



MEMKey Programming Software

Windows Programming Software

*MEMKey specific

*Intuitive interface



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Introduction

The MEMKey Programming Software is an integrated Windows environment designed specifically for programming and interfacing to the Solutions Cubed MEMKey keypad encoder. The software allows access of all of the MEMKey's special functions and programmable features. This enables the MEMKey to be rapidly configured in a prototype environment or programmed in mass quantities in a production setting. Because of the Windows nature of the product, the user interface is intuitive and easy to use.

System Requirements

The MEMKey Programming Software requires an IBM PC or compatible computer running Windows 95 or higher. An 80486 processor, hard drive, mouse, and 16 megabytes of RAM are required. 5 megabytes of free hard disk space is necessary to store the program. A VGA monitor with resolution of at least 640X480 is necessary. A CD-ROM drive is necessary in order to load the software.

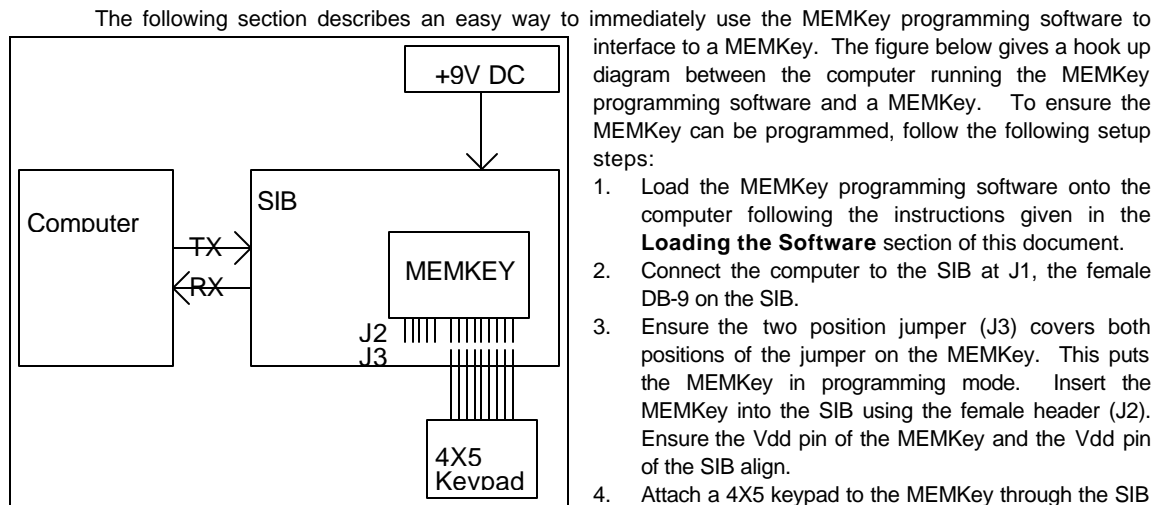
In addition, the MEMKey programming software communicates to the MEMKey via a COM port on the computer. As such, one free serial port is necessary to use the software. Because a COM port sends and receives data at RS-232 voltage levels, a level converter is necessary to convert the RS-232 voltage levels of the computer to and from the TTL voltage levels of the MEMKey. The Solutions Cubed Serial Interface Board (SIB) is one such device. This document assumes the use of an SIB throughout, so reference to the SIB data sheet would be helpful.

Loading the Software

After ensuring the computer meets the requirements for the MEMKey programming software, the software may be loaded onto the computer in question. Use the following steps to load the software. The software must be installed using the SETUP program which is included on the distribution CD. To install the MEMKey programming software:

1. Run Windows.
2. Insert the MEMKEY programming software into the CD-ROM drive.
3. From the START Menu select "Run".
4. Use the "Browse" button to find the CD-ROM drive.
5. Double click on the "SETUP" icon.
6. The path to the "SETUP" program should be in the path box of the Run window. If it is not, repeat steps 4 and 5. If that still does not work, manually type in the path to the setup program.
7. Click the "OK" button in the Run window.
8. Follow the instructions on the screen.
9. The MEMKey programming software has now been successfully loaded onto your computer.
10. To run the software, click on the "The MEMKey, by Solutions Cubed" icon located in the "START → Programs" menu.

Quick Start



1. Load the MEMKey programming software onto the computer following the instructions given in the **Loading the Software** section of this document.
2. Connect the computer to the SIB at J1, the female DB-9 on the SIB.
3. Ensure the two position jumper (J3) covers both positions of the jumper on the MEMKey. This puts the MEMKey in programming mode. Insert the MEMKey into the SIB using the female header (J2). Ensure the Vdd pin of the MEMKey and the Vdd pin of the SIB align.
4. Attach a 4X5 keypad to the MEMKey through the SIB using the male header (J3).
5. Power the SIB by plugging the 9V wall plug into J5, the female receptacle. Ensure the green LED on the SIB lights up.



1. Run the MEMKey programming software on the computer. The screen capture below shows what should appear on the computer monitor. Note all of the keys are greyed out, this indicates that there is no current programming information loaded in the software. The lower right corner indicates the firmware version of the MEMKey which is currently being programmed (in this example, version 13 of the firmware).

The MEMKey programming software tries to automatically detect the COM port that the SIB is attached to. If it can't find it, an error box will appear. Once the software starts running, the COM port can be selected manually.

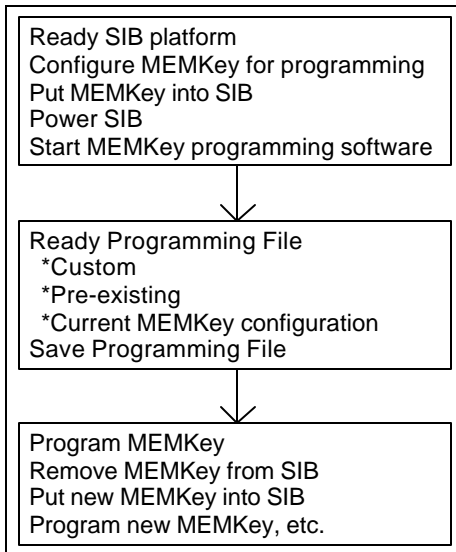
Main programming screen

7. Use the “File → Load Values From MEMKey” command to download the current settings of the MEMKey in the SIB board. At this point the two red LEDs on the SIB board will flash, indicating communication. After a few seconds, the buttons on the screen will no longer be greyed out and all of the values will be lit up. Valid communication has been established with the MEMKey through the MEMKey programming software. Now various programming options can be explored using the software and the SIB.

Programming Software Operation

The software is setup to be used as a programmer. As such it is setup to allow for all of the MEMKey's attributes to be entered and then programmed all at once to the MEMKey. The steps to use the programmer are given in the flow chart below. The first block in the flow chart is covered in the **Quick Start** section of this data sheet. The rest of the flow chart will be covered in this section.

After readying the MEMKey for programming, powering up the SIB, and starting the programming software, the first step is to configure the settings of the MEMKey that need to be programmed. This can be done in one of three ways: custom configuration; use a pre-existing programming file; or read the data from the MEMKey in the SIB and use that data to program further MEMKeys. All three will be discussed below. For details on all of the configuration of the MEMKey values see the MEMKey data sheet.



Custom Programming File

The MEMKey is a fully configurable keypad encoder and the programming software allows the access to all of the MEMKey's customizable features. There are seven specific items that must be configured in the programming file:

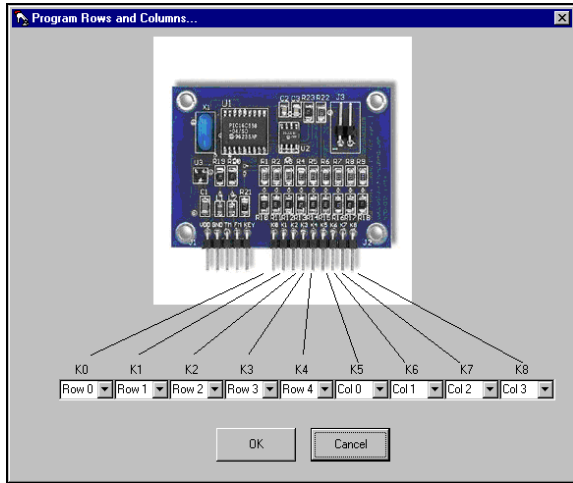
1. Rows and Columns
2. User EEPROM
3. Serial Key Values
4. PC/AT Key Values
5. Typematic setup
6. Debounce settings
7. Configuration

Each of these items will be discussed in detail below.

Rows and Columns: The MEMKey has fully customizable row and column settings for its 4X5 matrix. This allows the MEMKey to interface to most off-the-self keypads with a straight across header without the use of complex connectors. To program the row columns into the MEMKey start from the main programming screen and then go to the “Tools → Modify Rows and Columns” menu. The screen below will appear over the standard software screen.

Each of the KX pins on the MEMKey has a pull-down menu associated with it. This allows each pin to be individually programmed from ROW0 → ROW4 or COL0 → COL3. In order to ensure the correct MEMKey operation, all pins must be expressly assigned and they must all be unique. If two pins are assigned the same value (for instance ROW1), and the “OK” button is pushed, an error pops up letting the user know that the rows and columns have been incorrectly specified.

After assigning all of the rows and columns, pressing the “OK” button assigns the displayed values for rows and columns for the current programming cycle. The rows and columns programming screen then disappears. Pressing the “Cancel” button cancels all of the changes made and closes the rows and columns programming screen.

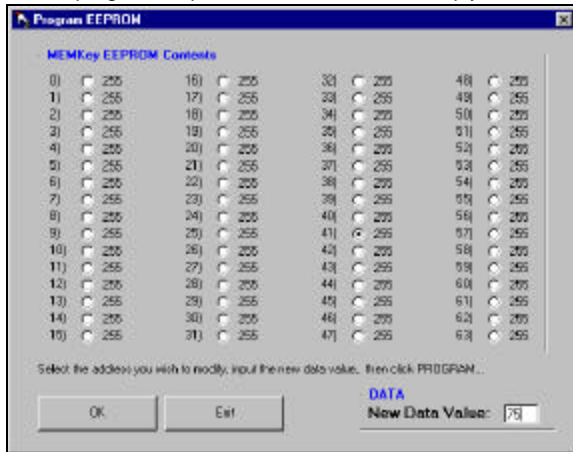


Values cannot be typed into the KX values. The pull down menus must be used.

Rows and Columns Programming Screen

User EEPROM: The MEMKey has 64 bytes of EEPROM which may be accessed by the user over the serial lines. These can be used for calibration, serial numbers, etc. To program the EEPROM with the MEMKey programming software start in the main programming screen and then go to the “Tools → Modify EEPROM” menu. The screen to the left will appear.

To program a specific EEPROM value, simply select a bubble and then fill in the data from 0 to 255 in the “DATA” window in the lower right.

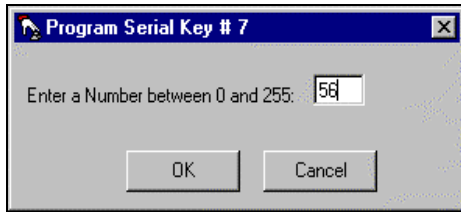


In this case, the diagram shows location 41 being programmed with the value of 75. To load the value, press the “OK” button. If a value larger than 255 or a non-numerical number is entered, the value is ignored and the program tells the user that the value is invalid.

After the EEPROM is setup to be programmed, exit the screen by pressing the “EXIT” button. This saves the changes made and returns to the main programming screen.

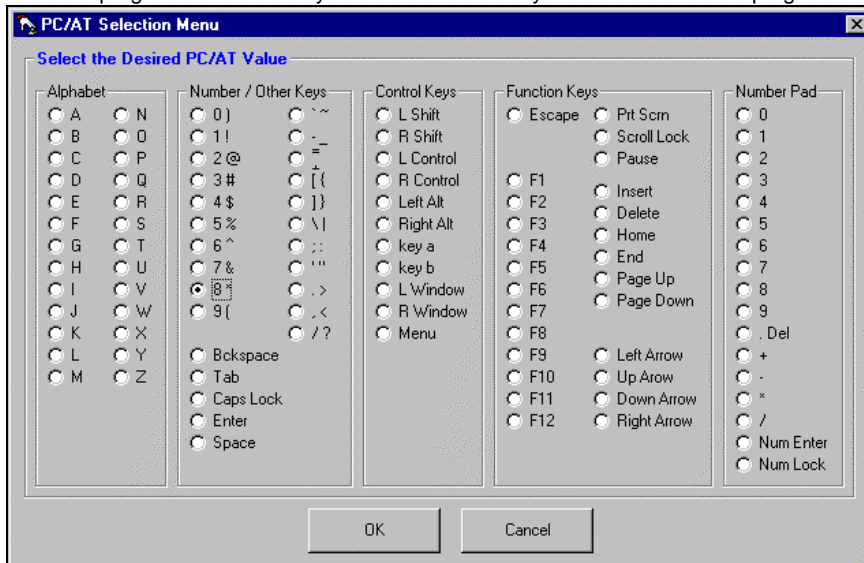
EEPROM programming screen

Serial Key Values: If the MEMKey is used in the serial mode, these are the values that will be returned with each key press. To program the serial keys click the "Serial Keys" bubble in the main programming screen. The key matrix will display the values that each key will return when pressed. To change a value click on the key in question in the main programming window. A window like the one to the left will appear. Enter in a value from 0 to 255 and press the "OK" button. The key in the main programming window will now display the new value. To cancel the selection simply hit the "Cancel" button and the serial key programming window will disappear and the key value will not be changed. The



window above shows that key #7 will be programmed to return a decimal 56 when pressed. If a value larger than 255 or a non-numerical value is entered, the programming window will not accept it and the program window tells the user that an erroneous value has been entered.

PC/AT Key Values: If the MEMKey is used in the PC/AT mode, these are the values that will be returned with each key press. To program the PC/AT keys click the "PC/AT Keys" bubble in the main programming screen. The key matrix will



display the values that each key will return when pressed. To change a value click on the key in question in the main programming window. A window like the one above will appear. To change the value simply click the bubble for the desired value and then press the "OK" button. In the case above, the key will be programmed to return the "8*" when pressed. Pressing the "Cancel" button returns to the main programming screen without loading the key value.

Typematic Setup: The default typematic rate and delay can be set using the slides in the main programming window. Simply move them to the desired position. The “Enabled” and “Disabled” buttons refer to the serial key reporting. In PC/AT mode typematic key action is always on. In serial mode typematic action is toggled on and off by selecting the appropriate bubble.

Debounce Setup: The debounce rate for key presses and releases can be set using the slide in the main programming window. Simply move it to the desired position.

Configuration: The key reporting mode can be selected in the main program mode using the “Automatic Mode” bubbles. In PC/AT mode the key reporting is always automatic. In serial mode, the “On” bubble enables the MEMKey to report a key press as soon as it happens, while the “Off” bubble sets the MEMKey to wait for a host to poll it before sending key information.

Saving the File

After the custom programming file is created, save it using the “File → Save As” command. The file is simply a text file with the *.MKY extension.

Programming the MEMKey

After the programming file is loaded, simply press the “Program All Current Values to MEMKey” button in the lower corner of the main programming screen. Every value that can be programmed to the MEMKey will be programmed to the MEMKey and verified. After the programming bar disappears, the MEMKey is programmed and another MEMKey can be programmed.

Loading a Pre-Existing MEMKey file

A pre-existing MEMKey file can be loaded using the “File → Open MEMKey Program File” menu from the main programming screen. Loading the file will overwrite all current data in the MEMKey programming software. By default this file is read only, so the only way to save changes is to use the Save As command rather than the Save command. When opening the file, the read only option can be disabled by un-checking the “Open as read only” box at the bottom of the open file dialog box.

Using the Current MEMKey Configuration

To read the programmable values of a MEMKey, use the “File → Load Values from MEMKey” menu in the main programming window. This will read all of the values from the current MEMKey and load them into the MEMKey programming software. These values can then be saved in a program file, or perused to check the configuration of the MEMKey

Selecting a Different COM Port

It may be necessary to change the COM port of the MEMKey programmer on the fly. To do this use the “Tools → Select Comm Port” menu from the main programming screen. The greyed out selections are not available, while the bold selections are free COM ports that may be used. To select a new one, simply highlight the new COM port and click it. The new COM port is now selected.

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