ZEROPLUS

Zero Loss ◆ Make Plus

Debugging Protocol Buses in Embedded System Designs

Historically performing troubleshooting and debugging of digital circuits, an oscilloscope has been used. However, now more complex embedded systems, including multi-channel signal, timing analysis, protocol analysis, etc., use advanced semiconductor process technology - single chip system (SoC), making digital circuit debugging more and more challenging, to the use of oscilloscopes No longer enough.

Like many electronic test and measurement tools, logic analyzers provide suitable solutions to specific classes of problems. It is a versatile tool that helps you with digital hardware debugging, design verification, and embedded bus debugging. A logic analyzer is an essential tool for engineers designing digital circuits.

Logic analyzers support developers in optimizing and debugging the hardware in their digital systems, as well as in identifying and repairing problems in faulty systems. During the integration of software and hardware, the logic analyzer can trace the execution of the embedded bus, analyze the efficiency of program execution, and then find out the correlation between the program design and the relative hardware operation.

Logic analyzers are primarily used for verifying complex digital circuits in embedded systems, for troubleshooting and debugging, and in some applications, can provide better results than oscilloscopes. Logic analyzers acquire and display multiple signals from a digital system or circuit, making it easy to analyze the timing relationships of the signals and organize the recorded data into state traces, timing diagrams, or bus decoding. For debugging elusive randomness problems, logic analyzers can detect glitches, detect anomalies in setup and hold times, help engineers verify digital circuit operation and help troubleshoot problems.

ZEROPLUS TECHNOLOGY, a leading manufacturer of logic analyzers, has been committed to incorporating powerful tools into innovative products to enhance "time of record". Longer recording times enable users to diagnose and repair defects in complex electronic systems in detail. Just connect your PC via USB3.0, you can use PC to control Zeroplus Logic Analyzer, let it help engineers to quickly and thoroughly verify performance and debug complex electronic systems. The PC software needs to be downloaded and installed from the official website.

ZEROPLUS TECHNOLOGY provides different logic analyzers for engineers with different needs：

Engineers developing SD3.0 or eMMC are recommended to choose the **Bus Expert II**

- Special purpose to SD3.0 and eMMC
- 64Gb RAM
- Standard configuration active probe
- LA / PA mode switch
- Long time protocol analyzer record

Engineers developing embedded systems are recommended to choose the **LAP-C Pro** series.

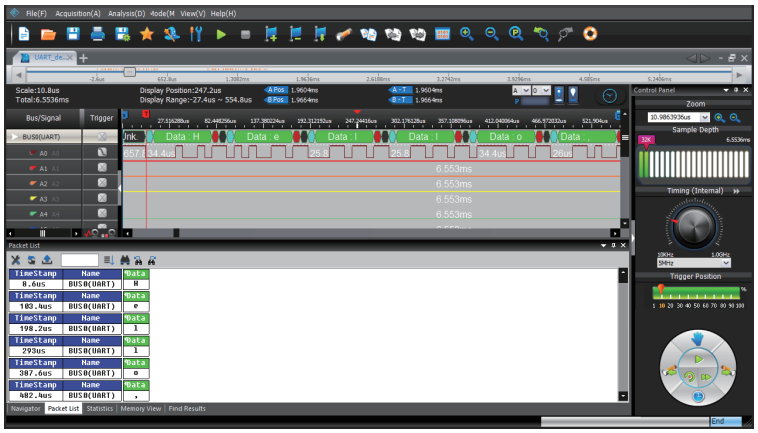
- Light weight
- 8 channels; 2GHz sample rate 1Gb sampling depth
- Input voltage range ±30V
- 130 protocol decoder
- Long time logic analyzer record

Engineers who need multi-channel or signal interference measurement are recommended to choose the **LAP-F1** series.

- 64 channels
- 64Gb RAM
- Standard configuration active probe
- 130 protocol decoder
- Long time logic analyzer record

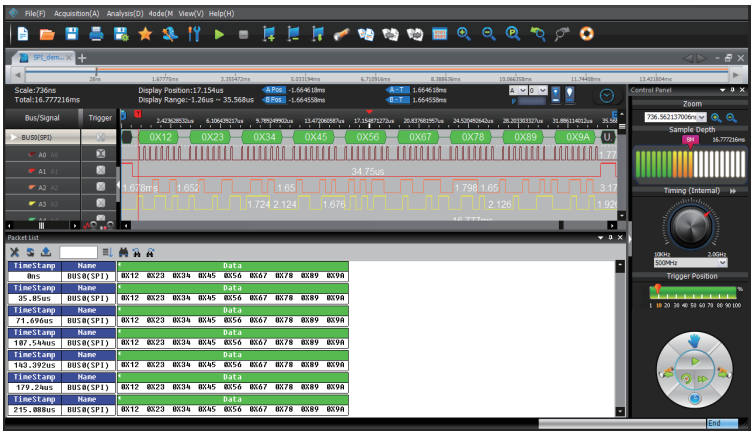
Common bus interfaces UART, SPI, I2C, RMII, USB 2.0 are supported by **Zeroplus Logic Analyzer.**

UART Protocol



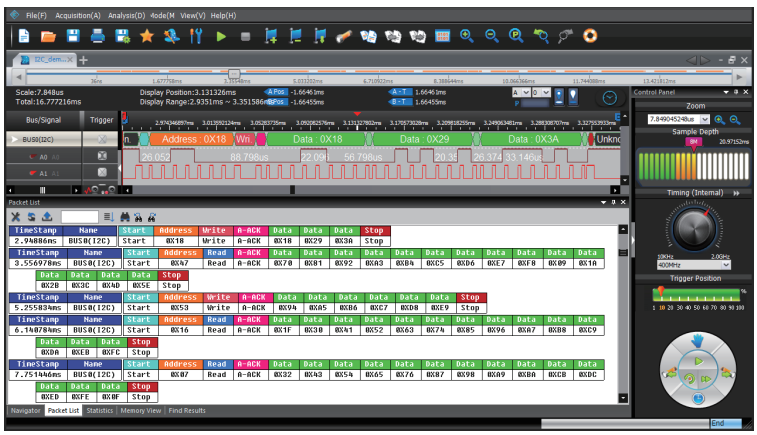
Universal Asynchronous Receiver / Transmitter is an asynchronous transceiver that converts data from serial transmission to parallel transmission. It can be applied to RS232, RS422, RSS485 and other interface standard specification.

SPI Protocol



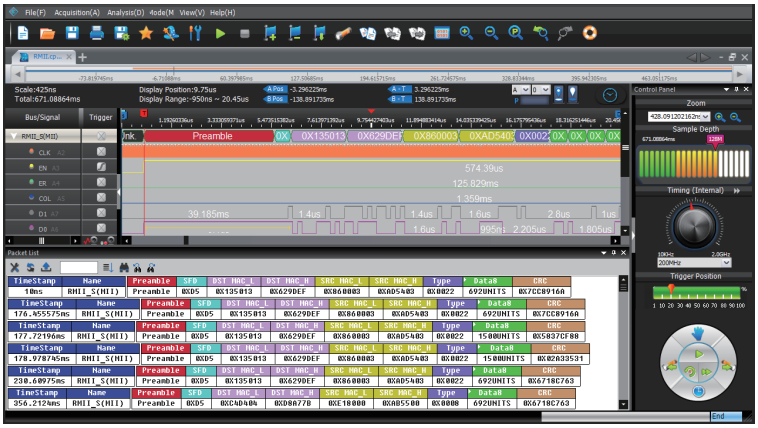
Serial Peripheral Interface Bus is a synchronous serial communication interface specification for short-range communication. Mainly used in single-chip systems. Similar to I2C. The interface was first developed by Motorola and later developed into an industry standard.

I2C Protocol



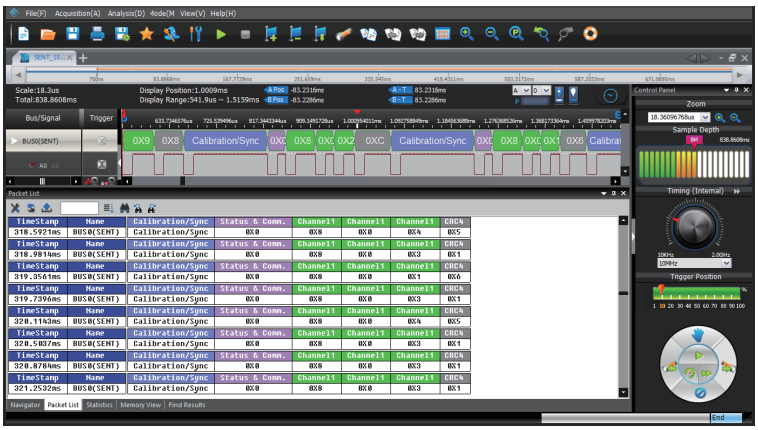
I2C (Inter-Integrated Circuit) bus is a two-wire serial bus developed by PHILIPS, which is used to connect the microcontroller and its peripheral devices. The main advantage of the I2C bus is its simplicity and effectiveness. Since the interface is directly on the component, the space occupied by the I2C bus is very small, reducing the space of the circuit board and the number of chip pins, and reducing the interconnection cost.

RMII Protocol



Reduced Media Independent interface is one of the standard Ethernet interfaces. RMII uses 2 wires to transmit data. In the Ethernet PHY, serial-to-parallel conversion, codes, etc, can be used to transfer data.
For transmission on twisted wires and optical fibers, the frame format follows IEEE 802.3(10M)/ IEEE 802.3 (100M)/IEEE 802.1q(VLAN)

SENT Protocol



The SENT (Single Edge Nibble Transmission) bus is used to transmit high-resolution sensor data from the sensor to the ECU. It can replace lower resolution methods and is a simpler low-cost alternative to CAN or LIN.

ZEROPLUS provides logic analyzers for different developers' needs, and provides efficient results with a friendly user interface. Once you start using the **ZEROPLUS logic analyzer**, you have the ideal tool to help you with your embedded system debugging challenges, and you may never want to use another logic analyzer.

If you are interested in our products, and want to get more insights, please contact：

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