



# OPERATING MANUAL

## MINIRATOR MR2 / MR-PRO

## **NTI Contact Info**

### **Head Office**

NTI AG  
Im alten Riet 102  
9494 Schaan  
Liechtenstein, Europe  
Tel.: +423 - 239 6060  
Fax: +423 - 239 6089  
E-Mail: [info@nti-audio.com](mailto:info@nti-audio.com)  
Web: [www.nti-audio.com](http://www.nti-audio.com)

### **Americas**

NTI Americas Inc.  
PO Box 131027  
Tigard, Oregon 97281  
USA  
Tel.: +1 (503) 684-7050  
Fax: +1 (503) 684-7051  
E-Mail: [americas@nti-audio.com](mailto:americas@nti-audio.com)  
Web: [www.ntiam.com](http://www.ntiam.com)

### **Japan**

NTI Japan Limited  
Ryogokusakamoto Bld. 1-8-4  
Ryogoku, 130-0026 Sumida-Ku  
Tokyo, Japan  
Tel.: +81 / 3 3634 6110  
Fax: +81 / 3 3634 6160  
E-Mail: [okayasu@nti-japan.com](mailto:okayasu@nti-japan.com)  
Web: [www.nti-japan.com](http://www.nti-japan.com)

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## 1. Minirator Basics

### Introduction

Thank you for purchasing the Minirator. The Minirator is a powerful audio generator, offering a wide range of analog test signals for the calibration, maintenance and repair of professional audio systems.

The rotary wheel combined with surrounding fast access function keys enables instant and intuitive operation without compromising fine adjustment capabilities.

While the MR2 has been optimized for “Value at a most attractive price”, the MR-PRO has been developed with additional innovative functionality for even more demanding applications.

The MR-PRO is also equipped with the following functions:

- Integrated measurement functions for impedance, balance and phantom power voltages
- Playback of WAV-files
- Cable tester
- High output level
- True level output stage
- Shock protection

### Scope of delivery

The following items are included with the respective model:

MR2:

- MR2
- Operating manual
- USB cable
- Hand strap

MR-PRO:

- MR-PRO
- Protective shock jacket
- Operating manual
- USB cable
- Hand strap



## Notes



### Danger of electric shock

Never connect the instrument to a power output!

Non-compliance could result in damage to persons or property that is not covered by the warranty.



### Damage caused by opening the instrument

Never open the instrument.

The instrument can be damaged if the housing is opened, and your warranty will be invalid.



### Damage through damp

Do not use the instrument in damp environments!

The instrument can be permanently damaged by the penetration of water.

## Accessories

Accessories available for the MR2 / MR-PRO:

- Pouch MR2 / MR-PRO NTI Art.No 600 000 302

---

The soft pouch protects the Minirator against shock and dust and comes with a convenient belt-clip.

- System case NTI Art.No 600 000 020

---

The Minirator can be stored together with other Minstruments in the compact system case for "out in the field" jobs.

- EU Power Supply 7.5V NTI Art.No 600 000 301

---

Linear regulated 230V AC adapter with EU type connector.

- Minirator -40dB Adapter NTI Art.No 600 000 312

---

Attenuator for high quality microphone level signals.

- Cable Test Adapter NTI Art.No 600 000 311

---

The Cable Test Adapter is used for single-ended cable testing. By installing the Cable Test Adapter at the far end of the cable, the MR-PRO will be able to complete its cable test procedure and display the condition.

- MR-PRO 70/100V Protection NTI Art.No 600 000 313

---

Protects Minirator MR-PRO against accidentally applied 70V/100V voltages during impedance or power testing at distributed speaker systems.

- Calibration Certificate NTI Art.No 600 000 303

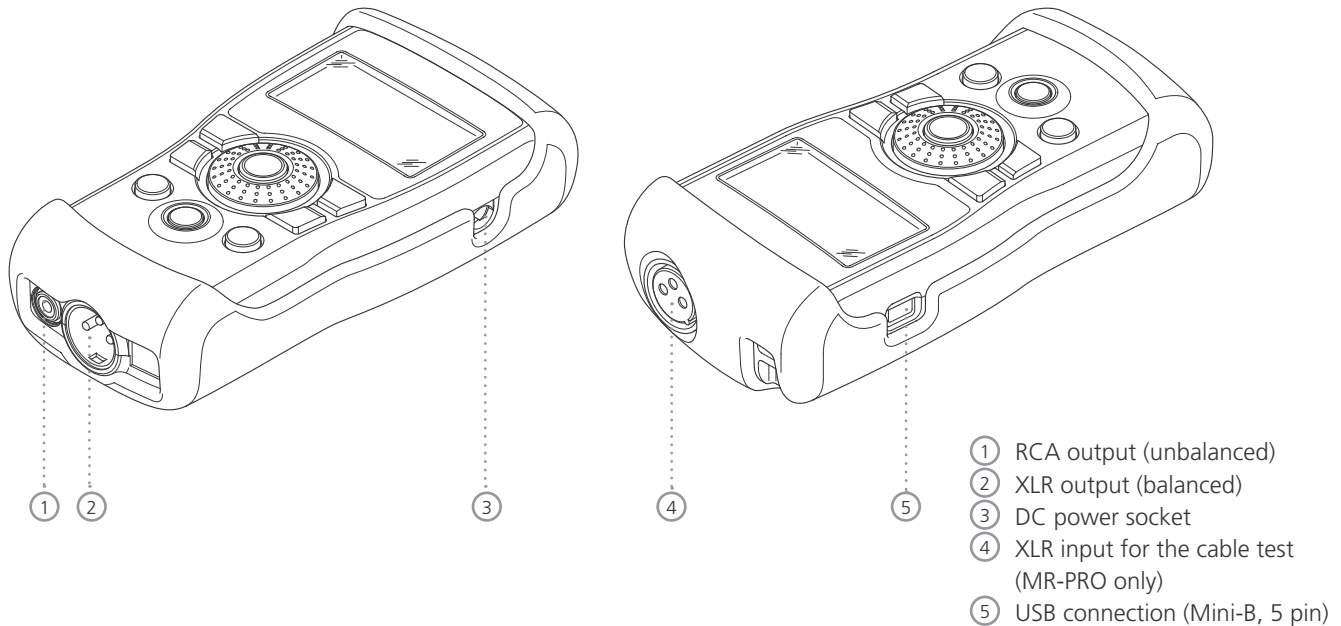
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Individual calibration certificate with serial number according to ISO 9001:2000 regulations.

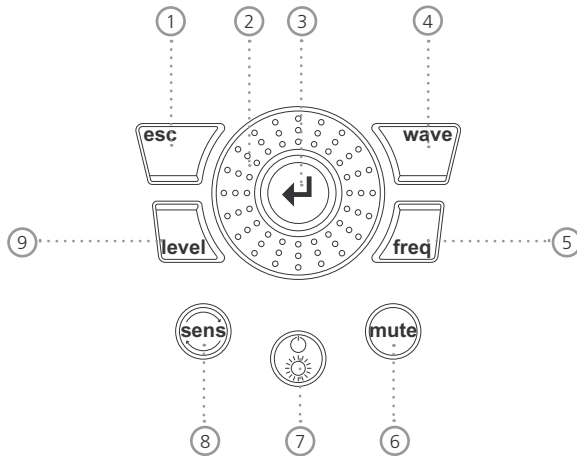
## 2. Overview of the instrument

### Connections

The Minirator has the following connections:



## Buttons and operating elements



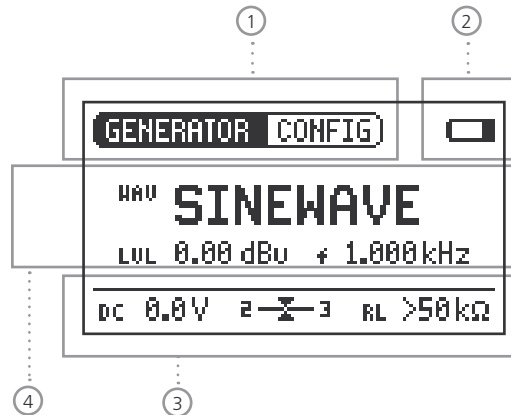
- ① **ESC** Terminates an entry, jumps to the top menu level or closes an open window.
- ② **Rotary wheel** Slow turning: Precise setting of the value.  
Rapid turning: Setting the value in larger steps.
- ③ **Enter** Confirming a selection.

- ④ **Wave** Selection of the test signal.
- ⑤ **Freq** Setting the output frequency. Direct jump to the "PARAM" menu with the "SWEEP" and "CHIRP" test signals.
- ⑥ **Mute** Switches off the output signal.  
Mute is indicated at the lower right corner of the display and a flashing mute button.  
  
The button lights up continually during the pauses of the "PNoise" and "Chirp" signal waveforms.
- ⑦ **On/Off** Switches the instrument off if held down for one second. Switches the back-lighting on and off.
- ⑧ **Sens** Changes the sensitivity steps of the frequency and level settings.
- ⑨ **Level** Setting the output level. You can set up the output signal in the following units:  
dBV, dBu, V.  
  
With the MR-PRO, dBf (dB referred to Full Scale) and % units are available when playing back Wave files.



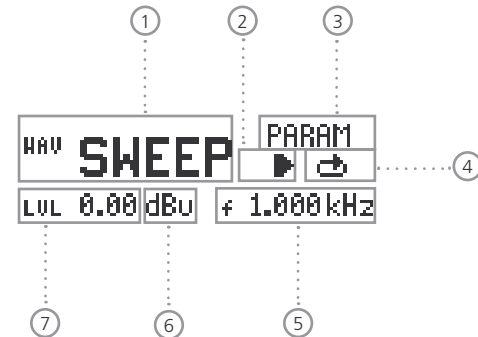
## The screen display

### The main menu



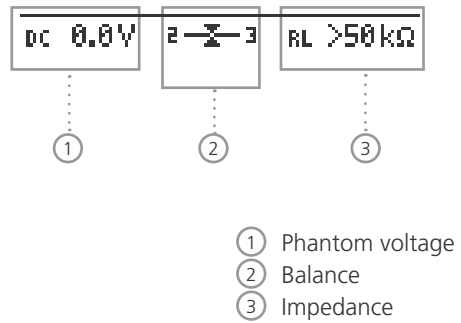
- ① Menu bar
- ② Battery symbol:  
If the battery symbol lights up the batteries are almost completely discharged and must be replaced.
- ③ Display of the readings (MR-PRO)
- ④ Settings for signal generation

### Settings for signal generation



- ① Test signal
- ② Start / Stop for certain test signals
- ③ Setting up the parameters
- ④ Single / continuous mode for certain test signals
- ⑤ Output frequency
- ⑥ Units for the output level
- ⑦ Output level

## Display of the measured values (MR-PRO)



## Power supply

### Battery operation

In order to be always able to use the Minirator flexibly, we recommend the use of batteries.



Only use AA, LR6 batteries.

You will need 3 batteries for battery operation.

During operation, the battery temperature may increase noticeably. This is not a defect.

The Minirator can also be used with rechargeable batteries.

### Operation using the mains socket

You can also connect the Minirator to a mains socket with a DC power supply unit. To do this, you will need the corresponding DC power supply unit, which you can order from NTI.



We recommend you use only the NTI DC supply. But if you want to make use of a different DC power supply unit, you must observe the following:

Use an electrically-isolated, non-earthed linear DC power supply unit.

Do not use a switching power supply. Unbalanced connections in combination with a switching power supply can lead to noise interference and an unpleasantly high interference level when plugging in and out.

Only use DC power supply units with a voltage from 5 to 8 volts and a current of at least 500 mA.

Damage caused by using an inappropriate external DC supply is not covered by warranty.

## Characteristics of the outputs

The Minirator has two outputs that are wired in parallel:  
An unbalanced RCA output and a balanced, non-earthed XLR output. Both outputs are resistant to externally applied phantom power.

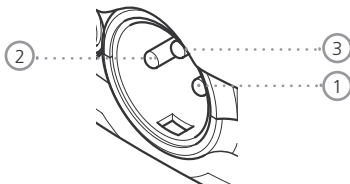
Wherever possible, always use balanced (XLR) connections, as these have much better immunity to interference than unbalanced connections.



Do not use both outputs at the same time.

The simultaneous use of both outputs could lead to a short-circuit in one of the generator outputs in the connected instrument.

### Allocation of the XLR output:



- ① PIN 1
- ② PIN 2
- ③ PIN 3

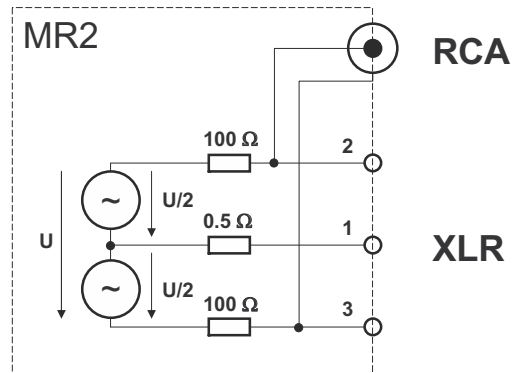
### MR2 outputs

Both the RCA and the XLR have a balanced output impedance of 200 Ohm.



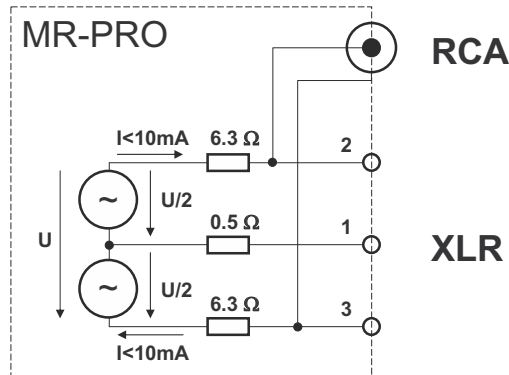
The voltage at the MR2 XLR or RCA output is less than the set voltage  $U$  with low impedance loads. Example:

A balanced 200 Ohm load impedance matching the 200 ohm output impedance will result in the expected output drop of 6 dB.



### MR-PRO outputs (True Level)

Both the RCA and the XLR have a balanced output impedance of only 12.5 ohms. The level at the XLR output corresponds to the set source voltage  $U$  ( $\rightarrow$  True Level) over a wide range of loads.



### Behavior with low-impedance loads

The maximum output current of the MR-PRO is 10 mA. If the connected load consumes more power, the internal regulation of the MR-PRO reduces the output level. This condition will be indicated on the screen by the blinking of the output level display:

**LVL 0.00 dBu**



XLR short-circuit between Pin 1 and 3

Commercially available XLR to RCA adapters short-circuit the XLR Pins 1 and 3.

Do not use such adapters with the Minirator!



The MR-PRO is designed for loads down to 600 Ohm. Depending on the output level and the output frequency, however, the True Level is maintained, even with smaller loads.



For highest quality microphone level signals we recommend the "Minirator -40dB Attenuator" which is available as an accessory.

It improves the signal to noise ratio for low level signals by 40 dB.

## 3. Getting Started

### Inserting the batteries



Only use AA, LR6 batteries for the Minirator.

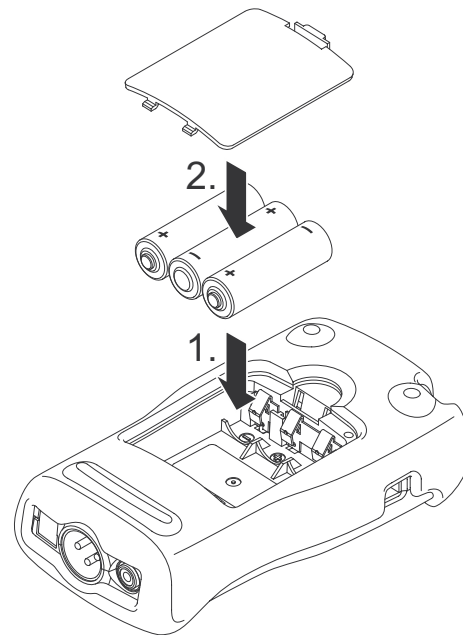
Only use batteries from the same manufacturer.

Replace the discharged batteries by new ones. Do not mix used and new batteries.

You can also use rechargeable batteries.

1. Open the battery cover.
2. Insert three AA, LR6 batteries with the same state of charge, paying attention to the +/- marking in the battery compartment.
3. Close the battery cover once the batteries have been inserted.

 You have now successfully inserted the batteries.

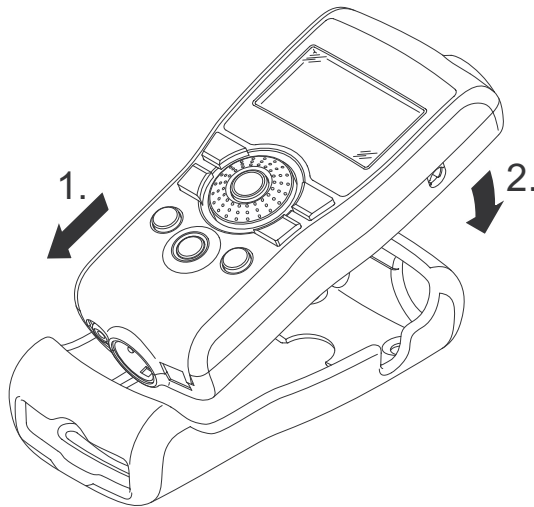




## Fitting the protective shock jacket

### (MR-PRO only)

With the MR-PRO, you can fit the supplied protective shock jacket. This will protect the instrument against light impacts without impairing its easy operation.



1. Push the lower end of your MR-PRO into the lower end of the protective shock jacket.
2. Push the upper end of the MR-PRO into the protective housing.

👍 You have now fitted the protective shock jacket



#### Damage through impacts / shocks

The protective shock jacket shields your MR-PRO against reasonable impacts that could occur in normal use.

But do not intentionally subject the instrument to extreme stress!

Please do not drop the instrument!

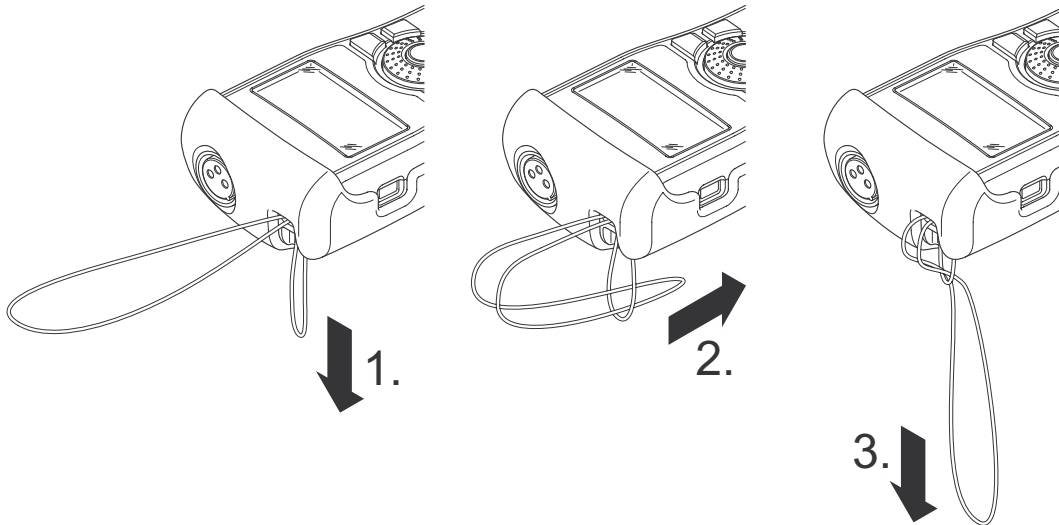
Damage caused by dropping or impact is not covered by warranty.

## Attaching the hand strap

To prevent you from accidentally dropping the Minirator, a hand strap is supplied with the instrument. You can also fit the hand strap when the protective shock jacket of the MR-PRO has been fitted.

1. Pull the hand strap through the opening.
2. Pull the rear part of the hand strap through the loop of the front part.
3. Pull the hand strap tight.

👍 You have now secured the hand strap.





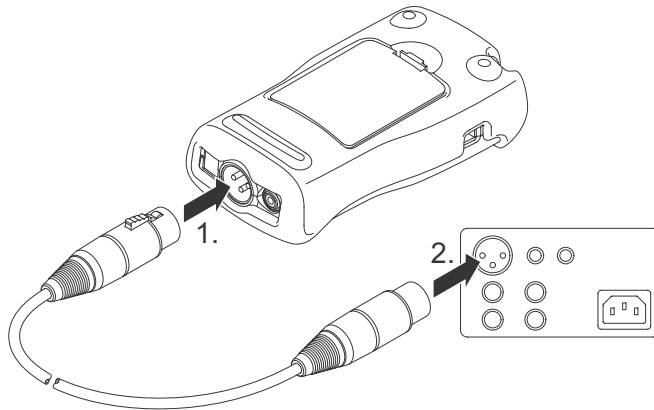


## Connecting the Minirator

### XLR connection

1. Connect the Minirator to your audio device using an XLR cable. Note that the locking pin of the plug must be located on the lower side of the instrument!

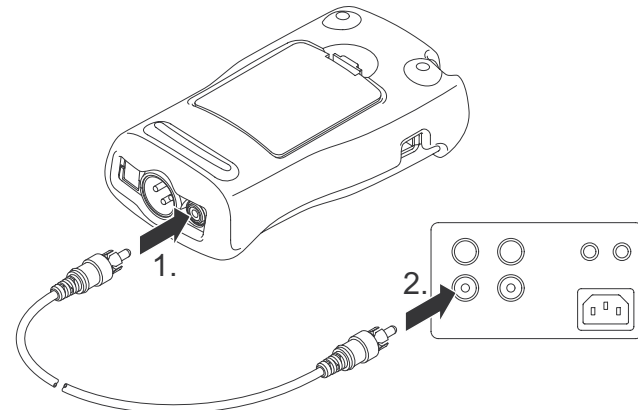
👍 You have now connected the Minirator.



### RCA connection

1. Connect the Minirator to the input of the unit to be tested using a RCA cable.

👍 You have now connected the Minirator.



## 4. Operation

### Switching the Minirator on and off

#### Switching the Minirator on

1. To switch the Minirator on, press the "On/Off" button.

👍 The display lighting is switched on.  
You have switched on the Minirator.

#### Switching the Minirator off

1. To switch the Minirator off, press the "On/Off" button and hold it down for one second.

👍 You have switched off the Minirator.

### Navigation in the menu bar

The menu bar is divided into two parts. On the left-hand side, you can choose between the Generator, Cable test (MR-PRO only), Impedance (MR-PRO only) and System functions.



1. To do this, select the left side of the menu bar with the rotary wheel and confirm with "Enter".

👍 A selection window opens.

2. Select the desired function with the rotary wheel.
3. Confirm the selection with "Enter".

👍 You have now selected the desired function.

You can save and call up configurations on the right-hand side of the menu bar (see the "Configurations" chapter, MR-PRO only).

## Selecting a test signal is easy

You have two choices for selecting test signals. You can use either the direct buttons or the rotary wheel.

### Signal selection using the direct buttons

1. Ensure that GENERATOR ① is selected in the menu bar.
2. Press the "Wave" button.

👍 A selection menu appears.

3. Select the desired test signal with the rotary wheel.
4. Press "Enter".

👍 You have now selected the test signal.

### Signal selection using the rotary wheel

1. Ensure that GENERATOR ① is selected in the menu bar.
2. Select "WAV" ② with the rotary wheel.
3. Press "Enter".

👍 A selection menu appears.

4. Select the desired test signal with the rotary wheel.
5. Press "Enter".



👍 You have now selected the test signal.

## Setting the parameters

You have two possibilities for setting up the parameters for the test signals. You can use either the direct buttons or the rotary wheel.

### Setting parameters using the direct buttons

1. Press the “Level” or “Freq” button.

👍 You have selected the desired parameter.

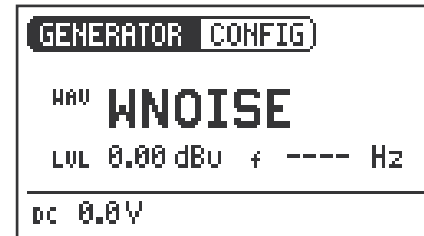
2. Turn the rotary wheel to set the parameter.
3. Confirm the setting with the “Enter” button.

👍 You have now set up the parameter.

### Setting parameters using the rotary wheel

1. Turn the rotary wheel.

👍 The selected parameters will be marked with a black bar.



2. Confirm your choice with the “Enter” button.

👍 The parameter display blinks.

3. Turn the rotary wheel to set the parameter.
4. Confirm the setting with the “Enter” button.

👍 You have now set the parameter.

## Setting the sensitivity of the rotary wheel

You can set up the sensitivity (step size) of the rotary wheel. To do this, proceed as follows:

1. Select Level **LVL** or Frequency **f** with the rotary wheel.
2. Hold down the “Sens” button.

👍 The current sensitivity of the rotary wheel will be displayed ①.

3. Turn the rotary wheel to set up the desired sensitivity.
4. Release the “Sens” button to accept the desired sensitivity.

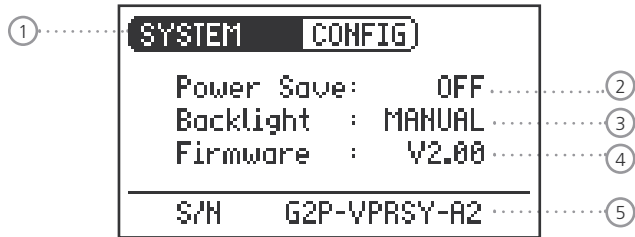
👍 You have now changed the sensitivity of the rotary wheel.



## System settings

You can adjust various system settings of your instrument. To do this, switch to System ① in the menu bar using the rotary wheel and confirm with "Enter".

The possible system settings are displayed:



### Power Save

The Power Save mode switches the instrument off if no button has been pressed within an adjustable time period.

1. Use the rotary wheel to select the Power Save function ②.
2. Confirm the selection with the "Enter" button.

👍 The display starts to blink.

3. Turn the rotary wheel to set the desired time.
4. Confirm the entry with the "Enter" button.

👍 You have now changed the switch-on time of the Power-Save mode.

### Backlight

Auto:

The backlight will be switched on automatically during operation, and will be switched off again after a period of time.

Manual:

1. Press the "On/Off" button to switch the background lighting on and off.

You can choose between "Auto" and "Manual".

1. To do this, select the Backlight ③ function with the rotary wheel.
2. Press "Enter".

👍 The display now changes between "Auto" and "Manual".

### Firmware

Display of the version number, with the possibility of carrying out an update for the MR-PRO ④ (see "Update instrument" chapter).

### Display of the serial number

You can read out the instrument's serial number ⑤ from the bottom line.

### Setting the contrast

Changing the contrast of the screen display.

To do this, proceed as follows:

1. Hold down the "ESC" button and turn the rotary wheel until the desired contrast is obtained.

👍 You have now changed the contrast of the screen display.

## Configurations (MR-PRO only)

With the MR-PRO, you can store your current instrument settings as configurations, and can call these up again at a later date.

### Storing configurations

10 configuration storage locations are available to you.

1. Using the rotary wheel, select CONFIG in the menu bar.
2. Confirm with "Enter".

👍 The following menu is opened:



3. Select STORE and confirm with "Enter".

👍 The following selection menu is opened:



4. Select a memory location with the rotary wheel and store your configuration by confirming the selection with "Enter".

- 👍 You have now stored the current instrument settings as a configuration.

## Calling up configurations

1. Use the rotary wheel to select CONFIG in the menu bar.
2. Confirm with "Enter".

- 👍 The following menu is opened:



3. Select "Recall" and confirm with "Enter".
4. Select the desired configuration in the Selection menu and confirm with "Enter".

- 👍 You have now loaded the desired configuration.



In order to easily remember configurations you may rename them.

For altering the file names, connect the MR-PRO to a computer via USB and rename the files in the CONFIG folder. Only the first 10 configurations are shown in the display.

## Transferring configurations to another device (MR-PRO)

With the MR-PRO, you have the possibility of transferring stored configurations to another device.

1. Connect your MR-PRO to a computer via USB.

- 👍 A removable memory drive will be indicated on the computer.

2. Select the CONFIG sub-folder.

- 👍 You will see the stored configurations of your MR-PRO.

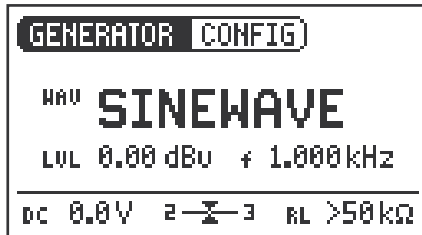
3. Copy this data to your computer.
4. Connect another MR-PRO to the computer via USB.
5. Copy the previously copied data into the CONFIG sub-folder by overwriting the data therein.

- 👍 You have now transferred configurations from your MR-PRO to another MR-PRO.



## 5. The Minirator test signals

### Sine



#### Characteristics and use

Pure sinusoidal signals are required for almost every audio measurement. The Minirator provides a wide and adjustable output level range and selectable output frequencies.

#### Parameters

You can define the following parameters for this test signal:

- f Output frequency
- LVL Output level

### Sweep



#### Characteristics and use

Sweep signals with a resolution of up to 1/12 octave can be generated over a freely selectable frequency range. An audio analyzer like the Minilyzer from NTI can automatically trigger to this signal sequence to measure the frequency response.

#### Starting the Sweep signal

1. Select the "START" symbol  with the rotary wheel.

- 👉 You can interrupt a running sweep via the „STOP“  symbol.

## Sweep Signal modes

Using the “MODE” symbol, you can run the test signal in the following modes:

Once-only : Plays the test signal once

Continuous : Repeats the test signal

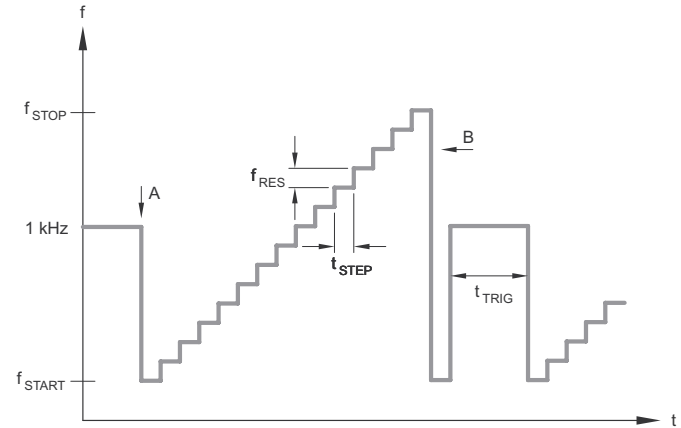
## Parameters:

You can define the following parameters for this test signal:

**LVL** Output level

**f** The frequency display is for information only. The current frequencies will be displayed here once the SWEEP test signal has been started.

**PARAM** You can configure the signal sequence here.



- A The sweep recording starts as soon as the frequency drops from 1 kHz to  $f_{START}$ .
- B The end of the sweep will be signaled by a falling frequency.

## Chirp



### Characteristics and use

A Chirp is the name for a signal whose frequency continually changes over time (also known as continuous sweep). It is used for the recording of frequency responses, the measurement of impulse responses and the acoustic assessment of rooms.

### Starting the Chirp signal

1. Select the START symbol with the rotary wheel.

👍 If this is activated, it turns into a STOP symbol which will end the test signal when selected.

### Chirp Signal modes

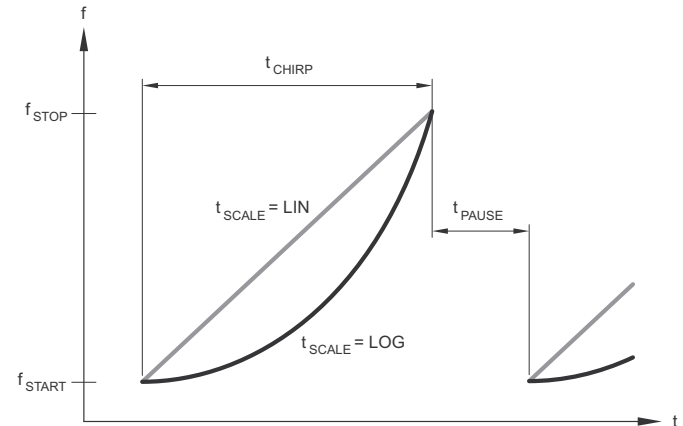
Using the "MODE" symbol, you can run the test signal in the following modes:

- Once-only : Plays the test signal once.
- Continuous : Repeats the test signal after an adjustable pause (tPAUSE).

### Parameters

You can define the following parameters for this test signal:

- LVL** Output level
- f** The frequency display is purely for information only. The current frequencies will be displayed here after the start of the CHIRP test signal.
- PARAM** Configuration of the signal sequence





Fading in and out of any Chirp signal generates spurious frequency components, leading to ripple in the frequency response.

The Chirp sequences of the MR-PRO / MR2 are optimized for ripple of  $\pm 0.2$  dB maximum.

Parameter combinations resulting higher ripple are automatically corrected during input.

## Delay Test



### Characteristics and use

The Delay Test signal is a specially configured Chirp signal. In combination with the Acoustilyzer AL1 from NTI, it makes it possible to determine acoustic signal running times. You can find further information in the handbook for the AL1 Acoustilyzer.

### Parameters

You can define the following parameters for this test signal:

**LVL** Output level

## Pink Noise



### Characteristics and use

The Pink Noise test signal has a high spectral density, an infinite period (> 100 years) and 20 kHz bandwidth. Pink Noise is used as a reference signal for the layout of loudspeaker systems (PA systems), whereby a Real Time Analyzer (RTA) is used to execute the required measurements.

When operated in the intermittent mode, Pink Noise forms the basis for reverberation time measurements.

### Operation

You can choose between the following test signal modes with the MOD setting ①:

CONT : generates a continuous test signal.

 : generates a intermittent test signal.

You can determine the cycle times of the intermittent signal with the CYC setting ②.

(3/3 = 3 seconds of signal and 3 seconds pause.)

These settings have no effect in the continuous mode.

### Parameters

You can define the following parameters for this test signal:

**LVL** Output level

## White Noise



### Characteristics and use

The White Noise test signal has a high spectral density, Gaussian amplitude distribution and an infinite period (> 100 years). White Noise is used for all measurements with FFT analyzers, and has a constant signal power per Hertz and a 20 kHz bandwidth.

### Parameters

You can define the following parameters for this test signal:

**LVL** Output level

## Polarity



### Characteristics and use

The sawtooth test signal is ideally suited for checking the polarity of loudspeakers. The "Minilyzer ML1" and "Acoustilyzer AL1" instruments from NTI detect this signal and determine the polarity.

### Parameters

You can define the following parameters for this test signal:

**LVL** Output level  
**f** The frequency display is for information only.  
 The frequency cannot be adjusted.

## Wave File Player (MR-PRO only)



### Characteristics and use

You can play back your own test sequences with the MR-PRO. The test sequences will be repeated automatically and without pauses.

For a better overview, Wave files are organized in sub-folders.

The MR-PRO is already equipped with a series of demo sequences in the WAV file format. You can create a link to a computer at any time via the USB interface and can exchange existing WAV files or add new ones.

### Possible applications

Possible applications include, for example:

- Identification generator in the broadcasting sector
- Musical signals for the assessment of PA systems
- Playing back complex test signals

### Selecting a folder

1. Select the Symbol folder (1) with the rotary wheel.
2. Confirm with "Enter".
3. Select the desired folder with the rotary wheel.
4. Confirm with "Enter".

👍 You have now changed the current playback folder.

### Selecting a Wave file

1. Use the rotary wheel to select the Symbol file (2).
2. Confirm with "Enter".
3. Select the desired WAV file with the rotary wheel.
4. Confirm with "Enter".

👍 The WAV file will be played.



## Loading your own WAVE files

Wave files for the MR-PRO must fulfill the following requirements:

- 48 kHz sampling frequency
- Mono / Stereo
- 16-bit definition



If a Wave file does not meet the requirements, the playback stops and the "Mute" button lights up continuously red.



To load WAV-files, you will need a computer with the following minimum specifications:

- PC with Windows 98SE
- Macintosh computer with OSX

1. Connect the MR-PRO to the computer via USB.

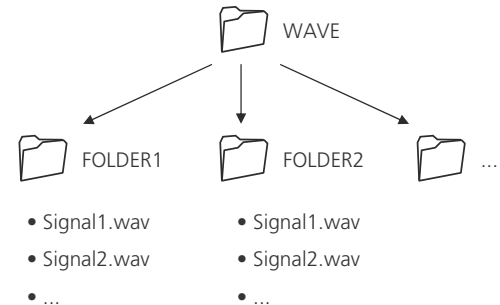
👉 The MR-PRO appears on your computer as a removable data medium.

2. Open the "WAVE" sub-folder on the removable medium



All the sub-folders in the "Wave" folder now appear in the folder selection ①. Add additional sub-folders to this folder level as required.

A maximum of 100 files or folders per folder is supported.





3. Open one of the sub-folders in the “WAVE” folder.

|                                                                                   |                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>If necessary, you can make use of the other standard possibilities of a removable data medium. For example, you can copy WAV files from the MR-PRO onto your computer or delete unnecessary files.</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

4. Copy the desired files into the folder.

👍 You have now loaded your Wave files.

|                                                                                   |                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Copyright</b></p> <p>NTI delivers a set of demonstration wave files with the MR-PRO. These wave files may only be replayed with an NTI unit (MR-PRO). Any further usage is forbidden.</p> |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Parameters

You can define the following parameters for this test signal:

### LVL Output level

The output level of this test signal is adjusted in dBF (dB full scale) or %.

|                                                                                   |                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>The absolute level generated at the output depends on the modulation as well as the signal form of the data present in the WAV file.</p> <p>Example: A fully modulated sinusoidal signal played back at 0 dBF generates an absolute level of 18 dBu at the output.</p> |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 6. The measurement functions of the MR-PRO

The MR-PRO offers the following measurement functions:

| Menu      | Measurements                                                            |
|-----------|-------------------------------------------------------------------------|
| Generator | Impedance<br>Phantom Power<br>Balance                                   |
| Cabletest | XLR cables<br>Phantom Power                                             |
| Impedance | Impedance + Phase<br>Apparent Power + Phase<br>Phantom Power<br>Balance |



### Impedance test in generator mode

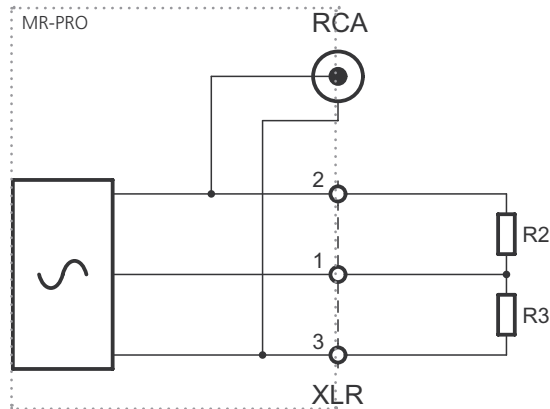
The MR-PRO measures phantom voltages and displays impedances and the impedance balance in the SINEWAVE operating mode. Using the SINEWAVE sinusoidal test signal, the MR-PRO measures the load connected to the output between PIN 2 and 3 ( $RL=R2+R3$ ). The measured values of R2 and R3 will be displayed by selecting RL with the rotary wheel.

If only R2 or R3 can be measured, RL is replaced by R2 or R3 accordingly.

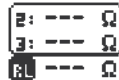


In the case of balanced connections (XLR), interference radiated onto the receiver side will be eliminated.

For this to work there must be a balanced impedance distribution on both signal lines. In the case of unbalanced impedance distribution, signal interference could occur. The MR-PRO allows you to test the connections for balance.



The impedance and balance measurement can only be carried out down to a defined minimum level. If the measurement cannot be carried out, the display shows:



## Balance display

The balance display allows localizing a number of typical faults, such as short-circuits and defective cables.

In the case of an unbalanced impedance distribution, the display arrow points to the pin with the higher impedance.



Balanced impedance,  $R2 = R3$



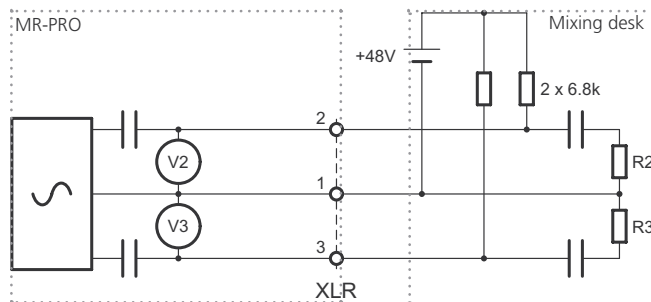
Unbalanced impedance,  $R3 > R2$

Unbalanced load relationships can be analyzed further by selecting the impedance display with the rotary wheel. If the impedance cannot be measured, the display shows "---" instead of the measurement value.

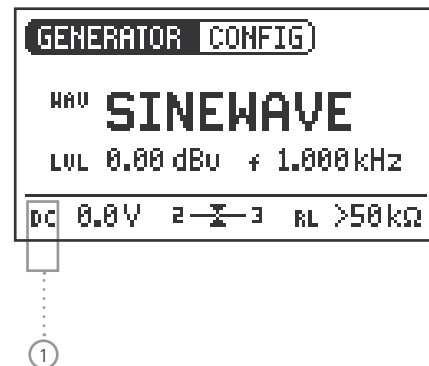


## Measuring phantom power voltages

The phantom voltage is necessary in connection with capacitor microphones in order to operate the impedance converter located in the microphone as well as for some “active” direct boxes.



The most common phantom voltage is 48 V and lies on both Pin 2 and Pin 3 with balanced impedances (see diagram).



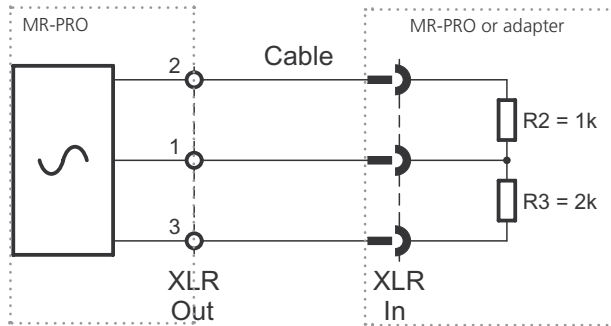
Unequal phantom voltages on Pin2 and Pin3 of the XLR cable indicate an error and will be displayed by the blinking of the phantom voltage display (DC).

You can localize the faulty voltage source by selecting the DC function ① with the rotary wheel.

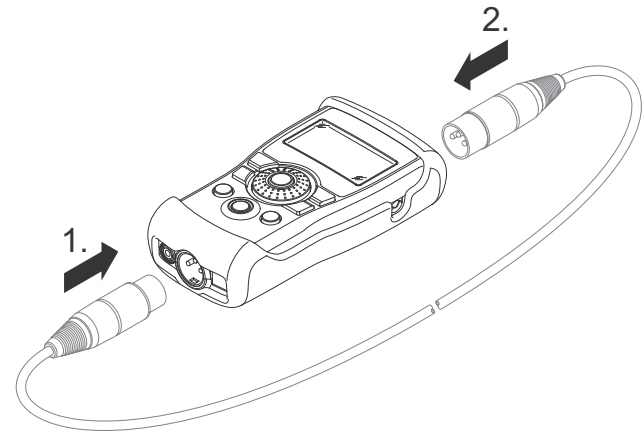
## XLR cable test

The MR-PRO supports a cable test function that quickly detects damaged XLR cables.

The cable test is based on an impedance measurement. In order to indicate a correctly wired XLR cable, the test routine of the MR-PRO assumes the following impedances on the output:



**To test a cable, proceed as follows:**



1. Select the "Cable test" function in the menu.
2. Plug the XLR cable into the XLR output (1).
3. Plug the other end into the XLR input (2).

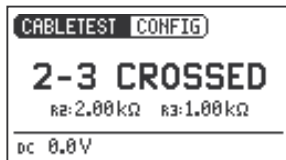


## Meas. functions (MR-PRO only)

👉 The following is displayed on the screen:



The cable has not been plugged in correctly. Check the cable connection.



The tested cable is defective, the pins 2 and 3 are crossed. Other error indications may appear depending on the cables fault.



The tested cable is OK.



For long cables already in place, NTI offers an optional adapter named "Cable Test Plug". Plug one end of the cable into the Cable Test Plug and the other end of the cable into the MR-PRO.

Order details:  
Cable Test Plug, NTI Art.No 600 000 311.

## Impedance test

The impedance test supports the verifications of distributed loudspeaker installations and shows detailed information of the connected load.

Connect any unpowered load between Pin 2 + 3 of the XLR output for best performance.



Damage caused by high voltage

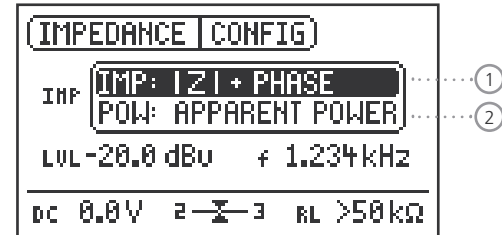
Never connect the instrument to a power output or any activated distribution system!



The accessory “MR-PRO 70/100V Protection” protects the Minirator MR-PRO against accidentally applied 70V/100V voltages during impedance or power testing at distributed speaker systems.

Order details:  
MR-PRO 70/100V Protection,  
NTI Art.No 600 000 313

### Supported Display Modes

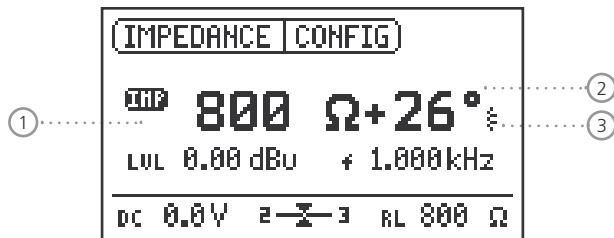


In the mode  $|Z| + \text{Phase}$  ① the absolute value of the impedance and the phase is shown.

Based on the measured impedance, the apparent power ② which the load would sink when driven with a defined reference voltage is calculated and displayed.



## Impedance



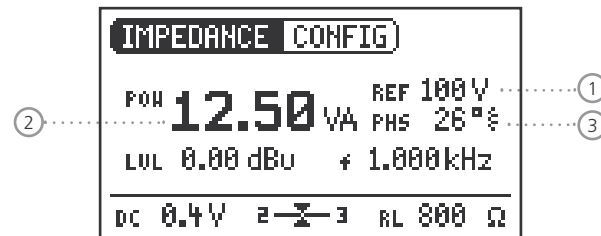
### How to measure

1. Connect the load between Pin 2 + 3 of the XLR.
2. The absolute value of the impedance (1), the phase (2) and whether the load is inductive or capacitive (3) is displayed.

The output level and frequency may be adjusted as described earlier in this manual.

If the load is connected unbalanced (e.g. between pin 1 + 2), a "2" or "3" is displayed below the "IMP" symbol.

## Power indication



### How to measure

1. Select the reference voltage of the distributed loudspeaker system (1) with the rotary wheel.
2. Connect the load between Pin 2 + 3 of the XLR.
3. The apparent power (2) in VA (Volt Ampere) and the phase information (3) is displayed.

### Selection of Phase / Power Factor readout

1. Select "PHS" and press "Enter".



You have toggled between Phase and Power Factor display





## 7. Updating the instrument

### General firmware update:

The firmware is the software of the instrument. Updating is possible by connecting your Minirator to a computer via USB.

You can find the firmware version of your instrument as follows:

1. Select "System" in the menu bar.
2. Confirm the selection with the "Enter" button.

👍 The firmware version of the instrument will be displayed.



In order to update the firmware, you will need a computer with the following minimum specifications:

- PC with Microsoft Windows 2000
- USB termination

You can find information about the latest firmware and update procedure at <http://support.nti-audio.com/mr2>.

### MR2: Updating the firmware

Proceed as follows to update the firmware:

1. Connect your MR2 to the USB connector of a PC and follow the instructions on the screen of the MR2.

👍 You have now updated the firmware of your MR2.

### MR-PRO: Updating the firmware

Proceed as follows to update the firmware:

1. Select "System" in the menu bar.
2. Select "Firmware", press "Enter" and follow the instructions on the screen of the MR-PRO.

👍 You have now updated your MR-PRO.

## Calibration

The Minirator has been carefully tested during production and corresponds to the specifications listed in the “Technical Data” chapter.

NTI recommends regular calibration of the instrument in annual intervals. Please contact your dealer for information regarding calibration or contact NTI directly on the E-Mail address [info@nti-audio.com](mailto:info@nti-audio.com).

## 8. Tips and trouble shooting

### Resetting to the factory settings

If the Minirator reacts unexpectedly, a reset to the factory settings might solve the problem.

1. Switch the instrument off.
2. Hold down the “ESC” button and simultaneously operate the “On/Off” button.



The confirmation of the reset is displayed on the screen.

### Reloading Wave files (MR-PRO only)

You can reload the Wave files of the MR-PRO that were installed in the factory.

The files are available on the Internet. Please visit <http://support.nti-audio.com/mr2> for further details.



## Faults and their correction

| Fault                                             | Fault finding                         | Cause                                                                                                            | Remedy                                                            |
|---------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| The Minirator does not generate an output signal. | "Mute" button blinks.                 | You have switched the instrument to Mute.                                                                        | Press the "Mute" button.                                          |
|                                                   | "Mute" button lights up continuously. | You have called up the "Pink Noise" (PNoise) test signal or you are in the Pause cycle of the Chirp test signal. | Wait until the pause has ended.<br>Press the "Start" button.      |
|                                                   |                                       | Non-supported Wave format.                                                                                       | Load a supported Wave format.                                     |
|                                                   |                                       | Cable not plugged in correctly.                                                                                  | Plug in the cable correctly.                                      |
| Screen contrast poor.                             |                                       | Contrast needs to be adjusted.                                                                                   | Press "ESC" and operate the rotary switch to set the contrast.    |
| MR-PRO: Wave files are not played back            | "Mute" button lights up continuously. | Non-supported Wave format.                                                                                       | Load a supported Wave format.                                     |
| MR-PRO indicates no impedance.                    | The lowest line is not displayed.     | Output level too low.<br>Incorrect test signal.                                                                  | Increase the output level.<br>Change to the SINEWAVE test signal. |

## 9. Technical data

|                                   |                                                                         | MR2                                                                                 | MR-PRO                                                                                   |
|-----------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Outputs                           |                                                                         | Balanced XLR, unbalanced RCA<br>phantom power resistant                             |                                                                                          |
| Inputs                            |                                                                         | DC power supply, USB                                                                | DC power supply, USB<br>XLR for cable test                                               |
| Signal wave forms                 |                                                                         | Sine, Pink Noise, White Noise<br>Polarity test signal, Delay test signal            |                                                                                          |
| Wave File Format                  | Sampling freq.:<br>Resolution:<br>Output level:                         |                                                                                     | 48 kHz<br>16 Bit, Mono / Stereo<br>0 dBFS = 18 dBu (sine)<br>according to EBU R68        |
| Frequency setting                 | Range:<br>Increment:<br>Accuracy:                                       | 10 Hz - 20 kHz<br>in 1 digit steps<br>0.01%                                         |                                                                                          |
| Stepped Sweep Function            | Freq. range:<br>Increment:<br>Sweep speed:                              | freely selectable<br>1/1, 1/3, 1/6, 1/12 octave<br>selectable 0.5 - 5 seconds       |                                                                                          |
| Continuous Sweep (Chirp) Function | Freq. range:<br>Increment:<br>Chirp speed:                              | freely selectable<br>Linear / Logarithmic<br>1 - 99 seconds per cycle               |                                                                                          |
| Level Units                       |                                                                         | dBu, dBV, V                                                                         | dBu, dBV, V, dBFS, %                                                                     |
| Output Level Ranges               | Sine, Sweep, Chirp<br>White Noise<br>Pink Noise<br>Polarity, Delay Test | -80 dBu to + 8 dBu<br>-80 dBu to + 0 dBu<br>-80 dBu to - 2 dBu<br>-80 dBu to +6 dBu | - 80 dBu to +18 dBu<br>- 80 dBu to +10 dBu<br>- 80 dBu to + 8 dBu<br>- 80 dBu to +16 dBu |
| Flatness                          | RL ≥ 600 Ohm                                                            | ± 0.5 dB                                                                            | ± 0.2 dB                                                                                 |
| Accuracy @ 1kHz                   |                                                                         | ± 0.5 dB                                                                            | ± 0.2 dB                                                                                 |



|                            |                                                       | MR2                                                 | MR-PRO                                                                                                                                                         |
|----------------------------|-------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| THD+N                      | 22 Hz - 22 kHz, average,<br>@ 1 kHz, typical          | -90 dB (0.0032%) @ 8 dBu,<br>Noise floor typ. 25 µV | -96 dB (0.0016%) @ 18 dBu,<br>Noise floor typ. 15 µV                                                                                                           |
| Output impedance           |                                                       | 200 Ohm (balanced)                                  | 12.5 Ohm balanced, I <sub>max</sub> = 10 mA                                                                                                                    |
| Impedance measurement      | Method:<br>Meas. range:<br><br>Accuracy:              |                                                     | Absolute value Z<br>4 Ohm - 50 kOhm balanced<br>2 Ohm - 25 kOhm unbalanced<br>@ f = 30 Hz to 10 kHz (Sine)<br>@ Level from -20 to +18 dBu<br>± 10 % or ± 2 Ohm |
| Power calculation          | Reference voltage                                     |                                                     | 25 V, 50 V, 70.7 V, 100 V                                                                                                                                      |
| Phantom voltage            | Meas. range:<br>Accuracy:                             |                                                     | 0 - 54 V<br>± 3 % or ± 0.5 V                                                                                                                                   |
| USB functionality          |                                                       | Firmware update                                     | Firmware update<br>Mass Storage Device                                                                                                                         |
| Flash memory               |                                                       |                                                     | 32 MByte for storing wave files and<br>configurations                                                                                                          |
| Display                    | Graphical, with back light                            |                                                     |                                                                                                                                                                |
| Auto-Power-Off             | 10, 30, 60 minutes or OFF                             |                                                     |                                                                                                                                                                |
| Batteries                  | 3 x AA Alkaline dry cells or rechargeable equivalents |                                                     |                                                                                                                                                                |
| Battery Life               | 0 dBu, no load, typ.                                  | 20 hours                                            | 10 hours                                                                                                                                                       |
| Temperatue range           | 0° to 45° C (32° to 113° F)                           |                                                     |                                                                                                                                                                |
| Humidity                   | < 90% rel. humidity, non-condensing                   |                                                     |                                                                                                                                                                |
| Dimensions (LxWxH)         |                                                       | 147 x 74 x 41 mm                                    | 152 x 81 x 43 mm<br>(incl. protective shock jacket)                                                                                                            |
| Weight including batteries |                                                       | 250 g (9 oz.)                                       | 310 g (11 oz.)                                                                                                                                                 |



# 10. Further information

## Warranty conditions

### International warranty

NTI guarantees the function of the MR2 and MR-PRO and their individual components for a period of one year from the date of sale. During this period, defective instruments will be repaired free of charge, or will be replaced.

### Limitations

These guarantee provisions do not cover damage caused by accidents, transportation, incorrect use, carelessness, accessories or the installation of any parts that were not delivered with the instrument, the loss of parts, connection to the mains voltage, operation with non-specified input voltages, adapter types or incorrectly inserted batteries. In particular, NTI accepts no responsibility for subsequent damage of any kind. The warranty will be voided by the carrying out of repairs or service work by third parties who are not part of an approved NTI Service Centre.

### Repair of the Minirator MR2 / MR-PRO

In the case of faulty functioning or damage, send the instrument to the local NTI agency in your country in its original packaging. Please enclose a precise description of the fault. You can find the contact addresses on the NTI Internet page [www.nti-audio.com](http://www.nti-audio.com). Repair work will only be carried out under warranty upon presenting the original sales receipt.

## Declaration of Conformity

### CE / FCC Compliance Statement

We, the manufacturer  
NTI AG  
Im alten Riet 102  
9494 Schaan  
Liechtenstein, Europe

hereby declare that the Minirator MR2 and Minirator MR-PRO products, approved in 2007, comply with the following standards or other standard documents:

EMC: 89/336, 92/31, 93/68  
Harmonised standards: EN 61326-1



This declaration will become invalid if modifications to the instrument are carried out without the written approval of NTI.

Date: 01.12.2006  
Signature:



Position: Technical Director

## Information regarding disposal and recycling



Dispose of your instrument in accordance with the valid legal environmental regulations in your country.

### Regulations for the European Union and other European countries with corresponding laws:

The instrument must not be disposed of in the household garbage. At the end of its service life, bring the instrument to a collecting point for electrical recycling in accordance with the legal regulations.

### Other countries outside the EU:

Contact your respective authorities for waste disposal and follow their regulations.

