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TECHNICAL DATA SHEET

Logic 8

Overview 1
Description 2
Included Components 2
Pin Configuration 2
Absolute Maximum Ratings 3
Recommended Operating Ratings 3
Electrical Characteristics 3
Logic 2 Software 3
Considerations 4
Ordering Information 5
Support and Warranty 5
Contact Information 5



Overview

The Saleae Logic 8 is a 8 channel logic analyzer with each input dual purposed for analog data recording. The device connects to a PC over USB and uses the Saleae Logic 2 software to record and view digital and analog signals.

Features

- Powerful, Easy-to-use Software
- Deep Sample Buffers
- Highly Portable, USB Attached
- 24 Included Protocol Analyzers
- Automation API
- Custom Protocol Decoder Plugin API
- Edge and Pulse Width Triggering
- Protocol Result Filter and Search
- Measurements, Bookmarks and Timing Markers
- Four Data Export Formats: CSV, Binary, VCD and MATLAB
- Cross Platform (Windows, Linux, and OSX)

Key Specifications

- 8 Digital Channels
- 100 MSPS Digital Sampling (max)
- 25 MHz Max Digital Bandwidth
- 8 Analog Channels
- 10 MSPS Analog Sampling (max)
- 1 MHz Analog Bandwidth
- Recording Length Limited by Available RAM and Density of Recorded Data
- USB 2 High Speed

Applications

- Firmware Debugging
- FPGA Debugging
- Functional Verification
- Performance Profiling
- Reverse Engineering
- Protocol Decoding
- Data Logging

⚠ Review the user manual and safety information carefully before using the device to ensure proper operation and prevent injury or equipment damage.

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Description

A logic analyzer is a debugging tool used to record and view digital signals. It operates by sampling a digital input connected to a device under test (DUT) at a high sample rate. These samples are recorded to a sample buffer, and at the end of the capture, the buffer is displayed in the software for review.

Logic analyzers are great for debugging embedded applications. In the most common case, a developer working on firmware for a microcontroller will write code to communicate with another component, possibly using protocols like serial, I2C, or SPI. To verify the functionality or to diagnose errors in the firmware, a logic analyzer is connected to the digital IO used for communication and records the activity during testing. The recording is then shown on the display so the user can view the actual behavior of the firmware, and compare that with the expected behavior to narrow down and identity the source of the issue – or verify that the operation is correct.

Included Components

Saleae Logic 8 USB Logic Analyzer
2x 4 Channel Wire Harnesses
16x Test Clips
Saleae Carrying Case
USB-2 cable
Getting Started Guide.

Pin Configuration

The Logic 8 has 8 channels, each supporting both digital and analog input. Each channel is paired with a ground connection. Each port of logic consists of a male 2x4 pin header with signal inputs across the top and common ground pins across the bottom.

2x4 Pin Header

- **CH0, CH1, CH2, CH3** - Inputs
- **GND** - Ground

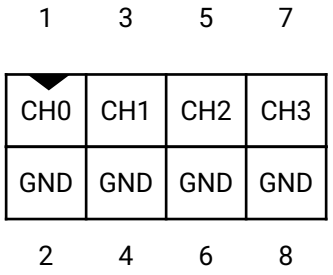


Figure 1: Standard 2x4 Pin Header.
2.54 mm (0.1 in) pitch. 0.75 mm (0.03 in) pin diameter.

Pin Configuration

Port 0 (Channels 0-3)

Channel 0 Digital + Analog	**Channel 1** Digital + Analog	**Channel 2** Digital + Analog	**Channel 3** Digital + Analog
Ground	Ground	Ground	Ground

Port 1 (Channels 4-7)

Channel 4 Digital + Analog	**Channel 5** Digital + Analog	**Channel 6** Digital + Analog	**Channel 7** Digital + Analog
Ground	Ground	Ground	Ground

Figure 2: Complete Pin Configuration for Logic MSO. All channels support both digital and analog measurements.

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All channels support:

- Digital logic analysis with selectable thresholds
- Analog signal recording up to 10 MSPS
- Input voltage range: +0V to +5V
- Maximum input voltage: ±25V

Absolute Maximum Ratings

Absolute Maximum Ratings	
Input Voltage	−25V to +25V
Operating Temperature	0°C to +70°C

Recommended Operating Ratings

Recommended Operating Ratings	
Input Voltage	+0V to +5V
Temperature	0°C to +70°C

Electrical Characteristics

Electrical Characteristics	
Input Impedance	1 MΩ || 10 pF
Digital Sampling Rates	100[1] 50[1], 40[1], 25, 20, 10, 8, 5, 4, 2, 1 MSPS
Analog Sample Rates	10, 5, 2.5, 1.25 MSPS, 625, 125, 5, 1 KSPS, 100, 10 SPS
Digital Logic Threshold IH = Input High IL = Input Low	Selectable: V_{IL} +0.6V, V_{IH} +1.2V
Common Supported Logic Standards	+5.0V, +3.3V, +2.5V, +1.8V, RS-232, RS-485/RS-422, +12V
Digital Bandwidth	25 MHz
Analog Bandwidth (-3db)	1 MHz[2]
ADC Number of Bits	10
Analog Input Voltage Range	+0V to +5V
Analog Volts per LSB	4.88 mV
PC Connection	USB 2.0 High Speed

Logic 2 Software

The Saleae Logic 2 software user manual can be located on the Saleae support site: https://support.saleae.com/user-guide

System Requirements

Saleae Logic is cross platform, with application software and drivers available for Windows, Linux, and Mac OS. The Saleae Logic 2 software can be downloaded from the Saleae website: https://www.saleae.com/downloads

USB 2.0 high speed ports are the minimum requirement.

1 100 MSPS digital on up to 3 channels, 50 MSPS on up to 6 channels, 40 MSPS on up to 7 channels.
2 Bandwidth when sampling at 10 MSPS.

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Sample Buffer Limit

The maximum recording length is determined by the density of activity in the recorded signal, the amount of free memory available to the Saleae Logic 2 software, and the exact settings of the capture. More information, as well as recommendations, can be found on the Saleae support site: https://support.saleae.com/faq/technical-faq/how-long-can-i-record-data

Bandwidth vs Sample Rate

In order to accurately record a signal, the sample rate must be sufficiently higher in order to preserve the information in the signal, as detailed in the Nyquist–Shannon sampling theorem. Digital signals must be sampled at least four times faster than the highest frequency component in the signal. Analog signals need to be sampled ten times faster than the fastest frequency component in the signal.

Active Channels vs Maximum Sample Rate

The maximum sample rates for digital and analog recordings is limited by the available USB bandwidth. Because of this, sampling at the maximum rate is not possible on all channels at once. To find out exactly what sample rates are available, please download the Saleae Logic 2 software from our website: https://www.saleae.com/downloads

Some example sample rate combinations:

3 channels, digital only, 100 MSPS	8 channels, digital only, 25 MSPS
2 channels, analog only, 10 MSPS	8 channels, analog only, 2.5 MSPS

Considerations

USB 3.0 / USB 2.0

Both Logic Pro 8 and Logic Pro 16 can operate over USB 2.0 or USB 3.0, though USB 3.0 is required to achieve the advertised sample rates.Logic Pro 16 is additionally limited to only 8 inputs when using USB 2.0 due to power restrictions.

Shared Ground and Ground Loops

The ground connections on Logic are between the inputs, the device chassis, the USB port, and connected PC. Do not energize the ground connection for any reason as it could result in damage, injury, or death Ground loops introduce risk of damage to the equipment. To mitigate the risk of damage, follow the precautions outlined on the Saleae website: https://support.saleae.com/user-guide/safety-and-warranty

Over Voltage Protection

The input pins on Saleae Logic devices (Logic 4, Logic 8, Logic Pro 8 and Logic Pro 16) have protection for signals within −25.00V to +25.00V for continuous operation. The device can be safely used for normal operation with signals in this range. The analog input on Logic 4 and Logic 8 is limited to +0V to +5V, and will saturate (take on minimum or maximum value) outside of this range. Logic Pro 8 and Logic Pro 16 have an analog input limited to −10V to +10V, and will saturate outside of that range.

Differential Signals

Each digital input is single ended only. It is recommended to use a differential to single ended receiver to first convert a differential signal to single ended before attempting to record. This is not always necessary. Details can be found on the Saleae support site: https://support.saleae.com/protocol-analyzers/analyzer-user-guides/decode-differential-and-high-voltage-data

Additional considerations and suggestions can be found at: support.saleae.com.

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Ordering Information

Logic Models

Model	SKU
Logic Pro 16 • Black	SAL-00115
Logic Pro 16 • Red	SAL-00116
Logic Pro 8 • Black	SAL-00113
Logic Pro 8 • Red	SAL-00114
Logic 8 • Black	SAL-00111
Logic 8 • Red	SAL-00112

Wire Harness

Description	SKU
Wire Harness - 2x4 to Test Clips (Channels 0-3)	SAL-00097
Wire Harness - 2x4 to Test Clips (Channels 4-7)	SAL-00098
Wire Harness - 2x4 to Test Clips (Channels 8-11)	SAL-00099
Wire Harness - 2x4 to Test Clips (Channels 12-15)	SAL-00100
Wire Harness - Logic-to-2x4 Header	SAL-00117
Wire Harness - Logic-to-Wires	SAL-00118

Test Clips

Description	SKU
Test Clips 8-Pack	SAL-00093
Nano-size Test Clip for leads < .025 inch diameter (< .64 mm)	SAL-00094

USB Cables

Description	SKU
USB 3.0 Cable A to Micro B - 1.1 ft (0.34 m)	SAL-00166
USB 3.0 Cable A to Micro B - 4.0 ft (1.2 m)	SAL-00164
USB 3.0 Cable A to Micro B - 6.6 ft (2.0 m)	SAL-00163

Support and Warranty

3-Year Warranty

Your new Logic MSO is covered against absolutely any malfunction, regardless of cause, for three years. Replacement units ship immediately, and shipping charges are on us.

180-Day Return Policy

Decide within 180 days that our products aren't for you, and return them for a full refund, including shipping. To arrange for a replacement or return, just contact us.

Contact Information

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