



## **NetBurner Network Development Kit Quick Start Guide**



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**Notice to Developer:** This is a contract. By installing the NetBurner Tools, you accept all the terms and conditions of the "NetBurner Tools Software" and "NetBurner Embedded Software" Agreements. If you do not agree with the terms and conditions of these agreements, return this development kit and all components to NetBurner.

1. All embedded software and source code provided in this Network development kit is subject to one of four possible licenses:

- The NetBurner Tools License (most restrictive)
- The NetBurner Embedded Software License
- The GNU Public License
- The Newlib License (least restrictive)

2. The GNU development executables provided in the nburn/GCC-M68k directory branch are subject to the GNU public license. This license can be found in nburn/docs/GNUlicense.txt file.

3. The runtime libraries and include files provided in the nburn/GCC-M68k directory branch are subject to the Newlib license. This license can be found in nburn/docs/NewlibLicense.txt file.

4. The compcode application provided in the nburn/pctools/compcode directory is subject to the GNU public license. This license can be found in the nburn/docs/GNUlicense.txt file.

5. The other programs in the nburn/pctools directory are subject to the NetBurner Tools License provided below.

6. All other provided source code and libraries are subject to the NetBurner Embedded Software License provided below.

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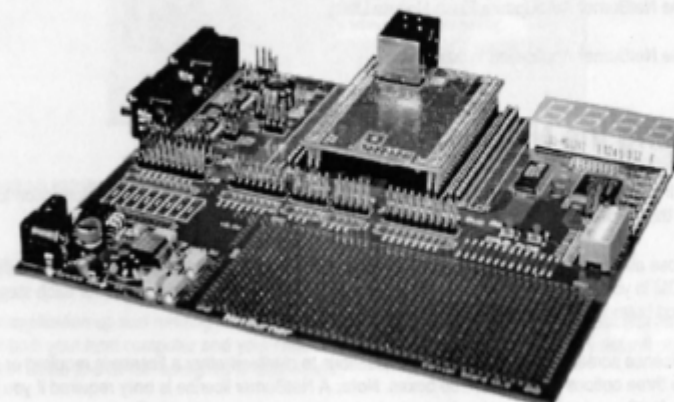
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## NNDK Introduction

The NetBurner Network Development Kit (NNDK) is the fastest way to develop your network product. This kit includes everything you need to create network applications, and all the hardware and software components are integrated in a complete and easy to use package. For specific hardware information, please read the hardware documentation help file. From Windows: **Start → Programs → Netburner NNDK → Platform Hardware.**

## Kit Contents

- NetBurner Carrier board and Module. (Firmly press the Module into the two 50 pin bus connectors on the Carrier board.) The RJ-45 connector on the module is on the outside edge of the Carrier board. **Note:** The promo Carrier board for the Mod5270 is different from the one shown below.



- NetBurner Tools CD-ROM
- Standard Serial Cable
- Standard Ethernet Cable (blue)
- Cross-Wired Ethernet Cable (red)
- 12 Volt DC Power Supply (USA and Canada only)
- Jumpers
- Quick Start Guide

## Kit Software

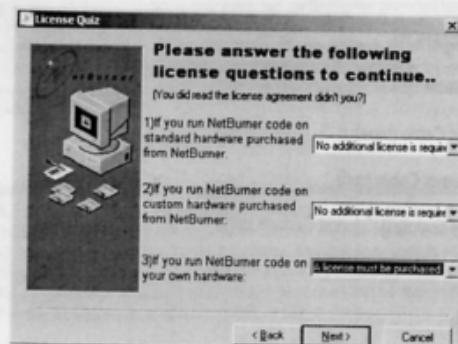
The NetBurner Network Development Kit CD-ROM contains many software libraries and utilities, including:

- The NetBurner TCP/IP Stack
- The NetBurner Web Server
- The NetBurner Real-time Operating System based on uC/OS
- The GNU C/C++ Compiler and Linker
- The GDB Debugger with GUI Interface
- The NetBurner Dev C++ IDE
- The NetBurner IPSetup Configuration Utility
- The NetBurner AutoUpdate Flash Update Utility
- The NetBurner Application Wizard

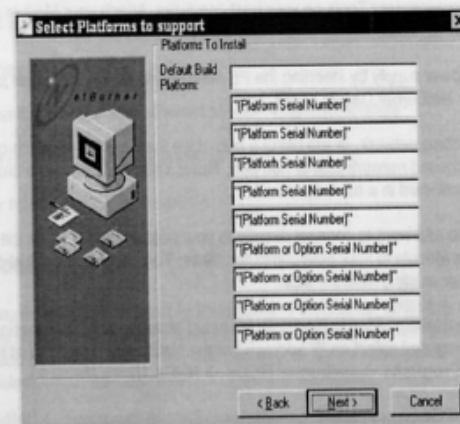
## Installing the NetBurner Software

**Note:** If you are running **Cygwin** on your host computer, please read the Cygwin information located at the end of this guide **BEFORE** installing the NetBurner Software tools.

- Close **all** Windows programs before running the NetBurner setup program. Put the NetBurner CD ROM in your host computer's CD ROM drive. Follow the on screen directions for each step, clicking the **Next** button when finished.
- A license screen will appear with three questions to clarify whether a license is required or not. Select the three options from the combo boxes. **Note:** A NetBurner license is **only** required if you intend to run NetBurner software on hardware that was **not** manufactured by NetBurner.



- For the "Select Platforms to support" screen, click on the first text field, and type the Serial Number (located on your NNDK CD case) of your NNDK correctly in the text box, and click the **Next** button when finished. (**Note:** For multiple platforms (i.e. more than one NetBurner NNDK), click on the text line **below** your first entry, type the other Serial Number(s), and click the **Next** button when finished.)



- Continue to follow the installation instructions.

## Obtaining an IP Address

To get your application up and running as quickly as possible (using your NNDK), you **must** first have an IP Address for both your host computer **and** your NetBurner Module. The NetBurner factory default program supports both Static and DHCP assigned IP addresses.

### Static IP Address

If you are part of an existing network and want to use a static IP address, you must get the address from your network administrator. If you are connecting your NetBurner Module to a single computer, or are on an isolated network, you should select one of the reserved addresses described in the Cook Book section ("How do I select an IP address") of the NetBurner User Manual. From Windows: **Start** → **Programs** → **NetBurner NNDK** → **NNDK Users Manual**.

### Dynamic IP Address (DHCP)

When the factory program boots, it will first attempt to obtain an address from a DHCP server. If you are connected to a network with a DHCP server, the IP address, subnet mask, and gateway should be configured automatically.

## Run the NetBurner Factory Program (Hardware Setup)

1. Get a Static IP address, or use DHCP. (**Note:** The factory default is DHCP.)
2. Install the NetBurner Development Tools on your host computer. Attach your Module to the Carrier board (if you have not already done so) now.
3. Connect the 12 VDC power supply by inserting the P5 male connector on the power supply cord into the P5 female connector on your NetBurner Carrier board.
4. If you are part of an existing network, or are using a hub - Use the **blue** RJ-45 patch cord to connect your NetBurner Module to an unused network jack or hub port. **Note:** You **cannot** use the blue patch cable to connect directly to a network card in a computer.
5. If you do **not** have a hub and want to connect directly to your host computer - Use the **red** RJ-45 patch cable to connect your NetBurner Module to your host computer. **Note:** You **cannot** use the red patch cable to connect to a network hub or existing network jack.
6. **U.S. and Canadian Customers:** Plug in the (120VAC input) power supply. **International Customers:** See the Cook Book section ("How do I select an IP address") of the NetBurner User Manual for more information. (From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual.**)
7. Execute the NetBurner IPSetup program. From Windows: **Start → Programs → Netburner NNDK → IPSetup tool.** If you used the default installation settings, this program will be in the C:\nburn\pctools\ipsetup directory. From the command line type the command: **C:\Nburn\pcbin\ipsetup** and press the **Enter** key.
8. The IPSetup program will automatically locate all NetBurner devices on your network. If more than one device appears - select your device by matching the MAC address displayed in IPSetup with the MAC address label on your NetBurner Module.
9. If you are using a static IP address - Enter your IP Address and Mask in the corresponding IPSetup text boxes (e.g. If you are on an isolated network, the IP Address could be 10.1.1.11, and the Mask could be 255.255.255.0). When you are finished, click the **Set** button to send the modifications into your NetBurner Module.
10. If you are using DHCP - Verify (via the IPSetup program) that your IP address and mask have been set.
11. Your NetBurner Module is now configured! Just click the **Launch Webpage** button to view the sample applications. (**Note:** You may have to click the **Search Again** button if your NetBurner device is **not** displayed in the "Select a Unit" pane.) Please refer to the "Cook Book" section of your User Manual for more detailed information. From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual.**

## The NetBurner AutoUpdate Utility

The NetBurner AutoUpdate utility is the fastest way to download code into your NetBurner Module. AutoUpdate can be run as a stand-alone windows utility to update your code in the field, or it can be invoked when you build your project by using the "make load" command instead of the "make" command. For more information on AutoUpdate, see the NetBurner Tools section in your User Manual. From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual.**

## Using the "make load" command

Using the "make load" command will perform all the following functions in just seconds!

- Compile and link your application code
- Compile and link any code in your html folder (**only** if you are using the web server)
- Compress the code image
- Download the code image over ethernet to your NetBurner Module
- Program the code image into Flash memory
- Reboot your NetBurner Carrier board

## Using AutoUpdate

AutoUpdate can be run from Windows: **Start → Programs → Netburner NNDK → Auto Update Tool** or from a command prompt by typing the command: **C:\Nburn\pcbin\AutoUpdate** and pressing the **Enter** key. If run without options, a dialog box will appear. If run with options, no user intervention is required. There are various options that can be selected, but the complete functionality is as follows:

- Download the code image over ethernet to your NetBurner Module
- Program the code image into Flash memory
- Reboot your NetBurner Carrier board

## How to Make and Download Files

This section describes how to compile and download application files, whether they are your own custom applications, or one of the many example programs located in the \nburn\examples directory of your installation. Learning by example is one of the fastest methods to learn how to create network applications. There are four ways to download applications into your NetBurner Module:

1. The RS-232 serial port - the default is serial port 0 (**J7** on your **Carrier board** or **J4** on your **promo board**). **This method is used when all else fails.** For example, when you download code that does not run, or the current application does not support network downloads. **Note:** For an application to support **network** downloads, it **must** call the function **EnableAutoupdate()** ;
2. TFTP
3. AutoUpdate, either by using the "make load" command, or by running AutoUpdate.
4. FTP

The following procedure is used to build and download applications to your NetBurner Module using the "make load" command at the command line. **Note:** You **must** have completed the device configuration and be able to communicate over the network before starting this section.

1. Create a project directory on your hard drive using the NBAppWizard application (**Start → Programs → Netburner NNDK → NBAppWizard**).

2. Open a command prompt window and navigate to your project directory, or if you are compiling one of the example programs, navigate to that particular example directory (e.g. `Nburn\examples\tictactoe`).

3. If you did **not** select the automatic environment variable setup option during the install, type the command `C:\Nburn\setenv.bat` and press the **Enter** key. To determine if you did select the automatic setup, type the command `set` and press the **Enter** key. If you see the environment variable `DEFPLATFORM=<Your NB Module>`, then you **did** select the automatic setup, and you **do not** need to run `setenv.bat`.

4. Type the command `make load` and press the **Enter** key. This command compiles your application and downloads it to your Module over your network connection. **Note:** If the current application in your Module does **not** support network downloads, you **must** use a serial download method (e.g. MTTY).

**Important:** The first time AutoUpdate is run a **timeout error** will occur because a target Module has **not** been selected. When the dialog box appears, click on the **Find** button and **select** your NetBurner Module, then click on the **Update** button to continue with the download.

5. Once the download is complete, your NetBurner Carrier board will automatically reboot (if "Reboot when complete" was checked), and your new application will be running!

For more information on "make", "make load", and the NBAppWizard application, please refer to your User Manual. (From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual**.)

## Serial RS-232 Downloads

NetBurner provides a simple high performance serial communications program called MTTY. The following examples will assume you are using this program. There is nothing extraordinary about MTTY, and you are free to use whatever serial communication program you desire. For more information on MTTY, see the NetBurner Tools section of your User Manual. (From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual**.) The following sections assume that you have correctly set up your NetBurner Module, and will be using the MTTY program.

- Attach the supplied standard Serial cable from the DB9 connector (i.e. **J7**) on your NetBurner Carrier board (**J4** on the promo board) to your host Computer's DB9 (Serial) connector
- Start the MTTY program (**Start → Programs → Netburner NNDK → MTTY Serial Terminal**). Select the comm port you connected the cable to on your host Computer (usually **COM1**), set the Baud to **115200**, the Parity to **None**, the Data Bits to **8**, the Stop Bits to **1**, and click the **Connect** button when you are finished.
- Reset your NetBurner Carrier board by pressing the blue reset button. You will see the message "Waiting 5 sec to start 'A' to abort" in the MTTY window.
- Before the 5 seconds expires, press the **A** key (i.e. an uppercase A), and the Boot Monitor Prompt (i.e. `nb>`) should appear in the MTTY window.

The next step depends on whether you choose to download to SDRAM or Flash. **Note:** Programs downloaded to SDRAM will be lost when the power to your NetBurner Carrier board is turned off. Programs downloaded to Flash memory will overwrite any existing program.

## Download to SDRAM

At the `nb>` prompt, type the command `DL` (DL stands for download) and press the **Enter** key. Send the `PROJECTNAME.s19` (e.g. `tictactoe.s19`) file to your NetBurner Module. This can be done in MTTY by selecting the **Transfer → Send** option from the File menu, or by pressing the **F5** key on your keyboard. All `.s19` files are stored in the `\Nburn\bin` directory.

As the download progresses, "\*\*\*\*" characters will appear in the MTTY window, and the progress bar in the lower left hand side of the window will move towards the right. When the download is complete, type the command `GO`, press the **Enter** key, and your application will start.

## Download To Flash

At the `nb>` prompt, type the command `FLA` (FLA stands for Flash Application) and press the **Enter** key. Send the `PROJECTNAME_APP.s19` (e.g. `tictactoe_APP.s19`) file to your NetBurner Module. This can be done in MTTY by selecting the **Transfer → Send** option from the File menu, or by pressing the **F5** key on your keyboard. All `_APP.s19` files are stored in the `\Nburn\bin` directory. As the download progresses, "\*\*\*\*" characters will appear in the MTTY window, and the progress bar in the lower left hand side of the window will move towards the right. The Boot Monitor will automatically reprogram the application area of the flash and reset your NetBurner Carrier board.

**Note:** If your program does **not** automatically restart, automatic loading may be turned off. In this case, you can start your application by typing the command `BOOT`, and pressing the **Enter** key. For more information on MTTY and/or downloading files, please refer to your User Manual. (From Windows: **Start → Programs → Netburner NNDK → NNDK Users Manual**.)

## Additional Services

The NetBurner design team has extensive experience in developing network products, and offers a full line of services from hourly consulting to complete turnkey systems. NetBurner also provides SSL and SNMP libraries for an additional charge. **Please contact [Sales@NetBurner.com](mailto:Sales@NetBurner.com) for more information.** Our services include:

- Hardware Design
- Firmware Design
- Software Applications in C, C++ and JAVA
- Schematic Capture
- PCB Layout
- Turnkey add-on boards to your specifications
- Consulting on product design definition
- Rapid Prototyping
- Low and High Volume Production



## Technical Support

Your NetBurner Network Development Kit purchase includes 90 days of free email support and software updates. **In order to submit technical support requests, you will first need to register your NetBurner Network Development Kit at: <http://Support.NetBurner.com>.** Registration is quick and easy. The registration data stored on NetBurner's server will not be sold, exchanged or knowingly released to third parties without prior written permission from the individuals affected.

To receive Technical Support you will need to include the software release number of your NNDK, the hardware Ethernet address and the hardware revision number of your NetBurner board. The NetBurner web site (<http://www.NetBurner.com>) is a good source for answers to frequently asked questions and design examples.

The NetBurner Annual Support/Maintenance Agreement is the best way for you to stay current with the rapidly changing technologies that impact your products. All annual maintenance plan subscribers receive upgrades and enhancements free of charge as soon as they are released (via E-Mail notification). This means that you will be able to uniformly manage upgrades across your organization, avoiding piecemeal implementation and technology inconsistency.

The NetBurner Annual Support/Maintenance Agreement provides "technology insurance," ensuring your employees have the latest technology to maximize their productivity. Yet, it lets you manage your upgrade strategy and technology versions inexpensively, easily, and with low administrative overhead. The NetBurner Annual Support/Maintenance Agreement helps ensure the maximum return on your hardware and software investment. **Please contact [Sales@NetBurner.com](mailto:Sales@NetBurner.com) for more information about purchasing an Annual Support/Maintenance Agreement.**

## Software Licensing

The Software included in the NetBurner development kit is licensed to run only on NetBurner provided hardware. **If your application involves manufacturing your own hardware, please contact [Sales@NetBurner.com](mailto:Sales@NetBurner.com) for details on a royalty-free software license.**

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## Using the NetBurner Tools in a Cygwin Environment

If you want to keep your existing Cygwin installation and run the NetBurner tools, it is possible, but not easy. **The following procedure is only recommended for those familiar with working in the Cygwin command line environment.**

NetBurner is offering this document for assistance only; as we do not offer support for a preexisting Cygwin environment.

**WARNING:** It is possible that you will end up with neither Cygwin nor the NetBurner tools working.

1. Before you install the NetBurner tools, capture the output of the Cygwin mount command. Save these settings and print them out. Your screen output should look something like:

```
c:\cygwin\tmp on /tmp type system (textmode)
c:\cygwin\bin on /usr/bin type system (binmode)
c:\cygwin\lib on /usr/lib type system (binmode)
c:\cygwin\ on / type system (binmode)
c: on /cygdrive/c type user (binmode,noumount)
d: on /cygdrive/d type user (binmode,noumount)
e: on /cygdrive/e type user (binmode,noumount)
```

2. Install the software on the NetBurner CD on your host computer. (Your Cygwin install is now broken.)

3. Make sure that the cygwin1.dll file in your Cygwin installation is as **new or newer** than the cygwin1.dll in Nburn\pcbin.

4. Under whatever directory mapped to / in your original Cygwin installation, copy the Nburn\gcc-m68k and Nburn\pcbin directories.

5. Restore the original Cygwin / and /tmp mount points.

• From the DOS command line:

```
mount -f -s c:\cygwin\ /
mount -f -s c:\cygwin\ /tmp
```

• From the Cygwin bash shell:

```
mount -f -s c:\\cygwin\\
mount -f -s c:\\cygwin\\ /tmp
```

6. Look in the NetBurner setenv.bat file (located in the /Nburn directory) and make sure the added paths and environment variables are added to your Cygwin environment.