USER'S MANUAL

Getting started with

ALEXAN ATMEL

AT89C2051/4051

Programmer

VERSION 2

About This Guide

In this User's Manual, it is assumed that the user is familiar with the Microsoft Windows operating environment. This includes an understanding on how to:

1. Use a mouse or other pointing device to click, double click, drag and select information
2. Scroll using scrollbars
3. Open and close program in Microsoft Windows
4. Type using a computer keyboard
5. Navigate or selecting menus and submenus

It is also assumed that the user is familiar in microcontroller programming either in C or assembly language. The user must have knowledge on compiling/debugging source codes and is well aware of some electronic terms and numbering system. Moreover, it is also assumed that the user is knowledgeable on the standards and safety precautions in operating electronics hardware and correct handling of microcontrollers.

I. Overview

This user manual will guide you in using ALEXAN ATMEL Device Programmer Software.

This software can program the ATMEL AT89C2051 and AT89C4051 microcontroller.

It has a comprehensive set of features that allows you to view, program, erase and secure the data of an ATMEL microcontroller. Equipped with a computer-interface, the computer-interface software allows you to:

1. Load or open hex files containing the code you want to program to the device.
2. Read the hex code from the device and store it in the program buffer for editing or saving.
3. View and edit the hex codes in the program buffer.
4. Save any changes made in the program buffer to a hex file for use with other devices.
5. Check the device ID.
6. Erase all the data in the device.
7. Blank check the device.
8. Program the hex codes found in the program buffer to the device
9. Verify the programmed hex code in the device
10. Protect the device from accidentally reprogramming by locking the device so that the code cannot be read from it.

For more information about ATMEL microcontrollers, please visit ATMEL's website at http://www.atmel.com to download datasheet and technical notes.

II. Installation

To install the ALEXAN ATMEL Programmer computer-interface, do the following:

1. Insert the CD containing the ALEXAN ATMEL Programmer into the CD-ROM.
2. Run the **setup.exe** file.
3. Follow the instructions given during setup.
4. After the installation is finished, click **ok.**
5. To run the ALEXAN ATMEL Programmer, go to:

   Start → Programs → ALEXAN ATMEL Programmer

III. Getting Started

What You Need To Get Started

1. Personal Computer with CD-ROM and serial or USB port
2. ALEXAN ATMEL Programmer Software
3. ALEXAN ATMEL Programmer Module
4. RS232 Serial Cable Or a USB to COM/Serial cable.

   Note: To create your own RS232 serial cable, connect PIN2 to PIN 2, PIN3 to PIN3 and PIN5 to PIN5.
5. 12 to 16Vdc Power Adaptor
6. AT89C2051 or AT89C4051 ATMEL Microcontroller (or MCU)
7. Any debugger/compiler software where you can write your source code and compile it to a hex file format
8. A Hex file

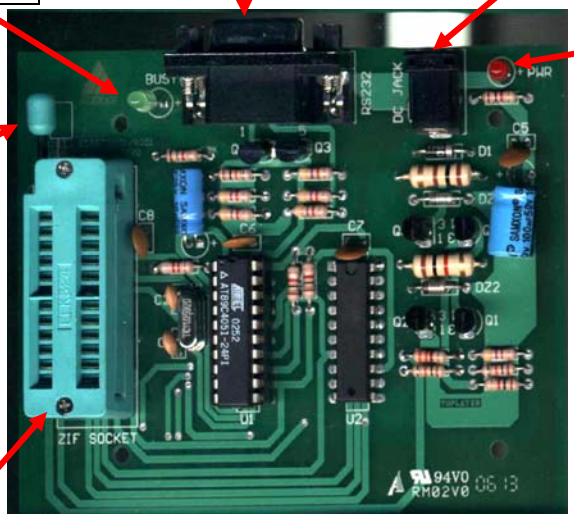
IV. ALEXAN ATMEL Programmer Module

RS232 connection; Must be connected to the computer using serial cable.

DC Jack for 12 to 18Vdc 500mA Adaptor

Busy LED; Blinks during programming.

Power Indicator



This lever must be lowered down during programming to hold the MCU in place.

ZIF socket. Insert your MCU here. Pins 10 and 11 of MCU (located at lower bottom) must be connected to the bottom-most pins of the ZIF socket (pin 12 & 13).

V. ALEXAN ATMEL Programmer Computer-Interface Software

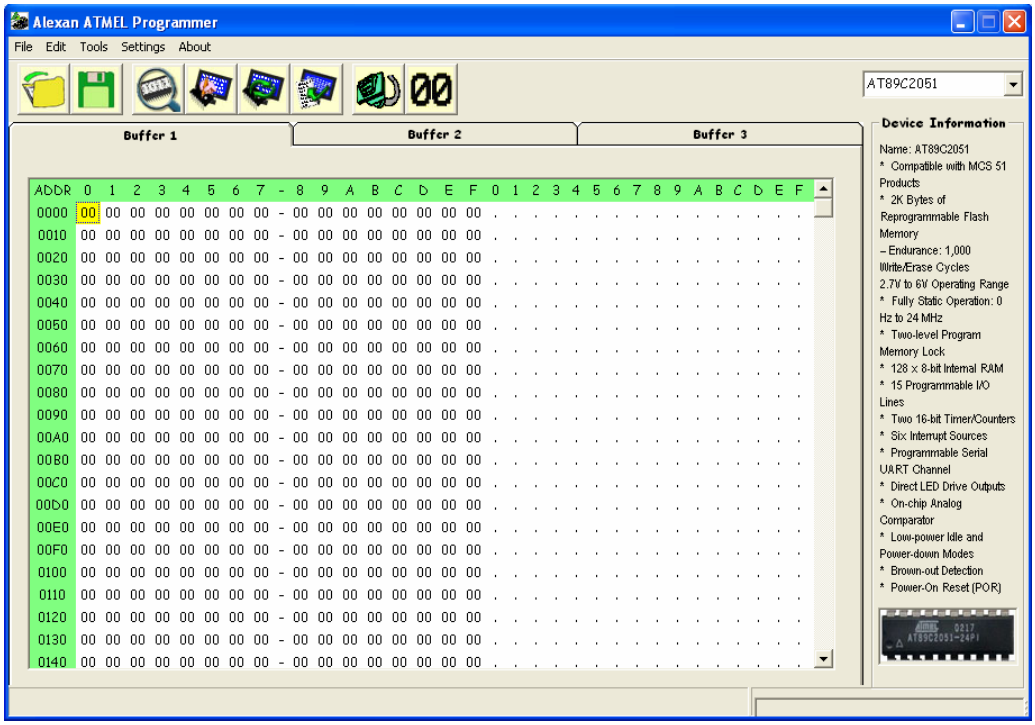


Figure 5.1: Programmer Computer-Interface Software

Once the program has been successfully installed, you are ready to run the program. After starting the programmer software, you will see the window as shown in Figure 5.1. Menus and submenus, toolbar buttons and shortcut keys are provided for ease of navigation.

VI. How To Program A Device

To program a device, do the following:

1. Connect the Programmer module to the serial port of your computer.
2. Plug the DC jack of the adaptor to the Programmer module then plug the adaptor to the AC outlet to turn on the power.
3. Insert the AT89C2051 or AT89C4051 device to program in the ZIF socket of the Programmer module.
4. Run the ALEXAN ATMEL PROGRAMMER software.
5. At startup of the software, it will automatically search for and connect to the serial port the Programmer module is connected to.

   Alternately, you may select the serial port to connect to by selecting the **Serial Port Setup** (press F9). After selecting the appropriate COM port, press OK. The programmer will then search for your Programmer module. If a connection failure occurs, either you do not have a COM port available or another application is using the COM port you selected.
6. Choose **AT89C2051** from the dropdown box (press F11) to program AT89C2051 MCU or **AT89C4051)** (press F12) to program AT89C4051 MCU. Make sure that the selected IC in the software matches that of the IC you have inserted in the Programmer module. Information about the device you choose is shown on the right side.
7. Open a hex file (*.hex). On the **File** menu, click **Open File**. Make sure that your compiler generates a hex file from your source code since the programmer will only allow a valid hex file format with a *.hex extension to be opened. The hex code is shown on the current active buffer tab. A maximum of 3 files may be opened.
8. To edit the programmer buffer, click the desired address and change the value that you want by typing any hex values from 00 to FF.
9. To save the codes in the program buffer of the current tab to a hex file, on the **File** menu, click **Save File** (press CTRL+S).
10. To program, on the **Tools** menu, click **Program Device** (press F5).

A form is displayed as shown in Figure 6.1. It contains an auto program function where you can still check and uncheck programming options available. Go to Chapter 6 for the detailed description of each option.

Click **Run** to start programming.

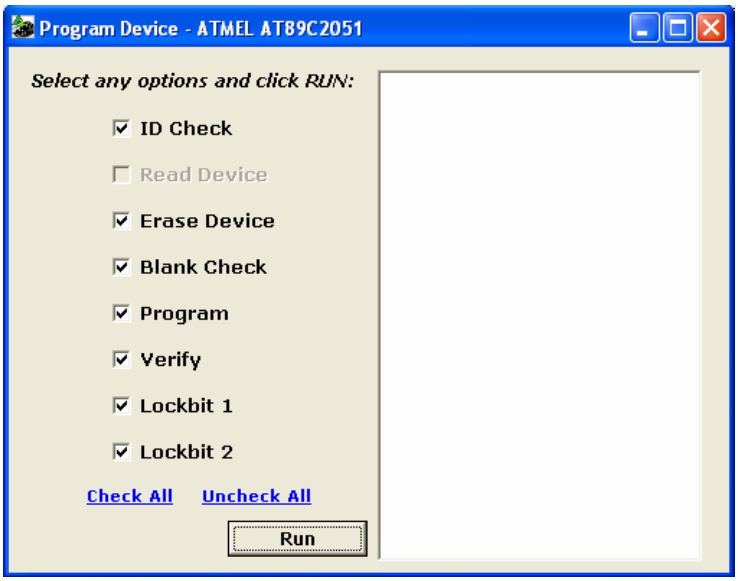


Figure 6.1: Program Device Form

VII.Programming Options

ID Check

AT89C2051 and AT89C4051 is the only recognized MCU and each has its unique ID. The **ID Check** option will verify if you have inserted a correct MCU to your Programmer module. Make sure that the device you have selected in the Programmer software must match with the one you are programming. In cases where the ID code of your MCU has been damage, you can still program by unchecking this option.

Erase Device

The **Erase Device** option will erase the entire PEROM (Programmable Erasable Read Only Memory) array of your MCU.

Blank Check

The **Blank Check** option will check if the entire PEROM array has been erased.

Program

The **Program** option will write the hex codes in the software's programmer buffer into your microcontroller.

Verify

The **Verify** option will check if the microcontroller has the same hex codes with that of the programmer buffer's hex codes.

Lockbit 1

The **Lockbit 1** option will protect your MCU from reprogramming. The microcontroller cannot be reprogrammed unless it is erased first.

Lockbit 2

The **Lockbit 2** option will hide the data bytes of your microcontroller. It is used for security purposes so that other users cannot copy what is inside your MCU. Take note that Lockbit 2 requires that you select also Lockbit 1.

VIII. Other Features

Fill

To fill certain addresses of the buffer/s with a specific data, you can use **Fill** rather than manipulating each data one by one. Just check which buffer tabs you want the **Fill** to apply. On the **Tools** menu, click **Fill** (press F3). The **Fill** form is shown in Figure 8.1.

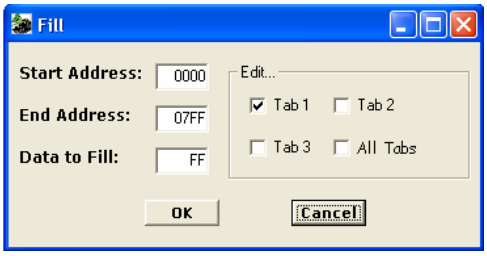


Figure 8.1: Fill Form

Read Device

If you want to know what is programmed in the MCU, you can read and view the data bytes for each address - 00h to 7FFh for AT89C2051 and 00h to FFFh for AT89C4051). On the **Tools** menu, click **Read Device** (press F4). A form is displayed as shown in Figure 8.2.

Select **Run** start reading. You can uncheck the ID Check box if the ID code of your MCU is damage. Open the programmer buffer to view the read data.

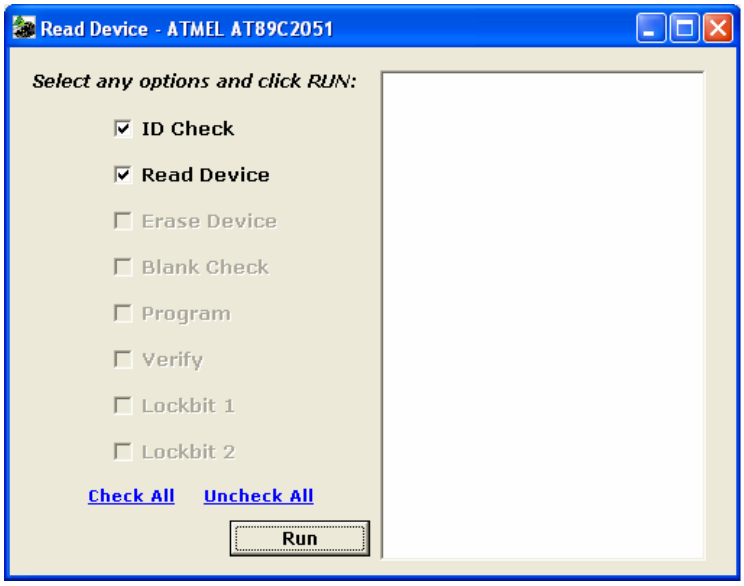


Figure 8.2: Read Device Form

Compare

The **Compare** option allows you to see the differences between the data byte written in your MCU and the data bytes currently loaded in the programmer buffer. On the **Tools** menu, click **Compare** (press F6). The programmer will read the entire PEROM array of your MCU and, then, compare it with the data on the programmer buffer. All differences will be displayed in the grid as shown in Figure 8.3.

To save the differences, click **Save to File**. The file is saved in a text file format (*.txt format) containing the difference between the device data and programmer buffer data together with its address.

Figure 8.3: Compare Device Form

Unused Bytes

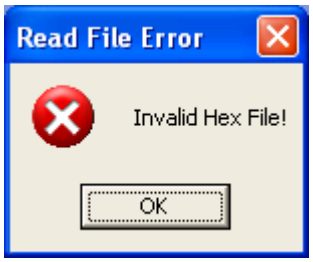
Default unused bytes set is 00. To change the unused bytes between 00 and FF, go to **Settings** menu, then, select **Unused Bytes.** Click **00** (press CTRL+F1) or **FF** (press CTRL+F2) for the desired unused bytes to use.

Disassemble

The corresponding assembly code of the hex file on the current buffer tab may be viewed by selecting **Disassemble** on the **Tools** Menu (press F3). You can then save the disassembled file as a *.txt file. The disassembled file is not guaranteed to run when you compile it on your editor.

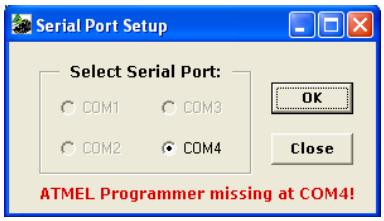
IX. Troubleshooting

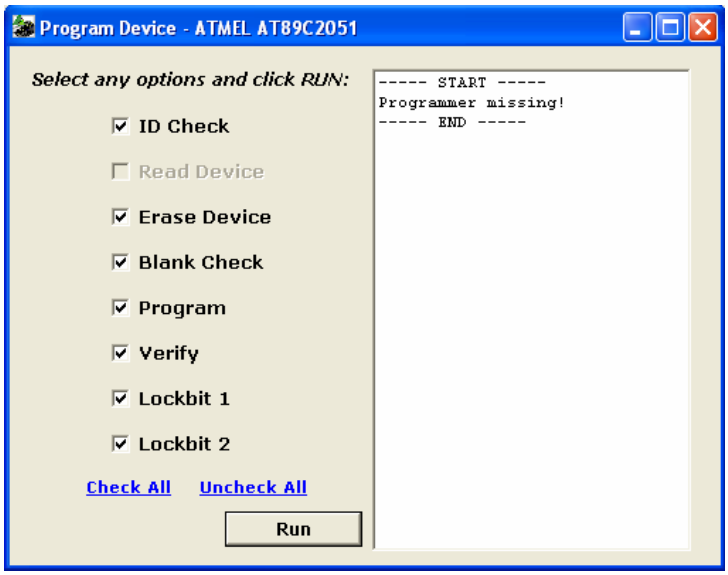
Invalid Hex File!



This occurs if the hex file you are attempting to load is not a valid hex file.

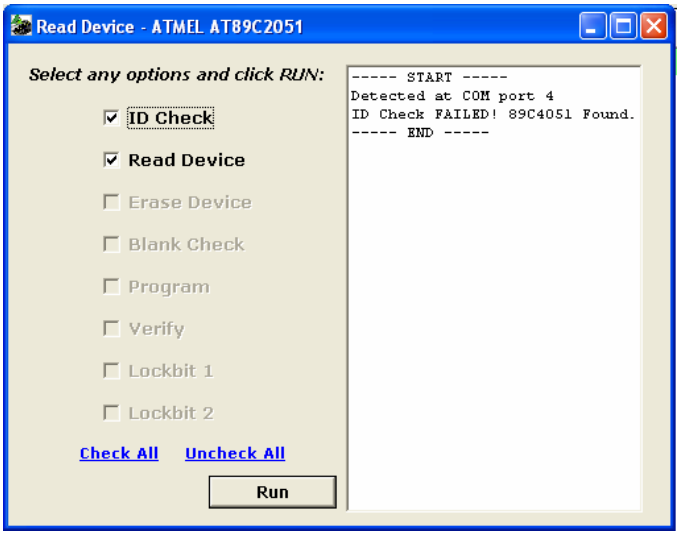
Programmer Missing!





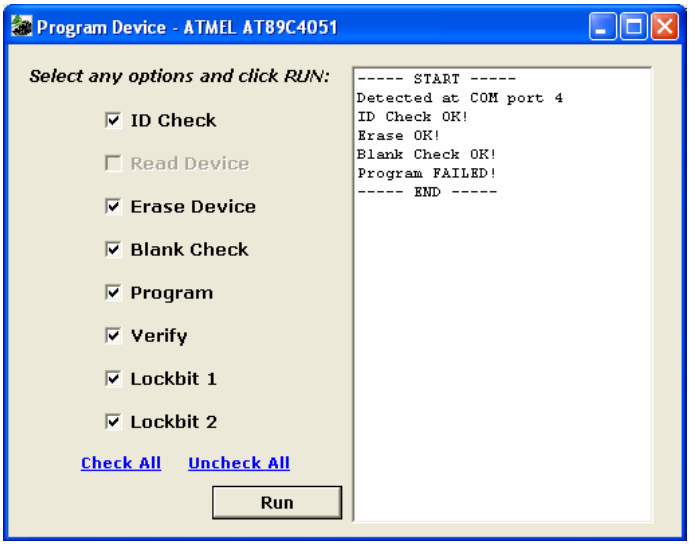
This occurs if: (1) Programmer module is turned off; (2) serial cable is not connected and/or is damaged; or (3) other application is using the same COM port. Configure your serial port so that during programming it can be used only by the Programmer software and is located between COM1 to COM4.

ID Check Failed!



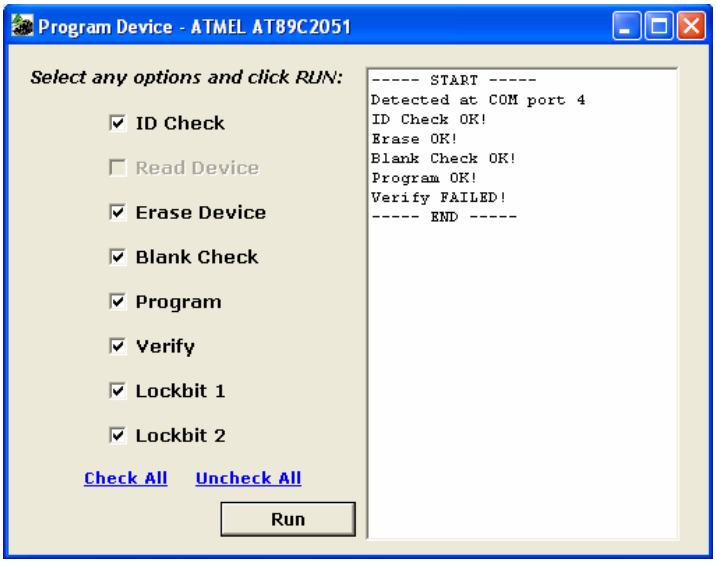
Check if the MCU you selected in the **ATMEL Device Use** option is the same with the MCU that you have inserted in your programmer module. Check for the correct insertion of the MCU. Check if the ZIF socket knob has been locked.

Program Failed!



Check if the power is turned on. Make sure the MCU is inserted properly into the ZIF socket. Reinsert MCU if necessary.

Verify Failed!



Be sure that the ZIF lever is in lock position. Check if the power is turned on. Check if the MCU is inserted properly. Make sure that the serial cable is working properly. Reconnect MCU and program again. Please note that if the MCU has reached its 1,000 erase/write cycles, it can no longer be programmed. In some other cases, MCU had been damage, and therefore it is not capable of reprogramming. Check the ATMEL datasheets for the correct handling of your MCU.