

Application Note **AN531**

HBI-0329

uSDCARD SPI Adaptor for the Cortex-M Prototyping System (MPS2+)

Non-Confidential



uSDCARD SPI Adaptor

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Release Information

The following changes have been made to this Application Note.

Change History			
Date	Issue	Confidentiality	Change
29/03/2017	A	Non-Confidential	First release

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V2C-uSD SPI uSDCARD adaptor

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1 Conventions and Feedback

The following describes the typographical conventions and how to give feedback:

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The following typographical conventions are used:

<code>monospace</code>	denotes text that you can enter at the keyboard, such as commands, file and program names, and source code.
<u><code>monospace</code></u>	denotes a permitted abbreviation for a command or option. You can enter the underlined text instead of the full command or option name.
<code>monospace</code> <i>italic</i>	denotes arguments to commands and functions where the argument is to be replaced by a specific value.
<code>monospace</code> bold	denotes language keywords when used outside example code.
<i>italic</i>	highlights important notes, introduces special terminology, denotes internal cross-references, and citations.
bold	highlights interface elements, such as menu names. Denotes signal names. Also used for emphasis in descriptive lists, where appropriate.

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- Details of the platform you are using, such as the hardware platform, operating system type and version.
- A small standalone sample of code that reproduces the problem.
- A clear explanation of what you expected to happen, and what actually happened.
- The commands you used, including any command-line options.
- Sample output illustrating the problem.
- The version string of the tools, including the version number and build numbers.

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- ARM Support and Maintenance, <http://www.arm.com/support/services/support-maintenance.php>
- ARM Glossary, <http://infocenter.arm.com/help/topic/com.arm.doc.aeg0014g/index.html>

The ARM Glossary is a list of terms used in ARM documentation, together with definitions for those terms. The ARM Glossary does not contain terms that are industry standard unless the ARM meaning differs from the generally accepted meaning.

1.1 Terms and abbreviations

Term	Meaning
MISO	Master In, Slave Out (The V2M-MPS2+ is Master)
MOSI	Master Out, Slave In (The SDCard is Slave)
MPS2+	Cortex-M Prototyping System+
SPI	Serial Peripheral Interface
SMM	Soft Macrocell Model, FPGA implementation of a processor subsystem
uSDCARD	Micro Secure Digital Card

2 Overview

2.1 Purpose of this application note

This application note details installation of the uSDCARD SPI Adaptor which provides a user storage device visible to processor SMMs loaded in to the Cortex-M Prototyping System (MPS2+) Motherboard.

2.2 Requirements

To use this adaptor you will require a SPI controller to be implemented in the FPGA design, such as the ARM[®] SSP primecell, PL022. An example of this can be found in the MPS2+ default SMM, Appnote AN385.

Software access to the SPI interface is supported by the ARM[®] MBED API libraries.

2.3 References

- *ARM[®] Versatile[™] Express Cortex[®]-M Prototyping System+ (MPS2+) Technical Reference Manual*
http://infocenter.arm.com/help/topic/com.arm.doc.100112_0200_06_en/index.html
- *ARM[®] PrimeCell Synchronous Serial Port (PL022) Technical Reference Manual*
<http://infocenter.arm.com/help/index.jsp?topic=/com.arm.doc.ddi0194g/I1005344.html>
- *Application Note AN385, ARM[®] Cortex[®]-M3 SMM on V2M-MPS2+*
http://infocenter.arm.com/help/topic/com.arm.doc.dai0385d/DAI0385D_cortex_m3_on_v2m_mps2.pdf
- *ARM[®] MBED API*
<https://docs.mbed.com/docs/mbed-os-api-reference/en/latest/APIs/interfaces/digital/SPI/#interface>

3 Getting Started

The uSDCARD SPI Adaptor kit should have arrived with the following contents:

1. uSDCARD SPI Adaptor Board
2. PCB spacer, male, 6 mm, M3
3. PCB spacer, female, 11 mm, M3
4. Screw, steel, 6mm, M3
5. 2GB uSD card

The steps below show you how to set up the adapter board on the MPS2+ Motherboard.

1. Remove the plastic spacer, supplied with MPS2+ Motherboard, from the mounting hole (Figure 3-1).

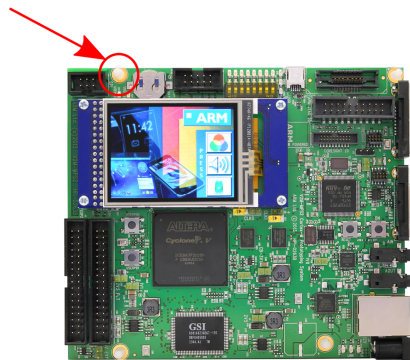
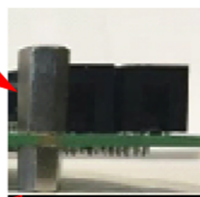


Figure 3-1 : Plastic spacer removal

2. Replace them with the two spacers provided with the Adaptor board as shown in Figure 3-2

PCB Spacer, Female, M3 x 11mm



PCB Spacer, Male, M3 x 6mm

Figure 3-2 : Spacers replacement

3. Plug the adaptor in to J21 of the V2M-MPS2+ motherboard.

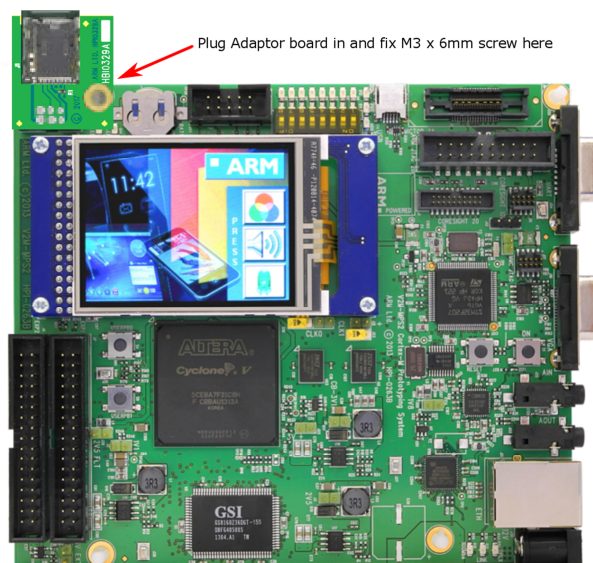


Figure 3-3 : Fit the Adaptor

4. Place the supplied SD card in to the adaptor connector slot and push in then release, possibly repeating until it latches.

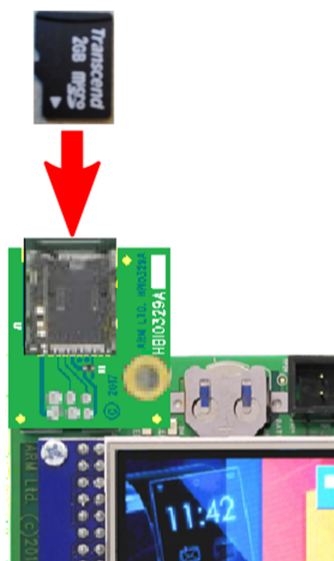


Figure 3-4 : Placing Card in Adapter board

4 PIN MAPPING

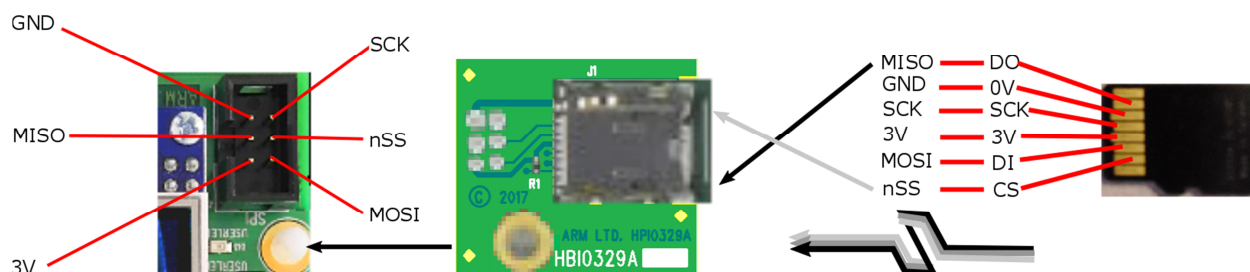


Figure 4-1 : SD Card to Adaptor to V2M-MPS2+ pin mapping

5 SCHEMATIC

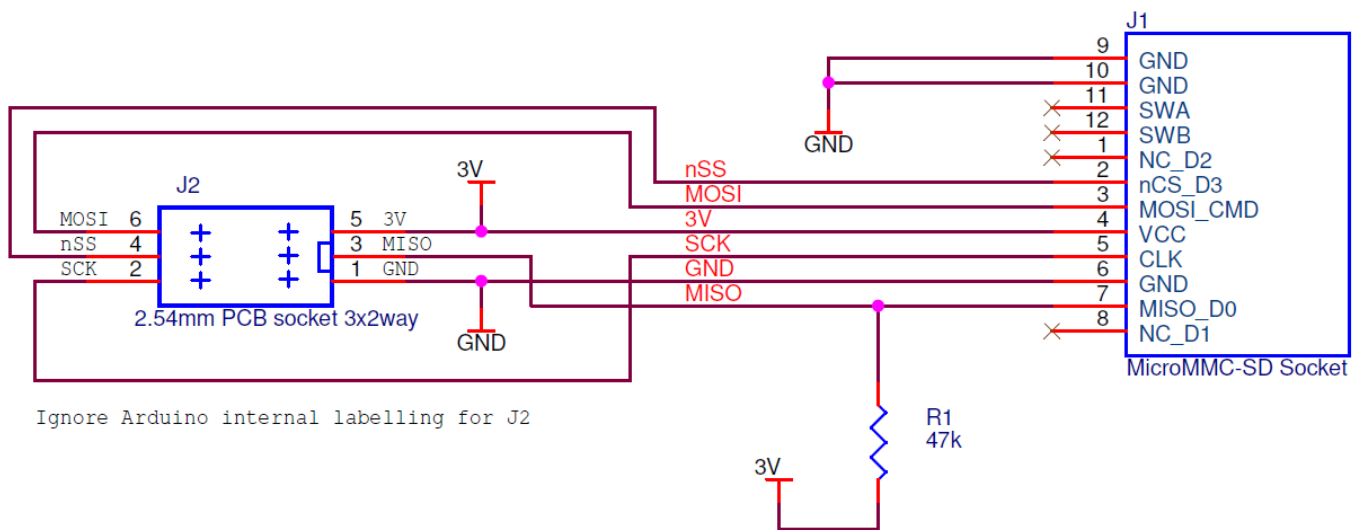


Figure 5-1 : SD Card to Adaptor Schematic

6 CONNECTIVITY

Table 6-1 represents connectivity between MPS2+ SPI port, Adaptor and SDCard.

MPS2+ FPGA Pin	MPS2+ Header Signal	MPS2+ Header Pin	Adaptor Signal	Adapt or Pin	SDCard Signal	SDCard Pin
GND	GND	J22, 1	GND	J2, 1	GND	6
AG8	SPI_SCK (Clock)	J22, 2	SCK	J2, 2	CLK	5
K25	SPI_MISO (Master In, Slave Out)	J22, 3	DO	J2, 3	MISO_D0	7
T25	SPI_nSS (not Select)	J22, 4	nCS	J2, 4	nCS_D3	2
3V	3V	J22, 5	3V	J2, 5	3V3	4
AF30	SPI-MOSI (Master Out, Slave In)	J22, 6	DI	J2, 6	MOSI_CMD	3

Table 6-1 : Connectivity