NS9750 Release Notes: NET+Works with GNU Tools

Operating system: NET+OS 6.1
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www.netsilicon.com

Contents

Using This Document

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

About this document

This document describes how to build and debug a sample application using NET+OS 6.1 with GNU Tools.

Software release

The content of this document supports NET+OS 6.1. By default, this software is installed in the `C:/NETOS61_GNU/` directory.

Who should read this document

This document is for software engineers and others who use NET+Works for NET+OS. To complete the tasks described in this document, 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 document

This table describes the typographic conventions used in this document:

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

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Documentation updates

NetSilicon 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.

Building and Debugging a Sample Application

This document provides a brief hands-on tutorial for NET+OS with GNU Tools.

Overview

In this tutorial, you will:

- Set up the MAJIC debugger.
- Build and download a sample application.
- Run and debug the sample application.
- Specify configuration options for the development board.

The tutorial is brief — it will take approximately 10-15 minutes — so you can go through it in one sitting.

Task 1: Preparing to do the tutorial

This section describes what you need to do before you get started.

Make sure the hardware and software are installed

Verify that the hardware and software are installed. The hardware installation instructions are in the *Quick Install Guide*, and the software installation uses a wizard to guide you through the process.

The instructions in this tutorial are based on the assumption that you installed NET+Works in `C:/NETOS61_GNU`, the default installation directory.

Gather information

See your network administrator for information you'll be prompted for when you configure the development board.

Here's what you need to find out; you may find it helpful to write down the information in the space provided:

- IP address for the board _____
- IP address for the MAJIC _____
- Subnet mask _____
- Default gateway _____
- MAC address _____

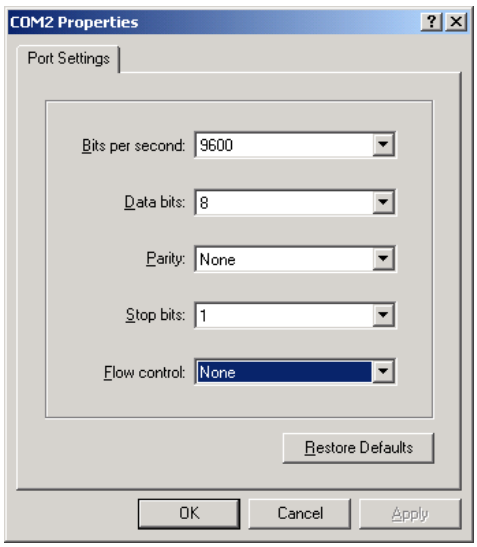
Start a terminal session

From your PC, open a terminal connection to the development board so you can view outputs from the board. Although several applications are available for this purpose, the one shown in this tutorial is HyperTerminal.

To open HyperTerminal:

1 Select **Start → Programs → Accessories → Communications → HyperTerminal**.

2 Make sure the selections are set up as shown here:



As you do the tutorial, keep the HyperTerminal window open for quick access.

Task 2: Setting up the MAJIC debugger

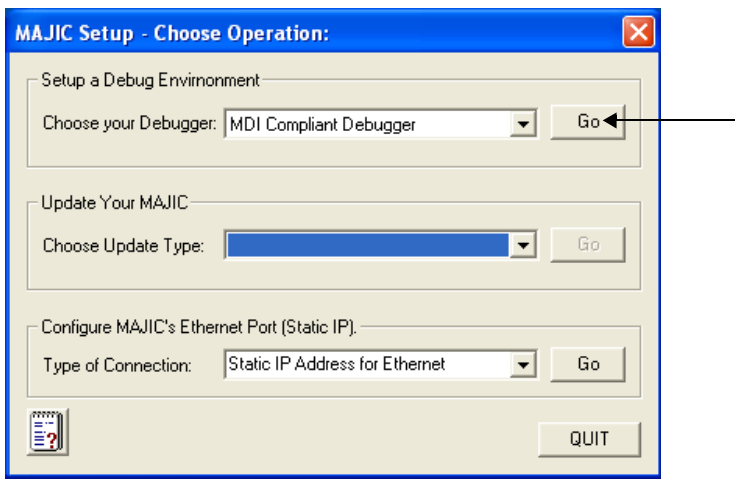
▶ **To set up the debugger:**

1 Set up a MDI server icon — the interface between the gdb and the MAJIC — by selecting **Start → All Programs → EPI Tools-EDTA → MAJIC Setup Wizard**.

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

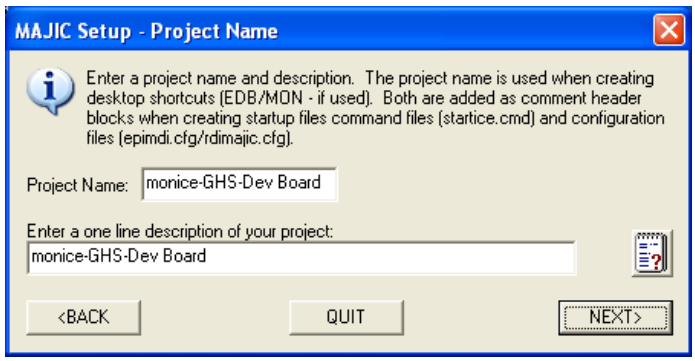
2 Click **NEXT**.

The **Choose Operation** window opens:



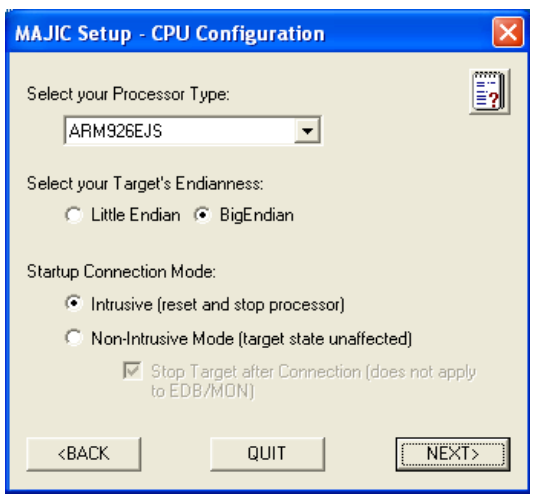
3 From the **Choose your Debugger** list, select **MDI Compliant Debugger**, and then click **Go**.

You go to the **Project Name** window:



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

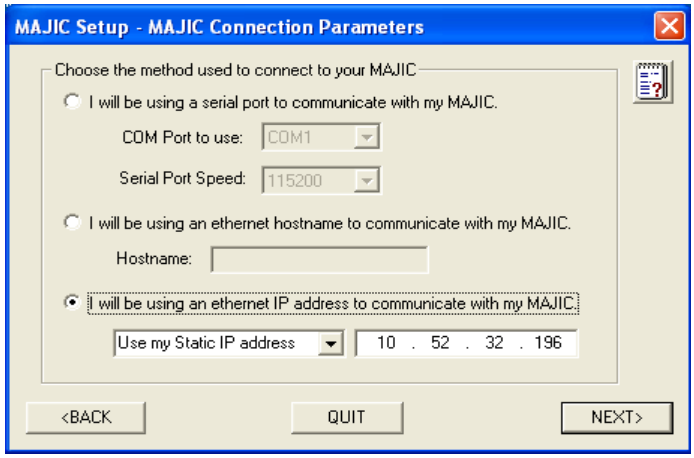
You see the CPU Configuration window:



5 Do these steps:

- From the **Select Your Processor Type** pulldown menu, select **ARM926EJS**.
- Under **Select your Target's Endianness**, click **Big Endian**.
- Under **Startup Connection Mode**, click **Intrusive Mode**, and click **NEXT**.

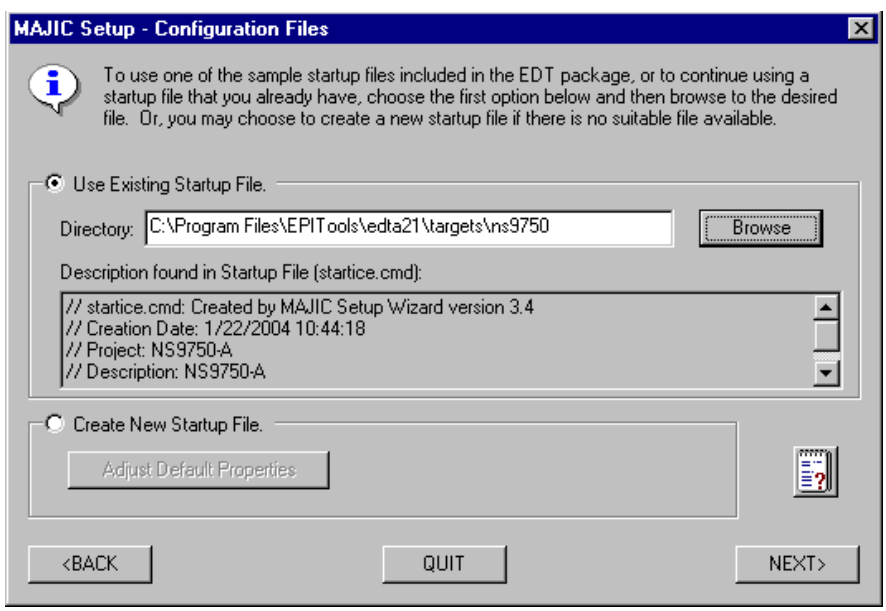
The **MAJIC Connection Parameters** window opens:



6 Do these steps:

- Click **I will be using an Ethernet IP address to communicate with my MAJIC.** Then enter the IP address for the MAJIC.
- Make sure **Use my Static IP address** is selected, and click **NEXT.**

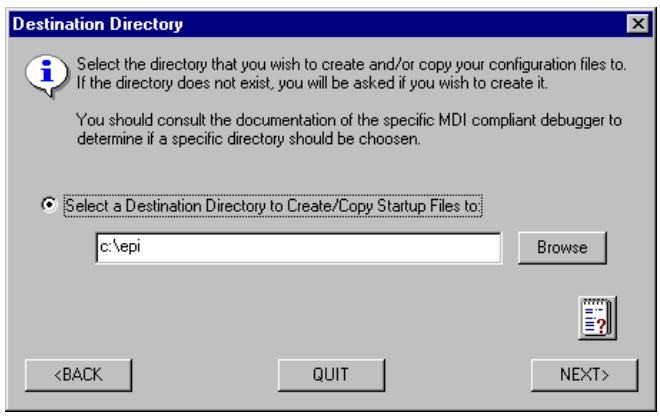
The **Configuration Files** window opens:



7 Click **Use Existing Startup File**.

Then browse to the **Program Files** → **EPI Tools** → **EDTA21** → **Targets** → **ns975** directory, click the `startice.cmd` file, and click **NEXT**.

You see the **Destination Directory** window:

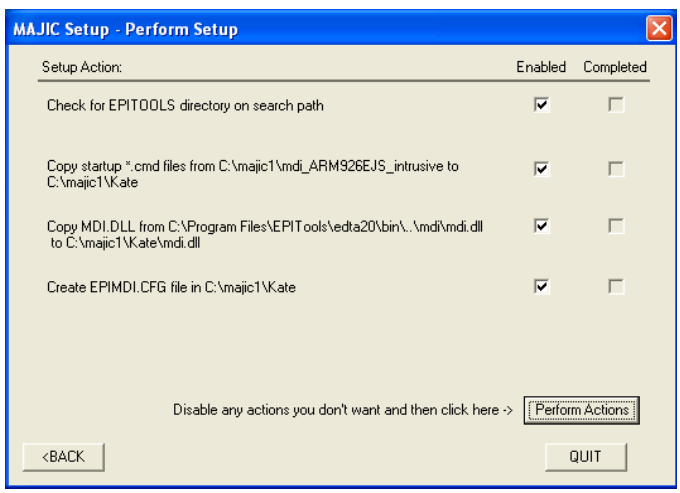


8 Click **Select a Destination Directory to Create/Copy Startup Files to**.

Then browse to the directory you want to use for the files that are created or copied during the MAJIC setup, and click **NEXT**.

Make a note of the directory name you select; you will need the information later in this procedure.

9 You see the **Perform Setup** window, with a summary of your selections:



10 Check **Enabled** for each item, and click **Perform Actions**.

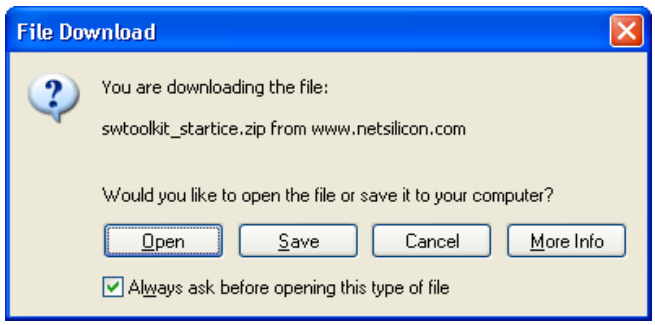
This step creates MAJIC setup files in the directory you specified in step 8.

The setup program also creates a shortcut to the MDI-server on your desktop.

11 To exit from the wizard, click **Done**.

12 Using your browser, go to `www.netsilicon.com/support/softwaretoolkit.jsp`, and click **NET+OS 6.1 MAJIC debugger update (June 2004)**.

The **File Download** dialog box opens:



13 Do either of these steps:

- Open the `startice.cmd` file and extract it to the directory you selected in step 8, overwriting the existing `startice.cmd` file.
- Save the `swtoolkit_startice` WinZip file and unzip it to the directory you selected in step 8, overwriting the existing `startice.cmd` file.

Task 3: Setting up the IP address

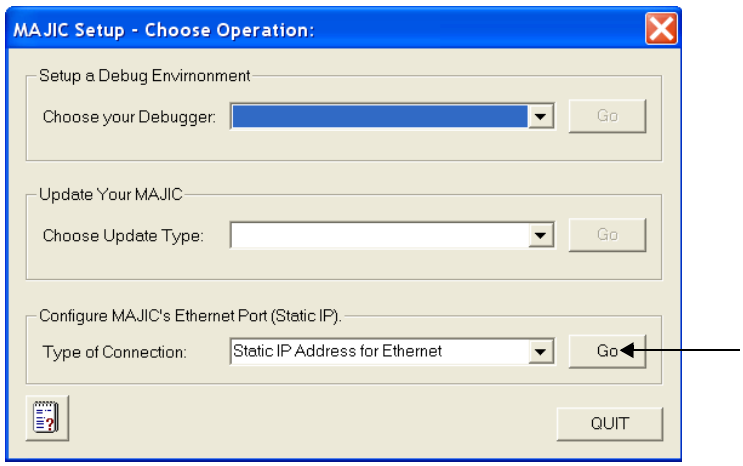
To set up the IP address of the MAJIC:

1 Select **Start** → **All Programs** → **EPI Tools-EDTA** → **MAJIC Setup Wizard**.

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

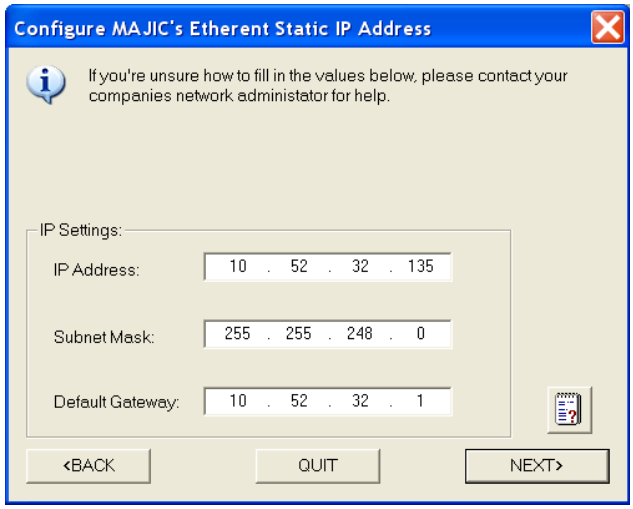
2 Click **NEXT**.

The **Choose Operation** window appears:



3 From the **Type of Connection** pulldown menu, select **Static IP Address for Internet**, and then click **Go** (as indicated by the arrow).

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

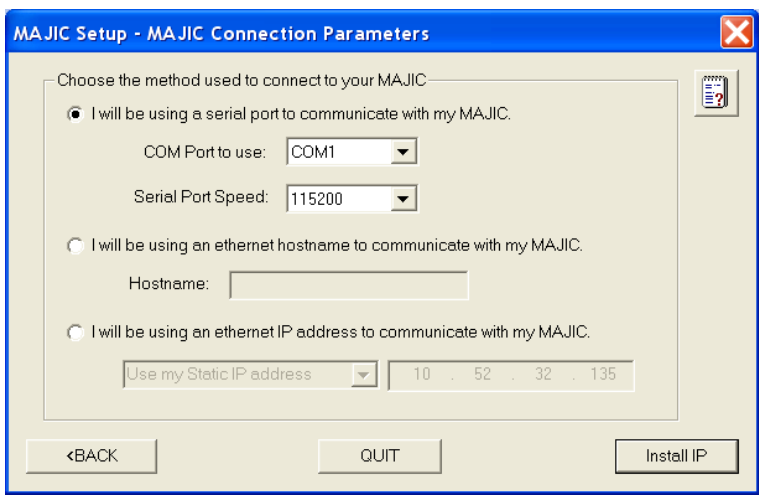


4 Enter the information that you previously gathered:

- IP address
- Subnet mask
- Default gateway

and click **NEXT**.

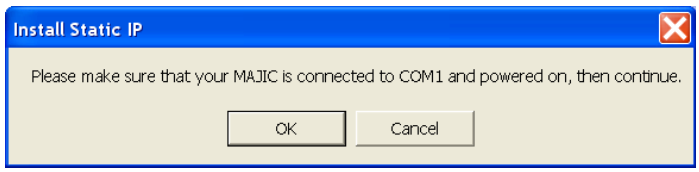
The **MAJIC Connection Parameters** window opens:



5 Do these steps:

- Click **I will be using a serial port to communicate with my MAJIC**.
- Connect the MAJIC serial crossover cable between the MAJIC serial port and an available COM port on your PC. Then, from the **COM port to use** pulldown menu, select the serial port number.
- Click **Install IP**.

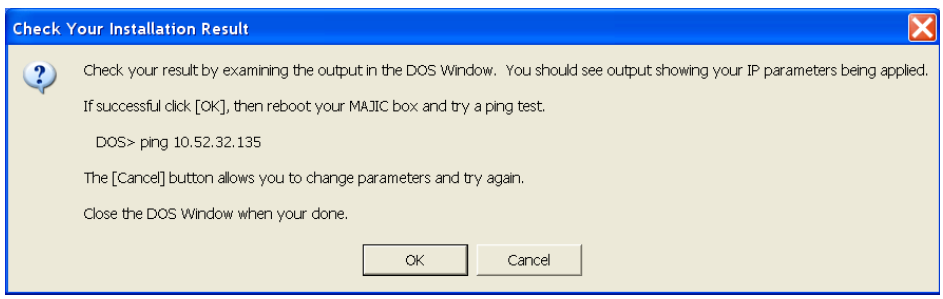
You see this dialog box:



6 Verify that the serial cable is attached from your PC to the MAJIC, and then click **OK**.

A dialog box and a DOS window open.

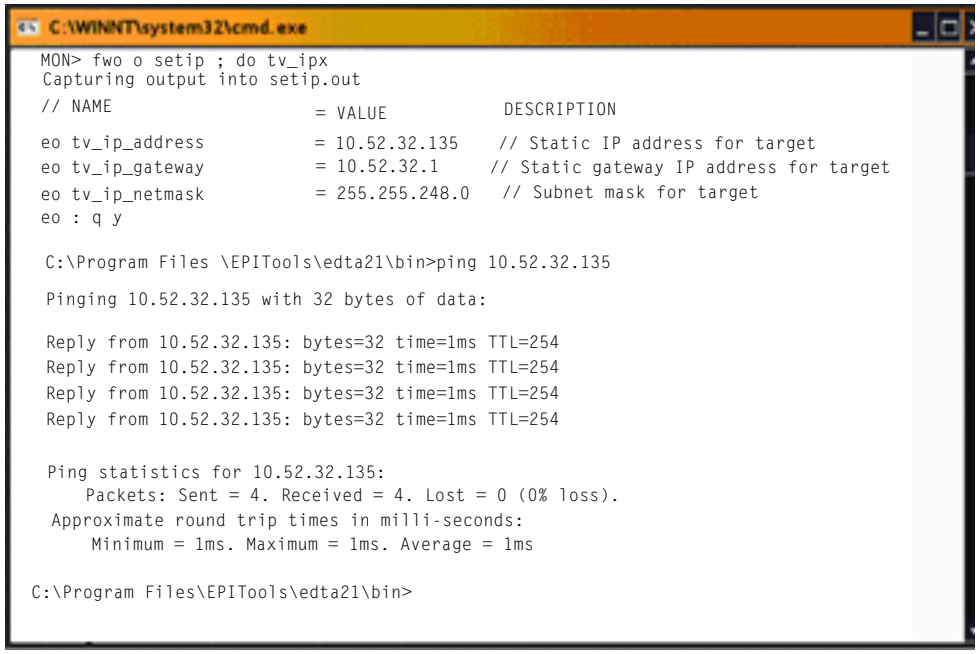
7 The **Check Your Installation Result** dialog box prompts you to verify that the IP address information in the DOS window is correct:



8 Power-cycle the MAJIC.

9 In the DOS window, `ping` the IP address.

This is what you see in the DOS window:



(Note that the colors of the window are reversed here for easier reading.)

If the ping reply is successful, the IP address is installed.

10 Close the DOS window.

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

Task 4: Building and downloading the template application

In this section, you will build the BSP and `Hello World`, one of the template applications provided with NET+Works. You also will download the application.

Building the BSP

In typical use, you don't need to build the BSP every time you build an application. The first time you use the software, however, you *must* first build the BSP, and then build your application.

▶ **To build the BSP:**

1. Double-click the GNU X-Tools shell on your desktop.

   An X-tools window opens.

2. In the GNU X-Tools shell, enter:

   ```
   xtools arm-elf
   ```

   and press Return.

   This message appears:

   ```
   arm-elf bash shell ready
   ```

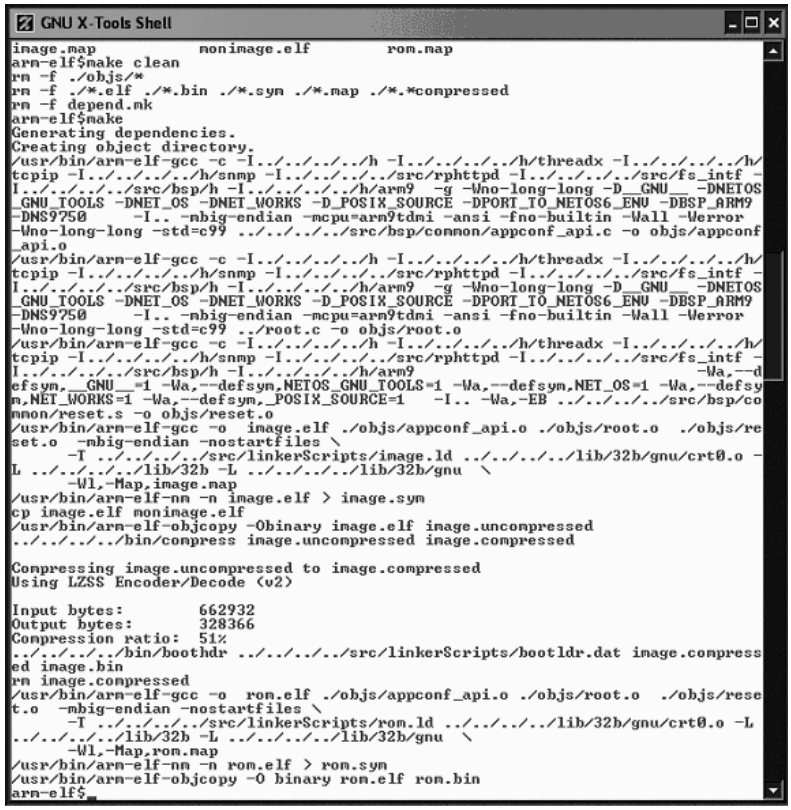
3. Change to the directory that contains the BSP, and then press Return:

   ```
   cd c/:netos61_/src/bsp/
   ```

4. To build the BSP, enter this command and press Return:

   ```
   make clean all
   ```

You see the build taking place in the X-Tools window:



(Note that the colors of the window are reversed in this illustration for easier reading.)

The build takes several minutes to complete.

Building the template application

▶ **To build the template application:**

1. Change to the directory in which the template resides:

   ```
   cd c:/netos61:gnu/src/apps/template/32b
   ```

2. Enter this command:

   ```
   make gdbinit
   ```

   and press Return.

This step creates a `.gdbinit` file, which is the GNU debugger initialization file. This is the only time you'll need to use this command.

3 To build the application, enter this command:

```
make
```

and press Return.

This command builds the `image.elf` file, which is your image to download to the debugger, and `rom.bin` is the corresponding ROM image.

The process, which you can see in the console window, takes just a few seconds.

Downloading the template

▶ **To download the template application:**

1 Power cycle the development board and the MAJIC.

Note that the MAJIC's status light is green.

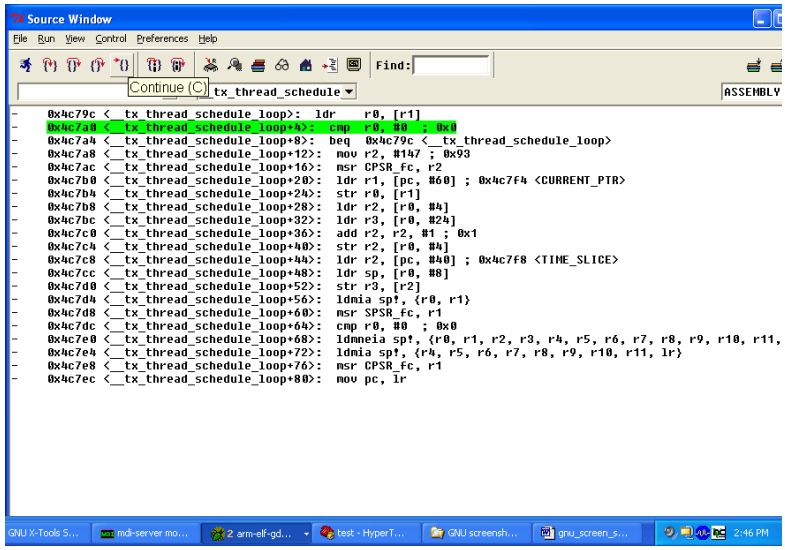
2 Click the MDI server icon (which you created when you set up the MAJIC) on your desktop.

3 To start up `gdb`, the debug environment, enter this command from the `c:/netos61:gnu/src/apps/template/32b directory`:

```
gdbtk -se image.elf
```

and then press Return.

The GNU debugger **Source** window appears:



The download begins and takes about one minute to complete.

At this point, you can run and debug the application.

Task 5: Running and debugging the application

You run and debug your application from the debugger window.

To run the template application, do either of these steps:

- Select **View → Console.**

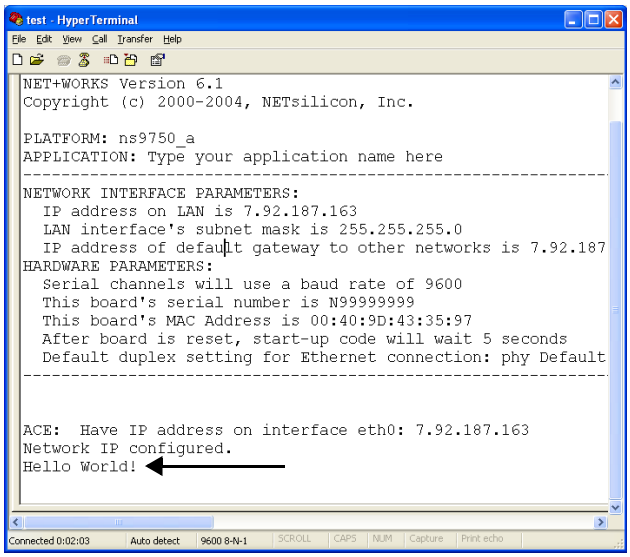
  This step opens a GNU Console window in which you can enter GDB commands.

  Enter `c` in the Console window and press Enter.

- In the Source window, click this icon:

  → { }

The sample application appears in the terminal window:



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

▶ **To debug the template application:**

1. Click Stop.
2. Do either of these steps:
   - Click to the left of a line of code on which to set the break point.

     A red square appears when you set the breakpoint.
   - Enter this command in the Console window:

     `b` *`function name`*

     where you replace *`function name`* with the function at which you want to insert the break point.

     and then press Return.
3. Either click { } or enter `c` in the Console window and press Return.

   Execution starts and then stops at the break point.
4. To continue debugging, click Go again.

   The sample application reappears.

Configuring the development board

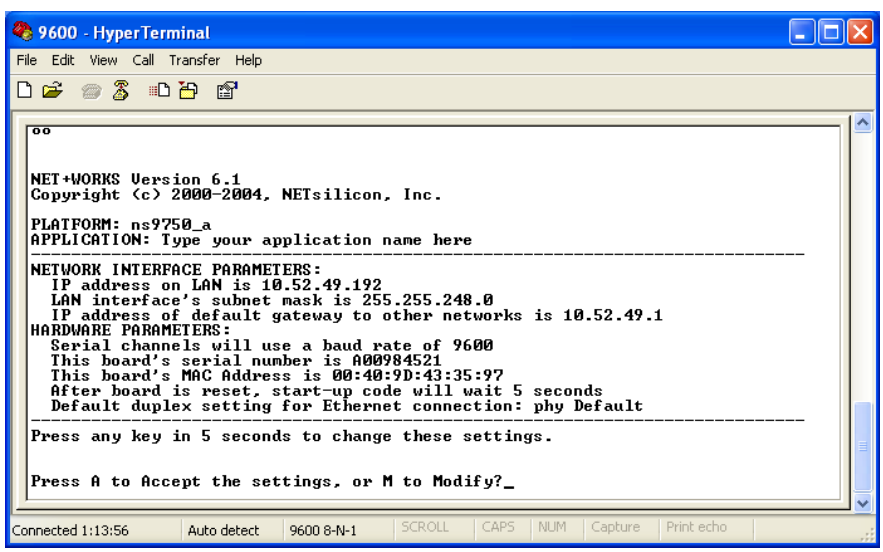
In this procedure, you need to be prepared to go quickly to your HyperTerminal window immediately after you do step 4 because you have only a few seconds to respond to the prompt.

▶ **To configure the development board:**

1. Reboot the development board by disconnecting it from the power source and then reconnecting it to the power source.
2. In the `appconf.h file`, verify that the `USE_NVRAM` define is set to `1`.

   If you need to change this setting, you must rebuild your application.
3. Get ready to go to the HyperTerminal window, and run the application again as you did in the section 'Task 5: Running and debugging the application."

   You see this information in the HyperTerminal window:



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

   You see a prompt to enter a password.

5 Enter `Netsilicon`, the default password.

The first of a series of configuration prompts appears.

6 At each configuration prompt, do one of these steps:

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

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