



BF7264 Series eMMC5.1 analyzer

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Feature:

Supported Models:

BF6264B	BF7264B	BF7264B+	BF7264 Pro
•	•	•	•

BF7264B/B+/Pro has two USB holes at the front.

Specifications:

1. BF7264B/B+/Pro , 32Gb RAM , eMMC 5.1 probes



2. Supports 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. Can display eMMC protocol packet data in tabular form, including command

TimeStamp (h:m:s.ms.us.ns)	Event	Data	Information	Current state	Error message	Bus	Clock	CMD Duration	Data Duration	詳細
34821	15:04:40.513.388.768 1	CMD06 SWITCH	46 03 B9 03 01 11			20.8264 M	Nrc: 2802	2.25977us		CMD06 SWITCH
34822	15:04:40.513.391.651 2	Resp06 Rlb	06 00 00 08 00 CB	Tran			Nrc: 12	2.25977us		[25:24] Access= Write Bits(3)
34823	15:04:40.513.391.988 3	Busy start								[23:16] Index= HS_TIMING(185)
34824	15:04:40.513.694.467 3	Busy end								[15:12] Selected Driver Strength(0)
34825	15:04:40.513.806.553 1	CMD13 SEND_STATUS	4D 00 01 00 00 53			20.8264 M	Nrc: 8593	2.25644us		[11:8] Timing Interface= HS400(3)
34826	15:04:40.513.810.349 3	Resp13 Rl	0D 00 00 09 00 3F	Tran			Nrc: 32	2.25644us		[2:0] Cmd Set= 1
34827	15:04:40.533.313.985 1	CMD06 SWITCH	46 03 A1 01 01 53			165.534 M	Nrc: Over...	283.305ns		
34828	15:04:40.533.314.469 4	Resp06 Rlb	06 00 00 08 00 CB	Tran			Nrc: 33	279.972ns		
34829	15:04:40.533.314.509 3	Busy start								[CRC7] = 00h (8b:11h)
34830	15:04:40.534.239.393 9	Busy end								[Raw Data]
34831	15:04:40.534.306.219 6	CMD13 SEND_STATUS	4D 00 01 00 00 53			165.534 M	Nrc: Over...	279.972ns		0 1 2 3 4 5 6 7 ASCII
34832	15:04:40.534.306.693 4	Resp13 Rl	0D 00 00 09 00 3F	Tran			Nrc: 32	283.305ns		0h 46 03 B9 03 01 11 F....
34833	15:04:40.534.451.645 1	CMD06 SWITCH	46 03 21 01 01 D9			165.534 M	Nrc: 23980	279.972ns		
34834	15:04:40.534.452.325 4	Resp06 Rlb	06 00 00 08 00 CB	Tran			Nrc: 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	Nrc: 20079	283.305ns		
34838	15:04:40.534.572.286 4	Resp13 Rl	0D 00 00 09 00 3F	Tran			Nrc: 31	283.305ns		
34839	15:04:40.534.694.107 1	CMD06 SWITCH	46 03 38 08 01 4F			168.438 M	Nrc: 20471	283.305ns		
34840	15:04:40.534.694.587 4	Resp06 Rlb	06 00 00 08 00 CB	Tran			Nrc: 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	Nrc: 19638	279.972ns		
34844	15:04:40.534.813.982 4	Resp13 Rl	0D 00 00 09 00 3F	Tran			Nrc: 32	283.305ns		
34845	15:04:40.558.468.036 2	CMD23 SET_BLOCK_COUNT	57 00 00 00 08 BF			168.438 M	Nrc: Over...	283.305ns		
34846	15:04:40.558.468.516 4	Resp23 Rl	17 00 00 09 00 1D	Tran			Nrc: 32	283.305ns		
34847	15:04:40.558.500.203 3	CMD18 READ_MULTIPLE_BLOCK	52 00 00 00 00 E1			165.534 M	Nrc: 5198	279.972ns		
34848	15:04:40.558.500.683 4	Resp18 Rl	12 00 00 09 00 D3	Tran			Nrc: 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			1.64317u	
34850	15:04:40.559.354.014 1	Read, 512 bytes	1E 00 00 00 00 00 00 00...	SC=2 WaitTime:199.98ns					1.64317u	
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					1.64317u	
34854	15:04:40.559.361.407 1	Read, 512 bytes	DC DA B2 2B 1A 01 2D 7E...	SC=6 WaitTime:206.646ns					1.64317u	
34855	15:04:40.559.363.257 1	Read, 512 bytes	63 E7 99 B5 6F 3C 22 A2...	SC=7 WaitTime:206.646ns					1.64317u	
34856	15:04:40.559.365.107 1	Read, 512 bytes	EA A8 B1 70 B3 E1 50 F5...	SC=8 WaitTime:206.646ns					1.64317u	
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	Nrc: Over...	283.305ns		
34859	15:04:40.563.939.702 4	Resp06 Rlb	06 00 00 08 00 CB	Tran			Nrc: 33	279.972ns		
34860	15:04:40.563.939.742 3	Busy start								

parsing

4. Use 32Gb RAM as the buffer to stream all eMMC data into the SSD HD in order to record all data flow from Low Power Mode to High Speed Mode.
5. “Data Filter” filters unwanted data to save memory.
6. “Search” searches specific data.
7. “CRC Packet” displays and counts CRC
8. eMMC command statistics include numbers of packets, individual command, different data length, and errors


Navigator			Statistics	
Description	Txns	Bytes	Txns	Bytes
Command	14442	693216	CMD00	4 192
Data	539533	276233832	CMD08	7 336
Error	21		CMD55	5 240
▼ Sector Count			CMD01	29 1392
CMD17	55	28160	CMD02	2 96
CMD18	7021	275227264	CMD03	2 96
CMD24	3	1536	CMD09	2 96
CMD25	40	344064	CMD13	114 5472
Wait Data Time(ns)			CMD07	2 96
Busy Time(ns)			CMD06	69 3312
			CMD16	1 48
			CMD17	55 2640
			CMD18	7021 337008
			CMD12	30 1440
			CMD52	2 96
			CMD05	4 192
			CMD21	8 384
			CMD23	7042 338016
			CMD25	40 1920
			CMD24	3 144

9. eMMC command trigger

- a. Trigger parameters include commands and data in order to cover all kinds of packets.
- b. Command or 16 byte Data.
- c. CRC7, CRC16, End Bit Error.
- d. Data to Data timeout, CRC Status timeout, CRC Status pattern, Busy timeout.
- e. VCC drop, VCCQ2 drop.
- f. The Trigger-Out port is to trigger a DSO to capture waveforms.

☒ Trigger on

General Error CRC Status Timeout VCC Drop GPIO

☒ CMD / RESP. ☐ No Response ☐ Data  Any Command

☒ Trigger on

General Error CRC Status Timeout VCC Drop GPIO

☐ CRC7 error ☐ CRC16 error ☐ End bit error

☒ Trigger on

General Error CRC Status Timeout VCC Drop GPIO

CRC Status Pattern Positive

Positive
Negative

☒ Trigger on

General Error CRC Status Timeout VCC Drop GPIO

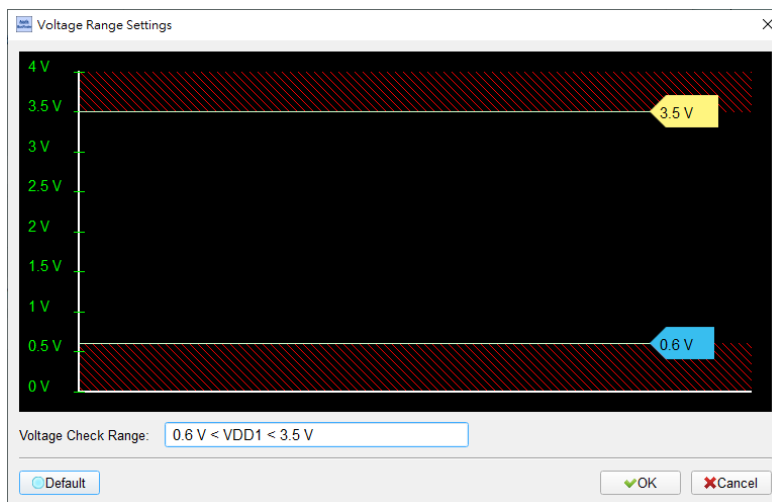
☐ VCC Drop ... ☐ VDD Drop ...

Trigger Setting

Any Command

S	T	Command	(Description)
0	1	XXh	
		Stuff Bits[31:24]	
		XXh	
		Stuff Bits[23:16]	
		XXh	
		Stuff Bits[15:8]	
		XXh	
		Stuff Bits[7:0]	
		XXh	
		CRC	
		XXh	

Default OK Cancel



Timeout Trigger

☒ Trigger on Data timeout after CMD/DATA

Trigger when wait Data time > 5 ns

☐ Trigger on Data IDLE timeout before CRC status

Trigger when wait CRC Status time > 5 ns

☐ Trigger on Busy timeout after CRC Status

Trigger when Busy time > 5 ns

The trigger function will be turned on only after receiving the following command

Cmd 17 Cmd 18 Cmd 24 Cmd 25

Default OK Cancel

10. Report area

Statistics list: Quickly categorize and track the location of data with statistical functions.

The screenshot displays the Acute BusFinder (Ver 1.4.48) interface. The main window shows a data capture window with a table of events. The table has columns: Timestamp (h:m:s.ms.us.ns), Event, Data, Information, Current state, Error message, Bus, Clock, and CMD. A red box highlights a specific event in the table. Below the main window, there is a 'Statistics List' window. This window has a 'Search List' section with a search bar and a 'Statistics List' section with a table of statistics. The table has columns: Lst No., Timestamp (h:m:s.ms.us.ns), Event, Data, Information, Current state, Error message, Bus, Clock, CMD, Description, and Data location. A red box highlights a specific row in the table. The 'Statistics List' window also has a 'Detail' section with a table of statistics. The table has columns: Description, Tms, and Bytes. The table lists various commands and their corresponding times and bytes.

11.eMMC settings

The screenshot displays the 'Protocol Settings' dialog box for eMMC 5.1. The dialog box is divided into several sections. On the left, there is a list of protocols, with 'eMMC 5.1' selected. The 'Sample Rate' is set to '2.4 GHz'. The 'Primary Protocol Analyzer' is set to 'eMMC Probe'. The 'Secondary Protocol Analyzer or I/O' is set to 'NAND Flash'. The 'Startup Settings' section includes 'Bus Mode' (High Speed), 'SDR', '4-bit', and 'Tuning Function' (Settings). The 'Filter' section includes 'Data Length > 128 bytes' and 'Number of blocks > 1 (SC > 1)'. The 'Trigger on' section includes 'General', 'Error', 'CRC Status', 'Timeout', 'VCC Drop', and 'GPIO'. The 'Option' section includes 'Vendor CMD OFF', 'Timing', '3 Pin mode (CMD, CLK, D0)', 'CLK Detect' (24ns), 'LBA Format' (Hex), and 'Voltage Detect' (A0, A1). The 'Default' button is at the bottom left, and the 'OK' and 'Cancel' buttons are at the bottom right.

1. **Sample Rate:** Choose the sampling rate to use. To enable the Secondary Protocol Analyzer – NAND Flash option, the sampling rate must be set below 1GHz,
2. **Primary Protocol Analyzer:** Can choose to use the probe type, can also customize the channel / trigger level,
3. **Secondary Protocol Analyzer or I/O:** An additional set of specified logic analysis can be opened to analyze the remaining available pins at the same time
4. **Startup setting:** It needs to be set to the mode of the current acquisition, the mode of the test object is running, and has the Tuning function.
5. **Filter:** Each Data Frame can specify the size of the collection, and data larger than the set value will not be recorded
6. **Trigger on:** CMD, DATA, ERROR, Voltage, Timeout, CRC Status trigger conditions can be set
7. **Other options:**
 - a. **Vendor CMD:** Can change the name of the command group by itself, with or without information
 - b. **Timing:** Set the clock cycle numbers of symbols.
 - c. **3 Pin mode:** After connecting CLK, CMD, D0, the protocol flow and status agreement can be analyzed. Mainly used for test objects with difficult wiring or non-data errors,
 - d. **CLK Detect:** Can detect whether CLK has action,
 - e. **Two sets of voltage detection function**

FAQ

1. What eMMC version is supported?

A : Support eMMC 5.1 HS400 / HS200 / CMD Queue.

2. Will the signal quality be affected during measurement?

A: The measurement of the external instrument will inevitably have some load effect. We use the active probe to reduce the interference of the object to be measured and improve the signal quality.

3. Is Tx supported?

A: No

4. Precautions during measurement

Please make sure to connection according to the “Probe and test object connection” on page 9.

5. Can I specify an eMMC packet as the trigger point function?

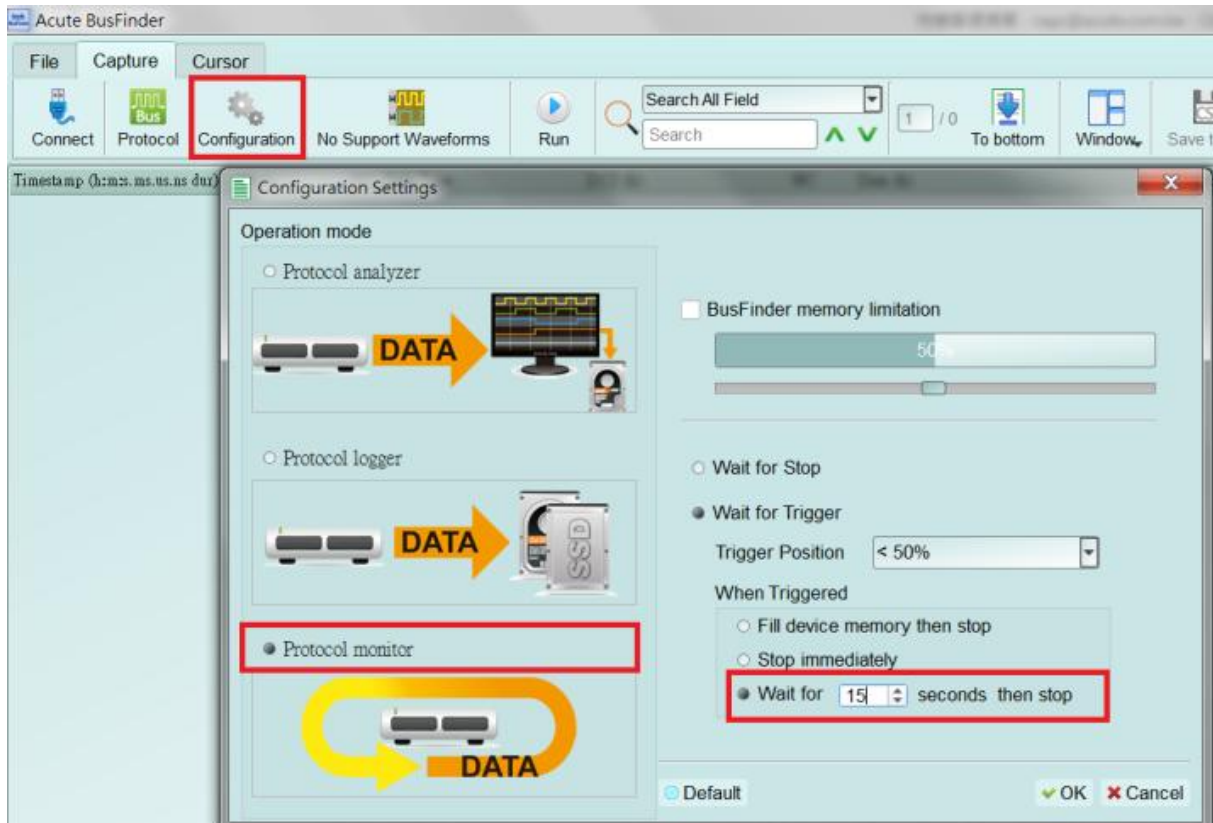
A: You can specify specific eMMC packet or Error to trigger.

S	T	Command	(Description)
0	1	6	
Set to 0		A	
XXh		Xh	
Index			
XXh			
Value			
XXh			
Set to 0		CS	
XXh		Xh	
CRC		E	
XXh		1	

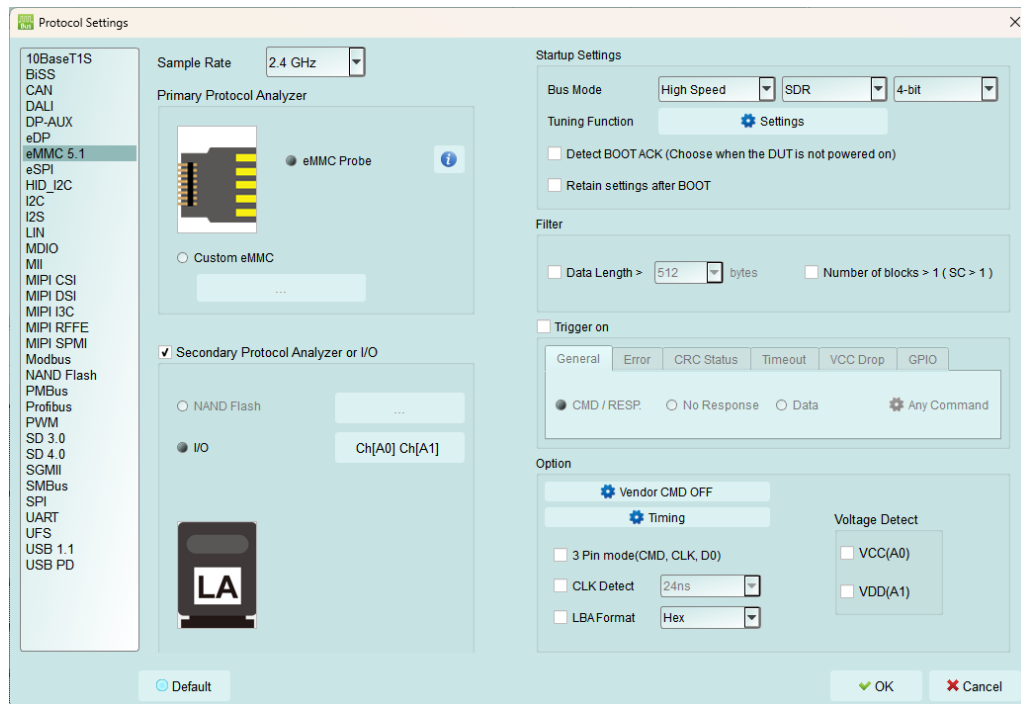
☐ Default

6. Is it possible to set an eMMC starting point, and specify how much time to capture Data?

A: You can set the starting condition to the trigger item and adjust to the data monitor mode in the working mode menu. And specify the length of acquisition time.

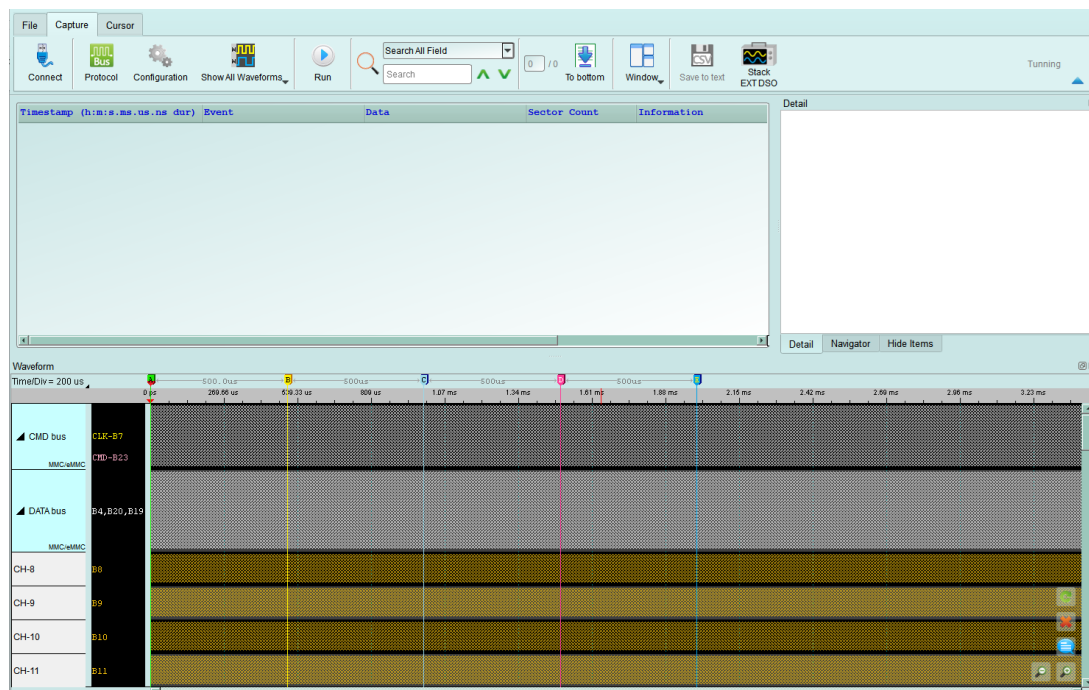


7. Secondary Protocol Analyzer or I/O



While using the eMMC 5.1 protocol analyzer, you can additionally enable the NAND Flash logic analyzer function or additional I/O pins for analysis.

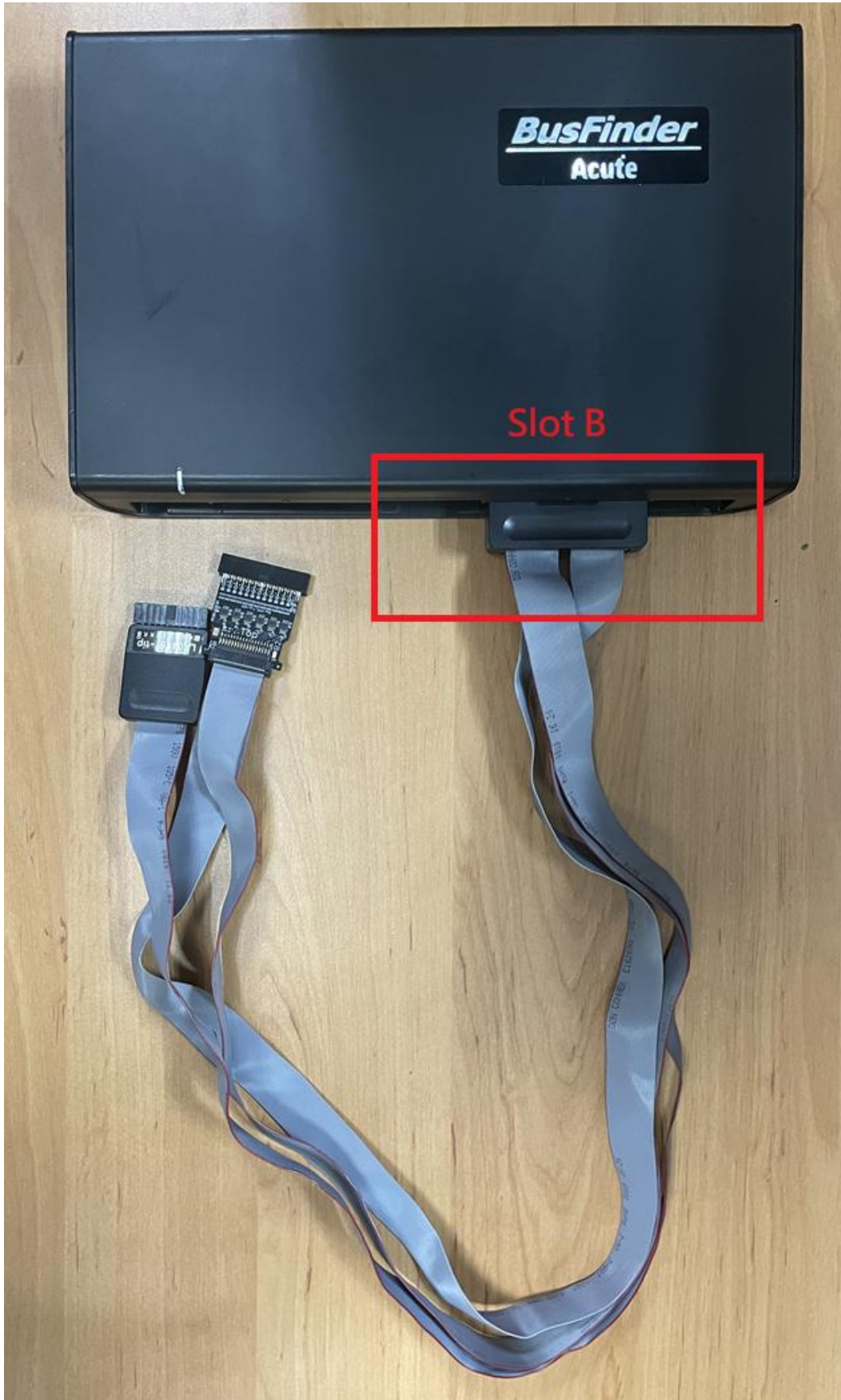
To use this function, you must turn on the “Show Waveform” on the main screen of the protocol analyzer.



Since the analysis of NAND Flash requires the use of more channels, an LA probe needs to be connected to Slot A, and it can only be turned on using a sampling rate of 1GHz.

BusFinder and Probe connection

The BusFinder can only use Slot B as the probe connection slot.



Probe and test object connection

