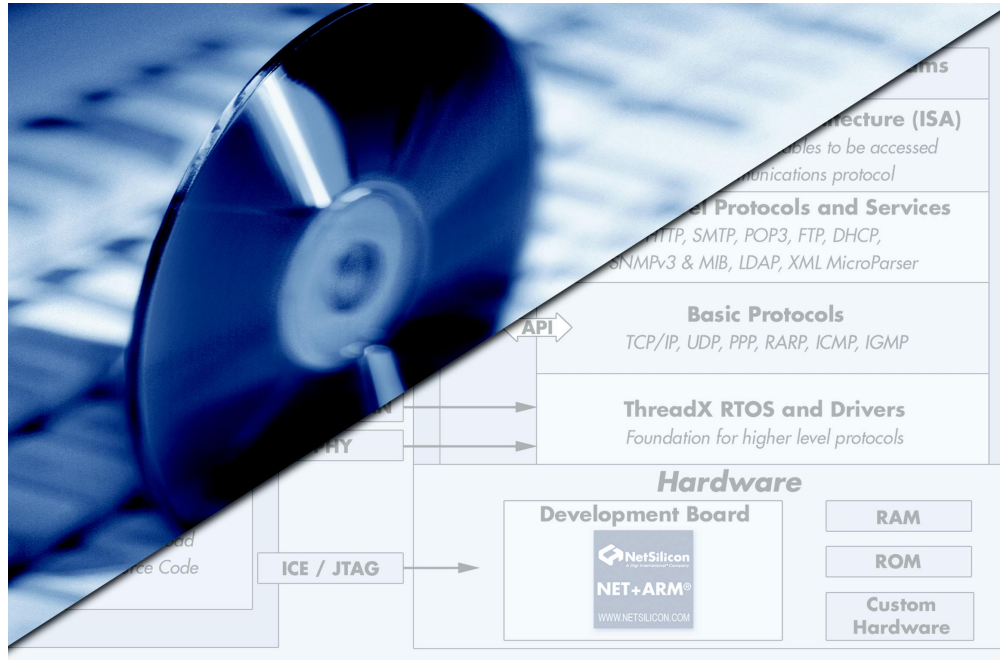
NetSilicon
A Digi International® Company

NET+OS with Green Hills Getting Started Guide



NET+OS 5.0
8833236G

NET+OS with Green Hills

Operating system/version: NET+OS 5.0
Part number/version: 8833236G
Release date: July 2002
www.netsilicon.com

Contents

Using This Guide

Review this section for basic information about this guide, as well as for general support contact information.

About this guide

This guide describes how to install and configure NET+OS 5.0 with Green Hills MULTI 2000. Part of the NET+Works integrated product family, NET+OS is a network software suite optimized for the NET+ARM chip.

The information in this guide is for sites that are installing NET+OS with Green Hills for the first time and sites that are upgrading from a previous version.

Who should read this guide

This guide is for system managers, software engineers, or others who install and use NET+OS.

To complete the tasks described in this guide, you must:

- Be familiar with installing and configuring software.
- Have sufficient user privileges to do these tasks.
- Be familiar with network software and development board systems.

What's in this guide

This table shows where you can find information this guide:

To read about	See
What to do before you install the software	Chapter 1, "Preparing to Install NET+OS with Green Hills"
How to install the software at a new installation	Chapter 2, "Installing NET+OS and Green Hills MULTI 2000"
How to upgrade an existing version of NET+OS	Chapter 3, "Upgrading NET+OS"
How to get the development board ready	Chapter 4, "Preparing the Development Board"
How to build and debug an application using either the Raven or the JEENI debug tool	Chapter 5, "Building and Debugging a Sample Application"

Conventions used in this guide

This table describes the typographic conventions used in this guide:

This convention	Is used for
italic type	Emphasis, new terms, variables, and document titles.
bold, sans serif type	Menu commands, dialog box components, and other items that appear on-screen.
Select **menu → option**	Menu commands. The first word is the menu name; the words that follow are menu selections.
`monospaced type`	Filenames, pathnames, and code examples.

Related documentation

- *NET+OS User's Guide* describes how to use NET+OS to develop programs for your application and hardware.
- *NET+OS BSP Porting Guide* describes how to port the board support package (BSP) to a new hardware application, with either Green Hills Software or GNU Tools.
- *NET+OS Application Software Reference Guide* describes the NET+OS software application programming interfaces (APIs).
- *NET+OS BSP Software Reference Guide* describes the board support package APIs.
- *NET+OS Kernel User's Guide* describes the real-time NET+OS kernel services.
- For information on third-party products and other components, review the documentation CD-ROM that came with your development kit.
- For information on the chip you are using, see the hardware documentation.

Customer support

To get help with a question or technical problem with this product, or to make comments and recommendations about our products or documentation, use the contact information listed in this table:

For	Contact information
Technical suppor	Telephone: 1 800 243-2333/ 1 781 647-1234 Fax: 1 781 893-1388 Email: tech_support@netsilicon.com
Documentation	techpubs@netsilicon.com
NetSilicon home page	www.netsilicon.com
Online problem reporting	www.netsilicon.com/EmbWeb/Support/forms/bugreport.asp An engineer will analyze the information you provide and call you about the problem.

Preparing to Install NET+OS with Green Hills

CHAPTER 1

Read this chapter for information that will help you prepare to install NET+OS with Green Hills. This information applies to both first-time installations and upgrades from previous NET+OS versions.

Overview of the installation

Installing NET+OS with Green Hills is a two-part procedure in which you'll install these software components:

1 **Green Hills MULTI 2000**

2 **NET+OS**

After you install the software and receive your permanent license agreement from Green Hills, you set up where to install the Green Hills licenses, and then you install the licenses.

The Green Hills software and NET+OS are provided on one CD.

System requirements

This section describes the hardware and software requirements for NET+OS with Green Hills.

Hardware

To install and run NET+OS with Green Hills, you need a Windows system that meets these hardware requirements:

Hardware component	Requirement
CPU	At least a 133 MHz Pentium processor
RAM	32 Mbytes
Disk space	■ 130 Mbytes free disk space for NET+OS with Green Hills 2.1 ■ 330 Mbytes free disk space for NET+OS with Green Hills 3.5 ■ 5 Mbytes additional disk space per extra compiler of the same CPU family ■ 50 Mbytes additional disk space for each new CPU family

Hardware component	Requirement
Devices	■ 1024 x 768, 256-color display ■ Mouse ■ CD-ROM drive

Software

You need this software on your system:

Software component	Requirement
Operating system	Microsoft Windows 98, NT 4.0, 2000, or XP. Be aware that Green Hills is not supported by Windows XP because at the time of this release, Green Hills Software does not support it.
Web browser	Internet Explorer v3.0.1. or higher. This application is required for viewing online help. If you try to run the online help without Internet Explorer, the Green Hills software crashes.
Documentation reader	Adobe Acrobat Reader. The reader opens during the installation so you can print and read the Green Hills license request. If you don't have Adobe Acrobat, you can install it from your NET+OS installation CD.
Terminal emulator	Windows HyperTerminal

Installing NET+OS and Green Hills MULTI 2000

CHAPTER 2

This chapter describes how to install NET+OS with Green Hills MULTI 2000. Use these instructions if you are installing NET+OS for the first time.

About the installation

Installation order is important

NET+OS needs to overwrite a portion of the Cygwin software with variants that are specific to NET+OS. To allow NET+OS to overwrite these files, you *must* install the software in this order:

1. Green Hills
2. NET+OS

Getting a Green Hills software license

During the Green Hills part of the installation, you request a software license key from Green Hills. NetSilicon recommends that you request the temporary (evaluation) 30-day license during the installation procedure and the permanent license later.

Raven support for in-circuit emulators (ICEs)

The MULTI 2000 temporary (evaluation) software license supports both the Raven and the JEENI. The MULTI 2000 permanent software license supports only the Raven.

If, however, you used the JEENI with the temporary license, you can continue to use it with the permanent license. To do so, when you request the permanent license, you must specify that the software will be used with the JEENI.

If you plan to use an ICE other than the Raven or the JEENI with the permanent license, contact Green Hills Software for information about licensing other debuggers.

Installation defaults

The installation instructions use these defaults:

- **CD drive.** `D:\`
- **Source drive and directory specification.** `C:\netos5_GH35`

If your CD drive is named something other than D:\, or if you want to install in a different directory, replace the defaults with your information.

Installing the Green Hills MULTI 2000 software

▶ **To install the Green Hills software:**

1 Place the NET+Works CD in your CD drive.

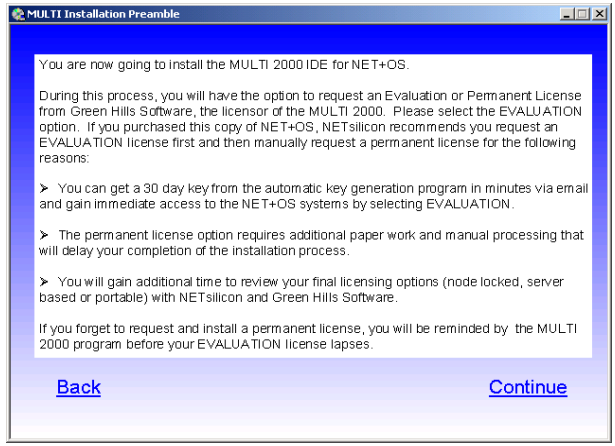
The NET+Works installation program starts automatically.

If the installation doesn't start automatically, select **Start** → **Run**, type `d:\autorun.exe`, and click **OK**.

You see the NET+OS Complete Development Environment dialog box:

2 Click **Option 1: Install MULTI 2000 IDE for NET+OS (30 Day License).**

You see the MULTI Installation Preamble dialog box:



3 Review the information and click **Continue.**

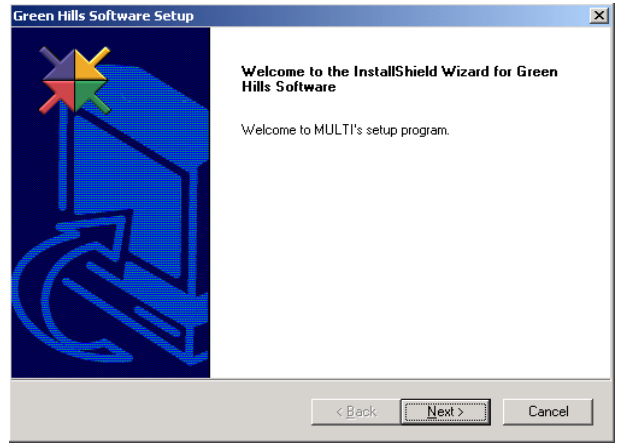
You see the Green Hills Software Main menu:

4 Click **Install.**

Two installation options **— Tools** and **Acrobat Reader —** appear on the Main menu:

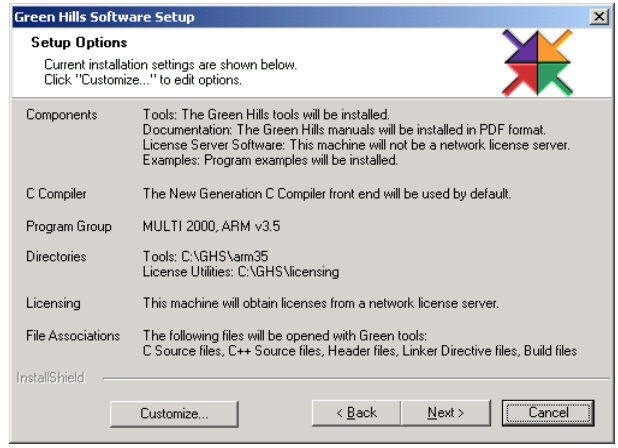
5 Click **Tools.**

You see the InstallShield Wizard welcome page:



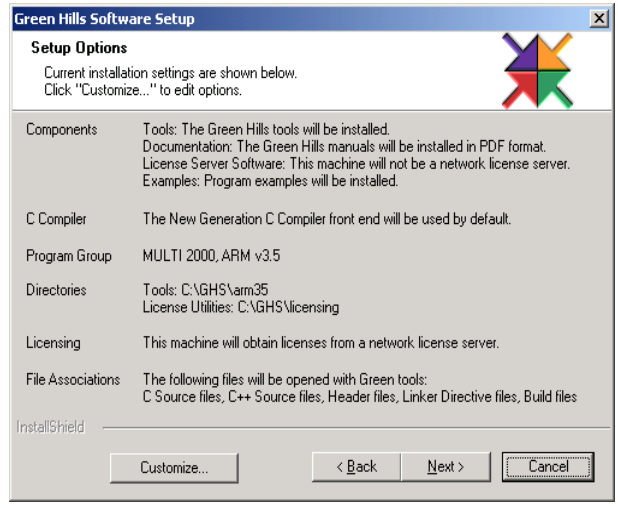
6 Click **Next.**

You see the Setup Options page, which shows a summary of what will be installed:



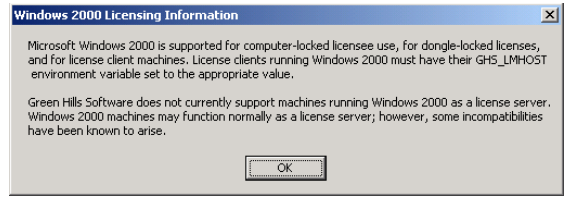
7 Click **Next.**

The installation begins. When the installation is complete, you see the Setup Options dialog box:



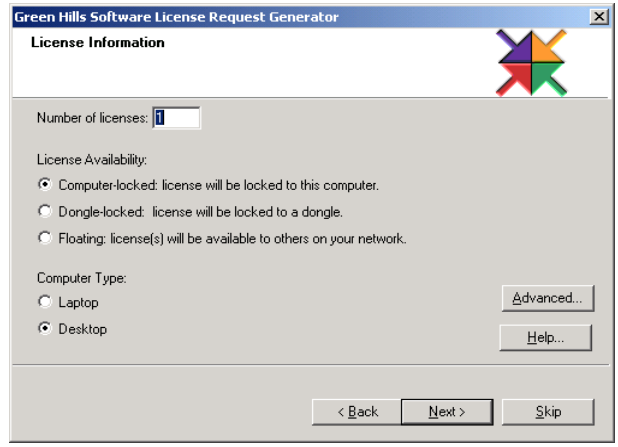
8 Click **Next.**

You see the Windows 2000 Licensing Information dialog box:



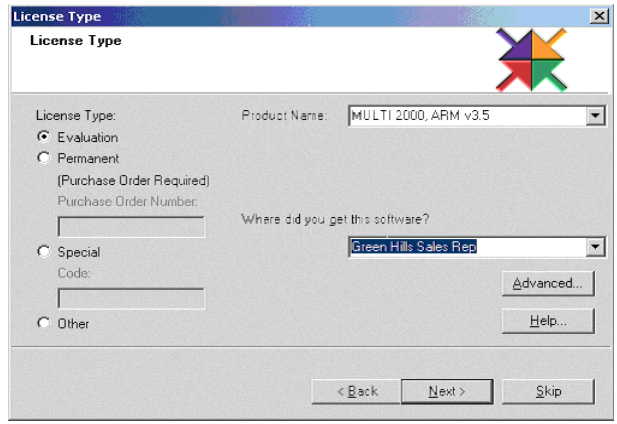
9 Review the information and click **OK.**

You see the License Information dialog box:



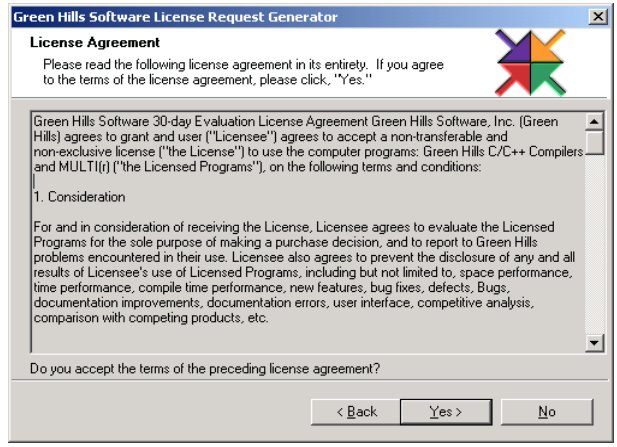
10 Type the number of licenses you need. Then specify the license availability and the type of computer you are using, and click **Next.**

The License Type dialog box appears:



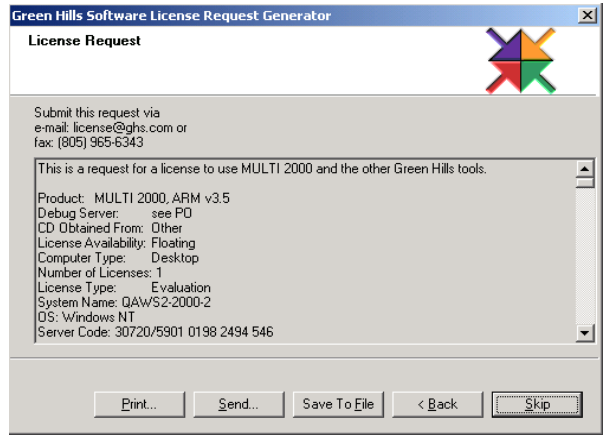
11 Select **Evaluation** for the license type, and **Other** for **Where did you get this software?**, and then click **Next.**

You see the License Agreement page:



12 Review the license agreement and click **Yes.**

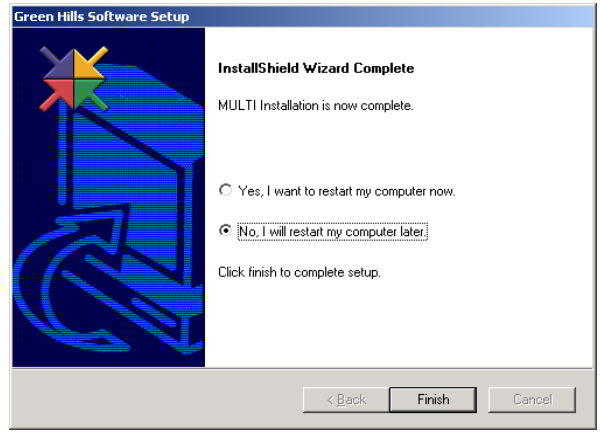
You see the License Request page:



13 Send in your temporary (evaluation) license request:

If you have	Click
E-mail on your system	**Send.** When your mail application opens, create a new message and send it to license@ghs.
Access to e-mail on another system	**Save to file.** Save the file to a diskette, take the diskette to a system that has e-mail, and send it to license@ghs.
No e-mail access	**Print.** Then fax the printed form to 1 805 965 6343.

You see the Green Hills Software Setup dialog box:



14 Click **Yes, I want to restart,** and then click **Finish.**

You see the ReadMe file.

15 Review the ReadMe file.

The system reboots.

Installing the NET+OS software

Use this procedure *only* after you complete the MULTI 2000 installation. You must install the MULTI 2000 software first so NET+OS can overwrite some Green Hills files with variants that are specific to NET+OS.

▶ **To install the NET+OS software:**

1 If you removed the NET+OS CD from your CD drive, place it in the CD drive.

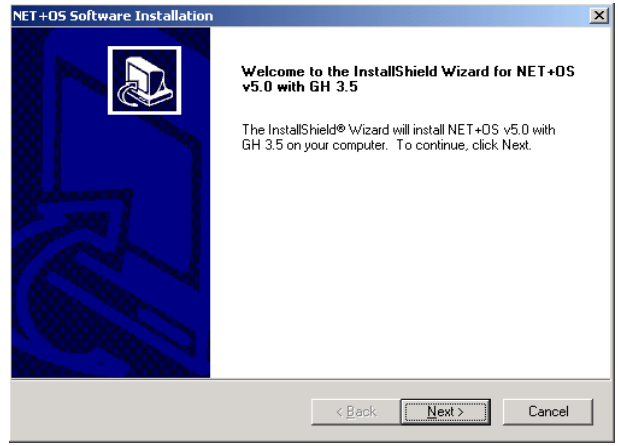
The NET+Works install program starts automatically.

If the install program does *not* start, select **Start** → **Run,** type `d:\autorun.exe`, and click **OK.**

You see the NET+OS Complete Development Environment dialog box:

2 Click **Option 2: Install NET+Works Development Tools for NET+OS.**

You see the NET+OS Software Installation page:

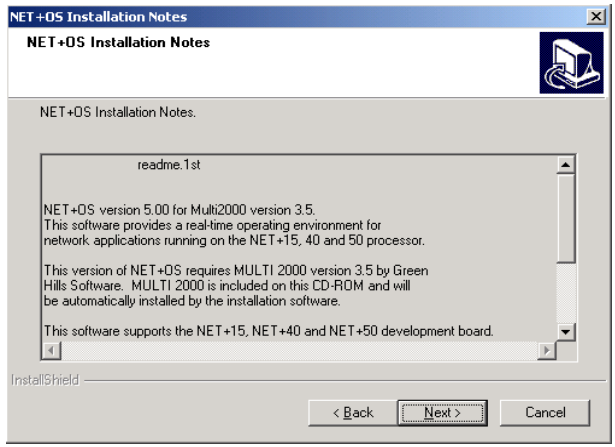


3 Click **Next.**

The NET+OS License Agreement page displays the terms of the NET+OS software agreement.

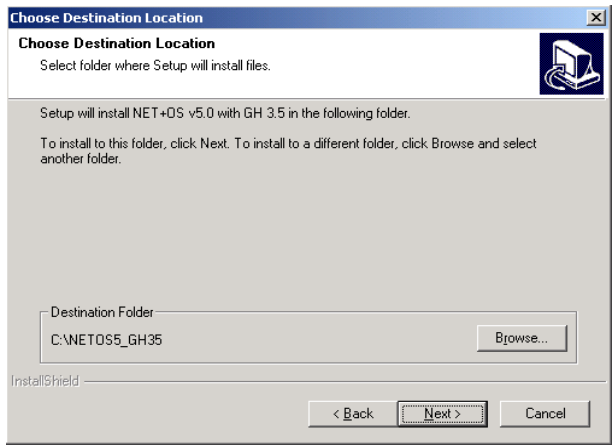
4 To accept the terms of the agreement and continue the installation, click **Next.**

You see the NET+OS Installation Notes dialog box:



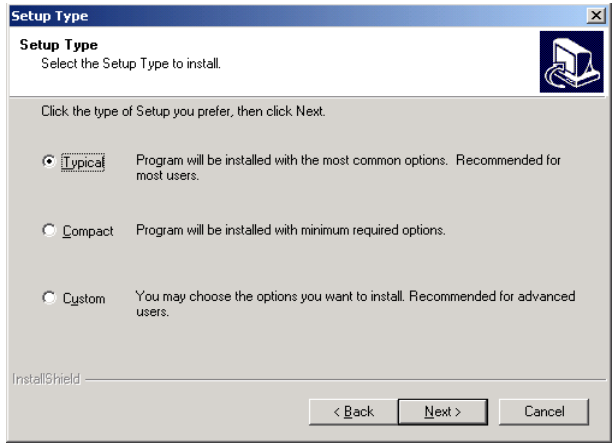
5 Review the installation notes, and click **Next.**

You see the Choose Destination Location dialog box.



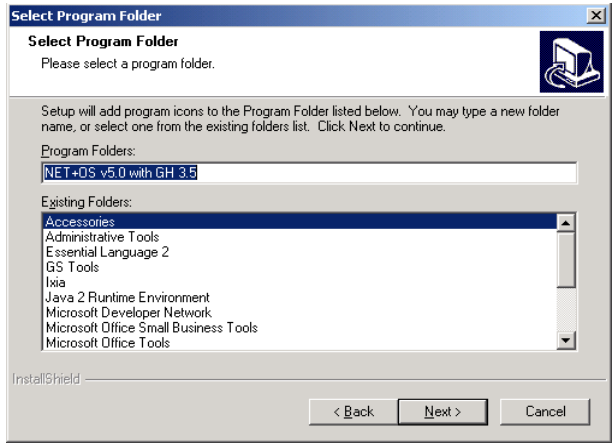
6 Specify where to install the software, and then click **Next.**

You see the Setup Type dialog box:



7 Click **Typical,** and then click **Next.**

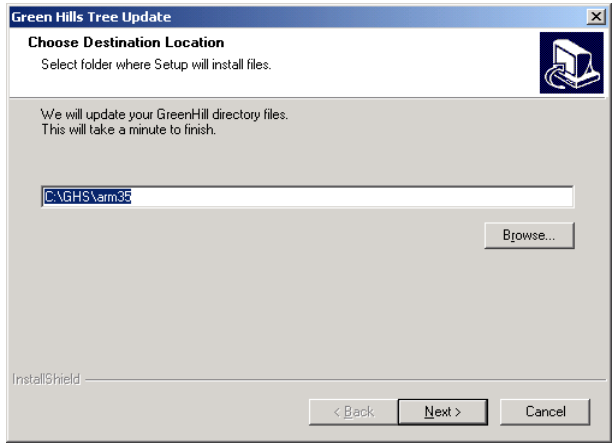
You see the Select Program Folder dialog box:



8 Select the folder for the program icon and click **Next.**

The installation begins.

You see the Green Hills Tree Update dialog box:

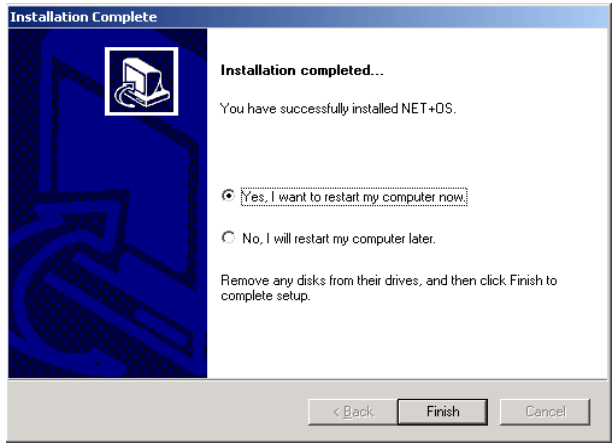


9 Navigate to and select the folder in which you installed the Green Hills software so NET+OS can overwrite some Green Hills files, and then click **Next.**

You see the ReadMe file for NET+OS.

10 Review the ReadMe file, and then close the file.

You see the Installation Complete dialog box:



11 Click **Yes, I want to restart my computer now,** and then click **Finish.**

Requesting and installing a Green Hills permanent license

After you install the Green Hills software with the temporary (evaluation) license, you need to request a permanent license within 30 days.

Receiving the license keyfile

To get your permanent license, contact Green Hills. When you receive the license keyfile, copy it to your desktop so you'll be able to find it easily for the installation.

Then use the procedure you used for requesting the temporary (evaluation) license during the Green Hills installation. This time, however, when you see the License Type dialog box, click **Permanent.**

Installing the license keyfile

You need to create two folders for the contents of the license keyfile. Then you can do the installation.

▶ **To install the license keyfile:**

1 From the Start menu, select **Programs→ Multi 2000, ARM v3.5 → Licensing → Set License Directories.**

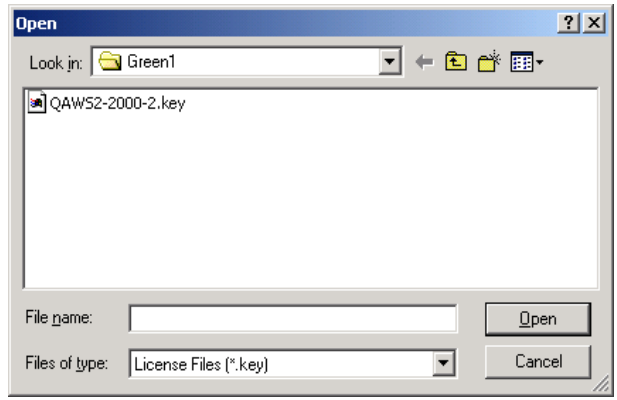
You see the Set Key Directories dialog box:

2 Type this information, and then click **OK:**

- **Computer-/Dongle-locked Key Directory.** A directory name in the form installation drive / folder / folder; for example, `c:\ghs\node`.
- **Floating Key Directory.** A directory name in the form installation drive / folder / folder; for example, `c:\ghs\node`.

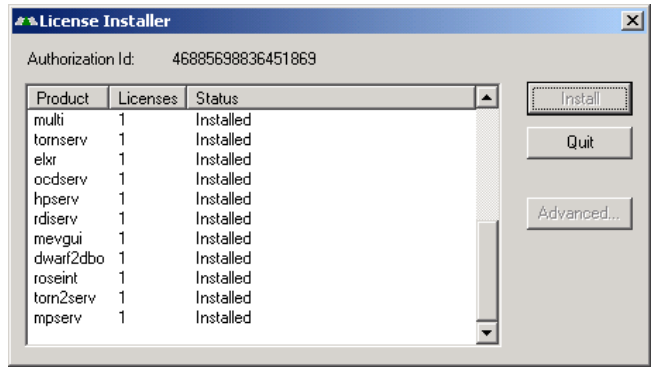
3 Select **Programs→ Multi 2000, ARM v3.5 → Licensing →Install.**

The Open dialog box appears:



4 Navigate to and select the license keyfile, which has a **.key** suffix, and click **Open.**

The License Installer dialog box appears with a list of the files in the license keyfile:



5 Click **Install.**

The listed items are installed.

6 Click the **Advanced** tab.

You see the Advanced Options dialog box, which displays the license directories so you can verify them:

7 Click **OK**.

You return to the NET+OS Complete Development Environment dialog box.

8 Click **Quit**.

Upgrading NET+OS

CHAPTER 3

This chapter describes how to upgrade from an existing version of NET+OS without upgrading the Green Hills software. In addition, this chapter describes post-installation tasks for upgrading your applications.

Before you begin the upgrade procedure

What to install

Because you are not upgrading to Green Hills v3.5, you will install *only* the NET+OS software. You do not need to install the Green Hills software.

If you decide to upgrade your Green Hills software, contact Green Hills, install the Green Hills update, and then call NetSilicon customer support for help with the post-installation setup.

Backing up your current NET+OS software

You can install in either the default location, `C:\netos5_GH35`, or in another location. Because the default installation does not overwrite your previous NET+OS software, you can have both the new software and a previous NET+OS version on your system at the same time.

If you want to install the software in the same location as the previous version and keep the previous version, NetSilicon strongly recommends that you either back up or copy and move your existing version directory to a safe location.

Do *not* rename the `netos_Gh35` directory; doing so can create problems with the registry information.

Keeping your customizing

When you upgrade NET+OS, you may lose the customizing you did with the previous version.

To read about how to find your customized files, identify the differences between your files and the original files, and use the customized files, see "Using customized files from a previous NET+OS version" at the end of this chapter.

Installation defaults

The installation instructions use these defaults:

- **CD drive.** `D:\`
- **Source drive and directory specification.** `C:\netos5_GH35`

If your CD drive is named something other than D:\, or if you want to install in a different directory, replace the defaults with your information.

Upgrading the NET+OS software

This section describes how to upgrade NET+OS on a system that's running an earlier version of NET+OS software.

▶ **To upgrade the NET+OS software:**

1 If you removed the installation CD from your CD drive, place it in the CD drive now.

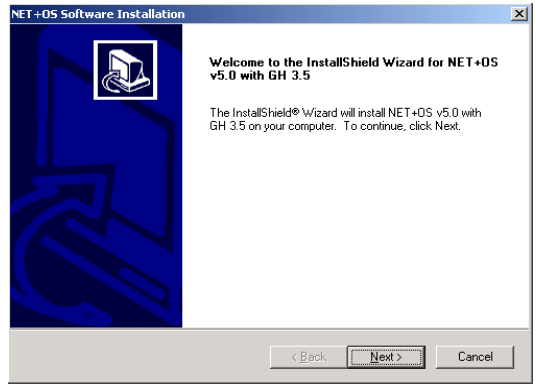
The install program starts automatically.

If the install program does *not* start, from the Start menu, select **Run**, type `d:\autorun.exe`, and click **OK**.

You see the NET+OS Complete Development Environment dialog box:

2 Click **Option 2: Install NET+Works Development Tools for NET+OS.**

You see the NET+OS Software Installation page:

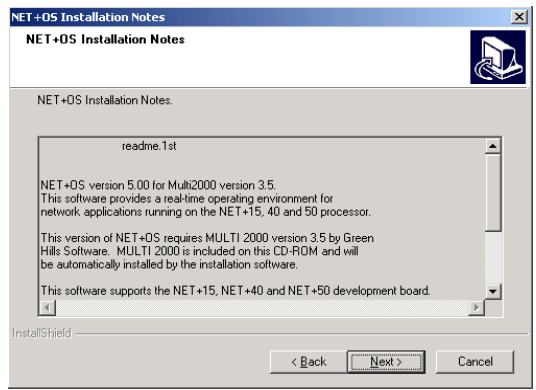


3 Click **Next.**

The NET+OS License Agreement page displays the terms of the NET+OS software agreement.

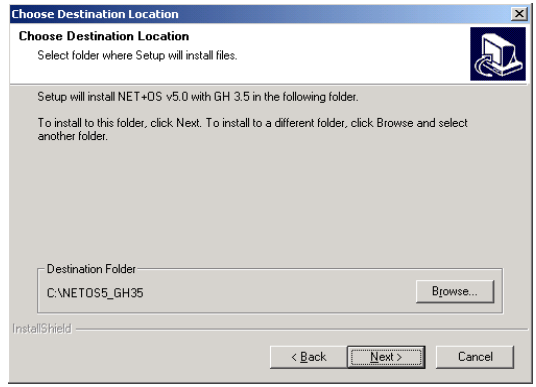
4 To accept the terms of the agreement and continue the installation, click **Yes.**

You see the NET+OS Installation Notes dialog box:



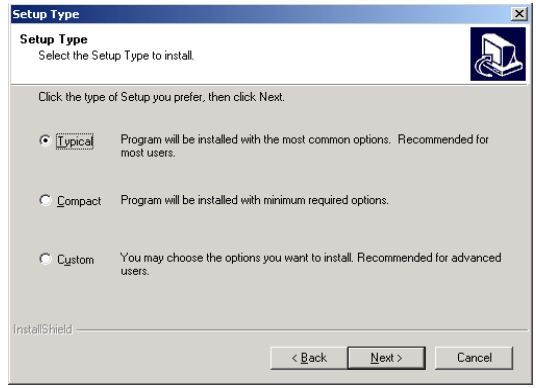
5 Review the installation notes, and then click **Next.**

The Choose Destination dialog box appears:



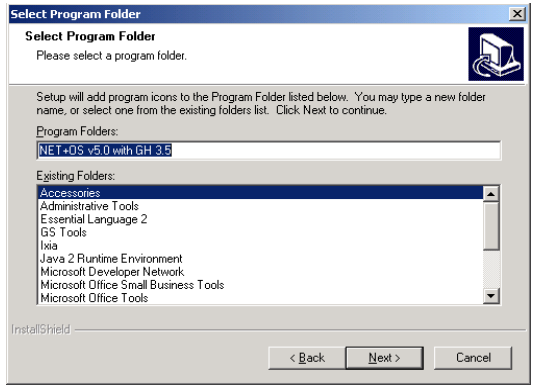
6 Specify where to install the software, and then click **Next.**

You see the Setup Type dialog box:



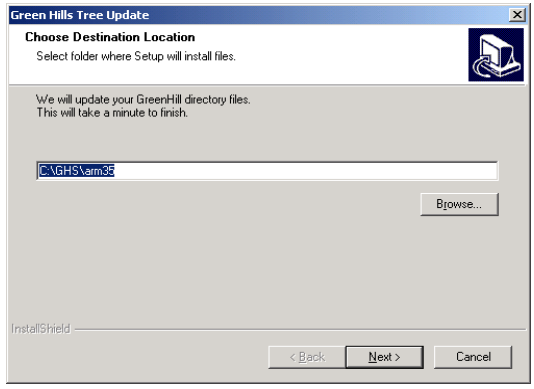
7 Click **Typical,** and then click **Next.**

The Select Program Folder dialog box appears:



8 Select the folder for the program icon.

The installation begins, and then you see the Green Hills Tree Update dialog box:

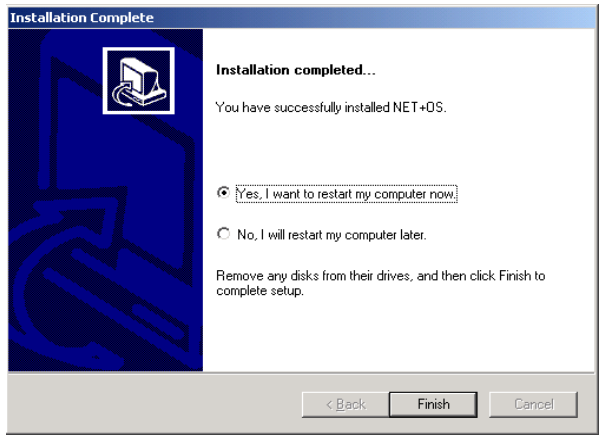


9 Navigate to and select the folder in which your Green Hills software is installed so NET+OS can overwrite some Green Hills files, and then click **Next.**

The ReadMe file appears.

10 Review the ReadMe file, and then select **File** → **Exit** to close the file and continue with the installation.

You see the Installation Complete dialog box:



11 To reboot the computer, click **Yes I want to restart my computer now,** and then click **Finish.**

Downloading rom.bin

Before you upgrade any applications, use the `naftpapp` example application to download the `rom.bin` image file from the naftprom example directory to your existing NET+OS development board. This file provides a stable platform for debugging NET+OS applications.

Upgrading applications

This section describes how to upgrade your applications from NET+OS 3.0, 3.0A, and 4.0.

Upgrading from NET+OS 3.0 or 3.0A

After you upgrade the NET+OS software, you'll upgrade your applications by directing them to new locations and by adding, removing, or changing files and functions. You may find it helpful to see the examples on the installation CD.

Make the changes in the order in which they are presented in the next sections.

Do *not* use an earlier version of the PBuilder utility (pbuilder.exe).

Adding files and functions

Add these changes:

- In *all* NET+OS 3.0 or 3.0A applications, add `#define APP_FILE_SYSTEM_SIZE 9` to `/src/examples/nasnmpd/appconf.h`.
- When you add the `APP_FILE_SYSTEM_SIZE 9` function, you may want to include these comments in your code:

```
/*
*APP_FILE_SYSTEM_SIZE determines the number of files the
*Advanced Web Server (AWS) will allocate for the file system.
*The default value is 9, *the number of connections allocated
*to AWS. Increasing *APP_FILE_SYSTEM_SIZE reduces the
*available memory.
/*
#define APP_FILE_SYSTEM_SIZE
```

To get the nasnmpd example running, use these steps:

1. Add `manMib.lib` to `/src/examples/nasnmpd/project.bld`
2. Add these lines of code before calling `snmpd_load` to `/src/examples/nasnmpd/root.c`:

```
#include <sysAccess.h>

NAsetSysAccess (NASYSACC_ADD, "private", "private",
NASYSACC_LEVEL_SNMP_RW, NULL);

NAsetSysAccess (NASYSACC_ADD, "public", "public",
NASYSACC_LEVEL_SNMP_R, NULL);
```

- If the application uses `True` or `False`, and they are not defined, add:
  `#include <npttypes.h>`
- In `root.c`, add:
  `#include <sysAccess.h> in root.c`

Copying applications

Copy the applications you want to upgrade from the 3.0 or 3.0A directory to the corresponding NET+OS 5.0 directory. The applications must be in the NET+OS 5.0 directory for the upgrade procedure to work.

Directing applications to new locations

During the NET+OS installation, some files and folders were moved, and you need to direct the applications to the new locations.

Here is a summary of the changes you need to be aware of:

- All library locations have been changed from `\lib` to `\lib\32b`.
- The library `init.a` has been deleted, and its functionality is now included in `bsp.a`.
- The original HTTP server was removed from the `na2.lib` and is now located in `httpd.a`. If an application uses the HTTP server library, you must include `httpd.a` in the build.
- If an application uses the e-mail API, the application requires either of the HTTP libraries to link (`httpd.a` or `rphttpd.a`). In addition, you must include any required external function of the library in the build.

Removing files and functions

Edit the software to remove these changes:

- All instances of `tcpport.h`
- All instances of `sockcall.h`
- All instances of `nptypes.h`

- Any function calls to `static int validate_user`
- Any function calls to `RSRegisterValidation` and `dtrap`.

  Be aware that you *must* remove `dtrap` from any previous applications that used it; otherwise, your applications will not compile.

Changing files and functions

Make these changes:

- Change all instances of `RpExtern.h` to `AsExtern.h`.
- If the application uses `t_errno` in its code, change it to `getErrno`.
- If you use the `UserExit (ExternalCgi)` feature of the Advanced Web Server (AWS), you need to modify the cgi.c file.

  Change the prototype of the function `int RpUserExitInit` to

```
int RpUserExitInit(void *the TaskDataPtr){
   return 0;
}
```

- Change the validate callback function call `NAgetSysAccess` to `NAsetSysAccess`.
- Replace `PPPAddUser` with `NAsetSysAccess`.
- Verify that if the application has socket API calls, it has "`#include <sockapi.h>`."

Setting up to use security

If you plan to use the security feature of AWS, you need to:

- Set up user/password in `root.c` by calling `SAsetSysAccess`. Include the header file `<sysAccess.h>`.
- Set up realm information by calling `HAHttpSetRealmSecurity` in the function `RpHInitSecurityTable` in `security.c`.

  Include the header file `http_security.h`:

```
/* Add Username netsilicon/sysadm to the system Access Database
*/

NAsetSysAccess (NASYSACC_ADD, "netsilicon", "sysadm",
NASYSACC_LEVEL_RW, NULL);
```

```
/* Add Username system/sysadm to the system Access Database
*/
NAsetSysAccess (NASYSACC_ADD, “system”, “sysadm”,
NASYSACC_LEVEL_RW, NULL);
```

Be aware that the function `RpHSSetRealm` is now obsolete.

Rebuilding libraries

Rebuild the `na1` and `bsp` libraries (a clean build) and verify that all components are present and working.

Upgrading from NET+OS 4.0

After you upgrade your NET+OS software, make these changes in your applications:

- In *all* NET+OS 4.0 applications, add #define `APP_FILE_SYSTEM_SIZE 9` to `/src/examples/nasnmpd/appconf.h`.

  When you add the `APP_FILE_SYSTEM_SIZE 9` function, you may want to include these comments in your code:

  ```
  /*
  *APP_FILE_SYSTEM_SIZE determines the number of files the
  *Advanced Web Server (AWS)
  *allocates for the file system. The default value is 9, the
  *number of connections AWS is allocated. Increasing
  APP_FILE_SYSTEM_SIZE reduces the available memory.
  /*
  #define APP_FILE_SYSTEM_SIZE
  ```

- To get the `nasnmpd` example running, use these steps:

  1. Add `manMib.lib` to `/src/examples/nasnmpd/project.bld`
  2. Add these lines of code before calling `snmpd_load` to `/src/examples/nasnmpd/root.c`:

  ```
  #include <sysAccess.h>
  NAsetSysAccess (NASYSACC_ADD, "private", "private",
                  NASYSACC_LEVEL_SNMP_RW, NULL);
  NAsetSysAccess (NASYSACC_ADD, "public", "public",
                  NASYSACC_LEVEL_SNMP_R, NULL);
  ```

Using customized files from a previous NET+OS version

When you upgrade to NET+OS 5.0, any customizing you have done to the original BSP, headers, and applications may be lost because the new installation may overwrite the earlier one.

Although there is no automated tool or procedure for capturing your custom updates and incorporating them into NET+OS 5.0, you can do so manually by:

- Locating the files you customized in the previous NET+OS release
- Finding the differences between your customized files and NET+OS 5.0 files
- Incorporating the customized files into the NET+OS 5.0 software

Locating your customized files

NetSilicon recommends that you encapsulate all customizing to NetSilicon files with a compiler directive, and define the compiler directive in all build files. This approach lets you quickly locate all customizing within the release and have a reference to the original code.

Here is an example:

```
#ifdef _COMPANY_XYZ_CUSTOMIZATION
    /* custom code here */
    Company XYZ customization code.
#else
    /* NetSilicon bsp */
    This is the original BSP code
#endif
```

Determining the differences

After you locate the customized files, you need to find the differences between your customized 3.0/3.0A/4.0 files and the original files by generating file differences.

Incorporating the customized files

NetSilicon recommends a gradual porting method, in which you change one group of functions at a time, and then test — rather than change everything in one big update. This approach will help you debug any small problem that may have been introduced during the porting process.

Preparing the Development Board

CHAPTER 4

This chapter describes how to set up and configure the NET+Works development board.

Overview

The NET+Works Board Support Package (BSP) lets you debug applications using an in-circuit emulator (ICE). You can use either the Raven or the JEENI.

The ICE supports both software and hardware breakpoints and watchpoints. You can use the ICE to debug both ROM and RAM applications in any of the ARM's processor modes.

Before you use the debugger, you need to configure the development board. This chapter describes the hardware connections and software settings you make to get the board ready for debugging.

Before you set up the development board

This section describes what to do before you connect the development board, the debugger, and your Windows system.

Gathering information

Gather this network information and write it down here:

- IP address or DHCP server IP address: _____
- Subnet mask: _____
- Default gateway: _____

Purchasing and assigning Ethernet addresses

Purchase a block of Ethernet addresses from the IEEE. NetSilicon provides an Ethernet address with each development board, but you need a unique address for your own boards.

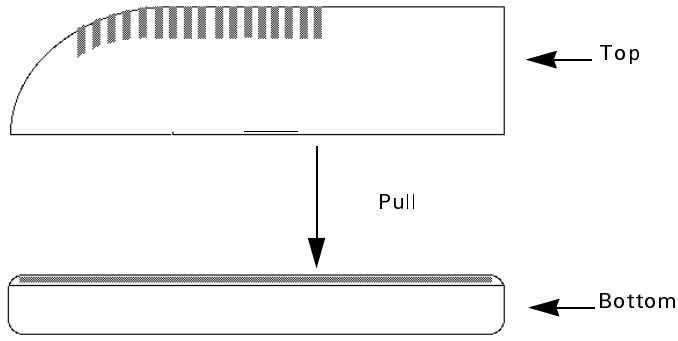
After you purchase a block of addresses, assign a unique address to each development board. These addresses are stored in NVRAM or in flash ROM.

Opening the development board case

You connect the development board and the ICE through a Joint Test Action Group (JTAG) interface. This section describes how to open the board development case to gain access to the JTAG connector, ENI connectors, and jumpers and switches.

▶ **To open the development board case:**

1. Hold the short side of the unit against your side.
2. Grasp the side farthest from you.
3. As you press the bottom half of the unit inward toward you, keep the top stationary, and pull the two halves apart as shown here:



Connecting the hardware

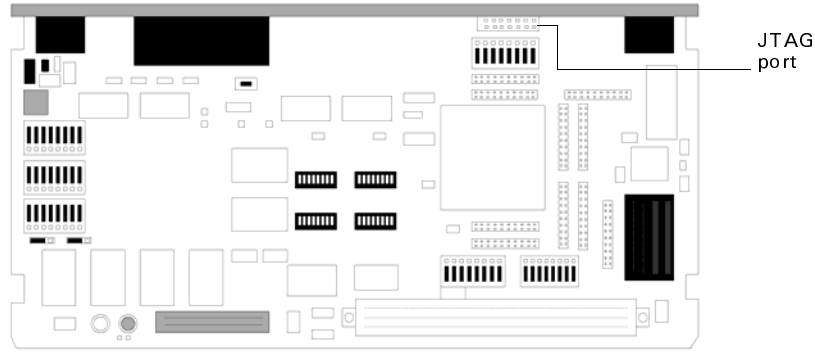
This section describes how to connect the development board, your system, and either the Raven or the JEENI.

Connecting the Raven

▶ **To connect the Raven, the development board, and your system:**

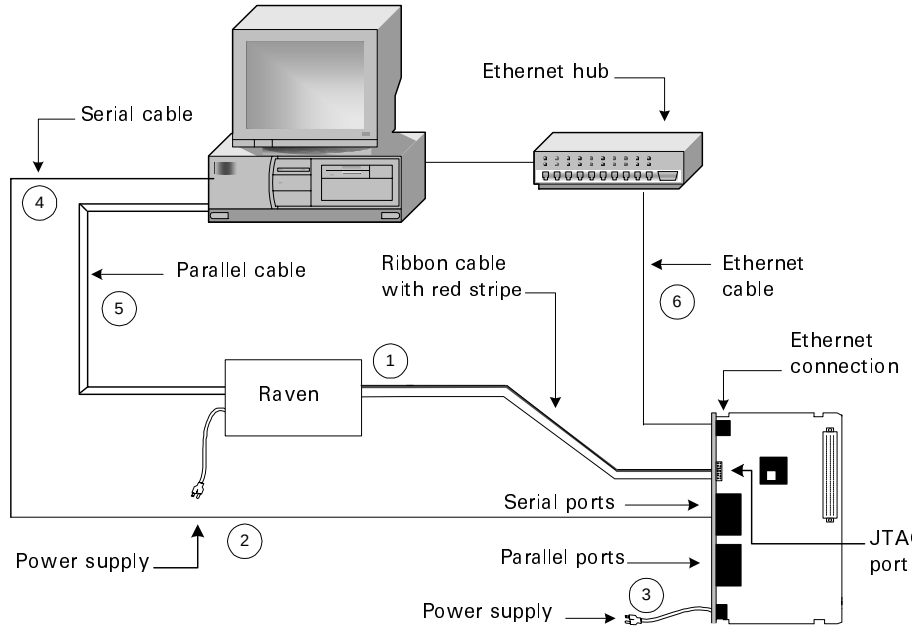
1. Connect the ribbon cable of the Raven to the JTAG port (P2) of the development board so that:
   - The red strip of the cable faces the side with the Ethernet connection.
   - The ribbon cable connection is flush with the back plate of the development board.

   The JTAG connection is next to the serial ports, as shown here:



2. Power up the Raven.
3. Power up the development board.
4. Using the cross-cable (also called a *null modem*) serial cable from the kit, connect serial port 1 on the development board to one of the serial ports on your system (for example, COM1 or COM2).
5. Using the parallel cable, connect the parallel port of the Raven to the parallel port on your system.
6. Connect the development board to the Ethernet hub.

This illustration shows the connections between your Windows system, the Raven, and the development board, and the order of the steps for connecting them:



Checking your system's parallel port setting

If you have difficulty connecting the Raven to a laptop computer, check the setting of the parallel port on the laptop BIOS. If the parallel port is set to bidirectional, change it to either **ECP** or **EPP.**

On Dell desktop systems, set the parallel port to **None.**

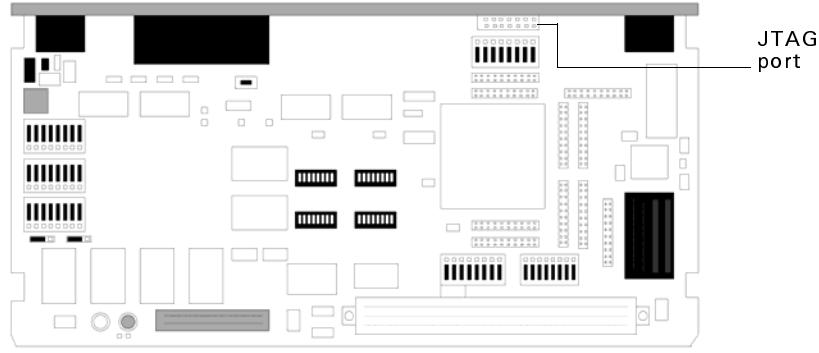
Connecting the JEENI

At the end of this procedure, you will connect the JEENI to the Ethernet. NetSilicon recommends that you review the JEENI documentation and use the instructions for connecting to the Ethernet.

▶ **To connect the JEENI, the development board, and your system:**

1. Power up the JEENI.
2. Connect the JEENI and your system with the cross-cable (also called a *null modem*) serial cable that shipped with the JEENI.
3. Configure the JEENI's IP address, following the instructions in the JEENI documentation.
4. Remove the cross-cable (null modem) serial cable that connects the JEENI and your system.
5. Connect the JEENI to the Ethernet.
6. Connect the ribbon cable of the JEENI to the JTAG port (P2) of the development board so that:
   - The red strip of the cable faces the side with the Ethernet connection.
   - The ribbon cable connection is flush with the back plate of the development board.

   The JTAG connection is next to the serial ports, as shown here:



7. Using the cross-cable (also called a *null modem*) serial cable from the kit, connect serial port 1 on the development board to one of the serial ports on your system (for example, COM1 or COM2).
8. Power up the board.
9. Connect the board to the Ethernet hub.

Before you configure the development board

▶ **Verify or make these software settings before you configure the development board:**

1 Start a HyperTerminal session.

2 Make sure you have these settings, and then click **OK**:

Parameter	Setting
Communications port	Either `COM1` or `COM2`. This should be the same port you used when you connected the development board and your system.
Bits per second	`9600`
Data bits	`8`
Parity	`None`
Stop bits	`1`
Flow control	`None`

3 Click **OK**.

4 Press SW5 (the small black reset button on the development board, next to U755).

You see the updated board settings within approximately 30 seconds.

Configuring the development board

NetSilicon recommends that you display the HyperTerminal window throughout your testing so you can monitor the status of the development board at all times.

To see an example terminal emulator for HyperTerminal, from the Start menu, select **Programs** → **NET+OS** → **Com_1**.

▶ To configure the development board:

1. From the Start menu, select **Programs → NET+OS5 with Green Hills COM1.**
2. Power up the development board.

   The board goes through startup diagnostics, and the green LED on the board blinks and then stays on.

   Within approximately 15 seconds, you see a configuration box in the HyperTerminal window:

```
NET+WORKS Version 5.00
Copyright (c) 2002, NetSilicon, Inc.
-----------------------------------------------------
NETWORK INTERFACE PARAMETERS:
   IP address on LAN is 132.74.179.148
   LAN interface's subnet mask is 255.255.255.0
   IP address of default gateway to other networks is
132.74.179.587
HARDWARE PARAMETERS:
   Serial channels will use a baud rate of 9600
   This board's serial number is 99994336
   This board's MAC Address is 0:40:af:79:61:0
   After board is reset, start-up code will wait 5 seconds
-----------------------------------------------------
Press any key in 5 seconds to change these settings.
```

3. To make changes, press any key within five seconds.
4. To modify the configuration settings, type **M** and press **Enter**.
5. When you are prompted, type this information for the development board:
   - IP address
   - Subnet mask
   - Gateway address
6. To accept the default values for the remaining information, press **Enter** at the rest of the prompts.

   Your changes are saved in non-volatile RAM, and the information is updated to reflect your changes.

Building and Debugging a Sample Application

CHAPTER 5

This chapter tells how to build and debug a sample application, using either the Raven debug tool or the JEENI.

Overview

You can build and debug a sample application using either of these in-circuit emulators (ICEs):

- Raven debug tool (the default)
- JEENI

Building an application

This section describes how to build a sample application using either the Raven debug tool or the JEENI.

You will build these files:

- `debug.x` (debug version)
- `rom.bin` (ROM version)
- `romzip.bin` (compressed ROM version)

Before you build

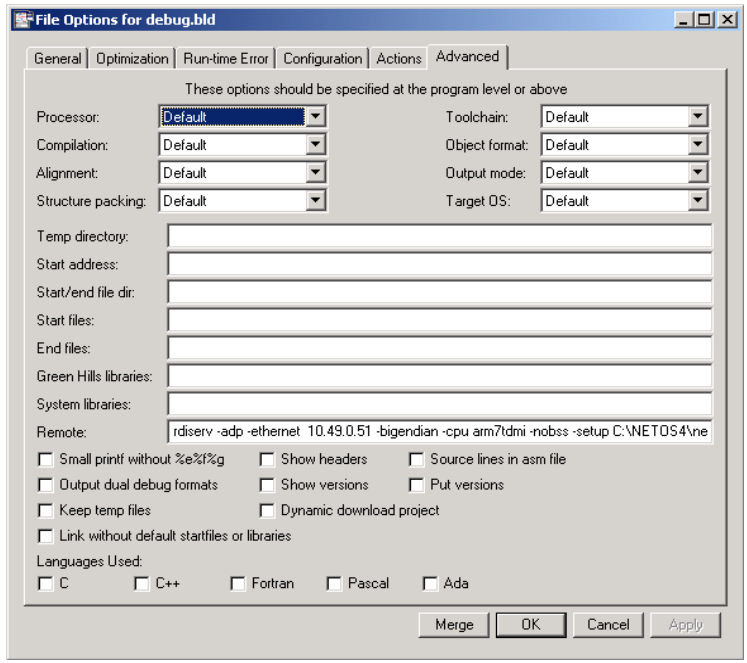
The development board has two types of memory — DRAM and EDO RAM — and each has a setup file for its memory configuration. Before you build an application, determine the type of memory you have so you can type the correct setup filename during the build procedure.

▶ **To build a sample application using either the Raven or the JEENI:**

1. To start the Green Hills software, select **Start** → **Programs** → **NET+OS5** → **MULTI 2000.**
2. From the MULTI toolbar, select **File** → **Open Project in Builder.**

   You see the Open dialog box, which prompts you to load a project.
3. Open `C:\Netos5_GH3.5\src\examples\nahttp\32b\debug.bld`.
4. Choose **Project Options for debug.bld,** and from the File Options for debug.build dialog box, click **Advanced.**

You see this window:



5 In the Remote field, type the command line for your ICE, click **Apply**, and then click **OK**:

– **If you are using the Raven:**

```
ocdserv rlpt1 arm7t -big -nobss - setupC:\netos5_GH3.5\net4032b.ocd
```

– **If you are using JEENI:**

```
rdiserv -adp -ethernet a.b.c.d -bigendian -cpu arm7tdmi -nobss -
setup c:\netos5_GH3.5\net4032b.dbs
```

where *a.b.c.d* is the IP address you assigned to the JEENI.

6 Close the Advanced Options dialog box, save the project by selecting **File** → **Save debug.bld**, and exit from the application.

When you save and close the project, you may see the message:

```
Project C\netos5_GH3.5\src\examples\nahttp\32b\debug.bld could
not be saved, because it could not be checked out
```

If this message appears, go to the MULTI toolbar, select **Config** → **Options** → **Options** → **Version Control,** deselect **Use version control,** and click **OK** to close the dialog box.

7 Reopen `C:\netos5_GH3.5\src\examples\nahttp\32b\debug.bld`.

8 Select **Build → Cleanup Intermediate Files.**

You see the Builder for debug.bld dialog box.

After Cleanup completes, close the **Build Cleanup** window.

9 Select **Build → Re-Build All.**

When you see the message `Build completed`, close the window.

10 To power cycle the port, press the reset button on the development board (SW5).

The process takes approximately 30 seconds.

11 Go on to the next section.

Debugging an application

NetSilicon recommends that you keep a HyperTerminal window open at all times as you debug an application.

This section describes how to debug an application using either the Raven debug tool or the JEENI.

▶ **To debug an application:**

1 Start a HyperTerminal session.

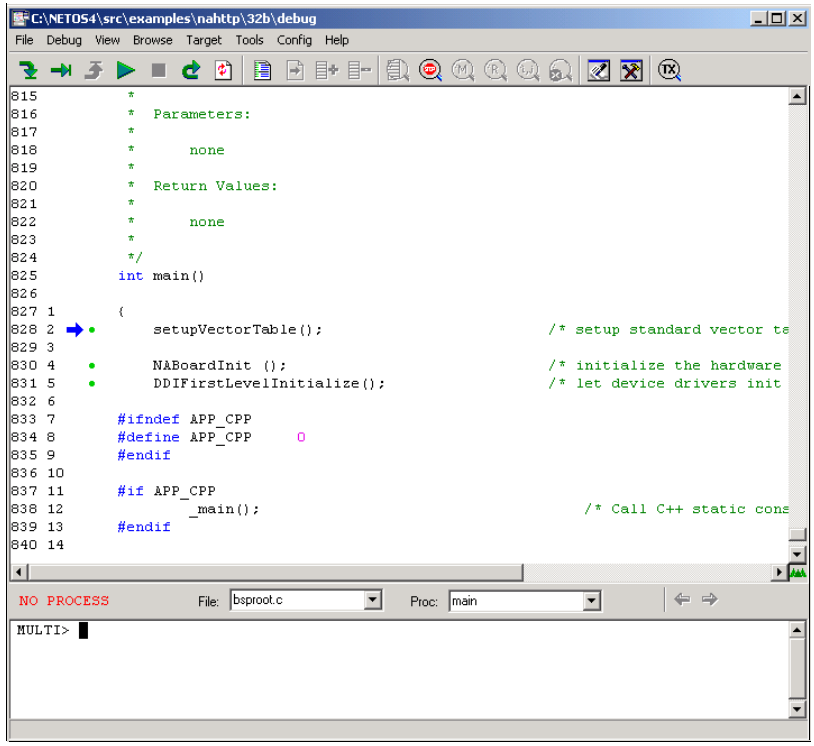
2 Select **Remote → Connect to Target.**

You see the Remote Command dialog box.

3 From the list, select the entry for your ICE, then click **OK.**

4 To start the debugger, select **Debug → Debug debug.**

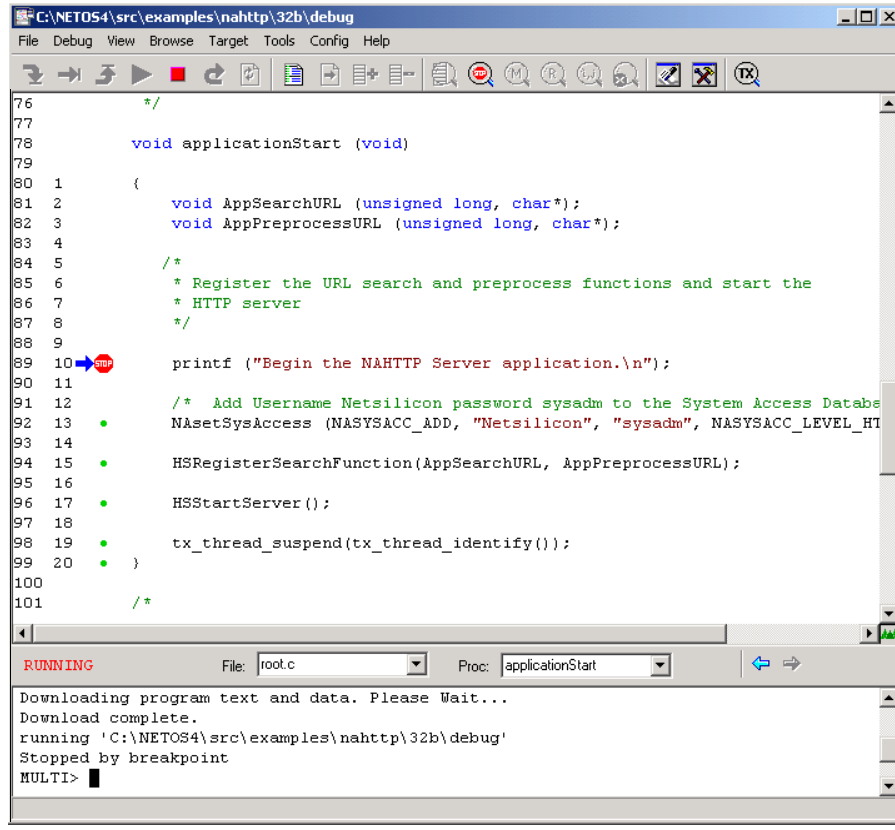
You see this window, which displays the default breakpoints:



5 Click the Go icon (F5).

The program begins downloading the file to the board and then stops at this line:

```
printf (“Begin the NAHTTPServer application.\n”)
```

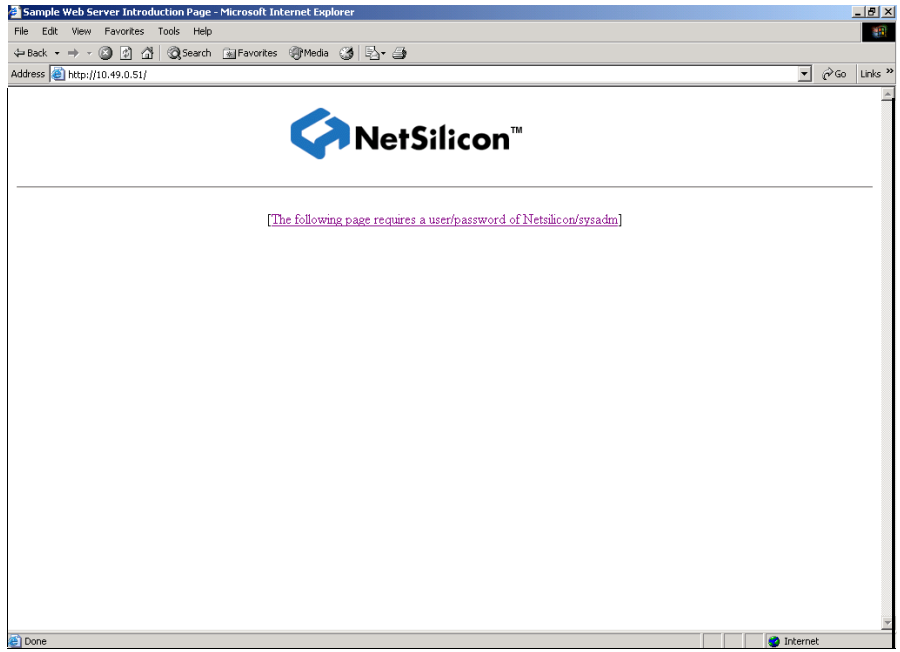


6 Click the Go icon again.

7 Open a Web browser.

8 In the **Address** field, type the IP address for the development board.

You see the NetSilicon Web page in the Web browser, which indicates that the application build was successful:



9 To see some sample features, click the link.

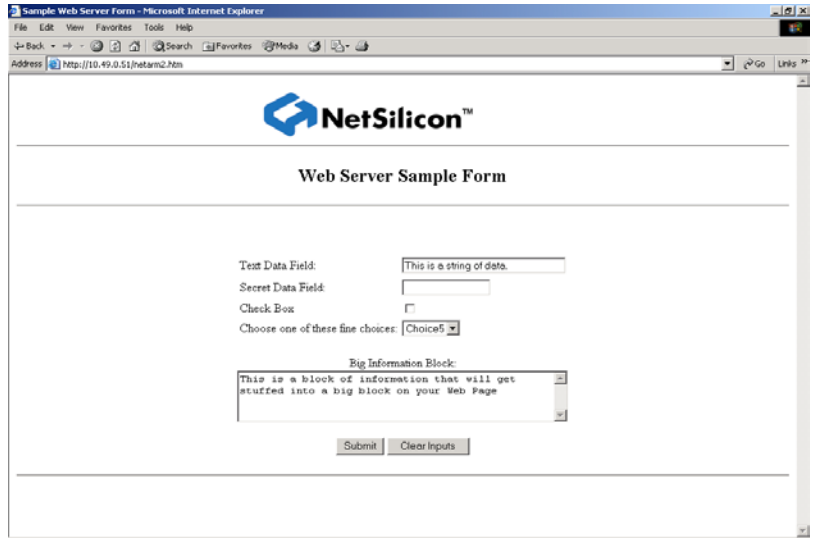
You see the Enter Network Password dialog box.

10 Log in, using this username and password, and then click **OK**:

– **Username.** `Netsilicon`

– **Password.** `sysadm`

You see this page:



11 From here, you can select the samples you want to see.

If you need to re-serialize the development board or restore the contents of the flash ROM, see the *NET+OS User's Guide*.

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