



BF7264 系列
SD 3.0 / SD 4.0 / SDIO 3.0
方案說明

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概況

支援型號:

BF6264B	BF7264B	BF7264B+	BF7264 Pro
•	•	•	•

BF7264B/B+/Pro 產品正面有兩個 USB 孔

BF7264B/B+/Pro , 32Gb RAM

1. 搭配 SD 3.0 / SD 4.0 探棒組，可以量測 SD 3.0 訊號

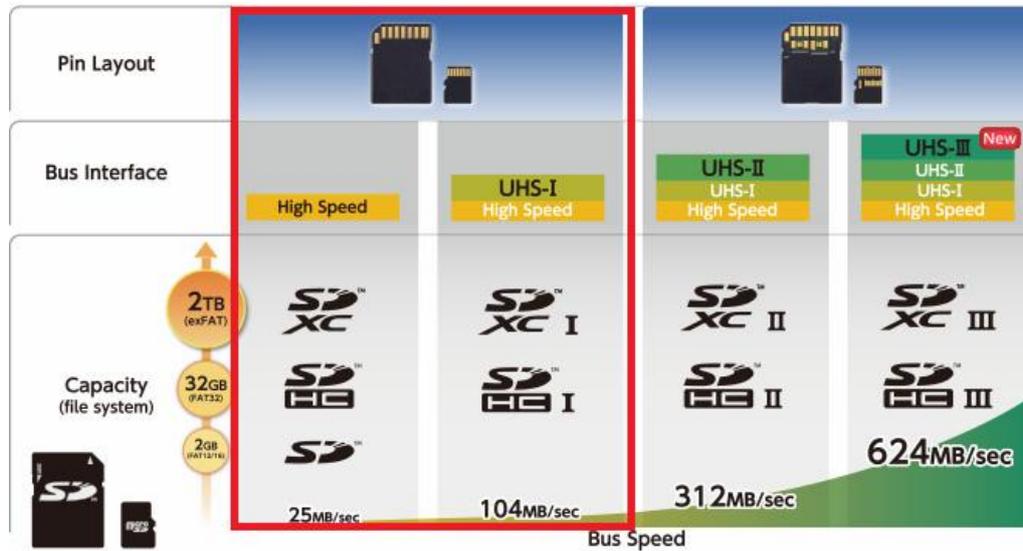


2. 搭配 SD 4.0 探棒組，可以量測 SD 4.0 訊號

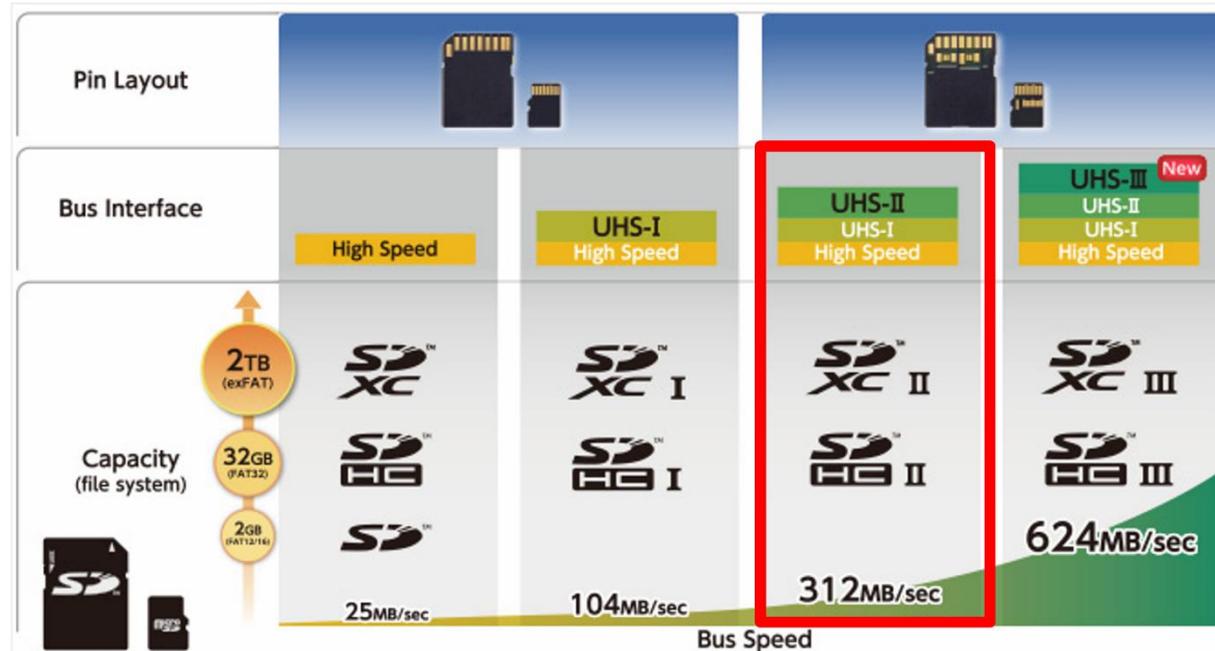


SD3.0 方案支援 SD 3.0 SDR104 / SD6.0 Legacy mode SDR104, DDR200/ SDIO 3.0

訊號量測



SD4.0 方案支援 SD4.0 訊號量測



I. 可顯示 SD 3.0 / SD 4.0 協定封包資料以表格方式呈現，包含指令解析

SD 3.0

Timestamp (h:m:s.ms.us.ns dur)	Event	Data	Information	Error message	Clock	Cmd	Duration	Data	Detail
17:35:59.487.190.425.606.4	ACMD6 SET_BUS_WIDTH	44 00 00 00 02 CB			232.451 K	Mcrr: 94	202.196us		ACMD6 SWITCH_FUNC
17:35:59.487.444.247.253.8	Resp16 R1	06 00 00 09 20 B9				Mcrr: 11	202.196us		
17:35:59.488.052.950.608.7	CMID6 SET_BLOCKLEN	50 00 00 02 00 15			232.446 K	Mcrr: 94	202.196us		[31] Mode= Check function (0)
17:35:59.488.306.798.253.0	Resp16 R1	10 00 00 09 00 0B				Mcrr: 11	202.196us		[10] group 1 Access mode= SDR104 (1h)
17:35:59.489.354.350.647.5	CMDS5 RSP_CMD	77 AA AA 00 00 2B			14.8622 M	Mcrr: 6618	3.15969us		[CRC7] = 1bh (0b1011)
17:35:59.489.356.316.940a	Resp16 R1	37 00 00 09 20 33				Mcrr: 11	3.15969us		[Raw Data] 0 1 2 3 4 5 6 7 ASCII 0h 46 00 FF FF F3 3B F....
17:35:59.489.247.424.289.1	ACMD51 SEND_SCR	73 00 00 00 00 2C			14.8622 M	Mcrr: 4249	3.15969us		
17:35:59.489.251.390.3.960a	Resp16 R1	33 00 00 09 20 91				Mcrr: 12	3.15969us		
17:35:59.489.395.798.147.4	Read, 16 bytes	02 35 84 03 00 00 00 00...	SC=1 WaitTime:144.264us		4bit	Mcrr: 2147	2.22311us		
17:35:59.490.344.700.943.8	CMDO6 SWITCH_FUNC	44 00 FF FF FF E3			14.8622 M	Mcrr: 11	3.15969us		
17:35:59.490.345.937.4.230a	Resp16 R1	06 00 00 09 00 DD				Mcrr: 16	3.15969us		
17:35:59.491.364.272.1.010a	Read, 64 bytes	00 64 80 01 80 01 80 0F...	SC=1 WaitTime:1.01218ms		4bit	Mcrr: 18064	9.74902us		
17:35:59.492.145.094.781.0	CMDO6 SWITCH_FUNC	44 00 FF FF FF 3B			14.8652 M	Mcrr: 15	3.15969us		
17:35:59.492.150.052.47.52	Resp16 R1	06 00 00 09 00 DD				Mcrr: 15	3.15969us		
17:35:59.492.150.052.47.52	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SC=1 WaitTime:144.7655us		4bit	Mcrr: 666	9.74902us		
17:35:59.492.896.862.698.0	CMDO6 SWITCH_FUNC	44 00 FF FF FF 0D			14.8652 M	Mcrr: 15	3.15635us		
17:35:59.492.901.098.4.230a	Resp16 R1	06 00 00 09 00 DD				Mcrr: 15	3.15969us		
17:35:59.494.732.738.1.830a	Read, 64 bytes	00 C8 80 01 80 01 80 0F...	SC=1 WaitTime:1.82848ms		4bit	Mcrr: 27178	9.74902us		
17:35:59.493.628.088.093.1	CMDO6 SWITCH_FUNC	44 00 FF FF FF 3F			14.8652 M	Mcrr: 33	3.15969us		
17:35:59.495.633.468.5.970a	Resp16 R1	06 00 00 09 00 DD				Mcrr: 33	3.15969us		
17:35:59.495.917.396.283.9	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SC=1 WaitTime:280.769us		4bit	Mcrr: 4179	9.74902us		
17:35:59.496.604.911.607.8	CMDO6 SWITCH_FUNC	44 00 FF FF FF A9			14.8622 M	Mcrr: 33	3.15969us		
17:35:59.496.604.911.607.8	Resp16 R1	06 00 00 09 00 DD				Mcrr: 33	3.15969us		
17:35:59.496.917.340.307.0	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SC=1 WaitTime:303.89us		4bit	Mcrr: 4823	9.75236us		
17:35:59.701.159.949.4.200a	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: 33	229.977ns		
17:35:59.701.160.339.399.9	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	226.644ns		
17:35:59.701.831.008.470.4	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.701.831.398.399.9	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	229.977ns		
17:35:59.702.396.832.565.4	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.702.397.245.393.2	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	229.977ns		
17:35:59.702.396.369.566.1	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	226.644ns		
17:35:59.702.393.789.399.9	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	229.977ns		
17:35:59.703.830.462.566.7	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.703.830.462.566.7	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 32	229.977ns		
17:35:59.704.098.232.567.3	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.704.098.232.567.3	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 32	229.977ns		
17:35:59.704.666.581.587.9	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.704.666.581.587.9	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	229.977ns		
17:35:59.705.235.615.568.6	CMID3 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Mcrr: Over	229.977ns		
17:35:59.705.236.008.393.2	Resp13 R1	0D 00 00 09 00 3F				Mcrr: 33	229.977ns		

SD 4.0

Timestamp (h:m:s.ms.us.ns dur)	Host (D0)	Card (D1)	Dir	Event	Data	Information	Detail
15:05:35.483.956.272.0 (De...)	---	---	RD				CCMD (Native) Header=[100] DID=1 SID=0 TID=0 Argument=[2000] Read 8B IOADDR=000 Generic Capabilities Register CSD[ADMA]
15:05:35.484.146.720.190.4	STB.L	---	RD				[Raw Data] 0 1 2 3 4 5 6 7 ASCII 0h 81 00 20 00 AD 6A ...J
15:05:35.484.664.832.518.1	---	---	RD				
15:05:35.487.171.597.004.0	---	---	RD				
15:05:39.498.224.929.001.0	SYN	---	RD				
15:05:39.498.225.749.819.0	SYN	---	RD				
15:05:39.498.226.825.001.0	LIDL	---	RD				
15:05:39.498.226.849.021.0	LIDL	---	RD				
15:05:39.508.329.632.010.1	CCMD(N)	LIDL	RD	Write 4B IOADDR=202	80 00 92 02 0A A8 00 00...	DEVICE_INIT	
15:05:39.508.329.811.179.0	LIDL	LIDL	RD				
15:05:39.522.739.137.014.4	LIDL	CCMD(N)	RD	Write 4B IOADDR=202	80 00 92 02 09 A0 00 00...	DEVICE_INIT	
15:05:39.522.739.317.179.0	LIDL	LIDL	RD				
15:05:39.524.656.672.001.0	CCMD(N)	LIDL	RD	Write 4B IOADDR=202	80 00 92 02 0A A8 00 00...	DEVICE_INIT	
15:05:39.524.656.852.179.0	LIDL	LIDL	RD				
15:05:39.525.420.242.763.3	LIDL	CCMD(N)	RD	Write 4B IOADDR=202	80 00 92 02 0A A8 00 00...	DEVICE_INIT	
15:05:39.525.420.422.179.0	LIDL	LIDL	RD				
15:05:39.525.481.489.061.0	CCMD(N)	LIDL	RD	Write 4B IOADDR=203	80 00 92 03 00 00 00 00...	ENUMERATE	
15:05:39.525.481.673.179.0	LIDL	LIDL	RD				
15:05:39.525.482.929.001.2	LIDL	CCMD(N)	RD	Write 4B IOADDR=203	80 00 92 03 11 00 00 00...	ENUMERATE	
15:05:39.525.483.109.179.0	LIDL	LIDL	RD				
15:05:39.525.889.785.110.6	CCMD(N)	LIDL	RD	Read 8B IOADDR=000	81 00 20 00 AD 6A	Generic Capabilities Register	
15:05:39.525.889.818.139.0	LIDL	LIDL	RD				
15:05:39.525.898.198.001.2	LIDL	RES(N)	RD	AD 10 20 00 00 01 00 00...			
15:05:39.525.898.229.029.0	LIDL	LIDL	RD				
15:05:39.525.875.623.980.1	CCMD(N)	LIDL	RD	Read 8B IOADDR=002	81 00 20 02 5D 28	PHY Capabilities Register	
15:05:39.525.875.780.136.0	LIDL	LIDL	RD				
15:05:39.525.877.033.001.2	LIDL	RES(N)	RD	AD 10 20 02 00 00 00 00...			
15:05:39.525.877.263.229.0	LIDL	LIDL	RD				
15:05:39.525.788.585.081.3	CCMD(N)	LIDL	RD	Read 8B IOADDR=004	81 00 20 04 ED EE	LINK/TRAN Capabilities Register	
15:05:39.525.788.715.129.0	LIDL	LIDL	RD				
15:05:39.525.789.998.001.2	LIDL	RES(N)	RD	AD 10 20 04 20 02 40 00...			
15:05:39.525.760.229.229.0	LIDL	LIDL	RD				
15:05:39.526.748.309.988.0	CCMD(N)	LIDL	RD	Write 4B IOADDR=00B	81 00 90 08 00 00 00 C0...	PHY Settings Register	
15:05:39.526.748.489.179.0	LIDL	LIDL	RD				
15:05:39.526.749.779.001.2	LIDL	RES(N)	RD	AD 10 10 08 1B 8D			
15:05:39.526.749.898.126.0	LIDL	LIDL	RD				

II. 使用 32Gb RAM 搭配硬碟串流來儲存 SD 3.0 / SD 4.0 通訊資料，可完整節錄待測物從低速初始化到高速傳輸資料的流程

III. 提供 Data Filter 功能，可將不必要的資料濾除以節省記憶體

IV. 提供 Search 資料功能

V. 提供 CRC Packet 計算及錯誤顯示

VI. SD 3.0 / SD 4.0 命令統計功能，包含封包總數、各類別指令數量以及錯誤數量統計

SD 3.0

Navigator			Statistics		
Description	Txns	Bytes		Txns	Bytes
CMD	489		CMD00	8	
ACMD	84		CMD08	8	
DATA	16533	8397134	CMD55	84	
Write SC of CMD24	0	0	CMD11	3	
Write SC of CMD25	2	8212	CMD02	5	
Read SC of CMD17	5	2560	CMD03	5	
Read SC of CMD18	58	8391632	CMD09	5	
ERROR	28		CMD07	5	
			CMD13	119	
			CMD16	5	
			CMD06	17	
			CMD17	5	
			CMD18	58	
			CMD12	60	
			CMD36	1	
			CMD45	2	
			CMD39	1	
			CMD19	96	
			CMD25	2	

SD 4.0

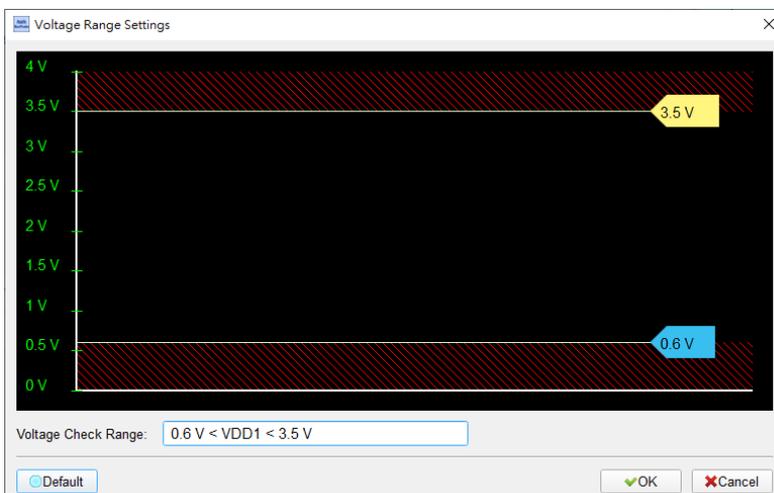
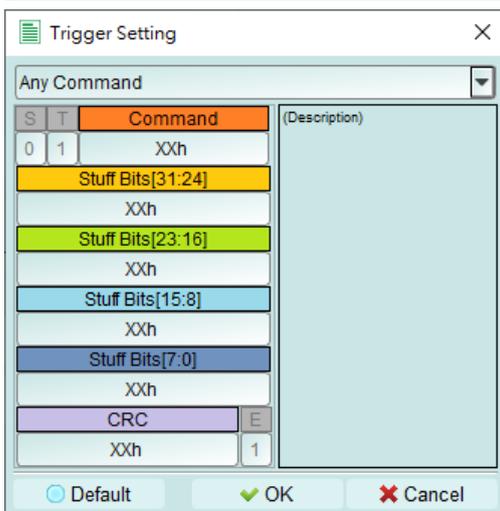
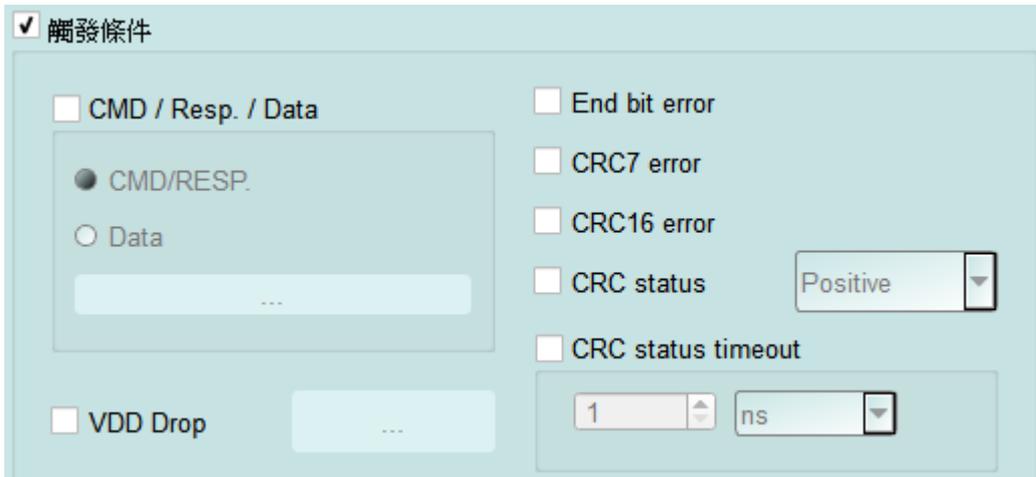
Navigator		
Description	Txns	Bytes
UHSII Bus		
Command Count	34	
Read/Write Count	11	
Read Count	11	
Write Count	0	
Write SC of CMD24	0	0
Write SC of CMD25	0	0
Read SC of CMD17	0	0
Read SC of CMD18	0	0
ERROR	0	0
Others	0	0

Statistics		
	Txns	Bytes
Rd Data(TLen= 1)	5	
Rd Data(TLen= 2)	1	
Rd Data(TLen= 16)	4	
Rd Data(TLen= 8)	1	

VII. 命令觸發功能

1. SD 3.0

- 觸發參數包含命令與參數資料可依據不同種類封包填入數值,
- 涵蓋所有 Command 或 16 byte Data,
- 可觸發 CRC7, CRC16, End Bit Error,
- 可觸發 3 種 timeout, CRC Status pattern,
- 可觸發 VCC drop, VCCQ2 drop
- 可透過 Trigger-Out 接孔同步觸發外部的示波器



SD 4.0

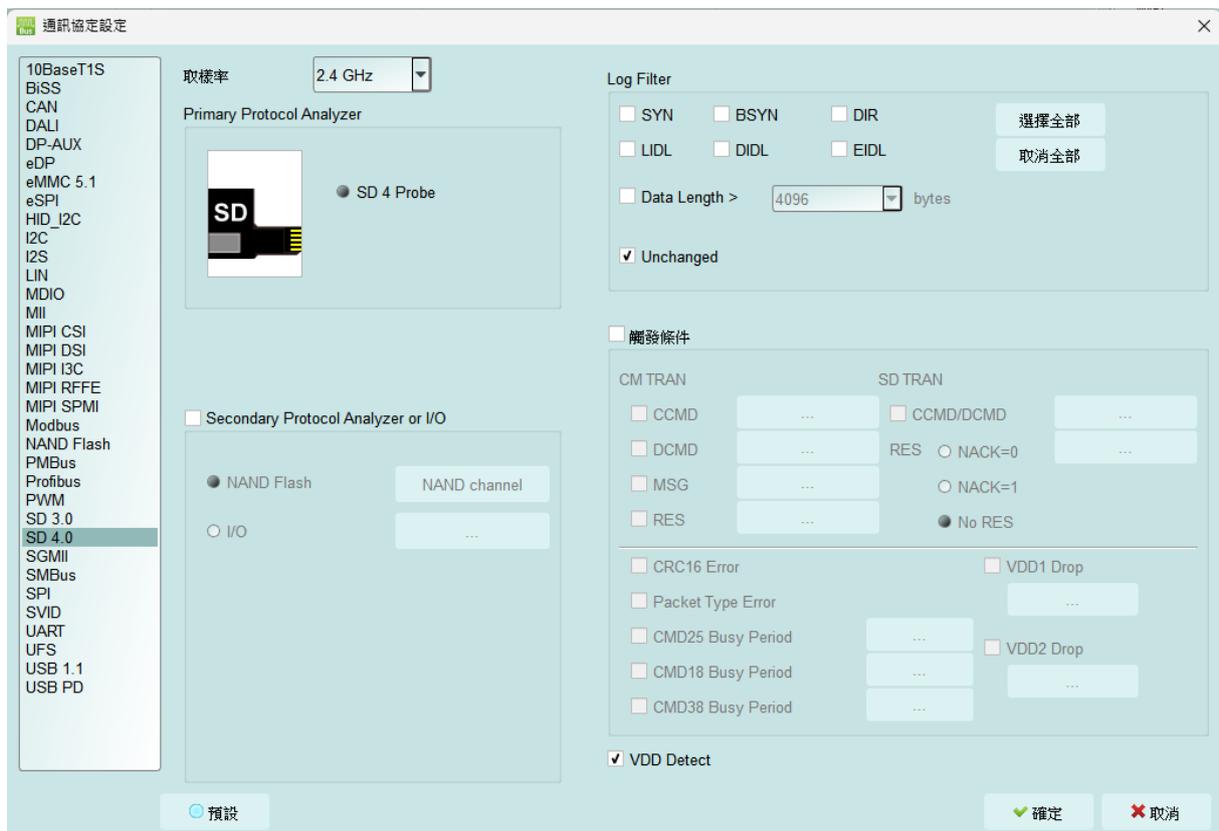
IX. Settings

SD 3.0

- 1. Sample Rate:** 選擇使用的取樣率，若要開啟 Secondary Protocol Analyzer – NAND Flash 選項，取樣率須設定為 1GHz 以下，
- 2. Primary Protocol Analyzer:** 可選擇使用探棒類型，也可自定義通道/觸發準位，
- 3. Secondary Protocol Analyzer or I/O:** 可額外開啟一組指定之邏輯分析，以剩下可用腳位同時進行分析，

4. **Filter:** 每一筆 Data Frame 可指定收錄之大小，大於設定值的資料則不會被記錄下來
5. **Trigger on:** 可設定 CMD, DATA, ERROR, Voltage, Timeout, CRC Status 觸發條件
6. **Option:**
 - a. **3 Pin mode:** 接上 CLK, CMD, D0 後，可進行命令流程以及狀態的協定分析，主要用於接線困難或是非資料錯誤的待測物使用，
 - b. **Startup:** 需設定於擷取當下，待測物所運行之模式，
 - c. **Tuning setting:** 提供相位調整功能
 - d. **Vendor CMD:** 可自行更改命令組名稱，是否帶有資料，
 - e. **CLK Detect:** 可偵測 CLK 是否有動作，
 - f. **兩組電壓偵測功能**

SD 4.0



FAQ

1. 支援 SD 第幾版的規格?

A：支援到 SD3.0 SDR104, SD6.0 Legacy mode SDR104 / DDR200, SD4.0。

2. 量測時是否會影響訊號品質?

A：外接的儀器量測必然會有部分的負載效應影響，我們採用主動探棒的連接方式來降低對待測物干擾並提升訊號品質。

3. 是否有支援訊號發送 (Tx) 功能?

A：不支援訊號發送功能

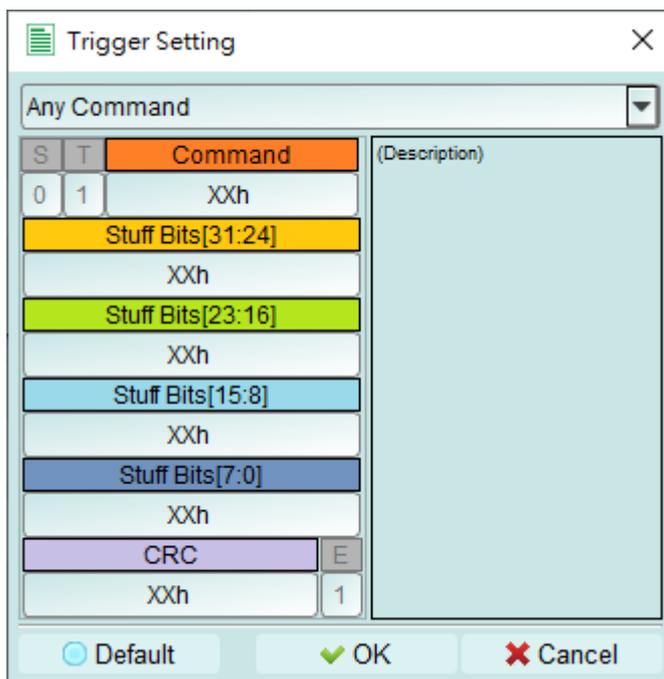
4. 量測時須注意的事項

a. 接線問題判斷與排除方法:

請確實按手冊探棒與待測物連接方式進行連接。

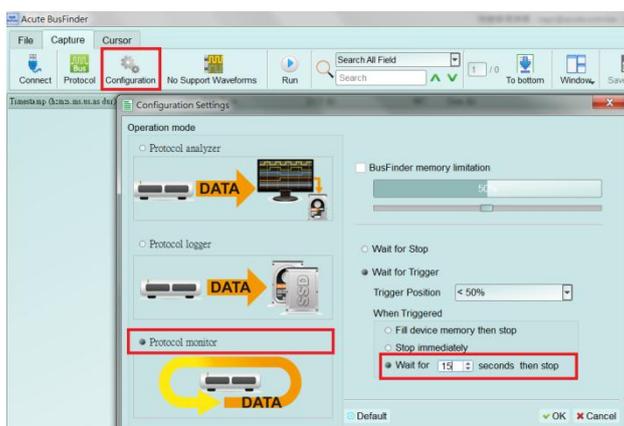
5. 有指定某個 SD 3.0 / SD 4.0 做為 trigger 點的功能嗎?

A：可以指定特定的 SD 3.0 / SD 4.0 packet 或是 Error 進行觸發。



6. 是否可以自行設定一個 SD 3.0 / SD 4.0 起始點，指定抓取多少時間內的 Data?

A：可以將起始條件設定在觸發項目後，到工作模式選單內調整為資料監控儀模式，並指定擷取時間長度。

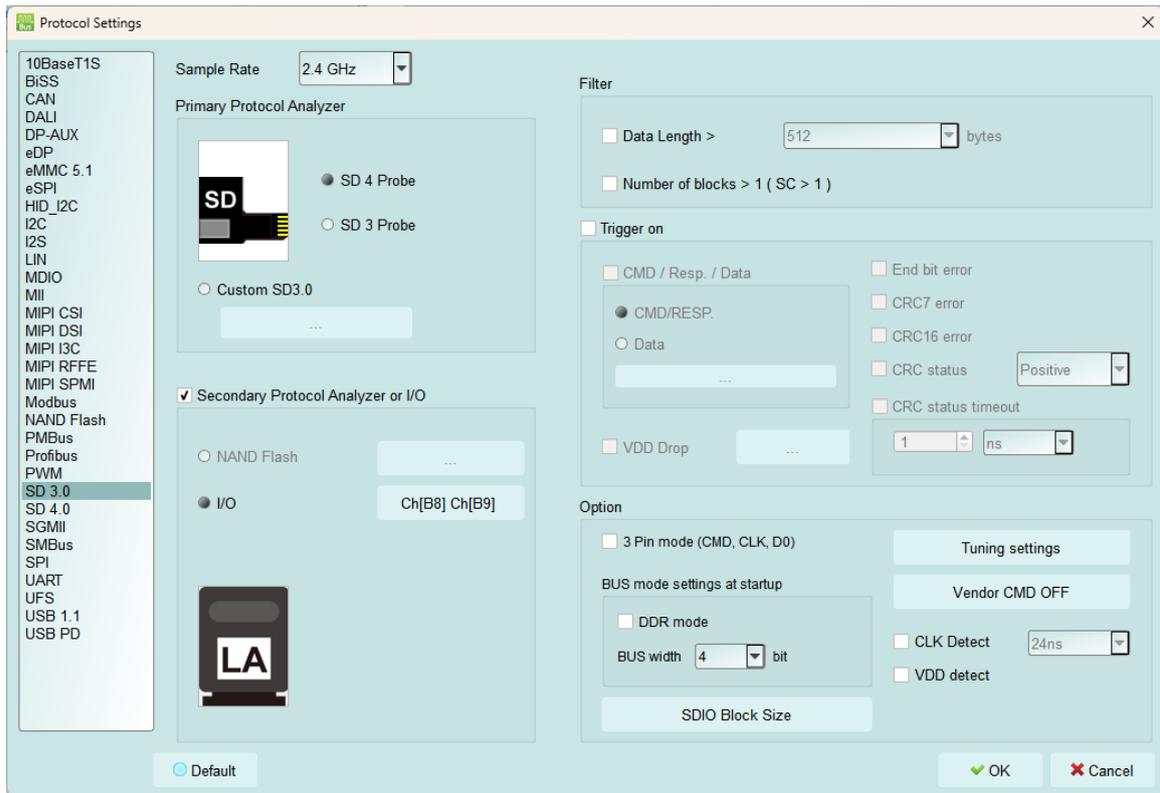


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皇晶科技股份有限公司 Acute Technology Inc.

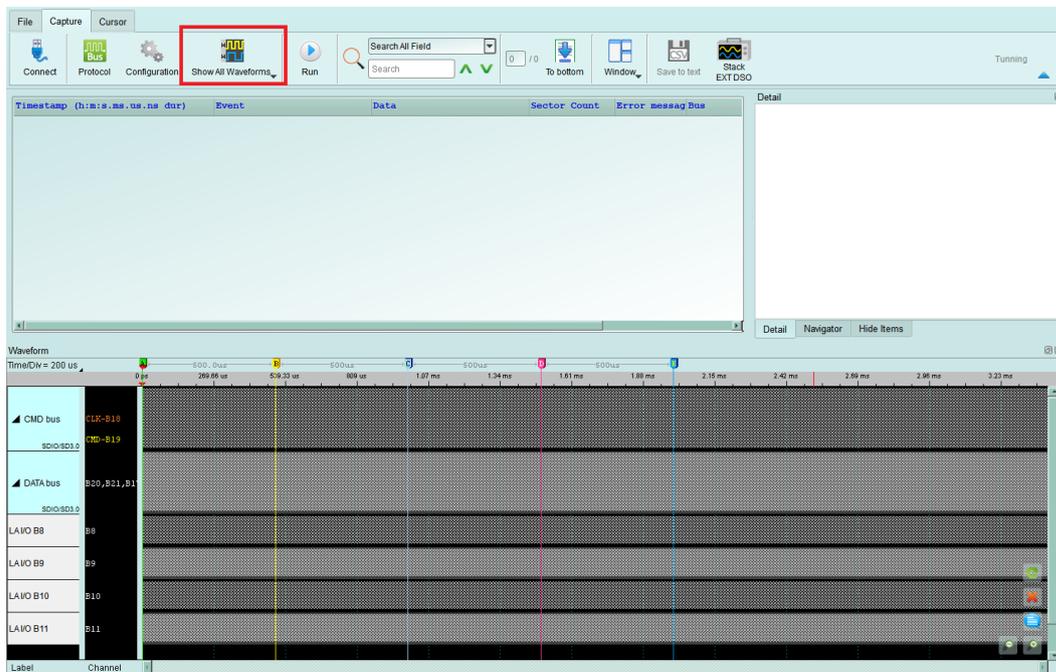
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7. Secondary Protocol Analyzer or I/O



在使用 SD3.0 協定分析儀的同時，可額外開啟 NAND Flash 邏輯分析儀功能或是額外的 I/O 腳位進行分析。

使用此功能必須在協定分析儀主畫面將顯示波形開啟才能使用。



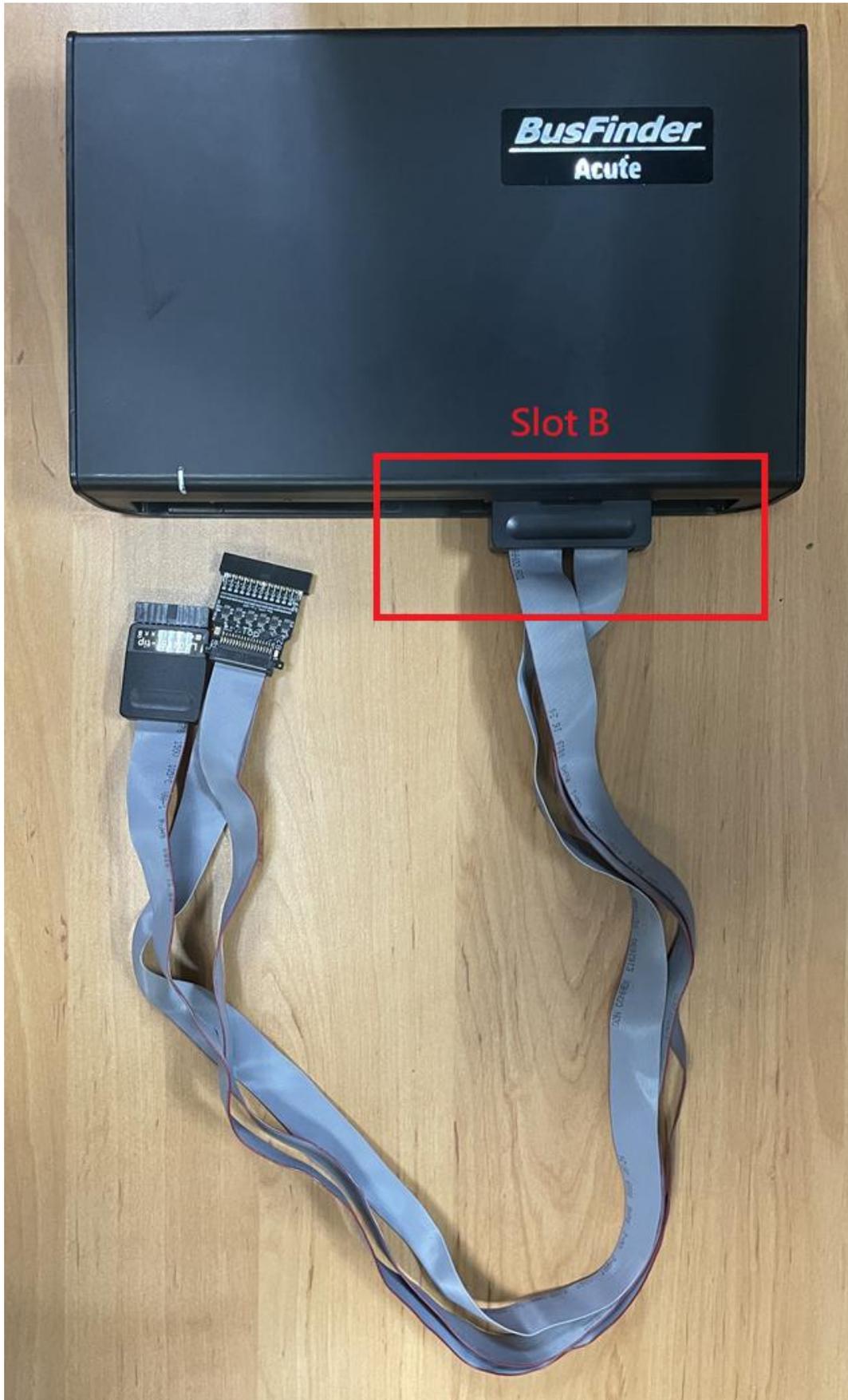
由於 NAND Flash 的分析需要使用更多的通道，因此需要一條 LA 探棒接於 Slot A，且僅能使用 1GHz 的採樣率才能開啟。

主機與探棒連接方式

主機僅能使用 Slot B 作為探棒連接槽。

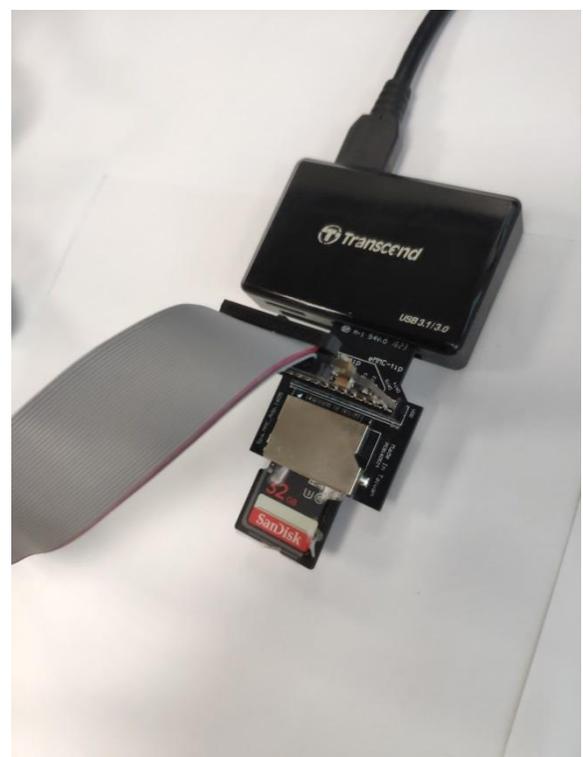


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探棒與待測物連接方式

SD 3.0



SD 4.0

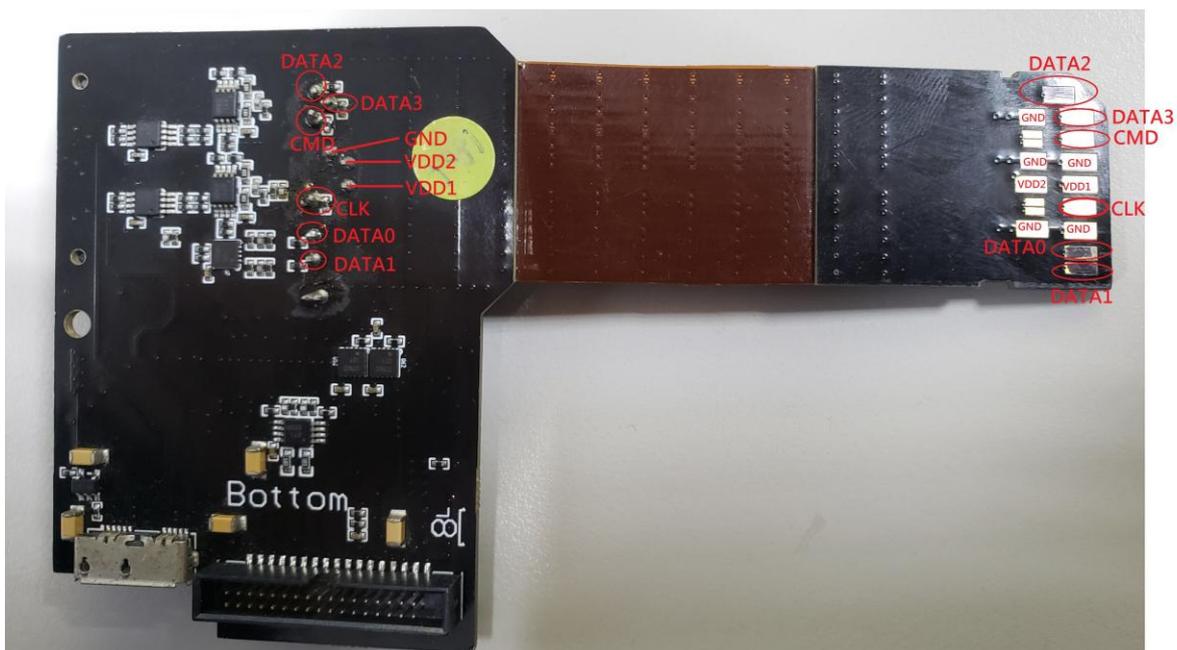


SD 4.0 比 SD 3.0 多了一條高速訊號線，使用時須將訊號線接上

SD4.0 轉板測試點:

使用時機:

- 需同時使用示波器查看波形時
- 可檢查轉板之軟板電路是否正常時，可以電表測量前端金手指與測點是否導通



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