ISP Daisy Chain Download Reference Manual

Version 5.0

Technical Support Line: 1-800-LATTICE or (408) 428-6414
pDS4104 -RM Rev 5.0

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Fax: (408) 944-8450
E-mail: applications@latticesemi.com

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Preface

This preface contains sections about the following information:

- Purpose of this reference manual
- What is in this reference manual
- Where to look for information
- Documentation conventions
- Other related documentation

Purpose of this Reference Manual

This reference manual describes the capabilities and use of the in-system programmable Large Scale Integration (ispLSI®) circuit download software and procedures. It serves as a primary learning guide for downloading the JEDEC files with the configuration setup (.dld) files to programmable devices.

This reference manual is intended for use by design engineers who are knowledgable in system design and architecture and in the use of design programs. This manual contains information to guide you through the download process, using a single device or multiple devices daisy-chained together in-system in PC Windows® environments.

What is in this Reference Manual

This reference manual contains the following information and procedural tasks:

- ISP Daisy Chain Download ***(ispDCD)*** software structure
- ISP Daisy Chain Download setup procedures
- Managing ISP Daisy Chain Download files
- Working with the Graphic User Interface (GUI)
- Setting a User Electronic Signature (UES)
- Device programming
- Daisy-chaining multiple devices
- Turbo downloading
- Generating ATE Vector Files
- Simulating ATE Functions

Where to Look for Information

Chapter 1, Introduction – Provides an introduction to the manual and gives the installation procedure for the ISP Daisy Chain Download software.

Chapter 2, ISP Daisy Chain Download Overview – Provides an overview of the download process using the ISP Daisy Chain Download software.

Chapter 3, Device Programming – Illustrates in detail how to perform device programming using the Lattice Semiconductor ISP Daisy Chain Download system software tool.

Documentation Conventions

The table below lists the documentation conventions used in this reference manual.

Convention	Definition and Usage
Italics	Italicized text represents variable input. For example: *design*.dld This means you must replace *design* with the file name that you used for all the files relevant to your design. Valuable information may be italicized for emphasis. Book titles appear in italics. The beginning of a procedure also appears in italics. For example: *To create a new configuration:*
Bold	Valuable information may be boldfaced for emphasis. Commands are shown in boldface. For example: 1. Select **Command** ⇒ **Turbo Download** ⇒ **Build** from the ISP Daisy Chain Download menu.
`Courier Font`	Monospaced (Courier) font indicates file and directory names and text that the system displays. For example: The `C:\DDOWNLD\EXE` subdirectory contains...
`Bold Courier`	Bold Courier font indicates text you type in response to system prompts. For example: C:> **`dld <path_name><file_name>`**
|...|	Vertical bars indicate options that are mutually exclusive; you can select only one. For example: **`OK|Cancel`**
"Quotes"	Titles of chapters or sections in chapters in this reference manual are shown in quotation marks. For example: See **Chapter 2, "ISP Daisy Chain Download Overview."**
✍ ***NOTE***	Indicates a special note.
▲ **CAUTION**	**Indicates a situation that could cause loss of data or other problems.**
❖ **TIP**	Indicates a special hint that makes using the software easier.
⇒	Indicates a menu option leading to a submenu option. For example: **Command ⇒ Turbo Download ⇒ Build**

Mouse Terminology

The following conventions are used throughout this manual to describe 3-button mouse techniques.

Term	Definition
Select	Highlight text and/or an option in a menu or dialog box using the mouse.
Press	Hold down a mouse button.
Click	Press and release the specified mouse button – once.
Double-click	Quickly press and release the specified mouse button – twice.

Related Documentation

- *pLSI and ispLSI Development System User Manual*
- *pLSI and ispLSI Development System Reference Manual*
- *ISP Manual*
- *ispDS+User Manual*
- *Lattice Semiconductor Data Book*
- *ispDS Design Manager User Manual*
- *ispDS Getting Started Manual*

Chapter 1 *Introduction*

This chapter provides an introduction to the ISP Daisy Chain Download (ispDCD) system hardware and software requirements, installation procedure, and how to get help. The Lattice Semiconductor Corporation (LSC) ISP Daisy Chain Download software supports the Microsoft Windows (3.1, 95, NT) environment.

System Requirements

To run the ISP Daisy Chain Download software you need a system comprised of the following hardware and software.

Hardware

- IBM® PC-AT™ 386/486 or higher
- 1 serial port
- 1 parallel port
- 8 MB RAM
- Approximately 500 KB of disk space for ISP Daisy Chain Download software
- EGA/VGA display (VGA is recommended)
- CD-ROM drive
- Mouse, Microsoft Windows compatible

Installation Procedure

The ISP Daisy Chain Download software setup program requires Microsoft Windows 3.1 (running in 386 enhanced mode), Windows NT, or Windows 95 to be installed on the system. The following procedure automatically installs the ISP Daisy Chain Download (ispDCD) software, version 5.0, under the Microsoft Windows environment.

To set up the ISP Daisy Chain Download software:

Insert the auto-install CD into the drive and select **File** ⇒ **Run** from the Program Manager menu. Enter the following command at the prompt:

***cd_drive*:setup**

The install program checks for any existing LSC ispDS or ispDS+ software. At this point, depending on which LSC software you are using, set the correct installation path corresponding to where you loaded the LSC software executables. The following subsections outline three possibilities:

- ispDS Installation
- ispDS+ Installation
- Stand-alone Installation

ispDS Installation

Install ISP Daisy Chain Download version 5.0 in the same directory as the ispDS software. Make certain the `wdownld.sdn` device information file is copied there. For example, during the installation procedure, use the following path at the prompt:

C:*ispds_install_path*

1. The program responds with a series of screens to guide you through the installation process. Follow the instructions on the screen.
2. The install program automatically includes the ispDCD icon in the current LSC group in the Windows Program Manager.

ispDS+ Installation

Install the ISP Daisy Chain Download version 5.0 in the directory that contains the ispDS+ executables for all LSC Windows-based applications. Make certain the `wdownld.sdn` device information file is copied there also. For example, during the installation procedure, use the following path at the prompt:

`C:\`*`pdsplus_install_path`*`\bin`

1. The program responds with a series of screens to guide you through the installation process. Follow the instructions on the screen.
2. The install program automatically creates an LSC group in the Windows Program Manager; it contains the ispDCD icon.

Stand-alone Installation

At the installation prompt:

1. Specify any location you choose for the ispDCD software.
2. The install program automatically creates an LSC group in the Windows Program Manager; it contains the ispDCD icon.

Getting Help

In most cases, this manual will answer many of your questions. However, Lattice Semiconductor Corporation provides assistance should you have further questions about using the ISP Daisy Chain Download software.

Readme File

To access the readme file:

1. Go to the Windows Program Manager.
2. Select the Lattice Semiconductor Group to display the icons (Figure 1-1).

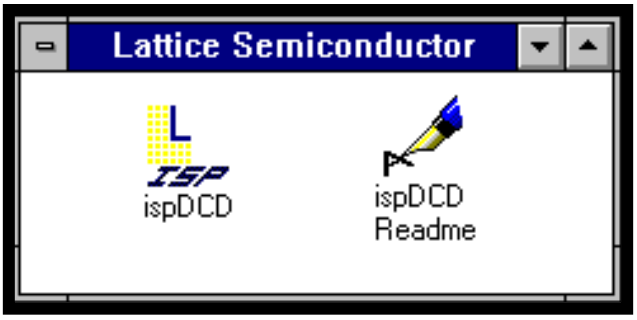

Figure 1-1. The Lattice Semiconductor Group

3. Select the **ispDCD Readme** icon.

Technical Support

Before contacting Lattice Semiconductor Technical Support, take a moment to review the following information for possible answers or solutions.

1. Check to see if the hardware meets the minimum system requirements listed under the **“System Requirements”** section.
2. Consult the Lattice Semiconductor documentation. It will answer most of your questions.
3. Verify that the hardware and peripherals are set up according to their respective documentation and that all cable connections are secure.
4. Verify that the proper installation of Microsoft Windows is running in enhanced mode.

Software Support

Software Update Service

You will receive free software updates for one year when you fill out and return to Lattice Semiconductor the License File/Registration Form included with your software. Extended maintenance agreements are available for purchase. Please contact your local Lattice Semiconductor Sales Representative for additional information.

Customer Hotline

If you have any questions or problems with this software, please call the Lattice Semiconductor Applications Hotline at **1-800-LATTICE** (1-800-528-8423) or (408) 428-6414. The Hotline is available Monday through Friday from 8:00 AM to 5:00 PM, Pacific Time. Or, send e-mail to applications@latticesemi.com.

Information Need	Customer Resource	USA & Canada	Other Locations
ispLSI/pLSI Applications Support	Telephone Hotline	1-800-LATTICE	(408) 428-6414
	Fax	(408) 944-8450	
	Bulletin Board System	(408) 428-6417	
	E-mail	applications@latticesemi.com	
	FTP Site	http://www.latticesemi.com/ftp/index.html	
	World Wide Web	http://www.latticesemi.com	
GAL/ispGAL/ispGDS Applications Support	Telephone Hotline	1-888-ISP-PLDS	(503) 681-0118
	Fax	(503) 681-3037	
	Bulletin Board System	(503) 693-0215	
	E-mail	gal@latticesemi.com	
	FTP Site	http://www.latticesemi.com/ftp/index.html	
	World Wide Web	http://www.latticesemi.com	
Literature	Telephone Hotline	1-800-327-8425	(503) 681-0118
	Fax	(503) 681-3037	
	E-mail	gal@latticesemi.com	
	FTP Site	http://www.latticesemi.com/ftp/index.html	

Chapter 2 ISP Daisy Chain Download Overview

The ISP Daisy Chain Download (ispDCD) software is a comprehensive design download package for the Lattice Semiconductor ISP device families. The ispDCD software provides an efficient method of programming the LSC devices using JEDEC files generated from any compatible software tool. This complete device programming tool helps you to quickly and easily program your devices with your designs.

The ISP Daisy Chain Download software features the following:

- Supports the Microsoft Windows 3.1, NT, or 95 design environments
- JEDEC file transfer via a download cable directly from your system
- JEDEC file transfer to a third-party programmer
- Detection and identification of as many as 64 devices at once
- Easy set-up menus for multiple ports
- Simple device configuration menus
- Single ISP device programming
- Multiple ISP device daisy chain programming
- Mixed chain downloading including JTAG device recognition
- Turbo downloading of daisy-chained devices
- ispSTREAM™ bit building, saving and loading
- Boundary Scan Description Language (BSDL) recognition
- UES (User Electronic Signature) reading and coding
- ATE vector file generation and simulation support
- Online help

Software Design Flow

The ISP Daisy Chain Download software uses any JEDEC file in ASCII format to program, in-system (on the board), a device or multiple devices. The “board” can be one device programmer or it can be inside your CPU on the board itself which requires no external programmer. ISP Daisy Chain Download also recognizes mixed chains with non-LSC JTAG compatible devices.

Once you attach the cables, the ISP Daisy Chain Download software can identify the number of devices you wish to program and be ready to accept your instructions for which files (designs) you want to load onto which device(s). For additional information on how to port the device programmers, see the *isp Engineering Kit Hardware Assembly Manual, Model 100.*

Programming Features

The object of the ISP Daisy Chain Download software is to program ISP devices with your designs on a board (or in system). In-system programming is advantageous because it alleviates the necessity of programming on a device programmer and mounting, plugging, and socketing the devices; it avoids the risk of bent or broken pins from handling. The devices can be programmed again and again depending on your system needs. Also, you can set the security bit to ON or OFF so the device cannot be read once it is programmed.

You can quickly choose the port setup with a pull-down menu. Use the Configuration Setup window to provide the device type, the JEDEC file you want to load onto each particular device, and the operation (e.g., **Program & Verify**, **Checksum**) you want to perform for each device. Once you supply the setup information, you should check your setup to identify any errors and resolve them prior to downloading. Then download the design files onto the appropriate devices as specified.

The ISP Daisy Chain Download software is very easy to use and provides you with a quick and comprehensive analysis of your device programming directions. One screen accesses everything you need to download all the devices.

Figure 2-1 illustrates a typical block diagram of multiple ISP devices cascaded together. The example shows the ISP aspects such as identifying the devices in the daisy chain, shifting commands, bypassing devices, and executing commands.

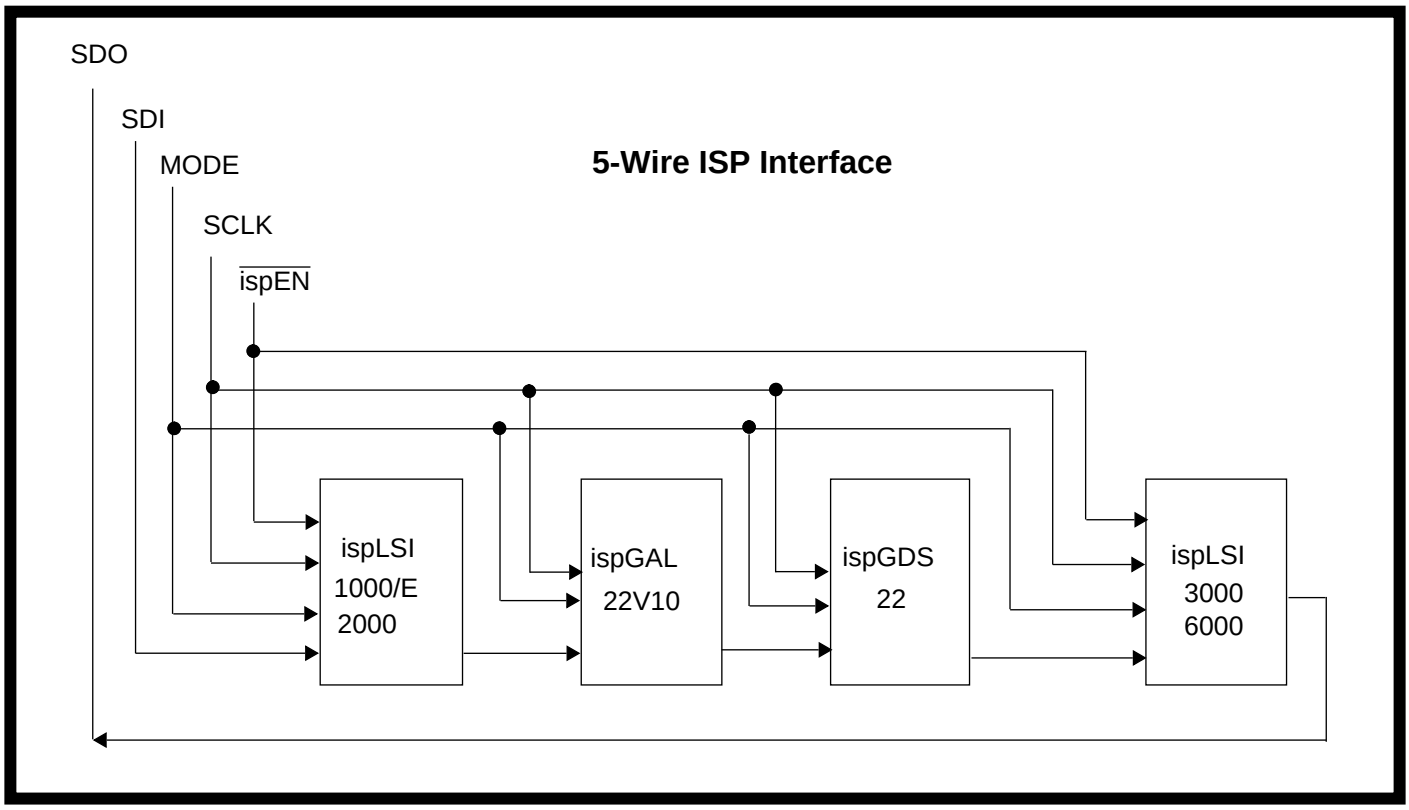

Figure 2-1. Multiple ISP Interface

Figure 2-2 illustrates a typical block diagram of multiple ispLSI devices connected to the 5-wire ispJTAG interface.

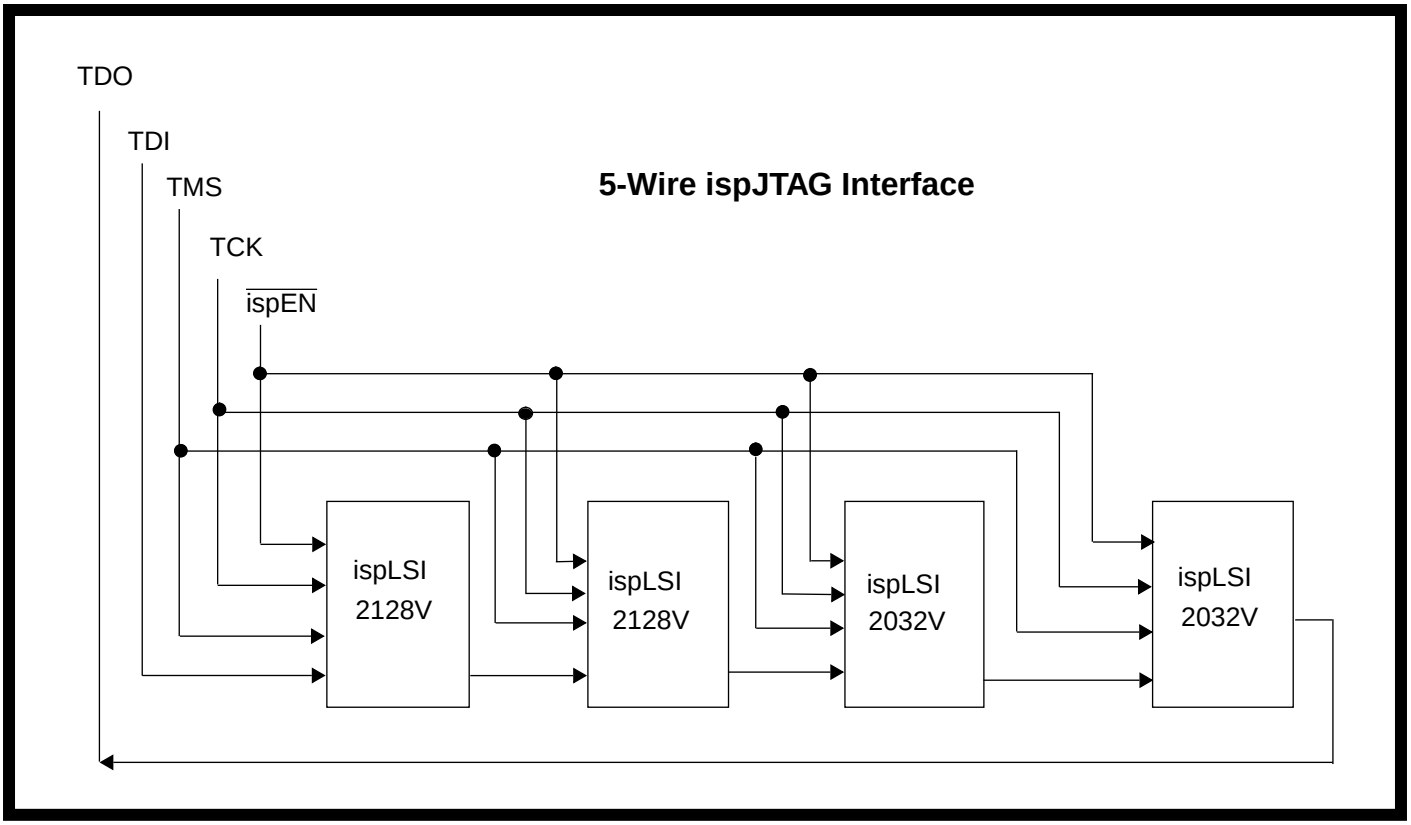

Figure 2-2. Multiple ispJTAG Interface

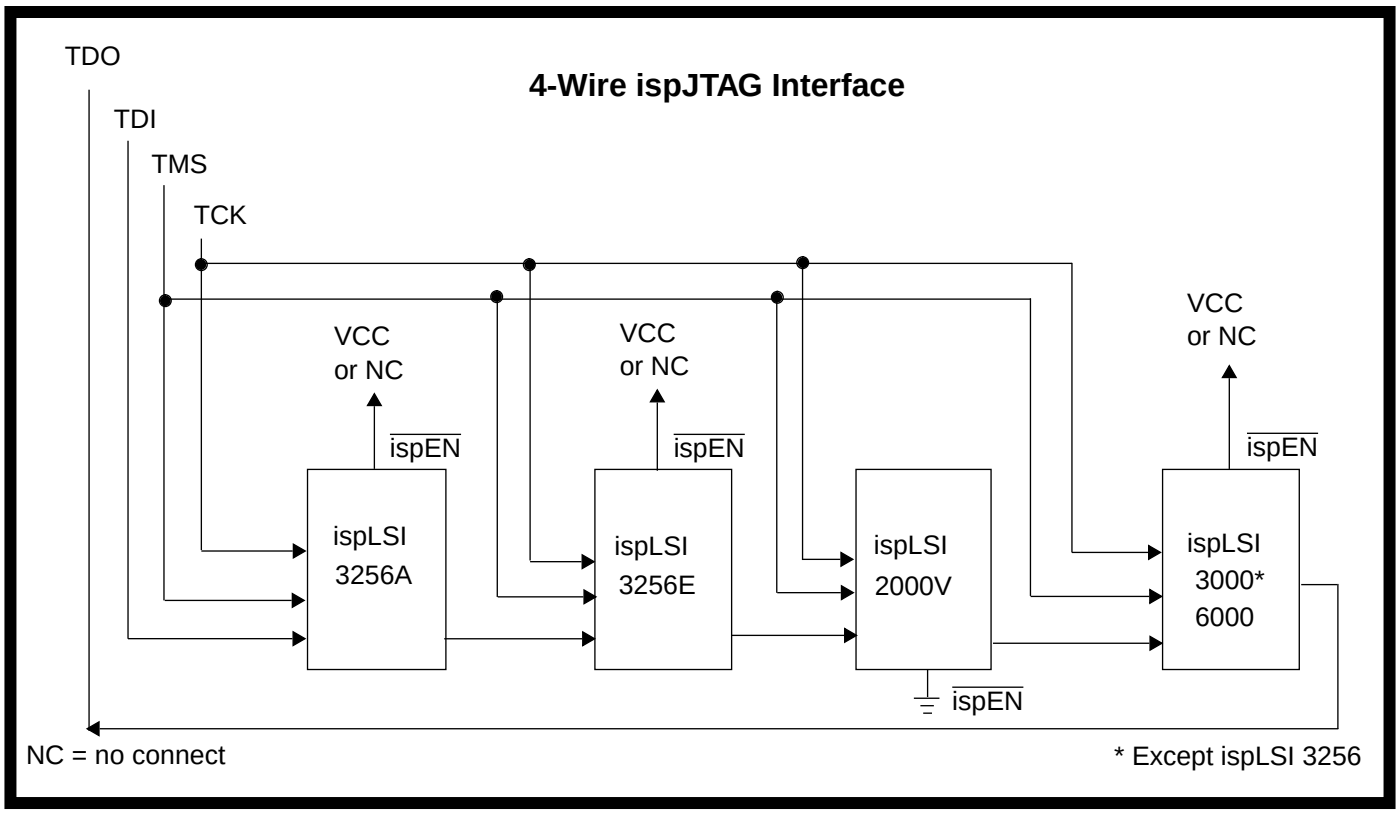

Figure 2-3. ispJTAG Chain Interface

Figure 2-3 illustrates a typical block diagram of multiple ispLSI devices connected to the 4-wire ispJTAG interface. Figure 2-4 illustrates a typical block diagram of multiple ispLSI devices connected to the 5-wire (ISP and ispJTAG) mixed interface. The ispDOWNLOAD Cable v2.0 is requried for the mixed interface.

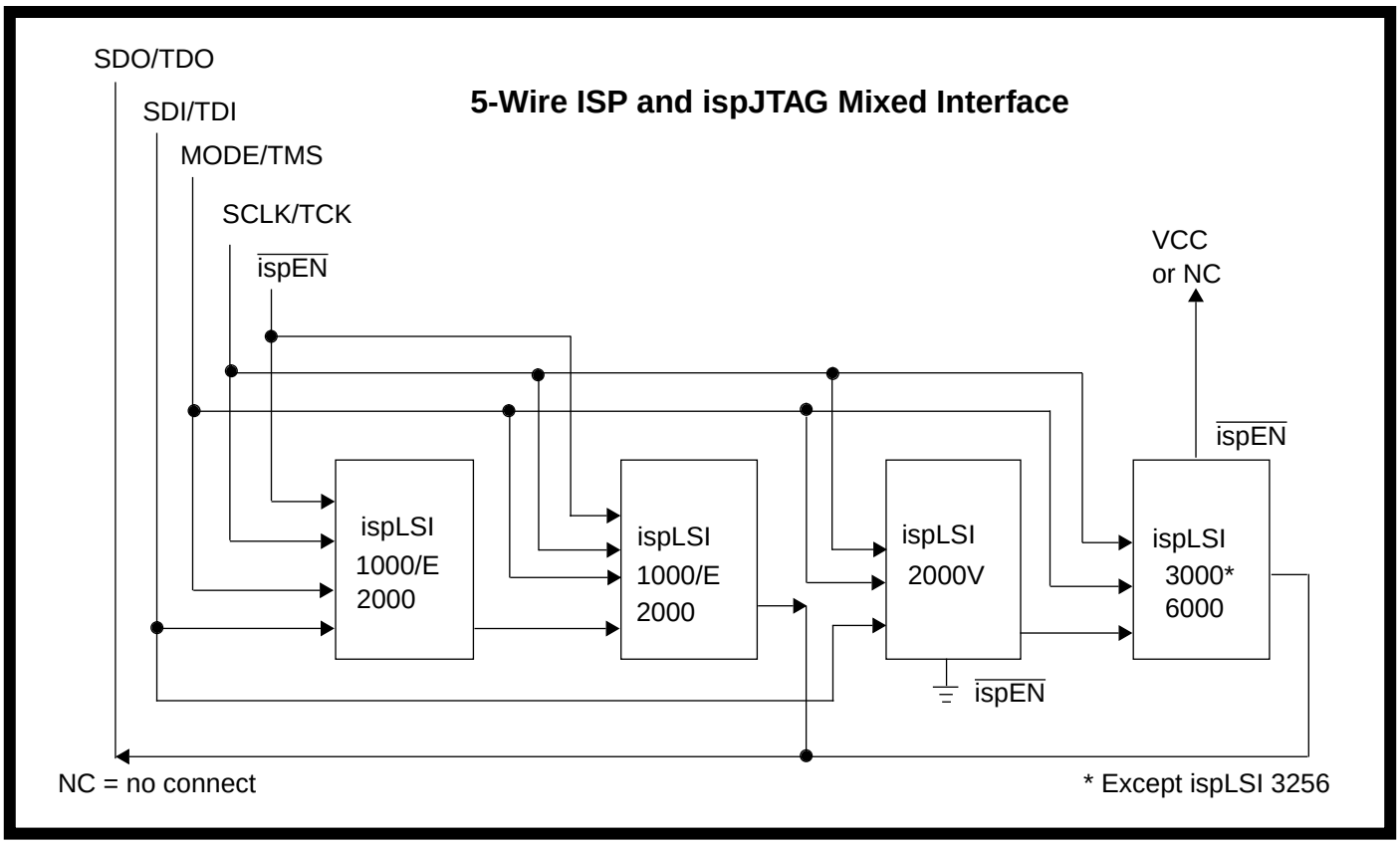

Figure 2-4. Multiple Mixed Chain Interface

Security Feature

The ispLSI and ispGAL22V10 devices contain a security bit that enables or disables program verification. If the security bit is enabled, the device program cannot be read, thus preventing unauthorized access to your design.

When you use the LSC ispDS+ software, check the Security check box in the Device Options section of the Device Selection dialog box. Alternately, you can control the security bit through the SECURITY Device Control Option in a Parameter File. The security feature defaults to SECURITY OFF. See the *ispDS+ User Manual* for details on how to set the security bit.

When you use the LSC ispDS software, you control the security bit by including the following PARAM statement in the LHDL file:

```
PARAM SECURITY ON|OFF
```

Refer to the *LHDL Reference Manual* for details.

When you use the LSC pDS software, you control the security bit through the Design Manager window **Design ⇒ Fuse Map** command or the **Fuse** icon. The Fuse Map Options window contains **Security On/Off** buttons you set for each JEDEC file. See the *pLSI and ispLSI Development System User Manual* for instructions on how to set the security bit.

ISP Download Support

There are three ways to program Lattice Semiconductor ISP devices:

- In-system without removing them from the circuit board
- The isp Engineering Kit
- A third-party programmer

Before you can program devices using the ISP Daisy Chain Download software, you must first have a JEDEC-format ASCII file to download onto a programmable device. When you invoke the download program, the ISP Daisy Chain Download software windows appear. Figure 2-5 shows the parent windows. Use the pull-down menus or the tool bar icons to perform the various functions needed to supply the JEDEC files to the specific devices. The Messages window is part of the parent ISP Daisy Chain Download window and remains on the screen at all times. It displays all the system messages and prints them to the screen for your convenience. You cannot minimize it or close it, but you can resize it.

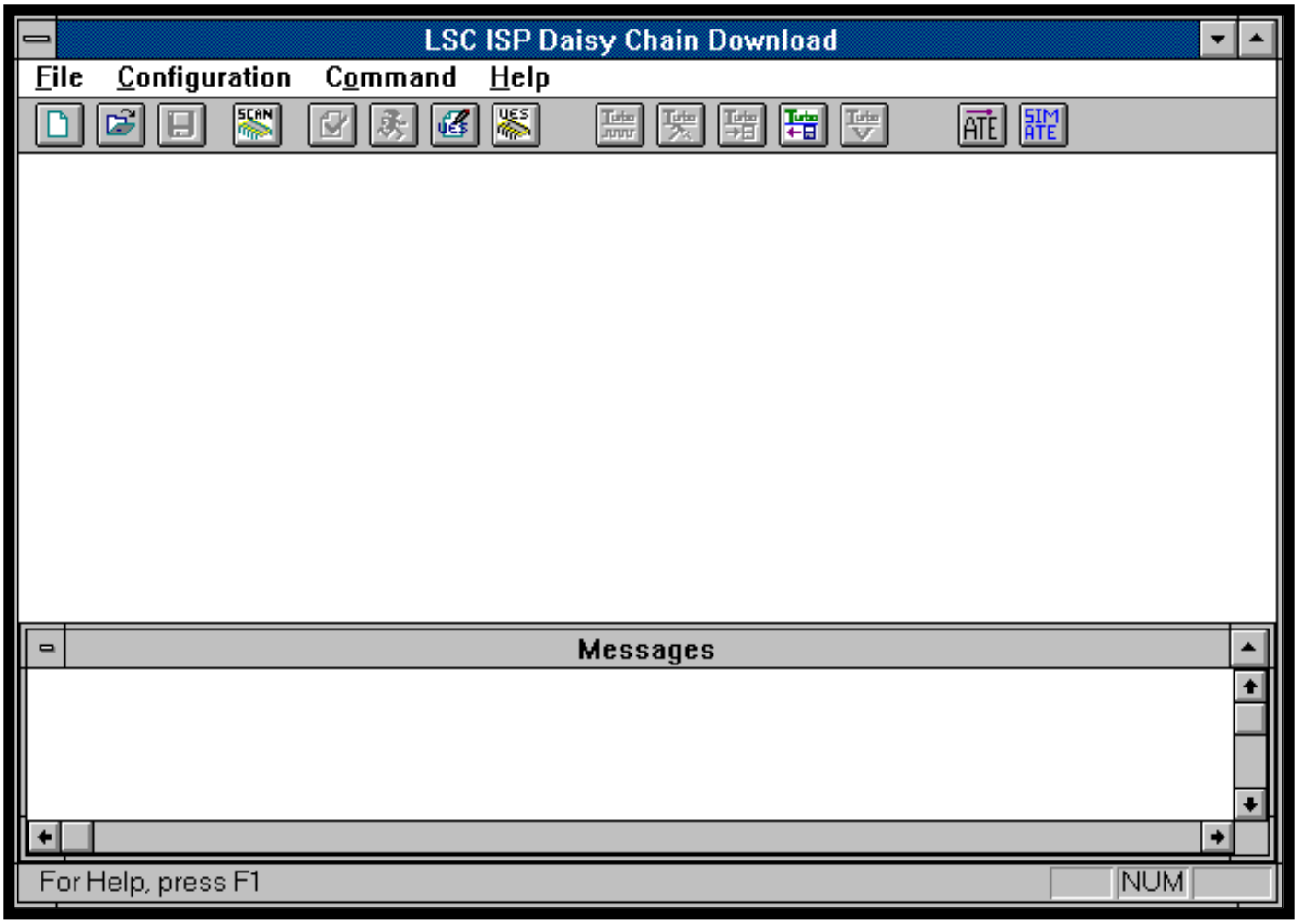

Figure 2-5. ISP Daisy Chain Download

Chapter 3 *Device Programming*

This chapter contains the ISP Daisy Chain Downloading procedure and is organized into the following sections:

- Programming ISP Devices
- Windows Downloading

There are two methods you can use to program ISP devices. One method sends a JEDEC file to a third-party programmer. The second method is to send a JEDEC file via an ispDOWNLOAD™ cable directly from your system to a device. This chapter contains information about the following:

- Options for programming a device using in-system programming (ISP) for ISP devices already installed on a printed circuit board
- Programming a device using industry-standard, third-party PLD programmers

For additional information about using a device programmer for the PC, see the *isp Engineering Kit Hardware Assembly Manual*, *Model 100*. For additional information about how to program multiple ISP devices in a daisy-chained configuration as well as general ISP interface and unique programming features of each ISP device, see the *Lattice Semiconductor Data Book*.

Programming ISP Devices

Using a PC

To program ISP devices in-system, you can either use the isp Engineering Kit Model 100 or implement the ISP algorithm for your own system and the ISP Daisy Chain Download software.

The isp Engineering Kit Model 100 contains the following:

- Universal Programming Module
- 25-pin parallel port adapter
- ispDOWNLOAD cable
- System cable
- Power supply converter (110VAC/9VDC @ 200 mA) – North America and Asia only
- *isp Engineering Kit Hardware Assembly Manual*, *Model 100*

A socket adapter, which is purchased separately, is required if you want to program the ISP devices directly on the programming module. A unique socket adapter board is available for each package type. An ISP sample is included with each socket adapter board. Table 3-1 shows a partial list of the socket adapters now available from Lattice Semiconductor.

A 5-volt to 3-volt converter (part number pDS4102-3/5ADP), purchased separately, is required if programming 3.3-volt ispLSI devices. Table 3-1 distinguishes which devices require this converter.

Table 3-1. Socket Adapter Boards

Socket Adapter Part Number	**Pins**	**Device Type**	**Package Type**
pDS4102-J44	44	ispLSI 1016 ispLSI 2032 ispLSI 2032LV/V*	PLCC
pDS4102-T44	44	ispLSI 1016 ispLSI 1016E ispLSI 2032 ispLSI 2032LV/V*	TQFP
pDS4102-J68	68	ispLSI 1024	PLCC
pDS4102-J84	84	ispLSI 1032	PLCC
pDS4102-T100	100	ispLSI 1032 ispLSI 1032E ispLSI 2064	TQFP
pDS4102-Q120	120	ispLSI 1048	PQFP
pDS4102-Q128	128	ispLSI 1048C ispLSI 1048E ispLSI 2096	PQFP
pDS4102-T176	176	ispLSI 2128	TQFP
pDS4102-M160	160	ispLSI 2128 ispLSI 3256/A	MQFP
pDS4102-T176/2128V	176	ispLSI 2128V*	TQFP
pDS4102-J84/2064V	84	ispLSI 2128V*	PLCC
pDS4102-T100/2128V	100	ispLSI 2128V*	TQFP
pDS4102-M208	208	ispLSI 6192	MQFP
pDS4102-M240	240	ispLSI 3192	MQFP
pDS4102-M304	304	ispLSI 3256E	MQFP

* The 5-volt to 3-volt converter must be purchased separately and used in conjunction with the socket adapter to program these 3.3-volt devices.

The part number for the isp Engineering Kit Model 100 is pDS4102-PM. To order the kit or socket adapters, contact a Lattice Semiconductor Sales Representative. The isp Engineering Kit Model 100 is also offered in a European edition featuring AC Power Supply Converter compatibility. Order part number pDS4102E-PM for use in Europe.

Using Third-Party Programmers

Refer to the documentation for the particular programmer you are using to download the JEDEC file. Table lists LSC-qualified, third-party device programmers for the ISP families.

Table 3-2. LSC-Qualified Programmers

Vendor	Model
Advin Systems	Pilot GL/GCE, Pilot U40/U84/U168/U256
BP Microsystems	CP/PLD-1128, BP-1200
Data I/O	2900, 3900, ChipLab, Unisite 40, Unisite 48, Autosite
Logical Devices	Allpro 32/40, Allpro 88
SMS Microsystems	Sprint Expert
Stag	ZL30/A/B, System 3000, Quasar 1040/1084, Eclipse
System General	Turpro-1/FX, Turpro-1

NOTE High pin-count socket adapters are available from Emulation Technology.

For a complete listing of certified third-party PLD programmers that support the ISP families, please contact the Lattice Semiconductor Literature Department at 1-800-327-8425 and request a copy of the *Lattice Semiconductor Programming Tools.*

Daisy Chain Downloading

Lattice Semiconductor high-density ISP devices have an advanced feature that allows you to program and reprogram the parts in-system without removing them. This feature eliminates using sockets for these devices, and avoids the common reliability problems associated with sockets. In-system programming can be done with an ispDOWNLOAD cable from the computer to the target device.

The software first scans to determine if there is a download cable connected to the device. If an ispDOWNLOAD cable is not attached, an alert appears in the Messages window. When you invoke the download program, the ISP Daisy Chain Download window appears (Figure 3-1).

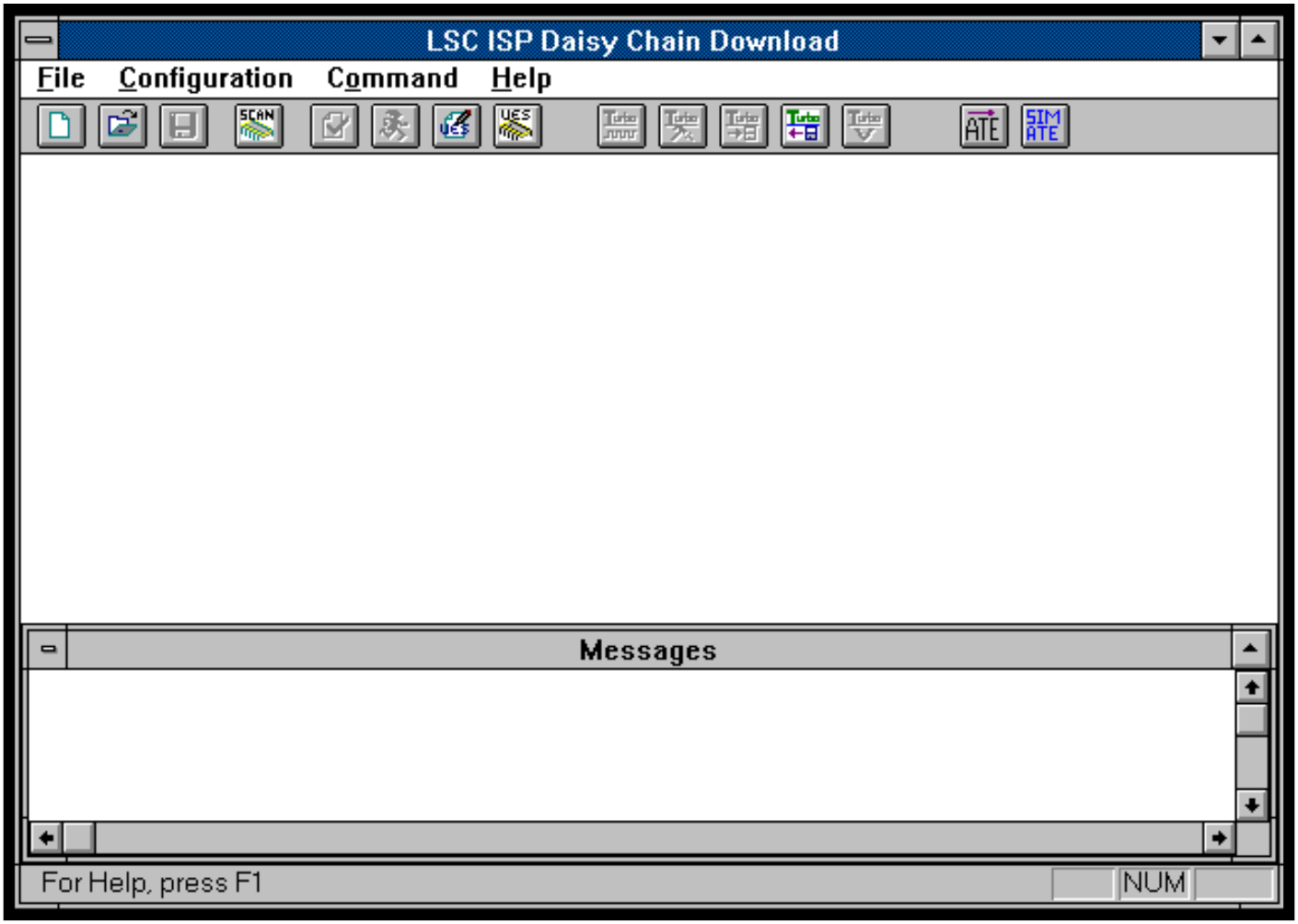

Figure 3-1. ISP Daisy Chain Download Window

The menu banner contains **File**, **Configuration**, **Command**, and **Help** pull-down options. Each menu option will be discussed briefly in the following sections.

The **File** menu contains the following options:

- **New** – Creates a new configuration setup
- **Open** – Opens a previously saved configuration setup
- **Save** – Saves a named configuration setup
- **Save As** – Names and saves a configuration setup
- **Exit** – Exits the ISP Daisy Chain Download program

The **Configuration** menu contains the following options:

- **Port Assignment** – Sets the parallel port(s) for the download configuration
- **Scan Board** – Scans the board and detects the configuration setup of an ISP chain or an ispJTAG chain
- **Scan Mixed Chain** – Scans the board and detects the configuration setup of both an ISP chain and an ispJTAG chain on the same board.

The ISP Daisy Chain Download software can detect the default port assignment if you have the cables connected properly when you start the program. Use the **Configuration** ⇒ **Port Assignment** menu option to *reset* the port.

The **Command** menu enables you to verify or download a configuration in the following ways:

- **Command** ⇒ **Check Configuration Setup**
- **Command** ⇒ **Run Operation**
- **Command** ⇒ **Turbo Download** ▶
- **Command** ⇒ **Edit File UES** ▶
- **Command** ⇒ **Display Board UES** ▶
- **Command** ⇒ **Display ispJTAG UES of Mixed Chain** ▶
- **Command** ⇒ **Generate ATE Vectors**
- **Command** ⇒ **Simulate ATE Testing**

Command ⇒ **Check Configuration Setup** verifies your setup once you set up the configuration properly. It is best to run the **Check Configuration Setup** operation before you download to check that your JEDEC device files are loading onto the correct devices, but that operation is optional. **Command** ⇒ **Run Operation** executes the non-turbo downloading procedure. Your design files are programmed onto the devices to your specification. For more information about daisy-chaining your devices, see the *Lattice Semiconductor Data Book*.

The **Help** menu contains the following options:

- **Index –** Lists the available topics
- **Using Help –** Tells you how to use Windows Help
- **About ISP Download –** Gives the version number of the ISP Daisy Chain Download software

Creating a New Configuration

ISP Daisy Chain Download has three separate methods to create a download configuration. The following sections will detail the procedure to: generate a new configuration for an ISP chain or an ispJTAG chain using ispLSI devices; generate a new configuration for ispJTAG chain with ispLSI devices and non-LSC JTAG devices; and generate a new configuration for a mixed ISP and ispJTAG chain.

Configuring an ISP chain using ispLSI devices

1. Select **File** ⇒ **New** or click the **New** icon from the ISP Daisy Chain Download menu (Figure 3-2). The New Configuration dialog box appears (Figure 3-3).

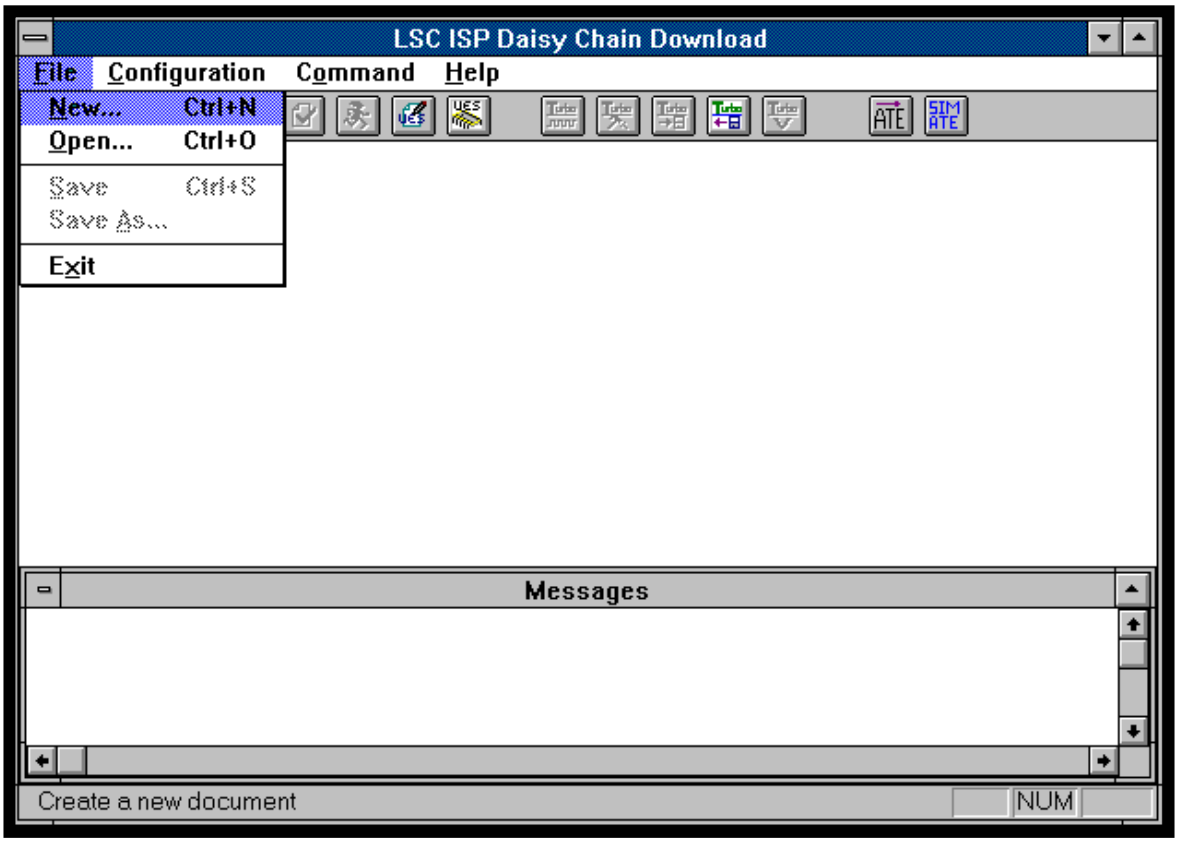

Figure 3-2. **File** ⇒ **New** Menu Option

This dialog box allows you to set the number of devices you want to program (the default is 1). The limit is 64. If you use the download cable (part number pDS4102-DL), we recommend that you configure no more than eight ISP devices in a daisy chain. If you choose a number greater than 64, a dialog box appears prompting you to re-enter a valid number of devices.

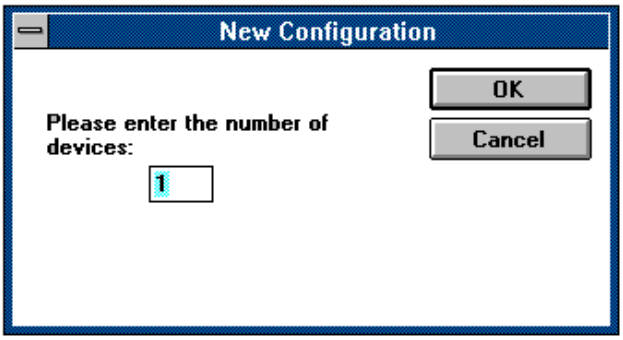

Figure 3-3. New Configuration Dialog Box

2. Enter a number in the device field, click **OK** to execute, and the New Configuration Setup window appears (Figure 3-4). The scroll arrows and box appear to the right of the Status column if you choose a number greater than five. The default device is the ispLSI1016.

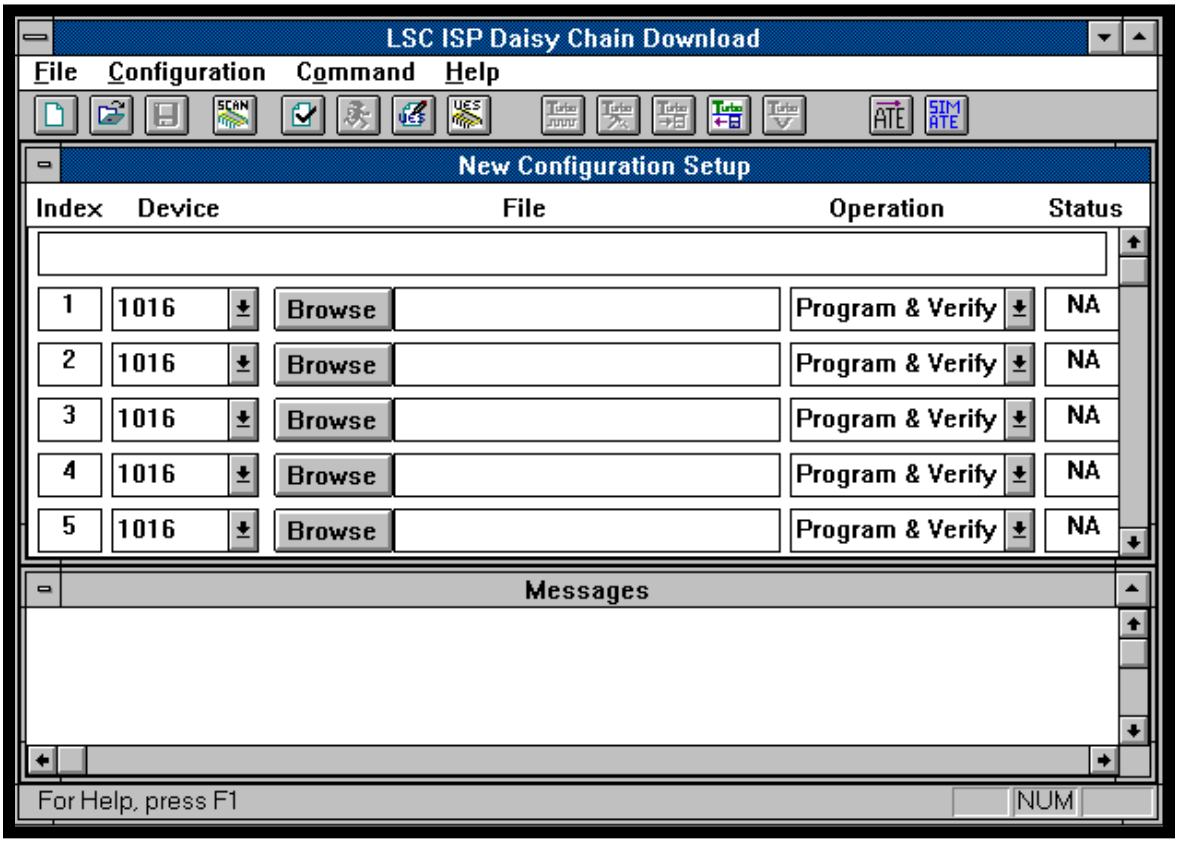

Figure 3-4. New Configuration Setup Dialog Box

The Configuration Setup dialog box includes the following features and options:

- **Comment Box** – Allows you to enter a comment (up to 256 characters in length) about the .dld file.
- **Index Number** – Gives the order of the devices identified. As many as five are displayed per screen. This column is not editable.
- **Device** – Gives the device(s) identified. Use the pull-down arrow to select the device type when creating a configuration.
- **File** – Displays the file name (.jed). Choose **Browse** to locate a file or enter the file name in the field.
- **Operation** – Lists the function to perform for each file. The default is Program & Verify. The Operation options include the following:
  - **Program & Verify** – Performs a download of the design pattern, then verifies the chip program (device pattern) with the original .jed file to ensure the device was programmed correctly. The file name must be specified.
  - **Verify** – Compares the chip program (device pattern) with the specified .jed file.
  - **Checksum** – Computes the check sum value of the chip and sends the information to the Status field for the corresponding device.
  - **Read & Save** – Reads the chip program and writes it into the specified JEDEC file. The file name must be specified. If the file name already exists, a dialog box appears asking if you want to replace the existing file.
  - **Erase** – Erases the chip program and the security fuse for the device you specify.
  - **No Operation** – Indicates that no operation will be performed for that device.
- **Status** – Shows the success factor after running a download procedure. The possibilities of results include the following:
  - Pass
  - Fail
  - Hexadecimal Value
  - Done
  - NA (not applicable)

  The Status column displays NA until you execute the ISP Daisy Chain Download software for the configuration setup.

3. Select the device type in the Device field. Use the arrow button to activate the pull-down menu (Figure 3-5).

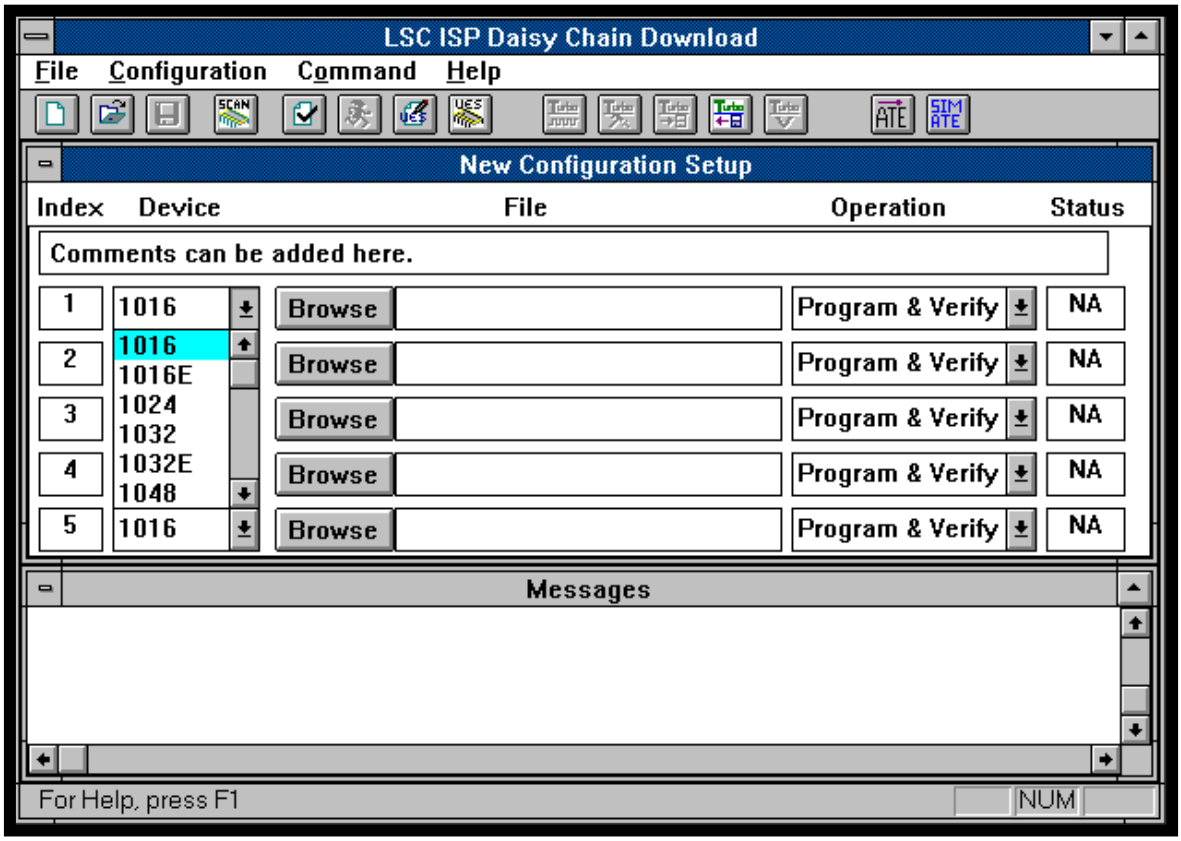

Figure 3-5. Device Pull-down Menu

4. Enter the file name or select **Browse** to find a file. If you choose browse, the Browse JEDEC File dialog box appears (Figure 3-6). Use the scroll down arrow keys to scroll through the lists. Make sure your choices are highlighted and choose **OK**. The Browse dialog box closes and the .jed file name that you chose appears in the Configuration Setup dialog box for that device.

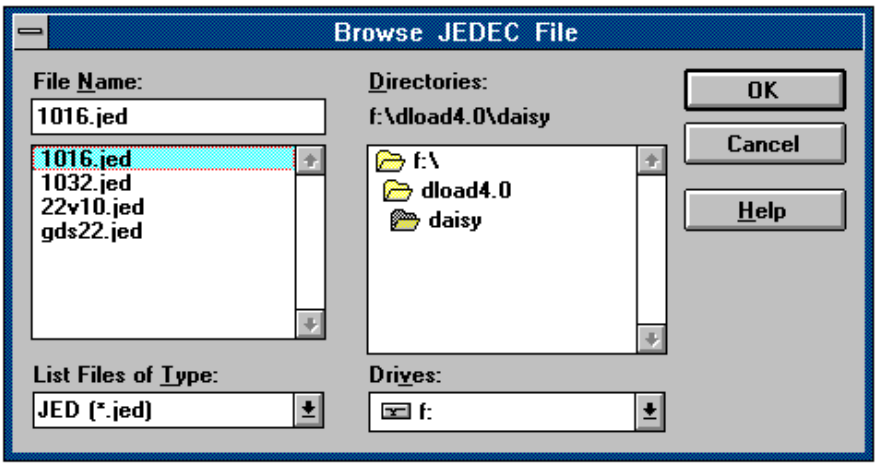

Figure 3-6. Browse JEDEC File Dialog Box

5. Select the Operation (Figure 3-7). Use the arrow button to activate the pull-down menu.

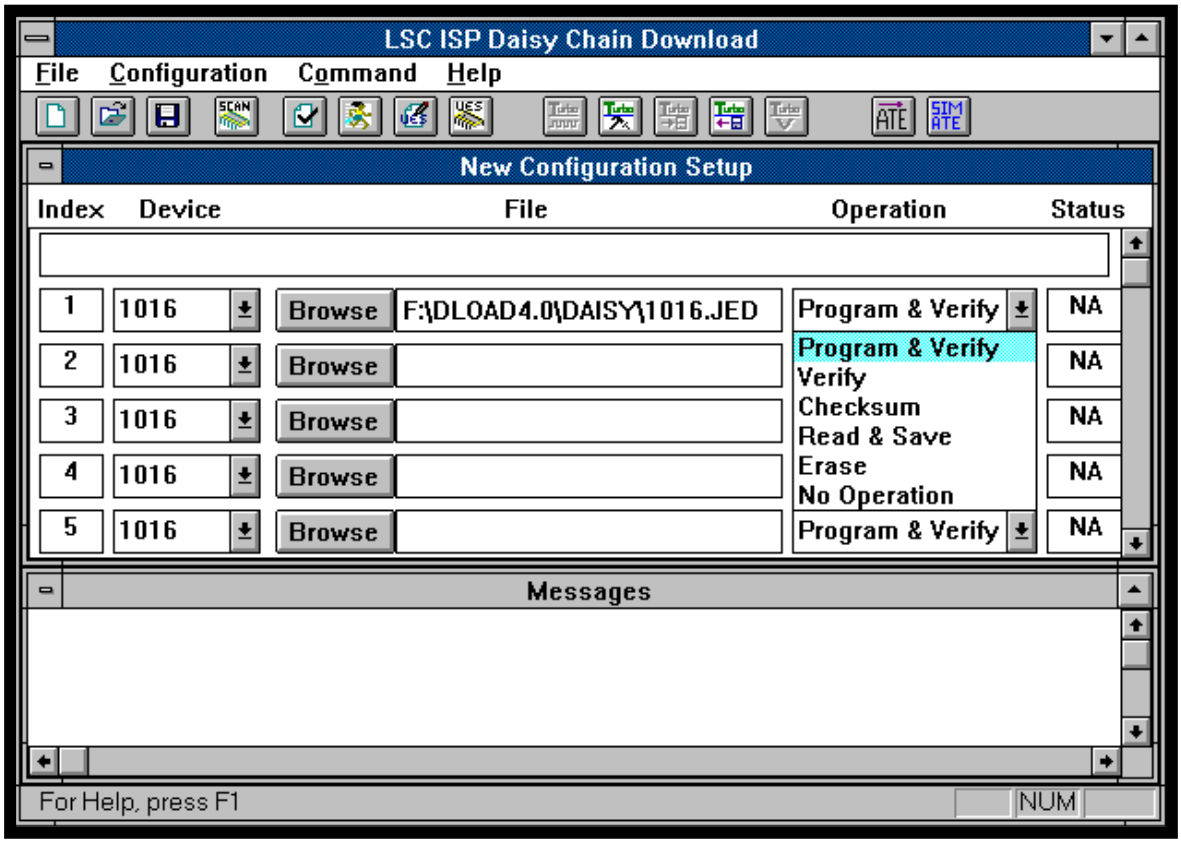

Figure 3-7. Operation Selection Options

Configuring an ispJTAG chain with ispLSI devices and non-LSC JTAG devices

1. Select **File** ⇒ **New** or click the **New** icon from the ISP Daisy Chain Download menu just as you did to configure an ISP chain. The New Configuration dialog box appears to allow you to set the number of devices you want to program. The limit is 64.
2. Enter a number in the device field, click **OK** to execute, and the New Configuration Setup dialog box appears (Figure 3-4). The scroll arrows and box appear to the right of the Status column if you chose a number greater than five. The default device is the ispLSI1016.

The New Configuration Setup dialog box includes the following features and options for configuring an ispJTAG chain with ispLSI and non-LSC devices:

- **Index Number** – Gives the order of the devices identified. As many as five are displayed per screen. This column is not editable.
- **Device** – Gives the device(s) identified. Use the pull-down arrow to select the device type when creating a configuration.
  - **JTAG** – Denotes non-LSC JTAG-compatible device.
  - **CHAIN-M** – Provides a separator for a mixed chain of devices.
- **File** – Displays the file name (.jed). Choose **Browse** to locate a file or enter the file name in the field.
- **Operation** – Lists the function to perform for each file. The default is **Program & Verify**. Operation options include the following:
  - **Program & Verify** – Performs a download of the design pattern, then verifies the chip program (device pattern) with the original .jed file to ensure the device was programmed correctly. The file name must be specified.
  - **Verify** – Compares the chip program (device pattern) with the specified .jed file.
  - **Checksum** – Computes the check sum value of the chip and sends the information to the Status field for the corresponding device.
  - **Read & Save** – Reads the chip program and writes it into the specified JEDEC file. The file name must be specified. If the file name already exists, a dialog box appears asking if you want to replace the existing file.
  - **Erase** – Erases the chip program and the security fuse for the device you specify.
  - **No Operation** – Indicates that no operation will be performed for that device.
  - **JTAG Program & Verify** – Performs a download of the design pattern, then verifies the chip program (device pattern) with the original .jed file to ensure the JTAG device was programmed correctly. File name must be specified.
  - **JTAG Verify** – Compares the chip program (device pattern) with the specified .jed file.
  - **JTAG No Operation** – Indicates that no operation will be performed for that JTAG device. It is the only option for a non-LSC JTAG device.

NOTE

JTAG operations will only appear in the Operation pull-down menu if the device is ispJTAG programmable. JTAG operations must be used when the configuration is set up for an ispJTAG chain.

- **Status** – Shows the success factor after running a download procedure. The possibilities of results include the following:
  - Pass
  - Fail
  - Hexadecimal Value
  - Done
  - NA (not applicable). The JTAG devices will remain NA throughout your download procedure.

  The Status column displays NA until you execute the ISP Daisy Chain Download software for the configuration setup.
- **Instruction Bits**– Shows the Instruction register bit length of the JTAG device. An "all 1s" instruction is sent to non-LSC JTAG devices to put them in bypass mode on all operations.

3. Select the device type in the Device field. Use the arrow button to activate the pull-down menu. If an ispJTAG device is chosen, a corresponding JTAG operation must be used.
4. Enter the file name or select **Browse** to find a file. Make sure your choice is highlighted and choose **OK**. The Browse dialog box closes and the file name you chose appears in the Configuration Setup dialog box for that device (Figure 3-8).

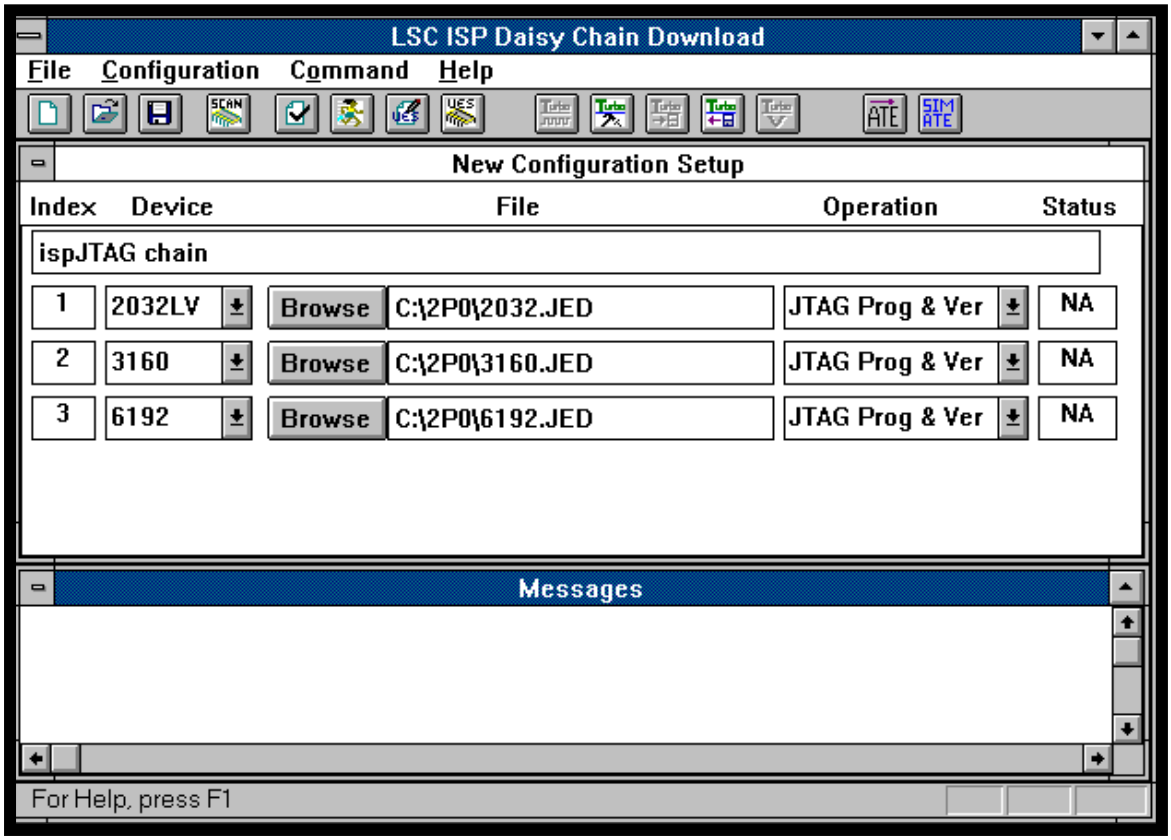

Figure 3-8. An ispJTAG Chain and JTAG Device Selected

Configuring a mixed ISP and ispJTAG chain

1. Select **File** ⇒ **New** or click the **New** icon from the ISP Daisy Chain Download window. The New Configuration dialog box appears to allow you to set the number of devices you want to program. The limit is 64. When configuring a mixed chain, set the number in the New Configuration dialog box to one more than the number of devices on your board to provide room for the mixed chain marker. You must have the 2.0 version of the download cable to configure a mixed chain.
2. Enter the total chip count in the ISP chain and the ispJTAG chain plus one for the chain separator (CHAIN-M) in the device field. Click **OK**, and the New Configuration Setup window appears. The scroll arrows and box appear to the right of the Status column if you choose a number greater than five. The default device is the ispLSI1016.

The New Configuration Setup dialog box includes the following features and options for configuring a mixed ISP and ispJTAG chain:

- **Index Number** – Gives the order of the devices identified. As many as five are displayed per screen. This column is not editable.
- **Device** – Gives the device(s) identified. Use the pull-down arrow to select the device type when creating a configuration.
  - **JTAG** – Denotes an non-LSC device.
  - **CHAIN-M** – Provides a separator for a mixed chain of devices.
- **File** – Displays the file name (.jed). Choose **Browse** to locate a file or enter the file name in the field. If the position is used for a mixed chain marker, this field is filled with NEW CHAIN and is not editable.
- **Operation** – Lists the function to perform for each file. The default is Program & Verify. If the position is used for a mixed chain marker, this field is filled with an a pound sign (#) and is not editable. The Operation options include the following:
  - **Program & Verify** – Performs a download of the design pattern, then verifies the chip program (device pattern) with the original .jed file to ensure the device was programmed correctly. The file name must be specified.
  - **Verify** – Compares the chip program (device pattern) with the specified .jed file.
  - **Checksum** – Computes the check sum value of the chip and sends the information to the Status field for the corresponding device.
  - **Read & Save** – Reads the chip program and writes it into the specified JEDEC file. The file name must be specified. If the file name already exists, a dialog box appears asking if you want to replace the existing file.
  - **Erase** – Erases the chip program and the security fuse for the device you specify.
  - **No Operation** – Indicates that no operation will be performed for that device.
  - **JTAG Program & Verify** – Performs a download of the design pattern, then verifies the chip program (device pattern) with the original .jed file to ensure the JTAG device was programmed correctly. File name must be specified.

- **JTAG Verify** – Compares the chip program (device pattern) with the specified .jed file.
- **JTAG No Operation** – Indicates that no operation will be performed for that JTAG device. It is the only option for a non-LSC JTAG device.

> ***NOTE*** JTAG operations will only appear in the Operation pull-down menu if the device is ispJTAG programmable. A JTAG operation must be used if the device is both ISP and ispJTAG programmable when the configuration is set up for a mixed chain.

- **Status** – Shows the success factor after running a download procedure. The Status column displays NA until you execute the ISP Daisy Chain Download software for the configuration setup.

3. Select the device type in the Device field. Use the arrow to activate the pull-down menu. Your configuration must have at least the first (Index 1) position filled with an ispLSI device and there must be a CHAIN-M marker placed to separated JTAG devices from ispLSI devices.
4. Enter the file name or select **Browse** to find a file (Figure 3-9). Use the arrow button to scroll through the lists. Make sure your choices are highlighted and choose **OK**. The Browse dialog box closes and the file name that you chose appears in the Configuration Setup dialog box for that device.

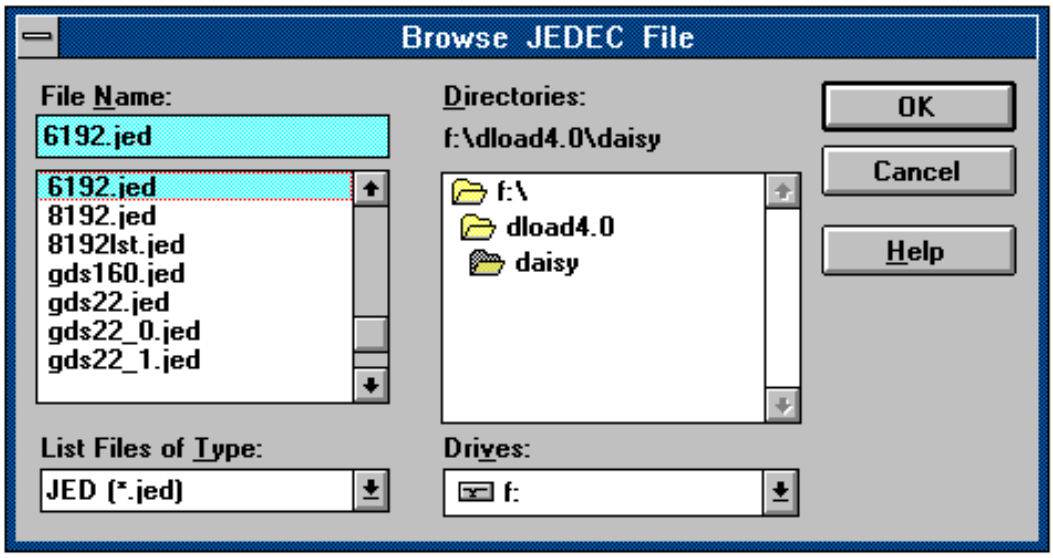

Figure 3-9. Browse JEDEC File Dialog Box

5. Select the ISP or ispJTAG Operation (Figure 3-10). Use the arrow button to activate the pull-down menu.

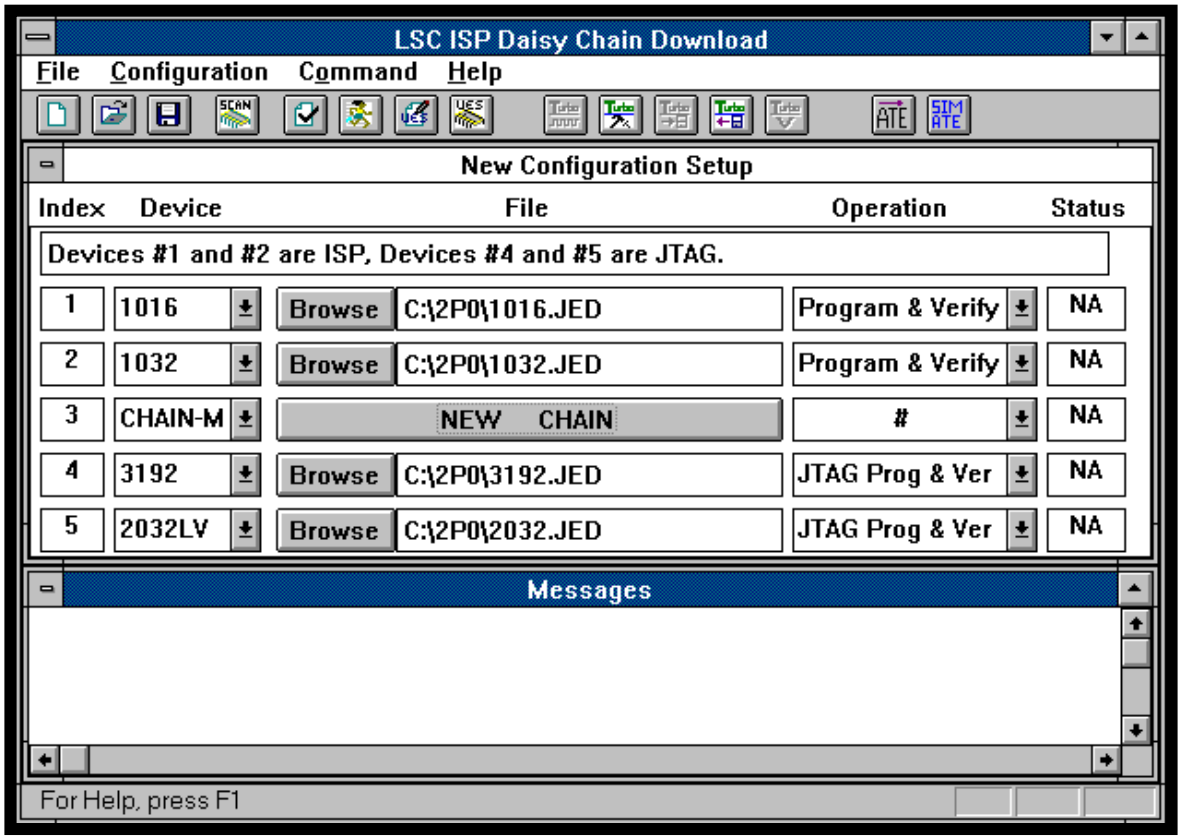

Figure 3-10. ispLSI and ispJTAG Operation Selection Options

When constructing a mixed chain, the Lattice Semiconductor ISP chain must come first. The mixed chain marker must be placed after the ISP chain and before the JTAG chain.

For the ISP chain, the first or last device of the chain cannot be a dual ISP/JTAG device, an ispGDS device, or a GAL device. A dual device is one that can be programmed in Lattice Semiconductor ISP or ispJTAG. These devices have the expanded Operation combo box.

Verifying a Configuration Setup

Once you enter all the specific information for each device, you should check your configuration to identify any errors before downloading.

> **NOTE** The **Command ⇒ Run Operation** command will also run a verification of you setup prior to downloading each file to your specifications.

To check a configuration setup:

1. Select **Command ⇒ Check Configuration Setup** or click the **Check** icon from the ISP Daisy Chain Download menu (Figure 3-11).

> **TIP** You can use **Command ⇒ Check Configuration Setup** to assure that you have all the information selected and the devices ported properly. This is particularly helpful if you do not want to download to a device until later.

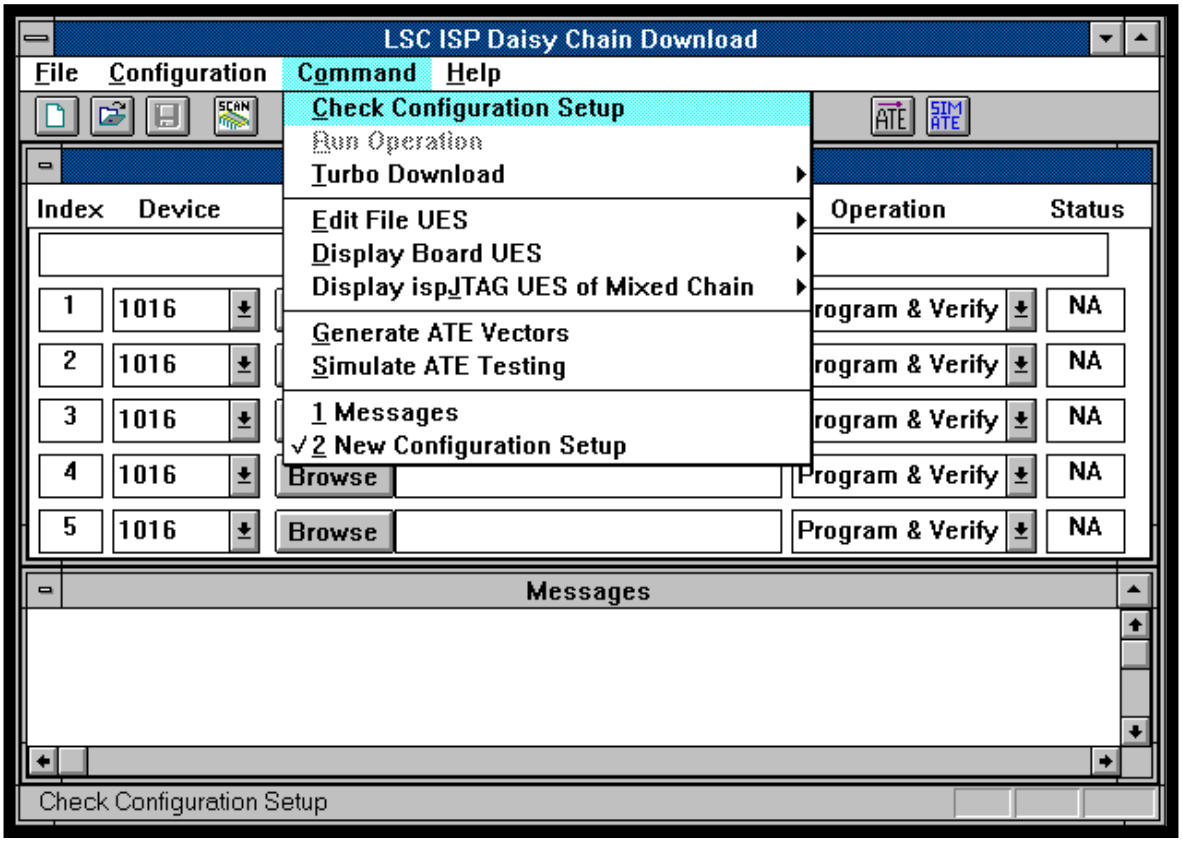

Figure 3-11. **Command ⇒ Check Configuration Setup** Menu Option

2. Check the Messages window and make any necessary corrections.

The Messages window is a clipboard for the log file created every time you perform either a **Command ⇒ Check Configuration Setup** or a **Command ⇒ Run Operation**. Access the log file by typing **`downld.log`** from any text editor. The log file does not append itself; it only records the last function performed.

Downloading a File

To download a file:

1. Select **Command ⇒ Run Operation** or click the **Run** icon from the ISP Daisy Chain Download menu to program the device with your design file (Figure 3-12).

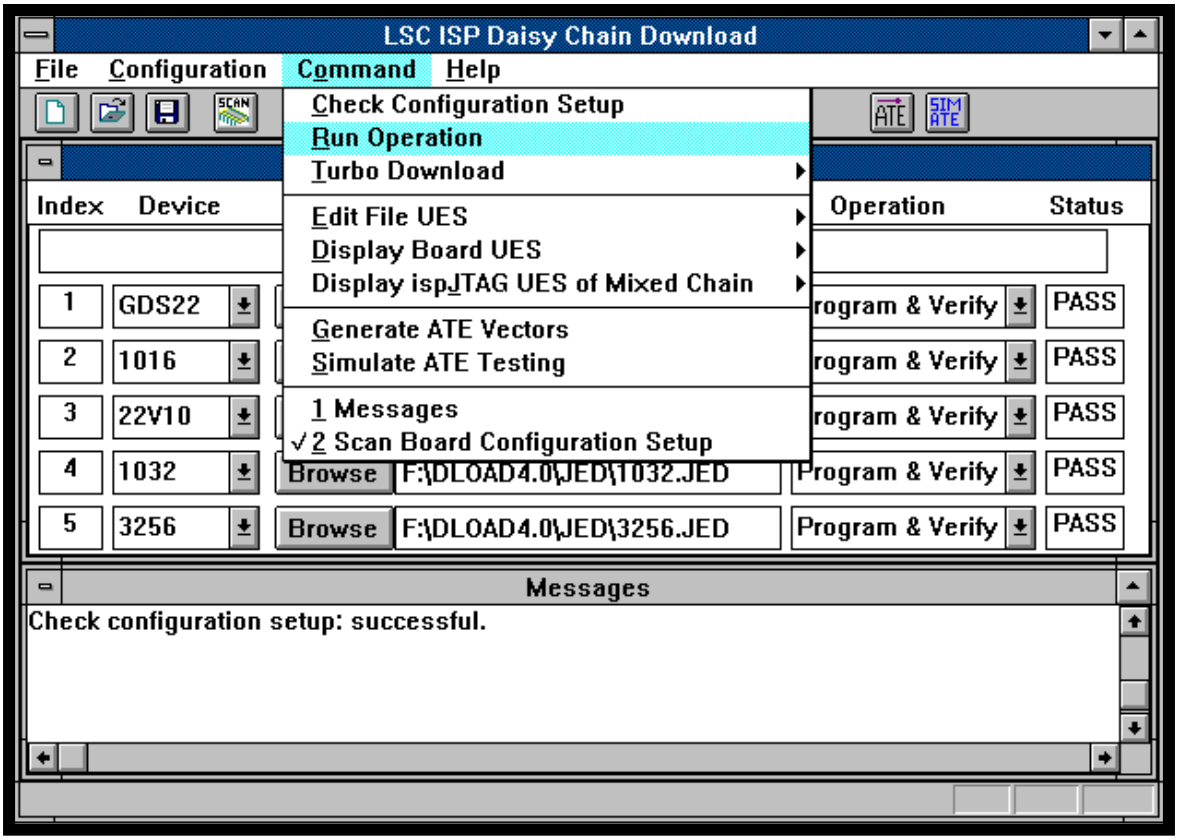

Figure 3-12. **Command ⇒ Run Operation** Menu Option

The software verifies that the configuration setup files and .jed files are compatible and performs the operation that you specified in the Operation field for each device. Check the Messages window for a successful notice.

Turbo Downloading a File

The turbo downloading feature differs from the **Run Operation** command by the method in which the ISP bit stream is read from the JEDEC files and sent to the daisy chain. Turbo Download is ***much*** faster. The more devices you have chained together, the more time you save. You can also retain your ISP bit stream so you can use it repeatedly provided you are downloading the same configuration onto the devices.

The turbo downloading process requires a complete and accurate configuration setup file, just like a regular downloading process.

To perform a turbo download:

1. Select **Command** ⇒ **Turbo Download** ⇒ **Build** or the **Turbo Build** icon from the ISP Daisy Chain Download menu (Figure 3-13).

   This process builds the ISP bit stream and stores it in a temporary buffer. You must perform the bit stream build to run turbo downloading. Until you build the ISP bit stream, the other download functions and icons are disabled. Check the Messages window for important information and a successful message.

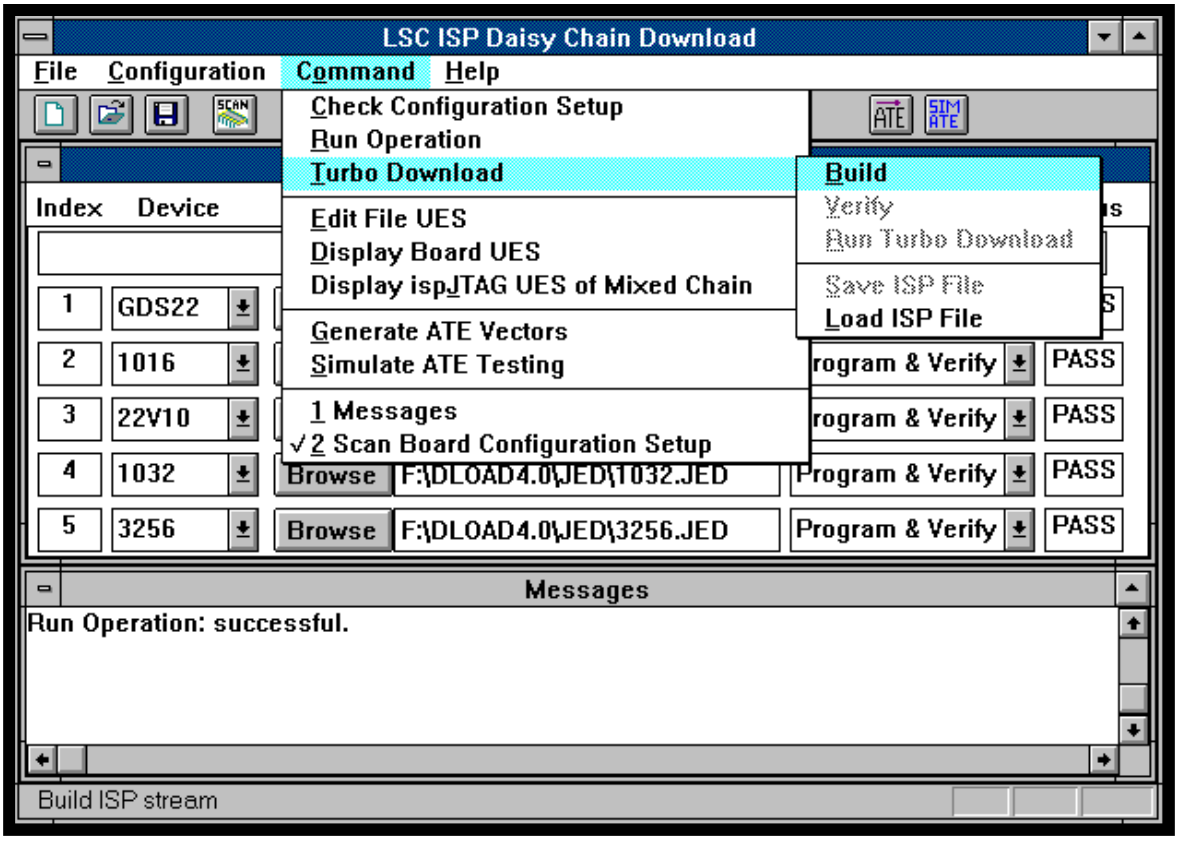

Figure 3-13. **Configuration** ⇒ **Turbo Download** ⇒ **Build** Menu Option

2. Select **Command** ⇒ **Turbo Download** ⇒ **Run Turbo Download** or the **Turbo Run** icon from the ISP Daisy Chain Download menu. This function checks the configuration setup file then downloads the ISP bit stream to the devices. The Message window reports that the software is checking your configuration setup for each device.

Saving a Bit Stream

If you want to retain an ISP bit stream, you can save it to a file.

To save an ISP bit stream:

1. Select **Command** ⇒ **Turbo Download** ⇒ **Save ISP File** or the **Turbo Save** icon from the ISP Daisy Chain Download menu (Figure 3-14). The Save As .ISP File dialog box appears (Figure 3-15).

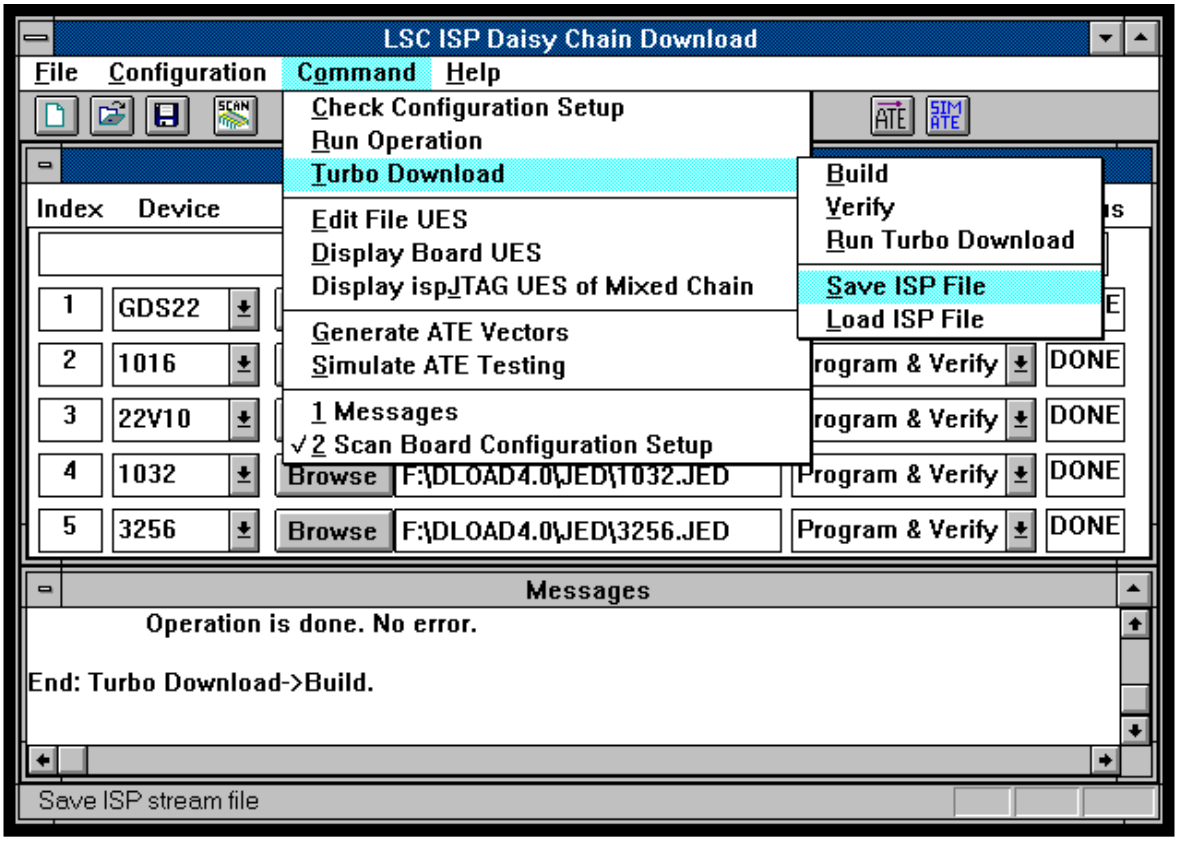

Figure 3-14. **Command** ⇒ **Turbo Download** ⇒ **Save ISP File** Menu Item

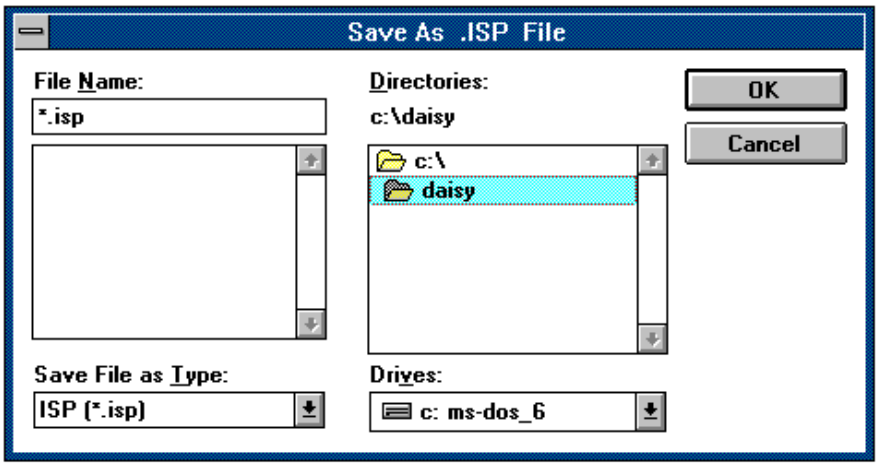

Figure 3-15. Save As .ISP File Dialog Box

2. Type in the name of your design file in the **File Name** field. It must have a .isp extension. If you enter more than eight characters, the file name is truncated. The full name of a file is not recognized against the truncated file name so the truncated file name overwrites itself each time you perform a save. If you forget to include the .isp extension, the file will not appear in the **Field Name** list. In that case, select **ALL** in the **Save File as Type** field.
3. Choose the directory and file type.
4. Click **OK**. The *name*`.isp` appears at the top of the main ISP window.

   If the file name already exists, a warning box to overwrite the file appears. Click **Yes** to overwrite the existing file. Click **No** to return to the Save As dialog box and save the file with a new name.

   Or click **Cancel** to close the Save As dialog box. The configuration setup is not saved.

Loading a Bit Stream

If you previously saved an ISP bit stream, you can access it and you will not need to rebuild the ISP bit stream. This function retrieves a named .isp file and loads it into the buffer for downloading.

To load an ISP bit stream:

1. Select **Command** ⇒ **Turbo Download** ⇒ **Load ISP File** or the **Turbo Load** icon from the ISP Daisy Chain Download menu (Figure 3-16). The Open .ISP File dialog box appears (Figure 3-17).

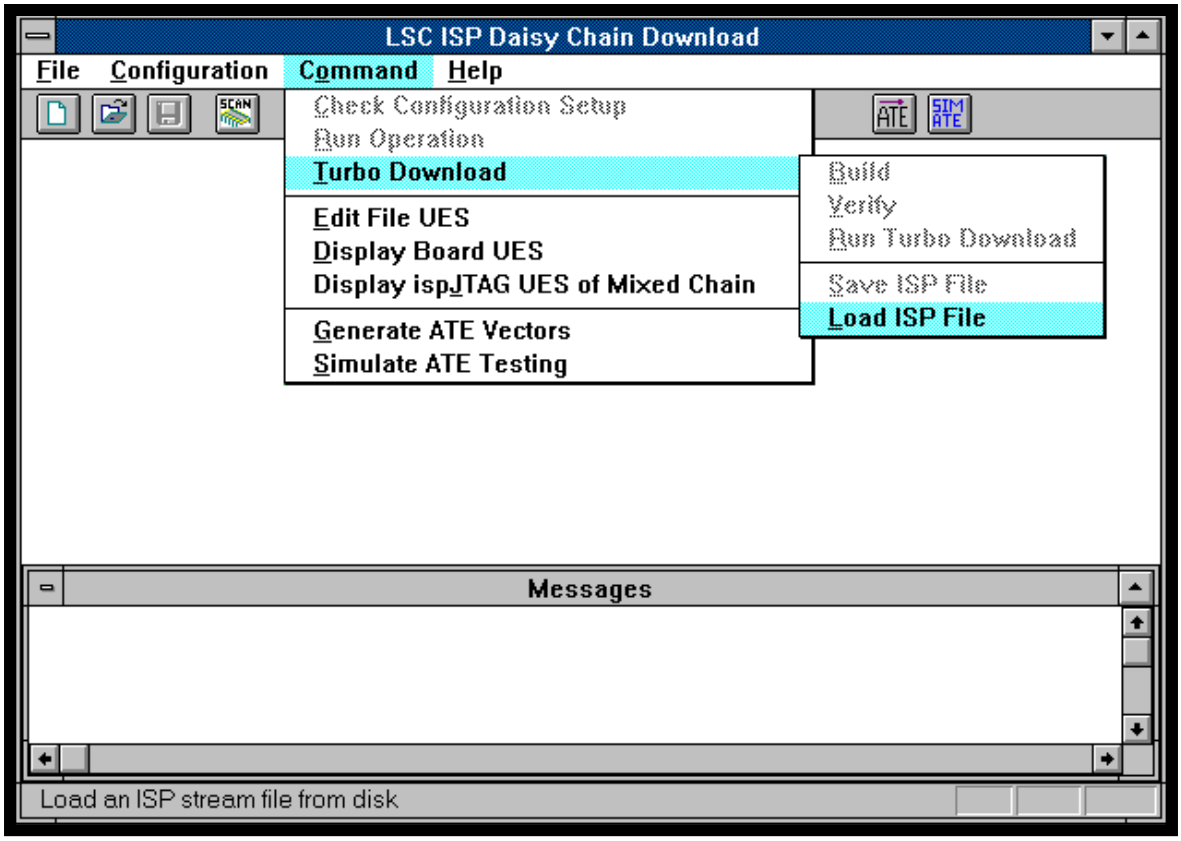

Figure 3-16. **Command** ⇒ **Turbo Download** ⇒ **Load ISP File** Menu Item

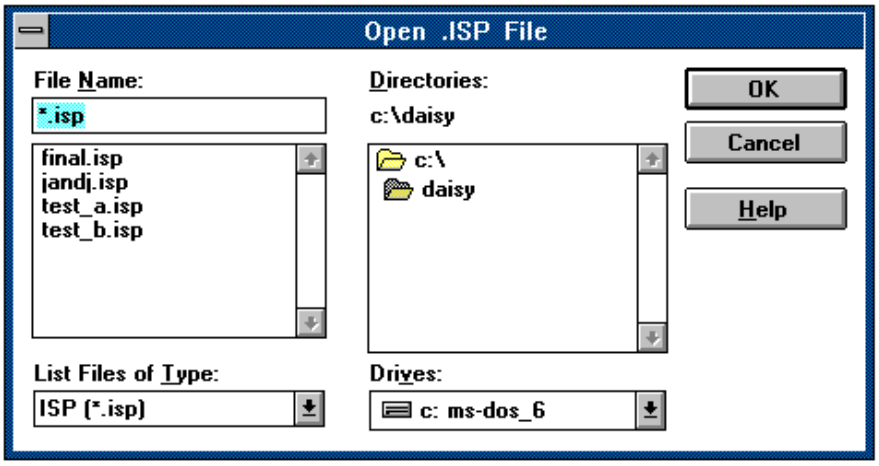

Figure 3-17. Open .ISP File Dialog Box

2. Type in the name of your design file in the **File Name** field. It must have an .isp extension. If you forgot to include the .isp extension, the file will not appear in the **Field Name** list. In that case, select **ALL** in the **List File of Type** field.
3. Click **OK**. The *name*.isp appears in the main ISP window. This function loads the ISP bit stream file into the buffer and reconstructs the configuration setup window. It is ready for a device programming download.

   Or click **Cancel** to close the Open .ISP File dialog box.
4. Check the Messages window to see that the bit stream has been loaded successfully.

The ISP bit stream file loads into the buffer and is ready to access for a device programming download. The **Turbo Run**, **Turbo Verify**, and the **Turbo Load** icons are enabled.

Verifying a Bit Stream

When you verify an ISP bit stream, the software checks the stream against the devices to verify that the .dld file (configuration setup) is present and accurate. If you have not performed a download, the verification process will fail because the stream is not present on the devices and cannot be verified.

To verify the ISP bit stream:

1. Select **Command** ⇒ **Turbo Download** ⇒ **Build** or the **Turbo Build** icon from the ISP Daisy Chain Download menu.

   Or:

   Select **Command** ⇒ **Turbo Download** ⇒ **Load ISP File** or the **Turbo Load** icon from the ISP Daisy Chain Download menu. The Open .ISP File dialog box appears. Choose a .isp file. Click **OK**.

2. Select **Command** ⇒ **Turbo Download** ⇒ **Verify** or the **Turbo Verify** icon from the ISP Daisy Chain Download menu (Figure 3-18).

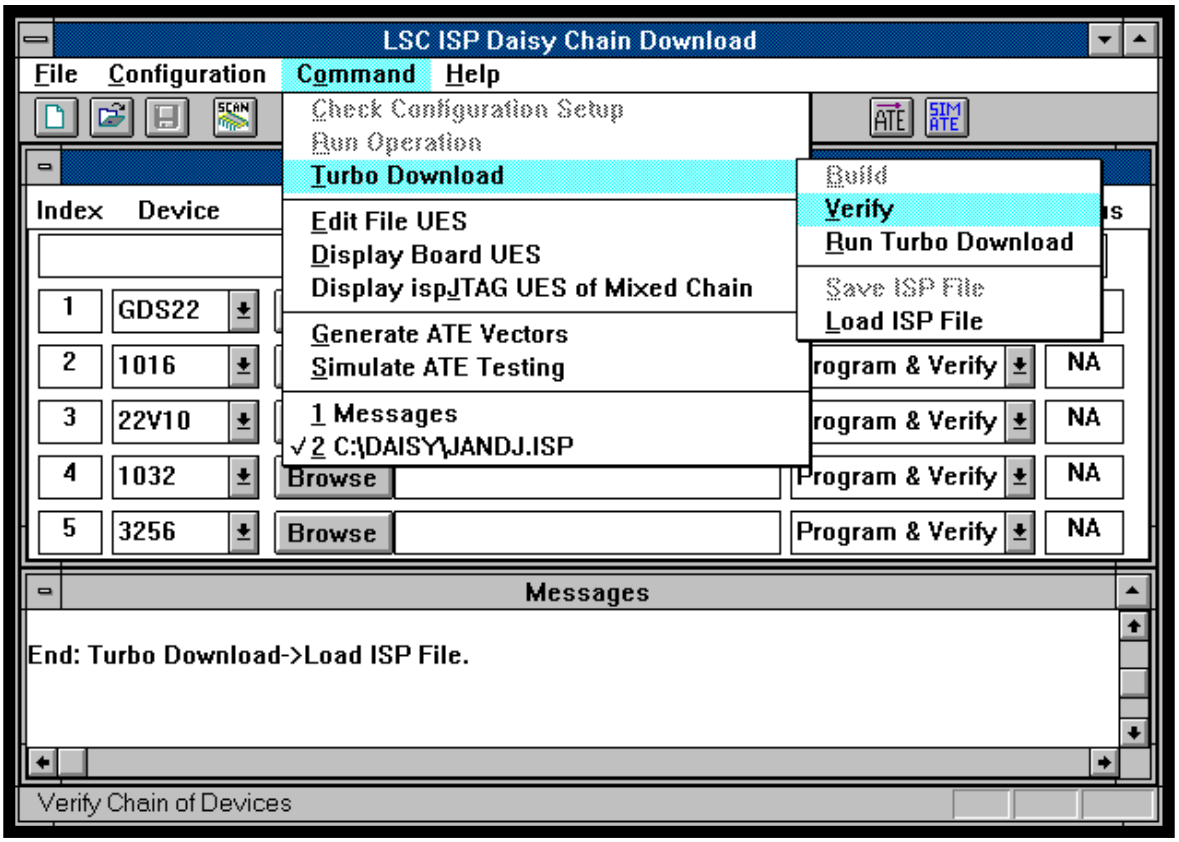

Figure 3-18. **Command** ⇒ **Turbo Download** ⇒ **Verify** Menu Item

3. Check the Messages window. It should list each device by index number, type, and state that the configuration setup check passed.

Loading a User Electronic Signature

The JEDEC file contains User Electronic Signature (UES) data that you can edit or read in from the board. Set a signature using hexadecimal or ASCII formats.

> **NOTE** The transmission checksum is recalculated each time the UES is modified.

Editing a UES

To edit a signature using hexadecimal characters:

1. Select **Command** ⇒ **Edit File UES** ⇒ **HEX** or the **write UES** icon from the ISP Daisy Chain Download menu to edit a UES (Figure 3-19). The icon defaults to hexadecimal format. You may also select the **ASCII** option. The Open .JED File dialog box appears (Figure 3-20).

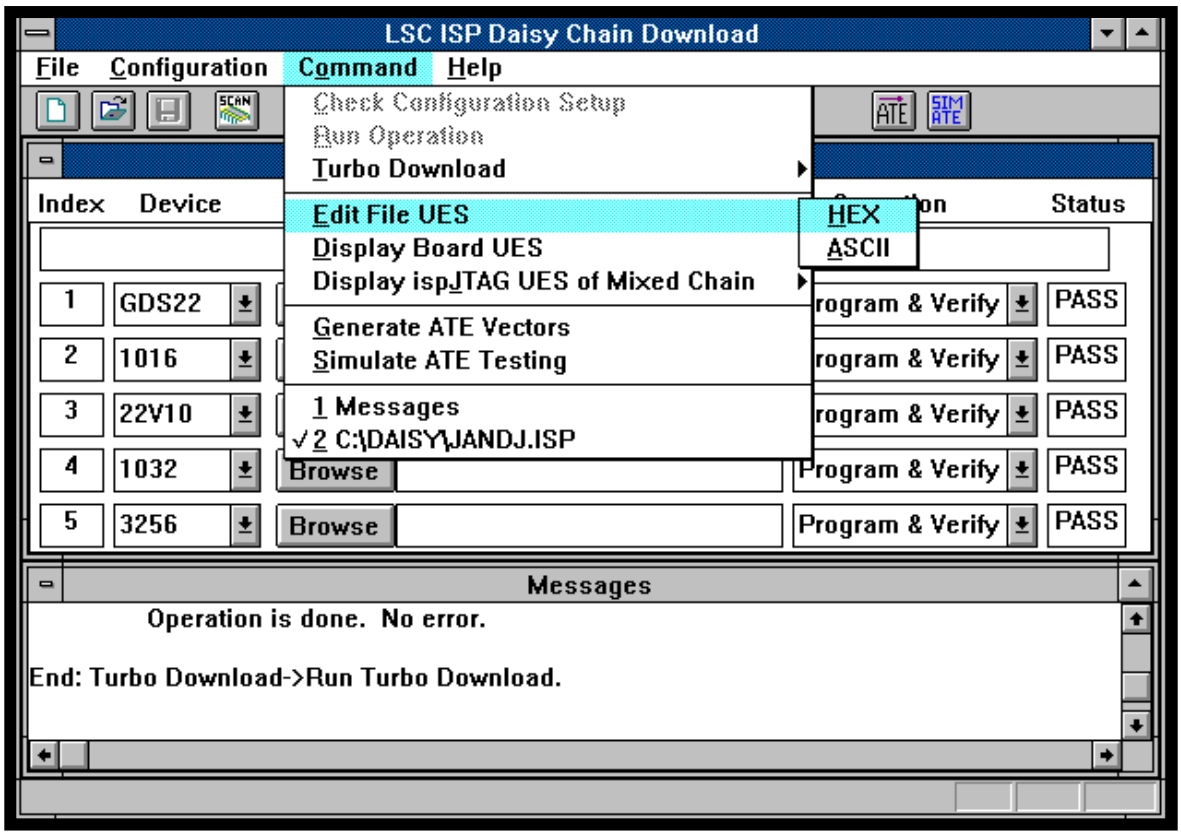

Figure 3-19. **Command** ⇒ **Edit File UES** ⇒ **HEX** Menu Option

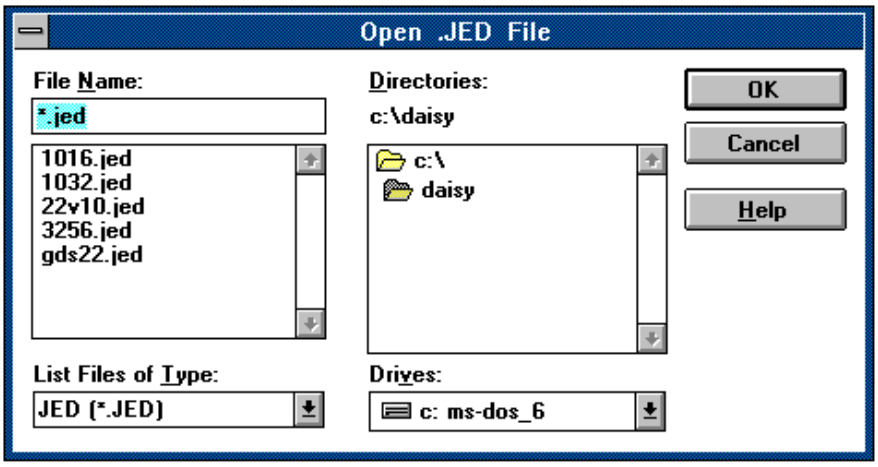

Figure 3-20. Open .JED File Dialog Box

2. Select a .jed file. Click **OK**. The UES dialog box appears (Figure 3-21).

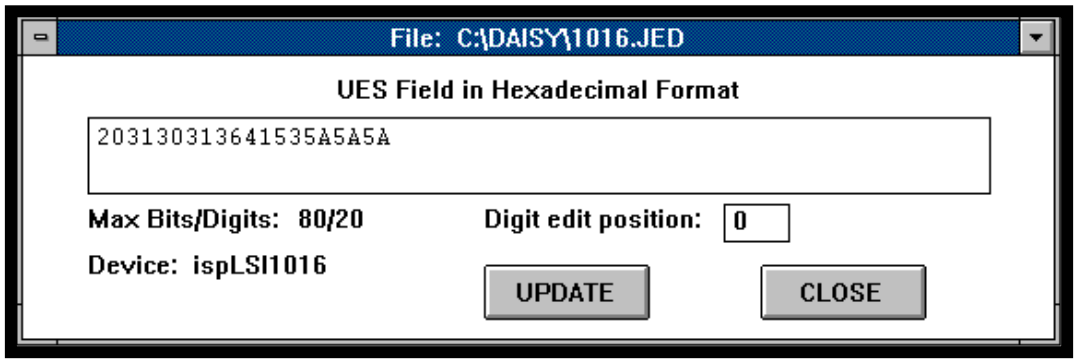

Figure 3-21. JEDEC File with UES Dialog Box

3. Type in the signature using only hexadecimal characters (0-9 and A-F). The Digit edit position field helps you while you are typing in the signature. Click **UPDATE**. The UES Write Successful dialog box appears (Figure 3-22) telling you the signature was saved in the .jed file. Remember, the signature is only embedded on the device ***after*** you perform a download.

   If you select the **Close** button before you press **UPDATE**, the dialog box closes and the new signature is not saved to the .jed file.

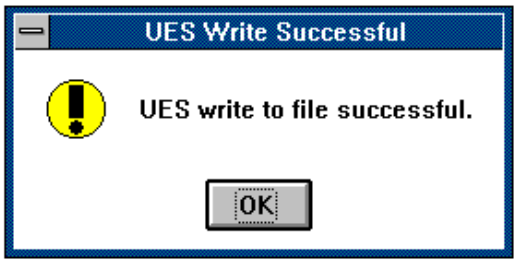

Figure 3-22. UES Write Successful Dialog Box

Editing a UES in ASCII format works exactly the same way, only you input any printable character – except the control characters. The default ASCII signature for a file is ..... (the dot character).

Scanning the Board for the UES

To read the signature from the chip:

1. Select **Command** ⇒ **Display Board UES** ⇒ **HEX** or the **read UES** icon from the ISP Daisy Chain Download menu (Figure 3-23). This function performs a scan for the UES on the board. The icon defaults to hexadecimal format. You may also select the **ASCII** option. The Display Board UES dialog box appears (Figure 3-24).

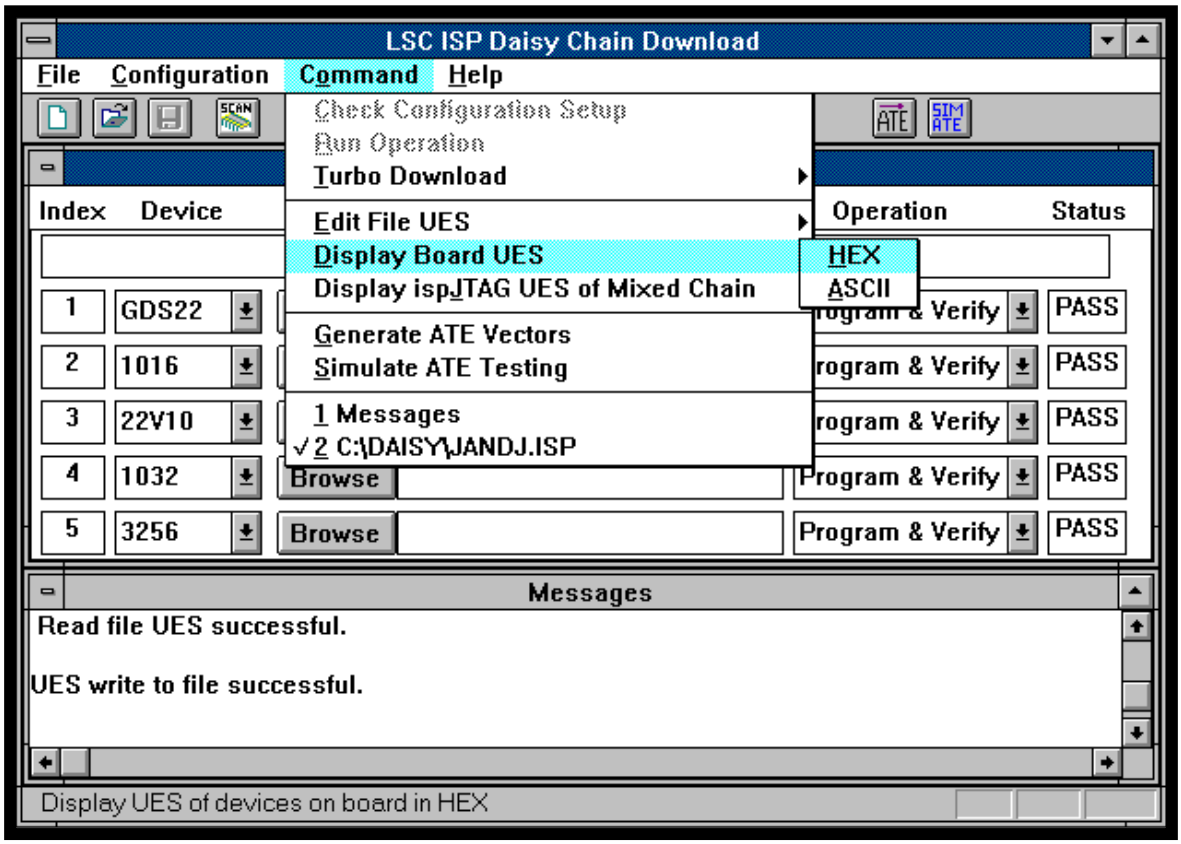

Figure 3-23. **Command** ⇒ **Display Board UES** ⇒ **HEX** Menu Option

If your board has a mixed chain, the **Command** ⇒ **Display ispJTAG UES of Mixed Chain** menu option is available to display the UES of the JTAG chain. You may select either ASCII or HEX format.

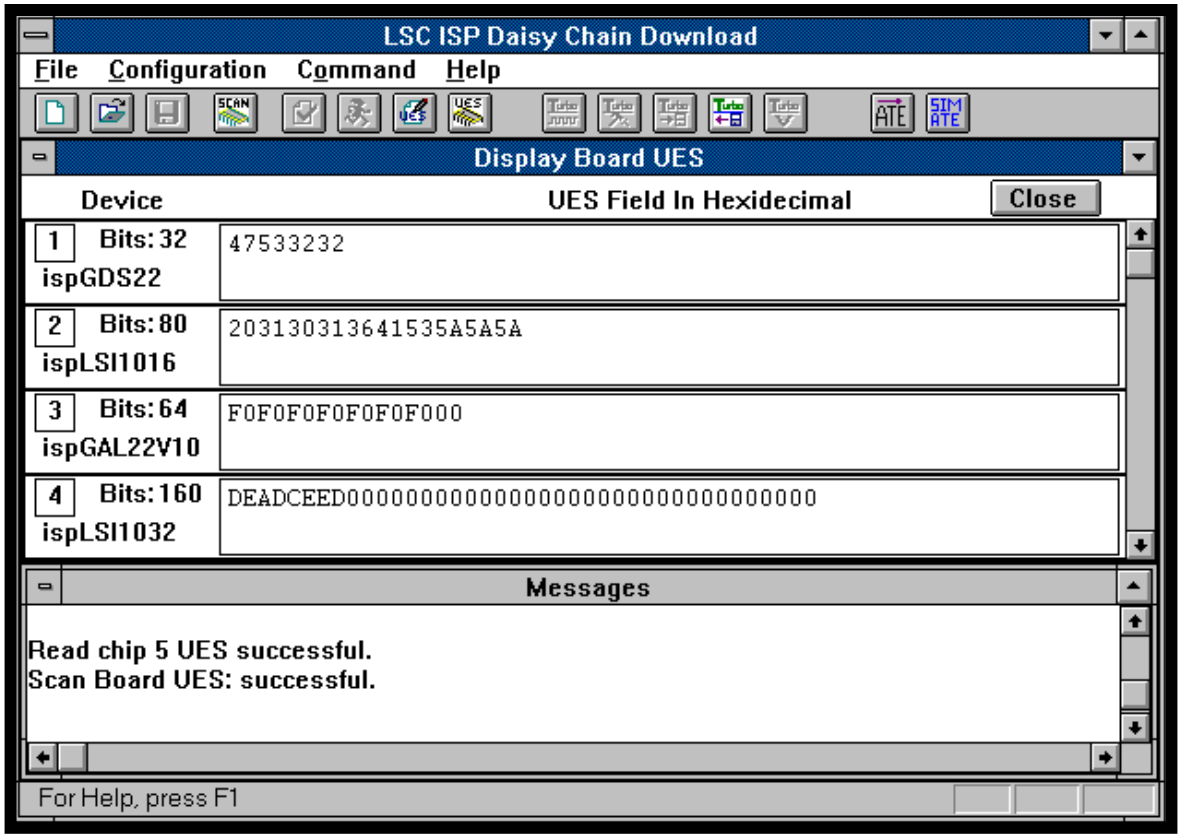

Figure 3-24. Display Board UES Dialog Box

You cannot edit the signatures on the devices with this box. This command only allows you to view the signature that you already downloaded onto the devices. If you have not downloaded a personal signature onto your devices, the *default* data will appear in the signature field.

The **Close** button terminates the Display Board UES dialog box and function.

NOTE The default signature for low-density devices is 0. The default signature for high-density devices is F in hexadecimal format.

2. Check the Messages window to confirm the scan function of the devices was successful.

Displaying a UES in ASCII format works exactly the same way, except that you see the signature in ASCII characters.

Using ATE Vectors

You can use automatic test equipment (ATE) to program and verify ISP devices, instead of using stand-alone device programmers. Since you can customize your ISP device configurations specifically for board-level testing, you can enhance the testability of your product. Any ATE programming solution requires a JEDEC file, and a method to translate the JEDEC file into signals on the ISP interface driven by the ATE. The following two methods are available for performing this translation:

- Create test vectors to program the devices using a translation tool from Lattice Semiconductor
- Write an ATE program language

This section discusses how to use test vectors. For complete information on how to configure the ATE with Lattice Semiconductor software and devices, see “ATE Programming of Devices” in the Lattice Semiconductor *ISP Manual*. Table 3-3 shows the current LSC-supported testers.

NOTE You must have an ISP bit stream file to create ATE vectors.

Table 3-3. LSC-Supported Testers

Company	**Model**
Hewlett Packard	All testers including: Models 3060, 3065, 3070, 3073
GenRad	GR228X/e Series
Teradyne	Z1800 Series & Z8000 Series–Vector Processor Option must be installed

To generate ATE vectors:

Select **Command** ⇒ **Generate ATE Vectors** or the **ATE** icon from the ISP Daisy Chain Download menu bar (Figure 3-25). The ATE Vector File Options dialog box appears (Figure 3-26).

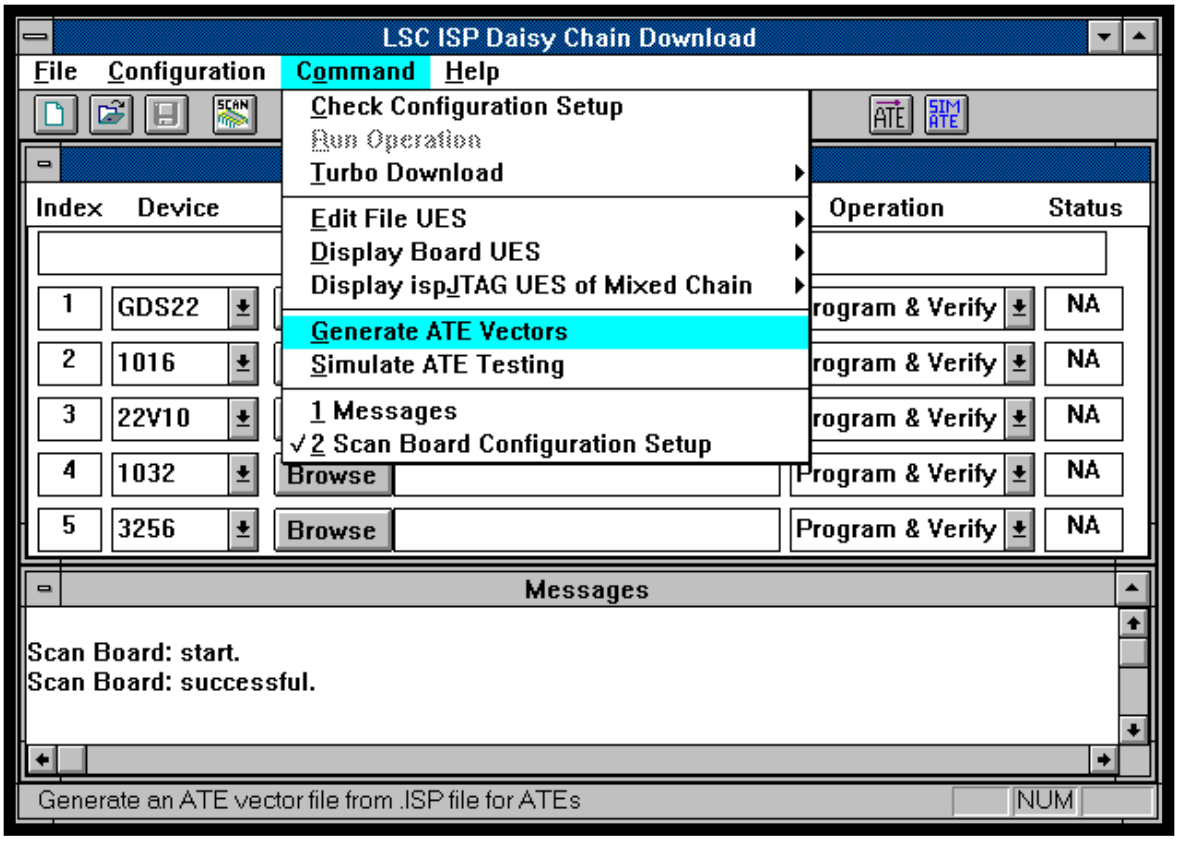

Figure 3-25. **Command** ⇒ **Generate ATE Vectors** Menu Item

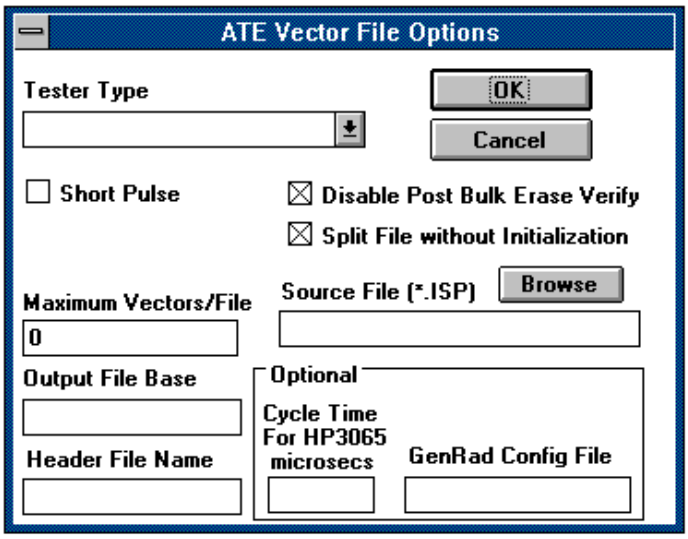

Figure 3-26. ATE Vector File Options Dialog Box

The following information explains each menu option:

- Tester Type – Includes the Lattice Semiconductor supported and compatible testers currently available.
- Short Pulse – For temporary test programming, the Short Pulse option cuts programming time. It is not guaranteed for permanent download to your device.
- Maximum Vector/File – Includes the maximum number of vectors allowed in each vector file. This data can be obtained from the ATE vendor. A default setting of 0 builds one ispVECTOR file.
- Output File Base – Includes the file name base (six characters or less) that will be appended incrementally by the ATE generation process. For example, if you enter “vec” as the base name and 128 files are created, the file names will appear as vec0, vec1, vec2, etc. The dot extension depends on the ATE vendor.
- Header File Name – Includes the file name (if the file is located in your current directory) or full path (if the file is located in another directory) for the header data that you type in any text editor file. The header data can include the author name, the type of configuration setup that this header will appear with, pin definitions, signal names, timing information, etc. The ispDCD software will affix this header data to the head of each ATE vector file it generates.
- Split File without Initialization – Allows the vector files to be split according to size to save vector size. Pull down resistors on ispEN, MODE and SCLK are mandatory to use this option.
- Disable Post Bulk Erase Verify – Determines if the post bulk erase verify vectors will be generated in each vector file. By checking this box, fewer vectors are generated and the file sizes are smaller. However, post bulk erase verify vectors help to confirm that the device is erased properly.
- Source File – Includes the ISP bit stream file name you will use to create the ATE vector files. This file must be an ISP bit stream file. If you are unsure of the file name, click **Browse** for a selection. The file name must be eight characters or fewer, otherwise it is truncated.
- Cycle Time – Includes the cycle time data if you are using a Hewlett Packard 3065 tester. Waits are implemented in repeat loops. The number of times a vector is repeated in the loop is determined by the vector cycle time. ispDCD will calculate the correct number of times to go through the loop; however, it is critical that you specify the correct cycle time in your header file. The ATE generation process does not read the header to determine timing delays. Specify the cycle time in microseconds. Filling in this field is optional.
- GenRad Config File – Includes the file name that is inserted after the header file for GenRad testers. Filling in this field is optional.

The following steps provide an example of how to fill out the ATE Vector File Options Dialog box.

1. Select the tester type with the Tester Type pull-down menu. This field must be set according to the ATE you are using. Select **ispVECTOR**.
2. Type in a .isp file name in the **Source File** field or click **Browse**. The Open .ISP File dialog box appears (Figure 3-17). Once you select a file, the path appears in the **Source File** field. Type **`ate2.isp`**
3. Enter a number in the **Maximum Vectors/File** field. Obtain a valid number range from the ATE specifications for whichever tester type you are using. For the example leave this at the default value of **`0`**.
4. Enter a file base name in the Output File Base field. Type **`vec`**.
5. Enter a name in the Header File Name field. Type **head** (Figure 3-27).

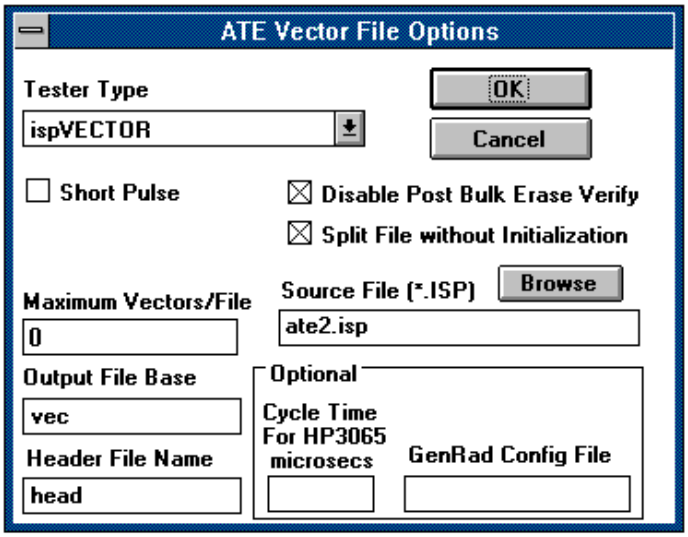

Figure 3-27. Filling in the ATE Vector File Options Dialog Box

6. Click the check box to disable the post bulk erase verify feature.
7. Click the check box to disable the split file feature.
8. Click **OK**. Check the Messages window for a successful notice and to determine how many files were generated.

▲ CAUTION **Do not use the Short Pulse option when programming the final pattern into your devices.**

You can open and edit the vector files using any text editor. The vector files now include markers that delineate the beginning of each device and the end of the chain. These help to isolate pins for troubleshooting. The dot extensions for vector files are determined by which type of ATE you used.

Simulating ATE Functions

Using your PC, you can simulate ATE tester functions. By simulating the test vector files, you insure that the test vector files will program correctly. Using a parallel port, the simulation downloads the vectors from the ispVECTOR files to your devices.

The following items are the ATE Download Simulation options:

- Type of ATE File – Includes the type of ATE vector file you will simulate. Lattice Semiconductor supports the ispVECTOR file type as well as several third-party testers. The ispVECTOR files have a .tst extension.
- Find Time Only – Calculates the time that the dowloading process will take. When this option is used, full simulation will not take place.
- Base File Name of ATE File – Includes the base file name of the vector files you want to simulate. Enter a name that is six characters or fewer. The ispDCD software assumes your vector file is located in your current working directory. Type in the same base file name that you used in the Output File Base field (**vec**).
- Number of Files – Includes the number of files into which the ispVECTOR file was split. The number of files is determined during the **Command ⇒ Generate ATE** function. Check the Messages window for the number of files. There is no limitation to the number of files.

To simulate ATE vectors:

1. Select **Command ⇒ Simulate ATE Testing** or the **ATE SIM** icon from the ISP Daisy Chain Download menu. The ATE Download Simulation dialog box appears (Figure 3-28).

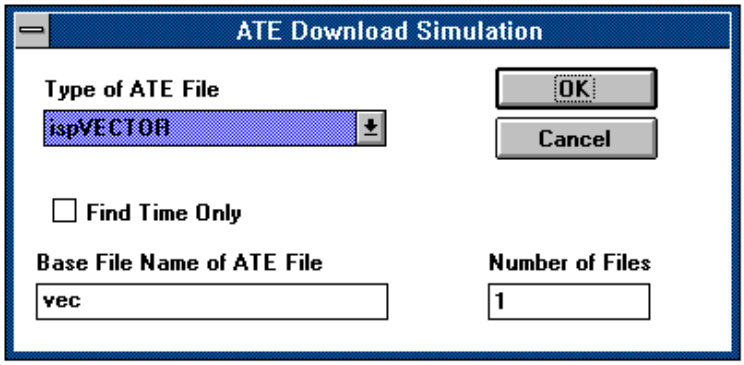

Figure 3-28. ATE Download Simulation Dialog Box

2. Select a file type from the Type of ATE File drop box.
3. Click to disable the Find Time Only option.
4. Enter the base file name in the Base File Name of ATE File field.
5. Specify the number of files in the Number of Files field. There is no limit.
6. Click **OK**. Check the Messages window for a successful notice.

Saving a New Download Configuration

Once you set all the parameters for the configuration, save it.

To save a new download configuration:

1. Select **File** ⇒ **Save As** or click the **Save** icon from the ISP Daisy Chain Download menu (Figure 3-29). The standard Save As dialog box appears.
2. Type in the name of your design file in the File Name field. It must have a .dld extension. If you enter more than eight characters, the file name is truncated. The full name of a file is not recognized against the truncated file name so the truncated file name overwrites itself each time you perform a save.
3. Choose the directory and file type.
4. Click **OK**. The *name*`.dld` appears in the main ISP window.

   If the file name already exists, a warning box to overwrite the file appears. Click **Yes** to overwrite the existing file. Click **No** to return to the Save As dialog box and save the file with a new name.

   Click **Cancel** to close the Save As dialog box. The configuration setup is not saved.

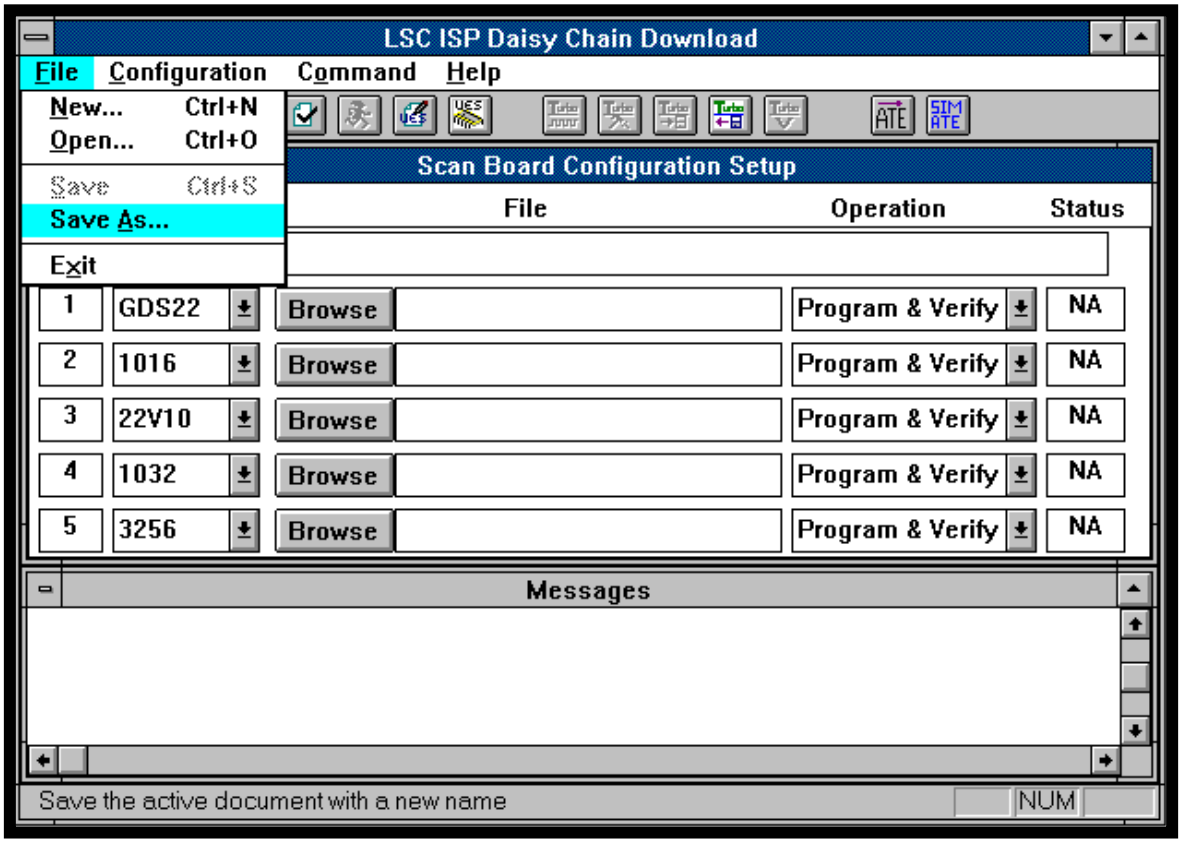

Figure 3-29. **File** ⇒ **Save As** Menu Option

Opening a Configuration

To open a configuration:

1. Select **File** ⇒ **Open** or click the **Open** icon in the ispDCD menu. The standard Open dialog box appears.
2. Click **OK** to execute or **Cancel** to close the dialog box.

Detecting a Configuration

If you want the software to identify all the devices available for programming, regardless of how you have them ported or mounted, use the **Configuration** ⇒ **Scan Board** command. This command detects all the available ISP devices and lists their order and device type. Once the ispDCD software identifies this information, complete the process by filling in the .jed file names and choosing the **Operation** for each device, exactly like the new configuration procedure beginning on **page 28**.

To identify the ispLSI devices in an ISP chain or ispJTAG chain automatically:

Select **Configuration** ⇒ **Scan Board** or click the **Scan** icon from the ISP Daisy Chain Download menu (Figure 3-30). If you connected more than 64 devices to the board, an alert appears in the Messages window. The ispDCD software can only detect and read up to 64 devices per file. Otherwise, the Scan Board Configuration Setup window appears with the **Index** and **Device** fields filled.

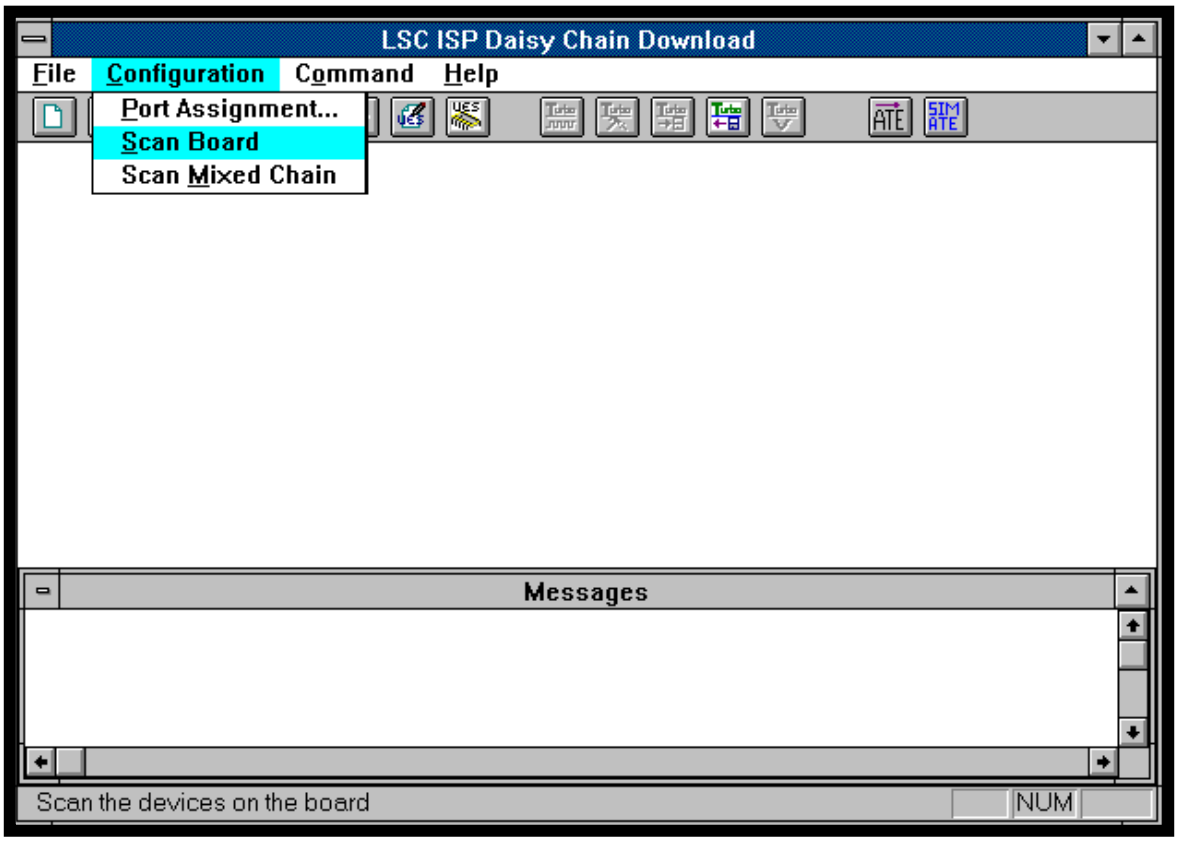

Figure 3-30. **Configuration** ⇒ **Scan Board** Menu Option

To automatically identify a ispJTAG chain with ispLSI devices and non-LSC JTAG devices:

The procedure is exactly the same as if the chain contains only ispLSI devices. However, if the non-LSC JTAG devices contain a non-JTAG compliant capture-IR pattern, the scan will fail. Follow the procedures for creating a new configuration beginning on **page 29**.

Detecting a Mixed Chain

If you want the software to scan a mixed chain configuration setup, use the **Configuration** ⇒ **Scan Mixed Chain** command. This command scans the ISP chain and the JTAG chain, and displays both chains in the configuration menu with a mixed chain marker between them. Once the ispDCD software identifies this information, complete the process by filling in the .jed file names and choosing the operation for each ISP-programmable device.

To automatically identify the ISP devices:

1. Select **Configuration** ⇒ **Scan Mixed Chain** (Figure 3-31). The ispDCD software detects the presence of JTAG devices and the Scan Board Configuration Setup window appears (Figure 3-31). A mixed chain marker in the list separates the ISP-programmable devices from JTAG devices.

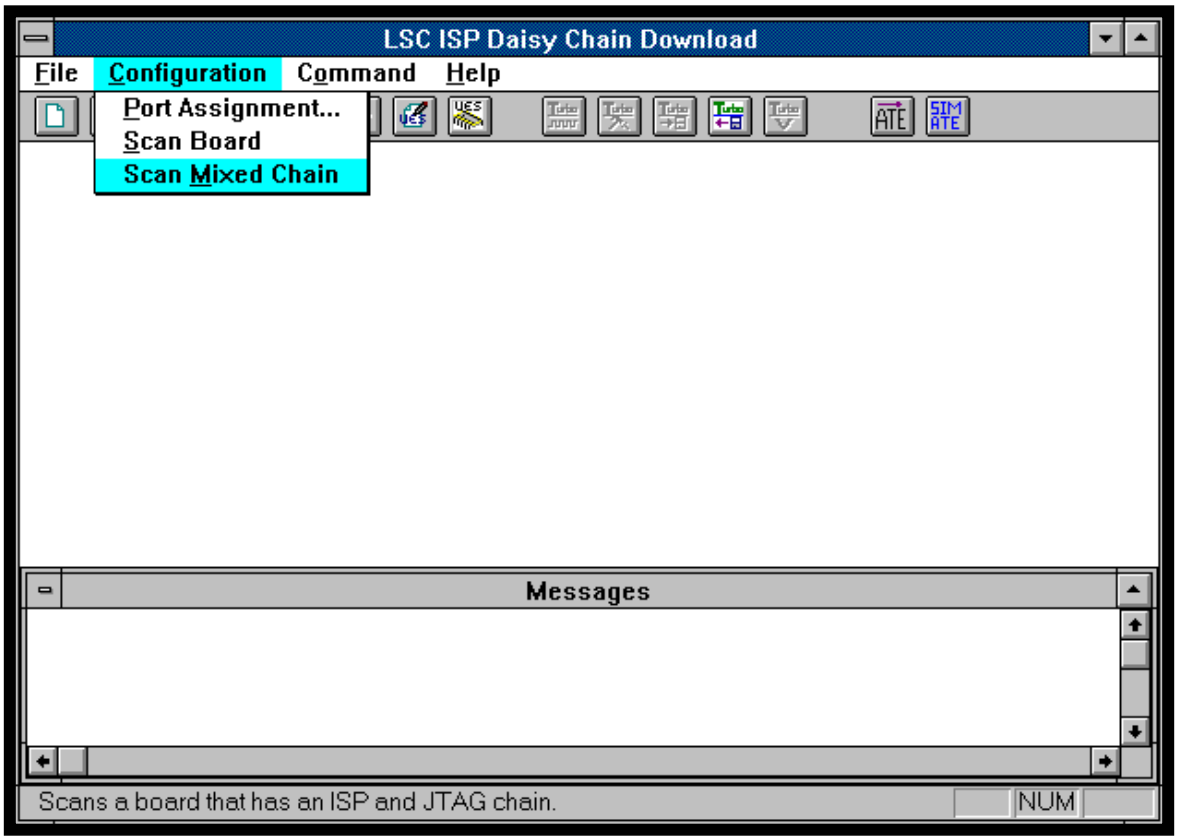

Figure 3-31. **Configuration** ⇒ **Scan Mixed Chain** Menu Option

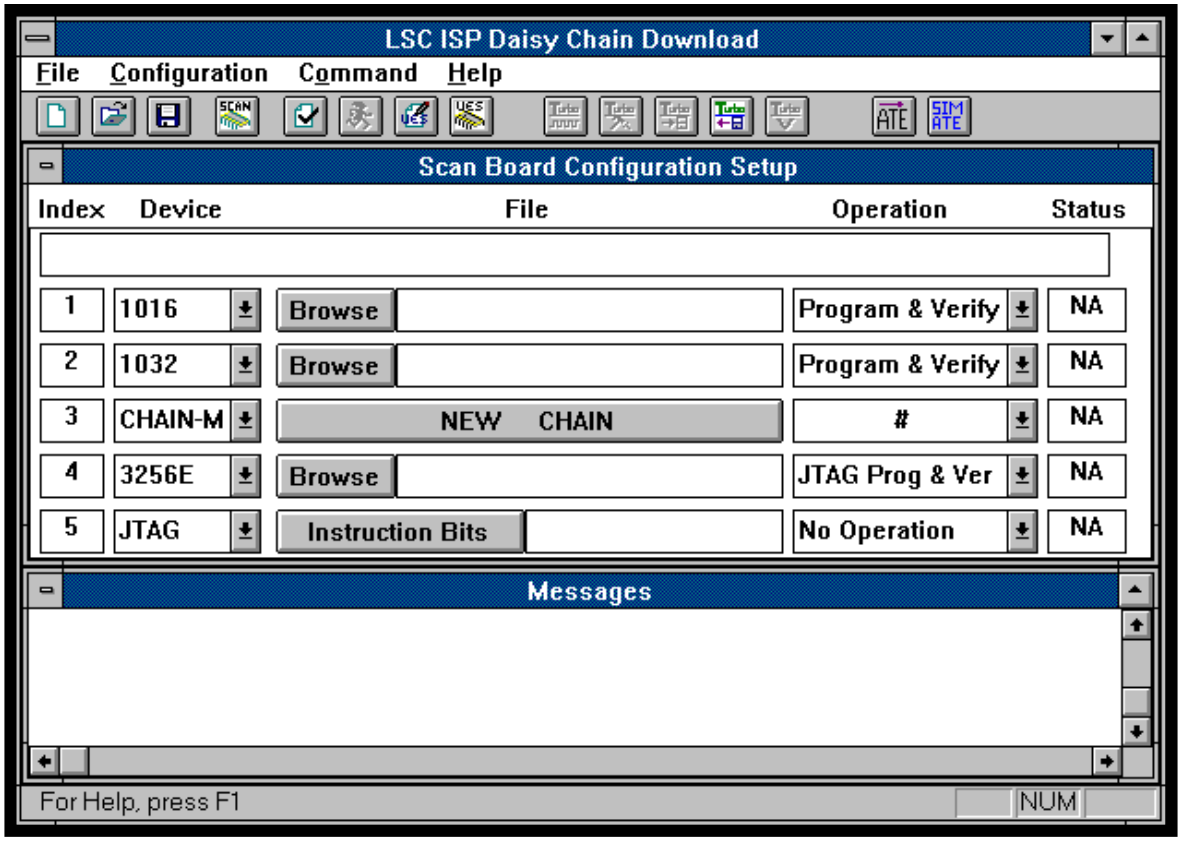

Figure 3-32. Scan Board Configuration With a Mixed Chain

2. Enter the File name or select **Browse** to find a file for the JEDEC files. Make sure your choices are highlighted and choose **OK**. The Browse dialog box closes and the .jed file name you chose appears in the Scan Board Configuration Setup dialog box for that device. The mixed chain marker and JTAG device will not have File or Operation options.
3. Select the Operation for the devices. The Operation options are defined starting on **page 31**.

Changing the Port

When you launch the ispDCD software with the cables properly connected, it identifies the first port it detects. This menu allows you to change the port setup to accommodate your porting needs.

To change the port setup:

1. Select **Configuration** ⇒ **Port Assignment** from the ispDCD menu. The Port Assignment dialog box appears (Figure 3-33).

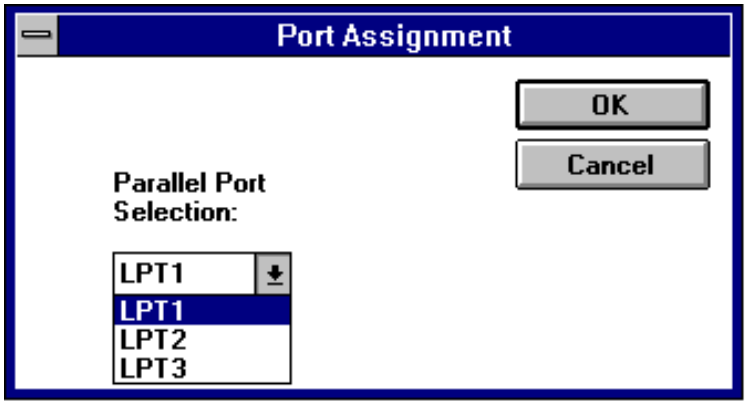

Figure 3-33. Port Assignment Dialog Box

2. Use the pull-down arrow to select a port. Make sure your choice is highlighted. It appears in the top of the box.
3. Click **OK** to execute your changes or **Cancel** to close the box with no changes.

   If the cable is not connected or cannot be detected, an error message displays in the Messages window (Figure 3-34).

Figure 3-34. No Cable Connected Error Message

If the cable is connected properly, but the power is not on, a message is displayed (Figure 3-35).

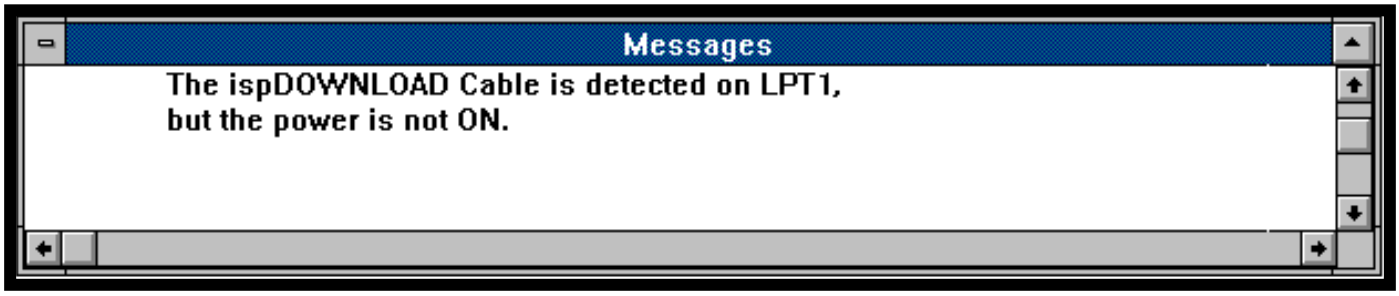

Figure 3-35. No Power Error Message

Exiting the Program

To quit the ISP Daisy Chain Download software:

1. Select **File** ⇒ **Exit** from the ISP Daisy Chain Download menu (Figure 3-36). The Save Configuration Setup dialog box appears (Figure 3-37), if you have not saved this file.
2. Click **Yes** to save the changes and exit the ISP Daisy Chain Download program. Click **No** to exit without saving the changes. If you created a new configuration and did not name it, the standard Save As dialog box appears. Fill in the fields and click **OK** to save the new configuration and exit the ISP Daisy Chain Download software.

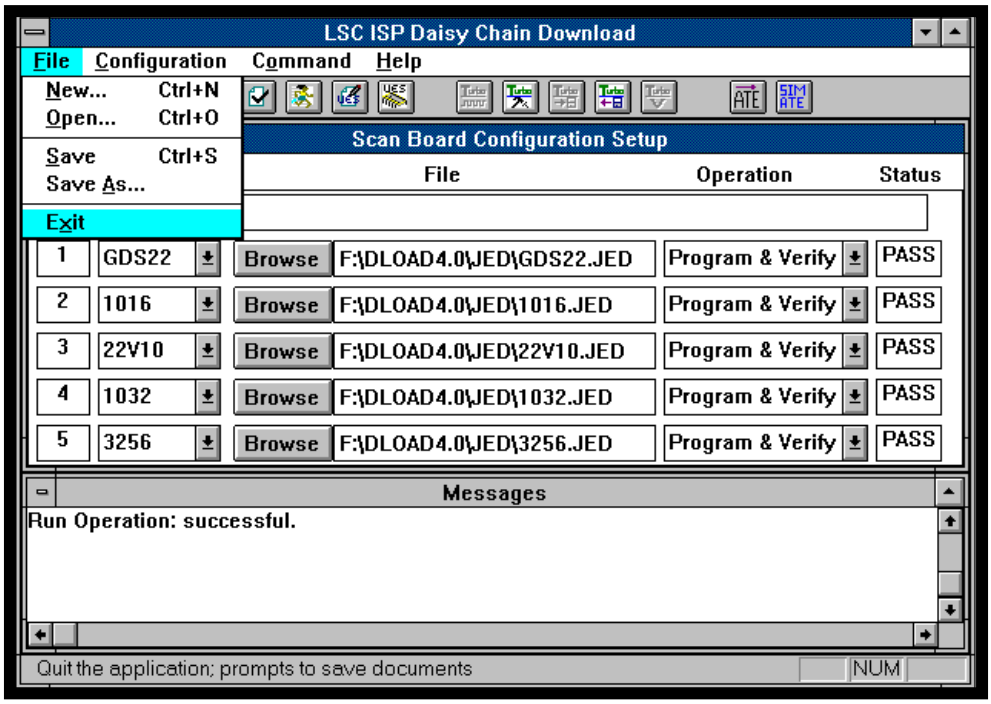

Figure 3-36. **File** ⇒ **Exit** Menu Option

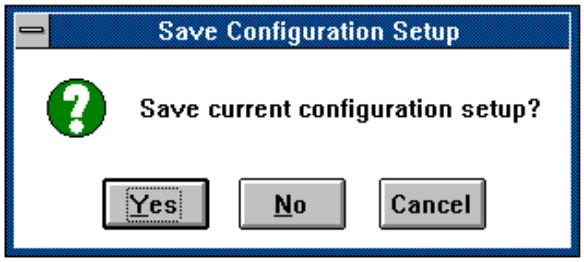

Figure 3-37. Save Configuration Setup Dialog Box

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