ROM Emulator for USB

EeRom-8U User's Guide

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INTRODUTION AND REQUIREMENT

I. INTRODUCTION

EeRom-8U ROM Emulator is aimed at developers who focus on making ROM based programs and data including embedded systems, BIOS, video games, robotics, printer drivers, graphic controller, postscript interpreters, character font libraries, and other ROM based application. In general, the emulator is used during program and data developing period to eliminate the frustration of repeated EPROM burn-erase cycles. EeRom-8U ROM Emulator easily plugs in place of the ROM through the emulator's target adapter.

Other ROM Emulators can emulate only EPROM. But EeRom-8U ROM Emulator can emulate many types of memories (EPROM, Flash-ROM, EEPROM, NVRAM) currently used. So EeRom-8U ROM Emulator can be called a "memory emulator". Also EeRom-8U can properly operate with user's board using 8bit/16bit/32bit data bus. EeRom-8U ROM Emulator adopts USB interface. This helps the user to have faster communication speed than the parallel port. From this, the user can enormously reduce the developing time and adopt high speed SRAM(15ns) for matching well with high speed RISC and CISC CPU.   Therefore both professional and novice program developers will find that EeRom-8U ROM Emulator can be an exceptional valuable tool.

< The Characteristics of EeRom-8U >

① High speed USB interface (Supports Plug & Play)

② 1M Byte (8M bit) / sec download speed

③ Supports 8bit data bus by itself

④ Uses 1MB high speed memory for proper emulation
   : 15ns high speed SRAM

⑤ Supports EeRom-8U without outside electric power supply

⑥ Convenient software environment: supports Windows/9598/ME/2000/XP

⑦ Supports hex (Intel/Motorola type), binary file format

⑧ Disassembling function supports 11 CPU types

⑨ Safety circuit against inverse insertion

II. SYSTEM REQUIREMENTS

The requirements to use the Windows graphical application are:

■ Processor: IMB PC or compatible, Pentium / 100 MHz or better

■ RAM: 5 MB

■ DISK: 5 MB

■ Port : USB

■ OS: Windows 98/ME/2000/XP

■ Floppy drive for installation (unless obtained on the Internet, www.eetools.com

■ OS: Windows 98/ME/2000/XP

TARGET SYSTEMS

Your target board requires the following memory type for proper emulation with EeRom-8U. The basic EeRom-8U unit supports 8Mbits with 45NS memory.

	EeRom-8U For supporting EEU100s needed	Software Setting for Target Memory (Memory Type)	
EPROM **DATA : 8BIT**	27C64	EPROM (2764)	8K
	27C128	EPROM (27128)	16K
	27C256	EPROM (27256)	32K
	27C512	EPROM (27512)	64K
	27C010	EPROM (27010)	128K
	27C020	EPROM (27020)	256K
	27C040	EPROM (27040)	512K
	27C080	EPROM (27080)	1M
EEPROM **DATA : 8BIT**	2864	EEPROM (2864)	8K
	28512	EEPROM (28256)	32K
FLASH ROM **DATA : 8BIT**	29512	FLASH (29512)	64K
	29010	FLASH (29010)	128K
	29020	FLASH (29020)	256K
	29040	FLASH (29040)	512K

Supported PLCC Socket	PLCC 32 Pin; ADP28:32PLCC-TO-28DIP, ADP32:32PLCC-TO-32DIP)

Memory Type	Size (Bytes)	Supported Memory
2764	8K	2764/A, 27C64, 27HC64
27128	16K	27128/A/B/D/DI, 27C128
27256	32K	27256, 27C256, 27H256, 27BV256, 27LV256
27512	64K	27512/AS, 27C512, 27LV512
27010	128K	27C010, 27H010, 27HB010, 27LV010/A/L
27020	256K	27C020, 27BV020, 27LV020, 27LC020, 27SF020, 27E020
27040	512K	27040, 27C040/Q, 27BV040, 27LV040
27080	1M	27C080, 27LV080
2864	8K	2864A/AE/B/BE, 28C64/A/AX, 28HC64/B, 28PC64/E, 28BV64, 28LV64/B
28256	32K	28C256, 28HC256
29512	64K	29C512, 29EE512/A, 29SF512
29010	128K	29010/L/V, 29C010A, 29F010/A/B, 29EE010/A,29SF010
29020	256K	29C020, 29EE020/A
29040	512K	29040/A/L/AL/V, 29F040/B
29080	1M	Special port is required.

# Chapter

2

SETUP AND INSTALLATION

I. USB DRIVER SETUP AND INSTALLATION

1. To Install USB Driver

If you are the first time user, when you connect EeRom-8U and USB Cable, PC will install Hardware Wizard by Plug and Play function in order to find the corresponding drive. As following the Hardware Wizard, choose **ERUSB.INF** provided with the instrument and install the driver. Afterwards, the program is saved to your PC so that whenever you connect EeRom-8U, the PC automatically finds the corresponding driver and installs it.

2. To Install EeRom-8U Software

1). Run the **SETUP.EXE** file located on the provided install version program, then a startup screen appears as shown below.
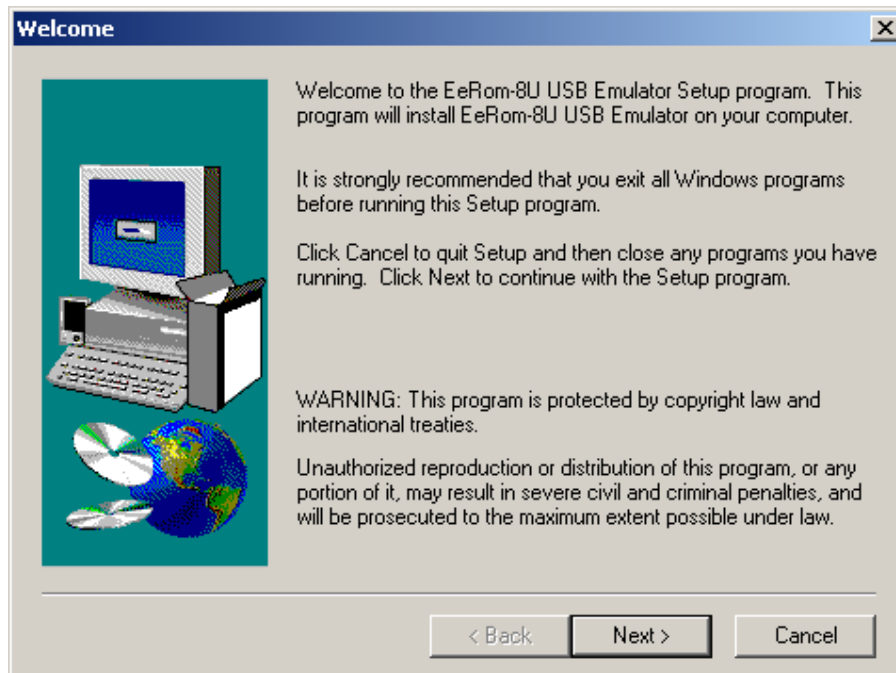
Picture 1. Welcome message.

2). Follow the on-screen instruction, and choose a directory that you desire to install the program.
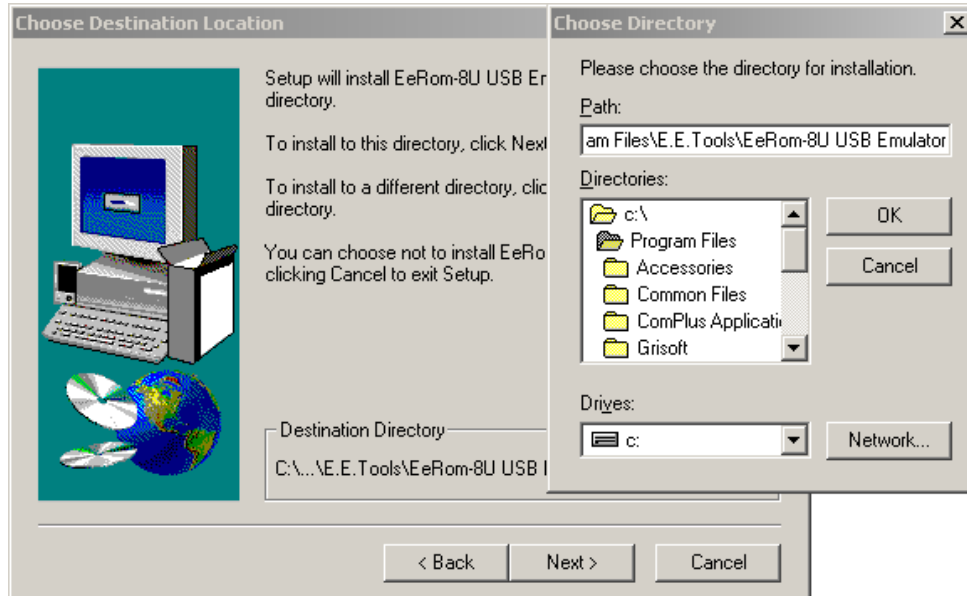
Picture 2. Choosing the directory for installation

3). Click "Program" from the "Start" menu, and select program folder.

Picture 3. Selecting program folder

4). After this is done, go back to Program Folder that you typed and run the program.

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SETUP AND INSTALLATION
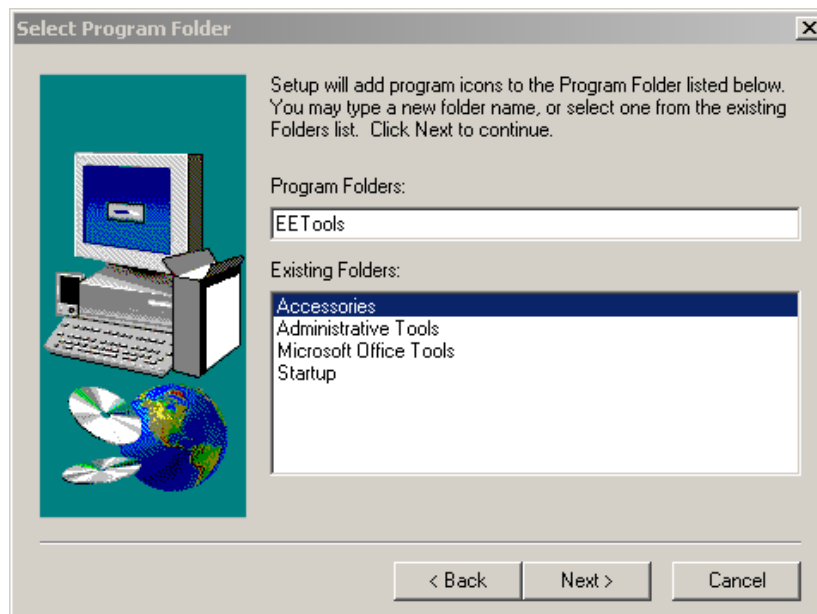
I. HARDWARE SETUP AND INSTALLATION

1. EeRom-8U Features

1). EeRom-8U is a very high speed Memory Emulator made upon USB 1.1 Spec.

2). Up to 8 instruments can be connected, and the Software supports 16bit Split Mode and 32bit Split Mode as well.

3). USB Since EeRom-8U uses 5V power from USB Cable, no additional Target power or power adaptor is required.

4). Convenient Reset Control by the Software is provided.
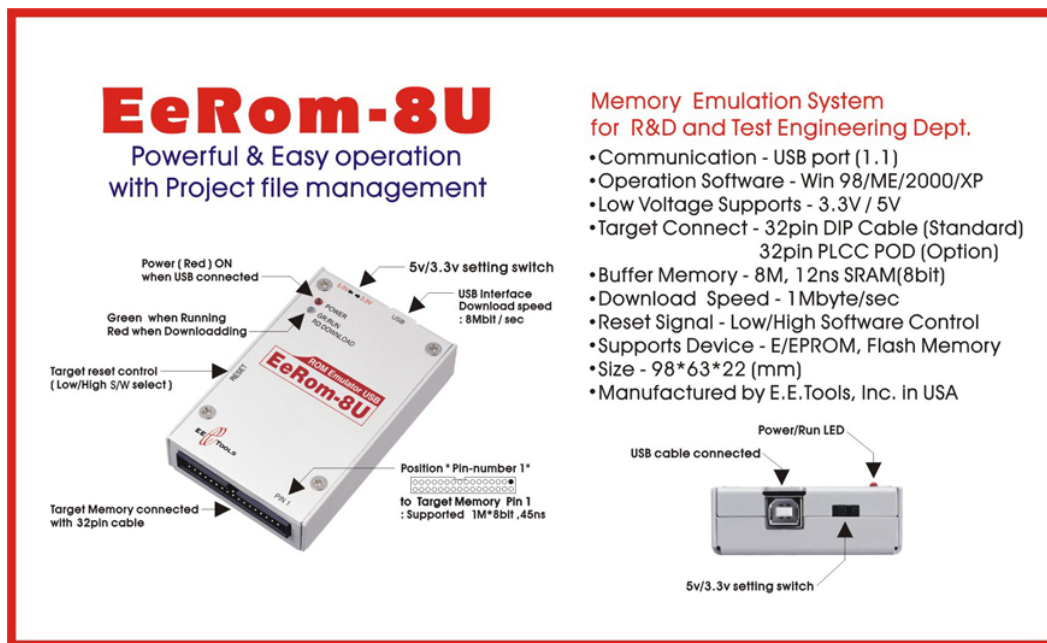
Picture 4-1. EeRom-8U   Picture 4-2. EeRom-8U

1. **32pin Cable Socket**
2. **Reset Out port**
3. **Power LED(RED) and Status LED(2 color-Green / Red)**
4. **Target Voltage Select(3.3 V / 5V)**
5. **USB Cable Socket**

2. To install Hardware

▶ **All items composing EEU100**

Supported Type	Item	Quantity
Both	Setup Disk and Device Driver Disk	1
	USB Cable ('Series B' B-Plugs)	1
	Reset Cable	1
	User's Manual	1
	EEU100 Emulator	1

1). Connect EeRom-8U and PC using USB Cable.

2). Check that a red light of Power LED is on.

3). Select EeRom-8U switch to either 3.3V or 5V depending upon Target power, and plug it in Target

4). Plug Cable's socket in where Target memory is placed after checking the pin number.

5). Turn on Target and download desired files using EeRom-8U.

After downloading the files, EeRom-8U Software automatically resets and starts Target.

* Reset : A user can select current Reset function of EeRom-8U with options.

Choose Reset type (Reset High-Active High, Reset Low-Active Low) and Reset signal time (millisecond) from Software option.

Click Target Run, and Target starts with Reset.

6). Turn off Target and remove EeRom-8U from the Target.

3. Common problems and solutions

1). Software doesn't recognize EeRom-8U device

- Check that red Power LED of EeRom-8U is on.

- Check that USB Cable is connected correctly.

- Click "Setting" -> "Hardware Profile" -> "Device Manager"-> "Universal Bus Controller" and check that the corresponding driver is loaded correctly.

- If you have any further questions, please contact with our technical assistances.

2). After downloading and Target Run, Target doesn't seem to be performing correctly.

- Check that green light of Status LED is on when downloading.

- Check that the selected Target power and EeRom-8U power are correct.

- Check that the Cable and the socket are connected properly to Target.

- If you have any further questions, please contact with our technical assistances.

3). Software is down and stops performing.

- Unplug USB Cable and shut down Software.

- After a while, connect the Cable again and start Software.

- If matter seems not to be better, please contact with our technical assistances.

4). Reset doesn't start.

- Check that Reset Cable is connected properly to Reset pin that is placed in the side of EeRom-8U.

- Check that Reset Cable is connected to the right Reset terminal of Target.

- Check that the selected Reset Type is correct from Option of Software and the Reset Duration is selected correctly. (For example, '0' is selected as a default value for Reset Duration.)

Reset Duration is the time period that Reset Signal is maintained.

- If you have any further questions, please contact with our technical assistances.
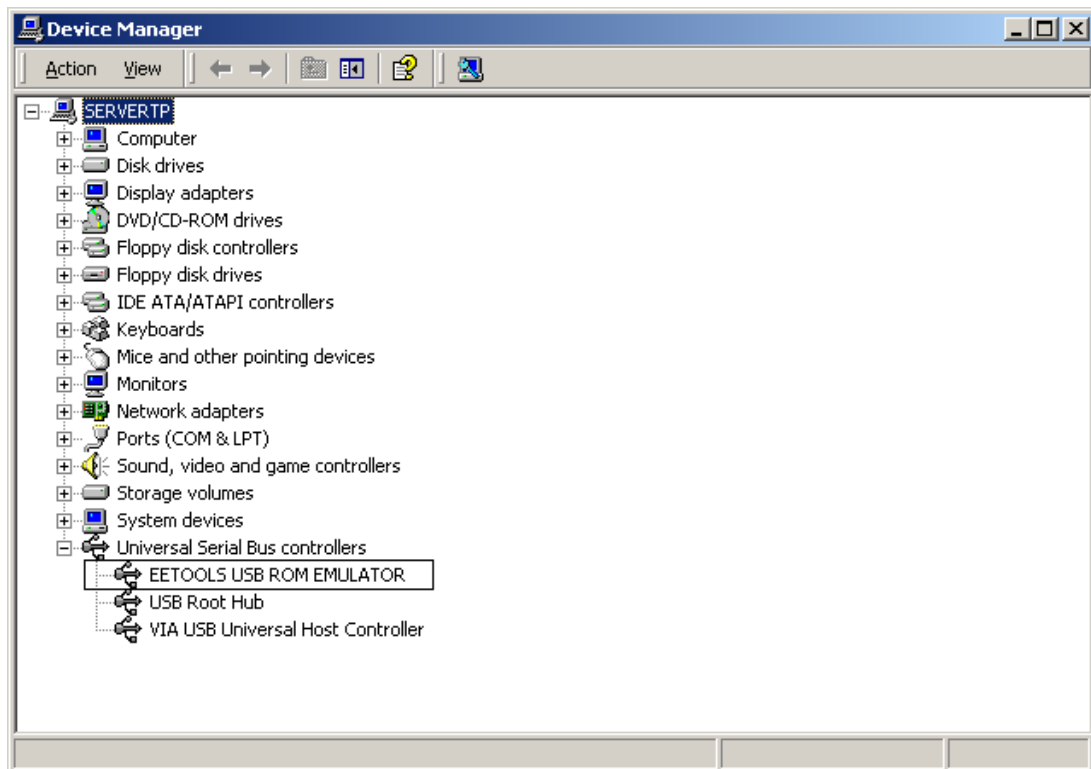
Picture 5. EeRom-8U Driver showed in Device Manager

II. SOFTWARE SETUP AND INSTALLATION
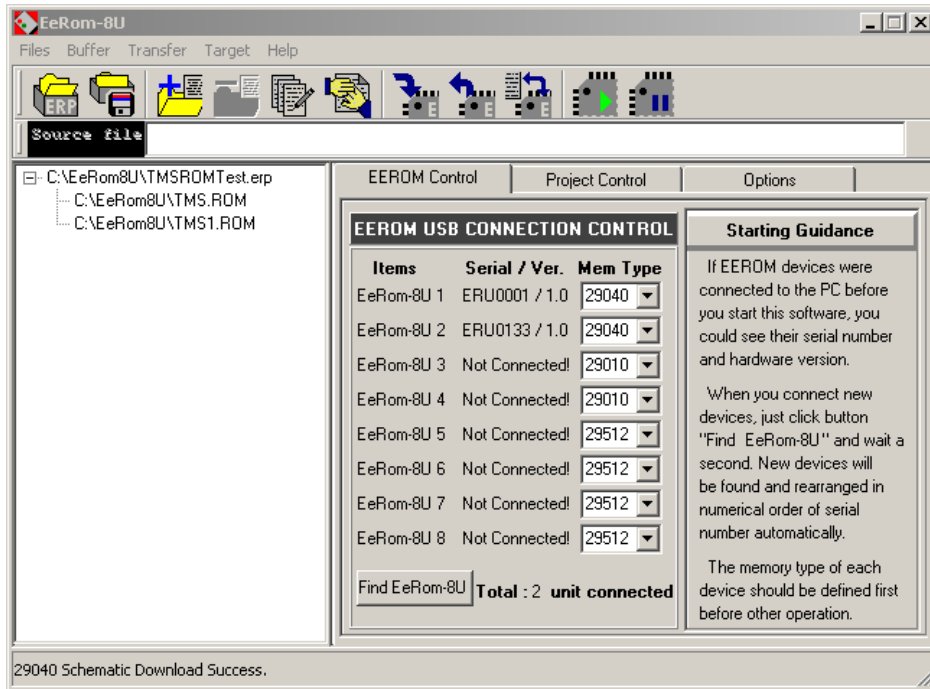
Picture 6. EeRom-8U Software.

1. Toolbar Icons .

Project Open : *Opening existing project or making new project. The file type is* ****.erp***.
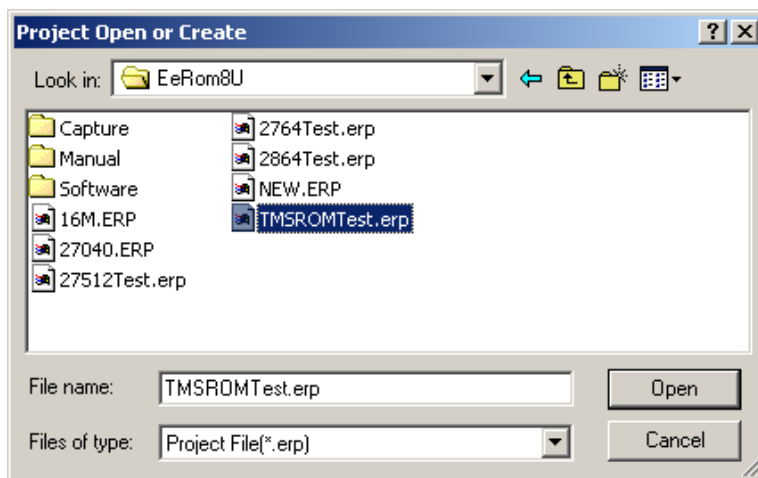
Picture 7.   Project Open Dialogue Box

Project Save : *Saving new project or changes made to project.*

File Add : *Adding new file to project.*

Picture 8.   Add File Dialogue Box

File Remove : *Remove file from project.*

Buffer Editor : *Show the data of added files to project in order.*

Picture 9.   Buffer Editor

Hide Program : Hiding program in Tray Icon Box.

Tray Icon Box is where the bottom right of Window screen.

Hide Popup Menu : The Menu appears when you place your mouse's pointer to the icon in Tray Icon Box and click once the right button of your mouse.
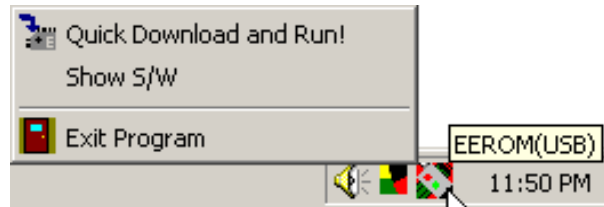
Picture 10.　Tray Icon and Popup Menu

● Exit Program : Exiting program.
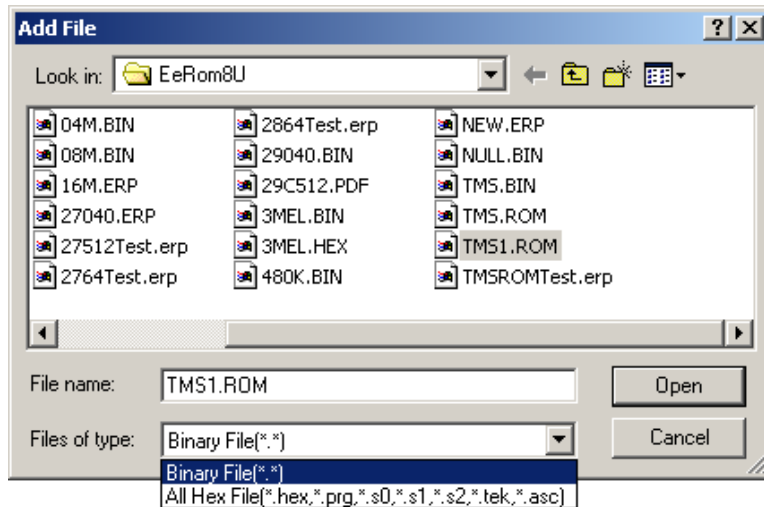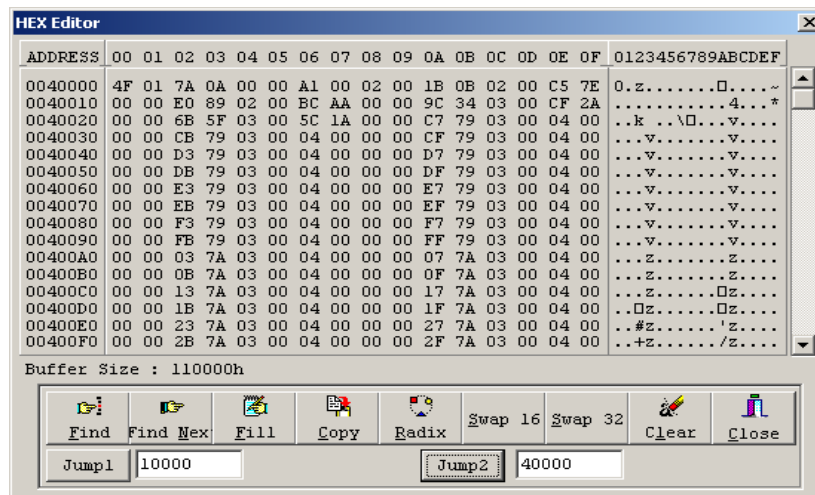● Show S/W : Returning program to Window screen.
● Quick download and Run : Performing Target Reset and Target Run with
downloading under the circumstance that program is hidden.
Double clicking icon in Tray Icon Box results will be same.

Download : Loading each file to Buffer and download it to EeRom-8U that is assigned from Project Control Page.

Upload : Sending the data that is downloaded to EeRom-8U device to PC Buffer and showing in Buffer Editor.

Verify : Comparing file that is loaded in Buffer and data that is downloaded in EeRom-8U and showing errors if any occurs.

Target Run : Performing Reset to start Target and letting EeRom-8U perform.

Target Stop : Stopping EeRom-8U at Target.

2. Operation menu
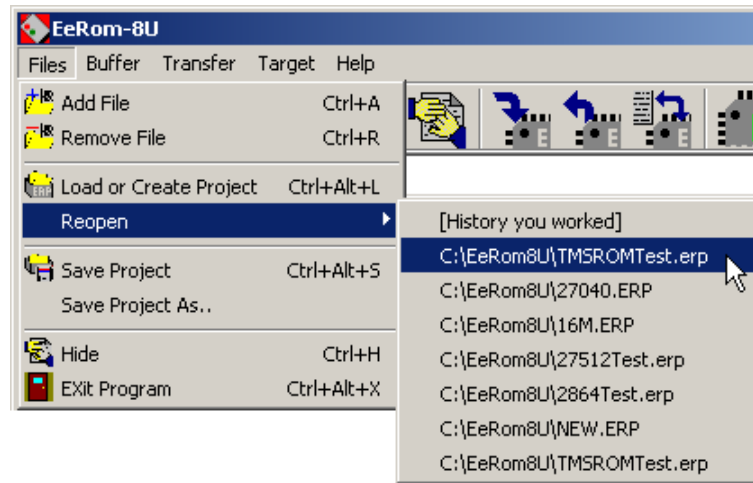
Picture 11.   Main Menu

1). Files

Add File : Add a new file in project.

Remove File : Remove a file from project.

Load or Create Project : Opening existing project or making new project.

Reopen : Reopening selected project from a list of created projects after opening program.

Save Project : Saving any changes made to project.

Save Project As... : Saving project as different name.

Hide : Hiding Window screen in Tray Icon Box.

Exit Program : Exiting program.

2). Buffer

Edit Buffer : Showing added files to project in order.

3). Transfer

File Download : Loading each file to Buffer and downloading it to EeRom-8U that is assigned from Project Control Page.

File Upload : Sending data that is downloaded to EeRom-8U device to PC Buffer

Verify : Comparing file that is loaded in Buffer and data that is downloaded in EeRom-8U and showing errors if any occurs.

4). Target

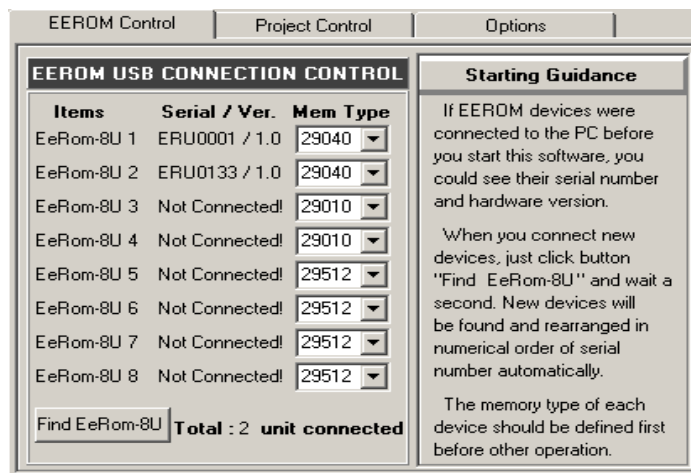**Target Run** : Performing Reset to start Target and letting EeRom-8U perform.

Target Stop : Stopping EeRom-8U at Target.

5). Help

3. Structure

Hardware and Project Control Tab is at the right of the main screen.

1). EEROM Control : Working on this page before starting any project is recommended.

Picture 12. 'EEROM Control' Section

Items : Up to 8 EeRom-8U can be connected.

Serial /Ver. : Serial number and Hardware version of the connected EeRom-8U appear, and "Not Connected" appears when EeRom-8U is not connected.

Mem Type : Selecting Memory Type that is applied to the corresponding EeRom-8U.

"**Find EeRom-8U**" Button : While using program, if additional EeRom-8U is connected or if Serial number and Hardware version of the connected EeRom-8U do not appear, click this button to find currently connected EeRom-8U and to rearrange Serial number in order. At this moment, order of EeRom-8U may change.

2). Project Control : When you select file from project that is placed at the left of the main screen, this page automatically appears. In order to make any changes to this page, you have to choose file.

EEROM Select : Choose an EeRom form the daisy-chained EeRoms. Your data will be

downloaded to the selected EeRom unit.

- − EEROM Start : This box indicates the beginning EeRom unit for downloading data.
- − EEROM End : This box indicates the ending EeRom unit for the Data Split Select operation. It also indicates the last EeRom unit when your data selected in "EEROM Control" section is larger than the EeRom memory size.

Configured Size of Memory : Showing Memory Type of the selected EeRom-8U at "EEROM Control" section.

Picture 13.   'Project Control' Section

Data Split Select : There is no influence to original file, but when data is sent to Buffer, the data is spit.

- − **8bit** : Data is sent without splitting.
- − **16bit** : Splitting data into Even and Odd. Even is assigned to EEROM Start that is selected from EEROM Select of Project Control, and Odd is assigned to EEROM End.
- − **32bit** : Splitting file as Word0, Word1, Word2, and Word0 is sent to EEROM Start, the rest are sent to EEROM End in order.

Load as a Hex file : If there is any file of project that its type is Hex Format, and if the check box is selected, the selected file is read as Hex Format. Otherwise, it is read as Binary Format.

Address Information: *This section explains the way in which EeRom unit is connected and the location in which EeRom will load files into. The total buffer memory size depends on the number of EeRom(s) and size of each unit selected in "EEROM Control" section.*

- **Buffer Start** : *This value indicates the buffer offset of the first byte to be loaded. The default value is 0.   In the total editor memory, the start address for the EeRom that you select in "EEROM Select" section is followed by "Editor Starts at".*
- **Buffer End**   : *This value indicates the last address of the defined emulated ROM. It is only for user reference and may not able to changed by user. In the total editor memory, the end address for the EeRom that you select in "EEROM Select" section is followed by "Editor Ends at".*
- **File Offset** : *This number indicates the start address of the file to be loaded.*

3). Option
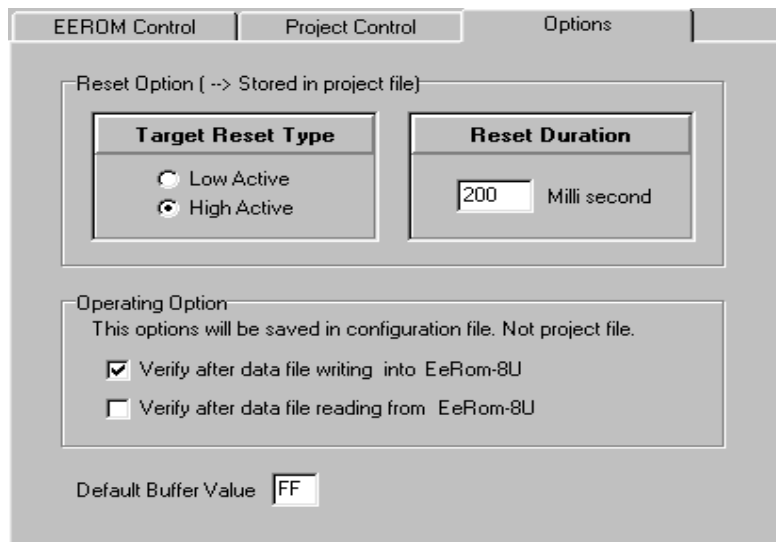
Picture 14.   'Option' Section

Reset Option : *Selecting Reset that is performed when clicking Target Run.*

- **Target Reset Type** : *Selecting Target Type. (Reset High or Reset Low).*
- **Reset Duration** : *Selecting how long Reset signal is maintained. (Millisecond).*

Operating Option : *Selecting option for when clicking Download or Target Run button of program. This option is not saved to project and is applied whenever program is executed.*

- **Verify after data file writing into EeRom-8U** : *After file downloading file, perform*

Verification.

– **Verify after data file reading from EeRom-8U** : After file uploading, perform

verification.

– **Default Buffer Value :** Filling out empty portion of Buffer Editor with the value.

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Chapter

4

EeRom-8U

QUICK-START

TUTORIAL

I. KEY PERFORMING EXAMPLE

1. Program performs for the first time.

The basic project name of this program is erusb.erp. When program performs for the first time and if project is created, you need to change another project name to different name. If the different name cannot be selected, project is not saved. The rest of all project need to be selected as different name, not erusb.erp.

1). Select desired Memory type to EeRom-8U connected to "EEROM Control" page.

2). Add file that you will work on to project.

3). Selecting that which file you download to which connected EeRom-8U device at "EEROM Select" menu of "Project Control" page.

4). "Selecting that whether you split the selected file at the left side of "Data Split" menu.

5). Selecting that starting Buffer address of downloaded file and file offset from "Address Information" menu.

6). "Selecting that Reset option that is applied when performing Target Run at "Option" page.

7). Starting downloading.

8). If project name is still erusb.erp, whether you want to save project as different name is asked when exiting program. If you click Cancel button, project is not saved; therefore, saving as different name is recommended.

2. Data Split Mode

This program basically performs with 8bit(Byte) mode and supports splitting data of 16bit(Even, Odd) and 32bit(Word0, Word1, Word2, Word3). After loading file, this program performs within Buffer, and there is no effect to original file.

1). If downloading file with splitting to 16bit, 2 EeRom-8U instruments, and if it is 32bit, 4 instruments are required to be connected.

2). Selecting EeRom-8U instrument from Split Mode

After connecting EeRom-8U instrument and reading Serial Number by program, EeRom-8U Software arranges Serial Number in order. In other words, EeRom-8U that has the lowest Serial Number becomes number 0. Afterwards, whenever you select Split mode, assigning Serial Number is started from the EeRom-8U that is selected from "EEROM Start" by program.

- 8bit : Byte.

- 16bit : Even, Odd.

- 32bit : Word0, Word1, Word2, Word3.

Chapter
5

TROUBLESHOOTING
& TECHNICAL SUPPORT

Regardless of the symptom, verify the following:

1. There are no "dongles", security keys, switch boxes or other devices between the EeRom-8U download cable and the USB port.
2. The target is powered up.
3. All download, daisy-chain and target interface cables are tight and fully inserted.

Target is not powered up.

EeRom-8U draws its operating power from the target's EPROM socket.   The target must be powered up during all load or verify operations.   If multiple emulators are daisy-chained, they must ALL be powered up to load to ANY of them.

Target power is noisy or Voltage too low.

EeRom-8U draws more current than the EPROM it is replacing.   If the target is a very low power system, or is already pushing its power supply limits, it may not have enough current to spare to power the emulator, causing power fluctuations or noise.   This is a rare condition, but worth mentioning

Checksum Errors

Checksum errors indicate a communications problem.   This may be due to bad download cable connections, a slow rise-time printer port, noise on the download cable, noise on the target power, etc.   You may try a slower download speed (increase the /d parameter).   Also verify that the download cable is not laying across a power transformer, your monitor, an arc-welder, etc.

Target Power noisy or Voltage too low.

Noise problems are very dynamic. It is possible that we could identify the emulators but be unable load and verify properly.   *EeRom-8U* draws more current than the EPROM it is replacing. If the target is a very low power system, or is already pushing its power supply limits, it may not have enough current to spare to power the emulator, causing power fluctuations or noise.

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Verifies, but target does not run

Target not being reset

If the wrong reset output is being used or it is connected to the wrong spot on the target, it may not be resetting the target during the download. We would get a good download, but the target was fetching garbage during the transfer. Some processors will HALT, others will simply execute the random garbage they received. In either event, the processor will not "know" to start over and execute the new code.

Try removing the reset line, turning off the target power for 10 seconds and then turning the power back on. If the target now comes up and runs, the reset signal connection was wrong. While you could do this after each load, we highly recommend correcting the reset problem to make resets automatic and to prevent the target from running garbage during the download.

Emulator device size set wrong.

The device SIZE configuration affects only the TARGET'S view of the emulator. The file will download and verify correctly as long as the emulator is large enough to hold the file. If the size is set too small, the target will not be able to access all of the file image. For example, if the file is 60,000 bytes long, it would load into an EeRom-8U and verify properly. However if the emulator is configured to emulate a 27256, the target would see only the first 32Kbytes mirrored into both halves of the 64KByte space. This is exactly what would happen if you burned the first 32Kbytes into a 27256 and plugged it into the same socket.

File Too Large

If the file size exceeds the configured device size, the target will not be able to access the entire file. Note that the file may still verify correctly, as long as it does not exceed the emulator's maximum capacity. If the emulator is configured correctly and the file is larger than the device setting, your code has just outgrown its space. If you are emulating the maximum size device the target is wired to accept, you will have to reduce the code size. If the target has some unused space contiguous to the current EPROM space, you may be able to modify the target board to accept a larger EPROM. This would typically involve adding another address line to the socket and possibly modifying the EPROM chip select decodes. Of course you would need to re-configure the emulator for the larger device as well (if it has room to spare).

Wrong PLCC or other adapters used.

Any adapter used between the target cable and the target socket itself has the potential of introducing errors. In particular, PLCC footprints vary by EPROM size, model and manufacturer.

In general, small EPROMs (<1Mbit) generally have one pin out and larger EPROMs have a different pin out. Most FLASH chips are pinned out like large EPROMs. However, SOME small FLASH are wired like SMALL EPROMs. In general, large devices (>=1Mbit) use a 32 pin DIP to 32 pin PLCC adapter. Smaller devices usually need a 28 pin DIP to 32 pin PLCC adapter but MIGHT need the 32 pin version. Give us a call if you are not sure.

File is not a raw binary image of the EPROM

The command line loader loads only unformatted, raw binary images. If the file is a formatted HEX file, use HEX2BIN.EXE to convert it first. If you are not sure about the file's format, "TYPE" it to the screen. If you see random printable, non-printable and graphics characters, it is BINARY. If you see well formatted HEX characters, it is a HEX file. Intel HEX files start each line with a ":". Motorola 'S' files start each line with an "S". Tektronix HEX files start with a "%" or a "/". HEX2BIN automatically recognizes and converts 8 variations of these HEX formats.

Remember, your Resume' will load and verify, but most likely will not execute properly!

1. Calling Customer Support

E.E. Tools provides telephone technical assistance during normal business hours (9:00 AM to 5:00 PM, Pacific time).

- Please call our Technical Support Department or your local E.E. Tools' distributor while you are at your computer and be prepared to repeat the sequence of steps leading up to the problem

- Have the following information ready when you call:

- The invoice number for the user who bought the EeRom-8U from E.E. Tools.

- The distributor's name and the purchased date.

- The model & serial number found in the posterior side of the
   programming module.

- Your hardware software revision number from the option info screen.

- Description of problem with error message.

- The exact part number you are working with.

2. Service Information

Before sending a unit in for service, call us at 408-263-2221 or contact by email(support@eetools.com) to obtain a Return Authorization Number (RMA). We will not repair your unit unless an RMA was issued.

Warranty Service: Please return the product in the original package with proof of purchase to the below address. Clearly state in writing the performance problem and send any leads, connectors and accessories that you are using with the device.

Non-Warranty Service: Return the product in the original packaging to the below address. Clearly state in writing the performance problem and return any leads, connectors and accessories that you are using with the device. Customers not on open account must include payment in the form of a money order or credit card. For the most current repair charges contact the factory before shipping the product.

Return all merchandise to E.E. Tools, Inc., with pre-paid shipping.

The flat-fee repair charge includes return ground shipping to addresses in North America only. For overnight shipments and non-North America shipping fees contact E.E. Tools, Inc.

ee Tools

4620 Fortran Drive #102

San Jose, CA 95134, USA

TEL: (408) 263-2221

FAX: (408) 263-2230

Email: support@eetools.com

Include with the instrument your complete return shipping address, contact name, phone number, and description of problem.

3. Limited One-Year Warranty

E.E. Tools, Inc., warrants to the original purchaser that its product and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase.

E.E. Tools, Inc., will, without charge, repair or replace, at its option, defective products or component parts. Returned products must be accompanied by proof of the purchase date in the form of a sales receipt.

To obtain warranty coverage in the U.S.A., this product must be registered by completing and mailing the enclosed warranty card to:

E.E. Tools, Inc.
4620 Fortran Drive #102
San Jose, CA 95134, USA
TEL: (408) 263-2221
FAX: (408) 263-2230
within fifteen (15) days from proof of purchase.

Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. It is void if the serial number is alternated, defeated, or removed.

E.E. Tools, Inc., shall not be liable for any consequential damages, including without limitations to damages resulting from loss of use. Some states do not allow limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.
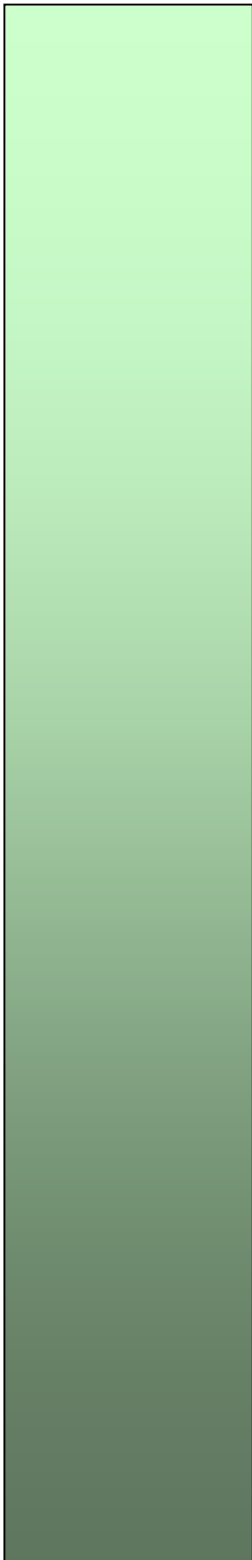
This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

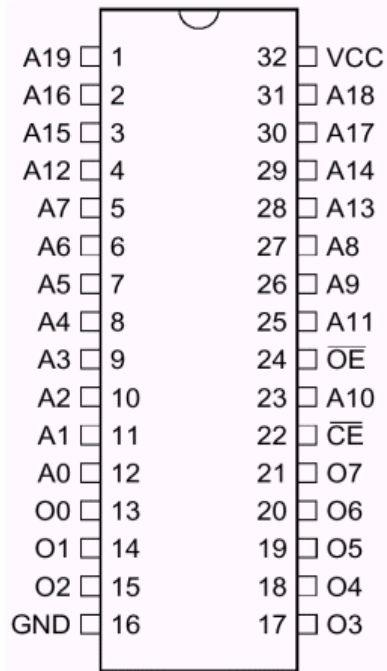Model Number:_____   Date Purchased:_____
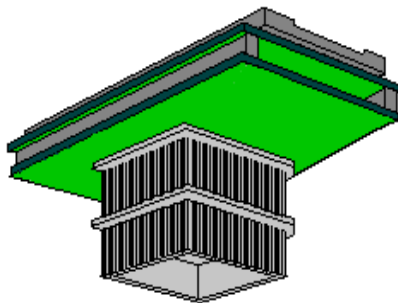
Chapter
6

APPENDIX

PIN ARRAY OF EeRom-8U

▶ **When using EERom-8U for supporting 8bit data bus**

A19	1	32	VCC
A16	2	31	A18
A15	3	30	A17
A12	4	29	A14
A7	5	28	A13
A6	6	27	A8
A5	7	26	A9
A4	8	25	A11
A3	9	24	$\overline{OE}$
A2	10	23	A10
A1	11	22	$\overline{CE}$
A0	12	21	O7
O0	13	20	O6
O1	14	19	O5
O2	15	18	O4
GND	16	17	O3

OPTION BOARD

1. ADP32: Conversion Adaptor

from 32-PLCC to 32-DIP

2. ADP28: Conversion Adaptor

from 32-PLCC to 28-DIP