Sonifex AVN-DIO10 Audiophile Interfaces AVN GPIO LAN Transceiver Instruction Manual

SONIFEX

HANDBOOK
Audiophile Interfaces
AVN-GPIO GPIO to
LAN Transceiver

Manufacturers of Audio Products for AV,
Installed Sound, Broadcast Radio & Broadcast TV

Contents

AVN-DIO10 Audiophile Interfaces AVN GPIO LAN Transceiver

Registration & Warranty

For the latest Sonifex handbook information please visit the Sonifex website at **www.sonifex.co.uk**

This handbook is for use with the following products:

AVN-GPIO GPIO to LAN Transceiver

Artwork: AW011097

Revision 1.02, April 2024

Sonifex Ltd, 61, Station Road, Irthlingborough,
Northants, NN9 5QE, England.
Tel: +44 (0)1933 650 700
Email: **sales@sonifex.co.uk**
Website: **https://www.sonifex.co.uk**

Made in the UK by **SONIFEX**

Register Online for an
Extended 2 Year Warranty
Product: ……..
Serial No:……..
www.sonifex.co.uk/register

Product Warranty – 2 Year Extended

As standard, Sonifex products are supplied with a 1 year back to base warranty. In order to register the date of purchase and so that we can keep you informed of any product design improvements or modifications, it is important to complete the warranty registration online. Additionally, if you register the product on the Sonifex website, you can increase your product warranty to 2 years. Go to the Sonifex website at: **www.sonifex.co.uk/register** to apply for your 2 year warranty.

Sonifex Warranty & Liability Terms & Conditions

1. Definitions

   'the Company' means Sonifex Ltd and where relevant includes companies within the same group of companies as Sonifex Limited.

   'the Goods' means the goods or any part thereof supplied by the Company and where relevant includes: work carried out by the Company on items supplied by the Purchaser; services supplied by the Company; and sofware supplied by the Company.

   'the Purchaser' means the person or organisation who buys or has agreed to buy the Goods.

   'the Price' means the Price of the Goods and any other charges incurred by the Company in the supply of the Goods.

   'the Warranty Term' is the length of the product warranty which is usually 12 months from the date of despatch; except when the product has been registered at the Sonifex website when the Warranty Term is 24 months from the date of despatch.

   'the Contract' means the quotation, these Conditions of Sale and any other document incorporated in a contract between the Company and the Purchaser.

   This is the entre Contract between the paries relating to the subject maiter hereof and may not be changed or terminated except in writing in accordance with the provisions of this Contract. A reference to the consent,

acknowledgement, authority or agreement of the Company means in writing and only by a director of the Company.

2. Warranty

a. The Company agrees to repair or (at its discretion) replace Goods which are found to be defective (fair wear and tear excepted) and which are returned to the Company within the Warranty Term provided that each of the following are satisfied:

i. notofication of any defect is given to the Company immediately upon its becoming apparent to the Purchaser;

ii. the Goods have only been operated under normal operating conditions and have only been subject to normal use (and in partoiular the Goods must have been correctly connected and must not have been subject to high voltage or to ionising radiation and must not have been used contrary to the Company's technical recommendations);

iii. the Goods are returned to the Company's premises at the Purchaser's expense;

iv. any Goods or parts of Goods replaced shall become the property of the Company;

v. no work whatsoever (other than normal and proper maintenance) has been carried out to the Goods or any part of the Goods without the Company's prior writien consent;

vi. the defect has not arisen from a design made, furnished or specified by the Purchaser;

vii. the Goods have been assembled or incorporated into other goods only in accordance with any instructions issued by the Company;

viii. the defect has not arisen from a design modified by the Purchaser;

ix. the defect has not arisen from an item manufactured by a person other than the Company. In respect of any item manufactured by a person other than the Company, the Purchaser shall only be entitled to the benefit of any warranty or guarantee provided by such manufacturer to the Company.

b. In respect of computer software supplied by the Company the Company does not warrant that the use of the software will be uninterrupted or error free.

c. The Company accepts liability:

i. for death or personal injury to the extent that it results from the negligence of the Company, its employees (whilst in the course of their employment) or its agents (in the course of the agency);

ii. for any breach by the Company of any statutory undertaking as to title, quiet possession and freedom from encumbrance.

d. Subject to conditions (a) and (c) from the time of despatch of the Goods from the Company's premises the Purchaser shall be responsible for any defect in the Goods or loss, damage, nuisance or interference whatsoever consequential economic of otherwise or wastage of material resulting from or caused by or to the Goods. In Particular the Company shall not be fable for any loss of profits or other economic losses. The Company accordingly excludes all liability for the same.

e. At the request and expense of the Purchaser the Company will test the Goods to ascertain performance bevels and provide a report of the results of that test. The report will be accurate at the time of the test, to the best of the belief and knowledge of the Company, and the Company accepts no liability in respect of its accuracy beyond that set out in Condition (a).

f. Subject to Condition (e) no representation, condition, warranty or other term, express or implied (by statute or otherwise) is given by the Company that the Goods are of any particular quality or standard or 'will enable the Purchaser to attain any particular performance or result, or will be suitable for any particular purpose or use under specific conditions or will provide any particular capacity, notwithstanding that the requiremvent for such performance, result or Capacity or that such particular purpose or conditions may have been known (or ought

to have been known) to the Company, its employees or agents.

g i. Tothe extent that the Company is held legally liable to the Purchaser for any single breach of contract, tort, representation or other act or default, the Company's ability for the sare shall Mot exceed the price of the Goods.

ii. The restriction of liability in Condition (g)(i) shall not apply to any liability accepted by the Seller in Condition (c).

h . Where the Goods are sold under a consumer transaction (as defined by the Consumer Transactions (Restrictions on Statements) Order 1976) the statutory rights of the Purchaser are not affected by these Canditions of Sate.

Unpacking Your Product

Each product is shipped in protective packaging and should be inspected for damage before use. If there is any transit damage take pictures of the product packaging and notify the carrier immediately with ail the relevant details of the shipment. Packing materials should be kept for inspection and also for if the product needs to be returned.
The product is shipped with the following equipment so please check to ensure that you have all of the items below. If anything is missing, please contact the supplier of your equipment immediately.

Item	Quantity
Product Unit	1

Repairs & Returns
Please contact Sonifex or your supplier if you have any problems with your Sonifex product. Email technical **support@sonifex.co.uk** for the repair/upgrade/returns procedure, or for support & questions regarding the product operation.

CE and UKCA conformity
The products in this manual comply with the essential requirements of the relevant UK and European health, safety and environmental protection legislation. The technical justification file for this product is held at Sonifex Ltd. Relevant declarations of conformity can be found at: **https://www.sonifex.co.uk/declarations**
WEEE Directive
Directive 2012/19/EU of the European Parliament and of the Council of 4th July 2012 lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste from electrical and electronic equipment (WEEE).
The policy of Sonifex Ltd is to comply with all applicable laws of all jurisdictions having authority over Sonifex's business, including the WEEE directive. Accordingly, Sonifex has implemented a rigorous program designed to ensure compliance of its products with the WEEE directive. The latest statements can be found at: **https://www.sonifex.co.uk/company/recycling**
Atmosphere/Environment
This apparatus should be installed in an area that is not subject to excessive temperature variation (<0°C, >50°C), moisture, dust or vibration.
This apparatus shall not be exposed to dripping or splashing, and no objects filled with water, such as vases shall be placed on the apparatus.
IMADE IN BRITAIN®

AVN-GPIO Interface
The AVN-GPIO unit is part of the DIO range of products which provide a convenient and elegant method of connecting legacy GPIO equipment to a network.

Introduction

The AVN-GPIO is part of the AVN range of network interface boxes, which converts GPIO (General Purpose Inputs & Outputs) to network commands to control, and be controlled by, other equipment or software across a standard network.

It has 10 configurable GPIO's, 8 of which can be used for PTP based programming, together with a relay. It provides virtual GPIO that allow the device to trigger or be triggered by other Sonifex devices on the network using virtual GPIO without the need for extra wiring (virtual GPIO communication occurs via the Ethernet connection).
The AVN-GPIO is a PTP (Precision Time Protocol) enabled GPIO device. IEEE1588-2008 PTPv2 is used to keep a hardware clock in sync with a PTP master, such as the AVN-GMCS Grandmaster Clock, to achieve a sub 10ns synchronisation to the master reference. This means that the AVN-GPIO can be used to accurately timestamp input events and to trigger outputs at configured times.
The AVN-GPIO supports Default and AES67 Media profiles, and also provides a Custom profile which can be configured by the user.
It is housed in a rugged aluminium box with side slots for screw-mounting and is powered by PoE (Power over Ethernet).
The device is configured via a built-in webserver. This allows the configuration of PTP as well as live monitoring of its status. A GPIO routing webpage is provided which allows physical, and virtual inputs to be routed to physical, virtual, and relay outputs.
The AVN-GPIO provides a simple UDP messaging system that allows other devices on the network to query the device status information, for example to retrieve the time at which a change in input occurred. Custom applications can also be written to query this information via UDP.
The device has 8 PTP enabled GPIOs – when used as inputs these can detect rising and falling edges and will generate a timestamp synced to the hardware PTP clock. This means that the recorded timestamps will be synced within 10ns of the PTP master in a correctly setup system. When setup as outputs, a signal can be generated precisely at a time chosen by you and the time at which the output toggles can be configured down to the nanosecond. Alternatively, these timed GPIOs can be configured to act as 'normal' GPIOs depending on your

application.

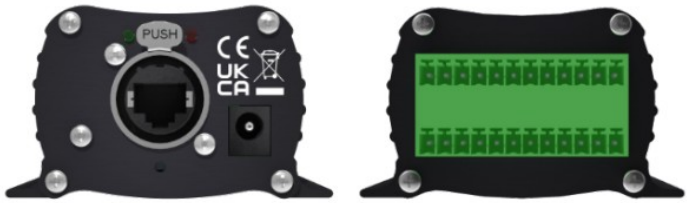
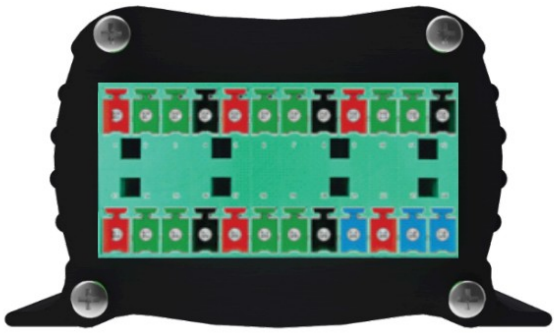


Fig 1-1: AVN-GPIO Front and Rear View

There are also two ‘normal’ GPIOs. When normal GPIOQs are configured as inputs they can be set to either momentary or latching mode. When setup as outputs, they pull the signal on the GPO pin down to ground when active.
The AVN-GPIO has a voltage free relay contact that can be used to operate external equipment, and also provides 6 x OC output voltage pins that can be used to power external equipment such as signage and various sensors and actuators. When powered via PoE (Power over Ethernet) the AVN-GPIO outputs 12V at 300mA total on these pins. When powered via the DC input the AVN-GPIO provides 1A total on these pins and the voltage follows the OC input. The DC outputs are fused to prevent drawing more current than the device can provide and these fuses are automatically reset when the device is power cycled.
On one side of the device is the 24-pin Phoenix style terminal block, the pin-out for this connector can be seen in the image and table below.

Overview



+12V DC	GPIO1	GPIO2	GROUND	+12V DC	GPIO3	GPIO4	GROUND	+12V DC	GPIO5	GPIO6	GROUND
1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24
+12V DC	GPIO7	GPIO8	GROUND	+12V DC	GPIO9	GPIO10	GROUND	RELAY NC	+12V DC	RELAY WIPER	RELAY NO

NC stands for Normally Closed, the default pin the relay wiper is connected to.
NO stands Normally Open, the pin the relay wiper will connect to when active.
The device has 1 relay and 10 general-purpose I/Os. The 10 general-purpose I/Os can be configured as inputs or outputs. When configured as an input (active low), the input is active (on) when the pin is pulled to ground. When not pulled to ground the input is inactive (off).
When the input pin is below 0.6V the input is active (on), when the input pin is above 2.3V the input is inactive (off). There is an internal 3.3V pull-up so it is not required that the user provide a voltage on the input pin to turn it off, the pin can be left floating. The outputs are open-drain pulling the output pin to ground when active.
Each open collector output can sink 100mMA maximum. If more current is required, the user can use the open collector output to turn on an external relay (max 24V) that is capable of passing higher currents.

The AVN-GPIO has DC outputs, as seen in the pin-out diagram, which can be sourced from (selectable via the web UI):

- System DC: this is derived from either the PoE (12V) or the supervised DC input (4 – 24V) and provides a DC output that is fused at 300 mA.
- DC Input: this is derived from the supervised DC input only (4-24V) and provides a DC output that is fused at 1A.

On the other side of the device there is an Ethernet port, which can be used to provide the device with PoE, and provides network connectivity allowing the device to be configured via a web browser. There is a 2.5mm locking DC inlet (Max 24V DC) which allows you to provide an alternative power source.
Two status LEDs are to the top-left and top-right of the Ethernet port: the top-left LED is illuminated red when power is supplied to the device, this turns orange when a link is established. The top-right LED is illuminated green when a 100Mbps link is established, this LED is off when a 1OMbps link is established. Below the Ethernet port is the reset button which can be used to reset the device or put the device into bootstrap mode. For more information on the bootstrap mode see the section Bootstrap Mode.

Embedded Web Server

The embedded web server can be accessed via a web browser and is the main interface for configuring, monitoring, and updating the AVN-GPIO. Accessing the Web Server

1. Connectthe AVN-GPIO and your computer to the same network.
2. Ensure that the network interfaces for both devices are configured within the same P address range.
3. Type the AVN-GPIO's IP address into the address bar of your web browser.

By default, the AVN-GPIO has a static IP address which is 192.168.0.100 with a subnet mask of 255.255.255.0. Therefore, your computer's network interface will need to be configured in the same range. For example an IP address 192.168.0.101, with a subnet mask of 255.255.255.0.
The AVN-GPIOs network interface can be configured via the embedded web server and changed to a more suitable address if necessary.
In the case that the IP address is unknown, the active IP address for the network port can be found using the Sonifex Service Discovery tool, available here: **http://sonifex.co.uk/technical/software/index.shtml#sfxsrvdisc**

Help
When browsing the web UI, a question mark in a widget can be pressed to display useful help information.

The Information page shows useful status information about the device.

Device Information

Device ID

Displays the type of device.

Host Name

Unique device name displayed on a network which can be used to access the web UI, for example with a hostname of avn-gpio-000002 you can type avn-gpio-000002.local into the address bar to access the devices web UL

Friendly Name

User configurable name displayed on the web UI and virtual output advertisements.

Serial Number

Unique device number provided by Sonifex.

Firmware Version

The version of firmware on the unit. The latest firmware version can be found on the Sonifex website.

DC Voltage

Indicates whether the DC supply s present or missing.

PoE Voltage

Indicates whether the PoE (Power over Ethernet) supply is present or missing.

System Up Time

Displays the time since the device was powered on.

Control Port Information

Hardware Address

A unique MAC address provided by Sonifex.

Actual IP Address

The current IP address.

Actual Subnet Mask

The current subnet mask.

Addressing Mode

The current address mode, either static or dynamic.

Network

The network page shows the current configuration of the control port which is used to access the device’s web server. The friendly name and security options can also be set here.

Device Name & Security

Friendly Name

The friendly name identifies the unit on the network. It is a good idea to assign a user name or locationwhich is easily recognised by other users. The default friendly name is a combination of the device ID and the 7-digit product serial number, for example AVN-GPI0-1234567. The friendly name can only contain letters, numbers and hyphens but can not start or end with a hyphen.

Password

In order to prevent other users connected to the same network from modifying the configuration of the device, it is possible to protect your device with a password. The password may be between 4 and 8 characters long and may only contain numbers and letters.

Removing Password Protection

Password protection can be removed from a device by clearing both the “Password’ and ‘Retype Password” fields and clicking ‘Submit’.

HTTP Port

The HTTP port number can be set to any integer from ‘1024’ up to and including ‘65535, or to ‘80″ the default value. The value entered determines which port the web server on the device will use. When the port number is modified the unit will be restarted automatically. To view the web pages of a device with a modified port number, the port number must be specified in the address bar of the web browser after the IP address and separated by a colon.

For example, if the HTTP port of a unit is set to ‘1024’ and the IP address of the unit is 192.168.0.100″ then ‘**http://192.168.0.100:1024**’ would need to be entered into the address bar of the web browser. When the portis set toits default value of ‘80’ a port number doesn’t need to be specified when accessing the web server. The web server on the unit is advertised as an Avahi/Bonjour service so tools like Sonifex Service Discovery or avahi-browse will be able to discover the address and port number being used by the web server on the unit.

Control Port Settings

Address Mode

The address mode determines how the port obtains its IP address. When set to dynamic, the unit will attempt to acquire an IP address automatically from either a DHCP server or via auto configuration if no DHCP server is found. The actual IP address will be shown on the device information page. When static mode is used, the IP address and subnet mask values entered will be assigned to the port.

Static IP Address

This is the IP address that will be assigned to the port when static address mode is selected. It is important to ensure that this IP address is not currently in use on the network. This value is not used when the address mode is dynamic.

Static Subnet Mask

This is the subnet mask that will be used for the port when static address mode is selected. This value is not used when the address mode is dynamic.

Static Gateway

This is the router IP address that will be used for the port when static address mode is selected.

Note

If any of the network configuration options are changed, the unit will automatically restart to implement the new settings. If the address mode of the control port is changed, a new connection will need to be made once the unit has restarted and the IP address assigned via DHCP is known. Otherwise, the new page will be reloaded automatically once the restart of the unit is complete.

PTP

The PTP (Precision Time Protocol) page displays information on the current PTP configuration and status. PTPv2 is used to keep the AVN-GPIO's hardware clock in sync with a PTP master, such as the AVN-GMCS Grandmaster Clock, toachieve a sub 10ns synchronisation to the master reference. This means that the AVN-GPIO can be used to accurately timestamp input events and to trigger outputs at configured times.

PTP General

Event DSCP

Time critical PTP messages should be sent with a higher packet priority. Event messages include sync, delay request, peer delay request, and peer delay response messages.

General DSCP

These PTP messages are not timestamped. General messages include follow up, delay response, peer delay response follow up, announce, management, and signalling messages.

TTL

Sets the Time to Live for PTP packets. This is the maximum number of hops a PTP packet can perform before being removed from the network.

Active PTP Profile

Active Profile

The PTP profile that is currently active. PTP profiles provide flexibility for different applications.

Profile Configuration

Profile

The PTP profile to be configured.

Delay Mechanism

The End-to-End (E2E) mechanism is the default option and delay measurement messages are sent from the master to the slave. The Peer-to-Peer (P2P) mechanism should only be used on networks in which all switches are guaranteed to be IEEE 1588 capable – delay measurement messages are sent between peers providing better timing accuracy.

Announce Interval

The time in seconds between announce messages being sent when in master mode.

Announce Receipt Timeout

When in slave mode the number of missed announce messages before the device announces itself to the network, in an attempt to determine the new master device.

Sync Interval
The time in seconds between sync messages when in master mode.
Minimum Delay Request Interval
Configurable when the E2E delay mechanismis selected. The minimum time to wait between sending delay request messages in slave mode.
Minimum Peer Delay Request Interval
Configurable when the P2P delay mechanism is selected. The minimum time to wait between sending peer delay request messages in slave mode.
Priority 1
Used by the Best Master Clock Algorithm (BMCA) to help determine the new Grand Master (GM). The device with the lowest priority 1 value will become the GM, this is normally set to 128 for master capable devices.
Priority 2
I two devices have the same priority 1, clock class, clock accuracy and clock variance values, the priority 2 field is used to determine the GM. The lower value wins.
PTP domain
There may be multiple PTP domains on a network, set this value to determine Wwhich domain to join.
Slave Only
Ensure that the device remains in slave mode and never becomes a master device.
PTP Info
Port State
Indicates whether the PTP state of the device, for example master, slave, or listening.
Master ID
When in slave mode indicates the ID of the PTP master the device is slave to.
When in master mode this devices ID is displayed.
Offset
‘When this device is a slave, this indicates the current difference in nanoseconds between this devices clock and the master’s clock. The closer the difference is to zero the better.
Date
The current date this devices PTP clock is set to. This device is normally a slave to a GPS enabled GM allowing an accurate date to be shown.
Time
The current time this devices PTP clock is set to. This device is normally a slave to a GPS enabled GM allowing an accurate time to be shown.
Offset Chart
This chart shows how the offset value previously mentioned changes over time. This value should gradually move towards zero.
Time
The time page allows the time displayed throughout the device to be configured. The display time is used by

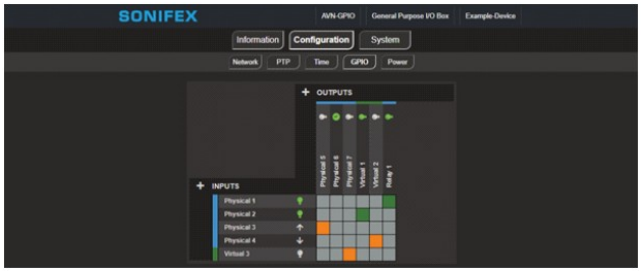
- The PTP page to display the current date and time.
- The GPIO page to display the time at which an event occurred.
- The GPIO page to configure the time at which a trigger will become active.
- In UDP messages when reporting the time at which an event occurred.

Time Settings
Display Time

Select between International Atomic Time (TAI), Coordinated Universal Time (UTC), and local time:

- TAIis acontinuous scale of time without leap seconds.
- UTCisthe primary time standard used around the world and includes leap seconds.
- Local time can be used in conjunction with an offset to display the local time, in this mode Daylight Saving Time (DST) can also be applied.

Local Offset
Use this option to provide the offset required to set the local time, for example +1 hours in Germany.
DST Options
Enable DST
Allows Daylight Saving Time to be configured.
DST Begin
Determine the start date at which the DST offset will be applied for example Sun, Mar 26, 2023 1:00 AM for the UK in 2023.
DST End
Determine the end date at which the DST offset will be removed for example Sun, Oct 29, 2023 2:00 AM for the UK in 2023.
DST Offset
The hours and minutes to offset the time by when DST is active (between the begin and end dates) for example 1 hour for the UK in 2023.
GPIO
The GPIO page can be used to configure and monitor the inputs and outputs of the device.



Inputs are shown to the left of the grid and outputs are shown above the grid. Clicking on a box between an input and an output creates a link, allowing an input to drive an output.
Input/Output Icons
When an input/output is not active its corresponding icon is grey, when the input/output becomes active the icon changes to green.
The icon may vary depending on the configuration of the input/output.

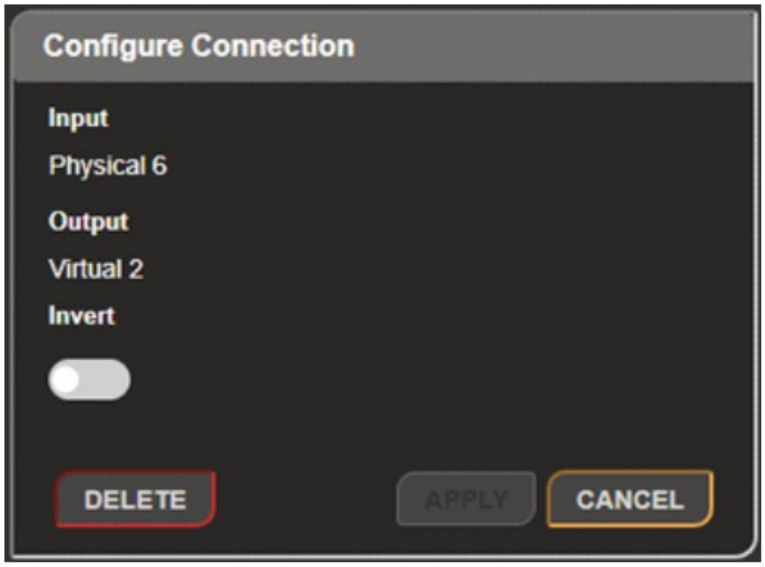
- For normal physical inputs/outputs and virtual inputs foutputs the bulb icon is displayed:

- For physical inputs setup to detect rising edge events an upwards arrow is displayed:

- For physical inputs setup to detect falling edge events a downwards arrow s displayed:

- For physical outputs setup as triggers the clock iconis displayed:

Links
Alink is represented by an orange box on the grid – the box becomes green when the link s active. To add a link, click on an empty square.
To configure a link, click on it – this will open the ‘Configure Connection’ window.

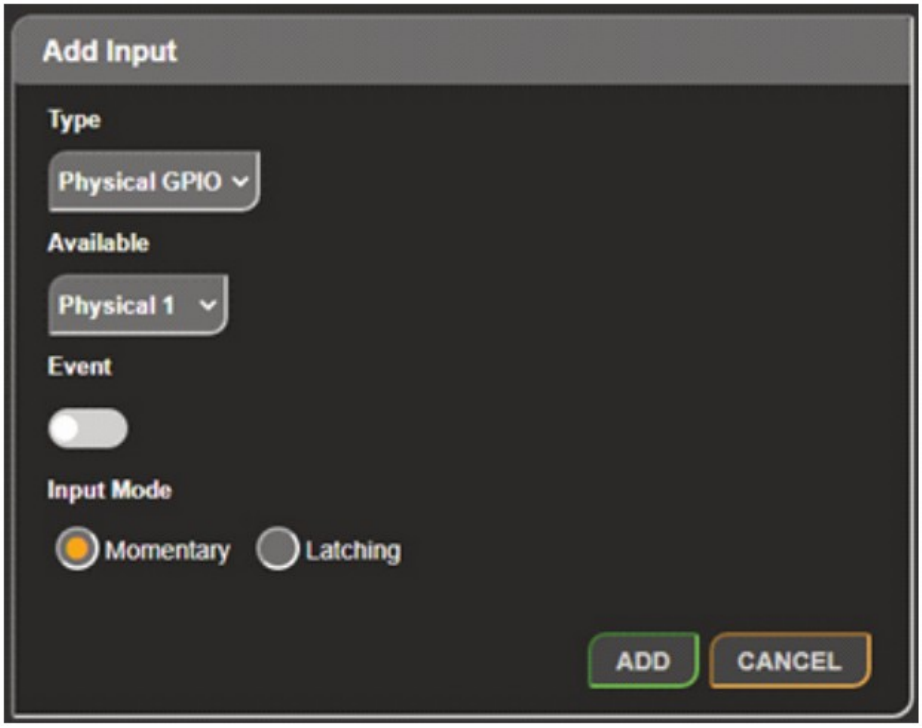


In this window the input and output link connects can be seen. There is also an option to invert the link which means that if the link would normally be off,itis instead on, and if a link would normally be on, it is instead off.
The buttons at the bottom of the window allow the link to be deleted, or the invert changes to be applied/cancelled.

Adding Inputs
Inputs can be added by pressing the add button next to ‘INPUTS’. A new window titled ‘Add Input’ will be displayed.
The input type can be selected here – the input can be one of the following:

- Physical – An input driven physically by pulling the physical pin high or low.
- Virtual- Aninput driven over the network by another device.

Physical Inputs
When adding a physical input, it can be setup in either normal mode or event mode.



Normal Mode

Innormal mode the input mode can be set to either momentary o latching.

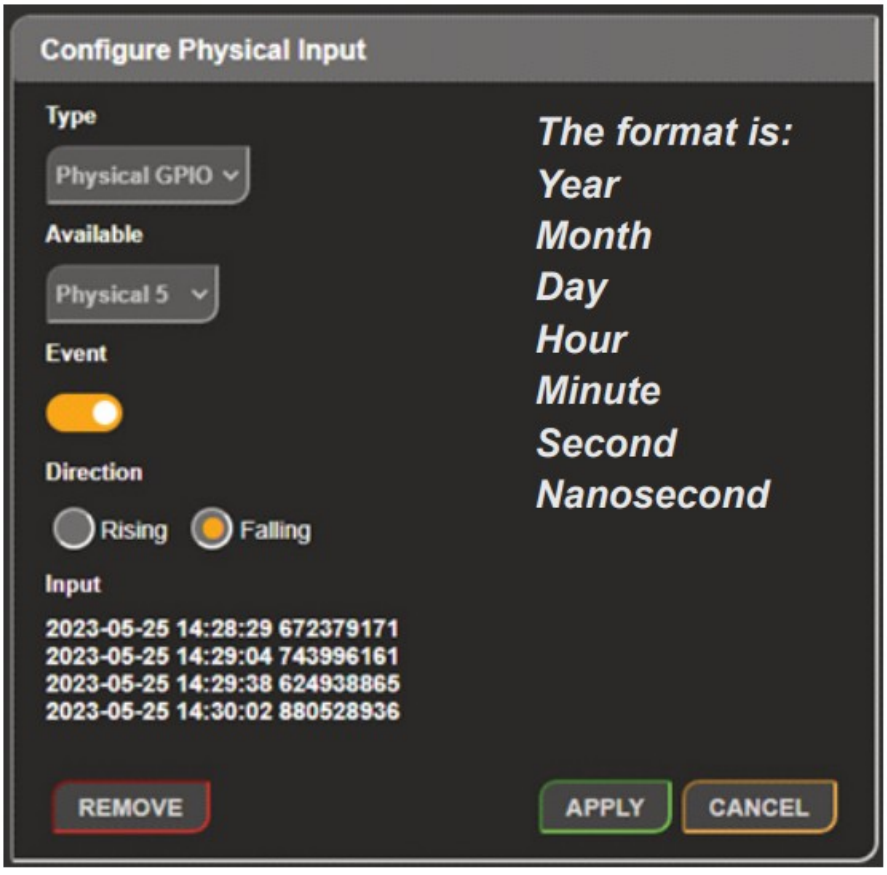
When momentary is selected the input must be held low to keep the input active. Inlatching mode, the input will become active when the input is pulled low and then released. The inputs have a 30 millisecond debounce period – the pin state is assumed correct if it remains the same for 30 millseconds.

Event Mode

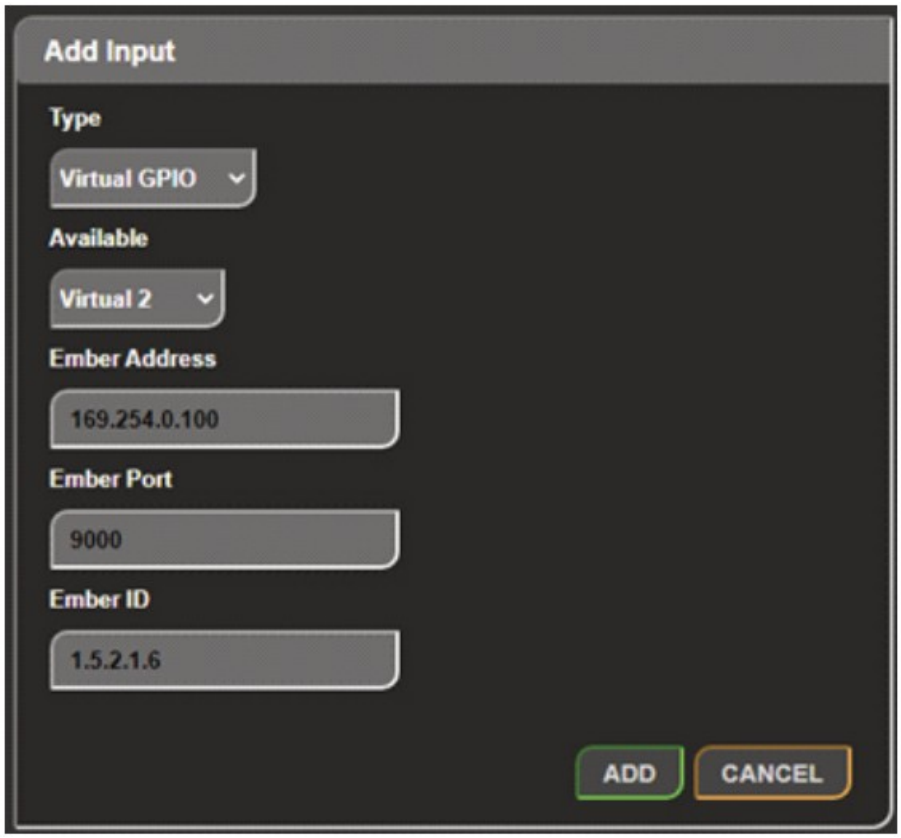
In event mode the detected direction of the signal s selected, this s either tising or falling. When the rising direction is selected the input detects changes from a low level to a high level. When the falling direction is selected the input detects changes from a high level to alow level.

The time at which an event occurs will be recorded and can be found by clicking on the input. When an event is captured, the input becomes active.

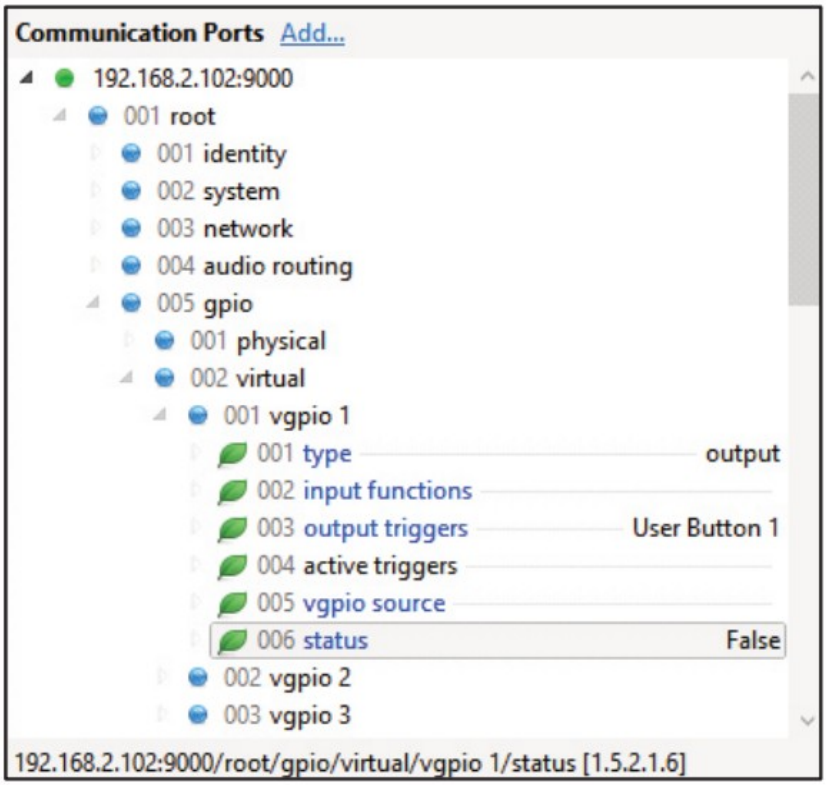
An example of some recorded data is shown below.



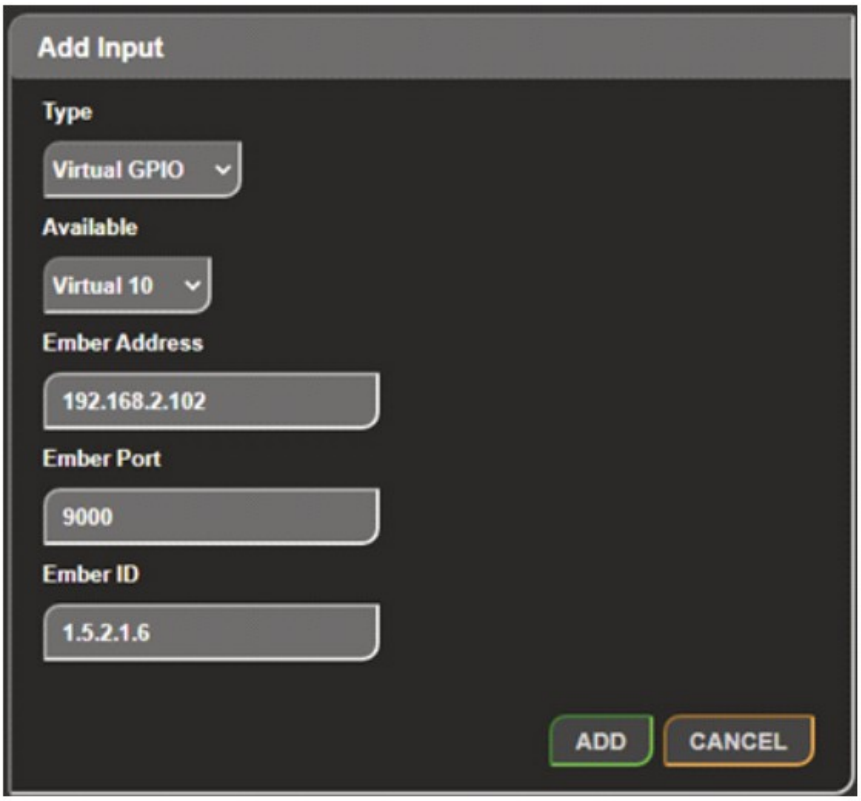
Virtual Inputs
Avirtual input uses the Ember+ control protocol to obtain the value of a Boolean parameter. This can then be used to drive outputs.



The field ‘Ember Address’ should be set to the address of the device you would like to connect to. This device must have an Ember provider, for example an AVN-Portal could be used.
The field “Ember Port’ should always be set to 9000 for Sonifex devices.
The Ember ID is the raw path to the value you want to connect, this can be found in Ember+ Viewer.
The Ember+ Viewer can be downloaded here:
https://github.com/Lawo/ember-plus/releases
In the image below the provider tree for an AVN-Portal is shown.



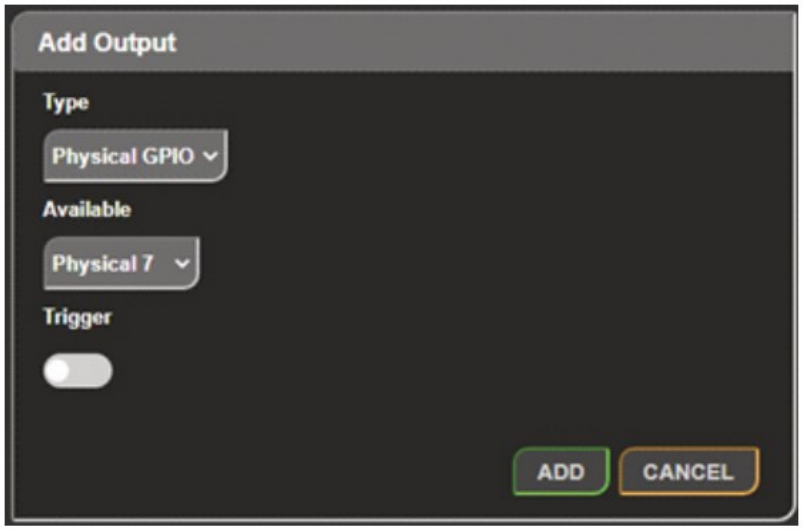
In the example provider tree, the status parameter can be seen, this is a Boolean value that can be added as an input. The raw path to this parameter is152.16
The correct value to add this parameter as an input to the grid is shown in the image below:



Adding Outputs
Outputs can be added by pressing the add button next to ‘OUTPUTS. A new window titled ‘Add Output’ will be displayed.
The output type can be selected here, the output can be one of the following:

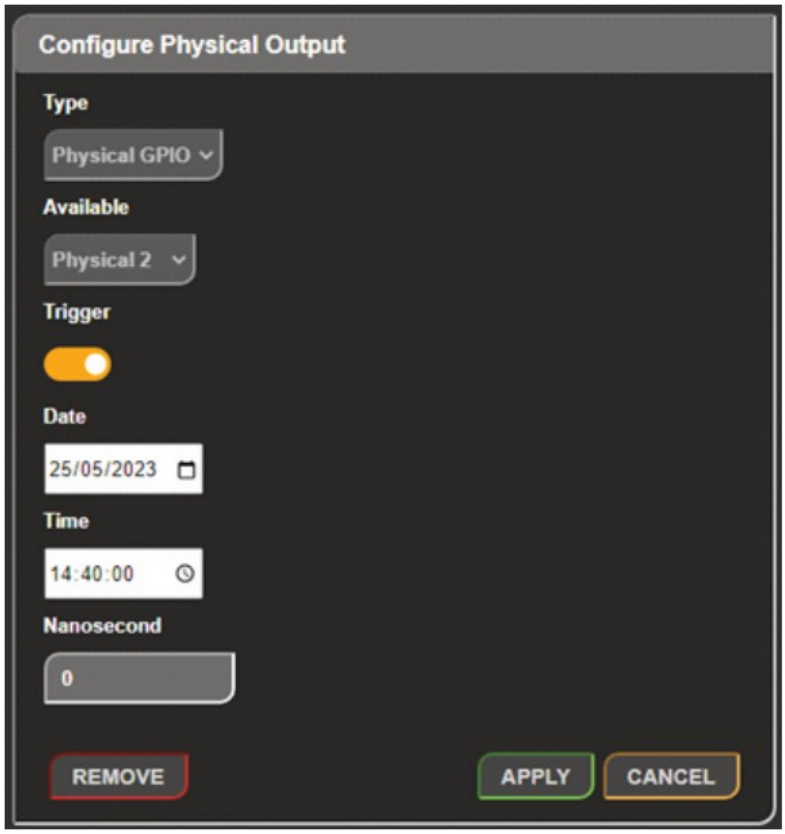
- Physical – Used to pull a physical pin to ground when active.
- Virtual – Used to drive a virtual input over the network.
- Relay—Creates a connection between the common pin and normally closed pin when inactive, create a connection between the common pinand normally open pin when active.

Physical Outputs
Physical outputs can be set up in normal mode or trigger mode.



Normal Mode
In normal mode the output will become active when any links connected to it become active. When active the associated pin is pulled down to ground.
Trigger Mode
In trigger mode ‘Date’, “Time’, and “Nanosecond’ fields become available and allow the time at which the output

becomes active to be configured. In this mode links to the output are ignored.



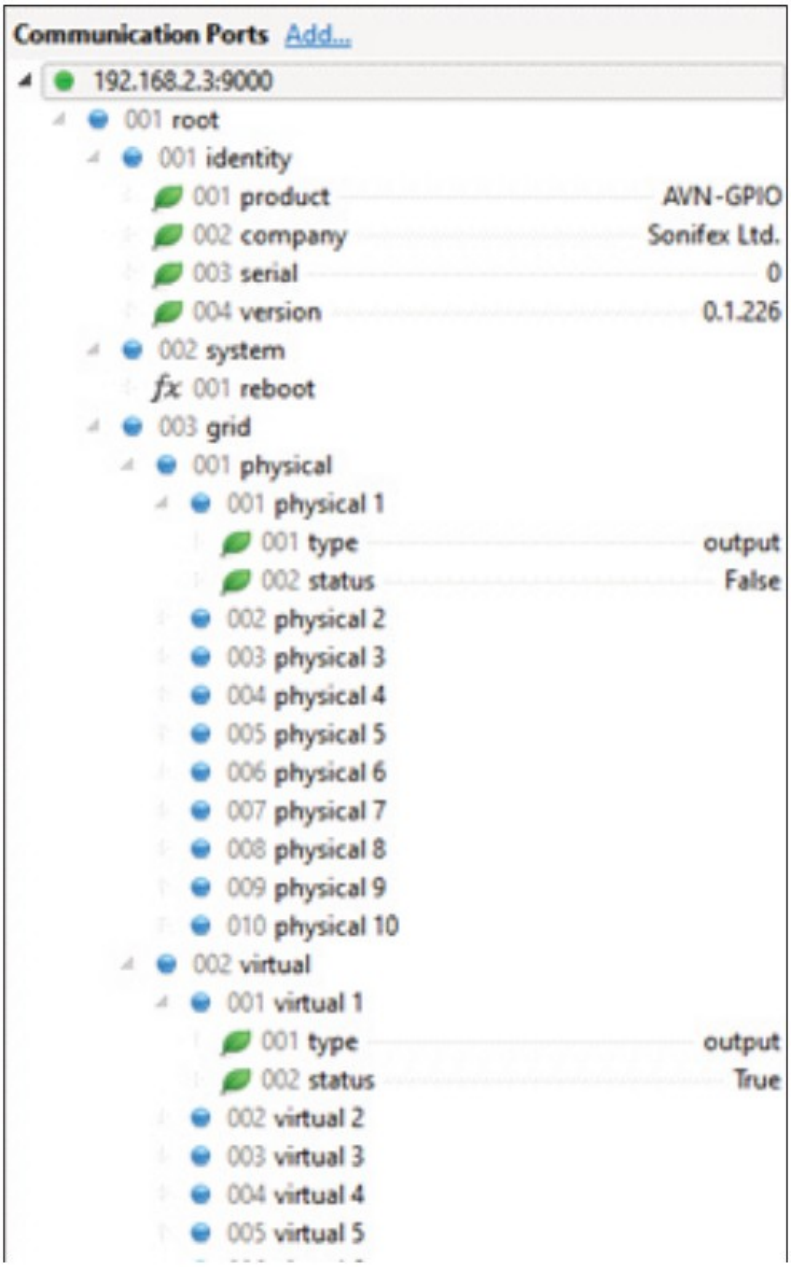
Virtual Outputs

Virtual outputs use the Ember+ control protocol to drive other devices overa network.

The Ember+ provider and tree information is advertised on the network via mDNS. This allows other Sonifex devices such as the AVN-Portal, AVN-CU, and AVN-PXH12 to automatically discover and add these virtual outputs to their own routing grid as inputs.

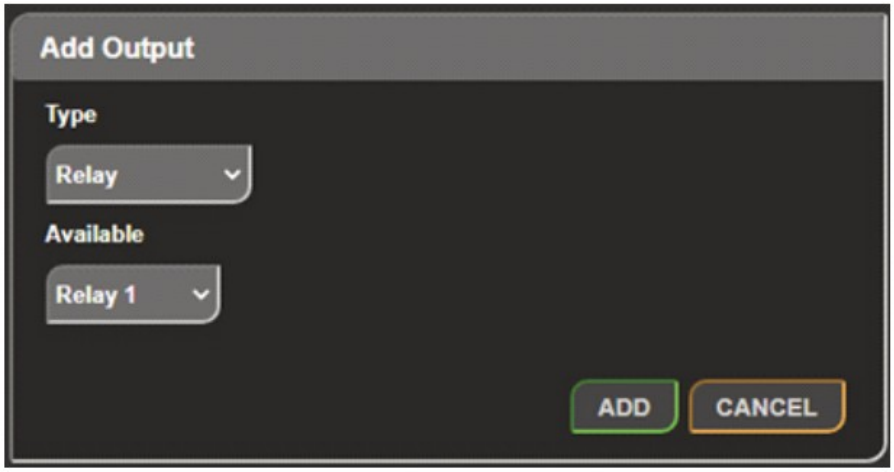
Alternatively other devices can obtain the tree information directly from the AVN-GPIOs Ember+ provider.

The Embers+ provider for the AVN-GPIO can be seen in Ember+ Viewer, this is shown below.



Relay Output

The relay output creates a connection between the common pin and normally closed pin when inactive, and creates a connection between the common pin and normally open pin when active.



The relay is active when any links connected to it become active.

Power

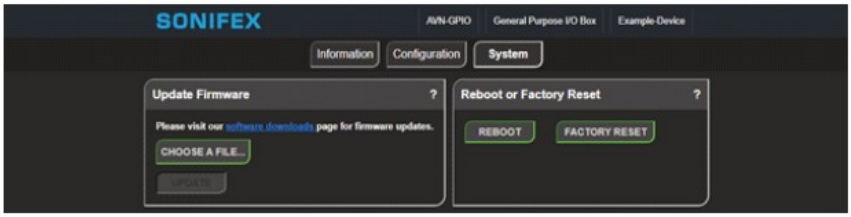
Power related configuration options are displayed here.

DC Output Source
Select between the system DC supply or the DCinput supply.

- The system DC supply is derived from PoE (Power over Ethemet) or DC input when a DC supply is connected. (Max current draw 300mA)
- The DCinput supply is a supervised version of the supply provided on the DCinput. (Max current draw 14)

System
The system web page is used for the following:

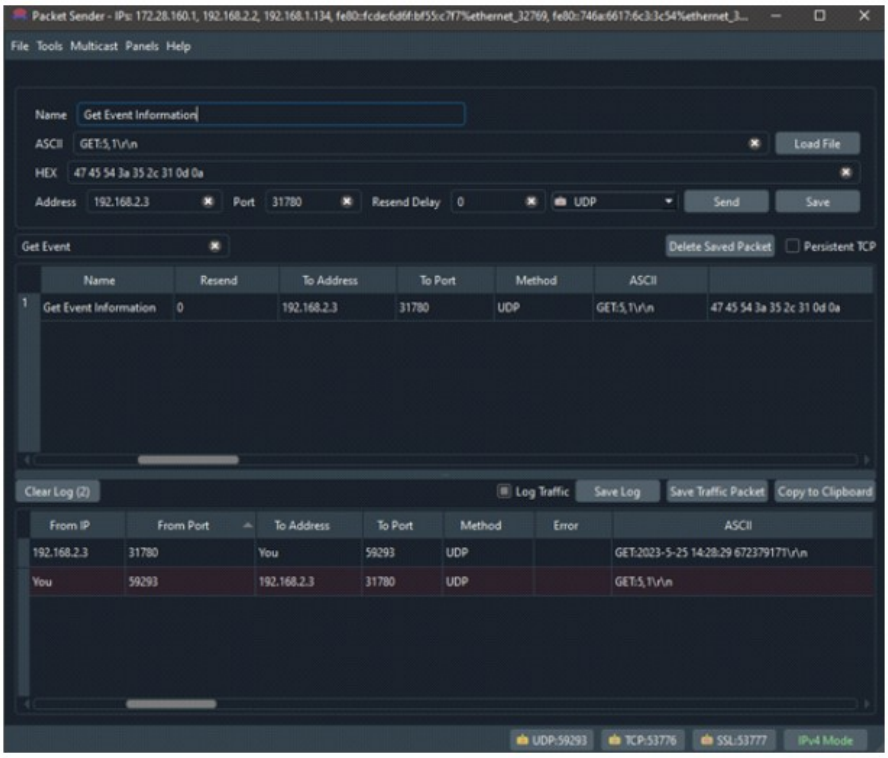
- Updating the unit
- Rebootingand resetting the unit



Update Firmware
New versions of firmware will be released as new features are added, and when any bug fixes are completed. Click on the software downloads link to visit the firmuware downloads webpage of the Sonifex website. If an update is available for your unit, you can download it as a zipped archive file. You will need to extract the “dwn’ file from the archive which can be done in Windows by right-dlicking the archive and selecting ‘Extract Il You can then upload the dwn file to the unit.
Reboot or Factory Reset
The unit can be rebooted using the reboot button. A quick reboot can often fix any issues with the unit and after rebooting the webpage should automatically be reloaded. The factory reset button restores the unit to factory settings. Restoring the factory settings will also cause the unit to reboot.

UDP Commands

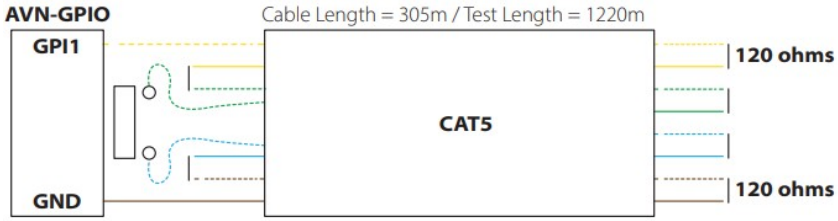
The AVN-GPIO can respond to UDP commands, in order to allow an application to query status information.
An application such as Packet Sender can be used to send UDP commands: **https://packetsender.com/**
The UDP command must be sent to port 31780 as this is the port the AVN- GPIO listens to for UDP commands.
To retrieve the time at which an event occurred, use the following command:
GET:X,Y\r\n
Here X is the input to be queried and Y is the event number to retrieve.
For example, to fetch the event 1 on input 5 the following command would be used:
GET:5,1\r\n
Below shows an example of using Packet Sender to retrieve the time an event occurred.



The AVN-GPIO responds with the following:
GET:2023-5-25 14:28:29 672379171\r\n
The time at which the event 1 occurred. Again this s in the format:
Year-Month-Day Hour:Minute:Second Nanosecond

Bootstrap Mode

In the unlikely event that power s lost during a firmware upgrade then the unit may enter ‘bootstrap mode’, This is a limited firmware set that allows firmware upgrades to take place to return the unit to a normal working state. ‘Bootstrap mode’ is indicated by both primary and secondary PoE and Link LEDs flashing in unison. Firmware updates are performed using a TFTP client running on a host PC. Forcing Bootstrap Mode
If you need toforce the unit into bootstrap mode, this is done by pressing and holding the reset button down for more than 5 seconds. After 5 seconds the front panel LEDs willstart to flash slowly which indicates that the unit will be forced into bootstrap mode with a static IP address of 192.168.0.100.
If the reset button is held for more than 10 seconds, the LEDs will flash faster which indicates that the unit will be forced into bootstrap mode with dynamic mode addressing set. The unit will now attempt to get an address from a DHCP server or fall back to a link-local IP address using Auto-IP.
If the reset button is held for more than 15 seconds, the LEDs will flash even faster and the unit will now perform a factory reset and clear all of the current configuration settings.
Upgrading Firmware in Bootstrap Mode
Once the device has been put into bootstrap mode, a TFTP client can be.
used to transfer firmware to it. The IP address of the device must be known – the Sonifex Service Discovery Application can be used tofind the 1P address of the device. Many TFTP clients are available, fro example, on Microsoft Windows a free application called TFTPD64 is available.
Within TFTPD64, select the TFTP client tab, enter the device’s address in the host field and 69 in the port field. Next navigate to the firmware update file (this has the .dwn file extension). The remote file field should be left blank and the block size left on default. Finally press the button labelled ‘Put’, the progress of the upload wil then be displayed.
The device will reboot and now be using the uploaded firmware. If you are still experiencing issues, try holding the reset button for 15 seconds to perform a factory reset.
6 Maximum Cable Length Testing
Testing was performed using a 305 metre Cat 5 twisted pair cable and the ends of the wire were connected to increase the length of the cable. The maximum test length that could be reached was alength of 1220 metres from the input to the switch and 1220 metres back to the switch to ground. Using this test length, the input could be successfully toggled.



Technical Specification For AVN-GPIO

PTP Timing Specifications	
Profile Support	IEEE1588 Default Profile, AES67 Media Profile, and Custom Profile
Timing Protocol	PTPv2 IEEE 1588-2008
Timing Accuracy	PTP time stamping resolution 8 nanoseconds
Connections	
Network	1 x 100 Mbit/s Ethernet (RJ45/100BASE-TX) with Power over Ethernet (PoE)
DC Power In	1 x 2.5mm locking DC inlet Centre pin positive
GPIO Connector	1 x 24-Pin Phoenix Style Terminal Block
GPIO Format	10x GPIOs (8x PTP enabled) configurable as pull-low inputs or open collector outputs
Voltage Free Relay Contact	NC, NO, Wiper
Relay Contacts Max Voltage	125V (AC) 30V (DC)
Relay Contacts Max Current	600mA (AC) 2A (DC)
Power over Ethernet	
Standard	IEEE 802.3af
Class	0
PD Power Range	0.44 W to 12.94 W
Typical PSE Power Usage	2.3W
Max PSE Power Usage	15.4W
DC Power Out (Powered by PoE)	
Voltage	12V DC
Max Current	300mA (Fused)
DC Power in	
Min Voltage	4V DC
Max Voltage	24V DC

Min external supply current	2A
DC Power Out (Powered by DC input)	
Voltage	Follows DC Input(fused)
Max Current	1A (fused)
UDP Interface Connection	
Port	31780
Equipment Type	
AVN-GPIO:	GPIO to LAN Transceiver (PTP, EMBER+ & UDP)
Physical Specification	
Dimensions (Raw)	10.6cm (W) x 7.3cm (D) x 4.3cm (H) 4.2″ (W) x 2.9″ (D) x 1.7″ (H)
Dimensions (Boxed)	17.4cm (W) x 9.5cm (D) x 5.6cm (H) 6.9″ (W) x 3.7″ (D) x 2.2″ (H)
Weight	Nett: 0.2kg Gross: 0.3kg Nett: 0.44lbs Gross' 0.66lbs

SONIFEX

www.sonifex.co.uk
www.sonifex.co.uk
t:+44 (0)1933 650 700
sales@sonifex.co.uk
MADE IN BRITAIN®

Documents / Resources

	Sonifex AVN-DIO10 Audiophile Interfaces AVN GPIO LAN Transceiver [pdf] Instruction Manual AVN-DIO10 Audiophile Interfaces AVN GPIO LAN Transceiver, Audiophile Interfaces AVN GPIO LAN Transceiver, Interfaces AVN GPIO LAN Transceiver, GPIO LAN Transceiver, LAN Transceiver, Transceiver

References

- Releases · Lawo/ember-plus · GitHub
- Welcome to Sonifex - Manufacturers of Broadcast Audio & Video Equipment for Radio & TV Studios
- sonifex.co.uk/register
- Welcome to Sonifex - Manufacturers of Broadcast Audio & Video Equipment for Radio & TV Studios
- User Manual