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Phone +64 9 524 7456  
Fax +64 9 524 7457  
Email support@cleverscope.com  
28 Ranfurly Rd, Epsom  
P.O. Box 26-527  
Auckland 1023  
New Zealand

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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

The USB Cleverscope firmware supports both the CS740 USB module and the CS741 Ethernet module, provided the firmware is version 6449 or later.

1. If your existing USB firmware is earlier than 6449, please update it first using Rom Loader.
2. Replace the USB board with the Ethernet board.

### *Update the Firmware*

Make sure you have firmware 4649 or later. The firmware automatically adapts to a USB or Ethernet module.

### *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. Do this if you are upgrading a USB Cleverscope acquisition unit.**

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

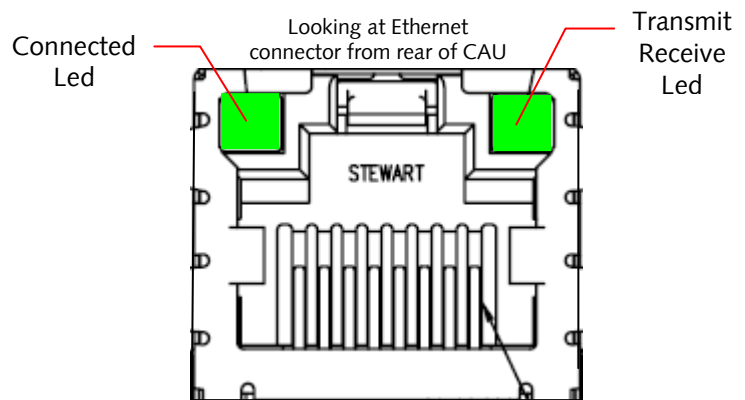
1. Remove two Philips screws from the underside of the Cleverscope Acquisition Unit. Remove top cover. Locate the CS740 USB module. Carefully remove the four white nylon screws, and pull up the CS740 from the end opposite the USB connector. Put aside with screws in antistatic bag. Remove the hot melt 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.

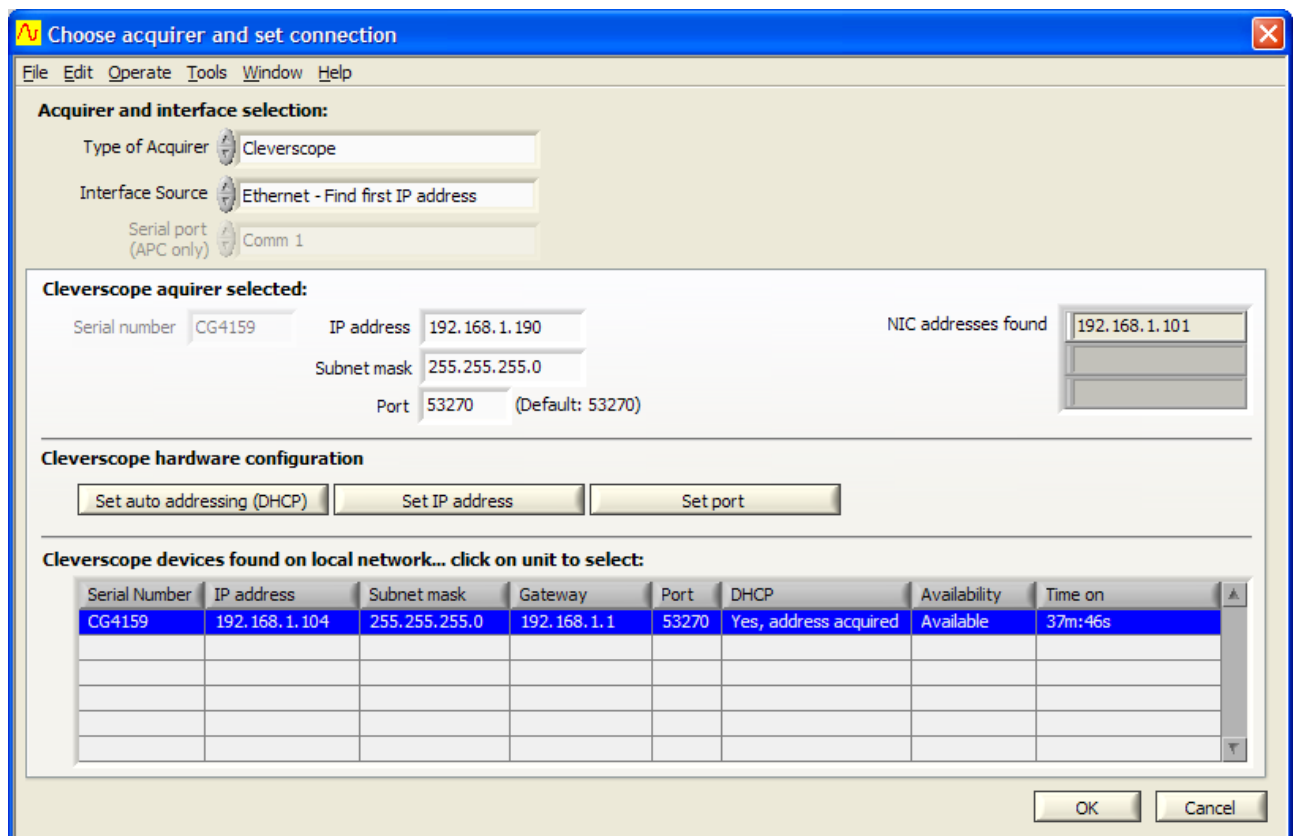
The Connected Led shows that the CAU has connected to the network. The Transmit/Receive Led will flash whenever packets of data are transferred. Once the CAU has triggered, the Transmit/receive light will flash once per second, as the Cleverscope application polls the CAU to make sure it is still connected.

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:



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:

- Set the Interface Source to 'Ethernet – Find by IP address'.
- 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.

**Choose acquirer and set connection**

File Edit Operate Tools Window Help

**Acquirer and interface selection:**

Type of Acquirer: Cleverscope

Interface Source: Ethernet - Find by IP address

Serial port (APC only): Comm 1

**Cleverscope acquirer selected:**

Serial number: CG4159 IP address: 192.168.1.104 NIC addresses found: 192.168.1.101

Subnet mask: 255.255.255.0

Port: 53270 (Default: 53270)

**Cleverscope hardware configuration**

Set auto addressing (DHCP) Set IP address Set port

**Cleverscope 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	192.168.1.1	53270	Yes, address acquired	Not available	8m:7s

OK Cancel

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

- Click OK to exit.
- 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.

The screenshot shows the 'Choose acquirer and set connection' dialog box. It has a menu bar with File, Edit, Operate, Tools, Window, and Help. The 'Acquirer and interface selection' section contains three dropdown menus: 'Type of Acquirer' set to 'Cleverscope', 'Interface Source' set to 'Ethernet - Find by serial number', and 'Serial port (APC only)' set to 'Comm 1'. The 'Cleverscope acquirer selected:' section shows fields for 'Serial number' (CG4159), 'IP address' (192.168.1.104), 'Subnet mask' (255.255.255.0), 'Port' (53270, Default: 53270), and 'NIC addresses found' (192.168.1.101). Below this is the 'Cleverscope hardware configuration' section with three buttons: 'Set auto addressing (DHCP)', 'Set IP address', and 'Set port'. The 'Cleverscope devices found on local network... click on unit to select:' section contains a table with the following data:

Serial Number	IP address	Subnet mask	Gateway	Port	DHCP	Availability	Time on
CG4159	192.168.1.104	255.255.255.0	192.168.1.1	53270	Yes, address acquired	Not available	17m:26s

At the bottom right are 'OK' and 'Cancel' buttons.

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.

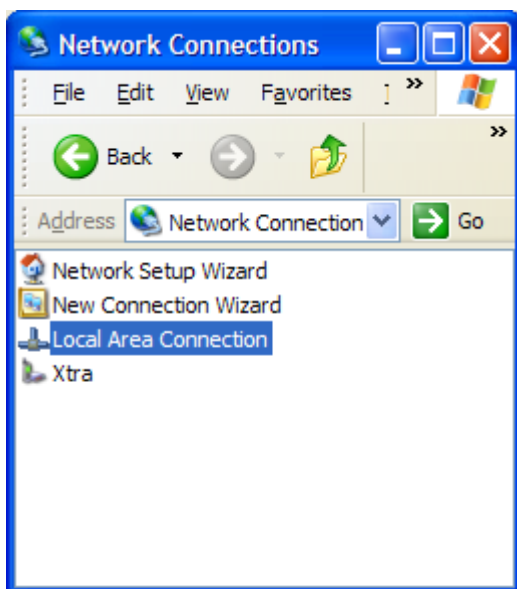
We will examine two situations – the Cleverscope is plugged into a fixed IP local network, or the Cleverscope application is connecting to a remote Cleverscope at some other place.

### Local Fixed IP network

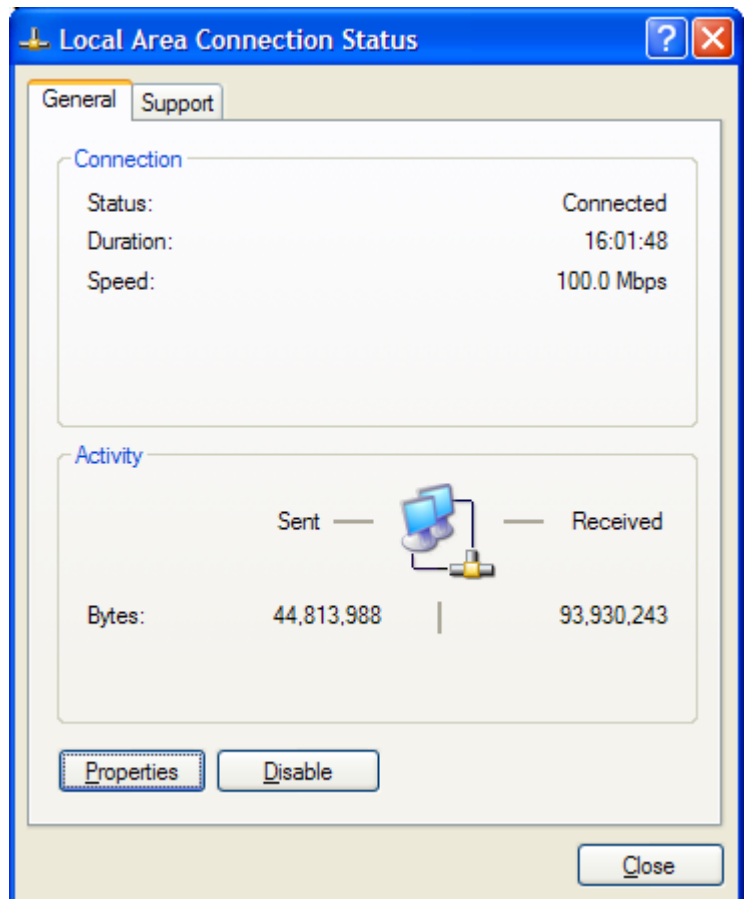
For this network there is no DHCP server, and so someone will need to manually enter the IP address of each unit on the network. All the units must be on the same 'subnet'. The IP protocol subnet is the first three groups of digits in the IP address. For example, for 192.168.1.104, the subnet is 192.168.1. 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).

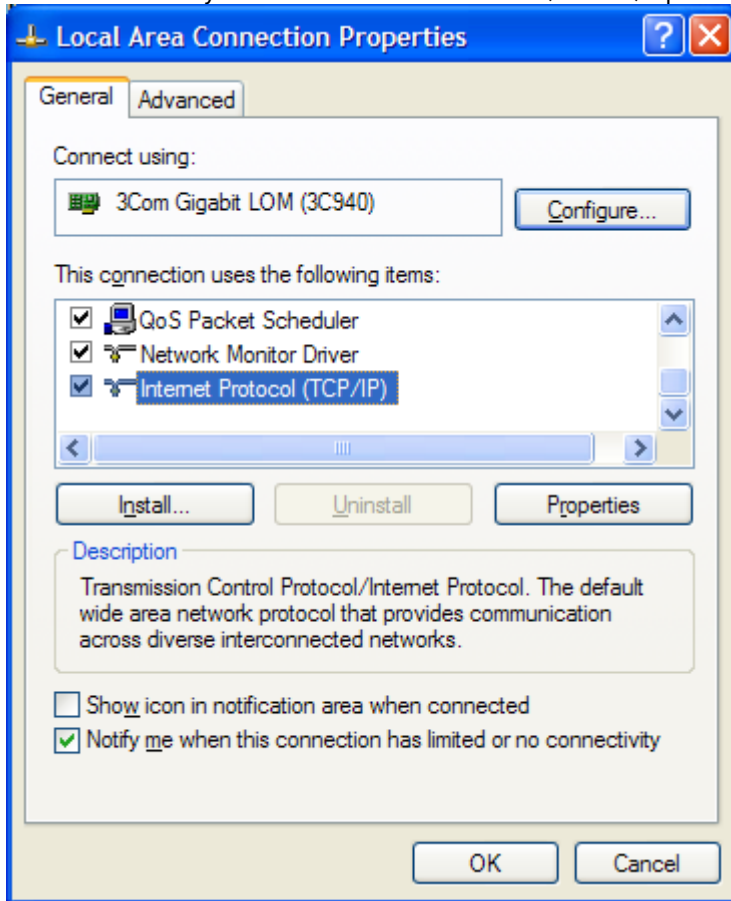
Using Start/Settings/Control Panel from the Windows task bar, open the 'Network Connections' option. Here it is in XP:



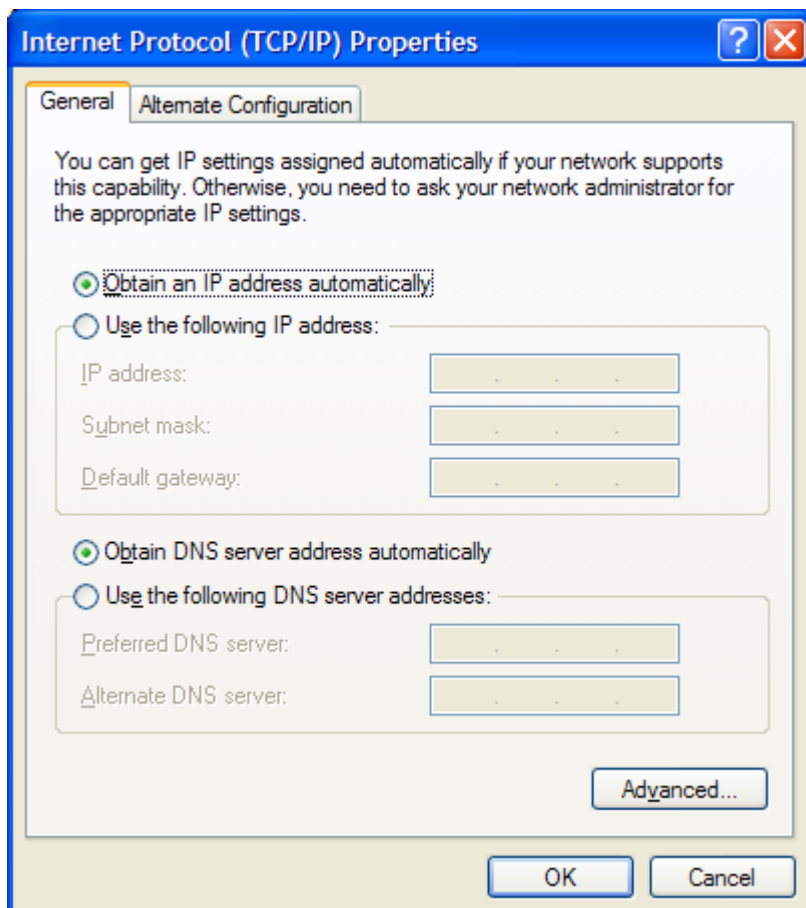
Open the 'Local Area Connection' option, and click on Properties button.



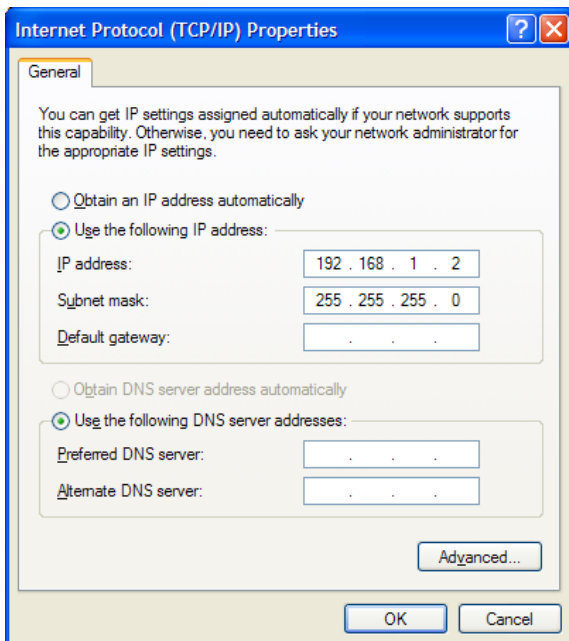
Scroll down until you see the Internet Protocol (TCP/IP) option:



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

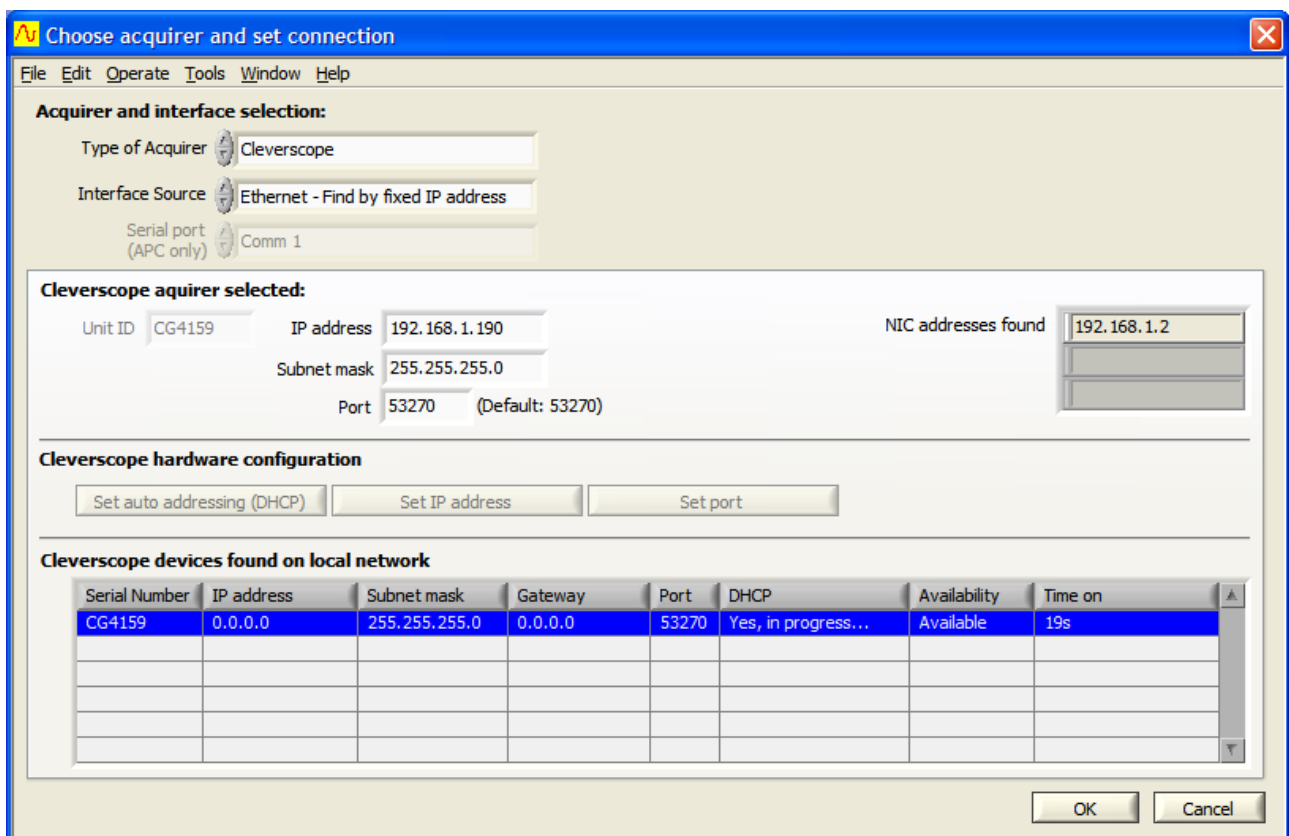


Choose the 'Use the following IP address' option, and type in the subnet that you want to use, and a subnet mask that selects all units on the subnet:



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:



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'.

**Choose acquirer and set connection**

File Edit Operate Tools Window Help

**Acquirer and interface selection:**

Type of Acquirer: Cleverscope

Interface Source: Ethernet - Find by fixed IP address

Serial port (APC only): Comm 1

**Cleverscope acquirer selected:**

Unit ID: CG4159 IP address: 0.0.0.0 Subnet mask: 255.255.255.0 Port: 53270 (Default: 53270)

NIC addresses found: 192.168.1.2

**Cleverscope hardware configuration**

Set auto addressing (DHCP) Set IP address Set port

**Cleverscope devices found on local network**

Serial Number	IP address	Subnet mask	Gateway	Port	DHCP	Availability	Time on
CG4159	0.0.0.0	255.255.255.0	0.0.0.0	53270	Yes, in progress...	Available	19s

OK Cancel

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:

**Choose acquirer and set connection**

File Edit Operate Tools Window Help

**Acquirer and interface selection:**

Type of Acquirer: Cleverscope

Interface Source: Ethernet - Find by fixed IP address

Serial port (APC only): Comm 1

**Cleverscope acquirer selected:**

Unit ID: CG4159 IP address: 192.168.1.20 Subnet mask: 255.255.255.0 Port: 53270 (Default: 53270)

NIC addresses found: 192.168.1.2

**Cleverscope hardware configuration**

Set auto addressing (DHCP) Set IP address Set port

**Cleverscope devices found on local network**

Serial Number	IP address	Subnet mask	Gateway	Port	DHCP	Availability	Time on
CG4159	192.168.1.20	255.255.255.0	192.168.1.1	53270	No, using static IP	Available	1m:40s

OK Cancel



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.

**Choose acquirer and set connection**

File Edit Operate Tools Window Help

**Acquirer and interface selection:**

Type of Acquirer: Cleverscope

Interface Source: Ethernet - Find by IP address

Serial port (APC only): Comm 1

**Cleverscope acquirer selected:**

Serial number: CG4159

IP address: 60.234.234.7

Subnet mask: 255.255.255.0

Port: 53270 (Default: 53270)

NIC addresses found: 192.168.1.101

**Cleverscope hardware configuration**

Set auto addressing (DHCP) Set IP address Set port

**Cleverscope devices found on local network... click on unit to select:**

Serial Number	IP address	Subnet mask	Gateway	Port	DHCP	Availability	Time on

OK Cancel