



CONFIDENTIAL

Spacious sound 3D,
Harmonics enhancer Extended
Sound Tuning Tool
Manual

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Semiconductor Division

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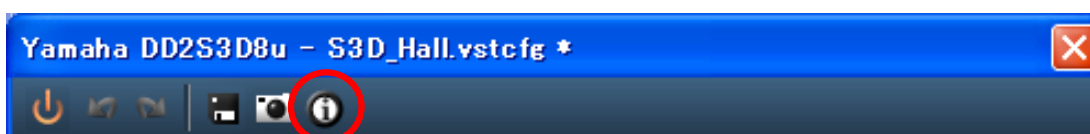
1 Overview

This document shows the basics of how to tune up parameters for the two "DSE Mode" firmware effects that run on YDA174 (DD-2SP) or YSS952 (SPR-2), *Spacious sound 3D* for three dimensional surround, and *Harmonics enhancer Extended* for harmonically enhanced reproduction.

The tune up tool program lets you try out these effects, and produces parameters in a form for use in DD-2SP or SPR-2 firmware.

[Notes]

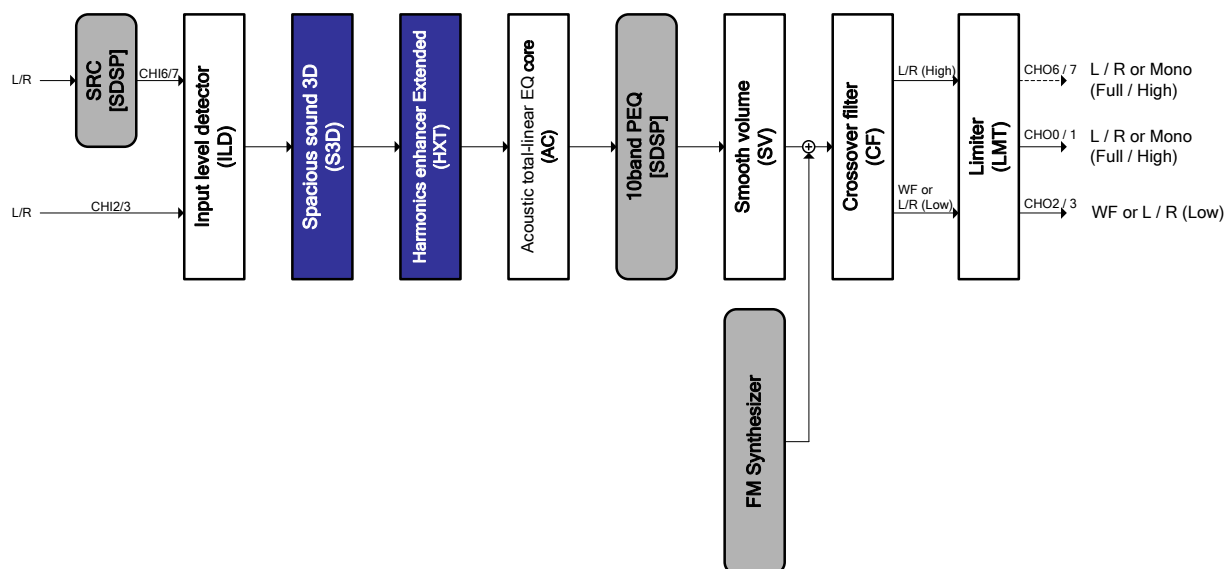
- Only supports DD-2SP or SPR-2 firmware parameters.
- The tool can be used for a limited time. The  icon tells you the expiration date.



Expiration date

- This tool runs on Windows XP SP3 / Windows 7 SP1.
- *Spacious sound 3D* may be called "S3D", *Harmonics enhancer Extended* "HXT" in this manual.

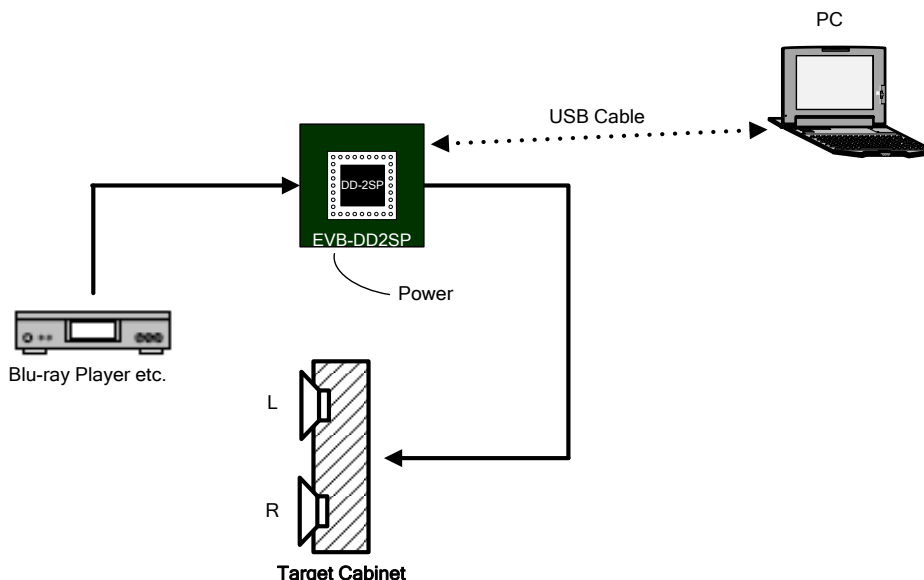
◆DSE Mode Firmware Block Diagram



2 Preparation

2.1 Preparing Hardware

Connect the YDA174 evaluation board (EVB-DD2SP or EVB-SPR2) to the target speaker cabinet and hardware. The example blow uses EVB-DD2SP for illustration.



[Notes]

- In the example, speakers are directly connected to the EVB-DD2SP board with wires.
- For the EVB-SPR2 board, use speaker cabinet input terminals for connection.
- Both EVB-DD2SP and EVB-SPR2 may be called the "evaluation board" in this document.

2.2 Preparing Software

2.2.1 Installing Sound Tuning Program

Copy the EVB-DD2SP (or EVB-SPR2) folder on the *DSE mode standard kit* in a PC folder, if already not done so. Copy the files in the EVB-DD2SP (or EVB-SPR2) folder on this tune up tool kit to that folder.

[Notes]

- This tune up tool kit only works with *DSE mode standard kit* Version 2.0 or later.
- DD-2CTL must be Version 2.00.03 or later.



2.2.2 Installing Evaluation Board Driver

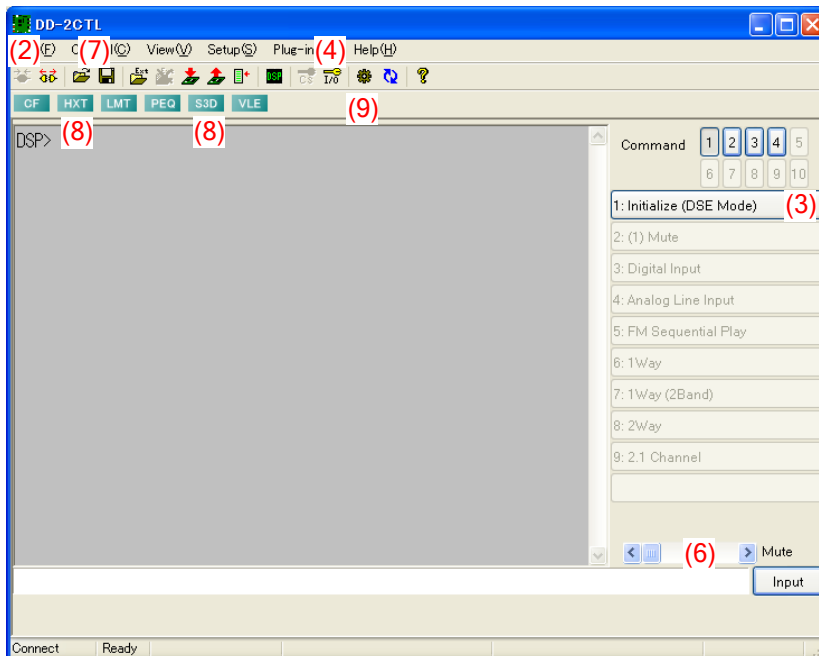
Follow steps in "EVB-DD2SP / EVB-SPR2 USB Driver Installation Manual" on the *DD-2SP/SPR-2 Standard Evaluation Kit* to install the driver.


3 Tuning Up Effect Parameters

3.1 Basic Operation

Follow the steps below to tune up parameters using DD-2SP as an example. When using SPR-2, read "EVB-SPR2" when it says "EVB-DD2SP".

- (1) Power up the evaluation board, speakers, and other hardware in *2.1 Preparing Hardware*.
- (2) Run DD-2CTL tool (EVB-DD2SP¥DD-2CTL¥DD-2CTL.exe), and click  icon on the window.
- (3) Initialize the evaluation board with the *1: Initialize (DSE Mode)* button. Initializing the board makes all effects on firmware disabled except the volume control (Initial volume level: -30dB for DD-2SP board, -12dB for SPR-2).
- (4) Open input source select window with  icon.
- (5) Selecting an input source starts playing it on the speaker.
- (6) Use volume level slider to adjust if necessary.



- (7) Set effect parameters from a file in VST plug-in configuration format (EVB-DD2SP¥Tune¥Sample). Drag the configuration file and drop it in the *main window*, or select it on the file select dialog window opened with  icon or [All Plug-ins] in [File] → [Load .vstcfg] sub menu.


[Notes]




- To set parameters of a particular effect separately, drag the configuration file and drop it on the *tune-up tool window*; or choose the effect on the file select dialog window open with the sub menu [File] → [Load .vstcfg].
- VST plug-in configuration files have different sections for parameters of the following effects in DSE mode standard kit.

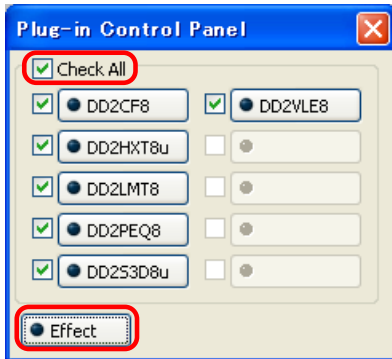
| | |
|-----------------------|------------------------------|
| - S3D_Hall.vstcfg: | DSE mode S3D Hall effects |
| - S3D_Natural.vstcfg: | DSE mode S3D Natural effects |
| - S3D_Stadium.vstcfg: | DSE mode S3D Stadium effects |
| - S3D_Wide1.vstcfg: | DSE mode S3D Wide 1 effects |
| - S3D_Wide2.vstcfg: | DSE mode S3D Wide 2 effects |
| - HXT_Bass1.vstcfg: | DSE mode HXT Bass 1 effects |
| - HXT_Bass2.vstcfg: | DSE mode HXT Bass 2 effects |
| - HXT_High1.vstcfg: | DSE mode HXT High 1 effects |
| - HXT_High2.vstcfg: | DSE mode HXT High 2 effects |

- (8) Click **S3D** or **HXT** button, or select a tuning tool on [Plug-ins] menu to open the tuning tool window.
Example below shows the tuning tool window for *S3D Hall* effects.




(9) Toggling  icon allows checking that sound effects can be turned on and off.

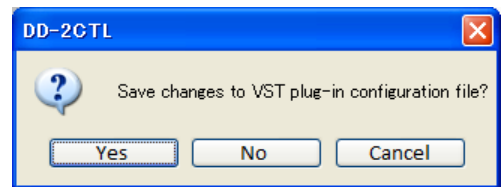
Click  icon to open *Plug-in Control Panel* dialog box, which can turn on and off multiple tuning tool effects at the same time. For example, checking  and then toggling  button activates or inactivates six effects at a time.




(10) To save the parameters adjusted with the tune-up tool, use the file save dialog window opened with [File] → [Save .vstcfg As]. One VST plug-in configuration file stores all six effect parameters.

[Notes]

- To overwrite an existing VST plug-in configuration file, use  icon or [File] → [Save .vstcfg].
- Exiting the tool after modifying parameters for some effect (those with * on their VST section names) without saving presents the file save dialog box shown to the right for exit confirmation. Click *(Y)* to save those parameters before exiting, *(N)* to discard parameters, or *Cancel* to cancel exit.



(11) Click  icon and then power down the evaluation board.

3.2 Effect Parameters

3.2.1 DD2S3D8u



(1). S3DLev

Use this slider to adjust *Spacious sound 3D* mix level (dB).

The indicator is blue when the effect output is mixed, and turned off by clicking it.

(2). PE Type

Use this drop-down to select one of three phase processing types.

- a. Legacy : Phases are processed as in previous (DSB mode and older) versions
- b. Standard : Sound images have more depth towards top than *Legacy*
- c. Wide : Wide stereo effect

The indicator is blue when the processed output is mixed, and turned off by clicking it.

(3). PE Freq

Use this drop-down to set phase processing output frequency characteristics.

For *Legacy* or *Standard*, choose from *Freq1* to *Freq5*. Start with *Freq4* for try outs.

For *Wide*, only *Freq1* is available. (Note selecting "-" turns off phase processing output)

(4). PE Depth

Use this drop-down to adjust phase processing effect depth.

For *Legacy* or *Standard*, choose from *Depth3* to *Depth7*. Start with *Depth6* for try outs.

For *Wide*, choose from *Depth3* to *Depth6*. (Note selecting "-" turns off phase processing output)

(5). AE Type

Use this drop-down to select surround component filter type.

The indicator is blue when the filter is in effect, or turned off to use no filter by clicking it.

(6). REData

Use this drop-down to select *sound field* model for reverb processing.

The indicator is blue when the processing is in effect, and turned off by clicking it.

(7). RE#Mix / Inv (# = L / R)

Use these sliders to set reverb processing left or right channel input levels.

Right channel slider has *Inv* switch to invert signal polarity. Inverting makes in-phase signals get less reverb, and left and right input levels being equal makes them get no reverb. Making some left and channel input level difference get them some reverb for adjustment.

The indicators are blue when that input channel is on, and turned off by clicking it.

(8). PreLPF

Use this slider to set first order low pass filter cut off at the reverb processing input.

The indicator is blue when the filter is in effect, or turned off to use no filter by clicking it.

(9). REEffLev

Use this slider to set reverb processing mix level. Typically -12 dB, adjust as necessary.

The indicator is blue when the reverb output is mixed, and turned off by clicking it.

(10). #Mix (# = Dry / PE / AE / RE)

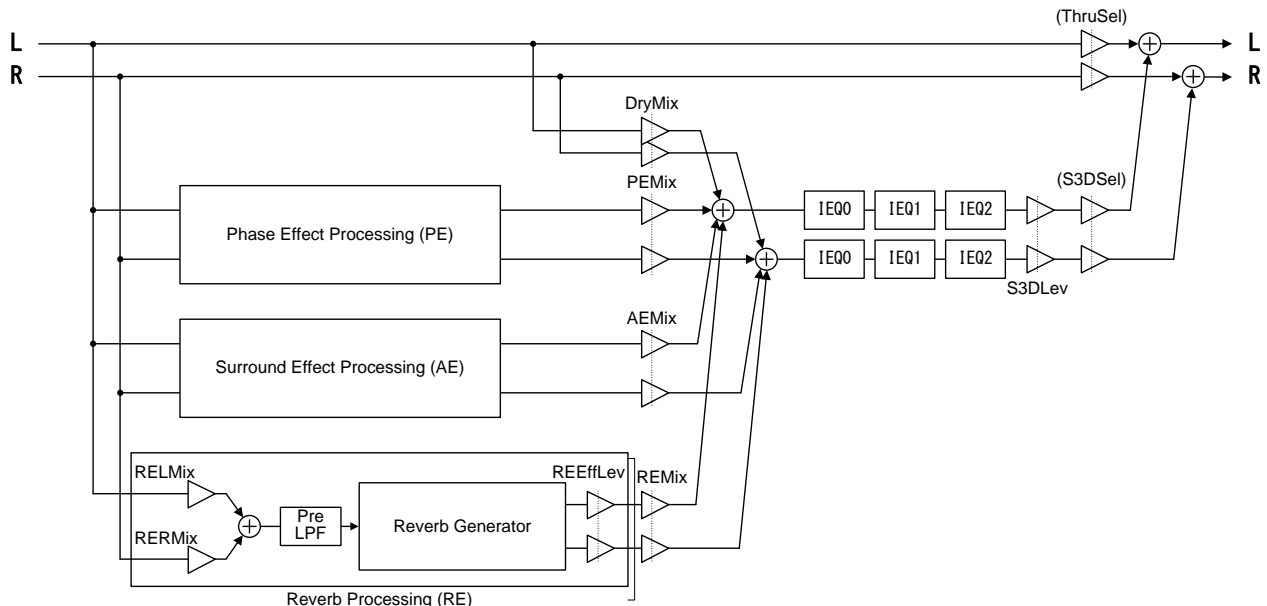
Use these sliders to set original signal (Dry) mix level, phase processed signal (PE) mix level, surround processed signal (AE) mix level, and reverb processed signal (RE) mixed level.

The indicators are blue when that signal is mixed, and turned off for no mixing by clicking it.

(11). IEQ# Type / Freq / Gain / Q (# = 0 / 1 / 2)

Use these drop-downs to select IEQ# filters' type, frequency, and Q factor. These filters are applied to *Spacious sound 3D* outputs.

The indicators are blue when that filter is used, and turned off by clicking it.

◆ Spacious sound 3D Processing Signal Flow:

3.2.2 DD2HXT8u



(1). Band# Mix (# = 0 / 1)

Use these sliders to set the mix level for each range cut out for signal band extension.

The indicators are blue when that signal is mixed, and turned off for no mixing by clicking it.

(2). Band# NLD (# = 0 / 1)

Use these drop-downs to select one of five HXT (Harmonics enhancer Extended) processing types for the band.

- | | | |
|------------------|---|-------------------------------------------------------------------------|
| (1) NLD1 | : | Weak bass boost Adds both odd- and even-order harmonics |
| (2) NLD2 | : | Strong bass boost Adds both odd- and even-order harmonics |
| (3) NLD1 wo Even | : | Weak bass boost Adds odd-order harmonics |
| (4) NLD2 wo Even | : | Weak bass boost Adds odd-order harmonics |
| (5) NLD3 | : | For compressed audio sources Adds both odd- and even-order harmonics |

[Notes]

- HXT produces harmonics for input louder than a threshold.
 $NLD1$ or $NLD1$ *wo Even* : $-62 + HR$ [dBFS]
 $NLD2$ or $NLD2$ *wo Even* : $-60 + HR$ [dBFS]
 $NLD3$: $-40 + HR$ [dBFS]
 HR shows the total signal headroom (in dB) at HXT input (ILD.Att[15:0] bit). (This tool sets 18 dB in ILD.Att[15:0].)
- For $NLD1$, $NLD2$, or $NLD3$, HXT generates DC signal component in addition to odd- and even-order harmonics. The DC components must be removed with a high-pass filter, for example by using one of Band#EQ# configured as such.

(3). Band# HPF / LPF (# = 0 / 1)

Use these sliders to set bandpass filter cut off frequencies for each band.

The indicators are blue when that filter is on, and turned off to use no filter by clicking it.

(4). Band# Delay (# = 0 / 1)

Use these sliders to set Band# path output latency in samples.

(5). Dry Delay

Use this slider to set main path output latency in samples.

(6). Band# EQ* Type / Freq / Gain / Q (# = 0 / 1, * = 0 / 1)

Use these drop-downs to set equalization filter frequency, gain, and Q factor for each band.

The indicators are blue when that filter is on, and turned off for no filter by clicking it.

(7). DRYEQ# Type / Freq / Gain / Q (# = 0 / 1)

Use these drop-downs to set main path signal DRYEQ# filter type, frequency, gain, and Q factor.

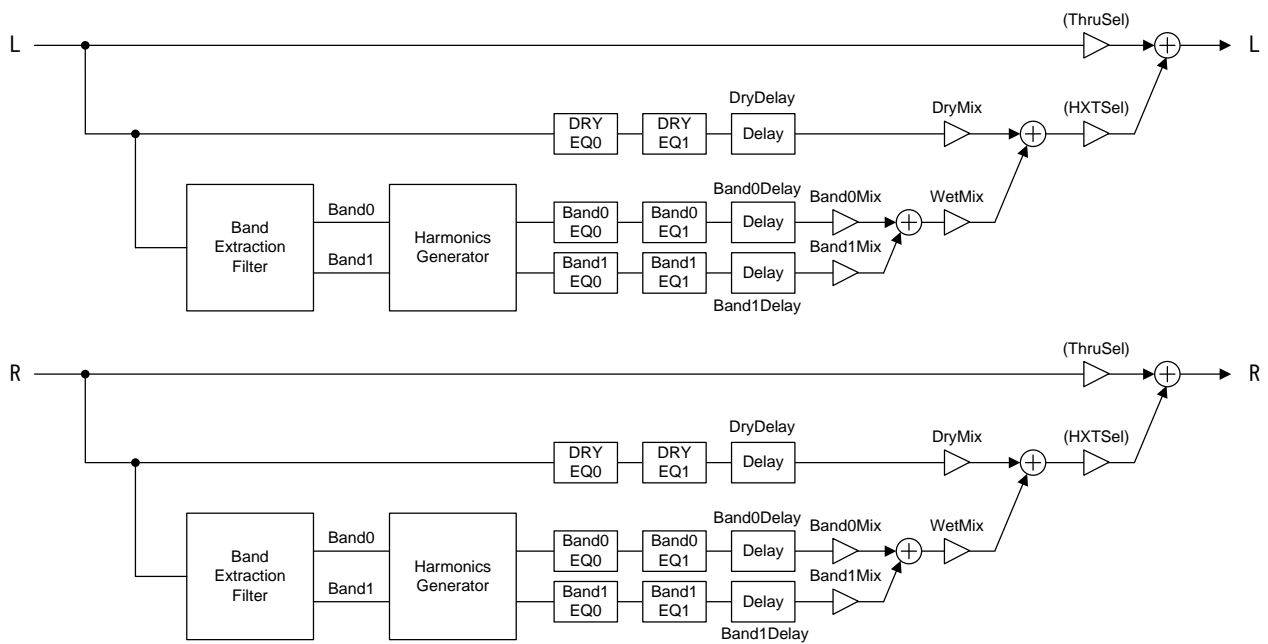
The indicators are blue when that filter is on, and turned off for no filter by clicking it.

(8). Wet Mix / Dry Mix

Use these sliders to set effect path (Wet) mix level and main path (Dry) mix level.



The indicators are blue when that signal is mixed, and turned off for no mixing by clicking it.

◆ **Harmonics enhancer Extended Processing Signal Flow:**



HXT processing extracts signal in certain ranges from input and produce harmonics for the fundamentals in that range, and outputs harmonics and fundamental mix.

3.3 Firmware Parameter File Output

- (1) Run DD-2CTL tool.
- (2) Restore parameters from a saved VST plug-in configuration file.
- (3) Open DD2S3D8u or DD2HXT8u sound tuning window, and click  icon to start it.
- (4) Click  icon to save S3D or HXT parameters as an *mdspcfg* format file.



Effect (ON / OFF)

Parameter Save Icon

