AURALiC®
inspire the music

ARK MX+ 32Bit/192KHz USB Audio D/A Converter

USER'S GUIDE

Revision 1.1

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Welcome

Thanks for choosing AURALiC product. ARK MX+ is a 32Bit/192KHz USB D/A Converter, which is created for modern leisure lifestyle. It is advanced in design, powerful in functions and precise in musical representation. To achieve the goal of perfect music replay, AURALiC offers multiple original technical solutions by managing to combine the advanced digital technology and the sophisticated analog circuit.

- **AURALiC Sanctuary Audio Processor**
  The heart of ARK MX+ is AURALiC Sanctuary audio processor, which is jointly made by AURALiC and its technical partner: Archwave AG in Swiss. Sanctuary is based on multi-core ARM architecture, with the calculating capability as high as 1000MIPS, it could handle 32Bbit/192KHz multi-channel real-time audio stream.

- **ActiveUSB™**
  Resorting to the ActiveUSB™ technology from AURALiC, ARK MX+ overcomes the transmission limitation from traditional Asynchronous USB which could only adjust +/- one clock cycle error of data package in isochronous clock. With mass data buffer technology and multi-stage, high resolution PLL circuit, ARK MX+ could buffer audio stream as long as 2 seconds, which prevent time-based jitter resulted from the limitation of computer.

- **Self-adapted upsampling circuit**
  Upsampling to higher sample rates make improvements to fine detail, sound stage depth and image separation. The self-adapted upsampling circuit inside ARK MX+ could automatically choose the best upsampling ratio; it could convert 44.1KHz & 88.2KHz to 176.4KHz or 48KHZ & 96KHz to 192KHz. Such self-judgment uses proprietary interpolation technology to provide the highest possible fidelity at all sampling rates from 44.1KHz to 192KHz so as to precisely restore the originality of music by avoiding the signal distortion from non-integer ratio upsampling algorithm.

- **Low noise DC amplification circuit**
  ARK MX+'s analog circuit adopts low noise DC amplification circuit designed by AURALiC. All the components have been manually examined and preciously matched. Low noise DC amplification circuit is the working fruit from our engineering team after long-term design and optimization. It is low in noise and distortion but wide in dynamic range. Moreover, since there is no couple capacitance in signal path, the purity of audio signal could be ensured; thus, the music turns out to be naturally alive and silky smooth.

For us, ARK MX+ is an artistic work that bears our dream and glory. Restless technical innovation, meticulous working attitude together with perfect manufacturing requirements are to spare no efforts from us making your private music hall better than ever.

Table of Contents

Warranty **6**

Unpacking **6**

Placement and Cabling **7**

Placement 7

Check Your AC Mains Voltage 7

Cabling 8

Operation **10**

Power On/Off 10

Driver Installation 10

AURALiC USB Driver Control Panel 12

Playback Software Setting 14

Use S/PDIF Single-Ended Digital Input 16

How to Achieve Better Sound Quality 17

Maintenance & Service **18**

Maintenance 18

Service 18

Contact 18

Troubleshooting **19**

No Power 19

No Sound or Low Output 19

Distorted or Partial Sound 19

Noise/Hum 19

Specifications **20**

EC Declaration of Conformity **21**

AURALiC Product Registration Form **23**

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

TO REDUCE THE RISK OF ELECTRIC SHOCK,

DO NOT REMOVE COVER.

NO USER-SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

IMPORTANT SAFETY INSTRUCTIONS

- All safety and operating instructions should be read before the product is operated, and retained for future reference.
- This product should be operated only from the type of power source indicated on the back of the unit. If you are not sure of the type of your mains power supply, consult your dealer or local power company.
- To completely disconnect this product from the AC mains, disconnect the power supply cord plug from the AC receptacle.
- Do not use the product near water, i.e. near a bathtub, kitchen sink, laundry tub, in a wet basement, near a swimming pool etc.
- Do not install the product near heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat. See “Placement and Cabling” on page 7.
- Do not let objects or liquids fall into the product. Do not expose the product to dripping or splashing. Do not place a vessel containing liquid on top of the product.
- Clean only with a soft, dry cloth.
- Do not attempt to service this product yourself. Opening or removing covers may expose you to dangerous voltage. Refer all servicing to authorized service personnel. See “Service” on page 18.

Warranty

AURALiC offers a 90-day factory warranty from the date of purchase that can be extended to a 3-Year limited warranty. This non-transferable warranty is available to the original owner by completing the product registration form including the original sales information from your authorized AURALiC dealer within 30 days of purchase. You could either use the online registration form on our website (www.auralic.com) or fill 'AURALiC Product Registration Form' on page 23 and send it back to your dealer to finish the registration.

Warranty coverage includes all parts and labors. Warranty is void if damage is due to abuse, neglect or unauthorized modification. Cost associated with the return of this product is the sole responsibility of the owner. All repair work must be done by AURALiC or by an authorized AURALiC repair agency. Work done by unauthorized persons will void any and all warranty coverage.

AURALiC products are uniquely identified with a serial number (S/N) on the back of the unit. This number is required to validate your warranty. Please reference your serial number if service is required.

Before the product can be returned for service, an RMA (Return Material Authorization) number must be issued by AURALiC. Contact your dealer or AURALiC for further information. Units without an RMA number will not be accepted for service.

Unpacking

Please confirm that the following items are in the box:

- ARK MX+
- AC Power Cord
- USB Cable
- User's Guide
- Product CD

Carefully unpack each piece, if there is any damage, or if anything is missing, please contact your dealer or AURALiC.

ONLY SHIP THIS PRODUCT IN ITS ORIGINAL PACKING!

Please be sure to retain the original shipping carton and all packing materials as they are specially designed to protect the unit during transportation or shipping.

Placement and Cabling

Placement

ARK MX+ should be placed on a solid and stable surface with good ventilation. Do not install this product near any heat sources such as radiators or other product (such as amplifiers) that produce heat. Site the product so that its location or position does not interfere with its proper ventilation. For example, it should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings, or placed in a built in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

Ventilation Requirement

ARK MX+ dissipates up to 20 Watts of power during normal operation. It should be installed in a space with at least one inch of clearance above, behind and on both sides of its enclosure to provide adequate ventilation. Avoid placing it directly above other equipment that produces heat.

Check Your AC Mains Voltage

ARK MX+ is shipped with its mains voltage preset for operation in the destination country. The mains voltage setting is written on the back of the unit, right besides power cord socket. Mains voltage setting is not intended to be changed by the user. If it needs to be changed, contact your dealer or AURALiC.

The power cord has a three-wire grounding type plug (a plug having a third pin for grounding). It will only fit into a grounding type power outlet. If you are unable to insert the plug fully into the outlet, contact your dealer or AURALiC. Do not defeat the safety purpose of the grounded type plug.

ARK MX+ MUST BE USED WITH CORRECT MAINS VOLTAGE AND PROPERLY EARTHED!

Cabling

The I/O ports on the back of the unit are shown as following:

1	Right Balanced Analog Output	5	AES/EBU Balanced Digital Output
2	Right Single-Ended Analog Output	6	USB 2.0 Communication Port
3	Left Single-Ended Analog Output	7	S/PDIF Single-Ended Digital Input
4	Left Balanced Analog Output	8	AC Mains Power Cord Socket

Please be sure to power off all units in your system before any cabling job, failed to follow this instruction may result in permanent damage to the device and void any warranty.

ALWAYS POWER OFF ARK MX+ BEFORE CABLING!

- **Analog Outputs**

The balanced and single-ended analog outputs of ARK MX+ are individually buffered so as to be used simultaneously, however, it is still strongly recommended to disconnect unused ports to avoid any potential electromagnetic interference induced by cable.

The amplitude for 0dBFS of ARK MX+ is 2Vrms of RCA single-ended outputs and 4Vrms of XLR balanced outputs with its pin 2 as positive. This output level is higher than most home audio devices so if you are about to connect ARK MX+ directly to a power amplifier or active loudspeaker, please make sure it will not overdrive the later one's input.

Direct Connecting to Power Amplifier or Active Loudspeakers

If ARK MX+'s analog outputs are connected directly to power amplifiers or active loudspeakers, the product should be powered on for 15 seconds or longer before the power amplifiers or active loudspeakers are powered on. Before power off ARK MX+, the power amplifiers or active loudspeakers should be powered off first.

- **AES/EBU Balanced Digital Output**

ARK MX+'s digital output is transformer coupled, supporting AES/EBU standard digital stream up to 24Bit/192KHz.The stream is possible to be converted to S/PDIF level with appropriative adapter. Digital output port is internally connected to AURALiC Sanctuary processor with individual channels and will not automatically function unless manually set by user. Please refer to page 15 for more information.

- **USB 2.0 Communication Port**

By connecting to the computer via USB 2.0 port, ARK MX+ delivers bit-perfect audio stream with format up to 32Bit/192KHz. Specific drivers are required for operation under Windows PC system, please refer to 'Driver Installation' on page 10.

When you use the USB 2.0 port, please make sure there is no signal presents at digital input port to avoid any possible synchronization issue.

- **S/PDIF Single-Ended Digital Input**

ARK MX+ accepts digital input stream in S/PDIF format though a 75 ohm single-ended RCA port; this digital input is also compatible with 75 ohm single-ended transformed AES/EBU stream. The sampling rates supported by ARK MX+ though its digital input are 44.1Khz, 48KHz, 88.2KHz, 96KHz, 176.4KHz and 192KHz with word length up to 24bit.

It is recommended to disconnect USB cable when you use the digital input to avoid any interferer induced by computer and future avoid any possible synchronization issue.

FEED BOTH USB AND S/PDIF PORTS WITH SIGNALS AT ONE TIME WILL RESULT IN SYNCHRONIZATION ISSUE THIS WILL FORCE ARK MX+ TO MUTE AUTOMATICLLY.

Operation

Power On/Off

The front panel of ARK MX+ is shown as following:

1	Power LED	2	Rotary Power Switch

ARK MX+ will power on by operate the rotary power switch in clockwise and power off by anticlockwise operation.

The Power LED indicates current work status of ARK MX+:

- LED off: Power Off
- LED light: Ready to work
- LED flash: Locking sampling rate in progress

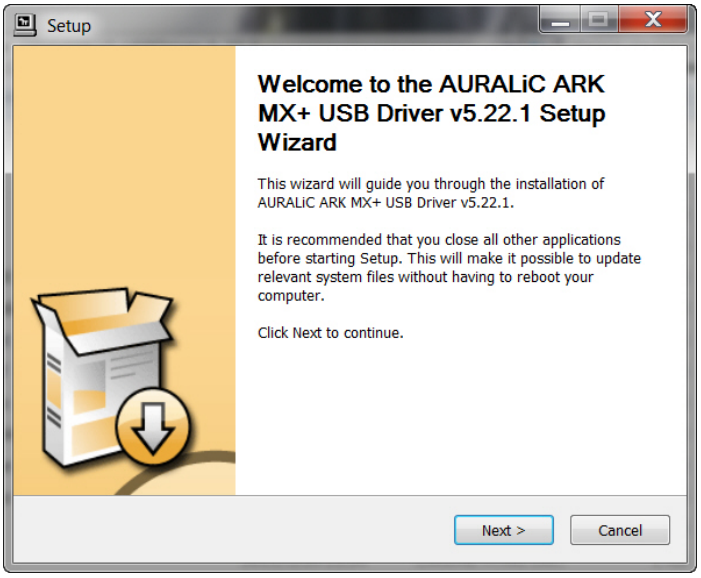
Driver Installation

Apple Mac OS X 10.6.4 or above system natively support USB 2.0 audio device, there is no need for driver installation. AURALiC Sanctuary USB driver package is required to be installed for proper operation under Microsoft Windows operation system.

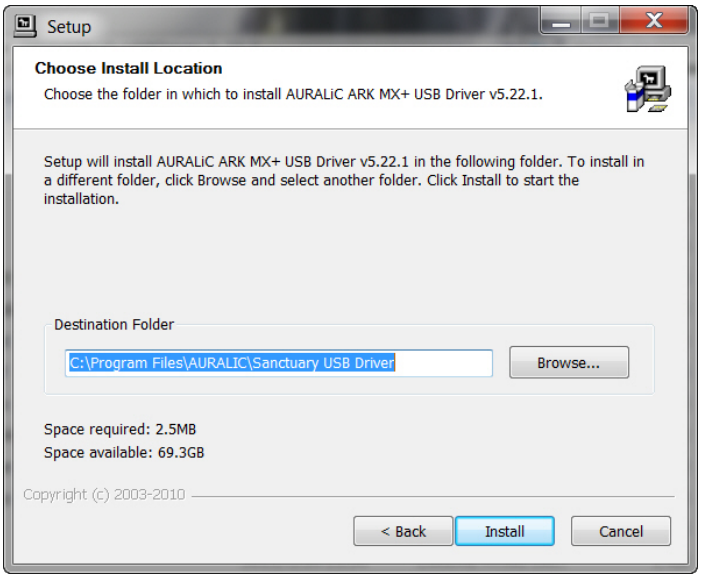
The following procedure installs ARK MX+'s ASIO and WDM drivers and 'AURALiC Sanctuary USB Driver Control Panel' on your Windows PC. You must have Windows XP/Vista/ 7 system (32 or 64bit), and a spare USB 2.0 port.

- Connect your ARK MX+ to the mains supply with power cord; connect ARK MX+ to PC with USB cable provided, **DO NOT POWER ON ARK MX+ NOW**.

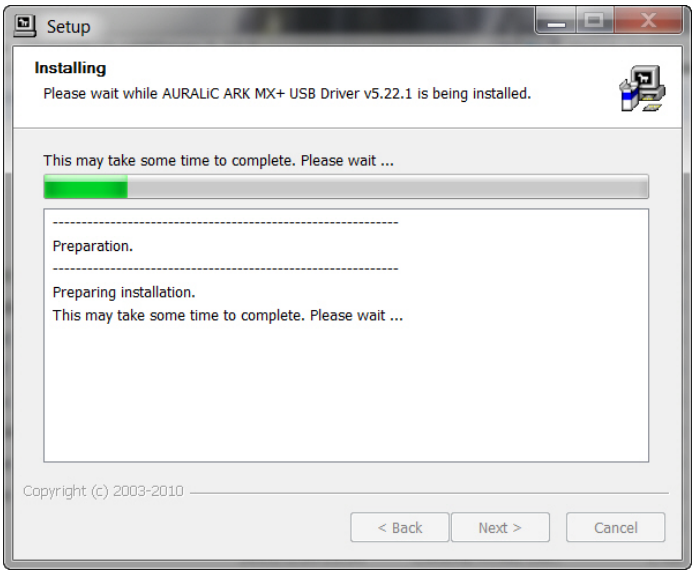
- Find and click folder 'ARKMXPLUS_USBDriver_5_22_1' in the product CD and run 'setup.exe'.



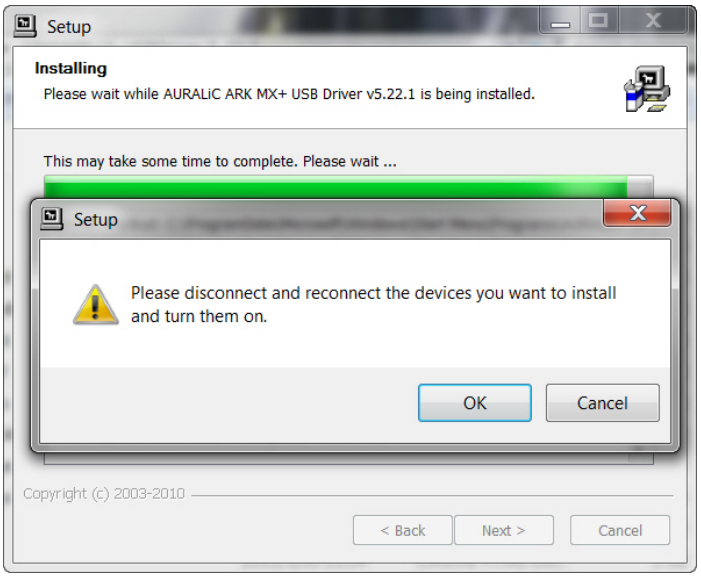
The setup wizard warns you to shut down other applications prior to installation. Do so and click 'Next'.



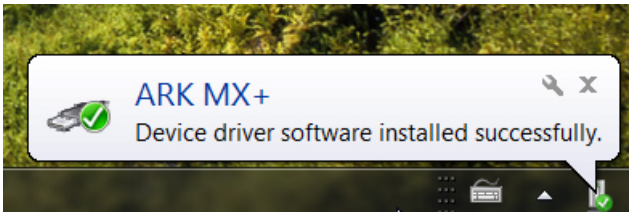
Choose the installation folder location by clicking 'Browse…' if required, or else use the default (recommended); click 'Install'.



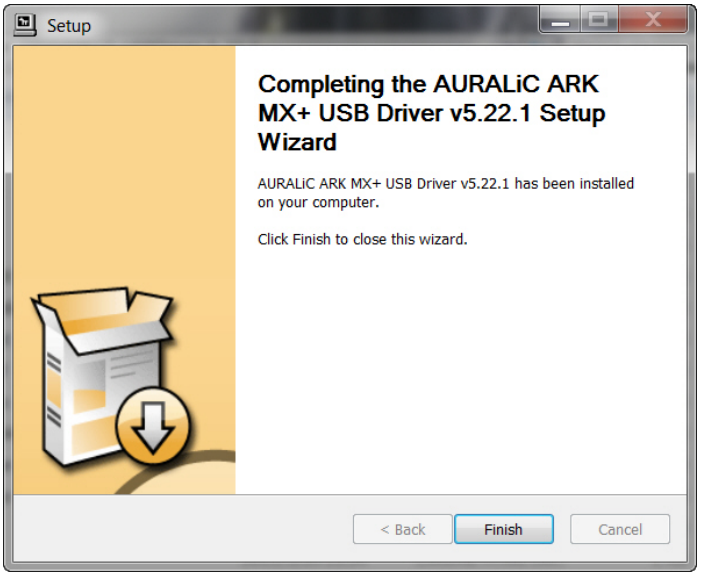
Installation will then proceed. Since ARK MX+ drivers have not been submitted for Windows Logo testing, warnings will be issued during installation. Select 'Continue anyway' when these occur.



When you see this notice, please power on ARK MX+ and press 'OK; setup program will install device automatically.



You will see the Windows pop-up notice after ARK MX+ has been installed successfully.

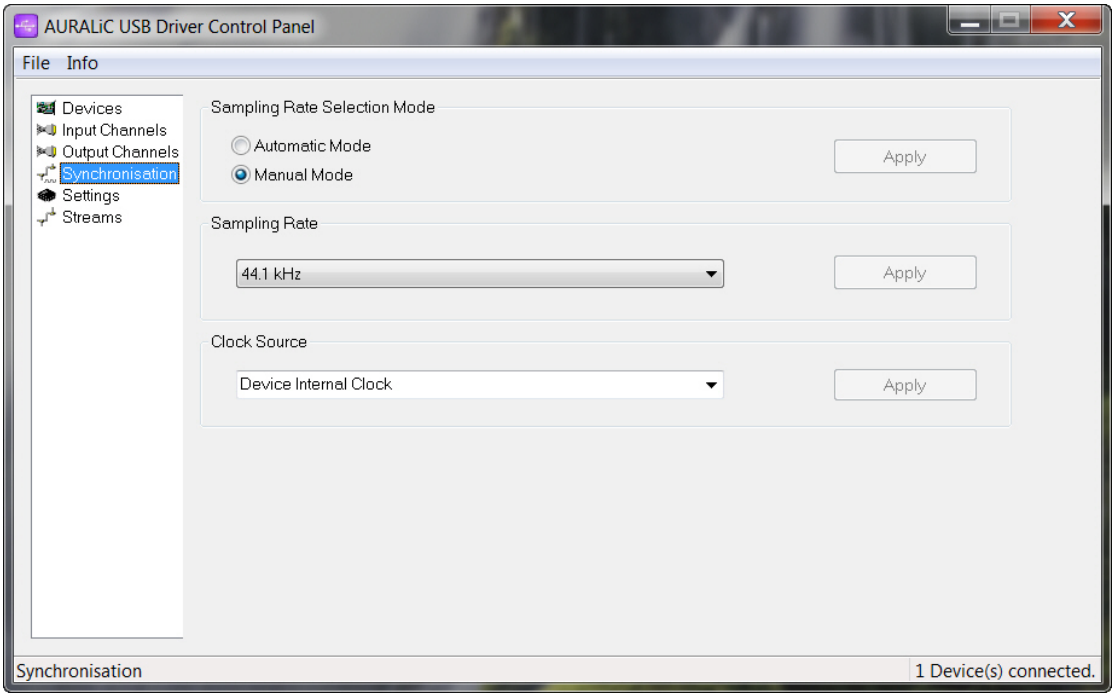


Click 'Finish' to close the setup program. The device should now be visible to Windows and any applications as both ASIO and WDM audio device

AURALiC USB Driver Control Panel

ARK MX+ will work automatically after drivers' installation without additional setting. AURALiC also provides a control panel program with advanced options for future tuning.

Start 'AURALiC USB Driver Control Panel', select 'Synchronisation' on the left hand side, you will see the following interface:



- Sampling Rate Selection Mode

This option sets the work mode of ARK MX+. We suggested you to use ‘Manual Mode’, which allows playback program to send commands to ARK MX+ and switch sampling rates. If you choose ‘Automatic Mode’, ARK MX+ will work at a fixed sampling rate set by Windows WDM driver and can not be changed by playback program or by manual.

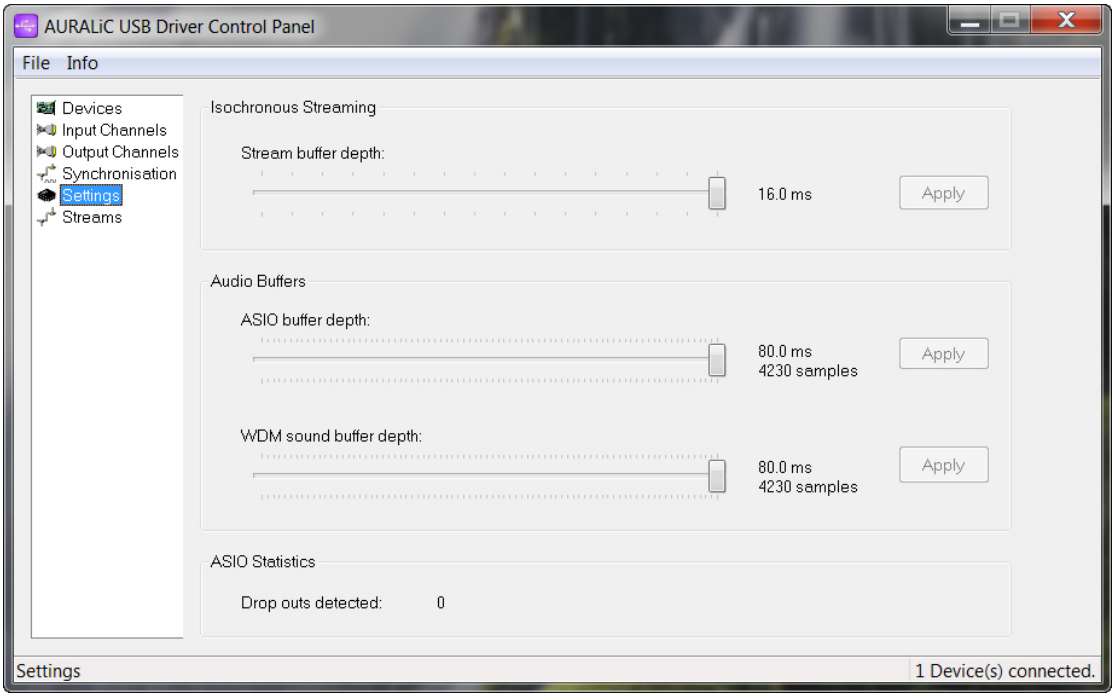
- Sampling Rate

Sampling rate option shows current work sampling rate of ARK MX+. It is usually set by playback program automatically, but you can change it by manual here.

- Clock Source

You may select different master clock of ARK MX+ by changing this option. ‘Device Internal Clock’ is the default setting which actives AURALiC’s ActiveUSB™ technology and provides lowest jitter for best sound quality.

It is also possible to adjust several buffer depths in ‘Settings’ page:



- Stream buffer depth

Stream buffer depth option sets the global buffer depth of ARK MX+. The default setting is ‘16.0 ms’ for stable consideration; try to set a lower buffer depth if possible.

- ASIO buffer depth

ASIO buffer depth option sets the buffer depth when playback using ASIO output. This value is set to maximum by default; try to set a lower buffer depth if possible.

- WDM sound buffer depth

WDM sound buffer depth option sets the buffer depth when playback using WDM output. This value is set to maximum by default; try to set a lower buffer depth if possible.

Buffer depth settings will affect jitter performance of ARK MX+ which results in different sound quality. It is always recommended to set the value as low as possible. A modern PC with a ‘clean’ Windows system should be able to replay music without interrupt at all three buffer depths set to lowest.

Playback Software Setting

ARK MX+’s Windows drivers include a specific ASIO driver, it is highly recommended to use audiophile grade software (such as foobar2000, J.River Media Center) which support ASIO output for bit-perfect playback.

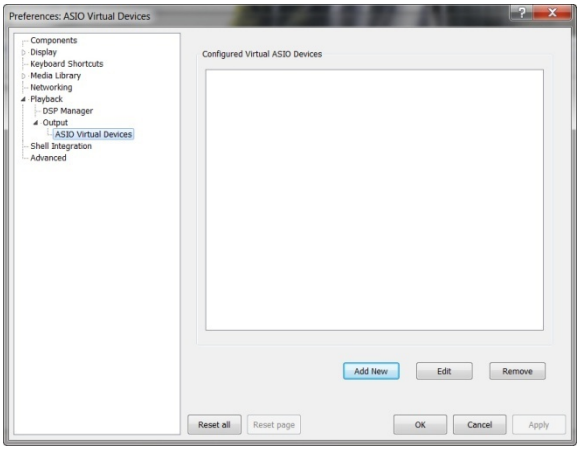
Foobar2000 is the most common used audiophile grade software under Windows system. We will explain the setting procedure in the next following paragraphs.

- Download and install foobar2000 program at official website:
  http://www.foobar2000.org/

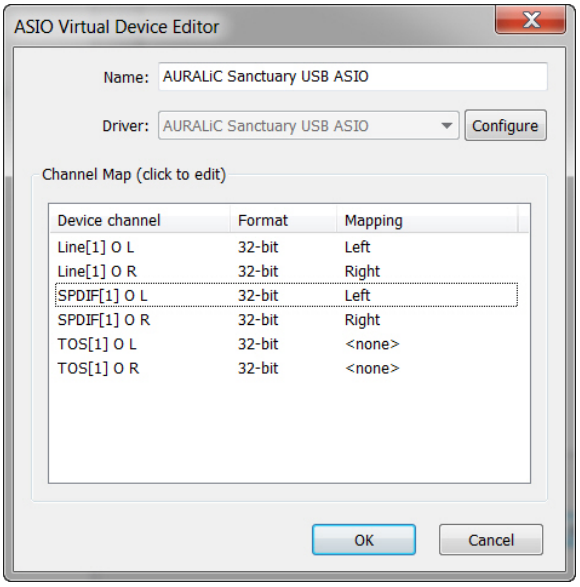
- Download ‘ASIO support 1.2.7’ plug-in from official website:
  http://www.foobar2000.org/components/view/foo_out_asio

- Extract the ‘foo_out_asio.zip’ you just downloaded and put ‘foo_out_asio.dll’ file to the ‘components’ folder under foobar2000 folder, for example: ‘C:\Program Files\foobar2000\components’

- Start foobar2000 program, click ‘File’ on menu and select ‘Preferences’ to open preferences window. Click ‘Playback>‘Output’ then select ‘ASIO Virtual Devices’:



Select ‘Add New’, open ‘ASIO Virtual Device Editor’ window.



Map the ‘Line[1] O L’ as ‘Left’ and ‘Line[1] O R’ as ‘Right’ to active the analog outputs of ARK MX+.

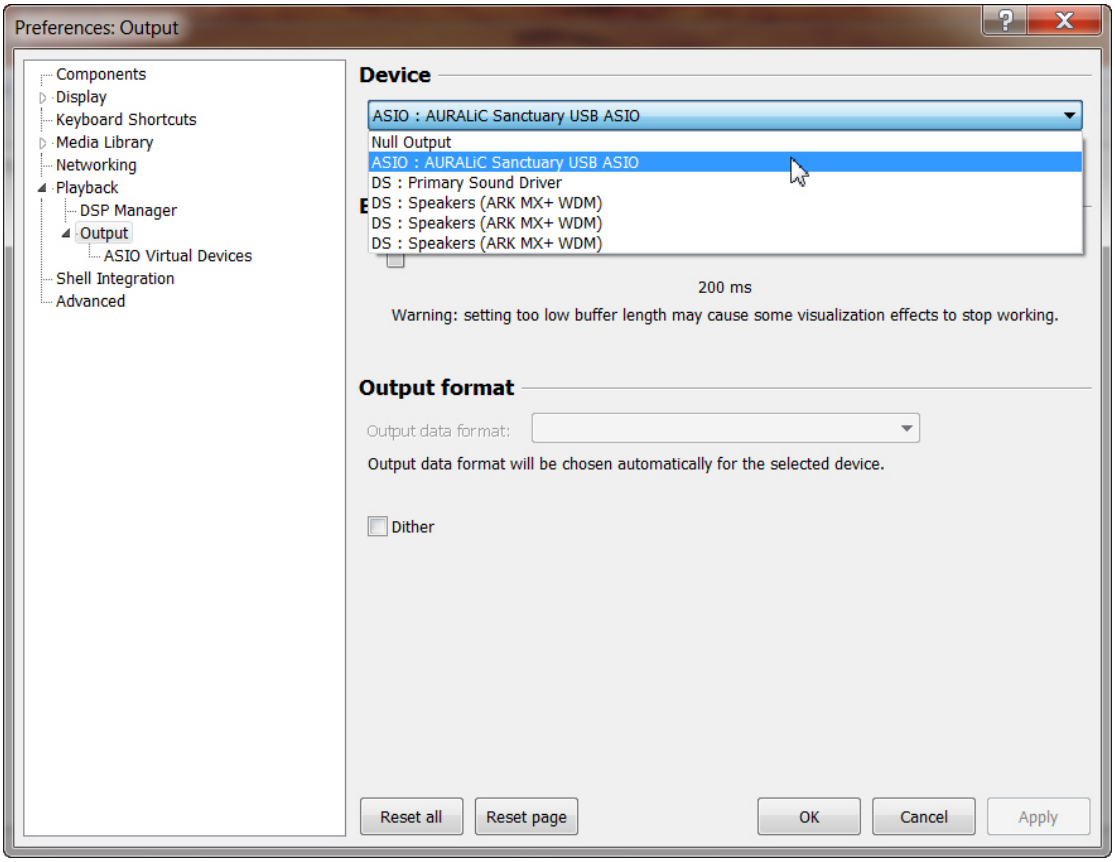
If you are about to use the AES/EBU digital output, you should also map the ‘SPDIF [1] O L’ and ‘SPDIF [1] O R’ as left and right channels.

- Click ‘OK’ to close ‘ASIO Virtual Device Editor’ window, then click ‘OK’ on ‘Prefe-

rences' window.

- Close foobar2000 program and restart it.

- Go to 'Preferences'>'Playback'>'Output', select 'ASIO: AURALiC Sanctuary USB ASIO':



- Click 'OK' on 'Preferences' window.

Now, you have enabled ARK MX+'s bit-perfect playback in foobar2000.

You can download the ASIO output pre-set foobar2000 program at AURALiC's website under 'Drivers and Manuals' section.

Use S/PDIF Single-Ended Digital Input

ARK MX+ will act as a standalone D/A Converter when using the S/PDIF digital input. To use the digital input, please refer to the following steps:

- Power off ARK MX+ first; connect digital input to digital source by a 75 ohm digital cable and power on unit.

- ARK MX+ will detect digital signal present at digital input automatically and try to lock the sampling rate, the Power LED will flash during the locking progress.

- When Power LED keeps light, the unit is ready to work.

- If the sampling rate presents at digital input changed during work, ARK MX+ will try to lock the new frequency immediately.

Please make sure to disconnect any cable at USB port when you use the digital input function. To change back to USB port, please power off your ARK MX+ before disconnect the digital input cable.

How to Achieve Better Sound Quality

AURALiC recommend you to use a specific computer with 'clean' system to achieve best listening experience. Installing a lot of software on operation system will increase the system latency and degrade sound quality.

ARK MX+'s Windows drivers include a specific ASIO driver, it is highly recommended to use audiophile grade software (such as foobar2000, J.River Media Center) which support ASIO output for bit-perfect playback.

Process a Windows system optimization will remarkably improve the sound quality. AURALiC finds 'CPlay' with 'cMP' to be the best sounding playback software under Windows system so far. Please refer to the following link:

- CPlay and cMP software website:
http://www.cicsmemoryplayer.com/index.php?n=Main.HomePage#cPlay

- Windows system optimization guide:
http://www.cicsmemoryplayer.com/index.php?n=CMP.07Optimisations

If you run ARK MX+ under Apple Mac OS X system, we highly recommended you to use 'CHANNEL D Pure Music' playback software which allows for bit-perfect replay in OS X system. Pure Music will greatly improve the sound quality of OS X system.

- CHANNEL D Pure Music:
http://www.channld.com/puremusic/

Maintenance & Service

Maintenance

ARK MX+ does not require regular maintenance in normal use. However, there are a few things that will help to keep it in good operating and cosmetic condition:

Cleaning
Only clean the enclosure with a soft, dry cloth.

Extended Nonuse
Disconnect ARK MX+ from mains power when it will be left unattended or unused for an extended period of time.

Service

If your ARK MX+ encounters a problem, contact your dealer or AURALiC. Do not void the warranty by allowing unauthorized personnel to attempt repairs. Do not attempt to service the product yourself. Opening the cover may expose you to dangerous voltage, as well as void the warranty.

Before ARK MX+ can be returned for service, an RMA (Return Material Authorization) number must be issued by AURALiC. Contact your dealer or AURALiC for further information.

Contact

If you have any question, please feel free to contact our technical support department:

AURALIC LIMITED
B406, No.11 East Shixing Street
Shijingshan District, Beijing, 100041
China

support@auralic.com
www.auralic.com

Troubleshooting

No Power

- Examine the power cord to be sure that it is connected to both the AC mains connector and an AC wall outlet.
- Try substituting another power cord.
- Check the AC mains voltage setting on the back of the unit and see if it is according to your local power voltage.

No Sound or Low Output

- Examine all cables to ensure a solid connection between the ARK MX+ and associated components.
- If you are using the USB port, make sure the playback software's volume is set to an audible level and not muted.
- Make sure all associated components are powered on.
- Make sure the associated component connected to the selected input is producing an audible input signal.
- Only one signal is allowed to be present at USB and S/PDIF ports at one time, please be sure to disconnect either of these two's cables.
- Try rebooting the ARK MX+ by cycling the power (power off the ARK MX+, then power on again).

Distorted or Partial Sound

- Check the output cables between the ARK MX+ and the preamplifier/power amplifiers/active loudspeakers, making sure all connections are good and sound.
- Make sure that all speaker connections are tight and that there are no stray strands of wire shorting across the speaker terminals.
- Try rebooting the ARK MX+ by cycling the power (power off the ARK MX+, then power on again).

Noise/Hum

- Check the output cables between the ARK MX+ and associated components, making sure all connections are good and sound.
- Make sure the output cables between the ARK MX+ and the power amplifiers are not routed near AC cables, power transformers, or other EMI inducing devices.
- It may be helpful to plug all associated components into the same AC circuit in order to share a common ground.

Specifications

Frequency Response	DC - 20KHz, +/- 0.02 dB
Signal/Noise	118 dB, 20Hz-20KHz, A-weighted
THD+N at Maximum Level	<0.0005%, 20Hz-20KHz
Dynamic Range	124dB, 20Hz-20KHz, A-weighted
Output Port	Balanced Analog Output, 4Vrms into >5Kohm Single-Ended Analog Output, 2Vrms into >5Kohm AES/EBU Digital Output*
Input Port	USB 2.0 Port** (44.1-192KHz, up to 32Bit) S/PDIF Digital Input (44.1-192KHz up to 24Bit)
Power Dissipation	20 Watts
Dimension	11"W x 9"D x 2.6"H (33cm x 23cm x 6.5cm)
Weight	12 lbs (5.5kg)

* Digital output supports 44.1-192KHz sampling rate up to 24Bit.

** USB 2.0 Port works under Windows XP/Vista/7, Apple OS X 10.6.4(and above) only.

All specifications are subject to change without notice.

EC Declaration of Conformity

AURALIC LIMITED declares this product is in conformity with the Low Voltage Directive 73/23/EEC and Electromagnetic Compatibility 89/336/EEC as amended by 92/31/EEC and 93/68/EEC.

The conformity of the designated product with the provisions of Directive number 73/23/EEC (LVD) is proved by full compliance with the following standards:

EN60065 2002 General requirements

The conformity of the designated product with the provisions of Directive number 89/336/EEC (EMC) is proved by full compliance with the following standards:

EN55013 2001 Conducted emissions
EN55013 2001 Absorbed emissions
EN55020 2002 Immunity

The conformity of the designated product with the provisions of Directive number 2005/32/EC ecodesign requirements is proved by full compliance with the ‘off mode’ setting power of 0.0 Watts.

AURALiC Product Registration Form

Owner Information	
Your Name	
Street Address	
City	
Zip Code	
Country	
Email	
Telephone	
Product Information	
Product Type	
Serial Number	
Dealer Name	
Purchase Date	
Purchase Price	
Currency	