

Product Data

TRITON - USB Audio Interface

Version 2: with standard or IEPE inputs

July 2018



Standard: with normal inputs



IEPE: with IEPE (microphone) inputs

Features

- USB-bus powered
- Two input versions
 - Standard (unpowered RCA sockets)
 - IEPE 4.5 mA powered BNC sockets
- Four input gains: 0, 10, 20 or 30 dB
- Overload indication
- Optional attenuator cable (standard input)
- Input and output 1 kHz level measurement report included
- No manual controls, ensuring reproducible measurements
- Compact and robust design
- Uses native Windows and Apple Computer macOS drivers
- Ideal for use with DIRAC software

Description

The Triton is a USB/Audio interface intended for acoustical measurements. Several types are available that differ in input. The **Standard** type (grey) is provided with RCA sockets, while the **IEPE** (Integrated Electronics Piezo Electric) type (black) is provided with BNC sockets and constant-current powered inputs (IEPE is also

known as ICP[®] or DeltaTron[®]). The analog inputs and outputs are phase-synchronous, thereby enabling the use of synchronous deconvolution techniques, such as with MLS and sine sweep measurements. USB's Plug & Play architecture and the compatibility with native Microsoft[™] Windows[™] and Apple Computer[™] macOS drivers enable instant use without driver installation.

Applications

- Room acoustics
 - Concert hall, studio or stage parameters
- Building acoustics
 - Sound insulation or loss factor
- Road acoustics
 - Road surface or sound barrier absorption or insulation
- Electronic systems
 - Transfer functions or spectral impedance
- Acoustic signals
 - Sound levels or frequency spectra
- Electronic signals
 - Voltage levels or frequency spectra

TRITON USB Audio Interface

Package Contents

1. USB audio interface Standard version (grey) or IEPE version (black)
2. CA05 USB-A/C cable
3. Quick Guide
4. LP03 leather pouch
5. Measurement report
6. 2 RCA/BNC socket adapters (Standard type) or 2 BNC/RCA socket adapters (IEPE type)

With a Standard Triton it is possible to attenuate the input voltage or to increase the input impedance using the optional **CA06-AAC** attenuator cable (see figure 1). This cable contains a series resistor, which forms a voltage divider with the 10 k Ω Triton input impedance. It can be ordered using the AAC suffix explained in table 1. The default cable (CA06) is 10 dB black.



Figure 1. Input attenuator cable CA06-AAC for standard Triton.

Table 2. CA06-AAC ordering information.

Attenuation [dB]	Input impedance [k Ω]	AA	Color	C
0	10.0	00		
3	14.1	03	Black	B
6	20.0	06		
10	31.5	10	Red	R
20	101	20		

IEPE microphone SPL range

With a microphone connected to an IEPE input, the maximum sound pressure level SPL_{max} (in dB re 20 μ Pa) that can be measured is given by: $SPL_{max} = 94 + 20\log(2000/S) - CF - G$, where:

- S = microphone sensitivity in mV/Pa or mV at 94 dB_{SPL}
- CF = crest factor of the signal to be measured in dB
- G = Triton input gain in dB

Below table shows the sine wave SPL measuring ranges for several microphone sensitivities and Triton input gains.

Table 2. SPL measuring ranges for 1 kHz sine wave. All values in dB

Input Gain	S = 20 mV/Pa	S = 30 mV/Pa	S = 40 mV/Pa	S = 50 mV/Pa
0	46 ... 131	42 ... 127	40 ... 125	38 ... 123
10	36 ... 121	32 ... 117	30 ... 115	28 ... 113
20	26 ... 111	22 ... 107	20 ... 105	18 ... 103
30	16 ... 101	12 ... 97	10 ... 95	8 ... 93

At the upper range limits, the peaks of a sine wave (having a 3 dB crest factor) will just reach the Triton input limits. Signals with higher crest factors, such as most practical measured response signals, would exceed the input limits at a lower SPL level.

For example, a 20 dB gain Triton would allow the calibration of a Brüel & Kjær Type 4189 microphone (S = 50 mV/Pa) using a 94 dB 1 kHz sine wave calibrator, since the maximum SPL would then be 103 dB. However, a measured noise response signal may have a crest factor of 13 dB, hence 10 dB higher peaks than a sine wave at the same SPL. Therefore, the maximum SPL for this noise response signal would be 93 dB with the same Triton, 103 dB with a 10 dB Triton, and 113 dB with a 0 dB Triton.

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Technical Specifications

All specifications at $T_A = 25^\circ\text{C}$, $f_S = 48\text{ kHz}$, $f_{IN} = 1\text{ kHz}$, $f_{OUT} = 1\text{ kHz}$, 16 bit data, unless otherwise noted.

Parameter	Condition	Min	Typ	Max	Unit
Inputs (general)					
Full scale voltage	0 dB input gain 10 dB input gain 20 dB input gain 30 dB input gain		2.0 0.63 0.20 0.063		V_p
Full scale RMS voltage ¹⁾	0 dB input gain 10 dB input gain 20 dB input gain 30 dB input gain		1.4 0.45 0.14 45		V V V mV
Full scale error		-0.2	0	0.2	dB
Overload trigger voltage	re full scale voltage	-0.5	0		dB
Frequency range (see figure 2)	$\pm 0.1\text{ dB}$ re 1 kHz level $+0.1/-0.3\text{ dB}$ re 1 kHz level $+0.1/-3\text{ dB}$ re 1 kHz level: • 0, 10 or 20 dB input gain • 30 dB input gain	40 20 4 6		21 k 22 k 23 k 23 k	Hz
Resolution		8 or 16			bit
Sample frequency		8, 11.025, 16, 22.05, 32, 44.1 or 48			kHz
Standard Inputs					
Allowable AC voltage	0, 10 or 20 dB input gain 30 dB input gain			15 5	V_{rms}
Allowable DC voltage		-25		25	V
Input impedance		9.9	10.0	10.1	k Ω
IEPE Inputs					
IEPE DC supply current	Input voltage $V_{DC} = 0 \dots 23\text{ V}$	4		5	mA
Allowable AC voltage	0, 10 or 20 dB input gain 30 dB input gain			25 5	V_{rms}
Allowable DC voltage		0		24	V
Input impedance	V_{in} within 0 ... 23 V_{DC} range	60			k Ω
Outputs					
Nominal full scale voltage			2		V_p
Full scale RMS voltage ¹⁾	Load impedance = 10 k Ω		1.4		V
Full scale error		-0.5	0	0.5	dB
Allowable DC voltage		-25		25	V
Output impedance			100		Ω
Load impedance		0			Ω
Frequency range (see figure 3)	$\pm 0.1\text{ dB}$ re 1 kHz level $+0.1/-0.3\text{ dB}$ re 1 kHz level $+0.1/-3\text{ dB}$ re 1 kHz level	6 4 1		18 k 21 k 23 k	Hz
Resolution		8 or 16			bit
Sample frequency		32, 44.1 or 48			kHz

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Parameter	Condition	Min	Typ	Max	Unit
Loopback ²⁾					
SNR	Full scale / Silence, unweighted 0...24 kHz	86			dB
Crosstalk	Channel 1 to 2, vice versa, 0...24 kHz			-80	dB
THD+N	Full scale, input + output ²⁾ -5 dB re full scale, input + output			-82 -84	dB
Dynamic Range	Input + output	85			dB
USB					
USB compatibility		USB 1.1 – 2.0			
USB connector		USB-C			
General					
Supply current	Standard IEPE, both inputs loaded		70 130		mA
Audio sockets	Standard IEPE		RCA BNC		
USB cable length			1		m
Dimensions	w x h x d, sockets excluded	82 x 22 x 40			mm ³
Weight	Standard IEPE		111 121		g

Alterations reserved

Notes

1. A measurement report on the input and output full scale voltage levels at 1 kHz is provided with each individual Triton supplied.
2. Because system measurements are often performed by generating an excitation signal at the output, while recording the system response at the input, measurement system quality parameters depend on the Triton input + output chain. Therefore, these parameters are given for a loopback configuration where the output signals are fed back to the inputs using a special converter preserving the respective full scale levels.

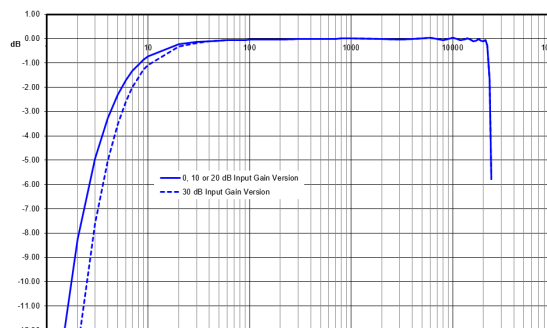


Figure 2. Typical input frequency characteristic.

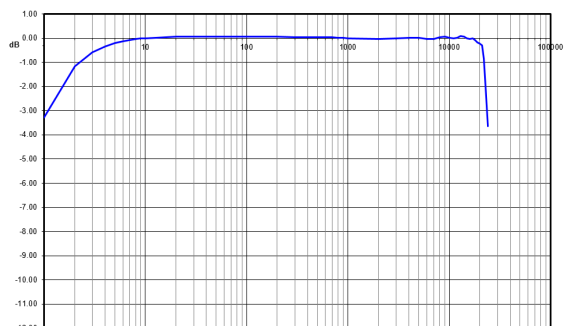


Figure 3. Typical output frequency characteristic.