



BF7264B+ SD 3.0 / SDIO 3.0
方案說明

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概況

此方案僅於 BF6264B, BF7264B 以及 BF7264B+ 產品適用。

SD 3.0 方案，規格內容如下：

1. BF7264B+，32Gb RAM，搭配 SD 4.0 / SD 3.0 探棒組



2. 支援 SD 3.0 SDR104 / SD6.0 Legacy mode SDR104, DDR200/ SDIO 3.0

Pin Layout				
Bus Interface	High Speed	UHS-I High Speed	UHS-II UHS-I High Speed	UHS-III UHS-I High Speed New
Capacity (file system)	2TB (exFAT) 32GB (FAT32) 2GB (FAT12/16)	2TB (exFAT) 32GB (FAT32) 2GB (FAT12/16)	2TB (exFAT) 32GB (FAT32) 2GB (FAT12/16)	2TB (exFAT) 32GB (FAT32) 2GB (FAT12/16)
	SD XC SD HC SD	SD XC I SD HC I SD	SD XC II SD HC II SD	SD XC III SD HC III SD
	25MB/sec	104MB/sec	312MB/sec	624MB/sec
	Bus Speed			

3. 可顯示 SD 3.0 協定封包資料以表格方式呈現，包含指令解析

Timestamp (h:m:s.ms.us.ns.dor)	Event	Data	Information	Error msgqBus	Clock	CMD	DuraticData	Durati
17:35:59.687.190.429.606.5...	ACMD06 SET_BUS_WIDTH	46 00 00 00 02 CB			232.451 K	Nrcr: 94	202.196us	
17:35:59.687.944.247.253.0...	Resp6 Rl	06 00 00 09 20 B9				Nrcr: 11	202.196us	
17:35:59.688.052.980.408.7...	CHD16 SET_BLOCKLEN	80 00 00 02 00 15			232.444 K	Nrcr: 94	202.196us	
17:35:59.688.306.750.253.0...	Resp16 Rl	10 00 00 09 00 0B				Nrcr: 11	202.196us	
17:35:59.689.954.350.647.5...	CHD55 APP_CMD	77 AA AA 00 00 2B			14.8622 M	Nrcr: 6618	3.15968us	
17:35:59.689.958.316.3.96us	Resp55 Rl	37 00 00 09 20 33				Nrcr: 11	3.15968us	
17:35:59.689.247.424.289.1...	ACMD51 SEND_SCR	73 00 00 00 00 C7			14.8622 M	Nrcr: 4249	3.15968us	
17:35:59.689.251.390.3.96us	Resp51 Rl	33 00 00 09 20 91				Nrcr: 12	3.15968us	
17:35:59.689.398.795.147.4...	Read, 16 bytes	02 38 84 03 00 00 00 00...	SCr: WaitTime:144.246us	4bit		Nrcr: 2147	2.22311us	
17:35:59.690.344.700.945.9...	CHD06 SWITCH_FUNC	46 00 FF FF FF E3			14.8622 M		3.15968us	
17:35:59.690.348.937.4.23us	Resp6 Rl	06 00 00 09 00 DD				Nrcr: 16	3.15968us	
17:35:59.691.344.272.1.01ms	Read, 64 bytes	00 64 80 01 80 01 80 0F...	SCr: WaitTime:1.01218ms	4bit		Nrcr: 15066	9.74902us	
17:35:59.692.145.894.791.6...	CHD06 SWITCH_FUNC	46 00 FF FF FF 3B			14.8652 M		3.15968us	
17:35:59.692.150.127.4.23us	Resp6 Rl	06 00 00 09 00 DD				Nrcr: 15	3.15968us	
17:35:59.692.198.052.47.92...	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SCr: WaitTime:44.7655us	4bit		Nrcr: 666	9.74902us	
17:35:59.692.896.862.690.8...	CHD06 SWITCH_FUNC	46 80 FF FF F3 0D			14.8652 M		3.15635us	
17:35:59.692.901.095.4.23us	Resp6 Rl	06 00 00 09 00 DD				Nrcr: 15	3.15968us	
17:35:59.694.732.735.1.83ms	Read, 64 bytes	00 CE 80 01 80 01 80 0F...	SCr: WaitTime:1.82848ms	4bit		Nrcr: 27178	9.74902us	
17:35:59.695.628.069.895.3...	CHD06 SWITCH_FUNC	46 00 FF 3F FF 9F			14.8652 M		3.15968us	
17:35:59.695.633.460.5.37us	Resp6 Rl	06 00 00 09 00 DD				Nrcr: 33	3.15968us	
17:35:59.698.917.394.283.9...	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SCr: WaitTime:280.769us	4bit		Nrcr: 9179	9.74902us	
17:35:59.696.604.911.687.5...	CHD06 SWITCH_FUNC	46 80 FF 3F FF A3			14.8622 M		3.15968us	
17:35:59.696.610.291.5.37us	Resp6 Rl	06 00 00 09 00 DD				Nrcr: 33	3.15968us	
17:35:59.696.917.340.307.0...	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SCr: WaitTime:303.59us	4bit		Nrcr: 4523	9.73236us	
17:35:59.701.159.849.4.24ms	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M		229.977ns	
17:35:59.701.160.339.389.9...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 33	226.644ns	
17:35:59.701.831.008.670.4...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.701.831.390.389.9...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 32	229.977ns	
17:35:59.702.396.852.565.4...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.702.397.245.393.2...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 33	229.977ns	
17:35:59.702.963.360.566.1...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	226.644ns	
17:35:59.702.963.758.389.9...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 33	229.977ns	
17:35:59.703.830.462.566.7...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.703.830.852.389.9...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 32	229.977ns	
17:35:59.704.098.232.567.3...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.704.098.622.389.9...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 32	229.977ns	
17:35:59.704.666.501.567.9...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.704.666.975.353.2...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 33	229.977ns	
17:35:59.705.238.615.568.6...	CHD13 SEND STATUS	4D AA AA 00 00 43			204.276 M	Nrcr: Over	229.977ns	
17:35:59.705.236.008.393.2...	Resp13 Rl	0D 00 00 09 00 3F				Nrcr: 33	229.977ns	

Detail

CMD06 SWITCH_FUNC

[31] Mode= Check function (0)
[3:0] group 1 Access mode= SDRI04 (3h)

[CRC7] = 10h (8b:88h)

[Raw Data]
0 1 2 3 4 5 6 7 ASCII
0h 46 00 FF FF F3 0D F....:

Detail Navigator Hide Items

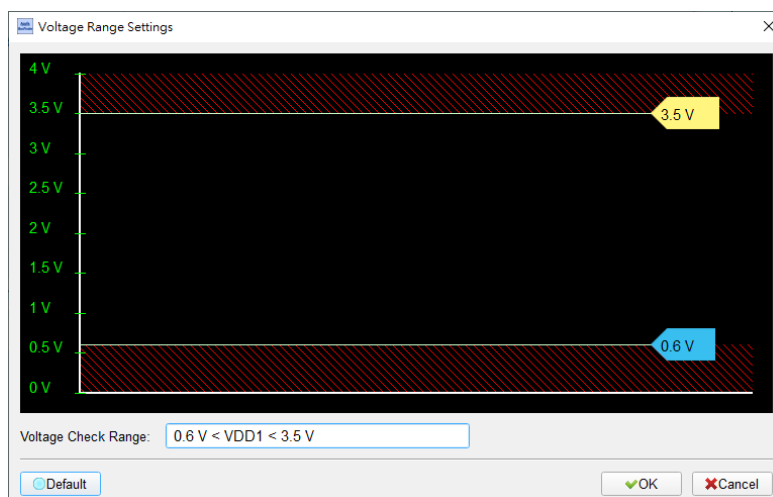
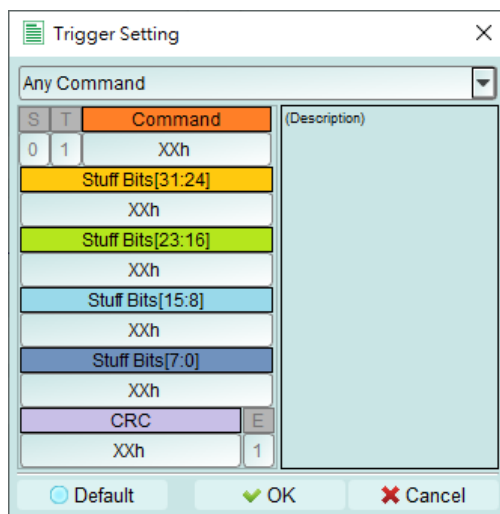
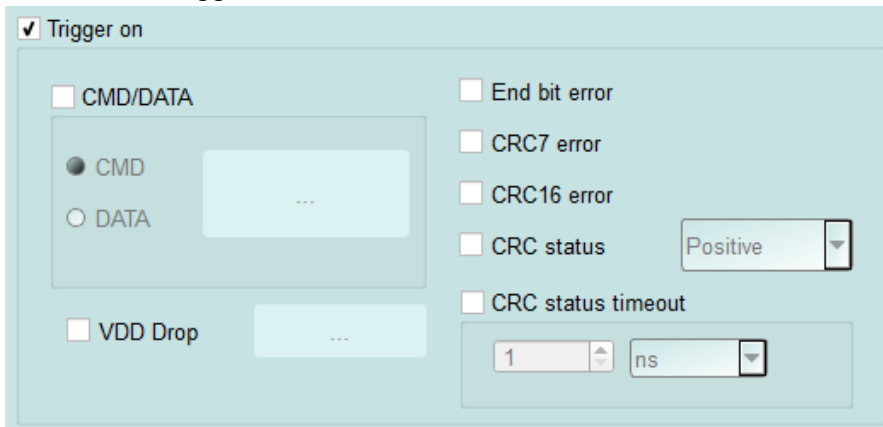
4. 使用 32Gb RAM 搭配硬碟串流來儲存 SD 3.0 通訊資料，可完整節錄待測物從低速初始化到高速傳輸資料的流程
5. 提供 Data Filter 功能，可將不必要的資料濾除以節省記憶體
6. 提供 Search 資料功能
7. 提供 CRC Packet 計算及錯誤顯示
8. SD 3.0 命令統計功能，包含封包總數、各類別指令數量以及錯誤數量統計

Navigator			Statistics	
Discription	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

Detail Navigator Hide Items

9. SD 3.0 命令觸發功能

- a. 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,
- b. 涵蓋所有 Command 或 16 byte Data,
- c. 可觸發 CRC7, CRC16, End Bit Error,
- d. 可觸發 3 種 timeout, CRC Status pattern,
- e. 可觸發 VCC drop, VCCQ2 drop
- f. 可透過 Trigger-Out 接孔同步觸發外部的示波器



10. 報告區進階使用方法

統計列表: 以統計功能快速分類並可追蹤資料位置

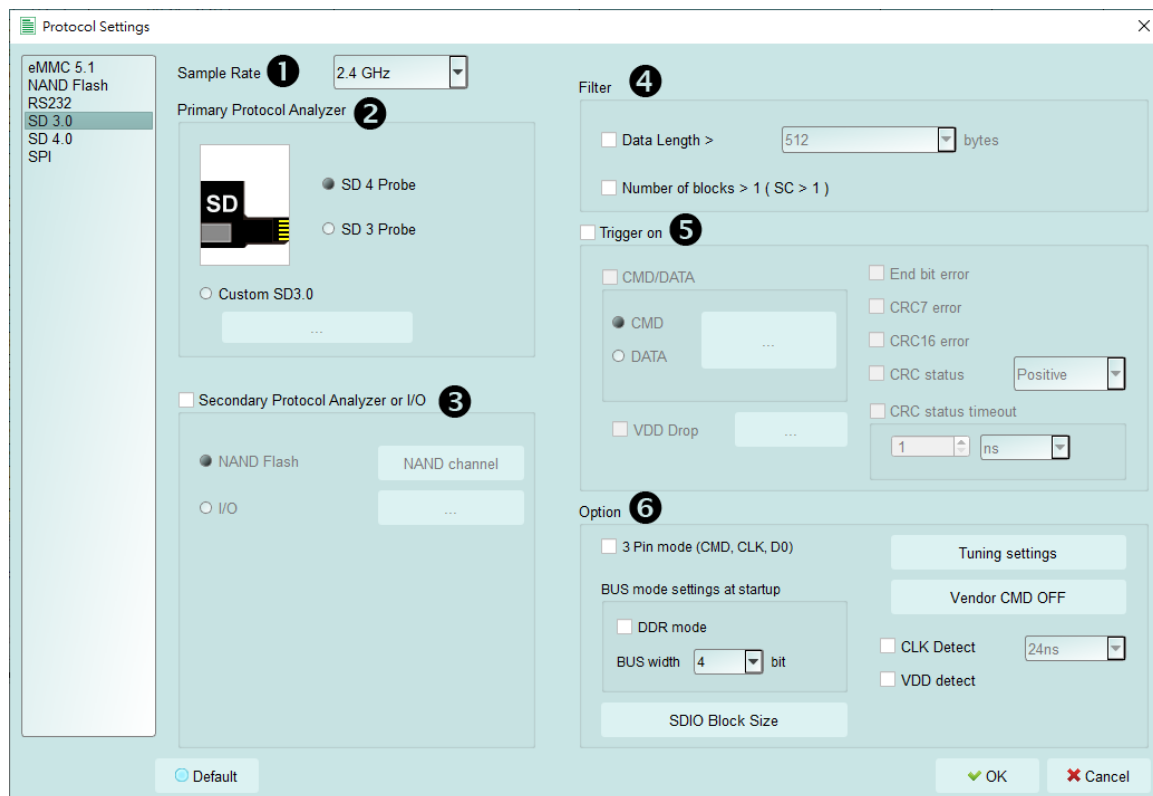
Timestamp (hh:mm:ss.us ns dur)	Event	Data	Information	Error message	Bus	Clock	CMD Duration	Data Duration
596	ACMD06 SET_BUS_WIDTH	46 00 00 00 02 CB			232.451 K	Ncr: 94	202.196us	
597	Resp6 R1	06 00 00 09 20 B9				Ncr: 11	202.196us	
598	CMD16 SET_BLOCKLEN	50 00 00 02 00 15			232.446 K	Ncr: 94	202.196us	
599	Resp16 R1	10 00 00 09 00 0B				Ncr: 11	202.196us	
600	CMD35 APP_CMD	77 AA AA 00 00 2B			14.8622 M	Ncr: 6618	3.15968us	
601	Resp55 R1	37 00 00 09 20 33				Ncr: 11	3.15968us	
602	ACMD61 SEND_SCR	73 00 00 00 00 C7			14.8622 M	Ncr: 4249	3.15968us	
603	Resp61 R1	33 00 00 09 20 91				Ncr: 12	3.15968us	
604	Read, 16 bytes	02 35 04 03 00 00 00 00...	SC=1 WaitTime:144.246us		4bit	Nac: 2147		2.22311us
605	CMD06 SWITCH_FUNC	46 00 FF FF F3 E3			14.8622 M	Ncr: 15	3.15968us	
606	Resp6 R1	06 00 00 09 00 DD				Ncr: 16	3.15968us	
607	Read, 64 bytes	00 04 00 01 80 01 80 0F...	SC=1 WaitTime:1.01218ms		4bit	Nac: 43066		9.74902us
608	CMD06 SWITCH_FUNC	46 00 FF FF F3 3B			14.8622 M	Ncr: 15	3.15968us	
609	Resp6 R1	06 00 00 09 00 DD				Ncr: 15	3.15968us	
610	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SC=1 WaitTime:44.7655us		4bit	Nac: 666		9.74902us
611	CMD06 SWITCH_FUNC	46 80 FF FF F3 0D			14.8652 M	Ncr: 15	3.15635us	
612	Resp6 R1	06 00 00 09 00 DD				Ncr: 15	3.15635us	
613	Read, 64 bytes	00 C8 80 01 80 01 80 0F...	SC=1 WaitTime:1.02849ms		4bit	Nac: 27175		9.74902us
614	CMD06 SWITCH_FUNC	46 00 FF 3F FF 5F			14.8652 M	Ncr: 33	3.15968us	
615	Resp6 R1	06 00 00 09 00 DD				Ncr: 33	3.15968us	
616	Read, 64 bytes	00 40 00 01 80 01 80 0F...	SC=1 WaitTime:280.769us		4bit	Nac: 4179		9.74902us
617	CMD06 SWITCH_FUNC	46 00 FF 3F FF A9			14.8622 M	Ncr: 15	3.15968us	
618	Resp6 R1	06 00 00 09 00 DD				Ncr: 33	3.15968us	
619	Read, 64 bytes	00 FA 80 01 80 01 80 0F...	SC=1 WaitTime:303.89us		4bit	Nac: 4523		9.75236us
620	CMD13 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Ncr: 32	229.977ns	
621	Resp13 R1	0D 00 00 09 00 3F				Ncr: 33	226.644ns	
622	CMD13 SEND_STATUS	4D AA AA 00 00 43			204.276 M	Ncr: Over	229.977ns	
623	Resp13 R1	0D 00 00 09 00 3F				Ncr: 32	229.977ns	

Search List	Trigger List	Statistics List	Bookmark List
Statistics List			
Low No	Timestamp (hh:mm:ss.us ns dur)	Event	Data
462	17:35:59.688.373.387 767.63us	CMD06 SWITCH_FUNC	46 80 FF FF F1 29
600	17:35:59.692.145.894 781.62us	CMD06 SWITCH_FUNC	46 00 FF FF F3 3B
614	17:35:59.695.628.089 895.35us	CMD06 SWITCH_FUNC	46 00 FF 3F FF 5F

Navigator	Description	Time	Bytes
CMD	488		
ACMD	84		
DATA	16633		8397134
Write SC of CMD24	0		0
Write SC of CMD25	2		8212
Read SC of CMD17	5		2560
Read SC of CMD18	58		8391832
ERROR	28		

Statistics	Time	Bytes
CMD08	8	
CMD05	84	
CMD11	3	
CMD02	5	
CMD03	5	
CMD09	4	
CMD07	5	
CMD13	119	
CMD16	5	
CMD06	17	
CMD17	5	
CMD18	58	
CMD12	60	
CMD36	1	
CMD45	2	
RMPI16	1	

11. SD 3.0 settings



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**

FAQ

1. 支援 SD 第幾版的規格?

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

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

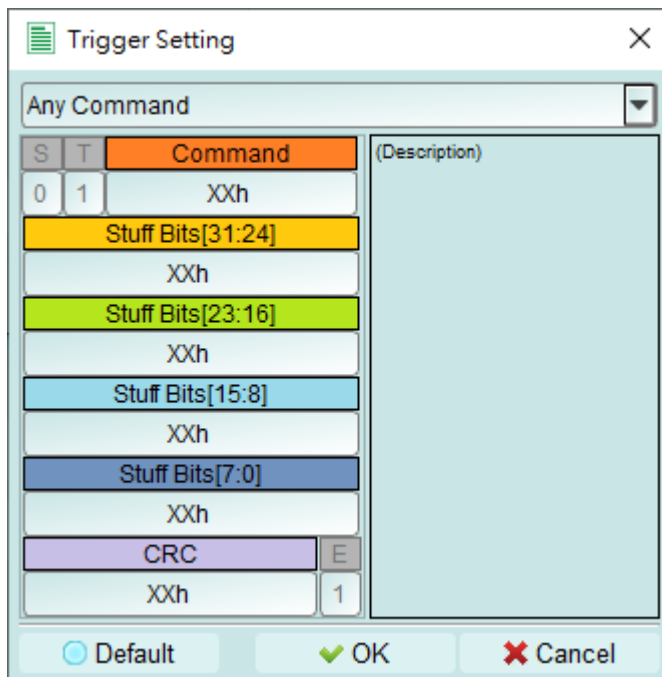
4. 量測時須注意的事項

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。

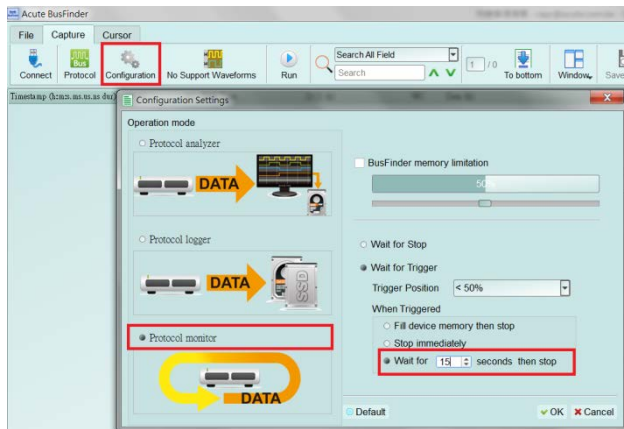
5. 有指定某個 SD 3.0 做為 trigger 點的功能嗎?

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



6. 是否可以自行設定一個 SD 3.0 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。



探棒與待測物連接方式

