eMMC Solution *(Flyer)*

eMMC 5.1 Protocol Analysis

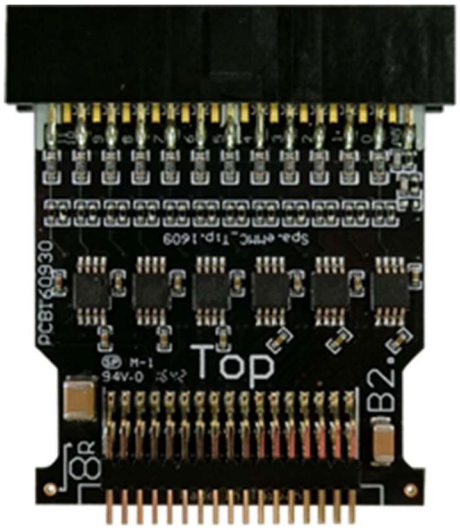
The embedded MultiMedia Card(eMMC) is the flash memory standard set by the MMC Association for mobile phones and tablets. It is an embedded multimedia memory card packaged into a BGA chip.

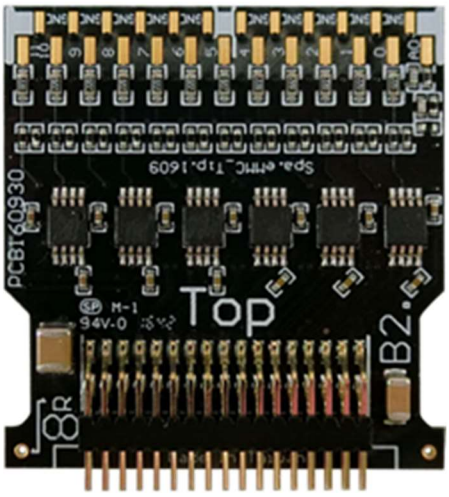
eMMC is made using parallel transmission technology. Although data reading and writing must be performed separately, it has the advantages of small size, low wiring difficulty, and high integration. eMMC is obviously different from other versions of MMC, because eMMC is not a card that users can move at will, but a permanent circuit board accessory. If eMMC has a problem with the memory or its controller, it may be necessary to replace the entire PCB (printed circuit board) to repair it.

Features

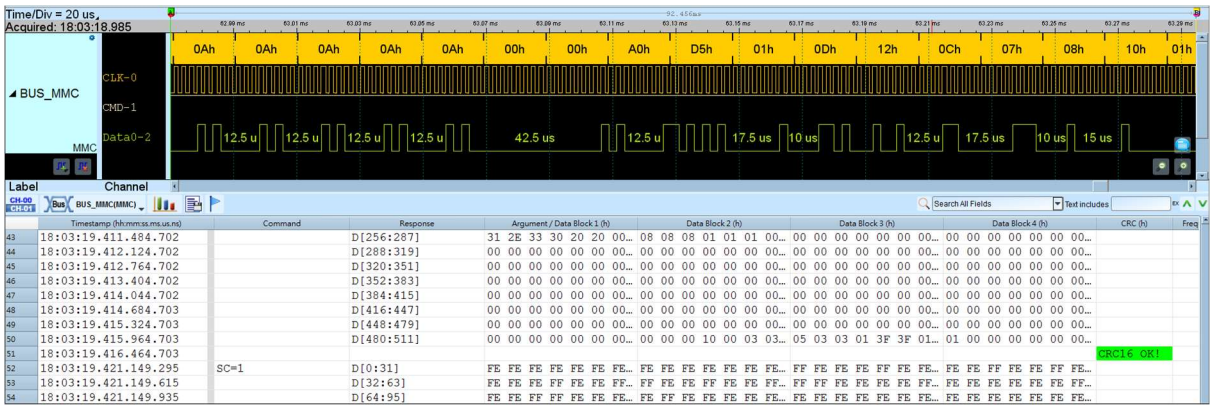
TravelLogic & MSO series support eMMC / MMC Trigger、Bus decodes (According to the optional model)
– The order to record all data flow from Low Power Mode to High Speed Mode.
– “Data Filter” filters unwanted data to save memory.
– “Search” searches specific data.
– “CRC Packet” displays and counts CRC

This option is supported in **BusFinder BF7264B, and BF7264B+**
– Can display eMMC/MMC 5.1 protocol packet data in tabular form, including command parsing
– eMMC/MMC 5.1command statistics include numbers of packets, individual command, different data length, and errors
– eMMC/MMC 5.1 command trigger
*BusFinder eMMC solution provides 2 different adapters:

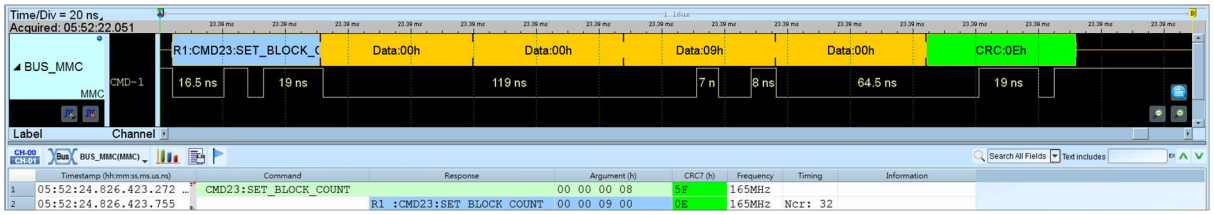




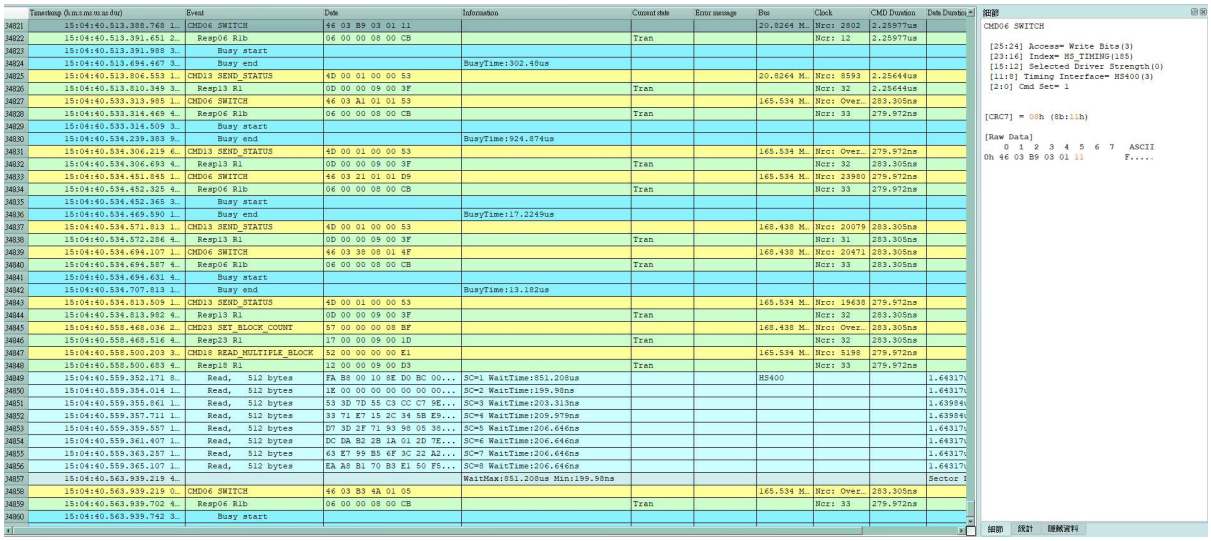
3-Pin Mode



No Clk Mode



eMMC Packet



	Timestamp (h:m:s:ms.us.ns day)	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration
34821	15:04:40.513.388.768 1...	CMD06 SWITCH	46 03 B9 03 01 11				20.8264 M...	Ncr: 2802	2.25977us	
34822	15:04:40.513.391.651 2...	Resp06 R1b	06 00 00 08 00 CB		Tran			Ncr: 12	2.25977us	
34823	15:04:40.513.391.988 3...	Busy start								
34824	15:04:40.513.694.467 3...	Busy end		BusyTime:302.48us						
34825	15:04:40.513.806.553 1...	CMD13 SEND_STATUS	4D 00 01 00 00 53				20.8264 M...	Ncr: 8593	2.25644us	
34826	15:04:40.513.810.349 3...	Resp13 R1	0D 00 00 09 00 3F		Tran			Ncr: 32	2.25644us	
34827	15:04:40.533.313.985 1...	CMD06 SWITCH	46 03 A1 01 01 53				165.534 M...	Ncr: Over...	283.305ns	
34828	15:04:40.533.314.469 4...	Resp06 R1b	06 00 00 08 00 CB		Tran			Ncr: 33	279.972ns	
34829	15:04:40.533.314.509 3...	Busy start								
34830	15:04:40.534.239.383 9...	Busy end		BusyTime:924.874us						
34831	15:04:40.534.306.219 6...	CMD13 SEND_STATUS	4D 00 01 00 00 53				165.534 M...	Ncr: Over...	279.972ns	
34832	15:04:40.534.306.693 4...	Resp13 R1	0D 00 00 09 00 3F		Tran			Ncr: 32	283.305ns	
34833	15:04:40.534.451.845 1...	CMD06 SWITCH	46 03 21 01 01 D9				165.534 M...	Ncr: 23980	275.972ns	
34834	15:04:40.534.452.325 4...	Resp06 R1b	06 00 00 08 00 CB		Tran			Ncr: 33	279.972ns	
34835	15:04:40.534.452.365 3...	Busy start								
34836	15:04:40.534.469.590 1...	Busy end		BusyTime:17.2249us						
34837	15:04:40.534.571.813 1...	CMD13 SEND_STATUS	4D 00 01 00 00 53				168.438 M...	Ncr: 20079	283.305ns	
34838	15:04:40.534.572.286 4...	Resp13 R1	0D 00 00 09 00 3F		Tran			Ncr: 31	283.305ns	
34839	15:04:40.534.694.107 1...	CMD06 SWITCH	46 03 38 08 01 4F				168.438 M...	Ncr: 20471	283.305ns	
34840	15:04:40.534.694.587 4...	Resp06 R1b	06 00 00 08 00 CB		Tran			Ncr: 33	283.305ns	
34841	15:04:40.534.694.631 4...	Busy start								
34842	15:04:40.534.707.813 1...	Busy end		BusyTime:13.182us						
34843	15:04:40.534.813.509 1...	CMD13 SEND_STATUS	4D 00 01 00 00 53				165.534 M...	Ncr: 19638	275.972ns	
34844	15:04:40.534.813.982 4...	Resp13 R1	0D 00 00 09 00 3F		Tran			Ncr: 32	283.305ns	
34845	15:04:40.558.468.036 2...	CMD23 SET_BLOCK_COUNT	57 00 00 00 08 BF				168.438 M...	Ncr: Over...	283.305ns	
34846	15:04:40.558.468.516 4...	Resp23 R1	17 00 00 09 00 1D		Tran			Ncr: 32	283.305ns	
34847	15:04:40.558.500.203 3...	CMD18 READ_MULTIPLE_BLOCK	52 00 00 00 00 E1				165.534 M...	Ncr: 5198	279.972ns	
34848	15:04:40.558.500.683 4...	Resp18 R1	12 00 00 09 00 D3		Tran			Ncr: 33	279.972ns	
34849	15:04:40.559.352.171 8...	Read, 512 bytes	FA B8 00 10 8E D0 BC 00...	SC=1 WaitTime:851.208us			HS400			1.643170
34850	15:04:40.559.354.014 1...	Read, 512 bytes	1E 00 00 00 00 00 00 00...	SC=2 WaitTime:199.98ns						1.643170
34851	15:04:40.559.355.861 1...	Read, 512 bytes	53 3D 7D 55 C3 CC C7 9E...	SC=3 WaitTime:203.313ns						1.639840
34852	15:04:40.559.357.711 1...	Read, 512 bytes	33 71 E7 15 2C 34 5B E9...	SC=4 WaitTime:209.979ns						1.639840
34853	15:04:40.559.359.557 1...	Read, 512 bytes	D7 3D 2F 71 93 98 05 38...	SC=5 WaitTime:206.646ns						1.643170
34854	15:04:40.559.361.407 1...	Read, 512 bytes	DC DA B2 2B 1A 01 2D 7E...	SC=6 WaitTime:206.646ns						1.643170
34855	15:04:40.559.363.257 1...	Read, 512 bytes	63 E7 99 B5 6F 3C 22 A2...	SC=7 WaitTime:206.646ns						1.643170
34856	15:04:40.559.365.107 1...	Read, 512 bytes	EA A8 B1 70 B3 E1 50 F5...	SC=8 WaitTime:206.646ns						1.643170
34857	15:04:40.563.939.219 4...			WaitMax:851.208us Min:199.98ns						Sector I
34858	15:04:40.563.939.219 0...	CMD06 SWITCH	46 03 B3 4A 01 05				165.534 M...	Ncr: Over...	283.305ns	
34859	15:04:40.563.939.702 4...	Resp06 R1b	06 00 00 08 00 CB		Tran			Ncr: 33	279.972ns	
34860	15:04:40.563.939.742 3...	Busy start								

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CMD06 SWITCH

  [25:24] Access= Write Bits(3)
  [23:16] Index= HS_TIMING(185)
  [15:12] Selected Driver Strength(0)
  [11:8] Timing Interface= HS400(3)
  [2:0] Cmd Set= 1

[CRC7] = 06h (6b:11h)

[Raw Data]
    0  1  2  3  4  5  6  7   ASCII
0h 46 03 B9 03 01 11         F.....
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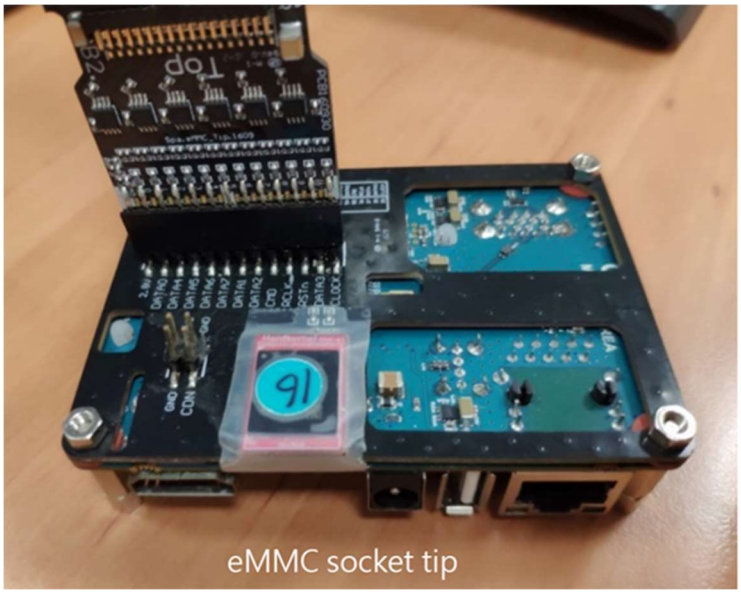
Pin Connection



* Suggestion：The bonding wire distance is about 3cm (the shorter the better), and 100~75 ohm resistance can be added for anti-reflection to improve the measurement quality.