



dBTechnologies DSX 2040 Loudspeaker Management System User Manual

[Home](#) » [dBTechnologies](#) » dBTechnologies DSX 2040 Loudspeaker Management System User Manual 

DSX 2040

LOUDSPEAKER MANAGEMENT SYSTEM



USER MANUAL



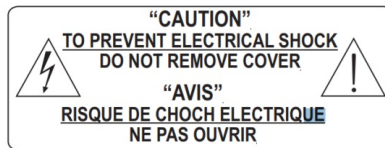
The warnings in this manual must be observed together with the “USER MANUAL – Section 2”.



Contents

- 1 IMPORTANT SAFETY INSTRUCTIONS
- 2 IMPORTANT NOTES
- 3 INSTALLATION AND OPERATING PRECAUTIONS
- GENERAL
- 4 CONNECTION
- 5 SUGGESTIONS
- 6 INTRODUCTION
- 7 FEATURES
- 8 FRONT PANEL FUNCTIONS
- 9 REAR PANEL FUNCTIONS
- 10 POWERING UP THE DEVICE
- 11 OPERATING THE CHANNEL MENUS
- 12 OPERATING THE SYSTEM MENUS
- 13 QUICK REFERENCE
- 14 PC CONTROL SOFTWARE
- 15 SPECIFICATIONS
- 16 Documents / Resources
 - 16.1 References
- 17 Related Posts

IMPORTANT SAFETY INSTRUCTIONS



CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK, DO NOT REMOVE THE COVER (OR BACK). NO USER-SERVICEABLE

PARTS INSIDE; REFER SERVICING TO QUALIFIED PERSONNEL.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK. DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.



This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure – voltage that may be sufficient to constitute a risk of shock.



This symbol wherever it appears alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

IMPORTANT NOTES

This manual is to be considered an integral part of the product, and must always accompany the equipment when it changes ownership, as a reference for correct installation and operation as well as for the safety regulations. The Manufacturing Company will not assume any responsibility for incorrect installation of the amplifier.

Read these instructions

All the safety and operation instructions should be read before the appliance is operated.

Heed all Warnings

All warnings on the appliance and in the operating instructions should be adhered to

Long-period nonuse of equipment

If long-term non-use of the appliance is expected, it would be better to unplug this apparatus from the power

supply, put it into proper packaging, and cover it to avoid dust exposure.

Damage and repair

If the apparatus has been damaged it is forbidden to repair it or to remove the cover. Disconnect the unit from the mains power and contact technical assistance for repair.

INSTALLATION AND OPERATING PRECAUTIONS GENERAL

Keep these instructions

For the correct use of the appliance, the safety and operating instructions should be retained for future reference.

Apparatus positioning

Make sure that the apparatus is positioned in a stable and secure way in order to avoid any dangerous conditions for persons or objects.

Grounding protection

The apparatus is made in protection CLASS I to prevent the risk of electrical shock the appliance must be connected to a mains socket outlet with a protective earthing connection. Before making the electrical connection of the appliance, ensure that the electrical distribution network conforms to the regulations regarding electrical equipment.

Power Source

The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance (see "Specifications"). In order not to jeopardize the safety of the amplifier, it must only be connected to the mains using the power cable provided.

Disconnection from the mains

The power mains connector (VDE) is the device to disconnect from the mains. This device must be easily accessible after installation.

Power Cord Protection

To ensure safe use of the appliance, use only the power cord supplied with the equipment, taking care to place it and protect it to avoid damage during use. If the power cord becomes damaged contact technical assistance and request replacement. Do not use cables other than supplied cables.

Water and Moisture

Do not install this apparatus near water (e.g. near washbasins, sinks, showers, bathtubs, swimming pools, wet floors, or anything in the presence of water and liquids in general).

Object and Liquid Entry

The apparatus must be placed in an inappropriate position. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through the cooling grid with consequent electrical danger.

Ventilation

The appliance should be situated so that its location or position does not interfere with its proper ventilation. Do not block or cover any openings of the grid ventilation or heatsink. Install the apparatus at a distance that ensures good ventilation between devices.

Heat

Do not install the appliance near any source of heat. Accessories and installation For a safe installation, do not make any holes in the external chassis for the application of additional brackets. In case of particular installations not described in this manual, contact technical service for accessories specified by the manufacturer.

Follow the instructions

All operations and instructions in this user manual should be followed for the correct operation and function of the appliance. Pay attention in particular to:

- Never force the control elements (switches, controls, etc.).
- Do not force the amplifier to work in overload for extended periods of time.

Cleaning

Clean only with a dry cloth. Do not use solvents, alcohol, benzene, or volatile substances for cleaning the exterior parts.

CONNECTION



- For connecting the appliance, use only qualified and experienced personnel having sufficient technical

knowledge or specific instructions for making the connections correctly and thus preventing electrical dangers.

- To prevent the risk of electrical shock, the appliance must only be supplied from the mains after all connections have been completed.
- Before powering up the appliance, it is advisable to re-check all the connections.
- The entire sound system must be designed and installed in compliance with the current standards and regulations regarding electrical systems.

SUGGESTIONS



To prevent inductive phenomena from giving rise to hum or disturbance which would jeopardize efficient appliance operation, the cables that transmit microphone signals or line-level signals (e.g. 0 dB/V) must be screened and should not be run in the vicinity of:

1. Equipment that produces strong magnetic fields (e.g. large power supply transformers)
2. Electrical energy conductors
3. Lines that supply speakers.

INTRODUCTION

The DSX 2040 is a digital loudspeaker management system designed for the touring or fixed sound installation markets. The absolute latest in available technology is utilized with 40-bit floating-point processors and high-performance 24-bit Analog Converters. The high-bit DSP prevents noise and distortion induced by truncation errors of the commonly used 24-bit fixed-point devices. A complete set of parameters include I/O levels, delay, polarity, 8 bands of EQ per channel, 31 bands of GEQ per input, multiple crossover selections, and full function limiters. Precise frequency control is achieved with its 1 Hz resolution. Inputs and outputs can be routed in multiple configurations to meet any requirement. The DSX 2040 can be controlled or configured in real-time on the front panel or with the intuitive PC GUI accessed via the RS-232 or USB interface. Software upgrade for CPU and DSP via PC keeps the device current with newly developed algorithms and functions once available. Multiple setup storage and system security complete this professional package.

Shipped contents:

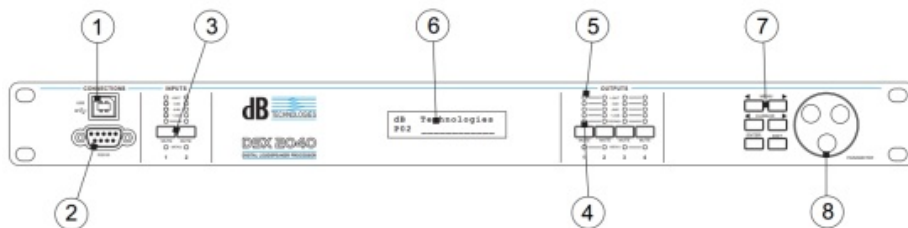
- DSX 2040 Unit
- User Manual
- console Software CD
- Power Cord

FEATURES

- 2 Inputs and 4 Outputs with flexible routing
- 40-bit floating-point DSP
- 96kHz Sampling Rate
- High-Performance 24-bit A/D Converters
- 1 Hz Frequency Resolution
- 8 Equalizers (Magnitude or Phase) for each Input and Output
- 31 Bands GEQ for each Input
- Multiple Crossover types with Full Function Limiters

- Precise Level, Polarity, and Delay
- CPU and DSP upgrade via PC
- Individual Channel Buttons with Linking capability
- 2-Line x 16 Character Backlit LCD Display
- Full 5-segment LED's on every Input and Output
- Storage of up to 30 Preset Setups
- Security Lock
- USB and RS232 Interface for PC Control and Configuration

FRONT PANEL FUNCTIONS



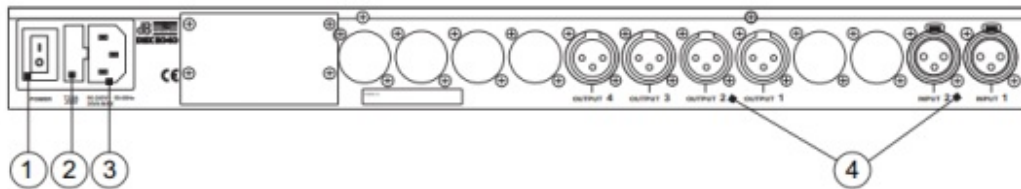
1. USB – a standard Type B USB connector. The device driver from the provided software CD must be installed prior to usage.
2. RS232 – a standard female DB9 socket. A straight-through cable is required for a PC connection.
3. Mute (Channel Menu) Buttons – Mute or un-mute input and output channels. When an input channel is muted, a red LED will come on for indication.
When the <<Menu or Menu>> key is held down, the Mute Buttons selects the corresponding channel for the LCD menu display and is acknowledged by a green LED below the button. The last modified menu will be displayed on the LCD. Multiple channels can be linked or unlinked by pushing the desired channels. This eases programming for the same parameters across multiple channels. Multiple Inputs can be linked together and multiple outputs can be linked together. Inputs and Outputs are linked separately.
4. Channel Menu LED – Indicates the activated channels for data modification.
5. Peak Level LED – Indicates the current peak level of the Signal: Signal, -12dB, -6dB, -3dB, Over/Limit. The Input Limit LED references the device's maximum headroom. The Output Limit LED references the threshold of the output limiter.
6. LCD – Shows all the necessary information to control the unit.
7. Menu Buttons – There are 6 menu keys: <<Menu (Menu Down), Menu>> (Menu Up), <<Cursor (Cursor Down), Cursor>> (Cursor Up), Enter/Sys/Speed, Exit.
The functions of each key are explained below:
<<Menu: Go to the previous menu screen. Holding this button down while pressing the Mute key will go to the specified channel menu.
Menu>>: Go to the next menu screen. Holding this button down while pressing the Mute key will go to the specified channel menu.
<<Cursor: Go to the previous cursor in the menu screen.
Cursor>>: Go to the next cursor in the menu screen.
Enter/Sys/Speed: Enter is used only in the System Menu to proceed with selected actions. Sys enters the System Menu from the main menu. Speed modifies delay and frequency (1 Hz resolution mode) data values by

100X.

Exit: Exit to the Main Menu.

8. Rotary Thumb Wheel – Changes parameter data values. The wheel has travel velocity sensing which eases large incremental data modifications. For modifying delay and frequency (1 Hz resolution), pressing the Speed key simultaneously will increment/decrement the data value by 100X.

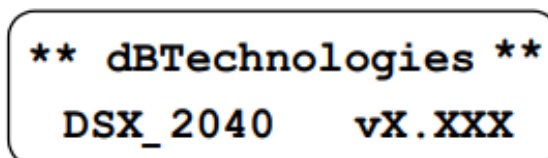
REAR PANEL FUNCTIONS



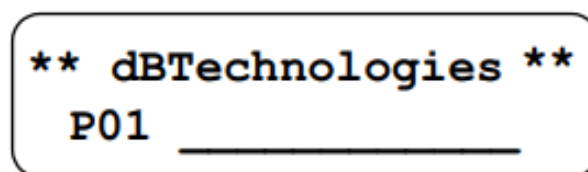
1. Main Power – Connects via a standard IEC socket. A compatible power cord is supplied with the unit. The voltage input is 90-240VAC, 50-60Hz.
2. Main Fuse – T2.5A-250V. Slow blow type.
3. Power switch – Controls power On/Off.
4. Analog Inputs and Outputs – XLR connectors are provided for each audio input and output. The device's output stage employs the balanced impedance topology. All I/O connectors have pin 1 as ground (shield), pin 2 as +, and pin 3 as -.

POWERING UP THE DEVICE

- After powering up the unit, the following initialization screen is displayed on the LCD:



- The initialization process takes several seconds and during that period the unit boots and displays the device model and firmware version.
- After the initialization process is finished the DSX 2040 displays its main screen:



- The screen shows the current program number and program name assigned to the unit. If the program number is 31 and the name is MEMORY, it means that the program is assigned, the last data before the previous power down is recalled no instead.
- Now the DSX 2040 is ready to operate.

OPERATING THE CHANNEL MENUS

Channel Linking – While holding down the <<Menu or Menu>>, more than 1 channel from the same group (Input or Output group) can be selected to link the channels together. The green LEDs below the Mute buttons are lit for

the linked channels. Any modification of the data for the selected channel will be applied to the linked channels as well. To cancel the linking, simply deselect the desired channel while the <<Menu or Menu>> key is still pressed, or just press the Exit key to deselect all channels.

INPUT/OUTPUT SIGNAL

LEVEL:

The level (or gain) ranges from -40.00dB to +15.00dB in 0.25dB steps.

I1 : _____ Signal
LEVEL: 0.00dB

POL:

The polarity (or phase) can be normal (+) or inverted (-).

I1 : _____ Signal
POL: +

DELAY:

The maximum delay permitted is 650ms, in steps of approximately 10us. It can be displayed in ms, ft, or m. The time unit of the delay is set in the System Menu. Please refer to page 28 for more details.

I1 : _____ Signal
DELAY: 000.000 ms

INPUT / OUTPUT EQUALIZER

EQ#:

Each input channel has 8 bands of equalization. This control selects one of the 8 available bands.

I1 : _____ EQ 1
EQ#: 1

BYPASS:

This control will un-bypass (Off) or bypass (On) the currently selected band.

I1 : _____ EQ 1
BYPASS: Off

TYPE:

The 5 types of EQ that can be used are: parametric (PEQ), low shelf (LO-SHF), high shelf (HI-SHF), 1st-degree all-pass (AP-1), and 2nd-degree all-pass (AP-2).

I1: _____ EQ 1
TYPE : PEQ

FREQ:

The EQ center frequency ranges from 20Hz to 30kHz in either 1Hz steps or 1/36 octave steps. The frequency steps can be selected in the System Menu. Please refer to page 28 for more details.

I1: _____ EQ 1
FREQ: 1000Hz

BW:

The EQ bandwidth ranges from 0.02 to 3.61 octaves in steps of 0.01 octaves. The equivalent Q value is automatically shown beside the octave value. For the 1st-degree allpass (AP-1) filter, the bandwidth will set the phase shift at the center frequency. This phase shift is gradually changed from 180 degrees above the centre frequency to the specified value.

I1: _____ EQ 1
BW: 0.33 Q=4.36

I1: _____ EQ 1
DEG: 15.5 deg

LEVEL:

The EQ level (or gain) ranges from -30.00dB to +15.00dB in 0.25dB steps.

I1: _____ EQ 1
LEVEL: 0.00dB

INPUT GRAPHIC EQUALIZER

GEQ#:

The graphic equalizer has 31 bands of equalization from 20Hz to 20kHz. This control selects one of the 31 available bands. The frequency corresponding to each band is also shown.

I1: _____ GEQ 1
GEQ#: 1 f=20

LEVEL:

The GEQ level (or gain) ranges from -30.00dB to +15.00dB in 0.25dB steps.

I1: _____ GEQ 1
LEVEL : 0.00dB f=20

BYPASS:

This control will un-bypass (Off) or bypass (On) the entire GEQ for this channel.

I1: _____ GEQ 1
BYPASS : Off

INPUT/OUTPUT CROSSOVER

TYPE:

The 3 available filter types for the low-frequency crossover point (high pass) are Butterworth, Linkwitz Riley, and Bessel.

O1: _____ XOver
TYP L: Off

FRQL:

The filter cut-off frequency for the low-frequency crossover point (high pass) ranges from 20 to 30kHz in either 1Hz steps or 1/36 octave steps. The frequency steps can be selected in the System Menu. Please refer to page 28 for more details.

O1: _____ XOver
FRQL: 1000Hz

SLPL:

The filter slope for low-frequency crossover point (high pass) ranges from 6 to 48dB/octave. If the selected filter type is Linkwitz Riley, the available slopes are 12, 24, 36, or 48 dB/octave only.

O1: _____ XOver
SLPL: 24dB

TYPE:

The 3 available filter types for the high-frequency crossover point (low pass) are Butterworth, Linkwitz Riley, and Bessel.

O1: _____ XOver
TYP H: Off

FRQH:

The filter cut-off frequency for the high-frequency crossover point (low pass) ranges from 20 to 30kHz in either 1Hz steps or 1/36 octave steps. The frequency steps can be selected in the System Menu. Please refer to page 28 for more details.

O1 : _____ XOver



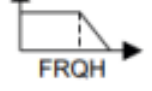

FRQH : 1000Hz

SLP:

The filter slope for the high-frequency crossover point (low pass) ranges from 6 to 48dB/octave. If the selected filter type is Linkwitz Riley, the available slopes are 12, 24, 36, or 48 dB/octave only.

O1 : _____ Xover

SLPH : 24dB

Filter configuration	Low crossover point	High crossover point	
None	FTRLOff	FTRHOff	
Highpass	FTRLnot Off	FTRHOff	
Lowpass	FTRLOff	FTRHnot Off	
Bandpass	FTRLnot Off	FTRHnot Off	

INPUT COMPRESSOR

THRESH:

The compressor threshold ranges from -20 to +20dBu in 0.5dB steps.

O1 : _____ Comp

THRESH : +20.0dB

ATTACK:

The compressor attack time ranges from 0.3 to 1ms in 0.1ms steps, then ranges from 1 to 100ms in 1ms steps.

O1 : _____ **Comp**
ATTACK : 10ms

RELEASE:

The compressor release time can be set at 2X, 4X, 8X, 16X, or 32X the attack time.

O1 : _____ **Comp**
RELEASE : 8X **Atck**

RATIO:

The compressor ratio is the slope in which the signal is compressed. It ranges from 1:1 to

O1 : _____ **Comp**
RATIO : 1:1

INPUT/OUTPUT CHANNEL NAME

NAME:

A 6 characters name can be assigned to each channel.

I1 : _____ **Name**
NAME : _____

OUTPUT LIMITER

THRESH:

The limiter threshold ranges from -20 to +20dBu in 0.5dB steps.

O1: _____ Limit
THRESH: +20.0dB

ATTACK:

The limiter attack time ranges from 0.3 to 1ms in 0.1ms steps, then ranges from 1 to 100ms in 1ms steps.

O1: _____ Limit
ATTACK: 10ms

RELEASE:

The limiter release time can be set at 2X, 4X, 8X, 16X, or 32X the attack time.

O1: _____ Limit
RELEASE: 8X Atck

OUTPUT SOURCE

IN1-2:

This sets the input channel source for the current output channel. It can be used to mix the input source (in dB) or disable it (Off). If more than one input sources are enabled, they will be added together as the source for the current output channel.

O1: _____ Source
IN1: Off

O1: _____ Source
IN2: -14.00

OPERATING THE SYSTEM MENUS

The System Menus allow the user to control and change parameters that are related to the system behavior and general operation. It can be accessed by pressing the Sys key in the main menu (when no Input/Output or System Menu is activated). All System Menus require pressing the Enter key to confirm and save the settings.

PRESET RECALL

The DSX 2040 has a built-in non-volatile memory that can store up to 30 different preset setups.

P:

This control selects which program to recall from the non-volatile memory. The program name is displayed to the

right of the program no.

SYSTEM	Recall
P:1	_____

PRESET STORE

The DSX 2040 has a built-in non-volatile memory that can store up to 30 different preset setups. A program can be stored using this menu. The old program with the same program number will be replaced. Once the program is stored in the flash memory, it can be recalled at a later time, even after power down.

P:

This control selects which preset location in the non-volatile memory to be saved.

SYSTEM	Store
P:1	_____

NAME:

A descriptive name of up to 12 characters can be assigned to each program.

SYSTEM	Store
NAM:	_____

COPY CHANNELS

Copy Channels from the source to the target. When the Source and Targets are both Inputs and Outputs, all audio parameters will be copied. When one of the Source or the Target is an input while the other is an output, only the Level, Polarity, Delay, EQ, Crossover, and Channel Names are copied.

SOURCE:

This is the channel to be copied from.

SYSTEM Copy

SOURCE : In1

TARGET:

This is the channel to be copied to.

SYSTEM Copy

TARGET : In2

GENERAL SETTINGS

FREQ MODE:

This changes the frequency control mode for EQ and crossover filters. It can be 36 steps/octave or All Frequencies (1 Hz resolution).

SYSTEM Gener1

FREQ MODE : All

DELAY UNIT:

This sets the time unit for input and output delay to ms, ft, or m.

SYSTEM Gener1

DELAY UNIT : ms

COMMUNICATION SETTINGS

NOTE: The user must power cycle the unit for this setting to take effect.

BAUD RATE:

The sets the baud rate of the serial communication. the console uses a baud rate of 115200, it should be left unchanged for most users.

SYSTEM Comm
DEVICE ID : 1

DEVICE ID:

This control assigns a device ID from 1 to 16 to the unit. This ID is only useful when a network of more than 1 unit is used in conjunction with 1 or more consoles.

SYSTEM Comm
NETWORK ID : 0

NETWORK ID:

This control assigns a network ID from 0 to 60000 to the unit. This ID is used for future network expansion only, please leave it at 0.

SYSTEM Comm
BAUD

SECURITY PASSWORD

The factory default password is blank ("____"), it can be changed to any combination of 4 characters in this menu.

OLD PW:

The user is required to enter the old password first to modify the password.

SYSTEM Passwd
OLD PW : _____

NEW PW:

A new password is desired.

SYSTEM Passwd

NEW PW : _____

SECURITY LOCK

The DSX 2040 enables the user to secure the unit and prevent undesired changes in the setup. In order to lock or unlock the unit, the user must enter the correct password. The user can only lock or unlock all menus using the front panel, XConsole is required to lock or unlock the individual menus.

PASSWORD:

The password is 4 characters in length. The factory default of a new unit does not require a password. The user can change the password via XConsole or the Set Password menu.

SYSTEM Secure

PASSWORD : _____

QUICK REFERENCE

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The DSX 2040 is shipped with a special PC Graphic User Interface (GUI) application – XConsole. the console gives the user an option to control the unit from a remote PC via the serial communication link. The GUI application makes it much easier to control and monitor the device, allowing the user to get the whole picture on one screen. Programs can be recalled and stored from/to PC's hard drive, thus expanding the storage to become virtually limitless. the console can be connected to the DSX series via RS232 or USB. USB requires the installation of an additional driver. The user is given an option to install it during the installation of XConsole, and if the user did not install it at that time, they may choose to do so by running the USB driver installer from the provided software CD or last download from www.dbtechnologies.com.

SPECIFICATIONS

Inputs and Outputs

Input Impedance: >10k Ohms

Output Impedance: 50 Ohms

Maximum Level: +20dBu

Type: Electronically balanced

Audio Performance

Frequency Response: +/- 0.1dB (20 to 30kHz)

Dynamic Range: 115dB typ (unweighted)

CMMR: > 60dB (50 to 10kHz)

Crosstalk:< -100dB

Distortion:0.002% (1kHz @+4dBu)

Digital Audio Performance

Processor: 40-bit

Sampling Rate: 96kHz

Analog Converters: High Performance 24-bit

Propagation Delay: 1.5ms

Front Panel Controls

Display:2 x 16 Character Backlit LCD

Level Meters:5 segment LED

Buttons:Mute/Edit Controls,Menu Controls

Dial Encoder:Embedded Thumb Wheel

ConnectorsAnalog Inputs:3-pin Female XLR

Analog Outputs:3-pin Male XLR

RS-232:Female DB-9

USB:Type B

Power:Standard IEC Socket

General

Power:90-240 VAC (50-60Hz)

Dimensions:19"x1.75"x9" (483x44x229 mm)

Weight:10 lbs / 4.5 kg

Audio Control Parameters

Mic Gain:0to +45dB in 3dB steps

Gain:-40 to +15dB in 0.25dB steps

Polarity: +/-

Delay: Up to 650ms per I/O

Equalizers (8 per I/O)

Type: Parametric, Hi-shelf, Lo-shelf, Phase 1, Phase 2

Gain: -30 to +15dB in 0.25dB steps

Bandwidth:0.02 to 3.61 octaves (Q=0.3 to 72)

31-Band Graphic Equalizers (1 per Input)

Gain:-30 to +15dB in 0.25dB steps

Crossover Filters (2 per I/O)

Filter Types:Butterworth, Bessel, Linkwitz Riley

Slopes: 6 to 48dB/oct

Limiters (1 per Output)

Threshold:-20 to +20dBu

Attack:0.3 to 100ms

Release:2 to 32X the attack time

System Parameters

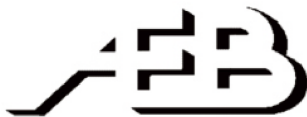
No. of Presets: 30

Program Names:12 character length

Delay Units:ms, ft, m

Frequency Modes: 36 steps/oct, 1Hz resolution

Note: Specifications subject to change without notice



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E-mail: info@dbtechnologies-aeb.com

Documents / Resources

	dBTechnologies DSX 2040 Loudspeaker Management System [pdf] User Manual DSX 2040, Loudspeaker Management System
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References

-  [AEB Software for Global Trade and Logistics](#)
-  [dBTechnologies - Professional Audio Equipment](#)