# MZ-4000

Line tester

Reference: 596 195

Date: October 2018

Version: 3


Made in France

## Contents







**BOUYER INDUSTRIE**
1270, avenue de Toulouse
82000 Montauban – France
Tel.: +33 (0)5 63 21 30 00
Fax: +33 (0)5 63 03 08 26
bouyerfrance@bouyer.com
www.bouyer.com

# I. INTRODUCTION

The **MZ 4000** is a test device for professional public address and sound systems.
It has a range of features to perform diagnostics and troubleshooting of professional sound systems.
It also supports the specific features of equipment marketed by "Bouyer".
It has been designed to be easy to use and can store measurements in files in ".csv" format on the SD card, thereby facilitating evaluation of the results later on.

The **MZ 4000** provides the following functions:

- Graphical user interface on a 64*36mm screen.
- Adjustable backlight.
- Simple user-friendly menus.
- Impedance measurement from 4Ω to 10kΩ @1kHz.
- Displays the equivalent power for 100V rms.
- Measurement of end-of-line resistance.
- Measurement of ground isolation.
- Playback of audio files in WAV format stored on the SD card.
- Low-impedance audio output, output level adjustable from -30dB to +10dB.
- Generation of pulse signals.
- Automated measurement of lines and storage of results on SD card.
- Management of the date and time.
- Powered by 4 LR6 batteries.
- Micro USB socket.
- The content of the SD card can be accessed via the USB port.
- Standard connectors for 4-mm banana plugs.
- Test leads supplied.
- ABS case with battery compartment



**BOUYER INDUSTRIE**
1270, avenue de Toulouse
82000 Montauban – France
Tel.: +33 (0)5 63 21 30 00
Fax: +33 (0)5 63 03 08 26
bouyerfrance@bouyer.com
www.bouyer.com

## II. TERMINOLOGY

| | |
|---|---|
| **PA** | Public Address: Voice alarm and safety sound systems. |
| **PSE** | Power Supply Equipment Power supply in compliance with EN54-16. |
| **VACIE** | Voice Alarm Control and Indicating Equipment. |
| **EN54-16** | Standard for voice alarm and safety systems<br>Fire detection and fire alarm systems - Part 16: voice alarm control and indicating equipment |
| **Line** | Basic element that can be selected on a public-address system.<br>Physically, a line corresponds to the output of an amplifier.<br>Depending on the output power, a line may have more than one loudspeaker. A discriminant loudspeaker selection cannot be achieved on the same line. |
| **EOL** | End of Line: 10-KΩ resistor wired at the end of the line so that the VACIE can test line integrity. |
| **SC/OC** | Short Circuit/ Open Circuit |
| **AZ** | Alarm Zone: Set of lines on the system over which the Vocal Alarm is broadcast. |
| **VA** | Specific measuring technique developed by Bouyer that detects faults on loudspeaker lines. |
| **Region** | Group of alarm zones. |
| **General Call** | Broadcast on all lines in an alarm zone. |
| **Voice Alarm** | Evacuation message broadcast. |
| **HMI** | Human Machine Interface |



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www.bouyer.com

## III. PRESENTATION

### 1. FRONT PANEL


① Monochrome LCD, 128x64 pixels.
② Button (rotary knob) to navigate in the menus and confirm by pressing
③ Enter: Validate / Press and Hold: Power on.
④ Esc: Cancel, go back to the previous menu / Press and Hold: Power off.



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Tel.: +33 (0)5 63 21 30 00
Fax: +33 (0)5 63 03 08 26
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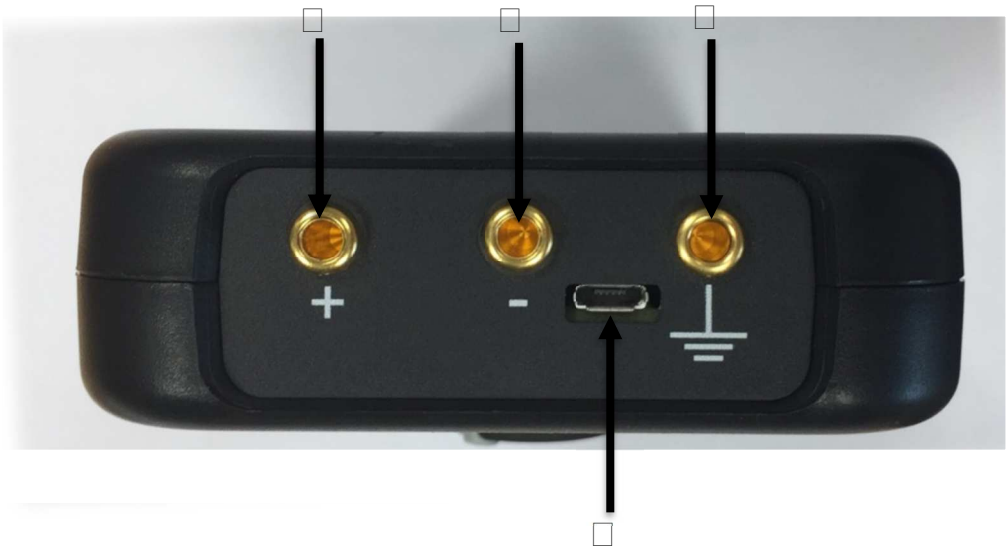
www.bouyer.com

## 2. TOP OF THE CASE




① Positive measuring terminal socket.
① Negative measuring terminal socket.
③ Ground connection socket.
④ Micro USB port.

## 3. ACCESSORIES SUPPLIED

- 4 batteries - LR6 1.5V 2600mAh.
- 3 test leads with crocodile clips.
- Service manual.



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www.bouyer.com

## IV. CAUTION

**CAUTION: Risk of electric shock may result following a contact with HP lines activate.**

**Make only measurements on speaker lines disconnected from their amplifiers.**

**Before disconnecting speaker lines, it is advisable to turn off amplifiers.**

**Any electric potential on the line may cause the destruction of the MZ-4000.**



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# V. OPERATION

## 1. TURN ON AND OFF

Press the “ON - ⏎ ” button to power up the device. The following main menu is displayed on the screen:


If the user does not perform any action for a configurable period of time, the device switches off automatically. The user can also switch off the device by pressing and holding the "ESC" button.
**NB:** This function is only available from the main menu.

## 2. MAIN FUNCTIONS

The main menu is used to access the different tester functions.

These functions are as follows:

- Impedance measurement
- VA measurement
- Audio generator
- Automated line testing with the results saved on the SD card.
- Settings

The status bar at the bottom of the screen displays the date / time and the battery voltage level.
Measurement may become less accurate if the battery voltage is less than 5V.
In this case, the "Low Bat" message is displayed in the lower banner.



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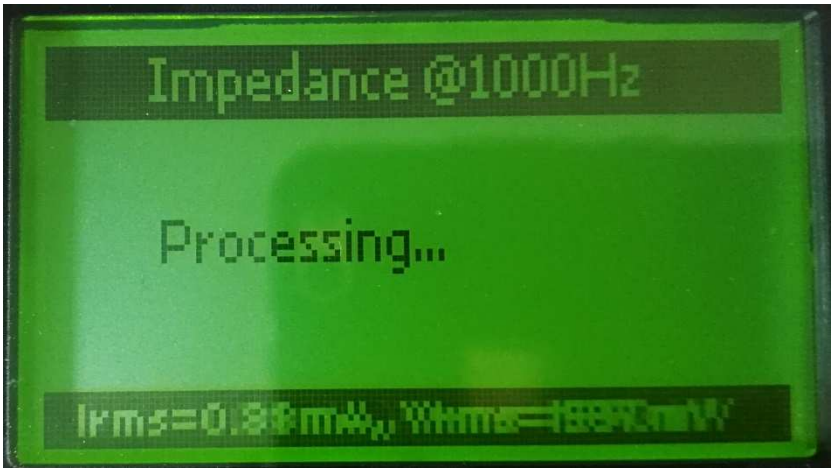
## 3. IMPEDANCE MEASUREMENT

This function measures the impedance of a line of speakers.

To access this function, use the jog dial (rotary knob) to reach the "Impedance" icon.


After connecting the "+" and "-" terminals of the tester to the line to be measured, press the knob to start measuring. The measurement is taken at a frequency of 1000Hz.

The device searches for the optimal measuring point to obtain the best accuracy, and until it is reached, the following screen is displayed:



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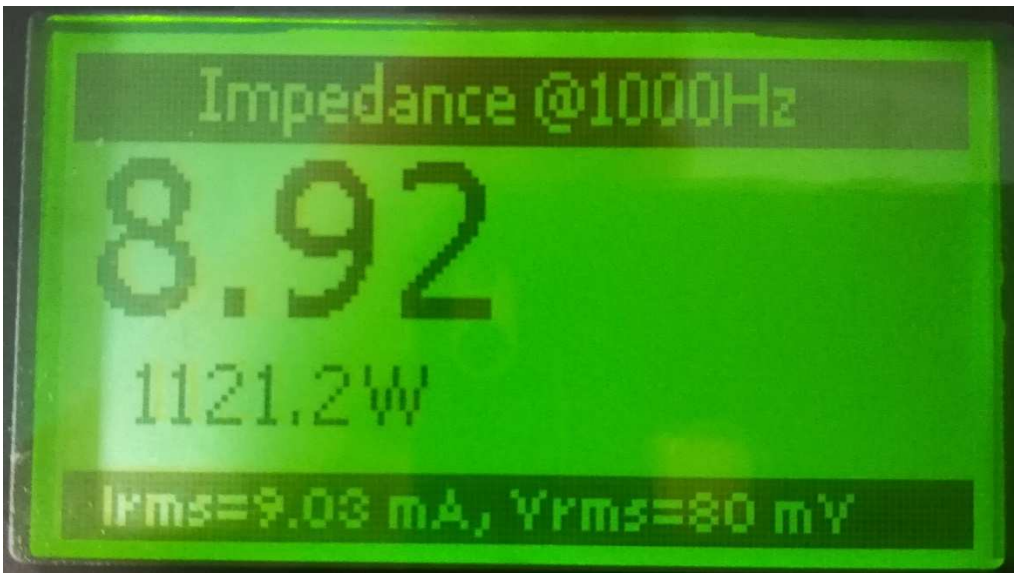
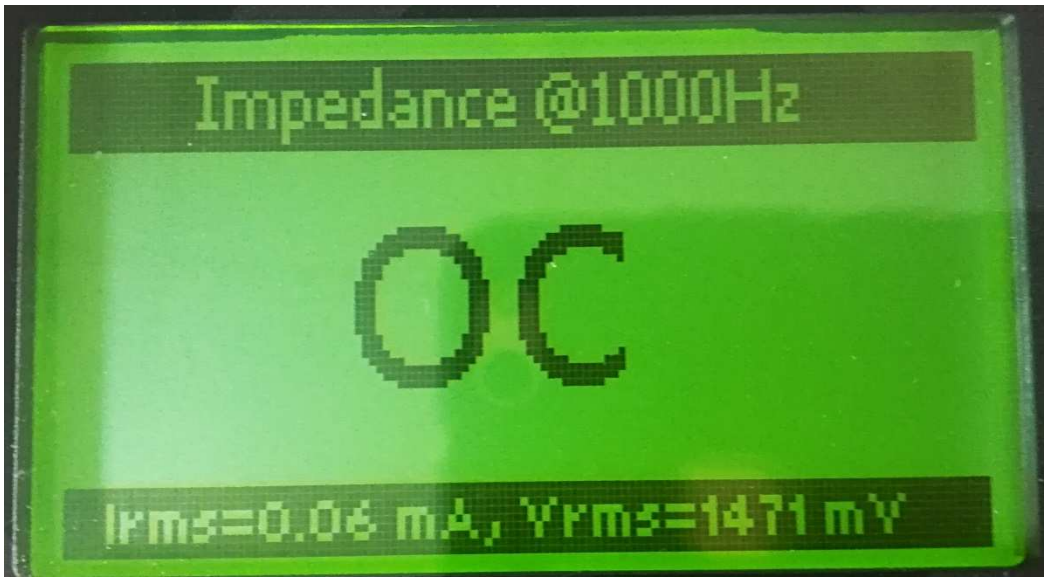
As soon as the optimum measuring point is reached, the value is displayed in Ohms with its equivalent in Watts for a voltage of 100V RMS.




If the measured value is greater than the upper limit of the tester (10kΩ), the device will display the following screen:



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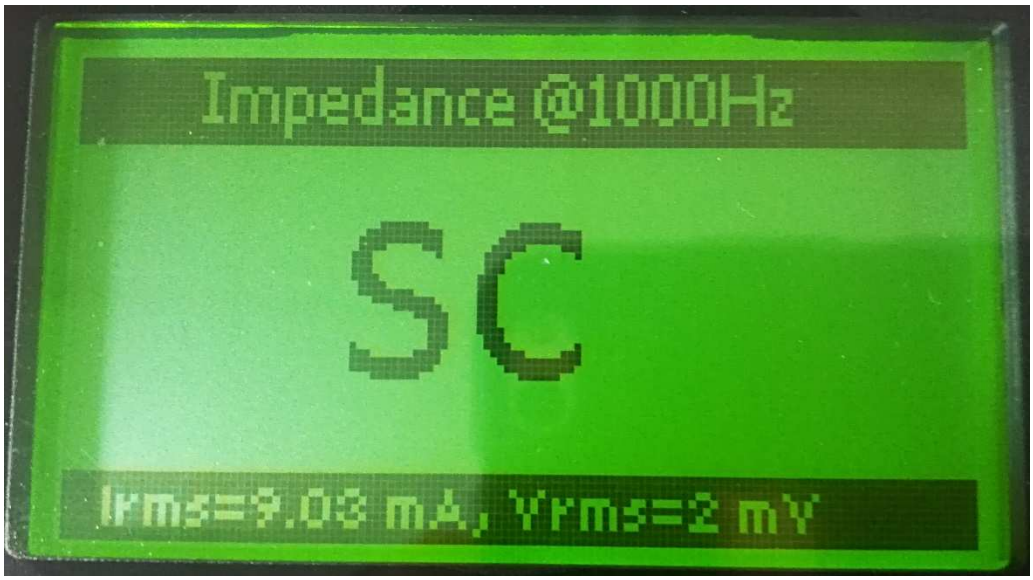
In the opposite case where the measured value is less than 4 ohms, the device will display "CC” (SC).

The user can then repeat a measurement by pressing the “ON” button or go back to the main menu by pressing the (Esc) button.



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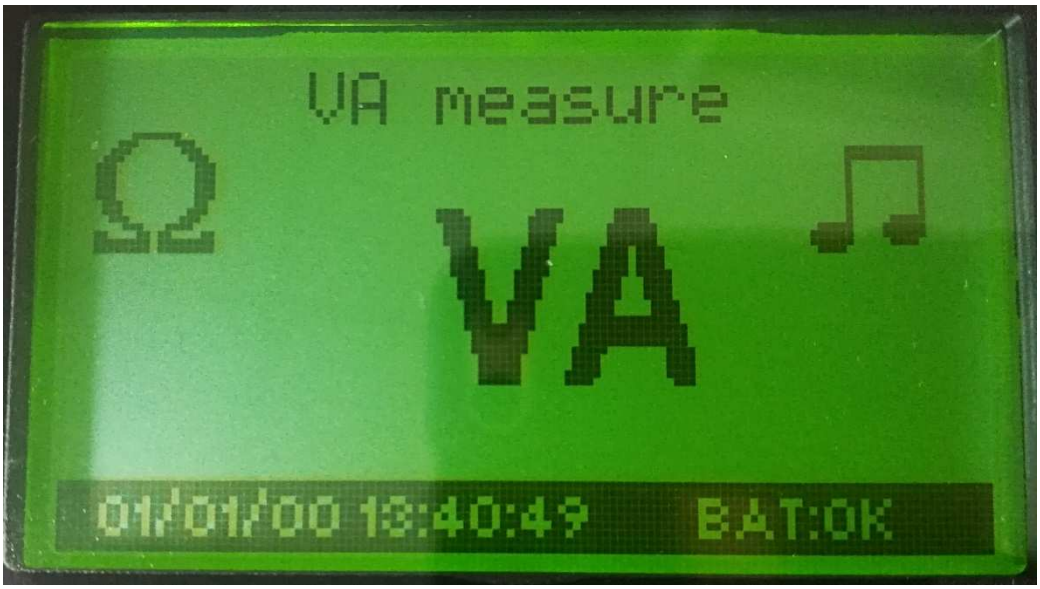
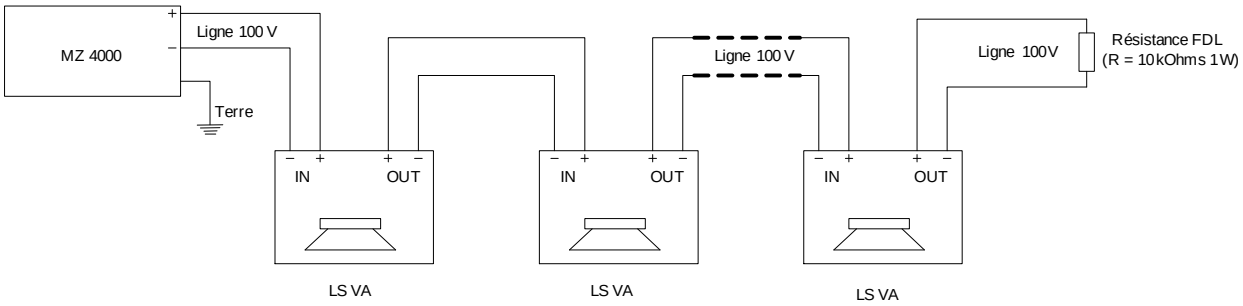
## 4. VA MEASUREMENT

This function is used to check that the end-of-line resistor is present and to check the value of it. Line isolation relative to ground is also measured.




Connect the tester as shown in the diagram below:




| | |
|---|---|
| Ligne 100V | 100V line |
| Résistance FDL (R = 10kOhms 1W) | End-of-line resistance (R = 10kOhms 1W) |
| Terre | Ground |

Press the OK button or press the rotary knob to start the measurement.



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bouyerfrance@bouyer.com
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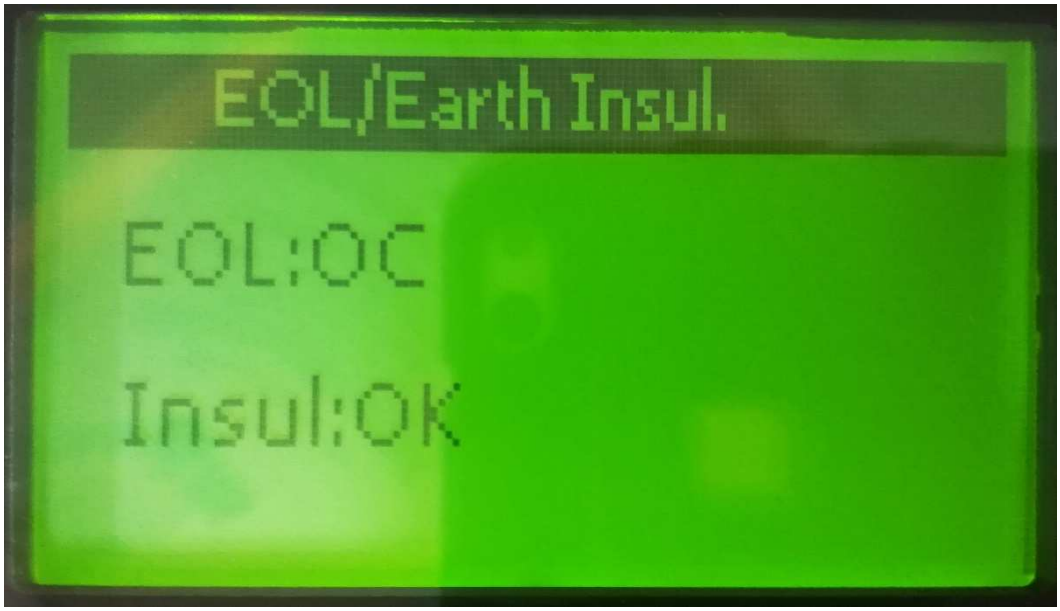
Once the measurement is complete, the results are presented in the following form:




Press the "Esc" button to go back to the main menu.



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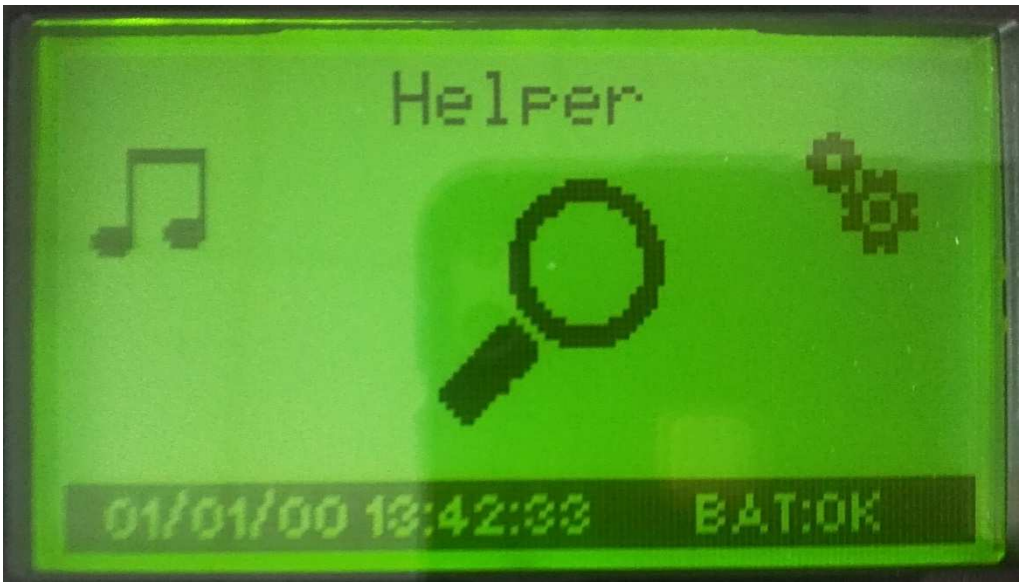
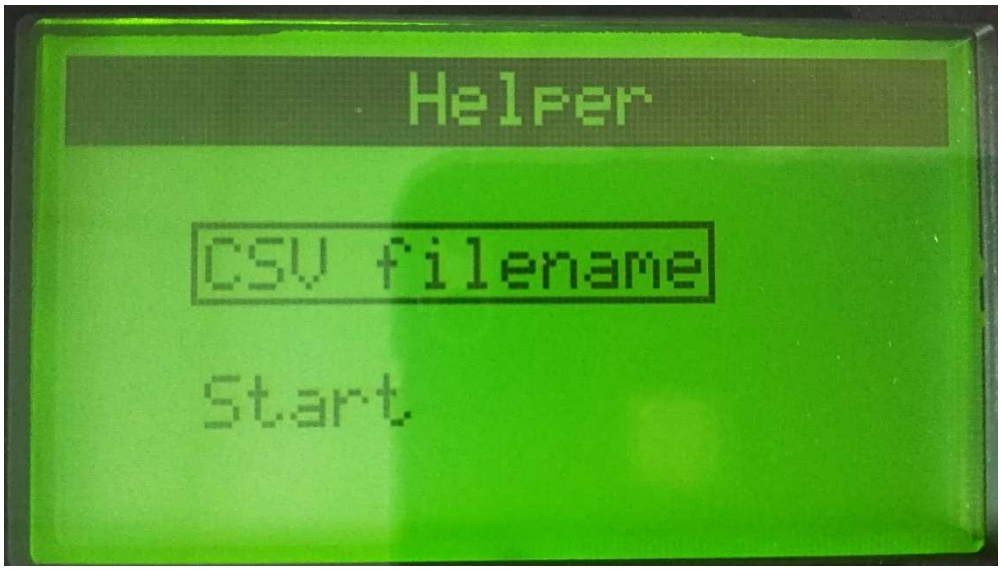
## 5. WIZARD MODE

With the help of a wizard, this menu can be used to perform complete diagnostics on the lines of an alarm zone and save the results on the micro SD card in the device.




Press "OK / rotary knob" to reach the following submenu:



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1270, avenue de Toulouse
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The "CSV filename" button can be used to enter the name of the file used to save the results.


A filename can be entered using the virtual keyboard. Up to 12 characters are permitted.
The characters are selected using the rotary knob and validated by pressing it (OK - rotary knob).
It is a good idea to name the file with the name of the zone to be tested.

- DEL: delete
- OK: confirm
- 123: numeric keypad
- Abc: alphabetic keyboard



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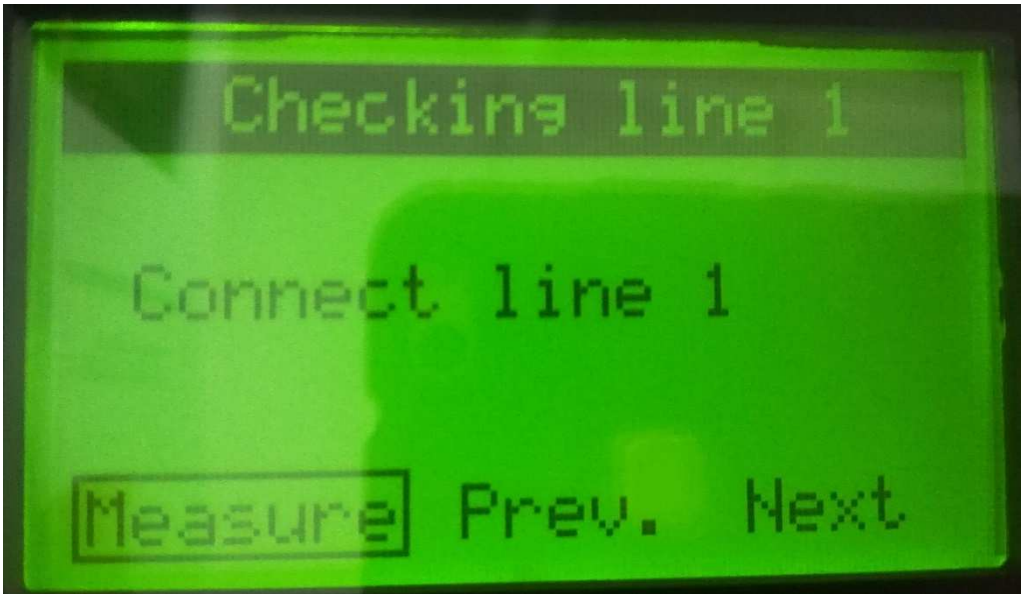
bouyerfrance@bouyer.com
www.bouyer.com

Once the filename has been entered, you can start the measurement campaign. To do this, simply confirm with the "Start" button and the following screen will be displayed:

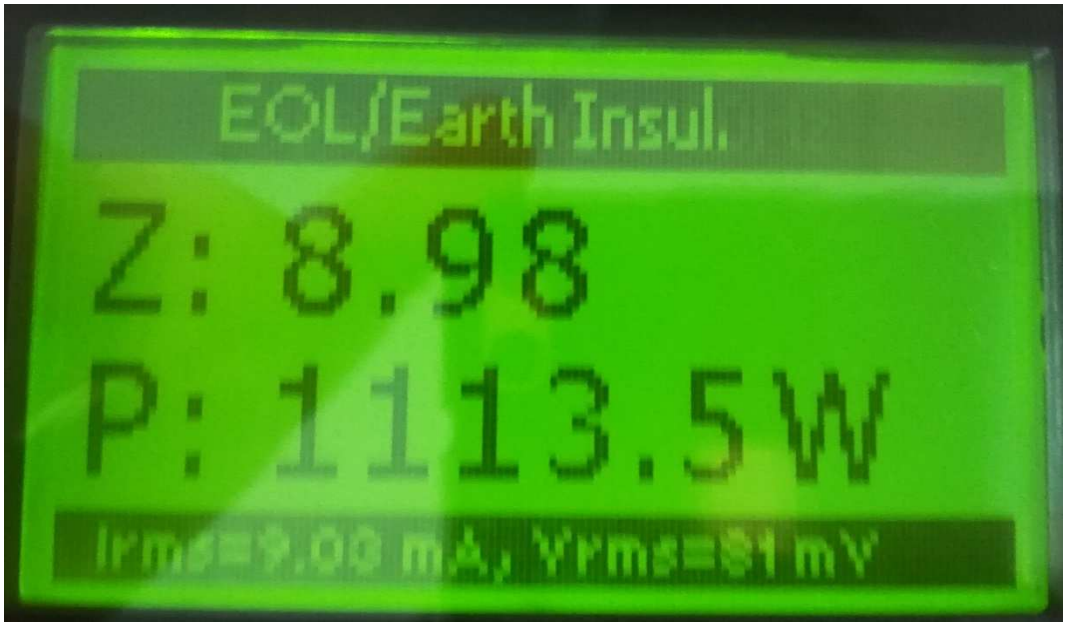



The “Prev.” and “Next” buttons can be used to increment or decrement the number of the line to be tested.

The "Measure” button will start the automated process to test the displayed line.

The device will begin by taking an impedance measurement followed by a measurement of the end-of-line resistance and ground isolation of the loudspeaker line.

Two screens will be displayed one after the other; the first screen below, which is the impedance measurement followed by the VA measurement screen:



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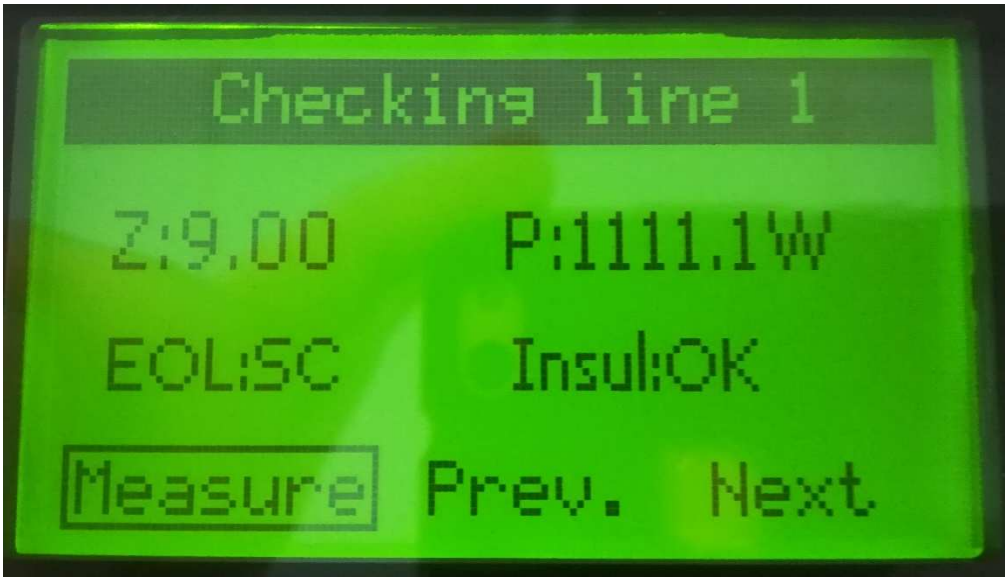
bouyerfrance@bouyer.com
www.bouyer.com

Once the measurements are complete, a screen summarizing the obtained results is displayed:




These results are automatically recorded in the file that was named previously in the "LOGS" directory at the root of the SD card.

This file is in "CSV" format, which makes it easier to be opened with a spreadsheet.



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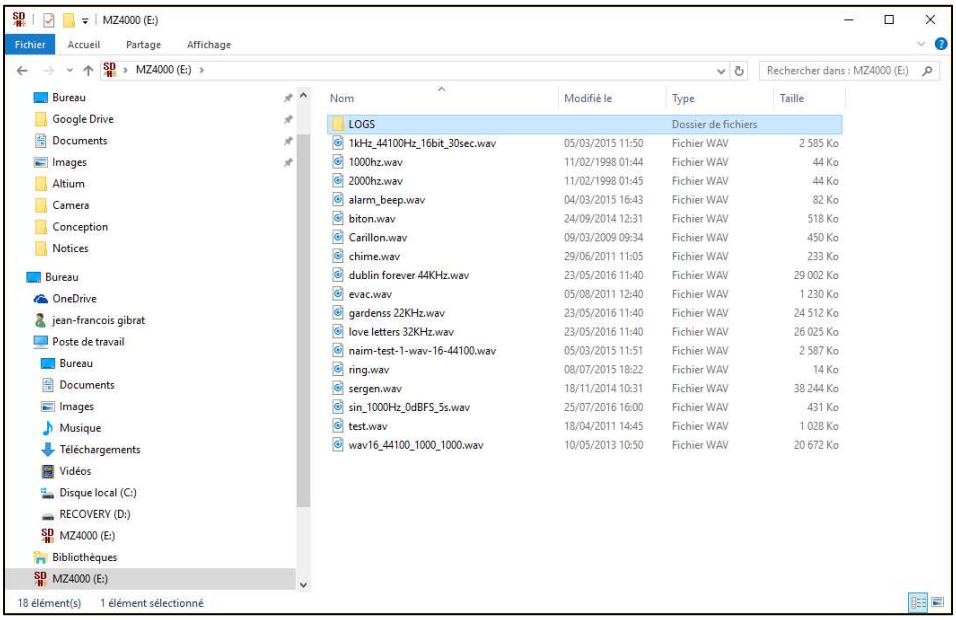
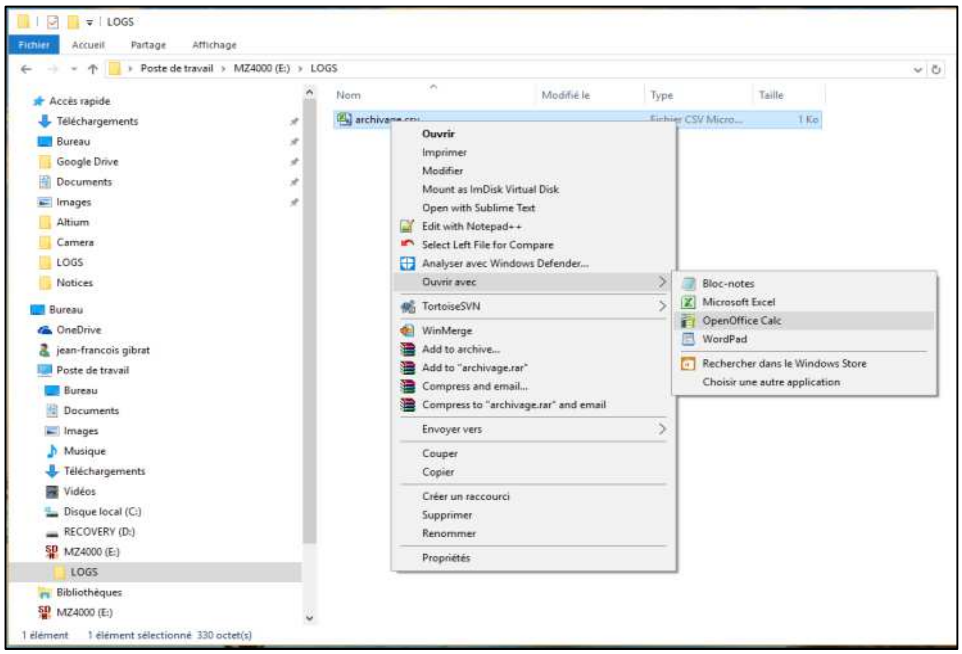
Fax: +33 (0)5 63 03 08 26

bouyerfrance@bouyer.com
www.bouyer.com

To use these results, connect the MZ-4000 to a computer via the micro USB port (see Fig 4). The content of the SD card can be accessed using a file explorer.




The file can be opened directly with a spreadsheet:



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Fax: +33 (0)5 63 03 08 26
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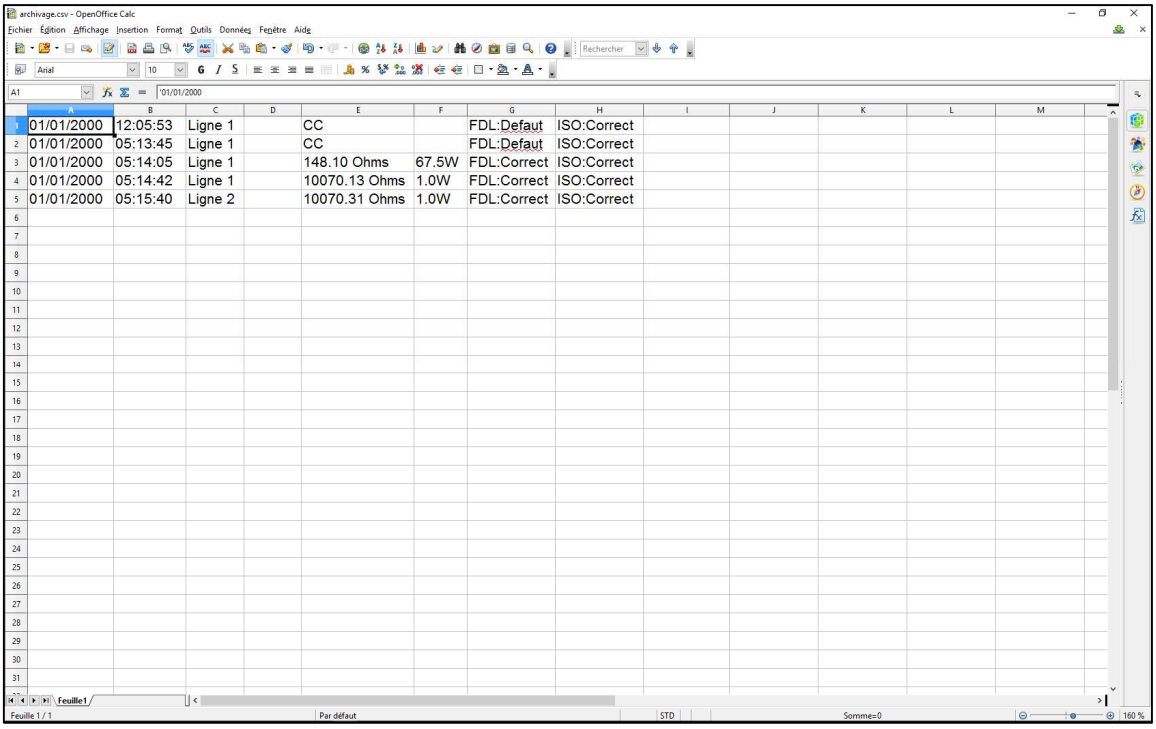
The file opened in a spreadsheet:




| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | 01/01/2000 | 12:05:53 | Ligne 1 | | CC | | FDL:Defaut | ISO:Correct |
| 2 | 01/01/2000 | 05:13:45 | Ligne 1 | | CC | | FDL:Defaut | ISO:Correct |
| 3 | 01/01/2000 | 05:14:05 | Ligne 1 | | 148.10 Ohms | 67.5W | FDL:Correct | ISO:Correct |
| 4 | 01/01/2000 | 05:14:42 | Ligne 1 | | 10070.13 Ohms | 1.0W | FDL:Correct | ISO:Correct |
| 5 | 01/01/2000 | 05:15:40 | Ligne 2 | | 10070.31 Ohms | 1.0W | FDL:Correct | ISO:Correct |

All the files on the SD card can be renamed, edited or deleted using a PC (they cannot be deleted directly on the MZ-4000).



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1270, avenue de Toulouse
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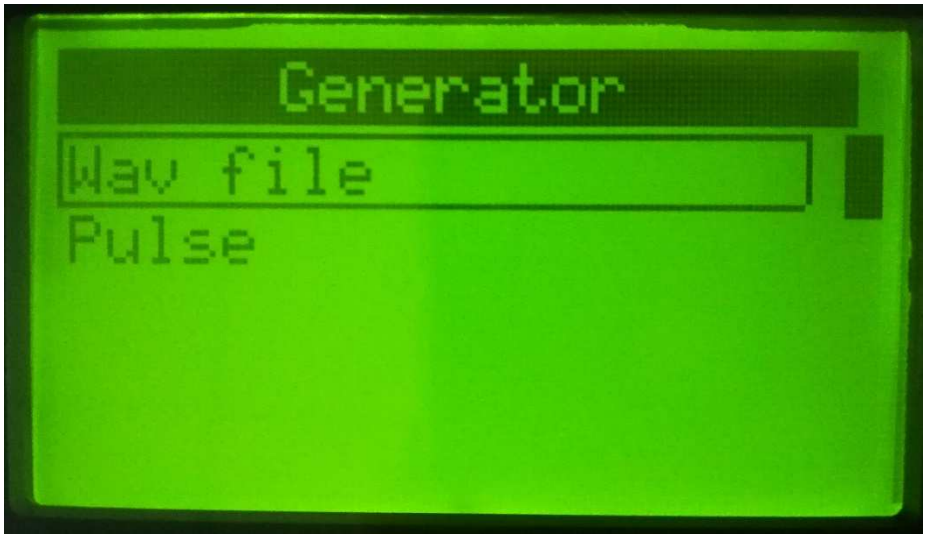
Tel.: +33 (0)5 63 21 30 00
Fax: +33 (0)5 63 03 08 26
bouyerfrance@bouyer.com
www.bouyer.com

## 6. AUDIO GENERATOR FUNCTION

This function will read files in WAV format. The integrated output amplifier supports 8Ω impedances down to an open circuit and the level can be adjusted from -30dB to +10dB.


After pressing "OK - rotary knob", the following submenu is displayed:
Use the rotary knob to select the menu.



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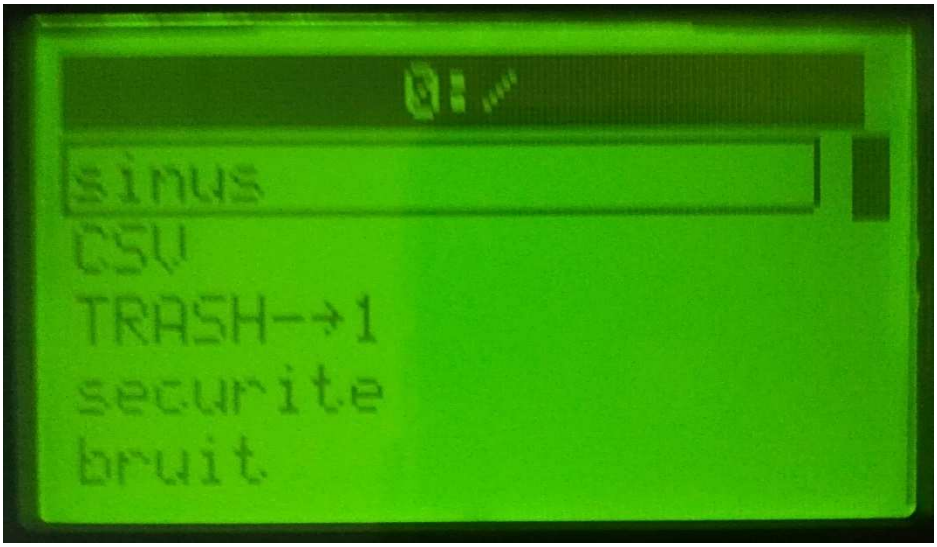
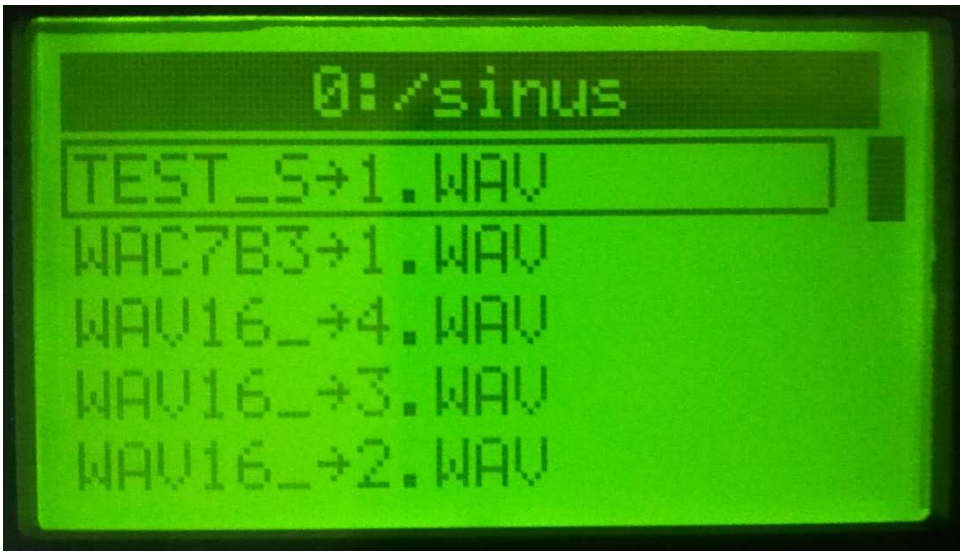
The first item in the drop-down list provides access to the audio playback function.




Press the "WAV file" item in the menu described above to open a file explorer.
It will display the files with a ".WAV" extension that are located at the root of the FAT32 partition on the SD card.
The rotary knob and the "OK - rotary knob" button can be used to navigate in the file system tree.




To play a WAV file on the output of the device, simply select the desired file with the rotary knob and press "OK - rotary knob".



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1270, avenue de Toulouse
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Fax: +33 (0)5 63 03 08 26

bouyerfrance@bouyer.com
www.bouyer.com

After checking the format of the file and if the format is compatible with the formats supported by the device, playback begins.

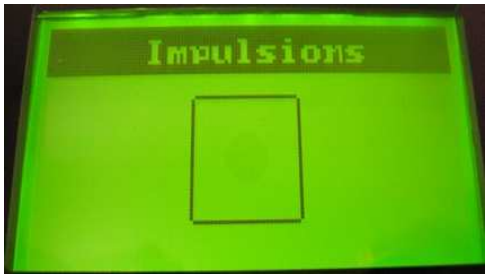

During playback, a bar indicates the state of progress. The output volume level can be adjusted with the rotary knob.

To stop the broadcast, press "Esc".

## Generator of impulse

The second mode allows a simple control of the loudspeaker working.


A black dot appears in the center of the square to every impulse. A “bip” is generated each second.



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## 7. SETTINGS MENU

The user can use this menu to set everything that can be adjusted on the device.


Press the rotary knob or the “Enter” button to access to the following menu.


The settings are:

- Standby (Mise en veille): idle time before the device shuts down automatically - can be set by rotating the rotary knob
- Backlight level (Niveau backlight): can be set by rotating the rotary knob
- Date and time (Date/heure): a box will appear around the selected digit or month when the rotary knob is pressed, then rotate to change and press again to confirm
- About (A propos): product features and software version



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## VI. DECLARATION OF CONFORMITY

CE

The manufacturer named below:

**Bouyer Industrie**
1270 avenue de Toulouse
82000 Montauban, France

Declares that this product complies with the following standards:

- EMC directive 2004/108/EC
- Directive 2004/22/EC
- NF EN 61326-1 July 2006



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## VII. TECHNICAL DATA

| | |
|---|---|
| **HMI** | |
| Backlit graphic display screen | 128 x 64 pixels |
| Backlight level settings | From 0 to 100% |
| Simple and user-friendly HMI | Simplified navigation using the rotary knob and pushbuttons |
| | |
| **Impedance measurement** | |
| Measurement frequency | 1 kHz |
| Measuring range | 4Ω to 10KΩ |
| Relative accuracy | 3% from 4Ω to 5 kΩ |
| Relative accuracy | 5% above 5 kΩ |
| Automatic calibration | From 4Ω to 10 kΩ |
| Equivalent power displayed | For 100V rms |
| Displays "OC" (CO) or "SC" (CC) | If the measuring range is exceeded |
| | |
| **VA measurement** | |
| Measurement of end-of-line resistance | Correct if equal to 10KΩ +/-10% |
| Ground isolation measurement | Correct if > 500kΩ |
| | |
| **Audio generator** | |
| Output level settings | -30dB to +10dB |
| Load impedance | 8 ohms to infinity |
| Generation of phase control pulses | Pulses every second |
| Playback of WAV files on SD card | 44kHz PCM 16-bit mono |
| | |
| **Power supply** | |
| Battery | 4 Lithium batteries - LR6 1.5V/2600mAh |
| Automatic switch-off time settings | 60s to 3600s |
| Nominal battery life | 70H |
| Switching on/off | By pushbutton |
| **Micro USB port** | |
| Power supply function | 5V 100mA |
| Mass storage function | Used to access the content of the SD card via the USB port. |
| | |
| **Miscellaneous** | |
| Material | ABS |
| Colour | Black |
| Dimensions (mm) | 210 x 100 x 25 |
| Weight | 440g with batteries |
| Accessories | Supplied with test leads + crocodile clips |



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## VIII. RECYCLING

When the product reaches the end of its life, if it is installed in the French territory (DOM-TOM included), please contact BOUYER to organize its destruction in compliance with the WEEE directive.

Otherwise, please follow the local regulations of the country where the product is installed.



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