

Have your JACE also monitor your Ethernet network

It may not be well known that besides monitoring/ controlling your HVAC systems, your lights, your security systems, etc. your JACE can also be used to monitor your Ethernet network. Most managed Ethernet switches support the Simple Network Management Protocol or SNMP. SNMP is the IT world's version of BACnet. Although Ethernet switches do not have any "points", they do have "binary inputs" in the status of each Ethernet port something is or is not connected to the port. They also have "analog inputs" in the port statistics they collect. Managed switches will collect the quantity of various types of messages flowing through their ports. They will also provide the number of errors seen on each port.

SNMP also has its own version of an alarm. This is called an **SNMP trap**. When the switch has its power cycled it will send an SNMP trap when it regains power. This is called a **cold start** trap. If a port on the switch loses connection the switch will send a **link down** trap. When the port sees a new connection the switch will send a **link up** trap.

By loading the SNMP driver in the JACE it can now receive these trap alarms and have them appear along with all other alarms. The JACE can also poll the port status of the switch and put this into its trends/history. The JACE can also monitor the number of errors on each port and the number of bytes carried by each port. All of this information can be used to monitor the status of your Ethernet network.

All managed switches from Contemporary Controls fully support SNMP. These switches can vary from, the low cost, 8-port, 0° to 60°C, EISK8M-100T to the 24-port, -40° to +75°C, EIDX24M-100T models. These can be seen at http://www.ccontrols.com/ctrlink/manswitches.htm.

MIBs

In SNMP each piece of data is called a Management Information Base or MIB. These are addressed through a series of hierarchical values called the Object Identifier or OID. For example, the number of seconds that the switch has been powered has an OID of 1.3.6.1.2.1.1.3.0. The number of errors seen on a port will have an OID of 1.3.6.1.2.1.2.2.1.20.x where x = the port number. With the JACE you do not need to know the OIDs. You bring in the MIB file from the manufacturer of the switch and then "walk the MIBs". This allows the JACE to discover the MIBs within your device. Then you select the MIBs you wish to monitor and bring these into your point database. The JACE will also show you a description of each MIB. Our MIB files can be found at http:// www.ccontrols.com/support/managedswitches.htm.

One application that has been found to be popular with our managed switches is creating a RapidRing® redundant ring network. In a RapidRing network if one cable fails the rest of the network will continue to operate (see www.RapidRing.com). This has been found useful in critical HVAC systems. The JACE can

be used to monitor the status of this network as all of our managed switches will report the status of the RapidRing via SNMP private MIBs.

To utilize SNMP on your JACE you will need to install the SNMP driver. Once this is installed you can add Ethernet switches by double-clicking the driver and selecting New and fill out the information requested (see Figure 1). You will need to provide the SNMP version (1 for Contemporary Controls managed switches), the IP address of the switch and the Community string. The Community String is a "password" for the switch — "public" is the default used on most managed switches, but this can be modified and must match what is used on the switch.



Once the Ethernet switch is in the JACE you can then bring in points by double-clicking the points folder

and performing a discovery. It will ask for a MIB file. Select the "Walk MIB" option. See Figure 2.

CONTEMPORARY

-ONTROLS

🔉 Niagara Workbench		
File Edit Search Bookmarks Tools	Window Manager Help	
🌣 • 🐟 • 🌜 • 🔲 • 🔕 🔂 🔁 🗟	😂 • 🗐 🕼 🖁 🖓 🖄 🖄 🖉 🗢 🕫 🖏 🖓 🗐 🗖 🚳 • • 🔡 😂	
🚬 10.0.0.221 (Jace6) 🛛 😼 Station (Jace6)	📱 Config 😘 Drivers 😘 SampNetwork 🖩 Rooftop Network Ethernet Switch 🗞 Points 📢 Sa	mp Point Manager 🔹
• Si Nav	Database	0 objects
	Name Out ObjectIdentifier Variable Type	
🔓 🔝 🔮 My Network		
* 🛃 My Host : TridumPC (Al/Super)		
* 🔄 10.0.0.100 (PNT)		
+ 10.0.0.211 (BAS Remote)	Select MR(c) to load	
- P 10.0.0.221 (Jace6)		
E 😽 Station (Jace6)	una la desenante desenante de	
🖹 📕 Config	MIB to Keed CI (SWRP) EECIZIS. MID	
* Ø Services	⊕ Wak MB?	
E S Drivers		
Coll Recontributionsk	OK Cascal	
E Sa Smothetwork	OK CORC	
* 🛄 Local Device		
🖹 🛄 Rooftop Network Ethernet	t Switch	
* Alarm Source Info		
Points		
* Charling		
+ C MyWeb		
🖲 🖽 Files		
🖲 🖄 History		
* 10.0.0.222 (BAS Remote)	New Folder D New Folder C Add Fi AddTable	3 Match
* 3.4. 10.0.0.225		
Discover: Scart the discovery process		0
	Figure 2	

Figure 2

Once it has discovered the points you can bring them into your database for polling. Some interesting SNMP MIBs are:

- **sysUpTime** This is the amount of time the switch has been powered up. This can tell you if the switch experienced a recent power cycle.
- *ifOperStatus* This is the Boolean status of one port – up or down. There is one of these for each port of the switch. This will tell you if there is a good electrical connection between this port and the device to which it is connected. If this status is down, when there should be a connection , then you either have a bad cable or the other device at the end of the cable has lost power.
- ifInOctets This is the number of octets or bytes received by one port of the switch. There is one of these for each port of the switch. This can be useful to indicate if there is an unusually large number of messages being sent through this port or if there is an unusually low number of messages. Both conditions could indicate problems.

- *ifInUcastPkts* This is the number of unicast (directed message) packets received by the port. This can be helpful to monitor to verify the traffic load is normal.
- ifInNUCastPkts This is the number of nonunicast packets (broadcast or multicast) packets received by the port. If there are a large number of broadcast messages per second then you could have an active loop in your network and this could cause communication problems for some devices.
- *ifInErrors* This is the number of packets that have errors. This can be used to diagnose cable problems.
- The input points also have corresponding output MIBs such as *ifOutOctets*, *ifOutUcastPkts*, *ifOutNUcastPkts* and *ifOutErrors*. These can be monitored as well.

The JACE will also provide descriptions for each MIB from the MIB file provided by the switch manufacturer.

CONTEMPORARY

🗟 Niagara Workbench					
File Edit Search Bookmarks Tools Window	Manager Help				
		BBV	0 8 D		
		40 10 40 1	6 8 Ld		
🚬 10.0.0.221 (Jace6) 🛛 😼 Station (Jace6) 🔲 C	onfig 省 Drivers	SrmpNetwork	Rooftop Network Ether	net Switch 🛯 🕤 Points	Srmp Point Manager •
- 🖾 Nav					» 🔀
🔉 🔝 🚯 My Network	Discovered				101 objects
* 🖳 My Host : TridumPC (AVSuper)	▲ Name		OID	Value	Description #
* 🛄 10.0.0.100 (PNT)	E = fin0d	ets	1.3.6.1.2.1.2.2.1.10		The total number
+ 🛄 10.0.0.211 (BAS Remote)	+ 📼 finika	stPkts	1.3.6.1.2.1.2.2.1.11		The number of su
* 🔜 10.0.0.212 (BAS Remote)	+ 🗆 finNuk	astPits	1.3.6.1.2.1.2.2.1.12		The number of no
- 🛃 10.0.0.221 (Jace6)	🛞 📼 fInDisc	tards	1.3.6.1.2.1.2.2.1.13		The number of inb
E 😽 Station (Jace6)	🔹 📼 finErre	Jrs .	1.3.6.1.2.1.2.2.1.14		The number of inb
🗟 📕 Config	+ 🗆 finunk	nownProtos	1.3.6.1.2.1.2.2.1.15		The number of pa
	+ = Fouto	ctets	1.3.6.1.2.1.2.2.1.16		The total number
E C Drivers	+ Coutor	castPkts	1.3.6.1.2.1.2.2.1.17		The total number
+ Sg NagaraNetwork	* C four	UcastPits	1.3.6.1.2.1.2.2.1.18		The total number
BacnetNetwork	= + = fout	scards	1.3.6.1.2.1.2.2.1.19		The number of ou
SompNetwork	+ = fouter	rors	1.3.6.1.2.1.2.2.1.20		The number of our
Local Device	• m				Þ
 Alarm Source Info 	Total Statement				0 abiasta
Adam bource and	Database	Inter		In the second	9 cojects
E A Trace	Name	Out	ObjectIdentifier	Variable Type	5
+ 0 (old Swt	O sysUpTime	8 35954769 (082	1.3.6.1.2.1.1.3.0	Timeticks	
* O Warm Start	O PoperStar	tus_1 up (ok)	1.3.6.1.2.1.2.2.1.8.1	Integer Type	
* O Link Down	O FOperStat	tus_2 up {ok}	1.3.6.1.2.1.2.2.1.8.2	Integer Type	
+ O Link Up	O FOperSta	tus_3 up (ok)	1.3.6.1.2.1.2.2.1.8.3	Integer Type	
* O Authentication Falure	O ifOperStal	tus_4 down {ok}	1.3.6.1.2.1.2.2.1.8.4	Integer Type	
+ O Eqp Neighbor Loss	iOperStal	tus_5 down {ok}	1.3.6.1.2.1.2.2.1.8.5	Integer Type	
+ 🗂 Schedules	O #OperStat	tus_6 down {ok}	1.3.6.1.2.1.2.2.1.8.6	Integer Type	
+ 🛅 MyWeb	O FOperSta	tus_7 up {ok}	1.3.6.1.2.1.2.2.1.8.7	Integer Type	
* E Files	O ifOperSta	tus_8 up (ok)	1.3.6.1.2.1.2.2.1.8.8	Integer Type	
🖲 🕰 History					
*		Transfelder F	and state	AB Discours all a add	martine Consta
* 10.0.0.225		New Folder	New Edic	DQ Discover	AddTable System

Figure 3

SNMP Traps

You must first enable SNMP traps to be sent to the JACE (see Figure 4). Here we have the configuration screen for our managed switch. The *Community*

string has been set to "public" and one *Trap Receiver* has been set to "10.0.0.221" (the address of our JACE) and it has been marked as valid.

TRLINK" EISX_	M Series				н
	System Configuration SNMP	Configuration Performance Monitor Save Se	ttings CTRLink Webpage Logout		
TRLink Compact Manag	ed Switching Hub			Refresh	Help
	SNMP Configuration:				
	System Name:	Contemporary Controls E	Contemporary Controls EISX8M Mar		
	System Location:				
	System Contact:				
		Apply			
	Community:				
	Community String	Access	Status		
	public	Read Only 💌	Valid 💌	_	
	private	Read Write .	Valid •	_	
		Read Only	Invalid 💌	_	
		Read Only 💌 Invalid 💌			
		Apply			
	Trap Receivers : IP Address		Status		
	10.0.0.221		Valid 💌		
	0.0.0.0		Invalid 💌		
	0.0.0.0		Invalid 💌		
	0.0.0.0		Invalid 💌		
		- Analyi			
		(Abba)			

be configured for SNMP traps. View the property sheet for the SNMP driver and make sure the "SNMP Receive Traps" option is set to *true*. All other properties should have their default settings. You can configure a description for the trap message by double-clicking the trap in the database and entering your own description (see Figure 5). This will appear for all traps of this type for this device.

CONTEMPORARY

ONTROLS

File Edit Search Bookmarks Tools Window Manager Help Image: Image	😹 Niagara Workbench					
Image: Services Image: Services <th>File Edit Search Bookmarks Tools Wind</th> <th>dow Manager Help</th> <th></th>	File Edit Search Bookmarks Tools Wind	dow Manager Help				
Image: Config Image: Config<	⇔・⇒・᠖・ □・◎ 办 🗈 🔄 🛩・🛶 🗟 🔉 🗴 ګ 隆 ګ 🗙 🗠 🔍 🔍 🖬 🗖 🚧・⊗ ◇ 🕾					
Nav Database 6 objects Name Description 12 Config Cold Start The Ethernet switch has rebooted! Config Warm Start Unk Down Drivers Link Down The Ethernet switch port has lost connection! Link Up The Ethernet switch port has gained a connection. Authentication Failure Egp Neighbor Loss	🔝 😺 🖹 Config 📽 Drivers 📽 Snr	npNetwork 📑 Rooftop	Network Ethernet Switch 🐥 Traps 🌏 Snmp Trap Manager 👻			
Name Description Image: Config Config Cold Start The Ethernet switch has rebooted! Warm Start Unk Down The Ethernet switch port has lost connection! Drivers Link Down The Ethernet switch port has gained a connection. NagaraNetwork Authentication Falure SompNetwork Egp Neighbor Loss	- 🔀 Nav	Database	6 objects			
Cold Start C	D D My Naturyk	Name	Description			
Config Services Config Owarm Start Oward		Cold Start	The Ethernet switch has rebooted!			
Services Image: Construction in the image: Construction	🖻 🗐 Config 📃 📥	🔘 Warm Start				
Convers Convers Convers Converse	Services	🔘 Link Down	The Ethernet switch port has lost connection!			
Carl NagaraNetwork Carl SompNetwork Carl SompNetwork Carl Device	C C Drivers	🔘 Link Up	The Ethernet switch port has gained a connection.			
Cap Reighbor Loss Cap Local Device	GalagaraNetwork	Authentication Failure				
Cal Device	GaratNetwork	Egp Neighbor Loss				
	SimpNetwork Control Device Rooftop Network Ethern Alarm Source Info Rooftop Points Traps Trap	New 📑	Edit 🛱 Discover 🔻 📀 Cancel 💿 Add 📄 Match 📀			

Figure 5

The Ethernet switch traps can be viewed along with your standard alarms. Your description will appear in the details of the alarm record. The port number can be viewed in the details in the displayed *Variables* value. For example "5 (OID: 1.3.6.1.2.1.2.2.1.1.5)" indicates port 5 (see Figure 6).





United States Contemporary Control Systems, Inc. 2431 Curtiss Street Downers Grove, IL 60515 USA	China Contemporary Controls (Suzhou) Co. Ltd 11 Huoju Road Science & Technology Industrial Park New District, Suzhou PR China 215009	United Kingdom Contemporary Controls Ltd 14 Bow Court Fletchworth Gate Coventry CV5 6SP United Kingdom	Germany Contemporary Controls GmbH Fuggerstraße 1 B 04158 Leipzig Germany	
Tel: +1 630 963 7070 Fax:+1 630 963 0109	Tel: +86 512 68095866 Fax: +86 512 68093760	Tel: +44 (0)24 7641 3786 Fax:+44 (0)24 7641 3923	Tel: +49 341 520359 0 Fax: +49 341 520359 16	
info@ccontrols.com	info@ccontrols.com.cn www.ccontrols.asia	info@ccontrols.co.uk www.ccontrols.eu	info@ccontrols.de	

CONTEMPORARY ONTROLS