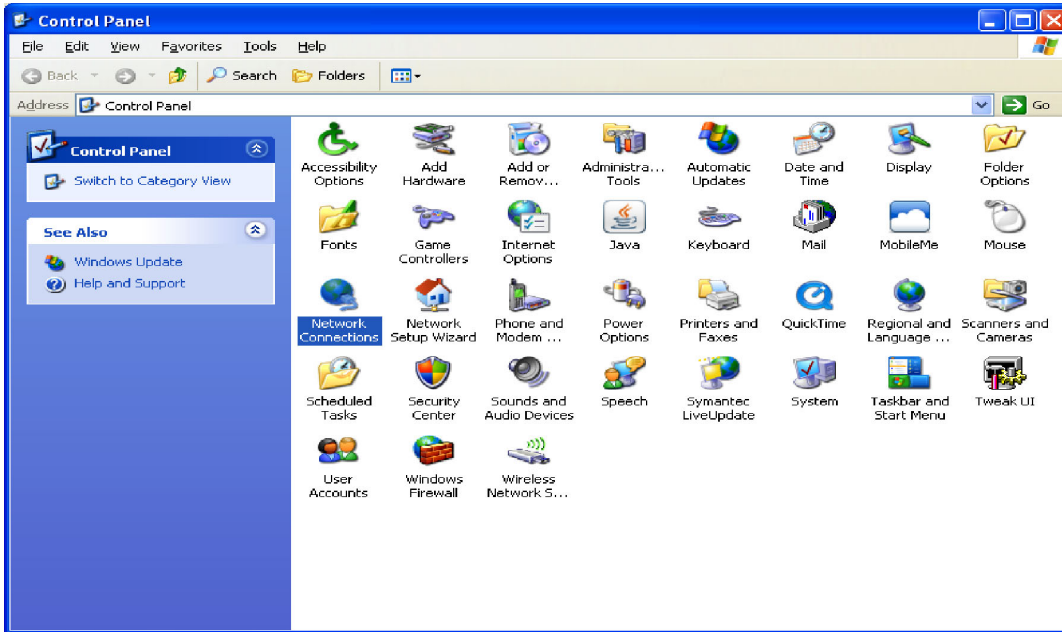


## INSTALLATION

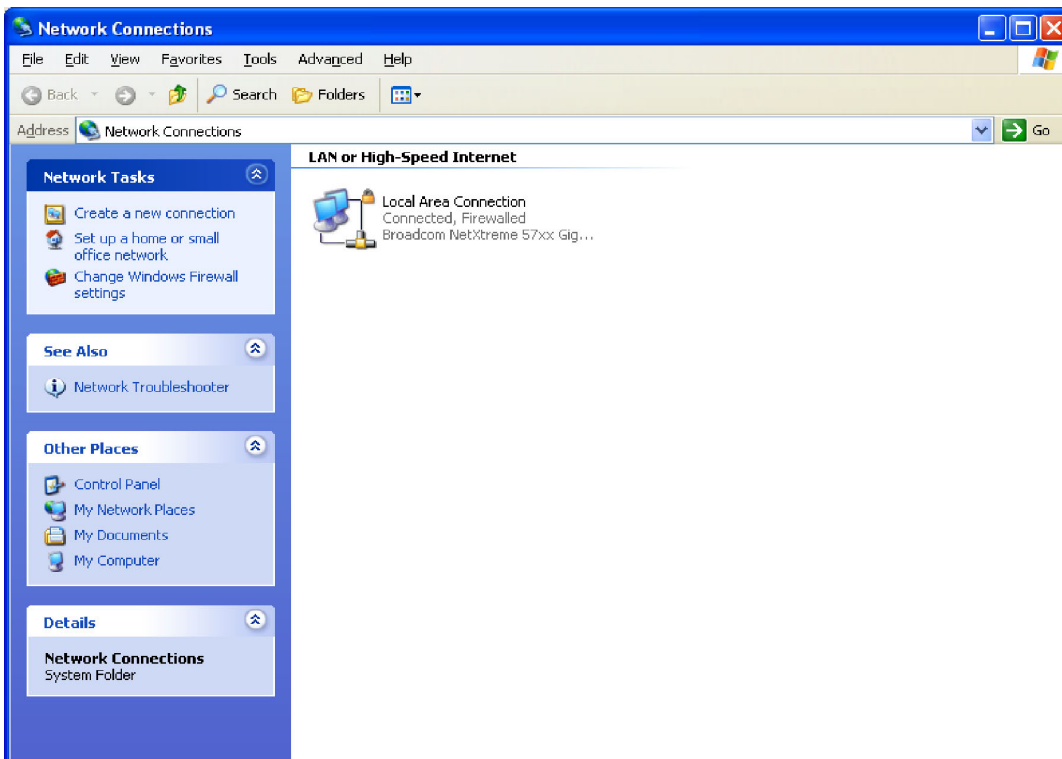


## Web Setup/Operation

**Step 1:** Open the control panel by clicking on the start menu, click on settings, then click on Control Panel. (Note that the control panel shown is in “Classic View”. If control panel is in “Category View” select the “Classic View” option before proceeding.)



**Step 2:** Double click on the icon labeled Network Connections. The following menu will pop up.

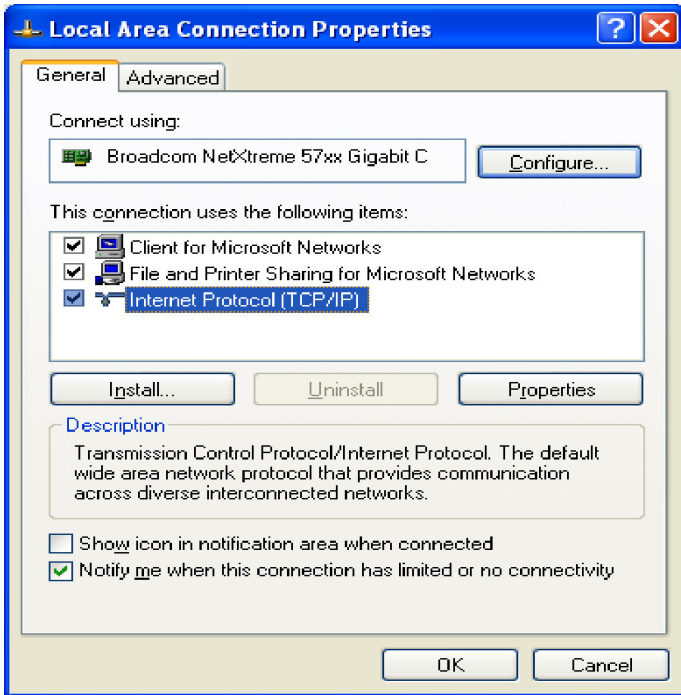


## CAUTION!

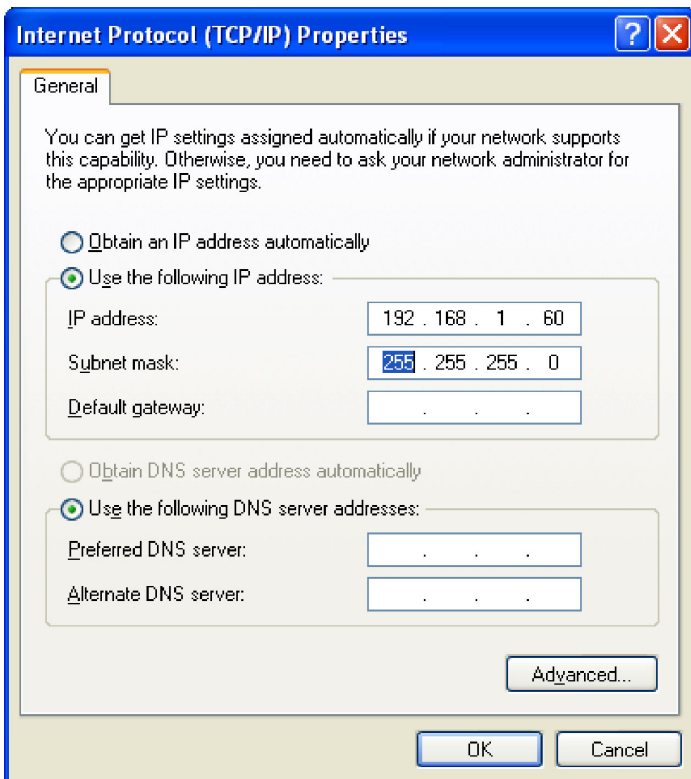
*NEVER DOWNLOAD FIRMWARE UPDATES OR CHANGES TO THE XPORT WEB-SERVER UNLESS INSTRUCTED TO DO SO BY BROADCAST TOOLS®. DOING SO DELETES ALL SOFTWARE AND VOIDS ALL WARRANTIES FROM BROADCAST TOOLS, INC.*

*If you are not familiar with Ethernet enabled equipment, it may be useful to contact your IT department, network administrator or network consultant for help. Assigning an IP address already in use by another device may cause problems with your network! Instructions for changing the IP address of the computer that will be used for the configuration of this product are given here. Note that these instructions are specifically for computers with the Windows XP operating system. For setup using other operating systems, refer to the appropriate OS user's manual.*

**Step 3:** Right click on the icon labeled Local Area Connection. Another menu will appear. Select the option at the bottom of the menu labeled Properties. The Local Area Connection Properties window will appear.

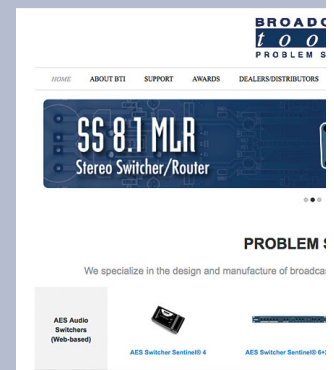


**Step 4:** On the Local Area Connection Properties page, double click on Internet Protocol (TCP/IP) to display properties.



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**Step 5:** Before making any changes to the network settings, write down the current settings (or screen capture the page and print) so that they can be restored once the unit is configured. Next, select the radio button labeled “Use the following IP address” and type in the IP address 192.168.1.60. Type in the subnet mask of 255.255.255.0. Leave the default gateway field blank. Click OK to apply the new settings.

### Opening the LOGIN Web Page

1. Connect the supplied GRAY colored XOVER cable between the PC’s Ethernet port and the products NETWORK RJ45’s jack.
2. Connect the supplied 7.5 VDC power supply to the product’s power jack labeled Power 7.5 VDC. Verify that the green POWER LED and left “LINK” LED above the “NET” Network RJ-45 are illuminated

#### Ethernet (NETWORK) port LED indicator functions

Link LED Left Side	
Color	Meaning
Off	No Link
Amber	10 Mbps
Green	100 Mbps

Activity LED Right Side	
Color	Meaning
Off	No Activity
Amber	Half Duplex
Green	Full Duplex

3. Open the product’s login page by typing the following URL into the browser:  
<http://192.168.1.55> A username and password is required to change any parameter and are case sensitive.

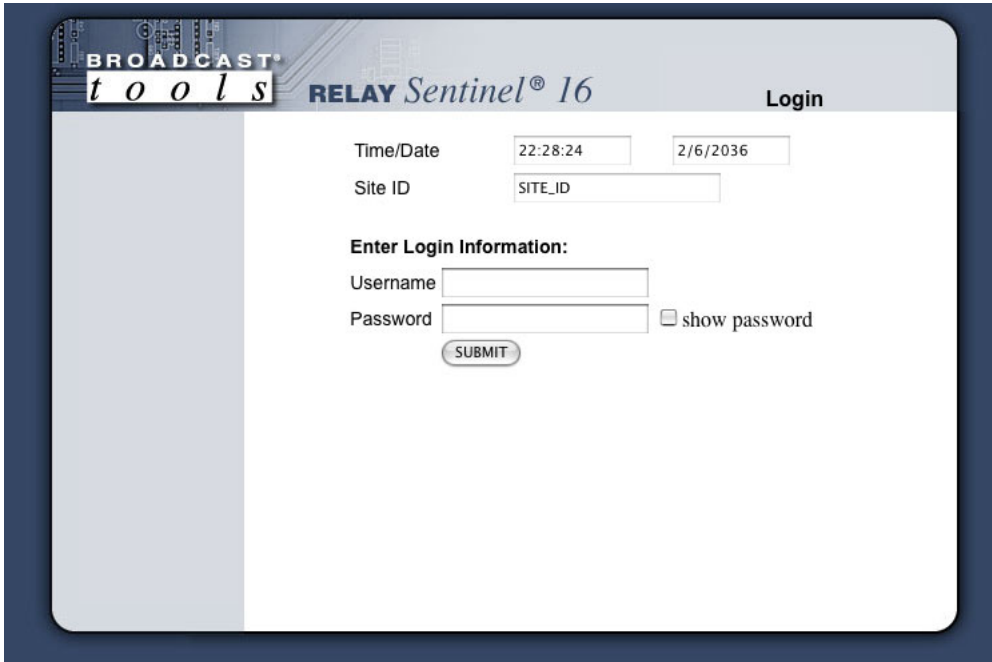
Factory “Login” defaults:                      username:      admin (lower case)  
   password:      1234

4. Once you are logged in, follow this manual for setup and/or operational information.



## “Login” Web Page

The Login screen displays the username and password entry points.



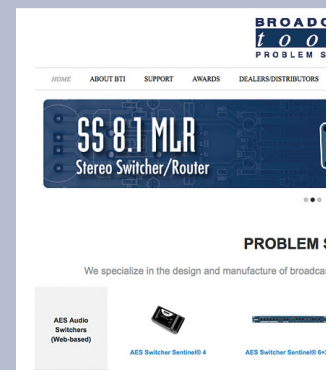
The screenshot shows the login interface for the Relay Sentinel 16. At the top left is the 'BROADCAST tools' logo, followed by 'RELAY Sentinel® 16' and a 'Login' button. The form includes fields for 'Time/Date' (displaying 22:28:24 and 2/6/2036) and 'Site ID' (displaying SITE\_ID). Below these is the 'Enter Login Information:' section with 'Username' and 'Password' input fields. A 'show password' checkbox is next to the password field. A 'SUBMIT' button is at the bottom of the form.

You may view the password by checking the “Show Password” box.

After you have successfully logged in, the Monitor/Control page will be displayed. Depending on your access level, you may or may not be able to control or modify the product’s configuration.

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## “Monitor/Control” Web Page

**BROADCAST tools** **RELAY Sentinel<sup>®</sup> 16** **Monitor/Control**

**NAVIGATION**  
About  
Monitor/Control  
User Setup  
Relay Setup  
Email/Network Setup  
Show Alarms  
Help  
Logout

**Date:** 2/6/2036 **Site ID:** SITE\_ID  
**Time:** 21:32:07 **Queued Logs:** Disabled

Output Relay	Status	State	Duration	
Relay 1	<input type="radio"/>	Off	100	Submit
Relay 2	<input type="radio"/>	Off	100	Submit
Relay 3	<input type="radio"/>	Off	100	Submit
Relay 4	<input type="radio"/>	Off	100	Submit
Relay 5	<input type="radio"/>	Off	100	Submit
Relay 6	<input type="radio"/>	Off	100	Submit
Relay 7	<input type="radio"/>	Off	100	Submit
Relay 8	<input type="radio"/>	Off	100	Submit
Relay 9	<input type="radio"/>	Off	100	Submit
Relay 10	<input type="radio"/>	Off	100	Submit
Relay 11	<input type="radio"/>	Off	100	Submit
Relay 12	<input type="radio"/>	Off	100	Submit
Relay 13	<input type="radio"/>	Off	100	Submit
Relay 14	<input type="radio"/>	Off	100	Submit
Relay 15	<input type="radio"/>	Off	100	Submit
Relay 16	<input type="radio"/>	Off	100	Submit

Off  
On  
Pulse (ms)  
Reboot (min)

The Monitor/Control page allows the monitoring of each SS relay via each status LED. The SS relays may be configured for one of four states. ON, OFF, Pulse with selectable length of 100 to 2000 milliseconds and reboot with selectable duration of 1 to 30 minutes.

When the desired state and duration is completed, the “SUBMIT” button MUST be pressed to activate the function.

The user defined Site ID, Time, Date and queued logs are also displayed.

To select other pages (if authorized), make your selection under the left hand Navigation column.

Output Relay Label: Used to identify the relay.  
Status: Illuminates when each relay is activated.  
State: Determines the state a relay will function  
Duration: Allows the user to select the timing for pulse or reboot operation.

## “User Setup” Web Page

Username	Password	Show Password	--- Access Level ---		
			Admin	Monitor Control	Monitor Only
admin	****	<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<input type="checkbox"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Save Settings

### NOTE:

*After any item has been changed, you **MUST** press the “Save Settings” button for your changes to be saved.*

This page can only be configured with (factory default) the “admin” access level.

The site ID may be used to display up to 29 numbers and/or characters labels.

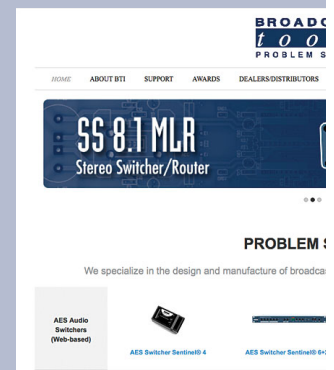
You may view the password by checking the “Show Password” box.

Eight Usernames and Passwords may be configured for up to three access levels.

1. “admin” allows complete product configuration access.
2. “Monitor/Control” allows the following access:  
About, Monitor/Control, Show log, Help, and Logout.
3. “Monitor Only” allows the following access:  
About, Monitor only, Help, and Logout.

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## “Relay Setup” Web Page

**BROADCAST tools** **RELAY Sentinel® 16** **Relay Setup**

**NAVIGATION**  
About  
Monitor/Control  
User Setup  
Relay Setup  
Email/Network Setup  
Show Alarms  
Help  
Logout

Relay 1 ▾

**Relay Label**  
Relay 1

**Alarms**  
On ☐  
Off ☐  
Log Device ☐

**Email Addresses**  
1 2 3 4 5 6 7 8  
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Sync Pulse ☐

Default State: Pulse (ms) ▾ 300 ▾

Sync Time: 0 (Minute) 0 (Second)  
Sync Length: 0 (Second)

Save Settings



### NOTE:

*After any item has been changed, you **MUST** press the “Save Settings” button for your changes to be saved.*

- Relay selection drop-down: Allows for the selection of each relay.
- Relay Label: Used to identify each relay.
- Alarms ON: This box is checked to enable alarms when the relay is ON.
- Alarms OFF: This box is checked to enable alarms when the relay is OFF.
- Email Addresses: The boxes labeled 1 thru 8 allows the user to select up to eight different alarm email addresses when enabled.
- Log Device: This box is checked to enable the logging of each relay.
- Default State: This setting allows you to set the default state of each relay control. The factory default setting is OFF for all relays.
- Sync Pulse: When checked, the relay will close at the minute and second programmed each hour.

## “Email/Network Setup” Web Page – Device Network Settings

**BROADCAST**  
**tools**

RELAY Sentinel® 16

Email / Network Setup

**NAVIGATION**  
About  
Monitor/Control  
User Setup  
Relay Setup  
Email/Network Setup  
Show Alarms  
Help  
Logout

Device Address192168155

Device Netmask2552552550

Gateway Address19216811

DNS Server Address19216811

HTTP Port80

SMTP Server Address

SMTP Port25

SMTP Return Address

SMTP Host ID

SMTP Authentication☐

SMTP Username

SMTP Password  
☐ show password

Logging Email Address

Logging Email Snapshot Interval (Hours)0

Logging Email Update Interval (Hours)0

Email Alarms☒ Immediately  
☐ Daily

Daily Alarm Email Time (Hour)0

Recipient Addresses1  
2  
3  
4  
5  
6  
7  
8

SNMP Manager IP Address1921681170

SNMP Manager Trap Port162

SNMP Read Communitypublic

SNMP Write Communityprivate

SNMP Enable Traps☐

Listening Port0

Listening Enabled☐

NTP Server Addresspool.ntp.org

NTP Port123

NTP Update Interval (Minutes)30

NTP Enabled☒

Site IDSITE\_ID

Monitor Refresh Time1Seconds

Time Zone Offset from UTC-8.0 hours

Enable Event Logging☐ Login  
☐ Email  
☐ Reboot  
☐ Alarms Cleared

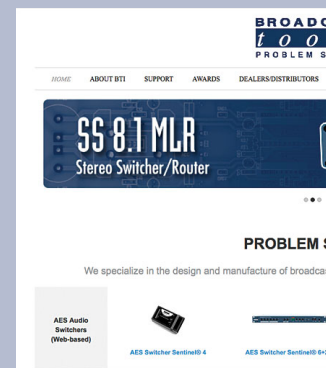
Save SettingsReboot Device

Send Test E-mailReload Defaults

Clear Daily LogsSend Daily Logs

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### SETUP



### Restoring Network Factory Defaults

The Relay Sentinel® 16 factory defaults may be restored by depressing the recessed front panel “default” push button for five seconds while powering up the unit.

Device Address:	Enter a static IP address here.	Default: 192.168.1.55
Device Netmask:	Enter the Netmask here:	Default: 255.255.255.0
Gateway Address:	Enter the Gateway IP here:	Default: 192.168.1.1
DNS Server IP Address:	Enter your DNS address here.	Default: 192.168.1.1
HTTP Port:	Normally Port 80	Default: 80

### “Email/Network Setup” Web Page – SMTP Settings

SMTP Server Address: The user can enter either an IP address in the xxx.xxx.xxx.xxx format or a URI in the form: smtp.com-cast.net. In order to resolve the URI, a working DNS server must be present or its IP address entered into the system.

SMTP Port: Normally Port 25 Default: 25

SMTP Return Address: Enter your return email here. If an email cannot be delivered, a message stating why will be sent to this address.

**NOTE:** The user must enter the following items before an email can be successfully sent: SMTP Server Address, SMTP Port, SMTP Return Address, SMTP Host ID, SMTP username and SMTP password must be supplied if authentication is turned on and the Recipient Address 1. The test email is sent to email recipient address 1.

The user should press the “Save Settings” button after entering the SMTP information before attempting an email test. If authentication fails, the email is not sent, please ensure that the username and password is correct.

SMTP Host ID: Enter something here to identify the device.

SMTP Authentication: When checked, Base64 SMTP authentication is supported by clicking on the checkbox.

SMTP Username: Enter user name here.

SMTP Password: Enter password here.

### “Email/Network Setup” Web Page – Email Logging Settings

Logging Email Address: IP address for the “Logging” email recipient (may be different from the 8 “Alarm” Recipient Addresses. Logging emails and Daily emails are sent to this address.

Logging Email Snapshot Interval: The period in hours that a snapshot is taken of the system. An email is not sent on this interval.

Logging Email Update Interval: The period in hours that the snapshots are emailed. This email may contain multiple snapshots if the Snapshot Interval is less than the Update Interval. Each snapshot will be identified by the date and time.

### “Email/Network Setup” Web Page – Email Alarm Settings

Email Alarms: Choose Immediate and/or Daily. If Immediate is selected, then an email will be sent out as soon as an alarm is generated. If Daily is selected, then each alarm is queued and the number of queued alarms is displayed on the Monitor/Control page.

Daily Alarm Email Time: The time that queued alarms are sent. Queued alarms are sent to the Logging Email Address only.

“Alarm” Recipient Address: Email addresses for up to 8 addresses. These address correlate to the 8 email addresses selectable on each I/O Device.

### “Email/Network Setup” Web Page – SNMP Manager Settings

SNMP Manager IP Address: This is the IP address of the SNMP manager. The system only accepts SNMP requests from this IP address, and will send traps to this IP address only.

SNMP Manager Trap Port: This is the port number that SNMP trap messages will be sent.

SNMP Read Community: This is the community name for Read-Only access.

SNMP Write Community: This is the community name for Read-Write access.

SNMP Enable Traps: When checked, trap messages will be sent. When Unchecked, no trap messages will be sent.

**NOTE:** A cold-start trap will be sent when the unit boots up if the SNMP Enable Traps is checked, otherwise trap messages are sent when a device enters or exits an alarm condition, depending on whether or not alarms are enabled.

### “Email/Network Setup” Web Page – “Optional” Status Sentinel 16 Settings

Listening Port IP Address: Enter the IP address of the Status Sentinel® 16 being used.

Listening Enabled: Check this box to enable the pairing with the Status Sentinel® 16.

### “Email/Network Setup” Web Page – NTP Settings

NTP (Time) Server Address: Enter the NTP address here. Default: pool.ntp.org

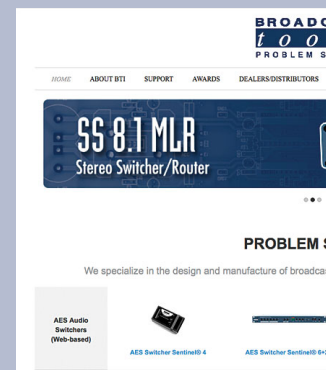
NTP Port: Normally 123. Default: 123

NTP Update Interval (Min): Time between timing updates. Default: 30

NTP Enabled: Must be enabled for correct timing.  
Default: Enabled

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### “Email/Network Setup” Web Page – Other Settings

- Site ID: This is the Site Identifier that will be sent in each email.
- Monitor Refresh Time (Sec): How many seconds the Monitor page refreshes. Shorter times may increase network traffic.
- Time Zone Offset from UTC: Must be set for correct timing. Default: -8
- Enable Event Logging: Enabling these checkboxes will generate an alarm, but will not send an email. If the system is configured for Daily Alarm emails, then that Daily Alarm email will contain the Event Logging items as well.

### “Email/Network Setup” Web Page – Other Settings

- Login: Whenever someone logs into the system, the username and date/time will be logged.
- Email: Whenever an email is sent, the type of email and date/time will be logged.
- Reboot: Whenever the device boots, the date/time will be logged.
- Alarms Cleared: Whenever the Daily Logs or Normal Alarms are cleared, the type of log cleared and date/time will be stored. When Daily Logs are sent, the Daily Logs are also cleared; this will cause an event log as well.



#### NOTE:

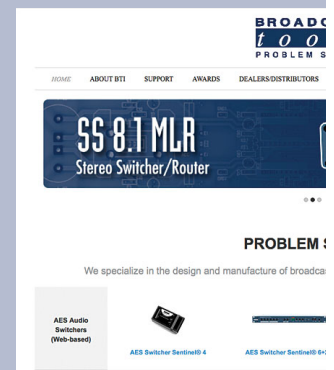
*After any item has been changed, you **MUST** press the “Save Settings” button for your changes to be saved.*

### “Email/Network Setup” Web Page – Controls

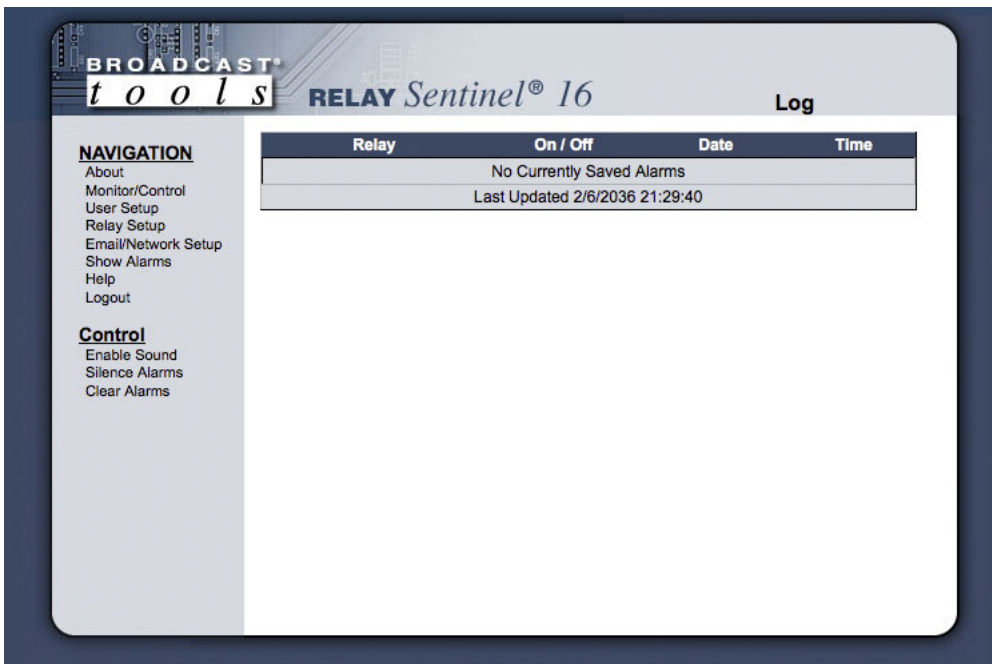
Save Settings:	After pressing the “Save Settings” button, the device will reboot (If you changed the IP address, you must navigate your web browser to the new IP address (if the HTTP port was changed from port 80, be sure to add the new port number after the IP: xxx.xxx.xxx.xxx:port #). If you didn’t change the IP address, then the web page will return to the login screen after the device reboots.
Reboot Device:	When you press the “Reboot Device” button, the device resets, you must navigate your web browser to the new IP address.
Send Test Email:	Press this button to send a test email. When the email has Completed, an alert box will pop-up indicating the status of the email and an error condition if the email was not sent correctly. If an email was not sent correctly, please review your SMTP settings and correct as necessary.
Reload Defaults:	When you press the “Reload Defaults” button, the device resets, you must navigate your web browser to the new IP address (if the HTTP port was changed from port 80, be sure to add the new port number after the IP: xxx.xxx.xxx.xxx:port #).
Clear Daily Logs:	When you press the “Clear Daily Logs” button, the daily logs stored in memory will be cleared. Keep in mind that if the Alarms Cleared Event is enabled, this event will post after the logs are cleared.
Send Daily Logs:	When you press the “Send Daily Logs” button, the system will send the daily logs email and then clear those logs as if the correct time has expired.

### WEBSITE:

*Visit our web site for product updates and additional information.*



## “Show Log” Web Page



This page displays current alarms.

With the “admin” access level, the user may control all functions.

With the “Monitor/Control” access level, the user may view the “Show Log”, enable/disable PC speaker sound and silence alarms.

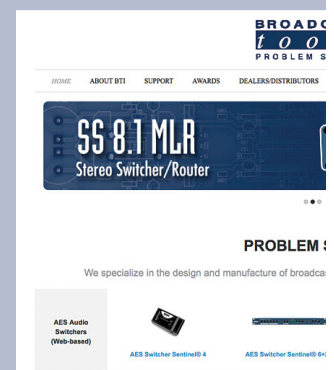


### NOTE:

*Shock Wave “Flash” must be installed and operating properly on your PC for the “Alarm Sound” to work when enabled.*

### WEBSITE:

*Visit our web site for product updates and additional information.*





## “About” Web Page



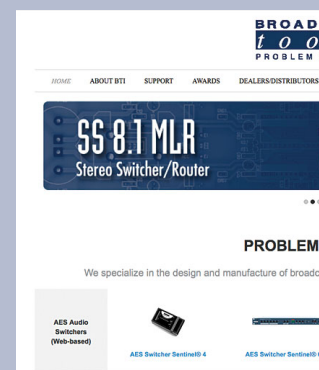
The “About” Web Page displays the product name, firmware version numbers, and Broadcast Tools® Web site link.

## Specifications

Ethernet Interface:	RJ-45, 10base-T or 100base-TX, auto sensing with link & activity led indicators - Full/half duplex.
Protocols:	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP.
Solid-state Relays:	16 channel high-voltage, high-current Darlington transistor array. The output devices consist of 16 npn Darlington pairs that feature high-voltage outputs with common-cathode clamp diodes for switching inductive loads (may be disabled). The collector-current rating of each Darlington pair is 500mA at 50 volts DC. Note: In some installations, pull-up resistors may be required.
Connectors:	Removable euroblock screw terminals
EMI / FCC Compliance:	See the Declaration of Conformity page. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including that which may cause undesired operation.
Required power supply:	7.5 VDC only @ 500ma. 2.1mm ID x 5.5mm OD coaxial connector. Surge protected. Domestic PS supplied.
Operating Temperature:	32 to 122 °F / 0 to 50 °C for all operating voltage ranges.
Humidity:	0 - 90% RH, non-condensing.
Size:	6.18" x 3.70" x 1.42" (L,W,H)
Weight:	1.0 lb.
Options:	* CE certified 240 VAC power supply. * RA-1, 1-RU rack shelf. Note: Velcro may be used to secure the product to the RA-1 shelf.

### WEBSITE:

*Visit our web site for product updates and additional information.*



## SPECIFICATIONS

### **LIMITED WARRANTY**

The term “Buyer” as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person’s or entity’s own use.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time it is shipped by Broadcast Tools if the item is properly installed, used and maintained.

### **EXCLUSIVE REMEDIES**

If Broadcast Tools is notified, in writing, of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer’s acquisition of the item, and if the item is returned to Broadcast Tools in accordance with Broadcast Tools’ instructions for confirmation by inspection of the defect (which at Broadcast Tools’ election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

### **NO OTHER WARRANTIES OR REMEDIES**

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, BROADCAST TOOLS AND ITS SUPPLIERS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; AND THE FOREGOING ALTERNATIVE REMEDIES SHALL BE EXCLUSIVE OF ALL OTHER REMEDIES. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

### **NO LIABILITY FOR CONSEQUENTIAL DAMAGES**

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#### **Broadcast Tools, Inc.**

131 State Street  
Sedro-Woolley, WA 98284 • USA

360.854.9559 **voice** • 866.783.1742 **fax**  
support@broadcasttools.com **e-mail**  
www.broadcasttools.com **website**

## Declaration of Conformity

The XPORT Device contained in the Relay Sentinel® 16 conforms to the following standards: (according to ISO/IEC Guide 22 and EN 45014)

### Manufacturer's Name & Address:

Relay Sentinel® 16: Broadcast Tools®, Inc.  
131 State Street, Sedro Woolley, WA 98284-1503 USA

XPort: Lantronix 15353 Barranca Parkway, Irvine, CA 92618 USA

Declares that the following product:

### Product Name Model: XPORT™ Device Server

Conforms to the following standards or other normative documents:

### Electromagnetic Emissions:

EN55022: 1998 (IEC/CSP12: 1993) Radiated RF emissions, 30MHz-1000MHz  
Conducted RF Emissions – Telecom Lines – 150KHz – 30MHz  
FCC Part 15, Subpart B, Class B  
IEC 1000-3-2/A14: 2000  
IEC 1000-3-3: 1994

### Electromagnetic Immunity:

EN55024: 1998 Information Technology Equipment-Immunity Characteristics  
Direct ESD, Contact Discharge  
Indirect ESD  
Radiated RF Electromagnetic Field Test  
Electrical Fast Transient/Burst Immunity  
RF Common Mode Conducted Susceptibility  
Power Frequency Magnetic Field Test

### Manufacturer's Contact:

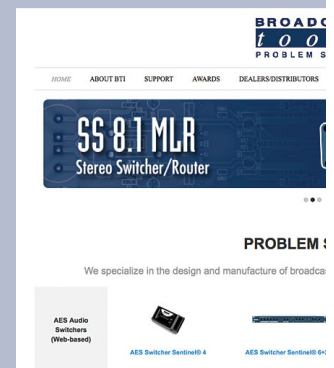
Relay Sentinel® 16  
Broadcast Tools®, Inc.  
131 State Street  
Sedro Woolley, WA 98284-1503 USA  
Tel: 360 . 854 . 9559 Fax: 866 . 783 . 1742

### XPORT™

Lantronix:  
Director of Quality Assurance  
15353 Barranca Parkway, Irvine, CA 92618 USA  
Tel: 949 . 453 . 3990 Fax: 949 . 453 . 3995

### WEBSITE:

*Visit our web site for  
product updates and  
additional information.*



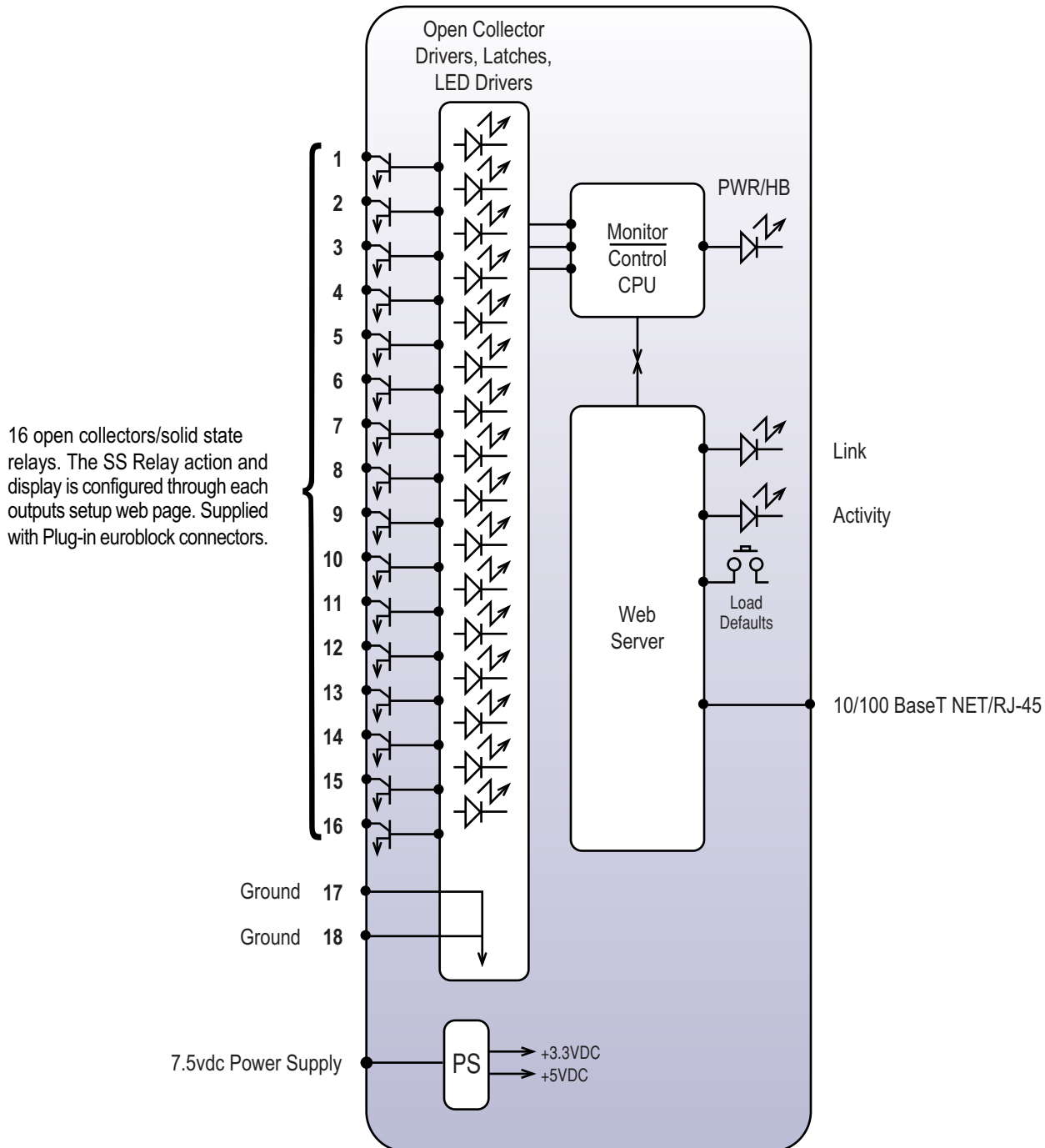
### DECLARATION

## 23





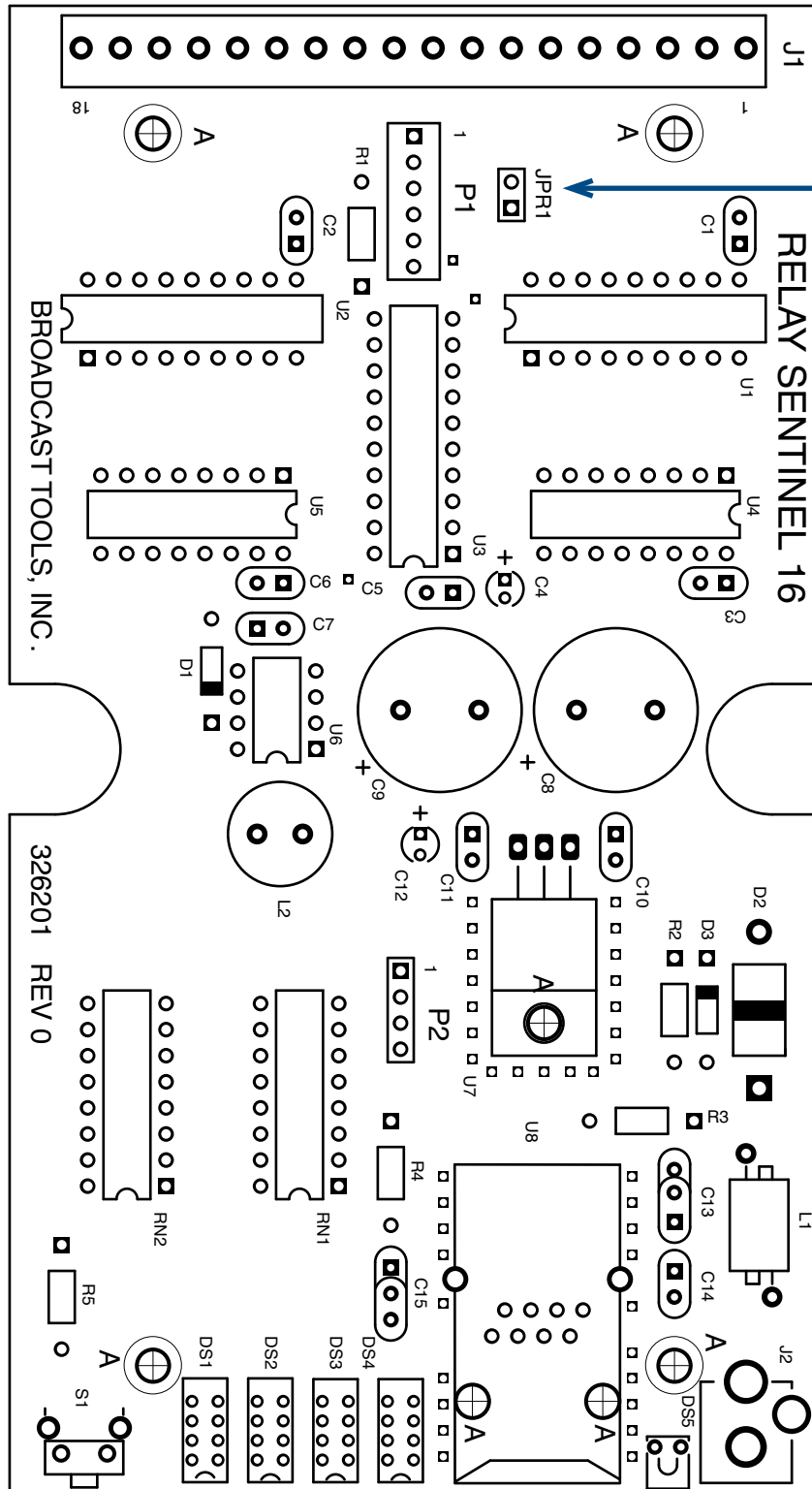
## Functional Diagram



NOTE: May be paired with the **Status Sentinel™ 16** to form a "16 channel relay extension cord"

# RELAY Sentinel® 16

## Jumper Layout



Open collector  
voltage select:  
ON=5vdc Max  
OFF=5-24vdc Max