

# Acute LA4000 logic analyzer

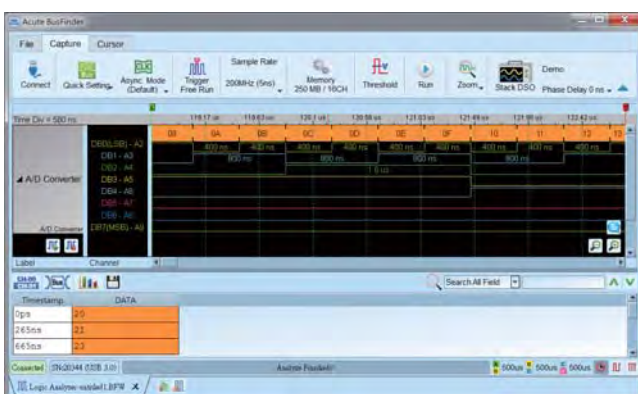
- PC-based
- 68 / 136 channels
- USB 3.0 interface, 12V power adaptor
- 4GHz Timing Analysis / 400MHz State Analysis
- 32Gb Memory
- Active Probes (4GHz x1, 2.4GHz x2/x4)
- Logic, State and Protocol triggers
- Stackable with a DSO to form an MSO
- Protocol Decode : 10BASE-T1S<sup>1</sup>, CAN 2.0B/CAN FD, DP\_Aux<sup>1</sup>, eMMC 4.5, I<sup>2</sup>C, MIPI I3C 1.1.1, SD 3.0, SPI, SVID<sup>2</sup>, SWD, UART (RS232), USB1.1, USB PD 3... (100+)
- Protocol Trigger I : 10BASE-T1S<sup>1</sup>, I<sup>2</sup>C, MIPI I3C 1.1.1, SPI, UART (RS232), USB PD 3, ...
- Protocol Trigger II : eMMC 4.5, eSPI, NAND Flash, SD3.0, Serial Flash, SVID<sup>3</sup>, ...
- Protocol Analyzer I : 10BASE-T1S<sup>1</sup>, CAN 2.0B/CAN FD, I<sup>2</sup>C, MIPI I3C 1.1.1, SPI, USB PD 3, ...
- Protocol Analyzer II : DALI, eSPI, MDIO, PMBus, Profibus, PWM, SVID<sup>3</sup>, ...



270 x 175 x 55 (mm<sup>3</sup>)

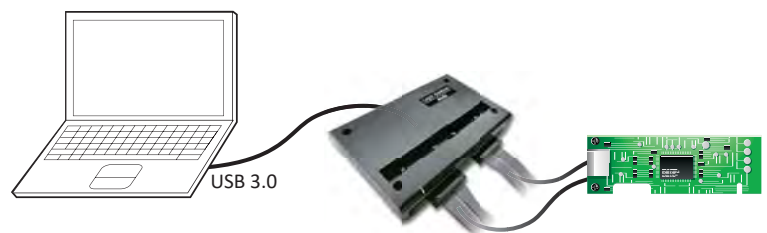
Model	Channel	Protocol Trigger	Protocol Analyzer
LA4068E	68	I	I
LA4136E	136	I	I
LA4068B	68	I, II	I, II
LA4136B	136	I, II	I, II

## Software Window



## System Requirements

- USB 3.0 port
- Win 7, Win 8, Win 10, Win 11
- PC RAM 16GB (recommended) or 8GB at least



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# LA4000 series

Model		LA4068E	LA4136E	LA4068B	LA4136B
Power	Power Source	12V Power adapter			
	Static Power Consumption	18W	30W	18W	30W
	Max Power Consumption	45W	75W	45W	75W
Hardware Interface		USB 3.0			
Timing Analysis (Asynchronous, Max. Sample Rate)		4 GHz			
State Clock Rate (Synchronous, External Clock)		400 MHz			
Storage		Conventional Timing, Transitional Timing			
Channels (Data / Clock)		64 / 4	128 / 8	64 / 4	128 / 8
Total Sample Memory		32Gb			
Available channels vs. Memory per channel	Timing Analysis	Available channels (Conventional / Transitional Timing) - Memory per channel			
	4GHz	(16 / 16) - 2Gb			
	2.4 / 2GHz	(32 / 32) - 1Gb			
	1GHz	(64 / 64) - 500Mb			
500 / 250 / 200MHz		(64 / 64) - 500Mb	(128 / 128) - 250Mb	(64 / 64) - 500Mb	(128 / 128) - 250Mb
Resolution		250 ps			
Channels		64	128	64	128
Pre / Post Trigger		Yes			
Pass Count		Yes (1 ~ 1000000 times)			
Event Types		Channel, Pattern, Single / Multi Level, Parallel Clause, Width, Time-out, External			
Protocol Triggers I		10BASE-T1S <sup>1</sup> , BiSS-C, CAN2.0B/CAN FD, DP_Aux <sup>1</sup> , HID over I2C, I2C, I2S, LIN2.2, MIPI I3C 1.1.1, SENT, SPI, UART (RS232), USB PD 3			
Trigger	Protocol Triggers II	---		DALI, eMMC 4.5, eSPI, HyperBus, LPC, MDIO, MII, Mini/Micro LED, MIPI RFFE 3, MIPI SPMI 2, Modbus, NAND Flash, PMBus, Profibus, RGMII, RMII, SD 3.0 (SDIO 2.0), SENT, Serial Flash (SPI NAND), SMBus, SVI2, SVID <sup>3</sup> , USB1.1	
	Trig-In / Out (for Stack)	TTL 3.3V			
	Ref. Clock Input	10MHz, Vpp=3.3 to 5V			
	Range	±15V			
Threshold	Resolution	10mV			
	Accuracy	± 100mV + 5%* Vth			
Input Voltage	Non-destructive (Max.)	±40V			
	Sensitivity	~300mV			
Impedance		~ 55KΩ    <2pF to 1Vdc			
Temperature	Operating / Storage	5°C~45°C (41°F~113°F)/-10°C~65°C (14°F~149°F)			
Channel to channel skew		250 ps			
Protocol Analyzer / Protocol Logger / Protocol Monitor	I	10BASE-T1S <sup>1</sup> , BiSS-C, CAN2.0B/CAN FD, DP_Aux <sup>1</sup> , HID over I2C, I2C, I2S, LIN2.2, MIPI I3C 1.1.1, SPI, UART (RS232), USB PD 3			
	II	---		DALI, eSPI, MDIO, MII, MIPI RFFE 3, MIPI SPMI 2, Modbus, PMBus, Profibus, RGMII, RMII, SMBus, SVID <sup>3</sup> , USB1.1	
Zoom In / Out		Yes			
Languages		English / Traditional Chinese / Simplified Chinese			
Waveform Height		Adjustable			
Zoom / Report Window		Yes			
Quick Cursor-positioning		Yes			
Import Label(s)		Yes			
Quick Bus Decode Setup		Yes			
Trigger / Auxiliary cursors		1/25			
Software Features	Protocol Decode	1-Wire, 3-Wire, 7-Segment, 8b10b decoding, 10BASE-T1S <sup>1</sup> , A/D Mux Flash, AccMeter, ADC, APML, AVSBus, BiSS-C, BSD, BT1120, CAN 2.0B/FD, Close Caption, CODEC_SSI, DALI, DMX512, DP_Aux <sup>1</sup> , EDID, eMMC 4.5, eSPI, FlexRay, HD Audio, HDLC, HDQ, HID over I2C, HID over SPI, HTSensor, HyperBus, I2C EEPROM, I2C, I2S, I80, IDE, IrDA, ISELED, ITU-R BT.656 (CCIR656), J1850, JTAG, JVC IR, LCD1602, LED_Ctrl, LIN 2.2, Line Decoding, Line Encoding, Lissajous, LPC, LPT, Math, M-Bus, MCTP over I2C/ I3C/ SMBus <sup>4</sup> , MDDI, MDIO, MHL CBUS, Microchip SWI, Microwire, MII, Mini/Micro LED, MIPI CSI LP, MIPI DSI LP, MIPI I3C 1.1.1, MIPI RFFE 3, MIPI SoundWire 1.2, MIPI SPMI 2, Modbus, NAND Flash, NEC IR, OA3p, OATC6, PCM, PECL 3.0, PDM, PMBus, Profibus, PS/2, PWM, QEI, QI, QSPI, RC-5, RC-6, RGB Interface, RGMII, RMII, S/PDIF, SD 3.0 (SDIO 2.0), SENT, Serial Flash, Serial IRQ, Serial PSRAM, SGPIO, Smart Card, SMBus (SBS, SPD), SMI, SPI, SPI-NAND, SSI, ST7669, SVI2, SVID <sup>2</sup> , SWD, SWIM, SWP, TDM, UART (RS232), ULPI, UNI/O, USB 1.1, USB4/TB3 SB Channel, USB PD 3, Wiegand, ...			
	Line Decoding	Biphase Mark, Differential-Manchester, Manchester (Thomas, IEEE802.3), Miller, Modified Miller, NRZI, ...			
	Line Encoding	AMI (Standard, B8ZS, HDB3), Biphase Mark, CMI, Differential-Manchester, Manchester (Thomas, IEEE802.4), MLT-3, Miller, Modified Miller, NRZI, Pseudoternary, ...			
	Dimension	L x W x H (mm <sup>3</sup> )	270 x 175 x 55		
Weight	Device / Accessories	800g / 1500g			
LA-Pod 2/ LA4G-POD/ Flying lead cable		2 / 1 / 10	4 / 1 / 18	2 / 1 / 10	4 / 1 / 18
Grippers		100	180	100	180

<sup>1</sup> Optional 10BASE-T1S / DP\_Aux adapter needed. <sup>2</sup> Upon request ONLY by users who have signed CNDA with Intel, SVID decode supported by all LA4000 models.

<sup>3</sup> Upon request ONLY by users who have signed CNDA with Intel, SVID trigger & PA supported by LA4068B/LA4136B ONLY.

<sup>4</sup> MCTP over I2C/I3C/SMBus decode supports analysis of Ethernet / MCTP Control / NC-SI / PLDM packets.

## LA4068B/LA4136B can be additionally equipped with the following options.

### NAND Flash Option

weight : 450g

Use 32Gb RAM as the buffer to stream all NAND Flash data into the SSD/ HDD to record all data flow from the Low-Speed Mode to the High-Speed Mode. It supports both x8 and x16 configurations for Data(I/O) pins and offers both logic analyzer and protocol analyzer modes. Additionally, it is compatible with multiple brands and allows for custom data settings.



## LA4000 series can be additionally equipped with the following options.

### LVDS Option

weight : 450g

LVDS Probe can be applied to logic signal and low voltage differential signal (LVDS) measurement.



### Tip specification

Model	LA4K/LA4G	LA08/09	NAND	LVDS
Number of Channels	8 / 8+1 (Data+CLK)	8 / 8+1 (Data+CLK)	4+2 (Data+Analog)	8-Diff.
Threshold of Data	Range	±15V	-0.5V ~ +4.8V	---
	Resolution	10mV	21mV	---
	Accuracy	±100mV + 5% *Vth		---
Input Voltage of Data	Max. (Non-destructive)	±40V DC+ AC peak	±15V DC+AC peak	-0.5V~+4.6V DC+AC peak
	Operation	±15V	-1V ~ 8V	0V ~ 3.3V
	Sensitivity	~300mV		~100mV
Impedance of Data	~ 55KΩ    <2pF to 1Vdc	1MΩ    5pF		75K Ω    3pF
Input Voltage of Analog	Max. (Non-destructive)	---	-0.5V ~ +8V DC+AC peak	---
	Operation	---	0V ~ 4V	---
	Resolution	---	~1mV	---
	Sampling Rate	---	1M	---
Impedance of analog	---	1MΩ    100pF		---

## Protocol Analyzer:

It is hardware decoding and streaming protocol data into SSD hard drive for a long time without waveforms.

Support multiple protocols with different operating modes

Real-time data search

Stack with a DSO as an MSO in logic analyzer mode

Real-time data statistics

Hide items for easy view

Protocol report

Show waveforms with bus decodes



### Protocol Analyzer

Show real-time protocol data

Application timing: view real-time protocol data if many idles in between



### Protocol Logger

Like data logger, save massive data into SSD hard drive

Application timing: save massive protocol data if not many idles in between



### Protocol Monitor

Like dash cameras, record protocol data by the device's memory only

Application timing: trigger event only happens in very long time

## Standard Equipment List for LA4000 Series:



## Logic Analyzer:

Capture digital waveforms and support bus decodes. Able to stack with a DSO to form as an MSO.

### Parallel Clause triggers (Logic) :

▶ State 0	Description... <b>IF</b> (Bus_[A7:A0] = 55h AND CH-08 )Edge Rising <b>OR</b> (Bus_[A7:A0] = AAh AND CH-08 )Edge Rising Start Timer 0 AND Reset Timer 0 Goto Next
▶ State 1	Description... <b>IF</b> CH-08 Edge Falling AND Timer/Counter 0 Condition Matched Set Triggered

16-States parallel IF Clause settings for 128/64 channel value comparisons combined with AND/OR logic condition and 4 Timer/Counter conditions.

### Quick View

Right-click and drag on the clock waveform to see the frequency and the number of transitions

Clear setting

Single or repetitive captures

Fast DSO stack setting

The screenshot shows the Logic Analyzer interface with several annotations:

- Clear setting:** Points to the 'Quick Setting' button in the top toolbar.
- Single or repetitive captures:** Points to the 'Run' and 'Repeat' buttons in the top toolbar.
- Fast DSO stack setting:** Points to the 'Stack DSO' button in the top toolbar.
- User note:** A yellow box highlights a note window titled 'Note 1' with the text 'Acute Note'.
- Display digital and analog waveforms at the same phase:** A yellow box highlights a section of the waveform where digital data is overlaid on an analog signal.
- Report window:** A red arrow points to the bottom section of the interface, which contains a table of captured data.

Sample	Status	Address	D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	ASCII
1	Ops	Start	Rd	3F	00														
2	547.62us	Start	Wr	12	41	43	55	54	45										ACUTE
3	2.10016ms	Start	Wr	46	54	4C	5F	33	30	30	30	53	65	72	69	65	73		IL_3000Series
4	5.64638ms	Start	Rd	3F	D0														

### Flow chart bus triggers (Protocol) :

The screenshot shows the 'Clause Trigger' configuration window with the following annotations:

- Power trigger for serial bus, 8-states flow chart setting with Counter/Timer:** A red box highlights the flow chart showing a sequence of states (State 1, State 2, State 3) leading to a 'Counter 1' trigger.
- Detail parameters for each states:** A red box highlights the 'Event 1' configuration panel, which includes settings for Mode (7-Bit Addressing), Value (12h), R/W, ACK, and Data (Any Position/Fix Offset).

Power trigger for serial bus, 8-states flow chart setting with Counter/Timer

Detail parameters for each states

# Automation & SDK

Acute LAVISA provides an interface where users can operate the software for capturing, stopping, or dynamically reading the current software's measurement and decoding analysis data (such as I2C, eSPI, SPI, QSPI,...) through self-written programs using textual commands.

The screenshot displays the Acute LAVISA software interface. At the top, there is a toolbar with icons for Connect, Protocol, Configuration, Waveform, Run, Search, and other functions. Below the toolbar is a large table showing captured data with columns for Timestamp, Status, Address, Data, ASCII, Error, and Information. An orange arrow points from this table to a smaller window below it.

The smaller window shows a table of measurement statistics for BUS\_I2C (I2C) with columns for Measurement Type, Label Name A, Label Name B, From, To, Minimum, Maximum, Average, and Total. Below this is a command-line interface with a table of commands and their results:

Command	Parameter	Read Back
1 *PA:CAPTURE:START		
2 SLEEP	3000	
3 *PA:REPORT:ROWCOUNT?		1724
4 *PA:REPORT:COLUMNCOUNT?		8
5 *PA:REPORT:DATA?	1500 4	77* A7*

Below the command table is another table showing measurement reports:

Command	Parameter	Read Back
2 *LA:MEASUREMENTREPORT:DATA?	1 5	3.740us
3 *LA:MEASUREMENTREPORT:DATA?	2 5	20ns
4 *LA:MEASUREMENTREPORT:DATA?	3 5	20ns

## Remote Control

AqLAVISA can be further integrated with gRPC or TCP/IP connections, allowing remote software to conduct data analysis.

