

SD NAND 存储功能描述 (14) 命令类 b

CMD INDEX	type	argument	resp	abbreviation	command description
CMD16	ac	[31:0] block length	R1	SET_BLOCKLEN	See description in Table 4-22
CMD20	ac	[31:28]Speed Class Control [27:0]Reserved (all-0)	R1b	SPEED_CLASS_CONTROL	Speed Class control command. Refer to Section 4.13.2.8.
CMD23	ac	[31:0] Block Count	R1	SET_BLOCK_COUNT	Specify block count for CMD18 and CMD25.
CMD24	adtc	[31:0] data address ²	R1	WRITE_BLOCK	In case of SDSC Card, block length is set by the SET_BLOCKLEN command ¹ . In case of SDHC and SDXC Cards, block length is fixed 512 Bytes regardless of the SET_BLOCKLEN command.
CMD25	adtc	[31:0] data address ²	R1	WRITE_MULTIPLE_BLOCK	Continuously writes blocks of data until a STOP_TRANSMISSION follows. Block length is specified the same as WRITE_BLOCK command.
CMD26	Reserved For Manufacturer				
CMD27	adtc	[31:0] stuff bits	R1	PROGRAM_CSD	Programming of the programmable bits of the CSD.

Block-Oriented Write Commands (class 4)

- 1) 传输的数据不得跨越物理块边界, 除非在 CSD 中设置了 WRITE BLK MISALIGN。如果不支持写部分块, 则块长度-默认块长度(在 CSD 中给出)1
- 2) SDSC 卡(CCS=0)使用字节单位地址, SDHC 和 SDXC 卡(CCS=1)使用块单位地址(512 字节单位)。

CMD INDEX	type	argument	resp	abbreviation	command description
CMD28	ac	[31:0] data address ²	R1b	SET_WRITE_PROT	If the card has write protection features, this command sets the write protection bit of the addressed group. The properties of write protection are coded in the card specific data (WP_GRP_SIZE). SDHC and SDXC Cards do not support this command.
CMD29	ac	[31:0] data address ²	R1b	CLR_WRITE_PROT	If the card provides write protection features, this command clears the write protection bit of the addressed group. SDHC and SDXC Cards do not support this command.
CMD30	adtc	[31:0] write protect data address ²	R1	SEND_WRITE_PROT	If the card provides write protection features, this command asks the card to send the status of the write protection bits. ¹ SDHC and SDXC Cards do not support this command.
CMD31	reserved				

- 1) 32 个写保护位(代表从指定地址开始的 32 个写保护组)后跟 16 个 cRC 位, 通过数据线以有效载荷格式传输。保护位的最后一位(最低有效位)对应于第一个寻址组。如果最后一个组的地址在有效范围之外, 则将对应的写保护位置为 0。
- 2) 数据地址在标准容量 SD 存储卡中以字节为单位。

Block Oriented Write Protection Commands (class 6)

CMD INDEX	type	argument	resp	abbreviation	command description
CMD32	ac	[31:0] data address ¹	R1	ERASE_WR_BLK_START	Sets the address of the first write block to be erased.
CMD33	ac	[31:0] data address ¹	R1	ERASE_WR_BLK_END	Sets the address of the last write block of the continuous range to be erased.
CMD38	ac	[31:0] stuff bits	R1b	ERASE	Erases all previously selected write blocks.
CMD39	reserved				
CMD41	reserved				

Erase Commands (class 5)

- 1) SDSC 卡(CCS-0)使用字节单位地址, SDHC 和 SDXC 卡(CCS-1)使用块单位地址(512 字节单位)
- 2) 将 CMD40 移动到下方表格中(Class 7)。

CMD INDEX	type	argument	resp	abbreviation	command description
CMD16	ac	[31:0] block length	R1	SET_BLOCKLEN	See description in Table 4-22
CMD40	adtc	Reserved for Security Specification			
CMD42	adtc	[31:0] Reserved bits (Set all 0)	R1	LOCK_UNLOCK	Used to set/reset the password or lock/unlock the card. The size of the data block is set by the SET_BLOCK_LEN command. Reserved bits in the argument and in Lock Card Data Structure shall be set to 0.
CMD43-49 CMD51	reserved				

Lock Card (class 7)

CMD INDEX	type	argument	resp	abbreviation	command description
CMD55	ac	[31:16] RCA [15:0] stuff bits	R1	APP_CMD	Indicates to the card that the next command is an application specific command rather than a standard command
CMD56	adtc	[31:1] stuff bits. [0]: RD/WR	R1	GEN_CMD	Used either to transfer a data block to the card or to get a data block from the card for general purpose/application specific commands. In case of a SDSC Card, block length is set by the SET_BLOCK_LEN command. In case of SDHC and SDXC Cards, block length is fixed to 512 bytes. The host sets RD/WR=1 for reading data from the card and sets to 0 for writing data to the card.
CMD58-59	reserved				
CMD60-63	reserved for manufacturer				

Application-Specific Commands (class 8)

如果 Class 8 是允许的(SD 存储卡必须), 则支持所有应用程序特定的命令(如上方表格 class8 所示)。

CMD INDEX	type	argument	resp	abbreviation	command description
CMD52-54	Commands for SDIO (refer to the "SDIO Card Specification")				

I/O Mode Commands (class 9)

以后所有的保留命令的码字长度都应该是 48 位, 以及它们的响应(如果有的话)。下表描述了 SD 支持/保留的所有特定于应用程序的命令. 以下所有 acmd 前都必须加 APP_CMD 命令(CMD55)。

ACMD INDEX	type	argument	resp	abbreviation	command description
ACMD1-5	Reserved				
ACMD6	ac	[31:2] stuff bits [1:0]bus width	R1	SET_BUS_WIDTH	Defines the data bus width ('00'=1bit or '10'=4 bits bus) to be used for data transfer. The allowed data bus widths are given in SCR register.
ACMD7-12	Reserved				
ACMD13	adtc	[31:0] stuff bits	R1	SD_STATUS	Send the SD Status. The status fields are given in Table 4-40.
ACMD14-16	Reserved for Security Specification				
ACMD17	Reserved				
ACMD18	Reserved for SD security applications ¹				
ACMD19-21	Reserved				
ACMD22	adtc	[31:0] stuff bits	R1	SEND_NUM_WR_BLOCKS	Send the number of the written (without errors) write blocks. Responds with 32bit+CRC data block. If WRITE_BL_PARTIAL='0', the unit of ACMD22 is always 512 byte. If WRITE_BL_PARTIAL='1', the unit of ACMD22 is a block length which was used when the write command was executed.
ACMD23	ac	[31:23] stuff bits [22:0]Number of blocks	R1	SET_WR_BLK_ERASE_COUNT	Set the number of write blocks to be pre-erased before writing (to be used for faster Multiple Block WR command). "1"=default (one wr block) . ²
ACMD24	Reserved				
ACMD25	Reserved for SD security applications ¹				
ACMD26	Reserved for SD security applications ¹				
ACMD27-28	Reserved for Security Specification				
ACMD29	Reserved				
ACMD30-35	Reserved for Security Specification				
ACMD36-37	Reserved				
ACMD38	Reserved for SD security applications ¹				
ACMD39-40	Reserved				

ACMD INDEX	type	argument	resp	abbreviation	command description
ACMD41	bcr	[31]reserved bit [30]HCS(OCR[30]) [29]reserved for eSD [28]XPC [27:25]reserved bits [24]S18R [23:0] V _{DD} Voltage Window(OCR[23:0])	R3	SD_SEND_OP_COND	Sends host capacity support information (HCS) and asks the accessed card to send its operating condition register (OCR) content in the response on the CMD line. HCS is effective when card receives SEND_IF_COND command. Sends request to switch to 1.8V signaling (S18R). Reserved bit shall be set to '0'. CCS bit is assigned to OCR[30]. XPC controls the maximum current in the default speed mode of SDXC card. XPC=0 means 100mA (max.) but speed class is not supported. XPC=1 means 150mA (max.) and speed class is supported.
ACMD42	ac	[31:1] stuff bits [0]set_cd	R1	SET_CLR_CARD_DETECT	Connect[1]/Disconnect[0] the 50 KOhm pull-up resistor on CD/DAT3 (pin 1) of the card.
ACMD43 ACMD49	--	--	--	--	Reserved for SD security applications ¹
ACMD51	adtc	[31:0] stuff bits	R1	SEND_SCR	Reads the SD Configuration Register (SCR).
ACMD52-54	Reserved for Security Specification				
ACMD55	Not exist			Equivalent to CMD55. Refer to Section 4.3.9.1.	
ACMD56-59	Reserved for Security Specification				

- 1)关于 SD 安全特性的详细说明, 请参见 “Part3 Security specification”
- 2)无论是否使用预擦(ACMD23)特性, 都应使用命令 STOP TRAN (CMD12)来停止 Write Multiple Block 中的传输

Application Specific Commands used/reserved by SD Memory Card

CMD INDEX	type	argument	resp	abbreviation	command description
CMD6	adtc	[31] Mode 0:Check function 1:Switch function [30:24] reserved (All '0') [23:20] reserved for function group 6 (0h or Fh) [19:16] reserved for function group 5 (0h or Fh) [15:12] function group 4 for current limit [11:8] funciton group 3 for drive strength [7:4] function group 2 for command system [3:0] function group 1 for access mode	R1	SWITCH_FUNC	Checks switchable function (mode 0) and switch card function (mode 1). See Chapter 4.3.10.
CMD34	Reserved for each command system set by switch function command (CMD6).				
CMD35	Detailed definition is referred to each command system specification.				
CMD36					

CMD INDEX	type	argument	resp	abbreviation	command description
CMD37					
CMD50					
CMD57					

Switch Function Commands (class 10)