

PCARD-1 Programmer for Microcontrollers and Serial EEPROM's

Quick Start Guide

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TABLE OF CONTENTS

| | |
|---|----------|
| 1. OVERVIEW | 3 |
| 1.1 PCARD-1 Programmer features | 3 |
| 1.2 PCARD-1 Programmer System Components | 3 |
| 2. GETTING STARTED | 4 |
| 2.1 Installation of the Hardware | 4 |
| 2.1 Installation of the Software | 4 |
| 3. USING THE PCARD-1 PROGRAMMER | 5 |
| 3.1 Configuring of the Serial Port | 5 |
| 3.2 Selecting of a Target IC | 5 |
| 3.3 Programming of a Target device | 6 |
| 3.4 Reading a Device | 6 |
| 3.5 Programming of Special Memory PIC MCU | 6 |
| 3.6 Upgrading of the PCARD-1 software | 7 |
| 3.7 Device Programming Limitations | 7 |
| 3.8 Batch Programming | 8 |
| 4. TROUBLESHOOTING | 9 |
| 4.1 Serial Communications Troubleshooting | 9 |
| 4.2 Error Messages | 9 |

1. Overview

1.1 PCARD-1 Programmer features

PCARD-1 is a Low-cost Programmer for Microchip PIC12/16xx Microcontrollers and for Serial EEPROM's. 24xx I²C EEPROMs and 93xx Microwire EEPROMs from Atmel, Catalyst, Fairchild, ISSI, Microchip, Philips, Ramtron, Rohm, Samsung, STMicroelectronics, Xicor are supported. More devices are being added.

PCARD-1 has a 24-pin Zero Insertion Force Socket (ZIF socket) for on board programming of a DIP target IC and one expansion connector for In-circuit programming of a target IC device. 28-pin and 40-pin Microcontrollers can be programmed through optional adapter modules.

PCARD-1 operates through RS232 Serial Port with any IBM PC compatible computer, desktop or portable. PCARD-1 software operates as a Windows (9X, NT, 2000, Me, XP) application on a PC-compatible host system. With the software, the user can display and edit files to be programmed into PIC microcontrollers (MCUs) or into Serial EEPROMs.

PCARD-1 has the following configuration and features:

- Programming of Microchip PIC12/16xxx Microcontrollers and 24/93xx EEPROMs
- 24-pin ZIF socket for on-board programming of a DIP target IC
- 20-pin Expansion connector for In-circuit programming of a target IC
- RS232 Serial Port connector for a communications with a host PC.
- Optically isolated from a host PC for safe operation.
- Single operating unregulated voltage 16 ... 18V
- On-board 13 Volt and 5 Volt regulators
- Dimensions are 2.55 X 3.75 inches (6.48 X 9.51 centimeters).
- 0° to 70°C operating, -40° to +85°C storage temperature range.
- Windows-based program with graphical user interface.
- Program, Read, Verify, Blank Check and Erase operations.
- Hex Editor with Locate and Fill features.
- Full support for Special Function Area, Data Memory, Program Memory.
- BIN and HEX file format support.
- Batch operation

Note: PCARD-1 is designed for prototyping but not for production use.

1.2 PCARD-1 Programmer System Components

The PCARD-1 development programmer system includes:

- PCARD-1 board. Dimensions are 2.55 X 3.75 inches (6.48 X 9.51 centimeters).
- RS-232 Interface cable to connect to any standard PC serial port
- Windows-based PC software with graphical user interface
- 18V power supply

2. Getting Started with the PCARD-1 Programmer

2.1 Installation of the Hardware

An installation of the PCARD-1 programmer hardware is very easy. First the communication cable should be attached, then the power supply should be connected.

The PCARD-1 provides communications with a PC via an RS-232 9-pin connector. RTS and DTR signals of a PC are used as a power source of the PCARD-1 optocoupler.

A straight through RS232 data cable with DB-9 connectors is supplied with the PCARD-1 programmer.

- Connect the cable to an available COM port on PC.
- Check the PC set up to see which communication port is available.
- Connect the cable from your COM port to the PCARD-1 programmer.

PCARD-1 board comes with a 18 Volt unregulated DC power supply. Other power supplies can also be used. External power supply should be able to supply 16 to 18 Volts DC at minimum 200mA current (more if peripheral boards will be used). The inner pin of the supply connector is positive and the outer ring is negative.

Plug the power supply into a power socket and then connect the power supply cable to the PCARD-1 programmer.

WARNING:

- Correct polarity should be observed when applying an external DC supply to PCARD-1 Power connector.
- DO NOT connect power if a target device is in the ZIF socket of the PCARD-1. Damage to the device is possible.

2.1 Software Installation

The PCARD-1 software runs under Windows 95, 98, NT, 2000, Me, XP and Vista.

Latest Windows software can be downloaded from <http://www.bipom.com/piccard.php>.

In order to rule out the possibility of electrical damage of the chips that will be handled by the PCARD-1, these must be inserted **after** selecting device type from the software, preferably when the device placement dialog is shown when a PIC operation is chosen. The chips should be inserted into the socket **exactly** as displayed on this dialog, with the correct orientation, and docked to the correct side. Once any operation on the chip is carried out, it should be removed from the socket immediately. Do not leave the chip in a ZIF socket when a different chip type is selected.

3. Using the PCARD-1 Programmer

3.1 Configuring of the Serial Port

The first thing to do after a start of the PCARD-1 software is a selection of the COM port.

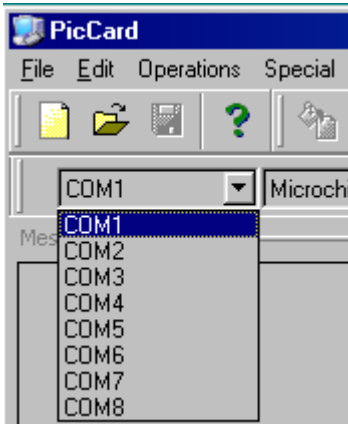


Figure 1

1. Select the COM port for the programmer from the main window of the programmer software (Fig. 1). The Communications Port Setup will be done by the PCARD-1 software automatically.

2. Check the communication between the PC and PCARD-1 board through menu: "Special->Check connection".

3. If PCARD-1 is not detected on the selected COM port, an error message appears on the messages window of the application. Try to select another COM port and retry the check of the communication.

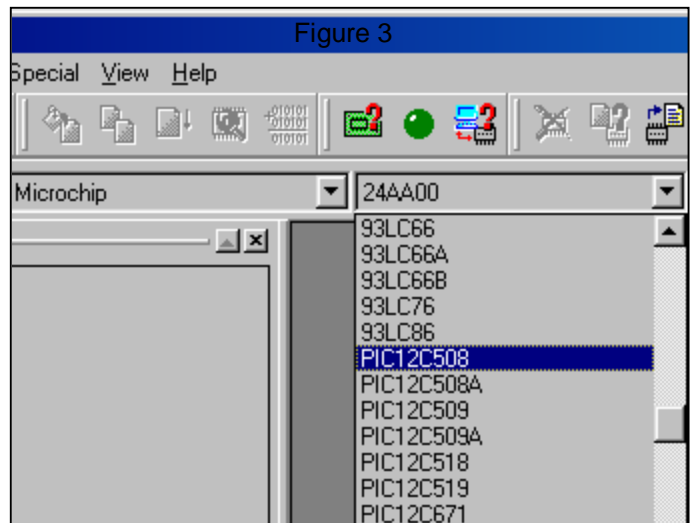
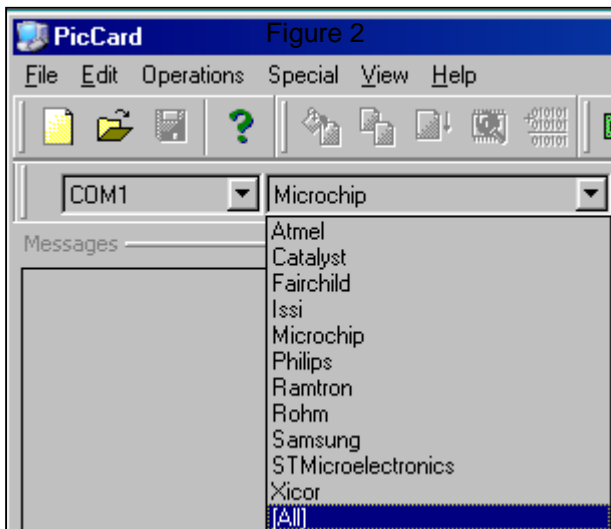
4. If you cannot establish communications between the PC and PCARD-1, please make sure that PCARD-1 is powered.

PCARD-1 Programmer software uses COM1 as the default serial port. If you change the serial port selection, then the next time you run your programmer, the software will use the serial port used in the previous session and you do not need to change the port selection again.

3.2 Selecting of a Target Device



Before selecting a target device, make sure that there is no target device on the ZIF socket of PCARD-1.

Select the manufacturer of the target device if it is known or otherwise select "All" (Fig.2). Then select the target device from the list (Fig.3).



3.3 Programming of a Target Device


Please follow the steps below to program a target device:

- Make sure that the PCARD-1 board is connected to your PC and the target device is not yet inserted in a ZIF socket.
- Run PCARD-1 programmer software and select the target chip.
- Open BIN or HEX file with the code to be programming (Menu: "File"/"Open"). File size is set automatically to fit the selected chip size.
- Insert the target chip to a ZIF socket of the PCARD-1 board and check that the device is completely blank (all bits are set to a "1"). For a PIC MCU this will also check that all configuration bits are set to a "1" (unprogrammed state).
- Edit binary data in byte, word, or ASCII mode if it is necessary.
- Write data to chip (Menu: "Operations", "Write chip" or click the button  on the tool bar)
- Verify the data (compare file with chip contents) through Menu: "Operations", "Verify chip" or click the button  on the tool bar.

3.4 Reading a Device

This is a useful feature to make a copy of the target device.

Follow these steps to perform read operation:


- Make sure that external board is connected to your PC and the target device is inserted in socket.
- Click "Read chip" toolbar button. 
- Check the target device position on the ZIF socket.

You will be asked which memory types to read. Select all the desired types and click 'OK'.

PCARD-1 will connect to the board and a popup window will show the progress. If reading is successful, a new HEX file with the read data will be opened.

Now it is possible to save the file (Menu: "File", "Save As ...") and then this data can be used as a source for programming of another target chip.

3.5 Programming of Special Memory PIC MCU

PCARD-1 allows to easily set special settings supported by different chip types. Device Configuration are usually stored in the chip special memory to set particular operation modes. You can set these by editing the entries in "Special" tab of the hex file, but PCARD-1 provides you more easy way. By clicking toolbar button "Special features"  you can open a dialog with special settings for the current chip.

The example of the Device Configuration dialog for PIC16C84 is shown on Fig.4.

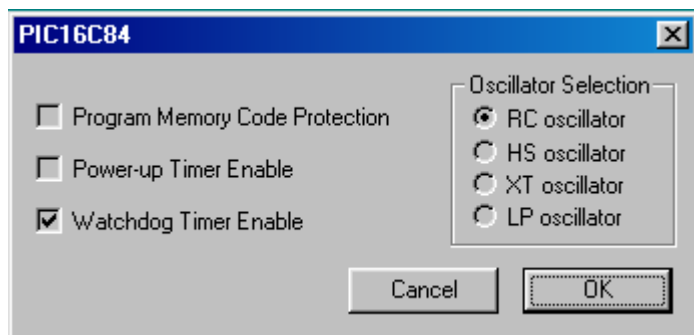


Figure 4

3.6 Upgrading of the PCARD-1 software

Free software upgrades are possible through <http://www.bipom.com/piccard.php>.

Upgrade of the PCARD-1 firmware is possible through the same web link.

3.7 Device Programming Limitations

PCARD-1 programmer supports programming Microchip PIC12/16xx Microcontrollers and 24xx/93xx Serial EEPROM's (DIP-8 ... DIP-18 packages only). Adapters are available for DIP-28 and DIP-40 devices. More devices and adapters are being added.

In-circuit programming of a target device is possible also through the expansion connector. Figure 5 shows the expansion connector pins that are used for in-circuit programming of external PIC microcontrollers.

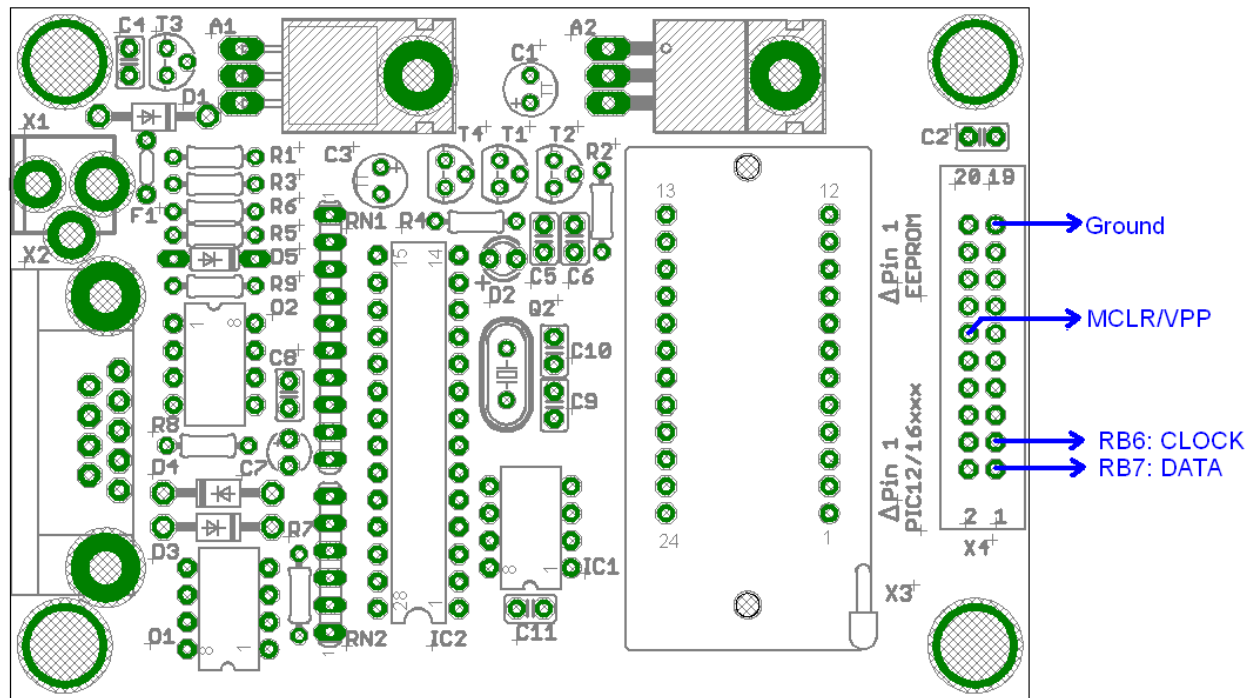


Figure 5

The PCARD-1 is designed for prototyping and firmware development but not for production use.

For all memory except configuration bits (that are not code protected), it is possible to program from 1 to 0, but not from 0 to 1. In the last case you have to erase and then to program.

3.8 Batch Programming

PCARD-1 has a useful batch programming mode that allows you spawn the software from a batch file (or Windows command line) and program, read and verify target devices. The executable file piccard.exe accepts some command line arguments for this purpose. The syntax of batch programming:

```
piccard.exe SILENT cmd=<command> chip=<target device type> port=<COM port> file=<filename>
```

Erase Example:

```
piccard.exe SILENT cmd=E chip="PIC16F819" port=1 file="1.HEX"
```

(A dummy hex filename must be specified even though the Erase operation does not need)

Write Example:

```
piccard.exe SILENT cmd=W chip="PIC16F819" port=1 file="1.HEX"
```

This example programs the target device (PIC16F819) with contents of file 1.HEX using a PCARD-1 connected to serial port COM1.

Verify Example:

```
piccard.exe SILENT cmd=V chip="PIC16F819" port=1 file="1.HEX"
```

This example verifies the contents of the target device (PIC16F819) against contents of file 1.HEX using a PCARD-1 connected to serial port COM1.

On success, piccard.exe returns 0. On error, the return is value greater then 0. A batch file calling piccard.exe can check for return value.

Read command is not supported at this time for command line operation.

Thank you for your purchase of the PCARD-1 Programmer.

4. Troubleshooting

4.1 Serial Communications Troubleshooting

Make sure that the RS-232 cable is connected, the power supply is connected and the yellow power LED on the programmer board is ON during the READ/WRITE/VERIFY operations.

Try to connect the programmer to a different COM port.

4.2 Error Messages

The following are the most common error messages that may be reported by PCARD-1.

▶ **Chip not selected**

Before performing an operation, the chip type was not selected. Use the manufacturer and device lists on the toolbar to select the chip type.

▶ **Port can not be opened**

The serial (COM) port that you selected may be in use by another application. Try to close that application or select another port.

▶ **No connection**

PCARD-1 can not establish connection with external board. Make sure that the serial and power cables are plugged.

▶ **Error sending data to port**

An error occurred while writing data to the board. The problem might be with cable connections or port settings.

▶ **No response from the board**

This usually means that the board is not connected to PC.

▶ **The board reported failure of the operation**

Communications with the board was established, but for some reason operation was not successful. Usually it happens when the board detects checksum error. Try repeating the operation again.

▶ **Error in checksum**

PCARD-1 detected a checksum error. Try repeating the operation again.

▶ **Error reading data from port**

This error occurs while reading data from board. The problem might be with cable connections or port settings.