DREAM ADA-128

Operations Manual

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General Information

ADA-128 Operation Manual Revision History

Rev	Date	Author	Comments
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Support Contacts

Audio Squadron Ltd
Unit 1A, Grovemere House,
Lancaster Way Business Park,
Ely, Cambridgeshire,
CB6 3NW, UK

Telephone: +44 1353 648888
Fax: +44 1353 648867

Email: tech.support@prismsound.com
Web: www.prismsound.com

WARNING!

TO PREVENT FIRE OR SHOCK HAZARD DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE. DO NOT REMOVE THE COVER. NO USER-SERVICABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Statements of conformity

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 interference in a residential area. This device generates and uses radio frequency energy and, if not installed and used in accordance with the instructions, may cause interference to radio or

TV reception. If this unit does cause interference to radio or TV reception, please try to correct the interference by one or more of the following measures:
a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and the receiving antenna.
c) Plug the equipment into an outlet on a different circuit from the receiver.
d) If necessary, consult your dealer or an experienced radio or TV technician.
CAUTION: Changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

THIS DIGITAL APPARATUS MEETS ALL CLASS B LIMITS FOR RADIO NOISE EMISSIONS AS LAID DOWN IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.
CET APPAREIL NUMÉRIQUE RESPECTE TOUTES LES EXIGIENCES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE B SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

Audio Squadron Ltd. hereby declares that this equipment conforms to the following standards:
EN 55032: 2015+A11: 2020 EMC Emission
EN 55035: 2017+A11: 2020 EMC Immunity
EN 62368-1: 2023 Safety

NOTE: The use of this equipment with non-shielded interface cabling is not recommended by the manufacturer and may result in non-compliance with one or more of the above directives. All coaxial connections should be made using a properly screened 75R cable with the screen connected to the outer of the connector at both ends. All analogue XLR and jack connections should use screened cable with the screen connected to pin 1 of the XLR connector, or the jack outer, at both ends.

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In accordance with our policy of continual development, features and specifications are subject to change without notice.

Introduction

The Prism Sound 'Dream' ADA-128 is the latest in the acclaimed range of Prism Sound 'Dream' A/D and D/A professional audio converters which have become widely regarded as the world's best sounding converters. Whilst continuing the tried and trusted 'no compromise' design philosophy of previous 'Dream' products, the 'Dream' ADA-128 adds new flexibility, functionality and greater cost-effectiveness.

The Dream ADA-128 is not just a conversion system, but a high-performance networkable audio distribution and processing system which meets the most exacting requirements of a recording studio through to a film sound stage.

Fully Modular

The 'Dream' ADA-128 is a 2U chassis that can accommodate up to 20 plug-in modules. These presently include eight-channel Analogue Input and Output modules and an eight-channel AES3 Module. Four of the slots can accommodate a range of 64-channel Host Modules which include Pro Tools HDX and Dante Host Modules (and more to come). As well as being able to route analogue and AES3 I/O to and from Host media, full routing flexibility allows analogue to/from AES3 routing without use of Host slots, and Host-to-Host bridging.

Every I/O Module, as well as the unit's built-in Routing Module, has dedicated DSP capability, which will allow a wide range of future functionality to be added by a simple software download.

A/D & D/A.

The ADA-128 offers accurate, ultra-detailed A/D and D/A conversion providing complete focus of sound to ensure you're not distracted by colouration while allowing every nuance of a performance to be heard.

A.D.R.A

Advanced Digital Routing Architecture allows the ADA-128 to provide you with flexible interconnectivity both internally and externally allowing point to point flexible routing.

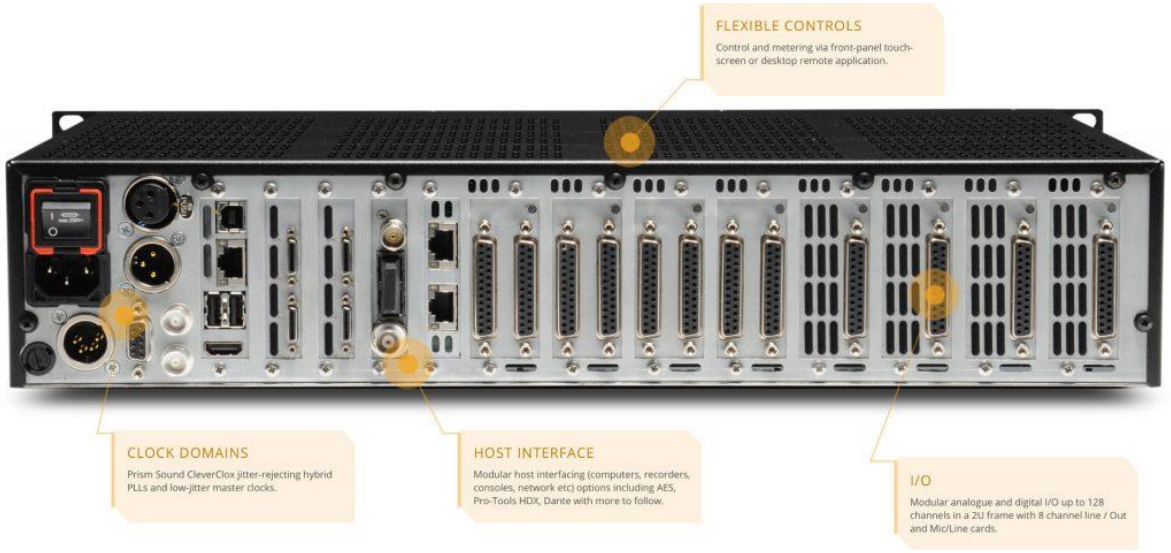
QCLOCK

The ADA-128 contains four independent clock generators, each of which can run at a different sample rate and with a different sync source. The ADA-128's Host and I/O Modules can be

dynamically assigned to these Clock Domains, allowing multiple workflows (such as separate project studios or ingest stations) to simultaneously share the resources of a single ADA-128.

SOUND APPLICATIONS

Designed for a multitude of audio applications. ADA-128 has the I/O, the tools and the sonic accuracy to be the converter of choice for Dolby Atmos, Mastering, Dubbing, Archiving, Mixing, Recording and Post.



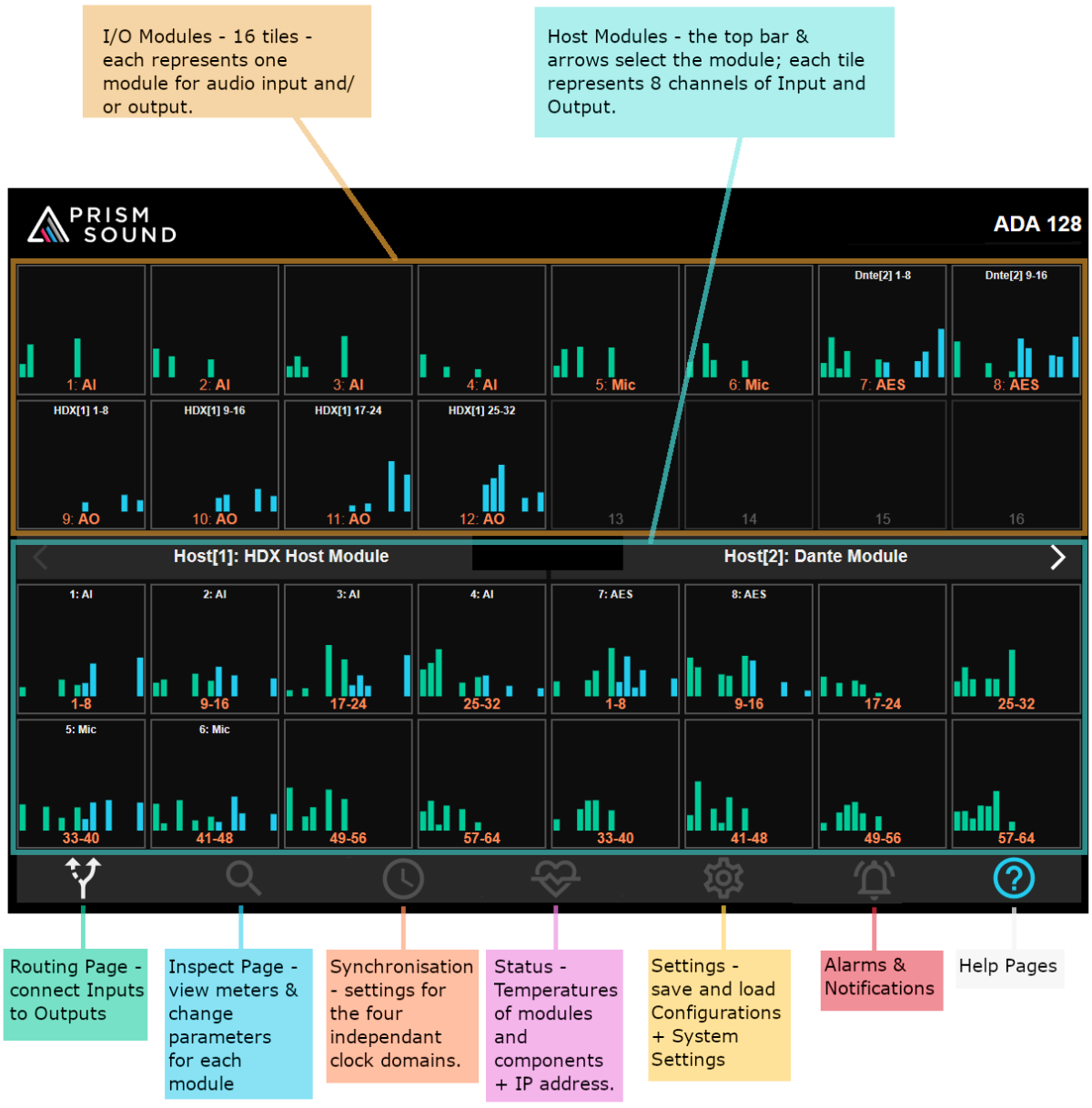
A list of the currently available I/O and host options is in Appendix A.

The unit has a large touch-screen on the front panel to allow the user to control settings and routings as well as displaying level meters for each channel. This control and monitoring may be replicated in a standard browser running on any computer (or tablet, or smartphone etc.) which is on the same network as the ADA-128.

Explanation of Concepts.

A **'Dream' ADA-128** can be configured with different numbers of I/O and Host modules in many different ways to suit your work.

Settings, Configurations and **Routings** are controlled by using a front panel touch-screen display.



Because ADA-128s are likely to be kept in a machine room, and you may wish to control them from a different location, Remote Control of the settings and routings can be made over a standard network using any device – computer, smartphone, tablet – that can run a browser.

I/O modules can be Analogue Inputs (Line and/or Mic level) and/or Analogue Outputs, or AES/EBU digital inputs and outputs. The settings of the I/O modules can be changed in the Inspect Page of the

Control Panel, and in this manual, the functions of each I/O module are described in detail in the I/O Modules section under 'Inspect' in the Software Reference chapter.

Host Modules are for connection to computer based systems, such as Pro Tools | HD systems, Dante, Ethernet, Ravenna, or AES67 networks, a MADI interface, or some other form of computer interface, such as USB, Thunderbolt etc. etc. In time more Host and I/O modules will be added to the range as different formats gather industry support.

When you start working with your ADA-128, you must decide how the available Audio channels are to be ***routed*** – i.e. how Inputs and Outputs connect to the host and/or to each other. With a basic setup, you may well simply require all the Inputs to be routed *to* a digital Host module, and all the outputs *from* the digital Host. In a setup with multiple Host modules, used perhaps by multiple studios and computers, the routings and synchronisations may be more complex.

Audio channels on I/O and Host modules may be routed to any of the other I/O or Host modules, usually in blocks of 8 channels.

The **Control Panel** gives access to '**Configurations**'–a snapshot of the unit's settings and routings – and this way the ADA-128 can be reconfigured, signals re-routed, synchronisations altered etc. by simply loading a new configuration. Configurations are supplied by the factory for popular usages, and custom, personalised configurations may also be saved by the user.

As with all digital audio systems, there must be a consideration of how the different equipment in the studio should be synchronised. ADA-128's modules can be associated to one of 4 separate **Clock Domains** and each Clock Domain can be synchronised independently.

This Manual

…breaks down into, essentially, four sections: -

1) The introduction and outline of the 'Dream' ADA-128 system, including this 'Explanation of Concepts' article.
2) Quick Start guides – these are step by step guides for getting started quickly, but they are designed to be very brief, and it is expected that you have some background knowledge of the concepts and you can find your way around the ADA-128's (quite intuitive) Control Panel.
3) Application Section – this goes into much more detail about setting up your system for a particular type of Host.
4) Reference Section – more than 70% of the manual gives fully detailed descriptions of the functions of the Control Panel Software, and the ADA-128 hardware and its specifications. Parts of the Reference guide will be linked from the Quick Starts and Applications to flesh out the shorter-form descriptions.

Note: each version of the manual relates to a particular firmware release for the 'Dream' ADA-128. The version of this manual, and the firmware version it relates to is declared in General Information above. Features and descriptions of how they work may differ between versions, and thus it is expected that your ADA-128 is up to date with respect to firmware and you are reading the correct manual to describe the operation of that firmware.

Quick Start Guides

Let's get straight to it and start using the 'Dream' ADA-128.

ADA-128 is very customisable and your particular work application may determine exactly how you need to set it up. We have separate 'Quick Start' guides based on the Host card you are using. You may have more than one Host card, but the Quick Start Guides should get you started with a simple setup.

The Quick Start Guides are lists of step-by-step bullet points to help a reasonably knowledgeable engineer to get up and running as quickly as possible. You may need to refer to the reference sections highlighted if you need more detailed explanations.

Quick Start AES3

The AES I/O module is not *strictly* considered a 'Host' module; it's an I/O module (but it *can* be inserted into a Host module slot). However, a valid way to set up the 'Dream' ADA-128 is with all Analogue Inputs and Outputs routed to and from AES Outputs and Inputs in order to provide high quality A/D and D/A conversion to a computer system using a digital interface card.

1. Take the ADA-128 out of its box.
2. If you have any new modules that need to be fitted, follow the Module Fitting Guide.
3. Consider how to **rack mount** the ADA-128 unit (See 'Thermal Considerations' in the Hardware section of the Reference Manual) making sure that there is sufficient air flow to cool it and that there are spaces between other units above and below in the rack.
4. Connect **audio connection looms** to all your Analogue and AES I/O ports at the back of the unit. 25-way D-Subs to XLR are wired to Tascam conventions - AES is different from Analogue. (See 'D-type connection pin-outs' in the Hardware Section). If you're connecting to other equipment which also uses 25-way D-subs you can use suitable multi-way cables.
5. (Optional but recommended) If you would like to use remote control of the ADA-128 via a browser, the device running the browser must be on the same network domain as the ADA-128. Connect a **network** cable from the back of the ADA-128 to your network.
6. Connect **Power** using the supplied power to IEC cable. ADA-128 automatically accepts mains voltages between 90 and 260 Volts A.C. at 50 or 60Hz and so there's nothing to change for regional power variations. Switch the ADA-128 on at the rear of the unit. Watch the display start up – it takes a few seconds.
7. Set up the **remote control** if required (See 'Remote Control over network using a browser' below). The unit's IP address is shown in the Status page in the Network section at the bottom left of the screen. Point your browser at the address specified in the 'GUI' line…. example …. http://192.168.68.120:2001 (where :2001 is always the port being used).
8. At this point you will need to consider the routing of your audio Inputs and Outputs. This is set up in the **Routing** page – See Routing below, and The Routing Procedure for a step-by step guide to routing. Simply….Click on an Analogue Input module, followed by the AES module, then OK to route 8 Analogue Ins to AES Outs. Similarly click on an AES module, then an Analogue Out module and OK, to route to the Analogue Outs.
9. You will need to consider clocking. If you are using Word Clock or i.e. a studio clock to synchronise your system, then you will need to connect cables first. Then go to the **Synchronisation** page of the Control Panel, and set the clocking regime there – 'Clock Source'.
10. Audio on Analogue inputs should now appear at AES Outputs and AES Inputs should pass audio to Analogue Outputs.
11. Having customised the routings and clocking of your ADA-128 and it is now working nicely, make sure to save it as a new configuration file. Go to **Settings** and in the 'Configurations' tab press 'Save Configuration', type a name, then 'Save'.

Quick Start ProTools

This brief quick start guide expects some familiarity with the Avid Pro Tools | HD software itself.

1. Take the ADA-128 out of its box.
2. If you have any new modules that need to be fitted, follow the Module Fitting Guide.
3. Consider how to rack mount the ADA-128 unit (See 'Thermal Considerations' in the Hardware section of the Reference Manual) making sure that there is sufficient air flow to cool it and that there are spaces between other units above and below in the rack.
4. Connect audio connection looms to all your Analogue and AES I/O ports at the back of the unit. 25-way D-Subs to XLR are wired to Tascam convention, and AES is different from Analogue. (See 'D-type connection pin-outs' in the Hardware Section). If you're connecting to other equipment using 25-way sub you can obviously use suitable multi-way cables.
5. Connect DigiLink cables between your host computer's Pro Tools interface and the ADA-128 DigiLink ports on the Pro Tools | HDX Host Module.
6. You will need to consider synchronisation and any cabling required – one unit in your system will be Leader for Clocks, the rest will be synchronised to it. Connect Loop Sync BNC cables between ADA-128 and any other I/O units connected to your Pro Tools system – with more than two I/O units in the system you may need to consider daisy-chained sync cables. (See Pro Tools Connection Diagrams below).
7. (Optional) If you would like to use remote control of some of the ADA-128's settings via a browser, the device running the browser must be on the same network domain as the ADA-128. Connect a network cable from the back of the ADA-128 to your network.
8. Connect Power using the supplied power to IEC cable. ADA-128 automatically accepts mains voltages between 90 and 260 Volts A.C. at 50 or 60Hz and so there's nothing to change for regional power variations. Switch the ADA-128 on at the rear of the unit. Watch the display start up – it takes a few seconds.
9. Set up the remote control if required (See 'Remote Control over network using a browser' below). The unit's IP address is shown in the Status page  in the Network section at the bottom left of the screen. Point your browser at the address specified in the 'GUI' line…. example …. http://192.168.68.120:2001 (where :2001 is always the port being used).
10. At this point you will need to consider the routing of your audio Inputs and Outputs. This is set up in the **Routing** page  – See Routing below, and The Routing Procedure for a step-by step guide to routing. Simply… Click on an Analogue Input module, followed by the desired 8 channel block on the PTHDX Host module, then OK to route 8 Analogue Ins to the Pro Tools software's Inputs. Similarly click on an 8 channel block on the PTHDX Host module, then an Analogue Out module and OK, to route to the Analogues Outs.
    If you are using AES modules, you will need to consider the setting of the Emulation Mode, and also it is advisable to keep the routings of any AES modules on a different 'Virtual' Interface to the Analogue modules (to ensure correct delay compensations).
11. In the ADA-128 Control Panel's Clocks page, you will need to set the ADA-128's Clock Source to match your synchronisation strategy – in short is the ADA-128 on Internal or External Sync? This is explained in more detail in the Pro Tools | HDX Application notes.

12. So that the sample rate can be switched within the Pro Tools software, you should enable Pro Tools Remote Control – go to the Global Inspect page for the PTHDX module, and click **Enabled.**
13. Start Pro Tools – the ADA-128 should be seen in Setup /Hardware as one or more 'HD I/O' units (ADA-128s are set to emulate and act exactly as if they are standard HD I/O units).
14. Depending on your chosen synchronisation strategy, you may need to set your Clock Source and Loop Master within the Pro Tools software – go to Setup/Hardware/Clock Source.
15. Audio on Analogue Inputs and Analogue Outputs should now appear at their respective Pro Tools channels.
16. If you have customised the ADA-128 configuration and it is working nicely, make sure to save it as a new configuration file. Go to **Settings**  and in the 'Configurations' tab press 'Save Configuration', type a name, then 'Save'.

Quick Start Dante

Dante is a system for connecting between digital audio equipment using standard network cables and infrastructure. This quick-start description expects knowledge of the concepts of Dante. Further detail, and discussion of which other equipment and software may be required to configure a suitable Dante network for your application is provided later in the Applications section. There is a wealth of information about Dante on www.audinate.com. In particular there are some valuable Technical Documents and Video Tutorials on their www.audinate.com/learning pages to get you started.

1. Take the ADA-128 out of its box.
2. If you have any new modules that need to be fitted, follow the Module Fitting Guide.
3. Consider how to **rack mount** the ADA-128 unit (See 'Thermal Considerations' in the Hardware section of the Reference Manual) making sure that there is sufficient air flow to cool it and that there are spaces between other units above and below in the rack.
4. Connect **audio connection looms** to the Analogue and AES I/O ports at the back of the unit. 25-way D-Subs to XLR are wired to Tascam convention, and AES is different from Analogue. (See 'D-type connection pin-outs' in the Hardware Section). If you're connecting to other equipment using 25-way D-subs you can obviously use suitable multi-way cables.
5. Connect **CAT5e or CAT6 cables** between the ports on the ADA-128 Dante module and your network – Dante requires physical cables. Any switches used must be Gigabit ethernet. You can use a single network cable to connect the ADA-128 to the network, however, using two cables will enable redundancy mode. Note that the ADA-128's single network port on the CPU card cannot be used for Dante or any other digital audio; it's merely for control.
6. In order to configure the ADA-128 for the Dante network, you will probably need to download and install some **Dante software** to a computer that is attached to the Dante network. Go to www.audinate.com/products/software. There are several Dante software packages that could be useful to you. **Dante Controller** is recommended for controlling routings on the Dante network. You may wish to consider using **Dante Domain Manager** if your Dante network is large-scale. If you need computer drivers – ASIO, WDM or Mac Core Audio – then **Dante Virtual Soundcard** will give most DAW software an entry to the Dante network using a computer's (physical) network port.
7. You will need to consider synchronisation and any cabling required. What will be required depends on the scale of your system. The Dante network provides high quality synchronisation. You could set your ADA-128 to Internal clock, and synchronise other Dante devices to ADA-128 by making the ADA-128 'Primary Leader Clock'. Alternatively set ADA-128 to sync to the Dante module, and set up some other Dante network Leader Clock – Primary Leader for clocks can be set in the Clock Status tab of the Dante Controller software.
8. (Optional) If you would like to use **remote control** of some of the ADA-128's settings via a browser, the device running the browser must be on the same network domain as the ADA-128's CPU card. Connect a network cable from the network port on the CPU module of the ADA-128 to your network. The network used for remote control could be either the Dante network or a separate network.
9. Connect Power using the supplied power to IEC cable. ADA-128 automatically accepts mains voltages between 90 and 260 Volts A.C. at 50 or 60Hz and so there's nothing to change for

regional power variations. Switch the ADA-128 on at the rear of the unit. Watch the display start up – it takes a few seconds.

10. Set up the **remote control** if required (See 'Remote Control over network using a browser' below). The unit's IP address is shown in the Status page in the Network section at the bottom left of the screen. Point your browser at the address specified in the 'GUI' line…. example …. http://192.168.68.120:2001 (where :2001 is always the port being used).
11. You will need to configure TWO separate stages of **audio routing**: a) to and from devices on the Dante network and b) within the ADA-128 between its Dante module and the ADA-128 analogue and AES I/O.
    Dante routing is a task for the Dante Controller software – you will need to create '**subscriptions**' for every audio connection in its Routing Matrix.
    ADA-128 routing is set up in the **Routing** page – See Routing below, and The Routing Procedure for a step-by step guide to routing. Simply….Click on an Analogue Input module, followed by the desired 8 channel block on the Dante Host module, then OK to route 8 Analogue Ins to the Dante module's outputs (i.e. *transmitted* to the Dante network). Similarly click on an 8 channel block on the Dante Host module, then an Analogue Out module and OK, to route audio received from the Dante network to the ADA-128's analogue outputs.
12. You should now be able to check that audio is passing between the Dante network and the ADA-128's I/Os.
13. If you have customised the ADA-128 configuration and it is working nicely, make sure to save it as a new configuration file. Go to **Settings** and in the 'Configurations' tab press 'Save Configuration', type a name, then 'Save'.

Applications

In the following section, we will discuss how to get started, and operations with individual Host modules in more detail than in the Quick Start guides, and this will link to still further information in the Software and Hardware Reference sections of the manual.

The 'Dream' ADA-128 is modular, it can contain multiple host cards and can support multiple clock domains, which means that a single ADA-128 could be connected to different hosts performing different tasks simultaneously.

In these sections, we will be using the ADA-128's Front Panel Touch screen to make settings changes, and it may also be helpful to attach the ADA-128 to a network and to set up Remote Control in a browser.

Analogue to / from AES Converter

In its (perhaps) simplest setup you may use the 'Dream' ADA-128 as a large channel-count AES to / from Analogue converter, for instance replacing a rack of 'Dream' ADA-8s set up in a similar configuration.

There are many possible applications for this, from recording, mixing, archiving of multi-channel material etc.

Using an ADA-128 like this with a computer, the computer would need some kind of multi-channel digital audio interface.

In recent times devices with multiple AES connections are not so common – many interface devices have one or two AES or SPDIF I/Os, but very few have larger numbers.

A small selection of computer audio interfaces with multiple AES are listed in Appendix B along with ideas for using different digital audio interfaces and converting to and from AES3 digital audio.

In a system like this, in order to maximise the number of AES to and from Analogue channels, AES modules can be fitted into Host module slots – routings can be made freely between Analogue and AES I/O, no matter which slots the AES cards are fitted into.

Setting up as an AES Converter system

To prepare your ADA-128 for operation as a multi-channel AES converter you will need to consider the following aspects: -

a) Connection looms – all Analogue and AES connections are on 25-way D-Type connectors that follow the Tascam convention for pin-outs.
b) You will need to set up Routings in the ADA-128 to 'connect' your Analogue Inputs to AES outs, and AES Inputs to Analogue Outputs.
c) You will need to think about and set up your Synchronisation regime – you will need to decide which of your digital audio hardware units (including the computer's interface card) is to be the Clock Leader and which are Followers. You should then set up the ADA-128's Clock Source and any Reference Outs you may wish to use in the ADA-128's Clocks and Synchronisation pages.
d) You should check your Analogue **Line-up levels** to make sure that the ADA-128's inputs and outputs are matched to onward audio connections for consoles or outboard gear.

Pro Tools | HDX

Introduction

Pro Tools | HDX Core systems use an Avid-proprietary Interface card / device to connect a computer (running Pro Tools software) to arrays of audio inputs and outputs.

There are some possible 'devices' which can be used for a system like this: -

- Pro Tools | HDX PCIe card
- Pro Tools | HD Native PCIe card or …
- Pro Tools | HD Native Thunderbolt interface.

(For the sake of this manual, we shall refer to any Pro Tools interface card or device as a 'Pro Tools | HDX card' and may abbreviate it to 'HDX card'. We will abbreviate the ADA-128's 'Pro Tools | HDX module' as a 'PTHDX' module.)

The Pro Tools | HDX PCIe card is equipped with its own DSP to provide processing for software and plugins as well as connection to Audio Interfaces. The Pro Tools | HD Native options are without DSP, but offer very low latency input/output and connection to the I/O Interfaces using Avid's proprietary 'DigiLink' connections.

Multiple Pro Tools | HDX PCIe cards may be used together up to a maximum of three cards; the 'Native' cards/Thunderbolt units cannot be combined or used concurrently.

The **Pro Tools | HDX Host (PTHDX) module** for the 'Dream' ADA-128 allows the ADA-128 to be connected directly and provide audio Inputs and Outputs for an Avid | Pro Tools system with a Pro Tools | HDX card.

With this setup, Pro Tools users can enjoy the excellent sound quality of the Prism Sound ADA-128.

Thunderbolt or PCIe?

The **Pro Tools | HDX PCIe card** requires a computer with a PCIe slot. This may be a 'desktop' computer box with internal PCIe slots (i.e. an Apple Mac Pro, or a Windows desktop box). Alternatively, it's possible to purchase a Thunderbolt connected PCIe Expansion Chassis to house the HDX PCIe card(s), which may be connected to any computer with a suitable Thunderbolt port.

Many companies can supply this kind of Expansion chassis – Magma and Sonnet are amongst those. When purchasing this, you should double-check for compatibility with the Pro Tools | HDX PCIe card.

Setting Up for Pro Tools operation

There are a number of factors to consider when setting up a Pro Tools system for use with the ADA-128.

1. The computer needs a Pro Tools | **HDX PCIe card** (or HD Native card or unit).
2. The ADA-128 requires a **PTHDX module**.
3. **DigiLink** Mini cables are required to connect the ADA-128's PTHDX module to the Pro Tools | HDX card. You will need one Digilink cable if your channel count is less than or equal to 32 in, 32 out, or two for between 32 and 64 channels.
4. In the ADA-128 you must set up **routings** to connect digital audio from the PTHDX module to the outside world via the ADA-128's audio I/O modules.
5. You should enable **Pro Tools Remote Control** on the ADA-128 so that some settings can be controlled by the Pro Tools software.
6. If you have other hardware attached to your system – either Pro Tools | HD I/O units connected to the HDX cards alongside the ADA-128, or else other digital audio hardware used for processing etc. then all units must be synchronised – you will need to connect them together with **Sync cables**, and you will need to consider the **Sync settings** for the ADA-128, the Pro Tools software and any other hardware.
7. You should check your Analogue **Line-up levels** to make sure that the ADA-128's inputs and outputs are matched to onward audio connections for consoles or outboard gear.

PTHDX Module and Emulation

When the ADA-128 is fitted with a single Pro Tools | HDX Host (PTHDX) module, the ADA-128 can support up to 64 channels of audio Input *and* 64 channels of Output for the Pro Tools system.

In order that the operation with Pro Tools is seamless, the ADA-128 *'emulates'* Avid's own Pro Tools | HD I/O interfaces, and (when Pro Tools Remote Control is enabled) control of settings such as sample rates and other parameters is from within the Pro Tools software.

With the PTHDX module connected via DigiLink Mini cables to the system's Pro Tools | HDX card, the Pro Tools software will see the ADA-128 as up to 4 separate 'Virtual Interface' units which will show in Pro Tools software as HD I/O units, allowing 16 channels of I/O per 'Virtual Interface'/ HD I/O unit.

For those that are familiar with earlier Prism Sound I/O units that supported Pro Tools connection, such as Atlas, Titan or ADA-8XR, the concept is similar. However, you can forget about the older regime of 'Main' and 'Sub' units – thankfully, this complication does not apply to the ADA-128.

For channel counts that exceed 64 in or out (for instance you may require your ADA-128 to be fitted with, say, 112 inputs and 16 outputs) you can fit an extra PTHDX module to your ADA-128. You will also need another Pro Tools | HDX PCIe card to support the higher channel count and to connect via DigiLink to the extra PTHDX module.

DigiLink Connections

Note that the ADA-128 has 'DigiLink Mini' connections, like modern Pro Tools | Core system cards. For the sake of this document, any mention of 'DigiLink' refers to 'DigiLink Mini' connections.

Each ADA-128 PTHDX module has 2 x DigiLink ports. Each Pro Tools | HDX card has 2 x DigiLink ports. Each DigiLink port supports up to 32 channels of Input *and* Output and thus a maximum of 64 I/O is allowed for one HDX card (and one PTHDX module).

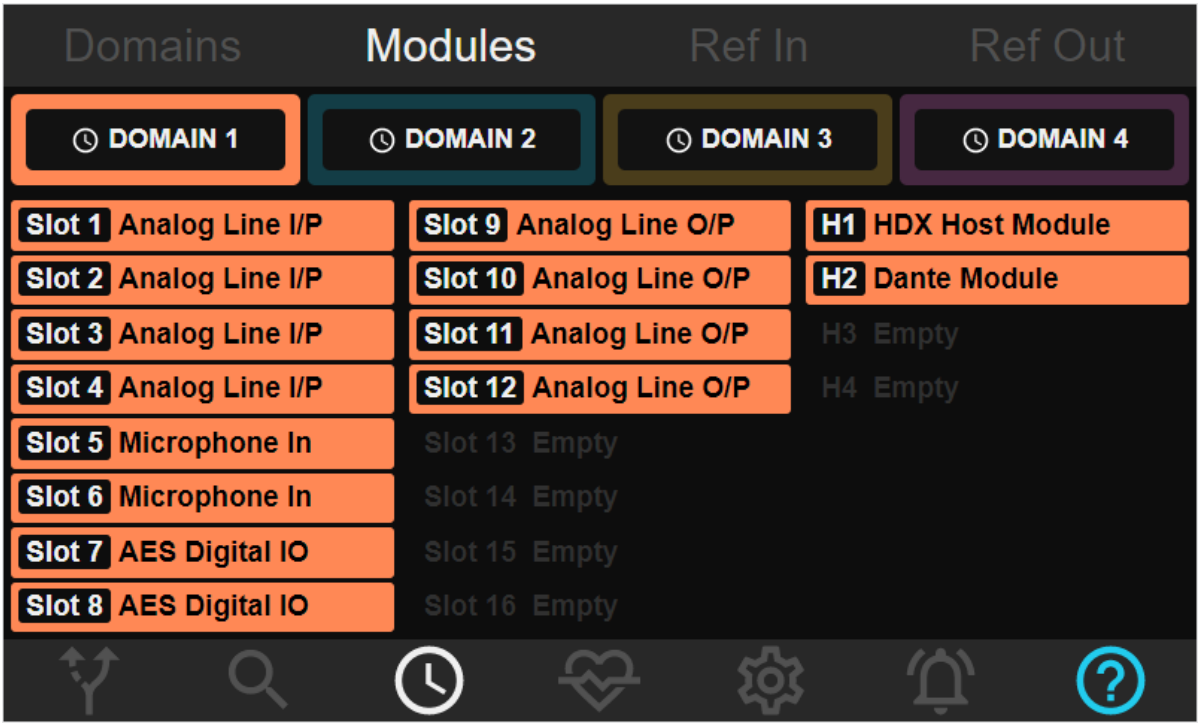
From the Pro Tools perspective, whatever I/O modules are fitted to the ADA-128, the ADA-128 occupies 32 channels (with one DigiLink connected) or 64 channels (with two DigiLinks connected), and will show as 2 x 16 channel units or 4 x 16 channel units.

Some Avid HD I/O units (and Prism ADA-8XR and Titan/Atlas) provide 'Expansion' DigiLink ports to allow further I/O units to be 'daisy-chained' on the DigiLink bus. The DigiLink Ports on the ADA-128 are *direct* connection ports, like those on the HDX/HD Native card, and do not provide any daisy-chaining facility.

ADA-128 Modules' Clock Domains

If this is a factory set unit then this step may not be necessary, but if the ADA-128 has had any significant customisation, before setting up any audio Routings and Sync settings, you may wish to reload a Configuration or check that the I/O modules that you wish to use with the PTHDX module are all on the same Clock Domain.

Click on the  icon on the ADA-128's control panel bottom toolbar, and then click on the MODULES tab: -



You will want to check which Clock Domain (colour) the 'HDX Host Module' (Slot 17 in the example picture) is associated with, and that all the I/O modules you plan to use belong to that same Clock Domain. In this example (and likewise a factory default system) all the modules belong to Clock Domain 1 and are all coloured Orange.

Synchronisation

The Synchronisation of any digital audio system is critical, particularly if multiple pieces of equipment are linked within the system.

There must always be a single 'Leader' for synchronisation of the system, from which the clocks are derived for all other devices to follow.

You will need to prepare your ADA-128, in terms of sync connections and sync settings to match to your chosen synchronisation strategy.

You will need to consider several aspects: -

a) Which hardware unit is Clock Leader?
b) How sync cables are connected.
c) The ADA-128's Pro Tools Remote Control setting.
d) The ADA-128's own Clock and Synchronisation Settings.
e) The Pro Tools software Sync Settings.

How the sync cables are connected depends of course on a) whether the ADA-128 is Leader or Follower for clocks b) the type of digital clock signal that you plan to use for synchronisation – Word Clock, DARS, Loop Sync etc. etc.

It's recommended that you enable Pro Tools Remote Control. Without it being enabled, you would always have to set the synchronisation *and* the Sample Rate of the ADA-128 independently of the rest of the Pro Tools system and its software. Unless you only ever use a single sample rate, it's quite an advantage to have the Sample Rate switch from the software. Pro Tools can be fussy when I/O units are not set to the correct sample rate and sync, and so with Pro Tools Remote Control you don't have to worry about a very strict order of changing settings. When Pro Tools Remote Control is enabled on the ADA-128, it will follow the sample rate changes of the software (i.e. when you change session in Pro Tools).

Pro Tools Remote Control also has control over which unit in the system is Clock Leader as well as the setting of Internal or External Sync of the Leader.

Within the Pro Tools software there is scope for setting an External Sync Reference to be one of several possible connectors – i.e. Word Clock, AES, ADAT etc. but because the possible Reference connections on an Avid | HD I/O are not the same as the ADA-128, you will need to set the Reference connector within the ADA-128 software.

So … when you select Internal sync in the Pro Tools software, the ADA-128 interprets this as 'Internal'. But whatever you set for external sync in Pro Tools– AES, ADAT. Word Clock, etc. –will switch the ADA-128's clock source to its *last set* external sync source.

And so there is some sense in 'priming' the ADA-128 by setting its Sync Source's external setting to a sensible value, particularly if you are using Loop Sync for your synchronisation regime.

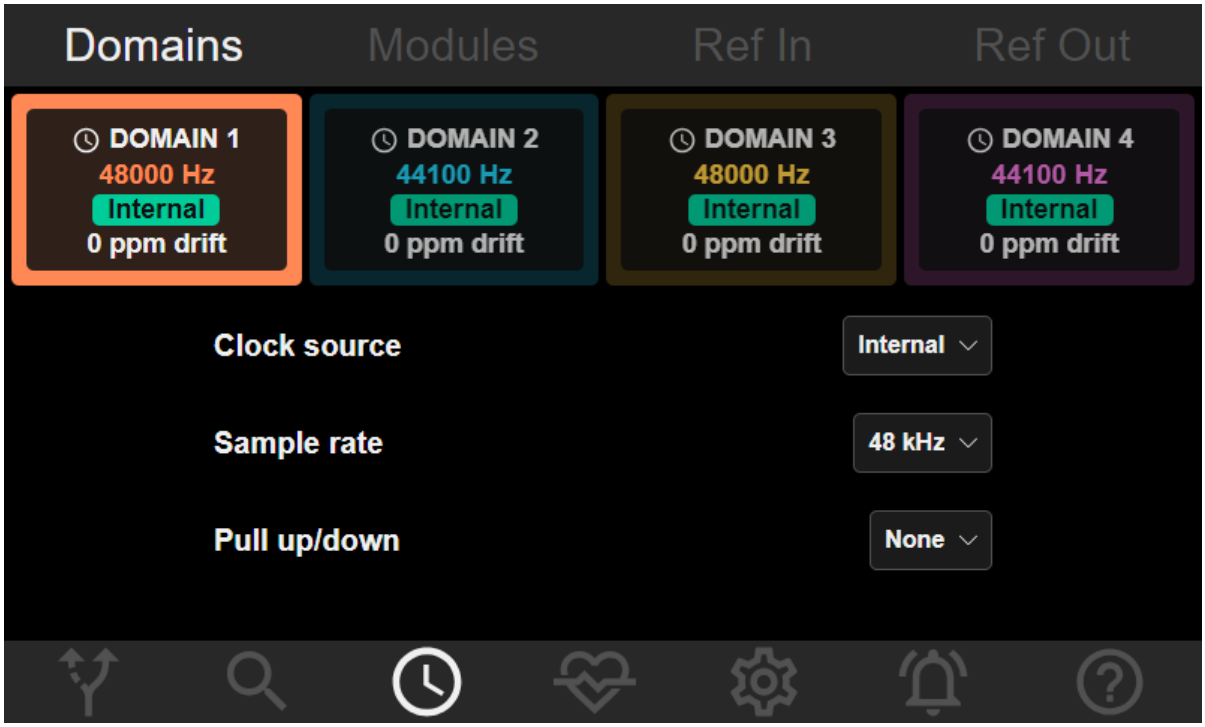
On the other hand, many users set their sync regime and leave it (perhaps for ever), and so from the ADA-128's perspective the key thing is to decide whether ADA-128 is Leader for clocks, or whether it is a Follower of another hardware unit or a reference clock unit. If it's a Follower, you will need to decide which Reference connector to use, and set it up correctly.

ADA-128's Clock Settings

ADA-128 has several possible Sync Reference connections In and Out. These are on the rear of the unit, and also in a multi-way D-type connector (for which a suitable breakout cable is available).

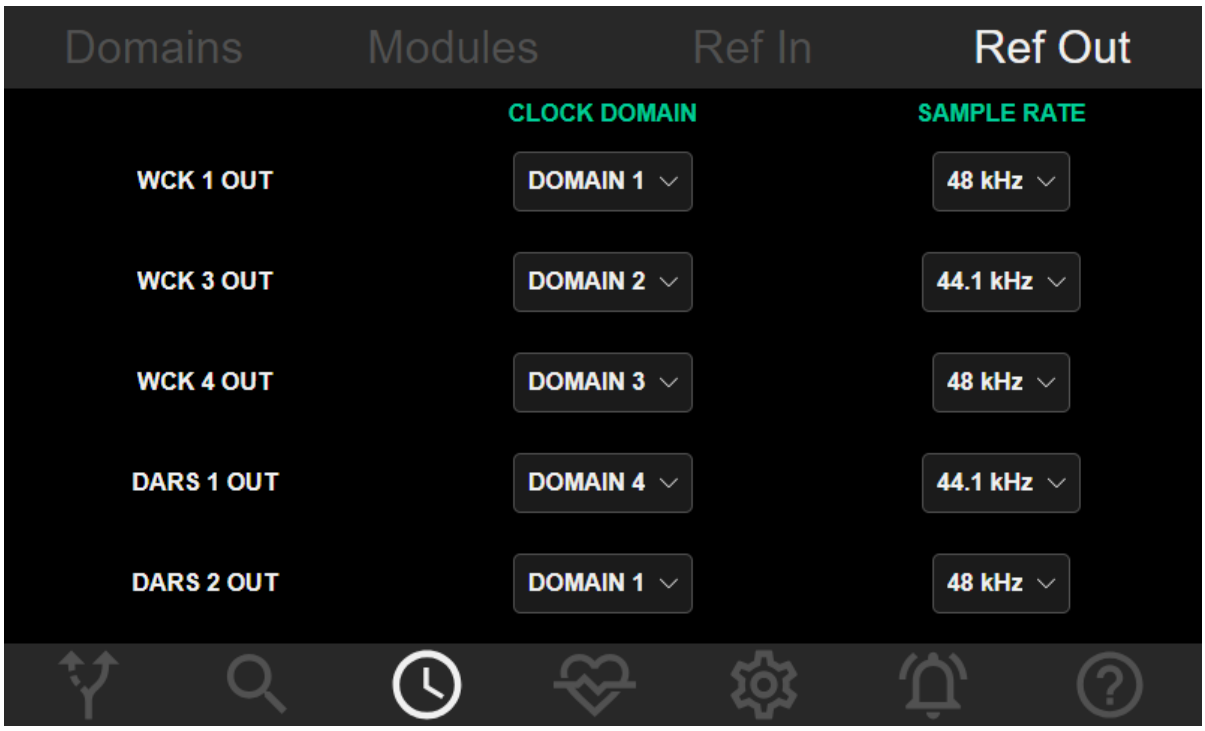
In the ADA-128's Clocks and Synchronisation Pages you will need to nominate which (of several possible) Sync connectors you are using.

In the 'Domains' page, select the Domain to which your ADA-128's PTHDX module belongs, and from the Clock Source drop down selector, choose either 'Internal' or the connector you plan to use for sync – WCK1 and DARS1 are BNC and XLRs on the rear of the unit; WCK2 and DARS2 are on the Ref I/O D-type connector and its break out cable.



(Clicking on the Clock Source 'drop-down' selector shows another page offering the possible clock sources – see Control Panel Drop-Down Selectors for a more detailed description, although this is quite intuitive.)

While you're here, you should take a look at the **Ref Out** tab, and check or set settings for the ADA-128's Sync Reference Output if you plan to use one of the ADA-128's Ref outputs to clock any other hardware units in the system.

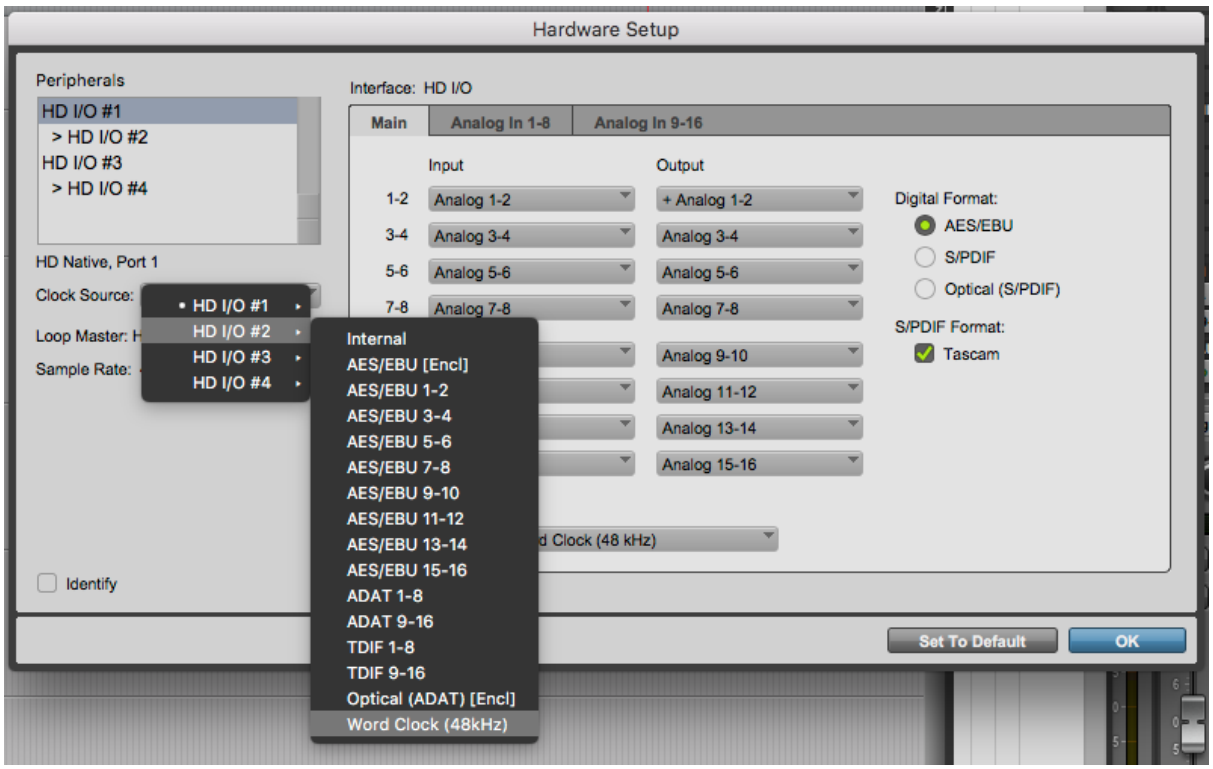


For instance, if you are running a Loop Sync regime, you will want to set your chosen WCK Out connector to belong to your PTHDX's Clock Domain, and also to make sure its Sample Rate is set to the 'Base' rate associated with your selected Sample Rate – i.e. the lowest value offered in the Sample Rate drop-down.

Pro Tools Sync Settings

With Pro Tools Remote Control enabled, your sync connections made correctly, and the ADA-128's Internal/External Clock source setting made, you need to check that the Pro Tools software settings are set correctly too.

Start Pro Tools and go to the **Setup/Hardware** dialogue.



At the left side is the list of the attached I/O units - 'Peripherals'.

Underneath there is a drop-down selector for 'Clock Source'

There are two levels within this drop-down. You must first choose the HD I/O unit that you wish to be the 'Loop Master', and then in the secondary selector, you should choose its source of clock (which may be 'Internal').

If you have a **single ADA-128** unit, the choice is simple and will probably be as default – you would choose **HD I/O #1** followed by **Internal.**

Or perhaps, if you have a single ADA-128, but you are using a studio **Reference Clock** box to clock your system – the choice would be **HD I/O #1** followed by **Word Clock.** (however, as mentioned, *anything* other than Internal would set the ADA-128 to external clock with the Reference In as selected in the ADA-128 Clock page)

If you have **multiple hardware I/Os** – i.e. Avid HD I/Os in addition to the ADA-128, then you must decide which is the Clock Leader.

Sync Connections

Some examples ….

If you have a **single ADA-128** and no other audio I/O units, then there's very little to consider.

- No Sync cables are required.
- Enabling Pro Tools Remote Control will ensure that ADA-128 changes sample rate automatically to follow the Pro Tools software.
- Set the ADA-128 to Internal Clock, in the Clocks page/Domains/Selected Domain/Clock Source.
- Set Pro Tools so that HD I/O #1 is Clock Master and on Internal Clock.

Then there's the possibility that you have a **single ADA-128, clocked from a reference clock**

- You will connect a sync cable from the clock device to your nominated Reference In connector on the ADA-128 (probably WCK1 In?)
- Enabling Pro Tools Remote Control will ensure that ADA-128 changes sample rate automatically to follow the Pro Tools software.
- Set the ADA-128 to Clock Source = WCK1 (or whichever connector you have chosen), in the Clocks page/Domains/Selected Domain/Clock Source.
- Set Pro Tools so that HD I/O #1 is Clock Master and clocked to Word Clock.

Loop Sync

A further possibility is to use **Loop Sync.**

Historically, Pro Tools systems have usually synchronised multiple audio I/O units by means of a 'Loop Sync' regime.

The idea is that you would connect from one unit's Loop Out BNC connector to the next unit's Loop In, and so on around the loop. You would usually complete the loop by connecting the final unit's Loop Out back to the first unit's Loop In.

Loop sync always runs at Base Clock – i.e., the base rate of the sample rate (44.1KHz for 44.1, 88.2 and 176.4Khz or 48KHz for 48, 96 and 192KHz) not the multiplied sample rate.

Loop sync is actually not completely necessary – there are other ways to make sure multiple units are synchronised correctly (i.e. …. Using Word clock, or a reference clock feeding units in a 'star', atomic or GPS clocks where they are supported) as long as all units are using the same clock reference, then everything will be in sync. However, Loop Sync is a kind-of 'traditional' and convenient method of synching Pro Tools systems.

Loop sync gives the advantage that once the Loop Sync cabling is in place, it's very simple to change the Clock Master from the Pro Tools software.

Avid | HD I/O and MTRX units always have a pair of Loop Sync connections marked 'Loop In' and 'Loop Out'.

To include an ADA-128 in a Loop Sync regime, you must decide *which* of the ADA-128's BNC Sync connectors you are going to use (ADA-128 has a pair of BNC In/Out on the back panel, and some

more Inputs and Outputs on the Ref I/O multi-way D-Type connector on the back panel, close to the BNCs).

Then, having made the connections for Loop Sync, you will need to set these up correctly in ADA-128's Clock Settings:-

1. Set the Clock Source for the Clock Domain associated with the PTHDX module to WCK1 (or WCK2, or WCK3, whichever you have chosen to use).

2. In the Ref Out tab of the Clocks Page, set WCK1 (or whatever your nominated Loop Out BNC is) to a) the Domain the PTHDX is in, b) set its Frame Rate to 'Base' so that it always outputs Base clock to the Loop.

Note:- You may notice that this manual mostly uses the terms 'Leader' and 'Follower' to describe a device's standing in any clock regime, whereas historically they may have been known as 'Master' and 'Slave'. In some software those terms are retained, and so this manual may use both. They mean the same.

Routing

The PTHDX module shows 'Virtual' Interfaces to the Pro Tools software. Audio signals connect onwards to and from the ADA-128's I/O modules via the ADA-128's Routing mechanism.

You will want to decide how you would like your ADA-128's I/Os to appear in Pro Tools.

The Routing Procedure is described in detail below.

You will quite likely want audio inputs and outputs numbered 1 to n to be routed to the Pro Tools channels 1 to n. You can route channels in the order you wish but are limited to each block of 8 channels being routed together.

Simply….In the ADA-128 software's Routing  page, click on an Input module, followed by an 8 channel block on the PTHDX I/O module, then OK to complete the routing. Continue until you have routed all the Inputs you require. Similarly clicking on an 8 channel block of the PTHDX I/O module, followed by an Output module and then OK, routes to the outputs.

It's worth noting that when the PTHDX I/O module is connected to the Pro Tools | HDX card, as long as synchronisation is valid, the ADA-128's HD I/O 'Virtual Interfaces' will be seen whether or not there are the routings to and from the ADA-128's I/O modules. Routings may be changed while Pro Tools is running (subject to the I/O cards being on the same Clock Domain as the PTHDX module). Of course, if you are switching ADA-128's I/O routings whilst playing from Pro Tools, you may need to take steps to protect any speakers / ears in potential signal chains.

Analogue Line Up Levels

The Input sensitivity and Output gain of your ADA-128 Analogue input and output modules may need to be adjusted to best match to the equipment it is connected to. The Input Sensitivity and Output gain settings are controlled in the ADA-128's Inspect pages for the modules and described later in this manual.

Configurations

Once you are happy with the settings of the ADA-128, it's a good idea to save the ADA-128's full configuration to a Configuration within the ADA-128.

On the front panel, or in the Remote Control browser, press the **Settings** button  and in the 'Configurations' tab press 'Save Configuration', give your configuration a name and follow the prompts to save it. Subsequently, if you are in any doubt about the configuration of the unit, you will be able to load your working settings from the 'Load Configuration' button.

The ADA-128 will remember its configuration through a power down/up cycle, however it will be very useful in future to have a known working state which can be loaded at will.

Pro Tools Connection Diagrams

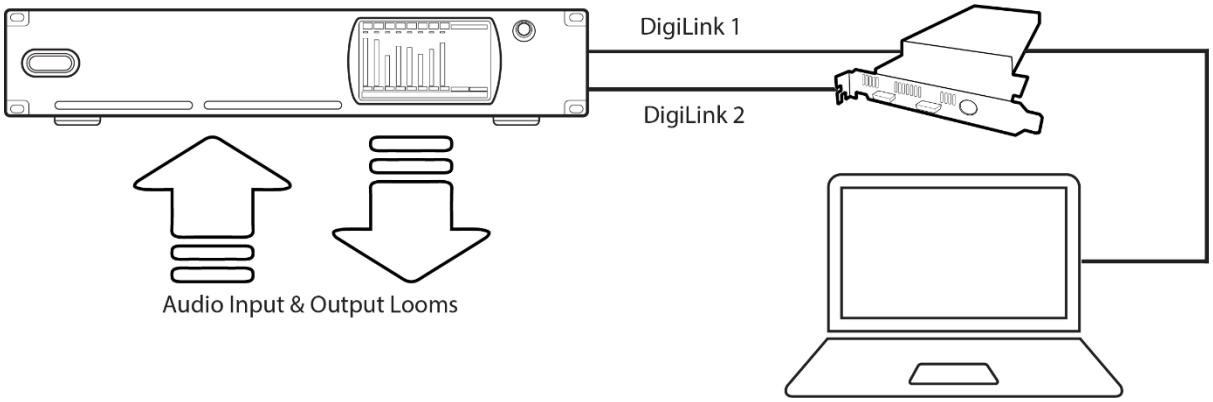
Here are a few examples of possible system connections.

Note:- *For the sake of simplicity, we have drawn the computer and Pro Tools | HDX interface as a laptop and HDX PCIe card. The HDX PCIe card may be inside a Thunderbolt Expansion Chassis, alternatively, the 'laptop' may be a desktop PC which includes PCIe slots for this card. It could also be a however this could also be a desktop PC with PCIe slots, The HDX PCIe card in the diagram could also represent a Thunderbolt connected HD Native unit. See Thunderbolt or PCIe? for further explanation.*

Single ADA-128 unit

Let's start with a single ADA-128, connected to a Pro Tools system with a single HD Native (or HDX PCIe) interface. The ADA-128 is the only I/O unit in the system.

This is really very straightforward.



The HD Native (or a single HDX PCIe card) has 2 x DigiLink Mini connectors. The ADA-128's HDX module also has 2 x DigiLink Mini connectors.

- Connect 2 suitable DigiLink mini cables between the HD Native unit and the ADA-128. Connect the HD Native's Port 1 to ADA-128's Port 1, and Port 2 to Port 2.
- Connect the ADA-128's Audio looms. (*See D-Type Pin Outs for details of audio cable connections).*
- Configure the ADA-128 – Pro Tools Remote Control Enabled;
- Create some routings in the ADA-128's Routing page.
- Switch the ADA-128's power on.
- Start the Pro Tools software.

There are no other audio I/O units, and so there is no need for sync cables (unless you plan to sync the ADA-128 to another system, house clock etc. etc.).

Inside the Pro Tools software, in the Setup/Hardware page, the ADA-128 will show as 4 separate HD I/O units, each with 16 Inputs and 16 Outputs. This is because of the ADA-128's *emulation mode*– this is explained in more detail in the Inspect section below … Emulation Mode.

You will need to set the ADA-128's Clock Source to Internal, and likewise the Pro Tools Clock Source should be Internal.

You can proceed to assign the audio channels to your Pro Tools session's tracks for recording, and for use as Outputs, Inserts etc. etc.

You will only need to access the ADA-128's control panel to change, for instance, Input or Output settings for level, filters, etc. Do not try to change sample rate settings, as this is under the control of Pro Tools. These Pro Tools-remote functions are listed in Appendix C – Pro Tools | HDX Software Controls.

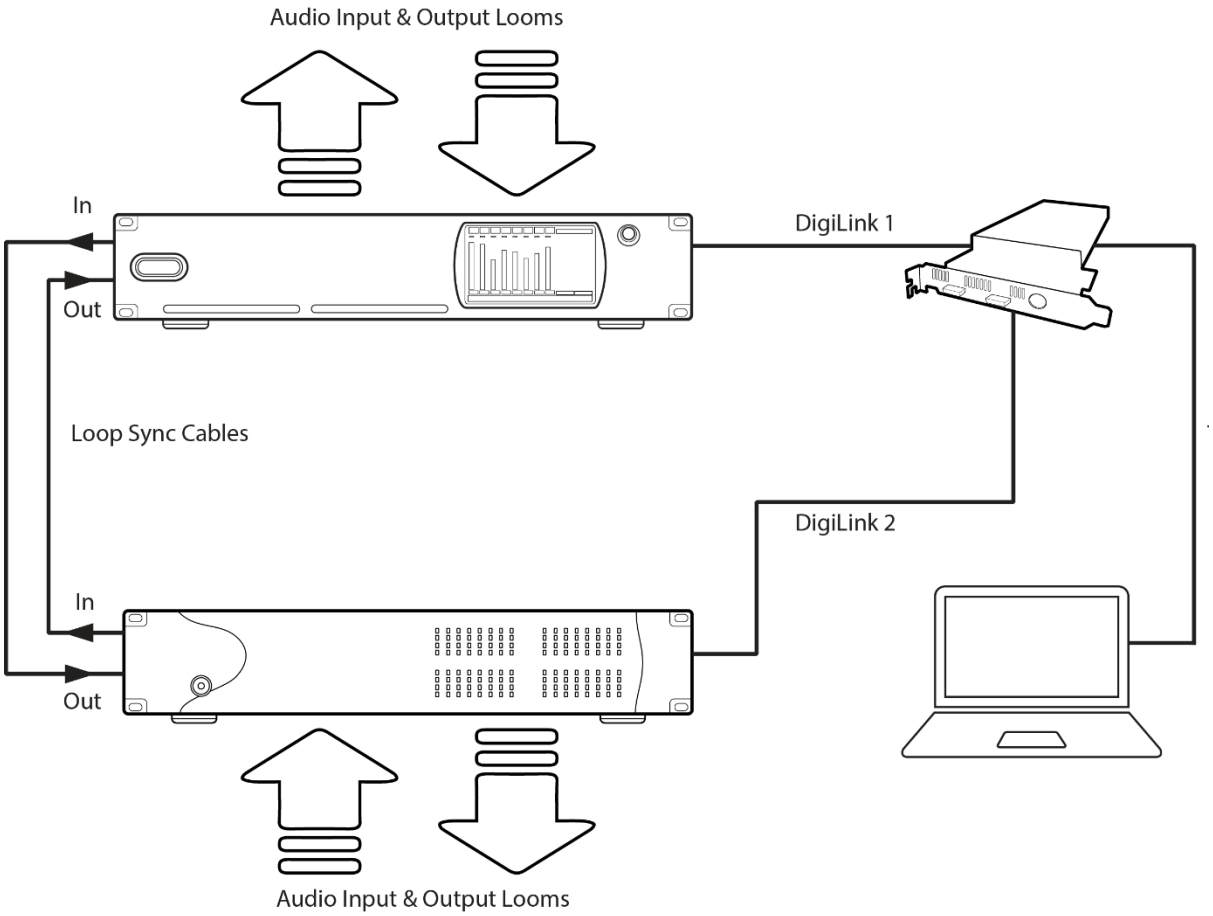
Pro Tools will see two or four 'HD I/O' units (i.e. 32 or 64 channels, depending on how many DigiLink cables are connected). If your ADA-128 is populated with less inputs and outputs, (or has less inputs and outputs routed) then Pro Tools will still see the missing 'Virtual' I/O, but those channels have nowhere to go of course.

Two Audio I/O Units

For the next example, we'll look at a case where you have 1 x 'Dream' ADA-128 unit, plus an Avid HD I/O unit.

The connections of the Mini-DigiLink cables will depend on the maximum number of channels that both units can provide, and how many Pro Tools | Core system cards you have.

Example 1 – ADA-128, 16 (or any number up to 32) channels all Analogue, plus Pro Tools | HD I/O, 16 channel.



DigiLinks

The ADA-128 is connected by one DigiLink Mini cable to Port 1 of the HDX card. The Avid | HD I/O is connected to Port 2 of the HDX card with another DigLink Mini cable.

Note that the DigiLink connection to the ADA-128 is direct. The older HD I/O units (and also for instance Prism Sound Atlas, Titan and ADA-8XR) have 'Primary' and 'Expansion' ports which support daisy-chaining of the DigiLink connections, however newer ADA-128 and MTRX have two separate 32-channel DigiLink ports, with no support for daisy chaining.

Loop sync

There needs to be a pair of Loop Sync cables – BNC to BNC – between the ADA-128 and the HD I/O – ADA-128 Loop Out to HD I/O Loop In; HD I/O Loop out to ADA-128 Loop In.

Virtual Interfaces

The ADA-128 software will show only 'DigiLink 1' as connected, and 'Interface 1' and 'Interface 2' of its PTHDX 'Interfaces' will be active.

The Pro Tools software will (perhaps surprisingly) show *three* Interfaces – HD I/O #1 and HD I/O#2 on the first Port (which is the ADA-128's first two 'Virtual Interfaces') and HD I/O #3 (which is the real Avid HD I/O unit).

Depending on how many audio I/O modules you have routed in the ADA-128, some of the channels on HD I/O #1 and HD I/O #2 may remain 'Virtual' and may not reach the outside world.

For this example with 16 Analogue I/O channels, Input and Output channels 1-16 should be routed to the PTHDX module's channels 1-16, and thus the whole of HD I/O #2 in the Pro Tools software is Virtual and cannot be used for I/O.

However, if for instance, you have some AES modules in the ADA-128, you might choose to route the AES modules to channels 17-24 and/or 25-32 so that these channels will appear on 'Interface 2' in the ADA-128 and 'HD I/O #2' in the Pro Tools software. A reason for doing this would be that you can then change the Emulation Mode of 'Interface 2' to be '16x16 Digital' and then Pro Tools software would handle delay compensation differently for the ADA-128's Analogue and Digital channels. See Emulation Mode below for more detail about this aspect.

Pro Tools Remote Control

As per the more basic example, you should enable Pro Tools Remote Control, so that Sample Rate and Clock Master & Internal/External sync settings can be controlled within the Pro Tools Software.

Dante

Introduction

Dante is an Audio-over-IP system developed by Audinate which allows Dante-enabled equipment to be connected using network cables and through standard gigabit network switches, with the ability to control all routings between devices by software.

The Dante Host Module for the 'Dream' ADA-128 uses modern Dante IP Core technology and supports up to 64 input channels and 64 outputs of audio at all sample rates up to and including 192KHz.

A Dante system could be as simple as a single network cable between a computer and an ADA-128. With the appropriate software this could allow for recording and playback of multi-channel audio to and from the computer.

Or it's more likely to involve many pieces of Dante-enabled equipment installed throughout an entire multi-room facility, allowing the routing and patching of audio signals across long distances between any part of the building.

Dante is a 'plug-and-play' system, but, naturally, the more channels of audio moving around the network at any moment (and the higher the sample rate!), the more care you will need to take over network infrastructure and performance. There is some information and links to articles about optimising your Dante network later in this section.

Audinate Dante Resources

Our ADA-128 manual will provide some advice on Dante aspects, but is not able to provide full information on Dante networking. If you are new to Dante and/or want to find out more about it, we suggest that you take advantage of the large resource of information on the Audinate website.

In particular the learning pages ….Learning | Audinate | Dante Pro AV Networking …. which provide a broad range of information, including detailed technical documentation, FAQs, video tutorials and a training and certification programme.

On the same Audinate site there is a …. Software | Audinate | Dante Pro AV Networking …. page with information and downloads for several software packages allowing control of the Dante network and utilities to help you work with Dante.

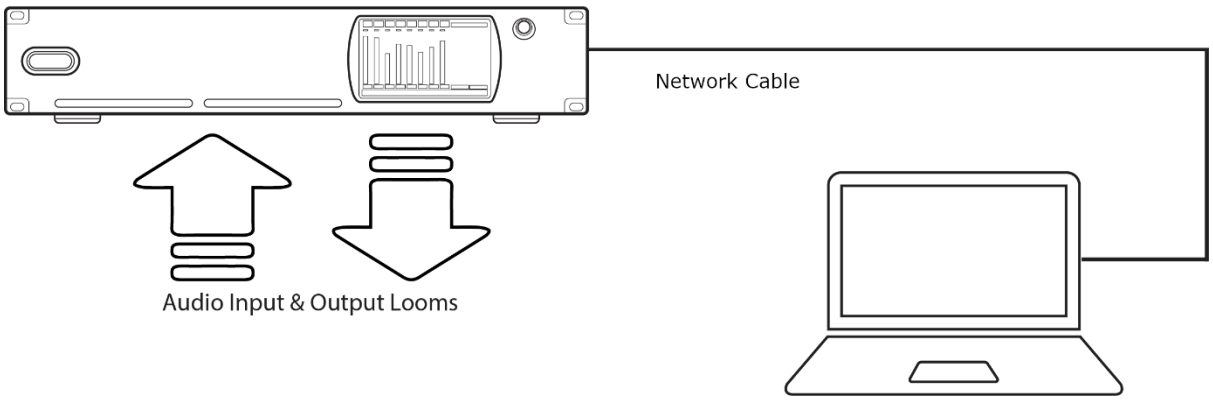
Setting up ADA-128 with the Dante network

We'll start by describing the steps you need to take to connect a single computer to an ADA-128 for recording & playback. I appreciate that most Dante applications for the ADA-128 will be considerably more complex, and some aspects (particularly the network connections and management) will need much more attention in a larger installation. However, the steps described …. routing signals across the Dante network; routing signals inside the ADA-128 itself; how to get computer audio into the Dante network; synchronisation, apply to any size of Dante network.

Example One Computer / One ADA-128 Step by Step

In this simplest situation you have a computer, connected by a single network cable to an ADA-128 equipped with a Dante Host module. We will not require a network switch as there are only two devices (and this is the one scenario where a switch is not necessary).

Even if your Dante network is significantly more complex, this section of the manual has some value as it describes the steps most users will have to do to get audio into and out of the Dante network.



An example application for this simple setup would perhaps be a live music recording. You have a number of audio sources - say, microphones, keyboards, mixers etc. - connected to the audio inputs of an ADA-128 sited on the stage. This connects via a single network cable (or two to give redundancy) to the control booth some distance away, where the multi-channel audio of the concert is recorded onto a laptop computer.

A similar example would be where an ADA-128 is connected to an analogue console for music recording & playback, whilst interfacing to a computer over Dante.

Dante Virtual Soundcard (DVS)

Dante Virtual Soundcard is a software package supplied by Audinate for Mac and Windows computers that provides an audio driver (as either ASIO, WDM or Core Audio) which most DAW software packages can use for their audio I/O. Using a connection to the computer's network port, audio in the DAW software is then transmitted and received to/from the Dante network.

For computers that don't have network ports, it is not possible to run Dante audio across a wireless connection, however there are many suitable USB or USB-C 'dongles'/adaptors which can provide a wired network port on an RJ45 connector.

DVS can be downloaded as a trial; there is a cost for the full version but it is not very expensive.

DVS allows for 64 channels of input and output at 44.1KHz or 48KHz sample rates, with channel counts reduced to 32 at 88.2/96KHz and 8 at 176.4/192KHz.

Open the DVS software interface, and set it to use the Network Interface on your computer. On a Mac DVS would act as a Core Audio device. On Windows, for a larger track count DAW software we would expect you to use the ASIO driver (not WDM which would only be used for simpler audio playback).

There are settings for Buffer size (behind the ASIO 'Options' button, and channel numbers, Dante latency etc.). The maximum channel count will be determined by the sample rate. If you haven't started your DAW yet, the sample rate may not be set correctly – it's always set by the DAW software. Press START on the DVS dialogue to start the driver.

When you start your DAW software, select Dante Virtual Soundcard as the Audio Device, and then when you choose Inputs and Outputs in DAW's mixer you will be receiving/sending audio to the Dante network.

Other Dante Computer Interfaces

This example uses Dante Virtual Soundcard for the sake of simplicity. DVS is somewhat restricted with regard to numbers of audio channels at higher sample rates and does not support Dante's Redundancy Mode.

So for a real situation, you may require a separate Dante-enabled Audio Interface (i.e. a card or a unit).

Several manufacturers produce hardware devices that can provide a multi-channel audio interface for integrating with a Dante network. These have greater capability with respect to channel counts and sample rates, and provide drivers for use with DAW software, and some may support Redundancy mode.

At the time of the ADA-128's Dante Host module's release, these are some possible hardware interfaces….

Focusrite RedNet PCIeNX card - RedNet PCIeNX | Focusrite is the latest card – 128 channels in and 128 out at 192K.

Marian Clara E - Clara E – MARIAN GmbH – 512 channels in and 512 out at 48k up to 128 channels in and 128 out at 192K.

There is a Dante PCIe card which was sold by a number of manufacturers – Yamaha, Audinate, SSL, Focusrite (the RedNet PCIe-*R*). These supported 128 channels in and 128 out at up to 96K, 64 in and 64 out at 192K, but these tend to be obsolete or unavailable at the current time.

RME Digiface Dante – USB3 connected. 64 in and 64 out @ 48, 32in, 32 out @96, 16 in, 16 out at 192K.

PCIe cards can be used with laptops and other computers that have no slots for PCIe by putting the card(s) into an external housing, which would usually be connected by Thunderbolt. There are several manufacturers of these – i.e. Sonnet Technologies, Magma, OWC. You should consult with the manufacturers of the housing *and* of the Dante card to check for compatibility.

Connect to the 'Network'

Whichever audio interface you are using on the computer, you will need to connect a CAT5e or CAT6 network cable between its Dante network port (or the computer's network port if you are using DVS) and the ADA-128's Dante port.

For Dante operation you will require gigabit hardware network ports.

If you have two hardware network ports on your computer or Dante audio interface, then you can connect both and this Dante connection will operate in 'redundant' mode whereby one cable could fail and the flow of data would continue uninterrupted.

ADA-128 Routing

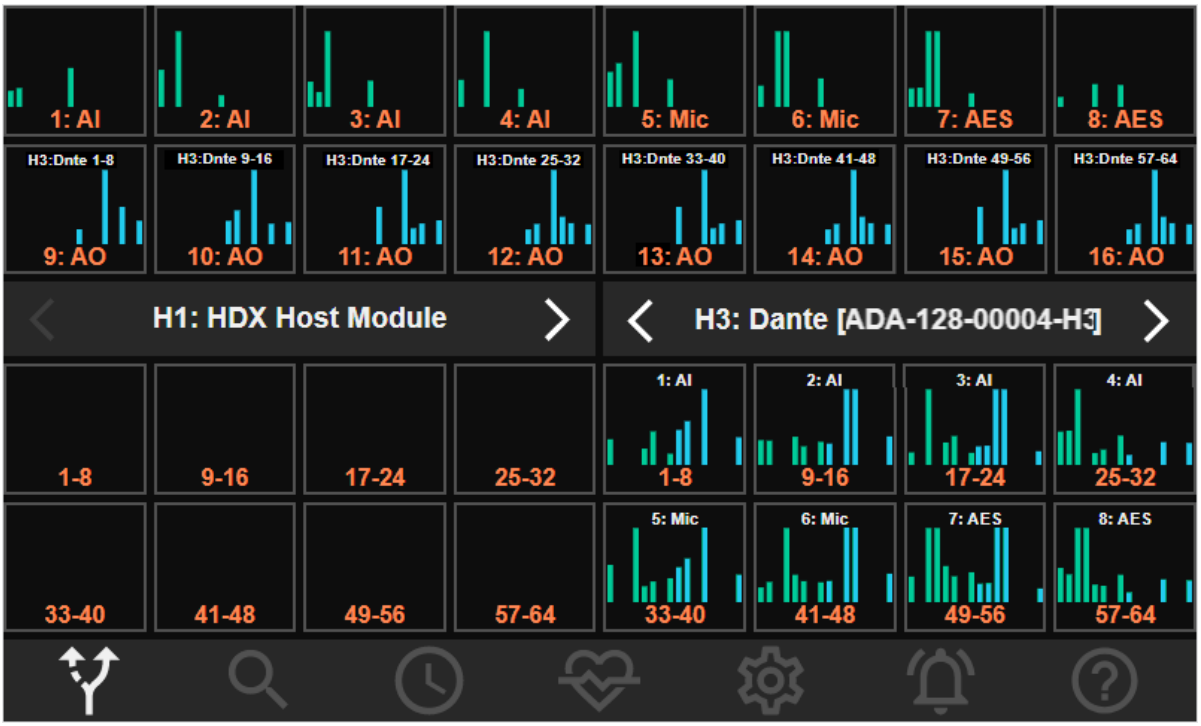
Set up routings in the ADA-128 so that audio is being transmitted to the Dante network.

The Routing Procedure is described in detail below. (You may wish to remote control the ADA-128's Control Panel using a browser – the setup for this is described later in the manual.)

You will quite likely want audio inputs numbered 1 to n to be routed to Dante channels 1 to n. You can route channels in the order you wish but you are limited to each block of 8 channels being routed together.

Simply….In the ADA-128 software's Routing  page, click on an Input module, followed by an 8 channel block on the Dante Host module, then OK to complete the routing. Continue until you have

routed all the Inputs you require. If your scenario requires you to route the outputs as well, similarly, clicking on an 8 channel block of the Dante Host module, followed by an Output module and then OK, routes audio from the Dante network to the ADA-128 outputs.



Dante Controller

Dante Controller is a free software package, again from Audinate, which provides tools for managing the Dante network and in particular includes a routing matrix to allow you to connect audio between the devices on the network.

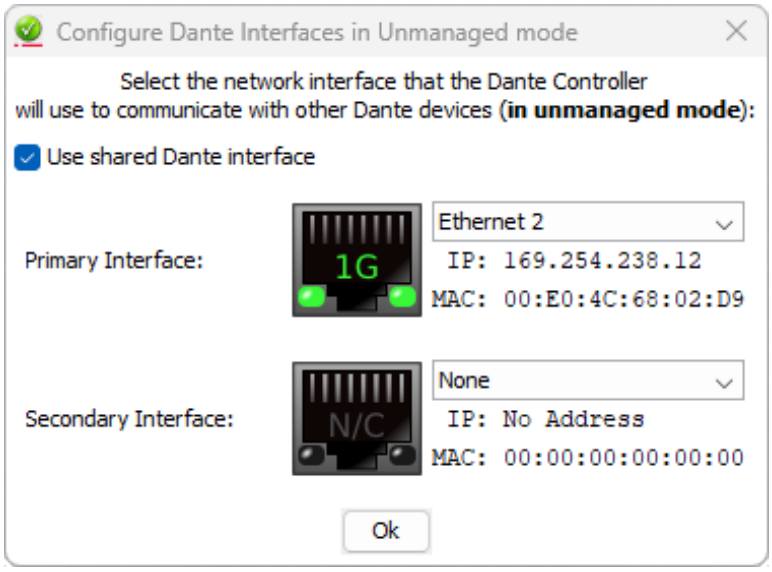
Download and install Dante Controller onto the computer you are using for the DAW software and recording.

(Note …in a bigger network, Dante Controller can be run on any computer on the network).

Once Dante Controller is installed you will need to select the network port you are using.

Press the ‘Choose a Dante Interface’ button  on the top menu bar.

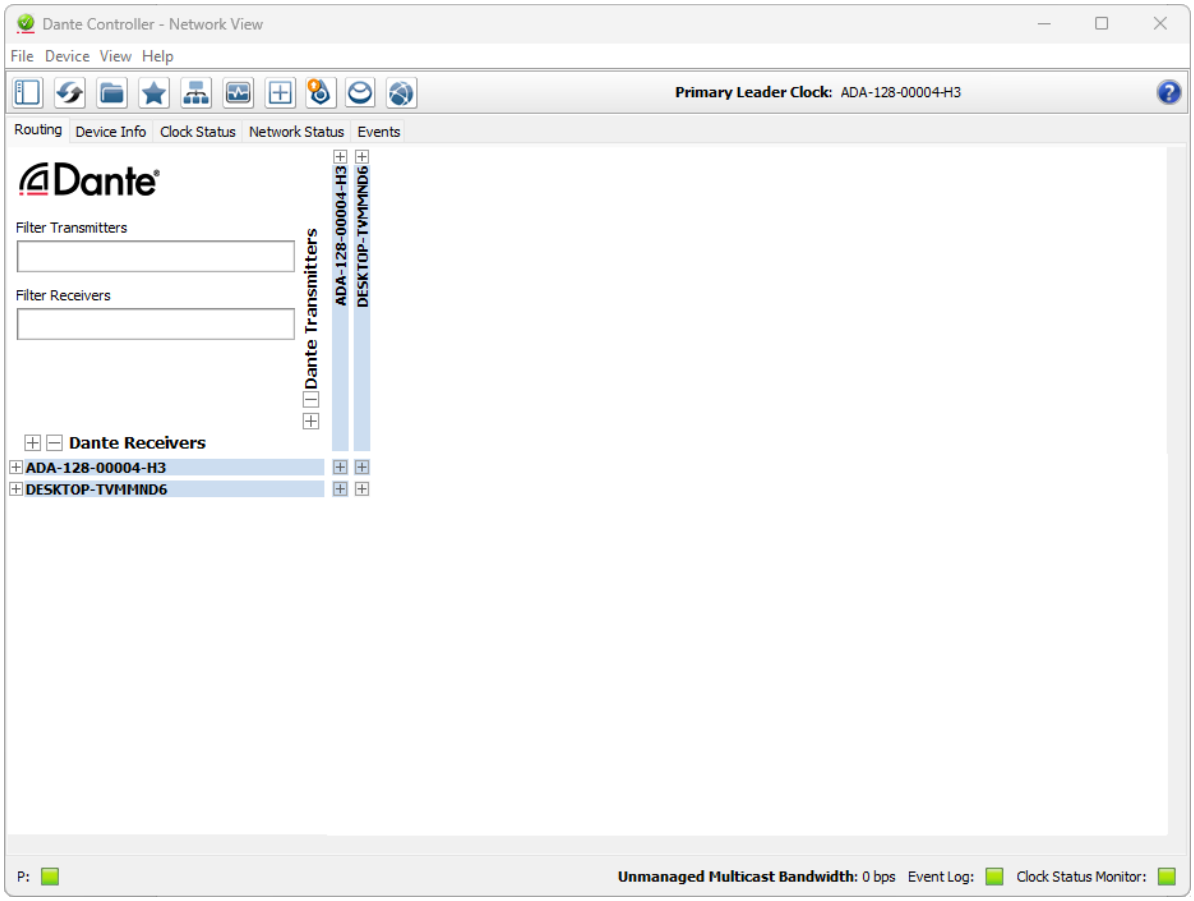
You’ll see a dialogue box like this:-



Select the computer's network port.

If you are using a Dante audio interface other than DVS, only the Audio interface and ADA-128 are on the network, and so, in order to use Dante Controller, you will need to connect the computer to this network, and adding a third device to this small 'network' will require a gigabit network switch.

Now if you look at the **Routing** tab of Dante Controller, you should shortly see something like this:-

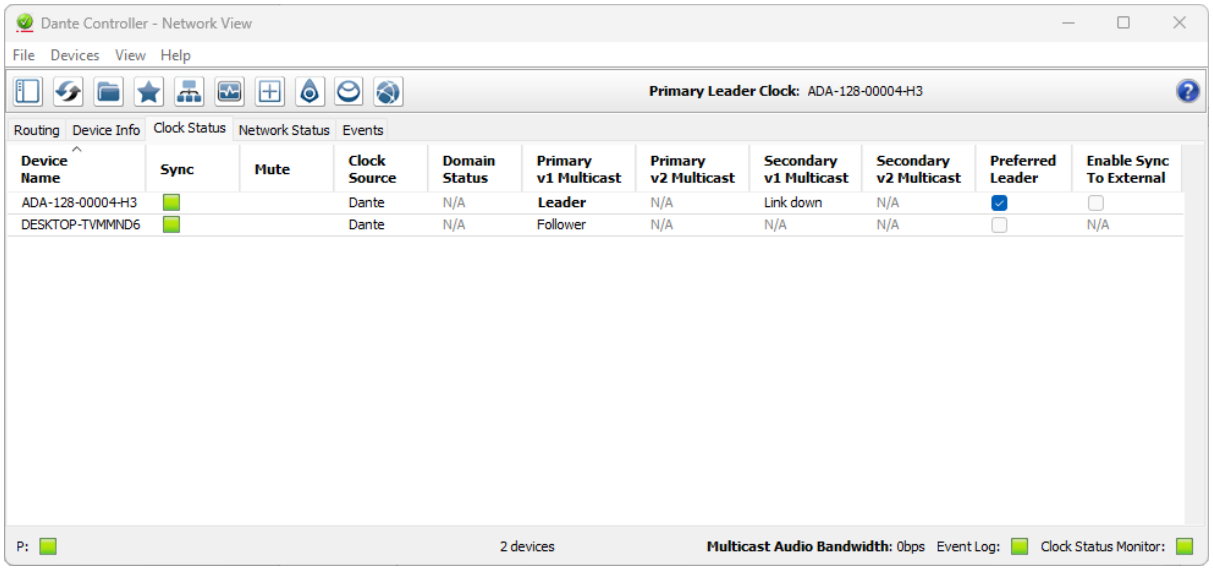


(You may need to press the 'Reload Device Information' button  to update the view of all the devices on the network).

In my example I have a single ADA-128 (with serial number and slot number of the Dante module in its description) plus 'DESKTOP-TVMMND6' which is the DVS.

Synchronisation

You should check the 'Clock Status' tab.



In this simple setup, the ADA-128 should be marked as 'Primary Leader Clock' (because it's the only device in this 2-device network that is capable of being clock leader – DVS can't do that). It's a good idea to set it to be 'Preferred Leader', then ADA-128 will always be the clock leader for Dante.

You may also need to check the ADA-128's own Clock setting page  so that ADA-128 is set to Internal clock (and the Dante module and all I/O modules are set to the same Clock Domain). See below in the Clocks and Synchronisation pages of this manual.

If any of the Sync LEDs or the Event Log and Clock Status Monitor in the bottom right corner are not green, this indicates an error has occurred (but it could have been at some time in the past). You should click on the LEDs to look at the list of errors, and to see if the error has cleared (the LED will go green again).

Check the DAW software and the ADA-128 are set to the same sample rate if necessary.

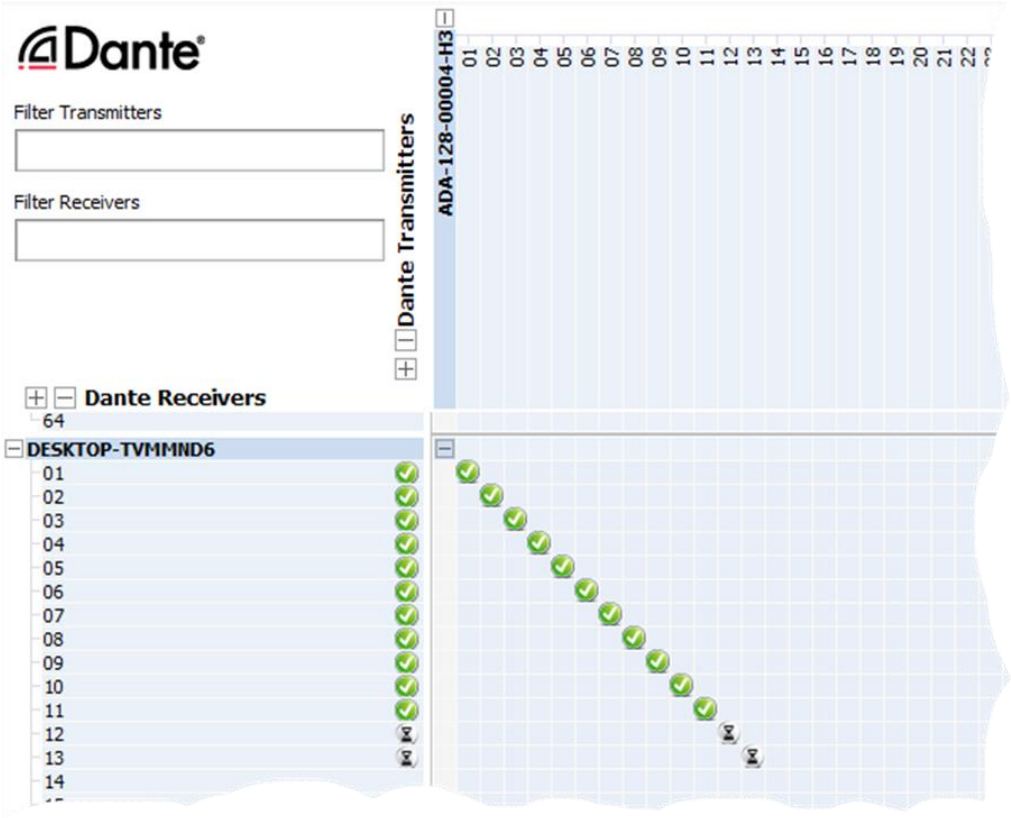
Note:- You may notice that this manual mostly uses the terms 'Leader' and 'Follower' to describe a device's standing in any clock regime, whereas historically they may have been known as 'Master'

and 'Slave'. In some software those terms are retained, and so this manual may use both. They mean the same.

Dante Routings

Routing connections in Dante are called '**Subscriptions**'.

You will now need to make subscriptions in the Dante network between the DVS driver and the ADA-128.



Firstly, we'll route the ADA-128 inputs into the DVS driver. For the sake of ease, every input number will route to the same input number on the DVS driver.

It's not unusual to find the concepts of 'Transmitter' and 'Receiver' a little difficult to reconcile with the idea of audio 'Inputs' and 'Outputs'. Transmit and Receive (hereafter abbreviated as TX and RX respectively) are always *with respect to the Dante network*.

In the earlier steps (within the ADA-128 control panel) we have already routed the ADA-128's audio inputs to its Dante module's 'Dante Outputs' i.e. 'Dante Transmitters'. And likewise, we routed the 'Dante Inputs' a.k.a. 'Dante Receivers' to Audio Outputs.

Firstly, in Dante Controller, from the perspective of the Dante network, we are connecting the ADA-128's Dante TX's to the DVS Dante RX's – Audio inputs into the DAW for recording.

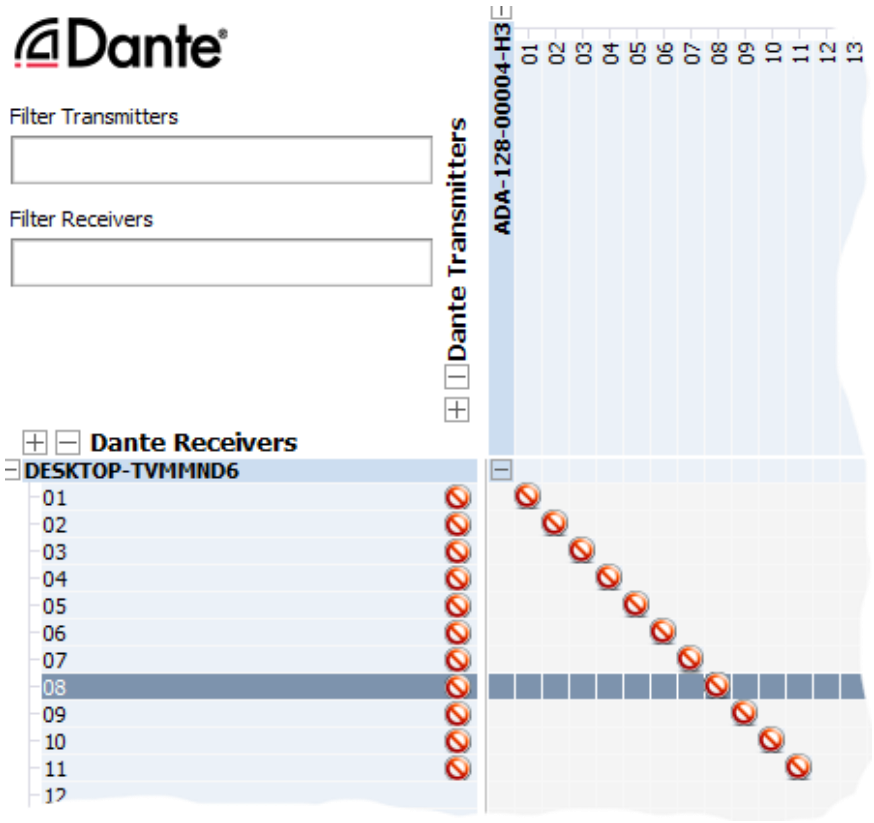
In the grid as shown partially above, click on the cross-point in the grid between ADA-128 TX 01 and DVS RX 01.

Each of these cross-points in the grid is a **Subscription.**

You will initially see an hourglass icon, as the Dante network 'thinks' about the subscription, and then this will change to a green tick as in the picture above.

If you wish to create routings between devices on the Dante network, they must be at the same sample rate, and if the cross-point does not display any icon you may see a message like…'cannot subscribe, sample rate mismatch'.

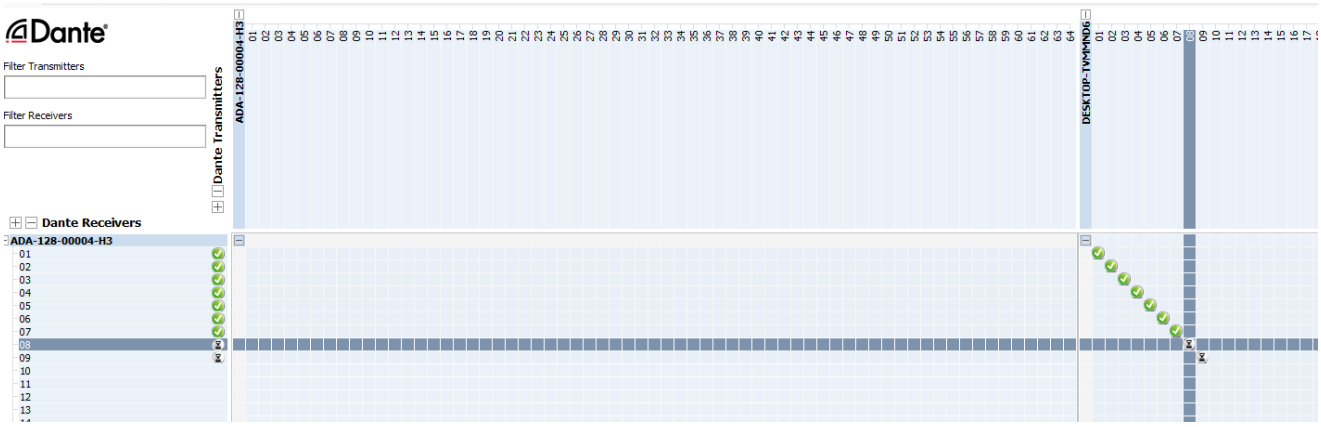
If any of the cross-points show a 'Stop' sign, then there has been a problem since you made the subscription.



The source of the issue will be shown if you hover the mouse over the cell. It can often be caused by a sample rate mismatch (…….'channel format … do not match').

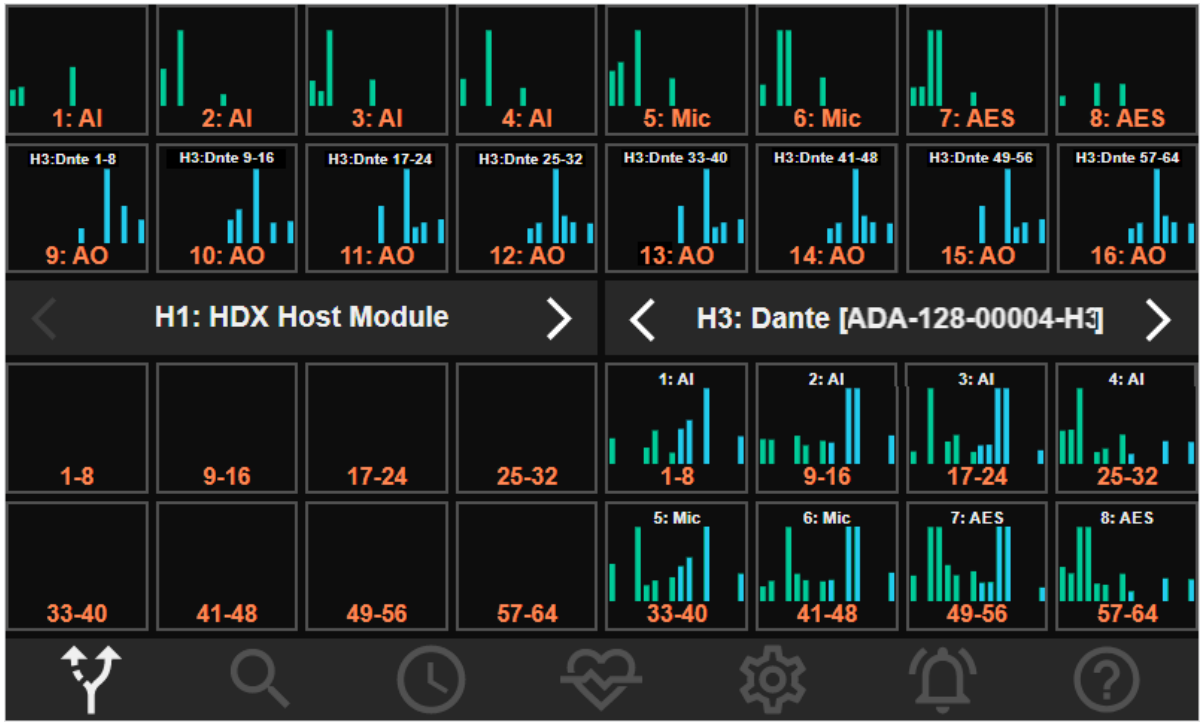
You will need to continue down the diagonal in this same part of the grid – ADA-128 TX vs. DVS RX – and connect as many channels as you need. If you're not using channels, it's not worth connecting them; it may only add a slight extra burden on the Dante network if you have inactive channels subscribed.

Now, if you also wish to send audio out of the DAW into the ADA-128 for output, you will need to do the same thing between the DVS TX and ADA-128 RX.



Which will route the DVS playback to ADA-128 outputs.

Having already made the routings within the ADA-128 control panel, if audio is playing from the DAW, in the ADA-128's Routing Page, you should now see it on the ADA-128's Output meters (blue). Likewise any audio on the ADA-128's Input meters (green) should appear at the DAW inputs.



Hoorah! Well done!

At this point you may wish to save and name an ADA-128 configuration within the  Settings page of the Control Panel, so this can be reloaded.

Dante Subscriptions are saved inside the devices in the network, and can also be saved in Dante Controller – go to the File menu and select 'Save Preset'.

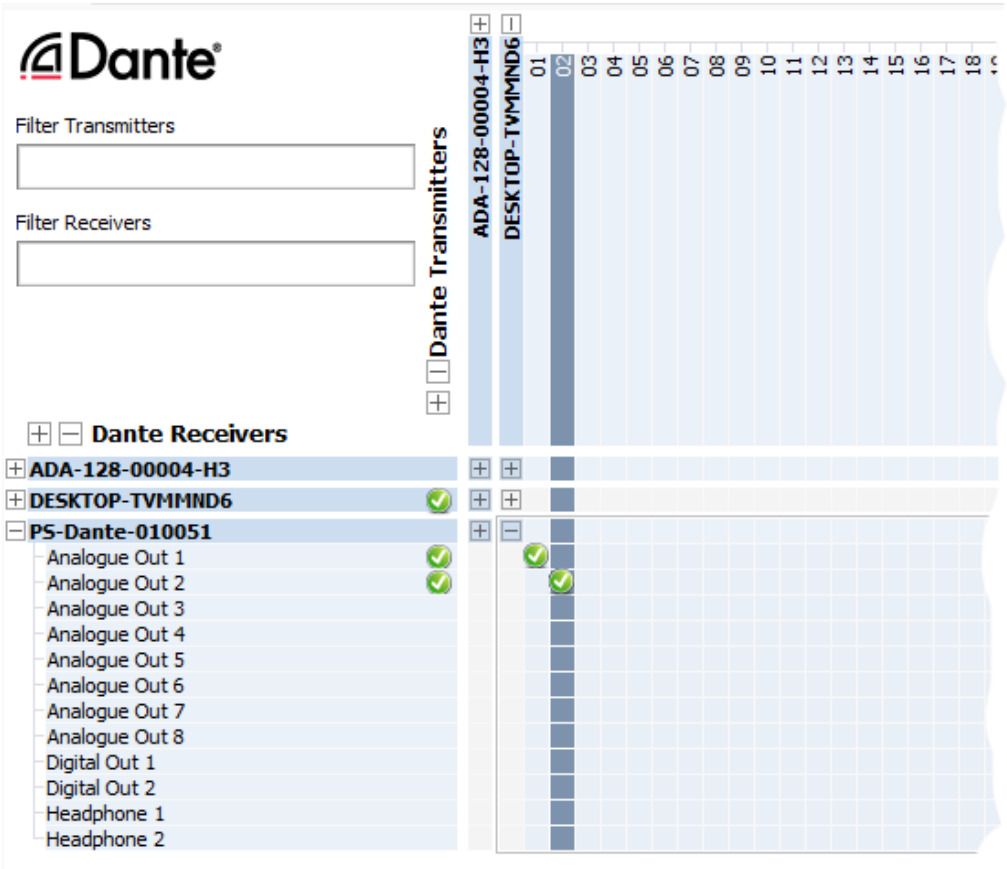
Note that Dante subscriptions are not saved with an ADA-128 Configuration – if you need to save both the Dante Routings and the ADA-128 Routings, you'll need to save them in Dante Controller and the ADA-128's Configurations page respectively.

Other Dante Devices

In the scenario where ADA-128 is on stage and you are using the computer some distance away, you may need to provide audio outputs in your Control Room. It's possible to route Dante Inputs and Outputs to different devices. In fact, a Dante Transmitter can be routed to *multiple* Receivers and onwards to multiple audio outputs, although the converse is not the case – you cannot route a single receiver from multiple transmitters, because there is no ability to mix multiple signals. Therefore, you could set up audio outputs to a smaller device or even the laptop audio outputs for monitoring close to the computer.

Of course, if you add further devices to your Dante network, your network connection is no longer one-to-one and so you will probably require a network switch / router.

This example shows a Prism Sound Atlas (PS-Dante-010051) being used for monitoring (with the ADA-128's Input subscriptions hidden behind a single green tick against the DVS RX.)



Expanding the Dante Network

Of course, this first example above is very much the simplest possibility. In the last section we expanded it slightly to add a second audio I/O unit, but more often you would use Dante to allow audio routings through an entire facility and across a much wider area involving more Dante-enabled equipment than merely a couple of audio devices.

The steps above can be applied to much more complex scenarios, however considerations of some aspects such as Clocking and network performance will need particular attention as the network becomes bigger.

In essence, whatever the scenario, the steps are similar: -

1. Connect the Dante network using standard network cables, switches etc.
2. Consideration of clocking regimes - create a Primary Leader Clock.
3. Check sync and sample rates for devices that need to be connected.
4. Create channel routings within the ADA-128.
5. Make subscriptions using the Dante Controller software.

Connecting the Dante Network

Let's look at the network connections in more detail.

Every device on the Dante Network – Audio Devices, Computers, PCIe cards etc. - must be connected by CAT5e or CAT6 cables. Two units could be connected directly as above, but if you're connecting more than two devices, you will need to connect everything using one or more Gigabit network switches.

It's important to realise that Dante utilises *standard off-the-shelf* networking, and supports both managed and unmanaged switches. In general, most Dante equipment (including ADA-128) has 1 gigabit speed ports, and you should use switches that are 1 Gigabit or faster.

Dante does not support wireless network connections (aside from less time-critical control signals such as those from Dante Controller).

While Dante can work on a wide range of networks, robust operation will depend on the channel count used and sample rates and bit depth (doubling the sample rate doubles the data rate), the level of traffic on the network from other devices, and the capabilities of the network equipment.

It would be possible to operate any kind of data across the network alongside the Dante data, but to maintain high priority audio performance we would recommend using dedicated networks for audio traffic where possible.

For best Dante operation, it's recommended that a network **switch** should have the following features:-

- Gigabit (1000 Mbps)
- Managed
- Non-blocking
- Quality of Service (QoS)
- The ability to disable Energy Efficient Ethernet, "EEE", Green Ethernet, 802.3az

The Audinate site has many resources on their Learning pages to help you configure your network and switches for the most reliable operation.

For example:

Audinate offers a free Certification Program (which is highly recommended), and many of the Training Videos are freely available without enrolling.

Part 1 of the Certification program includes a video about Network Connections and another which goes further - 'Dante is Standard networking' - which also has suggestions about the sort of network equipment you may be looking for. Part 2 of the Certification program goes deeper into what you would need for a larger network – bandwidth management, optimisations etc.

A Managed Switch Tutorial gives an example of how to setup a managed switch for Quality of Service (QoS)

Dante System Designer

Audinate have a new tool which may be useful to help you design your Dante network and produce drawings of the network connections – Dante System Designer .

Dante Domain Manager

Dante Domain Manager (DDM) is not necessary for managing a Dante network, but DDM gives you Enterprise IT-level management of security, user authentication, logging and administration tools for your network, and works in conjunction with Dante Controller.

See Audinate's Dante Domain Manager page for information.

The DDM Overview video on that page gives an introduction.

ADA-128 is Dante Domain Manager compatible.

Clocking & Synchronisation under Dante

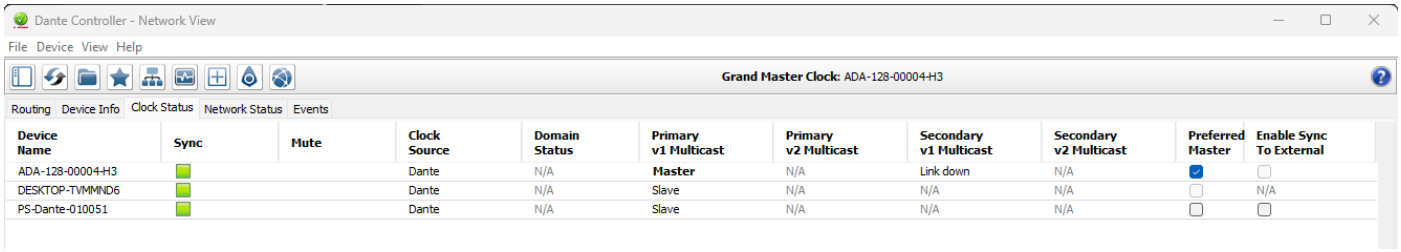
It has been mentioned earlier that devices on the Dante network must be synchronised, and that the usual (and simplest) method is to synchronise them automatically via the Dante network.

The Dante network itself will choose a device to be 'Primary Leader', making all other devices 'Followers' of the clock of this 'Primary Leader'.

It would be possible to lock one (and only one) device on the network to an external clock (i.e. a station reference Clock), and if that were the case, then the externally-locked device must be the Dante Primary Leader.

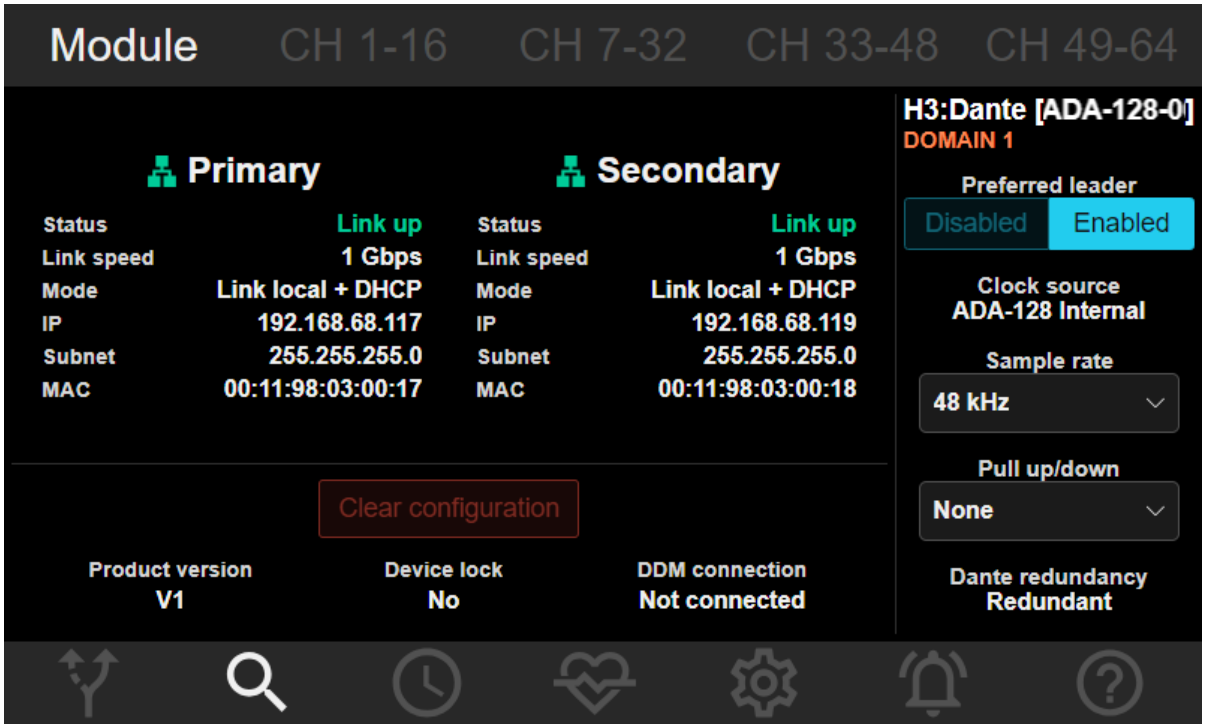
It's possible to *influence* the Dante network into its choice of Primary Leader, by nominating a device as being a 'Preferred Leader'.

You can view the status of every device's Clock in the **Clock Status** tab of Dante Controller:-



Devices will show a green LED when locked, and will display **Leader** or **Follower** on each Multicast. The 'Primary Leader' is named along the top bar. There is a tick box for 'Preferred Leader'. The Dante network will choose the Preferred Leader unless there are multiple Preferred Leaders, and in that case, Dante will choose one of them (is that not necessarily the one you want? Therefore, you should check the setting of this across all your devices.)

'**Preferred Leader**' can also be selected in the ADA-128's own Control Panel in the Dante module's Inspect page (described in detail later.)



Near the top of the right side is a button – Preferred Leader – which can be enabled or disabled.

An ADA-128 clock domain can be used to provide clock synchronization to the Dante network, or alternatively an ADA-128 clock domain can be synchronized to the recovered clock from a Dante module.

In practice you will set the ADA-128's Sync settings in one of three ways:-

1. ADA-128 to Internal Clock and Preferred Leader.
   Set the Clock Domain that the ADA-128's Dante module is a member of to Internal Clock. In the Dante Inspect Page, set ADA-128 to be Preferred Leader.
   In Dante Controller, the ADA-128 should be shown as the 'Primary Leader Clock'. If not, then you have some other device marked as Preferred Leader and will need to manually resolve the conflict.
2. ADA-128 set to External Clock (WCK or DARS, or i.e. an AES input) and Preferred Leader.
   ADA-128 can only be clocked externally if it is the Dante network's Primary Leader Clock.
   In a Dante network it's not possible to clock all devices externally – the Primary Leader may be externally clocked, and then everything else should be clocked from the Dante network's PTP clock.
3. ADA-128 set so that the Dante Module is the Sync Source for the Domain.
   In this situation, ADA-128 uses the PTP clock supplied by the Dante network. ADA-128 may or may not be Primary Leader, depending on your choice.

More about Dante Controller

As has been suggested earlier, the Dante Controller software gives you control of the majority of the Dante settings parameters for all your Dante devices, as well as control over the Routings / Subscriptions that connect your devices through the network.

Its important features include:-

- Viewing all Dante devices and their channels on the network
- View and control of clocking of all devices.
- Control/change clock settings, sample rates, and encoding (bit rate) of devices.
- Routing, a.k.a. Subscription connections between devices.
- Event logs.
- Viewing TX and RX bandwidth on devices.
- View and customise latency settings and stats.
- Create multicast flows.
- Lock / unlock devices.

Audinate's Dante Controller pages offer further information, and its current version's User Guide is linked on that page.

Unicast and Multicast

A normal subscription routing in Dante Controller is one to one. It's possible to route the same Dante Transmitter to multiple Receivers, however if you are doing this regularly or with large numbers of channels, it's more efficient and less burden on the Transmitter to use a '**Multicast flow**', whereby the audio distribution is controlled by the network, and the Transmitter only transmits a single flow.

A step by step guide to create multicast flows is described in the Dante Controller User Guide … MultiCast Transmit Flow Configuration

Audinate have a video tutorial on Unicast & Multicast flows in one of their Certification videos.

ADA-128 supports 16 channels per multicast flow.

Redundancy Mode

The 'Dream' ADA-128's Dante Host module supports network redundancy whereby two copies of all of the Dante audio, clocking and control data are sent across two separate networks. If one network

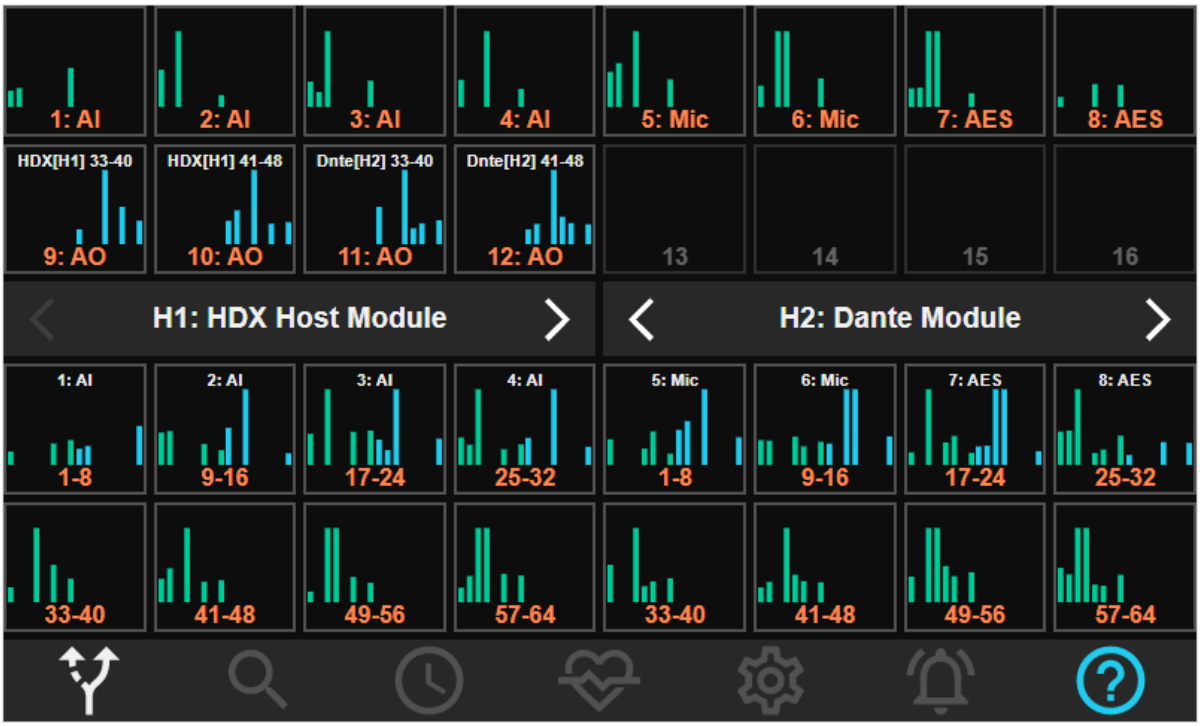
stops working for any reason (i.e. because of a broken cable or some other equipment in the path) audio will not stop flowing.

That's why ADA-128's Dante Host module includes two connections for network cables – marked 'Primary' and 'Secondary' – connecting both enables redundancy.

ADA-128's Dante Redundancy setting defaults to 'Redundant' (it's expected to use fairly large numbers of channels) but can be changed to 'Switched' mode using Dante Controller if required (see below for details).

Software Reference

Control panel / GUI



The functions and configurations of the 'Dream' ADA-128 are set using either ... a) the **touch display** on the front panel of the unit or b) **remote control inside a web browser** by some other device – a computer, tablet or smart-phone – that is attached to the same network domain as the ADA-128. The controls and layout are the same on the front panel and browser, so there is no new learning curve, the controls can be adjusted from different locations & multiple devices with a browser.

Front Panel Display

The front panel display gives you access to all functions of the ADA-128, can display the status of the unit, and can show audio metering for each of the audio inputs and outputs.

Control is by pressing buttons and areas of the screen with your finger. There is always a bar along the bottom of the display which gives you instant access to the seven main pages.

The configuration of the whole unit can be saved and reloaded in the Settings page  .

The functions of the control panel are described in detail in the Control Panel Pages section of this manual.

Remote Control over a network using a browser

Although almost all* of the settings for the ADA-128 can be accessed through the front panel touch display, it's *very* useful to set up the Remote Control option – for instance if the unit is in a different location from the operator. Even if the unit is by the side of the operator, the remote control may have advantages (i.e. it can show more pages at once).

(*The only features that are not available through the front panel are ‘maintenance’ features that require some sort of uploading or downloading of a file and need a remote computer to access the files – firmware updating and configuration upload/download/backup.)

How to set up the browser

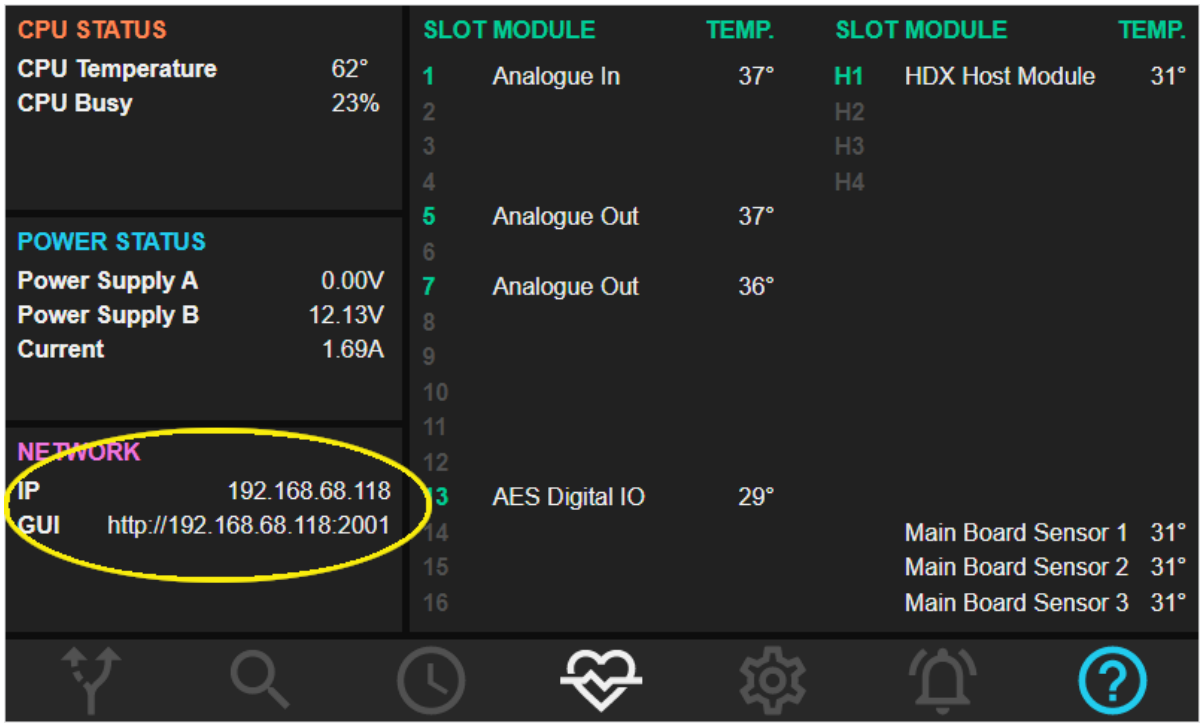
The ADA-128 must be connected to the same network that your controlling device is connected to. There is no wireless module for the ADA-128, so its network connection must use an ethernet cable plugged into the network socket in the CPU module on the rear left side of the unit.

The device running the browser can of course be connected wirelessly to the same network.

How to find out the ADA-128's IP address?

You will need to know the ADA-128's IP address in order to remote control it using a browser.

1. The ADA-128's IP address is shown in the Status page within the Control Panel :-



   This shows the IP address itself and the address to be used in the browser ('GUI')
   (The IP Address and other network settings can also be seen and edited in the **Settings page** in its **System** tab.)

2. Open a web browser on your device. Into the address bar of the browser type the 'GUI' address displayed, (which is the IP address followed by :2001 - the port being used) i.e.…. **http://192.168.68.118:2001**

   The browser will show a 'Connecting to Unit' progress timer, and then after a few seconds should display the home 'Routing' page of the control panel.
   Each browser tab can display a different page, and different controls from the front panel display (and so you could open more browsers to see multiple pages at the same time).

   We suggest that you save the shortcut to your browser to make it easier to access the remote control again.

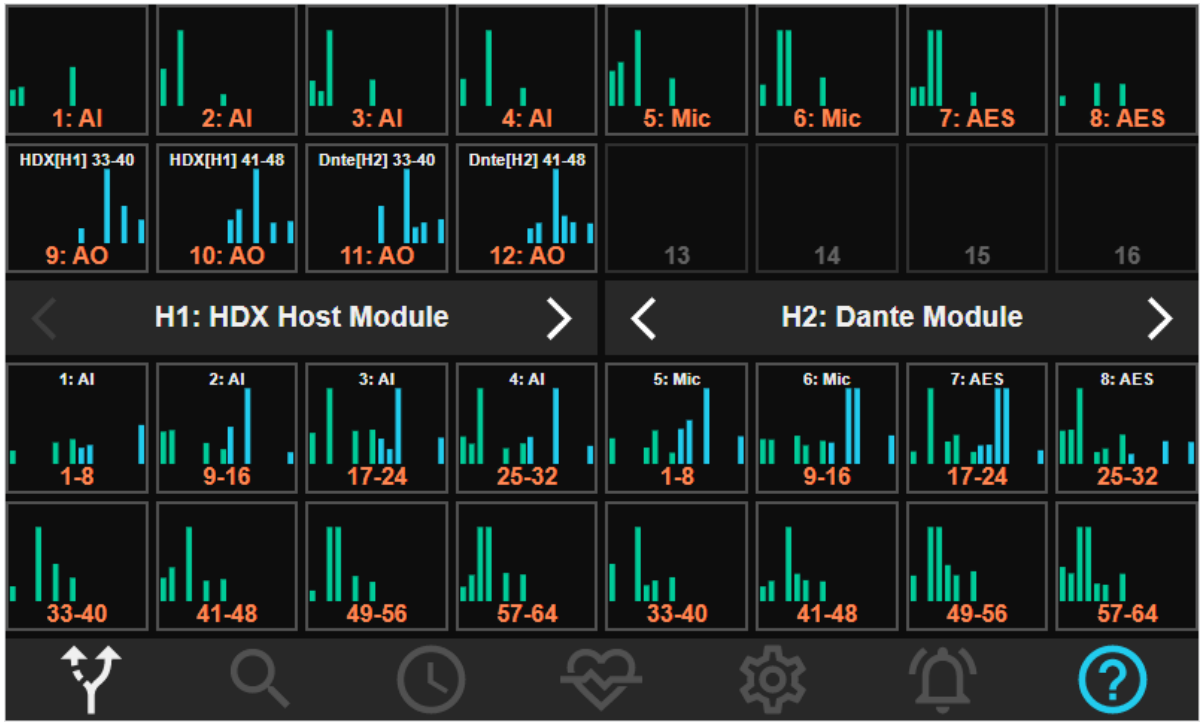
Note:- Your computer network will require a DHCP server. Depending on your network's DHCP support you may be able to open the remote control by using the ADA-128's Hostname (as displayed in the Settings / System page). For example, using the default Hostname of 'dream128', you may be able use the address '**dream128:2001**' in your browser to view the control panel. Another possibility

which makes it a little simpler for the computer (and so the device might find the ADA-128 more quickly) would be to type…. '**dream128.local:2001**'.

The Remote Control display looks almost identical to the front panel screen, but is shown inside the browser with a black **Prism Sound** border.

Control Panel Pages

Default screen



The default screen is the Routing page. The **icons along the bottom** will take you to other pages for control of:-

Routing – for making connections between I/O and Host modules

Inspect – Metering and control of functions, filters and various parameters.

Synchronisation – for setting up sync.

Status – to display the temperature of the CPU and modules & power rail voltages.

Settings – for saving Configurations, and viewing / changing system settings.

Alarms – reporting any errors, i.e. clock or temperature

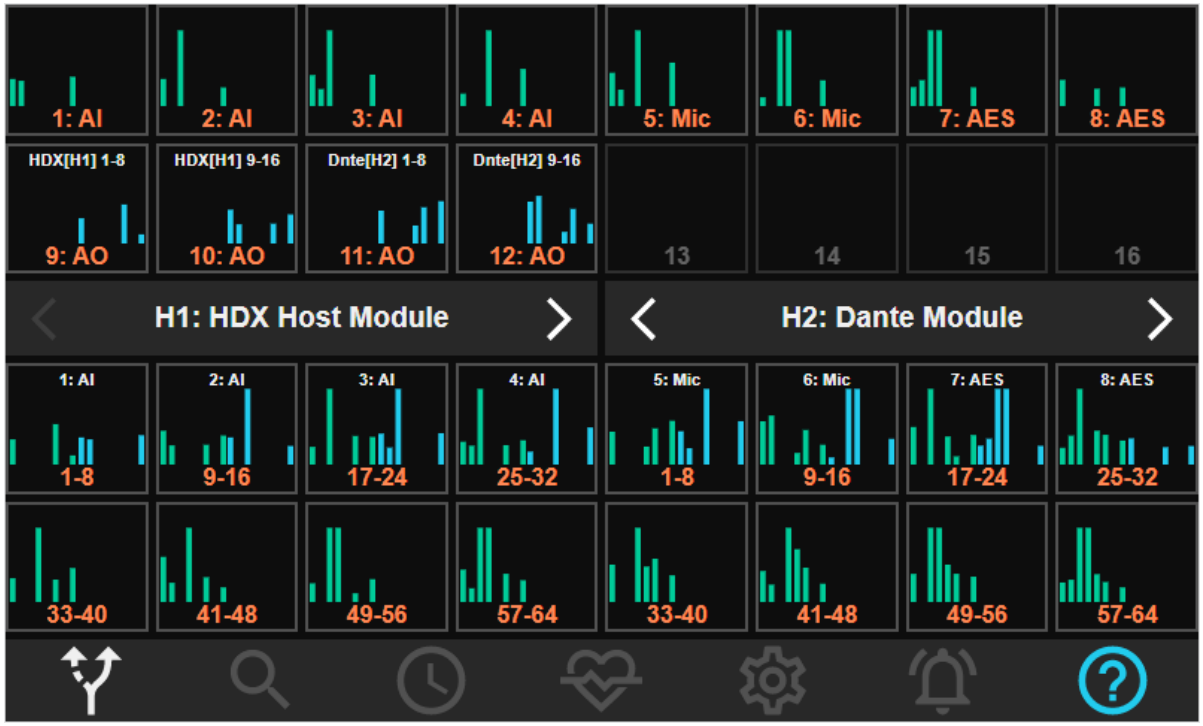
Help – Context sensitive help popups.

The control panel is designed to be used on the unit's own front panel, as well as in a browser on a computer, tablet or phone.

There is a 'hidden', Quick Access feature in the default Routing page in software from 1.5.1 onwards, in that a 'long' press on a module's tile will take you not to the routing mechanism, but to the

module's Inspect page. A 'long' press can be with a mouse or a finger on a tablet, or a finger in the front panel display - just hold the button/finger down and don't release it until the Inspect screen appears.

The Routing Page



Description

The top half of the screen has two rows of 8 tiles to represent up to 16 I/O modules. These are numbered as per the slot numbers in the hardware unit.

A central bar shows the names of two of the possible four Host modules. Left/right arrows allow you to select and display other host modules (if fitted).

Two further rows of tiles in the bottom half of the screen represent channels on the two displayed Host modules – eight sets of tiles on each side.

The bottom toolbar has icons for other control panel pages, or shows a 'hint' and Tick/Cross buttons for confirming or cancelling actions when a new routing is in progress.

Each of the 32 tiles can display meters of audio activity. GREEN meters are for INPUTS, BLUE meters are for OUTPUTS. The meters will display yellow and red at the top of their range (matching the colours in the Inspect pages), and have momentary peak hold markers.

Each tile has a short description in coloured text at the bottom of the tile alongside the module's slot number – i.e., in the I/O module section, AI = Analogue Input, AO= Analogue Output, MIC= Mic/Line Input, AES=AES Input and Output. A channel number range in the Host section refers to a set of 8 channels of that Host Module. The colour of the text here tells you which of the four clock domains the I/O or Host module is associated with (see Clocking below).

When channels are routed, tiles representing Outputs will have white text along the top of the tile to show which Input that Output is routed from.

Note that some I/O modules are only Inputs (i.e., an Analogue Input or Microphone / Line module), some are only Outputs (i.e., an Analogue output module), and some are *both* Input and Output (i.e., AES module).

Routings can be made in blocks of 8 channels – each tile represents 8 channels. Where a module has both Inputs *and* Outputs, the tile works for both the 8 Inputs and the 8 Outputs (but you would perform two separate routing sequences to route both In and & Out).

Host modules are always *both* Input and Output.

The meters inside each tile are arranged to show eight green (In) channel meters on the left, and eight blue (Out) channels on the right, (and thus single direction I/O modules will only have one side populated, whereas, i.e. Host modules and AES modules show both sets of meters.)

The Routing procedure.

The order of routing is:-

a) Click an input (or *Source* of Audio)
b) Click the output (or *Destination*) to which you want it to be routed
c) Click OK on the OK button which appears on the toolbar.

Sources may be routed to multiple destinations – i.e. the same audio inputs can be made to appear as inputs of two different Hosts – i.e. Pro Tools and Dante. Of course, they would need to be on the same Clock Domain, as a module cannot operate on multiple domains.

Destinations cannot be routed from multiple Sources. This would require some mixing of audio signals which is (currently) not possible.

You can route from an Input on one Host module to an Output on another Host, and also directly between Input and Output I/O modules.

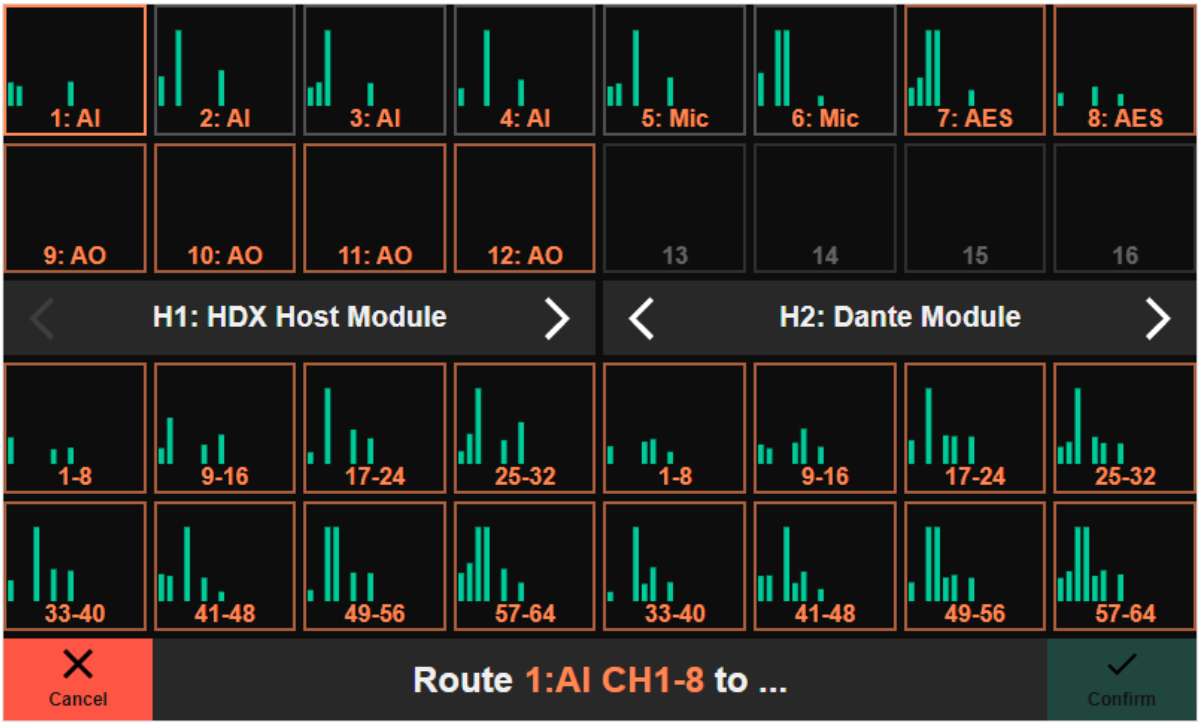
As mentioned above, routings are always in blocks of 8 channels.

Note:- a 'long' press on a module's tile will not take you to the routing mechanism, but is designed to give you Quick Access to the module's Inspect page. A 'long' press can be with a mouse or a finger on a remote tablet, or a finger in the front panel display - just hold the button/finger down and don't release it until the Inspect screen appears. You can use the 'long' press, even if you've just made a 'short' click and initiated a routing change; the routing will be abandoned and you'll open the module's Inspect page.

Routing - Step-by-step

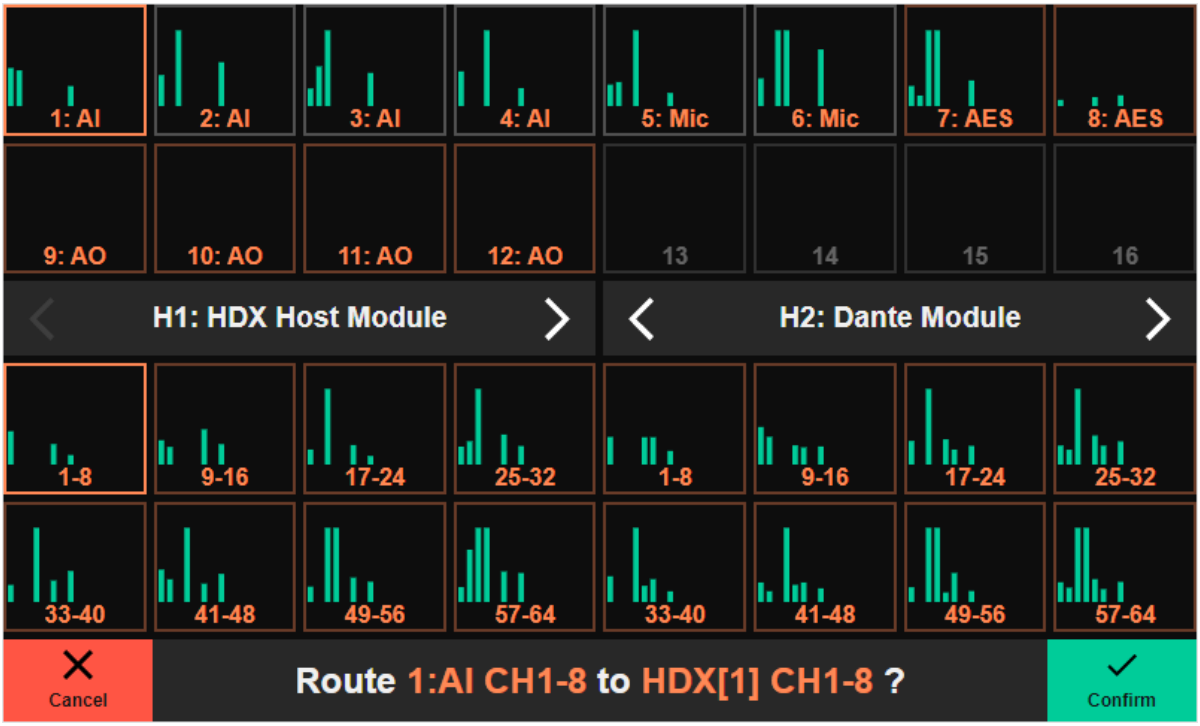
1. Decide which Input and Output you want to connect with a routing.

2. Press the tile for the Input (**an Input must always be chosen first** otherwise an error will be shown).



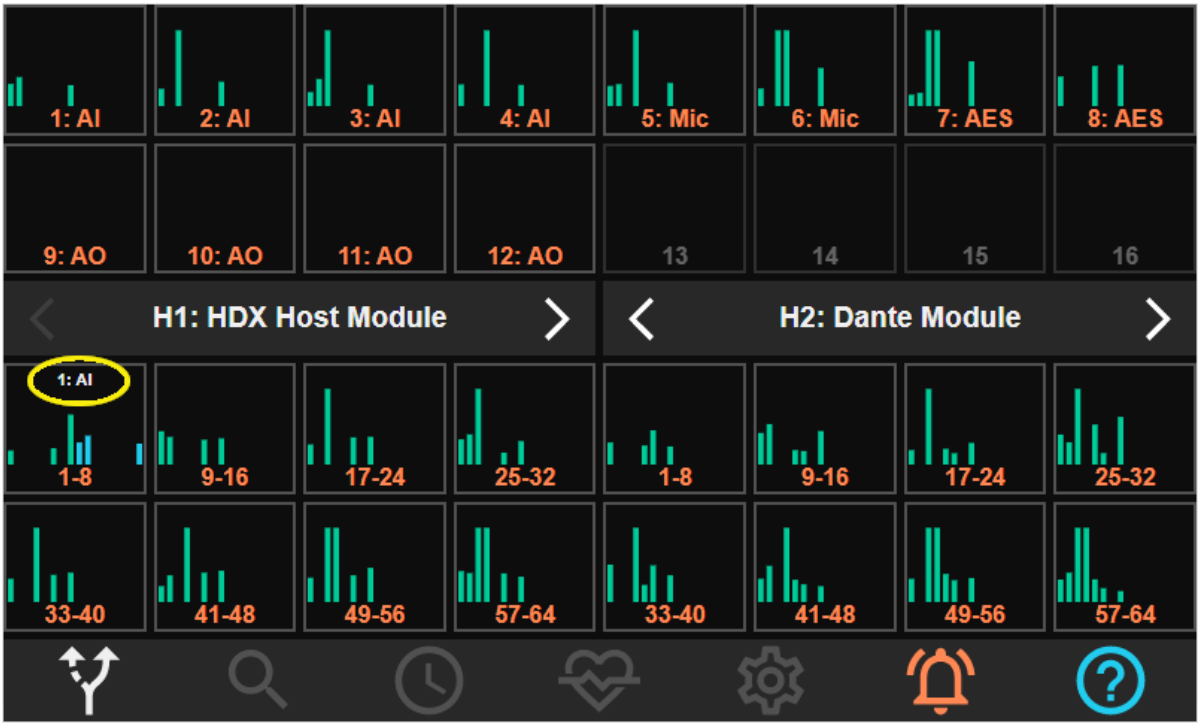
The Input selected is outlined. The outline of any other modules that can provide a viable routing link will flash in the same colour as the Input's outline (orange in this case, which tells you the Input and the flashing modules are members of the first clock domain). Notice now that the bottom bar shows a prompt containing the next instructions – from here you can either 'select destination' or press the red X to abort the routing.

3. Now press the tile for the Output.

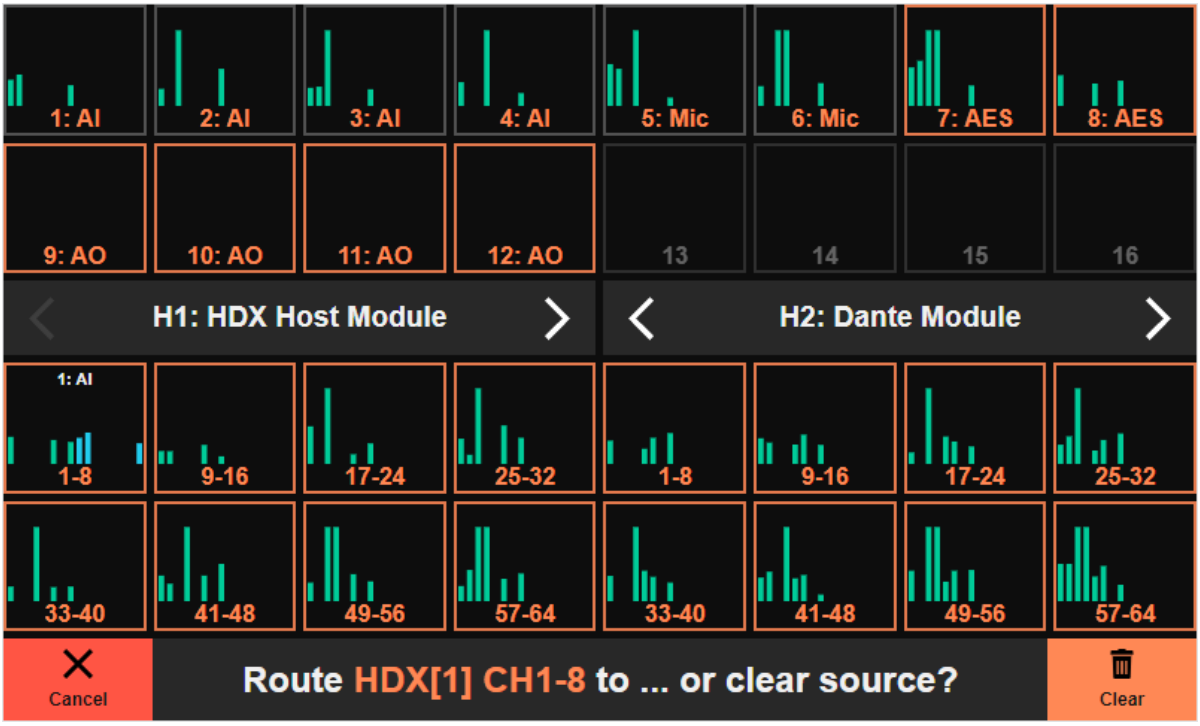


In this case I am routing my AI (Analogue Input 1 module) to channels 1 to 8 of my HDX Host module. The prompt on the bottom bar changes to show the tick box in green and describes the routing you are about to confirm. Press the green tick to Confirm and complete the routing (or red X to cancel).

4. On pressing the green tick, the bottom bar reverts to show the toolbar's normal state, and the new routing is shown – '1:AI' in white at the top of the HDX Host's CH 1-8 tells you which input the HDX Host CH 1-8 is receiving from, and the HDX Host channels 1-8 are now showing blue meters alongside the green Input meters.



Note that you can **clear a routing** by pressing the Output in question …



The bottom bar shows a new prompt. In this case pressing the pale orange “Clear” button on the right now will clear the routing. In this example HDX 1-8 is both an Output *and* an Input, and so you could continue to route HDX 1-8’s Input to another Output by clicking on a different Output tile.

Clock domains

Tiles must be associated with the same clock domain in order to complete a routing – notice that when you are selecting the Output tile to complete the routing, those that are viable for selection will flash in the clock domain's colour. (See clocking below).

Saving Routings

Once you have created some routings for your application, it would be a good idea to save a **Configuration**, which will allow you to reload the Routings (along with other settings for Clocking, Level Setups etc. – i.e. the *entire* setup of the ADA-128) at a later time.

Configurations and saving and reloading them are covered later on in this guide.

Remote Control Loading of Routings

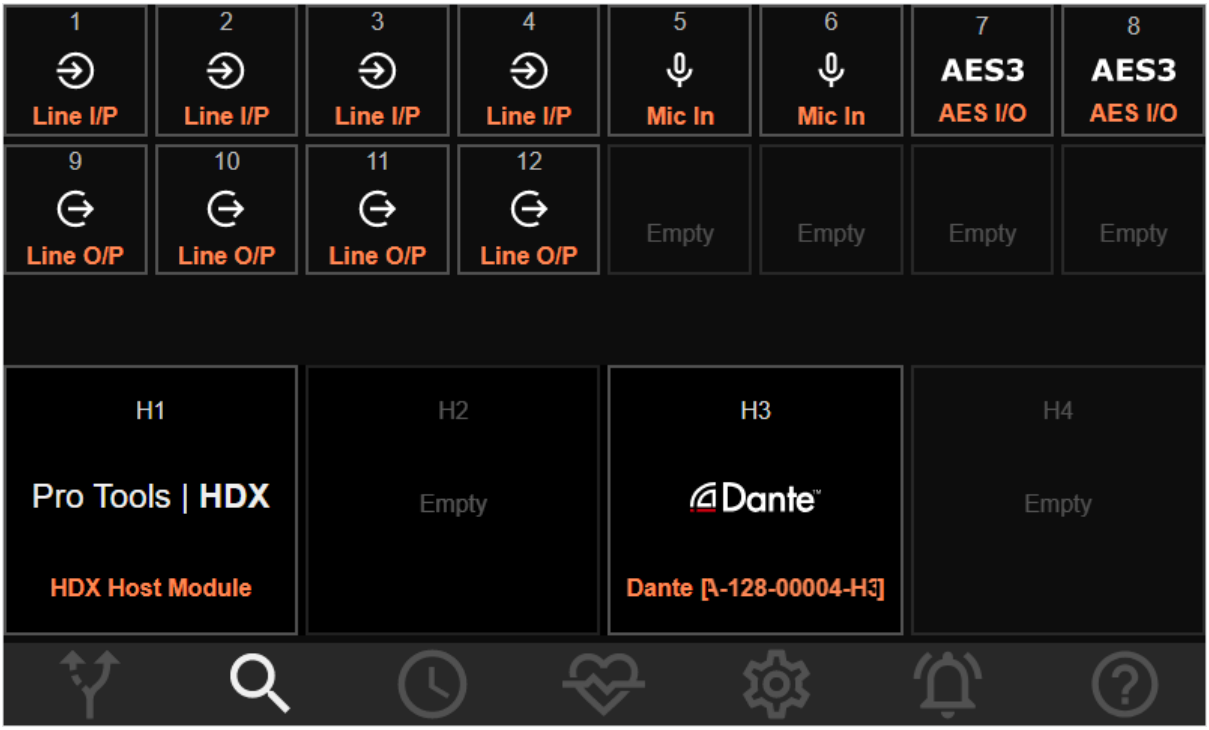
The Loading of the Routings in a Configuration can be controlled by a WebSocket command. It's possible to use third-party controllers, along with suitable software to send these WebSocket commands. Thus, it would be possible to set up a controller with buttons for different Routings to allow them to be switched instantly. Similarly, an 'Emergency' state, which perhaps clears all routings, could be set up in order to instantly clear routings and provide a mute state.

Details for setting up Remote Control of routing changes are in Appendix D at the back of this manual.

The Inspect Page

The Inspect Pages give you control of all the functions of each of the modules – i.e. levels, filters, digital formats and other features, and will also display full-sized audio meters for incoming and/or outgoing audio on those modules.

On first selecting Inspect, you are shown a page with a similar layout to the routing page but with icons in place of the meters. There's a tile for each I/O and Host Module.



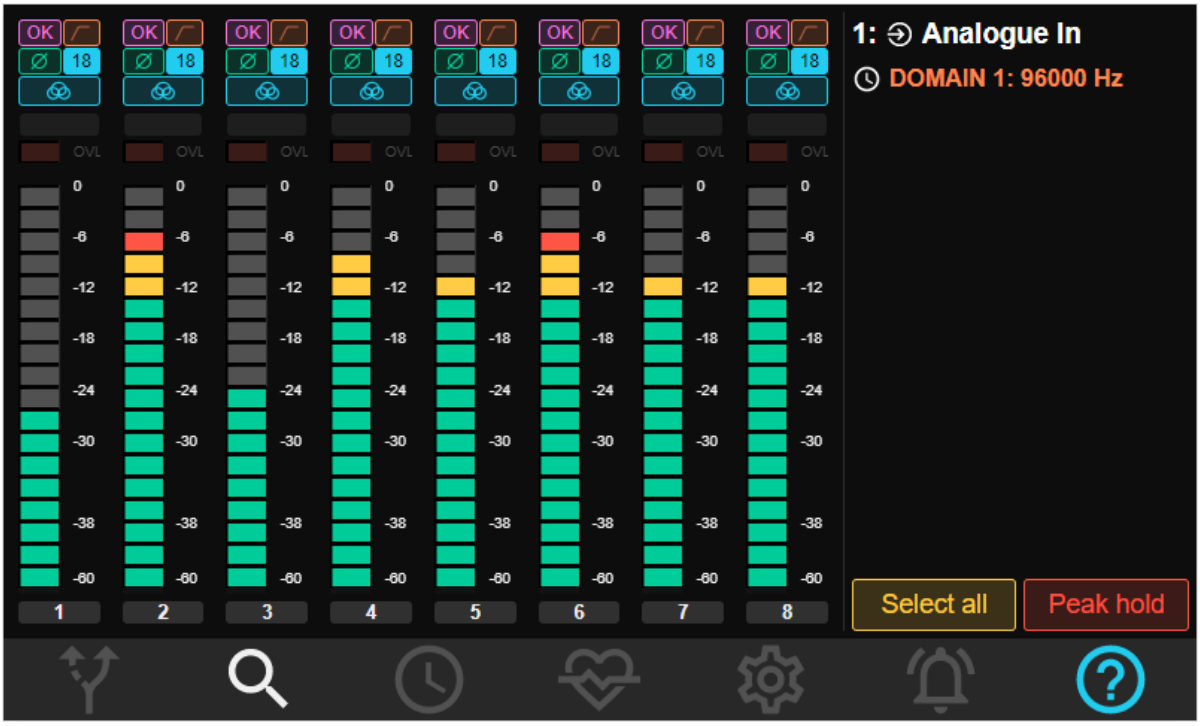
Click on any tile to display the Inspect pages for that module.

Note:- there is a 'hidden' Quick Access feature to show you the Inspect pages from the Default Routing page - a 'long' press on a module's Routing tile will take you to the module's Inspect page. A 'long' press can be with a mouse or a finger on a remote tablet, or a finger in the front panel display - just hold the button/finger down and don't release it until the Inspect screen appears.

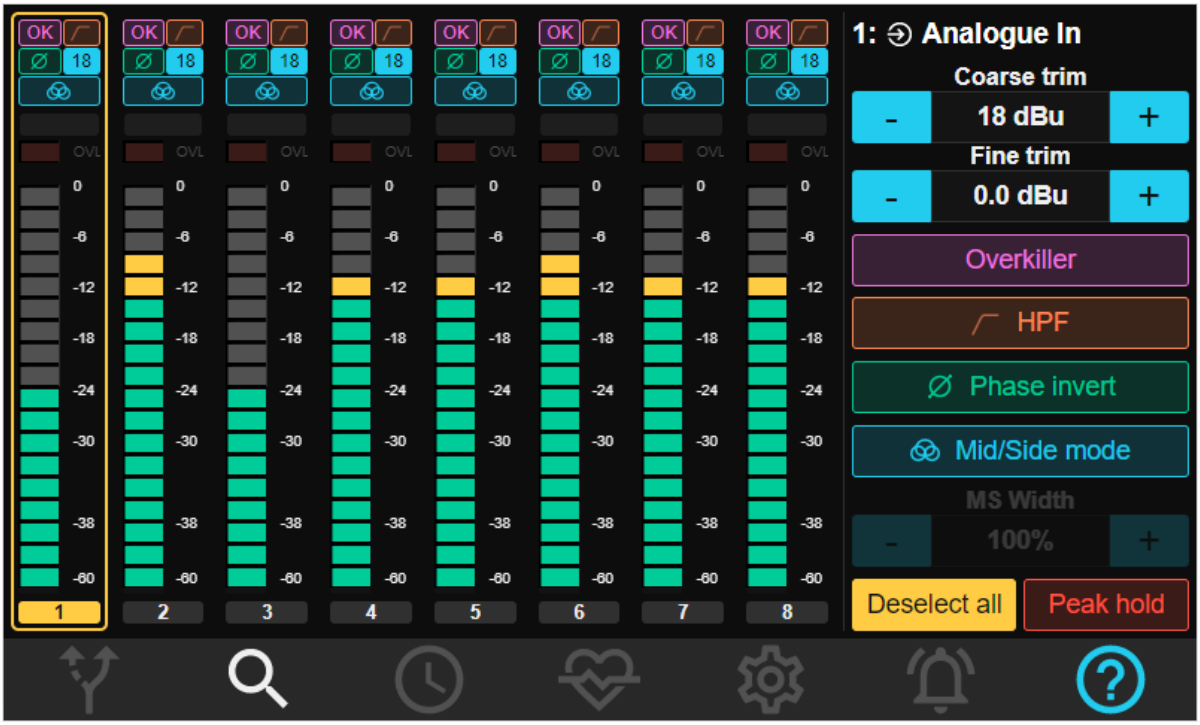
Parameters that are displayed and can be adjusted in the Inspect pages are dependent on the module in question – each modules' parameters are described in the following I/O Modules section.

Selected Channels View

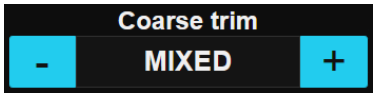
In general, when you first open a module's Inspect page, you will be offered *global,* module-wide settings to the right side of the channel meters. i.e. for an Analogue Line Input module….



You can select an individual channel by clicking on its number or anywhere in the area of its ppm strip. This then shows 'Selected Channels View' which reveals more controls on the right hand side of Inspect to allow you to change some settings for 'Selected' or individual channels.



Clicking on another channel will select the new channel 'additively' – i.e. the first channel remains selected. This way you can apply settings to multiple selected channels. Clicking on a selected channel deselects it. Selected channels are outlined in yellow and their 'number' button at the bottom is lit in yellow.



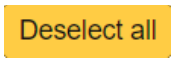
If the selected channels have different values for any parameters, the values on the right side will be reported as 'MIXED'.

Where a parameter is enabled or disabled differently for every selected channel - the button on the right side will show 'cross-hatch' stripes. For example, in the picture above, Phase Invert (the green 'LED') is enabled on channel 1, but disabled on channel 3.

In this situation, clicking on the button will now disable the parameter for all selected channels, and clicking it again would enable it for all channels.

Select All / Deselect All

In addition, on the first, 'global' Inspect page, there is a '**Select All**' button which allows you to apply the 'individual' settings to every channel of the module.



When one or more channels are selected, the '**Deselect All**' button switches back to the first page to show you the global module settings.

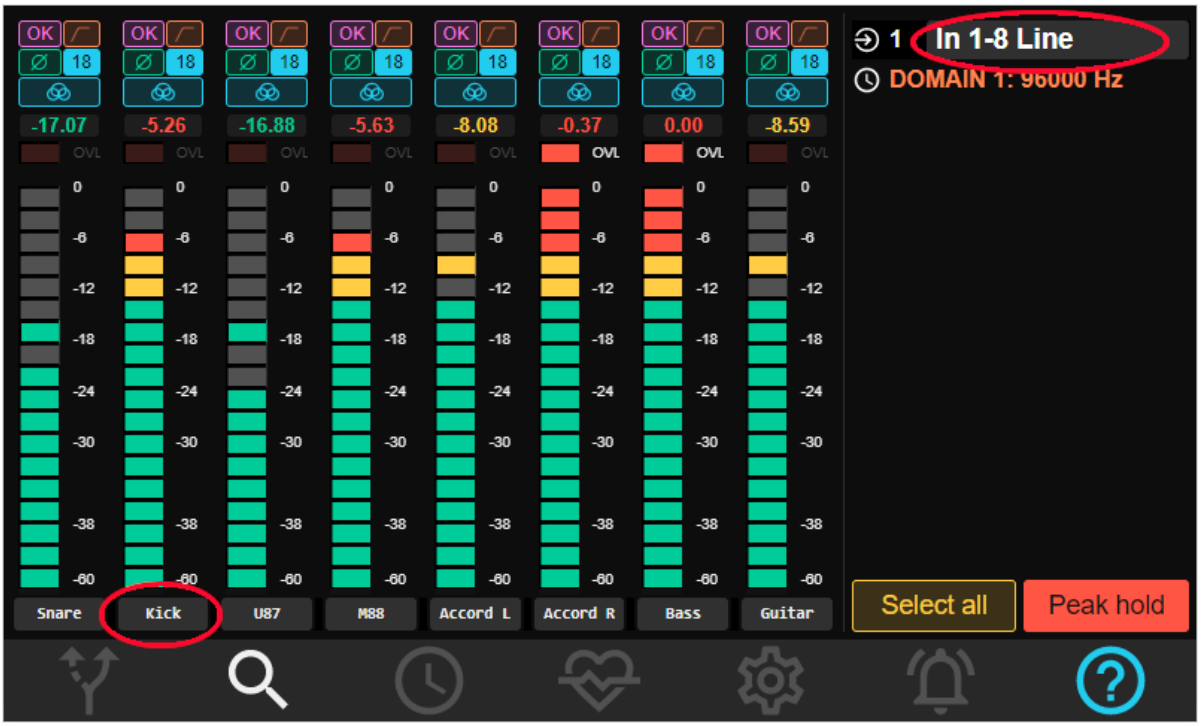
Clicking the magnifying glass at the bottom of the screen takes you back to the Inspect tile view to allow you to choose a different module.

Channel & Module Names

By default channels are numbered at the bottom of each meter strip – usually 1 to 8. And in the Inspect page, each module has a descriptive name – Line In, Line Out, AES3 I/O, Mic In etc.etc.

These labels may be customised by the user. Please **note**, you can only use a browser with Remote Control over a network to do this – this cannot be done on the unit's own front panel.

This may be useful to name a module, or clarify the channel numbers it's occupying, and to name the individual sources by name, instrument, microphone etc.etc.



To edit a channel name, double click in the grey number box below each strip. To edit a module's name, double click on its name at the top right. Clicking outside the name box, or pressing the Enter key will finish the edit.

You are allowed a maximum of 31 characters, however not all of them may display. How many that will display in a browser depends on the screen resolution and size of the browser window. The unit's own front panel will show only the first 8 characters of a channel name. The Global and Selected Channels page will display 19 characters of the module name, but will also scroll to display the missing characters.

The main Inspect page (showing a box for all modules) will only show 10 characters of the module's name.

The module name will also show in the Routing Page, but additions characters are lost in order to display the Module's number.

Generally it would help to make sure the important information is early in the name you use.

I/O Modules

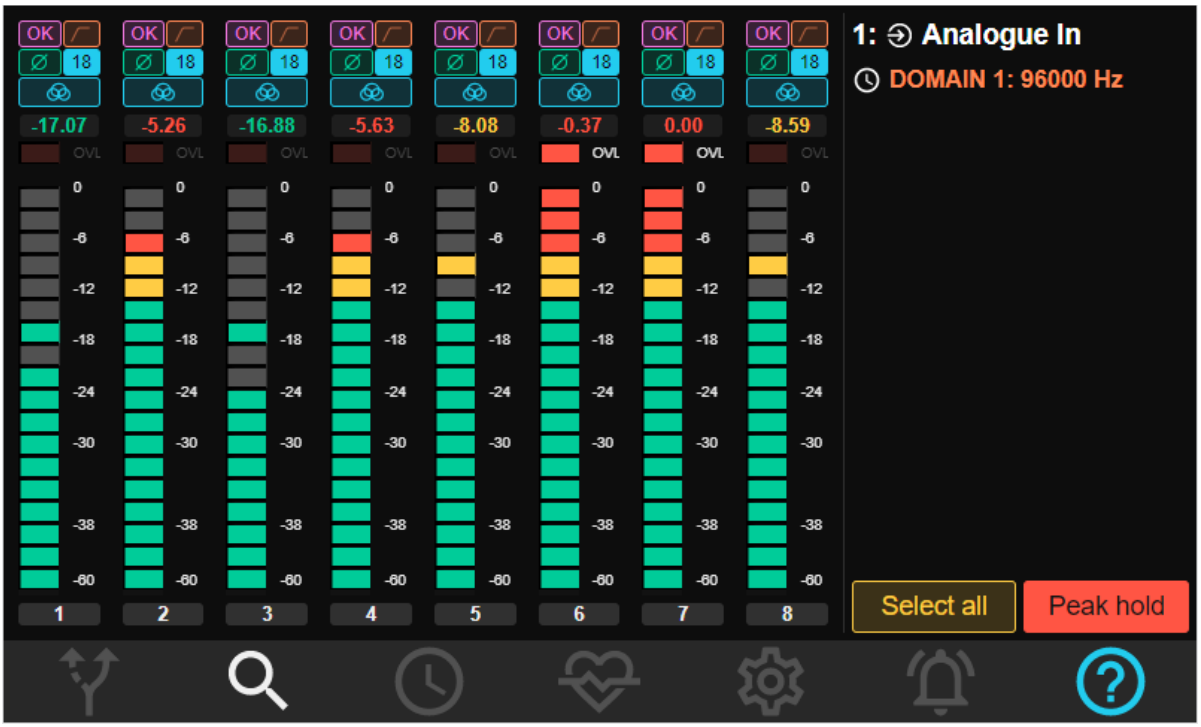
This section is under the 'Inspect' topic of the Software Control Panel, and describes all functions of each type of I/O module, so this is the best reference for the functions and parameters of those modules. Although this is a 'software' section of the manual, the descriptions here may include extra detail regarding the hardware of the module.

Analogue Input Module (AI)

The Analogue Line Input Module provides eight electronically-balanced analogue input channels to each AI module, on 25 way D-sub connectors. Using standard cable looms they can be broken out to eight XLR socket connectors.

Settings in the Inspect pages allow you to change: - Maximum Line Input Sensitivity, Input Sensitivity, Sensitivity Trim, enabling of Overkiller progressive soft limiters, High Pass Filters, Phase Reverse, and the MS decoder.

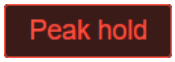
When you first click on an Analogue Input module's tile in the Inspect page, you are shown:-



- 8 **Peak Programme Meters (PPM**) displaying audio presence and level on each of the eight inputs. The bottom of the meters is coloured green to display these are Inputs (green for In, blue for Out is a convention used throughout ADA-128's GUI – and this also applies, for instance, to the ppms on the Routing Page). The upper meter segments are coloured yellow and red.
- At the top right, the module's slot number in the main unit and description are displayed.
- On the next line, the Clock Domain and Sample Rate are shown (in the colour associated with the Clock Domain that the module belongs to).

- Bottom right side - ‘Select All’ - used as described below to enable Selected Channels View.
- Bottom right side - ‘Peak Hold’.
- Above each PPM are five ‘LEDs’ displaying the current status of the settings for: Overkiller, High Pass Filter, Phase, Input Sensitivity and MS Decoding on that Input channel.
- On the line below are numeric peak meters.
- Above the meter segments are ‘OVL’ indicators for ‘Overloads’.

Peak Hold



The ‘**Peak Hold**’ button enables the metering peak-hold function on all eight of the meters – a single segment of each meter remains lit to show the highest peak, and the numeric peak value in dBFs is shown at the top of the meter, below the channel settings block. Notice that the **numeric peak display** changes colour as well – figures are in Green below -12db, Yellow between -12db and -6db, and Red to show the Input is over -6db. Peak Hold is enabled when the button is Red.

To ‘release’ the peak hold and reset the numeric value, toggle the Peak Hold button off then on again.

Note that the ‘Peak Hold’ button also shows in the ‘Selected Channels’ view, but that its action is always global.

OVL

The ‘OVL’ LEDs will light in red (and the text ‘OVL’ becomes brighter) when it is detected that the Input level has passed the ‘Meter Overload threshold’. This threshold is a user setting, which can be set between -0.5db and 0db in the  Settings page in the System Tab.

Peaks and Overloads will display momentarily (segments and OVL LEDs stay lit for about one second) unless ‘Peak Hold’ is enabled. To reset any held Peaks, numeric Peaks and OVLs, toggle the Peak Hold button off and back on.

Selected Channels View

As with Inspect pages for other I/O modules, clicking on a strip, or multiple strips, or pressing 'Select All' shows the 'Selected Channels View' with parameters that can be set for individual channels. The 'Deselect All' button clears the selection and reverts to the 'Global' view.

Overkiller

OK

The 'LED' labelled **OK** shows the setting of the Overkiller function for the selected channel, and clicking on the larger '**Overkiller**' button on the right side toggles the enabling/disabling of the function.

The Prism Sound Overkiller is a progressive analogue peak-limiter which can be applied to any of the ADA-128's analogue input channels.

The Overkiller allows analogue input signals far above the normal maximum handling level of the A/D converter to be accommodated without causing the converter to clip. This is done in a gentle and progressive manner so that distortion is as inaudible as possible.

This is useful in certain situations. For example, it may be desirable for a digital recording to be made 'louder' than would be possible if its loudest transients had to be accurately represented on the digital medium. Or in a situation where levels are not easily controlled, such as when recording a live performance.

In these situations, the Prism Sound Overkiller acts in a uniquely progressive manner, which gives it unrivalled capacity to soak up large transient overloads without any noticeable distortion, whilst protecting the A/D converter from overmodulation.

Clicking on **Overkiller** on the right side changes the small **OK** 'LED' above the channel PPM to violet to show that the Overkiller is enabled on that channel.

High-pass filter

The analogue input channels have switchable high-pass 'impact filters', which roll off below 80Hz. These are most useful when a microphone is being recorded through the input, in removing unwanted low-frequency content. The filters are also available on Line input modules and AES Inputs, which can be useful if, for example, external microphone pre-amplifiers without filters are used.

Clicking on **HPF** on the right side changes the small 'LED' above the channel PPM to orange to show that the High Pass Filter is enabled on that channel.

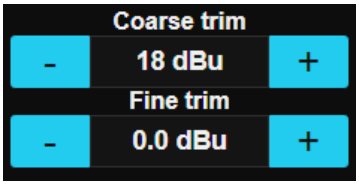
Phase Invert

The phase of an input signal can be reversed. Clicking on '**Phase Invert**' on the right side enables this and colours the 'LED' at the top of the channel ppm in green. This may be useful when recording with multiple sources.

Input Sensitivity

Each channel has a pair of **Trim** controls which specify the input line-up adjustment in terms of the analogue input amplitude (in dBu) which produces the peak handling level of the A/D converter (i.e., 0dBFS).

This is set by using the **Coarse Trim** and **Fine Trim** controls.



The Coarse Trim control allows you to adjust the Input Sensitivity in increments of 1db.

The Fine Trim control allows adjustments in 0.1db steps.

 The Coarse Trim value for each channel is displayed in the blue 'LED' at the top of each channel strip.

 If there is an additional Fine trim value, a tilde character ~ is displayed beside the number.

If the  plus control to the right or the  minus to the left of the Coarse Trim value is 'darker' this means it's not possible to increase or decrease the Input Sensitivity beyond the current setting.

At the time of writing, the standard Analogue Input module allows for Input sensitivity settings between -6db and +24db.

Trim settings are normally between plus and minus 0.5db (but when you've reached the limit in the Coarse setting, you'll find you won't be able to go any further in that direction with the Trim setting).

Although it should not be necessary to trim the analogue sensitivity to produce accurate line-up levels (the ranges are set very accurately at the factory), line-up with other equipment can be achieved by connecting an external reference level and adjusting the trims to suit. If, for example, a +4dBu (0VU) tone is connected, and the analogue input line-up is being adjusted for 0dBFS=+18dBu, each trim should be set so that the peak level display reads as close as possible to -14dBFS.

MS Mode

Each pair of analogue input channels has a switchable MS matrix. This is intended for monitoring a pair of 'mid-side' microphones, where sum and difference signals from the two input channels are matrixed to create left and right stereo channels.

Clicking on '**MS Mode**' on the right side of the Inspect page enables MS decoding. The two signals that are passed on from the input are decoded and turned into a true left-right stereo signal, with the stereo width determined by the setting of the **MS Width** control - values of less than 100% reduce the stereo width, higher values increase it.

Note that **MS Mode can only apply to a *pair* of channels**, and the MS Mode and MS Width controls pairs always work on an ***odd/even numbered*** pair of channels – i.e. the Mid is expected to be in the odd numbered channel, the Side in the even numbered, which become Left & Right once decoded. A Mid/Side pair cannot be paired i.e. channels 6 and 7.

Enabling MS decoding on a single channel will always apply MS mode to the channel's stereo 'partner' – it doesn't matter which of the left/right pair is selected. I.e. if you enable MS on channel 3, it will also enable on channel 4; similarly enabling MS on channel 6 will enable it on channel 5.

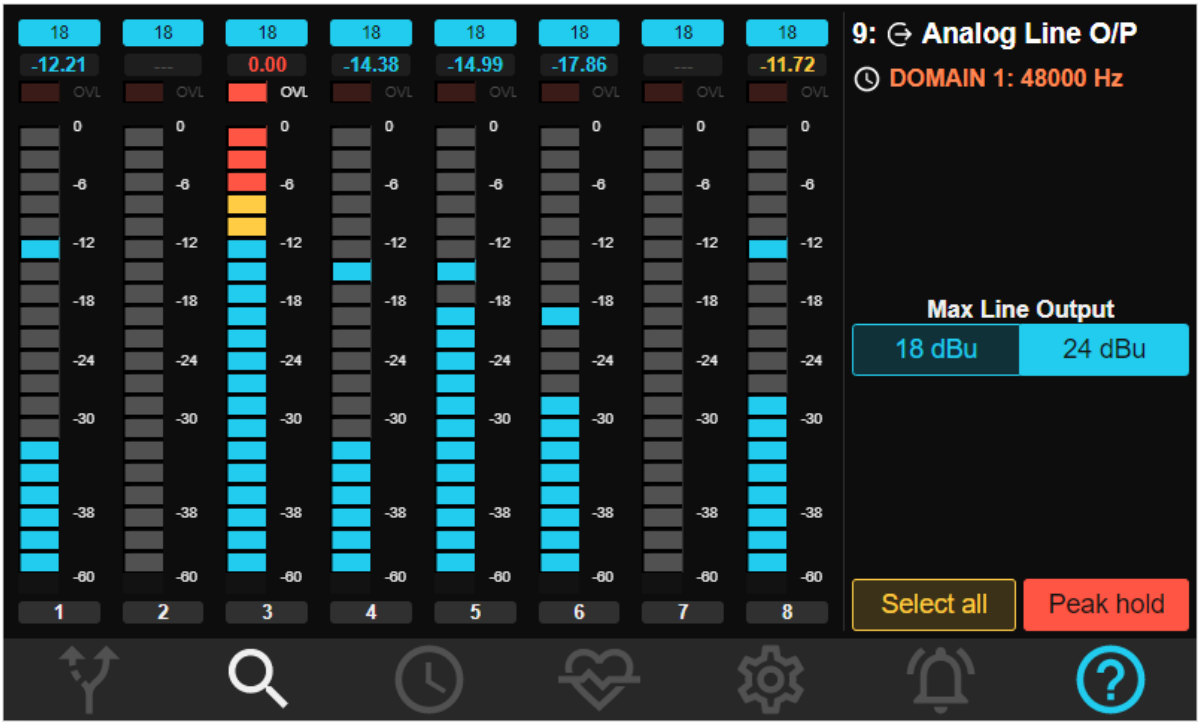
When MS mode is enabled on a pair of channels, the MS 'LED' at the top of the strip will be lit in blue and the MS width value will also be displayed in the 'LED'.

Analogue Output Module (AO)

The Analogue Line Output Module provides eight electronically-balanced analogue output channels from each AO module, on a 25 way D-sub connector. Using standard cable looms this can be broken out to eight XLR plug connectors.

Settings in the Inspect pages allow you to change the Output Level with Coarse and Fine controls.

When you first click on an Analogue Output module's tile in the Inspect page, you are shown:-



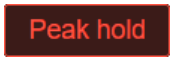
- 8 PPMs displaying audio presence and level on each of the eight outputs. The bottom of the meters is coloured blue to show that these are Outputs.
- At the top right, the module's slot number in the main unit and description are displayed.
- On the next line, the Clock Domain and Sample Rate are shown (in the colour associated with the Clock Domain).
- Below that on the right side are buttons for Maximum Line Output and below that, Peak Hold. These functions are global for the module and will be applied to all eight outputs.
- Bottom right is also a button for 'Select All'.
- Above each PPM is a blue 'LED' displaying the current status of the Output Gain setting
- Below that are numeric peak meters.
- Above the meter segments are 'OVL' indicators for 'Overloads'.

Max Line Output

Analogue Output modules allow the Analogue Output gain levels to be set as high as +24dBu, however running at levels higher than +18dBu requires an extra power supply to be switched on. If you need to operate above +18dBu, then you must set 'Max Line Out' to +24dBu. However, if you're not using the extra level, then setting 'Max Line Out' to +18dBu will save power, and perhaps more significantly will make the unit run at a lower temperature. There's no sonic benefit in enabling +24dBu if you're operating at +18dBu or lower.

Depending on the current setting, clicking on these 'global' +18 or +24 buttons will not *necessarily* change the current setting; it sets the maximum level each channel can be set to. Once you have selected a channel (or... several or all channels) to show the 'Selected' channel parameters, you will then be able to change the *actual* Output Gain using the Coarse and Fine Trim controls. However, if for instance some channels are set to +24, if you click on the +18 button, these channels' Input Sensitivity will be changed to +18.

Peak Hold



The '**Peak Hold**' button enables the metering peak hold function on all eight of the meters – a single segment of each meter remains lit to show the highest peak, and the numeric peak value in dBFs is shown at the top of the meter. Notice that the **numeric peak display** changes colour as well – the segments are in Blue below -12db, Yellow between -12db and -6db, and Red to show the Input is over -6db. Peak Hold is enabled when the button is Red.

To 'release' the peak hold and reset the numeric value, toggle the Peak Hold button off then on again.

Note that the 'Peak Hold' button also shows in the 'Selected Channels' view, but that its action is always global.

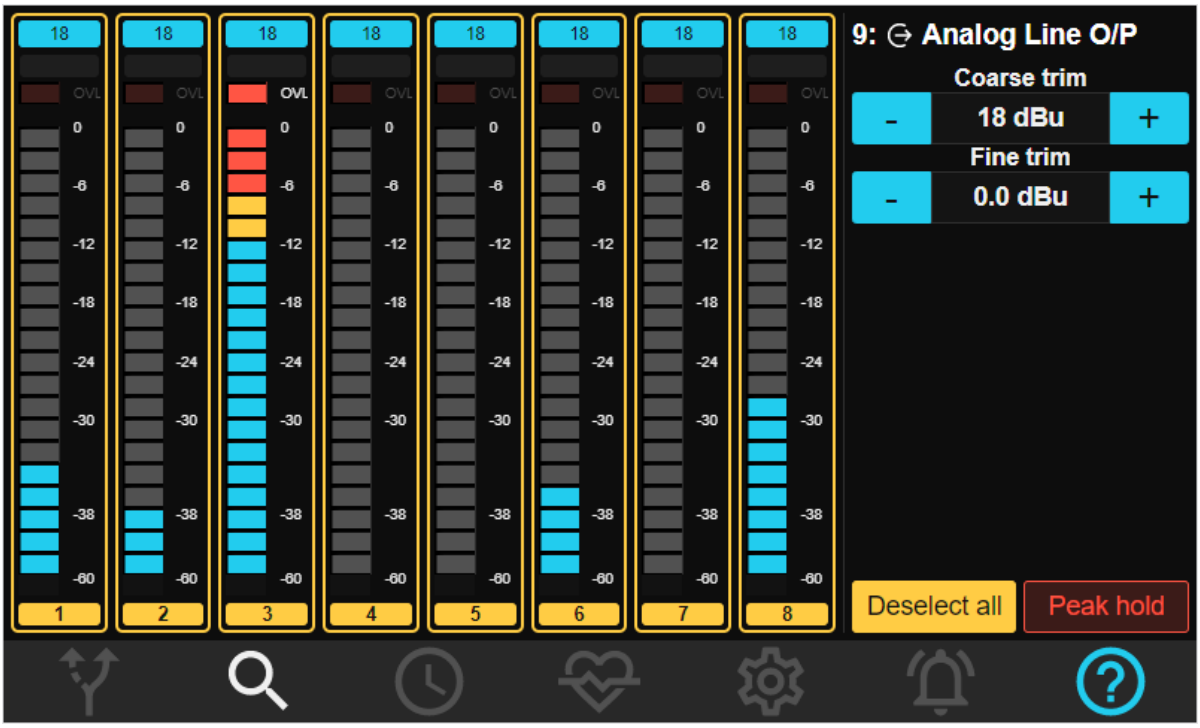
OVL

The 'OVL' LEDs will light in red (and the text 'OVL' becomes brighter) when it is detected that the Output level has passed the 'Meter Overload threshold'. This threshold is a user setting, which can be set between -0.5db and 0db in the  Settings page in the System Tab.

Peaks and Overloads will display momentarily (segments and OVL LEDs stay lit for about one second) unless 'Peak Hold' is enabled. To reset any held Peaks, numeric Peaks and OVLs, toggle the Peak Hold button off and back on.

Selected Channels View

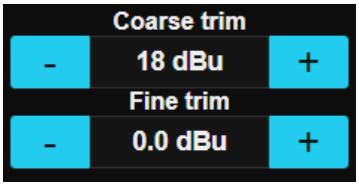
As with Inspect pages for other I/O modules, clicking on a strip, or multiple strips, or pressing 'Select All' shows the 'Selected Channels View' with parameters that can be set for individual channels. The 'Deselect All' button clears the selection and reverts to the 'Global' view.



Output Gain

Each channel has a pair of **Trim** controls which specify the Output line-up adjustment in terms of the Analogue Output amplitude produced by a peak digital audio signal (i.e., 0dBFS).

This is set by using the **Coarse Trim** and **Fine Trim** controls.



The Coarse Trim control allows you to adjust the Input Sensitivity in increments of 1db.

The Fine Trim control allows adjustments in 0.1db steps.

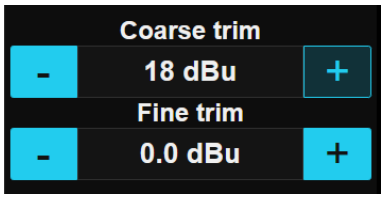
The Coarse Trim value for each channel is displayed in the blue 'LED' at the top of each channel strip.

If there is an additional Fine trim value, a tilde character ~ is displayed beside the number.

If the 

plus control to the right or the 

minus to the left of the Coarse Trim value is 'darker' this means it's not possible to increase or decrease the Input Sensitivity beyond the current setting.



In the picture to the side, where it's not possible to increase beyond +18dBu, this suggests that the Max Line Output setting on the 'global' Inspect page for this module is restricted to +18dBu. To allow higher levels, change to +24dBu by pressing 'Deselect All' then switching to +24dBu.

At the time of writing, the standard Analogue Output module allows for Output Gain settings between -6db and +24db.

Trim settings are normally between plus and minus 0.5db (but when you've reached the limit in the Coarse setting, you'll find you won't be able to go any further in that direction with the Trim setting).

Although it should not be necessary to trim the analogue gain to produce accurate line-up levels (the ranges are set very accurately at the factory), line-up with other equipment can be achieved by playing a reference signal out of the ADA-128, into the other equipment and adjusting the trims to suit. If, for example, a +4dBu (0VU) tone is playing, and an analogue input line-up is being adjusted for 0dBFS=+18dBu, each trim should be set so that the peak level display on the other piece of equipment reads as close as possible to -14dBFS.

AES In/Out Module (AES)

The AES Input/Output Module provides eight channels of digital inputs and outputs on four AES3 carriers in each direction.

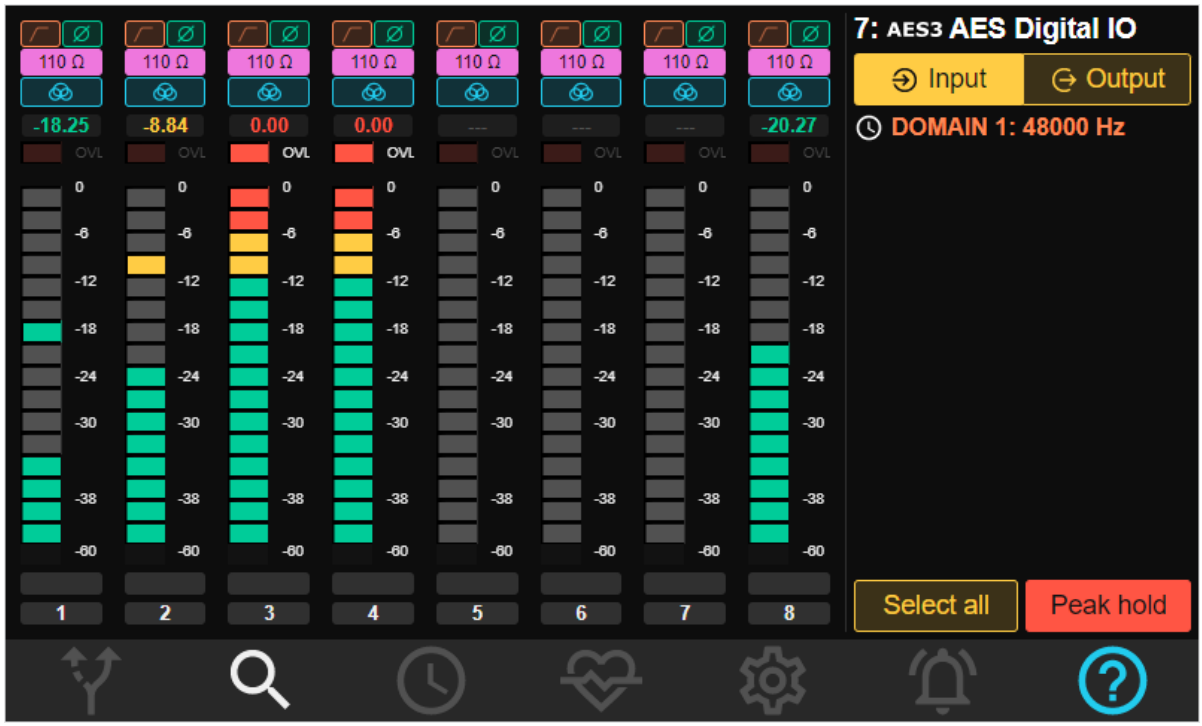
A 25 way D-sub connector is used for connections. Using standard looms this can be broken out to four plug (for outputs) and four socket (inputs) XLR connectors.

AES Modules are **I/O modules**, however, they can be inserted into **Host** module slots, which allows the number of I/Os to be maximised for AES-only AD/DA systems. The AES modules will appear in the lower, Host, sections of the Routing and Inspect pages of the Control panel, but otherwise, the features offered and operations are identical to an AES module in an I/O slot.

Note that because the AES card has inputs as well as outputs, both sides of the meters on the Routing page – green and blue – may be active.

The inputs and outputs may be routed independently; however, they must be on the same clock domain (and hence at the same sample rate). When you're in the routing page and you click first on the AES module, you are selecting only the inputs for the routing operation; the outputs are selected as a destination as the second click.

The Inspect page for an AES card has an Input and Output button near the top, to toggle the view between the 8 input channels and 8 output channels.

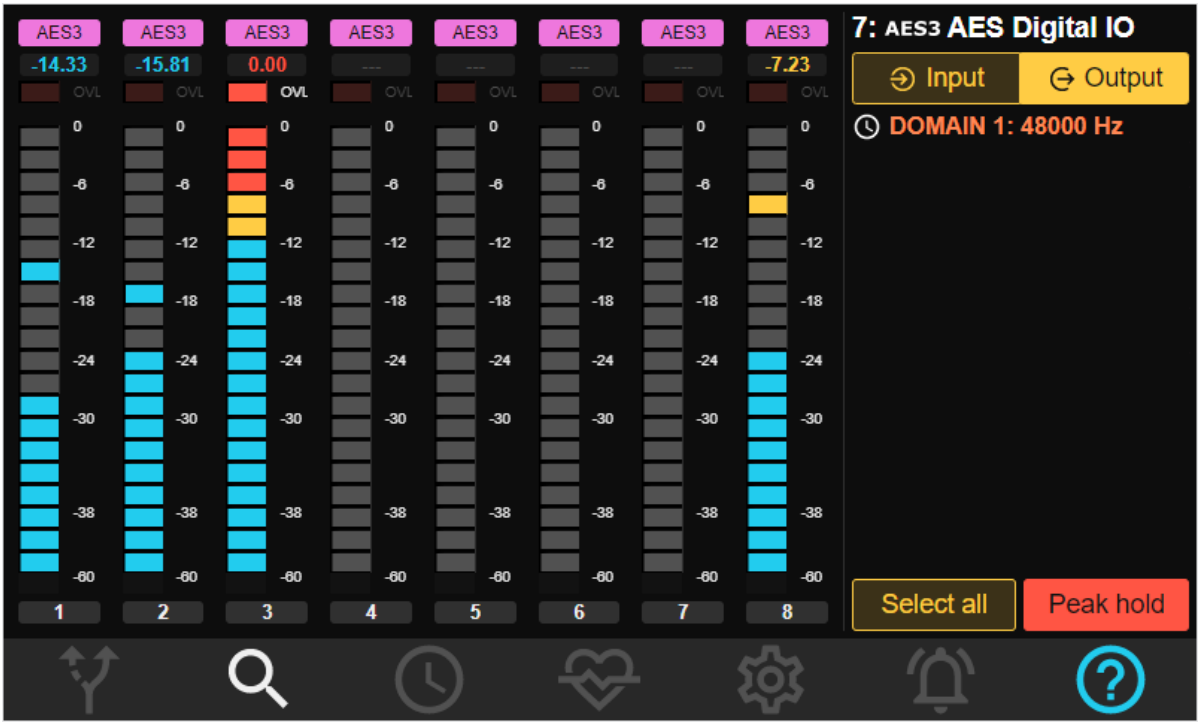


When you first click on an AES module's tile in the Inspect page, you will see, for the **Inputs** of the AES module...

- 8 PPMs displaying audio presence and level on each of the eight inputs. The lowest segments of the PPMs are green on the Input page, as normal.
- At the top right, the module's slot number in the main unit, and description are displayed.

- Below that on the right side are buttons for **Input** and **Output** – this allows you to toggle the view to show the settings for the Output side of the AES module (and back to Input..) which has a similar layout.
- Next, the Clock Domain the module belongs to and its Sample Rate is displayed in the colour associated with the Clock Domain..
- At the bottom right side a 'Select All' and a 'Peak Hold' button. 'Select All' works in the normal way to select all channels (and to then show the 'Selected Channels View' and the individual channel controls). 'Peak Hold' turns on or off the peak hold function of the meters in the usual way.
- Above each PPM are 'LEDs' displaying the current status of settings for Filter, Phase, Input impedance, and Mid/Side mode which can be altered in 'Selected Channels View'.
- Below that are numeric peak meters.
- Above the meter segments are 'OVL' indicators for 'Overloads'.
- At the bottom of each channel strip is an extra 'LED' display warning about the condition and synchronisation of the digital signal attached to each input (these are grey in the picture above indicating that the digital source is locked.)

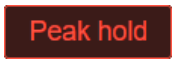
When you click the switch to view the **Outputs** page, a similar layout is shown.



- 8 PPMs displaying audio presence and level on each of the eight outputs. The lowest segments of the PPMs are blue, as normal.
- At the top right, the module's slot number in the main unit, and description are displayed again.
- Below that on the right side are buttons for **Input** and **Output** – this allows you to toggle the view to show the settings for the Input side of the AES module (and back to Output..).
- Next, the Clock Domain the module is associated with is displayed.

- At the bottom right side a 'Select All' and a 'Peak Hold' button. 'Select All' works in the normal way to select all channels (and to then show the 'Selected Channels View' and the individual channel controls). 'Peak Hold' turns on or off the peak hold function of the meters in the usual way.
- Above each PPM is a pink 'LED' displaying the current status of the Output Format setting.
- Below that are numeric peak meters.
- Above the meter segments are 'OVL' indicators for 'Overloads'.

Peak Hold



In the usual way, the '**Peak Hold**' button on both the Input and Output side of the AES module's Inspect pages enables the metering peak-hold function on all eight of the meters – a single segment of each meter remains lit to show the highest peak, and the numeric peak value in dBFs is shown at the top of the meter, below the channel settings block. Notice that the **numeric peak display** changes colour as well – figures are in Green below -12db, Yellow between -12db and -6db, and Red to show the Input is over -6db. Peak Hold is enabled when the button is Red.

To 'release' the peak hold and reset the numeric value, toggle the Peak Hold button off then on again.

Note that the 'Peak Hold' button also shows in the 'Selected Channels' view, but that its action is always global.

OVL

The 'OVL' LEDs will light in red (and the text 'OVL' becomes brighter) when it is detected that the Input level has passed the 'Meter Overload threshold'. This threshold is a user setting, which can be set between -0.5db and 0db in the  Settings page in the System Tab.

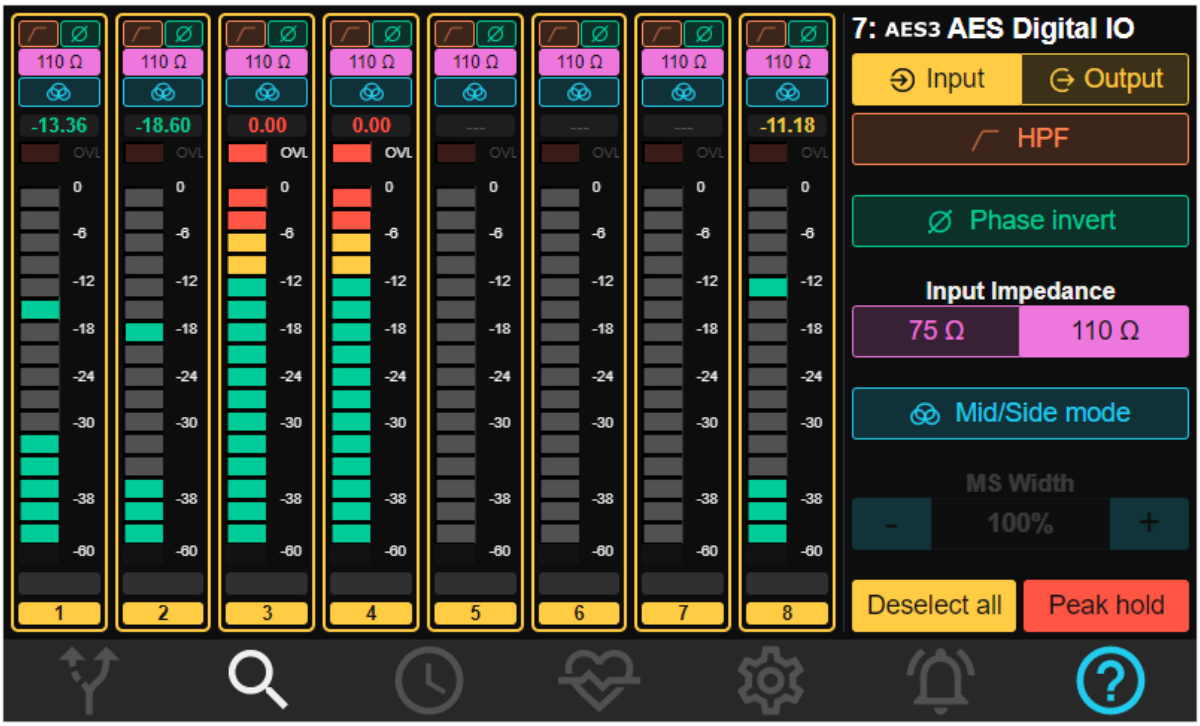
Selected Channels View

As with Inspect pages for other I/O modules, clicking on a strip, or multiple strips, or pressing 'Select All' shows the 'Selected Channels View' with parameters that can be set for individual channels.

The '**Deselect All**' button deselects all strips and switches back to the global module settings.

As usual, if multiple selected streams have different settings for a parameter, the button on the right side will display with a 'cross-hatch' and any value displays will show 'MIXED'.

AES Input Settings



Available settings for AES inputs are:-

High-pass filter

The AES input channels have switchable high-pass 'impact filters', which roll off below 80Hz. These filters may be useful if, for example, external microphone pre-amplifiers without filters are used.

Clicking on **HPF** on the right side changes the small 'LED' above the channel PPM to orange to show that the High Pass Filter is enabled on that channel.

Phase Invert

The phase of an input signal can be reversed. Clicking on '**Phase Invert**' on the right side enables this and colours the 'LED' at the top of the channel ppm green. This may be useful when recording with multiple sources.

Input Impedance

Input impedance can be set for channel pairs. AES Input channels are always paired odd/even (i.e. like the cables – AES channels are always paired on a single cable). If you change the impedance on an even numbered channel, the odd-numbered channel will change too.

You can set the Input Impedance to 110 ohm (for 'professional' AES3 signals on input) or 75 ohm (for 'consumer' SPDIF). In practice ADA-128's AES inputs may be quite tolerant of any discrepancies

(although SPDIF connections are more likely to require the correct impedance settings), but for full confidence you should set this correctly to match the digital source that is connected.

MS Mode

Each pair of AES input channels has a switchable MS matrix. This is intended for monitoring a pair of 'mid-side' microphones, where sum and difference signals from the two input channels are matrixed to create left and right stereo channels.

Clicking on '**MS Mode**' on the right side of the Inspect page enables MS decoding. The two signals that are passed on from the input are decoded and turned into a true left-right stereo signal, with the stereo width determined by the setting of the **MS Width** control - values of less than 100% reduce the stereo width, higher values increase it.

Note that **MS Mode can only apply to a *pair* of channels**, and the MS Mode and MS Width controls pairs always work on an ***odd/even numbered*** pair of channels – i.e. the Mid is expected to be in the odd numbered channel, the side in the even numbered, which become Left & Right once decoded. A Mid/Side pair cannot be paired i.e. channels 6 and 7.

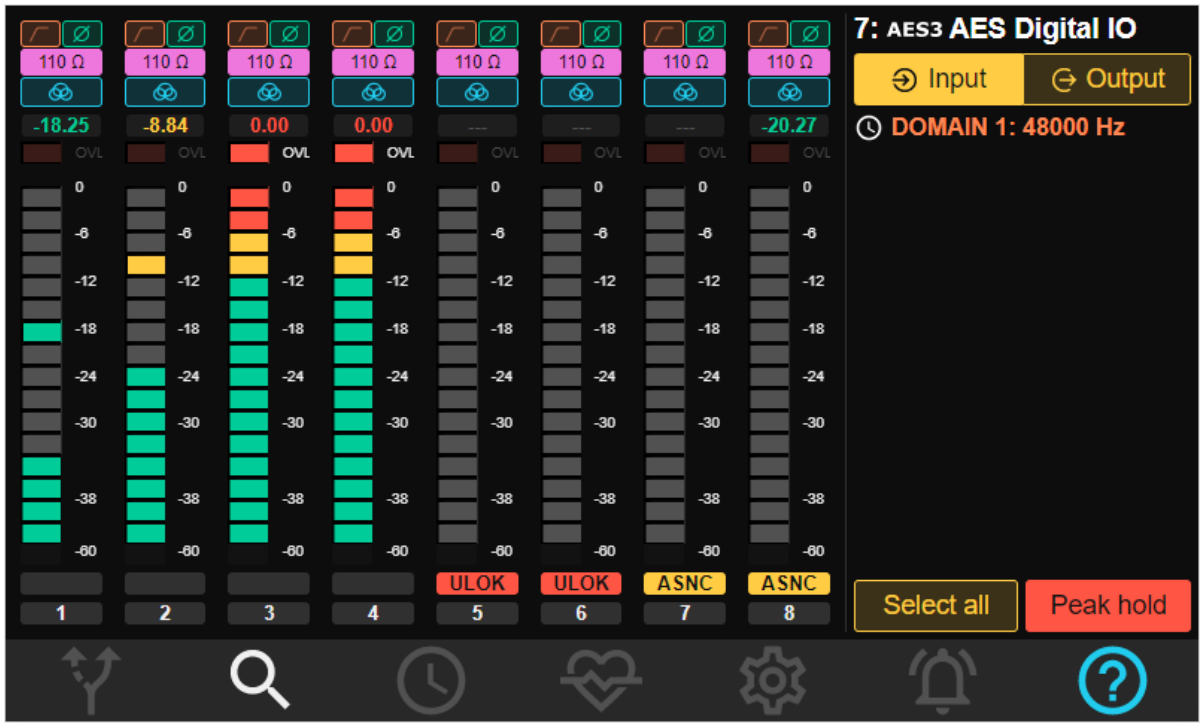
Enabling MS decoding on a single channel will always apply MS mode to the channel's stereo 'partner' – it doesn't matter which of the left/right pair is selected. I.e. if you enable MS on channel 3, it will also enable on channel 4; similarly enabling MS on channel 6 will enable it on channel 5.

When MS mode is enabled on a pair of channels, the MS 'LED' at the top of the strip will be lit in blue and the MS width value will also be displayed in the 'LED'.

AES Input Condition Indicator

ASNC ULOK

Above the channel strip number and below the PPM segments is a ‘LED’ which reports the condition of the digital carrier that is attached to that input (pair).

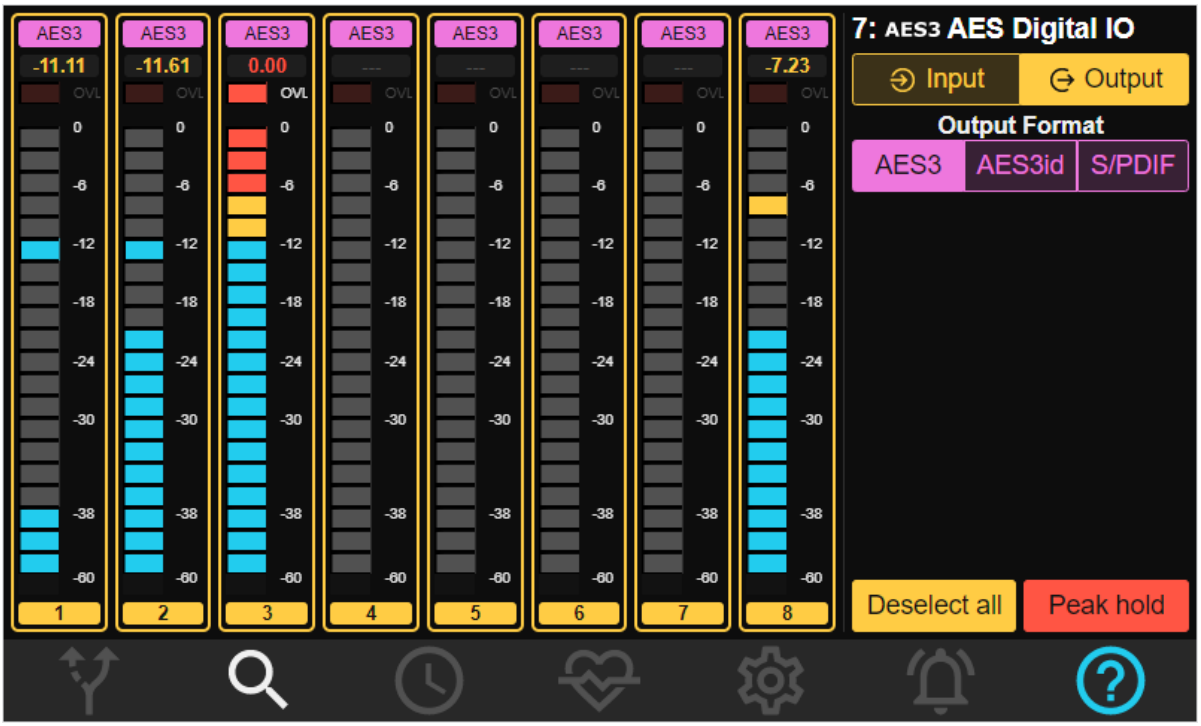


The LED will be **unlit** if no error is reported.

It will display **ULOK** (unlocked) if no carrier is detected at that input.

It will display **ASNC** (asynchronous) in yellow if a carrier is detected that is not synchronous with the ADA-128 clock domain that this AES module belongs to. This can be for a number of reasons – it’s at the wrong sample rate, or it may be at the correct sample rate but the device generating it is not genlocked to the same clock source as the ADA-128.

AES Output Settings



Settings for AES Outputs can also only be changed for odd/even channel pairs (and if you change the setting on one channel, its odd/even partner will change too). Available settings are:-

Channel Status

AES3 | AES3id | S/PDIF

Allows you to set the channel status and levels for the AES outputs to match with other equipment. You can choose one of the three main formats for professional and consumer digital audio formats –

- AES3 - 110 ohm professional, usually on balanced XLR
- AES3id – 75 ohm professional, usually on unbalanced BNC
- SPDIF - 75 ohm consumer, usually on RCA phono.

The channel status setting is displayed above each channel in a pink ‘LED’

Mic Pre / Line input Module (MIC)

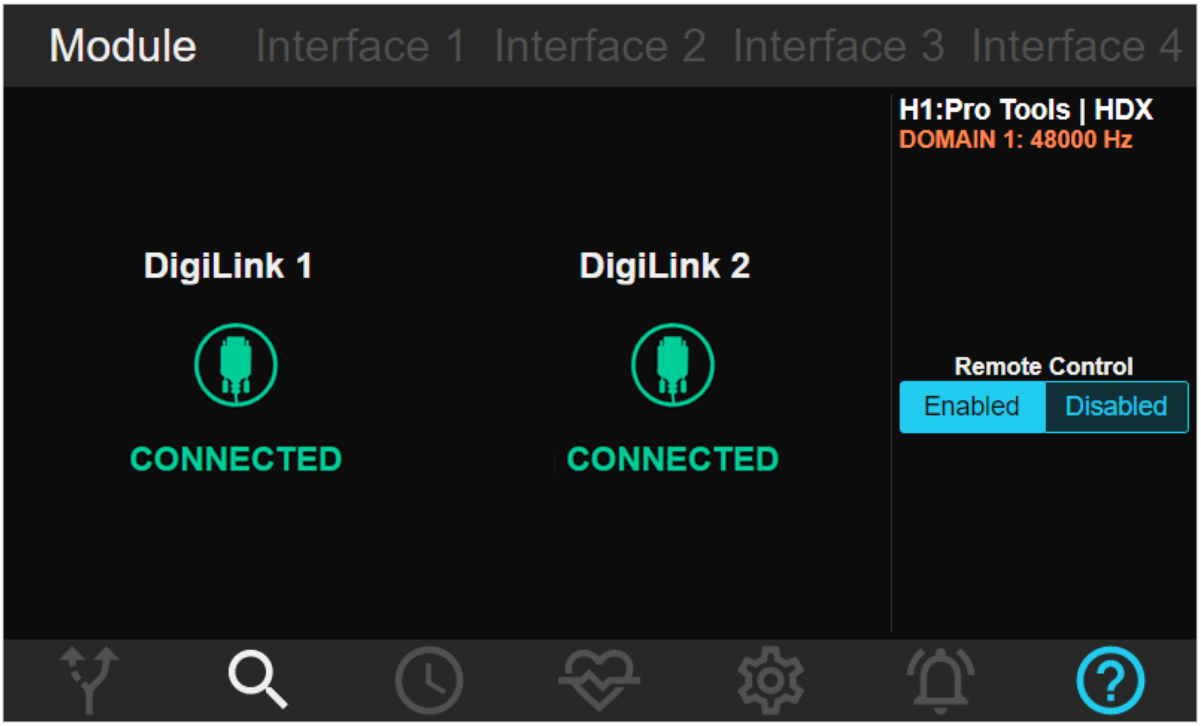
Not released as of October 2023.

Host Modules

ProTools DigiLink I/O (HDX Host)

The Pro Tools | HDX module is a **Host** module, and has pages within **Inspect** to give access to a number of settings. As with other modules, the Inspect pages also display audio metering for the audio channels sent to and returning from the Host computer.

On pressing the large 'Pro Tools | HDX' Host button on the main Inspect page you will see the first Pro Tools | HDX Inspect page:



There are five 'tab' buttons along the top which give access to further settings.

The first tab we see is for ….

Module Settings

There are two large areas which show the status of the two DigiLink connections on Pro Tools | HDX module hardware – 'Connected' or 'Disconnected'.

The right side bar shows…

- The Slot number and name of the Module.
- The Clock Domain to which the Pro Tools | HDX module belongs, and its sample rate setting (in the colour associated with the clock domain).
- Remote Control enabled /disabled.

Remote Control

You should take great care over how the **Pro Tools Remote Control** setting is used. In normal usage, it should be **Enabled**, which allows the Pro Tools software to change some settings of the ADA-128 remotely**.** There is an advantage to allow the Pro Tools software to control certain settings – particularly things like the sample rate and clock settings of the system (including any other attached hardware I/Os). For instance, if you are switching between Pro Tools sessions of different sample rates, allowing Pro Tools to change the ADA-128's sample rate on opening the session will avoid you needing to think about it, and will also avoid any confusions and stalling of the software if for instance you were to press play when a conflict was present.

However, it should be noted that if your ADA-128 is being used by multiple Hosts, then having Pro Tools Remote Control enabled may cause conflicts elsewhere, particularly perhaps if Pro Tools isn't even running (the sample rate for that domain cannot be changed…). In some circumstances you may wish to disable Pro Tools Remote momentarily.

The ability to change sample rate automatically is one of the most useful remote functions for when the Pro Tools software changes to a session at a different sample rate. However, if in your work you *never* change sample rate, then it would reduce the necessity for running with Pro Tools Remote Control enabled.

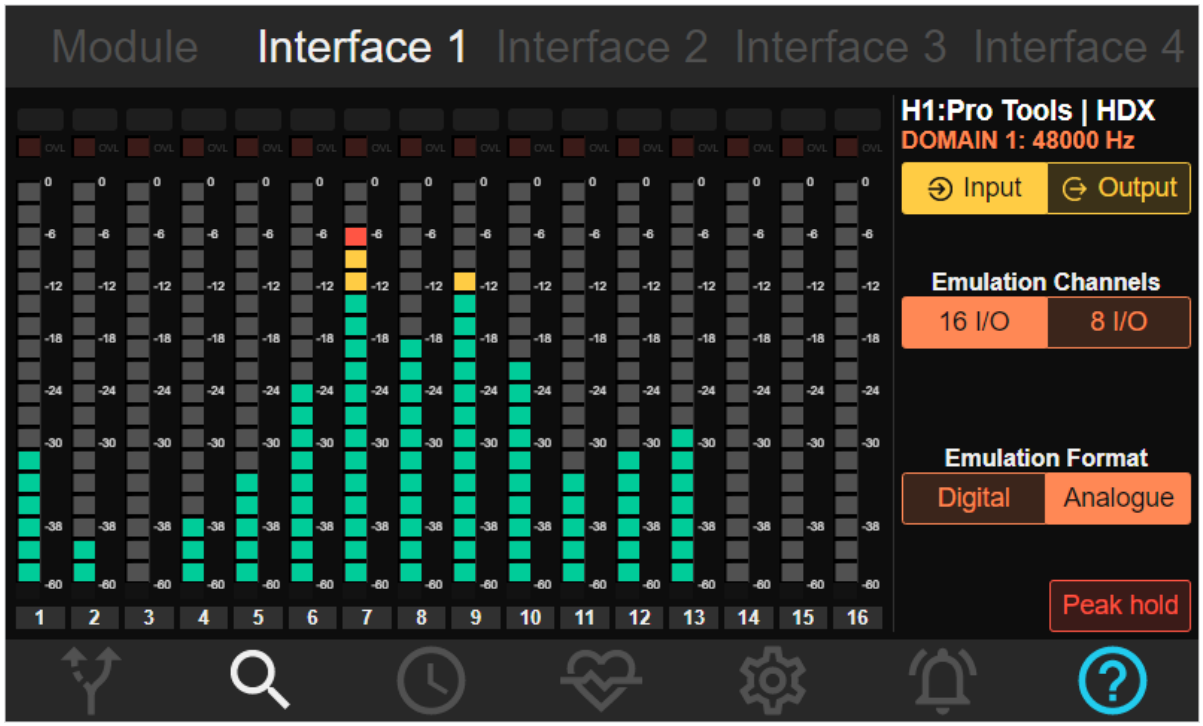
Note that changes within the Pro Tools software for Clock Master/Loop Master and any external reference connectors will be recognised by the ADA-128, however the choice of the external reference connector is not passed down to the ADA-128 – only the selection of 'Internal' or 'External'.

When any external clock source is set in the Pro Tools software, the ADA-128 chooses its previously set external clock source (for the domain that the PTHDX module belongs to).

A full list of features that are under Remote Control when this function is enabled are shown in Appendix C.

Audio Routings between ADA-128 modules are not under remote control from Pro Tools.

Interface 1 (and 2,3,4)



The other four tabs show the meters for each of the audio channels (Inputs *and* Outputs), and a control for **Emulation Format.**

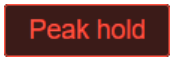
At the top of these pages is noted the slot number and type of module – i.e. Slot H1, Pro Tools | HDX in this case.

Below is the Clock Domain to which the Dante module belongs and its Sample Rate, displayed in the clock domain's colour.

The next line down has the **Input** & **Output** buttons to allow the toggling of the meter view between Inputs and Outputs. One button is yellow to show the current selection.

Unlike I/O modules, the PTHDX module does not allow for selection of individual channels – the only settings are global.

Peak Hold



As with other types of module, the '**Peak Hold**' button enables the metering peak hold function on all 16 of the meters – a single segment of each meter remains lit to show the highest peak, and the numeric peak value in dBFs is shown at the top of the meter. Notice that the **numeric peak display** changes colour as well – the segments are in Blue below -12db, Yellow between -12db and -6db, and Red to show the Input is over -6db. Peak Hold is enabled when the button is Red. Input and Output meters both have Peak Hold displays.

To 'release' the peak hold and reset the numeric value, toggle the Peak Hold button off then on again.

OVL

The ‘OVL’ LEDs will light in red (and the text ‘OVL’ becomes brighter) when it is detected that the Output level has passed the ‘Meter Overload threshold’. This threshold is a user setting, which can be set between -0.5db and 0db in the  Settings page in the System Tab.

Peaks and Overloads will display momentarily (segments and OVL LEDs stay lit for about one second) unless ‘Peak Hold’ is enabled. To reset any held Peaks, numeric Peaks and OVLs, toggle the Peak Hold button off and back on.

Emulation Format

In order to be seen and to be controlled by the Pro Tools software, the ADA-128 must emulate standard Pro Tools | HD I/O hardware units.

The ADA-128 normally emulates Pro Tools | HD I/O units with 16 channels of Input and Output.

A single ADA-128’s Pro Tools PTHDX module can support more than 16 channels – in fact a maximum of 64 channels of Input and 64 channels of Output. Thus to allow a full 64 in / 64 out channels, ADA-128 will look like up to **FOUR** x Pro Tools | HD I/O units to the Pro Tools software.

The four ‘Interface’ tabs correspond to the four ‘Virtual’ 16 channel HD I/O units shown to the Pro Tools software.

To use the ADA-128 with a Pro Tools system, you will need a Pro Tools | HD Core interface: -

- HDX PCIe card
- HD Native PCIe card or...
- HD Native Thunderbolt connected unit.

Each of these has 2 x DigiLink Mini ports. Each port can support up to 32 channels of Input and Output (I/O) at standard sample rates between 44.1KHz and 192KHz, giving a total of 64 I/O on the 2 ports.

Similarly, the ADA-128 has 2 x DigiLink ports, and in terms of these ‘Inspect’ pages has 2 x ‘Virtual Interfaces’ per DigiLink port – Interface 1 and 2 are associated with DigiLink 1, and Interface 3 and 4 are associated with DigiLink 2.

Multiple Pro Tools | HDX PCIe cards (up to a maximum of 3) can be used to give you 6 x DigiLink ports and up to 192 channels of I/O (i.e. 32 x 6). Therefore you could connect up to 3 x fully loaded ADA-128s to a Pro Tools | HDX Core system.

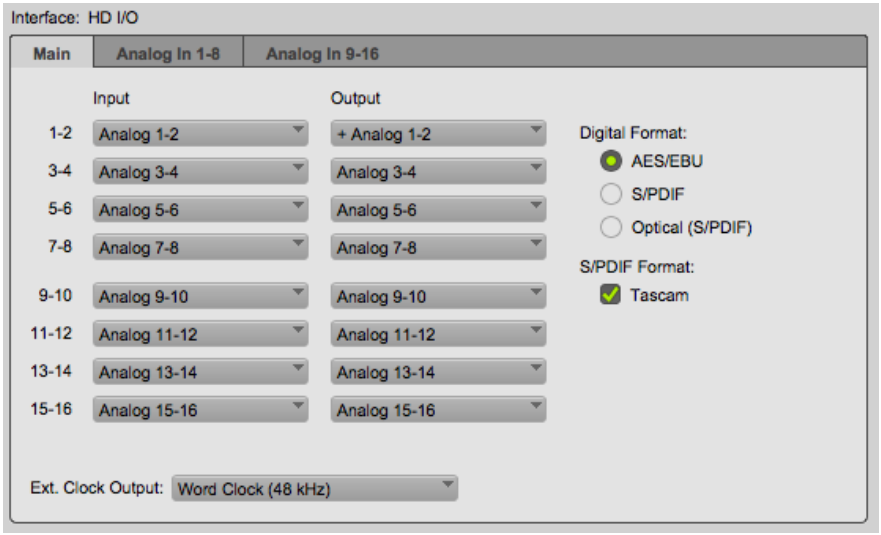
If you have up to 32 channels of ADA-128 I/O then you only need to make a single DigiLink connection to the HDX card.

For each of an ADA-128's four 'Interfaces' you can choose which type of Pro Tools | HD I/O unit it is emulating, by switching the 'Analogue' and 'Digital' buttons (the selected one is lit in orange):

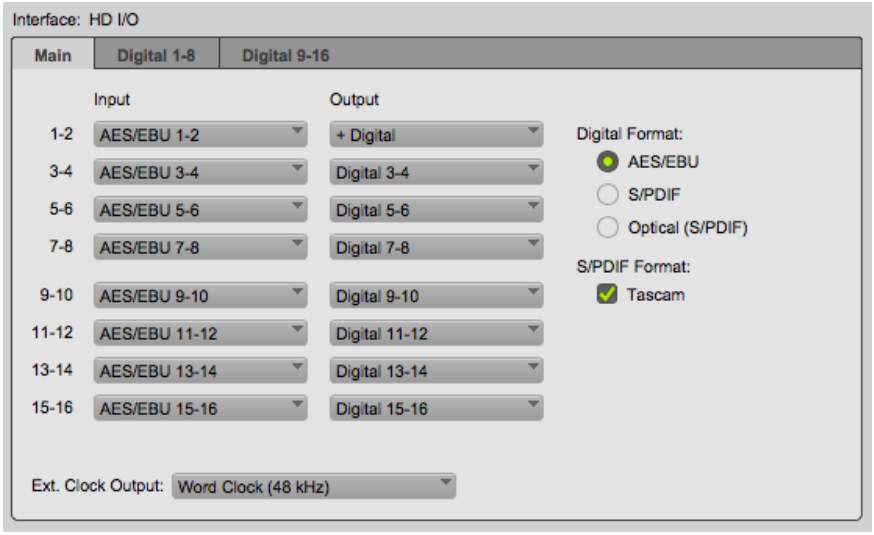
- 16x16 **Analogue** (i.e. 16 Analogue Inputs and 16 Analogue Outputs)
- 16x16 **Digital** (i.e. 16 Digital Inputs and 16 Digital Outputs)

The key differences between the Analogue and Digital I/O emulations are:-

1. The controls and labels that the Pro Tools software offers –
   For instance in Pro Tools' Setup/Hardware dialogue box, the 16x16 Analogue emulation looks like this :-



   and the 16x16 Digital emulation looks like this :-



2. The delay through the I/O – Analogue interfaces have an increased delay (for the Analogue conversion stage).

If you configure your ADA-128's channel routing so that Analogue modules route to & from an 'Interface' which emulates an 'Analogue' HD I/O, and likewise AES modules route to an 'Interface'

which emulates a 'Digital' HD I/O, then any delays calculated by the Pro Tools software will be correct.

The consequences of ill-matched emulations are perhaps not so serious. Audio will still pass and route correctly, but any delay compensations within the Pro Tools software may be incorrect and so if you are recording or playing multichannel audio through different types of Input or Output, you may experience phase issues.

Note also that the secondary tabs in the Pro Tools Software's Setup/Hardware menu (for Analog In 1-8 or 9-16 on an Analogue I/O; Digital 1-8 or 9-16 on a Digital) will show different options, however, currently none of these functions are remote controlled to the ADA-128, and therefore parameters such as Analogue Reference Level, Digital format, and Limiter/Overkiller should be set in the ADA-128's Control Panel.

Using 4 'Interfaces', the ADA-128 channels on the Routing page will map as follows...

1-8 & 9-16	Interface 1
17-24 & 25-32	Interface 2
33-40 & 41-48	Interface 3
49-56 & 57 -64	Interface 4

If you are operating your ADA-128 with more than 64 Inputs or Outputs then you will need to fit more than one x Pro Tools PTHDX module (and in turn, more than one Pro Tools | HDX PCIe card to connect to the host computer). For example, for an ADA-128 with say, 14 x Analogue Input modules and 2 x Analogue Output modules (112 In, 16 Out), the first PTHDX module may handle 64 inputs and 16 outs, and the second would handle the remaining 48 channels (other splits of channels may be desirable and would be possible).

The second Pro Tools PTHDX module will appear as a second Host module, and its controls, emulations, meters etc. will appear in their own Inspect pages.

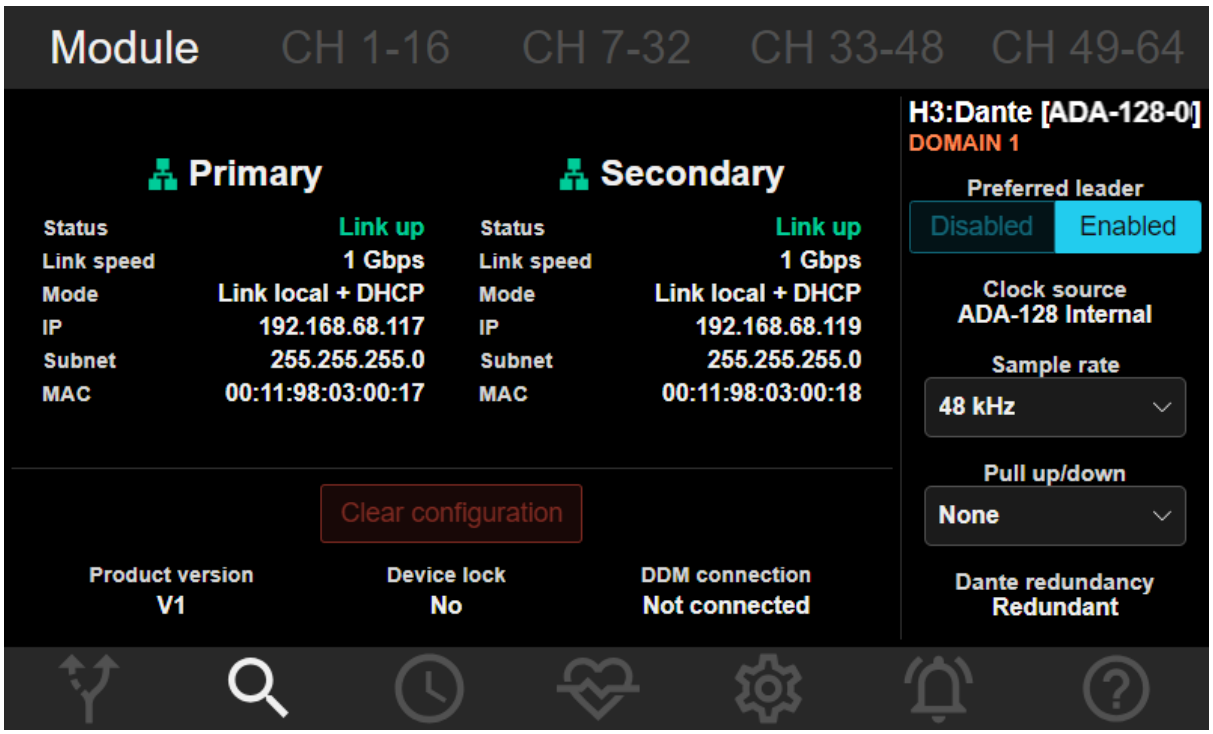
Emulation Channels

At first release a control to allow the emulation to be 16 I/OL or 8 I/O is present, however as this serves no practical purpose, you are advised to leave this set to 16 I/O channel emulations.

Dante Host Module (Dante)

The Dante module is a **Host** module, and has pages within **Inspect** to give access to a number of settings. As with other modules, the Inspect pages also display audio metering for the audio channels sent to and returning from the Host computer.

On pressing the large 'Dante' Host button on the main Inspect page you will see the first Dante Inspect page:



There are five 'tab' buttons along the top which give access to further settings.

The first tab we see is for ….

Module Settings

Some of the fields on this page are for information only; others are interactive and can be used to change certain parameters.

At the top right the Host slot number (H3 for slot 3 in the picture) is reported, along with the type of Host module and its identification string for the Dante network – this is a long number including the serial number and slot number of the ADA-128 that scrolls in the display.

Underneath, the **Clock Domain** this module belongs to is displayed in the clock domain's colour (see Clock Domains below for more detailed explanation).

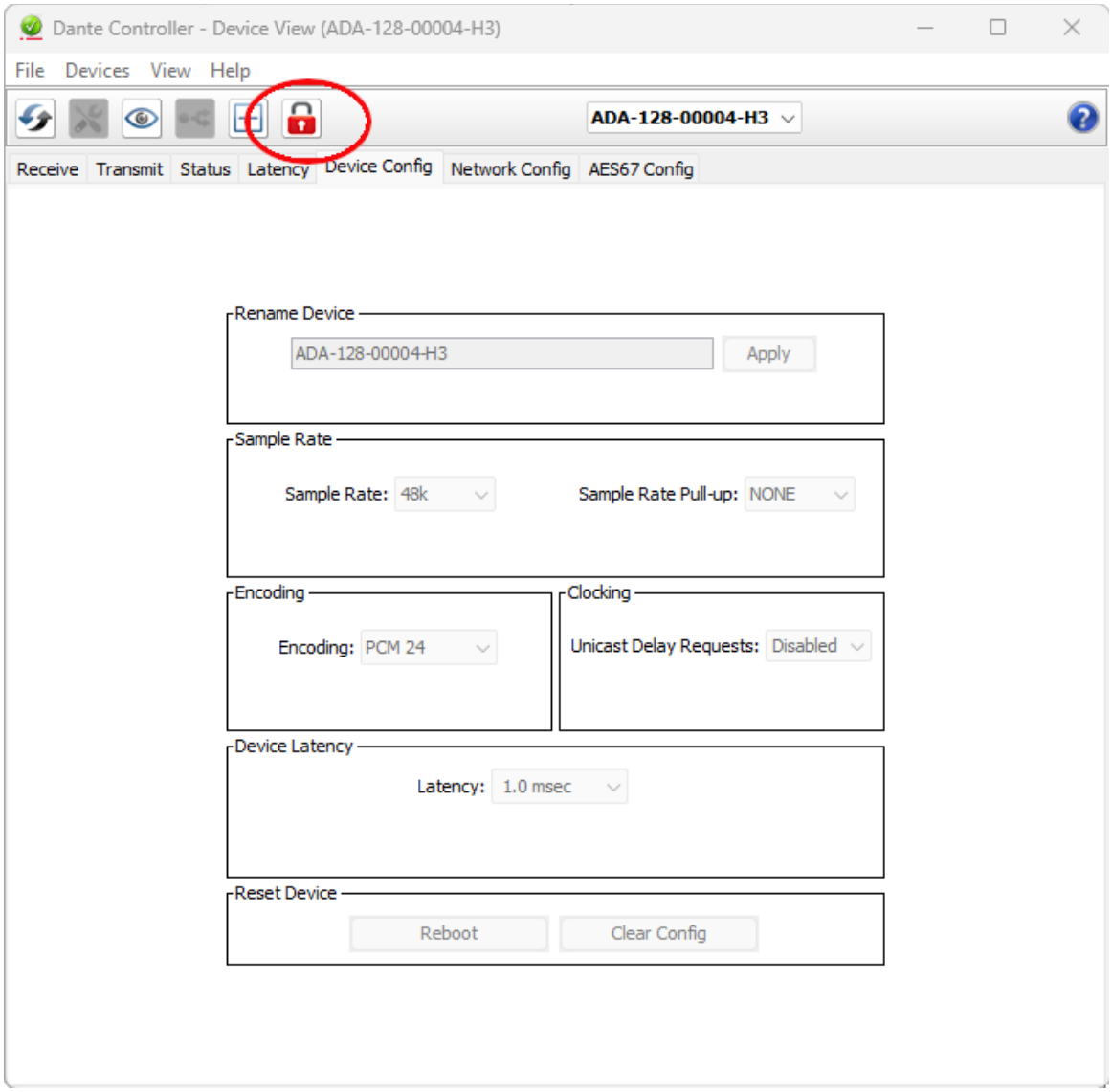
Next below is **Clock Source** for that clock domain, as set in the Clock Domain page.

Then there are two controls for '**Sample Rate**' and '**Pull Up/Down**' which allows you to change these directly in the Dante Inspect page without moving to the Clocks page.

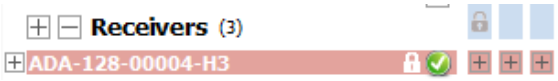
Along the bottom of the Module Settings page are four displays reporting:-

Product Version reports the version of the Dante Host module. Further details about the versions of Dante software and hardware are displayed inside Dante Controller – Select 'Device View' from the Device menu (CTRL-D) and select the ADA-128 (or double-click on its name in any of the main tabs of Dante Controller). These details are displayed on the 'Status' tab of Device View.

Device Lock reports whether the ADA-128's Dante settings are locked (for security purposes). When locked, audio subscriptions will continue to work, and audio will flow, but the ADA-128's Dante configuration cannot be changed. The setting of this is changed inside Dante Controller.
The top bar of Device View has a 'padlock' icon, which displays in red



When you press the button to lock ADA-128, you are asked to create a 4 digit PIN.
When the ADA-128's Dante settings are locked, its name will show in red in the routing page :



to show that the routings cannot be changed.
To unlock, it's the reverse procedure – press the 'padlock' in Device View, type the PIN, then 'unlock'.
You can also lock and unlock ADA-128's Dante settings inside Dante Controller's 'Device Info' tab, where there is a 'Device Lock' tick box.

DDM Connection reports whether Dante Domain Manager is running on the Dante network and whether the ADA-128 is connected.

Dante Redundancy reports the setting of Dante Redundancy mode on your Dante Host Module. 'Redundant' means redundancy is enabled and both network ports on the Dante Host module will be carrying data, 'Switched' means it's not and just the Primary network connection will be running.
ADA-128 is supplied set to 'Redundant' by default as it's expected to be used for high channel counts.

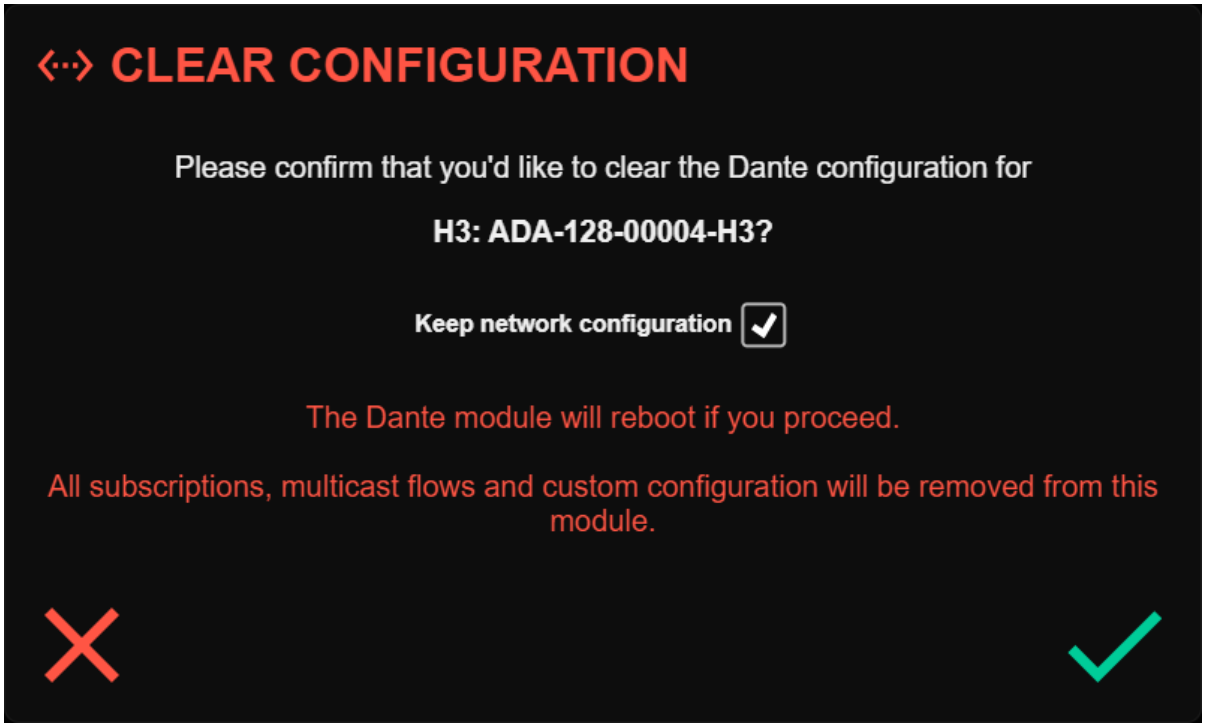
To change this setting to 'Switched', use Dante Controller. The Dante Redundancy setting is shown and can be changed in the 'Network Config' page of Device View. You will need to reboot the ADA-128 for the change to take effect. Note that 'Reboot' in the Dante device view will reboot only the Dante Host card – the rest of the ADA-128 will keep running.

Clear Configuration

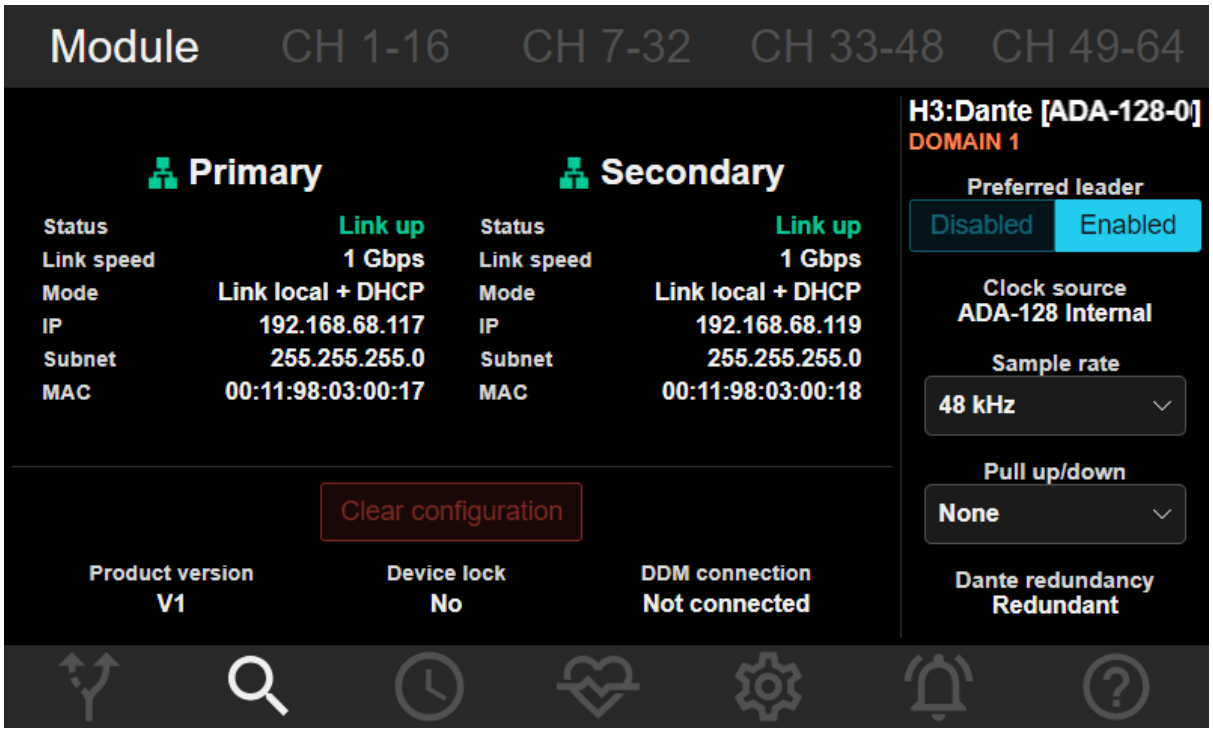
Just above is a red button 

Dante settings, routings/subscriptions, multicast flows, and pretty much everything you can see in Dante Controller and its Device View relating to the ADA-128 are all stored within the ADA-128's Dante Host module.

This button allows you to clear all settings in the ADA-128's Dante Configuration. Note that in the dialogue box that follows pressing the Clear Configuration button, there is a tick box that allows you to keep the Network Configuration whilst clearing everything else.



Primary & Secondary Ports

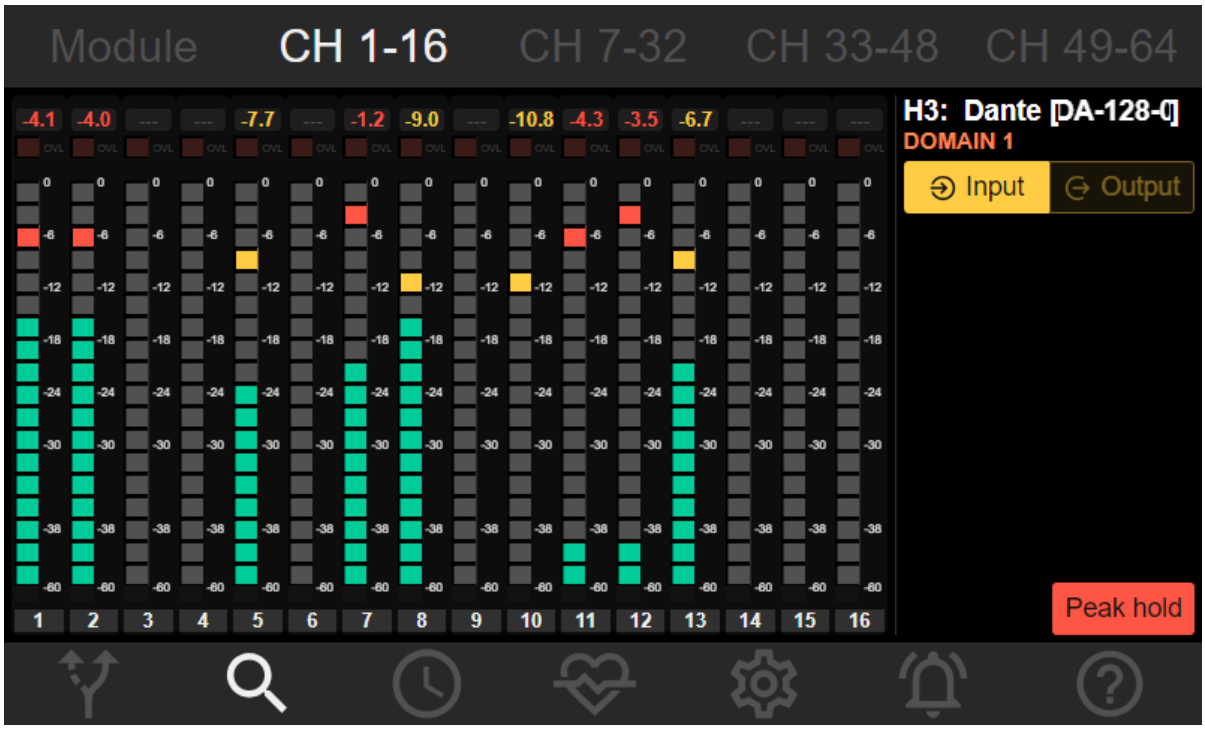


The larger area at the top left of the Module tab shows the status of each of the Dante Host module's network ports along with their network configuration.

This is a report only. These details can also be viewed, and some parameters changed, inside Dante Controller's Device View for the ADA-128.

CH 1-16 Tab

(and CH 17-32, CH 33–48 and CH 49–64)



The other four tabs show the meters for each of the audio channels (Inputs *and* Outputs) of this Dante Host module

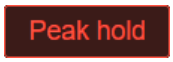
At the top of these pages are noted the slot number, type of module, and its Dante Identification – i.e. Slot H3, Dante, ADA-128-00004-H3 in this case.

Below is the Clock Domain to which the Dante module belongs, displayed in the clock domain's colour.

The next line down has the **Input** & **Output** buttons to allow the toggling of the meter view between Inputs (Dante Receive) and Outputs (Dante Transmit). One button is yellow to show the current selection.

Unlike I/O modules, the Dante module has no settings for individual channels, they are all global.

Peak Hold



As with other modules, the '**Peak Hold**' button enables the metering peak hold function on all 16 of the meters – a single segment of each meter remains lit to show the highest peak, and the numeric peak value in dBFs is shown at the top of the meter. Notice that the **numeric peak display** changes colour as well – the segments are in Blue below -12db, Yellow between -12db and -6db, and Red to

show the Input is over -6db. Peak Hold is enabled when the button is Red. Input and Output meters both have Peak Hold displays.

To 'release' the peak hold and reset the numeric value, toggle the Peak Hold button off then on again.

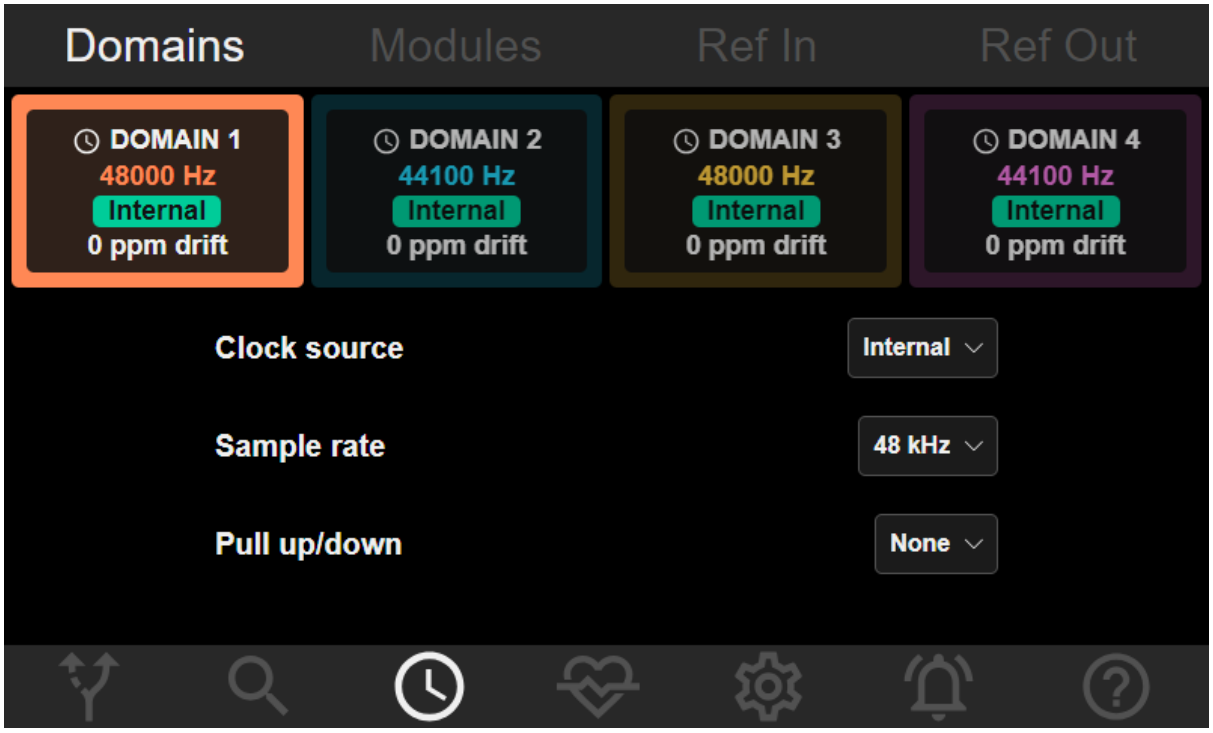
OVL

The 'OVL' LEDs (underneath the row of Peak hold numeric displays) will light in red (and the text 'OVL' becomes brighter) when it is detected that the Output level has passed the 'Meter Overload threshold'. This threshold is a user setting, which can be set between -0.5db and 0db in the  Settings page in the System Tab.

Peaks and Overloads will display momentarily (segments and OVL LEDs stay lit for about one second) unless 'Peak Hold' is enabled. To reset any held Peaks, numeric Peaks and OVLs, toggle the Peak Hold button off and back on.

Clocks & Synchronisation Page

The ‘Clock’ icon on the bottom of the Control Panel allows control over the clock domains.



The ADA-128 system allows for four independently synchronised clock domains.

The Clocks page has a bar across the top with buttons to allow you to select from four sub-pages:-

- **Domains**
- **Modules**
- **Ref In**
- **Ref Out**

Below that bar are **four coloured tiles – orange, cyan, yellow and violet** - which display the details at a glance for each of the four domains, with one of the tiles in full colour to show which domain is focussed for editing in the area below.

The clock domain that a module belongs to is an important concept, and you should note that these same colours are used in other pages of the Control Panel to show a module’s domain. (i.e. the colour of some of the writing in the Routing and Inspect pages).

Domains Tab

This tab allows you to change the clock settings for each of the four clock domains.

Select the Clock Domain you wish to view or edit by clicking on its coloured tile along the top of the Domains tab.

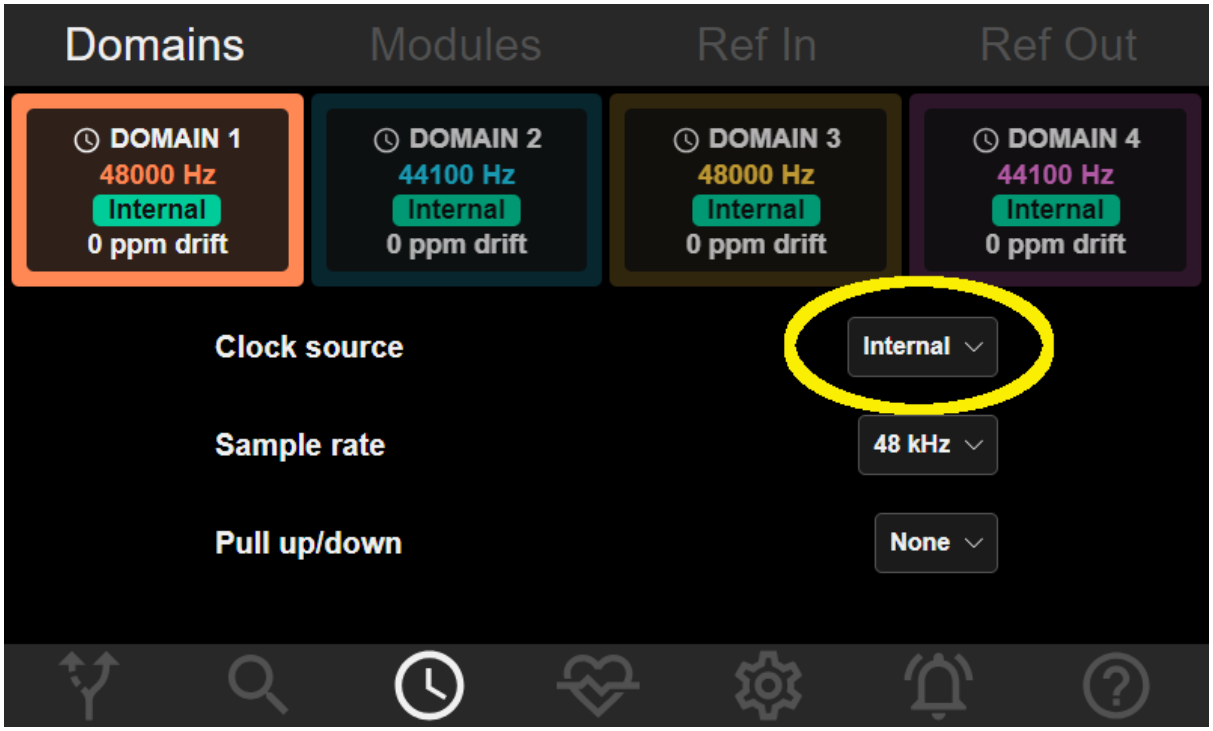
Each of the four Clock Domains has settings for: -

a) Clock Source.
b) Sample Rate – 'Follow Clock', 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, or 192kHz. ('Follow Clock' is only available when the Clock Source is set to an External source).
c) Pull up / down.

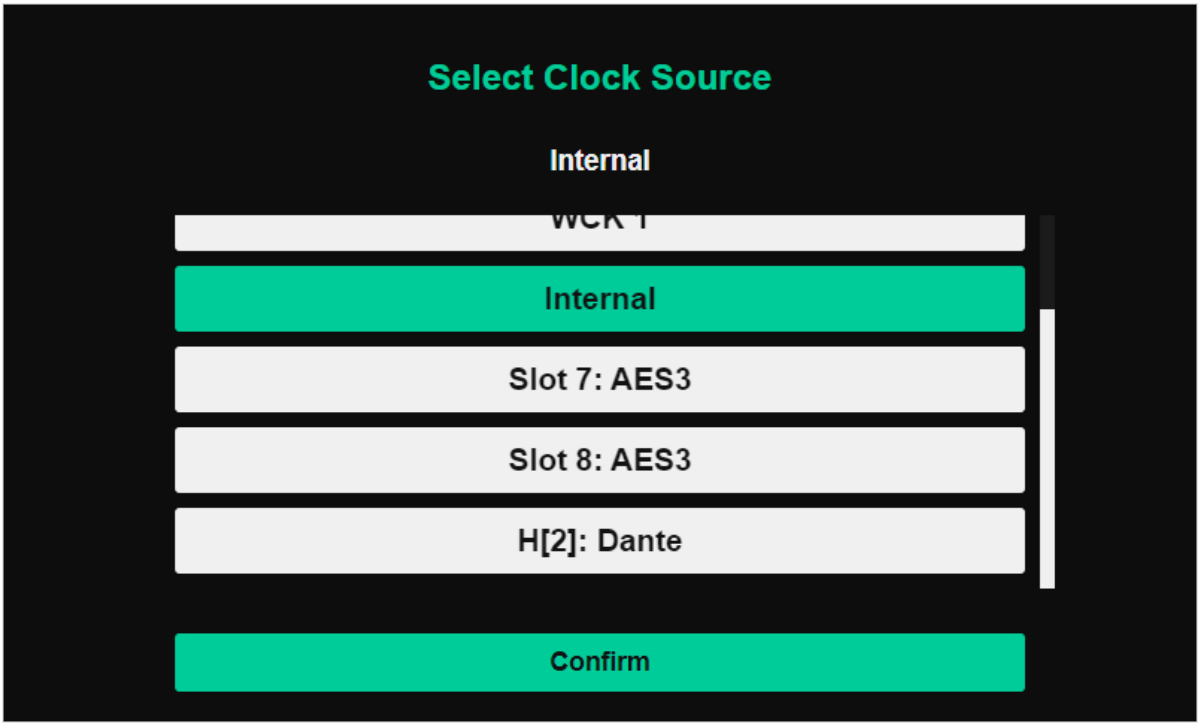
Control Panel Drop-Down Selectors

Where a setting in the Control Panel has a number of possible options (as with the clock settings we are about to talk about), a 'drop-down' selector will appear with a 'down arrow' on the button. To ease operation with the touch screen, when the selector box is clicked, a new screen appears showing the possible options.

For instance, in the Sync Page, there are a number of these controls, and i.e. the Clock Source may have several options.

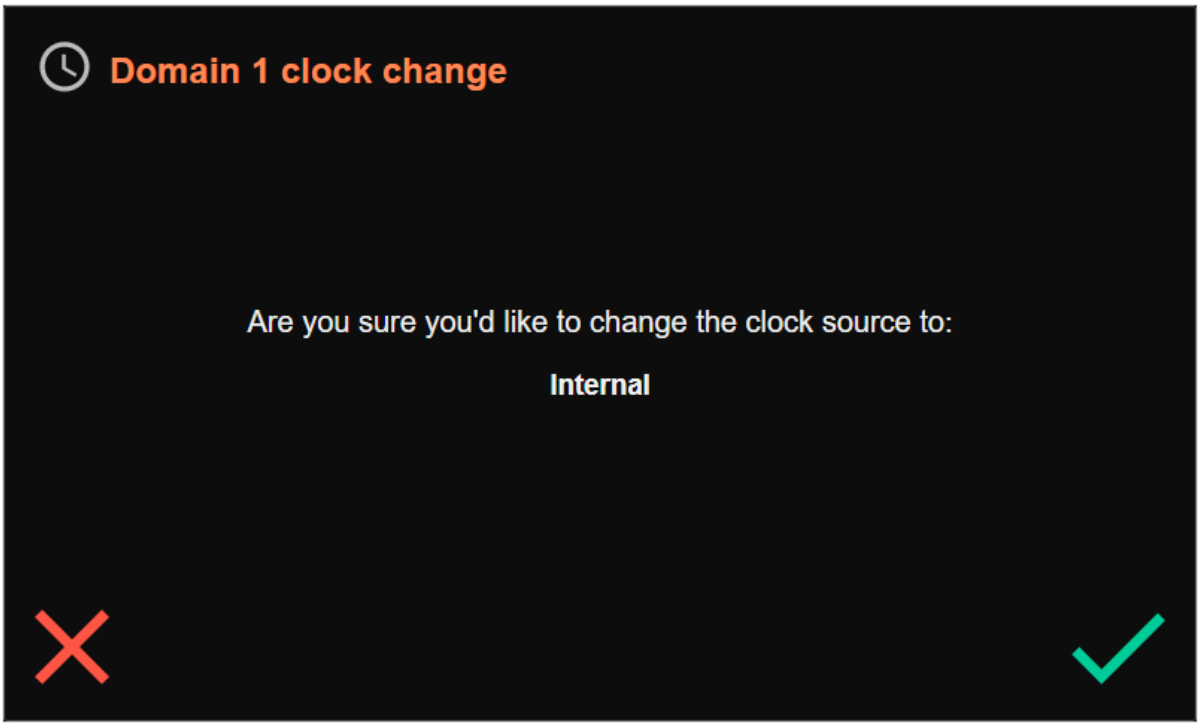


Clicking on the Clock Source selector then shows the following screen:-



Note that extra options may be available and can be shown by moving the scroll bar on the right side (or rolling a mouse wheel if you are using a computer remote control).

Click on the desired option and press **Confirm** to continue, at which point you will see a confirmation screen...



You can then click on the tick or cross to accept or reject the change.

Clock Source

This is a 'drop-down' selector. The options offered for the Clock Source for a domain depend on which options are fitted and also which modules are assigned to the domain.

Options may be:-

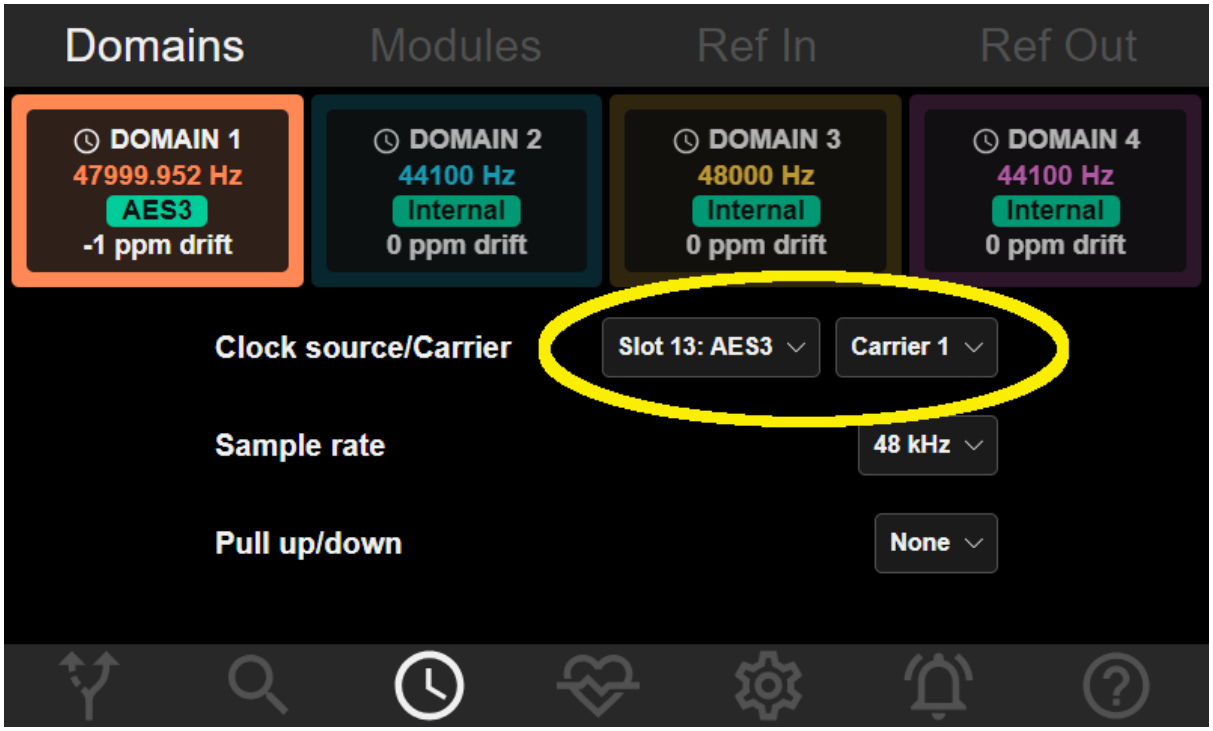
Internal – using the ADA-128's own internal clock. In a digital system all other equipment must be synchronised to the ADA-128 (using one of ADA-128's external clock or digital audio outputs).

DARS – 'Digital Audio Reference Signal' – DARS is an AES3 signal which carries a clock, but not necessarily an audio signal (ADA-128 can lock to a valid DARS input irrespective of whether it carries an audio or not). DARS sync uses the DARS-IN XLR connector on the Utility module near the power inlet at the rear of the ADA-128, or one of the connectors on the Ref I/O multi-way D-type.

WCK1 or WCK2 – Word clock is a clock signal which runs at the system Sample Rate and is carried over a 75 ohm BNC cable. WCK sync uses the WCK-IN connector on the Utility module near the power inlet at the rear of the ADA-128 or one of the connectors on the Ref I/O multi-way D-type.

Also … from version 1.5.1 onwards, a 10Mhz off-air/atomic clock may be connected to one of the 'WCK' BNC connectors and used as a synchronisation source. (I.e. the 'WCK' connectors can support more than just a Word Clock signal).

AES Digital I/O module – any digital audio I/O module may be the source of clock for a domain as long as it is a member of the domain. When an AES module is selected as the Clock Source for a Domain, a second 'Carrier' selector will appear which allows you to choose which of the four input pairs to use. Selecting 'Auto' would choose the lowest numbered input of the module that has a valid signal as the clock reference for the domain.



Host Modules – if a host module can be used as the Clock Source and is a member of the domain it will appear in the list of possible Clock Sources. Dante modules may be used as a Clock Source. If you choose a Dante module, you will be clocking the ADA-128 from the Dante network.

Sample Rates

The ADA-128 Sample Rate can be set to a standard rate between 44.1kHz and 192kHz.

Follow Clock – if it's set to this, when you're set to an external Clock Source (i.e. not Internal) the Sample Rate changes to match the sample rate on the external clock signal.

Note that when you change the Clock Source to an external source, by default, the Sample Rate will change to 'Follow Clock' – you can manually change to any other Sample Rate, but this speeds up the change in the majority of situations.

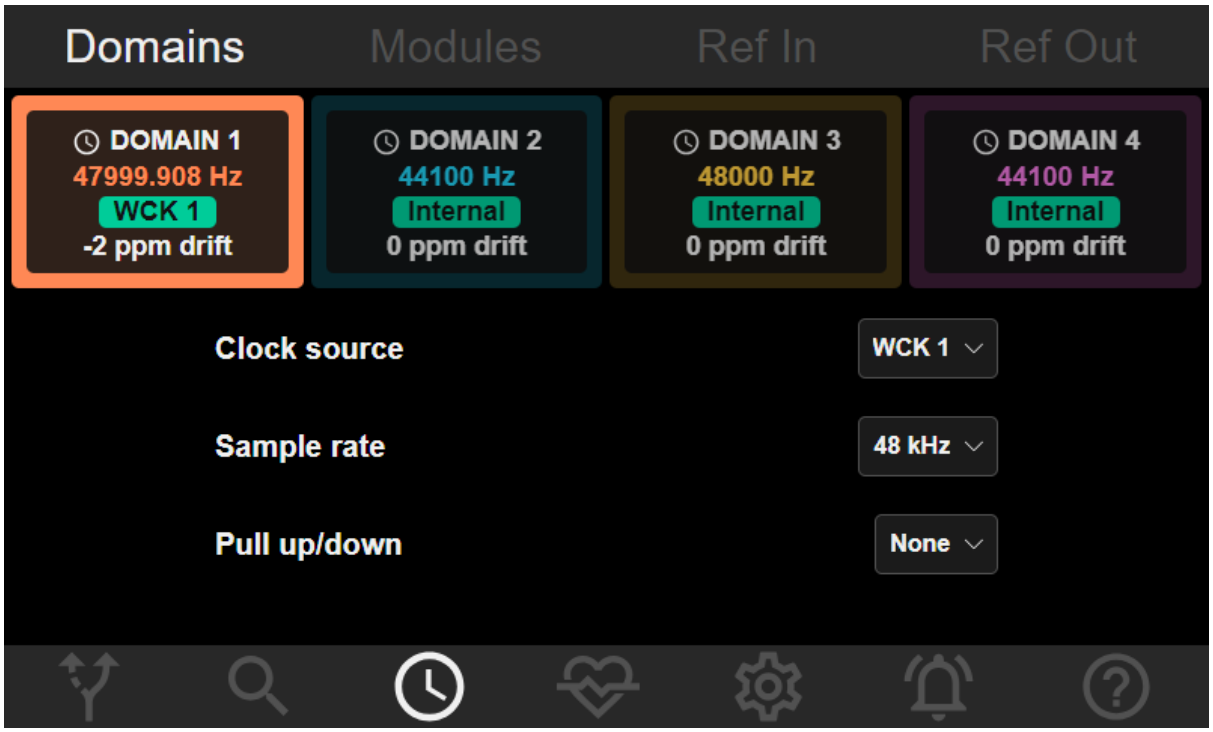
Sample Rate can also be set to:-

44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz

Pull Up / Down

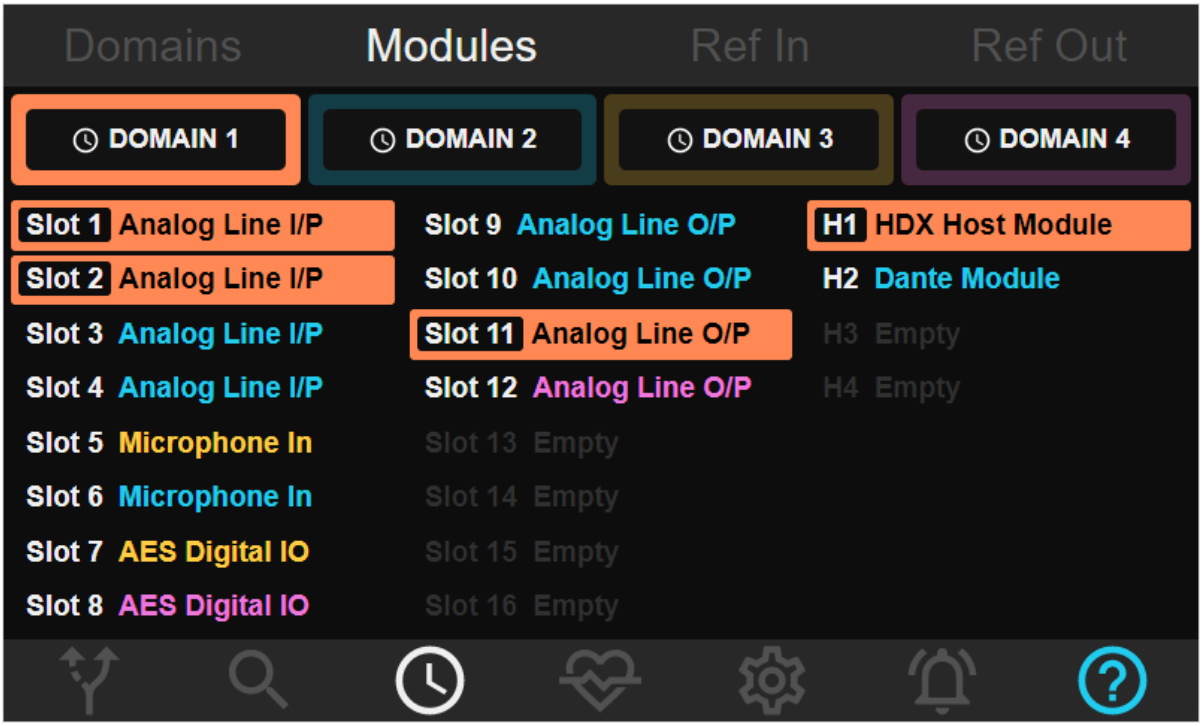
Allows for a speed up or slow-down of the clock rate usually for use in picture applications. You can select from four pull up/down rates - +4.16%, +0.1%, -0.1% and -4.0%.

When a Clock Domain is using an external clock source, the coloured tile for the domain will report the *exact* Sample Rate (as measured relative to the ADA-128's internal clock) and this may be slightly different from the Sample Rate setting.



Modules Tab

The Modules Tab has the four coloured tiles for each of the four Clock Domains shown along the top of the tab. Pressing one of those shows 20 'slots' – one for each of the possible I/O modules – 16 I/O, and the last column of 4 slots is for Host modules.



Modules that belong to the currently selected Clock Domain have a block outline in the colour of the selected domain in order to highlight those modules. Those that belong to a different Clock Domain have their text written in their domain's colour. The domain colour is repeated in the module's text colour in both the Routing and Inspect pages.

There are some important rules for the handling of clock domains …

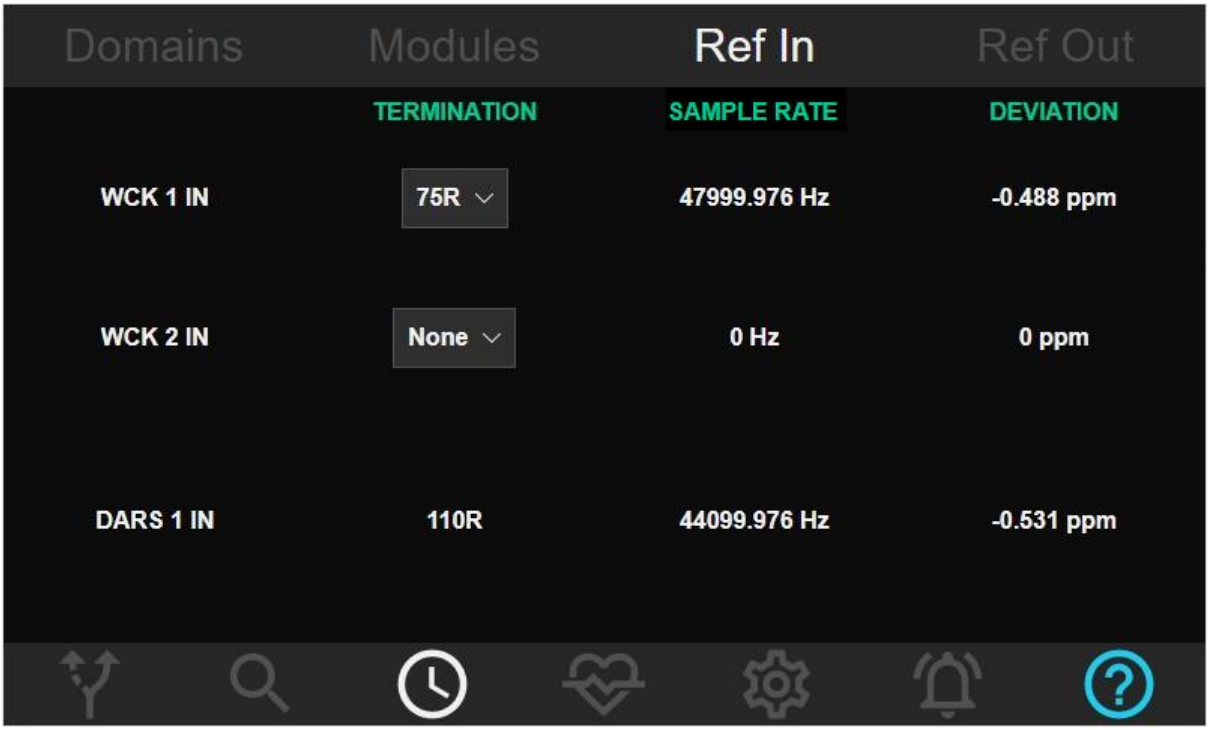
1. A module may only belong to *ONE* clock domain.
2. You may only change a module's clock domain if the module and its inputs or outputs do not feature in a routing.

To change a module's clock domain, select the new domain at the top of the modules page, then click on the module. You will see a message box asking you to confirm; pressing OK will complete the domain change.

As with all changes that involve a major reconfiguration of the unit, it's wise to mute any audio monitoring whilst changing Clock Domain settings.

Ref In Tab

The Ref In tab shows the status of each of the Sync Reference *Input* connections in the Sync Connections block at the rear of the ADA-128 unit – Word Clock In and DARS In connections.



Note: from version 1.5.1, the BNC connectors labelled 'WCK' support 10Mhz off-air or atomic clock as well as a Word Clock signal.

There are primary connectors for Word Clock (BNC – 'WCK1') and DARS (XLR – 'DARS1') on the back panel, and there are extra ports available on the Ref I/O 9-way D-type connector, for which a break out cable is available. These are listed in the Ref I/O Hardware reference below.

The Ref In Tab reports on some conditions of signals on the available Reference Inputs – the measured Sample Rate of any signal present on those connectors, along with its percent deviation from the ADA-128's own internal clock.

When a WCK input has a 10Mhz clock connected, the 'sample rate' column will show the speed of the clock – i.e. 10000000 Hz.

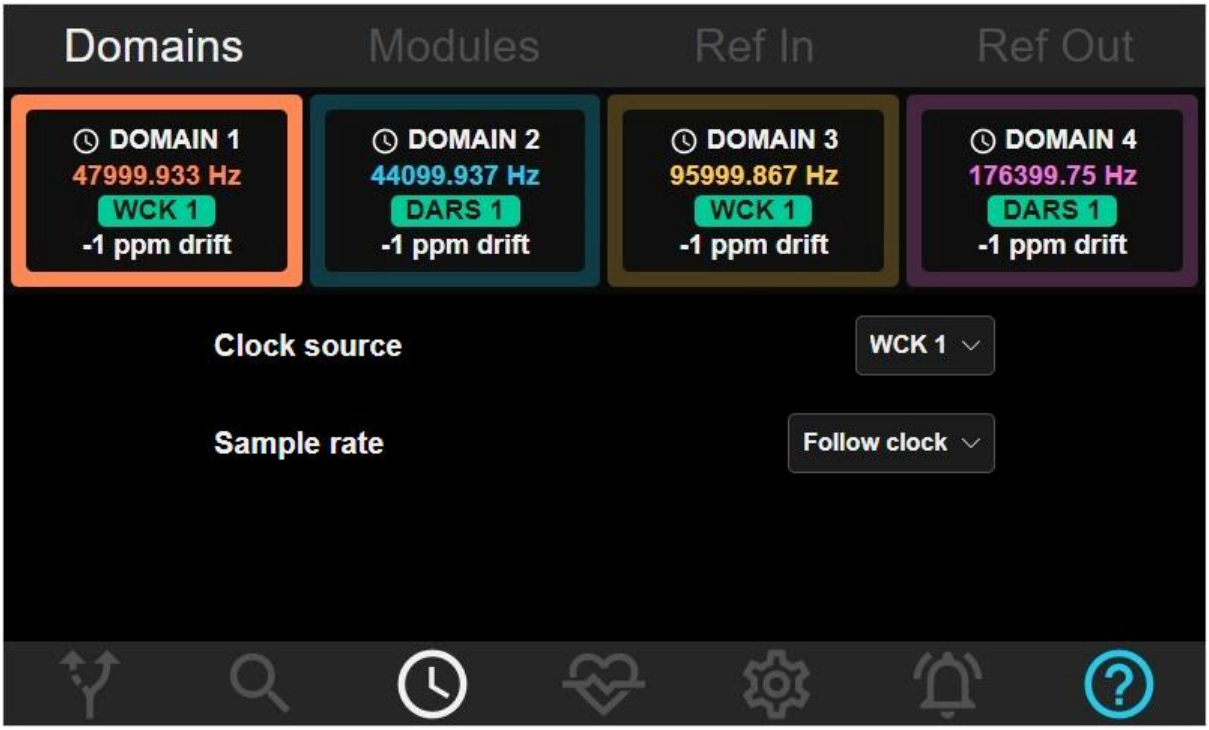
These Reference Input connectors can be used as a Clock Source for any Clock Domain but they don't actually *belong* to one Clock Domain (and could be used by multiple domains).

Although there are inevitably times when you would want the Clock Domain's sample rate to be the same as the Clock source – it does not have to be the case - the choice of sample rate for a Clock Domain is independent of the Sample rate of the Sync Source, and the Clock Domain may be at a different sample rate, as long as the clock Source is running at a standard Sample Rate.

For instance, the Clock Domain may run at 96KHz with a Sync Source at 48KHz. Similarly, a different base rate is acceptable – i.e. the Clock Domain at 48KHz with a Clock Source at 44.1KHz (or vice versa).

However, in most situations, you would want to run a Clock Domain at the same rate as the Clock Source, in which case you should select 'Follow Clock' to allow the Clock Domain's rate to change if the Sync Source rate changes.

The **Domains** tab will display the measured Sample Rate and deviation when domains are locked to an external clock source i.e.:-

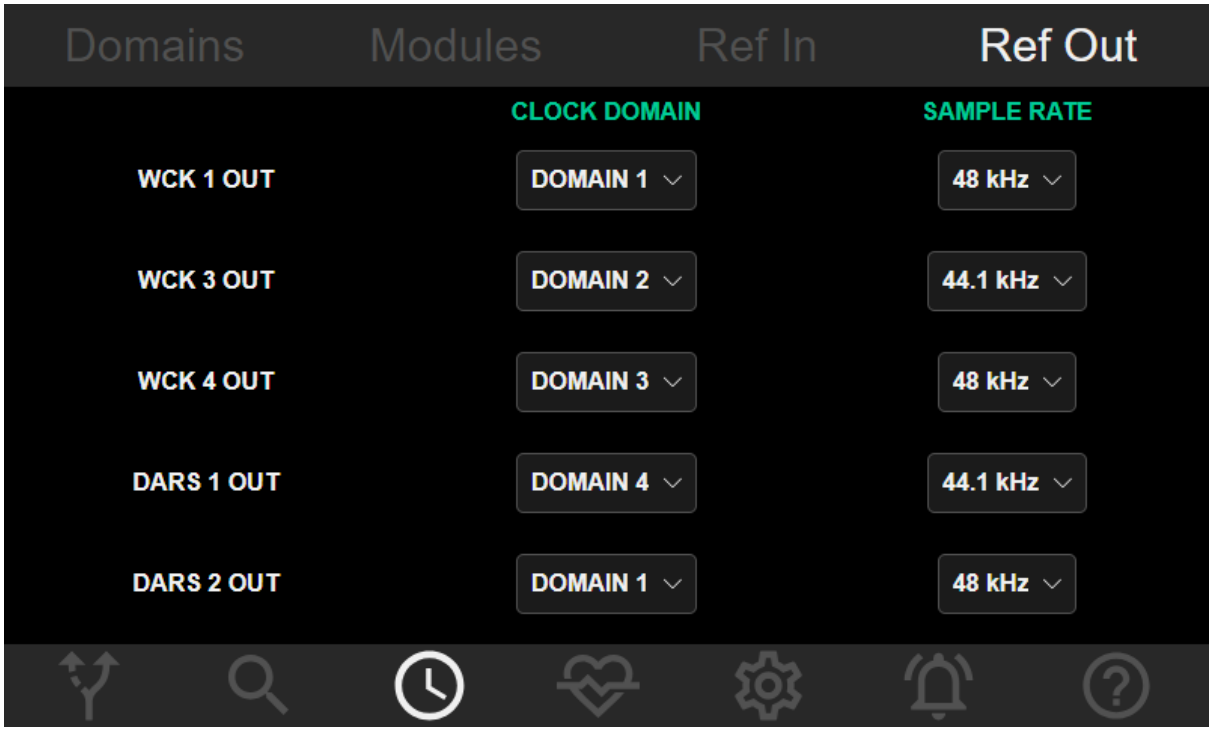


The **Termination** selector allows you to enable or disable the 75 ohm termination on Word Clock inputs. Word Clock signals may be 'chained' and looped through to other devices by using a 75 ohm T-piece. The end points (and only the end points) of any Word Clock chain *must* be terminated to avoid signal reflections which may cause incorrect timings. You should enable the terminator if the Word clock cabling ends at the ADA-128's Word Clock input, or disable the terminator if the Word Clock is looped through.

Note that the BNC connectors are named 'WCK' but they might be connected to some reference other than Word Clock such as video black & burst, 10MHz off-line, atomic or GPS reference etc. (some of these in possible future expansions).

Ref Out Tab

The Ref Out Tab shows settings for the Sync Reference *Output* Connectors in the Sync Connections block at the rear of the ADA-128 – for Word Clock or DARS Outputs.



There are primary connectors for Word Clock (BNC – 'WCK1') and DARS (XLR – 'DARS1') on the back panel, and there are extra ports available on the Ref I/O 9-way D-type connector, for which a break out cable is available. These are listed in the Ref I/O Hardware reference below.

The Ref Out Tab shows the settings for the available Reference Outputs –WCK 1 Out, WCK 3 Out, WCK 4 Out, DARS 1 Out, DARS 2 Out (note... there is no WCK 2 OUT).

Clock Domain – the Ref Out clock may be derived from any of the four clock domains.

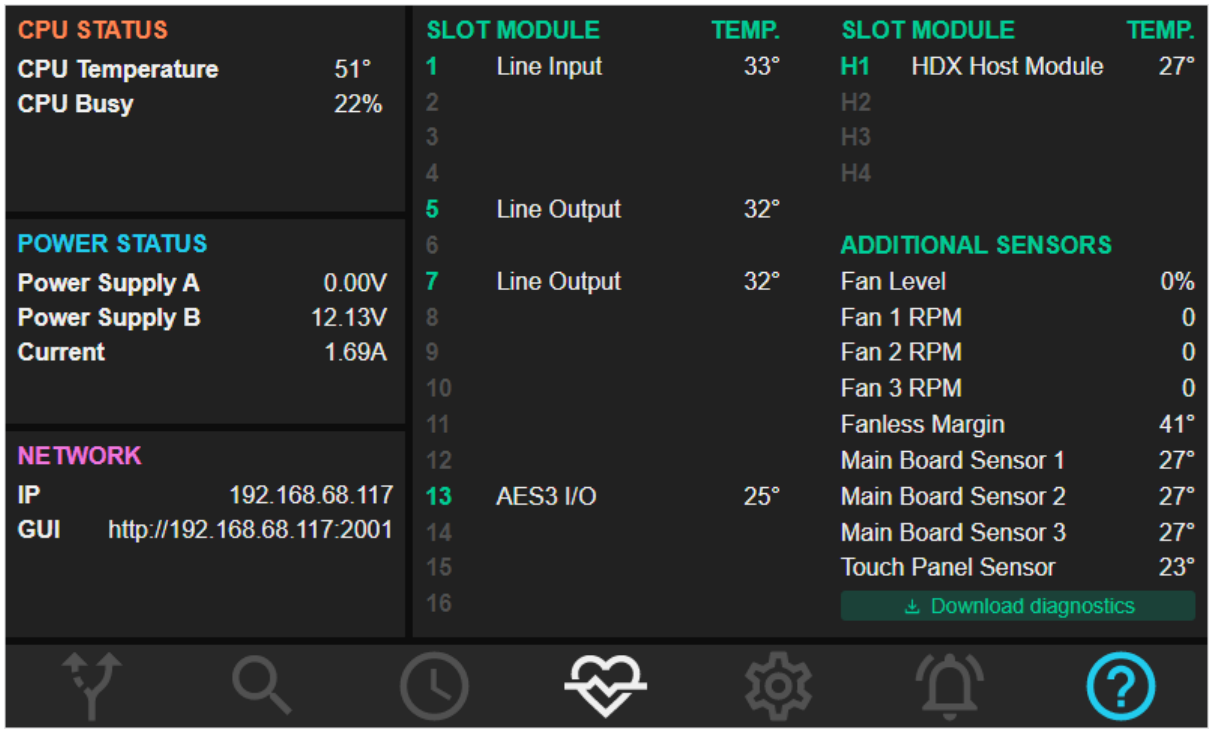
Sample Rate – the Sample Rate of the selected domain will be displayed for each Ref Out connection. Each Reference Output must be clocked at its clock domain's *Base* Rate, but the multiplier can be changed – when you select the Sample Rate drop-down you will be offered three choices.

Base Rate – to clarify the term 'Base Rate'. Sample Rates used in professional audio products tend to be a multiple of 44,100 or 48000, which we call the 'Base Rate' - i.e. 44.1KHz, 88.2KHz and 176.4kHz as multiples of the 44,100 Base Rate and 48kHz, 96kHz and 192kHz as multiples of 48,000.

For instance, when operating at, say 96KHz sampling rate, you could set the Ref Out to run at 'Base' which would be 48KHz (for instance for use as 'Loop Sync' with a Pro Tools system). The 'Sample Rate' may also be set to the value of **Frame Rate** and in that case, it would follow the full sample rate of the Clock Domain to which it belongs.

Status Page

The Status or 'Health' page displays some details about the condition of the ADA-128 hardware.



In the example above you can see that the temperature of all the fitted I/O and Host modules is reported, along with the temperature of the Mainboards, and the CPU.

In addition, the status of the Power supply is reported, and there's an indicator of how busy the CPU is.

In the bottom left corner **Network** section, the IP address is displayed when the ADA-128 is connected to a network, so that you can connect a computer, smartphone etc. as a remote control. Into a browser on the device, type the 'GUI' line – i.e. type **http://192.168.68.117:2001** which is the IP address with :2001 added to specify which port is being used.

Finally, the bottom right corner displays the temperature of a number of key sensors within the housing, along with the status and speed of the fans….

Automatic Fan Controller

The ADA-128 has an automatic fan controller that adjusts the fans' level depending on how hot the unit is running.

The fans are normally off. The maximum internal temperature before the unit switches on the fans is around 60'C for a fully populated unit; this threshold is increased for units that are populated with fewer modules.

In practice this means that in a recommended rack installation (open frame 19" rack, 1U free space above and below ADA-128, no significant heat generating components top or bottom) a fully populated unit should remain fanless to around a 30'C ambient temperature. Less populated units will have a larger fanless operating temperature range.

The Status Page shows the required fan level, measured fan speeds, and calculated fanless margin. Fanless margin is how much temperature increase is still allowed inside of the ADA-128 before it switches from fanless to fan mode. Users can use this feedback to understand whether they are likely to have fans running during operation, and improve their operating environment to promote fanless operation. Note that this margin is dynamic and depends on external temperatures, the current temperature of the unit, ongoing power consumption and heat dissipation through the ADA-128 vents.

Download Diagnostics

It is possible to download a file containing some diagnostic information relating to the temperatures and other status of the various components in the system, which may help you work out where any high temperature related incident may have occurred.

The 'Download Diagnostics' button in the bottom right corner of the Status page can only be used under remote control, as it saves a file to the device being used for remote control.

The file saved is called 'ADA-128-diagnostics.tar.gz' and is a compressed file, containing a .CSV file inside.

The method you use to extract the tar.gz file will depend on the computer platform you are using. On a Mac, tar.gz files can be extracted by double clicking in Finder, or using the command…

```
% tar -xvf ADA-128-diagnostics.tar.gz
```

in the Terminal app.

Under Windows, you can either use a separate zip application, such as WinZip, or by using a command prompt (Run as Administrator):-

```
tar -xvzf C:\PATH\TO\FILE\ADA-128-diagnostics.tar.gz -C
C:\PATH\TO\FOLDER\EXTRACTION.
```

When extracted, the file 'ADA-128-Temperature-Log.csv' can be opened in a spreadsheet app, such as Numbers or Excel.

The top of the spreadsheet lists the circuit boards, with their names (i.e. Main board, CPU board etc.) serial numbers and versions, and then lists the fitted IO and Host modules with their serial numbers and versions.

Below that is a list of the maximum temperatures logged at particular times by the sensors on all the circuit boards, along with Power supply voltages and current.

The time is expressed as a single number for year, month, date, time – i.e. 20230529102322 is logged at 10:23am (and 22 seconds) on 29th May 2023.

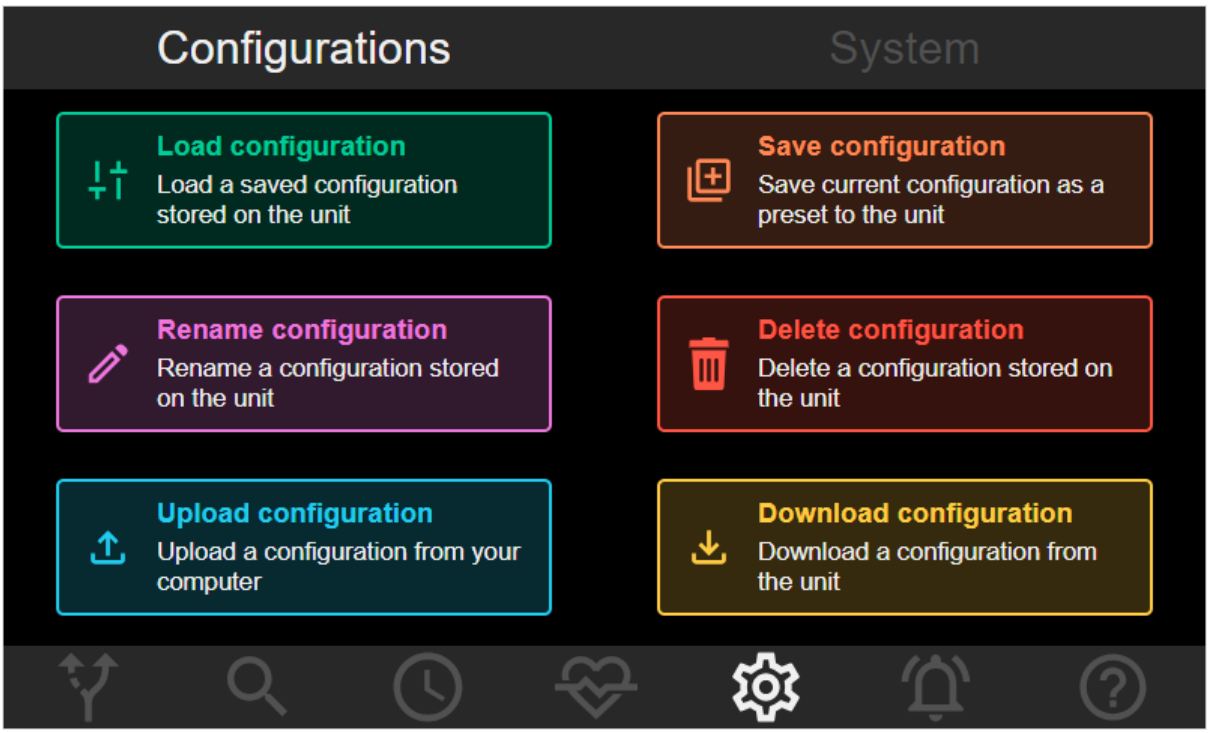
Settings Page

The ADA-128 can save and load its full configuration to files so that the unit can be quickly set up for an application. The **Settings** page is the area for loading, saving and managing those configurations. It also includes the **System** tab for reporting and changing some system level details.

The Settings page has a bar across the top with two buttons to allow you to select from the sub-pages:-

- **Configurations**
- **System**

Configurations Tab



The entire setup of the 'Dream' ADA-128 - a '**Configuration'**- including routings, clock domains, synchronisation settings, module line-up and all other parameters can be saved and reloaded as a full set.

The ADA-128 unit stores Configurations in internal memory. These Configurations are accessed via the touch-screen display (as well as via a browser remote control) and are available when ADA-128 is 'off-grid' or 'stand-alone' and unconnected to networks.

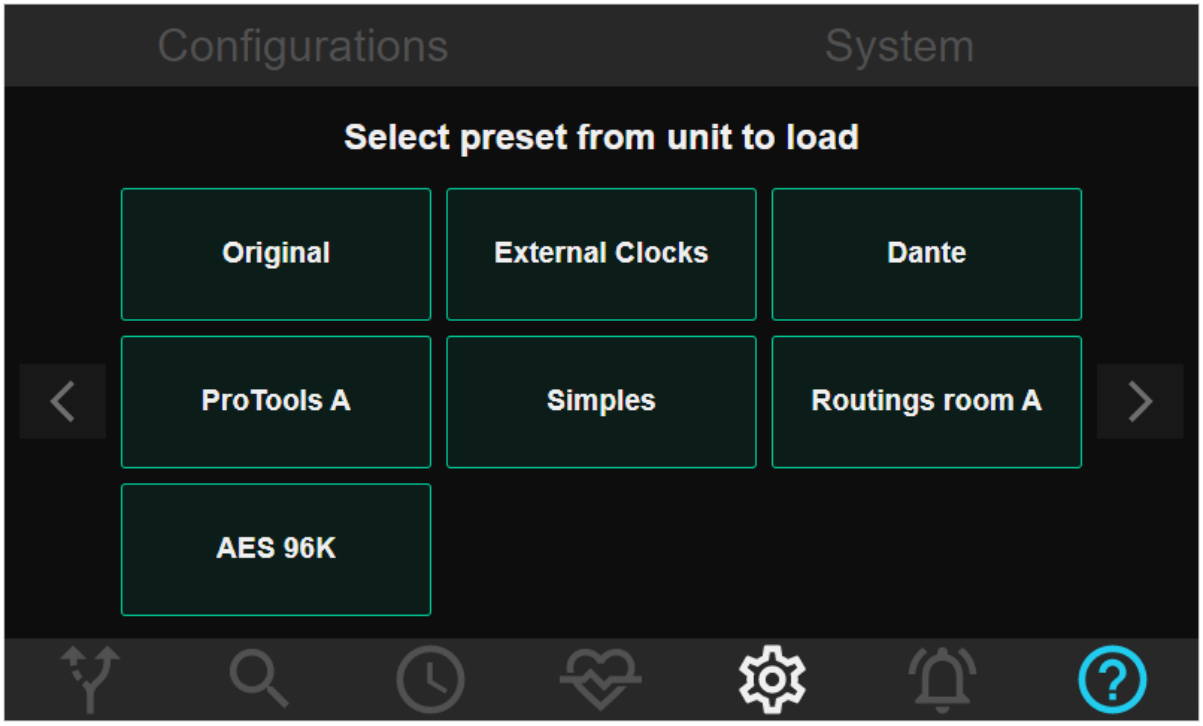
Of the six button options in the picture above, only the top four can be used with the front panel touch-screen display.

When the ADA-128 is being controlled from a networked device, Configurations may also be uploaded and downloaded via the browser control panel to/from the ADA-128 using files on any computer disks that the device can see. This also provides a means of backing up any Configurations in the ADA-128's own memory, and reloading Configurations from computer files.

Some standard Configurations may be supplied with the ADA-128. You may wish to customise some of these for your own purposes, and resave them – for instance line up levels are part of the Configuration, and the standards may not be exactly to your own standards.

The buttons' names are largely self-explanatory…

Load Configuration shows a list of Configurations stored on the ADA-128.



On selecting a Configuration and pressing 'Load' on the confirmation dialogue box, the entire configuration of the ADA-128 changes to whatever was saved in the Configuration.
It would be a good idea to mute any monitoring while loading a new configuration as there could be a big change in setup, routings and sync when the configuration is changed.

Save Configuration allows you to save the current full configuration of the ADA-128 to a new Configuration. You can name the new Configuration before saving it.

Rename Configuration allows you to rename an existing Configuration.

Delete Configuration allows you to delete an existing Configuration – obviously be very careful, there is no way to get the Configuration back, unless you have previously backed it up to a computer disk using the Download Configurations function.

Menu pages which show the saved Configurations – i.e. Load, Rename, or Delete Configuration – will display the Configuration tiles with a coloured outline to show which option had been selected (green for Load, violet for Rename and red for Delete). To back out from these menus just press the  Settings button or the **Configurations** tab.

Configurations may be copied to and from a computer when using remote control with a browser… Configurations are saved an a .XML file (and it's possible to read the contents, although you should take care not to spoil the file and make it unusable by trying to editing it...)

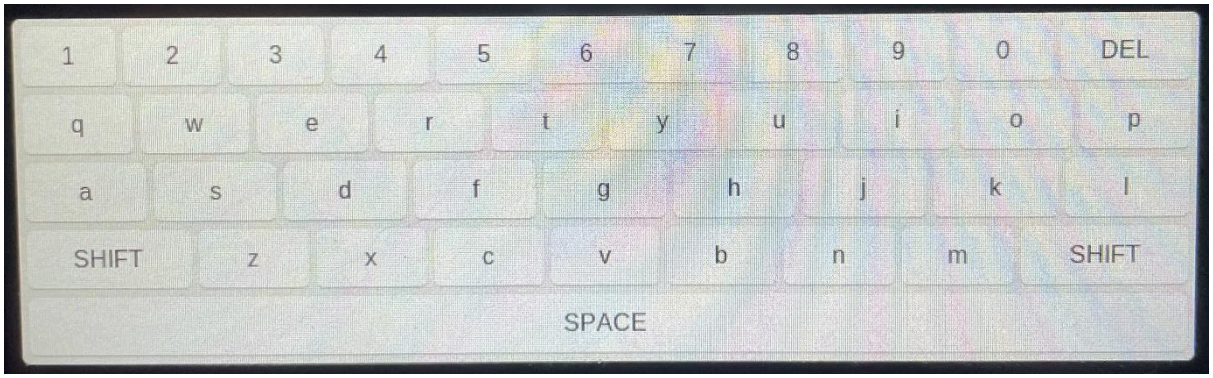
Upload Configuration allows you to copy a previously-saved Configuration .XML file to the ADA-128 to save in internal memory.

Download Configuration allows you to save any Configuration on the ADA-128 to a file on the remote computer (perhaps as a backup, so that it may be uploaded at a later date, or loaded to a different ADA-128 system).

The ADA-128 auto-saves its configuration internally (so that it can be reloaded when the unit is restarted) within around 20 seconds of a settings or routing change. It also saves when you press the front panel to switch it off.

Control Panel Keyboard

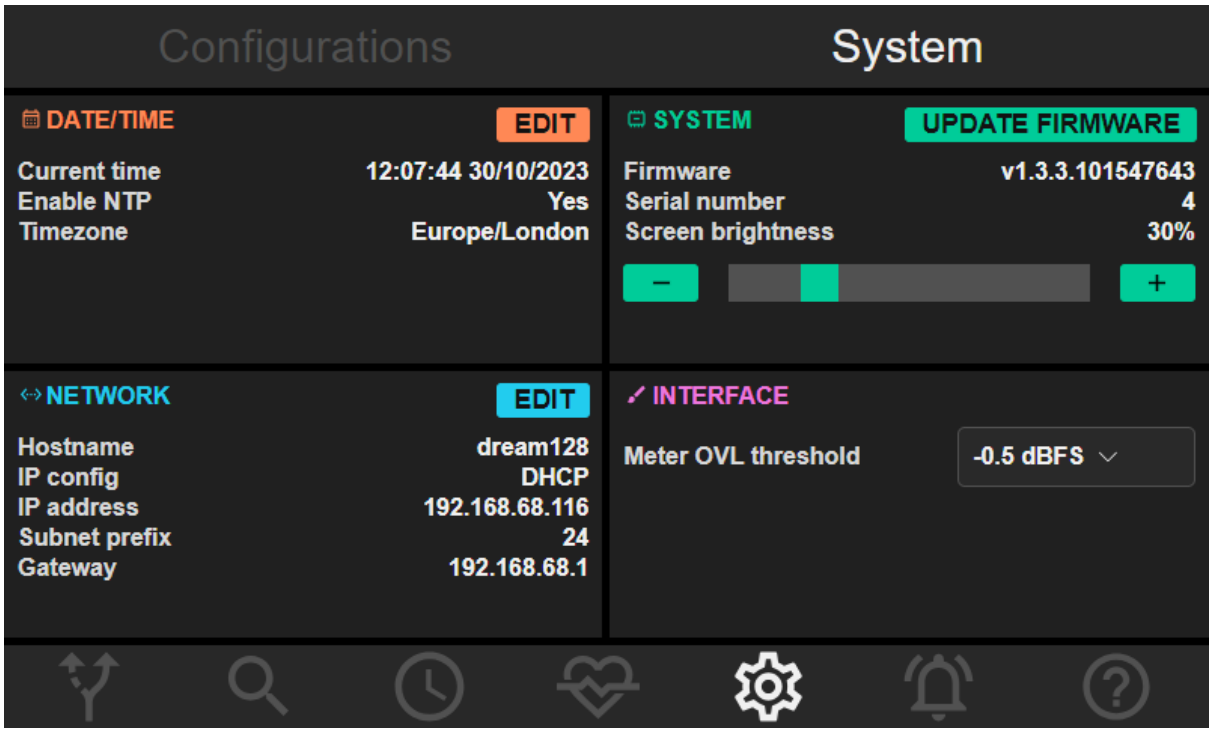
If the action you are taking in the front control panel requires some typing, (i.e. for naming Configurations) a qwerty keyboard will be shown on screen when you tap into the naming box .



When using the Control Panel in a browser, the device's normal keyboard is used for naming – i.e. a normal keyboard on a computer, or the devices usual pop-up keyboard on a phone or tablet.

In addition, when editing i.e. a name field, on the ADA128's own touch display, you are offered buttons for **Cancel, Clear, Confirm,** and two **arrow** buttons. The arrows move the edit cursor left and right. Clear, clears the entire field and the on-screen keyboard's **Del** key deletes backwards from the cursor.

System Tab



The System Tab has four sections:-

- **Date/Time**
- **System**
- **Network**
- **Interface**

Date/Time Section of System Tab

Displays the ADA-128's time setting and allows you to update it – press EDIT to change the time and date.

The 'Dream' ADA-128 supports NTP – Network Time Protocol – whereby the current time can be taken from an NTP server found on the network (of course, *if* the ADA-128 is attached to a network). If you enable NTP, you should also select the timezone as appropriate.

This section also displays the time when the unit was last restarted.

System Section of System Tab

Offers an 'UPDATE FIRMWARE' button and displays the currently loaded version of the firmware. To update the firmware you will need to be using a Remote Control (in order to be able to upload the firmware file itself). Press the **UPDATE FIRMWARE** button and follow the instructions – the process is explained in more detail later in the Hardware Section of this manual - Firmware updates.

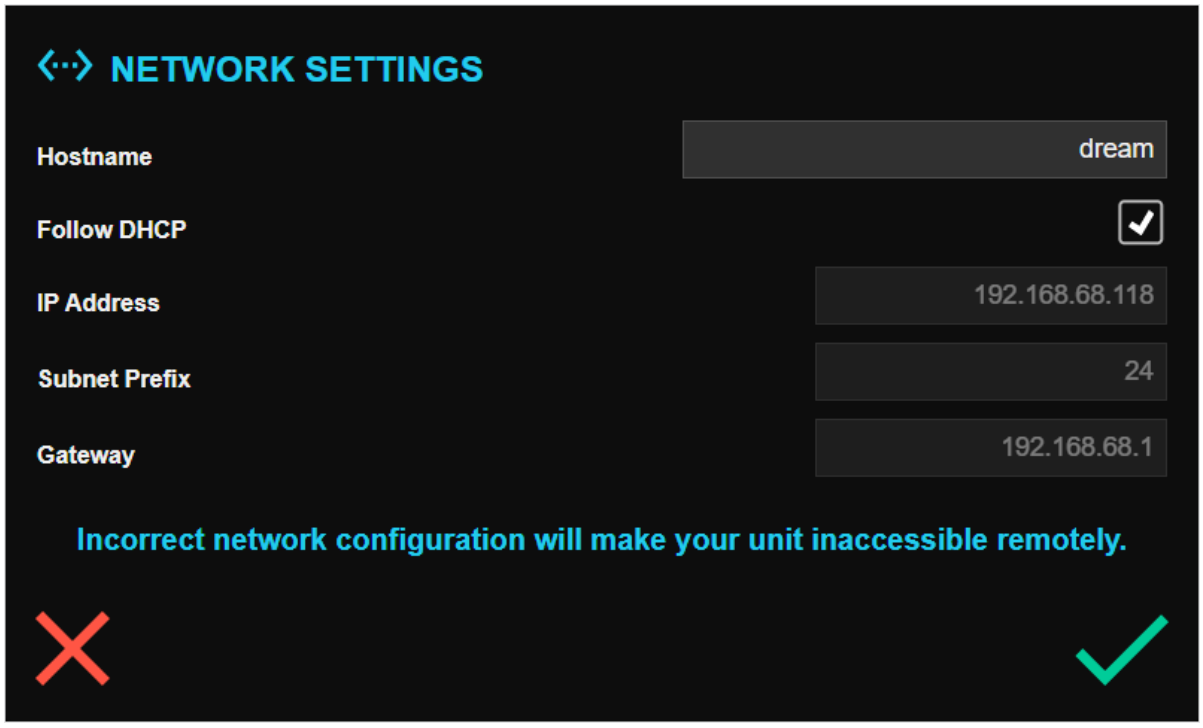
The Serial Number of the unit is reported in this area.

There is also a control to allow you to change the screen brightness – press the + or – buttons to increase or decrease the brightness.

Network Section of System Tab

Displays the network configuration of ADA-128 unit. The IP address is particularly important to allow you to connect a phone/tablet/computer device for Remote Control.

Pressing the EDIT button shows a dialogue box which allows you to change the Network settings. The default is for DHCP, whereby the ADA-128 allows its IP address to be dynamically allocated by the network.



With the IP address set by DHCP you may find that the IP address changes from time to time (and you will then not be able to log in remotely at the earlier address until you find out the new one… although you could use the hostname method i.e. http://dream128.local:2001 mentioned below). It is possible, by changing the network mode to **Static** to assign a fixed IP address, but depending on your situation you may wish to consult with a network administrator first.

Under DHCP, many networks will recognise the Hostname field, and so for instance with the settings as in the picture typing...

http://dream128:2001/

into a browser may find the ADA-128, and in that situation, assigning a Static IP address may not be necessary. You should power cycle the ADA-128 after changing the Hostname field, to make sure the network's DNS refreshes.

http://dream128.local:2001/

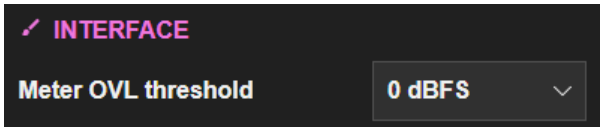
is another alternative way of addressing the unit, and perhaps may be more reliable or quicker (our experience suggests this may work better on iPads and iPhones).

If you have multiple ADA-128's you may find it convenient to give them unique names and to update the Hostname in order to make the addressing of them easier (and easier to remember).

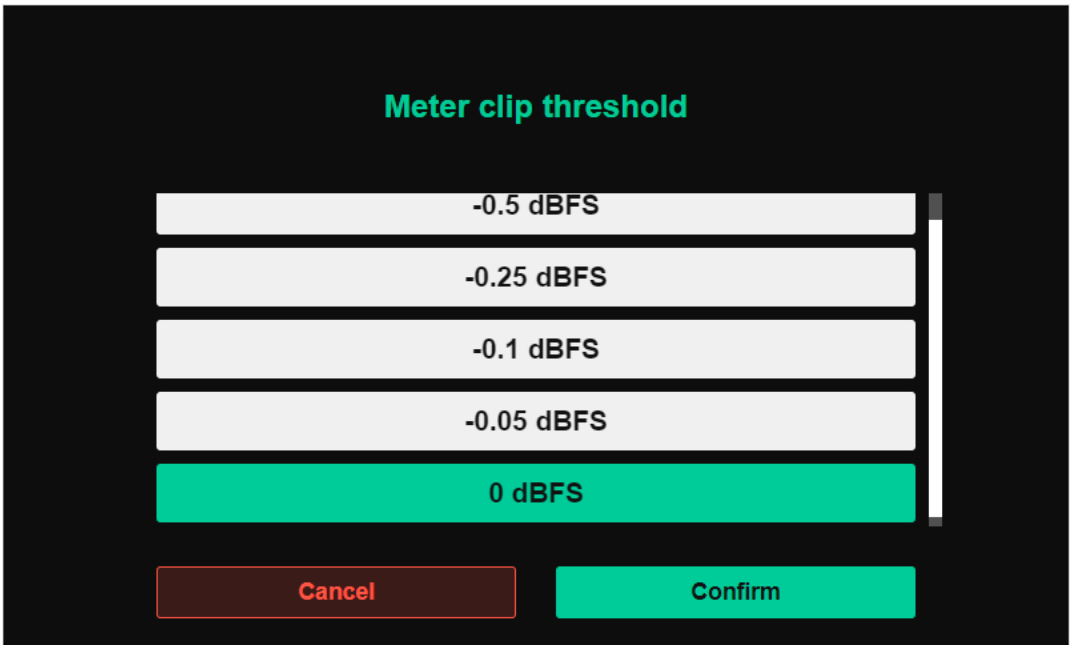
Interface Section of System Tab

The Interface section includes user settings for certain parameters: -

Meter OVL Threshold – sets the threshold, above which the OVL LEDs light up on all of the Inspect pages' meters.



Clicking on the 'drop-down' dBFS selector box shows the usual menu which allows you to select the value of the threshold.



Alarms Page

The Alarms page can display any errors that are reported – for instance digital audio sync issues, and any components that may be running too warm.

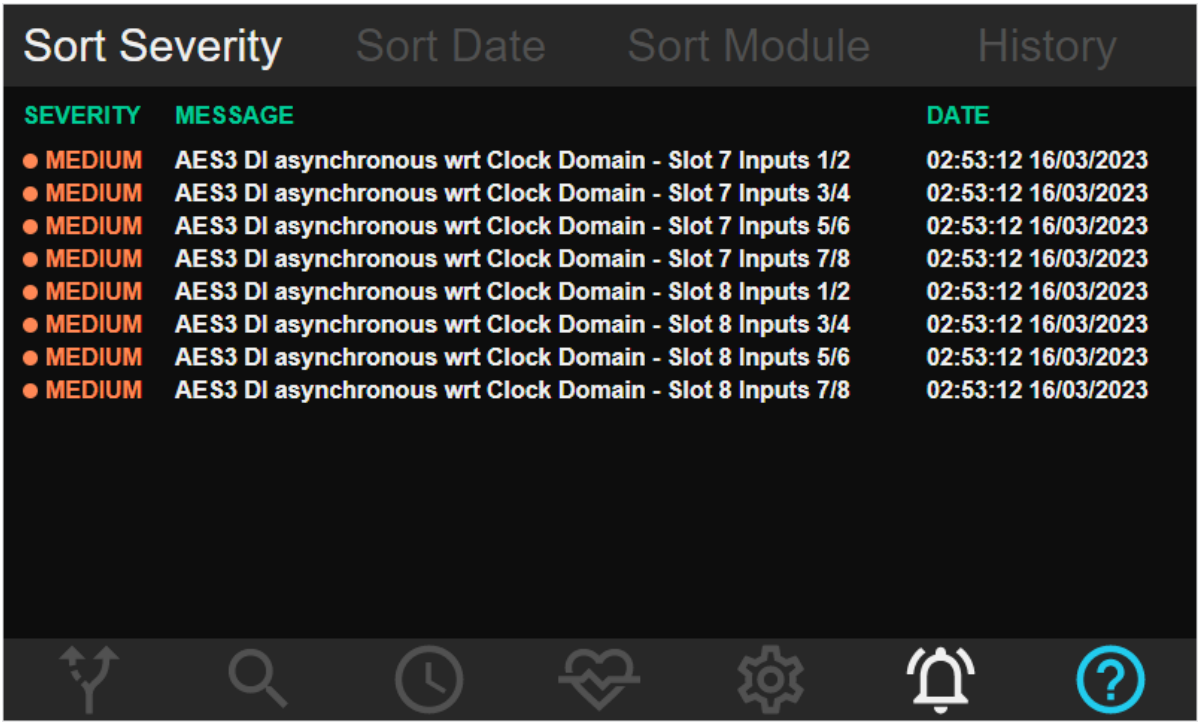
Alarms are described with three levels of severity. Red is HIGH, Orange is MEDIUM, and Yellow is LOW.

When there are no errors in the list, the Alarm button is white .

When an Alarm is triggered, the 'Bell' icon on the bottom toolbar will change colour -to show the severity level of the most severe error that has occurred – i.e.

Yellow for Low, Orange for Medium, Red and flashing for High severity errors

Pressing the alarm button on the toolbar shows the alarm page (and the Alarms icon is now in white while this page displays).



There are four tabs along the top.

The **History** tab shows all **High Severity Red** alarms that have ever occurred in the unit's service life.

Red alarms are usually quite serious and cover situations for instance where something has been detected at Over-temperature, some sort of hardware component failure, or a failure to boot.

The other Live pages will show *current* alarms. Any error that has been resolved will disappear from the 'Sort…' tabs but any Red alarms will persist in the History tab.

The sort buttons allow you to sort the list by Severity, Date and Module.

Medium (Orange) alarms cover situations like … Clock invalid/disconnected/drifted significantly, or Digital Input asynchronous with respect to the clock domain.

Low (Yellow) alarms are for i.e. AES input unlocked, AES parity error etc.

Temperature Alarms

When the temperature of certain components exceeds allowed thresholds, a High priority red alarm will display.

The threshold values are as follows:-

For I/O or Host Modules, the threshold is 80'C.
For the CPU, it's 90'C.
For the mainboard, it's 70'C.

Once the temperature falls to within the threshold bounds, the Alarm entry will disappear from the Live "Sort…" pages but will persist in the History page.

 Information Page

The Information icon and its page should not usually show – this page is for test purposes and only shows on internal software builds.

 Help Page

When the **?** icon is pressed, context sensitive help topics about the page you are viewing will appear. Clicking on the green tick in the bottom right corner will return you to the page.

Hardware Reference

Considerations when fitting into a 19” rack

The ‘Dream’ ADA-128 chassis is a 2U 19” rack unit. Rack ears are part of the chassis as standard, and you will need 4 rack bolts to fix it into a 19” housing. The ADA-128 is 31cms/12 ¼ inches deep from the rack fixings to the rear, but you will also need plenty of room for connections.

Thermal Considerations

The ‘Dream’ ADA-128 does have fans to assist air circulation if required. These are managed by the software using a number of temperature sensors within the unit.

If the air flow is sufficient to keep the internal temperature below certain thresholds, they will not switch on and thus may remain silent during use.

The fan operation may be more critical if the unit is in the same room you are working in, and so to help set up the positioning in the rack for optimum temperatures, the temperatures and the fan speeds and levels can be viewed in the  Status page. The Automatic Fan Controller is described in more detail above along with some guidelines of temperature ranges.

The air flow inside the rack is designed such that warm air is vented through the perforations in the rack case. The cut-outs in the top, bottom and sides of the ADA-128 should *never* be blocked, and so you should always leave a gap of 1U in any 19-inch rack both above and below so that warm air can escape. Similarly, the rear of any rack case should be vented to allow warm air to escape. Avoid positioning high heat generating equipment too close in the rack to the ADA-128.

The amount of heat the ADA-128 generates depends very much on how many modules are fitted, how hard the unit is working and even what levels any Analogue I/O is operating at; Analogue levels set to operate at +24dBu will make the ADA-128 run warmer than at +18dBu. With a fully loaded unit more attention must be paid to air-flow, and perhaps even the assistance of external fans to force the air-flow may be required.

When the temperature of any key component exceeds safe levels, the hardware will produce a Warning in the Alarms page, and the  ‘Bell’ icon will show / flash in red.

How & where to fit modules

There are slots for up to 16 I/O modules (labelled 1-16) , and 4 Host modules (labelled H1-H4).

At the left side of the rack (as viewed from the rear) there are power supplies and the module nearest the power supplies is the CPU module, which should not be moved.

The rear of the rack has 8 apertures for the I/O modules, and so a fully loaded rack will require the I/O modules to be paired.

The four Host Module slots each take a single module.

If the rack is not fully loaded it's preferable to space the modules to help with the heat distribution – particularly the Host Modules – i.e. if you have two, use slots 1&3. Once you've opened the rack you will see that there are three fans along the front of the unit. It shouldn't be necessary to put modules directly in front of a fan, but space them as far apart from each other as is practical for your setup.

To fit a new module:-

Switch off the ADA-128

Remove the power cable.

WARNING: Replacing or reconfiguring I/O and Host modules requires removal of the top cover of the ADA-128. This operation presents a risk of electric shock, therefore **refer this operation to qualified personnel**.

Remove the ADA-128 from its 19" rack

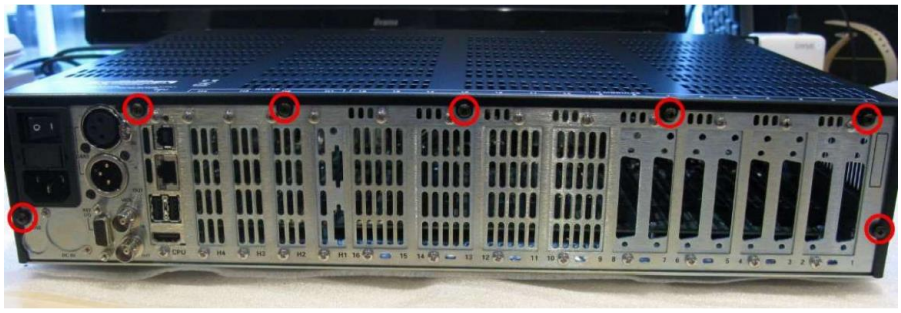
It's not possible to fit a module while the ADA-128 is rack mounted.

Remove the top of the rack.

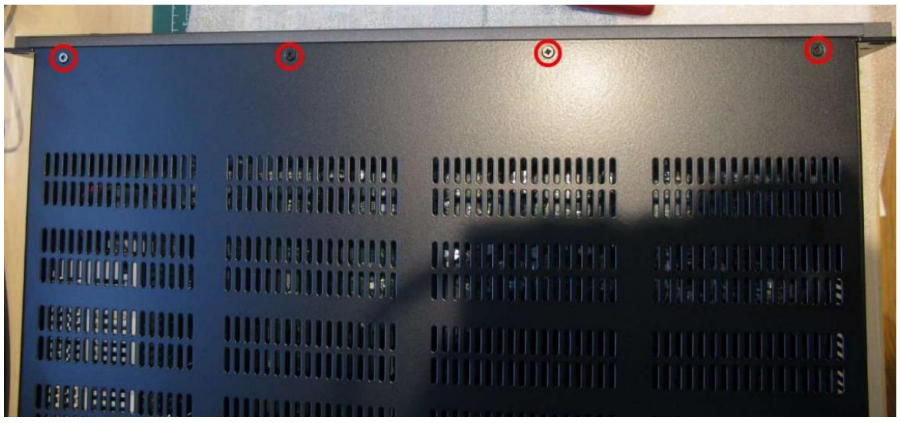
There are 4 off M3x8mm countersunk screws on the Left Side:-

… and 5 off M3x8mm countersunk screws on the Right Side:-

There are 5 off M3x8mm pan head screws along the top edge of the rear of the rack, and one on each side at the rear:-



And 4 more M3x8mm countersunk screws along the front of the top panel:-



Remove any slot blanking panels – two M3x6mm pan head screws - one top, one bottom.

New modules are fitted with back plates to suit your rack – if you have plenty of space in the rack they will come as one module on a back plate, but if you are fitting many modules, they may be fitted as two-modules to a back plate.

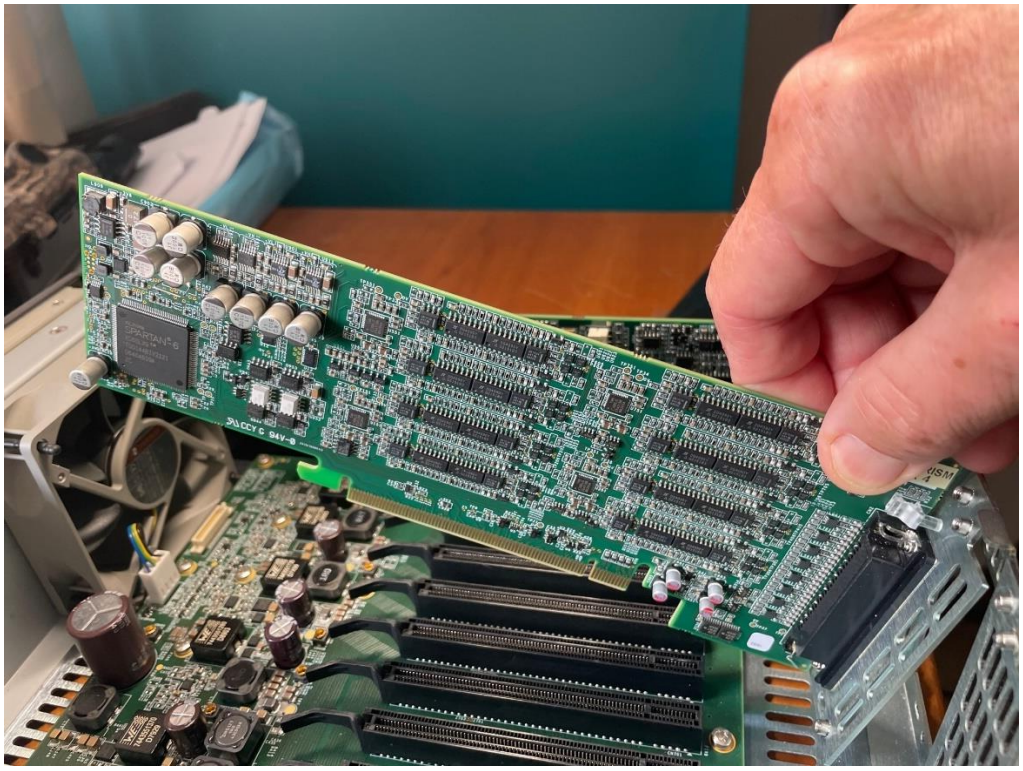
Colour coded stickers are available for quick recognition of modules – red for Line In, Green for Line Out, Yellow for Mic/Line In and Blue for AES.

When handling any ADA-128 modules be sure to take anti-static precautions. Always properly ground yourself. The modules will come in an anti-static bag. Keep them in the bag until inserting them into the rack.

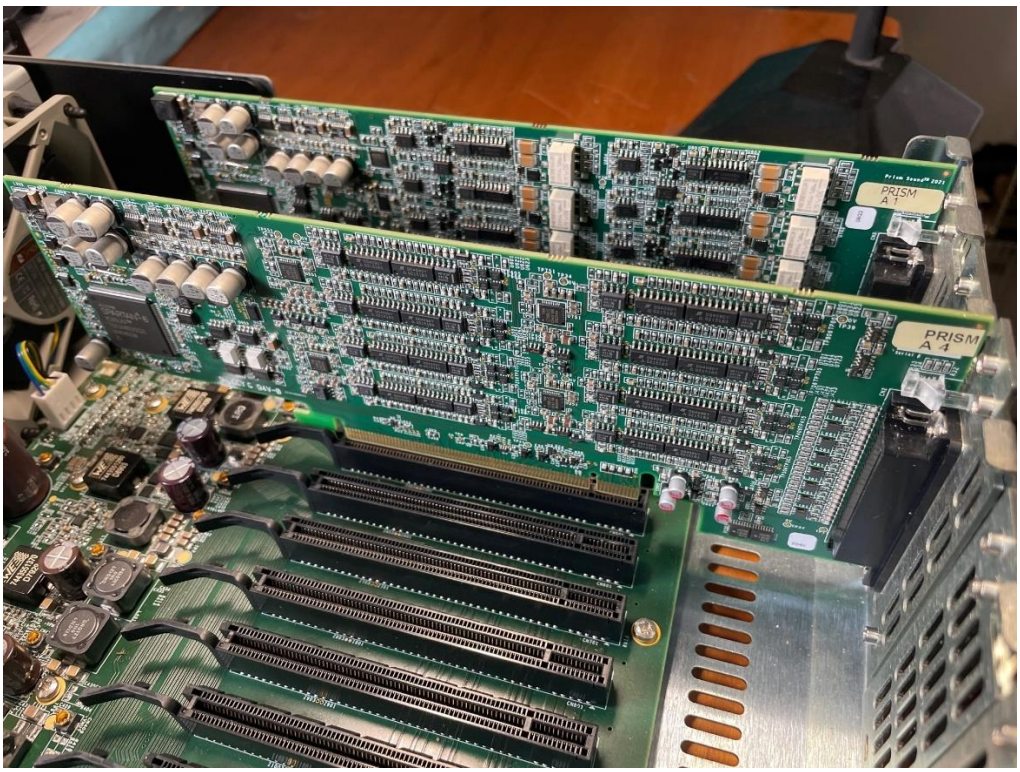
If you plan to move other modules to make room for new additions, the removal procedure is the reverse of the insertion procedure however also you will need to gently pull the plastic clip on the rear (i.e. closest to the *front* of the unit case) of the card slot outwards to allow the card to lift out. When inserting a card, the plastic clip moves as you push the card in.

Inserting a Module

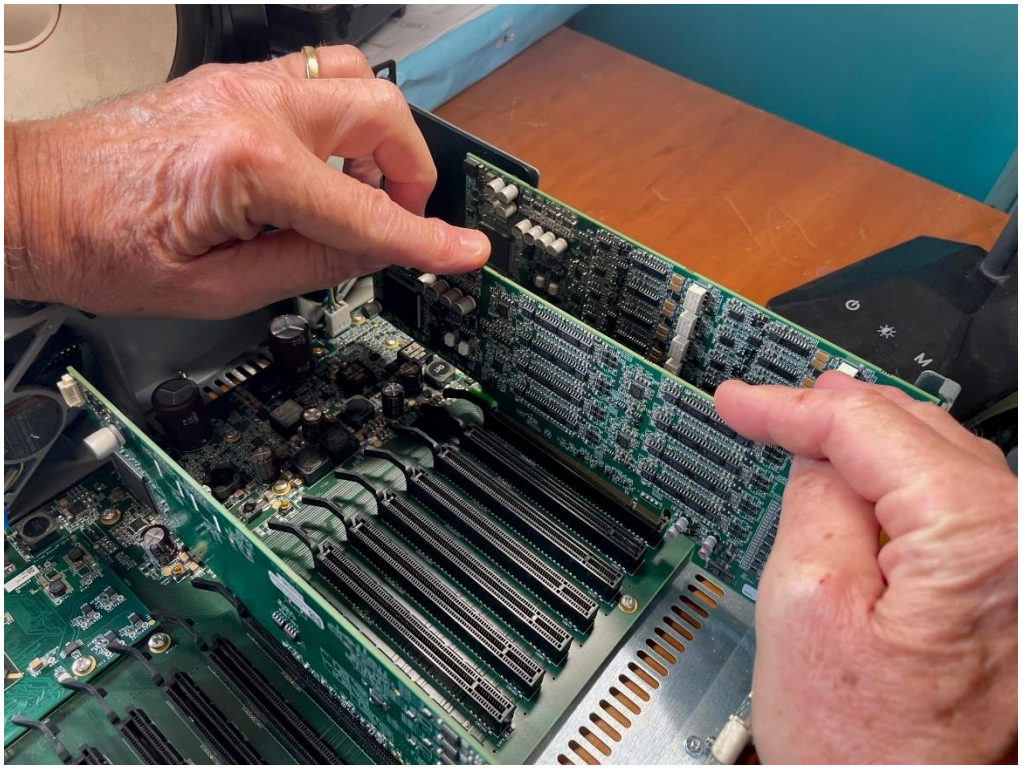
Step 1 – the top of the rear panel has a folded-over clip and so you will first need to offer the module's connector edge into the hole in the back of the rack...



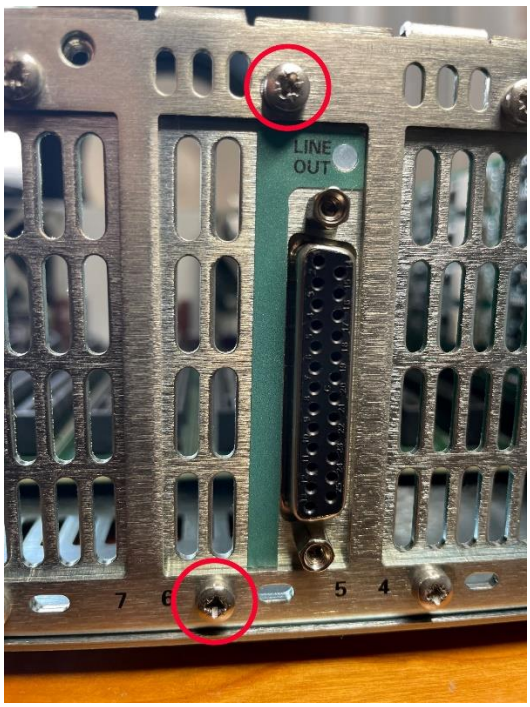
Step 2 - you can now rest the module into its slot – make sure that the key-way aligns with the slot in the card's edge connector.



Step 3 – Carefully but firmly press the module down into the slot. You may find it easiest to 'rock' it slightly as you push – with your fingers on top of the module, but close to the ends of the card slot in the motherboard, push one end down a little and then the other.



Step 4 – you can now screw in the two screws at the rear – one at the top, one at the bottom of the module mounting - to hold the module into the rack

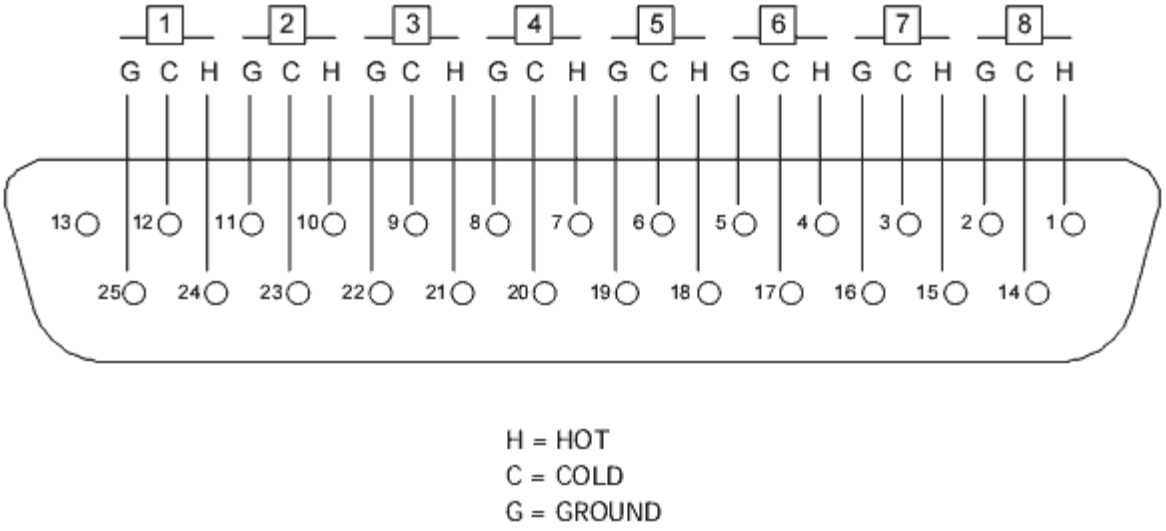


Step 5 – replace the lid and secure it with the screws, and replace the ADA-128 into its rack unit.

D-type connector pin-outs.

Connections for Analogue and AES audio are on 25-way D-Type multi-pin connectors. Prism Sound can supply cable looms which break the channels out to individual XLR connectors. The pin-outs are in the standard Tascam format.

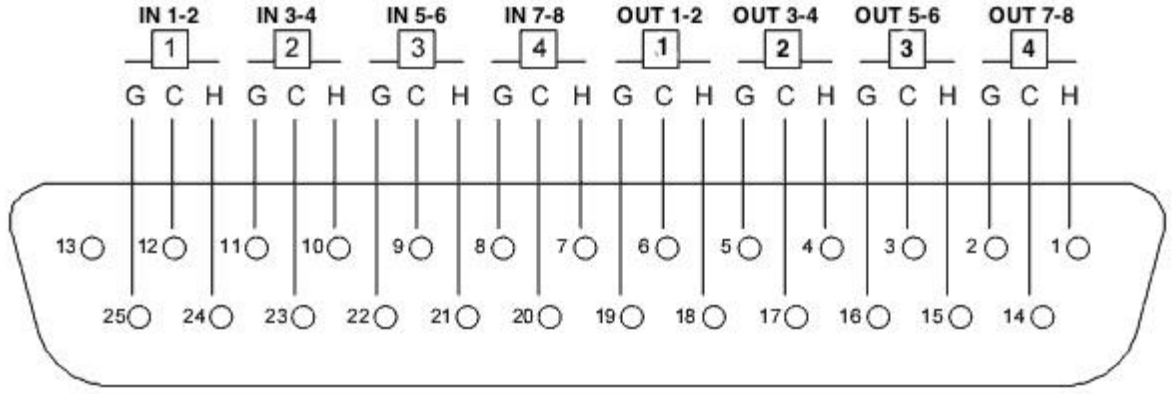
Analogue Input and Output



Pin Number	Description	Pin Number	Description

1	Channel 8 hot	14	Channel 8 cold
2	Channel 8 ground	15	Channel 7 hot
3	Channel 7 cold	16	Channel 7 ground
4	Channel 6 hot	17	Channel 6 cold
5	Channel 6 ground	18	Channel 5 hot
6	Channel 5 cold	19	Channel 5 ground
7	Channel 4 hot	20	Channel 4 cold
8	Channel 4 ground	21	Channel 3 hot
9	Channel 3 cold	22	Channel 3 ground
10	Channel 2 hot	23	Channel 2 cold
11	Channel 2 ground	24	Channel 1 hot
12	Channel 1 cold	25	Channel 1 ground
13	n/c		

AES I/O



H = HOT
C = COLD
G = GROUND

Pin Number	Description	Pin Number	Description
1	Output 7&8 hot	14	Output 7&8 cold
2	Output 7&8 ground	15	Output 5&6 hot
3	Output 5&6 cold	16	Output 5&6 ground
4	Output 3&4 hot	17	Output 3&4 cold
5	Output 3&4 ground	18	Output 1&2 hot
6	Output 1&2 cold	19	Output 1&2 ground
7	Input 7&8 hot	20	Input 7&8 cold
8	Input 7&8 ground	21	Input 5&6 hot
9	Input 5&6 cold	22	Input 5&6 ground
10	Input 3&4 hot	23	Input 3&4 cold
11	Input 3&4 ground	24	Input 1&2 hot
12	Input 1&2 cold	25	Input 1&2 ground
13	n/c		

REF I/O

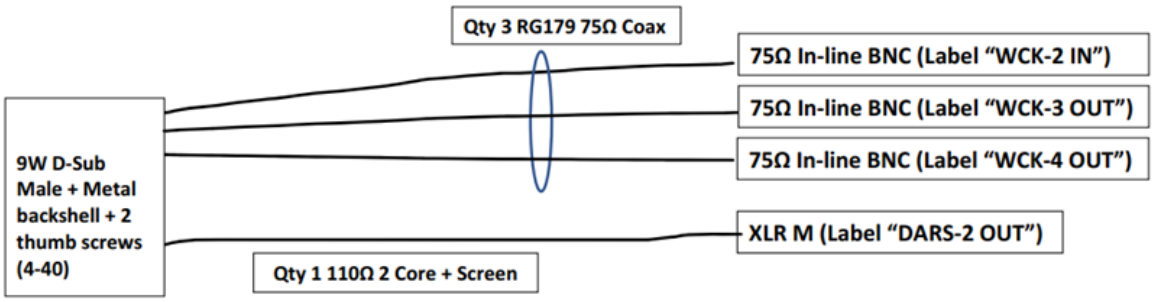
The REF I/O connector is a 9-way D-Type multi-pin socket connector positioned on the Sync Connections block at the rear of the unit. A suitable breakout cable can be ordered.

The sync connections which appear on this connector are software configurable, and so you may need to check how your unit has been configured before making your own cable.

As of first release March 2023, a single configuration is available utilising the 030-00108(3) break out cable as in the diagram, which provides :-

WCK-2 IN on a BNC connector
WCK-3 OUT and WCK-4 OUT on BNC connectors
DARS-2 OUT on an XLR connector.

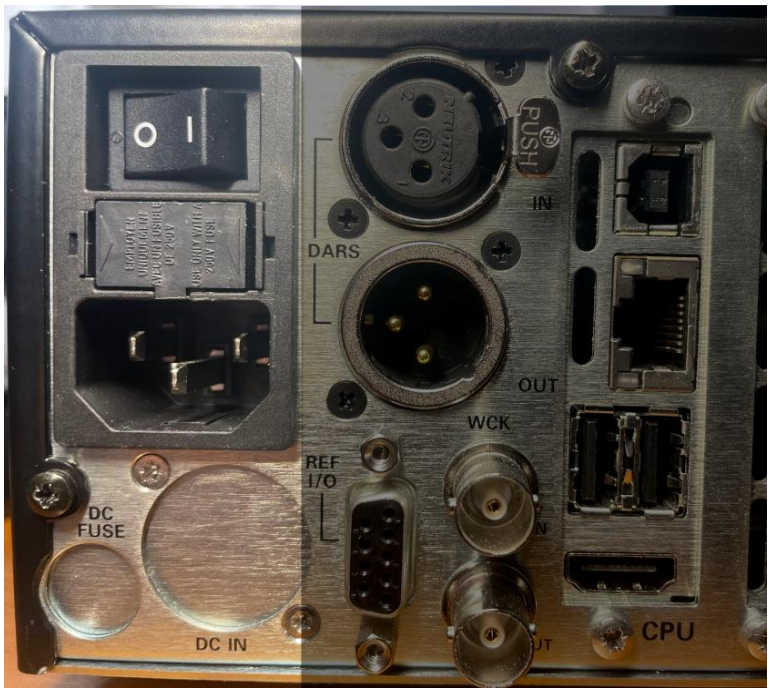
030-00108(3) ADA-128 Ref IO Breakout–1m



Connection Table

Cable	Cable Detail	D-Sub 9W	BNC-1	BNC-2	BNC-3	XLR3-M	Signal Name	Label
Coax-1	Centre	5	Centre				CREFO3	WCK-4 OUT
	Shield	9	Chassis				GND	
Coax-2	Centre	4		Centre			CREFO2	WCK-3 OUT
	Shield	8		Chassis			GND	
Coax-3	Centre	3			Centre		CREFI1	WCK-2 IN
	Shield	7			Chassis		GND	
2 Core + Screen	Black	2				3	XREFON1	DARS-2 OUT
	Red	1				2	XREFOP1	
	Screen	6				1	GND	

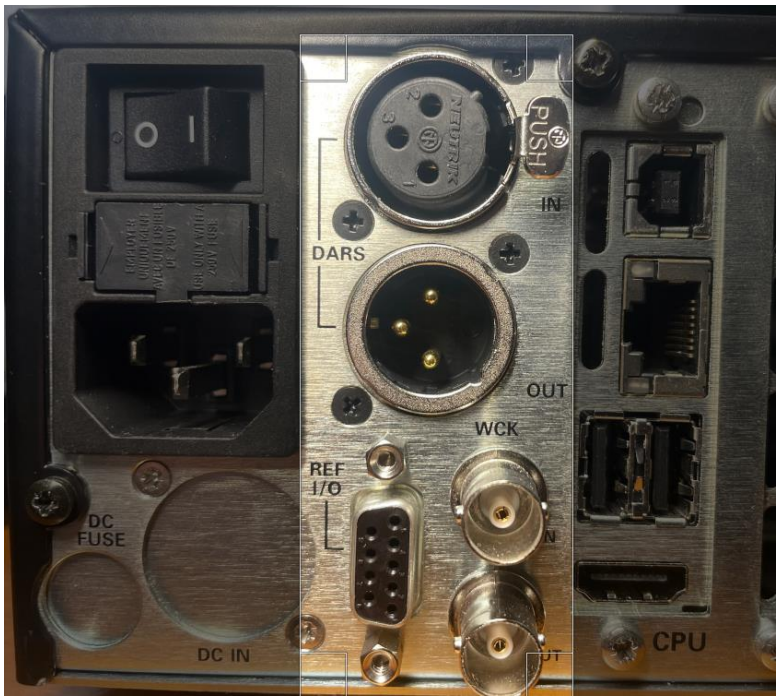
Power Inlet and Power Switch



At the rear of the rack unit on the left side, there is a power on/off switch, and below that a standard IEC inlet for plugging into the AC mains. Between the switch and the inlet is a flap that holds the fuse. Power specifications are detailed below.

On the front panel at the right side is another power switch which is lit green when the ADA-128 is switched on, and red when it's off (but still powered on at the rear). When you power up the unit from the rear, it will always fully start the unit, irrespective of the state it was left in by the front panel switch. In normal operation you can switch the unit on and off from the front panel.

Sync Connections Block



In order to support the four independent clock domains of the 'Dream' ADA-128, a number of connections for possible clock sources and sync outputs are provided. To the right of the power inlet when viewed from the rear, there is a block of connectors for these Sync connections: -

DARS sync

Sync Input and Output on XLR connections. DARS stands for Digital Audio Reference Signal, and is essentially an AES3 data stream that is used for clocking. ADA-128 can use it as a clock reference whether it carries audio data or not.

Word Clock sync

Word clock (WCK) Input on BNC connections. Word clock is a clock signal at the system sample rate and carries no audio. Word clock cables can be 'looped through' to chain to other devices by using a 75 ohm T-piece connector. ADA-128's Word clock input includes a software switchable 75 ohm terminator to which must be disabled/ set to 'None' if you are looping Word Clock through, and similarly must be set to '75Ω' if you're not.

The Status of the Sync Inputs and the Settings for the Sync Outputs are shown in the Clock Pages,  where there is a tab for 'Ref In' and 'Ref Out'.

Ref I/O

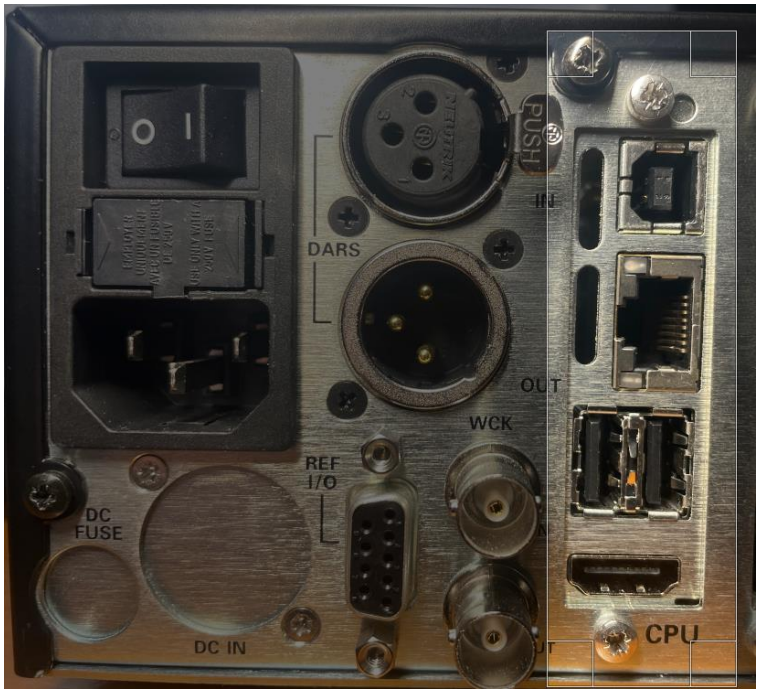
is a proprietary pin-out 9 pin connector.

An optional **9 pin multi clock lead** is available for this which will give extra sync connections for: -

1. BNC Word Clock Input 2
2. BNC Word Clock Output 3
3. BNC Word Clock Output 4
4. DARS2 Output

The function of these can be monitored or assigned in the Sync Pages for 'Ref In' and 'Ref Out'. There is a Ref I/O pin-out diagram above.

CPU Module



The ADA-128's processor occupies a module slot at the left side of the unit; between the Host modules and the Sync Connections block.

The CPU module carries several external connections on the rear panel for:-

USB-B – for future use to connect to a computer's USB port.

RJ45 – to attach the ADA-128 to a network with a CAT5 cable (currently for remote control by browser).

USB-A x 2 – for future use connecting other USB devices.

HDMI – to attach a display.

Important note:- these are not for audio connections (which would require a Host Module), but are for control and update purposes and connection of peripherals.

Firmware updates

From time to time firmware updates may be available for the ADA-128. Check with the prismsound.com website periodically.

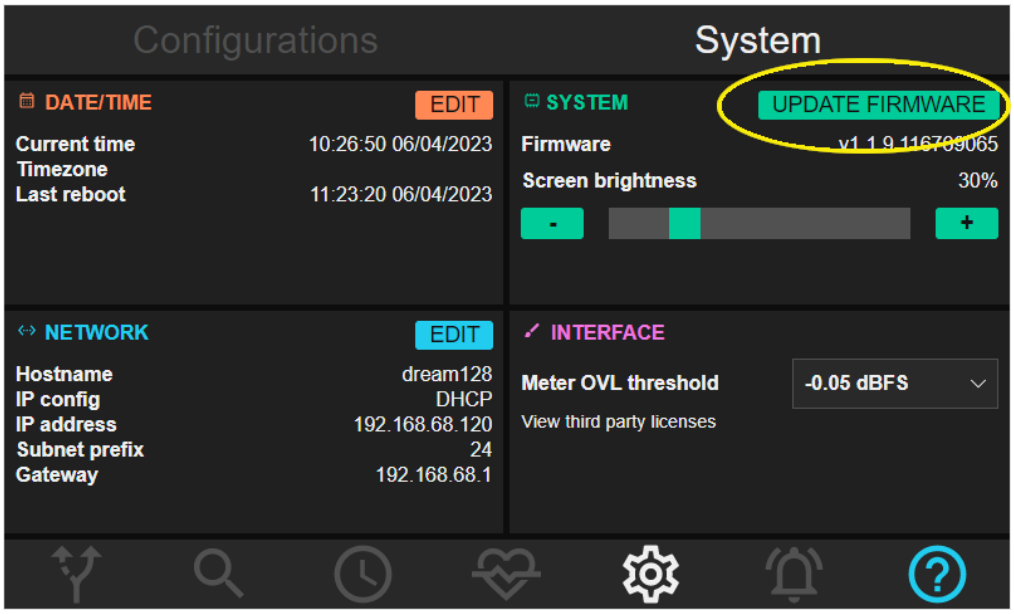
To update the firmware, you *must* have a remote connection via a browser and thus the ADA-128 must be connected to the same network as the computer that you plan to use for the firmware upgrade.

See Remote Control over network using a browser.

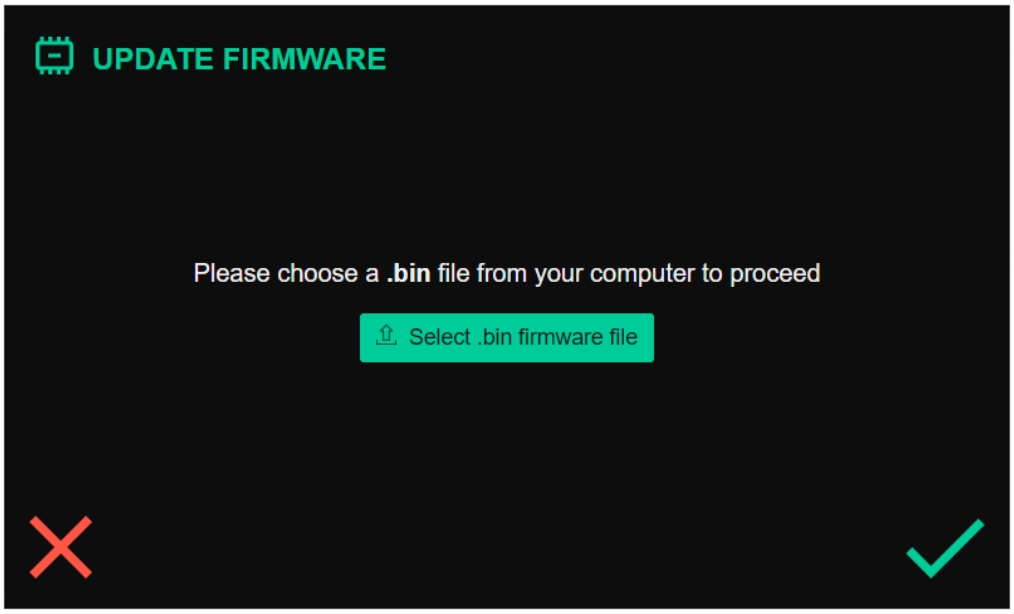
Download the most up-to-date firmware file if necessary, and make a note of where you have saved it on your computer.

Note that a firmware update will interrupt audio and require a restart of the unit – so … stop working with it please.

- Go to the Settings Page and press the '**System'** button at the top right.
- Press the 'UPDATE FIRMWARE' button. (The Update Firmware button on the front panel display takes you to a message telling you to connect to the ADA-128 using a browser - there's no way to read a file directly on the ADA-128 unit – you need to use the remote control).

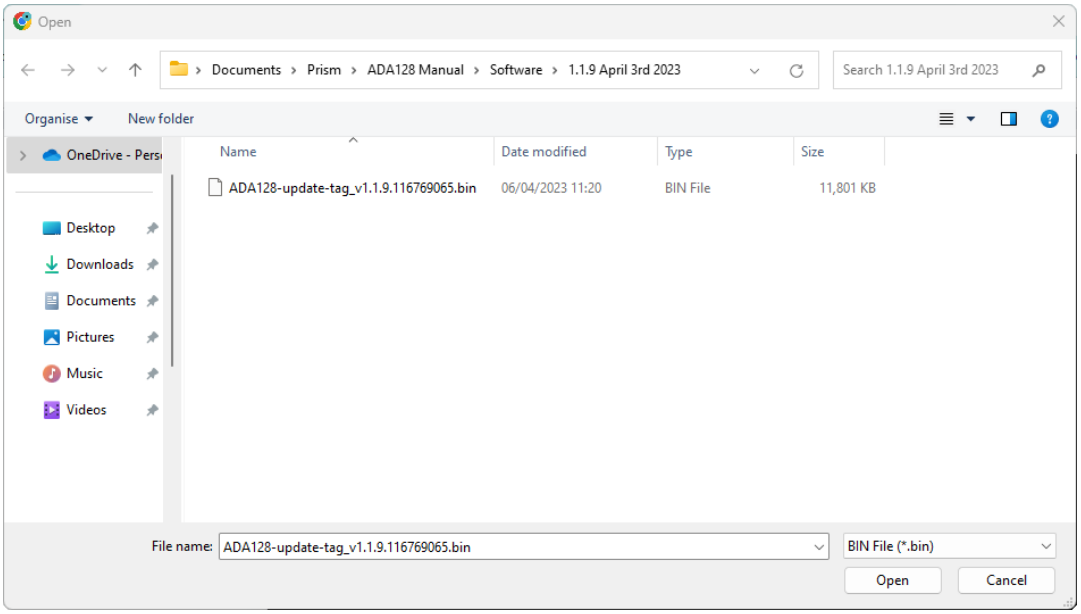


- In the dialogue box that follows,

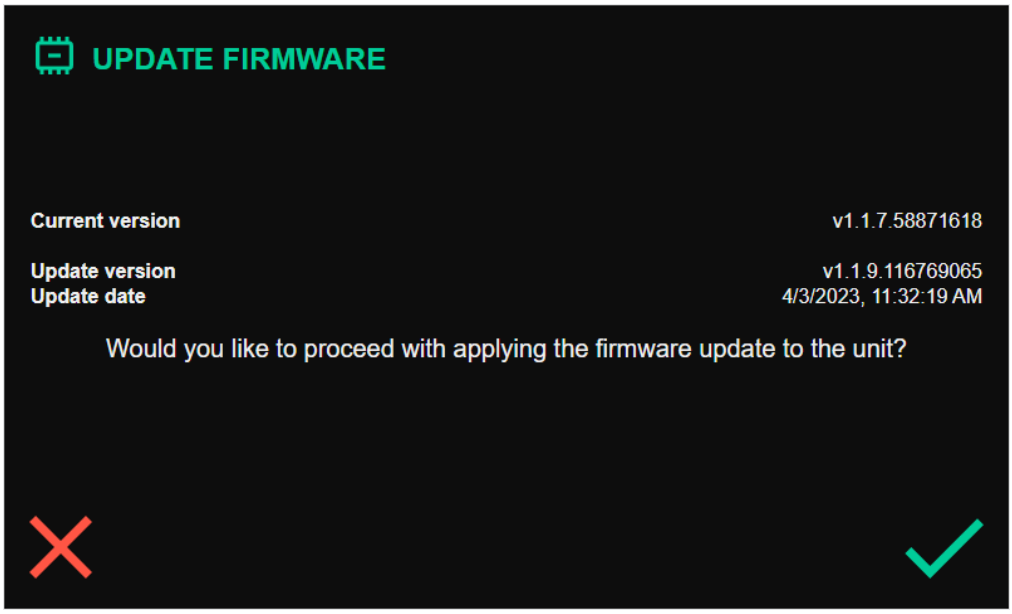


……press ‘Select .bin firmware file’

- Navigate on the computer to where you downloaded the firmware file. It is likely to be called something like ‘ADA128-update-tag_v1.1.9.116769065.bin’. Click on the file and press the **Open** button.

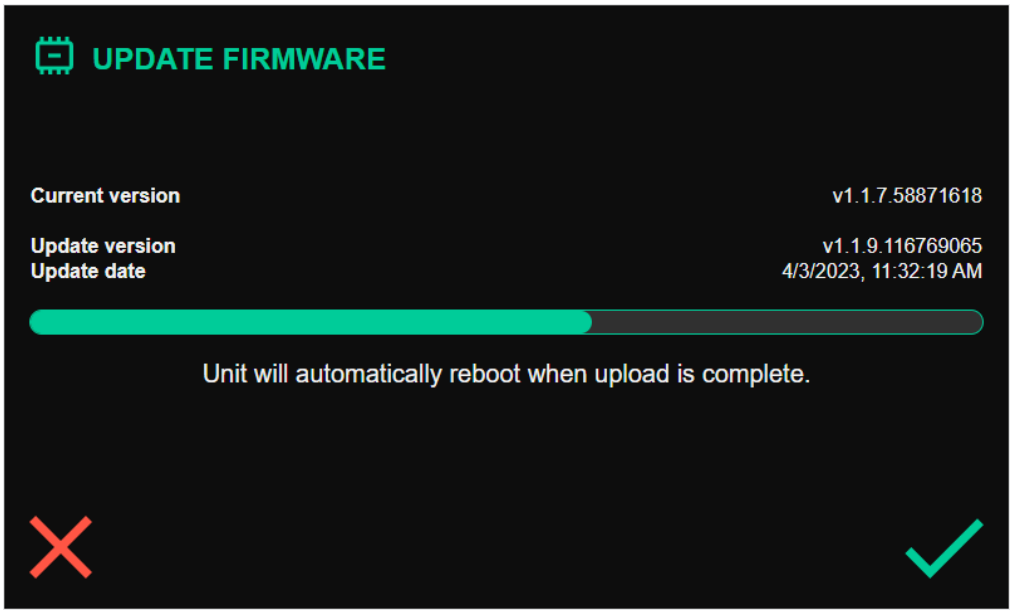


- The details, date, version etc. of the firmware file will be displayed.

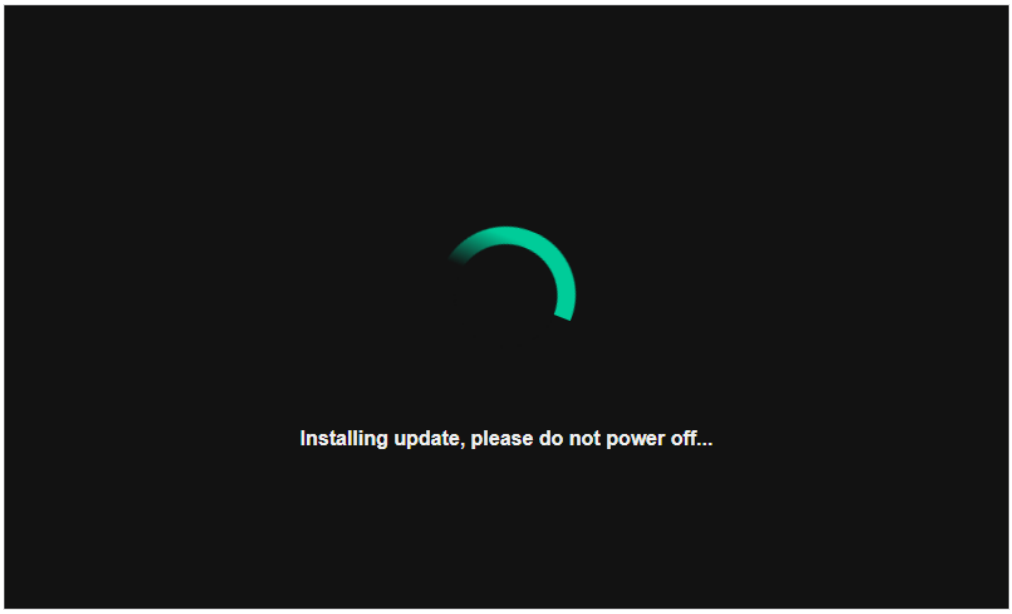


Note that the 'Installed Version' is also displayed – check that the new firmware is what you expect – i.e. usually newer than the installed version. (You will be warned if it's detected that the firmware you have chosen is older or newer than the version currently installed).

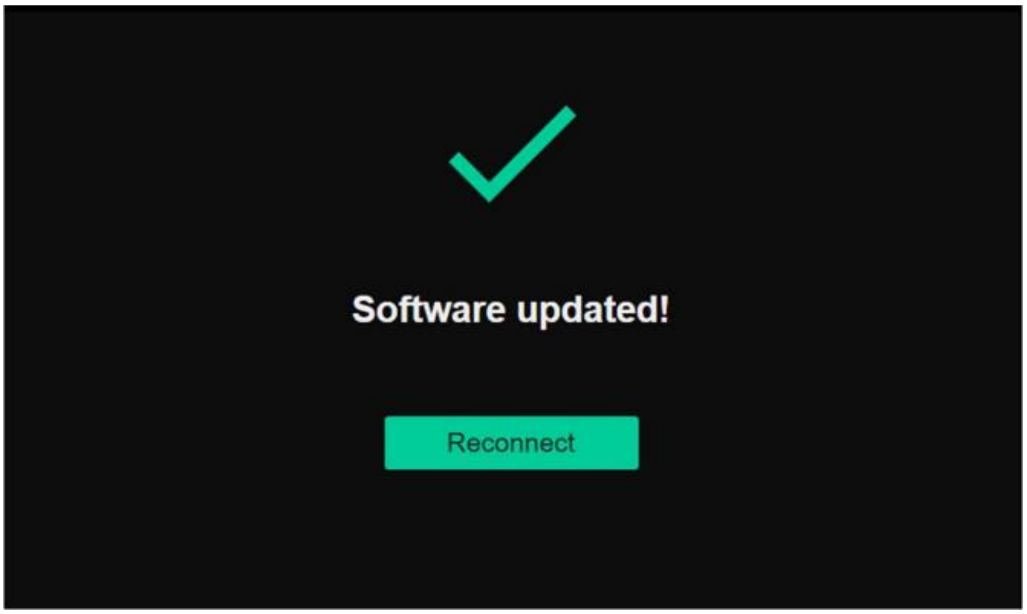
- Pressing the green tick at the bottom right will start the upload of the firmware. The Progress of the upload is reported on the screen.



- Once the firmware upload has completed, a new page will appear:-



- The ADA-128 unit will restart, showing the 'whirly wheel' and 'Please Wait' - it usually takes a little less than a minute. (The reconnect may happen automatically).



- When you can see the unit has restarted, press the 'Reconnect' button in the browser.

The Firmware Update is complete and your ADA-128 is ready to use again.

Troubleshooting

Browser Issues

If you are having trouble connecting to the 'Dream' ADA-128 using a browser, first check that ….

1. The ADA-128 is connected to the network using a wired connection.
2. The computer you are using is connected to the same network.
3. The address details you are using are correct?
   Check with the step by step connection instructions for How to set up the browser and How to find out the ADA-128's IP address?

   Check you are using the correct IP address by looking the Network section of the  Status page. When IP addresses are assigned automatically, they may change if devices on the network change.
   If you are using the 'Hostname' method of accessing the remote control, try using the correct IP address (or vice versa). See ….Network Section of System Tab.
4. It may be necessary to clear the browser's cache for the ADA-128's 'page', perhaps after a firmware update. Symptoms that have been noted include a forever spinning 'Connecting to unit' wheel.
   How to do this may depend on which browser you are using ... for instance, whilst trying to access the ADA-128's address try:-
   Chrome & Edge under Windows – Press CTRL and the refresh button.
   Chrome on Mac – Press Shift and the Reload button, or Command+Shift+R
   Safari – Option+Command+E
   Firefox, Windows – CTRL+Shift+R or CTRL-F5
   Firefox, Mac – Command+Shift+R or Shift and Reload button
   For other options try googling "hard refresh..." and your browser & platform.

Technical Topics

Clocking and Jitter

Good clock stability is probably the single most important issue separating good-quality analogue interfaces from the rest. With the linearity of modern A/D and D/A converter chips beginning to rival and exceed the performance of the best analogue circuits, digital recordings would already be 'beyond reproach' if clock stability did not so often degrade their potential quality.

Why is good clock stability so rare? Probably because most conversion equipment has to compromise between clock stability, operational requirements and cost. The ideal clock system in an A/D or D/A converter would be ultimately stable, i.e. would exhibit no jitter (frequency variations) at the point of conversion, whether operating from an internal clock or from an external synchronization reference of any format and at any sample rate. But this is a very tall order for circuit designers, especially if they are on a budget.

Why are good clocks so rare?

Most analogue interfaces can provide workmanlike performance when internally clocked, since this is only a matter of providing a stable clock oscillator (or range of oscillators) at a fixed frequency (or frequencies) – although even this is not always well-executed. The real problem is that in many installations the analogue interfaces can almost never operate from their own internal clocks since they must be slaved to an external reference sync, or maybe to a clock from a host computer.

The externally-clocked design challenge has traditionally been a trade-off since the more stable a clock oscillator is, the less is its range of frequency adjustment: but we would ideally like an oscillator which can operate over a wide range of sample rates, perhaps from <44.1kHz to >48kHz, plus multiples thereof. But such an oscillator would inevitably have poor stability – at least in terms of the stringent requirements for high-quality audio conversion. On the other hand, if we limit the range of rates at which the oscillator needs to operate to small 'islands' around the standard sample rates we could use a bank of oscillators, selecting the appropriate oscillator according to our desired sample rate. But this is expensive and, in any case, the 'pull-range' of an ordinary quartz crystal oscillator is still generally insufficient to meet the tolerance demands of the digital audio interfacing standards.

As well as a very stable clock oscillator, a good sounding converter must have a PLL (phase-locked loop) with a loop-filter which steeply attenuates incoming reference jitter towards higher

frequencies. Unfortunately, even if sourcing equipment provides a reference clock with low jitter, cabling always adds unacceptable amounts, especially poor quality or high-capacitance cable, which results directly in sampling jitter in the analogue interface if jitter-filtering is inadequate.

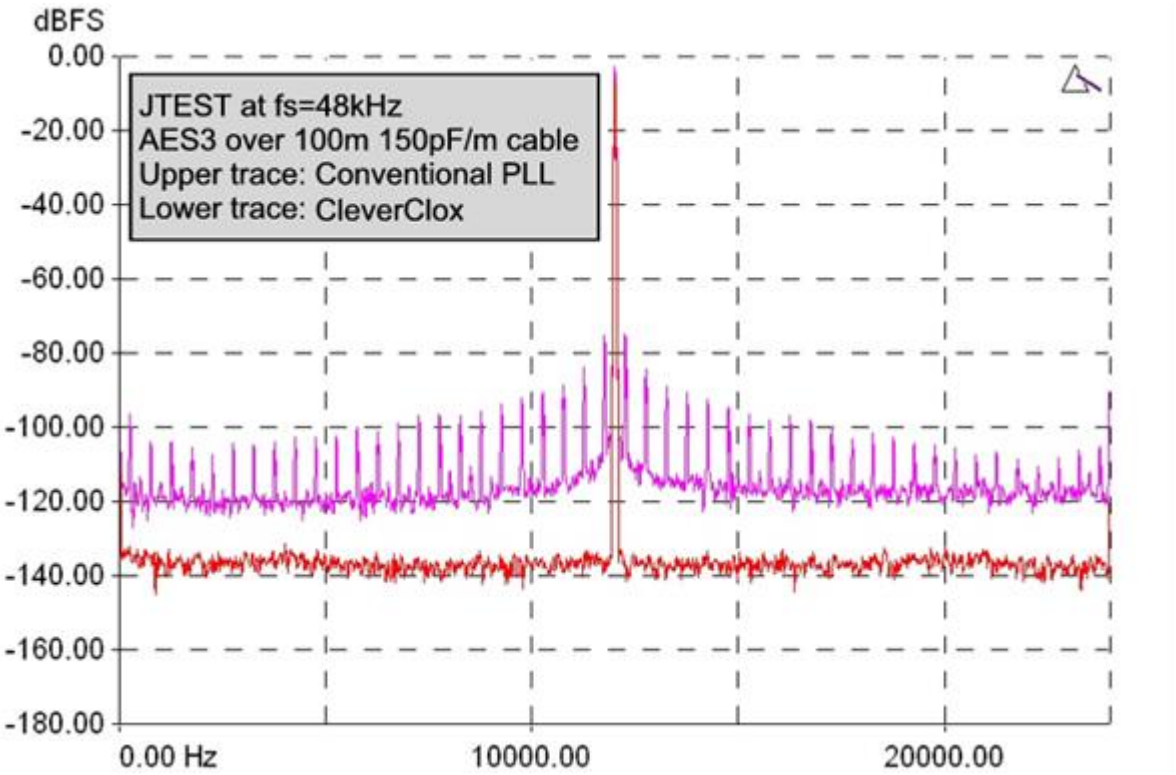
Prism Sound's unique CleverClox technology breaks these traditional constraints, allowing a low jitter clock to be re-created from any reference sync, no matter how much jitter it has and no matter what its frequency.

But why is clock jitter so important?

Analysis of sampling jitter

Analysis of sampling jitter (small variations in the sampling intervals of an A/D or D/A converter) shows that it produces a similar effect to phase modulation, where distortion components appear as ‘sidebands’ spaced away from the frequency of a converted tone by the frequency of the jitter itself. These components get louder as the amount of jitter increases, but also as the frequency of the converted tone increases. So sampling jitter produces distortions which should sound much worse than conventional analogue harmonic distortions, since the spurious components appear at aharmonic frequencies. High audio frequencies should suffer worse distortion than low frequencies. For low-frequency jitter, the resulting distortion sidebands appear close in frequency to the audio signals which produce them – this should mean that they are ‘masked’ from our hearing by the same psycho-acoustic phenomenon upon which are based sub-band (perceptual) coding schemes such as MPEG. This is fortunate, since it is quite difficult for a PLL to remove jitter to a good degree even at moderate frequencies, but for very low frequencies it would be very difficult indeed.

The graph below shows the effects of 'JTEST', a special test stimulus to expose jitter susceptibility of D/A converters. JTEST is basically an fs/4 tone (12kHz at fs=48kHz) which is specially coded to cause an AES3 or S/PDIF carrier transmitted over a lossy cable to become very jittery by the time it reaches the receiving D/A converter. The jitter produced has regular frequency components fs/96 apart (500Hz at fs=48kHz). The quality of the D/A converter's jitter rejection is shown by the degree to which it suppresses the resulting 500Hz-spaced side-tones. In the example below, the upper trace shows the poor jitter rejection of 'conventional' D/A converter design, where the conversion clock is derived directly from the AES3 or S/PDIF receiving chip, without any further jitter filtering. Remember that none of these side-tones is present in the digital audio signal - they are caused only by jitter. The lower trace shows almost complete jitter rejection across the band by the CleverClox process in ADA-128.



Listening experience

In practice, it seems that the benefits of careful clock design are very apparent in listening tests. On the other hand, it can sometimes be difficult to expose the shortcomings of converters with poor clocks, because these units often have other analogue problems whose severity might obscure jitter-related effects.

In general, some of the widely-noted effects of sampling jitter are not surprising – for example the muddying of brass, strings and high-frequency percussion and the loss of stereo (or multi-channel) imaging. These are well explained by the worse distortions which result in the lab at loud, high frequencies, and the way that sampling jitter produces quiet, aharmonic components, perhaps only subliminally perceptible, which blur our impression of the ambience which creates a soundstage.

Other effects are harder to explain – for example there is wide observation that large amounts of sampling jitter can take the edge off extreme bass rendition. Such reports are probably too widespread to be ignored, but defy explanation within current theory.

ADA-128 and CleverClox

ADA-128 is designed to source clocks which are as stable and accurate as possible, and also with the aim of being insensitive to the quality of incoming clocks. It is designed to remove jitter from any selected reference sync source before it is used as a conversion timebase, so as to eliminate any audible effects of sampling jitter, whatever sync source is used.

ADA-128 does this with the help of Prism Sound's unique CleverClox clock technology, which removes the jitter from any selected clock source down to sub-sonic frequencies, without the need for a narrow-band quartz VCO. CleverClox can adapt to any reference, irrespective of frequency, and regardless of how much jitter it has, derives an ultra-stable conversion timebase.

Overkiller

The Prism Sound Overkiller is a progressive analogue peak-limiter which can be applied to any of the ADA-128's analogue input channels, so long as a suitably-equipped Analogue Input Module is fitted.

The Overkiller allows analogue input signals far above the normal maximum handling level of the A/D converter to be accommodated without causing the converter to clip. This is done in a gentle and progressive manner so that distortion is as inaudible as possible.

This is useful in certain situations. For example, it may be desirable for a digital recording to be made 'louder' than would be possible if its loudest transients had to be accurately represented on the digital medium. Or where the dynamic range of the recording medium is limited, and perhaps levels are not easily controlled, such as when recording a live performance.

In these situations, the Prism Sound Overkiller acts in a uniquely progressive manner, which gives it unrivalled capacity to soak up large transient overloads without any noticeable distortion, whilst protecting the A/D converter from overmodulation.

There is no need for the Overkillers' thresholds to be manually adjusted; thresholds are automatically adjusted according to the selected analogue line-up level and trim

Specifications

'Dream' ADA-128 Chassis Specifications

Form Factor:	2U rack mountable.
Front Panel:	Power/standby button, 5" touch TFT control panel.
Rear Panel:	16 I/O Module slots (1-16), 4 Host Module or I/O Module slots (17-20) CPU Module with: 1xGbE RJ45, 2xUSB host, 1xUSB device, 1xHDMI Utility reference sync panel with: • XLR DARS/AES11 input, XLR DARS/AES11 output • BNC Wordclock/Baseclock/Black-burst-video*/10MHz input* • BNC Wordclock/Baseclock output • DE-9F sync breakout, with 1x DARS out, 2xBNC out, 1xBNC in 3-pin 6A IEC mains inlet, fuse holder and isolation switch**
Clock Domains:	Four independent clock generators providing four Clock Domains. Each Module slot can be assigned to any Clock Domain. Host slots have access to multiple Clock Domains.
Routing:	Every output port can be routed from any input port. Host Modules may thus operate as bridges.
Dimensions:	W: 483mm D: 320mm H: 88mm (2U).
Weight:	TBC, depending on fitment.
Power Requirement:	90-260VAC 50/60Hz up to 80W depending on fitment.
Environmental:	0-35°C, 85% maximum relative humidity.
Note:	* Black/burst and 10MHz support under development. **DC and redundant power options under development.

'Dream' ADA-128 I/O Modules

Analogue 8 Channel Line Input A/D Module

Note: - Unless otherwise noted: specifications apply at fs = 48kHz and 18dBu line-up setting, balanced operation; residuals are band-limited 20Hz..20kHz and are quoted rms unweighted.

Note:	Unless otherwise noted: specifications apply at fs+48kHz and +18dBu line-up setting, balanced operation; residuals are band-limited 20Hz .. 20kHz and are quoted rms unweighted.
Configuration:	Eight input ports, electronically balanced, with fully-balanced analogue signal paths.
Connector:	DB25F (industry standard TASCAM pinout).
Supported Sample rates:	44.1kHz. 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz. Pullup: 0.1%, 4.16%; pulldown 0.1%, 4.0%
Wordlength:	32 bits
Verifile support:	Tag insertion (allows downstream signal integrity verification). *Coming Soon.*
DSP functions:	Amplitude calibration and trim; MS Processing; High-pass filter selectable.
Input sensitivity:	0dBFS = 24dBu to 3dBu in 1dB steps, with 0.1dB stepped trim.
Input impedance:	14.5kΩ
Unbalanced Mode:	Automatic
Over-killer (soft limit):	per channel, software selectable.
Total harmonic distortion:	-115dB (<0.00018%)
THD+N:	-111dB (<0.00028%)
Dynamic Range	116dB (residual at -60dBFS), 119dB with A-weighting filter.
Idle channel noise:	-116dBFS
Gain accuracy:	+/-0.05dB
LF roll-off (wrt 997Hz):	-0.05dB at 20Hz, -3dB at 1.7Hz
HF roll-off (wrt 997Hz): -	-0.05dB at 20Hz (fs>=48kHz) -3dB at 19k2 (fs=44k1) -3dB at 20k9 (fs=48k0)

	-3dB at 38k4 (fs=88k2) -3db at 41k6 (fs=96k0) -3db at 75k6 (fs=176k4) -3db at 81k5 (fs=192k0)
CMRR:	>80dB at 50Hz, >63dB at 15kHz
Cross talk (any port pair):	<-130dB (50Hz) <-112dB (15kHz)
Inter-channel phase:	+/-0.03° (10Hz – 5kHz) +/-0.12° (5kHz – 20kHz) +/-0.3° (20kHz – 50kHz)

Analogue 8 Channel Line Output D/A Module

Note: - Unless otherwise noted: specifications apply at fs = 48kHz and 18dBu line-up setting, balanced operation; residuals are band-limited 20Hz...20kHz and are quoted rms unweighted.

Note:	Unless otherwise noted: specifications apply at fs+48kHz and +18dBu line-up setting, balanced operation; residuals are band-limited 20Hz ... 20kHz and are quoted rms unweighted.
Configuration:	Eight input ports, electronically balanced, with fully-balanced analogue signal paths.
Connector:	DB25F (industry standard TASCAM pinout).
Supported Sample rates:	44.1kHz. 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz. Pullup: 0.1%, 4.16%; pulldown 0.1%, 4.0%
Wordlength:	32 bits
Verifile support:	Tag checking (signal integrity verification). *Coming Soon*
DSP functions:	Amplitude calibration and trim.
Output Amplitude:	0dBFS = 24dBu to 3dBu in 1dB steps, with 0.1dB stepped trim.
Output impedance:	50Ω
Unbalanced Mode:	Automatic, with bootstrapping level compensation (only at <= 18dBu line up)
Total harmonic distortion:	-114dB (<0.0002%)
THD+N:	-111dB (<0.00028%)

Dynamic Range:	123dB (residual at -60dBFS), 125dB with A-weighting filter.
Idle channel noise:	-123dBFS
Gain accuracy:	+/-0.05dB
LF roll-off (wrt 997Hz):	-0.1dB at 20Hz, -3dB at 1.25Hz
HF roll-off (wrt 997Hz): -	-0.1dB at 20Hz -3dB at 21k6 (fs=44k1) -3dB at 23k9 (fs=48k0) -3dB at 42k3 (fs=88k2) -3db at 46k0 (fs=96k0) -3db at 80k0 (fs=176k4) -3db at 86k8 (fs=192k0)
Output balance:	>50dB
Cross talk (any port pair):	<-133dB (50Hz) <-121dB (15kHz)
Inter-channel phase:	+/-0.02° (10Hz – 5kHz) +/-0.1° (5kHz – 20kHz) +/-0.2° (20kHz – 50kHz)

AES3 digital IO module

Configuration:	Eight input and output ports on four pairs of digital carriers, transformer coupled.
Connector:	DB25F (industry standard TASCAM pinout).
Supported Sample rates:	44.1kHz. 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz. Pullup: 0.1%, 4.16%; pulldown 0.1%, 4.0%
Wordlength:	24 bits
Verifile support:	Tag checking on outputs (signal integrity verification). *Coming Soon*
DSP functions:	MS processing High-pass filter selectable on inputs.
Formats:	AES3 (110Ω I/O impedance, professional Channel Status) S/PDIF (75Ω I/O impedance, consumer Channel Status) AES3id (110Ω I/O impedance, professional Channel Status) Format is software-selectable per carrier

The functions and settings available on each of the I/O modules are described in the I/O Modules section of the Software Reference.

'Dream' ADA-128 Host Modules

Pro Tools HDX Host module

Configuration:	64 directly-connected Pro Tools | HD I/O ports.
Connection:	2x DigiLink Mini connectors, each carrying 32 I/O ports.
Supported Sample rates:	44.1kHz. 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz. Pullup: 0.1%, 4.16%; pulldown 0.1%, 4.0%
Wordlength:	24 bits
Emulation Modes:	Avid | HD I/O 16x16 Analog or Avid | HD I/O 16x16 Digital. Two emulations per DigiLink
Pro Tools Control:	Supported functions are controlled from the Pro Tools UI.

Dante Host module

Configuration:	64 directly-connected Dante I/O ports.
Connection:	2x GbE RJ45 connector (switched or redundant operation).
Supported Sample rates:	44.1kHz. 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz. Pullup: 0.1%, 4.16%; pulldown 0.1%, 4.0%
Wordlength:	32 bits

Supported Sample rates

The Sample rates supported will depend on the specification of individual modules, and in the case of Host modules, may depend on sample rate support of any connected Host. See the specifications of the I/O and Host modules above.

Power Specifications

WARNING: You should only remove the lid of the ADA-128 chassis if the power cable is **removed.** It should only be necessary to remove the lid if you are maintaining the unit, replacing or reconfiguring I/O and Host modules. This operation presents a risk of electric shock, therefore refer this operation to qualified personnel.

The 'Dream' ADA-128's power supply can operate using mains voltages between 90 and 260 Volts A.C. at 50 or 60Hz. Consumption is 50 watts.

Therefore, nothing needs to be changed if you are running from i.e., U.S. or European mains.

The mains fuse is a 1A (T).

The ADA-128 must be earthed by the power cord.

Appendix A – List of Current Available I/O and Host modules

At time of writing, the following I/O and Host Modules are available:-

Part No.	I/O Modules	Channels
PREV00752	Analogue Line Input	8
PREV00762	Analogue Line Output	8
	Microphone / Line Input (coming soon)	8
PREV00781	AES Digital I/O	8 in, 8 Out*
	Host Modules	
PREV00791	HDX Host Module	64 in, 64 out
PREV00792	Dante Module	64 in, 64 out
	MADI Module (in development)	64 in, 64 out
PREV00781	AES Digital I/O	8 in, 8 Out*

* AES I/O modules can be inserted into either I/O or Host module slots in order to maximise the potential I/O count for AES-only systems.

Appendix B – List of third party Audio Interfaces with high numbers of AES I/O

Many computer audio interfaces have AES and/or SPDIF digital inputs and outputs, but there are only a few that have larger than 1 or 2 channels of AES I/O. These are not 'approved' interfaces, nor is it an exhaustive list, and we suggest that you discuss your specific application with our sales and support staff for up to date recommendations.

- RME HDPSe AES
  HDSPe AES - RME Audio Interfaces | Format Converters | Preamps | Network Audio & MADI Solutions (rme-audio.com)
  This is a PCIe device with up to 16 channels of AES input and 16 channels of AES output. Connections are on the same Tascam format 25-way D-Sub connectors that ADA-128 uses. Up to three HDPSe cards can be used together.
- RME make several interfaces – HDSPe MADI, HDSPe MADI FX, MADIFace USB, MADIFace XT which input and output to multichannel MADI (64 channels at 44.1/48KHz), and which may

be connected to the computer by a variety of methods – PCIE, USB, USB3. Then you can use their ADI-6432 box ADI-6432/ADI-6432R - RME Audio Interfaces | Format Converters | Preamps | Network Audio & MADI Solutions (rme-audio.com)
...to convert the MADI streams to standard AES3 for connection to the ADA-128.

- RME also make the Digiface USB
  Digiface USB - RME Audio Interfaces | Format Converters | Preamps | Network Audio & MADI Solutions (rme-audio.com)
  Which connects to a computer via USB and can output to multiple channels of ADAT. You would then need some other converter to convert ADAT to AES3.
- Lynx Studio Technology make a PCIe card – 'AES16e' with 16 channels of AES inputs and outputs. AES16e - Products - Lynx Studio Technology, Inc.

Appendix C – Pro Tools | HDX Software Controls

The following is a list of controls in the Pro Tools software which will control settings in the 'Dream' ADA-128:-

Setup … Hardware

Sample Rate (this tends to be set per session).

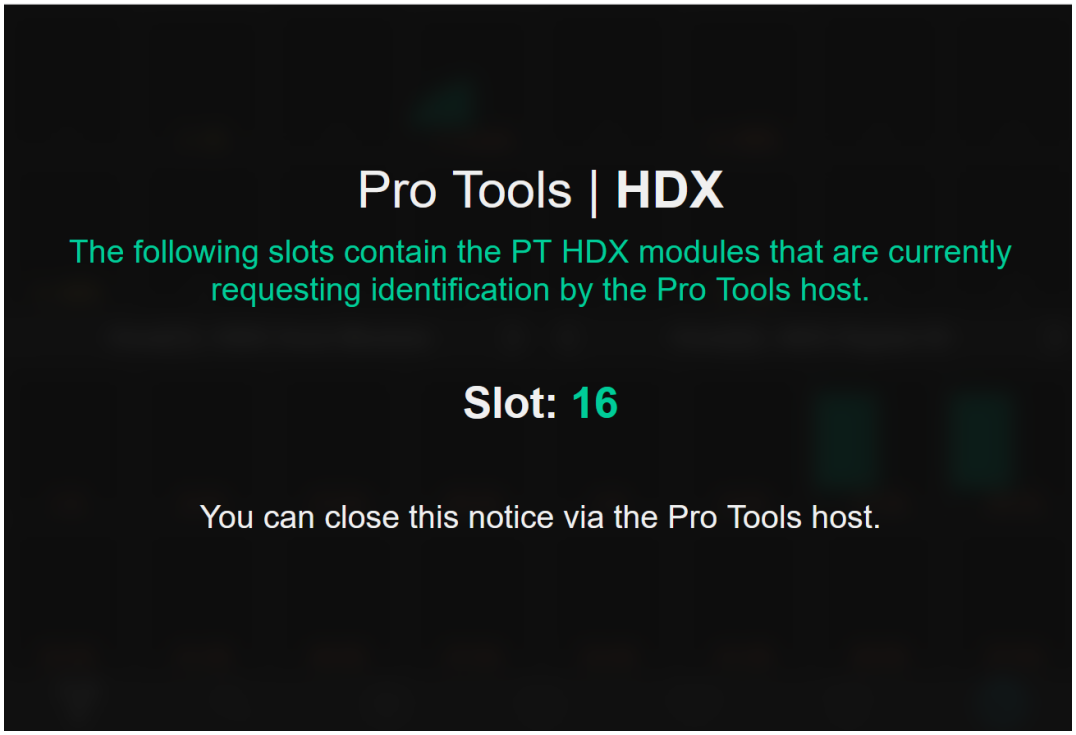
Loop Sync Master (which is set by the Clock Source control).

Clock Source – Internal/External. Selecting 'Internal' will set the ADA-128's Clock Source to 'Internal'. Selecting AES / Wordclock / ADAT etc. will set the ADA-128 to whatever its last external Clock Source was. The unit selected will choose the Loop Sync Master, and so any ADA-128 units that are not Loop Master will be set to use their External Clock Source.

Ext Clock Output is not supported (and should be set in the ADA-128's Clocks page)

(the synchronisation options are described in more detail above in the Pro Tools | HDX Application section).

Identify - The screen of any unit called by the Pro Tools 'Identify' button will change to display the fact that Identify has been called. I.e.: -



Limiter / Soft Clip (or Curv) – is not supported. The Overkiller feature can be enabled /disabled per channel in the ADA-128's Analogue Input module's Inspect page.

I/O port routing is not supported.

Line Input sensitivity switching is not supported and must be changed within the ADA-128's Control Panel.

Setup... I/O matrix for remapping the I/O on Input and Output tabs is not supported

Mic/Line controls are not currently supported.

High-pass filter, **Phase** switching, Mic/instrument **gain** setting, **+48V phantom power** switching, **-20dB pad** switching are all NOT supported, but can be set in the ADA-128's Inspect pages.

Appendix D – Control by Third-Party Controllers

From software release v1.2.0, the ADA-128 supports remote control by third party controllers using **WebSocket** commands.

The first command implemented is for ….

Loading ADA-128 Routings

This may be useful for quick loading of routing setups for different studio requirements. It can also be useful as a failsafe, i.e. loading a safe or clear routing setup to instantly wipe down any bad routing which might have caused a feedback loop.

Set your WebSocket software to address a **Target URL** of:-

ws://*ip_address:5555*/Control

5555 is the port number for the WebSocket, so, for instance, for an ADA-128 at IP address 192.168.68.120, the URL is:-

ws://192.168.68.120:5555/Control

Then use a **WebSocket command string** as follows:-

{"command":"switch_routing","data":{"preset":"*preset_name*"}}

Where *preset_name* should be replaced by the name of the ADA-128 Preset containing the routing setup that you wish to load.

Example WebSocket Setup

Several hardware and software solutions exist to provide WebSocket Control.

We recommend the popular and reasonably priced Elgato Stream Deck controller to provide you with hardware buttons to send these commands if required.

For software that works well with Stream Deck, we recommend the Open Source Bitfocus Companion software. Bitfocus Companion includes a hardware emulator and thus could be used without the Stream Deck.

Step-by-Step Bitfocus Companion Setup

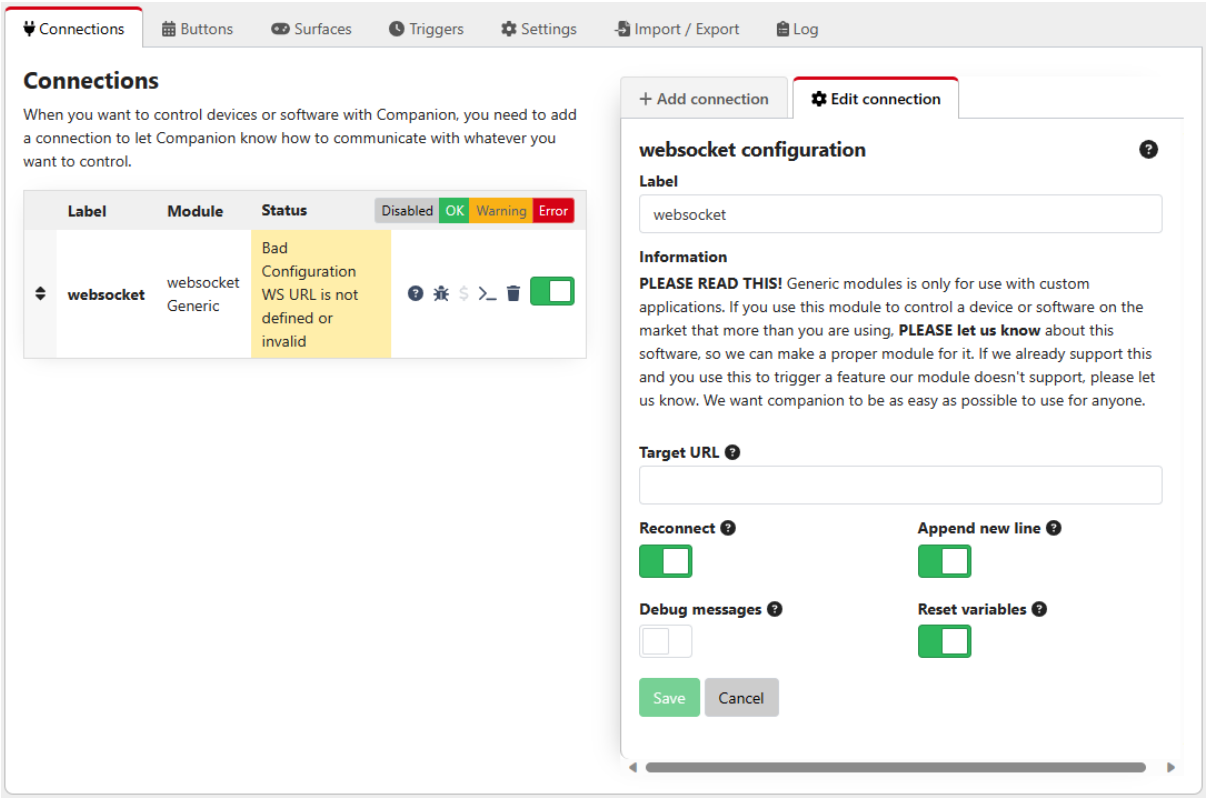
1. Make sure your ADA-128 is running v1.2.0 firmware or higher, and is running, and attached to the same network that the device you wish to control it from is attached to. You will need to know its IP address (which you can see in the **Status** page on the ADA-128 front panel.)

For this example, you are expected to have saved a configuration which contains the particular routings you wish to load. See Configurations above for details.

2. **Download and install** Bitfocus Companion from their website https://bitfocus.io/companion

3. On first starting Bitfocus Companion you may need to give it Firewall access, and it may run a Wizard to search for Surfaces etc.

4. At the **Connections** Tab, ADD CONNECTION. In the Search Tab, type websocket. You'll be offered '**Generic: WebSocket**' Press its ADD button ……

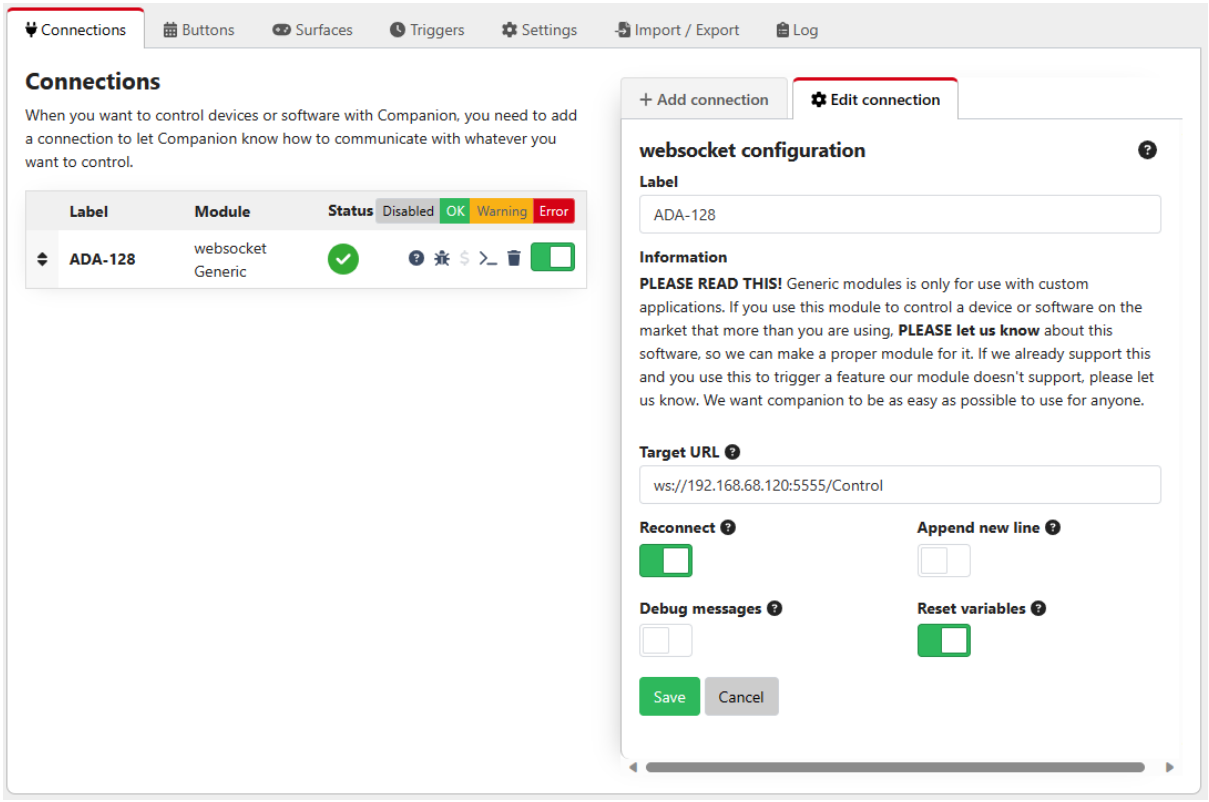


Don't worry about the 'Bad Configuration …. ' – you haven't set it up yet.

5. Give it a **Label** – 'ADA-128' or something that allows you to easily identify the unit.
Into the **Target URL** field type...
ws://*IP_Address*:5555/Control
i.e.
ws://192.168.68.120:5555/Control
for an ADA-128 at IP address 192.168.68.120

You can untick 'Append New Line' and Press the green **SAVE** button.

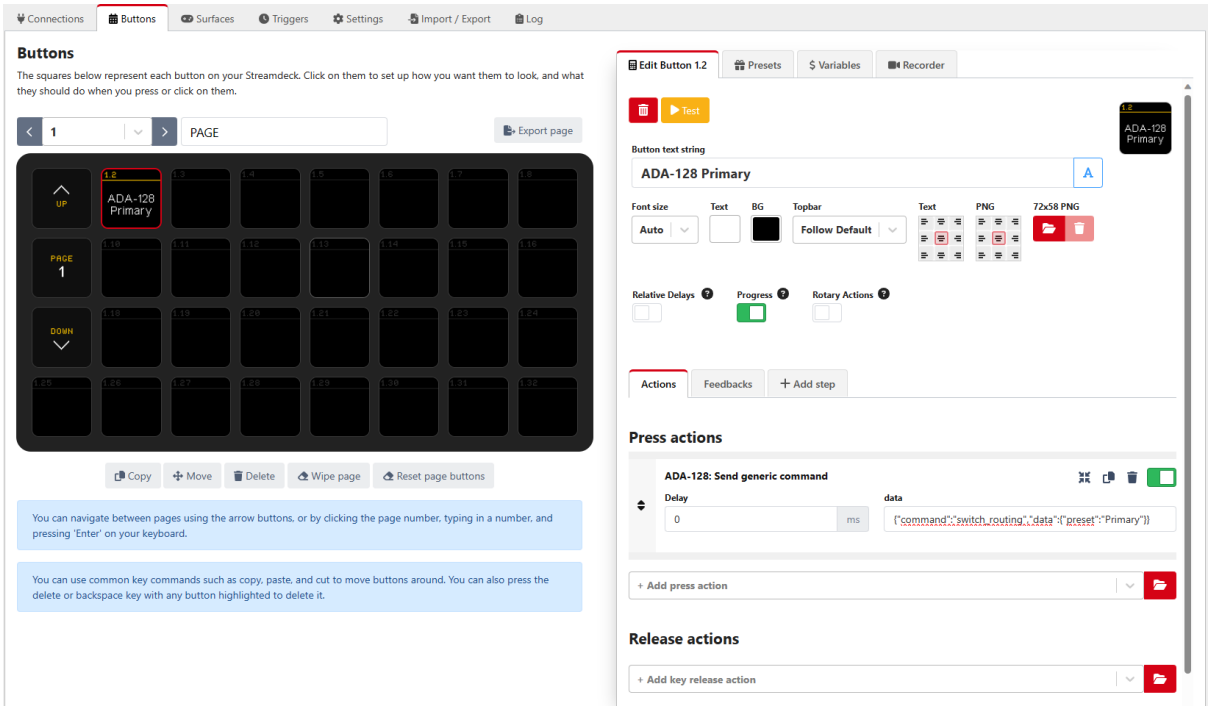
6. Clicking again on the ‘ADA-128’ connection will show this in the Edit Connection tab…



7. Now click on the **Buttons** tab. Click on the button in the grid that you wish to add, and press **Create Button.**
   Name the button in **Button Text String.**

   Then, in **Press Actions**, type ADA-128, and (as long as the ADA-128 is live and connected to the same network), you will be offered **ADA-128 Send Generic Command.**

   In the **Data** field inside the 'ADA-128 Send Generic Command' section, type…..
   {"command":"switch_routing","data":{"preset":"*preset_name*"}}
   Where *preset_name* is the name of the Configuration file containing the routings you wish to load.



8. You can now press the **TEST** button and watch the routings change on the ADA-128's screen or web interface.

9. You can continue to set up more buttons – i.e. to load alternatives, or an 'Emergency' or 'Cleared' routing configuration.

10. You may wish to set up a hardware surface. Bitfocus Companion will search for surfaces in the **Surfaces** tab. In Surfaces you can also **Add Emulator,** give it a name, then when you click on the **Emulator** button at the side, and click on the name you gave it, you'll see a Virtual Stream Deck in the browser i.e…….

….and clicking on each button will load a different Routing setup.

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