

NET+Works with Green Hills Getting Started Guide



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Using this guide

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m R}_{
m eview}$ this section for basic information about this guide, as well as for general support

contact information.

About this guide

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

Software release

This guide supports NET+OS 6.3. By default, this software is installed in the C:\netos63_ghs directory. The instructions in this guide are based on the assumption that NET+Works is installed in the default installation directory.

Who should read this guide

This guide is for software engineers and others who use NET+Works for 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 table describes the typographic conventions used in this guide:

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

Related documentation

- The Hardware Installation Guide describes how set up the hardware.
- NET+Works with Green Hills BSP Porting Guide describes how to port the board support package (BSP) to a new hardware application using Green Hills.

Digi strongly recommends that you go to the porting guide after you complete the tasks in this guide to learn about using the central build system.

- NET+Works with Green Hills Programmer's Guide describes how to use NET+OS to develop programs for your application and hardware.
- NET+Works online help describes the application programmer interfaces (APIs) that are provided with NET+OS. The online help is located in C:\netos63_ghs\Documentation.

For information about third-party products and other components, review the documentation CD-ROM that came with your development kit.

For information about the processor you are using, see your NET+Works hardware documentation.

Documentation updates

Digi occasionally provides documentation updates on the Web site.

Be aware that if you see differences between the documentation you received in your NET+Works package and the documentation on the Web site, the Web site content is the latest version.

Customer support

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

- United States telephone: 1 877 912-3444
- International telephone: 1 952 912-3444
- email: digi.info@digi.com
- Web site: http://digi.com

Introduction

This document provides a series of tasks in which you will:

- Install NET+Works with Green Hills.
- Request and install a license for the Green Hills software.
- Configure the IP address for your development board.
- (MAJIC only) Configure the address for your MAJIC probe and configure the MAJIC probe.
- 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

You must do the all the tasks in this guide, in the order in which they are 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.

Task 1: Getting ready

This section describes what you need to do before you begin the tasks in this document.

The instructions in this document are based on the assumption that you have already installed your hardware.

Gather information (MAJIC only)

See your network administrator for this information, which you'll need to set up the MAJIC's IP address and configure the development board. Write the information in the space provided:

- IP address for the board:
- IP address for the MAJIC:
- Subnet mask:
- Default gateway:

Save files and close applications

Save all open files and close any open applications, because after you install the software, you will reboot your PC.

Verify your access rights

Make sure you have administrative rights on the PC on which you are installing NET+Works.

Verify hardware requirements

Verify that your PC is running either Microsoft Windows 2000 or XP. Be aware that Windows 95/98/ME and Windows NT 4.0 are *not* supported.

MAJIC upgrades

If you have a previous version of the MAJIC firmware, you *must* upgrade it. See the Appendix.

What's next?

Go on to the next task, where you'll install NET+Works.

Task 2: Installing the NET+Works software

In this task, you will install the NET+Works software on your system. The software installation uses a wizard to guide you through the process.

About the installation

During the installation, if you register NET+Works, you are prompted for a serial number. Use the serial number that's located on your development board. If the development board is not available, use Vnnnnnnn.

The NET+Works software uses a wizard to install the software. The major components are installed in this order:

- 1 Green Hills software
- 2 NET+OS

After the Green Hills software is loaded, you see a prompt about whether to restart your PC. You *must* click Yes, I want to restart my computer now. After you restart your system, continue to follow the wizard instructions.

► To begin the NET+Works installation:

Place the installation CD in your CD drive, and follow the wizard prompts.

What's next?

Go to the next task to complete the Green Hills installation.

Task 3: Finishing the Green Hills installation

This task describes how to complete the installation of your Green Hills software.

When you browse on your NET+Works installation CD, be careful not to reinvoke the installation program.

To complete the installation:

- 1 Using your NET+Works installation CD, browse to and double-click \GHS405\image\licensing\legacy\Setup.exe
- 2 Follow the Green Hills software setup for installation.
- 3 When the installation is complete, click Finish in the Install Shield Wizard.
- 4 Using your NET+Works CD, browse to and double-click \GHS405\image\licensing\dongle_drivers\SSD5411-32bit.exe
- **5** Follow the Sentinel System Driver Install Shield Wizard for a complete install.
- 6 When the installation is complete, click Finish in the Install Shield Wizard.

What's next?

To be able to use the Green Hills software, you need a license key. Go on to the next section for instructions about requesting one.

Task 4: Requesting a Green Hills software license key

In this task, you will request a license key for your Green Hills software.

If you are upgrading from a prior NET+OS/Green Hills installation, you do not need to request and install a Green Hills license. Skip to Task 7, "Configuring the IP address of the development board."

About the Green Hills license keys

Before you can use the Green Hills MULTI software, you must request and install a software license key. You can request:

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

Digi strongly recommends that you request both license types at the same time. With an evaluation license key, you can start using the software immediately, while getting a permanent license key can take up to 15 business days.

You use the MULTI Licensing Wizard to create a license request that you can either e-mail, fax, or mail to Green Hills. The wizard prompts you for information such as:

- The number of licenses you want
- Whether the license is computer-locked or dongle-locked
- The type of computer on which you will use the software
- Whether the license key is an evaluation (temporary) or permanent license

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

About license types

If you request a computer-locked license, you must use it on the PC from which you request the license.

If you request a dongle-locked license, you must attach the dongle to your PC before you begin the license request procedure.

Requesting a license

To request a license:

1 Click the MULTI icon on your desktop.

The MULTI Launcher opens:



Because you don't yet have a license, a warning popup window also opens:

MULTIN	AULTI v4.0.5
⚠	No MULTI licenses available. [license request failed: license server can not be contacted.] Launching License Manager Administration GUI.
	OK

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

The MULTI Licensing Wizard opens:

🗰 MULTI Licensing Wizard								
Green Hills	Total Solutions For Embedded Development							
Welcome to the Green Hills licensing wizard.								
Select one of the following op	ations:							
Request a license from G Install a license which I al Install or Configure license Check for new licenses. Obtain a commuter lease Perform license administra Verity license configuratio	reen Hills. ready have. e server software on this machine. license from a local license server. tition tasks. n.							
🔲 Take me straight to the administra	tion panel when launching this utility.							
Generate Support Request	< Back Quit							

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.

🗰 MULTI Licensing Wizard	
Green Hills	Total Solutions For Embedded Development
Welcome to the Green Hills licensing	wizard.
Select one of the following op	ations:
Request a license from G Install a license which I al Install or Configure license Check for new licenses. Obtain a commuter lease Perform license administra Verify license configuratio	reen Hills. ready have. e server software on this machine. license from a local license server. tion tasks. n.
🔲 Take me straight to the administra	tion panel when launching this utility.
Generate Support Request	< Back Quit

This window opens:

💥 MULTI Licensing Wizard		
Green Hills	Total Solutions For Embedded Developm	nent
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, and then click Next.

The License Request Generator opens with this form:

License Req	uest Generator		
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)			
		< Back	Next > Cancel

6 Fill in the form, leaving the GHS User ID (if known) field blank, and 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	
Pesktop	Advanced Help
< Back Next>	Cancel

- 7 Do these steps:
 - Enter the number of licenses you want to request.
 - Under License Availability, click the type of license you want.

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

- Click your computer type.

Then click Next.

This window opens:

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

- 8 Under License Type, click Evaluation, and then click Next. The Green Hills Software 30-day license agreement opens.
- **9** Review the license agreement, and then click Yes.

The License Request Generator window opens.

If the License Request Generator window doesn't open, you see this dialog box:

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

This message indicates that you did not connect the dongle.

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

If the License Request Generator does not return a copy of your license request (shown next), stop and call 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
Product: NULTI 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-CHS-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 you are making the request has e-mail, click Send.
 - If the PC from which you are making the request does not have e-mail, click Save to File. Then go to a system that has e-mail, and send your 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 your permanent license, repeat this task but at step 8, click Permanent for the license type.

What's next?

Within an hour, you receive an e-mail message that either:

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

Go on to the next task, where you'll save your license key to your PC.

Task 5: Saving the license key

When you receive the e-mail message from Green Hills, save the attachments to a folder on the PC on which you plan to install the license.

What's next?

Now you need to install your Green Hills license. Go on to the next task.

Task 6: Installing the Green Hills license key

In this task, you will install the evaluation license key you received by e-mail from Green Hills.

When you receive your permanent license, follow the directions provided by Green Hills with your license. To launch the MULTI Licensing Wizard from the MULTI Launcher, select Utilities \rightarrow License Administrator.

- ► To install the evaluation license key:
- 1 Double-click the MULTI icon on your desktop. The MULTI Launcher opens:



Because you don't 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 a pop-up window from the MULTI License Administrator opens:



- 3 To continue, click OK in the pop-up window.
- 4 In the MULTI Launcher window, select File \rightarrow Close Launcher.

The MULTI Licensing Wizard remains open.

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

If you did not close the MULTI Launcher window, the MULTI Licensing window prompts you to close all MULTI windows. Close the other MULTI windows, and click Next in the MULTI Licensing Wizard.

The Choose License File dialog box opens:

Choose License	- File				? 🗙
Look in:	GHS		•	+ 🗈 💣 💷+	
My Recent Documents Desktop	🗀 arm405				
My Documents					
My Computer					
My Network Places	File name: Files of type:	License File (*.lck, *.key, *.st	1)	• •	Install Cancel

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

💥 MULTI Licensing Wizard	
Green Hills	Total Solutions For Embedded Development
If you continue to have licer generate a support request.	nsing problems, you can try again or
Start Over	
Generate Support Request	CBack Next> Quit

The installation takes a few minutes. This window, which doesn't require any response from you, remains open during the installation process

Then the Update Licenses window opens:



- 7 If you see any error messages in the Update Licenses window, contact Technical Support.
 Otherwise, click Close.
- 8 In the MULTI Licensing Wizard, click Quit.

What's next?

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

Task 7: Configuring the IP address of the development board

In this section, you'll configure the IP address of your development board.

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

- To configure the IP address of your development board:
- 1 Do one of these steps:
 - Windows XP systems. Select Start → All Programs → NET+OS 6.3 Green Hills → HyperTerminal Connection, and then select either COM1 or COM2 - whichever you connected your development board to.
 - Windows 2000 systems. Select Start → Programs → NET+OS 6.3 Green Hills → HyperTerminal Connection, and then select either COM1 or COM2 - whichever you connected your development board to.
- 2 Reboot the development board by disconnecting it from the power source and reconnecting it.

You see this information in the HyperTerminal window:



3 Press any key.

You have only five seconds to press a key.

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

You are prompted for a root password.

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.

As you scroll through the settings, a prompt indicates that you must press a key within five seconds if you want to change additional settings.

What's next?

If you are using a MAJIC probe, go on to the next section, where you'll set up the MAJIC's IP address.

If you are using a Raven debugger, you're ready to build the software. Skip to Task 10, "Building the BSP, libraries, and sample applications."

Task 8: Setting up the IP address of the MAJIC probe

This section describes how to set up the IP address of the MAJIC probe. In this procedure, you'll use the EPI MAJIC Setup Wizard and provide the information you got from your network administrator.

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 probe.

- ► To set up the MAJIC's IP address:
- 1 Using the serial cross cable that ships with the MAJIC, connect the MAJIC to an available COM port on your PC.

If you don't have an available connection on your PC, reuse the one that's already connected to the development board. In this case, close all applications associated with the COM port, such as HyperTerminal.

- 2 Do one of these steps:
 - Windows XP systems. Select Start → All Programs →
 EPI Tools-EDTA 2.2a→ MAJIC Setup Wizard.
 - Windows 2000 systems. Select Start → Programs → EPI Tools-EDTA 2.2a → MAJIC Setup Wizard.

The EPI MAJIC Setup Wizard Introduction window opens:



3 Click NEXT.

The Choose Operations window opens:

MAJIC Setup - Choose Operation: 🛛 🗙
Setup a Debug Environment 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
QUIT

4 From the Type of Connection pulldown menu, select Static IP Address for Ethernet, and then click Go.

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

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

- **5** Enter the information you got from your network administrator:
 - IP Address
 - Subnet Mask
 - Default Gateway

and then click NEXT.

The MAJIC Connection Parameters window opens:

MA	JIC Setup - MAJIC Connection Parameters	X
	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 ethemet hostname to communicate with my MAJIC. Hostname: I will be using an ethemet IP address to communicate with my MAJIC. Use my Static IP address I 0 . 52 . 32 . 135	
	<back inste<="" quit="" td=""><td>ll IP</td></back>	ll 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 pulldown menu, select the serial port number.

Make sure no other programs are using the COM port you select.

c Click Install IP.

The Install Static IP dialog box opens:



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

A dialog box and a DOS window open.

8 In the Check Your Installation Result dialog box, 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 your MAJIC probe to your LAN hub or switch.
- **10** After the MAJIC probe turns off, power-cycle the MAJIC.
- 11 In the DOS window, ping the IP address by entering:

ping IP_ADDR

where *IP_ADDR* is the IP address of the MAJIC.

This is what you should see in the DOS window:

C:\WINNT\system32\cmd.exe	- 🗆 ×
Capturing output into setip.out MON> fwo o setip ; do tv_ipx	-
<pre>// NAME = VALUE DESCRIPTION eo tv_ip_gateway = 10.52.32.135 // Static IP address for target 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>	
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>	

(Note that 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 you don't see this response, do these steps:

- Check the Ethernet connection to the MAJIC
- Confirm that the IP parameters are legal
- Verify that you power-cycled your MAJIC Otherwise, repeat this task.
- **12** Close the DOS window.

In the Check Your Install Results dialog box, click OK.

What's next?

Go on to the next task for instructions about configuring the MAJIC probe.

Task 9: Configuring the MAJIC probe

In this task, you will set up the MAJIC probe by making software configuration settings. The EPI MAJIC Setup Wizard leads you through the process in which you'll make selections and provide information.

To configure the MAJIC probe:

- 1 Start the MAJIC Setup Wizard by doing one of these steps:
 - Windows XP systems. Select Start → All Programs →
 EPI Tools-EDTA 2.2a → MAJIC Setup Wizard.
 - Windows 2000 systems. Select Start \rightarrow Programs \rightarrow EPI Tools-EDTA 2.2a \rightarrow MAJIC Setup Wizard.

The EPI MAJIC Setup Wizard Introduction window opens:

🛎 EPI MAJIC Setup Wizard - Introduction 🛛 🛛 🔀
We Shorten Your Design Time
606 Valley Way, Milpitas, CA 95035, Tel.(408) 957-0350, Fax (408) 957-0307, www.epitools.com
The MAJIC Setup Wizard may be used to:
Configure your debug environment. Install MA IIC firmure or bardware undetee
Set the MAJIC's ethernet IP parameters.
There are a number of additional configuration settings for advanced features and personal preferences which are not addressed in this wizard. Once you have verified the base line configuration, you should review the "Advanced MAJIC Probe Configuration" section of the
QUIT Majic Setup Wizard Ver: 3.6 (ARM arch)

2 After you review the introduction, click NEXT.

The Choose Operation window opens:

MAJIC 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).	Go
<u>E</u> ?	QUIT

3 From the Choose Your Debugger pulldown 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 h blocks when creating various startup and configuraiton files.	neader
Project Name: ns9xxx	
Enter a one line description of your project:	mm
For ARM9 related Green Hills debugger	?
<back quit<="" td=""><td>NEXT></td></back>	NEXT>

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 appl to EDB/MON)	ý
<back next<="" quit="" td=""><td>>)</td></back>	>)

- 5 Do these steps:
 - a From the Select Your Processor Type pulldown menu, select ARM926EJS.
 - Under Select your Target's Endianness, click BigEndian.
 Under Startup Connection Mode, click Instrusive Mode (reset and stop processor).

Then click NEXT.

The MAJIC Connection Parameters window opens:

MA	JIC 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
	I will be using an ethernet hostname to communicate with my MAJIC.
	Hostname:
	☞ [will be using an ethernet IP address to communicate with my MAJIC]
	Use my Static IP address 🗨 10 . 52 . 32 . 196
	<back next="" quit=""></back>

- 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 you provided in Task 8, step 6.
 - c Make sure Use My Static IP address is selected.

Then 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 continue using a startup file that you already have, choose the first option below and then browse to the desired file. Or, you may choose to create a new startup file if there is no suitable file available.											
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 74:25 // Project na9750/ns3360 // Description: ARM9 GDB ▼											
Create New Startup File. Adjust Default Properties											
<pre> QUIT NEXT></pre>											

- 7 Click Use Existing Startup File, and do these steps:
 - a Click Browse.
 - b Navigate to the Program Files → EPI Tools → edta22a → Targets → ns9xxx directory, select the startice.cmd file, and click Open.

Click NEXT.

The Destination Directory window opens:

Destinat	ion Directory		×								
Select the directory that you wish to create and/or copy your configuration files to If the directory does not exist, you will be asked if you wish to create it.											
In the GDB case, you must copy the resulting files to your Linux or Solaris system where you intend to run mdi-server. Please consult the "GDB readme.txt file"fo details.											
€ Se	elect a Destination Directory	to Create/Copy Startup Files to:									
c:\epi Brow											
			?								
< B.A	ICK	QUIT	(NEXT>)								

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

Then browse to the directory you want 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 doesn't use any spaces.

Click NEXT.

The **Perform Setup** window opens with a summary of your selections:



9 Check Enabled for each item, then click Perform Actions.

This step creates MAJIC setup files in the directory you specified in step 8.

If the directory doesn't exist, the MAJIC Setup Wizard prompts you with a pop-up warning to create one. Click Yes to create the directory.

10 To exit from the wizard, click Done.

What's next?

You're ready to build the software. Go on to the next task, in which you'll build the BSP, libraries, and sample applications.

Task 10: Building the BSP, libraries, and sample applications

In this section, you will build the BSP, libraries, and sample applications, including Hello World, which is one of the template applications provided with NET+Works. This simple application writes Hello World to the HyperTerminal window (which you opened in Task 7, step 1).

About building

You use one build file for each platform as the main access point for building all the libraries, the BSP, and the applications you need for a NET+OS project.

When you build a platform, always open the parent build file for that platform. From there, you can either:

- Build the entire system.
- Navigate to your application's build file, and build the application.
- Navigate to your bsp platform build file, and build the BSP.

Building the entire system

This section uses the NS9360 as an example.

- ► To build the entire system:
- 1 Open Green Hills MULTI v4.0.5 by double-clicking the MULTI icon on your desktop.

The MULTI launcher opens:

🗮 MULTI Launcher				_ 🗆 🗵
<u>File U</u> tilities <u>W</u> indows	<u>Processes</u> <u>C</u> onfig <u>H</u> el	p		
<no workspaces=""></no>	- 🛃 🏊 💌	🐼 📴 🕏	-	<u>₄-</u> -
In The MULTI Laun launch all maj workspaces tha environments. If you have no should use the install them f	formation about cher toolbar pr or IDE componen t can be custom t yet installed : License Manage irst.	the MULTI L ovides the a ts and manag ized to your your produc r Administra	auncher bility to (e user-def common wo: t licenses tion utili	easily ined rking , you ty to
Don't show this mess	age again	V	Start with MUL1	TI Launcher

- 2 Select File \rightarrow Open Project Builder.
- **3** Browse to \netos63_ghs, and select your platform.

For example, to build the NS9360 development board, select ns9360_a.gpj.

The MULTI Project Builder window opens.

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

You see the build take place, as shown here:

💦 C:\netos62_ghs\ns9360_a.gpj - MULTI Project Builder												
<u>File Edit Build Connect Debug Tools Wi</u> r	ndows <u>H</u> elp											
💐 🚅 🔲 🗼 🛍 🛍 📮 😜 🗷												
Find:			~									
Name	Туре	Options										
netos62_ghs\ns9360_a.gpj	Project	-bsp generic -I. :sou	arceDir=I.\bi									
Image: Book and the second	Project	-I.\build\ns9360_a\32	2b :sourceDir=.'									
			<u></u>									
Compiling sflash.c because -al	Compiling sflash.c because -all was specified											
Compiling sflsem.c because -all was specified												
Archiving libsflash.a because	Archiving libsflash.a because sflsem.o has changed											
Compiling snmp_api.c because -	all was specified											
Archiving libsnmpd.a because s	nmp_api.o has chang	ed	_									
Compiling posqueue.c because -	all was specified		-									
C:\netos62_ghs\ns9360_a.gpj			ARM ThreadX									

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

Building an individual application

You can rebuild an individual application by selecting the application and selecting **Build**, as shown in this example.

1 Navigate to the template application for the ns936@_a platform, as shown here:

💦 C:\netos62_ghs\ns9360_a.gpj - MULTI Project Builder 📃 🔟 🗙											
<u>File Edit Build Connect Debug Tools Windows</u>	Help										
🕺 🍃 🔲 🗼 🖻 🛍 🔓 🛠 🐛	💌 🗷										
Find:											
Name Type Options											
🖻 netos63_ghs\ns9360_a.gpj	Project	-bsp generic -I. :sc									
🗆 🗆 ./ns9360 a/32b/template.gpj	Project	-I.\build\ns9360 a\3									
😑 system.gpj	Project	-I.\build :sourceDir									
-⊞ library.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\$									
custom_app.gpj	Project -I.\build\ns936										
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									

2 Select Build \rightarrow Rebuild image.

You see the build take place in the window.

What's next

You're ready to run and debug the template application. Go on to the next task.

Task 11: Running and debugging the template application

You run and debug the application in the builder window. This section describes how to debug the application using both the MAJIC probe and the Raven debugger.

Running the application with the MAJIC

- ► To run the template application using the MAJIC probe:
- In the MULTI Project Builder window, select Debug → Debug image.

You see this in the window:



2 Select Target \rightarrow Show Connection Organizer.

The Connection Organizer window opens:

Connection Organizer				
Opened Connection Files:	User Methods:			
[User Methods]	Name	Type	Command	
	Click	anywhere	in this section	
Connected Targets:				
Name	Method		Processes	s
.				Ľ

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 box opens:

Ereate Ne	w Connection Method
Name:	пз9жж
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.

Then click Create.

The ARMulator (rdiserv) Connection Editor opens:

ARMulator (rdiserv) Connection Editor
Name: n:9xxx
Type: ARMulator (rdiserv)
🔲 Log Connection to file:
Target Setup script:
MULTI C Legacy
Connect for: Cownload (Download and debug application) C Attach (Debug application already on target) C Board Setup (Debug board initialization sequence)
Connection Download Advanced Debug
Processor: ABM9TDMI
🖵 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 pulldown menu, select ARM9TDMI. (This option is compatible with the Net+Silicon ARM926EJS-based processors.)
 - b Uncheck Little Endian.
 - c Click the Advanced tab.

You see this information in the center of the window:

ARMulator (rdiserv) Connection Editor
Name: ns9xxx
Type: ARMulator (rdiserv)
🗖 Log Connection to file:
Target Setup script:
MULTI C Legacy Connect for: O Download (Download and debug poplication) Attach (Debug application already on target) O Board Setup (Debug board initialization sequence)
Connection Download Advanced Debug
Use armsd.map settings
Use breakpoints when stepping
Memory Size:
Use RDI DLL: C:/epi/rdimajic.dll Choose
rdiserv -bigendian -dll C:/epi/rdimajic.dll
Connect OK Cancel Revert Apply

- 6 Do these steps:
 - a Check 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 you 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 (/).
- 7 Click Apply.
- 8 Close the ARMulator (rdiserv) Connection Editor by clicking OK, and then close the Connection Organizer window.
- **9** If a HyperTerminal window is not open, open one as you did in Task 7, step 1.
- **10** In the MULTI Debugger window, select Target \rightarrow Connect.

The Connection Chooser dialog box opens:



- 11 Check that the target name matches the name you entered in step 4a.
- 12 In the Connection Chooser dialog box, click Connect.
- 13 To start running the application, in the MULTI Debugger window, select Debug \rightarrow Go.

If you have difficulty connecting, you may need to select Target \rightarrow Disconnect from Target, and then go back to step 10 and continue.

When the application is loaded and starts running, the application dialog appears in the HyperTerminal window, as shown here:

🗣 portb - HyperTerminal	
Bie Edit Yew Call Dransfer Help	
D 📽 🐵 💲 🗠 🗃	
NET+WORKS Version 6.2 Copyright (c) 2000-2004, NETsilicon, Inc. PLATFORM: ns9750_a MPPLICHTION: Type your application name here	
NETWORK INTEFIGE PROMETERS: IP oddress on LDN is 7 92 187 134 LDN interface's submet wask is 255.255.255.0 IP address of default gateway to other networks is 7.92.187.218 INTERMENT PROMETERS: Serial channels will use a baud rate of 9600 This board's MRC #ddress is 00.408.090.000.000 Rfter board is reset, start-up code will wait 5 seconds Default duples 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! -	
Connected 0.09:18 ANSIW 9600 8-N-1 SCROLL CAPS MUM Capture Print echo	

Note that Hello World appears in the last line of the window.

14 Select Debug \rightarrow Halt.

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

b main

and press Enter.

- **15** Select Target \rightarrow Disconnect from Target.
- 16 Repeat steps 10 through 13 of this task.

When you reach the breakpoint, you see this:



17 To continue execution, select Debug \rightarrow Go.

You have now completed all the tasks in this guide.

Running the template application with the Raven debugger

- To run the template application using the Raven debugger:
- In the MULTI Project Builder window, select Debug → Debug image.

You see this in the window:

Eie Debug Vew Browse Target Look Config Windows Help Image: Setup Vector Table(); 200 15 setup Vector Table(); 211 16 #idder ESP_ARM9 202 17 NARnableHmu(); 203 18 #endif 204 19 NARoardInit (); 205 20 205 21 207 22 NAGetAppCpp(); 208 23 209 24 tx_kernel_enter(); /* Enter the ThreadX kernel Source File NULTI>	2	::\neto	s62	_ghs\s	src\a	pps\t	empl	ate\32	o\ima	ge - M	ULTII	Debu	gger							(
Image: Second	File	Debug	⊻ie	w <u>B</u> ro	wse	Targel	t <u>T</u> oc	ls <u>⊂</u> on	ig <u>W</u> i	ndows	Help											
200 IS→ setupVectorTable(); /* setup standard vector t 201 IS #Idef BSP_ARM9 202 I7 NAEnableMmu(); 203 IS #endif 204 I9 NABordInit (); /* initialize the hardware 205 20 DDIFirstLevelInitialize(); /* let device drivers init 207 22 NAGetAppCpp(); 208 23 209 24 tx_kernel_enter(); /* Enter the ThreadX kerner Source FRe mainc Phoc. main • • • •	3	₩	3			đ	\$: 8;	圓	٢	(\mathbb{N})	R	0	2	₹.,	Ż	۶			
204 19 NABoardInit (); /* initialize the hardware 205 20 DDIFirstLevelInitialize(); /* let device drivers init 206 21 207 22 NAGetAppCpp(); 208 23 209 24 tx_kernel_enter(); /* Enter the ThreadX kernet 209 24 tx_kernel_enter(); /* Enter the ThreadX kernet 209 25 FHz main 209 27 ThreadX kernet 209 24 tx_kernel_enter(); /* Enter the ThreadX kernet 209 24 tx_kernel_enter(); /* Enter the ThreadX kernet 200 25 ThreadX kernet 200 27 ThreadX kernet 200 28 ThreadX kernet 200 29 ThreadX kernet 201 20 ThreadX kernet 201 20 ThreadX kernet	200 201 202 203	15 16 17 18	:	#ifd #end	set lef NAE: lif	upVec BSP_i nable	ctor ARM9 ∋Mmu	Table	();						/	* 36	tup	sta	undar	d ve	ctor	t_
209 24 tx_kernel_enter(); /* Enter the ThreadX kernet 29 24 tx_kernel_enter(); /* Enter the ThreadX kernet 500 25 File main C Proc. main • • • • • • • • • • • • • • • • • • •	204 205 206 207	19 20 21 22	:		NAB DDII NAG	⊃ard: Firs† ≘tApj	Init tLev pCpp	(); ≘lIni ();	iali	ze ()	;				1	* ir * le	iti t d	aliz evic	e th e dr	e ha iver:	cdwa 3 in	re it
Source ▼ File main.c ▼ Proc: main ▼	209	24	:	_	tx_	kerne	el_e:	nter (;		_				',	* Er *	iter	the	Thr	eadX	ker	n∈ ↓ ↓ ↓
	Sou M	uce v	Fik	e: [mair	nc						•	Proc:	main							•	-	1 1

2 Select Target \rightarrow Show Connection Organizer.

The Connection Organizer window opens:

Connection Organizer						102
Opened Connection Files:	User Method	r.				
[User Methods] debug.con	Name		Туре	Command	1	
Connected Taxaste	•					
Name		Method			Processes	5
4						

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

The Create New Connection Method dialog box opens:

Create N	lew Connection Method		
	Deven en		_
Name:	naven-sp		
Type:	Macraigor OCD (ocdserv) for ARM		-
		Create Cance	
			_

- 4 Do these steps:
 - a In the Name input box, enter a descriptive name for your 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:			
Target Setup script: C:\netos62_ghs\debugger_files\connectsp_raven.mbs			
MULTI C Legacy			
Connect for: Convolutional (Download and debug application) Contact (Debug application already on target) Contact (Debug board initialization sequence)			
Connection Advanced Debug			
Remote Local C Ethernet OCDemon C MacDemon G Raven			
Port Parallel Port LPT1			
Processor: NEWERM Endian: Big			
setup=C:\netos62_ghs\debugger_files\connectsp_raven.mbs ocdserv -cpu netarm -port RLPT1 -big			
Connect OK Cancel Revert Apply			

- 5 In the Macraigor OCD (ocdserv) Connection Editor, do these steps:
 - a In the input box next to Target Setup script, navigate to the netos63_ghs\debugger_files\ directory, and select the script for your platform. The scripts have a .mbs extension.
 - **b** In the Local section of the window, click Raven. Then, from the Parallel Port pulldown menu, select your parallel port for the local connection
 - c In the Processor section of the window, from the Processor pulldown menu, select NetARM. Then, from the Endian pulldown menu, select Big.

Click Apply.

6 Close the Macraigor OCD (ocdserv) Connection Editor by clicking OK, and then close the Connection Organizer window.

7 In the MULTI Debugger, select Target → Connect.
 The Connection Chooser dialog box opens:



- 8 Check that the target name matches the name you entered in step 4a.
- 9 In the Connection Chooser dialog box, click Connect.
- **10** In the MULTI Debugger window, select Debug \rightarrow Go to start running the program.

If you have difficulty connecting, you may need to select Target \rightarrow Disconnect, and 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 \rightarrow 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 \rightarrow Disconnect from Target, and repeat steps 7 through 10.

When you reach the breakpoint, you see this:



13 To continue execution, select **Debug** \rightarrow **Go**.

You have now completed all the tasks in this guide.

Tips and suggestions

Now that you've completed the exercise, here are some tips for when you start using NET+Works with Green Hills with your own projects.

Where should I put my code, and why?

Add your code as a subdirectory in the netos63_ghs/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 you to reload new code after it's running in flash. Without the FTP server in your application, you can't re-flash the system.

To load your specific settings, edit the root.c file. To make your board settings, edit the appconf.h file.

For information about modifying Makefiles, see the NET+Works with Green Hills BSP Porting Guide.

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), which is located in: netos63_ghs/src/bsp/platforms/your platform.
- Your application (image.bin), which is located in netos63_ghs/src/examples/your example/32b.

What do I need to know?

You need to become familiar with the central build system. Digi strongly recommends that you go to the *NET+Works with Green Hills BSP Porting Guide* to learn how to use the central build.

Appendix: Updating the MAJIC probe's firmware

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

You must do this procedure if you have a previous version of the MAJIC firmware.

If you need to set up the IP address of the MAJIC probe, see Task 8.

- To update the MAJIC's firmware:
- 1 Start the MAJIC Setup Wizard by doing one of these steps:
 - Windows XP systems. Select Start \rightarrow All Programs \rightarrow EPI Tools-EDTA 2.2a \rightarrow MAJIC Setup Wizard.
 - Windows 2000 systems. Select Start \rightarrow Programs \rightarrow EPI Tools-EDTA 2.2a \rightarrow MAJIC Setup Wizard.

The EPI MAJIC Setup Wizard Introduction window opens:

🛎 EPI MAJIC Setup Wizard - Introduction 🛛 🛛 🔀
We Shorten Your Design Time
606 Valley Way, Milpitas, CA 95035, Tel.(408) 957-0350, Fax (408) 957-0307, www.epitools.com
The MAJIC Setup Wizard may be used to:
Configure your debug environment.
Set the MAJIC's ethernet IP parameters.
There are a number of additional configuration settings for advanced features and personal preferences which are not addressed in this wizard. Once you have verified the base line configuration, you should review the "Advanced MAJIC Probe Configuration" section of the
QUIT Majic Setup Wizard Ver: 3.6 (ARM arch)

2 After you review the introduction, click NEXT.

The Choose Operation window opens:

MAJIC Setup - Choose Operation:	×
Setup a Debug Envirnonment	Go
Update Your MAJIC Choose Update Type: Firmware Update	Go
Configure MAJIC's Ethernet Port (Static IP).	Go
E2	QUIT

3 From the Choose Update Type pulldown menu, select Firmware update.

Then click Go.

The MAJIC Connection Parameters dialog box opens:

The MAJIC Firmware Update Installer dialog box 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	2		
<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.

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 . 33 . 159		
<back quit="" td="" upde<=""><td>ate]</td></back>	ate]	

- 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 box opens:



6 To begin the update, click OK.

A DOS window and the Check Your Installation Result dialog box open.

The firmware download takes place in the DOS window:

🖼 C:\WINDOWS\system32\cmd.exe	- 🗆	×
Establishing communications with remote target via 10.52.33.159		•
Connection verified		
larget System: Eri midic frome, version: 3.6.4, S/N 308NS074		
Target CPII: ARM920T		
Ethernet: at address 00:80:CF:00:17:64		
IP address: 10.52.33.159, Subnet mask: 255.255.248.0		
Trace Buffer: None		
Connected via: Ethernet UDP/IP		
Device name: 10.52.33.159		
larget Englan: Dig		
Mon > /*	*/	
MON> /* startice.cmd: startup command file for F/W update.	*/	
MON> /*	*/	
MON> //		
MON> eo Ice_Power_Sense = Off /* leave disconnected during F/W update */		
MUNY // (eller) (') mailing (') mailing and the second sec		
How (Closing C. Majicupuate (ice Majicubate) read scartice.cmu/		
MoN>+0		
loading memory image file		
Validating download and programming EEPROMs		-

- 7 When the download finishes, do one of these steps:
 - If the download was successful, click OK in the Check Your Installation Result dialog box.
 - If the download was not successful, click Cancel in the Check Your Installation Result dialog box, and repeat this procedure.



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