



# MZ-4000

Line tester

Reference: 596 195

Date: july 2023

Version: 4



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## 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



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## II. TERMINOLOGY

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



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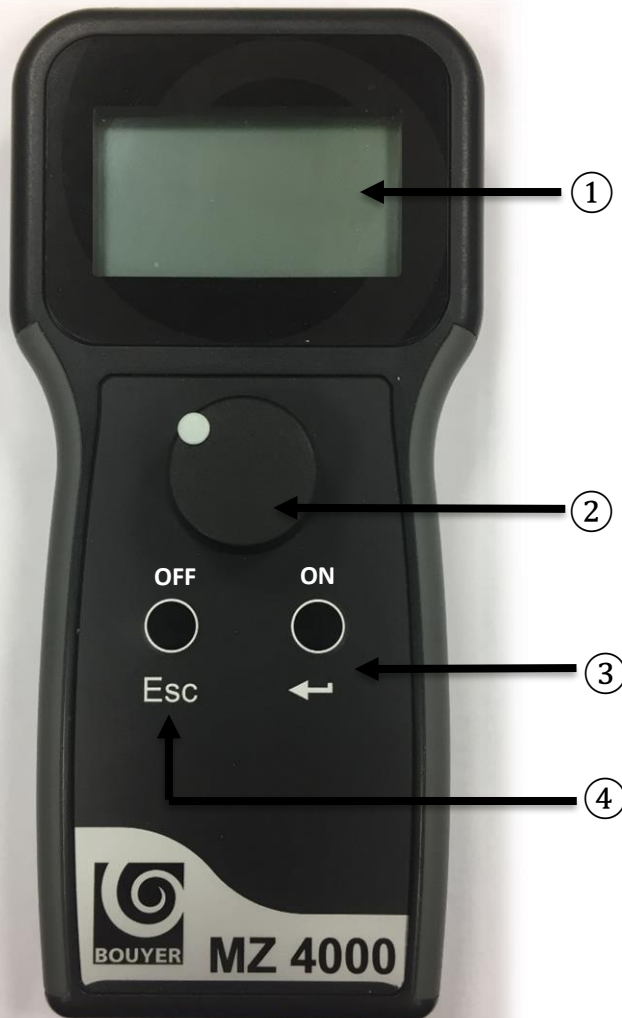
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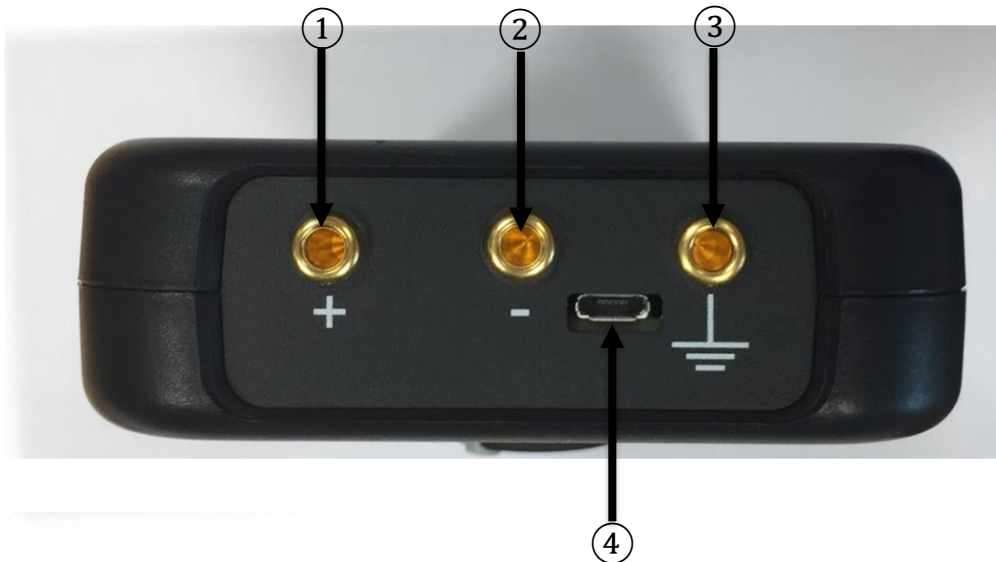
## III. PRESENTATION

### 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.

## 2. TOP OF THE CASE



- ① Positive measuring terminal socket.
- ② Negative measuring terminal socket.
- ③ Ground connection socket.
- ④ Micro USB port.

## 3. ACCESSORIES SUPPLIED

- 4 batteries - LR6 **1.5V 2600mAh** (In case of prolonged non-use, we recommend removing the batteries).
- 3 test leads with crocodile clips.
- Service manual.



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## 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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
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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.

### 3. IMPEDANCE MEASUREMENT

This function measures the impedance of a line of loudspeakers.

To access this function, use the wheel (rotary button) to position yourself on the "Impedance" icon.



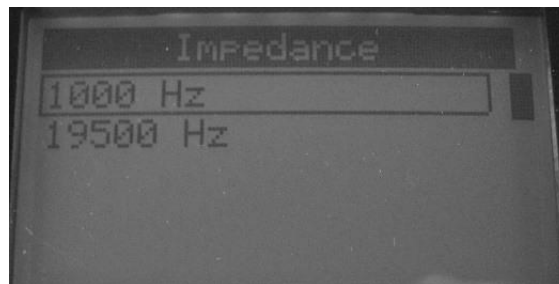
Connect the "+" and "-" terminals of the tester to the line to be measured (the polarity does not matter).

Press the rotary knob or the "ON" key and select the desired measurement frequency using the rotary knob.

Either :

**1000 Hz** = checking the impedance of the loudspeaker lines.

**19500 Hz** = verification of loudspeaker lines with EFL-4000 type end-of-line element.



Press the rotary button or the "ON" key to start the measurement.

The impedance measurement is made at a frequency of 1000Hz (or 19500 Hz depending on the selection).

The device searches for the optimum measurement point to obtain the best accuracy, and as long as it is not 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.

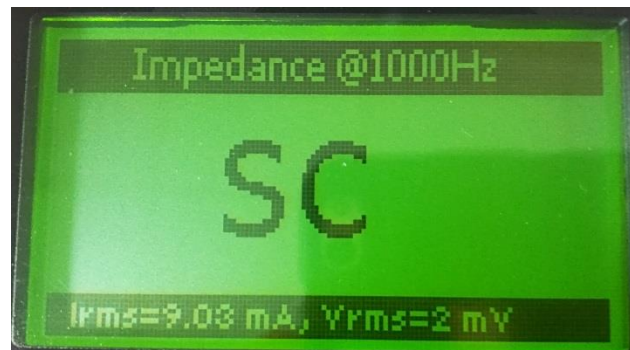


If the measured value is greater than the upper limit of the tester (10k $\Omega$ ), the device will display the following screen:



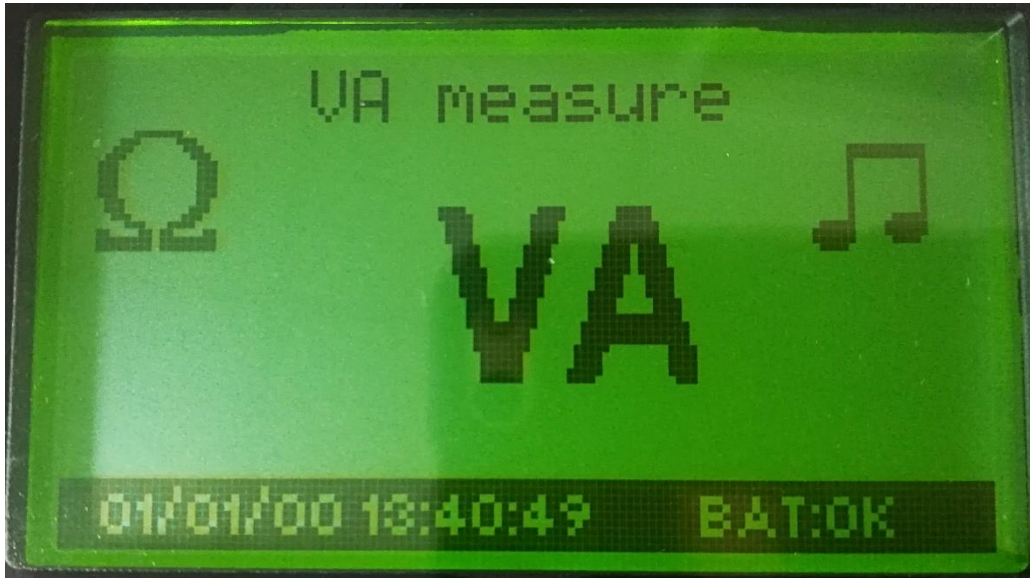
In the opposite case where the measured value is less than 4 ohms, the device will display "CC" (SC).

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

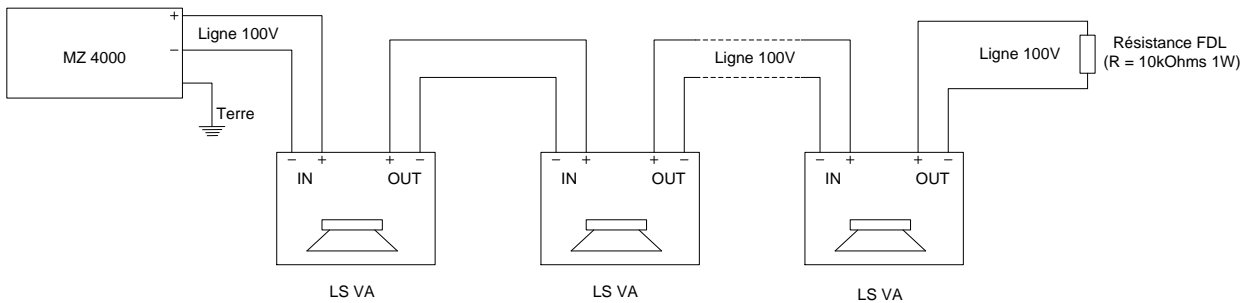


## 4. VA MEASUREMENT

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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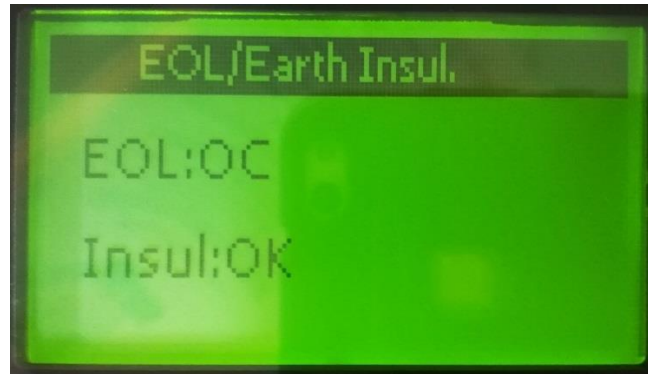
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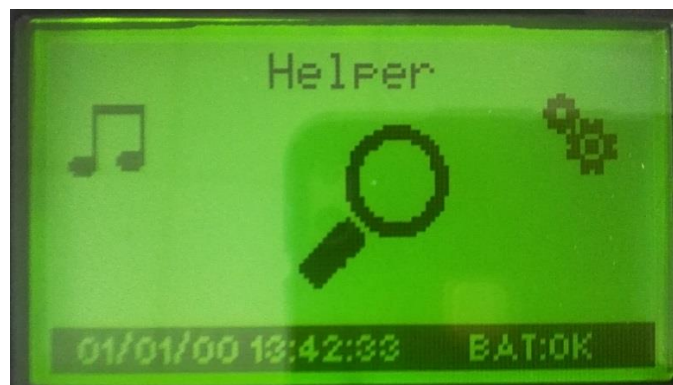
Once the measurement is complete, the results are presented in the following form:



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

## 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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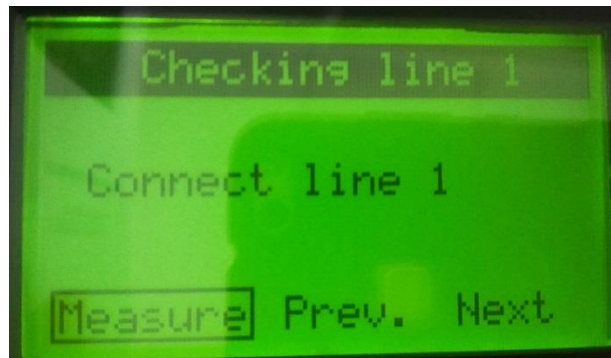
The "CSV filename" button can be used to enter the name of the file used to save the results.



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

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:



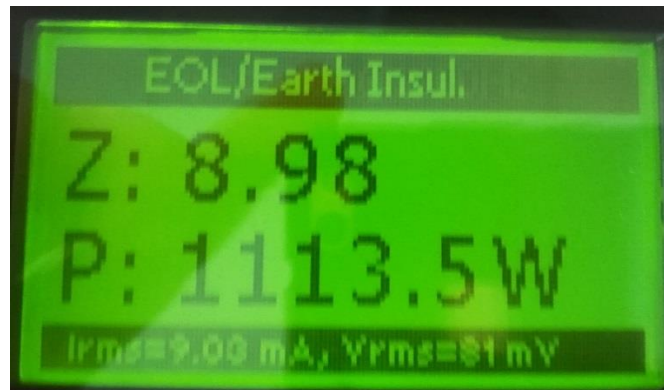
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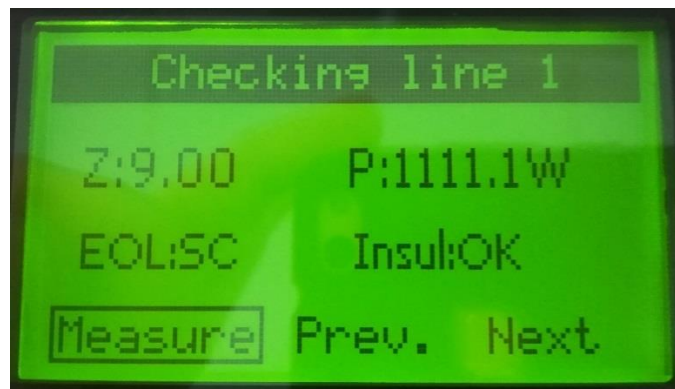
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Once the measurements are complete, a screen summarizing the obtained results is displayed:



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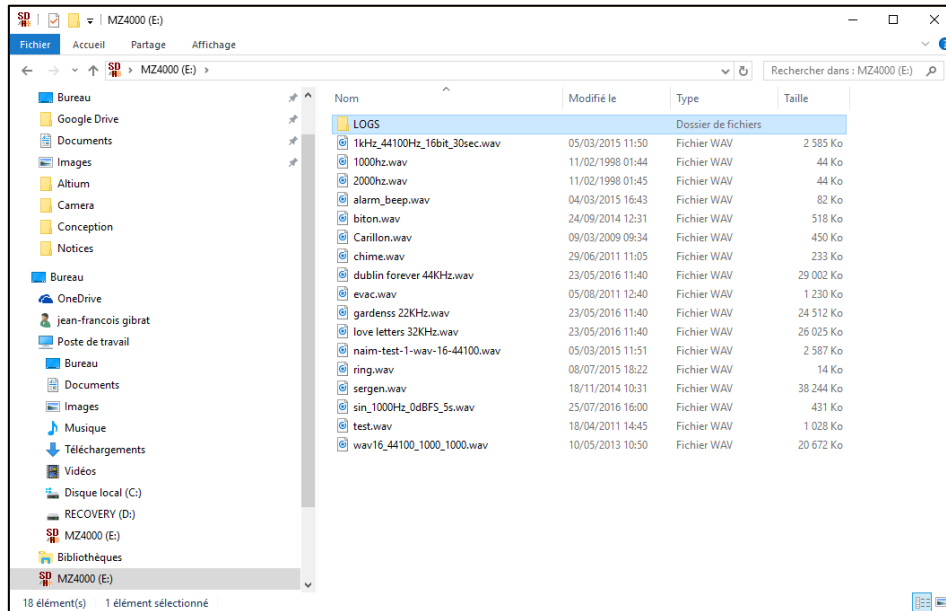
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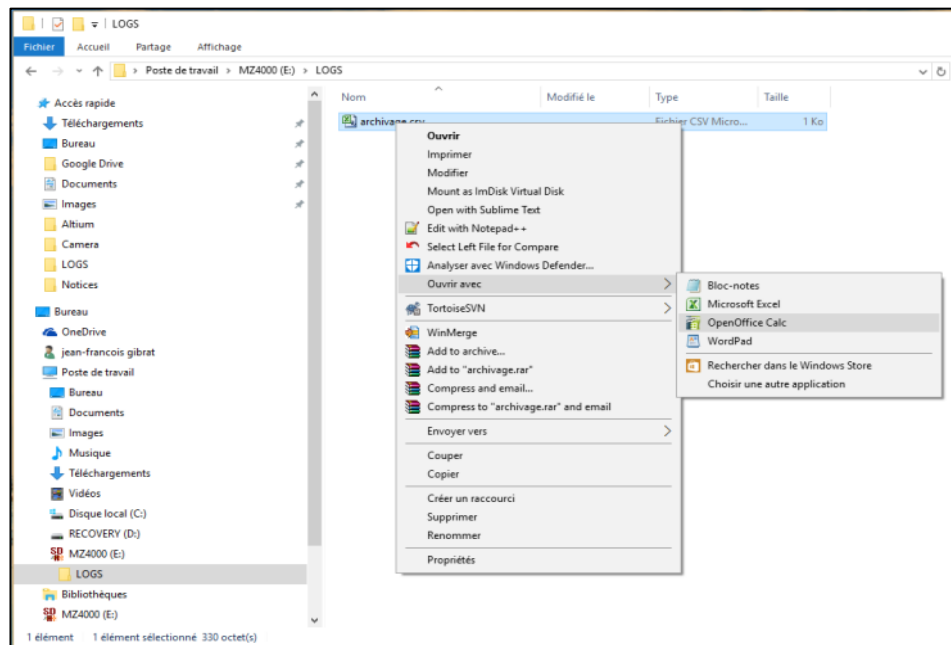
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To use these results, connect the MZ-4000 to a computer via the micro USB port (see Fig 4). The content of the SD card can be accessed using a file explorer.



The file can be opened directly with a spreadsheet:





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The file opened in a spreadsheet:

A	B	C	D	E	F	G	H	I	J	K	L	M
01/01/2000	12:05:53	Ligne 1	CC			FDL:Default	ISO:Correct					
01/01/2000	05:13:45	Ligne 1	CC			FDL:Default	ISO:Correct					
01/01/2000	05:14:05	Ligne 1	148.10 Ohms	67.5W		FDL:Correct	ISO:Correct					
01/01/2000	05:14:42	Ligne 1	10070.13 Ohms	1.0W		FDL:Correct	ISO:Correct					
01/01/2000	05:15:40	Ligne 2	10070.31 Ohms	1.0W		FDL:Correct	ISO:Correct					

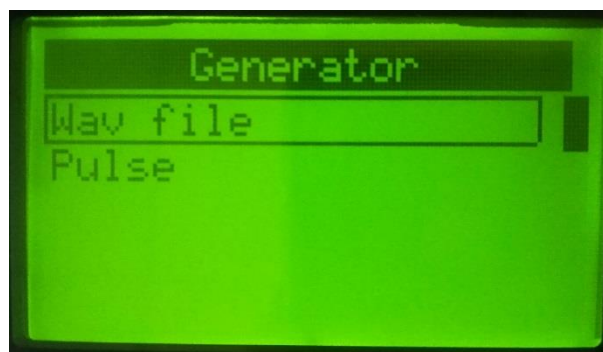
All the files on the SD card can be renamed, edited or deleted using a PC (they cannot be deleted directly on the MZ-4000).

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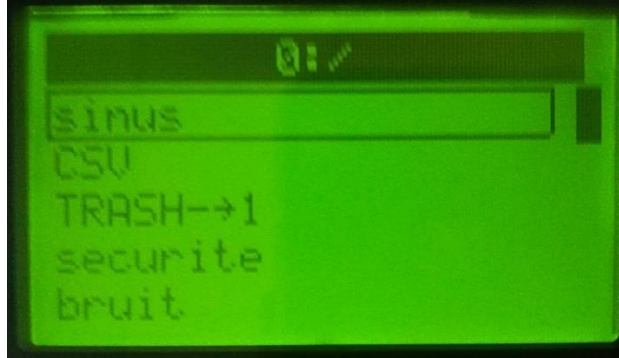
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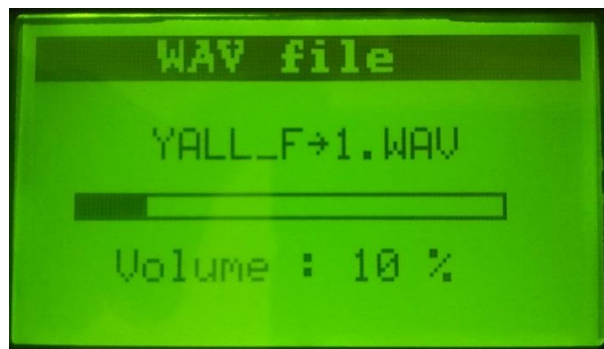
The first item in the drop-down list provides access to the audio playback function.



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". 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".





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## b. Pulse generator

The second allows simplified control of the operation of the loudspeaker.



A black dot appears in the center of the square with each pulse. Generates a top every second.



## 7. SETTINGS MENU

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





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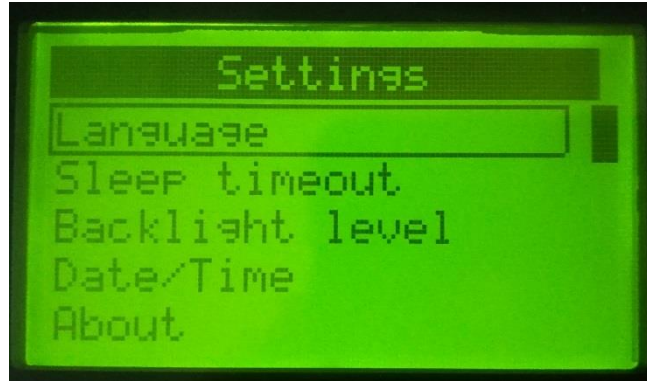
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Press the rotary knob or the “Enter” button to access to the following menu.



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



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 / 19,5 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 (In case of prolonged non-use, we recommend removing the batteries).
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. PREVENTIVE MEASURES

Please read all of the following instructions carefully

- 1- Observe all warning messages. Do not remove safety labels or other information from the device.
- 2- Use the device only for the applications indicated, and in the appropriate manner.
- 3- The use of the device is not recommended above 2000 meters altitude.
- 4- Do not block the ventilation openings with any objects.
- 5- Respect a minimum distance around the device for sufficient ventilation.
- 6- Do not expose the appliance to rain or humidity (unless it is an appliance designed for outdoor use – in this case, follow the instructions provided).
- 7- If your device no longer works properly, water or objects have gotten inside, turn it off immediately and unplug it. This device should only be repaired by qualified personnel.

### Devices connected to the mains

- 1- Switch off the device before touching the conductive parts inside it.
- 2- Do not turn the device off and on again quickly several times: you risk reducing the longevity of its internal components.
- 3- Only replace the fuse with a fuse of the same type and rating.
- 4- Attention, a power plug has three pins, including a ground pin. The third pin provides security. Check that the ground pin provided fits into the outlet, if not, consult an electrician to have the obsolete outlet replaced.

### Symboles d'avertissement

	Protective earth terminal
	Ground terminal
	Direct current or direct voltage
	Alternating current or alternating voltage
	Dangerous voltage to touch, risk of electric shock or even electrocution
	Read the accompanying document carefully
	Caution, hot surfaces, do not touch during operation under penalty of burns



### Apparatus sources of excessive thermal energy (TS2 and TS3)

Caution, hot surfaces, do not touch during operation under penalty of Appareils audios tels que des haut-parleurs.



High sound pressure, risk of hearing damage, do not listen at high volume levels for prolonged periods (above 90 dB).



### Disposal of the product

At the end of the product's life, if it is installed on French territory (DOM-TOM included), please contact BOUYER to organize its destruction in accordance with the WEEE directive. Otherwise, please apply the local regulations of the country where the product is installed.



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