PX348

PxArt Audio

User manual

Table of Contents

1   Description

PxArt Audio is a component of sound system designed for mounting on GLOBAL Trac® Pulse Control.

The device consists of a speaker, amplifier and *.wav file player, whole is connected to the control bus GT Pulse Control using included adapter.

From firmware version 1.28 on the SD/SDHC memory card you can put 85 or 255 songs in the root directory of the card in *.wav format of any length, the only limitation is the memory card capacity. In addition, from firmware version 1.28, it is possible to create up to 9 playlists with 85 or 255 songs each, which allows to play up to 765 or 2295 songs.

The PX348 allows to play audio tracks anywhere in the room equipped with a bus-bar system without the need for additional installation. The player can work with DMX devices in a mode that takes up 4, 5, 7 or 8 DMX channels.

Functions implemented by PX348 using DMX control allow for playback, selection of a particular song, choosing a playlist, looping one and multiple track or random playback of songs, smooth volume control, bass and treble.

Using the PxArt Settings Controller (PX277) it is possible to adjust the low and high tones and set the DMX address. PX277 also allows to define the behavior of the player in the absence of a DMX signal.

2 Safety conditions

The PX348 device is powered directly from standard 230V AC grid what can cause electric shock when safety rules are not observed.

Therefore it is necessary to observe the following:

1. Installation, particularly power connection, should be performed by a person holding the appropriate qualifications, according to instruction manual.
2. The electrical installation to which the lamp is to be connected must meet the safety requirements (the installation must be 3-wire and provided with a residual current device).
3. All the conductors should be protected against mechanical and thermal damage.
4. In the event of damaging any conductor, it should be replaced with a conductor of the same technical data.
5. All repairs, should be made with cut off power supply.
6. Device with visible mechanical damage cannot be connected to the mains.
7. The device should be strictly protected against water and other liquids.
8. All sudden shocks, particularly dropping, should be avoided.
9. The device cannot be used in places with temperature lower than 2°C or higher than 40°C.
10. The device cannot be turned on in places with humidity exceeding 90%.

11. Clean with damp cloth only – device should be cut off power supply.

3 Connectors and control elements

SD/SDHC card slot

SD Card

Parametr programming
interface
(using PX277)

Diode informing about
state of PxArt Audio

link
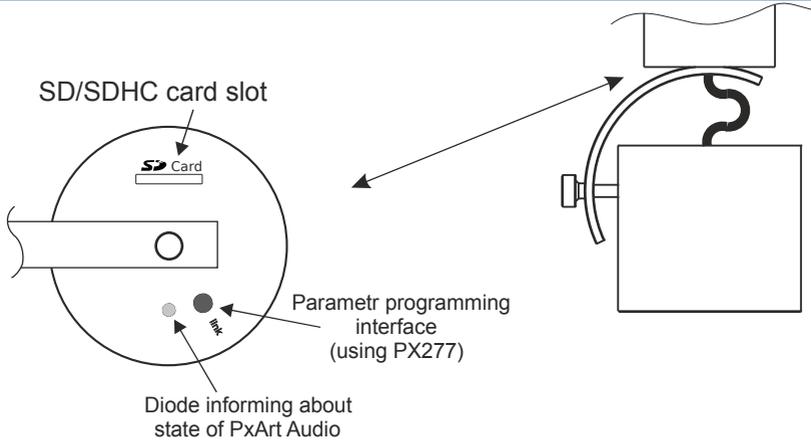
4 Information about the version

The PX348 is available in several versions differing in the color of the housing.

Determination of housing color:

PX348 – X

X – available colors of housing:

1 – white

2 – black

3 – gray

Example of the PxArt Audio design for white color:

PX348-1

5   Audio, memory card and files naming

The player built into PxArt Audio only supports audio files saved in *.wav format <u>with the following parameters:</u>

- *.wav files with bits per sample value of 16-bit on two-channels
- acceptable sampling frequencies:
    - 48kHz
    - 44.1kHz
    - 32kHz
    - 22.05kHz
    - 16kHz
    - 11.025kHz
    - 8kHz

NOTE! The player supports only SD or SDHC cards formatted in the FAT32 file system. Moreover, the memory card cannot contain more than 85 files. A higher number of tracks or additional directories can result in the module's malfunctions when changing tracks.

Playlists 1 through 8 are in the folders on the SD / SDHC memory card with the following names: *P01 … P08*. The ninth playlist is the *Root*, which is the main directory of the memory card.

<u>Tracks on the SD card should be named according to the following principle:</u>

<div align="center">xxx_ABCD...Z.wav</div>

where:

xxx – numbers from 001 up to 255

ABC...Z – up to 16 alphanumeric characters

.wav – WAV files extension

<u>Example:</u>

001_FryderykChopin.wav

002_Beethoven.wav

003_Mozart.wav

…

085_Mendelssohn.wav

NOTE! If the correct track naming or the maximum number of tracks are not followed, playback or track changing problems may occur.

6   Cooperation with the PX277 configurator

The PxArt Audio settings can be changed by connecting to the PX277 (PxArt Settings Controller) configurator. It allows in connection with PX348 to define the following parameters: DMX address (in the range of 1 – 512), the value of bass and treble and the behavior of the device in the absence of DMX signal.

When the loudspeaker is connected to the configurator, the PX348 will restart, and the LED will go out for a while.

After the connection has been made and the parameters have been read by the PxArt Settings Controller, the speaker settings are returned to the state before the connection.

6.1 Information parameters

Current information parameters about PX348, which can be read on the PX277 screen:

- currently performed action,
- playlist and track number,
- playing time / track time,
- volume in [%],
- playback mode,
- bass and treble settings,
- device number and model,
- serial number,
- software version.
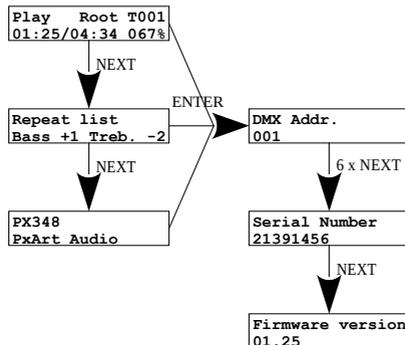
6.2 DMX address

In the **[DMX Addr.]** Menu it is possible to change the DMX address in groups for a device within the range 1 – 512.

```
         ┌────────────────┐
         │Play   Root T001│
         │01:25/04:34 067%│
         └────────────────┘
              │ NEXT
              ▼
         ┌────────────────┐  ENTER   ┌────────────┐  ENTER   ┌────────────┐
         │Repeat list     │─────────▶│DMX Addr.   │─────────▶│DMX Addr.   │
         │Bass +1 Treb. -2│          │001         │          │001 *       │
         └────────────────┘          └────────────┘          └────────────┘
              │ NEXT                                                │ NEXT
              ▼                                                     ▼
         ┌────────────────┐                                   ┌────────────┐
         │PX348           │                                   │DMX Addr.   │
         │PxArt Audio     │                                   │509 *       │
         └────────────────┘                                   └────────────┘
```
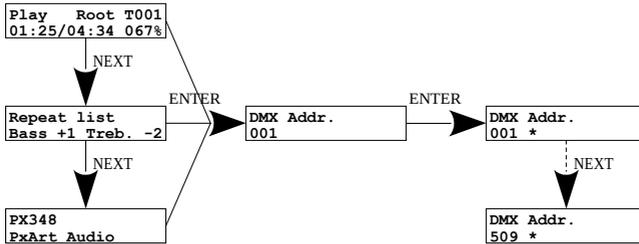
NOTE! Remember not to set the DMX address beyond the addressing.

- **4ch** – DMX range 1 – 509,
- **5ch** – DMX range 1 – 508,
- **7ch** – DMX range 1 – 506,
- **8ch** – DMX range 1 – 505.

6.3 Operating mode

[DMX mode] – that is, the operating mode of the device after connecting the DMX signal (*4ch* – four-channel, *5ch* – five-channel, *7ch* – seven-channel, *8ch* – eight-channel):

- Channel 1 – stop, pause / resume, start,
- Channel 2 – track number selection (001 … 85 / 001 … 255),
- Channel 3 – playback mode:
  - *Single track* – play the song only once,
  - *Repeat track* – looping a song,
  - *Single playlist* – play the playlist once,
  - *Repeat playlist* – looping a playlist,

- *Single random* – play a random song once,
- *Repeat random* – play a random track in a loop,
- *Rand. all once* – play randomly playlist once,
- *Rand. all loop* – play random tracks in a loop,
- Channel 4 – volume control (0 – 100%),
- Channel 5:
  - **5ch** – change playlist,
  - **7ch** / **8ch** – bass control (-10 … 10),
- Channel 6 – treble adjustment (-10 … 10),
- Channel 7 – *unused*,
- Channel 8 – change playlist (only in **8ch** mode).

```
┌─────────────────┐
│Play    Root T001│
│01:25/04:34 067% │
└─────────────────┘
        │ NEXT                    ENTER
        ▼
┌─────────────────┐        ┌─────────────────┐
│Repeat list      │        │DMX Addr.        │
│Bass +1 Treb. -2 │        │001              │
└─────────────────┘        └─────────────────┘
        │ NEXT                    │ NEXT
        ▼                         ▼
┌─────────────────┐        ┌─────────────────┐   ENTER   ┌─────────────────┐
│PX348            │        │DMX Mode.        │           │DMX Mode.        │
│PxArt Audio      │        │4 ch             │  ───────► │4 ch *           │
└─────────────────┘        └─────────────────┘           └─────────────────┘
                                                                 │ NEXT
                                                                 ▼
                                                         ┌─────────────────┐
                                                         │DMX Mode.        │
                                                         │7 ch *           │
                                                         └─────────────────┘
                                                                 │ NEXT
                                                                 ▼
                                                         ┌─────────────────┐
                                                         │DMX Mode.        │
                                                         │5 ch *           │
                                                         └─────────────────┘
                                                                 │ NEXT
                                                                 ▼
                                                         ┌─────────────────┐
                                                         │DMX Mode.        │
                                                         │8 ch *           │
                                                         └─────────────────┘
```
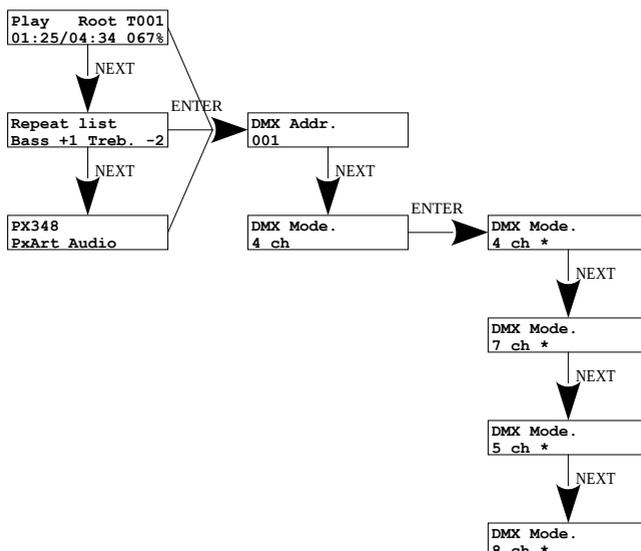
6.4   The reaction to the DMX signal lack

[No signal] – defines how the device is to behave in the absence of DMX signal, possible options to choose from:

- **[NOS Function]** – No Signal function:
  - ○ *off* – playback stops when the DMX signal is lost
  - ○ *run* – the player will perform the functions defined in **[NOS Command], [NOS Playlist], [NOS Track], [NOS PlayMode], [NOS Volume], [NOS Bass], [NOS Treble]**,
  - ○ *last* – the player continues to operate as it was
- **[NOS Command]** – behavior of the device in the event of loss of the control signal (*play*, *stop*, *pause*)
- **[NOS Playlist]** – playlist to be played in the absence of DMX signal (*Root*, *P01 … P08*)
- **[NOS Track** – track that will be played in the absence of DMX signal (*001 … 085* or *001 … 255*)
- **[NOS PlayMode]** – the mode in which the songs will be played
  - ○ *Single track* – play the song only once
  - ○ *Repeat track* – looping a song
  - ○ *Single playlist* – play the playlist once
  - ○ *Repeat playlist* – looping a playlist
  - ○ *Single random* – play a random song once
  - ○ *Repeat random* – play a random track in a loop
  - ○ *Rand. all once* – play randomly playlist once
  - ○ *Rand. all loop* – play random tracks in a loop

- **[NOS Volume]** – volume level of the songs being played, value in the range 0 – 100%
- **[NOS Bass]** – setting the bass parameters in the range -10 to 10
- **[NOS Treble]** – treble setting in the range -10 to 10

```
Play   Root T001
01:25/04:34 067%
        | NEXT
        |            ENTER
Repeat list      ------->   DMX Addr.
Bass +1 Treb. -2            001
        | NEXT                | 2 x NEXT
        |                     |
PX348              No signal    ENTER      NOS Function                          ENTER                        NOS Function
PxArt Audio                ------->       off                ---------------------------------------->       off *
                                           | NEXT                                                                | NEXT
                                          NOS Command          ENTER            NOS Command                  NOS Function
                                          stop               ------->          stop *                        last *
                                           | NEXT                                | NEXT                         | NEXT
                                          NOS Playlist         ENTER    NOS Playlist      NOS Command        NOS Function
                                          Root               ------->  Root *            pause *             run *
                                           | NEXT                        | NEXT            | NEXT
                                          NOS Track   ENTER   NOS Track   NOS Playlist     NOS Command
                                          001       ------->  001 *       P01 *            play *
                                           |                   | NEXT      | NEXT
                                           |                  NOS Track   NOS Playlist
                                           | NEXT            085 *        P08 *
                                           |                             NOS Track
                                           |                             255 *
                                          NOS Playmode                 ENTER                              NOS Playmode
                                          Single track   ------------------------------------------>     Single track *
                                           | NEXT                                                            | NEXT
                                          NOS Volume          ENTER                     NOS Volume        NOS Playmode
                                          000%         -------------------------->      000% *            Repeat track *
                                           |                                             | NEXT              | NEXT
                                           |                            NOS Bass        NOS Volume        NOS Playmode
                                           |                            -10 *           100% *            Single list *
                                           | NEXT                         | PREV                            | NEXT
                                          NOS Bass        ENTER          NOS Bass                         NOS Playmode
                                          0          ------->            0 *                              Repeat list *
                                           |                              | NEXT                            | NEXT
                                           |                  NOS Treble  NOS Bass                        NOS Playmode
                                           |                  -10 *       10 *                            Single random *
                                           | NEXT               | PREV                                     | NEXT
                                          NOS Treble  ENTER    NOS Treble                                 NOS Playmode
                                          0          ------->  0 *                                        Repeat random *
                                                                | NEXT                                     | NEXT
                                                               NOS Treble                                NOS Playmode
                                                               10 *                                      Rand. all once
                                                                                                           | NEXT
                                                                                                        NOS Playmode
                                                                                                        Rand. all loop
```
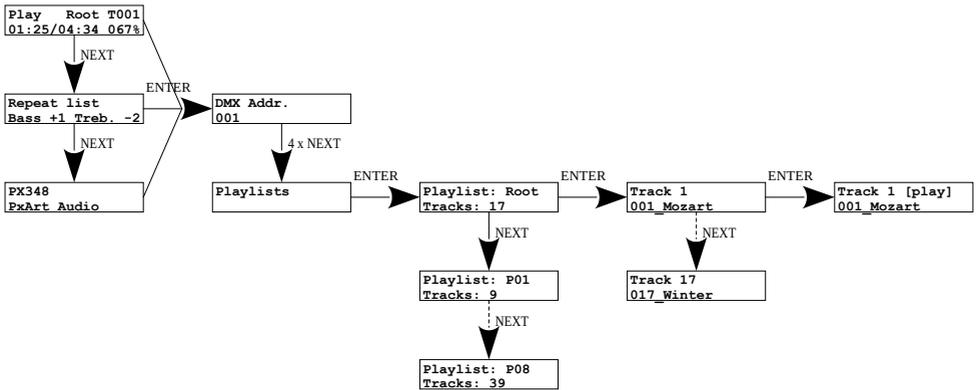
6.5   Additional options

Additional PX348 settings are available in the **[Options]** menu, they are:

- **[Neutral 0]** – interpreting a DMX value of 0. By default, a value of zero for each channel alters the behavior of the fixture (e.g., for channel 1 it stops playback), but when **[Neutral 0]** is *Enabled*, a value of zero is treated as neutral.

- **[DMX Filter]** – filtration of short-term changes in the DMX signal. The player will react to the value if it remains unchanged for at least 5 DMX frames.

- **[Equalizer]** – turning on the equalizer allows to change the tone in the **[No signal]** → **[NOS Bass]** / **[NOS Treble]** menu. Switching off increases the volume.

- **[More Tracks]** – activating this function allows to handle up to 255 tracks on one playlist, by default this option is off (support for up to 85 tracks on one playlist). After turning this function on or off, the device must be restarted.

```
┌─────────────────┐
│Play   Root T001 │
│01:25/04:34 067% │
└─────────────────┘
        │ NEXT
        ▼
┌─────────────────┐      ENTER      ┌─────────────────┐
│Repeat list      │────────────────▶│DMX Addr.        │
│Bass +1 Treb. -2 │                 │001              │
└─────────────────┘                 └─────────────────┘
        │ NEXT                              │ 3 x NEXT
        ▼                                   ▼
┌─────────────────┐                 ┌─────────────────┐   ENTER    ┌─────────────────┐   ENTER    ┌─────────────────┐
│PX348            │                 │Options          │───────────▶│Neutral 0        │───────────▶│Neutral 0        │
│PxArt Audio      │                 │                 │            │Disabled         │            │Disabled *       │
└─────────────────┘                 └─────────────────┘            └─────────────────┘            └─────────────────┘
                                                                            │ NEXT                          │ NEXT
                                                                            │                               ▼
                                                                            │                      ┌─────────────────┐
                                                                            │                      │Neutral 0        │
                                                                            │                      │Enabled *        │
                                                                            │                      └─────────────────┘
                                                                            ▼
                                                                   ┌─────────────────┐   ENTER    ┌─────────────────┐
                                                                   │DMX Filter       │───────────▶│DMX Filter       │
                                                                   │Disabled         │            │Disabled *       │
                                                                   └─────────────────┘            └─────────────────┘
                                                                            │ NEXT                          │ NEXT
                                                                            │                               ▼
                                                                            │                      ┌─────────────────┐
                                                                            │                      │DMX Filter       │
                                                                            │                      │Enabled *        │
                                                                            │                      └─────────────────┘
                                                                            ▼
                                                                   ┌─────────────────┐   ENTER    ┌─────────────────┐
                                                                   │Equalizer        │───────────▶│Equalizer        │
                                                                   │Disabled         │            │Disabled *       │
                                                                   └─────────────────┘            └─────────────────┘
                                                                            │ NEXT                          │ NEXT
                                                                            │                               ▼
                                                                            │                      ┌─────────────────┐
                                                                            │                      │Equalizer        │
                                                                            │                      │Enabled *        │
                                                                            │                      └─────────────────┘
                                                                            ▼
                                                                   ┌─────────────────┐   ENTER    ┌─────────────────┐
                                                                   │More Tracks      │───────────▶│More Tracks      │
                                                                   │Disabled         │            │Disabled *       │
                                                                   └─────────────────┘            └─────────────────┘
                                                                                                           │ NEXT
                                                                                                           ▼
                                                                                                  ┌─────────────────┐
                                                                                                  │More Tracks      │
                                                                                                  │Enabled *        │
                                                                                                  └─────────────────┘
```

6.6   Playlists

Using the PX277 keyboard, it is possible to preview playlists and the songs in them. Information is displayed how many songs are in the selected playlist, in addition, each song can be played.
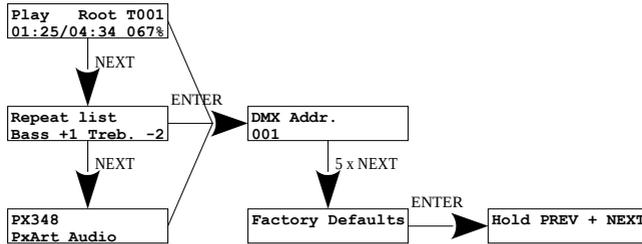
```
┌──────────────────┐
│ Play   Root T001 │
│ 01:25/04:34 067% │
└──────────────────┘
   │           ╲
   │ NEXT       ╲
   ▼      ENTER  ╲
┌──────────────────┐      ┌──────────────┐
│ Repeat list      │─────▶│ DMX Addr.    │
│ Bass +1 Treb. -2 │      │ 001          │
└──────────────────┘      └──────────────┘
   │                          │
   │ NEXT                     │ 4 x NEXT
   ▼                          ▼
┌──────────────────┐      ┌──────────────┐
│ PX348            │      │ Playlists    │
│ PxArt Audio      │      │              │
└──────────────────┘      └──────────────┘
```

ENTER → Playlist: Root / Tracks: 17
NEXT → Playlist: P01 / Tracks: 9
NEXT → Playlist: P08 / Tracks: 39

ENTER → Track 1 / 001_Mozart
NEXT → Track 17 / 017_Winter

ENTER → Track 1 [play] / 001_Mozart

6.7   Default settings

Restoring factory settings is available in the menu. Using the **[Factory Defaults]** function will restore the factory settings:

- **DMX Addr.**: 001
- **DMX Mode**: 4 ch
- **No Signal**:
  - **NOS Function**: off
  - **NOS Command**: play
  - **NOS Playlist**: Root
  - **NOS Track**: 001
  - **NOS PlayMode**: Repeat list
  - **NOS Volume**: 010%
  - **NOS Bass**: 0
  - **NOS Treble**: 0
- **Options**:
  - **Neutral 0**: Disabled

- ◦ **DMX Filter**: Enabled

- ◦ **Equalizer**: Enabled

- ◦ **More Tracks**: Disabled


```
┌──────────────────┐
│ Play    Root T001│
│ 01:25/04:34 067% │
└──────────────────┘
        │ NEXT
        ▼                ENTER
┌──────────────────┐   ──────▶  ┌──────────────────┐
│ Repeat list      │            │ DMX Addr.        │
│ Bass +1 Treb. -2 │            │ 001              │
└──────────────────┘            └──────────────────┘
        │ NEXT                          │ 5 x NEXT
        ▼                               ▼           ENTER
┌──────────────────┐            ┌──────────────────┐ ────▶ ┌──────────────────┐
│ PX348            │            │ Factory Defaults │       │ Hold PREV + NEXT │
│ PxArt Audio      │            └──────────────────┘       └──────────────────┘
└──────────────────┘
```

7   DMX connection

PxArt Audio is a device attached to the GLOBAL Trac® Pulse Control rail by using the GAC 600 adapter included in the kit.

7.1   GLOBAL Trac® GAC 600 adapter
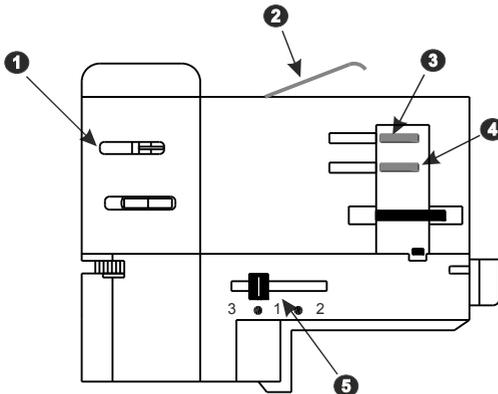
DMX contacts

❶ DMX - (on the opposite side DMX +)

MAINS POWER SUPPLY

❷ protective ⏚

❸ phase 1 (on the opposite) side phase 2)

❹ neutral (on the opposite side phase 3)

❺ phase selection switch

7.2 The cross-section of the DMX GLOBAL Trac® Pulse Control

POWER SUPPLY

❶ phase 2
❷ phase 3
❸ phase 1
❹ neutral

DMX
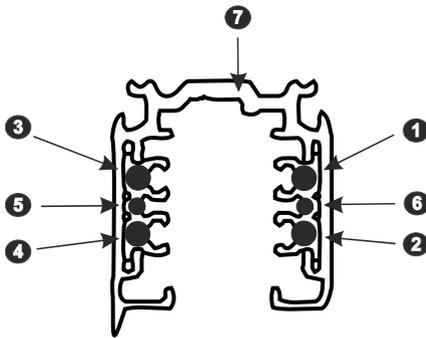
❺ DMX -
❻ DMX +
❼ mass (GND)

8   DMX-512 control

The device can be controlled via 4, 5, 7 or 8 DMX-512 channels.

8.1   Control via 4 or 5 channels

Channel 1: stop, pause, resume, start.

DMX values:

   0 – 63 – [*stop*]

   64 – 127 – [*pause*]

   128 – 255 – resume / start [*play*]

Channel 2: track number selection (1 – 85)

DMX value	0-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24	25-27	28-30	31-33
Track number	1	2	3	4	5	6	7	8	9	10	11
DMX value	34-36	37-39	40-42	43-45	46-48	49-51	52-54	55-57	58-60	61-63	64-66
Track number	12	13	14	15	16	17	18	19	20	21	22
DMX value	67-69	70-72	73-75	76-78	79-81	82-84	85-87	88-90	91-93	94-96	97-99
Track number	23	24	25	26	27	28	29	30	31	32	33
DMX value	100-102	103-105	106-108	109-111	112-114	115-117	118-120	121-123	124-126	127-129	130-132
Track number	34	35	36	37	38	39	40	41	42	43	44
DMX value	133-135	136-138	139-141	142-144	145-147	148-150	151-153	154-156	157-159	160-162	163-165
Track number	45	46	47	48	49	50	51	52	53	54	55
DMX value	166-168	169-171	172-174	175-177	178-180	181-183	184-186	187-189	190-192	193-195	196-198
Track number	56	57	58	59	60	61	62	63	64	65	66
DMX value	199-201	202-204	205-207	208-210	211-213	214-216	217-219	220-222	223-225	226-228	229-231
Track number	67	68	69	70	71	72	73	74	75	76	77
DMX value	232-234	235-237	238-240	241-243	244-246	247-249	250-252	253-255			
Track number	78	79	80	81	82	83	84	85			

NOTE! When [More Tracks] is active, the DMX signal value corresponds to the track number.

Channel 3: playback mode

<u>DMX values:</u>

0 – 64	– play the song only once (*Single track*)
65 – 127	– looping a song (*Repeat track*)
128 – 191	– play the playlist once *(Single list)*
192 – 251	– looping a playlist (*Repeat list*)
252	– play a random song once (*Single random*)
253	– play a random track in a loop (*Rand. all once*)
254	– play randomly playlist once (*Repeat random*)
255	– play random tracks in a loop (*Rand. all loop*)

Channel 4: volume control

On the fourth DMX channel, the device supports volume control in the range from 0 up to 100%. The volume is changed linearly in accordance with the following schedule: for the DMX signal with a value of 0 the volume is 0%, while for the value of 255 the volume is 100%.
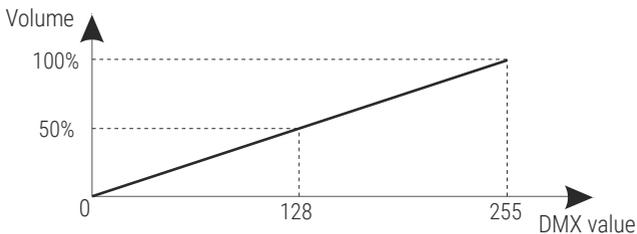
Channel 5: change of playlist (only available for 5-channel **5 ch** control mode)

DMX value	0	1	2	3	4	5	6	7	8	9 – 255
Playlist number	Root	P01	P02	P03	P04	P05	P06	P07	P08	Root

NOTE! In 4-channel mode, only files from the root playlist (root directory on the memory card) are played. Playback of 85 tracks (first 85 out of 255) and 4 ch mode are set to the default.

8.2   Control via 7 or 8 channels

In the seven DMX channels mode, in addition to the same settings on the first four channels (as for the four-channel mode), PX348 can change parameters of [*Bass*] and [*Treble*] on the fifth and sixth channel.

All channels in this mode are described below:

Channel 1: stop / pause / play

Channel 2: track number selection (1 – 85) / (1 – 255)

Channel 3: playback mode – *Single track*, *Repeat track*, *Single list*, *Repeat list*, *Single random*, *Repeat random*, *Rand. all once*, *Rand. all loop*

Channel 4: volume control (0 – 100%)

NOTE! Channels from 1 to 4 are described in detail in section 8.1. Control via 4 or 5 channels.

Channel 5: bass control (-10 to +10)

Channel 6: treble control (-10 to +10)

For each of the three additional channels (5 and 6), adjustment through DMX control is made for the same values. These values are shown in the table below.

DMX value	0-12	13-24	25-36	37-48	49-60	61-72	73-84	85-96	67-108	109-120	**121-135**
Adjustment value	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	**0**
DMX value	136-147	148-159	160-171	172-183	184-195	196-207	208-219	220-231	232-243	244-255	
Adjustment value	1	2	3	4	5	6	7	8	9	10	

<u>Channel 7:</u> *unused*

<u>Channel 8:</u> change of the playlist (available only for 8-channel **8 ch** control, DMX values corresponding to a specific playlist are described in the channel 5 table in point 8.1. Control via 4 or 5 channels)

NOTE! In 7-channel mode, only files from the root playlist (root directory on the memory card) are played.

9 Connection scheme

1 3-phase DMX GLOBAL Trac® Pulse Control bus-bar

2 end feed

3 power supply cable

4 DMX wire (2 wires in the screen)

5 GLOBAL Trac® GAC600 adapter

DMX+
DMX-
GND

10 Dimensions

57

264

Ø121,5

159
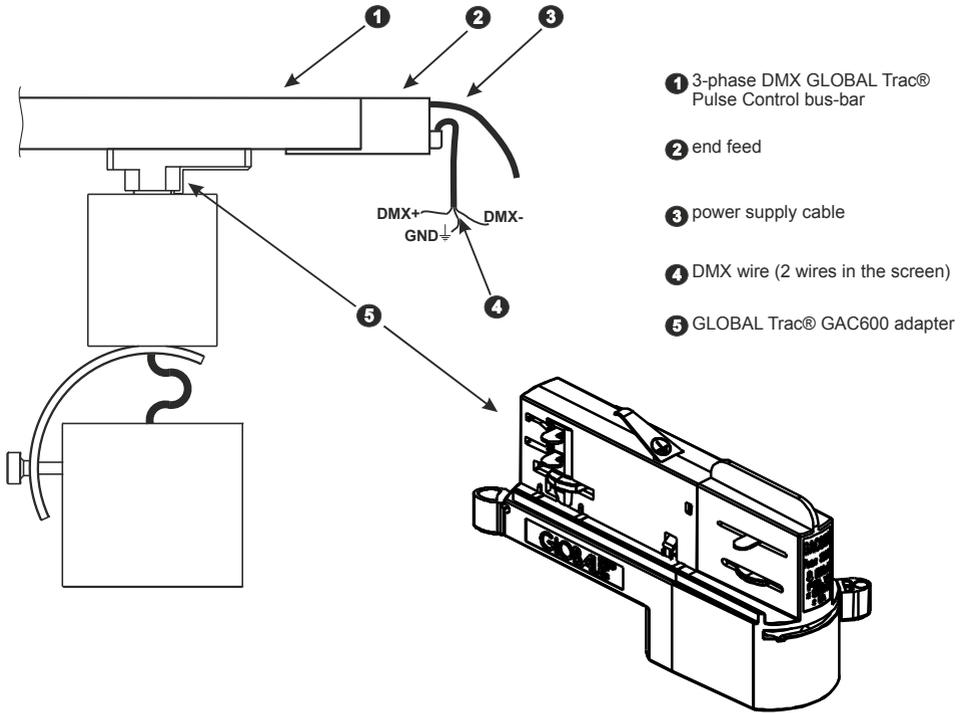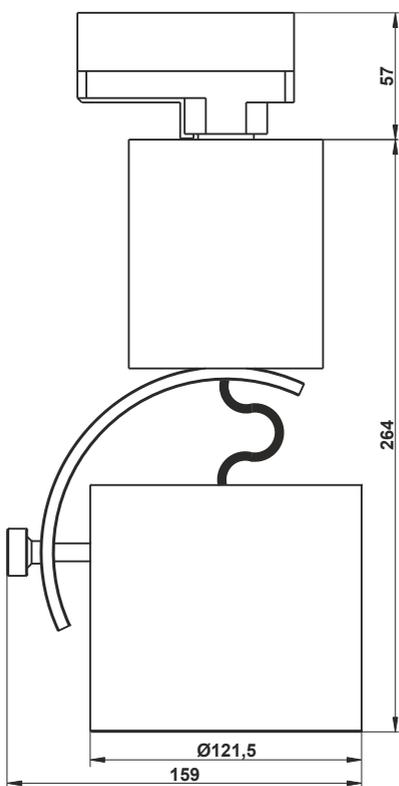
11   Technical data

type	PX348
power supply	230V AC
DMX channels	4, 5, 7 or 8
amplifier power output	10W
audio digital format	*.wav
audio media cards type	SD / SDHC
max. supported number of tracks	up to 2295* (in 9 playlists)
device programming	yes (using PX277)
DMX-512 control LED	yes
mounting	GLOBAL Trac® Pulse Control bus-bar
available housing colors	silver, black or white
weight	3.6kg
dimensions	diameter: 121,5mm height: 264mm

* - from the firmware version 1.28

DECLARATION OF CONFORMITY

PXM Marek Żupnik spółka komandytowa
Podłęże 654, 32-003 Podłęże

we declare that our product:

Product name: PxArt Audio

Product code: PX348

meets the requirements of the following standards, as well as harmonised standards:

PN-EN IEC 63000:2019-01	EN IEC 63000:2018
PN-EN 62368-1:2020-11	EN 62368-1:2020
PN-EN 61000-4-2:2011	EN 61000-4-2:2009
PN-EN IEC 61000-6-1:2019-03	EN IEC 61000-6-1:2019
PN-EN 61000-6-3:2021-08	EN 61000-6-3:2021

and meets the essential requirements of the following directives:

2011/65/UE DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
Text with EEA relevance.

2014/30/UE DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)
Text with EEA relevance.

2014/35/UE DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

PXM
Marek Żupnik spółka komandytowa
32-003 Podłęże, Podłęże 654
NIP 677-002-54-53

mgr inż. Marek Żupnik.