

Industrial Audio Player
MP3 SD with build-in amplifier
2x15 Watt



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Table of contents

1. Short description of Embedded MP3 Player	3
2. Pinout	5
2.1 Device Dimensions	7
3. Description of the functionality.....	8
4. Modes of operation.....	10
5. Configuration file	12
6. Modbus Slave.....	13
7.1 Modbus Slave - Coils	14
7.2 Modbus Slave – Holding Registers	15
7. Inputs - connections	16
8. Preparing a SD card.....	17
9. Technical specification.....	19

1. Short description of Embedded MP3 Player



Industrial 2x15 Watt audio player with built-in amplifier 2x15 Watts. It is used to listen to music and sound messages from the SD card. Thanks to the built-in amplifier, no additional external devices are needed.

Technical information:

- supported file format: MP3 – type MPEG I, II, III,
- class D audio amplifier,
- speaker impedance from 4 to 8 ohm,
- 28 gradual volume control,
- audio file sampling frequency MP3: 32 kHz, 44.1 kHz, 48 kHz,
- audio resolution 24 bit,
- bitrate MP3 96kbit – 320kbit
- several different operation modes,
- simple player control: from microcontroller or buttons,
- supported file format type: FAT, FAT32,
- supported memory type: SD or SDHC,

- support of RS485 ModBus Slave,
- inputs 10x Binary Active 5V-24V,
- work temperature -20°C do +80°C (without SD),
- power supply 12-24V,
- aluminum case.

2. Pinout

The audio player has 4 configuration pins, 10 control pins, an output for connecting speakers, a power connector, a connector for an SD card and 2 LEDs. The pinout layout is shown below:

a) front part of the player:



Configuration pins **CONF**:

They are used to select the operating mode. Their full description is presented in Chapter 3.

Power connector **IN**:

Pin 1 : GND –

Pin 2 : VCC +

Speaker connector **SPK**:

Pin 1 : output, right channel +

Pin 2 : output, right channel -

Pin 3 : output, left channel -

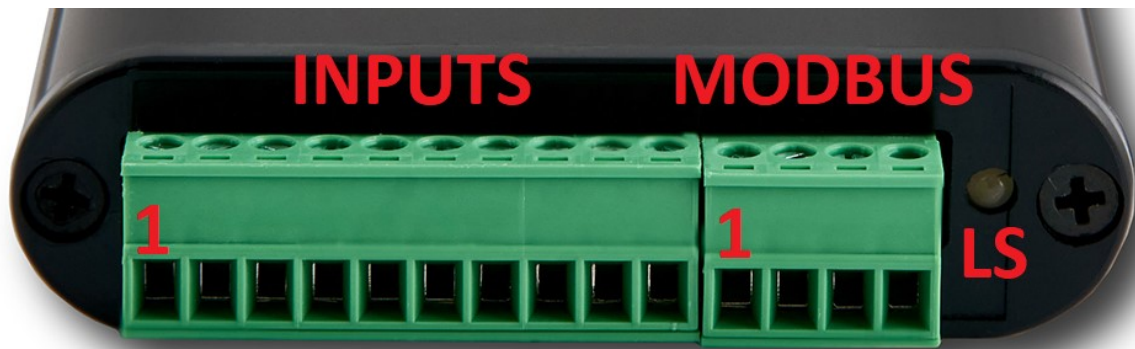
Pin 4 : output, left channel +

WARNING: In this STEREO 2x15W player, both speakers must be connected. If you need to use only one speaker, please use the MONO 1x30W audio player version.

Connector of **SD** card:

Connector for „big” SD card.

b) rear part of the player:



Connector **INPUTS**:

Pin 1 to 10 : their function depends on the selected operating mode, details in chapter 3,

Communication **MODBUS**:

Pin 1: GND,

Pin 2: RS485 A,

Pin 3: RS485 B,

Pin 4: VCC + use only for driving a inputs IN1 do IN10.

Diode LED **LS**:

They indicate the current state of the player:

- a) orange and blue is blinking - no SD card,
- b) orange diode is on - SD card OK,
- c) blue diode is blinking – the track is playing,
- d) LED is blinking white - error while playing the file.

2.1 Device Dimensions



All dimensions are in millimeters.

3. Description of the functionality

The operation of the MP3 module depends on its configuration. 4 configuration jumpers CONF1, CONF 2, CONF 3, CONF4 are used to determine the operating mode. In order to change the operating mode, move the appropriate jumper up or down. The jumper in the lower position is OFF, the jumper in the upper position is ON:



After purchasing the device, all jumpers are in the OFF position.

We can choose the following operating modes of the player:

Jumpers position CONF				Work Mode
4	3	2	1	
OFF	OFF	OFF	OFF	- normal The player works in the standard player mode. The following buttons are available: START, STOP, NEXT, PREV, VOL+, VOL-
OFF	OFF	OFF	ON	- unattended After turning on the module, the music is played over and over again, without interruption.

OFF	OFF	ON	OFF	<p>- numbers</p> <p>After pressing the button, tracks with the file name 1.mp3, 2.mp3 etc. are played. Pressing another button does not interrupt the playback.</p>
OFF	OFF	ON	ON	<p>- numbers 2</p> <p>After pressing the button, tracks with the file name 1.mp3, 2.mp3 etc. are played. Pressing another button interrupt the playback.</p>

4. Modes of operation

The player allows you to work in several operating modes. Each of them has a different mode of action.

Modbus communication can be used in each mode.

The mp3 player can work in the following modes:

a) normal – in this mode the player waits for the user's reaction. We can choose the following actions:

- IN 1 - START – the player starts playing the mp3 file once,
- IN 2 - STOP – stopping playback,
- IN 3 - NEXT – go to the next file,
- IN 4 - PRV – go to the previous file,
- IN 5 - VOL+ - increases the volume level (28-step adjustment),
- IN 6 -VOL- - reduces the volume level (28-step adjustment),

b) unattended – the player starts playing music as soon as it finds the mp3 file.

- IN 1 - NEXT – go to the next file,
- IN 2 - PRV – go to the previous file,
- IN 3 - VOL+ - increases the volume level (28-step adjustment),
- IN 4 -VOL- - reduces the volume level (28-step adjustment),

c) numbers – Pressing the button causes playback of files with the specified name:

- IN 1 – the file is being played 1.mp3,
- IN 2 – the file is being played 2.mp3,
- IN 3 – the file is being played 3.mp3,
- IN 4 – the file is being played 4.mp3,
- IN 5 – the file is being played 5.mp3,

- IN 6 – the file is being played 6.mp3,
- IN 7 – the file is being played 7.mp3,
- IN 8 – the file is being played 8.mp3,
- IN 9 – the file is being played 9.mp3,
- IN 10 – the file is being played 10.mp3.

Playing the next file is possible only after the current file has finished playing.

d) numbers 2 – same as the special mode, except that during playback, pressing another button stops playback.

5. Configuration file

In addition to the configuration jumpers described in chapter 3, you can configure the player using a configuration file. This file should be uploaded to the SD card and it is read each time the device is turned on.

A sample file can be downloaded from the product page.

File details:

Name: audio.txt

Available settings:

- a) INTVOL:5
- b) MBBAUD:38400
- c) MBPAR:2
- d) MBADDR:30

Description of settings:

- INTVOL - maximum volume level when playing MP3 files (max 28),
- MBBAUD – Modbus transmission speed (available speeds: 2400, 4800, 9600, 19200, 38400, 57600, 115200, 256000),
- MBPAR - Modbus parity (0 = ODD, 1 = EVEN, 2 = NONE),
- MBADDR – Modbus device address.

6. Modbus Slave

Modbus communication is always available in any mode. For correct communication, set the transmission parameters in the audio.txt file (see chapter 5), such as:

- baudrate: MBBAUD,
- parity: MBPAR,
- slave module address: MBADDR.

Other parameters:

- Number of bits: 8
- Stop bit: 1
- waiting time for a response: min. 2 sec.

The Modbus protocol supports the following functions:

a) readable:

- Coils – address 51 – details in chapter 6.1
- Holding Registers – addresses 101 - details in chapter 6.2

b) writable:

- Holding Registers – addresses 101 - details in chapter 6.2

7.1 Modbus Slave - Coils

The supported function of the device is the ability to read Coils, starting with address 51. This function is only for reading the current status of the device. A maximum of 2 values can be read:

- address 51 (IS_READY): 0 = player not ready, 1 = player ready,
- address 52 (AUDIO_PLAYING): 0 = the audio track from the SD card is not played, 1 = it is playing the audio track from the SD card.

7.2 Modbus Slave – Holding Registers

The supported function of the device is the ability to read Holding Registers starting with addresses 101. Both addresses have possibility to read and write.

1. Holding Registers – readings:

- a) address 101 (VOL): playback volume, from 0 = mute, the maximum volume level is 28.
- b) address 102: number of current played file.

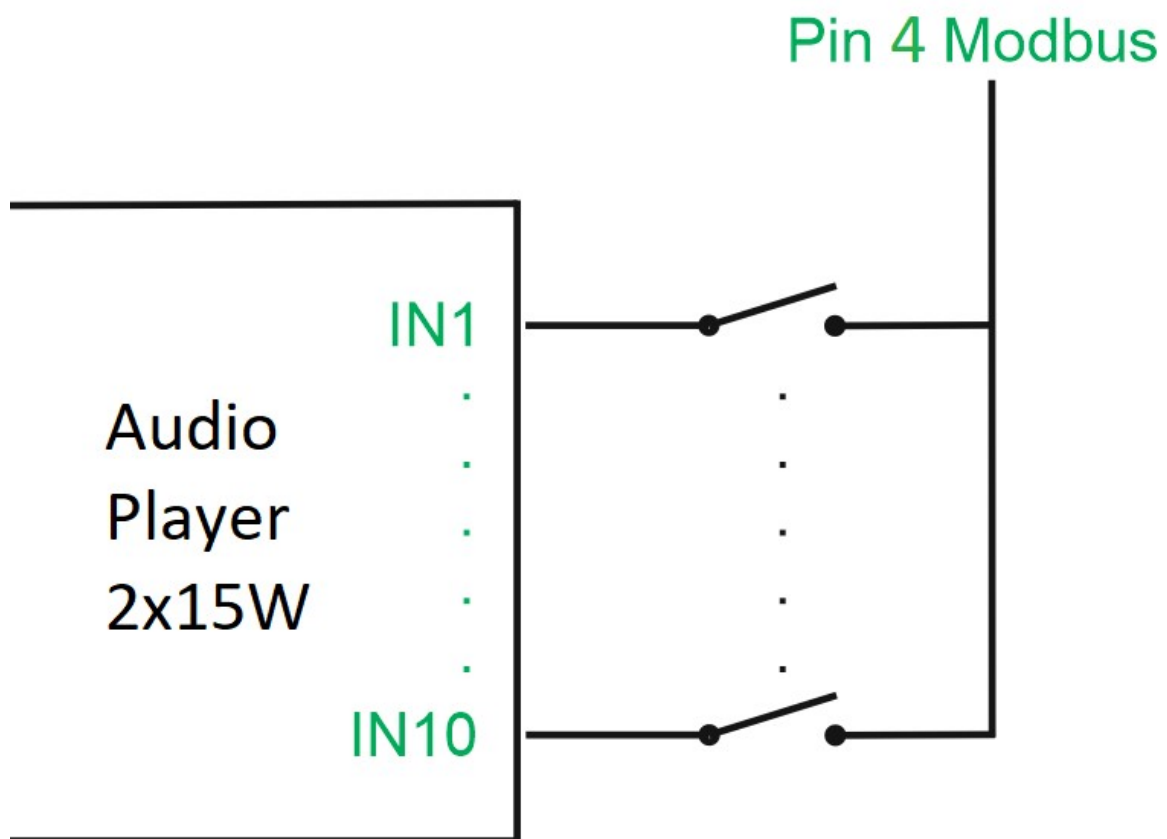
2. Holding Registers – write:

- a) address 101 (VOL): playback volume, from 0 = mute, the maximum volume level is 28.
- b) address 102: write into this register will play the file with the given number. Ranges from 1 (1.mp3) to 254 (254.mp3). The number 255 stops playback

7. Inputs - connections

The control inputs have been designed in such a way that they can be controlled by means of an active signal from 5V-24V. In order to control them, you can use the pin number 1 from the MODBUS connector (description in chapter 2).

You can use relays or normally open buttons to control the IN1-IN10 inputs. The minimum contact time is 100ms. Connection examples:

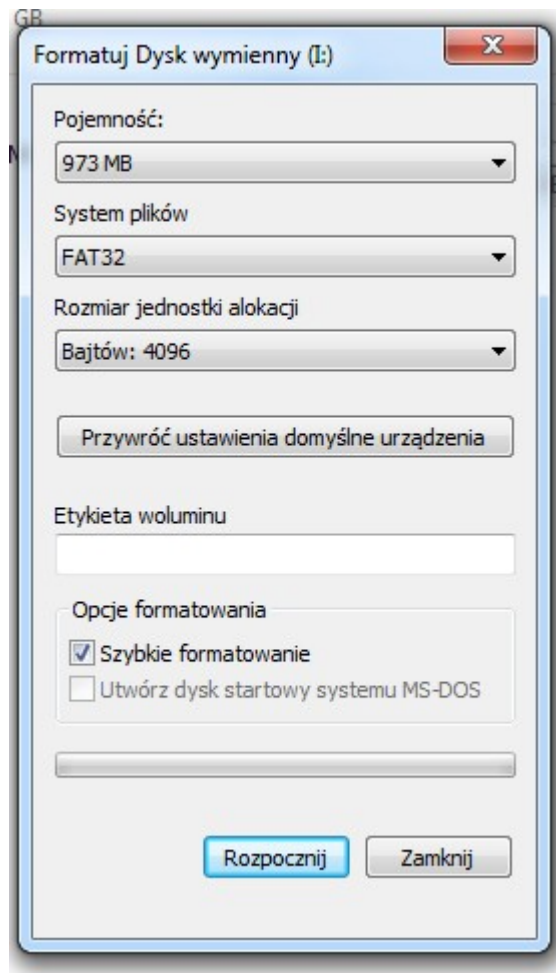


8. Preparing a SD card

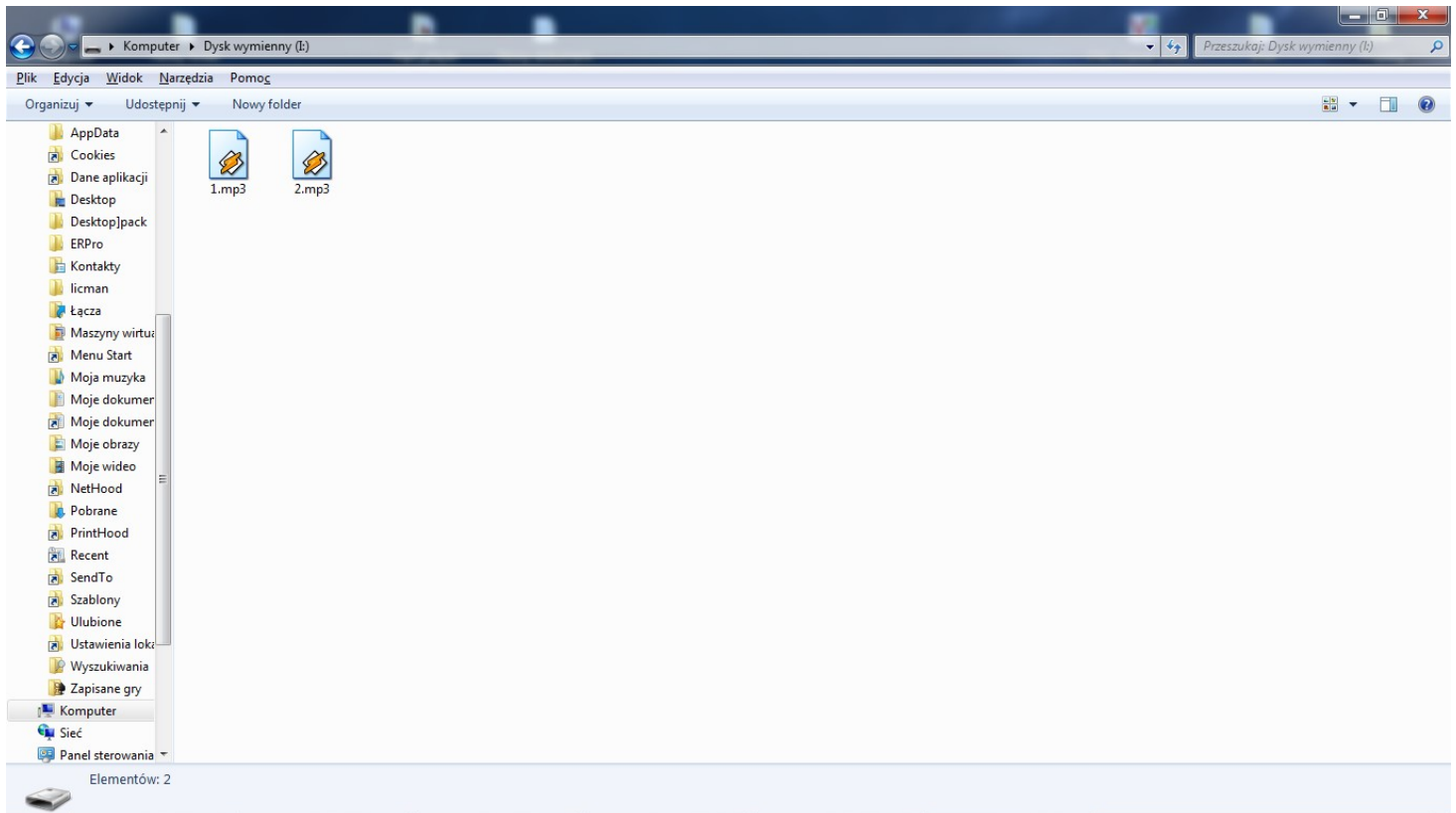
MP3 Player support SD memory with FAT 16/32 file systems. In this case you need to prepare SD card memory using computer with Windows OS.

Put your SD card into free SD card reader to computer or by using USB<=>SD adapter. Click a right mouse button on new installed removable disk and select 'format' option. Choose an FAT32 partition type and press button 'start'.

Example:



After successfully device format we can put mp3 files into removable disk:



MP3 Player doesn't support any files other than .mp3 extension and folders other than root.

WARNING:

It is not recommended to format your SD card in PC with MAC OS.

9. Technical specification

Parameter	Comment	Min	Typ	Max	Unit.
Input Power Supply		11	-	25	V
Max Current Consumption				6	A
Signal to noise SNR	VDD = 12 V, RSPK = 8 Ω , -60dBFS Input		99.7		dB
	VDD = 24 V, RSPK = 8 Ω , -60dBFS Input		98.8		dB
Total Harmonic Distortion + Noise	VDD = 12 V, RSPK = 8 Ω , Po = 1 W		0.02		%
	VDD = 24 V, RSPK = 8 Ω , Po = 1 W		0.02		%
Amplifier Output Power per 1 channel	PVDD = 12 V, RSPK = 4 Ω , THD+N = 0.1%		14		W
	PVDD = 12 V, RSPK = 8 Ω , THD+N = 0.1%		8		W
	PVDD = 24 V, RSPK = 4 Ω , THD+N = 0.1%,		11		W
	PVDD = 24 V, RSPK = 8 Ω , THD+N = 0.1%		15		W