



**dynaudio**acoustics®



# **BX30 subwoofer**

## **Owner's Manual - and Safety Instructions**

Preliminary Version 990209  
455 490 A

EXPLANATION OF GRAPHIC SYMBOLS	
	The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

***This product conforms to the following Product Specifications:***



**EN 60065**

**EN 55103-1**

**EN 55103-2**

**EN 60065 (LVD)**

Safety requirements for mains operated electronic and related apparatus for household and similar general use.

*Use only in environments where humidity is between 30 and 70%<sub>rh</sub> and temperature between 5° and 40° C*

**EN 55103-1 (Emission)**

Electromagnetic compatibility – Product family standard for audio, video, audio-visual and entertainment lightning control apparatus for professional use

**EN 55103-2 (Immunity)**

Electromagnetic compatibility – Product family standard for audio, video, audio-visual and entertainment lightning control apparatus for professional use

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The information contained in this document is subject to change without notice.

# Important Safety Instructions

## Safety

Read these instructions before any connection to the apparatus.  
Please keep these instructions in a convenient place.



To avoid electric shock, do not open the subwoofer.  
There are no user-serviceable parts inside.

## Installation

If the BX30 have been stored for a longer period in an environment, where temperature was low or humidity high, we recommend that the BX30 is disconnected for at least three hours before use.

Do not operate this apparatus near water.

Do not install near any heat sources such as radiators, heat registers, fireplaces, stoves, or other items that produce heat.

Do not cover the apparatus. Keep it ventilated, minimum 3 cm all around the cabinet.

## Power connection

Do not defeat the safety purpose of the grounding-type plug. A grounding-type plug has two blades and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into the wall outlet, consult an electrician for replacement of the obsolete outlet.

Protect the power cord from being stepped on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

Unplug this apparatus during lightning storms or when unused for long periods of time.

## Attachments

Only use attachments/accessories specified by the manufacturer.

## Servicing

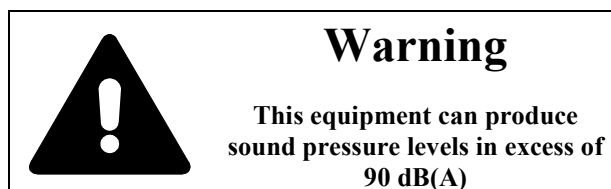
Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in a way such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, has been dropped, or does not operate normally.

## Maintenance

To prevent fire or shock hazard, clean only with a damp cloth. Never use cleansers or chemicals.

## Sound pressure level

Please note that excessive listening at high sound pressure levels may cause permanent hearing damage.



**Please follow all instructions and heed all warnings**

# CONTENTS

SAFETY .....	3
Installation .....	3
Power connection .....	3
Attachments .....	3
Servicing .....	3
Maintenance .....	3
Sound pressure level .....	3
BX30 OWNER'S MANUAL .....	5
Unpacking .....	5
INTRO .....	5
INLET SECTION .....	6
OPERATING PANELS .....	7
BX30 PLACEMENT .....	9
COOLING .....	9
MOUNTING .....	9
5.1 SYSTEMS .....	11
SOUND CALCULATOR .....	12
BX30 TECHNICAL DESCRIPTION .....	13
System topology .....	13
FLOW DIAGRAMS .....	14
BOX DATA .....	15

## BX30 Owner's Manual

### Unpacking

Every loudspeaker leaving DYNAUDIO ACOUSTICS A/S has been carefully and thoroughly inspected and tested.

When unpacking the subwoofer, be sure to check if any physical damage has occurred to the subwoofer due to shipping. In case of damage, please contact the selling dealer immediately.

When unpacking the subwoofer, verify that the voltage switch is positioned according to area voltage requirements.

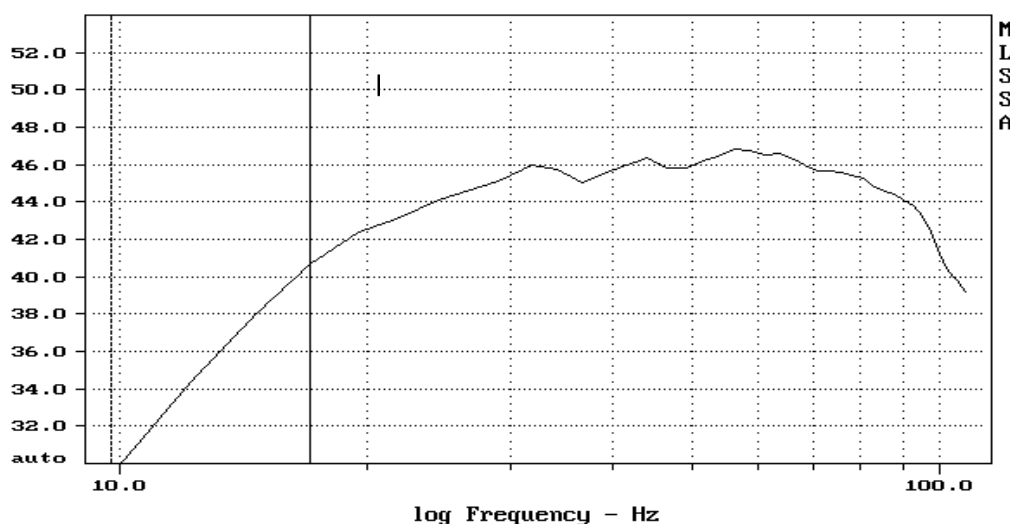
### Intro

The *BX30* is a sophisticated and versatile low frequency monitor speaker, which satisfies all the demands of the recording and postproduction facilities.

As a stand-alone unit it can be used to provide the sub bass channel of a 5.1 multi speaker system.

It can be used as the bass-extension-section of a small full range monitor, in single mono, dual stereo or multiple applications, where a large amount of low frequency energy is required.

The *BX30* features an innovative electro-acoustic system which optimises bass output power for the music spectrum, giving an advantage of up to 18 dB over conventional bass reflex designs.



**Figure 1.** *The BX30 driver has a -6 dB point at 17 Hz, which results in superb reproduction of the most demanding material.*

An electronic filter limits the response to 22 Hz in order to prevent large excursion by sub sonic signals and rumble. This filter can be removed when the *BX30* is used for reference listening purposes. This is a factory modification, which must be ordered through an authorised agent.

A single *BX30* is a perfect match to any of the smaller **dynaudio acoustics**® monitors, such as the BM5, BM6, BM6A or M1. The integrated 95 Hz high-pass crossover combined with the variable level and phase adjustment allows perfect matching in any position, giving complete freedom of movement and placement of the *BX30*; very useful in confined spaces!

Two *BX30*s will be more than a match for the BM15A and BM15, while four will rival the output of very large monitor systems; the *BX30* can, thanks to its flexibility, grow with your requirements and give a lifetime of service.

Inlet section

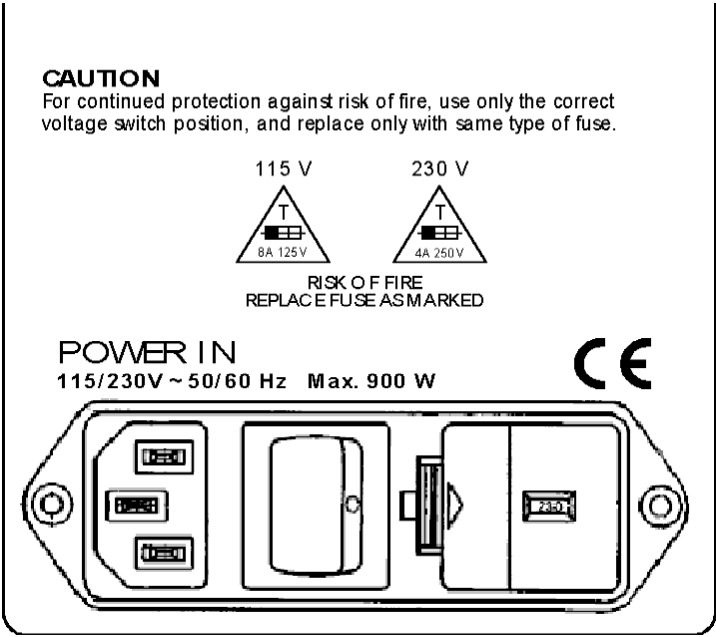


Figure 2. AC inlet

<b>AC inlet</b>	This is a grounding-type plug. Do not connect to a convenient AC outlet on a sound system or non-grounding AC outlet.
<b>Power switch</b>	0: 1: There is voltage on the amplifier. The <b>Protection</b> LED lights up, red.
<b>Voltage switch</b>	115/230: The amplifier's power supply can be used with various voltages, 115/230 V ~, and frequencies, 50/60 Hz. The voltage selector switch on the back panel of the subwoofer shall be positioned according to the required voltage in your area. The manufacturer fixes the setting prior to shipping. <b>Caution</b> Do not try to alter the voltage setting, as doing so will result in a blown fuse. Wrong settings may result in damaged electronics.
<b>Fuse-drawer</b>	<b>Replace</b> The main fuse for the subwoofer is located in the Fuse-drawer. For continued protection against risk of fire, replace only with same type of fuse. 115 V:    8 A / 125 V Slow-blow 230 V:    4 A / 250 V Slow-blow

## Operating panels

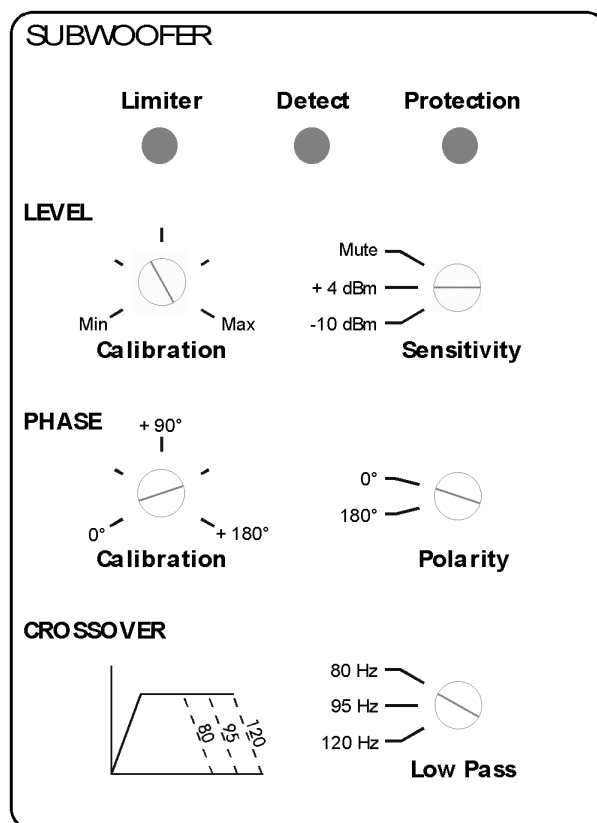


Figure 3. Subwoofer control panel

<b>LED</b>	<p><b>Limiter:</b> Lights up when the limiter circuits start protecting the woofer. The limiter does not affect the signals on the XLR OUT.</p> <p><b>Detect:</b> When the input signal is above – 20 dB it lights green. If the line signal increases to 0 dB it turns red.</p> <p>The protection circuit also measures signal levels inside the subwoofer amplifier. If the level calibration is turned clockwise and the signal in one of the measuring point surpass –20 dB.</p> <p><b>Protection:</b> Switch on the subwoofer, and the LED turns red, and for the next 5 seconds the protection circuit checks the amplifier. When everything is all right, the protection circuits switch the signal- and speaker relays on.</p>
<b>LEVEL</b>	<p><b>Calibration:</b> Adjustment of the subwoofer level.</p> <p><b>Sensitivity:</b> Level attenuation of input signal.</p> <p>–10 dBm consumer level signal</p> <p>+4 dBm pro level signal</p> <p><b>Mute</b> for muting the subwoofer. The signal on XLR OUT remains.</p>
<b>PHASE</b>	<p><b>Calibration:</b> Changes the phase alignment IN versus subwoofer.</p> <p><b>Polarity:</b> Invert the IN proportion subwoofer phase.</p>
<b>CROSSOVER</b>	<p><b>Low Pass:</b> Changes the crossover frequency subwoofer itself. To fit the BX30 to your main speakers.</p>

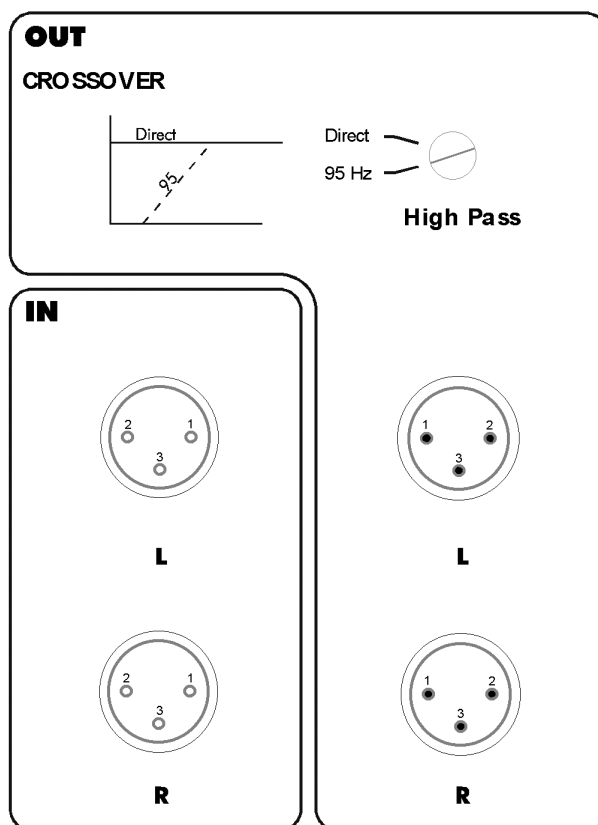


Figure 4. Output control and connectors

**CROSSOVER** High Pass: Changes round the **OUT** line signals between :

**Direct:** The signal on XLR **IN** connectors is directed to the XLR **OUT**.

**95 Hz:** The signal on XLR **IN** runs through a 95 Hz high pass filter, before it is send to the XLR **OUT**.

**IN** L and R : Balanced line signal input.

Pin 1 : Ground

Pin 2 : Non inverted (hot)

Pin 3 : Inverted (cold)

**OUT** L and R: Balanced line signal output.

Pin 1 : Ground

Pin 2 : Non inverted (hot)

Pin 3 : Inverted (cold)

If **CROSSOVER High Pass** is set on 95 Hz and the *BX30* is turned off, the relays in the amplifier will change and thereby the **OUT** signal will disappear.



## ***BX30 Placement***

### **Single Unit (Stereo)**

The correct location and phase alignment of the *BX30* is essential to achieve accurate performance with any given system. The best results are usually achieved with the *BX30* floor standing and at the same distance from the listening position as the main speakers. The unit should be placed at the centre point of a line between the main speakers if used as part of a stereo system. The polarity and phase can be adjusted so that there is the maximum cut in bass at 95 Hz when the unit is switched 'out of phase'. This should ensure the optimum coupling with the main speakers when 'in phase'.

### **Double Units (Stereo)**

The optimum stereo performance will be achieved with one *BX30* directly beneath each main speaker. This will ensure correct panning and image location of signals when mixing. If performance is affected by the presence of a solid console or equipment furniture, it may be necessary to place the *BX30* units at the same level as the main speakers in which case suitable, mechanically adequate stands should be employed. In any event the *BX30*s should always be placed equidistant to the mixing position in order to avoid phase cancellations.

### **Single Low Frequency Effects Channel (.1)**

In this mode the *BX30* will reproduce only the low frequency content of a discrete multi channel format and the positioning is usually asymmetrical to the room. This is done to avoid direct coupling to standing waves which results in better frequency response. The internal filter should be set to 120 Hz for film mixing or as required by the medium being used. Several *BX30* units may be daisy chained using the input and output XLR connectors.

### **Large Active Systems**

The *BX30* can be used as part of a large sound system to handle bass frequencies up to 120 Hz. The phase adjustment allows combination with any mid range device and the integrated signal and power management makes the *BX30* suitable for club and sound system installations. It is also suitable for mobile use but it should not be used outdoors or anywhere prone to damp or moisture, for electrical safety reasons.

The cabinet is designed for free standing or stand mounting; flying or rigging will require a suitable cradle or full supporting bracket. No fixing should be made directly to the MDF panels or rear electronics panel.

## ***Cooling***

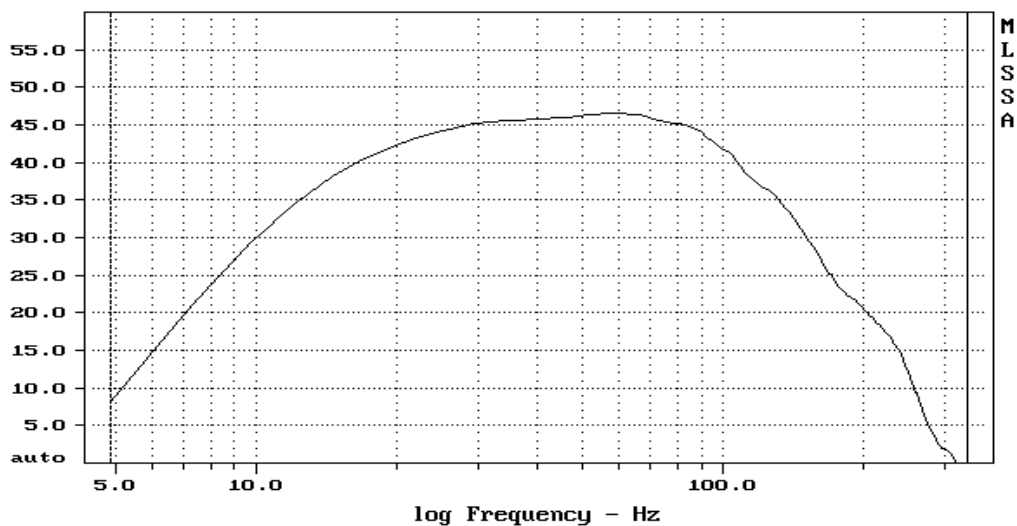
The *BX30* has full logic thermal control, which will shut the amplifier down in the event of the inner heat sink reaching 60 degrees Celsius. Always allow sufficient air flow, around the rear panel, especially if the unit is mounted in a front wall baffle or similar enclosure.

Under normal circumstances the *BX30* should not be mounted with the heat sink fins horizontal, as this will impede convection cooling.

## ***Mounting***

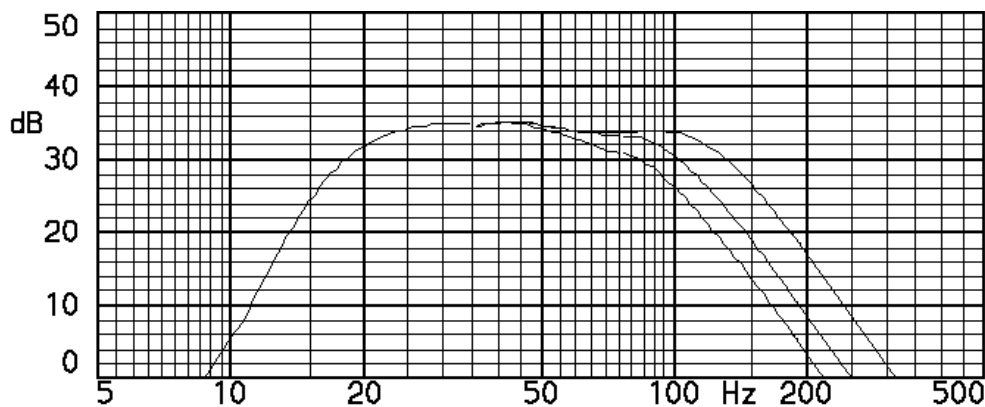
Under some conditions it may be desirable to place the *BX30* on anti vibration mounts so as avoid direct transmission to a floor or shelf unit. Special damping units may be ordered from your **dynaudio acoustics®** agent who will facilitate this without compromising bass performance. Placing the unit on soft foam or carpet may reduce audible buzzing or vibration.

The design of the amplifier lead to the possibility of rotating the amplifier to horizontal or vertical. Disconnect the *BX30*, then remove the eight fixing screws. Lift the amplifier carefully out of the mounting hole. Then rotate it in the direction which suits you. Place it again and mount the eight fixing screws.

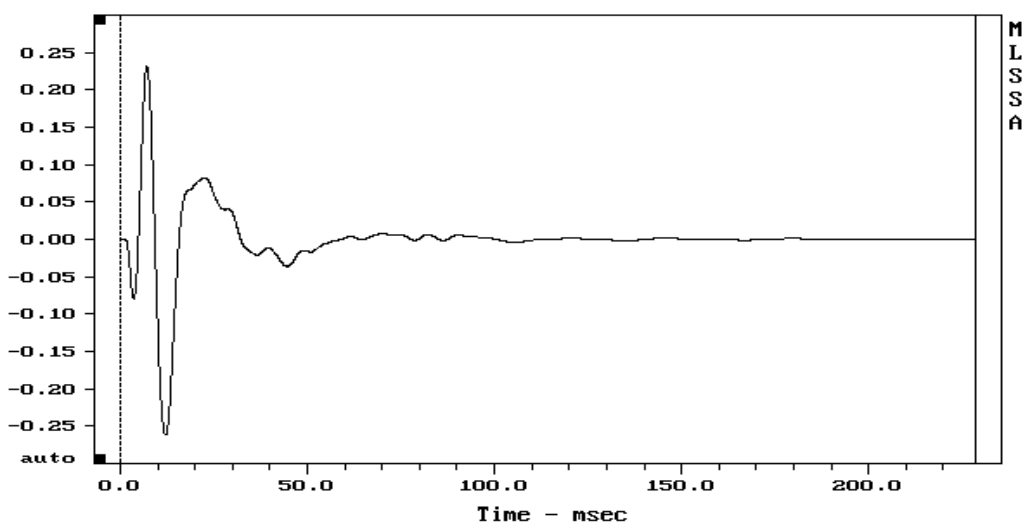


**Figure 5.** Shows the standard  $\frac{1}{3}$  octave response in active bass extension mode with the crossover pre set to 95 Hz.

The response offers a seamless match to any high quality monitor system but it is particularly well suited to smaller models with limited bass output capability.



**Figure 6.** The flexibility of switching low pass and match high pass x-overs means the BX30 can be matched to any system with ease and accuracy.



**Figure 7.** The impulse response of the BX30 is almost perfect for a two octave, 100 Hz band pass filter.

The impulse response Figure 7 shows the superior transient response of direct radiating systems compared to narrow resonant cavities and chambers.

## 5.1 Systems

Dolby AC3 format.

The specification for each channel is strictly defined and the *BX30* conforms carefully and accurately to that standard. The agreed sound level capability for the sub bass channel in film theatres is 115 dB in any one-octave band, in any seat. The *BX30* can deliver this output with clean, undistorted power, which is equally suited to small rooms, or in multiple (modular) formats in much larger spaces. Our design chart gives SPL predictions for different rooms. Please note these are narrow band or single frequency predictions, not broad band levels which are much higher. For example a single *BX30* will produce 112 dB at 63 Hz at one metre, enough to match nearly all near-field monitors, while eight units can satisfy the requirement for THX theatres of 1000 cubic metres at a distance of 10 metres. By comparison the Dolby requirement for calibrated 5.1 systems is only 105 dB and so the *BX30* is well equipped to deal with the future demands of digital multi channel audio, especially in the professional dubbing theatre.

## Sound Calculator

### ONE BX30 AT VARYING DISTANCE D FOR 100WRMS POWER

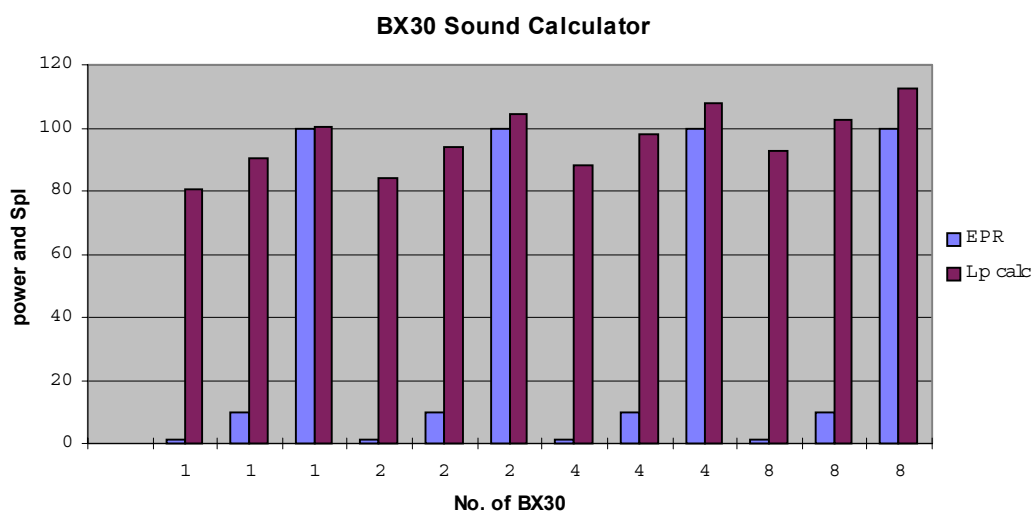
Freq.	L	W	H	Lw(1W)	Lw(Rqd)	EPR	Q	D	S	V	a	T60	Lp calc	Dc
63	20	10	5	100	120	100	2	1,0	700	1000	0,4	0,50	112	3,21
63	20	10	5	100	120	100	2	2,0	700	1000	0,4	0,50	107	3,21
63	20	10	5	100	120	100	2	3,0	700	1000	0,4	0,50	104	3,21
63	20	10	5	100	120	100	2	4,0	700	1000	0,4	0,50	103	3,21
63	20	10	5	100	120	100	2	8,0	700	1000	0,4	0,50	101	3,21
63	20	10	5	100	120	100	2	12,0	700	1000	0,4	0,50	100	3,21
63	20	10	5	100	120	100	2	16,0	700	1000	0,4	0,50	100	3,21

### 1 TO 8 BX30 UNITS WITH 1, 10 AND 100W AMP POWER EACH

L	W	H	BX30	Lw	EPR	Q	D	S	V	a	T60	Lp calc	Dc
20	10	5	1	100	1	2	10,0	700	1000	0,4	0,50	81	3,21
20	10	5	1	110	10	2	10,0	700	1000	0,4	0,50	91	3,21
20	10	5	1	120	100	2	10,0	700	1000	0,4	0,50	101	3,21
20	10	5	2	103	1	4	10,0	700	1000	0,4	0,50	84	4,54
20	10	5	2	113	10	4	10,0	700	1000	0,4	0,50	94	4,54
20	10	5	2	123	100	4	10,0	700	1000	0,4	0,50	104	4,54
20	10	5	4	106	1	8	10,0	700	1000	0,4	0,50	88	6,42
20	10	5	4	116	10	8	10,0	700	1000	0,4	0,50	98	6,42
20	10	5	4	126	100	8	10,0	700	1000	0,4	0,50	108	6,42
20	10	5	8	109	1	16	10,0	700	1000	0,4	0,50	93	9,08
20	10	5	8	119	10	16	10,0	700	1000	0,4	0,50	103	9,08
20	10	5	8	129	100	16	10,0	700	1000	0,4	0,50	113	9,08

L length  
 W width  
 H height  
 Lw sound power of source speaker  
 Q directivity index  
 D distance to point of measurement  
 EPR electronic power required (amplifier)

S room surface area  
 V room volume  
 a average absorption  
 Sa total absorption  
 T60 reverb decay time  
 Lp sound pressure at D  
 Dc critical distance  $L_d = L_r$



## ***BX30 Technical description***

### **System topology**

The BX30 is fully active with a sophisticated signal management system. The following features are provided as standard.

Dual inputs and outputs fully balanced with automatic bypass in the event of power loss. The outputs are buffered and filtered with a 24 dB/octave high pass network which forms a perfect 24<sup>th</sup> order crossover (Linkwitz-Riley) when the BX30 is set at 95 Hz Low Pass mode. A direct through switch is also provided for multiple BX30 linking.

- All inputs and outputs are relay switched for full protection of system. There is a voltage protection limiter on each input to protect the balanced line level amplifiers.
- A full logic management and protection system controls all switching functions with LED indication of fault conditions.
- Switchable -10 dB, +4 dB or mute gain with level control.
- Three precision low pass networks, calibrated to meet international standards;
  - 80 Hz for critical listening applications using high quality small monitors.
  - 95 Hz for most subwoofer applications in stereo or part of a multi channel system.
  - 120 Hz for full 5.1 systems requiring a separate low frequency effects channel. This mode is designed to meet Dolby, DTS and THX criteria for theatres.
- Additionally there is an internal spectrum equaliser and subsonic filter (17 Hz) to ensure optimum sensitivity and maximum output from 20 Hz to the cut off frequency.
- Full 360 degrees of phase adjustment allows room positioning and alignment for optimum summing with a main or satellite speaker. This promotes mutual coupling of multi speaker systems for perfectly solid imaging.
- VCA controlled power limiting ensures overload conditions cannot occur. Driver protection is achieved without compression and misleading changes in the sound spectrum. A relay offers instant protection of the driver in a condition of fault or overload.

We believe the BX30 is the most advanced low frequency speaker system available. It can work alone or as part of a larger modular system.

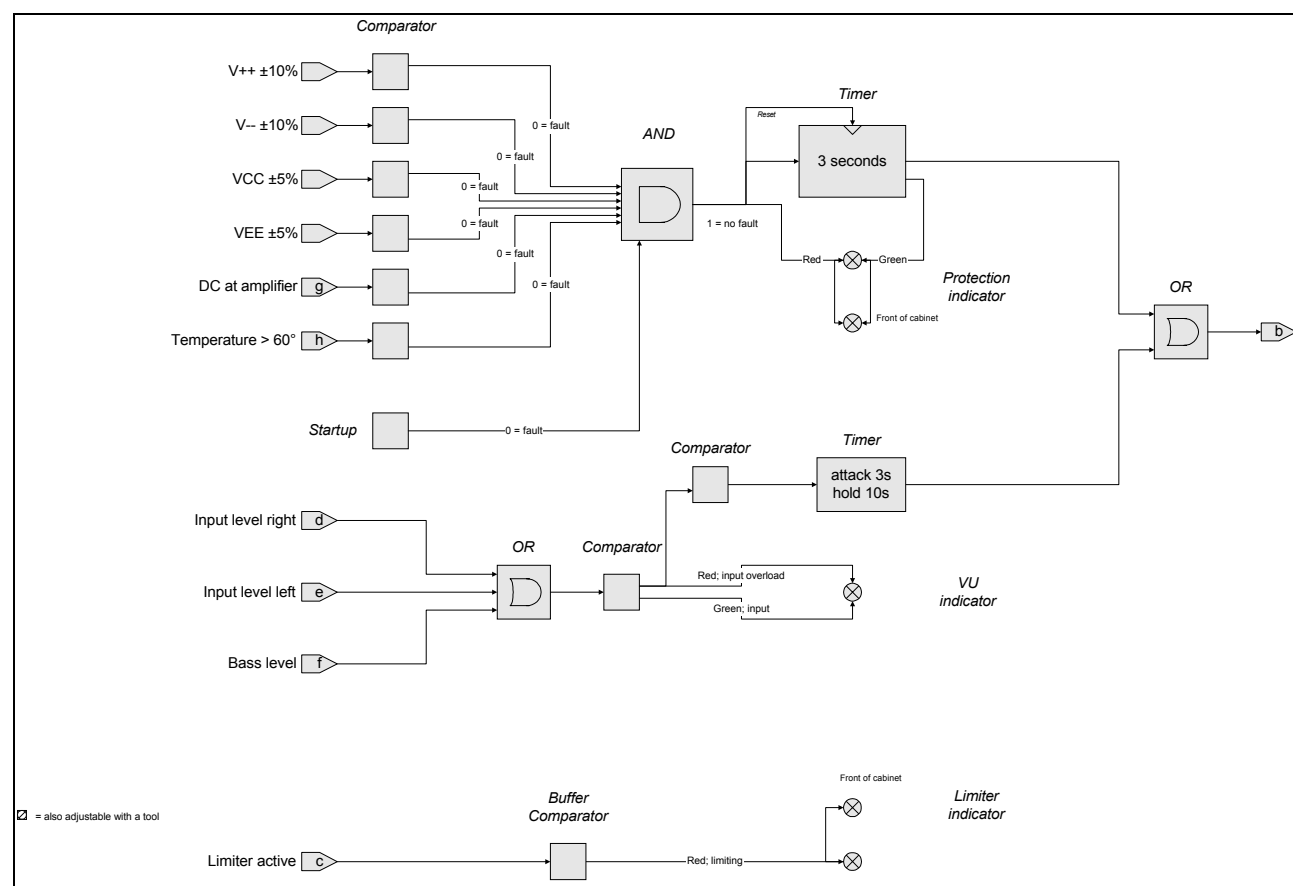
The 140 W power module is an extremely efficient unit with virtually no quiescent current. The unit can be operated indefinitely in standby mode. Distortion is negligible under normal operating conditions.

The diagram illustrates a Hi-Fi system architecture with the following components and signal flow:

- IN XLR**: Input signal source.
- Input relay**: Switches the input signal.
- Passiv limiter**: Limits the signal level.
- Line receiver**: Receives the signal from the limiter.
- High pass 95 Hz**: Filters out low-frequency noise.
- Line driver**: Drives the signal to the next stage.
- Output relay**: Switches the signal to the output.
- Output switch**: Selects the output destination.
- OUT XLR**: Output signal source.
- Temperature sensor**: Monitors the system temperature (60°).
- Buffer**: Buffers the signal.
- Low pass**: Filters out high-frequency noise.
- Equalizer**: Adjusts the frequency response.
- Subsonic**: Filters out subsonic frequencies.
- Phase 0°-180°**: Adjusts the phase response.
- Phase +180°**: Adjusts the phase response.
- Limiter**: Limits the signal level.
- Power Amplifier**: Amplifies the signal.
- Speaker relay**: Switches the signal to the speaker.
- Speaker**: Output device.

The diagram also includes a legend: **Q** = also adjustable with a tool.

**Figure 8.** *Flowchart preamplifier*



**Figure 9.** *Flowchart protection circuit*

**Box data**

Power Amplifier	:	collector coupled quasi complementary BJT	140 W
Phase Shift	:	20-150 Hz, variable	0-180 °
Frequency Response	:	+/- 3 dB	17-80/95/120 Hz
Internal cabinet volume	:	inner	76 litres
Bass Principle	:	reflex	
Weight	:	net	29,9 kg
Dimensions	:	w × h × d	41 × 619 × 547 Mm
Crossover	:	Linkwitz-Riley	
input		crossover frequencies	80, 95, 120 Hz
		crossover slope	12 dB/Oct
output		crossover frequencies	95 Hz
		crossover slope	12 dB/Oct
Connections	:	input	XLR female 3 pole
		output	XLR male 3 pole
Impedance	:	input	20 kΩ
		output	50 Ω
Woofer	:	30 cm polypropylene cone 100 mm pure aluminium wire voice coil	
Cabinet	:	front baffle 22 mm MDF cabinet 22 mm chip board internal bracing structure	