

# WebDAQ 504

Internet Enabled Vibration/Acoustic Logger



Remote Configuration and Monitoring

Virtually Unlimited Storage

Integrated HW and SW



Flexible Triggers,  
Alarms, Events,  
Email and SMS Text  
Notification

Built-in Web Server,  
Easy-to-Use

Simultaneous ADC  
Sampling



# WebDAQ 504

## Internet Enabled Vibration/Acoustic Logger



The WebDAQ 504 intelligent logger features remote monitoring and control of real-time acoustic and vibration data.

### Overview

The WebDAQ 504 is a stand-alone, acoustic and vibration logger designed for remote monitoring and control. All the intelligence is built into the WebDAQ, eliminating the need for a PC or additional software. By using the embedded WebDAQ web server, users can easily configure simple or sophisticated applications, log vibration data, update digital outputs and/or send notifications based on alarm conditions, and view real-time data from any location and any device with a web browser.

The WebDAQ 504 performs high-accuracy measurements from up to four IEPE (Integrated Electronic Piezoelectric) sensors. Housed in a heavy-duty chassis, the WebDAQ 504 is rugged enough for industrial applications such as noise and vibration testing.

### Integrated Software and Hardware

The WebDAQ Series embedded OS and web server provides an all-in-one package for stand-alone data logging and alarming. Users can monitor and control their applications from anywhere with a web browser.

The WebDAQ web server is optimized for both desktop and mobile use. Users can perform data acquisition tasks from phones, tablets and laptops with a single, intuitive user interface.

### WebDAQ Web Interface

An embedded web server provides a clean, intuitive interface to access all configuration and data management tasks.

Hardware, trigger and alarm settings are contained in a single task, or “job”. Multiple “jobs” can be run in a “schedule” for more complex data logging applications.

For example, users can create a schedule of jobs in which one job automatically runs after an alarm condition is triggered on a different job, such as when a digital input changes.

### Remote Access and Control

Install the WebDAQ 504 on any network and access it using any device with a web browser to remotely monitor and control all operations.

### Wireless communication

After the WebDAQ is detected on a wired network, users can connect an approved WiFi adapter to the rear panel and communicate with the WebDAQ over a wireless network. Refer to our website for a list of the [WiFi adapters approved for use](#) with WebDAQ Series hardware.

### Features

- Four simultaneous analog inputs
  - AC/DC coupling
  - IEPE excitation current
- Real-time FFTs for continuous monitoring and analysis
- Four isolated DIO for triggers and alarms
- Log data to internal storage or mapped network storage
- Share folders to view files over a local network
- Export data to csv, UFF, or binary for use in other applications
- Alarm and event notifications with email and SMS messaging
- Easy, flexible task scheduling
- Configurable read/write access
- No driver software to install
- Built-in web server
- Remote monitoring and control
- WiFi support

### Flexible Triggering

Start or stop the acquisition based on FFT, analog, or digital thresholds, alarm states, or date/time values. On-demand push button triggering is also supported.



Device-independent operation lets you remotely monitor and control the WebDAQ 504 from any device with a web browser.

### Easy Setup – Powerful Capabilities

Jobs are the building block of WebDAQ. The ability to define different data logging jobs, or tasks, and add them to a schedule unleashes flexibility not seen in any other data logger.

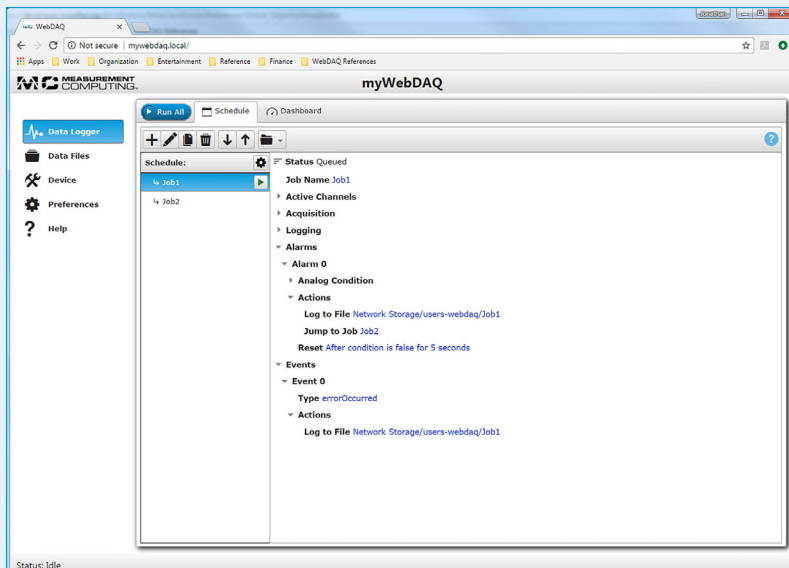
Whether you want to set up a simple logging task or a complex task, jobs and a schedule make it easy and straightforward.

### What is a Job?

The basic building block of WebDAQ, a job defines channel configuration, logging options, start and stop conditions, and alarming.

### What is a Schedule?

A schedule is a collection of jobs that gives flexibility to dynamically change data logging attributes, such as sampling rate, active channels configuration, or alarm levels.



### Example:

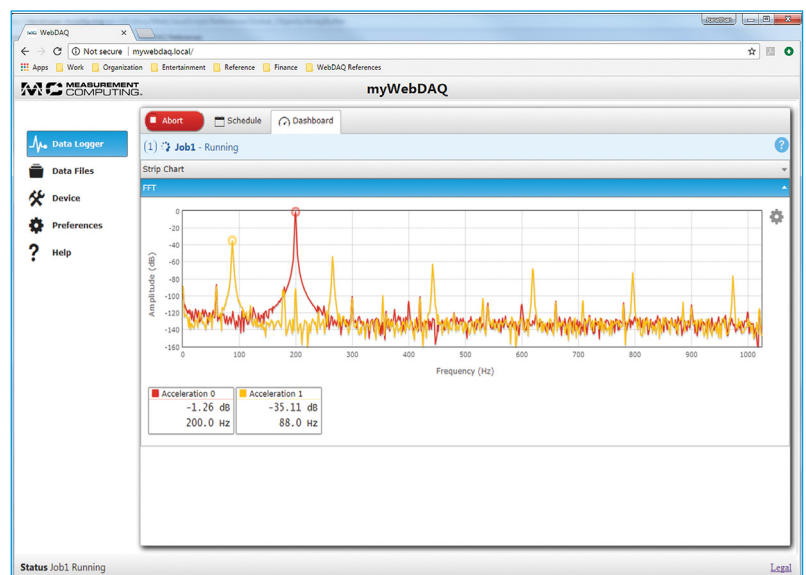
Switching from static acquisition to dynamic acquisition.

#### 1 Schedule and 2 Jobs

Users can easily setup a job for a slow, static acquisition and a fast dynamic acquisition. When a trigger condition is met (i.e. over/under alarm), Job 1 (slow acquisition) ends and Job 2 (fast acquisition) begins. When the trigger condition returns to normal, Job 1 can be restarted.

### Clear, Concise, Data Displays

WebDAQ users don't need to rely on the small screens and difficult to navigate displays of most other loggers. With WebDAQ's intuitive web interface, users can easily see their data and alarm conditions in real time or after the acquisition is complete.



### Alarm and Event Notifications

Create multiple alarms using analog or digital channel sources. Configure alarms to reset and re-arm when the condition clears, or reset them remotely with your browser. View the alarm status on the web interface.

Users can configure one or more events to record when a job is started, stopped, or triggered, or if an error condition is detected.

Receive alarm and event notifications on one or more addresses using email and SMS messaging.

### Virtually Unlimited Storage

Store data files and configuration settings locally in internal flash memory, or save to external media or network folders.

Users can map a network drive or FTP server as the location to log data or store files.

Easily transfer files between WebDAQ storage locations and mapped network storage locations.

### Share Folders

Users can share a WebDAQ storage location or specific folder over a local network.

### Real-Time Data Display

View data as it is acquired or from a stored file. Data can be plotted on strip chart and FFT displays. Users can specify a range of data to view. Real-time FFTs allow continuous monitoring and analysis. Users can apply windowing parameters with software.

### Control Read and Write Access

Users can control who can view and modify job settings by defining a password and setting the security level.

### Run the Schedule on Startup

Automatically run the schedule when the system starts up. Multiple jobs in the schedule are run consecutively.

### Real-Time Clock

A real-time clock provides an absolute time reference for time-stamping data. The clock can be set to any timezone, and may be synchronized to the internet time server.

### Simultaneous Sampling

The WebDAQ performs simultaneous measurements from up to four analog inputs at rates of up to 51.2 kS/s per channel. Users can configure each input for voltage or IEPE sensor measurements.

### Sensor Measurements

Users can configure IEPE channels to measure acceleration, sound pressure, velocity, and force. AC coupling is automatically enabled for IEPE channels. WebDAQ provides a minimum of 4 mA excitation current and IEPE compliance voltage up to 19 V to drive internal circuitry. Users can configure voltage channels for AC or DC coupling.

### FFT Display

An FFT is displayed for each active channel in a job on a single FFT plot. The WebDAQ 504 performs a spectrum function on the time-domain data, and displays the amplitude of the frequency response. The data is scaled in dB based on the full-scale range of the sensor for that channel.

Users can configure the window type to apply to the FFT data for each channel. The following window types are supported: Hann, Hamming, Blackman-Harris, Blackman, Flattop, or None (Uniform).

The peak amplitude and frequency can be shown or hidden, as desired.

### FFT Triggering

An FFT trigger can be used for starting or stopping an acquisition.

Users can configure the channel to use as the FFT trigger source, the FFT size, and the window type to apply to the FFT data for the trigger. The following window types are supported for the FFT trigger: Hann, Hamming, Blackman-Harris, Blackman, Flattop, or None (Uniform).

The WebDAQ 504 performs a Power Spectrum function on the time-domain data of the selected FFT trigger source.

The power frequency band and the total power in band threshold level to use for the FFT trigger are user-configurable.

Users can also specify the number of samples to acquire before the trigger occurs.

### Anti-alias Filtering

Built-in anti-alias filters automatically adjust to the sampling rate. Analog and digital filtering accurately represents in-band and out-of-band signals. Signals within the passband have frequency-dependent gain. A stopband filter attenuates all signals above the stopband frequency.

### Isolated Digital I/O

The four isolated digital I/O lines can be used either as triggers to start or stop the acquisition or as alarm outputs.

### Flexible Power Requirements

Provide power with the 9 volt, 1.67 amp supply that ships with the device, or connect any 6 to 16 DC supply.

### Firmware Updates

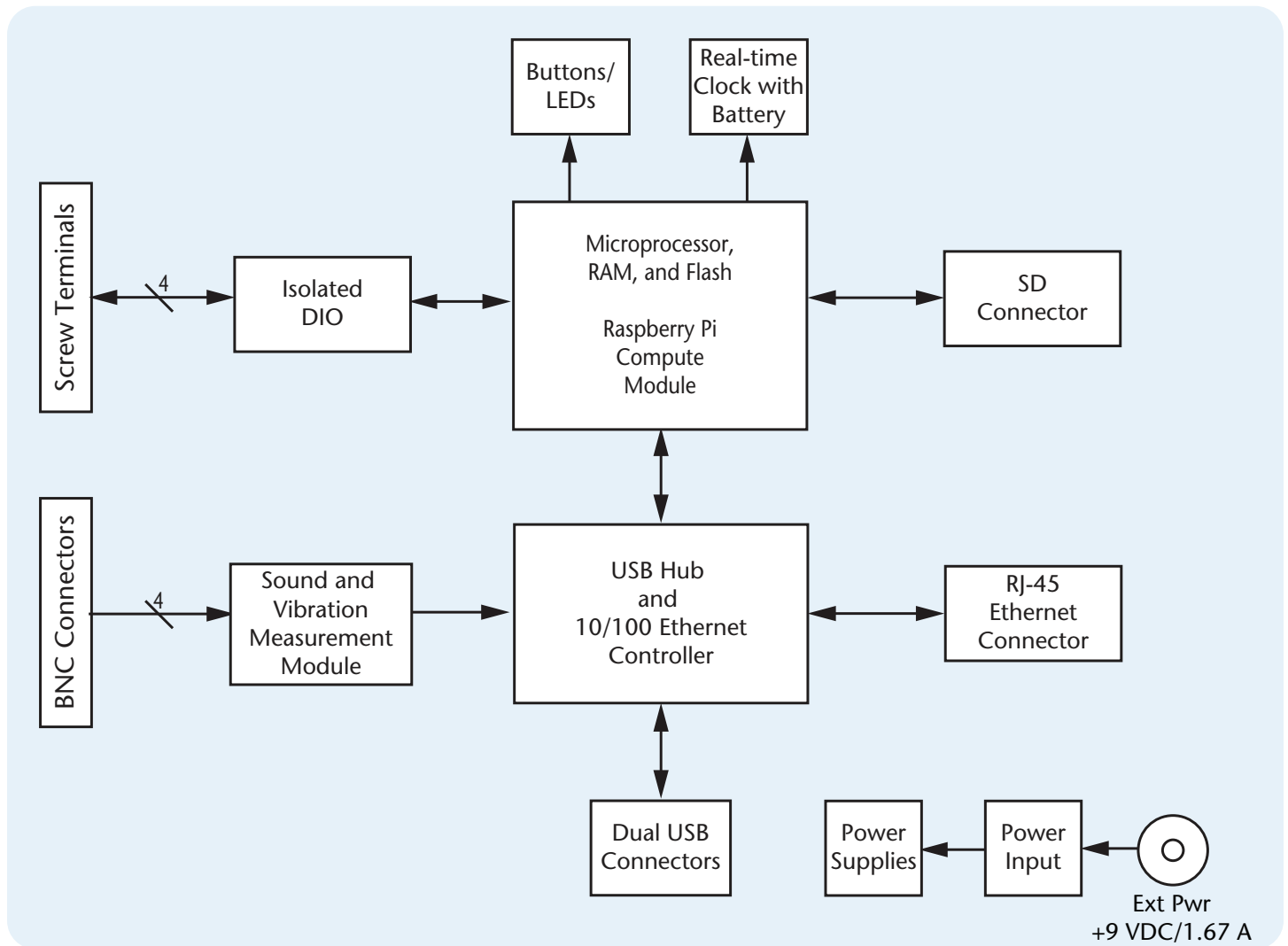
Device firmware is bundled with the operating system and web server in one update file. This allows the WebDAQ to be updated in the field.

### Calibration

The WebDAQ is factory-calibrated using a NIST-traceable calibration process. Specifications are guaranteed for one year. Return the device to the factory for recalibration.

# WebDAQ 504

## Functional Block Diagram

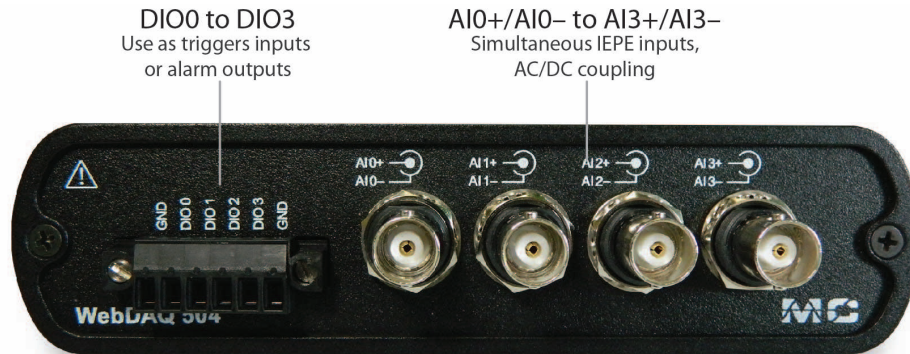


# WebDAQ 504

## Front and Rear Panels

### Front Panel

BNC connectors and detachable screw terminals allow quick sensor and digital connections.

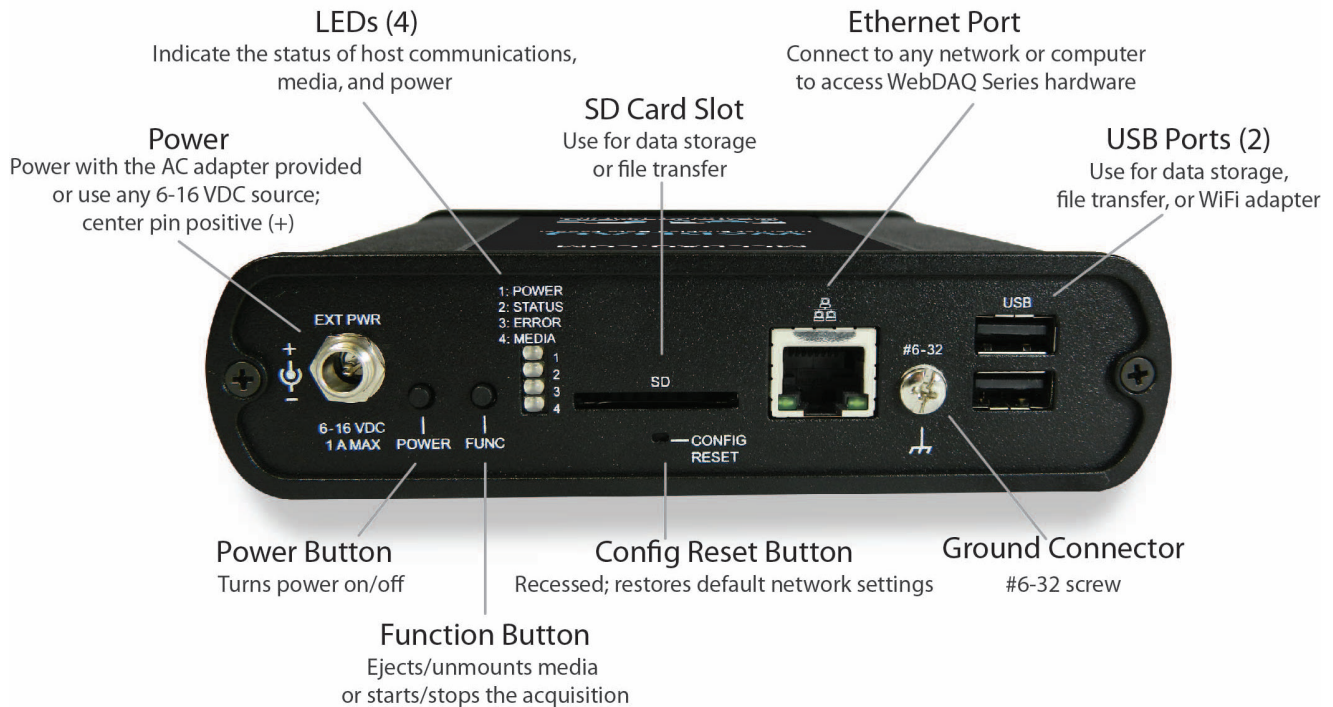


DIO0 to DIO3  
Use as triggers inputs  
or alarm outputs

AI0+/AI0- to AI3+/AI3-  
Simultaneous IEPE inputs,  
AC/DC coupling

### Rear Panel

The rear panel provides Ethernet and power connections, LED indicators, dual USB ports, one SD card slot, buttons, and a ground connector.



LEDs (4)  
Indicate the status of host communications,  
media, and power

Ethernet Port  
Connect to any network or computer  
to access WebDAQ Series hardware

Power  
Power with the AC adapter provided  
or use any 6-16 VDC source;  
center pin positive (+)

SD Card Slot  
Use for data storage  
or file transfer

USB Ports (2)  
Use for data storage,  
file transfer, or WiFi adapter

Power Button  
Turns power on/off

Config Reset Button  
Recessed; restores default network settings

Ground Connector  
#6-32 screw

Function Button  
Ejects/unmounts media  
or starts/stops the acquisition

All specifications are subject to change without notice.  
Typical for 0 °C to 50 °C unless otherwise specified.

### Analog Input

Number of channels: 4 analog input channels  
ADC resolution: 24 bits  
Type of ADC: Delta-Sigma (with analog prefiltering)  
Sampling mode: Simultaneous  
Internal master timebase ( $f_M$ )  
Frequency: 13.1072 MHz  
Accuracy:  $\pm 50$  ppm max  
Data rate range ( $f_s$ ): 1.652 kS/s min, 51.2 kS/s max. The data rate must remain within the appropriate data range.  
Data rates ( $f_s$ ):  $(f_M \div 256)/n$ , where  $n = 1, 2, \dots, 31$ .  
Input coupling: AC/DC, software-selectable  
AC cutoff frequency  
-3 dB: 0.5 Hz  
-0.1 dB: 4.6 Hz max  
Input range:  $\pm 5$  V  
AC voltage full-scale range:  $\pm 5$  Vpk min,  $\pm 5.1$  Vpk typ,  $\pm 5.2$  Vpk max  
Common-mode voltage range, AI- to earth ground:  $\pm 2$  V max  
IEPE excitation current; software selectable on/off: 2.0 mA min, 2.1 mA typ  
Power-on glitch: 90  $\mu$ A for 10  $\mu$ s  
IEPE compliance voltage: 19 V max  
Overvoltage protection, with respect to chassis ground  
Signal source connected to AI+ and AI-:  $\pm 30$  V  
Low-impedance source connected to AI+ and AI-: -6 V to 30 V  
Input delay:  $(40 + 5/512)/f_s + 2.6$   $\mu$ s  
Gain drift: 0.14 mdB/ $^{\circ}$ C (16 ppm/ $^{\circ}$ C) typ, 0.45 mdB/ $^{\circ}$ C (52 ppm/ $^{\circ}$ C) max  
Offset drift: 19.2  $\mu$ V/ $^{\circ}$ C typ, 118  $\mu$ V/ $^{\circ}$ C max  
Channel-to-channel matching  
Phase ( $f_m$  in kHz):  $f_m \times 0.045^{\circ} + 0.04$  max  
Gain 0.01: dB typ, 0.04 dB max  
Passband  
Frequency:  $0.45 \times f_s$   
Flatness ( $f_s = 51.2$  kS/s):  $\pm 40$  mdB (pk-to-pk max)  
Phase nonlinearity,  $f_s = 51.2$  kS/s:  $\pm 0.45^{\circ}$  max  
Stopband  
Frequency:  $0.55 \times f_s$   
Rejection: 100 dB  
Alias-free bandwidth:  $0.45 \times f_s$   
Oversample rate:  $64 \times f_s$   
Crosstalk (1 kHz): -110 dB  
CMRR,  $f_m \leq 1$  kHz, 40 dB min: 47 dB typ  
SFDR,  $f_m = 1$  kHz, -60 dBFS: 120 dB  
Input impedance  
Differential: 305 k $\Omega$   
AI- (shield) to chassis ground: 50  $\Omega$

Measurement Accuracy			
Measurement Conditions		% Reading (Gain Error)	% Reading (Offset Error) <sup>1</sup>
Calibrated	0 °C to 50 °C max	$\pm 0.34\%$ , $\pm 0.03$ dB	$\pm 0.14\%$ , $\pm 7.1$ mV
	25 °C $\pm 5$ °C typ	$\pm 0.07\%$ , $\pm 0.006$ dB	$\pm 0.01\%$ , $\pm 0.5$ mV

<sup>1</sup> Range = 5.1 Vpk.

Idle Channel and Noise Density			
Idle Channel	51.2 kS/s	25.6 kS/s	2.048 kS/s
Noise	97 dBFS	99 dBFS	103 dBFS
	50 $\mu$ V <sub>rms</sub>	40 $\mu$ V <sub>rms</sub>	25 $\mu$ V <sub>rms</sub>
Noise density	310 nV/ $\sqrt$ Hz	350 nV/ $\sqrt$ Hz	780 nV/ $\sqrt$ Hz

Total Harmonic Distortion (THD)		
Input Amplitude	Condition	Specification
Input amplitude	-1 dBFS	1 kHz: -95 dB 8 kHz: -87 dB
	-20 dBFS	1 kHz: -95 dB 8 kHz: -80 dB
Intermodulation distortion (-1 dBFS)	DIN 250 Hz/8 kHz 4:1 amplitude ratio	-80 dB
	CCIF 11 kHz/12 kHz 1:1 amplitude ratio	-93 dB

### Digital input/output

Digital type: CMOS (Schmitt trigger) input / open drain output  
Number of I/O: One port of 4 bits  
Configuration: Bit configurable for input or output  
Power on conditions: Power on reset is input mode  
Pull-up configuration: Each bit is pulled up to 5 V with a 100 k $\Omega$  resistor  
Input frequency range: DC - 10 kHz.  
Input high voltage threshold: 1.9 V min, 3.6 V max  
Input low voltage threshold: 2.3 V max, 1.0 V min  
Schmitt trigger hysteresis: 0.6 V min, 1.7 V max  
Input high voltage limit: 15 V absolute max  
Input low voltage limit: -0.5 V absolute min, 0 V recommended min  
Output off state leakage current: 10  $\mu$ A max  
Output sink current capability: 100 mA max (continuous) per output pin  
Output transistor on-resistance (drain to source): 1.6  $\Omega$

### Network

Ethernet type: 100 Base-TX, 10 Base-T  
Communication rates: 10/100 Mbps, auto-negotiated  
Connector: RJ-45, 8 position  
Cable length: 100 meters (328 feet) max

### Network configuration

Network IP configuration: DHCP, link-local, static  
DHCP may be disabled by the user and a static IP address assigned  
If DHCP is enabled but is unsuccessful at obtaining an IP address the device will fall back to link-local and request the IP address 169.254.100.100.  
Network device name: The name used for detecting the device using mDNS (zero-conf). This name may be changed using the web interface.  
Network name publication: By mDNS  
User accounts: *admin* and *share*. These accounts are case-sensitive and cannot be changed using the web interface.

### Factory default settings

Factory default IP address: 192.168.0.101  
Factory default subnet mask: 255.255.255.0  
Factory default Gateway: 192.168.0.1  
Factory default DHCP setting: DHCP + link-local enabled  
Factory default password for admin account: *admin*. Passwords are case sensitive and can be changed using the web interface.  
Factory default password for share account: *share*. Passwords are case sensitive and can be changed using the web interface.  
Factory default device name: *webdaq-xxxxxx*, where *xxxxxx* is the last 6 digits of the MAC address (printed on the label on the underside of the device).  
**Note:** When factory defaults are restored, any shared folders or mapped drives are reset.

### USB ports

Number of USB ports: Two, for connection to a mass storage device or approved WiFi adapter.  
USB device type: USB 2.0 (high-speed)  
Device compatibility: USB 1.1, USB 2.0, USB 3.0

### SD memory card slot

Memory card type: SD, SDHC, SDXC, MMC, TransFlash  
File systems supported: FAT16, FAT32, exFAT, ext2/3/4, NTFS

# WebDAQ 504

## Ordering



### Push buttons

Power (POWER):

W1 jumper installed (factory default): Turns device on or off.

W1 jumper removed (device on when power is applied): Reboots the device.

Function (FUNC): Unmounts external media, or starts/stops an acquisition

Reset (CONFIG RESET): Restores network and alarm settings to factory default values.

### Ground connector

Connector port for the #6-32 ground screw.

### Power

Input voltage: Center positive. 6 VDC to 16 VDC

Input wattage: 4 W typ, 10 W max

External AC adapter: 9 VDC, 1.67 amps, 110 VAC to 240 VAC input range

Battery: One 3 V button cell lithium battery (BR1225 or CR1225); replaceable

### Shock

Operating shock: 30 g, 11 ms half sine; 18 shocks at 6 orientations

### Mechanical

Dimensions (L × W × H): 158.8 × 146.1 × 38.1 mm (6.25 × 5.75 × 1.50 in.)

With BNC connectors: 178.8 × 146.1 × 38.1 mm (7.04 × 5.75 × 1.50 in.)

Weight: 680 g (1.5 lb)

### Environmental

Temperature range: 0 °C to 50 °C max operating, -40 °C to 85 °C storage

Ingress protection: IP 30

Humidity: 10- 90% RH, noncondensing (Operating), 5-95% RH (Storage)

Maximum altitude: 2,000 m (6,562 ft)

Pollution Degree: 2

The WebDAQ 504 is intended for indoor use only but may be used outdoors if installed in a suitable enclosure.

## Order Information

### Hardware

Part No.	Description
WebDAQ 504	Internet enabled vibration and acoustic logger with four analog inputs, simultaneous sampling, IEPE signal conditioning, embedded operating system and web server; includes the PS-9V1AEPS230V power supply with USA, UK, and Europe plugs.

### Accessories

Part No.	Description
ACC-205	DIN-rail mounting kit; requires the ACC-404 panel/wall mounting kit.
ACC-403	6-position detachable screw terminal (2).
ACC-404	Panel/wall mounting bracket; use with the ACC-205 to mount on a DIN rail.
PS-9V1AEPS230V	9 VDC, 1.67 A replacement power supply. Interchangeable power plugs are available separately.