







#### **General information**

## Ti10 Manual

Version: 1.2 en, 10/2018, D2602.EN .01

Copyright © 2018 by d&b audiotechnik GmbH & Co. KG; all rights reserved.

# Keep this document with the product or in a safe place so that it is available for future reference.

We recommend you to regularly check the d&b website for the latest version of this document.

When reselling this product, hand over this document to the new owner.

If you supply d&b products, please draw the attention of your customers to this document. Enclose the relevant documents with the systems. If you require additional documents for this purpose, you can order them from d&b.

d&b audiotechnik GmbH & Co. KG Eugen-Adolff-Str. 134, D-71522 Backnang, Germany T +49-7191-9669-0, F +49-7191-95 00 00

1	Safety precautions	4
1.1	Information regarding the use of loudspeakers	4
2	Ti10 loudspeaker	5
2.1	Product description	5
2.2	Connections	6
2.3	Operation	7
2.3.	1 Controller settings	7
2.4	Dispersion characteristics	8
2.5	Technical specifications	9
3	Ti10L Rigging procedure	11
4	Manufacturer's declarations	12
4.1	EU conformity of loudspeakers (CE symbol)	12
4.2	WEEE Declaration (Disposal)	12

# 1.1 Information regarding the use of loudspeakers

## Potential risk of personal injury

Never stand in the immediate vicinity of loudspeakers driven at a high level. Professional loudspeaker systems are capable of causing a sound pressure level detrimental to human health. Seemingly non-critical sound levels (from approx. 95 dB SPL) can cause hearing damage if people are exposed to it over a long period.

In order to prevent accidents when deploying loudspeakers on the ground or when flown, please take note of the following:

- When setting up the loudspeakers or loudspeaker stands, make sure they are standing on a firm surface. If you place several systems on top of one another, use straps to secure them against movement.
- Only use accessories which have been tested and approved by d&b for assembly and mobile deployment. Pay attention to the correct application and maximum load capacity of the accessories as detailed in our specific "Mounting instructions" or in our "Flying system and Rigging manuals".
- Ensure that all additional hardware, fixings and fasteners used for installation or mobile deployment are of an appropriate size and load safety factor. Pay attention to the manufacturers' instructions and to the relevant safety guidelines.
- Regularly check the loudspeaker housings and accessories for visible signs of wear and tear, and replace them when necessary.
- Regularly check all load bearing bolts in the mounting devices.

### Potential risk of material damage

Loudspeakers produce a static magnetic field even if they are not connected or are not in use. Therefore make sure when erecting and transporting loudspeakers that they are nowhere near equipment and objects which may be impaired or damaged by an external magnetic field. Generally speaking, a distance of 0.5 m (1.5 ft) from magnetic data carriers (floppy disks, audio and video tapes, bank cards, etc.) is sufficient; a distance of more than 1 m (3 ft) may be necessary with computer and video monitors.









### 2

#### Ti10 Loudspeaker

Horn and lens in line source setup Ti10L
Horn and lens in point source setup Ti10P

# 2.1 Product description

The Ti10 is a very compact loudspeaker system which can be used both, as a line array and as a high directivity point source speaker. For these applications, the Ti10 cabinet provides two different dispersion characteristics which can be swapped over without any tools.

The core of the design is a unique combination of a rotatable waveguide with horn and an acoustic lens. The horn natively provides a vertical line source with 90° horizontal dispersion. The lens is part of the front grill and widens the HF dispersion in line array mode to 105° (Ti10L).

When used upright as a point source, the lens curves the wavefront of the line source providing a 90° x 35° dispersion pattern (Ti10P).

The Ti10 is a two way design, employing dual 6.5" drivers, a 1.4" exit compression driver and a passive crossover network. The low drivers are positioned in a dipolar arrangement providing an exceptional dispersion control towards low frequencies.

Its frequency response extends from 68 Hz to above 18 kHz.

The cabinet is constructed from polyurethane integral hard foam with an impact and weather resistant black paint finish. The cabinet shape allows the system to be set up as a single unit in upright orientation or as a line array in user defined vertical configurations. The front of the loudspeaker cabinet is protected by a rigid metal grill in front of an acoustically transparent foam.

## Ti-Series rigging components and arrays

For line and point source applications the Ti10 loudspeaker is available in two different cabinet versions which are acoustically identical:

- **Ti10L**: Line source version including line array rigging devices. It can be used as a line array and as a stand-alone loudspeaker with both horn orientations.
- Ti10P: Point source version without line array rigging devices. It can be used as a stand-alone loudspeaker with both horn orientations.

For line array applications Ti10L cabinets are mechanically connected using the rigging strands on both sides of the cabinet front and a central strand at the rear of the cabinet. All necessary rigging components are mounted to the cabinet and are folded or slide out when needed. Splay angles between adjacent cabinets can be set in the range from 0° to 15°. Please also refer to  $\Rightarrow$  Chapter 3 "Ti10L Rigging procedure" on page 11.

For point source applications, the Ti10P is fitted with six threaded inserts to connect to different rigging accessories such as Z5371 T Flying bracket, Z5372 T Horizontal bracket, Z5354 E8/E12 Flying adapter or Z5020 Flying adapter 02/ Z5025 Flying adapter 03.



**Connector wiring** 



Faston type connector, male single PG (standard), dual PG (optional)

# 2.2 Connections

The cabinet is fitted with two NL4 M connectors. All four pins of both connectors are wired in parallel. It uses the pin assignments 1+/1-. Pins 2+/2- are designated to actively driven subwoofers. Using one connector as the input, the second connector allows for direct connection to a second cabinet.

NL4 M	1+	1 -	2+	2-
-------	----	-----	----	----

# d&b LoadMatch

With the d&b four channel amplifier platform, the LoadMatch function enables the amplifier to electrically compensate for the properties of the loudspeaker cable used without the need for an additional sense wire. For applicable loudspeakers, LoadMatch is therefore independent of the connector type used.

## WR option (Weather Resistance)

A number of d&b loudspeakers are available in special options suitable for different types of installed applications and environmental conditions. The following options are available:

 Weather resistant (WR): This option is suitable for outdoor use. The cabinets have an impact and weather protected black PCP (Polyurea Cabinet Protection) finish.

WR cabinets are equipped with a recessed connector panel including a Faston type connector (2 x 6.3 mm, female). A cover plate which accepts single or dual PG cable glands (Type PG13.5 for cable diameters from 6 - 12 mm) is enclosed, as shown in the graphic opposite.

# NOTICE!

The WR option enables operation of loudspeakers in changing ambient conditions, however it is not intended to enable permanent, unprotected operation of loudspeakers outdoors.

- Provide an additional cover over the loudspeakers.
- Aim the cabinets either horizontally or with a downward tilt.

To install the fixed connection cable, please proceed as follows:

Tools required: Screw driver (#T20).

**Note:** Observe the correct polarity of the cable Brown (+) / Blue (-).

- 1. Insert the connection cable through the PG screwing and connect the male connector to the female connector.
- 2. Push the cover plate towards the connector panel until it fits into place.
- 3. Fix the cover plate to the connector panel using the four countersunk screws.

## 2.3 Operation

### NOTICE!

Only operate d&b loudspeakers with a correctly configured d&b amplifier, otherwise there is a risk of damaging the loudspeaker components.

## Applicable d&b amplifiers:

30D/10D/D80/D20/D12/D6.

Application	Setup	Cabinets per channel
Ti1OL Line source	T10 Arc/T10 Line	4
TilOP Point source	T10 PS	4

For applicable d&b amplifiers, the controller setups are available in Dual Channel and/or Mix TOP/SUB mode. For combinations with active subwoofers fed by a single 4-wire cable Mix TOP/SUB mode must be selected.

# "T10 Arc" and "T10 Line" setups

These setups are selected when Ti10L loudspeakers are used as line sources. The selection depends on the curvature of the array. Both setups may be used within one array. The "Arc" setup is used for Ti10L loudspeakers when used in curved array sections. The "Line" setup is used for long throw array sections with three or more consecutive splay settings of 0°, 1° or 2°. Compared to the "Arc" setup, the upper mid range is reduced to compensate for the extended near field. The transition from "Line" to "Arc" configuration within the array is made according to the splay progression but may allow for certain deviations due to the wiring of the cabinets in groups of up to four.

## "T10 PS" setup

This setup has to be selected when Ti10L loudspeakers are configured as a point source or when used as single cabinets with horn in line array configuration (e.g. front fill or ceiling mounted).

### 2.3.1 Controller settings

For acoustic adjustment the functions CUT, HFA, HFC and CPL can be selected.

## CUT mode

Set to CUT, the low frequency level is reduced. The Ti10 is now configured for use with the Ti-SUB or other d&b active subwoofers.



Frequency response correction in HFA mode



Frequency response correction of the HFC function



Frequency response correction of the CPL function

# HFA mode (Ti10 PS setup only)

In HFA mode (High Frequency Attenuation), the HF response of the system is rolled off. HFA provides a natural, balanced frequency response when a cabinet is placed close to listeners in near field or delay use.

High Frequency Attenuation begins gradually at 1 kHz, dropping by approximately 3 dB at 10 kHz. This roll off mimics the decline in frequency response experienced when listening to a system from a distance in a typically reverberant room or auditorium.

# HFC function (Ti10L Arc/Line setups only)

Selecting the HFC (High Frequency Compensation) function compensates for loss of high frequency energy due to absorption in air when loudspeakers are used to cover far field listening positions.

The HFC function has two settings (HFC1, HFC2) for different distances the cabinets need to cover. The settings should be used selectively; HFC1 for cabinets covering distances larger than 25 m (80 ft) and HFC2 for those covering distances larger than 50 m (160 ft).

The compensation is adjusted for a typical relative humidity of 40 %. With lower humidity the absorption by air increases therefore the distances where the respective HFC setting provides a correct equalization are shorter than indicated above.

Using the HFC function provides the correct sound balance between close and remote audience areas, whilst all amplifiers driving the array can be fed with the same signal.

# **CPL** function

The CPL (Coupling) function compensates for coupling effects between the cabinets of an array. CPL begins gradually around 1 kHz, with the maximum attenuation below 400 Hz. As coupling effects increase with the length of the line array, the CPL function can be set to dB attenuation values between 0 and -9. With higher attenuation values the corner frequency of the filter shifts towards lower values.

Positive CPL values create an adjustable low frequency boost (0 to ++5 dB) and can be set when the system is used in full range mode without subwoofers.

**Note:** Make sure that all cabinets within the line array are operated with the same CPL setting.

# 2.4 Dispersion characteristics

The graphs below show dispersion angle over frequency of a single Ti10 cabinet plotted using lines of equal sound pressure (isobars) at -6 dB and -12 dB.



Line setup



Isobar diagram Ti10L line source, vertical



Isobar diagram Ti10P point source, horizontal

1k

2k

4k

8k

16k

500

- 10 - 20 - 30 - 40 - 50 - 60 - 70 - 80

-90

125

250



Point setup



Ti10L frequency response line source, single cabinet, standard and CUT modes

# 2.5 Technical specifications

# Ti10 system data

Frequency response (-5 dB standard)	68 Hz - 18 kHz			
Frequency response (-5 dB CUT mode)	120 Hz - 18 kHz			
Max. sound pressure (Line/Arc setups, 1 m, free field)				
10D/D6	129 dB			
30D/D80/D20/D12	132 dB			
Max. sound pressure (PS setup, 1 m, free field)				
10D/D6	127 dB			
30D/D80/D20/D12	130 dB			
(SPLmax peak, pink noise test signal wi	th crest factor of 4)			



Ti10P frequency response point source, standard and CUT modes







Ti10 cabinet dimensions in mm [inch]

# Ti10L/Ti10P loudspeaker

Nominal impedance	16 ohms
Power handling capacity (RMS/peak 10 ms)	200/800 W
Nominal dispersion angle (line array, horizontal)	105°
Splay angle settings0 15°	°(1° increment)
Nominal dispersion angle (point source, hor. x vert.)	90° x 35°
Components	dymium magnet
1.4" exit compression driver on rotate	able waveguide
	ossover network
Connections	2 x NL4 M
WR option: Faston type connec	tor (2 x 6,3mm)
Pin assignment	NL4 M: 1+/1-
	n: (+) / Blue: (-)
Weight	10.5 kg (23 lb)







Ti10L line arrays are set up using the Z5370 T Flying frame. The rigging procedure follows the description given in the T-Series Rigging manual which is provided with the T Flying frame. However, Ti10L and T10 cabinets have different front rigging mechanisms. The Ti10L front rigging is equipped with hooks and fixed bolts instead of locking pins and is hidden behind a cover in cabinet color.

To attach a Ti10L cabinet to an array or to the T Flying frame, proceed as follows:

- 1. Slide out the Front links and the Splay link of the cabinet.
- 2. Set the Locking pin at the rear rigging of the upper cabinet/ frame to the desired position (splay angle).
- 3. Keep the cabinet at an angle of 90° to the upper cabinet/ frame.
- Insert the Front links into the front rigging of the upper cabinet [1].
- 5. Slowly lower the cabinet and make sure the hooks are engaged in the bolts [2].
- 6. Lift the back of the cabinet **[3]** and hook the Splay link over the preset Locking pin of the upper cabinet/frame **[4]**.
- 7. Insert the second Locking pin (safety pin) to secure the Splay link of the cabinet.

Ti10L line arrays of up to 3 cabinets can be supported with the Z5373T Cluster bracket which allows an easy aiming of the array either flown or mounted on a high-stand.

A detailed description of planning and designing T-Series arrays is given in the technical information "TI 385 d&b Line array design, d&b ArrayCalc" which is also provided with the T Flying frame.

The d&b ArrayCalc simulation software can be downloaded from the d&b website at <u>www.dbaudio.com</u>.

CE

# 4.1 EU conformity of loudspeakers (CE symbol)

This declaration applies to:

# d&b Z0551 Ti10L loudspeaker

## d&b Z0552 Ti10P loudspeaker

manufactured by d&b audiotechnik GmbH & Co. KG.

All product variants are included, provided they correspond to the original technical version and have not been subject to any later design or electromechanical modifications.

We herewith declare that said products are in conformity with the provisions of the respective EC directives including all applicable amendments.

A detailed declaration is available on request and can be ordered from d&b or downloaded from the d&b website at www.dbaudio.com.

# 4.2 WEEE Declaration (Disposal)

Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

Please dispose of this product according to the respective national regulations or contractual agreements. If there are any further questions concerning the disposal of this product, please contact d&b audiotechnik.

WEEE-Reg.-Nr. DE: 13421928

