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QUICKLOGIC

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Programmer Kit User's Guide

with Desk*Fab*™ and Quick*Pro*™ Reference

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1 Introduction

Welcome to the QuickLogic Programmer Kit

QuickLogic's device programming software, Quick*Pro*, allows you to program and test QuickLogic's Field Programmable Gate Arrays (FPGAs) and QuickLogic's Embedded Standard Products (ESPs). Running on the PC platform, this software package, along with the Desk*Fab* programmer hardware, allows you to program QuickLogic devices in your own facility. QuickLogic also offers volume programming service through the factory or through its distributors.

This Introduction includes:

- An Introduction to Desk*Fab*
- Items Included in the Programmer Kit
- Registering Your Quick*Pro* Software
- About This User's Guide
- QuickLogic Technical Support

Desk*Fab*

The QuickLogic Desk*Fab* programmer supports all QuickLogic FPGA and ESP families. The Desk*Fab* programmer can program from one to four devices at a time, depending on the programming adapter being used and the device family being programmed. Desk*Fab* programmers may also be connected in a daisy chain of up to 8 programmers. This chain of Desk*Fab* programmers can then be connected to a single PC, allowing up to 32 devices to be programmed at once.



Figure 1-1 QuickLogic Programmer Kit

Items Included in the Programmer Kit

The QuickLogic Programmer Kit contains the following items:

- Desk*Fab* Programmer
- Quick*Pro* Programming Software on CD-ROM
- Software Registration Card (fax or mail this back to QuickLogic)
- License Agreement
- RS-232 Cable (6 feet long, 9-pin male to 9-pin female)
- RS-232 Shielded Cable (12 in. long, dual 9-pin male to 9-pin female)
- RS-232 Adapter (25-pin female to 9-pin male)
- RS-232 Surge Protector (You should have the surge protector already connected to the 6-foot long RS-232 cable by the manufacturer.)

- Universal Power Supply (100V/1A - 250V/1A, 50/60 Hz)
- ESD Cable and Grounding Wrist Strap
- Programmer Kit User's Guide

Registering Your Quick*Pro* Software

Please fill out the Quick*Pro* registration card, and mail or fax it back to QuickLogic.

Registering your software ensures that you will be notified of recent upgrades. It is extremely important that you always use the current version of QuickLogic software, especially when programming devices. You may also check the QuickLogic website for current Quick*Pro* software upgrades.

About This User's Guide

This User's Guide includes:

- Installing the Quick*Pro* Software
- Overview of Programming Procedures
- Programming QuickLogic FPGA and ESP Devices
- Troubleshooting Problems and Error Messages
- Gang Programming
- Programming Adapters for FPGAs/ESPs

Technical Support

If you have any questions that cannot be addressed by the documentation, the Quick-Logic technical support team can be reached by using any of the following methods:

USA - Hotline: (408) 990-4100

BBS: (408) 990-4080

FAX: (408) 990-4040

EMAIL: support @quicklogic.com

WEB: www.quicklogic.com/support/

For programming problems:
www.quicklogic.com/hw_debug/

Europe - Hotline: +44-181-563-7624

BBS: +44-181-563-0489

FAX: +44-181-563-9254

EMAIL: support @quicklogic.com

WEB: www.quicklogic.com/support/

For programming problems:
www.quicklogic.com/hw_debug/

2 Installation

Quick*Pro* contains some of the most sophisticated programming algorithms available today. Device programming is supported on the PC under Windows 95 and NT environments. Device programming is NOT supported on the Sun and HP workstation platforms, nor under Windows 3.1.

Note – Proper handling of programmers, adapters, and devices is the key to high programming yield and minimum hardware problems. All these hardware elements are ESD sensitive. For more information on proper handling, see *Hardware Handling* in this chapter.

This chapter includes:

- Requirements
  - Hardware Requirements
  - Programming Adapter Requirements
  - Software Requirements
  - Power Requirements
- Software Installation
- Hardware Set-Up
  - Hardware Handling and ESD Precautions
  - Hardware Installation
  - Desk*Fab* Calibration

Requirements

Hardware Requirements

The hardware requirements for Quick*Pro* programming software running on the PC platform are:

- Pentium™ processor (90 MHz Pentium™ or higher recommended). Slower processors can be used but programming time will be longer.
- CD-ROM drive to easily and quickly install the latest Quick*Pro* software. If you intend to download the latest version of Quick*Pro*, a LAN connection with ISDN or T1 access to the Internet can be used instead.
- Microsoft Windows compatible Mouse.
- Super VGA Monitor with Microsoft Windows compatible display driver.
- 32+ Megabytes of RAM. Less RAM can increase programming time by a factor of 2-3X.
- 64 Megabytes of RAM recommended for Windows NT Systems to achieve optimal programming time.
- 50 Megabytes of free hard disk space after installing the Quick*Pro* software.
- A quality serial (COM 1 or COM 2) add-in card. Serial ports which are built into the motherboard are not recommended as they require longer cables within the PC case to connect the motherboard serial interface chips to the serial port on the back of the PC. A good example of a quality I/O Card is SIIG, Inc.'s High Speed I/O - I/O Professional, 16550 Serial Port & Bi-directional Parallel Port Card.

Programming Adapter Requirements

The QuickLogic Desk*Fab* Programmer requires programming adapters. See Appendix B: *Programming Adapters* to match appropriate QuickLogic programming adapters with different device-package combinations. These are ordered separately.

There are two types of programming adapters:

- QD-XX and QA-XX are Single-Site programming adapters

  The Single-Site adapters consist of 1 to 3 sockets, each for a different package type, allowing the Desk*Fab* to program one device at a time.

  For example, the QD-PF100144 adapter has a 100 pin TQFP socket and a 144 pin TQFP socket.

- QD-DF-XX and QA-DF-XX are Multi-Site programming adapters

  The Multi-Site programming adapters, on the other hand, have 4 sockets of the same package type, enabling the programmer to program up to 4 devices of the same package type simultaneously.

  For example, the QD-DF-PQ208 adapter has 4 208 pin PQFP sockets.

Software Requirements

QuickLogic devices using the Desk*Fab* Programmer require:

- Windows ’95 or Windows NT - 3.51 or higher.

Download the Latest Quick*Pro* Software

If you have a fast (ISDN or T1) connection to the Internet, you can download the latest Programming Software from the QuickLogic Web Site (www.quicklogic.com). If you cannot download the software, contact your closest QuickLogic representative or distributor and ask for the latest version on CD-ROM.

Power Requirements

Make sure you understand whether your outlets have their own fuse/breaker, or whether they share a common fuse. See examples below for International and U.S. voltage to fuse ratios.

Table 2-1: Power Requirements

Hardware	110V Power Circuit	220V Power Circuit
Typical 90 MHz PC + monitor	1.5 Amps	0.75 Amps
Desk*Fab* Programmers	0.5 Amps	0.25 Amp

U.S. (110V) Examples:

- One 15 Amp fuse can handle 2 PCs and up to 16 Desk*Fab* Programmers
- One 20 Amp fuse can handle 3 PCs and up to 24 Desk*Fab* Programmers

International (220V) Examples:

- One 8 Amp fuse can handle 2 PCs and up to 16 Desk*Fab* Programmers
- One 12 Amp fuse can handle 3 PCs and up to 24 Desk*Fab* Programmers

Note – DO NOT use any surge protectors, or UPS's (un-interruptible power supplies) between the Desk*Fab* and the outlet. The Desk*Fab* Programmer has it's own surge protection. *You should always use a surge protector for the computer's power supply.*

The above power requirements are based on a per-fuse/breaker basis, not per outlet. It is possible that two or more outlets share the same fuse/breaker. Always balance the number of Desk*Fab* programmers across the outlets connected to the same fuse/breaker. In other words, if two outlets are connected to the same fuse/breaker, don't connect all the Desk*Fab* programmers to one outlet, while the other outlet is left unused.

Software Installation

This section covers the installation of Quick*Pro*.

Note – You may install Quick*Pro* in the same directory with any other QuickLogic software. Quick*Pro* installation will not overwrite the existing QuickLogic software, but it will add a sub-directory in the installation directory. Or, you may install Quick*Pro* in a separate directory than any other QuickLogic software.

Quick*Pro* includes an interactive installation program to perform all necessary installation functions.

To install the software:

1. Insert the Quick*Pro* CD-ROM into the CD-ROM drive.

2. The CD-ROM comes with the Autoplay feature to allow easy installation.

   Or you can manually install the software in the following way:

   - From Windows '95 or Windows NT 4.0
     Select START>RUN. Then type:
     `D:\QPRO\Disks\Disk1\Setup.exe`
     (where `D:` is the CD-ROM drive)

   - From Windows NT 3.51:
     Select File>RUN. Then Type:
     `D:\QPRO\Disks\Disk1\Setup.exe`
     (where `D:` is the CD-ROM drive)

3. After an initial setup screen, a registration screen appears as shown in Figure 2-1.

   Enter your name and company name in the appropriate fields. The System ID field is optional.

Note – If you are installing the software from a CD-ROM, be sure to fax or mail in the registration card. Registering your software ensures that you will be notified of software upgrades. It is extremely important that you always use the current version of QuickLogic software, especially when programming devices.

Click **Next** to advance through the registration and installation process.

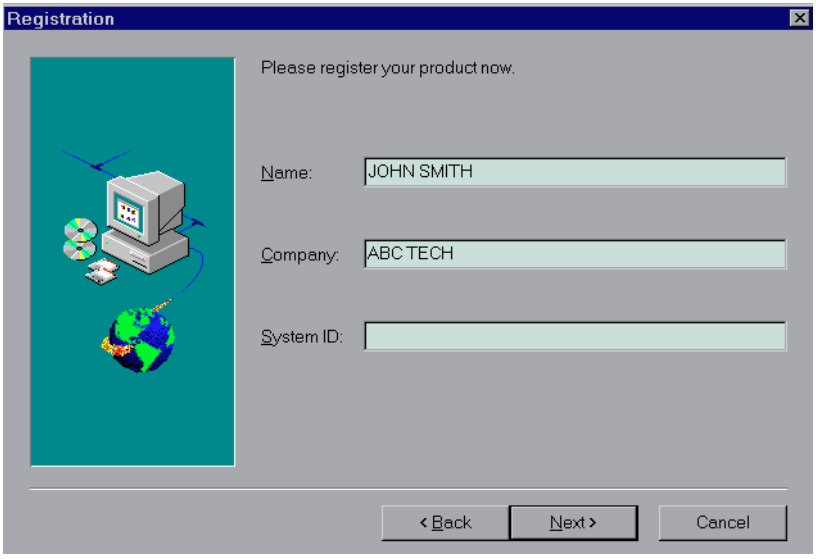


Figure 2-1 Registration Window

4. In the Select Setup Type window shown in Figure 2-2, choose one of the following:
   - **Compact** to install Quick*Pro* with support for LOF file format only.
   - **Advanced** to install Quick*Pro* with support for LOF and CHP files.

5. Click **Next** to continue with the installation.

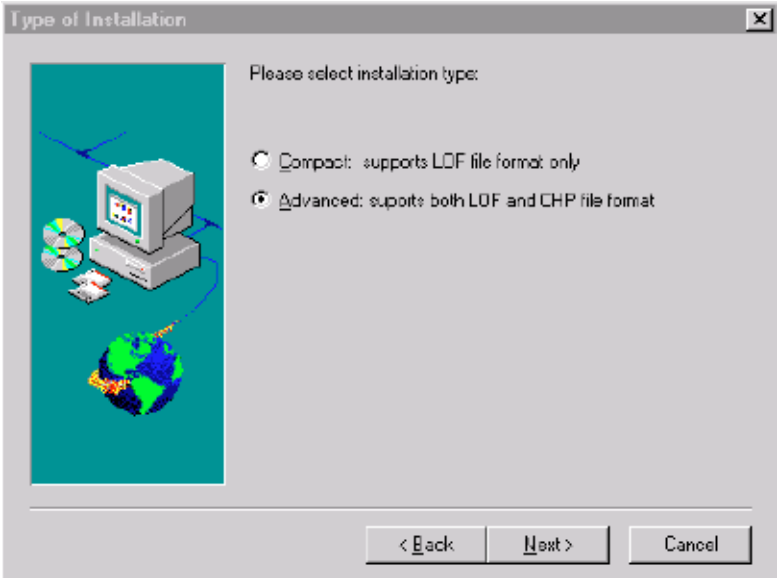


Figure 2-2 Select Setup Type Window

Note – QuickLogic has developed a new data file format for programming FPGA and ESP devices. Named the Link Object Format (LOF), this is a self-contained file for programming a QuickLogic device. LOF files can also be used with some third party programmers. To determine if you can use this format with a particular third party programmer, contact the QuickLogic Hotline.

6. In the Select Program Folder window, as shown in Figure 2-3, click **Next** to accept the recommended default folder, `QuickLogic`.

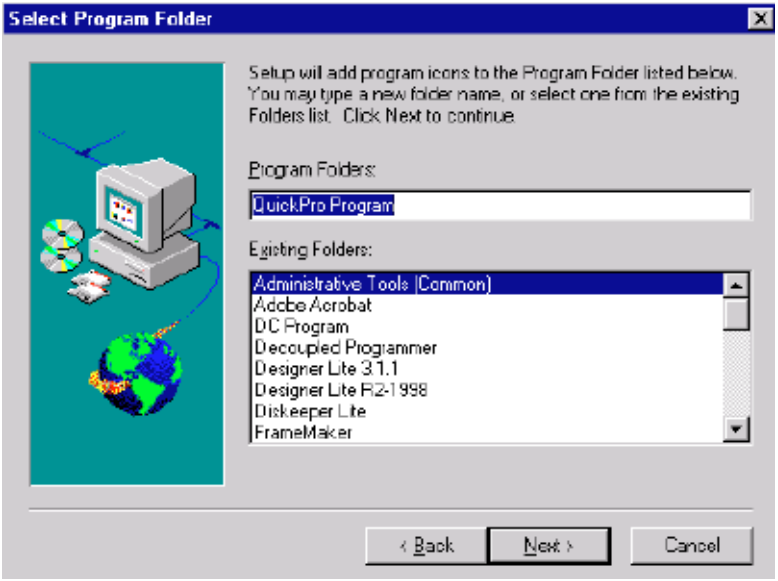


Figure 2-3 Select Program Folder Window

7. Click **Next** to begin the installation.

8. When the installation is complete, the `SETUP` program may inform you that your PATH variable needs to be updated in your `AUTOEXEC.BAT` file. Allow this automatic path update to occur, or you will need to edit your `AUTOEXEC.BAT` file manually.

9. If the `AUTOEXEC.BAT` file is not updated automatically, you can edit it manually.
   - In Windows 95, add `C:\PASIC\QPRO` directory to the PATH environment variable (where `C:\PASIC\` is the installation directory).
   - In Windows NT, modify the PATH variable using the System icon in the Control Panel.

10. Review the `README.TXT` file. It may contain new information that could not be included in this User's Guide.

Hardware Set-Up

Hardware Handling and ESD Precautions

It is very crucial that you properly handle all programmers, adapters, and devices to avoid damage due to electro-static discharge (ESD). Please follow the precautions outlined below.

Proper Grounding

1. QuickLogic highly recommends using a wrist strap, such as the one provided with the Desk*Fab* programmer. Heel straps can be used provided the floor has conductive tiles, and heel straps are worn on both ankles. Floors with conductive coatings are not strongly recommended, because the coating may not have been properly applied, and it can wear out. A combination of heel straps and wrist straps, when used properly, is the best precaution against ESD.

2. When using the wrist strap provided by QuickLogic, be sure to plug the grounding strap into the programmer. Make sure that the programmer's serial cable is plugged into the PC and that the power supply is plugged into a grounded outlet, or the grounding strap will not work properly.

Proper Storage and Handling

1. Keep the programmer, adapter, and devices stored in an ESD conductive mylar bag when they are not being used, or when they need to be transported.

   This is especially important if you are not properly grounded while carrying these items. Storing these items in mylar bags also helps keep dust and debris from affecting the performance of the programming hardware. All QuickLogic programmers, adapters, and devices are shipped in ESD conductive mylar bags. Save these so that they will be available for future use.

2. When removing a programmer, adapter, or devices from their mylar bag, be sure to place these items on a static-free work surface.

3. Be sure to handle the programmer and programming adapters gently.

   Any damage to the device socket, such as misalignment or bent pins, can affect your ability to properly program QuickLogic devices. Also be careful not to damage the connectors on the underside of the adapter, or the LEDs on the top of the adapter.

4. When handling devices in TQFP, VQFP, PQFP, or trimmed and formed CQFP packages, always use a vacuum pencil.

   Never try to handle these devices with your bare hands, as the leads are very fragile and can easily become misaligned. Devices in PLCC, PBGA, and CPGA packages may be handled without a vacuum pencil.

   Be sure you are properly grounded when handling devices in any package.

   Also, be aware that these devices are moisture-sensitive. Use the moisture level indicator included within the vacuum-sealed packaging. Minimize the time in which the bag is open to the external air.

Hardware Installation

Once you have installed the software, you are ready to connect the Desk*Fab* Programmer to your PC.

1. To Interface the QuickLogic Desk*Fab* Programmer to the computer, attach the COM port (either COM1 or COM2) of the computer to the serial port of the programmer with the supplied RS-232 cable.

Note – If you are going to connect multiple Desk*Fab* programmers to a single PC, please see *Appendix A: Gang Programming* for information on setting up multiple Desk*Fab*s for gang programming.

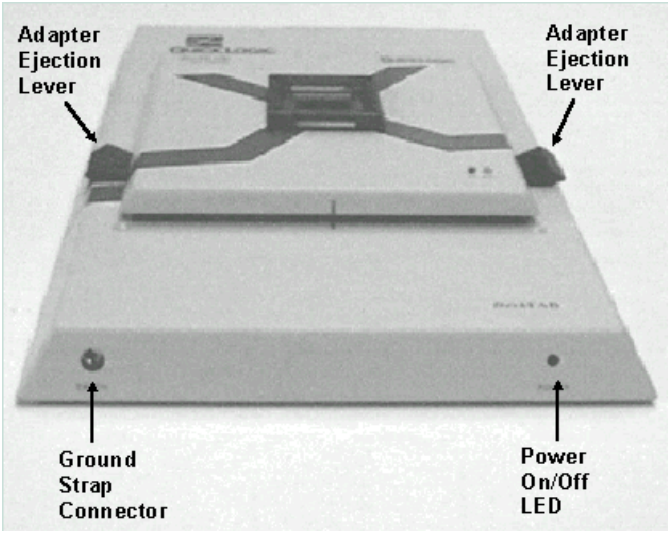


Figure 2-4 Front View of the Desk*Fab* Programmer

Figure 2-4 and Figure 2-5 show the front and rear view of the QuickLogic Desk*Fab* Programmer. Follow the steps outlined below:

2. Make sure the computer is turned off.

3. Make sure the programmer is turned off.

4. The RS-232 surge protector Spike™, should already be connected to the 6-foot long RS-232 cable by the manufacturer. Otherwise, you will need to insert the female end of the 6-foot long RS-232 cable into the RS-232 surge protector.

5. Connect the female end of the surge protector to one of your computer's COM ports.

   If your computer does not have a 9-pin COM port, but has a 25-pin connector instead, use the 25-pin to 9-pin adapter that is supplied with the programmer kit.

   This will allow you to use the shielded 6-foot RS-232 cable to connect the programmer to the PC. For all cable connections, tighten the screws so the cable cannot become loose or disconnect accidentally.

6. Insert the male end of this cable into the rear of the programmer. Tighten the screws so the cable cannot become loose or disconnect accidentally.

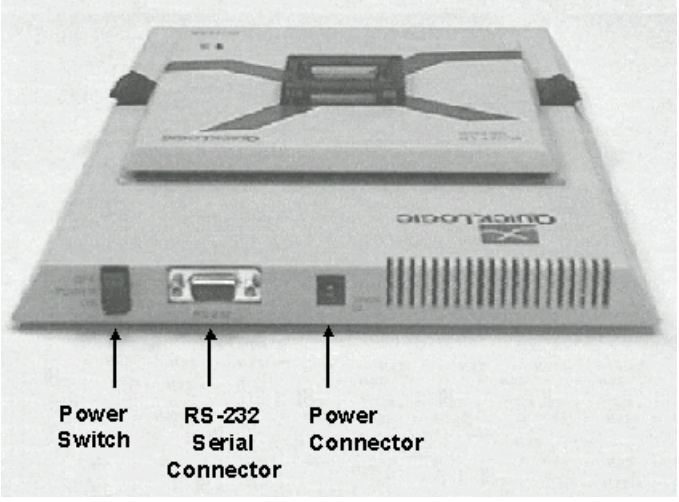


Figure 2-5 Rear View of the Desk*Fab* Programmer

7. Insert the power jack into the power connector at the rear of the programmer.

8. Insert the connection end of the grounding wrist strap to the ESD cable. The ESD cable should be connected to the ground strap connector at the front of the programmer. Be sure to wear the grounding strap when handling the programmer, adapters, or devices.

9. Install the programming adapter. See *Installing and Removing the Programming Adapter* on page 4-6.

10. Turn on the computer.

11. Turn the Desk*Fab*'s power switch to the ON position.

    The Power On/Off LED on the front of the programmer should now be on. The LEDs on the adapter should turn on and off intermittently, then stop with the green PASS LED.

    If both the LEDs remain on or only the red LED is on, this indicates hardware initialization failure or other hardware problems. Turn off the Desk*Fab* programmer for a few seconds before switching it on again. If the problem persists, contact QuickLogic Technical Support Hotline for assistance.

Note – DO NOT use any RS-232 cables or power supplies except the ones supplied with your QuickLogic programmer. All Desk*Fab* programmers must be connected to their respective PCs via the QuickLogic supplied RS-232 cable and surge protector. If these are not used, results will be unpredictable. *Do not use the power supply from the older QuickLogic Designer Programmer with your DeskFab.*

Once you have properly installed the Quick*Pro* software and have connected the Desk*Fab* Programmer to your PC, you will be ready to program QuickLogic FPGAs and ESPs.

Desk*Fab* Calibration

The QuickLogic Desk*Fab* programmer does not require external calibration.

Each time the programming system is initialized it performs a self test procedure and a self calibration procedure. The self test procedure verifies that all components in the microprocessor based programmer are operating. The self calibrating procedure verifies that all relevant components are operating at the correct voltage and current levels, and if not, provides the appropriate correction offsets. All measurements are compared to a voltage reference that is guaranteed by design to be accurate for the life of the programmer.

3 

Device Programming Overview

Overview of Procedures

Read this chapter to gain an overview of the procedures for programming. This overview is *not* meant to replace the detailed instructions for programming you will find in Chapter 4, *Device Programming Procedures*. After you have gone through the steps in chapter 4, you may want to use this chapter as a quick reference when programming.

Use this chapter as a quick overview and reference for:

- Programming a device
- Reading back a device's signature
- Testing a device

Programming

1. If you need to change the programming adapter for the device-package combination you are about to program, wear the grounding strap. Make sure the programmer is turned off. Remove the installed adapter, and insert the proper programming adapter into the programmer.

Note – Always wear the grounding strap before handling any adapters or chips.

2. Turn on the programmer.

3. Open Quick*Pro* and load the chip file (`.CHP`) or lof file (`.LOF`) for the design you wish to program. (In order to be able to program using a `.CHP` file, you must choose the advanced option during Quick*Pro* installation.)

4. Insert a device in the socket.

5. After the diagnostic test on the Desk*Fab* has finished, click **Program>Program Device**.

6. If nothing goes wrong, you should see a message telling you that the device passed programming. Click **OK**.

7. If the programming fails, a message will appear to inform you that a failure occurred. The details of the programming failure will be displayed in the scrolling log window (or the status window). Refer to Chapter 5, *Debugging Programming Problems*.

8. After a successful programming session, the Quick*Pro* programmer window will wait for another device to be programmed. To program another device, return to Step 4. If you are done with this programming session, click **Close** to close the Quick*Pro* programmer window.

9. You may remove the device from the programmer.

Signature Readback

1. If you need to change the programming adapter for the device-package combination you are about to readback the signature from, wear the grounding strap. Make sure the programmer is turned off. Remove the installed adapter, and insert the proper programming adapter into the programmer.

2. Turn on the programmer.

3. Open Quick*Pro* and load the chip file (`.CHP`) or lof file (`.LOF`) that was used to program the device you want to verify.

4. Once you are in the Quick*Pro* programmer window, click **Program>Read Silicon Signature**.

5. When a message box appears telling you to insert a device, insert the part into the socket adapter. Click **OK**.

6. After a moment, the silicon signature information for the device will be displayed for you to review.

7. You may remove the device from the programmer.

8. If you wish to read the silicon signature from another device, insert it into the programmer, and click **Program>Read Silicon Signature** again.

9. If you are done, click **Close** to close the programming window.

Device Testing

1. If you need to change the programming adapter for the device-package combination you are about to test, wear the grounding strap. Make sure the programmer is turned off. Remove the installed adapter, and insert the proper programming adapter into the programmer.

2. Turn on the programmer.

3. In Quick*Pro*, load the chip file (`.CHP`) or lof file (`.LOF`) that corresponds to the device you wish to verify.

4. The Quick*Pro* programmer window appears. Click **Program>Test Device**.

5. When a message box appears telling you to insert a device, insert the part into the programming adapter. Click **OK**.

6. If nothing is wrong, you should see a message telling you that the device passed. Click **OK**.

7. If the programming fails, a message will appear to inform you that a failure occurred. The details of the programming failure will be displayed in the scrolling log window. Refer to Chapter 5, *Debugging Programming Problems*.

8. You will be returned to the Quick*Pro* programmer window. You may remove the device from the programmer.

9. To begin testing another device, return to Step 3. If you are done with testing devices, click **File>Exit**.

4 

Device Programming Procedures

This chapter provides instructions on programming QuickLogic devices. If you wish to do gang programming, see Appendix A, *Gang Programming*. If you run into any problems or receive error messages, see Chapter 5, *Debugging Programming Problems*. For additional help, check QuickLogic's on-line Solutions Database (www.quicklogic.com), or call the QuickLogic Hotline at (408) 990-4100.

This chapter includes the following topics:

- Loading a Design
- Installing and Removing the Programming Adapter
- Selecting a COM Port
- System Testing
- Programming a Device
- Verifying a Device

Loading a Design

1.  To launch Quick*Pro*, double-click its icon, shown to the left. The Quick*Pro* window will appear, as shown in Figure 4-1.

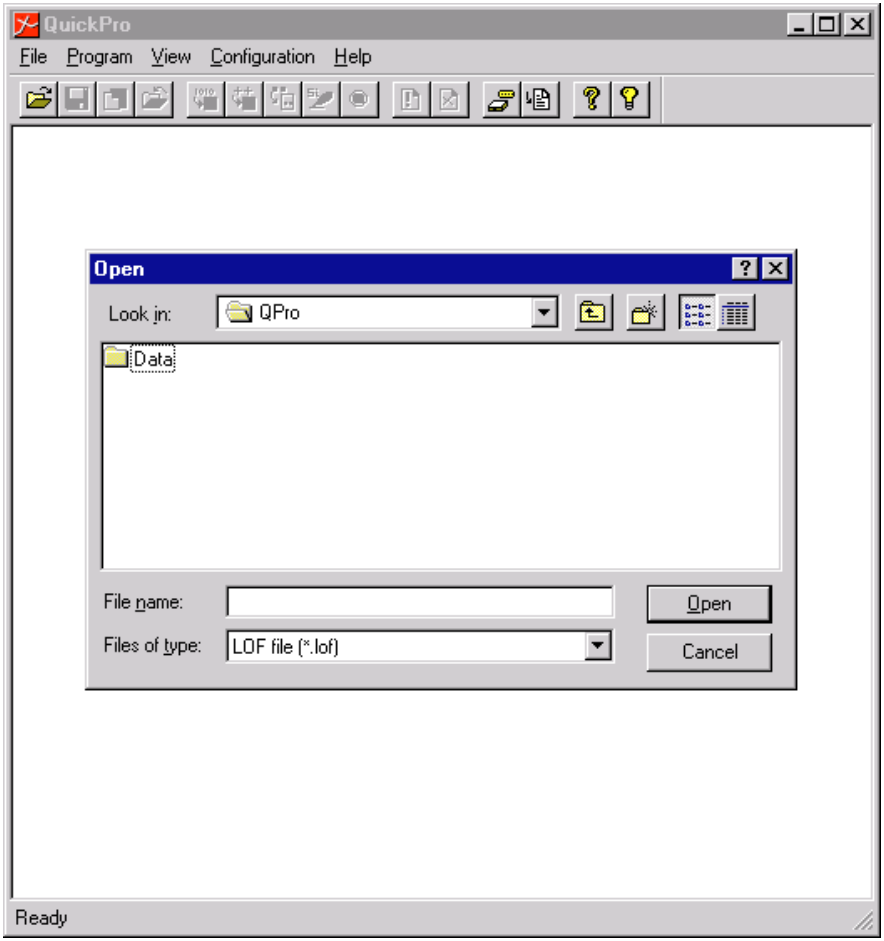


Figure 4-1 Quick*Pro* Window

2. Select the file format of the file you want to use, chip file (`.CHP`) or lof file (`.LOF`). (Chip and lof files are created in SpDE.)

Note – QuickLogic has developed a new data file format for programming FPGA and ESP devices. Named the Link Object Format (LOF), this is a self-contained file for programming a QuickLogic device. LOF files can also be used with some third party programmers. To determine if you can use this format with a particular third party programmer, contact the QuickLogic Hotline.

3. Select the filename and click **OK** to load the file into memory. The design name and device part number will be displayed in the Quick*Pro* title bar as shown in Figure 4-2.

   You will only be able to program this design into an FPGA if your blank QuickLogic FPGA matches the device type and package type shown in the SpDE title bar. The design's speed grade (`-X, -0, -1, -2, -3,` or `-4`), and the operating range (`Commercial, Industrial, or Military`) do not need to correspond to the blank device you are programming.

Note – If you open a chip or lof file, and receive any warnings or errors, make sure the designer is made aware of these potential problems. Do not attempt to program such a device unless the designer has verified that these warnings or errors are OK.

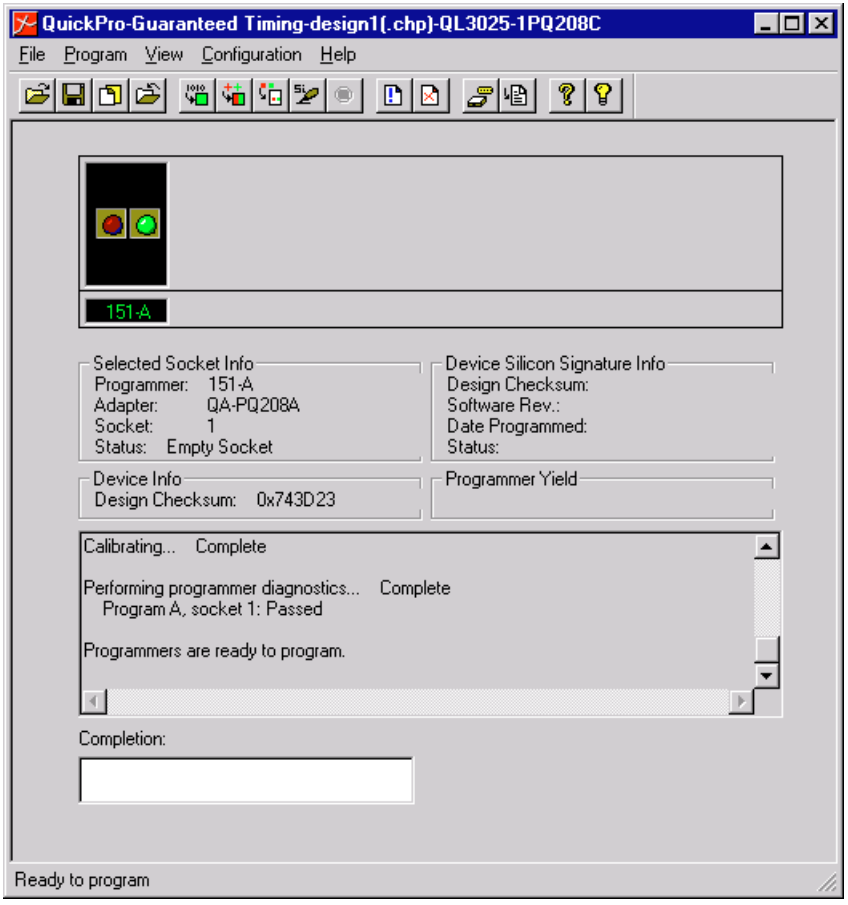


Figure 4-2 Loading a Chip File

In Figure 4-2, the design name is `design1`, the file type is `chp`, and the part number is `QL3025-1PQ208C`. See Figure 4-3 for a detailed explanation of part numbers.

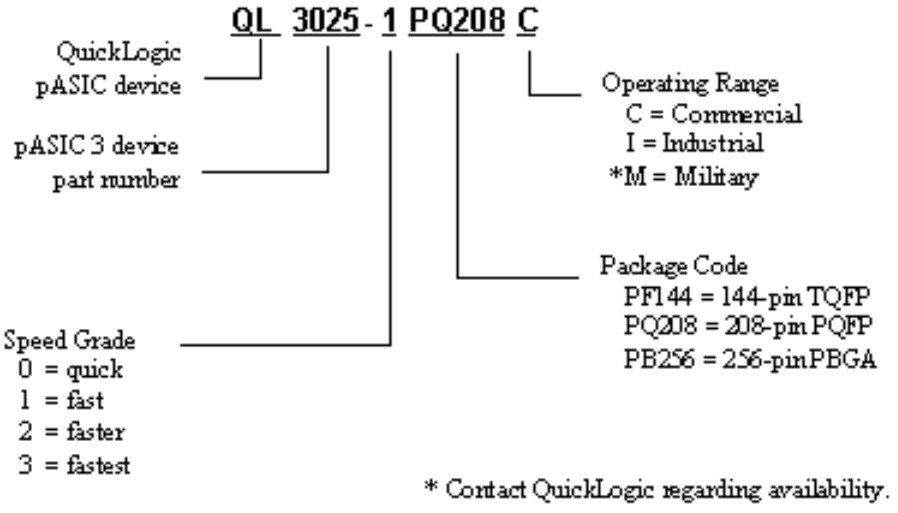


Figure 4-3 Device Part Numbers

Installing and Removing the Programming Adapter

Once a chip design is in memory, set up your programmer with the appropriate programming adapter. See Appendix B, *Programming Adapters* for the correct adapter required for your part and package combination.

Installing the Programming Adapter

To install the programming adapter:

1. Make sure Desk*Fab* is off.

Note – Always turn off the Desk*Fab* programmer before inserting or removing a programmer adapter. The programmer is not designed for hot insertion. Removing or inserting a programming adapter with the power on can severely damage your Desk*Fab* Programmer.

2. *Visually* inspect the connectors on the adapter as shown in Figure 4-4. Ensure there are no bent pins. Inspect the connectors on the programmer to ensure they are clean.

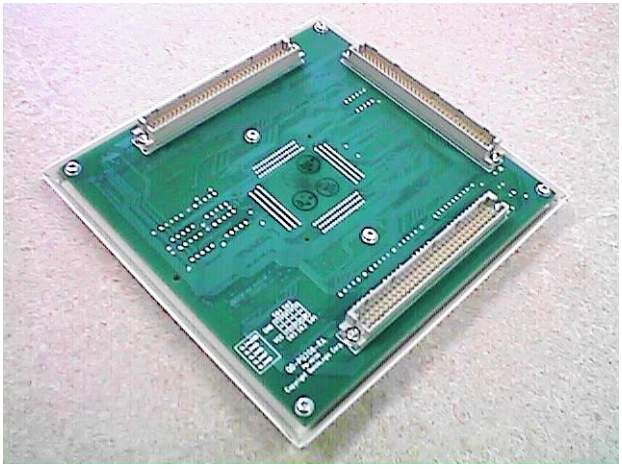


Figure 4-4 Connectors on the Adapter

3. Carefully line up the adapter connectors to the programmer connectors.

   The red stripes of the QuickLogic logo on the programming adapter should line up with the red stripes on the programmer. A center red stripe is also provided to help you line up the adapter to the programmer as indicated by the arrows in Figure 4-5.

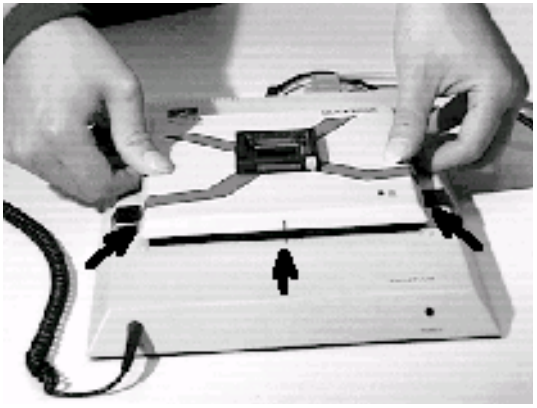


Figure 4-5 Plugging the Adapter into the Programmer Connectors

4. Once the connectors are properly lined up, push down gently but firmly, until the adapter settles into the programmer. When the adapter is seated, the adapter ejection levers should point up at a 45º angle as shown Figure 4-6.

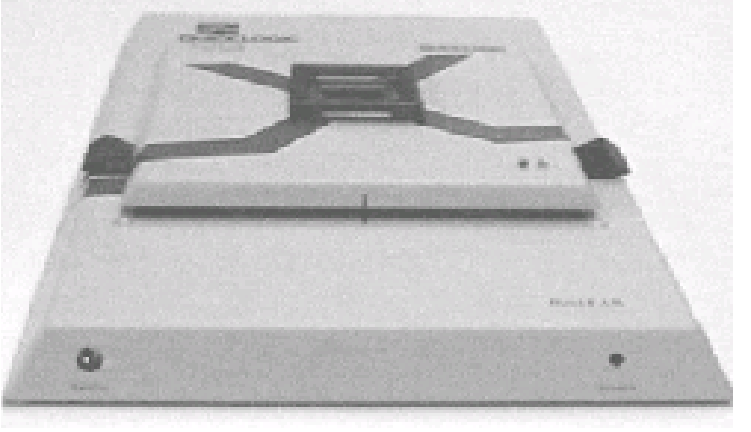


Figure 4-6 Adapter Properly Connected to Programmer

5. Turn the Desk*Fab* power switch to the **ON** position.

   If the adapter is connected properly, the LEDs will briefly flash, then the green PASS LED on the adapter will light up.

Removing the Programming Adapter

To remove the programming adapter:

1. Turn the Desk*Fab* power switch to the **OFF** position.

Note – Always turn off the Desk*Fab* programmer before inserting or removing a programmer adapter. The programmer is not designed for hot insertion. Removing or inserting a programming adapter with the power on can severely damage your Desk*Fab* Programmer.

2. Always wear the grounding strap before removing any adapter with your hands.



Figure 4-7 Disconnect Adapter from Programmer

3. Place your thumbs on the adapter ejection levers located on each side of the programmer and push down gently. The adapter should be ejected as shown in Figure 4-7.

4. Carefully remove the programming adapter.

Selecting a COM Port

The Desk*Fab* programmer is connected to your computer via a serial port. In order for the programmer to communicate with your computer, you need to set the COM port setting in SpDE to either COM 1 or COM 2.

To select a COM port, in **Quick*Pro***, select **Configuration>Communication Port**. The Configure COM Port dialog box appears as shown in Figure 4-8, allowing you to select the correct COM port.

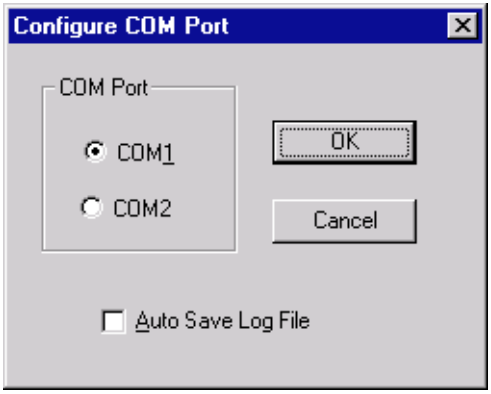


Figure 4-8 Configure COM Port Dialog Box

System Testing

QuickLogic strongly recommends running a system diagnostic test *before* programming a device. This will ensure that the hardware has been set up properly.

Before programming a device, be sure that:

- a `.CHP` or `.LOF` file is loaded into Quick*Pro*
- the adapter is properly inserted before turning on the Desk*Fab* programmer

To run a system test:

1. In **Quick*Pro***, select **Program>System Test** as shown in Figure 4-9, or click the **System Test** toolbar button.

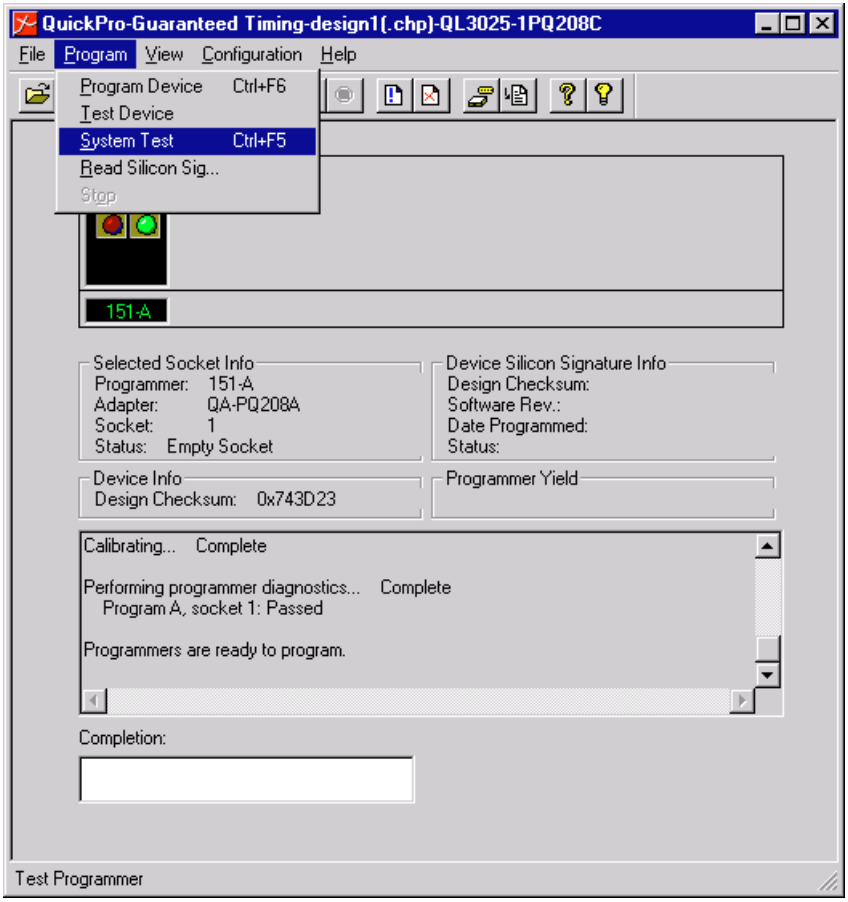


Figure 4-9 System Test Window

After the completion of the diagnostic test, the results will appear in the scrolling log display window (or the status window).

2. You will be instructed to insert a device. This is an optional extension of the test. If you want to continue the test, a blank device should be inserted.

   At the end of the test, the scrolling log display window (or the status window) will indicate the testing status. If your programmer fails the system test, contact the Quick-Logic Technical Hotline.

Programming a Device

Once you have performed a system diagnostic test, you can begin programming a device. Make sure you have the programming adapter properly inserted.

1. Turn on your Desk*Fab* programmer if you have it turned off after performing the system diagnostic test.

2. Open **Quick*Pro*** and load the desired `.chp` or `.lof` file.

3. The programming window will open as shown in Figure 4-10. The software will automatically detect the Desk*Fab* programmer(s) connected to the system, and display the message that the programmer has been found.

   Once a Desk*Fab* programmer is detected, its hardware ID code is read by the software. If a new version of Quick*Pro* software was installed recently, the Desk*Fab* programmer may need a firmware upgrade. If so, Quick*Pro* will perform the firmware upgrade automatically.

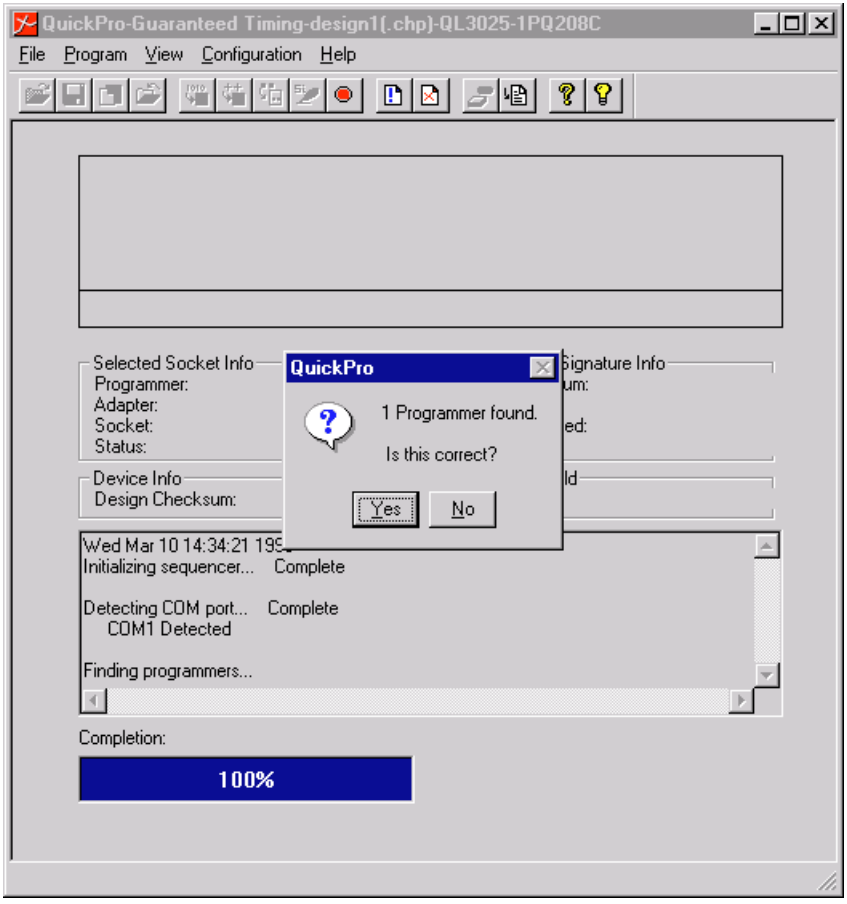


Figure 4-10 Programming Window

4. After the software has finished the auto-detection of programmers, it will run diagnostics on each programmer detected, and then calibrate each programmer. If you have a device in the socket at this time, the software will ask you to remove the device from the programming socket.

   Remove the device(s) from the socket(s) and click **OK.**

   The software will continue with the diagnostic and calibration routine.

5.  After the software has detected and performed the necessary tests on the programmer(s), you may begin with programming. To begin programming, click the **Program Device** toolbar button (as shown at left), or select **Program>Program Device** as shown in Figure 4-11.

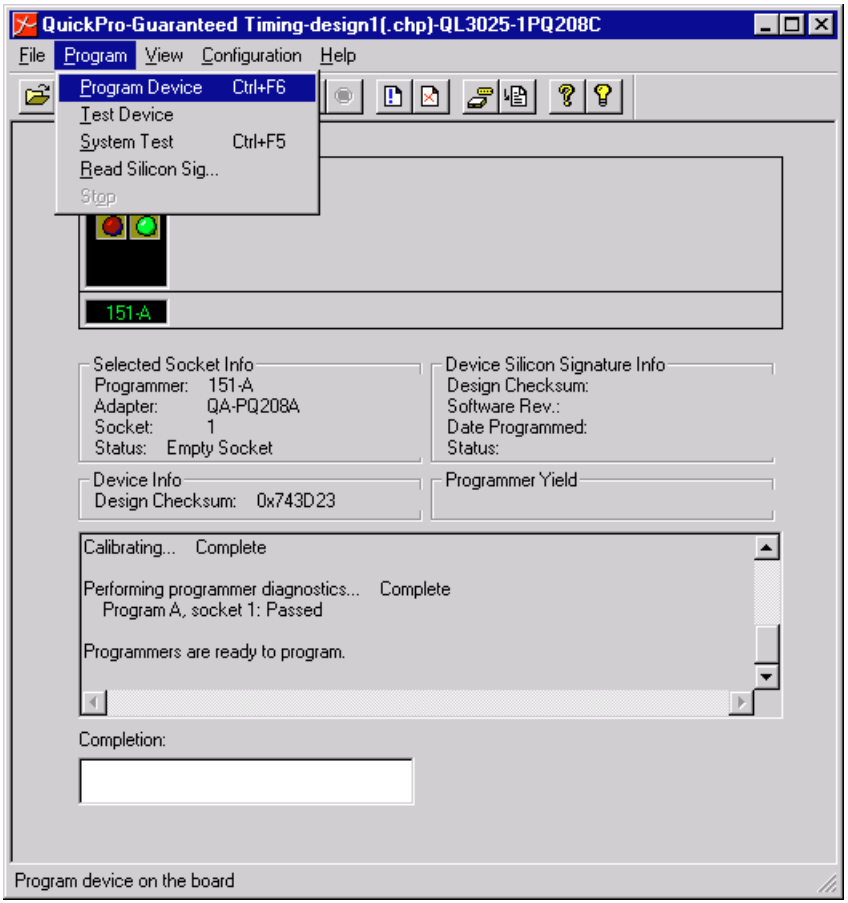


Figure 4-11 Programming Window with Programmer Information

Quick*Pro* Programming Window Fields

Each of the fields in the programming window displays current information on your device status.

Programmer and Adapter Indicator

The Programmer and Adapter Indicator displays the number of Desk*Fab* programmers detected by the software.



Figure 4-12 Programmer and Adapter Indicator

The programmer ID code is listed under each programmer symbol. In this example `1132-A` is the programmer ID code. `1132` is the hardware ID, while the `A` is the software-assigned gang ID. The Programmer and Adapter Indicator can display up to 8 programmer symbols. The number of sockets on the adapter is indicated by the pairs of LEDs, which corresponds to the `FAIL/PASS` LEDs on your programming adapter. Up to 4 pairs of LEDs can be displayed, corresponding to the number of sockets on the programming adapter you are using.

SELECTED SOCKET INFO



Figure 4-13 Selected Socket Info

The Selected Socket fields display:

Programmer: The currently selected programmer's hardware ID code and the software assigned gang ID.

Adapter: The programming adapter type that is installed for the selected programmer.

Socket: The number of the currently selected socket.

Status: The status of the currently selected socket.

DEVICE SILICON SIGNATURE INFO

This block shows information for the device in the currently selected socket.

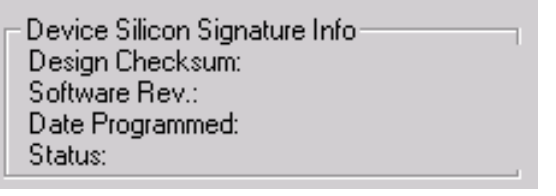


Figure 4-14 Device Silicon Signature Info

For a detailed explanation of silicon signature information, see *Verifying a Device* on page 4-24.

DESIGN INFO

This block displays the design checksum of the file that has been loaded into Quick*Pro*.

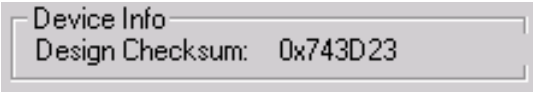


Figure 4-15 Design Info

STATUS WINDOW

The Status window contains a scrolling display of the current status for the task being performed.

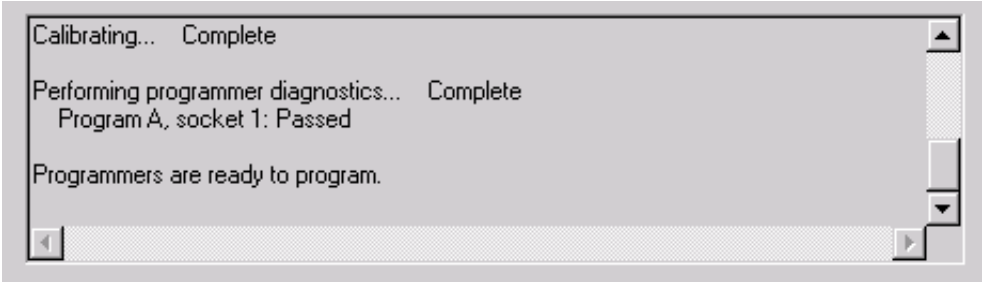


Figure 4-16 Status Window

It serves as a record of all activities performed during the programming session. This information can be saved to a file by clicking on **File>Save Log**.

TOOLBAR BUTTONS

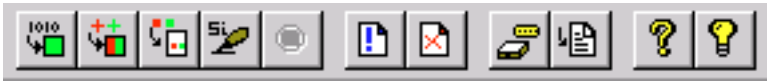


Figure 4-17 Toolbar Buttons

The toolbar buttons allow you to execute the following programming procedures:

- **Program Device:** Begin programming.
- **Test Device:** Test the device in the socket.
- **System Test:** Perform a system test of the Desk*Fab*.
- **Read Silicon Signature:** Read silicon signature from a device in the socket of the adapter.
- **Stop:** Stop any on-going action.
- **View QPR File:** View the QPR file.
- **View PRG File:** View the PRG file.
- **Configure COM Port:** Configure the COM Port.
- **Configure Default Text Editor:** Select a text editor.
- **About Quick*Pro:*** Quick*Pro* release information.
- **Help:** Open the User's Guide in PDF format. (To view this file, Acrobat Reader must be installed. You may install Acrobat Reader from the Quick*Pro* installation CD-ROM.)

PROGRAM PULL-DOWN MENU OPTIONS

Under **Program**, you have the following options:

Program Device: The programmer will run the programming tools.

Test Device: The programmer will run device testing.
The test includes:

- Verify part(s) in socket(s)
- Verify non-blank device
- Verify passing ICC test
- Read Device Silicon Signature
- Verify device checksum
- Verify device checksum with design checksum

System Test: The programmer will run a diagnostic test on itself.

Run the Programmer

1.  To begin device programming, click the **Program Device** toolbar button (as shown at left), or select **Program>Program Device**.

2. A dialog box appears prompting you to insert blank device(s) as shown in Figure 4-18. The device you insert should have the same device type and package type as the part number shown in the Quick*Pro* toolbar.

Note – While a device is being programmed or tested, do not attempt to run other programs in the Windows background. Although Windows is a multitasking environment, certain actions may interfere with the programming sequence, and may cause a device to fail programming.



Figure 4-18 Inserting a Device

Handling Surface Mount Packages

When handling surface mount packages, always be sure that the programmer is on a level surface. This will help to minimize pin and socket damage.

Follow the steps below to insert your packaged parts. Although QFP packages are shown, the following procedures will apply to PLCC packages as well.

1. Put on the grounding wrist strap. Make sure it is properly connected to the front of the Desk*Fab*.

2. Pick up the device using a vacuum pen as shown in Figure 4-19. When inserting surface mount packages, the device should be set on the socket using a vacuum wand so that all pins are aligned. No pressure on the socket is necessary for this first step.

   The vacuum pen is not provided by QuickLogic, but may be obtained from your local electronic stores.

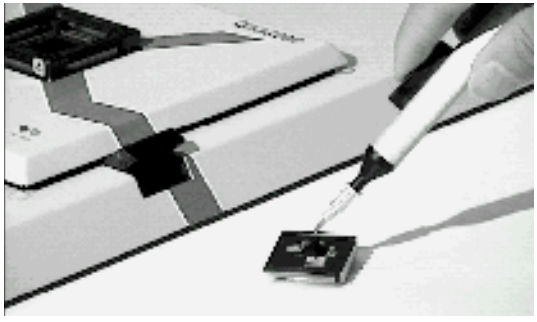


Figure 4-19 Vacuum Pen

3. Orient the device properly, making sure the pin 1 dot marker on the chip is aligned with the pin 1 marker on the adapter, as shown in Figure 4-20. Carefully set the device into the socket.

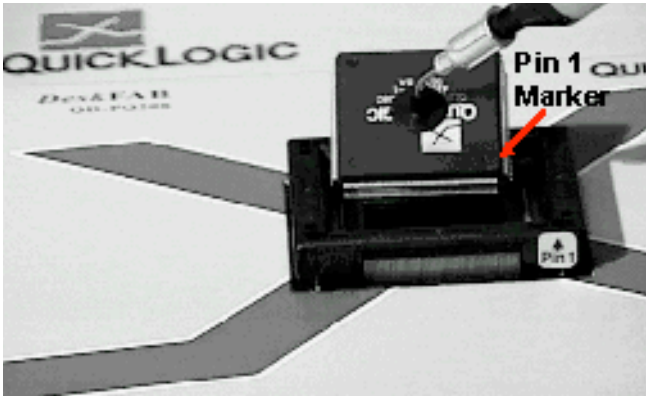


Figure 4-20 Insert Device

4. Visually inspect the device to make sure it is properly seated, resting on the socket pins.

5. Use pressure with two fingers on opposite corners of the socket to press it down evenly. This will drop the device into position in the socket. Release the socket slowly, making sure that the device is aligned correctly. The device will then be locked into place.

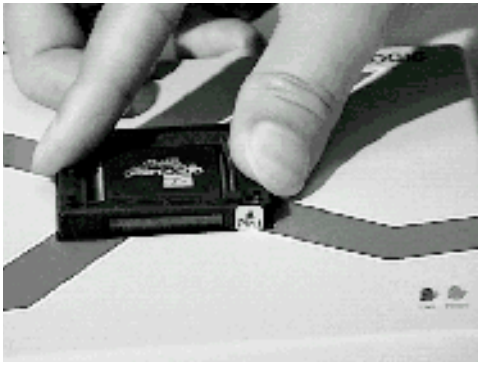


Figure 4-21 Device in Socket

6. To continue with the programming, click **OK** in the dialog box as shown in Figure 4-18.

   The scrolling log display (or the status window) shows the status of programming tool.

   The Completion bar shows the progress of the programming routines.

   A status message box appears once the programming routines have completed, as shown in Figure 4-22. Note that the box reflects the current number of devices that were programmed successfully (in this example, one device was programmed successfully). If any devices failed programming, the status message box will inform you of this fact.



Figure 4-22 Status Message Box

7. You are now done programming the device.

   If you would like to program another device with the same chip file, replace the device and click the **Program Device** button in the toolbar.

   If you are done programming devices, click the **File Close** tool button.

8. You may remove the device from the socket.

Note – Always wear the grounding strap before handling any devices.

When removing surface mount packages, use the index finger and thumb on one hand to press down firmly on the programmer socket (applying even pressure to opposite corners).

While the socket is pressed all the way down, use a vacuum wand to lift the device from the socket and place it into a surface mount handling tray which should be lying next to the programmer.

Note – If two devices in a row fail programming or device testing, stop programming immediately. See Chapter 5, *Debugging Programming Problems* and call the QuickLogic Hotline.

Verifying a Device

After a device has been programmed, it can be verified by either reading back the silicon signature or by running device testing. This section instructs you on how to do both.

The silicon signature is written into the chip at the end of programming. It contains basic information about the programming status and design checksum. It can be read back for programming verification purposes only.

Signature Readback

To read back a device's signature:

1. Refer to Appendix B, *Programming Adapters*, to find out whether your device-package combination requires you to change the adapter.

   To insert the required programming adapter, turn off the programmer's power and wear a grounding strap.

   For information on changing programming adapters, refer to *Installing and Removing the Programming Adapter* on page 4-6.

2. Turn on the programmer.

3. Run Quick*Pro*, and load the design.

4. Select **Program >Program Device**.

   The software will automatically run the diagnostic test on the programmer.

   After all the tests have been performed, the programming window appears.

5. Locate the **Device Silicon Signature Info** block on the programming window, as shown in Figure 4-23.



Figure 4-23 Device Silicon Signature Info

   The four information fields shown in Figure 4-23 are currently blank as they have not read any information from the device.

6. Insert the device you want to verify into the socket. For procedures on how to insert a device, refer to the previous section of this chapter, *Handling Surface Mount Packages* on page 4-21.

7. To read the signature bits from the device, click the **Read Silicon Signature** button in the toolbar.

   The software will read the signature bits that were programmed into the device.

8. If you are performing multi-site programming or gang programming, select the appropriate socket in the **Programmer and Adapter Indicator** at the top of the programming window.

The **Device Silicon Signature Info** fields will be updated with the device silicon information, as shown in Figure 4-24.



Figure 4-24 Device Silicon Signature Info

The fields display:

Design Checksum: The design checksum written to the device.
You can verify the design checksum with:

- the design file's checksum. Each `.CHP` or `.lof` file has a **unique checksum**. The design file's checksum is also shown in the **Device Info** block.
- the report file. The report file can be viewed in SpDE by selecting **Info>Report File**.

Software Rev: The version of software used to program the device.

Date Programmed: The date the device was programmed.

Status: Whether the device passed or failed programming and the cause of the failure (High Icc, failed device Mode testing, etc.).

9. Once the silicon signature from a device is displayed in the Device Silicon Signature Info window, you may read the signature from additional devices of the same device type and package type.

   Insert another device, and click the **Read Silicon Signature** toolbar button.

   For multi-site programming or gang programming, select the appropriate socket in the **Programmer and Adapter Indicator**, then click the **Read Silicon Signature** toolbar button.

   The software will update the programming window with the new information.

   Read Device Signature can only be performed on one device at a time.

Device Testing

Device testing is a convenient feature that allows you to verify a programmed device. During device testing, the programmer performs a few tests on the device. The tests include:

- device type verification test
- package type verification test
- blank device verification test
- ICC test
- device silicon signature verification test
- device checksum comparison test (compares the device checksum with the design checksum)

To perform device testing:

1. Under **Program**, select **Test Device**; or click the **Test Device** tool button.

2. The tool will prompt you to insert the device, as shown in Figure 4-25. For the proper procedure to insert parts, refer to the previous section of this chapter, *Handling Surface Mount Packages* on page 4-21.



Figure 4-25 Inserting a Device to be Tested

3. After you have inserted the device, click **OK**. Device testing will begin. The status window displays the testing tool status as it runs.

   If there are no problems found with the device, the Desk*Fab* message appears as shown in Figure .



Testing Status If the device did not pass the test, the status message box will display a message telling you so. In this case, refer to Chapter 5, *Debugging Programming Problems*.

Congratulations! You have programmed the device.

5 Debugging Programming Problems

This chapter will help you debug problems you encounter before, during, or after programming. Since some of these problems are not easily diagnosed, common sense and the systematic approach goes a long way in finding the cause of a problem. Once the QuickLogic software and hardware programmer are set up, use this chapter as a guide. If you have any questions or cannot solve the problem on your own, contact the QuickLogic Hotline.

This chapter includes:

- Errors Before Diagnostics or Programming
  - Programmer Not Found Errors
  - Programmer Communication Errors
  - Programmer Initialization Errors
  - Device Initialization Errors
- Errors During or After Programming
- Frequently Asked Questions about Programming Troubleshooting
- Locating a Faulty Programmer or Socket Adapter in a Gang Configuration

Errors Before Diagnostics or Programming

There are four types of errors which can occur *before* the programmer diagnostic test or the device programming has begun:

- Programmer Not Found Errors
- Programmer Communication Errors
- Programmer Initialization Errors
- Device Initialization Errors

Programmer Not Found Errors

When QuickLogic has problems detecting or communicating with the programmer, a warning message box appears as shown in Figure 5-1.



Figure 5-1 Programmer Not Found Message Box

The message box asks you to check for the three common causes of this error:

1. **Make sure that your programmer is turned on.**
   - Make sure the power supply is plugged in, the adapter is installed properly and the programmer is turned on.
   - Make sure the POWER LED on the front of the programmer is lit.

Immediately after the programmer is turned on, you should also see the red and green LEDs on the adapters flash intermittently and then stop with the green PASS LED.

If it stops with either the red FAIL LED or both LEDs lit, turn off the programmer power. Wearing the grounding strap, make sure the adapter is properly installed before your next attempt to turn on the programmer. Make sure that the power supply is the one supplied with the QuickLogic programmer.

If the problem persists, contact the QuickLogic Hotline for technical support.

2. **Make sure that you have the correct COM port settings.**
   - ♦ Make sure the COM port you have selected is physically present in the computer (i.e. do not choose COM2 if your computer doesn't have a second COM port). You cannot select a COM port that is being used for another peripheral (such as a modem or a serial mouse).
   - ♦ Try using the other COM port if the current one does not seem to work. Select **Configuration>COM Port** to change the COM port setting.

3. **Make sure that your serial cable is connected properly.**
   - ♦ Make sure the serial cable is securely connected to the programmer *and* to your computer.
   - ♦ Make sure you are using the serial cable supplied by QuickLogic.

If you have performed all the suggested checks above and you are still getting this error message, try the following steps to troubleshoot the problem:

1. Make sure you do not have any interrupt conflicts. Sometimes computers are configured such that a network card (or other peripheral) shares the same IRQ as the COM port. In this case, COM port communication may behave erratically, or may become disabled altogether.

2. Try disabling any device drivers (network drivers, CD-ROM drivers, etc.) that are loaded in the AUTOEXEC.BAT and CONFIG.SYS files.

3. Try disabling any or all peripherals such as SCSI or IDE CD-ROM drive, a SCSI controller (for hard drives, CD-ROM drives, scanners, or other peripherals) or a network card.

4. Make sure your computer's COM port is enabled. Some computers can enable or disable COM ports using the information stored in the CMOS or BIOS setup. You can usually access this information while the computer is booting.

   QuickLogic recommends you install a high-quality serial add-in card rather than rely on the serial ports built into the motherboard. See *Hardware Requirements* on page 2-2 for examples of recommended cards.

5. Certain COM port cards may not support the high-speed communication required for device programming. These cards typically have one or more serial COM ports and one or more parallel COM ports.

   Try replacing the card or try using the programmer with a different computer. See *Hardware Requirements* on page 2-2.

6. If after trying all the above options you still cannot determine the problem, try using a different computer — preferably with a different software/hardware configuration.If the problem no longer exists on the new computer, try to determine the difference between the two computers, and see if you can locate the cause of the problem.

7. If you cannot identify and solve the problem, contact the QuickLogic Hotline.

Programmer Communication Errors

When QuickLogic detects programmer communication problems, the Communication Error message box appears as shown in Figure 5-2. This usually means that the software is able to use the specified COM port, but is not able to properly handshake with the Desk*Fab* Programmer.



Figure 5-2 Communications Error Box

Once the programmer has been detected and tested by the software and you get an error message, the following information may help troubleshoot the problem:

1. Error Codes

   In the example shown in Figure 5-2, `DF0719` is the error code.
   The error code associated with any message is very important in helping the Technical Support representative identify the problem, so please take note of it *before* you contact the QuickLogic HotLine.

2. Gang ID Codes

   The number shown after the error message is the gang ID code. The gang ID code should be a number between `0` and `7`. In cases where there are multiple programmers connected to the same computer, the gang ID code is used to indicate which programmer the software is having problems with.

3. Make sure you are using the current version of the software. You can determine your software version in Quick*Pro* by selecting **Help>About Quick*Pro***.

4. Make sure the programmer is connected to the same COM port the software is trying to use. To change the COM port settings, in **Quick*Pro***, go to **Configuration>Communication Port**. Make sure the correct COM port is selected. If you make any changes, click **OK** to save these settings.

5. Make sure you are using the accessories that were included with the programmer. It is vitally important that you use the QuickLogic serial cable(s) and power supply. The correct shielded serial cable is a beige color with blue plastic inside each of the jacks. The correct power supply has a QuickLogic label and is supplied with your programmer.

6. Make sure your computer does not have any IRQ conflicts, and that the correct COM port is selected (see step 4). The typical culprits are network cards, CD-ROM controllers, and SCSI controllers.

7. If you cannot determine the problem, or have any questions, please call the QuickLogic Hotline.

Programmer Initialization Errors

The following programmer initialization error messages usually appear when the wrong socket adapter is being used, or when there is a hardware problem with the programmer.

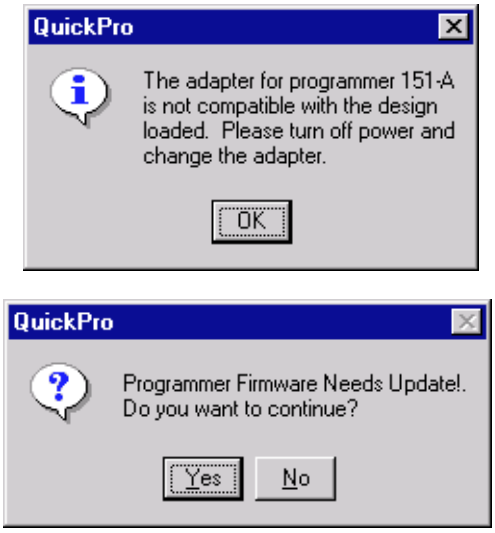


Figure 5-3 Programmer Initialization Errors

To troubleshoot these types of programmer initialization problems:

1. Make sure you are using the current version of the Quick*Pro* software, and make sure your programmer has been upgraded. You can determine your software version in Quick*Pro* by selecting **Help>About...**.

2. Make sure you are using the accessories that were included with the programmer. It is vitally important that you use the QuickLogic serial cable(s) and power supply. The correct shielded serial cable is a beige color with blue plastic inside each of the jacks. The correct power supply has a QuickLogic label.

3. If you are using a programming adapter, make sure that it corresponds to the design loaded into Quick*Pro*. For example, if the targeted parts being shown on the Quick*Pro* title bar are `QL3025-1PQ208C`, the socket and adapter must be appropriate for this particular design. Use Appendix B, *Programming Adapters* as a reference.

4. If the software prompted you to insert a device, make sure you insert a part with the same device type and package type as specified by the design file. The design file's device is shown in the Quick*Pro* title bar.

5. If you are trying to program a device, try running the system test first. In **Quick*Pro***, select **Program>System Test**, or press control + F5. If your programmer fails the system test, contact the QuickLogic Hotline.

6. Physically inspect the programmer. Make sure the connectors are clean.

7. Physically inspect the programming adapter. Make sure its pins are clean and are not bent.

8. If, after trying all of the above options, you cannot determine the problem, contact the QuickLogic Hotline.

Device Initialization Errors

When QuickLogic detects a device initialization error, the following programmer error message box may appear as shown in Figure 5-4.



Figure 5-4 Device Initialization Error

To troubleshoot a non-blank silicon signature device error:

1. Make sure you are using the current version of the software. You can determine your software version in Quick*Pro* by selecting **Help>About Quick*Pro***.

2. Make sure you are using the accessories that were included with the programmer. It is vitally important that you use the QuickLogic serial cable(s) and power supply. The correct shielded serial cable is a beige color, with blue plastic inside each of the jacks. The correct power supply has a QuickLogic label.

3. If you need to change the programming adapter, make sure that it corresponds to the design loaded into Quick*Pro*. Verify that the part number in Quick*Pro*'s title bar corresponds to the programming adapter you are using. Use Appendix B, *Programming Adapters* as a reference.

4. If the software prompted you to insert a device, make sure you insert a part with the device type and package type as specified by the design file. The design file's device is shown in the Quick*Pro* title bar.

5. Check for physical damage. Visually inspect the programming adapter. If the software prompted you to insert a device, make sure there are no bent pins on the device. Be extra careful when handling surface-mount devices such as TQFP's, VQFP's, and PQFP's. When handling these devices, you should use an vacuum wand.

6. Try using another device to see if the problem exists with other devices.

7. Make sure you are inserting the device in the correct orientation. The pin 1 marker on the device should line up with the pin 1 marker on the socket.

8. If you are trying to program a device, make sure the device is blank. Check to see if a device is blank by reading its silicon signature. A blank device will have a checksum of `00000`. The status field will say `device is blank`. A device that has been previously programmed will have a checksum other than `00000`, it will have a date for the Date Programmed field, and the Status field will say either `Passed Programming` or `Failed Programming`. Review the *Signature Readback* on page 4-24 for more information.

9. If the software keeps prompting you to insert a device when the device is already in the programming adapter, you may have inserted the wrong device, or you may be using the wrong programming adapter. See steps 3 and 4 above.

Errors During or After Programming

Once device programming has begun, you might get a error message stating that a device has failed programming and/or testing.

If you receive a Communication Error message in the middle of programming a device, this means communications between the software and the programmer were interrupted. This is usually caused by problems with the COM port, or the computer configuration. To resolve this problem, carefully read *Programmer Communication Errors* on page 5-5.

If several devices in a row fail programming and/or testing, stop programming immediately and contact the QuickLogic Hotline — especially if these are the first few devices you attempt to program. Devices that fail during programming can be returned.

Frequently Asked Questions about Programming Troubleshooting

Q: When programming a device with the newest Desk*Fab* programmer, the following warning appears:

```
...firmware incompatible with the current SPDE
```

A: You need the current version of the Quick*Pro* software. You probably still have an older version of the software (formerly called programmer kit software) installed in your PC.

Q: You get less than 95% programming yield.

A: Remember that 1-3% programming fallout is considered normal. There are several possibilities. Listed in order of likelihood they are:

- Old programming software. Always use the latest version.
- Small sample size. For x% accuracy, you should try about 100/x devices.
- Poor PC-Programmer communication. Make sure you have a good serial card and adequate power configuration. See *Hardware Requirements* on page 2-2, and *Power Requirements* on page 2-4.
- Poor handling. Make sure ESD protection is always used. See Chapter 2, *Installation*, and refer to *Handling Surface Mount Packages* on page 4-21 when using surface mount devices.
- Programmer specific defect. Try another programmer if possible.
- Adapter specific defect. Try another adapter if possible.
- Poor AC power or overloaded circuits.

Q: Programming results in zero percent programming yield or 2 or more device failures in a row.

A: This is probably a programmer or adapter defect. However, this could be related to a poor power configuration or hardware & software setup. See the sections on *Hardware Requirements* on page 2-2, *Software Requirements* on page 2-3, and *Power Requirements* on page 2-4.

If you suspect a hardware defect, replace the programmer and then the adapter to isolate the problematic hardware. Try the System Test option in the programmer window.

Call the QuickLogic Hotline (408-990-4100) if you need additional help.

Q: The 'Finding Programmers' takes 1 minute or longer when starting the programming software.

Q: The programming window says it can not communicate with the programmer.

Q: Programming 'hangs up' for over 20 minutes with no change to the progress meter.

Q: All programmers in a gang programming configuration fail simultaneously.

A: These are all communications errors and are signs of larger problems. Consider the following solutions:

1. Make sure the COM port setting is correct in the Program Options window. Try both settings regardless of the COM1/COM2 markings on the rear of the PC.
2. Make sure any built-in motherboard serial ports are disabled in the computer's BIOS setup, and that you are using a recommended add-in serial card. See *Hardware Requirements* on page 2-2.
3. Make sure you are NOT using Windows 3.1.

4. Make sure you have the latest Quick*Pro* software and that your system has enough physical memory and meets the hardware requirements. See *Requirements* on page 2-2.

5. Make sure you are using shielded gang programming cables. See *Hardware Requirements* on page 2-2.

6. Make sure the programmers are receiving adequate power. See *Power Requirements* on page 2-4.

7. One programmer in a gang configuration could be defective. If you have a gang setup, try each programmer individually, to possibly find the suspect programmer. If you do not have a gang configuration, try the programmer on another PC or with a different COM card.

Q: The programming interface tells you to upgrade the programmer firmware.

A: The firmware upgrade is not optional. Make sure that all other programs are closed on the PC, any email or background programs are closed. Screen savers should also be disabled. Also, be sure no one disturbs the computer during the firmware upgrade which will take only about 1-2 minutes. This should allow you to avoid the next question.

Q: A firmware upgrade seemed to fail. The programmer will not respond to the programming software.

A: The firmware upgrade failed because of a communication problem (see above), or an interruption in power or the cable connections between the PC and programmer. Once a firmware upgrade fails, the programmer needs to be repaired by QuickLogic. Call the QuickLogic Hotline (408-990-4100) for assistance.

Locating a Faulty Programmer or Socket Adapter in a Gang Programming Configuration

To locate a faulty socket or adapter in the gang programming configuration:

1. Test each programmer individually.

   Attach only one programmer to the PC at a time. Be sure to shut down the programmer and PC while changing serial port connections, to avoid ESD damage to the programmer or serial port on the PC. Most faulty programmer hardware can be located in this fashion.

2. If a programmer fails, try to determine whether the programmer itself or the socket adapter is the problem. Try another socket adapter of the same type on the programmer to see if the problem follows the programmer or the socket adapter.

3. If the above steps do not find the problem, set up a single programmer, then a gang of two, then a gang of three, etc., until you can replicate the original problem. If you notice a problem with a certain number of programmers attached together, that cannot be replicated with each programmer individually, then the problem is likely due to one of the following reasons:

   - An incorrect power configuration.
     See *Power Requirements* on page 2-4.
   - An incompatible serial card (COM card).
     See *Hardware Requirements* on page 2-2.
   - Unshielded gang daisy-chain cables.
     See *Hardware Requirements* on page 2-2.

Appendix A



Gang Programming

By using a single Desk*Fab* programmer and a Multi-Site programming adapter you can program up to 4 devices at a time. Up to 8 Desk*Fabs* can be daisy-chained together to program up to 32 devices at a time.

This chapter includes:

- Using the Multi-Site Program Adapters
  - Multi-Site Programming
- Setting Up a Gang of Programmers
  - Verifying Connections in a Gang of Programmers

Using the Multi-Site Programming Adapters

Replace the currently installed adapter with the Multi-Site programming adapter to program up to 4 devices at a time. Since Single-Site programming and Multi-Site programming procedures are essentially the same, see Chapter 4, *Device Programming Procedures* for more information on programming.

Multi-Site Programming Window

To begin Multi-Site Programming:

1. Remove the currently installed adapter.

2. Insert the Multi-Site programming adapter. See Appendix B, *Programming Adapters*.

3. In **Quick*Pro***, load the `.CHP` file or the `.lof` file.

4. Select **Program>Program Device**.

   The multi-site programming window appears as shown in Figure A-1.

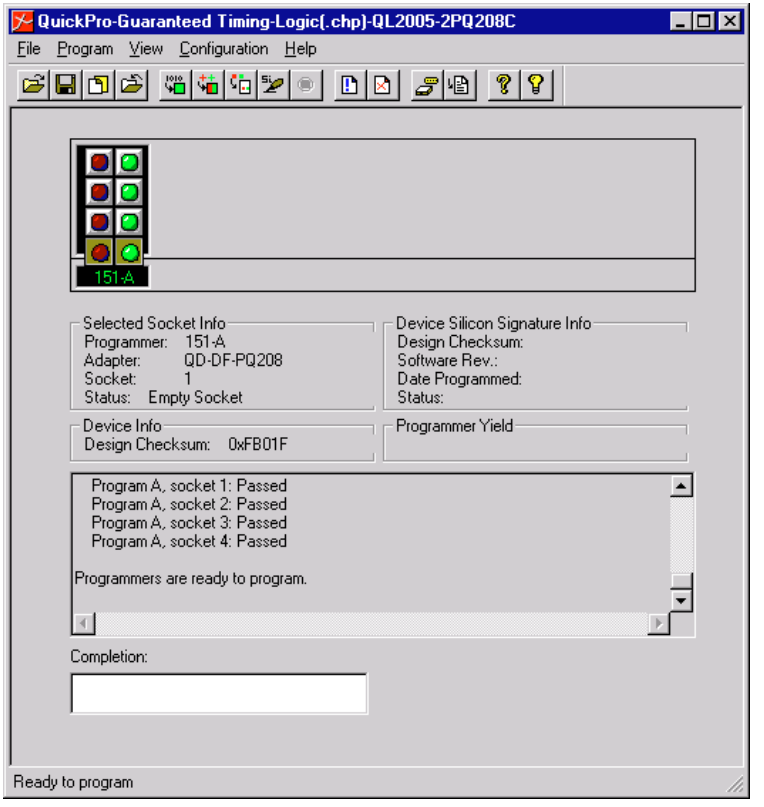


Figure A-1 Multi-Site Programming Window

5. The programming window shows 3 additional PASS/FAIL LED pairs in the programmer symbol block. Each pair of PASS/FAIL LEDs represents a socket on the Multi-Site programming adapter, as shown in Figure A-2.



Figure A-2 Symbol and Socket Correspondence

6. To select a socket, in the programing window, click on one of the LED pairs.

   When you click on an LED pair, the LED on the programmer will flash, showing which socket it corresponds to. The programming window will display the current status of the selected socket.

7. You can begin to program parts. Single-site programming and multi-site programming procedures are essentially the same. Refer to Chapter 4, *Device Programming Procedures* for more details.

Setting Up a Gang of Programmers

Up to 8 Desk*Fab*s can be daisy-chained together to program up to 32 devices at a time. To connect 2 or more Desk*Fab*s together, follow the instructions below:

1. Make sure the computer is turned off.

2. Make sure that each Desk*Fab* programmer's power is turned off.

3. Put the adapters or the programmer in a mylar bag for static protection, especially when transporting the hardware out of your immediate programming laboratory.

4. The RS-232 surge protector, Spike™, should already be connected to the 6-foot long RS-232 cable by the manufacturer. Otherwise, you will need to insert the female end of the shielded 6-foot long RS-232 cable into the RS-232 surge protector.

5. Connect the female end of the surge protector to one of your computer's COM ports.

   If your computer has a 25-pin COM port instead of a 9-pin COM port, use the supplied 25-pin to 9-pin adapter. This will allow you to use the shielded 9-pin to 9-pin RS-232 cable to connect the programmer chain to your computer.

6. Insert the male end of the shielded RS-232 cable into the female end of one of the RS-232 shielded gang cables.

Note – Do not attempt to gang more than 8 programmers or you will damage your programmers and adapters.

---

7. Insert one of the male jacks of the shielded gang cable into the RS-232 connector of one of the programmers.

8. Using another shielded gang cable, connect its female jack into the open male jack from the first programmer's shielded gang cable.

9. Connect this second shielded gang cable to the second programmer, by attaching one of the cable's male jacks to the female jack in the back of the second programmer.

10. Continue to daisy-chain any additional programmers in this fashion.

    Use only the RS-232 shielded cables and the shielded gang cables.

    Figure A-3 illustrates the correct layout for gang programmer connection.

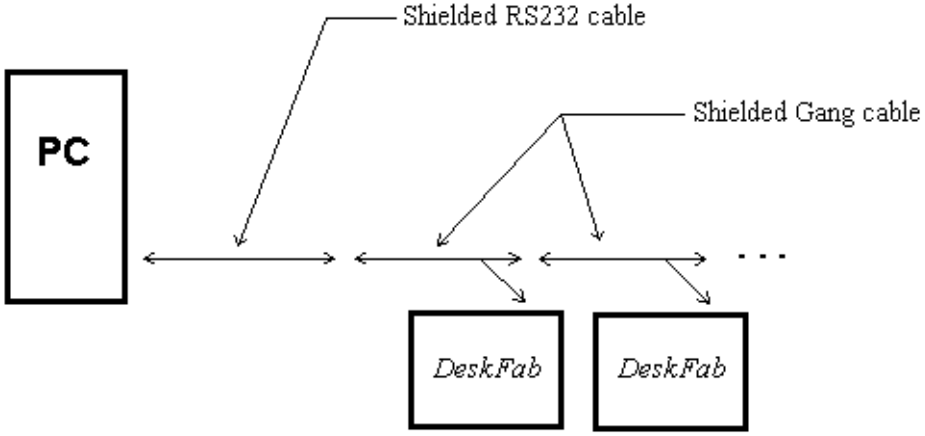


Figure A-3 Connecting a Gang of Programmers to a PC

11. Tighten all screw connectors to avoid accidental disconnection during programming.

Note – Always wear the connected grounding strap when transferring any adapters or devices. The grounding strap connecting wire should always be connected to the ground strap connector at the front of the programmer.

12. Turn on the computer.

13. Turn on the power for each Desk*Fab* programmer.

Note – DO NOT use any RS-232 cables or power supply cables except the ones supplied with your QuickLogic Programmer shown in Figure A-4. The proper 6-foot long RS-232 cable is a beige color with blue plastic inside the jacks. The power supply should have a QuickLogic label on the transformer.



Figure A-4 Shielded Gang Programming Cable

Note – Current shielded gang programming cables—QuickLogic part # 710-02050-01—are a beige color and should be used to connect programmers in a gang.

Programming stations in existence before August of 1997 may be using unshielded (blue) ribbon cables to connect a gang of programmers. These unshielded ribbon cables, as shown in Figure A-5, can cause programming yield losses and programming failures. It is very important to replace them with new cables.



Figure A-5 Ribbon Cable

Verifying Connections in Gang Programmers

Once you have connected the chain of programmers to your PC, make sure that the Quick*Pro* software is able to communicate properly with each programmer. Carefully read the following section to make sure there are no problems with your programmer setup.

1. In Quick*Pro*, select **Configuration>Communication Port**.

   Make sure the correct COM port is selected for your programmer.

   Click **OK** to accept the selection.

2. To open the Programming Window, in **Quick*Pro***, select **Program>Program Device**.

   If you have set up your programmers correctly all the programmers should be detected by the software. This information should appear in the Programmer and Adapter Indicator section of the Programming Window.

   The programmers are identified by:

   - a hardware ID

     The hardware ID is an integer. In the example it is 24 and 1132.

   - a software-assigned gang ID

     The gang ID is a character between A and H. In the example, A is assigned to the first programmer, B to the second programmer, and so on. The software will identify the programmers in the gang using the gang ID.

3. The software will run diagnostics and calibration on each of the detected programmers.

   If the programmers passed all the tests, you are ready to program parts. See Chapter 4, *Device Programming Procedures* for instructions on programming devices. The procedures for programming with gang programmers are almost identical to those for programming with a single programmer. Whenever an action involving the programmer needs to be performed, perform the same action to all programmers in the chain.

   If you encounter any problems during the diagnostic and calibration phase, see Chapter 5, *Debugging Programming Problems*.

Appendix B

Programming Adapters

The following tables match the appropriate QuickLogic programming adapters to the different pASIC/ESP device packages.

Desk*Fab* Adapters for QuickLogic Devices

Device Family	Device	Type	Total Pins	Package Type	Desk*Fab* Adapter
QuickRAM	QL4016	PL84	84	PLCC	QA-PL6884
		PF100	100	TQFP	QA-PF100144
		PF144	144	TQFP	QA-PF100144
	QL4036	PF144	144	TQFP	QA-PF100144
		PQ208	208	PQFP	QA-PQ208A
		PB256	256	PBGA	QA-PB256
	QL4058	PQ208	208	PQFP	QA-PQ208A
		PQ240	240	PQFP	QA-PQ240
		PB456	456	PBGA	QA-PB456
	QL4090	PQ208	208	PQFP	QA-PQ208A
		PQ240	240	PQFP	QA-PQ240
		PB456	456	PBGA	QA-PB456

Device Family	Device	Type	Total Pins	Package Type	Desk*Fab* Adapter
pASIC 3	QL3012	PL84	84	PLCC	QA-PL6884*
		PF100	100	TQFP	QA-PF100144*
		PF144	144	TQFP	QA-PF100144*
	QL3025	PF144	144	TQFP	QA-PF100144*
		PQ208	208	PQFP	QA-PQ208*
		PB256	256	PBGA	QA-PB256*
	QL3040	PQ208	208	PQFP	QA-PQ208*
		PQ240	240	PQFP	QA-PQ240*
		PB456	456	PBGA	QA-PB456*
	QL3060	PQ208	208	PQFP	QA-PQ208*
		PQ240	240	PQFP	QA-PQ240*
		PB456	456	PBGA	QA-PB456*

Device Family	Device	Type	Total Pins	Package Type	Desk*Fab* Adapter
pASIC 2	QL2003	PL84	84	PLCC	QA-PL6884*
					QD-PL6884
		PF100	100	TQFP	QA-PF100144*
					QD-PF100144
		PF144	144	TQFP	QA-PF100144*
					QD-PF100144
					QD-DF-PF144**
	QL2005	PL84	84	PLCC	QA-PL6884*
					QD-PL6884
		PF144	144	TQFP	QA-PF100144*
					QD-PF100144
					QD-DF-PF144**
		PQ208	208	PQFP	QA-PQ208*
					QD-PQ208
					QD-DF-PQ208**
	QL2007	PL84	84	PLCC	QA-PL6884*
					QD-PL6884
		PF144	144	TQFP	QA-PF100144*
					QD-PF100144
					QD-DF-PF144**
		PQ208	208	PQFP	QA-PQ208*
					QD-PQ208
					QD-DF-PQ208**
	QL2009	PF144	144	TQFP	QA-PF100144*
					QD-PF100144
					QD-DF-PF144**
		PQ208	208	PQFP	QA-PQ208*
					QD-PQ208
					QD-DF-PQ208**
		PB256	256	PBGA	QA-PB256*
					QD-PB256

Device Family	Device	Type	Total Pins	Package Type	Desk*Fab* Adapter
pASIC 1	QL8x12B(L)	PL44	44	PLCC	QD-PL44
		PL68	68	PLCC	QA-PL6884*
					QD-PL6884
		PF100	100	TQFP	QA-PF100144*
					QA-PF100144
		CG68	68	CPGA	QD-CG6884
	QL12x16B(L)	PL68	68	PLCC	QA-PL6884*
					QD-PL6884
		PL84	84	PLCC	QA-PL6884*
					QD-PL68844
		PF100	100	TQPF	QA-PF-100144*
					QD-PF100144
		CG84	84	CPGA	QD-CG6884
	QL16x24B(L)	PL84	84	PLCC	QA-PL6884*
					QD-PL6884
		PF100	100	TQFP	QA-PF100144*
					QD-PF100144
		PF144	144	TQFP	QA-PF-100144*
					QD-PF100144
		CG144	144	CPGA	QD-CFCG
		CF160	160	CQFP	QD-CFCG
	QL24x32B(L)	PF144	144	TQFP	QA-PF100144*
					QD-PF100144
		PQ208	208	PQFP	QA-PQ208*
					QD-PQ208
		CF208	208	CQFP	QD-CFCG

TABLE FOOTNOTES

* QA-XX adapters support pASIC 3, pASIC 2, and pASIC 1 in a given pin/package type. Contact QuickLogic for availability.

** QD-DF-XX adapters are Multi-site adapters. Multi-stage adapters are available only for the pASIC 2 family at this time.

Note – If you need the name of an adapter for a device not listed here, please refer to the QuickLogic website (www.quicklogic.com), or call QuickLogic Technical Support at 408-990-4100.

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