AUDIO®

DSI-2

OWNER'S MANUAL

INTRODUCTION

Thank the you for purchasing the DD Audio DSI-2. The DSI-2 is a feature rich audio signal processor that will allow you to precisely tune the acoustics of a vehicle's audio system for maximum listening pleasure. It can be used in conjunction with aftermarket systems or integrated into factory systems to realize the full potential of the connected audio components. To ensure ease of use and proper setup please take a moment to thoroughly read through this operation manual. We hope you thoroughly enjoy this product, and if you have any questions regarding the setup or installation please contact the DD Audio technical support team.

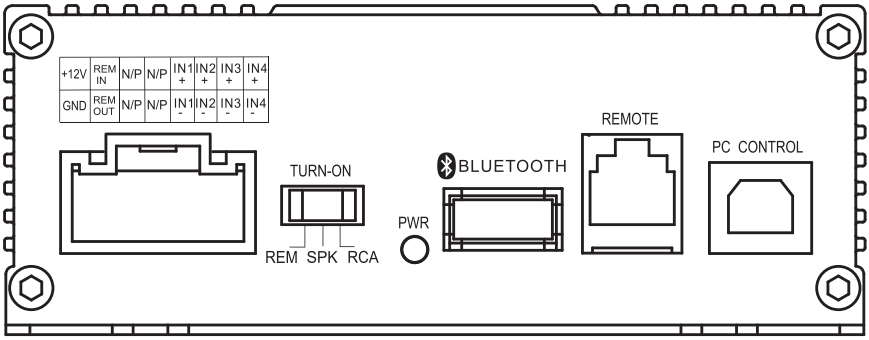
DESIGN FEATURES

- **PC and Smartphone Graphic User Interfaces**
- **Customizable Parametric Equalizer, Crossovers, and Time Alignment**
- **Bluetooth Compatible (w/ optional BTR accessory package)**
- **Remote Controllable (w/ optional BTR accessory package)**
- **6 Customizable EQ Presets**
- **4ch High-level inputs**
- **4ch Low-level RCA inputs**
- **Input Summing**
- **10ch Low-level RCA outputs (8 Programmable + 2 Pass Through)**
- **Aluminum Chassis**

TECHNICAL SPECIFICATIONS

DSI-2	
Operating Voltage	7.5V-17.5V
High-Level Input Impedance	180Ω
RCA Input Impedance	20KΩ
RCA Output Impedance	≥50Ω
RCA Output Voltage	5V (CH1-CH8), 2.6V (CH9-CH10)
High-Level Input S/N	≥100dBA
RCA Input S/N	≥105dBA
High-Level Input THD	0.01%
RCA Input THD	0.002%
REM OUT Output Current	12V >500mA
SPK Input Sensitivity Max	8V
RCA Input Sensitivity Max	855mV
Turn-On	>10V(REM), >1.3V(SPK), >9mV(RCA)
Turn-On Time	3 Seconds
Input Channels	4
Output Channels	10 (8 DSP + 2 Pass Through)
Parametric EQ	10 Bands
Sampling Frequency	24bit/48Khz
DSP Resolution	56bit
Dimensions mm (LxWxH)	150 x 106 x 39
Dimensions inches (LxWxH)	5.9 x 4.1 x 1.5

INPUT CONNECTION



+12V:
Connect to 7.5V-17.5V constant positive power supply input.

-GND:
Connect to a verified chassis ground.
Run a separate ground wire vs connecting it to a factory ground wire. Factory ground wires usually have multiple devices connected to them and are not recommended because this can lead to ground loop issues.

REM IN:
Connect to switched +12V turn-on power input.

REM OUT:
Provides a >500mA 12v switched turn-on signal for connected amplifiers. May require an additional relay for multi amp turn-on.

IN1-IN4:
Connect to hi-level (speaker level) inputs for integrating into OEM audio systems.

TURN-ON Switch:
Used to select the desired DSI-2 turn-on method. REM=REM IN +12v, SPK=High level CH1-CH4 input (signal sense), RCA=RCA INPUT CH1-CH4 (signal sense).

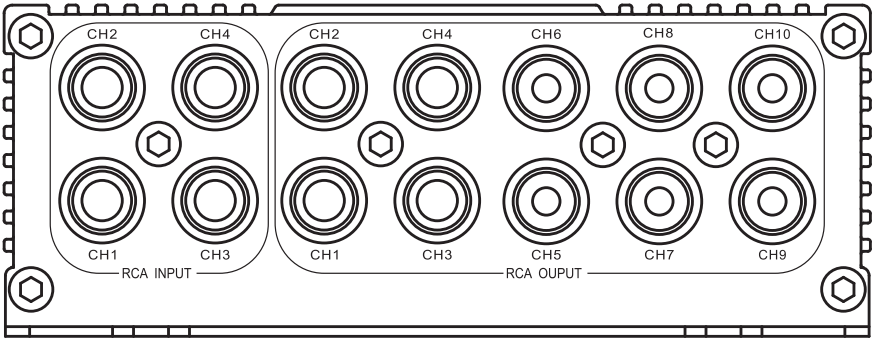
PWR LED:
When illuminated indicates the unit is powered on.

BLUETOOTH:
Port for connecting the optional Bluetooth interface dongle.

REMOTE:
Port for connecting the optional remote control via modular cable.

PC CONTROL:
USB (type B) Port for connecting a PC to the DSI-2 via USB Cable.

OUTPUT CONNECTION



RCA INPUT CH1-CH4:
Low-level inputs for connecting to a source unit with low level RCA outputs.

RCA OUTPUT CH1-CH8:
DSP processed low-level analog signal outputs.

RCA OUTPUT CH9-10 (Pass Through):
Non DSP processed low-level analog signal outputs.

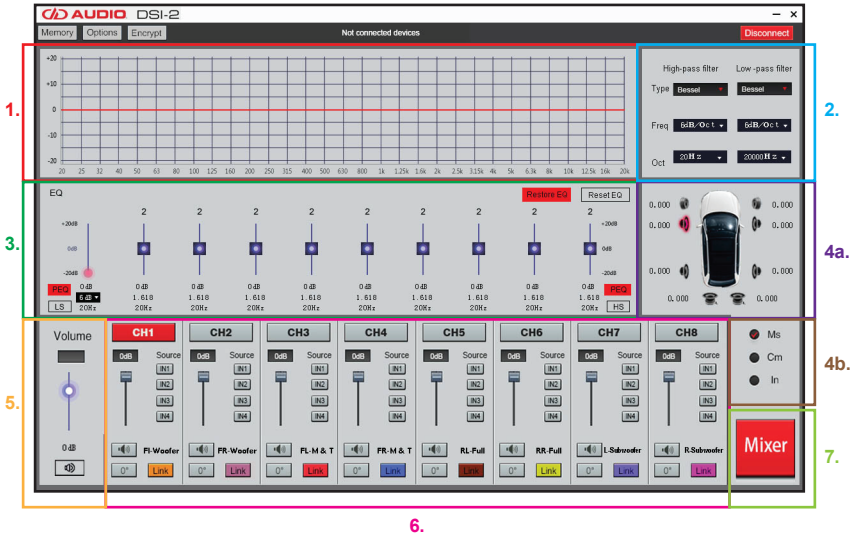
Accessing the interface:

1. Go to the DSI-2 product page at **ddaudio.com** for links to download the DSI-2 interface software and apps. Install the DSI-2 app on a PC and/or smartphone.*
2. Connect the DSI-2's PC Control Port to a computer using a USB cable, or link the DSP to a smartphone via Bluetooth using the optional Bluetooth Dongle.
3. From the PC desktop or the smartphone app screen select the DSI-2 app icon.**

*Windows, Android, and iOS compatible

**When opening the DSI-2 app for the first time the computer may display a security warning stating the publisher could not be verified. It is safe to run the DSI-2 application without causing any harm to computer. Uncheck the "Always ask before opening this file" box to avoid this message in the future.

PC INTERFACE CONTROLS



CONTROL BAR:

- **Memory**: Use for saving, loading, and deleting customized EQ settings.
- **Options**: Use to install software updates, access available help menus, and to determine the current software version.
- **Encryption/Decryption**: Use to password protect, and unlock EQ presets.
- **Connected/Not Connected**: Indicates the connection status between the interface and DSI-2.
- **Disconnect**: Use to connect or disconnect the interface to a DSI-2

AUDIO ADJUSTMENTS:

1. EQ Display: This window displays a visual representation of the current EQ settings. Click on an EQ band and set its center frequency by dragging it to the desired frequency. Adjustments can be made to the Q Factor and dB Level of each EQ band from this this window.

Input Signal Display : The input signal gain for output channels CH1-CH8 can be adjusted from this window. This window can be used to sum input channels by adjusting the input channel level.

See page 10 for detailed Output/Input Configuration and Summing Instructions.

***(NOTE)** Use the Mixer button to switch between the EQ Display and Input Signal Display.*

2. Crossovers: From this window set the desired crossover type, frequency, and crossover slope for the selected EQ band.

a. **Crossover Type**: Choose the filter type based on the equipment configuration and design goals. Different types of filters possess different phase alignment, dampening, and Q factor characteristics.

b. **High-pass filter**: Evenly attenuates all frequencies below the crossover frequency.

c. **Low-pass filter**: Evenly attenuates all frequencies above the crossover frequency.

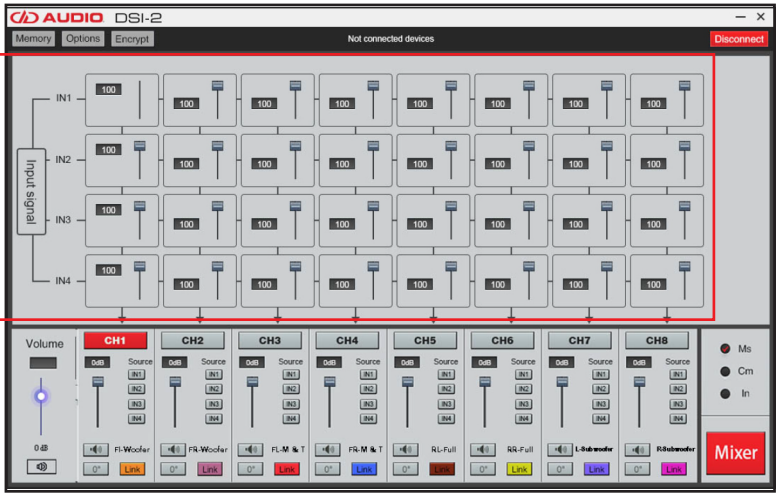
d. **Crossover Slope (Filter Octave)**: Sets the steepness/ rolloff rate of the filter when either the low-pass or high-pass filter is selected.

3. EQ Settings: From this window adjust the center frequency, Q Factor, and dB level for each EQ band.

a. **PEQ Buttons**: Activates Parametric EQ filter setting capabilities for EQ Bands 1 and/or 10. A parametric EQ boosts or cuts a range of frequencies around around a center frequency. Each equalization band has three controls:

b. **Parametric EQ (PEQ)**: A parametric EQ boosts or cuts a range of frequencies around around a center frequency. Each equalization band has three controls:

PC INTERFACE CONTROLS (continued)



- **Frequency**: The center of the frequency range to be cut or boosted.
- **Gain (dB)**: The amount of boost or cut.
- **Q Factor**: The "sharpness" of the boost or cut, higher Q, means a narrower range of frequencies will be affected.

c. LS Button: Activates a Low Shelf filter for EQ Band 1. A low shelf EQ filter has an adjustable center frequency and will boost/cut parameters below the center frequency. Roll-off rate is selectable as 6dB or 12dB per octave.

d. HS Button: Activates a High Shelf filter for EQ Band 10. A high shelf EQ filter has an adjustable center frequency and will boost/cut parameters above the center frequency. Roll-off rate is selectable as 6dB or 12dB per octave.

e. Bypass EQ/Restore EQ Button: Allows you to momentarily bypass then restore EQ adjustments.

f. Reset EQ Button: Resets all EQ adjustments.

4. Time Alignment Settings: To compensate for various speaker locations and listening positions, time delay adjustments can be made to the output channels. By doing this you can make every speaker's musical playback reach the listener's ears at the same time to create a realistic, "concert-like" sound stage.

a. Graphically displays the selected output channel via a highlighted speaker image and allows you to input the amount of desired delay for that channel.

b. Allows you to select the desired unit of duration for the delay Milliseconds(Ms), Centimeters(Cm), or Inches(In).
See page 9 for detailed Time Alignment Instructions.

5. Main Volume: Adjusts the volume of all outputs evenly.

6. Input/Output Channel Configuration: From this window you can adjust the output dB level, select the desired input channel/s, switch phasing, mute, and link output level controls for the selected output channel.
See page 10 for detailed Input/Output Configuration and Summing Instructions.

7. EQ Display/Input Signal Button: Use this button to switch the top window between the EQ Display and Input Signal control panels.

SMARTPHONE INTERFACE CONTROL SCREENS

1. **Home Screen**: Main Volume: Adjusts the volume of all outputs evenly.
   a. **Encryption**: Use to password protect and unlock EQ presets.
   b. **Sound Selection**: Allows the user to select from the available presets.
   c. **Advanced Settings**: Access the Time Alignment, Equalizer, Output, and Mixer screens.
2. **Set Delay Screen**: Select an output channel and set the unit of duration and amount of desired delay for each output channel when time aligning the audio system. See page ? for detailed **Time Alignment Instructions**.
3. **Equalizer Screen**: This screen displays a visual representation of the current EQ settings for the selected EQ band. Adjustments can be made to the dB Level, Q Factor and center frequency of each EQ band from this screen.
   a. **Bypass EQ/Restore EQ Button: Allows you to momentarily bypass and restore EQ adjustments**
   b. **Reset EQ Button:** Resets all EQ adjustments
4. **Output Screen**: Adjust the output dB level, switch phasing, mute, and link output level controls for the selected output channel from this screen. This is also the screen where you can store and name customized EQ presets.
5. **Mixer Screen**: The input signal gain for output channels CH1-CH8 can be adjusted from this screen. This screen can be used to sum input channels by adjusting the input channel level. See page ? for detailed **Input/Output Configuration and Summing Instructions**.

TIME ALIGNMENT INSTRUCTIONS

1. Measure and record the distances from the listening position in the vehicle to each speaker. The speaker distance that is the farthest away from the listening position will be the 0 delay reference, because no delay will be needed for this speaker.

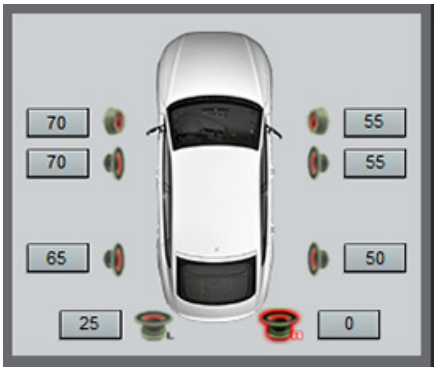
2. Subtract each speaker to listening position distance from the 0 delay reference to determine the amount of time delay to input into the DSI-2 software.

Delay Calculation Formula:
0 Delay Reference - Speaker Distance = Delay Duration

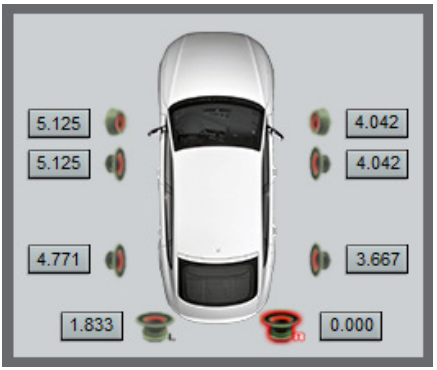
Example: Measured from the front left listening position, the farthest speaker is 100 inches from the listening position. Notice that the speakers closest to the listening position will have more delay and the speakers that are farther away will have less delay. This enables the sound to arrive to the listening position at the same time.

Front Left Position	0 Delay Reference	Speaker Distance	Delay Duration
CH1	100IN	30IN	70IN
CH2	100IN	45IN	55IN
CH3	100IN	30IN	70IN
CH4	100IN	45IN	55IN
CH5	100IN	35IN	65IN
CH6	100IN	50IN	50IN
CH7	100IN	75IN	25IN
CH8	100IN	100	IN0IN

Inches:



Milliseconds:



INPUT/OUTPUT CONFIGURATION AND SUMMING INSTRUCTIONS

You will not see CH9/10 in the interface. They are non-programmable pass-through outputs and are only affected by the main volume control. IN1/IN3 are summed for output CH9, IN2/IN4 are summed for CH10.

There are several ways to configure the input/output sections of the DSI-2 allowing it to be used in many different applications. For the DSP programmable channels 1-8 reference the following configuration options for examples of some optional. Use the IN1-IN4 buttons in the Output Channel Configuration window to assign an input, pair of inputs, or set of summed inputs to the selected output channel/s.

When using the PC interface output channel 1 can be mated with input channel 1, by selecting CH1 and then selecting IN1 in the Output Channel Configuration window.

When using the smartphone interface refer to the Input Signal Mixer method.

4 inputs to 4 outputs
CH1-IN1, CH2-IN2, CH3-IN3, CH4-IN4.

4 inputs to 8 outputs
CH1-IN1, CH2-IN2, CH3-IN1, CH4-IN2, CH5-IN3, CH6-IN4, CH7-IN3, CH8-IN4.

2 inputs to 8 outputs
CH1-IN1, CH2-IN2, CH3-IN1, CH4-IN2, CH5-IN1, CH6-IN2, CH7-IN1, CH8-IN2.

Channel Summing: The DSI-2 has the ability to internally sum together input channels. This feature is used when integrating with a factory system that has multiple, actively crossed-over signals from the OEM source unit or amplifier. For example, in some vehicles there are actively crossed-over tweeters and woofers in the front of the vehicle. The DSI-2 lets you take those signals and sum them together to get a high-quality, full-range pre-amp signal.

4 summed inputs to 8 outputs
CH1-IN1+IN3, CH2-IN2+IN4, CH3-IN1+IN3 CH4-IN2+IN4, CH5-IN1+IN3 CH6-IN2+IN4, CH7-IN1+IN3 CH8-IN2+IN4

Input Signal Mixer method can be used to sum input channels by adjusting the input channel level for each output channel. To do this adjust the levels of the inputs to be summed to equal levels. For example if you want to sum IN1 and IN3 for CH1, Select CH1 and adjust IN1 to level 100, IN2 to level 0, IN3 to level 100, and IN4 to level 0.

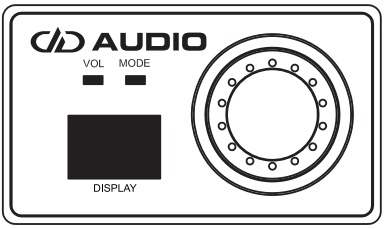
Output Linking: To evenly adjust multiple output levels at once without affecting every output level you can link outputs. You would use output linking in applications such as using CH7+CH8 for sending signal to a subwoofer amplifier, or multi amplifier setups where CH1-CH4 send signals to amp A and CH5-CH8 send signals to amp B.

To Link channels, select a channel then click Link. The Link button will change colors indicating that is now part of a Link Set. Next, click the Link button of all channels to be linked together. To start a new Link Set select a channel that is not part of a Link set, click Link, and proceed to link the desired channels. The color of the Link button will indicate what Link Set it belongs to. You can unlink a channel by clicking Link again.

BTR BLUETOOTH AND REMOTE CONTROL (optional)

The remote control allows for installation flexibility, and easy operation of the Main Volume and the preset selection functions without having a PC or smartphone connected. Rotate the control knob clockwise to turn the main volume up and counterclockwise to turn the main volume down.

To select a preset depress the control knob, turn the knob until the desired preset is displayed, depress the knob again to select the preset and exit the preset selection menu.



The Bluetooth dongle allows streaming of Bluetooth audio between a smartphone and the DSI-2. The Bluetooth dongle also allows the smartphone to interface with the DSI-2 for interface control. Connect a smartphone to the DSI-2:

1. Plug the Bluetooth dongle into the Bluetooth port on the DSI-2.
2. Make sure the smartphone and the DSI-2 are within 10ft of each other during pairing. Bluetooth connectivity distance will vary based on the environment. The maximum connectivity distance will be 30ft in perfect conditions.
3. Turn Bluetooth on in the smartphone settings.
4. Power the DSI-2 on.
5. Allow the phone to search for Bluetooth devices.
6. When DSI-2 displays in the smartphone's device menu connect to it.

If you have any questions regarding setup, installation or warranty please contact the DD Audio technical support team by email at **service@ddaudio.com** or by phone at **(405) 239-2800**.

TIME ALIGNMENT WORKSHEET

Left Front Position	0 Delay Reference	Speaker Distance	Delay Duration
CH1			
CH2			
CH3			
CH4			
CH5			
CH6			
CH7			
CH8			

Right Front Position	0 Delay Reference	Speaker Distance	Delay Duration
CH1			
CH2			
CH3			
CH4			
CH5			
CH6			
CH7			
CH8			

Center Front Position	0 Delay Reference	Speaker Distance	Delay Duration
CH1			
CH2			
CH3			
CH4			
CH5			
CH6			
CH7			
CH8			

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