



Ambisonics Plugin

USER GUIDE



Legal Notices

Product specifications and features are subject to change without prior notification.

Copyright© 2019 Sound Devices, LLC. All rights reserved. This product is subject to the terms and conditions of a

software license agreement provided with the product, and may be used in accordance with the license agreement. This document is protected under copyright law. An authorized licensee of this product may reproduce this publication for the licensee's own personal use. This document may not be reproduced or distributed, in whole or

in part, for commercial purposes, such as selling copies or providing educational services or support. This document is supplied as a technical guide. Special care has been taken in preparing the information for publication; however, since product specifications are subject to change, this document might contain omissions and technical or typographical inaccuracies. Sound Devices, LLC does not accept responsibility for any losses due to the user of this guide.

Trademarks

The “WAVE” logo is a registered trademark and Kashmir is a trademark of Sound Devices, LLC. iPad, iPhone, Mac and OS X are trademarks of Apple Inc., registered in the U.S. and other countries. Windows is a registered trademark of Microsoft Corporation in the U.S. and other countries. Bluetooth Smart is a registered trademark of Bluetooth SIG, Inc. ASIO is a registered trademark of Steinberg Media Technologies. All other trademarks herein are the property of their respective owners.



WEEE Statement

If you wish to discard a Sound Devices product in Europe, contact Sound Devices (Germany) for further information.



Post Office Box 576
E7556 State Rd. 23 and 33
Reedsburg, Wisconsin 53959 USA
www.sounddevices.com

+1 608.524.0625 main
+1 608.524.0655 fax
800.505.0625 toll free
support@sounddevices.com



Warning! This device can drive headphones to potentially dangerous levels. Do not listen at high volume levels for long periods.

Read and fully understand this manual before operation.

Ambisonics Plugin User Guide | 11/26/19

This document is distributed by Sound Devices, LLC in online electronic (PDF) format only. Published in the USA.

This table provides the revision history and cross-reference links to “what’s new” in this guide.

DATE	DESCRIPTION
08/19	v4.00 Initial release
11/19	v5.00

Table of Contents

ABOUT AMBISONICS	4
INSTALLING AND ACTIVATING THE PLUGIN	5
ENABLING AMBISONICS	5
RECORDING MULTIPLE FORMATS	5
AMBISONICS MODES	6
FILES	7
SOFTWARE LICENSE	8
FCC & ISED COMPLIANCE STATEMENTS	9

About Ambisonics

An ambisonic recording uses a multi-capsule microphone to capture a spherical representation of sound from a single point.

Ambisonic recordings are captured in A-Format or B-Format.

A-Format is the raw audio captured from each capsule on the microphone.

B-Format is the decoded audio, representing the spherical sound space with 4-channels, W, X, Y, Z:

- W = Sum of all signals from all directions
- X = Front minus rear signal
- Y = Left minus right
- Z = Up minus down

B-Format comes in two versions, with different orderings of the formatted channels:

- FuMa = W,X,Y,Z
- AmbiX = W,Y,Z,X




Recording Ambisonics


To use the Ambisonics Plugin, you will need an ambisonics microphone, such as the Sennheiser AMBEO. The MixPre must be set to Advanced Mode, with a bit depth of 16 or 24. Ambisonics is not supported with 32-bit float depth. Sample rates of up to 192 kHz may be recorded, but binaural monitoring is not supported above 48 kHz.

The Ambisonics Plugin may not be used in combination with other plugins, such as the Musician or MixAssist Plugins.

INSTALLING AND ACTIVATING THE PLUGIN

1. Visit the Sound Devices Store to purchase the Ambisonics Plugin.
2. Download the license—a .LIC file—and transfer to an SD card. The license file may only be used once.
3. Insert the SD card into the MixPre and turn on the recorder.
4. Tap .
5. Navigate to System > Plugins.
6. Tap Apply Plugins. This installs the license, activates the plugin, and reboots the device.

ENABLING AMBISONICS

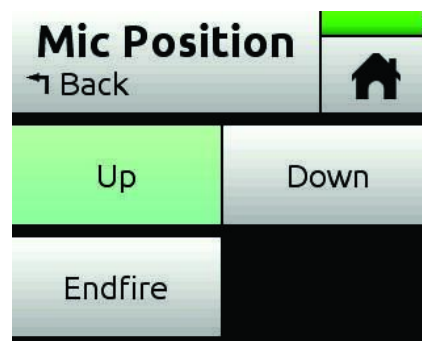
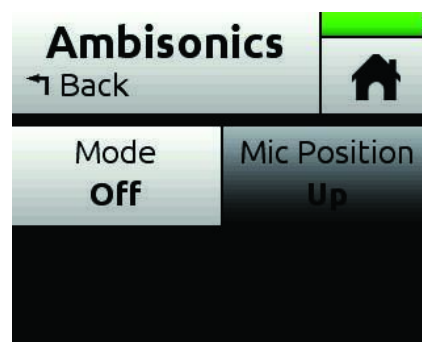
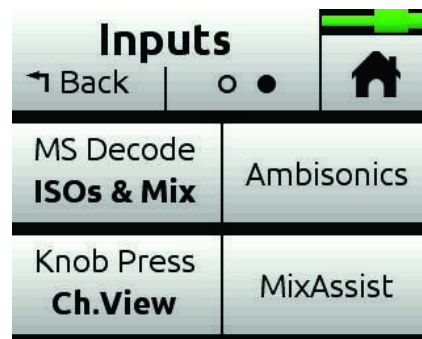
1. Navigate to Inputs > Ambisonics.
2. Select the desired Mode. [Off, A -> B (AmbiX), A->B (FuMa), A->B(AmbiX + FuMa), A (Direct), A (Direct) + AmbiX, A (Direct) + FuMa, B (AmbiX), B (FuMa)]
3. Select the Mic Position. [Up, Down, Endfire]
4. In the menu screen, tap .
5. Select LR Stereo or Binaural monitoring.
6. Plug in the ambisonics microphone according to the manufacturer's instructions.
7. Enable phantom power on channels 1-4 and set appropriate gain on channel 1. Channels 1-4 are automatically linked. 8. Arm channel 1 when ready to record.

RECORDING MULTIPLE FORMATS

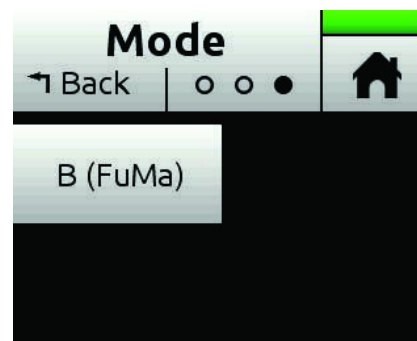
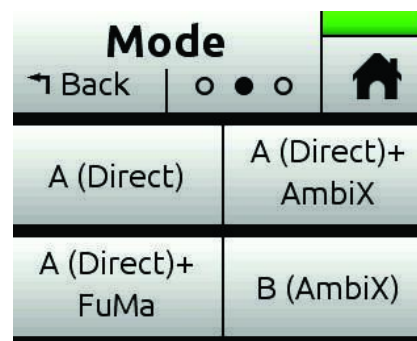
1. Navigate to Menu > Record.
2. Select Rec L,R to record a stereo WAV.
3. Select Rec Binaural to record a binaural WAV.

The MixPre-6 and MixPre-6 II can record one ambisonic format (such as A->B (AmbiX)) and a stereo WAV and/or a binaural WAV. If two ambisonic formats are being recorded (such as A->B (AmbiX+FuMa)), it is not possible to record a stereo WAV/binaural WAV.

The MixPre-10T and MixPre-10 II can record up to two ambisonic formats, a stereo WAV, and a binaural WAV file simultaneously.

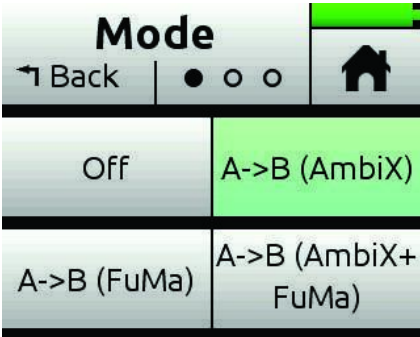


MODE	DESCRIPTION
Off	<ul style="list-style-type: none"> Ambisonics Mode is disabled.
A->B (AmbiX)	<ul style="list-style-type: none"> The incoming A-Format is converted to AmbiX B-Format (W,Y,Z,X) for recording on tracks 1-4. Recording results in a single 4ch poly WAV.
A->B (FuMa)	<ul style="list-style-type: none"> The incoming A-Format is converted to FuMa B-Format (W,X,Y,Z) for recording on tracks 1-4. Recording results in a single 4ch poly WAV.
A->B (AmbiX+FuMa)	<ul style="list-style-type: none"> The incoming A-Format is converted to AmbiX B-Format (W,Y,Z,X) for recording on tracks 1-4 plus FuMa B-Format (W,X,Y,Z) on tracks 5-8. Channel knob 1 controls the level going to all 8 tracks. Recording results in two separate 4ch poly WAVs.
A (Direct)	<ul style="list-style-type: none"> The incoming A-Format is routed directly to tracks 1-4 without any processing. Use this if you intend to do conversion to B-Format in post. Recording results in a single 4ch poly WAV.
A (Direct) + AmbiX	<ul style="list-style-type: none"> The incoming A-Format is routed directly to tracks 1-4 without any processing and also converted to AmbiX B-Format (W,Y,Z,X) for recording on tracks 5-8. Channel knob 1 controls the level going to all 8 tracks. Recording results in two separate 4ch poly WAVs.
A (Direct) + FuMa	<ul style="list-style-type: none"> The incoming A-Format is routed directly to tracks 1-4 without any processing and also converted to FuMa B-Format (W,X,Y,Z) for recording on tracks 5-8. Channel knob 1 controls the level going to all 8 tracks. Recording results in two separate 4ch poly WAVs.



B (AmbiX) or B (FuMa)	<ul style="list-style-type: none">• The incoming B-Format is routed directly to tracks 1-4 without any processing. Use this if the microphone source is already in B-Format e.g. Soundfield ST450 MKII.• Recording results in a single 4ch poly WAV.

Modes



Files

When recording multiple formats or a stereo/binaural WAV, the MixPre will store each file separately, with a unique suffix:

- LR is the decoded stereo mix.
- AmbiX is the decoded AmbiX B-Format.
- FuMa is the decoded FuMa B-Format.
- Bin is the decoded binaural file.
- A_Fmt is the raw A-Format file.



Software License

End-user license agreement for Sound Devices MixPre Series Software / Embedded Firmware

Important Read carefully:

This Sound Devices, LLC end-user license agreement (“EULA”) is a legal agreement between you (either an individual or a single entity) and Sound Devices, LLC for the Sound Devices, LLC software product identified above, which includes computer software, embedded firmware, and may include associated media, printed materials, and “online” or electronic documentation (“SOFTWARE PRODUCT”). By using, installing, or copying the SOFTWARE PRODUCT, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not use or install the SOFTWARE PRODUCT.

Software Product License

The SOFTWARE PRODUCT is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The SOFTWARE PRODUCT is licensed, not sold.

Grant of license. This EULA grants you the following limited, non-exclusive rights: In consideration of payment of the licensee fee, Sound Devices, LLC, as licensor, grants to you, the licensee, a non-exclusive right to use this copy of a Sound Devices, LLC software program (hereinafter the “SOFTWARE”) on a single product and/or computer. All rights not expressly granted to licensee are reserved to Sound Devices, LLC.

Software ownership. As the licensee, you own the hardware on which the SOFTWARE is recorded or fixed. Sound Devices, LLC shall retain full and complete title to the SOFTWARE and all subsequent copies of the SOFTWARE, regardless of the media or form on or in which the original copies may exist. The license is not a sale of the original SOFTWARE.

Two Level Segregated Fit memory allocator, version 3.1. Written by Matthew Conte <http://tlsf.baisoku.org>

Based on the original documentation by Miguel Masmano: <http://www.gii.upv.es/tlsf/main/docs>

This implementation was written to the specification of the document, therefore no GPL restrictions apply. Copyright (c) 2006-2016, Matthew Conte All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met: Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

** THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS “AS IS” AND
** ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
** WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
** DISCLAIMED. IN NO EVENT SHALL MATTHEW CONTE BE LIABLE FOR ANY
** DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
** (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;
** LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND
** ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
** (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS ** SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright

All rights, title, and copyrights in and to the SOFTWARE PRODUCT (including, but not limited to, any images, photographs, animations, video, audio, music, text, and “applets” incorporated into the SOFTWARE PRODUCT) and any copies of the SOFTWARE PRODUCT are owned by Sound Devices, LLC or its suppliers. The SOFTWARE PRODUCT is protected by copyright laws and international treaty provisions. Therefore, you must treat the SOFTWARE PRODUCT like any other copyrighted material, except that you may make copies as only provided below. You may not copy the printed materials accompanying the SOFTWARE PRODUCT.

Restrictions on use. Licensee may not distribute copies of the SOFTWARE or accompanying materials to others. Licensee may not modify, adapt, translate, reverse engineer, decompile, disassemble, or create derivative works based on the SOFTWARE or its accompanying printed or written materials.

Transfer restrictions. Licensee shall not assign, rent, lease, sell, sublicense, or otherwise transfer the SOFTWARE to another party without prior written consent of Sound Devices, LLC. Any party authorized by Sound Devices, LLC to receive the SOFTWARE must agree to be bound by the terms and conditions of this agreement.

Termination

Without prejudice to any other rights, Sound Devices, LLC may terminate this EULA if you fail to comply with the terms and conditions of this EULA. In such event, you must destroy all copies of the SOFTWARE PRODUCT and all of its component parts.

Limited Warranty

No warranties. Sound Devices, LLC expressly disclaims any warranty for the SOFTWARE PRODUCT. The SOFTWARE PRODUCT and any related documentation is provided “as is” without warranty or condition of any kind, either express or implied, including, without limitation, the implied warranties and conditions of merchantability, fitness for a particular purpose, or non-infringement. The entire risk arising out of use or performance of the SOFTWARE PRODUCT remains with you.

No liability for damages. In no event shall Sound Devices, LLC or its suppliers be liable for any damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use this Sound Devices, LLC product, even if Sound Devices, LLC has been advised of the possibility of such damages. In any case, Sound Devices, LLC’s entire liability under any provision of this evaluation license shall be limited to the greater of the amount actually paid by you for the SOFTWARE PRODUCT or U.S. \$5.00. Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you. **Governing Law**

This agreement and limited warranty are governed by the laws of the state of Wisconsin.

FCC & ISED Compliance Statements



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15.19 (a) (3)

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC & ISED User Statement

This device complies with FCC and ISED RF Exposure SAR limits exposure limits for general population / uncontrolled exposure.

Cet appareil est conforme à la norme FCC et USED RF Exposure SAR limite les limites d'exposition pour la population générale / l'exposition incontrôlée.

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: 1) this device may not cause interference, and 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada, exempts de licence standard RSS (s). Son fonctionnement est soumis aux deux conditions suivantes: 1) ce dispositif ne peut pas causer d'interférences, et 2) ce dispositif doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.