

## M-780138 M-STATION SYSTEM Quick Start Guide

### Important

Before designing with your M-Station system, make sure to check the Document Updates section in the CD-ROM included with your package. Document updates may include critical information not found in the user's manuals. You may access the document updates from the **Documents** menu of your board in the CD-ROM.

The following steps provide a basic procedure to set up your M-Station system and test its functionality. Please refer to the documentation included on the CD-ROM for more detailed information about your system.

### II. Install Software

1. Insert the CD-ROM supplied with your M-780138 micro-board. The CD-ROM will start automatically. If it doesn't start, click **Start** → **Run**. Browse to your CD-ROM drive and select **MStation.exe**.
2. Select **M-780138** from the M-Station micro-board menu.
3. Click **Software & Documentation**.



Figure 1

4. Install all of the software in the following recommended sequence:
  - a. 78K0 M-Station Integrated Debugger
  - b. M-Station System Software
  - c. Microcontroller Files
  - d. Microsoft .NET Framework (unless already installed on your computer)
  - e. Programming Examples
  - f. NEC Electronics 78K0 Assembler and C Compiler  
(Use **Product ID 37197156Y** to install software)

### III. Install M-Station USB Driver

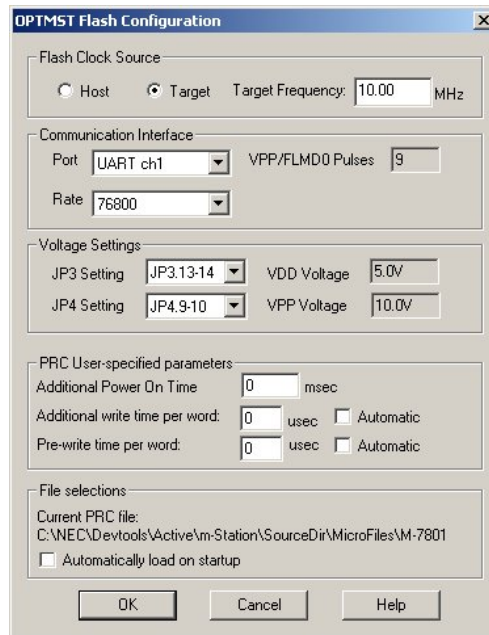
1. Do not connect power supply to M-Station yet.
2. Connect the M-Station to host computer via the USB cable. The Windows operating system will detect the M-Station as new hardware.
3. Use Windows Hardware Wizard to install the drivers for the M-Station. Drivers can be found on the CD-ROM under `\fscommand\Software\M-Station\Drivers`. (Select 2K-XP directory for Windows 2000 or Windows XP.)
4. Once the M-Station drivers are installed, the green **USB LED (D1)** on the M-Station board will turn ON.

### IV. Connect M-780138 Micro-Board to M-Station

1. Confirm jumper settings on the **M-Station** board.  
**JP1:** Open, **JP2:** 1–2 (REG-VDD), **JP3:** 13–14, **JP4:** 9–10, **JP5:** 1–2,  
**JP6:** Open, **JP7:** 1–2, **JP8:** 1–2 (UTXD-TXDSO), **JP9:** 1–2 (URXD-RXDSI)
2. The **M-780138** board is configured correctly with the default jumper settings.
3. Connect M-780138 to the bottom of the M-Station using the two 100-pin connectors.
4. Connect the 12VDC power supply to J8 connector on the M-Station.
5. The red **PWR LED D11** will turn ON.

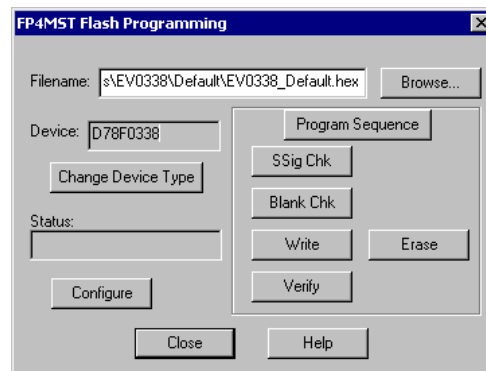
### V. Using M-Station Flash Programming Software (OPTMST and FP4MST)

1. Run the **OPTMST** program installed by the M-Station System Software. OPTMST will configure the flash programming options. The options need to be configured only once unless changes are required. Launch OPTMST from **Start → Programs → NEC Tools32 → M-Station**.
2. Set the options as shown in Figure 2. Ignore File Selection (.PRC) for now and just clear the check box.
3. Click **OK** to save settings and close the OPTMST program.



**Figure 2**

4. Run the **FP4MST** program installed by the M-Station system software. FP4MST is the flash programming control software. Launch FP4MST from **Start → Programs → NEC Tools32 → M-Station**.
5. In the **Open File** box, select the .PRC file for the M-780138 board. **78F0138.prc** can be found in the **C:\NECTools32\PRC** directory.
6. You will briefly see the **FP4MST initialization ...** message and then the **FP4MST Flash Programming** box. The filename box will be blank.



**Figure 3**

7. This confirms that the M-Station and M-780138 are configured properly for flash programming.
8. From this point on you have the following two options for debugging:
  - a. Use the terminal emulation software for command-line control.
  - b. Use the integrated debugger ID78K0-MON for source-level debugging.

## VI. Using M-Station Terminal Emulation Software (MSTTERM)

To use the MSTTERM software, the user's code needs to configure the microcontroller to send/receive commands through the UART interface. NEC Electronics America is providing a sample program that configures the M-780138 board in such a way. Follow the steps below to use the example provided.

1. From step 6 of the "Using M-Station Flash Programming Software" section, select the program image in file **C:\NECTools32\Program\_Examples\M-780138\Default\M-780138\_Default.hex**. This program includes a serial monitor function that allows communication between the M-780138 board and a host computer through a terminal emulation tool such as MSTTERM.
2. Click **Program Sequence** to program the microcontroller's flash memory.
3. Once the Program Sequence is complete, click **Close** to exit FP4MST.
4. Run the **MSTTERM** program installed by the M-Station system software. Launch MSTTERM from **Start → Programs → NEC Tools32 → M-Station**.
5. Press and hold **SW1**, labeled RESET. After a few seconds, the 7-segment LEDs on the M-Station baseboard should display "=1" (equal sign and digit 1).
6. Press **SW2** twice. The LEDs should display "=3"
7. Press **SW3**. The LEDs should display "30" and the MSTTERM window should show:  
 UART6 Test 0 – Transmit test  
 Press switch SW2 or SW3, or both to end transmit test
8. Press **SW2** and **SW3** together. The LEDs should display "31" and the MSTTERM window should show:  
 UART6 Test 1 – Receive test  
 Enter characters; press CR to end test  
 Character -
9. Press **Enter** on the computer keyboard. The LEDs should display "6d" (Good), and the MSTTERM window should show:  
 = 0x0d  
 UART6 test done.
10. At this point, if steps 5–8 above pass, then the M-Station and M-780138 are configured properly for UART communication using the MSTTERM program.

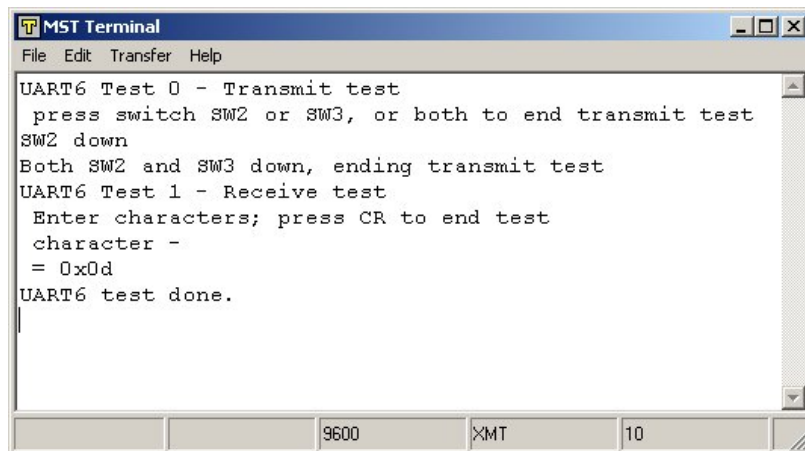


Figure 4

## VII. Using M-Station Integrated Debugger Software (ID78K0-MON)

To use the M-Station's integrated debugger, the user code must be linked with the appropriate C startup file (s0MMON.rel) and debugging monitor file (MMON780138.rel or MMON780138R.rel) for your M-780138 system. For details about using the ID78K0MON M-Station debugger tool, refer to the ID78K0-MON Addendum (document no. 50974). NEC Electronics America is providing a sample program that configures the M-780138 board for source-level debugging. Follow the steps below to use the example.

1. From step 6 of the "Using M-Station Flash Programming Software" section, select the program image in **C:\NECTools32\Program\_Examples\M-780138\Debugger\M-780138\_Debug.hex**. This program includes sample code that has been linked with the M-780138 debugging monitor and C startup files required by the integrated debugger tool.
2. Click **Program Sequence** to program the microcontroller's flash memory.
3. Once the Program Sequence is complete, click **Close** to exit FP4MST.
4. Run the **ID78K0MON** program installed by the M-Station debugger software. Launch ID78K0MON from **Start → Programs → NEC Tools32**.
5. In the **Debugger Configuration** window, select **uPD78F0138** for the **Chip Name**.
6. Click **OK**. The debugger will initialize and its main window will appear as shown below.

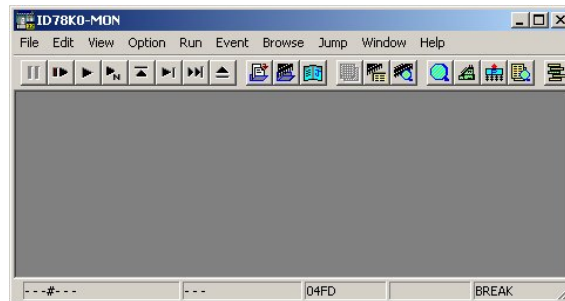


Figure 5

7. Click **File → Download**.
8. Select **C:\NECTools32\Program\_Examples\M-780138\Debugger\M-780138\_Debug.lmf**. The debugger's main window will display your source code.

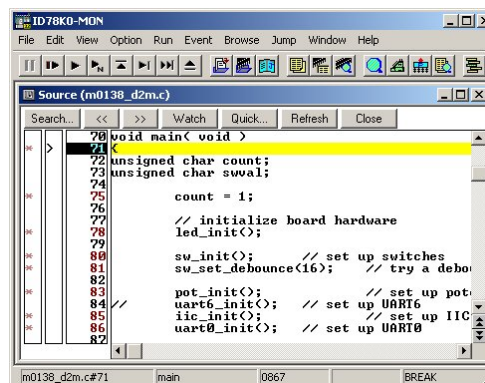


Figure 6

9. Click **Run → Go** to execute the code in real time. Click **Run → Stop** to stop execution. At this point, you may exercise other source-level debugging functions.

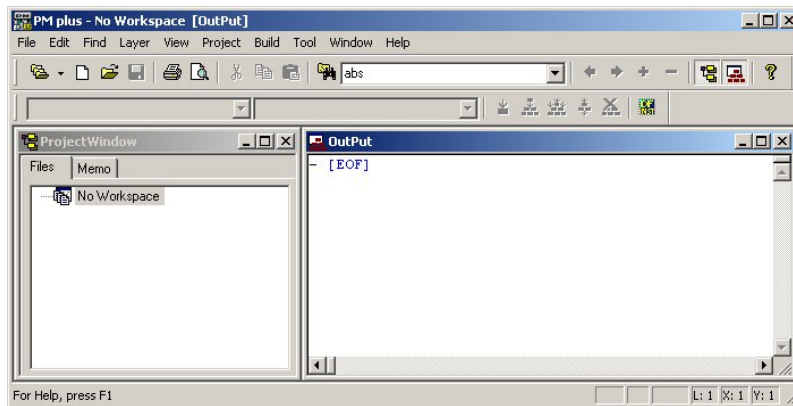
**Note:** When using the M-Station ID78K0-MON software, the M-780138 system supports

- » Up to eight single-stepping breakpoints (when using MMON780138.rel)
- » Up to two ROM correction breakpoints (when using MMON780138R.rel)

Refer to the ID78K0-MON Addendum for more information on breakpoints.

### **VIII. Using the NEC Electronics Assembler and C Compiler**

1. The programming examples installed in step (e) of the “Install Software” section includes sample code for the M-780138. The sample code includes workspace and project files used with Project Manager Plus, which is NEC Electronics’ integrated development environment software. If you want to modify the programming examples provided, follow the steps below.
2. Run PM Plus program installed by the NEC Electronics assembler software. Launch PM Plus from **Start → Programs → NEC Tools32**. PM Plus will display its main window as shown below.



**Figure 7**

3. Click **File** and select **Open Workspace**. Choose one of the options below.
  - a. To open the code that is pre-programmed in the M-780138 micro-board, browse to **C:\NECTools32\Program\_Examples\M-780138\Default** and select **M-780138\_1.prw**, which is the PM Plus workspace file. The workspace file will contain one project called **M-780138 Default**.
  - b. To open the code that is configured for source-level debugging, browse to **C:\NECTools32\Program\_Examples\M-780138\Debug** and select **M-780138\_debug.prw**, which is the PM Plus workspace file. The workspace file will contain one project called **M-780138 Debug**.
4. To recompile the code, click **Build** and select **Rebuild**.
5. At this point, you may change the code and recompile as needed.
6. After building the code, you may use the M-Station flash programming software to reprogram the M-780138 micro-board.