16 bit *Econo*ROM

Model EE240

USER'S MANUAL

Version 1.0

INTRODUCTION:

Thank you for selecting a TechTools product. We have made every attempt to provide a quality product at an affordable price. Our goal is to provide tools for the Engineer and Technician that are inexpensive, but fully functional. If you have any problems or comments, please don't hesitate to call or FAX and let us know.

The EE240 uses 512 KBytes of static RAM to emulate EPROMS up to 512 KBytes (256K WORDS) in size. An IBM compatible computer (PC) is used to down-load object code into the RAM. The RAM is dual-ported, allowing both the PC interface circuitry and the target to access it. When the PC starts to download object code, the target port is disabled and the PC interface port is enabled. While the download is occurring, the RESET pins are activated, holding the target in reset until its port is re-enabled.

INSTALLATION:

1. Turn off power to the target system.

2. Configure the EE240 for the size of EPROM you are emulating. Jumpers JP1 and JP2 configure the EE240 as follows:

DEVICE	JP1	JP2
27210	OFF	OFF
27220	ON	OFF
27240	ON	ON

3. Insert the EE240 into the target socket.

> BE CAREFUL TO INSERT THE EE240 PROPERLY. INSERTING THE EE240 BACKWARDS MAY RESULT IN PERMANENT DAMAGE TO THE EE240 OR THE TARGET SYSTEM!

Pin 1 of the EE240 is identified by the small notch in the DIP plug, similar to an IC. Insert the EPROM Emulator so that this notch points the same direction as the notch on the target socket.

4. Connect a jumper wire between one of the reset pins on one of the EE240s to the target reset circuitry if automatic reset is desired during each download. If you choose NOT to connect the RESET line, be sure to do a MANUAL RESET of the target after downloading. RESET and /RESET are TRI-STATE-TTL/CMOS compatible outputs, capable of sourcing 15 milliamps or sinking 15 milliamps.

5. IF YOUR TARGET HAS IN-CIRCUIT EPROM PROGRAMMING CAPABILITY, DISABLE IT!

The EE240 is a 5 Volt ONLY device. Programming voltages will DAMAGE the device and will void the warranty. Even short surges during power-up or reset can be damaging.

6. Apply power to the target system.

7. Select an unused printer port on your IBM compatible PC/XT/AT.

8. Plug the supplied DB-25 to RJ-45 adapter into the selected port.

9. Plug one end of the supplied modular cable into the adapter.

10. Plug the other end of the modular cable into the EE240 jack labeled "IN".

NOTE: In general, the target and the PC should be powered up/down together. If it becomes necessary to cycle power on one and not the other, the download cable should be disconnected first. This prevents the possibility of a POWERED device being connected to an UN-POWERED device, resulting in possible CMOS latch-up of either. Remember, if you cycle power on the target, the EE240 will loose its memory and will need to be re-loaded for proper operation.

11. For target systems with wider data paths, multiple EE240s can be daisy-chained. Up to four units can be connected for data paths up to 64 bits wide. The "OUT" jack of the first EE240 is connected to the "IN" jack of the next EE240. This is repeated up to three times. The FIRST TWO BYTES of the data file are loaded into the LAST emulator in the chain(the one with ONLY ONE CABLE CONNECTED TO IT). The third and forth bytes will be placed in the next-to-the-last EE240, and so on. The EVEN BYTES (0,2,4...) are loaded into data bits 0-7. The ODD BYTES (1,3,5...) are loaded into data bits 8-15.

12. Run the loader program. We wrote the loader as a command line driven routine rather than an interactive one. This allows you to run the program from a batch file without intervention. It can be added directly to your Compile-Link-Locate batch file. Enter "BLD16" without parameters to see the parameter syntax.

    All parameters are optional and can be listed in any order. The Printer Port is specified by base address rather than LPTx. Most BIOS/DOS compatible printer ports are located at one of the following I/O addresses: 378, 3BC, or 278. Any existing LOCAL port can be used, even if that port has been re-directed by a network shell.

ADDITIONAL NOTES

1. Most linker/locators will generate Binary files quicker than Intel Hex or Motorola 'S' files. In addition, BINARY files will download faster than HEX files when the EPROM is over about 35% full.

   With that in mind, we wrote BLD16.EXE to use BINARY files. If your development tools refuse to generate BINARY files directly, you will need to convert them before downloading. You will find a HEX2BIN utility on the distribution disk for this purpose. BLD16 and HEX2BIN are both fully batchable, enabling you to do the conversion and download with a single command by including both commands in a batch file.

   EXAMPLE:

   L.bat:

```
compile source.c out.hex
HEX2BIN out.hex out.bin /s2048
BLD16 out.bin /p3bc /v
```

2. The EPROM Emulator uses high quality machined pin headers for the target socket pins. However, they are not very forgiving to being bent. We recommend the use of a "sacrificial" socket between the EPROM Emulator and the target socket. This socket protects the EPROM Emulator from mechanical damage. If one of the socket pins becomes bent or damaged, the socket can be replaced a lot easier than the EPROM Emulator can be repaired. This is common practice for most test equipment that plugs into target sockets.

3. The RESET and /RESET outputs are driven by TRI-STATED devices. They are active during the download only.

TROUBLESHOOTING TIPS

ERROR MESSAGES:

1. NO PRINTER PORT FOUND AT XXX:
   The downloader verifies that a printer port exists at the specified address. If you receive this message, the loader could not find a valid port at this address. Use the /Pxxx parameter on the command line to tell the downloader the address of the printer port you wish to use. The downloader defaults to address 378. Other common addresses are 278 and 3BC. Also verify that the target (and therefor the EE240) is powered up.

2. NO EMULATOR(S) FOUND AT PORT XXX:
   After verifying that the selected port exists, the downloader attempts to establish contact with the emulator(s) to determine how many are connected to this port. If NO emulators respond, this message is printed. If you receive this message:
   - Verify that the download cable is plugged into the printer port.
   - Verify that the download cable is plugged into the "IN" jack on the EE240.

- Verify that the target is powered up.
- If downloading multiple EE240s, Verify that they are daisy-chained correctly.
- Specify the correct printer port with the /Pxxx parameter (SEE #1 above)
- Remove any "DONGLE"s, "LOCK"s or "KEY"s from the printer port.
- Remove any cable extensions you may have added to the download cable.
- Remove any printer port switch boxes between the EE240 and the printer port.
- Verify that the printer port is in STANDARD mode, not ENHANCED,ECP,EPP or BI-DIRECTIONAL.
- Add pacing delays with the /Dx parameter. These delays help compensate for ports with extra slow rise times due to excess EMI filtering or weak drivers.

3. VERIFY ERROR AT XXXXXX READ:XX EXPECTED: XX

After verifying that the port exists and that at least one EE240 responds, the downloader sends the file to the EE240(s). After downloading, the contents of the EE240(s) is compared to the specified download file. If any bit is different, the loader stops and prints this message. If you receive this message:

- Verify that the downloaded file is not too large for the device being emulated.
- Verify that the EE240 is configured properly for the device being emulated.
- Verify that the target is powered up.
- Verify that the target has a clean 5V power supply with the EE240 installed.
- Verify that the target EPROM socket has adequate BY-PASS capacitance.
- Remove any DOWNLOAD cable extensions you may have added.
- Remove any "DONGLE"s, "LOCK"s or "KEY"s from the printer port
- Remove any switches boxes between the EE240 and the printer port
- If you are downloading multiple EE240s, verify that they are daisy-chained properly.
- Verify that the printer port is in STANDARD mode, not ENHANCED,ECP,EPP or BI-DIRECTIONAL.
- Add pacing delays with the /Dx parameter. These delays help compensate for ports with extra slow rise times due to excess EMI filtering or weak drivers.

If YOU DO NOT RECEIVE ANY error messages and the target does not run:

- Download with the /V1 parameter to insure the code loaded properly. If the verify fails, refer to "VERIFY ERROR" above.
- Verify that you are downloading a BINARY image to the EE240. If the file is in HEX format, use HEX2BIN to convert it to BINARY before downloading.
- Verify that the target is being reset after the download. If the target runs after a manual reset, verify the polarity and placement of the reset lead.
- Verify that the EE240 is jumpered to match the EPROM size the target expects.
- Verify that the target does not require an access time quicker than 120ns.
- Verify that the target runs correctly when the same file is burnned into an EPROM.

If you need additional technical assistance or have comments, we can be reached at:

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