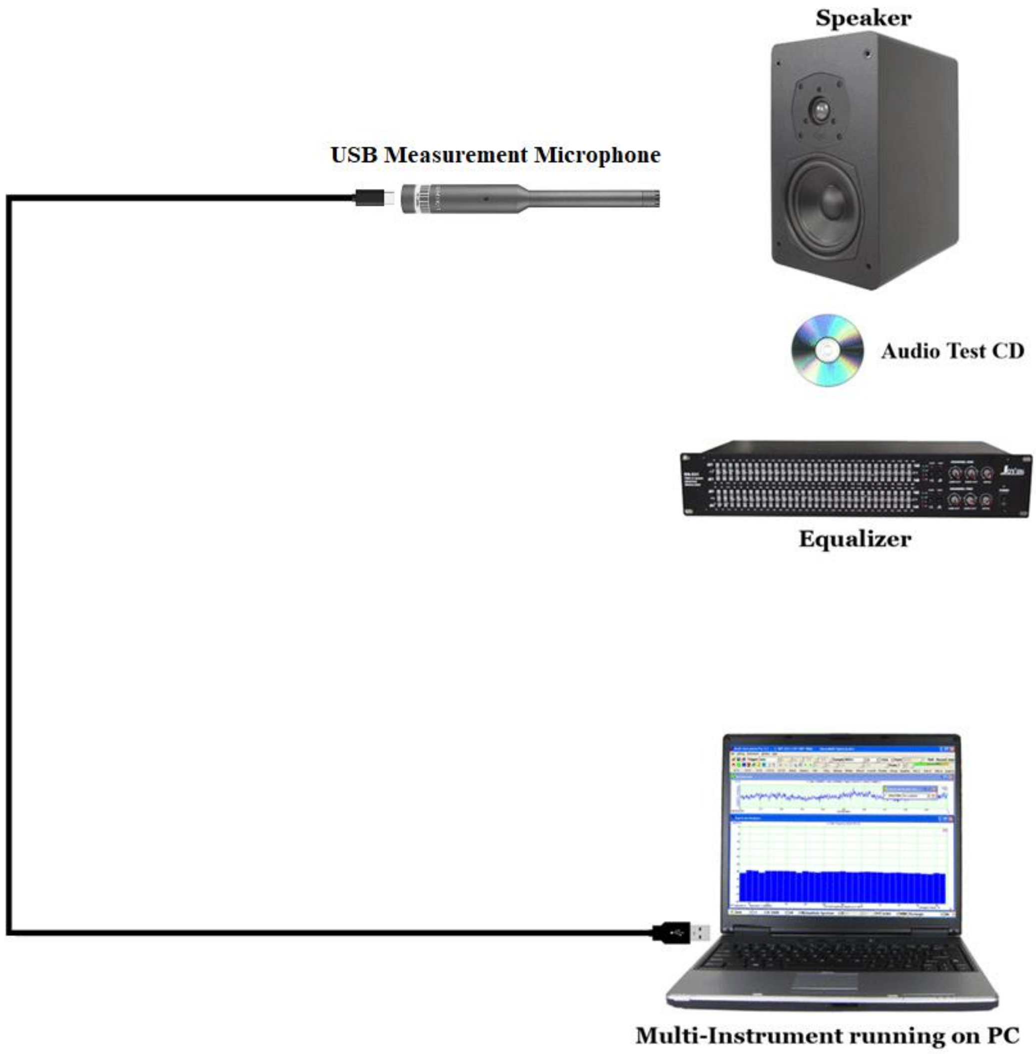
# VT RTA-168C Manual

**A Real Time Acoustic Analyzer, Sound Level Meter, Distortion Analyzer, Polarity Tester, …**




*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

## 1.1 Package Contents

A standard VT RTA-168C Package contains the following items:

1) USB Measurement microphone and its accessories (a windshield, a microphone clip and stand)

*USB Measurement Microphone*

*Windshield*

*Microphone Clip and Stand*

2) USB cable (2 m)

3) CD (containing the copy-protected Multi-Instrument Software)


The latest software can always be downloaded from www.virtins.com/MIsetup.exe.

4) USB hardkey (containing a Multi-Instrument Standard License)

5) Audio Test WAV files (containing a list of audio test tones and noises)

They can be downloaded at: www.virtins.com/AudioTestCD.zip and then burnt into a CD or saved into a USB memory stick. They can also be generated directly from the Signal Generator of Multi-Instrument.

6) 1/8” TRS cable (1.8m)

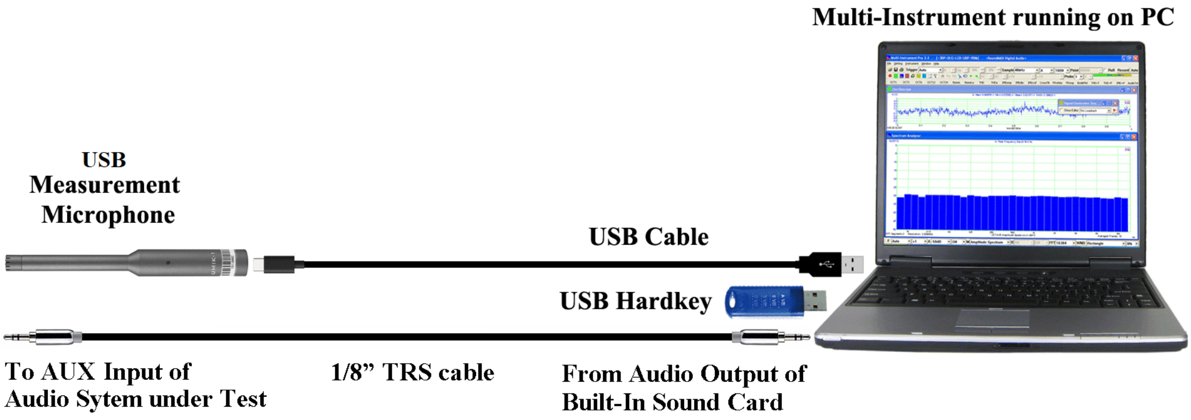
7) Black Soft Pouch Case

8) Unique Sound Level Calibration Data (in CD)

9) Unique Microphone On-Axis and 90-degree Calibration Data (in CD)

## 1.2 Hardware Connection Diagram

Connect the corresponding ends of the USB cable to the USB measurement microphone and a PC's USB port. When this is complete, the blue LED lights up indicating that it is receiving power.




**Software Activation**
The USB hardkey needs to be plugged into any USB port of the PC in order to activate the Multi-Instrument software. Otherwise the software will run under the 21-day fully functional free trial mode before the trial period expires.

**Test Signal Generation**
You can generate the test signals from the Signal Generator of Multi-Instrument. The USB measurement microphone does not have any audio output channels, so you need to use your computer's built-in sound card or any other sound card for audio test signal output. The quality of the test signals would depend on the sound card used. Generally, the built-in sound card of a laptop is good enough for generating quality test signals for magnitude frequency response measurement of an audio system.

The 1/8” TRS cable provided in the product package can be used to connect the sound card’s audio output (e.g. Line Out, Headphone, Speaker) to the AUX input of the audio system under test.

Alternatively, you can play the test signals from an audio CD or a memory stick.

## 1.3 Hardware Driver Installation

No hardware driver installation is required.  It is supported by Windows natively.

## 1.4 Multi-Instrument Software Installation and Configuration

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 DSOs and so on. It consists of multiple test instruments such Oscilloscope, Spectrum Analyzer, and Multimeter, etc.

### 1.4.1 Install Multi-Instrument

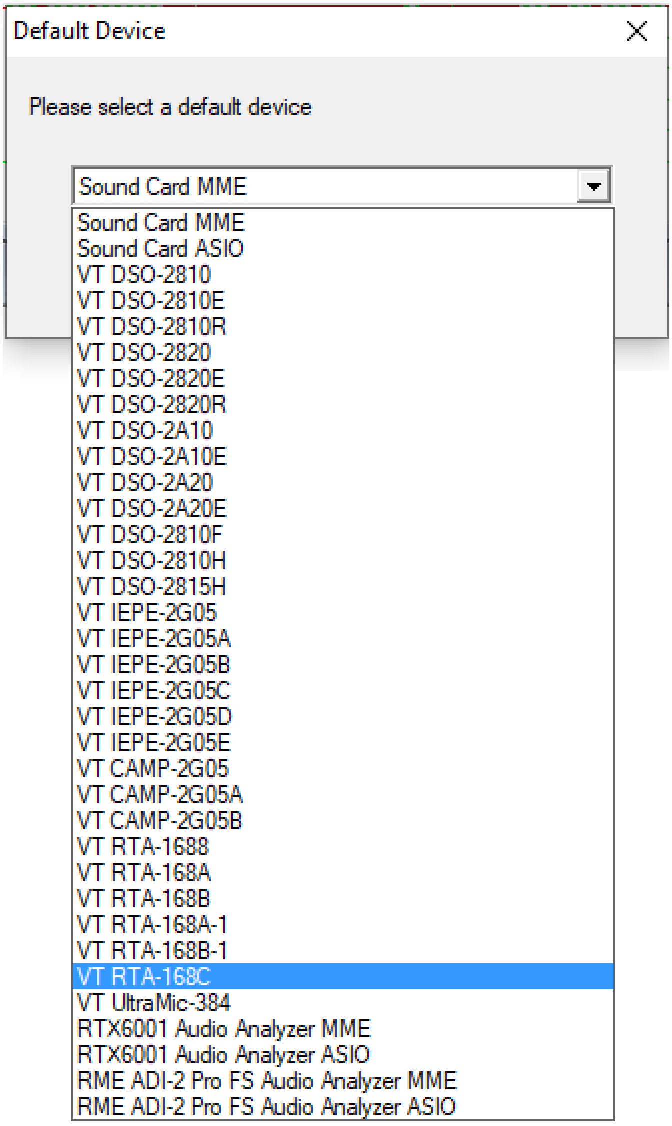
Insert the Multi-Instrument installation CD into your computer’s CD-ROM drive and follow the instruction on the screen to install the Multi-Instrument software.  The installation file can also be downloaded from www.virtins.com/MIsetup.exe.

### 1.4.2 Start Multi-Instrument

To start Multi-Instrument, on the Windows desktop, select [Start]>[All Programs]>[Multi-Instrument]>[VIRTINS Multi-Instrument], or simply double click the MI icon.

If the software is started for the very first time after installation, it will prompt the user to select a default device (see figure below). Select VT RTA-168C according to the hardware device to be used.

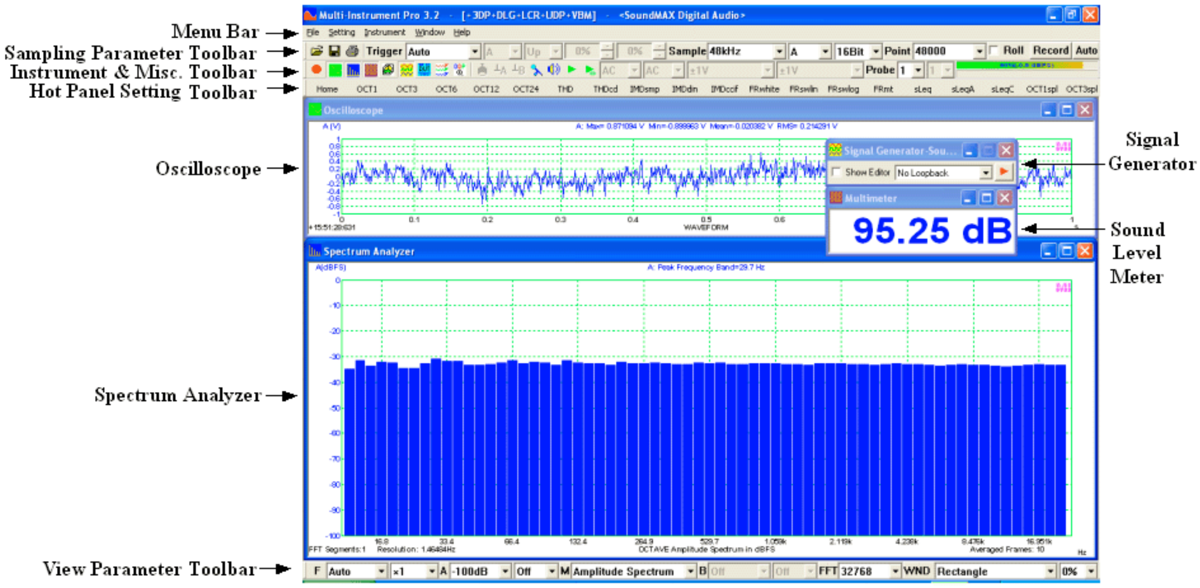



The default device can also be changed later via [Setting]>[ADC Device], [Setting]>[DAC Device], and [Setting]>[Configure Hot Panel Setting Toolbar], or simply [Setting]>[Restore to Factory Default]. **However, if [Restore to Factory Default] command is executed, all calibration data entered manually via [Setting]>[Calibration] after software installation will be reset to the default values of the selected product. To avoid the loss of the manually entered calibration data, you can save them as a calibration file first. Otherwise, you will have to enter the unique calibration data that come with the product package again**.

After the default device is selected, the software will prompt the user to select a default color scheme (Skin). The default skin can also be changed later via [Setting]>[Display].

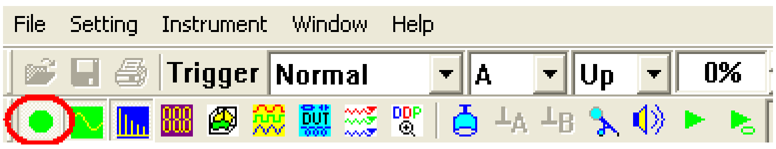
 


The main window of the software will open after the above skin selection. The following figure shows a typical screen layout (obtained by clicking the "OCT3" button in the Hot Panel Setting Toolbar after the launch of the software). Please refer to the software manual for detailed functions of the software. The software manual can be accessed via [Start]>[All Programs]>[Multi-Instrument]>[VIRTINS Multi-Instrument Manual] (in PDF format) or [VIRTINS Multi-Instrument Help] (in HTML format) on Windows Start menu, or [Help]>[Software Manual] or F1 inside the software.



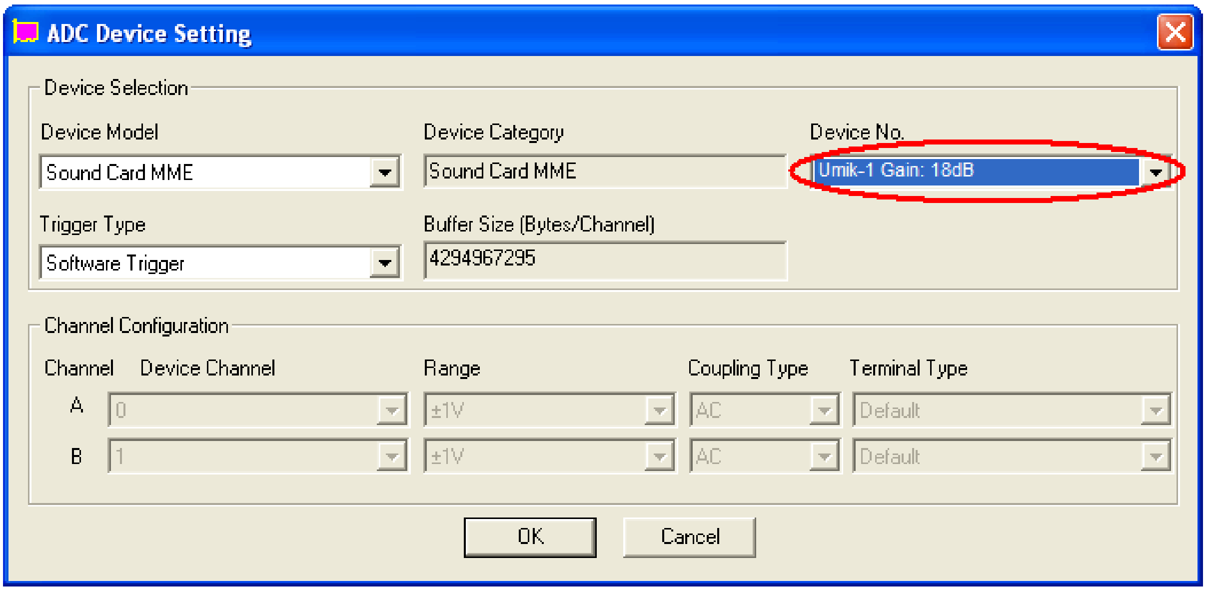

### 1.4.3 Configure Multi-Instrument

In Multi-Instrument, the menu items are enabled/disabled based on context. Many menu items are disabled when the Oscilloscope or the Signal Generator is running. To do the configuration, stop the oscilloscope first by pressing the green button at the upper left corner of the screen (see figure below). The button will turn red once the Oscilloscope is stopped.

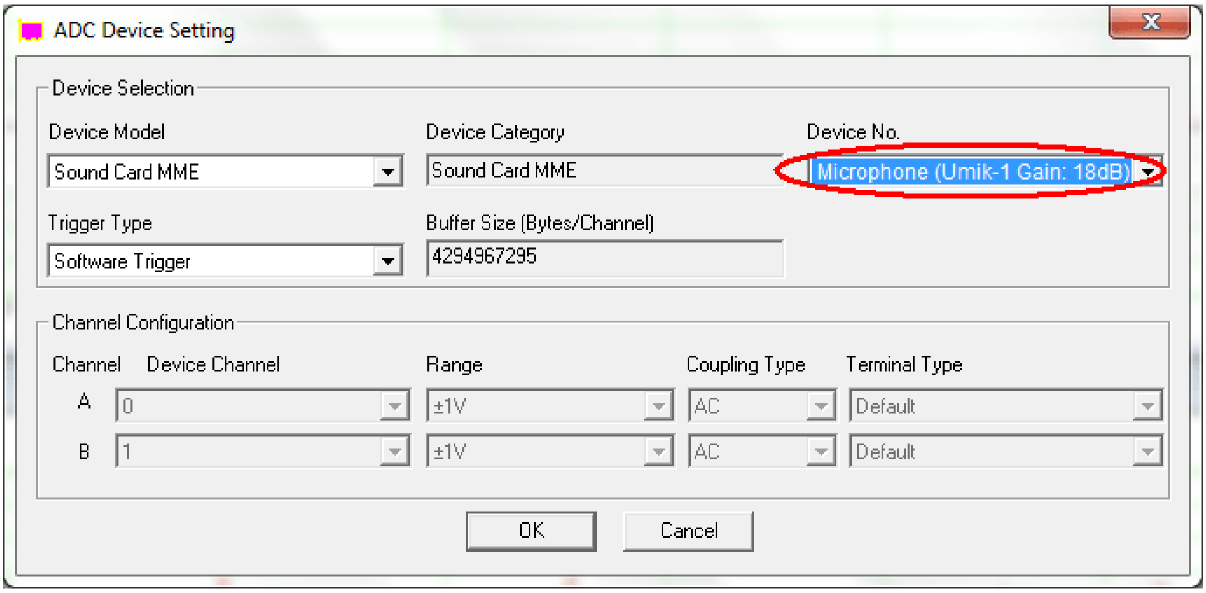



#### 1.4.3.1 Configure Sound Recording Devices for Multi-Instrument

Go to [Setting]>[ADC Device], and choose "Umik-1" , "Microphone (Umik-1)" and the like in the "Device No." field (see figure below). This is to configure the USB measurement microphone Umik-1 as the sound recording device for the software. Note that the displayed name of the USB microphone may vary a bit under different Windows versions. The "Device Model" field must be set to "Sound Card MME".




**Under Windows XP or a Windows Version Before XP**




**Under a Windows Version after XP**

Now, if you start the oscilloscope by pressing the red button at the upper left corner of the screen, and then talk before the measurement microphone, you should be able to see your "voices" in the Oscilloscope and Spectrum Analyzer.

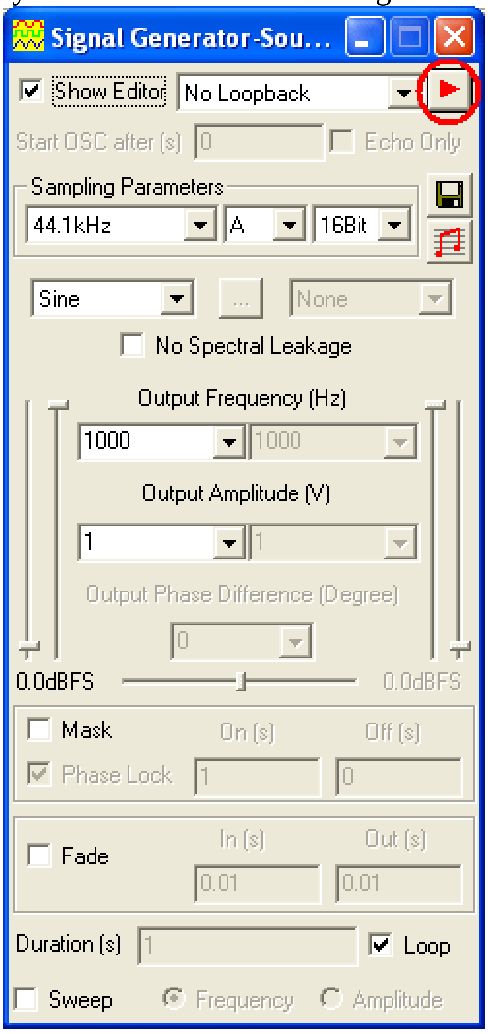
### 1.4.3.2 Configure Sound Playback Devices for Multi-Instrument

The USB microphone does not have any audio output channels, but you can use your computer's built-in sound card or any other sound card for audio test signal output, if you want to use the Signal Generator in Multi-Instrument to generate the test signals. To configure the sound card for the Signal Generator, go to [Setting]>[DAC Device] and choose the corresponding sound card's name in the "Device No." field. By default, Multi-

Instrument will use the computer's built-in sound card for signal output. Again, the "Device Model" field must be set to "Sound Card MME".


Now, if you press the Signal Generator button (see figure above), the Signal Generator panel will be opened (see figure below). Press the red triangle button at the upper right corner of the Signal Generator panel, you should hear a 1kHz test tone from the speaker or earphone connected to the selected playback sound card. Press it again to stop the sound.




## 1.5 Input of Sound Level Calibration Data and Adjustment of Input Gain

Sound Level Calibration is not required for those relative measurements such as frequency response, THD, THD+N, IMD, etc.. It is required only if you want to measure the absolute sound level.

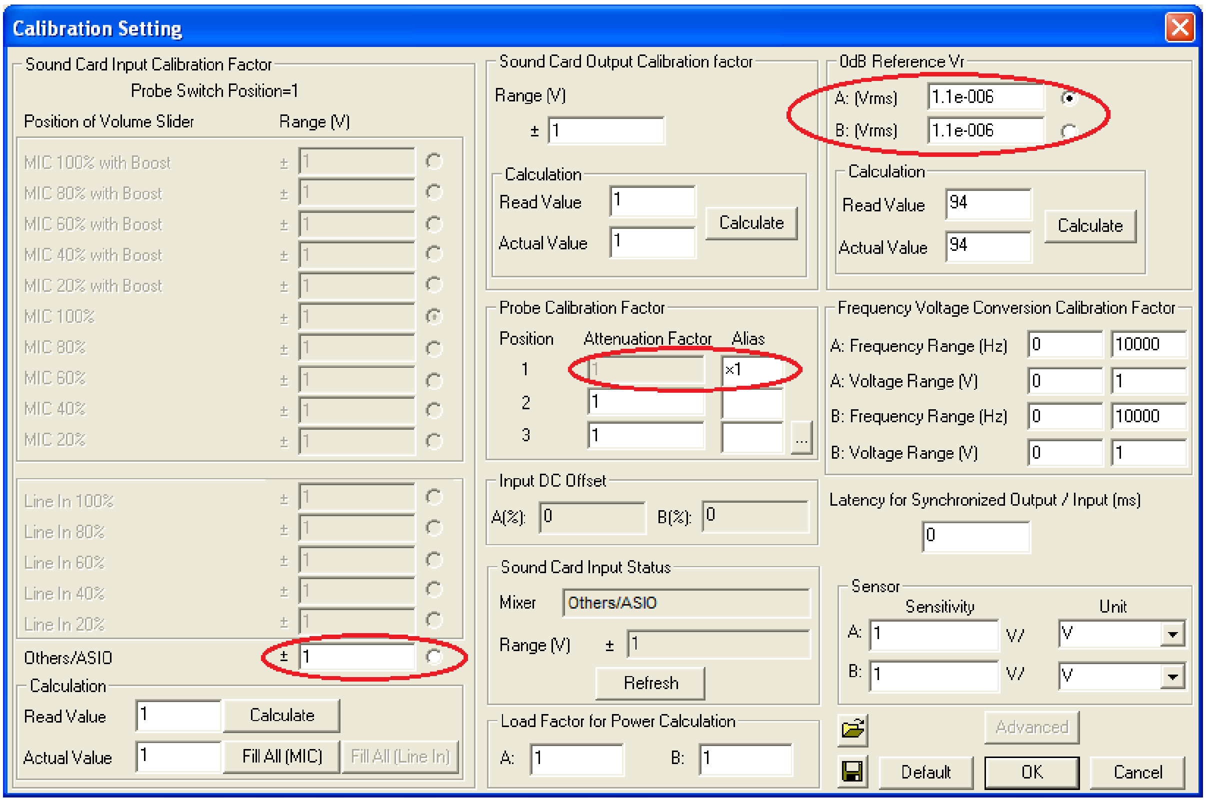
The USB measurement microphone has been calibrated in the factory. The sound level calibration data are provided in a separate sheet inside the product package. Please refer to the calibration data sheet provided and enter the calibration data in the respective highlighted fields in the Calibration Setting dialog box (see figures below). Note that different calibration data are required for different Windows versions. The Calibration Setting dialog box is opened via [Setting]>[Calibration] in Multi-Instrument.

You can adjust the sound level measurement range by adjusting the input gain of the USB microphone through software.

### 1.5.1 Under Windows XP or a Windows Version Before XP

Input of the Sound Level Calibration Data

Note that the calibration data in the following figure are examples only, you should enter the actual calibration data provided inside the product package.



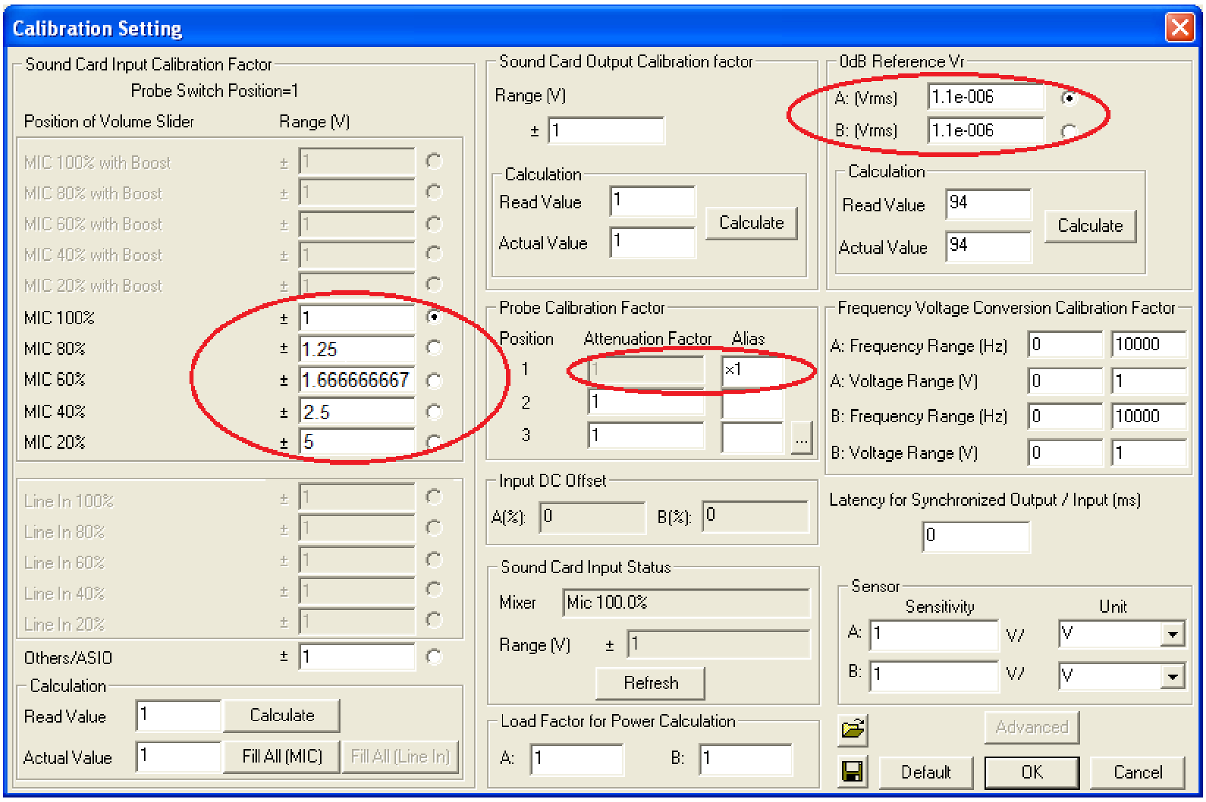

Adjustment of Input Gain via Software

Under Windows XP or a Windows version before XP, the input gain of the USB microphone is not adjustable. Neither the Recording Control under Windows Control Panel nor Multi-Instrument can adjust the input gain.

### 1.5.2 Under Windows Vista

Input of the Sound Level Calibration Data

Note that the calibration data in the following figure are examples only, you should enter the actual calibration data provided inside the product package.




<u>Adjustment of Input Gain via Software</u>

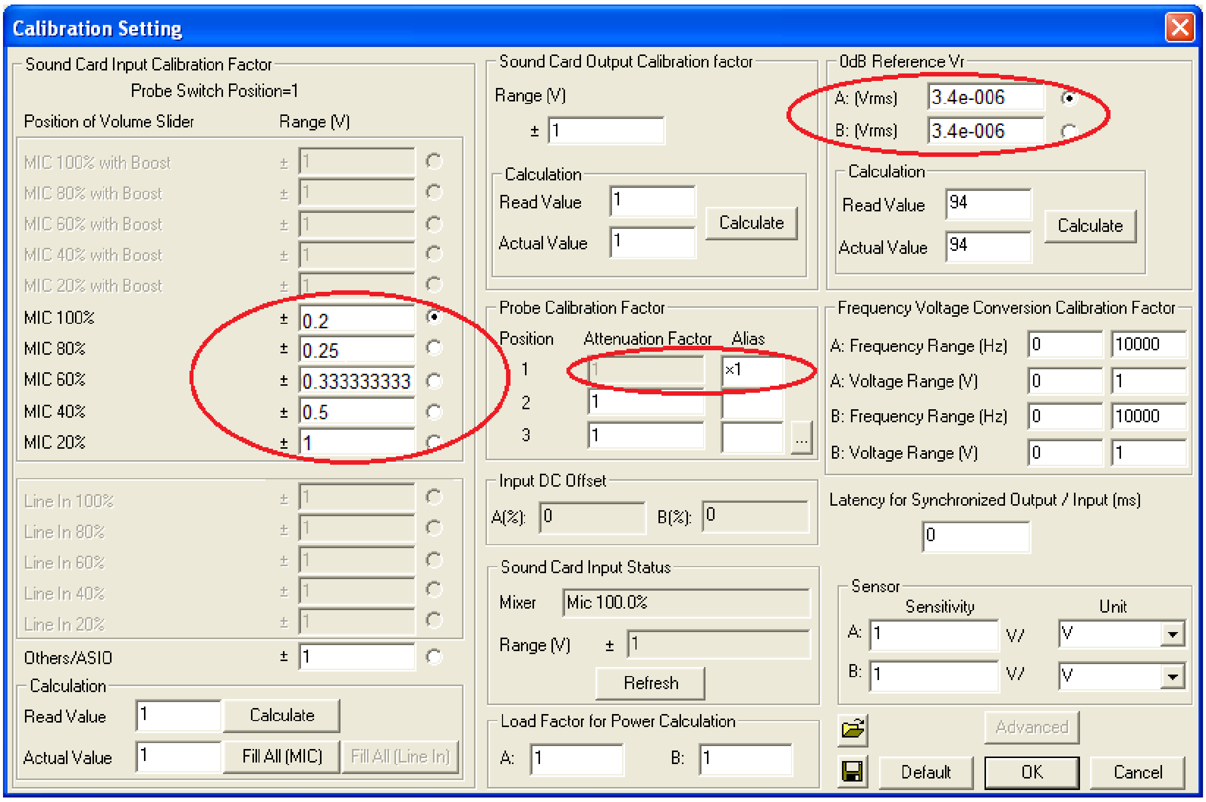
Under Windows Vista, the input gain of the USB microphone is not adjustable in the Sound Recording Tab under Windows Control Panel. However, you can adjust it by clicking the respective radio buttons beside the “Mic 100%”, “Mic 80%”, “Mic 60%”, “Mic 40%” and “Mic 20%” in the above figure. It should be noted that the selection status of these radio buttons does not necessarily reflect the actual input gain (For example, when you open the Calibration Setting dialog box, if the selected radio box is “Mic 80%”, it does not necessarily mean the current input gain is set at 80%.). The actual input gain is reflected by the “Mixer” status under the “Sound Card Input Status” in the above figure. You can press the “Refresh” button to make sure the status display has been refreshed.

### 1.5.3 Under Windows 7

<u>Input of the Sound Level Calibration Data</u>

Note that the calibration data in the following figure are examples only, you should enter the actual calibration data provided inside the product package.

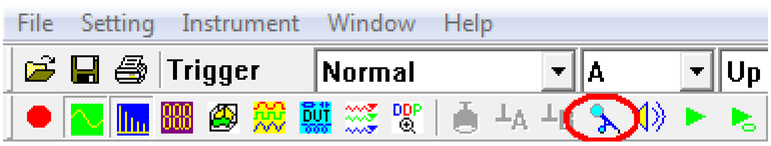
 




## Adjustment of Input Gain via Software

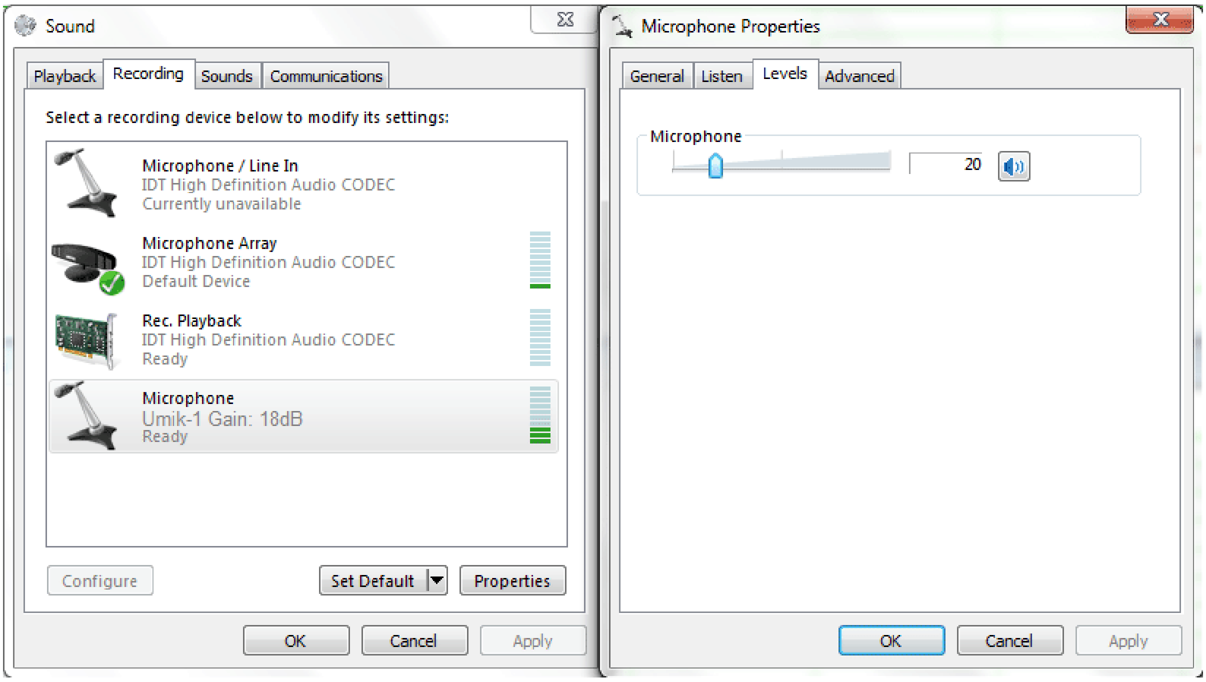
Similar to Windows Vista, you can adjust the input gain by clicking the respective radio buttons beside the “Mic 100%”, “Mic 80%”, “Mic 60%”, “Mic 40%” and “Mic 20%” in the above figure. It should be noted that the selection status of the radio button does not necessarily reflect the actual input gain (For example, when you open the Calibration Setting dialog box, if the selected radio box is “Mic 80%”, it does not necessarily mean the current input gain is set at 80%.). The actual input gain is reflected by the “Mixer” status under the “Sound Card Input Status” in the above figure. You can press the “Refresh” button to make sure the status display has been refreshed.

Unlike Windows Vista, the input gain is adjustable in the Sound Recording Tab under Windows Control Panel. You can access the Sound Recording Tab by clicking the “Windows Recording Control” button (see figure below) in Multi-Instrument.




This will bring up the Sound Recording Tab (see left part of the figure below).



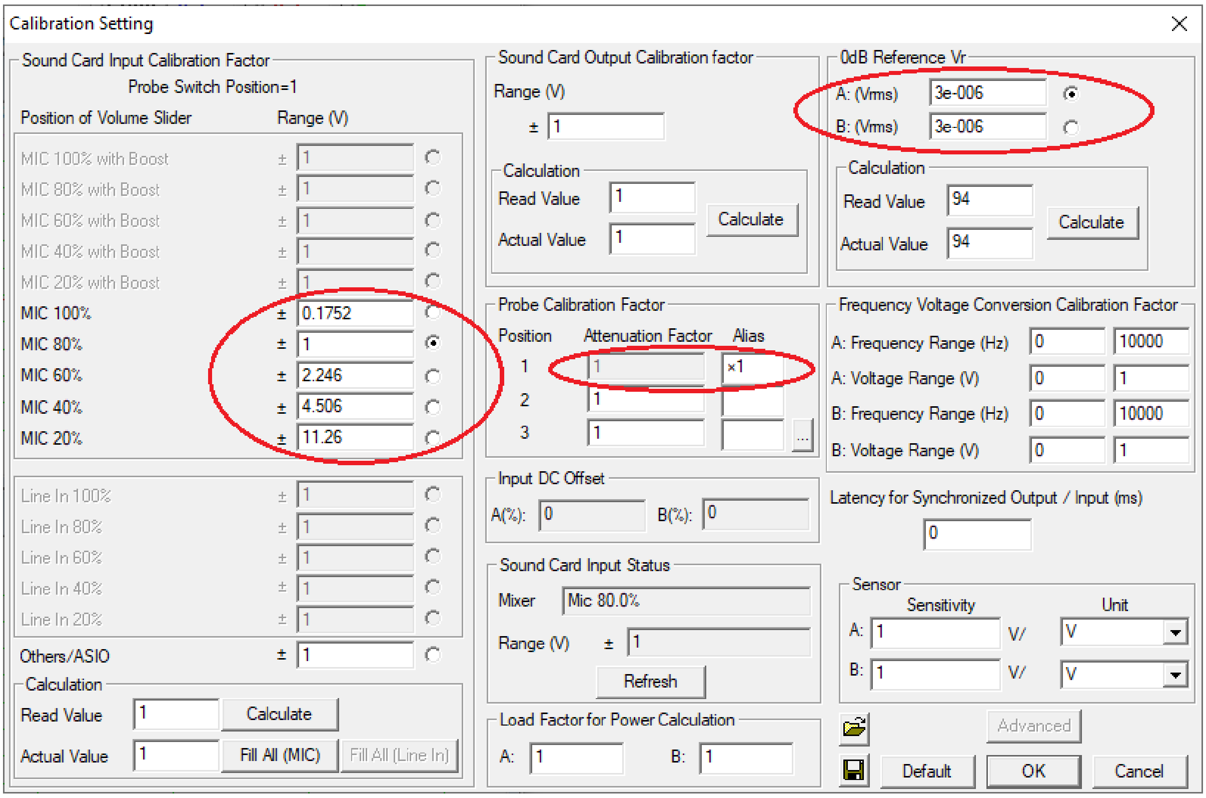

If you right click "Microphone (Umik-1 Gain: 18dB)" and select "Properties", the right part of the figure above will be shown. You can then adjust the input gain through the "Microphone" slider.

### 1.5.4 Under Windows 8/8.1/10

Input of the Sound Level Calibration Data

Note that the calibration data in the following figure are examples only, you should enter the actual calibration data provided inside the product package.




Adjustment of Input Gain via Software

Same as Windows 7

### 1.5.5 0dB Reference Vr

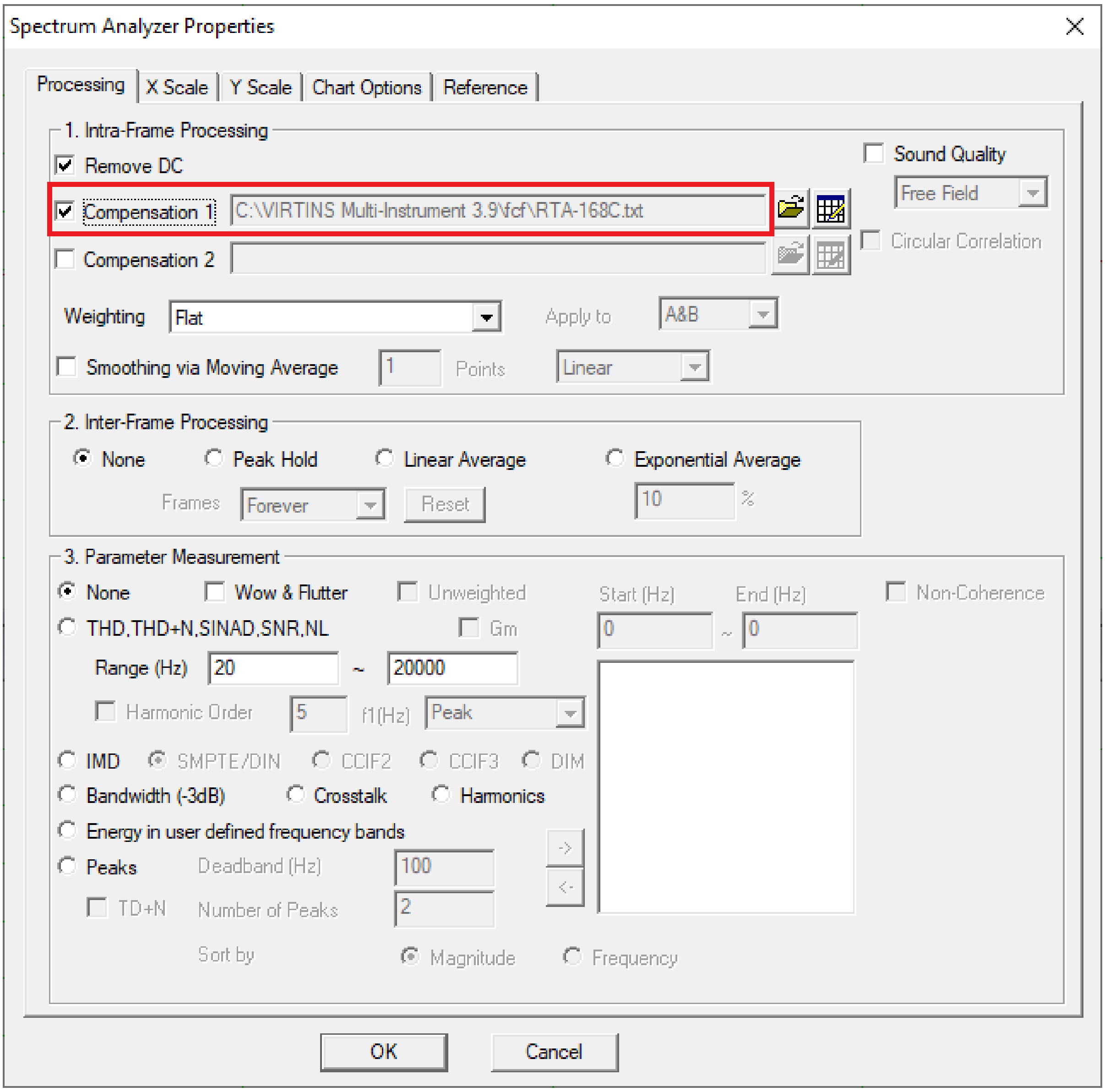
The "0dB Reference Vr" in the Calibration Setting dialog box is used to finally calibrate the input voltage to dBSPL. The input voltage here should be considered as a relative value as the actual input is not a voltage but a sound pressure. The "0dB Reference Vr" is the parameter to be recalibrated if a sound level recalibration is necessary. To do the recalibration, simply enter the actual sound level value into the "Actual Value" edit box and the measured sound level value into the "Read Value" edit box, and then press the "Calculate" button once.

## 1.6 Microphone Frequency Compensation

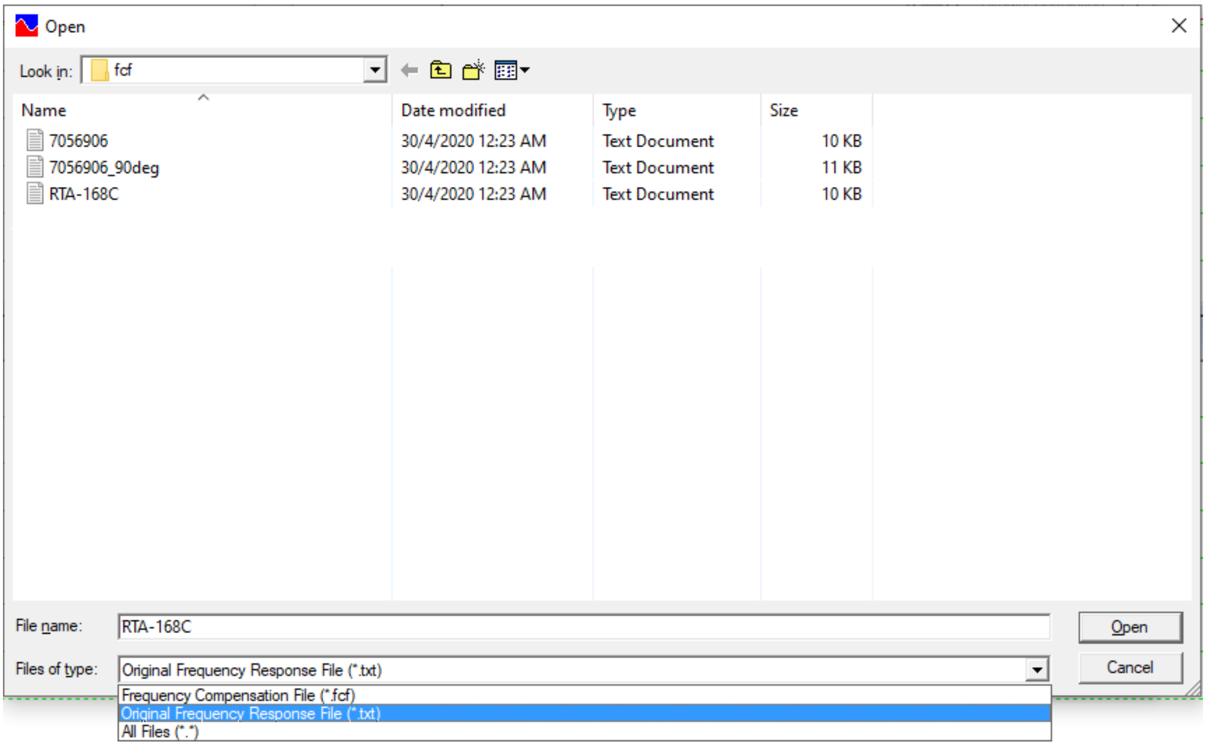
The measurement microphone in RTA-168 series has an extremely flat frequency response in the audio frequency range. Generally, there is no need to compensate for the microphone frequency response. However, a higher degree of accuracy can be achieved if the microphone comes with a frequency response file or a frequency compensation file. The difference between these two files is the sign of the gain values (in dB). For example, a gain of 3dB in a frequency response file should have a gain of -3dB in its equivalent frequency compensation file.

The USB microphone Umik-1 in RTA-168C comes with an individually calibrated Original Frequency Response File RTA-168C.txt. "Original" means that it has exactly the same format and contents as the calibration file provided by the microphone manufacturer. **This file is located in the CD directory "\Microphone Frequency Compensation File". Please copy this file to the "\fcf" directory under the root directory of Multi-instrument in the hard disk (if the file already exists, overwrite it), so that you can use it later.** This file is also used by the twenty default panel settings configured in the Hot Panel Setting Toolbar (The third toolbar from the top).

You can load the Original Frequency Response File by right clicking anywhere within the Spectrum Analyzer window, selecting [Spectrum Analyzer Processing]> "Intra-Frame Processing"> "Compensation 1", changing the "Files of type" from "Frequency Compensation File (*.fcf)" to "Original Frequency Response File (*.txt)" in the pop-up File Open dialog box, and loading that file (see figures below). If you want to apply it to the twenty most frequently used panel settings in the Hot Panel Setting Toolbar, you will need to configure and save the corresponding panel setting files one by one. Luckily, this has already been done for the twenty default panel settings.

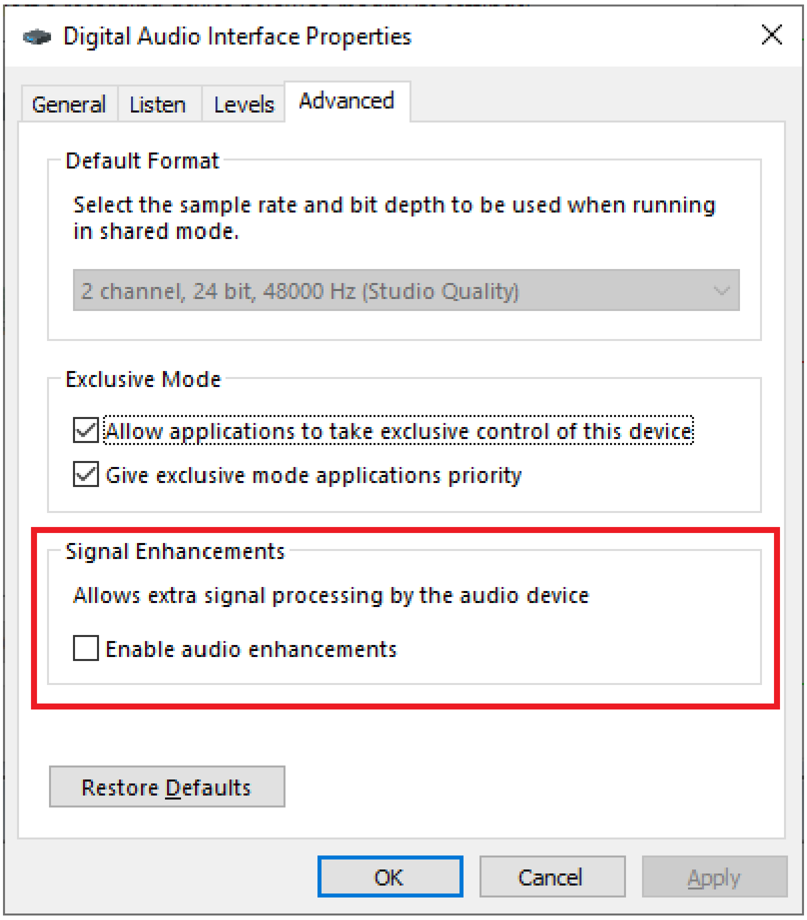





The above frequency compensation file RTA-168C.txt is actually copied and renamed from the original calibration file supplied by the manufacturer of Umik-1. Two original calibration files are provided: one for 0 degree (on-axis) and the other for 90 degree. The RTA-168C.txt is renamed from the 0 degree calibration file by default. Normally the 0 degree file should be used in a mono or stereo system with the microphone pointing to the sound source while the 90 degree file should be used in a surround sound environment with the microphone pointing upwards. These two original calibration files **can also be found in the CD directory "\Microphone Frequency Compensation File". Their file names are something like xxxxxxx.txt and xxxxxxx_90deg.txt where xxxxxxx is the serial no. labelled on the Umik-1 microphone body.**

Some Windows versions / editions come with some audio signal enhancement features which are enabled by default. These features must be disabled through the Sound Recording Control under Windows Control Panel to prevent them from altering the originally sampled data, as shown below. One of the possible problems caused by these features is the unwanted alteration of the frequency response of the setup.




## 1.7 Twenty Most Frequently Used Measurement Settings

Multi-Instrument bundled with VT RTA-168 comes with many pre-configured panel setting files. This saves you time to configure various parameters for some frequently performed measurements by yourself. You can load these panel setting files via [Setting]>[Load Panel Setting]. Furthermore, 20 most frequently used panel setting files are pre-configured in the Hot Panel Setting Toolbar (The third toolbar from the top). You can load one of them by a single mouse click. These 20 measurement settings are:

(1) Home: Default Setting
The factory default panel setting. It is equivalent to the [File]>[New] command.

(2) OCT1: 1/1 Octave Analysis (Avg. 10)
Pink noise will be generated by pressing the start button of the Signal Generator. The pink noise will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. A flat curve in the Spectrum Analyzer would indicate a flat magnitude frequency response of the DUT. The equivalent continuous sound level in dB will be displayed in the Multimeter window.

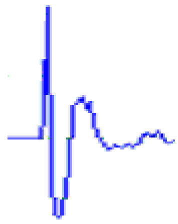
(3) OCT3: 1/3 Octave Analysis (Avg. 10)
Same as OCT1, but with a finer frequency resolution.

(4) OCT3ppn: 1/3 Octave Analysis

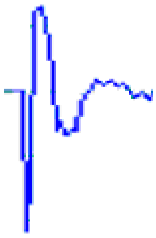
 

Same as OCT3, but periodic pink noise instead of ordinary (non-periodic) pink noise is used as the stimulus. One advantage of using periodic pink noise is that its spectrum is ideally flat under octave analysis even without inter-frame averaging.

(5) Polarity: Speaker, Microphone, Amplifier Polarity Tester with Crest Factor Check
A polarity test signal will be generated by pressing the start button of the Signal Generator. Point the microphone close to the center of the speaker under test along its axis, and observe the polarity of the captured pulse in the oscilloscope window. If the pulse goes positive initially, then the polarity of the speaker under test is positive, and vice versa.



Positive



Negative

(6) THD: THD,THD+N,SNR,SINAD,Noise Level, ENOB (Avg. 10 )
A 1 kHz (to be precise, a frequency very close to 1 kHz) sine wave will be generated by pressing the start button of the Signal Generator. The sine wave will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. All the above parameters of the DUT will be measured and displayed. This panel setting should be used only if the same sound card is used for signal input and output.

(7) THDcd: THD,THD+N,SNR,SINAD,Noise Level, ENOB (Avg. 10 )
A 1 kHz sine wave will be generated by pressing the start button of the Signal Generator. The sine wave will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. All the above parameters of the DUT will be measured and displayed. This panel setting should be used if different sound cards are used for signal input and output, such as the case of RTA-168. It should also be used if the 1 kHz test tone is played from an audio CD or a memory stick.

(8) IMDsmp: IMD SMPTE (60 Hz + 7 kHz, 4:1) (Avg. 10)
A 60 Hz and a 7 kHz sine waves mixed at an amplitude ratio of 4:1 will be generated by pressing the start button of the Signal Generator. The mixed signals will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. The SMPTE IMD value of the DUT will be measured and displayed.

(9) IMDdin: IMD DIN (250 Hz + 8 kHz, 4:1) (Avg. 10)
A 250 Hz and a 8 kHz sine waves mixed at an amplitude ratio of 4:1 will be generated by pressing the start button of the Signal Generator. The mixed signal will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. The DIN IMD value of the DUT will be measured and displayed.

(10)IMDccif: IMD CCIF2 (19 kHz + 20 kHz, 1:1) (Avg. 10)

A 19 kHz and a 20 kHz sine waves mixed at an amplitude ratio of 1:1 will be generated by pressing the start button of the Signal Generator. The mixed signal will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. The CCIF2 IMD value of the DUT will be measured and displayed.

(11) FRwhite: Magnitude Frequency Response (White Noise, Avg. 30)
White noise will be generated by pressing the start button of the Signal Generator. The white noise will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. The curve in the Spectrum Analyzer indicates the magnitude frequency response of the DUT.

(12) FRpwn: Magnitude Frequency Response (Periodic White Noise)
Periodic white noise will be generated by pressing the start button of the Signal Generator. The periodic white noise will be injected into the DUT (Device Under Test), and the response of the DUT will be captured and analyzed by the Oscilloscope and Spectrum Analyzer. The curve in the Spectrum Analyzer indicates the magnitude frequency response of the DUT. One advantage of using periodic white noise is that its spectrum is ideally flat even without inter-frame averaging.

(13) FRswLin: Magnitude Frequency Response (Frequency Sweep, Linear)
A 0.68266667-second 20Hz-to-20kHz linear frequency swept sine wave will be generated by pressing the start button of the Signal Generator. The signal will be injected into the DUT (Device Under Test), and the response of the DUT will be captured by the Oscilloscope and Spectrum Analyzer. The curve in the Spectrum Analyzer indicates the magnitude frequency response of the DUT. Note that you will need to adjust the trigger level so that the Oscilloscope will be triggered just upon the start of the sweep.

(14) FRswLog: Magnitude Frequency Response (Frequency Sweep, Log)
A 0.68266667-second 20Hz-to-20kHz logarithmic frequency swept sine wave will be generated by pressing the start button of the Signal Generator. The signal will be injected into the DUT (Device Under Test), and the response of the DUT will be captured by the Oscilloscope and Spectrum Analyzer. The curve in the Spectrum Analyzer indicates the magnitude frequency response of the DUT. Note that you will need to adjust the trigger level so that the Oscilloscope will be triggered just upon the start of the sweep.

(15) FRmt: Magnitude Frequency Response (MultiTone, 31 1/3 Octave Bands)
A multitone consists of 31 1/3 octave band center frequencies from 20 Hz to 20kHz will be generated by pressing the start button of the Signal Generator. The signal will be injected into the DUT (Device Under Test), and the response of the DUT will be captured by the Oscilloscope and Spectrum Analyzer. The curve in the Spectrum Analyzer indicates the magnitude frequency response of the DUT.

(16)sLeq: Short Equivalent Continuous Sound Level (Short Leq, 125ms)
This panel setting will display the short equivalent continuous sound level. The value is time-averaged over continuous 125 ms.

(17)sLeqA: Short Equivalent Continuous Sound Level (Short Leq, 125ms) (A-Weighted)
This panel setting will display the A-weighted short equivalent continuous sound level. The value is time-averaged over continuous 125 ms.

(18)sLeqC: Short Equivalent Continuous Sound Level (Short Leq, 125ms) (C-Weighted)
This panel setting will display the C-weighted short equivalent continuous sound level. The value is time-averaged over continuous 125 ms.

(19)OCT1spl: 1/1 Octave Analysis (Avg. 10) in SPL
Same as OCT1, but with the Y axis displayed in dBSPL instead of dBFS in Spectrum Analyzer.

(20)OCT3spl: 1/3 Octave Analysis (Avg. 10) in SPL
Same as OCT3, but with the Y axis displayed in dBSPL instead of dBFS in Spectrum Analyzer.

## 1.8 More Acoustic Analysis Functions Available in Multi-Instrument Pro or Above

Multi-Instrument is very versatile and supports a comprehensive set of acoustic measurements. To highlight a few not mentioned in the previous sections: Reverberation (including RT60), Speech Intelligibility (including STI), ANSI / CEA-2010 Subwoofer Peak SPL Test, Cumulative Spectral Decay, Speaker Rub & Buzz, Sound Quality (loudness, loudness level, sharpness, etc.), etc. Some of these functions are only available in Multi-Instrument Pro or above. Please refer to Multi-Instrument software manual for more details.

## 1.9 List of Audio Test WAV Files (AudioTestCD.zip)

| Track | Description | Length (second) | Recommended Panel setting to be used |
|---|---|---|---|
| 1 | Pink Noise in Phase (-1dBFS) | 298 | OCT1 ~ OCT24<br>OCT1spl, OCT3spl |
| 2 | Pink Noise out of Phase (-1dBFS) | 298 | |
| 3 | White Noise in Phase (-1dBFS) | 298 | FRwhite |
| 4 | White Noise out of Phase (-1dBFS) | 298 | |
| 5 | Log Sweep 20Hz~20kHz (-1dBFS) | 60 | |
| 6 | Log Sweep 20Hz~20kHz out of Phase (-1dBFS) | 60 | |
| 7 | Linear Sweep 20Hz~20kHz (-1dBFS) | 60 | |
| 8 | Linear Sweep 20Hz~20kHz out of Phase (-1dBFS) | 60 | |
| 9 | Log Sweep 20Hz~200Hz (-1dBFS) | 60 | |
| 10 | Log Sweep 20Hz~200Hz out of Phase (-1dBFS) | 60 | |
| 11 | Linear Sweep 20Hz~200Hz (-1dBFS) | 60 | |
| 12 | Linear Sweep 20Hz~200Hz out of Phase (-1dBFS) | 60 | |
| 13 | Log Sweep 2kHz~20kHz (-1dBFS) | 60 | |
| 14 | Log Sweep 2kHz~20kHz out of Phase (-1dBFS) | 60 | |
| 15 | Linear Sweep 2kHz~20kHz (-1dBFS) | 60 | |
| 16 | Linear Sweep 2kHz~20kHz out of Phase (-1dBFS) | 60 | |
| 17 | Log Sweep 20Hz~20kHz (-1dBFS) | 0.683 | FRswlog |
| 18 | Log Sweep 20Hz~20kHz out of Phase (-1dBFS) | 2.73 | |
| 19 | Linear Sweep 20Hz~20kHz (-1dBFS) | 0.683 | FRswlin |
| 20 | Linear Sweep 20Hz~20kHz out of Phase (-1dBFS) | 2.73 | |
| 21 | MultiTone32Octave1/3 in Phase (-1dBFS) | 60 | FRmt |

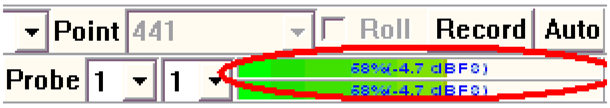
| | | | |
|---|---|---|---|
| 22 | MultiTone32Octave1/3 out of Phase (-1dBFS) | 60 | |
| 23 | 1kHz (0dBFS) | 60 | |
| 24 | 1kHz (-1dBFS) | 60 | THDcd |
| 25 | 1kHz (–3dBFS) | 60 | |
| 26 | 1kHz (–10dBFS) | 60 | |
| 27 | 1kHz (–60dBFS) | 60 | |
| 28 | 60Hz and 7kHz mixed at 4: 1 (-1dBFS) | 60 | IMDsmp |
| 29 | 250Hz and 8kHz mixed at 4: 1 (-1dBFS) | 60 | IMDdin |
| 30 | 19kHz and 20kHz mixed at 1: 1 (-1dBFS) | 60 | IMDccif |
| 31 | 1kHz Square (-1dBFS) | 60 | |
| 32 | Digital Silence | 60 | |
| 33 | LeftRight (English) | 60 | |
| 34 | Left Right Center Surround (English) | 60 | |
| 35 | LeftRight (Chinese) | 60 | |
| 36 | Left Right Center Surround (Chinese) | 60 | |
| 37 | 12.5 Hz (-1dBFS) | 60 | 1/3 Octave Band 1 |
| 38 | 16 Hz (-1dBFS) | 60 | 1/3 Octave Band 2 |
| 39 | 20 Hz (-1dBFS) | 60 | 1/3 Octave Band 3 |
| 40 | 25 Hz (-1dBFS) | 60 | 1/3 Octave Band 4 |
| 41 | 31.5 Hz (-1dBFS) | 60 | 1/3 Octave Band 5 |
| 42 | 40 Hz (-1dBFS) | 60 | 1/3 Octave Band 6 |
| 43 | 50 Hz (-1dBFS) | 60 | 1/3 Octave Band 7 |
| 44 | 63 Hz (-1dBFS) | 60 | 1/3 Octave Band 8 |
| 45 | 80 Hz (-1dBFS) | 60 | 1/3 Octave Band 9 |
| 46 | 100 Hz (-1dBFS) | 60 | 1/3 Octave Band 10 |
| 47 | 125 Hz (-1dBFS) | 60 | 1/3 Octave Band 11 |
| 48 | 160 Hz (-1dBFS) | 60 | 1/3 Octave Band 12 |
| 49 | 200 Hz (-1dBFS) | 60 | 1/3 Octave Band 13 |
| 50 | 250 Hz (-1dBFS) | 60 | 1/3 Octave Band 14 |
| 51 | 315 Hz (-1dBFS) | 60 | 1/3 Octave Band 15 |
| 52 | 400 Hz (-1dBFS) | 60 | 1/3 Octave Band 16 |
| 53 | 500 Hz (-1dBFS) | 60 | 1/3 Octave Band 17 |
| 54 | 630 Hz (-1dBFS) | 60 | 1/3 Octave Band 18 |
| 55 | 800 Hz (-1dBFS) | 60 | 1/3 Octave Band 19 |
| 56 | 1250 Hz (-1dBFS) | 60 | 1/3 Octave Band 21 |
| 57 | 1600 Hz (-1dBFS) | 60 | 1/3 Octave Band 22 |
| 58 | 2000 Hz (-1dBFS) | 60 | 1/3 Octave Band 23 |
| 59 | 2500 Hz (-1dBFS) | 60 | 1/3 Octave Band 24 |
| 60 | 3150 Hz (-1dBFS) | 60 | 1/3 Octave Band 25 |
| 61 | 4000 Hz (-1dBFS) | 60 | 1/3 Octave Band 26 |
| 62 | 5000 Hz (-1dBFS) | 60 | 1/3 Octave Band 27 |
| 63 | 6300 Hz (-1dBFS) | 60 | 1/3 Octave Band 28 |
| 64 | 8000 Hz (-1dBFS) | 60 | 1/3 Octave Band 29 |
| 65 | 10000 Hz (-1dBFS) | 60 | 1/3 Octave Band 30 |
| 66 | 12500 Hz (-1dBFS) | 60 | 1/3 Octave Band 31 |
| 67 | 16000 Hz (-1dBFS) | 60 | 1/3 Octave Band 32 |
| 68 | 20000 Hz (-1dBFS) | 60 | 1/3 Octave Band 33 |
| 69 | 999.9481201 Hz (-1dBFS) | 60 | THD |
| 70 | One 0.5ms Inverted Saw Tooth Pulse Every 100ms (-1dBFS) | 1 | Polarity Test |

Note that you can compare the sound level of the in-phase signal with that of the out-of-phase signal to judge whether you need to swap the polarity of the speakers in one channel.

## 1.10 Operation Notes

- The sound level of the test signal should be at least 30 dB higher than that of the background noise in order to achieve sufficient signal-to-noise ratio in the measurement.
- The volume of the test signal and the input gain of the RTA should be adjusted such that the input peak level (displayed at the upper right corner of the screen) is in the range of 10%~95% (preferably around 85%). This is to ensure sufficient measurement accuracy and at the same time avoid distortion caused by input saturation. **When the input peak level reaches 100% (the bar turns fully red), the results cannot be trusted.**



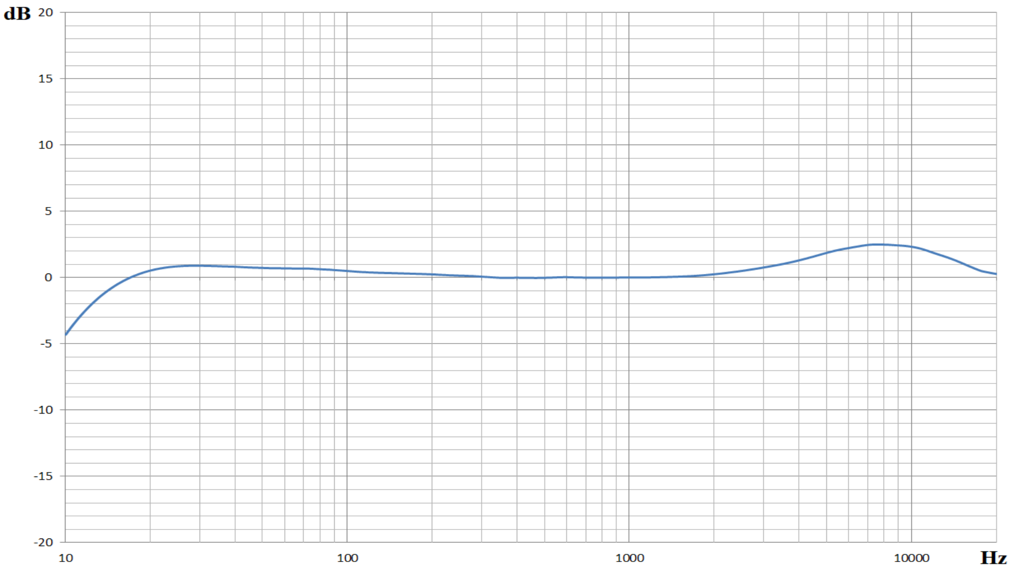

- You can change the number of frames for averaging by right clicking anywhere within the Spectrum Analyzer window and selecting [Spectrum Analyzer Processing]> "Inter-Frame Processing"> "Linear Average" and choose a number in the "Frames" field.
- You can change the frequency weighting by right clicking anywhere within the Spectrum Analyzer window and selecting [Spectrum Analyzer Processing]>"Intra-Frame Processing" and choose a weighting profile in the "weighting" field.
- You can save a panel setting file via [Setting]>[Save Current Panel Setting]
- You can load a panel setting file via [Setting]>[Load Panel Setting].
- You can configure your own Hot Panel Setting Toolbar via [Setting]>[Configure Hot Panel Setting Toolbar].
- You can lock the panel setting via [Help]>[Lock Panel Setting].
- You can unlock the panel setting via [Help]>[Unlock Panel Setting].
- You can set or change the password for unlocking the panel setting via [Setting]>[Change Password].

# 2 Specifications

## 2.1 Hardware Specifications

| | |
|---|---|
| Transducer Type | 6mm electret condenser |
| Polar Pattern | Omni-directional |
| Frequency Response | 20Hz ~ 20kHz<br>(±1dB with the frequency response calibration file loaded) |
| Sampling Rate | 48 kHz |
| Bit Depth | 24 Bit |
| Number of Input Channels | 1 |
| Frequency Accuracy | 0.01% |
| Frequency Weighting | Flat, A, B, C, ITU-R 468 |
| Time Weighting | Linear, Exponential<br>(Equivalent continuous sound level (*Leq*) fully complies with IEC61672) |
| Max. SPL (THD<1%, 1kHz) | 133 dBSPL @ 0dB analog gain |
| Sound Level Measurement Range | 35dB ~ 125dB (typical), adjustable through software gain slider. Recalibration is not required after the gain setting changes. |
| Sound Level Measurement Accuracy | ± 0.3 dB at 94dB, 1kHz after calibration |
| Sound Level Calibration | Calibrated using Type 1 Sound Level Calibrator |
| Octave Analysis | 1/1,1/3,1/6,1/12,1/24,1/48, 1/96<br>(Complies with IEC61260) |
| Other Functions | THD, THD+N, SINAD, SNR, SMPTE IMD, DIN IMD, CCIF2 IMD, Frequency Response, etc.<br><br>Much more functions are described in the software manual. |
| USB Audio | USB Audio Class 1.0 (no driver installation required) |
| Connector | Mini USB socket (Version 1)<br>USB Type C socket (Version 2) |
| Case Material | Die cast aluminum |
| Weight | 120 g |
| Dimensions | Φ21.0 × 181.0 mm |
| Power Supply | USB bus powered (5V) |
| System Requirements | Windows XP/VISTA/7/8/8.1/10/11, 32 bit or 64 bit. Minimum Screen Resolution: 1024 × 600 |
| Calibration | Individually calibrated. Calibration files for on-axis and 90 degree included. |




**Typical Frequency Response**

Note: This is only a typical frequency response chart. Umik-1 measurement microphone is calibrated individually and the calibration data is included in the product package.

## 2.2 Multi-Instrument Software Specifications

A complete Multi-Instrument software package consists of basic and add-on modules with all features in each of them. The basic modules include Oscilloscope, Spectrum Analyzer, Signal Generator, Multimeter, Derived Data Point Viewer, Derived Data Curve, and General Functions. The add-on modules include Spectrum 3D Plot, Data Logger, LCR Meter, Device Test Plan, Vibrometer, and Dedicated Hardware Support.

There are six license levels to access the basic modules: Sound Card Oscilloscope, Sound Card Spectrum Analyzer, Sound Card Signal Generator, Multi-Instrument Lite, Multi-Instrument Standard, and Multi-Instrument Pro. The add-on modules need to be purchased separately. They can only run with Multi-Instrument Lite, Standard, or Pro, except that Vibrometer can only run with Multi-Instrument Standard or Pro. The following table shows the function allocation among different license levels. Please note that a license of Multi-Instrument Full Package contains Multi-Instrument Pro and all add-on modules.

*Legend: √ - Function available √* - Function available in Multi-Instrument Full Package only*

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| General Functions | | | | | | | |
| ADC / DAC 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 | Load WAV File | √ | √ | √ | √ | √ | √ |
| | Load TXT File | | | | | √ | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | 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 | √ | √ | | √ | √ | √ |
| | 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 | | | | | √ | √ |
| Ot he | Gain Adjustment | √ | √ | √ | √ | √ | √ |
| | Input Peak Indicator | √ | √ | √ | √ | √ | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | 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) | √ | √ | √ |
| Type | Waveform Addition | √ | √ | √ (offline) | √ | √ | √ |
| Type | Waveform Subtraction | √ | √ | √ (offline) | √ | √ | √ |
| Type | Waveform Multiplication | √ | √ | √ (offline) | √ | √ | √ |
| Type | Lissajous Pattern | √ | √ | √ (offline) | √ | √ | √ |
| Inter-Frame Processing | Linear Average | | | | | √ | √ |
| Inter-Frame Processing | Exponential Average | | | | | √ | √ |
| Intra-Frame | Time Delay Removal | | | | | √ | √ |
| Demodulation (Intra-Frame) | AM | | | | | √ | √ |
| Demodulation (Intra-Frame) | FM | | | | | √ | √ |
| Demodulation (Intra-Frame) | PM | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | Remove DC | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | Rectification | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FFT Low Pass | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FFT High Pass | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FFT Band Pass | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FFT Band Stop | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FFT Frequency Response | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FIR Low Pass | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FIR High Pass | | | | | √ | √ |
| Digital Filtering (Intra-Frame Processing) | FIR Band Pass | | | | | √ | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | FIR Band Stop | | | | | √ | √ |
| | FIR Frequency Response | | | | | √ | √ |
| | IIR Coefficients | | | | | √ | √ |
| Parameter Measureme | Reverberation / Speech Intelligibility | | | | | | √ |
| | Discontinuity | | | | | | √ |
| | Step Response | | | | | | √ |
| 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 / Power Spectrum Density / Impedance Spectrum | | √ | | √ | √ | √ |
| | Phase Spectrum | | √ | | √ | √ | √ |
| | Auto-correlation (Linear/Circular) | | √ | | √ | √ | √ |
| | Cross-correlation (Linear/Circular) | | √ | | √ | √ | √ |
| | Coherence/Non-Coherence | | | | | | √ |
| | Transfer Function / Impedance Analyzer | | | | | | √ |
| | Impulse Response | | | | | | √ |
| Intra-Frame Processing | Frequency Compensation | | √ | | √ | √ | √ |
| | Frequency Weighting | | √ | | √ | √ | √ |
| | Remove DC | | √ | | √ | √ | √ |
| | Smoothing via Moving Average (Linear/Octave) | | √ | | √ | √ | √ |
| Inter-Frame Processing | Peak Hold | | √ | | √ | √ | √ |
| | Linear Average | | √ | | √ | √ | √ |
| | Exponential Average | | √ | | √ | √ | √ |
| Parameter Measurement | THD,THD+N,SNR, SINAD,Noise Level, ENOB | | √ | | √ | √ | √ |
| | IMD/DIM | | √ | | √ | √ | √ |
| | Bandwidth | | √ | | √ | √ | √ |
| | Crosstalk | | √ | | √ | √ | √ |
| | Harmonics & Phase | | √ | | √ | √ | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | Energy in User Defined Frequency Band | | √ | | √ | √ | √ |
| | Peak Detection, SFDR, TD+N | | √ | | √ | √ | √ |
| | Wow & Flutter | | | | | | √* |
| | Sound Loudness | | | | | | √ |
| | Sound Loudness Level | | | | | | √ |
| | Sound Sharpness | | | | | | √ |
| | Total Non-Coherent Distortion + Noise | | | | | | √ |
| | GedLee Metric | | | | | | √ |
| FFT | FFT Size 128~32768 | | √ | | √ | √ | √ |
| FFT | FFT Size 65536~4194304 | | | | | | √ |
| FFT | Intra-Frame Average | | √ | | √ | √ | √ |
| FFT | Window function | | √ | | √ | √ | √ |
| FFT | Window Overlap | | √ | | √ | √ | √ |
| Others | Octave Analysis (1/1, 1/3, 1/6, 1/12, 1/24, 1/48, 1/96) | | √ | | √ | √ | √ |
| Others | Linear / Log Scale for X and Y | | √ | | √ | √ | √ |
| Others | Peak Marker / Label | | √ | | √ | √ | √ |
| Signal Generator | | | | | | | |
| Waveform | Sine | | | √ | √ | √ | √ |
| Waveform | Rectangle | | | √ | √ | √ | √ |
| Waveform | Triangle | | | √ | √ | √ | √ |
| Waveform | Saw Tooth | | | √ | √ | √ | √ |
| Waveform | White Noise | | | √ | √ | √ | √ |
| Waveform | Pink Noise | | | √ | √ | √ | √ |
| Waveform | MultiTones | | | √ | √ | √ | √ |
| Waveform | Arbitrary Waveform | | | √ | √ | √ | √ |
| Waveform | MLS | | | √ | √ | √ | √ |
| Waveform | DTMF | | | √ | √ | √ | √ |
| Waveform | Musical Scale | | | √ | √ | √ | √ |
| Waveform | Wave File | | | | | √ | √ |
| Waveform | Play Waveform in Oscilloscope | √ | √ | √ | √ | √ | √ |
| Waveform | Cyclic Play Waveform in Oscilloscope | √ | √ | √ | √ | √ | √ |
| Sweep | Frequency Sweep (Linear/Log) | | | √ | √ | √ | √ |
| Sweep | Amplitude Sweep (Linear/Log) | | | √ | √ | √ | √ |
| Sweep | Forward + Reverse Sweep | | | √ | √ | √ | √ |
| Burst (Mask) | Normal Phase | | | √ | √ | √ | √ |
| Burst (Mask) | Locked Phase | | | √ | √ | √ | √ |
| Burst (Mask) | Window-Shaped Burst | | | √ | √ | √ | √ |
| Burst (Mask) | On/Off Amplitude Ratio | | | √ | √ | √ | √ |
| Fade | Fade In | | | √ | √ | √ | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | 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 (Derived Data Point) Viewer | | | | | | | |
| Function | DDP & UDDP display | | | | | | √ |
| | HH, H, L, LL Alarm | | | | | | √ |
| | Set Display Precision | | | | | | √ |
| | Define UDDP | | | | | | √ |
| | Alarm Sound | | | | | | √ |
| | Alarm Acknowledge | | | | | | √ |
| | Inter-frame Linear / Exponential Average | | | | | | √ |
| DDP Array | Harmonic Frequencies, RMS, Phases Report | | | | | | √ |
| | Octave Bands, RMS Report | | | | | | √ |

| | | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument Standard | Multi-Instrument Pro |
|---|---|---|---|---|---|---|---|
| | Peak Frequencies, RMS, Phases Report | | | | | | √ |
| | Frequency Bands, RMS Report | | | | | | √ |
| | Reverberation / Speech Intelligibility Report (1/1 Octave) | | | | | | √ |
| | Reverberation / Speech Intelligibility (1/3 Octave) | | | | | | √ |
| Derived Data Curve (DDC) | | | | | | | |
| Function | Energy Time Curve (Log-Squared) | | | | | | √ |
| | Energy Time Curve (Envelop) | | | | | | √ |
| | Energy Time Curve (dBSPL) | | | | | | √ |
| | Impulse Response Schroeder Integration Curve | | | | | | √ |
| | Step Response Curve (via Impulse Response Integration) | | | | | | √ |
| | Frequency Time Curve | | | | | | √ |
| | X-Y Plot | | | | | | √ |

*Legend: Blank - Function available if purchased   Shaded Blank - Function NOT available in that license level*

| | | 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 (Inter-frame, STFT) | | | | | | |
| | Waterfall Plot (Intra-frame, STFT) | | | | | | |
| | Waterfall Plot (Intra-frame, CSD) | | | | | | |
| | Spectrogram (Inter-frame, STFT) | | | | | | |
| | Spectrogram (Intra-frame, STFT) | | | | | | |
| | Spectrogram (Intra-frame, CSD) | | | | | | |
| 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 | | | | | | |
| | Octave Analysis (1/1, 1/3, 1/6, 1/12, 1/24, 1/48, 1/96) | | | | | | |
| | Spectrogram Smoothing | | | | | | |
| Data Logger | | | | | | | |
| Real Time Logging | | | | | | | |
| Load Historical Log File | | | | | | | |
| Three logging methods (Fastest, Time Interval, Update Threshold) | | | | | | | |
| 246 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 | | | | | | | |
| Automatic Mutli-Step Generation | | | | | | | |
| User Log In / Out | | | | | | | |
| Volatile & Non-volatile | | | | | | | |

| | Sound Card Oscilloscope | Sound Card Spectrum Analyzer | Sound Card Signal Generator | Multi-Instrument Lite | Multi-Instrument | Multi-Instrument Pro |
|---|---|---|---|---|---|---|
| Variables | | | | | | |
| Vibrometer | | | | | | |
| RMS, Peak/PP, Crest Factor 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 | | | | | | |

# 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, and Dedicated Hardware Support.

The license contained in the standard VT RTA-168 package is a hardkey activated Multi-Instrument Standard license, without any add-on modules/functions. No softkey (activation code) is provided. The software will run under the licensed mode as long as the USB hardkey (dongle) is connected to your computer before you launch the Multi-Instrument software.

Note: If the software is launched without the USB hardkey connected to the computer, it will enter into 21-day fully functional trial mode, unless the software is activated by a softkey (activation code), which is NOT included in the standard VT RTA-168 package and should be purchased separately as a brand-new license if needed.

## 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 information inside the USB hardkey by selecting [Start]>[All Programs]>[Multi-Instrument]>[VIRTINS Hardware Upgrading Tool] on your Windows desktop.

## 3.3 Software Upgrade in the Same License Level

Software upgrade in the same license level (if the hardkey 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 check frequently with our website to see if a new version or build is available.

# 4 Warranty

Virtins Technology guarantees this product against defective materials and manufacutring 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 unauthorised 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.

# 5 Disclaimer

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