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Topics Covered in this SNMP Supplement for the E-xD Environment Monitoring System

For the complete E-xD product manual with all features and functions, click here.

HOW TO SETUP SNMP

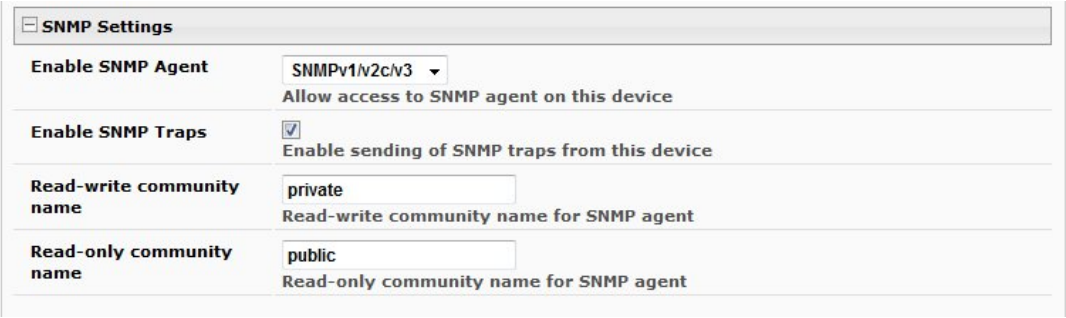
Follow these steps to prepare the ENVIROMUX to send SNMP traps to ENVIROMUX users.

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

Note: The v3 browser uses an Engine ID string to encrypt and decrypt SNMP messages. The Engine ID for the E-xD (each ENVIROMUX will have a different one made from the ENVIROMUX's MAC address) can be found on the System Information page in the ENVIROMUX web interface.

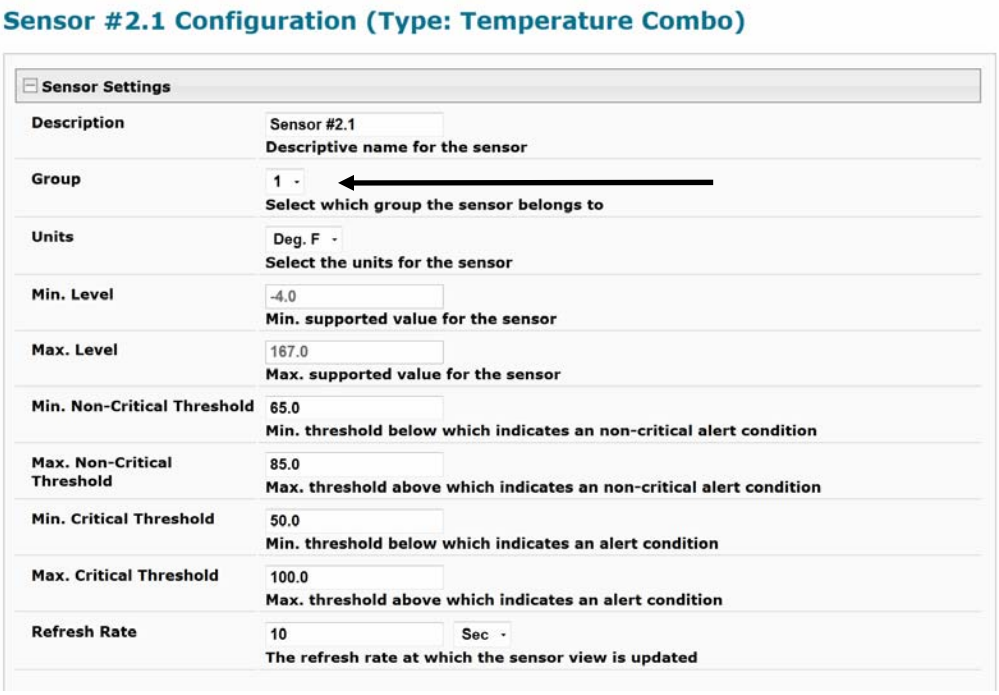
2. Place a checkmark in “Enable SNMP Traps”.
3. Enter names for the Read-write community and Read-only community (usually just “private” and “public” as shown).



SNMP Settings under Network Settings

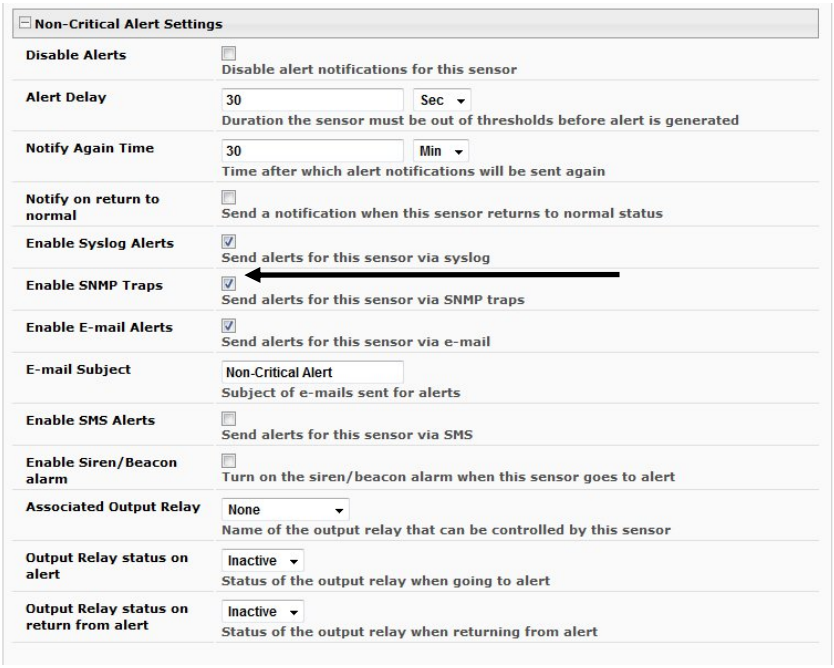
Under Sensor Configuration:

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.



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.



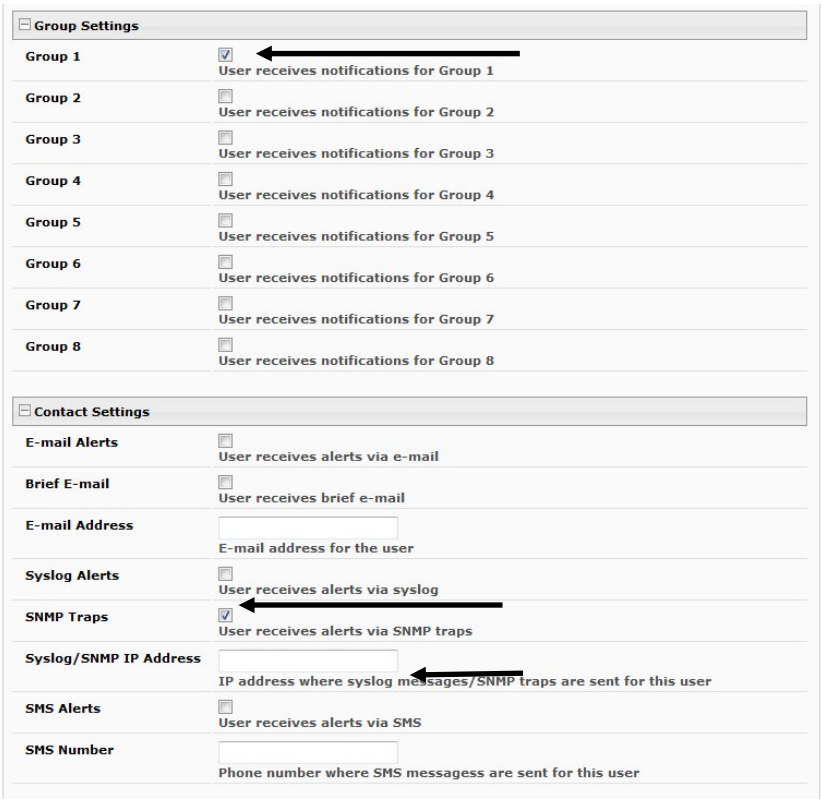
Enable SNMP Traps for the sensor

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 <u>each</u> user that should receive SNMP traps

8. Enter a valid IP address where traps are to be sent for each user.



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 (v128)), 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.

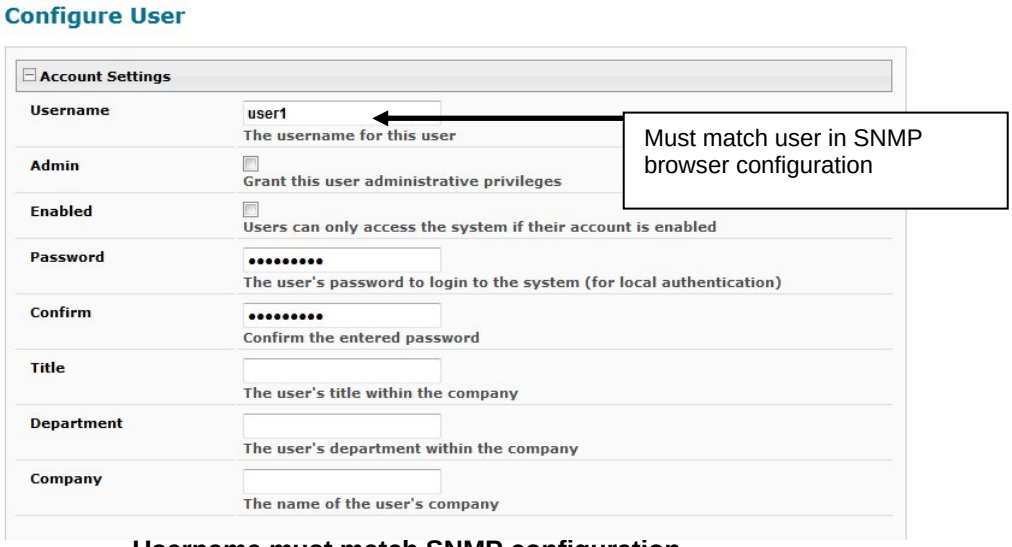
The protocol types will be dependent upon the type of SNMP Agent you are using (refer to your SNMP Agent specifications).

- Authentication Protocol = MD5 or SHA
- Privacy Protocol = DES or AES (v128)

If only SNMPv1/v2c will be used, the default settings of "None" will apply.

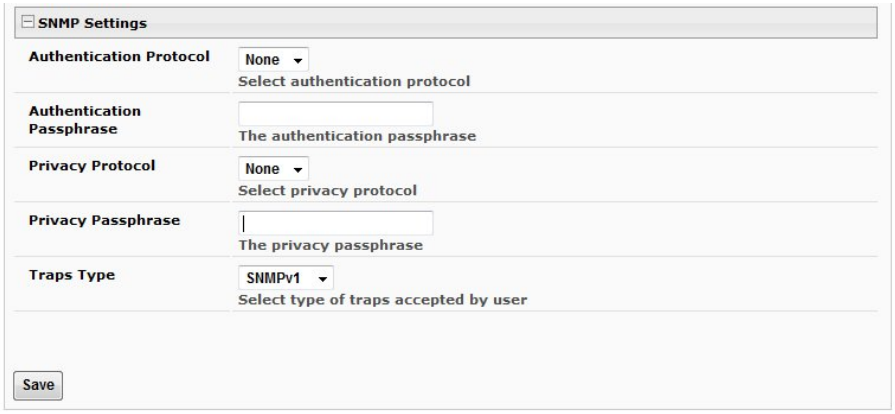
The passphrases will be those that have been setup in your SNMP agent for the user being configured.

Note: The username in the ENVIROMUX user configuration must match the username in the SNMP browser configuration.



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.



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

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.

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.

In order to use this feature, you must configure your third-party device's SNMP settings to send a SET command to the ENVIROMUX. If your device (printer, fax, access server, router) has SNMP features, and you have an SNMP Client installed (MIB Browser for example), you need to configure the third party devices to send a SET command using the format described below when triggered.

Note: Not all devices that support SNMP also support the sending of SET commands.

We used a MIB browser to configure an E-5D as the device to send the message in the image below.

1. From within your SNMP browser, click on **msgRegisters** ->**msgRegisterDescription**.

2. Right click **msgRegisterDescription1** and select SET.

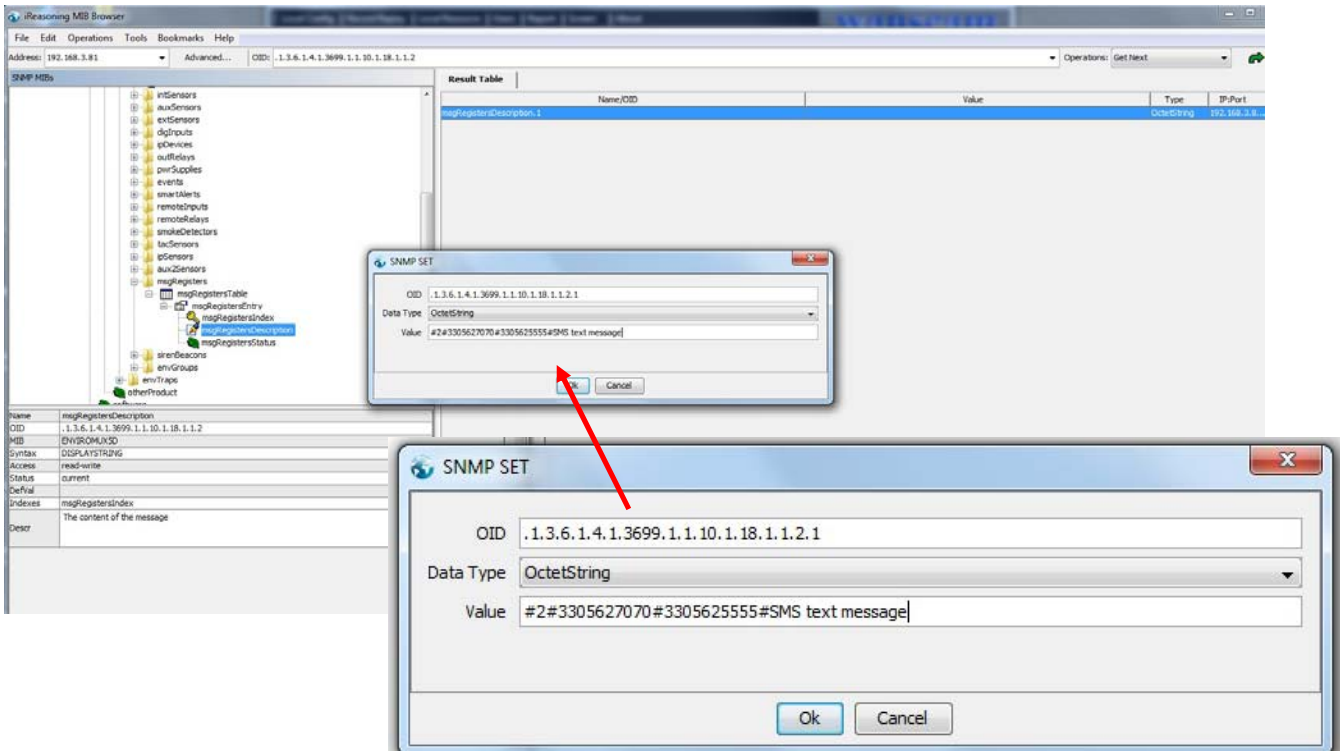
3. Under Value, enter the number of phone numbers to send the text message to (up to 4 different numbers), enter the phone numbers to be called (no hyphens), and enter a text message up to 160 characters in length. Each piece of information must be separated by a "#" sign.

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, when a text message is sent, a record of it being sent will be logged.



Use SNMP as SMS Relay

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.

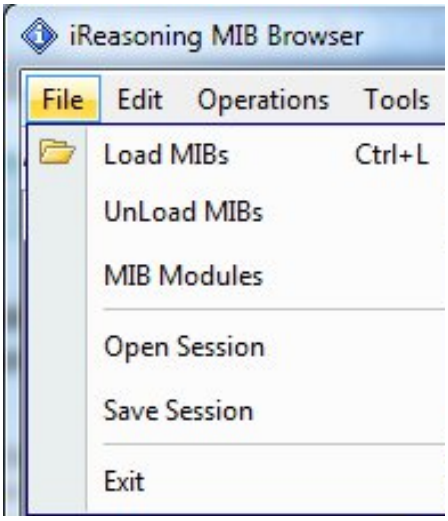
View OIDs

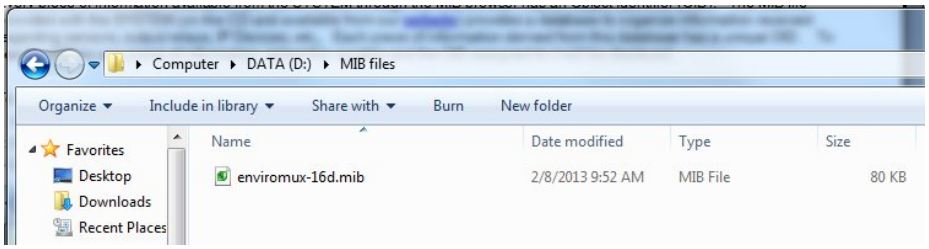
To view this information, you must do the following:

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.

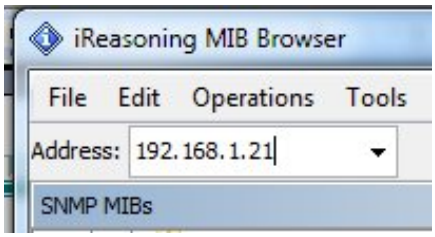




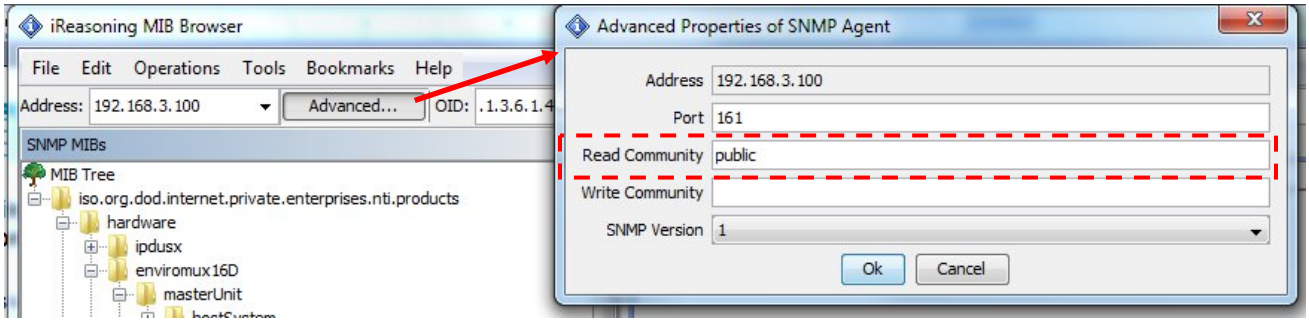
Select "Load MIBs" and locate the MIB file on your PC.

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.

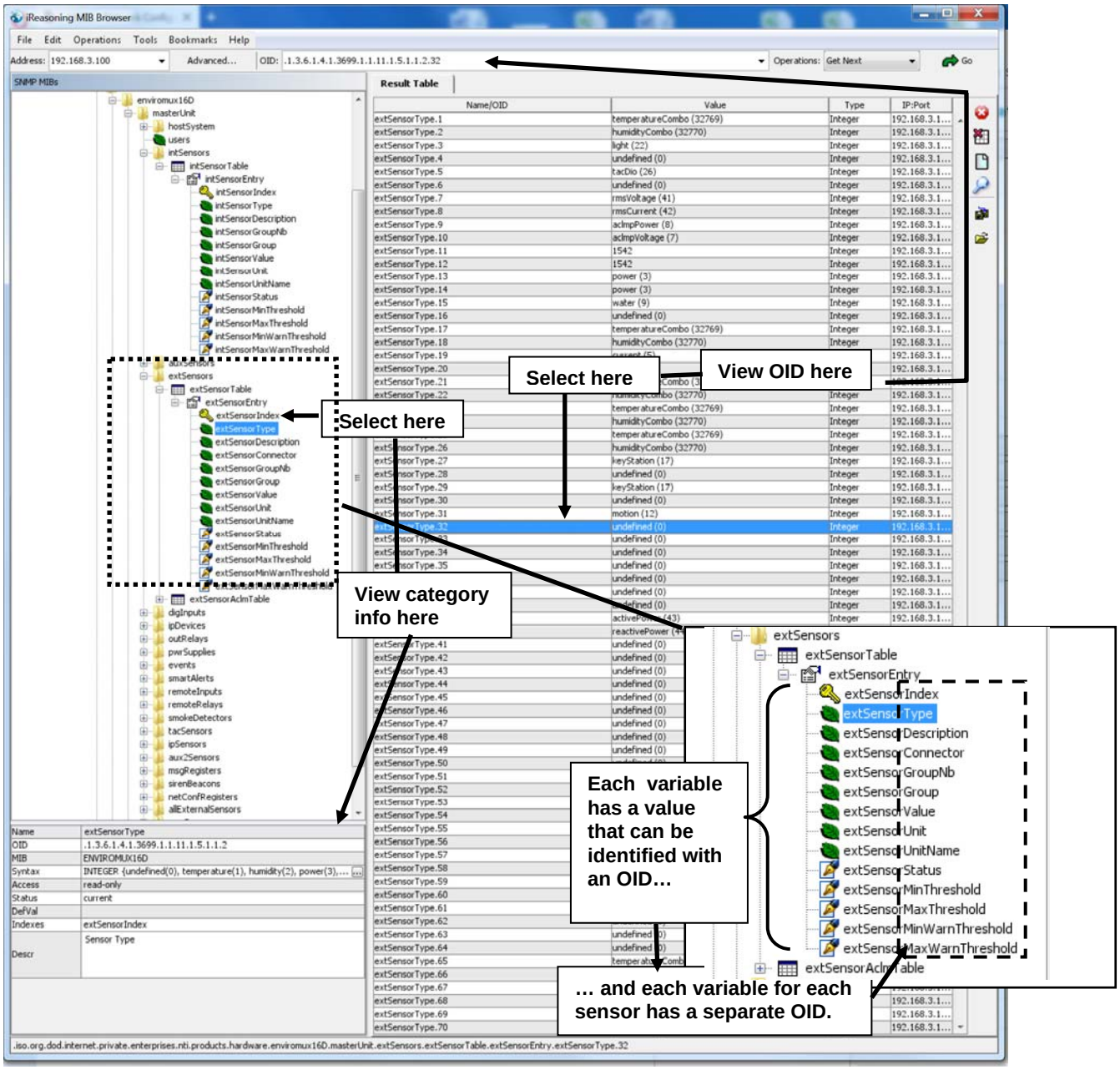


5. With the iReasoning browser, the Read-only Community Name (default is "public") was automatically sensed and applied when the IP address was entered, but if this doesn't happen in your browser, make sure the "Read Community" field in the agent properties includes the name "public" (or whatever you have changed it to in the E-16D network configuration).



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 2 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.



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.

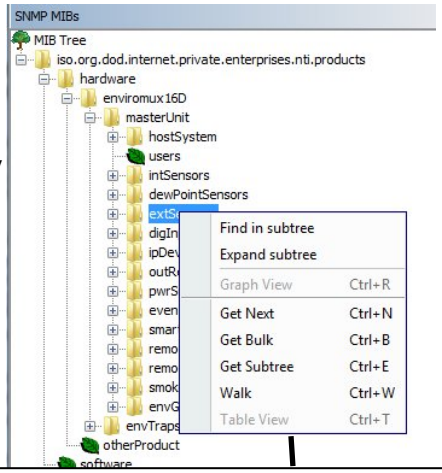
To get specific results in the Result Table, right click on an item in the MIB Tree and choose the type of search ("operation") you want.

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

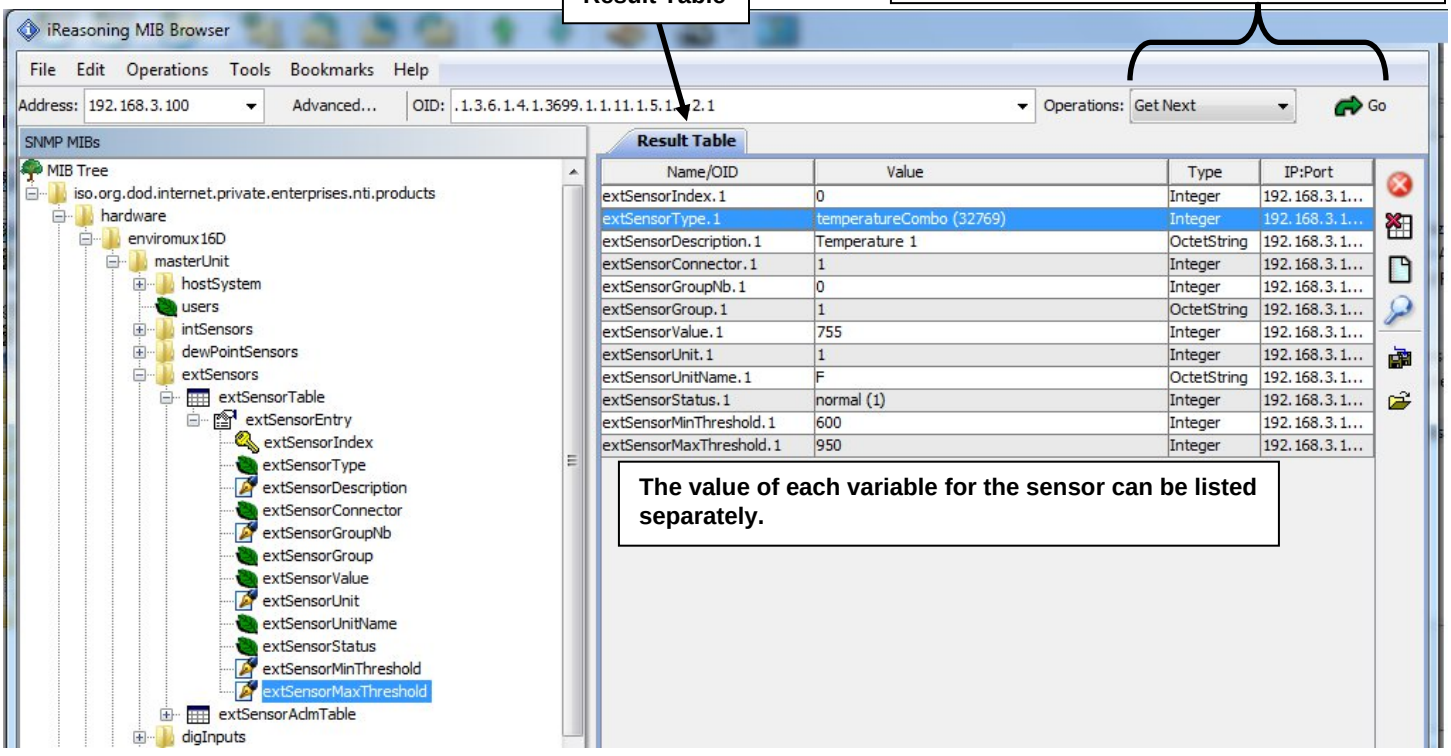
Get Subtree- will result in OIDs of that category and any sub-categories in the tree

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.



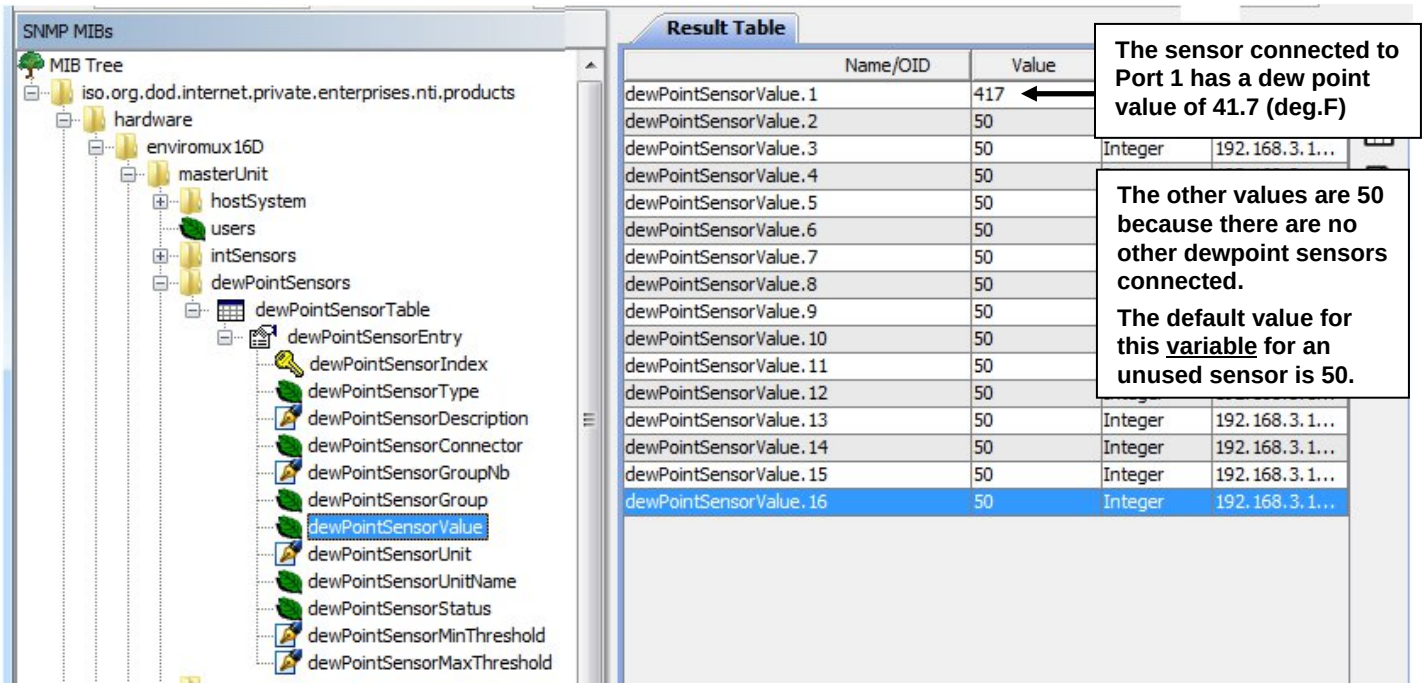
The operation can be selected with a right click (above), or using the "Operations" field (below). Once selected, press "Go"

Result Table

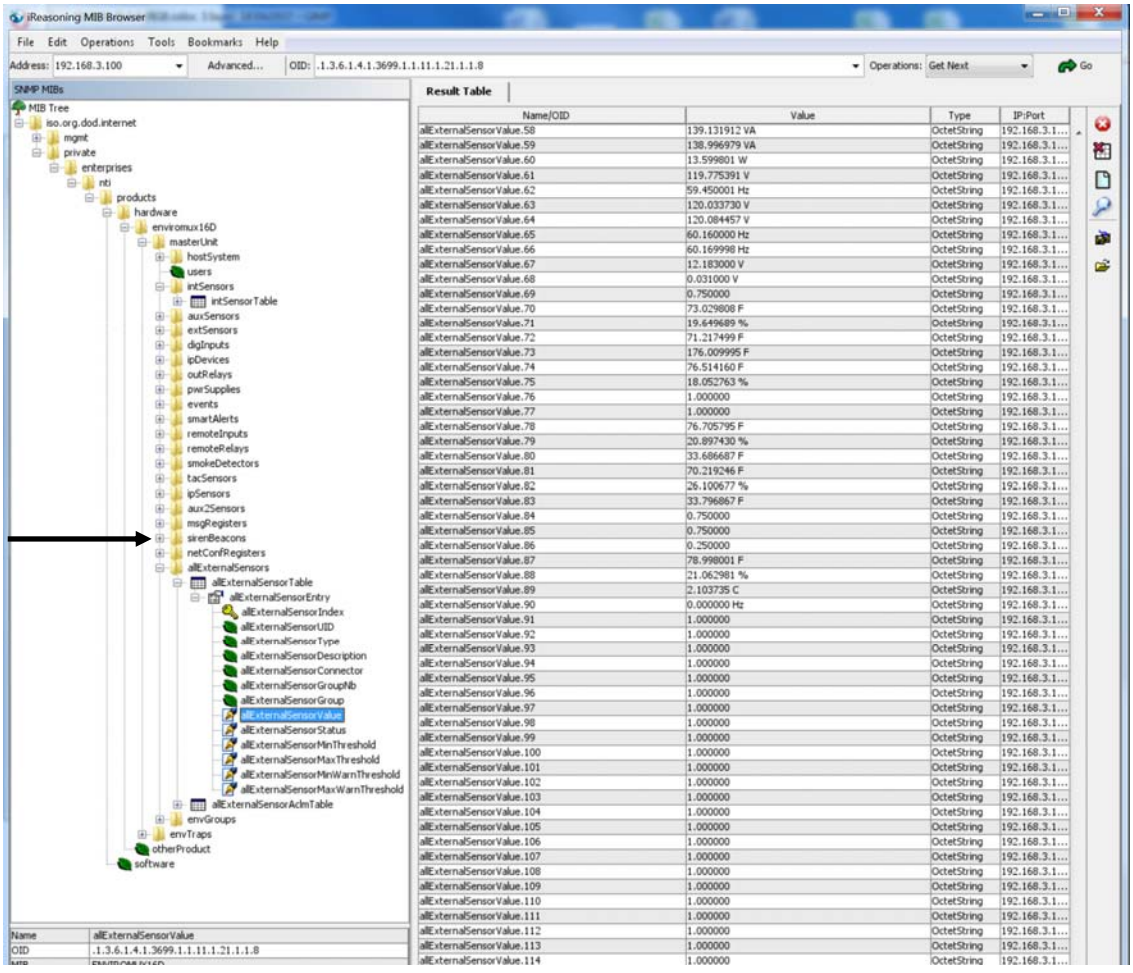


The value of each variable for the sensor can be listed separately.

The E-STHS is a specialty sensor that provides a third piece of information (dew point) managed through an additional category with virtual ports named “dewPoint Sensors”.

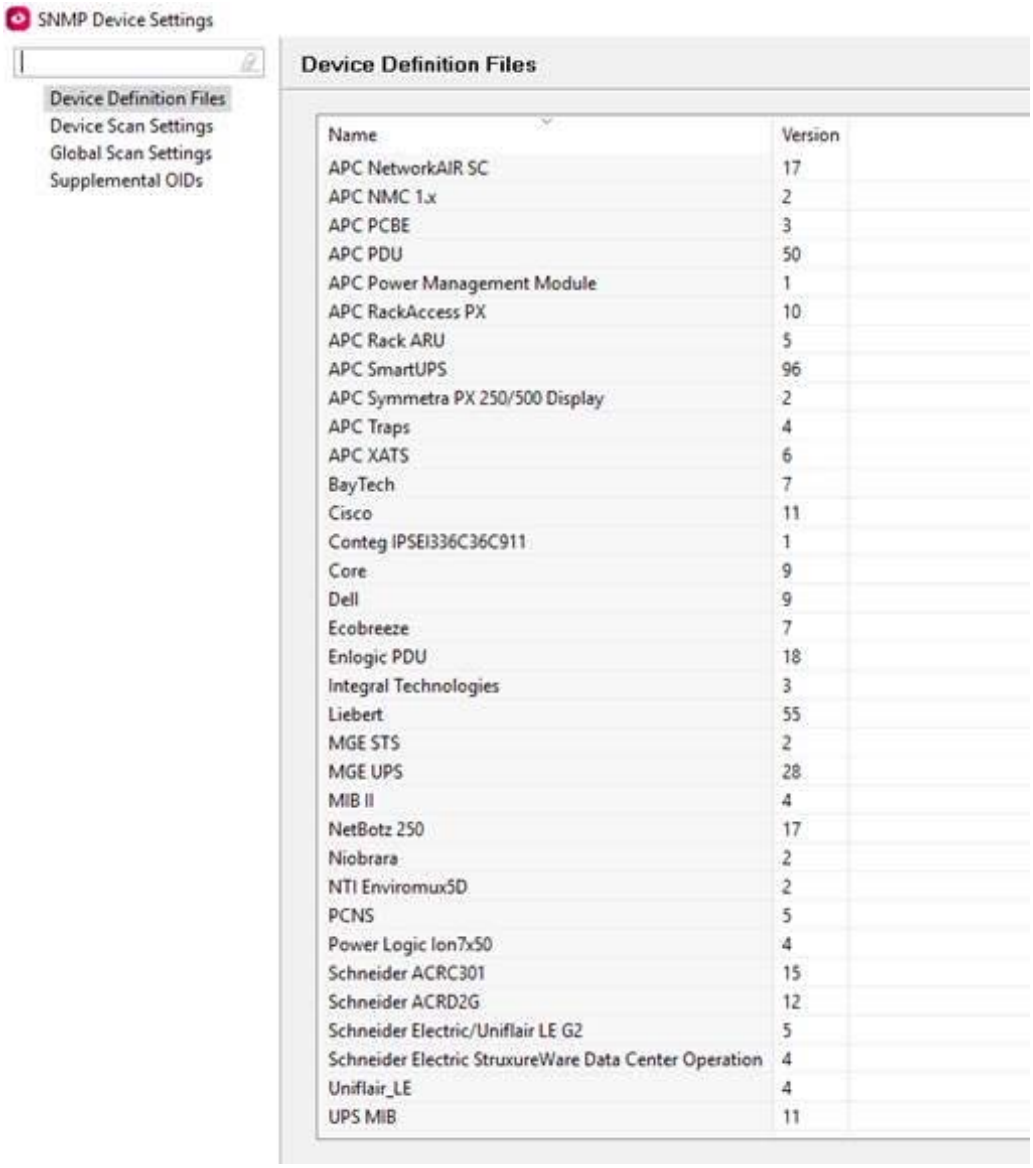


The group "allExternalSensors" consolidates information for all of the external sensors connected to the ENVIROMUX, whether directly or through DI16DO(R)16 expansion units. One of the differences between sensors listed here and those under "extSensors" is that the Value is presented in OctetString format here.



USING SNMP WITH DCIM

If your DCIM (Data Center Infrastructure Management) software is compatible with the ENVIROMUX MIB file, it can be used to monitor the ENVIROMUX sensors. For example, the Schneider Electric DCIM software can be used to sense the E-xD. They provide instruction on their website for using existing DDF files in XML format as well as instruction for requesting custom DDF files that enable our MIB files to integrate with their DCIM. See the Schneider Electric website for more information.



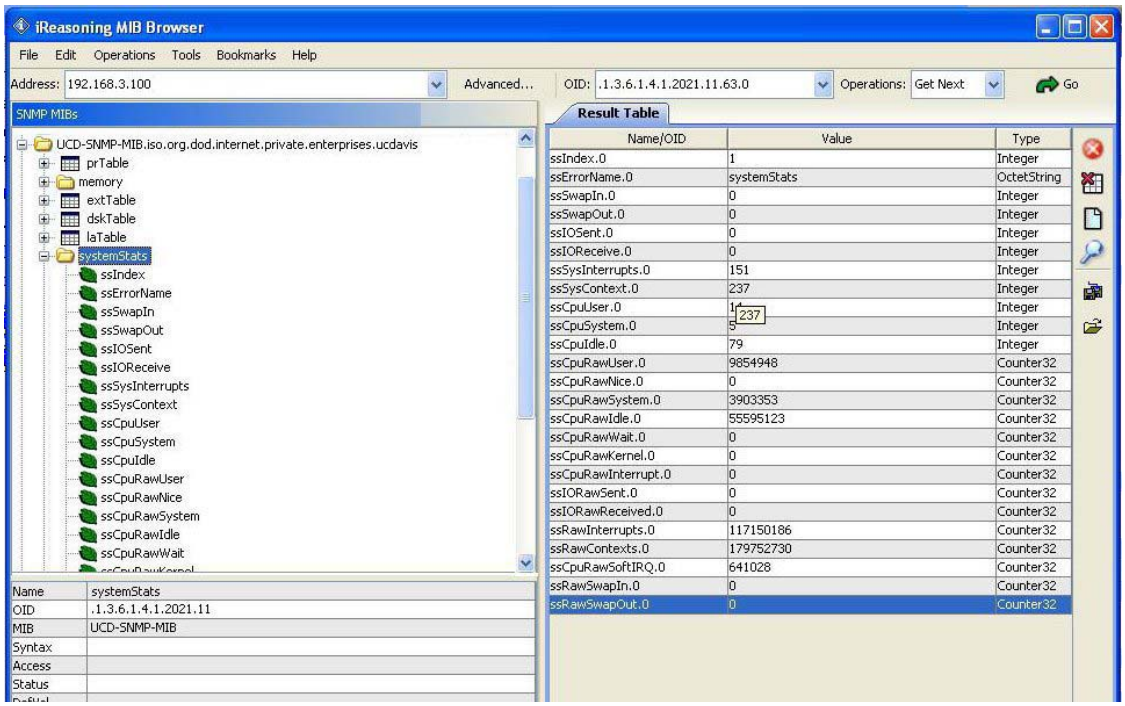
Name	Version
APC NetworkAIR SC	17
APC NMC 1.x	2
APC PCBE	3
APC PDU	50
APC Power Management Module	1
APC RackAccess PX	10
APC Rack ARU	5
APC SmartUPS	96
APC Symmetra PX 250/500 Display	2
APC Traps	4
APC XATS	6
BayTech	7
Cisco	11
Conteg IPSEI336C36C911	1
Core	9
Dell	9
Ecobreeze	7
Enlogic PDU	18
Integral Technologies	3
Liebert	55
MGE STS	2
MGE UPS	28
MIB II	4
NetBotz 250	17
Niobrara	2
NTI Enviromux5D	2
PCNS	5
Power Logic Ion7x50	4
Schneider ACRC301	15
Schneider ACRD2G	12
Schneider Electric/Uniflair LE G2	5
Schneider Electric StruxureWare Data Center Operation	4
Uniflair_LE	4
UPS MIB	11

Example of Listing of DDF files in DCIM

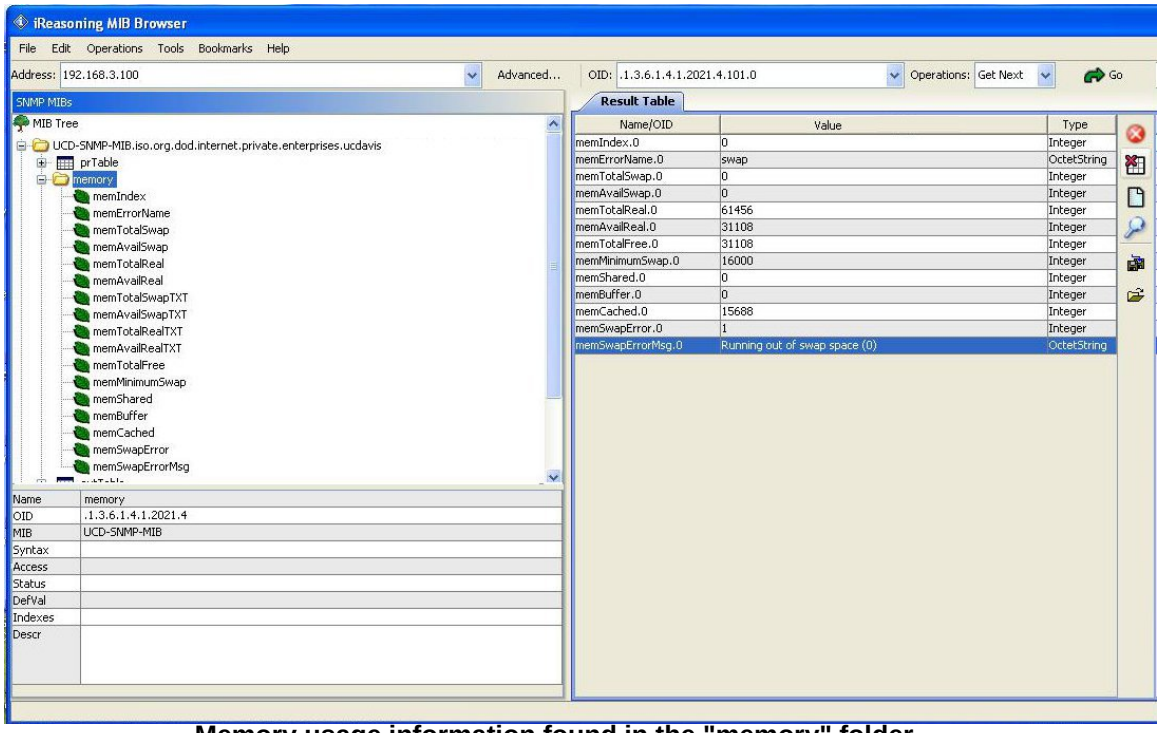
USING SNMP TO ACQUIRE CPU/MEMORY USAGE DATA

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.



CPU Information found in the "systemStats" folder



Memory usage information found in the "memory" folder

READING SNMP VALUES WITH PAESSLER PRTG

To add and monitor E-xD sensors and alerts using the Paessler PRTG software, you need to convert the MIB file (supplied by NTI) to an OIDLIB file using the converter in the following link:

https://www.paessler.com/tools/mibimporter

Drop the resulting OIDLIB file into the `snmplibs` directory of the PRTG installation directory. Now open the PRTG application.

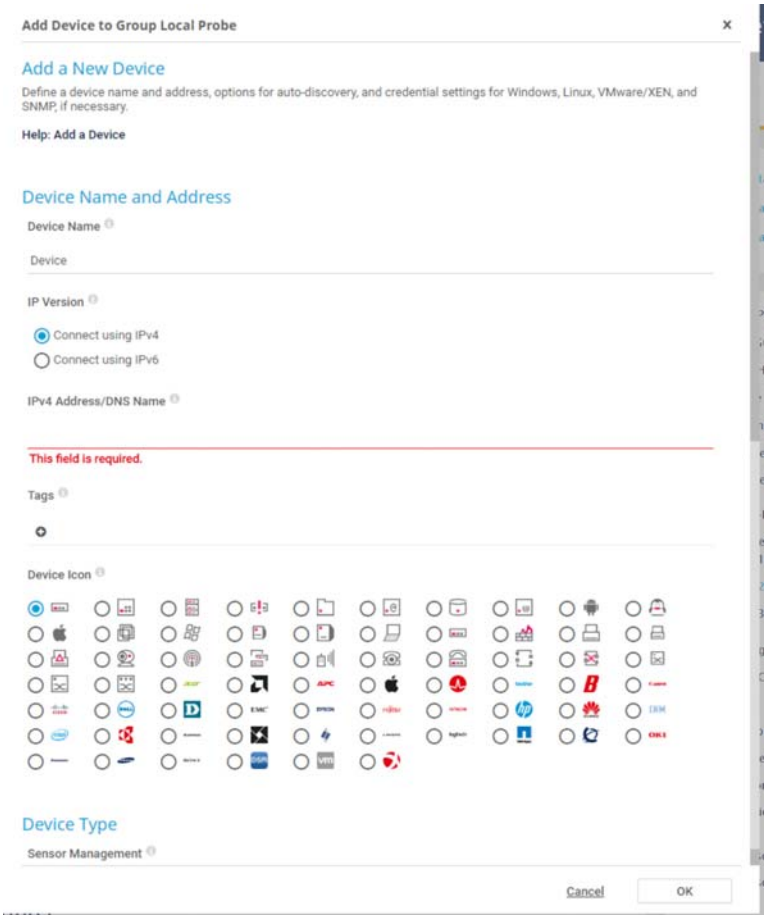
Add your E-xD device to PRTG with SNMP credentials as set in the device. Any sensor can then be added using Devices->E-xD Device -> Add Sensor ->

Select 'SNMP' for Technology Used ->
Search for 'Library'->
Click '+' for SNMP Library ->
Select E-xD oidlib ->
Select the sensor you wish to monitor and configure the settings for that sensor accordingly.

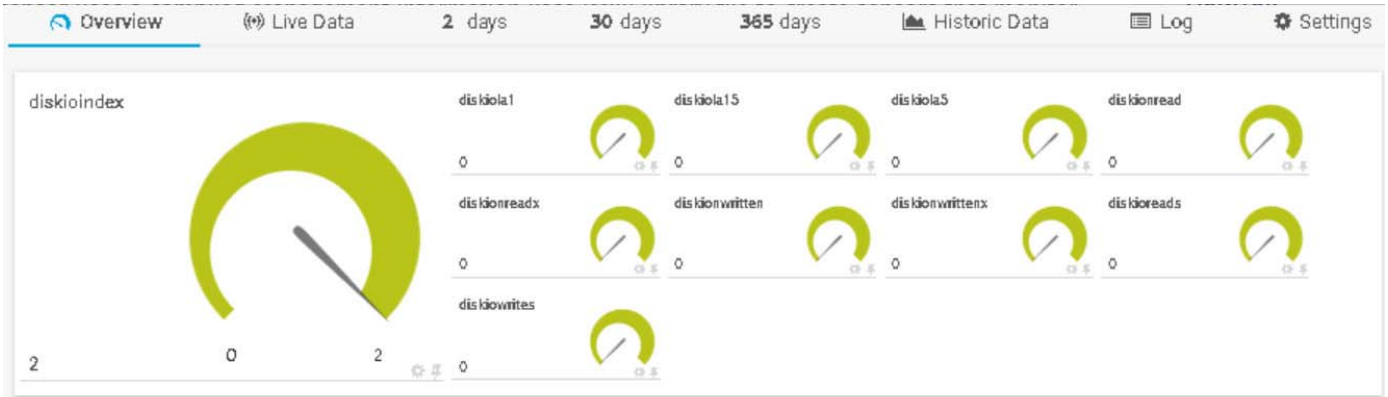
For external sensors the Lookup value needs to be set to "None", otherwise you will get the message "lookup failed".

The "Sensors Divisor" needs to be set to 1, 10 or 100 as appropriate depending on sensor type.
Ex; For E-STHSB humidity set the divisor to 1
For E-STHSB temperature set the divisor to 10.
For E-AV-LC air velocity st the divisor to 100.

If using a sensor from allExternalSensors group, the datatype needs to be set as string and the Sensor Divisor is not necessary.



Instruction found at https://www.paessler.com/manuals/prtg/add_a_device .



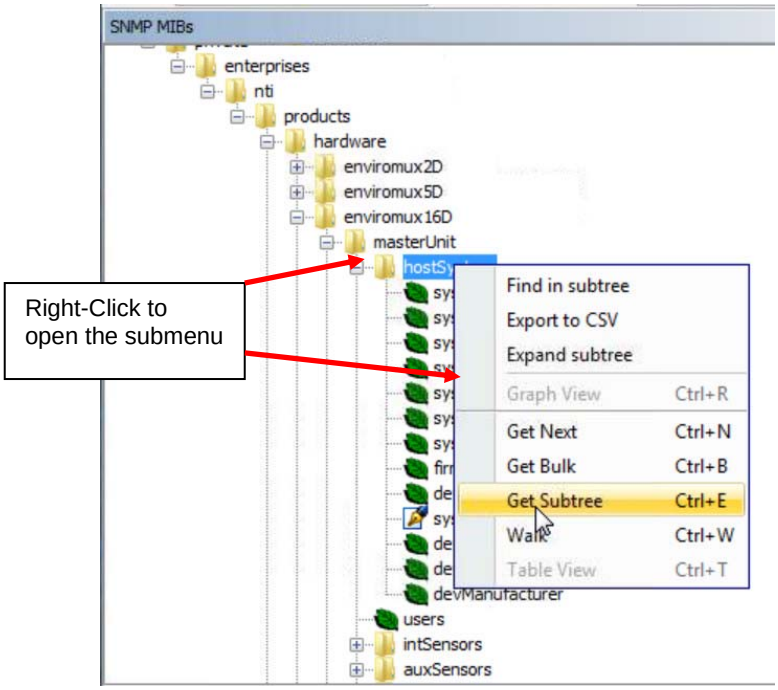
Channel	ID	Last Value	Minimum	Maximum	
diskioindex	2	2	2	2	
diskiola1	7	0	0	0	
diskiola15	9	0	0	0	
diskiola5	8	0	0	0	
diskionread	3	0	0	0	
diskionreadx	10	0	0	0	
diskionwritten	4	0	0	0	
diskionwrittenx	11	0	0	0	
diskioreads	5	0	0	0	
diskiowrites	6	0	0	0	
Downtime	-4				

Image of SNMP Custom Advance Sensor created by SNMP Library found at
https://www.paessler.com/manuals/prtg/snmp_library_sensor

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".



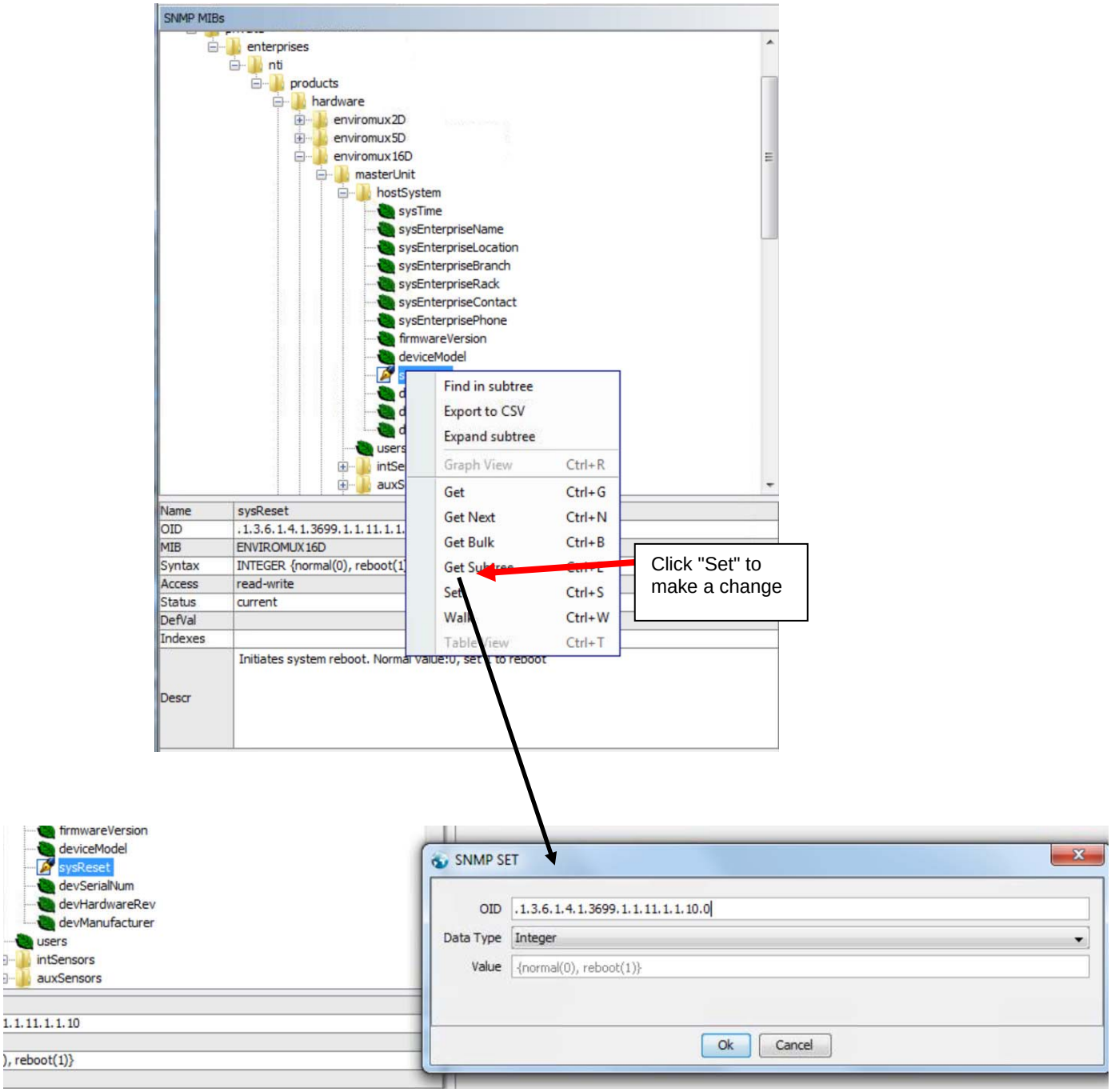
Get SNMP values for System Information

All the settings under System Information will be displayed.

System Information displayed in SNMP

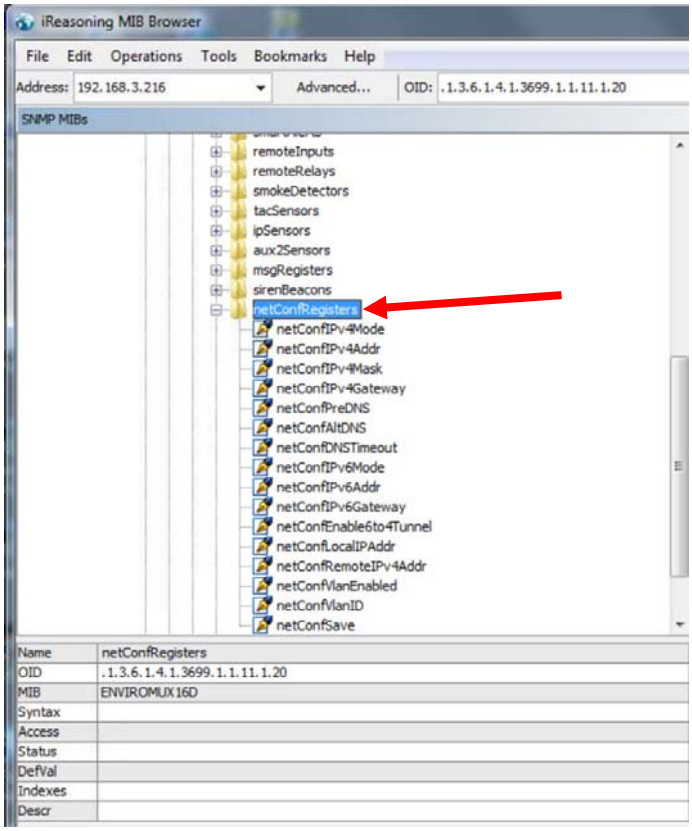
From this, the user can change settings by right-clicking any property and clicking on "Set". Enter the desired value and click "OK" to make the change.

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.



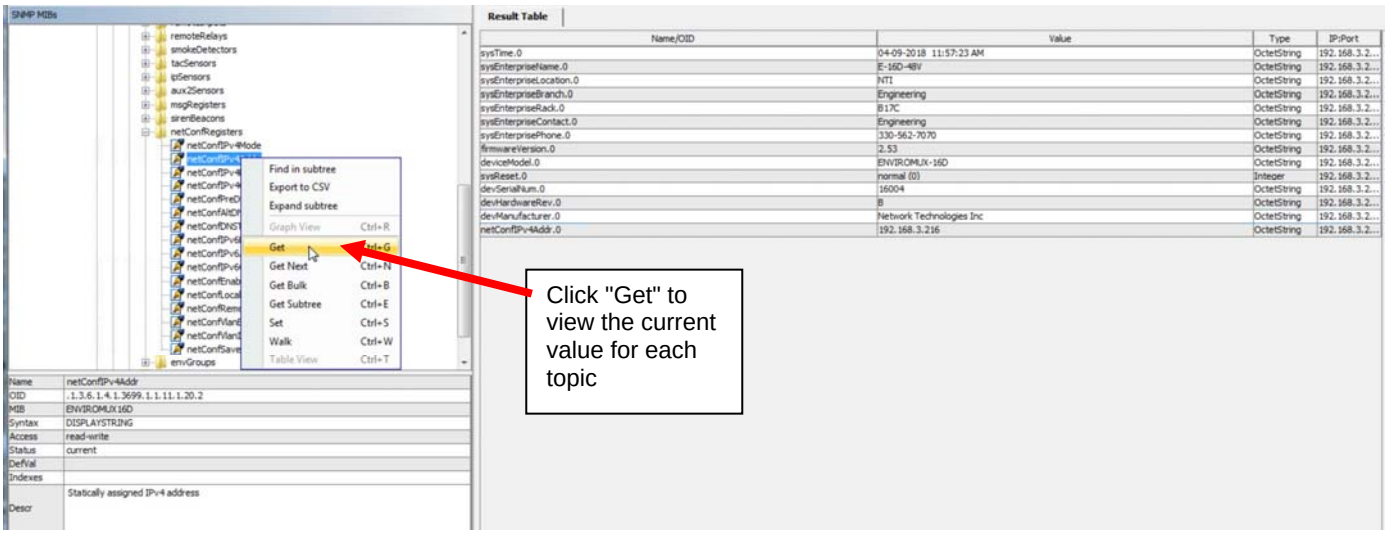
Use SNMP to reboot the ENVIROMUX

To view and change network settings, double-click "NetConfRegisters" from the SNMP MIBs tree.



Network Configuration topics through SNMP

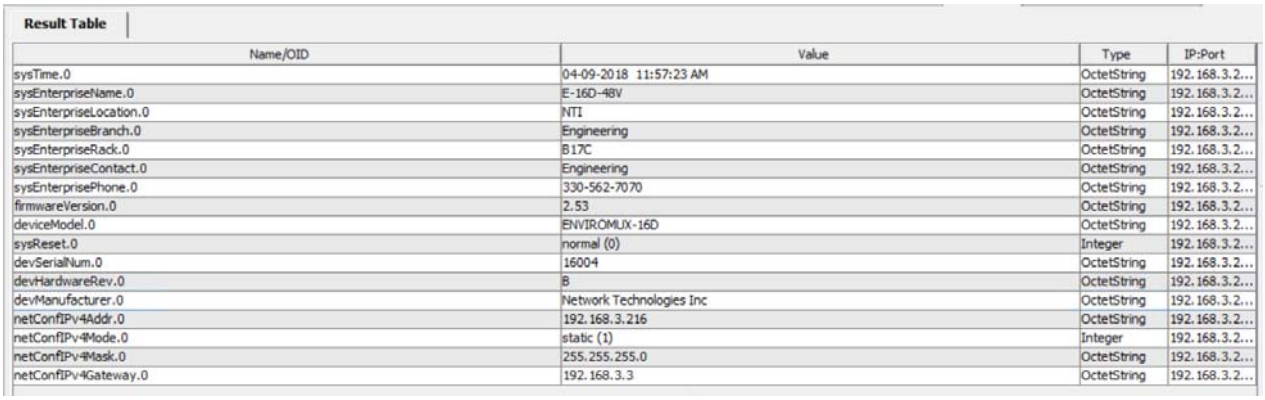
To view the current setting of any property, right click the topic and click "Get". The value for that property will appear in the Result Table.



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.

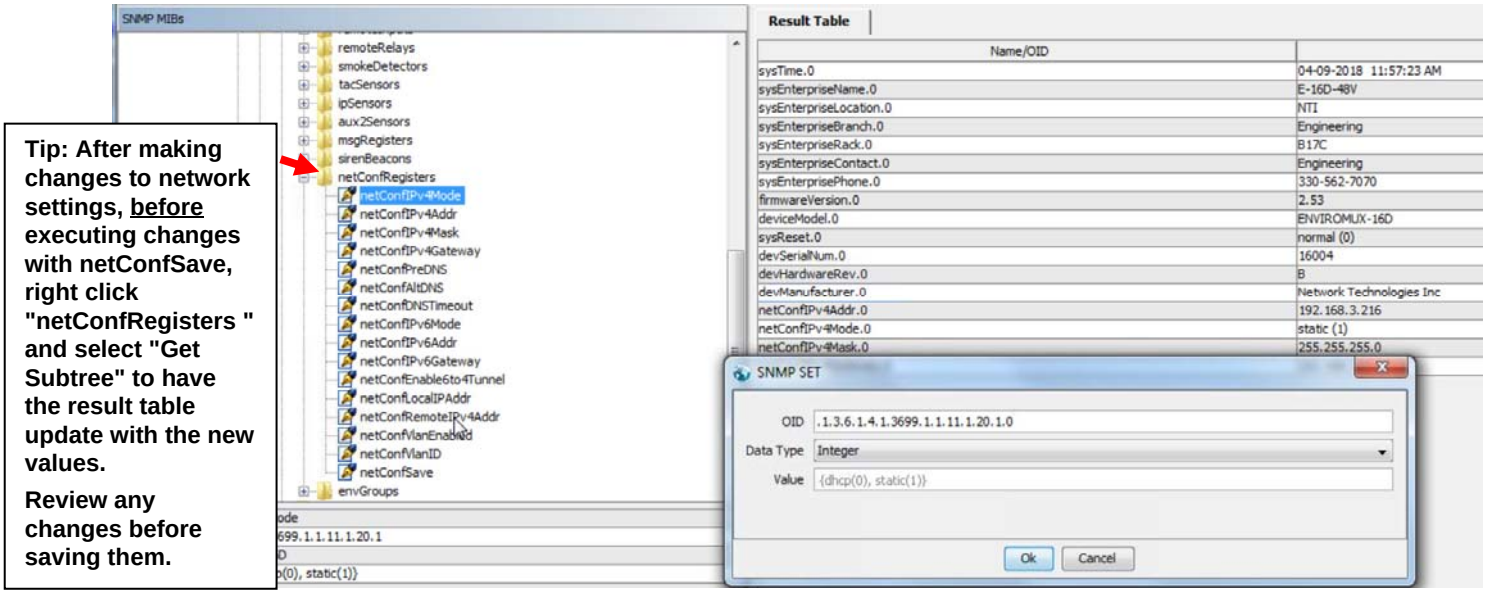
Note: Individual network setting value changes will not take immediate affect. Once you are done making all network setting changes, right click the topic "netConfSave", enter the value "1" and click "OK". All network settings changes made will now take immediate affect.



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...

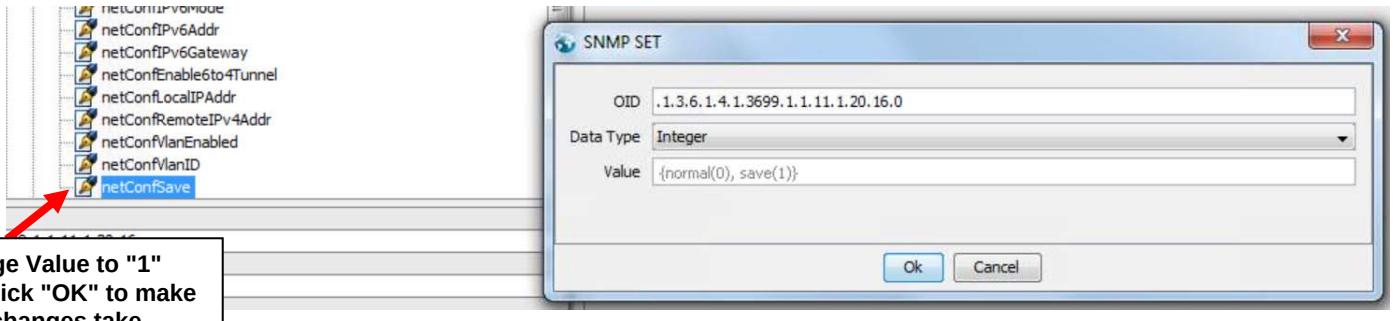
SNMP-Present Network Configuration



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.

Que up changes to Network Settings



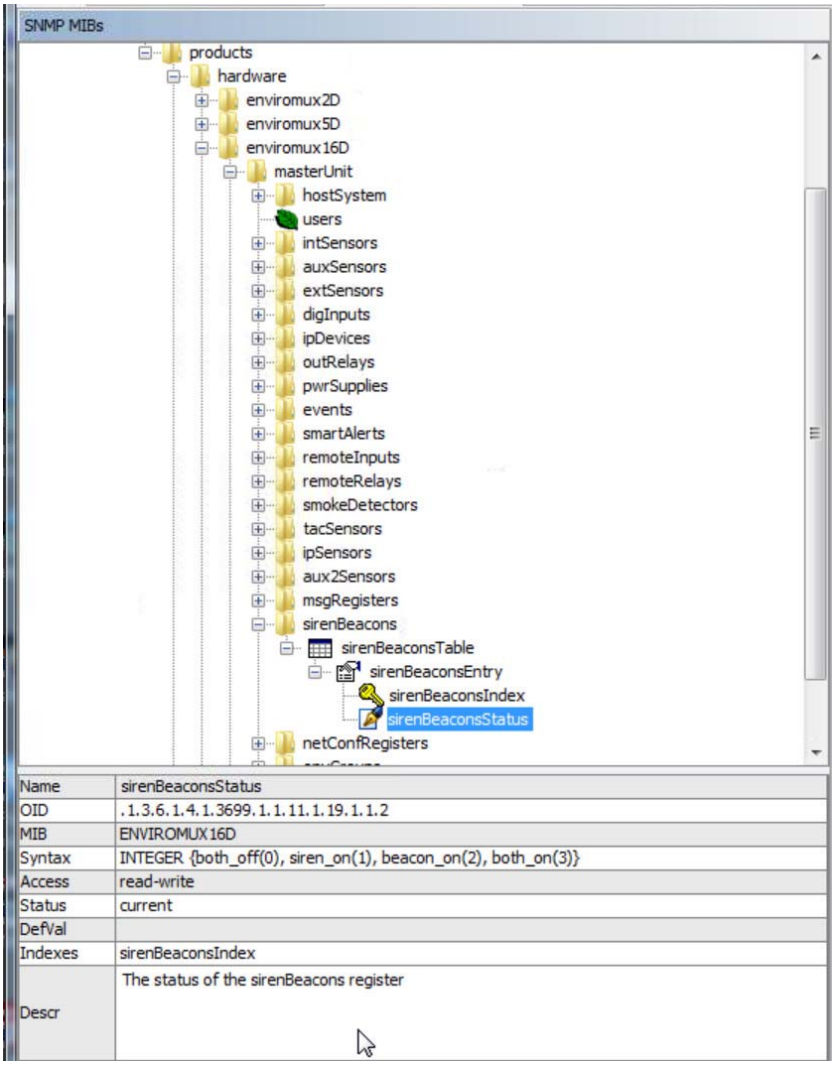
Change Value to "1" and click "OK" to make your changes take affect.

Save and execute changes made to network settings

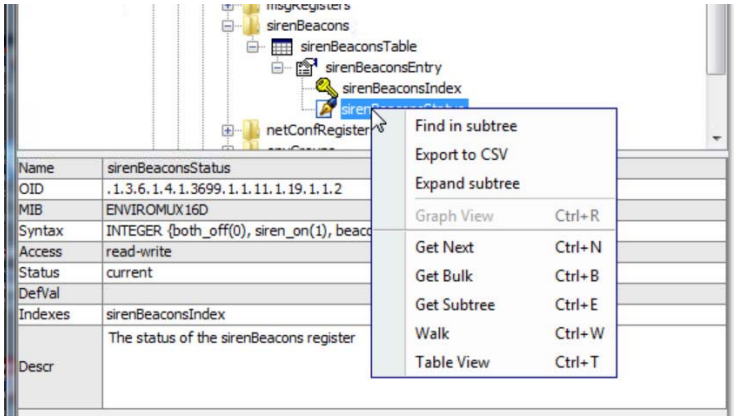
USING SNMP TO CONTROL SIREN AND/OR BEACON

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.

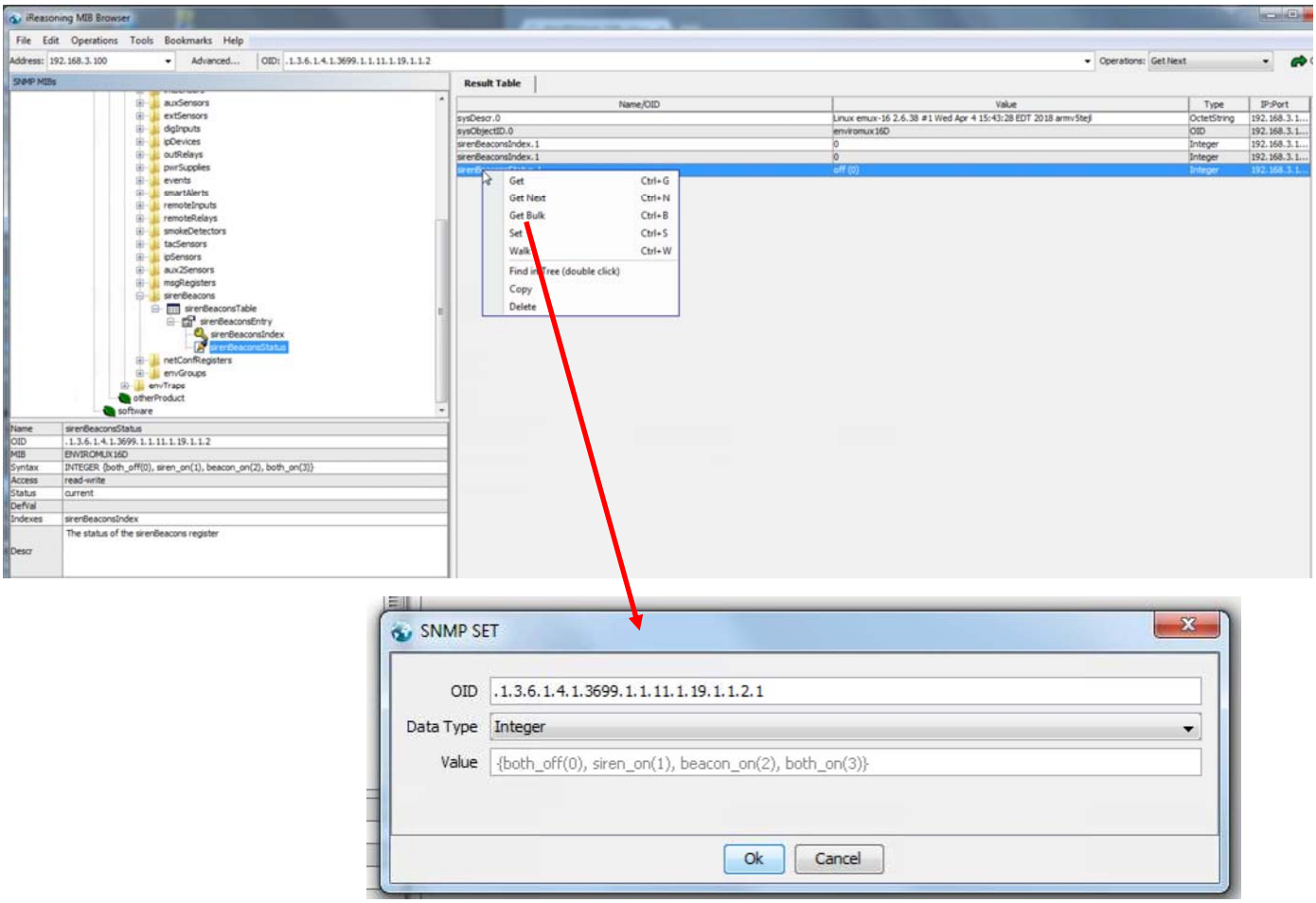


To see status, right click "sirenBeaconsStatus" to open menu, and click on "Get Next".
The status will show up in the results table to the right.



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.



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.

USING INTERMAPPER FOR SNMP

Intermapper's network monitoring software helps you create a network map, giving you a live view of what's happening on your network. Intermapper is a cross-platform, network monitoring, and network mapping program for Mac, Linux, and Windows.

The current version of Intermapper comes with a variety of network probes based on ping, SNMP, http and other network protocols used to monitor the state of networked devices and servers.

To use Intermapper with the ENVIROMUX, you will need to import the E-xD MIB file to Intermapper program.

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

Adding SNMP probe to the Intermapper is described in the links below.

https://community.helpsystems.com/kb-nav/kb-article/?id=3681489c-68c3-eb11-bacc-000d3a1fe4c0

https://www.helpsystems.com/intermapper/interactive-snmp-probe-builder?_ga=2.200786861.26862347.1650895816-961834423.1650895816

https://community.helpsystems.com/forums/intermapper/snmp-probes/577f53db-fa83-e511-80cf-0050568460e4#902aaa7a-fb83-e511-80d0-005056842064

OPEN SOURCE MONITORING INTEGRATION

The ENVIROMUX is compatible with other open source SNMP network monitoring tools, including, but not limited to Nagios, Zabbix and MRTG. Below are links to instruction for using these available on our website.

- SNMP Plugin for Nagios
- NTI SNMP Plugin for Zabbix
- Using Multi Router Traffic Grapher (MRTG).

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