MPLAB-PRO MATE
User's Guide

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MPLAB-PRO MATE USER'S GUIDE

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Preview

A Quick Look at PRO MATE® Development System

What is PRO MATE

Congratulations on selecting the PRO MATE, a Microchip microcontroller device programmer. Though interchangeable programming socket modules PRO MATE enables you to quickly and easily program the entire line of Microchip PICmicro™ microcontroller devices, many of the Microchip memory parts, and the KEELOQ® Code Hopping Encoders.

How PRO MATE Helps You

With the PRO MATE device programmer, you can program Microchip microcontroller devices from a PC Host, or you can use the device programmer as a stand-alone unit.

- PRO MATE is easy to use and flexible in programming Microchip devices and package types.
- PRO MATE will expand to support future Microchip devices always providing the latest programming algorithms to support Microchip PICmicro microcontroller devices and other Microchip parts, via the Microchip Internet Web page and the Microchip BBS.

PRO MATE Connected to a PC

When connected to a PC, PRO MATE provides two levels of control:

MPLAB Windows IDE

Using MPLAB™ Integrated Development System as the interface, PRO MATE becomes another tool in MPLAB's integrated development environment (IDE), allowing you to quickly compile, test, and debug your firmware, then download it into PRO MATE to be programmed in your firmware.

DOS Command Line Interface

For environments where a Windows interface is not required, PRO MATE can perform basic functions, such as download and program firmware, and add SQTP℠ serialization to firmware.

PRO MATE Operating Without a PC (Stand-Alone)

Without a PC connection to PRO MATE, the unit operates as a stand-alone device programmer. The main programmer features of the PRO MATE are available, including Read, Program, Verify.

The PRO MATE is CE compliant

The PRO MATE development system is designed, tested and certified to meet the Electromagnetic Compatibility requirements known as the CE compliance directives. These standards set by the European Union (EU) countries include limiting radiated emission, improving susceptibility to radiated emission and improving susceptibility to Electrostatic Discharge (ESD).

How PRO MATE Helps You

The PRO MATE device programmer is a device programmer system that has the following features:

- Programs PICmicro microcontrollers
- Programs many Microchip Memory parts
- Programs KEELOQ Code Hopping devices
- Operates as a Windows® 3.1 application on a PC with the MPLAB™ Integrated Development Environment
- Communicates with the PC via a standard RS-232 cable
- With MPLAB the user can create, display, and edit firmware to be programmed into PICmicro microcontrollers and Microchip memory devices

The PRO MATE device programmer comes with the following accessories:

- RS-232 Interface cable to a standard PC serial port
- Universal power supply
- MPLAB, an Integrated Development Environment including a text editor, project manager, MPASM assembler, and MPLAB-SIM debugger

Note: A complete line of socket modules is available. You may order the socket modules separately for the device that you will be programming.

Chapter 1. About PRO MATE

Introduction

This section will present an overview of the PRO MATE device programmer. The features and requirements of PRO MATE are presented.

MPLAB Integrated Development Environment

The MPLAB Integrated Development Environment (IDE) is the host software for PRO MATE. You will be able to load in your hex files and program with the PRO MATE without reading the MPLAB User's Guide. To take advantage of the MPLAB editor, project manager, and built in MPASM support, read the MPLAB User's Guide. With MPLAB-SIM (described in the MPLAB User's Guide) you will be able to test execution of your code and perform most debugging functions without an emulator.

PRO MATE Tools

You can set up PRO MATE on any serial communications port on your PC.

With PRO MATE you can do the following operations:

- Program memory, configuration bits, ID locations, and calibration data into PICmicro devices.
- Verify that PICmicro microcontrollers are blank.
- Verify that code in the target microcontroller matches your firmware.
- Read code from an unprotected PICmicro microcontroller into MPLAB's program memory window for debugging and programming into other PICmicro devices.
- Program unique serialized ID numbers into your firmware using SQTP (Serial Quick Turn Programming) files.
- Program many Microchip Memory parts.
- Program KEELOQ Code Hopping devices.

System Requirements

To run in the Windows mode with MPLAB you must have MPLAB installed on IBM PC/AT¨ compatible 386 or better with:

- Windows 3.1 with a VGA or better monitor and mouse
- 4 MB of memory, 16 MB recommended
- 8 MB of hard disk space, 20 MB recommended
- Serial port

To run in the DOS command prompt mode or from a DOS Batch file, you must have:

- MS-DOS 5.0 or later
- EGA (or better) monitor
- 1 MB of memory
- 1.44 Megabyte floppy disk drive, 3.5"
- Hard drive
- Serial port

About This Guide

This user guide describes how to use the PRO MATE development programmer with MPLAB, the Integrated Development Environment for Microchip development tools. The layout of the manual is as follows:

Chapter 1 - About PRO MATE - An overview of the features and benefits of the PRO MATE device programmer.

Chapter 2 - PRO MATE Installation - Instructions for installing the PRO MATE hardware and software.

Chapter 3 - PRO MATE Basic Functions - An overview of the features of PRO MATE, covering all the basic hardware functions, and explaining the MPLAB software interface.

Chapter 4 - Using PRO MATE - A walk-through on using PRO MATE in a typical application.

Chapter 5. Stand-Alone Mode - Information on how to program microcontroller devices by using the menu options available from the PRO MATE device programmer without connecting to the PC.

Chapter 6 - PRO MATE Menu Options - Reference material that covers each of the PRO MATE MPLAB menu options, and the basic MPLAB software dialogs for PRO MATE.

Chapter 7 - Migrating from Earlier PRO MATE Systems - Information for users of previous versions of PRO MATE.

Appendix A - Troubleshooting Guide - A list of solutions for common problems.

Appendix B - On Line Support - Information on Microchip's electronic support services.

Appendix C - Programming Microchip Memory Parts - Details on using PRO MATE to program Microchip programmable memory devices.

Appendix D - Programming KEELOQ Code Hopping Encoders - Special PRO MATE programming capabilities to program Microchip security devices.

Index - Alphabetical index to PRO MATE User's Guide

Worldwide Sales and Service - Listing of worldwide Microchip sales offices.

Chapter 1. About PRO MATE

Recommended Reading

README.PRO For the latest information on using PRO MATE, read the README.PRO file on the installation diskette. The README.PRO file contains update information that may not be included in this manual.

PICmicro Microcontroller Data Book Contains comprehensive data sheets for Microchip PICmicro microcontroller devices available at print time. *Document Number DS00158, Microchip Technology Inc., Chandler, AZ.*

Embedded Control Handbook Contains a wealth of information about microcontroller applications. The application notes described in this manual are also available electronically through the Microchip BBS or from the Microchip Internet Home Page (see Appendix B: On-Line Support, for information). *Document Number DS00092, Microchip Technology Inc., Chandler, AZ.*

MPLAB User's Guide Comprehensive guide that describes installation and features of Microchip's MPLAB, Integrated Development Environment, as well as the editor and simulator functions in the MPLAB environment. *Document Number DS30421, Microchip Technology Inc., Chandler, AZ.*

PRO MATE/PRO MATE II Device Support A document which lists the part numbers for the socket modules that support each device, discusses the life expectancy and cleaning procedures for the different socket types, and documents specific MPLAB details. *Document Number DS51110, Microchip Technology Inc., Chandler, AZ.*

Warranty Registration

Upon receiving the software diskettes, complete the enclosed Warranty Registration Card and mail it promptly. Sending in your Warranty Registration Card will ensure that you receive new product updates and notification of interim software releases that may become available.

Customer Support

Microchip endeavors at all times to provide the best service and responsiveness possible to its customers. Technical support questions should first be directed to your distributor and representative, local sales office, Field Application Engineer (FAE), or Corporate Applications Engineer (CAE).

The Microchip Internet Home Page can provide you with technical information, application notes, and promotional news on Microchip products and technology. The Microchip Web address is http://www.microchip.com.

You can also check with the Microchip BBS (Bulletin Board System) for non-urgent support, customer forums, and the latest revisions of Microchip systems development products. Refer to Appendix B: On-Line Support, for access information.

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Chapter 2. PRO MATE Installation

Introduction

When running under Windows, the PRO MATE development system requires the installation of MPLAB IDE software as well as connecting the hardware to the PC. This chapter covers the details of both software and hardware set up, including serial port configuration, processor selection, and enabling the PRO MATE from MPLAB.

PRO MATE Setup

Installing PRO MATE Hardware

PRO MATE provides communications with the host PC via an RS-232 9-pin D type connector. PRO MATE is DCE (data communication equipment), and hardware handshaking is via CTS (clear to send) and RTS (request to send).

Check your PC set up to see which communications port is available. Usually a mouse device is connected to COM1 or COM2. If you have a modem, you may not have a third serial port on your PC.

Connect the cable from your COM port to the PRO MATE development programmer.

A 6-foot data cable with DB-9 connectors is supplied with PRO MATE. All lines on the data cable are wired straight through. This cable is NOT a null modem cable.

PRO MATE Power Supply

The PRO MATE device programmer requires +5 Volts ±5% at 750 mA on the 5-pin DIN connector (5VDC IN). Pin 3 is +5 Volts, pins 1, 2, and 4 are ground, and pin 5 is not connected.

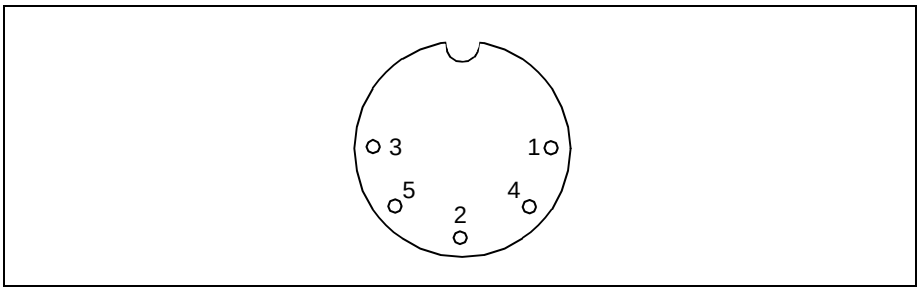

Figure 2.1: Back of PRO MATE

The PRO MATE II requires +9 volts at 750 mA. The power connector is a 2.5mm DC power jack (Switchcraft P/N RAPC-712). A 0.75A fuse (Littlefuse Nano2Smf, P/N 451.750) is located near the +9V input on the PRO MATE II motherboard for circuit protection.

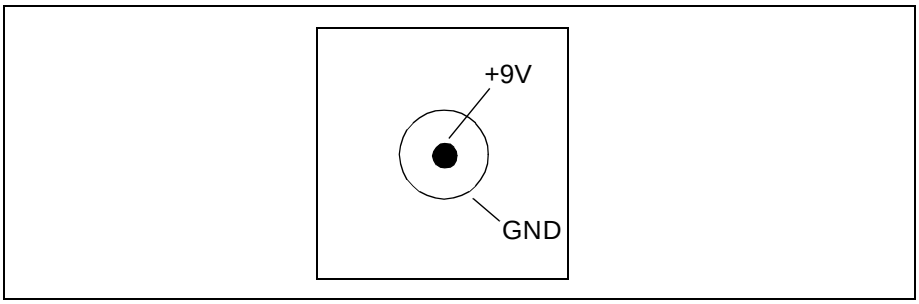

Figure 2.2: Back of PRO MATE II

Plug the power supply into a power socket and connect the power supply cable to the PRO MATE.

Socket Modules

Interchangeable socket modules allow you to use the device programmer for all PICmicro devices. For details about the available socket modules, refer to the PRO MATE Device Support document. Refer to the documentation enclosed with the socket module for special requirements in programming devices with a specific socket module.

Changing Socket Modules

Caution: Ensure that the device programmer is powered OFF before changing socket modules.

Tighten the socket-module thumbscrews evenly and, if possible, simultaneously. Avoid overtightening them; they should be finger-tight only. To remove the socket modules, simply unscrew the thumbscrews.

Socket Module Alignment

Caution: The gold connector strips on PRO MATE are relatively fragile. Avoid touching them with the socket module screws, and avoid over-tightening the screws.

After tightening the socket module screws, apply power to the device programmer. If the LCD display shows any of the following messages, turn off power to the device programmer and realign the socket module:

– Align Socket Bottom
– Align Socket Top
– Select Socket
– Socket Not Known

After changing a socket, insert a blank device and use the device programmer Verify command to perform a blank check on the device programmer to ensure the socket is making proper contact. A blank device shows erased.

Ordering Socket Modules

Socket modules do not come with the device programmer. You must order your socket module(s) separately. Socket modules are available to accommodate each device package. Microchip Technology Inc. *Development System Ordering Guide* (DS30177) describes the available socket modules.

Configuring MPLAB for PRO MATE

You should install the MPLAB software by following the instructions in the MPLAB User's Guide. This is a brief summary:

- Insert MPLAB installation diskette 1 into drive A:
- From the Program Manager Run option, type **A:Setup.**
- Follow the on-screen instructions and install MPLAB

Installing PRO MATE Software for MPLAB

The PRO MATE software is included in the MPLAB installation. To install PRO MATE, either select the full MPLAB installation or select custom installation and check the checkbox for PRO MATE.

Configuring Serial Port for PRO MATE

If you are not already running the MPLAB software, double click on the MPLAB icon now to start. From the Options menu, select *Options>Programmer Options>Communications Port Setup.*

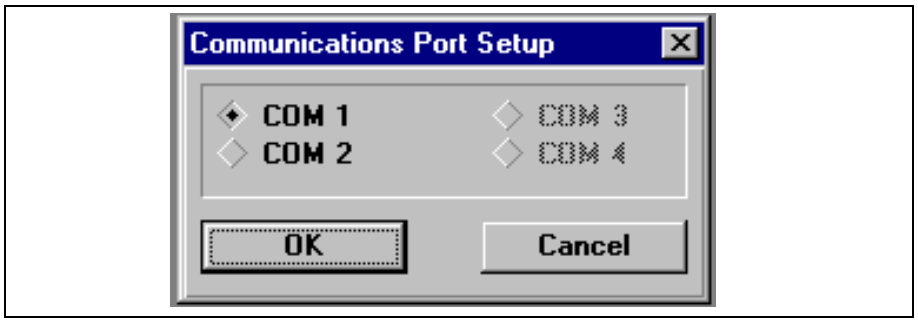

Figure 2.3: Communications Port Setup Dialog

The Communications Port Setup Dialog shows the possible PC serial communication ports. **OK** sets the communications port. **Cancel** will ignore the change and close the dialog.

Installing PRO MATE Software for DOS

Insert PRO MATE diskette into drive A:

- From the Program Manager Run option, type **A:Install.**
- Follow the on-screen instructions to install PRO MATE DOS command mode software onto your hard disk drive.

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Chapter 3. PRO MATE Basic Functions

Introduction

This chapter describes the basic functions of the PRO MATE development system. Once the hardware and software are installed as described in **Chapter 2: PRO MATE Installation**, the various functions of PRO MATE can be used as described here. **Chapter 4: Using PRO MATE** provides a quick sample session using PRO MATE.

Highlights

This chapter covers

- **Enabling the PRO MATE**
- **The PRO MATE Programmer Status Dialog**
- **Programming a Microcontroller Device**
- **Verifying a Microcontroller Device**
- **Checking for a Blank Device**
- **Reading a Device Master**
- **Running PRO MATE from the DOS Command Line**
- **Upgrading PRO MATE Firmware and Host Software**
- **Files Used by PRO MATE**

Enabling the PRO MATE

If a programmer other than PRO MATE is specified on the menu bar, change programmers by selecting *Options>Programmer Options>Select Programmer*. Select PRO MATE from the pull-down list and click **OK**. MPLAB must terminate and be restarted to use the new selection.

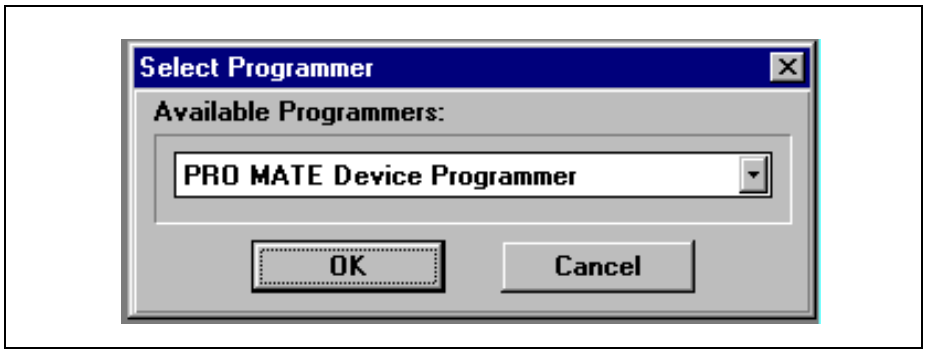

Figure 3.1: Select Programmer Dialog

To enable PRO MATE, select the PRO MATE pull down menu and click **Enable Programmer** to establish communications with PRO MATE. Once the programmer is enabled, this menu will show "Disable Programmer" and can be used to disable PRO MATE.

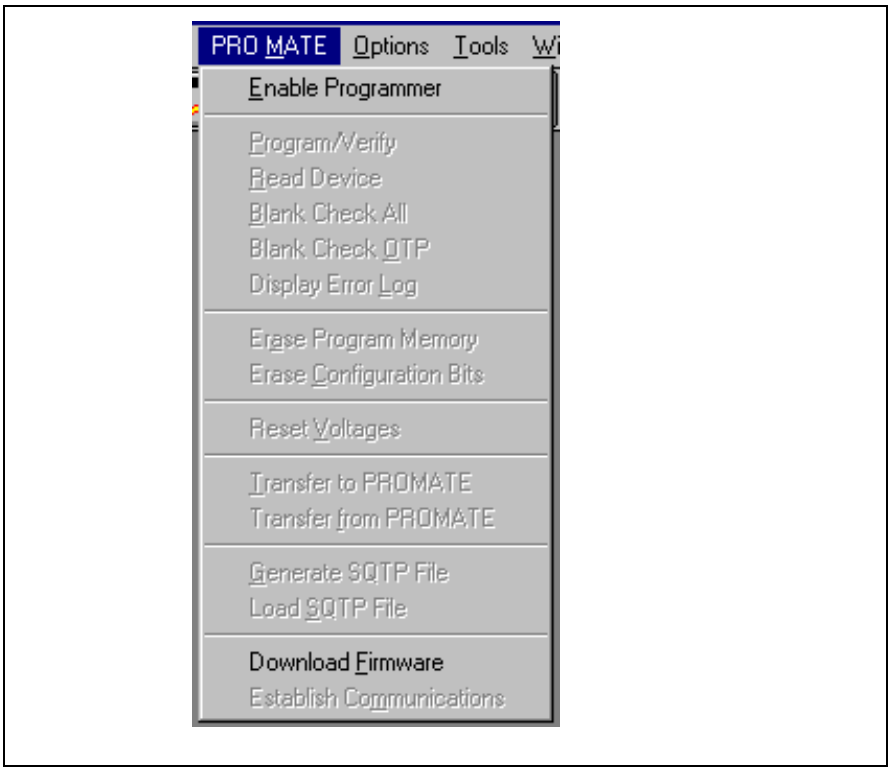

Figure 3.2: PRO MATE Pull Down Menu

The PRO MATE Program Status Dialog

The Programmer Status dialog is shown on the screen whenever the PRO MATE is enabled. This dialog displays the current setting of the configuration bits for the target microcontroller.

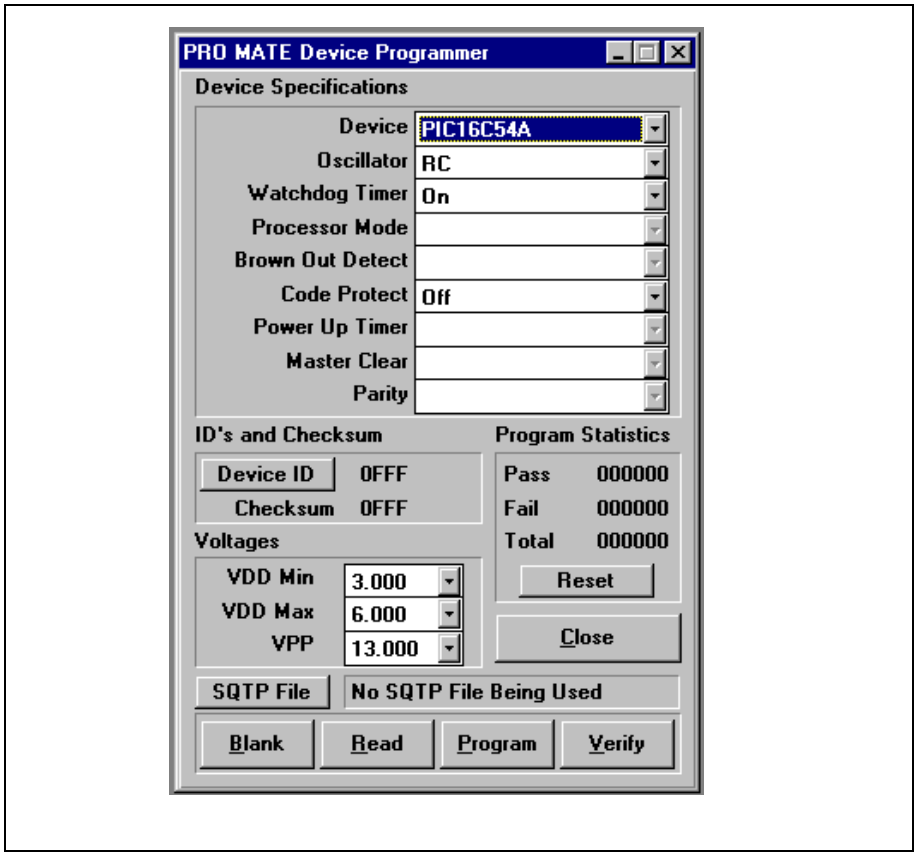

Figure 3.3: Programmer Status Dialog

The options on the screen will show the current values if active, or will be disabled. Depending upon which processor you are currently configured for, these items will be enabled or grayed out.

From this dialog you can set these items (if they are available in your currently selected microcontroller):

Device Specifications

- Device - The device type to use with PRO MATE
- Oscillator - Configuration bits for the oscillator mode
- Watch Dog Timer - WDT configuration bit.
- Processor Mode - PIC17CXX family processor mode
- Brown Out Detect - Configuration bits that enable brown out detection

- Code Protect - Code protection configuration bits
- Power Up Timer - Timer power up configuration bits
- Master Clear - Master Clear Enable configuration bits
- Parity- Parity Enable configuration bits

ID's and Checksum

Pressing the **Set ID** button on the Programmer Status dialog will pop up the Edit ID Dialog.

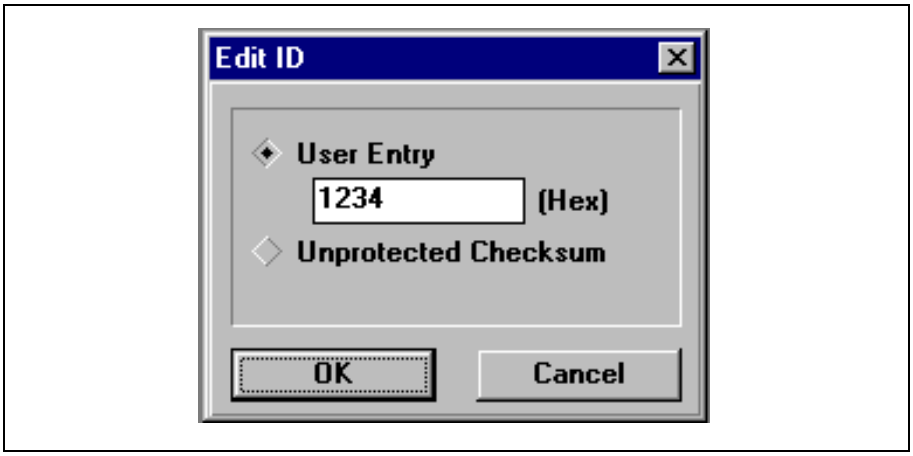

Figure 3.4: Edit ID Dialog

If a particular ID value is to be programmed, check the user Entry box and enter the 4-digit hex value for the ID. Click on **Unprotected Checksum** to have the non code protected checksum automatically programmed into the device. **OK** sets the option, **Cancel** cancels the screen and returns to the Programmer Status dialog.

The Checksum field displays the checksum of a part. The checksum is not selectable and updates automatically.

SQTP^{SM} File — Serialized Quick Turn Program

Click the **SQTP File** button to enable or disable serial programming. The box next to the SQTP button will display the SQTP file. To enable SQTP, click SQTP File and select a file from the displayed dialog box. To disable SQTP, click SQTP File and select Cancel in the displayed dialog box.

Refer to "Using Serial Programming" in **Chapter 4: Using PRO MATE** for a list of the steps required to use serial programming.

Program Statistics

The Program Statistics area in the dialog will record the total number of Pass and Fail trials as you are programming a series of devices. Press the **Reset** button to set all counts to zero. Program Statistics are updated after programming each device.

How the Device Programmer Uses Voltage Checks

The Device Programmer performs its operations with VDD set to the following voltages:

- Blank checks at VDD Min.
- Read operations at 5 volts
- Programming at 5 volts
- Verify operations at both VDD Min. and VDD Max.

Here is why:

Partially erased EPROM cells will show erased at a higher voltage and not erased at a lower voltage. For this reason, PRO MATE performs a blank check at VDD Min.

An EPROM cell that is not fully programmed will read correct at lower voltages, but not show programmed at higher voltages. For this reason, PRO MATE verifies programmed devices at VDD Max.

PRO MATE reads devices at 5 volts, the nominal voltage at which the devices should operate.

Check to see if a device is fully erased by setting the VDD Min value to a higher voltage from the Setup Window. Then perform a blank check to see if the device shows blank.

PASS

The number of devices passing.

FAIL

The number of devices failing.

TOTAL

The number of devices programmed.

Reset

Sets the Program Statistics Counters to zero.

Voltages

The voltage settings allow you to change the voltages used in programming and verifying microcontroller devices. Voltages can be adjusted in 0.25 volt increments.

VDD Min and VDD Max — Blank Check/Verification Voltages

Click **VDD Max** or **VDD Min** to select the VDD maximum or minimum values. VDD Min must not be greater than VDD Max, or you will receive an error message. The pull-down lists display the allowable VDD range for the selected device. Granularity is 0.25 volts. The default values for VDD Max and VDD Min are device specific. Refer to the PRO MATE Device Support document for details.

VPP — Programming Voltage

Click **VPP** to select the VPP value. The pull-down list displays the allowable VPP range, which is device specific. Refer to the PRO MATE Device Support document for details.

Programmer Function Buttons

The Blank, Read, Program, and Verify buttons provide one-click access to the common functions of blank checking, reading, programming, and verifying a device. Using these buttons will perform the indicated function on the entire device. To access only specific areas of the device, use the pull-down menu.

Initializing the Attached Socket Module

If a socket module attached to the device programmer is supported, the PRO MATE firmware executes the initialization routine provided for that socket module. If the PRO MATE firmware can not recognize an installed socket module, the firmware displays a message “Socket Not Supported.”

Upon completing initialization, the MPLAB looks to see which socket module is attached to the device programmer. MPLAB will not connect to the device programmer until after a socket module is correctly attached to PRO MATE.

Setting Configuration Bits and IDs

Configuration bits can be manually entered from the Programmer Status dialog.

You can also specify the configuration bit values in your source code. Use the _ _CONFIG directive in MPASM to set the configuration bits for the device to be programmed. You can also use the _ _IDLOCS directive to set the ID locations from MPASM. Each time you rebuild your project or reload your hex file, the configuration bits and ID locations will be set according to the values from these directives.

Programming a Microcontroller Device

When you select Program/Verify from the PRO MATE menu, the following dialog will be activated:

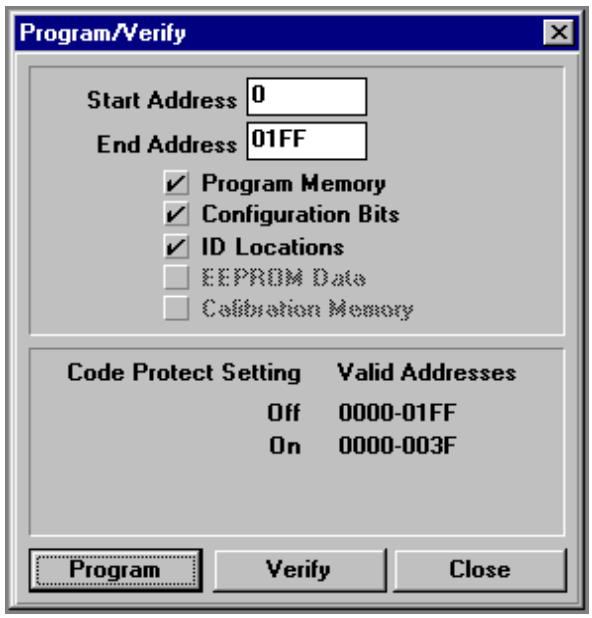

Figure 3.5: Program/Verify Dialog

The Program/Verify Dialog is used to send code to the target device (Program) or to check that the data in the current device matches the code in the Program Memory window (Verify). For normal programming use the default addresses.

If you do not wish to program all sections of the device, remove the checks from the appropriate boxes. Options not available on the currently selected processor will be grayed out, and cannot be selected.

When you select Program/Verify, the following sequence is initiated:

1. The PRO MATE checks to see if the device is blank. If the device is not blank, PRO MATE asks if you want to continue.

2. PRO MATE programs the selected options on the microcontroller device inserted in the socket.
3. PRO MATE performs a check of the selected options to verify the information programmed into the microcontroller device and returns the results of the verification. Although you can also select Verify manually, the Verify option takes place every time a device is programmed.

Verifying a Microcontroller Device

You can choose to verify the contents of the target device manually by selecting Verify from the Program/Verify dialog.

Checking for a Blank Device

The PRO MATE checks the microcontroller device to verify that all program locations contain ones (the erased state). This is done automatically before a device is programmed, or can be done manually by selecting Blank Check All from the pull-down menu.

Reading a Device Master

PRO MATE reads the microcontroller device contents and copies the information into MPLAB's Program Memory window and Programmer Status dialog.

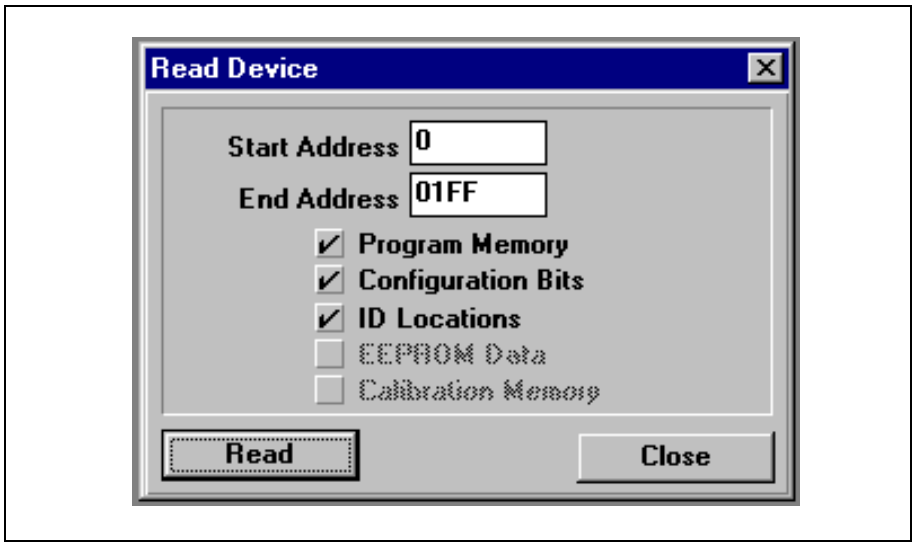

Figure 3.6: Read Device Dialog

The Read Device dialog is just like the top half of the Program/Verify dialog.

Program Memory and PRO MATE

For MPLAB, Program Memory can mean various things. When in the PICMASTER emulator mode, Program Memory shows the data that is in the emulation memory of the PICMASTER pod. This memory is read by the PICMASTER probe when you run, single step, or trace using the emulator. When in the simulator mode, the Program Memory window reflects memory as seen by MPLAB-SIM. This memory is read by MPLAB-SIM when you run, single step, or trace.

When you are using PRO MATE, the Program Memory window also represents data that is to be programmed into the target device inserted into PRO MATE, or represents data that has been read from the target device.

If you read memory from PRO MATE while in emulator or simulator mode, the emulator or simulator program memory will be overwritten.

Because of these various uses of the Program Memory window, you should be aware of potential "mis-matches" if you read data from a target device while you have an MPLAB project open. Debug operations may not work properly, and data in other windows may not match the newly read data from PRO MATE.

Figure 3.7: Program Memory Window

You can view the Program Memory in hex, machine code, or disassembler with symbols (if available).

Running PRO MATE from the DOS Command Line

Invoke PRO MATE software from the PC Host with the following command:

PROCMD <options>

The following command line options are available.

Command	Syntax
Download firmware	/d<filename>
Target hex file	/f<filename>
SQTP file	/s<filename>
Device	/p<partname>
Comm port	/<number>
V_{DD} Max	/x<voltage>
V_{DD} Min	/n<voltage>
V_{PP}	/v<voltage>
Enable Safe Mode	/r
Program	/m

If you should enter an invalid parameter a minimal error message will be shown. Test the returned error code in your batch program to determine the error. The error codes are

ERRORLEVEL Value	Description
0	Success
1	PRO MATE not found
2	Wrong socket module
3	File not found
4	Illegal device specified
5	Illegal voltage specified
6	Program/verification error
7	Download firmware must be done independently
8	Illegal parameter
9	Illegal hex file
10	Illegal SQTP file
255	Other error

Serial Communications Port

/# Serial Port Selection where # = <1|2|3|4>. Valid serial ports are COM1 through COM4. The default serial port is COM1.

Firmware File Name

/d<file> Firmware File Name Selection. The /d argument selects the *.HEX firmware program file that PRO MATE uses in its internal firmware. This will download the specified file from the PC. Refer to the latest README.PRO text file that accompanied the most recent version of software for the names of the current firmware file.

Target Hex File

/f<file> Target Hex File Name Selection. The /f argument selects the *.HEX firmware program file that PRO MATE will program into the device. The host software accepts the absolute file name as well as the relative file name (with respect to the working directory).

Program

/m Program the current device in the PRO MATE programming socket.

Part Name

/p<part> Part Name Selection. The string match is case insensitive. Refer to the most current README.PRO file for a list of the available devices.
Enter the suffix of the part name. For example, for the PIC16C54 device, enter PIC16C54. Please be very careful to enter the exact part number in order to select the programming algorithm for the device you are programming.

Safe Mode

/r Safe/Restricted Mode. This mode is intended to protect against inadvertent modification of a master file by disabling most commands (including Read and Edit) while still allowing execution of the Program, Verify, and Blank Check commands.

SQTP File

/s<file> Enable SQTP mode and set the SQTP file name.

VDD Max

/x — Set the VDD programming voltage on the device to be programmed to a maximum value. Enter as four digits. To set it to a value of 5.75 volts:
/x0575

VDD Min

/x — Set the VDD voltage on the device to be programmed to minimum value. Enter as four digits. To set it to a value of 4.00 volts:
/x0400

VPP

/v — Set the VPP programming voltage value. Enter as four digits. To set it to a value of 13.25 volts:
/x1325

Command Line Examples:

```
procmd     /d  PM400000.HEX
procmd /1 /Fmyfile.hex /PIC16C54 /m
procmd /3 /Fd:\mydir\myfile.hex /P16C54 /m
```

Upgrading PRO MATE Firmware and Host Software

PRO MATE's modular design allows Microchip Technology to easily upgrade PRO MATE firmware and host software to support new devices as the devices become available.

PRO MATE Version Numbers

Select *Help>About* to display the current software version information.

MPLAB Software: The current version of the PC Integrated Development Environment software.

PRO MATE Software: The current version of the MPLAB PRO MATE software driver that is used on the PC

MPLAB Software Version

MPLAB is updated on a regular basis to provide support for new features and to support simulation of new processors. Usually the MPLAB software must be used with a specific version of PRO MATE PC software.

PRO MATE PC Software

The PRO MATE PC Software is the software that is installed into MPLAB to control the PRO MATE. This software has a version different from MPLAB and can be seen in the *Help>About* box.

PRO MATE Firmware Version

To see which firmware version is loaded in your device programmer, turn the device programmer off and back on and read the version from the second display. If have more current firmware files you should upgrade the device programmer firmware. Refer to "Updating Firmware" in Chapter 4 for additional information.

Version Number Compatibility Check

Every time the PRO MATE host software runs, compatibility checks are made with MPLAB. If there is an incompatibility, a message box will inform you of the version required.

When you select devices from the Programmer Status window, you will be informed if the firmware version does not support that device. Refer to "Updating Firmware" in Chapter 4 for information on downloading firmware.

Files Used by PRO MATE

PRO MATE can use information directly from MPLAB projects without any intermediate steps. MPASM can be used separately from MPLAB to produce hex files for PRO MATE. Alternatively, devices can be programmed with hex files from any PICmicro microcontroller compatible cross-assembler or cross-compiler.

If you are using MPASM separate from MPLAB, or are generating hex files from within MPLAB for use later with PRO MATE, you should use either INHX8M or INHX32 hex formats. MPASM's default output format for hex files is INHX8M. If you are programming PIC17CXX devices, you should use INHX32 format. See MPASM User's Guide or MPLAB's on-line help for MPASM for details on file formats.

Chapter 4. Using PRO MATE

Introduction

This chapter will cover the basic operation of the PRO MATE device programmer. This will cover the main steps for programming and reading a device.

Highlights

This chapter covers these topics:

- **Preliminary Requirements**
- **Accessing MPLAB Tools and Menu Functions**
- **Loading PICmicro Hex Code**
- **Checking For a Blank Device**
- **Programming a Device**
- **Reading a Device Master**
- **Using Serial Programming**
- **Using Hexadecimal Record Formats**
- **Changing Voltage Settings**
- **Updating Firmware**

Preliminary Requirements

Make sure that you have gone through the hardware and software installation procedures as described in **Chapter 2: PRO MATE Installation**. You should have the PRO MATE device programmer connected to the PC with a cable to your serial port, and MPLAB should be communicating with PRO MATE as described in **Chapter 3: PRO MATE Basic Functions**.

You should have an unprogrammed PICmicro device to use in this tutorial, and you should have some code to use, either in the form of a hex file, or as a source text file which can be built using an MPLAB project.

Accessing MPLAB Tools and Menu Functions

MPLAB functions are accessed from standard Windows 3.1 style pull down menus. The MPLAB menus are discussed at length in the MPLAB User's Guide. You can take the time to learn about MPLAB Projects and use the editor and simulator to write and debug your code if you wish.

If you already have your code finished, or prefer not to use the MPLAB IDE, you can simply use MPLAB as host software to import your code and control PRO MATE. You will not need to read the MPLAB manual to use PRO MATE.

Loading PICmicro Hex Code

Using PRO MATE without MPLAB Projects

If you have a .HEX file ready for programming into a PICmicro microcontroller, select *File>Import>Download to Memory* to load your code into the MPLAB Program Memory window.

Using PRO MATE with MPLAB Projects

If you have read the MPLAB User's Guide and are building your firmware code using an MPLAB project, code shown in the Program Memory window can be directly programmed into the PICmicro device.

If you have configuration bits set in your source code, then every time you re-build your project, the configuration bits shown in Programmer Status dialog will be updated with those values. If you do not set configuration bits in your source code, then these bits will not be changed. You can manually change them from their default values and they will be programmed into the PICmicro device when you program the microcontroller.

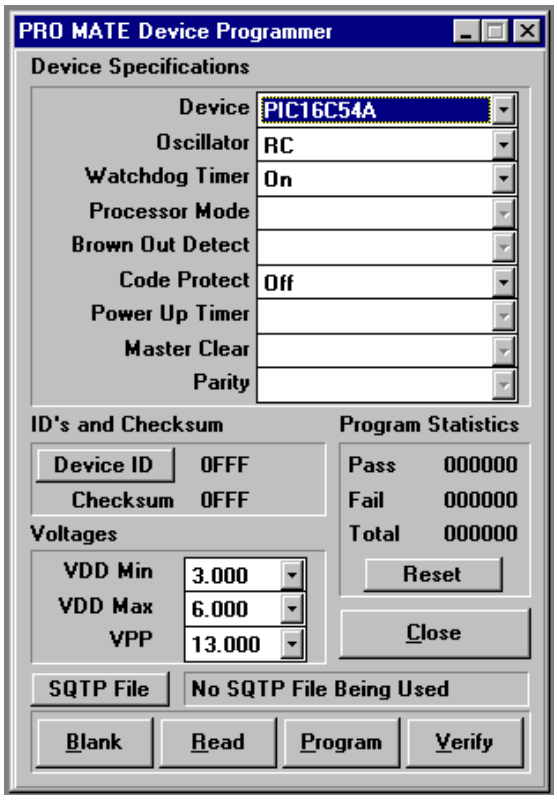

Figure 4.1: Programmer Status Dialog

You may change the device type for the programmer by selecting a new device.

Checking For a Blank Device

You can select *PRO MATE>Blank Check All* to verify that a device is completely erased (all bits are set to a "1"). This will also verify that all configuration bits are set to a "1" (unprogrammed) state.

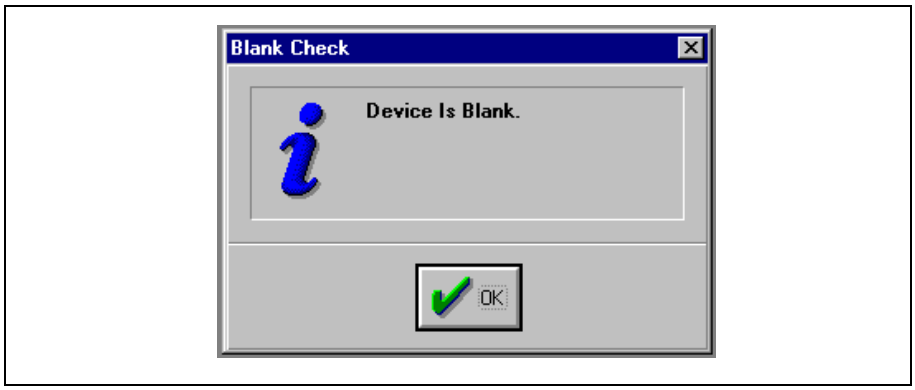

Figure 4.2: Blank Check Result

If you are using an OTP (one-time programmable) part, some configuration bits may be already programmed from the factory (oscillator bits, for instance). In that case you should set the configuration bits in the Programmer Status dialog to the factory settings and select *PRO MATE>Blank Check OTP*. This will check that all program memory bits are set to one's, and that the configuration bits match the values in the Programmer Status dialog (Watch Dog Timer, Oscillator, etc.).

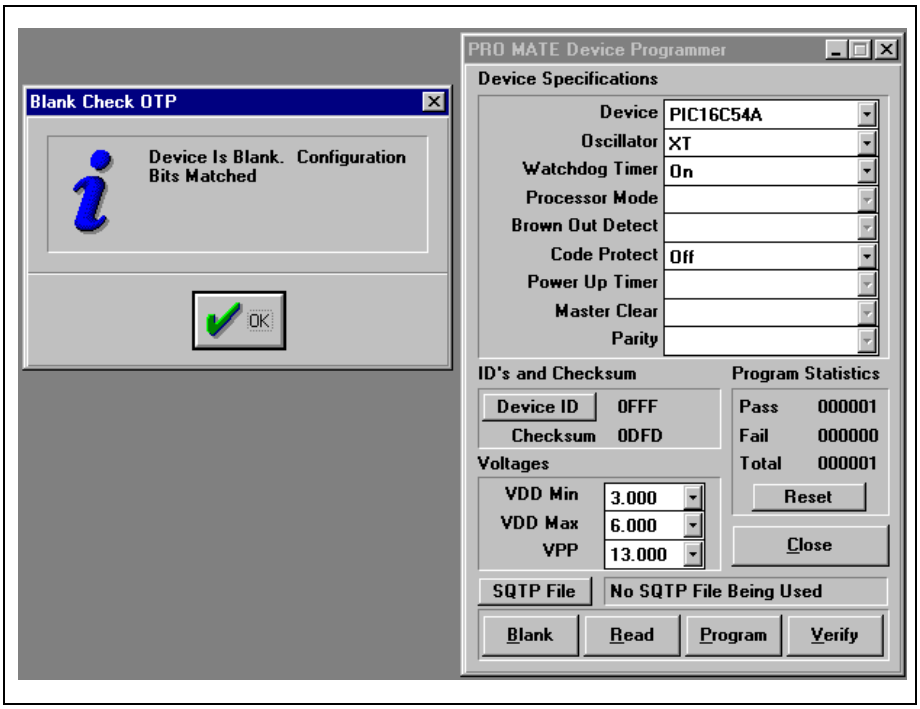

Figure 4.3: Blank Check OTP Result

Programming a Device

Make sure that the device as shown on MPLAB's Programmer Status dialog is the same as the device you are ready to program.

Insert a device to be programmed into the PRO MATE socket. Position pin one on the device to be in the pin one position as shown on the diagram next to the socket.

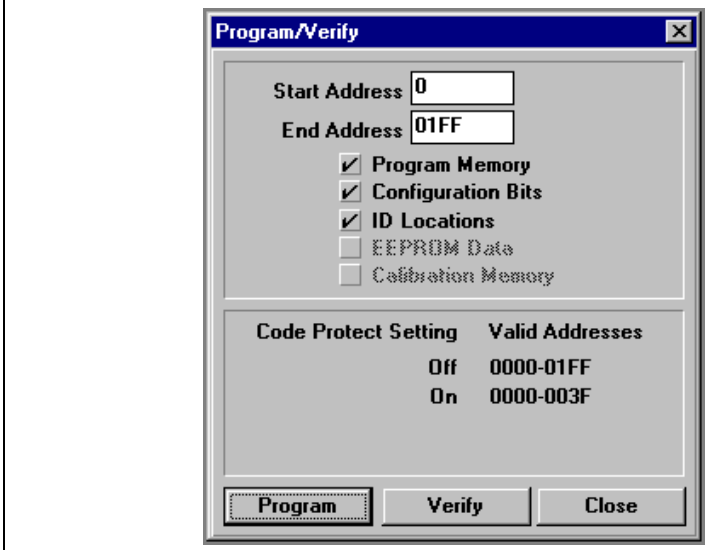

Figure 4.4: Program/Verify Dialog

Select *PRO MATE>Program/Verify* to bring up the Program/Verify dialog.

Ensure that the address range is correct and that the appropriate options are checked.

Click **Program**, and PRO MATE will program the data into your device. PRO MATE will immediately verify that the device was correctly programmed.

Reading a Device Master

If you want to copy the data from a programmed PICmicro device into an unprogrammed device, you can select *PRO MATE>Read Device* to bring up the Read Device dialog. Leave the settings at their default state to read all of memory into MPLAB. Click **Read**.

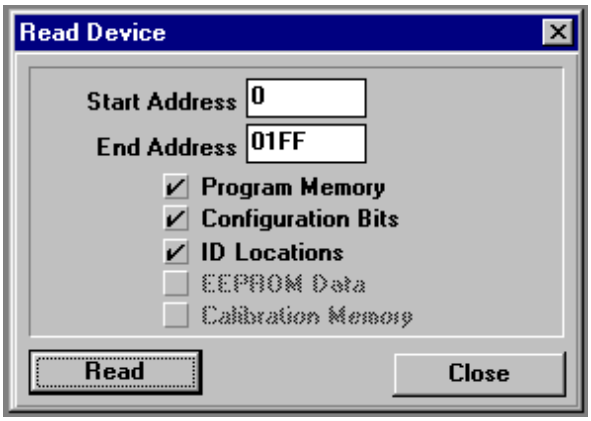

Figure 4.5: Read Dialog

The Program Memory window will now show you the data read from the device master, and you can then save that data as a hex file, insert a new device into PRO MATE to copy that same data into a new device, or modify the data in MPLAB before you save or program another device.

Note:	Code protected devices can not be copied.

Using Serial Programming

Serialization allows you to program a serial number into each microcontroller device that the Device Programmer programs. Serialization is done by using a series of RETLW (Return Literal W) instructions, with the serial number bytes as the literal data. To serialize, you must first generate a serialization file, and then use that file to serialize locations in the device microcontroller.

Generate SQTP File

Select *PRO MATE > Generate SQTP File* to display a dialog box for generating an SQTP file. Fill in the appropriate values for the type of SQTP file you are generating, then click **Generate**. For example, an SQTP file for a PIC16C5X device might be generated as shown:

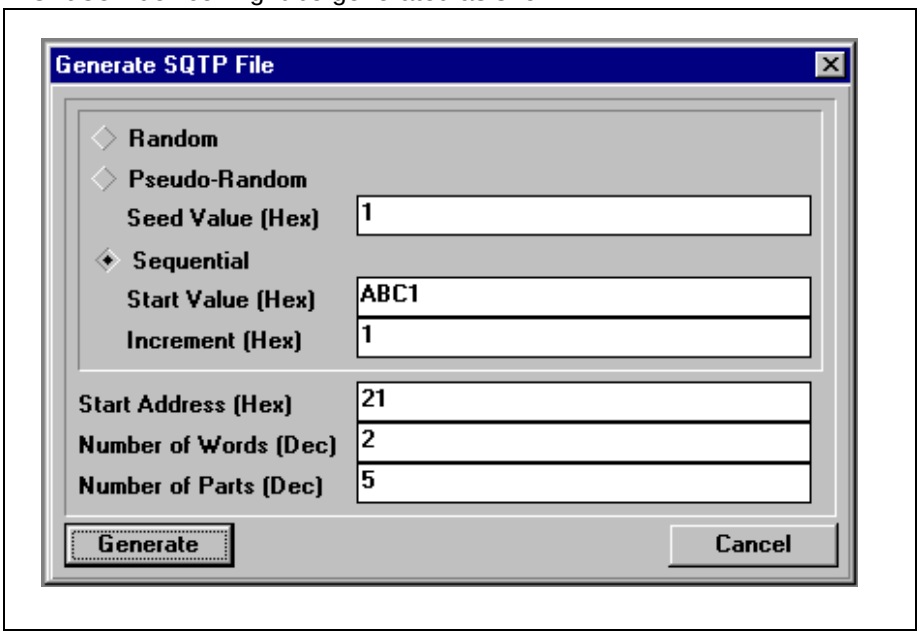

Figure 4.6: Sample Serial SQTP File

Refer to "Using Hexadecimal Record Formats" in this chapter for more information on the format of SQTP files.

Serialization On

Click **SQTP File** from the Programmer Status dialog and select a file to enable serialization for the current programming session.

When serialization is enabled, the serial number that will be programmed into the next device can be seen in its appropriate location in the Program Memory Window.

Programming SQTP Devices

To program a device with the SQTP information, simply enable SQTP and program the device normally. After the device is programmed, the Program Memory Window will display the next serial number. If the last serial number in the file was used, a message will appear and serialization will be disabled.

When a serial number is used, the SQTP file is marked by replacing the colon for that entry by a semicolon. This allows you to use the same SQTP file over multiple programming sessions without repeating any numbers.

Using Hexadecimal Record Formats

The following hexadecimal record format discussion provides the proper file format for the PICmicro device families. Make sure your assembler or compiler is configured to generate hex files in the proper format.

PRO MATE uses the formats described in the following paragraphs as follows:

PIC16C5X/6X	Uses INHX8M
PIC17CXX	Uses INHX32
Firmware Downloads	Uses INHX32

Each hexadecimal data record has the following format:

:BBAAAATTHHHH....HHCC

:	Start Character (prefix)
BB	Two-Digit Byte Count specifying number of data blocks in record
AAAA	Four-Digit Starting Address of data record
TT	Two-Digit Record Type
	00 = Data Record
	01 = End-of-File Record
	02 = Segment Address Record
	04 = Extended Linear Address Record (INHX32)
HHHH....HH	Two-Digit Data Blocks
CC	Two-Digit Checksum—Two's complement of sum of all preceding bytes in data record except the colon.

INHX8M

The data record is output as described above.

INHX32

The extended linear address record is output to establish upper 16 bits of data address.

Changing Voltage Settings

Change voltage settings only if your application runs at the extreme voltage operating range. Most users will never need to change the default voltage settings.

- V_{DD} Max and V_{DD} Min are the voltages at which programmed microcontroller devices will be verified.
- V_{PP} is the voltage at which microcontroller devices will be programmed.

The Programmer Status Window always displays the current voltage settings. To change a voltage, select it from the pull down list next to each setting. Choose the desired V_{DD} minimum, maximum, or V_{PP} voltage value.

Note: The voltage range and default voltage setting may be different for each microcontroller device type. Refer to the PRO MATE Device Support document for voltage values for specific devices.

Voltage Settings		
Selection		**Default Voltage Value**
V_{DD} Min	(3.00 .. 6.00)	3.00
V_{DD} Max	(3.00 .. 6.00)	6.00
V_{PP}	(12.5 .. 13.5)	13.25

Updating Firmware

Update your firmware when you receive a firmware upgrade, or when the EEPROM in the Device Programmer needs to be reprogrammed. The EEPROM needs to be reprogrammed if the message "Ready for Download" appears at power-up on the LCD Display.

PRO MATE firmware is downloaded as follows:

From the PRO MATE Device Programmer:

1. While powering on the device programmer, simultaneously press **F1** and **F3** to select "Ready for Download...". (You may also use the PRO MATE Utilities menu to access "Ready for Download.")
2. The Device Programmer displays "Ready for Download."

From MPLAB

1. Start up the MPLAB software.
2. Select *PRO MATE > Download Firmware* from the menu bar.
3. Select the current firmware version to download to PRO MATE.
4. Verify that the device programmer is ready for download and click **OK**.

5. “Downloading to PRO MATE” displays on the PC monitor and on the Device Programmer. The Device Programmer also displays an activity indicator in the last location of the second line. Downloading may take a couple of minutes.
6. The device programmer perform a calibration when download is complete. This will take approximately 30 seconds.
7. “Complete! Press a key to begin” appears on the PRO MATE display. Press one of the four PRO MATE buttons to continue. The PRO MATE II does not require a button to be pressed.

NOTES:

Chapter 5. Stand-Alone Mode

Introduction

This chapter contains a description of the PRO MATE device programmer menus and commands. The device programmer provides a user friendly interface that gives you complete control over a programming session.

Highlights

The highlighted points in this chapter are:

- **Stand-Alone Mode**
- **PRO MATE Start-Up**
- **Command Menu**
- **Utilities Menu**

Stand-Alone Mode

Stand-Alone mode allows you to read, program, and verify a device without using a PC. Stand-Alone mode is useful in situations where a PC may not be available or even required, such as in the field or in a lab production environment. To use the device programmer, you must have a socket module installed.

Socket Module

When you power up the PRO MATE device programmer, the unit automatically detects the type of socket module installed and initializes the PRO MATE function buttons, F1 - F4. The device programmer then displays the device options that you can choose from for the currently installed socket module. You must install a new socket module prior to selecting a device not supported by the current socket module. If you power on the device programmer without a valid socket module installed, the unit displays the message "Socket Not Supported."

Caution: Ensure the device programmer is powered OFF before changing a socket module.

Caution: Do not power up the PRO MATE with a device loaded in the socket. Damage to the device or PRO MATE may result.

LCD Display

In Stand-Alone mode, the PRO MATE device programmer communicates with the user through a two-line by 20 character LCD display. The top line of the LCD displays status and error message information. The bottom line of the LCD displays command options. The displayed commands are spaced to correspond to the F1 through F4 function buttons. To execute a specific command, press the appropriate function button.

PRO MATE Start-Up

After applying power to PRO MATE, the unit displays the product title and version number. The PRO MATE firmware then attempts to identify the currently installed socket and displays the socket module name if the socket module is recognized.

PRO MATE next displays a device selection menu. Select the desired device from the selection menu. After selecting a device, PRO MATE displays the Command menu.

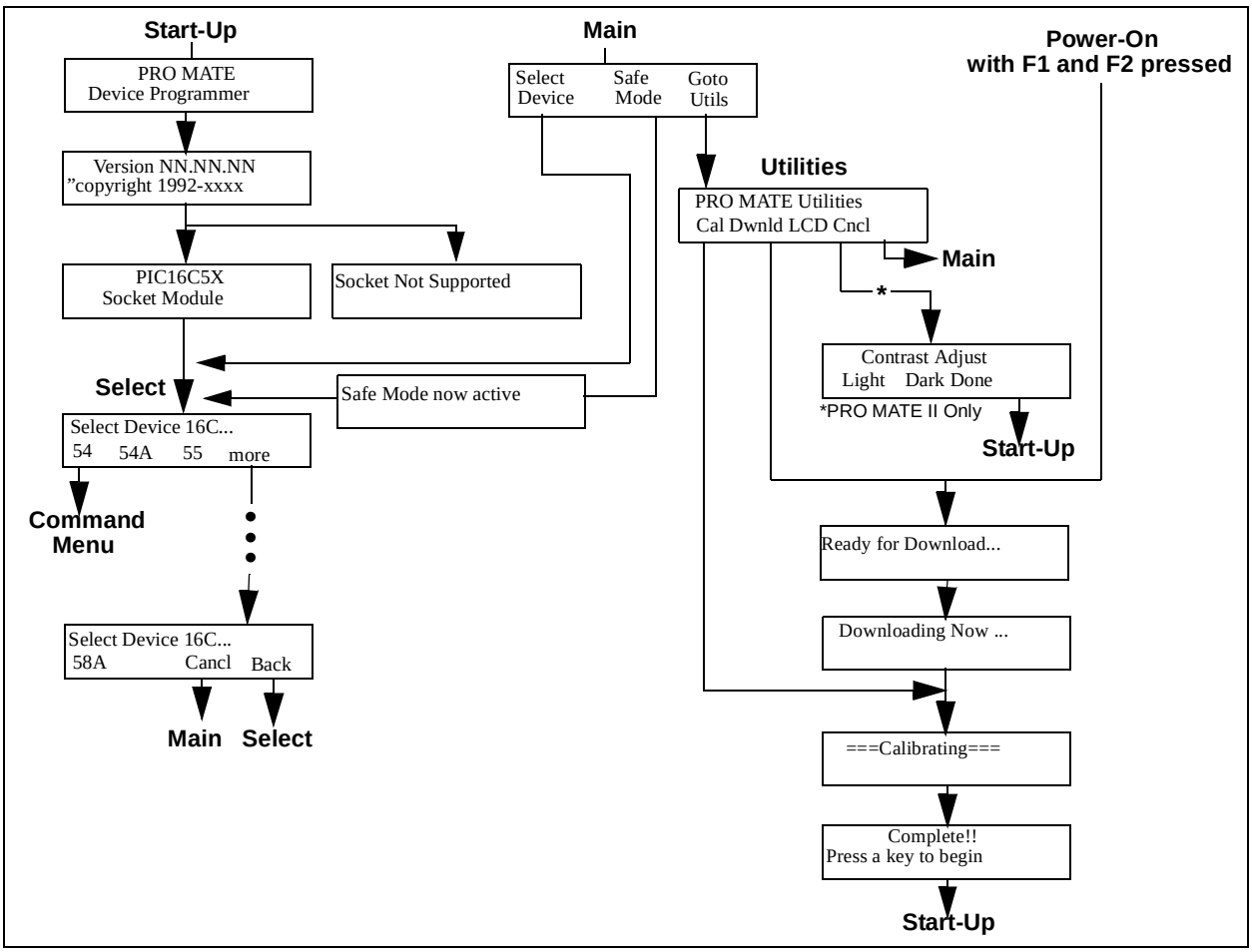

Figure 5.1: Start-Up/Utilities Menu Tree – PIC16C5X Shown

Command Menu

After you select a device, the device programmer displays the Command menu. The functions on the Command Menu allow you to perform the basic user tasks for programming a microcontroller device: Program, Verify, and Read.

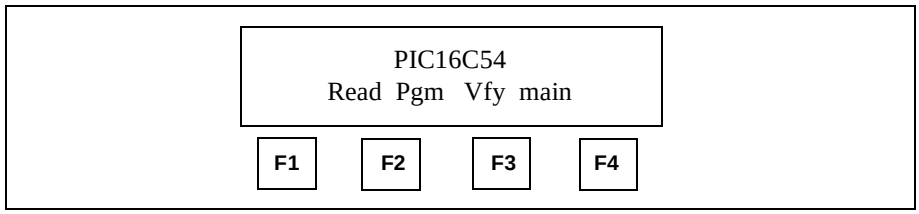

Figure 5.2: Command Menu

Program (Pgm, F1)

This command programs the device in the socket module with the contents of the internal memory of the device programmer.

The device programmer checks to see if the installed microcontroller device is blank. If the device is not blank, the device programmer asks if you want to continue. Answer “Yes” to continue. Answer “No” to return to the Command menu.

The device programmer programs the contents of its memory into the microcontroller device loaded in the socket module.

After programming a device without errors, the device programmer performs a check to verify the data programmed into the device, and returns the results of the verification. For the installed device, the device programmer performs the verification at the V_{DD} Minimum and V_{DD} Maximum voltages.

The device programmer reports programming errors and verify errors according to where the error occurred. Errors are reported for program, configuration bits, and ID locations.

After programming, the device programmer displays the checksum.

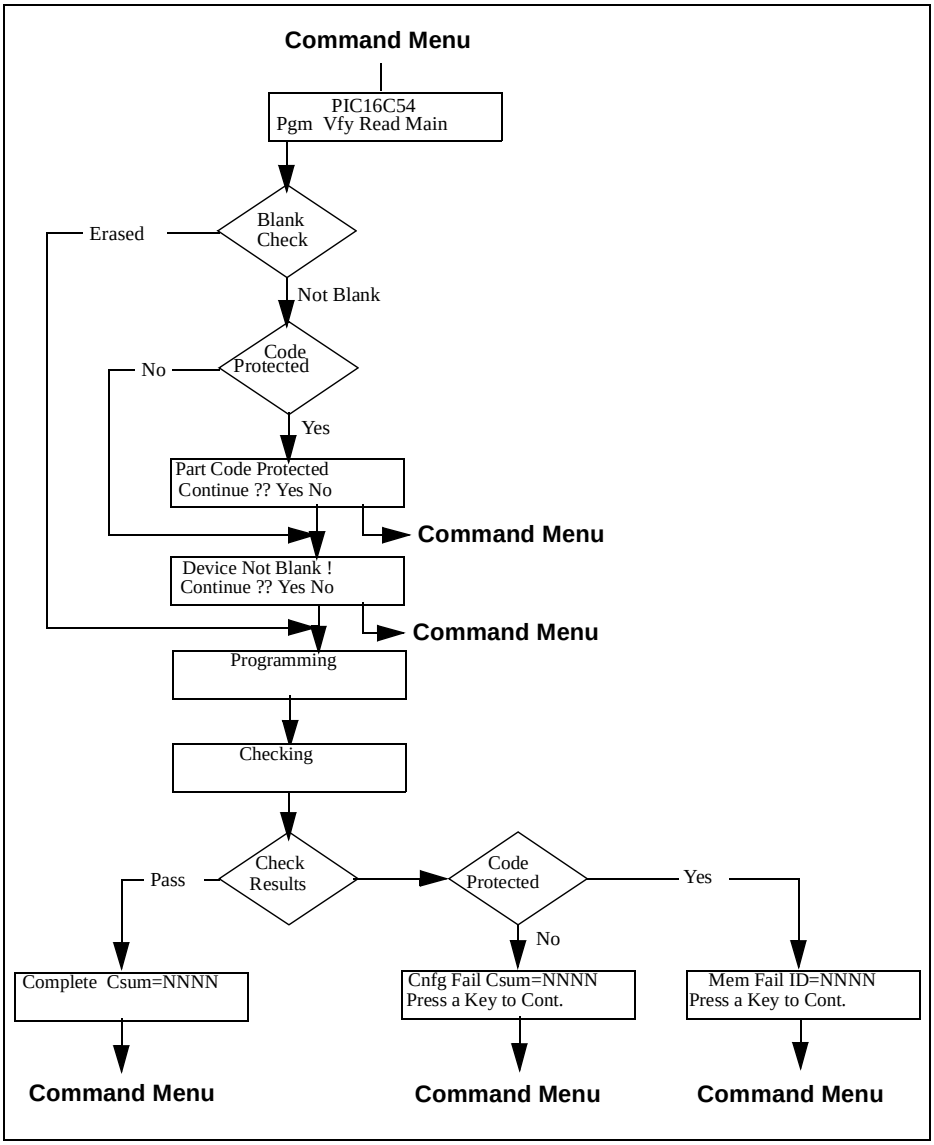

Figure 5.3: Program Menu Tree—PIC16C5X Shown

Verify (Vfy, F2)

The device programmer compares the contents of its internal memory to the contents of the programmed microcontroller device loaded in the socket module. If the data and configuration bit settings are correct, "VERIFIED" will display on the LCD. The device programmer performs the verification at the V_{DD} Minimum and V_{DD} Maximum voltages. The device programmer reports errors according to which part of the device failed.

The Verify function also confirms that erased parts are blank. If all programmable locations are blank for a device loaded in the socket module, the device programmer displays ERASED. Reported results include the following:

- Same Contents
- Blank Device
- Errors

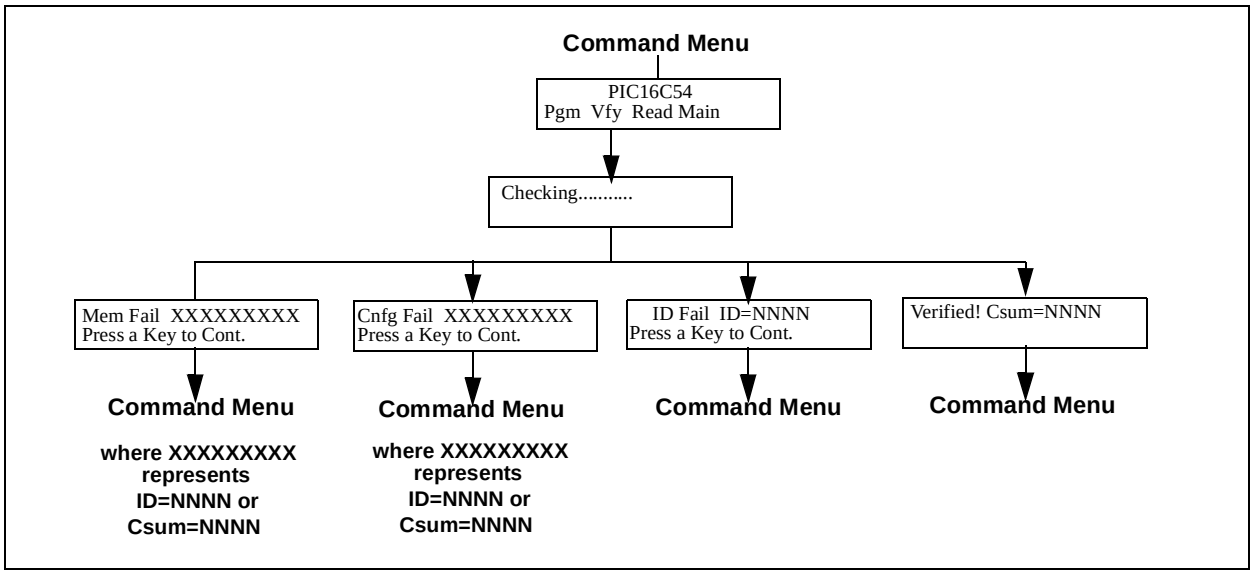

Figure 5.4: Verify Menu Tree—PIC16C5X Shown

Read (Read, F3)

Press **Read** to copy the contents of the device in the socket module into the internal memory of the device programmer.

For PIC16CXX devices, the device programmer will ask the question: “Code Protect Parts?” Answer “Yes” to code protect the parts that you will be programming. Code protection will remain effective until a new device is read. Answer “No” to program devices exactly as read.

After reading a device, the device programmer displays a checksum. If the device is code protected, a code protection message will be displayed prior to the read. Answer “Yes” to continue. Answer “No” to return to the Command menu.

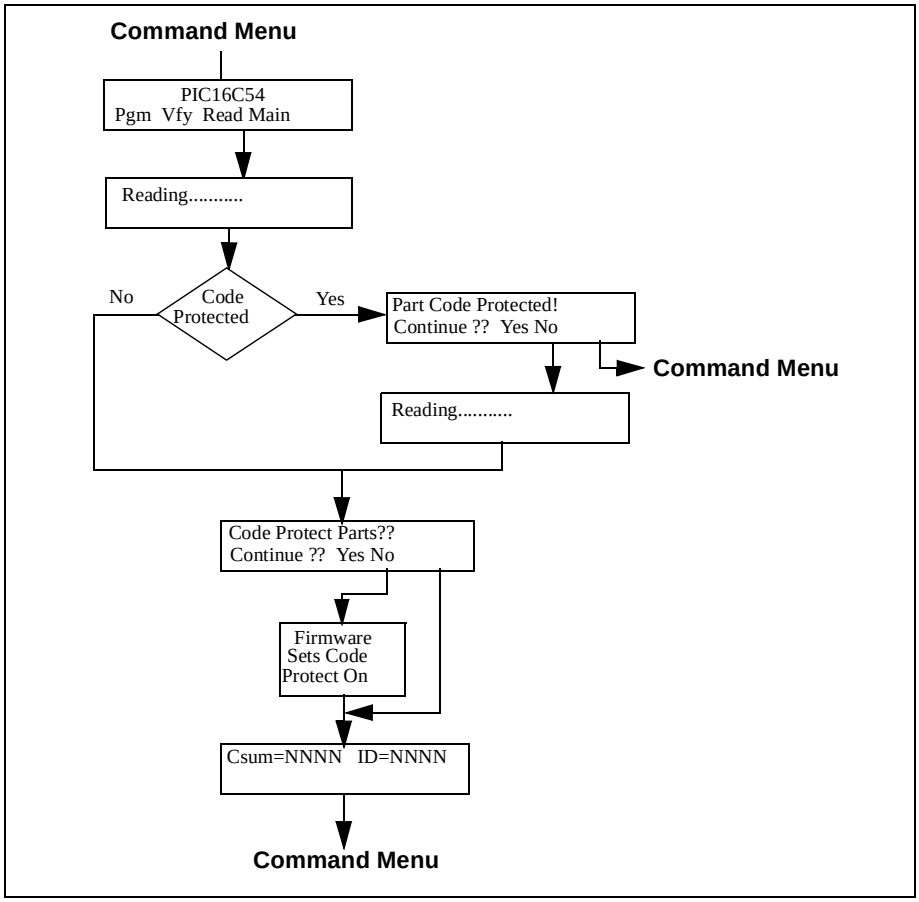

Figure 5.5: Read Menu Tree – PIC16C5X Shown

Main (Main, F4)

Returns to the Main menu.

Utilities Menu

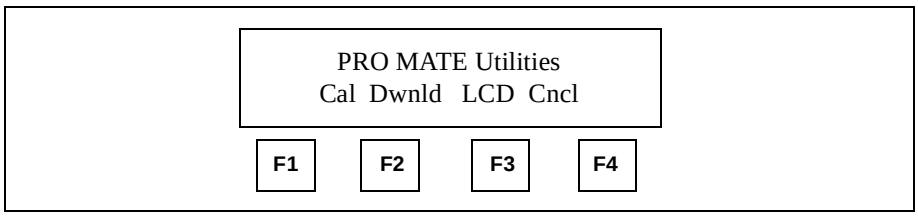

Figure 5.6: Stand-Alone Utilities Menu

Calibrate (Cal, F1)

Performs a calibration on the PRO MATE device programmer.

Calibrates the internal voltage generators (V_{DD} and V_{PP}). After calibration is complete, the device programmer displays:

```
Complete!!
Press a key to begin
```

Figure 5.7: Calibration Complete Message

Note: In a production environment, calibrate the device programmer each week. Also calibrate the device programmer after changing the power supply.

Caution: Do not have a device installed in the socket module when calibrating the device programmer. Applied voltages will exceed the maximum ratings of all parts, and will damage the installed device.

Download (Dwnld, F2)

Sets up the device programmer for downloading new firmware.

Press Dwnld to Download new firmware into the onboard memory. “Ready for Download” displays after pressing Dwnld.

```
Ready for Download..
```

Figure 5.8: Ready for Download Message

After this message displays, execute the download command from MPLAB menu, *PRO MATE > Download Firmware*. When downloading starts, the LCD will show “Downloading from PC...,” and an activity indicator will display on the last location of the second display line. Refer to Updating Firmware in Chapter 6 for additional downloading information.

To exit Download, wait until download is completed, or turn the device programmer off.

Note: The device programmer performs a calibration after each download.

LCD Contrast Adjust (LCD, F3)

The Contrast Adjust control (available with PRO MATE II hardware only) allows you to make the LCD display lighter or darker. Press **Light** to make the LCD display lighter. Press **Dark** to make the LCD display darker. Press **Done** when finished.

Figure 5.9: Contrast Adjust Message

Chapter 6. PRO MATE Menu Options

Introduction

This chapter covers all of the PRO MATE menu items on the MPLAB Integrated Development Environment, and details the PRO MATE dialogs that control device programming, reading, and verifying.

PRO MATE Menu

Enable/Disable Programmer

This selection will enable or disable the PRO MATE operation. When *PRO MATE >Enable Programmer* is selected, MPLAB will attempt to establish communications with the PRO MATE. You will get an error message if the COM port is not set correctly, if the PRO MATE is not hooked up, or if the PRO MATE power supply is not connected.

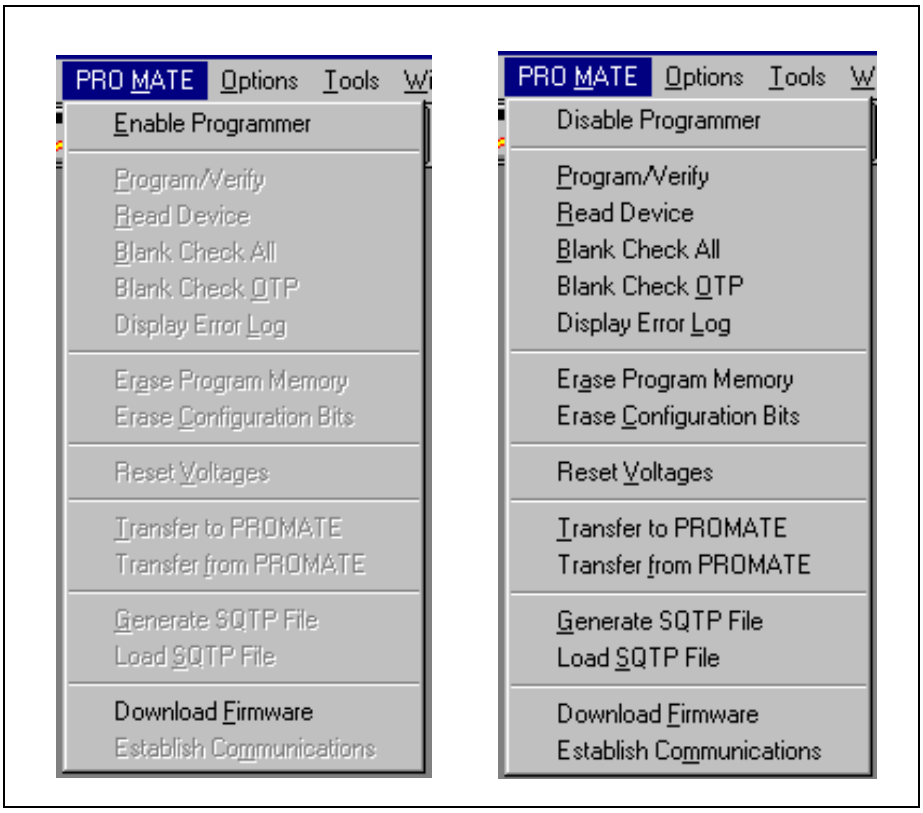

Figure 6.1: PRO MATE Pull Down Menus

If you do not establish communications at first, you can correct the problem and reselect the menu option to try to again initialize the communications between MPLAB and PRO MATE.

Program/Verify

Once communications are set up and you have selected the target device, you can either load your code from a .HEX file with *File>Import>Download To Memory* or directly from your recently built project. In both cases, the code will be shown in MPLAB's Program Memory window.

Select *PRO MATE>Program/Verify* to bring up the Program/Verify dialog. From this dialog, you can either program the data as shown in MPLAB's Program Memory window, or verify that the data in the device in the PRO MATE socket matches data in MPLAB's Program Memory window.

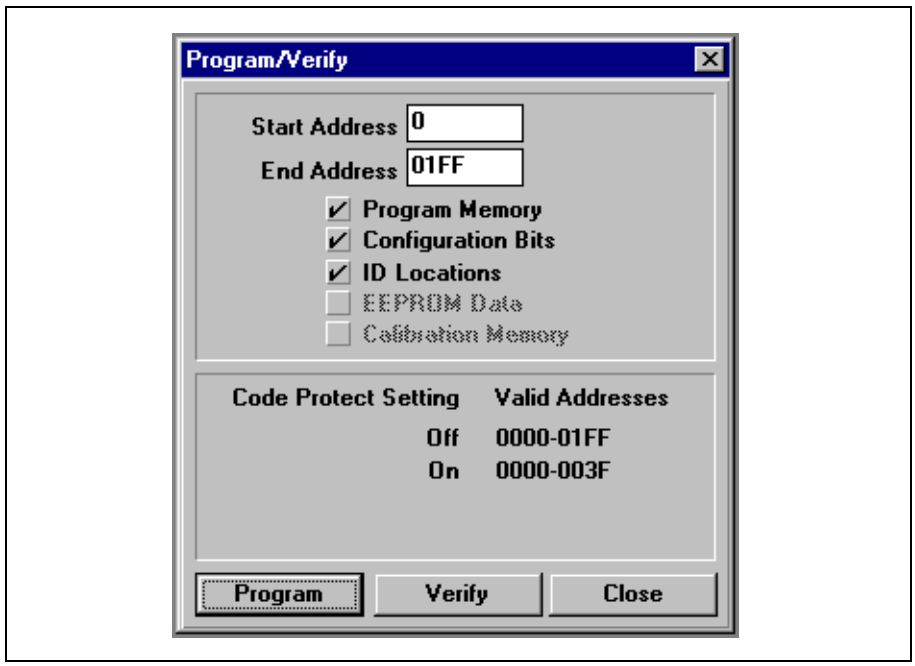

Figure 6.2: Program/Verify Dialog

Using the check boxes on the Program/Verify dialog, you can select to program or verify only the program memory or other memory areas on the target device.

The Start Address and End Address will default to the start and end addresses of program memory on the selected device. You can change this to a smaller area by changing the addresses in these boxes.

Read Device

When you select *PRO MATE>Read Device*, the Read Device dialog will appear on your screen. Like the Program/Verify, you can set the program memory range and the other read options.

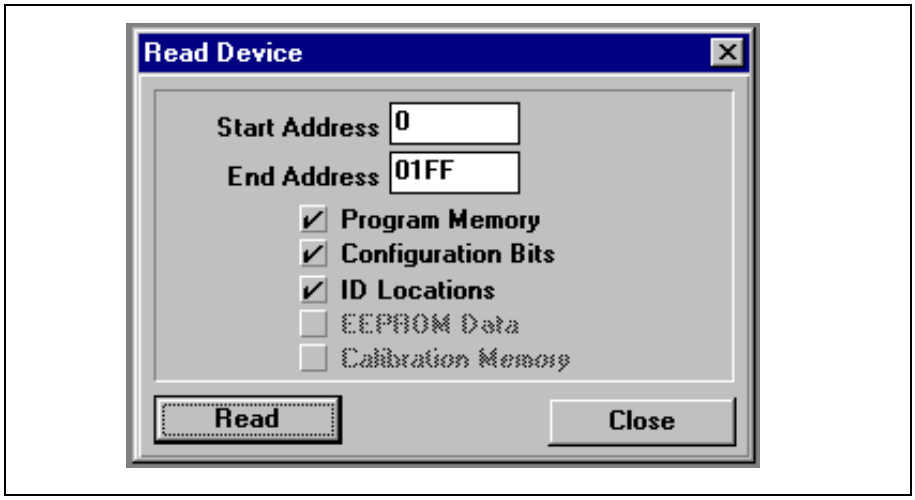

Figure 6.3: Read Device Dialog

After reading a device into MPLAB, its data will appear in the Program Memory window. Data can be changed using the Modify dialog, and it can be saved it to a hex file with *File>Export>Save Hex File*.

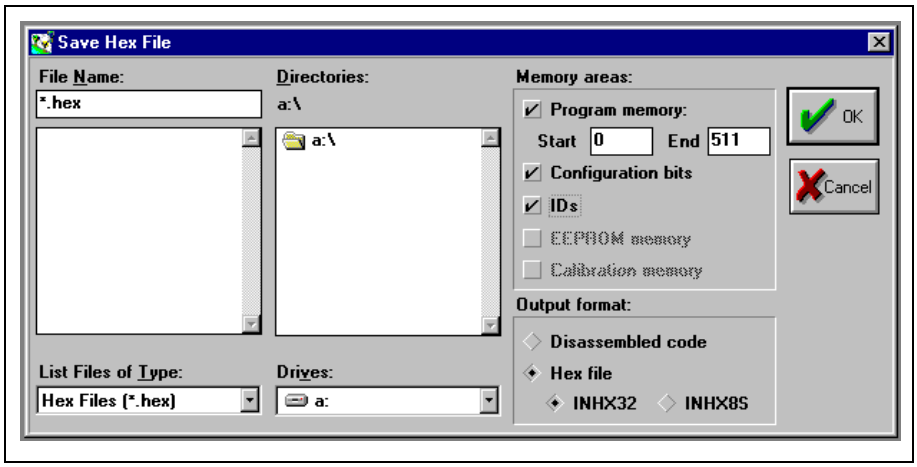

Figure 6.4: Save Hex File Dialog

If you have a PICMASTER® emulator connected to MPLAB, your code will be downloaded to the emulated program memory of the PICMASTER. If you have a project open be aware that the Absolute Listing window and the Source window may not match the data you have read into the Program Memory window. Symbols may not match the proper addresses in the Program Memory window, and code in the PICMASTER's memory, as shown in the Program Memory window, may be different than code shown in the Absolute Listing window.

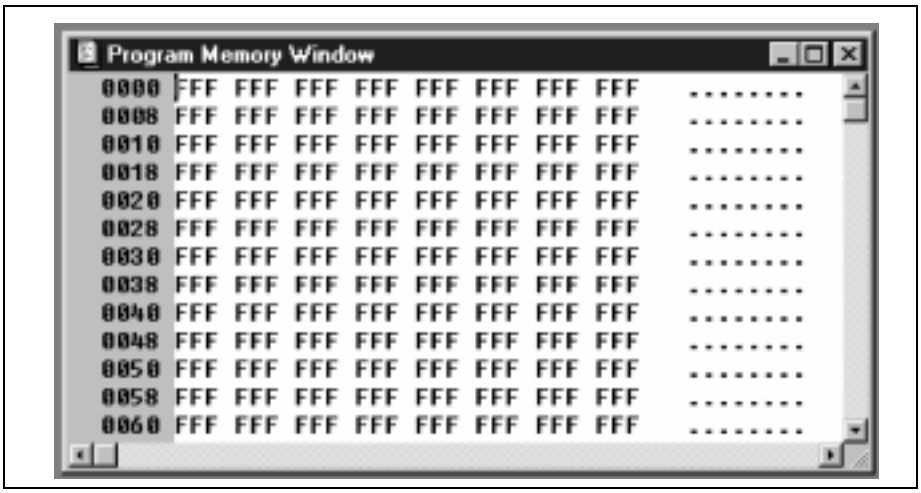

Figure 6.5: Program Memory Window

Blank Check All

You can select *PRO MATE>Blank Check All* to verify that a device is completely erased (all bits are set to a "1"). This will also verify that all configuration bits are set to a "1" (unprogrammed) state.

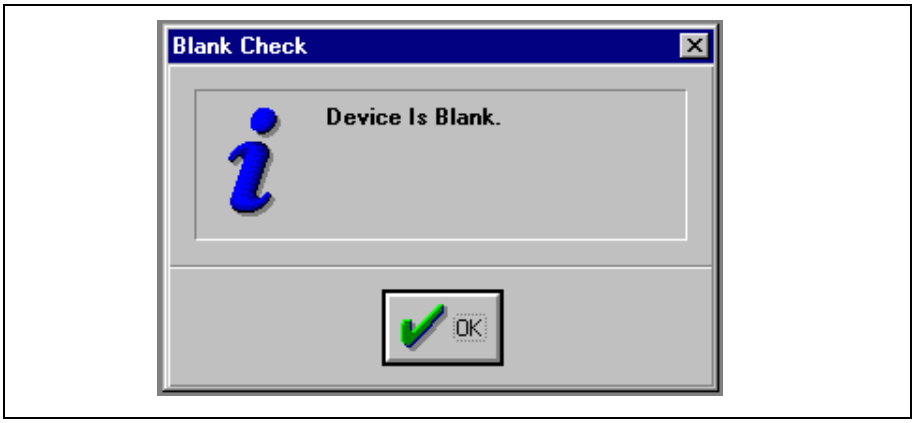

Figure 6.6: Blank Check All Result

If you are using an OTP part, some configuration bits may be already programmed from the factory (oscillator bits, for instance). In that case you should use *PRO MATE>Blank Check OTP*.

Blank Check OTP

If you are using an OTP part, some configuration bits may already be programmed from the factory (oscillator bits, for instance). In that case you should set the configuration bits in the Programmer Status Dialog to the factory programmed settings and select *PRO MATE>Blank Check OTP*. This will check that all program memory bits are set to one's, and that the configuration bits match the value in the Programmer Status dialog

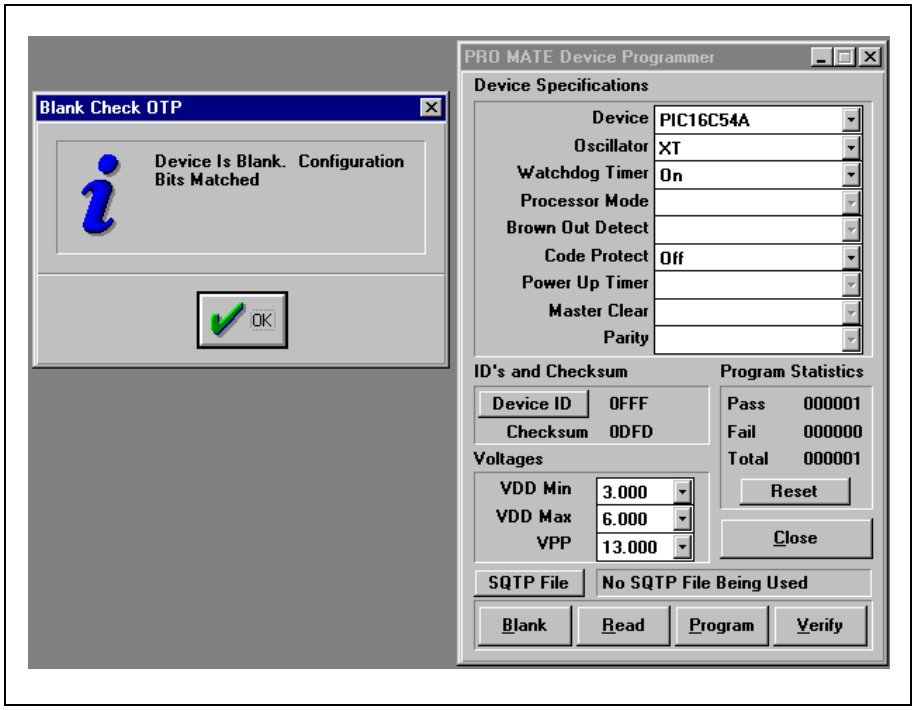

Figure 6.7: Blank Check OTP Result

Display Error Log

When you have programmed a device or verified a device, an error window will show you data from memory in the device that do not match the corresponding memory in MPLAB.

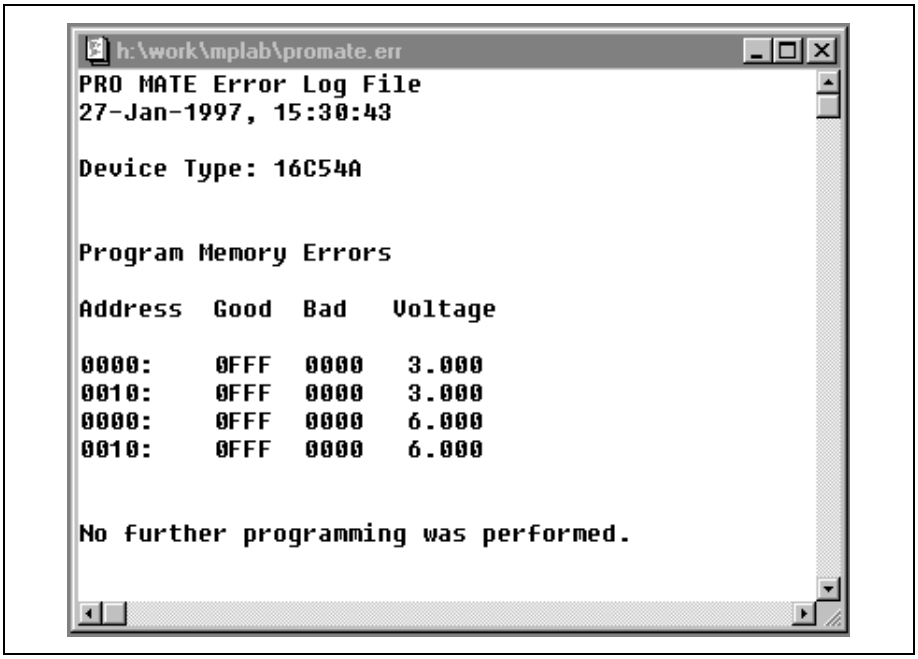

Figure 6.8: Sample Error Log Dialog

Erase Program Memory

This will set all bits in program memory, data memory and calibration memory window to ones.

Erase Configuration Bits

This option will set all available configuration bits and ID location bits to ones, their un-programmed state. If you then reload your hex file which has configuration data or if you rebuild your project which has configuration bits defined, these values will change in the Programmer Status dialog. You can use this to override the values in your code by selecting this after you have loaded your hex file or rebuilt your project.

Reset Voltages

This option sets V_{DD} Min, V_{DD} Max, and V_{PP} to their default values for the selected device.

Transfer to PRO MATE

This option transfers all device and voltage information from MPLAB to the PRO MATE Device Prigrammer.

Transfer from PRO MATE

This option transfers all device and voltage information from the PRO MATE Device Programmer to MPLAB.

Generate SQTP File

This option generates a file that can be used for device serialization. Refer to **Chapter 4: Using PRO MATE**, “Using Serial Programming,” for more information.

Load SQTP File

This option includes serial programming and selects serialization file. It is identical to clicking **SQTP File** on the Programmer Status dialog. Refer to **Chapter 4: Using PRO MATE**, “Using Serial Programming,” for more information.

Download Firmware

This option downloads firmware to the PRO MATE Device Programmer. Refer to **Chapter 4: Using PRO MATE**, “Updating Firmware,” for more information.

Establish Communications

This re-establishes RS-232 communications with the device programmer. Use this if power has been disconnected from the PRO MATE. This does not reset programming information in the Programmer Status Dialog, configuration bits or IDs.

Options>Programmer Options Menu

Communications Port Setup

The Communications Port Setup Dialog shows the possible PC serial communication ports.

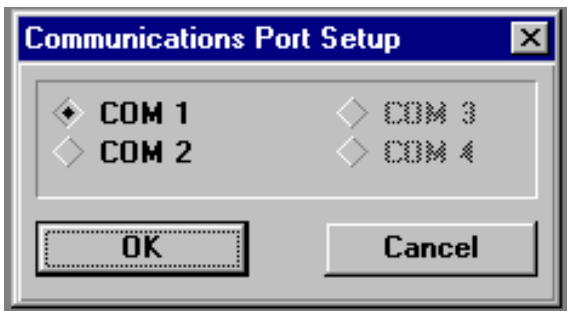

Figure 6.9: Communications Port Setup Dialog

OK sets the options. **Cancel** will ignore the changes and close the dialog.

Select Programmer

If you use other device programmers with MPLAB, only one can be enabled at a time. To change the active device programmer, select *Options>Programmer Options>Select Programmer*. Choose the desired programmer from the pull down list and click on **OK**.

Note that MPLAB must be restarted after the device programmer has been changed.

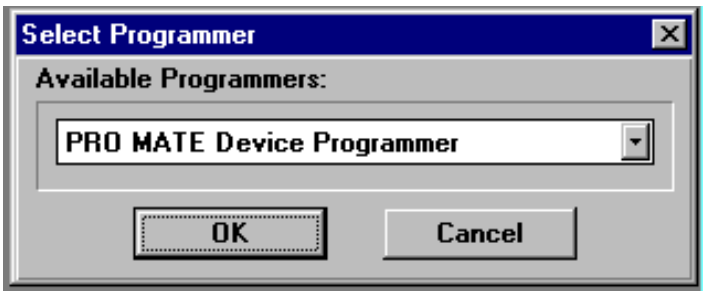

Figure 6.10: Select Programmer Dialog

Chapter 7. Migrating from Earlier PRO MATE Systems

If you have used previous Microchip PRO MATE development systems, you should find MPLAB PRO MATE to be easy to use. Install MPLAB as described in **Chapter 2: PRO MATE Installation**, "PRO MATE Installation." If you already have the serial cable installed, set the COM port from MPLAB's *Options>Programmer Options>Communications Port Setup* menu.

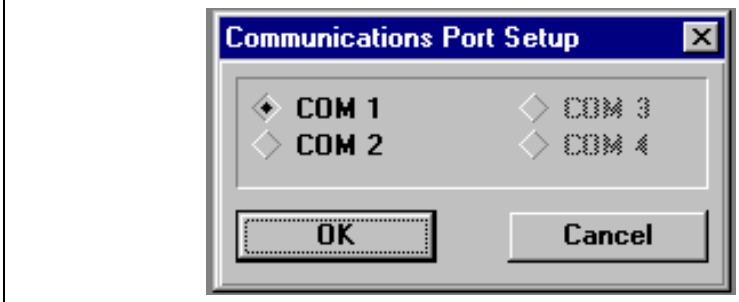

Figure 7.1: Programmer Setup Dialog Box

MPLAB offers you new features, such as:

- Disassembly of code read from target devices
- Save code as instructions so that you can generate source files
- Quickly program code from MPLAB projects
- Directly read code from a device in PRO MATE to the MPLAB-SIM simulator debugger, or to PICMASTER emulation memory for real-time debugging

NOTES:

Appendix A. Troubleshooting

Introduction

The troubleshooting information in this chapter can help you resolve typical problems or obstacles in programming microcontroller devices.

Highlights

The troubleshooting information in this chapter includes:

- Troubleshooting Hardware
  - Calibration
  - Communication Failure
  - Ensuring Proper Socket Module Contact
  - Socket Module Alignment
  - Socket Module Failure
- Troubleshooting Operation Type Problems
  - Device Selection in Stand-Alone Mode
  - Reading a Device Master in Stand-Alone Mode
  - Unstable EEPROM in Device Programmer
  - Device Pin Damage
- Troubleshooting Software
  - Establishing Communication with PRO MATE
  - Default Serial Port

Troubleshooting Hardware

Calibration

An internal hardware problem could prevent proper calibration. If you receive the message "Calibration Error!" on the Device Programmer, contact your Microchip Sales Office for further instructions.

Communication Failure

The following table gives the data for connecting the PRO MATE Device Programmer to a 25-pin serial port. Connect the corresponding terminals on each line of the table. If communication fails, check your PC serial port.

Table A. 1: PC HOST TO PRO MATE SIGNALS

25-Pin	Female (PC Host)	9-Pin	Male (PRO MATE)
2	TX	3	RX

Table A. 1: PC HOST TO PRO MATE SIGNALS (Continued)

25-Pin	Female (PC Host)	9-Pin	Male (PRO MATE)
3	RX	2	TX
20	DTR	4	Data Ready
7	Ground	5	Ground
6	DSR	6	+5 volts
4	RTS	7	CTS
5	CTS	8	RTS

Ensuring Proper Socket Module Contact

After changing a socket, insert a blank device and do a blank check (Vfy/F2 on the Device Programmer) to insure the socket is making proper contact. A blank device will show erased.

Socket Module Alignment

After tightening the socket module screws, power on the Device Programmer. If the LCD display shows any of the following messages, power off the Device Programmer and realign the socket module:

- Align socket bottom
- Align socket top
- Select socket
- Socket not known

Socket Module Failure

If you can program a master chip, and if you can read and try to program code protected chips, but the chips fail the programming attempts, then potential socket pin damage may be the cause of the problem.

Contact your FAE if your socket module is not operating properly.

Troubleshooting Operational Problems

Device Selection in Stand-Alone Mode

When you power up the Device Programmer, the unit will automatically detect the type of socket module installed and determine the device(s) for the installed socket module. A new socket module must be installed prior to selecting a new device type.

Reading a Device Master in Stand-Alone Mode

When reading a device master in stand-alone mode, the Device Programmer asks the question: "Code Protect Parts" being programmed. Answer **Yes** to code protect the parts that you will be programming.

Unstable EEPROM in Device Programmer

Update your firmware when you receive a firmware upgrade, or when the contents of the EEPROM in the Device Programmer is damaged. The EEPROM contents is damaged if the message, “Ready for Download” appears on the LCD Display at normal power-up.

Device Pin Damage

On the smaller device packages (SSOP, PQFP, and SOIC) the pins can bend easily and give problems in programming the devices.

Troubleshooting Software

Establishing Communication with PRO MATE

MPLAB attempts to establish communication with the PRO MATE device programmer upon enabling the programmer. If communication cannot be established, no programming can occur. A dialog box appears if the attempt to establish communication fails. If a communication attempt fails, try again after correcting the problem, or cancel.

If you encounter communications problems, try the following:

1. Make sure that the RS-232 cable is connected, the power supply is connected, and the Power LED on the PRO MATE is on.
2. Make sure that a COM port is properly set up exclusively for use by PRO MATE.

   Windows Users: A serial mouse will use a COM port, as will an external modem. An internal modem has its own COM port, so if you have a second COM port on your PC, set it so it won’t conflict with either the mouse or the modem.

   Win 95 Users: Note that Win 95 requires special attention to setting up COM ports. Check your computer BIOS settings to make sure that your board has an available COM port. A serial mouse will use a COM port, and an external modem will, tool. An internal modem has its own COM port, so if you have a second COM port on your PC, set it so it won’t conflict with either the mouse or the modem. Check the Ports (COM & LPT) under the System settings in the Control Panel. Check their *Properties>Resources* to ensure they are operating properly and that there are no conflicts.

   On some systems, it is also necessary to manually set the COM port to hardware handshaking. Disable the FIFO as well if problems persist.

Default Serial Port

PRO MATE uses COM1 as the default serial port the first time you run PRO MATE. If you change your serial port selection with the *Options>Programmer Options > Communications Port Setup* command, then the next time you run PRO MATE, the host software will use the same serial port used in the previous session.

Appendix B. On-Line Support

Introduction

Microchip provides two methods of on-line support. These are the Microchip BBS and the Microchip World Wide Web (WWW) site.

Use Microchip's Bulletin Board Service (BBS) to get current information and help about Microchip products. Microchip provides the BBS communication channel for you to use in extending your technical staff with microcontroller and memory experts.

To provide you with the most responsive service possible, the Microchip systems team monitors the BBS, posts the latest component data and software tool updates, provides technical help and embedded systems insights, and discusses how Microchip products provide project solutions.

The web site, like the BBS, is used by Microchip as a means to make files and information easily available to customers. To view the site, the user must have access to the Internet and a web browser, such as Netscape or Microsoft Explorer. Files are also available for FTP download from our FTP site.

Connecting to the Microchip Internet Web Site

The Microchip web site is available by using your favorite Internet browser to attach to:

www.microchip.com

The file transfer site is available by using an FTP service to connect to:

ftp://ftp.futureone.com/pub/microchip

The web site and file transfer site provide a variety of services. Users may download files for the latest Development Tools, Datasheets, Application Notes, User's Guides, Articles and Sample Programs.

A variety of Microchip specific business information is also available, including listings of Microchip sales offices, distributors and factory representatives. Other data available for consideration is:

- Latest Microchip Press Releases
- Technical Support Section with Frequently Asked Questions
- Design Tips
- Device Errata
- Job Postings
- Microchip Consultant Program Member Listing
- Links to other useful web sites related to Microchip Products

Connecting to the Microchip BBS

Connect worldwide to the Microchip BBS using either the Internet or the CompuServe" communications network.

Internet: You can telnet or ftp to the Microchip BBS at the address **mchipbbs.microchip.com**

CompuServe Communications Network: In most cases, a local call is your only expense. The Microchip BBS connection does not use CompuServe membership services, therefore

You do not need CompuServe membership to join Microchip's BBS.

There is **no charge** for connecting to the BBS, except for a toll charge to the CompuServe access number, where applicable. You do not need to be a CompuServe member to take advantage of this connection (you never actually log in to CompuServe).

The procedure to connect will vary slightly from country to country. Please check with your local CompuServe agent for details if you have a problem. CompuServe service allow multiple users at baud rates up to 14400 bps.

The following connect procedure applies in most locations.

1. Set your modem to 8-bit, No parity, and One stop (8N1). This is not the normal CompuServe setting which is 7E1.
2. Dial your local CompuServe access number.
3. Depress **<Enterø>** and a garbage string will appear because CompuServe is expecting a 7E1 setting.
4. Type +, depress **<Enterø>** and Host Name: will appear.
5. Type **MCHIPBBS,** depress **<Enterø>** and you will be connected to the Microchip BBS.

In the United States, to find the CompuServe phone number closest to you, set your modem to 7E1 and dial (800) 848-4480 for 300-2400 baud or (800) 331-7166 for 9600-14400 baud connection. After the system responds with Host Name:, type **NETWORK,** depress **<Enterø>** and follow CompuServe's directions.

For voice information (or calling from overseas), you may call (614) 723-1550 for your local CompuServe number.

Using the Bulletin Board

The bulletin board is a multifaceted tool. It can provide you with information on a number of different topics.

- Special Interest Groups
- Files
- Mail
- Bug Lists

Special Interest Groups

Special Interest Groups, or SIGs as they are commonly referred to, provide you with the opportunity to discuss issues and topics of interest with others that share your interest or questions. SIGs may provide you with information not available by any other method because of the broad background of the PICmicro user community.

There are SIGs for most Microchip systems and device families. These groups are monitored by the Microchip staff.

Files

Microchip regularly uses the Microchip BBS to distribute technical information, application notes, source code, errata sheets, bug reports, and interim patches for Microchip systems software products. Users can contribute files for distribution on the BBS. For each SIG, a moderator monitors, scans, and approves or disapproves files submitted to the SIG. No executable files are accepted from the user community in general to limit the spread of computer viruses.

Mail

The BBS can be used to distribute mail to other users of the service. This is one way to get answers to your questions and problems from the Microchip staff, as well as keeping in touch with fellow Microchip users worldwide.

Consider mailing the moderator of your SIG, or the SYSOP, if you have ideas or questions about Microchip products, or the operation of the BBS.

Software Releases

Software products released by Microchip are referred to by version numbers. Version numbers use the form:

xx.yy.zz

Where xx is the major release number, yy is the minor number, and zz is the intermediate number.

Intermediate Release

Intermediate released software represents changes to a released software system and is designated as such by adding an intermediate number to the version number. Intermediate changes are represented by:

- Bug Fixes
- Special Releases
- Feature Experiments

Intermediate released software does not represent our most tested and stable software. Typically, it will not have been subject to a thorough and rigorous test suite, unlike production released versions. Therefore, users should use these versions with care, and only in cases where the features provided by an intermediate release are required.

Intermediate releases are primarily available through the BBS.

Production Release

Production released software is software shipped with tool products. Example products are PRO MATE, PICSTART, and PICMASTER. The Major number is advanced when significant feature enhancements are made to the product. The minor version number is advanced for maintenance fixes and minor enhancements. Production released software represents Microchip's most stable and thoroughly tested software.

There will always be a period of time when the Production Released software is not reflected by products being shipped until stocks are rotated. You should always check the BBS or the WWW for the current production release.

Systems Information and Upgrade Hot Line

The Systems Information and Upgrade Line provides system users a listing of the latest versions of all of Microchip's development systems software products. Plus, this line provides information on how customers can receive any currently available upgrade kits. The Hot Line Numbers are: 1-800-755-2345 for U.S. and most of Canada, and 1-602-786-7302 for the rest of the world.

These phone numbers are also listed on the "Important Information" sheet that is shipped with all development systems. The hot line message is updated whenever a new software version is added to the Microchip BBS, or when a new upgrade kit becomes available.

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