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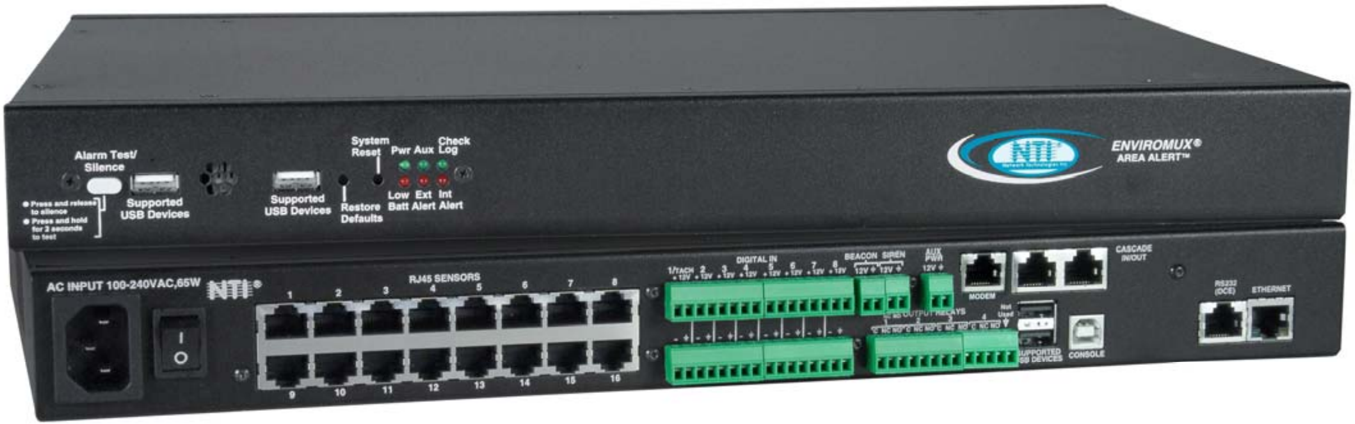
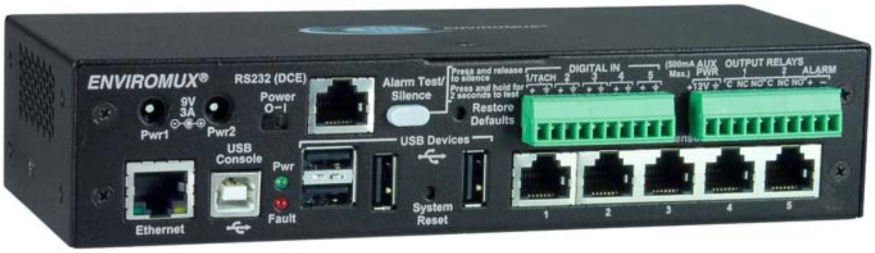
ENVIROMUX® Series

E-16D/-5D/-2D

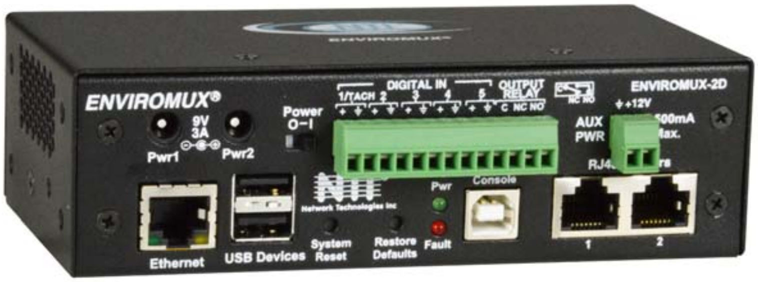
Enterprise Environment Monitoring System
Installation and Operation Manual



Front and Rear View of E-16D



Front View of E-5D



Front View of E-2D

TRADEMARK

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CHANGES

The material in this guide is for information only and is subject to change without notice. Network Technologies Inc reserves the right to make changes in the product design without reservation and without notification to its users.

CE Statement

We, Network Technologies Inc, declare under our sole responsibility that the E-16D , E-5D and E-2D are in conformity with European Standard EN55022.

Firmware Version

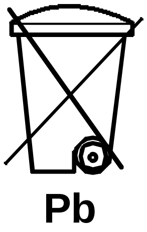
Current Firmware version 2.57

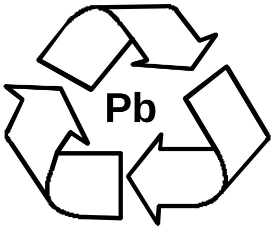
As of firmware version 2.35, the webserver in the E-xD supports only TLS v1.2 security encryption. Due to security vulnerability, SSL is no longer supported.

Exception: E-mail servers requiring SSL encryption will still be supported for alert messages.

WARNING

The E-16D contains a sealed lead acid battery.   Battery maintenance must be performed by an authorized trained technician.   Always follow local laws and regulations regarding the disposal of this unit.





CAUTION

Turn OFF power to the ENVIROMUX and discharge your body's static electric charge by touching a grounded surface or use a grounding wrist strap before performing any connections to the unit.

CAUTION

For continued protection against fire and electric shock this device should only be connected to an AC mains outlet equipped with a proper ground terminal.

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INTRODUCTION

The ENVIROMUX Enterprise Environment Monitoring System (ENVIROMUX) provides a way to supervise, from a remote location, the environmental conditions and security in cabinets and rooms containing servers, hubs, switches and other network components. Input data is filtered, collected, analyzed and processed to instantly and accurately display the status of the room. The user is able to specify parameters for all monitored conditions: if the parameters are exceeded, the unit will signal an alarm, which may include several pre-defined processes.

The E-16D, our most feature-filled model, includes sensors that monitor the internal temperature and humidity of the unit, giving readings that can be used as an estimate for the conditions of other nearby rack components.

All models are capable of monitoring external RS485 sensors and additional digital contact-type sensors (often called open-collector, contact-closure, relay-style, normal-open, or normal-closed). All sensors are sold separately, available from NTI. ENVIROMUX includes output relays to control devices such as door locks, keypads, and circulation fans. The E-16D and E-5D also include outputs specifically for the connection of an alarm siren and/or beacon.

The external sensors sold by NTI will monitor temperature and humidity, monitor AC line voltage, frequency, and current, detect smoke, and much more. The temperature and humidity sensors will provide current readings as well as alerts when thresholds are exceeded. The AC line monitor detects AC line input voltages between 50~250V AC, the Frequency (Hertz) between 47~63Hz, and the Power (Current) up to 12 amperes from a single AC line. The remainder of the sensors will simply provide alerts. These sensors can be manufactured by any third party, provided the alert notification method is compatible. Each of the aforementioned NTI sensors will connect to the ENVIROMUX via RJ45 connectors and CAT5 cable.

The ENVIROMUX can also work with both 4-wire and 2-wire contact-style sensors (4-wire sensors require a power connection, 2-wire do not). An external power supply for some 4-wire sensors may be required (sold separately). Screw terminals are provided for the connection of external contact-style sensors.

The Ethernet provides the main user interface for the ENVIROMUX. The ENVIROMUX provides data logging that can be viewed via a web browser and send alerts via email, Syslog, SNMP traps, SMS text messages and front panel LEDs. USB ports are provided for the connection of a USB modem and for downloading log data to a USB flash drive.

Features: (see Feature Differences chart on next page for more details)

- Enables up to 16 users to monitor environmental conditions and security status remotely
- Alerts users of environmental faults via email, Syslog, SMS messages, SNMP traps (v1, v2c, and/or v3), Illuminated front panel LEDs, or notifications on a web page
- Sensors are assigned to organized groups, and users can receive alerts from any group(s)
- Smart alerts provide sophisticated configurable multi-event triggering of alert messages or device control
- Up to 16 users can control simultaneously via Ethernet and a single user control serially via connected terminal
    - Connections include RJ45 and USB for local serial control
    - RJ45 w/ LEDs for Ethernet-based control
- Easy connections for sensors and devices
    - RJ45 connections w/o LEDs provided for sensors
    - Screw terminals for digital input devices
    - Screw terminals for digital output devices
- 12VDC provided for all digital inputs (E-16D only)
- RJ45 Sensors include Temperature, Humidity, Temperature and Humidity, Water, Vibration, Smoke, Motion Sensor, Glass break detector and many more
- Provides control for devices such as door locks, keypad, or a fan via digital outputs (1A/ 30VDC, .5A/ 100VAC)
- Full configuration via web-based graphic user interface
- Limited configuration using text menus via Telnet , SSH, RS232 or USB-to-serial interface
- Browser independent (IE, Netscape, Mozilla, Opera)
- Outgoing mail using SMTP or SMTP over SSL for alert notifications- up to 16 different email addresses
- Configurable Alarms to match specific user schedule
- Local Email Authentication, SSL3
- Data logging to keep viewable record of events such as changes in the environment or user access
- Monitors (ping) up to 64 configurable IP addresses. Response Timeout and number of retries are user configurable for each address
- Flash firmware upgradeable via FTP server or web page
- Internal temperature, humidity, and power sensors (E-16D, 5DB, 2DB (see chart on next page)
- USB ports for USB modem and USB flash drive

The E-5D Medium Enterprise Environment Monitoring System and E-2D Small Enterprise Environment Monitoring System have almost the same functionality as the E-16D, just fewer connection points.

E-16D vs. E-5D vs. E-2D
Feature Differences

Feature	E-16D	E-5D	E-2D
Internal Sensors	3	2	0
Temperature	✓	✓	N/A
Humidity	✓	✓	N/A
Battery	✓	only for E-5D**B**	only for E-2D**B**
RJ45 Sensor Ports	16	5	2
Digital Inputs	8	5	5
12VDC provided on Digital Inputs	✓	N/A	N/A
Output Relays	4	2	1
Auxiliary (12V) Power Terminal	✓	✓	✓
Alerts	8 Methods	8 Methods	6 Methods
Alarm Silence/Test Button	✓	✓	N/A
Control Methods	6 Methods	6 Methods	5 Methods**
USB Ports for Modem and Data Logging	4	4	2
Front Panel LEDs	**6**	**2**	**2**
Backup Battery	✓ (1 Hour)	Optional (2 Hour) (E-5D**B**)	Optional (2 Hour) (E-2D**B**)
Power	• 110 or 220 VAC at 50 or 60 Hz via IEC connector. 65W • Options: dual power, 18-36VDC, 36-72VDC, 18-36VDC dual power, 36-72VDC dual power	110 or 220 VAC at 50 or 60 Hz via AC adapter. 3A Optional Dual Power, 18-72VDC, 18-72VDC dual power	110 or 220 VAC at 50 or 60 Hz via AC adapter / 3A Optional Dual Power

*** No dedicated alarm beacon/siren terminals although they CAN be connected to E-2D**

**** E-2D does not include an RS232 port for console control, but a USB Type B "Console" port (and drivers) is provided for this control method.**

N/A= Not Available

Options:

- **E-16D**
  - **Dual Power** – ENVIROMUX with two power connections for optional redundant power source connection (see page 20) - add "DP" to the model number (i.e. E-16D**DP**)
  - **DC Power** - to install the ENVIROMUX in a Telecom environment (see page 21). Add "-48V" or "-24V" to the model number (i.e. E-16D-**48V**). A "48V" model ENVIROMUX accepts 36-72VDC while a "24V"model accepts 18-36VDC, positive or negative polarity and includes a 3-pole screw terminal for connecting the DC voltage input.
- **E-5D /-2D**
  - **DIN Rail Mounting**- E-5D or -2D can be ordered with a DIN rail mounting bracket- Add "D" to the part number (i.e. E-5D-**D**)
  - **Battery Backup**- E-5D or -2D can be ordered with battery backup support and DC power monitoring installed, providing up to 2.3 hours of operation in the event of a power failure- to order, add "B" to *the part number (i.e. E-5D**B**)*
  - **48V/24V/12V/9V Power Option-** E-5D-**48V** can be ordered with power connections for 18-72VDC (24 or 48VDC nominal) in addition to jacks for 9-12VDC AC adapter connection. For dual 48V connections, just add **"DP"** to the model number (i.e. E-5D-48V**DP**).
    - E-2D-**24V** can be ordered with power connections for 9-36VDC (24VDC nominal) in addition to jacks for 9-12VDC AC adapter connection.
  - **48VINDLT Industrial Low Temperature Option-** E-5D-48VINDLT will operate between 36-72VDC at temperatures between -40 to 185°F (-40 to 85°C)

MATERIALS

Materials included with the E-16D kit:

- E-16D Large Enterprise Environment Monitoring System
- Power Cord- country specific (2 power cords for model E-16D-DP)**(excluded in E-16D-48V/-24V)**
- 1-CB4306 USB2-AB-6-5T   2 meter USB 2.0 male type A-male type-B transparent cable
- CT6182 DB9 Female-to-RJ45 Female adapter
- CT6488 DB9 Male-to-RJ45 Female adapter
- 2- CB7339 5 foot RJ45-to-RJ45 CAT5 SF patch cable
- Rack mount kit

Materials included with the E-5D kit:

- NTI E-5D Medium Enterprise Environment Monitoring System
- 1- PS4225 120VAC or 240VAC at 50 or 60Hz-9VDC/3A AC Adapter (**excluded in E-5D-48V(DP)**)

  -OR-

  1- PS4264 120VAC or 240VAC at 50 or 60Hz-9VDC/**5A** AC Adapter (**E-5D(B)-IND only**)
- 1- Line cord- country specific (**excluded in E-5D-48V(DP)**)
- 1- CB4306 USB2-AB-2M-5T   2 meter USB 2.0 male type A-male type-B transparent cable
- 1- CT6182 DB9 Female-to-RJ45 Female adapter
- 1- CT6488 DB9 Male-to-RJ45 Female adapter
- 1- CB7094 5 foot RJ45-to-RJ45 CAT5 SF patch cable

Materials included with the E-2D kit:

- NTI E-2D Small Enterprise Environment Monitoring System
- 1- PS4225 120VAC or 240VAC at 50 or 60Hz-9VDC/3A AC Adapter **(excluded in E-2D-24V)**
- 1- Line cord- country specific **(excluded in E-2D-24V)**
- 1- CB4306 USB2-AB-2M-5T   2 meter USB 2.0 male type A-male type-B transparent cable

Materials <u>required</u> for connection but not supplied:

- Cables required for connection:

  Cat5 for RS485 sensors with RJ45 connectors wired to the TIA/EIA-568B standard (see page 170 for specifications)

  E-2W-xx 2-wire sensor cables for dry contact sensors
- Cable required for Ethernet connection:

  Cat5 cable with RJ45 connectors wired straight through (pin 1 to pin 1, pin 2 to pin 2, etc..)
- E-TRMPLG Terminating Plug- one required if multiple E-16D units will be cascaded using the RS485 connection method (page 93)

See our webpage for the latest sensors available; http://www.networktechinc.com/environment-monitor-16d.html

Contact your nearest NTI distributor or NTI directly for all of your cable needs at 800-RGB-TECH (800-742-8324) in US & Canada or 330-562-7070 (Worldwide) or at our website at www.networktechinc.com and we will be happy to be of assistance.

SUPPORTED WEB BROWSERS

Most modern web browsers should be supported. The following browsers have been tested:

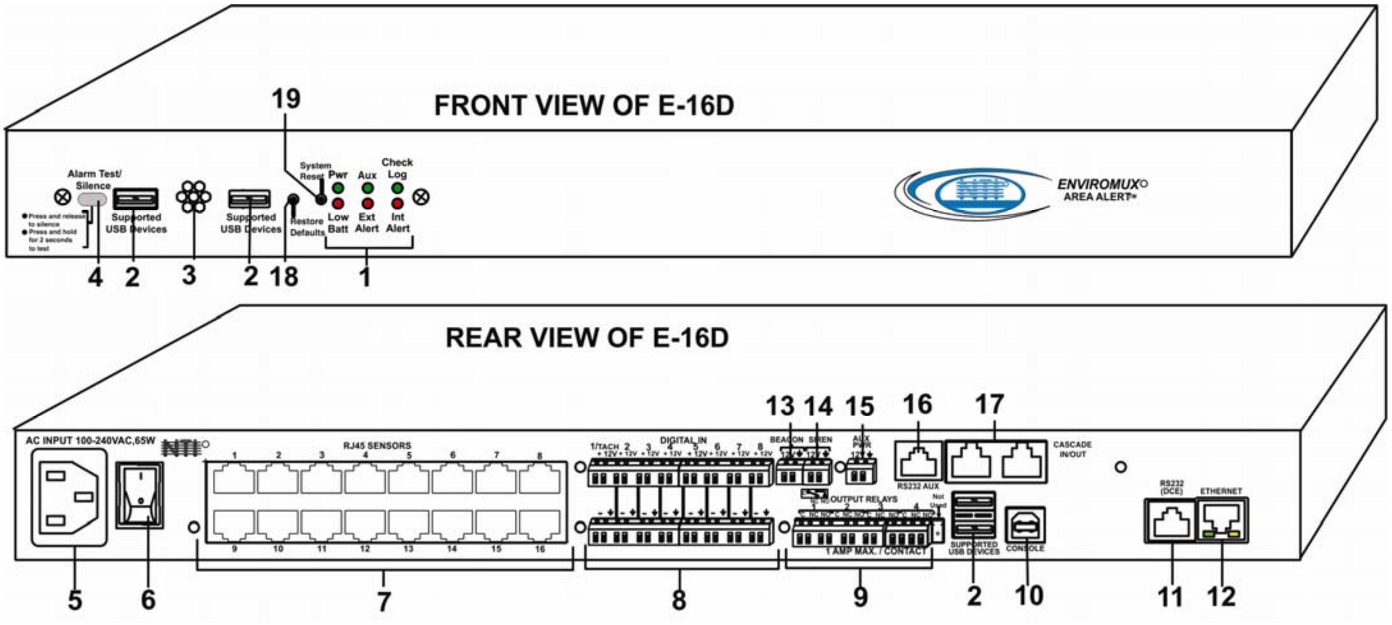
- Microsoft Internet Explorer 6.0 or higher
- Mozilla FireFox 1.5 or higher
- Opera 9.0
- Google Chrome

Note: If HTTPS pages cannot be viewed in the browser ("The page cannot be displayed" message appears) try to disable SSL 2.0 and TLS 1.0 from advanced options of the browser.

As of firmware version 2.35, the webserver in the E-xD supports only TLS v1.2 security encryption. Due to security vulnerability, SSL is no longer supported.

Exception: E-mail servers requiring SSL encryption will still be supported for alert messages.

FEATURES AND FUNCTIONS

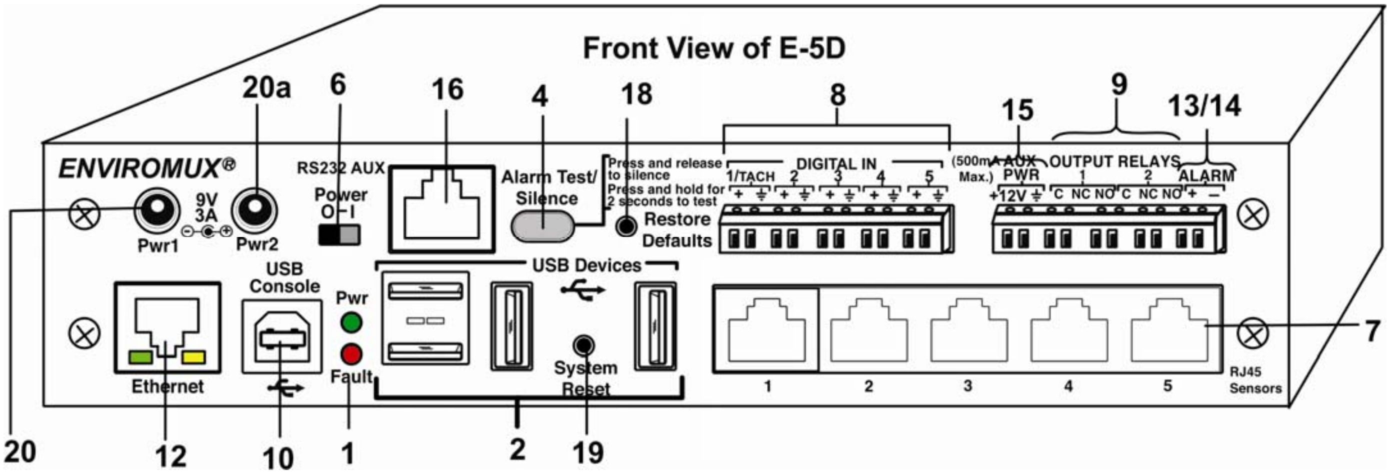


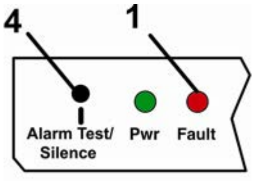
#	LABEL (LEDs)	DESCRIPTION
1	Pwr-	indicates when power to ENVIROMUX is ON (solid ON) and when power failure has occurred (battery power is ON- LED is blinking once per second)
	Low Batt-	indicates that the backup battery is running low on power, disconnected, or in failure
	Check Log-	illuminates when a new entry that is not an alert is added to the log
	Int Alert-	illuminates when an internal sensor generates an alert
	Ext Alert-	illuminates when an external sensor generates an alert
	Aux-	Not used as of this printing
	Fault-	red — illuminates if a sensor goes out of range of a configurable threshold (E-2D/5D Only)

See LED Status Chart (page 116) for more on LED indicators.

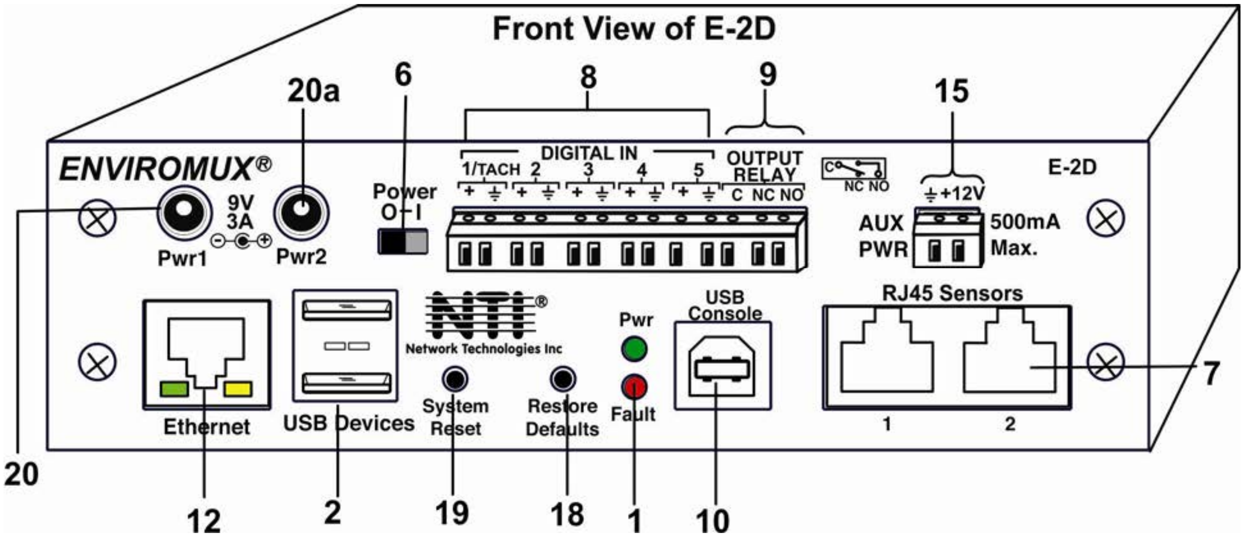
#	LABEL	CONNECTOR	DESCRIPTION
2	Supported USB Devices	USB Type A Female	for connection of supported USB 1.1 compatible devices (USB modem or flash drive for logging data)(see more information on pages 17 and 118)
3	None	None	Opening for humidity sensor to sense
4	Alarm Test/Silence	Button	Used to test or silence the alarm connected to the siren terminals
5	---	IEC Connector	for connecting the power cable (see also “Dual Power Option” on page 20)
6	---	Power Switch	used to turn the power to the ENVIROMUX ON/OFF
7	RJ45 Sensors	RJ45 female connectors	for attachment of various sensors
8	Digital IN	Terminal block	connection block for wired sensors (2-to-4 wire)
9	Output Relays	Terminal block	connection block for devices to be controlled in the event of alerts
10	Console	USB Type B female connector	For connecting USB cable for serial connection of a terminal to control the system
11	RS232 (DCE)	RJ45 female connector	Alternative port for RS232 serial connection of a terminal to control the system
12	Ethernet	RJ45 female connectors	for connection to a Local Area Network (LAN) for remote configuration, monitoring, and control
13	Beacon	Terminal block	for two-wire connection of visual indication of alarm (page 13)
14	Siren	Terminal block	for two-wire connections of audible indication of alarm (page 13)

#	LABEL	CONNECTOR	DESCRIPTION
15	Aux Pwr	Terminal block	for powering an auxiliary device with 12VDC power at 150mA maximum (fuse protected)
16	RS232 AUX	RJ45 female	for connection of a serial modem or remote RS232 device to be controlled
17	Cascade In / Out	RJ45 female connectors	used for RS485 method of cascading multiple E-16D units
18	Restore Defaults	Reset Button	for manually restoring the ENVIROMUX back to factory settings (see page 116 for details)
19	System Reset	Reset Button	for manually resetting the system (rebooting) the ENVIROMUX (see page 116 for details)
20	9V 3A- PWR1	2.1x5.5mm Power Jack	for connection of primary power supply
20a	9V 3A- PWR2	2.1x5.5mm Power Jack	for connection of backup power supply





E-5D REAR VIEW



INSTALLATION

Mounting Instructions-16D

The E-16D was designed to either sit on a shelf or be mounted in a rack. For mounting in a rack It includes a rack mount kit to make attachment easy.

1. Attach the ears to the ENVIROMUX using the #6-32x3/16" flat Phillips-head screws (6) provided as shown in the illustration below.

FYI: The same hole pattern is provided at the front and rear of the ENVIROMUX, enabling the ENVIROMUX to be mounted with the front facing out or rear facing out.

2. The holes in the ears should line up with pre-threaded holes in the sides of the ENVIROMUX.   Tighten the screws securely.

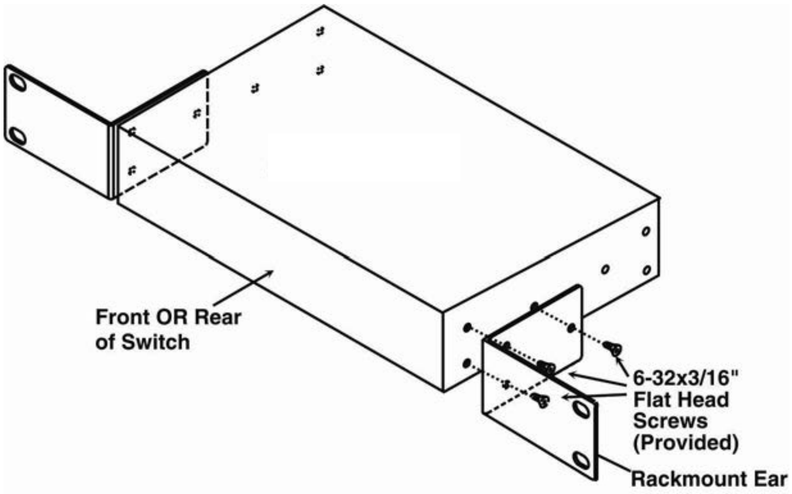


Figure 1- Secure rack mount ears to E-16D

3. Install 4 cage nuts to the rack in locations that line up with the holes in the mounting ears on the ENVIROMUX.
4. Secure the ENVIROMUX to the rack using four #10-32x3/4" screws and cage nuts (provided). Be sure to tighten all mounting screws securely.

Note: Do not block power supply vents in the ENVIROMUX case.   Be sure to enable adequate airflow in front of and behind the ENVIROMUX.

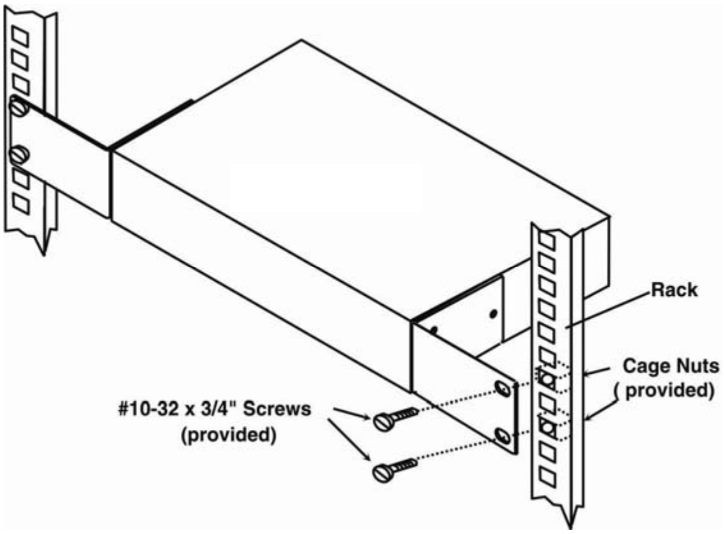


Figure 2- Mount ENVIROMUX in a rack

5. Attach all cables securely to the ENVIROMUX and where necessary supply adequate means of strain relief for cables.

Mounting Instructions-5D / -2D

The E-5D and -2D can either be placed on a solid surface, mounted to a wall, mounted to a DIN rail or mounted to an accessible surface within rack (Zero-RU). To mount to a wall or other surface, first remove the screws holding the mounting tabs to the rear of the box. Rotate the tabs such that they extend from the back of the box, and attach the tabs with the screws removed. Now the ENVIROMUX can be secured to any convenient surface. Use appropriate hardware (not supplied) when mounting.

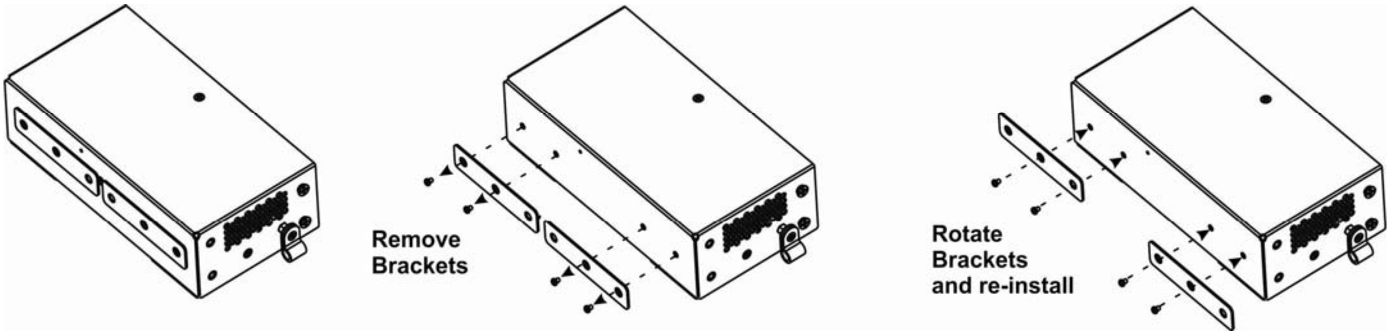


Figure 3- Rotate the tabs for Zero-RU mounting

If rack-mounting is preferred, the E-RK1-5D or E-RK1-2D rack-mount kit can be used (sold separately). Simply attach the ears (instructions included with the kit) and secure to a rack with the hardware provided.

FYI: Two sets of mounting holes are provided on the side of the ENVIROMUX to enable the ears to be attached such that the ENVIROMUX can be mounted with the front facing out or rear facing out, as desired.

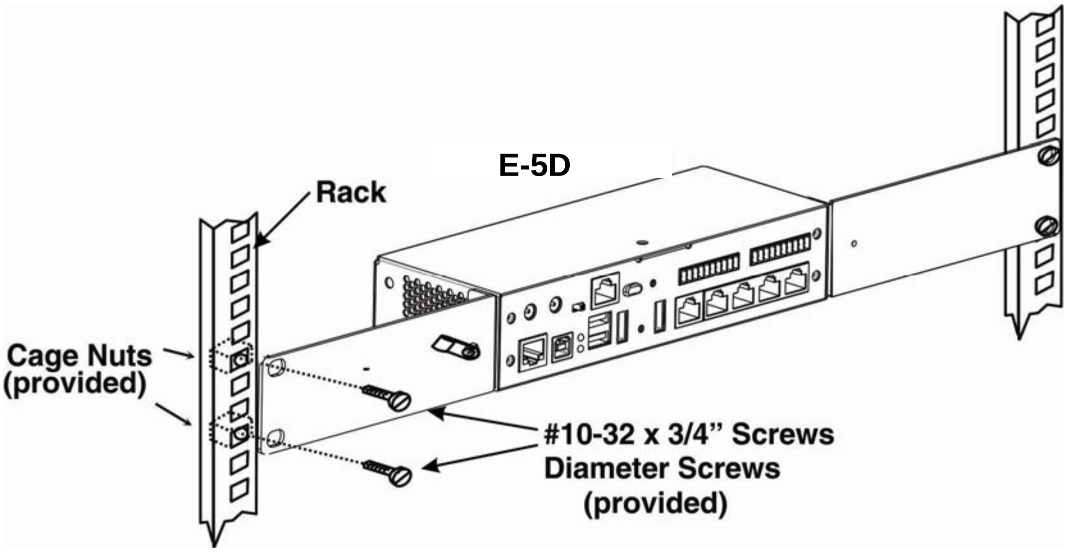


Figure 4- Mount E-5D/2D in a rack

DIN Rail Mounting

If DIN rail mounting is preferred, and you have purchased the E-5D-D or E-2D-D, then a DIN rail bracket has been pre-installed on the ENVIROMUX. Simply determine where on the DIN rail you want to place the ENVIROMUX and follow the instructions below for attaching it.

Note: You will either have a plastic DIN rail clip or a metal one. Instruction for each is provided below.

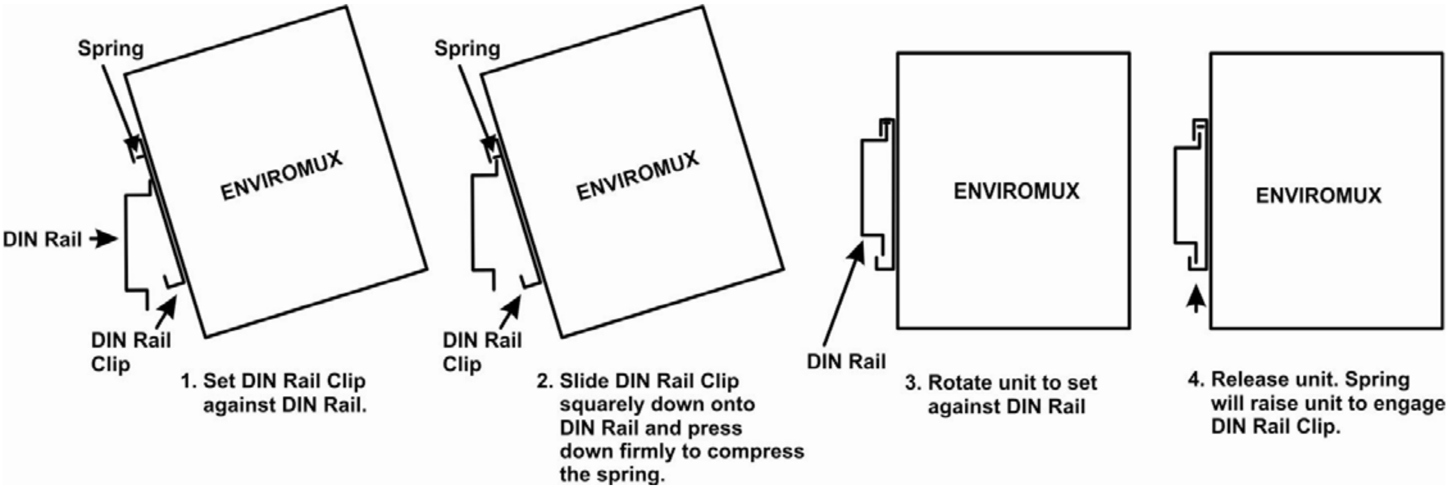

Spring
ENVIROMUX
DIN Rail
DIN Rail Clip
1. Set DIN Rail Clip against DIN Rail.
Spring
ENVIROMUX
DIN Rail Clip
2. Slide DIN Rail Clip squarely down onto DIN Rail and press down firmly to compress the spring.
ENVIROMUX
DIN Rail
3. Rotate unit to set against DIN Rail
ENVIROMUX
4. Release unit. Spring will raise unit to engage DIN Rail Clip.

Figure 5- Mount E-5D/2D to DIN rail- plastic clip

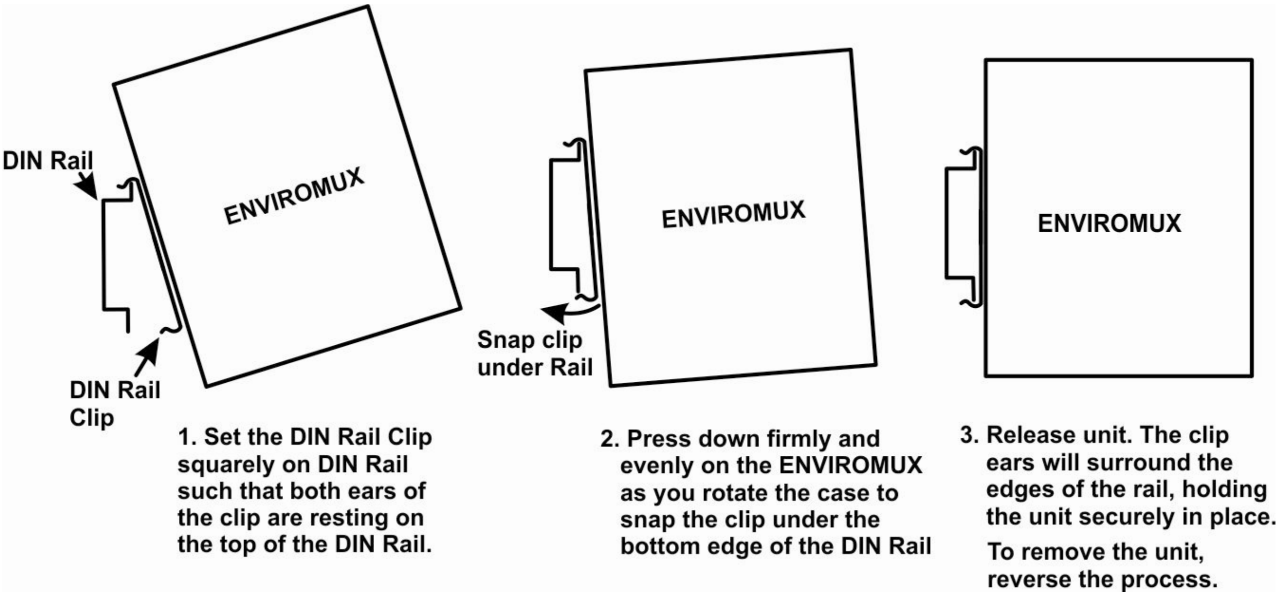

DIN Rail
ENVIROMUX
DIN Rail Clip
1. Set the DIN Rail Clip squarely on DIN Rail such that both ears of the clip are resting on the top of the DIN Rail.
ENVIROMUX
Snap clip under Rail
2. Press down firmly and evenly on the ENVIROMUX as you rotate the case to snap the clip under the bottom edge of the DIN Rail
ENVIROMUX
3. Release unit. The clip ears will surround the edges of the rail, holding the unit securely in place.
To remove the unit, reverse the process.

Figure 6- DIN Rail Mount with metal clip

Sensor Attachment

Connect the desired sensors (sold separately) to the available ports on the ENVIROMUX. Sensors come with one of two connection methods, RJ45 and individual wires for terminal connection. This section explains both methods of connection. Configuration of these sensors will come later in this manual.

RJ45 Sensor Ports

1. Connect each external sensor having an RJ45 male connector on it (E-STS, E-STHSB, E-LDS) to one of the female connectors labeled "RJ45 Sensors" on the ENVIROMUX. Male connectors should snap into place. Cables may be up to 1000 feet in length. See page 170 for wiring specification and pinout.

Note: It is very important to locate the temperature and/or humidity sensors away from ventilation sources and fans.

If CATx cabling will be installed near sources of EMI (electric motors, light ballasts, etc) use shielded cable to reduce the introduction of noise to the circuits. Otherwise, communications between the sensor and ENVIROMUX may be unreliable.

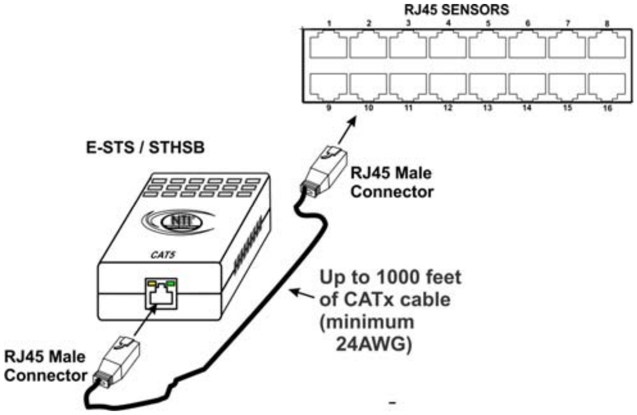


Figure 7- Sensors connected by cables with RJ45 connectors

The RJ45 SENSORS ports can be used to connect a variety of sensors. Specifically on the E-16D, the combined power load of all 12VDC sensors on each row of ports (ports 1-8 is one row and ports 9-16 is the second) **cannot exceed 500mA per row**. Some sensors use more power than others. The table below provides the top power users:

Sensor	12VDC Power Consumption in mA	Sensor	12VDC Power Consumption in mA
E-S420MA-24V	130	E-ACLM-V	70
E-ACLM-P	130	E-S5VDC(-5V)	100

Caution: Be careful not to overload the E-16D as failure may occur and damage to the ENVIROMUX may result.

2. Some sensors do not have RJ45 connectors on them and instead have terminal blocks. These can either be connected to the "DIGITAL IN" connectors or they can be terminated and plugged into the remaining RJ45 connectors (see figure-right). (The illustration uses CAT5 patch cable to make cable connection easy.) Some examples of these sensors include E-IMD, E-IMD-CM, E-VSS, E-SDS, and E-GBS. Cables may be up to 1000 feet in length.

Note: For sensors requiring 5VDC power source, connect the wht/brown wire to pin 4 instead of pin 7.

All contact sensors can be wired in this way and use the RJ45 sensor ports instead of the Digital In terminals if desired.

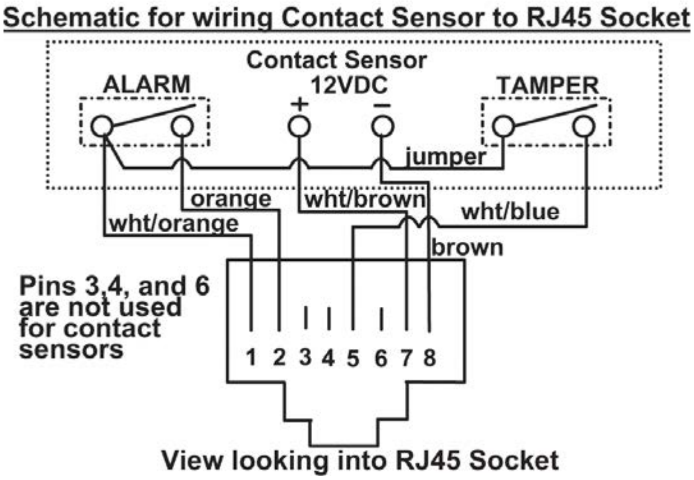
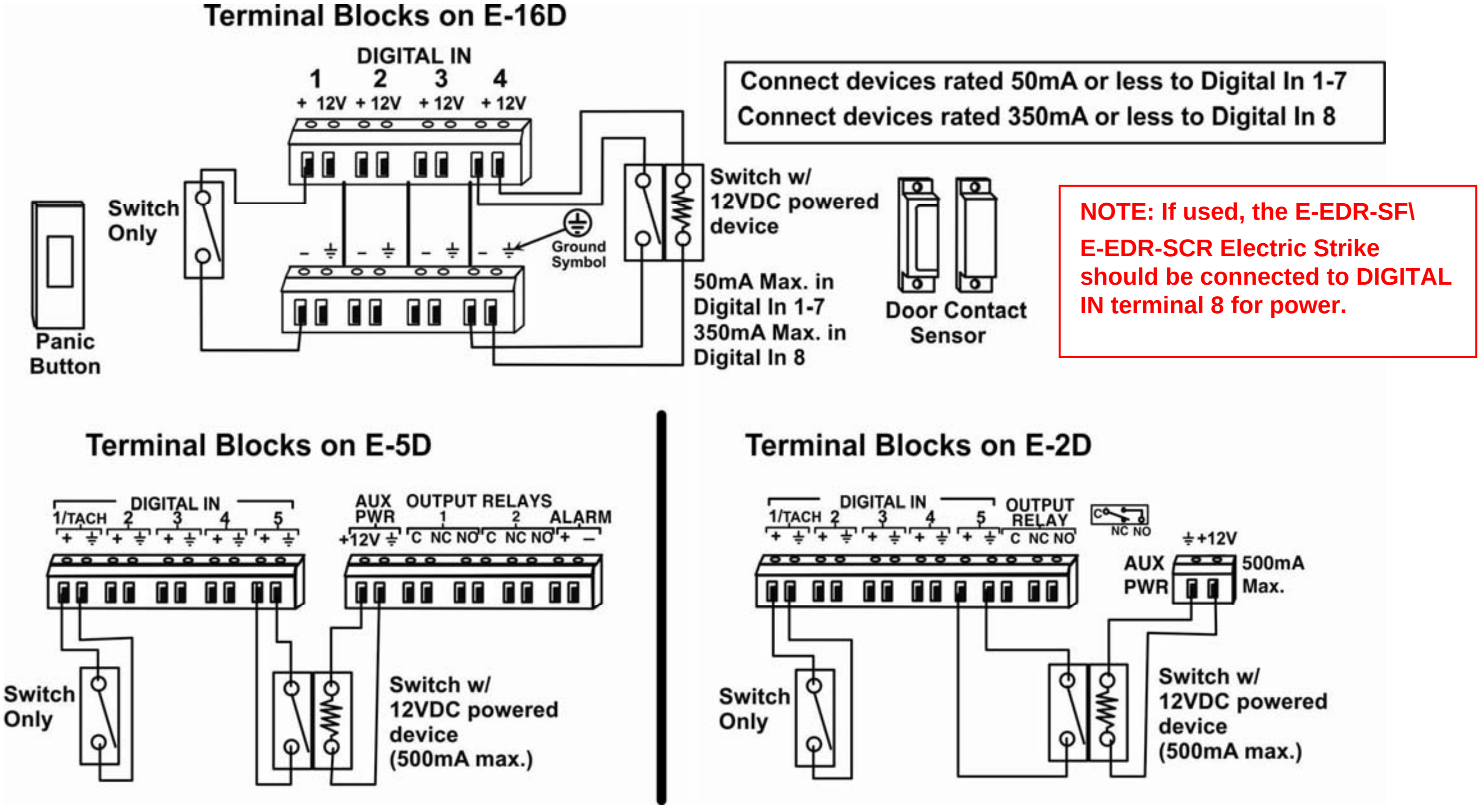

Schematic for wiring Contact Sensor to RJ45 Socket
Contact Sensor
12VDC
ALARM
+
–
TAMPER
jumper
orange
wht/brown
wht/blue
wht/orange
brown
Pins 3,4, and 6 are not used for contact sensors
1 2 3 4 5 6 7 8
View looking into RJ45 Socket

Figure 8- Contact sensor wired to RJ45 socket

Digital In Terminals

To connect contact sensors without using RJ45 connectors, terminal blocks have been provided labeled "DIGITAL IN". Two wire switch-only type sensors can be connected to the DIGITAL IN terminals as shown below. If the sensors require a 12V power source to operate, additional 12V and ground terminals have been provided on each model, with restrictions as shown. Connect each two-wire or four-wire contact sensor using 16-26 AWG wire.

FYI: The terminal block is removable for easy sensor wire attachment if needed.



Connect devices rated 50mA or less to Digital In 1-7
Connect devices rated 350mA or less to Digital In 8

NOTE: If used, the E-EDR-SF\ E-EDR-SCR Electric Strike should be connected to DIGITAL IN terminal 8 for power.

Figure 9- DIGITAL IN Terminal Connections

Liquid Detection Sensors

Liquid Detection Sensors are available for simple connection to **either** the “Digital In” terminals (use model E-LD) or the “RJ45 Sensor” ports (use model E-LDS).

Connect the two-wire cable (up to 1000 feet long) from a liquid detection sensor (E-LD shown in Figure 10-upper image) to a set of “DIGITAL IN” contacts. For added range (up to 1000 more feet), use an E-LDS (shown in Figure 10-lower image) and connect to an “RJ45 Sensor” port.

Note: If you are not looking to extend a liquid detection sensor (E-LDx-y) an additional 1000 feet, you can still connect the two-wire cable to pins 1 and 2 of the RJ45 connector (Figure 8) and plug it into an RJ45 Sensor Port instead of connecting it to a Digital In terminal. You do not have to use an E-LDS for the sensor to work, only to extend it an additional 1000 feet.

The twisted orange sensing cable should be placed flat on the surface (usually the floor) where liquid detection is desired. If tape is required to hold the sensor in place, be sure to only apply tape to the ends, exposing as much of the sensor as possible. At least 5/8" of the sensor must be exposed for it to function. (See Figure 10)

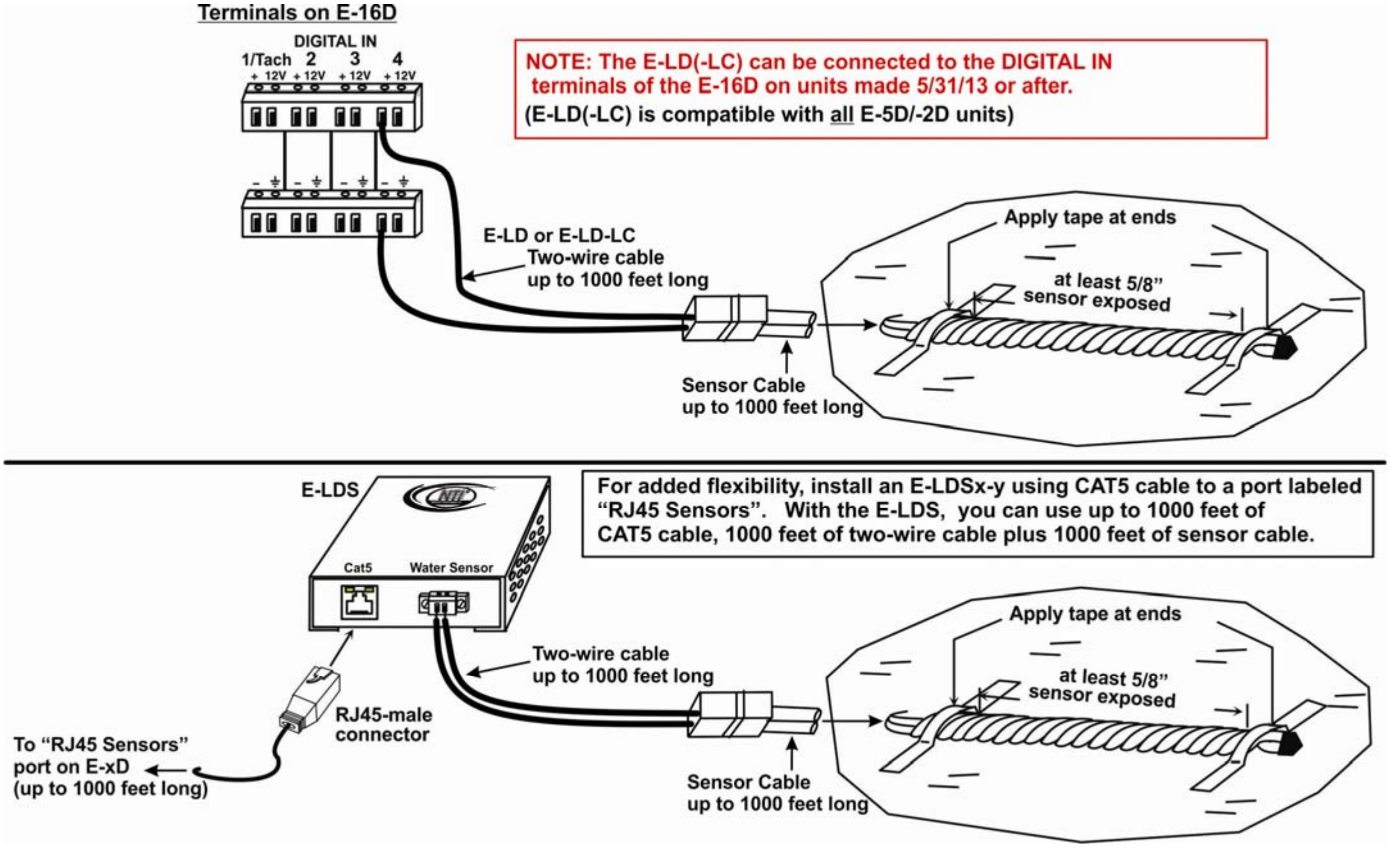

Terminals on E-16D
DIGITAL IN
1/Tach 2 3 4
+ 12V + 12V + 12V + 12V
NOTE: The E-LD(-LC) can be connected to the DIGITAL IN terminals of the E-16D on units made 5/31/13 or after.
(E-LD(-LC) is compatible with all E-5D/-2D units)
E-LD or E-LD-LC
Two-wire cable
up to 1000 feet long
Apply tape at ends
at least 5/8" sensor exposed
Sensor Cable
up to 1000 feet long
E-LDS
Cat5
Water Sensor
For added flexibility, install an E-LDSx-y using CAT5 cable to a port labeled "RJ45 Sensors". With the E-LDS, you can use up to 1000 feet of CAT5 cable, 1000 feet of two-wire cable plus 1000 feet of sensor cable.
Two-wire cable
up to 1000 feet long
RJ45-male connector
To "RJ45 Sensors" port on E-xD (up to 1000 feet long)
Apply tape at ends
at least 5/8" sensor exposed
Sensor Cable
up to 1000 feet long

Figure 10- Secure liquid detection sensor with tape

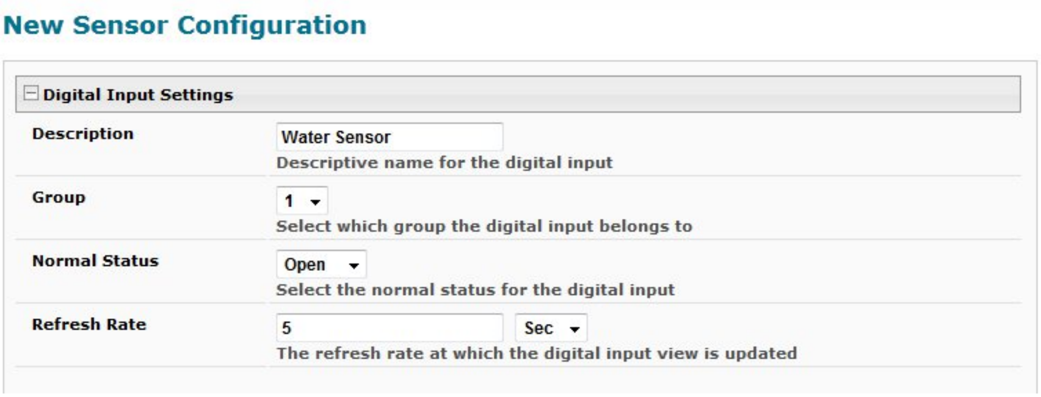
After installation of rope style leak detection sensor in its desired location, **it is very important** to test the sensor to verify correct installation. This applies to **all** rope-style leak detection sensors (E-LD/ E-LD-LC / E-CD, etc.).

To test the rope style leak detection sensor;

1. Configure the sensor (page 48). (Normal Status set to "Open", Sampling Period set to 5 seconds.)
2. Place approximately one table spoon of tap water across the sense cable so that the 2 thin sensing wires are connected by mutual contact with the water. Do NOT use distilled water as water must be conductive.
3. Monitor the sensor (page 31) to see the sensor "Value" change from "Open" (dry) to "Closed" (wet). (How quickly the change occurs is based on the amount of impurities in the water, so allow up to 30 seconds).
4. Dry the exposed area of the sensor and the sensor "Value" should change back to "Open" within 30 seconds.

If the sensor fails to behave in this manner, contact NTI for support.

This completes the testing of the sensor.



New Sensor Configuration

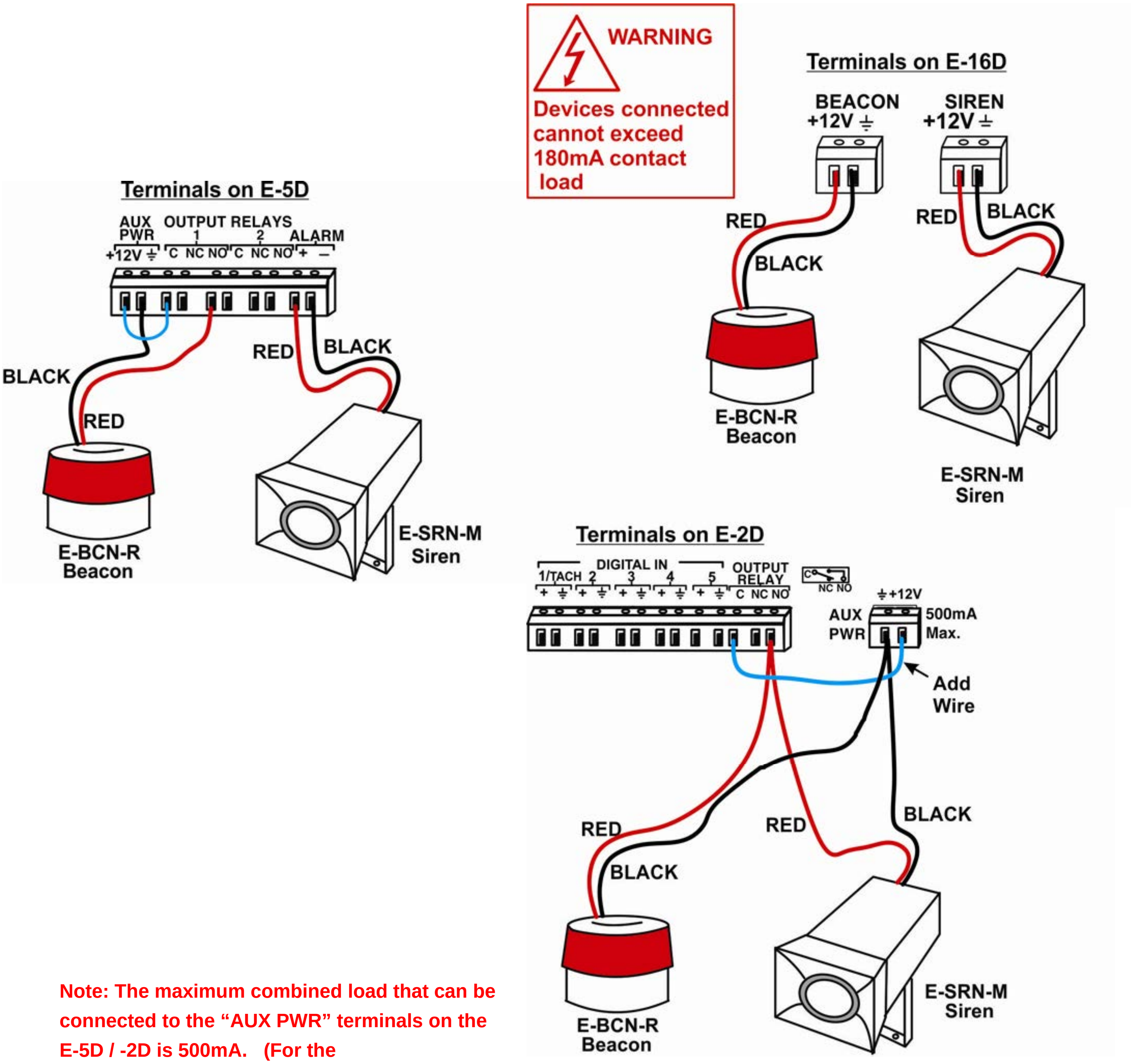
⊟ Digital Input Settings

Description	Water Sensor Descriptive name for the digital input
Group	1 ▾ Select which group the digital input belongs to
Normal Status	Open ▾ Select the normal status for the digital input
Refresh Rate	5 Sec ▾ The refresh rate at which the digital input view is updated

Figure 11- Portion of Water Sensor configuration page

Alarm(Beacon/Siren) Connections

Terminals have been provided for connection of the E-BCN-R Beacon and E-SRN-M Siren to use for visual alerts and audible alerts when configured.   Devices such as this can be installed in locations best suited to get attention. The terminals for these connections will accept 16-26 AWG wire.



Note: The maximum combined load that can be connected to the “AUX PWR” terminals on the E-5D / -2D is 500mA.   (For the E-16D the maximum is 150mA.)

Figure 12- Connect visual and audible external indicators

Connect Output Devices

For connection of additional output devices to be controlled by the ENVIROMUX, terminals labeled "Output Relays" have been provided. The contacts will work as switches to either close or open circuits (switch ON or OFF) when used. The “default” position of the switch is configurable independently (page 54) and how the switch reacts to sensor alerts can also be configured on any Sensor Configuration page (page 38).

The status page and any sensor configuration page describe the Output Relay’s status as either “active” or “inactive”.

- When a relay is “**active**”, the circuit will be closed between the **Normally Open** and **Common** contacts of the relay.
- When a relay is “**inactive**”, the circuit will be closed between the **Normally Closed** and **Common** contacts of the relay.

WARNING **OUTPUT RELAY dry contact ratings must not be exceeded. Dry contact rating: DC 30V, 1A; AC 100V, 500mA. The OUTPUT RELAY contacts are not to be connected directly to AC mains wiring.**

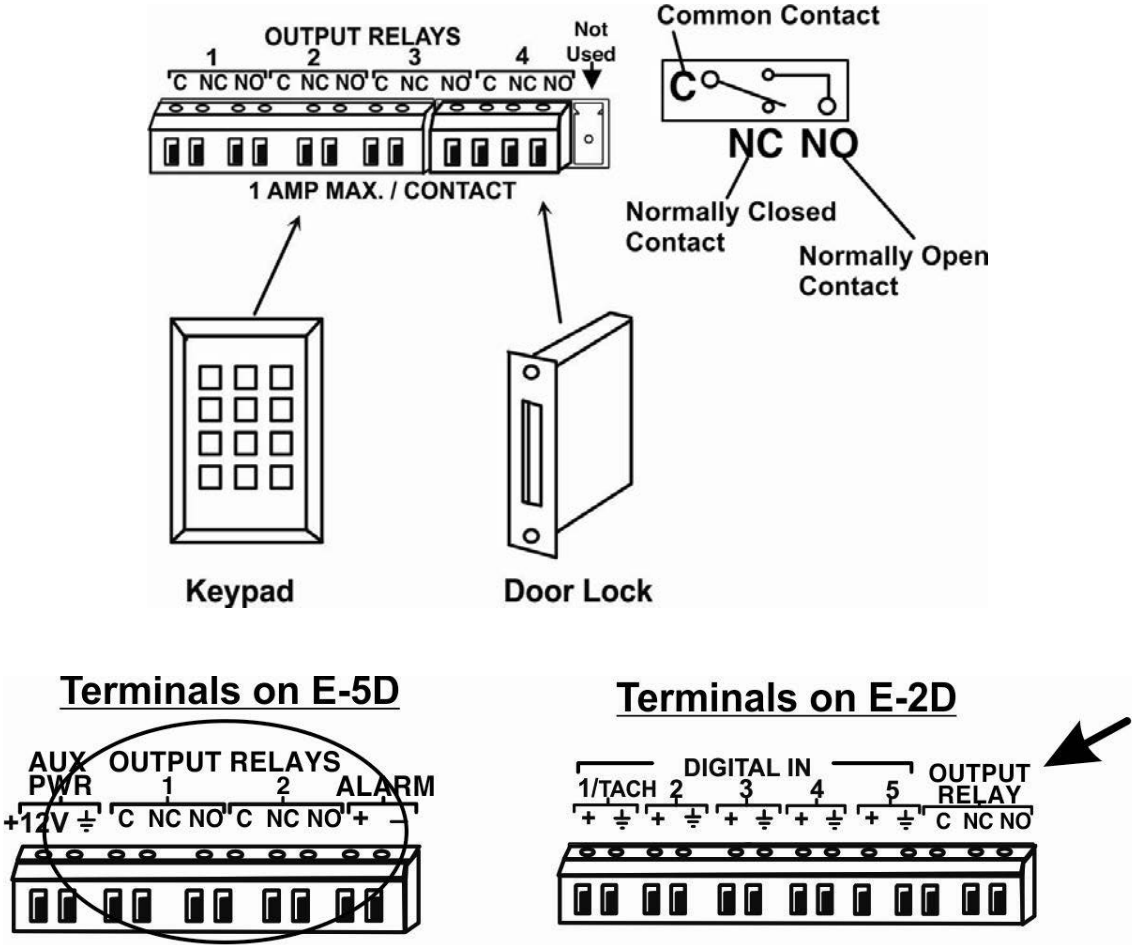


Figure 13- Install additional devices to output terminals

Terminal Connection for RS232

If control via serial connection is going to be used, serial control can be achieved using the “USB Console” port (**all models**) or the “RS232” port (E-16D only) or “RS232 AUX” port (E-5D only). A terminal connection is accessible by the user “root” only.

To use the “RS232” port, connect one end of a CAT5 patch cable (supplied) to the port labeled “RS232” on the rear of the ENVIROMUX. Plug the other end of the CAT5 cable into an RJ45-to-DB9F adapter (supplied), and connect the adapter to the RS232 port on the control terminal. Follow the instruction in the Serial Control Manual for configuration and use of the Serial Control feature.

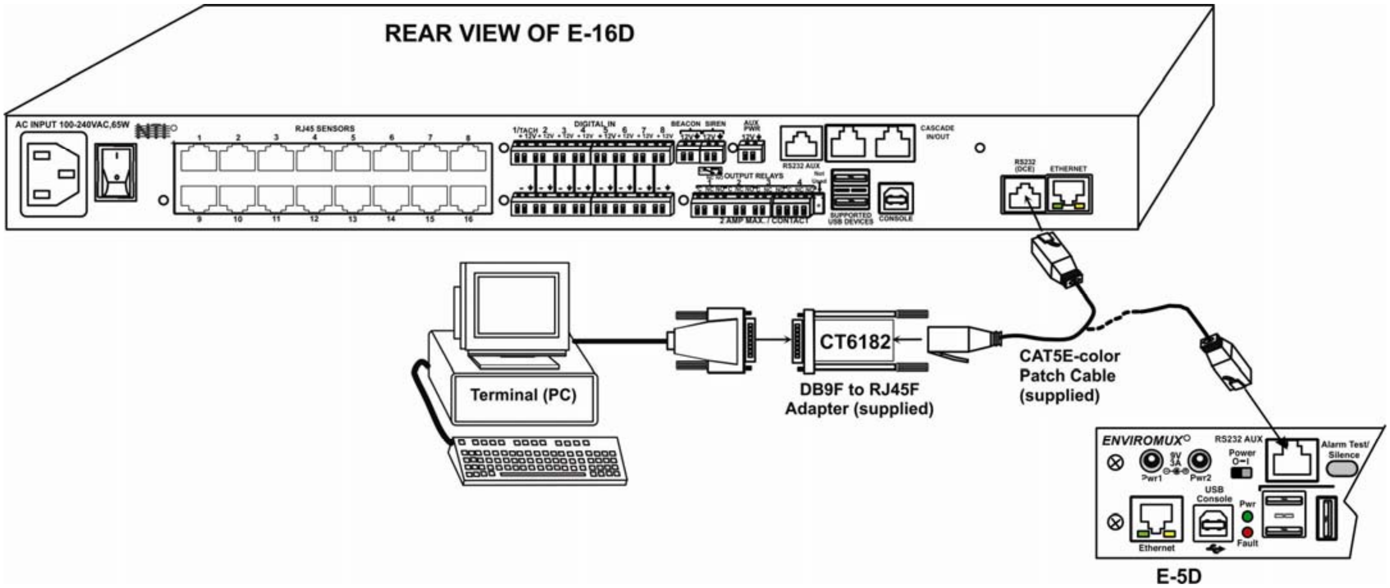


Figure 14- Connect a terminal for direct RS232 serial communication

To use the USB “CONSOLE” port, connect a USB cable (2 meter cable supplied) between the ENVIROMUX and your PC. Then install the drivers as described in the Serial Control Manual.

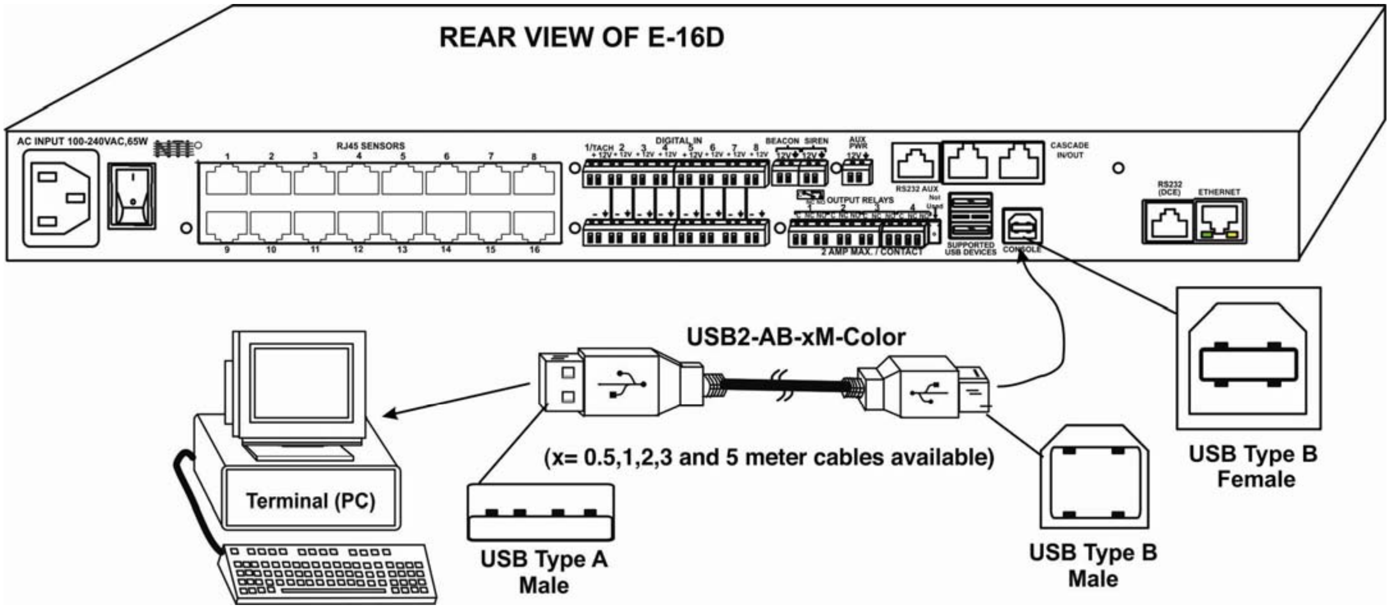


Figure 15- Connect a terminal using USB Console port

Ethernet Connection for Remote User Control

To make a remote connection, over the Ethernet, from anywhere on the local area network, connect a CAT5/5e/6 Ethernet cable with RJ45 male connectors on the ends, wired straight through (pin 1 to pin 1, pin 2 to pin 2, etc.). Up to 8 users can connect to the ENVIROMUX using the Ethernet at a time.

Note: A direct connection from a computer's Ethernet port to the ENVIROMUX "ETHERNET" port may also be made using the same cable.

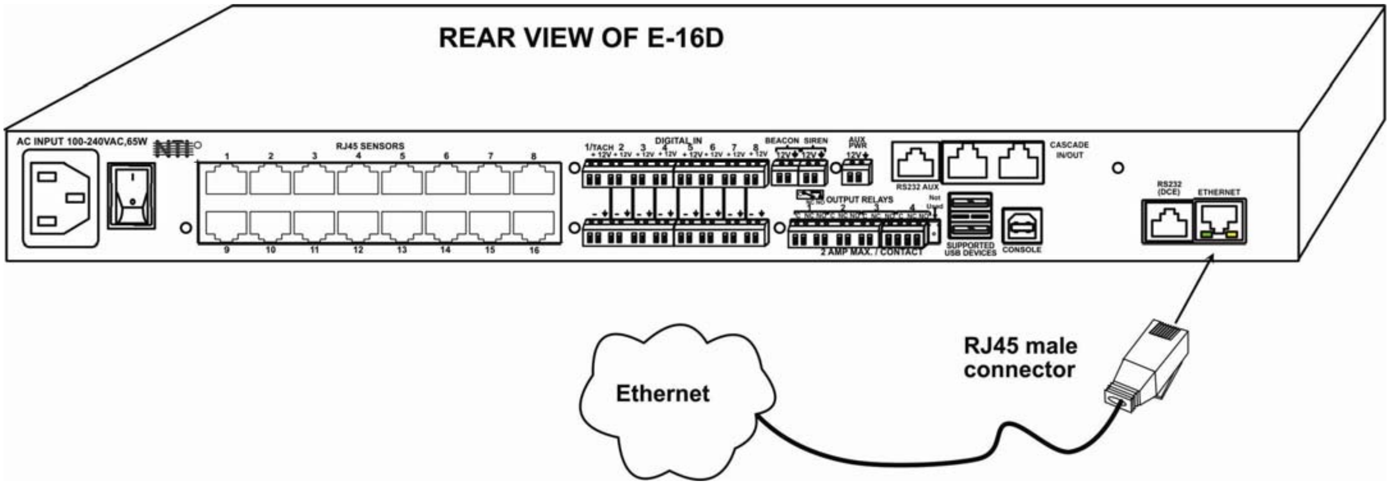


Figure 16- Connect ENVIROMUX to the Ethernet

Modem Connection

The ENVIROMUX includes support for a GSM modem to send alert notifications via SMS to a cell phone if desired. Either a USB GSM modem (**all** models) or a serial GSM modem (E-16D/-5D only) may be connected. Using a modem each user can receive SMS alert messages directly on their cell phone. When a USB 3G modem is used, SMS alert messages, all email messages, and web interface control over the ENVIROMUX is possible.

USB GSM Modem

To use a USB GSM Modem, a USB modem (with GSM SIM card configured for SMS messaging) can be connected to one of the USB ports on the ENVIROMUX. The remaining USB Type A connector(s) on the ENVIROMUX is available for the connection of a USB Flash Drive for data logging (pages 114 and 118).

Once installed, the ENVIROMUX will sense the modem and provide status information on the “Enterprise Setup” page in the web browser (page 68).

The USB GSM modems that have been tested and are confirmed to be compatible with the ENVIROMUX include:

- HiLink E303 3G Modem (**NTI # E-3GU**)
- E-Lins M300D Industrial USB Modem (**NTI# E-3GU-IND)**
- Zoom 4595 Modem
- iCON GI1505(M) 3G Modem
- iCON GI0452 3G Modem
- Teltonica USB/G10 Modem

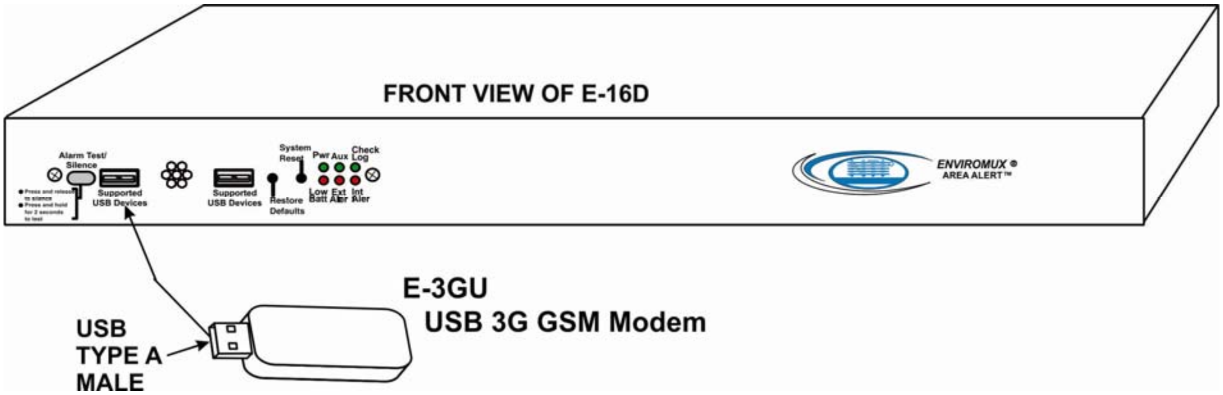


Figure 17- Install USB GSM Modem

Cell phone SIM card for GSM modem

A SIM card or *Subscriber Identity Module* is a portable memory chip used in some models of cellular telephones. It can be thought of as a mini hard disk that automatically activates the phone (or in this case the GSM modem) into which it is inserted.

SIM cards are available in four standard sizes. The first is the size of a credit card (85.60 mm 53.98 mm x 0.76 mm). The next, more popular “mini” version has a width of 25 mm, a height of 15 mm, and a thickness of 0.76 mm. The third, “micro” version measures 15 mm x 12 mm x 0.76 mm, and lastly the “nano” version measures 12.3 mm x 8.8 mm x 0.67 mm.

Some cellular service providers use SIM cards. Verify with your service provider that their SIM card will work with GSM / 3G GSM modems before making a purchase.

Your USB modem can be used for 3 different levels of functionality:

- ➢ SMS Messaging Only
- ➢ 3G Data Transfer And SMS Messaging
- ➢ 3G Data Transfer, SMS Messaging, and Web Interface

SMS Messaging Only

When using your modem only for SMS messaging, make sure the SIM card is for GSM communication (not CDMA), configured to send SMS messages, and that it is not locked (some SIM cards are "locked" to search for a specific IMEI number of the phone to operate).

Note: When configured for SMS messaging only, no access to the ENVIROMUX will be possible through the modem.

3G Data Transfer And SMS Messaging

To use your USB modem for 3G Data connection, your SIM card must be configured to support 3G data connections and have either **public or private** IP address. Make sure the account associated with the SIM card also has SMS messaging enabled if this feature will be used. With 3G data connection support, the ENVIROMUX can be configured (page 74) to send all alert messaging through the USB modem instead of requiring an Ethernet connection for these messages.

Note: When configured for 3G data transfer and SMS messaging only, no access to the ENVIROMUX will be possible through the modem.

3G Data Transfer, SMS Messaging, and Web Interface

To access the web interface through your USB modem, your SIM card must be configured to support 3G data connections and have a **public** IP address. The ENVIROMUX can be configured (page 74) to send all alert messaging through the USB modem instead of requiring an Ethernet connection for these messages. With a public IP address, you will also be able to access the web interface using the IP address of the SIM card for full control of the ENVIROMUX through the modem.

Make sure the account associated with the SIM card also has SMS messaging enabled if this feature will be used.

Contact your service provider to obtain a SIM card with the features you desire.

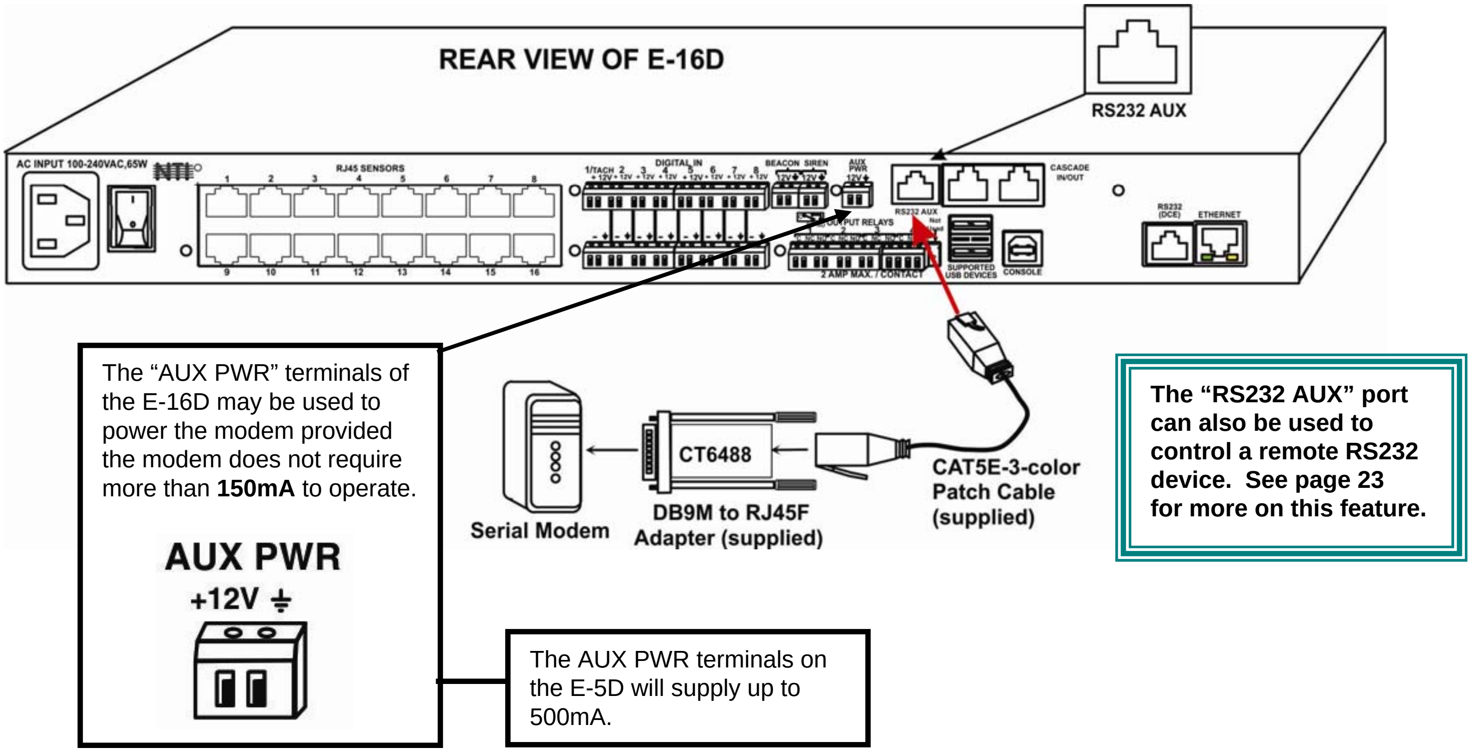
SMS Relay Via SNMP

Your ENVIROMUX can be used as an SMS relay through an SNMP browser (requires firmware version 2.51 or later). SMS messages, up to 160 characters in length, can be sent to up to 4 different phone numbers each when your SNMP browser is properly configured. For more details, see page 160.

Serial GSM Modem

To use a serial modem (E-16D/-5D only), connection of the modem to the ENVIROMUX requires a CAT5 patch cable and RJ45-to-DB9 male adapter (supplied). The modem connects to the "RS232 AUX" port and that port must be configured to use as a GSM Modem (page 65). The firmware in the ENVIROMUX must be version 1.3 or later.

Operation and use of the modem will be the same as that of the USB GSM modem. Once installed, the ENVIROMUX will sense the modem and provide status information on the "Enterprise Setup" page (page 68).



The "AUX PWR" terminals of the E-16D may be used to power the modem provided the modem does not require more than **150mA** to operate.

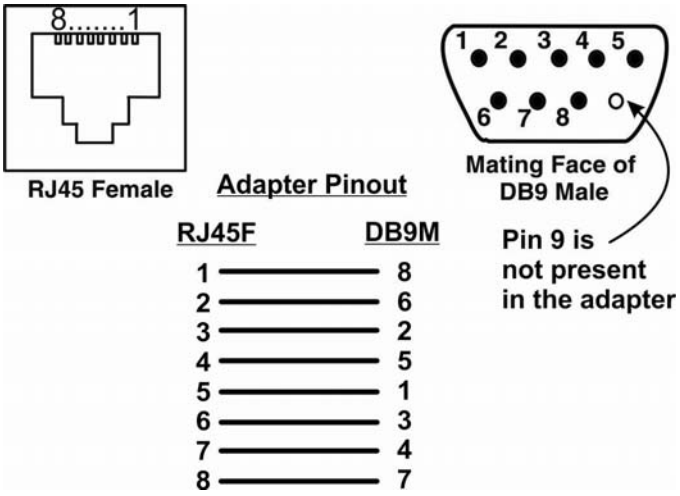
The "RS232 AUX" port can also be used to control a remote RS232 device. See page 23 for more on this feature.

The AUX PWR terminals on the E-5D will supply up to 500mA.

Up to 1000 feet of CAT5E (350Mhz) cable may be used at a baud rate of 115,200bps.

Serial Modems Tested Include:

- Sierra Wireless Airlink MP895
- Four-Faith F1103 (**NTI# E-GSM-IND**)
- MultiTech MTCBA-G-F2
- Enfora GSM1308
- Teltonika ModemCOM/G10



Adapter Pinout

RJ45F	DB9M
1	8
2	6
3	2
4	5
5	1
6	3
7	4
8	7

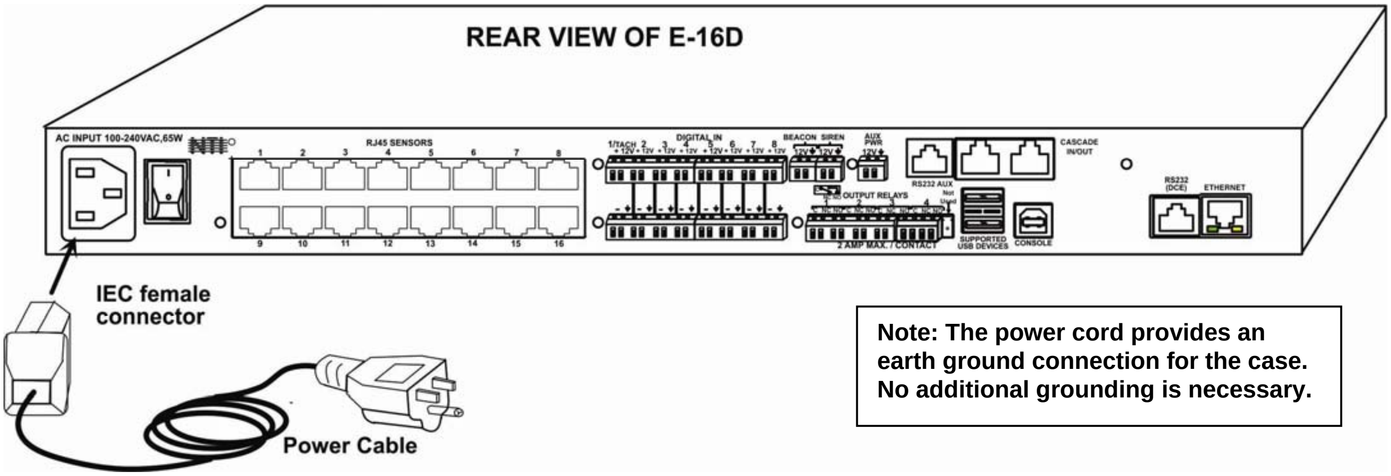
CT6488 Adapter

DB9 Male to RJ45 Pin Assignments

RJ45	Signal		DB9M	Signal
1	RTS	Connected to	8	CTS
2	DTS	Connected to	6	DSR
3	TxD	Connected to	2	RxD
4	GND	Connected to	5	GND
5	GND	Connected to	1	DCD
6	RxD	Connected to	3	TxD
7	DSR	Connected to	4	DTR
8	CTS	Connected to	7	RTS

Power Connection-E-16D

Connect the power cord supplied to the IEC connector on the rear of E-16D. Plug the other end into AC mains and use the switch to power ON ENVIROMUX.



Note: The power cord provides an earth ground connection for the case. No additional grounding is necessary.

Figure 18- Connect the power cord

Dual Power Option

The E-16DDP has two IEC connectors on the rear, for connection to two separate power sources. If the power source connected to “PWR 1” fails, the ENVIROMUX will automatically and without interruption switch over to the power source connected to “PWR 2” before switching to the battery backup (page 117).

Note: If only one power source is used, it should be connected to “PWR 1”.

Note: The power ON/OFF switch is located on the front panel of ENVIROMUX when two IEC connectors are present.

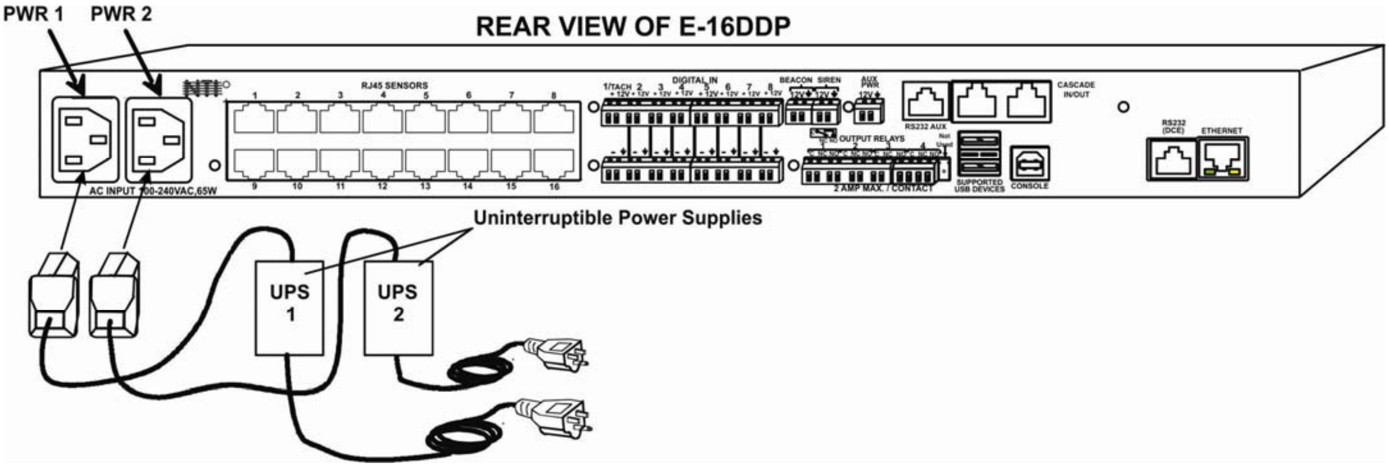


Figure 19- Power connections for ENVIROMUX with Dual Power Option

DC Power Option

The E-16D is available with connections for DC power connection. The E-16D-**48**V can be connected to a 36~72VDC (48VDC nominal) power supply. The E-16D-**24**V can be connected to a 18~36VDC (24VDC nominal) power supply. Each has connections on the rear for a user-supplied DC power supply (minimum 27 watt). This is typically used when the ENVIROMUX is installed in a Telecom environment. The E-16D-xxV will accept a DC power source with positive or negative polarity. A removable 3-pole screw terminal is provided for easy connection. The image below shows an E-16D-48VDP, which has dual 48VDC power connections for a dual power supply option (also available for the 24VDC model).

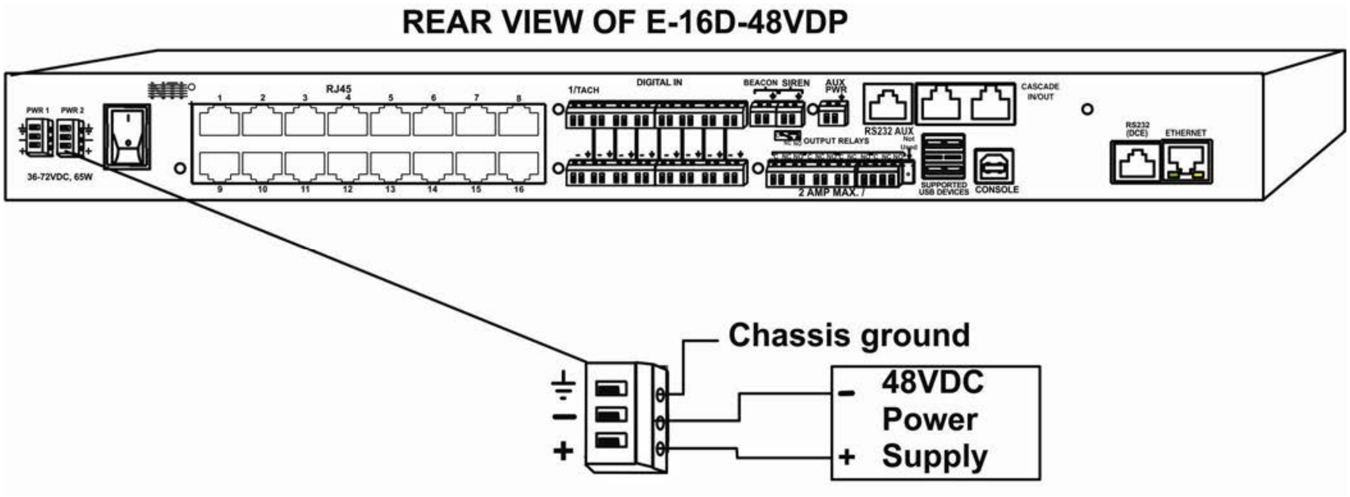
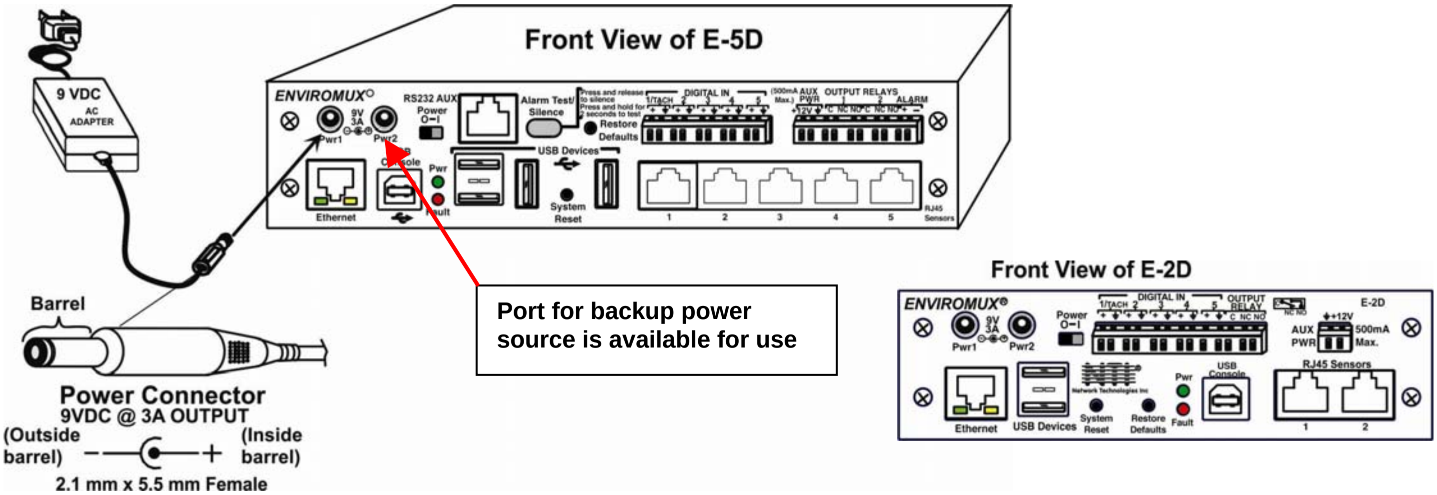


Figure 20- 48VDC Power Option Connections

Power Connection- E-5D/-2D

Note: Sensors should be connected before supplying power to the ENVIROMUX.

Connect the AC adapter to the connection marked "PWR1" or "PWR2" on the ENVIROMUX and plug it into an outlet. If you have an alternate source of 9V power for the ENVIROMUX, the second PWR connection is provided to make that source available. If the source connected to "PWR1" is lost for any reason, the ENVIROMUX will automatically switch to receiving power from the source connected to "PWR2".



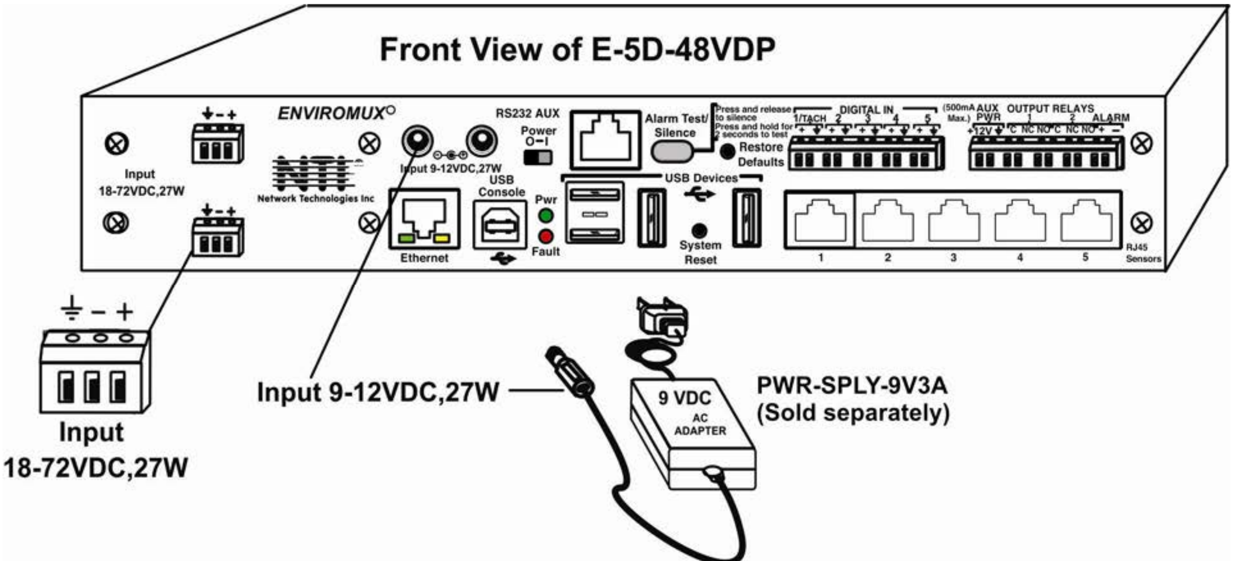
Port for backup power source is available for use

E-5D(B)-IND uses a 9VDC 5A power supply with 2.5mm x 5.5mm Female connector.

Figure 21- Connect the AC adapter and power-up

The E-5D-48V is available with connections for a 18~72VDC (24 or 48VDC nominal) user-supplied power supply. This is typically used when the ENVIROMUX is installed in a Telecom environment. The E-5D-48V will accept a DC power source with positive or negative polarity. A removable 3-pole screw terminal is provided for easy connection. The image below shows an E-5D-48VDP, which has dual 18-72VDC power connections for a dual power supply option.

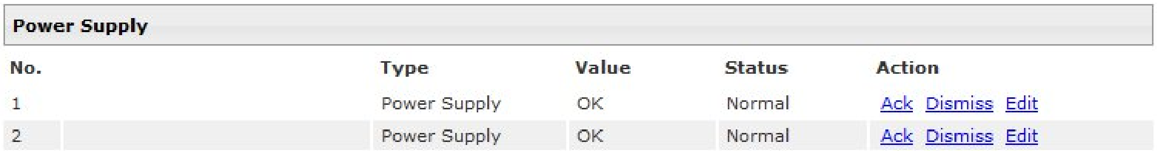
For your convenience, the power jacks for connecting and AC adapter are also provided, and may be used as well. These jacks will accept 9-12VDC (9VDC 3A power supply may be purchased separately-order PWR-SPLY-9V3A). All power connections can be used simultaneously without damage to the ENVIROMUX.



Note: The E-5D-48VINDLT has a narrower input voltage range of 36-72VDC.

Figure 22- Power connections on E-5D-48VDP

Note: The power supply monitor on the sensor summary page will only display the status of the 18-72VDC connections. The 9-12VDC power connections will be ignored on the E-5D-48V(DP) models.



Power Supply

No.		Type	Value	Status	Action
1		Power Supply	OK	Normal	Ack Dismiss Edit
2		Power Supply	OK	Normal	Ack Dismiss Edit

Figure 23- Power Supply sensors-Summary Page

Remote RS232 Device Control

The "RS232 AUX" port can be used to connect a remote serially-controlled device (E-5D and -16D only). Once connected, a user named "rs232" can login to the ENVIROMUX from a command prompt and begin sending commands directly to the serial device.

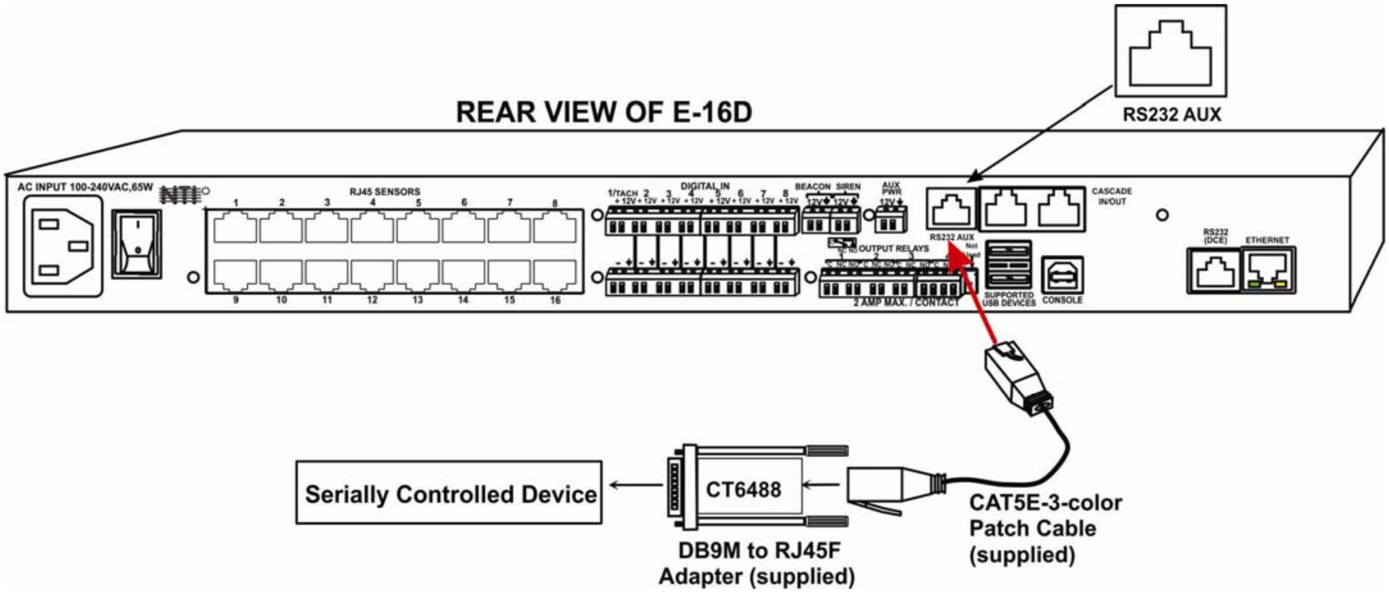
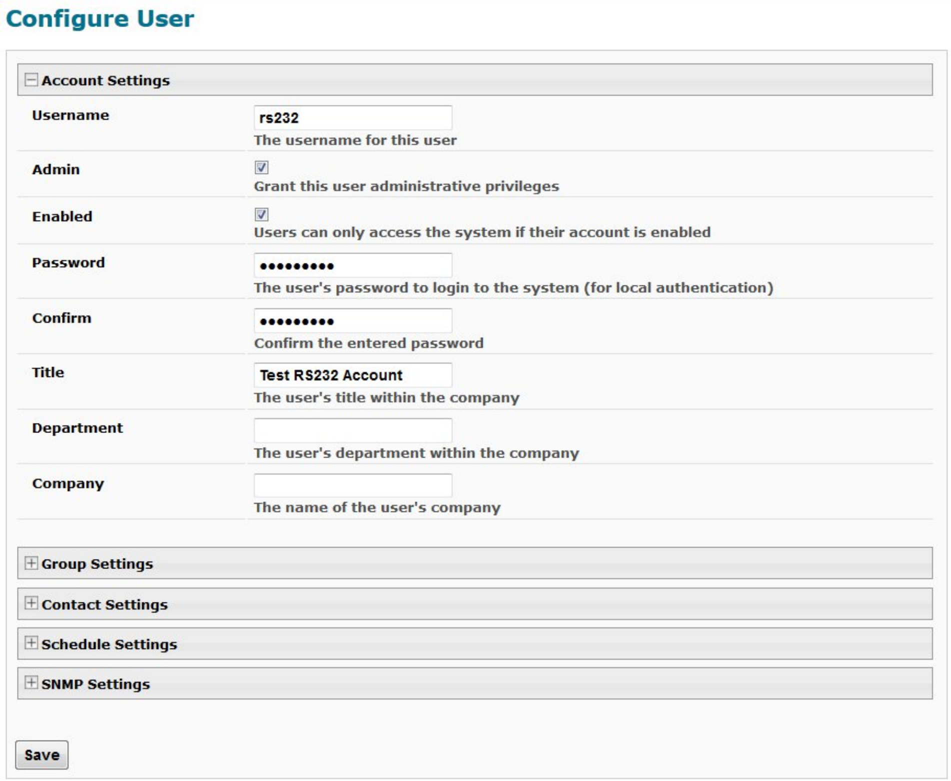


Figure 24- Connect serially controlled device

To control a remote serially-controlled device from the "RS232 AUX" port:

1. Configure the "Auxiliary Serial Port" under System Configuration (page 65) as a **Remote Serial Port** with the correct parameters for communication with the device.

2. Setup a user named "rs232" (**must be lowercase letters**) with password under User Configuration (page 79)



Configure User

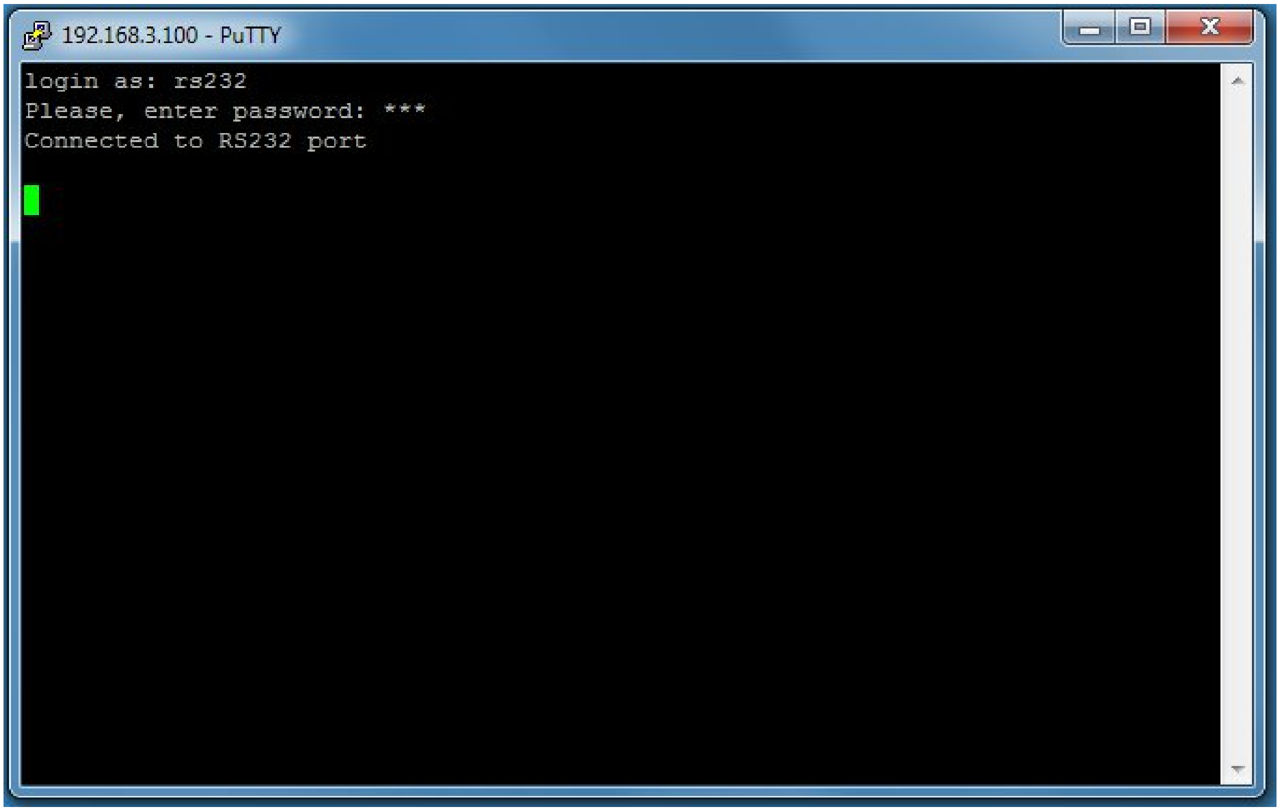
⊟ Account Settings

Username	rs232 The username for this user
Admin	☑ Grant this user administrative privileges
Enabled	☑ Users can only access the system if their account is enabled
Password	••••••••• The user's password to login to the system (for local authentication)
Confirm	••••••••• Confirm the entered password
Title	Test RS232 Account The user's title within the company
Department	The user's department within the company
Company	The name of the user's company

Figure 25- Create user "rs232"

3. Open a SSH client program (Putty, Tera Term, etc.), connect to the ENVIROMUX by entering the IP address of the ENVIROMUX.
4. When prompted for a login, enter "**`rs232`**".
5. When prompted, enter the password you have assigned.

With a successful login you will receive the message "Connected to RS232 port". You are now ready to send commands directly to the connected serially controlled device.



```
login as: rs232
Please, enter password: ***
Connected to RS232 port
```

Figure 26- Connection to serial device successful

To exit the connection, close the command window.

OVERVIEW - USE AND OPERATION

The ENVIROMUX is controlled via RS232 or Ethernet using a terminal emulator, web browser, or SNMP monitor. The user interfaces are for viewing and configuring sensor data and system settings. However, full configuration of the system can be done only through the Web browser due to graphics limitations in the other interfaces.

The web interface allows for the configuration of the thresholds for all attached sensors, their alert methods, and the formats of the alerts. In addition, network information (IP address, subnet mask, default gateway, DNS, etc.), user administrative settings, and log settings can also be configured. All settings are saved in memory when applied. A user may also restore the unit back to its default settings at any time via the web interface (see page 64), text menu (see Serial Control Manual) or a button on the front panel (page 117).

Individual sensor status pages are available for each connected sensor. A sensor summary page allows the user to view the connected sensors' current values, threshold settings and alert statuses. Also, the user can view recorded sensor readings that have been stored in the system data log.

Sensors

The ENVIROMUX provides RJ45 sensor input jacks and screw terminal ports. Some available sensor configurations include Temperature, Humidity, or Temperature+Humidity, Liquid, Vibration, Smoke, Motion Sensor, Glassbreak detector, and AC Line Monitors. See page 2 for more on available sensors.

The temperature/humidity sensors have been given factory default settings and thresholds that can be changed (see page 38). Sensor readings can be reported continuously, only when readings change, or at a regular rate (for instance, a temperature reading could be updated once each hour).

Sensors connected to the terminals labeled "Digital In" must be manually configured, and can be any sensor of contact-closure / open-collector type that operate on 12VDC and 50mA, with a maximum load resistance of 10kΩ or less. (See page 51 for more info.)

IP Assignment

An IP address can be assigned to the ENVIROMUX through any of three methods:

- Using the NTI Device Discovery Tool (page 28)
- Through the web interface on the Network page (page 71)
- Using the RS232 interface (Serial Control Manual)

Initially, IP configuration will be the easiest to change using the NTI Device Discovery Tool, which will search for NTI devices on the user's network and allow IP assignment to them through its web interface. Other settings for subnet mask and default gateway may also be configured (see page 28). These settings must be configured properly in order to access the ENVIROMUX web interface.

User Management

The ENVIROMUX supports up to 16 user accounts plus the root account (page 79). Each user account is protected by local password authentication. Each user may be assigned "User" or "Administrative" privileges. Users accessing the ENVIROMUX will be granted access to only the monitoring functions, and will be able to view the log. An account with "Administrative" privileges has all of the privileges necessary to view and configure network settings, add/edit/delete other user accounts, configure sensors, etc..

Alerts

A high and low threshold limit can be set for each temperature or humidity sensor within the operating range of the sensor. Each open collector/contact-closure sensor can be set as normally-open or normally-closed. When a sensor takes a reading that is outside a threshold or a contact-closure sensor is not in its normal condition, an alert notification can be generated. The user can specify how often alert notifications are provided. Also, there is an adjustable alert delay time involved with alert notifications. This means if a sensor's readings are moving in and out of the threshold boundaries within a configurable period of time, additional alert notifications will not be sent. Alerts may be sent if the condition of the sensor returns to normal or back within its threshold boundaries. Alert notifications (page 45) will be provided through any or all of six main methods:

- visible notification via the user interfaces (red LED on front panel, beacon, alert on webpage)
- emails (up to 17 different addresses)
- SNMP Traps
- SMS Messages (up to 68 different phone numbers)
- Syslog Messages
- audible notification via siren

Data and Event Logging

The ENVIROMUX can log sensor readings, sensor alerts, alert handling, sensor connections/removals, and user logins/logouts. The logs can be viewed at any time through the web interface (page 110). Additionally, as entries are generated, they can be emailed or sent as SNMP traps. Entries can be deleted from the logs via the web interface. The maximum size of each log is 1000 entries, listed in chronological order. Each log's behavior upon reaching this maximum size can be configured, allowing the log to either wrap (overwrite oldest entries), stop logging, or clear and start over. The entire log can be downloaded as a plain text file from the web interface at any time. Log entries can be removed individually, in groups, or all at once.

Email

The ENVIROMUX can access an outgoing SMTP server (authenticated or non-authenticated, with or without SSL encryption) to send email. Outgoing mail may contain pre-formatted alert notifications or data log messages (samples on page 110). The user can configure what conditions cause emails to be sent. The ENVIROMUX's email address can be configured through the web interface on the Enterprise Setup page (page 68), and SMTP server information can be configured on the Network Setup page (page 71). Up to 17 outgoing email addresses (112 characters max. including commas) may be configured (corresponding to the 16 user and 1 root email addresses). An example of email configuration can be found on page 129.

Syslog

The ENVIROMUX can send alerts as SYSLOG messages when a sensor enters/leaves alert mode, and for all log events. The destination for SYSLOG can be configured in each user profile (page 81). For detailed instructions on setting up Syslog, see page 136.

SNMP

The ENVIROMUX can send alerts as SNMP traps when a sensor enters/leaves alert mode, and for all log events. Using an SNMP MIB browser, a user can monitor all sensor statuses and system IP settings, as well as configure sensor thresholds, sensor names, and the system name. Click on the checkbox for SNMP under contacts (page 81) for each user that should receive SNMP messages. The SNMP agent supports SNMP v1, v2c and v3.

Note: The SNMP MIB file (sems-16-v1.xx.mib), for use with an SNMP MIB browser, can be found at http://www.networktechinc.com/download/d-environment-monitor-16.html.

Modbus TCP/IP Support

The ENVIROMUX is equipped with Modbus TCP/IP support to enable PLC controls to read the value/state of sensors and read and command the state of relays.

External Modem

An external modem (GSM) can be connected to allow the system to send alert notifications via SMS messages. When a sensor crosses a threshold, an alert notification can be formatted to SMS message (see page 81) and the modem could transmit the message to pre-specified cellular numbers (up to 17- one for each user). The external modem can be supplied from an external power supply or from the USB port.

Power-on/Reset Operation

On power-up, after going through its boot sequence, the ENVIROMUX will launch the monitoring application, load any stored configuration values, and immediately identify and begin taking readings from any connected sensors. Alerts will be reported using the configured alert methods, and data will be logged using the stored preferences. A user can log in at any time after the system has launched the monitoring application (approximately 60 seconds after power is applied) to view and configure properties of the system and its sensors.

FYI: The boot sequence can also be initiated manually using the System Reset button. See page 116 for details.

Out-of-Box Operation

The operation of the unit directly out of the box is nearly identical to the Power-on/Reset operation. However, information about the unit will only be able to be monitored and controlled through the "RS232" or "CONSOLE" ports until valid network settings are assigned to the device (see page 71). The RS232 provides only limited configuration options, pertaining mostly to Ethernet settings.

Alert notifications will only be able to be viewed through the front panel until network settings are configured. Email and SNMP alert notifications must be configured within the web interface (page 63) before these methods can be used. The network settings must be compatible with the physical network to which the ENVIROMUX is attached. Once these configurations are made, they will be saved in the unit, even if the ENVIROMUX is powered-OFF.

Expandability

Multiple ENVIROMUX units may be used together on one system, so as to increase the number of sensors the user can have connected. Despite having multiple units, the user does not have to access the webpage of each ENVIROMUX individually. Up to 4 units can be cascaded from a single ENVIROMUX with all of the data from each of the units displayed on one webpage.

DEVICE DISCOVERY TOOL

In order to easily locate NTI Devices on a network, the NTI Device Discovery Tool may be used. The Discover Tool can be downloaded from http://www.networktechinc.com/download/d-environment-monitor-16.html, unzipped and saved to a location on your PC. To open it just double-click on the file `NTIdiscover.jar` . This will open the NTI Device Discovery Tool.

Note: The Device Discovery Tool requires the Java Runtime Environment (version 6 or later) to operate. Here is a link to the web page from which it can be downloaded.

Note: The computer using the Device Discovery Tool and the NTI Device must be connected to the same subnet in order for the Device Discovery Tool to work. If no devices are found, the message "No Devices Found" will be displayed.

Tip: If your Windows program asks which program to open the `NTIDiscover.jar` file with, select the Java program.

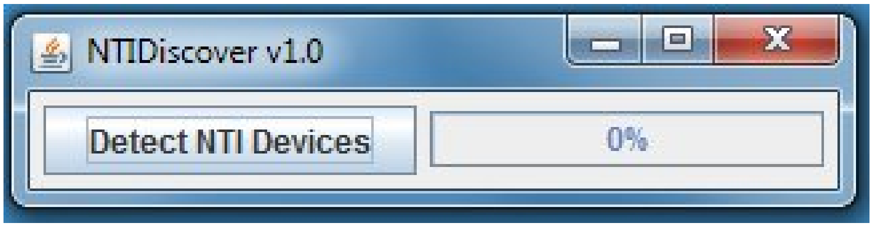
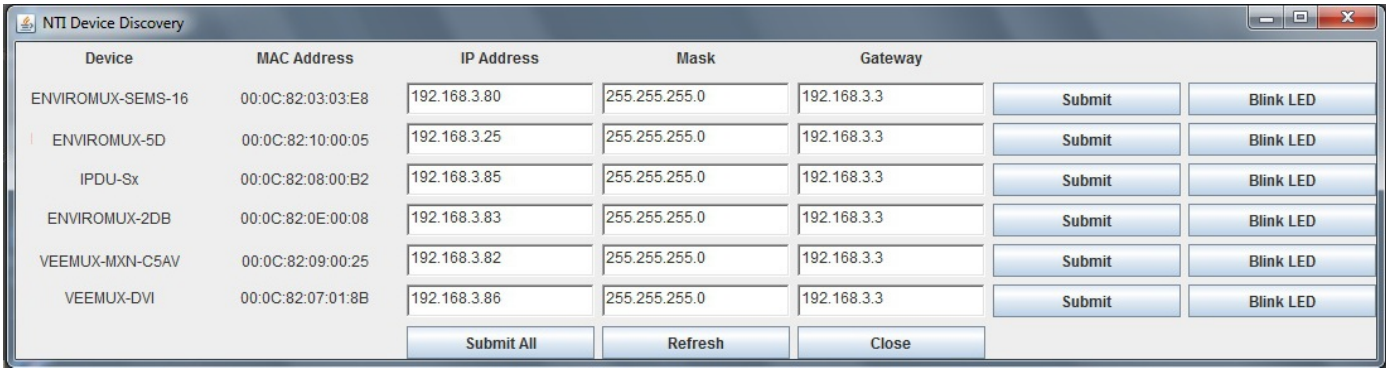


Figure 27- Device Discovery Tool

Click on the "**Detect NTI Devices**" button to start the discovery process. After a short time, the tool will display all NTI devices on your network, along with their network settings.



Device	MAC Address	IP Address	Mask	Gateway		
ENVIROMUX-SEMS-16	00:0C:82:03:03:E8	192.168.3.80	255.255.255.0	192.168.3.3	Submit	Blink LED
ENVIROMUX-5D	00:0C:82:10:00:05	192.168.3.25	255.255.255.0	192.168.3.3	Submit	Blink LED
IPDU-Sx	00:0C:82:08:00:B2	192.168.3.85	255.255.255.0	192.168.3.3	Submit	Blink LED
ENVIROMUX-2DB	00:0C:82:0E:00:08	192.168.3.83	255.255.255.0	192.168.3.3	Submit	Blink LED
VEEMUX-MXN-C5AV	00:0C:82:09:00:25	192.168.3.82	255.255.255.0	192.168.3.3	Submit	Blink LED
VEEMUX-DVI	00:0C:82:07:01:8B	192.168.3.86	255.255.255.0	192.168.3.3	Submit	Blink LED

How to Use the Device Discovery Tool

To Change a Device's Settings, within the row of the device whose settings you wish to change, type in a new setting and click on the **Enter** key, or the **Submit** button on that row. If the tool discovers more than one device, the settings for all devices can be changed and you can click on the **Submit All** button to submit all changes at once.

To Refresh the list of devices, click on the **Refresh** button.

To Blink the LEDs of the unit, click on the **Blink LED** button (This feature is not supported on all products.) The **Blink LED** button will change to a "**Blinking….**" button. The LEDs of the unit will blink until the **Blinking…** button is clicked on, or the NTI Device Discovery Application is closed. The LEDs will automatically cease blinking after 2 hours.

To Stop the LEDs of the unit from blinking, click on the **Blinking…** button. The **Blinking….** button will change to a **Blink LED** button.

USE AND OPERATION VIA WEB INTERFACE

A user may monitor and configure the settings of any device connected to the ENVIROMUX using the Web Interface via any web browser (see page 4 for supported web browsers). To enable the Web Interface, connect the ENVIROMUX to the Ethernet (page 16). Use the Device Discovery Tool (page 28) to setup the network settings. Then, to access the web interface controls, the user must log in.

Note: In order to view all of the graphics in the Web Interface, the browser's JavaScript and Java must be enabled.

By default, the ENVIROMUX is configured to dynamically assign network settings received from a DHCP server on the network it is connected to. (This can be changed to a static IP address to manually enter these settings in the Network Settings on page 71.) The ENVIROMUX will search for a DHCP server to automatically assign its IP address each time the unit is powered up. If the ENVIROMUX does not find a DHCP server, the address entered into the static IP address field (page 71 -default address shown below) will be used. If a DHCP server on the network has assigned the IP address, use the Device Discovery Tool to identify the IP address to enter when logging in to the ENVIROMUX.

Note: The computer using the Device Discovery Tool and the NTI Device must be connected to the same subnet in order for the Device Discovery Tool to work. If no devices are found, the message "No Devices Found" will be displayed.

Log In and Enter Password

To access the web interface, type the current IP address into the address bar of the web browser. (The default IP address for the ENVIROMUX is shown below):

http://192.168.1.21

Note: If an E-3GU USB modem is installed (page 17) and configured to enable access to the web interface through it (page 74), you can instead enter the IP address of the SIM card account (requires E-xD firmware version 2.5 or later.) If the ENVIROMUX is properly configured, you can view the SIM card IP address on the system information page (page 91).

Note: If HTTPS pages cannot be viewed in the browser ("The page cannot be displayed" message appears) try to disable SSL 2.0 and TLS 1.0 from advanced options of the browser.

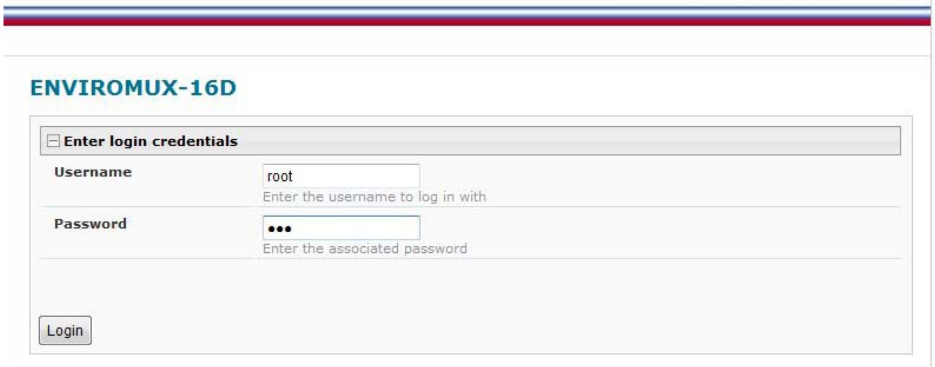
A log in prompt requiring a username and password will appear:

Username = root

Password = nti

(lower case letters only)

Note: usernames and passwords are case sensitive



ENVIROMUX-16D

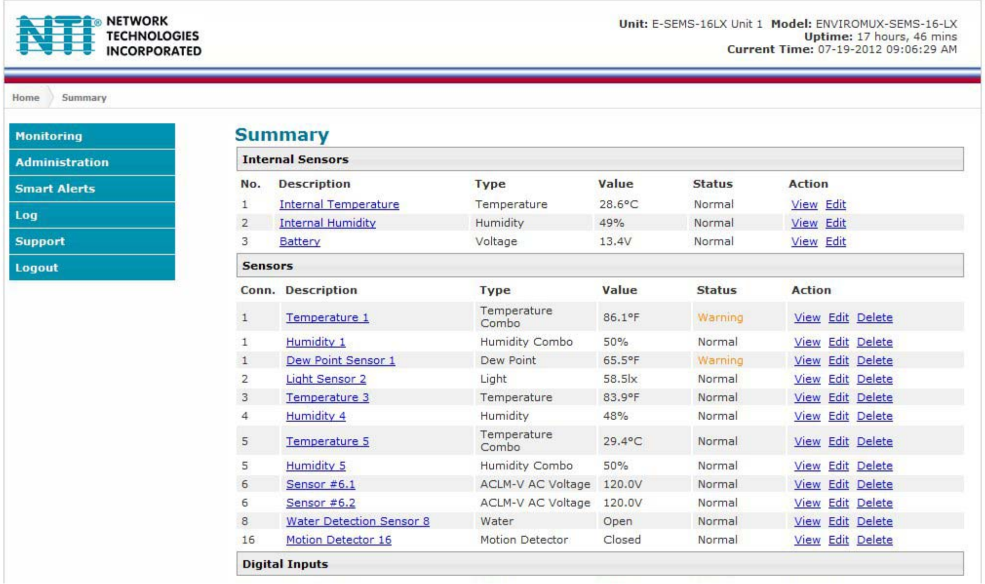
Enter login credentials

Username: root
Enter the username to log in with

Password: •••
Enter the associated password

Figure 28- Login prompt to access web interface

With a successful log in, a screen similar to the following will appear:



Unit: E-SEMS-16LX Unit 1 **Model:** ENVIROMUX-SEMS-16-LX
Uptime: 17 hours, 46 mins
Current Time: 07-19-2012 09:06:29 AM

Summary

Internal Sensors

No.	Description	Type	Value	Status	Action
1	Internal Temperature	Temperature	28.6°C	Normal	View Edit
2	Internal Humidity	Humidity	49%	Normal	View Edit
3	Battery	Voltage	13.4V	Normal	View Edit

Sensors

Conn.	Description	Type	Value	Status	Action
1	Temperature 1	Temperature Combo	86.1°F	Warning	View Edit Delete
1	Humidity 1	Humidity Combo	50%	Normal	View Edit Delete
1	Dew Point Sensor 1	Dew Point	65.5°F	Warning	View Edit Delete
2	Light Sensor 2	Light	58.5lx	Normal	View Edit Delete
3	Temperature 3	Temperature	83.9°F	Normal	View Edit Delete
4	Humidity 4	Humidity	48%	Normal	View Edit Delete
5	Temperature 5	Temperature Combo	29.4°C	Normal	View Edit Delete
5	Humidity 5	Humidity Combo	50%	Normal	View Edit Delete
6	Sensor #6.1	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
6	Sensor #6.2	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
8	Water Detection Sensor 8	Water	Open	Normal	View Edit Delete
16	Motion Detector 16	Motion Detector	Closed	Normal	View Edit Delete

Digital Inputs

Figure 29- Summary page

The initial page includes the Summary page, and a menu to the left with access to all pages used to manage the functions of the ENVIROMUX.

Function	Description
MONITORING	Monitor all the sensor and data input received by the ENVIROMUX (below)
ADMINISTRATION	**Configure all network and multi-user access settings (page 63)**
SMART ALERTS	View and configure the Events used for Smart Alerts and the Smart Alerts themselves (page **99**)
LOG	View and configure the Event and Data Logs (page 112)
SUPPORT	Links for downloading a manual, the MIB file, or firmware upgrades
LOGOUT	Log the user out of the ENVIROMUX web interface

Monitoring

Under Monitoring, there are links to view the sensors, IP cameras, IP address data and more being monitored by ENVIROMUX.

Topic	Description
Summary	Lists all monitored items , including their type, description, value, and status
Alarm Summary	Lists all sensors that are in alarm state including their type, description, value, and status (page 35)
Sensors	Provides a link to view the status of specific Internal and External Sensors (page 36 and 42)
Digital Inputs	Provides a link to view the status of each Digital Input (page 51)
IP Devices	Provides a link to view the status of only the IP Devices and a link to add them (page 56)
IP Sensors	Provides a link to view the status of each IP Sensor configured (page 60)
Output Relays	Provides a link to view the status of each Output Relay (page 54)
IP Cameras	Provides a link to view each IP camera defined- with a link to the configuration page (page 56)
Power Supplies	Provides a link to view the status of each power supply- with a link to the configuration page (page 32)

Summary Page

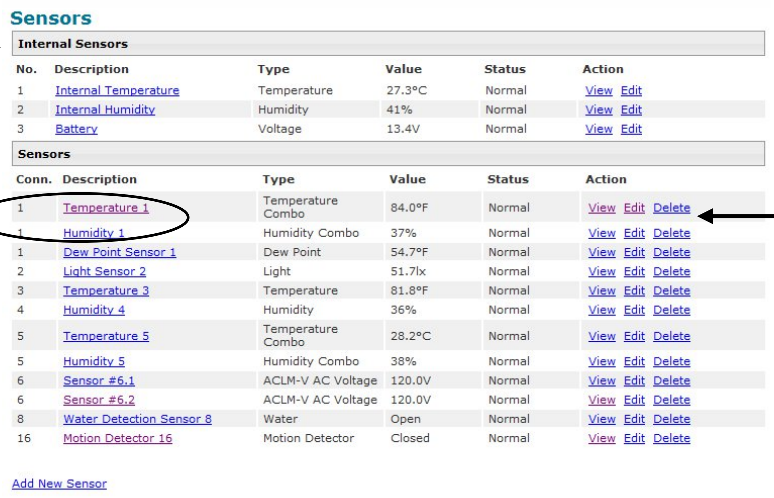
The Summary Page displays the data for all categories of monitored items:

Category	Description
Internal Sensors	there are three inside the ENVIROMUX
Sensors	sensors that connect to the RJ45 connectors
Digital Inputs	sensors that connect to the terminals "Digital In"
IP Devices	IP Addresses that can be monitored by ENVIROMUX
IP Sensors	sensors connected to E-MICRO that are being monitored
Output Relays	Relays that open or close depending on alert status
AC Power	Indicates the status of the power supply(s)
Smart Alerts	Displays the status of each Smart Alert configuration (page **99**) and provides link to respond when triggered

To see the settings of each sensor, click on the link in the description column for the desired sensor.   Click on the browser's Back button to return to the summary.

Internal sensors measure the inside of the E-16D, not the environment the ENVIROMUX is mounted in.

Double-function sensor (see page 35)



Sensors

Internal Sensors

No.	Description	Type	Value	Status	Action
1	Internal Temperature	Temperature	27.3°C	Normal	View Edit
2	Internal Humidity	Humidity	41%	Normal	View Edit
3	Battery	Voltage	13.4V	Normal	View Edit

Sensors

Conn.	Description	Type	Value	Status	Action
1	Temperature 1	Temperature Combo	84.0°F	Normal	View Edit Delete
1	Humidity 1	Humidity Combo	37%	Normal	View Edit Delete
1	Dew Point Sensor 1	Dew Point	54.7°F	Normal	View Edit Delete
2	Light Sensor 2	Light	51.7lx	Normal	View Edit Delete
3	Temperature 3	Temperature	81.8°F	Normal	View Edit Delete
4	Humidity 4	Humidity	36%	Normal	View Edit Delete
5	Temperature 5	Temperature Combo	28.2°C	Normal	View Edit Delete
5	Humidity 5	Humidity Combo	38%	Normal	View Edit Delete
6	Sensor #6.1	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
6	Sensor #6.2	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
8	Water Detection Sensor 8	Water	Open	Normal	View Edit Delete
16	Motion Detector 16	Motion Detector	Closed	Normal	View Edit Delete

Add New Sensor

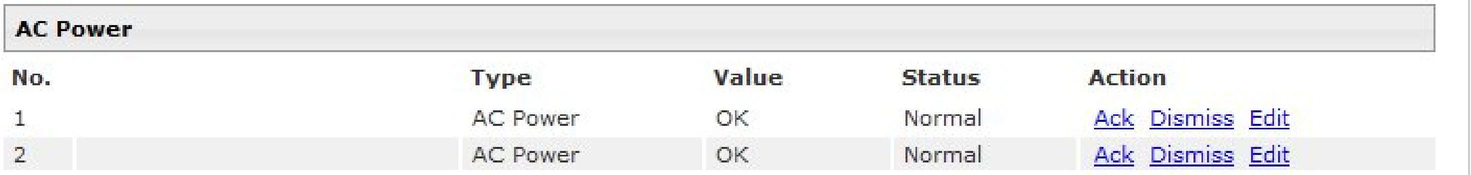
To delete a sensor from this list, select "**Delete**".   A pop-up confirmation window will appear before removal takes place.

Figure 30- Summary Page

Note: The E-16D internal sensor is not intended to measure room temperature/humidity. This sensor measures the environment inside the metal case which is affected by the heat generated by the power supplies as well as the amount of airflow moving through the unit. Typically this sensor will read 3-8˚C (37-46˚F) above room temperature.

Power Supplies

The status of the power supply can be seen, and when a dual power supply model is present, both power supplies will be shown. Click on the power supply to open a web page that displays the type of item sensed, the status of the power supply, and the time and date of the most recent alert sent regarding the power supply.



AC Power

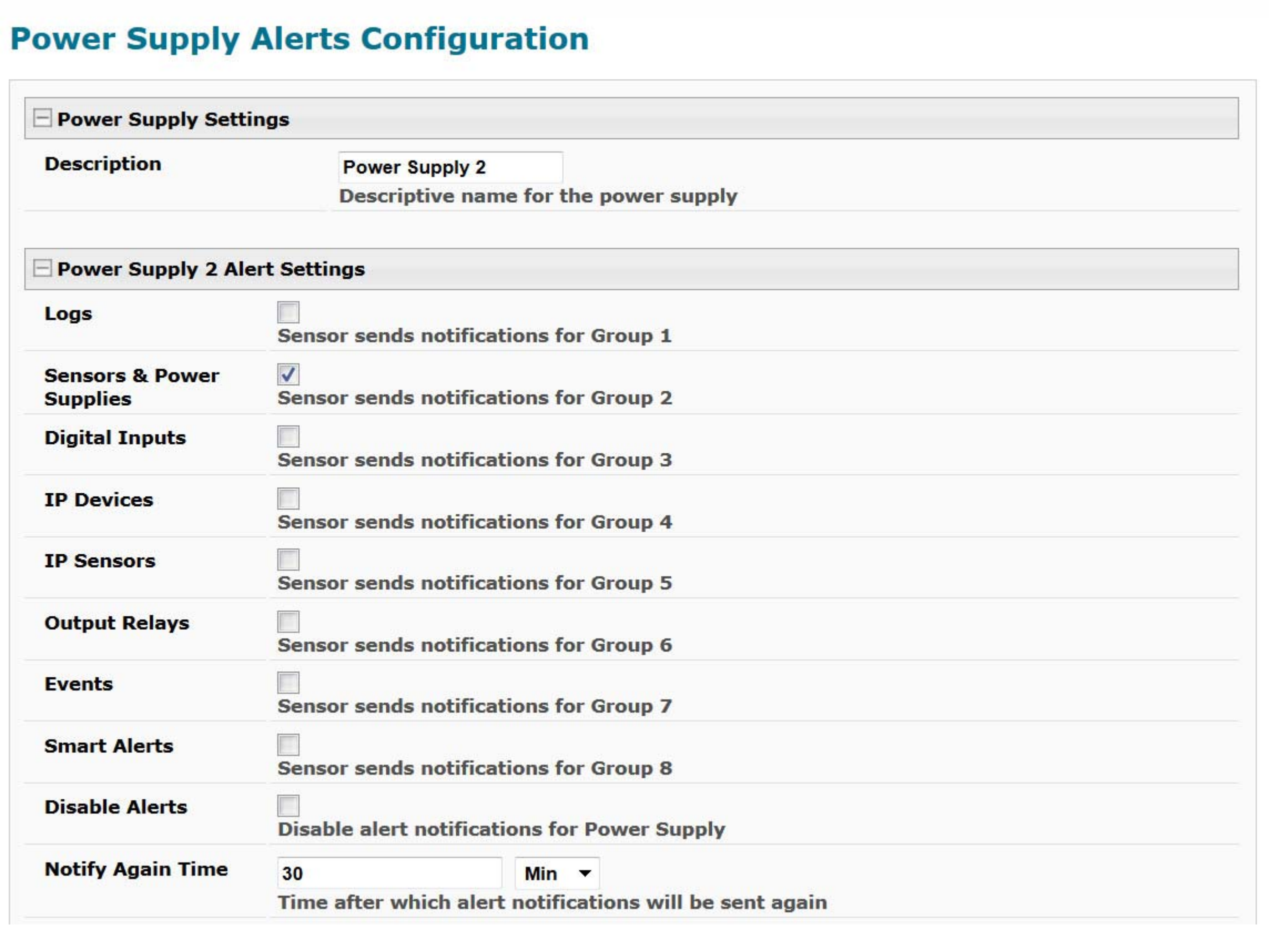
No.		Type	Value	Status	Action
1		AC Power	OK	Normal	Ack Dismiss Edit
2		AC Power	OK	Normal	Ack Dismiss Edit

Figure 31- Power Supply status- Dual Power model

If the power supply is in alert status, the user has the option to either **acknowledge** the alert or **dismiss** it. If the user acknowledges the alert, no additional alert messages will be sent during that alert status cycle. If the user dismisses the alert, another alert message will be sent once the “notify again after” time designated on the configuration page (below) elapses.

The **Edit** option allows the user to apply a description for and configure alert parameters of the power supply.

Power Supply Alert Configuration



Power Supply Alerts Configuration

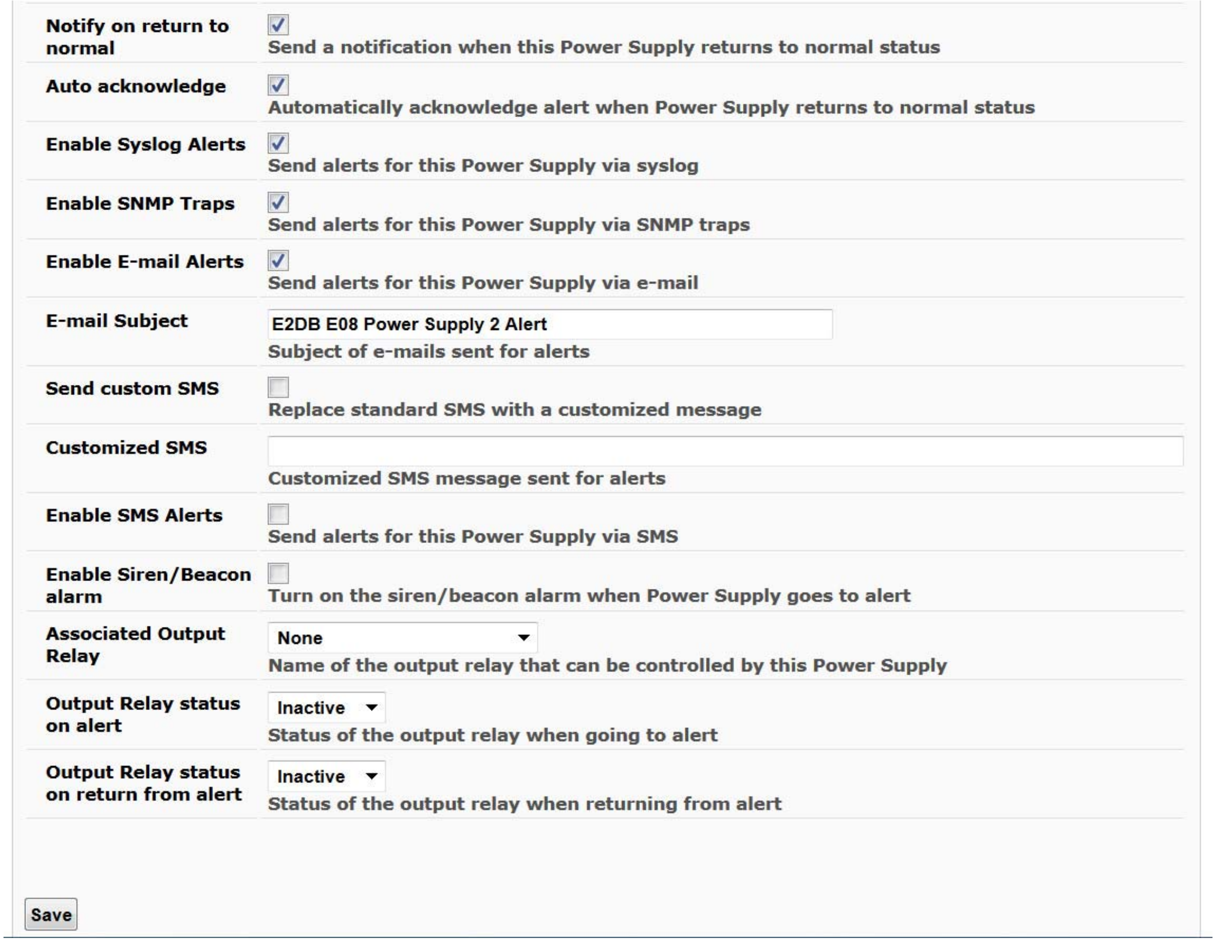
⊟ Power Supply Settings

Description	Power Supply 2 Descriptive name for the power supply

⊟ Power Supply 2 Alert Settings

Logs	□ Sensor sends notifications for Group 1
Sensors & Power Supplies	☑ Sensor sends notifications for Group 2
Digital Inputs	□ Sensor sends notifications for Group 3
IP Devices	□ Sensor sends notifications for Group 4
IP Sensors	□ Sensor sends notifications for Group 5
Output Relays	□ Sensor sends notifications for Group 6
Events	□ Sensor sends notifications for Group 7
Smart Alerts	□ Sensor sends notifications for Group 8
Disable Alerts	□ Disable alert notifications for Power Supply
Notify Again Time	30 Min ▾ Time after which alert notifications will be sent again

Figure 32- Power Supply alerts configuration-part 1



Notify on return to normal	☑ Send a notification when this Power Supply returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when Power Supply returns to normal status
Enable Syslog Alerts	☑ Send alerts for this Power Supply via syslog
Enable SNMP Traps	☑ Send alerts for this Power Supply via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this Power Supply via e-mail
E-mail Subject	E2DB E08 Power Supply 2 Alert Subject of e-mails sent for alerts
Send custom SMS	□ Replace standard SMS with a customized message
Customized SMS	Customized SMS message sent for alerts
Enable SMS Alerts	□ Send alerts for this Power Supply via SMS
Enable Siren/Beacon alarm	□ Turn on the siren/beacon alarm when Power Supply goes to alert
Associated Output Relay	None Name of the output relay that can be controlled by this Power Supply
Output Relay status on alert	Inactive Status of the output relay when going to alert
Output Relay status on return from alert	Inactive Status of the output relay when returning from alert

Figure 33- Power Supply alerts configuration-part 2

Alert Settings

Group: This is the group (or groups) of sensors the power supply sensor will belong to. Users that subscribe to alerts from this group will receive alerts from the power supply sensor. Each sensor can be configured to send alerts. Up to 8 sensor groups can be defined. Each user can receive alerts from any or all of the sensor groups.

Disable Alerts:* *Place a checkmark here if you don't want the ENVIROMUX to send alert messages regarding the AC power sensor.

Note: If alerts for a power supply are disabled, the associated output action will still take place. There just won't be any alert notifications that this is occurring. For example, this might be used to turn ON a device, such as a beacon, when the power supply loses power, and OFF again when power is restored. An alert message may not be desired under these circumstances.

Note: if the user wants to disable alerts for a power supply after the power supply is already in alert status, the user must either acknowledge or dismiss the alert first.

Note: In the event of a line power failure, the battery backup (page 117) will power the ENVIROMUX for up to 1 hour.

Notify Again: Specifies the amount of time before an alert message is repeated. The repeated alert can be set to occur from 1-999 seconds, minutes, or hours.

Notify on return to normal: The user can also be notified when the power supply has returned to the normal operation by selecting the "***Notify on return to normal***" box.

Alert Notifications

The alert can be configured to notify one or more users via email, SNMP traps (v1,v2c, v3), Syslog messages, or SMS alerts. It can also activate an audible siren, or an alarm beacon. Alerts are also indicated on the "Int Alert" or "Ext Alert " LEDs on the front of the ENVIROMUX and in the WEB interface.

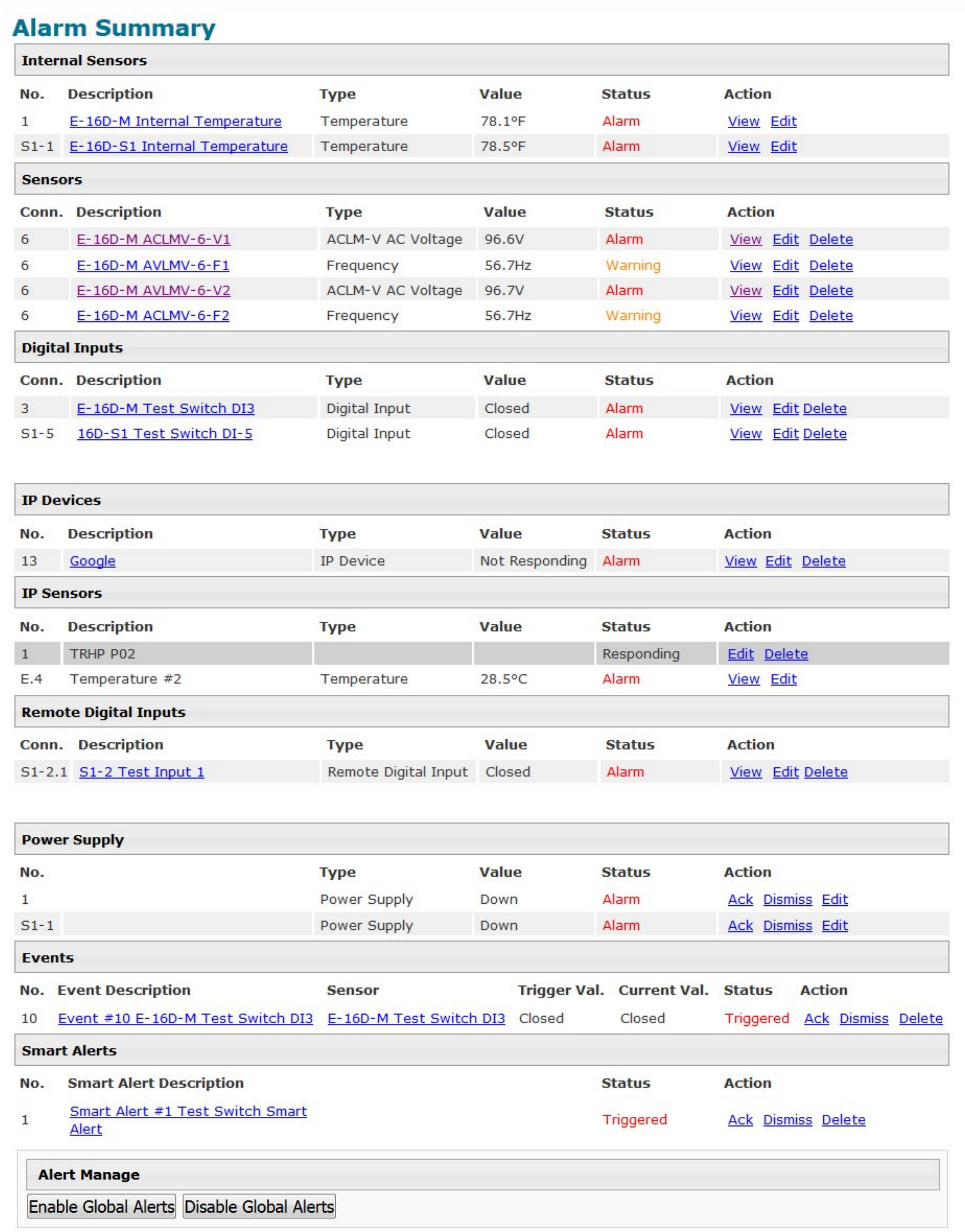
When SMS alerts is enabled, the user has to option to enable the customization of the SMS message. Select "Send custom SMS" and enter up to 160 characters) to be sent with an SMS Alert.

Outputs

Each power supply can be associated with one of the connections labeled "Output Relays" (see page 14 or 54), and that connection can be set to “active” or “inactive” pertaining to the state of the contacts of the relay either on alert, or when returning to normal. The tamper can also block the output command generated by the alert. In this way other devices can be controlled by power supply alerts.

Alarm Summary

To view only those sensors in an alarm state, select the Alarm Summary page under Monitoring. To enable or disable all alerts, use the "Alert Manage" buttons at the bottom of this page.



Alarm Summary

Internal Sensors

No.	Description	Type	Value	Status	Action
1	E-16D-M Internal Temperature	Temperature	78.1°F	Alarm	View Edit
S1-1	E-16D-S1 Internal Temperature	Temperature	78.5°F	Alarm	View Edit

Sensors

Conn.	Description	Type	Value	Status	Action
6	E-16D-M ACLMV-6-V1	ACLM-V AC Voltage	96.6V	Alarm	View Edit Delete
6	E-16D-M AVLMV-6-F1	Frequency	56.7Hz	Warning	View Edit Delete
6	E-16D-M AVLMV-6-V2	ACLM-V AC Voltage	96.7V	Alarm	View Edit Delete
6	E-16D-M ACLMV-6-F2	Frequency	56.7Hz	Warning	View Edit Delete

Digital Inputs

Conn.	Description	Type	Value	Status	Action
3	E-16D-M Test Switch DI3	Digital Input	Closed	Alarm	View Edit Delete
S1-5	16D-S1 Test Switch DI-5	Digital Input	Closed	Alarm	View Edit Delete

IP Devices

No.	Description	Type	Value	Status	Action
13	Google	IP Device	Not Responding	Alarm	View Edit Delete

IP Sensors

No.	Description	Type	Value	Status	Action
1	TRHP P02			Responding	Edit Delete
E.4	Temperature #2	Temperature	28.5°C	Alarm	View Edit

Remote Digital Inputs

Conn.	Description	Type	Value	Status	Action
S1-2.1	S1-2 Test Input 1	Remote Digital Input	Closed	Alarm	View Edit Delete

Power Supply

No.		Type	Value	Status	Action
1		Power Supply	Down	Alarm	Ack Dismiss Edit
S1-1		Power Supply	Down	Alarm	Ack Dismiss Edit

Events

No.	Event Description	Sensor	Trigger Val.	Current Val.	Status	Action
10	Event #10 E-16D-M Test Switch DI3	E-16D-M Test Switch DI3	Closed	Closed	Triggered	Ack Dismiss Delete

Smart Alerts

No.	Smart Alert Description	Status	Action
1	Smart Alert #1 Test Switch Smart Alert	Triggered	Ack Dismiss Delete

Alert Manage

Figure 34- Alarm Summary Page

Internal Sensors

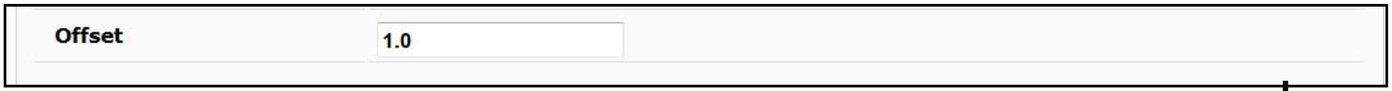
E-16D and -5D have three on-board sensors, which are permanently present:

- one temperature sensor
- one humidity sensor
- one power (battery) sensor

Internal sensors are monitored and fully configurable just as External Sensors are (see Figure 37 and page 42) except that they do not have a box for "Enable Disconnection Alert" since they cannot be disconnected.

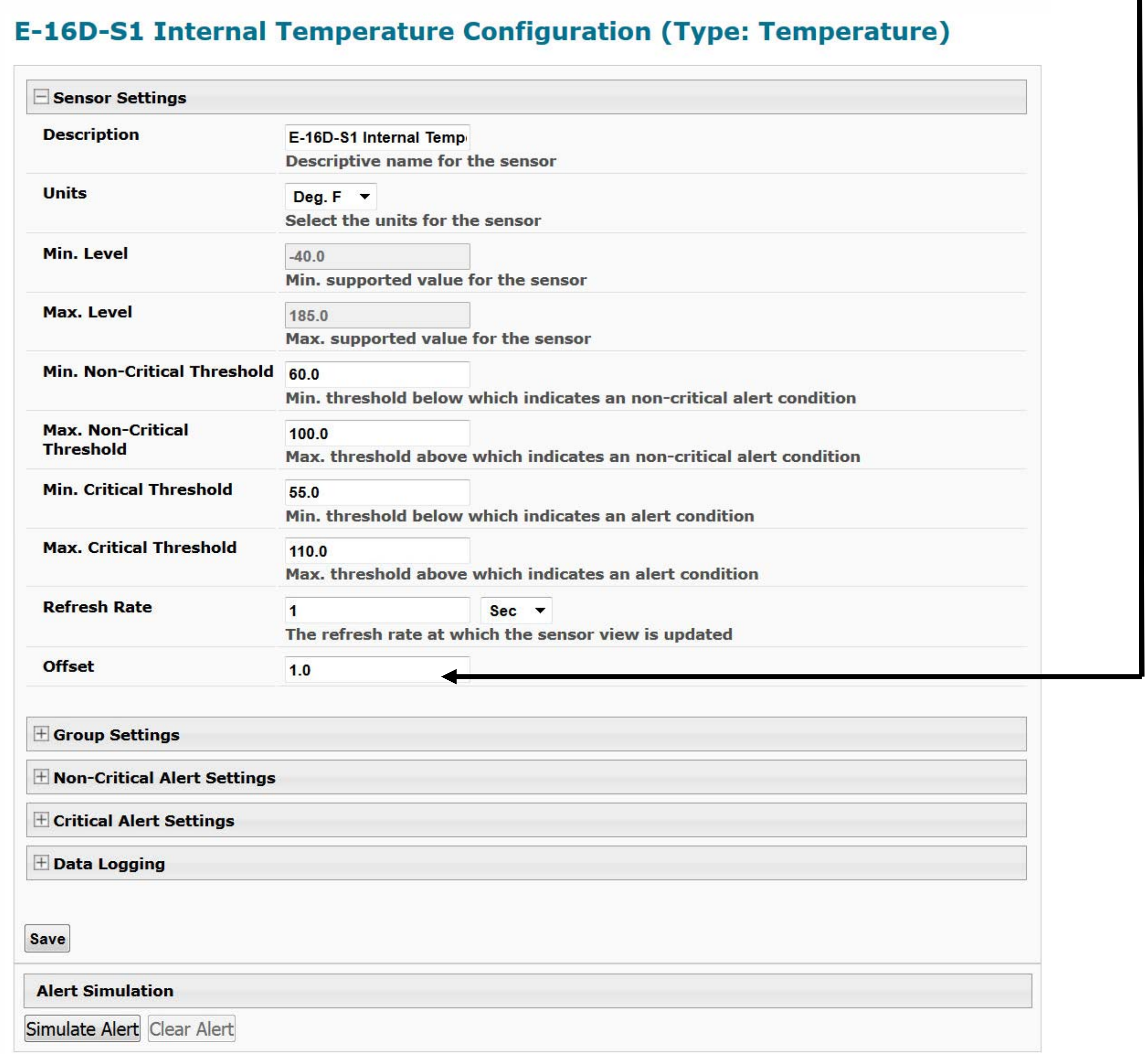
The internal temperature sensor and humidity sensor also include an **Offset** feature. These sensors measure the internal environment of the ENVIROMUX, however that value may be different than the environment the ENVIROMUX is actually mounted in. If you know what the difference is, you can use the "**Offset**" block to enter a value, positive or negative, and that will be applied to the measured value. The resulting difference will be the temperature or humidity that is reported on the Summary page.

For example, if the measured temperature is 75˚F, and the environment is typically 5 degrees cooler, enter a value of "-5", click "Save", and the reported value will now be 70˚F.



Offset	1.0

Internal sensors are always shown in the left menu of the web page and they cannot be removed.



E-16D-S1 Internal Temperature Configuration (Type: Temperature)

⊟ Sensor Settings

Description	E-16D-S1 Internal Temp Descriptive name for the sensor
Units	Deg. F ▾ Select the units for the sensor
Min. Level	-40.0 Min. supported value for the sensor
Max. Level	185.0 Max. supported value for the sensor
Min. Non-Critical Threshold	60.0 Min. threshold below which indicates an non-critical alert condition
Max. Non-Critical Threshold	100.0 Max. threshold above which indicates an non-critical alert condition
Min. Critical Threshold	55.0 Min. threshold below which indicates an alert condition
Max. Critical Threshold	110.0 Max. threshold above which indicates an alert condition
Refresh Rate	1 Sec ▾ The refresh rate at which the sensor view is updated
Offset	1.0

Figure 35- Internal Sensor Configuration

External Sensors

The External Sensors are those that connect through RJ45 connectors. There are two types of external sensors supported by the RJ45 connectors: **RS485 Sensors** and **Contact Sensors**.

RS485 Sensors

The following types of RS485 sensors are supported:

- Temperature Sensor (E-STS/STS-O/STSP)
- Humidity Sensor (E-SHS)
- Combined Temperature + Humidity Sensor (E-STHS/STHS-99/STHS-PRC) **(STHS-99/STHS-PRC also includes dewpoint reading)**
- Current Sensor (E-S420MA-24V)
- Voltage Detector Converter (E-S60VDC)
- AC Line Monitor (E-ACLM-V/ -P
- 5VDC Sensor Converter (E-S5VDC)
- Light Intensity Sensor (E-LIS)
- Dust and Smoke Sensor (E-DUST)

RS485 Sensor Management

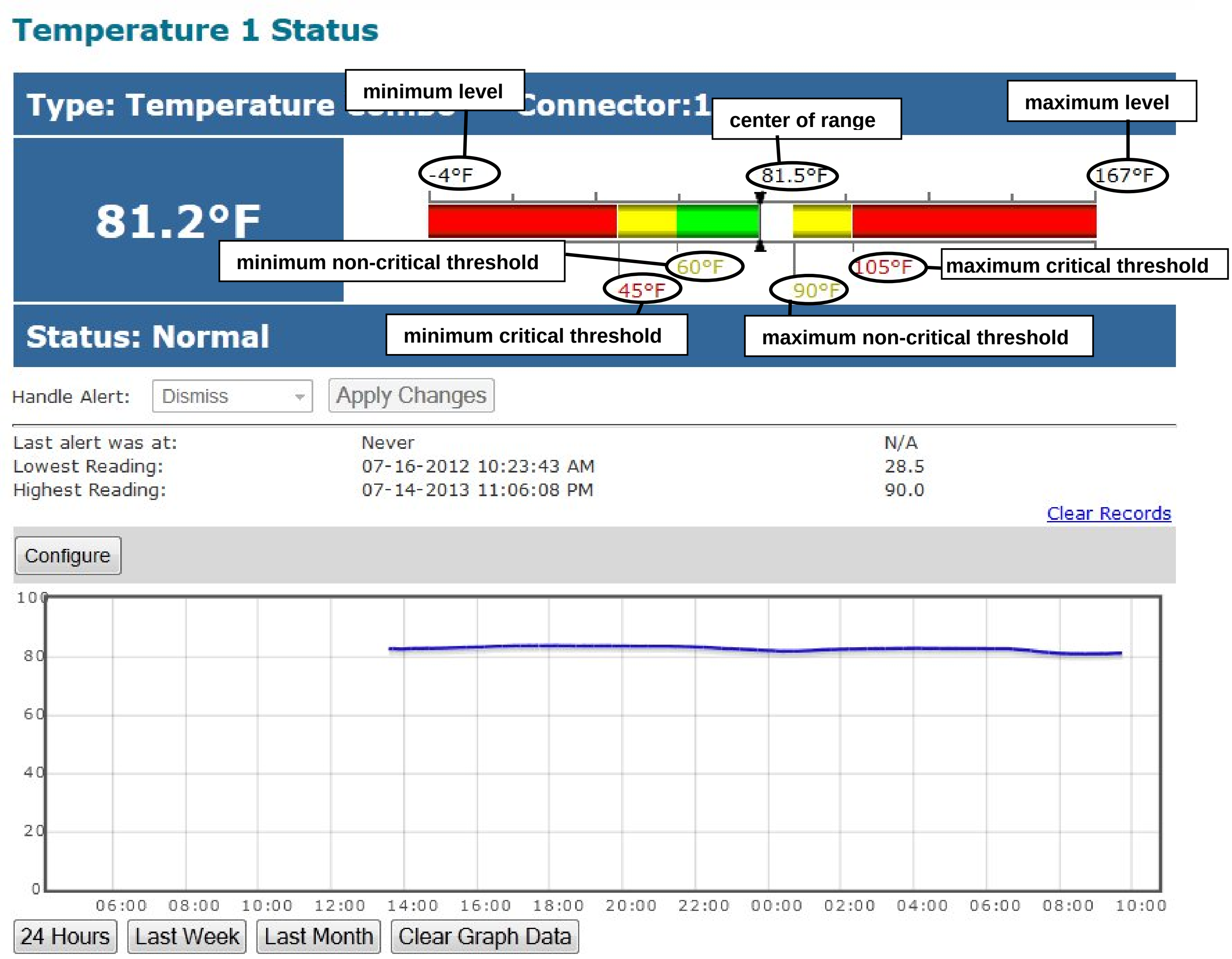
The RS485 sensors are detected and identified by type automatically when they are connected to the RJ45 connector. The newly detected sensor will appear in the left menu of the web page under **Monitoring->Sensors**. A web page will be created for the sensor and the default name issued to the sensor by ENVIROMUX will be "***Undefined #n"***, where n is the number of RJ45 connector from 1 to 16.

If a **double-function sensor** is detected (E-STHS), it will be displayed as two sensors, each one with a single function (as shown in Figure 30). For example a Temperature/Humidity sensor will appear as separate sensors (Temperature sensor and a Humidity sensor) both with the same number connector. The default name of both sensors will be ***Undefined #n***, where n is the connector. A double-function sensor will be listed as a “Combo” type (i.e. Temperature Combo).

The user can see the sensor measurements by clicking on the sensor's name on the left menu or in the Summary page. A web page will be displayed for the selected sensor, showing the type of sensor, the name, value of the reading (if it is an analog value it will be also displayed graphically), the threshold settings (in red) and the current reading (in green) of a selected sensor. It also shows the time, date, and measurement taken of the most recent alert, statistics (last alert, lowest value, highest value) and a graph of the recorded values. Lowest and highest values are indicated only for RS485 sensors.

Note: In a cascaded configuration, only the sensors connected to the master unit will display graphs. To view the graph of a slave sensor you need to log into that slave unit directly.

If the sensor is removed or communication lost for any reason (example: cable disconnected) the unit will detect this and show the sensor in "Non Responding" status. Question marks (???) will replace the name in the summary list. In this way the user will know the sensor has a problem or as been accidentally disconnected. If the user wants to remove a sensor (including a sensor now replaced by question marks) from the summary list, it must be done manually by selecting **Delete** in the summary listing (see Figure 30 on page 31). If Delete is selected, a pop-up will appear confirming this selection before removal takes place.



Temperature 1 Status

Type: Temperature Connector:1

81.2°F

Status: Normal

Handle Alert: Dismiss Apply Changes

Last alert was at:	Never	N/A
Lowest Reading:	07-16-2012 10:23:43 AM	28.5
Highest Reading:	07-14-2013 11:06:08 PM	90.0

Figure 36- External Sensor Reading

If the sensor is in alert status, the user has the option to either **acknowledge** the alert or **dismiss** it. If the user acknowledges the alert, no additional alert messages will be sent during that alert status cycle. If the user dismisses the alert, another alert message will be sent once the "notify again after" time designated on the configuration page elapses.

The **Configure** button allows the user to configure parameters of the sensor.

A graph that shows a history of a sensor's readings is displayed (RS485 and TACH sensors only). The time period displayed can be changed to show the last hour, last week or last 30 days.

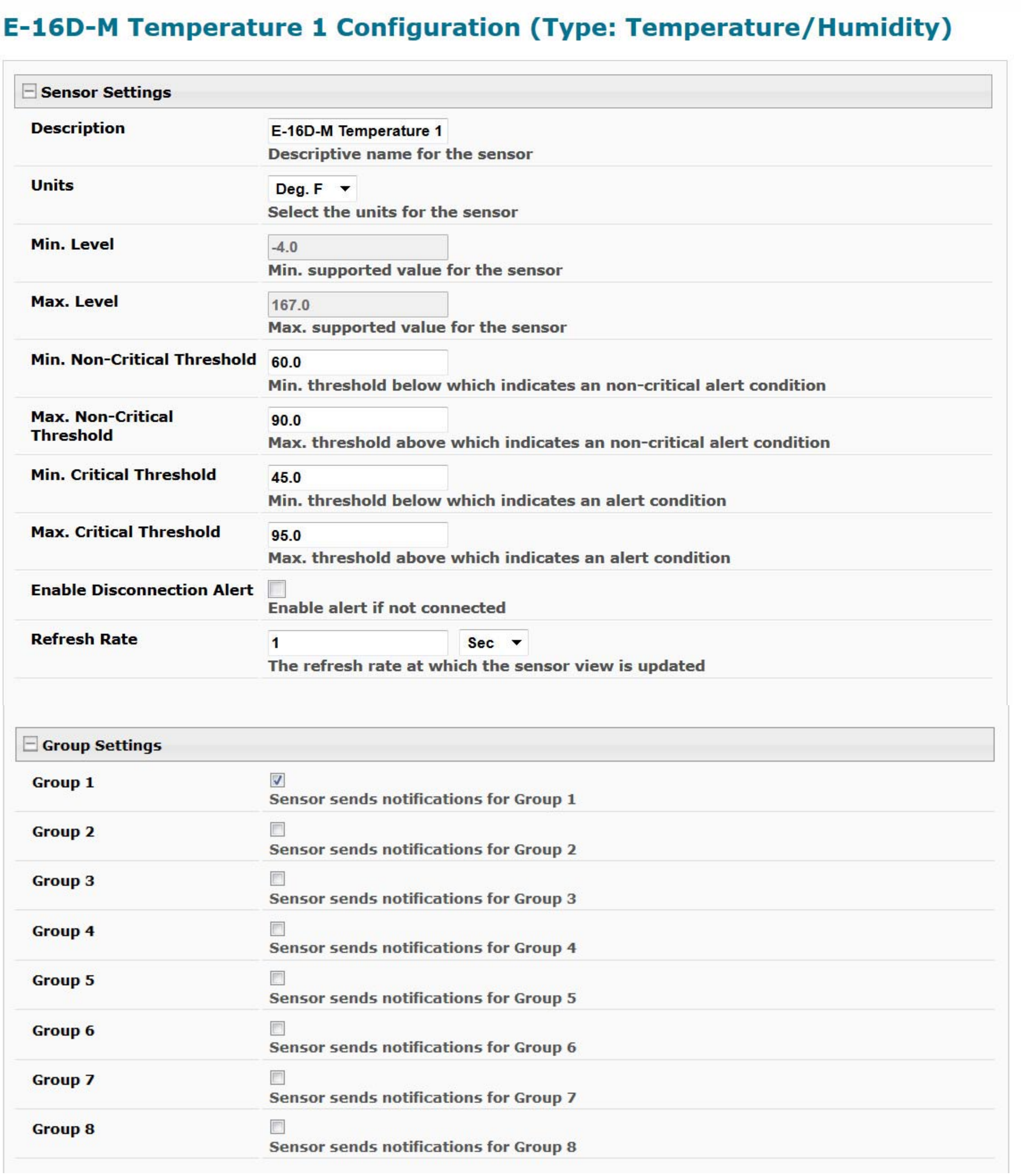
Note: If the ENVIROMUX is power-cycled, all history of sensor readings will be cleared.

Note: In a cascaded configuration, only the sensors connected to the master unit will display graphs. To view the graph of a slave sensor you need to log into that slave unit directly.

The range of readings displayed will adjust as the readings are taken. For example, in the above image, for the time period displayed the range of readings was between 82.2°F. to 80.2°F. As the readings vary and the time period increases, the range will automatically update to a wider range of temperatures and adjust the graph accordingly.

To clear the readings for a sensor and start over, click on "**Clear Graph Data**". To disable the viewing of graphs, see page 67.

Note: If the sensor is a double-function sensor (E-STHS), then using "Clear Graph Data" will clear the data for both the temperature and humidity readings of that sensor.



E-16D-M Temperature 1 Configuration (Type: Temperature/Humidity)

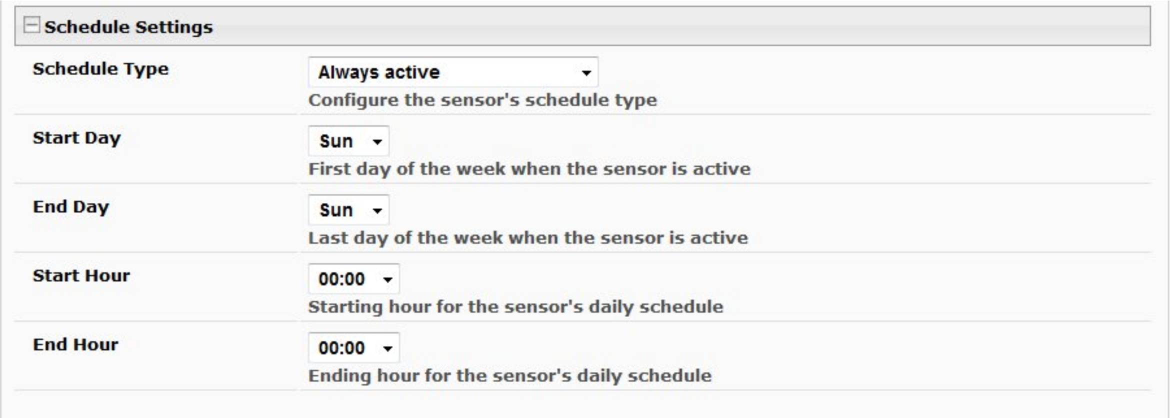
⊟ Sensor Settings

Description	E-16D-M Temperature 1 Descriptive name for the sensor
Units	Deg. F ▼ Select the units for the sensor
Min. Level	-4.0 Min. supported value for the sensor
Max. Level	167.0 Max. supported value for the sensor
Min. Non-Critical Threshold	60.0 Min. threshold below which indicates an non-critical alert condition
Max. Non-Critical Threshold	90.0 Max. threshold above which indicates an non-critical alert condition
Min. Critical Threshold	45.0 Min. threshold below which indicates an alert condition
Max. Critical Threshold	95.0 Max. threshold above which indicates an alert condition
Enable Disconnection Alert	□ Enable alert if not connected
Refresh Rate	1 Sec ▼ The refresh rate at which the sensor view is updated

⊟ Group Settings

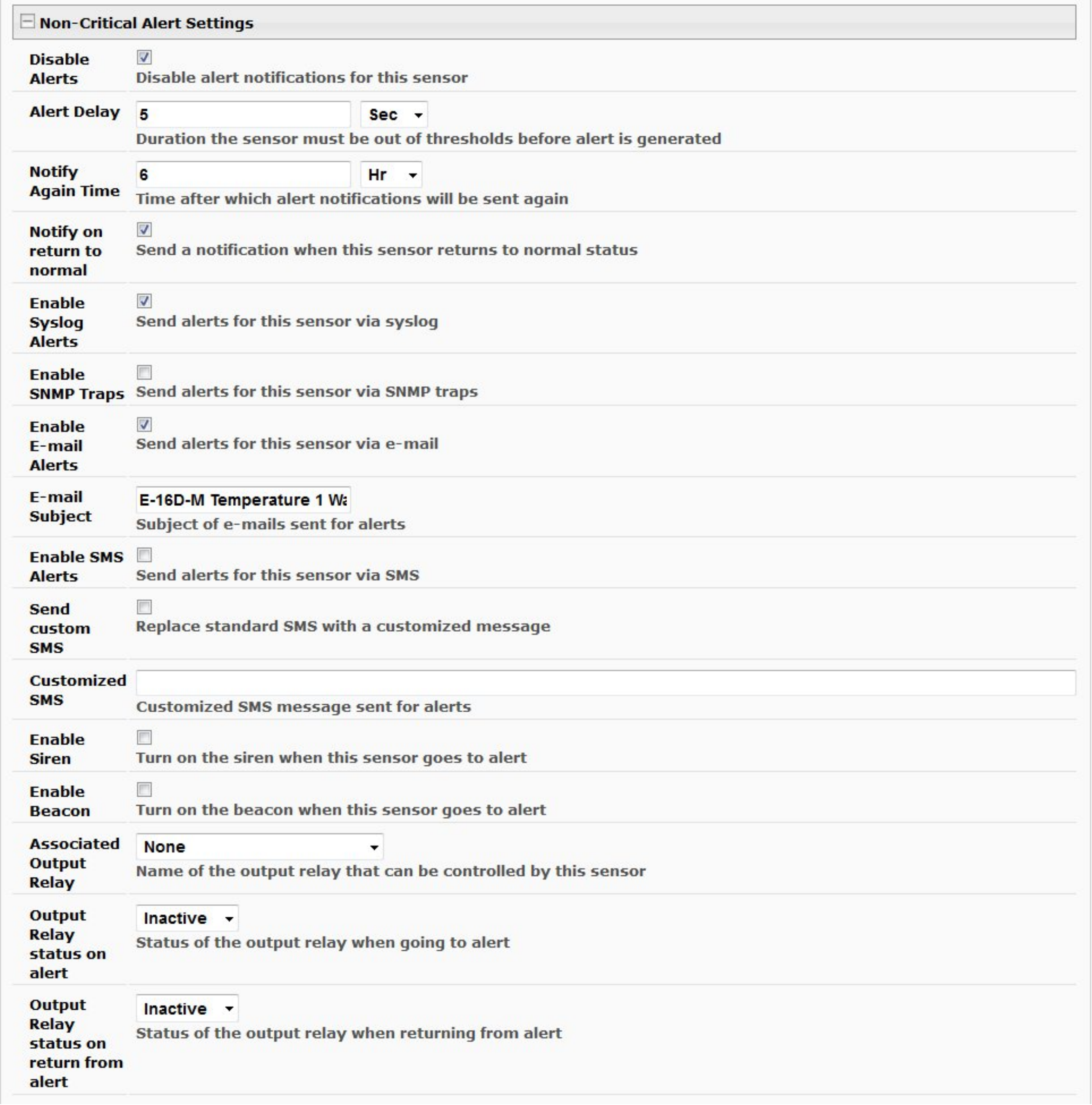
Group 1	☑ Sensor sends notifications for Group 1
Group 2	□ Sensor sends notifications for Group 2
Group 3	□ Sensor sends notifications for Group 3
Group 4	□ Sensor sends notifications for Group 4
Group 5	□ Sensor sends notifications for Group 5
Group 6	□ Sensor sends notifications for Group 6
Group 7	□ Sensor sends notifications for Group 7
Group 8	□ Sensor sends notifications for Group 8

Figure 37- Sensor Configuration Page (1)



⊟ Schedule Settings

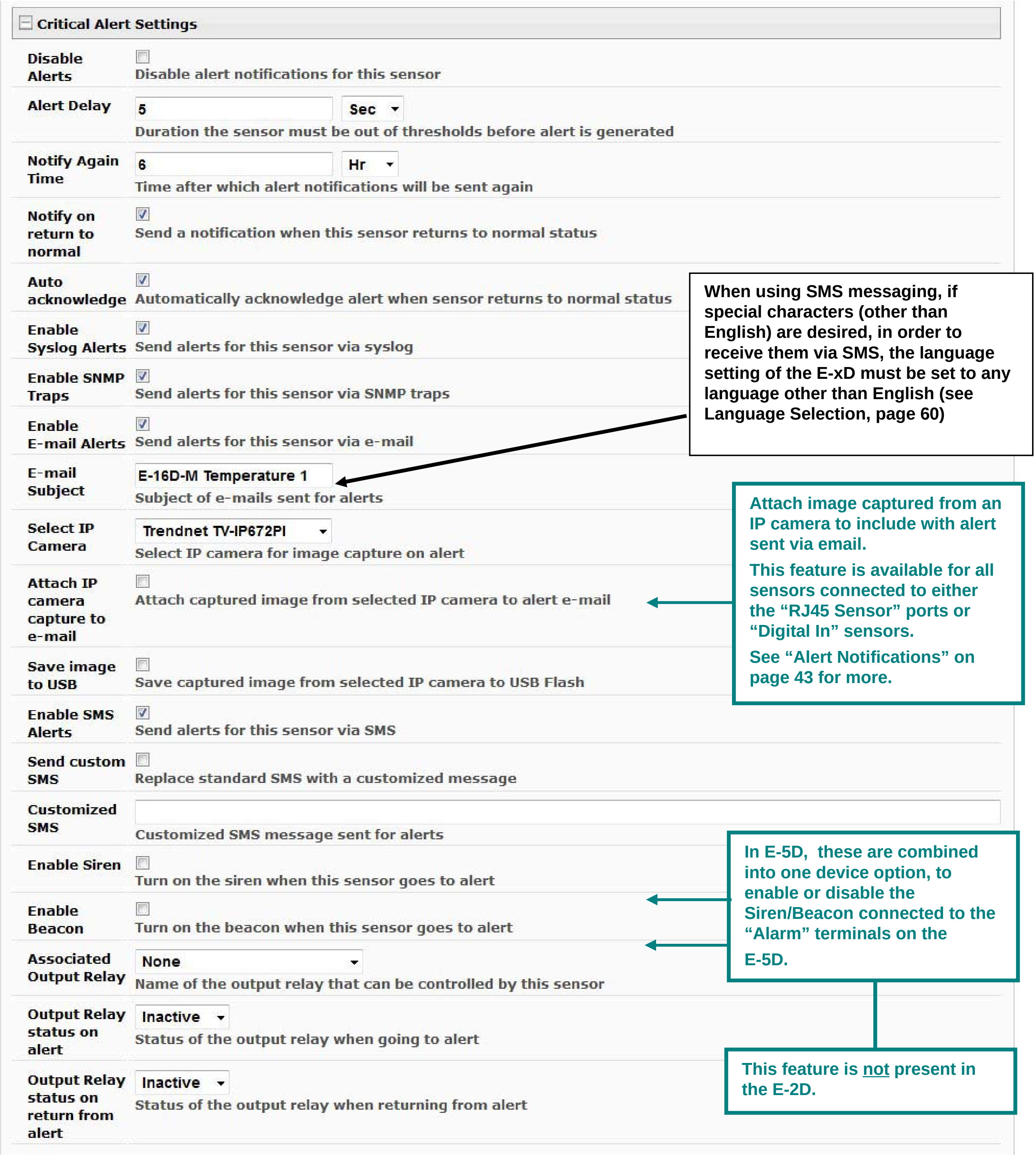
Schedule Type	Always active ▾ Configure the sensor's schedule type
Start Day	Sun ▾ First day of the week when the sensor is active
End Day	Sun ▾ Last day of the week when the sensor is active
Start Hour	00:00 ▾ Starting hour for the sensor's daily schedule
End Hour	00:00 ▾ Ending hour for the sensor's daily schedule



⊟ Non-Critical Alert Settings

Disable Alerts	☑ Disable alert notifications for this sensor
Alert Delay	5 Sec ▾ Duration the sensor must be out of thresholds before alert is generated
Notify Again Time	6 Hr ▾ Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this sensor via syslog
Enable SNMP Traps	☐ Send alerts for this sensor via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this sensor via e-mail
E-mail Subject	E-16D-M Temperature 1 W Subject of e-mails sent for alerts
Enable SMS Alerts	☐ Send alerts for this sensor via SMS
Send custom SMS	☐ Replace standard SMS with a customized message
Customized SMS	Customized SMS message sent for alerts
Enable Siren	☐ Turn on the siren when this sensor goes to alert
Enable Beacon	☐ Turn on the beacon when this sensor goes to alert
Associated Output Relay	None ▾ Name of the output relay that can be controlled by this sensor
Output Relay status on alert	Inactive ▾ Status of the output relay when going to alert
Output Relay status on return from alert	Inactive ▾ Status of the output relay when returning from alert

Figure 38- Sensor Configuration Page (2)



⊟ Critical Alert Settings

Disable Alerts	□ Disable alert notifications for this sensor
Alert Delay	5 Sec Duration the sensor must be out of thresholds before alert is generated
Notify Again Time	6 Hr Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this sensor returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this sensor via syslog
Enable SNMP Traps	☑ Send alerts for this sensor via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this sensor via e-mail
E-mail Subject	E-16D-M Temperature 1 Subject of e-mails sent for alerts
Select IP Camera	Trendnet TV-IP672PI Select IP camera for image capture on alert
Attach IP camera capture to e-mail	□ Attach captured image from selected IP camera to alert e-mail
Save image to USB	□ Save captured image from selected IP camera to USB Flash
Enable SMS Alerts	☑ Send alerts for this sensor via SMS
Send custom SMS	□ Replace standard SMS with a customized message
Customized SMS	 Customized SMS message sent for alerts
Enable Siren	□ Turn on the siren when this sensor goes to alert
Enable Beacon	□ Turn on the beacon when this sensor goes to alert
Associated Output Relay	None Name of the output relay that can be controlled by this sensor
Output Relay status on alert	Inactive Status of the output relay when going to alert
Output Relay status on return from alert	Inactive Status of the output relay when returning from alert

When using SMS messaging, if special characters (other than English) are desired, in order to receive them via SMS, the language setting of the E-xD must be set to any language other than English (see Language Selection, page 60)

Attach image captured from an IP camera to include with alert sent via email.

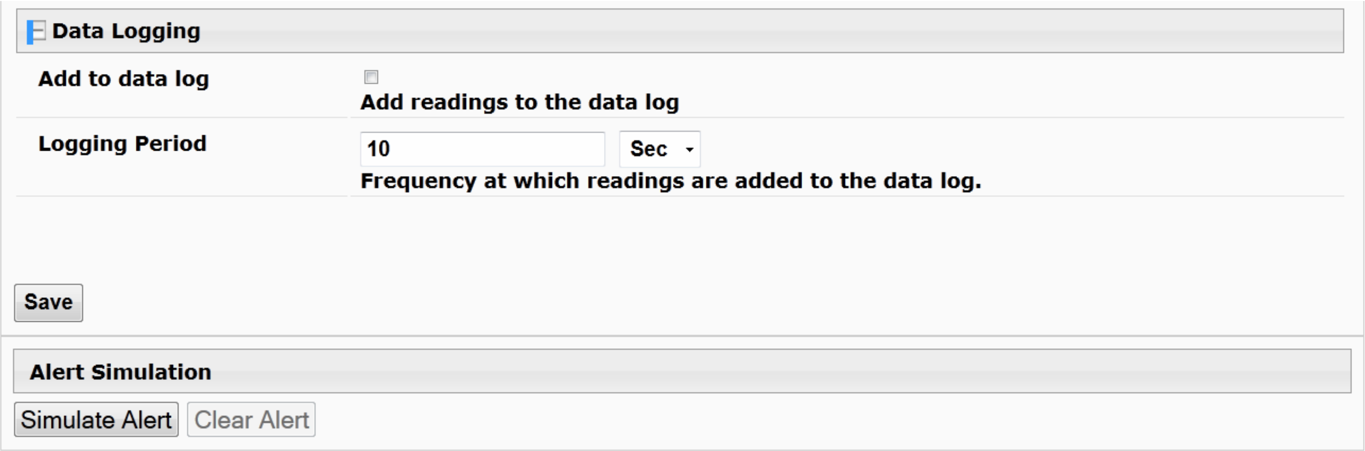
This feature is available for all sensors connected to either the "RJ45 Sensor" ports or "Digital In" sensors.

See "Alert Notifications" on page 43 for more.

In E-5D, these are combined into one device option, to enable or disable the Siren/Beacon connected to the "Alarm" terminals on the E-5D.

This feature is not present in the E-2D.

Figure 39- Sensor Configuration Page (3)



Data Logging

Add to data log □ Add readings to the data log

Logging Period 10 Sec Frequency at which readings are added to the data log.

Alert Simulation

Figure 40- Sensor Configuration Page (4)

External Sensor Configuration

Sensor Settings	Description
Description	The description of the sensor that will be viewed in the Summary page and in the body of alert messages
Units	This lets the operator choose between Celsius and Fahrenheit as the temperature measurement unit.
Min. Level	Displays the minimum value that this sensor will report
Max. Level	Displays the maximum value that this sensor will report
Minimum Non-Critical - Threshold	The user must define the lowest acceptable value for the sensors. If the sensor measures a value below this threshold, the sensor will move to non-critical alert status. The assigned value should be ➢ within the range defined by Minimum Level and Maximum Level and ➢ lower than the assigned Maximum Threshold value. If values out of the range are entered, and error message will be shown.
Maximum Non-Critical Threshold	The user must define the highest acceptable value for the sensors. If the sensor measures a value above this threshold, the sensor will move to non-critical alert status. The assigned value should be ➢ within the range defined by Minimum Level and Maximum Level and ➢ higher than the assigned Minimum Threshold value. If values out of the range are entered, and error message will be shown.
Minimum Critical Threshold	The user must define the lowest acceptable value for the sensors. If the sensor measures a value below this threshold, the sensor will move to alert status. The assigned value should be ➢ within the range defined by Minimum Level and Maximum Level, ➢ lower than the assigned Maximum Threshold value, and ➢ lower than the Minimum Non-Critical Threshold value. If values out of the range are entered, and error message will be shown.
Maximum Critical Threshold	The user must define the highest acceptable value for the sensors. If the sensor measures a value above this threshold, the sensor will move to alert status. The assigned value should be ➢ within the range defined by Minimum Level and Maximum Level, ➢ higher than the assigned Minimum Threshold value, and ➢ higher than the Maximum Non-Critical Threshold value. If values out of the range are entered, and error message will be shown.
Enable Disconnection Alert	If this sensor is disconnected its status will change to alarm and an alert will be sent
Refresh Rate	Determines how often the displayed sensor value is refreshed on the Sensor page. A numeric value and a measurement unit (minimum 1 seconds, maximum 999 minutes) should be entered.
Group Settings	**Description**
Group	Assign the sensor to any or all groups 1 -8 (see also page 44)

Schedule Settings	
Schedule Type	**Always active**- sensor will react to alert conditions at all hours of each day **Active during defined times**- sensor will only react to alert conditions during times as outlined below
Start Day	First day of the week the sensor should react to alert conditions
End Day	Last day of the week the sensor should react to alert conditions
Start Hour	First hour of the day the sensor should begin reacting to alert conditions
End Hour	Last hour of the day the sensor should react to alert conditions
Alert Settings (Applies to Critical and Non-Critical Alerts except where noted)	
Disable Alerts	Place a checkmark in the box to prevent alerts from being sent when this sensor's status changes ***Note: If alerts for a sensor are disabled, the associated output action (see "Outputs"- page 34) will still take place. There just won't be any alert notifications that this is occurring. For example, this might be used to turn ON a device, such as a fan, when the server room gets too warm, and OFF again when the temperature returns to normal. An alert message may not be desired under these circumstances.*** ***Note: if the user wants to disable alerts for a sensor after the sensor is already in alert status, the user must either acknowledge or dismiss the alert first.***
Alert Delay	The alert delay is an amount of time the sensor must be in an alert condition before an alert is sent. This provides some protection against false alarms. The Alert Delay value can be set for 0-999 seconds or minutes. For more on alert delay, see "Alert Settings" on page 45)
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the sensor readings have returned to the normal range by selecting the "***Notify when return to normal***" box for a sensor.
Auto Acknowledge (Applies to Critical Alert settings only)	Place a checkmark in this box to have alert notifications in the summary page return to normal state automatically when sensor readings return to normal. **Note**: The Non-Critical alert settings do not have this option. Instead, non-critical alert notifications are always auto-acknowledged when sensor readings return to normal
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received (up to 60 characters)
Attach IP Camera capture to email (Applies to Critical Alert settings only)	Associate a sensor with a IP camera. Select an IP camera from the drop-down box. An image will be captured and sent with the alert message when an alert is sent via e-mail. IP cameras that are monitored by the ENVIROMUX (page 61) will be available for this purpose. ***Note: To be able to send IP camera captures as e-mail attachments, viewer security (in your camera's configuration) needs to be disabled. Consult your IP camera manual to see if this feature is present and for instructions on how to do this.*** ***Note: If "Brief email" is enabled under User Settings (page 81) for a user, this setting will have no effect for that user. No images will be sent to that user.***
Save Image to USB	Save the image captured by the IP Camera to the USB flash device when an alert is triggered
Enable SMS Alerts	Place a checkmark in this box to have alert notifications sent via SMS messages (requires a modem)
Send Custom SMS	Place a checkmark in this box to have a custom SMS message instead of using the standard SMS message
Customized SMS	Enter the customized SMS message (up to 160 characters) to be sent with an SMS Alert
Enable Siren	Turn ON the siren when this sensor goes to alert (not applicable to E-2D)
Enable Beacon	Turn ON the beacon when this sensor goes to alert (not applicable to E-2D)

Alert Settings (Applies to Critical and Non-Critical Alerts except where noted) (Cont'd)	
Associated Output Relay **Tip: Another way to have a single output relay react to the changes of more than one sensor is to use Events and Smart Alerts (page 99) to create that association.**	You can associate the sensor with the operation of the output relay, or not. By Default, the operation of an output relay can only be associated with one sensor or IP Device. To associate an output relay with more than one sensor or IP Device, place a checkmark in the checkbox under "System- Other Options- Disable Relay Interlock (page 67). ***Note: If the Output Relay is associated with a sensor/device, and configured to change state when a sensor crosses threshold into alert, it will change state even if the alerts are disabled.*** ***Note: Only one sensor/device should be associated with the Output Relay at a time. Contradicting commands from two or more sensors will result in the output relay responding to the state directed by the last command received.***
Output Relay Status on Alert	State the output relay will be in when sensor goes to an alert
Output Relay Status on Return from Alert	State the output relay will be in when sensor is no longer in alert
Data Logging	
Add to data log	This is a check-box that lets the user decide if the data sampled should be recorded in the Data Log.
Logging Period	Enter the time period between logged measurements

Be sure to press the **Save** button to save the configuration settings.

Groups

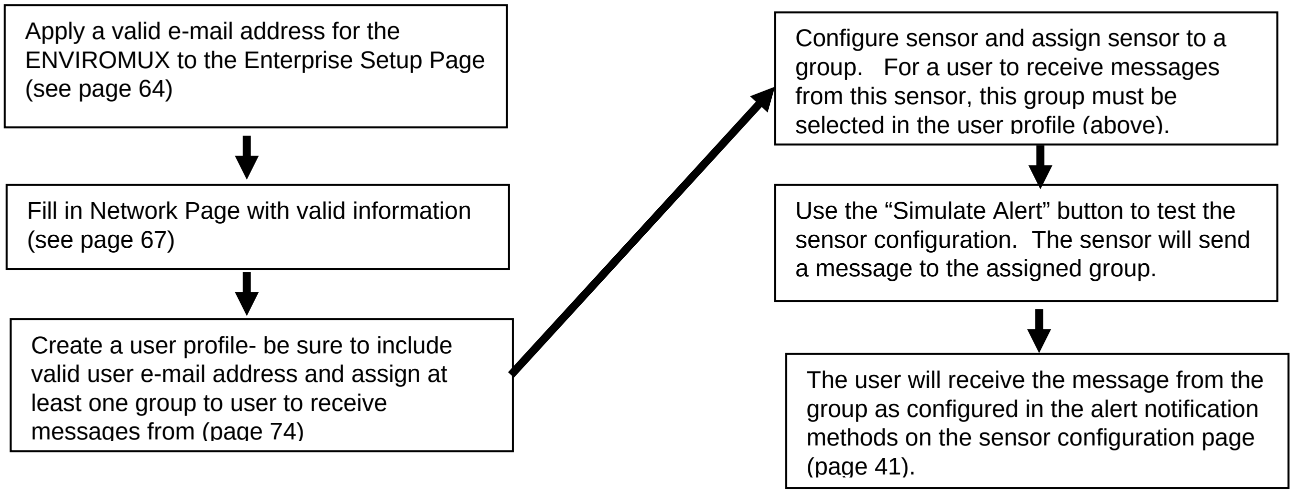
Groups are used to create a common relationship between sensors, IP devices, etc. and their alert messages. Each item being monitored can be assigned to one or more groups (up to 8 possible). Users (a maximum number of 17 including the root user) can receive alert messages from items in one or more groups (see user configuration on page 79).

Test Alerts

With all configuration settings completed, each sensor and how the ENVIROMUX will react to an alert condition can be tested. Press the **Simulate Alert** button at the bottom of the configuration page to test each of the notification methods configured. To cancel the simulation, press the **Clear** button.

Note: A simulated alert will test all settings including any delay that has been configured (i.e. if a 2 minute delay is configured, it will delay sending the email for 2 minutes)

To perform a test, the ENVIROMUX must be properly setup for a user to receive alert messages. Use the chart below to make sure the ENVIROMUX is setup properly.



Apply a valid e-mail address for the ENVIROMUX to the Enterprise Setup Page (see page 64)

Fill in Network Page with valid information (see page 67)

Create a user profile- be sure to include valid user e-mail address and assign at least one group to user to receive messages from (page 74)

Configure sensor and assign sensor to a group. For a user to receive messages from this sensor, this group must be selected in the user profile (above).

Use the "Simulate Alert" button to test the sensor configuration. The sensor will send a message to the assigned group.

The user will receive the message from the group as configured in the alert notification methods on the sensor configuration page (page 41).

Figure 41- Chart to setup alert notification

Alert Settings

Alert Delay: The alert delay is an amount of time the sensor must be in an alert condition before an alert is sent. This provides some protection against false alarms. The Alert Delay value can be set for 0-999 seconds or minutes.

Example:

The maximum threshold of a temperature sensor is 90 F, and the temperature of the monitored area is fluctuating between 88 and 91 degrees:

Reading # (taken 1/ second)	Value	Action (with delay set @ 3 seconds
1	88F	
2	89F	
3	90F	Ignored
4	89F	
5	90F	Ignored
6	89F	
7	90F	Ignored
8	90F	Ignored
9	90F	Alert sent
10	89F	

The sensor is in an alert condition in Reading 3 but is back within the acceptable range in Reading 4. At Reading 5, the sensor is in an alert condition again. Without the Alert Delay set, alerts will be sent for both Reading 3 and Reading 5. If the Alert Delay had been set to 3 seconds, an alert would only be sent if the sensor had made three consecutive readings in an alert condition (since readings are made every second). In this case, an alert will not be sent until Reading 9.

Alert Notifications

The alert can be configured to notify one or more users via e-mail, SNMP traps (v1,v2c,v3), Syslog messages, or SMS alerts. The e-mail subject line for e-mail notification can be customized for easy source identification. The alert can activate an audible siren, or an alarm beacon. Alerts are also indicated on the "Int Alert" or "Ext Alert " LEDs on the front of the ENVIROMUX and in the WEB interface.

External sensors have the added feature of being able to be associated with an IP camera. If a checkmark is added to the block "**Attach IP camera capture to email**" and an IP camera is selected from the drop-down box, an image will be captured and sent with the alert message when an alert is sent via e-mail. IP cameras that are monitored by the ENVIROMUX (page 61) will be available for this purpose.

Note: To be able to send IP camera captures as e-mail attachments, viewer security (in your camera's configuration) needs to be disabled. Consult your IP camera manual to see if this feature is present and for instructions on how to do this.

If a checkmark is added to "**Save Image to USB**", the image captured by the IP camera will also be saved to a flash drive connected to a USB port.

Thresholds

Minimum Threshold: The user must define the lowest acceptable value for the sensors. If the sensor measures a value below this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and lower than the assigned Maximum Threshold value. If values out of the range are entered, they will be automatically adjusted to be within range.

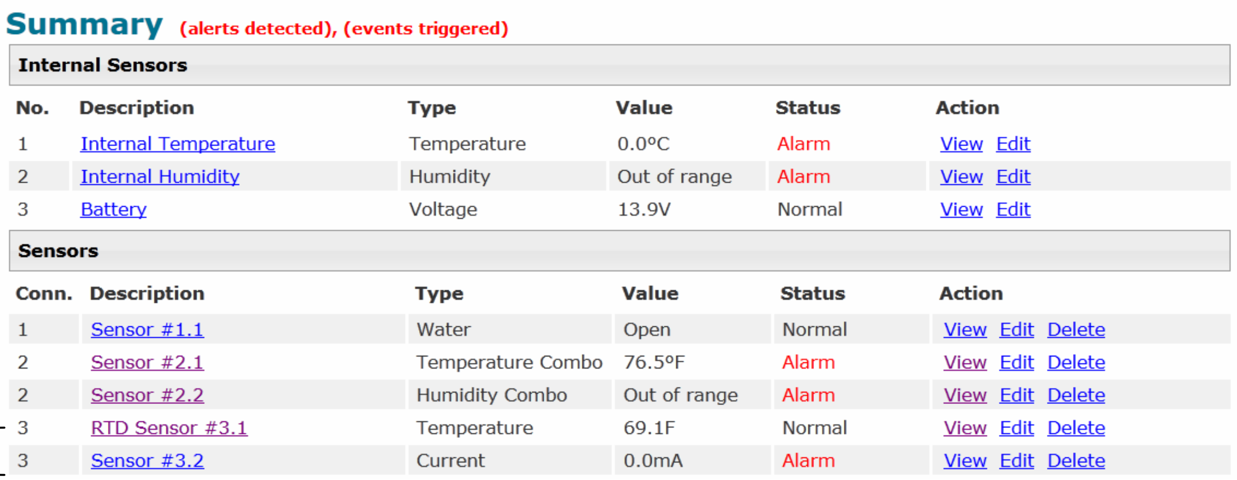
Maximum Threshold: The user must define the highest acceptable value for the sensors. If the sensor measures a value above this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and higher than the assigned Minimum Threshold value. If values out of the range are entered, they will be automatically adjusted to be within range.

Outputs

Each sensor can be associated with one of the connections labeled "Output Relays" (see page 23), and that connection can be set to open or close the contacts of the relay either on alert, or when returning to normal. The tamper can also block the output command generated by the alert. In this way other devices can be controlled by sensor and tamper alerts.

Specialized Sensors (for E-S420MA-24V Current Sensor Configuration only)

When a E-S420MA-24V Current Sensor is connected to the ENVIROMUX, the summary page will update with two sensor names of the Type "Current". Various types of sensors can be connected to an E-S420MA-24V. In order to better define the sensor on the Summary Page, in SNMP traps, or in an MIB browser, click on the "Edit" link to open the sensor configuration page and configure the sensor. In the image below, an RTD Temperature sensor has been connected to the Current Sensor plugged into RJ45 port 3 and configured to be used.



Summary (alerts detected), (events triggered)

Internal Sensors

No.	Description	Type	Value	Status	Action
1	Internal Temperature	Temperature	0.0°C	Alarm	View Edit
2	Internal Humidity	Humidity	Out of range	Alarm	View Edit
3	Battery	Voltage	13.9V	Normal	View Edit

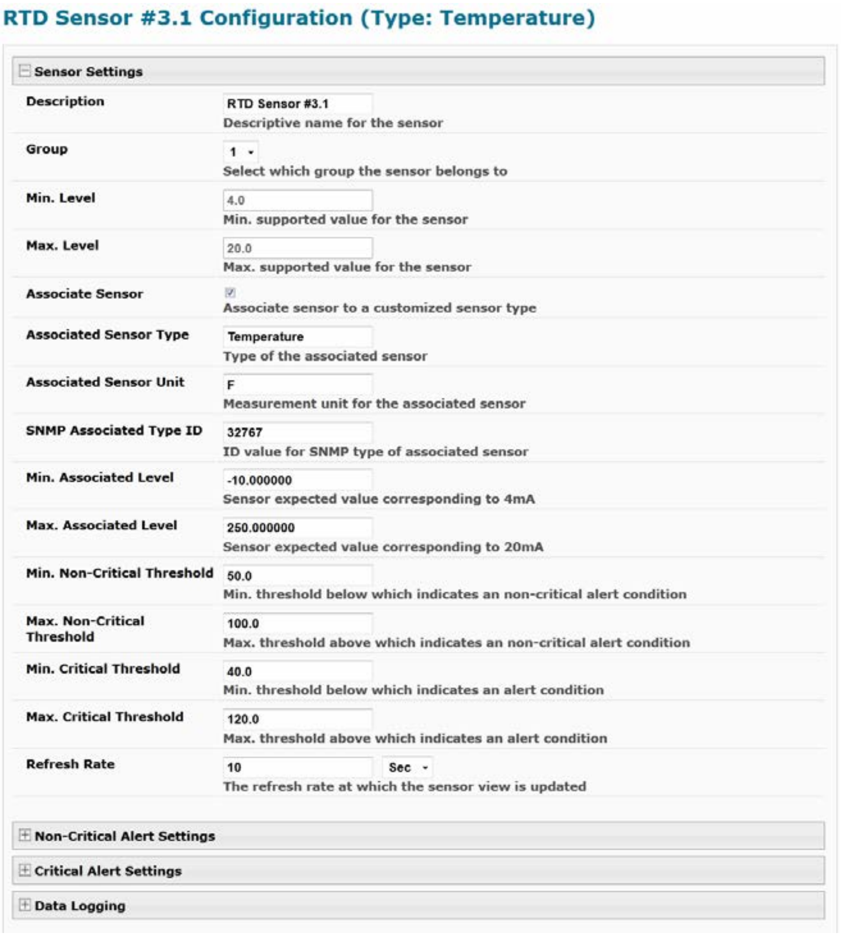
Sensors

Conn.	Description	Type	Value	Status	Action
1	Sensor #1.1	Water	Open	Normal	View Edit Delete
2	Sensor #2.1	Temperature Combo	76.5°F	Alarm	View Edit Delete
2	Sensor #2.2	Humidity Combo	Out of range	Alarm	View Edit Delete
3	RTD Sensor #3.1	Temperature	69.1F	Normal	View Edit Delete
3	Sensor #3.2	Current	0.0mA	Alarm	View Edit Delete

An RTD sensor is connected to one input on the current sensor, the second input has not been configured.

Select "Edit" to configure

Figure 42- Current sensor added to ENVIROMUX



RTD Sensor #3.1 Configuration (Type: Temperature)

⊟ Sensor Settings

Description	RTD Sensor #3.1	Descriptive name for the sensor
Group	1	Select which group the sensor belongs to
Min. Level	4.0	Min. supported value for the sensor
Max. Level	20.0	Max. supported value for the sensor
Associate Sensor	☑	Associate sensor to a customized sensor type
Associated Sensor Type	Temperature	Type of the associated sensor
Associated Sensor Unit	F	Measurement unit for the associated sensor
SNMP Associated Type ID	32767	ID value for SNMP type of associated sensor
Min. Associated Level	-10.000000	Sensor expected value corresponding to 4mA
Max. Associated Level	250.000000	Sensor expected value corresponding to 20mA
Min. Non-Critical Threshold	50.0	Min. threshold below which indicates an non-critical alert condition
Max. Non-Critical Threshold	100.0	Max. threshold above which indicates an non-critical alert condition
Min. Critical Threshold	40.0	Min. threshold below which indicates an alert condition
Max. Critical Threshold	120.0	Max. threshold above which indicates an alert condition
Refresh Rate	10 Sec	The refresh rate at which the sensor view is updated

⊞ Non-Critical Alert Settings

⊞ Critical Alert Settings

⊞ Data Logging

Figure 43- Configuration of sensor connected to E-S420MA-24V

Most of the sensor settings are the same as any other sensor configuration (page 42) but there are some differences:

Sensor Settings	Description
Associate Sensor	Select if the Type “Current” should be replaced by the sensor type to be entered in the next box
Associated Sensor Type	Enter the “Type” of sensor that should be displayed on the summary page and in all alert communications received regarding this sensor
Associated Sensor Unit	Enter between 1 and 3 alphabetical characters. These characters will be used by the ENVIROMUX to represent the unit of measure reported by the attached sensor. Leaving it empty will result in an empty string in the reported data.
SNMP Associated Type ID	Enter ID value from MIB file if SNMP traps will be used for alert notifications for this sensor (for more on this, see “SNMP Custom Type ID” below)
Min. Associated Level	The minimum range of the units to be associated with the current reading measured from the attached sensor.
Max. Associated Level	The maximum range of the units to be associated with the current reading measured from the attached sensor.

SNMP Custom Type ID: Use this field if SNMP traps will be used for alert notifications. The Type ID corresponds with a value defined in the MIB file under “extSensorType” (default value is 32767 for type “Custom”). Place the desired number in this box that represents the type of sensor to be reported in the MIB browser or SNMP trap.

To define a new type of sensor;

1. open the MIB file,
2. locate the section titled “extSensorType”,
3. assign a description and a number not already in use (in the “SYNTAX” field) to associate with it ,
4. enter the number for the newly defined extSensorType in the SNMP Custom Type ID box.

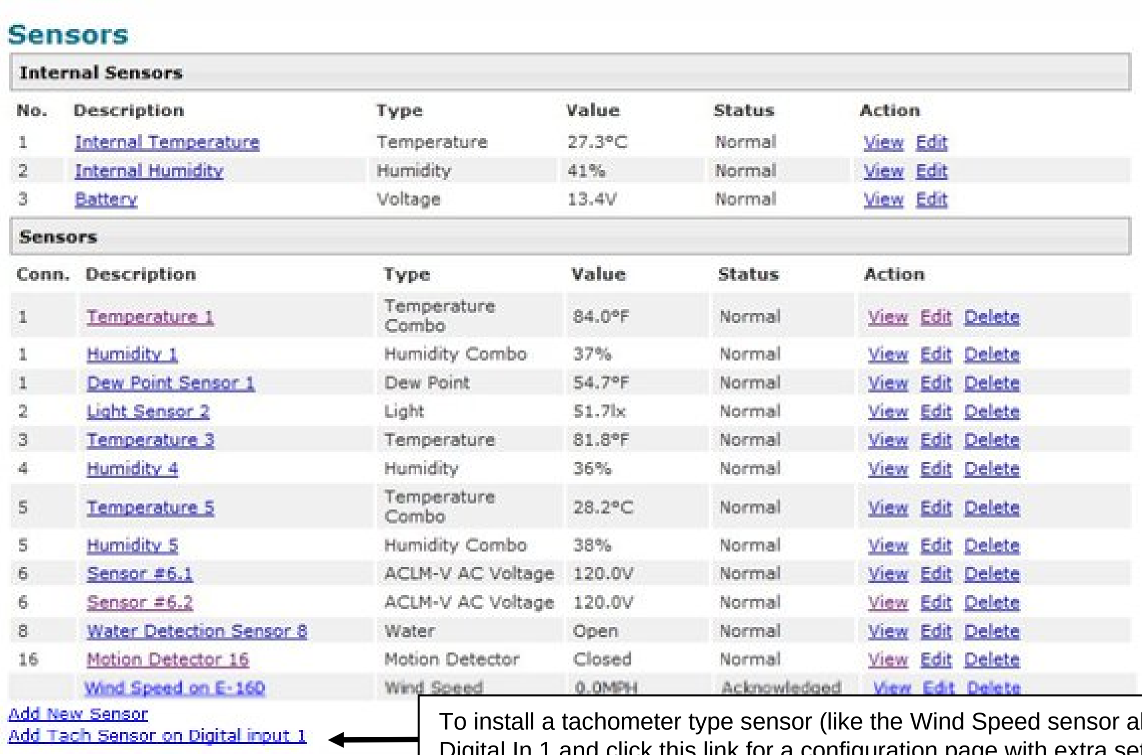
If the Type ID is left blank, the value “0” will be assigned, which will be reported in the browser and SNMP trap as type “undefined”.

Contact Sensors

Contact Sensors are sensors that close or open a contact according to the sensor condition. Their presence and their type cannot be automatically detected by the RJ45 Sensor port. The sensors have to be manually added to the unit list by the administrator or a user with administrator privileges. Contact sensors can be either connected to RJ45 Sensor ports, or more commonly to Digital Input terminals.

Add a Contact Sensor to RJ45 Sensor port

When adding a contact sensor to an RJ45 Sensor port, after connecting the sensor to an available port, the administrator must select "Add New Sensor" at the bottom of the **Monitoring->Sensors** page.



Sensors

Internal Sensors

No.	Description	Type	Value	Status	Action
1	Internal Temperature	Temperature	27.3°C	Normal	View Edit
2	Internal Humidity	Humidity	41%	Normal	View Edit
3	Battery	Voltage	13.4V	Normal	View Edit

Sensors

Conn.	Description	Type	Value	Status	Action
1	Temperature 1	Temperature Combo	84.0°F	Normal	View Edit Delete
1	Humidity 1	Humidity Combo	37%	Normal	View Edit Delete
1	Dew Point Sensor 1	Dew Point	54.7°F	Normal	View Edit Delete
2	Light Sensor 2	Light	51.7lx	Normal	View Edit Delete
3	Temperature 3	Temperature	81.8°F	Normal	View Edit Delete
4	Humidity 4	Humidity	36%	Normal	View Edit Delete
5	Temperature 5	Temperature Combo	28.2°C	Normal	View Edit Delete
5	Humidity 5	Humidity Combo	38%	Normal	View Edit Delete
6	Sensor #6.1	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
6	Sensor #6.2	ACLM-V AC Voltage	120.0V	Normal	View Edit Delete
8	Water Detection Sensor 8	Water	Open	Normal	View Edit Delete
16	Motion Detector 16	Motion Detector	Closed	Normal	View Edit Delete
	Wind Speed on E-16D	Wind Speed	0.0MPH	Acknowledged	View Edit Delete

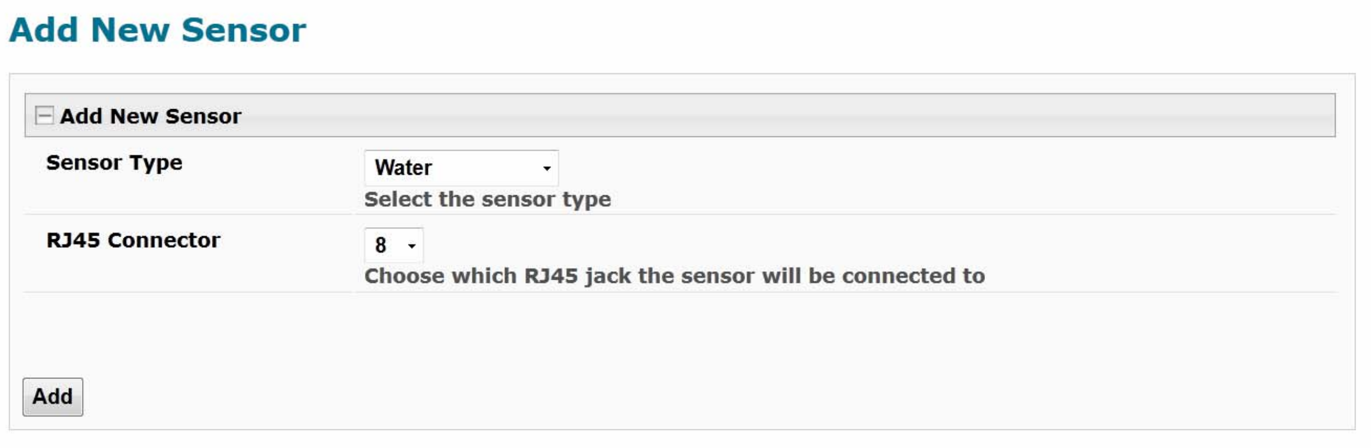
Add New Sensor
Add Tach Sensor on Digital input 1

To install a tachometer type sensor (like the Wind Speed sensor above), connect it to Digital In 1 and click this link for a configuration page with extra settings for specialized sensors (page 44).

Figure 44- List of sensors

In the Add Sensor page, enter the type of sensor and the RJ45 connector where the sensor is connected. Then select "Add".

If the connector was already in use and has a sensor already defined for it, an error message will be displayed at the bottom of the Summary page.



Add New Sensor

Add New Sensor

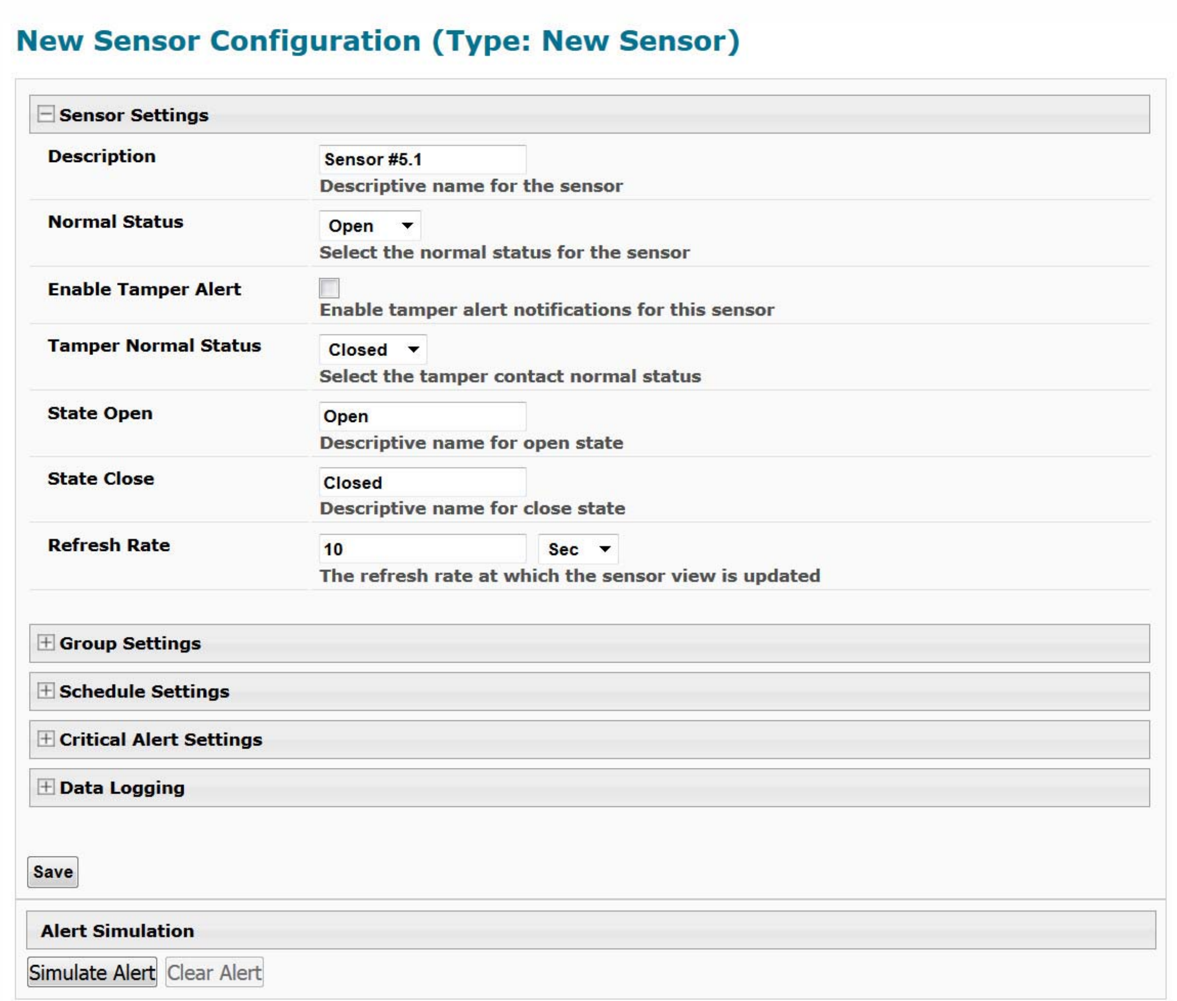
Sensor Type: Water
Select the sensor type

RJ45 Connector: 8
Choose which RJ45 jack the sensor will be connected to

Figure 45- Add a contact sensor

Many of the settings found in the RS485 configuration page are not present because they do not apply to contact sensors. As such, only “Critical Alert Settings” apply (see descriptions on page 42) and non-critical alert settings are omitted altogether.

A setting that is present only for contact sensors connected to RJ45 sensor ports **and** for Digital Input sensors (page 51)is "**Change Global Alert Status on triggering this sensor**" (explained on page 50).



New Sensor Configuration (Type: New Sensor)

⊟ Sensor Settings

Description	Sensor #5.1 Descriptive name for the sensor
Normal Status	Open ▾ Select the normal status for the sensor
Enable Tamper Alert	□ Enable tamper alert notifications for this sensor
Tamper Normal Status	Closed ▾ Select the tamper contact normal status
State Open	Open Descriptive name for open state
State Close	Closed Descriptive name for close state
Refresh Rate	10 Sec ▾ The refresh rate at which the sensor view is updated

⊞ Group Settings

⊞ Schedule Settings

⊞ Critical Alert Settings

⊞ Data Logging

Figure 46- Contact Sensor configuration page

Aside from the usual Description, Group, and Refresh Rate settings to be applied, the configuration page introduces four new settings:

Normal Status: This will be the contact sensors state when it is not in alert, either with contact closed, or contact open.

Enable Tamper Alert: If the contact sensor has a tamper feature, and the feature is being connected to the ENVIROMUX, then this box can be selected if alert messages are desired in the event the contact sensor tamper feature’s state changes from its defined “Normal Status”.

Tamper Normal Status: This will be the normal state of the contact sensor’s tamper feature when not being tampered with.

State Open/Close: Customize the information that will be provided to you in an alert message (up to 32 characters) when the state changes

Change Global Alert Status on triggering this sensor: Found under Critical Alert Settings, this feature enables the user to configure this sensor to cause the following changes to take effect:

A) **No Alert Changes**: make no changes to how alerts are managed (the default setting)

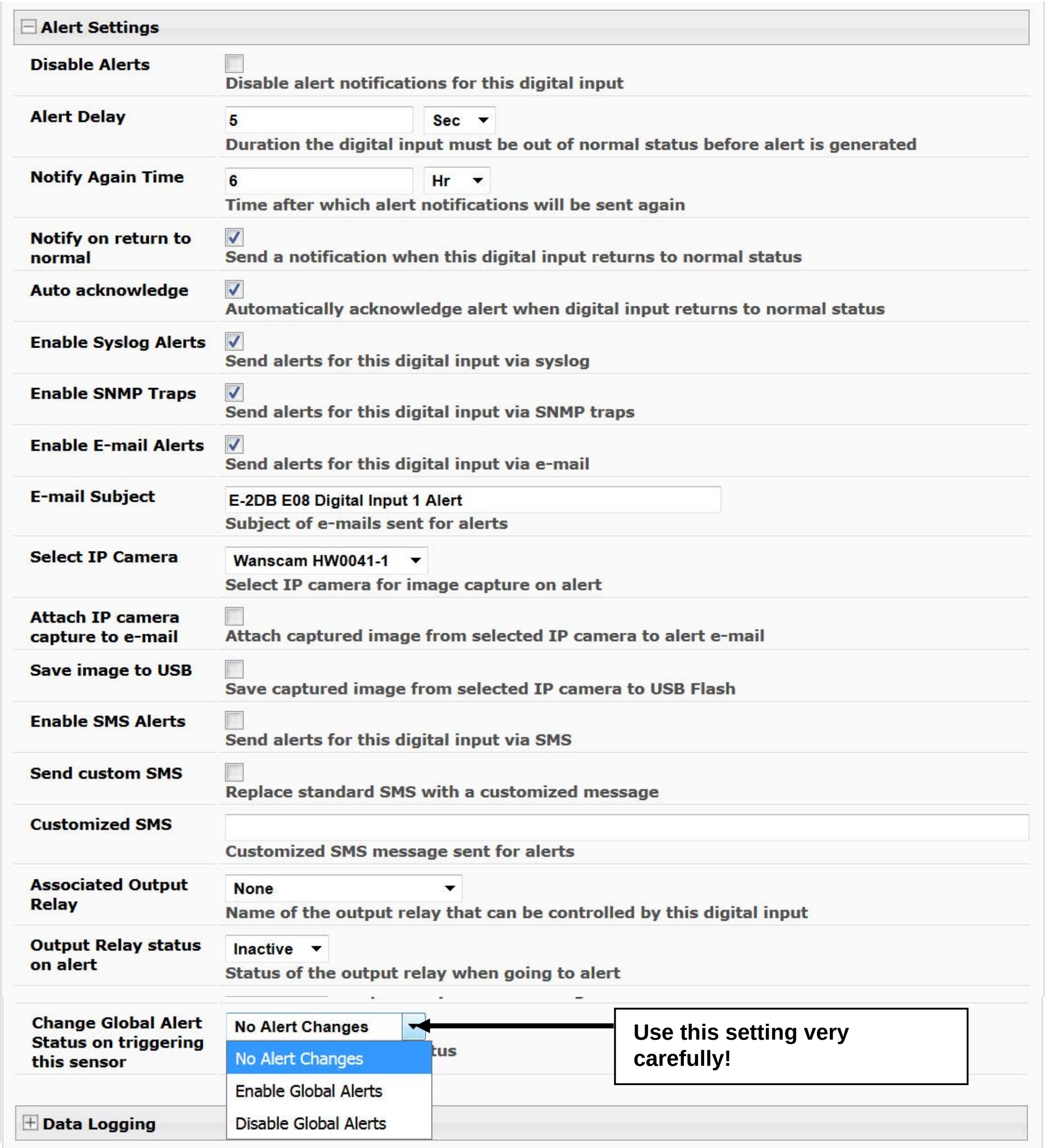
B) **Enable Global Alerts**: force all alert settings in effect to be acted upon as configured (if another sensor has disabled alerts, this setting will re-enable them). An alert message will be sent to all configured users to indicate this has occurred.

Note: This will not enable sensor alerts for those sensors that have "Disable Alerts" checked.

C) **Disable Global Alerts**: disable all alerts from being sent throughout the ENVIROMUX - when this sensor state changes, all alert communications from all sensors connected to this ENVIROMUX **will be disabled**. An alert message will be sent to all configured users to indicate this has occurred. When disabled, the message "**Global Alerts are currently disabled**" will be displayed in red at the top of the Summary and Alert Information pages.

Note: If one contact sensor is configured to disable global alerts, it is recommended to configure another contact sensor put to enable global alerts. Otherwise, once disabled, global alerts will remain disabled indefinitely, or until global alerts are manually re-enabled by using the "Enable Global Alerts" button on the Alarm Summary page (page 35).

An example for configuring this feature is on page 161.



⊟ Alert Settings

Disable Alerts	☐ Disable alert notifications for this digital input
Alert Delay	5 Sec Duration the digital input must be out of normal status before alert is generated
Notify Again Time	6 Hr Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this digital input returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when digital input returns to normal status
Enable Syslog Alerts	☑ Send alerts for this digital input via syslog
Enable SNMP Traps	☑ Send alerts for this digital input via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this digital input via e-mail
E-mail Subject	E-2DB E08 Digital Input 1 Alert Subject of e-mails sent for alerts
Select IP Camera	Wanscam HW0041-1 Select IP camera for image capture on alert
Attach IP camera capture to e-mail	☐ Attach captured image from selected IP camera to alert e-mail
Save image to USB	☐ Save captured image from selected IP camera to USB Flash
Enable SMS Alerts	☐ Send alerts for this digital input via SMS
Send custom SMS	☐ Replace standard SMS with a customized message
Customized SMS	 Customized SMS message sent for alerts
Associated Output Relay	None Name of the output relay that can be controlled by this digital input
Output Relay status on alert	Inactive Status of the output relay when going to alert
Change Global Alert Status on triggering this sensor	No Alert Changes

Use this setting very carefully!

Figure 47- Contact and Digital Alert Settings

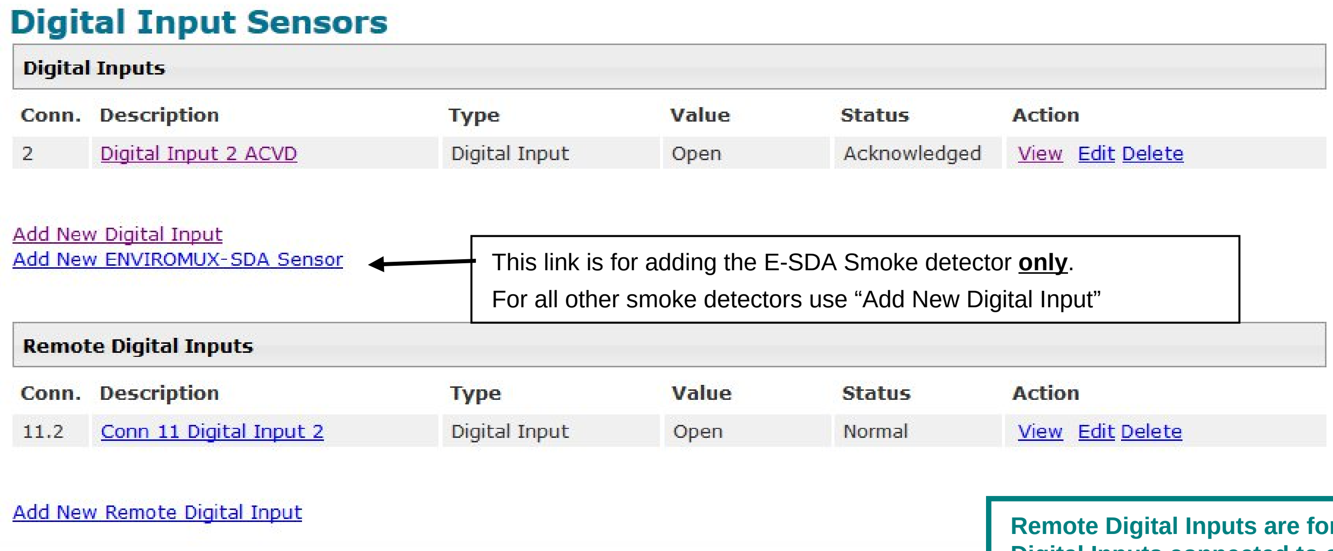
Digital Inputs

The "Digital In" terminals (page 11) are for easy installation of contact sensors (as opposed to using the RJ45 sensor ports). Connect up to 8 different contact sensors having either 2-wire contacts (for open or closed circuit sensing) or 4-wire contacts (for open or closed circuit sensors requiring 12V power supplies to operate). Therefore, the field "Normal Status" is provided to select the status of the sensor when it is not in an alert state. Select between **Open** contacts, or **Closed** contacts for the normal status of the sensor. (Water sensors are open contact when not in alert state.)

Note: The E-5D/2D have room for only 5 contact sensors, and do not provide 12V power to them individually.

An "Aux Pwr" terminal is available for up to 500mA of sensor support.

Before Digital Inputs will be listed in the Summary page or Digital Input page, they must first be added on the Digital Input page using "Add New Digital Input" (shown in image below).



Digital Input Sensors

Digital Inputs

Conn.	Description	Type	Value	Status	Action
2	Digital Input 2 ACVD	Digital Input	Open	Acknowledged	View Edit Delete

Add New Digital Input
Add New ENVIROMUX-SDA Sensor

This link is for adding the E-SDA Smoke detector **only**.
For all other smoke detectors use "Add New Digital Input"

Remote Digital Inputs

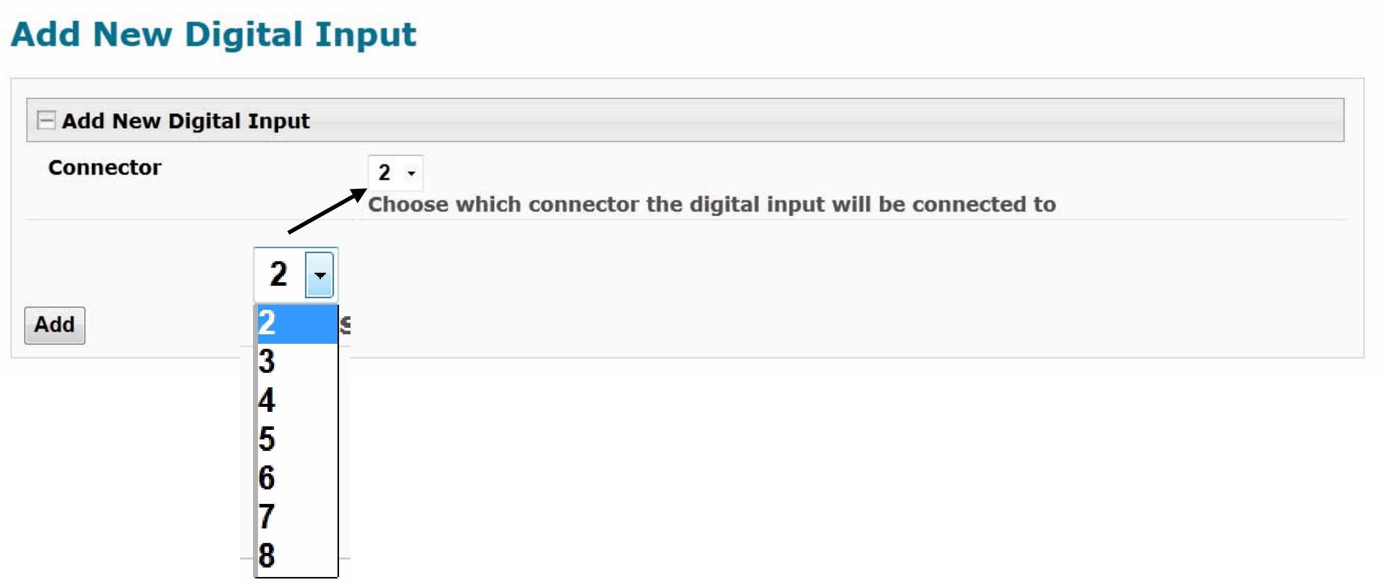
Conn.	Description	Type	Value	Status	Action
11.2	Conn 11 Digital Input 2	Digital Input	Open	Normal	View Edit Delete

Add New Remote Digital Input

Remote Digital Inputs are for Digital Inputs connected to an E-DI16DO(R)16 Digital Input Expander (sold separately)

Figure 48- Digital Input Sensors

First, select a connector on the ENVIROMUX that you wish to view the status of.



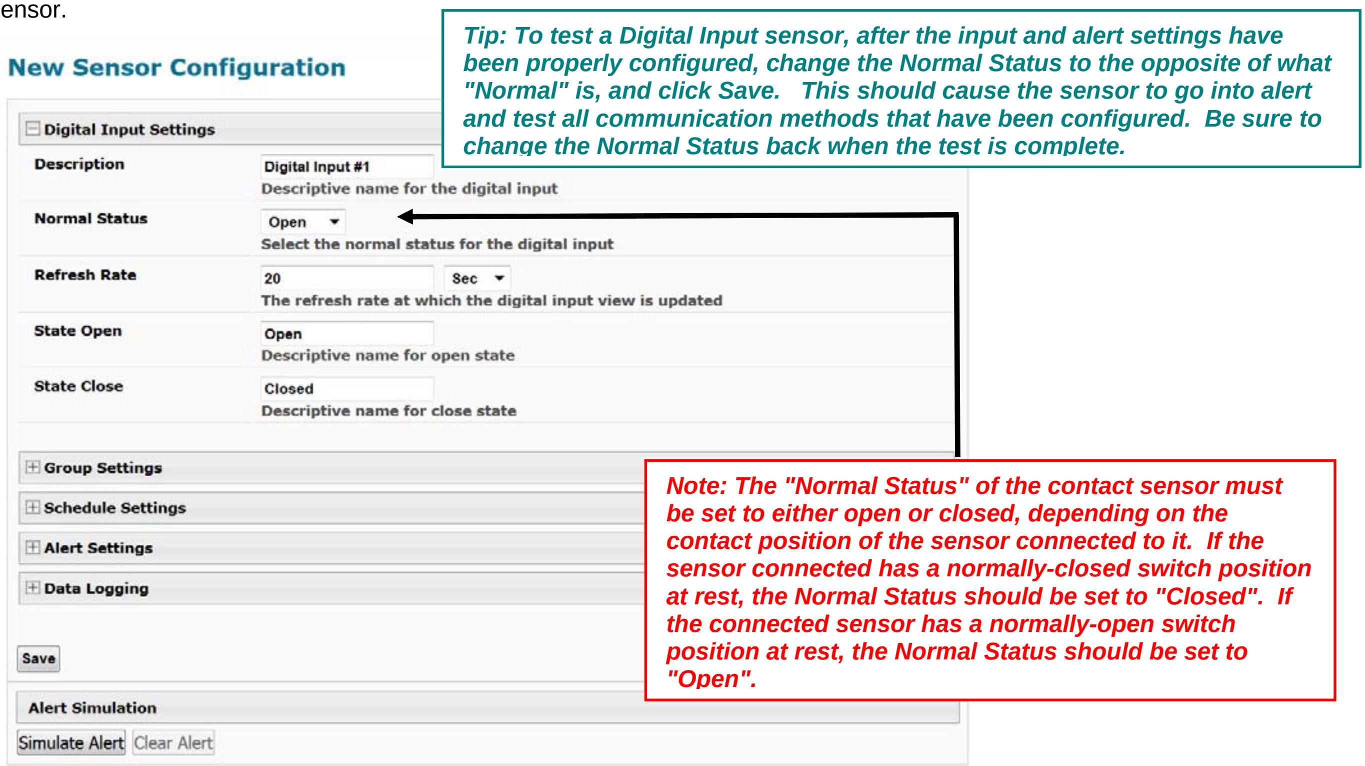
Add New Digital Input

Add New Digital Input

Connector 2
Choose which connector the digital input will be connected to

Figure 49- Select connector on ENVIROMUX

Once the connector is selected, a configuration window will open providing fields for the additional information available to setup the sensor.



New Sensor Configuration

⊟ Digital Input Settings

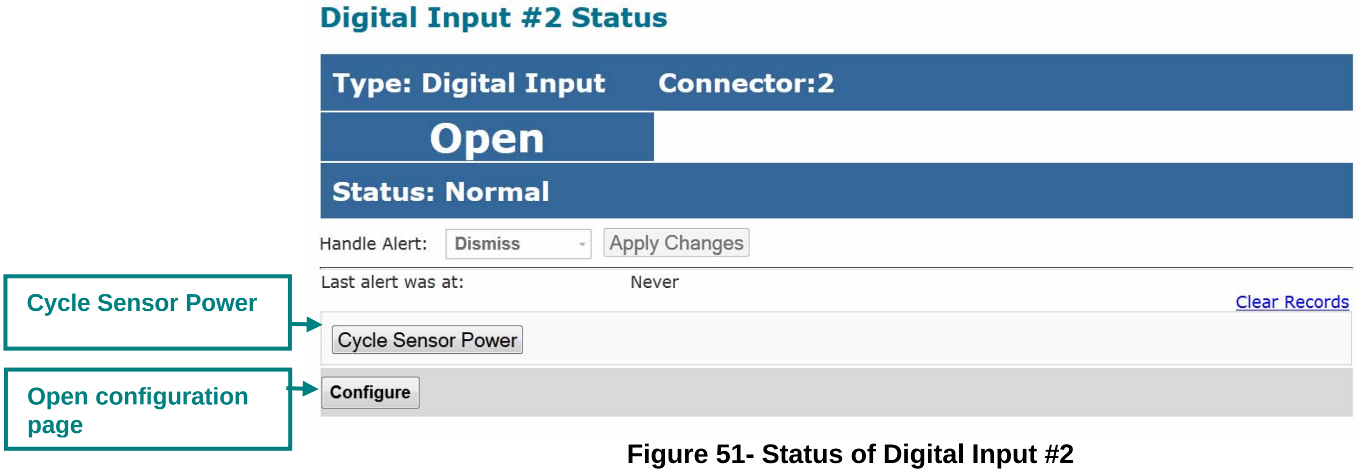
Description	Digital Input #1 Descriptive name for the digital input
Normal Status	Open Select the normal status for the digital input
Refresh Rate	20 Sec The refresh rate at which the digital input view is updated
State Open	Open Descriptive name for open state
State Close	Closed Descriptive name for close state

Tip: To test a Digital Input sensor, after the input and alert settings have been properly configured, change the Normal Status to the opposite of what "Normal" is, and click Save. This should cause the sensor to go into alert and test all communication methods that have been configured. Be sure to change the Normal Status back when the test is complete.

Note: The "Normal Status" of the contact sensor must be set to either open or closed, depending on the contact position of the sensor connected to it. If the sensor connected has a normally-closed switch position at rest, the Normal Status should be set to "Closed". If the connected sensor has a normally-open switch position at rest, the Normal Status should be set to "Open".

Figure 50- Configure New Sensor

After the Digital Input sensor has been installed, the management and configuration of it is similar to Contact Sensors (page 48). To view the status of a sensor, click on the sensor as listed in the Digital Input page (Figure 48).



Digital Input #2 Status

Type: Digital Input Connector:2

Open

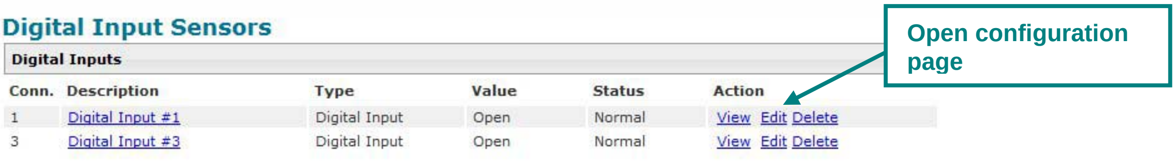
Status: Normal

Handle Alert: Dismiss

Last alert was at: Never

Figure 51- Status of Digital Input #2

To adjust configuration of an existing sensor, click on “Configure”. The configuration window can also be opened by clicking on “Edit” in the Digital Input page.



Digital Input Sensors

Digital Inputs

Conn.	Description	Type	Value	Status	Action
1	Digital Input #1	Digital Input	Open	Normal	View Edit Delete
3	Digital Input #3	Digital Input	Open	Normal	View Edit Delete

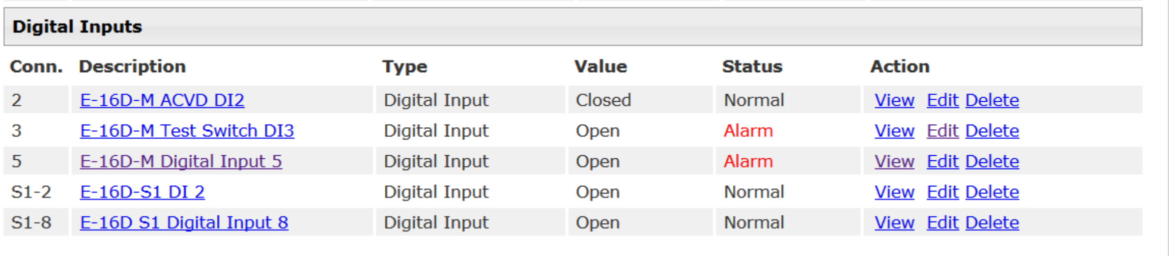
Figure 52- Open configuration from Digital Input page

Cycle Sensor Power

A "Cycle Sensor Power" button is also provided (see Figure 51) for each sensor connected to the "Digital In" terminals (locally-connected Digital Inputs only). To momentarily disrupt power to any sensor connected to a Digital Input terminal, click on this button. For example, when a smoke detector needs to be power-cycled in order to reset it. The 12VDC power will be disrupted to the sensor for 5 seconds and then automatically restored.

Note: On E-5D and -2D, the "Cycle Sensor Power" will cause the "AUX PWR" terminals to cycle power. This will only be effective for the sensor you are clicking the button for if that sensor is being powered from these terminals. If your sensor is powered, for example, from an AC adapter, the "Cycle Sensor Power" button will have no effect on that sensor, but it will still cycle power on the "AUX PWR" terminals, disrupting any device getting power from these terminals for 5 seconds. Keep this in mind if more than one sensor (or device) is being powered from these terminals.

To test your Digital Input configuration, click on "Configure" (Figure 51) for the sensor, and click on "Simulate Alert" (Figure 50). Now go to the Summary Page. The Status for that sensor should now show it to be in "Alarm" (provided your Alert Delay, under Alert Settings, is not set for too many seconds). If the Alert Delay is in play, you will have to wait for that time to expire before the Status will change.



Digital Inputs

Conn.	Description	Type	Value	Status	Action
2	E-16D-M ACVD DI2	Digital Input	Closed	Normal	View Edit Delete
3	E-16D-M Test Switch DI3	Digital Input	Open	Alarm	View Edit Delete
5	E-16D-M Digital Input 5	Digital Input	Open	Alarm	View Edit Delete
S1-2	E-16D-S1 DI 2	Digital Input	Open	Normal	View Edit Delete
S1-8	E-16D S1 Digital Input 8	Digital Input	Open	Normal	View Edit Delete

Add Tach Sensor

To add a Tach Sensor, make connections of the tachometer type sensor (ENVIROMU-WSS for example) to Digital Input 1 on the rear of the ENVIROMUX. Then select "Add Tach Sensor on Digital Input 1" on the Sensors summary page (page 48). The sensor configuration page with added settings for a custom sensor will appear. These settings are the same as those described under "Specialized Sensors" on page 46. This special purpose of Digital Input 1 can be used by any device that produces a frequency up to 255Hz.

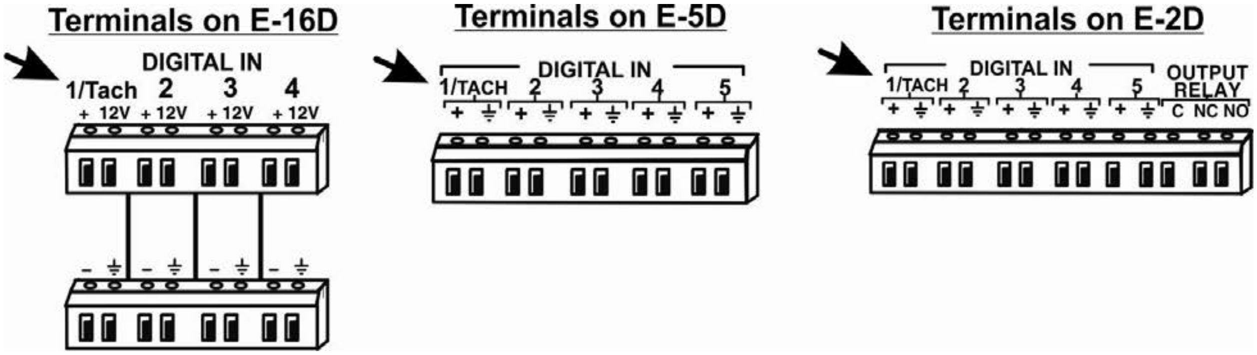


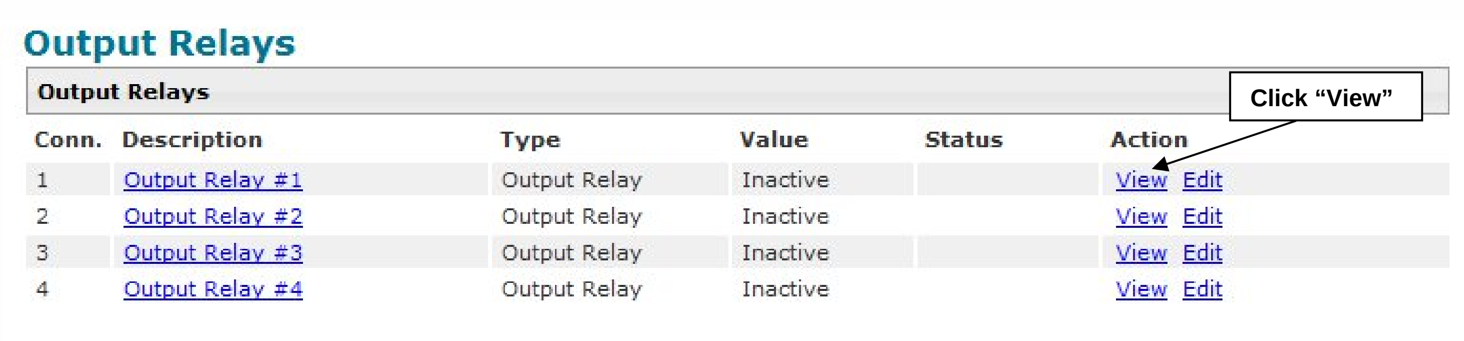
Figure 53- Connection that supports Tachometer Sensor

Note: Digital Input 1 is the only terminal connection point that supports a tach sensor.

To remove a digital input sensor from the displayed list, click on "**Delete**" under the Action column in the Digital Input Sensor list.

Monitor Output Relay

Output relays are provided to control external devices with a rating of up to 1A, 30VDC or 0.5A, 125VAC. Each relay state is monitored to be either inactive (relay is at rest; contacts as indicated by product markings) or active (relay is energized; contacts are opposite that of product markings). The status of the relay can be changed either manually through the web interface, or as a result of an alert (page 43).



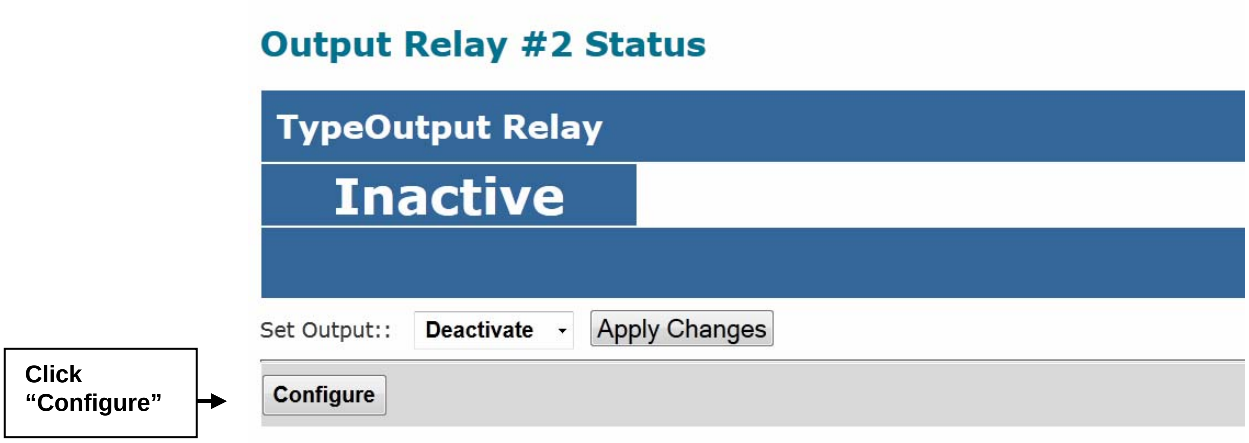
Output Relays

Output Relays

Conn.	Description	Type	Value	Status	Action
1	Output Relay #1	Output Relay	Inactive		View Edit
2	Output Relay #2	Output Relay	Inactive		View Edit
3	Output Relay #3	Output Relay	Inactive		View Edit
4	Output Relay #4	Output Relay	Inactive		View Edit

Click “View”

Figure 54- Monitoring Output Relays



Output Relay #2 Status

TypeOutput Relay

Inactive

Set Output:: Deactivate Apply Changes

Configure

Click “Configure”

Figure 55- Output Relay Status

To test your connections and set the state of the relay manually, from the relay status page (Figure 55), select the arrow next to Set Output to drop down the window and select either “Deactivate” or “Activate”. Then click the “Apply Changes” button.

The relay state can also be changed using SNMP. See page 74 for details.

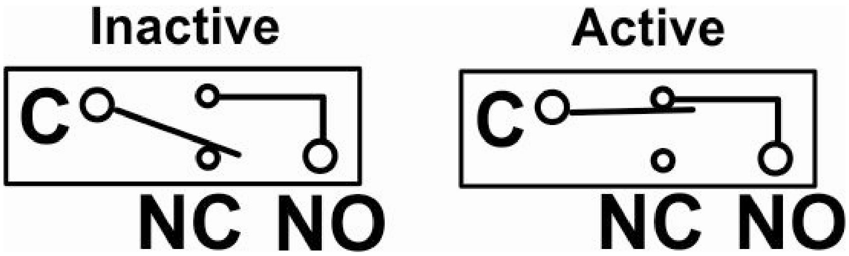
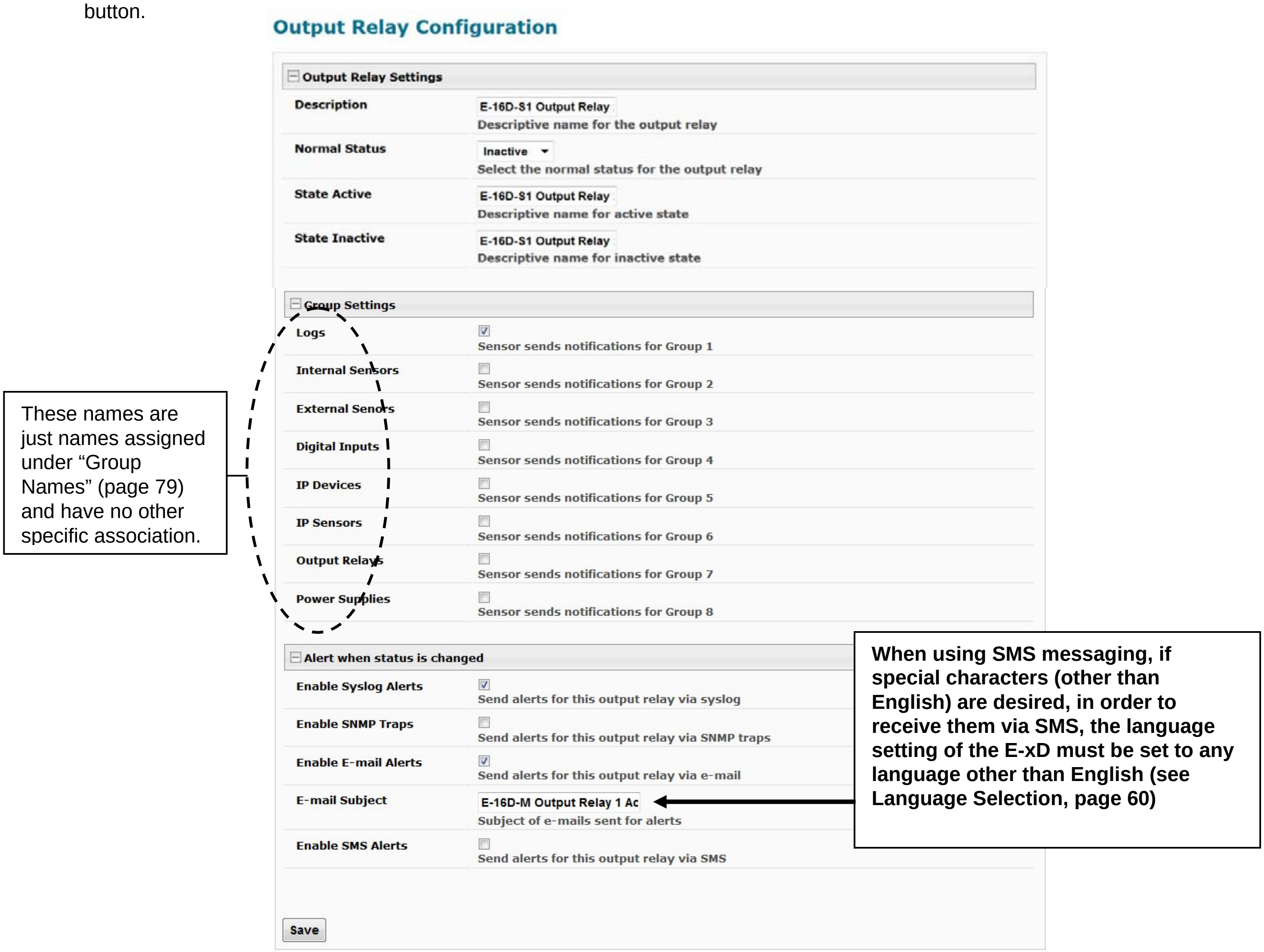


Figure 56- Output Relay Contact State

To change settings for the output relay and whether or not a state change should generate an alert message, click the “Configure” button.



Output Relay Configuration

Output Relay Settings

Description	E-16D-S1 Output Relay Descriptive name for the output relay
Normal Status	Inactive Select the normal status for the output relay
State Active	E-16D-S1 Output Relay Descriptive name for active state
State Inactive	E-16D-S1 Output Relay Descriptive name for inactive state

Group Settings

Logs	☑ Sensor sends notifications for Group 1
Internal Sensors	□ Sensor sends notifications for Group 2
External Senors	□ Sensor sends notifications for Group 3
Digital Inputs	□ Sensor sends notifications for Group 4
IP Devices	□ Sensor sends notifications for Group 5
IP Sensors	□ Sensor sends notifications for Group 6
Output Relays	□ Sensor sends notifications for Group 7
Power Supplies	□ Sensor sends notifications for Group 8

Alert when status is changed

Enable Syslog Alerts	☑ Send alerts for this output relay via syslog
Enable SNMP Traps	□ Send alerts for this output relay via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this output relay via e-mail
E-mail Subject	E-16D-M Output Relay 1 Ac Subject of e-mails sent for alerts
Enable SMS Alerts	□ Send alerts for this output relay via SMS

These names are just names assigned under “Group Names” (page 79) and have no other specific association.

When using SMS messaging, if special characters (other than English) are desired, in order to receive them via SMS, the language setting of the E-xD must be set to any language other than English (see Language Selection, page 60)

Figure 57- Configure Output Relay

From the configuration page, the user can apply a description of the relay that will be used on the summary page and in any alert messages sent, if so configured.

Choose the Normal Status for the relay, between Inactive or Active. When the status changes from what is defined as “normal”, an alert will be sent if so configured.

To have messages sent to specific members, select the monitoring group(s) the relay will belong to.

When the relay is in an alert state, the ENVIROMUX can be configured to send an email, syslog and SMS alerts, as well as an SNMP trap to the users subscribing to alerts in the selected group. Place a checkmark in the box for those features you wish to enable.

If email alerts is enabled, enter an e-mail subject line that will get the attention of the recipient(s).

Note: When the ENVIROMUX is powered OFF with the battery completely drained, each relay will revert to an inactive state, regardless of the “Normal Status” setting.

Once configured, output relays are controlled by their associated sensor and can be programmed to change state (from normally-open to normally-closed or vice versa) on an alert or on the return to normal conditions. Programming is done on the configuration page of the associated sensor or Smart Alert. Each output relay can be associated with any one sensor or Smart Alert.

IP Devices

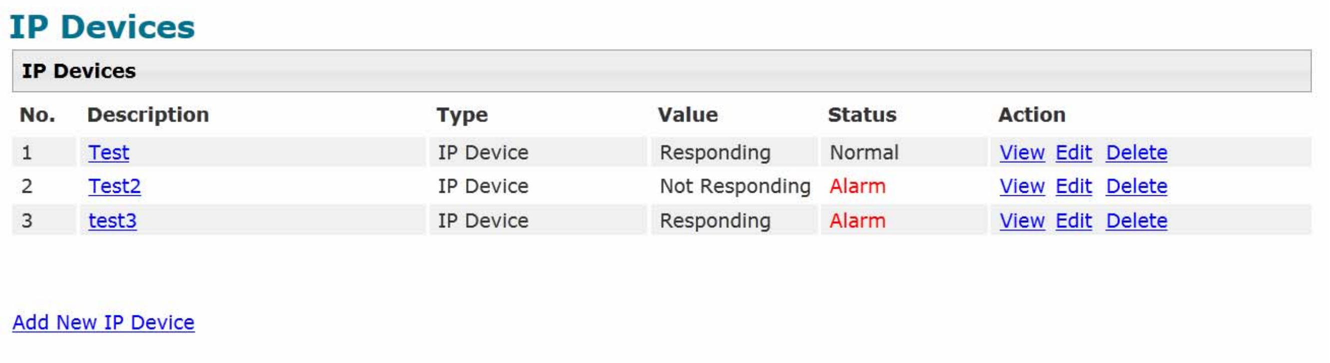
Up to 64 IP addresses can be assigned to be monitored by ENVIROMUX. They will be displayed under the **Monitoring->IP Devices** item in the left side menu. The ENVIROMUX will periodically ping (test) these addresses to determine whether or not they are up and running. If the address is not running, an alert will be recorded.

For each device the user can configure the

- IP address,
- the name,
- the sensor group the IP device will belong to
- the ping period (period of time between two consecutive tests),
- the time-out period (in seconds) in which the address should respond
- the number of times the ENIROMUX should ping the address before reporting an alert
- how often, if at all, the reading taken should be added to the data log.

If the address fails to respond within the time-out for the selected number of times it will generate an alert. It will be tested again after the programmed period of time.

Just as with other sensors, the method of alert notification and the effect, if any, on output contacts can be configured in response to IP address connection failures.



IP Devices

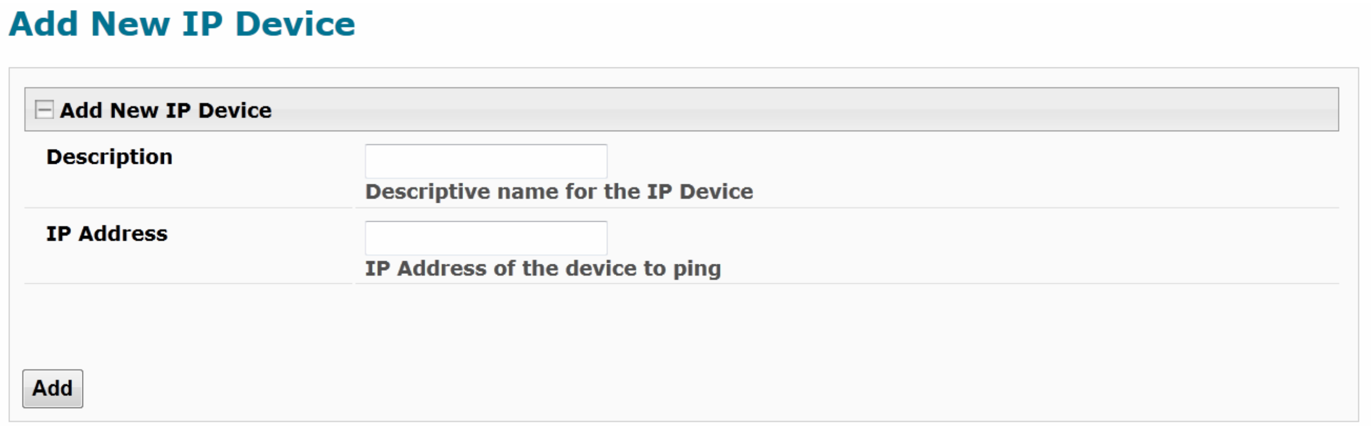
IP Devices

No.	Description	Type	Value	Status	Action
1	Test	IP Device	Responding	Normal	View Edit Delete
2	Test2	IP Device	Not Responding	Alarm	View Edit Delete
3	test3	IP Device	Responding	Alarm	View Edit Delete

Add New IP Device

Figure 58- IP Devices monitored

To add an IP device to monitor, select “Add New IP Device” from the **Monitoring ->IP Devices page**.



Add New IP Device

⊟ Add New IP Device

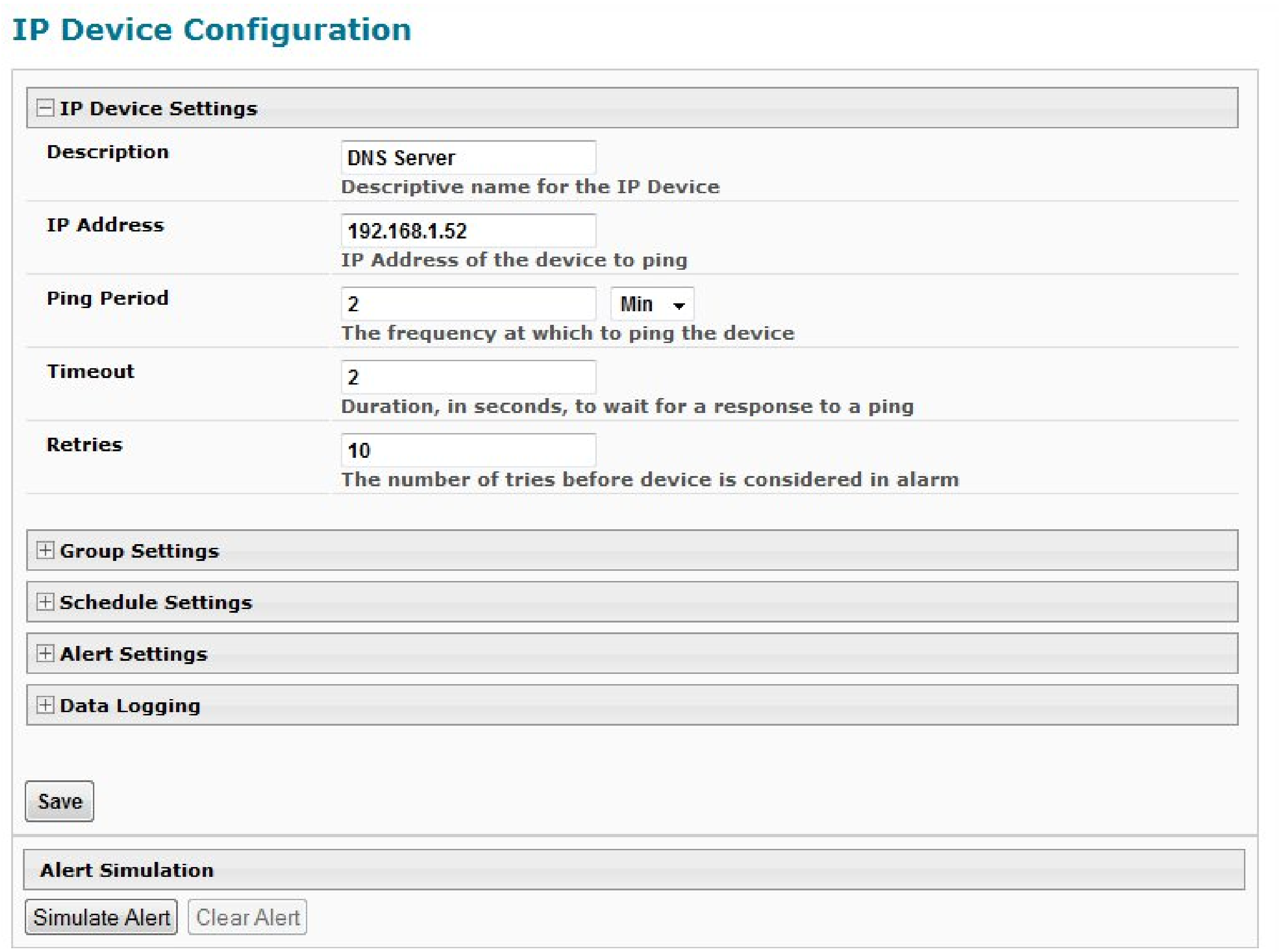
Description
Descriptive name for the IP Device

IP Address
IP Address of the device to ping

Add

Figure 59- Add new IP Device

Apply a descriptive name for the IP Device to be monitored, and the IP address of the device.



IP Device Configuration

⊟ IP Device Settings

Description: DNS Server
Descriptive name for the IP Device

IP Address: 192.168.1.52
IP Address of the device to ping

Ping Period: 2 Min
The frequency at which to ping the device

Timeout: 2
Duration, in seconds, to wait for a response to a ping

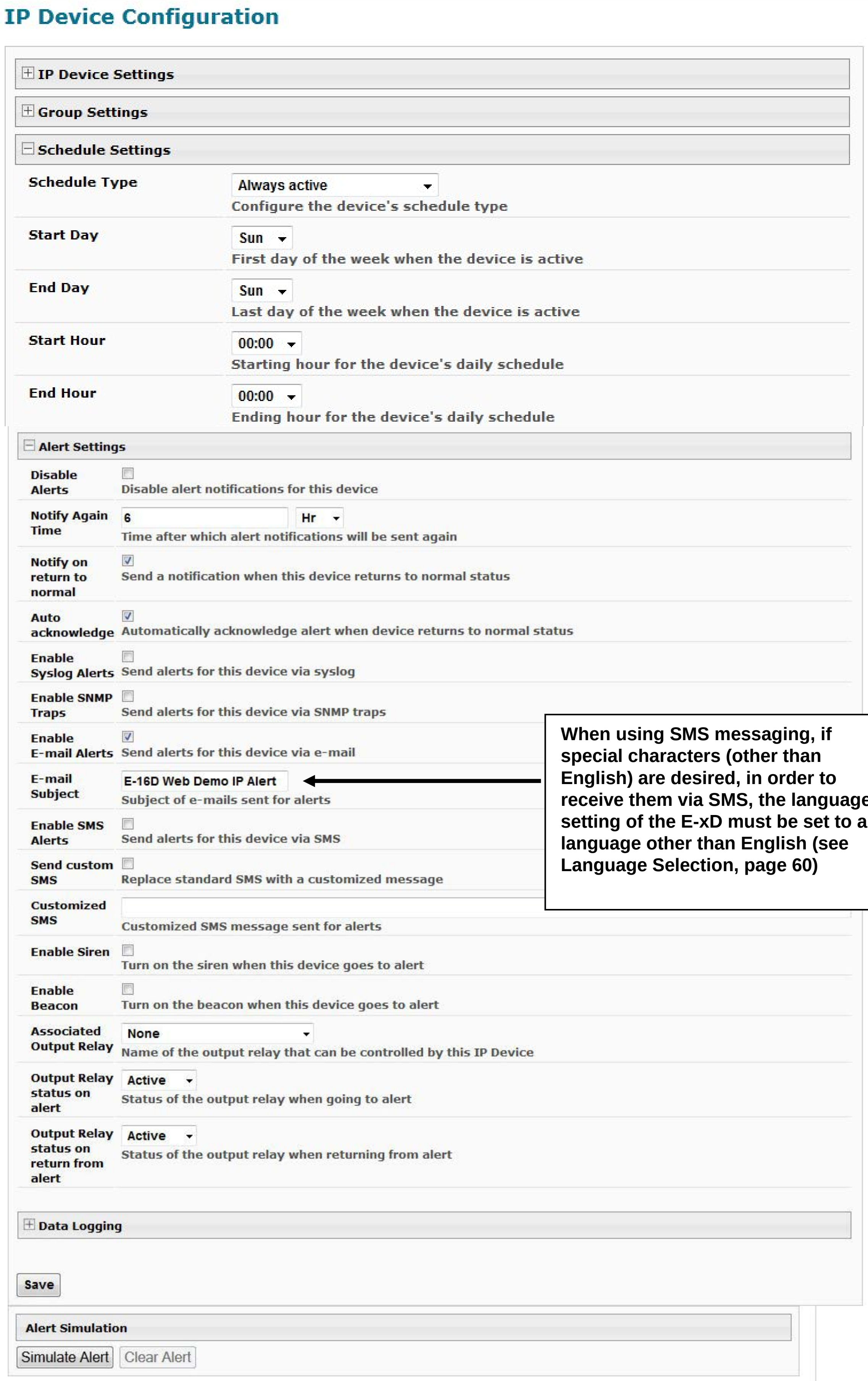
Retries: 10
The number of tries before device is considered in alarm

Figure 60- IP Device Configuration

IP Device Settings	Description
Description	The description of the IP Device that will be viewed in the Summary page and in the body of alert messages
IP Address	The IP address of the IP Device
Ping Period	Enter the frequency in minutes or seconds that the ENVIROMUX should ping the IP Device
Timeout	Enter the length of time in seconds to wait for a response to a ping before considering the attempt a failure
Retries	Enter the number of times the ENVIROMUX should ping a non-responsive IP device before changing its status from normal to alarm and sending an alert

There is no limit to the number of times you can retry to ping (retries), how long to wait for a response (timeout), or how long you can set it to wait between pings to a device(ping period). These values are up to you.

Under Group Settings, place a checkmark for each group that alert messages should be assigned to. This will determine who will receive an alert due to a ping failure.



IP Device Configuration

⊞ IP Device Settings

⊞ Group Settings

⊟ Schedule Settings

Schedule Type	Always active ▾ Configure the device's schedule type
Start Day	Sun ▾ First day of the week when the device is active
End Day	Sun ▾ Last day of the week when the device is active
Start Hour	00:00 ▾ Starting hour for the device's daily schedule
End Hour	00:00 ▾ Ending hour for the device's daily schedule

⊟ Alert Settings

Disable Alerts	☐ Disable alert notifications for this device
Notify Again Time	6 Hr ▾ Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this device returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when device returns to normal status
Enable Syslog Alerts	☐ Send alerts for this device via syslog
Enable SNMP Traps	☐ Send alerts for this device via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this device via e-mail
E-mail Subject	E-16D Web Demo IP Alert Subject of e-mails sent for alerts
Enable SMS Alerts	☐ Send alerts for this device via SMS
Send custom SMS	☐ Replace standard SMS with a customized message
Customized SMS	Customized SMS message sent for alerts
Enable Siren	☐ Turn on the siren when this device goes to alert
Enable Beacon	☐ Turn on the beacon when this device goes to alert
Associated Output Relay	None ▾ Name of the output relay that can be controlled by this IP Device
Output Relay status on alert	Active ▾ Status of the output relay when going to alert
Output Relay status on return from alert	Active ▾ Status of the output relay when returning from alert

⊞ Data Logging

Alert Simulation

When using SMS messaging, if special characters (other than English) are desired, in order to receive them via SMS, the language setting of the E-xD must be set to any language other than English (see Language Selection, page 60)

Figure 61- IP Device Configuration-more

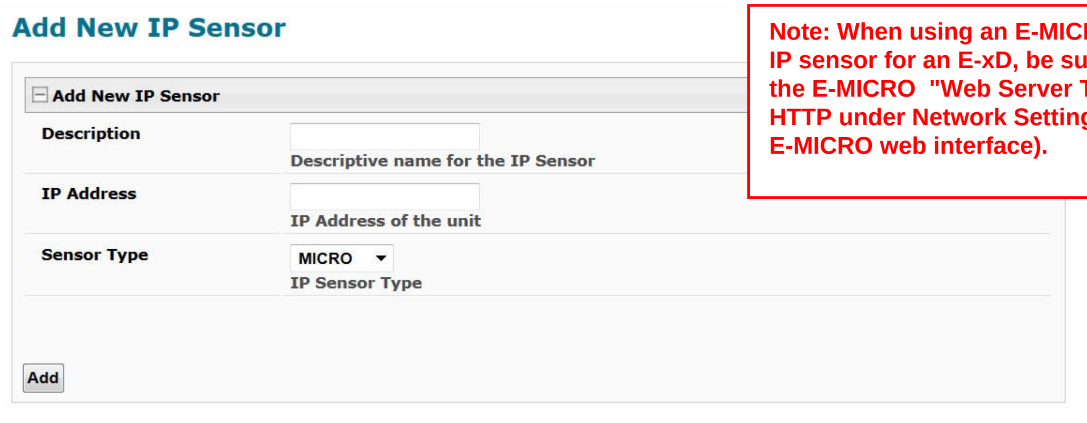
Group Settings	**Description**
Group	Assign the device IP to any or all groups 1 -8 (see also page 44)
Schedule Settings	
Schedule Type	**Always active**- system will react to alert condition at all hours of each day **Active during defined times**- system will only react to alert condition during times as outlined below
Start Day	First day of the week the system should react to alert condition
End Day	Last day of the week the system should react to alert condition
Start Hour	First hour of the day the system should begin reacting to alert condition
End Hour	Last hour of the day the system should react to alert condition
Alert Settings	
Disable Alerts	Place a checkmark in the box to prevent alerts from being sent when the device's status changes ***Note: If alerts for an IP device are disabled, the associated output action (see outputs"- page 34) will still take place. There just won't be any alert notifications that this is occurring. For example, this might be used to turn ON a device, such as a fan, when the server room gets too warm, and OFF again when the temperature returns to normal. An alert message may not be desired under these circumstances.*** ***Note: if the user wants to disable alerts for an IP device after the device is already in alert status, the user must either acknowledge or dismiss the alert first.***
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the IP device status has returned to normal by selecting the "***Notify when return to normal***" box for a device.
Auto Acknowledge	Place a checkmark in this box to have alert notifications in the summary page return to normal state automatically when sensor readings return to normal.
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received (up to 60 characters)
Enable SMS Alerts	Place a checkmark in this box to have alert notifications sent via SMS messages (requires a modem)
Enable Siren	Turn ON the siren when this device goes to alert (not applicable to E-2D)
Enable Beacon	Turn ON the beacon when this device goes to alert (not applicable to E-2D)
Associated Output Relay **Tip: Another way to have a single output relay react to the changes of more than one sensor is to use Events and Smart Alerts (page 99) to create that association.**	Associate the IP Device with the operation of an output relay, or not. By Default, the operation of an output relay can only be associated with one sensor or IP Device. To associate an output relay with more than one sensor or IP Device, place a checkmark in the checkbox under "System- Other Options- Disable Relay Interlock (page 67). ***Note: Only one sensor/device should be associated with the Output Relay at a time. Contradicting commands from two or more sensors will result in the output relay responding to the state directed by the last command received.*** ***Note: If the Output Relay is associated with a sensor/device, and configured to change state when a sensor crosses threshold into alert, it will change state even if the alerts are disabled.***
Output Relay Status on Alert	State the output relay will be in when IP Device goes to an alert
Output Relay Status on Return from Alert	State the output relay will be in when IP Device is no longer in alert

Data Logging	
Add to data log	This is a check-box that lets the user decide if the data sampled should be recorded in the Data Log.
Logging Period	Enter the time period between logged measurements

IP Sensors

Sensors connected to an E-MICRO-T(RHP) can be monitored and configured from the E-xD interface.

On the IP Sensors page, click on “Add New IP Sensor”.   On the page that opens, enter a description to be viewed on the sensor summary page for this group of sensors, enter the IP Address of the E-MICRO to be monitored.   Up to 8 different E-MICRO IP Addresses can be added.   When finished, click on “Add”.



Add New IP Sensor

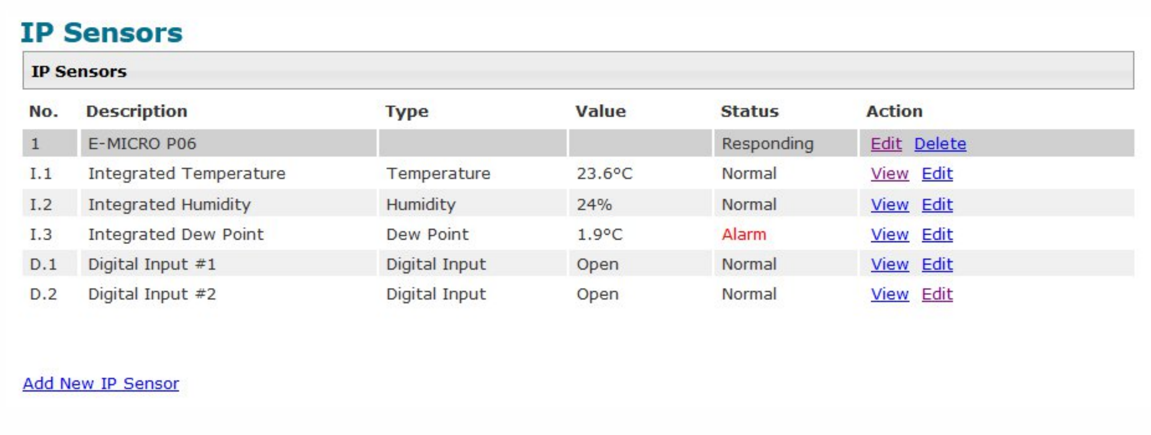
⊟ Add New IP Sensor

Description	Descriptive name for the IP Sensor
IP Address	IP Address of the unit
Sensor Type	MICRO ▾ IP Sensor Type

Note: When using an E-MICRO as an IP sensor for an E-xD, be sure to set the E-MICRO "Web Server Type" to HTTP under Network Settings (in the E-MICRO web interface).

Figure 62- Add IP Sensor

The E-xD will then sense what sensors are attached to the E-MICRO units and add them to your summary list under “IP Sensors”. Once listed, to view the status of an individual sensor, click on “View”.   The change the configuration, click on “Edit”.



IP Sensors

IP Sensors

No.	Description	Type	Value	Status	Action
1	E-MICRO P06			Responding	Edit Delete
I.1	Integrated Temperature	Temperature	23.6°C	Normal	View Edit
I.2	Integrated Humidity	Humidity	24%	Normal	View Edit
I.3	Integrated Dew Point	Dew Point	1.9°C	Alarm	View Edit
D.1	Digital Input #1	Digital Input	Open	Normal	View Edit
D.2	Digital Input #2	Digital Input	Open	Normal	View Edit

Figure 63- IP Sensor List

In a cascaded configuration of E-xD units, IP sensors (maximum of 8) must be configured from the Master unit to receive alerts about those sensors.

Note: The configuration settings applied to these sensors in this interface will not alter the settings as configured within the E-MICRO web interface.

IP Cameras

The IP Camera page displays the video snapshots of up to 8 monitored IP cameras. ENVIROMUX will display the video from specified IP addresses and provide images at 320 x 240 resolution. Place a name, the URL or IP address of the link, and the name of the image taken by the camera in the blocks provided (examples in Figure 65). The images can be set to be refreshed every 100 msec (.1 second) up to 99,900 msec (almost 100 seconds).

Click ***Save*** at the bottom of the page. Then click on **Monitoring->IP Cameras** to see the images taken by those cameras. The user can click on any image and be connected to the site defined by the configuration.

If your camera requires authentication in order to view images or send images via email, place a checkmark in "**Enable HTTP Auth**" and add the **Username** and **Password** that your camera has been configured to accept.

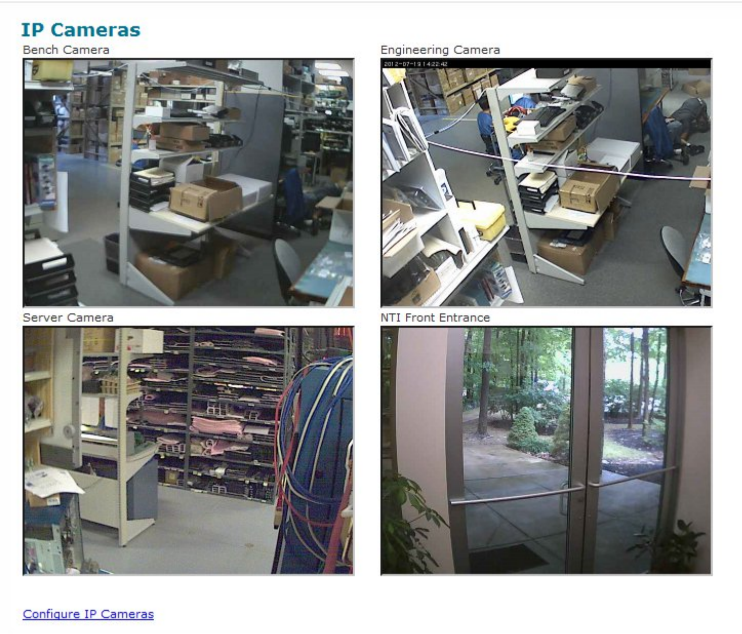
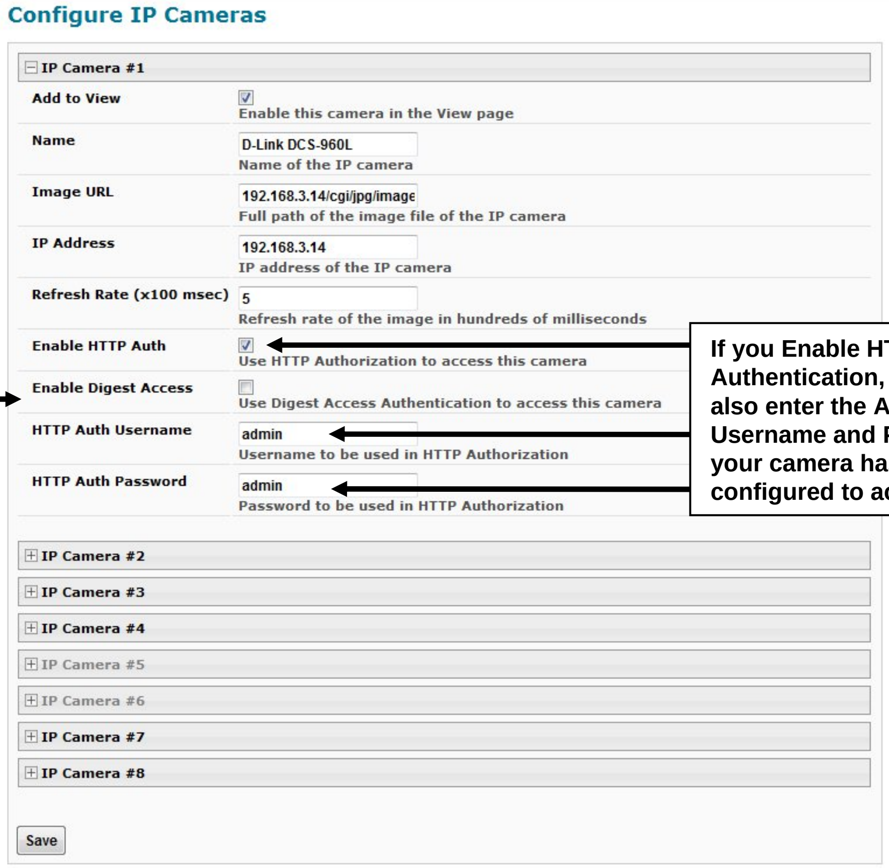


Figure 64- Monitoring IP Cameras



Configure IP Cameras

⊟ IP Camera #1

Add to View	☑ Enable this camera in the View page
Name	D-Link DCS-960L Name of the IP camera
Image URL	192.168.3.14/cgi/jpg/image Full path of the image file of the IP camera
IP Address	192.168.3.14 IP address of the IP camera
Refresh Rate (x100 msec)	5 Refresh rate of the image in hundreds of milliseconds
Enable HTTP Auth	☑ Use HTTP Authorization to access this camera
Enable Digest Access	☐ Use Digest Access Authentication to access this camera
HTTP Auth Username	admin Username to be used in HTTP Authorization
HTTP Auth Password	admin Password to be used in HTTP Authorization

⊞ IP Camera #2

⊞ IP Camera #3

⊞ IP Camera #4

⊞ IP Camera #5

⊞ IP Camera #6

⊞ IP Camera #7

⊞ IP Camera #8

Save

Once this is configured, test to see if images come via email. (See below)

If not, your camera may require "Digest Access Authentication" to work. In this case, place a checkmark in "**Enable Digest Access**".

Caution: Don't enable this unless it is necessary, because if it isn't needed, you won't get emails from cameras that don't support this feature.

If you Enable HTTP Authentication, you must also enter the Authentication Username and Password that your camera has been configured to accept.

Figure 65- IP Camera Configuration

The images from web cameras can also be associated with alert messages. When configured (page 45), an image from an IP camera can be taken and sent along with a sensor alert message via email and/or saved to a connected USB flashdrive.

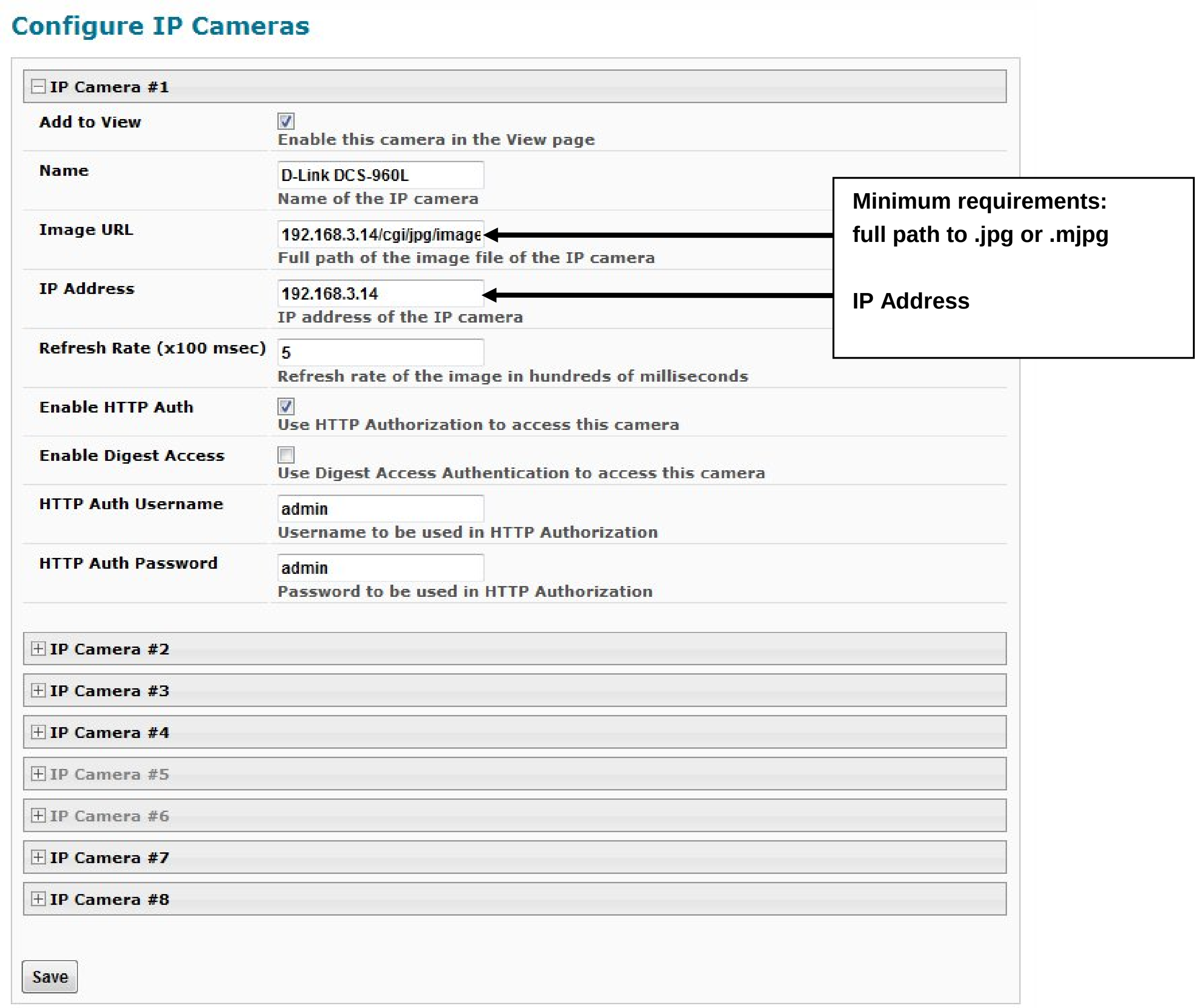
Note: If your camera's security can be disabled, and you don't want to use it to be able to send IP camera captures as e-mail attachments, then disable it. The "Enable HTTP Auth" and "Enable digest Access" features are provided for cameras the require authentication to view images or send images via email. Consult your IP camera manual to see if this feature is present and for instructions on how to configure this.

Other IP Cameras

NTI offers several compatible IP cameras at http://www.networktechinc.com/ip-camera.html and each of these have been tested to work with the ENVIROMUX E-xD monitoring systems, but if you have a different model IP camera to connect, it may also work well with the system.

To work with the ENVIROMUX, the camera must provide JPEG or MJPEG images, and you must know the path within the camera software to the camera image(s):

I.e.: <ip address>/mjpg/video.mjpg



Configure IP Cameras

⊟ IP Camera #1

Add to View	☑ Enable this camera in the View page
Name	D-Link DCS-960L Name of the IP camera
Image URL	192.168.3.14/cgi/jpg/image Full path of the image file of the IP camera
IP Address	192.168.3.14 IP address of the IP camera
Refresh Rate (x100 msec)	5 Refresh rate of the image in hundreds of milliseconds
Enable HTTP Auth	☑ Use HTTP Authorization to access this camera
Enable Digest Access	☐ Use Digest Access Authentication to access this camera
HTTP Auth Username	admin Username to be used in HTTP Authorization
HTTP Auth Password	admin Password to be used in HTTP Authorization

⊞ IP Camera #2

⊞ IP Camera #3

⊞ IP Camera #4

⊞ IP Camera #5

⊞ IP Camera #6

⊞ IP Camera #7

⊞ IP Camera #8

Save

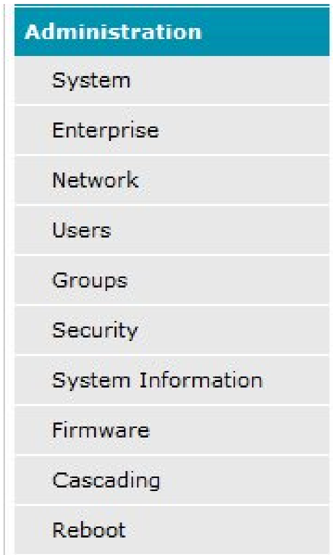
Minimum requirements:
full path to .jpg or .mjpg

IP Address

Figure 66- IP Camera minimum requirements

Administration

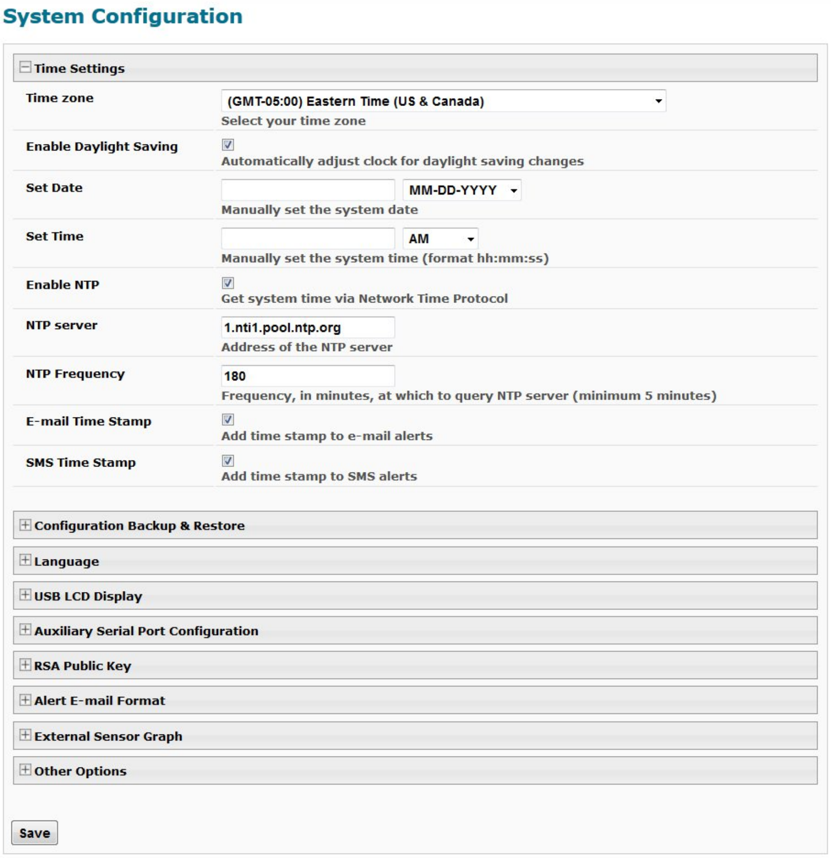
From the Administration section there are several sub sections for configuring the ENVIROMUX:



System	Fields for applying time zone, date, time, NTP server, backup and restore configuration settings and settings for the “RS232 AUX” port
Enterprise	Fields for assigning the unit name, address, contact person, the ENVIROMUX e-mail address, and phone number of a contact person
Network	Fields for providing all the network settings the ENVIROMUX including IP address, DNS, SMTP and SNMP settings
Users	Fields for assigning users, access privileges, passwords, contact settings, and schedule settings
Groups	Fields for assigning names to the groups that will receive alerts and messages
Security	Fields for setting authentication method and IP Filtering
System Information	For viewing ENVIROMUX system information
Firmware	For updating the firmware of the ENVIROMUX when improved software becomes available.
Cascading	For controlling up to 4 ENVIROMUX slaves from one master unit
Reboot	Enables user to reboot the ENVIROMUX using the web interface

System Configuration

The System Configuration section is where all the settings necessary for proper time reporting within alert messages and log records are configured.   To view the System Configuration page, click on **System** from the **Administration** section of the menu.


System Configuration

⊟ Time Settings

Time zone: (GMT-05:00) Eastern Time (US & Canada) — Select your time zone

Enable Daylight Saving: ☑ Automatically adjust clock for daylight saving changes

Set Date: [ ] MM-DD-YYYY — Manually set the system date

Set Time: [ ] AM — Manually set the system time (format hh:mm:ss)

Enable NTP: ☑ Get system time via Network Time Protocol

NTP server: 1.nti1.pool.ntp.org — Address of the NTP server

NTP Frequency: 180 — Frequency, in minutes, at which to query NTP server (minimum 5 minutes)

E-mail Time Stamp: ☑ Add time stamp to e-mail alerts

SMS Time Stamp: ☑ Add time stamp to SMS alerts

Figure 67- System Configuration page

The Date and Time of the ENVIROMUX can be either manually setup to use an onboard clock or set to be synchronized with an NTP server.   The configuration of the ENVIROMUX can also be easily backed up to a file on your PC and restored from that file as needed.

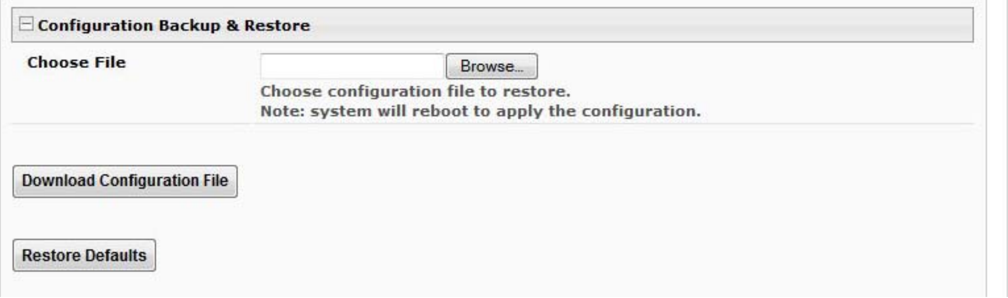
Time Settings	Description
Time Zone	Enter the appropriate time zone
Enable Daylight Saving	Apply a checkmark to have the time change according to Daylight Saving Time rules
Set Date	Enter the system date in MM-DD-YYYY format
Set Time	Enter the system time of day in hh:mm:ss format
Enable NTP	Place a checkmark to enable the ENVIROMUX to automatically sync up with a time server via NTP
NTP server	If the NTP is enabled, enter the Domain Name or IP address of the NTP server
NTP Frequency	Enter the frequency (in minutes) for the ENVIROMUX to query the NTP server (minimum is 5 minutes)
E-mail Time Stamp	Place a checkmark to have the ENVIROMUX apply a time of day stamp in the alert message sent via email
SMS Time Stamp	Place a checkmark to have the ENVIROMUX apply a time of day stamp in the alert message sent via SMS
Configuration Backup & Restore	
Choose file	Browse for a saved configuration file to be restored to the ENVIROMUX. Upon selection, press “Save” and the ENVIROMUX will restore the configuration settings and reboot. Allow 1 minute before trying to reconnect and log in again. ***Note: The IP address will be set to the IP address in the file and may be different*** ***Note: Before overwriting the existing configuration, consider whether the existing configuration should be saved first. If it will be saved, be sure to save the current configuration file under a different name than the configuration file to be loaded.***
Download Configuration File	Click this button to save the configuration of the ENVIROMUX to a location on your PC. This file can be restored using the “Choose file” field in the event you wish to return the ENVIROMUX to a former state
Restore Defaults	Click this button to restore the ENVIROMUX to the configuration settings it had upon receipt from the factory. **Be careful!** This will erase all user configuration settings. Upon restoration, the ENVIROMUX will reboot. Allow 1 minute before trying to reconnect and log in again. **Confirmation is required**.
Language Selection	
Select Language	Select between English, German (Deutsch) and Japanese for the language to read the ENVIROMUX menus in.

Note: If “Restore Defaults” is used, the IP address will also be restored to its default address (192.168.1.21) with a login name “root” and password “nti”. To restore the root password to “nti” without having to restore all default settings, contact NTI for assistance.

To identify the IP address of the ENVIROMUX without restoring defaults, use the Discovery Tool (page 28).

This is particularly useful when preparing to make changes to the configuration that may provide unsatisfactory results. If the configuration is saved in a file before changes are made, stepping backward and restoring the previous settings is as simple as clicking on the file saved. Just be sure to remember the name of the file saved and where in the PC it was saved.

Default settings can also be restored using the “Restore Defaults” button on the front of the ENVIROMUX (see page 117).



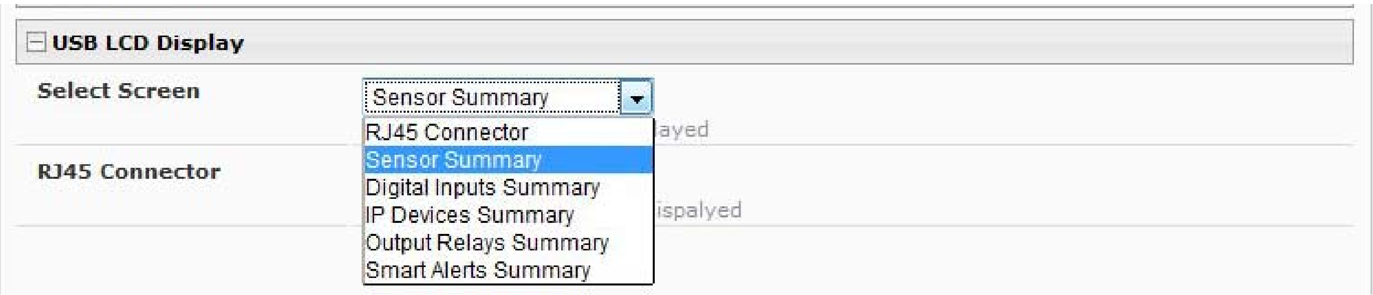
Configuration Backup & Restore

Choose File

Choose configuration file to restore.
Note: system will reboot to apply the configuration.

Figure 68- Configuration Backup and Restore

USB LCD Display	
Select Screen	Select what should be displayed on a USB LCD monitor when plugged into a USB port on the ENVIROMUX (see Figure 69) An USB LCD monitor can be connected to any of the USB Type A ports (page 118). The ENVIROMUX will automatically sense the monitor and send the selected images to the screen.
RJ45 Connector	When RJ45 Connector is selected for display on the LCD monitor, choose between RJ45 connector 1 or 2 as the sensor status page to be viewed on the monitor.
Auxiliary Serial Port Configuration (“RS232 AUX”)	
Use Aux Port for	Choose between Remote Serial Port or GSM Modem or Console ➢ Configure as a **Remote Serial Port** when the port will be used to control a remote serial device. ➢ Configure as a **GSM Modem** port when a modem will be connected ➢ Configure as a **Console** port when a terminal will be connected for serial control of the ENVIROMUX (E-5D only)
Baud Rate	When “Remote Serial Port” is selected, set the Baud Rate to a speed compatible with the connected serial device. Speeds range from 1200bps through 115200bps. When GSM Modem is connected, no configuration is necessary here.. When Console is selected, set to a speed compatible with the connected terminal
Format	When “Remote Serial Port” is selected, enter the number of bits, parity, and number of stop bits for the remote serial device to be connected. When GSM Modem is connected, no configuration is necessary here. When Console is selected, enter the number of bits, parity, and number of stop bits for the terminal to be connected (usually 8-N-1)

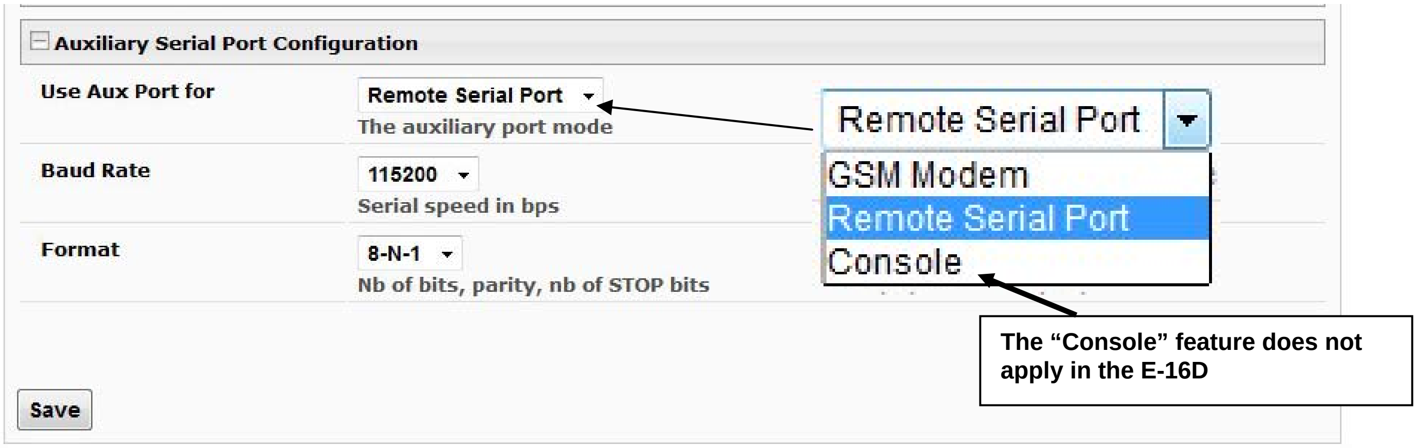


USB LCD Display

Select Screen: Sensor Summary

RJ45 Connector

Figure 69- Select what will be displayed on connected USB LCD Monitor



Auxiliary Serial Port Configuration

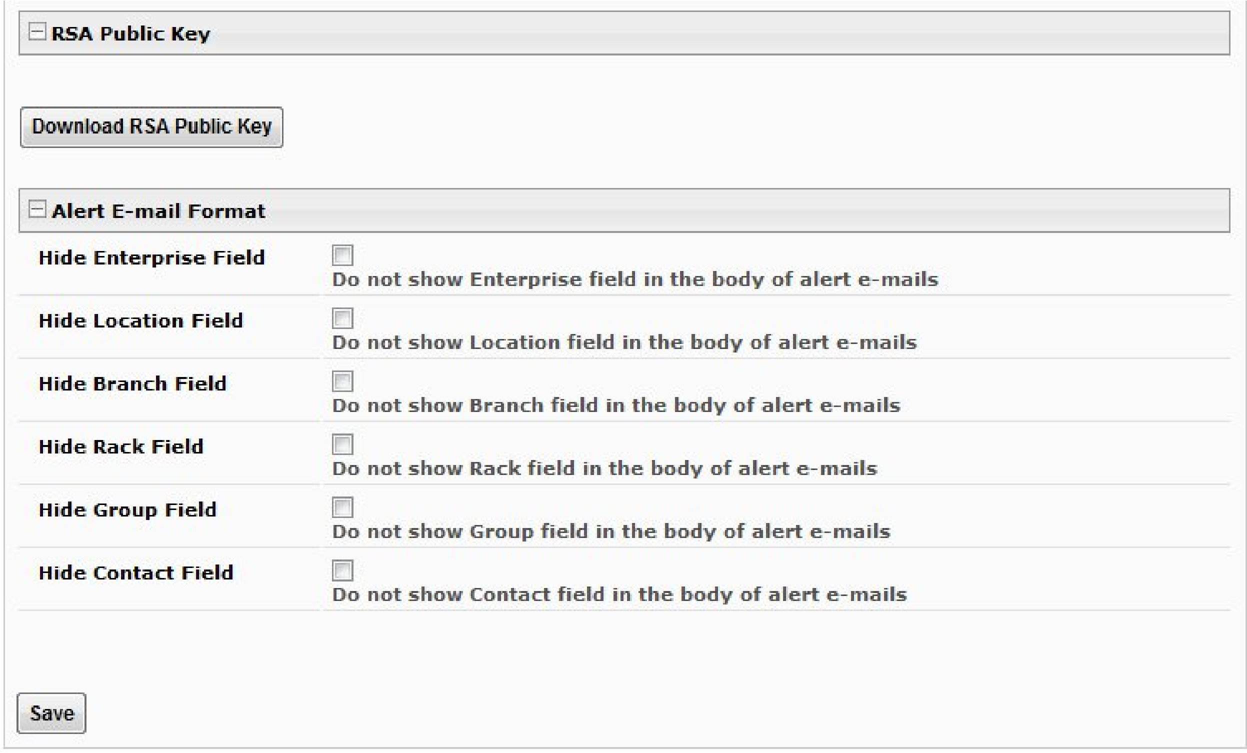
Use Aux Port for: Remote Serial Port
The auxiliary port mode

Baud Rate: 115200
Serial speed in bps

Format: 8-N-1
Nb of bits, parity, nb of STOP bits

The “Console” feature does not apply in the E-16D

Figure 70- Configure the purpose of the "RS232 AUX" port



Hide Enterprise Field	□ Do not show Enterprise field in the body of alert e-mails
Hide Location Field	□ Do not show Location field in the body of alert e-mails
Hide Branch Field	□ Do not show Branch field in the body of alert e-mails
Hide Rack Field	□ Do not show Rack field in the body of alert e-mails
Hide Group Field	□ Do not show Group field in the body of alert e-mails
Hide Contact Field	□ Do not show Contact field in the body of alert e-mails

Figure 71- System Configuration-continued

RSA Public Key

Click on this button to save an authentication key to a Linux or Unix machine. In order to configure an Event or Smart Alert to cause an SSH command to be sent to a Linux or Unix machine automatically (see page 102 or page 106), the Linux or Unix computer must be configured to accept the command from the ENVIROMUX. To do this, save the RSA public key, filename **`id_rsa.pub`**, to the computer(s) to receive remote SSH commands.

Then, on the computer to take the command, while logged in as root, type the following command from the directory where the file was downloaded:

```
$ cat id_rsa.pub >> root/.ssh/authorized_keys
```

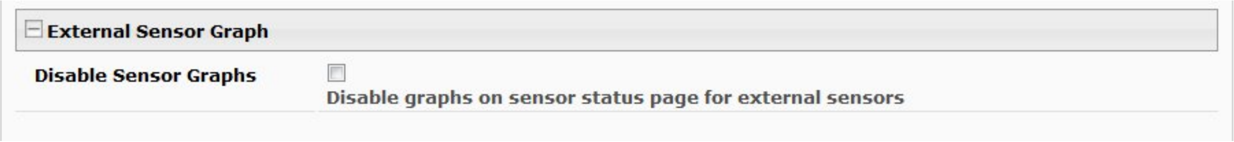
This command will append the ENVIROMUX key to the list of authorized keys

Then, to make the change take effect, restart the SSH server by typing:

```
$ sudo service ssh restart
```

Alert E-mail Format

To customize the content of the alert messages received via e-mail, pieces of information that would normally be contained in the emails can be omitted. For each piece of information that you do not want to be shown, place a checkmark in the category. Once you click on “Save”, your changes will be made in the ENVIROMUX.



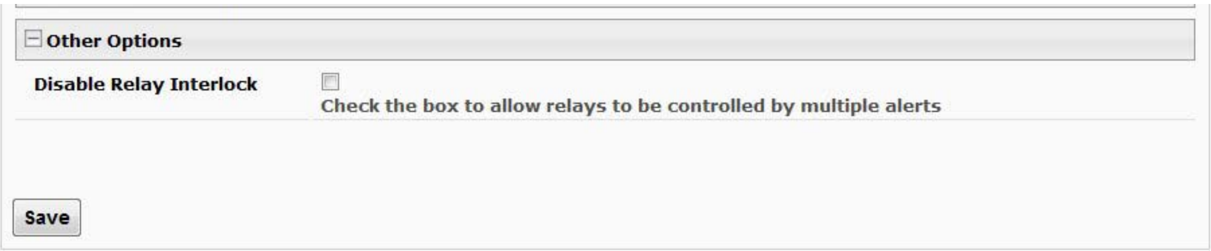
⊟ External Sensor Graph

Disable Sensor Graphs □ Disable graphs on sensor status page for external sensors

Figure 72- Disable External Sensor Graph

Disable Sensor Graphs

When checking the status of external RS485 sensors, by default a graph is displayed with the accumulative readings for that sensor (see page 38). The display of that information will take some additional time for your browser to provide. If you don't wish to have that graph displayed and would rather speed up the status information of these sensors, you can place a checkmark in "Disable Sensor Graphs".



⊟ Other Options

Disable Relay Interlock □ Check the box to allow relays to be controlled by multiple alerts

Figure 73- Disable/Enable Relay Interlock

Other Options

Under "Other Options" is a checkbox that allows you to enable or disable the ability to have output relays controlled by multiple alert conditions. By default this box is unchecked.

While unchecked, each output relay can only be associated with one alert.

When this box is checked, the same output relay can be associated with multiple alert conditions and will have its state (open or closed) changed according to the configuration with each association (see page 44).

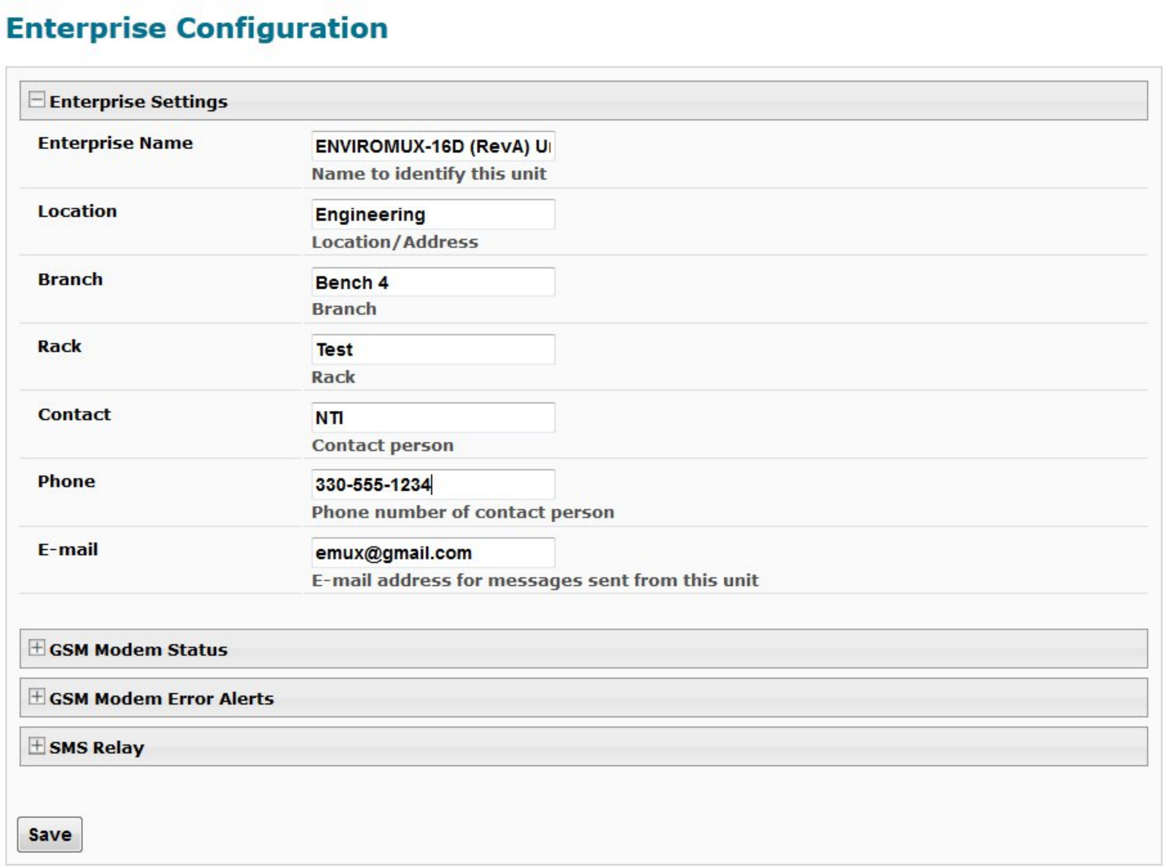
Click on **Save** when finished with System Configuration.

Administration-Enterprise Setup

The Enterprise Setup page (**Administration ->Enterprise**) is used to enter basic company information to be applied to the body of alerts. Enter the information to the blocks provided with your company name, location, the contact person that alert e-mails should refer to, the phone number to reach them, and the e-mail address assigned to the E-16D.

If SMS messages will be used as an alert method, a GSM modem will be needed and this page will provide status information for that connection as well as the ability to configure alerts to be sent if the modem connection fails (see also page 17).

Note: If the e-mail address you supply doesn't work, one possible cause may be the policy of the server. Verify that the introduced Enterprise e-mail address will be accepted by the server. With some SMTP servers, messages may be rejected prompting an error message to be logged and alert messages being blocked from reaching their destinations.



Enterprise Configuration

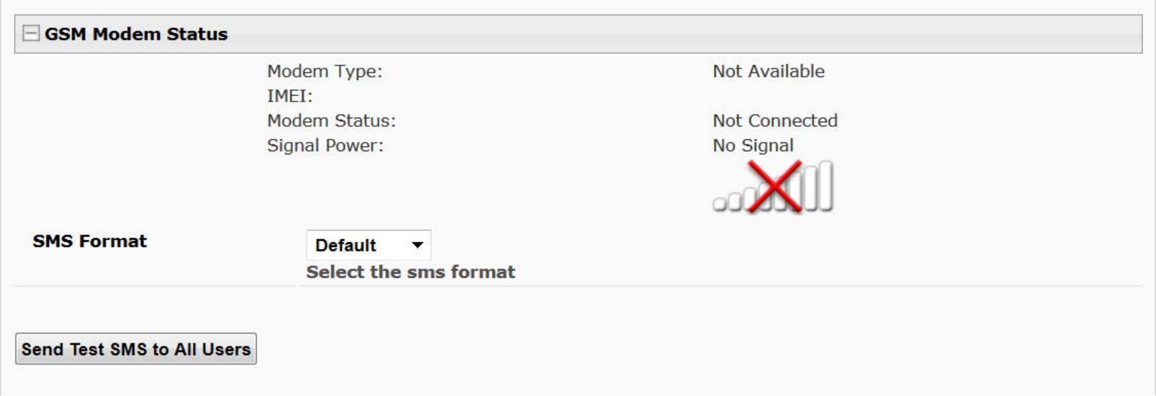
⊟ Enterprise Settings

Enterprise Name	ENVIROMUX-16D (RevA) Ui Name to identify this unit
Location	Engineering Location/Address
Branch	Bench 4 Branch
Rack	Test Rack
Contact	NTI Contact person
Phone	330-555-1234 Phone number of contact person
E-mail	emux@gmail.com E-mail address for messages sent from this unit

Figure 74- Enterprise Configuration Page

GSM Modem Status

If a modem has not yet been connected, the message "Not Available" will appear on the setup menu. The modem must be powered ON and connected before the ENVIROMUX is powered ON.



⊟ GSM Modem Status

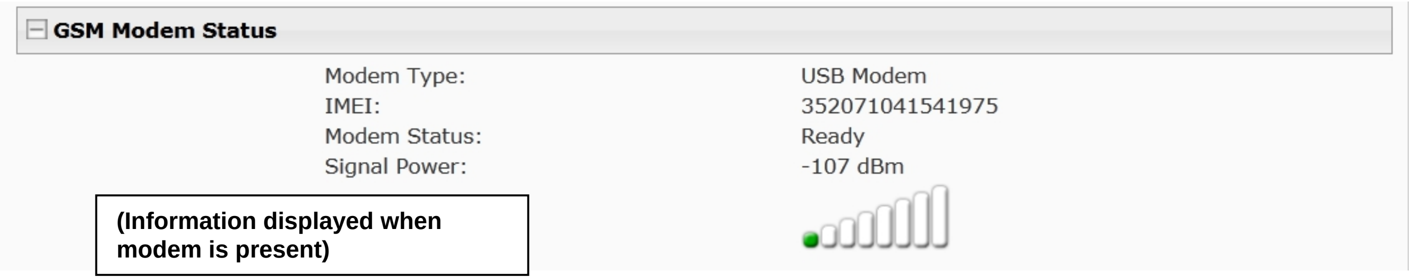
Modem Type:	Not Available
IMEI:	
Modem Status:	Not Connected
Signal Power:	No Signal

SMS Format: Default ▾
Select the sms format

Send Test SMS to All Users

The connected modem must have a GSM type SIM card configured for SMS messaging and should be "unlocked" to prevent it from being limited to use in just this modem without further configuration.

When a modem is present, the type, status, IMEI number, and signal strength will be displayed. The modem will work with a signal strength between -111dBm (weak) and -51dBm (strong).



⊟ GSM Modem Status

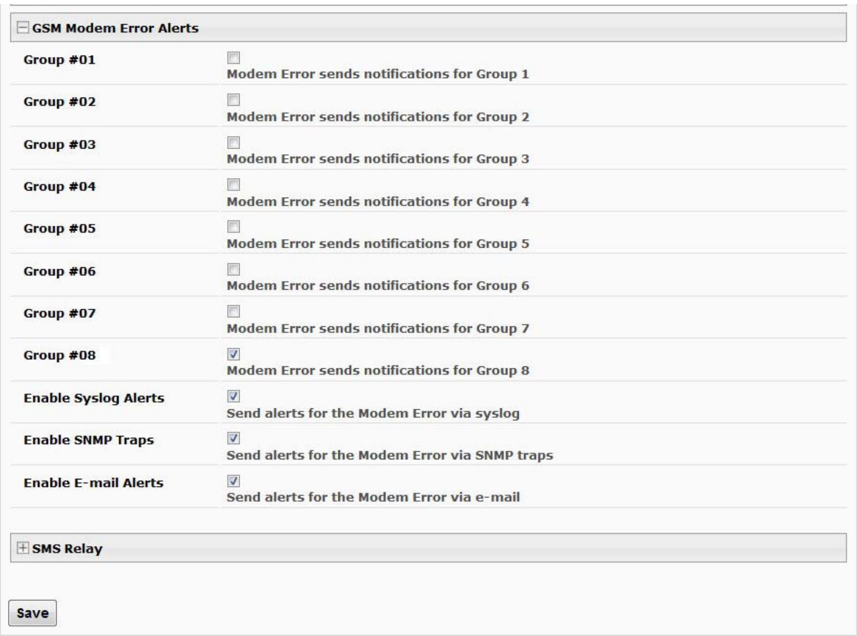
Modem Type:	USB Modem
IMEI:	352071041541975
Modem Status:	Ready
Signal Power:	-107 dBm

(Information displayed when modem is present)

Figure 75- GSM Modem Status

GSM Modem Error Alerts

If the modem fails to send an SMS when prompted to do so due to loss of service provider connection, error in protocol, or if the connection runs out of prepaid minutes, the ENVIROMUX can be configured to send an alert message via Email, Syslog and/or SNMP. Select what group(s) this notification will belong to and what methods of communication to use and click "Save".



⊟ GSM Modem Error Alerts

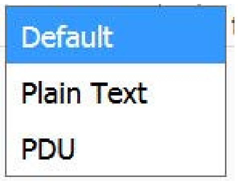
Group #01	☐ Modem Error sends notifications for Group 1
Group #02	☐ Modem Error sends notifications for Group 2
Group #03	☐ Modem Error sends notifications for Group 3
Group #04	☐ Modem Error sends notifications for Group 4
Group #05	☐ Modem Error sends notifications for Group 5
Group #06	☐ Modem Error sends notifications for Group 6
Group #07	☐ Modem Error sends notifications for Group 7
Group #08	☑ Modem Error sends notifications for Group 8
Enable Syslog Alerts	☑ Send alerts for the Modem Error via syslog
Enable SNMP Traps	☑ Send alerts for the Modem Error via SNMP traps
Enable E-mail Alerts	☑ Send alerts for the Modem Error via e-mail

⊞ SMS Relay

Save

Figure 76- GSM Modem Error Alert Configuration

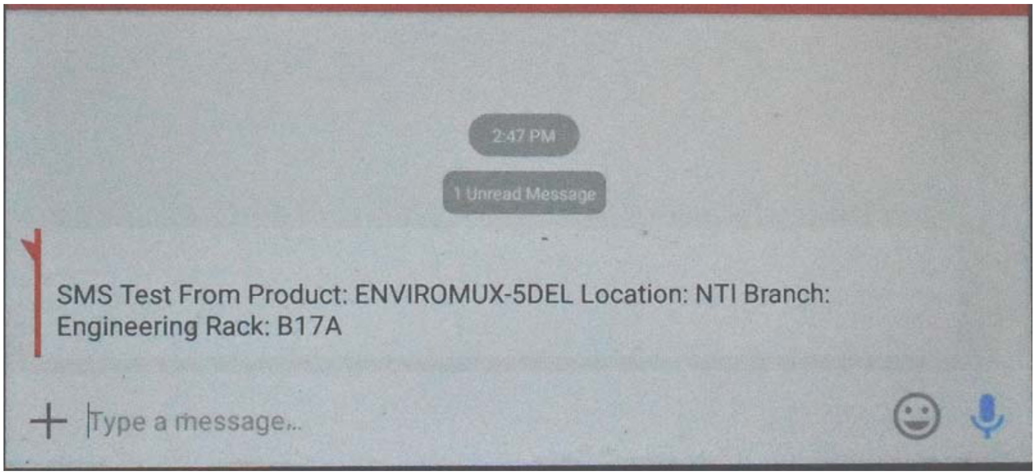
In the same screen as the GSM Modem Status is the selection for the SMS message format.   Three settings are available for this format:



Default: With this setting, if your language setting is English, the SMS messages will be sent in Plain Text.   If the language setting is other than English, the SMS messages will be sent in PDU (Protocol Description Unit) format.   This is a format supported by carriers that support extended character sets other than English.

Plain Text: With this setting, regardless of what the language setting is, SMS messages will be sent in a plain text format.

PDU: With this setting, regardless of what the language setting is, SMS messages will be sent in PDU format.



SMS Test From Product: ENVIROMUX-5DEL Location: NTI Branch: Engineering Rack: B17A

Figure 77- Example of Plain Test SMS Test Message

To test the modem function, click on "**Send Test SMS to All Users**" to send a test message to everyone that has been setup to receive SMS messages from the ENVIROMUX.

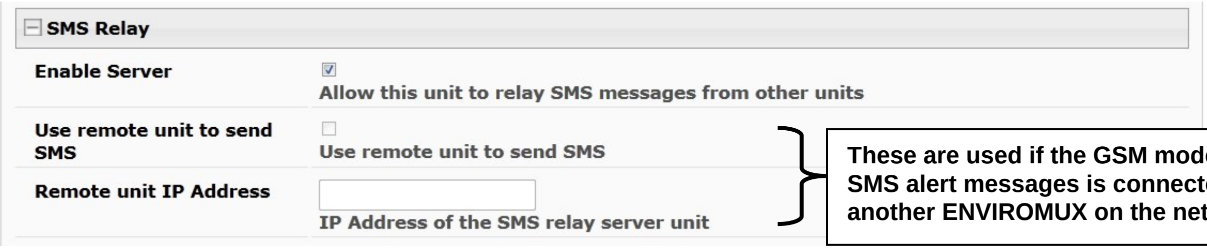
Enable SMS Relay

If your network includes more than one ENVIROMUX (E-16D, E-5D and/or E-2D), only one GSM modem is required for all the ENVIROMUX units to send SMS messages. That GSM modem can be connected to any of the ENVIROMUX units.   Using the SMS Relay feature, all ENVIROMUX units can send SMS messages through the single GSM modem.

To use the SMS Relay feature;

- If the GSM modem is connected to the ENVIROMUX you are configuring, place a checkmark in “**Enable Server**” block.
- If the GSM modem is connected to another ENVIROMUX unit, leave “Enable Server” unchecked and instead place a checkmark in “**Use remote unit to send SMS**” and enter the IP address of the ENVIROMUX unit that has the GSM modem connected to it in the block “**Remote unit IP Address**”.

Be sure to click “**Save**” to save the configuration.



⊟ **SMS Relay**

Enable Server	☑ Allow this unit to relay SMS messages from other units
Use remote unit to send SMS	□ Use remote unit to send SMS
Remote unit IP Address	 IP Address of the SMS relay server unit

These are used if the GSM modem for SMS alert messages is connected to another ENVIROMUX on the network.

Figure 78- SMS Relay Configuration

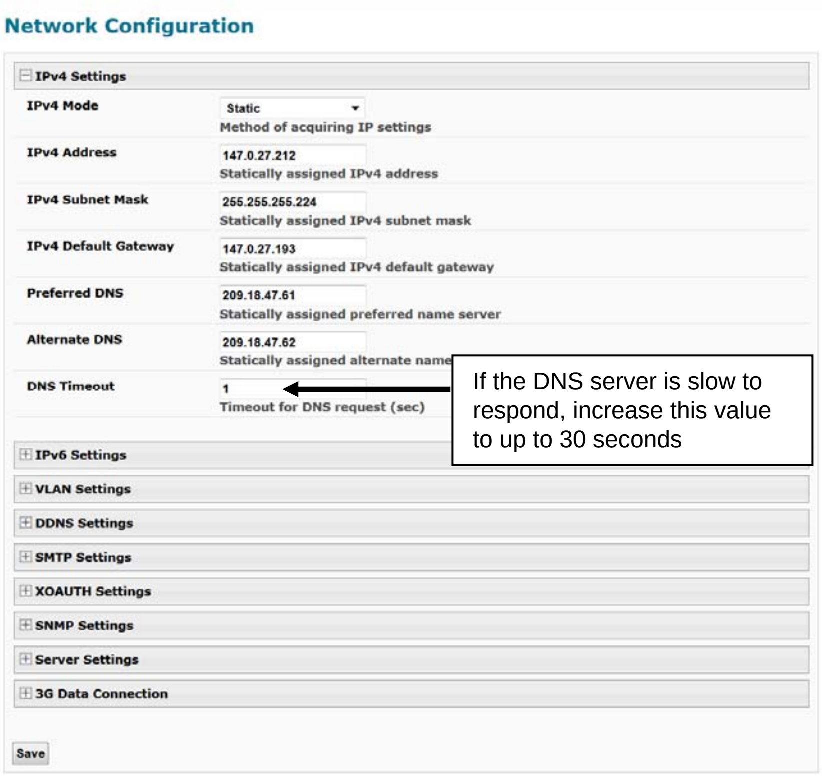
Note: To use the SMS relay feature between two ENVIROMUXs on a network separated by a firewall, be sure to open ports 6001 and 6002 in the firewall configuration to enable SMS communication between the ENVIROMUXs

If your network has only one ENVIROMUX connected to it, the SMS Relay feature will have no effect

Administration-Network Setup

From the Network Configuration page (**Administration->Network**) the administrator can either choose to have the IP address and DNS information filled in automatically by the DHCP server (the default setting), or manually fill in the fields (use a static address). Settings can be entered for either the IPv4 or IPv6 protocols.

Note: If you select "DHCP", make sure a DHCP server is running on the network the E-16D is connected to.



Network Configuration

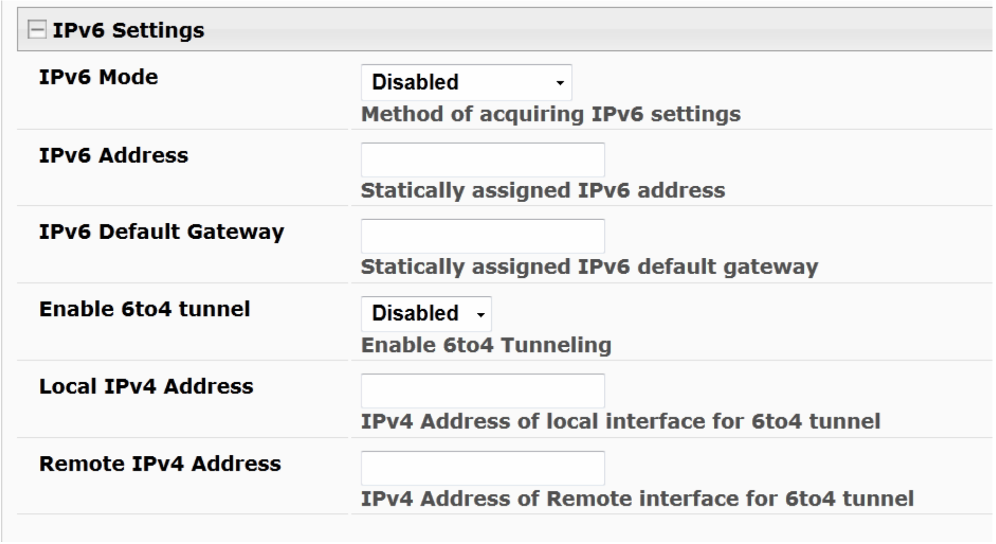
⊟ IPv4 Settings

IPv4 Mode	Static Method of acquiring IP settings
IPv4 Address	147.0.27.212 Statically assigned IPv4 address
IPv4 Subnet Mask	255.255.255.224 Statically assigned IPv4 subnet mask
IPv4 Default Gateway	147.0.27.193 Statically assigned IPv4 default gateway
Preferred DNS	209.18.47.61 Statically assigned preferred name server
Alternate DNS	209.18.47.62 Statically assigned alternate name
DNS Timeout	1 Timeout for DNS request (sec)

If the DNS server is slow to respond, increase this value to up to 30 seconds

Figure 79- Network Configuration Page

Settings can be entered for either the IPv4 or IPv6 protocols.

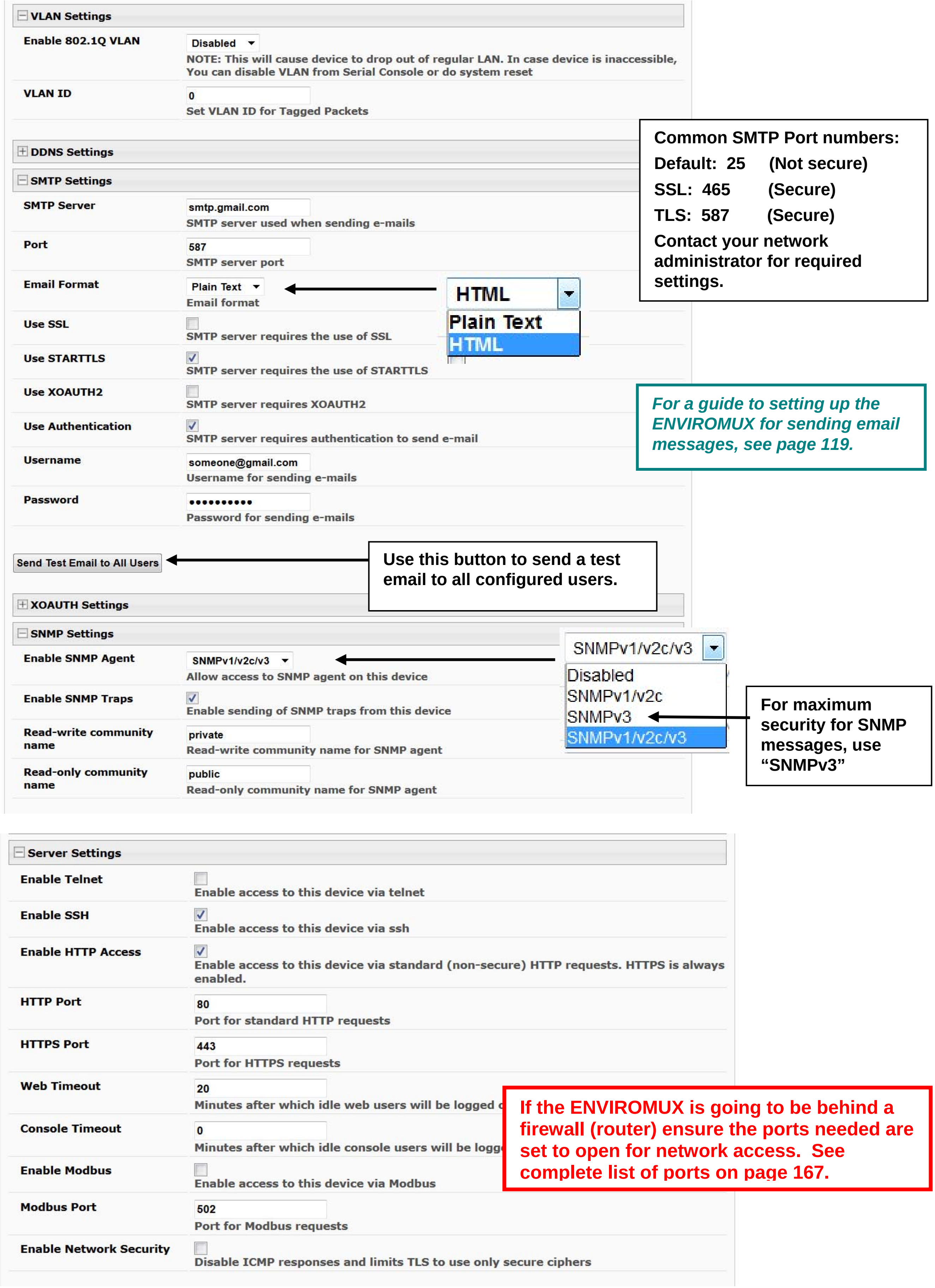


⊟ IPv6 Settings

IPv6 Mode	Disabled Method of acquiring IPv6 settings
IPv6 Address	Statically assigned IPv6 address
IPv6 Default Gateway	Statically assigned IPv6 default gateway
Enable 6to4 tunnel	Disabled Enable 6to4 Tunneling
Local IPv4 Address	IPv4 Address of local interface for 6to4 tunnel
Remote IPv4 Address	IPv4 Address of Remote interface for 6to4 tunnel

Figure 80- Apply IPv4 or IPv6 Settings

If the administrator chooses to have the DNS information filled in automatically, the SMTP server and port number still need to be entered for e-mail alerts to work. If the SMTP server requires a password in order for users to send e-mails, the network administrator must first assign a user name and password to the ENVIROMUX. Then apply the user name and password to the "User" and "Password" fields under "SMTP Settings". The ENVIROMUX must be power-cycled for changes to the SMTP server to take effect. Once all users are configured, click the "**Send Test Email to all Users**" button to check that all settings have been done properly. This will send an email to all users configured in the user list.



⊟ VLAN Settings

Enable 802.1Q VLAN	Disabled ▾ NOTE: This will cause device to drop out of regular LAN. In case device is inaccessible, You can disable VLAN from Serial Console or do system reset
VLAN ID	0 Set VLAN ID for Tagged Packets

⊞ DDNS Settings

⊟ SMTP Settings

SMTP Server	smtp.gmail.com SMTP server used when sending e-mails
Port	587 SMTP server port
Email Format	Plain Text ▾ Email format
Use SSL	□ SMTP server requires the use of SSL
Use STARTTLS	☑ SMTP server requires the use of STARTTLS
Use XOAUTH2	□ SMTP server requires XOAUTH2
Use Authentication	☑ SMTP server requires authentication to send e-mail
Username	someone@gmail.com Username for sending e-mails
Password	•••••••••• Password for sending e-mails

Common SMTP Port numbers:
Default: 25 (Not secure)
SSL: 465 (Secure)
TLS: 587 (Secure)
Contact your network administrator for required settings.

For a guide to setting up the ENVIROMUX for sending email messages, see page 119.

Use this button to send a test email to all configured users.

⊞ XOAUTH Settings

⊟ SNMP Settings

Enable SNMP Agent	SNMPv1/v2c/v3 ▾ Allow access to SNMP agent on this device
Enable SNMP Traps	☑ Enable sending of SNMP traps from this device
Read-write community name	private Read-write community name for SNMP agent
Read-only community name	public Read-only community name for SNMP agent

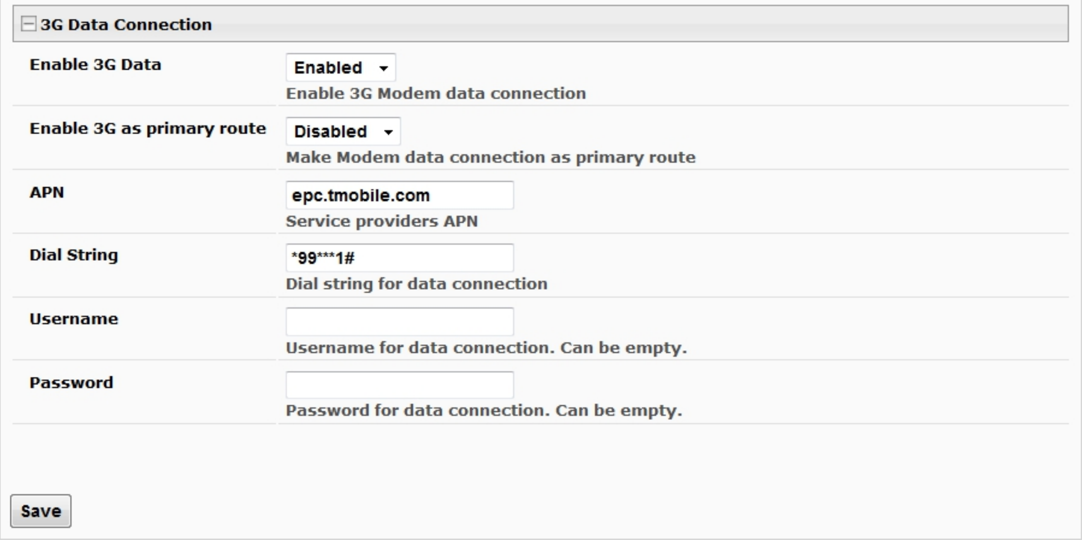
For maximum security for SNMP messages, use “SNMPv3”

⊟ Server Settings

Enable Telnet	□ Enable access to this device via telnet
Enable SSH	☑ Enable access to this device via ssh
Enable HTTP Access	☑ Enable access to this device via standard (non-secure) HTTP requests. HTTPS is always enabled.
HTTP Port	80 Port for standard HTTP requests
HTTPS Port	443 Port for HTTPS requests
Web Timeout	20 Minutes after which idle web users will be logged
Console Timeout	0 Minutes after which idle console users will be logg
Enable Modbus	□ Enable access to this device via Modbus
Modbus Port	502 Port for Modbus requests
Enable Network Security	□ Disable ICMP responses and limits TLS to use only secure ciphers

If the ENVIROMUX is going to be behind a firewall (router) ensure the ports needed are set to open for network access. See complete list of ports on page 167.

Figure 81- Configure SMTP, SNMP, and security settings



⊟ 3G Data Connection

Enable 3G Data: Enabled
Enable 3G Modem data connection

Enable 3G as primary route: Disabled
Make Modem data connection as primary route

APN: epc.tmobile.com
Service providers APN

Dial String: *99***1#
Dial string for data connection

Username:
Username for data connection. Can be empty.

Password:
Password for data connection. Can be empty.

Figure 82- Configure 3G Data Connection

VLAN Settings	Description
Enable 802.1Q VLAN	Select between "Disabled" (the default) or "Enabled"
VLAN ID	Enter a number between 0-4095 for your VLAN ID
SMTP Settings	
SMTP Server	Enter a valid SMTP server name (e.g. yourcompany.com)
Port	Enter a valid port # (default port is 25, for SSL most use 465, for STARTTLS most use 587)
Email Format	Choose between sending emails in Plain Text format (the default) and HTML format
Use SSL	Place a checkmark in the box if the SMTP server supports SSL
Use STARTLS	Place a checkmark in the box if the SMTP server supports TLS
Use XOAUTH2	Place a checkmark in the box if the SMTP server supports OAUTH authentication (i.e. Gmail server)
Use Authentication	Place a checkmark in the box if the SMTP server requires authentication to send email
Username	Enter a valid username to be used by the ENVIROMUX to send emails
Password	Enter a valid password assigned to the ENVIROMUX username
SNMP Settings	
Enable SNMP agent	Place a checkmark in the box to enable access to the SNMP agent. Choose between v1/v2c, v3 only (maximum security), or v1/v2c/v3.
Enable SNMP traps	Place a checkmark in the box to allow SNMP traps to be sent
Read-write community name	Enter applicable name (commonly used- “private”)
Read-only community name	Enter applicable name (commonly used- “public”)
Server Settings	
Enable Telnet	Place a checkmark in the box to enable access to the ENVIROMUX via Telnet **By default Telnet is disabled.**
Enable SSH	Place a checkmark in the box to enable access to the ENVIROMUX via SSH
Enable HTTP access	Place a checkmark in the box to enable access to the ENVIROMUX via standard (non-secure) HTTP requests. **Don't disable until you read the notes below (the first two notes at the top of the next page).**
HTTP Port	Port to be used for standard HTTP requests.
HTTPS Port	Port to be used for HTTPS requests
Web Timeout	Number of minutes after which idle web uses will be logged-out (enter 0 to disable this feature)
Console Timeout	Number of minutes after which idle console user will be logged-out (enter 0 to disable this feature)
Enable Modbus	Place a checkmark in the box to enable access via Modbus software
Modbus Port	Enter a valid port number to be used to communicate via Modbus (default is 502)
Enable Network Security	Place a checkmark here to disable ICMP responses and limit TLS to use only secure ciphers

Note: When using only a secure access configuration ("Enable HTTP Access" is NOT checked), if you intend to connect to the ENVIROMUX from a location outside the local area network, make sure the firewall on the local area network is configured to allow traffic through the port assigned to HTTPS requests.

Note: If you are installing the ENVIROMUX with a public IP address and intend to use only a secure access configuration, you will need to create an x.509 certificate (page 88) and load it into the ENVIROMUX and any PC that will be required to access the ENVIROMUX.

Read-Only Community Name

The SNMP Read-only community name enables a user to retrieve "read-only" information from the ENVIROMUX using SNMP network management software or a MIB browser and a MIB file. This name must be present in the ENVIROMUX and in the proper field in the SNMP software. This name is **case sensitive** so be sure to enter it correctly in the ENVIROMUX as well as in the SNMP software.

Read-Write Community Name

The SNMP Read-Write community name enables a user to read information from the ENVIROMUX and to modify settings on the ENVIROMUX using SNMP network management software or a MIB browser and MIB file (MIB file version 1.05 or later). This name must be present in the ENVIROMUX **AND** in the proper field in the SNMP software. This name is **case sensitive** so be sure to enter it correctly in the ENVIROMUX as well as in the SNMP software.

This function is particularly useful if you want to control the state of the Output Relays (page 54) through SNMP. With the ENVIROMUX and SNMP network management software properly configured for SNMP control (enable agent, enable traps, apply Read-only and Read-write Community Names), a SET command can be sent either from the SNMP software or MIB browser (Windows) or through command line (Linux) to change the outputRelay value state. See Figure 84 on page 76 for example of setup.

3G Data Connection	
Enable 3G Data	Enable if you want the option to have the ENVIROMUX send alert messages through the USB modem and the option to access the web interface using the IP address assigned to the SIM card account. The default is disabled. ***NOTE: In order to access the web interface through the modem, the SIM card must have a "public" IP address (page 18).***
Enable 3G as primary route	Enable if you want all messages that are sent by the ENVIROMUX to go through the modem connection instead of the Ethernet. The default is disabled. ***Note: If this feature is enabled, and then later disabled, the ENVIROMUX must be rebooted to reset outgoing messaging parameters.***
APN	Enter the APN address of the service provider (provided by the service provider)
Dial String	Enter the dial string required for data connection(provided by the service provider)
Username	Enter the username supplied by service provider for access to connection. Leave blank if no username is required.
Password	Enter the password supplied by service provider for access to connection. Leave blank if no password is required.

If the administrator chooses to have the IP and DNS information filled in automatically via DHCP, the SMTP server and port number still need to be entered for email alerts to work. If the SMTP server requires a password in order for users to send emails, the network administrator must first assign a user name and password to the ENVIROMUX.

Note: The most common SMTP server port number is 25, but it is not necessarily the port number assigned to your SMTP server. For SMTP servers that support SSL, the common port number is 465, and for those that support TLS, the common port number is 587.

The administrator may assign a different HTTP Server Port than is used by most servers (80). This might be desired if the administrator wants a secure connection.

Note: If the port number is changed and forgotten, to determine what it has been changed to connect the ENVIROMUX for RS232 control (page 15) and review the Network Settings (page 71).

If the SMTP server supports SSL (user authentication), click the block next to "Use SSL" to place a check mark in it.

Note: If the 3G Data connection is enabled as the primary internet connection, make sure that a reliable signal exists between the modem and service provider. Otherwise attempts made by the ENVIROMUX to communicate with devices on the network may be delayed and cause unnecessary alert messages.

For a guide to setting up the ENVIROMUX for sending email messages, see page 129. For assistance in setting up SNMP messaging, see page 132.

For a complete list of ENVIROMUX factory-assigned port numbers, see page 169.

VLAN Settings

The ENVIROMUX supports 802.1Q VLAN tagging (firmware version 2.52 and later) which can be used on managed switches to get more bandwidth and improved security. Any ID number between 0 and 4095 can be used.

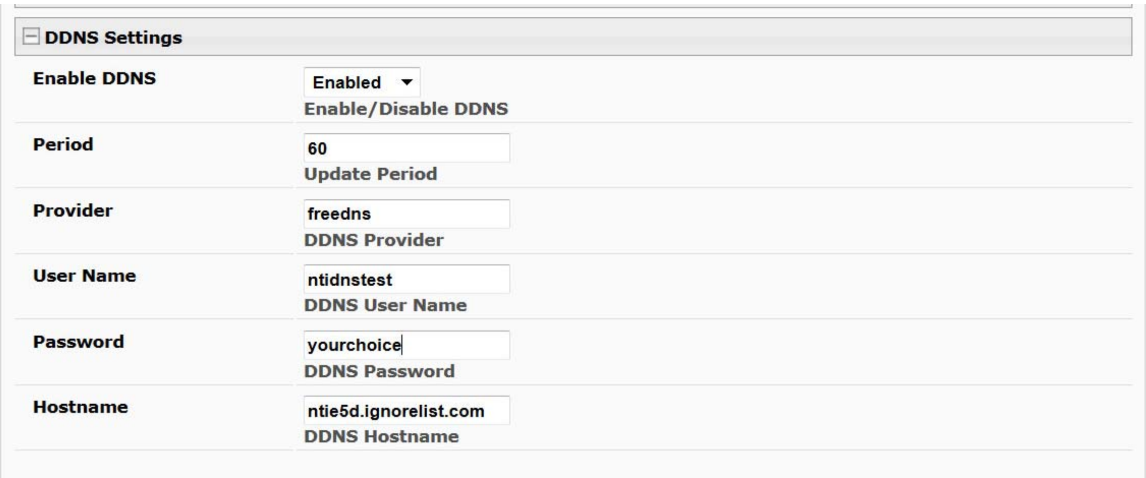
Note: If VLAN Tagging is enabled, the E-xD will drop out of the regular network (Native VLAN) and users won't be able to access it from an unmanaged switch. If the ID number is lost/forgotten, you can reset it by connecting to the ENVIROMUX through the serial port (page 65) or by using the "Restore Defaults" button (page 117) on the E-xD.

DDNS Settings

The ENVIROMUX supports DDNS services with many providers, for example No-IP, Dydns and FreeDNS. (See list of known providers on page 169) Any provider compatible with inadyn daemon will work with the E-xD. For general information on inadyn go to https://github.com/troglobit/inadyn .

Simply enable the support, enter a value in seconds (range is 30-764000) for the Update Period, enter the DDNS service provider and other required pieces of information indicated below.

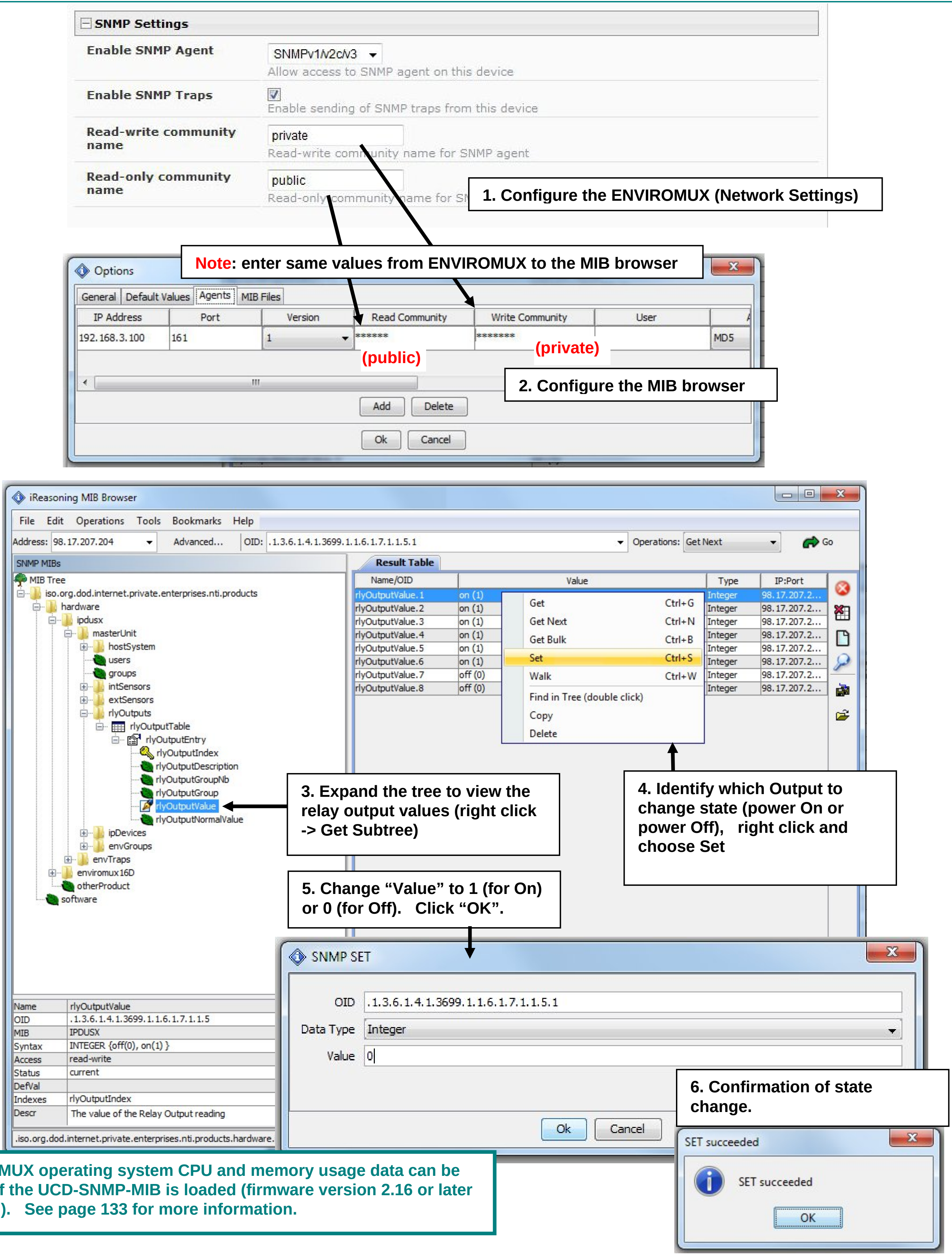
The Update Period determines how often the ENVIROMUX will check with the DDNS provider to verify that it has the correct IP address associated with the DDNS hostname. If the IP address they have is different than that in the ENVIROMUX, the recorded IP address will be updated with the IP address in the ENVIROMUX.



⊟ DDNS Settings

Enable DDNS	Enabled ▾ Enable/Disable DDNS
Period	60 Update Period
Provider	freedns DDNS Provider
User Name	ntidnstest DDNS User Name
Password	yourchoice DDNS Password
Hostname	ntie5d.ignorelist.com DDNS Hostname

Figure 83- DDNS Settings



SNMP Settings

Enable SNMP Agent	SNMPv1/v2c/v3 Allow access to SNMP agent on this device
Enable SNMP Traps	☑ Enable sending of SNMP traps from this device
Read-write community name	private Read-write community name for SNMP agent
Read-only community name	public Read-only community name for SN

1. Configure the ENVIROMUX (Network Settings)

Note: enter same values from ENVIROMUX to the MIB browser

Options – Agents

IP Address	Port	Version	Read Community	Write Community	User	
192.168.3.100	161	1	******	*******		MD5

(public)

(private)

2. Configure the MIB browser

iReasoning MIB Browser

Address: 98.17.207.204 OID: .1.3.6.1.4.1.3699.1.1.6.1.7.1.1.5.1 Operations: Get Next

Result Table

Name/OID	Value	Type	IP:Port
rlyOutputValue.1	on (1)	Integer	98.17.207.2...
rlyOutputValue.2	on (1)	Integer	98.17.207.2...
rlyOutputValue.3	on (1)	Integer	98.17.207.2...
rlyOutputValue.4	on (1)	Integer	98.17.207.2...
rlyOutputValue.5	on (1)	Integer	98.17.207.2...
rlyOutputValue.6	on (1)	Integer	98.17.207.2...
rlyOutputValue.7	off (0)	Integer	98.17.207.2...
rlyOutputValue.8	off (0)	Integer	98.17.207.2...

Name	rlyOutputValue
OID	.1.3.6.1.4.1.3699.1.1.6.1.7.1.1.5
MIB	IPDUSX
Syntax	INTEGER {off(0), on(1) }
Access	read-write
Status	current
DefVal	
Indexes	rlyOutputIndex
Descr	The value of the Relay Output reading

.iso.org.dod.internet.private.enterprises.nti.products.hardware.

3. Expand the tree to view the relay output values (right click -> Get Subtree)

4. Identify which Output to change state (power On or power Off), right click and choose Set

5. Change “Value” to 1 (for On) or 0 (for Off). Click “OK”.

SNMP SET

OID .1.3.6.1.4.1.3699.1.1.6.1.7.1.1.5.1

Data Type Integer

Value 0

6. Confirmation of state change.

SET succeeded

ENVIROMUX operating system CPU and memory usage data can be viewed if the UCD-SNMP-MIB is loaded (firmware version 2.16 or later required). See page 133 for more information.

Figure 84- How to setup SNMP to control output relays

XOAUTH Settings

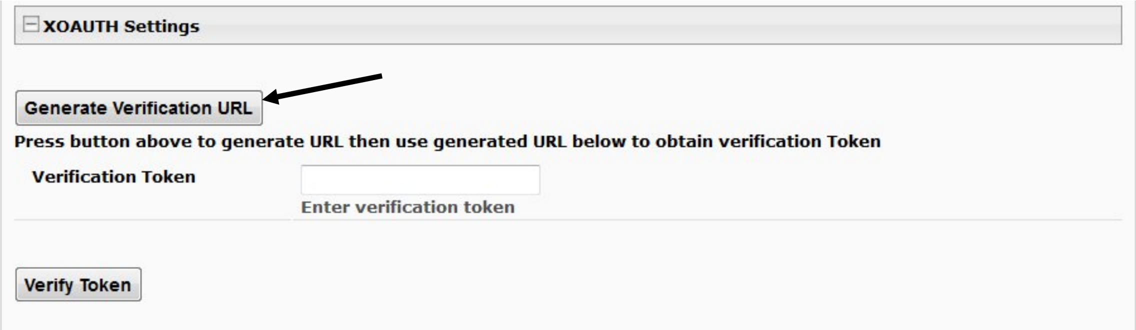
On the Network Configuration page is a section for XOAUTH Settings, used to enable automatic user authentication verification when the SMTP server requires XOAUTH2 authentication (i.e. Gmail).

Note: Make sure your SMTP settings are entered correctly (username, password, "Use Authentication" is checked, etc.) before proceeding (page 72).

1. First place a checkmark in the box under SMTP settings to enable the use of XOAUTH authentication (page 72). Click "**Save**" at the bottom of the page to apply this change.

Notes: If your SMTP Server port is set to 587, make sure "Use STARTTLS" is checked (page 72).
If your SMTP Server port is set to 465, make sure "Use SSL" is checked.
Do NOT set the Server port to 25 when using XOAUTH.

2. Next click on "**Generate Verification URL**" under XOAUTH Settings.



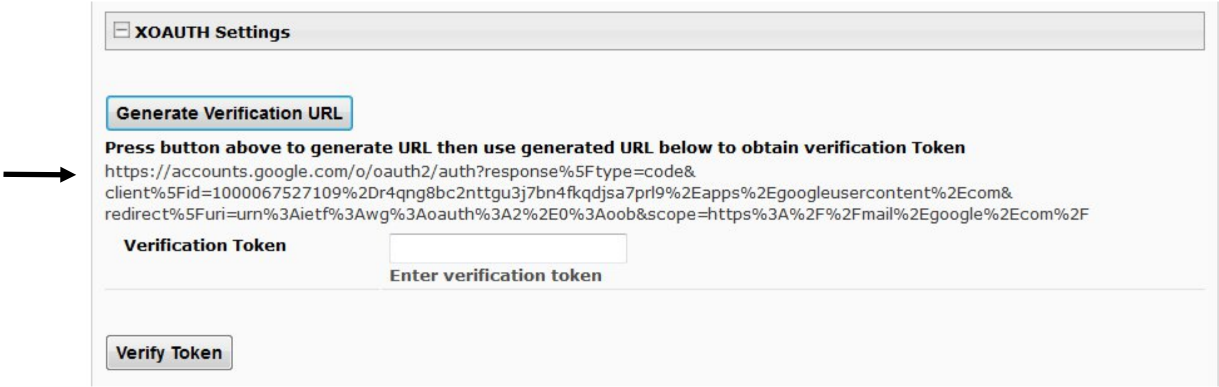
⊟ XOAUTH Settings

Press button above to generate URL then use generated URL below to obtain verification Token

Verification Token
Enter verification token

Figure 85- XOAUTH- Generate Verification URL

3. A lengthy URL address will be generated. Copy and paste the **<u>entire</u>** URL into your browser.



⊟ XOAUTH Settings

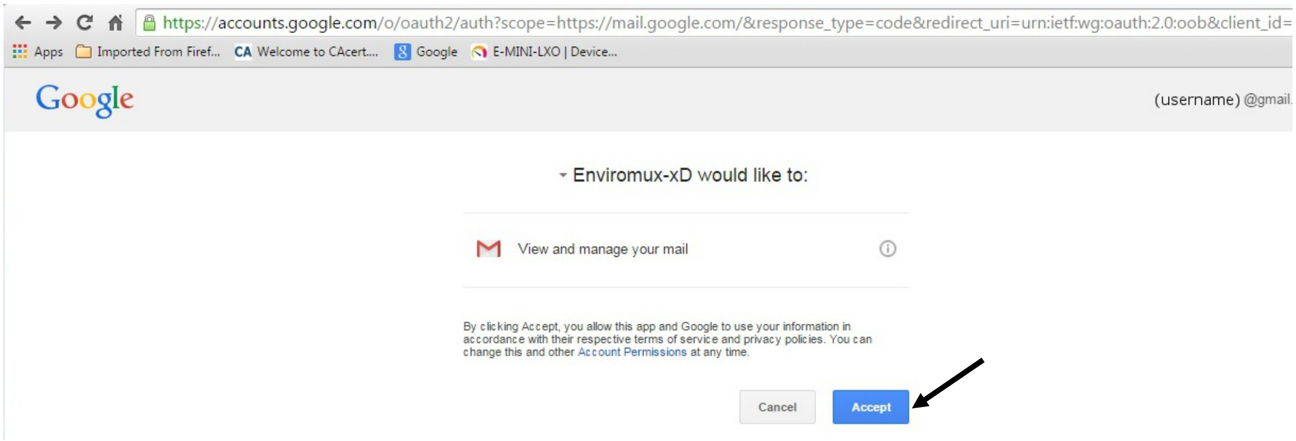
Press button above to generate URL then use generated URL below to obtain verification Token

https://accounts.google.com/o/oauth2/auth?response%5Ftype=code&
client%5Fid=1000067527109%2Dr4qng8bc2nttgu3j7bn4fkqdjsa7prl9%2Eapps%2Egoogleusercontent%2Ecom&
redirect%5Furi=urn%3Aietf%3Awg%3Aoauth%3A2%2E0%3Aoob&scope=https%3A%2F%2Fmail%2Egoogle%2Ecom%2F

Verification Token
Enter verification token

Figure 86- XOAUTH- Copy Verification URL

4. You will be prompted to login to the Gmail account you have setup for the ENVIROMUX. Once logged in, Gmail will ask if you want the ENVIROMUX to be able to view and manage email from this account. Click on “**Accept**”.



https://accounts.google.com/o/oauth2/auth?scope=https://mail.google.com/&response_type=code&redirect_uri=urn:ietf:wg:oauth:2.0:oob&client_id=

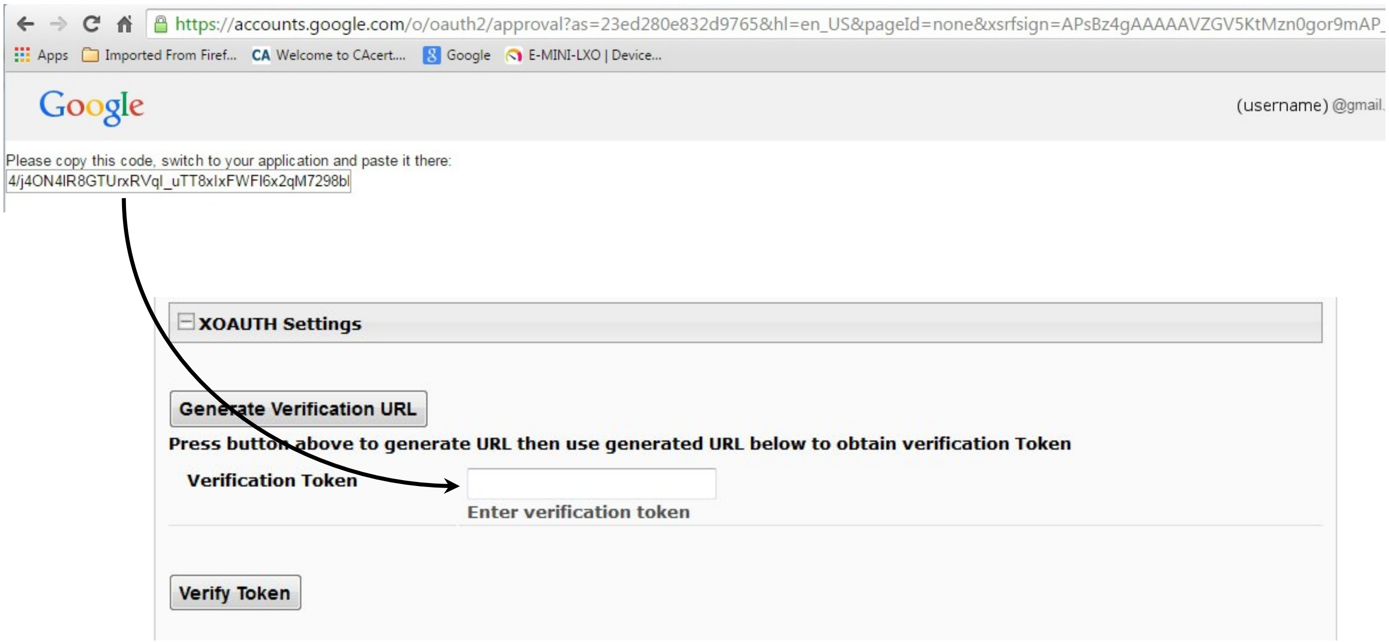
Enviromux-xD would like to:

View and manage your mail

By clicking Accept, you allow this app and Google to use your information in accordance with their respective terms of service and privacy policies. You can change this and other Account Permissions at any time.

Figure 87- XOAUTH- Accept prompt to manage your mail

5. You will then be presented with a token. Copy the characters in the token to your clip board, and switch back to the web interface page of the ENVIROMUX. Paste those characters into the “**Verification Token**” block.



https://accounts.google.com/o/oauth2/approval?as=23ed280e832d9765&hl=en_US&pageId=none&xsrfsign=APsBz4gAAAAAVZGV5KtMzn0gor9mAP_

Please copy this code, switch to your application and paste it there:

4/j4ON4IR8GTUrxRVql_uTT8xIxFWFI6x2qM7298bl

XOAUTH Settings

Press button above to generate URL then use generated URL below to obtain verification Token

Verification Token

Enter verification token

Figure 88- XOAUTH- Enter Verification Token

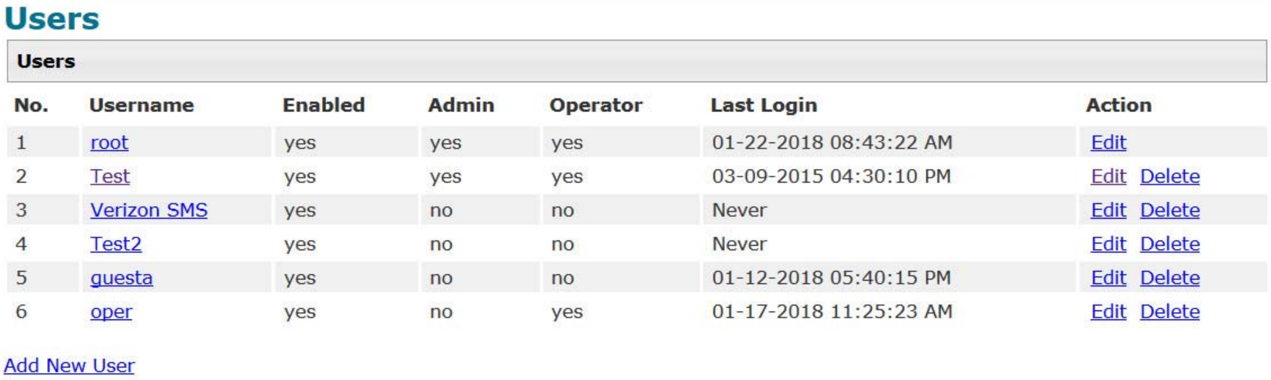
6. Click on “**Verify Token**” and if successful, you should see the message “**Changes Applied**” at the bottom of the page.

You will only need to perform this procedure once.

User Configuration

The Users page is a list of all configured users of the ENVIROMUX. A maximum of 15 users (other than root) can be configured.

From this page the root user (or any user with administrator rights) can choose to add more users, go to the user configuration page to edit a user's access to the ENVIROMUX, or delete a user from the list. A user with Operator rights can perform some administrative functions, but not all. (See page 83). To view the Users page, click on **Users** from the **Administration** section of the r



Users

Users

No.	Username	Enabled	Admin	Operator	Last Login	Action
1	root	yes	yes	yes	01-22-2018 08:43:22 AM	Edit
2	Test	yes	yes	yes	03-09-2015 04:30:10 PM	Edit Delete
3	Verizon SMS	yes	no	no	Never	Edit Delete
4	Test2	yes	no	no	Never	Edit Delete
5	guesta	yes	no	no	01-12-2018 05:40:15 PM	Edit Delete
6	oper	yes	no	yes	01-17-2018 11:25:23 AM	Edit Delete

Add New User

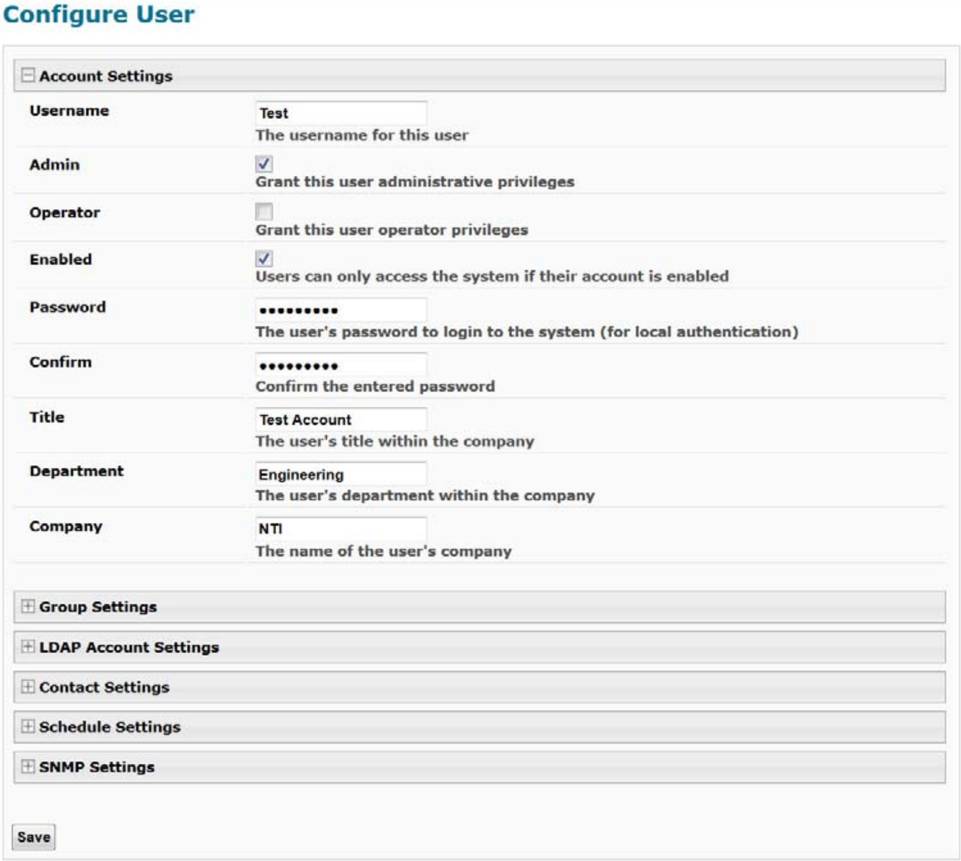
Figure 89- Usernames List and Status

To add a user, click on the "Add New User" link.

To edit a user's configuration, either click on the listed username, or on the "Edit" link.

To delete a user and their configuration, click on "Delete" link.

When adding a new user, the Configure User page will open with the username "user*x"* assigned, where x = the next consecutive number (up to 15) based on the quantity of users in the list (other than the root user). You can either leave the name as "userx", or change it to what you would like to see listed. With the name assigned, fill in the remaining information as needed.



Configure User

⊟ Account Settings

Username	Test	The username for this user
Admin	☑	Grant this user administrative privileges
Operator	□	Grant this user operator privileges
Enabled	☑	Users can only access the system if their account is enabled
Password	•••••••••	The user's password to login to the system (for local authentication)
Confirm	•••••••••	Confirm the entered password
Title	Test Account	The user's title within the company
Department	Engineering	The user's department within the company
Company	NTI	The name of the user's company

⊞ Group Settings

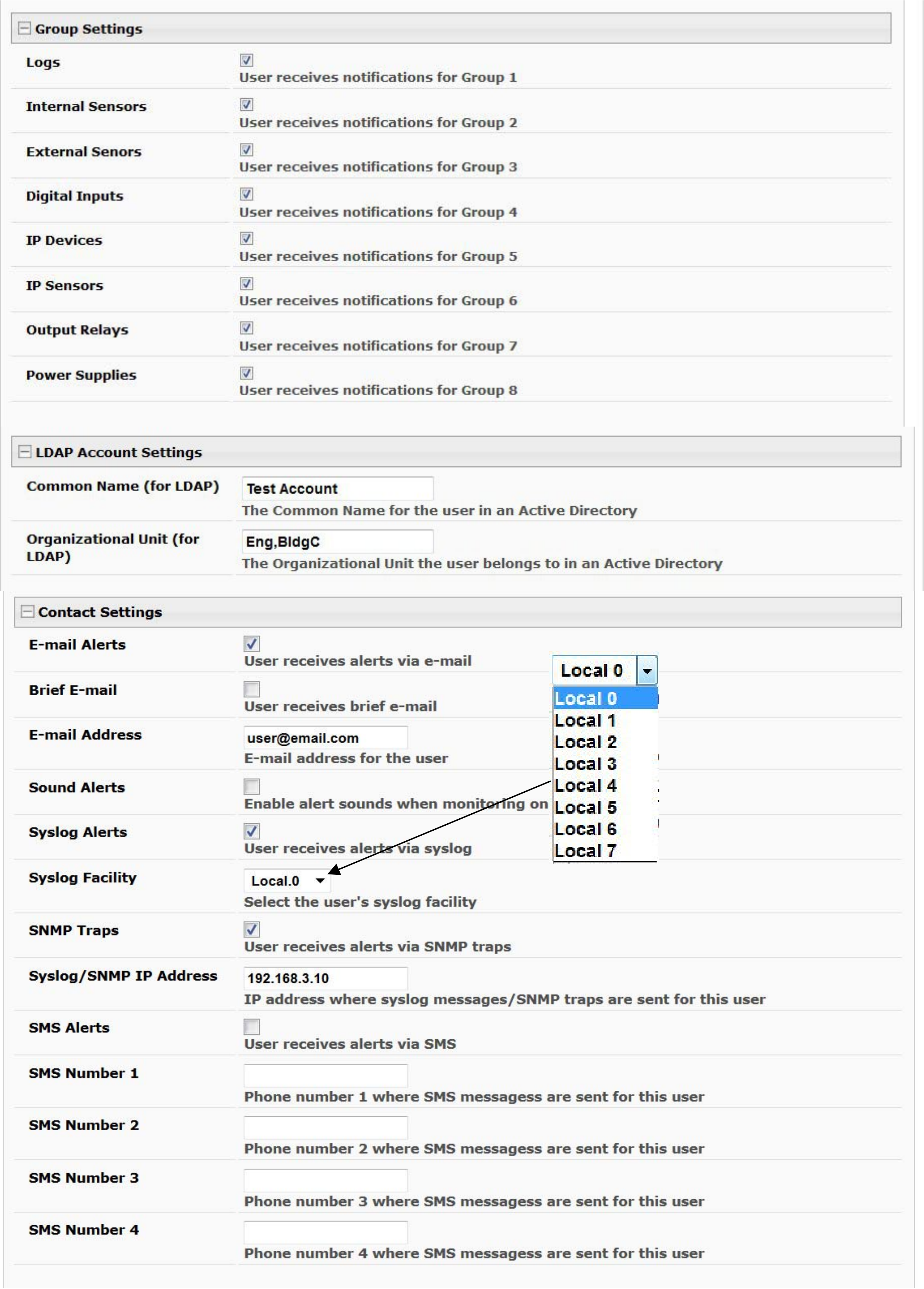
⊞ LDAP Account Settings

⊞ Contact Settings

⊞ Schedule Settings

⊞ SNMP Settings

Figure 90- Edit user profile for root user



⊟ Group Settings

Logs	☑ User receives notifications for Group 1
Internal Sensors	☑ User receives notifications for Group 2
External Senors	☑ User receives notifications for Group 3
Digital Inputs	☑ User receives notifications for Group 4
IP Devices	☑ User receives notifications for Group 5
IP Sensors	☑ User receives notifications for Group 6
Output Relays	☑ User receives notifications for Group 7
Power Supplies	☑ User receives notifications for Group 8

⊟ LDAP Account Settings

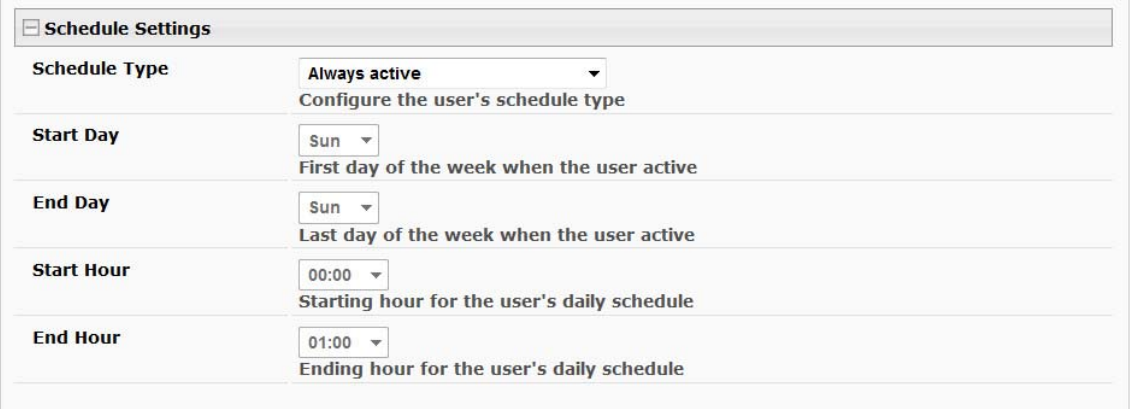
Common Name (for LDAP)	Test Account The Common Name for the user in an Active Directory
Organizational Unit (for LDAP)	Eng,BldgC The Organizational Unit the user belongs to in an Active Directory

⊟ Contact Settings

E-mail Alerts	☑ User receives alerts via e-mail
Brief E-mail	□ User receives brief e-mail
E-mail Address	user@email.com E-mail address for the user
Sound Alerts	□ Enable alert sounds when monitoring on
Syslog Alerts	☑ User receives alerts via syslog
Syslog Facility	Local.0 Select the user's syslog facility
SNMP Traps	☑ User receives alerts via SNMP traps
Syslog/SNMP IP Address	192.168.3.10 IP address where syslog messages/SNMP traps are sent for this user
SMS Alerts	□ User receives alerts via SMS
SMS Number 1	Phone number 1 where SMS messagess are sent for this user
SMS Number 2	Phone number 2 where SMS messagess are sent for this user
SMS Number 3	Phone number 3 where SMS messagess are sent for this user
SMS Number 4	Phone number 4 where SMS messagess are sent for this user

Figure 91- More user settings

Account Settings	Description
Username	Enter the desired username for this user
Admin	Place a checkmark here if this user should have administrative privileges
Operator	Place a checkmark here if this user should have operator privileges
Enabled	Place a checkmark here to enable this user to access the ENVIROMUX
Password	Enter a password that a user must use to login to the system **A password must be assigned for the user's login to be valid** **Passwords must be at least 1 keyboard character.**
Confirm	Re-enter a password that a user must use to login to the system
Title	Enter information as applicable
Department	Enter information as applicable
Company	Enter information as applicable
Group Settings	
Group 1-8	Place a checkmark if the user should receive messages from sensors, accessories, or IP devices in Group 1, 2, 3… thru 8 (see also pages 42 and 57 for group assignments)
LDAP Account Settings	
Common Name (for LDAP)	"Common Name" assigned in the LDAP server account in an Active Directory. Often a name assigned that is different than the Username. If this is the same as the Username in the "Account Settings" (above), this can be left blank.
Organizational Unit (for LDAP)	Enter the Organizational Unit the user belongs to in an Active Directory Format is <ou,ou,etc> (like example in Figure 91)
Contact Settings	
Email alerts	Place a checkmark if the user should receive messages via email
Brief email	Place a checkmark if email messages should be brief (contain only critical information) ***Note: Enabling this will also prevent images being sent from IP cameras to this user***
Email address	Enter a valid email address if this user should receive email alert messages (1 address only, maximum 63 characters) **Tip:** The user can receive alert messages to their cell phone (SMS) by entering the cell carrier's email address here (i.e. 1234567890@vtext.com for Verizon) in the absence of a modem.
Sound Alerts	Place a checkmark if the user wants to be notified of an alert through their PC with an audible sound. User must be logged in to the Web Interface and the Summary Page displayed.
Syslog alerts	Place a checkmark if the user should receive alerts via syslog messages
Syslog facility	Select a Syslog Facility for the messages to be sent to- Local0 thru Local7 (default is Local0).
SNMP traps	Place a checkmark if the user should receive alerts via SNMP traps
Syslog/SNMP IP address	Enter a valid syslog/SNMP IP address for the user to receive syslog/SNMP messages
SMS Alerts	Place a checkmark if the user should receive alerts via SMS messages (requires a modem)
SMS Number	Enter up to 4 different phone numbers to call to alert the user via SMS message

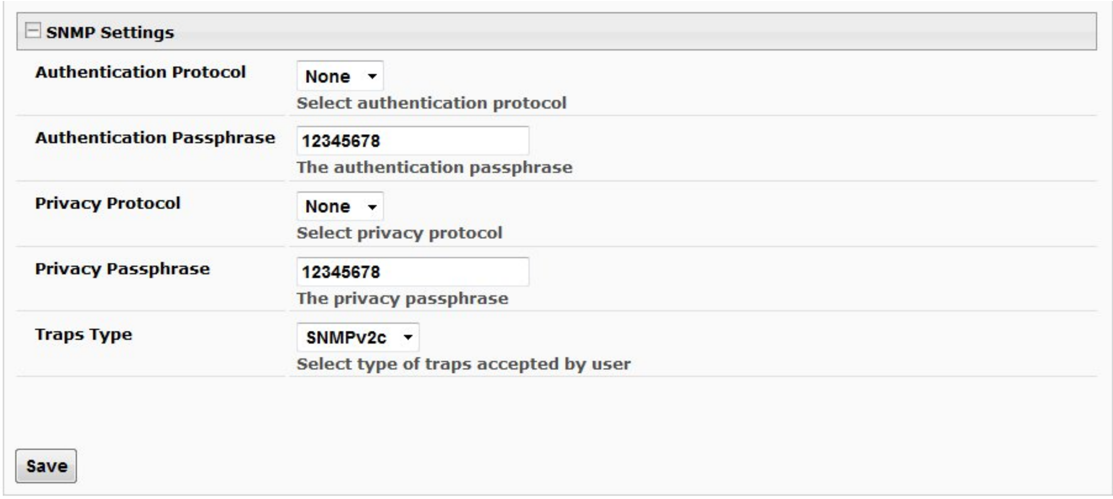


⊟ Schedule Settings

Schedule Type	Always active Configure the user's schedule type
Start Day	Sun First day of the week when the user active
End Day	Sun Last day of the week when the user active
Start Hour	00:00 Starting hour for the user's daily schedule
End Hour	01:00 Ending hour for the user's daily schedule

Figure 92- More user settings

Schedule Settings	
Schedule Type	**Always active**- user will receive messages at all hours of each day **Daily active during defined times-** user will receive message every day but during only the times specified **Active during defined times**- user will only receive alert messages during days and times as specified **Inactive during defined times-** user will receive alert messages at all hours EXCEPT those days and times specified.
Start Day	First day of the week the user should begin receiving messages
End Day	Last day of the week the user should receive messages
Start Hour	First hour of the day the user should begin receiving messages
End Hour	Last hour of the day the user should receive messages



⊟ SNMP Settings

Authentication Protocol: None ▾ — Select authentication protocol

Authentication Passphrase: 12345678 — The authentication passphrase

Privacy Protocol: None ▾ — Select privacy protocol

Privacy Passphrase: 12345678 — The privacy passphrase

Traps Type: SNMPv2c ▾ — Select type of traps accepted by user

Figure 93- More user settings

SNMP Settings	
Authentication Protocol	Choose between MD5 or SHA to require authentication, or none to disable it
Authentication Passphrase	Assign the passphrase to be used to enable the receipt of SNMP v3 messages
Privacy Protocol	Choose between DES or AES to encrypt SNMP readings or traps or “None” to disable encryption. If encryption is enabled, then the Authentication Protocol must also be set at “MD5” or “SHA”.
Privacy Passphrase	Assign the passphrase to be used to open and read readings or alert messages received via SNMP v3
Traps Type	Choose between SNMPv1, SNMPv2C, or SNMPv3

After changing any settings in the user profile, press “Save”.

If a user is set with only "User" rights instead of "Administrator" rights, the user will only be able to see current sensor readings and to change their password if so desired. No other ENVIROMUX access is possible.

Note: If the root user’s password is changed and forgotten, contact Network Technologies Inc at (800) 742-8324 (800-RGB-TECH) or (330) 562-7070 for assistance.

Note: Each user can have only one email address (maximum 63 characters) associated with that user.   If an additional email address is needed, an additional user must be added with the desired email address.   As long as both users are configured to get messages from the same sensor groups, both email addresses will get the same alert messages.   For more on users and sensor groups, see page 44.

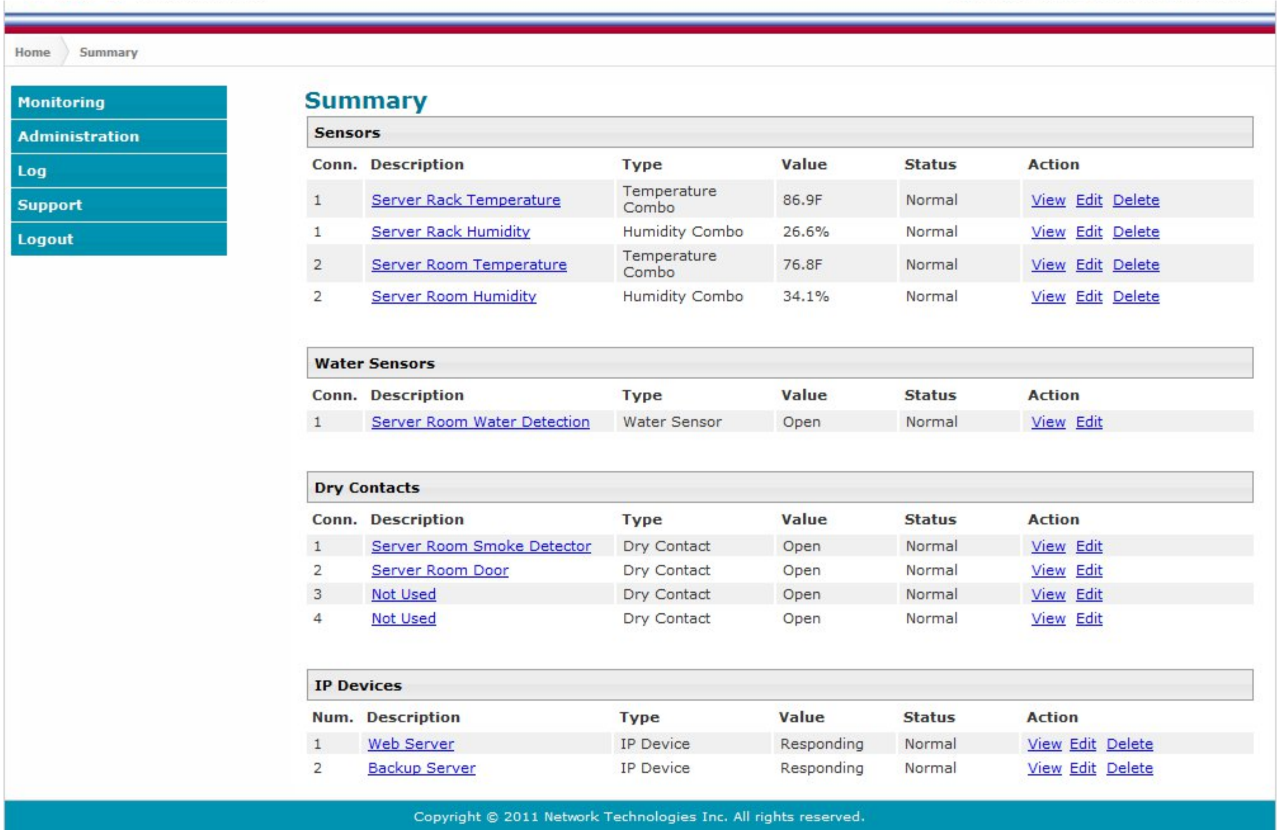
More about User Privileges

The root user (or any user with administrator rights) can change the root password and configure how the root user will receive alert messages. Users with **administrative** rights can change all configuration settings except for the root user name.

The user with Operator privileges has fewer rights than an administrator but more rights than just the basic user rights. Operator privileges include:

- Ability to view alerts, acknowledge alerts and dismiss alerts of all Internal and External sensors.
- Ability to control output relays
- Ability to cycle the sensor power on digital inputs.
- Ability to view and download logs.
- Ability to reboot the unit.

Users with **user** rights can only see the current readings of monitored items and change their own passwords.



Summary

Sensors

Conn.	Description	Type	Value	Status	Action
1	Server Rack Temperature	Temperature Combo	86.9F	Normal	View Edit Delete
1	Server Rack Humidity	Humidity Combo	26.6%	Normal	View Edit Delete
2	Server Room Temperature	Temperature Combo	76.8F	Normal	View Edit Delete
2	Server Room Humidity	Humidity Combo	34.1%	Normal	View Edit Delete

Water Sensors

Conn.	Description	Type	Value	Status	Action
1	Server Room Water Detection	Water Sensor	Open	Normal	View Edit

Dry Contacts

Conn.	Description	Type	Value	Status	Action
1	Server Room Smoke Detector	Dry Contact	Open	Normal	View Edit
2	Server Room Door	Dry Contact	Open	Normal	View Edit
3	Not Used	Dry Contact	Open	Normal	View Edit
4	Not Used	Dry Contact	Open	Normal	View Edit

IP Devices

Num.	Description	Type	Value	Status	Action
1	Web Server	IP Device	Responding	Normal	View Edit Delete
2	Backup Server	IP Device	Responding	Normal	View Edit Delete

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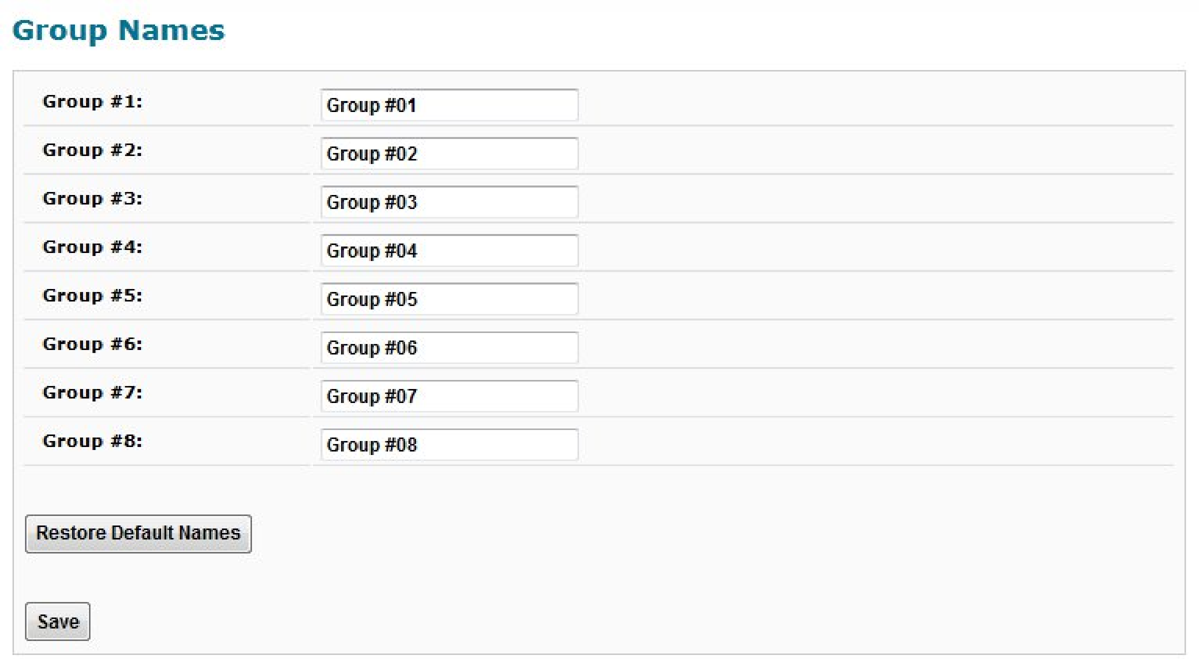
Figure 94-Summary page for User without Admin privileges

Group Names

Group names can be applied instead of the group numbers in the event an association is desired other than “Group 0x” .   For each group (1-8),   a name can be applied containing up to 64 English or 21 Kanji (Japanese) characters.



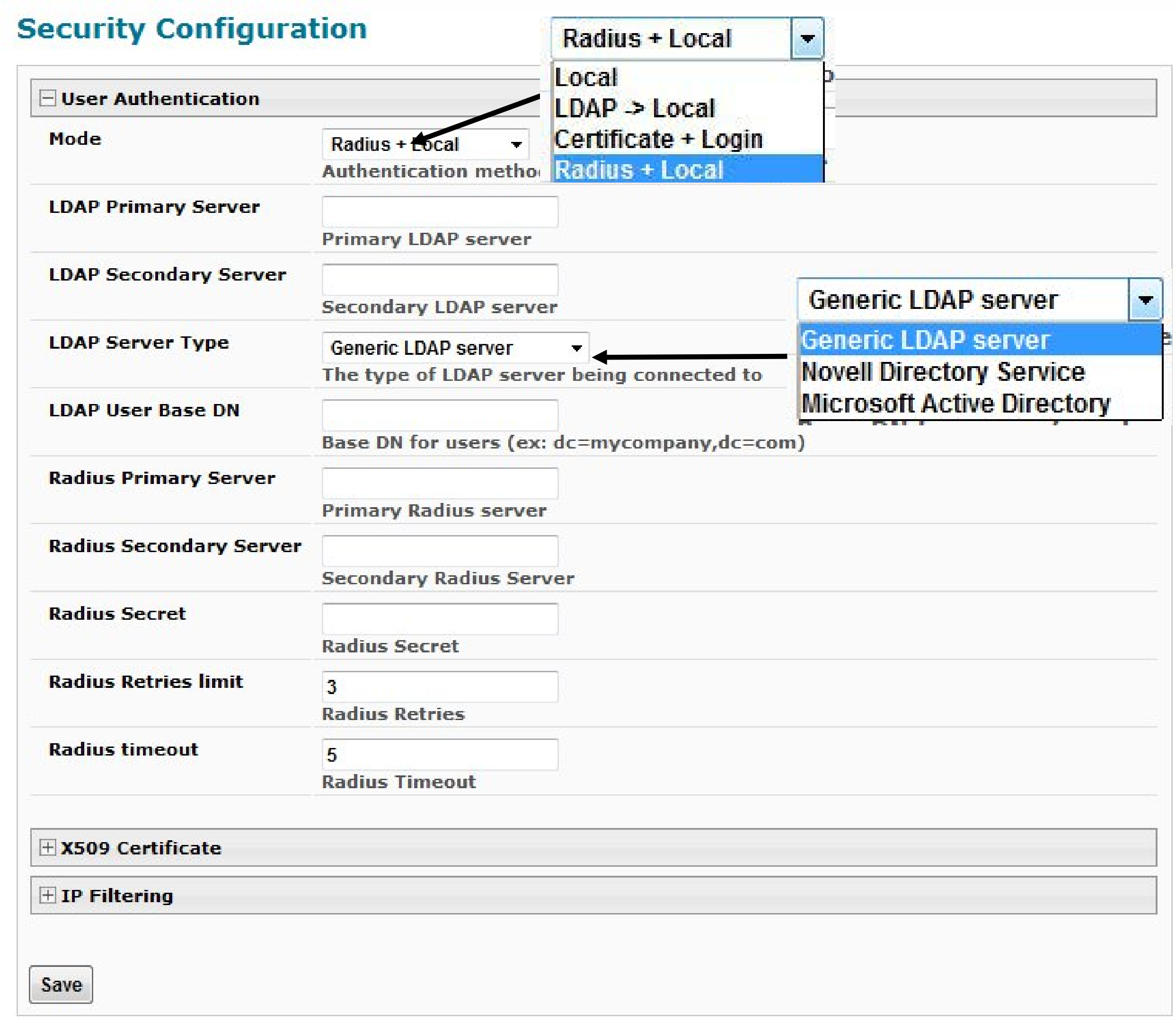
Group Names

Group #1:	Group #01
Group #2:	Group #02
Group #3:	Group #03
Group #4:	Group #04
Group #5:	Group #05
Group #6:	Group #06
Group #7:	Group #07
Group #8:	Group #08

Figure 95- Enter custom group names

Security

Access to the web interface on the ENVIROMUX can be through standard methods (enable HTTP access- page 73) or limited to secure access only (disable HTTP access and only allow HTTPS access which is always enabled by default). Security in the ENVIROMUX can be managed one of three ways; through the local settings (passwords assigned in user settings on page 81), through an LDAP server or through a RADIUS server. If security is configured to use LDAP mode, then the names for users must be the same as those found on a configured LDAP server. To view the Security Configuration page, select **Security** in the **Administration** section of the menu.



Security Configuration

⊟ User Authentication

Mode	Radius + Local Authentication metho
LDAP Primary Server	Primary LDAP server
LDAP Secondary Server	Secondary LDAP server
LDAP Server Type	Generic LDAP server The type of LDAP server being connected to
LDAP User Base DN	Base DN for users (ex: dc=mycompany,dc=com)
Radius Primary Server	Primary Radius server
Radius Secondary Server	Secondary Radius Server
Radius Secret	Radius Secret
Radius Retries limit	3 Radius Retries
Radius timeout	5 Radius Timeout

Figure 96- Security Configuration page

When in LDAP mode, usernames on the LDAP server **must match** those in the user settings of the ENVIROMUX or access will be denied.

Passwords for users can be different between the LDAP server and those in the ENVIROMUX configuration, so when in LDAP mode, make sure the LDAP password is the one being entered or access to the ENVIROMUX will be denied.

Note: When in LDAP mode, if the LDAP server is not responding, local authentication will be tried. If a mistake is made in the LDAP configuration and access to the ENVIROMUX is being denied, to return to local user setting control, disconnect the ENVIROMUX from the network and connect a PC to the ENVIROMUX ETHERNET port directly. Once the ENVIROMUX can no longer see the LDAP server the user will be able to login with a local account.

User Authentication	
Mode	Select Local to use authentication based on passwords in the ENVIROMUX user configuration Select LDAP to use authentication based on passwords in an LDAP server Select "Certificate+Login" when authentication requires the connecting PC to hold a valid certificate Select "Radius +Local" to use either local user authentication or authentication through a RADIUS server
LDAP Primary Server	Enter Hostname or IP address of Primary LDAP Server
LDAP Secondary Server	Enter Hostname or IP address of Secondary LDAP Server (optional)
LDAP Server Type	Choose from drop down list: Generic LDAP server Novell Directory server Microsoft Active Directory
LDAP User Base DN	Enter the Base DN for users (ex: ou=People,dc=mycompany,dc=com)
Radius Primary Server	Enter Hostname or IP address of Primary RADIUS Server
Radius Secondary Server	Enter Hostname or IP address of Secondary RADIUS Server (optional)
Radius Secret	Type the shared secret between the ENVIROMUX and the RADIUS server. The shared secret is case-sensitive, and it must be the same on the ENVIROMUX and the RADIUS server.
Radius Retries Limit	The number of times the ENVIROMUX will try to submit the provided username and password to the RADIUS server before it reports a failed connection attempt
Radius Timeout	The length of time in seconds that the ENVIROMUX will wait for a reply from the RADIUS server before either reporting a failed connection attempt or resubmitting as determined by the Radius Retries Limit

Even though LDAP authentication is being used, each user must also have a local account. User permission level is established by the local account.

When using an LDAP server, the ENVIROMUX is preloaded with a generic security certificate in X509 format. If you wish to provide your own X509 Server certificate, the Server certificate must be uploaded to the ENVIROMUX. See pages 88 and 174 for more information.

LDAP Server Troubleshooting

We recommend that you remain logged in to the ENVIROMUX on an administrative user's account while you test your LDAP server settings and verify that the LDAP server works correctly. If mistakes are made, as long as you are still logged in you can quickly make corrections. For example, using Chrome, make your changes to the LDAP server settings and press the **Save** button on the configuration page. Remain logged in and try logging in from another browser on the same PC (or from another PC altogether). If you can no longer get access to the ENVIROMUX, you need to review and adjust your LDAP server settings and the settings in the ENVIROMUX (above and the user settings on page 81) until you find the cause.

In the event that you do log out before verifying your LDAP server settings are correct and now find your access to the ENVIROMUX is being denied, disconnect the ENVIROMUX from the network and connect a PC to the ENVIROMUX ETHERNET port directly. Once the ENVIROMUX can no longer see the LDAP server the user will be able to login with a local ENVIROMUX account.

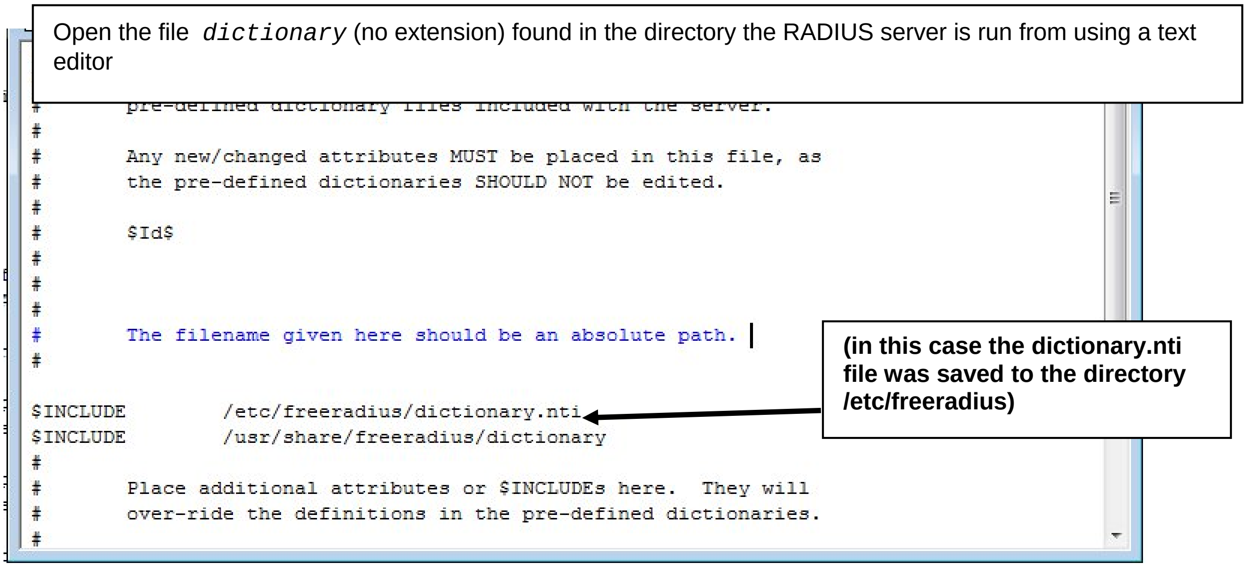
Using a RADIUS Server

1. The `dictionary.nti` file (this file has an `.nti` extension) must be saved to a location on the PC the RADIUS server is run from. (This file is found on the ENVIROMUX download page (http://www.networktechinc.com/download/d-environment-monitor-16.html).)

2. Edit the RADIUS ***dictionary*** file (no file extension) in the RADIUS server using a text editor, adding the following line:

```
$INCLUDE   /<path to dictionary.nti>/dictionary.nti
```

Example:



Open the file *dictionary* (no extension) found in the directory the RADIUS server is run from using a text editor

```
#       pre-defined dictionary files included with the server.
#
#       Any new/changed attributes MUST be placed in this file, as
#       the pre-defined dictionaries SHOULD NOT be edited.
#
#       $Id$
#
#
#
#       The filename given here should be an absolute path.
#

$INCLUDE        /etc/freeradius/dictionary.nti
$INCLUDE        /usr/share/freeradius/dictionary
#
#       Place additional attributes or $INCLUDEs here.  They will
#       over-ride the definitions in the pre-defined dictionaries.
#
```

(in this case the dictionary.nti file was saved to the directory /etc/freeradius)

Figure 97- Dictionary file of RADIUS server

3. Save the RADIUS ***dictionary*** file.

4. Once the ***dictionary.nti*** file has been included in the RADIUS server dictionary, users outlined in the RADIUS server users file (filename ***users***, again, no extension) can be assigned these properties. The values can be customized based on your requirements or kept the same for a group of users using a single variable. An example user configuration is below. Please note the tab characters preceding property names.

To save time, you could copy and paste this list into your *users* file and then edit it as needed for your custom installation.

```
# Test Account
"Test"     Cleartext-Password := "T123est"
    Service-Type = Login-User,
    NTI-User-Permission := "readonly",
    NTI-User-Title := "Analyst",
    NTI-User-Department := "IT",
    NTI-User-Company := "VPI",
    NTI-User-Sensor-Groups := "1,3,4,5,6,7,8",
    NTI-User-Email := "network.technologies@gmail.com",
    NTI-User-Syslog-SNMP-Address := "192.168.3.10",
    NTI-User-Syslog-Facility := "2",
    NTI-User-SMS-Number := "1234567891",
    NTI-User-Enable-Email-Alert := 1,
    NTI-User-Enable-Brief-Email := 1,
    NTI-User-Enable-Syslog-Alert := 1,
    NTI-User-Enable-SNMP-Traps := 1,
    NTI-User-Enable-SMS-Alert := 0,
    NTI-User-Schedule-Type := "custom",
    NTI-User-Schedule-Start-Day := "sun",
    NTI-User-Schedule-End-Day := "sat",
```

Remember:

The files: *dictionary*
users
dictionary.nti

all need to be in the same directory (in the example in Figure 93 that is /etc/freeradius/)

```
    NTI-User-Schedule-Start-Hour := "01:00",
    NTI-User-Schedule-End-Hour := "22:00",
    NTI-User-SNMP-Auth-Protocol := "MD5",
    NTI-User-SNMP-Auth-Passphrase := "12345678",
    NTI-User-SNMP-Privacy-Protocol := "none",
    NTI-User-SNMP-Privacy-Passphrase := "123456789",
    NTI-User-SNMP-Traps-Version := "v3",
    NTI-User-Enable := 1
```

The above username is "**Test**", and the password is "**T123est**". All the properties listed mirror those found in the user configuration in the ENVIROMUX web interface. Change "Test" and "T123est" as needed for a user. For the "Enable" properties, "1," means yes and "0," means no.

5. Once the ***dictionary*** file is updated and users are added to the ***users*** file, please restart the RADIUS server service and correct syntax errors if any.

6. In order to use a RADIUS server to access the ENVIROMUX, the Mode must be changed to "Radius + Local" and the additional RADIUS fields (all under Security Configuration-User Authentication (page 85)) must first be entered. When finished, click the "Save" button. Changes will have immediate effect.

7. After this the ENVIROMUX will auto add/update RADIUS users and log them in (if successful). Local users accounts can also be used to login if added through the Web Interface. A maximum of 16 users are enabled and active at a time on a device. If more than 16 users login, ENVIROMUX will evict the least recently logged-in user.

Note: If the user password as configured in the RADIUS server is different than that set in the ENVIROMUX user account, the RADIUS server will adjust the ENVIROMUX user account password to match the one in the RADIUS server.

All radius property names are optional except for "`NTI-User-Enable := 1`" . For a detailed list of available property values, please check ***dictionary.nti*** file.

Change User Attributes

To change user attributes on the RADIUS Server:

1. Edit the user's file in RADIUS (filename ***users***, no extension) and make the desired changes to the user attributes.

    ex. NTI-User-Permission := “admin”

2. Save the user file.

3. Restart the RADIUS service.

4. On the E-xD, delete the user that the changes have been made on in the RADIUS server.

5. Logout and Re-Login to the E-xD with the updated user's login and password.

The RADIUS server should automatically load the new user attributes into the E-xD unit.

X509 Certificate

The ENVIROMUX is designed to be configurable with secure access to the web interface controls. The ENVIROMUX is pre-loaded with a generic X509 Server Certificate. If you wish to provide your own X509 Server certificate, the Server certificate must be uploaded to the ENVIROMUX. The Server certificate and key must be combined in a single file ("PEM" format). For instruction to create your own certificate, see page 174.

Browse to the Server certificate file and select it. Then load using the button "**Upload Server Certificate and key**".

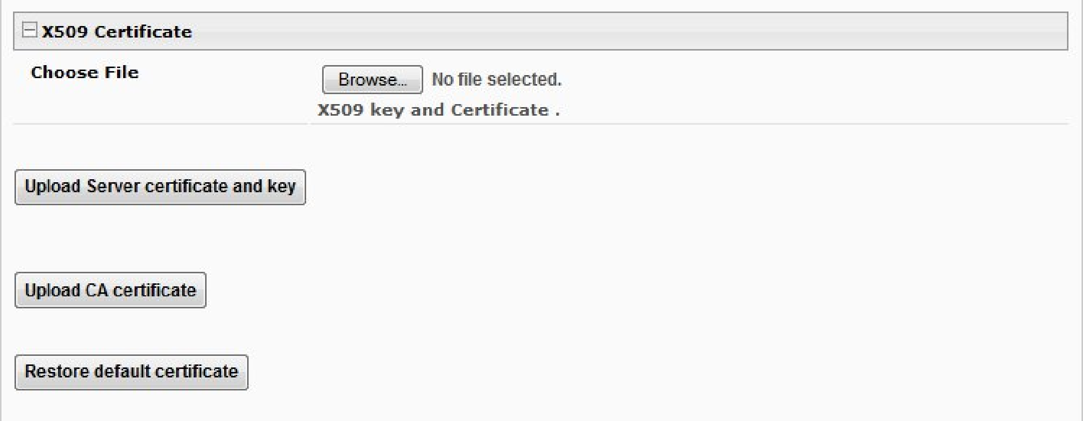
Note: The key used should not be password protected.

X509 Certificate Authority

A Certificate Authority (CA) needs to be used to sign the server certificate describe above. This Certificate Authority can be created as a self-signed certificate (page 174) in "CRT" format. It can also be given to you by an external Certificate Authority in "CRT" or "PEM" format.

For https to work properly, you must load the certificate of your CA onto the ENVIROMUX. Use the "**Browse"** button to browse to the file containing the CA certificate (which may also contain an intermediate certificate) and select it. Then click on the "**Upload CA certificate**" button. Please see page 174 for more details.

The "**Restore default certificate**" button will restore the unit's default self-signed certificates if needed.



⊟ X509 Certificate
Choose File
Browse...
Upload Server certificate and key
Upload CA certificate
Restore default certificate

No file selected.

X509 key and Certificate .

Figure 98- Security Configuration-X509 Certificate

Note: HTTP access can be enabled/disabled from web page under Administration -> Network -> Server Settings -> Enable HTTP (page 73). Do not disable http access until you verify certificate verification works properly for https connection. HTTP connection will allow you to change any settings if a wrong certificate is uploaded. Once HTTPS client certificate validation is verified to be working properly, disable HTTP access for security.

X509 Client Authentication

In addition to Local and LDAP client authentication, X509 client authentication is also available. In order to use X509 client certificate authentication, select "**Certificate + Login**" for the mode setting (Figure 96). X509 client certificate authentication requires the user to present client certification (this happens behind the scenes when you enter the https IP address, before you are presented with a "Login" screen). For this to work a client certificate signed by the same Certifying Authority (CA) used to sign the server certificate and key must be loaded into the user's browser (see page 182 for more details).

Note: The user will need to login after the X509 client certificate is validated.

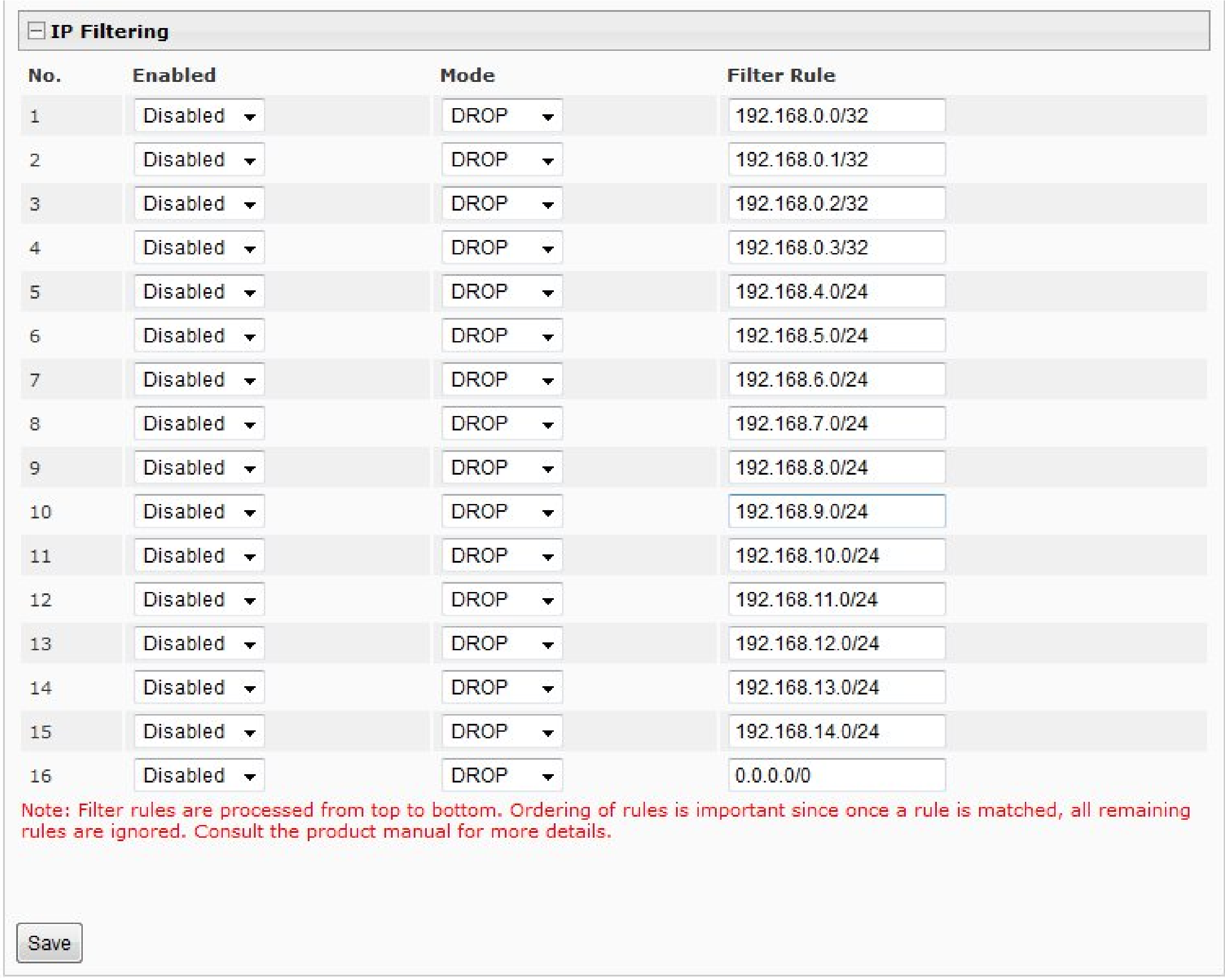
Whether you are just loading your own Server Certificate, or also using client authentication, **reboot the ENVIROMUX for this certificate to take effect.**

IP Filtering

Included in the Security Configuration options is IP Filtering. IP Filtering provides an additional mechanism for securing the ENVIROMUX. Access to the ENVIROMUX network services (SNMP, HTTP(S), SSH, Telnet) can be controlled by allowing or disallowing connections from various IP addresses, subnets, or networks.

Up to 16 IP Filtering rules can be defined to protect the ENVIROMUX from unwanted access from intruders. Each rule can be set as Enabled or Disabled. Rules can be set to explicitly drop attempts to connect, or to accept them.

Be sure to press **Save** after changes are made.



⊟ IP Filtering

No.	Enabled	Mode	Filter Rule
1	Disabled	DROP	192.168.0.0/32
2	Disabled	DROP	192.168.0.1/32
3	Disabled	DROP	192.168.0.2/32
4	Disabled	DROP	192.168.0.3/32
5	Disabled	DROP	192.168.4.0/24
6	Disabled	DROP	192.168.5.0/24
7	Disabled	DROP	192.168.6.0/24
8	Disabled	DROP	192.168.7.0/24
9	Disabled	DROP	192.168.8.0/24
10	Disabled	DROP	192.168.9.0/24
11	Disabled	DROP	192.168.10.0/24
12	Disabled	DROP	192.168.11.0/24
13	Disabled	DROP	192.168.12.0/24
14	Disabled	DROP	192.168.13.0/24
15	Disabled	DROP	192.168.14.0/24
16	Disabled	DROP	0.0.0.0/0

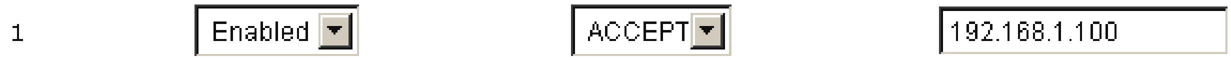
Note: Filter rules are processed from top to bottom. Ordering of rules is important since once a rule is matched, all remaining rules are ignored. Consult the product manual for more details.

Figure 99- Security Configuration- IP Filtering Rules

More on IP Filtering

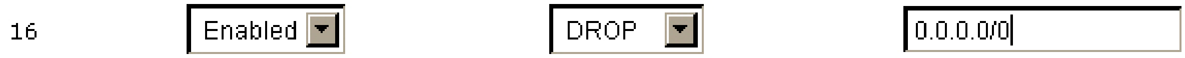
The most common approach is to only allow “white-listed” IP addresses, subnets, or networks to access the device while blocking all others. The IP Filters are processed sequentially from top to bottom, so it is important to place the most precise rules at the top of the list and the most generic rules at the bottom of the list.

As an example, assume we wish to block all connections except those which come from the IP address 192.168.1.100. To allow connections from 192.168.1.100, we need to configure and enable an ACCEPT rule at the top of the list:



1	Enabled	ACCEPT	192.168.1.100

Then, to block all other IP addresses from connecting to the ENVIROMUX, we add a rule to drop all other connections.



16	Enabled	DROP	0.0.0.0/0

If the preceding “drop all connections” rule was placed in position one, no connections at all would be allowed to the unit. Remember: rules are processed from top to bottom. As soon as a rule matches, the processing stops and the matching rule is executed.

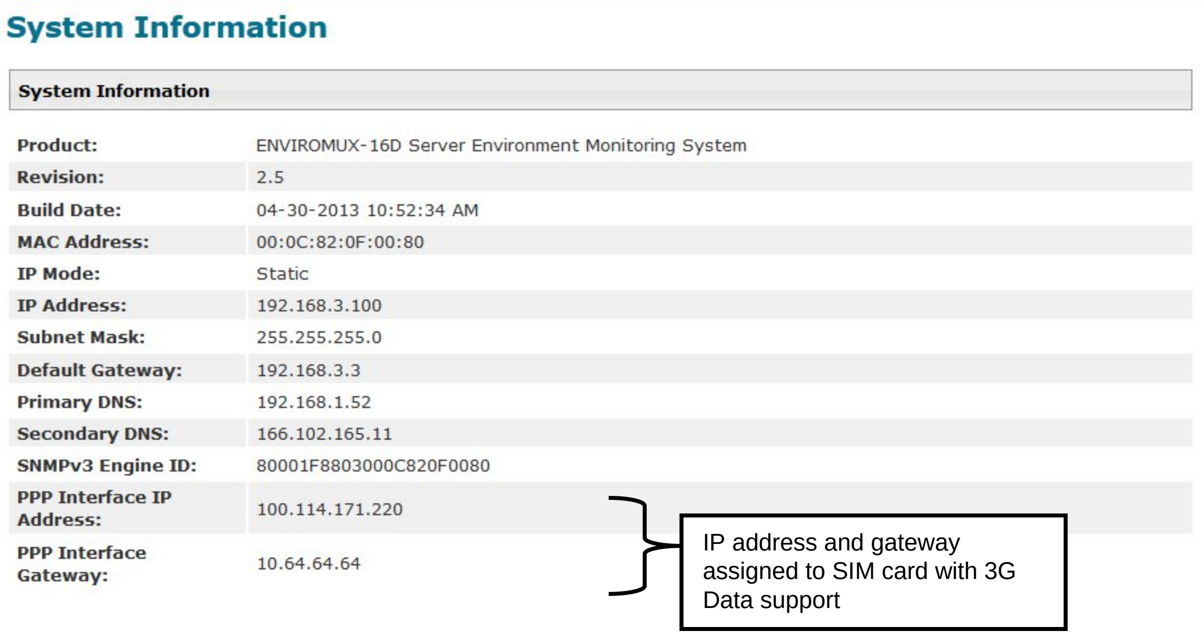
To match a particular IP address, simply enter in the desired IP address (e.g. 192.168.1.100).

To match a subnet, enter in the subnet with the associated mask (e.g. 192.168.1.0/24).

To match all IP address, specify a mask of 0 (e.g. 0.0.0.0/0).

System Information

The system information page displays the model name of the ENVIROMUX, the firmware version in the ENVIROMUX, the MAC address of the Ethernet port, the IP mode, and the network configuration. To view the System Information, select **System Information** in the **Administration** section of the main menu.



System Information

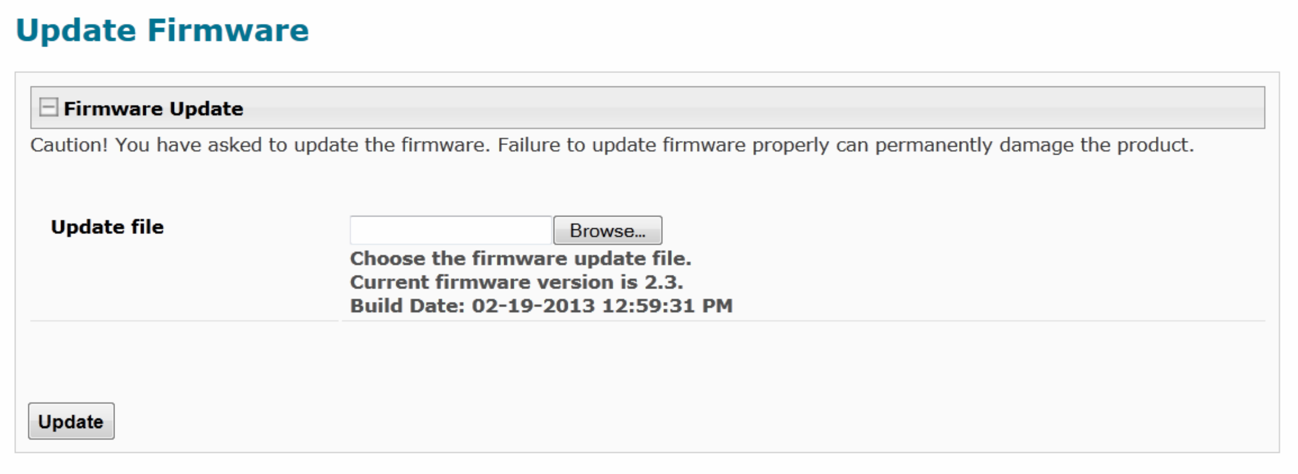
System Information	
Product:	ENVIROMUX-16D Server Environment Monitoring System
Revision:	2.5
Build Date:	04-30-2013 10:52:34 AM
MAC Address:	00:0C:82:0F:00:80
IP Mode:	Static
IP Address:	192.168.3.100
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.3.3
Primary DNS:	192.168.1.52
Secondary DNS:	166.102.165.11
SNMPv3 Engine ID:	80001F8803000C820F0080
PPP Interface IP Address:	100.114.171.220
PPP Interface Gateway:	10.64.64.64

IP address and gateway assigned to SIM card with 3G Data support

Figure 100- System Information page

Administration- Firmware

The Update Firmware page is used to change the firmware of the ENVIROMUX. Occasionally new features or changes to existing features will be introduced and new firmware with these changes will be made available on the NTI website (http://www.networktechinc.com/download/d-environment-monitor-16.html). To view the Update Firmware page, select **Firmware** in the **Administration** section of the main menu. Once a user has downloaded the required file for firmware upgrade, this page will be used to upload it to the ENVIROMUX.



Update Firmware

⊟ Firmware Update

Caution! You have asked to update the firmware. Failure to update firmware properly can permanently damage the product.

Update file

Choose the firmware update file.
Current firmware version is 2.3.
Build Date: 02-19-2013 12:59:31 PM

Figure 101- Update Firmware Page

1. Download the most current firmware file from http://www.networktechinc.com/download/d-environment-monitor-16.html to a location on your PC.
2. Click on the "Browse" button and locate and select the firmware file for the ENVIROMUX (***enviromux-xd-vx-x.bin, for example***).
3. Click on the "Update" button to perform the firmware update. The firmware update process will take approximately 5 minutes while the ENVIROMUX installs the firmware. Once the update file has been installed, the unit will automatically reboot (this will take another 4-5 minutes after a firmware update) and the login screen will appear.

Note: In the event the ENVIROMUX firmware should be corrupted, such that connection through the web interface is no longer possible, contact NTI for instruction and recovery files to access the ENVIROMUX and restore the firmware using a TFTP server and Terminal connection (page 15).

Advanced-Cascade Configuration

From the **Administration->Advanced>Cascade** menu, the administrator can configure the ENVIROMUX to either be

- a master system,
- an Ethernet slave
- an RS485 local slave

When cascading via Ethernet, the E-16D, -5D or -2D can be used as master or slave in any combination.

In a cascaded configuration, there can be 1 master unit and up to 4 slave units.

A cascaded configuration can consist of one or more Ethernet slaves and one or more RS485 slaves, but a maximum of 4 slaves total.

Notes:

-When ENVIROMUX units are connected as slaves, only their sensors and output relays are used and are monitored through the master unit.

-Only E-16D units can be used as Master and Slaves in an RS485 cascaded configuration.

-E-16D,-5D and -2D units can be Master or Slaves when cascading via Ethernet.

-E-2D used in a cascaded configuration must be the "REV C" design (includes 2- 9VDC power jacks).

-After setting up cascading for ENVIROMUX units, we recommend re-booting the slaves completely before re-booting the master to have the master properly recognize the slaves and their sensors.

-Do not configure sensors from the Slave web interface, do not put a check in "Add to datalog" (page 42) and do not enable any alert methods. Only enable datalogging and alert methods for sensors when configuring them from the Master interface. Otherwise accumulative data at the Slave will cause a loss in communication with the Master.

1. Go to the Administration -> Cascading page for each ENVIROMUX and using the choices in the drop down box (Figure 102), select the position each ENVIROMUX will hold in the cascaded system.

   If you select **Ethernet Slave**, make sure each Ethernet Slave has a unique IP address (must be different from the Master unit and any other Ethernet Slave). With "Ethernet Slave" selected and a unique IP address assigned, press "Save" and exit the web interface. This unit will be controlled and configured from the Master unit web interface.

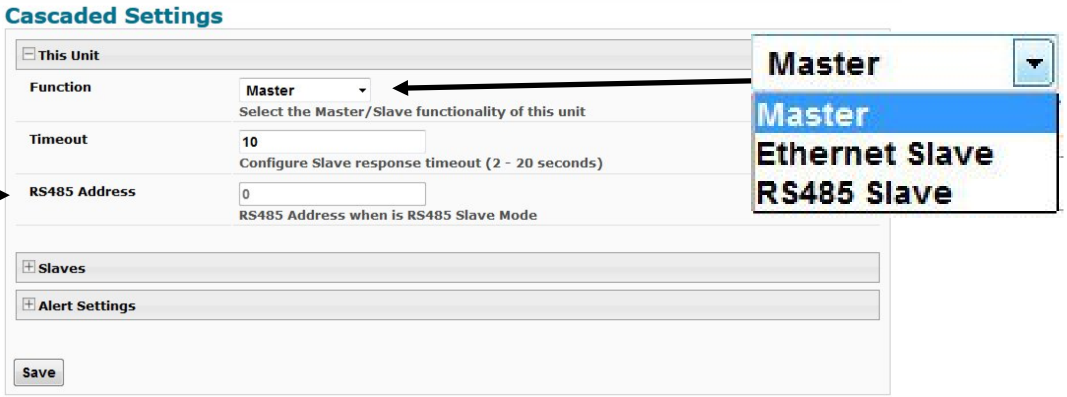
   If you select **RS485 Slave (E-16D only)**, also enter an RS485 address value from 1-255 to be used when defining what RS485 slaves are part of a cascaded configuration. Make note of the address entered. Each RS485 slave must have a unique address, but any value from 1-255 can be used. Once the address values have been saved, connect the RS485 slaves to the master as described in step 2 (Figure 103).

   If you select **Master**, then be sure to designate and connect the Slave units properly (unique IP addresses must be assigned for Ethernet Slaves and unique RS485 addresses assigned to RS485 Slaves and connected as shown in Figure 103 and Figure 104) before continuing to step 4. To prevent unnecessary alert messages due to LAN connectivity issues, configure a response timeout value between 2 and 20 seconds. This will be the amount of time that a slave must have lost connection before an alert message regarding connectivity will be sent. This will apply to all connected slaves.

Enter a unique value between 1-255 if "RS485 Slave" is selected.

(Each RS485 slave **must** have a different RS485 address.)

Otherwise, leave this blank



Cascaded Settings

⊟ This Unit

Function: Master
Select the Master/Slave functionality of this unit

Timeout: 10
Configure Slave response timeout (2 - 20 seconds)

RS485 Address: 0
RS485 Address when is RS485 Slave Mode

⊞ Slaves

⊞ Alert Settings

Figure 102- Cascade configuration options

2. Connect the RS485 slaves to the master as shown below using CAT5/5e/6 patch cables with RJ45 connectors wired straight thru (pin 1 to pin 1, pin 2 to pin 2, etc.). The maximum total distance from the master to the final slave unit cannot exceed 4000 feet. The last slave **must** have a terminating plug (E-TRMPLG-sold separately) in the empty socket.

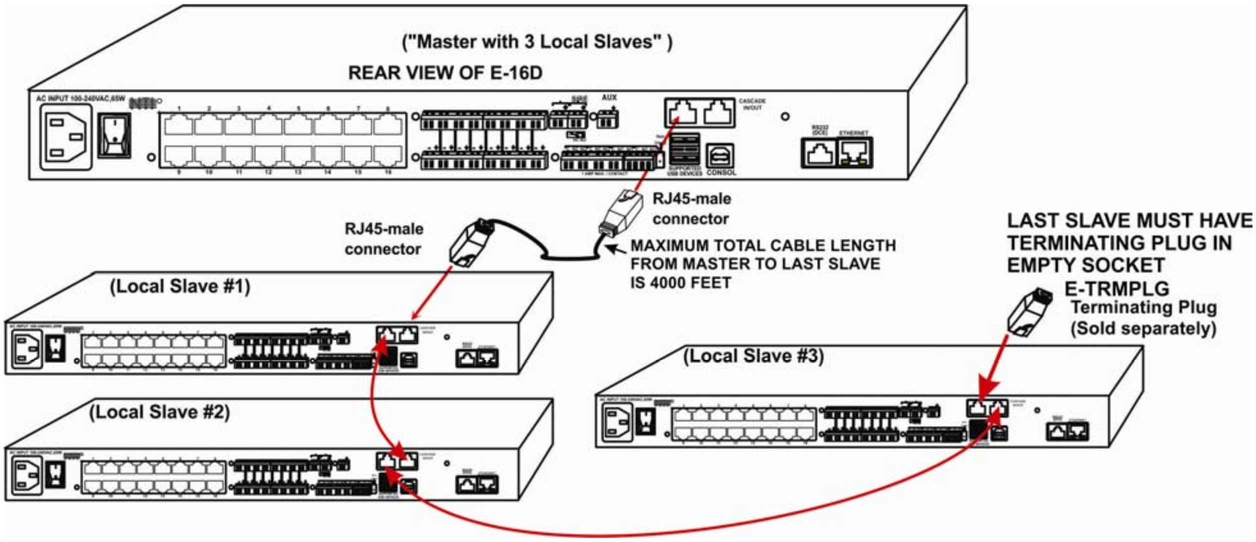

("Master with 3 Local Slaves")
REAR VIEW OF E-16D
RJ45-male connector
RJ45-male connector
MAXIMUM TOTAL CABLE LENGTH FROM MASTER TO LAST SLAVE IS 4000 FEET
LAST SLAVE MUST HAVE TERMINATING PLUG IN EMPTY SOCKET
E-TRMPLG Terminating Plug (Sold separately)
(Local Slave #1)
(Local Slave #2)
(Local Slave #3)

Figure 103- Master with local (RS485) slaves

3. Each ENVIROMUX unit configured as an Ethernet Slave must be given a unique IP address. Connection of an Ethernet Slave will be through its Ethernet connection alone. An Ethernet Slave can be located anywhere provided the Master Unit has access to it through equipment settings (routers, firewalls, etc.).

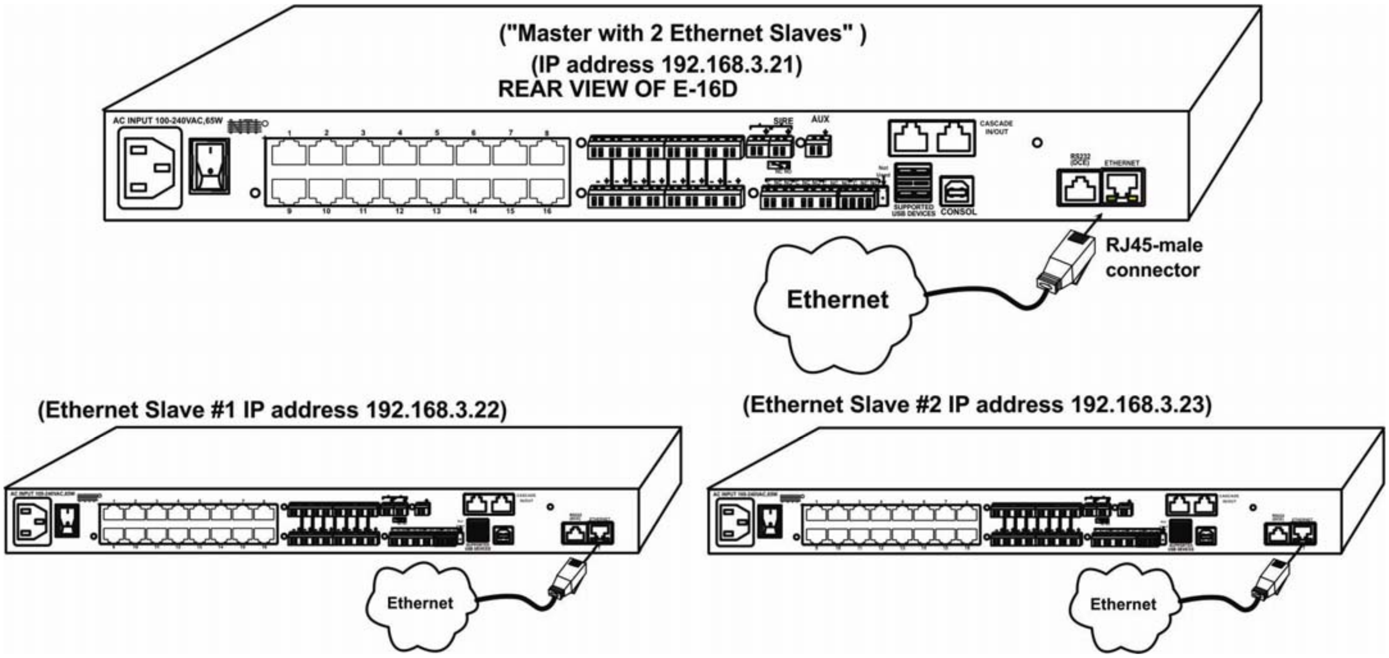
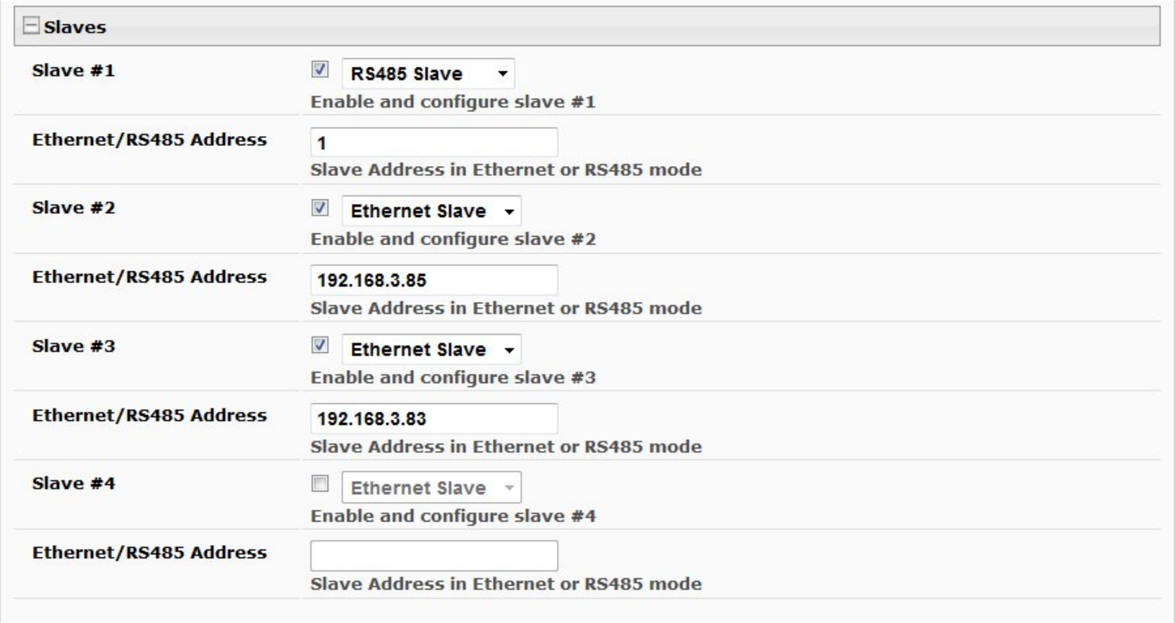

("Master with 2 Ethernet Slaves")
(IP address 192.168.3.21)
REAR VIEW OF E-16D
RJ45-male connector
Ethernet
(Ethernet Slave #1 IP address 192.168.3.22)
(Ethernet Slave #2 IP address 192.168.3.23)
Ethernet
Ethernet

Figure 104- Cascade configuration with Ethernet slaves

4. From the Cascaded Settings page of the Master unit, enter a checkmark for each slave that will be present in the configuration. This enables the slave and defines the slave sequence (number 1-4) as it will appear on the sensor summary page.

5. Enter the type of Slave (Ethernet or RS485) to be connected at that sequence number.

6. Either enter the IP address of the Ethernet Slave, or the RS485 address of the RS485 slave.

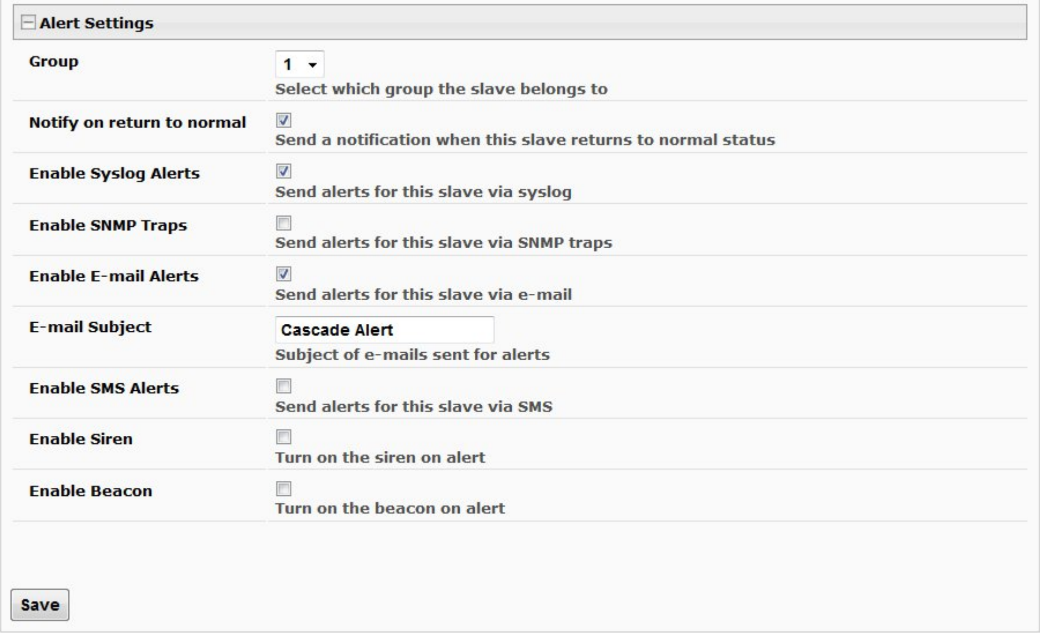


⊟ Slaves

Slave #1	☑ RS485 Slave ▾ Enable and configure slave #1
Ethernet/RS485 Address	1 Slave Address in Ethernet or RS485 mode
Slave #2	☑ Ethernet Slave ▾ Enable and configure slave #2
Ethernet/RS485 Address	192.168.3.85 Slave Address in Ethernet or RS485 mode
Slave #3	☑ Ethernet Slave ▾ Enable and configure slave #3
Ethernet/RS485 Address	192.168.3.83 Slave Address in Ethernet or RS485 mode
Slave #4	☐ Ethernet Slave ▾ Enable and configure slave #4
Ethernet/RS485 Address	 Slave Address in Ethernet or RS485 mode

Figure 105- Configure which Slaves will be connected to the Master

7. In the web interface of the Master unit, configure the Alert Settings that will determine how the user will be alerted if any of the Slave units lose communication with the Master unit. This configuration is **only** performed in the Master unit.



⊟ Alert Settings

Group	1 ▾ Select which group the slave belongs to
Notify on return to normal	☑ Send a notification when this slave returns to normal status
Enable Syslog Alerts	☑ Send alerts for this slave via syslog
Enable SNMP Traps	☐ Send alerts for this slave via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this slave via e-mail
E-mail Subject	Cascade Alert Subject of e-mails sent for alerts
Enable SMS Alerts	☐ Send alerts for this slave via SMS
Enable Siren	☐ Turn on the siren on alert
Enable Beacon	☐ Turn on the beacon on alert

Figure 106- Apply alert settings to alert for Slave connection loss

Alert Settings	
Group	Just as sensors are assigned to a group, a Slave loss alert can be assigned to a group. In the event a Slave loses connection with the Master, for any reason, an alert notification will be sent to all users subscribing to alerts from this sensor group.
Notify on Return to Normal	The user can also be notified when the connection to a Slave has been restored by selecting the "***Notify when return to normal***" box.
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received
Enable SMS Alerts	Place a checkmark in this box to have alert notifications sent via SMS messages (requires a modem)
Enable Siren	Turn ON the Master unit siren when a Slave connection is in an alert state
Enable Beacon	Turn ON the Master unit beacon when a Slave connection is in an alert state

Note: The Beacon and Siren connections of the Slave units are not used.

Be sure to click **Save** before exiting this page.

Note: The master and each slave must be power-cycled for changes to take effect.

8. Power-cycle each Slave unit and allow to fully boot up.
9. Power-cycle the Master unit

Sensors attached to the connected slaves will appear when viewing the Summary Page for the master (see Figure 107).

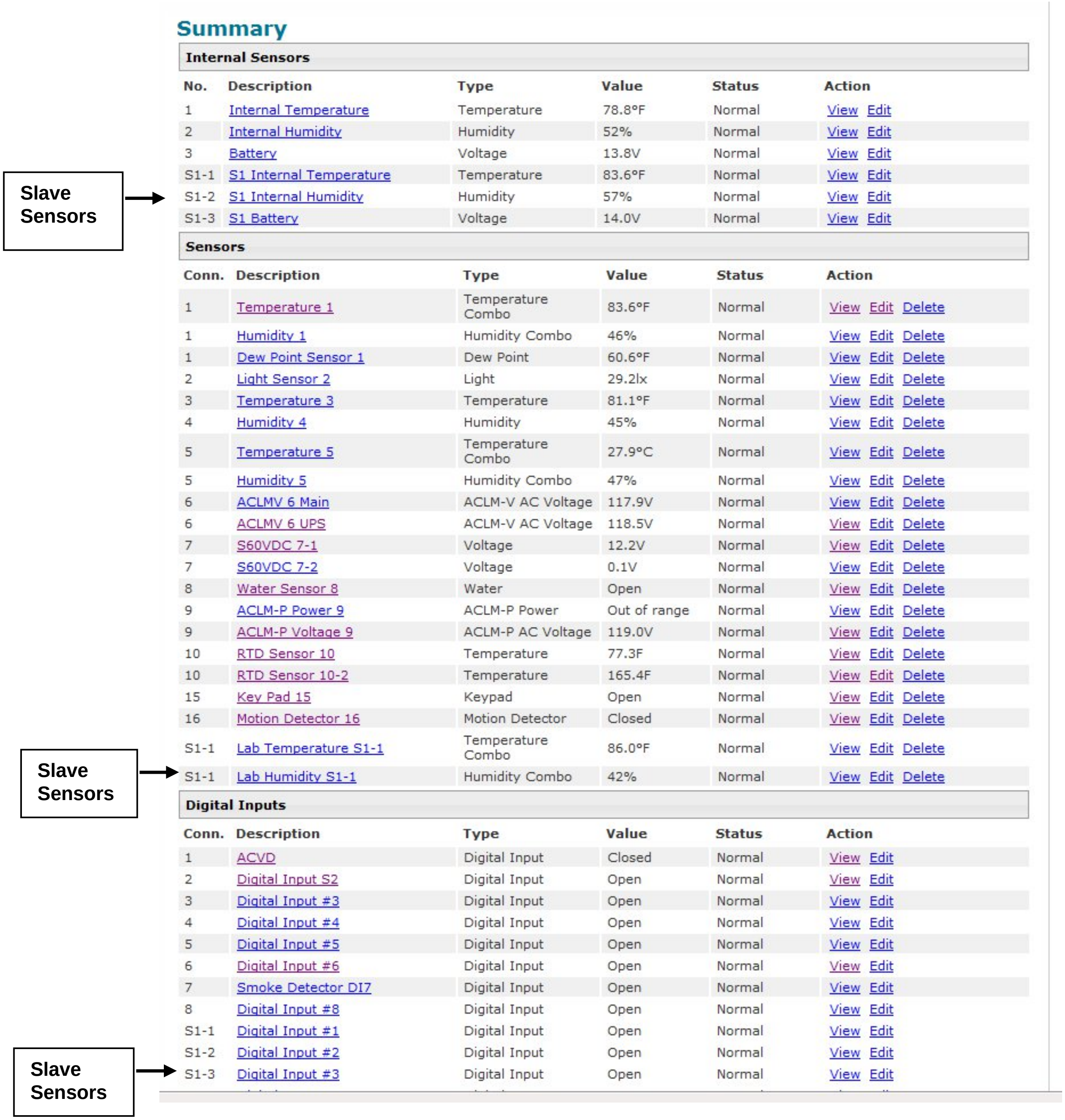
Note: Contact sensors wired to “RJ45 Sensor” ports and any sensor connected to “Digital Input” terminals must first be added to the sensor list from the web interface of the Slave unit before they can be monitored and configured from the Master unit.

If the ENVIROMUX in a cascade configuration is behind a firewall, be sure to open port 5919 so that it can communicate with other ENVIROMUXs.

Summary- Steps to Setup Cascading

1. Define whether the unit will be the Master, an Ethernet Slave or an RS485 slave.
2. Assign unique IP addresses to Ethernet Slaves
3. Assign unique RS485 addresses to RS485 slaves and connect to Master unit with CAT5 cable. Don’t forget to install the terminating plug!
4. Configure Master unit to communicate with each Slave unit (Figure 105).
5. Configure alert settings for cascaded slaves (in Master unit only) to alert user(s) when connection to any slave is lost and restored.
6. Power-cycle each Slave, allow them to fully boot up, then power-cycle the Master unit.
7. Configure sensors of all units (Master and Slaves) as desired from the web interface of the Master unit.

Note: Contact sensors wired to “RJ45 Sensor” ports and any sensor connected to “Digital Input” terminals must first be added to the sensor list from the web interface of the Slave unit before they can be monitored and configured from the Master unit.



Summary

Internal Sensors

No.	Description	Type	Value	Status	Action
1	Internal Temperature	Temperature	78.8°F	Normal	View Edit
2	Internal Humidity	Humidity	52%	Normal	View Edit
3	Battery	Voltage	13.8V	Normal	View Edit
S1-1	S1 Internal Temperature	Temperature	83.6°F	Normal	View Edit
S1-2	S1 Internal Humidity	Humidity	57%	Normal	View Edit
S1-3	S1 Battery	Voltage	14.0V	Normal	View Edit

Sensors

Conn.	Description	Type	Value	Status	Action
1	Temperature 1	Temperature Combo	83.6°F	Normal	View Edit Delete
1	Humidity 1	Humidity Combo	46%	Normal	View Edit Delete
1	Dew Point Sensor 1	Dew Point	60.6°F	Normal	View Edit Delete
2	Light Sensor 2	Light	29.2lx	Normal	View Edit Delete
3	Temperature 3	Temperature	81.1°F	Normal	View Edit Delete
4	Humidity 4	Humidity	45%	Normal	View Edit Delete
5	Temperature 5	Temperature Combo	27.9°C	Normal	View Edit Delete
5	Humidity 5	Humidity Combo	47%	Normal	View Edit Delete
6	ACLMV 6 Main	ACLM-V AC Voltage	117.9V	Normal	View Edit Delete
6	ACLMV 6 UPS	ACLM-V AC Voltage	118.5V	Normal	View Edit Delete
7	S60VDC 7-1	Voltage	12.2V	Normal	View Edit Delete
7	S60VDC 7-2	Voltage	0.1V	Normal	View Edit Delete
8	Water Sensor 8	Water	Open	Normal	View Edit Delete
9	ACLM-P Power 9	ACLM-P Power	Out of range	Normal	View Edit Delete
9	ACLM-P Voltage 9	ACLM-P AC Voltage	119.0V	Normal	View Edit Delete
10	RTD Sensor 10	Temperature	77.3F	Normal	View Edit Delete
10	RTD Sensor 10-2	Temperature	165.4F	Normal	View Edit Delete
15	Key Pad 15	Keypad	Open	Normal	View Edit Delete
16	Motion Detector 16	Motion Detector	Closed	Normal	View Edit Delete
S1-1	Lab Temperature S1-1	Temperature Combo	86.0°F	Normal	View Edit Delete
S1-1	Lab Humidity S1-1	Humidity Combo	42%	Normal	View Edit Delete

Digital Inputs

Conn.	Description	Type	Value	Status	Action
1	ACVD	Digital Input	Closed	Normal	View Edit
2	Digital Input S2	Digital Input	Open	Normal	View Edit
3	Digital Input #3	Digital Input	Open	Normal	View Edit
4	Digital Input #4	Digital Input	Open	Normal	View Edit
5	Digital Input #5	Digital Input	Open	Normal	View Edit
6	Digital Input #6	Digital Input	Open	Normal	View Edit
7	Smoke Detector DI7	Digital Input	Open	Normal	View Edit
8	Digital Input #8	Digital Input	Open	Normal	View Edit
S1-1	Digital Input #1	Digital Input	Open	Normal	View Edit
S1-2	Digital Input #2	Digital Input	Open	Normal	View Edit
S1-3	Digital Input #3	Digital Input	Open	Normal	View Edit

Figure 107- Portion of Summary Page from a Master with a Slave

From the Summary page of the Master (above), sensors connected to Slave unit can be viewed and configured just as if they were directly connected to the Master unit itself.

Reboot the System

The ENVIROMUX can be remotely rebooted by anyone with administrative privileges. To view the Reboot System page, select **Reboot** in the **Administration** section of the main menu. Click the **Reboot Now** button to cause the ENVIROMUX to reboot. This will disconnect any user and shut down all activity. Any configuration changes that were made prior to this action will be made active.

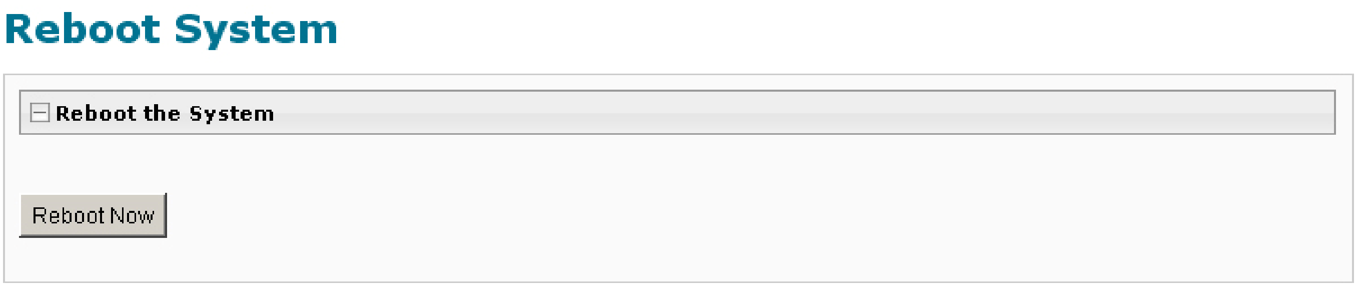
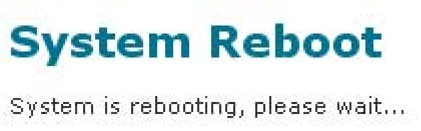


Figure 108- Reboot System page

The message "System is rebooting, please wait..... " will appear and after approximately 45-60 seconds the login screen will appear.

Log in to resume activity.



System is rebooting, please wait...

Figure 109- System is rebooting

Note: In the event of a power failure, using REBOOT will cause the ENVIROMUX to shut OFF.

Click on the "Reboot Now" button to shut down the ENVIROMUX in the event of a power failure or use the System Reset button on the front of the ENVIROMUX. During a power failure, this will be the only way the ENVIROMUX can be shut OFF. **The battery backup will power the ENVIROMUX for up to 1 hour.**

The power switch will only shut down the ENVIROMUX during normal operation. If the power switch is not shut OFF during a power failure, when AC power has been restored the ENVIROMUX will power ON automatically.

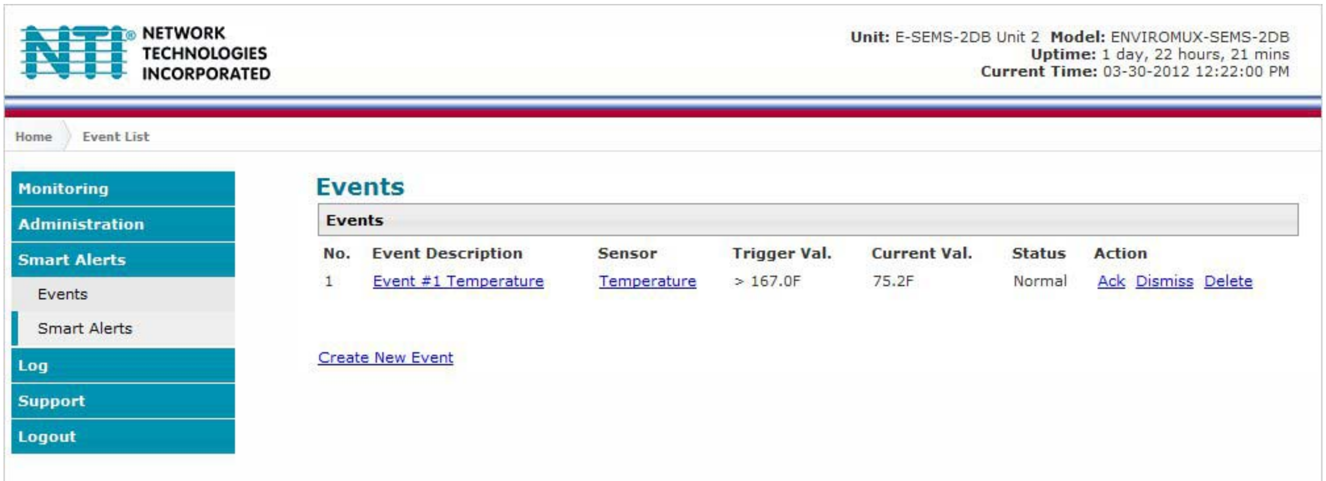
Smart Alerts

Smart Alerts enable the ENVIROMUX to contact users when specially configured circumstances exist for defined sensors. Smart Alerts will respond to 1 or more alert conditions independent of the alert configurations for each sensor configured on page 38.

Assorted conditions can produce configurable events (up to 50) that can then be used in numerous scenarios to produce Smart Alert messages (up to 20) that are sent to users. In addition, the already configured alert status of any sensor or group of sensors can be used to trigger Smart Alerts.

To begin, Events must be defined and configured. Events are sensor conditions to be notified of. Events logged based on the sensor configurations described on page 38 will be managed separately from events logged by these user-defined Events. Sensor configuration for these Events will have no impact on the general configuration of your sensors. User-defined Events provide more control over what you want to be notified of.

For example, if an IP camera is located just inside a monitored entranceway, and an image is desired of each person that goes through that entrance, it may be difficult to get the image consistently since people move at different rates of speed. Using multiple events triggered by the same sensor, each having the Event Delay configured for a different time period and/or a different camera to take the image, you can use Events to be assured of taking a snapshot of the person entering/leaving.



Unit: E-SEMS-2DB Unit 2 **Model:** ENVIROMUX-SEMS-2DB
Uptime: 1 day, 22 hours, 21 mins
Current Time: 03-30-2012 12:22:00 PM

Events

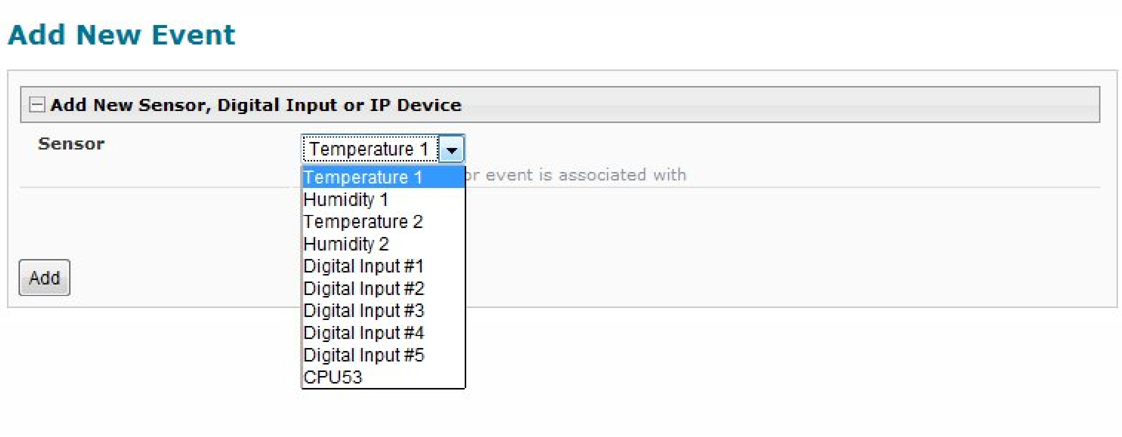
Events

No.	Event Description	Sensor	Trigger Val.	Current Val.	Status	Action
1	Event #1 Temperature	Temperature	> 167.0F	75.2F	Normal	Ack Dismiss Delete

Create New Event

Figure 110- Events used for Smart Alerts

From the side menu, select “Smart Alerts”, and “Events”. Click on “Create New Event” on the Events page.



Add New Event

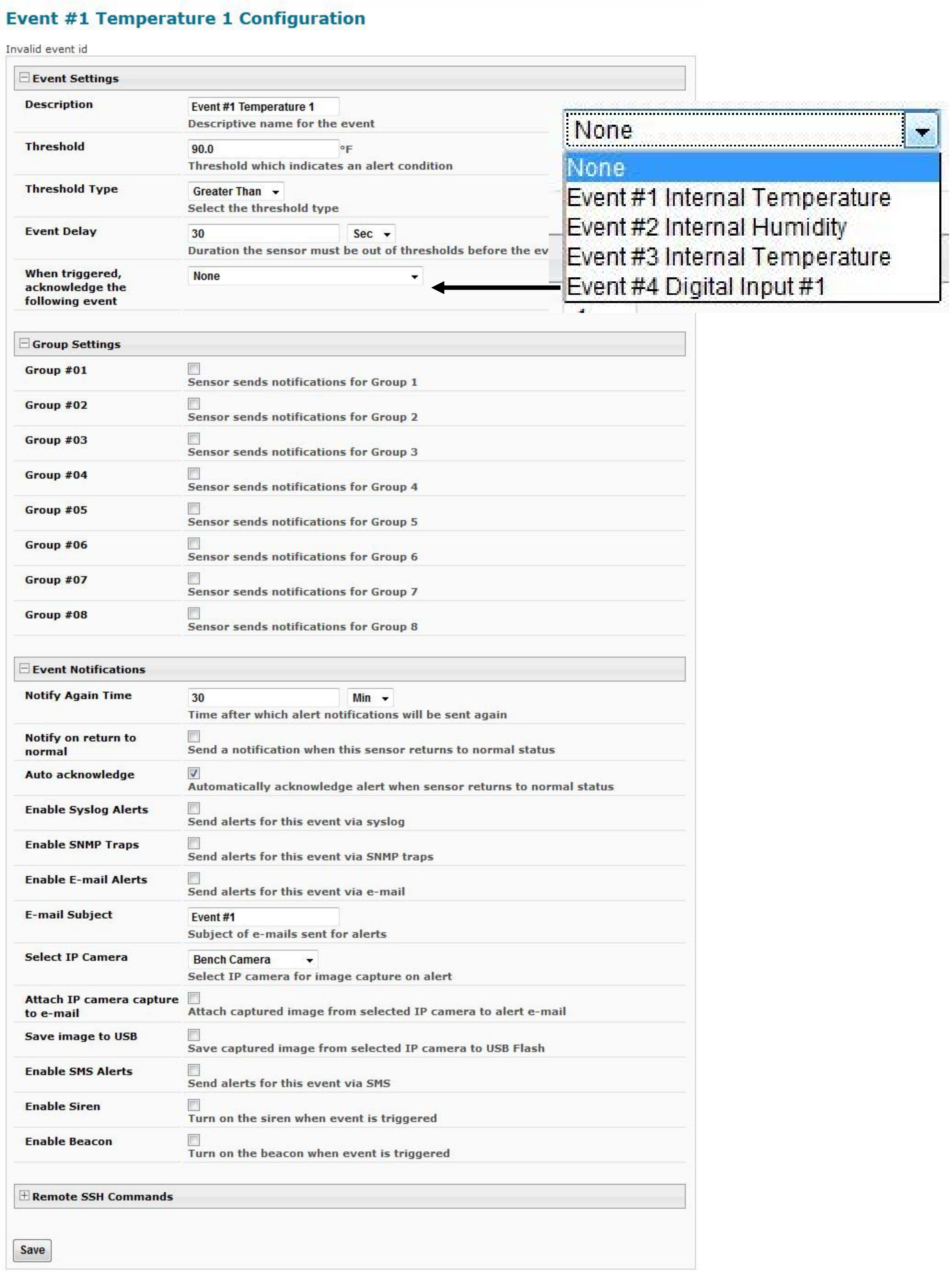
Add New Sensor, Digital Input or IP Device

Sensor: Temperature 1

…r event is associated with

Figure 111- Sensor to be used for a predefined event

You will be prompted to select which connected sensor to associate the event with. Which sensor’s data do you want to trigger this event? Once the sensor is selected, click “Add”.



Event #1 Temperature 1 Configuration

Invalid event id

⊟ Event Settings

Description	Event #1 Temperature 1 Descriptive name for the event
Threshold	90.0 °F Threshold which indicates an alert condition
Threshold Type	Greater Than ▾ Select the threshold type
Event Delay	30 Sec ▾ Duration the sensor must be out of thresholds before the ev
When triggered, acknowledge the following event	None ▾

None
None
Event #1 Internal Temperature
Event #2 Internal Humidity
Event #3 Internal Temperature
Event #4 Digital Input #1

⊟ Group Settings

Group #01	□ Sensor sends notifications for Group 1
Group #02	□ Sensor sends notifications for Group 2
Group #03	□ Sensor sends notifications for Group 3
Group #04	□ Sensor sends notifications for Group 4
Group #05	□ Sensor sends notifications for Group 5
Group #06	□ Sensor sends notifications for Group 6
Group #07	□ Sensor sends notifications for Group 7
Group #08	□ Sensor sends notifications for Group 8

⊟ Event Notifications

Notify Again Time	30 Min ▾ Time after which alert notifications will be sent again
Notify on return to normal	□ Send a notification when this sensor returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when sensor returns to normal status
Enable Syslog Alerts	□ Send alerts for this event via syslog
Enable SNMP Traps	□ Send alerts for this event via SNMP traps
Enable E-mail Alerts	□ Send alerts for this event via e-mail
E-mail Subject	Event #1 Subject of e-mails sent for alerts
Select IP Camera	Bench Camera ▾ Select IP camera for image capture on alert
Attach IP camera capture to e-mail	□ Attach captured image from selected IP camera to alert e-mail
Save image to USB	□ Save captured image from selected IP camera to USB Flash
Enable SMS Alerts	□ Send alerts for this event via SMS
Enable Siren	□ Turn on the siren when event is triggered
Enable Beacon	□ Turn on the beacon when event is triggered

⊞ Remote SSH Commands

Save

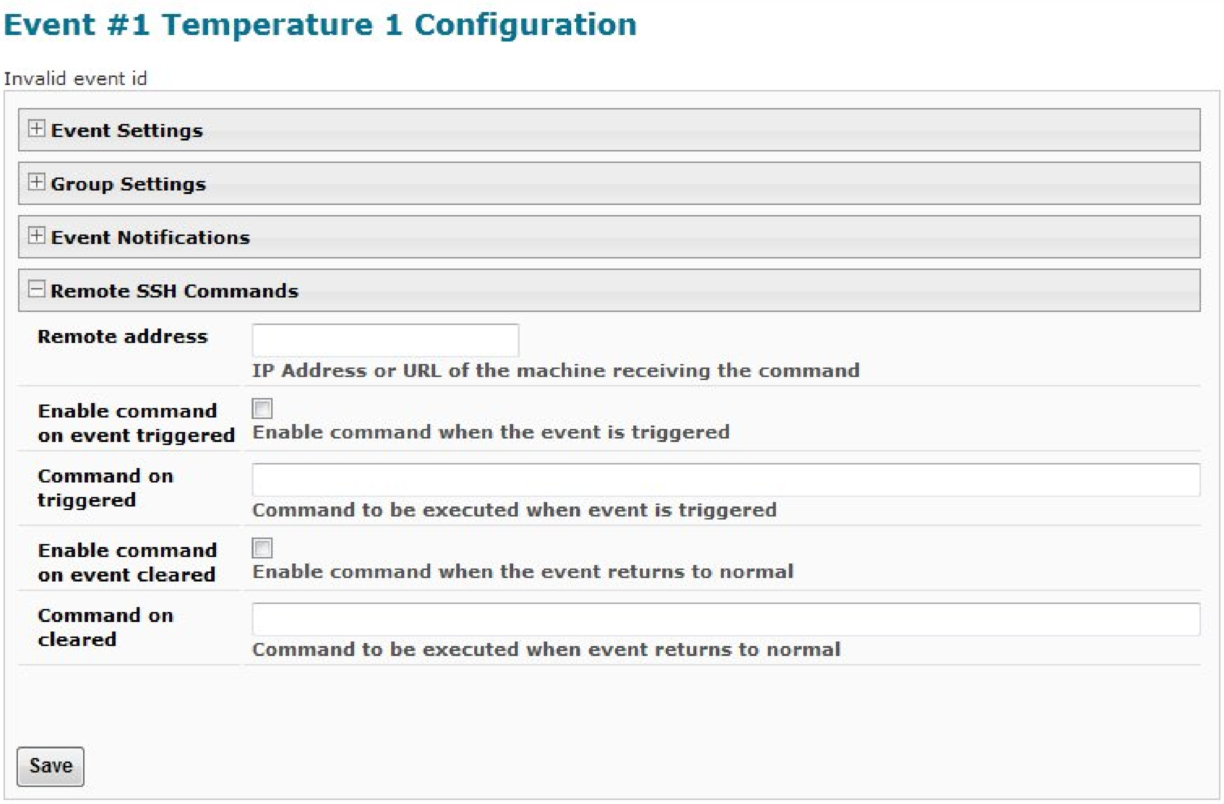
Figure 112- Configuration options for new event

Depending upon the type of sensor chosen, various event settings can be configured that will cause an event to be logged.

In the example above, if the temperature sensor sees a temperature greater than 90.0 degrees C for more than 30 seconds, an event will be logged.

Event Notifications can then be configured to be sent, with the options described in the following table.

Event Settings	
Description	The description of the sensor that will be viewed in the Summary page and in the body of alert messages
Threshold (for RJ45 sensors)	The threshold value of the measured unit that will trigger an event ***Note: The trigger value can be a value that is considered a sensor's "normal" state, or its "alert" state.***
Threshold Type	The type of variation from the threshold value that indicates a condition (greater than or less than)
Trigger Status (for digital inputs)	The condition of the sensor that indicates a triggered state (open or closed)
Event Delay	The amount of time the event must be triggered before an event is logged. This provides some protection against false alarms. The Event Delay value can be set for 0-999 seconds or minutes.
When triggered, acknowledge the following event	Selecting an event for this field gives the option to cancel notice of another separate event (acknowledge) when current event is triggered
Group Settings	
Group#xx	Assign the Event to any group 1 -8 (see also page 44)
Event Notifications	
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the Event has returned to a non-triggered state by selecting the "***Notify when return to normal***" box for an Event.
Auto Acknowledge	Place a checkmark in this box to have alert notifications in the summary page return to normal state automatically when an Event is no longer being triggered.
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received
Select IP Camera	Associate an Event with an IP camera. Select an IP camera from the drop-down box.
Attach IP Camera capture to email	An image will be captured and sent with the alert message when an alert is sent via e-mail. IP cameras that are monitored by the ENVIROMUX (page 61) will be available for this purpose. ***Note: To be able to send IP camera captures as e-mail attachments, viewer security (in your camera's configuration) needs to be disabled. Consult your IP camera manual to see if this feature is present and for instructions on how to do this.***
Save image to USB	Save the image captured by the IP camera to a connected USB Flash Drive
Enable SMS Alerts	Place a checkmark in this box to have alert notifications sent via SMS messages (requires a modem)
Enable Siren	Turn ON the siren when this event goes to alert (E-16D only)
Enable Beacon	Turn ON the beacon when this event goes to alert (E-16D only)



Event #1 Temperature 1 Configuration

Invalid event id

Remote address
IP Address or URL of the machine receiving the command

Enable command on event triggered □
Enable command when the event is triggered

Command on triggered
Command to be executed when event is triggered

Enable command on event cleared □
Enable command when the event returns to normal

Command on cleared
Command to be executed when event returns to normal

Figure 113- Event Configuration options continued

Remote SSH Commands	
Remote address	Enter the IP address or host name of the Linux or Unix computer to be sent a command via an SSH connection.
Enable command on event triggered	Place a checkmark here to send a command when this Event is triggered
Command on triggered	Enter an SSH command to be sent to the remote address when this Event is triggered (examples of commands include “**poweroff**” and “**reboot**”)
Enable command on event cleared	Place a checkmark in this box to send a command when this Event is cleared
Command on cleared	Enter an SSH command to be sent to the remote address when this Event is cleared

After all options are selected, click the “Save” button.   This Event will now be added to the Events page (Figure 110). Up to 50 events can be defined.   Events can be configured to trigger alerts by themselves, and/or be used in combination with other events to trigger Smart Alerts.   Smart Alerts can also be triggered by combinations of basic sensor alerts without having to provide specific Event configurations.

More on Remote SSH Commands

There are also some things that need to be done on the computer side to accept the commands sent by the ENVIROMUX.

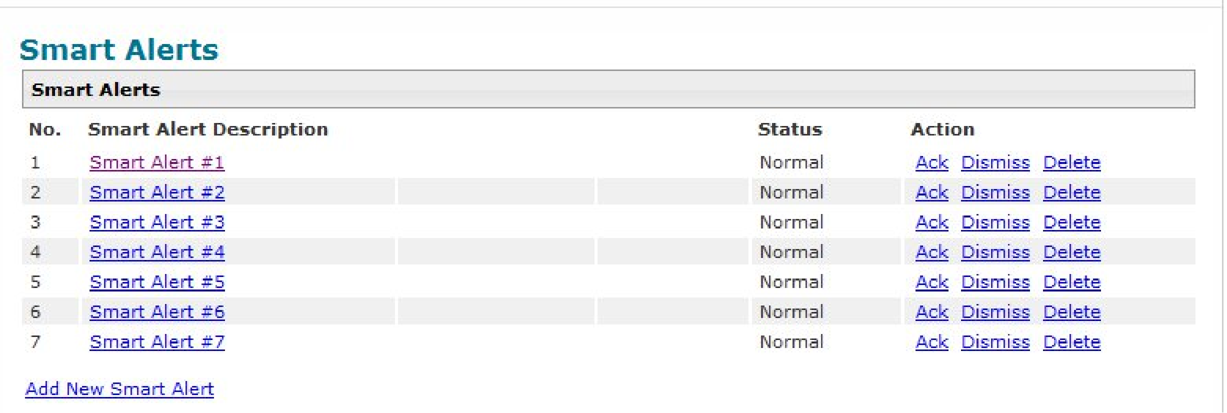
1. The computer needs to have an SSH server installed and running. It needs to accept connection as "root". (On some installations of Linux the “root” connection may be disabled by default.)
2. The SSH connection will be done without a password as it uses authentication keys. To install the authentication key of E-xD on the computer, download that key from the Administration->System->RSA Public key page (see page 66), on the computer to take the command. The downloaded file will have the default name **`id_rsa.pub`**.
3. On the computer to take the command, logged in as root, from the directory where the file was downloaded, type the command:

```
$ cat id_rsa.pub >> root/.ssh/authorized_keys
```

Then, to make the change take effect, restart the SSH server by typing:

```
$ sudo service ssh restart
```

With Events defined, Smart Alerts (up to 20) can be configured to use Event combinations to send alert messages.



Smart Alerts

Smart Alerts

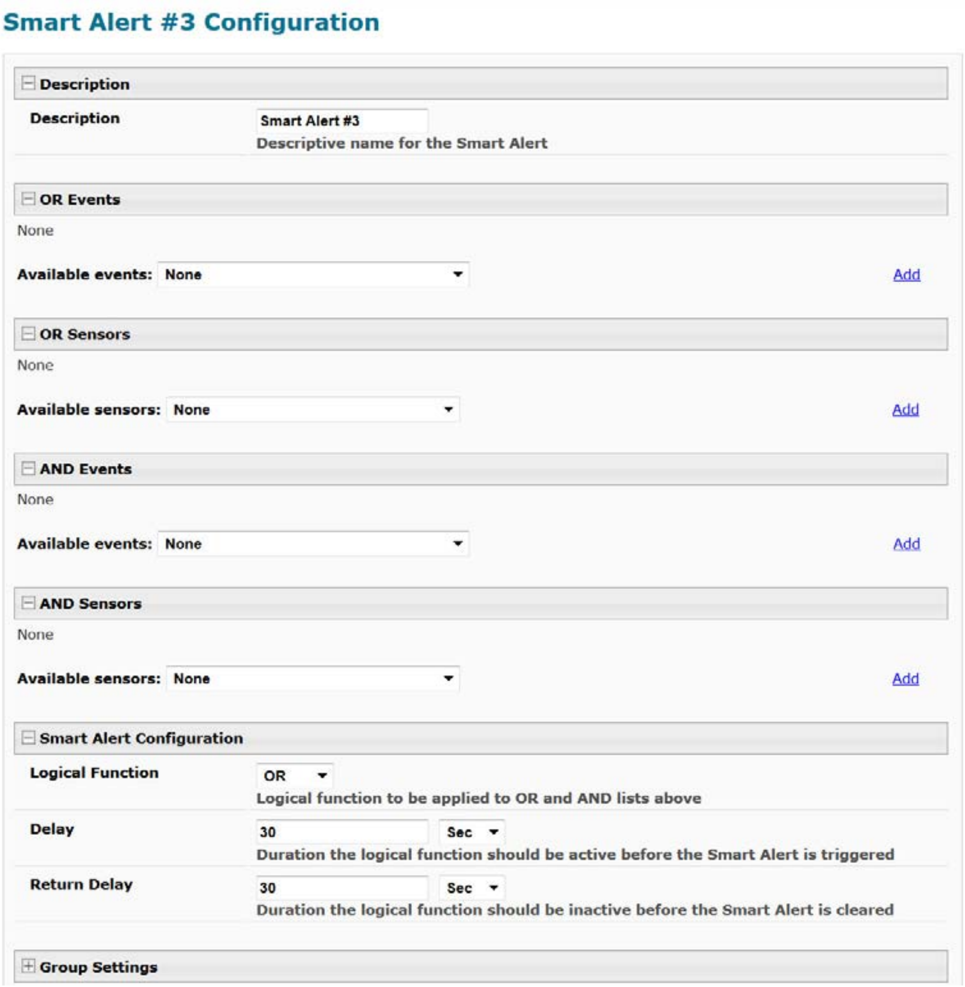
No.	Smart Alert Description	Status	Action
1	Smart Alert #1	Normal	Ack Dismiss Delete
2	Smart Alert #2	Normal	Ack Dismiss Delete
3	Smart Alert #3	Normal	Ack Dismiss Delete
4	Smart Alert #4	Normal	Ack Dismiss Delete
5	Smart Alert #5	Normal	Ack Dismiss Delete
6	Smart Alert #6	Normal	Ack Dismiss Delete
7	Smart Alert #7	Normal	Ack Dismiss Delete

Add New Smart Alert

Figure 114- Smart Alert summary page

From the side menu, select “Smart Alerts”, and “Smart Alerts” again. On the Smart Alerts page, click on “**Add New Smart Alert**”. A new numbered Smart Alert will be added to the summary page (above).   To configure the Smart Alert, click on it.

A menu will open with many options to choose to make the best use of the information provided by the events and/or to use simple sensor alerts to configure Smart Alerts.



Smart Alert #3 Configuration

⊟ **Description**

Description: Smart Alert #3
Descriptive name for the Smart Alert

⊟ **OR Events**

None

Available events: None ▾ Add

⊟ **OR Sensors**

None

Available sensors: None ▾ Add

⊟ **AND Events**

None

Available events: None ▾ Add

⊟ **AND Sensors**

None

Available sensors: None ▾ Add

⊟ **Smart Alert Configuration**

Logical Function: OR ▾
Logical function to be applied to OR and AND lists above

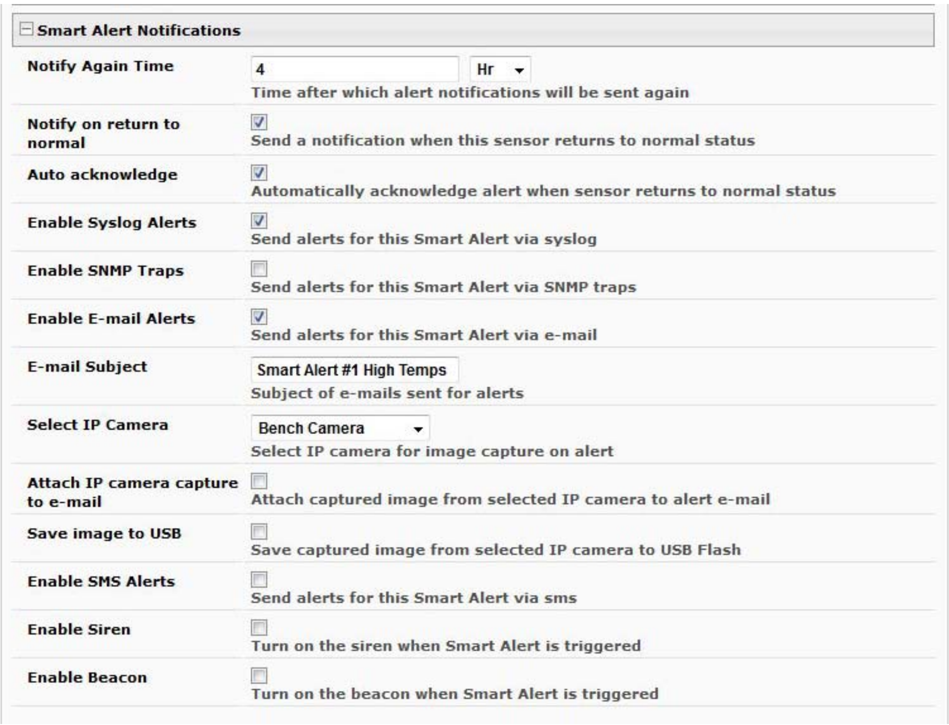
Delay: 30 Sec ▾
Duration the logical function should be active before the Smart Alert is triggered

Return Delay: 30 Sec ▾
Duration the logical function should be inactive before the Smart Alert is cleared

⊞ **Group Settings**

Figure 115- Smart Alert configuration

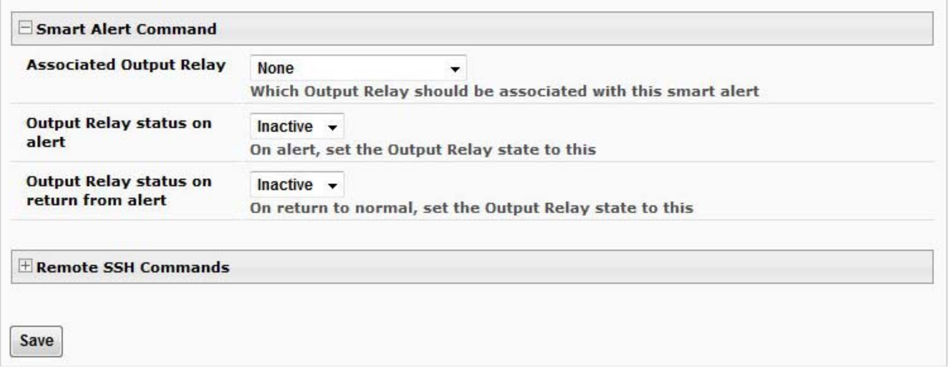
DESCRIPTION	
Description	Use the default description provided or enter the description you want to see on notifications received.
OR Events	
Available Events	Select from the predefined available Events (Figure 110) to have OR logic applied to a triggered Event
OR Sensors	
Available Sensors	Select from any configured sensors to have OR logic applied to a triggered sensor alert. No other sensor configuration necessary.
AND Events	
Available Events	Select from the predefined available Events (Figure 110) to have AND logic applied to a triggered Event
AND Sensors	
Available Sensors	Select from any configured sensors to have AND logic applied to a triggered sensor alert. No other sensor configuration necessary.
Smart Alert Configuration	
Logical Function	Logical function to be applied to the output of the logical status of the OR and AND lists to determine when a Smart Alert should be generated. Options include OR, AND, XOR, NOR and NAND
Delay	The amount of time the Smart Alert Event status must be in an alert condition before a Smart Alert message is triggered. This provides some protection against false alarms. The Delay value can be set for 0-999 seconds or minutes.
Return Delay	The amount of time the Smart Alert Event status must have returned to normal condition before a Smart Alert message is cleared. The Delay value can be set for 0-999 seconds or minutes.
Group Settings	
Group#xx	Assign the Smart Alert to any group 1 -8 (see also page 44)



⊟ Smart Alert Notifications

Notify Again Time	4 Hr ▾ Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this sensor returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this Smart Alert via syslog
Enable SNMP Traps	□ Send alerts for this Smart Alert via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this Smart Alert via e-mail
E-mail Subject	Smart Alert #1 High Temps Subject of e-mails sent for alerts
Select IP Camera	Bench Camera ▾ Select IP camera for image capture on alert
Attach IP camera capture to e-mail	□ Attach captured image from selected IP camera to alert e-mail
Save image to USB	□ Save captured image from selected IP camera to USB Flash
Enable SMS Alerts	□ Send alerts for this Smart Alert via sms
Enable Siren	□ Turn on the siren when Smart Alert is triggered
Enable Beacon	□ Turn on the beacon when Smart Alert is triggered

Figure 116- Smart Alert configuration- continued



⊟ Smart Alert Command

Associated Output Relay: None ▾
Which Output Relay should be associated with this smart alert

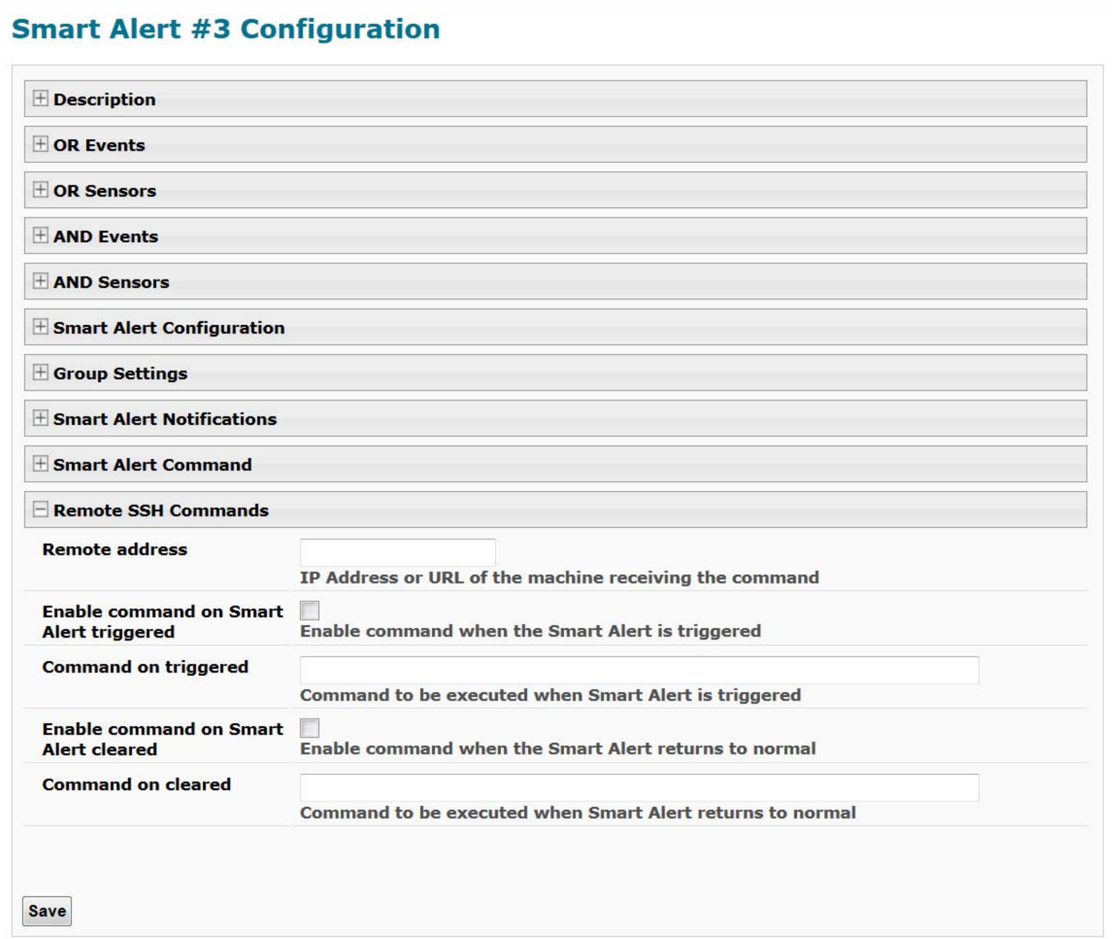
Output Relay status on alert: Inactive ▾
On alert, set the Output Relay state to this

Output Relay status on return from alert: Inactive ▾
On return to normal, set the Output Relay state to this

⊞ Remote SSH Commands

Figure 117- Smart Alert configuration- continued

Smart Alert Notifications	
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the Smart Alert conditions have returned to the normal (non-triggered state) by selecting the "***Notify when return to normal***" box.
Auto Acknowledge	Place a checkmark in this box to have alert notifications in the summary page return to normal state automatically when Smart Alert conditions return to normal.
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received
Select IP Camera	Associate an Event with an IP camera. Select an IP camera from the drop-down box.
Attach IP Camera capture to email	An image will be captured and sent with the alert message when an alert is sent via e-mail. IP cameras that are monitored by the ENVIROMUX (page 61) will be available for this purpose. ***Note: To be able to send IP camera captures as e-mail attachments, viewer security (in your camera's configuration) needs to be disabled. Consult your IP camera manual to see if this feature is present and for instructions on how to do this.***
Save image to USB	Save the image captured by the IP camera to a connected USB Flash Drive
Enable SMS Alerts	Place a checkmark in this box to have alert notifications sent via SMS messages (requires a modem)
Enable Siren	Turn ON the siren when this event goes to alert (E-16D only)
Enable Beacon	Turn ON the beacon when this event goes to alert (E-16D only)
Smart Alert Command	
Associated Output Relay	Associate the Smart Alert with the operation of the output relay, or not ***Note: Only one sensor or Smart Alert should be associated with the Output Relay at a time. Contradicting commands from two or more sensors or Smart Alerts will result in the output relay responding to the state directed by the last command received.***
Output Relay Status on Alert	State the output relay will be in when a Smart Alert is triggered
Output Relay Status on Return from Alert	State the output relay will be in when a Smart Alert is no longer being triggered



Smart Alert #3 Configuration

Remote address
IP Address or URL of the machine receiving the command

Enable command on Smart Alert triggered □
Enable command when the Smart Alert is triggered

Command on triggered
Command to be executed when Smart Alert is triggered

Enable command on Smart Alert cleared □
Enable command when the Smart Alert returns to normal

Command on cleared
Command to be executed when Smart Alert returns to normal

Figure 118- Smart Alert Configuration- continued

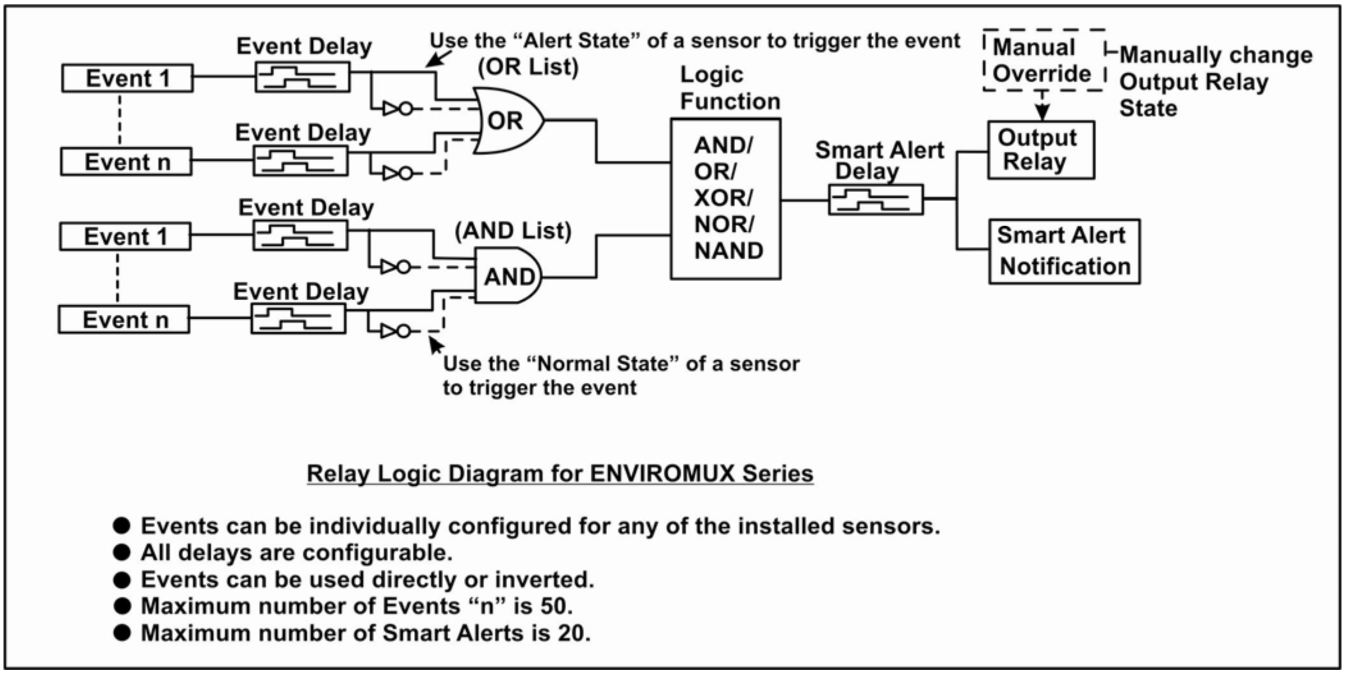
Remote SSH Commands	
Remote address	Enter the IP address or host name of the Linux or Unix computer to be sent a command via an SSH connection.
Enable command on event triggered	Place a checkmark here to send a command when this Smart Alert is triggered
Command on triggered	Enter an SSH command to be sent to the remote address when this Smart Alert is triggered (examples of commands include "**poweroff**" and "**reboot**")
Enable command on event cleared	Place a checkmark in this box to send a command when this Smart Alert returns to normal
Command on cleared	Enter an SSH command to be sent to the remote address when this Smart Alert returns to normal

After all options are selected, click the "**Save**" button. This Event will now be added to the Events page (Figure 110). Up to 50 events can be defined. Events can be configured to trigger alerts by themselves, and/or be used in combination with other events to trigger Smart Alerts.

The Unix or Linux machine to receive the commands must be configured to receive them before these commands will work. See "**More on SSH Commands**" on page 102 for instruction to setup the Unix or Linux machine.

More on Logical Functions

Using Logical Functions, you can select how to use or not use the reported state of an Event. You can combine the information from multiple Events to achieve an end result.



Relay Logic Diagram for ENVIROMUX Series

- Events can be individually configured for any of the installed sensors.
- All delays are configurable.
- Events can be used directly or inverted.
- Maximum number of Events "n" is 50.
- Maximum number of Smart Alerts is 20.

Figure 119- Event Logical Function Diagram

Smart Alert Rules:

- Any configured Event can be applied to either the OR Events list or the AND Events list, or both lists.
- Events can be configured to be triggered by a sensor or monitored device in alert state or in normal state.
- Each list will generate an output value, the value to either send an alert (1), or not (0).
  - If **any** Event in the OR list is triggered, the output value of the OR list will be 1.
  - **All** Events in the AND list must be triggered for the output value of the AND list to be 1.

The Logical Function combines the two values to determine if a Smart Alert should be sent, as detailed in the table below:

OR List	AND List	Logical Function	Smart Alert Generated
0	0	OR	No
1	0		Yes
0	1		Yes
1	1		Yes
0	0	XOR	No
1	0		Yes
0	1		Yes
1	1		No
0	0	AND	No
1	0		No
0	1		No
1	1		Yes

OR List	AND List	Logical Function	Smart Alert Generated
0	0	NOR	Yes
1	0		No
0	1		No
1	1		No
0	0	NAND	Yes
1	0		Yes
0	1		Yes
1	1		No

Example: If the OR list value is at 0, and AND list value is at 0, when the Logical Function is set to OR a Smart Alert will NOT be generated.

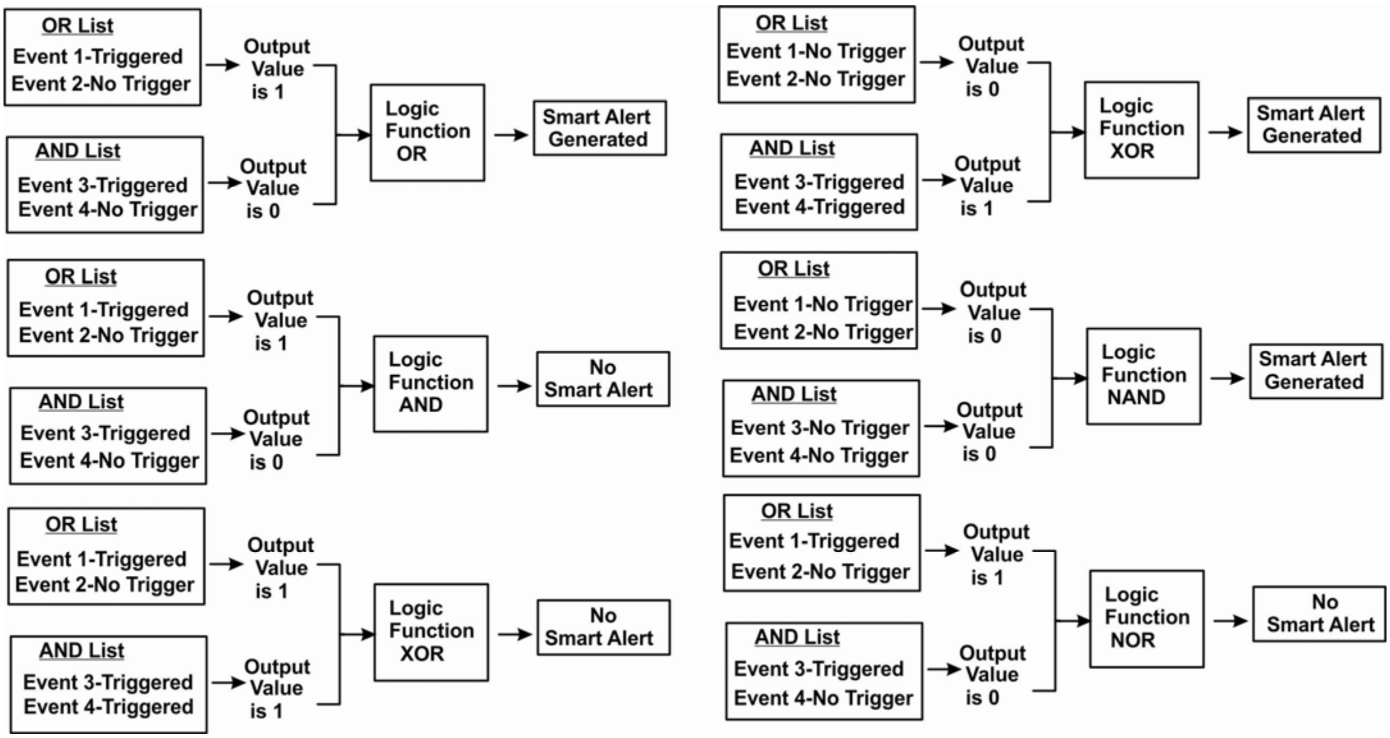
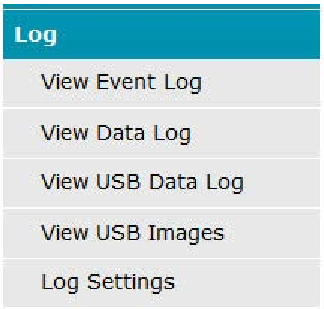


Figure 120- Examples of Smart Alert conditions

LOG

From the Log section there are three sub sections for configuring the ENVIROMUX:

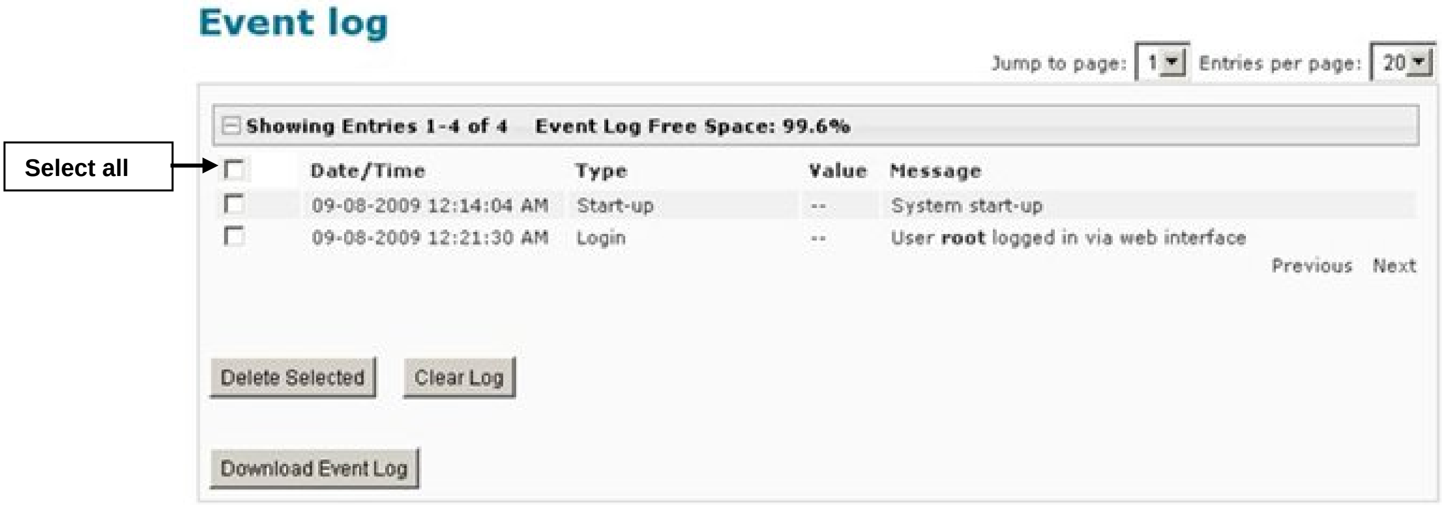


View Event Log	View a log listing the date and time of events such as startups, shut downs, user logins
View Data Log	View data readings from sensors and IP addresses
View USB Data Log	View data readings that have been saved to a connected USB flash drive- Up to 1000 files will be displayed.
View USB Images	View images that have been saved on a connected USB flash drive- A list of up to 1000 jpg images will be displayed
Log Settings	Configure how the logs are sent to users, how they handle reaching capacity, which users will be notified that it has reached capacity, and how they will be notified

View Event Log

The Event Log provides the administrative user with a listing of many events that occur within the ENVIROMUX. The event log will record the date and time of:

- each ENVIROMUX startup,
- each user login and logout time,
- any time an unknown user tries to login,
- sensor and IP device alerts
- an alert handled by a user



Showing Entries 1-4 of 4 Event Log Free Space: 99.6%

□	Date/Time	Type	Value	Message
□	09-08-2009 12:14:04 AM	Start-up	--	System start-up
□	09-08-2009 12:21:30 AM	Login	--	User **root** logged in via web interface

Figure 121- Event Log page

From the Event Log page the administrative user can view the logs, select specific logs to be deleted or press **Clear Log** to delete them all. The number of entries per page can be changed for the user's reading preference. Navigating between pages is as easy as clicking **Previous** or **Next** buttons, or jumping to a specific page if you know where the log entry you are interested in is listed.

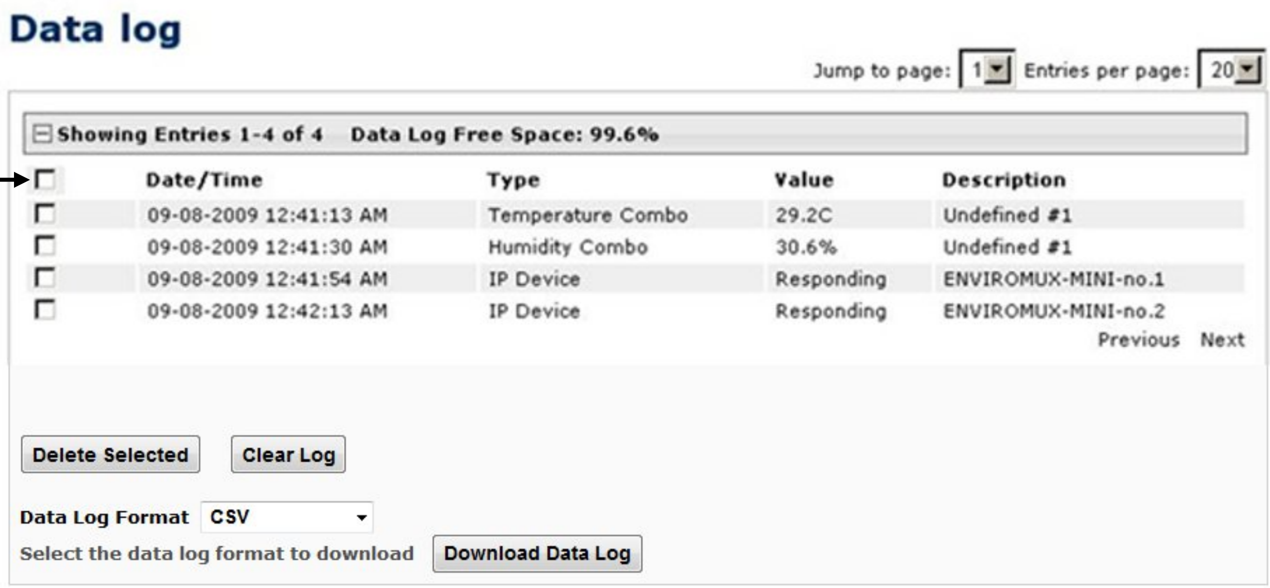
To clear only specific log entries, place a checkmark in each line item to be deleted, and press **Delete Selected**. To select all entries at once, place a checkmark in the uppermost box. Before deleting, the user may want to save the log for future reference and to make space for more logs by downloading the event log to a file on a PC. Press **Download Event Log** to save the log file before clearing it.

Example of an Event Log Message:

TIME: 07-27-2012 02:15:44 AM
ENTERPRISE: E-16D Unit 1
LOCATION: Engineering
BRANCH: RACK: CONTACT: NTI
DESCRIPTION: Temperature 1
CONNECTOR: 1
TYPE: Temperature
MESSAGE: Sensor value crossed over non-critical thresholds
VALUE: 85.0F

View Data Log

The Data Log provides the administrative user with a listing of all the readings taken by the ENVIROMUX pertaining to the sensors and IP Devices being monitored. The event log will record the date and time of each reading.



Select all

Data log

Jump to page: 1 Entries per page: 20

Showing Entries 1-4 of 4 Data Log Free Space: 99.6%

☐	Date/Time	Type	Value	Description
☐	09-08-2009 12:41:13 AM	Temperature Combo	29.2C	Undefined #1
☐	09-08-2009 12:41:30 AM	Humidity Combo	30.6%	Undefined #1
☐	09-08-2009 12:41:54 AM	IP Device	Responding	ENVIROMUX-MINI-no.1
☐	09-08-2009 12:42:13 AM	IP Device	Responding	ENVIROMUX-MINI-no.2

Previous Next

Delete Selected Clear Log

Data Log Format: CSV

Select the data log format to download Download Data Log

Figure 122- Data Log page

From the Data Log page the administrative user can view the logs, select specific logs to be deleted or press **Clear Log** to delete them all. The number of entries per page can be changed for the user's reading preference. Navigating between pages is as easy as clicking **Previous** or **Next** buttons, or jumping to a specific page if you know where the log entry you are interested in is listed.

To clear only specific log entries, place a checkmark in each line item to be deleted, and press **Delete Selected**. To select all entries at once, place a checkmark in the uppermost box. Before deleting, the user may want to save the log for future reference and to make space for more logs by downloading the event log to a file on a PC. Choose the **Data Log Format** (CSV or Tab Delimited), then press **Download Data Log** to save the log file before clearing it.

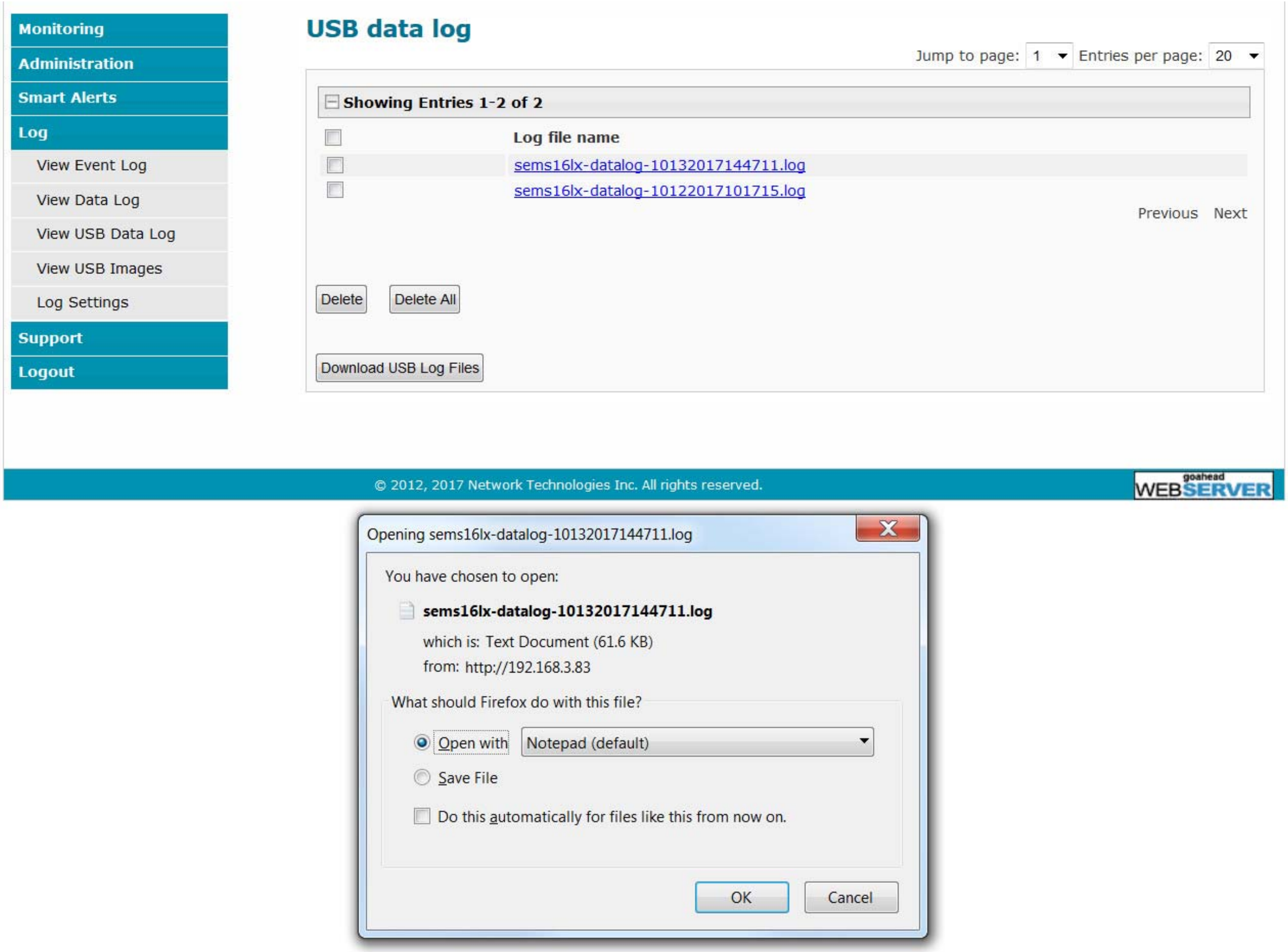
Example of a Data Log Message:

TIME: 07-27-2012 09:12:28 AM
ENTERPRISE: E-16D Unit 1
LOCATION: Engineering
BRANCH: Bldg. B

RACK: IPMI
DESCRIPTION: ACLMV 6 Main
TIME:07-27-2012 09:12:28 AM
TYPE: ACLM-V AC Voltage 1
VALUE:115.5V

View USB Data Log

If any Data Logs have been saved to the USB flash drive connected to a USB port on the ENVIROMUX, a list of those logs can be viewed and opened for review.



USB data log

Jump to page: 1 Entries per page: 20

⊟ Showing Entries 1-2 of 2

□	Log file name
□	sems16lx-datalog-10132017144711.log
□	sems16lx-datalog-10122017101715.log

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Opening sems16lx-datalog-10132017144711.log

You have chosen to open:

sems16lx-datalog-10132017144711.log

which is: Text Document (61.6 KB)

from: http://192.168.3.83

What should Firefox do with this file?

● Open with Notepad (default)

○ Save File

□ Do this automatically for files like this from now on.

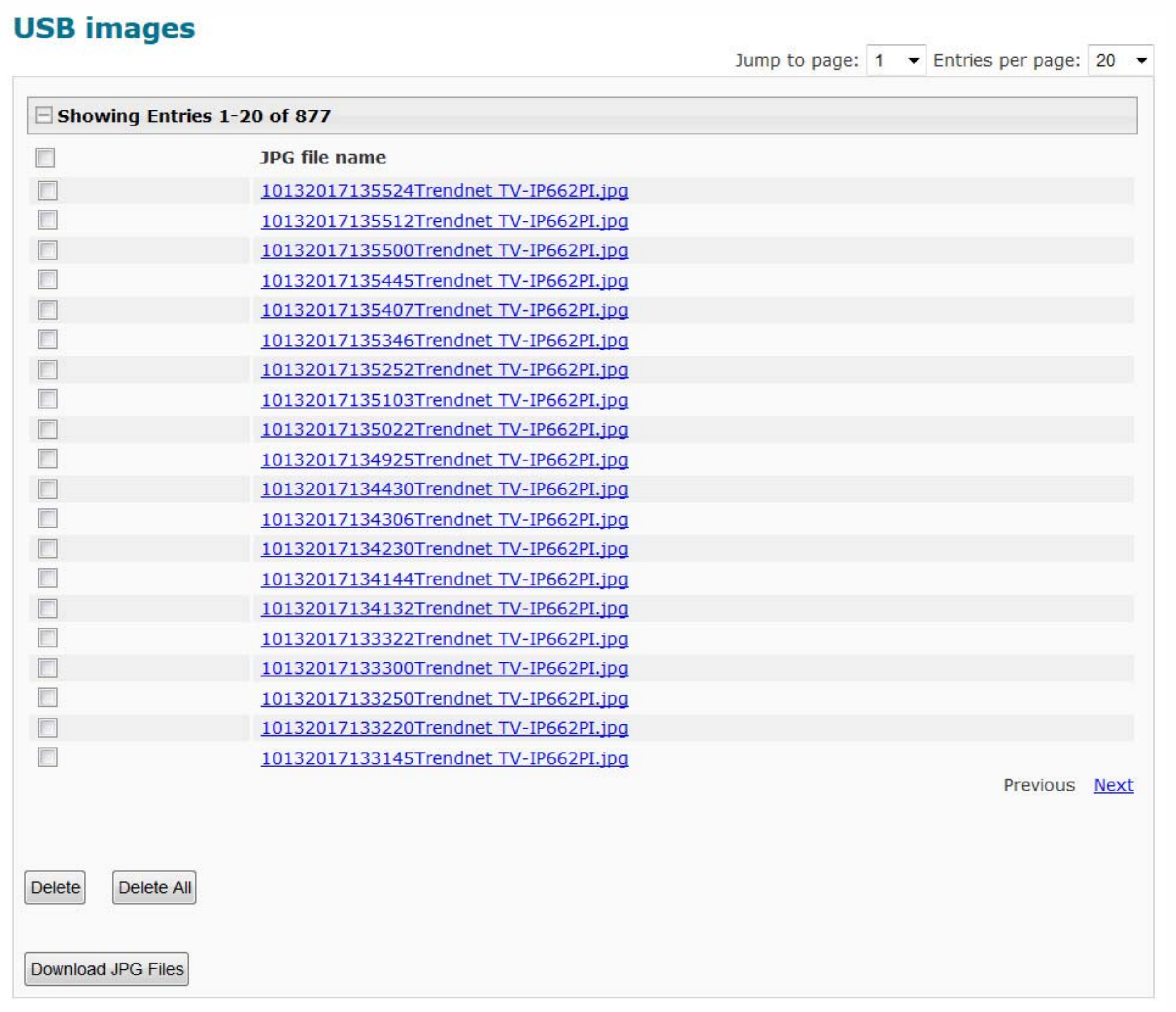
Figure 123- View Saved USB Data Log

View USB Images

If any IP camera images have been saved to the USB flash drive connected to the ENVIROMUX, a list of those images, up to 20 at a time, will be displayed.   Click on an image to view it.

To delete specific images from the flash drive, place a checkmark in the box on the left side and click “Delete Selected”,   or, to erase them all select “Delete All”.

To open more than one image sequentially or download them as a group,   place a checkmark in several images and select “Download JPG Images”.   You will be prompted to either open the images or download them to your PC.



USB images

Jump to page: 1 Entries per page: 20

Showing Entries 1-20 of 877

□	JPG file name
□	10132017135524Trendnet TV-IP662PI.jpg
□	10132017135512Trendnet TV-IP662PI.jpg
□	10132017135500Trendnet TV-IP662PI.jpg
□	10132017135445Trendnet TV-IP662PI.jpg
□	10132017135407Trendnet TV-IP662PI.jpg
□	10132017135346Trendnet TV-IP662PI.jpg
□	10132017135252Trendnet TV-IP662PI.jpg
□	10132017135103Trendnet TV-IP662PI.jpg
□	10132017135022Trendnet TV-IP662PI.jpg
□	10132017134925Trendnet TV-IP662PI.jpg
□	10132017134430Trendnet TV-IP662PI.jpg
□	10132017134306Trendnet TV-IP662PI.jpg
□	10132017134230Trendnet TV-IP662PI.jpg
□	10132017134144Trendnet TV-IP662PI.jpg
□	10132017134132Trendnet TV-IP662PI.jpg
□	10132017133322Trendnet TV-IP662PI.jpg
□	10132017133300Trendnet TV-IP662PI.jpg
□	10132017133250Trendnet TV-IP662PI.jpg
□	10132017133220Trendnet TV-IP662PI.jpg
□	10132017133145Trendnet TV-IP662PI.jpg

Figure 124- View Images saved on USB Flash Drive

Log Settings

The Log Settings page (Figure 125) provides settings for how the ENVIROMUX will react when its Data and Event logs reach capacity.

The Event Log settings include a Logging Level that can be configured to log different amounts of information:

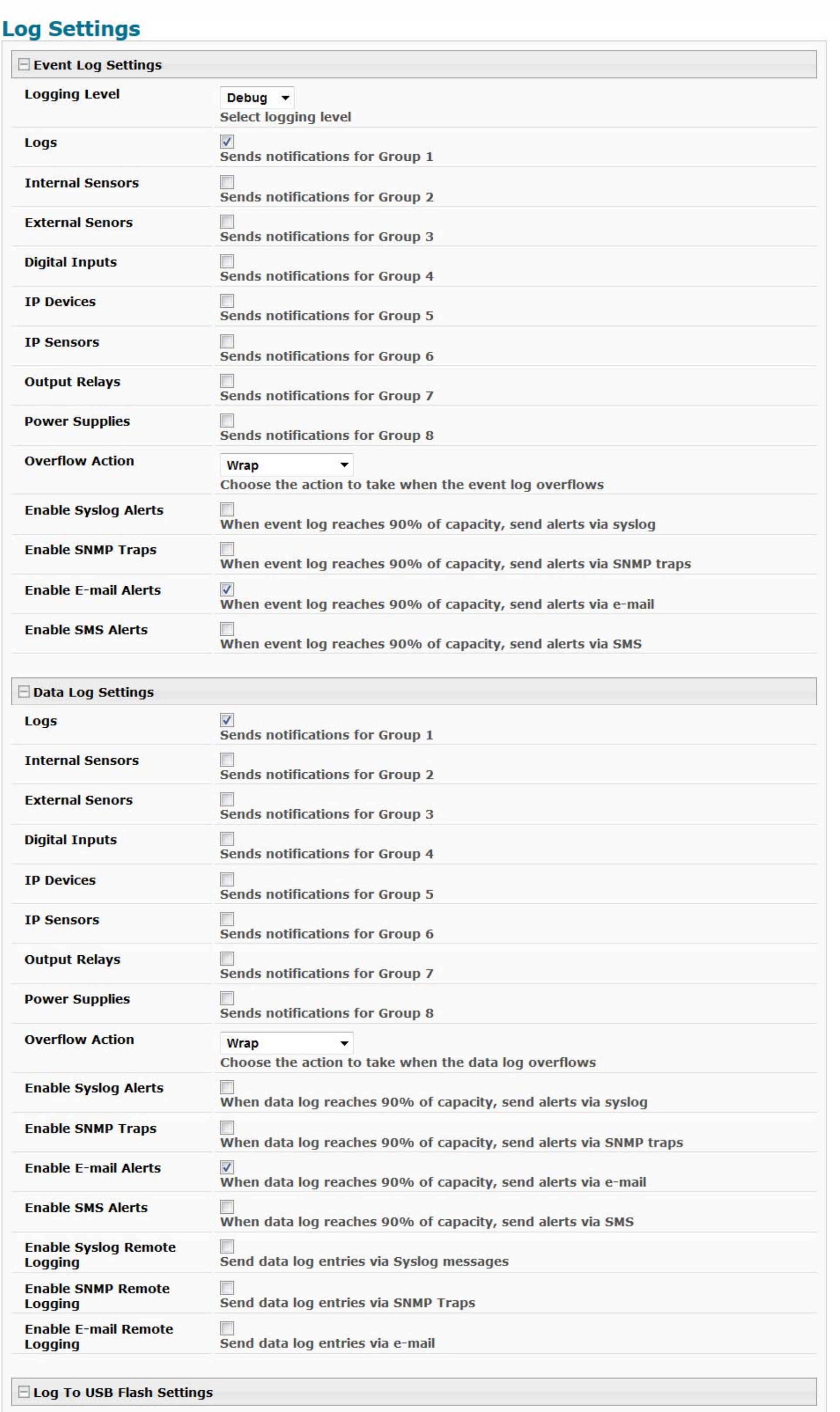
- Error : shows only system errors (like sending e-mail failures or SMS)
- Alert: shows recorded system errors and alert messages
- Info: In addition to all of the above, the log will show less relevant information: user login/logout for example
- Debug: shows more frequent and detailed errors however the log will fill up much more rapidly

Log can be assigned to multiple groups and any user that receives messages from those groups can be notified when capacity is being reached.   The log can be set to either:

- Discontinue- stop logging information
- Clear and restart- delete all log entries and restart with new entries
- Wrap- continue logging but delete the oldest entries so new ones can be recorded

The Data and/or Event log can be set to send alerts to users via email, syslog, SMS and/or SNMP traps once it has reached 90% of capacity, allowing them time to react.

The Data log can also be set to send log entries via email, syslog, SMS and/or SNMP traps to users in addition to the entries it records internally. Enable Remote Logging for email, syslog, or SNMP as desired.



Log Settings

⊟ Event Log Settings

Logging Level	Debug ▾ Select logging level
Logs	☑ Sends notifications for Group 1
Internal Sensors	□ Sends notifications for Group 2
External Senors	□ Sends notifications for Group 3
Digital Inputs	□ Sends notifications for Group 4
IP Devices	□ Sends notifications for Group 5
IP Sensors	□ Sends notifications for Group 6
Output Relays	□ Sends notifications for Group 7
Power Supplies	□ Sends notifications for Group 8
Overflow Action	Wrap ▾ Choose the action to take when the event log overflows
Enable Syslog Alerts	□ When event log reaches 90% of capacity, send alerts via syslog
Enable SNMP Traps	□ When event log reaches 90% of capacity, send alerts via SNMP traps
Enable E-mail Alerts	☑ When event log reaches 90% of capacity, send alerts via e-mail
Enable SMS Alerts	□ When event log reaches 90% of capacity, send alerts via SMS

⊟ Data Log Settings

Logs	☑ Sends notifications for Group 1
Internal Sensors	□ Sends notifications for Group 2
External Senors	□ Sends notifications for Group 3
Digital Inputs	□ Sends notifications for Group 4
IP Devices	□ Sends notifications for Group 5
IP Sensors	□ Sends notifications for Group 6
Output Relays	□ Sends notifications for Group 7
Power Supplies	□ Sends notifications for Group 8
Overflow Action	Wrap ▾ Choose the action to take when the data log overflows
Enable Syslog Alerts	□ When data log reaches 90% of capacity, send alerts via syslog
Enable SNMP Traps	□ When data log reaches 90% of capacity, send alerts via SNMP traps
Enable E-mail Alerts	☑ When data log reaches 90% of capacity, send alerts via e-mail
Enable SMS Alerts	□ When data log reaches 90% of capacity, send alerts via SMS
Enable Syslog Remote Logging	□ Send data log entries via Syslog messages
Enable SNMP Remote Logging	□ Send data log entries via SNMP Traps
Enable E-mail Remote Logging	□ Send data log entries via e-mail

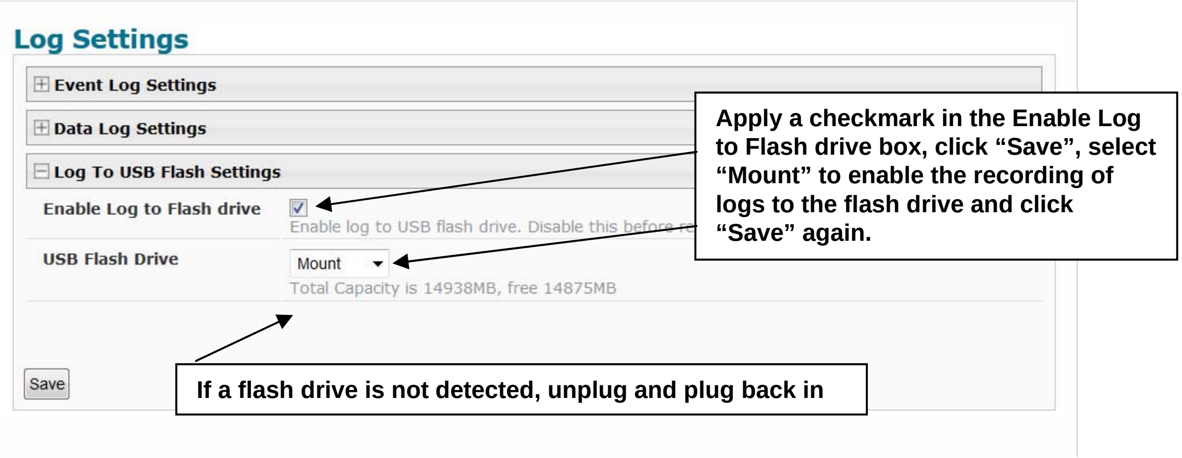
⊟ Log To USB Flash Settings

Figure 125- Log Settings page

Log to USB Flash Settings

Event and Data log messages are automatically sent to users as configured above in addition to being recorded in the logs. The logs can also be downloaded as a tab-delimited plain text file. If a USB flash drive is present (it doesn't matter which of the 4 ports it is plugged-into), logs will also be recorded on the flash drive to make them portable provided the feature is enabled.

The number of logs that can be recorded depends on the capacity of the flash drive installed. To begin recording to the flash drive, first connect a flash drive to an available USB port on the ENVIROMUX. Then change "Unmount" to "Mount" and click "Save". Then place a checkmark in the "Enable Log to Flash drive" box and click "Save" again.



Log Settings

⊞ Event Log Settings

⊞ Data Log Settings

⊟ Log To USB Flash Settings

Enable Log to Flash drive ☑ Enable log to USB flash drive. Disable this before re

USB Flash Drive: Mount

Total Capacity is 14938MB, free 14875MB

Save

Apply a checkmark in the Enable Log to Flash drive box, click "Save", select "Mount" to enable the recording of logs to the flash drive and click "Save" again.

If a flash drive is not detected, unplug and plug back in

Figure 126- Mount a USB Flash Drive

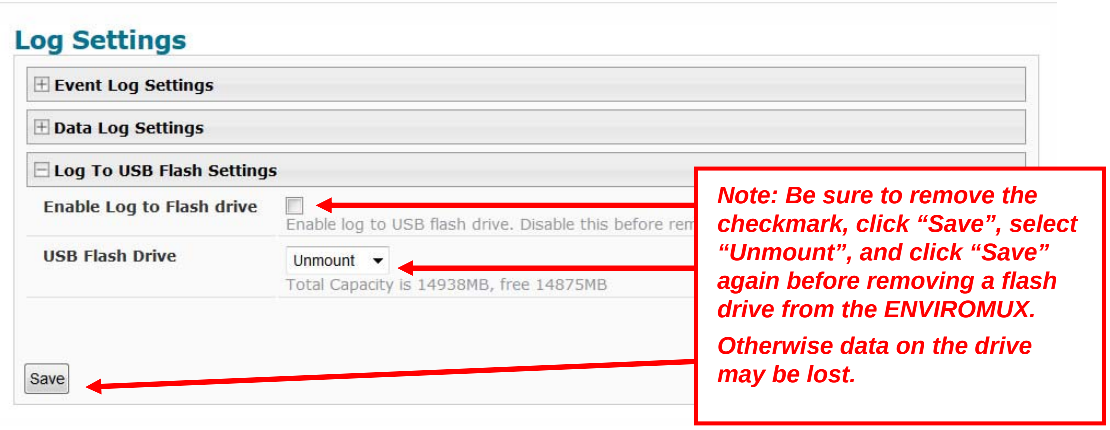
Note: Only 1 flash drive can be connected to the ENVIROMUX at a time.

Note: If the "Overflow Action" under Data Log Settings is set to "Discontinue Log", then logging to the flash drive will also be stopped when the data log has reached capacity.

Note: The file system of the flash drive must be formatted FAT32 (not NTFS). Make sure there is plenty of space on it.

<u>To remove a flash drive from the ENVIROMUX</u>,

1. Uncheck "Enable Log to Flash drive" and click "Save",
2. Change "Mount" to "Unmount".
3. Click "Save" again. Now it is safe to remove the flash drive.



Log Settings

⊞ Event Log Settings

⊞ Data Log Settings

⊟ Log To USB Flash Settings

Enable Log to Flash drive ☐ Enable log to USB flash drive. Disable this before rem

USB Flash Drive: Unmount

Total Capacity is 14938MB, free 14875MB

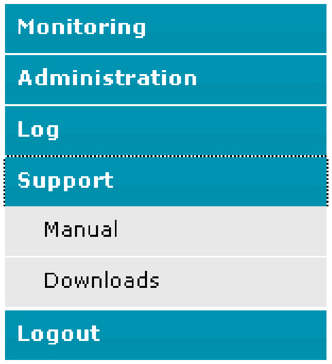
Save

Note: Be sure to remove the checkmark, click "Save", select "Unmount", and click "Save" again before removing a flash drive from the ENVIROMUX.

Otherwise data on the drive may be lost.

Figure 127- Steps to unmount a flashdrive

Support



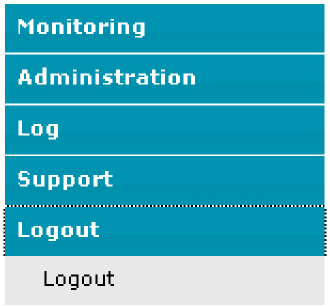
The Support section of the menu includes two links, Manual and Downloads.

The Manual link will open the pdf manual for the ENVIROMUX on the NTI website. You must have Adobe Reader installed on your PC to open this.

The Downloads link will take you to the Firmware Downloads page for the ENVIROMUX on the NTI website. All versions of firmware and MIB files for the ENVIROMUX will be found there, available for immediate download to your PC.

Figure 128- Support

Logout



To logout of the ENVIROMUX user interface, click on the "Logout" section in the menu. A gray menu label will drop down. Click on the gray label to be immediately logged out. The login screen will appear, at which you can close your browser or log back in.

Figure 129- Logout

FRONT PANEL CONTROLS AND LED INDICATORS

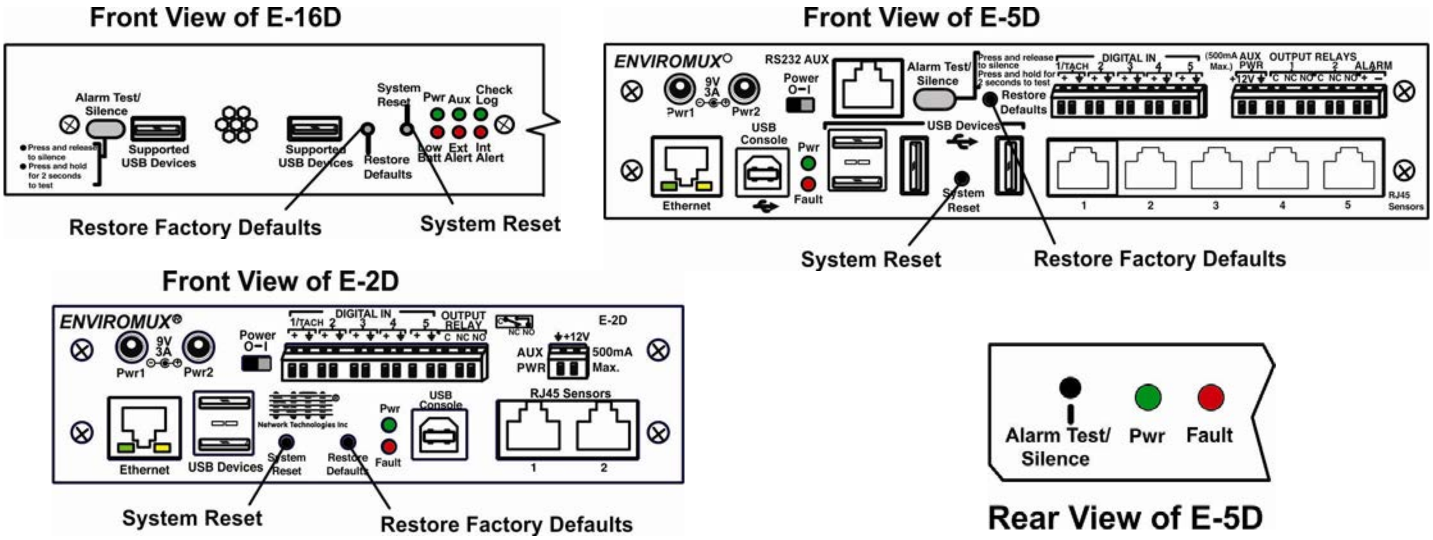


Figure 130- Front panel

Front Panel LED Status Chart

LED Label	Status	Meaning
Pwr	OFF	No Power
	Solid ON	AC Power is ON
	Blinking slowly (once /second)	AC Power has failed, Battery backup (pg. 117) is ON (The LED will not blink if the unit is powered OFF by the switch.)
	Blinking rapidly	Discovery Tool (pg. 28) is in use and communicating with the ENVIROMUX
Low Batt	OFF	Battery is OK, AC power is ON
	Solid ON	Battery is below 12V and charging (no action required)
	Blinking	Battery has been disconnected (battery is below 10.7V), requires attention, contact NTI
Check Log	OFF	No new messages in Data Log since last viewing
	ON	New message in Data Log-not an alert
Int Alert	OFF	No new alert message in Event Log re: internal sensors
	ON	New alert message in Event Log re: internal sensors
Ext Alert	OFF	No new alert message in Event Log re: external sensors
	ON	New alert message in Event Log re: external sensors
Fault	ON	A sensor has gone out of range of a configurable threshold

Note: When power is first applied to the E-2D or -5D, both the Power LED (green) and Fault LED (red) will illuminate for the first 30 seconds of the boot process. After this the fault LED will turn OFF until a sensor alarm is generated which will turn the fault LED back ON.

System Reset Button

A reset button is located on the front of the ENVIROMUX (see Figure 130). The button can be used to reboot/restart the firmware of the ENVIROMUX. Pressing this button supersedes the use of the power on/off switch and battery backup to allow the firmware to easily reboot in the event of a system lockup. To activate a reset, momentarily press the button with a pen or other small pointed object. The ENVIROMUX will reboot and be ready for login within its usual start-up time period.

Alarm Test/Silence Button

A button is provided on the front of the E-16D and E-5D (and on the rear of the E-5D) to be used to test or to silence the alarm siren when connected. To test the alarm function, press and hold the button for at least 2 seconds. The siren and beacon will "alarm" until the button is released. To silence an alarm, press and immediately release the button.

Restore Defaults Button

Another button is located on the front of the ENVIROMUX (see Figure 130). The button can be used to clear all configuration changes and restore the ENVIROMUX to default settings including the administrative password. To use this button, press it with a pen or other small pointed object and hold it for 5 seconds. The ENVIROMUX will reboot and be ready for login within its usual start-up time period. If possible, consider saving the ENVIROMUX configuration before using this button (page 64).

BATTERY BACKUP

E-16D

E-16D has a rechargeable sealed lead-acid battery backup that will prevent the monitoring system from shutting down in the event of a power failure. Should a service power failure occur, **the ENVIROMUX will continue to operate as normal for 1 hour under full load** and approximately 30 minutes after the "Low Bat" LED on the front panel (page 53) illuminates.

When the battery is not being used, it is being charged as long as line power is provided. It will take 24 hours for the battery to fully charge from a fully discharged state. While charging the "Low Batt" LED will be solid ON.

If the power is ON and the battery is fully charged, the "Low Batt" LED will be dark.

If the battery fails to charge or if the battery's output voltage drops from 12VDC to below 10.7 volts, the "Low Batt" LED will blink. The battery will automatically be disconnected from the system. If this happens, the battery must be replaced. Contact NTI to arrange for return and service.

Note: While operating on the battery backup, to shut OFF the ENVIROMUX, switch the power switch to OFF and press the System Reset button.

CAUTION

RISK OF ELECTRIC SHOCK. Do not remove cover. No user serviceable components inside. All repairs and maintenance must be performed by authorized service personnel only.

E-5DB / -2DB

E-5DB /-2DB has a rechargeable sealed lead-acid battery backup that will prevent the monitoring system from shutting down in the event of a power failure. Should a service power failure occur, **the ENVIROMUX will continue to operate as normal for 2 hours under full load.**

When the battery is not being used, it is being charged as long as line power is provided. It will take 24 hours for the battery to fully charge from a fully discharged state.

CAUTION

RISK OF ELECTRIC SHOCK. Do not remove cover. No user serviceable components inside. All repairs and maintenance must be performed by authorized service personnel only.

USB PORT

The ENVIROMUX are each equipped with USB Type A female ports on the front and rear panel for connection of a USB flash drive, a GSM modem or for receiving alert messages via SMS, or a USB LCD Monitor (page 65).

- The ports are compatible with USB 2.0 Full Speed flash drives. When enabled (page 114) and with the USB flash drive connected, the Event and Data Logs will be written to a text file on the flash drive in addition to the memory in the ENVIROMUX.
- When a modem is connected (page 17), it will automatically be sensed by the ENVIROMUX (page 68).
- When an USB LCD monitor is connected, and a selection is made as to what will be viewed on the monitor (page 65), the ENVIROMUX will automatically send video to the connected monitor.

Figure 131- USB Flash Drive/Modem/LCD Monitor port

To enable recording logs to a flash drive,

1. Connect a FAT32 formatted flash drive to an available USB port on the ENVIROMUX. Make sure there is plenty of space on it.

2. Apply a checkmark to the check box “Enable Log to Flash Drive”, click “Save”, change “Unmount” to “Mount” and click “Save” again on the Log Settings page (page 114).

While the flash drive is present, the Event and Data Logs will be written to a text file on the flash drive in addition to the memory in the ENVIROMUX.

Note: When using the USB port with a flash drive, be sure to remove the checkmark from the “Enable Log to Flash Drive”, click “Save”, change “Mount” to “Unmount” and click “Save” again in the Log Settings page (page 114) before removing the flash drive from the port. Failure to do so may result in a loss of data stored on the drive.

Note: Only 1 flash drive can be connected to the ENVIROMUX at a time. Additional drives will be ignored.

Note: The file system of the flash drive must be formatted FAT32 (not NTFS).

SERIAL CONTROL

The ENVIROMUX can be controlled serially through a text menu using one of these methods:

- a terminal program (e.g. HyperTerminal) from a PC connected to the RJ45 “RS232” port (page 15),
- a terminal program from a PC connected to the USB “Console” Port (page 15),
- Telnet protocol using an Ethernet connection (page 16),
- SSH protocol using an Ethernet connection (page 16).

Either of these methods will work to access the ENVIROMUX text menu. The text menu can be used to control most functions of the ENVIROMUX as an alternative to the Web Interface (page 29). For more on using the text menu, see the Serial Control Manual.

MOBILE SUMMARY PAGE

The user can login to the ENVIROMUX through the browser on a smart phone or similar device to view a Summary Page for the sensor status (below). To login, type the current IP address of the ENVIROMUX into the address bar of the browser (default IP address used in the example below):

```
http://192.168.1.21/
```

Note: The ENVIROMUX must have a public accessible IP address for this to work or your browsing device must connected to the same local network as the ENVIROMUX.

Note: If the HTTP Server Port number is changed (page 73) from port 80 (default), then the port number will need to be added to the IP address (i.e. if the port number is changed to 95, then the IP address would be http://192.168.1.21:95)

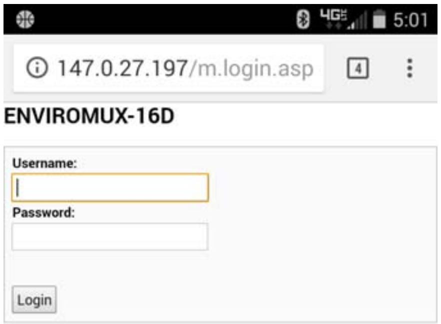
A log in prompt requiring a username and password will appear:

Username = root

Password = nti

(lower case letters only)

Note: usernames and passwords are case sensitive



5:01

147.0.27.197/m.login.asp

ENVIROMUX-16D

Username:

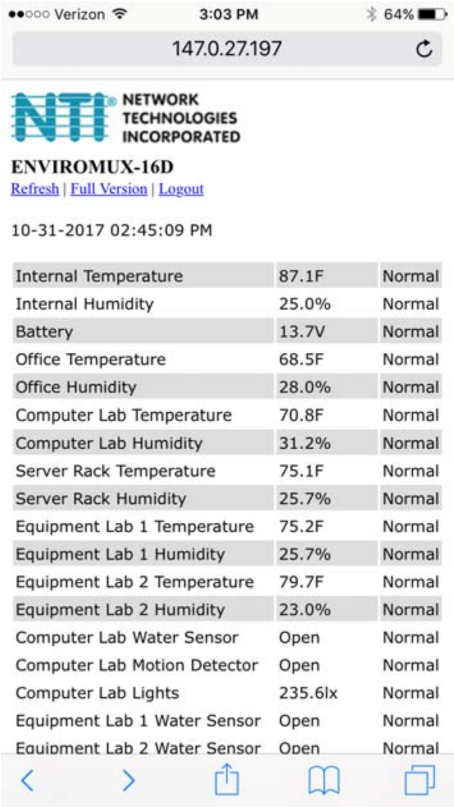
Password:

Login

Figure 132- Mobile Login page

With a successful login, a screen similar to the following will appear. This is the only information that can be accessed through the interface. Select "**Refresh**" to refresh the information on the display. Select "**Log out**" when you are finished viewing the information. For access to the complete web interface, select "**Full Version**".

Note: The display will refresh automatically every 15 seconds



Verizon 3:03 PM 64%

147.0.27.197

NTI NETWORK TECHNOLOGIES INCORPORATED

ENVIROMUX-16D

Refresh | Full Version | Logout

10-31-2017 02:45:09 PM

Internal Temperature	87.1F	Normal
Internal Humidity	25.0%	Normal
Battery	13.7V	Normal
Office Temperature	68.5F	Normal
Office Humidity	28.0%	Normal
Computer Lab Temperature	70.8F	Normal
Computer Lab Humidity	31.2%	Normal
Server Rack Temperature	75.1F	Normal
Server Rack Humidity	25.7%	Normal
Equipment Lab 1 Temperature	75.2F	Normal
Equipment Lab 1 Humidity	25.7%	Normal
Equipment Lab 2 Temperature	79.7F	Normal
Equipment Lab 2 Humidity	23.0%	Normal
Computer Lab Water Sensor	Open	Normal
Computer Lab Motion Detector	Open	Normal
Computer Lab Lights	235.6lx	Normal
Equipment Lab 1 Water Sensor	Open	Normal
Equipment Lab 2 Water Sensor	Open	Normal

Figure 133- Mobile Summary page

JSON API SUPPORT

Support has been built into the ENVIROMUX firmware to use JSON API to poll sensors using HTTP protocol like cURL command. To automate the interface between servers and the ENVIROMUX and provide data, the following instruction is provided.

Using cURL

Step 1: Get the session cookie by a HTTP POST request:

Get session cookie by sending 'username' and 'password' in POST body to endpoint '/goform/login'. We'll receive a JSON response with the 'sessionId' as a 'cookie' variable

Request:

```
curl -X POST -d "username=root&password=nti" http://192.168.3.216/goform/login
```

Response:

```
{ "success":"true", "cookie":"sessionId=cm9vdDpudGk6MTA=" }
```

Step 2: Get the sensor details using appropriate end point and by providing the session cookie in header.

Example with Endpoint of /json/get/appISens.json:

Request:

```
curl -v -H "Host: 192.168.3.216"  -H "Cookie: sessionId=cm9vdDpudGk6MTA" http://192.168.3.216/json/get/appISens.json
```

Response:

Please refer to page 117 for example of the response format.

Using HTTP browser as an example

First login to the ENVIROMUX from the web browser. Then enter any of the listed requests in the URL bar to be provided with the desired information.

Note: Command syntax is case sensitive.

List of available API endpoints:

IPADDRESS/json/get/appISens.json	- for Internal Sensors
IPADDRESS/json/get/appESens.json	- for External Sensors
IPADDRESS/json/get/appDiginp.json	- for Digital Inputs
IPADDRESS/json/get/appIpdev.json	- for IP Devices
IPADDRESS/json/get/appEvents.json	- for Events
IPADDRESS/json/get/appSmalerts.json	- for Smart Alerts
IPADDRESS/json/get/appNetwork.json	- to get Network Settings
IPADDRESS/json/get/appDevice.json	- to get Device Settings
IPADDRESS/json/get/appAll.json	- to get all of the above information in one API

The tables on the following page provide definitions for the Type and Status numbers that will be provided. See Figure 134 for an example of a json response via HTTP.

Sensor ID Definitions:

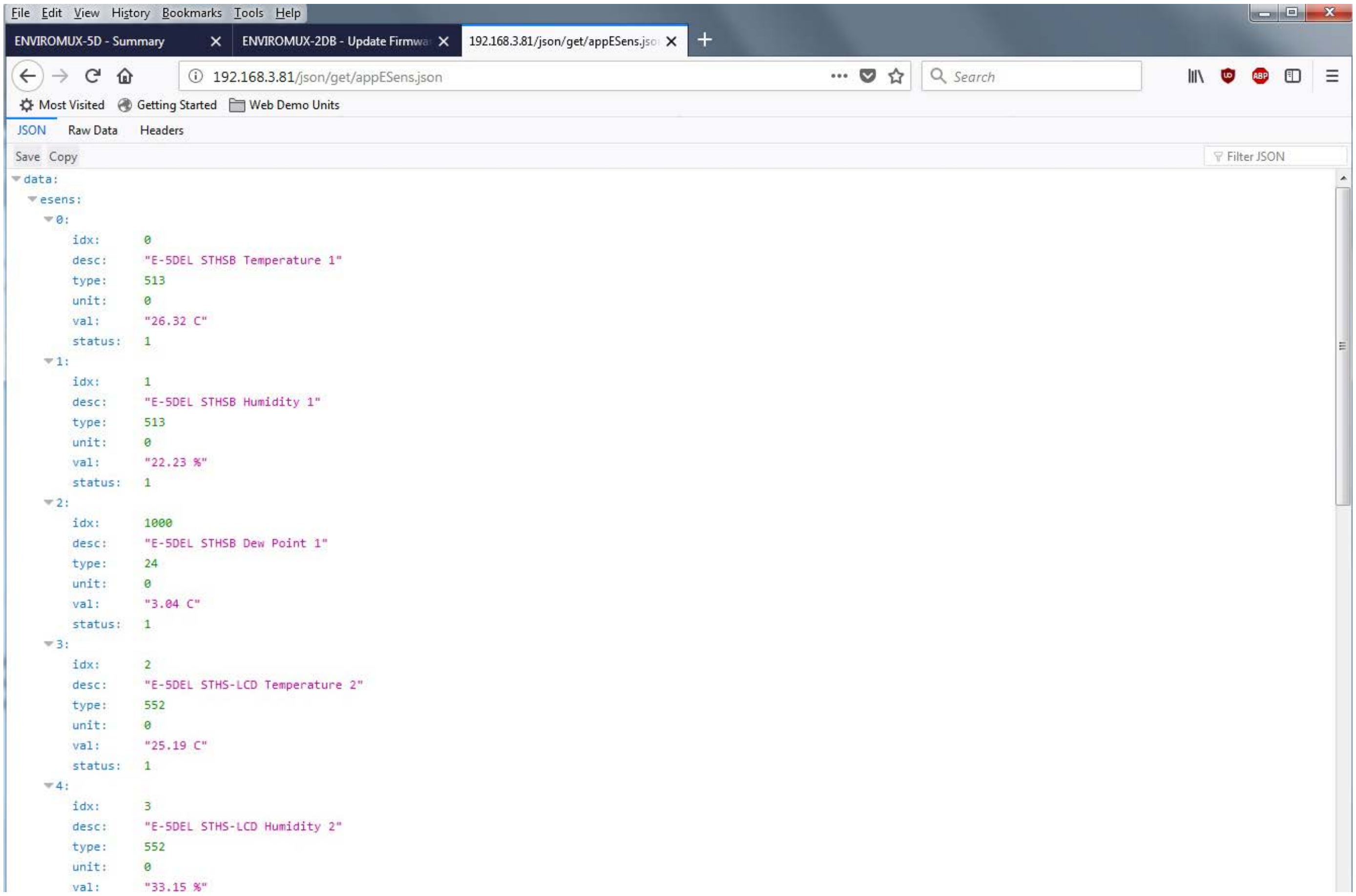
Sensor Type ID	Sensor Type	Sensor Type ID	Sensor Type	Sensor Type ID	Sensor Type
0	ID_UNDEFINED	20	ID_PING	42	ID_ACLM3_C
1	ID_TEMPERATURE	21	ID_NOT_RESPONDING	43	ID_ACLM3_W
2	ID_HUMIDITY	22	ID_LIGHT	44	ID_ACLM3_VAR
3	ID_POWER	23	ID_TEMPERATURE_EX	230	ID_POWER_SUPP
4	ID_LOW_VOLTAGE	24	ID_DEWPOINT	513	ID_TEMP_HUM
5	ID_CURRENT	25	ID_NLS	540	ID_TEMP_HUM_EX2
6	ID_ACLM_V	26	ID_TAC_DIO16	552	ID_TEMP_HUM_EX3
7	ID_ACLM_V_OF_P	27	ID_HUMIDITY_D	771	ID_POW_POW
8	ID_ACLM_P	28	ID_TEMPERATURE_EX2	1285	ID_CURR_CURR
9	ID_WATER	29	ID_TAC_DIP1	1028	ID_LOWV_LOWV
10	ID_SMOKE	30	ID_AIR_VELOCITY	1542	ID_ACLM_V_V
11	ID_VIBRATION	31	ID_DUST	1800	ID_ACLM_P_V
12	ID_MOTION	33	ID_RTD_TRANSMITTER	6913	ID_TEMP_HUM_D
13	ID_GLASS	35	ID_FREQUENCY	32769	ID_TEMP_COMBO
14	ID_DOOR	36	ID_AC_V	32796	ID_TEMP_COMBO_EX2
15	ID_KEYPAD	37	ID_AC_C	32808	ID_TEMP_COMBO_EX3
16	ID_PANIC_BUTTON	38	ID_DC_V	32770	ID_HUM_COMBO
17	ID_KEY_STATION	39	ID_DC_C	32767	ID_CUSTOM
18	ID_DRY_CONTACT	40	ID_TEMPERATURE_EX3	9767	ID_DCLM6
19	ID_DIG_INPUT	41	ID_ACLM3_V	9253	ID_ACLM3

Sensor Status ID	Sensor Status	Sensor Status ID	Sensor Status
0	STATUS_NOTCONNECTED	6	STATUS_DISCONNECTED
1	STATUS_NORMAL	7	STATUS_TAMPER_ALERT
2	STATUS_WARNING	8	STATUS_PREDIZZY
3	STATUS_ALERT	9	STATUS_DIZZY
4	STATUS_ACKNOWLEDGED	10	STATUS_IN_USE
5	STATUS_DISMISSED	11	STATUS_NOT_USED

HTTP Example:

Entered into the browser URL bar: `<IP Address>/json/get/appESens.json`

Response:


File Edit View History Bookmarks Tools Help
ENVIROMUX-5D - Summary
ENVIROMUX-2DB - Update Firmwa
192.168.3.81/json/get/appESens.jso
192.168.3.81/json/get/appESens.json
Search
Most Visited
Getting Started
Web Demo Units
JSON
Raw Data
Headers
Save
Copy
Filter JSON

```
data:
  esens:
    0:
      idx:      0
      desc:     "E-5DEL STHSB Temperature 1"
      type:     513
      unit:     0
      val:      "26.32 C"
      status:   1
    1:
      idx:      1
      desc:     "E-5DEL STHSB Humidity 1"
      type:     513
      unit:     0
      val:      "22.23 %"
      status:   1
    2:
      idx:      1000
      desc:     "E-5DEL STHSB Dew Point 1"
      type:     24
      unit:     0
      val:      "3.04 C"
      status:   1
    3:
      idx:      2
      desc:     "E-5DEL STHS-LCD Temperature 2"
      type:     552
      unit:     0
      val:      "25.19 C"
      status:   1
    4:
      idx:      3
      desc:     "E-5DEL STHS-LCD Humidity 2"
      type:     552
      unit:     0
      val:      "33.15 %"
```

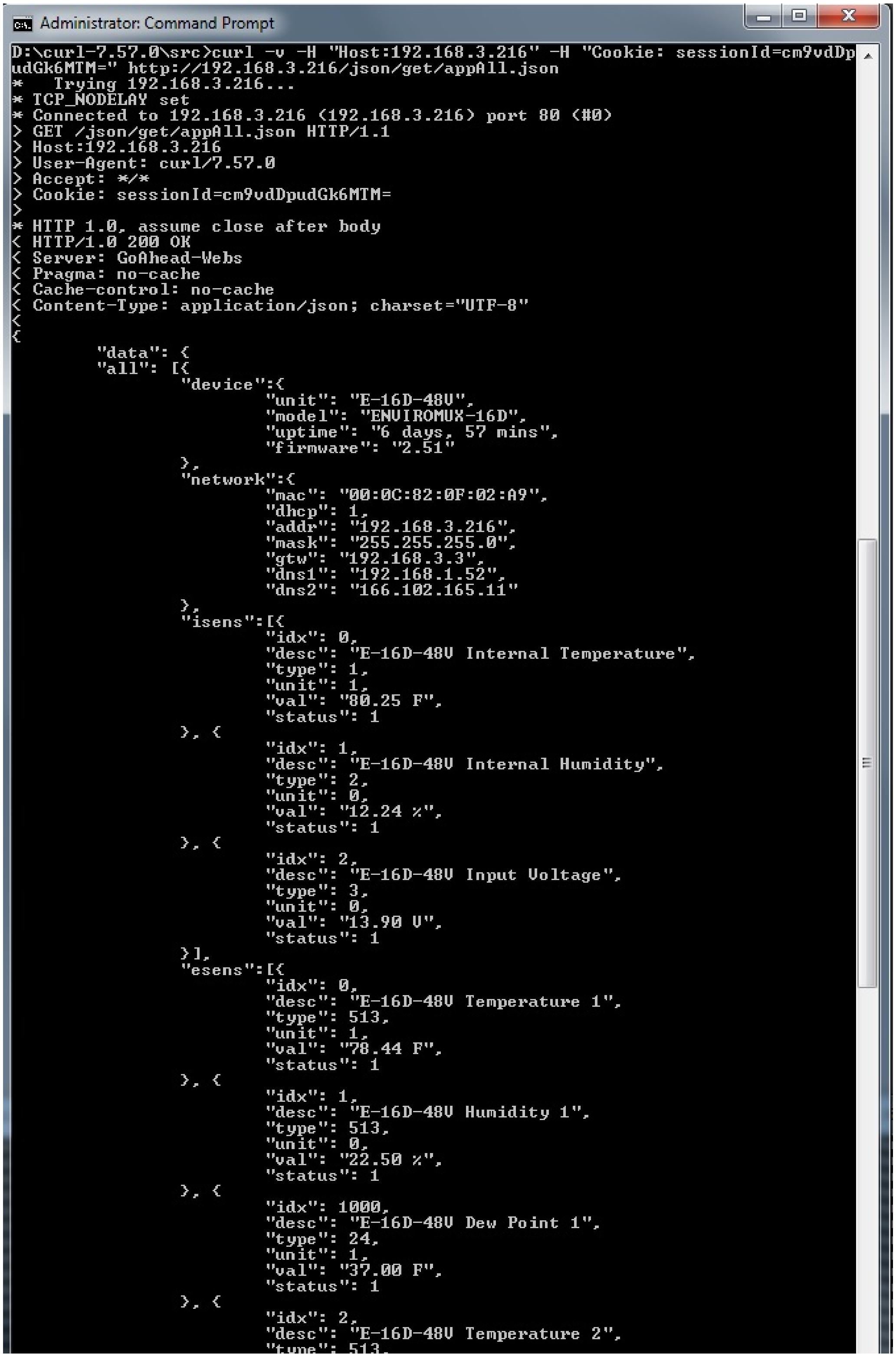
Figure 134- Example JSON Response for External Sensors shown on browser

cURL Example:

Entered at the command line after getting sessionId:

```
curl -v -H "Host: 192.168.3.216"  -H "Cookie: sessionId=cm9vdDpudGk6MTM"
http://192.168.3.216/json/get/appAll.json
```

Response:



```
D:\curl-7.57.0\src>curl -v -H "Host:192.168.3.216" -H "Cookie: sessionId=cm9vdDp
udGk6MTM=" http://192.168.3.216/json/get/appAll.json
*   Trying 192.168.3.216...
* TCP_NODELAY set
* Connected to 192.168.3.216 (192.168.3.216) port 80 (#0)
> GET /json/get/appAll.json HTTP/1.1
> Host:192.168.3.216
> User-Agent: curl/7.57.0
> Accept: */*
> Cookie: sessionId=cm9vdDpudGk6MTM=
>
* HTTP 1.0, assume close after body
< HTTP/1.0 200 OK
< Server: GoAhead-Webs
< Pragma: no-cache
< Cache-control: no-cache
< Content-Type: application/json; charset="UTF-8"
<
{
        "data": {
        "all": [{
                "device":{
                        "unit": "E-16D-48V",
                        "model": "ENVIROMUX-16D",
                        "uptime": "6 days, 57 mins",
                        "firmware": "2.51"
                },
                "network":{
                        "mac": "00:0C:82:0F:02:A9",
                        "dhcp": 1,
                        "addr": "192.168.3.216",
                        "mask": "255.255.255.0",
                        "gtw": "192.168.3.3",
                        "dns1": "192.168.1.52",
                        "dns2": "166.102.165.11"
                },
                "isens":[{
                        "idx": 0,
                        "desc": "E-16D-48V Internal Temperature",
                        "type": 1,
                        "unit": 1,
                        "val": "80.25 F",
                        "status": 1
                }, {
                        "idx": 1,
                        "desc": "E-16D-48V Internal Humidity",
                        "type": 2,
                        "unit": 0,
                        "val": "12.24 %",
                        "status": 1
                }, {
                        "idx": 2,
                        "desc": "E-16D-48V Input Voltage",
                        "type": 3,
                        "unit": 0,
                        "val": "13.90 V",
                        "status": 1
                }],
                "esens":[{
                        "idx": 0,
                        "desc": "E-16D-48V Temperature 1",
                        "type": 513,
                        "unit": 1,
                        "val": "78.44 F",
                        "status": 1
                }, {
                        "idx": 1,
                        "desc": "E-16D-48V Humidity 1",
                        "type": 513,
                        "unit": 0,
                        "val": "22.50 %",
                        "status": 1
                }, {
                        "idx": 1000,
                        "desc": "E-16D-48V Dew Point 1",
                        "type": 24,
                        "unit": 1,
                        "val": "37.00 F",
                        "status": 1
                }, {
                        "idx": 2,
                        "desc": "E-16D-48V Temperature 2",
                        "type": 513,
```

Figure 135- Example JSON Response for all information using cURL

MODBUS TCP/IP SUPPORT

The ENVIROMUX is equipped with Modbus TCP/IP support to enable PLC controls to read the value/state of sensors and read and command the state of relays.   Using the Modbus communication protocol devices can be programmed over TCP/IP to treat the ENVIROMUX as a Modbus slave device reacting to readings from available sensors and controlling relays as needed.

Modbus TCP Function Codes Definition

Function Code	Name	Usage
01	Read Coils	Read the state of Output Relays
02	Read Discrete Inputs	Read the state of Digital Inputs
03	Read Holding Registers	Not Available
04	Read Input Registers	Read Internal/External Sensors floating point values
05	Write Single Coil	Write data to force Output Relay Active/Inactive
06	Write Single Holding Register	Not Available
15	Write Multiple Coils	Write data to force multiple Output Relays Active/Inactive
16	Write Multiple Holding Registers	Not Available

Function Code 01 - Read the state of Output Relays

Description:

Function code 01 is used to read the status of Output Relays (Active/Inactive) of the E-xD slave device in a binary data format.

Query:

Device ID (0,1 or 255)	Function Code	Starting Address High	Starting Address Low	Quantity of coils High	Quantity of coils Low	CRC	CRC

Response:

The Relay Outputs status in response message is packed as one Relay Output per bit of data field. The first Relay Output addressed by Starting Address is the LSB. A value of “1” for a bit means that the relay is INACTIVE while “0” means relay ACTIVE.

Mapping:

Coil # (Address)	E-16D	E-5D	E-2D
0	Relay Output #1	Relay Output #1	Relay Output #1
1	Relay Output #2	Relay Output #2	N/A
2	Relay Output #3	N/A	N/A
3	Relay Output #4	N/A	N/A
4	Remote DO #1-1	Remote DO #1-1	Remote DO #1-1
...	...	...	...
19	Remote DO #1-16	Remote DO #1-16	Remote DO #1-16
20	Remote DO #2-1	Remote DO #2-1	Remote DO #2-1
…	...	...	...
35	Remote DO #2-16	Remote DO #2-16	Remote DO #2-16

Mapping (Cont'd):

Coil # (Address)	E-16D	E-5D	E-2D
…	…	…	N/A
4 + (M – 1) * 16 + N - 1	Remote DO #M-N	Remote DO #M-N	N/A
…	…	…	N/A
68	Remote DO #5-1	Remote DO #5-1	N/A
…	…	…	N/A
83	Remote DO #5-16	Remote DO #5-16	N/A
244	Remote DO #16-1	N/A	N/A
		N/A	N/A
259	Remote DO #16-16	N/A	N/A

Function Code 02 - Read the state of Digital Inputs

Description:

Function code 02 is used to read the status of Digital Inputs (Open/Closed) of the E-xD slave device in a binary data format

Query:

Device ID (0,1 or 255)	Function Code	Starting Address High	Starting Address Low	Quantity of inputs High	Quantity of inputs Low	CRC	CRC

Response:

The Relay Outputs status in response message is packed as one Digital Input per bit of data field. The LSB of the first data byte. The other inputs follow toward the high order end of this byte, and from low order to high order in subsequent bytes. If the returned input quantity is not a multiple of eight, the remaining bits in the final data byte will be padded with zeros (toward the high order end of the byte). The byte count field specifies the quantity of data.

A value of "1" for a bit means that the corresponding Digital Input is "Open", a value of "0" means it is closed.

Device ID (0,1 or 255)	Function Code	Byte Count	Data	Data	….	CRC	CRC

Mapping:

Input # (Address)	E-16D	E-5D	E-2D
0	Digital Input #1	Digital Input #1	Digital Input #1
1	Digital Input #2	Digital Input #2	Digital Input #2
2	Digital Input #3	Digital Input #3	Digital Input #3
3	Digital Input #4	Digital Input #4	Digital Input #4
4	Digital Input #5	Digital Input #5	Digital Input #5
5	Digital Input #6	N/A	N/A
6	Digital Input #7	N/A	N/A
7	Digital Input #8	N/A	N/A

Mapping (Cont'd):

Input # (Address)	E-16D	E-5D	E-2D
8	Remote DI #1.1	Remote DI #1.1	Remote DI #1.1
…	…	…	…
23	Remote DI #1.16	Remote DI # 1.16	Remote DI #1.16
24	Remote DI #2.1	Remote DI #2.1	Remote DI #2.1
…	…	…	…
39	Remote DI #2.16	Remote DI #2.16	Remote DI #2.16
…	…	…	N/A
8 + (M – 1) * 16 + N - 1	Remote DI #M.N	Remote DI #M.N	N/A
…	…	…	N/A
72	Remote DI #5.1	Remote DI #5.1	N/A
…	…	…	N/A
87	Remote DI #5.16	Remote DI #5.16	N/A
248	Remote DI #16.1	N/A	N/A
		N/A	N/A
263	Remote DI #16.16	N/A	N/A

Function Code 04 - Read Internal/External Sensors floating point values

Floating Point Format

The values of analog sensors are in floating point format. For this reason, two 16-bit registers are used to represent the value of each sensor. The format is IEEE 32-bit Floating Point Big Endian with byte-swapped (the order of bytes is 3,4,1,2)

Description:

Function code 04 is used to read the values of Internal Sensors and External Sensors. If external sensors are of a contact type, a value of 0.0 will represent a closed contact and a value of 1.0 will represent an open contact. Two consecutive 16-bit registers are used for each sensor.

Query:

Device ID (0,1 or 255)	Function Code	Starting Address High	Starting Address Low	Quantity of Inputs High	Quantity of Inputs Low	CRC	CRC

Note: because two registers are needed to represent any sensor in Input Registers, the Quantity of Inputs value should be the double of the number of sensor to read.

Response:

The sensors value in response messages are packed as IEEE 32-bit Floating Point Big Endian format and they use 4 bytes for each value. The Modbus protocol has a single byte count which represents the number of 16 bits register. Because of this, the protocol can process up to maximum 64 floating point values in a single request.

Device ID (0,1 or 255)	Function Code	Byte Count	Data	Data	….	CRC	CRC

Mapping:

Input # (Address)	E-16D	E-5D	E-2D
0	Internal Sensor #1	Internal Sensor #1	
1	Internal Sensor #2	Internal Sensor #2	N/A
2	Internal Sensor #3	N/A	N/A
3	External Sensor #1.1	External Sensor #1.1	External Sensor #1.1
4	External Sensor #1.2	External Sensor #1.2	External Sensor #1.2
5	External Sensor #2.1	External Sensor #2.1	External Sensor #2.1
6	External Sensor #2.2	External Sensor #2.2	External Sensor #2.2
7	External Sensor #3.1	External Sensor #3.1	N/A
8	External Sensor #3.2	External Sensor #3.2	N/A
9	External Sensor #4.1	External Sensor #4.1	N/A
10	External Sensor #4.2	External Sensor #4.2	N/A
11	External Sensor #5.1	External Sensor #5.1	N/A
12	External Sensor #5.2	External Sensor #5.2	N/A
13	External Sensor #6.1	N/A	N/A
14	External Sensor #6.2	N/A	N/A
…	…	N/A	N/A
3 + 2 * (M – 1) + N - 1	External Sensor #M.N	N/A	N/A
	…	N/A	N/A
33	External Sensor #16.1	N/A	N/A
34	External Sensor #16.2	N/A	N/A
35	Auxiliary Sensor #1.1	Auxiliary Sensor #1.1	Auxiliary Sensor #1.1
36	Auxiliary Sensor #1.2	Auxiliary Sensor #1.2	Auxiliary Sensor #1.2
37	Auxiliary Sensor #2.1	Auxiliary Sensor #2.1	Auxiliary Sensor #2.1
38	Auxiliary Sensor #2.2	Auxiliary Sensor #2.2	Auxiliary Sensor #2.2
39	Auxiliary Sensor #3.1	Auxiliary Sensor #3.1	N/A
40	Auxiliary Sensor #3.2	Auxiliary Sensor #3.2	N/A
41	Auxiliary Sensor #4.1	Auxiliary Sensor #4.1	N/A
42	AuxiliarySensor #4.2	Auxiliary Sensor #4.2	N/A
43	Auxiliary Sensor #5.1	Auxiliary Sensor #5.1	N/A
44	Auxiliary Sensor #5.2	Auxiliary Sensor #5.2	N/A
45	Auxiliary Sensor #6.1	N/A	N/A
46	Auxiliary Sensor #6.2	N/A	N/A
…	…	N/A	N/A
35 + 2 * (M – 1) + N - 1	Auxiliary Sensor #M.N	N/A	N/A
…	…	N/A	N/A
65	Auxiliary Sensor #16.1	N/A	N/A
66	Auxiliary Sensor #16.2		
67	Tachometer #1	Tachometer #1	Tachometer #1

Write data to force multiple Output Relays Active/Inactive

Description:

Function code 15 is used to force the status of Output Relays (Active/Inactive) of the E-xD slave device in a binary data format.

Query:

Device ID (0,1 or 255)	Function Code	Starting Address High	Starting Address Low	Quantity of coils High	Quantity of coils Low	Byte Count (N)	Data	Data	Data	CRC	CRC

N in Byte Count field is Quantity of Coils / 8 (if the remainder is different of 0, add 1).

The Relay Outputs status in data field(s) is packed as one Relay Output per bit of data field. The first Relay Output addressed by Starting Address is the LSB. A value of “1” for a bit means that the relay is INACTIVE while “0” means relay ACTIVE.

Response:

The Relay Outputs status in response message has the following format:

Function Code	Starting Address High	Starting Address Low	Quantity of Inputs High	Quantity of Inputs Low	CRC	CRC

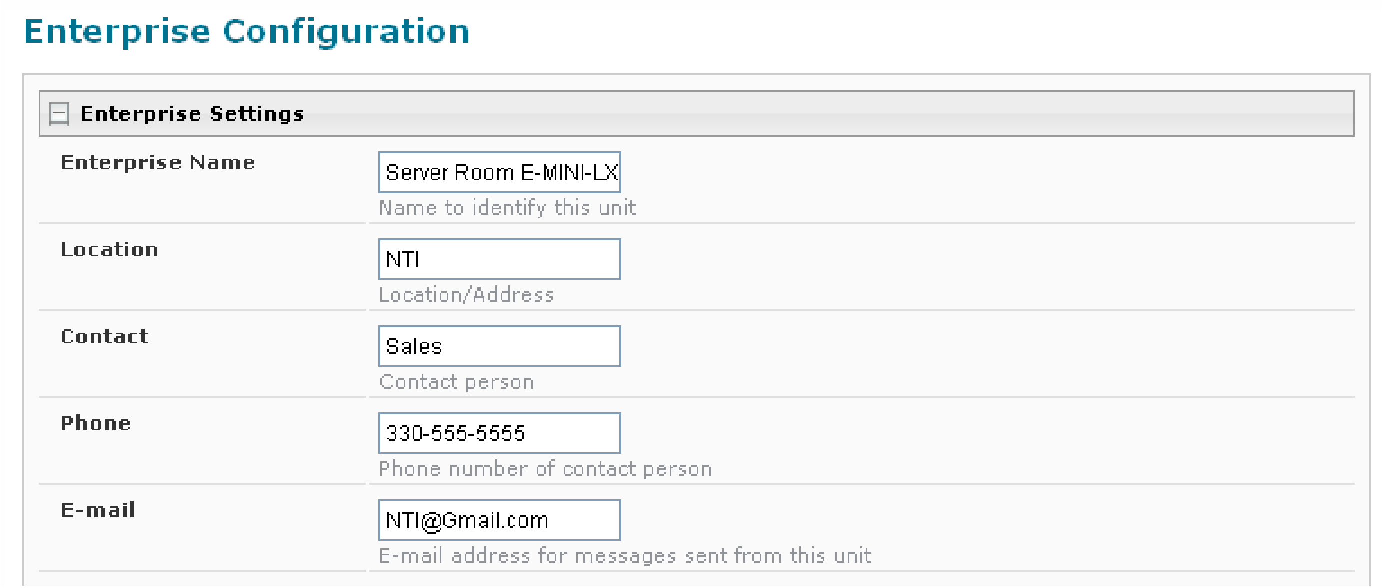
Mapping:

The mapping of output relays is the same as for Function Code 01

HOW TO SETUP EMAIL

Use this guide to assist in the configuration of the ENVIROMUX to send email messages.

1. Apply a valid email address for the ENVIROMUX to the Enterprise Setup Page (see page 68).

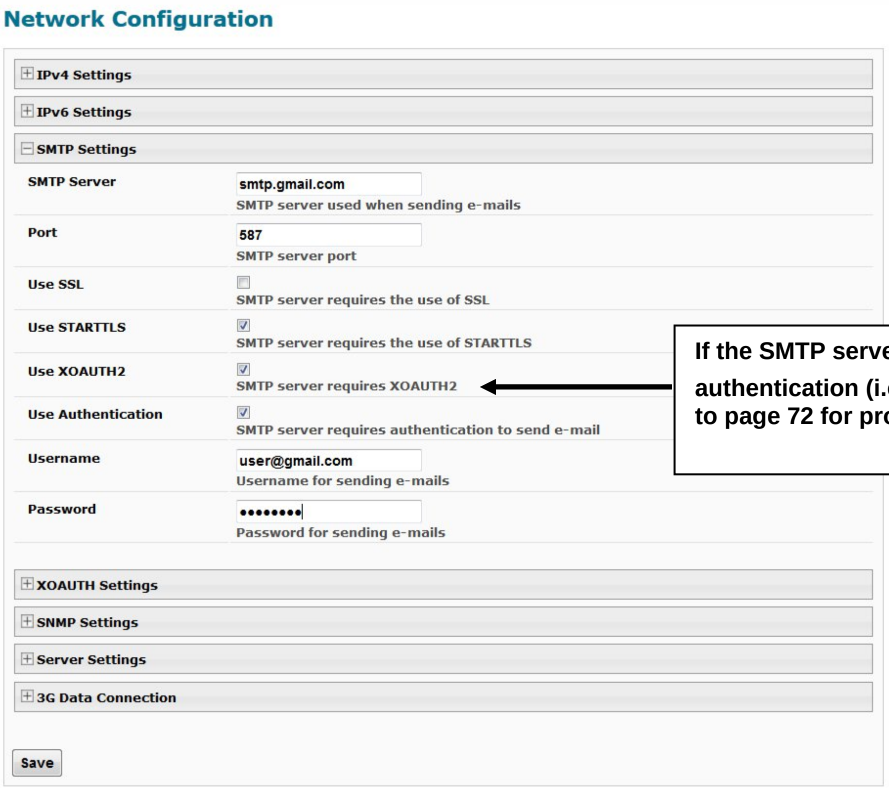


Enterprise Configuration

⊟ Enterprise Settings

Enterprise Name	Server Room E-MINI-LX Name to identify this unit
Location	NTI Location/Address
Contact	Sales Contact person
Phone	330-555-5555 Phone number of contact person
E-mail	NTI@Gmail.com E-mail address for messages sent from this unit

Note: When authentication is required (check your email server requirements) the Username and Password applied on the Network Configuration page must be for the user's email address applied in the Enterprise Setup Page. If no authentication is required, the Username and Password fields can be left empty.



Network Configuration

⊞ IPv4 Settings

⊞ IPv6 Settings

⊟ SMTP Settings

SMTP Server	smtp.gmail.com SMTP server used when sending e-mails
Port	587 SMTP server port
Use SSL	□ SMTP server requires the use of SSL
Use STARTTLS	☑ SMTP server requires the use of STARTTLS
Use XOAUTH2	☑ SMTP server requires XOAUTH2
Use Authentication	☑ SMTP server requires authentication to send e-mail
Username	user@gmail.com Username for sending e-mails
Password	•••••••• Password for sending e-mails

⊞ XOAUTH Settings

⊞ SNMP Settings

⊞ Server Settings

⊞ 3G Data Connection

If the SMTP server requires XOAUTH authentication (i.e. possibly Gmail), refer to page 72 for proper setup instruction.

Figure 136- Example of configuration for Gmail server

2. Fill in Network Page (page 71) with valid information:

A. SMTP Server - check with your service provider as to what this should be.
Sometimes it is just the name of the provider (gmail.com), sometimes characters are added (mail.gmail.com, smtp.gmail.com, smtp-mail.gmail.com, etc)

B. The default port is 25. If authentication is required, a different port number may be required. Check with your service provider.

C. Check “Use SSL” if your SMTP server requires SSL.

D. Check “Use STARTTLS” if your SMTP server requires STARTTLS.

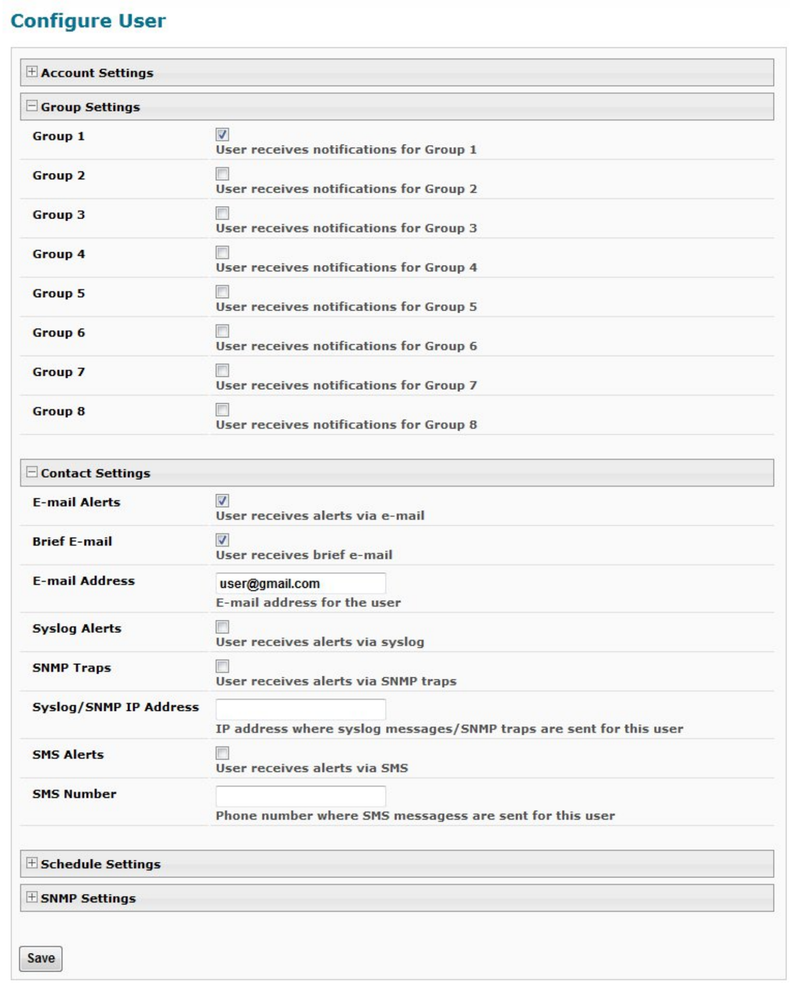
E. Check “Use Authentication” if SMTP server requires authentication to send emails.
a. If required, Enter “Username” and “Password” that has been assigned to ENVIROMUX.
Make sure they apply to the email address applied in the Enterprise Setup Page.

Example: username@gmail.com Most servers (not all, check with your service provider) use just the characters in front of the “@” for your Username on the account. These, and only these characters should be entered into the “Username” block.

Note: If the SMTP server requires XOAUTH authentication (i.e. possibly Gmail), refer to page 77 for proper setup instruction.

Note: Passwords are case sensitive. Be sure to apply the password exactly as it is required by the server.

3. Verify User is configured to receive notifications for at least one sensor group as well as having “E-Mail Alerts” selected and a valid E-Mail address to send the notifications to.



Configure User

⊞ Account Settings

⊟ Group Settings

Group 1	☑ User receives notifications for Group 1
Group 2	☐ User receives notifications for Group 2
Group 3	☐ User receives notifications for Group 3
Group 4	☐ User receives notifications for Group 4
Group 5	☐ User receives notifications for Group 5
Group 6	☐ User receives notifications for Group 6
Group 7	☐ User receives notifications for Group 7
Group 8	☐ User receives notifications for Group 8

⊟ Contact Settings

E-mail Alerts	☑ User receives alerts via e-mail
Brief E-mail	☑ User receives brief e-mail
E-mail Address	user@gmail.com E-mail address for the user
Syslog Alerts	☐ User receives alerts via syslog
SNMP Traps	☐ User receives alerts via SNMP traps
Syslog/SNMP IP Address	IP address where syslog messages/SNMP traps are sent for this user
SMS Alerts	☐ User receives alerts via SMS
SMS Number	Phone number where SMS messagess are sent for this user

⊞ Schedule Settings

⊞ SNMP Settings

Figure 137- Configure user to receive alerts via email

Email Settings to be used in conjunction with Office 365

1. Enter on the Enterprise page (page 68) the full Office 365 account e-mail address being used.

2. On the Network > SMTP settings page (page 72) enter the following settings:

- SMTP Server: smtp.office365.com
- Port: 587
- Select: STARTTLS
- Select: Use Authentication
- Username: This should be the full user account e-mail address.
  - **Note: This is case sensitive!**
- Password: This should be the user account password
  - **Note: This is also case sensitive**

This must be the same username as applied on the Enterprise Settings screen (page 113)

HOW TO SETUP SNMP

Follow these steps to prepare the ENVIROMUX to send SNMP traps to ENVIROMUX users.

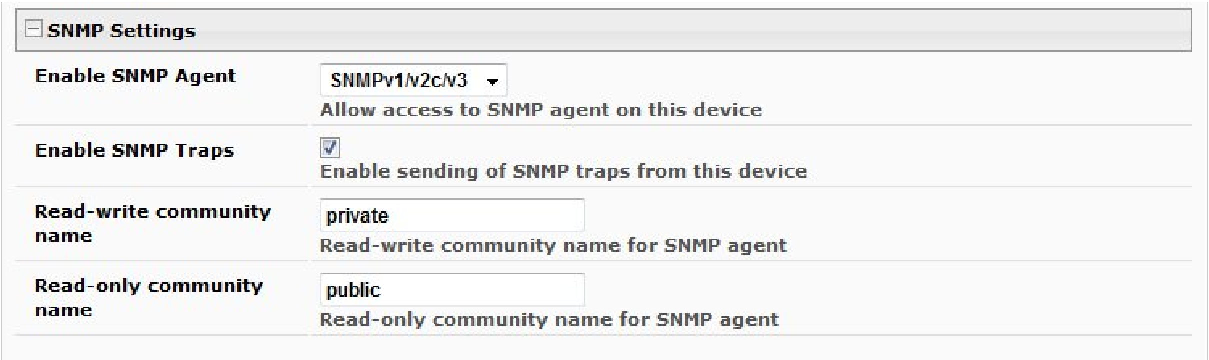
Under Network Settings:

1. Enable the proper SNMP Agent type (v1/v2c , v1/v2c/v3, or just v3) depending upon what type of SNMP browser you use.

- v1/v2c = no security required
- v1/v2c/v3 = messages with or without security
- v3= only secure messages will be sent

2. Place a checkmark in “Enable SNMP Traps”.

3. Enter names for the Read-write community and Read-only community (usually just “private” and “public” as shown).



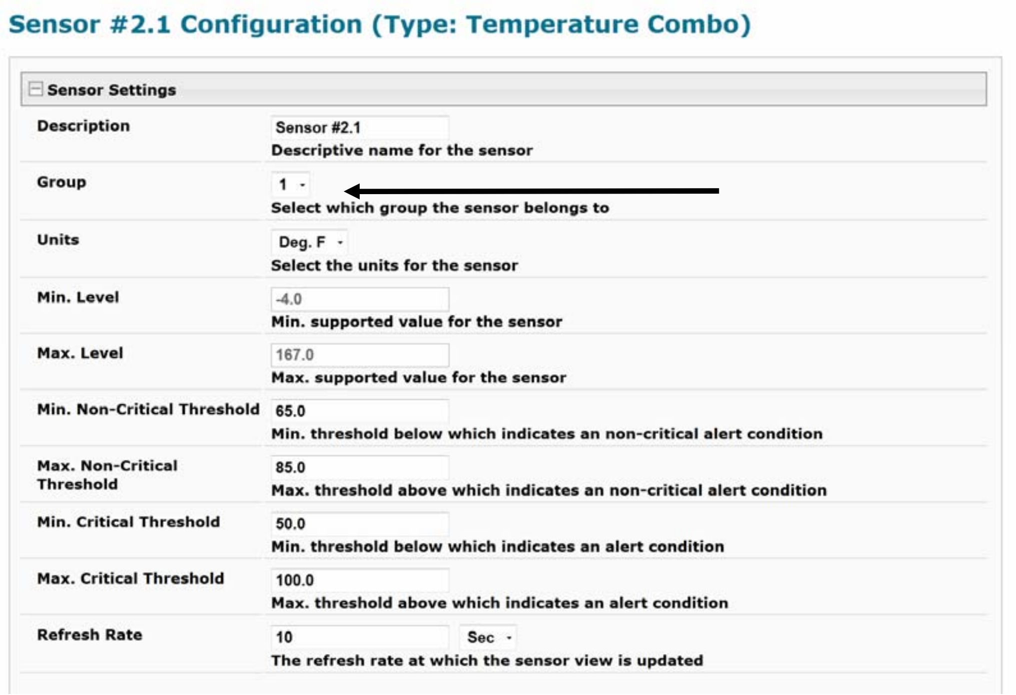
⊟ SNMP Settings

Enable SNMP Agent	SNMPv1/v2c/v3 ▾ Allow access to SNMP agent on this device
Enable SNMP Traps	☑ Enable sending of SNMP traps from this device
Read-write community name	private Read-write community name for SNMP agent
Read-only community name	public Read-only community name for SNMP agent

Figure 138- SNMP Settings under Network Settings

Under Sensor Configuration:

4. Under the sensor configuration for each sensor, enter a Group number that the sensor should belong to. Users can receive alert messages from some, all, or no sensor groups, as configured under User Settings.



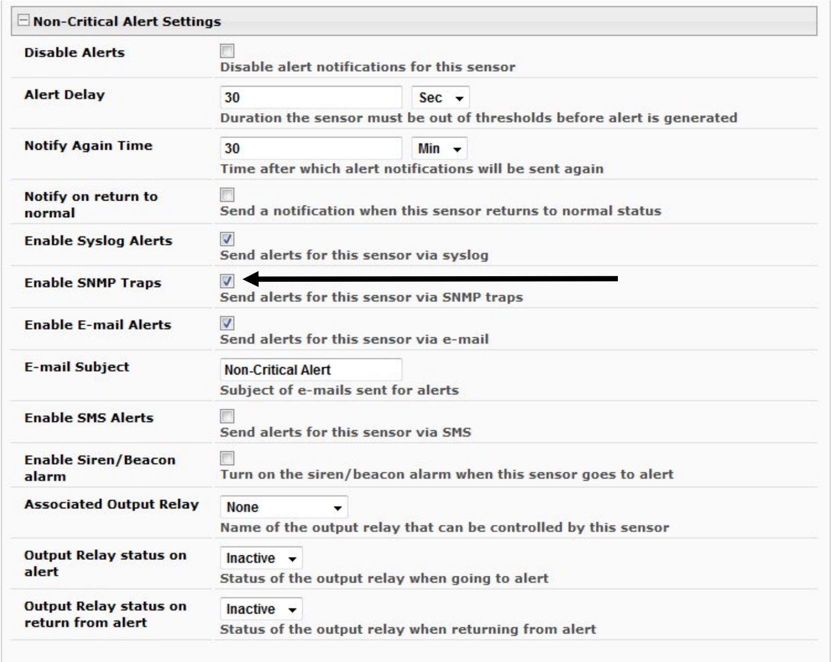
Sensor #2.1 Configuration (Type: Temperature Combo)

⊟ Sensor Settings

Description	Sensor #2.1 Descriptive name for the sensor
Group	1 ▾ Select which group the sensor belongs to
Units	Deg. F ▾ Select the units for the sensor
Min. Level	-4.0 Min. supported value for the sensor
Max. Level	167.0 Max. supported value for the sensor
Min. Non-Critical Threshold	65.0 Min. threshold below which indicates an non-critical alert condition
Max. Non-Critical Threshold	85.0 Max. threshold above which indicates an non-critical alert condition
Min. Critical Threshold	50.0 Min. threshold below which indicates an alert condition
Max. Critical Threshold	100.0 Max. threshold above which indicates an alert condition
Refresh Rate	10 Sec ▾ The refresh rate at which the sensor view is updated

Figure 139- Enter at least one group number to sensor configuration

5. Place a checkmark in “Enable SNMP Traps” checkbox under the sensor configuration for each sensor that should send traps when there is an alert.   If you want them sent for Critical Alerts and Non-Critical Alerts, there is a checkbox for each level.



⊟ Non-Critical Alert Settings

Disable Alerts	□ Disable alert notifications for this sensor
Alert Delay	30 Sec Duration the sensor must be out of thresholds before alert is generated
Notify Again Time	30 Min Time after which alert notifications will be sent again
Notify on return to normal	□ Send a notification when this sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this sensor via syslog
Enable SNMP Traps	☑ Send alerts for this sensor via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this sensor via e-mail
E-mail Subject	Non-Critical Alert Subject of e-mails sent for alerts
Enable SMS Alerts	□ Send alerts for this sensor via SMS
Enable Siren/Beacon alarm	□ Turn on the siren/beacon alarm when this sensor goes to alert
Associated Output Relay	None Name of the output relay that can be controlled by this sensor
Output Relay status on alert	Inactive Status of the output relay when going to alert
Output Relay status on return from alert	Inactive Status of the output relay when returning from alert

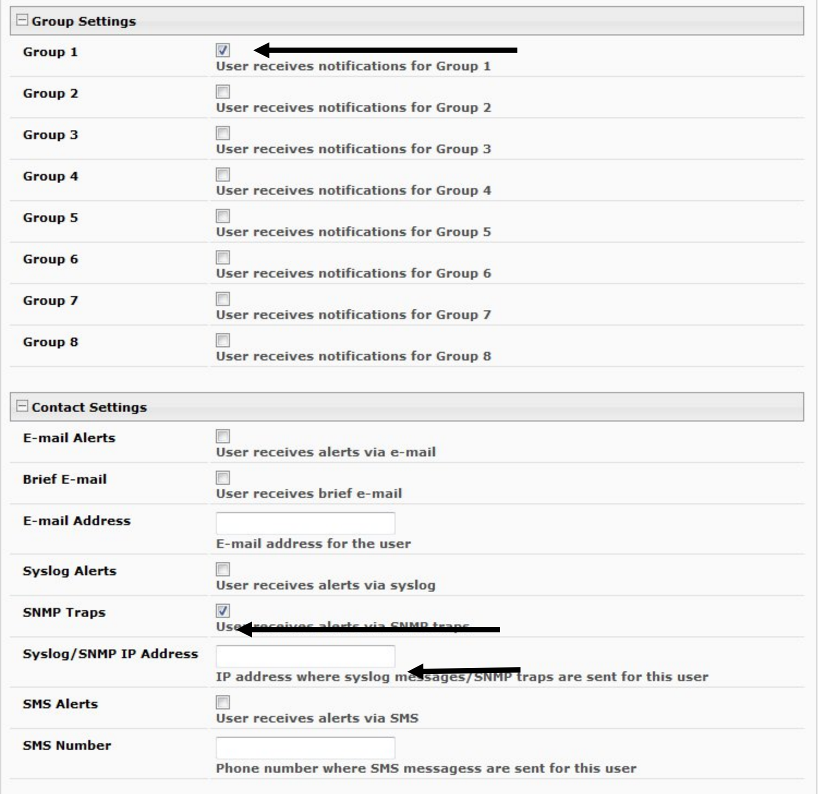
Figure 140- Enable SNMP Traps for the sensor

Under User Settings:

6. Apply a checkmark to the Group number(s) for the sensor(s) you want to receive SNMP traps about.

7. Be sure to apply a checkmark in the “SNMP Traps” box under Configure User ->Contact Settings for each user that should receive SNMP traps

8. Enter a valid IP address where traps are to be sent for each user.



⊟ Group Settings

Group 1	☑ User receives notifications for Group 1
Group 2	□ User receives notifications for Group 2
Group 3	□ User receives notifications for Group 3
Group 4	□ User receives notifications for Group 4
Group 5	□ User receives notifications for Group 5
Group 6	□ User receives notifications for Group 6
Group 7	□ User receives notifications for Group 7
Group 8	□ User receives notifications for Group 8

⊟ Contact Settings

E-mail Alerts	□ User receives alerts via e-mail
Brief E-mail	□ User receives brief e-mail
E-mail Address	E-mail address for the user
Syslog Alerts	□ User receives alerts via syslog
SNMP Traps	☑ User receives alerts via SNMP traps
Syslog/SNMP IP Address	IP address where syslog messages/SNMP traps are sent for this user
SMS Alerts	□ User receives alerts via SMS
SMS Number	Phone number where SMS messagess are sent for this user

Figure 141- User Settings required for SNMP Traps

9. If the “Enable SNMP Agent” setting under “Network Settings” was SNMPv1/v2c/v3, then the Authentication Protocol (MD5 or SHA), Authentication Passphrase, Privacy Protocol (DES or AES), and Privacy Passphrase will only need to be filled in for users that will receive secure messages.

If only aSNMPv3 was selected, then these settings **must** be filled in for each user.

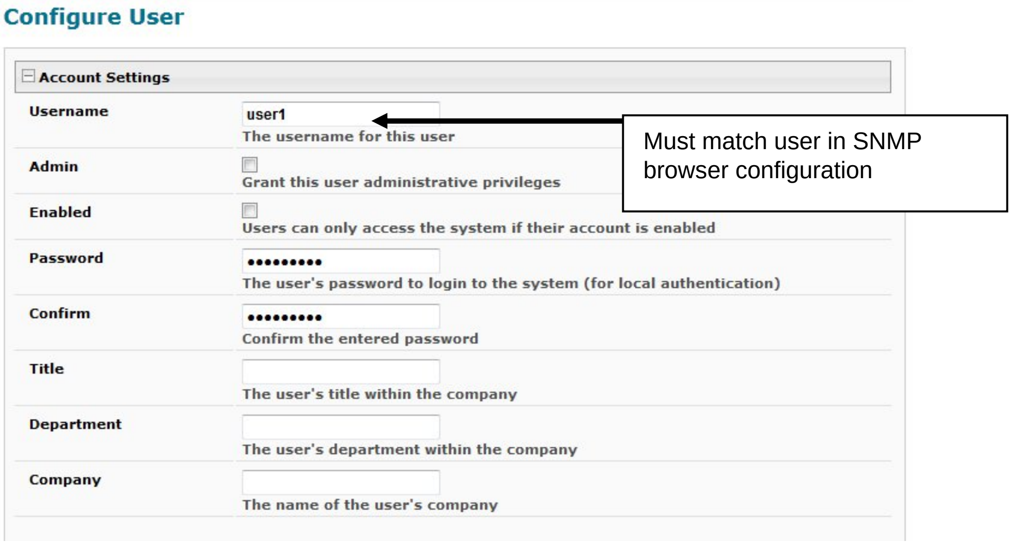
The protocol types will be dependent upon the type of SNMP Agent you are using (refer to your SNMP Agent specifications).

- Authentication Protocol = MD5 or SHA
- Privacy Protocol = DES or AES

If only SNMPv1/v2c will be used, the default settings of “None” will apply.

The passphrases will be those that have been setup in your SNMP agent for the user being configured.

Note: The username in the ENVIROMUX user configuration must match the username in the SNMP browser configuration.



Configure User

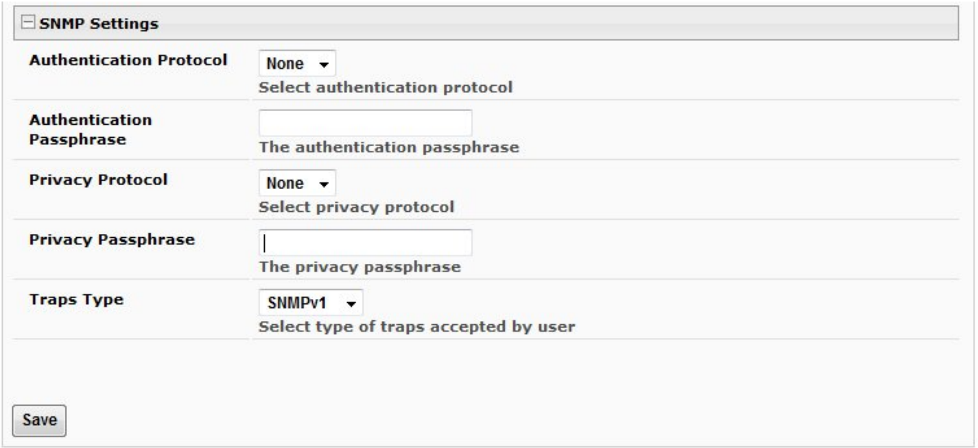
⊟ Account Settings

Username	user1 The username for this user
Admin	□ Grant this user administrative privileges
Enabled	□ Users can only access the system if their account is enabled
Password	••••••••• The user's password to login to the system (for local authentication)
Confirm	••••••••• Confirm the entered password
Title	 The user's title within the company
Department	 The user's department within the company
Company	 The name of the user's company

Must match user in SNMP browser configuration

Figure 142- Username must match SNMP configuration

10. Select which Traps type the user should receive. If SNMPv1 or SNMPv2c are selected, the Authentication and Privacy settings below do not need to be configured as they are only required to receive SNMPv3 messages.



⊟ SNMP Settings

Authentication Protocol	None ▾ Select authentication protocol
Authentication Passphrase	 The authentication passphrase
Privacy Protocol	None ▾ Select privacy protocol
Privacy Passphrase	 The privacy passphrase
Traps Type	SNMPv1 ▾ Select type of traps accepted by user

Figure 143- Apply applicable authentication settings

11. Use the MIB file (below) with your SNMP browser to setup and manage SNMP traps.

The MIB file is available for download from the firmware update website:
http://www.networktechinc.com/download/d-environment-monitor-16.html for E-16D / -5D / -2D

BASIC SNMP SET COMMANDS

In order to Acknowledge and Dismiss Alerts only:

Internal Sensor Status

External Sensor Status

Aux Sensor Status (devices like the E-ACLM-V, E-ACDCLM, and E-ACLM-3P480)

Tac Sensor Status

Digital Input Status

Remote Digital Input Status

IP Device Status

Event Status

Smart Alert Status

IP Sensor Status

In order to Activate or Deactivate Relays only:

Output Relay Status

Remote Output Relay Status

SNMP DEFINITIONS

Definitions of Integer Values reported by an SNMP Trap for Sensors

(From the mib file:)

```
digInputStatus          OBJECT-TYPE
        SYNTAX          INTEGER {notconnected(0), normal(1), prealert(2), alert(3), acknowledged(4),
                          dismissed(5), disconnected(6), reserved(10) }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION       "The status of the sensor"
```

(Also applies to extSensorStatus)

INTEGER Value Definitions:

0- Not connected : No sensor has been connected to the referenced digital input.

1- Normal : Sensor is connected and operating within the parameter defined by “normal status” for that sensor, or in the case of external sensors, working between the values set by “Minimum Level” and “Maximum Level”.

2- Prealert: Sensor is connected and has entered alert status but has not been in alert status longer than the value defined by the “alert delay” for that sensor. Once that delay time has been satisfied, if still in alert status an alert will be sent by the ENVIROMUX.

3- Alert: Sensor is connected and has been in alert status longer than the time specified in the “alert delay” field.

4- Acknowledged: User has acknowledged the alert that has been reported by the ENVIROMUX for the sensor. The ENVIROMUX will not report another alert until the status for the sensor has returned to normal and then returns to alert status.

5- Dismissed: User has dismissed the alert reported by the ENVIROMUX for the sensor. The ENVIROMUX will report another alert if the sensor status does not return to normal when the time period configured in the “notify again after” field elapses.

6- Disconnected: Sensor was previously connected to the ENVIROMUX but has since lost its physical connection with the ENVIROMUX

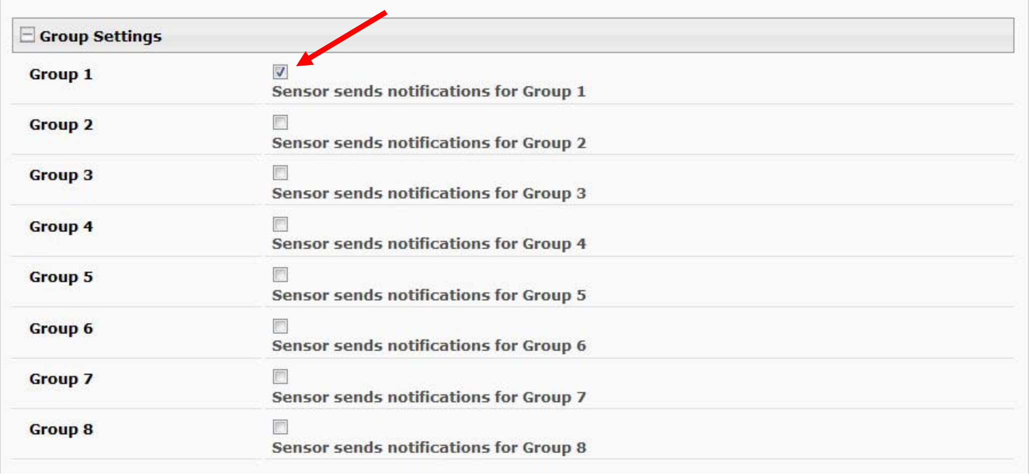
10- Reserved : This field is not in use and is held for future reporting purposes.

HOW TO SETUP SYSLOG

Follow these steps to prepare the ENVIROMUX to send Syslog messages to ENVIROMUX users. This instruction assumes you have Syslog software configured to receive and record messages sent by the ENVIROMUX and know how to use it.

Configure the ENVIROMUX to send alerts via Syslog

1. Configure each sensor that will cause a message to be sent via Syslog to be included in one or more groups.

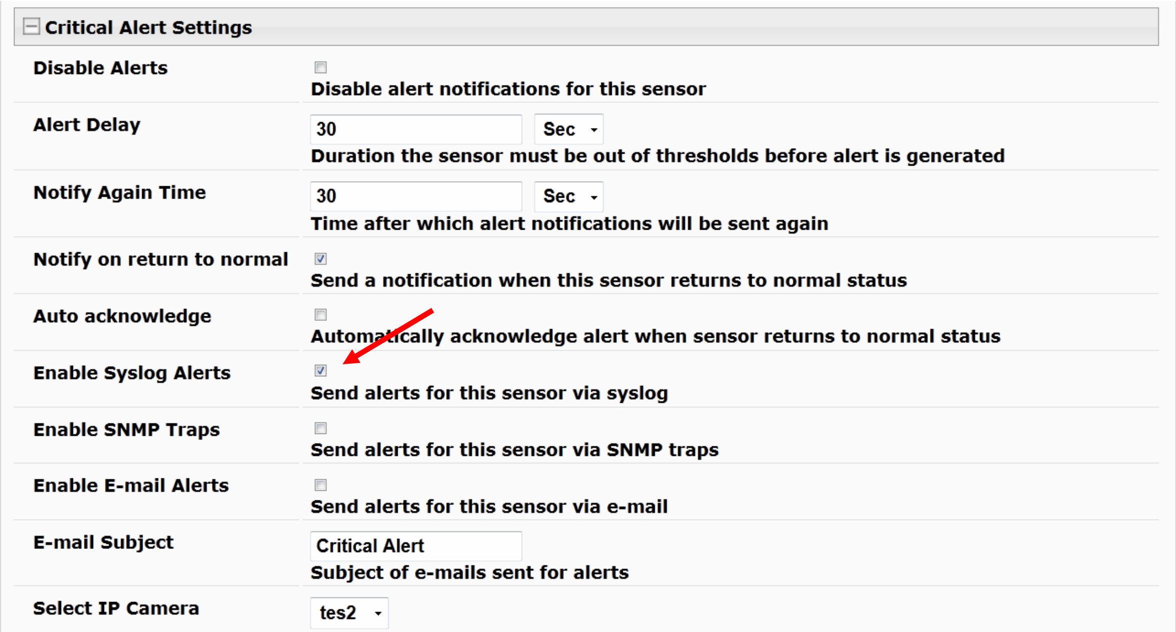


⊟ Group Settings

Group 1	☑ Sensor sends notifications for Group 1
Group 2	□ Sensor sends notifications for Group 2
Group 3	□ Sensor sends notifications for Group 3
Group 4	□ Sensor sends notifications for Group 4
Group 5	□ Sensor sends notifications for Group 5
Group 6	□ Sensor sends notifications for Group 6
Group 7	□ Sensor sends notifications for Group 7
Group 8	□ Sensor sends notifications for Group 8

Figure 144- Configure which group(s) a sensor will belong to

2. Apply a checkmark in “Enable Syslog Alerts” under Non-Critical Alert Settings and/or Critical Alert Settings on the configuration page for each sensor that will cause Syslog Alerts.



⊟ Critical Alert Settings

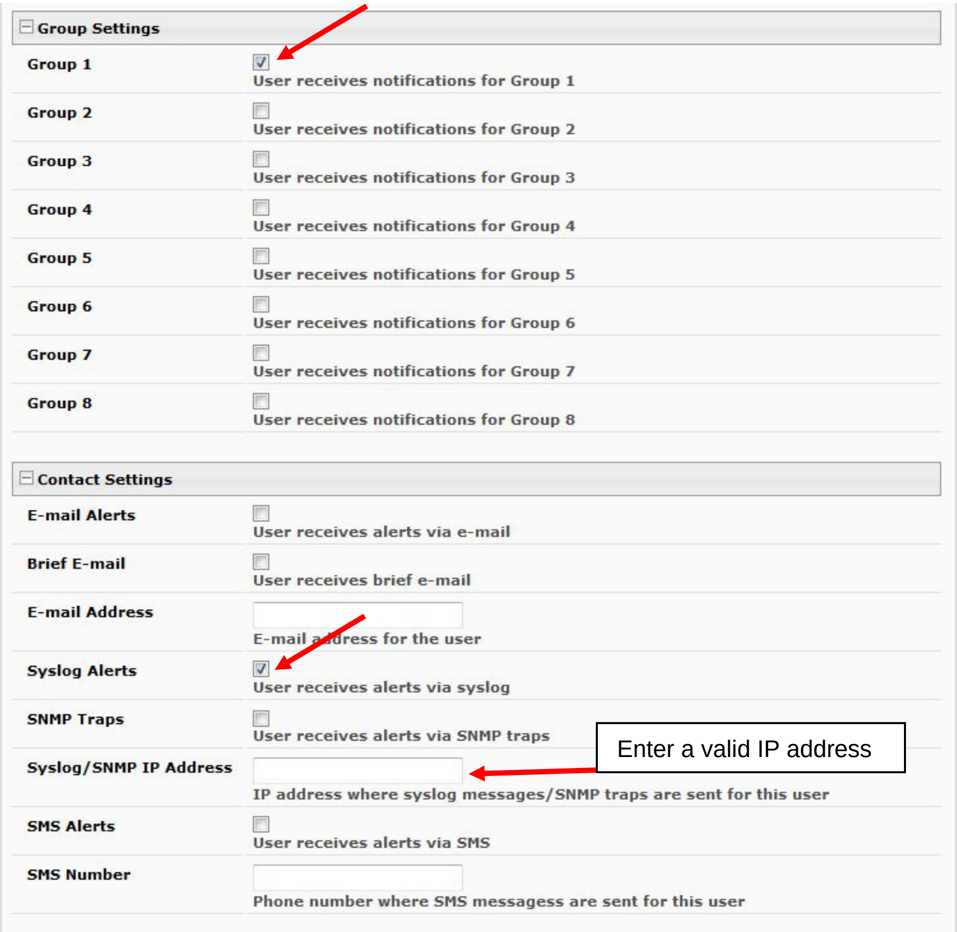
Disable Alerts	□ Disable alert notifications for this sensor
Alert Delay	30 Sec Duration the sensor must be out of thresholds before alert is generated
Notify Again Time	30 Sec Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this sensor returns to normal status
Auto acknowledge	□ Automatically acknowledge alert when sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this sensor via syslog
Enable SNMP Traps	□ Send alerts for this sensor via SNMP traps
Enable E-mail Alerts	□ Send alerts for this sensor via e-mail
E-mail Subject	Critical Alert Subject of e-mails sent for alerts
Select IP Camera	tes2

Figure 145- Enable Syslog alerts for the sensor

3. Under User configuration, place a checkmark in the group number(s) that the sensors belong to. (These are the groups that you checked off in step 1.)

4. Place a checkmark in the box for Syslog Alerts under Contact Settings so that the user can receive Syslog messages.

5. Enter a valid IP address where the Syslog messages for that user are to be sent.



⊟ Group Settings

Group 1	☑ User receives notifications for Group 1
Group 2	□ User receives notifications for Group 2
Group 3	□ User receives notifications for Group 3
Group 4	□ User receives notifications for Group 4
Group 5	□ User receives notifications for Group 5
Group 6	□ User receives notifications for Group 6
Group 7	□ User receives notifications for Group 7
Group 8	□ User receives notifications for Group 8

⊟ Contact Settings

E-mail Alerts	□ User receives alerts via e-mail
Brief E-mail	□ User receives brief e-mail
E-mail Address	 E-mail address for the user
Syslog Alerts	☑ User receives alerts via syslog
SNMP Traps	□ User receives alerts via SNMP traps
Syslog/SNMP IP Address	 IP address where syslog messages/SNMP traps are sent for this user
SMS Alerts	□ User receives alerts via SMS
SMS Number	 Phone number where SMS messagess are sent for this user

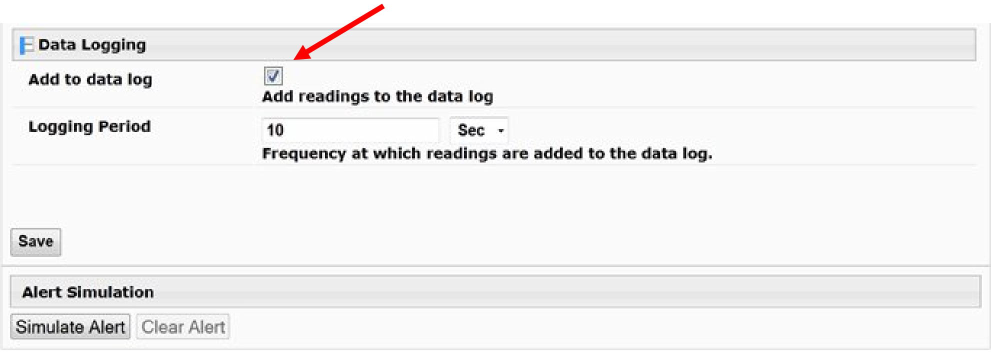
Enter a valid IP address

Figure 146- Configure user to receive alerts via Syslog

With sensors properly configured to send Syslog messages to specified groups, and Users enabled to receive messages from the same specified groups at a valid IP address, Syslog messages for sensor alerts will now be received.

Configure the ENVIROMUX to send sensor data via Syslog

1. Under Sensor Configuration, Data Logging, place a checkmark under "Add to data log" to have sensor readings added to the log. Set the time period for the frequency at which readings will be added to the data log. Press "Save".



Data Logging

Add to data log	☑ Add readings to the data log
Logging Period	10 Sec Frequency at which readings are added to the data log.

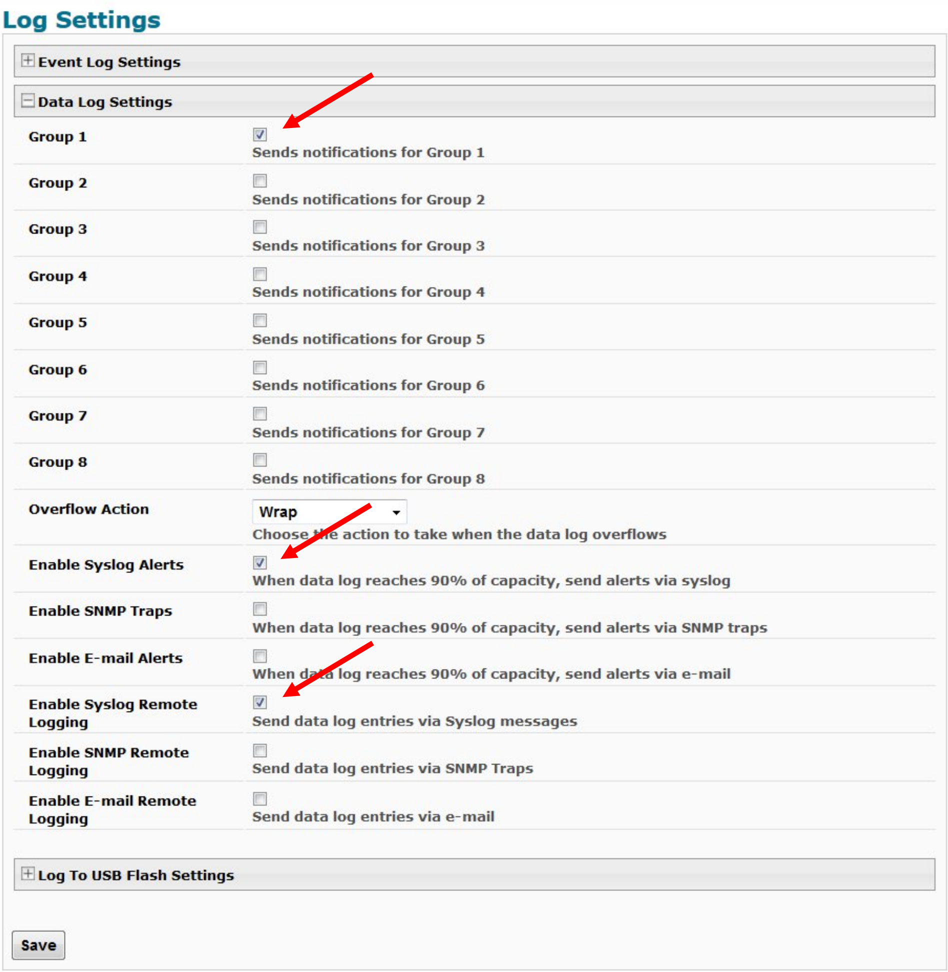
Save

Alert Simulation

Simulate Alert Clear Alert

Figure 147- Configure sensor readings to be added to data log

2. Under Log, Log Settings, place a checkmark under "Enable Syslog Remote Logging". This will then send all data logs via Syslog message. To receive alerts regarding data logs, place a checkmark under "Enable Syslog Alerts". Make sure the group numbers are checked that the User is configured to receive Syslog messages from (under Configure User- Group Settings- see Figure 146).



Log Settings

⊞ Event Log Settings

⊟ Data Log Settings

Group 1	☑ Sends notifications for Group 1
Group 2	□ Sends notifications for Group 2
Group 3	□ Sends notifications for Group 3
Group 4	□ Sends notifications for Group 4
Group 5	□ Sends notifications for Group 5
Group 6	□ Sends notifications for Group 6
Group 7	□ Sends notifications for Group 7
Group 8	□ Sends notifications for Group 8
Overflow Action	Wrap Choose the action to take when the data log overflows
Enable Syslog Alerts	☑ When data log reaches 90% of capacity, send alerts via syslog
Enable SNMP Traps	□ When data log reaches 90% of capacity, send alerts via SNMP traps
Enable E-mail Alerts	□ When data log reaches 90% of capacity, send alerts via e-mail
Enable Syslog Remote Logging	☑ Send data log entries via Syslog messages
Enable SNMP Remote Logging	□ Send data log entries via SNMP Traps
Enable E-mail Remote Logging	□ Send data log entries via e-mail

⊞ Log To USB Flash Settings

Save

Figure 148- Configure data logs to send Syslog messages

LOCATING OIDS

To use SNMP (Simple Network Management Protocol) to monitor the sensors and control the functions of an ENVIROMUX Enterprise Environment Monitoring System (SYSTEM), you first need to install SNMP network management software. The software package will include an MIB (Management Information Base) browser and there are many different MIB browsers so we will be very general about the instruction provided herein. The MIB browser can be used to quickly view sensor data and the status of all characteristics of the SYSTEM. How you make use of that information is up to you.

General Information

Every piece of information available from the SYSTEM through the MIB browser has an OID (Object Identifier). The MIB file provided with the SYSTEM (available from http://www.networktechinc.com/download/d-environment-monitor-16.html) provides a database to organize information received regarding sensors, output relays, IP Devices, etc.. Each piece of information derived from this database has a unique OID. To see the OID for any piece of information, select the variable and the OID assigned to it will be displayed.

For this instruction we used the free MIB browser “iReasoning” found at http://ireasoning.com/mibbrowser.shtml.

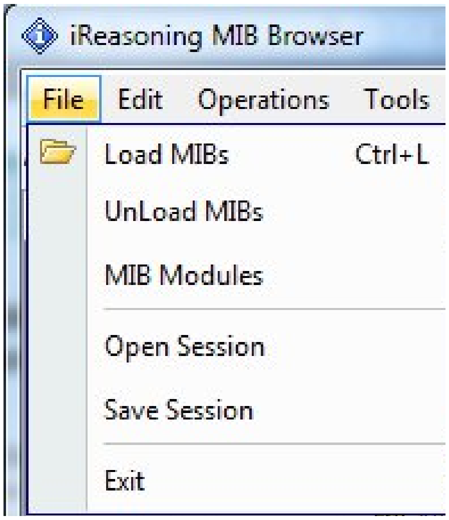
View OIDs

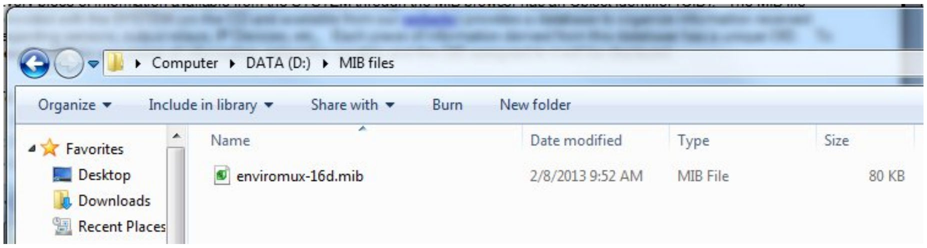
To view this information, you must do the following:

1. Install the browser to your PC

2. Copy the MIB file associated with your SYSTEM to the hard drive on your PC.(perhaps to a new directory “MIB files” as shown below.)

3. Load the MIB file for the SYSTEM to your browser.



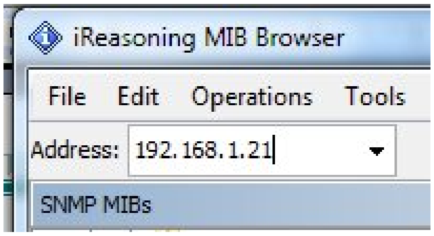


Name	Date modified	Type	Size
enviromux-16d.mib	2/8/2013 9:52 AM	MIB File	80 KB

Select “Load MIBs” and locate the MIB file on your PC.

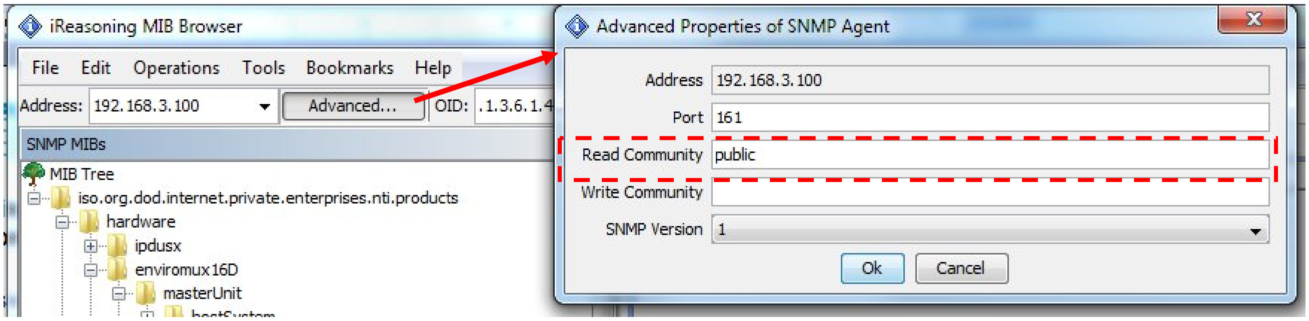
TIP: iReasoning provided a couple of default MIB files that were preloaded. To clean up the resulting data tree, we used “UnLoad MIBs” (above) to remove those.

4. Enter the IP address of the SYSTEM so the browser knows where the SYSTEM is to retrieve data.



Address: 192.168.1.21

5. With the iReasoning browser, the Read-only Community Name (default is “public”) was automatically sensed and applied when the IP address was entered, but if this doesn’t happen in your browser, make sure the “Read Community” field in the agent properties includes the name “public” (or whatever you have changed it to in the E-16D network configuration).

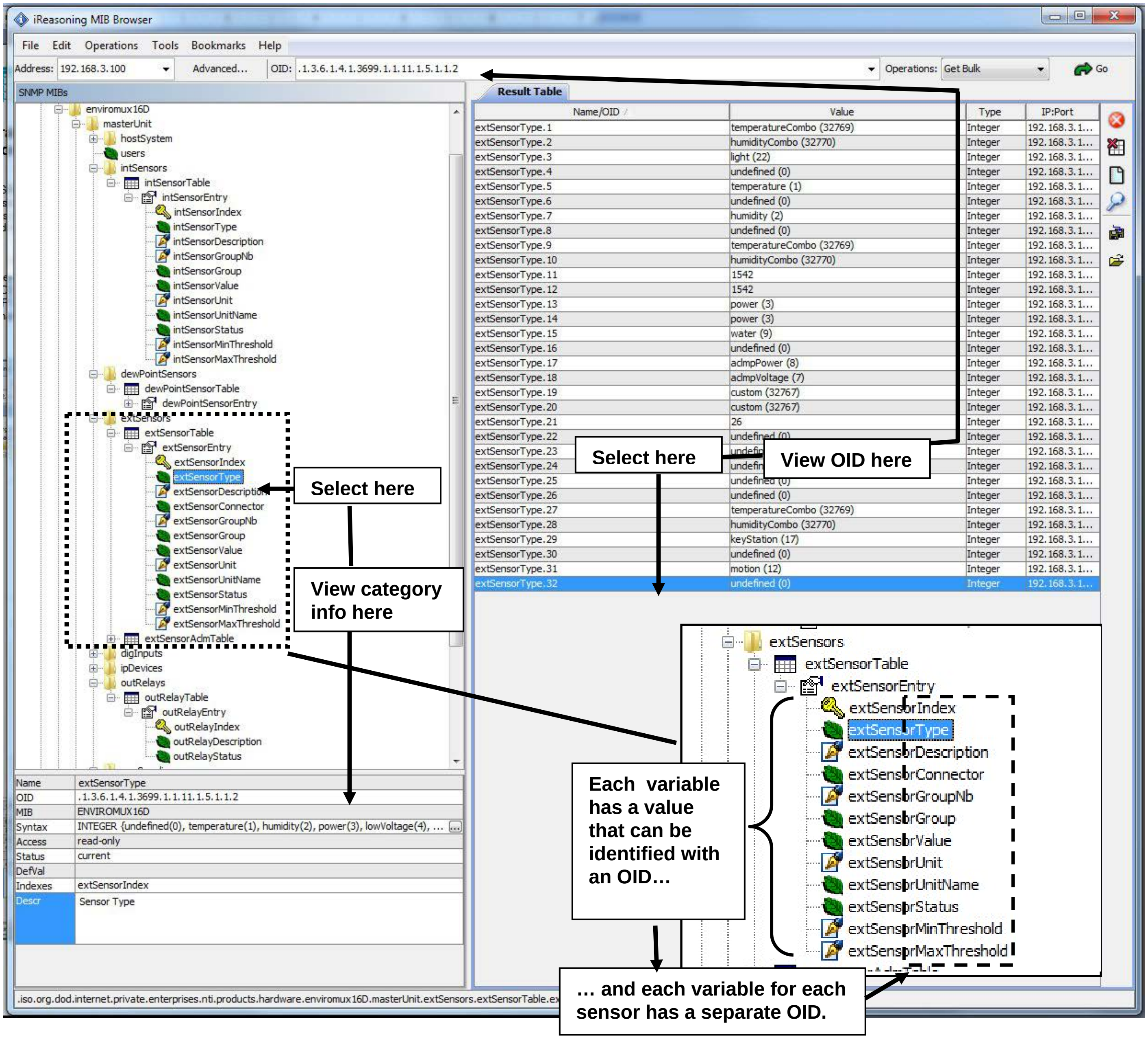


Advanced Properties of SNMP Agent

Address	192.168.3.100
Port	161
Read Community	public
Write Community	
SNMP Version	1

6. With that information entered, the default SYSTEM will be accessible for SNMP browsing. A connection that uses security will require more configuration, Refer to page 132 and your browser manual to apply the required additional settings.

Once a connection is made, the browser will present a directory structure with tree organizing all the different variables of information available from the SYSTEM. Click on the various categories and sub categories to go as deep into the hierarchy as necessary. As seen in the image below, each variable of information presented has an OID assigned to it. These OIDs can be used in conjunction with other SNMP control systems to communicate and/or perform functions automatically.



Name/OID	Value	Type	IP:Port
extSensorType.1	temperatureCombo (32769)	Integer	192.168.3.1...
extSensorType.2	humidityCombo (32770)	Integer	192.168.3.1...
extSensorType.3	light (22)	Integer	192.168.3.1...
extSensorType.4	undefined (0)	Integer	192.168.3.1...
extSensorType.5	temperature (1)	Integer	192.168.3.1...
extSensorType.6	undefined (0)	Integer	192.168.3.1...
extSensorType.7	humidity (2)	Integer	192.168.3.1...
extSensorType.8	undefined (0)	Integer	192.168.3.1...
extSensorType.9	temperatureCombo (32769)	Integer	192.168.3.1...
extSensorType.10	humidityCombo (32770)	Integer	192.168.3.1...
extSensorType.11	1542	Integer	192.168.3.1...
extSensorType.12	1542	Integer	192.168.3.1...
extSensorType.13	power (3)	Integer	192.168.3.1...
extSensorType.14	power (3)	Integer	192.168.3.1...
extSensorType.15	water (9)	Integer	192.168.3.1...
extSensorType.16	undefined (0)	Integer	192.168.3.1...
extSensorType.17	aclmpPower (8)	Integer	192.168.3.1...
extSensorType.18	aclmpVoltage (7)	Integer	192.168.3.1...
extSensorType.19	custom (32767)	Integer	192.168.3.1...
extSensorType.20	custom (32767)	Integer	192.168.3.1...
extSensorType.21	26	Integer	192.168.3.1...
extSensorType.22	undefined (0)	Integer	192.168.3.1...
extSensorType.23	undefi	Integer	192.168.3.1...
extSensorType.24	undefin	Integer	192.168.3.1...
extSensorType.25	undefined (0)	Integer	192.168.3.1...
extSensorType.26	undefined (0)	Integer	192.168.3.1...
extSensorType.27	temperatureCombo (32769)	Integer	192.168.3.1...
extSensorType.28	humidityCombo (32770)	Integer	192.168.3.1...
extSensorType.29	keyStation (17)	Integer	192.168.3.1...
extSensorType.30	undefined (0)	Integer	192.168.3.1...
extSensorType.31	motion (12)	Integer	192.168.3.1...
extSensorType.32	undefined (0)	Integer	192.168.3.1...

Name	extSensorType
OID	.1.3.6.1.4.1.3699.1.1.11.1.5.1.1.2
MIB	ENVIROMUX16D
Syntax	INTEGER {undefined(0), temperature(1), humidity(2), power(3), lowVoltage(4), ...
Access	read-only
Status	current
DefVal	
Indexes	extSensorIndex
Descr	Sensor Type

.iso.org.dod.internet.private.enterprises.nti.products.hardware.enviromux16D.masterUnit.extSensors.extSensorTable.ex

Select here

View OID here

Select here

View category info here

Each variable has a value that can be identified with an OID…

… and each variable for each sensor has a separate OID.

Each RJ45 Sensor port has two OIDs assigned, because the sensors that connect to these ports often have two possible functions (Temperature/Humidity, ACLM-V with two connections, etc.). The image above shows they are numbered sequentially (The “extSensor Type” variable for Port 1 is extSensorType.1 and extSensorType.2, port 2 is extSensorType.3 and extSensorType.4, and so on, for a total of 32 extSensors (RJ45 Sensor) for an E-16D.)

Each variable for a sensor that is reported has its own OID (i.e. Index number, type, description of the connected sensor, the connector number the sensor is plugged into, group the sensor belongs to, etc.). When using OIDs, be sure to create an association with the right variable.

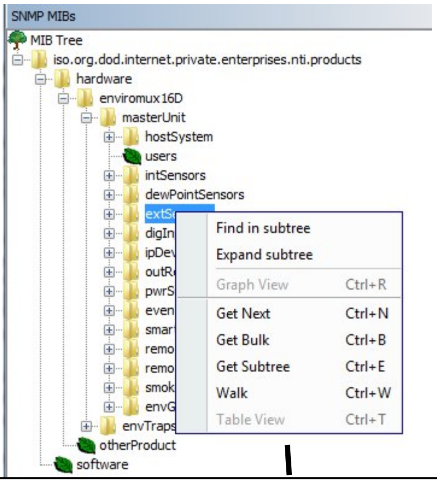
To get specific results in the Result Table, right click on an item in the MIB Tree and choose the type of search (“operation”) you want.

Get Next- will result in the next OID record of that category, displaying them one at a time.

Get Bulk- will result in all the OIDs of that category being displayed at once, but only that category

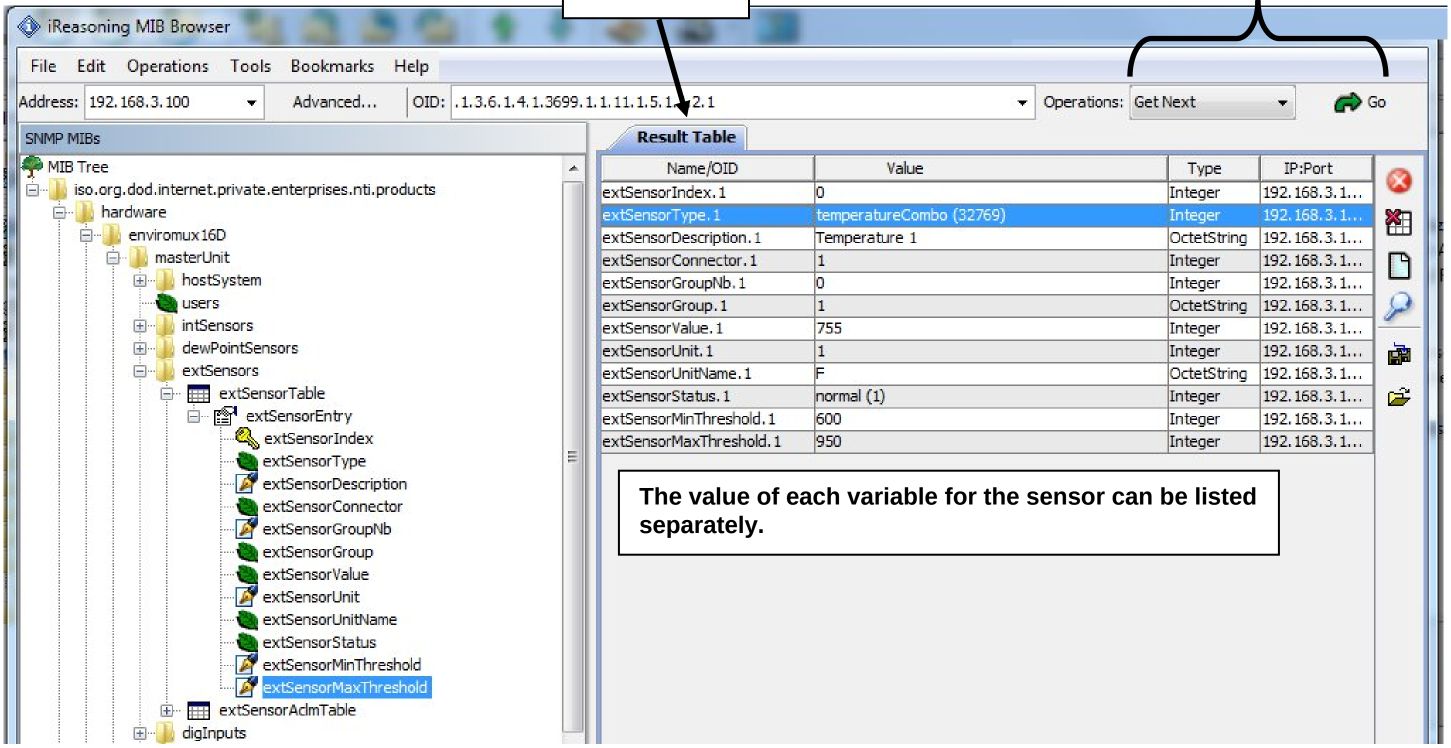
Get Subtree- will result in OIDs of that category and any sub-categories in the tree

Walk- will result in a listing of every OID in the system from the point at which you select it until the last category in the tree.



The operation can be selected with a right click (above), or using the “Operations” field (below). Once selected, press “Go”

Result Table



Address: 192.168.3.100

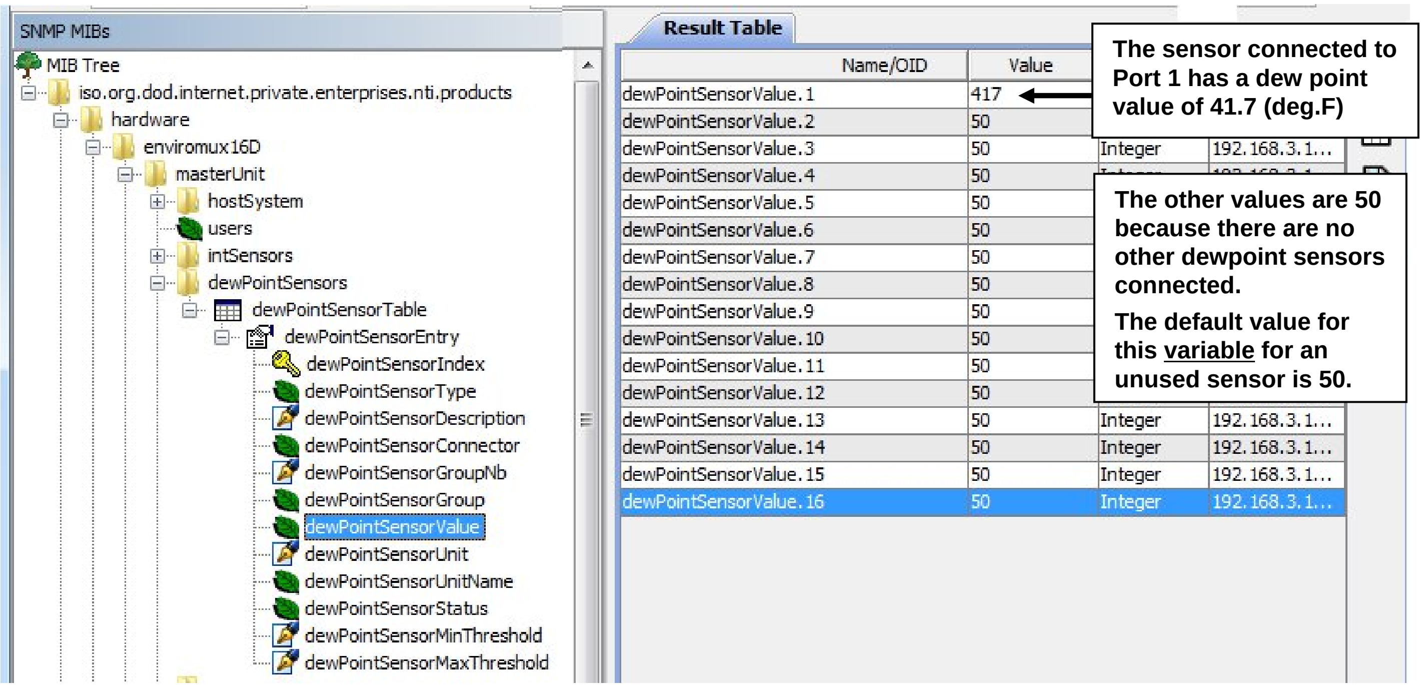
OID: .1.3.6.1.4.1.3699.1.1.11.1.5.1.1.2.1

Operations: Get Next

Name/OID	Value	Type	IP:Port
extSensorIndex.1	0	Integer	192.168.3.1...
extSensorType.1	temperatureCombo (32769)	Integer	192.168.3.1...
extSensorDescription.1	Temperature 1	OctetString	192.168.3.1...
extSensorConnector.1	1	Integer	192.168.3.1...
extSensorGroupNb.1	0	Integer	192.168.3.1...
extSensorGroup.1	1	OctetString	192.168.3.1...
extSensorValue.1	755	Integer	192.168.3.1...
extSensorUnit.1	1	Integer	192.168.3.1...
extSensorUnitName.1	F	OctetString	192.168.3.1...
extSensorStatus.1	normal (1)	Integer	192.168.3.1...
extSensorMinThreshold.1	600	Integer	192.168.3.1...
extSensorMaxThreshold.1	950	Integer	192.168.3.1...

The value of each variable for the sensor can be listed separately.

The E-STHS-99 is a specialty sensor that provides a third piece of information (dew point) managed through an additional category with virtual ports named “dewPoint Sensors”.



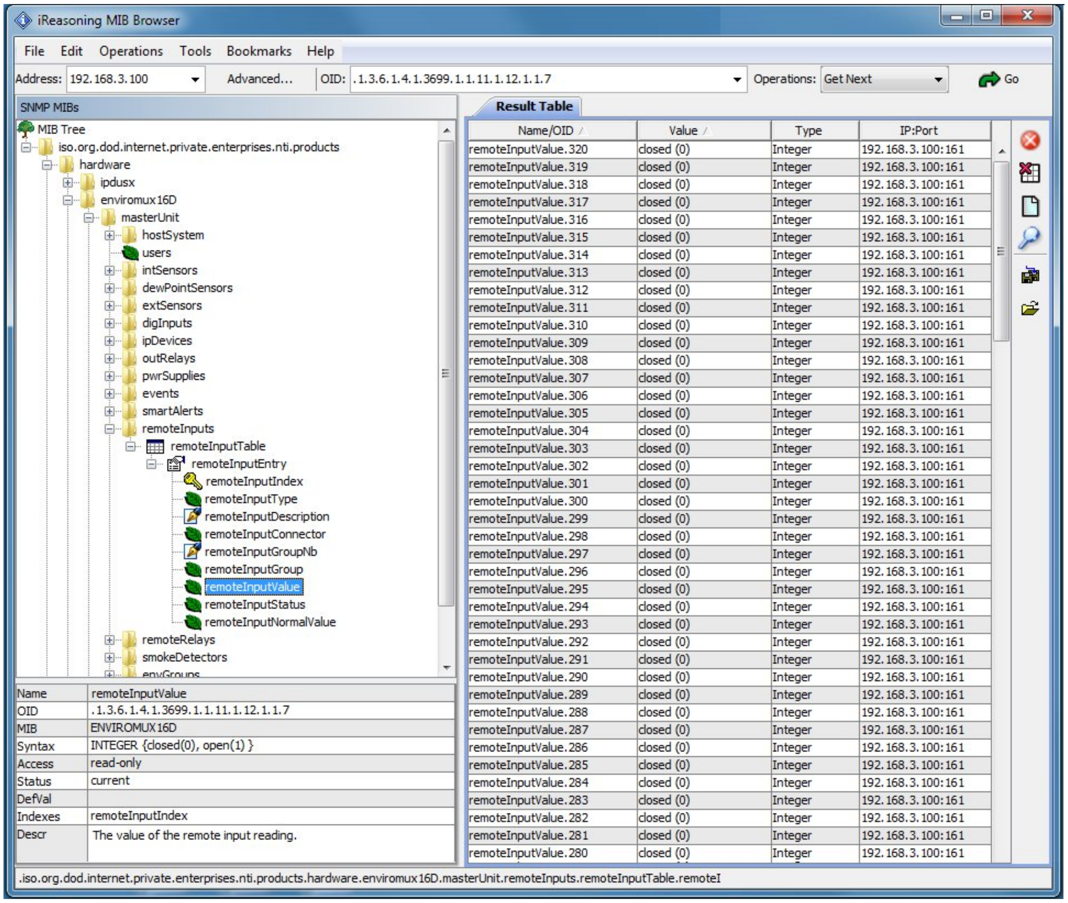
Name/OID	Value		
dewPointSensorValue.1	417		
dewPointSensorValue.2	50		
dewPointSensorValue.3	50	Integer	192.168.3.1...
dewPointSensorValue.4	50		
dewPointSensorValue.5	50		
dewPointSensorValue.6	50		
dewPointSensorValue.7	50		
dewPointSensorValue.8	50		
dewPointSensorValue.9	50		
dewPointSensorValue.10	50		
dewPointSensorValue.11	50		
dewPointSensorValue.12	50		
dewPointSensorValue.13	50	Integer	192.168.3.1...
dewPointSensorValue.14	50	Integer	192.168.3.1...
dewPointSensorValue.15	50	Integer	192.168.3.1...
dewPointSensorValue.16	50	Integer	192.168.3.1...

The sensor connected to Port 1 has a dew point value of 41.7 (deg.F)

The other values are 50 because there are no other dewpoint sensors connected.

The default value for this <u>variable</u> for an unused sensor is 50.

The category remoteInputs and remoteRelays are reserved for identifying contact sensors connected through E-DI16DO16(R) expansion units. No remoteInputs are connected to this SYSTEM (the default value of the remoteInputValue is closed (0)).



Address: 192.168.3.100

OID: .1.3.6.1.4.1.3699.1.1.11.1.12.1.1.7

Operations: Get Next

Name/OID	Value	Type	IP:Port
remoteInputValue.320	closed (0)	Integer	192.168.3.100:161
remoteInputValue.319	closed (0)	Integer	192.168.3.100:161
remoteInputValue.318	closed (0)	Integer	192.168.3.100:161
remoteInputValue.317	closed (0)	Integer	192.168.3.100:161
remoteInputValue.316	closed (0)	Integer	192.168.3.100:161
remoteInputValue.315	closed (0)	Integer	192.168.3.100:161
remoteInputValue.314	closed (0)	Integer	192.168.3.100:161
remoteInputValue.313	closed (0)	Integer	192.168.3.100:161
remoteInputValue.312	closed (0)	Integer	192.168.3.100:161
remoteInputValue.311	closed (0)	Integer	192.168.3.100:161
remoteInputValue.310	closed (0)	Integer	192.168.3.100:161
remoteInputValue.309	closed (0)	Integer	192.168.3.100:161
remoteInputValue.308	closed (0)	Integer	192.168.3.100:161
remoteInputValue.307	closed (0)	Integer	192.168.3.100:161
remoteInputValue.306	closed (0)	Integer	192.168.3.100:161
remoteInputValue.305	closed (0)	Integer	192.168.3.100:161
remoteInputValue.304	closed (0)	Integer	192.168.3.100:161
remoteInputValue.303	closed (0)	Integer	192.168.3.100:161
remoteInputValue.302	closed (0)	Integer	192.168.3.100:161
remoteInputValue.301	closed (0)	Integer	192.168.3.100:161
remoteInputValue.300	closed (0)	Integer	192.168.3.100:161
remoteInputValue.299	closed (0)	Integer	192.168.3.100:161
remoteInputValue.298	closed (0)	Integer	192.168.3.100:161
remoteInputValue.297	closed (0)	Integer	192.168.3.100:161
remoteInputValue.296	closed (0)	Integer	192.168.3.100:161
remoteInputValue.295	closed (0)	Integer	192.168.3.100:161
remoteInputValue.294	closed (0)	Integer	192.168.3.100:161
remoteInputValue.293	closed (0)	Integer	192.168.3.100:161
remoteInputValue.292	closed (0)	Integer	192.168.3.100:161
remoteInputValue.291	closed (0)	Integer	192.168.3.100:161
remoteInputValue.290	closed (0)	Integer	192.168.3.100:161
remoteInputValue.289	closed (0)	Integer	192.168.3.100:161
remoteInputValue.288	closed (0)	Integer	192.168.3.100:161
remoteInputValue.287	closed (0)	Integer	192.168.3.100:161
remoteInputValue.286	closed (0)	Integer	192.168.3.100:161
remoteInputValue.285	closed (0)	Integer	192.168.3.100:161
remoteInputValue.284	closed (0)	Integer	192.168.3.100:161
remoteInputValue.283	closed (0)	Integer	192.168.3.100:161
remoteInputValue.282	closed (0)	Integer	192.168.3.100:161
remoteInputValue.281	closed (0)	Integer	192.168.3.100:161
remoteInputValue.280	closed (0)	Integer	192.168.3.100:161

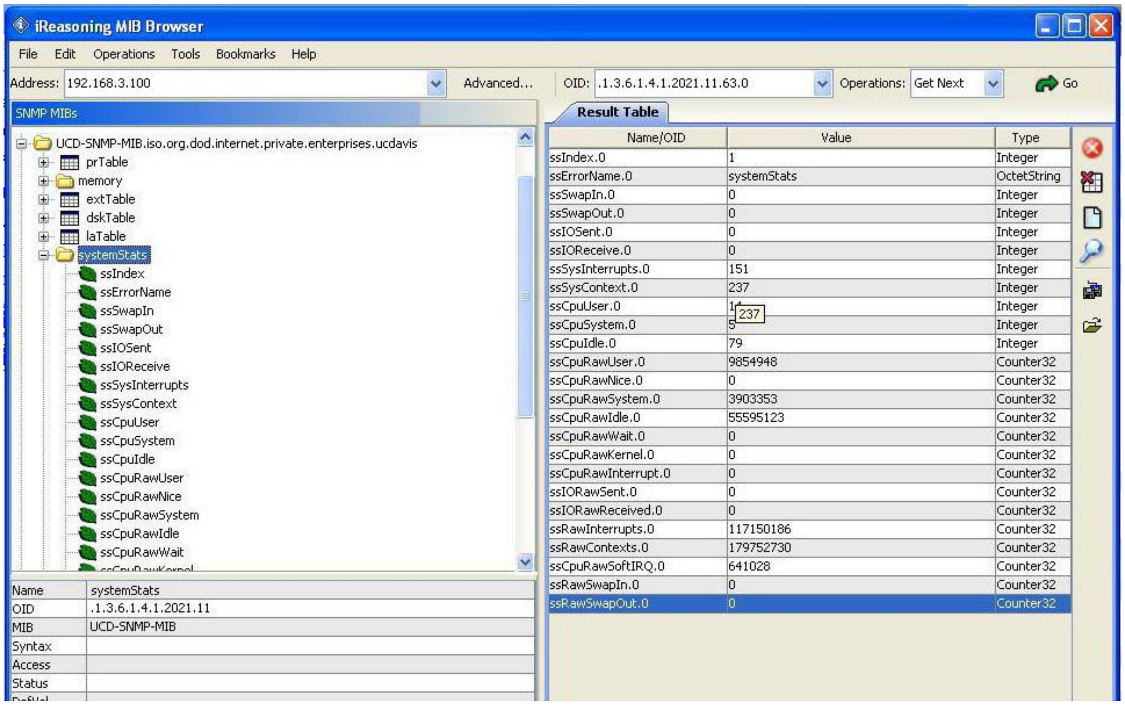
Name	remoteInputValue
OID	.1.3.6.1.4.1.3699.1.1.11.1.12.1.1.7
MIB	ENVIROMUX16D
Syntax	INTEGER {closed(0), open(1) }
Access	read-only
Status	current
DefVal	
Indexes	remoteInputIndex
Descr	The value of the remote input reading.

.iso.org.dod.internet.private.enterprises.nti.products.hardware.enviromux16D.masterUnit.remoteInputs.remoteInputTable.remoteI

USING SNMP TO ACQUIRE CPU/MEMORY USAGE DATA

You can use a MIB browser to acquire ENVIROMUX memory and CPU usage information (requires firmware version 2.16 or later). By loading the U.C. Davis MIB file “UCD-SNMP-MIB.mib” (copy found at

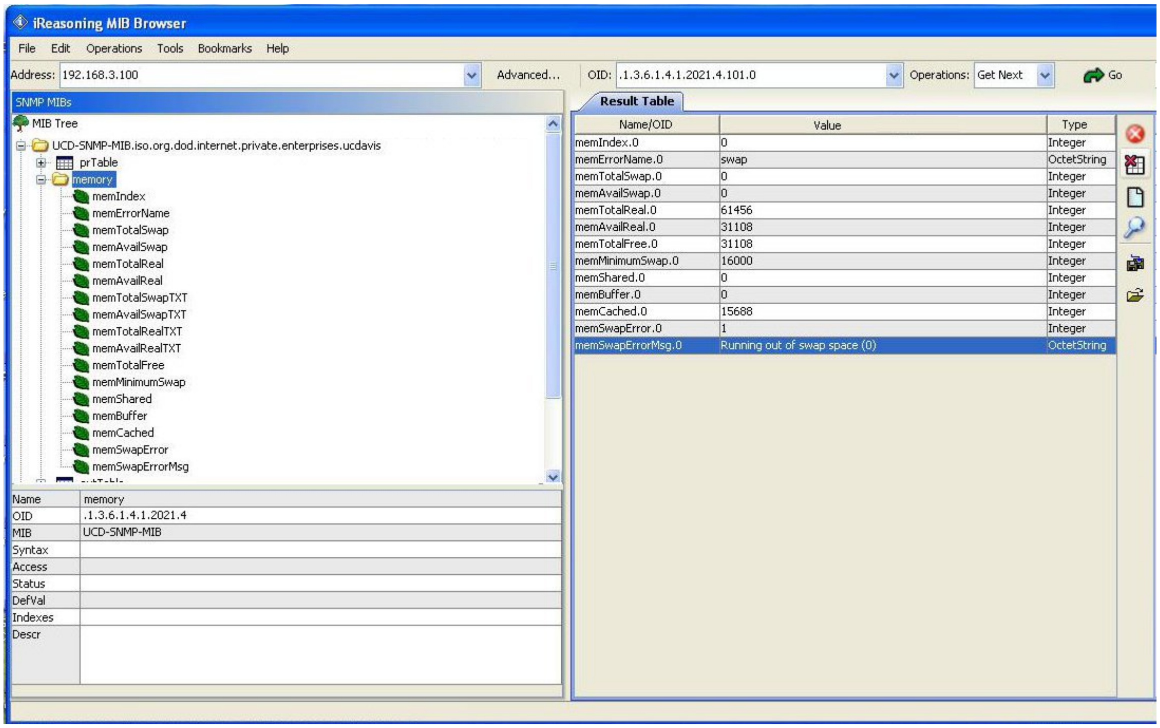
http://www.net-snmp.org/docs/mibs/ucdavis.html) into your MIB browser, memory and CPU usage information for the operating system in the ENVIROMUX can be readily viewed.



Name	systemStats
OID	.1.3.6.1.4.1.2021.11
MIB	UCD-SNMP-MIB
Syntax	
Access	
Status	

Name/OID	Value	Type
ssIndex.0	1	Integer
ssErrorName.0	systemStats	OctetString
ssSwapIn.0	0	Integer
ssSwapOut.0	0	Integer
ssIOSent.0	0	Integer
ssIOReceive.0	0	Integer
ssSysInterrupts.0	151	Integer
ssSysContext.0	237	Integer
ssCpuUser.0	1	Integer
ssCpuSystem.0	5	Integer
ssCpuIdle.0	79	Integer
ssCpuRawUser.0	9854948	Counter32
ssCpuRawNice.0	0	Counter32
ssCpuRawSystem.0	3903353	Counter32
ssCpuRawIdle.0	55595123	Counter32
ssCpuRawWait.0	0	Counter32
ssCpuRawKernel.0	0	Counter32
ssCpuRawInterrupt.0	0	Counter32
ssIORawSent.0	0	Counter32
ssIORawReceived.0	0	Counter32
ssRawInterrupts.0	117150186	Counter32
ssRawContexts.0	179752730	Counter32
ssCpuRawSoftIRQ.0	641028	Counter32
ssRawSwapIn.0	0	Counter32
ssRawSwapOut.0	0	Counter32

Figure 149- CPU Information found in the "systemStats" folder



Name	memory
OID	.1.3.6.1.4.1.2021.4
MIB	UCD-SNMP-MIB
Syntax	
Access	
Status	
DefVal	
Indexes	
Descr	

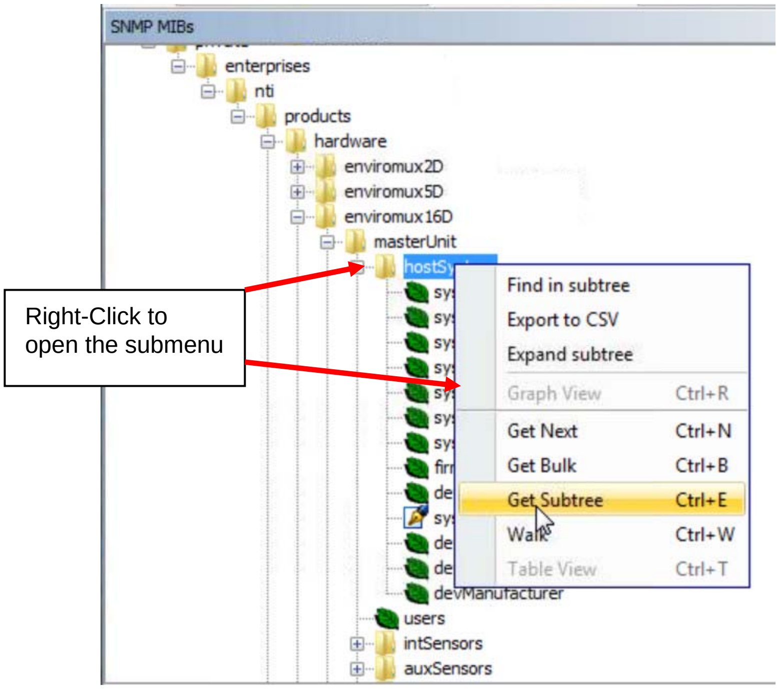
Name/OID	Value	Type
memIndex.0	0	Integer
memErrorName.0	swap	OctetString
memTotalSwap.0	0	Integer
memAvailSwap.0	0	Integer
memTotalReal.0	61456	Integer
memAvailReal.0	31108	Integer
memTotalFree.0	31108	Integer
memMinimumSwap.0	16000	Integer
memShared.0	0	Integer
memBuffer.0	0	Integer
memCached.0	15688	Integer
memSwapError.0	1	Integer
memSwapErrorMsg.0	Running out of swap space (0)	OctetString

Figure 150- Memory usage information found in the "memory" folder

USING SNMP TO VIEW AND CONFIGURE SETTINGS

You can use a MIB browser to view System Information as well as view and change ENVIROMUX network settings (requires firmware version 2.53 or later).

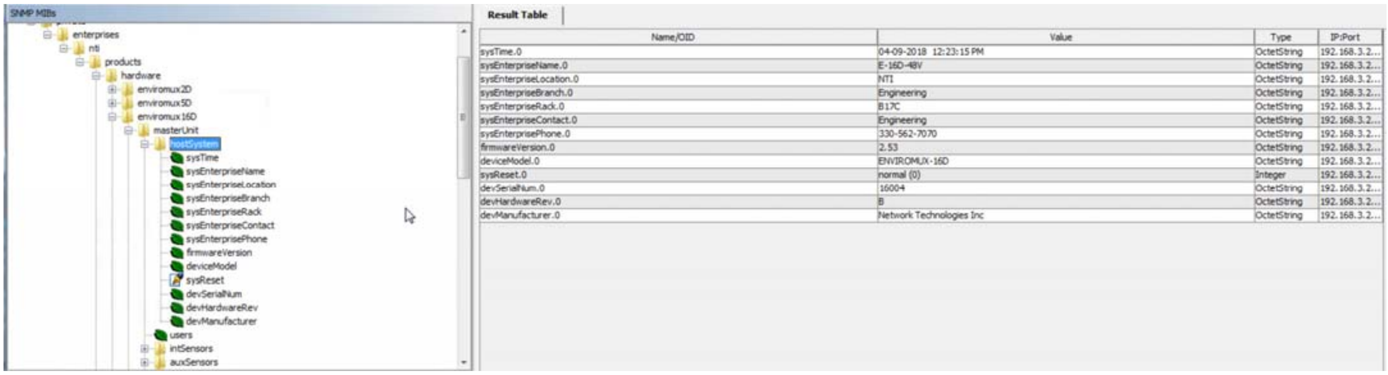
To see System Information values, click on "masterUnit" under the ENVIROMUX model, then click on "hostSystem" , right click to open the menu and click on "Get Subtree".



Right-Click to open the submenu

Figure 151- Get SNMP values for System Information

All the settings under System Information will be displayed.

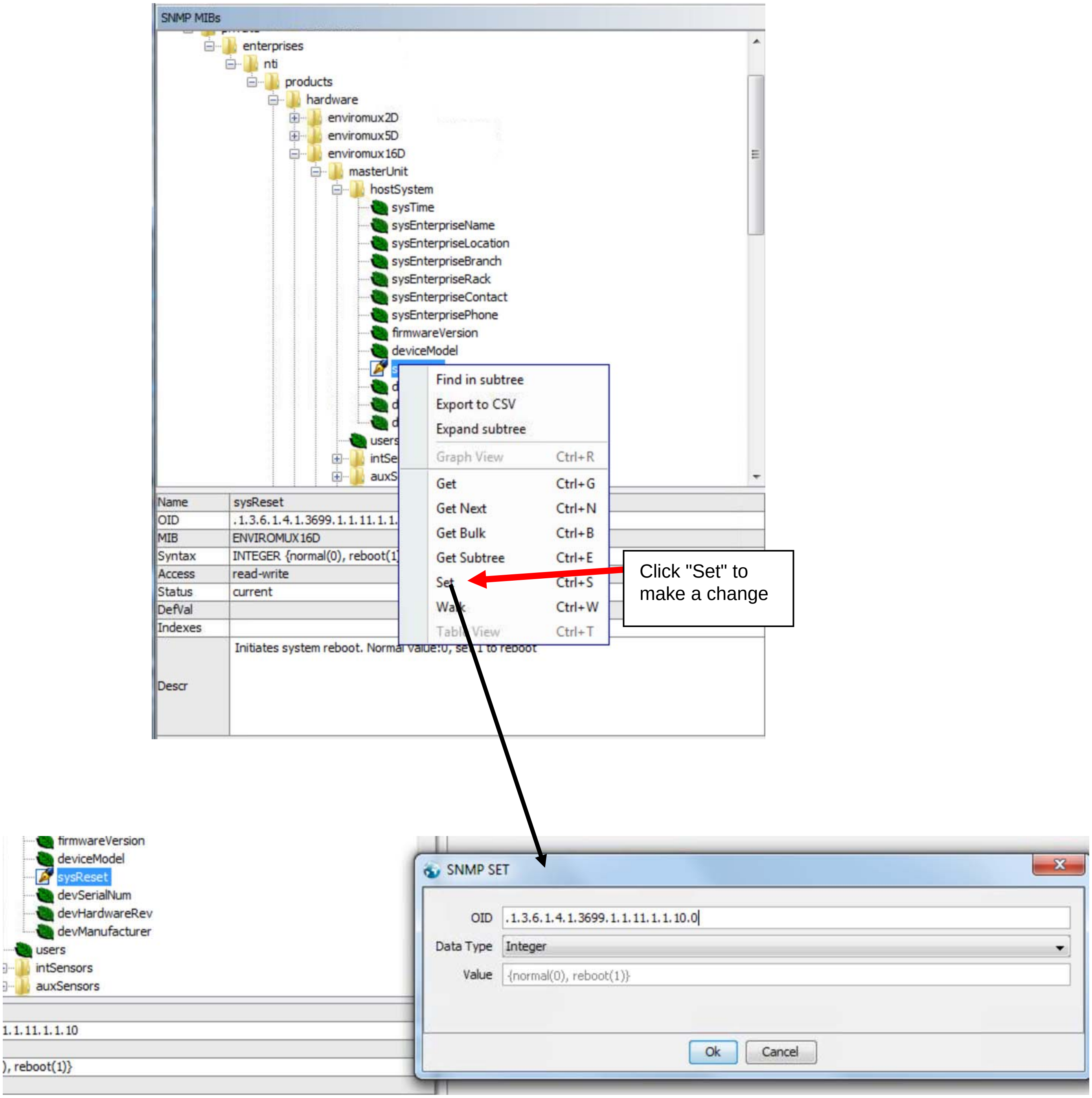


Name/OID	Value	Type	IP:Port
sysTime.0	04-09-2018 12:23:15 PM	OctetString	192.168.3.2...
sysEnterpriseName.0	E-16D-48V	OctetString	192.168.3.2...
sysEnterpriseLocation.0	NTI	OctetString	192.168.3.2...
sysEnterpriseBranch.0	Engineering	OctetString	192.168.3.2...
sysEnterpriseRack.0	B17C	OctetString	192.168.3.2...
sysEnterpriseContact.0	Engineering	OctetString	192.168.3.2...
sysEnterprisePhone.0	330-562-7070	OctetString	192.168.3.2...
firmwareVersion.0	2.53	OctetString	192.168.3.2...
deviceModel.0	ENVIROMUX-16D	OctetString	192.168.3.2...
sysReset.0	normal (0)	Integer	192.168.3.2...
devSerialNum.0	16004	OctetString	192.168.3.2...
devHardwareRev.0	B	OctetString	192.168.3.2...
devManufacturer.0	Network Technologies Inc	OctetString	192.168.3.2...

Figure 152- System Information displayed in SNMP

From this, the user can change settings by right-clicking any property and clicking on "Set". Enter the desired value and click "OK" to make the change.

Note: When you select "Set" for "sysReset", you can cause the ENVIROMUX to reboot by changing the value to "1" and click "OK". The ENVIROMUX will immediately reboot. All connections to it will be lost.



Name	sysReset
OID	.1.3.6.1.4.1.3699.1.1.11.1.1.
MIB	ENVIROMUX16D
Syntax	INTEGER {normal(0), reboot(1)
Access	read-write
Status	current
DefVal	
Indexes	
Descr	Initiates system reboot. Normal value:0, set 1 to reboot

Click "Set" to make a change

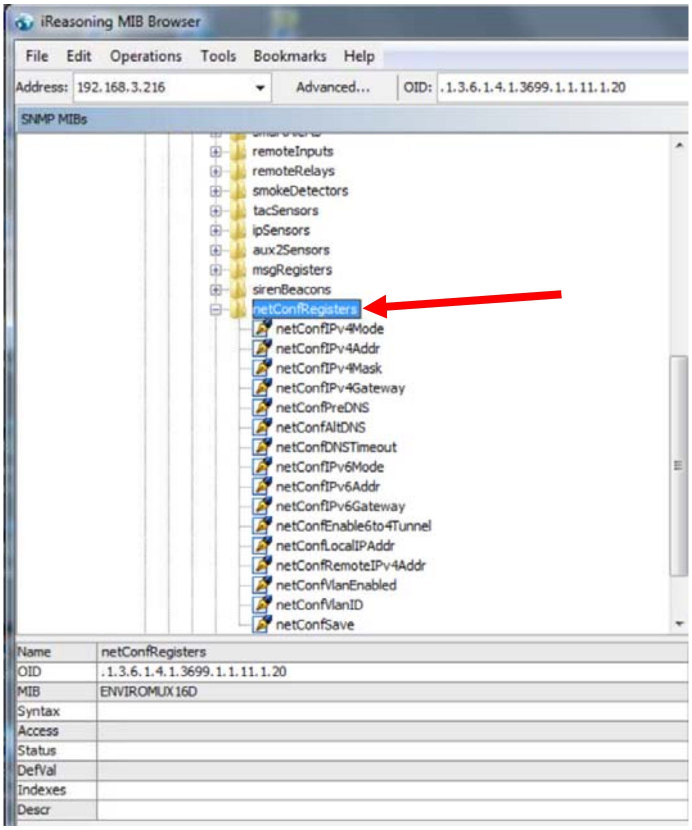
OID .1.3.6.1.4.1.3699.1.1.11.1.1.10.0

Data Type Integer

Value {normal(0), reboot(1)}

Figure 153- Use SNMP to reboot the ENVIROMUX

To view and change network settings, double-click "NetConfRegisters" from the SNMP MIBs tree.



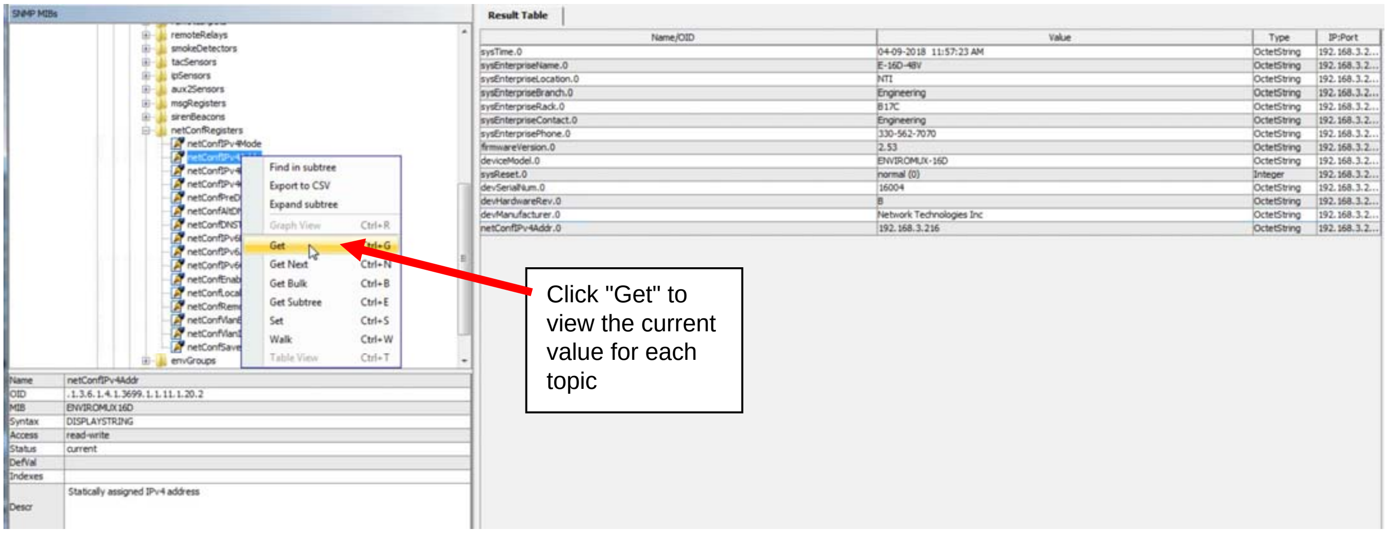
Address: 192.168.3.216

OID: .1.3.6.1.4.1.3699.1.1.11.1.20

Name	netConfRegisters
OID	.1.3.6.1.4.1.3699.1.1.11.1.20
MIB	ENVIROMUX16D
Syntax	
Access	
Status	
DefVal	
Indexes	
Descr	

Figure 154- Network Configuration topics through SNMP

To view the current setting of any property, right click the topic and click "Get". The value for that property will appear in the Result Table.



Name	netConfIPv4Addr
OID	.1.3.6.1.4.1.3699.1.1.11.1.20.2
MIB	ENVIROMUX16D
Syntax	DISPLAYSTRING
Access	read-write
Status	current
DefVal	
Indexes	
Descr	Statically assigned IPv4 address

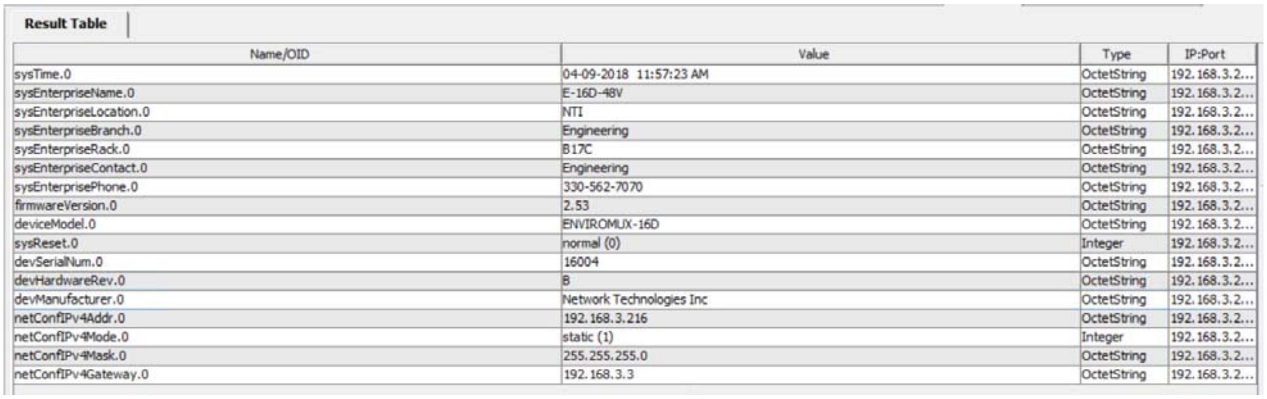
Name/OID	Value	Type	IP:Port
sysTime.0	04-09-2018 11:57:23 AM	OctetString	192.168.3.2...
sysEnterpriseName.0	E-16D-48V	OctetString	192.168.3.2...
sysEnterpriseLocation.0	NTI	OctetString	192.168.3.2...
sysEnterpriseBranch.0	Engineering	OctetString	192.168.3.2...
sysEnterpriseRack.0	B17C	OctetString	192.168.3.2...
sysEnterpriseContact.0	Engineering	OctetString	192.168.3.2...
sysEnterprisePhone.0	330-562-7070	OctetString	192.168.3.2...
firmwareVersion.0	2.53	OctetString	192.168.3.2...
deviceModel.0	ENVIROMUX-16D	OctetString	192.168.3.2...
sysReset.0	normal (0)	Integer	192.168.3.2...
devSerialNum.0	16004	OctetString	192.168.3.2...
devHardwareRev.0	B	OctetString	192.168.3.2...
devManufacturer.0	Network Technologies Inc	OctetString	192.168.3.2...
netConfIPv4Addr.0	192.168.3.216	OctetString	192.168.3.2...

Click "Get" to view the current value for each topic

Figure 155- View Network Configuration settings in SNMP

To change a network setting, right click the topic and click "Set". In the window that pops up, enter the value that you want to change that topic to. Then click "OK". Repeat for each of the network settings to be changed.

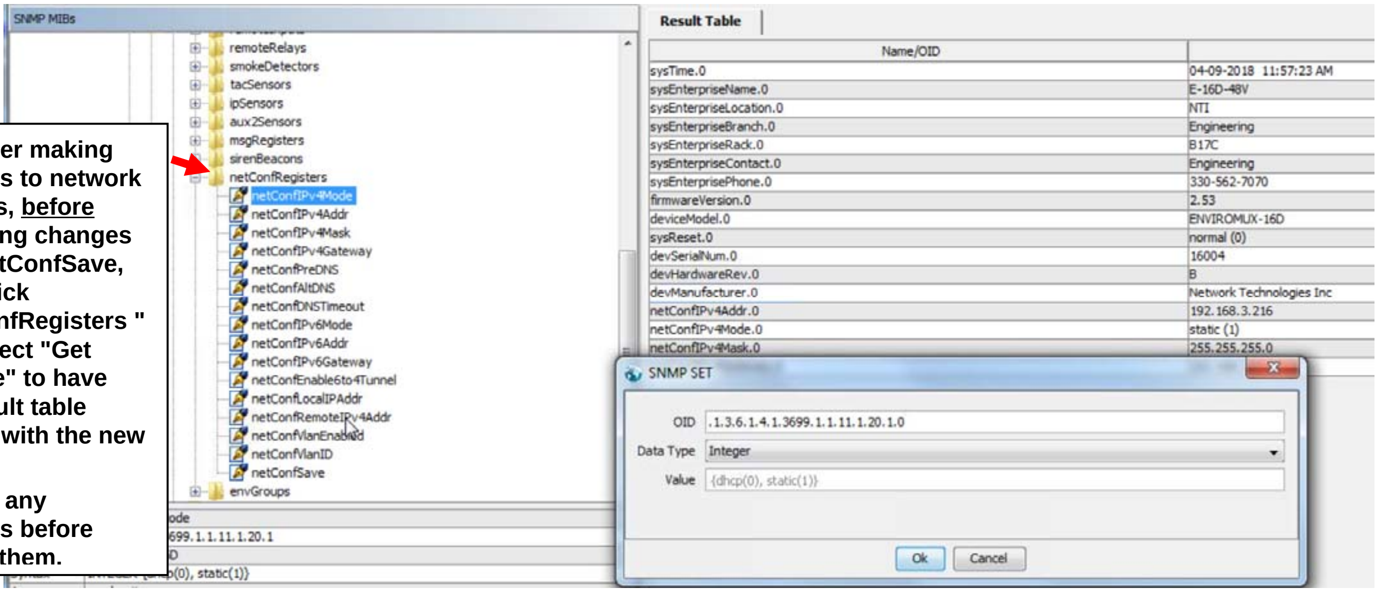
Note: Individual network setting value changes will not take immediate affect. Once you are done making all network setting changes, right click the topic "netConfSave", enter the value "1" and click "OK". All network settings changes made will now take immediate affect.



Result Table

Name/OID	Value	Type	IP:Port
sysTime.0	04-09-2018 11:57:23 AM	OctetString	192.168.3.2...
sysEnterpriseName.0	E-16D-48V	OctetString	192.168.3.2...
sysEnterpriseLocation.0	NTI	OctetString	192.168.3.2...
sysEnterpriseBranch.0	Engineering	OctetString	192.168.3.2...
sysEnterpriseRack.0	B17C	OctetString	192.168.3.2...
sysEnterpriseContact.0	Engineering	OctetString	192.168.3.2...
sysEnterprisePhone.0	330-562-7070	OctetString	192.168.3.2...
firmwareVersion.0	2.53	OctetString	192.168.3.2...
deviceModel.0	ENVIROMUX-16D	OctetString	192.168.3.2...
sysReset.0	normal (0)	Integer	192.168.3.2...
devSerialNum.0	16004	OctetString	192.168.3.2...
devHardwareRev.0	B	OctetString	192.168.3.2...
devManufacturer.0	Network Technologies Inc	OctetString	192.168.3.2...
netConfIPv4Addr.0	192.168.3.216	OctetString	192.168.3.2...
netConfIPv4Mode.0	static (1)	Integer	192.168.3.2...
netConfIPv4Mask.0	255.255.255.0	OctetString	192.168.3.2...
netConfIPv4Gateway.0	192.168.3.3	OctetString	192.168.3.2...

Figure 156- SNMP-Present Network Configuration



Result Table

Name/OID	
sysTime.0	04-09-2018 11:57:23 AM
sysEnterpriseName.0	E-16D-48V
sysEnterpriseLocation.0	NTI
sysEnterpriseBranch.0	Engineering
sysEnterpriseRack.0	B17C
sysEnterpriseContact.0	Engineering
sysEnterprisePhone.0	330-562-7070
firmwareVersion.0	2.53
deviceModel.0	ENVIROMUX-16D
sysReset.0	normal (0)
devSerialNum.0	16004
devHardwareRev.0	B
devManufacturer.0	Network Technologies Inc
netConfIPv4Addr.0	192.168.3.216
netConfIPv4Mode.0	static (1)
netConfIPv4Mask.0	255.255.255.0

SNMP SET

OID .1.3.6.1.4.1.3699.1.1.11.1.20.1.0

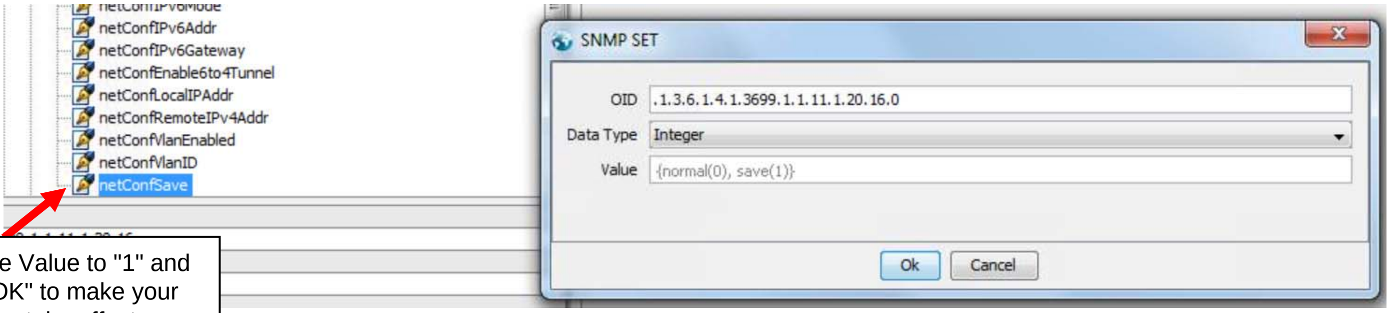
Data Type Integer

Value {dhcp(0), static(1)}

Tip: After making changes to network settings, __before__ executing changes with netConfSave, right click "netConfRegisters " and select "Get Subtree" to have the result table update with the new values.

Review any changes before saving them.

Figure 157- Que up changes to Network Settings



SNMP SET

OID .1.3.6.1.4.1.3699.1.1.11.1.20.16.0

Data Type Integer

Value {normal(0), save(1)}

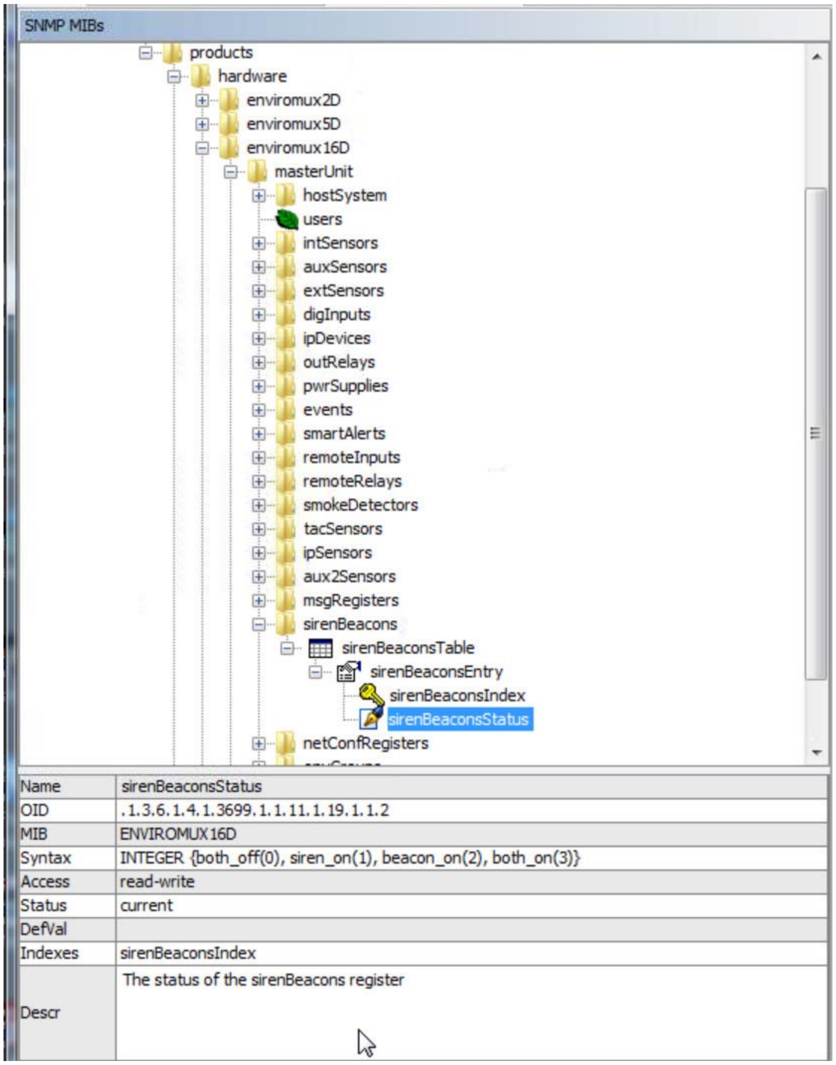
Change Value to "1" and click "OK" to make your changes take affect.

Figure 158- Save and execute changes made to network settings

USING SNMP TO CONTROL SIREN AND/OR BEACON

You can use a MIB browser to toggle the siren and beacon ON and OFF.   (requires firmware version 2.52 or later).

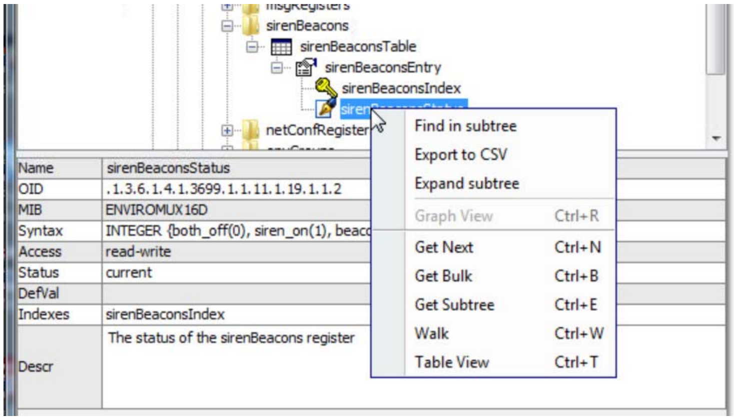
To see the siren and beacon entries, click on "masterUnit" under the ENVIROMUX model, then click on "sirenBeacons" , double-click to open the subtree.



Name	sirenBeaconsStatus
OID	.1.3.6.1.4.1.3699.1.1.11.1.19.1.1.2
MIB	ENVIROMUX16D
Syntax	INTEGER {both_off(0), siren_on(1), beacon_on(2), both_on(3)}
Access	read-write
Status	current
DefVal	
Indexes	sirenBeaconsIndex
Descr	The status of the sirenBeacons register

To see status, right click "sirenBeaconsStatus" to open menu, and click on "Get Next".

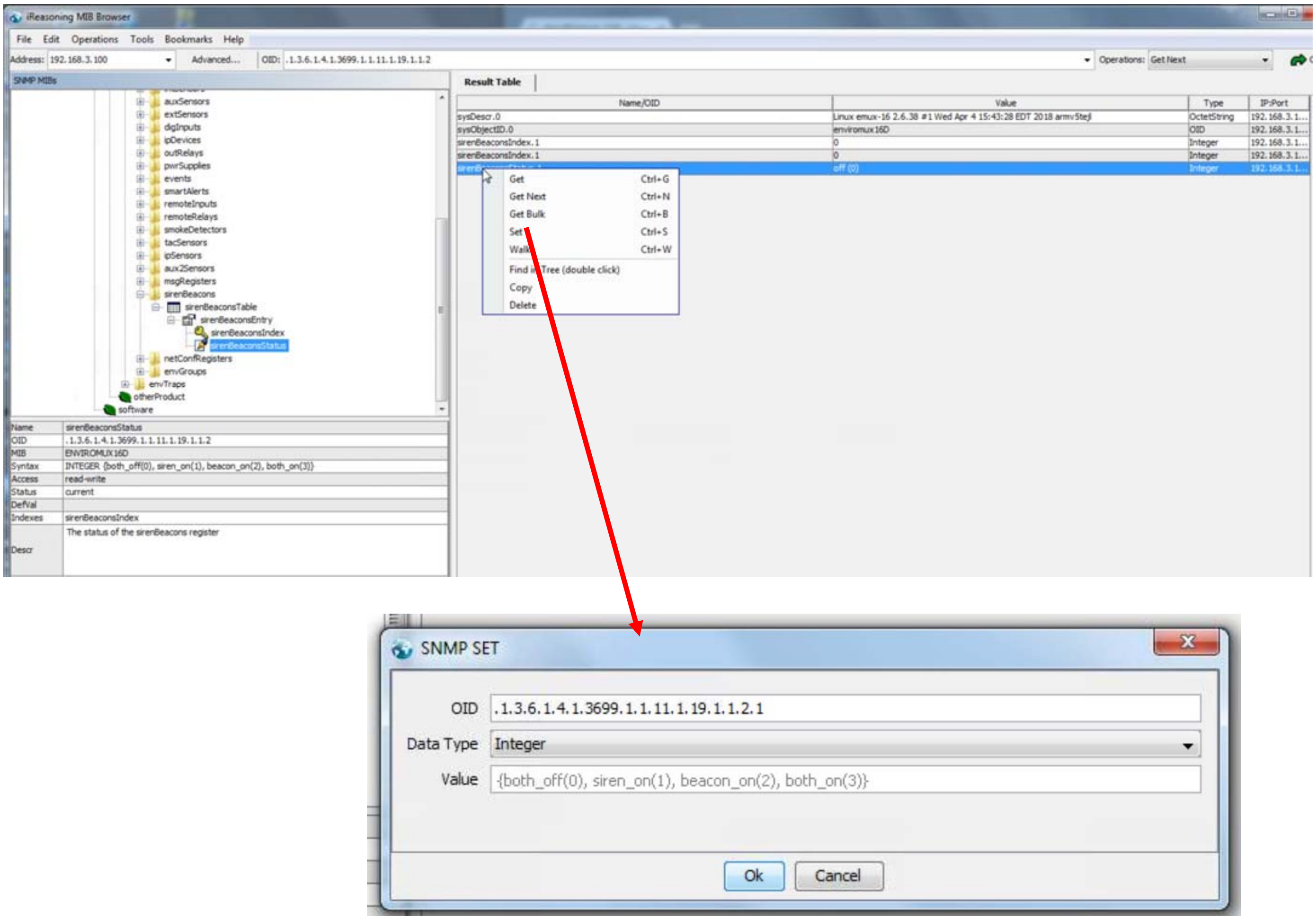
The status will show up in the results table to the right.



Name	sirenBeaconsStatus
OID	.1.3.6.1.4.1.3699.1.1.11.1.19.1.1.2
MIB	ENVIROMUX16D
Syntax	INTEGER {both_off(0), siren_on(1), beac
Access	read-write
Status	current
DefVal	
Indexes	sirenBeaconsIndex
Descr	The status of the sirenBeacons register

Figure 159- Siren and Beacon status viewed from MIB browser

In the results table, right-click "sirenBeaconStatus.1" to open menu. Click "Set" to see window where the settings of the Siren and Beacon can be changed.



Address: 192.168.3.100

OID: .1.3.6.1.4.1.3699.1.1.11.1.19.1.1.2

Name/OID	Value	Type	IP:Port
sysDescr.0	Linux emux-16 2.6.38 #1 Wed Apr 4 15:43:28 EDT 2018 armv5tejl	OctetString	192.168.3.1...
sysObjectID.0	enviromux16D	OID	192.168.3.1...
sirenBeaconsIndex.1	0	Integer	192.168.3.1...
sirenBeaconsIndex.1	0	Integer	192.168.3.1...
sirenB	off (0)	Integer	192.168.3.1...

Name	sirenBeaconsStatus
OID	.1.3.6.1.4.1.3699.1.1.11.1.19.1.1.2
MIB	ENVIROMUX16D
Syntax	INTEGER {both_off(0), siren_on(1), beacon_on(2), both_on(3)}
Access	read-write
Status	current
DefVal	
Indexes	sirenBeaconsIndex
Descr	The status of the sirenBeacons register

OID .1.3.6.1.4.1.3699.1.1.11.1.19.1.1.2.1

Data Type Integer

Value {both_off(0), siren_on(1), beacon_on(2), both_on(3)}

Figure 160- Control Siren and Beacon operation from MIB browser

Enter a value of 0 to turn both OFF

1 to turn the siren ON

2 to turn the beacon ON

3 to turn both the siren and beacon ON

Then click OK to execute the change.   The change will have immediate affect.

SHUTDOWN WINDOWS SERVER USING REMOTE SSH COMMAND

Following the steps outlined below, a Windows server can be shutdown automatically by the ENVIROMUX SYSTEM.

Cygwin Method

1. Setup a user account on the Windows PC named “root” (must be all lower case) and make sure user “root” has administrative privileges.

2. Install an SSH server on the Windows PC. (We used Cygwin for our test. We found instruction on Oracle for installation that was very helpful http://docs.oracle.com/cd/E24628_01/install.121/e22624/preinstall_req_cygwin_ssh.htm).

3. Setup a user account in your SSH server named “root”.

4. Check to make sure the SSH configuration file has RSA authorization enabled and if not, edit the SSH server configuration file to enable it (in cygwin the file was found at c:\cygwin64\etc\sshd_config). Other SSH servers might have different configuration filenames.

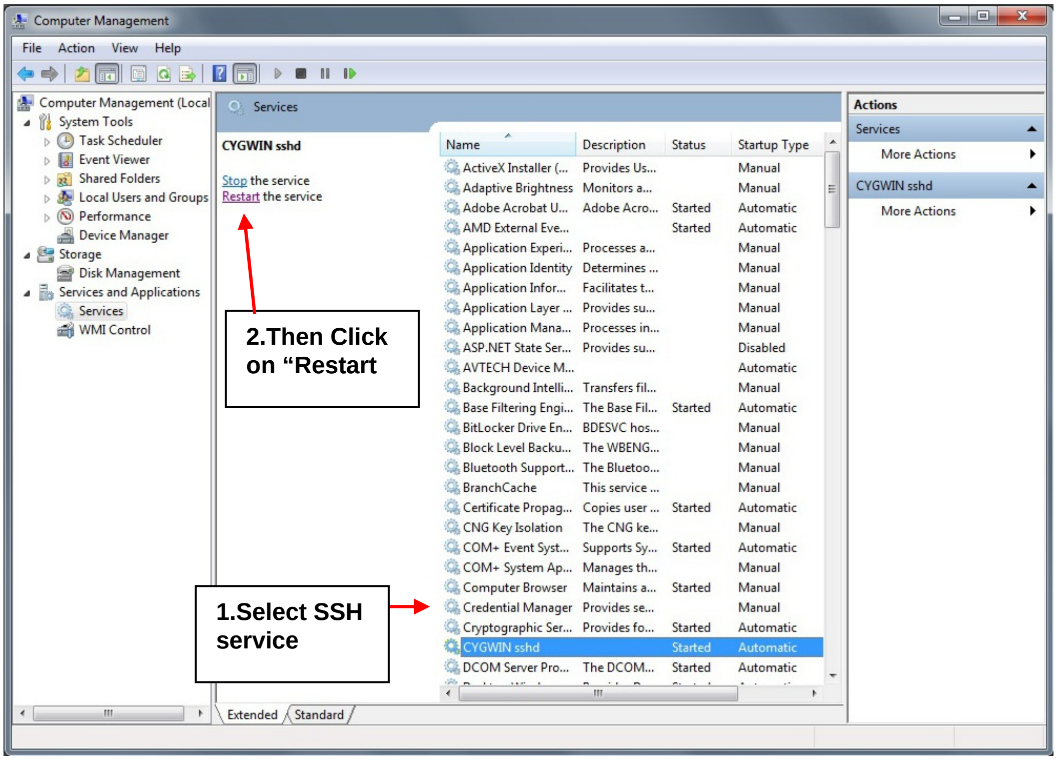
5. Download the RSA Public Key (page 66) to the Windows computer. The downloaded file will have the default name **`id_rsa.pub`**.

6. Create a directory in the SSH server directory called “/home/root/.ssh” (i.e. `c:/cygwin64/`**`home/root/.ssh`** and don’t forget to put the period before the “ssh”).

7. On the computer to take the command, logged in as root, from the directory where the file was downloaded, type the command:

```
$ cat id_rsa.pub >> /home/root/.ssh/authorized_keys
```

8. Then, to make the change take effect, restart the SSH server. To do this, **right** click on “Computer” (in the Start Menu) and click on “Manage”. Locate the SSH server in the list of Services and select it. Then click on “Restart”.



CYGWIN sshd

Stop the service
Restart the service

2.Then Click on “Restart

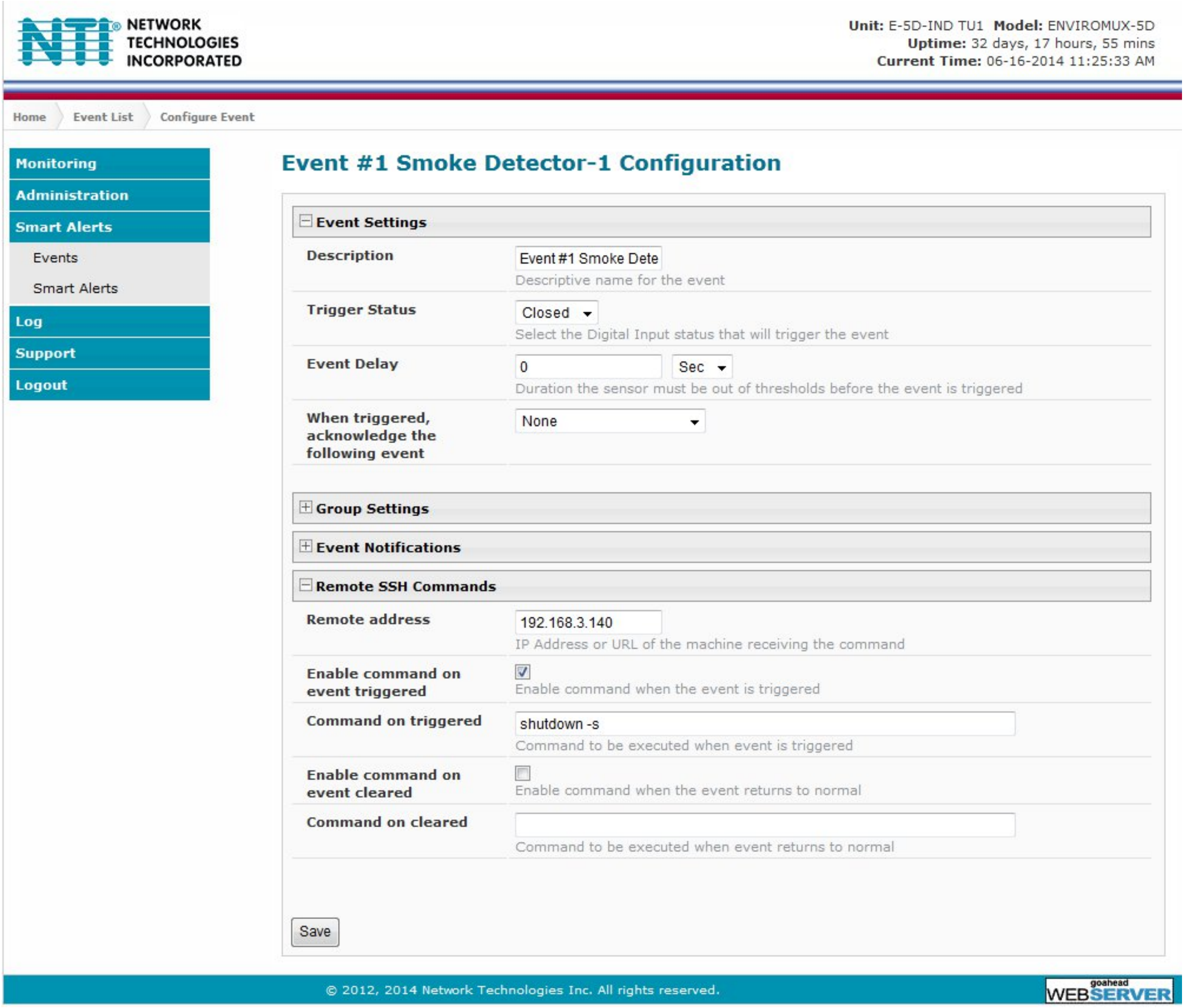
1.Select SSH service

Name	Description	Status	Startup Type
ActiveX Installer (...	Provides Us...		Manual
Adaptive Brightness	Monitors a...		Manual
Adobe Acrobat U...	Adobe Acro...	Started	Automatic
AMD External Eve...		Started	Automatic
Application Experi...	Processes a...		Manual
Application Identity	Determines ...		Manual
Application Infor...	Facilitates t...		Manual
Application Layer ...	Provides su...		Manual
Application Mana...	Processes in...		Manual
ASP.NET State Ser...	Provides su...		Disabled
AVTECH Device M...			Automatic
Background Intelli...	Transfers fil...		Manual
Base Filtering Engi...	The Base Fil...	Started	Automatic
BitLocker Drive En...	BDESVC hos...		Manual
Block Level Backu...	The WBENG...		Manual
Bluetooth Support...	The Bluetoo...		Manual
BranchCache	This service ...		Manual
Certificate Propag...	Copies user ...	Started	Automatic
CNG Key Isolation	The CNG ke...		Manual
COM+ Event Syst...	Supports Sy...	Started	Automatic
COM+ System Ap...	Manages th...		Manual
Computer Browser	Maintains a...	Started	Manual
Credential Manager	Provides se...		Manual
Cryptographic Ser...	Provides fo...	Started	Automatic
CYGWIN sshd		Started	Automatic
DCOM Server Pro...	The DCOM...	Started	Automatic

Figure 161- Restart CYGWIN service

9. Configure a Smart Alert to include an Event that will be used to trigger the shutdown of the Windows Server (page 99).

10. Within the Event configuration, apply the address of the Windows Server as the "Remote Address", place a checkmark in "Enable command on event triggered" and add a command to be executed as a Remote SSH command under "Command on triggered". (We used "shutdown –s" but there are more possibilities (http://technet.microsoft.com/en-us/library/cc780360%28v=ws.10%29.aspx).



Unit: E-5D-IND TU1 **Model:** ENVIROMUX-5D
Uptime: 32 days, 17 hours, 55 mins
Current Time: 06-16-2014 11:25:33 AM

Event #1 Smoke Detector-1 Configuration

⊟ **Event Settings**

Description	Event #1 Smoke Dete Descriptive name for the event
Trigger Status	Closed Select the Digital Input status that will trigger the event
Event Delay	0 Sec Duration the sensor must be out of thresholds before the event is triggered
When triggered, acknowledge the following event	None

⊞ **Group Settings**

⊞ **Event Notifications**

⊟ **Remote SSH Commands**

Remote address	192.168.3.140 IP Address or URL of the machine receiving the command
Enable command on event triggered	☑ Enable command when the event is triggered
Command on triggered	shutdown -s Command to be executed when event is triggered
Enable command on event cleared	☐ Enable command when the event returns to normal
Command on cleared	 Command to be executed when event returns to normal

Figure 162- Configure Event for remote shutdown

10. Be sure to click "Save" when finished.

OPEN SSH Method

1. Setup SSH server on Windows machine with public key access. If this procedure is already done, skip to step 2
   a. We are using OpenSSH for windows to setup SSH server. Any SSH server compatible for your Windows OS can be used.
   b. Please install SSH to the location as in below link and execute the commands to setup SSH server and Setting up Public Key Authentication.
      https://winscp.net/eng/docs/guide_windows_openssh_server
      https://winscp.net/eng/docs/guide_public_key
   c. Make sure you can start the SSH service listed in your windows services list (services.msc application).
   d. Troubleshooting:

* During execution of SSH setup commands if you receive syntax error for

```
powershell.exe -ExecutionPolicy Bypass -File .\FixHostFilePermissions.ps1 -Confirm:$false
```

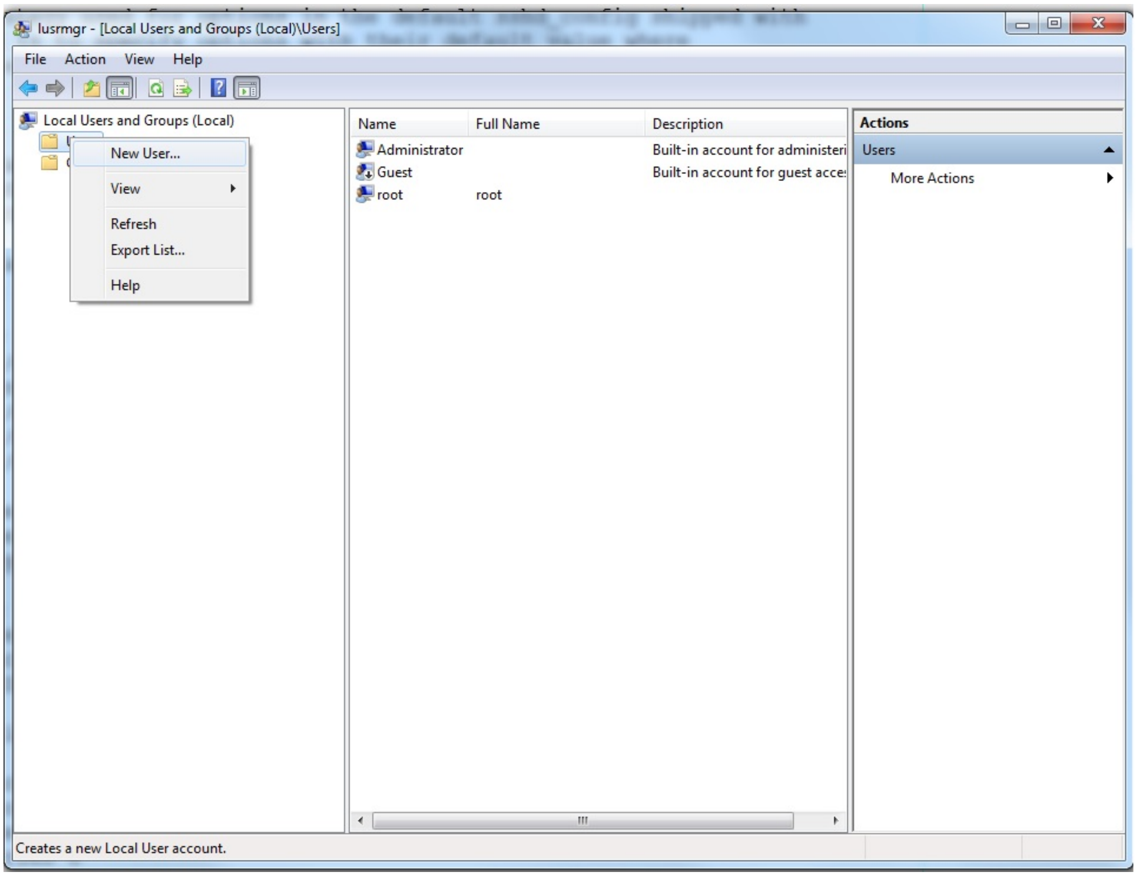
please use the below command instead:

```
      powershell.exe -ExecutionPolicy Bypass -File .\FixHostFilePermissions.ps1
```

* During startup process if you receive error related to a permission issue, please make sure LOCAL SERVICE is added to “Replace a process level token”. If not it can be added by opening the application secpol.msc -> Local Policies -> User Rights Assignment -> 'Replace a process level token' as mentioned in below link.

https://social.technet.microsoft.com/Forums/en-US/419ba006-4413-4036-8c49-252b08593131/service-fails-to-start-error-1297-and-7000?forum=winserverDS

2. Add E-xD user to Windows SSH service user list.
   a. E-xD logs in as user root. If you do not have a 'root' user on the PC add this user by going in to Control Panel -> Manage User Accounts -> 'Advanced' tab -> Advanced -> Right click on User and add New User as shown in root_user.jpg. User password can be anything you wish as this is not used by the E-xD.



Name	Full Name	Description
Administrator		Built-in account for administeri
Guest		Built-in account for guest acce:
root	root	

Creates a new Local User account.

Figure 163- Add user "root" to PC

b. Download RSA public key from E-xD as shown in Figure 164 and rename the file to 'authorized_keys'. Place this file into the following path:

```
C:\Program files\OpenSSH\ssh\authorized_keys
```

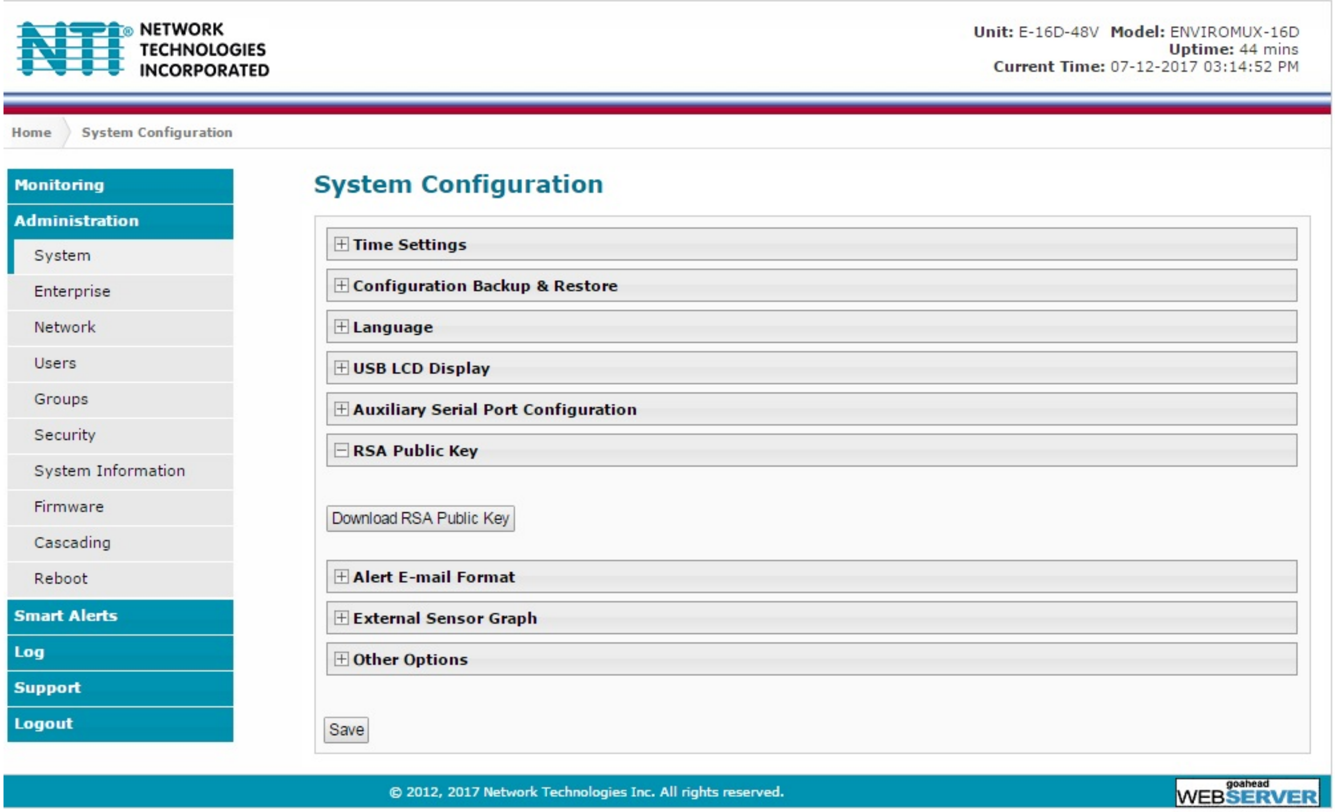
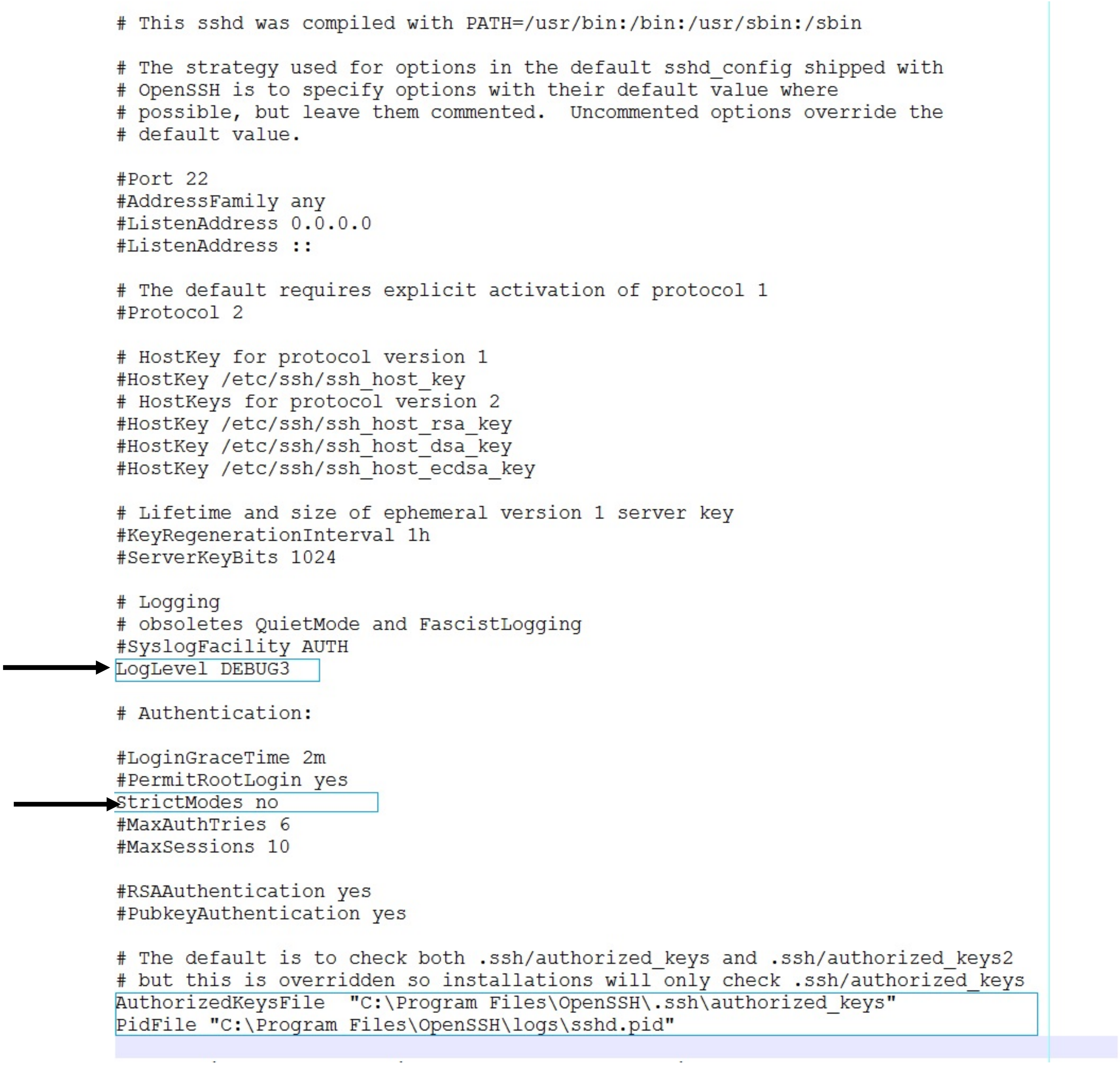


Figure 164- Download RSA Public Key

c. The permissions on this file needs to be limited to the user running SSH service. If not please disable Strict Mode in sshd_config file as shown in Figure 165. Please make sure the path of public key and pid file is correct and accessible by SSH service.



```
# This sshd was compiled with PATH=/usr/bin:/bin:/usr/sbin:/sbin

# The strategy used for options in the default sshd_config shipped with
# OpenSSH is to specify options with their default value where
# possible, but leave them commented.  Uncommented options override the
# default value.

#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

# The default requires explicit activation of protocol 1
#Protocol 2

# HostKey for protocol version 1
#HostKey /etc/ssh/ssh_host_key
# HostKeys for protocol version 2
#HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_dsa_key
#HostKey /etc/ssh/ssh_host_ecdsa_key

# Lifetime and size of ephemeral version 1 server key
#KeyRegenerationInterval 1h
#ServerKeyBits 1024

# Logging
# obsoletes QuietMode and FascistLogging
#SyslogFacility AUTH
LogLevel DEBUG3

# Authentication:

#LoginGraceTime 2m
#PermitRootLogin yes
StrictModes no
#MaxAuthTries 6
#MaxSessions 10

#RSAAuthentication yes
#PubkeyAuthentication yes

# The default is to check both .ssh/authorized_keys and .ssh/authorized_keys2
# but this is overridden so installations will only check .ssh/authorized_keys
AuthorizedKeysFile  "C:\Program Files\OpenSSH\.ssh\authorized_keys"
PidFile "C:\Program Files\OpenSSH\logs\sshd.pid"
```

Figure 165- sshd_config file

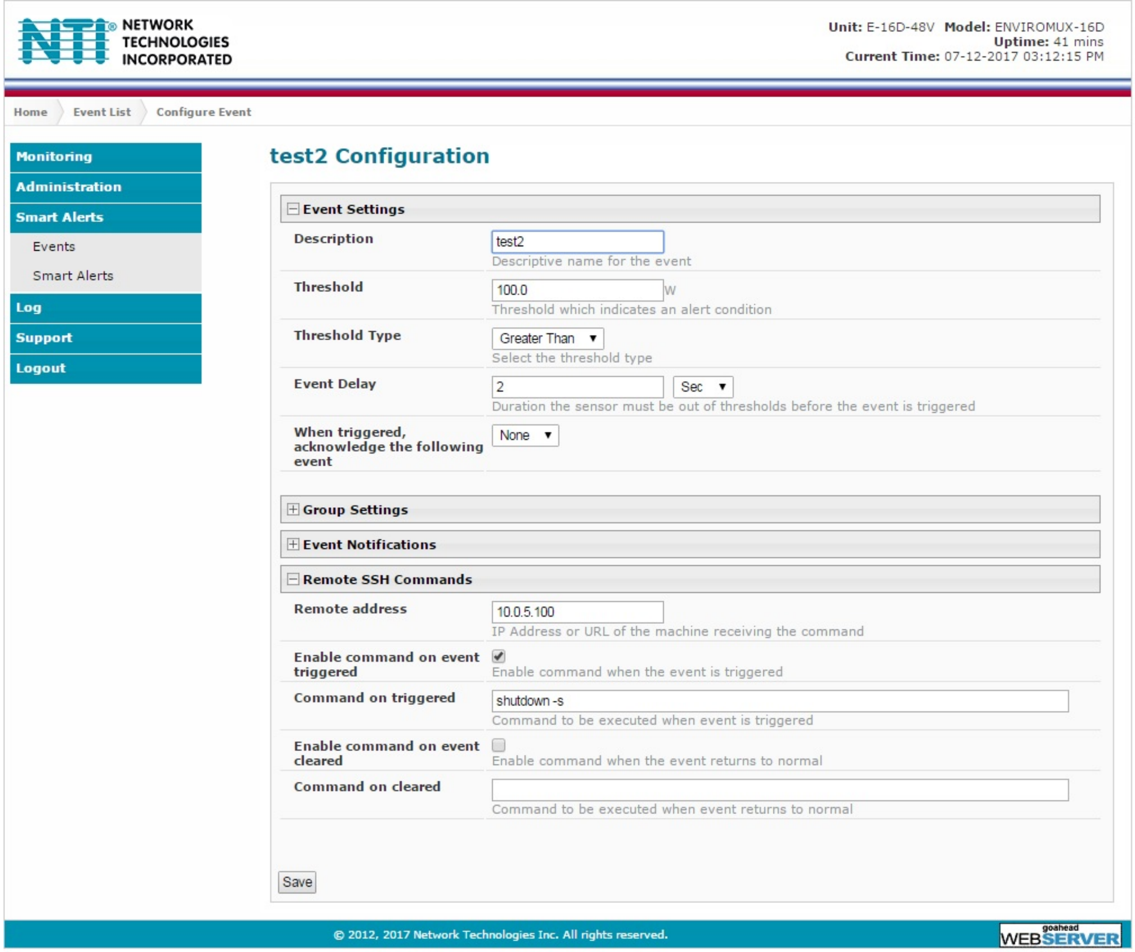
d. To troubleshoot any errors please set log level to DEBUG3 as shown in the image above.

3. Setup of SSH command on E-xD:

a. To test, try logging into windows machine using any user and password. You can also try testing public key authentication by generating your own SSH key and adding its rsa key to the authorized_keys file.

b. Any windows commands can be executed on Windows machine through E-xD. To shutdown, add an event with remote SSH command 'shutdown -s' as shown in Figure 166. Shutdown parameters like timeout can be configured as described in the link below:

https://technet.microsoft.com/en-us/library/bb491003.aspx



Unit: E-16D-48V **Model:** ENVIROMUX-16D
Uptime: 41 mins
Current Time: 07-12-2017 03:12:15 PM

test2 Configuration

⊟ **Event Settings**

Description	test2 Descriptive name for the event
Threshold	100.0 W Threshold which indicates an alert condition
Threshold Type	Greater Than ▾ Select the threshold type
Event Delay	2 Sec ▾ Duration the sensor must be out of thresholds before the event is triggered
When triggered, acknowledge the following event	None ▾

⊞ **Group Settings**

⊞ **Event Notifications**

⊟ **Remote SSH Commands**

Remote address	10.0.5.100 IP Address or URL of the machine receiving the command
Enable command on event triggered	☑ Enable command when the event is triggered
Command on triggered	shutdown -s Command to be executed when event is triggered
Enable command on event cleared	☐ Enable command when the event returns to normal
Command on cleared	 Command to be executed when event returns to normal

Figure 166- Configure Event for Remote SSH Command

c. To troubleshoot any issues please check event log on E-xD which should show a message if there was any error. Also SSH logs will be helpful to fix an issue.

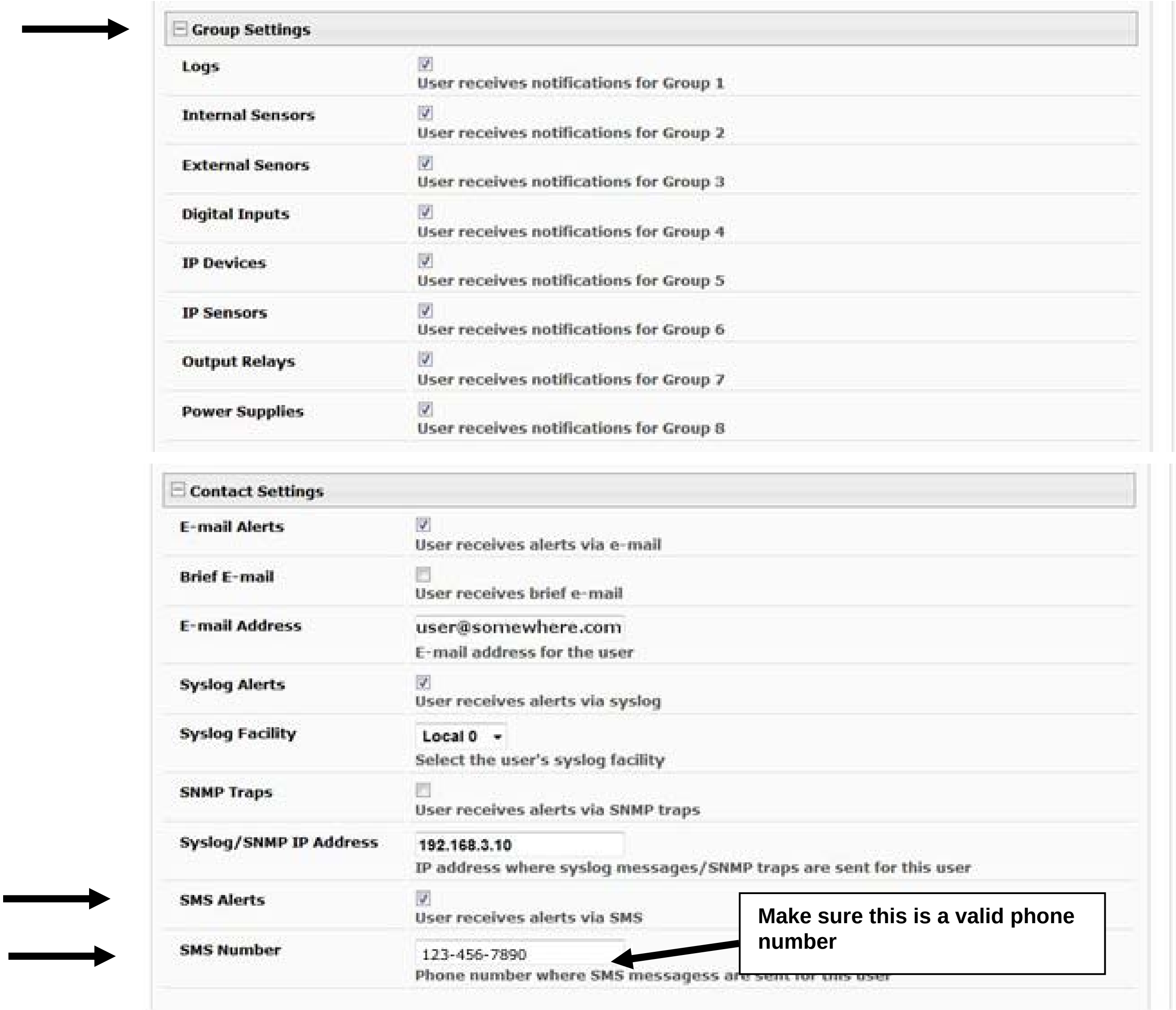
SETUP AND TEST SMS MESSAGING

To test a modem installed on an ENVIROMUX Monitoring System, you must first make sure the System has been configured properly to use the modem. This guide will take you through the basic steps to do that. For more details, see other parts of this manual.

1. Install a USB modem as directed on page 17.

2. Configure the ENVIROMUX User Account Contact settings (Administration -> Users ->Edit User -> Contact Settings) to receive SMS Alerts and enter a valid phone number for the SMS messages to be sent to for that user.

Also make sure that user is set to receive messages from the type of sensor causing the message to be sent. Make sure enough boxes are checked under “Group Settings.“ .



⊟ Group Settings

Logs	☑ User receives notifications for Group 1
Internal Sensors	☑ User receives notifications for Group 2
External Senors	☑ User receives notifications for Group 3
Digital Inputs	☑ User receives notifications for Group 4
IP Devices	☑ User receives notifications for Group 5
IP Sensors	☑ User receives notifications for Group 6
Output Relays	☑ User receives notifications for Group 7
Power Supplies	☑ User receives notifications for Group 8

⊟ Contact Settings

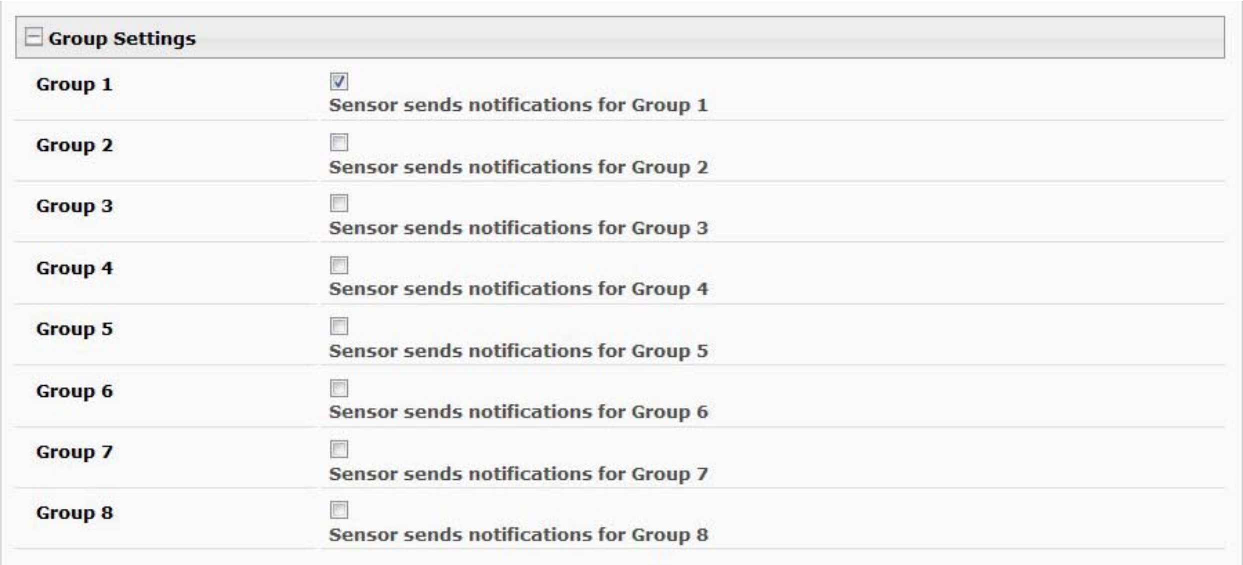
E-mail Alerts	☑ User receives alerts via e-mail
Brief E-mail	□ User receives brief e-mail
E-mail Address	user@somewhere.com E-mail address for the user
Syslog Alerts	☑ User receives alerts via syslog
Syslog Facility	Local 0 ▾ Select the user's syslog facility
SNMP Traps	□ User receives alerts via SNMP traps
Syslog/SNMP IP Address	192.168.3.10 IP address where syslog messages/SNMP traps are sent for this user
SMS Alerts	☑ User receives alerts via SMS
SMS Number	123-456-7890 Phone number where SMS messagess are sent for this user

Make sure this is a valid phone number

(Image from the E-XD web interface under User Settings)

3. Configure a sensor to send alerts via SMS messaging. These settings can be found under Sensor Configuration on page 85.

First make sure the sensor will send messages to a group the user is configured to get messages from, again, under "Group Settings" for that sensor.

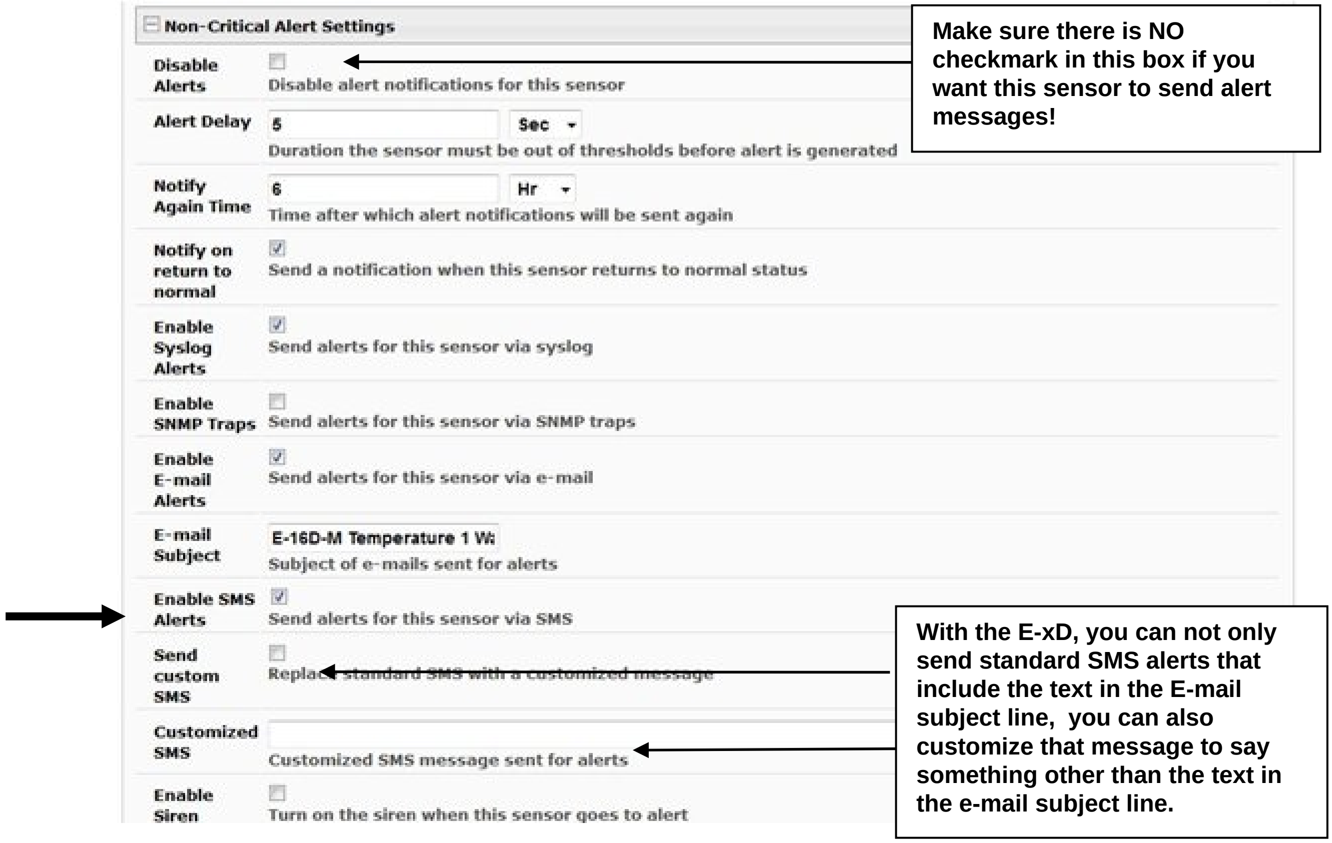


Group Settings

Group 1	☑ Sensor sends notifications for Group 1
Group 2	□ Sensor sends notifications for Group 2
Group 3	□ Sensor sends notifications for Group 3
Group 4	□ Sensor sends notifications for Group 4
Group 5	□ Sensor sends notifications for Group 5
Group 6	□ Sensor sends notifications for Group 6
Group 7	□ Sensor sends notifications for Group 7
Group 8	□ Sensor sends notifications for Group 8

(Image from the E-XD web interface under Sensor Configuration Settings)

Next make sure that "Enable SMS Alerts" is checked. Also make sure that "Disable Alerts" is **NOT** checked for this sensor.



Non-Critical Alert Settings

Disable Alerts	□ Disable alert notifications for this sensor
Alert Delay	5 Sec Duration the sensor must be out of thresholds before alert is generated
Notify Again Time	6 Hr Time after which alert notifications will be sent again
Notify on return to normal	☑ Send a notification when this sensor returns to normal status
Enable Syslog Alerts	☑ Send alerts for this sensor via syslog
Enable SNMP Traps	□ Send alerts for this sensor via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this sensor via e-mail
E-mail Subject	E-16D-M Temperature 1 W: Subject of e-mails sent for alerts
Enable SMS Alerts	☑ Send alerts for this sensor via SMS
Send custom SMS	□ Replace standard SMS with a customized message
Customized SMS	Customized SMS message sent for alerts
Enable Siren	□ Turn on the siren when this sensor goes to alert

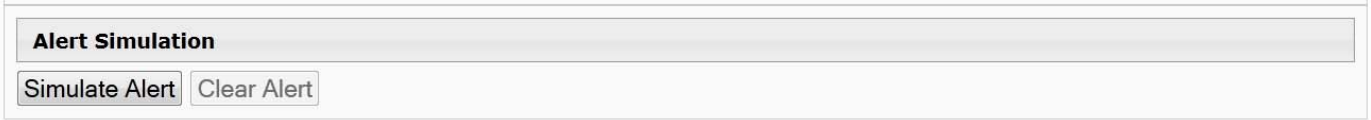
Make sure there is NO checkmark in this box if you want this sensor to send alert messages!

With the E-xD, you can not only send standard SMS alerts that include the text in the E-mail subject line, you can also customize that message to say something other than the text in the e-mail subject line.

(Image from the E-xD web interface under Sensor Configuration Settings)

4. Once the sensor is configured, and the user settings include the correct settings and valid phone number, a test can be conducted.

The web interface for the E-xD includes a button that simulates an alert message being sent. This is found under the sensor configuration for each sensor. There is also a button on the GSM Modem Status page that will send a test SMS message to all users configured to receive SMS messages (see below).

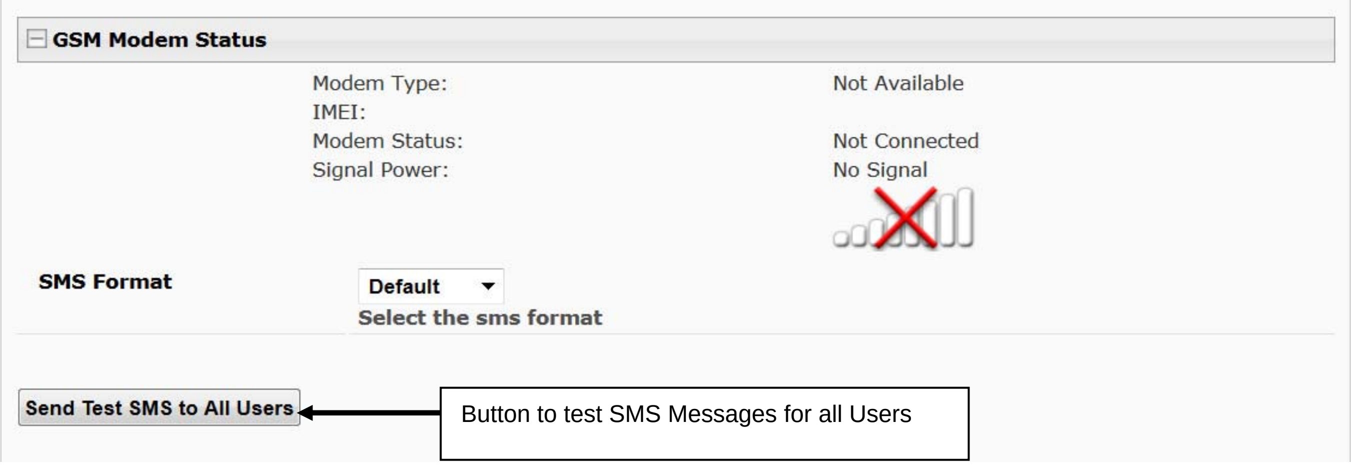


Once the alert is tripped or simulated, the phone number for the configured user should receive the configured SMS message.

Troubleshooting

If no message is received, double-check all of the settings just described. Then check your modem status and strength (see page 68).

When installed and working, the modem status will say "Ready" and the signal strength will be indicated. Ideally, signal strength should always be at least -100db. (-99, -98 is better, -101,-102 is worse). If the modem is plugged in and not working, make sure your SIM card is up to date and paid for with your service provider.



GSM Modem Status

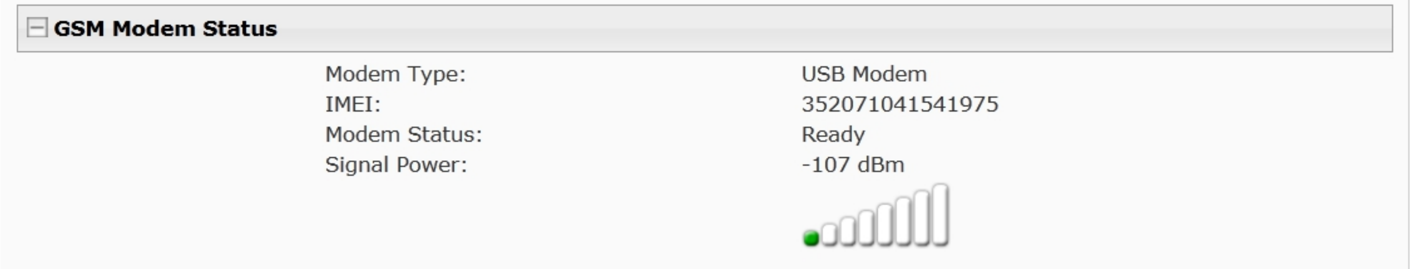
Modem Type:	Not Available
IMEI:	
Modem Status:	Not Connected
Signal Power:	No Signal

SMS Format: Default

Select the sms format

Button to test SMS Messages for all Users

No Modem Installed



GSM Modem Status

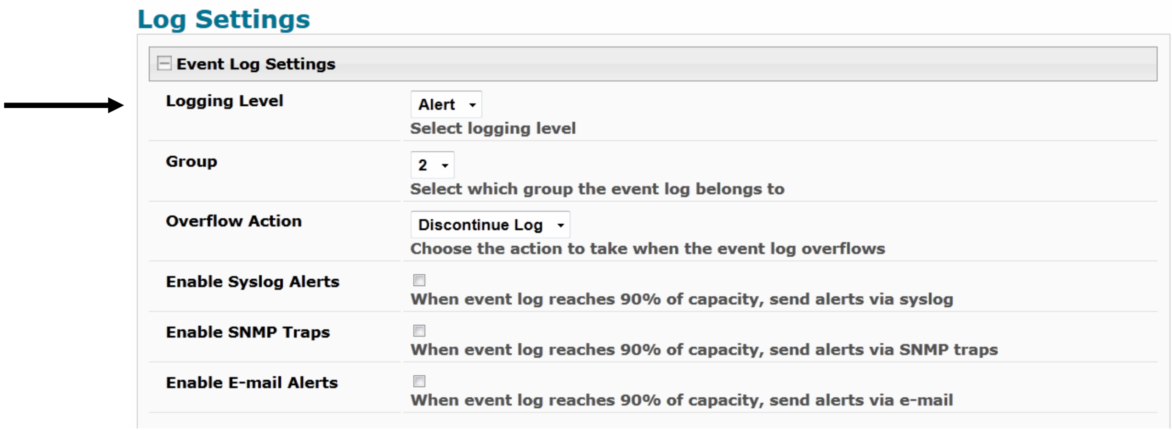
Modem Type:	USB Modem
IMEI:	352071041541975
Modem Status:	Ready
Signal Power:	-107 dBm

Modem properly installed in an E-xD (Note: Signal strength shown here is extremely poor)

If the signal to the modem is too weak, then either the ENVIROMUX will need to be moved or the modem will have to be moved (you can extend the modem up to 5 meters (16.4 feet) from the ENVIROMUX with a USB extension cable).

CMS Error Codes

With E-xD units, there is also a feature under Log Settings for setting the Logging Level. Try setting the Logging Level to "Debug", and test the SMS messaging again. If the SMS message does not work, check the event log for an error code. "CMS error #500" for example, might show up. Perform a web search on the error code to investigate the possible cause ("SIM card inactive") for example.



Log Settings

⊟ Event Log Settings

Logging Level	Alert ▾ Select logging level
Group	2 ▾ Select which group the event log belongs to
Overflow Action	Discontinue Log ▾ Choose the action to take when the event log overflows
Enable Syslog Alerts	☐ When event log reaches 90% of capacity, send alerts via syslog
Enable SNMP Traps	☐ When event log reaches 90% of capacity, send alerts via SNMP traps
Enable E-mail Alerts	☐ When event log reaches 90% of capacity, send alerts via e-mail

Log Setting configuration in E-xD

SMS RELAY VIA SNMP

The ENVIROMUX has the ability to send an SMS text message via SNMP using the ENVIROMUX as a relay (applies to ENVIROMUX firmware version 2.51 and later). The ENVIROMUX must have a GSM modem installed (page 17).

1. From within your SNMP browser, click on **msgRegisters** ->**msgRegisterDescription**.

2. Right click **msgRegisterDescription1** and select SET.

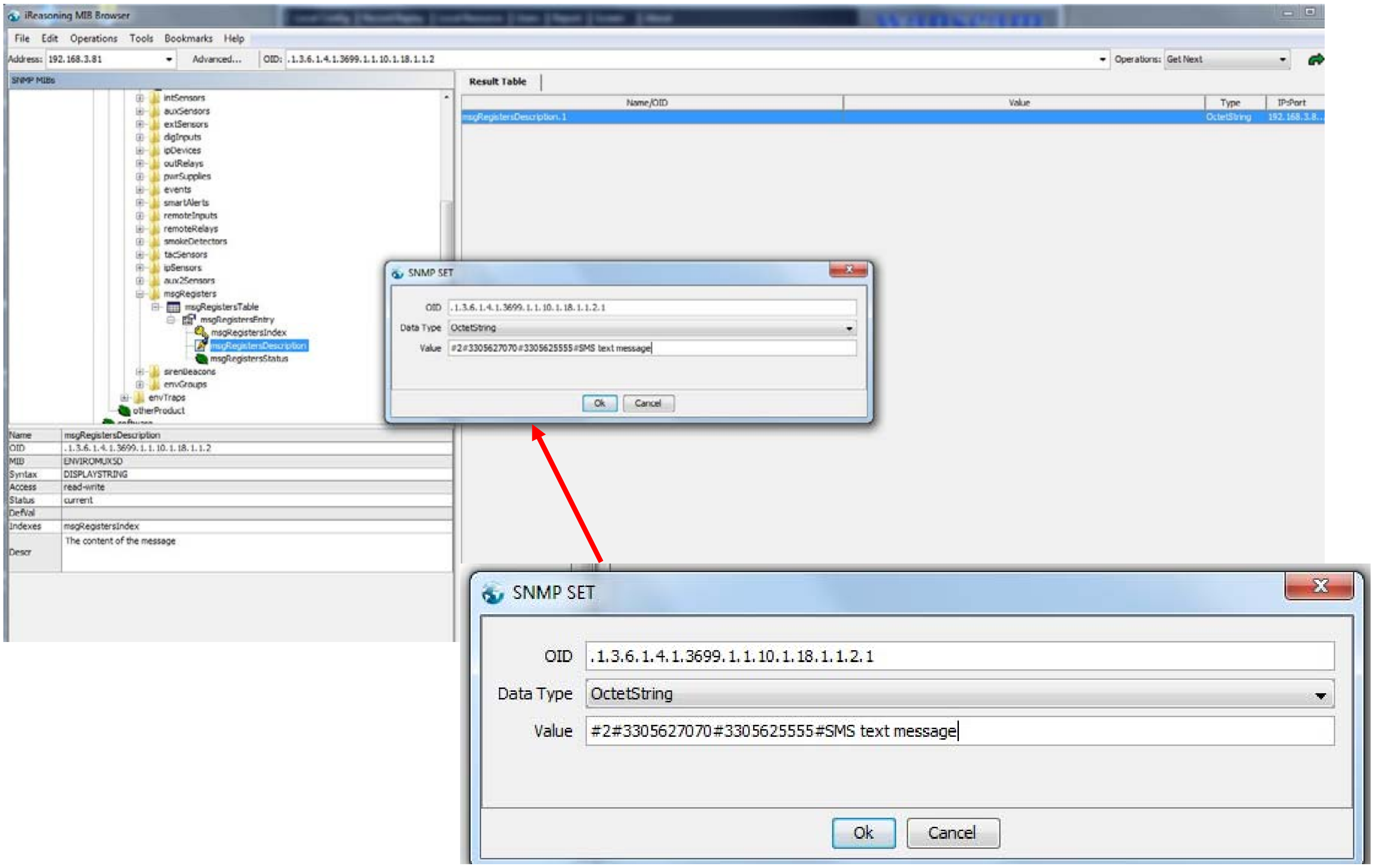
3. Under Value, enter the number of phone numbers to send the text message to (up to 4 different numbers), enter the phone numbers to be called (no hyphens), and enter a text message up to 160 characters in length. Each piece of information must be separated by a "#" sign.

Example:

#number of phone numbers (1-4)#phone number#next phone number#text message to be sent

#2#3305627070#3305622622#SMS SAMPLE MESSAGE

Note: If your Log Settings are set to Debug (page 112), when a text message is sent, a record of it being sent will be logged.



Address: 192.168.3.81

OID: .1.3.6.1.4.1.3699.1.1.10.1.18.1.1.2

Operations: Get Next

Name/OID	Value	Type	IP:Port
msgRegistersDescription.1		OctetString	192.168.3.8...

Name	msgRegistersDescription
OID	.1.3.6.1.4.1.3699.1.1.10.1.18.1.1.2
MIB	ENVIROMUXSD
Syntax	DISPLAYSTRING
Access	read-write
Status	current
DefVal	
Indexes	msgRegistersIndex
Descr	The content of the message

SNMP SET

OID .1.3.6.1.4.1.3699.1.1.10.1.18.1.1.2.1

Data Type OctetString

Value #2#3305627070#3305625555#SMS text message

Figure 167- Use SNMP as SMS Relay

USING ENABLE/DISABLE GLOBAL ALERTS FEATURE

Firmware version 2.57 introduces a feature that enables the user to enable and disable global alerts either manually or by using a trigger from a contact sensor. When disabled, an alert message will be sent to all configured users (see Figure 170 for sample message) that alerts have been disabled. The only other alert messages that will be received will be from contact sensors that enable or disable global alerts.

To manually enable or disable Global alerts, go to the Alarm Information page in the Monitoring Menu and click on the desired action.

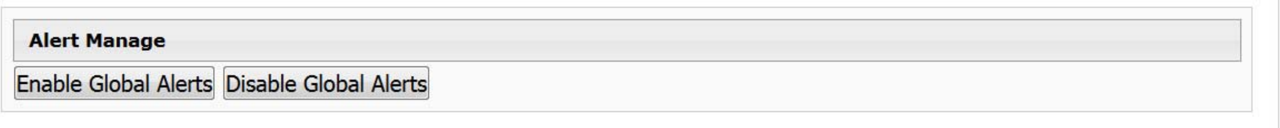


Figure 168- Buttons at the bottom of the Alarm Information page

For example, to use a sensor connected to a Digital Input to Enable or Disable Global alerts, set the state of the sensor that would cause this action to occur, and set the desired action.

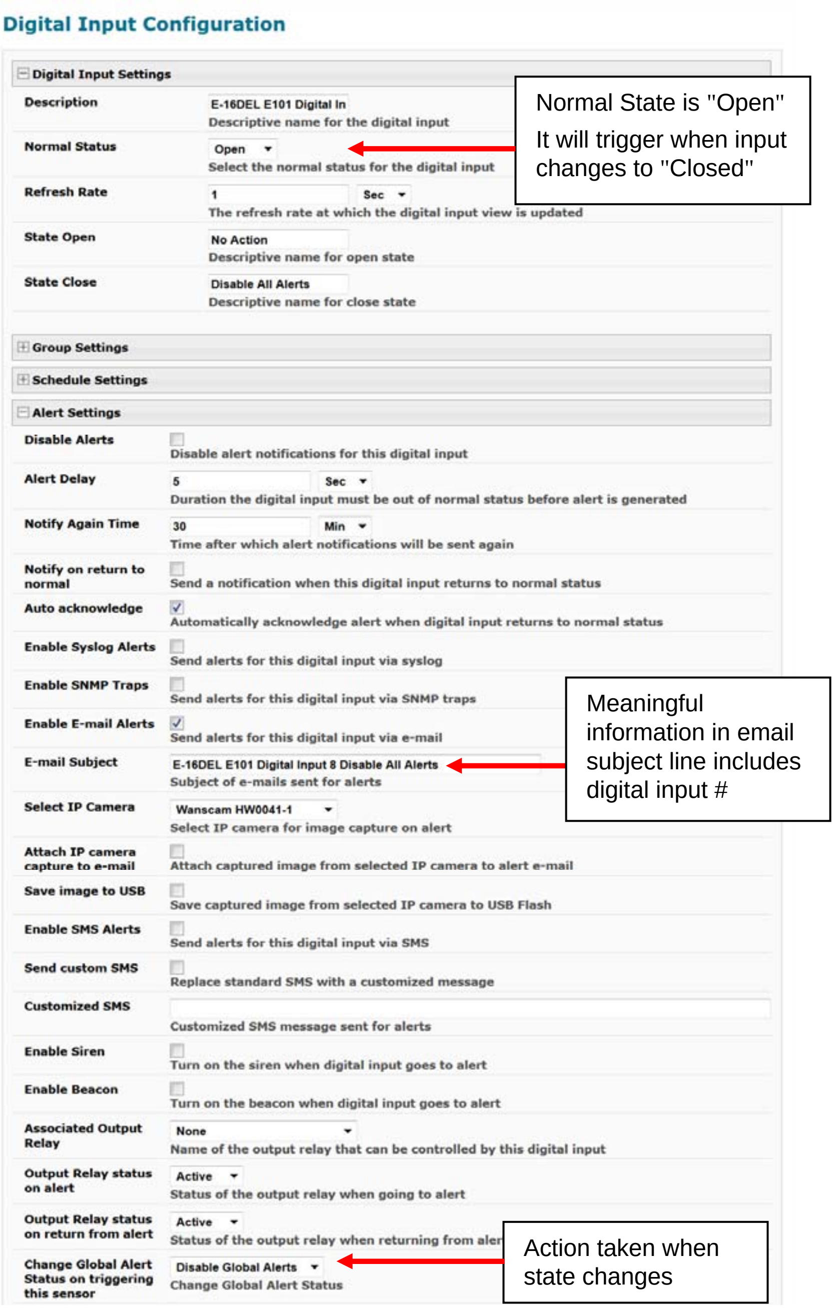
Note: A single digital input can enable or disable, one input cannot do both. To configure both actions, a second contact sensor must be configured.

In the image right, digital input 8 is configured to disable global alerts when closed. In this scenario, for example, one output of a E-ACKR keypad has been connected to digital input 8, and configured to close its contacts for 5 seconds when the proper code is entered.

Normal Status is set to "Open" so that it will trigger the action ("Disable Global Alerts" under Change Global Alert Status) when the status changes to Closed.

In order to have another contact sensor configured to enable global alerts when closed, connect it to a second set of digital inputs or RJ45 sensor port and configure it in the same fashion except change the action to "Enable Global Alerts".

For example, use the second set of outputs from an E-ACKR keypad, configured to change state with a different code than the first. This way you can disable global alerts with one code, and enable global alerts with the second.



Digital Input Configuration

⊟ Digital Input Settings

Description	E-16DEL E101 Digital In Descriptive name for the digital input
Normal Status	Open Select the normal status for the digital input
Refresh Rate	1 Sec The refresh rate at which the digital input view is updated
State Open	No Action Descriptive name for open state
State Close	Disable All Alerts Descriptive name for close state

⊞ Group Settings

⊞ Schedule Settings

⊟ Alert Settings

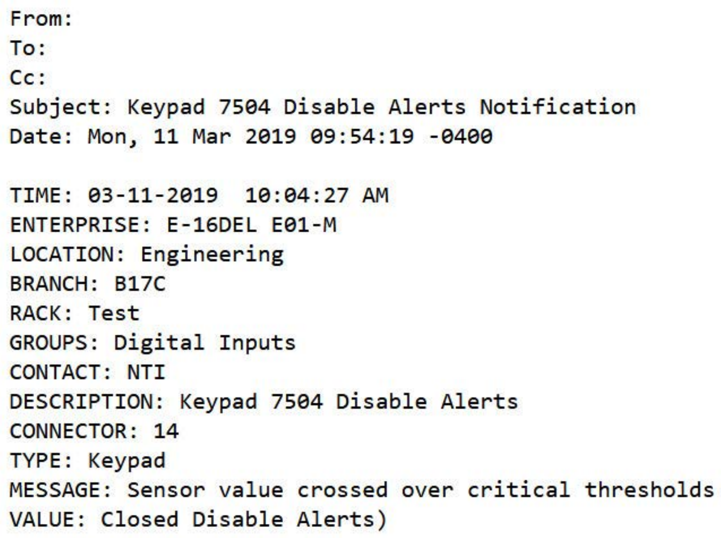
Disable Alerts	□ Disable alert notifications for this digital input
Alert Delay	5 Sec Duration the digital input must be out of normal status before alert is generated
Notify Again Time	30 Min Time after which alert notifications will be sent again
Notify on return to normal	□ Send a notification when this digital input returns to normal status
Auto acknowledge	☑ Automatically acknowledge alert when digital input returns to normal status
Enable Syslog Alerts	□ Send alerts for this digital input via syslog
Enable SNMP Traps	□ Send alerts for this digital input via SNMP traps
Enable E-mail Alerts	☑ Send alerts for this digital input via e-mail
E-mail Subject	E-16DEL E101 Digital Input 8 Disable All Alerts Subject of e-mails sent for alerts
Select IP Camera	Wanscam HW0041-1 Select IP camera for image capture on alert
Attach IP camera capture to e-mail	□ Attach captured image from selected IP camera to alert e-mail
Save image to USB	□ Save captured image from selected IP camera to USB Flash
Enable SMS Alerts	□ Send alerts for this digital input via SMS
Send custom SMS	□ Replace standard SMS with a customized message
Customized SMS	Customized SMS message sent for alerts
Enable Siren	□ Turn on the siren when digital input goes to alert
Enable Beacon	□ Turn on the beacon when digital input goes to alert
Associated Output Relay	None Name of the output relay that can be controlled by this digital input
Output Relay status on alert	Active Status of the output relay when going to alert
Output Relay status on return from alert	Active Status of the output relay when returning from aler
Change Global Alert Status on triggering this sensor	Disable Global Alerts Change Global Alert Status

Normal State is "Open"
It will trigger when input changes to "Closed"

Meaningful information in email subject line includes digital input #

Action taken when state changes

Figure 169- Digital Input configured to disable alerts



```
From:
To:
Cc:
Subject: Keypad 7504 Disable Alerts Notification
Date: Mon, 11 Mar 2019 09:54:19 -0400

TIME: 03-11-2019  10:04:27 AM
ENTERPRISE: E-16DEL E01-M
LOCATION: Engineering
BRANCH: B17C
RACK: Test
GROUPS: Digital Inputs
CONTACT: NTI
DESCRIPTION: Keypad 7504 Disable Alerts
CONNECTOR: 14
TYPE: Keypad
MESSAGE: Sensor value crossed over critical thresholds
VALUE: Closed Disable Alerts)
```

Figure 170- Example of email warning of disabled alerts

E-16D SPECIFICATIONS

Front Panel Interface

LEDs	Green – Power, Solid for Main power, flashing for Backup power
	Red – Low Bat (solid for charging battery, blinking for fault)
	Green – Check Log
	Green – AUX (not used)
	Red – Internal Sensor Alert
	Red – External Sensor Alert
USB	USB Type A Female X2, USB 2.0 Full Speed compatible
Buttons	Alarm Test/Silence- momentary switch
	Restore Defaults- momentary switch
	System Reset- momentary switch

RJ45 Sensor Inputs

Connector	RJ45 connector
Voltage Supply	5VDC and 12VDC
Signal Type	RS485 for RS485 sensors; 2-wire for contact sensors
Max. Cable Length	1000 FT
ESD Protection	IEC 61000-4-2
Fuse Protection	12V Resetable poly fuse – 500mA hold, 1A trip; 15VDC max. One fuse shared by ports 1-8, another fuse shared by ports 9-16. .
	5V Resetable poly fuse - 750mA hold, 1.5A trip; 16VDC max. One fuse shared by all 16 ports

Digital Inputs

Connector	Detachable terminal block-plug-in, 8 x 4 contacts
Wire Range	16-26 AWG
Max. Input Voltage	25VDC
Max. Contact Resistance	1K Ohm
Auxiliary Voltage Supply	12VDC+/-10%
Max. Current Supply	**50 mA** (terminals 1-7) **350mA** (terminal 8 **only**)
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 200mA hold, 400mA trip; 16VDC max. One fuse shared by 2 ports

Output Relays

Connector	Detachable terminal block-plug-in, 4 x 3 contacts
Wire Range	16-26 AWG
Output Type	Dry contact, relay isolated
Output Rating	1A / 30 VDC, 0.5A / 100VAC
Contact Resistance	20 milliohm
ESD Protection	No, Relay Isolated.
Fuse Protection	Non-resetable, 2A Hold, 4A trip, 125V

Warning: The digital output relay contacts are not to be connected directly to AC mains wiring.

Beacon Port & Siren Port

Connector	Detachable terminal block-plug-in, 1x2 contacts
Wire Range	16-26 AWG
Voltage Output	12VDC+/-10%
Current Output	180mA
ESD Protection	IEC 61000-4-2,
Fuse Protection	Resetable poly fuse – 200mA hold, 400mA trip; 16VDC max.

USB Device Ports

Connector	USB Type A Female
Version	USB 2.0 Full Speed compatible

Control Serial Port “RS232”

Connector	RJ45 Female
Supported Signals	TXD, RXD, RTS, CTS, DTR, DSR
Baud Rate	max 115,200 bps
Data Format	8 bits
Parity	odd, even or no parity
Stop Bits	1, 2 stop bits
ESD Protection	IEC1000-4-2

USB-Serial Port “Console”

Connector	USB Type B Female
Supported Signals	D+ ,D-
Baud Rate	max 115,200 bps
Data Format	8 bits
Parity	no parity
Stop Bits	1 stop bits
ESD Protection	IEC1000-4-2

Auxiliary Power Port

Connector	Detachable terminal block-plug-in, 1x2 contacts
Wire Range	16-26 AWG
Voltage Output	12VDC+/-10%
Current Output	150mA
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 200mA hold, 400mA trip; 30VDC max.

Ethernet Port

Connector	RJ45 Female
Connection Speed	10/100 Base-T
Security	SSL
Supported Protocols	http, https, Telnet,SSH

Back-Up Battery

Type	Rechargeable Sealed Lead-Acid Battery
Voltage, Current Rating	12VDC, 2.9Ahrs
Battery Operational Time	1 hr, fully loaded; 30 min. after ‘Low Bat’ LED illuminates
Battery Charging Time	32 hrs (from fully discharged to fully charged).
Replaceable	Yes – can be replaced by authorized personnel only (NTI)

General Specifications

Power Input	110/220VAC, 50 – 60 Hz, 45W
Operating Temperature	32° -104°F (0-40˚C)
Operating Humidity	17-90%RH, non-condensing
MTBF	39,685 hours
Enclosure Size(WxDxH)	1 RU metal enclosure (19 x 9.5 x 1.73 inches)

TCP/IP

Supported Browsers	IE, Netscape, Mozilla, Opera,Chrome
Network Configuration	Allows Static or Dynamic IP Configuration
Max Number of Email Addresses	17; 1 per User Account + 1 for Administrator

E-5D SPECIFICATIONS

User Interface

LEDs	Green – Power (solid when ENVIROMUX is powered ON)
	Red – Fault (solid when any sensor is in alert)

RJ45 Sensor Inputs

Connector	RJ45 connector
Voltage Supply	5VDC and 12VDC
Signal Type	RS485 for RS485 sensors; 2-wire for contact sensors
Max. Cable Length	1000 FT
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 1.1A (5VDC); 500mA (12VDC) One of each fuse shared by 5 ports.

Digital Inputs

Connector	Detachable terminal block-plug-in, 5 x 2 contacts
Wire Range	16-26 AWG
Max. Input Voltage	25VDC
Max. Contact Resistance	300K ohm
ESD Protection	IEC 61000-4-2

Output Relays

Connector	Detachable terminal block-plug-in, 2 x 3 contacts
Wire Range	16-26 AWG
Output Type	Dry contact, relay isolated
Output Rating	1A / 30 VDC, 0.5A / 100VAC
Contact Resistance	20 milliohm
ESD Protection	No, Relay Isolated.
Fuse Protection	Non-resetable, 2A Hold, 4A trip, 125V

Warning: The digital output relay contacts are not to be connected directly to AC mains wiring.

Alarm Port

Connector	Detachable terminal block-plug-in, 1x2 contacts
Wire Range	16-26 AWG
Voltage Output	12VDC+/-10%
Current Output	180mA
ESD Protection	IEC 61000-4-2,
Fuse Protection	Resetable poly fuse – 200mA hold, 400mA trip; 16VDC max.

USB Device Ports

Connector	USB Type A Female
Version	USB 2.0 Full Speed compatible

USB-Serial Port “Console”

Connector	USB Type B Female
Supported Signals	D+ ,D-
Baud Rate	max 115,200 bps
Data Format	8 bits
Parity	no parity
Stop Bits	1 stop bits
ESD Protection	IEC1000-4-2

Auxiliary Power Port

Connector	Detachable terminal block-plug-in, 1x2 contacts
Wire Range	14-22 AWG
Voltage Output	12VDC+/-10%
Current Output	500mA
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 1.1A hold, 1.95A trip; 16VDC max.

Ethernet Port

Connector	RJ45 Female
Connection Speed	10/100 Base-T
Security	SSL
Supported Protocols	http, https, Telnet,SSH

General Specifications

Power Input	120VAC or 240VAC at 50 or 60Hz-9VDC/3A AC Adapter
Operating Temperature	32° -140°F (0-60˚C) / (-5DB model) 32° -104°F (0-40˚C)
Operating Humidity	17-90%RH, non-condensing
MTBF	170,344 / (-5DB model) 169,279 hours
Enclosure Size(WxDxH)	7.9 x 3 x 1.73 inches

TCP/IP

Supported Browsers	IE, Netscape, Mozilla, Opera,Chrome
Network Configuration	Allows Static or Dynamic IP Configuration
Max Number of Email Addresses	17; 1 per User Account + 1 for Administrator

Optional Battery

Type	Lithium-ion-rechargeable
Rated Capacity	2400mAh
Maximum current	2A
Output	7.4VDC
Duration	2 Hrs Minimum

E-2D SPECIFICATIONS

User Interface

LEDs	Green – Power (solid when ENVIROMUX is powered ON)
	Red – Fault (solid when any sensor is in alert)

RJ45 Sensor Inputs

Connector	RJ45 connector (2)
Voltage Supply	5VDC and 12VDC
Signal Type	RS485 for RS485 sensors; 2-wire for contact sensors
Max. Cable Length	1000 FT
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 200mA shared (5VDC); 200mA independent (12VDC)

Digital Inputs

Connector	Detachable terminal block-plug-in, 5 x 2 contacts
Wire Range	16-26 AWG
Max. Input Voltage	25VDC
Max. Contact Resistance	300K ohm
ESD Protection	IEC 61000-4-2

Output Relays

Connector	Detachable terminal block-plug-in, 3 contacts
Wire Range	16-26 AWG
Output Type	Dry contact, relay isolated
Output Rating	1A / 30 VDC, 0.5A / 100VAC
Contact Resistance	20 milliohm
ESD Protection	No, Relay Isolated.
Fuse Protection	Non-resetable, 2A Hold, 4A trip, 125V

Warning: The digital output relay contacts are not to be connected directly to AC mains wiring.

USB Device Ports

Connector	USB Type A Female
Version	USB 2.0 Full Speed compatible

USB-Serial Port “Console”

Connector	USB Type B Female
Supported Signals	D+ ,D-
Baud Rate	max 115,200 bps
Data Format	8 bits
Parity	no parity
Stop Bits	1 stop bits
ESD Protection	IEC1000-4-2

Auxiliary Power Port

Connector	Detachable terminal block-plug-in, 1x2 contacts
Wire Range	16-26 AWG
Voltage Output	12VDC+/-10%
Current Output	500mA
ESD Protection	IEC 61000-4-2
Fuse Protection	Resetable poly fuse – 1.1A hold, 1.95A trip; 16VDC max.

Ethernet Port

Connector	RJ45 Female
Connection Speed	10/100 Base-T
Security	SSL
Supported Protocols	http, https, Telnet,SSH

General Specifications

Power Input	120VAC or 240VAC at 50 or 60Hz-9VDC/3A AC Adapter
Operating Temperature	32° -140°F (0-60˚C)
Operating Humidity	17-90%RH, non-condensing
MTBF	229,580 / (-2DB model) 230,693 hours
Enclosure Size(WxDxH)	5.822 x 2.988 x 1.720 inches

TCP/IP

Supported Browsers	IE, Netscape, Mozilla, Opera, Chrome
Network Configuration	Allows Static or Dynamic IP Configuration
Max Number of Email Addresses	17; 1 per User Account + 1 for Administrator

Optional Battery

Type	Lithium-ion-rechargeable
Rated Capacity	2400mAh
Maximum current	2A
Output	7.4VDC
Duration	2 Hrs Minimum

PORT ASSIGNMENTS

Here are the default ports used by the ENVIROMUX:

- 80 HTTP
- 443 HTTPS
- 22 SSH
- 23 Telnet
- 161 SNMP (machine configuration & sensor data)
- 162 SNMP (traps)
- 502 MODBUS (default port)
- 514 SYSLOG
- 5908 Sensor info for the Management Software
- 5919 Cascading via Ethernet
- 6000 Management Software

The HTTP, HTTPS and MODBUS port numbers may be changed by the administrator. If they are changed, contact the system administrator for the new assignments.

DDNS PROVIDER LIST

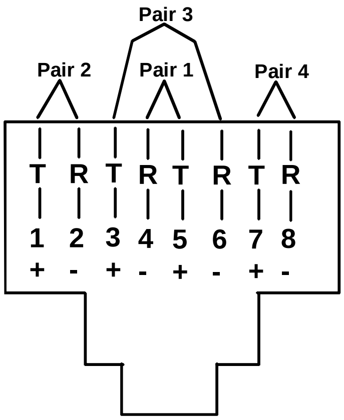
DDNS Provider	Provider Name To Use	DDNS Provider	Provider Name To Use
ChangeIP	changeip	gira.de	gira
OVH	ovh	sitelutions.com	sitelutions
Strato	strato	dnsomatic.com	dnsomatic
cloudxns	cloudxns	dynsip.org	dynsip
ddnss.de	ddnss.de	no-ip.com	no-ip
dhis	dhis	3322.org	3322
dnsexit	dnsexit	he.net	he
dtdns	dtdns	spdyn.de	spdyn
duckdns	duckdns	nsupdate.info	nsupdate
duiadns	duiadns	loopia.com	loopia
dyndns.org	dyndns	domains.google.com	domains.google
dynv6.com	dynv6	tzo.com	tzo
easydns.com	easydns	zerigo.com	zerigo
freedns.afraid.org	freedns	zoneedit.com	zoneedit
freemyip.com	freemyip		

WIRING METHODS

RS485 Sensor Cable

The CAT5 connection cable between the ENVIROMUX and the external RS485 Sensors (page 10) is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard. Wiring is as per the table and drawing below.

Pin	Wire Color	Pair
1	White/Orange	2
2	Orange	2
3	White/Green	3
4	Blue	1
5	White/Blue	1
6	Green	3
7	White/Brown	4
8	Brown	4



(View Looking into RJ45 Socket)

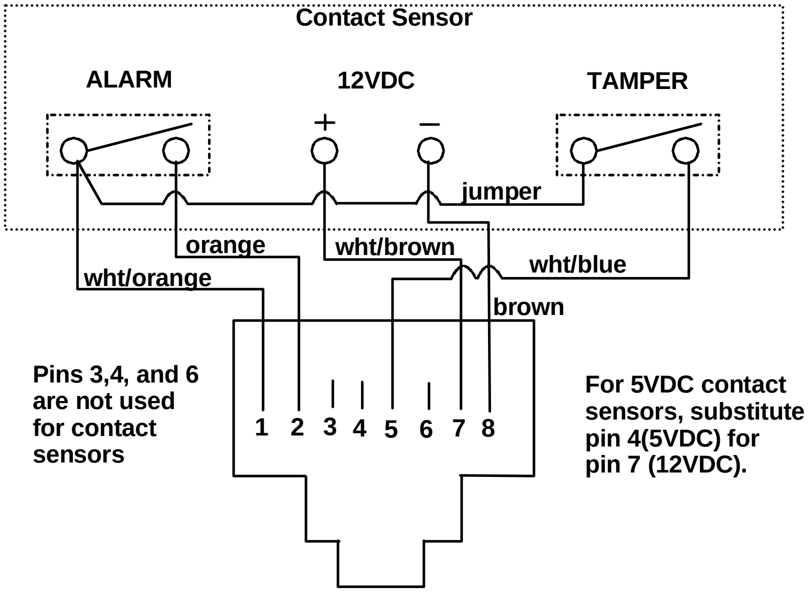
Contact Sensor Wiring

When applying CAT5 cables to contact sensors for plug-in to the RJ45 Sensor sockets, the following socket-to-sensor wiring must be followed:

RJ45 Sensor Socket Pinout

Pin #	Pin Name
1	GND
2	SENSE
3	RS485 +
4	+5 VDC
5	TAMPER SWITCH
6	RS485 -
7	+12 VDC
8	GND

Schematic for wiring Contact Sensor to RJ45 Socket



Pins 3,4, and 6 are not used for contact sensors

For 5VDC contact sensors, substitute pin 4(5VDC) for pin 7 (12VDC).

View looking into RJ45 Socket

TROUBLESHOOTING

Each and every piece of every product produced by Network Technologies Inc is 100% tested to exacting specifications. We make every effort to insure trouble-free installation and operation of our products. If problems are experienced while installing this product, please look over the troubleshooting chart below to see if perhaps we can answer any questions that arise. If the answer is not found in the chart, a solution may be found in the knowledgebase on our website at http://information.networktechinc.com/jive/kbindex.jspa or please call us directly at **(800) 742-8324 (800-RGB-TECH)** or **(330) 562-7070** and we will be happy to assist in any way we can.

Problem	Cause	Solution
"Pwr" LED is blinking (E-16D only)	• Blinking 1/sec =Power is OFF, battery backup is powering the ENVIROMUX • Blinking rapidly= discovery tool in use	• Restore AC power to the ENVIROMUX • Nothing wrong- close Discovery Tool to stop
Cannot access ENVIROMUX through my browser	• Browser not supported • Trying to connect to wrong IP address • User not authorized	• See supported browsers on page 4 • Type correct IP address into browser URL field. If IP address is unknown, use Discovery Tool (page 28) to identify it. • See administrator for user name and password
Cannot access ENVIROMUX user interface with direct Ethernet connection	• Telnet not enabled • Cable not wired correctly	• Must enable Telnet through web interface (page 71) • Cable should be wired pin-to-pin (1 to 1, 2 to 2, etc.)
ENVIROMUX will not recognize sensor	Previously used sensor port was never cleared from memory upon removal	Click on "???" in summary page, click on "Configure " button, click on "Remove" at bottom of Configure page to remove sensor and clear the port. (see page 38)
Device Discovery tool will not work	• Java not installed • PC and ENVIROMUX are on different physical networks	• Download and install Java (see page 28) • Make sure PC and ENVIROMUX or both on same physical network
Not receiving e-mail alert messages	• Ethernet cable disconnected • Wrong or no IP address provided for SMTP server • User does not have user profile correctly configured • Email address not accepted by SMTP server	• Check Ethernet cable connections • Check all Network Settings (page 71) • Check user profile. Make sure groups have been selected and the contact settings are correct (see page 81) • Check policies of SMTP server for restrictions
Beacon not illuminating	• Wires are not connected properly • Beacon in use is improperly rated • Sensor is not configured to power-ON the beacon	• Check wire connections • Make sure Beacon is rated at 12VDC, 180mA or less • Check sensor configuration- make sure Beacon is selected under "Alert Notifications" (-16D)
Siren not making noise	• Wires are not connected properly • Siren in use is improperly rated • Sensor is not configured to power-ON the siren	• Check wire connections • Make sure Siren is rated at 12VDC, 180mA or less • Check sensor configuration- make sure Siren is selected under "Alert Notifications" (-16D)
Ethernet cascading is not working	Ethernet Configuration not complete	• Make sure the correct IP of the Slave unit is entered into the Master configuration • Make sure Slave is configured as "Ethernet Slave" (page 93) • If behind a firewall, make sure port 5919 is open for the ENVIROMUX to pass data through

Problem	Cause	Solution
The sensor page does not display the current readings	Java scripts cannot be displayed-java not enabled in browser	Enable the Java Scripts and Java in the browser
Sensor status alternates between "normal" and "no answer" on summary page **User is receiving alert notifications about sensors being disconnected and then reconnected**	Electronic noise is being induced into sensor cables (near large motors, electronic ballasts, etc) causing errors in RS485 communication between ENVIROMUX and sensor. (this pertains to "RJ5 SENSORS" only)	Change the unshielded CATx cable to the RJ45 sensor(s) to shielded cable to reduce noise being introduced. If the issue is ignored it could potentially lead to damage of the RS485 communication circuit and require the ENVIROMUX unit to be returned for repair
Sensors connected to RJ45 Sensor ports stop working	Sensors applied collectively exceed current rating.	Disconnect sensors. After approx. 10 minutes fuse inside ENVIROMUX should reset. **For E-16D**: Make sure the load of all 8 sensors per row does not exceed 500 mA. (i.e. only one keypad per row (row 1 = ports 1-8, row 2= ports 9-16))
Unit will not boot up-access via Ethernet not possible	Firmware has been corrupted	Contact NTI for FTP recovery software and procedure.
Sensor connected to DIGITAL IN terminal stops working **(E-16D only)**	Sensor is rated for more current than terminal can supply. Fuse protecting port has opened. E-EDR-SF and E-EDR-SCR Electric Strike may cause this if connected to DIGITAL IN terminals 1-7	Disconnect failed sensor. After approx. 10 minutes internal fuse should reset. Reconnect sensor to terminals provided sensor current requirements fall within terminal limitations. **DIGITAL IN terminals 1-7 max. load = 50mA** **DIGITAL IN terminal 8 max. load = 650mA**
Event Log has "GSM Error code -3"	GSM Modem failed to communicate with cell tower due to a weak signal	Adjust the modem antenna using the Enterprise Setup screen (page 68) as a guide for the best signal
Attempt at connection via HTTPS from outside the LAN errors out	Port in Firewall not open to secure connection to ENVIROMUX	***Configure your firewall to allow communication through the port assigned to HTTPS connection (page 71).***
Slave in cascaded configuration keeps losing communication with Master	Slave configured (within the web interface for the slave) to add sensor values to datalog.	***Do not configure sensors from the Slave web interface, do not put a check in "Add to datalog" (page 42) and do not configure any alert methods. Only enable datalogging and alert methods for sensors when configuring them from the Master interface.***

For a complete list of ENVIROMUX factory-assigned port numbers, see page 169.

SMTP Error Codes:

Without SSL enabled:	Meaning	Comments
-1	SMTP_CONN_ERR,	Cannot establish a connection to the SMTP server. Possible reasons: bad setting for IP of SMTP server, firewall blocking the connection
-4	SMTP_SERVER_NOT_READY_ERR,	Server denied connection
-5	SMTP_EHLO_ERR,	Server did not answer to HELO command
-6	SMTP_AUTH_NO_SUPPORT_ERR,	Authentication method is not supported
-7	SMTP_AUTH_FAILURE_ERR,	Authentication failure (user or password rejected)
-8	SMTP_BAD_FROM_ERR,	SMTP Server did not accept the sender e-mail address
-9	SMTP_BAD_TO_ERR,	SMTP Server did not accept the destination e-mail address
-10	SMTP_DATA_ERR,	SMTP Server did not accept the DATA command
-11	SMTP_BAD_DATA_ERR,	SMTP Server did not accept the body of e-mail message
With SSL enabled:		
-100	SMTP_SSL_CONN_ERR,	Failed to resolve connection to DNS server
-99	SMTP_SSL_CONN_ERR1,	Cannot establish a connection to the SMTP server. Possible reasons: bad setting for IP of SMTP server, firewall blocking the connection
-98	SMTP_SSL_CONN_ERR2,	System failed to create a socket (this is for internal reasons - like network down (a highly unlikely occurrence))
-97	SMTP_SSL_PROTOCOL_ERR,	SMTP server connected but did not accept SSL connection
-95	SMTP_SSL_SERVER_NOT_READY_ERR,	Server denied connection
-94	SMTP_SSL_EHLO_ERR,	Server did not answer to HELO command
-93	SMTP_SSL_AUTH_NO_SUPPORT_ERR,	Authentication method is not supported
-92	SMTP_SSL_AUTH_FAILURE_ERR,	Authentication failure (user or password rejected)
-91	SMTP_SSL_BAD_FROM_ERR,	SMTP Server did not accept the sender e-mail address
-90	SMTP_SSL_BAD_TO_ERR,	SMTP Server did not accept the destination e-mail address
-89	SMTP_SSL_DATA_ERR,	SMTP Server did not accept the DATA command
-88	SMTP_SSL_BAD_DATA_ERR,	SMTP Server did not accept the body of e-mail message
-87	SMTP_TLS_ERROR,	Cannot connect through STARTTLS protocol. SMTP server probably does not support this protocol. Disable STARTTLS.

Communication Ports used by the ENVIROMUX:

Port Number	Purpose
80	HTTP (also IP sensor monitoring)
443	HTTPS
22	SSH
23	Telnet
161	SNMP (system config, sensor data and mgmt. software sensor data)
162	SNMP (traps)
502	MODBUS (default)
514	SYSLOG
5908	Sensor info for Management Software
5919	Cascading via Ethernet
6000	Management Software

HOW TO CREATE AN X.509 CERTIFICATE FOR ENVIROMUX

The ENVIROMUX family of products is designed to be configurable with security to limit access to their web interface controls. The ENVIROMUX includes a default x.509 certificate. However, this procedure will help you create your own custom x.509 certificate to use with this feature. This procedure was created using CentOS and OpenSSL.

Note: Do not disable access to the ENVIROMUX web interface using http before you verify that the https client authentication works properly (see page 185).

I. Using Self-Signed Certificates for ENVIROMUX Series Products

We can use self-signed certificates to access ENVIROMUX products with HTTPS with a self-signed root certificate authority. In this procedure, our root certificate authority needs to be explicitly added to every PC as trusted authority, to access the product page.

1. Creating a Self-Signed Certificate Authority using OpenSSL

An example SSL configuration file to use can be found here: http://www.networktechinc.com/download/openssl.cnf

When using this document, make a copy of the current default openssl configuration file and replace it with the file above.

a. Creating the Certificate Management Files and Directories

The following directories are made for organizing the files being used and generated. These directories are also used for other procedures in the document.

1. Create directory “ntiCA” in /usr/local/ssl for ntiCA certificate management and change to that directory. If you prefer, this directory name can be set to any other name like MyCompanyCA. Make sure the **`openssl.cnf`** file is edited to match the changes to the folder name. The **`openssl.cnf`** file can usually be found in /usr/local/openssl/openssl.cnf on local installations of OpenSSL.

```
# mkdir /usr/local/ssl/ntiCA
# cd /usr/local/ssl/ntiCA
```

Create the following directories in the ntiCA directory: **(The number sign (#) is the command prompt, not part of the command.)**

```
# mkdir CA
# mkdir server
# mkdir server/certificates
# mkdir server/requests
# mkdir server/keys
# mkdir user
# mkdir user/certificates
# mkdir user/requests
# mkdir user/keys
```

Perform the following commands in the ntiCA directory:

```
# cd /usr/local/ssl/ntiCA
# touch index.txt
# echo “01” > serial
```

b. Creating the CA Key and Certificate

The general process for creating a certificate includes:

1. Creating a private CA key
2. Creating a certificate request
3. Creating and signing a certificate from the certificate request

1. Create the private CA key:

```
# cd /usr/local/ssl/ntiCA
# openssl genrsa -out ./CA/ntiCA.key 2048
Generating RSA private key, 2048 bit long modulus
.....++++++
......++++++
e is 65537 (0x10001)
```

2. Create the CA certificate signing request:

```
# openssl req -sha512 -new -key ./CA/ntiCA.key -out ./CA/ntiCA.csr
```

```
You are about to be asked to enter information that will be incorporated into your certificate
request.
    What you are about to enter is what is called a Distinguished Name or a DN.
    There are quite a few fields but you can leave some blank
    For some fields there will be a default value,(indicated by the characters "[ ]")
    If you enter '.', the field will be left blank.
  -----
    Country Name (2 letter code) [US]:US
    State or Province Name (full name) [OH]:OH
    Locality Name (eg, city) []:
    Organization Name (eg, company) [NTI]:NTI
    Organizational Unit Name (eg, section) []:
    Common Name (eg, YOUR name) [NTI CA]:NTI CA
    Email Address [sales@ntigo.com]:sales@ntigo.com

    Please enter the following 'extra' attributes
    to be sent with your certificate request
    . []:
    . []:
```

3. Self-sign the CA certificate:

```
        # openssl x509 -req -sha512 -days 3650 -in ./CA/ntiCA.csr -out ./CA/ntiCA.crt
-signkey ./CA/ntiCA.key
        Signature ok
        subject=C = US, ST = OH, O = NTI, CN = NTI CA, emailAddress = sales@ntigo.com
        Getting Private key
```

c. Verifying the CA certificate contents

At this point we have our self-signed CA certificate and our CA key, which will be used to sign the ENVIROMUX certificates that we create. To verify the certificate contents, use the following command:

```
# openssl x509 -in ./CA/ntiCA.crt -text
```

The output should look similar to this:

```
Certificate:
    Data:
        Version: 1 (0x0)
        Serial Number:
            b2:ce:14:9d:bf:52:f5:1f
    Signature Algorithm: sha512WithRSAEncryption
        Issuer: C = US, ST = OH, O = NTI, CN = NTI CA, emailAddress = sales@ntigo.com
        Validity
            Not Before: Dec  4 20:00:24 2018 GMT
            Not After : Dec  1 20:00:24 2028 GMT
        Subject: C = US, ST = OH, O = NTI, CN = NTI CA, emailAddress = sales@ntigo.com
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
                Public-Key: (2048 bit)
                Modulus:
                    00:b0:43:2b:de:93:7b:ac:1f:24:96:9d:e9:98:26:
                    44:bc:cb:7e:04:ec:c2:64:da:60:59:a1:c8:b7:42:
                    52:04:b7:b2:91:b1:10:db:ea:04:25:52:14:8b:52:
                    a4:7f:5a:fc:08:65:c6:77:44:8b:48:27:71:68:00:
                    c2:09:a2:b4:4a:3d:f9:3c:f8:d0:69:24:e8:44:b8:
                    07:57:e1:57:2d:0e:9b:2f:3e:df:4c:71:00:45:bb:
                    ff:2d:a6:7f:11:2d:34:ca:f2:07:f5:79:f0:4f:9b:
                    d8:d3:ad:04:3b:3c:56:07:25:c1:be:fe:09:03:8a:
                    6e:4d:72:82:ad:67:22:2c:54:1b:d5:69:5b:2b:67:
                    1f:12:f5:98:ef:a4:10:1d:56:83:13:ca:8d:d7:2f:
                    c5:0a:da:d5:3b:30:25:9a:2c:6f:8c:94:c1:69:35:
                    e2:38:9b:1b:37:53:ff:d6:2d:3e:d9:1c:7a:03:b3:
                    71:a6:76:16:f4:eb:35:2a:f2:86:6f:40:d9:cc:6e:
                    59:31:ef:94:11:cf:cc:52:9d:eb:8e:06:69:67:ee:
                    86:98:b0:54:11:61:71:aa:ae:19:2a:f3:77:ce:95:
                    2c:a5:87:0d:10:16:b9:5e:88:c8:03:da:d9:6d:90:
                    3b:ca:4c:32:15:0c:ba:05:64:79:c7:4b:b0:7a:f5:
                    26:5d
                Exponent: 65537 (0x10001)
    Signature Algorithm: sha512WithRSAEncryption
         9f:d2:50:61:36:f3:d9:b9:cb:39:5e:31:d6:2a:a8:e4:03:f0:
         e0:65:4d:37:e0:60:cd:71:f5:5a:6d:7d:87:53:6e:2e:8b:3a:
         f2:fb:73:fc:21:51:63:79:8a:2d:5d:a9:c2:a9:47:a1:b3:17:
         9a:2e:5b:8a:7f:29:ab:08:cb:2f:52:70:26:2c:76:2d:2d:07:
         81:cc:84:6f:59:db:f3:be:fe:77:dc:67:6b:5d:ff:b3:17:24:
         bd:f3:c0:cc:83:10:d0:17:67:2d:e5:5b:4b:59:aa:80:fb:ec:
         53:ed:e4:c5:0d:a1:0d:13:b3:0b:ee:a4:c2:f0:d2:a0:29:ef:
         11:f5:6a:29:8b:46:ed:1a:64:2b:93:02:af:0d:7f:83:28:2c:
                a2:11:2e:e6:fc:af:61:d2:df:eb:e2:c0:e2:46:6e:ef:51:6e:
                e1:db:4f:d4:24:2b:6d:63:21:d0:3c:f2:02:6e:d0:63:10:bf:
                1c:9c:bf:31:c8:74:cd:88:51:7b:cc:a6:8d:6d:c1:fb:5c:63:
                8a:dc:74:de:5f:04:d2:2d:b0:5b:c7:65:06:37:c0:42:8d:87:
                22:2e:2d:59:dc:89:6c:e4:32:fe:2f:88:da:42:50:6e:67:3e:
                6c:7c:86:9b:f4:20:60:6b:26:c2:cd:0b:97:d8:e1:f5:f9:c1:
                4c:32:6c:ab
       -----BEGIN CERTIFICATE-----
       MIIDLjCCAhYCCQCyzhSdv1L1HzANBgkqhkiG9w0BAQ0FADBZMQswCQYDVQQGEwJV
       UzELMAkGA1UECBMCT0gxDDAKBgNVBAoTA05USTEPMA0GA1UEAxMGTlRJIENBMR4w
       HAYJKoZIhvcNAQkBFg9zYWxlc0BudGlnby5jb20wHhcNMTgxMjA0MjAwMDI0WhcN
       MjgxMjAxMjAwMDI0WjBZMQswCQYDVQQGEwJVUzELMAkGA1UECBMCT0gxDDAKBgNV
       BAoTA05USTEPMA0GA1UEAxMGTlRJIENBMR4wHAYJKoZIhvcNAQkBFg9zYWxlc0Bu
       dGlnby5jb20wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQCwQyvek3us
       HySWnemYJkS8y34E7MJk2mBZoci3QlIEt7KRsRDb6gQlUhSLUqR/WvwIZcZ3RItI
       J3FoAMIJorRKPfk8+NBpJOhEuAdX4VctDpsvPt9McQBFu/8tpn8RLTTK8gf1efBP
       m9jTrQQ7PFYHJcG+/gkDim5NcoKtZyIsVBvVaVsrZx8S9ZjvpBAdVoMTyo3XL8UK
       2tU7MCWaLG+MlMFpNeI4mxs3U//WLT7ZHHoDs3Gmdhb06zUq8oZvQNnMblkx75QR
       z8xSneuOBmln7oaYsFQRYXGqrhkq83fOlSylhw0QFrleiMgD2tltkDvKTDIVDLoF
       ZHnHS7B69SZdAgMBAAEwDQYJKoZIhvcNAQENBQADggEBAJ/SUGE289m5yzleMdYq
       qOQD8OBlTTfgYM1x9VptfYdTbi6LOvL7c/whUWN5ii1dqcKpR6GzF5ouW4p/KasI
       yy9ScCYsdi0tB4HMhG9Z2/O+/nfcZ2td/7MXJL3zwMyDENAXZy3lW0tZqoD77FPt
       5MUNoQ0TswvupMLw0qAp7xH1aimLRu0aZCuTAq8Nf4MoLKIRLub8r2HS3+viwOJG
       bu9RbuHbT9QkK21jIdA88gJu0GMQvxycvzHIdM2IUXvMpo1twftcY4rcdN5fBNIt
       sFvHZQY3wEKNhyIuLVnciWzkMv4viNpCUG5nPmx8hpv0IGBrJsLNC5fY4fX5wUwy
       bKs=
-----END CERTIFICATE-----
```

2. Creating a CA-Signed ENVIROMUX server Certificate (This will need to be done for each ENVIROMUX device.)

The procedure for creating a CA-Signed web server certificate is similar to that for creating the CA certificate except that the device certificate will be signed using the CA key rather than self-signing with a server-specific key.

a. Create the web server private key using a fully qualified DNS name (or IP address).

```
# cd /usr/local/ssl/ntiCA
# openssl genrsa -out ./server/keys/your_device_fqdn_or_ipaddress.key 2048
Generating RSA private key, 2048 bit long modulus
.......++++++
.++++++
e is 65537 (0x10001)
```

b. Create the web server certificate signing request using the same fully qualified DNS name (or IP address) you used for the private key. **It is vitally important** that you set the Common Name value to the fully qualified DNS name of your web server because that's the value that a browser client will verify when it receives the web server's certificate.

```
       # openssl req -sha512 -new -key ./server/keys/your_device_fqdn_or_ipaddress.key -
out ./server/requests/your_device_fqdn_or_ipaddress.csr
```

```
    You are about to be asked to enter information that will be incorporated into your
certificate request.
    What you are about to enter is what is called a Distinguished Name or a DN.
    There are quite a few fields but you can leave some blank
    For some fields there will be a default value, (indicated by the characters "[ ]")
    If you enter '.', the field will be left blank.
```

```
-----
    Country Name [US]:US
    State or Province Name [OH]:OH
    Locality Name []:Aurora
    Organization Name [NTI]:NTI
    Organizational Unit Name []:
    Common Name [NTI CA]:192.168.3.144
    Email Address [sales@ntigo.com]:your.email@yourdomain.com

    Please enter the following 'extra' attributes
    to be sent with your certificate request
    . []:
    . []:
```

c. Create a file defining the Subject Alternative Name. This extension file extensions.ext can be made with any text editor, and should be added to the /usr/local/ssl/ntiCA directory. This needs to be defined to know for what domains or IP addresses the certificate will be valid. Add the following lines to the **`extensions.ext`** file:

```
basicConstraints=CA:FALSE
subjectAltName=IP:<ip_address>
```

Replace "**<ip_address>**" with the IP address you plan to use to access the device. Other options are available for specifying this. Below is an example using a DNS:

```
subjectAltName = DNS:server.example.com
```

d. Sign the web server certificate with the CA key:

```
       # openssl x509 -req –in server/requests/your_device_fqdn_or_ipaddress.csr -CA
CA/ntiCA.crt -CAkey CA/ntiCA.key –CAcreateserial -out your_device_fqdn_or_ipaddress.pem -
days 1024 -extfile extensions.ext
```

```
Signature ok
subject=C = US, ST = OH, L = Aurora, O = NTI, CN = 192.168.3.144, emailAddress =
sales@ntigo.com
Getting CA Private Key
```

To verify the web server certificate contents, use the following command:

```
       # openssl x509 -in your_device_fqdn_or_ipaddress.pem -text
```

Key values to look for are:

```
  Subject CN=192.168.3.144
  Issuer CN=NTI CA
```

3. Uploading a Self-Signed Certificate Authority to a ENVIROMUX Device

You should import the "ntiCA.crt" file located in the /usr/local/ssl/ntiCA/CA directory that is generated using this procedure into the ENVIROMUX. To import this file into the ENVIROMUX, you must log into its web interface.

On the ENVIROMUX Web Interface menu Under "Administration" select "Network". In X509 certificates, select "Choose File", select the CA certificate file ntiCA.crt, and click **"Upload CA certificate**".

4. Uploading Server Certificate to a ENVIROMUX Device

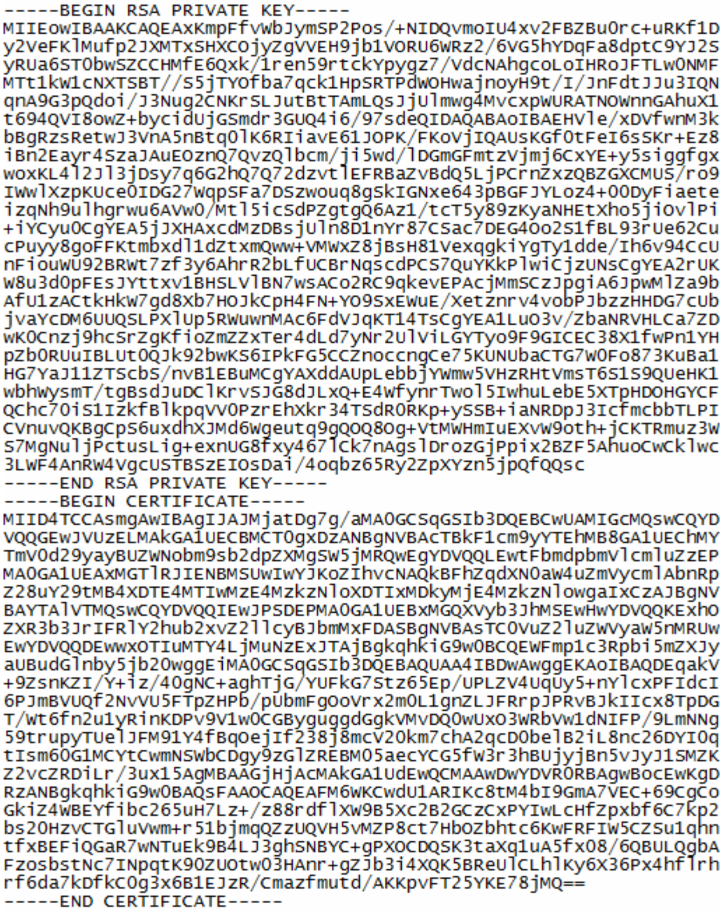
The NTI ENVIROMUX web server expects the certificate and key as a single file in "PEM" format.

Use the following command to combine certificate and key file to a single file with extension “pem”.

```
cat ./server/keys/your_device_fqdn_or_ipaddress.key your_device_fqdn_or_ipaddress.pem >
server.pem
```

On the ENVIROMUX Web Interface menu Under “Administration” select “Network”. In X509 certificates, select “Choose File”, select the server certificate and key file, and click “Upload **Server certificate and key"**.

The following is an example of what the **`server.pem`** file should look like:



```
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAxKmpFfvWbJymSP2Pos/+NIDQvmoIU4xv2FBZBu0rc+uRKf1D
y2VeFKlMufp2JXMTxSHXCOjyZgVVEH9jb1VORU6WRz2/6VG5hYDqFa8dptC9YJ2S
yRUa6ST0bwSZCCHMfE6Qxk/1ren59rtckYpygz7/VdcNAhgcoLoIHRoJFTLw0NMF
MTt1kW1cNXTSBT//S5jTYOfba7qck1HpSRTPdWOHwajnoyH9t/I/JnFdtJJu3IQN
qnA9G3pQdoi/J3Nug2CNKrSLJutBtTAmLQsJjUlmwg4MvcxpWURATNOWnnGAhuX1
t694QVI8owZ+bycidUjGSmdr3GUQ4i6/97sdeQIDAQABAoIBAEHVle/xDVfwnM3k
bBgRzsRetwJ3VnA5nBtq0lK6RIiavE61JOPK/FKoVjIQAUsKGf0tFeI6sSKr+Ez8
iBn2Eayr4SzaJAuEOznQ7QvzQlbcm/ji5wd/lDGmGFmtzVjmj6CxYE+y5siggfgx
woxKL4l2Jl3jDsy7q6G2hQ7Q72dzvtlEFRBaZvBdQ5LjPCrnZxzQBZGXCMUS/ro9
IWwlXzpKUce0IDG27WqpSFa7DSzwouq8gSkIGNxe643pBGFJYLoz4+0ODyFiaete
izqNh9ulhgrwu6AVw0/Mtl5icSdPZgtgQ6Az1/tcT5y89zKyaNHEtXho5jiOvlPi
+iYCyu0CgYEA5jJXHAxcdMzDBsjUln8D1nYr87CSac7DEG4Oo2S1fBL93rUe62Cu
cPuyy8goFFKtmbxdl1dZtxmQww+VMWxZ8jBsH81VexqgkiYgTy1dde/Ih6v94CcU
nFiouWU92BRWt7zf3y6AhrR2bLfUCBrNqscdPCS7QuYKkPlwiCjzUNsCgYEA2rUK
W8u3d0pFEsJYttxv1BHSLVlBN7wsACo2RC9qkevEPAcjMmSCzJpgiA6JpwMlZa9b
AfU1zACtkHkW7gd8Xb7HOJkCpH4FN+YO9SxEWuE/XetznrV4vobPJbzzHHDG7cUb
jvaYcDM6UUQSLPXlUp5RWuwnMAc6FdVJqKT14TsCgYEA1LuO3v/ZbaNRVHLCa7ZD
wKOCnzj9hcSrZgKfioZmZZxTer4dLd7yNr2UlViLGYTyo9F9GICEC38X1fwPn1YH
pZb0RUuIBLUt0QJk92bwKS6IPkFG5CCZnoccngCe75KUNUbaCTG7W0Fo873KuBa1
HG7YaJ11ZTScbS/nvB1EBuMCgYAXddAUpLebbjYWmw5VHzRHtVmsT6S1S9QUeHK1
wbhWysmT/tgBsdJuDClKrvSJG8dJLxQ+E4WfynrTwol5IwhuLebE5XTpHDOHGYCF
QChc7OiS1IzkfBlkpqVV0PzrEhXkr34TSdR0RKp+ySSB+iaNRDpJ3IcfmcbbTLPI
CVnuvQKBgCpS6uxdhXJMd6Wgeutq9gQOQ8Og+VtMWHmIuEXvW9oth+jCKTRmuz3W
S7MgNuljPctusLig+exnUG8fxy467lCk7nAgslDrozGjPpix2BZF5AhuoCwCklwc
3LWF4AnRW4VgcUSTBSzEIOsDai/4oqbz65Ry2ZpXYzn5jpQfQQsc
-----END RSA PRIVATE KEY-----
-----BEGIN CERTIFICATE-----
MIID4TCCAsmgAwIBAgIJAJMjatDg7g/aMA0GCSqGSIb3DQEBCwUAMIGcMQswCQYD
VQQGEwJVUzELMAkGA1UECBMCT0gxDzANBgNVBAcTBkF1cm9yYTEhMB8GA1UEChMY
TmV0d29yayBUZWNobm9sb2dpZXMgSW5jMRQwEgYDVQQLEwtFbmdpbmVlcmluZzEP
MA0GA1UEAxMGTlRJIENBMSUwIwYJKoZIhvcNAQkBFhZqdXN0aW4uZmVycmlAbnRp
Z28uY29tMB4XDTE4MTIwMzE4MzkzNloXDTIxMDkyMjE4MzkzNlowgaIxCzAJBgNV
BAYTAlVTMQswCQYDVQQIEwJPSDEPMA0GA1UEBxMGQXVyb3JhMSEwHwYDVQQKExhO
ZXR3b3JrIFRlY2hub2xvZ2llcyBJbmMxFDASBgNVBAsTC0VuZ2luZWVyaW5nMRUw
EwYDVQQDEwwxOTIuMTY4LjMuNzExJTAjBgkqhkiG9w0BCQEWFmp1c3Rpbi5mZXJy
aUBudGlnby5jb20wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDEqakV
+9ZsnKZI/Y+iz/40gNC+aghTjG/YUFkG7Stz65Ep/UPLZV4UqUy5+nYlcxPFIdcI
6PJmBVUQf2NvVU5FTpZHPb/pUbmFgOoVrx2m0L1gnZLJFRrpJPRvBJkIICx8TpDG
T/Wt6fn2u1yRinKDPv9V1w0CGByguggdGgkVMvDQ0wUxO3WRbVw1dNIFP/9LmNNg
59trupyTUelJFM91Y4fBqOejIf238j8mcV20km7chA2qcD0belB2iL8nc26DYI0q
tIsm60G1MCYtCwmNSWbCDgy9zGlZREBM05aecYCG5fW3r3hBUjyjBn5vJyJ1SMZK
Z2vcZRDiLr/3ux15AgMBAAGjHjAcMAkGA1UdEwQCMAAwDwYDVR0RBAgwBocEwKgD
RzANBgkqhkiG9w0BAQsFAAOCAQEAFM6WKCwdU1ARIKc8tM4bI9GmA7VEC+69CgCo
GkiZ4WBEYfibc265uH7Lz+/z88rdflXW9B5Xc2B2GCzCxPYIwLcHfZpxbf6C7kp2
bs20HzvCTGluVwm+r51bjmqQZzUQVH5vMZP8ct7HbOZbhtc6KwFRFIW5CZSu1qhn
tfxBEFiQGaR7wNTuEk9B4LJ3ghSNBYC+gPXOCDQSK3taXq1uA5fx08/6QBULQgbA
FzosbstNc7INpqtK90ZUOtw03HAnr+gZJb3i4XQK5BReUlCLhlKy6X36Px4hflrh
rf6da7kDfkC0g3x6B1EJzR/Cmazfmutd/AKKpvFT25YKE78jMQ==
-----END CERTIFICATE-----
```

5. Accepting a Self-Signed Certificate Authority as Trustworthy

How to add a Self-Signed Certificate Authority as a Trusted Root Certification Authority on Windows

The browsers must recognize and trust the Certificate Authority created. The following are directions for trusting the newly created CA.

1. Open “Internet Options” in Control Panel
2. Navigate to the “Content” tab.
3. Select the “Certificates” button.
4. Go to the “Trusted Root Certification Authorities” tab
5. Press “Import”
6. Navigate through the prompt. The only option that will need to be modified is selecting the certificate to trust.
7. Restart the preferred browser.

How to add a Self-Signed Certificate Authority as a Trusted Root Certification Authority on Mozilla Firefox

Mozilla Firefox does not use Window's Certificate Authorities. For the Firefox browser to recognize your CA, do the following:

1. Open the Mozilla Firefox browser.
2. Type "about:preferences#privacy" in the URL field of the browser.
3. Under "Security" in the "Certificates" section, press the "View Certificates" button.
4. Navigate to the "Authorities" tab.
5. Select "Import"
6. Find your self-made CA and press "Open"
7. Select "Trust this CA to identify websites" and click "OK".
8. Restart the Firefox browser.

Note that some of these directions may be slightly different for older versions of Firefox.

II. Using External CA Signed Certificates for ENVIROMUX Series Products

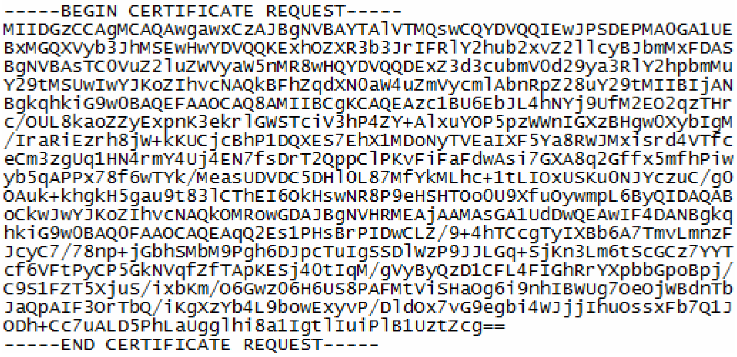
1. Creating a certificate signing request for External Certificate Authority

A Certificate Signing Request must be provided to an external Certificate Authority like DigiCert, Verisign, or Comodo.

The Certificate Signing Request should be made using the following command:

```
        # mkdir thirdparty
        # mkdir thirdparty/certificates
        # mkdir thirdparty/keys
        # openssl genrsa -out ./thirdparty/keys/server.key 2048
        # openssl req -sha512 -new -key ./thirdparty/keys/server.key -out
./thirdparty/certificates/server.csr
```

Below is an example of a valid certificate signing request:



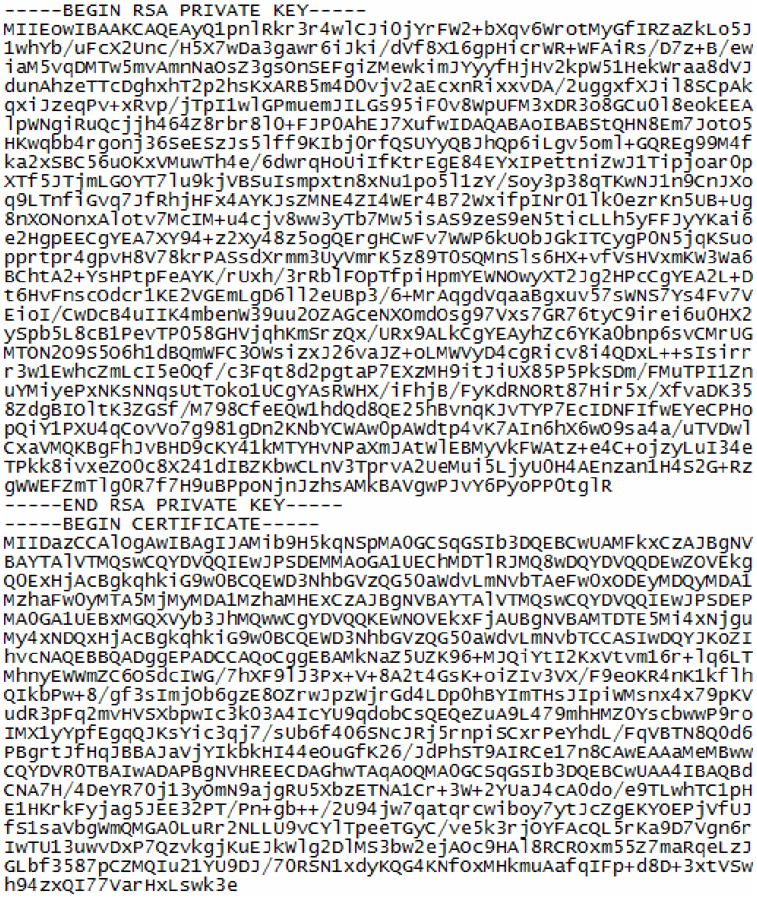
```
-----BEGIN CERTIFICATE REQUEST-----
MIIDGzCCAgMCAQAwgawxCzAJBgNVBAYTAlVTMQswCQYDVQQIEwJPSDEPMA0GA1UE
BxMGQXVyb3JhMSEwHwYDVQQKExhOZXR3b3JrIFRlY2hub2xvZ2llcyBJbmMxFDAS
BgNVBAsTC0VuZ2luZWVyaW5nMR8wHQYDVQQDExZ3d3cubmV0d29ya3RlY2hpbmMu
Y29tMSUwIwYJKoZIhvcNAQkBFhZqdXN0aW4uZmVycmlAbnRpZ28uY29tMIIBIjAN
BgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAzc1BU6EbJL4hNYj9UfM2EO2qzTHr
c/OUL8kaoZZyExpnK3ekrlGWSTciV3hP4ZY+AlxuYOP5pzWWnIGXzBHgw0XybIgM
/IraRiEzrh8jW+kKUCjcBhP1DQXES7EhX1MDoNyTVEaIXF5Ya8RWJMxisrd4VTfc
eCm3zgUq1HN4rmY4Uj4EN7fsDrT2QppClPKvFiFaFdwAsi7GXA8q2Gffx5mfhPiw
yb5qAPPx78f6wTYk/MeasUDVDC5DHl0L87MfYkMLhc+1tLIOxUSKu0NJYczuC/g0
OAuk+khgkH5gau9t83lCThEI6OkHswNR8P9eH5HTOo0U9XfuOywmpL6ByQIDAQAB
oCkwJwYJKoZIhvcNAQkOMRowGDAJBgNVHRMEAjAAMAsGA1UdDwQEAwIF4DANBgkq
hkiG9w0BAQ0FAAOCAQEAqQ2Es1PHsBrPIDwCLZ/9+4hTCcgTyIXBb6A7TmvLmnzF
JcyC7//78np+jGbhSMbM9Pgh6DJpcTuIgSSDlWzP9JJLGq+SjKn3Lm6tScGCz7YYT
cf6VFtPyCP5GkNVqfZfTApKESj40tIqM/gVyByQzD1CFL4FIGhRrYXpbbGpoBpj/
C9S1FZT5Xjus/ixbKm/O6GwzO6H6US8PAFMtViSHaOg6i9nhIBWUg7OeOjWBdnTb
JaQpAIF3OrTbQ/iKgXzYb4L9bowExyvP/DldOx7vG9egbi4wJjjIhuOssxFb7Q1J
ODh+Cc7uALD5PhLaUgglhi8a1IgtlIuiPlB1UztZcg==
-----END CERTIFICATE REQUEST-----
```

Upload your CSR to your Certificate Authority to get the certificate.

2. Uploading Server Certificate to a ENVIROMUX Device

The NTI ENVIROMUX device expects the certificate and key as a single file in "PEM" format.

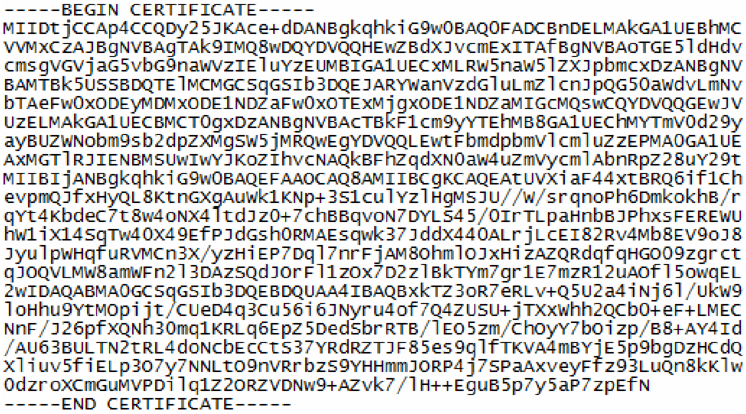
The server certificate file with extension “pem” should be received by your external CA after submitting a certificate request. Get your server certificate in a .pem or .cer format. Copy your server certificate into another file and add the device key as shown below.



```
-----BEGIN RSA PRIVATE KEY-----
MIIEowIBAAKCAQEAyQ1pnlRkr3r4wlCJi0jYrFW2+bXqv6WrotMyGfIRZaZkLo5J
1whYb/uFcX2Unc/H5X7wDa3gawr6iJki/dVf8X16gpHicrWR+WFAiRs/D7z+B/ew
iaM5vqDMTw5mvAmnNaOsZ3gsOnSEFgiZMewkimJYyyfHjHv2kpW51HekWraa8dvJ
dunAhzeTTcDghxhT2p2hsKxARB5m4DOvjv2aEcxnRixxvDA/2uggxfXJil8SCpAk
qxiJzeqPv+xRvp/jTpI1wlGPmuemJILGs95iFOv8WpUFM3xDR3o8GCu0l8eokEEA
lpWNgiRuQcjjh464Z8rbr8l0+FJP0AhEJ7XufwIDAQABAoIBABStQHN8Em7JotO5
HKwqbb4rgonj36SeESzJs5lff9KIbjOrfQSUYyQBJhQp6iLgv5oml+GQREg99M4f
ka2xSBC56uOKxVMuwTh4e/6dwrqHoUiIfKtrEgE84EYxIPettniZwJ1TipjoarOp
XTf5JTjmLGOYT7lu9kjVBSuIsmpxtn8xNu1po5l1zY/Soy3p38qTKwNJ1n9CnJXo
q9LTnfiGvq7JfRhjHFx4AYKJsZMNE4ZI4WEr4B72WxifpINrO1lk0ezrKn5UB+Ug
8nXONonxAlotv7McIM+u4cjv8ww3yTb7Mw5isAS9zeS9eN5ticLLh5yFFJyYKai6
e2HgpEECgYEA7XY94+z2Xy48z5ogQErgHCwFv7WWP6kUObJGkITCygPON5jqKSuo
pprtpr4gpvH8V78krPASsdXrmm3UyVmrK5z89TOSQMnSls6HX+vfVsHVxmKW3Wa6
BChtA2+YsHPtpFeAYK/rUxh/3rRblFOpTfpiHpmYEWNOwyXT2Jg2HPcCgYEA2L+D
t6HvFnscOdcr1KE2VGEmLgD6ll2eUBp3/6+MrAqgdVqaaBgxuv57sWNS7Ys4Fv7V
EioI/CwDcB4uIIK4mbenW39uu2OZAGceNXOmdOsg97Vxs7GR76tyC9irei6u0HX2
ySpb5L8cB1PevTP058GHVjqhKmSrzQx/URx9ALkCgYEAyhZc6YKa0bnp6svCMrUG
MTON2O9S5O6h1dBQmWFC3OWsizxJ26vaJZ+oLMWVyD4cgRicv8i4QDxL++sIsirr
r3w1EwhcZmLcI5e0Qf/c3Fqt8d2pgtaP7EXzMH9itJiUX85P5PkSDm/FMuTPI1Zn
uYMiyePxNKsNNqsUtToko1UCgYAsRWHX/iFhjB/FyKdRNORt87Hir5x/XfvaDK35
8ZdgBIOltK3ZGSf/M798CfeEQW1hdQd8QE25hBvnqKJvTYP7EcIDNFIfwEYeCPHo
pQiY1PXU4qCovVo7g981gDn2KNbYCWAw0pAWdtp4vK7AIn6hX6wO9sa4a/uTVDwl
CxaVMQKBgFhJvBHD9cKY41kMTYHvNPaXmJAtWlEBMyVkFWAtz+e4C+ojzyLuI34e
TPkk8ivxeZO0c8X241dIBZKbwCLnV3TprvA2UeMui5LjyU0H4AEnzan1H4S2G+Rz
gWWEFZmTlg0R7f7H9uBPpoNjnJzhsAMkBAVgwPJvY6PyoPP0tglR
-----END RSA PRIVATE KEY-----
-----BEGIN CERTIFICATE-----
MIIDazCCAlOgAwIBAgIJAMib9H5kqNSpMA0GCSqGSIb3DQEBCwUAMFkxCzAJBgNV
BAYTAlVTMQswCQYDVQQIEwJPSDEMMAoGA1UEChMDTlRJMQ8wDQYDVQQDEwZOVEkg
Q0ExHjAcBgkqhkiG9w0BCQEWD3NhbGVzQG50aWdvLmNvbTAeFw0xODEyMDQyMDA1
MzhaFw0yMTA5MjMyMDA1MzhaMHExCzAJBgNVBAYTAlVTMQswCQYDVQQIEwJPSDEP
MA0GA1UEBxMGQXVyb3JhMQwwCgYDVQQKEwNOVEkxFjAUBgNVBAMTDTE5Mi4xNjgu
My4xNDQxHjAcBgkqhkiG9w0BCQEWD3NhbGVzQG50aWdvLmNvbTCCASIwDQYJKoZI
hvcNAQEBBQADggEPADCCAQoCggEBAMkNaZ5UZK96+MJQiYtI2KxVtvm16r+lq6LT
MhnyEWWmZC6OSdcIWG/7hXF9lJ3Px+V+8A2t4GsK+oiZIv3VX/F9eoKR4nK1kflh
QIkbPw+8/gf3sImjOb6gzE8OZrwJpzWjrGd4LDp0hBYImTHsJIpiWMsnx4x79pKV
udR3pFq2mvHVSXbpwIc3kO3A4IcYU9qdobCsQEQezuA9L479mhHMZOYscbwwP9ro
IMX1yYpfEgqQJKsYic3qj7/sUb6f406SNcJRj5rnpiSCxrPeYhdL/FqVBTN8Q0d6
PBgrtJfHqJBBAJaVjYIkbkHI44eOuGfK26/JdPhST9AIRCe17n8CAwEAAaMeMBww
CQYDVR0TBAIwADAPBgNVHREECDAGhwTAqAOQMA0GCSqGSIb3DQEBCwUAA4IBAQBd
CNA7H/4DeYR70j13yOmN9ajgRU5XbzETNA1Cr+3W+2YUaJ4cA0do/e9TLwhTC1pH
E1HKrkFyjag5JEE32PT/Pn+gb++/2U94jw7qatqrcwiboy7ytJcZgEKYOEPjVfUJ
fS1saVbgWmQMGA0LuRr2NLLU9vCYlTpeeTGyC/ve5k3rjOYFAcQL5rKa9D7Vgn6r
IwTU13uwvDxP7QzvkgjKuEJkWlg2DlMS3bw2ejAOc9HAl8RCROxm55Z7maRqeLzJ
GLbf3587pCZMQIu21YU9DJ/7ORSN1xdyKQG4KNfOxMHkmuAafqIFp+d8D+3xtVSw
h94zxQI77VarHxLswk3e
```

On the ENVIROMUX Web Interface menu Under “Administration” select “Network”. In X509 certificates, select “Choose File”, select the combined server certificate /key file, click **"Upload Server certificate and key"**.

3. Uploading External CA Certificate to ENVIROMUX Device:



```
-----BEGIN CERTIFICATE-----
MIIDtjCCAp4CCQDy25JKAce+dDANBgkqhkiG9w0BAQ0FADCBnDELMAkGA1UEBhMC
VVMxCzAJBgNVBAgTAk9IMQ8wDQYDVQQHEwZBdXJvcmExITAfBgNVBAoTGE5ldHdv
cmsgVGVjaG5vbG9naWVzIEluYzEUMBIGA1UECxMLRW5naW5lZXJpbmcxDzANBgNV
BAMTBk5USSBDQTElMCMGCSqGSIb3DQEJARYWanVzdGluLmZlcnJpQG50aWdvLmNv
bTAeFw0xODEyMDMxODE1NDZaFw0xOTExMjgxODE1NDZaMIGcMQswCQYDVQQGEwJV
UzELMAkGA1UECBMCT0gxDzANBgNVBAcTBkF1cm9yYTEhMB8GA1UEChMYTmV0d29y
ayBUZWNobm9sb2dpZXMgSW5jMRQwEgYDVQQLEwtFbmdpbmVlcmluZzEPMA0GA1UE
AxMGTlRJIENBMSUwIwYJKoZIhvcNAQkBFhZqdXN0aW4uZmVycmlAbnRpZ28uY29t
MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAtUVXiaF44xtBRQ6if1ch
evpmQJfxHyQL8KtnGXgAuWk1KNp+3S1culYzlHgMSJU//W/srqnoPh6DmkokhB/r
qYt4KbdeC7t8w4oNX4ltdJz0+7chBBqvoN7DYLS45/0IrTLpaHnbBJPhxsFEREWU
hW1iX14SgTw40X49EfPJdGsh0RMAEsqwk37JddX44OALrjLcEI82Rv4Mb8EV9oJ8
JyulpWHqfuRVMCn3X/yzHiEP7Dql7nrFjAM8ohmlOJxHizAZQRdqfqHGO09zgrct
qJOQVLMW8amWFn2l3DAzSQdJOrFl1zOx7D2zlBkTYm7gr1E7mzR12uAOfl5owqEL
2wIDAQABMA0GCSqGSIb3DQEBDQUAA4IBAQBxkTZ3oR7eRLv+Q5U2a4iNj6l/Ukw9
loHhu9YtMOpijt/CUeD4q3Cu56i6JNyru4of7Q4ZUSU+jTXxWhh2QCb0+eF+LMEC
NnF/J26pfXQNh30mq1KRLq6EpZ5DedSbrRTB/lEO5zm/ChOyY7bOizp/B8+AY4Id
/AU63BULTN2tRL4doNcbECCtS37YRdRZTJF85es9qlfTKVA4mBYjE5p9bgDzHCdQ
Xliuv5fiELp3O7y7NNLtO9nVRrbzS9YHHmmJORP4j7SPaAxveyFfz93LuQn8kKlw
0dzroXCmGuMVPDilq1Z2ORZVDNw9+AZvk7/lH++EguB5p7y5aP7zpEfN
-----END CERTIFICATE-----
```

Get the certificate of your CA in a *.cer or *.pem format which should be as shown above. Optionally this file may include an intermediate certificate, which would be different from the above root Certificate, in the same file. On the ENVIROMUX Web Interface menu Under “Administration” select “Network”. In X509 certificates, click “Choose File”, select this CA certificate file, and click **"Upload CA certificate"**.

III. Creating a Client Certificate for ENVIROMUX Series Products

The procedure for creating a client certificate is similar to that for creating the web server certificate.

1. Creating a user key

The following instructions create a private key for a user named your_name@ntigo.com. When prompted for the pass phrase, enter a password that you can remember.

```
    % cd /usr/local/ssl/ntiCA
    % openssl genrsa -des3 -out ./user/keys/your_name@ntigo.com.key 2048
    Generating RSA private key, 2038 bit long modulus
    ...++++++
    .....++++++
    e is 65537 (0x10001)
    Enter pass phrase for ./user/keys/your_name@ntigo.com.key:
    Verifying - Enter pass phrase for ./user/keys/your_name@ntigo.com.key:
```

NOTE: When entering the password, the characters will not be displayed and there will not be an indication of what you typed in. An error message will be printed if you do not type the same password in both prompts.

2. Create the user certificate request

1. The following command creates a certificate request for a user with email address: your_name@ntigo.com and common name your_name. When prompted for the pass phrase for the keys in file ./user/keys/your_name@ntigo.com.key, enter the pass phrase that you used to create the user key (e.g. “password”).

```
    % openssl req -sha512 -new -key ./user/keys/your_name@ntigo.com.key -out
./user/requests/your_name@ntigo.com.csr
    Enter pass phrase for ./user/keys/your_name@ntigo.com.key:

You are about to be asked to enter information that will be incorporated into your certificate request.
  What you are about to enter is what is called a Distinguished Name or a DN.
  There are quite a few fields but you can leave some blank
  For some fields there will be a default value,
  If you enter '.', the field will be left blank.
  -----
   Country Name (2 letter code) [US]:US
    State or Province Name (full name) [OH]:OH
    Locality Name (eg, city) []: Aurora
    Organization Name (eg, company) [NTI]:NTI
    Organizational Unit Name (eg, section) []:Engineering
    Common Name (eg, YOUR name) []:your_name
    Email Address [ca@ntigo.com]:your_name@ntigo.com

    Please enter the following 'extra' attributes
    to be sent with your certificate request
    A challenge password []:
    An optional company name []:
```

2. Sign the user certificate request and create the certificate

```
    % openssl ca -in ./user/requests/your_name@ntigo.com.csr -cert ./CA/ntiCA.crt -keyfile
./CA/ntiCA.key -out ./user/certificates/your_name@ntigo.com.crt
```

Make sure the following line is in your **openssl.cnf**:

```
    unique_subject = "yes"
```

If it is not, you should add it on a separate line using any text editor.

3. Check that the request matches the signature

```
   Using configuration from /usr/local/openssl/openssl.cnf
   Check that the request matches the signature
   Signature ok
   The Subject's Distinguished Name is as follows
   countryName           :PRINTABLE:'US'
   stateOrProvinceName   :PRINTABLE:'OH'
   localityName          :PRINTABLE:'Aurora'
   organizationName      :PRINTABLE:'NTI'
   organizationalUnitName:PRINTABLE:'Engineering'
   commonName            :PRINTABLE:'justin'
   emailAddress          :IA5STRING:'justin.ferri@ntigo.com'
   Certificate is to be certified until Dec  7 14:52:08 2038 GMT (7305 days)
   Sign the certificate? [y/n]:y

   1 out of 1 certificate requests certified, commit? [y/n]y
   Write out database with 1 new entries
   Data Base Updated
```

If you receive an error message like the one below, you still should not have issues with signing the certificate. The index.txt.attr file will be generated.

```
      Can't open /usr/local/ssl/ntiCA/index.txt.attr for reading, No such file or directory
      3079379152:error:02001002:system library:fopen:No such file or
      directory:crypto/bio/bss_file.c:74:fopen('/usr/local/ssl/ntiCA/index.txt.attr','r')
      3079379152:error:2006D080:BIO routines:BIO_new_file:no such
      file:crypto/bio/bss_file.c:81:
```

4. Verifying the user certificate contents

To verify the user certificate contents, you can use the following command:

```
    % openssl x509 -in ./user/certificates/your_name@ntigo.com.crt -text
```

IV. Creating and Importing a Client Certificate for ENVIROMUX Series Products

Web browsers like Firefox and IE can't use the certificates in the PEM format that is generated by OpenSSL . Consequently, we'll need to export the user certificate to file formats that can be imported by web browsers.

1. Generating the client certificate in PKCS#12 format

Firefox and Windows support the PKCS#12 certificate format. Use the following command to convert the user certificate to this format.

NOTE: During the conversion process, you'll be asked for an export password. Enter anything you can remember, but don't let it be empty because the file will contain your private key.

```
    % openssl pkcs12 -export -clcerts -in ./user/certificates/your_name@ntigo.com.crt -inkey
./user/keys/your_name@ntigo.com.key -out ./user/certificates/your_name@ntigo.com.p12
        Enter pass phrase for ./user/keys/justin.ferri@ntigo.com.key:
        Enter Export Password:
        Verifying - Enter Export Password:
```

Copy the `your_name@ntigo.com.p12` file in the /usr/local/ssl/ntiCA/user/certificates directory to a location where you can access it from your web browser via the file system.

How to Import a Client Certificate on Windows

The browsers must be able to access the client certificate created. The following are directions for using the newly created client certificate.

1. Open “Internet Options” in Control Panel
2. Navigate to the “Content” tab.
3. Select the “Certificates” button.
4. Go to the “Personal” tab
5. Press “Import”
6. Follow the wizard instructions to select the certificate file
7. Enter the password you used to protect your certificate and private key
8. Import the client certificate into the Personal store.
9. Enter the password you used to protect your certificate and private key
10. Click the imported certificate and then on the View button in the Certificate intended purposes group box. Click the Details tab and then the Edit Properties button. Make sure that the Client Authentication option is checked.

Next time you try to access the ENVIROMUX Web Interface, you will be prompted to use the client certificate.

NOTE: You will also have to import the CA that was used to sign this client certificate.

How to Import a Client Certificate on Mozilla Firefox

The Mozilla Firefox browser does not use Window’s stores to use and trust certificates. The following are directions for trusting the newly created client certificate.

1. Open the Mozilla Firefox browser.
2. Type “about:preferences#privacy” in the URL field of the browser.
3. Under “Security” in the “Certificates” section, press the “View Certificates” button.
4. Navigate to the “Your Certificates” tab.
5. Select “Import”.

6. Make sure you are looking for the correct file type (in the dropdown next to the file name field, the file type should display something that accepts (*.p12) files.
7. Find your client certificate and press “Open”
8. Enter the password you used earlier to generate it and click “OK”.
9. Restart the Firefox browser.

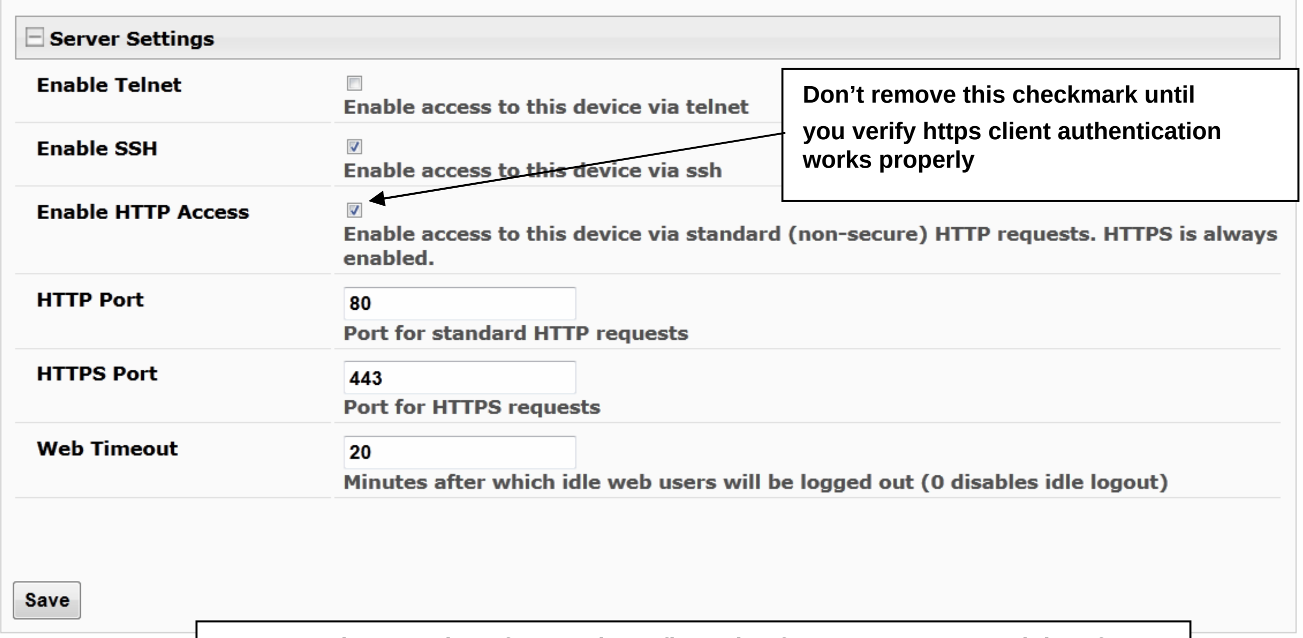
Next time you access the ENVIROMUX Web Interface, you will be prompted to use the client certificate.

NOTE: You will also have to import the CA that was used to sign this client certificate.

V. Configuring an ENVIROMUX Device to Require Client Certificate

On the ENVIROMUX Web Interface menu Under “Administration” select “Security”.
In X509 certificates select the file `ntiCA.crt` and press button "Upload CA certificate".
Select “certificate + login” in the "Mode" field under “User Authentication” to enable the device to ask for a client certificate.
Use https communication.

Note: Before disabling http be sure to verify https client authentication works properly.



Server Settings

Enable Telnet	□ Enable access to this device via telnet
Enable SSH	☑ Enable access to this device via ssh
Enable HTTP Access	☑ Enable access to this device via standard (non-secure) HTTP requests. HTTPS is always enabled.
HTTP Port	80 Port for standard HTTP requests
HTTPS Port	443 Port for HTTPS requests
Web Timeout	20 Minutes after which idle web users will be logged out (0 disables idle logout)

Don’t remove this checkmark until you verify https client authentication works properly

Server settings section of Network configuration from ENVIROMUX web interface

DATE/TIME BATTERY REPLACEMENT

The E-xD is equipped with a replaceable battery that maintains the set date and time when the ENVIROMUX is powered OFF. In the event you find that the date has been reset to “08/31/2009” after a power-cycle, this means the battery has reached end of life and needs replacement.

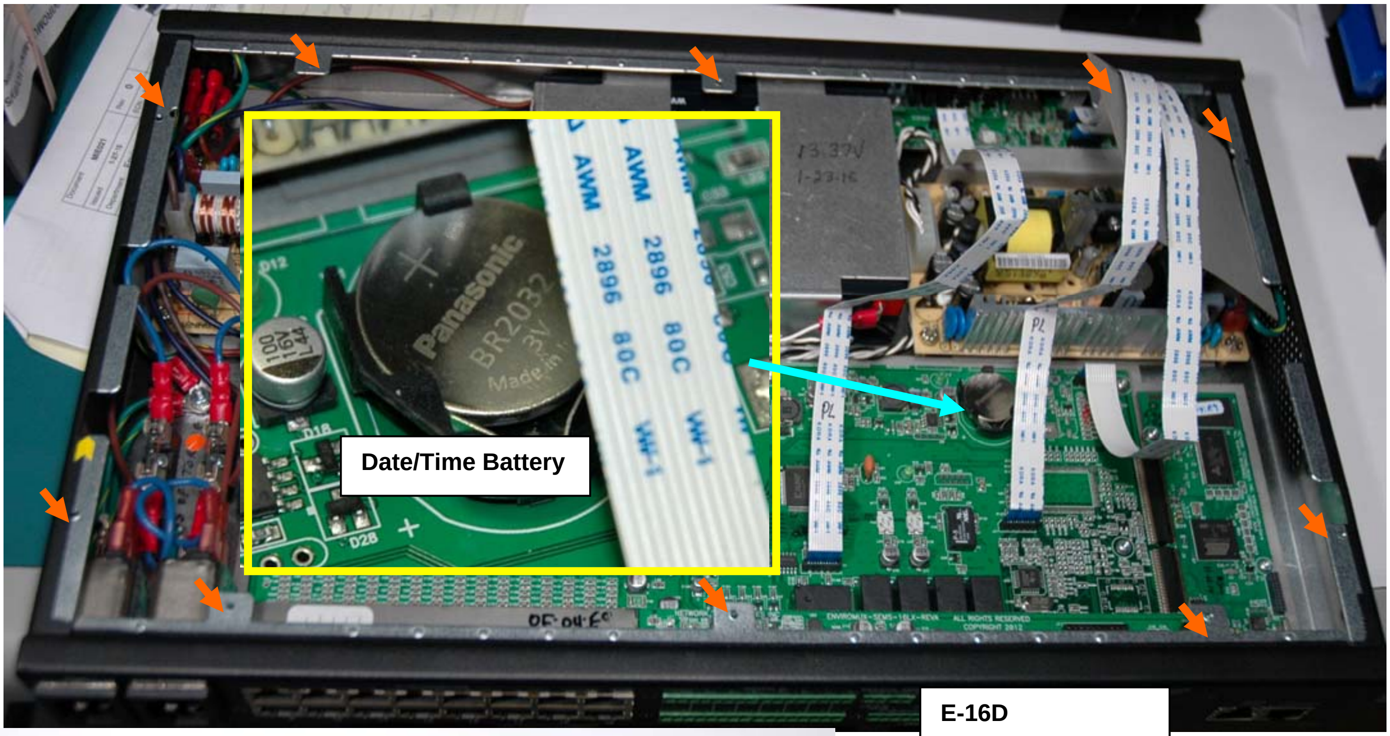
To replace the battery:

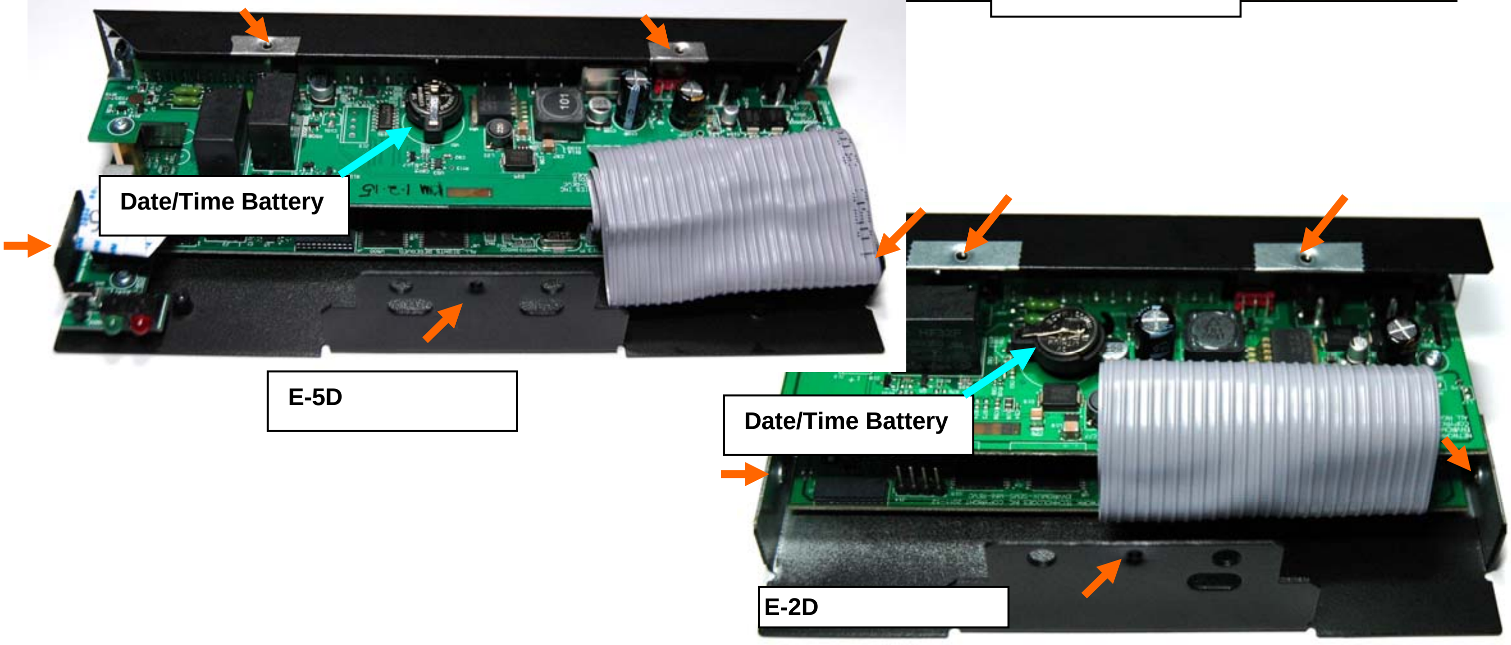
1. Avoid Electrostatic Discharge (ESD) by grounding yourself before touching the ENVIROMUX. Failure to follow this step may damage your ENVIROMUX.

2. Power OFF the ENVIROMUX.

WARNING: RISK OF ELECTRIC SHOCK!! If you prefer to change this battery while power is connected to avoid having to reset the date and time, be extremely careful not to touch the exposed 120 or 240VAC line voltage (E-16D) or any other part of the circuit boards. Also, **be careful** not to let the battery fall down onto the live circuit board.

3. Remove the screws that hold the top of the case to the ENVIROMUX (10 in the E-16D, 5 in the E-2D/5D, locations indicated below by orange arrows) and remove the cover to expose the circuit boards inside.

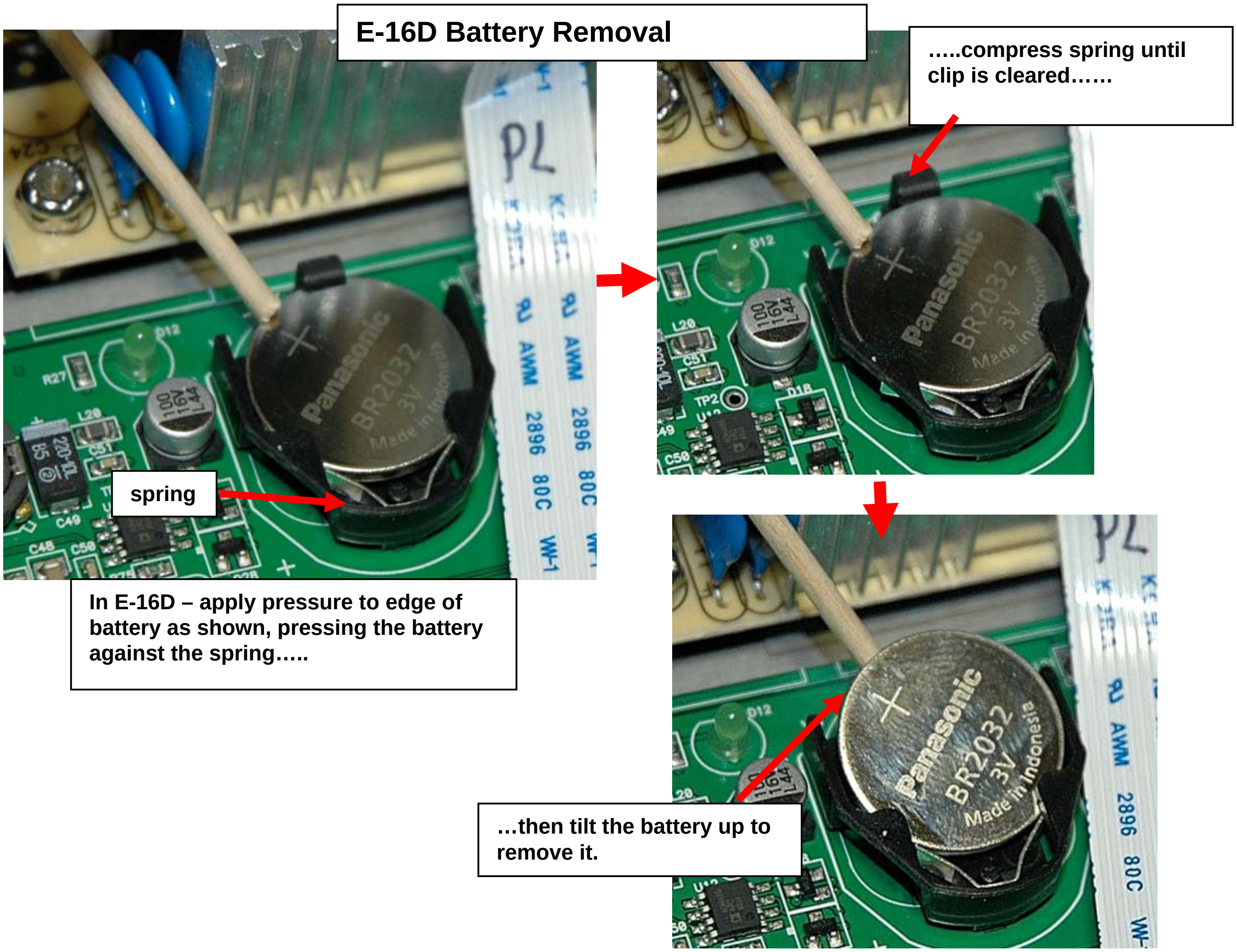




4. Locate the date/time battery in the ENVIROMUX (see images above).

5. Using a **non-conductive** stick-like object (ex. a Q-tip with the cotton removed from one end), press the battery out of the battery holder. **Be careful not to let it fall onto the circuit board** if you are doing this with power ON.

E-16D Battery Removal

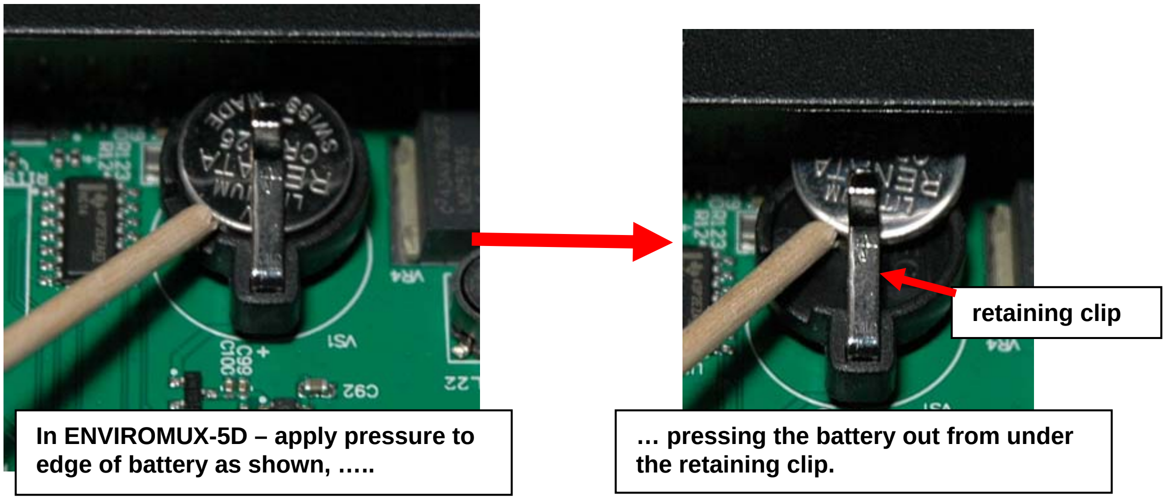


In E-16D – apply pressure to edge of battery as shown, pressing the battery against the spring…..

…..compress spring until clip is cleared……

…then tilt the battery up to remove it.

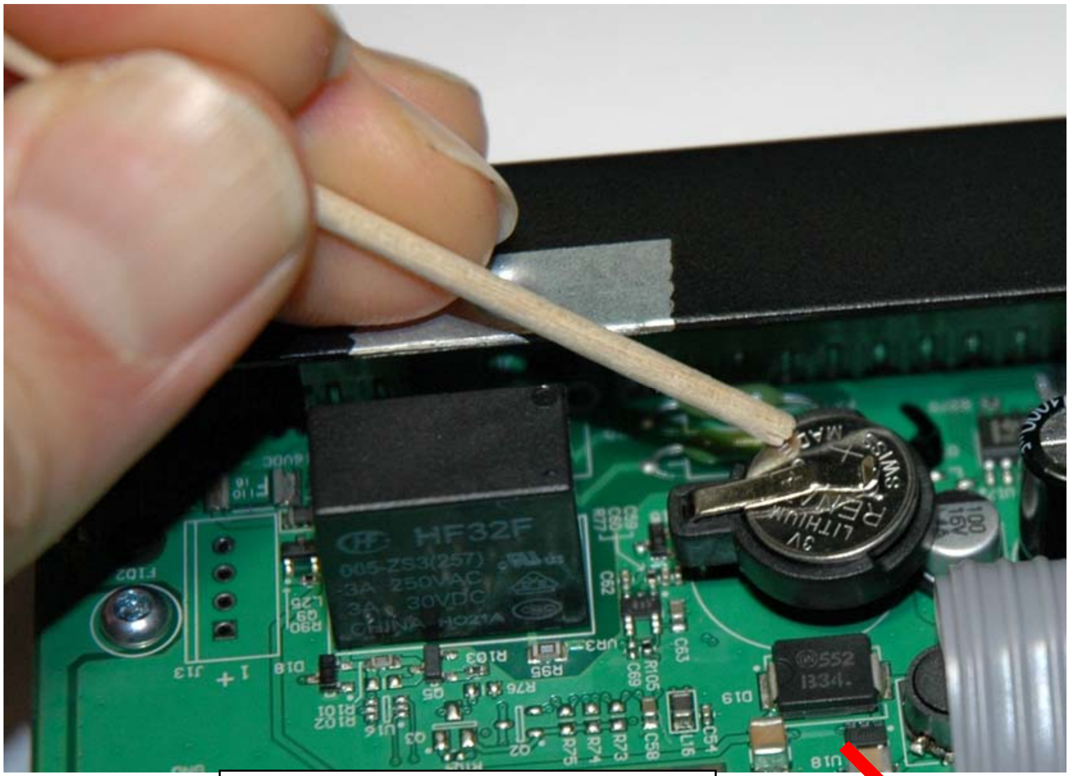
ENVIROMUX-5D Battery Removal



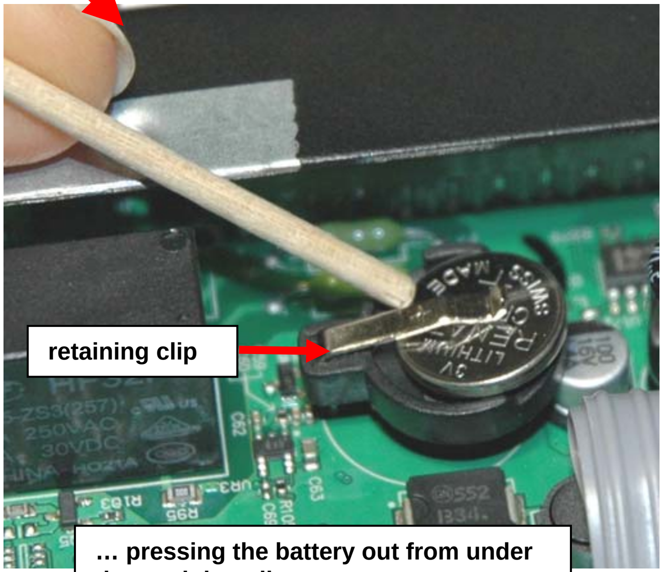
In ENVIROMUX-5D – apply pressure to edge of battery as shown, …..

… pressing the battery out from under the retaining clip.

E-2D Battery Removal



In E-2D – apply pressure to edge of battery as shown, …..



retaining clip

… pressing the battery out from under the retaining clip.

6. Re-install the new battery by reversing the process. (**CR1225** for E-2D/5D, **CR2032** for E-16D) With the E-2D/5D, be very careful not to lift up to hard on the retaining clip. Lift only far enough to slip the edge of the new battery under it and slide the battery back into place.

7. Carefully reinstall the cover to the base and install the screws removed.

8. If the ENVIROMUX was powered OFF during this procedure, power ON the ENVIROMUX and configure the correct time and date using one of the control methods described earlier in this manual.

E-16D BACKUP BATTERY REPLACEMENT

The NTI E-16D contains a sealed lead acid battery that may at some point need replacement. **If the unit is under warranty, contact NTI to arrange for return and factory replacement to prevent voiding the warranty.** If the unit is outside of the warranty, field replacement may be preferred (contact NTI to order part no. E-BATTERY2). In either case, the failed battery must be properly disposed of. To replace the battery, carefully follow all instructions.

WARNING

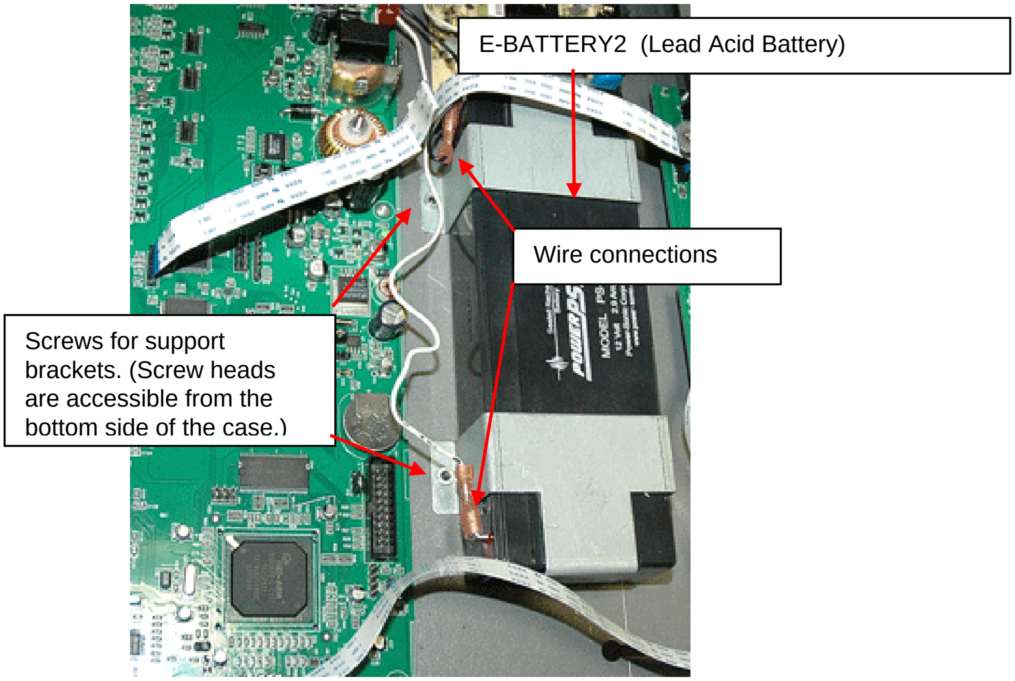
RISK OF ELECTRIC SHOCK! FAILURE TO FOLLOW ALL INSTRUCTIONS MAY RESULT IN ELECTRICAL SHOCK.

Disconnect ALL power and connection cables from the ENVIROMUX before proceeding.

1. Remove 10 Phillips-head screws securing the cover of the ENVIROMUX to expose the components inside.
2. Locate the battery inside the ENVIROMUX. (See figure below)
3. Remove the two wires connected to the battery using pliers.
4. Remove the 4 Phillips-head screws securing the two brackets holding the battery to the case. Screw heads are accessible from the bottom side of the ENVIROMUX.
5. Remove the battery.
6. Place the new battery in the case with the terminals in the same position as the battery that was removed.
7. Reinstall the two brackets to secure the battery using the 4 Phillips-head screws.
8. Attach the two wires. Be sure the wire connectors are fully on the battery terminals.
9. Reinstall the cover of the ENVIROMUX.
10. Dispose of the battery according to local requirements.

Note: Charge new battery (power up the ENVIROMUX) for at least 48 hours before putting the ENVIROMUX in storage, and if kept in storage, recharge the battery every 3 months.

For instruction on the proper disposal of the battery, either contact the Rechargeable Battery Recycling Corporation (RBRC) at 800-822-8837 or go to their website at www.call2recycle.org. Disposal will be at no cost to you.


E-BATTERY2 (Lead Acid Battery)
Wire connections
Screws for support brackets. (Screw heads are accessible from the bottom side of the case.)

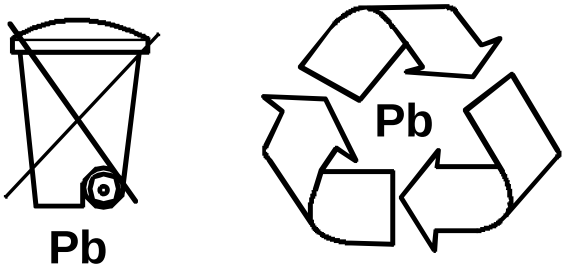
RECYCLING INFORMATION

Attention: Residents of New York, USA

The E-16D is subject to New York's recycle laws regarding lead acid batteries.

WARNING

The E-16D contains a sealed lead acid battery. Battery maintenance must be performed by an authorized trained technician. Always follow local laws and regulations regarding the disposal of this unit.



For instruction on the proper disposal of the battery contained in this unit, either contact the Rechargeable Battery Recycling Corporation (RBRC) at 800-822-8837 or go to their website at www.call2recycle.org. Disposal will be at no cost to you.

For instruction on the safe removal of the battery, see page 189.

In order to return the E-16D to Network Technologies Inc for any reason, please contact us at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** to receive a return goods authorization. All packaging and shipping expenses will be the sole responsibility of the customer.

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WARRANTY INFORMATION

The warranty period on this product (parts and labor) is two (2) years from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** or visit our website at www.networktechinc.com for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

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