



BF7264B SGMII
方案說明

目錄

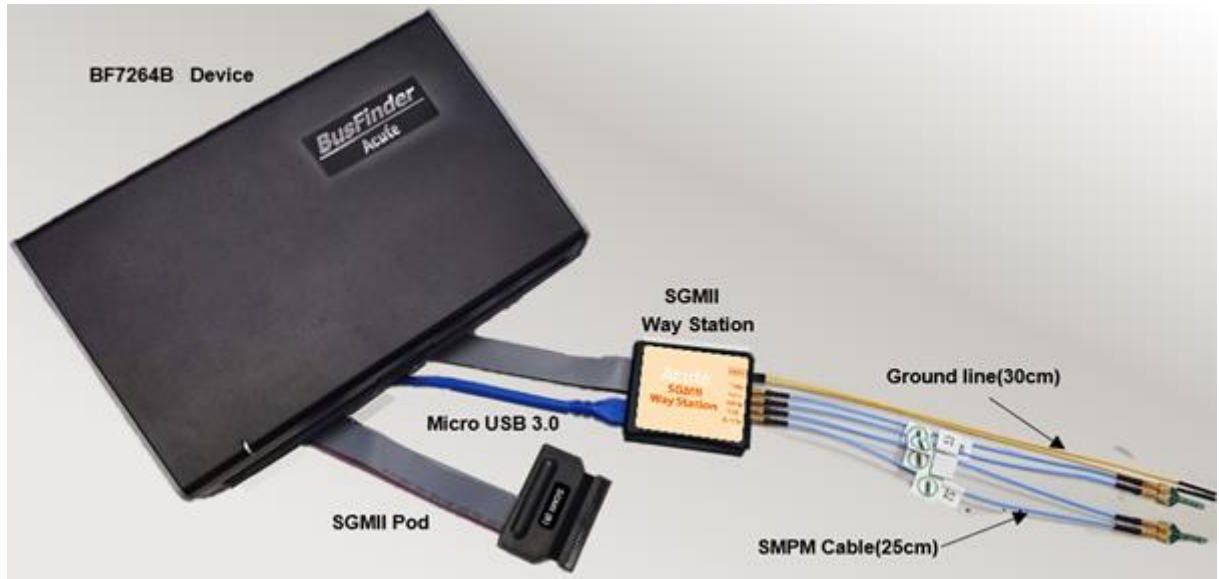
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概況

此方案僅於 BF7264B 產品適用，除主機可繼續使用原 BF6264B 功能外，增加 SGMII 分析儀功能。

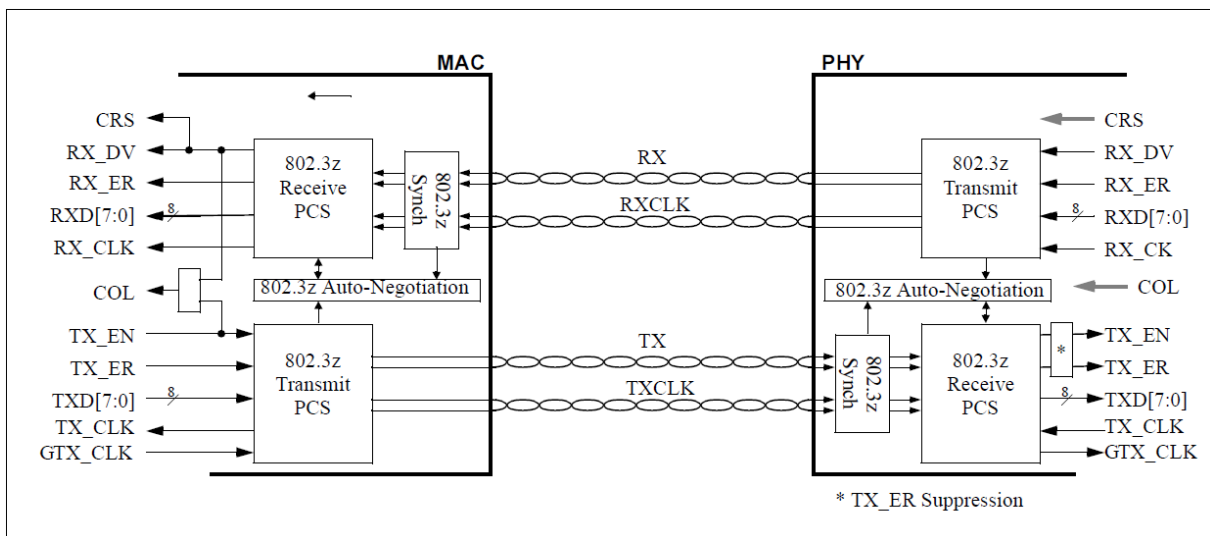
SGMII 方案，規格內容如下：

1. BF7264B，32Gb RAM，搭配 SGMII 探棒組



2. 支援 1000/100/10Mbps SGMII:

訊號傳輸速度為 1.25 Gbaud，Clock 速度為 625 MHz (DDR interface).



3. 可同時顯示 PCS (PHY)及 GMI(MAC)協定封包資料，解碼資料以表格方式呈現，包含指令解析、統計

TimeStamp (hh:mm:ss.nnnn)	Tx Code	Rx Code	Tx Set	Rx Set	Destination Address	Source Address	EtherType	Data
10:23:36.754.069.396	K28.5	D16.2	50	BC	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800	45 00 00
10:23:36.754.069.398	K28.5	D16.2	50	BC	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800	45 00 00
10:23:36.754.069.399	K28.5	D16.2	50	BC	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800	45 00 00

4. 使用 32Gb RAM 搭配硬碟串流來儲存 PCS, GMII 通訊資料
5. 提供 Data Filter 與 Idle Filter 功能，可將不必要的資料濾除以節省記憶體

Filter

Data Filter Range: 14~1475 bytes.

CRC is not available with data filter.

Must reserve Address and EtherType bytes.

Data filter > bytes

Idle filter

6. 提供 Search 資料功能
7. 提供 CRC Packet 計算及錯誤顯示
8. PCS, GMII 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			Navigator		
Discription	Txns	Bytes	Discription	Txns	Bytes
▼ PCS			▼ GMII		
Tx	38239		▼ Errors	1	
Rx	40337		Frame Error	0	
			CRC Error	1	
			▼ Destination Address	2	
			00-E0-4C-60-7B-82	119	
			04-D4-C4-4A-42-9D	90	
			▼ Source Address	2	
			04-D4-C4-4A-42-9D	119	
			00-E0-4C-60-7B-82	90	

Statistics			Statistics		
	Txns	Bytes		Txns	Bytes
▼ Configuration /C/	0		▼ 04-D4-C4-4A-42-9D		
CFG_REG1 /C1/	0		▼ Direction	90	
CFG_REG2 /C2/	0		TX	0	
▼ IDLE /I/	37846		RX	90	
IDLE1 /I1/	62				
IDLE2 /I2/	37784				
▼ LP /LI/	0				
LPI1 /LI1/	0				
LPI2 /LI2/	0				
▼ Encapsulation	393				
CAR_EXTEND /R/	131				
SPD /S/	131				
EPD /T/	131				
ERR_PROP /V/	0				
▼ Error	0				
Disparity	0				
Not in table	0				

9. SGMII 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 GMII & PCS Packet,
- c. 可觸發 CRC Error, Frame Error, Propagation Error, Start of Packet, End of Packet, Carrier Extend, Configuration
- d. 可透過 Trigger-Out 接孔同步觸發外部的示波器

Trigger On

Direction: ▾

PCS

Start of Packet (K27_7, SPD) End of Packet (K29_7, EPD)

Carrier Extend (K23_7) Propagation Error (K30_7)

Disparity Error Not in Table

Configuration (K28_5, D21_5 / K28_5, D2_2)

GMII

Frame Error CRC Error

Data Trigger

Direction for Data: ▾

PCS Configuration Register

GMII Data

GMII Trigger Settings

Destination Address

- - - - -

Source Address

- - - - -

Ethertype/Length

Data

Byte 1: Byte 2: Byte 3: Byte 4:

Byte 5: Byte 6: Byte 7: Byte 8:

Data Offset:

Default

10. 報告區進階使用方法

a. **雙報告關聯:** PCS 與 GMII 報告互相關聯，雙擊可追蹤另一報告區對應資料。

ex: 點擊 PCS 區報告，可關聯至 GMII 對應報告。

Timestamp (h:m:s.ms.us.ns dur)	Tx Code	Rx Code	Rx Tx Set	Rx Set
10:23:36.754.077.652 3.33ns	D16.2	50		
10:23:36.754.077.656 6.66ns				
10:23:36.754.077.656 6.00ns	K23.7	F7		SPD / S/
10:23:36.754.077.662 3.33ns	D21.2	55		
10:23:36.754.077.662 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.665 3.33ns	D16.2	50		
10:23:36.754.077.672 6.66ns	D21.2	55		
10:23:36.754.077.675 3.33ns	D21.2	55		
10:23:36.754.077.675 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.678 3.33ns	D16.2	50		
10:23:36.754.077.685 6.66ns	D21.2	55		
10:23:36.754.077.685 6.66ns	D21.2	55		
10:23:36.754.077.688 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.692 3.33ns	D16.2	50		
10:23:36.754.077.696 6.66ns	D21.2	55		
10:23:36.754.077.702 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.705 3.33ns	D16.2	50		
10:23:36.754.077.712 6.66ns	D4.0	04		
10:23:36.754.077.712 3.33ns	D00.6	04		
10:23:36.754.077.715 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.718 3.33ns	D16.2	50		
10:23:36.754.077.725 6.66ns	D4.6	C4		
10:23:36.754.077.725 3.33ns	D10.2	4A		
10:23:36.754.077.725 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.732 3.33ns	D16.2	50		
10:23:36.754.077.738 6.66ns	D2.2	42		
10:23:36.754.077.742 3.33ns	D29.4	9D		
10:23:36.754.077.742 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.745 3.33ns	D16.2	50		
10:23:36.754.077.752 6.66ns	D0.0	00		
10:23:36.754.077.752 3.33ns	D0.7	E0		
10:23:36.754.077.755 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.755 3.33ns	D16.2	50		
10:23:36.754.077.765 6.66ns	D12.2	4C		
10:23:36.754.077.765 3.33ns	D0.3	60		
10:23:36.754.077.768 0.00ns	K28.5	BC	IDLE2 / I2/	
10:23:36.754.077.772 3.33ns	D16.2	50		
10:23:36.754.077.775 6.66ns	D27.3	7B		
10:23:36.754.077.782 3.33ns	D2.4	82		
10:23:36.754.077.782 0.00ns	K28.5	BC	IDLE2 / I2/	

Timestamp (h:m:s.ms.us.ns dur)	Dir	Destination Address	Source Address	EtherData
10:23:36.754.041.919 3.27us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.044.385 2.46us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.047.545 3.15us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.050.358 2.81us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.052.118 1.75us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.055.477 3.35us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.056.517 1.03us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.061.400 4.88us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.065.066 3.66us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.066.570 1.50us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.069.466 2.89us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.072.542 3.07us	RX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.074.359 1.85us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.077.662 3.26us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.078.385 723.2	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.083.634 5.24us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.087.704 4.06us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.088.754 1.04us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.091.477 2.72us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.094.727 3.24us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.096.357 1.62us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.100.876 4.51us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.104.982 4.10us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.105.819 836.5	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.109.755 3.93us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.111.792 2.03us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.114.528 2.73us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.116.911 2.38us	RX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.118.101 1.18us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.123.301 5.19us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.126.887 3.58us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.128.003 1.11us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.132.006 4.00us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.133.976 1.96us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.135.593 1.61us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.140.139 4.54us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.145.068 4.92us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.149.098 4.02us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.151.041 1.94us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C
10:23:36.754.153.991 2.94us	TX	00-E0-4C-60-7B-82	04-D4-C4-4A-42-9D	0800 45 00 C
10:23:36.754.156.161 2.16us	RX	04-D4-C4-4A-42-9D	00-E0-4C-60-7B-82	0800 45 00 C

b. **統計列表:** 以統計功能快速分類並可追蹤資料位置

The screenshot shows the Acute software interface with three main windows:

- Capture Window:** Displays a list of captured packets with columns for Timestamp, Tx Code, Rx Code, Rx Tx Set, and Rx Set. A red box highlights a specific packet.
- Statistics Window:** Shows a summary of captured data, including a list of statistics and their values. A red box highlights the 'CAR_EXTEND /R/' entry.
- Search List Window:** Displays a list of search results for the selected packet, with columns for Line No, Timestamp, Tx Code, Rx Code, Rx Tx Set, and Rx Set. A red box highlights the search results for the selected packet.

11. SGMII settings



1. **SGMII way station settings:** 可交換同一 Lane 之 p, n，選擇是否需要 Ref CLK
2. **Startup Settings:** 設定起始的封包速度模式。
3. **Filter:** 開啟後將會濾除大於設定值之封包後方資料或是 Idle 封包
4. **Trigger On:** 可設定 GMII/PCS packets，以及 CRC Error, Frame Error, Propagation Error, Start of Packet, End of Packet, Carrier Extend, Configuration, Disparity Error, Configuration, Not in Table 觸發選項

FAQ

1. 支援 SGMII 速度的規格，是否有 Differential 對數或 port 數限制呢？

A：支援到 SGMII 1Gbps、100Mbps、10Mbps，Ports: TXp、TXn、RXp、RXn、Ref.Clk。

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 SMPM Coaxial Cable 的连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功能？

A：不支援訊號發送功能

4. 量測時須注意的事項

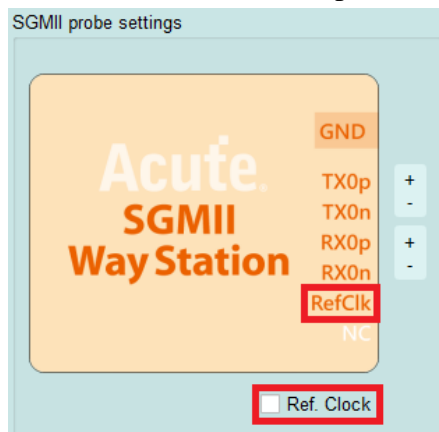
a. 起始設定用法:

因為 SGMII 有支援不同的封包速度，若沒有正確設定初始速度，會造成 Data 資料量變為 10 倍或是 100 倍，使得分析結果異常。另外，若在擷取的過程中有 Speed Config 封包出現，則會以 Config 封包做為新的封包速度。



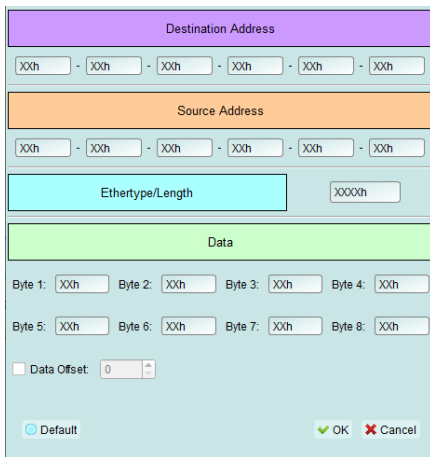
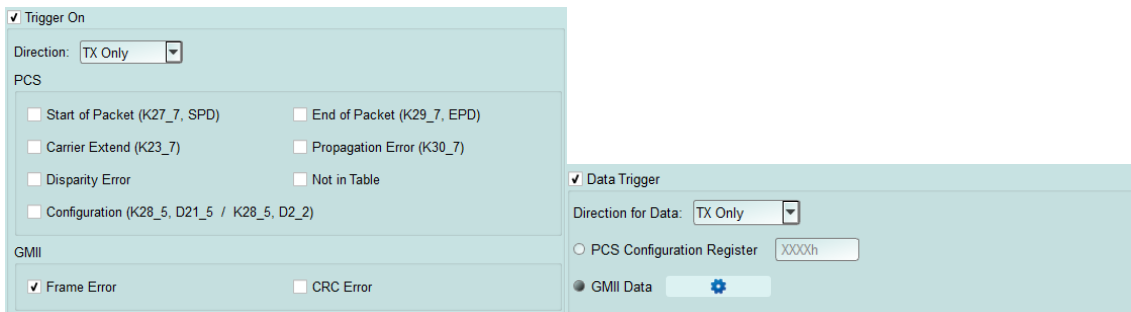
b. Reference clock 設定方式:

由於 SGMII 採用 8b10b 編碼模式，測量時可不用連接 Reference clock 就可正常分析，另外，若有需要外部 Ref Clk，Settings 有提供 Ref Clk 選項，可由下方 SGMII Way Station 標示接入 Ref Clk port，並選擇 Ref. Clock。



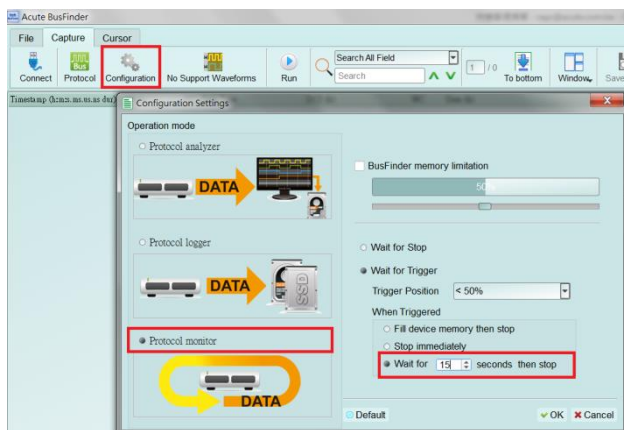
5. 有指定某個 PCS, GMII packet 做為 trigger 點的功能嗎?

A: 可以指定特定的 PCS, GMII packet 或是 Error 進行觸發。



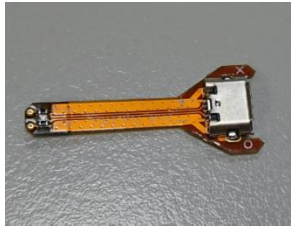
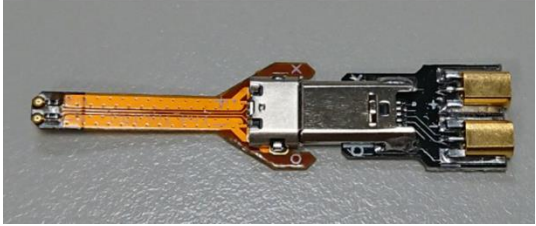
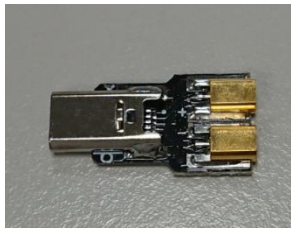
6. 是否可以自行設定一個 PCS, GMII 起始點，指定抓取多少時間內的 Data?

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

End-Tip 方式連接:

零件列表		
End-tip 軟板		組合完成 
End-Tip 軟板連接器		

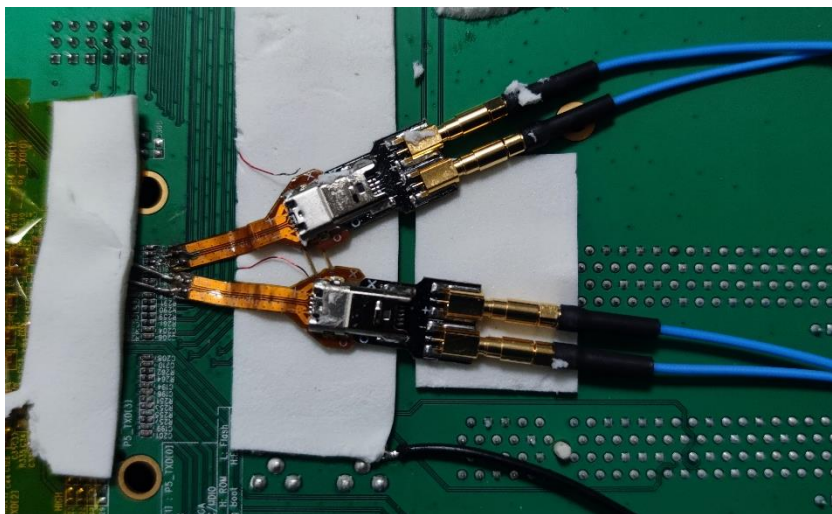
End-tip 軟板上面的電阻為 250ohm。

腳位連接

需接在下方的 USB 3.0 port



End-tip 實際接線:



Way Station 接線

