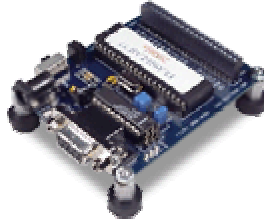

Flash-Lab 77 PIC16F877 Development System



FLASH Lab Development System Overview

The FLASH Lab is programmed and verified over a serial connection. This process does not require the use of a hardware programmer. Instead, the FLASH Lab programs itself with the included software application by sending your compiled program via a serial cable connected to your Personal Computer (PC). The PIC16F877-20/P RISC microcontroller supplied is an incredibly powerful processor and offers a multitude of onboard hardware features and peripherals, making it the ideal choice for almost any embedded application.

The PIC16F877 microcontroller installed in each FLASH Lab is pre-programmed with the bootloader firmware and tested before shipping. The microcontroller is then installed in the FLASH Lab board, which provides all of the required circuitry to power the device, interface to application circuitry and provide an RS232 serial port for programming and general use.

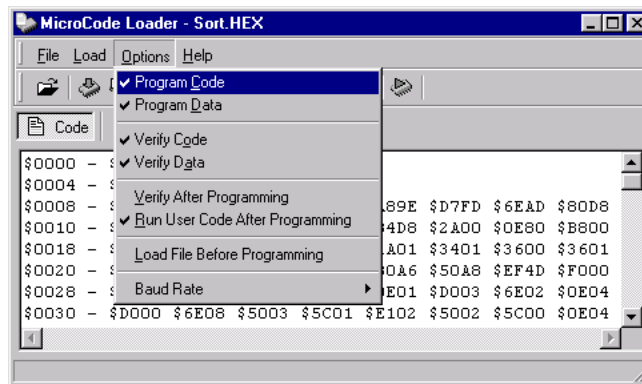


Figure 1. Boot-loader software options

The application software will run on various operating systems including Windows 95, 98, ME, NT, 2000 and XP. The software is simple and intuitive to use, with drop-down menus for selecting various options, as shown in Figure 1 above.

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Programming the FLASH Lab System

Programming the FLASH Lab is incredibly easy. The following sequence shows how to program the FLASH Lab development system.

- ❑ Connect the FLASH Lab to your PC serial port, and switch the power on. The green LED power indicator on the FLASH Lab should now be on.
- ❑ Start the loader software.

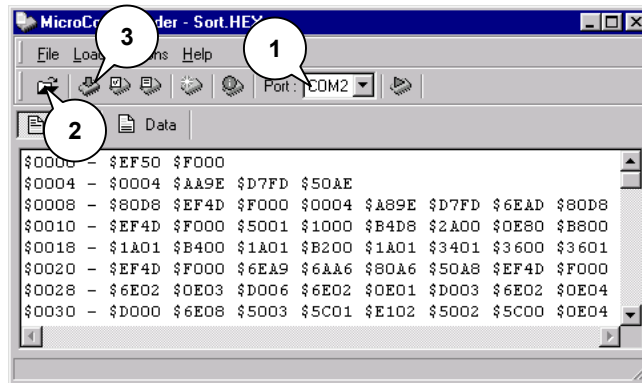


Figure 2. Programming the target microcontroller

Referring to figure 2, you should then:

1. Select the serial port you want to use to communicate with the FLASH Lab system and your PC.
2. Select the *Open Hex File* speed button located on the main toolbar, to load the *.hex file you want to program onto the target microcontroller.
3. Finally, press the *Program* speed button to program the target microcontroller.

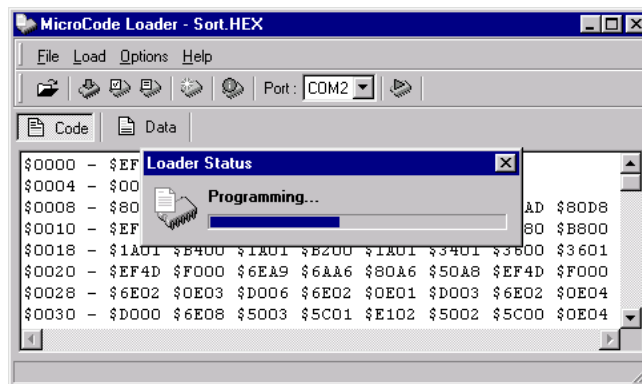


Figure 3. Programming status

The bootloader application will now send your *.hex file over the serial connection and program the target device, as shown in figure 3. As soon as the programming operation has completed, your program will start to run on the PIC microcontroller.

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FLASH Lab Power Requirements

- ❑ Power Supply: 9-12 VDC **center positive**
- ❑ Power Plug: 2.1mm x 5.5 mm female plug, **center positive**

Voltage Regulation

Power supply regulation is provided by an LM340MP-5.OCT, SOT-223 surface mount regulator capable of providing +5V @1A with integrated PCB heat sink.

Dimensions

- ❑ FLASH Lab Main Board PCB 2 ½ x 3 1/16"
- ❑ FLASH Lab Prototyping Board PCB 2 ½ x 3 1/16"
- ❑ Board to board (stacked) 5/8"

Using the FLASH Lab Prototyping Boards

The modular prototyping boards are a unique feature of the FLASH Lab development system, allowing you to build circuits that can be stored for later use. Embedded applications will normally grow to require the addition of clock circuits, LED or LCD displays, additional RAM, EEPROM, keypads, sensors and various other circuits.

Once you have a circuit constructed on the modular plug-in prototyping boards, you can unplug the complete circuit and store it in a drawer until needed for the next design. This can really save time by eliminating the need to build circuits over and over again when working on your application code.

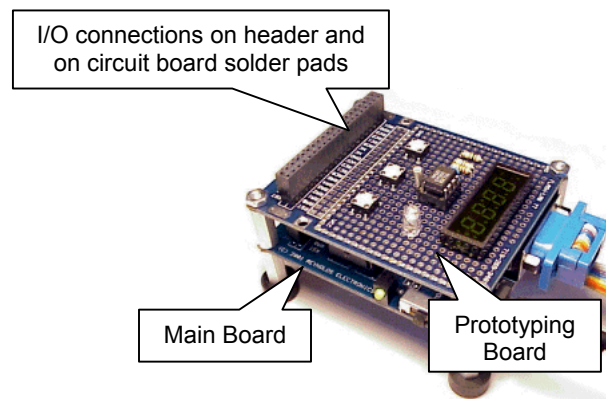


Figure 4. Modular architecture

As shown above in Figure 4, the modular prototyping boards simply plug-in to the FLASH Lab main board. The gold pass-through headers supplied with each board connect to the female header on the FLASH Lab main board. This is used to pass all I/O connections from the main board through to one or more prototyping boards. These boards can be stacked on top or on the bottom. Circuit connections to I/O-pins

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on the prototyping boards are made via the solder pads or header connections, as shown in Figure 5 below.

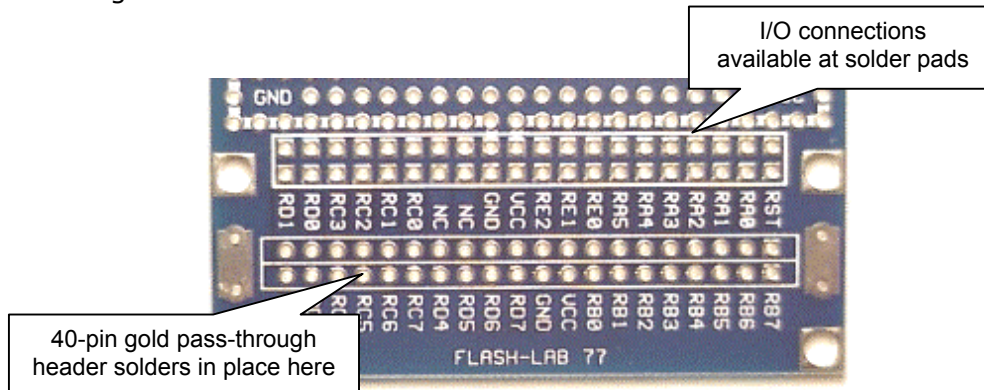


Figure 5. Circuit connections and I/O pin layout

The FLASH Lab prototyping boards have two 40-pin header areas. The lower section is where the gold pass-through header mounts. The upper section is available as a second connection point for soldering wires directly to the prototyping area or a second 40-pin header. Port connections are exactly the same on the upper header area as those marked on the silk screen around the lower header.

The FLASH Lab makes program development, prototyping new circuits and debugging application code very quick and easy. Old methods of programming the PIC with a standard device programmer, then moving the PIC from programmer to application circuit on a breadboard can be tedious and slow down the development cycle considerably.

FLASH Lab and MicroCode Studio Plus

The FLASH Lab can be programmed in assembler, C, or with your favorite PIC compiler. When used with the PicBasic Pro compiler and the MicroCode Studio Plus In Circuit Debugger (ICD), you can execute your application code line-by-line, insert single or multiple break points, pause program execution, and much more.

The new MicroCode Studio Plus ICD enables you to execute your PICBasic Pro programs on the FLASH Lab while viewing (on screen) internal variables, special function registers (SFR's), RAM memory and even EEPROM contents as your program executes. You can run full program animations, or single-step through your PicBasic Pro program code line-by-line.

MicroCode Studio Plus combined with the FLASH Lab development board forms an incredibly powerful development combination. For more information on MicroCode Studio Plus, or to locate an international distributor of the FLASH Lab systems, see the links shown at the end of this document.

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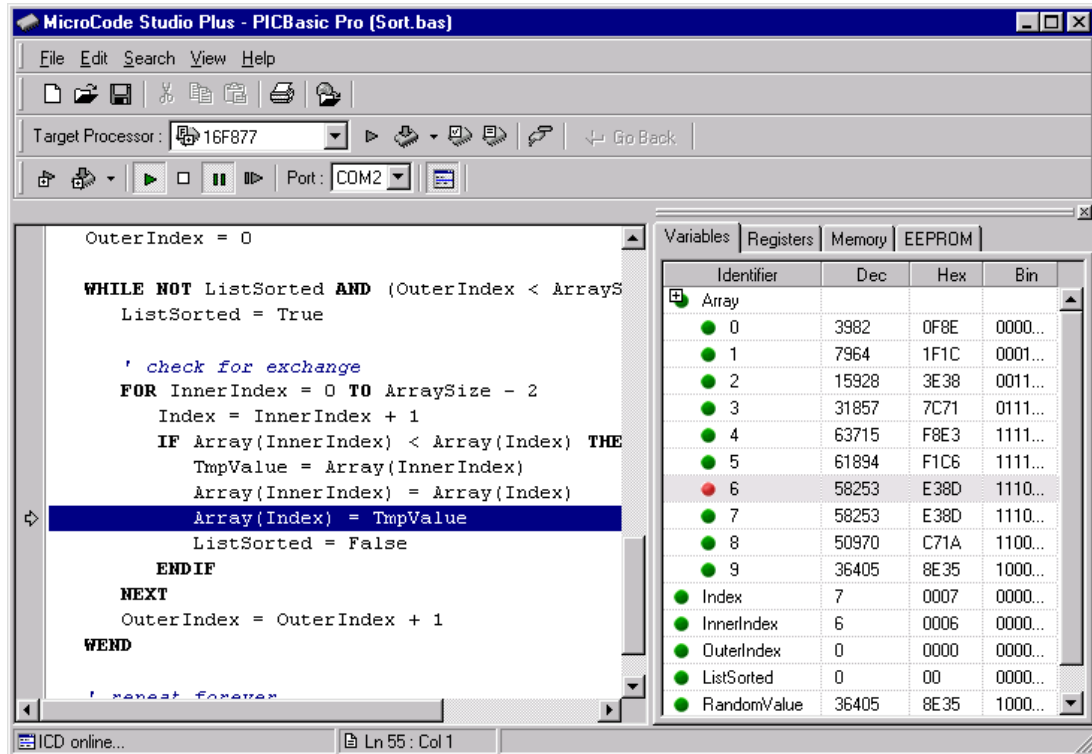


Figure 6. MicroCode Studio Plus ICD

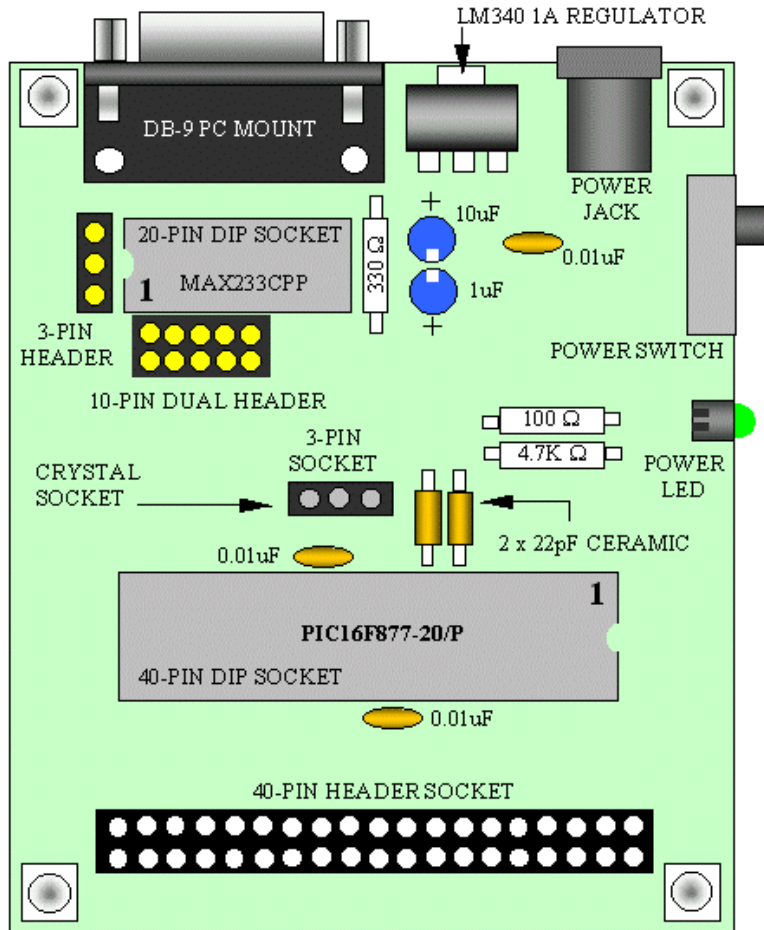
Applications

The PIC16F877-20/P RISC microcontroller used on the FLASH Lab board is a powerful processor, and offers a number of onboard hardware features making it an ideal choice for many embedded applications. Combined with the FLASH Lab's unique modular design capabilities, efficient size and rapid development features, you're only limited by your imagination. A few examples include:

- Robotics & Animatronics
- Motion Control Systems
- Security & Alarm Systems
- Industrial Control & Monitoring Systems
- Consumer Electronics
- Industrial Data-Logging Applications
- Home Automation
- Wireless Communications Systems Controllers
- Educational Development Platform

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FLASH Lab Parts Placement Diagram



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Purchasing Information

FLASH Lab development systems and MicroCode Studio Plus can be purchased from the following companies.

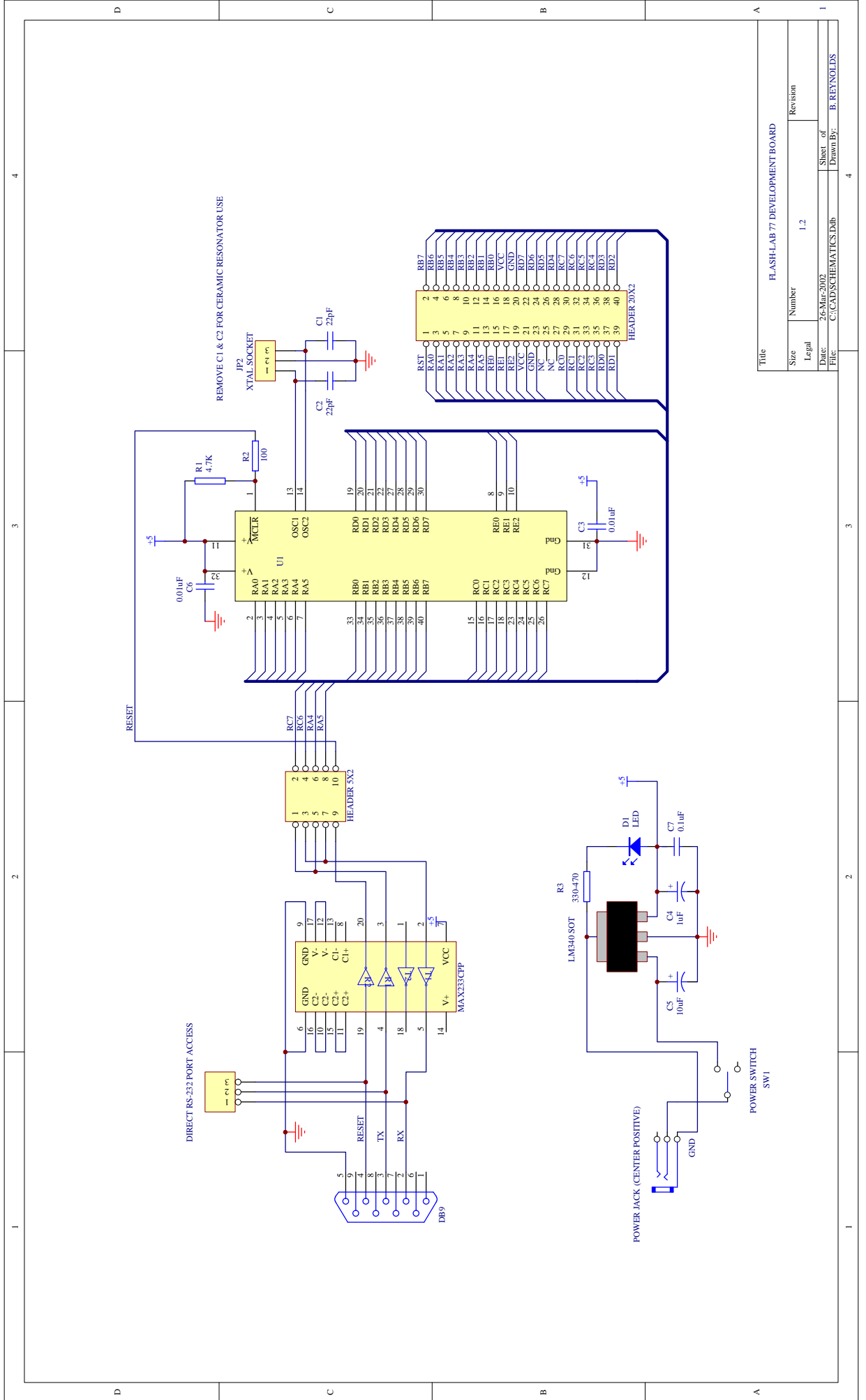
United States:

Reynolds Electronics
3101 Eastridge Lane
Canon City, CO. 81212
Sales: (719) 269-3469
Fax: (719) 276-2853
Web site: <http://www.rentron.com>
Tech Support: tech@rentron.com
Sales: sales@rentron.com

United Kingdom:

Mecanique
85 Marine Parade
Saltburn by the Sea
TS12 1BZ
United Kingdom
Phone: +44 (0)1287 624449
Web site: <http://www.mecanique.co.uk>
Email Inquiries: enquiries@mecanique.co.uk

Mecanique is the exclusive international distributor for the FLASH Lab 77 development systems.



Title		FLASH-LAB 77 DEVELOPMENT BOARD	
Size	Number	Revision	
Legal	1.2		
Date:	26-Mar-2002	Sheet of	1
File:	C:\CAD\SCHEMATICS.Ddb	Drawn By:	B. REYNOLDS