NET+OS with Green Hills Getting Started Guide

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About this guide

This guide describes NET+OS with Green Hills and how to use it as part of the development cycle. Part of the NET+OS integrated product family, NET+OS is a network software suite optimized for the NET+ARM.

Who should read this guide

This guide is for software engineers and others who 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.

Conventions used in this guide

This guide uses several typographic conventions:

Convention	Used for
italic type	Emphasis, new terms, variables, and document titles.
bold type	Menu commands, dialog components, items on the screen; filenames, pathnames, and commands. In most cases, software release information is not included with the filenames and pathnames; for example, **C:\netos** instead of **C:\netos72**.
menu name > **option**	Menu commands. The first word is the menu name; the words that follow are menu selections.
`monospaced type`	Code and command examples.

Software release level assumed in this guide

Instructions in this guide assume that NET+OS is installed in the default installation directory, **C:\netos**. The software release level is displayed in the numbers that follow **netos**, for example, **C:\netos72**.

Related documentation

NET+OS online help describes the application programmer interfaces (APIs) that are provided with NET+OS. The online help is located in **C:\netos\docs**.

For information about third-party products and other components, review the documentation CD-ROM in the development kit.

For information about the processor, see the NET+OS hardware documentation.

Documentation updates

Digi occasionally provides documentation updates on the Web site.

If there are differences between the documentation received in the NET+OS package and the documentation on the Web site, the Web site content is the latest version.

Introduction

This document provides a series of tasks in which you:

- Install Green Hills software.
- Install NET+OS software.
- Install the Digi JTAG Link debugger software.
- Install the license for the Digi JTAG Link debugger software. If using the Majic debugger instead, instructions are included in several appendixes.
- Request and install a license for the Green Hills software.
- Configure the IP address for the development board.
- Complete a brief exercise that demonstrates how to use the tool set, including:
  - Building the board support package (BSP), libraries, and template applications
  - Running and debugging the sample application

Do the all the tasks in this guide in the order presented.

Note Plan to spend approximately two hours completing the tasks in this document. The exact time depends on the speed of your PC and how long it takes to get a license key from Green Hills.

The exercise

Task 1: Getting ready

Before performing the rest of the tasks in this document several preparation tasks are necessary.

The instructions in this document assume that hardware is already installed.

Save files and close applications

The Green Hills and NET+OS software installation requires rebooting the PC. Safe all open files and close any open applications before installing the software.

Verify access rights

Make sure you have administrative rights on the PC on which Green Hills and NET+OS software are installed.

Verify hardware requirements

Verify that the PC is running either Microsoft Windows 2000 or XP.

Windows 95/98/ME and Windows NT 4.0 are *not* supported.

What's next?

Go on to the next task, installing Green Hills software.

Task 2: Install Green Hills MULTI IDE Software

Before installing NET+OS, it is required to install The Green Hills MULTI IDE version 4.05. This software is available from Green Hills Software at http://www.ghs.com/products/MULTI_IDE.html.

What's next?

When MULTI IDE software is installed, go on to the next task, installing NET+OS software.

Task 3: Install NET+OS software

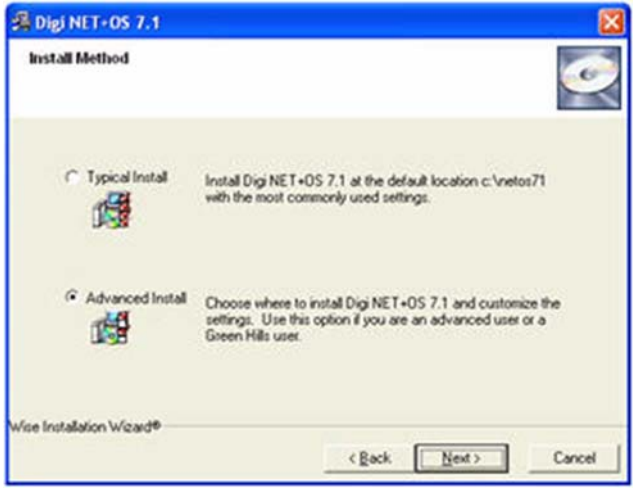
This task installs the NET+OS software on your system, using a wizard.

About the installation

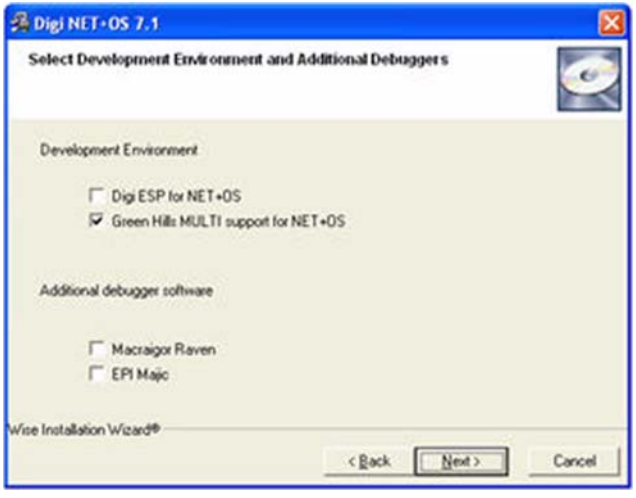
During the installation, if registering NET+OS, a serial-number prompt is displayed. Use the serial number located on the development board. If the development board is not available, use **Vnnnnnnnn**.

▶ **To begin the NET+OS installation:**

1. Place the installation CD in the CD drive, and follow the wizard prompts.
2. On the **Install Method** screen, select **Advanced Install** and continue with the wizard.



3 On the **Select Development Environment and Additional Debuggers** page, select **Green Hills MULTI support for NET+OS**. If not using the Digi JTAG Link debugger, select the desired debugger. Note that Digi ESP for NET+OS is not needed. Then continue following the wizard until NET+OS is installed.



What's next?

Go to the next task to obtain a Green Hills license.

Task 4: Request a Green Hills software license key

This task requests a license key for the Green Hills software.

If upgrading from a prior NET+OS/Green Hills installation, a Green Hills license is not necessary. Skip to "Task 7: Configure the IP address of the development board" on page 30.

About the Green Hills license keys

Before using the Green Hills MULTI software, request and install a software license key. Request either:

- An evaluation (temporary) key, which allows access to the Green Hills MULTI software for 30 days.
- A permanent key.

Digi strongly recommends requesting both license types at the same time. An evaluation license key allows immediate use of the software, while acquiring a permanent license key can take up to 15 business days.

The MULTI Licensing Wizard creates a license request that can be e-mailed, faxed, or mailed to Green Hills. The wizard prompts for information such as:

- The number of licenses desired.
- Whether the license is computer-locked or dongle-locked.
- The type of computer on which the software is used.
- Whether the license key is an evaluation (temporary) or permanent license.

The license key is sent to your e-mail address.

About license types

Two license types are available:

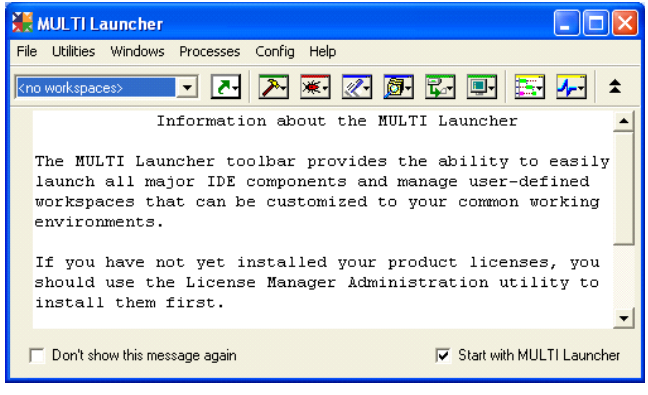
Computer-locked. A computer-locked license must be used on the PC from which the license was requested.

Dongle-locked.A dongle-locked license, requires attaching the dongle to the PC before beginning the license request procedure.

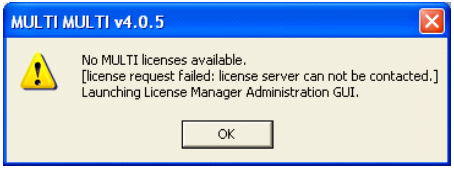
Requesting a license

1 Click the MULTI icon on the desktop.

The **MULTI Launcher** opens:

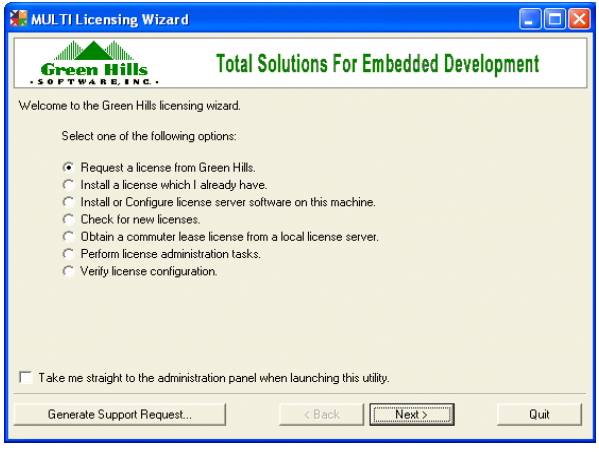


Because you do not yet have a license, a warning pop-up window also opens:

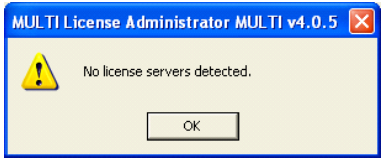


2 To continue, click **OK** in the pop-up window.

The **MULTI Licensing Wizard** opens:

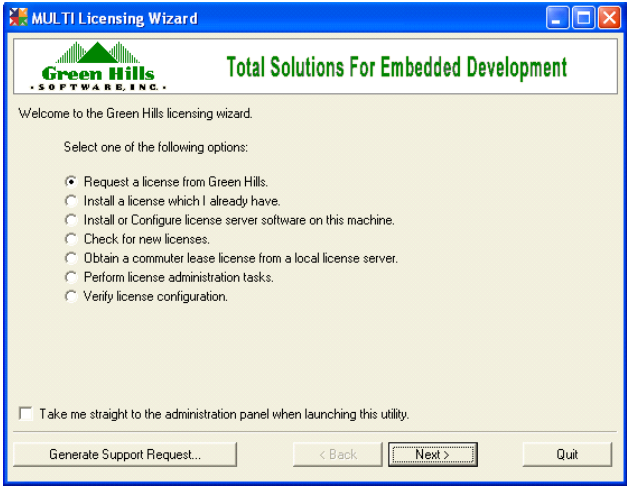


In addition, a warning pop-up window from the MULTI License Administrator opens:

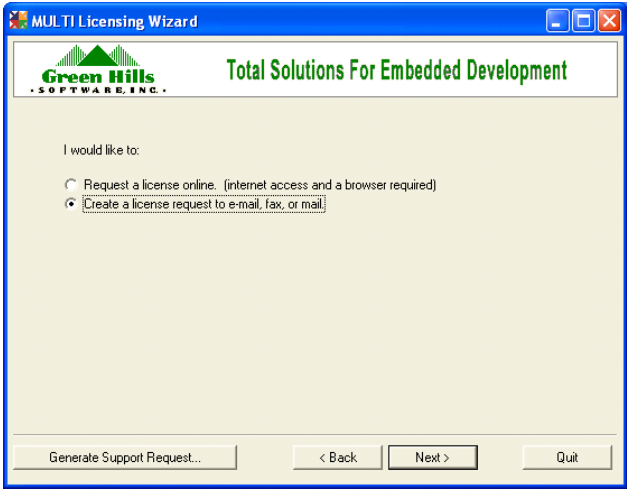


3 To continue, click **OK** in the pop-up window.

4 In the **MULTI Licensing Wizard**, click **Request a license from Green Hills**. Then click **Next**.



This window opens:

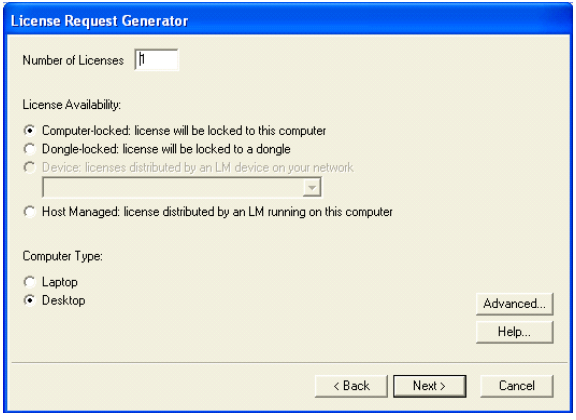


5 Click **Create a license request to e-mail, fax, or mail**, then click **Next**.

The **License Request Generator** opens with this form:

6 Fill in the form, leaving the **GHS User ID (if known)** field blank, then click **Next**.

The **License Request Generator** window opens:



7 Do these steps:

a Enter the number of licenses desired.

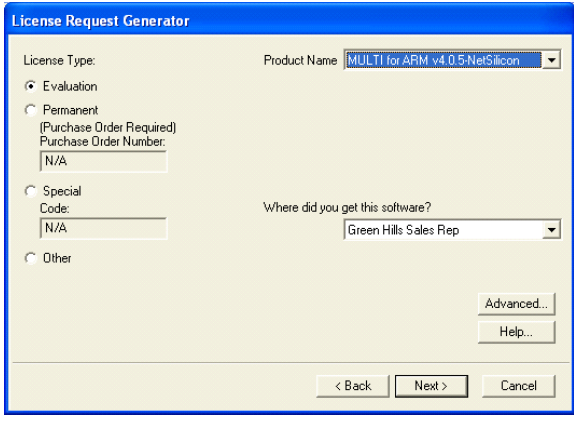
b Under **License Availability**, click the type of license desired.

c *Do not* click **Host Managed: license distributed by an LM running on this computer**.

d Select the computer type.

e Click **Next**.

This window opens:



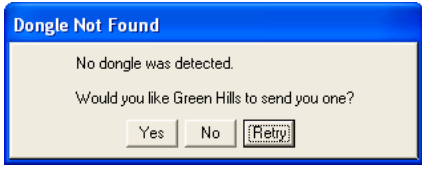
8 Under **License Type**, click **Evaluation**, then click **Next**.

The Green Hills Software 30-day license agreement opens.

9 Review the license agreement, and click **Yes**.

The **License Request Generator** window opens.

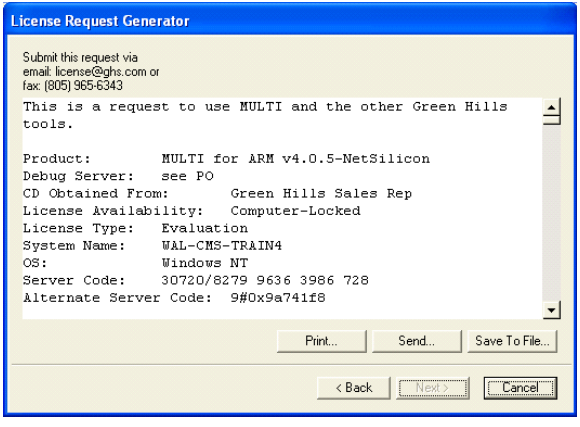
If the **License Request Generator** window does not open, this dialog is displayed:



This message indicates that the dongle was not connected.

Connect the dongle and click **Retry** in the **Dongle Not Found** dialog.

If the **License Request Generator** does not return a copy of the license request (shown next), stop and call Digi Technical Support.



10 Review the information in the license request to make sure it is correct. Then, do either of these steps:

- If the PC from which the request is made has e-mail, click **Send**.
- If the PC from which the request is made does not have e-mail, click **Save to File**. Go to a system that has e-mail and send the request as an attachment to **license@ghs.com**.

11 In the **License Request Generator**, click **Finish**.

12 In the **MULTI Licensing Wizard**, click **Quit**.

13 Exit from the **MULTI Launcher**.

14 To request a permanent license, repeat this task, but at step 8, click **Permanent for the license type**.

What's next?

Within an hour, an e-mail message should be received that either:

- Includes the license key file and installation instructions.
- Indicates that manual processing is required. Call Digi Technical Support.

Go on to the next task, in which the license key is saved to the PC.

Task 5: Save the license key

When the e-mail message is received from Green Hills, save the attachments to a folder on the PC on which the license should be installed.

What's next?

Go on to the next task to install the Green Hills license.

Task 6: Install the Green Hills license key

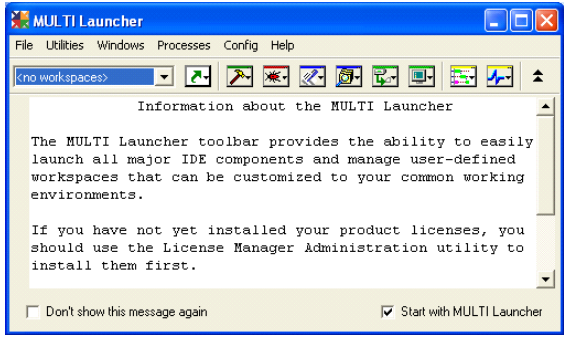
This task installs the evaluation license key received by e-mail from Green Hills.

When the permanent license is received, follow the directions provided by Green Hills with your license. To launch the MULTI Licensing Wizard from the MULTI Launcher, select **Utilities** > **License Administrator.**

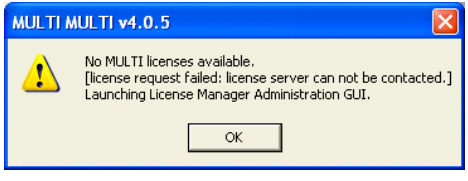
▶ **To install the evaluation license key:**

1 Double-click the MULTI icon on the desktop.

The **MULTI Launcher** opens:

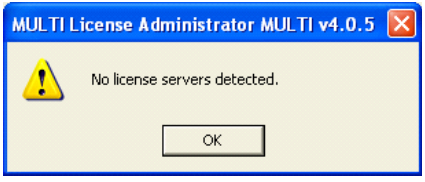


Because you do not yet have a license, this pop-up window opens:



2 To continue, click **OK** in the pop-up window.

The **MULTI Licensing Wizard** opens, and this message is displayed:



3 Click **OK**.

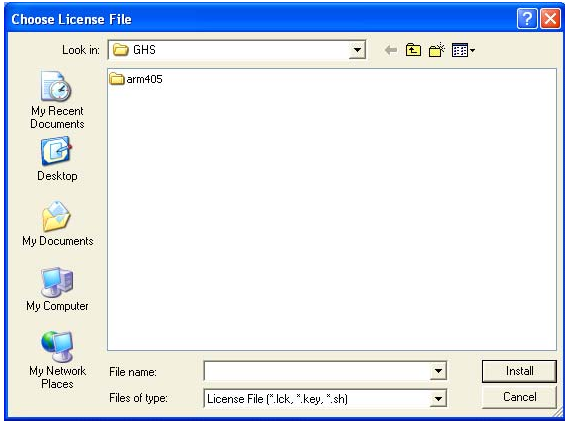
4 In the **MULTI Launcher** window, select **File > Close Launcher**.

The **MULTI Licensing Wizard** remains open.

5 In the **MULTI Licensing** window, click **Install a license which I already have**, then click **Next**.

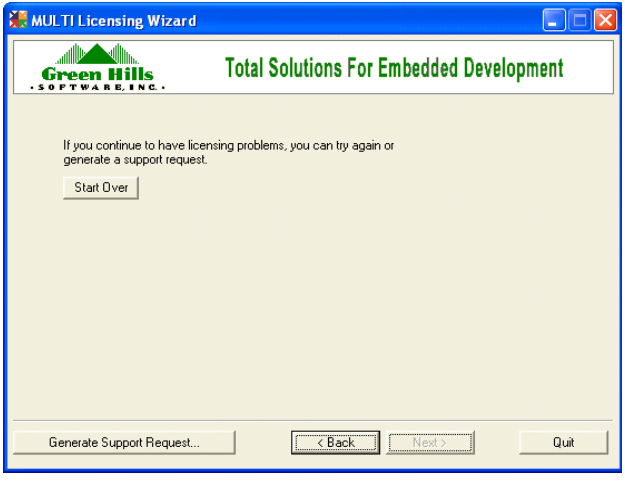
If the **MULTI Launcher** window was not closed, a prompt is displayed to close all MULTI windows. Close the other MULTI windows, and click **Next** in the **MULTI Licensing Wizard**.

The **Choose License File** dialog opens:



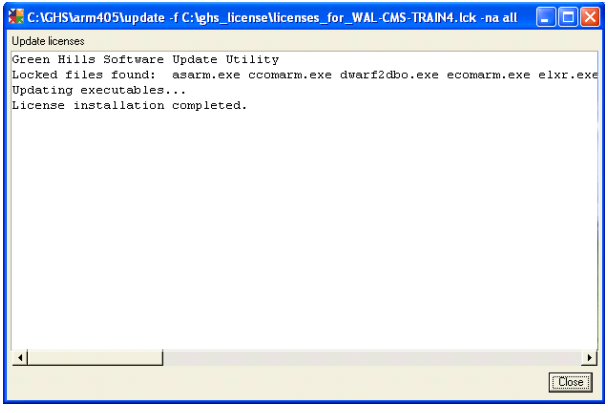
6 Browse to the license file, select it, and click **Install**.

This window opens:



The installation takes a few minutes. This window remains open during the installation process and does not require any action.

The **Update Licenses** window opens:



7 If error messages appear in the **Update Licenses** window, contact Digi Technical Support. Otherwise, click **Close**.

8 In the **MULTI Licensing Wizard**, click **Quit**.

What's next?

Go on to the next task to configure the development board's IP address.

Task 7: Configure the IP address of the development board

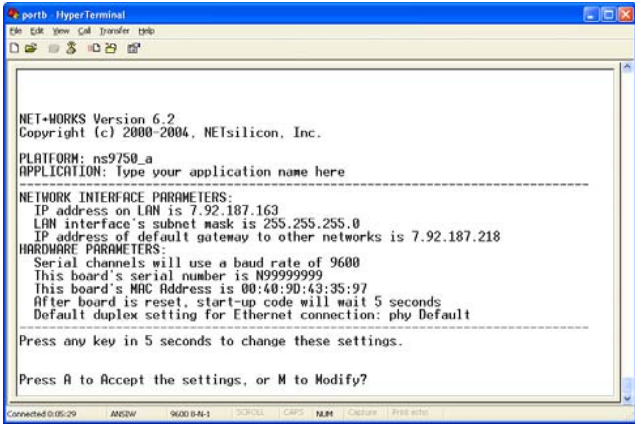
This task configures the IP address of the development board.

During this procedure, be prepared to move quickly to the HyperTerminal window at step 3, because you have only a few seconds to respond to the prompt.

▶ **To configure the IP address of the development board:**

1. Do one of these steps:
   - Windows XP systems. Select **Start > All Programs > NET+OS Green Hills > HyperTerminal Connection**, and, depending on the port to which the development board is connected, either **COM1** or **COM2**.
   - Windows 2000 systems. Select **Start > Programs > NET+OS Green Hills > HyperTerminal Connection**, and, depending on the port to which the development board is connected, either **COM1** or **COM2**.
2. Reboot the development board by disconnecting it from the power source and reconnecting it.

This information is displayed in the **HyperTerminal** window:



3 Press any key within five seconds.

4 To change the configuration, press **M**, then press **Enter**.

A prompt for a root password is displayed.

5 Enter the default root password, **Netsilicon**, and press Enter.

The first of a series of configuration prompts appears.

6 At each prompt, do one of these steps:

- To accept the current value, press **Enter**.
- To change a setting, enter a value and press **Enter**.

While scrolling through the settings, a prompt indicates that you must press a key within five seconds to change additional settings.

What's next?

If using a Digi JTAG Link debugger, go on to the next section, which installs the Digi JTAG Link debugger software.

If using a MAJIC debugger, follow the steps in "Appendix B: Set up an IP address for MAJIC debugger" on page 49 and "Appendix C: Configure the MAJIC debugger" on page 54.

If using the Raven debugger, skip to "Task 10: Build the BSP, libraries, and applications" on page 36.

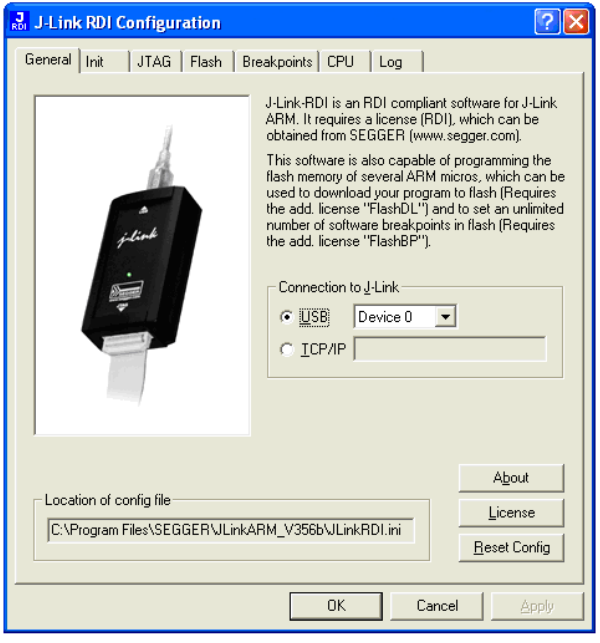
Task 8: Install the Digi JTAG Link debugger license

1. Request an RDI license for your Digi JTAG Link debugger by sending email to

   "mailto:license_admin@digi.com"
   license_admin@digi.com

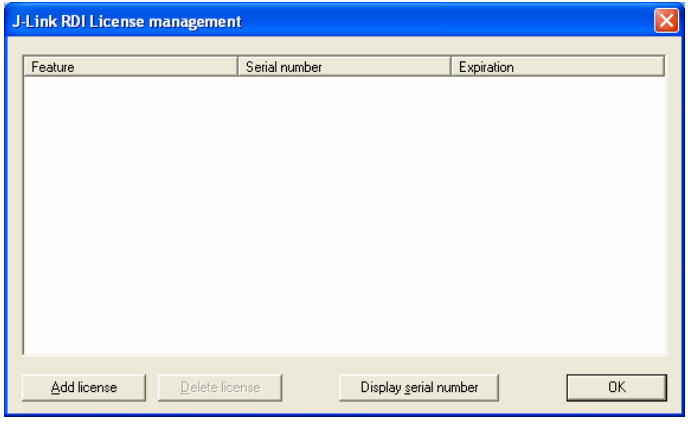
   including the serial number for the JTAG Link and the JTAG Link RDI request key printed on the card included in your NET+OS Green Hills Supplement Pack. If you do not have an RDI request key, you can purchase a license for the Digi JTAG Link from the Digi online store or a Digi sales distributor (part number DG-ACC-RDI-LIC).
2. Select **Start > All Programs > SEGGER > J-Link ARM > J-Link RDI Config**.

The **J-Link RDI Configuration** window opens:



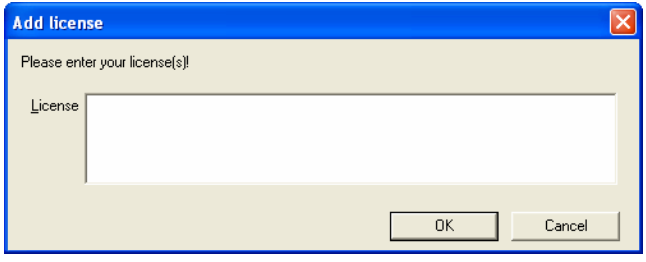
3 Click **License**.

The **J-Link RDI license management** window opens



4 Click **Add License**.

The **Add License** dialog opens:



5 Enter the license associated with the serial number on the back of the Digi JTAG Link debugger, then click **OK**.

The **J-Link RDI license management** window reopens.

6 Click **OK**.

7 The **J-Link RDI Configuration** window reopens.

What's next?

Go to the next task to configure the Digi JTAG Link debugger.

Task 9: Configure the Digi JTAG Link debugger

This task selects configuration settings for the Digi JTAG Link debugger.

1. Select **Start > All Programs > SEGGER > J-Link ARM > J-Link RDI Config**.

   The **J-Link RDI Configuration** dialog opens.
2. Click the **CPU** tab.
3. Under **Endian**, click **Big endian**.
4. Click **OK**.

What's next

You are ready to build the software. Go on to the next task, which involves building the BSP, libraries, and sample applications.

Task 10: Build the BSP, libraries, and applications

This task builds the BSP, libraries, and sample applications, including Hello World, one of the template applications provided with NET+OS. This simple application writes Hello World to the HyperTerminal window (which was opened in Task 7, step 1).

About building

One build file for each platform is used as the main access point for building all the libraries, the BSP, and the applications required for a NET+OS project.

When building a platform, always open the parent build file for that platform. From this build file, several tasks are possible, including:

- Building the entire system.
- Navigating to the application's build file, and building the application.
- Navigating to the BSP platform build file, and building the BSP.

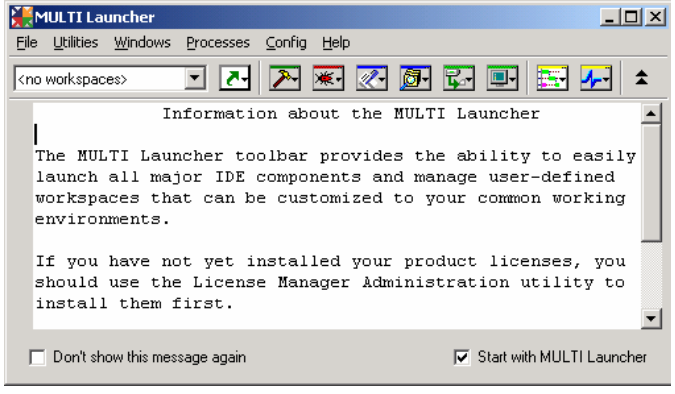
Build the entire system

This section uses the NS9360 as an example.

▶ **To build the entire system:**

1 To open Green Hills MULTI v4.0.5, double-click the MULTI icon on the desktop.

The **MULTI Launcher** opens:



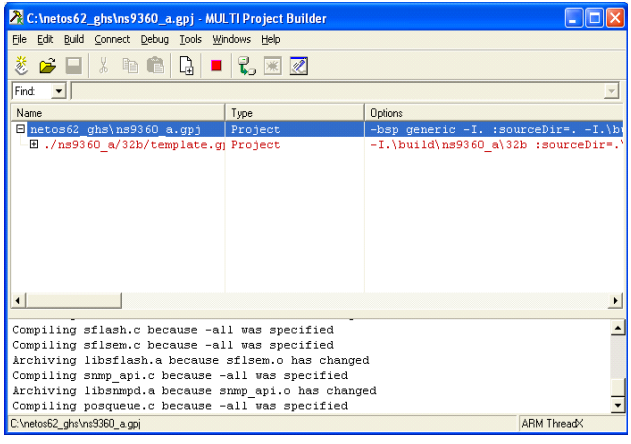
2 Select **File > Open Project Builder**.

3 Browse to **\netos**, and select the platform.

The **MULTI Project Builder** window opens.

4 In the **MULTI Project Builder** window, select **Build > Rebuild ns9360_a.gpj**.

The build begins, as shown here:

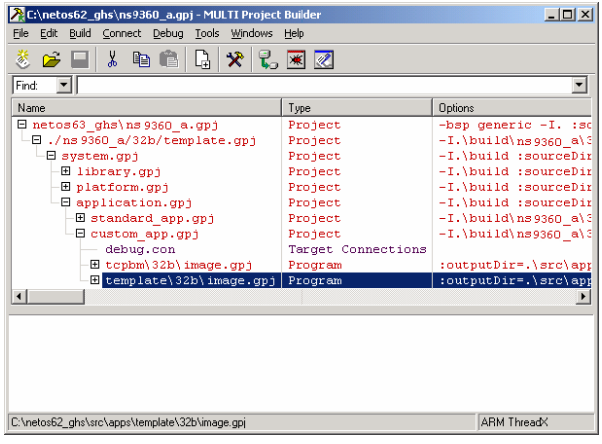


When the build completes, the BSP, libraries, and all the sample applications will be built.

Build an individual application

To rebuild an individual application, select the application and select **Build**, as shown in this example.

1 Navigate to the template application for the **ns9360_a** platform, as shown here:



2 Select **Build > Rebuild image**.

The build occurs and build messages are displayed.

What's next

Go on to the next task to run and debug the template application.

Task 11: Run and debug the template application

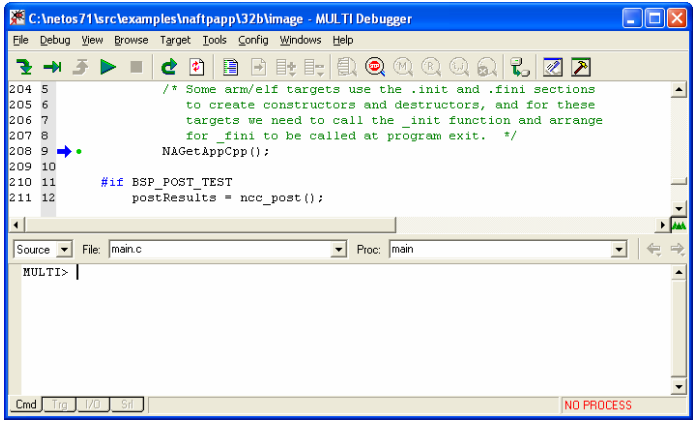
The application is run and debugged in the builder window. This section describes how to debug the application using the Digi JTAG Link debugger.

If using the MAJIC debugger, go to “Appendix D: Run and debug the template application with the MAJIC debugger” on page 59. If using the Raven debugger go to “Appendix E: Run and debug the template application with the Raven debugger” on page 65.

Run the template application using the Digi JTAG Link debugger

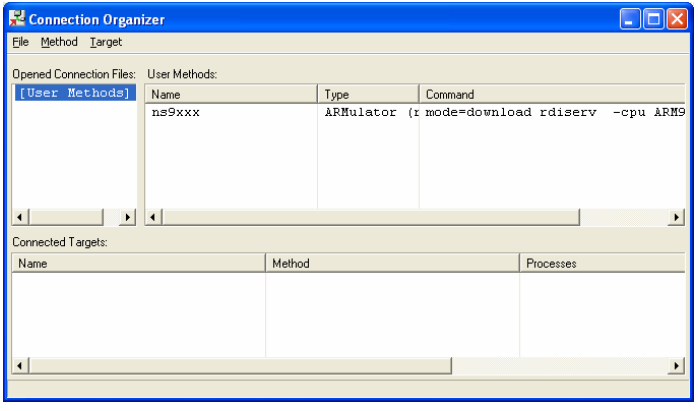
1 In the **MULTI Project Builder** window, select **Debug > Debug image**.

This window is displayed:



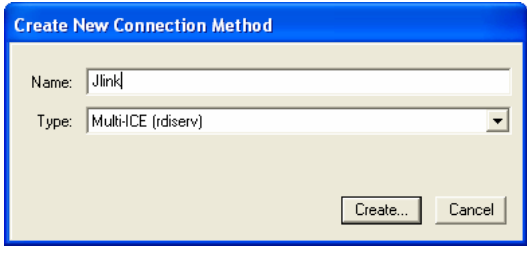
2 Select **Target > Show Connection Organizer**.

The **Connection Organizer** window opens:



3 Select **Method > New**.

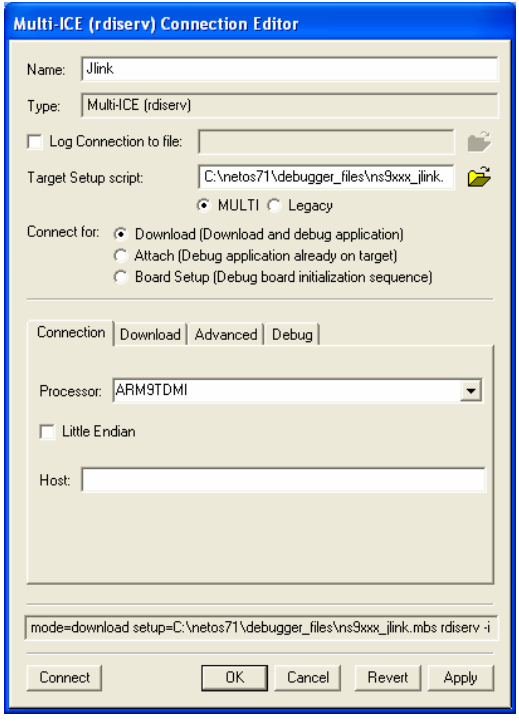
The **New Connection Method** window opens:



4 In the **Name** edit box. enter **Jlink**.

5 From the **Type** pull-down menu, select **Multi-ICE (rdiserv)**, then click **Create**.

The **Multi-ICE (rdiserv) Connection Editor** opens:



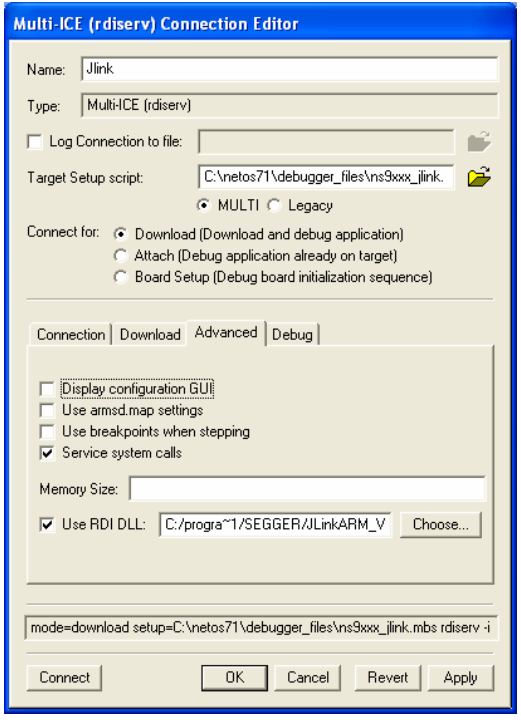
6 Click the folder icon at the end of the line, navigate to the **netos/debugger_files** folder, and select the setup script (.mbs file) for the target hardware. For most ARM9 platforms, use **ns9xxx_jlink.mbs**.

7 From the Processor pull down menu, select **ARM7TDMI** or **ARM9TDMI**, depending on the processor in use.

8 Deselect **Little Endian**.

9 Click the **Advanced** tab.

This dialog opens:



10 Do these steps:

a Check **Use RDI DLL**.

b If the input text box next to the **Use RDI DLL** check box contains text, delete it.

c Click **Choose**, navigate to the folder selected as the destination for the JLink files, and select **JLinkRDI.dll**.

d In the **Use RDI DLL** check box, replace all back slashes (****) with forward slashes (***/***).

e If using a sub-directory of the **Program Files** folder, change **Program Files** to **progra~1**.

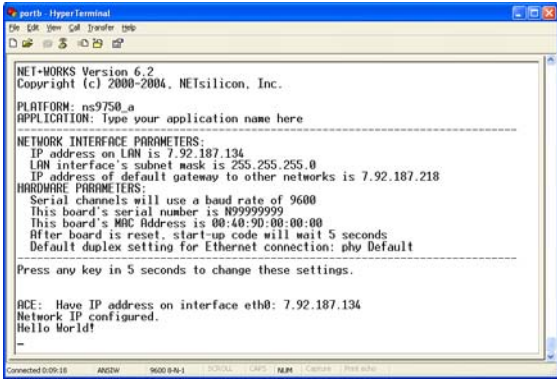
f Click **Apply**.

g Close the **Multi-ICE (rdiserv) Connection Editor** by clicking **OK**, then close the **Connection Organizer** window.

11 To start the application, in the **MULTI Debugger** window, select **Debug > Go**.

If there is difficulty connecting, select **Target > Disconnect from Target**, then go back to step 10 and continue.

12 When the application is loaded and starts running, the application dialog appears in the **HyperTerminal** window. Note that **Hello World** appears in the last line.



13 Select **Debug > Halt**.

14 At the **MULTI>** prompt at the bottom of the **MULTI Debugger** window, set a breakpoint at the main function by entering:

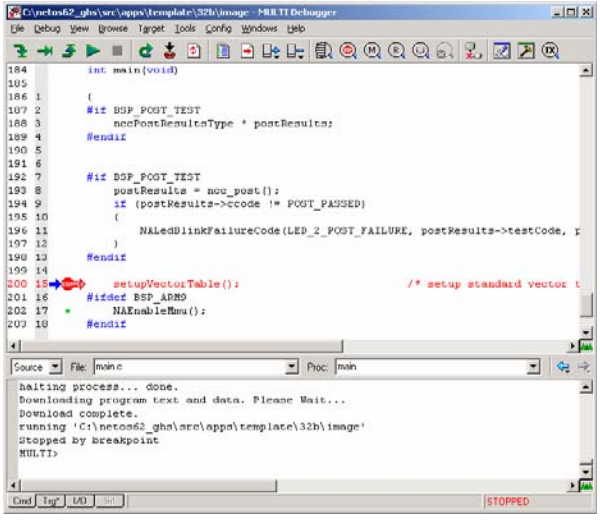
```
b main
```

Then press **Enter**.

15 To continue execution, select **Debug > Go**.

16 Repeat steps 10 through 13 of this task.

When the breakpoint is reached, the screen looks like this:



You have now completed all the tasks in this exercise.

Tips and suggestions

Here are some tips for using NET+OS with Green Hills with your own projects.

Where should I put my code, and why?

Add your code as a subdirectory in the **c:/netos/src/examples** directory. The software calls the **applicationStart** function in the **root.c** file. Start by duplicating some other example and modifying the Makefiles.

A good choice is **naftpapp**, the FTP server example. Add your application to this example, which allows reloading new code after it is running in flash. Without the FTP server in the application, it is not possible re-flash the system.

To load specific settings, edit the **root.c** file. To configure board settings, edit the **appconf.h** file.

What should my next step be?

The next step is running your application from flash. The flash code is broken up into two parts:

- The bootloader (**rom.bin**), located in: **netos/src/bsp/platforms/your platform**.
- Your application (**image.bin**), located in **netos/src/examples/your example/32b**.

Appendix A: Update the MAJIC debugger's firmware

This appendix describes how to update the firmware for the MAJIC debugger using the MAJIC Setup Wizard.

Performing this procedure is required if you have a previous version of the MAJIC firmware.

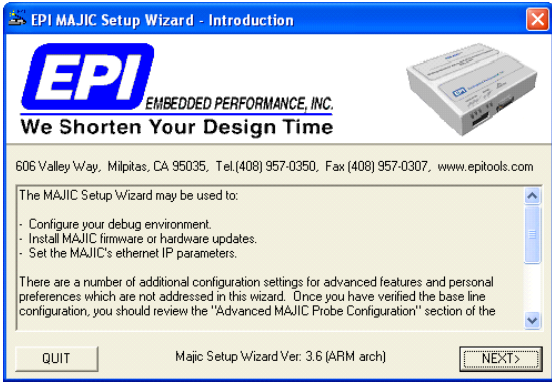
If an IP address of the MAJIC debugger is needed, see "Appendix B: Set up an IP address for MAJIC debugger" on page 49.

▶ **To update the MAJIC debugger's firmware:**

1 Start the MAJIC Setup Wizard. Depending on your Windows operating system, the menu sequence is:

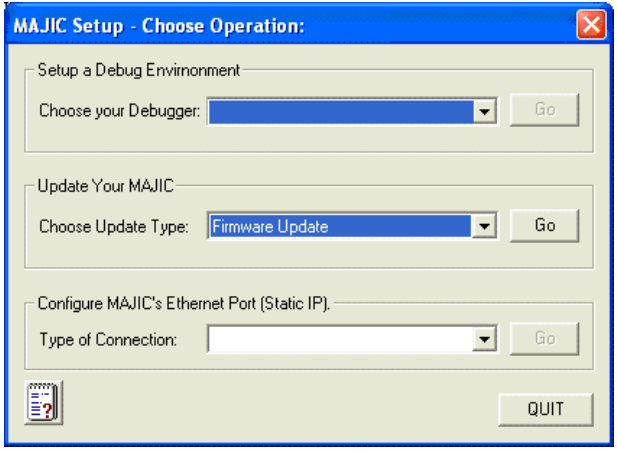
- Windows XP systems: **Select Start > All Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.
- Windows 2000 systems: **Select Start > Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.

The **EPI MAJIC Setup Wizard Introduction** window opens:



2 Review the introduction and click **NEXT**.

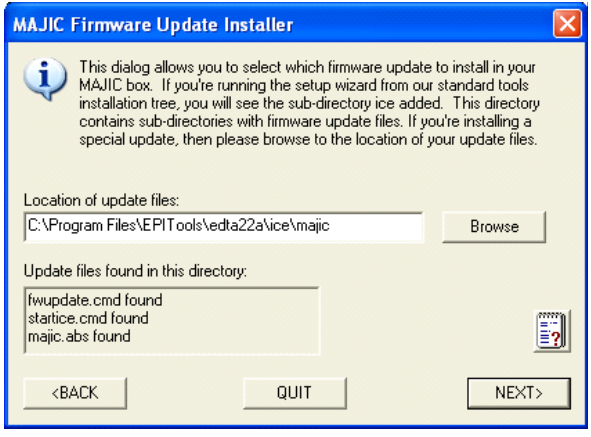
The **Choose Operation** window opens:



3 From the **Choose Update Type** pull-down menu, select **Firmware update**.

Then click **Go**.

The **MAJIC Firmware Update Installer** dialog opens:

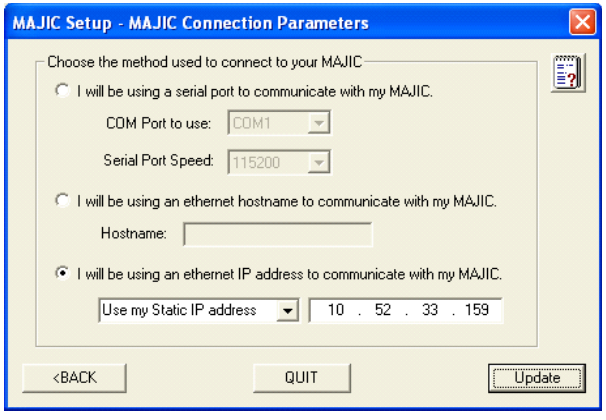


4 If the directory name is not already in the **Location of update files** input box, browse to this directory:

C:\ProgramFiles\EPITools\edta22A\ice\majic

and click **NEXT**.

The **MAJIC Connection Parameters** dialog opens:



5 Do these steps:

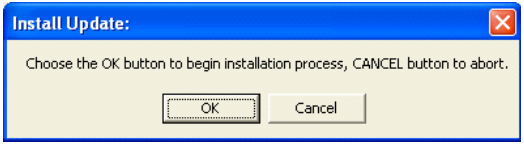
a Click **I will be using an Ethernet IP address to communicate with my MAJIC**.

b Enter the IP address for the MAJIC.

c Make sure **Use My Static IP address** is selected.

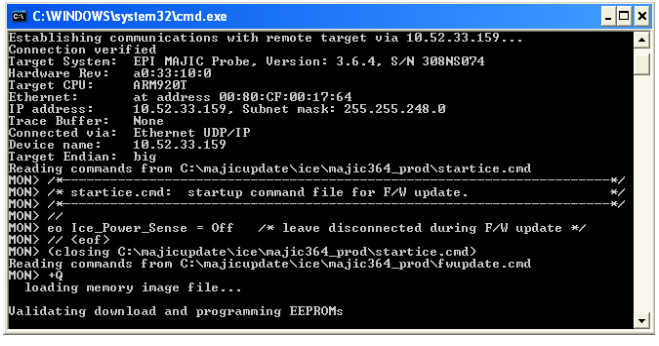
Then click **Update**.

The **Install Update** dialog opens:



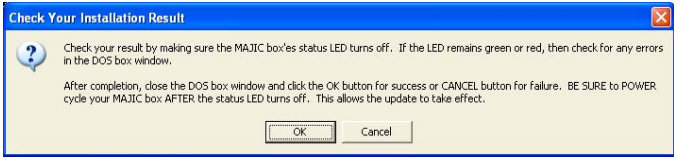
6 To begin the update, click **OK**.

A DOS window and the **Check Your Installation Result** dialog open. Messages about the firmware download are displayed in the DOS window:



7 When the download finishes, do one of these steps:

- If the download was successful, click **OK** in the **Check Your Installation Result** dialog.
- If the download was not successful, click **Cancel** in the **Check Your Installation Result** dialog, and repeat this procedure.



Appendix B: Set up an IP address for MAJIC debugger

This section describes how to set up an IP address for the MAJIC debugger.

You must follow the instructions in this section if:

You are a new user.

You are upgrading and do not know the IP address of your MAJIC debugger.

▶ **To set up the IP address of the MAJIC debugger:**

1. Using the serial cross cable that ships with the MAJIC, connect the MAJIC to an available COM port on your PC.

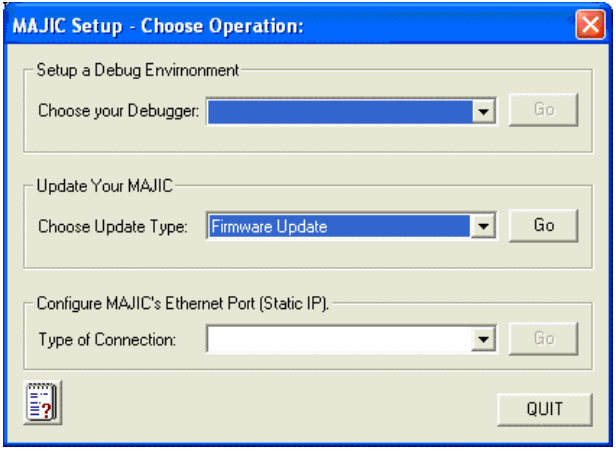
   If there is not an available connection on your PC, reuse the one already connected to the development board. In this case, close all applications associated with the COM port, such as HyperTerminal.

2. Start the MAJIC Setup Wizard. Depending on your Windows operating system, the menu sequence is:
   - Windows XP systems: **Start > All Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.
   - Windows 2000 systems: **Start > Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.

The **EPI MAJIC Setup Wizard Introduction** window opens:

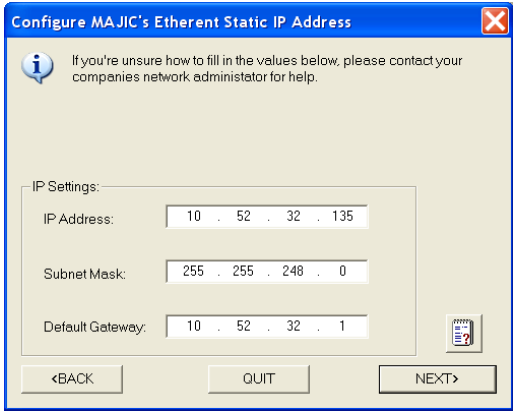
3 Click **NEXT**.

The **Choose Operation** window opens:



4 From the **Type of Connection** pull-down menu, select **Static IP Address for Ethernet**, then click **Go**.

The **Configure MAJIC's Ethernet Static IP Address** window opens:

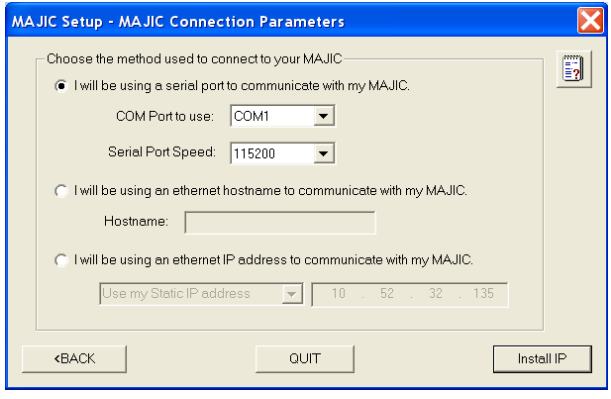


5 Enter this network information:

- IP Address
- Subnet Mask
- Default Gateway

then click **NEXT**.

The **MAJIC Connection Parameters** window opens:



6 Do these steps:

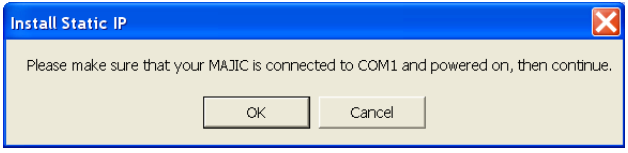
a Click **I will be using a serial port to communicate with my MAJIC**.

b From the **COM port to use** pull-down menu, select the serial port number.

c Make sure no other programs are using the COM port selected.

d Click **Install IP**.

The **Install Static IP** dialog opens:



7 Connect the MAJIC serial cable between the MAJIC debugger's serial port and the COM port selected in the **MAJIC Connection Parameters** window (in step 6 of this task), and then click **OK**.

A dialog and a DOS window open.

8 In the **Check Your Installation Result** dialog, confirm that the IP address information in the DOS window is correct by clicking **OK**.

If there is a problem, correct it and go back to step 1 of this task.

9 Connect an Ethernet cable from the MAJIC debugger to the LAN hub or switch.

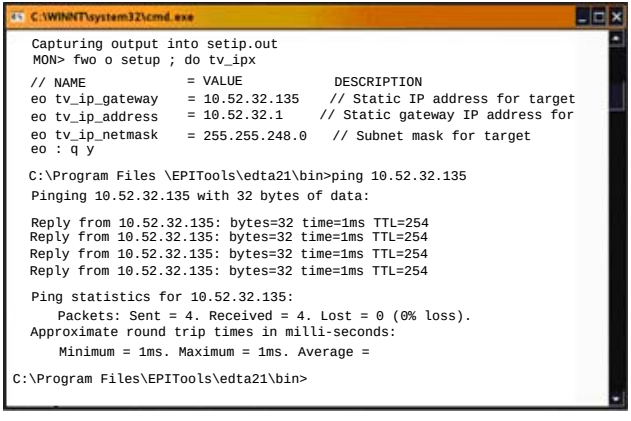
10 After the MAJIC debugger turns off, power-cycle the MAJIC.

11 In the DOS window, ping the IP address by entering:

`ping` *`ip address`*

where *`ip address`* is the IP address of the MAJIC.

The DOS window looks like this:



(The colors of the text and background are reversed in this screen for easier reading.)

If the **ping** succeeds, the IP address is installed.

If this response is not displayed:

- Check the Ethernet connection to the MAJIC.
- Confirm that the IP parameters are legal.
- Verify that the MAJIC was power-cycled.

Otherwise, repeat this task.

12 Close the DOS window.

13 In the **Check Your Install Results** dialog, click **OK**.

Appendix C: Configure the MAJIC debugger

This task configures software settings for the MAJIC debugger, using the EPI MAJIC Setup Wizard.

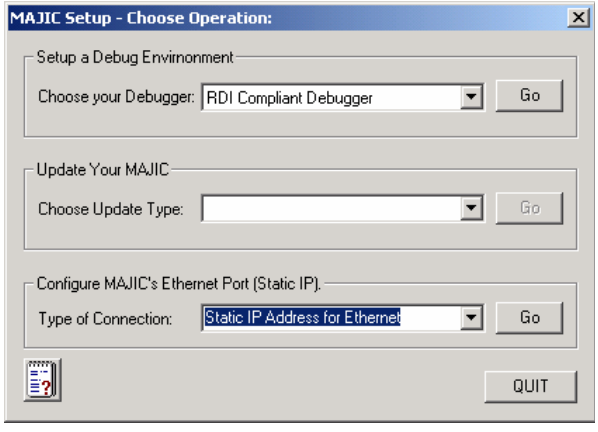
Configure the MAJIC debugger:

1. Start the MAJIC Setup Wizard. Depending on your Windows operating system, the menu sequence is:
   - Windows XP systems: **Start > All Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.
   - Windows 2000 systems: **Start > Programs > EPI Tools-EDTA > MAJIC Setup Wizard**.

The **EPI MAJIC Setup Wizard Introduction** window opens:

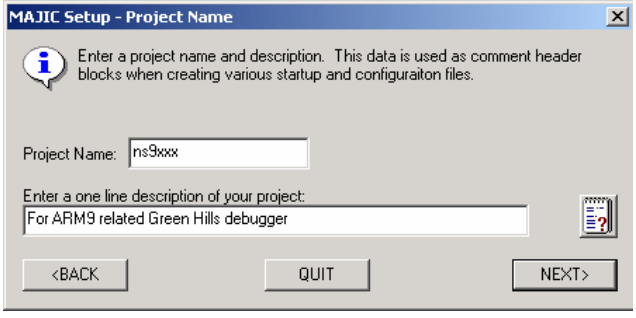
2 Review the introduction and click **NEXT**.

The **Choose Operation** window opens:



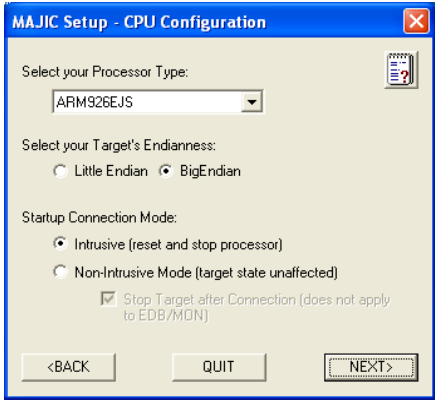
3 From the **Choose Your Debugger** pull-down menu, select **RDI Compliant Debugger**, and click **Go**.

The **Project Name** window opens:



4 Create a new project by entering a project name and a brief description. Then click **NEXT**.

The **CPU Configuration** window opens:



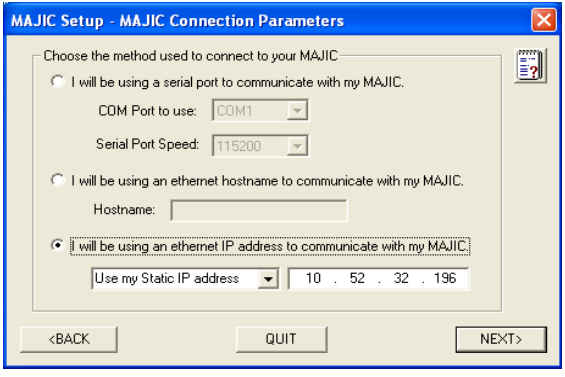
5 Do these steps:

a From the **Select Your Processor Type** pull-down menu, select **ARM926EJS**.

b Under **Select your Target's Endianness**, click **BigEndian**. Under **Startup Connection Mode**, click **Instrusive Mode (reset and stop processor)**.

c Click **NEXT**.

The **MAJIC Connection Parameters** window opens:



6 Do these steps:

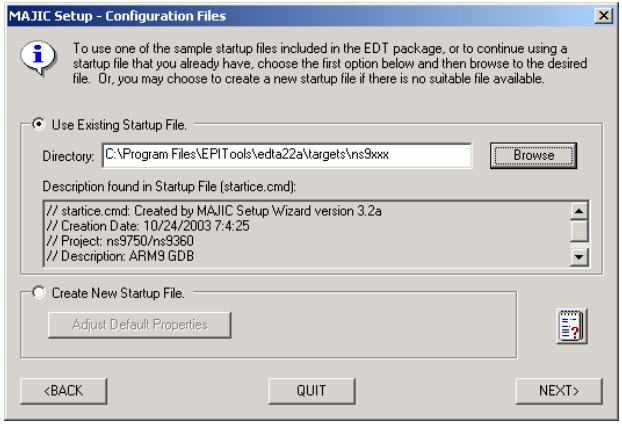
a Click **I will be using an Ethernet IP address to communicate with my MAJIC**.

b Enter the IP address for the MAJIC. Use the IP address provided in Task 8, step 6.

c Make sure **Use My Static IP address** is selected.

d Click **NEXT**.

The **Configuration Files** window opens:



7 Click **Use Existing Startup File**, and do these steps:

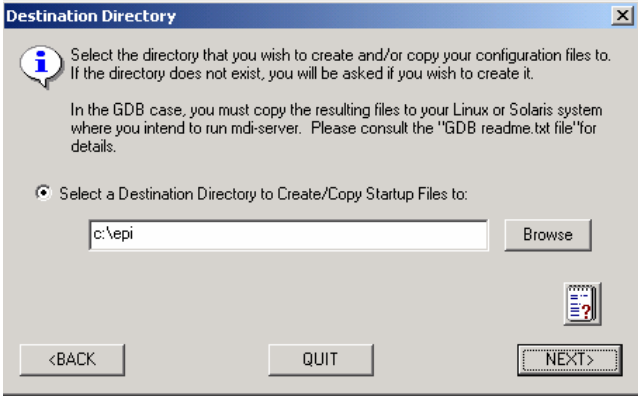
a Click **Browse**.

b Navigate to **Program Files > EPI Tools > edta22a > Targets > ns9xxx** directory.

c Select the file **startice.cmd**, and click **Open**.

d Click **NEXT**.

The **Destination Directory** window opens:



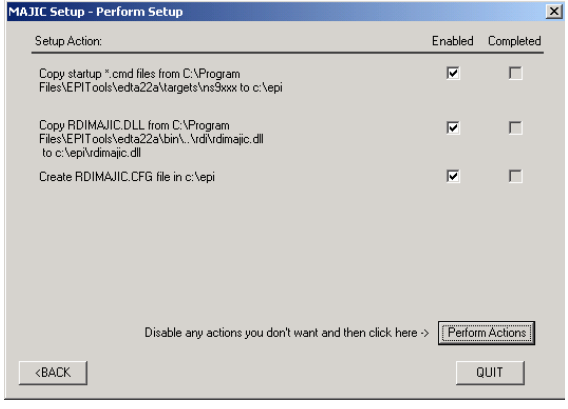
8 Click **Select a Destination Directory to Create/Copy Startup Files to**.

Browse to the directory to use for files that are created or copied during the MAJIC setup.

Make sure that each name in the path is eight characters or fewer and does not use any spaces.

Then click **NEXT**.

The **Perform Setup** window displays a summary of the selections:



9 Check **Enabled** for each item, then click **Perform Actions**. This step creates MAJIC setup files in the directory specified in step 8.

If the directory does not exist, the MAJIC Setup Wizard displays a pop-up warning to create one. Click **Yes** to create the directory.

10 To exit the wizard, click **Done**.

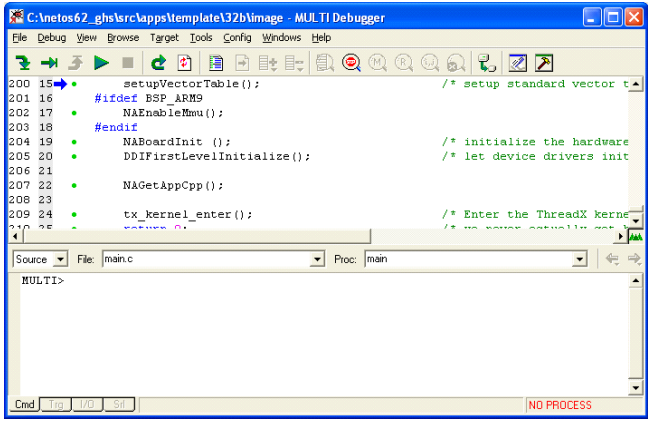
Appendix D: Run and debug the template application with the MAJIC debugger

This task shows how to run an application with MAJIC debugger.

▶ **To run the template application using the MAJIC debugger:**

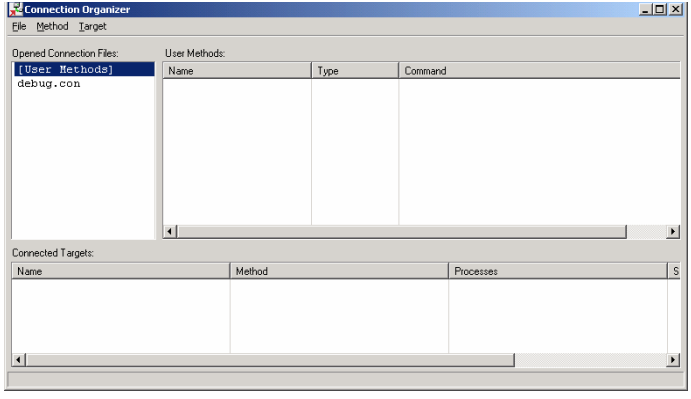
1 In the **MULTI Project Builder** window, select **Debug > Debug image**.

This window is displayed:



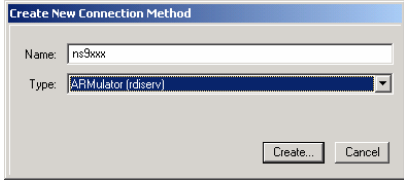
2 Select **Target > Show Connection Organizer**.

The **Connection Organizer** window opens:



3 In the **User Methods** section of the window, right-click as noted in the illustration, and select **New**.

The **Create New Connection Method** dialog opens:



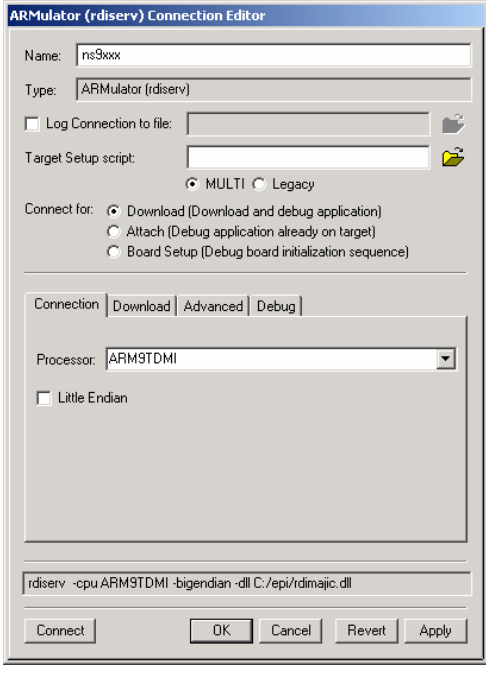
4 Do these steps:

a In the **Name** input box, enter **ns9*xxx*** (for either the ns9360_a or ns9750_a platform).

b From the **Type** pull-down menu, select **ARMulator (rdiserv)** for ARM.

c Click **Create**.

The **ARMulator (rdiserv) Connection Editor** opens:



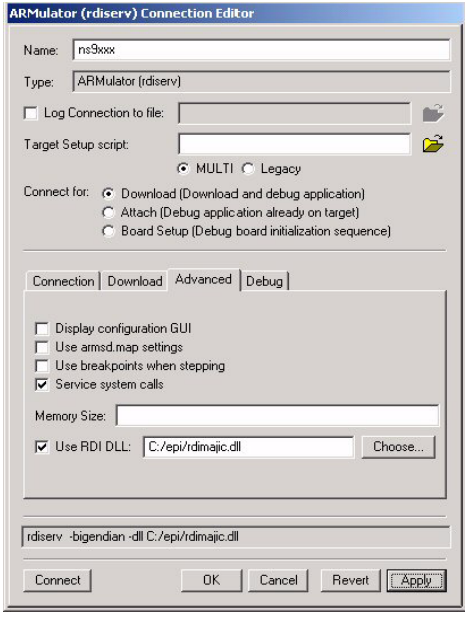
5 In the **Connection** portion of the Armulator window, do these steps:

a From the **Processor** pull-down menu, select **ARM9TDMI**. (This option is compatible with the Net+Silicon ARM926EJS-based processors.)

b deselect **Little Endian**.

c Click the **Advanced** tab.

This information is displayed in the center of the window:



6 Do these steps:

a Select **RDI DLL**.

b If the input text box next to the **RDI DLL** check box contains text, delete it.

c Click **Choose**, navigate to the folder selected as the destination for the EPI files (in Task 9, step 8), and select **rdimajic.dll**.

d In the **Use RDI DLL** text box, replace the back slashes (****) with forward slashes (***/***).

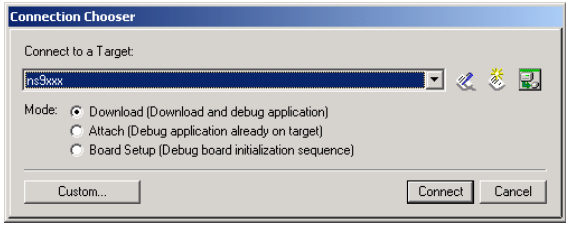
e Click **Apply**.

7 Close the **ARMulator (rdiserv) Connection Editor** by clicking **OK**, then close the **Connection Organizer** window.

8 If a HyperTerminal window is not open, open one as instructed in Task 7, step 1.

9 In the **MULTI Debugger** window, select Target > Connect.

The **Connection Chooser** dialog opens:

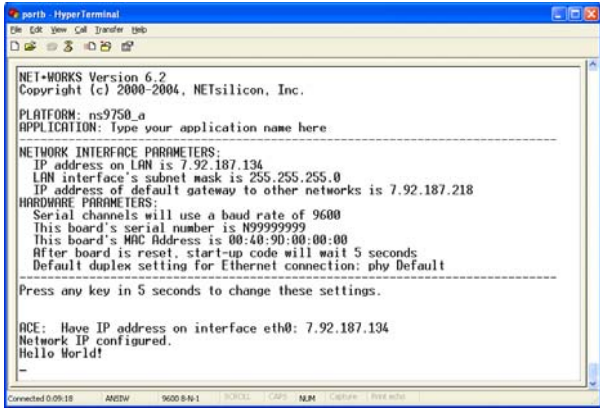


10 Check that the target name matches the name entered in step 4a, and click **Connect**.

11 In the **MULTI Debugger** window, select **Debug > Go** to start running the program.

If there is any difficulty connecting, select **Target > Disconnect**, then go back to step 7.

When the program is loaded and starts to run, the sample application dialog appears in the HyperTerminal window. Note that **Hello World** appears in the last line of code.



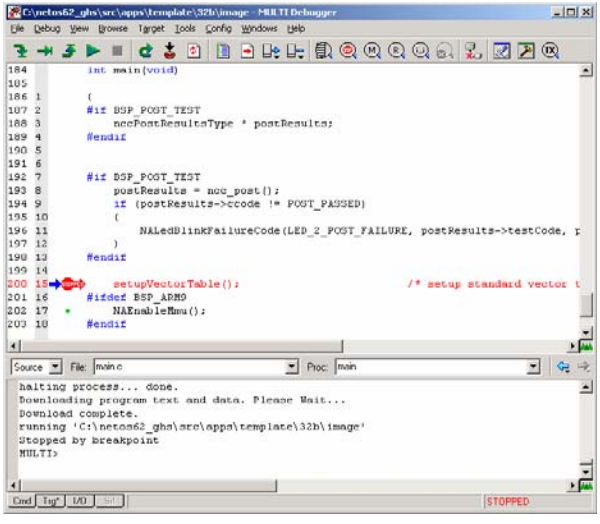
12 Select **Debug > Halt**.

13 At the **MULTI>** prompt at the bottom of the **MULTI Debugger** window, set a breakpoint at the main function by entering:

```
b main
```

14 Select **Target > Disconnect from Target**, and repeat steps 7 through 10.

When the breakpoint is reached, the screen looks like this:

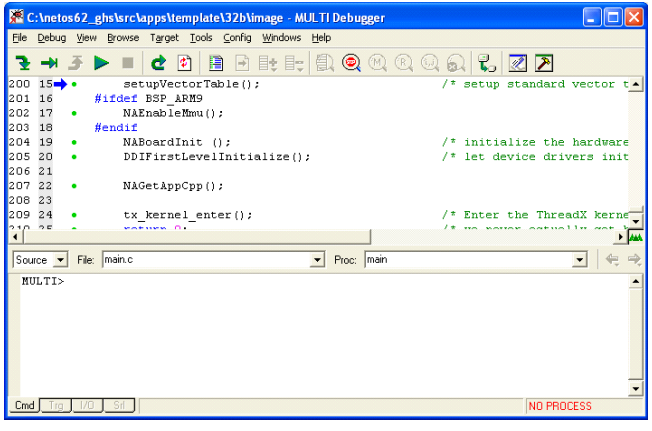


15 To continue execution, select **Debug > Go**.

Appendix E: Run and debug the template application with the Raven debugger

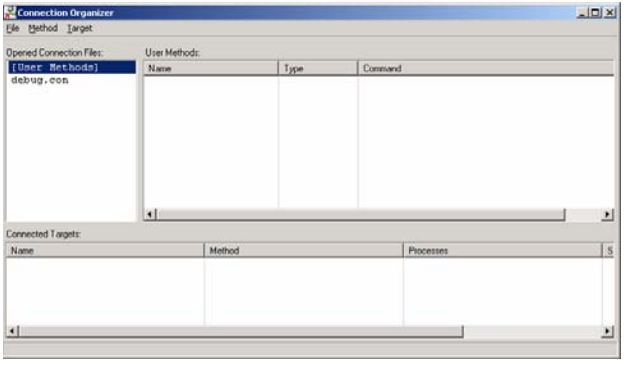
1 In the **MULTI Project Builder** window, select **Debug > Debug image**.

The window looks like this:



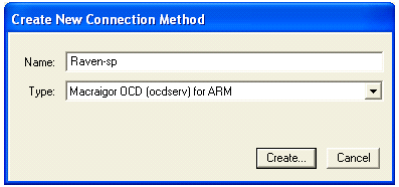
2 Select **Target > Show Connection Organizer**.

The **Connection Organizer** window opens:



3 In the **User Methods** section of the window, right-click and select **New**.

The **Create New Connection Method** dialog opens:



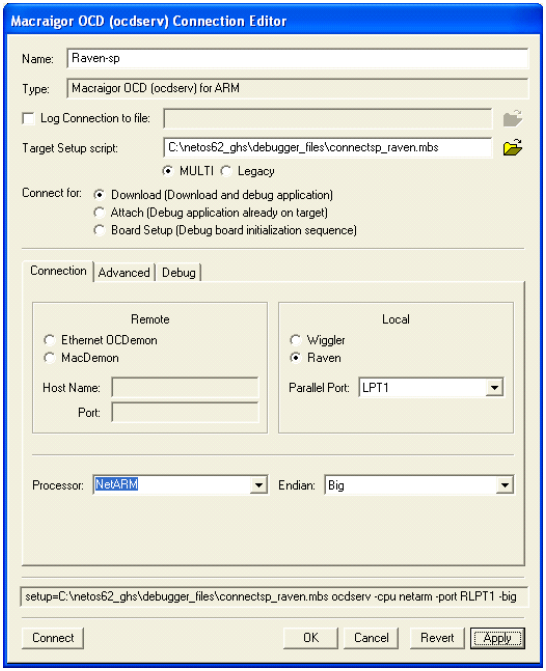
4 Do these steps:

a In the **Name** input box, enter a descriptive name for the platform.

b From the **Type** pull-down menu, select **Macraigor OCD (ocdserv) for ARM**.

Then click **Create**.

The **Macraigor OCD (ocdserv) Connection Editor** opens:



5 In the **Macraigor OCD (ocdserv) Connection Editor**, do these steps:

a In the input box next to **Target Setup** script, navigate to the **netos\debugger_files** directory, and select the script for the platform. The scripts have a **.mbs** extension.

b In the **Local** section, click **Raven**. Then, from the **Parallel Port** pull-down menu, select the parallel port for the local connection.

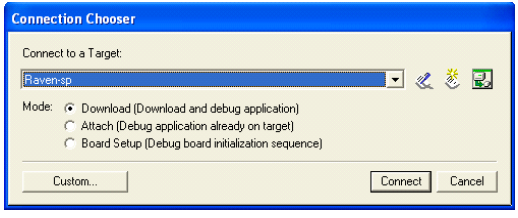
c In the **Processor** section, from the **Processor** pull-down menu, select **NetARM**. From the **Endian** pull-down menu, select **Big**.

Click **Apply**.

6 Click **OK** to close the **Macraigor OCD (ocdserv) Connection Editor**, then close the **Connection Organizer** window.

7 In the **MULTI Debugger,** select **Target > Connect**.

The **Connection Chooser** dialog opens:



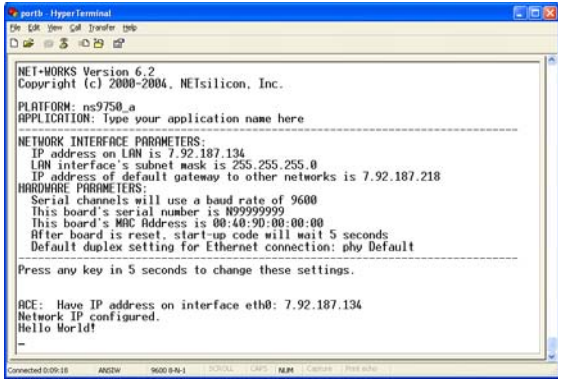
8 Check that the target name matches the name entered in step 4a.

9 In the **Connection Chooser** dialog, click **Connect**.

10 In the **MULTI Debugger** window, select **Debug > Go** to start running the program.

If there is difficulty connecting, select **Target > Disconnect**, then go back to step 7.

When the program is loaded and starts running, the sample application dialog appears in the HyperTerminal window, as shown here. Note that **Hello World** appears in the last line of the window.

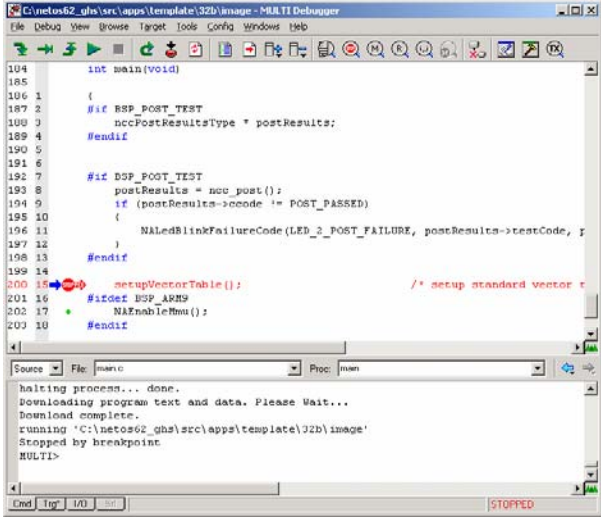


11 Select **Debug > Halt**.

At the **MULTI>** prompt at the bottom of the **MULTI Debugger** window, set a breakpoint at the main function by entering:

```
b main
```

12 Select **Target > Disconnect from Target**, and repeat steps 7 through 10. When the breakpoint is reached, the screen looks like this:



13 To continue execution, select **Debug > Go**.

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