Ethernet Line Driver (version B)
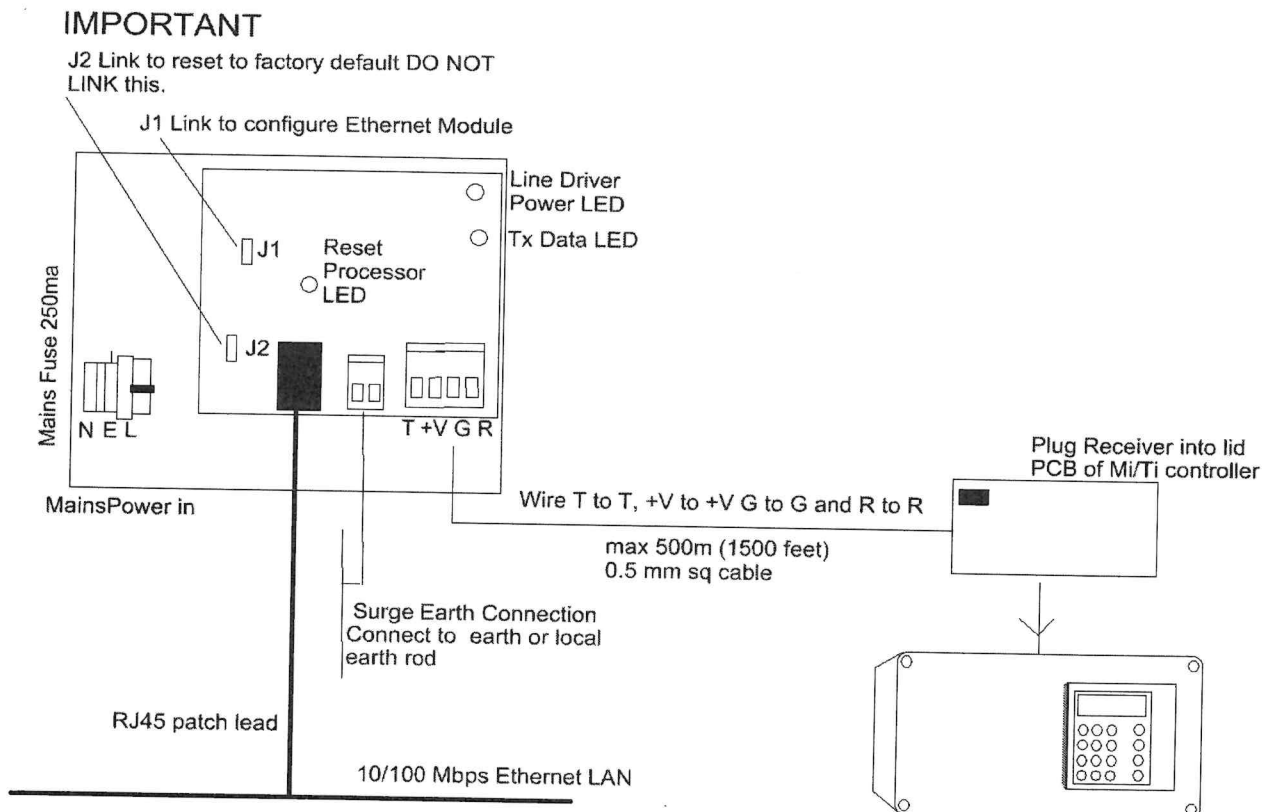
1 Principal of Operation

The Heron Ethernet Line Driver is an optically isolated line driver to connect Mi or Ti irrigation controllers to an Ethernet LAN. The line driver can extend the Ethernet LAN connection by up to 500 meters. The Ethernet Line Driver is designed to work with the Heron Server.

Connect the Ethernet Line Driver to the Ethernet LAN as shown below. Connect the mains supply as shown below.

Switch off the power to the irrigation controller and fit the Receiver card into the lid PCB. The receiver card plugs onto the 10 way connector. Please note that the receiver card may already be fitted into your controller.

Connect the Driver and the Receiver using a 4 core signal cable (7/0.2). Connect **V to V, G to G, R to R and T to T**.

Ethernet Line Driver

IMPORTANT
J2 Link to reset to factory default DO NOT LINK this.

J1 Link to configure Ethernet Module

Line Driver Power LED

Tx Data LED

J1 Reset Processor LED

J2

Mains Fuse 250ma

N E L   T +V G R

MainsPower in

Wire T to T, +V to +V G to G and R to R

max 500m (1500 feet)
0.5 mm sq cable

Plug Receiver into lid PCB of Mi/Ti controller

Surge Earth Connection
Connect to earth or local earth rod

RJ45 patch lead

10/100 Mbps Ethernet LAN

2 Controller Configuration

First set the LAN Connection Option to 2 on the Mi/Ti controller. (The LAN Connection Option is Option 32). Now you must enter the Server ID so the controller can connect to the Heron server. Proceed as follows.
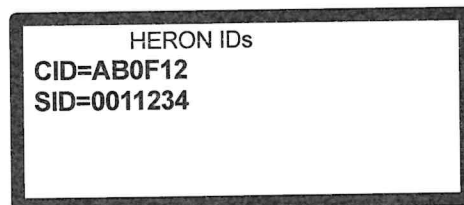
Select **LAN Menu** from the **Main Menu**.

```
MAIN MENU
    Program
    Program Starts
    LAN Menu
```
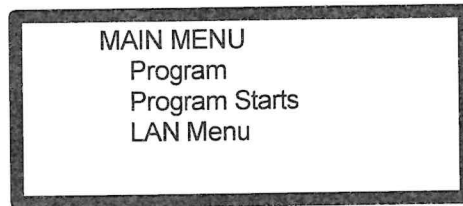
The following page will be displayed: Select **Heron IDs.**

```
LAN MENU
Status
Heron IDs
```
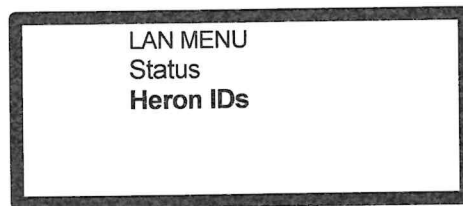
Now enter the Server ID (SID) that Heron has provided for you. In the example below a SID of **0011234** has been entered.

```
HERON IDs
CID=AB0F12
SID=0011234
```

Now switch off the controller and switch it back on. The controller will automatically connect to **heronserver.com.** This may take 1 minute

You can view the connection status by selecting **Status** from the LAN Menu. As shown below:-

```
STAUS
Status  Wait
Count   20
```
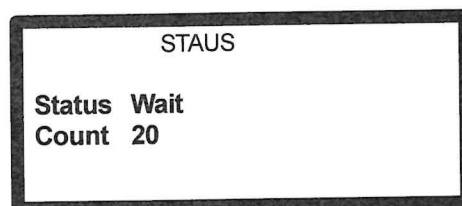
3   Changing IP address to a Static IP Address

By default the Ethernet Line Driver uses a dynamic IP address and will automatically connect to the Heron server. However, for a **reliable permanent connection a static IP address is required**. This section describes how to configure the line driver with a static IP address.
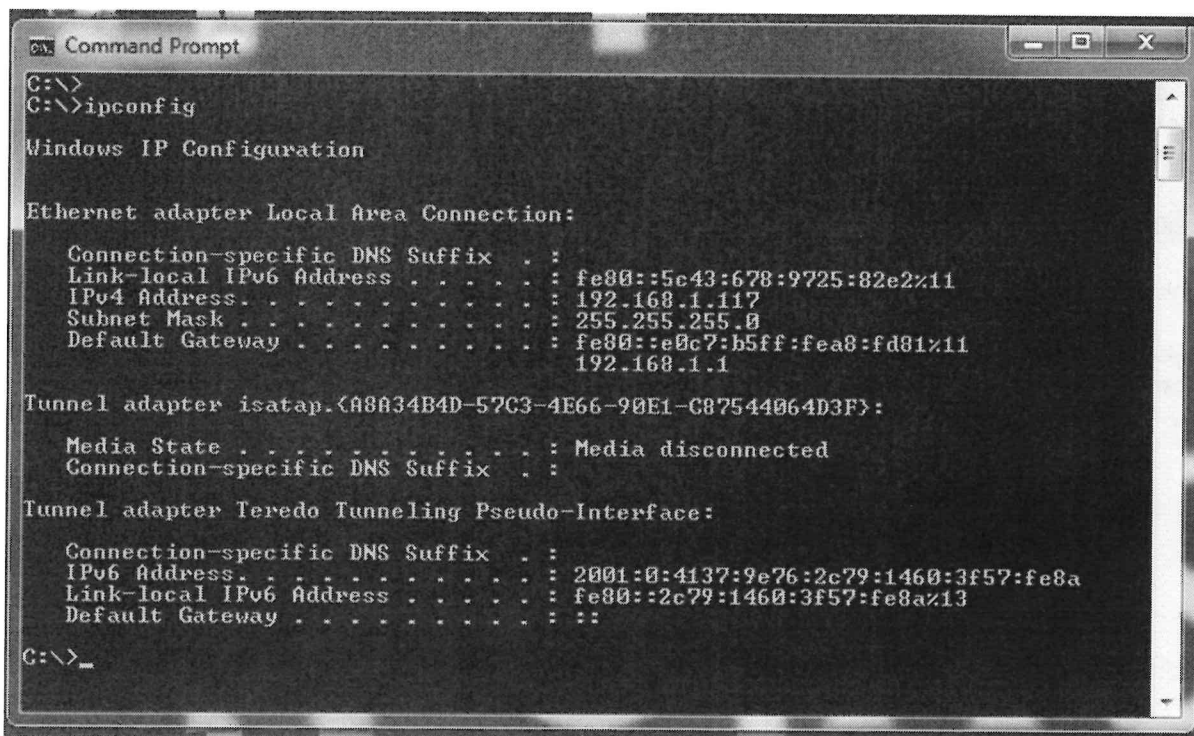
Link J1

Link J1 with the jumper (see diagram above), connect the Ethernet Line Driver to your LAN and power up.

If you are the network administrator or familiar with how to configure your router you can now go straight to **Configure Module** as the next 3 sections just describe how to find the IP address of the module.

Check Your LAN is a Standard Setup

From a Windows PC open the Command Prompt Window. Now type in **ipconfig**

```
C:\>
C:\>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::5c43:678:9725:82e2%11
   IPv4 Address. . . . . . . . . . . : 192.168.1.117
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : fe80::e0c7:b5ff:fea8:fd81%11
                                       192.168.1.1

Tunnel adapter isatap.{A8A34B4D-57C3-4E66-90E1-C87544064D3F}:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Tunnel adapter Teredo Tunneling Pseudo-Interface:

   Connection-specific DNS Suffix  . :
   IPv6 Address. . . . . . . . . . . : 2001:0:4137:9e76:2c79:1460:3f57:fe8a
   Link-local IPv6 Address . . . . . : fe80::2c79:1460:3f57:fe8a%13
   Default Gateway . . . . . . . . . : ::

C:\>_
```

You will see IPv4 address of your PC the subnet mask and the Gateway address.

The PC address should start with 192.168.1, the subnet mask should be 255.255.255.0 and the Default Gateway should be 192.168.1.1. If all these are correct you can continue.

Find the IP Address

Now you need to find the IP address of the Heron Ethernet module.

To do this you need the MAC address of the module. This is 6 digit number displayed where the Ethernet cable is plugged in to the module. It will be of the format 00:90:e8:57:d7:b3

You can find the IP address assigned to this MAC address from your router or via the Windows **ping** and **arp** command. As manufacturers routers operate differently, this manual describes the windows ping and arp command.
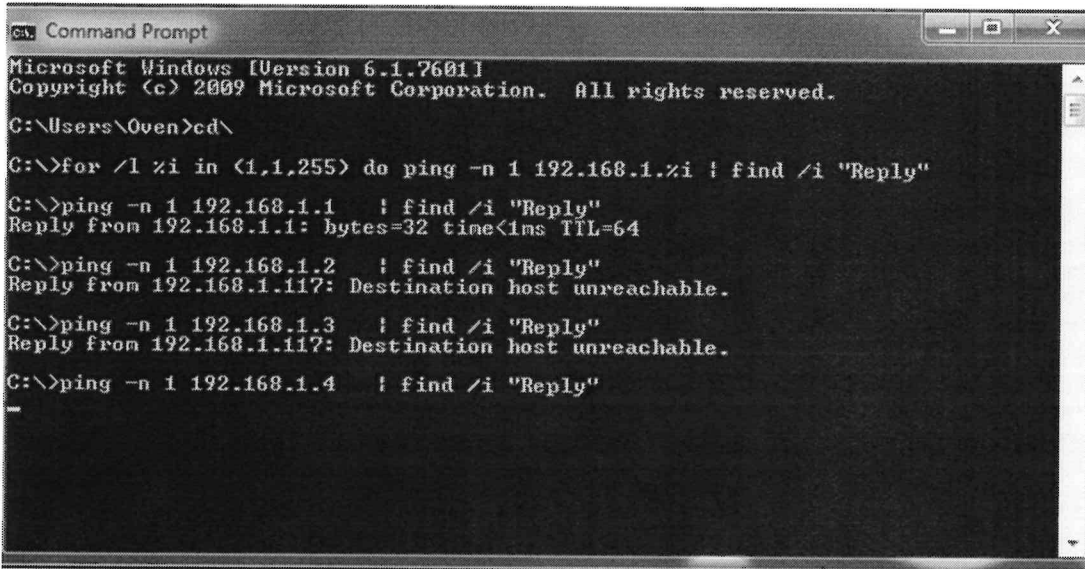
The arp command will display the arp table with the MAC and IP addresses. However, the table must be updated. To do this you can ping all the addresses in your subnet.

From the windows Command Prompt type in the following command. Hint: To make sure you get the command correct use copy and paste.

for /l %i in (1,1,255) do ping -n 1 192.168.1.%i | find /i "Reply"

This will ping all the addresses from 1-255. This will take a few minutes. Alternatively you can shorten the address range by changing the start address. In the example below addresses from 100 are being tested. However, only do this if you know your IP address will be above address 100.

for /l %i in (100,1,255) do ping -n 1 192.168.1.%i | find /i "Reply"

```
Command Prompt

Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\Oven>cd\

C:\>for /l %i in (1,1,255) do ping -n 1 192.168.1.%i | find /i "Reply"

C:\>ping -n 1 192.168.1.1    | find /i "Reply"
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64

C:\>ping -n 1 192.168.1.2    | find /i "Reply"
Reply from 192.168.1.117: Destination host unreachable.

C:\>ping -n 1 192.168.1.3    | find /i "Reply"
Reply from 192.168.1.117: Destination host unreachable.

C:\>ping -n 1 192.168.1.4    | find /i "Reply"
```
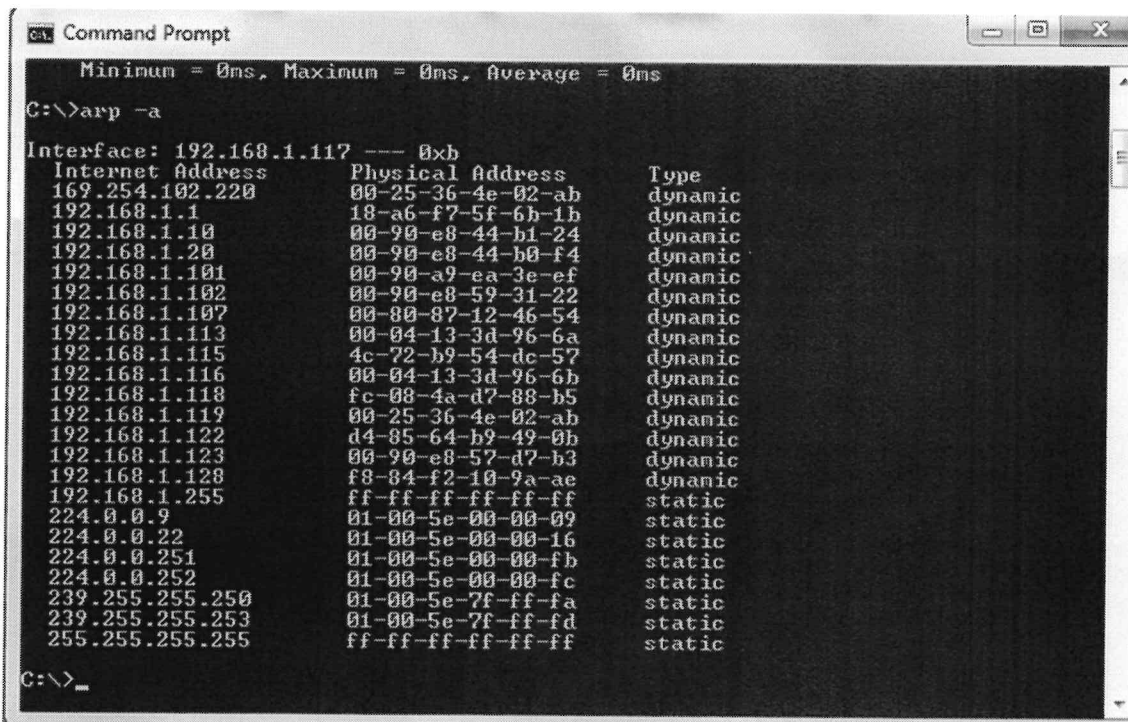
After the ping command has finished you can display the arp table. To display the arp table type in:-

arp -a

```
Command Prompt

    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>arp -a

Interface: 192.168.1.117 --- 0xb
  Internet Address      Physical Address      Type
  169.254.102.220       00-25-36-4e-02-ab     dynamic
  192.168.1.1           18-a6-f7-5f-6b-1b     dynamic
  192.168.1.10          00-90-e8-44-b1-24     dynamic
  192.168.1.20          00-90-e8-44-b0-f4     dynamic
  192.168.1.101         00-90-a9-ea-3e-ef     dynamic
  192.168.1.102         00-90-e8-59-31-22     dynamic
  192.168.1.107         00-80-87-12-46-54     dynamic
  192.168.1.113         00-04-13-3d-96-6a     dynamic
  192.168.1.115         4c-72-b9-54-dc-57     dynamic
  192.168.1.116         00-04-13-3d-96-6b     dynamic
  192.168.1.118         fc-08-4a-d7-88-b5     dynamic
  192.168.1.119         00-25-36-4e-02-ab     dynamic
  192.168.1.122         d4-85-64-b9-49-0b     dynamic
  192.168.1.123         00-90-e8-57-d7-b3     dynamic
  192.168.1.128         f8-84-f2-10-9a-ae     dynamic
  192.168.1.255         ff-ff-ff-ff-ff-ff     static
  224.0.0.9             01-00-5e-00-00-09     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  239.255.255.253       01-00-5e-7f-ff-fd     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static

C:\>
```

From the list above you should see your MAC address with the associated IP address. The MAC address 00:90:e8:57:d7:b3 has IP address 192.168.1.123 assigned to it.
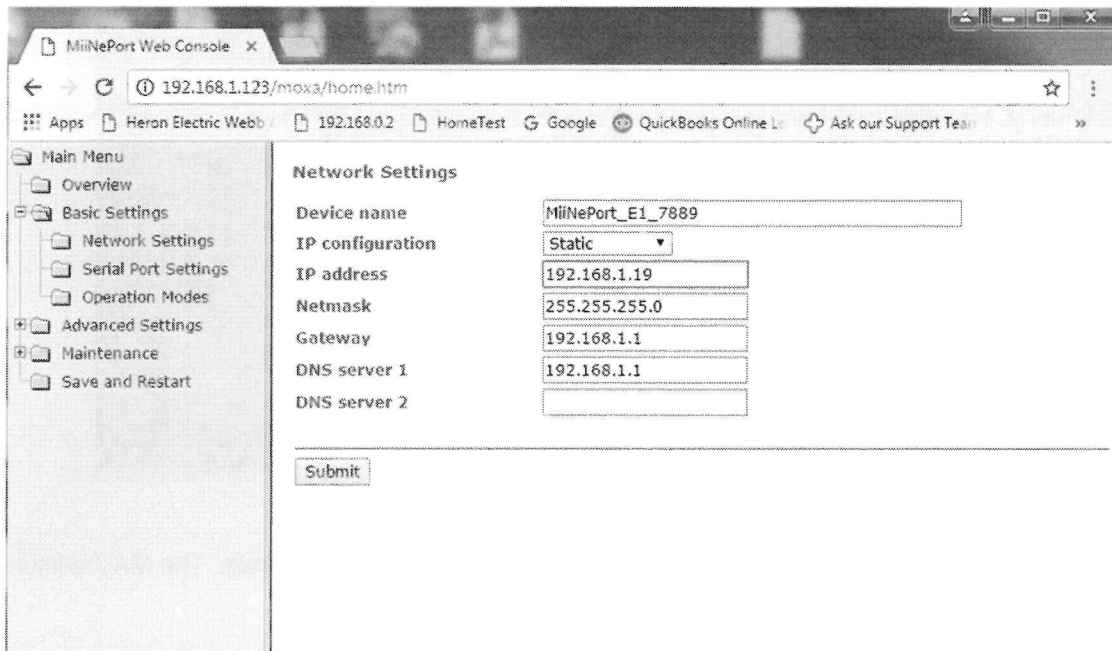
Configure Module

You can now configure the Ethernet Line Driver via an internet browser.

Open a Browser (eg. Internet Explorer or Chrome) and type in the IP address you have just found in the URL entry field.

The browser may now ask for a password. If it does enter **heron**.
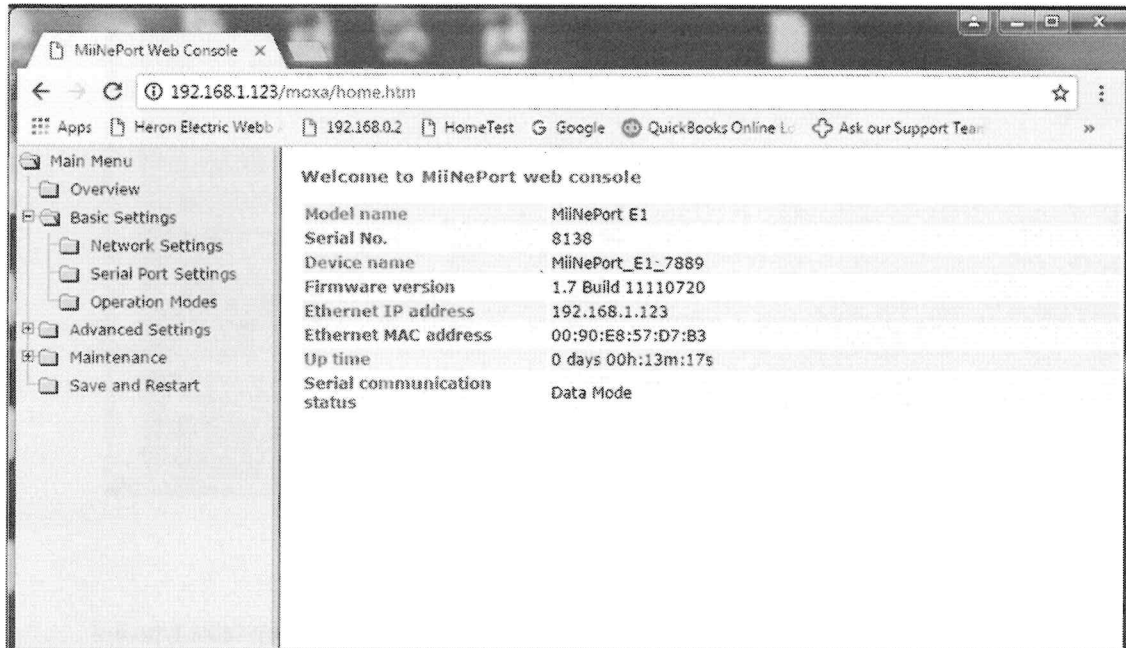
Now select Basic Settings and then Network Settings to change the IP address to a static IP address.

You need to use unique Static IP address. You can look at your arp table to see free addresses. On most modern routers dynamic IP addresses are set above 100 and you will see on your arp table that dynamic addresses are all above 100. You should, therefore, set a static IP address below 100. For example 192.168.1.19 would be a valid static IP address. Now you can enter the static IP information as shown above.

The other information should be default. That is, the Gateway at 192.168.1.1, the DNS server at 192.168.1.1, and the subnet mask 255.255.255.0.

In the example above the static IP address has been set at 192.168.1.19, the Gateway and DNS server as 192.168.1.1 and the subnet mask as 255.255.255.0.

When you have entered the information Click Submit and Save. Your Ethernet module will reboot.

Important: Now close the Browser and remove the Jumper Link.

4   Resetting to Factory Default

If you need to reset the Line Driver IP settings to Factory Default, Link J2 for 1 second when the driver is powered up. Please note this should only be done with the guidance of Heron as the device will need to be re-programmed afterwards. You will need the Moxa Utility software and a configuration text file from Heron.

To reprogram the device after resetting it back to factory default proceed as follows:-.
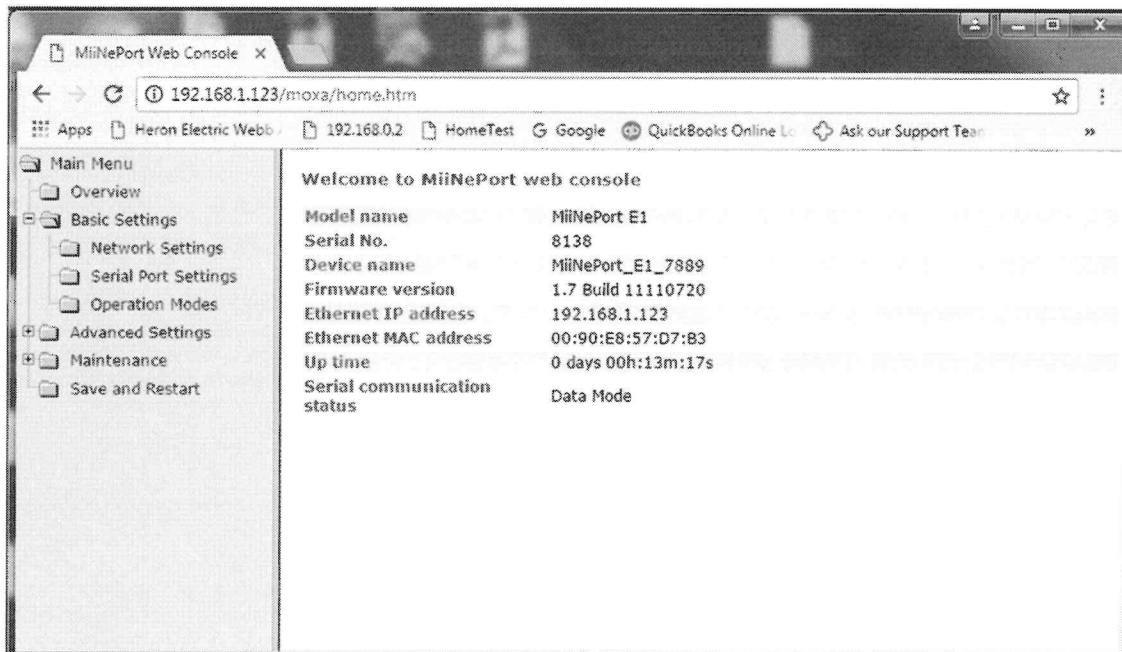
Down load Moxa Utility software.

Run the Moxa software and select **Search**.

When it has found the device select **Console** to edit.

If you are asked for a password enter 'moxa'.

The following Configuration screen will be displayed.

Now select **Maintenance, Configuration Tools, Configuration Import.**

Under **Choose File** select the text file that Heron has sent you. Tick Import all configurations and then **Submit.**

APPENDIX 1

To down load the utility use the following link:-
http://www.moxa.com/support/sarch_result.aspx?type=soft&prod_id=539&type_id=5

APPENDIX 2
Testing the Cable

0V and 12V Signals
At the Mi/Ti controller check there is 10-12V on the middle 2 contacts of the 4-way green plug. +V is labelled V.

Tx from Ethernet Interface
At the Ethernet Interface end take out the wire in T of the grey plug and put in V. There are now 2 wires in V. Put the plug back in and the Mi/Ti LED 2 will be lit. This is the upper LED on the receiver card.

Rx into Ethernet Interface
Switch off and on the ethernet interface. Then switch off and on the Mi/Ti controller. After 20 seconds LED3 will flash on the receiver card. This will cause the ethernet interface to reset and the left had green light on the ethernet interface will start to flash.