

EMP-20 Device Programmer

Programming Information for the Needham's
Electronics EMP-20 Device Programmer

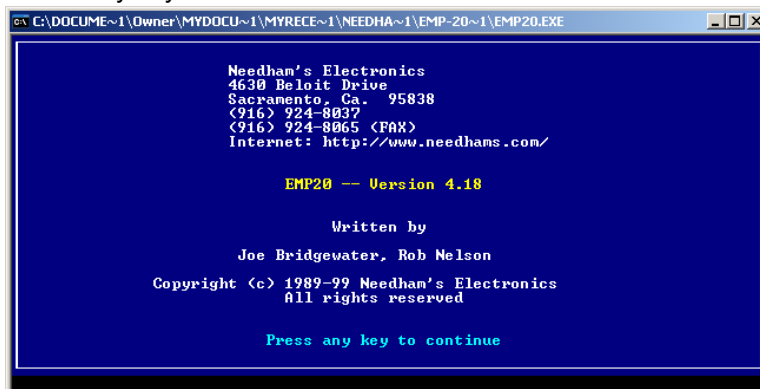
[http:// www.needhams.com](http://www.needhams.com)

Overview

- A device programmer gives you the ability to program a user defined set of bits into a particular programmable device.
- Programmable devices include: EPROM, EEPROM, Flash, GAL
- The device programmer must be able to provide the correct voltage levels and signals to the device being programmed, and must be able to meet the timing requirements specified in the device data sheet. Various programming algorithms may be supported.
- Basic steps for programming a device:
 1. Erase the device (if necessary, as with a UV erasable EPROM)
 2. Ensure the programmer supports the device to be programmed. Select the device using the software menu.
 3. Clear the device programmer buffer.
 4. Load a hex file into the device programmer.
 5. Program the device.
 6. Verify that the device contents match the buffer contents.
- Device programmers from Needham's Electronics are used in this course. For more detailed information, refer to www.needhams.com

Splash Screen

- EMP-20 software can be downloaded from www.needhams.com. Look for EMP-20 in the Discontinued Software section.
- When EMP20 starts, you see a splash screen.
- Press any key to continue.

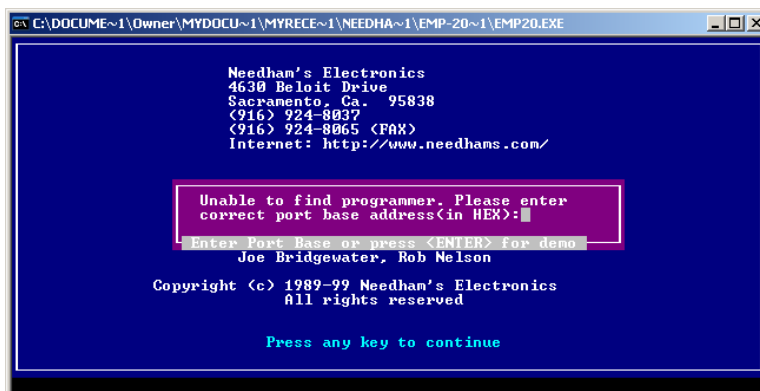


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EMP20 Error When Starting

- If you get an error message when starting EMP20, it may be because the device programmer is not powered on. Make sure the programmer has power before starting EMP20.



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Main Window (Control Panel)

- The Main Window shows you the main menu, status, and settings.
- To exit EMP20, press the escape key 'ESC'
- **Make sure this main window is visible whenever you insert or remove a device! When this window is showing, power to the device socket is turned off.**

```
C:\DOCUME~1\Owner\MYDOCU~1\MYRECE~1\NEEDHA~1\EMP-20~1\EMP20.EXE
Main Menu
1. Program with selected algorithm.
2. Verify device is erased.
3. Verify device equals buffer.
4. Read device into buffer.
5. Select device.
6. Print Buffer to ascii file.
7. Buffer editor.
8. Load file from disk.
9. Save file to disk.

Status/Settings
Manufacturer: EMP20
Device : Use option 5.
J. Algorithm : none selected
K. Buffer offset: 00000000,00000000
L. Device range : 00000000,00000000
M. Buffer checksum = 0000  cmpl: 0000
N. Device checksum = 0000  cmpl: 0000
O. Splitting: 1      Device #: 1
P. # of sets: 1     Set # : 1
Q. Pgm Upp : 5.00v  Pgm Ucc : 5.00v
R. Verify H : 5.00v  Verify L: 5.00v
S. Buffer : 0000300,0000400
T. File : 00000100,00000200
U. File type: BINARY
V. Filename :
W. Port Base: 03BCh

[Esc] to Quit [F10] for Help [F9] Suspend to DOS shell
```

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Main Help Window

- Press 'F10' from the Main Window to get the Main Help Window
- Press the escape key 'ESC' to close the help window
- Extensive help is available through this help system.
- You can download the EMP20 software at home to give yourself more time to read the documentation included in this help system or to determine whether a specific device is supported.

```
C:\DOCUME~1\Owner\MYDOCU~1\MYRECE~1\NEEDHA~1\EMP-20~1\EMP20.EXE
Main Menu
1. Program with sele
2. Verify device is
3. Verify device equ
4. Read device into
5. Select device.
6. Print Buffer to a
7. Buffer editor.
8. Load file from di
9. Save file to disk

EMP-20 HELP MENU
Enter Selection:
1. Introduction to EMP
2. Main-menu commands
3. Using the editor
4. Macros
5. File Definitions
6. Extended Help
7. Using EMP20.INI
8. Family Module
9. Software Updates

Status/Settings
Manufacturer: EMP20
Device : Use option 5.
J. Algorithm : none selected
K. Buffer offset: 00000000,00000000
L. Device range : 00000000,00000000
M. Buffer checksum = 0000  cmpl: 0000
N. Device checksum = 0000  cmpl: 0000
O. Splitting: 1      Device #: 1
P. # of sets: 1     Set # : 1
Q. Pgm Upp : 5.00v  Pgm Ucc : 5.00v
R. Verify H : 5.00v  Verify L: 5.00v
S. Buffer : 0000400,0000200
T. File : 00000100,00000200
U. File type: BINARY
V. Filename :
W. Port Base: 03BCh

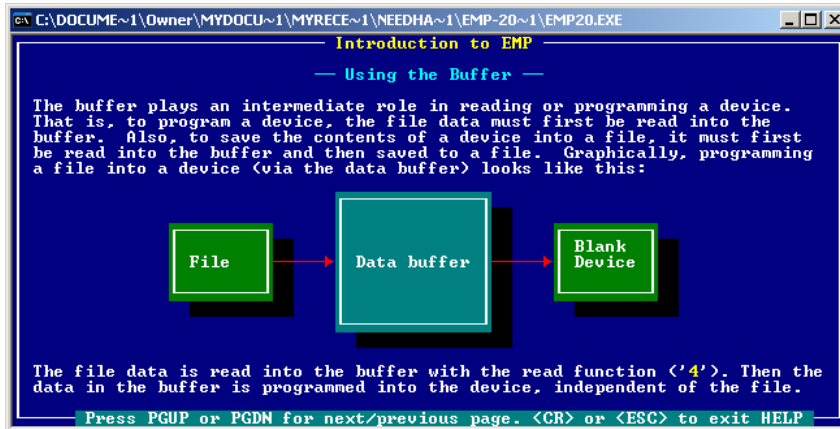
[Esc] to Quit [F10] For Help [F9] Suspend to DOS shell
```

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Using the Buffer

- You will normally read your .hex file into the buffer, at which point you'll be able to program your EPROM. Data already in the buffer is overwritten only if the .hex file contains data at those addresses.

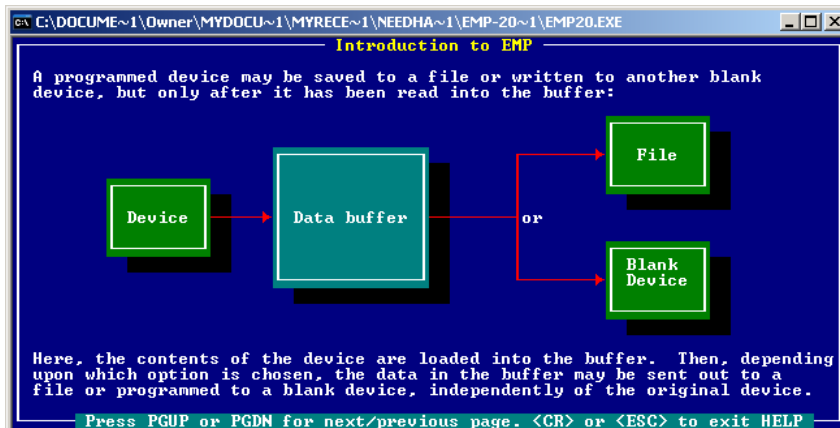


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Reading Device Into Buffer

- You can also read the contents of a device into the buffer, in order to analyze the device contents, copy the device, or store the contents to a file. This provides a quick way to copy an EPROM.

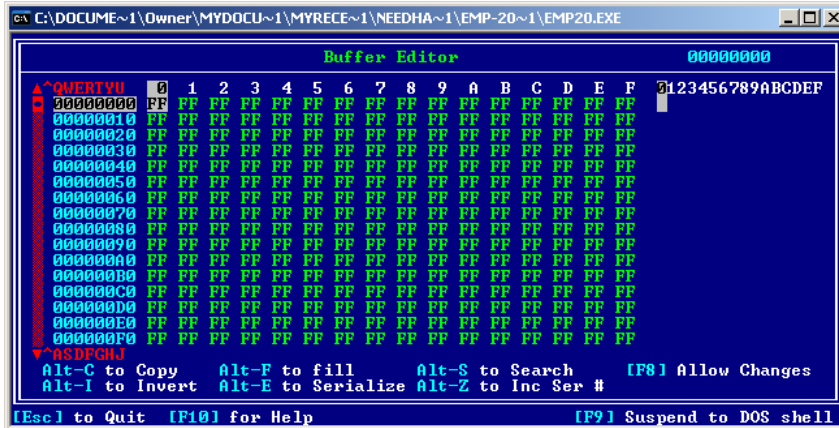


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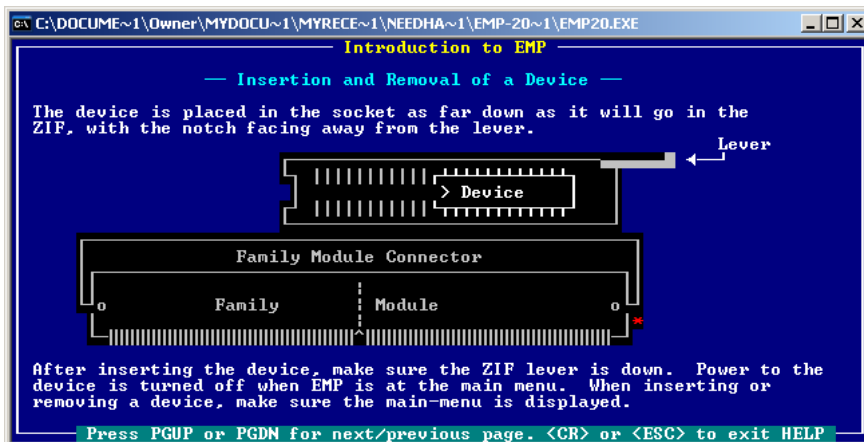
Buffer Editor

- The device programmer software includes a buffer editor, similar to the memory editors provided with simulators such as Emily52.



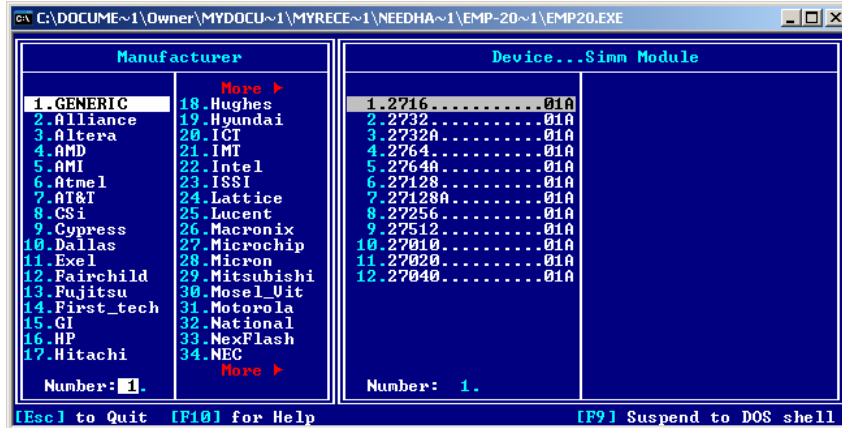
Insertion and Removal of a Device

- Be careful when inserting and removing a device! Damage can occur to the device and/or programmer if you make a mistake.



Selecting the Device

- Try to select the exact manufacturer and part number matching the device you want to program. If you can't find an exact match, select a similar device. Verify that the programming voltage is correct.



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EPROM Programming Instructions for EMP-20

1. Turn on the programmer before starting the EMP20 program.
2. Start the device programmer software. The program name is EMP20.exe.
3. Make sure you clear the buffer in EMP20 before loading your code, since restarting the program does not clear it out. Use the option in Buffer editor to fill the buffer with 0xFF. (Reading a blank EPROM into the buffer accomplishes the same thing.)
4. Select device (do this before putting your EPROM in the socket).
5. Select the manufacturer, then select the part number of your EPROM; make sure software is displaying the correct programming voltage Vpp for your device.
6. Display the EMP20 software main menu. This ensures the programming socket is not powered.
7. Put your EPROM in the socket correctly; wrong position or orientation can damage/destroy part.
8. Verify that the device is erased.
9. Read device into buffer (overwrites buffer; if EPROM is blank, this fills the buffer with 0xFF).
10. Select your file (V. Filename : <path\filename>).
11. Select file type (U. File Type : <Intel hex / Motorola hex>).
12. Load file from disk (puts your hex file in the buffer).
13. Buffer editor (Compare contents of the buffer to your .LST file, all unused bytes should be 0xFF).
14. Program with selected algorithm (this will Verify device equals buffer for you).
15. Display the EMP20 software main menu. This ensures the programming socket is not powered.
16. Remove device.
17. Turn off the programmer when no one is using it.

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