

MPC5647L: Programming the Flash Shadow Row using P&E

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1 Introduction

This application note is a brief guide on how to program the contents of the shadow flash on the MPC5647L for switching between Dual parallel and Lock step modes.

The following P&E software is required for this:

- CW_ICDPPCNEXUS.EXE v1.23.3.2 or newer
- cw_progpcnexus.exe v1.30.1.1 or newer

Additionally, a P&E USB multilink connected to user's computer and the MPC5674L hardware will be required.

Programming the shadow flash

The default contents of the shadow flash are dumped to a srecord using P&E. The srecord is hand modified for Dual parallel mode and the shadow flash is reprogrammed with this updated configuration.

The following srecord configuration files are provided along with this application note in AN4149SW which can also be used, if the user does not wish/require to create their own contents for the shadow flash.

LS_shadow_default.S19 – factory default setting for the shadow row. Uses default passwords and Lock Step Mode.

DPM_shadow.S19 – Configures the device for Dual parallel mode. Uses default passwords.

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2 Dual Parallel / Lock Step Mode Selection

The MCU boots in Dual parallel mode or Lock step mode dependent on the value of the LSM_DPMB bit. This bit is one of the user option bits located in the shadow flash Bus Interface Unit 4 register (BIU4). [Table 1](#) shows content of the BIU4 register.

Table 1. User option bits in the Shadow flash BIU4 register

Bit number	Function name	Description
31-20	FCCU_CFG	FCCU configuration Bits 0-5: FCCU_CFG.FOP Bits 6-8: FCCU_CFG.FOM Bit 9: FCCU_CFG.PS Bit 10: FCCU_CFG.SM Bit 11: FCCU_CFG.CM
19-12	Reserved	
11-10	SELFT-EST_CFG	00 Reserved 01 Reserved 10 Reserved 11 Self-test configuration via SSCM (default value)
9	LSM_DPMB	0 Selects DPM 1 Selects LSM (default value)
8-1	Reserved	
0	WATCH-DOG_ENABLE	0 Disable SWT 1 Enable SWT

The BIU4 register is located at address 0x00F03E10.

3 Open and Configure the Programming tool

1. Run the flash programming utility: cw_progpcnexus.exe. To avoid locking out the MCU, programming the shadow flash from within the debugger will not be possible.
2. Once the tool opens Connection Manager window is displayed.

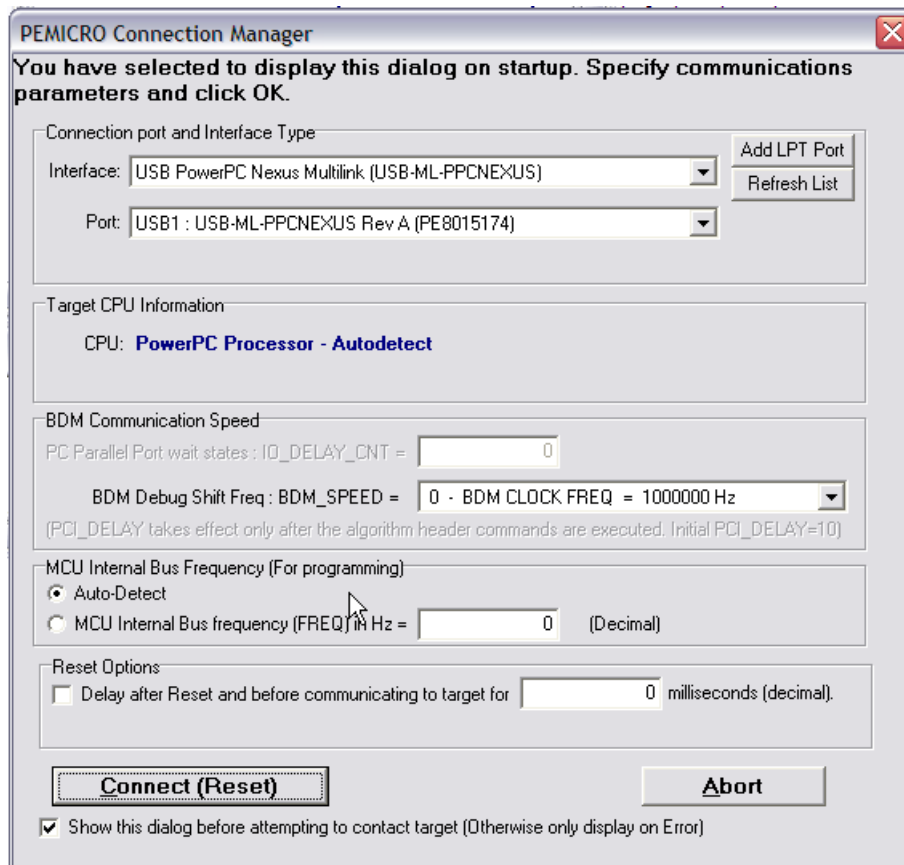



Figure 1. Connection Manager

3. Ensure the MCU is powered and the Multilink connected.
4. Press the Connect (Reset) button to connect to the MPC5674L.
5. Now specify the programming Algorithm to use. P&E provides a special Algorithm for programming the shadow flash of the MCU. In this case select the following file:
 Freescale_MPC5643L_1x32x4k_Shadow_Blkl_Freescale_C90FL2_Driver_031.PCP. This is located in:
 pemicro\pkgppcnexus_starter\Algorithms\shadow if the default installation path was used. The user can change the file using the  button in the console.

The tool is now configured to work with the MPC5643L Shadow Flash.

4 Creating a record dump of the shadow flash

Once the tool has been configured for the MPC5643L shadow flash the existing contents of the shadow flash (which will be the factory default if the shadow row has never been programmed) can be dumped to a record file.

Press the upload module button on the console  to do this. The user is prompted to provide a location and name for the file.

5 Modifying the record

The default record can be opened and edited in a text editor. For this example, the default has been taken and the following lines changed to update from Lock step mode to Dual parallel mode.


Programming the Shadow Flash

Original Line: S214FFFE10FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFE

Updated Line: S214FFFE10FBBFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF2




Note that the last Byte is a checksum and must be manually modified. To calculate this, take the sum of the values of all bytes from the byte count up to the last data byte, inclusive, modulo 256. Subtract this result from 255. Ensure that the censorship control word is present in the updated srec and give it an appropriate name.

6 Programming the Shadow Flash

Erase the shadow row by clicking on the Erase Module Button .

NOTE

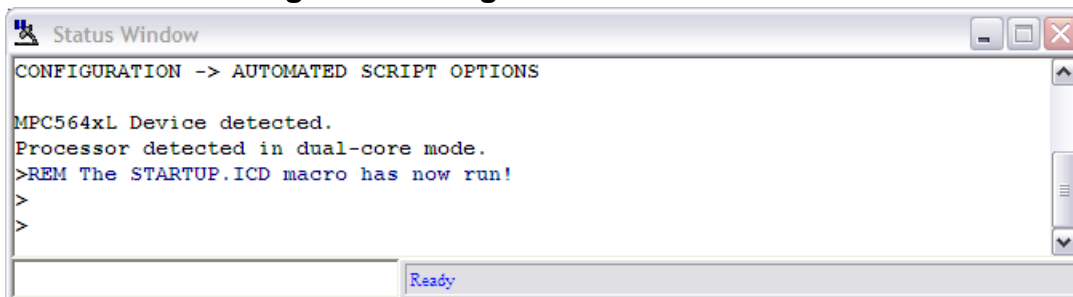
After the shadow flash is erased do not Reset or Power cycle the MCU or the flash will be inaccessible.

Now the updated srec can be programmed. Specify the file by clicking on the Specify Object File Button  and selecting the updated srecord. Now download the srecord into the shadow flash by clicking on the Program Module button . Use the Verify Module Button to check the programming operation .

7 Testing the Configuration

Power cycle the module to restart it in the new configuration. Start the P&E debugger CW_ICDPPCNEXUS.EXE and connect to the MCU as before. The programmer and debugger use the same connection utility. The status window, shown below, will confirm what mode the processor is operating in. Check the status window so that, it matches with the specified shadow flash configuration.

Figure 2. Configuration status window



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