

Debugging Network Communications

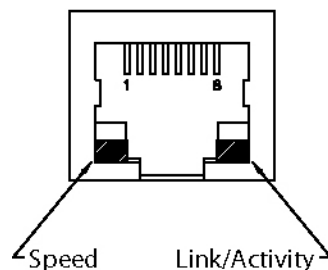
Situation: you have a computer and your NetBurner device on a network, but you cannot communicate between the two. This application note provides a set of debugging steps to try and identify the problem.

A summary of a standard operational check is:

1. Use the standard NetBurner development board.
2. Verify cabling is correct and you have a link light.
3. Use the debug serial port to check for boot logging information. This will tell you if a valid application is running, a trap is occurring, or the boot monitor halted the application.
4. If a valid application is not running, download the factory original via the serial port.
5. Disable any network firewall settings
6. Disable any web browser proxy settings
7. Verify the IP address of your computer and the NetBurner device
8. Try to Ping the NetBurner device
9. Use a direct cross-over cable

1 Check the Network Cabling

The link light on the NetBurner device and computer, switch or router will tell you if you have a good electrical connection, and if a connection has been negotiated between the physical layer at each end. You absolutely must have a link light, or network communication will not be possible. If you are connecting directly from a computer to the NetBurner device, you may need a crossover cable, which is the red cable provided in the development kit. If you are connecting to a hub, switch or router, then you will want to use a standard blue cable. Most NetBurner devices use Ethernet jacks with integrated LEDs as shown below.



2 Use the NetBurner Development Board

To eliminate the number of variables, use the standard NetBurner development board and power supply. Remove any connections to outside or custom equipment or circuitry other than the serial port, power and network cable.

3 Check the Serial Debug Port Output

The NetBurner device will send debug output to the “serial debug port” when it boots, and menus are provided when running examples and the default factory program. The serial debug port is normally UART 0 by default, but can be configured to be a different serial port through IPSetup or the monitor program. Here are the steps to receive serial debug port output:

1. Connect the serial cable that was included with your development kit from the debug serial port connector on your NetBurner development board to your computer.
2. Run the NetBurner MTTY dumb terminal program, or you can use Windows HyperTerm (or any other serial terminal program). The factory settings are 115,200 baud, 8 data bits, no parity, 1 stop bit. If using MTTY, be sure to click on the “Connect” button.
3. Press the reset button on your NetBurner device, or cycle power. You should see a sign on message that says: “Waiting 2 seconds to start, ‘A’ to Abort”. If you do not see this message, then connect the cable to the other serial port and repeat this step.
4. Once you see the sign-on message, you should see the boot sequence and log output appear. If you are running the factory demo, it will tell you the IP address of the NetBurner device, if DHCP was used and the result, etc.
5. If you see the boot information as described above, then you are done with this section. If the NetBurner device leaves you in the monitor at the ‘NB>’ prompt, or you see trap messages, then continue with the sections below.

3.1 Trap messages or “NB>” prompt on Boot

If you see a trap message, or your NetBurner device boots to the monitor, there may be an invalid application in the application space of flash memory. The NetBurner device will not be able to respond to IPSetup unless a valid network application is running on the board. The next step is to make sure there is a known good application running on the board. This can be accomplished by doing a serial port download of the original factory application .s19 file:

1. If you can see a trap message or the monitor prompt, then you must already have MTTY running with serial port communications, so we will start from there.
2. Cycle power to the board and enter the monitor program by sending an 'A' through MTTY when prompted BEFORE any traps occur. A power cycle is required since pushing the reset button will not clear the contents of SDRAM.
3. Type "fla" and press the <enter> key to begin a serial flash download. You will be prompted to send the file.
4. If using MTTY, Select "Transfer", then "Send File" from the main menu. If using HyperTerm, select "Transfer" and "Send Text File". Navigate to the precompiled factory demo for your platform, which is located in the \nburn\\original directory, where <platform> is Mod5272, Mod5282, etc. For the Mod5282, this would be:
\nburn\Mod5282\original\Mod5282FactoryDemo_APP.s19. BE SURE TO SELECT THE FILE NAME WITH _APP! The _APP files are mapped for flash memory – the files without _APP are mapped for RAM. Downloading a file mapped for RAM using the "fla" command will have no effect.
5. You should see a number of '*' characters go by as the download progresses. At the end of the download there should be a message indicating the flash was programmed, and the board will reboot. If you find yourself at the "NB>" prompt, then type "boot". If you need to change the boot mode, then type "setup" at the prompt and modify the boot option to "boot to application".
6. If the programming was successful, you will see boot messages and a menu on MTTY. Now try IPSetup again to see if you can communicate with the device.

4 IPSetup and Firewalls

If IPSetup cannot locate your device, make sure you do not have a firewall enabled that is blocking port number 20034. A quick and easy test is to disable the firewall completely and run IPSetup to locate the NetBurner device. If that works, then enable your firewall and find the setting to allow network communications on port 20034.

Verify your computer and the NetBurner device are on the same LAN. IPSetup uses a UDP broadcast, and UDP broadcast packets are not forwarded by routers.

5 Web Browsers and Proxy Servers

If you can see your device with IPSetup, but cannot connect to the device with a web browser, then your web browser may have the proxy setting enabled. If this is the case, then all web browser requests are routed to the proxy, and will not appear on your subnet. This means that the NetBurner web server will not see the request at all. Take a look at the web browser proxy settings. You may be able to add an entry of ip addresses to exclude, and you can add the NetBurner ip address to that list. If the web browser is set up to automatically load proxy settings from the proxy server, you may need to disable the proxy checkbox to verify communication, then speak with your MIS people about how to change the settings so local devices can be accessed via the web browser on port 80.

6 Verify the IP addresses of Each Host

The IPSetup utility uses UDP broadcasts (e.g. 255.255.255.255) to communicate between your computer and the NetBurner device, so it will work even if the addresses are not configured to enable unicast (e.g. 192.168.0.2) communication with UDP or TCP. However, to communicate with a web browser or any other application, you will need to make sure the IP address and mask are set correctly.

To check the IP address of your Windows computer, open a command prompt window and type “ipconfig”. You will then see the IP address, subnet mask and gateway displayed.

Now use IPSetup to view the same settings on your NetBurner device. For any two network devices to communicate using unicast, the logical AND of the subnet mask and IP address must match. Lets not worry about the ANDing part right now and just look at an example:

PC IP Address: 192.168.0.2
 Subnet Mask: 255.255.255.0

NetBurner
 IP Address: 192.168.0.50
 Subnet Mask: 255.255.255.0

Each setting is made up of 4 numbers separated by periods. Each of these numbers is called an “octet”. The easy way to check this is to look at the subnet mask and notice that the first 3 octets are 255.255.255, and the first 3 octets of the PC IP address are 192.168.0. This means that the NetBurner subnet mask should be the same (ie 255.255.255.0), and that the first 3 octets of the NetBurner IP address must match the

first 3 octets of the PC IP address, namely 192.168.0. This covers the AND part of the calculation.

So, if the subnet mask is 255.255.255.0, then the first three octets of IP address for each network device must match (192.168.0). The final octet **MUST** be different for each device.

Note: this is a very simplified explanation of subnet masking. Some installations are more complex and it is not the intention of this section to cover all the intricacies of subnet masking.

7 PING

PING is a wonderful little program. If the IP addresses and subnet masks are configured correctly, ping provides a very simple sanity check at a low level to determine if communications with higher level applications are possible. To use PING, open a Windows command prompt and type “PING <ip address>”, where the <ip address> is the IP address of your NetBurner device. If successful, then you will see three ping executions and the response time for each.

Note: PING does require a working application in your NetBurner device or it will be unable to respond.

8 Try a Direct Ethernet Connection

If the above procedures do not work, then you can try connecting directly from your computer to the NetBurner device with the red Ethernet cable that was provided with your development kit.

1. Run MTTY and verify the NetBurner device is running a valid network enabled application by looking at the debug serial port output.
2. Assign a static IP address and subnet mask to your computer.
3. Run IPSetup and assign a static IP address and subnet mask to the NetBurner device.
4. Use the Ping utility to ping the NetBurner device.