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Using the Ethernet Cleverscope

Summary

The Ethernet Cleverscope can be used on a 10/100 Mbit/sec Ethernet network. The Cleverscope Acquisition Unit (CAU) includes an automatic sensing Ethernet connector that senses the speed (10 or 100 Mbit/sec) and automatically reverses Tx and Rx if the Ethernet cable has been crossed over. No cross over cable is required for PC- CAU use. The CAU can be operated with either a Fixed IP address, or as part of a DHCP network (Dynamic Host Configuration Protocol), in which case the CAU automatically acquires an address in the correct internet protocol address range.

The simplest use is part of a DHCP network. Most modern routers and all servers offer a DHCP server function. This document provides instructions on using the Cleverscope as part of a DHCP network, or in a fixed IP address network.

You can also use Fixed IP (Internet Protocol) Addressing, which is useful when you do not have a DHCP server, or are connecting to a remote CAU connected at some other location.

Updating a USB Cleverscope

You will need to update an existing USB Cleverscope in two steps:

- 1. Update the firmware inside the existing USB Cleverscope.
- 2. Replace the USB board with the Ethernet board.

Update the Firmware

Use Rom Loader 49 to update the firmware inside the Cleverscope, using the firmware file cscope_lan 6431.bin Follow the instructions on the Rom Loader front panel. After updating the firmware turn off the power. You will find these in the accompanying CD.

Replace the USB board with the Ethernet board

You can only fit the Ethernet board to a Cleverscope with a serial number of 4000 or higher.

To be fitted at an anti-static workstation while wearing anti-static protection.

- 1. Remove two Philips screws from the underside of the Cleverscope Acquisition Unit. Remove top cover. Locate the CS740 USB module. Carefully remove the four white nylon screws, and pull up the CS740 from the end opposite the USB connector. Put aside with screws in antistatic bag. Remove the hot melt and Philips screws mounting the main circuit board to the base. Lift the rear of the board and remove the rear panel. Replace with the Ethernet Rear panel. Refit the screws, reverse turning first to avoid double threading. Re-apply hotmelt.
- 2. Fit CS741 Ethernet module by carefully pushing the Ethernet connector through the hole in the rear panel. Press home the module connector at the other end of the board. Replace four white screws and tighten gently.
- 3. Replace the top cover, and screws.

Using Cleverscope on a DHCP network

The Cleverscope CAU is set by default to work as part of a DHCP network. When it is plugged into a network, the two lights on the Ethernet connector show status.

The Connected Led shows that the CAU has connected to the network. The Transmit/Receive Led will flash whenever packets of data are transferred. Once the CAU has triggered, the Transmit/receive light will flash once per second, as the Cleverscope application polls the CAU to make sure it is still connected.

If the Connected Led is not on, there is a problem, and the CAU will not talk to the Cleverscope application. Please resolve the connection first.



To use the Cleverscope carry out these steps:

- 1. Connect the Cleverscope to the network and turn it on. Make sure the Connected Led comes on.
- 2. Use the Settings/Choose Acquirer and Set Connection menu to display the following dialog:

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Type of Acquirer	Cleverscope							
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(APC only)	eselected:							
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Set auto addres	sing (DHCP)	Set IP addre	ss	Set	port			
everscope device	s found on local ne	twork click	on unit to select	:				
Serial Number	IP address 🔰 S	ubnet mask	Gateway	Port	DHCP	Availability	Time on	A
CG4159	192.168.1.104 2	55.255.255.0	192.168.1.1	53270	Yes, address acquired	Available	37m:46s	

Make sure the Type of Acquirer is 'Cleverscope'. Set the Interface Source to 'Ethernet – Find first IP address'. This option will find the first free Cleverscope available on the network.

3. You should see the Cleverscope listed. If the entry under DHCP is not 'Yes, address acquired', click the line which corresponds to the Cleverscope you want to use, and then click the 'Set auto addressing (DHCP)' button. This will cause that Cleverscope to use the DHCP method of addressing. The DHCP column should change to 'Yes, address acquired', after you have clicked the button.

 Click OK to exit, and the CAU should be ready for use – click Auto to start capturing a signal. The next time you start up the CAU, and run the Cleverscope application, you do not need to do setup – the CAU will automatically connect.

Other DHCP connection options

Connect by IP Address.

The Cleverscope application can also connect to a particular CAU by IP address. DHCP is still being used to bring the CAU on to the current network. DHCP has a 'lease time' which is usually quite a long time (weeks). Each time the CAU is reconnected to the network, the lease is renewed. The lease is for a set IP (Internet Protocol) address that is supplied by the DHCP server. This means once you use the CAU on a network, you can use its address to reliably connect to just that CAU.

To do this:

- 1. Set the Interface Source to 'Ethernet Find by IP address'.
- 2. Click on the unit you want to use in the found devices list, this will update Cleverscope acquirer selected to have the same IP address as the one you clicked on.

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Notice that Cleverscope acquirer selected has an IP address of .104. This is the same as the device selected from the list.

- 3. Click OK to exit.
- 4. From now on, the Cleverscope application will always connect to the Cleverscope with an address of .104. Other Cleverscopes will be given different addresses by the DHCP server.

Connect by Serial Number

The Cleverscope application can be setup to always connect to a given serial number, regardless of the IP address. Setup as follows:

- 1. Set the Interface Source to 'Ethernet Find by Serial Number'.
- 2. Click on the unit you want to use in the found devices list, this will update Cleverscope acquirer selected to have the same Serial Number as the one you clicked on.

Edit Operate Tools Window Help xquirer and interface selection: Type of Acquirer Cleverscope Interface Source Ethernet - Find by serial number Serial port (APC only) Comm 1 everscope aquirer selected: Serial number CG4159 IP address 192.168.1.104 Subnet mask 255.255.255.0 Port 53270 (Default: 53270) everscope hardware configuration Set auto addressing (DHCP) Set IP address Set port everscope devices found on local network click on unit to select: Serial Number IP address Subnet mask Gateway Port DHCP Availability Time on CG4159 192.168.1.104 255.255.255.0 Set IP address acquired Not available 17m:26s CG4159 192.168.1.104 CG4159 192.168.1.104 CG4159 192.168.1.104 CG4159 192.168.1.104 CG4159 CG415		and see com	nection							
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3. Now click OK to exit. The next time you start the Cleverscope acquisition software, it will connect to the given serial number, regardless of IP address.

Using Cleverscope on a Fixed IP network

For a fixed IP network, for example a CAU plugged directly into a laptop, you need to do a little more work.

We will examine two situations – the Cleverscope is plugged into a fixed IP local network, or the Cleverscope application is connecting to a remote Cleverscope at some other place.

Local Fixed IP network

For this network there is no DHCP server, and so someone will need to manually enter the IP address of each unit on the network. All the units must be on the same 'subnet'. The IP protocol subnet is the first three groups of digits in the IP address. For example, for 192.168.1.104, the subnet is 192.168.1. For most circumstances all the computers and equipment connected to the same network must have addresses starting with 192.168.1. The remaining value (104) is the unit address.

So let us look at an example of a Laptop and a CAU connected directly to each other with an Ethernet cable (because of the Auto direction, it is not important if the cable is cross over or not).

Using Start/Settings/Control Panel from the Windows task bar, open the 'Network Connections' option. Here it is in XP:



Open the 'Local Area Connection' option, and click on Properties button.

🕹 Local /	Area Conr	ection Statu	S	?
General	Support			
Conne	ection			
Statu	IS:			Connected
Durat	tion:			16:01:48
Spee	ed:			100.0 Mbps
Activity	у	Sent —	3 1 -	- Received
Bytes	5.	44,813,988		93,930,243
Prope	erties	Disable		
				<u>C</u> lose

Scroll down until you see the Internet Protocol (TCP/IP) option:

Local Area Co	nnecti	on Propertie	es	?
General Advance	d			
Connect using:				
🕮 3Com Giga	bit LOM	(3C940)	Cor	nfigure
This connection u	ises the f	following items:		
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l <u>n</u> stall		<u>U</u> ninstall	Pro	perties
Description Transmission C wide area netv	ontrol Pr	otocol/Internet ocol that provide	Protocol. The	default tion
across diverse	interconr	nected network	s.	
Show icon in i ✓ Notify me whe	notificatio n this col	n area when co nnection has lim	nnected ited or no cor	nectivity
			ок	Cancel

Double click on this entry. For a DHCP computer you will see:

You can get this capabilit the appropria	IP settings ass y. Otherwise, y	signed					
	ate in settings.	ou ne	ed to as	tically if y k your ne	our ne twork	twork su administ	ipports rator for
⊙ <u>O</u> btain	an IP address	autom	natically				
Use the	e following IP a	addres	s:				
IP addres	:s:			đ		- 62	93
S <u>u</u> bnet m	iask:			(9)		- 63	
<u>D</u> efault g	ateway:		[÷.	- 93	E!	
⊙ O <u>b</u> tain	DNS server ad	ddress	automa	tically			
Use the	e following DN	S serv	ver addre	sses:			
Preferred	DNS server:						
Alternate	DNS server:		[111	÷1	-5	
						Adv	anced

Choose the 'Use the following IP address' option, and type in the subnet that you want to use, and a subnet mask that selects all units on the subnet:

roeral You can get IP settings assigned his capability. Otherwise, you nee he appropriate IP settings.	automatically if your network supports ed to ask your network administrator for
O Obtain an IP address autom	atically
• Use the following IP address	8:
<u>I</u> P address:	192 . 168 . 1 . 2
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address	automatically
O Use the following DNS served by the served of the served by the se	er addresses:
Preferred DNS server:	
<u>A</u> lternate DNS server:	
	Ad <u>v</u> anced
	OK Cance

Click OK, and close all the dialog windows.

Open the Cleverscope application. Open the Settings/Choose Acquirer and Set Connection menu. Connect the Cleverscope to the Laptop, and power up. If the CAU was setup for DHCP, it will not find an address, and you need to set it manually. Note the CAU IP address is returned as 0.0.0.0 as there is no DHCP server. Also note that the PC NIC address is 192.168.1.2, which is what you programmed it to:

Choose acquirer	and set connecti	on						
Edit Operate To	ools <u>W</u> indow <u>H</u> elp							
cquirer and inter	face selection:							
Type of Acquire	r 👌 Cleverscope							
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Serial por (APC only	t () Comm 1							
leverscope aquir	er selected:							
Unit ID CG415	59 IP address	192.168.1.190)			NIC addresses for	und 192.168.1.2	
	Subnet mask	255.255.255.0)				<u> </u>	
	Port	53270 (De	efault: 53270)				1	
leverscope hardv	ware configuration	Set IP addres	s	Set	port			
leverscope devic	es found on local ne	twork						
Serial Number	IP address	Gubnet mask	Gateway	Port	DHCP	Availability	Time on	
CG4159	0.0.0.0 2	255.255.255.0	0.0.0.0	53270	Yes, in progress	Available	19s	
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	1				2.		·	1 1000
							OK Ca	incel

Now select the CAU, by clicking on the CG4159 entry in the list. You will see the IP address transfer to the 'Cleverscope Acquirer selected' section. Note that we are using 'Ethernet – Find by Fixed IP address'.

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Now in the Cleverscope acquirer selected area, type in the fixed IP address you want to give the CAU, and click on the 'Set IP address' button. Note the CAU DHCP column changes from 'Yes, in progress' to 'No, using static IP'. You should see:

V Choose acquire	r and set connecti	on						
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CG4159	192.168.1.20	255.255.255.0	192, 168, 1, 1	53270	No, using static IP	Available	1m:40s	
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Once you see that the address of the CAU has changed to what you programmed it to, we suggest you power it down, and then up again – just to verify that the address and static IP usage are correct.

Now you should be able to click OK, and then select Auto on the Cleverscope Control Panel to acquire a signal.

Remote Fixed IP network

In this situation, you do not have a Cleverscope – it is located somewhere else, and you want to connect to it over the internet. Your IT people will make a bridge from the CAU to a port on the internet connection point, and give you the address. As an example, the address is 60.234.234.7.

- 1. Open the Settings/Choose Acquirer and Set Connection menu. Select 'Ethernet Find by IP address'.
- 2. Enter the IP address.
- 3. Select OK.
- 4. You should now be able to use 'Auto' on the Cleverscope Control Panel to capture a signal from the remote Cleverscope.

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