
SPC58EHx/SPC58NHx -MMC compatibility

Introduction

The SPC58EHx/SPC58NHx automotive microcontroller embeds the 3MCR (Multi-Card Reader) controller that is an advanced host controller compliant. It has the following specifications:

- MMC specification version 4.51
- SD host controller standard specification version 3.00
- SDIO card specification version 3.0
- SD memory card specification version 3.01
- SD memory card security specification version 1.01

This technical note describes the availability of the 3MCR controller on different SPC58EHx/SPC58NHx packages, i.e.:

- eTQFP144
- eLQFP176
- FPBGA302
- FPBGA386

1 Bus speed modes

Table 1. Bus speed mode supported shows the bus speed modes that can be supported for SD and MMC devices according to the available data lines, frequency and signal voltage.

Table 1. Bus speed mode supported

Bus speed mode	Data lines	Frequency	Signal voltage	Bus maximum performance
Secure digital card				
(SD specifications part 1 physical layer simplified specification version 3.01)				
Default speed (DS)	4	25MHz	3.3V	12.5MB/sec
High speed (HS)	4	50MHz	3.3V	25MB/sec
Multi media card				
(JESD84-B45)				
Backwards Compatibility with legacy MMC card	1 - 8	0-25MHz	3.3V	25MB/sec
High Speed SDR	4 - 8	0 - 50MHz	3.3V	50MB/sec
High Speed DDR	4 - 8	0 - 50MHz	3.3V	100MB/sec

2 I/O mapping

A set of ports on SPC58EHx/SPC58NHx are designed to support eMMC signals timing specification, the table below shows the signals and the compatibility for all the microcontroller samples. More details are detailed in the datasheet and the I/O definition document (see [Section 4.2 Reference documents](#)).

Table 2. I/O MMC pin mapping

Port	Function	Description	QFP144	QFP176	BGA302	BGA386
PB[10]	SDHC_SDBUS_POWER	eMMC	65	79	Y14	AA15
PD[15]	SDIF_CD_N	eMMC	2	2	C2	D3
PE[0]	SDIF_CD_N	eMMC	14	14	H2	J3
PN[12]	FBCLK	eMMC Feedback clock	72	88	W18	AB17
PO[3]	SDIF_CD_N	eMMC				C1
PP[13]	SDHC_SDBUS_POWER	eMMC				AB9
PP[15]	FBCLK	eMMC Feedback clock		86	Y18	AB15
PQ[0]	CMD	eMMC Command		87	Y19	AB16
PQ[2]	DATA6	eMMC Data 6			R17	P22
PQ[3]	DATA7	eMMC Data 7			P16	N22
PQ[4]	DATA0	eMMC Data 0		91	U20	AB20
PQ[5]	DATA1	eMMC Data 1		92	T19	AB21
PQ[6]	DATA2	eMMC Data 2		93	T20	AA22
PQ[7]	DATA3	eMMC Data 3		94	T17	Y22
PQ[8]	DATA4	eMMC Data 4			N17	W22
PQ[9]	DATA5	eMMC Data 5			P17	T22
PS[6]	CLK	eMMC Clock		89	V20	AB18

3 Compatibility

Table 3. Package compatibility shows the compatibility and the supported data lines of the 3MMC controller on all the available packages.

Table 3. Package compatibility

SPC58EHx, SPC58NHx package	Data lines	Note
eTQFP144	-	Missing signals
eTQFP176	1 - 4	Missing DATA[4:7]
FPBGA302	1 – 4 – 8	-
FPBGA386	1 – 4 – 8	-

According to the Table 1. Bus speed mode supported, for SD and eMMC devices it is possible to extract which modes can be supported by each package.

The TQFP144 package does not support either SD or MMC due to the missing signals (data, cmd, clock).

The FPBGA302 and FPBGA386 packages are fully compatible with the table 1 and all signals are available.

The TQFP176 package supports SD cards. This package has the CMD, clock and Feedback clock signals.

In the TQFP176 package the MMC device cannot switch to 8bit mode due to the missing data lines but still able to support high speed modes.

Refer to the “Application Note Getting started with SPC58EHx/SPC58NHx MultiMedia Card host controller” for programming guide on this micro-controller (see Section 4.2 Reference documents).

4 Other information

4.1 Acronyms

Table 4. Acronyms

Acronym	Name
MMC	Multimedia Card
eMMC	Embedded MMC
SD	Secure Digital
IO	Input Output

4.2 Reference documents

- RM0452 Reference manual
- SPC58EHx, SPC58NHx datasheet
- TN1257 SPC58EHx, SPC58NHx IO definition: signal description and input multiplexing tables
- IS21/22ES04G/08G/16G/32G/64G datasheet
- SPC58EHx, SPC58NHx Errata sheet
- EMBEDDED MULTI-MEDIA CARD (eMMC), ELECTRICAL STANDARD (4.5 Device) JESD84-B45 (June 2011)
- SD Specifications Part 1 Physical Layer Specification" document version 3.01 (Feb. 2010)
- SD Input/Output (SDIO) Card Specification
- PartA2 SD Host Controller Simplified Specification Ver3.00.

Revision history

Table 5. Document revision history

Date	Version	Changes
03-Sep-2020	1	Initial release.

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