
**DM88**
System Processor
**User Manual**
Revision 1.0

**www.nstaudio.com**

## CONTENTS

## EU DECLARATION OF CONFORMITY

This declaration is issued under the sole responsibility of the manufacturer.

**We:**

NST Audio Ltd.
Unit 4C Seph Way
York Road Industrial Park
Malton
North Yorkshire
YO17 6YF
United Kingdom

**Declare that this declaration of conformity is issued under our sole responsibility and belongs to the following product and derivatives:**

**Kind of equipment:** Audio processor
**Model:** DM88

**The object of the declaration is in conformity with the relevant Union harmonisation legislation:**

2014/35/EU Low Voltage Directive (LVD)
2014/30/EU Electromagnetic Compatibility Directive (EMC)

**The following harmonised standard and technical specifications have been applied:**

EN 62368-1:2014 - Audio/video, information and communication technology equipment - Safety requirements
EN 55032:2015 - Electromagnetic compatibility of multimedia equipment - Emission requirements
EN 55035:2017 - Electromagnetic compatibility of multimedia equipment - Immunity requirements

**Signed:**

**Name:** Dan Cartman

**Position:** Research and Development Manager

**Date:** June 2025

CE

## IMPORTANT SAFETY INSTRUCTIONS

CAUTION: RISK OF ELECTRIC SHOCK. DO NOT OPEN.


The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated dangerous voltage" within the product s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.


The exclamation point within an equilateral triangle is intended to alert the user of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: Apparatus with CLASS I construction shall be connected to a MAINS socket outlet with a protective earthing connection.
WARNING: To prevent injury, this apparatus must be securely attached to the rack in accordance with the installation instructions.

1 : Read these instructions.

2 : Keep these instructions.

3 : Heed all warnings.

4 : Follow all instructions.

5 : Do not use this apparatus near water.

6 : Clean only with a dry cloth.

7 : Do not block any ventilation openings, install in accordance with the manufacturer s instructions.

8 : Do not install near any heat sources, such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

9 : Do not defeat the safety purpose of the polarised or grounding-type plug. A polarised plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fi t into your outlet, consult an electrician for replacement of the obsolete outlet.

10 : Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

11 : Only use attachments/accessories specified by the manufacturer.

12 : Use only with the cart, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from a tip over.

13 : Unplug this apparatus during lightning storms or when unused for a long period of time.

14 : Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

15 : Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.

16 : To completely disconnect this equipment from the AC mains, disconnect the power cord from the mains circuit breaker.

17 : This unit is fitted with a 3-wire power cord. For safety reasons, THE EARTH LEAD SHOULD NOT BE DISCONNECTED IN ANY CIRCUMSTANCE.

18 : Only replace the IEC inlet fuse with the correct part:
T 3.15A H 250V.

## INSTRUCTIONS DE SECURITE IMPORTANTES

ATTENTION: RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR.

 Le symbole représentant un éclair fléché dans un triangle équilatéral a pour but d alerter l utilisateur de la présence d une tension dangeruese" non isolée à l intérieur du boitier, pouvant etre d une force suffisante pour constituer un risqué d électrocution.

 Le point d exclamation dans un triangle équilatéral a pour but d alerter l untilisateur de la présence d instructions importantes concernant le fonctionnement et la maintenance, dans la documentation qui accompagne l appariel.

ATTENTION: Appareils de construction de CLASSE I doit être raccordé au réseau électrique via une prise de courant reliée à la terre.
ATTENTION: Pour éviter toute blessure, cet appareil doit être solidement fixé à la torture, conformément aux instructions d'installation.

1 : Lisez ces consignes.

2 : Conservez ces consignes.

3 : Respectez tous les avertissements.

4 : Respectez toutes les consignes d utilisation.

5 : N utilisez jamais l appareil à proximité d un liquide.

6: Nettoyez l appareil avec un chiff on sec.

7 : Veillez à ne pas empecher la bonne ventilation de l appareil via ses ouies de ventilation. Respectez les consignes du fabricant concernant l installation de l appareil.

8 : Ne placez pas l appareil à proximité d une source de chaleur telle qu un chauff age, une cuisinière ou tout appareil dégageant de la chaleur (y compris un ampli de puissance).

9 : Ne supprimez jamais la sécurité des prises bipolaires ou des prises terre. Les prises bipolaires possèdent deux contacts de largeur diff érente. Le plus large est le contact de sécurité. Les prises terre possèdent deux contacts plus une mise à la terre servant de sécurité. Si la prise du bloc d alimentation ou du cordon d ali-mentation fourni ne correspond pas à celles de votre installation électrique, faites appel à un électricien pour eff ectuer le changement de prise.

10 :Installez le cordon d alimentation de telle facon que personne ne puisse marcher dessus et qu il soit protégé d aretes coupantes. Assurez-vous que le cordon d alimentation est suffisamment protégé, notamment au niveau de sa prise électrique et de l endroit où il est relié à l appareil; cela est également valable pour une éventuelle rallonge électrique.

11 : Utilisez exclusivement des accessoires et des appareils supplémentaires recommandés par le fabricant.

12: Utilisez exclusivement des chariots, des diables, des présentoirs, des pieds et des surfaces de travail recommandés par le fabricant ou livrés avec le produit. Déplacez précautionneusement tout chariot ou diable chargé pour éviter d éventuelles blessures en cas de chute.

13 : Débranchez l appareil de la tension secteur en cas d orage ou si l appareil reste inutilisé pendant une longue période de temps.

14 : Les travaux d entretien de l appareil doivent etre eff ectués uniquement par du personnel qualifié. Aucun entretien n est nécessaire sauf si l appareil est endommagé de quelque facon que ce soit (dommages sur le cordon d alimentation ou la prise par exemple), si un liquide ou un objet a pénétré à l intérieur du chassis, si l appareil a été exposé à la pluie ou à l humidité, s il ne fonctionne pas correctement ou à la suite d une chute.

15: N'exposez pas cet équipement au fait de tomber goutte à goutte ou au fait d'éclabousser et garantissez qu'aucun objet rempli des liquides, comme les vases, n'est placé sur l'équipement.

16: Pour complètement débrancher cet équipement de la conduite principale de courant alternatif, débranchez la corde de pouvoir du disjoncteur de conduite principale.

17 : Cette unité est correspondue avec une corde de pouvoir de 3 fils. Pour les raisons de sécurité, L'AVANCE DE TERRE NE DEVRAIT ETRE DÉBRANCHÉE DANS AUCUNE CIRCONSTANCE.

18 : Ne remplacez le fusible d'entrée IEC que par la pièce correcte: T 3.15A H 250V.

## WEEE

Once your NST Audio product has reached the end of its useful life, please ensure that is recycled in a proper manner.

"The WEEE Regulations 2013 are the UK interpretation of the EU WEEE Directive and aim to reduce the quantity of waste electrical and electronic equipment (WEEE) disposed of in the UK".

EEE producers are required to pay for the reuse, recycling and recovery of the products by registering as an EEE producer which requires them to join a producer compliance scheme.

NST Audio has been registered with producer compliance scheme Comply Direct since 2015 ensuring 100% compliance with the WEEE regulations 2013.

Our WEEE Producer Registration Number is WEE/HG5453ZY.

Old electrical equipment can be recycled along with its metal enclosure. Our products are marked with a crossed-out wheeled bin symbol on the rear of the product.

Please do not throw any electrical equipment (including those marked with the crossed out wheeled bin symbol) in your general waste bin.

NST Audio Ltd. is able to arrange WEEE collections for our customers through a trusted network of WEEE recycling facilities made available by Comply Direct. We are able to arrange collection and transportation of your WEEE to reprocess and recycle ensuring the minimum goes to landfill.

## ROHS

The Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU).

NST Audio Ltd products are RoHS compliant, and are available for export as lead-free and RoHS compliant.

NST Audio Ltd is committed to eliminating the use of hazardous substances in the materials, manufacturing and packaging of our products in strict accordance with the RoHS directive.

With regards to the RoHS Directive 2002 / 95 / EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, we declare that to the best of our knowledge, all products meet and fulfil all the requirements of the aforementioned directive.

## ADDITIONAL WARNINGS


只有在高海拔地区使用不超过 2000 米。
ONLY TO BE USED AT ALTITUDE BELOW 2000 METRES

只适合于非热带气候地区使用
ONLY TO BE USED IN NON-TROPICAL CLIMATE REGIONS

## THANK YOU

Thank you for choosing an NST Audio product for your application. Please spend a little time reading through this manual, so that you can obtain the best possible performance from the unit.
All NST products are carefully designed and engineered for cutting-edge performance and world-class reliability. If you would like further information about this, or any other NST product, please do not hesitate to contact us.

## UNPACKING THE UNIT

After unpacking, please check the unit carefully for any damage. If any is found, immediately notify the carrier concerned - you, the consignee, must instigate any claim.
Please retain all packaging, in case of future re-shipment.

## INSTALLATION

**Electrical Considerations:**
The NST device has been manufactured to comply with your local power supply requirements, but before connecting the unit to the supply, ensure that the voltage (printed on the rear panel) is correct, and that a mains fuse of the correct type and rating has been fitted.
Make sure power outlets conform to the power requirements listed on the back of the unit.
Damage caused by connecting to incorrect AC voltage is not covered by the warranty.

**Mechanical Considerations:**
To ensure that this equipment performs to specification, it should be mounted in a suitable rack or enclosure. When mounting the unit in a rack or enclosure, ensure that there is adequate ventilation. The cooling fan sucks cool air in through the left side and blows warm air out of the right side of the unit through the ventilating grills. Take care when mounting other equipment in the same rack.

**Operation:**
Read all documentation before operating your equipment and retain all documentation for future reference. Do not spill water or other liquids into or on the unit and do not operate the unit while standing in liquid. Do not block the fan intake or operate the unit in an environment that could impede the free flow of air around the unit. If the unit is used in an extremely dusty or smoky environment, it should be cleaned of any collected debris at regular intervals.

## OVERVIEW

The DM88 incorporates not only the best quality audio conversion and DSP, but also new levels of flexibility for routing and processing. Featuring 16 Dante, 8 analogue and 8 AES inputs, these are all available[1] to be matrixed to one of 16 processing channels, optimised for either general input processing or for more specialised output speaker processing.

General input processing features multiple layers of parametric EQ with a library of selectable behaviours, 3 bands of dynamic EQ, compression, high-pass filter plus delay and phase reverse. Specialised output processing includes 48dB/Oct high and low-pass filters, multiple EQ layers, FIR filtering, and a new 2-way mode limiter, designed for use with passive 2-way speaker boxes.

By allowing any source to be directly selected at any output, and incorporating a three-level failover system, the DM88 can perform format conversion and break-in/break-out duties. This is in addition to the 16 channels of individual signal processing and routing.

Our D-Net control software for PC, Mac and iPad gives you complete control over Ethernet and Wi-Fi. The latest release of D-Net incorporates advanced features that unlock the capabilities of the DM88. These include speaker module libraries for fast configuration, and powerful grouping and linking control to work with EQ layers, levels, and delays across multiple devices on the network[2].

The DM88 is also compatible with the VR1 & VR2 venue remotes and V-Remote, our iPhone venue remote application.

## KEY FEATURES

**Input and Output Connectivity**:
8 Analogue Inputs and Outputs
8 AES Inputs and Outputs (with WCLK in sync.)
16 Network Audio Inputs and Outputs
All inputs and outputs available all the time

**Routing Switching and Matrix Modes:**
4 Source Mix Matrix on all processing channels (Input or Output DSP)
plus direct Input to Output routing for format conversion or console switching

**General Input Processing Features:**
Variable High Pass Filter (freq and type)
50 Parametric EQs with Behaviour Library
Compressor with soft knee control
3 Band Dynamic EQ
Input Gain, Polarity
Delay (up to 1.3s per channel)

**Specialised Output Processing Features:**
50 Parametric EQs with Behaviour Library
Crossover Filters up to 48dB/Oct
Output Gain, Polarity,
Delay (up to 1.3s per channel)
RMS limiter with "2-way passive box" mode plus look ahead clip limiter
FIR filtering capable – up to 1024 taps/channel

**Control Features:**
5" colour touchscreen for monitoring and key parameter control (gain/phase/mute +memory recall)
Remote control via 100Mbps Ethernet
Up to 64 presets may be stored for offline recall with high granularity recall
Compatible with VR1/VR2 PoE remote control panels and V-Remote iPhone app
GPI muting for emergency evac systems programmable for either closed or open contact
GPI closed contact programmable memory recall (x4)
Simple Ethernet Control Protocol enables building control system integration for Crestron™ and other similar systems.

[1] Up to 4 sources & any channel of each source type
[2] Grouping only available on DM88 devices

**Front Panel Overview:**


**1. 5" Colour Touchscreen:**
Primarily used for monitoring of all input sources, all output channels, failover status and DSP (response curves and dynamics monitoring). Key parameter direct control – input and output gains/phase/mutes/delays can be directly access and adjusted, plus module[3] gains/phase/mutes/delays. Preset recalls for local[4] device may also be accessed.

**2. Rotary Encoder:**
For accurate adjustment of delay times, gains and push action for mutes, phase/polarity and recalls.
Also used to scroll between channels or modules on all views[5].

[3] For more information on the "module" concept please see page 20
[4] High granularity recalls may be initiated via front panel (granularity level pre-selected in D-Net per memory location) – see page 31
[5] Only if a delay or gain not currently selected

**Rear Panel Overview:**


**1. Mains Power Inlet, Fuse and Power Switch:**
3-pin IEC input, fused, 100-250VAC, 50-60Hz <20W.
A spare fuse is located within the fuse holder – only replace with the correctly rated fuse specified in the Technical Specifications section on page 51.

**2. GPI Port:**
The GPI port allows connection to a fire alarm relay to mute the device when the relay is either closed or opened (port pin 1 only), or to recall a preset when a selected GPI port pin is grounded (contact closed). The preset to recall can be chosen along with associated port pin and is configured in D-Net on the system page of each device. See page 31 for more information.

**3. Word Clock Input:**
Connection of a valid WCLK signal to this BCN socket will force the DSP and AES IO to lock to this clock signal. In the absence of a valid WLCK the DSP and AES default to the internal clock source unless Dante is being used in which case it becomes clock master.

**4. Dante Ethernet Ports:**
Dante RJ45 network Ethernet ports accept a standard CAT5 cable for connection to a network switch. The Dante ports are configured as redundant by default but can be configured in switched mode in the Dante Controller software.

**5: Comms Ethernet and 4-Port Switch:**
Connect a CAT5 cable to any of the ports for remote control and configuration using D-Net, running on either a Windows PC or mac, or via a wireless access point, using an iPad.

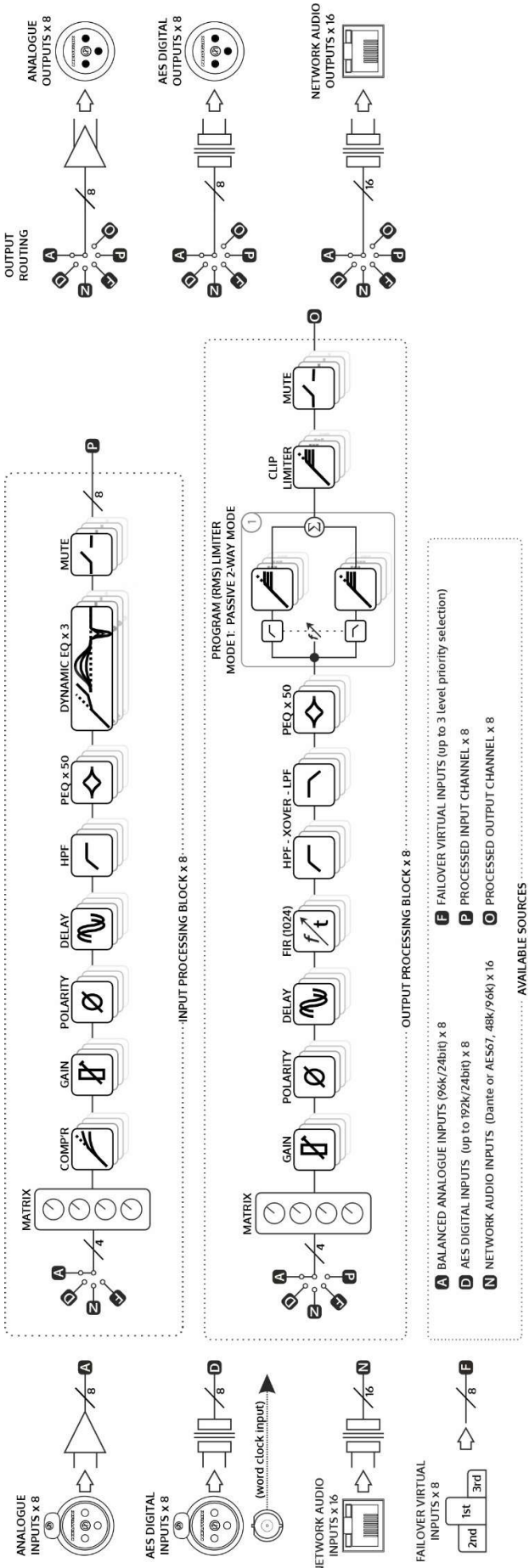
**6. AES Digital Audio Outputs:**
AES outputs arranged in channel pairs, 1+2, 3+4 etc. These outputs are active all the time.

**7. AES Digital Audio Inputs:**
AES inputs arranged in channel pairs, 1+2, 3+4 etc. These inputs are active all the time.
Note that if the Word Clock input is in use it will be providing the master clock for the DSP.

**8: Balanced Analogue Inputs:**
The analogue inputs are wired as follows:
Pin 1: Shield/Ground
Pin 2: Signal Hot (+)
Pin 3: Signal Cold (-)

**9: Balanced Analogue Outputs:**
The analogue outputs are wired as follows:
Pin 1: Shield/Ground
Pin 2: Signal Hot (+)
Pin 3: Signal Cold (-)

## SIGNAL PROCESSING DIAGRAM



## SIGNAL PROCESSING - EVERYTHING EVERYWHERE, ALL AT ONCE

The DM88 offers new levels of flexibility in routing and processing from an NST product. As all inputs and outputs are accessible and active simultaneously, the DSP can select, route and mix any of these sources either through the processing channels, or directly to the outputs.

Looking at the signal processing diagram on the previous page, it can be seen that each section of processing, whether that's a general input processing channel or a specialised speaker processing channel, has a 4-way mix matrix on its input. Any of the 32 "real" or 8 "virtual"[6] sources can be selected and up to four can be mixed to feed a DSP processing channel:

- A Analogue inputs 1-8
- D Digital AES inputs 1-8
- N Network audio inputs 1-16
- F Failover (virtual) inputs 1-8

As the intention is that sources would first pass through a general input processing channel and then be fed into one or more specialised speaker processing channels, the mix matrix on the input to the specialised speaker processing channels also includes an additional source type – the *output* from the general input processing channel
Hence, output processing channels have *five* possible source types:

- A Analogue inputs 1-8
- D Digital AES inputs 1-8
- N Network audio inputs 1-16
- F Failover (virtual) inputs 1-8
- P Input processing 1-8

Additionally, as all the outputs are simultaneously active, what feeds them can be selected not only from the output of the output processing channels, but also from the input processing outputs and from any of the input sources:

- A Analogue inputs 1-8
- D Digital AES inputs 1-8
- N Network audio inputs 1-16
- F Failover (virtual) inputs 1-8
- P Input processing 1-8
- O Output processing 1-8

This flexibility allows a DM88 to process up to 16 channels of audio if the general input processing is used independently to the output processing, as well as offering the possibility of making processing input channels available on the network at the same time as the output channels (there are 16 network audio outputs).

Other useful scenarios include routing analogue sources directly onto the network, bypassing the processing so they can be used by another DM88 (or any other network audio device), whilst at the same time processing AES or network audio inputs which are then output locally to feed amplifiers.

As presets can be designed that only feature routing changes (see page 31 for more on the memory structure and storage and recalls), a DM88 can also function as an efficient console switcher, with failover, and direct access via the front panel, or a VR2.

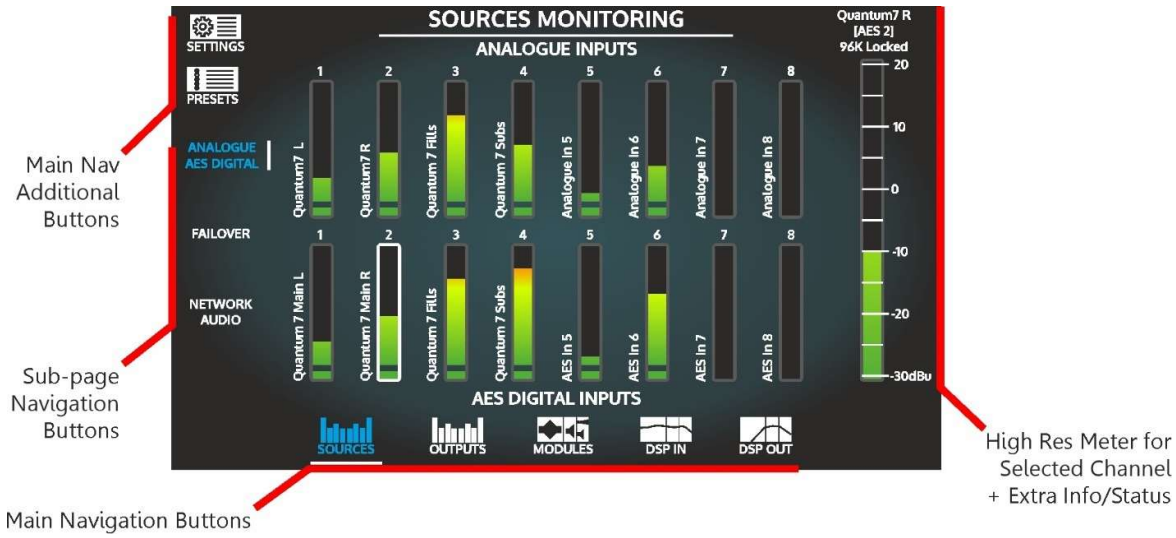
[6] "Virtual" sources refer to the failover system which endeavours to keep audio present at an input by monitoring for signal present conditions and switching automatically to a different source (generally a different source type) should the signal have dropped out

## TOUCHSCREEN NAVIGATION

D-Net is used to fully configure and control a DM88. However, the touchscreen of the DM88 has been designed to show comprehensive metering and "at a glance" feedback about processing at various points within the unit. Additionally, key parameters can be directly adjusted such as mutes, phase, delay and gain. Presets, designed and stored using D-Net, may also be recalled.

The touchscreen also works in conjunction with the rotary control/ push entry which can be used for fine adjustment and some navigation functions.

The screen is laid out as below:




The five main views are selected using the main navigation buttons at the bottom of the screen. On "Sources" and "Outputs" views, there are additional sub-page buttons on the left-hand side to swap between related metering views.

On all main screens, apart from "Modules" there is a large meter displayed on the right-hand side of the screen. This meter shows a "zoomed in" level of the currently selected channel. Additional information about this selection may be displayed above the meter – for example, the channel name, its source or its physical output number.

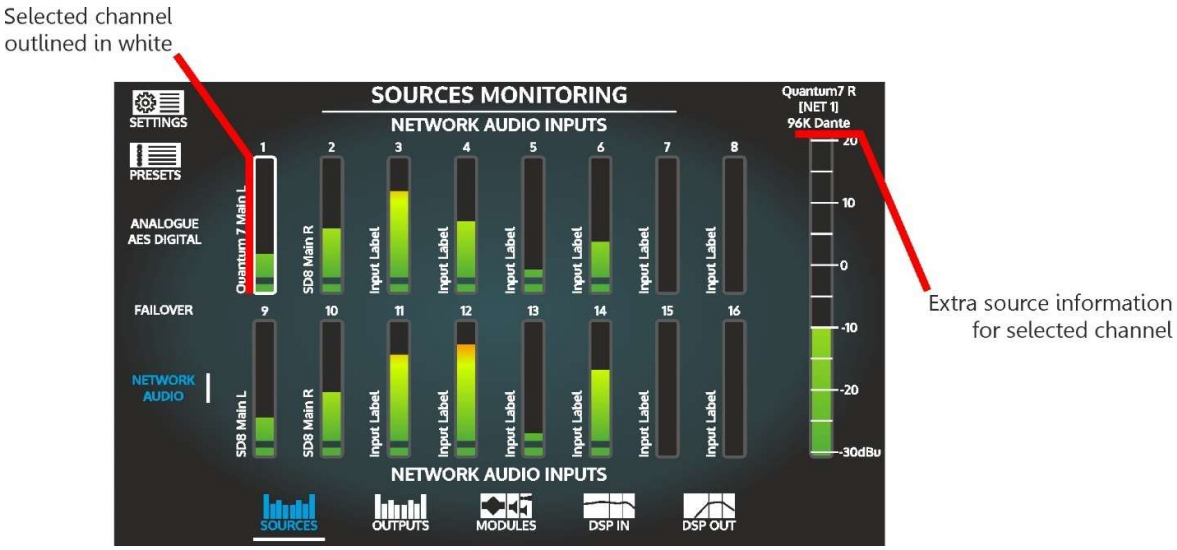
There are two additional buttons displayed top-left on all screens for the "Settings" view and the "Presets" view. These buttons are interlinked with the main five along the bottom of the screen and the user may swap freely between all seven views – there is no menu structure or nested levels of control to remember.

## SOURCES - ANALOGUE, AES AND NETWORK AUDIO

Sources monitoring shows all possible input sources, analogue, AES and network, on a single screen with selection of either Analogue and AES inputs, Failover Inputs or Network Audio via the three sub-page buttons on the LHS. No adjustments are available on this screen. Touching an individual channel small meter from a group will display its level on the larger high-resolution meter on the RHS and show additional info for that channel - label, and the source type + physical channel in square brackets.

This would be

Analogue – [ANA1] through [ANA8] for the analogue XLR inputs
AES Digital – [AES1] through [AES8] for the AES digital XLR inputs
Network – [NET1] through [NET16] for the Dante or AES67 inputs via the audio network input




Status information that can be displayed above the high-resolution meter would be:

Analogue – **Source name and physical input only**
AES Digital – **Not Locked or AES 44.1k/48k/96k/192k + Locked**
Network – **Dante 48k/96k or No Subs.**

The rotary can also be used to quickly scroll along channel selections. Note that the scaling on the high-resolution meter will change depending on the source selected: -30dBu to +20dBu for analogue sources and -50dBFS to 0dBFS for digital sources.

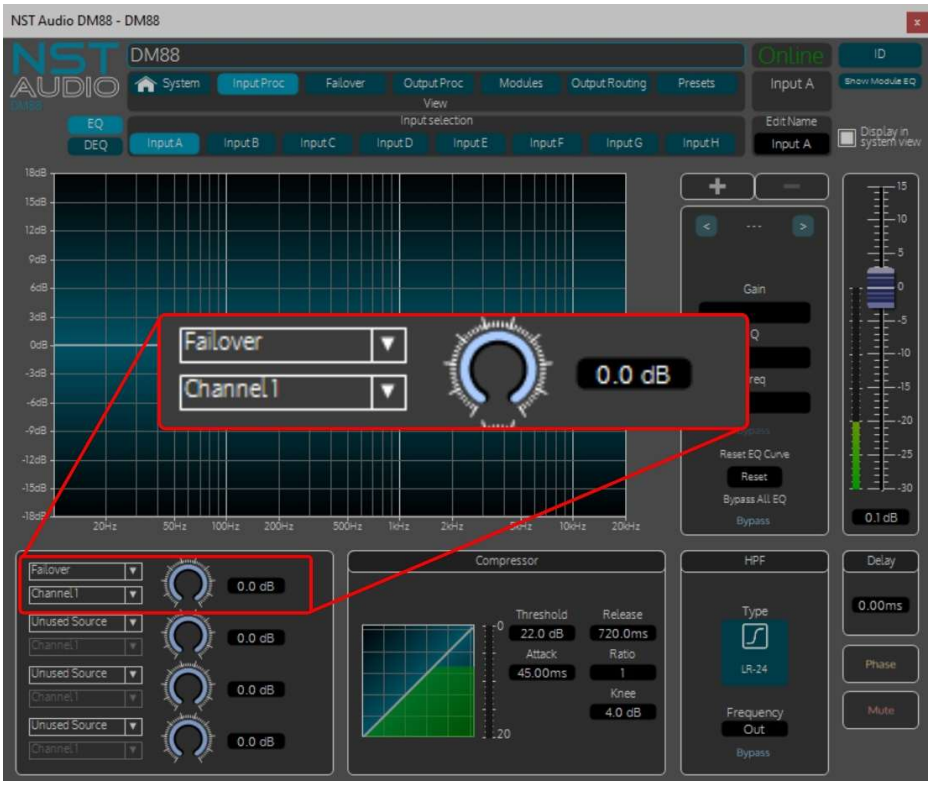
## SOURCES - FAILOVER SYSTEM

The failover system allows the DM88 to automatically select a different input source for a given channel should the current source become unavailable or fail. Up to three levels of priority switching can be selected, with all sources[7] being continuously monitored and their status shown on screen.

A source failure is defined differently for AES inputs and for Dante inputs. For AES sources it is indicated by a loss of signal, so either a failure of the upstream device or disconnection. For Dante sources it is indicated by loss of signal, disconnection and additionally by a loss of subscription. As analogue sources cannot be verified for signal integrity, if analogue is chosen as the primary source, the failover system will not be offered.

**Failover channels – they are a source!**

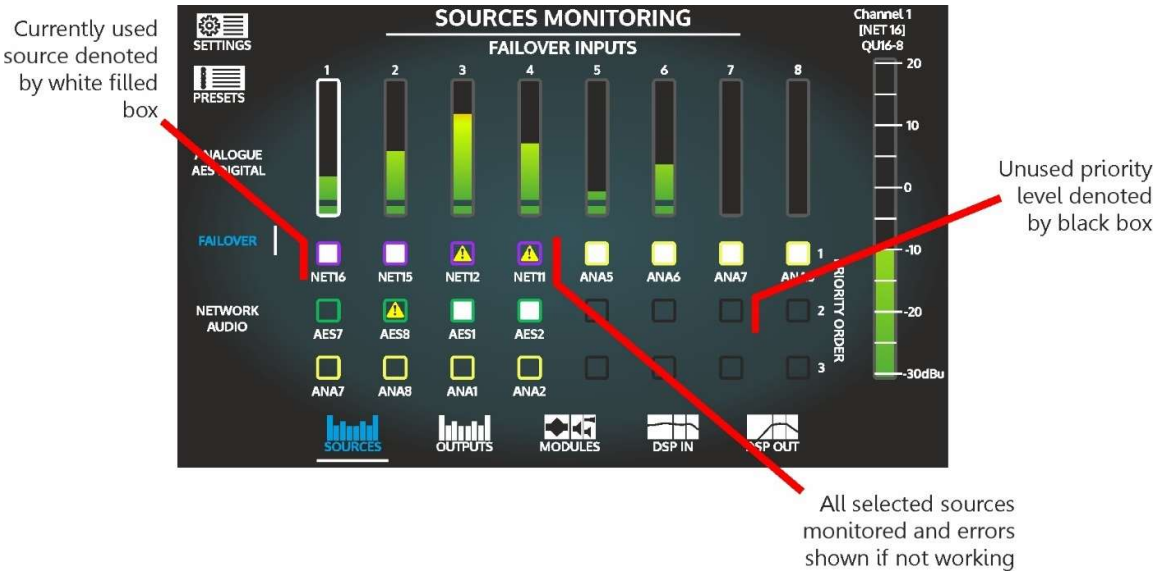
Note that failover channels do NOT have to be used as part of a system configuration. Even if this view is fully configured, the failover channels exist as a separate input source choice. "Failover" must be selected as a choice on DSP editing views in D-Net, on the input matrix:




The configuration of the failover system is through D-Net.

[7] Status of sources that are selected as failover choices – full metering of every source is available on the other sources views

The failover view is shown below:




Each virtual channel's priority levels are denoted by the three squares below the channel meter with the top one showing the highest priority. The priority level is colour coded in line with D-Net's use of colours for different sources -

**Purple** for network audio source channels;
**Green** for AES digital source channels;
**Yellow** for analogue source channels.

The channel number of the selected source type is also shown below the square. A black square means a priority level has not been set (it's possible to just have two level failover in place on a channel).

In the above example, channel 1's top priority source is Dante channel 16. Its second level priority is AES channel 7, and the lowest priority level is analogue channel 8. Currently, the Dante source is being used.

Channel 3's top priority source is Dante channel 12, but this channel is missing as shown by the warning triangle (normally if the channel has been accidentally unsubscribed in Dante controller). Therefore, priority level two is being used (AES channel 1).

Channels 5-8 have only the top priority level set for analogue channels 5-8 respectively and so the lower two levels for these channels are shown in black.


All channels are being constantly monitored for signal integrity and if a priority level signal is lost, a warning triangle will be shown for that selection – this means that even if that source isn't currently in use, it can be confirmed it is ready as a backup source.

Here, AES channel 8 is missing, but the top priority signal, Dante channel 15, is still OK. Should the Dante channel fail, the audio would drop directly to analogue input 8 in this instance.

**Recovery Time**

As part of the configuration of the Failover system in D-Net, there are options to adjust how the system reacts to changes in input states.

The Recovery Time setting determines how quickly an input is returned to a higher priority source if that source is reinstated. For example, consider a two level priority channel with AES as the primary source and analogue as the backup:

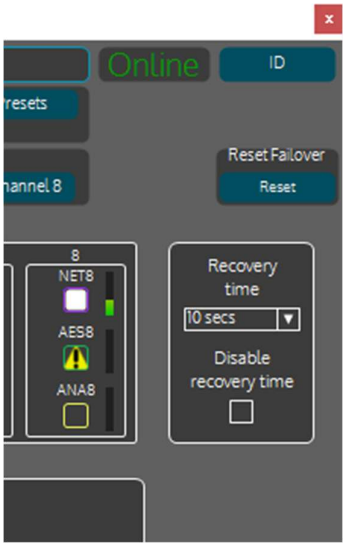

AES 1 & 2 are disconnected or disappear, so the Failover system swaps to using analogue inputs 1 & 2:


If the AES signal is restored, it will be reselected automatically as the input choice. However, if the signal is intermittent, for example due to a faulty connector or cable, it may better to delay this swapping from one priority to another.

The Recovery Time setting determines how long the system waits before switching back to the primary audio source after a failure has been resolved. This prevents erratic switching in cases where the primary source experiences intermittent faults.

Essentially, it ensures a stable transition by allowing the system to confirm that the primary source is fully restored before reverting. Without this setting, the system might switch back too quickly, only to fail again if the issue persists.

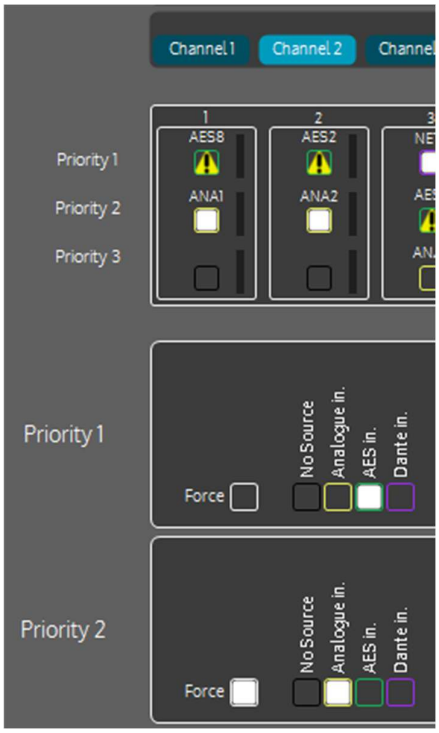
Recovery time may also be disabled, so the system attempts to swap to the highest priority as quickly as possible. Note that failures in network audio channels are always going to be slower to recover than AES signal loss.



**Failover Force**

If there are unresolvable issues during a show, and the failover system is trying to swap inputs repeatedly, to the detriment of the audio integrity, failover can be temporarily[8] disabled on channels that are "misbehaving". This is useful in scenarios where maintaining the primary audio feed is critical, such as live broadcasts or emergency communication systems.

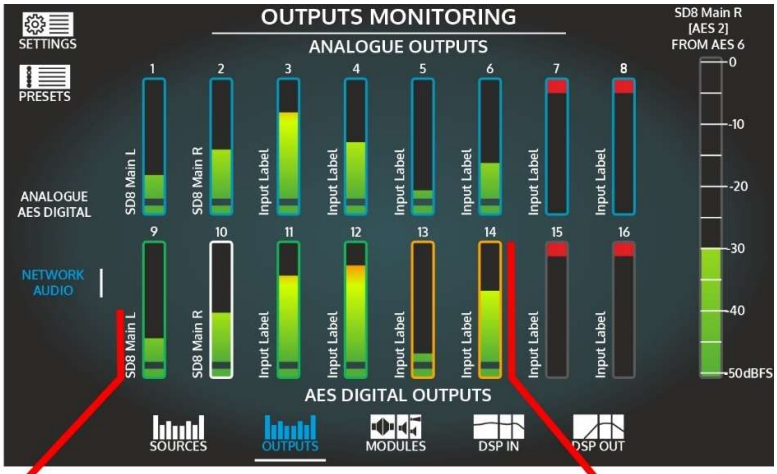
In the previous example, if the AES signal is proving to be unreliable, channels 1 & 2 can be "forced" to stay on priority level 2 and use the analogue inputs instead:




[8] The forcing of a failover priority is removed on a power cycle

## OUTPUTS - ANALOGUE, AES AND NETWORK AUDIO

Outputs monitoring shows all physical outputs, analogue, AES and network, on a single screen with selection of either Analogue and AES outputs or Network Audio via the two sub-page buttons on the LHS. No adjustments are available on this screen. Touching an individual channel small meter from a group will display its level on the larger high-resolution meter on the RHS and show additional info for that channel – the label, physical channel in square brackets and the source feed.




Network audio output names derived from Dante card

Meter outline colour denotes the source type

The coloured border of any output channel additionally shows its source for quick fault-finding should any outputs not appear to be working – if the channel is a different colour from its neighbour's then there might be an incorrect routing.

The colour coding used in D-Net is as follows:

**Black** for no source;
**Blue** for DSP output source channels;
**Orange** for DSP input source channels;
**Pink** for failover source channels;
**Purple** for network audio source channels;
**Green** for AES digital source channels;
**Yellow** for analogue source channels.

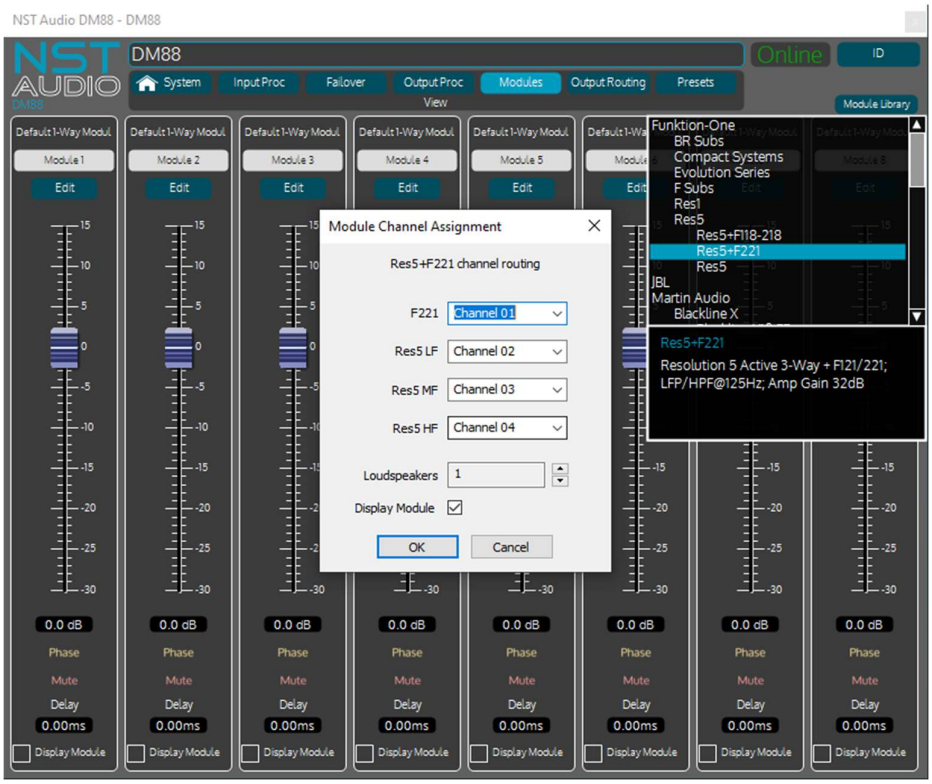
Note that the labels shown next to the channel meters in the Network Audio view are duplicated from the Dante card's configuration and are thus named within Dante Controller and not through D-Net, which will also use these for all Network Audio IO labels.

# SPEAKER MODULES AND THE MODULE LIBRARY

Central to the flexibility of the DM88 is the concept of grouping and the inclusion of speaker module libraries. A speaker module can be thought of as either an individual speaker cabinet which might contain multiple drivers which are individually connected to amplifier channels via the processor, or a complete system configuration with a multi-way cabinet plus subs.

The "module" will pre-configure all the required processing for the speaker(s) that are part of it – that may include

- Relative gains between individual drivers
- Phase/polarity as appropriate between different drivers
- Time alignment delays between drivers (or between a multi-way cabinet and sub)
- Crossover filters
- Corrective/tailored EQ
- FIR filtering
- Limiter settings (module notes should reference the assumed amplifier gain so this can be adjusted if needed)

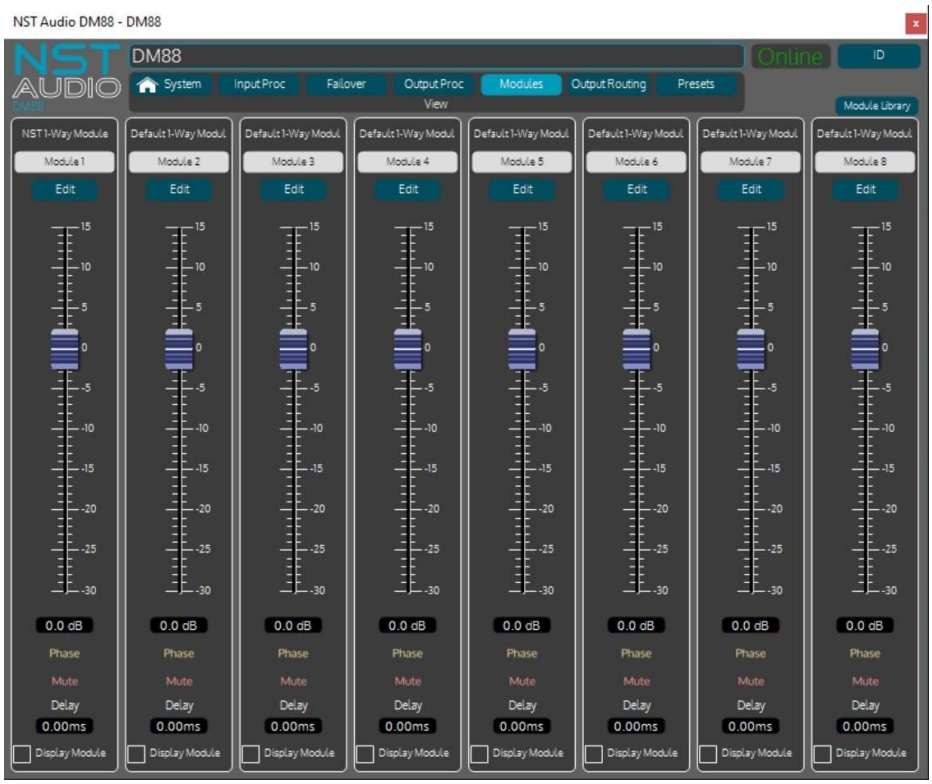



Modules designed by manufacturers have comprehensive security features that allow individual parameters to be either locked (so they can still be viewed) or hidden from view to protect against adjustments that would produce less than optimal results. To allow for a degree of placement flexibility or make a module work in several configurations, some parameters may be adjustable but only over a limited range – gains with a ±3dB range, or perhaps a high pass crossover filter with some frequency adjustment depending on sub + top placement.

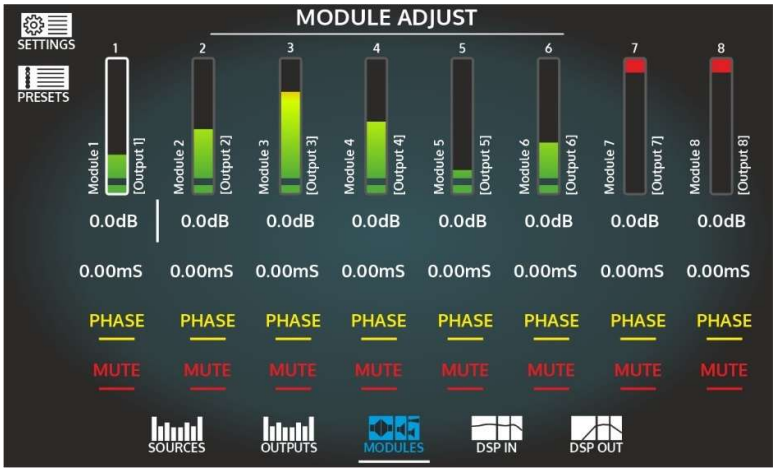
As the DM88 continues to evolve, the speaker libraries from manufacturers will also evolve and grow. Users are also able to create their own modules and build up a user library. Power users can access all the security features to create fully featured and secure modules. Note that modules created using a DM88 can also be loaded into all other NST Audio products, with certain limitations on number of PEQs used and FIR filter provision. Modules incompatible with a specific processor are automatically excluded. New module libraries will bundled with D-Net releases in the same manner as firmware is included in the download.

**Working with Modules**

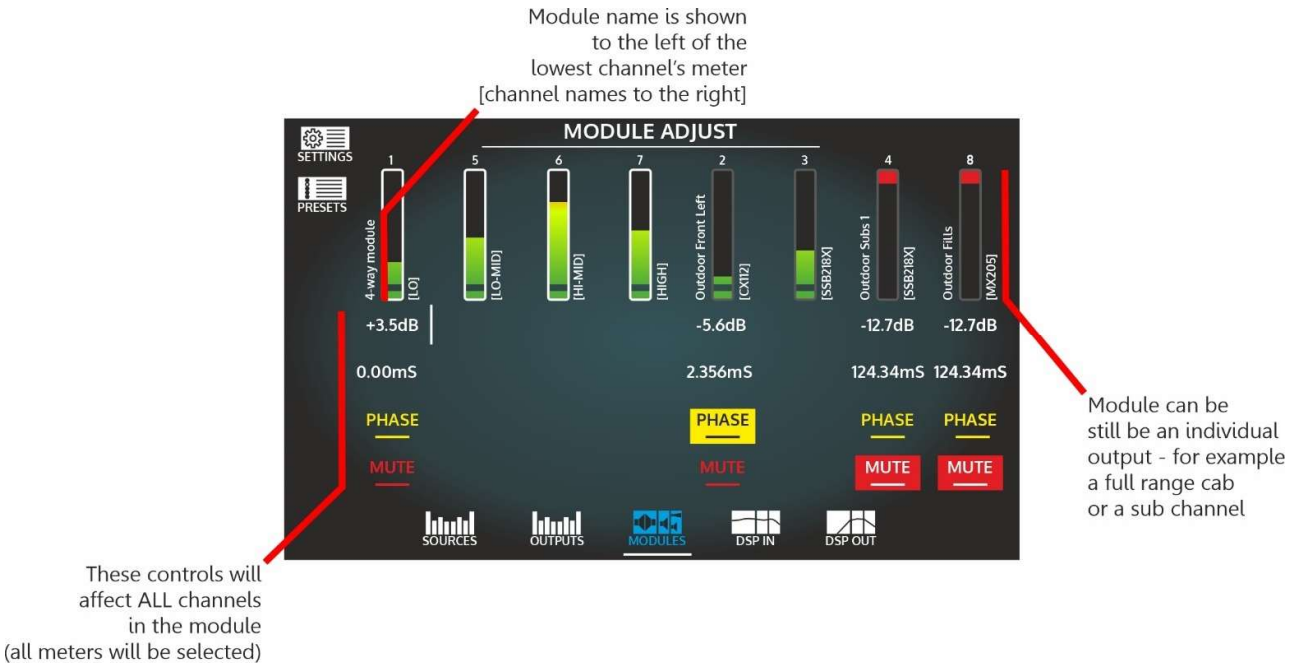
By default, the DM88 has no modules in place and so all 8 DSP output channels are completely independent. The Modules view will display 8 meters and eight sets of controls that mirror the modules view in D-Net.



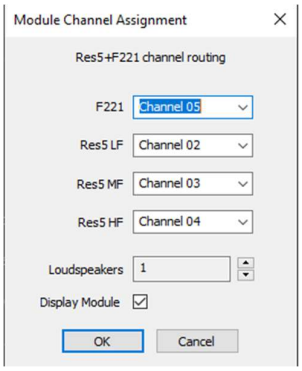

When all 8 channels are totally independent, the Modules view simply offers the same basic controls as are available on the DSP Out view – a gain control. a delay control, phase and mute switching. However, these operate independently to those on the output channel itself, adding (or subtracting) to the gains and delays on the output channel, and muting or swapping the phase separately, so muting a module will mute the channel even if the output mute is off.




The layout will change when modules are loaded, especially when these modules consist of more than one output channel. In the example below, a 4-way basic module has been loaded, along with a 2-way module and two separate single channel modules. Now, the sets of controls will be placed at the left most channel of each module, and any changes to these gains/delays or mute or phase will affect all channels in the module equally.

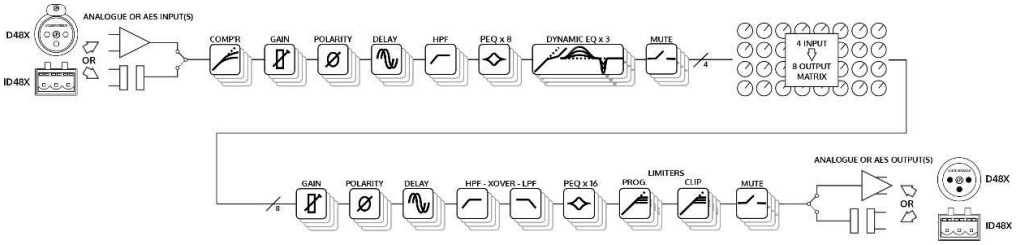



Touching any channel meter in the module will select it and all its meters will highlight together. Note that the channel numbers above the meters may no longer be in order, lowest to highest from left to right – the channels in a module are not allocated until the module is loaded so their order is determined by the user in D-Net:

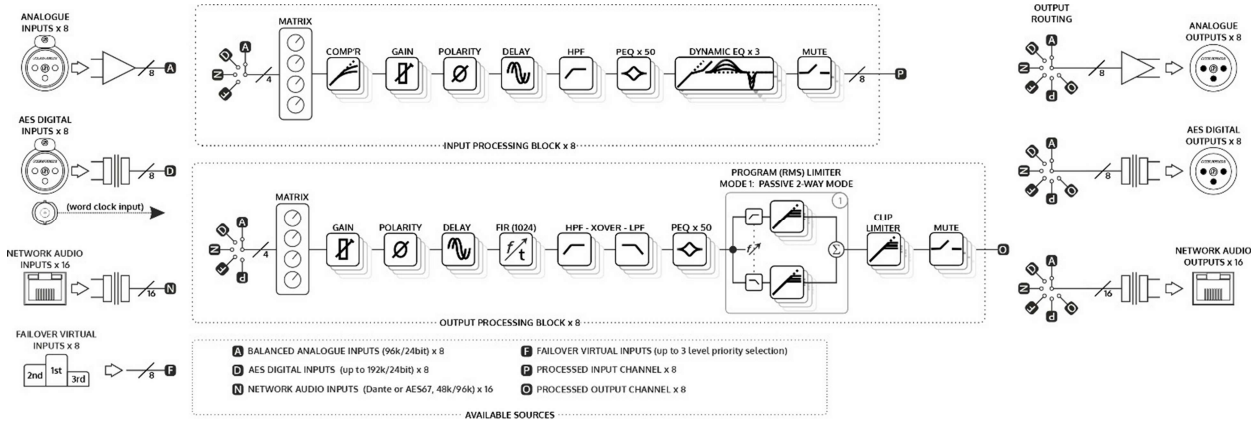


## DSP - KEEPING THINGS SIMPLE BUT FLEXIBLE

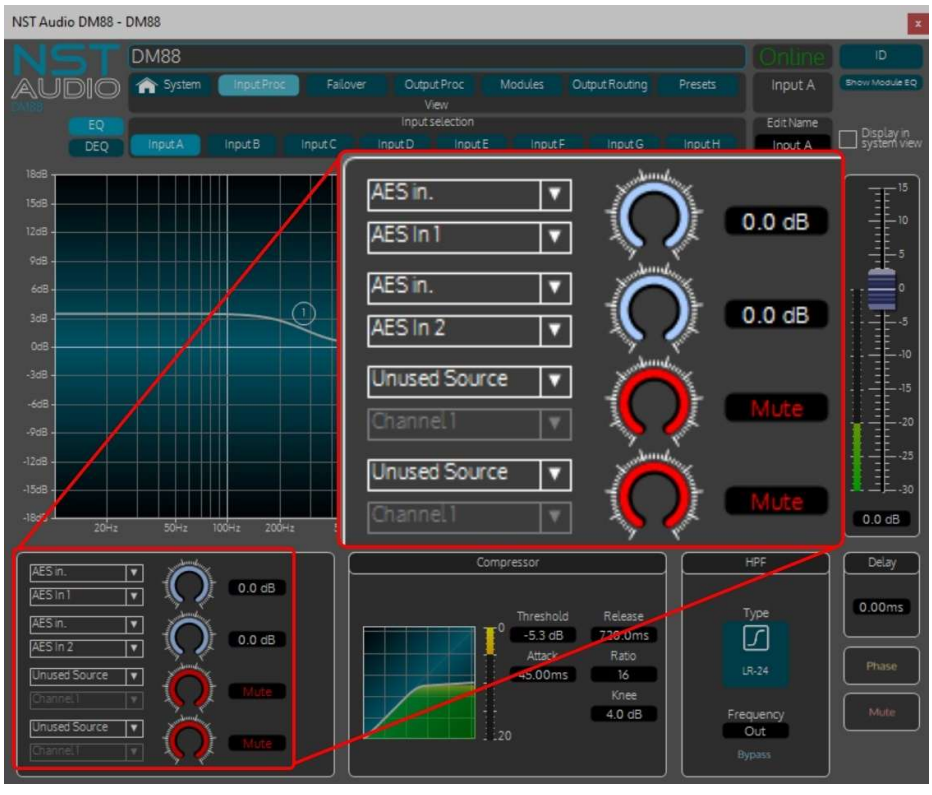
Increasing the flexibility of the processing was a key feature during the development of the DM88. Previous designs place a matrix mixer between the input and output processing channels. Whilst this does ensure any input processing can be mixed to any output processing path, it also fixes the signal path in one configuration and limits flexibility of use.



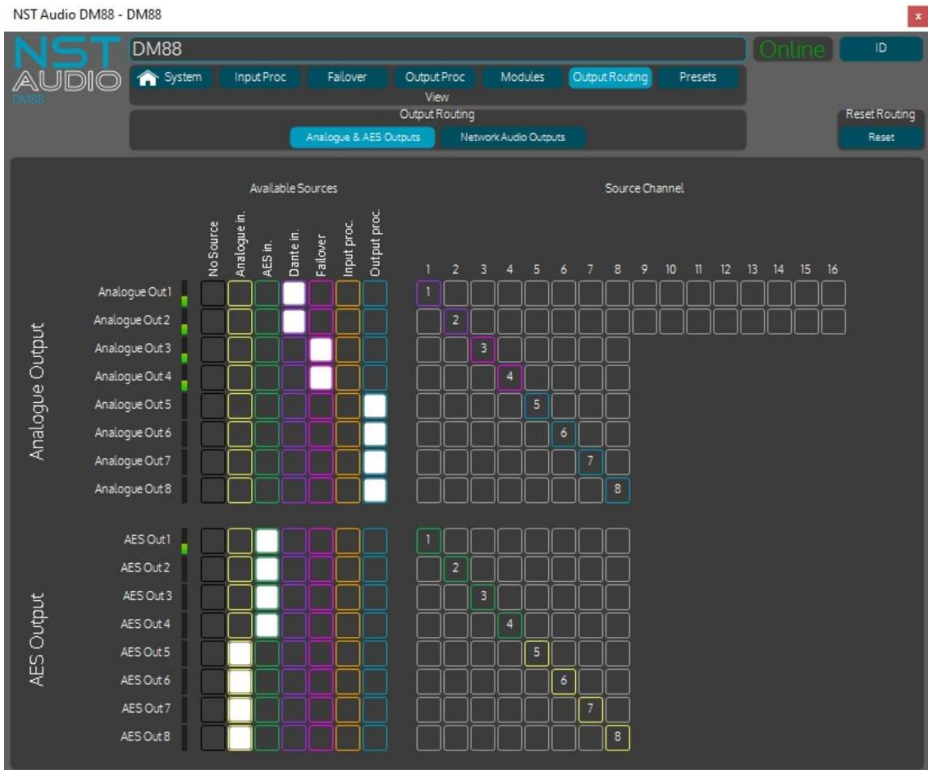

The DM88 is designed differently so both the input and output processing channels have up to four inputs available to them via a dedicated matrix, and their outputs sends flexible to route to other processing channels or to physical outputs.




Connections of physical inputs to processing, and outputs from processing to physical outputs is configured within D-Net. Individual channels' mix matrices are on every DSP processing (Input Proc and Output Proc) channel page:



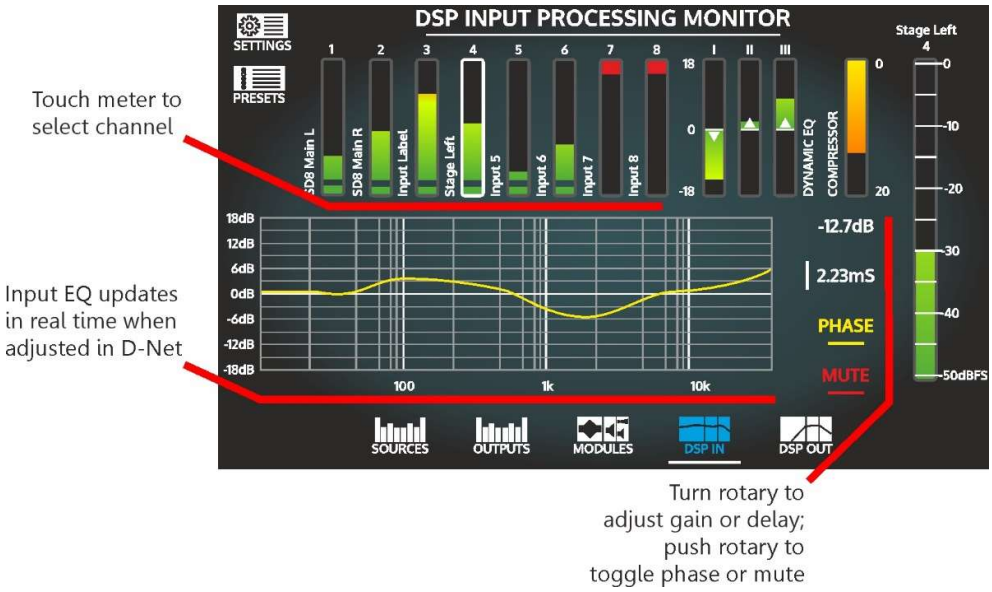
Selection of what is connected to all physical outputs is via the Output Routing view in D-Net:




The DSP In and DSP Out views on the DM88 focus on the processing characteristics of the channels and feature access to key channel parameters as well as extensive metering – these are explained in the following sections.

## DSP IN

A single set of 8 meters shows levels of all input processing channels simultaneously, including information on dynamics for selected input channel, as well as a frequency response curve showing the parametric EQ applied to this processing channel. Additional metering shown per selected channel for the dynamic EQ bands, the compressor gain reduction.




Selection of a channel is again by touching the small meter or using the rotary encoder to select the channel (if delay or gain is not selected). Channel label will populate above the higher resolution meter.

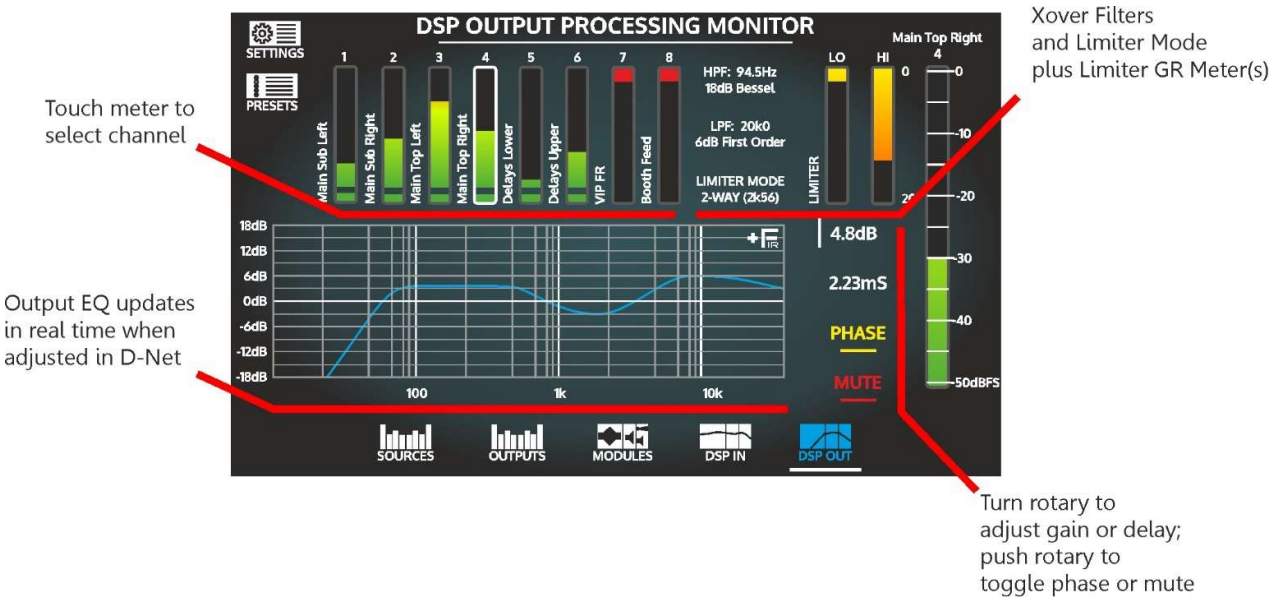
There are adjustable parameters on this screen – gain, delay phase switch and mute switch. Mute and phase adjustment can either be by touching the button on screen or pressing the rotary encoder. This method allows for quicker muting/unmuting of successive channels with a combination of turning and pressing the encoder.

Indication of which parameter is selected is by the vertical line by the left-hand side of the parameter for variable values (so, gain and delay) – in this example the delay is selected. Turning the rotary on a variable parameter will adjust it.

The frequency response is not adjustable via the touchscreen – it is updated in real time through D-Net. The Dynamic EQ bands' gain adjustments also show the operating mode of the filter – in the above example, band 1 is in "cut below" mode, whilst bands 2 & 3 are in "boost above" mode. The centre line of a band's meter will grey out if the band is bypassed.

## DSP OUT

A single set of 8 meters shows levels of all output processing channels simultaneously, including information on dynamics for selected output channel, as well as a frequency response curve showing the parametric and crossover EQ applied to this processing channel. Numerical readouts for the crossover filters and limiter mode are also displayed for the selected channel.




Selection of a channel is again by touching the small meter or using the rotary encoder to select the channel (if delay or gain is not selected). The channel's label will populate above the higher resolution meter.

There are adjustable parameters on this screen – gain, delay phase switch and mute switch. Mute and phase adjustment can either be by touching the button on screen or pressing the rotary encoder. This method allows for quicker muting/unmuting of successive channels with a combination of turning and pressing the encoder.

Indication of which parameter is selected is by the vertical line by the left-hand side of the parameter for variable values (so, gain and delay) – in this example the delay is selected. Turning the rotary on a variable parameter will adjust it.

The frequency response is not adjustable via the touchscreen – it is updated in real time through D-Net. The limiter gain reduction metering will change depending on whether the limiter is operating in single band (1-way) or dual band (2-way) mode.

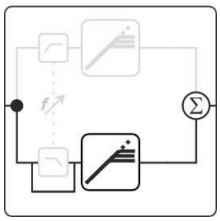
In 1-way mode, a single meter is shown representing the gain reduction for this output.

In 2-way mode as above, a pair of meters are displayed representing the applied gain reduction in each band of the limiter, and the crossover point for the limiter is shown in bracket (2k56). Normally match the crossover point of the passive 2-way cabinet. For more information on the 2-way limiter mode see the section on page 27.

**DSP Out – Single and Dual Band Limiters**

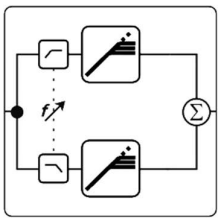
In order to better protect passive two way (or multi-way) passive speaker cabinets, the DM88 incorporates a dual-band mode limiter specifically for this application.

Single-band mode limiter



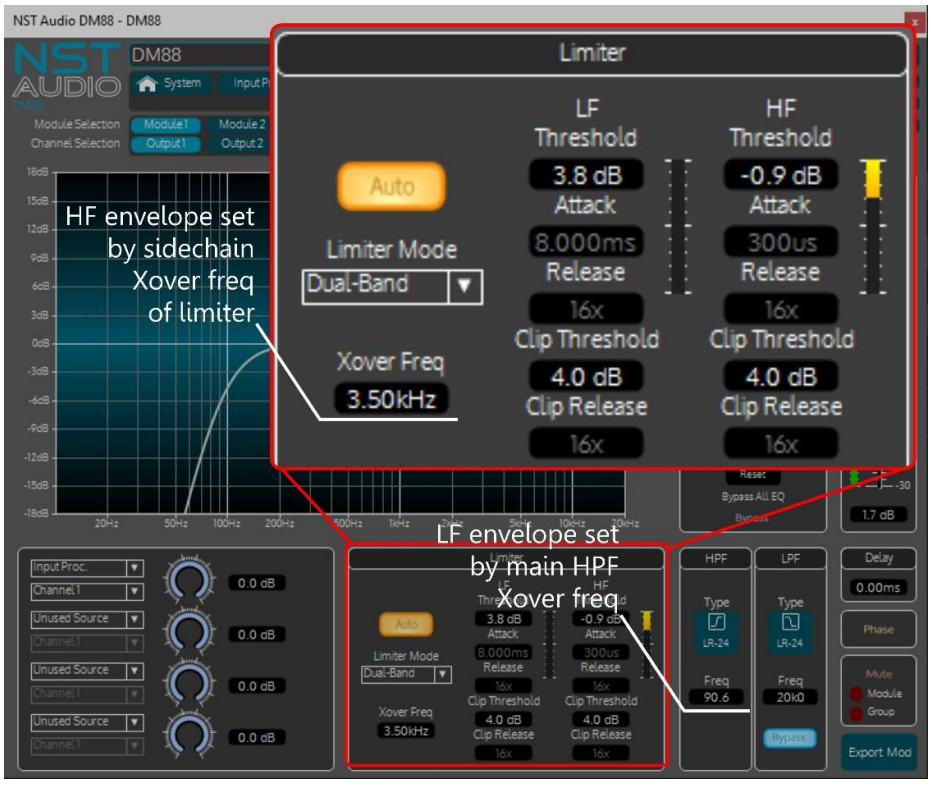
The single-band high performance limiter operates in the same way as in other NST products, with no sidechain filtering and the clip (look ahead) limiter following it to catch any (inherent) overshoot that might occur. When used to protect individual drivers, this method offers a high degree of control, especially if the time constants are set to automatic which links them to the high pass filter setting for the band's output.

Dual-band mode limiter



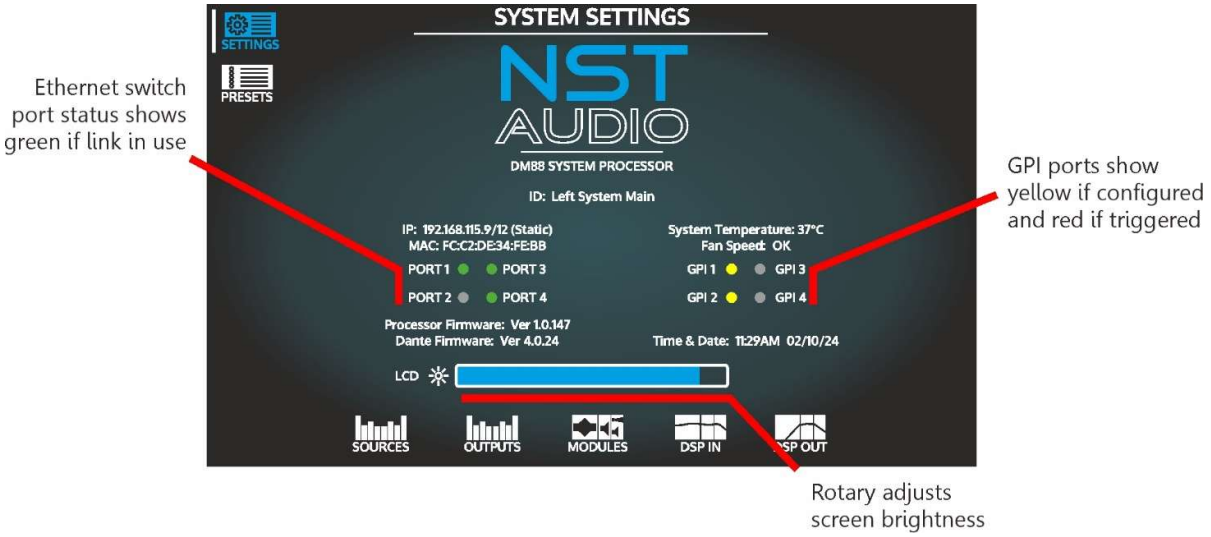
The dual-band mode limiter differs from the single-band limiter by splitting its sidechain signal into two separate paths and recombining them before the clip limiter.

This allows limiting to be applied more effectively, with less dulling of a two-way box as would occur if the LF is causing limiting but still offering better protection of the HF driver though use of a separate threshold and with more applicable time constants. There are still automatic time constants available, this time with the "LF" limiter's attack and release being set by the band's HPF as with the single-band mode, but the envelope of the "HF" limiter is set by the crossover point of the limiter itself.

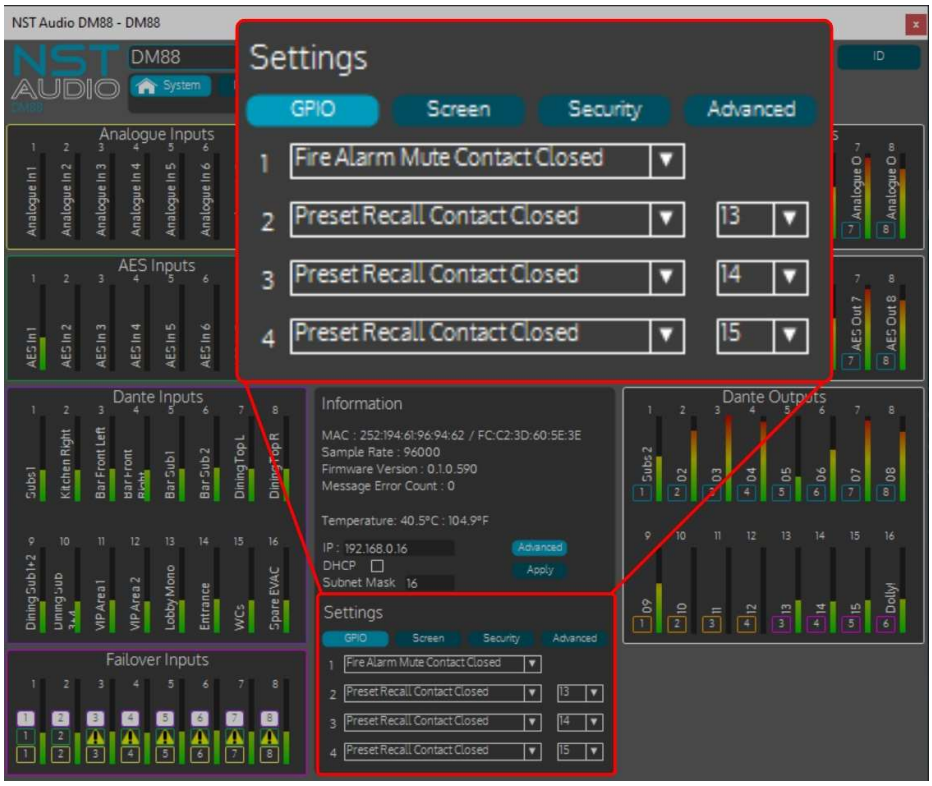


## SETTINGS

The settings view shows important information not directly related to audio processing. The rotary encoder directly adjusts the screen brightness.




The status of the ports on the ethernet switch show if any have connections (grey if unused, green if a connection is present). The GPI ports' configuration, set through D-Net, are also shown. A grey indicator means the port is disabled, a yellow indicator if the port is configured but not triggered (so the port pin is not grounded) and red if the port is activated.

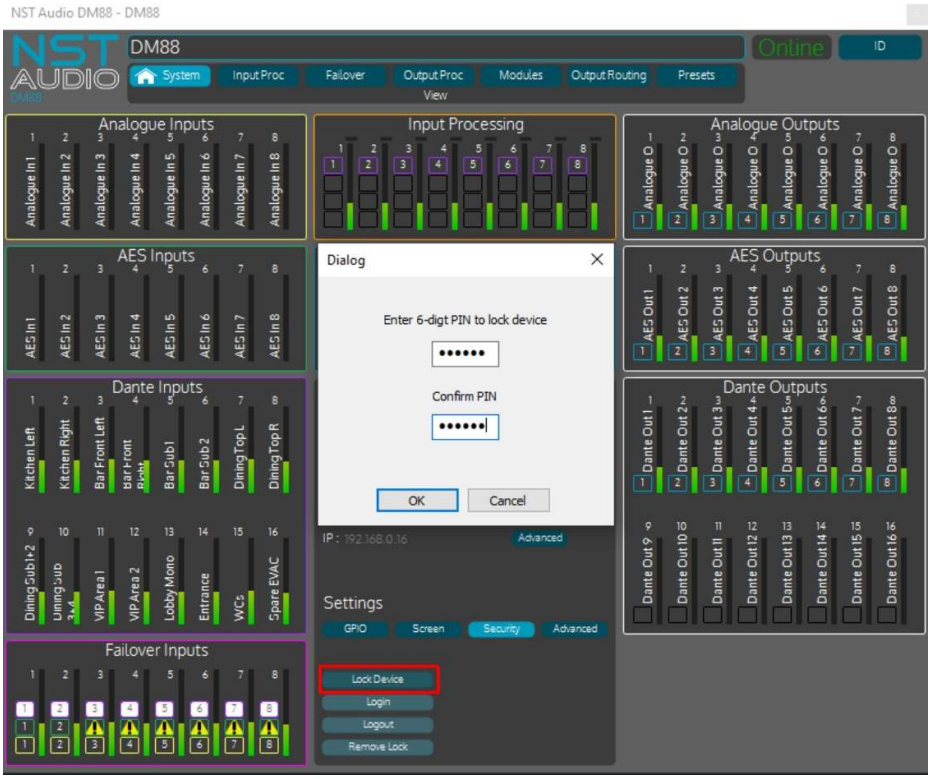


## SECURITY AND PARAMETER LOCKING

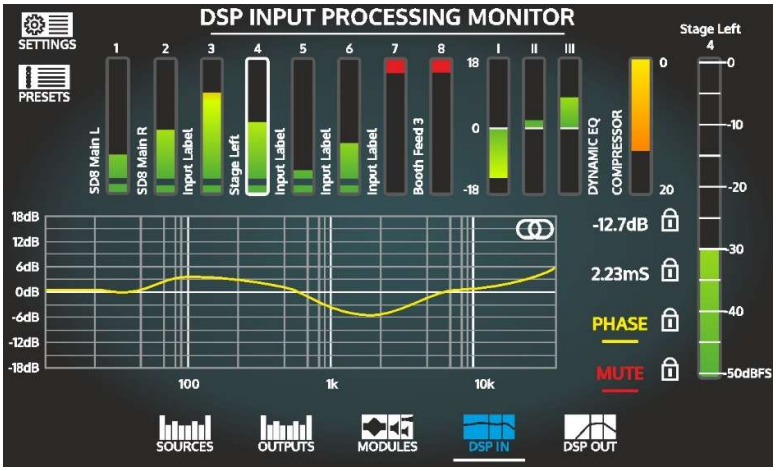
The DM88 has comprehensive security for users, installers and speaker manufacturers. For users, once the system has been configured, a PIN can be entered via D-Net (on a device by device basis) to lock out all front panel controls, and also to disable any adjustments in D-Net, should unauthorised personnel attempt to access settings on another device (iPad or different PC for example).

The PIN is stored in the device itself, once configured.

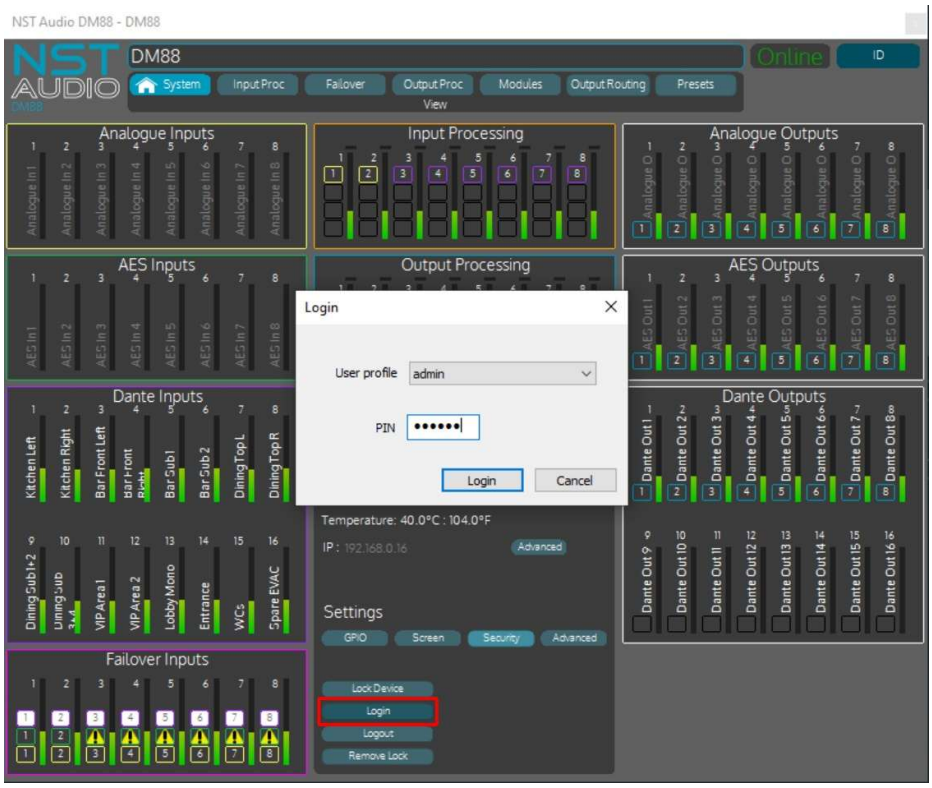
Setting the general lockout is via the "Lock Device" button on the "Security" view on the device window in D-Net:




Once a PIN has been entered and confirmed, only the "System" view will be available in D-Net, and on the device itself, all adjustable parameters will be disabled, as shown by the padlock symbol next to them. All monitoring views will still be accessible.



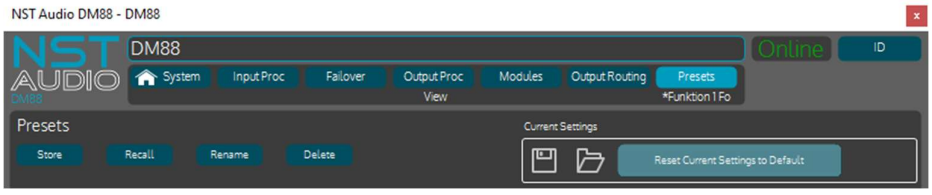
Unlocking the device is through D-Net. Go online to the device and press the Login button and reenter the PIN. This will grant access to the D-Net controls again, but the device itself will remain locked until the "Remove Lock" button is pressed.



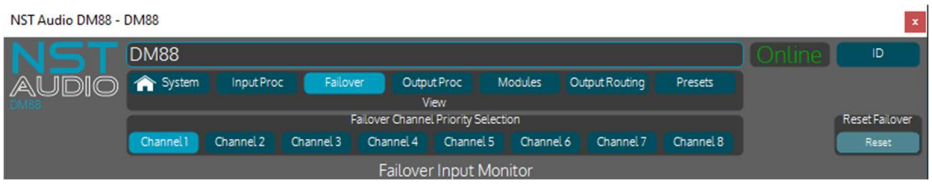

Note that there is NO master unlock PIN for any of our products – if you forget the PIN you will have to send us a copy of the D-Net ".nst" file after going online to the locked device.

## RESET TO DEFAULTS

The DM88 can be set back to defaults through D-Net, as with all our devices. Stored presets and GPIO settings are not affected. Note this will only be accessible if the device is unlocked. It cannot be used as a method to clear security settings. On the "Presets" tab in the device view, press the "Reset Current Settings to Default" button:



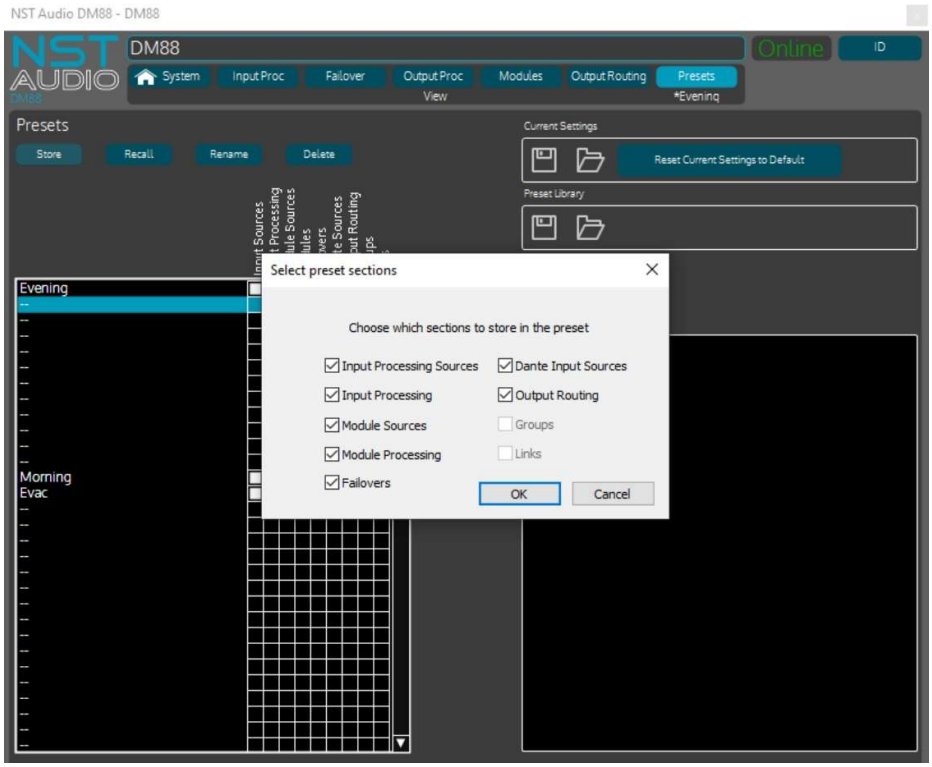

Note that this will also reset the Failover system to be disabled. There is a shortcut button to reset this to a default position:

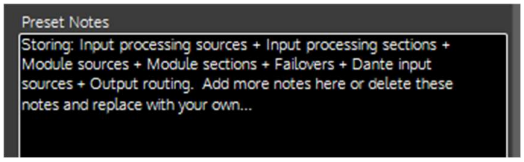


## PRESETS

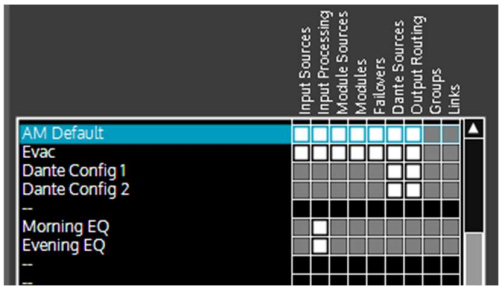
The DM88 has sophisticated preset storage that allows for high granularity control of what is stored or recalled from any preset location. Storage of current settings in a preset is via D-Net, with recall possible through D-Net or via the front panel[9]. Presets may also be recalled via the GPI port.

When a preset is stored via D-Net, the sections of the current settings that are to be stored must be chosen. The default is everything except groups and links (this functionality will be included in a future release). Choosing to store only what is required (by unticking sections) means that memory retrieval when going online is much faster. It also reduces the potential for accidentally overwriting sections of a device's configuration.




When a preset is stored for the first time, the notes section associated with it will populate with basic details of what sections have been stored. This notes section can be further added to at any time without needing to store the preset again.




The sections available for recall from any preset will be shown with white squares filled in – these can then be disabled to reduce the sections which will recall.

The sections enabled for a recall on an individual preset will determine the recall mode in D-Net, via a VR1/2 or V-Remote and for GPI preset recall.

[9] Front panel recall functions are preconfigured in D-Net and dependent on what was saved in a particular preset as well as the recall options selected for that location

**What Gets Stored in Each Section**

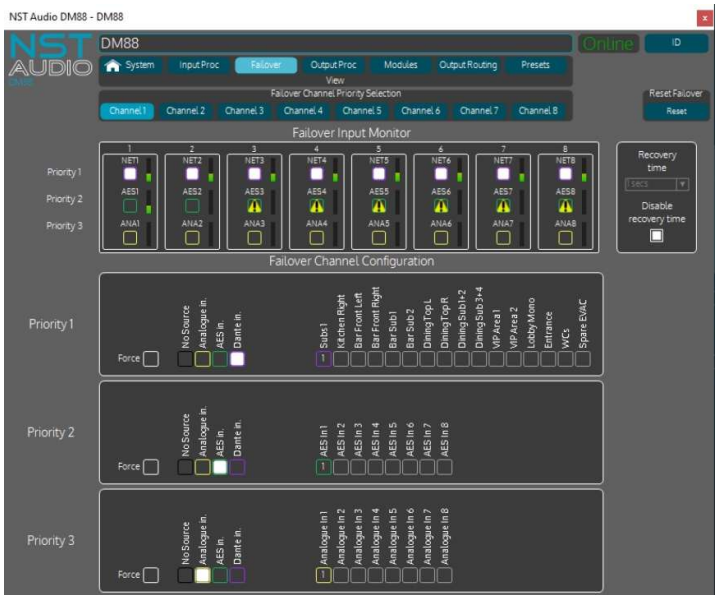
**"Input Sources"**: The choice of input type, input channel and mix level x 4 for all 8 input processing DSP paths.


**"Input Processing"**: All input DSP – parametric EQ, HPF, gain, mute, phase, delay, compressor, and DEQ.

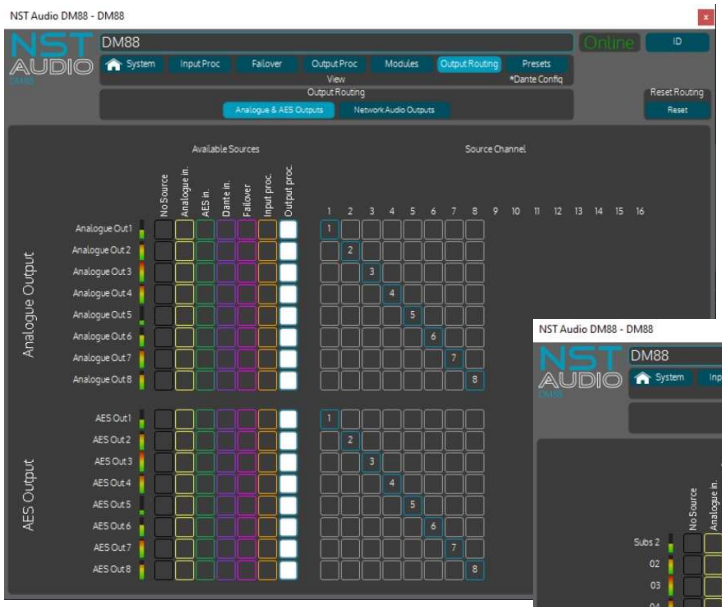
**"Module Sources"**: The choice of source type, channel and mix level x 4 for all modules. Note that if a module is a multi-way module, the sources will be ganged for all output channels in that module.

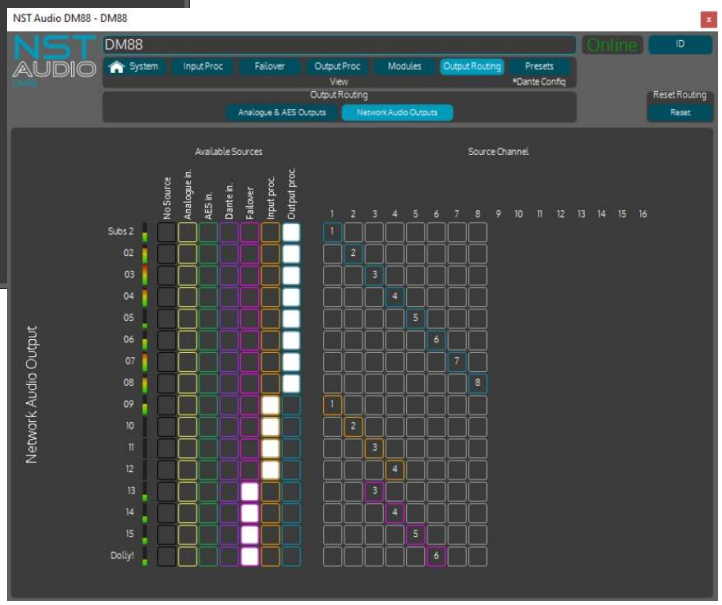

**"Modules"**: All output DSP – crossover filters, FIR filters (if applicable), parametric EQ, limiter settings including mode, and additionally module settings including names, channels used and any module gains, delays phase or mute adjustments applied.

**"Failovers"**: All of the failover system settings for channel types, channel numbers, priority levels and recovery time. Note that any forced priorities will NOT be recalled as the force setting on any channel is a run-time setting only and will be restored to the original settings for the priorities in place following a power cycle.

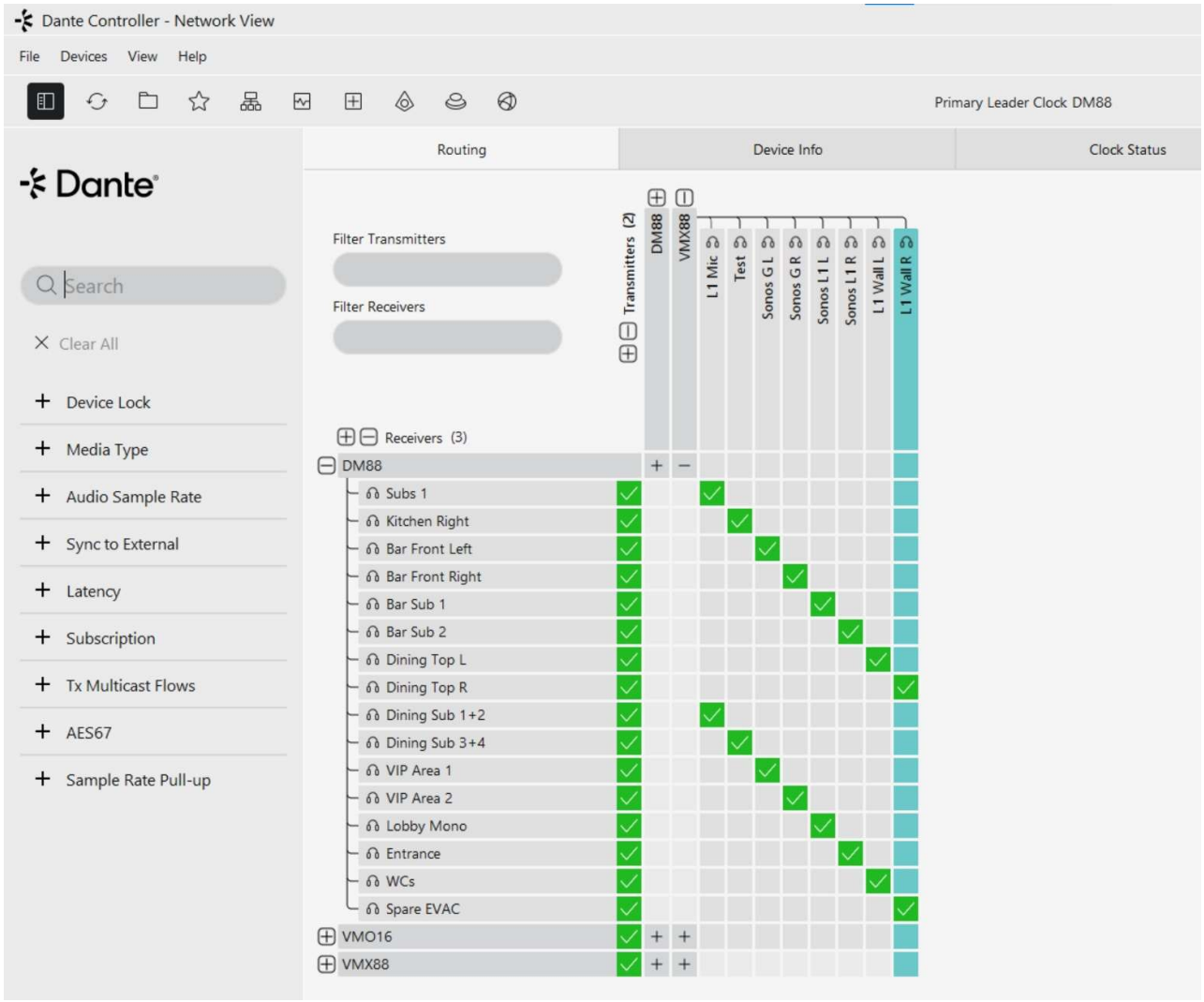



**"Output Routing"**: Source and channel numbers for all analogue, AES and Network Audio outputs.



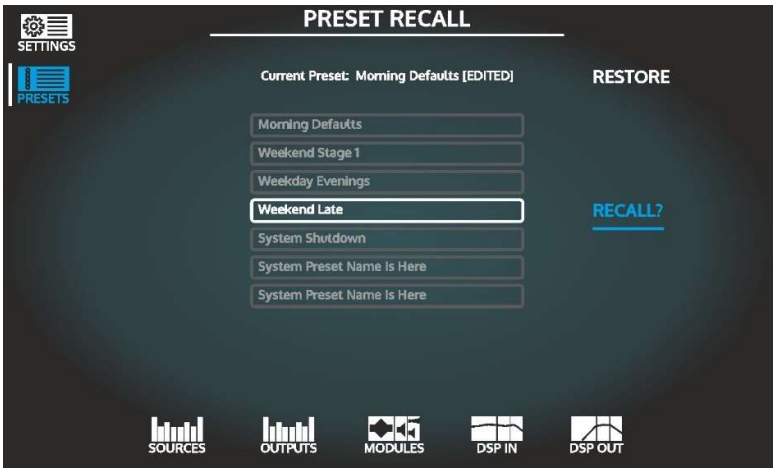



**"Dante Sources"**: The Dante sources are NOT set in D-Net, but in Dante Controller. The input subscriptions to the device can be recalled independently of all other routing. Dante RX and TX names are not part of this section.




Recall of presets via the touch screen displays a scrollable list of all the presets in the device, with the last recalled preset listed at the top of the screen. If the preset has been changed (either locally, or remotely) "[EDITED] will be displayed next to this name.

There is also the option to immediately recall this current preset and restore it to the original stored settings – press "RESTORE". Otherwise, use the rotary encoder to scroll through the list – pressing "RECALL?" will recall the preset highlighted.



## STATIC IP ADDRESSING

**Introduction and Polite Warning**

All NST products now support static IP addressing, including the DM88. This document section assumes the user is familiar with D-Net, our remote control application, and with networking terminology and configurations. It is possible to set a device to a static IP address that will no longer be accessible to D-Net making it impossible to reset without complex reconfiguration of the controlling device, which can be a lengthy process.

We strongly recommend using DHCP IP addressing for NST Audio products unless strictly necessary within your network infrastructure to do otherwise, and do not undertake swapping to static IP addressing during a critical performance!

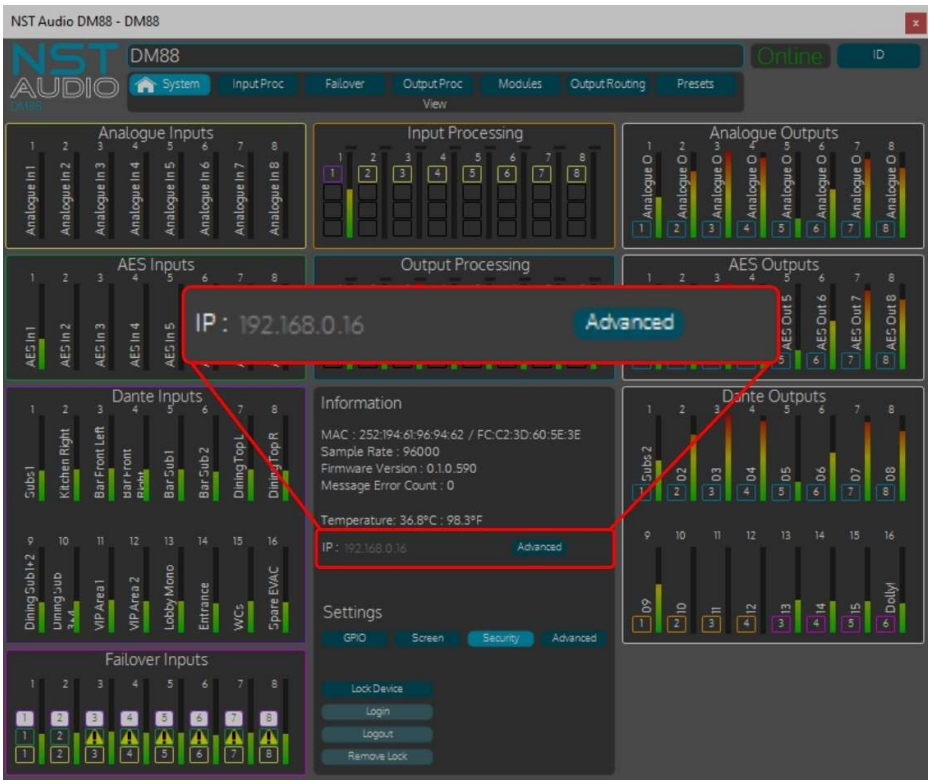
**DHCP and Static IP Addressing Modes**

By default, all products leave the factory in DHCP mode. This means the control network interface will be to get an IP address from a DHCP server. Should a DHCP server not be available it will resort to link local autoconfiguration /automatic private IP addressing mode and auto assign one in the 169.254.*.* range.

For communications between a computer and a device both must have IP addresses in the same range. For example, if auto assigned, both must be in the 169.254.*.* range or if obtaining addresses from a DHCP server both in the 192.168.*.* range.
Note : 192.168.*.* is just common default range used by many DHCP servers.

**Checking a device's IP address in D-Net**

After the device has been discovered by D-Net, opening it for editing (double click on device in the left hand rack view) and the IP address and status will be shown on the System view:




In this instance the device's IP address is set to 192.168.0.16.

The fact that this address is in the 192.169.*.* range means it is probably set to DHCP addressing and not a static IP address. This can be verified by pressing the "Advanced" button.

The “Advanced” button then reveals the DHCP status of the device and shows the current subnet mask.


The subnet mask number format is shown in the CIDR format, where the shorthand mask value is appended onto the end of the IP address. This is normally shown in the form 192.168.0.20/16 with the /16 being the subnet mask.

It is separated out in D-Net allowing it to be hidden unless required.

In our example, set to /16, this equates to an actual subnet mask of 255.255.0.0. Swapping from one format to the other is straightforward - the value in CIDR format is the number of bits shifted in from the MSB of the top octet in the mask.

So, a value of /3 for the subnet mask equates to 11100000.00000000.00000000.00000000 or 224.0.0.0 in decimal.

| CIDR | SUBNET MASK |
|---|---|
| /24 | 255.255.255.0 |
| /23 | 255.255.254.0 |
| /22 | 255.255.252.0 |
| /21 | 255.255.248.0 |
| /20 | 255.255.240.0 |
| /19 | 255.255.224.0 |
| /18 | 255.255.192.0 |
| /17 | 255.255.128.0 |
| /16 | 255.255.0.0 |
| /15 | 255.254.0.0 |
| /14 | 255.252.0.0 |
| /13 | 255.248.0.0 |
| /12 | 255.240.0.0 |
| /11 | 255.224.0.0 |
| /10 | 255.192.0.0 |
| /9 | 255.128.0.0 |
| /8 | 255.0.0.0 |
| /7 | 254.0.0.0 |
| /6 | 252.0.0.0 |
| /5 | 248.0.0.0 |
| /4 | 240.0.0.0 |
| /3 | 224.0.0.0 |
| /2 | 192.0.0.0 |
| /1 | 128.0.0.0 |
| /0 | 0.0.0.0 |

**Another Polite Warning!**

We strongly recommend using DHCP IP addressing for NST Audio products unless strictly necessary within your network infrastructure to do otherwise, and do not undertake swapping to static IP addressing during a critical performance!

**Changing a device's IP address in D-Net**


Having pressed the "Advanced" button, it is now possible to type in a new IP address for the device and to adjust the value of the subnet mask.

*Be aware that setting the IP address to something outside of the address space that the computer is using will immediately render it unreachable by D-Net and you will not be able to switch it back.*

Set the required IP address and press ENTER. Make sure you then press "Apply" to reconfigure the IP address. The device will go offline for a brief period while the network interface resets to use this new address. This will only be for about 1-2 seconds.

Any longer than this, and the IP address chosen is out of the range of the computer. *This is a not immediately recoverable state and restarting D-Net, your computer or the device will NOT fix this!*

**If The Worst Has Happened…**

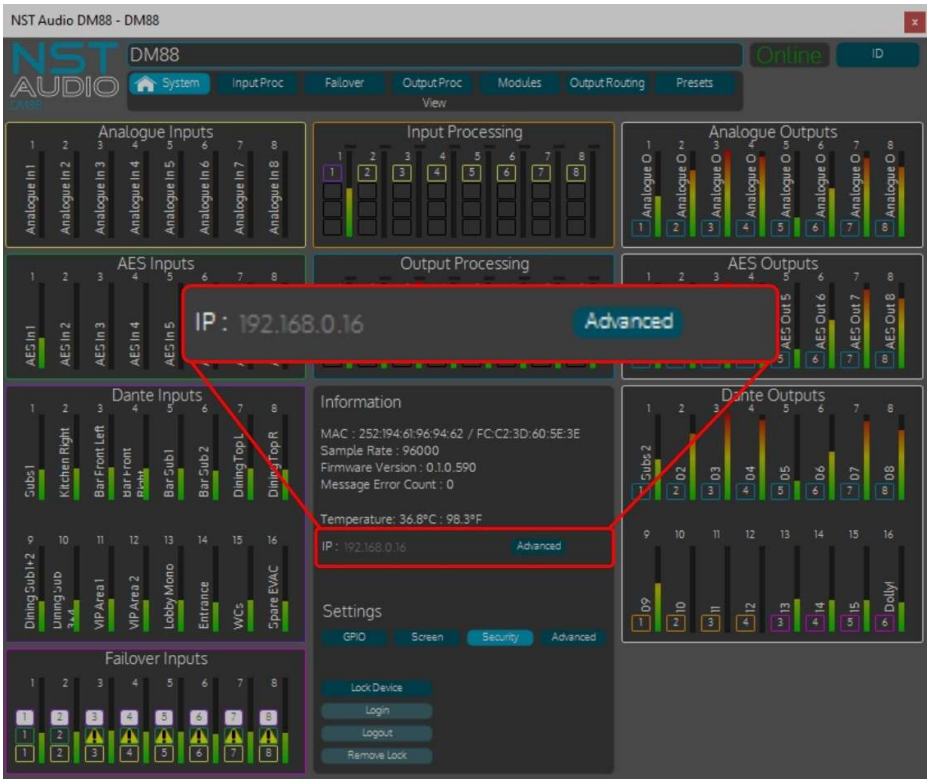
A device with an out of range IP address may still be discoverable by your computer and D-Net as the type of messages used for discovery use a different method not tied to the device's IP address. This allows D-Net to find all devices without having to know their individual IP addresses beforehand, and some limited information is returned following a broadcast exchange, including its name, its model and type and its IP address/subnet mask.

D-Net may show a device that is flashing green (connected normally) but primarily red (on a 1-2second cycle). This is most likely a device that is out of range. If the device has appeared in D-Net but it will not respond to a Global Mute command while all other devices will, this confirms an out of range IP configuration.

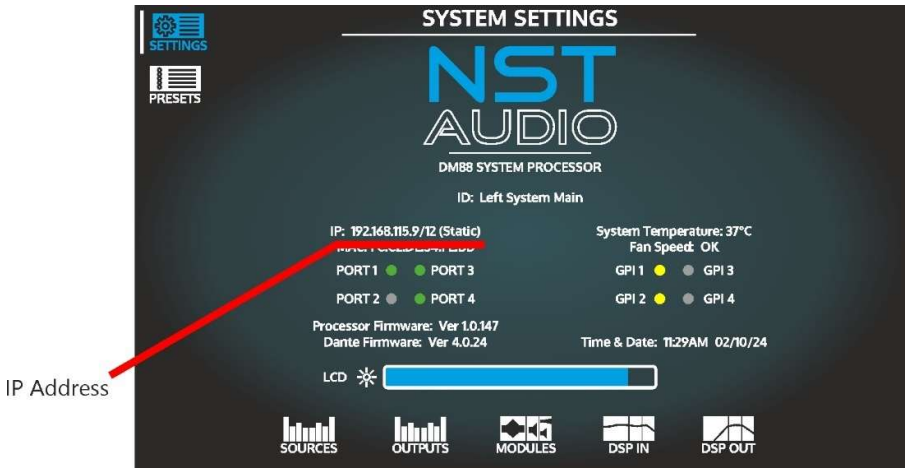
The quickest method to recover the device and reset to a working address space is a direct connection to a PC. The following sections deal with recovering a device to an IP address that is in range, and shows how on both Windows and Mac OS.

**IP Address Settings Recovery via Direct Connection**

We need to know the IP address and subnet mask on the device that is not responding correctly. If you have been able to discover it in D-Net, double click on device and the IP address is shown in the Information section – press the "Advanced" button to see if it is on a static IP or using DHCP.




In this instance the device's IP address is set to 192.168.0.16.
If the device cannot be discovered using D-Net, the IP address is also shown on the Settings view on the front panel:



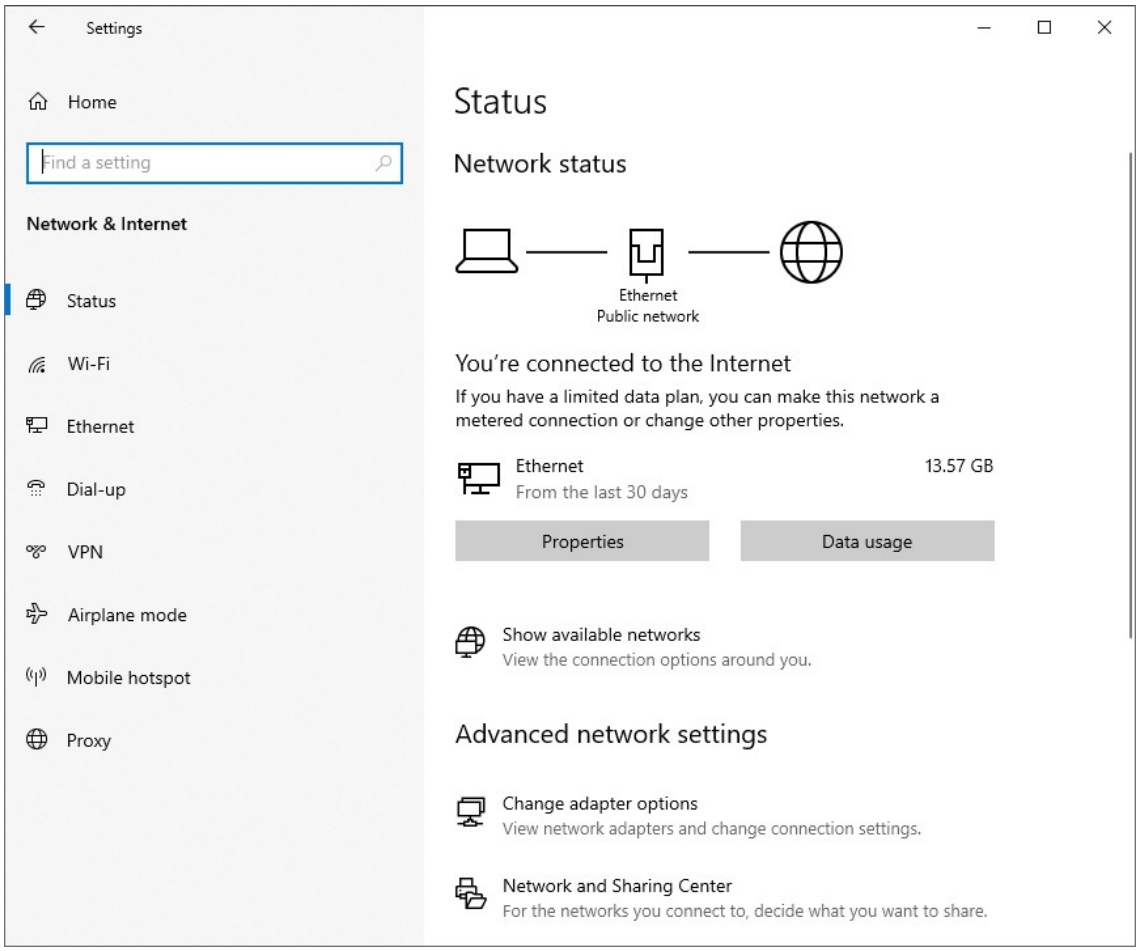

Whichever method is used to obtain the IP address and subnet mask information, the next step is the same. Configuration for a Windows PC starts overleaf and for Mac OS starts on page 47.

**Direct Connection to a Computer (Windows)**

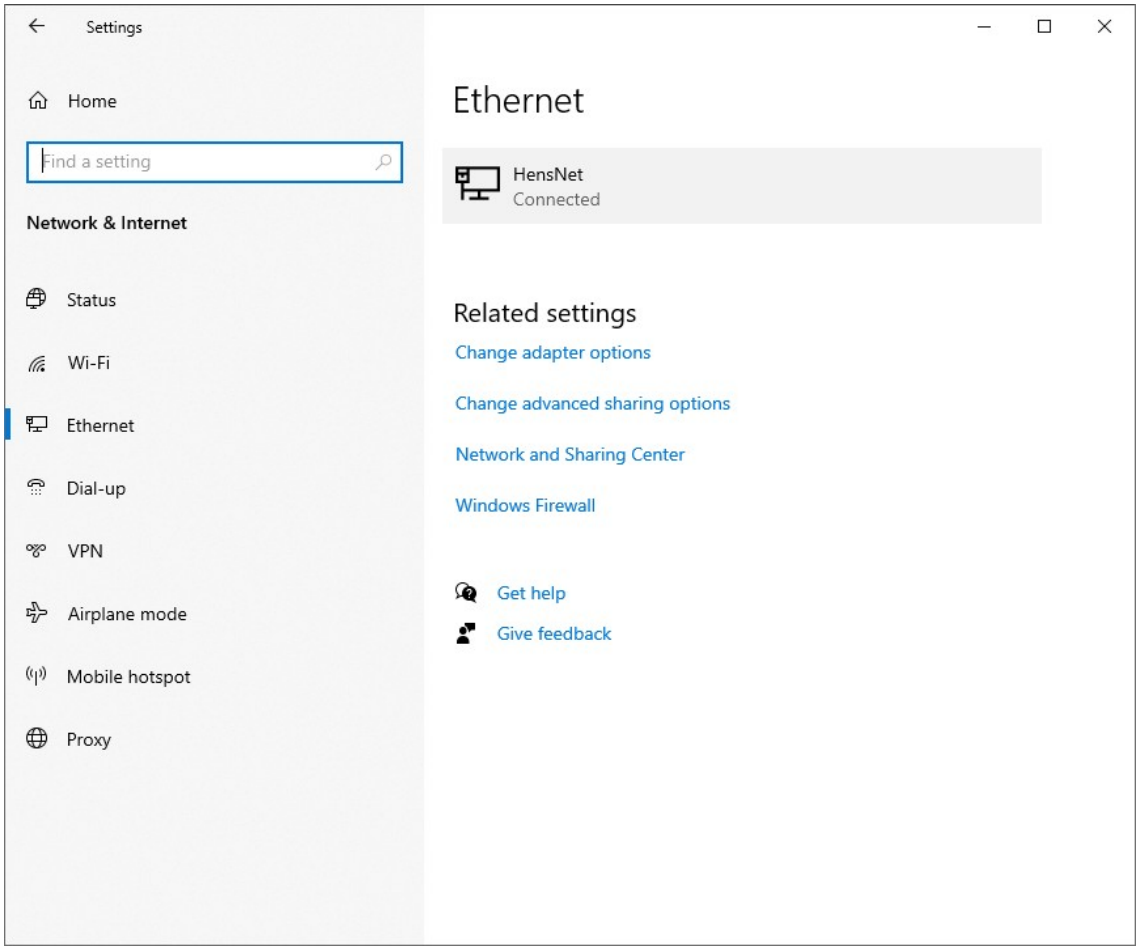
The next step is to set the computer's wired network IP address to be in a suitable range to allow visibility of the static IP erroneously assigned to the device. This method is largely the same on Windows 10 & 11, and our example shows Windows 10.

*Plug an ethernet cable directly into the Comms socket on the rear of the device and into the Ethernet port on the computer. We also recommend temporarily turning off WiFi if in use on the computer.*

1) Go into Settings > Network & Internet

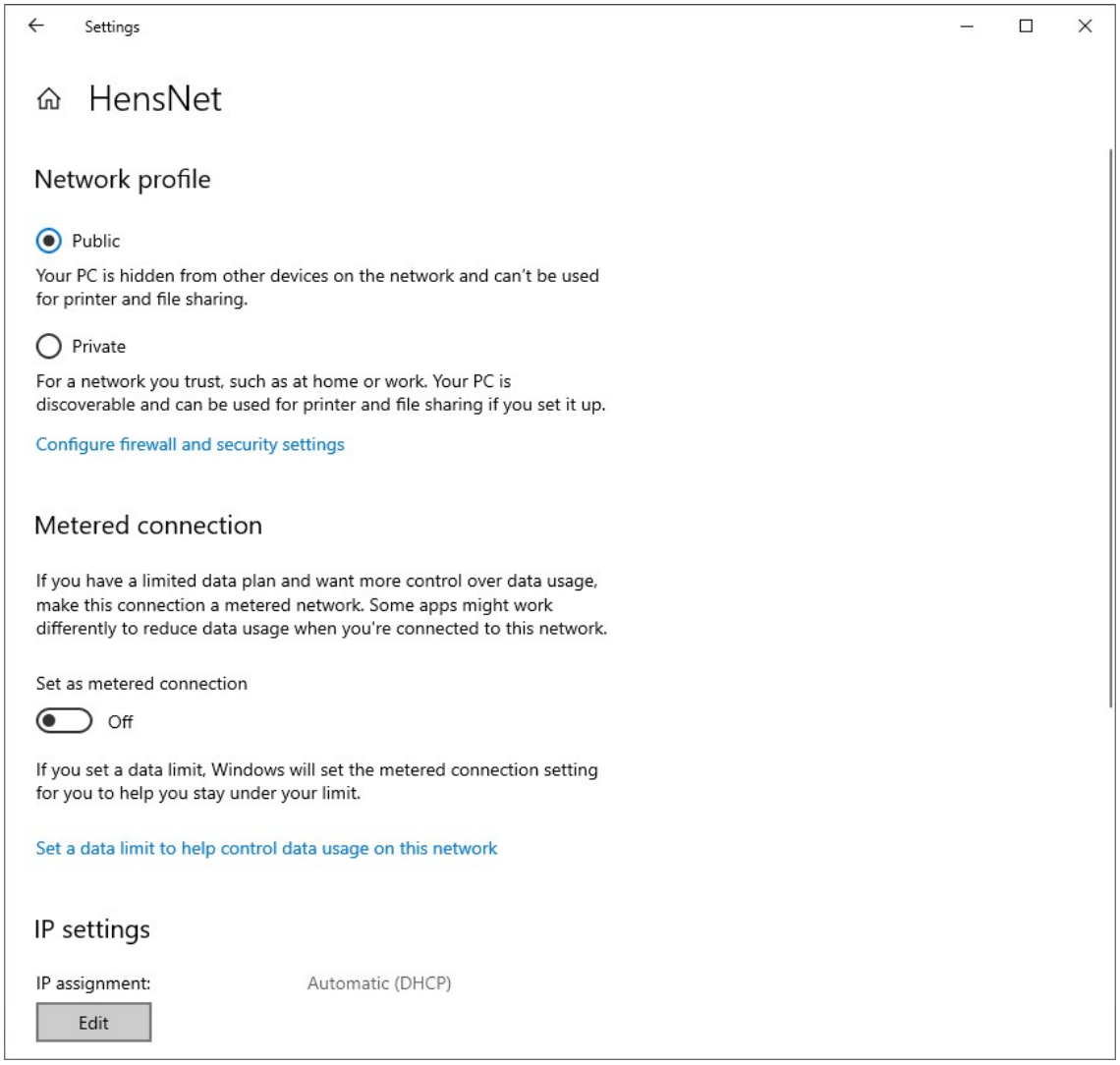


2) Select the Ethernet connection from the left hand list.



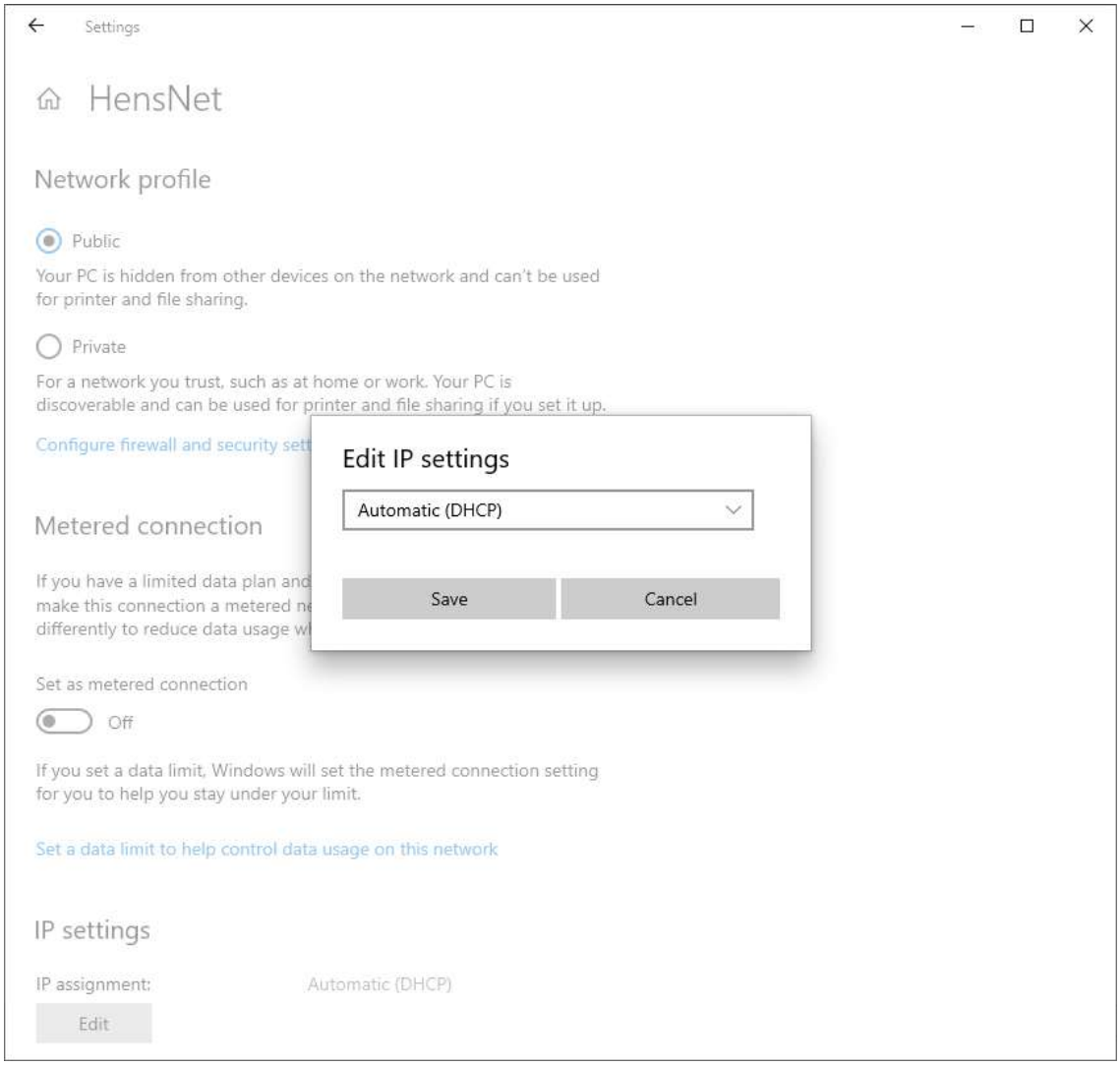
3) Click on the Ethernet network listed (in this example “HensNet”).

IP settings are shown towards the bottom of the page. In most instances this will be set to DHCP, as in our case.

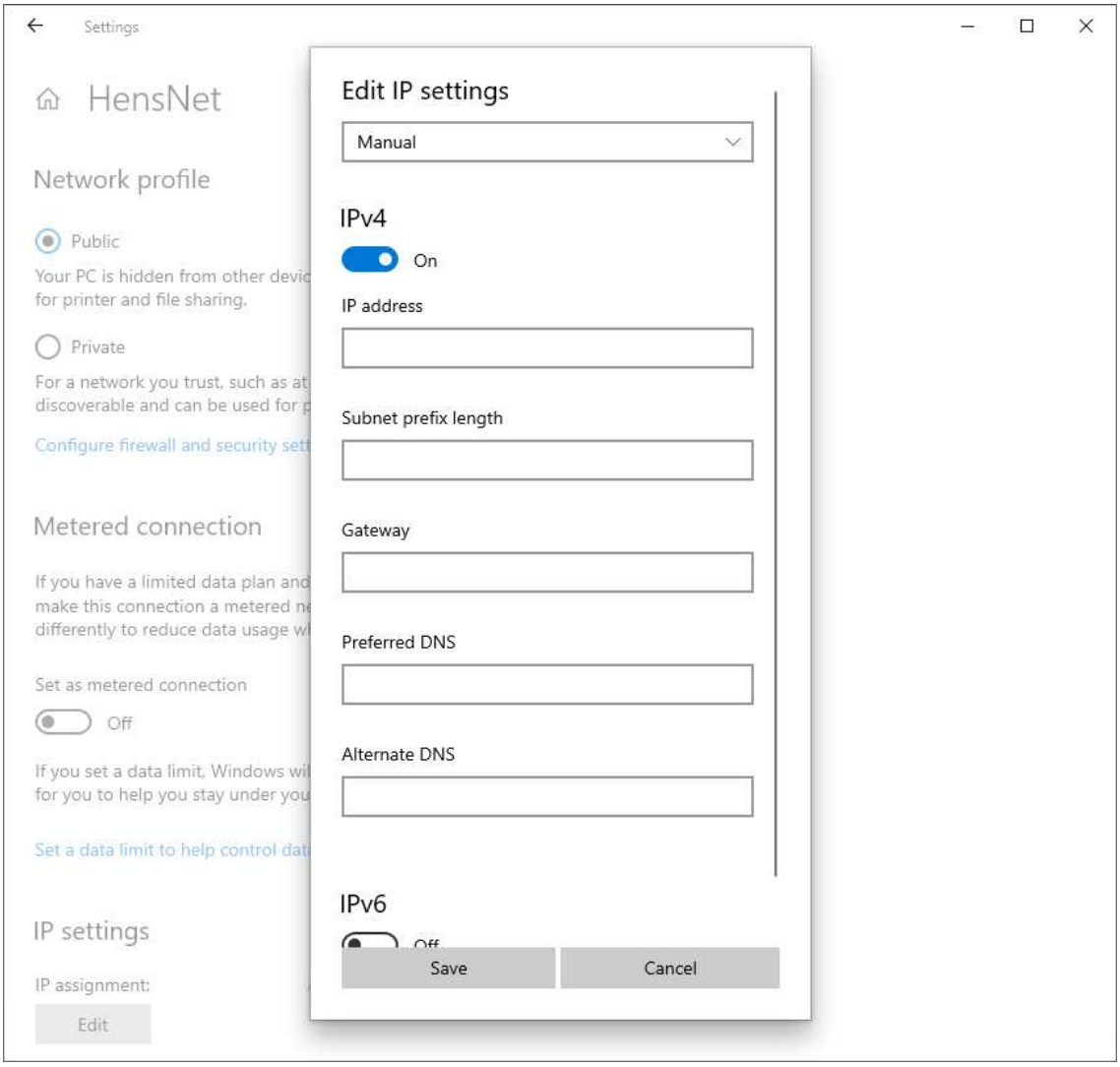


4) Press the Edit button to access the settings.

If set to DHCP, a small window will appear with a drop down list to allow swapping to manual configuration from DHCP.

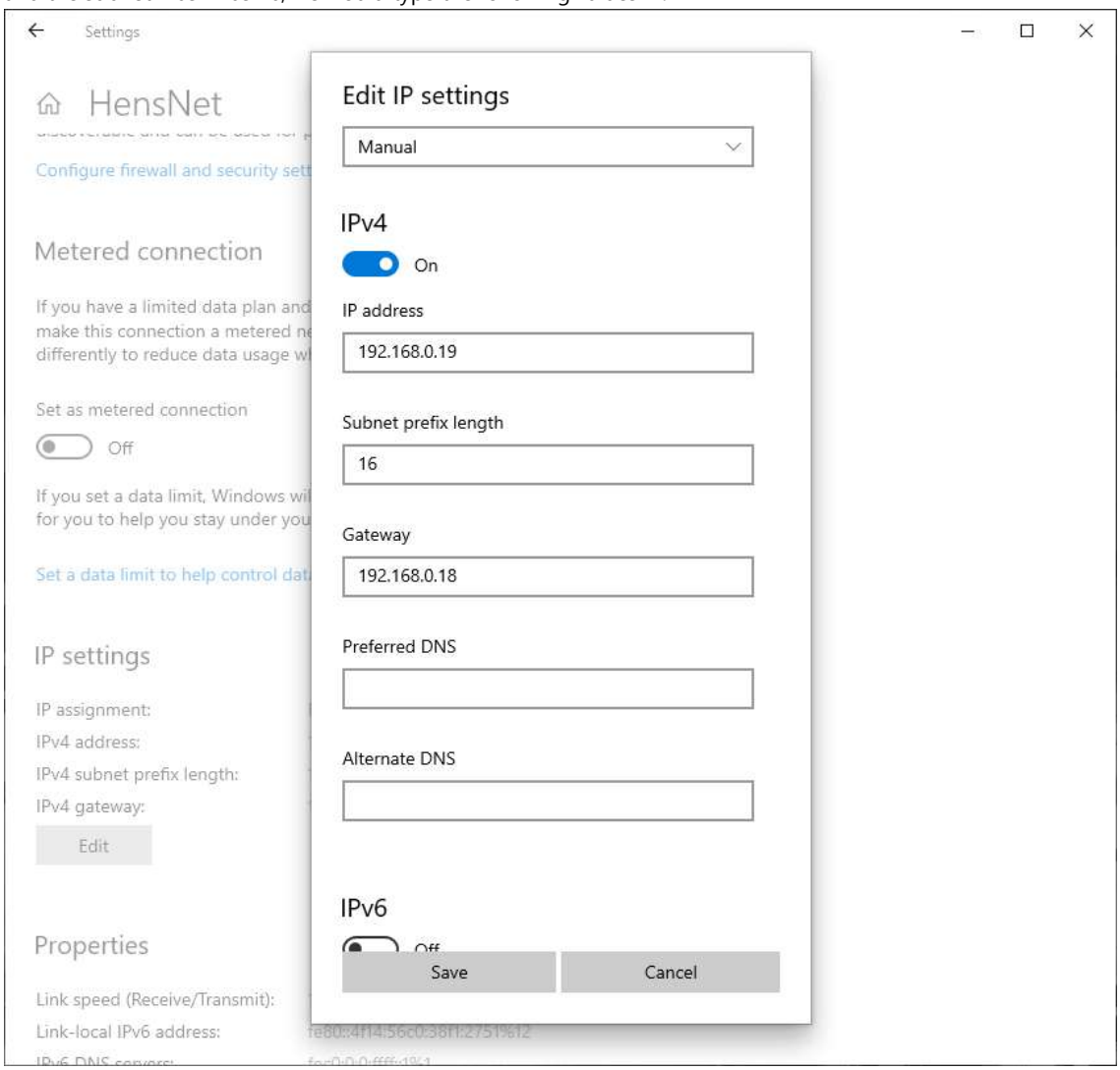


5) Select “Manual” and set the IPV4 switch to “On” to immediately display the manual addressing options.



6) Configure the IP address manually.

Based on the IP address and subnet mask of the device, we now populate these settings. Our advice would be to set the IP address to be one less than the device's and the Gateway to one less again. So, if the IP address of the device was 192.168.0.20 and the subnet mask was 16, we would type the following values in:




Leave the DNS fields blank. Press "Save" and you're done.

7) Open D-Net and go online.

The device should be discovered and be fully controllable. Test with the Global Mute button and confirm that this is working.


Access the device's IP address settings on the System tab, and press the "Advanced" button. Either set a static IP address in the correct range or reselect DHCP.

*Remember to press "Apply".*

The device will most likely go offline now, and you will have to reset your PC's network interface to DHCP (and reconnect it physically to the network, as well as plugging your device back into the network.

8) Reestablish a connection with the device normally on the network.

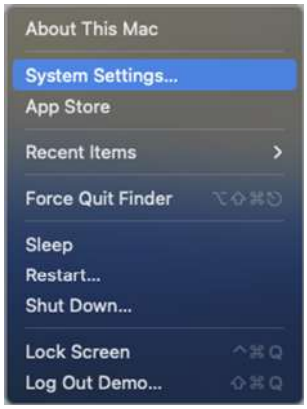
Once the IP configuration of the computer has been returned to normal, open D-Net once again and go online to confirm that all previous devices are visible as well as the one that has just been reset to DHCP (or the preferred static IP address).

**Direct Connection to a Computer (Mac OS)**

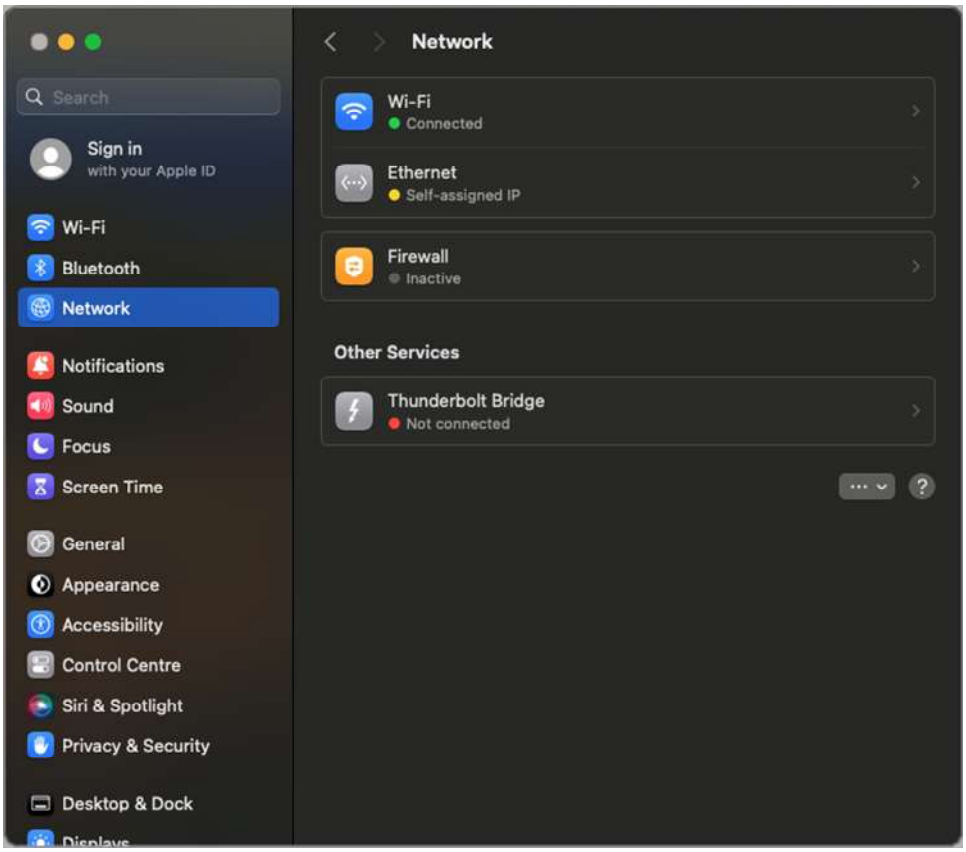
The next step is to set the computer's wired network IP address to be in a suitable range to allow visibility of the static IP erroneously assigned to the device.

*Plug an ethernet cable directly into the Comms socket on the rear of the device and into the Ethernet port on the computer. We also recommend temporarily turning off WiFi if in use on the computer.*

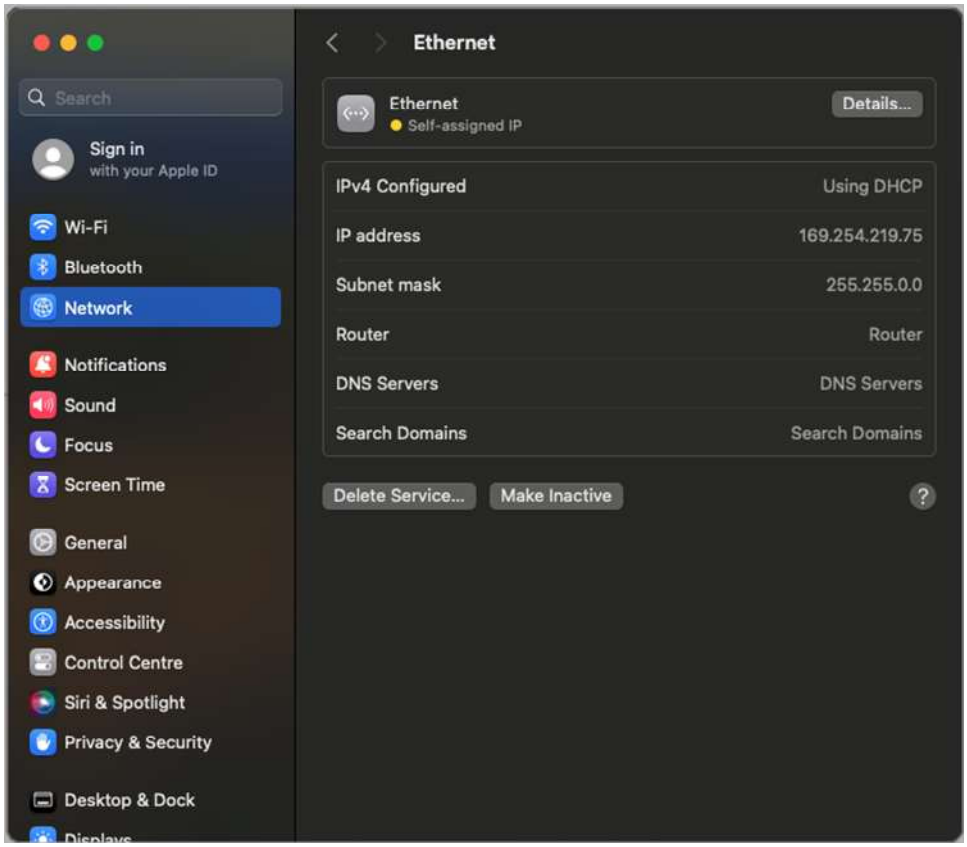
1) Click on the Apple icon and then System Settings:




2) Open "Network":

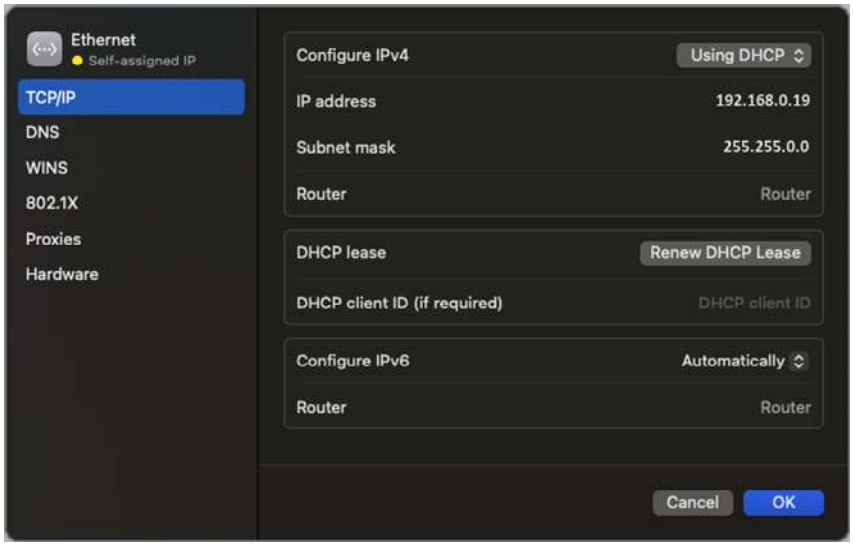


3) Select “Ethernet” and then the “Details” button.




4) In the network settings, select TCP/IP, and select “Manually” from the “Configure IPV4” option.

Our advice would be to set the IP address to be one less than the device’s and make sure the subnet mask matches that of the device. So, if the IP address of the device was 192.168.0.20 and the subnet mask was 16, we would type the following values in:




Click OK and you’re done.

5) Open D-Net and go online.

The device should be discovered and be fully controllable. Test with the Global Mute button and confirm that this is working.


Access the device's IP address settings on the System tab and press the "Advanced" button. Either set a static IP address in the correct range or reselect DHCP.

*Remember to press "Apply".*

The device will most likely go offline now, and you will have to reset your PC's network interface to DHCP (and reconnect it physically to the network, as well as plugging your device back into the network.

5) Reestablish a connection with the device normally on the network.

Once the IP configuration of the computer has been returned to normal, open D-Net once again and go online to confirm that all previous devices are visible as well as the one that has just been reset to DHCP (or the preferred static IP address).

**Final notes on the use of static IP addressing**

The use of static IP addressing for products is only recommended when network infrastructure does not allow DHCP addressing, or where the possibility of the IP address changing could affect operation, such as controlling the devices with third party hardware such as a Q-Sys or Crestron controller.

Note that VR1 and VR2 devices do NOT require the devices they are to control to have static IP addresses. Their addressing of other devices is through a combination of MAC address and device type.

Not having a DHCP server on a network will mean that devices use "link local" addressing and will still operate normally and be controllable with D-Net connected to a simple switch.

## D-NET REMOTE CONTROL APPLICATION

D-Net is an Ethernet based computer control platform that gives you the ability to not only control all the devices on a network, but also to store presets and configure systems offline.

Compatibility with Microsoft Windows, Apple Mac and Apple iPad means you can control your system in the way that suits you. USB connection (Microsoft Windows only) is also available on some devices, allowing quick connection to a single device.

D-Net is available to download, free of charge, from the NST Audio website:

**nstaudio.com/software-downloads**

The iPad version is available from the Apple app store. (There is also a link to this from the software page shown above).

macOS

Download on the App Store

**Analogue Inputs – 8 Electronically Balanced XLR**
CMRR: >60dB @ 1kHz
SNR: 119dB 'A'wtd
Maximum Level >20dBu
Input Impedance: 10k Balanced

**Analogue Outputs – 8 Electronically Balanced XLR**
SNR: 122dB 'A'wtd
Maximum Level: >20dBu
Source Impedance: <60R

**AES Inputs - 4 x 2 Transformer Balanced XLR**
AES Input Sample Rates: 8kHz - 192kHz
AES Input s/n Ratio: 139dB
Input Impedance: 110R

**AES Outputs - 4 x 2 Transformer Balanced XLR**
Sample Rate: 96kHz
Source Impedance: 110R

**Network Audio**
16 in, 16 out (96kHz)
Dante and AES67 compatible
BNC Word Clock Input (auto-selected if valid)

**Performance:**
Frequency Response: 12Hz - 32kHz +0.2dB
Dynamic Range: >119dB 'A'wtd (in-out analogue)
THD+N (+19dB @ 1kHz): 0.00029%
Latency: 0.615mS (in-out analogue, 96kHz)

**Input Processing Features**
Variable High Pass Filter;
Compressor;
Multi-Layer Parametric EQ with Behaviour Library;
3 Bands Dynamic EQ;
Delay/Gain/Polarity/Mute

**Output Processing Features**
Multi-Layer Parametric EQ with Behaviour Library;
Crossover Filters up to 48dB/Oct;
FIR Capable - up to 1024 taps/channel;
Band Gain, Output Gain, Polarity;
Delay (up to 1.3s per channel);
2 RMS Limiter Modes (Standard & Passive 2-way);
Look Ahead Clip Limiter

**Signal Routing Features**
Failover System - three-level automatic "virtual" inputs that select alternate sources if a signal fails;
Direct Source Conversion - any input source can be routed direct to any output bypassing DSP;
Mix Matrices - every input and output processing channel has a 4 source select and mix matrix.

**Comms & General Features**
5" colour touchscreen for monitoring, key level and delay/phase/mute control & preset recall;
4 GPI ports for configurable external control;
Up to 100 presets may be stored for offline recall;
Remote control via 100Mbps Ethernet with integrated 4 Port Switch.
Compatible with VR1, VR2 PoE remote control panels and V-Remote iPhone control app.

**Power Requirements:**
100-240 V AC, 50-60Hz via switched, fused C14 inlet, <20W.
Inlet Fuse: T3.15A H 250V
T = Slow Acting (Trage) 3.15A = Ampere Rating of 3.15A
H = High Breaking Capacity
250V = Voltage Rating of 250 Volts or less

**Environmental:**
Storage Temperature: -5 °C / 23 °F to 70 °C / 158 °F
Operating Temperature: 0 °C / 32 °F to 50 °C / 122 °F
Maximum Altitude: 2000m

**Dimensions:**
88 x 170 x 482mm (3.47 x 6.75 x 19in)

**Weight:**
Net: 3.2kg
Shipping: 4.4kg

## MAINTENANCE

The unit will require very little routine maintenance, apart from occasional routine checking of the fan inlet outlets on the side panels. Cleaning the casework should only be done with a cloth lightly dampened with water only! The use of chemical or abrasive cleaners may damage the paint finish.

## SERVICING

There are no user serviceable parts within the unit!
Please contact us to arrange returning any units to us that require servicing or repairing.

## WARRANTY

This product comes with a warranty against defects in components and workmanship only, for a period of five years from the date of shipment to the customer. During the warranty period, NST Audio will, at its discretion, either repair or replace products that prove to be defective, provided that the product is returned, shipping prepaid, to an authorised NST Audio service facility.

Defects caused by unauthorised modifications, misuse, negligence, act of God or accident, or any use of this product that is not in accordance with the instructions provided by NST Audio, are not covered by this warranty.

This warranty is exclusive and no other warranty is expressed or implied.
NST Audio is not liable for consequential damages.

## CONTACT

If you have any questions or comments about the information contained within this manual, or require further assistance, then please do not hesitate to contact us:

**www.nstaudio.com**

**support@nstaudio.com**

**www.facebook.com/nstaudio**

**www.instagram.com/nstaudio**

*Thank you!*

The NST Audio team