

NET+OS with Green Hills Getting Started Guide

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Using this guide

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 serialnumber prompt is displayed. Use the serial number located on the development board. If the development board is not available, use **Vnnnnnnn**.

- ► 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.

🛃 Digi NET+OS 7.1	×
Select Development Environment and Additional Debuggers	<u>و</u>
Development Environment	
Digi ESP for NET+0S	
Green Hills MULTI support for NET+OS	
Additional debugger software	
Macraigor Raven	
[[™] EPI Majo	
Wise Installation Wizard®	
< Back Next>	Cancel

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 donglelocked.
- 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

 $1 \quad \mbox{Click the MULTI icon on the desktop.}$

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:

🗰 MULTI Licensing Wizard	
Green Hills SETTIMARE INC. Total Solutions For Embedded Development	
Welcome to the Green Hills licensing wizard.	
Select one of the following options:	
 Request a license from Green Hills. Install a license which I already have. Install or Configure license server software on this machine. Check for new licenses. Dbtain a commuter lease license from a local license server. Petrom license administration tasks. Verity license configuration. 	
Take me straight to the administration panel when launching this utility.	
Generate Support Request <back next=""></back>	uit

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

MULTI L	icense Administrator MULTI v4.0.5 🔀
⚠	No license servers detected.
	ОК

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.

👯 MULTI Licensing Wizard		
Green Hills	Total Solutions For Embedded Developm	nent
Welcome to the Green Hills licensing	g wizard.	
Select one of the following	options:	
Request a license from Install a license which I Install or Configure licen Check for new licenses. Obtain a commuter leas Perform license administ Verify license configurat	Green Hills. already have. se server software on this machine. e license from a local license server. tration tasks. ion.	
Take me straight to the administr	ration panel when launching this utility.	
Generate Support Request	< Back Next >	Quit

This window opens:

💥 MULTI Licensing Wizard	
Green Hills	Total Solutions For Embedded Development
I would like to:	. [internet access and a browser required] to e-mail, fax, or mail.]
Generate Support Request	< Back Next> Quit

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

The License Request Generator opens with this form:

Name	John Q Smith		
Position	Engineer		
Telephone	781-555-1212	Fax	[
E-mail	jqsmith@netsilicon.com		
Company	Netsilicon		
Address 1	344 Commonwealth Av		
Address 2			
City	Boston	State/ Province	MA
Postal Code	02452	Country	USA
GHS User ID (if known)	[

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

The License Request Generator window opens:

License Request Generator	
Number of Licenses 1	
License Availability:	
Computer-locked: license will be locked to this computer Dongle-locked: license will be locked to a dongle Device: licenses distributed by an LM device on your network T O Host Managed: license distributed by an LM running on this computer	
Computer Type:	
C Laptop	
Tesktop	Advanced
	Help
< Back Next >	Cancel

- 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:

License Request Generator	
License Type: C Evaluation C Permanent (Purchase Order Required) Purchase Order Required) Purchase Order Number: N/A	Product Name MULTI for ARM v4.0.5-NetSilicon
C Special Code: N/A C Other	Where did you get this software? Green Hills Sales Rep
	Advanced
	< Back Next > Cancel

- 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:

Dongle Not Found	
No dongle was detected.	
Would you like Green Hills to send you one?	
Yes No (Fetry)	

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.

License Request Generator			
Submit this request via email license@ghs.com or fax: (805) 965-6343			
This is a request to use MULTI and the other Green Hills dools.			
Product: MULTI for ARM v4.0.5-NetSilicon Debug Server: see PO			
CD Obtained From: Green Hills Sales Rep License Availability: Computer-Locked			
License Type: Evaluation System Name: WAL-CMS-TRAIN4			
OS: Windows NT Server Code: 30720/8279 9636 3986 728			
Alternate Server Code: 9#0x9a741f8			
Print Send Save To File			
< Back Next> Cancel			

- **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.

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:

Choose Licens	e File					? 🛛
Look in:	GHS			•	+ 🗈 💣 💷-	
My Recent Documents Desktop My Documents	arm405					
My Network Places	File name: Files of type:	License File	e (*.lck, *.key, *.sh)	<u> </u>	Install Cancel

6 Browse to the license file, select it, and click Install. This window opens:

👯 MULTI Licensing Wizard		
Green Hills	Total Solutions For Embedded Developmen	nt
If you continue to have licen generate a support request.	sing problems, you can try again or	
Start Over		
Generate Support Request	Back Next>	Quit

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

 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

J	Link RDI License managemen	t	X
	Feature	Serial number	Expiration
	Add license Delete lice	ense Display <u>s</u> erial nu	mber OK

4 Click Add License.

The Add License dialog opens:

Add licer	ise 🛛 🔀
Please ent	ter your license(s)!
<u>L</u> icense	
	OK Cancel

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:

🥂 C:\netos62_ghs\ns9360_a.gpj - MULTI Proje	ct Builder			
Eile Edit Build Connect Debug Tools <u>W</u> indows Help				
🥇 🚅 🔲 X 🖻 🛍 🔓 📕 🖏 🗵	K 🖉			
Find:				Ψ.
Name Type		Options		
🗆 netos62 ghs\ns9360 a.gpj 🛛 Projec		-bsp generic -I.		=I.\b
./ns9360_a/32b/template.gp Project	t	-I.\build\ns9360	a\32b :sou	rceDir=.'
•				+ I
Compiling sflash.c because -all was s	specified			<u> </u>
Compiling sflsem.c because -all was specified				
Archiving libsflash.a because sflsem.o has changed				
Compiling snmp_api.c because -all was specified				
archiving libshmpd.a because shmp_api.o has changed				
Compliing posqueue.c because -all was	s specified			•
C:\netos62_ghs\ns9360_a.gpj			ABM Thr	eadX

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.

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

💦 C:\netos62_ghs\ns9360_a.gpj - MULTI Project Builder				
<u>File Edit Build Connect Debug Tools Windows Help</u>				
炎 🧀 🔲 🌡 🛍 🖏 🛠 🐛 🗷				
Find:		•		
Name	Туре	Options		
🖻 netos63_ghs\ns9360_a.gpj	Project	-bsp generic -I. :sc		
□ ./ns 9360_a/32b/template.gpj	Project	-I.\build\ns9360_a\3		
😑 system.gpj	Project	-I.\build :sourceDir		
— Iibrary.gpj	Project	-I.\build :sourceDir		
-⊞ platform.gpj	Project	-I.\build :sourceDir		
application.gpj	Project	-I.\build :sourceDir		
-⊞ standard_app.gpj	Project	-I.\build\ns9360_a\3		
custom_app.gpj	Project	-I.\build\ns9360_a\3		
debug.con	Target Connections	_		
-⊞ tcpbm\32b\image.gpj	Program	:outputDir=.\src\app		
🕀 template\32b\image.gpj	Program	:outputDir=.\src\app		
•		Þ		
C:\netos62_ghs\src\apps\template\32b\image.gpj		ARM ThreadX		

Select Build > Rebuild image. 2

The build occurs and build messages are displayed.

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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:

🔀 Connection Organizer 📃 🗖 🔀						
<u>File M</u> ethod <u>T</u> arget	File Method Iarget					
Opened Connection Files:	User Methods:					
[User Methods]	Name		Туре	Command		
	ns9xxx		ARMulator (r mode=downlo	ad rdiserv	-cpu ARM9
•	•					Þ
Connected Targets:						
Name		Method			Processes	
•						•

3 Select Method > New.

The New Connection Method window opens:

Create N	lew Connection Method
Name: Tupe:	Jlink MultiJCF (relisery)
туре.	
	Create Cancel

- 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:

Multi-ICE (rdiserv) Connection Edi	tor	
Name: Jlink		
Type: Multi-ICE (rdiserv)		
Log Connection to file:		
Target Setup script: C:\netos71\	debugger_files\ns9xxx_jlink. 🔁	
MULTI C	Legacy	
Connect for: 💿 Download (Download ar C Attach (Debug applicatio	nd debug application) on already on target)	
C Board Setup (Debug bo	ard initialization sequence)	
Connection Download Advanced D	Pebug	
Processor: ARM9TDMI	•	
🥅 Little Endian		
Host:		
mode=download setup=C:\netos71\debu	gger_files\ns9xxx_jlink.mbs rdiserv -i	
Connect OK	Cancel Revert Apply	

- 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:

Multi-ICE (rdiserv) Conn	ection Editor	
Name: Jlink		
Type: Multi-ICE (rdiserv)		
🔲 Log Connection to file: 🛛	F	
Target Setup script:	C:\netos71\debugger_files\ns9xxx_jlink.	
	MULTI C Legacy	
Connect for: C Download C Attach (De C Board Setu	(Download and debug application) bug application already on target) Ip (Debug board initialization sequence)	
Connection Download	Advanced Debug	
Display configuration GUI Use armsd.map settings Use breakpoints when stepping Service system calls		
Memory Size:		
Use RDI DLL: C:/progra~1/SEGGER/JLinkARM_V Choose		
mode=download setup=C:\netos71\debugger_files\ns9xxx_jlink.mbs rdiserv -i		
Connect	OK Cancel Revert Apply	

- 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:

MAJIC Setup - Choose Operation:				
Setup a Debug Environment				
Update Your MAJIC Choose Update Type: Firmware Update Go				
Configure MAJIC's Ethernet Port (Static IP).				
QUIT				

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

Then click Go.

The MAJIC Firmware Update Installer dialog opens:

MAJIC Firmware Update Installer				
This dialog allows you to select which firmware update to install in your MAJIC box. If you're running the setup wizard from our standard tools installation tree, you will see the sub-directory ice added. This directory contains sub-directories with firmware update files. If you're installing a special update, then please browse to the location of your update files.				
Location of update files:				
C:\Program Files\EPITools\edta22a\ice\majic	Browse			
Update files found in this directory:				
fwupdate.cmd found startice.cmd found majic.abs found				
<back quit<="" td=""><td>NEXT></td></back>	NEXT>			

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:

MA	JIC Setup - MAJIC Connection Parameters	
	Choose the method used to connect to your MAJIC	min
	C I will be using a serial port to communicate with my MAJIC.	2
	COM Port to use: COM1	
	Serial Port Speed: 115200	
	C I will be using an ethernet hostname to communicate with my MAJIC.	
	Hostname:	
	$\widehat{\mbox{\boldmath $\mathbf{ r}$}}$ I will be using an ethernet IP address to communicate with my MAJIC.	
	Use my Static IP address 📃 10 . 52 . 33 . 159	
	<back quit="" td="" up<=""><td>date)</td></back>	date)

- 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:

Install Update:	×
Choose the OK button to begin installation process, C	ANCEL button to abort.
OK Cancel]

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:

MAJIC Setup - Choose Operation: 🛛 🛛 🗙
Setup a Debug Environment
Update Your MAJIC Choose Update Type: Firmware Update Go
Configure MAJIC's Ethernet Port (Static IP).
QUIT

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:

Configure MAJIC's Etherent Static IP Address				
If you're unsure how to fill in the values below, please contact your companies network administator for help.				
IP Settings:	10 . 52 . 32 . 135			
Subnet Mask:	255 . 255 . 248 . 0			
Default Gateway:	10 . 52 . 32 . 1			
<back< th=""><td>QUIT</td><td>NEXT></td></back<>	QUIT	NEXT>		

- 5 Enter this network information:
 - IP Address
 - Subnet Mask
 - Default Gateway

then click NEXT.

The MAJIC Connection Parameters window opens:

MA	JIC Setup - MAJIC Connection Parameters	
	Choose the method used to connect to your MAJIC I will be using a serial port to communicate with my MAJIC. COM Port to use: COM1 Serial Port Speed: 115200 I will be using an ethernet hostname to communicate with my MAJIC. Hostname: C I will be using an ethernet IP address to communicate with my MAJIC.	2
	Use my Static IP address ID . 52 . 32 . 135 (BACK QUIT Inste	AII IP

- 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:

ntinue.
)

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:

C:\WINNT\system32\cmd.exe	_ 0	×
Capturing output into setip.out MON> fwo o setup ; do tv_ipx		•
<pre>// NAME = VALUE DESCRIPTION eo tv_ip_gateway = 10.52.32.135 // Static IP address for targe eo tv_ip_address = 10.52.32.1 // Static gateway IP address for eo tv_ip_netmask = 255.255.248.0 // Subnet mask for target eo : q y</pre>	t	
C: \Program Files \EPITools\edta21\bin>ping 10.52.32.135 Pinging 10.52.32.135 with 32 bytes of data:		
Reply from 10.52.32.135: bytes=32 time=1ms TTL=254 Reply from 10.52.32.135: bytes=32 time=1ms TTL=254 Reply from 10.52.32.135: bytes=32 time=1ms TTL=254 Reply from 10.52.32.135: bytes=32 time=1ms TTL=254		
Ping statistics for 10.52.32.135: Packets: Sent = 4. Received = 4. Lost = 0 (0% loss). Approximate round trip times in milli-seconds: Minimum = 1ms. Maximum = 1ms. Average =		
C: \Program Files\EPITools\edta21\bin>		-1

(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.

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:

1AJIC Setup - Choose Operation:	×
Setup a Debug Envirnonment Choose your Debugger: RDI Compliant Debugger	Go
Update Your MAJIC Choose Update Type:	Go
Configure MAJIC's Ethernet Port (Static IP). Type of Connection: Static IP Address for Ethernet	Go
E	QUIT

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

The Project Name window opens:

MAJIC Setup - Project Name
Enter a project name and description. This data is used as comment header blocks when creating various startup and configuraiton files.
Project Name: ns9xxx
Enter a one line description of your project: For ARM9 related Green Hills debugger
<back next="" quit=""></back>

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

The CPU Configuration window opens:

MAJIC Setup - CPU Configuration	
Select your Processor Type: ARM926EJS	2
Select your Target's Endianness:	
🔿 Little Endian 💿 BigEndian	
Startup Connection Mode: (• Intrusive (reset and stop processor)	
 Non-Intrusive Mode (target state unaffected) 	
Stop Target after Connection (does not app to EDB/MON)	
KBACK QUIT	ſ>]

- 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:

MAJIC Setup - MAJIC Connection Parameters	×
Choose the method used to connect to your MAJIC	
C I will be using a serial port to communicate with my MAJIC.	
COM Port to use: COM1	
Serial Port Speed: 115200	
C I will be using an ethernet hostname to communicate with my MAJIC.	
Hostname:	
I will be using an ethernet IP address to communicate with my MAJIC	
Use my Static IP address 🗨 10 . 52 . 32 . 196	
<back next<="" quit="" td=""><td>۲></td></back>	۲>

- 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:

MAJIC Setup - Configuration Files	×
To use one of the sample startup files included in the EDT package, or to startup file that you already have, choose the first option below and then b file. Or, you may choose to create a new startup file if there is no suitable l	continue using a rowse to the desired ille available.
Use Existing Startup File.	
Directory: C:\Program Files\EPITools\edta22a\targets\ns9xxx	Browse
Description found in Startup File (startice.cmd):	
// startice.cmd: Created by MAJIC Setup Wizard version 3.2a // Creation Date: 10/24/2003 7:4:25 // Project: ns9750/ns9360 // Description: ARM9 GDB	
Create New Startup File.	2
<back quit<="" td=""><td>NEXT></td></back>	NEXT>

- 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:

Destination Directory	×
Select the directory that you wish to create and/or copy your cor If the directory does not exist, you will be asked if you wish to cre	nfiguration files to. ate it.
In the GDB case, you must copy the resulting files to your Linux where you intend to run mdi-server. Please consult the "GDB re details.	or Solaris system adme.txt file''for
Select a Destination Directory to Create/Copy Startup Files to:	
c:\epi	Browse
	2
<back quit<="" td=""><td>NEXT></td></back>	NEXT>

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:

1A	JIC Setup - Perform Setup		×
	Setup Action:	Enabled	Completed
	Copy startup ".cmd files from C:\Program Files\EPITools\edta22a\targets\ns9xxx to c:\epi	V	
	Copy RDIMAJIC.DLL from C:\Program Files\EPITools\edta22a\bir\\rdi\rdimajic.dll to c:\epi\rdimajic.dll		Γ
	Create RDIMAJIC.CFG file in c:\epi	◄	
	Disable any actions you don't want and then click here ⇒	Perform	n Actions
	<back< td=""><td>(</td><td></td></back<>	(

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.

💑 Connection Organizer _ 🗆 🗙 Eile Method Target Opened Connection Files: User Methods: [User Methods] Name Type Command debug.con 4 Connected Targets: Name Method Processes •

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:

Create N	ew Connection Method
Name:	пзЭжж
Туре:	ARMulator (rdiserv)
	Create Cancel

- 4 Do these steps:
 - a In the Name input box, enter ns9xxx (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:

ARMulator (rdiserv) Connection Editor
Name: ns9xxx
Type: ARMulator (rdiserv)
Log Connection to file:
Target Setup script:
Connect for: (* Download (Download and debug application) (* Attach (Debug application already on target) (* Board Setup (Debug board initialization sequence)
Connection Download Advanced Debug
Processor: ARM9TDMI
☐ Little Endian
rdiserv -cpu ARM9TDMI -bigendian -dll C:/epi/rdimajic.dll
Connect OK Cancel Revert Apply

- 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:

Name: n	Эххх	
Гуре: 🛛	Mulator (rdiserv)	
Log Cor	nection to file:	h
Farget Setu	script	P
	MULTI C Legacy	
	C Board Setup (Debug board initialization sequence)	
Connectio	Download Advanced Debug	
Connectio	Download Advanced Debug	
Connectio	Download Advanced Debug	
Connectio	Download Advanced Debug configuration GUI msd.map settings eakpoints when stepping	
Connectio	Download Advanced Debug configuration GUI msd.map settings eakpoints when stepping e system calls	
Connection Displa Use a Use b Servio Memory S	Download Advanced Debug configuration GUI msd.map settings eakpoints when stepping s system calls ze:	
Connection Displa Use a Use b Servia Memory S	Download Advanced Debug Configuration GUI msd.map settings eakpoints when stepping e system calls ze: DI DLL: C:/epi/rdmajic.dll Choose	
Connectio Displa Use a Use b Servin Memory S V Use F	Download Advanced Debug Configuration GUI msd.map settings eakpoints when stepping e system calls ze: DI DLL: C:/epi/rdmajc.dll Choose	
Connectio	Download Advanced Debug Configuration GUI msd.map settings eakpoints when stepping e system calls zet DI DLL: C:/epi/rdimajic.dll Choose	
Connectio		

- 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.

portb - HyperTerminal	
le Edt Yew Cal Irander Help	
) 📽 🕫 🕉 🛱	
NET-WORKS Version 6.2 Copyright (c) 2000-2004, NETsilicon, Inc. PLATFORM: ns9750_a RPPLICHINO: Type your application name here	
NETHORY INTEFACE PRANMETERS: IP address on LPH is 7.32.187.134 IP address of LPH is 7.32.187.134 IP address of default sateway to other networks is 7.92.187.218 HRROWRE PARAMETERS: Serial Channels will use a baud rate of 9600 This board's serial number is N99999999 This board's serial number is N99999999 This board's serial number is N99999990 This board's serial number is N99999990 This board's serial number is N99999990 Difault duplex setting for Ethernet connection: phy Default	
Press any key in 5 seconds to change these settings. RCE: Have IP address on interface eth0: 7.92.187.134 Network IP configured. Hello World! -	

- 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:

Connection Organizer	-					
Ele Method Larget						
Opened Connection Files:	User Meth	odr.				
[User Nethods] debug.con	Name		Туре	Comman	d :	
Connected Targets:	4					±
Name		Method			Processes	5
a						1

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:

Macraigor OCD (ocdserv) Connection Editor						
Name:	Raven-sp					
Type:	Macraigor OCD (ocdserv) for ARM					
🔲 Log (Connection to file:		li i i i i i i i i i i i i i i i i i i			
Target S	etup script:	C:\netos62_ghs\debu	ugger_files\connectsp_raven.mbs			
		MULTI C Legacy				
Connect	Connect for: Connect for: Conn					
Connec	Connection Advanced Debug					
C E C M Host	Remo Ethernet OCDemon MacDemon Name: Port:	te	Local C Wiggler Raven Parallel Port LPT1			
Proces	Processor: NEMERIA Endian: Big					
setup=C	:\netos62_ghs\deb ct	ugger_files\connectsp_	raven.mbs ocdserv -cpu netarm -port RLPT1 -big			

- 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 pulldown menu, select NetARM. From the Endian pulldown 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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