

Ti10

Manual (1.0 EN)



Symbols on the equipment

Please refer to the information in the operating manual.

WARNING!
Dangerous voltage!

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General Information

Ti10 Manual

Version 1.0 EN, 04/2009, D2602.EN .01

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

When reselling this product, hand over this manual to the new customer.

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

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Safety precautions



WARNING!

Information regarding use of loudspeakers

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.

CAUTION!

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.

Ti10

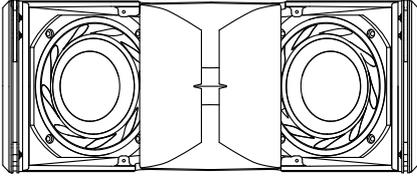


Fig. 1: Ti10 loudspeaker

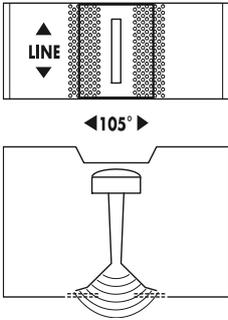


Fig. 2: Ti10 Horn and lens in line source setup

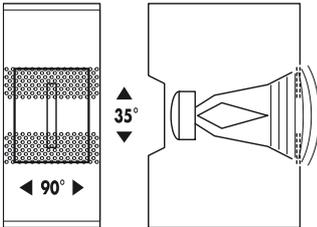


Fig. 3: Ti10 Horn and lens in point source setup

The Ti10 is the installation version of the T10 loudspeaker. It 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°. When used upright as a point source, the lens curves the wavefront of the line source providing a 90° x 35° dispersion pattern.

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 Ti10 enclosure 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.

NOTICE: Only operate Ti10 loudspeakers with a correctly configured d&b amplifier, otherwise there is a risk of damaging the loudspeaker components.

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°.

For point source applications both the Ti10L and Ti10P are fitted with six threaded inserts to connect to different rigging accessories like Z5371 T Flying bracket, Z5372 T Horizontal bracket, Z5354 E8/E12 Flying adapter or Z5020/25 Flying adapter 02/03.

Ti10L rigging procedure

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 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.
4. Insert the Front links into the front rigging of the upper cabinet (1)
5. Slowly lower the cabinet and make sure the hooks rest 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 Z5373 T 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 J, Q and T-Series system design, d&b ArrayCalc" which is also provided with the T Flying frame. The d&b ArrayCalc array calculator can be downloaded from the d&b website at www.dbaudio.com.

Ti10L, Ti10P cabinet options

The special color (SC) version of the cabinet is available in all colors of the RAL color table. The connector type is NL4.

The weather resistant (WR) version is available in black only. It is equipped with a fixed input cable.

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.

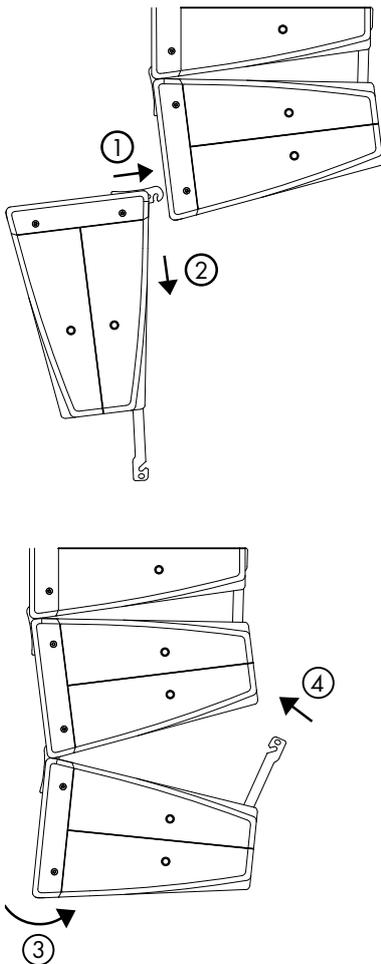


Fig. 4: Assembly of a Ti10L line array

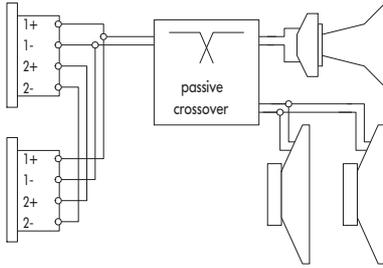


Fig. 5: Connector wiring

Connections

The Ti10 cabinet is fitted with a pair of NL4 connectors. All pins of both connectors are wired in parallel. The Ti10 uses the pin assignments 1+/1-. Pins 2+/2- are designated to active subwoofers. Using one connector as the input, the second connector allows for direct connection to additional loudspeakers.

The weather resistant (WR) version of the Ti10 is equipped with a fixed input cable (5 m / 16.4 ft, type H-07-RN-F 2 x 2.5 mm²/AWG 13).

Pin equivalents of NL4 connectors and the fixed cable option are listed in the table below.

NL4	1+	1-	2+	2-
Fixed cable (PG)	Brown (+)	Blue (-)		

Operation with D6 or D12

Select the controller setup T10.

The D6 and D12 amplifiers provide three configurations for Ti10 loudspeakers.

Within the D12 amplifier they are available in "Dual Channel" and "Mix TOP/SUB" mode.

Up to a total of four Ti10 loudspeakers can be driven by each channel of the D6 or D12 amplifiers.

"T10 Arc" and "T10 Line" setups

These setups are selected when Ti10L loudspeakers are used. 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 Ti10 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).

Controller settings

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

CUT circuit

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

HFA circuit (T10 PS setup only)

In HFA mode (High Frequency Attenuation), the HF response of the Ti10 system is rolled off. HFA provides a natural, balanced frequency response when a unit 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.

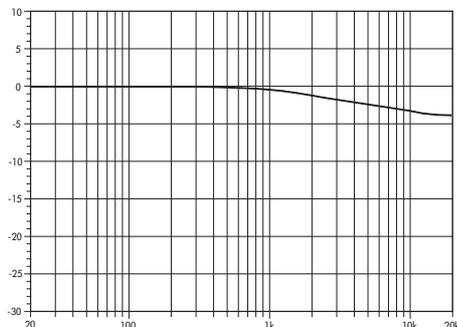


Fig. 6: Frequency response correction of HFA circuit

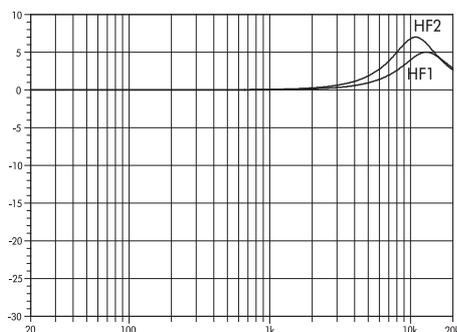


Fig. 7: Frequency response correction of HFC circuit

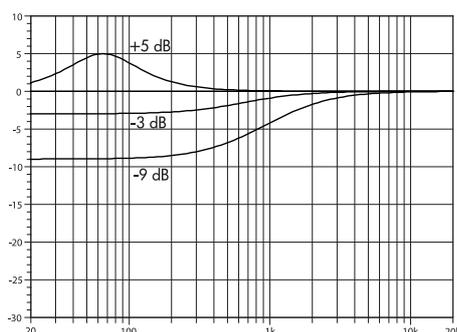


Fig. 8: Frequency response correction of CPL circuit

HFC circuit (T10 Arc/Line setups only)

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

The HFC circuit has two settings (HF1, HF2) for different distance ranges the cabinets have to cover. The settings should be used selectively, only for those cabinets covering the respective distances, HF1 for distances larger than 25 m (80 ft) and HF2 for 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 circuit

The CPL (Coupling) circuit compensates for coupling effects between the cabinets; these effects increase as the length of the line array is extended. CPL begins gradually at 1 kHz, with the maximum attenuation below 400 Hz, providing a balanced frequency response when Ti10 cabinets are used in arrays of four or more. The function of the CPL circuit is shown in the diagram opposite and can be set in dB attenuation values between -9 and 0, or a positive CPL value which creates an adjustable low frequency boost around 65 Hz (0 to +5 dB).

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

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.

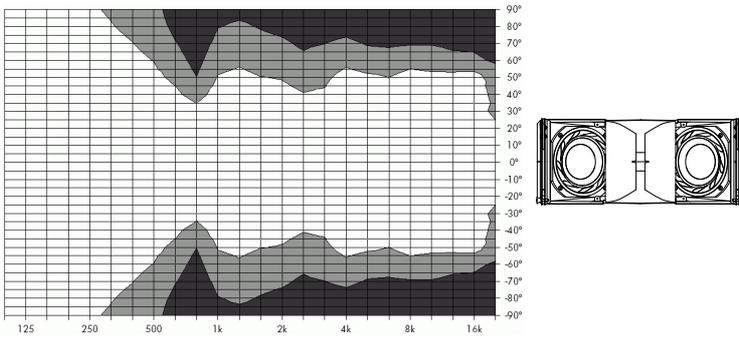


Fig. 9: Isobar diagram Ti10 line source, horizontal

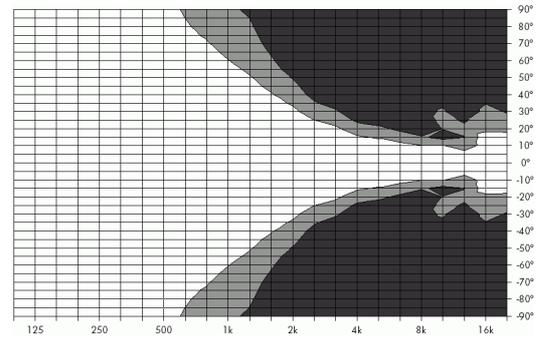


Fig. 10: Isobar diagram Ti10 line source, vertical

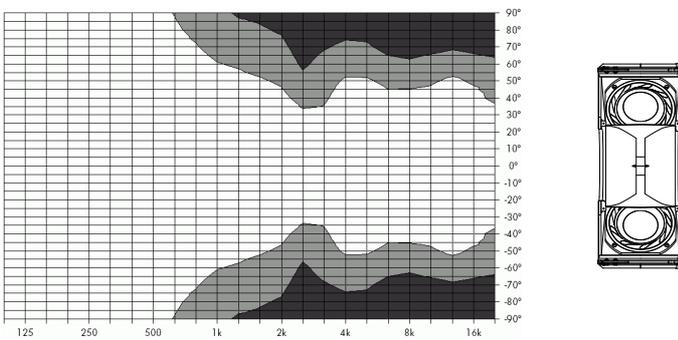


Fig. 11: Isobar diagram Ti10 point source, horizontal

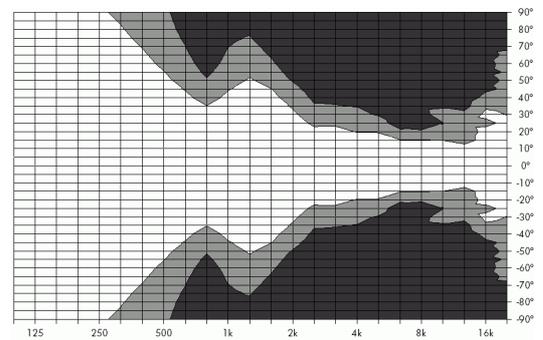


Fig. 12: Isobar diagram Ti10 point source, vertical

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).....	
with D6.....	129 dB
with D12.....	132 dB
Max. sound pressure (PS setup, 1 m, free field).....	
with D6.....	127 dB
with D12.....	130 dB
	(SPLmax peak, pink noise test signal with crest factor of 4)
Input level (100 dB-SPL/1 m).....	-13 dBu

Ti10L/P loudspeaker

Nominal impedance.....	16 ohms
Power handling capacity (RMS / peak 10 ms).....	200/800 W
Nominal dispersion angle (point source, hor. x vert.).....	90° x 35°
Nominal dispersion angle (line array, horizontal).....	105°
Splay angle settings.....	0...15° (1° increment)
Components.....	2 x 6.5" driver with neodymium magnet
.....	1.4" exit compression driver on waveguide
.....	Passive crossover network
Connections.....	2 x NL4
.....	WR option: Fixed cable 5 m (16.4 ft) (H-07-RN-F 2 x 2.5 mm ² /AWG 13)
Pin assignments.....	NL4: 1+/1-
.....	Fixed cable: Brown + / Blue -
Weight.....	11 kg (24 lb) / 10.5kg (23 lb)

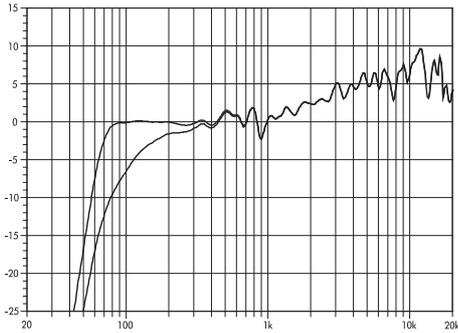


Fig. 13: Ti10 frequency response line source, single cabinet, standard and CUT settings

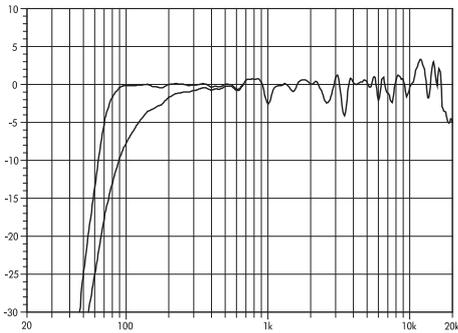


Fig. 14: Ti10 frequency response point source, standard and CUT settings

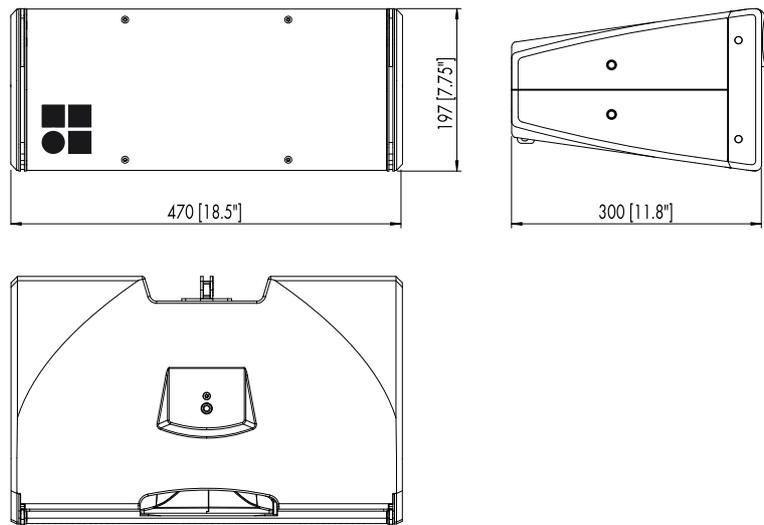


Fig. 15: Ti10L/P cabinet dimensions in mm [inch]

Manufacturer's Declarations



EU conformity of loudspeakers (CE symbol)

This declaration applies to

Ti10L loudspeaker, Z0551

Ti10P loudspeaker, Z0552

manufactured by d&b audiotechnik GmbH.

All production versions of these types 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.

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.