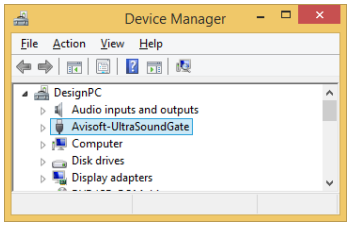
Introduction

Thank you for purchasing Avisoft UltraSoundGate 416Hb. This bus-powered USB device supports 4 channel high-speed data acquisition at sampling rates of up to 300 kHz.
The accompanying recording software Avisoft-RECORDER USGH provides either continuous or triggered direct-to-disk recording with real-time spectrogram displays.

Installation procedure

First download and install the RECORDER USGH software from the Avisoft Bioacoustics website (www.avisoft.com/downloads or directly www.avisoft.com/RECORDER%20USGH.exe). This installation program will install both the RECORDER USGH application (rec_usgh.exe) and the required device drivers (usgh_xx16h.inf, usgh.sys) for the UltraSoundGate xx16H devices. When the installation procedure has completed, the UltraSoundGate unit can be connected to the computer. The device should then be detected as “Avisoft-UltraSoundGate 416H” and the pre-installed driver should be finally activated.

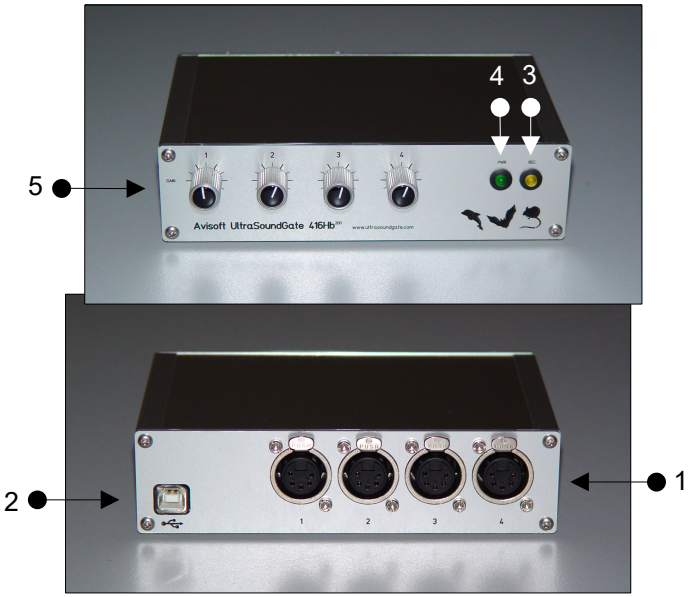
Under some circumstances it might happen that the silent installation of the device driver fails. If that happens, navigate to the *Windows Control Panel* > *Hardware and Sound* > *Device Manager* and right-click at the entry *Other devices* > *Avisoft UltraSoundGate 416H* and select the *Update Driver Software*... option. Then click at *Browse my computer for device driver software,* click at *Browse* and navigate to the folder *C:\Program Files (x86)\Avisoft Bioacoustics\RECORDER USGH\Drivers* and finally click at *Next*. The completed device driver installation will then look like this:



Getting started

The supplied RECORDER USGH software can be launched from **Start / All Programs / Avisoft Bioacoustics / RECORDER USGH.** On the first program start, the configuration dialog box will be launched automatically (otherwise it is available from **Options / Configuration).** Select the desired **Sampling rate** from the **Input Device Settings** section and click at **Ok.** Then click at the Pause button (**Monitoring/Pause**) and the Start button (**Monitoring/Start**). You will then see the real-time spectrogram displaying the incoming signals. To become familiar with the RECORDER USGH software use the online help system that can be accessed through the drop-down menu ***Help > Help...***, the ***Help...*** buttons on the individual dialog boxes or the website at http://www.avisoft.com/Help/RECORDER/content.htm and the section ***RECORDER USGH Software Settings*** in this guide.

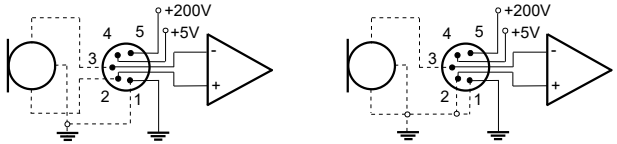
Components of the UltraSoundGate 416Hb



1 XLR input connectors

The 5-pole XLR input connectors represent the analog inputs of the recording device and provide power supply voltages for external amplifiers and microphones. The connector scheme is as follows:

1 Ground
2 Positive input
3 Negative input
4 +5V supply voltage (max current 20 mA)
5 +200V polarization voltage



differential source

single-ended source

2 USB 2.0 interface

Use this USB socket to connect the device to the computer. The additional USB socket (6) is an additional auxiliary power input that does not transmit any data over the USB.

3 REC indicator

This amber colored LED will flash once the device is connected to the PC. It will be switched off once the RECORDER USGH software is running the in the monitoring mode. In this mode, the REC LED indicates whether the RECORDER software is recording the incoming data onto disk.

4 POWER indicator

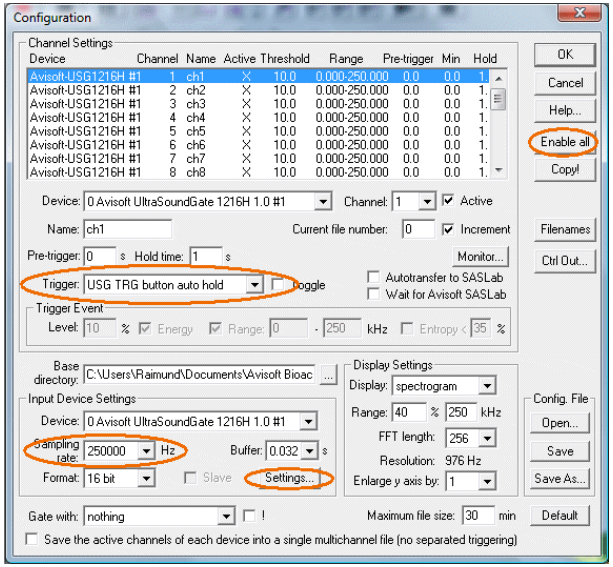
This green LED indicates that the unit is connected to the USB power supply.

5 GAIN control knobs

The control knobs adjust the analog input recording levels for each channel.

RECORDER USGH Settings

The configuration dialog box can be launched from the menu Options/Configuration... or through the button



There is a list of 24 virtual channels at the top of the configuration panel. Each of these virtual channels can be assigned to a physical channel of the UltraSoundGate unit by selecting the desired ***Device*** and ***Channel*** number for each list entry. The button labeled “Enable all” will assign and activate all available channels automatically.

The sample rate can be selected from the ***Input Device Settings*** section and will always apply to all channels of the selected UltraSoundGate device. Available sample rates are 300, 250, 214, 187.5, 166.6, 150, 125, 100, 75, 62.5 and 50 kHz.

The ***Buffer*** setting determines the USB transfer buffer size on the PC. Shorter durations will provide low real-time spectrogram display latencies but might lead to erroneous USB transfers under certain conditions.

The *Settings...* button in the *Input Device Settings* section launches the *Advanced USGH Device Settings* dialog box that provides several additional device options:

Enable master/slave mode for synchronizing several devices This option has no effect on the USG 416Hb.

Activate slave mode for this device This option has no effect on the USG 416Hb.

Enable low power mode The A/D converter chips can optionally be operated in a power-saving mode that would increase the battery life in mobile laptop-based systems. The low-power mode slightly degrades the dynamic range performance. This option should also be activated if the USG 1216H is bus-powered from a single USB port only. Otherwise, the supply voltage might drop below a critical value, which can prevent the proper operation of the A/D converters.

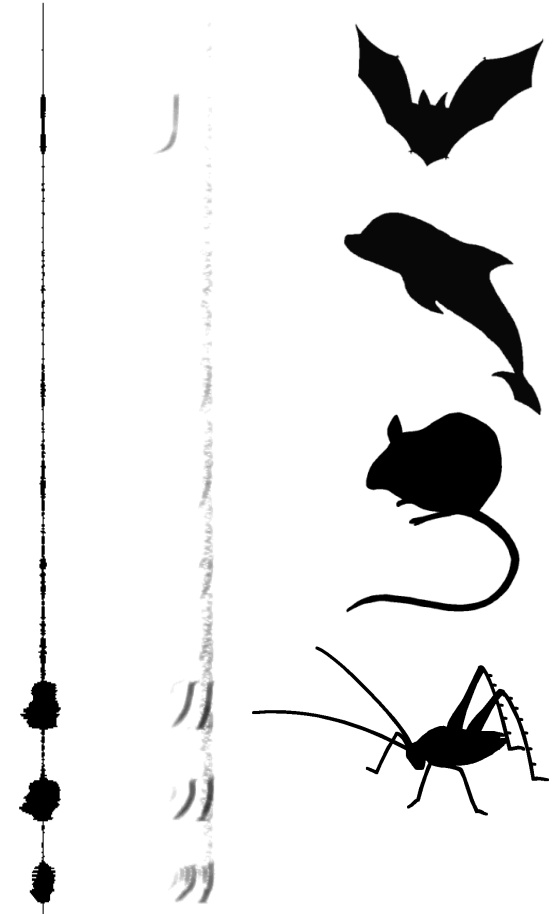
Enable band-pass mode At a few sample rates (50, 62.5, 75, 150, 187.5 and 250 kHz), the A/D converters can be configured for a special band-pass mode in which the analog input bandwidth ranges from fs/2 to fs instead of the normal mode from 0 to fs/2. This option can be advantageous for monitoring applications that require minimal .WAV files sizes. Note that the frequency scale of the resulting .WAV files will be reversed.

Turn on the polarization voltage This option activates the internal 200V polarization voltage generator of the UltraSoundGate XX16H devices and must be activated when using the CM16/CMPA microphones.

Ignore GetOverlappedResult error By default, the *GetOverlapped Result* error message will stop the monitoring/recording process. **If t**his option is activated, the monitoring procedure will be immediately restarted, which is desired in long-term monitoring applications.

TRG out mode This option has not effect on the USG 416Hb.

Enable safe multichannel data transfer mode Under some circumstances it might happen that the PC is unable to reliably transfer multichannel data streams through the USB interface without gaps. This can become a serious problem when the sample rates and the number of channels are high and if the latency of the Windows operating system is poor (due to insufficient processing power or misbehaving device drivers). So, if you encounter any problems while recording more than one channel (sporadically mixed-up channels), this option should be activated. The RECORDER software will then immediately correct such false channel associations.



Avisoft ULTRASOUNDGATE

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Sound-activated recording can be arranged by selecting the **Trigger** source option ***level of this channel***. For remote-controlled triggering via the trigger button on the device or via the external TRG input, one of the trigger options ***USG TRG button...*** can be used. For triggering by a TTL signal attached to **DIN**, select ***UltraSoundGate DI***.

The Pre-trigger duration should be kept as short as possible. Long pre-trigger settings can lead to data transmission errors if the sample rate and the number of channels is high.

In order to simplify the operation of the Avisoft-RECORDER software in the field, a link to **RECORDER USGH** may be added to the Windows ***Startup folder*** (*Start->All Programs->Startup*). Additionally, the Avisoft-RECORDER option ***Monitoring/Autostart*** should be activated. This arrangement will start the monitoring process automatically after booting the laptop (the UltraSoundGate device must be attached to the USB port prior to booting Windows).

When the system is operated on a battery-operated laptop or tablet PC, it is recommended to disable any power saving options that might otherwise lead to occasional loss of data (short gaps in the recordings) or temporarily interchanged channels.

Please refer to the users guide or the online help system for further details on the Avisoft-RECORDER software.

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Specifications

Number of channels	4 (4 separate A/D converters)
ADC type	Delta-Sigma architecture with integrated adaptive anti-aliasing filter
Resolution	16 bit or 8 bit
Maximum aggregate sample rate	4 x 300 kHz / 16 bit
Sample rates [kHz]	300, 250, 214, 187.5, 166.6, 150, 125, 100, 75, 62.5, 50
Frequency response (-3dB)	20 Hz - 140 kHz
Input sensitivity (max trim)	-43.2dBV = -41 dBu = 6.9 mVrms
Input sensitivity (min trim)	-3.2dBV = -1 dBu = 0.69 Vrms
Gain adjustment potentiometer	40 dB continuous range
Input impedance	50 kOhm
Analog input connectors	female XLR-5 sockets
Computer interface	USB 2.0, isochronous high-speed mode
Supply current (drawn from the USB)	400mA
Physical dimensions (W/H/D)	163 x 42 x 125 mm
Weight	610 g

Computer requirements

Windows PC with at least one USB 2.0 port,
Intel Core i5 processor or higher,
running Windows Vista / 7 / 8 / 10 / 11

In the interest of product improvement, the specifications and/or appearance of this unit are subject to change without notice.