

Realiser A16 Questions and Answers 1.0

Smyth Research

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- Q1: If the Kickstarter campaign does not reach its targets will the A16 development be dropped?
- Q2: What is the production status of the Realiser A8?
- Q3: Are A8 PRIR files compatible with the A16?
- Q4: How do you watch movies with Dolby Atmos, DTS-X or Auro-3D sound tracks?
- Q5: Will firmware updates be possible for the internal CODECs (Dolby, DTS, Auro, etc)?
- Q6: What standards do your HDMI ports support?
- Q7: Where do I get a 7.1.4ch loudspeaker measurement for listening to Dolby Atmos?
- Q8: Will factory defaults be available for the A16?
- Q9: Can the A16 be controlled by a remote?
- Q10: What audio modes are supported by the USB 2.0 port?
- Q11: Does the A16 support higher sampling rates?
- Q12: Will the A16 support SACD (DSD)?
- Q13: Will the A16 have the same bass management as the A8?
- Q14: Has the head tracker been changed?
- Q15: Are there plans to increase the reverberation time of 850ms (A8) so that bigger more reverberant rooms can be captured?
- Q16: Is there going to be a rack mount version of the A16 apart from the headphone stand version?
- Q17: What are the dimensions of the A16 enclosure?
- Q18: When using the dual user mode is the reverberation time reduced over the single user mode?
- Q19: I see the A16 demonstration in Munich used the HD800 headphone whereas the Stax 2170 had previously been recommended for the A8. What are your recommended headphones?
- Q20: Will the A16 support AES69-2015 format (an open file format for binaural impulse responses)?
- Q21: Can I bypass the virtualisation and output Dolby Atmos to the analog outputs?
- Q22: Can I have headphone equalisation on its own without any virtualisation?

Q23: Can the PRIR measurement sweeps be output over HDMI?

Q24: Will the A16 support single (ONE) speaker PRIR measurements?

Q25: Are there any improvements to headphone equalisation in the A16?

Q26: Can the Speaker/Tactile output shown on the A16 really drive a loudspeaker?

Q27: The documentation mentions a web server for operating the A16. How does that work?

Q28: Your demonstration in Munich High End was very convincing and the personalisation process was really fast. Were you doing anything different?

Q29: The brochure mentions support for up-down head tracking. Does this necessitate additional look angles in the PRIR measurement?

Q1: If the Kickstarter campaign does not reach its targets will the A16 development be dropped?

A1: No, but the retail pricing might be higher and getting to production may take a little longer. Up front funding means you can buy components in larger volumes and spend more on non-recurring engineering leading to a cheaper product in the long run.

Q2: What is the production status of the Realiser A8?

A2: Production will cease once the A16 is launched. However firmware updates will continue to be made from time to time to ensure interoperability with the A16 and the Realiser Exchange services.

Q3: Are A8 PRIR files compatible with the A16?

A3: Yes.

Q4: How do you watch movies with Dolby Atmos, DTS-X or Auro-3D sound tracks?

A4: These sound tracks are decoded inside the A16. If the movie is a disc then connect any Blu-ray player, PS4, or Ultra BD player to the A16 using HDMI. If it is being streamed then connect the set-top to the A16 using HDMI. Then connect the A16 HDMI out to your TV. In the A16 menu, load a 7.1.4ch PRIR file, select the HDMI input and decoding will begin automatically. If the movie is 4k then use HDMI input 1 for best refresh rates.

Q5: Will firmware updates be possible for the internal CODECs (Dolby, DTS, Auro, etc)?

A5: Yes. In fact, as with the A8, firmware updates for all the A16 signal processing functions will be made available over the course of the products lifetime. Moreover, we plan to continue adding features to the A16 beyond the launch.

Q6: What standards do your HDMI ports support?

A6: HDMI input 1 is HDMI 2.0 compliant and supports HDCP 2.2 authentication, all mandatory 3D formats, and 4k up to @50/60Hz. Inputs 2,3 and 4 are HDMI 1.4a compliant and support HDCP 1.4 authentication, all mandatory 3D formats, and up to 4k @24/30Hz.

Q7: Where do I get a 7.1.4ch loudspeaker measurement for listening to Dolby Atmos?

A7: There are a number of routes.

- 1) Use a factory default shipped with the A16.
- 2) Download one from the free library in Realiser Exchange.
- 3) Personalise one in Realiser Exchange and download to your Realiser.
- 4) Undertake a single (or stereo) speaker measurement in your own home.
- 5) Undertake a multi-speaker measurement in your own home.
- 6) Find a local studio in the Realiser Exchange Directory to undertake the measurement.

For more details see our “Realiser Exchange - a new Virtual Audio Exchange website” document.

Q8: Will factory defaults be available for the A16?

A8: Yes. Some will be shipped with the A16. Others will be made available through our new Virtual Audio Exchange website. For more details see our “Realiser Exchange a new Virtual Audio Exchange website” document.

Q9: Can the A16 be controlled by a remote?

A9: Yes. Most functionality is accessible in parallel using an IR remote control as well as through a web browser.

Q10: What audio modes are supported by the USB 2.0 port?

A10: The A16 USB interface natively inputs 16 channels of 24-bit PCM up to 96kHz. Windows sees the A16 as a 2.0ch, 5.1ch or 7.1ch 24-bit 44.1/48/88.2/96kHz sound card with stereo line in. Running

in ASIO mode an audio editing application such as Pro Tools or Reaper see the A16 as a discrete 16 channel 24-bit 44.1/48/88.2/96kHz output card. Mac OS sees the same.

Q11: Does the A16 support higher sampling rates?

A11: Yes initially there will be a stereo mode that allows operation up to 192kHz. Audio for this mode can be input either via line, SPDIF, USB (maximum 96kHz), or HDMI. Headphone output will be analog and SPDIF 24-bit @ Fs input. In the medium term we plan to offer a 5.1/7.1ch 96kHz listening mode.

Q12: Will the A16 support SACD (DSD)?

A12: Yes in conjunction with the higher sampling rate PCM modes we plan to support 2-ch DSD input via HDMI and will decode internally to 32-bit floating point PCM @176.4kHz before processing by the SVS algorithm. Headphone output will be analog and SPDIF 24-bit @176.4kHz. DST is not currently supported by our HDMI interface so multi-channel DSD support is not imminent.

Q13: Will the A16 have the same bass management as the A8?

A13: Yes and more. It will offer two channels of bass redirection. It will offer direct bass routing to the headphone (as per the A8) and it will offer a new mode that routes the direct bass through the head tracking algorithm so as to add dynamic inter-aural time delays for better out-of-head rendering.

Q14: Has the head tracker been changed?

A14: Yes. The head tracker has been upgraded to include a 3-axis gyro and 3-axis magnetometer as well as the single axis optical sensor. In the future we will also sell a lower cost version using only the gyro and magnetometer sensors. The new hybrid head tracker can now measure 360 degrees for head azimuth, elevation and roll and it can operate with or without the optical (set-top) reference during playback. However we still recommend engaging the optical mode during PRIR measurements. The hybrid head tracker design is no longer wireless due to issues with battery longevity and the inconvenience of having to constantly recharge. Nevertheless we may reintroduce wireless connectivity to the lower cost version.

Q15: Are there plans to increase the reverberation time of 850ms (A8) so that bigger more reverberant rooms can be captured?

A15: Yes. We plan a scaled mode of operation whereby one can trade channels for reverberation time. For regular cinematic 16-ch modes the A16 reverberation time is 750ms @48kHz. We plan to

offer three extended reverberation modes, 8-ch 1.5s reverb, 4-ch 3.0s reverb and 2-ch 6.0s reverb. All of these modes will run either for single or dual users.

Q16: Is there going to be a rack mount version of the A16 apart from the headphone stand version?

A16: Yes a 2U 19" rack-mountable enclosure will be available. The connectors, switches, volume pots and display layout will be identical to the headphone stand version since the same boards are used for both enclosures.

Q17: What are the dimensions of the A16 enclosures?

A17: The A16 will be available in a choice of two form factors.

Form 1: Headphone Stand enclosure. Height 286mm (11.25"): Width 160mm (6.3"): Depth 176mm (6.9"). Construction will be extruded aluminium. Approximate weight 2kg (4.4lbs).

Form 2: 2U 19" rack-mountable enclosure: Height 3.5" (89mm): Width 19" (483mm): Depth 6.9" (176mm). Construction will be extruded aluminium front, back and sides with top and bottom aluminium panels. Approximate weight 3kg (6.6lbs).

Q18: When using the dual user mode is the reverberation time reduced over the single user mode?

A18: No. The A16 now deploys two DSP chips, one for each user. User A and User B will operate identically when those modes are permitted.

Q19: I see the A16 demonstration in Munich used the HD800 headphone whereas the Stax 2170 had previously been recommended for the A8. What are your recommended headphones?

A19: We judge headphones in a number of ways. How comfortable are they to wear for an extended period of time, can they faithfully reproduce virtualised loudspeakers and how cost effective they are. For example the entire range of Stax headphones are comfortable and can reproduce virtual loudspeakers with stunning accuracy. Hence we continue to use the Stax 2170 for our own internal use due to its cost effectiveness. Sennheiser HD800s on the other hand have the same performance, are almost as comfortable, but are physically more robust, don't require an external amplifier and they go louder. Hence we have moved over to using these headphones for demonstrations. These are two headphones we use every day and can vouch for their performance and comfort.

Q20: Will the A16 support AES69-2015 format (an open file format for binaural impulse responses)?

A20: Not initially but we will keep the situation under review. The Realisers use a proprietary format developed by Smyth Research. Since our products all permit owners to create their own

personalised binaural measurements and to exchange these measurements among themselves, compatibility with the AES format is not an urgent priority.

Q21: Can I bypass the virtualisation and output Dolby Atmos to the analog outputs?

A21: Yes and any other decoded bit stream. And you can send up to eight channels of decoded PCM back out the HDMI. So you could decode Dolby Atmos to 5.1.2ch and output that to a legacy AV receiver over 8 channels of HDMI PCM. You can also pass the 16-ch USB inputs straight to the analog outputs or send eight of them over HDMI. Also the HDMI PCM inputs can be sent to the analog outputs. The Illusonic up-mixer output can go to the analog or HDMI outputs. So you could input stereo over HDMI, up-mix to 5.1ch, for example, and output that back out HDMI as 6 channels of PCM. DSD over HDMI can also be passed straight to headphone DAC(s) without conversion to PCM.

Q22: Can I have headphone equalisation on its own without any virtualisation?

A22: It is certainly feasible. People have also asked for the ability to compensate for ageing. Both are implemented in the same way. If we have time this may be available at launch. Otherwise it will be a firmware update.

Q23: Can the PRIR measurement sweeps be output over HDMI?

A23: Yes. The A16 can output PRIR sweeps over the 8-ch PCM HDMI bus. Hence up to 8 downstream speakers can be measured. Sweeps can also be directed to the 16-ch analog outputs, the SPDIF or the mono speaker/tactile output. More importantly, the A16 also implements a new asynchronous measurement method that allows sweeps to be played from a DVD player using either a DVD disc, an SD card or a USB drive. This allows measurements to be made in a completely closed system like in-car. It also makes it considerably easier to persuade, for example, Hi-Fi showroom, studio and cinema owners to offer Realiser owners measurement facilities since no connection/disruption to their audio chain occurs – they simply have to insert the DVD sweep disc and hit play.

Q24: Will the A16 support single (ONE) speaker PRIR measurements?

A24: Yes as well as the stereo (LR) and multi-channel (ALL) measurement modes. Since the head tracker can now operate 360 degrees in azimuth and elevation we now supply a purpose made head tracker head band to encourage subjects to use the head tracker to help them attain the correct head angles during the measurement process. In addition the A16 includes head guidance tones driven by the tracker angles that allows the subject to know in which direction to turn and when the correct angle has been reached. For example, if the aim is to create a 7.1ch measurement using the ONE measurement, the A16 will first output tones to allow the subject to find 0 degree azimuth (centre speaker). Once the head reaches the proper azimuth the sweep begins automatically. Next it

will output tones to guide the subject to 30 degree azimuth (right speaker) and the sweep will begin once again, and so on for the remaining 6 positions. The guidance system also works for elevation so it is technically possible to simply lower your head to the appropriate elevation, or turn round and raise your head, to create overhead speakers. The same tone guidance can be enabled for the LR mode and for obtaining look angles in ALL mode.

Q25: Are there any improvements to headphone equalisation in the A16?

A25: Yes. Improving headphone equalisation is an ongoing area of development here at Smyth Research. We plan to add a number of updates to the equalisation methods that further improve the neutrality of headphone delivery and to address applications that require lower latency operation.

Q26: Can the Speaker/Tactile output shown on the A16 really drive a loudspeaker?

A26: Yes and no. It was designed to drive low impedance transducers as would be typically found in the tactile sound market. It also serves as a loudspeaker driver for near field personalised measurements. The output deploys a mono high quality Class-D amplifier that can output up to 33 Watts into 3 Ohms or 25 Watts into 4 Ohms while using a 16v power supply (the A16 can run anywhere between 9 VDC and 16 VDC). This will drive two Crowson T108SS tactile actuators in parallel with ease and provides a very simple way of adding that subsonic realism absent with headphone reproduction. In our experience 25 or 33 watts is more than enough for a well integrated vibration/headphone sound experience. Of course an external amplifier can be connected to the tactile RCA output if more kick is required.

Q27: The documentation mentions a web server for operating the A16. How does that work?

A27: A dynamic web server runs inside the A16 and is connected to your home network using an RJ45 ethernet cable in much the same way as one would connect a DVD player or smart TV. From that point on the user can control the A16 by opening a web browser and navigating to the A16 web page. You can do this from your PC/Mac, tablet or phone. From the web page you can pretty much control/configure everything including all the real time controls like the headphone volumes and you see all the status information updated in real time like the audio level meters. You can upload PRIR files to the A16 or download PRIR files. The software also runs an HTTP client meaning that the A16 can also communicate directly with our Virtual Audio Exchange website to access your PRIR/BRIR files held in your account, or for automatic firmware updates, all under your control of course. Although the web server can control every aspect of the A16 it will be most useful for setup, file organisation and preset programming since the normal day-to-day operations can be controlled by the remote or from the front panel.

Q28: Your demonstration in Munich High End was very convincing and the personalisation process was really fast. Were you doing anything different?

A28: To tackle head-on the rising number of loudspeakers and the increasing number of look angles for 3D tracking, we have introduced a 75% overlapping sweep mode. This allowed us, for example, to complete a 3-point personalisation of a 7.1.4ch loudspeaker system in under 60 seconds. Both overlapping and non-overlapping sweep modes will be offered in the A16. Overlapping sweeps provide the same performance as non-overlapping provided the remainder of the overlap is greater than the reverberation time of the room under measurement. In Munich we used a 4 second sweep overlapped by 75%. This meant the room reverberation had to be lower than 1 second to avoid loudspeaker crosstalk.

Q29: The brochure mentions support for up-down head tracking. Does this necessitate additional look angles in the PRIR measurement?

A29: Yes. It requires a 5 point measurement, centre, left, right, up and down. The up and down elevation would typically be in the region 15 to 30 degrees above and below 0 degree azimuth. The SVS processing implements a 2D interpolation algorithm for such measurements to counter head movements on both axis.

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