



BF7264B eMMC5.1
方案说明

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概况

此方案仅于 BF6264B, BF7264B 以及 BF7264B+ 产品适用。

eMMC 5.1 方案，规格内容如下：

1. BF7264B，32Gb RAM，搭配 eMMC 5.1 探头组



2. 支援 eMMC 5.1

Up to eMMC 5.1 HS400

Standard*	Introduced	Sequential Read (MB/s)	Sequential Write (MB/s)	Random Read (IO/s)	Random Write (IOPS)
eMMC 5.1	2015	250	125	11,000	13,000
eMMC 5.0	2013	250	90	7,000	13,000
eMMC 4.5	2012	140	50	7,000	2,000

3. 可显示 eMMC 协议封包数据以表格方式呈现，包含指令解析

Timestamp (h:m:s.ms.us.ns)	Event	Data	Information	Current state	Error message	Bus	Clock	CMD	Duration	Data Duration	详细
34821	15:04:40.513.388.768 1	CMD06 SWITCH	46 03 B9 03 01 11			20.8264 M	Ncr: 2802				CMD06 SWITCH
34822	15:04:40.513.391.651 2	Resp06 Rib	06 00 00 08 00 CB	Tran			Ncr: 12		2.25977us		[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
34823	15:04:40.513.391.988 3	Busy start									[CRC7] = 00h (8b:11h)
34824	15:04:40.513.694.467 3	Busy end									[Raw Data] 0 1 2 3 4 5 6 7 ASCII 0h 46 03 B9 03 01 11 F....
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 Rl	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 Rib	06 00 00 08 00 CB	Tran			Ncr: 33		279.972ns		
34829	15:04:40.533.314.509 3	Busy start									
34830	15:04:40.534.239.393 9	Busy end									
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 Rl	0D 00 00 09 00 3F	Tran			Ncr: 32		283.305ns		
34833	15:04:40.534.451.645 1	CMD06 SWITCH	46 03 21 01 01 D9			165.534 M	Ncr: 23980		279.972ns		
34834	15:04:40.534.452.325 4	Resp06 Rib	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									
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 Rl	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 Rib	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									
34843	15:04:40.534.813.509 1	CMD13 SEND STATUS	4D 00 01 00 00 53			165.534 M	Ncr: 19638		279.972ns		
34844	15:04:40.534.813.982 4	Resp13 Rl	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 8F			168.438 M	Ncr: Over...		283.305ns		
34846	15:04:40.558.468.516 4	Resp23 Rl	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 Rl	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				1.64917u	
34850	15:04:40.559.354.014 1	Read, 512 bytes	1E 00 00 00 00 00 00 00...	SC=2 WaitTime:199.98ns							1.64917u
34851	15:04:40.559.355.861 1	Read, 512 bytes	53 3D 7D 55 C3 CC C7 9E...	SC=3 WaitTime:203.313ns							1.63984u
34852	15:04:40.559.357.711 1	Read, 512 bytes	33 71 E7 15 2C 34 5B E9...	SC=4 WaitTime:209.979ns							1.63984u
34853	15:04:40.559.359.557 1	Read, 512 bytes	D7 3D 2F 71 93 98 05 38...	SC=5 WaitTime:206.646ns							1.64917u
34854	15:04:40.559.361.407 1	Read, 512 bytes	DC DA B2 2B 1A 01 2D 7E...	SC=6 WaitTime:206.646ns							1.64917u
34855	15:04:40.559.363.257 1	Read, 512 bytes	63 E7 99 B5 6F 3C 22 A2...	SC=7 WaitTime:206.646ns							1.64917u
34856	15:04:40.559.365.107 1	Read, 512 bytes	EA A8 B1 70 B3 E1 50 F5...	SC=8 WaitTime:206.646ns							1.64917u
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 Rib	06 00 00 08 00 CB	Tran			Ncr: 33		279.972ns		
34860	15:04:40.563.939.742 3	Busy start									

4. 使用 32Gb RAM 搭配硬盘串流来储存 eMMC 通讯数据，可完整节录待测物从低速初始化到高速传输数据的流程

5. 提供 Data Filter 功能，可将不必要的的数据滤除以节省内存

6. 提供 Search 数据功能

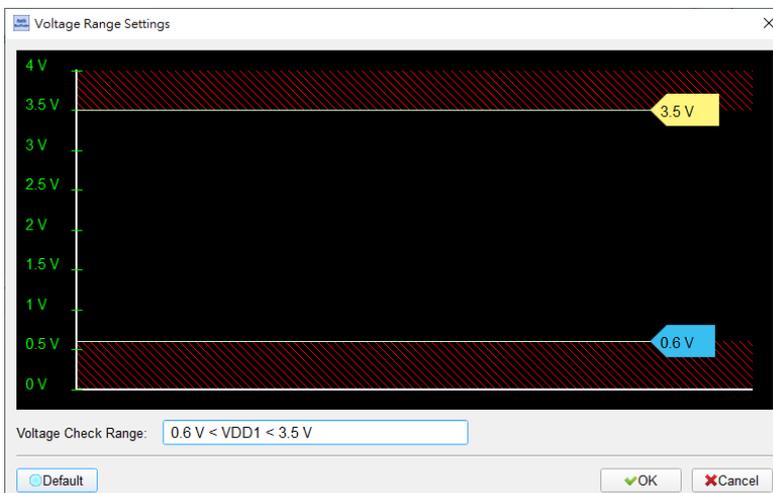
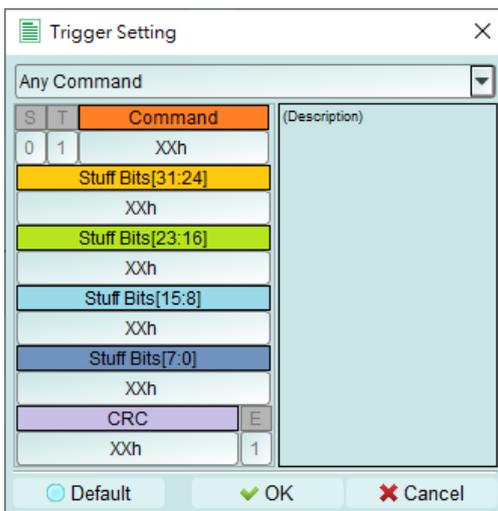
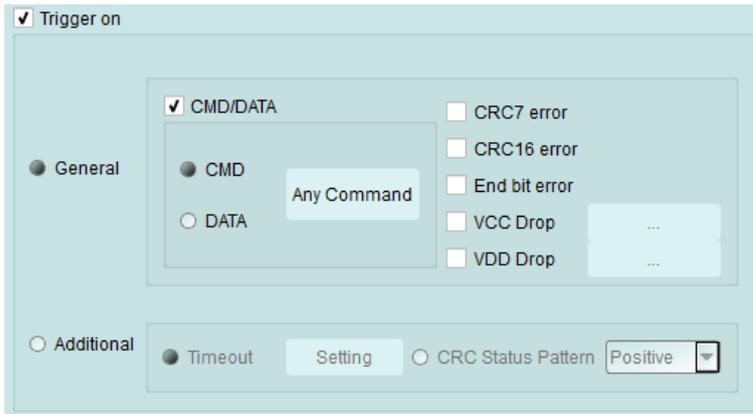
7. 提供 CRC Packet 计算及错误显示

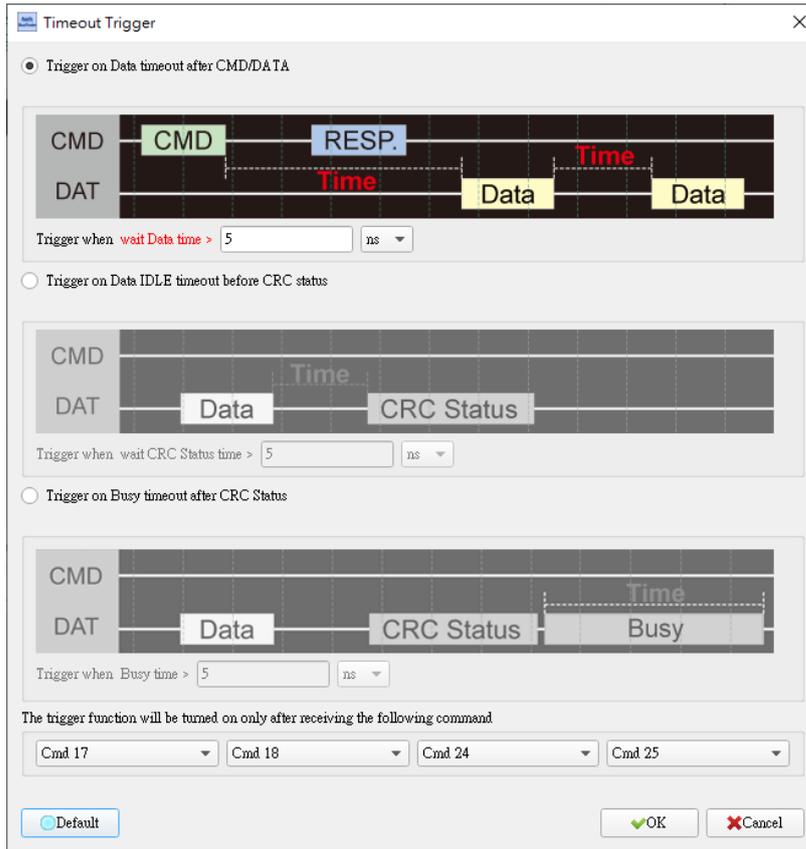
8. eMMC 命令统计功能，包含封包总数、各类别指令数量以及错误数量统计

Navigator			Statistics	
Description	Txns	Bytes	Txns	Bytes
Command	14442	693216	CMD00	4
Data	539533	276233832	CMD08	7
Error	21		CMD55	5
▼ Sector Count			CMD01	29
CMD17	55	28160	CMD02	2
CMD18	7021	275227264	CMD03	2
CMD24	3	1536	CMD09	2
CMD25	40	344064	CMD13	114
Wait Data Time(ns)			CMD07	2
Busy Time(ns)			CMD06	69
			CMD16	1
			CMD17	55
			CMD18	7021
			CMD12	30
			CMD52	2
			CMD05	4
			CMD21	8
			CMD23	7042
			CMD25	40
			CMD24	3

9. eMMC 命令触发功能

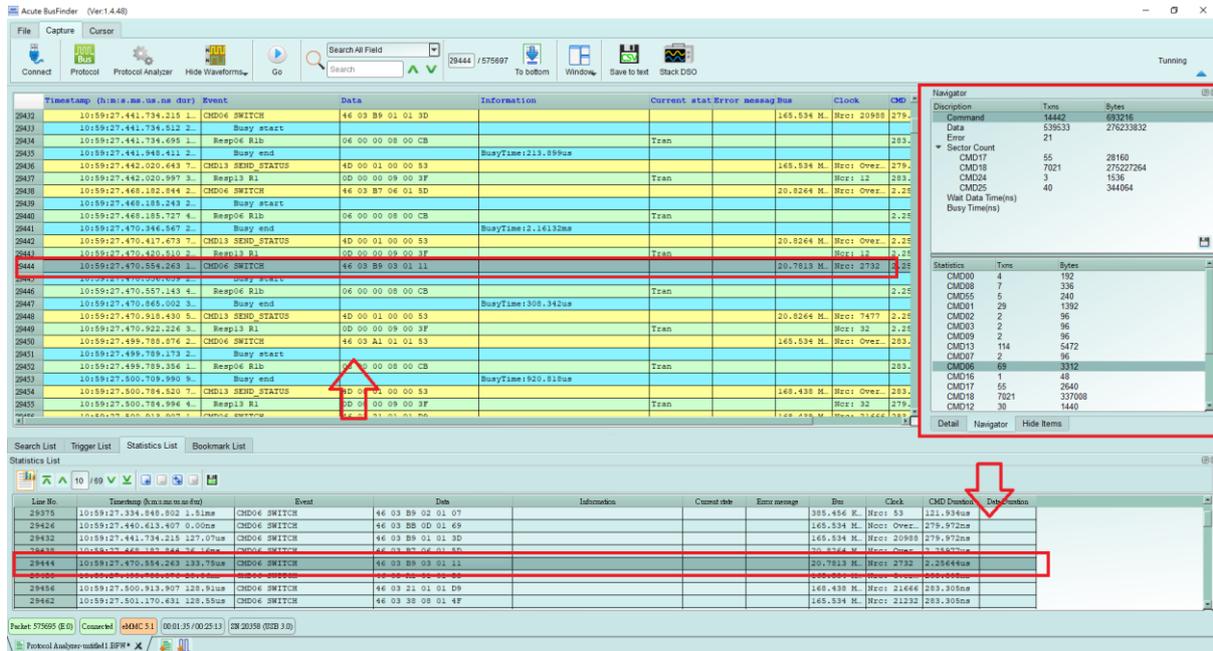
- a. 触发参数包含命令与参数资料可依据不同种类封包填入数值,
- b. 涵盖所有 Command 或 16 byte Data,
- c. 可触发 CRC7, CRC16, End Bit Error,
- d. 可触发 3 种 timeout, CRC Status pattern,
- e. 可触发 VCC drop, VCCQ2 drop
- f. 可透过 Trigger-Out 接孔同步触发外部的示波器



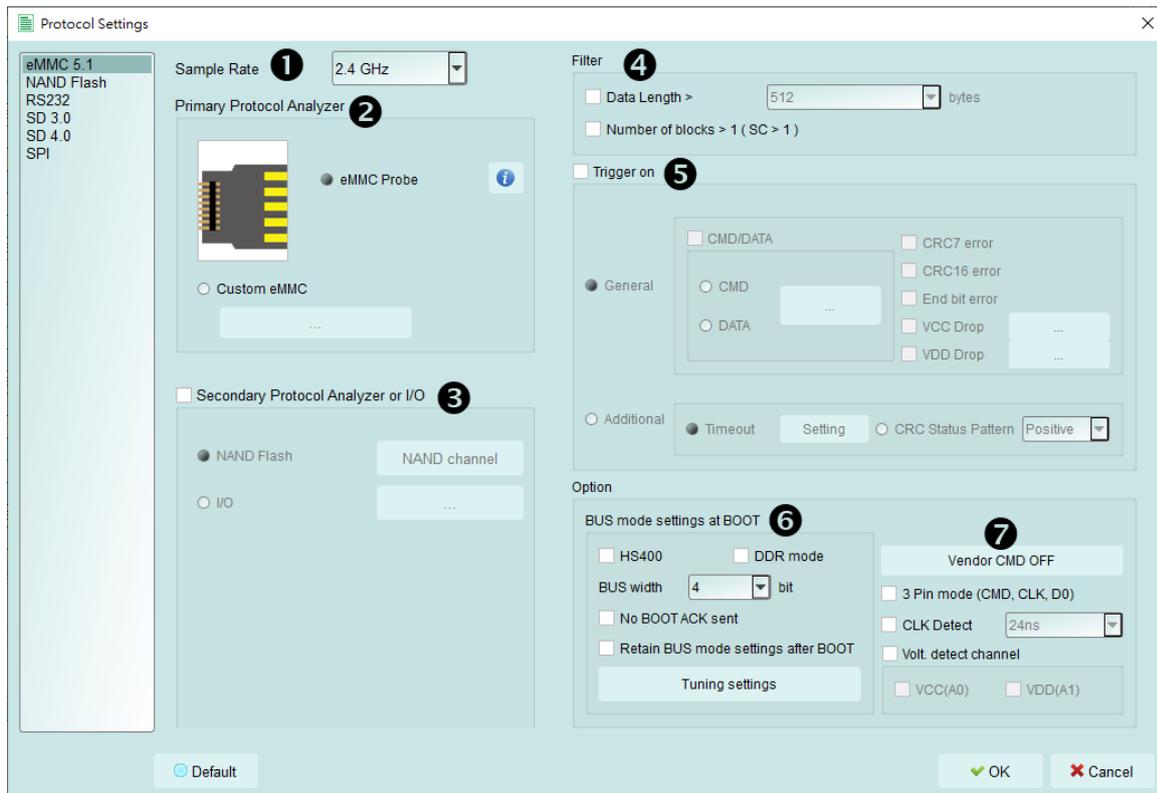


10. 报告区功能

统计列表: 以统计功能快速分类并可追踪数据位置



11. eMMC settings



1. **Sample Rate:** 选择使用的取样率，若要开启 Secondary Protocol Analyzer – NAND Flash 选项，取样率须设定为 1GHz 以下，
2. **Primary Protocol Analyzer:** 可选择使用探头类型，也可自定义通道/触发准位，
3. **Secondary Protocol Analyzer or I/O:** 可额外开启一组指定之逻辑分析，以剩下可用脚位同时进行分析，
4. **Filter:** 每一笔 Data Frame 可指定收录之大小，大于设定值的数据则不会被记录下来
5. **Trigger on:** 可设定 CMD, DATA, ERROR, Voltage, Timeout, CRC Status 触发条件
6. **Startup:** 需设定于撷取当下，待测物所运行之模式，并有提供 Tuning 功能
7. **其他 Option 设定:**
 - a. **Vendor CMD:** 可自行更改命令组名称，是否带有数据，
 - b. **3 Pin mode:** 接上 CLK, CMD, D0 后，可进行命令流程以及状态的协议分析，主要用于接线困难或是非数据错误的待测物使用，
 - c. **CLK Detect:** 可侦测 CLK 是否有动作，
 - d. **两组电压侦测功能**

FAQ

1. 支持 eMMC 第几版的规格?

A：支援到 eMMC 5.1 HS400 / HS200 / CMD Queue。

2. 量测时是否会影响讯号质量?

A：外接的仪器量测必然会有部分的负载效应影响，我们采用主动探头的连接方式来降低对待测物干扰并提升讯号质量。

3. 是否有支持讯号发送 (Tx) 功能?

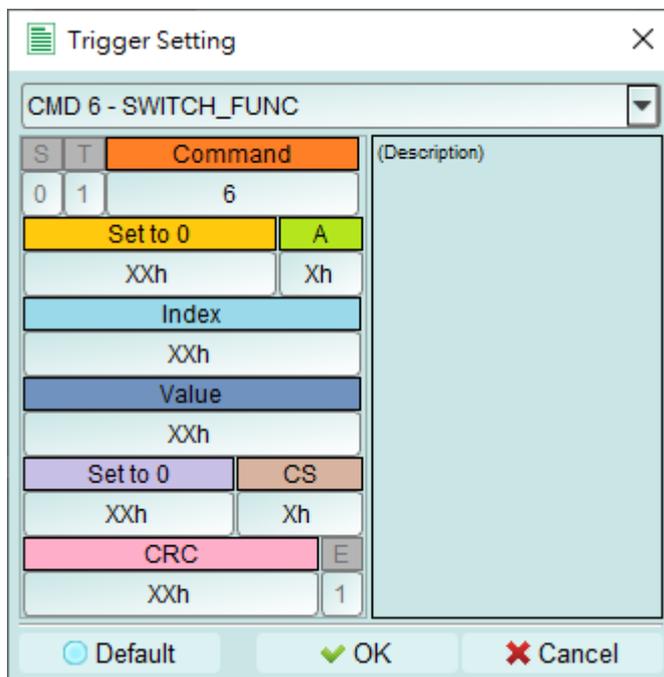
A：不支持讯号发送功能

4. 量测时须注意的事项

请确实按手册**探头与待测物连接方式**进行连接。

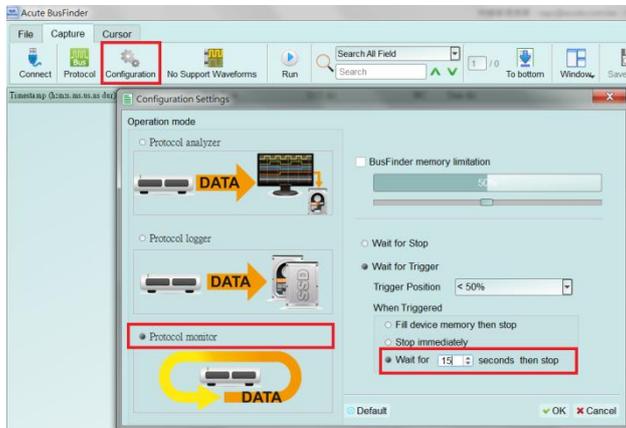
5. 有指定某个 eMMC CMD 做为 trigger 点的功能吗?

A：可以指定特定的 eMMC packet 或是 Error 进行触发。



6. 是否可以自行设定一个 eMMC CMD 起始点，指定抓取多少时间内的 Data?

A :可以将起始条件设定在触发项目后，到工作模式选单内调整为数据监控仪模式，并指定撷取时间长度。



探头与待测物连接方式

