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ZEN AUDIO

DSP12A-A2B

Ford A²B® to 12-channel Analog & Digital sound processor

NTV-KIT889

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WARNING: Due to the complexity and sensitivity of the OEM Ford A²B®, the ZEN-A2B must be used with amplifiers that are grounded directly to the battery. The resistance to (true battery) ground of the Amplifier(s) *must not exceed 1 ohm, otherwise you will likely experience performance issues or damage the ZEN-A2B*.

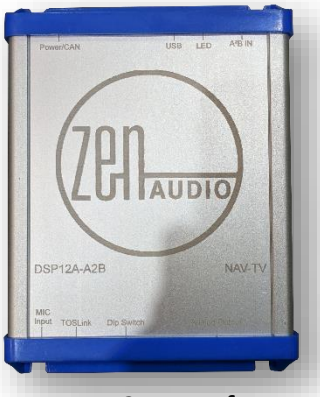
BHM
07/24/19
NTV-DOC320

Overview

The DSP12A-A2B processor seamlessly converts 2018+ Ford factory A²B® (Automotive Audio Bus) to 12-channel analog RCA and TOSLink output. Providing the best possible signal to aftermarket amplifiers to the OE B&O or Revel amplified SYNC3 system has never been so simple. This kit integrates with the OEM A²B® bus to retain volume control, full fade and balance (analog only), treble, mid-range, bass control, chime level control & Bluetooth voice calls with no external speaker (true OEM integration). *NOTE: 2018 vehicles not equipped with a factory B&O or Revel amplified system are not equipped with A²B® and do not require this interface.*

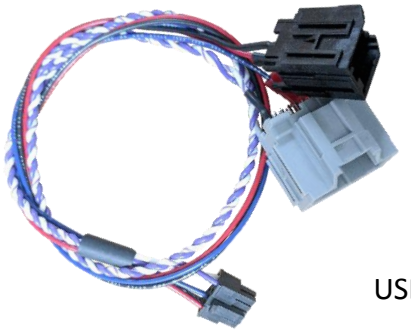
Kit Content

ZEN RCA Harness
NTV-HAR315



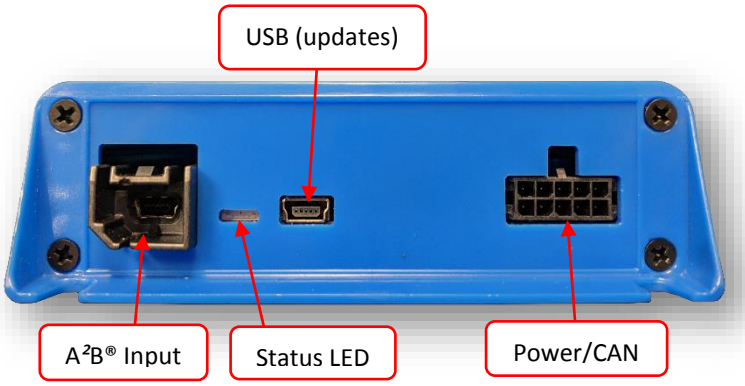
ZEN-A2B Interface
NTV-ASY274

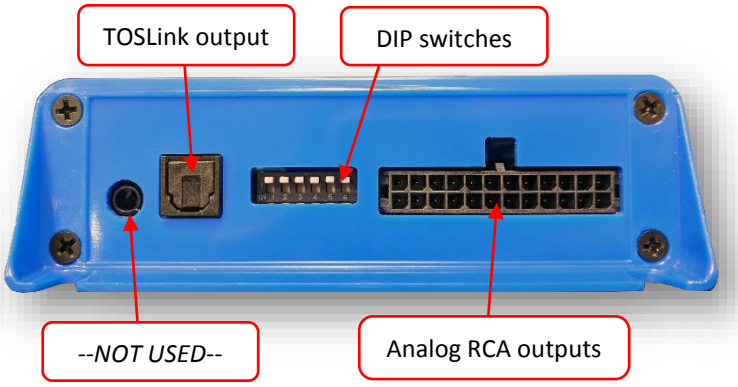
ZEN-A2B Harness
NTV-HAR325



USB Cable (updates)
NTV-CAB009

DSP12A-A2B overview





DSP12A-A2B Compatibility (SYNC3)

NOTE: All vehicles require SYNC3, this interface only applies to vehicles equipped with A²B® (B&O or Revel Amplifiers)

Year(s)	Make	Model	NOTE:
2017+	Ford	F150, Escape, Raptor	With B&O
2018+	Ford	Expedition	With B&O

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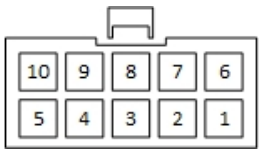
DSP12A-A2B Installation

1. For DSP12A-A2B installations, the factory amplifier must be removed and the ZEN unit can be installed into its place. If this vehicle is not amplified from factory then this interface is not needed.

2. After locating the factory amplifier, disconnect it entirely as it will no longer be in use. With the vehicle off, connect the provided ZEN harness to the (previously removed) OEM amplifier connectors (gray & black). Below is a pin out chart (just for reference):

3. Connect the OEM *A*²B® (USB) connector removed from the OEM amplifier to the ***A2B IN*** port on the ZEN unit.

Pin #	Description	Color
1	Ground (-)	Black
2	Remote Output	Blue
5	CAN HI	Violet/White
6	Constant 12v (+)	Yellow
10	CAN LO	Violet

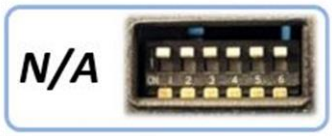


Wire Side (HAR325)

4. Connect the ***blue*** wire (PIN 2) to the remote input on the amplifier*.

**If installing more than one amplifier/DSP, a relay must be used for reliable turn-on (ZEN remote output: 500mA max).*
**Remote wire note: the (blue) remote wire will output 12v as soon as CAN wakes (door opens, etc).*

5. ***For ZEN modules with 3.0.12 firmware and up (units built past 09/16/18), the dip switches are no longer used. Use the ZEN online configuration tool to adjust tone levels, fader, etc. See pages 7-8 for more information on this tool. Open a browser and type in zen/ (or zen.local/ if on MAC). Connect via the USB to adjust desired settings.***



6. If using analog RCAs for signal to the amplifier, connect according to the reference chart below.
WARNING: Do not connect RCA cables to this interface until all amplifiers/external processors are properly grounded. Failure to do this may cause damage to the interface and VOID the warranty!

RCA	1	2	3	4	5	6	7	8	9	10	11	12
Channel	Left Front	Right Front	Left Front	Right Front	Left Front	Right Front	Left Rear Door	Right Rear Door	Left Rear Center	Right Rear Center	Center	Sub

7. If using TOSLink for signal to the amplifier, connect the cable to the TOSLink port shown on page 2.
NOTE: both Analog and Digital output sound simultaneously, regardless of which type is used.

DSP12A-A2B General Installation Notes

- ***Tuning tips:***
    1. Before beginning tuning process (especially with external EQ/Processors), set Bass & Treble on the head unit for each source to flat (0).
    2. *Begin with amplifier/EQ gains all the way* ***down.***
    3. *With dynamic music playing, adjust the radio volume to maximum.*
    4. *Adjust the amplifier/EQ gains to desired maximum level.*

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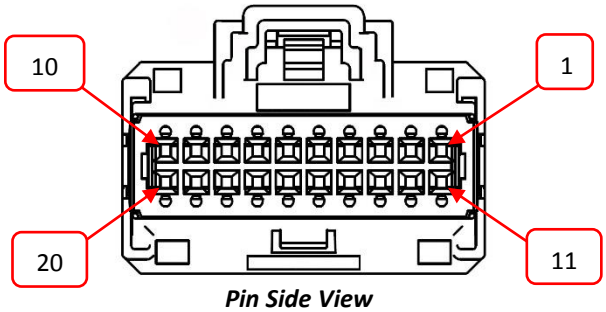
Multi-Color LED Status Indication

LED Status	Indication
Solid Red	A²B Active *only (no CAN present!)*
Solid Green	CAN Active *only (no A²B present!)*
Green + Red (yellow)	A²B + CAN Active *(normal operation)*
Blue/Violet/White	*receiving amplifier command…*
Blinking Red	*Clipping* (beyond maximum digital signal level achieved)
Blinking Blue	PC Link via USB (updates)

OEM Ford B&O amplifier connector pin out

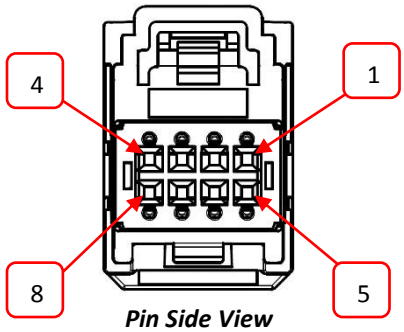
Pin #	Description	Color
1	CAN HI	Green/Blue
4	Center Channel (-)	Gray/Yellow
5	Subwoofer COIL 1 (-)	Gray
6	Right Front Door (-)	White/Orange
7	Left Front Door (-)	White/Brown
8	Right Rear Door (-)	Brown/Blue
9	Subwoofer COIL 2 (-)	Yellow
10	Left Rear Door (-)	Brown/Yellow
11	CAN LO	White/Green
14	Center Channel (+)	Green
15	Subwoofer COIL 1 (+)	Green/Violet
16	Right Front Door (+)	White/Violet
17	Left Front Door (+)	White
18	Right Rear Door (+)	Brown/White
19	Subwoofer COIL 2 (+)	Violet/Orange
20	Left Rear Door (+)	White/Green



Pin Side View

NOTE: if engine noise is introduced through system with the ZEN, match <u>the interface's ground wire</u> to the aftermarket amplifier's ground.

Pin #	Description	Color
1	Ground (-)	Black/Violet
2	*CAN HI (Lincoln only)**	Green/Blue
3	*CAN LO (Lincoln only)**	White/Green
4	Constant 12v (+)	Brown/Red
5	Ground (-)	Black/Violet
6	*--Not Used--*	--
7	*--Not Used--*	--
8	Constant 12v (+)	Brown/Red



Pin Side View

**The CAN wires on some Revel systems (Lincoln only) are located on the OEM <u>power harness</u> instead of <u>the speaker harness</u>. For these vehicles you will need to hard wire to the location shown here for proper ZEN operation.*

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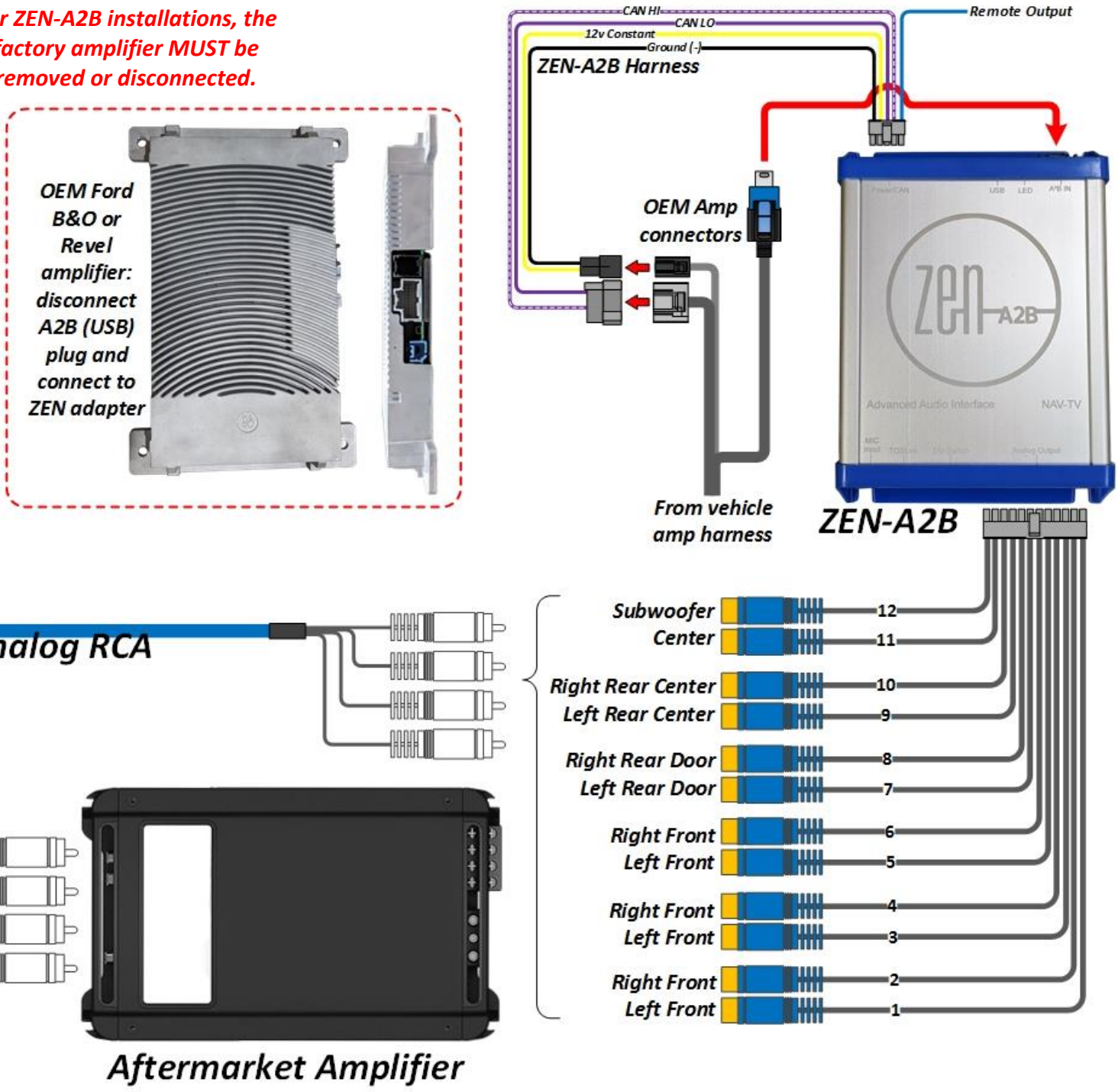
DSP12A-A2B System Layout (analog)

For ZEN-A2B installations, the factory amplifier MUST be removed or disconnected.



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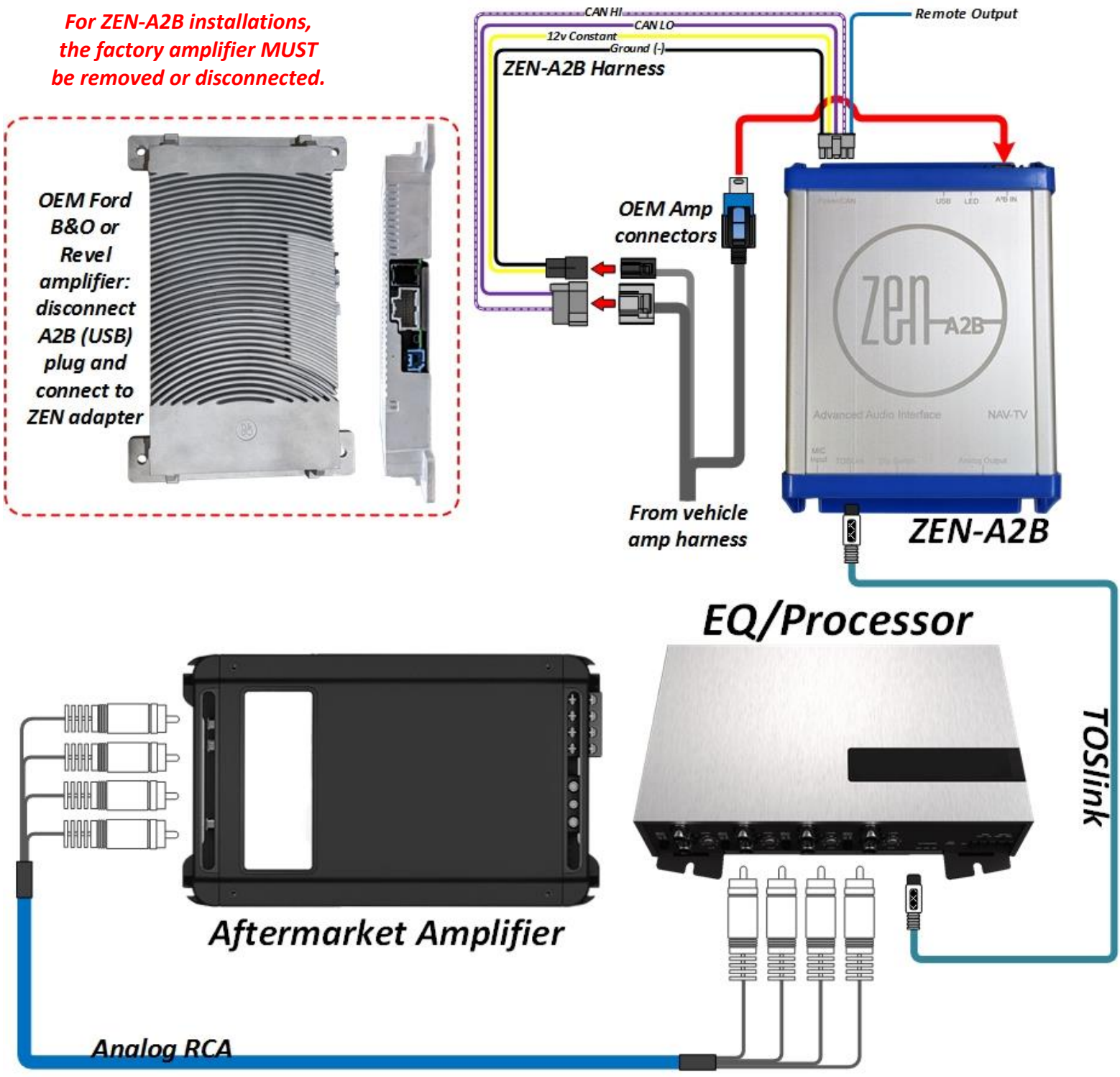
DSP12A-A2B System Layout (digital TOSLink)



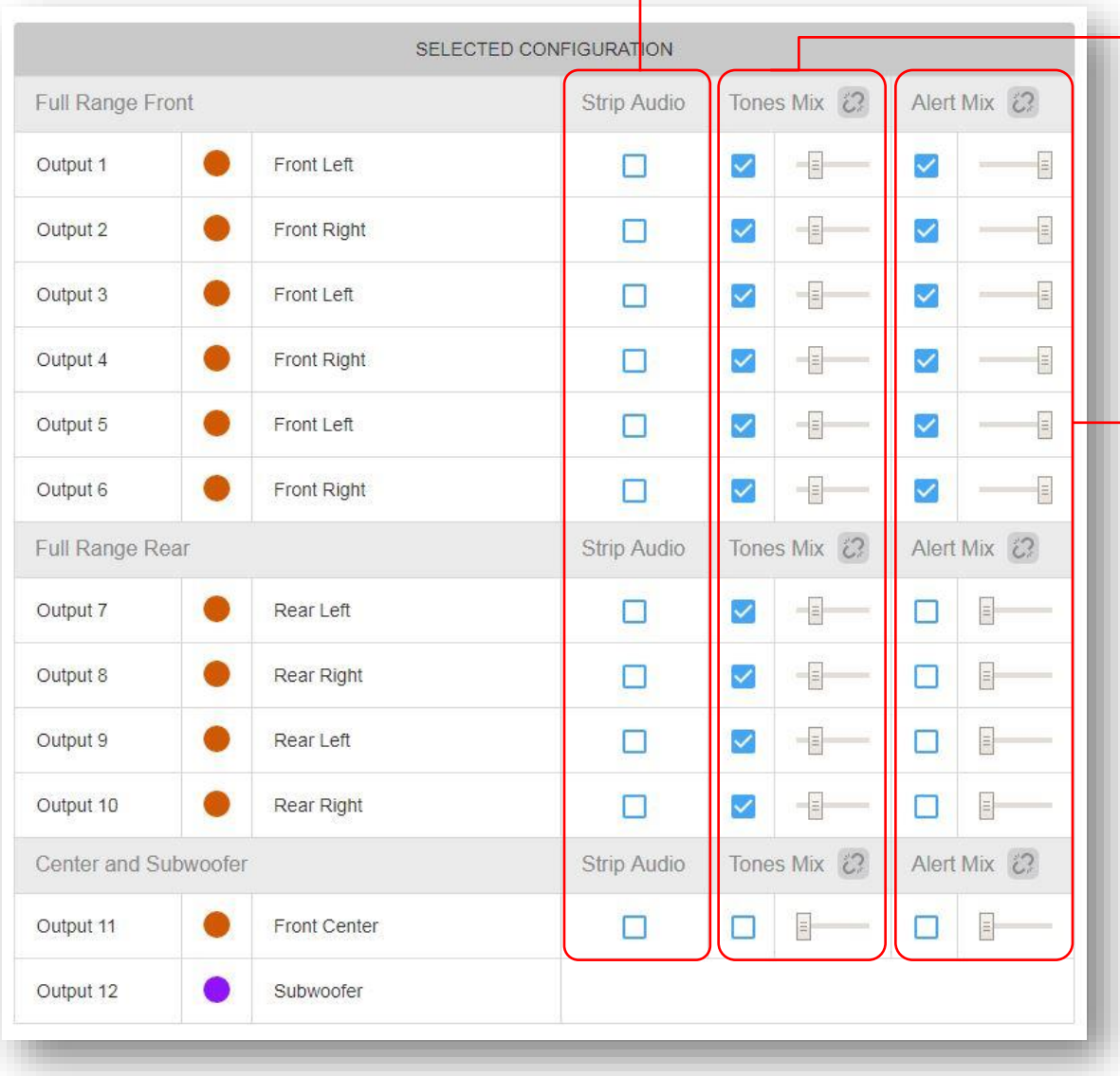
ZEN configuration: Analog Outputs (online tool)

To access the ZEN online configuration tool, first connect the provided USB cable from the ZEN module to the computer. Open an internet browser and navigate to ***zen/ If using a PC*** or **zen.local/ *if using a Mac***. Wait for the configuration page to load. Adjust settings as required for the installation.

NOTEs:

- *Default values for the ZEN module are shown below (Tones Mix on ALL: 20%, Phone Mix on front only: 100%)*
- *If the ZEN module is still connected to the vehicle while configuring via the web-tool, a door chime will be generated and repeated 4 times upon adjustment. To test Notification Mix volume level, go to SETTINGS, BLUETOOTH, then select 'Add a Bluetooth Device'. Selecting this emits an audible OEM message which can be adjusted via the mix slider.*

Strip Audio sends only door chimes/ safety alerts out on that RCA channel (removes all music). If music must play through the channel, you must use ***Tones Mix***. Adjust tone output level to suit. *NOTE: this setting CANNOT be used simultaneously with 'Tones Mix'.*



Tones Mix channels will play audio normally until a door chime or other safety alert is requested, at which time the tone will be heard along with the audio on that channel. Adjust tone output level to suit.

Alert Mix channels will play audio normally until a notification tone is received/active, at which time the audio will *attenuate* and the tone will be output on that channel. Adjust output level to suit. *Notification tone example: NAV turn prompts, certain CarPlay notifiers, etc*

Use the ***LINK*** button to simultaneously adjust all the levels (for front & front center, or rear). Select, then adjust the slider to suit.

Use the ***UNLINK*** button to separately adjust each channel level. Select, then adjust the slider to suit.

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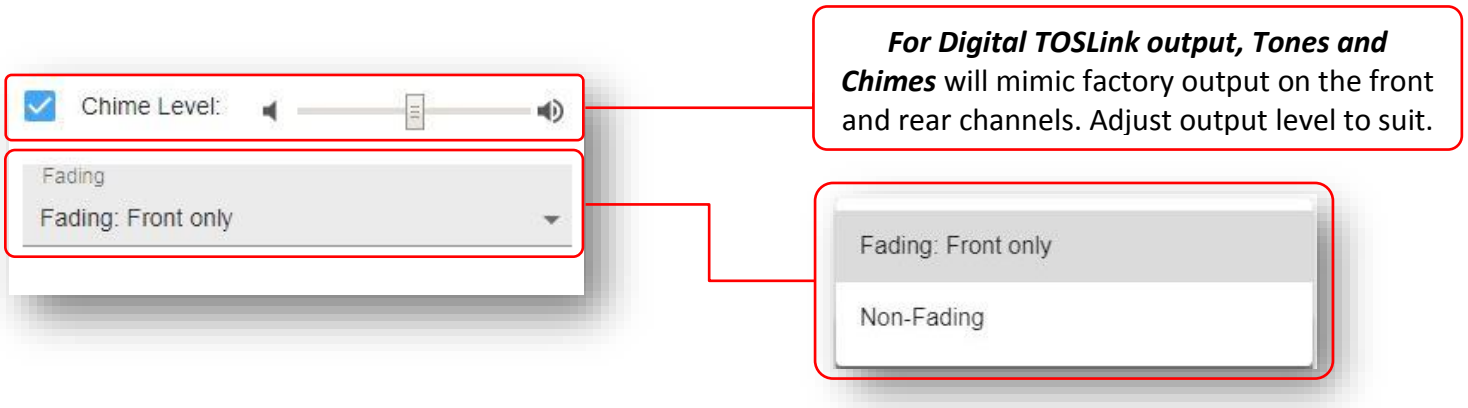
ZEN Configuration: Digital Output (online tool continued)

Since the digital TOSLink is a single stereo output, advanced adjustments are limited.

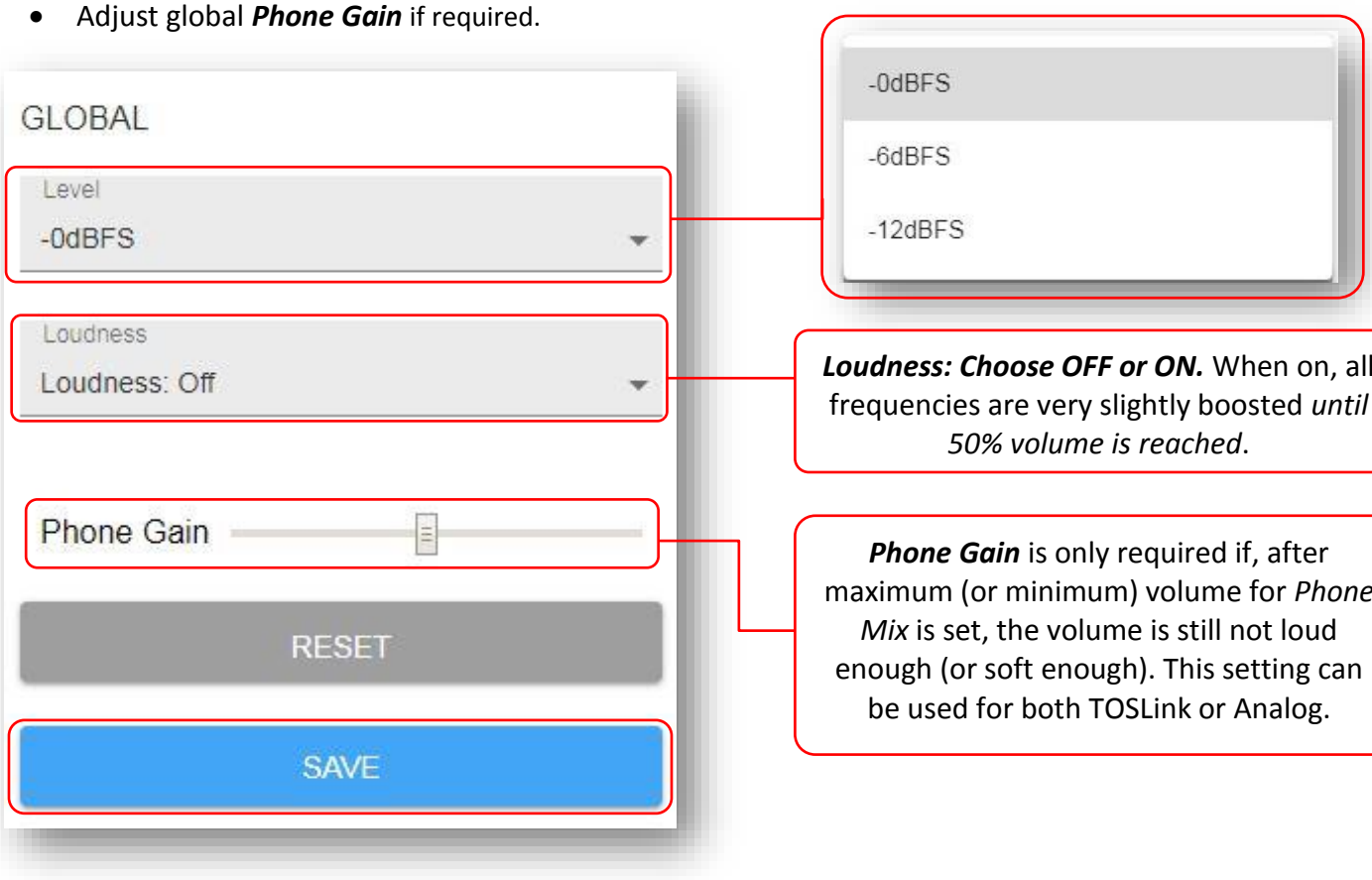


For Digital TOSLink output, Tones and Chimes will mimic factory output on the front and rear channels. Adjust output level to suit.

*Once complete, select **SAVE** to store the settings in the ZEN module.*

ZEN Configuration: GLOBAL Adjustments (online tool continued)

- Adjust global ***Output Level*** (attenuation) to desired level.
- Adjust ***Loudness Off or On***.
- Adjust global ***Phone Gain*** if required.



Loudness: Choose OFF or ON. When on, all frequencies are very slightly boosted *until 50% volume is reached*.

Phone Gain is only required if, after maximum (or minimum) volume for *Phone Mix* is set, the volume is still not loud enough (or soft enough). This setting can be used for both TOSLink or Analog.

Once complete, select SAVE to store the settings in the ZEN module.

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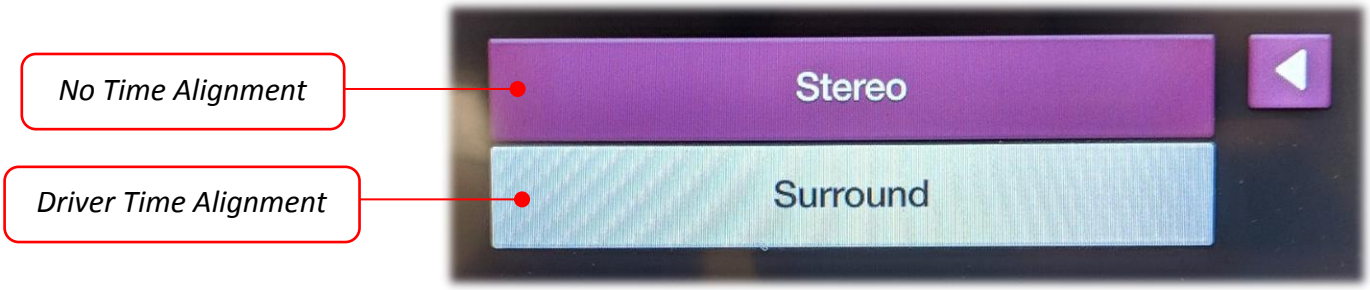
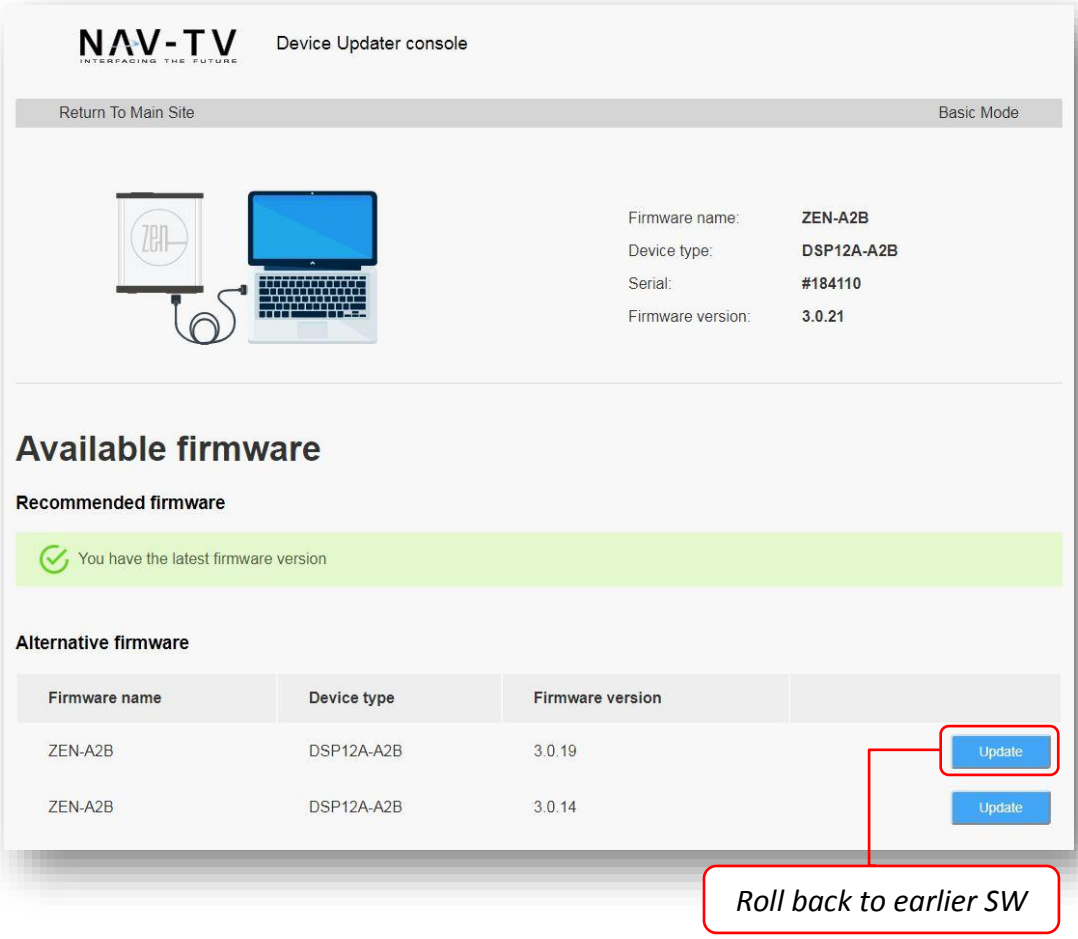
DSP12A-A2B Time Alignment (Analog only)

- The DSP12A-A2B features a built-in time alignment feature that can be activated on-the-fly, through an OEM menu setting. *To activate the (driver) time alignment, go to* ***Settings, Sound Settings,*** *then choose* ***Sound Mode.*** Choose *Surround* to use driver time alignment.



ZEN Updates

Updating the DSP12A-A2B interface is performed using the provided USB cable and an internet-connected PC. Connect the USB cable from the ZEN module to the PC, and with an internet browser go to ***navtvdevice.com***. Once there, let the page load and find the module. The unit will update automatically to the latest software (be patient). If required, you may roll back to a previous software version as well.



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DSP12A-A2B Technical Specifications

Hardware & Software	
Current HW version:	-- 3r0 --
Current SW version:	4.0.11 (website updater only)
Compatible SW (update) OS:	Windows 7 (64 bit), 8, 10
INPUT	
Digital Input	A²B Twisted Pair
OUTPUT	
Digital Outputs:	TOSLink
Digital Outputs supported:	24bit/48kHz
Frequency Response (digital):	18Hz – 24kHz
Analog Outputs:	12 channels (RCA)
Output Voltage *Peak:*	6v
Output Voltage *RMS:*	2.1v
Analog Output Type:	Single-Ended
S/N Ratio (analog):	114dB
Frequency Response (analog):	18Hz – 24kHz
THD+N @ -1dBFS	-94dB
DAC	48kHz 32bit
DSP	32bit Floating Point
Delay (Time Alignment)	Selectable
Power Supply	
Current Consumption Stand-by	<1 mA
Current Consumption Operational	350 mA MAX
Operational Voltage	7V – 20V DC
Amp Turn-On Output	Automatic
Amp Turn-On Voltage	V-batt
Amp Turn-On Current Limitation	500mA
Other	
Dimensions:	4”x5”x1 3/8”
Weight:	10 oz
Country of Origin:	USA

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Notes

- With A²B, if the power or (A2B) is ever removed from the ZEN module, the vehicle will require a CAN reset once or twice to regain normal OEM functionality (chimes, etc). CAN-reset procedure:
    1. Turning off ignition
    2. Close all doors
    3. Let the vehicle 'go to sleep' for ~10 minutes (without touching it)
    4. Return and test
- ***VITAL:*** For installations with this ZEN processor, make certain that any added amplifier's *ground* resistance (reference vehicle battery ground) ***does not exceed 1 ohm.***
- If engine noise is introduced through system with the ZEN, match the interface's ground wire to the aftermarket amplifier's ground to eliminate any ground loop.
- If you've installed a third-party DSP (receiving signal from the ZEN, before the amplifier) and you're having issues with *audio bleeding from one channel to another, echoing Bluetooth phone calls or any other signal processing issues,* ***rule out the ZEN first by temporarily bypassing the third-party DSP and running signal directly from the ZEN to the amplifier(s) and verify the problem still exists before calling technical support.***

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