VT IEPE-2G05 Manual

This product is designed to be used by those who have some basic electronics and electrical knowledge. It is absolutely dangerous to connect an unknown external voltage to the VT IEPE unit. Only IEPE sensors can be connected to the BNC connectors of this product.

Note: VIRTINS TECHNOLOGY reserves the right to make modifications to this manual at any time without notice. This manual may contain typographical errors.

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1 Installation and Quick Start Guide

VT IEPE-2G05 is a 24-bit, dual-channel, USB data acquisition interface specially designed for use with IEPE sensors such as IEPE accelerometers, IEPE microphones and IEPE hydrophones. Each channel has six calibrated voltage measurement ranges for easy calibration to sensor sensitivity: ± 250 mV, ± 500 mV, ± 1 V, ± 2.5 V, ± 5 V, ± 10 V, and a built-in 24V 4mA current source to drive an IEPE sensor directly. It contains a hardware high pass filter with 5 selectable -3dB corner frequencies: None (0.03Hz), 1.8 Hz, 119 Hz, 236 Hz and 464 Hz. The signals sensed by the IEPE sensors can be amplified and output directly from the stereo headphone jack even without running the PC software. When used in conjunction with the Multi-Instrument® software, the setup allows you to take reliable and quality vibration and noise measurements as simply as plug & play. No external power supply and driver installation is required. It is a truly hassle-free portable vibration and noise test & measurement solution.

1.1 Package Contents

1.1.1 Standard Package

A standard VT IEPE-2G05 Package contains the following items:

1) VT IEPE-2G05 unit with a hardware activated Multi-Instrument Standard software license

2) USB cable (1.5 m)

3) CD (contains the copy-protected Multi-Instrument software)

4) Carrying case

1.1.2 Optional Items

1) IEPE Accelerometers
2) IEPE measurement microphones
3) IEPE measurement hydrophones
4) Magnetic mounting base
5) BNC-to-M5 low-noise cable
6) Software license upgrade

1.2 Multi-Instrument Software Installation

Multi-Instrument is a powerful multi-function virtual instrument software. It is a professional tool for time, frequency and time-frequency domain analyses. It supports a variety of hardware ranging from sound cards which are available in almost all computers to proprietary ADC and DAC hardware such as NI DAQmx cards, VT DSO, VT RTA, VT IEPE, VT CAMP and so on. It consists of an oscilloscope, a spectrum analyzer, a multimeter, a spectrum 3D plot, a vibrometer, a data logger, a LCR meter and a Device Test Plan, all of which can run simultaneously. Please refer to the Multi-Instrument software manual for details.

Insert the installation CD into your computer's CD-ROM drive and follow the instruction on the screen to install the Multi-Instrument software. Alternatively, you can always download the latest software from: www.virtins.com/MIsetup.exe.

By default, VT IEPE-2G05 uses sound card MME driver which comes natively with all Windows versions. Thus no driver installation is required.

1.3 Start Multi-Instrument Software

With the hardware activated Multi-Instrument license, the hardware (i.e. VT IEPE-2G05) must be connected to the computer first before the software can be launched. The LED on the front panel will turn steady red once connected.

To start the Multi-Instrument software, on Windows desktop, click the MI icon directly, or select [Start]>[All Programs]>[Multi-Instrument]>[VIRTINS Multi-Instrument].   If the software is started for the very first time, the following dialog box will pop up. Select "VT IEPE-2G05" to make it the default data acquisition device. This dialog box can also be accessed via [Setting]>[Restore to Factory Default].
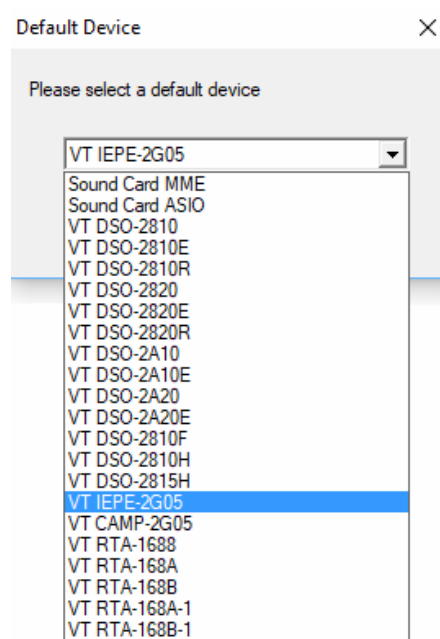
Click the round button at the upper left corner of the screen, or simply press the ENTER key, to start or stop the data acquisition. When the data acquisition is running, the LED will turn steady green.

VT IEPE-2G05 can also be selected via [Setting]>[ADC Device]> "Device Model".

1.4 Voltage Measurement Range Selection

The voltage measurement range can be selected in the second toolbar from the top as follows. Six options are available: ± 250 mV, ± 500 mV, ± 1 V, ± 2.5 V, ± 5 V, ± 10 V.

Please make sure that the "Probe" switch position is always at "1" (the default selection) if there is no external attenuation switch in the IEPE sensors, which is usually the case.

It should be noted that VT IEPE-2G05 will also be listed in the Recording Control under Windows Control Panel as follows. Thus it is possible to change the gain digitally by right clicking "Digital Audio Interface - IEPE 2G05" and select [Properties]>"Levels". However, this change will not be compensated in the software and thus you should NEVER change the gain from there. By default, the "Levels" is at 100%. It should remain as 100% in order for VT IEPE-2G05 to scale the measurement correctly.

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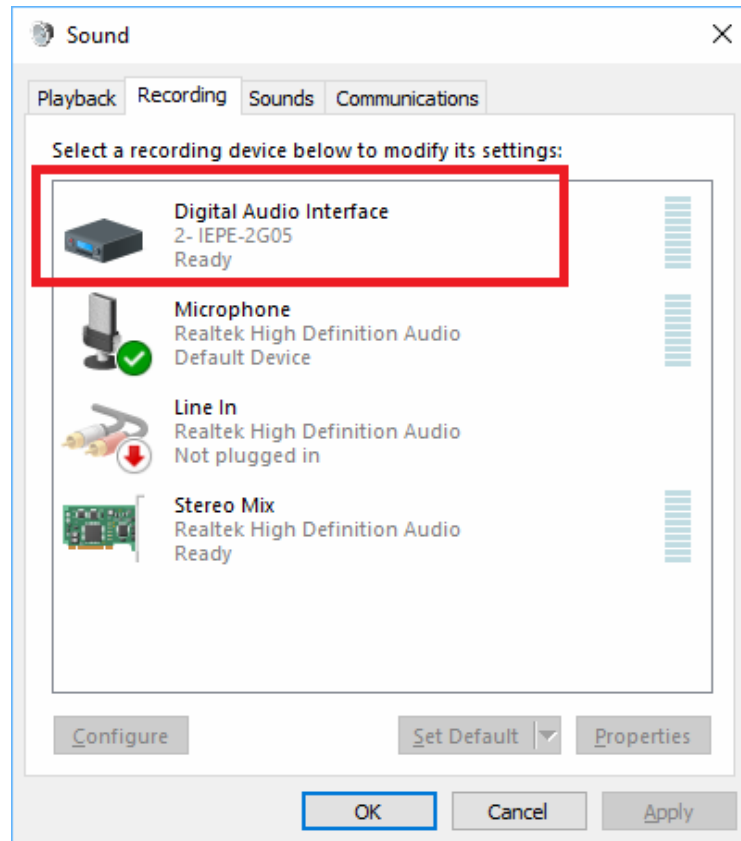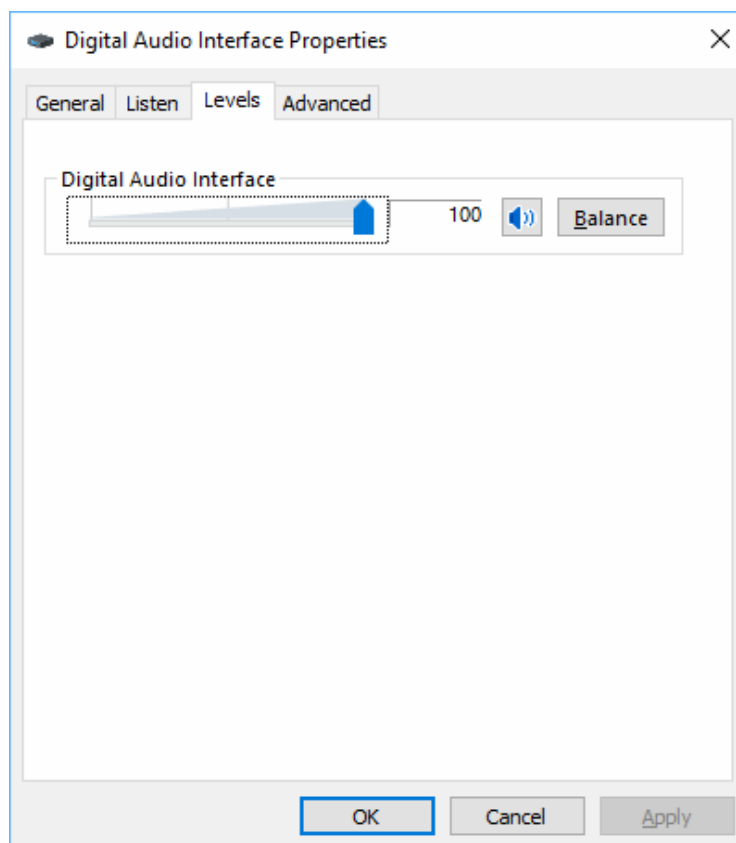
1.5 Sensor Sensitivity Input

To scale the input voltage to the physical quantity it measures, the sensor sensitivity needs to be entered manually via [Setting]>[Calibration]> "Sensor". For example, a ±100g ±5V IEPE accelerometer has a sensitivity of 0.05V/g. You can select or enter an engineering unit of any physical quantity that the IEPE sensor measures.
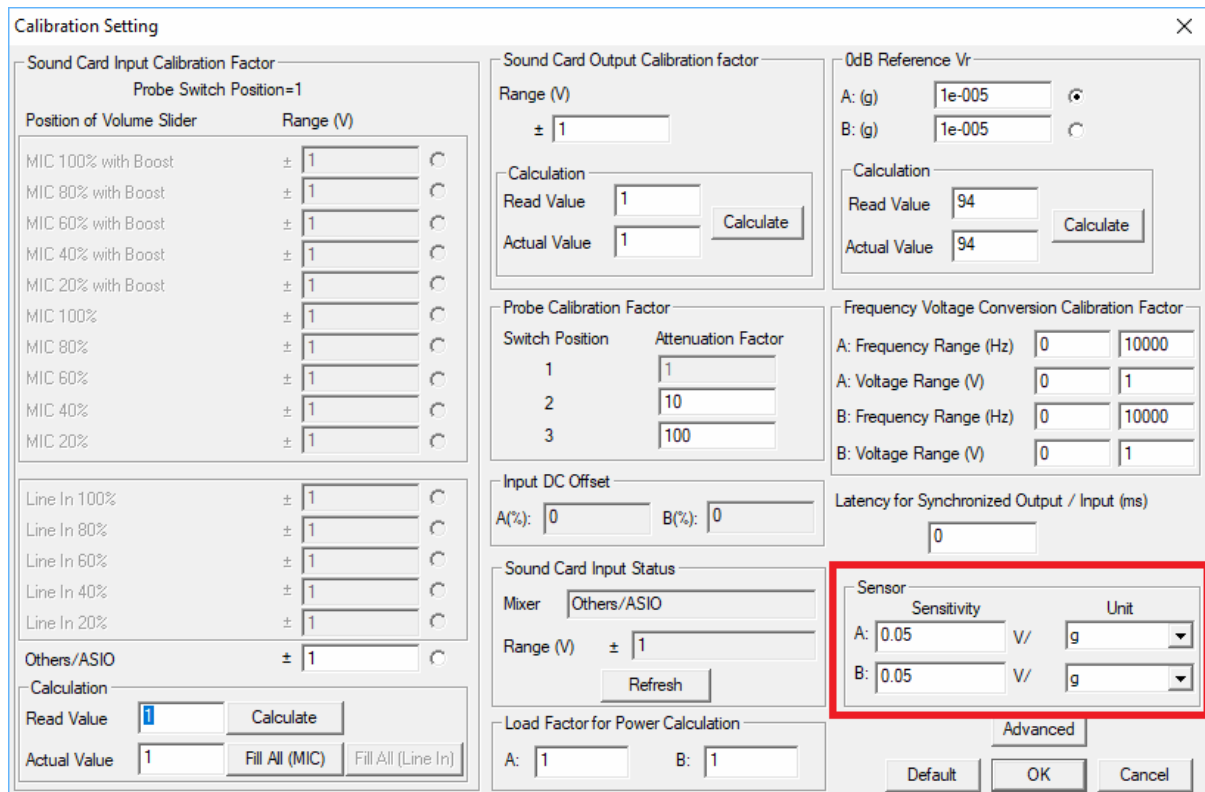
Note that in the above dialog box, the values in "Range (V)" column under Sound Card Input Calibration Factor do not affect the scaling of VT IEPE-2G05 at all.

1.6 High Pass Filter

VT IEPE-2G05 is AC coupled and thus high pass filtered at about 0.03 Hz (-3 dB). On the top of that, it is also equipped with a built-in adjustable high pass filter with five options: None, 1.8 Hz, 119 Hz, 236 Hz, 464 Hz. To check or change the high pass filter setting, click the microphone button in the second toolbar from the top, as shown below.

The following dialog box will pop up. This high pass filter is set to 1.8 Hz by default after the unit is powered on. The settings on this dialog box can be saved together with the Panel Setting File in Multi-Instrument. In other words, if you load a preconfigured Panel Setting File, these settings may change.
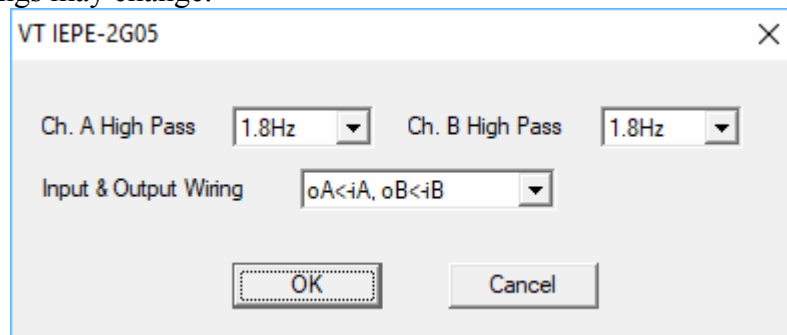
If "None" is selected for the high pass filter, the input will still be high pass filtered at 0.03 Hz due to the AC input coupling. For voltage ranges ± 250 mV, ± 500 mV and ± 1 V, it is recommended to use a high pass filter with a cutoff frequency equal to or above 1.8 Hz.

1.7 Zeroing

VT IEPE-2G05 exhibits extremely small DC offset and thus zeroing is generally not needed. Zeroing may be needed only under voltage measuring ranges: ± 250 mV, ± 500 mV, ± 1 V with the high pass filter set to "None" (not recommended).

To perform software zeroing, disconnect any IEPE sensors from the BNC connectors of VT IEPE-2G05, switch the Trigger Mode to "Auto" (see the figure below). With the oscilloscope running, you should see a horizontal line at 0V in the oscilloscope. If not, you should click " $\perp_A$ " and " $\perp_B$ "in the toolbar and choose "Yes" to compensate the ground levels of both channels to zero. If "No" is chosen instead, the software DC compensation will be removed. Be sure to remove the software DC compensation if the voltage measuring ranges are put back to ± 2.5 V, ± 5 V, ± 10 V or a high pass filter is selected. To make sure that the software DC compensation is inactive, go to [Setting]>[Calibration] and check the "Input DC Offset", make sure that the values are zeros for both channels.
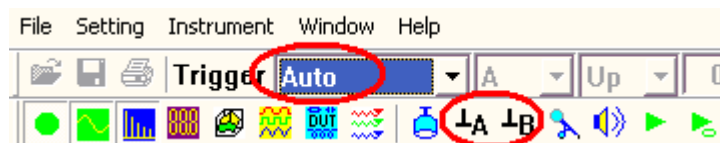
1.8 Direct Monitoring (Stethoscope)

VT IEPE-2G05 has a   3.5 stereo headphone jack on it back panel for direct monitoring of the input signal. Direct monitoring means that the input signals from the IEPE sensors are attenuated / amplified / impedance converted and sent directly to the headphone jack without going through ADC and DAC hardware as well as the computer. This direct path can be on and off from Multi-Instrument through the aforementioned high pass filter setting dialog box as shown below. If "oA<-iA, oB<-iB" is selected in the "Input & Output Wiring" selection box, the path is established. If "None" is selected instead, the path is disconnected. The path is on by default when the unit is powered on. Thus it is possible to monitor the input signal through this jack without even running the Multi-Instrument software. The output signal from this jack is able to drive a headphone or an audio power amplifier. If the IEPE sensor is an accelerometer, then this function, in effect, converts the vibration which can only be felt by touching to an audible sound which can be heard.

Again, the settings on this dialog box can be saved together with the Panel Setting File in Multi-Instrument. In other words, if you load a preconfigured Panel Setting File, these settings may change.
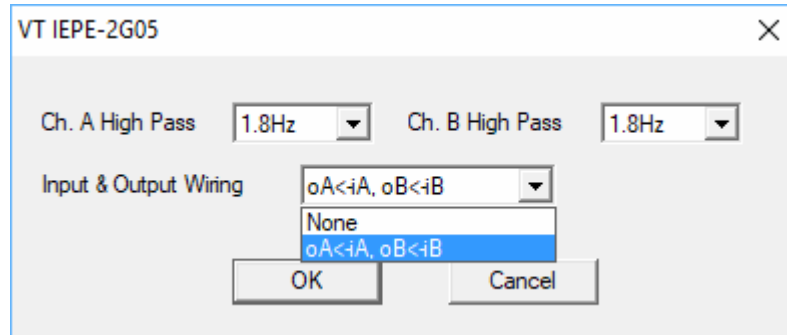
Please note that different voltage measurement range selection will affect the gain of the direct monitoring function as shown in the following table. For example, a 1V input signal under ±10V, ±5V, ±2.5V, ±1V, ±500mV and ±250mV measurement ranges will generate an output signal of 0.05V, 0.1V, 0.2V, 0.05V, 0.1V and 0.2V, respectively. ±10V is selected by default upon power on.
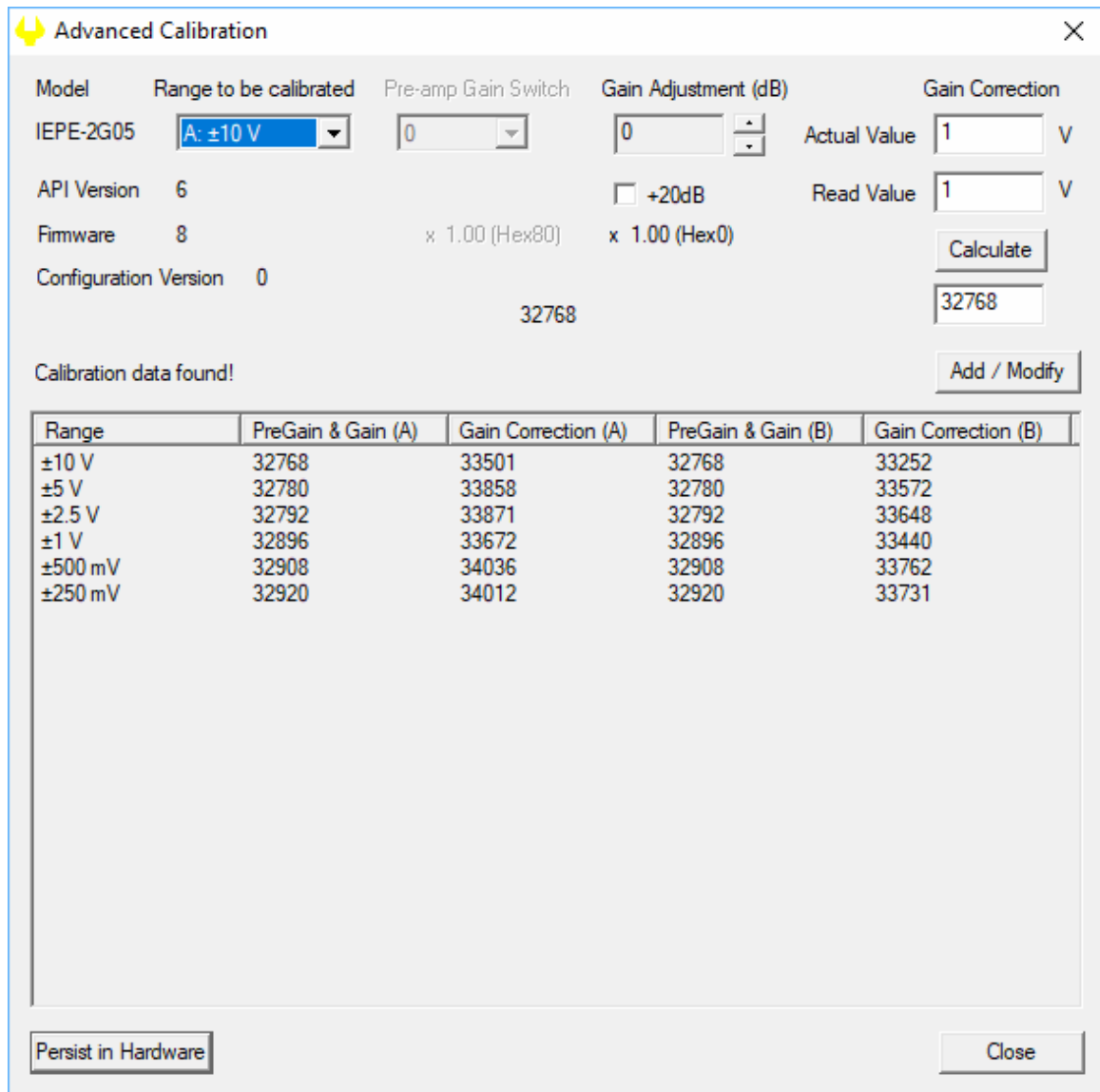
Input Voltage Range (For Direct Monitoring only)	Voltage Measurement Range Selection	Gain (Typical)	Output Voltage Range
±10V	±10V	1/20	±0.5V
±5V	±5V	1/10	±0.5V
±2.5V	±2.5V	1/5	±0.5V
±10V	±1V	1/20	±0.5V
±5V	±500mV	1/10	±0.5V
±2.5V	±250mV	1/5	±0.5V

1.9 Hard Reset

A hard reset can be done via disconnecting the unit from your computer and then re-connect it to the computer again. You can only do this with the Multi-Instrument software closed.

1.10 Calibration and Recalibration

VT IEPE-2G05 is individually calibrated in factory. Re-calibration is generally not required. To re-calibrate, go to [Setting]>[Calibration]> "Advanced". The following "Advanced Calibration" dialog will pop up. Calibration procedure will be described separately from this document. Please contact Virtins Technology for details.

1.11 Non-routine Applications

The non-routine applications refer to those applications that are not considered as routine tasks of VT IEPE-2G05. With Multi-Instrument's capability of simultaneous input and output, you can generate a stimulus to a Device Under Test (DUT) and acquire the response from it at the same time. Different stimuli can be generated and the responses can be analyzed in different ways. The characteristics of the DUT, such as frequency response and distortion, can then be obtained. You can even configure and then perform a sequence of automated test steps to evaluate a DUT using the Device Test Plan software module.

You can configure the output device via [Setting]>[DAC Device]. For example, the computer sound card can be used to generate vibration stimulus to some external devices which then generate mechanical vibration.

2 Specifications

2.1 VT IEPE-2G05 Hardware Specifications

Number of Input Channels	2
Sampling Frequency	48 kHz (original), 44.1 kHz, 32 kHz, 22.05 kHz, 16 kHz, 11.025 kHz, 8 kHz, 4 kHz, 2 kHz …
ADC Bit Resolution	24 Bits (can be reduced to 16 bits or 8 bits)
Input Voltage Ranges	±250 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V
Input Connectors & Interface	BNC, Single Ended, IEPE, 24V 4mA
Input Coupling Type	AC (High pass filtered at 0.03 Hz)
Input Isolation	No (Isolation can be achieved through a USB isolator)
Input Impedance	500 kΩ
Input High Pass Filter	None, 1.8 Hz, 119 Hz, 236 Hz, 464 Hz
Frequency Response	0.03 Hz ~ 22.8 kHz
Frequency Accuracy	50 PPM
Anti-aliasing Filter	22.8 kHz at Sampling Rate 48 kHz, proportionally adaptive to Sampling Rate Chosen
Buffer Size	Virtually unlimited (streaming mode)
Voltage Accuracy	±0.5% at 1kHz
Output Connector & Interface	3.5 mm Stereo Audio Jack
Output Voltage Range	±0.5V
Digital Input/Output Standard	USB Audio Class 1
Calibration	Individually done at factory, user re-calibratable
PC Interface	USB 2.0 Full Speed / USB 1.1
Device Category in Multi-Instrument	ADC Device — VT IEPE; DAC Device — Not Applicable
Power	Bus powered by USB port, no external power source required
Power Consumption	Max. 0.5W
Dimensions	128 mm (L) × 57 mm (W) × 24 mm (H), anodized aluminum case
System Requirement	Windows XP, Vista, 7, 8, 10 or above, 32 bit or 64 bit
Operating Temperature	0°C ~50°C
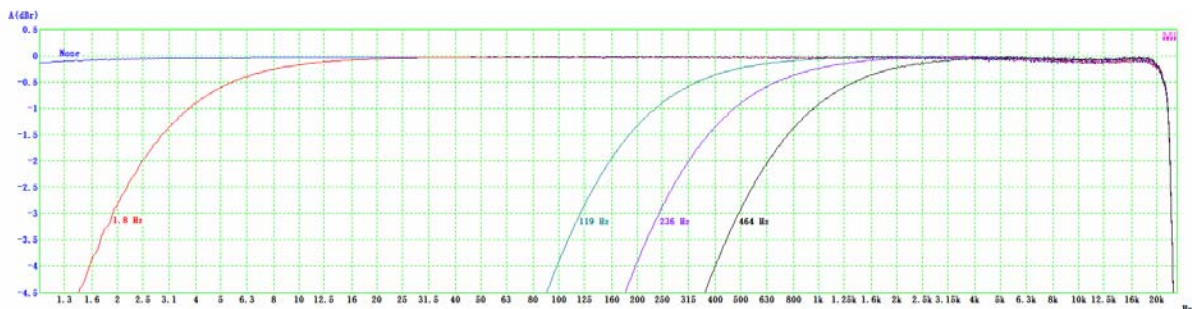
Frequency Response of Built-in High Pass Filter (sampled at 48 kHz)

2.2 Multi-Instrument Software Specifications

Please refer to Multi-Instrument software manual for detail. The following table shows the function allocation matrix for Multi-Instrument series. The Spectrum 3D Plot, Data Logger, LCR Meter, Device Test Plan, Vibrometer, Dedicated Hardware Support are add-on modules/functions and should be purchased separately, and they are only available for Multi-Instrument Lite, Standard, and Pro editions, except that the Vibrometer is only available for Multi-Instrument Standard and Pro editions.

Legend: √ - Function available   √* - Function available in Full version only

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
General Functions							
DAC / ADC / Hardware	Sound Card MME	√	√	√	√	√	√
	Sound Card ASIO						√
	Other Hardware				√	√	√
	vtDAQ, vtDAO software development kit	License automatically activated with the presence of the corresponding hardware, e.g. a USB hardkey or a VT DSO.					
File Operation	Load WAV File	√	√	√	√	√	√
	Load TXT File					√	√
	Load WAV File Frame by Frame (fore Long WAV File)					√	√
	Combine WAV Files	√	√	√	√	√	√
	Extract Data and save them into a new WAV File	√	√	√	√	√	√
	Save/Load Panel Setting	√	√	√	√	√	√
Data Export	Copy Text to Clipboard	√	√	√	√	√	√
	Copy BMP to Clipboard	√	√	√	√	√	√
	Print Preview	√	√	√	√	√	√
	Print	√	√	√	√	√	√
	Export as TXT File	√	√	√	√	√	√
	Export as BMP File	√	√	√	√	√	√
Trigger Settings	Trigger Mode	√	√		√	√	√
	Trigger Source	√	√		√	√	√
	Trigger Edge	√	√		√	√	√
	Trigger Level	√	√		√	√	√
	Trigger Delay	√	√		√	√	√
	High Frequency Rejection	√	√		√	√	√
	Noise Rejection	√	√		√	√	√
Sampling Settings	Sampling Rate	√	√	√	√	√	√
	Sampling Channels	√	√	√	√	√	√
	Sampling Bit Resolution	√	√	√	√	√	√
	Record Length	√	√		√	√	√
Calibration	Input	√	√		√	√	√
	Output			√	√	√	√
	Probe	√	√		√	√	√
	Sound Pressure Level	√	√		√	√	√

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
	F/V Conversion					√	√
	Latency for Sync. Output/Input						√
	Sensor Sensitivity	√	√		√	√	√
	Load Factor for Power Calculation	√	√		√	√	√
Graph Operation	Zoom	√	√	√	√	√	√
	Scroll	√	√	√	√	√	√
	Cursor Reader	√	√	√	√	√	√
	Marker	√	√	√	√	√	√
	Chart Type	√	√	√	√	√	√
	Line Width	√	√	√	√	√	√
	Color	√	√	√	√	√	√
	Fast/Slow Display Mode	√	√	√	√	√	√
	Refresh Delay	√	√	√	√	√	√
	Font Size	√	√	√	√	√	√
	Roll Mode					√	√
	Reference Curves & Limits					√	√
Others	Gain Adjustment	√	√	√	√	√	√
	Input Peak Indicator	√	√	√	√	√	√
	Sound Card Selection	√	√	√	√	√	√
	Sampling Parameter Auto Setting	√	√	√	√	√	√
	Multilingual GUIs	√	√	√	√	√	√
	Show/Hide Toolbar	√	√	√	√	√	√
	Lock/Unlock Panel Setting	√	√	√	√	√	√
	Hot Panel Setting Toolbar	√	√	√	√	√	√
	ActiveX Automation Server	√	√	√	√	√	√
	AutoRanging	√	√	√	√	√	√
	AutoScaling	√	√		√	√	√
	Input Channel Operation	√	√		√	√	√
Oscilloscope							
Type	Individual Waveform	√	√	√ (offline)	√	√	√
	Waveform Addition	√	√	√ (offline)	√	√	√
	Waveform Subtraction	√	√	√ (offline)	√	√	√
	Waveform Multiplication	√	√	√ (offline)	√	√	√
	Lissajous Pattern	√	√	√ (offline)	√	√	√
Inter-Frame Processing	Linear Average					√	√
	Exponential Average					√	√

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
Intra-Frame	Time Delay Removal					√	√
Demodulation (Intra-Frame)	AM					√	√
	FM					√	√
	PM					√	√
Digital Filtering (Intra-Frame Processing)	Remove DC					√	√
	Rectification					√	√
	FFT Low Pass					√	√
	FFT High Pass					√	√
	FFT Band Pass					√	√
	FFT Band Stop					√	√
	FFT Frequency Response					√	√
	FIR Low Pass					√	√
	FIR High Pass					√	√
	FIR Band Pass					√	√
	FIR Band Stop					√	√
	FIR Frequency Response					√	√
	IIR Coefficients					√	√
Others	Max, Min, Mean, RMS	√	√	√ (offline)	√	√	√
	Record Mode					√	√
	Persistence Display Mode	√	√		√	√	√
	Equivalent Time Sampling Mode	√	√		√	√	√
	Analog & Digital Signal Mixed Display				√	√	√
	SINC Interpolation	√	√	√	√	√	√
Spectrum Analyzer							
Type	Amplitude Spectrum		√		√	√	√
	Phase Spectrum		√		√	√	√
	Auto-correlation		√		√	√	√
	Cross-correlation		√		√	√	√
	Coherence/Non-Coherence						√
	Transfer Function / Impedance Analyzer						√
	Impulse Response						√
Intra-Frame Processing	Frequency Compensation		√		√	√	√
	Frequency Weighting		√		√	√	√
	Remove DC		√		√	√	√
	Smoothing via Moving Average		√		√	√	√
Inte	Peak Hold		√		√	√	√

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
	Linear Average		√		√	√	√
	Exponential Average		√		√	√	√
Parameter Measurement	THD,THD+N,SNR, SINAD,Noise Level, ENOB		√		√	√	√
	IMD		√		√	√	√
	Bandwidth		√		√	√	√
	Crosstalk		√		√	√	√
	Harmonics & Phase		√		√	√	√
	Energy in User Defined Frequency Band		√		√	√	√
	Peaks, SFDR		√		√	√	√
	Wow & Flutter						√*
	Sound Loudness						√
	Sound Loudness Level						√
	Sound Sharpness						√
	Total Non-Coherent Distortion + Noise						√
	GedLee Metric						√
FFT	FFT Size 128~32768		√		√	√	√
	FFT Size 65536~4194304						√
	Intra-Frame Average		√		√	√	√
	Window function		√		√	√	√
	Window Overlap		√		√	√	√
Others	Peak Frequency detection		√		√	√	√
	Cross Correlation Peak detection		√		√	√	√
	Octave Analysis (1/1, 1/3, 1/6, 1/12, 1/24, 1/48, 1/96)		√		√	√	√
	Linear/Log/Power Spectral Density Scale for X and Y		√		√	√	√
	Peak Marker		√		√	√	√
Signal Generator							
Waveform	Sine			√	√	√	√
	Rectangle			√	√	√	√
	Triangle			√	√	√	√
	Saw Tooth			√	√	√	√
	White Noise			√	√	√	√
	Pink Noise			√	√	√	√
	MultiTones			√	√	√	√
	Arbitrary Waveform			√	√	√	√
	MLS			√	√	√	√
	DTMF			√	√	√	√
	Musical Scale			√	√	√	√
	Wave File					√	√
	Play Waveform in Oscilloscope	√	√	√	√	√	√

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
	Cyclic Play Waveform in Oscilloscope	√	√	√	√	√	√
Sweep	Frequency Sweep (Linear/Log)			√	√	√	√
	Amplitude Sweep (Linear/Log)			√	√	√	√
Burst (Mask)	Normal			√	√	√	√
	Phase Locked			√	√	√	√
Fade	Fade In			√	√	√	√
	Fade Out			√	√	√	√
Modulation	AM			√	√	√	√
	FM			√	√	√	√
	PM			√	√	√	√
Others	Software Loopback (all channels)			√	√	√	√
	Software Loopback (1 channel)				√	√	√
	Sync. with Oscilloscope						√
	Save as WAV file			√	√	√	√
	Save as TXT file			√	√	√	√
	DDS				√	√	√
	DC Offset				√	√	√
Multimeter							
Type	RMS					√	√
	dBV					√	√
	dBu					√	√
	dB					√	√
	dB(A)					√	√
	dB(B)					√	√
	dB(C)					√	√
	Frequency Counter				√	√	√
	RPM					√	√
	Counter					√	√
	Duty Cycle					√	√
	Frequency/Voltage					√	√
	Cycle RMS					√	√
	Cycle Mean					√	√
	Pulse Width					√	√
Settings	Counter Trigger Hysteresis				√	√	√
	Counter Trigger Level				√	√	√
	Frequency Divider				√	√	√
DDP Viewer							
Function	DDP & UDDP display						√
	HH, H, L, LL Alarm						√

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument Standard	Multi-Instrument Pro
	Set Display Precision						√
	Define UDDP						√
	Alarm Sound						√
	Alarm Acknowledge						√
	Linear / Exponential Average						√
	DDP Array Viewer						√

Legend: Blank - Function available if purchased   Shaded Blank - Function NOT available for that version

		Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument	Multi-Instrument Pro
Spectrum 3D Plot							
Type	Waterfall Plot						
	Spectrogram						
Settings	Spectrogram Color Palette						
	Waterfall Color Palette						
	Waterfall tilt Angle						
	Waterfall / Spectrogram Height						
	Linear / Log Scale for X and Y						
	Number of Spectral Profiles (10~200)						
Others	3D Cursor Reader						
Data Logger							
Real Time Logging							
Load Historical Log File							
Three logging methods							
212 derived data points available for logging							
Up to 8 × 8 = 64 variables can be logged simultaneously							
LCR Meter							
High Impedance Measurement							
Low Impedance Measurement							
Up to 8 X-Y Plots (Linear/Log)							
Device Test Plan							
25 Instructions							
Create/Edit/Lock/Execute/Load/Save a Device Test Plan							
Up to 8 X-Y Plots (Linear/Log)							
Device Test Plan Log							
Vibrometer							
RMS, Peak/PP, Crest Factor							

	Sound Card Oscilloscope	Sound Card Spectrum Analyzer	Sound Card Signal Generator	Multi-Instrument Lite	Multi-Instrument	Multi-Instrument Pro
for acceleration, velocity, displacement (in Multimeter)						
Waveform conversion among acceleration, velocity and displacement (in Oscilloscope)						
SI / English units						
Dedicated Hardware Support						
RTX6001 Remote /Local Control						

2.3 Software Development Interface Specifications

Multi-Instrument provides the following secondary development features:

1. Multi-Instrument can work as an ActiveX automation server so that an external program can access the data and functions that Multi-Instrument exposes. You can integrate Multi-Instrument into your own software seamlessly via the ActiveX automation server interfaces exposed by Multi-Instrument.

   Please refer to: *Multi-Instrument Automation Server Interfaces*

   Download link:
   http://www.virtins.com/Multi-Instrument-Automation-Server-Interfaces.pdf

   The above document and the sample automation client programs in Visual C++, Visual Basic and Visual C# can be found in the AutomationAPIs directory of the software.

2. You can use the vtDAQ and vtDAO interface DLLs supplied in this software to allow your own back-end software to interface to sound cards, NI DAQmx cards, VT DSOs, VT RTAs, etc.. You can also develop your own vtDAQ and vtDAO compatible DLLs to allow Multi-Instrument to interface to your own hardware.

   Please refer to: *vtDAQ and vtDAO_Interfaces*

   Download link:
   http://www.virtins.com/vtDAQ-and-vtDAO-Interfaces.pdf

   The above document and the sample DAQ and DAO back-end programs and sample vtDAQ compatible DLL in Visual C++, Visual C# and Labview can be found in the DAQDAOAPIs directory of the software.

3. Virtins Technology's Signal Processing and Analysis (vtSPA) Application Programming Interfaces (APIs) provides a suite of generic APIs for data processing and analysis. It

contains some unique features / algorithms originated and only available from Virtins Technology.

Please refer to: *Signal Processing and Analysis (vtSPA) Interfaces*

Download link:
http://www.virtins.com/Signal-Processing-and-Analysis-APIs.pdf

The above document and the sample programs in Visual C++ can be found in the DAQDAOAPIs directory of the software.

Furthermore, Multi-Instrument is well prepared to be rebranded for OEM services. Its look and feel can be readily changed through configuration without even reprogramming. Contact Virtins Technology if interested.

3 Multi-Instrument Software License Information

3.1 License Types

The License of Multi-Instrument software has six levels and six add-on modules/functions. The six levels are: Sound Card Oscilloscope, Sound Card Spectrum Analyzer, Sound Card Signal Generator, Multi-Instrument Lite, Multi-Instrument Standard, Multi-Instrument Pro. The six add-on modules/functions are: Spectrum 3D Plot, Data Logger, LCR Meter, Device Test Plan, Vibrometer, Dedicated Hardware Support.

The license contained in the standard VT IEPE package is a hardware activated Multi-Instrument Standard license, without any add-on modules/functions. No softkey (activation code) and USB hardkey (USB dongle) are provided in this type of license. The software will run under the licensed mode as long as the VT IEPE unit is connected to your computer before you start the Multi-Instrument software.

Note: If the software is started without the VT IEPE unit connected to the computer, it will enter into 21-day fully functional trial mode, unless the software is activated by a softkey (activation code) or a hardkey (USB dongle), which are NOT included in the standard VT IEPE package and should be purchased separately as a brand-new license if needed. In other words, the VT IEPE hardware should always be connected to the computer in order for the Multi-Instrument software to work under the licensed mode, even though you might just want to use your computer sound card for ADC and DAC.

3.2 License Upgrade from one level to another

You can purchase an upgrade of the license, e.g. from Multi-instrument Standard to Multi-Instrument Pro + Data Logger, at any time if necessary. After you purchase the upgrade, a small upgrade package file will be sent to you via email. You can then use it to upgrade the license bundled within the VT IEPE unit by selecting [Start]>[All Programs]>[Multi-Instrument]>[VIRTINS Hardware Upgrading Tool] on your Windows desktop.

3.3 Software Upgrade for the same level

Software upgrade for the same level (if the hardware is still supported by the new version), e.g. from Multi-Instrument 3.0 Standard to Multi-Instrument 3.1 Standard, is always FREE. You just need to download the new version from our website and install it on any computer.

Thus, please do visit frequently our website to see if a new version or build is available.

4 Extended Use of Multi-Instrument Software

Multi-Instrument is a powerful multi-function virtual instrument software. It supports a variety of hardware ranging from sound cards which are available in almost all computers to proprietary ADC and DAC hardware such as NI DAQmx cards, VT DSO units, and so on. Furthermore, the ADC and DAC device can be chosen independently in Multi-Instrument. For example, you can use VT IEPE for data acquisition and use your computer's sound card for signal generation simultaneously.

You can change the ADC device via [Setting]>[ADC Device]>[Device Model]. For example you can also use your computer's sound card as the ADC device.

You can choose a DAC device via [Setting]>[DAC Device]>[Device Model]. For example, you can use your computer's sound card as the DAC device and thus make full use of the signal generator function of Multi-Instrument.
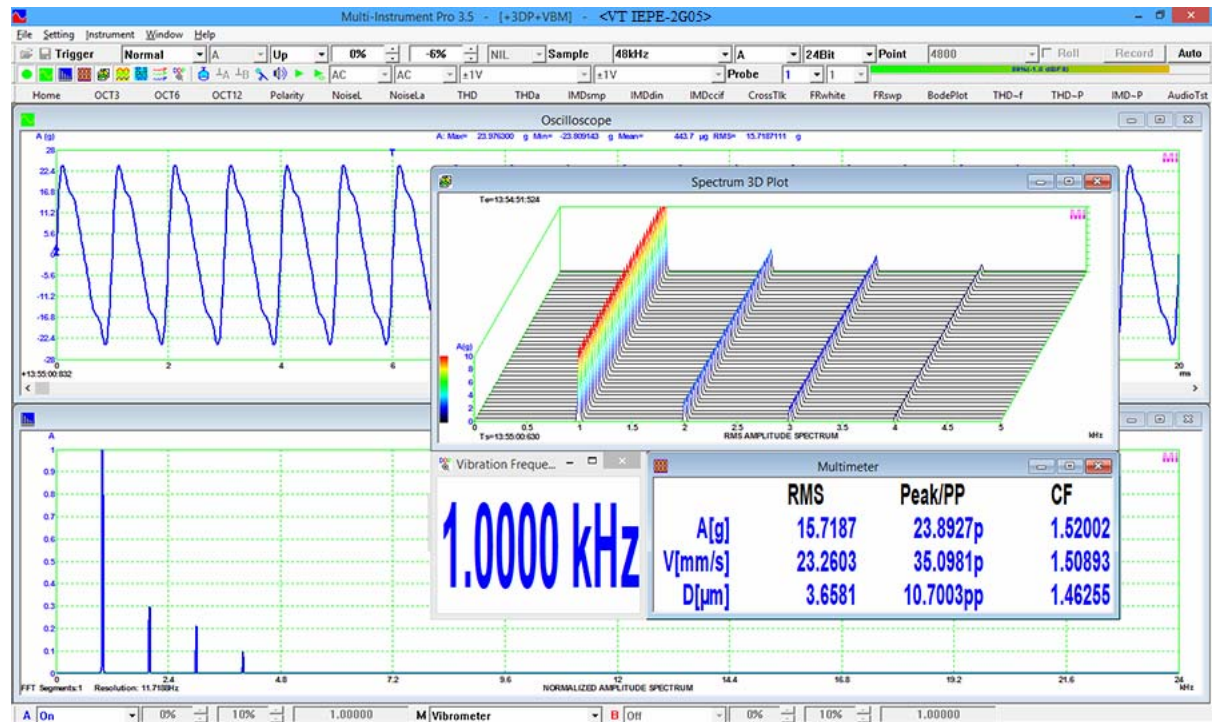
If you want to use the sound card as the ADC/DAC device, you may need to purchase the dedicated sound card oscilloscope probe kit from Virtins Technology separately, or you may make the connection by yourself.

5 Measurement Examples

5.1 VT IEPE-2G05 with Multi-Instrument Pro + Spectrum 3D Plot
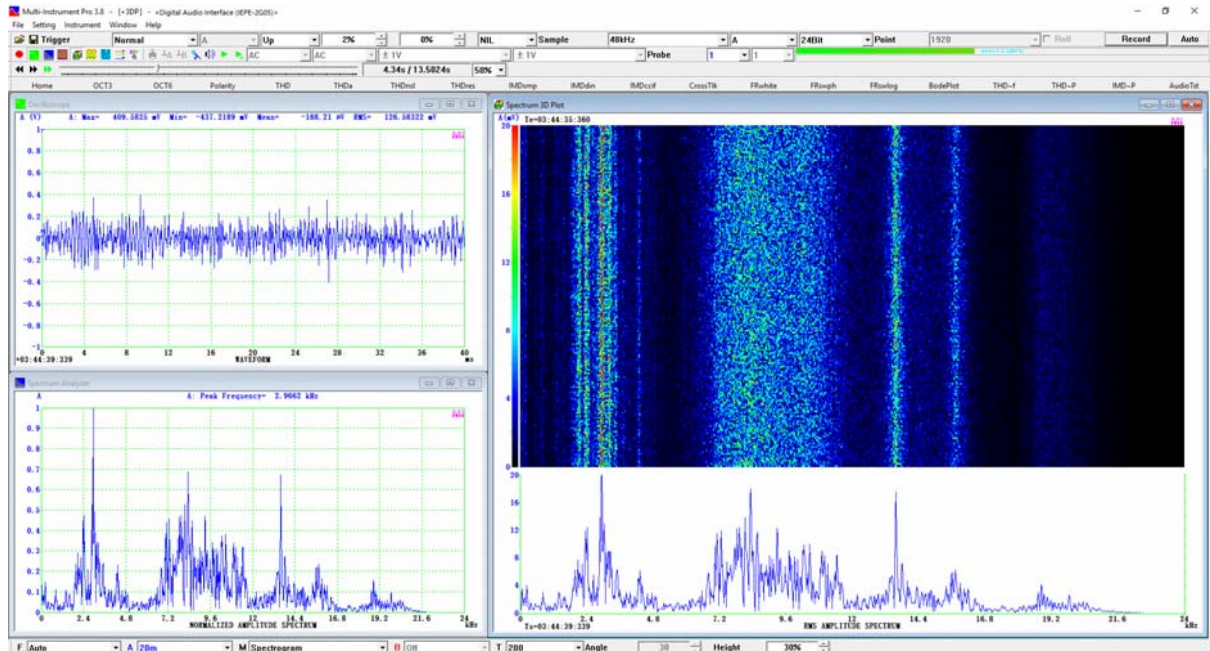
5.2 VT IEPE-2G05 with Multi-Instrument Pro + Spectrum 3D Plot + Vibrometer

6 Safety Instructions

- Always keep in mind that the input of VT IEPE is NOT galvanically isolated from the computer connected.
- Connect to passive IEPE sensors only. Never connect to an active signal.
- It should be noted that for many computers (typically desktop PCs or laptop PCs with a built-in AC power supply adapter), the ground of the BNC is connected to mains earth. This is not a problem if the IEPE sensors connected are floating (i.e. isolated from earth). Otherwise, you MUST make sure that the ground of the BNC is connected to a point that is also at earth potential.

7 Warranty

Virtins Technology guarantees this product against defective materials and manufacturing defects for a period of 12 months. During this period of warranty, a replacement of the faulty part will be shipped to the buyer's address free of charge upon receiving and verifying the returned faulty part. The Warranty is only applicable to the original buyer and shall not be transferable. The warranty shall exclude malfunctions or damages resulting from acts of God, fire, civil unrest and/or accidents, and defects from using wrong electrical supply/voltage and/or consequential damage by negligence and/or abuse, as well as use other than in accordance with the instructions for operation. The Warranty shall immediately cease and become void if the hardware is found to have been tampered, modified, repaired by any unauthorized person(s). Decisions by Virtins Technology on all questions relating to complaints as to defects either of workmanship or materials shall be deemed conclusive and the buyer shall agree to abide by such decisions.

8 Disclaimer

This document has been carefully prepared and checked. No responsibility can be assumed for inaccuracies. Virtins Technology reserves the right to make changes without prior notice to any products herein to improve functionality, reliability or other design aspects. Virtins Technology does not assume any liability for loses arising out of the use of any product described herein; neither does its use convey any license under its patent rights or the rights of others. Virtins Technology does not guarantee the compatibility or fitness for purpose of any product listed herein. Virtins Technology's products herein are not authorized for use as components in life support services or systems. Virtins Technology should be informed of any such intended use to determine suitability of the products.