

VHT technical notes

Audio diagrams

Version 5.1



Virtual
Home
Theater

<https://www.virtualhometheater.com>

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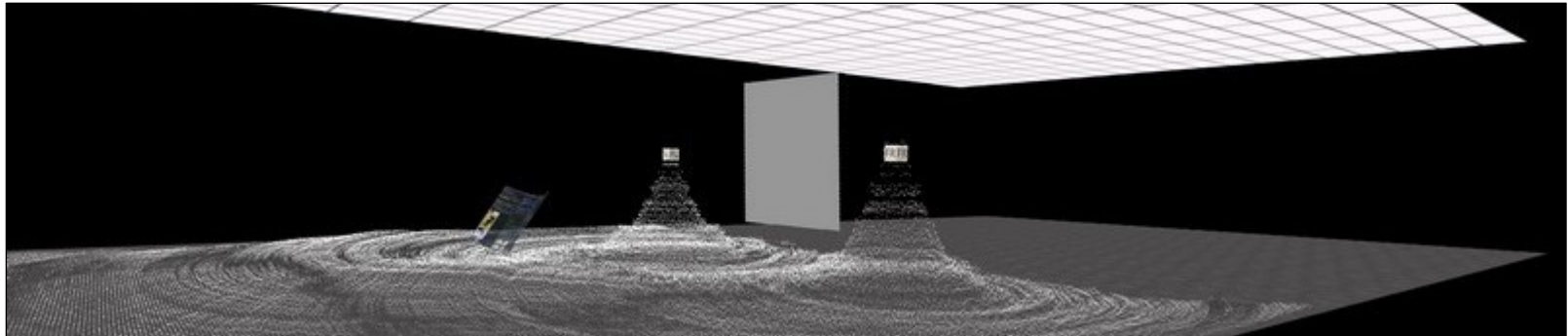
Binaural output mode

- Media player mode (stereo, 5.1, 7.1, 9.1.6, etc. audio)
- Desktop mirror mode (5.1 audio gaming)
- Ambisonics playback
- Audiospace playback



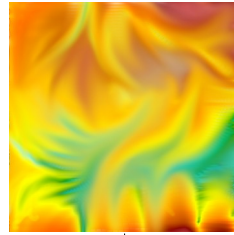
Direct output mode

- Media player mode (stereo, 5.1 or 7.1 audio)
- Desktop mirror mode (5.1 audio gaming)



BINAURAL MEDIA PLAYER mode

44.1 or 48 kHz HRTF



+10dB LFE offset gain					
FL	Mute	reset	-	+	17.6 dB
FR	Mute	reset	-	+	17.6 dB
FC	Mute	reset	-	+	7.0 dB
LFE	Mute	reset	-	+	-10.3 dB
SL	Mute	reset	-	+	-18.6 dB
SR	Mute	reset	-	+	-18.6 dB

1 to 16 channels gain -inf to +inf dB

Audio media file with
Classic layout:
2.0, 5.1, 7.1, etc.
Non-classic layout:
5.1.4, 9.1.6, etc. (all
discrete channels with an
audiospace preset
companion file)

16, 24, 32 bit
44.1/48 kHz
>48kHz FLAC/DSD/DXD
1 to 16 channels

FL
FR
FC
LFE + 10dB
BL
BR
Input audio
1 to 16 channels

6 DoF
Binaural
Audio
Render
Engine
32/64 bit
44.1/48 kHz

0 dBFS
clipping

L

R

PCM
2ch 32 bit
binaural
audio
(not stereo)

Output
audio
device

2 channels
16, 24, 32bit
44.1/48 kHz

-inf to 0 dB

volume knob

Headphones
up to 102 dBa
10 to 20000 Hz
SPL



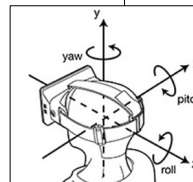
DAC/AMP

Output volume -inf to 0 dB

#1: Speakers (Realtek(R) Audio) used as output.	
Mute	30 Volume

Virtual speakers layout and pose	
Sphere	Layout geometry
Reducing radius will increase the volume.	
reset	4.00 Radius
reset	30.00 Front angle
reset	110.00 Side angle

Audio channel layout
(x,y,z) position
for each
virtual speaker



HMD pose
position (x,y,z)
orientation
(yaw, pitch, roll)



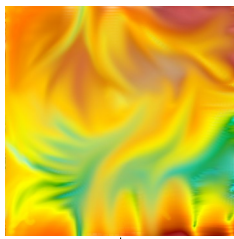
Virtual
Home
Theater

BINAURAL DESKTOP MIRROR mode

Headphones
up to 102 dBa
10 to 20000 Hz
SPL



44.1 or 48 kHz HRTF



Binaural rendering (HRTFs)
Built-In 44100hz

Master volume -inf to +inf dB virtual AMP
Audio
Output mode: Binaural
Mute 30.0 Volume

Output device
Output mode: Binaural Direct
Speakers (Fiio Q series)

+10dB LFE offset gain

FL	Mute	reset	-	+	17.6	dB
FR	Mute	reset	-	+	17.6	dB
FC	Mute	reset	-	+	7.0	dB
LFE	Mute	reset	-	+	-10.3	dB
SL	Mute	reset	-	+	-18.6	dB
SR	Mute	reset	-	+	-18.6	dB

2 to 8 channels gain -inf to +inf dB

CABLE Input (VB-Audio Virtual Cable)
34

non-VR game
Classic layout:
2.0, 5.1, 7.1,
etc.

Windows default audio device real/virtual
16, 24, 32 bit
44.1 or 48 kHz
2 to 8 channels

6 DoF Binaural Audio Render Engine
32/64 bit
44.1/48 kHz

FL FR FC LFE + 10dB BL BR
Input audio 2 to 8 channels

0 dBFS clipping
L R
PCM 2ch 32 bit binaural audio (not stereo)

Output audio device
2 channels 16, 24, 32bit
44.1/48 kHz

-inf to 0 dB

DAC/AMP

volume knob

Input volume -inf to 0 dB
#3: CABLE Input (VB-Audio Virtual Cable) used as input.
Mute 34 Volume

Output volume -inf to 0 dB
#4: Speakers (Fiio Q series) used as output.
Mute 78 Volume

Virtual speakers layout and pose

Sphere	Layout geometry
Reducing radius will increase the volume.	
reset	4.00 Radius
reset	30.00 Front angle
reset	110.00 Side angle

Audio channel layout (x,y,z) position for each virtual speaker

HMD pose
position (x,y,z)
orientation (yaw, pitch, roll)

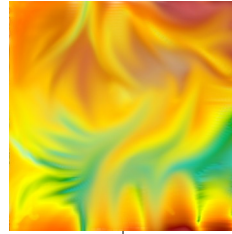


AMBISONICS audio playback

Ambisonics	Mute	reset	-	+	0.9238	Volume
Headlocked	Mute	reset	-	+	0.8286	Volume
FC	Mute	reset	-	+	-8.2	dB
SR	Mute	reset	-	+	4.7	dB
BC	Mute	reset	-	+	-8.0	dB
SL	Mute	reset	-	+	6.7	dB
TC	Mute	reset	-	+	-5.7	dB
DC	Mute	reset	-	+	-7.5	dB
L	Mute	reset	-	+	12.3	dB
R	Mute	reset	-	+	9.0	dB

up to 32 channels gain -inf to +inf dB

44.1 or 48 kHz HRTF

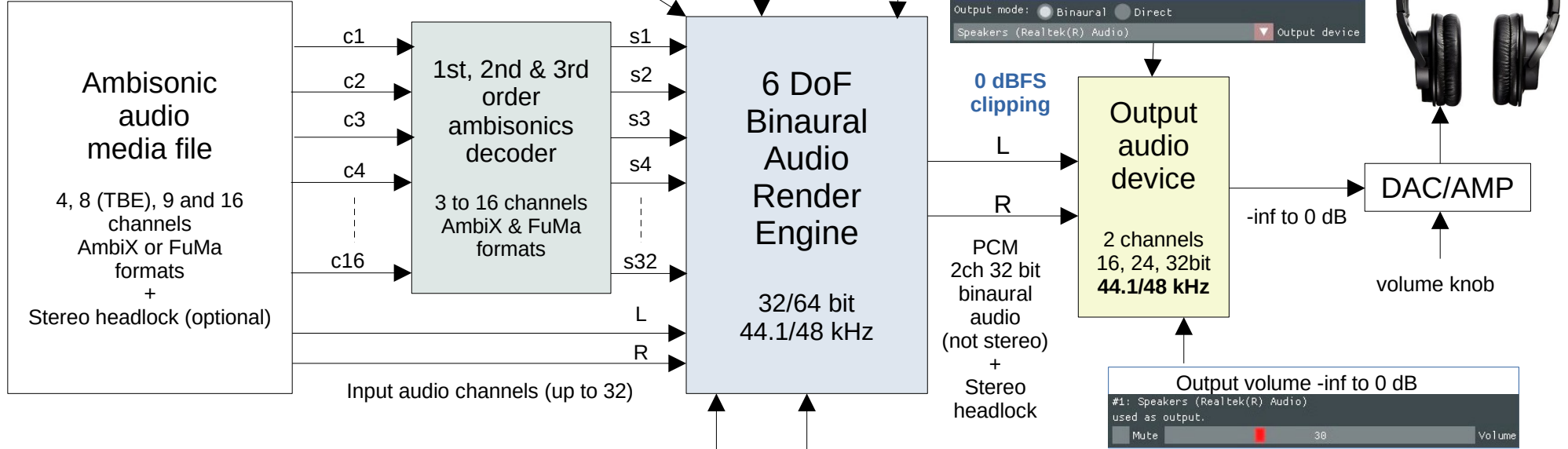


Binaural rendering (HRTFs)
 Built-In 44100hz
 HRTF

Master volume -inf to +inf dB virtual AMP
 Audio
 Output mode: Binaural
 Mute 30.0 Volume

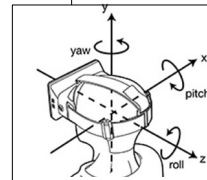
Output device
 Output mode: Binaural Direct
 Speakers (Realtek(R) Audio) Output device

Headphones
 up to 102 dBA
 10 to 20000 Hz
 SPL



Ambisonics decoding settings
 Some ambisonic media files use FuMa and +90deg azimuth!
 Media formats: RESET FuMa+90
 B-format: FuMa AmbiX
 0 +90 -90 180 0,00 Azimuth set
 Head-locked stereo
 Use SPHERE_26a layout

Audio channel layout (x,y,z) position for each virtual speaker



HMD pose
 position (x,y,z)
 orientation (yaw, pitch, roll)

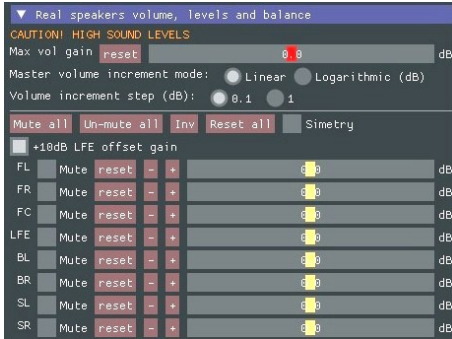
Output volume -inf to 0 dB
 #1: Speakers (Realtek(R) Audio) used as output.
 Mute 30 Volume



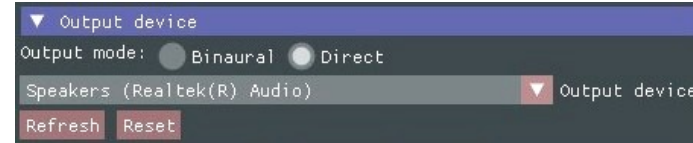
Virtual Home Theater

DIRECT MEDIA PLAYER mode

For direct playback to real speakers (no spatial audio) and to use a high sample rate DAC (e.g. 384kHz).

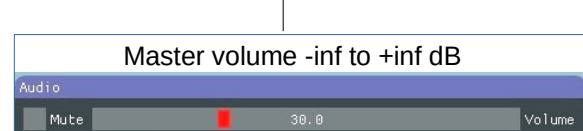
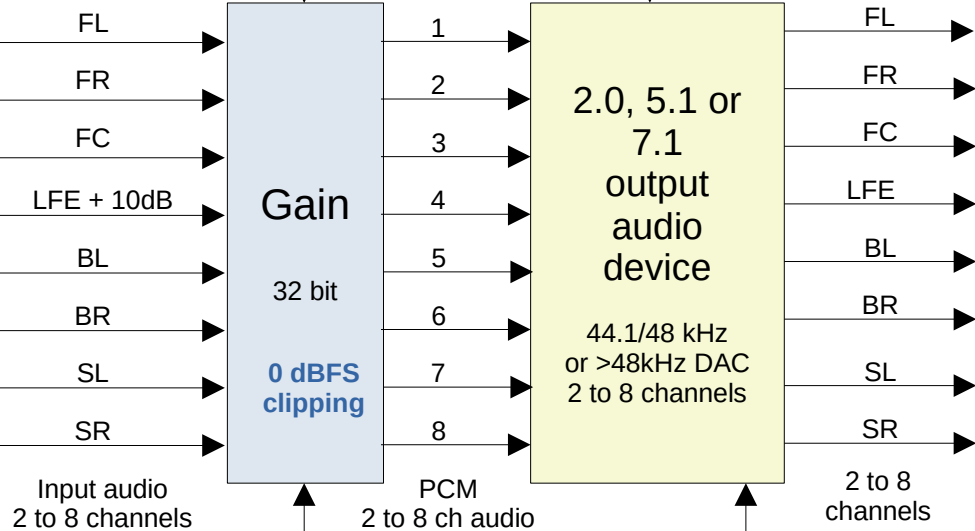


Gain
2 to 8 channels
-inf to +inf dB

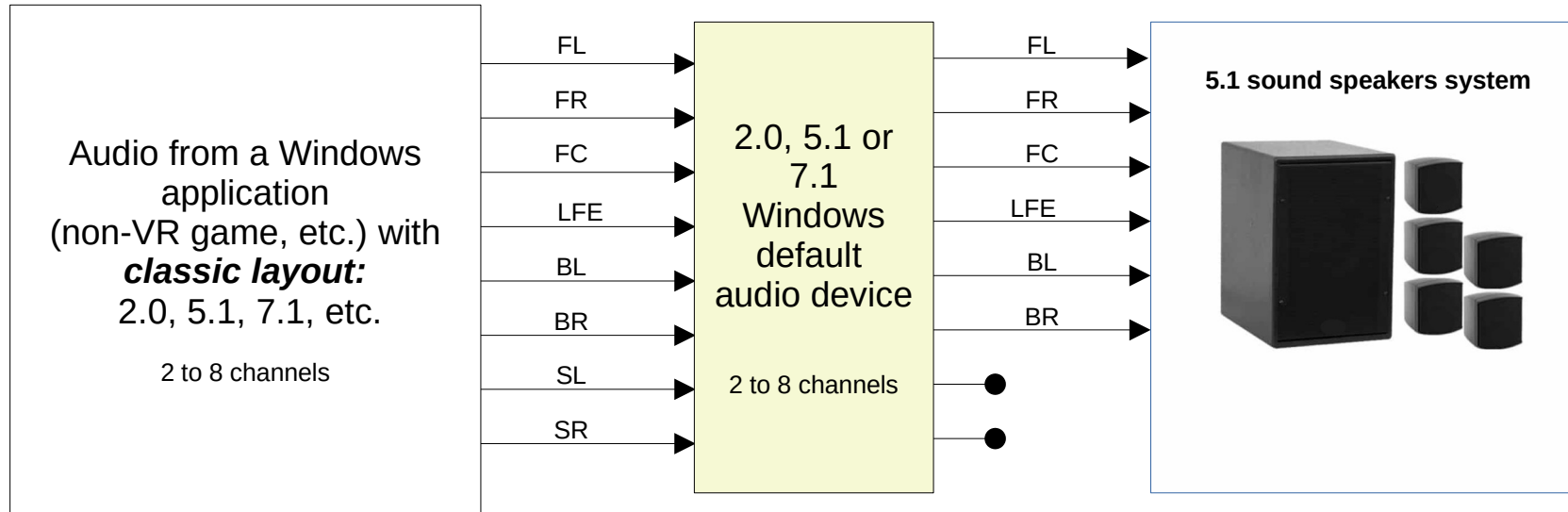
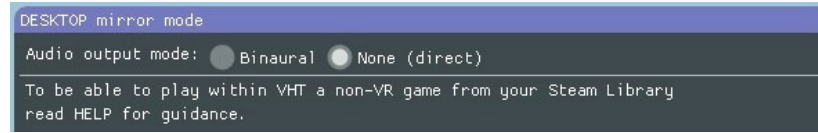


Audio media file with **classic layout:**
2.0, 5.1, 7.1, etc.

16, 24, 32 bit
44.1/48 kHz
>48kHz FLAC/DSD/DXD
2 to 8 channels



DIRECT DESKTOP MIRROR mode



BINAURAL MEDIA PLAYER mode with an audiospace preset companion file

