

# RTX6001

## Audio Analyzer



## User Manual

## General

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## Warranty

This instrument is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, RTX A/S will at its option, either repair or replace products, which prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by RTX A/S. The buyer shall prepay shipping charges to RTX A/S and RTX A/S shall pay shipping charges, duties, and taxes for products returned to RTX A/S from another country.

RTX A/S warrants that its software and firmware designated by RTX A/S for use with an instrument will execute its programming instructions when properly installed on that instrument.

RTX A/S does not warrant that the operation of the instrument or firmware will be uninterrupted or error free.

## Limitation of Warranty

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The general safety precautions, according to this User Manual, must be observed during all phases of operation. RTX A/S assumes no liability for the Buyers failure to comply with these requirements.

The purpose of the document is to provide guidance to users of the RTX6001 Audio Analyzer. It describes general functions of the product and also describes the use of the Windows® based interface.

## Documentation information

This User Manual contains essential items of information needed for general-purpose use of the RTX6001.

In this document you will find valuable information on how to unpack, install and operate your RTX6001.

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## Safety information

The following general safety precautions must be observed during all phases of operation and service of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. RTX assumes no liability for the customer's failure to comply with these requirements.

**WARNING!**

This is a Safety Class I instrument (provided with a protective Earth ground, incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Furthermore, any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is therefore prohibited.



**DO NOT** defeat the earth-grounding protection by using an extension cable, power cable, or autotransformer without a protective ground connector. If you are using an autotransformer, make sure its common terminal is connected to the protective earth contact of the power source outlet socket.



**DO NOT** operate the product in an explosive atmosphere or in the presence of flammable gasses or fumes.



**DO NOT** use repaired fuses or short-circuited fuse holders: For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type.



**DO NOT** perform procedures involving cover or shield removal unless you are qualified to do so – it is therefore strongly emphasized here that operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel at RTX only.

## Electrostatic Discharge

Electrostatic discharge (ESD) can damage electronic test equipment. Working with electronic components or test equipment should always be performed at a static-safe place.

## High Voltage

Some units under test can generate high voltages, which can damage the in/out port of the RTX6001.

To prevent damage to the RTX6001, the following should be observed:

External voltages should not be applied to the output terminals of the RTX6001.

The voltage applied to the input terminals should never exceed 150 V peak.

To avoid problems due to DC offsets on the inputs, it is recommended to use the AC input setting in most cases. AC coupling is especially important when operating the unit with inputs set to 0 dBV, -10 dBV or -20 dBV.

Furthermore, the unit should not be operated with excessive overload for extended periods of time. Doing so may compromise its performance.

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# 1 Getting Started

## 1.1 Introduction

The RTX6001 is a high-performance Audio Analyzer with a large degree of flexibility. It supports a wide range of audio tests, due to the standardized and open interface to the PC. Connected to a PC it operates as a USB audio device. This means that a wide range of audio analyzer software is available on the market, allowing the user to choose the one that provides the functionality needed in each particular case. It even makes it possible to use the RTX6001 in a high-quality audio recording and/or playback system.

The RTX6001 provides two output channels available as balanced signals on XLR connectors or unbalanced signals on BNC connectors. Each channel has a 3-stage attenuator with 20 dB steps. This allows full range signals (sine wave, balanced) from 100 mV to 10 V.

Two differential input channels are available on XLR connectors. Each channel has a 7-stage attenuator with 10 dB steps. This allows full-range signals (sine wave) from 100 mV to 100 V.

A 4 mm connector is available on the front. This is intended for connection of ground to the device under test. In many cases this can reduce problems with hum.

The rear panel has a USB connector for connection to a PC and a power connector for line power.

## 1.2 Unpacking the RTX6001 Audio Analyzer

### 1.2.1 Initial Inspection

Please inspect the shipping container for damage. If the shipping container or packaging material is damaged, it should be kept until the contents have been checked mechanically and electrically. If any mechanical or electrical damage is observed please notify RTX. Please refer to the description on how to contact RTX provided in this document. Please also keep the damaged shipping materials (if any) for inspection by the carrier and an RTX representative.

### 1.2.2 Box Contents

When unpacking the RTX6001 Audio Analyzer please verify that the items listed below are included in the box.

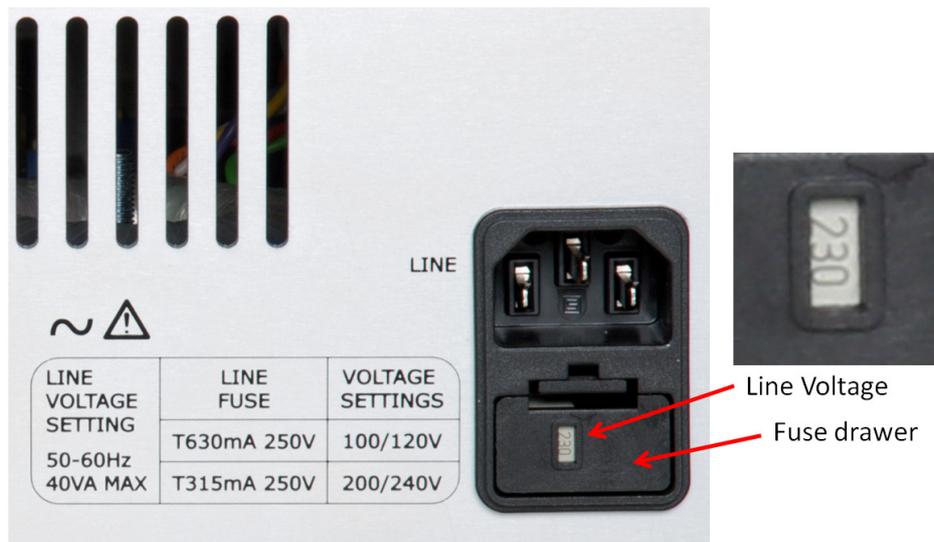
- RTX6001 Audio Analyzer unit
- Main power cable
- USB cable (for communication between the Analyzer and a PC)
- Certificate of conformity
- Calibration report (not for demo units)

### 1.2.3 Check Voltage Setting and Fuse Rating

**IMPORTANT!**

Check whether the voltage setting is compliant to the local region before connecting the main power cord (see instructions below). The RTX6001 is delivered prepared for 200V – 240 V operation.

The power line fuses are located within the power entry module on the rear panel, see picture below. For 110V to 120V operation the fuses are T0.63 250V. For 220-240V operation the fuses are T0.325 250V.



**Fuse location**

If the operating voltage needs to be changed, do the following:

- 1 Remove the power cord from the Analyzer.
- 2 Pull out the fuse drawer e.g. with a flat screwdriver.
- 3 Pull out the grey voltage selector and rotate it 180° to select a different line voltage.
- 4 Insert the correct fuses as shown in the figure below. Use two identical fuses.
- 5 Replace the fuse drawer in the power entry module.



**Fuse drawer**

### 1.2.4 Placement/Rack Mounting of the RTX6001

The RTX6001 can be used on the bench top or installed in a 19 inch rack cabinet (with optional mounting hardware). For desktop use, please place the RTX6001 on a hard horizontal surface, e.g. a table.



#### ***RTX6001 Audio Analyzer dimensions***

Rack mounting is possible with an optional rack mounting kit. Please contact RTX or distributor for additional information.

Please ensure that the space and airflow requirements within the rack cabinet are met. Dimensions of the RTX6001 Audio Analyzer are shown in the figure above.

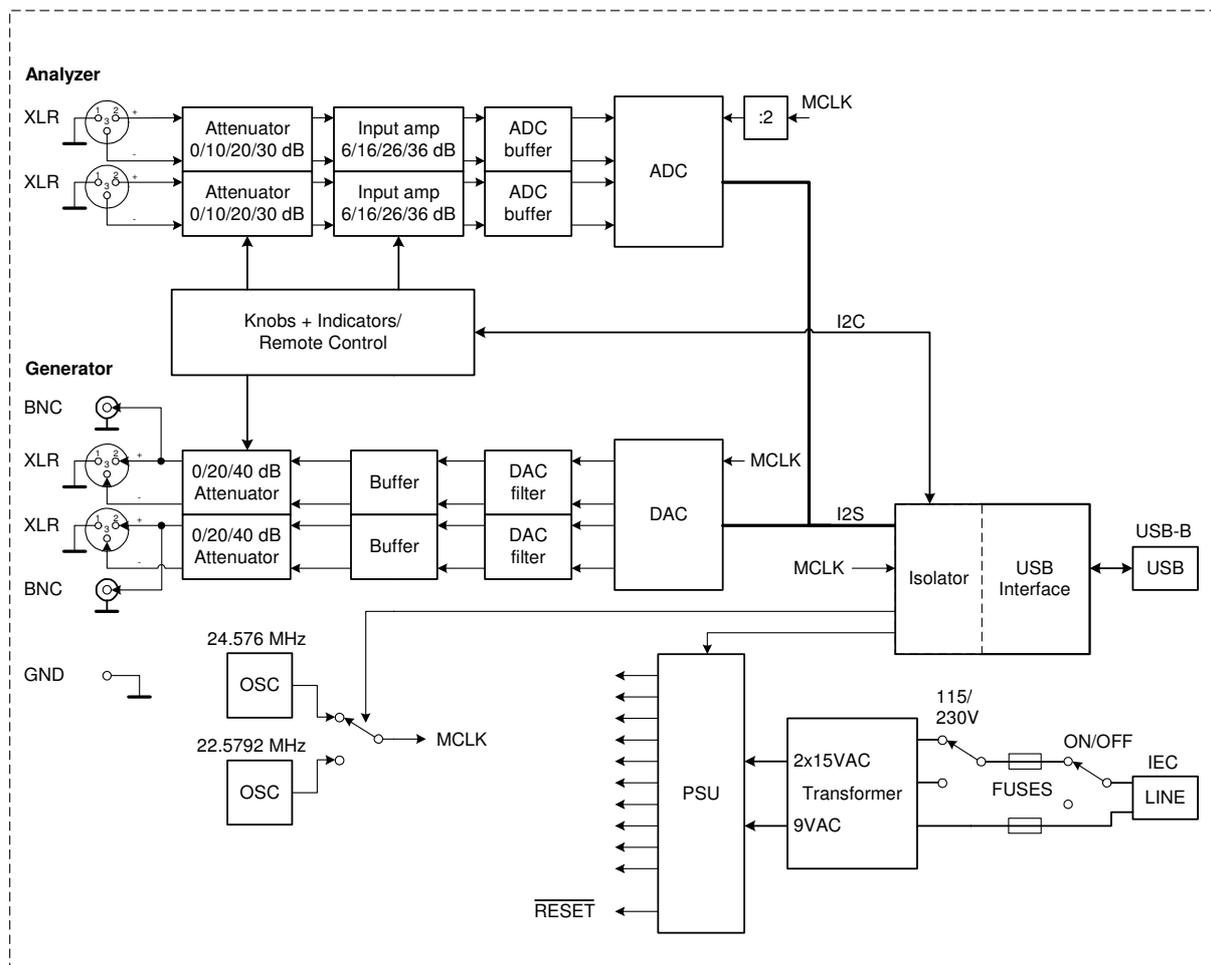
## 2 Description of the RTX6001 Audio Analyzer

### 2.1 General

The RTX6001 is a flexible tool for testing audio equipment. For operation it must be connected to a high-speed USB port on a PC. It works as a high-performance USB sound card, with sample rates from 44.1 kHz to 192 kHz. To make measurements, a program should be installed on the PC. Since the RTX6001 works as a sound card, a large selection of analyzer programs is available on the market, allowing the user to select the preferred one, based on needs and personal preference.

### 2.2 Block Diagram

The figure below shows a block diagram of the RTX6001 Audio Analyzer.



The measurement section of the RTX6001 is galvanically isolated from the USB interface. This ensures that there are no ground loops involving the connected PC. This ensures that potential issues with noise from the PC, e.g. noise from the switch-mode power supply of the PC, are virtually eliminated.

The Analyzer section, shown at the top of the diagram, has two input channels, each with a differential input. Both inputs are connected via XLR connectors. Pin 1 of the connectors (shield) is connected to the chassis (ground) of the unit.

Switchable attenuators and gain selections allow full-scale inputs between 100 mV and 100 V RMS in 10 dB steps. There are separate level settings for the two channels.

The two-channel Generator section has two output connectors per channel. Each channel has a balanced output on an XLR connector and a single-ended output on a BNC connector. Pin 1 of the XLR connectors (shield) is connected to the chassis (ground) of the unit. The ground of the BNC connector is also connected to the chassis (ground) of the unit. The signals on the BNC connectors are the same signals that are present on pin 2 (+) of the XLR connectors. This means that the single-ended output level is half the level of the balanced output level. It also means that the user should be careful not to load one output heavily in cases where both output connectors are used, since it will influence the output level and potentially also the distortion.

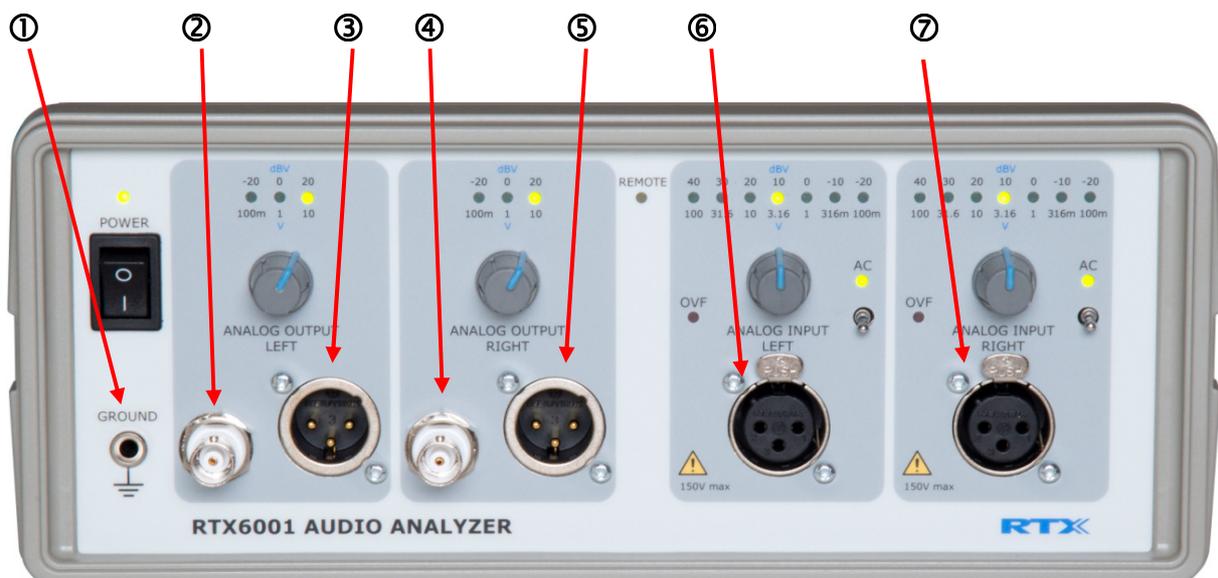
The master clock used in the Analyzer is common for the Generator and the Analyzer. The frequency will be selected based on the sample rate selected on the USB interface.

The USB connector provides the interface to the control PC.

The power supply can be set up for either 100 to 120 V or 220 to 240 V operation. The switch and the fuse must be set for the correct supply voltage available at the given location.

## 2.3 Front Panel Connectors

The RTX6001 provides analog inputs/outputs on the front panel as well as a ground connection. A brief overview of the available connectors is provided below along with a description of each of the connectors.

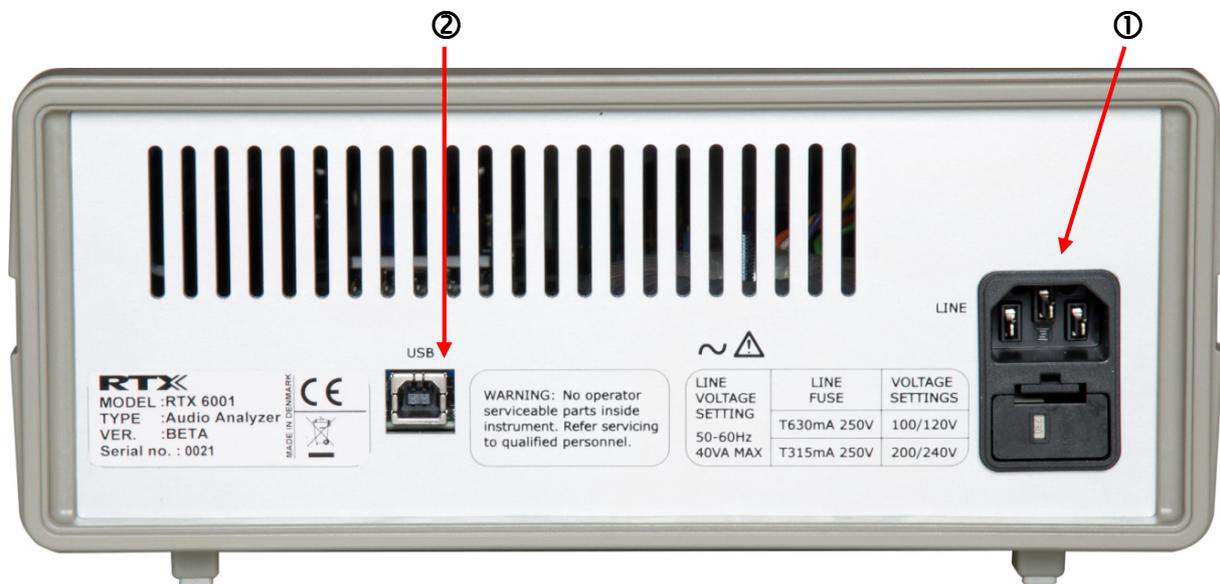


**Available front panel connectors**

1. **GROUND:** Ground connection (chassis) for 4 mm connector (banana plug).
2. **Left Channel Out, Single-ended:** BNC-connector. The outer connection (shield) is connected to ground.
3. **Left Channel Out, Balanced:** XLR connector. Pin 1 is connected to ground. Pin 2 is (+) and pin 3 is (-).
4. **Right Channel Out, Single-ended:** BNC-connector. The outer connection (shield) is connected to ground.
5. **Right Channel Out, Balanced:** XLR connector. Pin 1 is connected to ground. Pin 2 is (+) and pin 3 is (-).
6. **Left Channel In, Differential:** XLR connector. Pin 1 is connected to ground. Pin 2 is (+) and pin 3 is (-).
7. **Right Channel In, Differential:** XLR connector. Pin 1 is connected to ground. Pin 2 is (+) and pin 3 is (-).

## 2.4 Rear Panel Connectors

The RTX6001 provides rear panel connectors for power and control/audio (USB). A brief overview of the available connectors is provided below along with a description of each of the connectors.

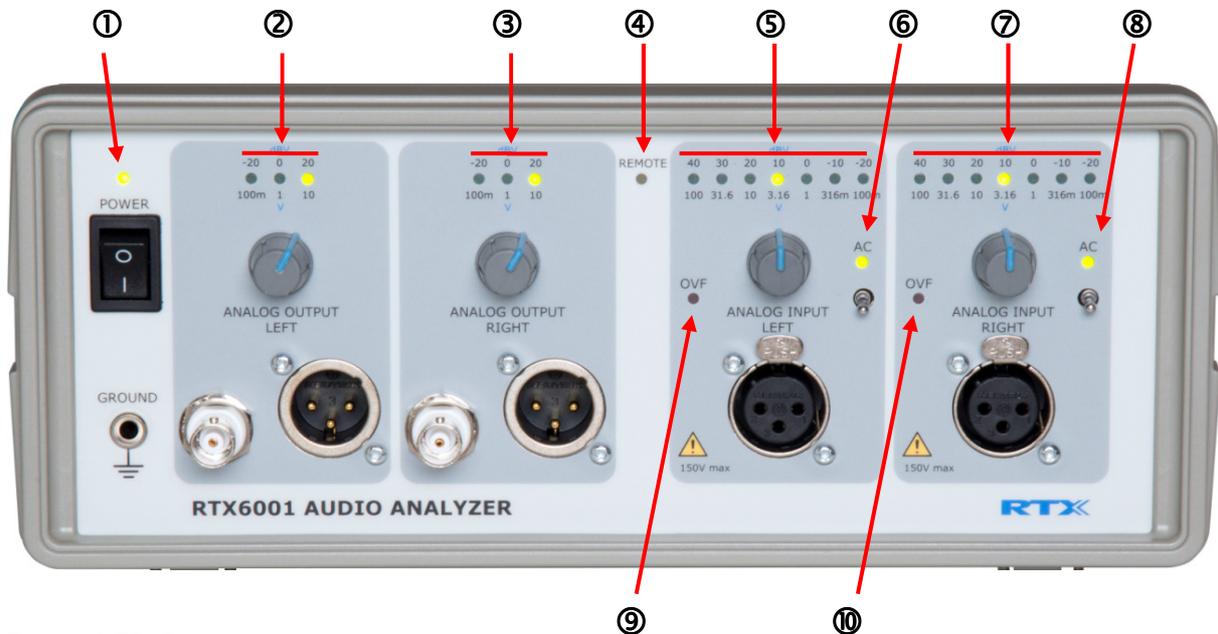


### Available rear panel connectors

1. **AC Input:** Power supply (110 / 220V).
2. **USB Interface:** The USB interface is used for transfer of audio and control information. It must be used with a PC in order to control the Analyzer. The USB interface on the Analyzer is a Type B receptacle, and hence, a standard High-speed USB cable with Type A-B plugs can be used to connect the Analyzer to a PC. The connector is isolated from the chassis.

## 2.5 Front Panel LED Indicators and Controls

On the front panel of the RTX6001 there are in total 26 LED indicators. These LED indicators are described in more detail below.



**Front LED Indicators and controls**

1. **Power (Green LED)** – If this LED is lit, it indicates that the Audio Analyzer is connected to the AC mains and that the power switch is ON.
2. **Output Range - Left (3 Green LED's)** - These LED's indicate the output level setting for the left channel. With local control, the setting is controlled by the rotary switch below the LED's.
3. **Output Range - Right (3 Green LED's)** - These LED's indicate the output level setting for the right channel. With local control, the setting is controlled by the rotary switch below the LED's.
4. **Remote (Yellow LED)** - If lit the front panel settings are controlled from the attached PC. Otherwise the front panel settings are controlled by the front panel rotary switches and toggle switches.
5. **Input Range - Left (7 Green LED's)** - These LED's indicate the input level setting for the left channel. With local control, the setting is controlled by the rotary switch below the LED's.
6. **AC - Left (Green LED)** – If this LED is lit, it indicates that the left channel input of the Audio Analyzer is AC coupled. Otherwise, the left channel input is DC coupled. With local control, the setting is controlled by the toggle switch below the LED.

7. **Input Range - Left (7 Green LED's)** - These LED's indicate the input level setting for the left channel. With local control, the setting is controlled by the rotary switch below the LED's.
8. **AC - Right (Green LED)** - If this LED is lit, it indicates that the right channel input of the Audio Analyzer is AC coupled. Otherwise the right channel input is DC coupled. With local control the setting is controlled by the toggle switch below the LED.
9. **OVF - Left (Red LED)** - If this LED is lit, it indicates an overflow condition on the left channel.
10. **OVF - Right (Red LED)** - If this LED is lit, it indicates an overflow condition on the right channel.

## 3 Installing the PC Software

In this paragraph the installation process is outlined. The following items of information are included:

1. Check the minimum system requirements to the PC on which the SW must be installed
2. Install RTX6000 series PC USB driver
3. Connect the RTX6001 to a PC USB port. The PC should install the driver automatically
4. Switch the RTX6001 on for the first time
5. Install the RTX6001 attenuation control program (optional)
6. Install an audio analyzer software of your choice
7. Run the analyzer program. Select the RTX6001 as audio interface

### 3.1 Minimum System Requirements

For successful operation of the Windows user interface, your PC must meet at least the minimum requirements outlined in the table below.

System Part	Minimum requirement
<b>CPU</b>	1 GHz processor (Intel© or AMD) or faster
<b>RAM</b>	Primarily determined by the Operating System and the application software
<b>Available disc space</b>	75 MB
<b>Monitor resolution</b>	1280 x 1024 pixels or higher recommended
<b>Ports</b>	High-speed USB port
<b>Operating System</b>	Windows 7, 8, 8.1 or 10 (32- or 64-bit) MAC Linux

The high-speed USB port should preferably be a port, which is not behind a USB hub. A USB hub will increase the probability of artefacts in the audio stream.

### 3.2 Installing the RTX6000 Series USB Driver

When used on a Windows PC, a driver is needed to support USB Audio Class 2.0. The driver for the RTX6001 must be installed on the PC for proper operation. The drivers support Windows 7, 8, 8.1 and 10. Both 32 and 64 bit systems are supported.

Download the software installation package from the download center on the RTX website <https://www.rtx.dk/en/design-services/contact/download-center/>.

To install the driver run the program RTX\_v4.33.0\_2017-10-11\_setup.exe (or later version).

### **3.3 Connecting the RTX6001 to a PC USB Port**

To operate the Audio Analyzer you must connect a PC (Windows, MAC or Linux) system controller to the USB port using a standard USB High Speed cable with Type A-B plugs (supplied together with the Audio Analyzer).

If the RTX6000 series PC driver was installed the Windows PC should recognize the Audio Analyzer and enumerate the unit.



***Standard USB cable with Type A-B plugs***

### **3.4 Switching the Audio Analyzer on for the First Time**

Before switching this instrument on please make sure that the:

- 1) Line voltage selector is set to the voltage of the power supply
- 2) Correct fuse is installed
- 3) Power supply voltage is in the specified range

Connect the Main Power Cord to the IEC power connector at the back of the unit.

Turn on the Analyzer by toggling the ON/OFF button on the front.

Some of the LED's on the front should light up.

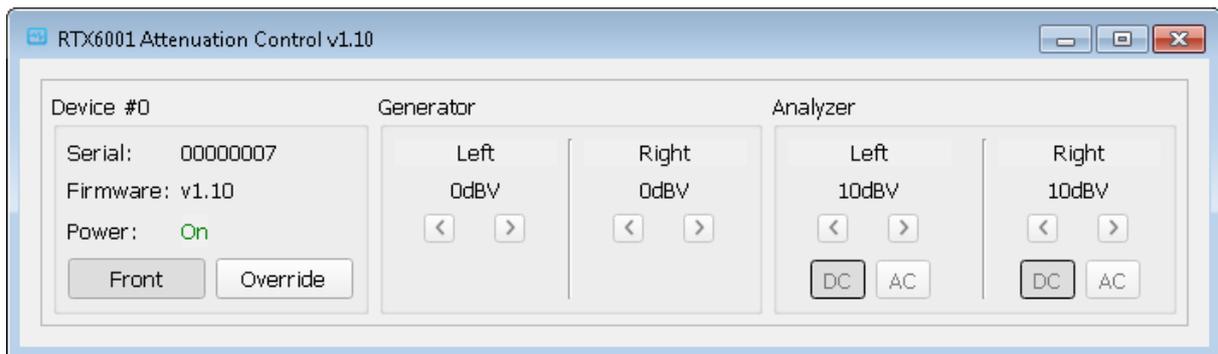
Depending on the attenuator settings some clicks from relays may be heard at power on and later during operation. This is normal.

### 3.5 Installing the RTX6001 Attenuation Control Program (optional)

A small utility program is provided with the RTX6001. It allows the user to monitor and control the status of the front panel settings on the attached Windows PC.

Locate and run the RTX6001\_v1.10.exe (or newer) installation program from the software installation package.

After installation the following control panel will be available:



To bring up the control panel later, run the program by clicking the program shortcut.

### 3.6 Installing an Audio Analyzer Program

To use the RTX6001 for audio measurements a program should be installed. The list below shows some of the available audio analyzer programs.

Virtins Multi-Instrument - <http://www.virtins.com/multi-instrument.shtml>

Arta, Steps - <http://www.artalabs.hr/>

HpW Works - <http://www.hpw-works.com/>

MATAA - <http://audioroot.net/mataa-mats-audio-analyzer/>

RightMark - <http://audio.rightmark.org/>

SpectraPlus - <http://www.spectraplus.com/>

VisualAnalyzer - <http://www.sillanumsoft.org/>

Audacity - <http://www.audacityteam.org/>

Virtins Multi-Instrument has an RTX6001 option for dedicated HW support, with full control of output and input settings from the analyzer SW.

ASIO or WASAPI interface is recommended for best performance.

Other SW packages can also be used.

Refer to the User Manual for the selected analyzer program for further information.

The RTX6001 can also be used for audio playback and/or recording.

## 4 Performing Measurements

The exact operational procedure to use when performing measurements depends on the analyzer SW used. Refer to the supplier's user manual for the selected analyzer program for further information.

If very low distortion is to be measured, it is generally best to operate the RTX6001 Audio Analyzer below -10dBFS, since the distortion will increase slightly when approaching full scale.

## 5 Specifications and Characteristics

### Technical Specifications

<b>System</b>	
Sample rates	44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, 192 kHz
ADC and DAC resolution	24 ADC, 32 bit DAC
Frequency accuracy	±30 ppm
PC Interface	USB 2.0 high-speed

<b>Analog Generator</b>	
Number of channels	2 outputs, 2 inputs
Output connectors	XLR for balanced outputs BNC for unbalanced outputs 4 mm banana jack (ground)
Frequency range	DC to 90 kHz
Output impedance	Balanced 100 ohm (±1%) Unbalanced 50 ohm (±1%)
Maximum Level (sine)	Balanced 10 V rms, no load Unbalanced 5 V rms, no load
Level accuracy	< ±0.1 dB @ 1 kHz
Level flatness	±0.01 dB DC to 20 kHz ±0.2 dB DC to 80 kHz
Output attenuator	3 steps, 10 V, 1 V, 100 mV
THD @ 0 dBV	
THD 48 kHz sample rate <sup>(1)</sup>	typical -124 dB @ 1 kHz
fundamental 20 Hz to 20 kHz	< -116 dB
THD 192 kHz sample rate <sup>(1)</sup>	typical -121 dB @ 1 kHz
fundamental 20 Hz to 20 kHz	< -115 dB
THD @ 10 dBV	
THD 48 kHz sample rate <sup>(1)</sup>	typical -119 dB @ 1 kHz
fundamental 20 Hz to 10 kHz	< -115 dB
THD 192 kHz sample rate <sup>(1)</sup>	typical -119 dB @ 1 kHz
fundamental 20 Hz to 40 kHz	< -115 dB
THD+N, 1 kHz @ 0 dBFS <sup>(1)</sup>	20 kHz BW
THD+N 48 kHz sample rate	typical -107dB
THD+N 192 kHz sample rate	typical -107dB
Output related crosstalk <sup>(2)</sup>	
10 Hz to 20 kHz	< -120 dB
20 kHz to 80 kHz	< -110 dB
DC offset on outputs	< 1 mV typical
Test signals	Defined by PC application

(1) System specification, Generator and Analyzer combined

(2) System specification, Generator and Analyzer combined, one output channel muted

<b>Analog Analyzer</b>	
Number of channels	2
Input connectors	XLR for balanced inputs 4 mm banana jack (ground)
Input bandwidth	DC to 90 kHz
Input coupling	AC (-3 dB at 2 Hz) DC (-3 dB at 1 Hz, -0.1 dB at 6.5 Hz in ADC)
Input impedance	Balanced 200 kohm / 20 pF Unbalanced 100 kohm / 37 pF
Maximum level (sine)	Input protected in all ranges Balanced 100 V rms Unbalanced 100 V rms
Input ranges	7 steps, 100 mVrms to 100 Vrms, 10 dB steps
Level measurement accuracy	< $\pm 0.05$ dB @ 1 kHz
Level measurement flatness AC coupling OFF	$\pm 0.01$ dB 20 Hz 20 kHz $\pm 0.2$ dB 10 Hz to 80 kHz - 0.1 dB @ 20 Hz, - 0.6 dB at 5 Hz
AC coupling ON	
Level measurement residual noise <sup>(3)</sup> 20 kHz BW A-weighted 20 kHz BW 80 kHz BW	0.4 $\mu$ V typical, $\leq 0.5$ $\mu$ V (-126 dBV) 0.55 $\mu$ V typical, $\leq 0.75$ $\mu$ V (-122 dBV) 1.0 $\mu$ V typical, $\leq 1.5$ $\mu$ V (-116 dBV)
CMRR (10 Hz to 20 kHz) DC coupl. <sup>(4)</sup> Input range $\leq 0$ dBV Input range = 10 dBV Input range = 20 dBV	$\geq 85$ dB $\geq 70$ dB $\geq 45$ dB
Analyzer residual THD 1 kHz fundamental 20 Hz to 20 kHz	typical -125 dB, < -120 dB @ 0 dBV < -115 dB @ 0 dBV
Analyzer THD+N, 1 kHz @ -1 dBFS THD+N 48 kHz sample rate THD+N 192 kHz sample rate	20 kHz BW typical -105 dB typical -105 dB
Inter-channel phase accuracy 10 Hz to 20 kHz 20 kHz to 80 kHz	DC coupled $\pm 0.2^\circ$ $\pm 0.5^\circ$

(3) 20 kHz BW measured at 48 kHz sample rate. 80 kHz BW measured at 192 kHz sample rate. All measurements done with inputs shorted to ground, input range = -20 dBV. Measured using AudioTester V3.0.

(4) AC coupling reduces CMRR at low frequencies due to tolerances of the input capacitors.

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<b>General Data</b>	
Power supply	100 – 120 VAC or 220 to 240 VAC 50/60 Hz 40 VA max. switchable
Temperature range operating conditions storage	+15 °C to +35 °C (+59 °F to +95 °F) -20 °C to +60 °C (-20 °F to +140 °F)
Mechanical dimensions width height depth	257.5 mm (10.1") 103 mm (4.1") excl. feet, 115 mm (4.5") incl. feet. 364 mm (14") excl. connectors.
Weight	4.4 kg (9.7 lbs)
EMC	European EMC Directive (2014/30/EU)
Safety	European Low Voltage Directive (LVD 2014/35/EU, EN 61010-1:2010)
Isolation	The measurement section is electrically isolated from the USB connection.

Specifications may be changed without further notice.

## 6 Regulatory Information

### 6.1 Compliance and Markings



Electromagnetic compatibility complies with the requirements of the European EMC Directive (2014/30/EU).



Mechanical resistance shock: IEC 60068-2-27 bump test 1000 times 40 G in 6 axes.

### 6.2 Safety

Electrical safety complies with the requirements of the European Low Voltage Directive (LVD 2014/35/EU, EN 61010-1:2010).

# 7 Maintenance

## 7.1 Introduction

This chapter describes general maintenance of the RTX2012 including central items of information in relation to calibration and return procedures. It contains the following sections:

- General customer responsibilities
- Operator maintenance
- Contacting RTX
- Calibration and service
- Returning your RTX6001 Audio Analyzer for service

## 7.2 General Customer Responsibilities

In general the customer shall:

- Replace consumables such as fuses etc.
- Perform routine operator maintenance and cleaning as specified in the paragraph "Cleaning" below.

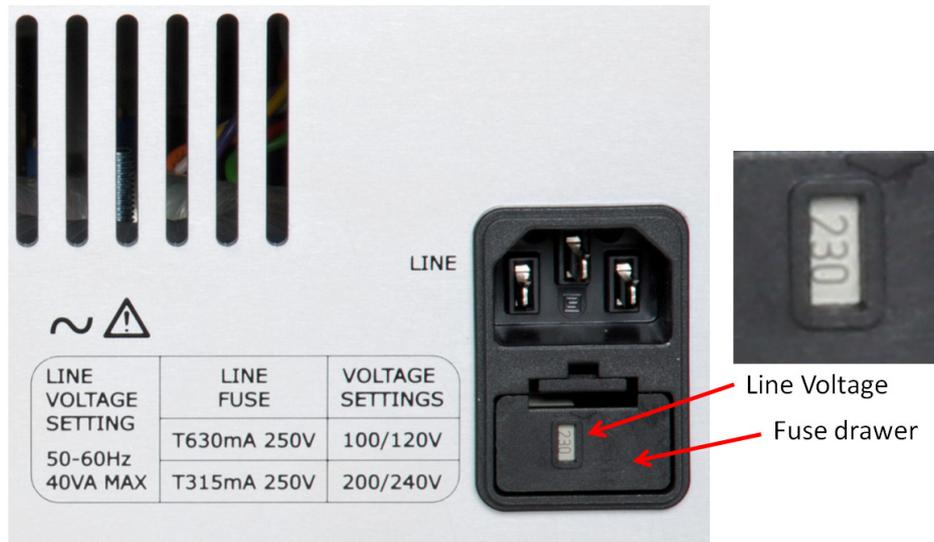
## 7.3 Operator Maintenance

This section describes general responsibilities of the customer. Furthermore, instructions on how to replace the power line fuse and clean the Analyzer are also provided in this section.

## 7.4 Replacing the Power Line Fuses

The power line fuses are located within the fuse holder and line switch assembly on the rear panel. For 110V to 120V operation the fuses are T0.63 250V. For 220-240V operations the fuses are T0.325 250V. To replace the fuses do the following:

- 1** Remove the power cord from the Analyzer.
- 2** Pull out the fuse drawer e.g. with a flat screwdriver.
- 3** Install the correct fuses as shown in the picture below.
- 4** Replace the fuse drawer in the power entry module.



### **Fuse location**



### **Fuse drawer**

## **7.5 Cleaning**

To clean the test set, disconnect the supply power and wipe the Analyzer with a damp cloth only and do this regularly.

## **7.6 Contacting RTX**

If you experience problems with your RTX6001 Audio Analyzer please read this section carefully before contacting RTX, since important aspects and items of information in relation to support is outlined here.

If you wish to contact RTX in relation to any aspect of the analyzer - from service problems to ordering information - please refer to the paragraph "*Sales and Service Offices*" later in this section.

If you wish to return the Analyzer to RTX please refer to the paragraph *"Returning Your RTX6001 Audio Analyzer for Service"* later in this section.

### **7.6.1 Before calling RTX**

Before calling RTX or returning the analyzer for service please take a couple of minutes to go through the checklist outlined in the paragraph "Check the Basics" later in this section. The checklist will guide you through some basic checks to rule out some of the most common problems. Furthermore, it could help you identify the root cause of your problem(s).

If this does not solve your problem(s) then please read the warranty printed in the first pages of this User Manual. If the problem(s) you experience seem to be covered by the warranty please state this when contacting RTX.

If your analyzer is covered by a separate maintenance agreement please look into the terms of the agreement and validate that your problem(s) is covered by the agreement. RTX offers several different maintenance plans to service your analyzer after the warranty period has expired. Please contact RTX for full details – see contact details in the paragraph *"Sales and Service Office"* later in this section.

If your RTX6001 analyzer becomes faulty and you wish to return it please follow the description on how to return the faulty instrument in the paragraph *"Sales and Service Offices"* later in this section.

### **7.6.2 Check the Basics**

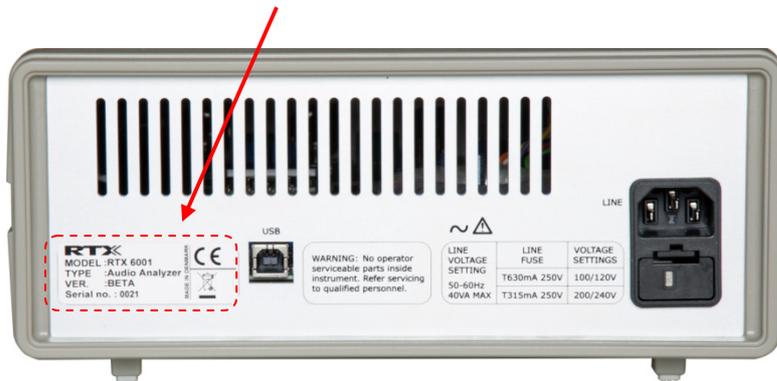
In order to rule out some of the basic problems that could occur please take a minute to go through the checklist below. If the Analyzer is still faulty after performing the above checks please contact the RTX service office for information and support.

- Check that the line socket has power.
- Check that the analyzer is plugged into the proper ac power source.
- Check that the analyzer is switched on.
- Check that the line fuses are in working condition.
- Check that the other equipment, cables, and connectors are connected properly and operating correctly.
- Check that the PC USB driver is correctly installed and that the analyzer is recognized as a soundcard by the PC.
- Check that the test being performed and the expected results are within the specifications and capabilities of the Analyzer.

### **7.6.3 Instrument Serial Numbers**

RTX service personnel have access to complete records of design changes for each instrument. This detailed information is based on the serial number of each Analyzer. Consequently, please have the complete serial number at hand whenever contacting RTX in relation to your RTX6001. This way we can ensure that you obtain the most complete and accurate service information. The serial number can be obtained from the serial number label (located at the rear of the instrument as indicated in the picture below).

## Location of Instrument serial number



## Sales and Service Office

You can contact one of the following sales offices and ask for a test and measurement sales representative. In any correspondence or telephone conversations, please refer to the RTX6001 by its model number and full serial number. With this information, the RTX representative can quickly determine whether your unit is still within its warranty period.

### Worldwide:

RTX A/S  
Stroemmen 6  
9400 Noerresundby  
Denmark

Tel. +45 96 32 23 00  
Fax +45 96 32 23 10

For more information about RTX test and measurement products, applications, services, and for a current distributor listing, please visit our web site <http://www.rtx.dk>.

## 7.7 Calibration and Service

Routine calibration and performance testing of your RTX6001 analyzer should be carried out on a regular basis. If traceable performance is required it is recommended to calibrate it on a yearly basis.

For many applications this may not be necessary. Checking the levels with a precision AC voltmeter will ensure basic performance.

The recalibration is done at RTX by our calibration master, and in accordance to strict specifications. After each calibration a new "Certificate of Calibration" report is issued to verify that the Analyzer has been calibrated by authorized RTX personnel.

Please contact an RTX Sales and Service office for details on the calibration.

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## 8 Returning Your RTX6001 Audio Analyzer for Service

This section contains important items of information in case you need to return RTX6001 to RTX.

***It is strongly emphasized here that all returns to RTX MUST be initialized by obtaining a Return Material Authorization (RMA). Any returns without authorization cannot be handled in the normal service process and in a timely manner.***

Please read the paragraphs very carefully and follow the instructions closely. The first step if you want to return your RTX6001 to RTX is to obtain an RMA. In order to avoid damages to the RTX6001 when shipping it, please pack it according to the recommendations provided in this section.

### 8.1 Obtaining an RMA for Service Return

In order to obtain an RMA (Return Material Authorization) please contact one of the RTX Service office by E-mail ([rtesupport@rtx.dk](mailto:rtesupport@rtx.dk)) or phone with the following items of information:

- Any error messages generated by the Analyzer
- Any information on the performance of the Analyzer
- Fault description
- Company name
- Company address
- Contact information
- Serial number of the unit
- Model Type
- Type of service agreement, warranty or re-calibration

Upon receiving the above information the Service Office will provide an RMA number. This number must be placed at a visible location on the shipping box, and furthermore, the RMA number must be used as a reference in all communication in relation to the return procedure.

### 8.2 Packing the RTX6001 for Shipment

***Please note that damage can result from using packaging materials other than those specified. Never use styrene pellets in any shape as packaging materials since they do not adequately cushion the Analyzer or prevent it from moving in the box. Furthermore, styrene pellets cause damage by generating static electricity. Consequently, the original packing materials should always be used when shipping the Analyzer.***

Please perform the steps below when packing the unit for shipment to RTX for service.

1. Fill in a note and attach it to the Analyzer or place it visible in the shipping box. Please be as specific as possible about the nature of the problem in order to give us the best basis for debugging the problem.
2. Use the original packaging materials or a strong shipping container made of double-walled, corrugated cardboard with 159 kg (350 lb) bursting strength. The carton must be both large enough and strong enough to accommodate the Analyzer and allow at least 3 to 4 inches on all sides of the Analyzer for packing material.
3. Surround the Analyzer with at least 3 to 4 inches of packing material, or enough to prevent the Analyzer from moving around in the carton. If packing foam is not available, the best alternative is SD-240 Air Cap™ from Sealed Air Corporation (Commerce, CA 90001). Air Cap looks like a plastic sheet covered with 1-1/4 inch air filled bubbles. Please use the pink Air Cap to reduce static electricity. Wrap the Analyzer several times in the material to both protect the Analyzer and prevent it from moving in the carton.
4. Seal the shipping container securely with strong nylon adhesive tape.
5. Mark the shipping container "**FRAGILE, HANDLE WITH CARE**" to ensure careful handling.
6. Retain copies of all shipping papers.