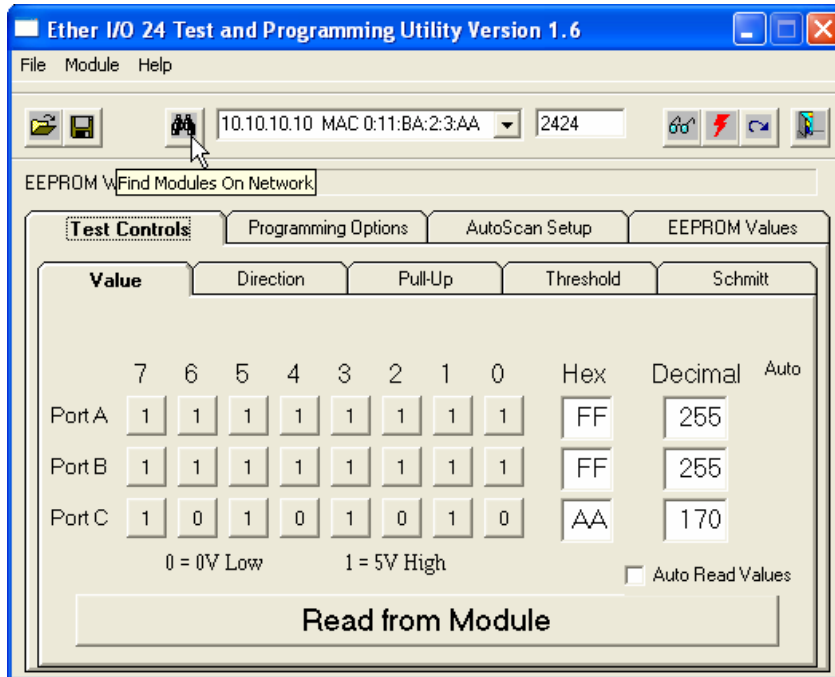


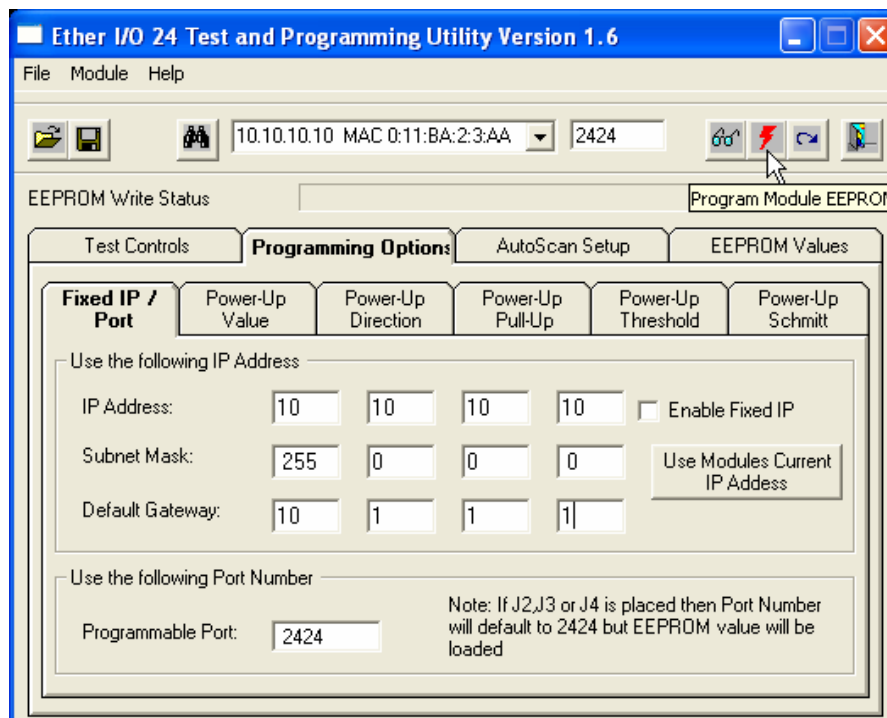
## Ether I/O 24 Auto scan Setup

The following steps, runs through how to setup autoscan

1. Run Test utility and search for any Ether I/O 24's on the network.



2. Once the desired unit is found click the Programming Options Tab

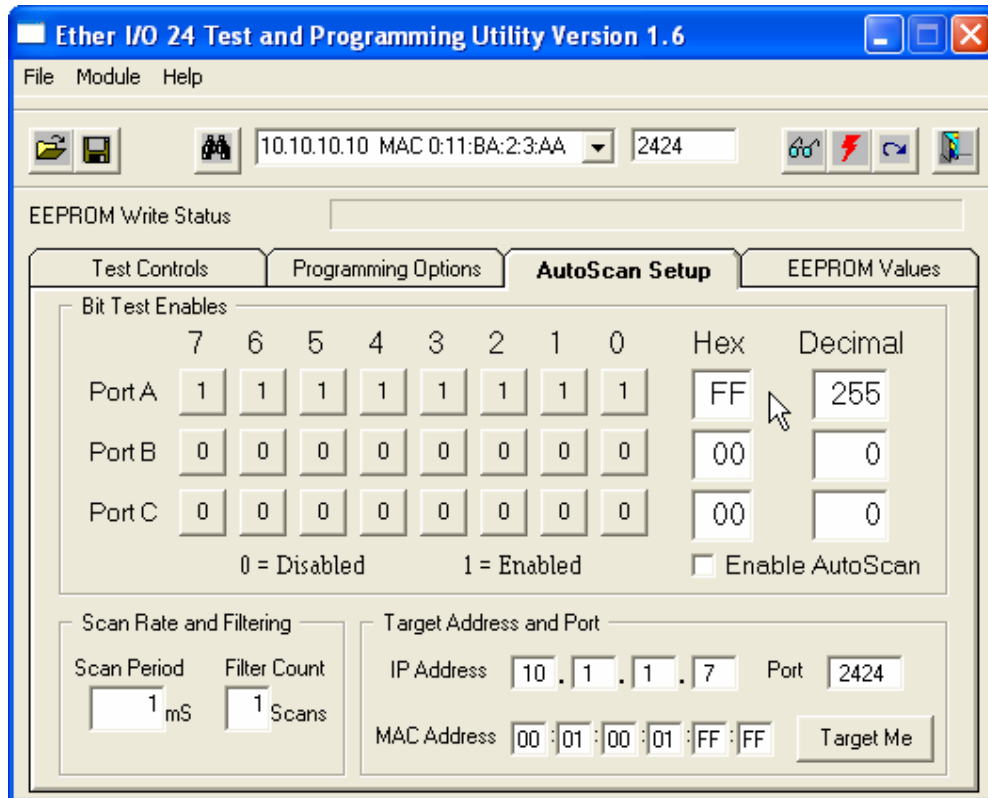


The subnet mask and gateway will need to be programmed into the unit. Once the values have been filled in, these values can be programmed in with the lightning bolt icon.

Why is loading the subnet mask and gateway so important?

Loading the subnet mask and gateway allows the Ether I/O unit to check to see if the Destination IP of the autoscan packets is within the same network (aka subnet). If the destination IP is no within the same subnet mask the computer will send the packets to the gateway IP address so that they can be sent to the destination IP not on the current network. The unit will ARP the destination address (whether it is PC that is on the same network or the gateway) to get all the information that it requires before it can send the autoscan packets. It will continue to ARP even after it has been set up to make sure that the address has not changed.

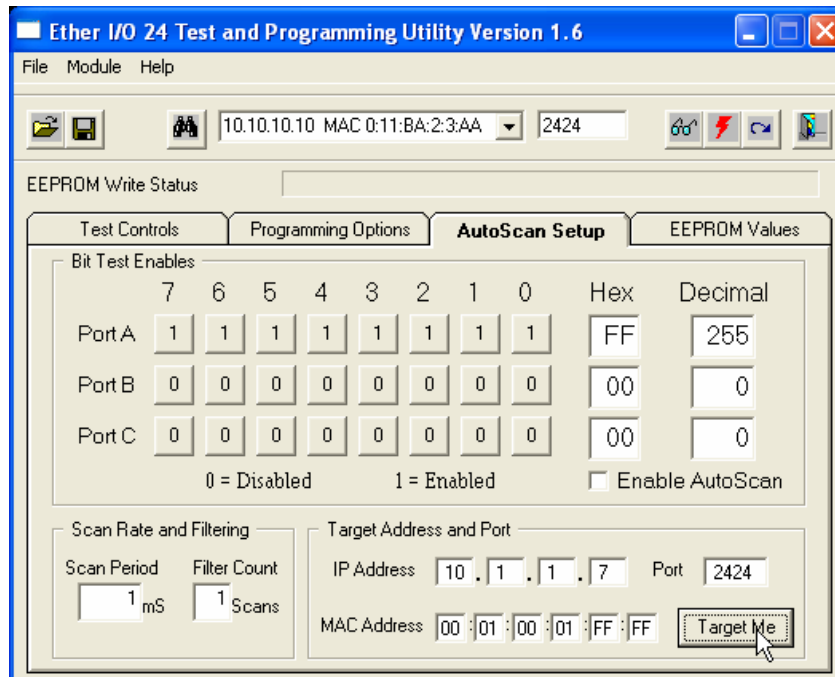
3. Click the Auto scan Setup tab to fill in the autoscan setup values



To set up auto scan with another Ether I/O unit or PC (target address). The IP address and Port number of the target address will have to be typed in the appropriate text boxes. If you are unsure of what to set the subnet mask and gateway too, ipconfig can be run on the PC to get the values.

The MAC address of the target can be left blank as it is not required with the new version of the Ether I/O 24R. The Ether I/O 24 R will perform an ARP to ascertain the MAC address required.

4. If the auto scan is only required on the PC that is running the test and programming utility, the Target me button can be pressed and the IP address, Port of the PC being used will be loaded. The program EEPROM button can be pressed and these values will be programmed into the EEPROM.



5. Set the scan rate and filtering that is required for the application. The above picture has a scan period of 1ms and a scan count of 1, these settings will be adequate for any application. The unit will scan the inputs every millisecond and if there is any change, the change will be sent. These values can be adjusted to suit application needs. . The program EEPROM button can be pressed and these values will be programmed into the EEPROM.
6. Once the address and scan rate have been set, the ports that require auto scan to be enabled can be set. Toggle the pin state to enable auto scan on any pin and then select the enable auto scan check box. The program EEPROM button can be pressed and these values will be programmed into the EEPROM.
7. Reset the unit and the when the enabled auto scan pin changes state, the new changed port value will be sent to the Target address.

8. This example sets the following parameters

- Ether I/O 24 R IP – 10.10.10.10 (loaded J3)
- Subnet Mask – 255.0.0.0
- Gateway – 10.1.1.1
- Destination IP – 10.1.1.7 (PC)
- Destination Port – 2424
- Scan period – 1
- Scan Count – 1
- Port A enabled for autoscan
- Port A power ups
  - i. Value 0xFF
  - ii. Direction 0xFF
  - iii. Pullup 0xFF
  - iv. Threshold 0xFF
  - v. Schmitt 0xFF

Below is a packet sniff of the data being sent back from the Ether I/O 24 R to the PC

No. -	Time	Delta Time	Source	Destination	Protocol	Info
1	0.000000	0.000000	10.10.10.10	Broadcast	ARP	who has 10.1.1.7? Tell 10.10.10.10
2	0.000016	0.000016	10.1.1.7	10.10.10.10	ARP	10.1.1.7 is at 00:e0:4c:69:15:f0
3	0.322237	0.322221	10.10.10.10	10.1.1.7	UDP	source port: 2424 Destination port: 2424
4	0.562795	0.240558	10.10.10.10	10.1.1.7	UDP	source port: 2424 Destination port: 2424
5	2.390361	1.827566	10.10.10.10	10.1.1.7	UDP	source port: 2424 Destination port: 2424
6	2.763317	0.372956	10.10.10.10	10.1.1.7	UDP	source port: 2424 Destination port: 2424
7	3.835727	1.072410	10.1.1.3	10.255.255.255	NBNS	Name query NB ELEXOL-REP<20>
8	3.835801	0.000074	10.1.1.6	Broadcast	ARP	who has 10.1.1.3? Tell 10.1.1.6
9	4.956743	1.120942	10.1.1.7	10.1.1.1	DNS	standard query PTR 6.1.1.10.in-addr.arpa

```

# Frame 3 (64 bytes on wire, 64 bytes captured)
# Ethernet II, Src: 10.10.10.10 (00:11:ba:02:03:aa), Dst: 10.1.1.7 (00:e0:4c:69:15:f0)
# Internet Protocol, Src: 10.10.10.10 (10.10.10.10), Dst: 10.1.1.7 (10.1.1.7)
# User Datagram Protocol, Src Port: 2424 (2424), Dst Port: 2424 (2424)
  Source port: 2424 (2424)
  Destination port: 2424 (2424)
  Length: 11
  Checksum: 0x0000 (none)
Data (3 bytes)

```

```

0000 00 e0 4c 69 15 f0 00 11 ba 02 03 aa 08 00 45 00  ..L1.... ..E.
0010 00 1f 00 0d 40 00 20 11 3b a6 0a 0a 0a 0a 01  ....@. :.....
0020 01 07 09 78 09 78 00 0b 00 00 2b 41 80 ff 43 aa  ...X.X. .[.C.
0030 21 41 ff 21 42 00 21 43 00 40 41 ff 40 42 ff 40  !A.!B.!C !@A.@B.@

```

The data being sent back is from the switch being activated on Port A bit 7.

## Testing Autoscan on the Ether I/O 24 module

When implementing autoscan with a PC, to test the autoscan is actually working a packet sniffer can be installed. There are a number of packet sniffers available for download, Elexol uses Wireshark to test the packet sent back to the PC.

Wireshark Link <http://www.wireshark.org/>

If you are testing it to another device you will need to connect the computer running the packet sniffer onto a hub along with the Ether I/O device so that you can capture all packets being sent from the Ether I/O 24. If you were to place the packet sniffer onto a switch or a router then you will not see the packets being sent from the Ether I/O module to the target device.

Once you have the packet sniffer running you will see the autoscan packets being sent back to the device that you are autoscanning with. The contents of the autoscan packet will depend on which port has changed state. The UDP data in the packet will contain "\*" followed by the port designator that changed and the new value of that port.

For example

UDP data HEX 2a 41 08 43 40 which corresponds to \*A port change C port change.

The data which is sent back in autoscan mode is set out similar to the response when a read is performed, with a "\*" followed by the Port designator (A,B,C) followed by the data byte (which is the value of the entire port). If bits on two or more autoscan pins change simultaneously, the module will place the changes in a single packet before being sent. If the pins are on different ports the packet data will always be in the order of A,B and C.

### ***Tips and tricks***

- Auto scan will only work with values that are set to inputs
- Don't leave floating input pins when using auto scan as the pins will change state and constantly send data. Tie them to a known state or set them as outputs if not being used.
- The Auto scan packet sent back from the Ether I/O contains 3 bytes "\*" 'Port Designator' 'Hex Port Value' e.g. \*A0 data in packet UDP packet will be 2a 41 00
- Use a program called Ethereal or Wireshark to debug the packets being sent back and forth from the PC to the Ether I/O 24 and vice versa. [www.ethereal.com](http://www.ethereal.com)  
[www.wireshark.org](http://www.wireshark.org)
- Know what data is being sent back with the various commands sent. E.g. Sending IO24 will return 12 bytes, Read command 2 bytes, etc
- Set the scan period and scan count correctly
- If EEPROM error occurs while writing to the EEPROM with test utility, rewrite the EEPROM till it is successful.
- When restarting the test utility, the port value used by the utility may change value.