

WorldCast Horizon NextGen & IP Decoder

User manual







DECLARATION OF CONFORMANCE

Established following the Directives 99/5/EC and 2006/95/EC



We, hereby, certify that APT WorldCast Horizon NextGen complies with the dispositions of the European Community Directive for harmonized standards within the Member States related to radio equipment and telecommunications terminal equipment (Directive 99/5/EC) and low voltage (Directive 2006/95/EC).



This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Installation and Operational Manual:

WorldCast Horizon NextGen Audio Codec & IP Decoder User Manual

System Release 1.5.2 - April 2015

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How to contact us:



WorldCast Systems Head Office

20, avenue Neil Armstrong - Parc d'Activités J.F. Kennedy 33700 BORDEAUX - MERIGNAC FRANCE

Tel: +33 (5)57 928 928 | Fax: +33 (5)57 928 929

Americas Office

19595 NE 10th Ave, Suite A Miami FL 33179 USA

Tel: +1 (305)249 31 10 | Fax: +1 (305) 249 31 13

How to get support

If you have a technical question or issue with your APT equipment, please consult the support section of our website at:

http://www.aptcodecs.com or
apt-cust-support@worldcastsystems.com



Table of Contents

This is the main table of contents of the entire User Manual. It presents the main topics of each section of this document.

Table of Contents	4
Safety Notices	8
General Precautions	12
1.0 About this Codec Manual	13
1.1 Release Notes	13
1.1.1 Additional Applications for SR.1.5.2:	13
1.2 Important Security Advices	13
1.2.1 This IP Audio Codec is a network device!	13
1.3 Company Profile	14
1.4 Unpacking and Inspection	15
1.5 Introduction	16
1.5.1 System Options	17
1.6 Getting Connected	18
1.7 The WorldCast Codec Management System - Overview	19
1.7.1 Installing the Network Management System	21
1.7.2 Getting Started	23
1.8 IT Security Recommendations	24
1.8.1 IP Codecs – Network Connection	24
1.8.2 Management Ports	25
1.8.3 Default LogIn and Services	25
2.0 Installation and Wiring	26
2.1 Pre-Installation Notes	26
2.1.1 Basic Installation Guide	26
2.1.2 Tools and Cables Required	26
2.1.3 Front panel Components	27
2.1.3.1 Power- Connection- and Alarm Status	27
2.1.3.2 Reset Switch – Default IP Addresses	27
2.1.3.3 Audio Level Indication	28
2.1.3.4 Monitoring and SD-Card	28
2.2 Wiring Information	29
2.2.1 Power Supplies	29
2.2.2 Audio Inputs and Outputs	30
2.2.3 Auxiliary Data Interface	31
2.2.4 Ethernet Interfaces	31
2.2.5 Relay Contact Closures	32



2.2.6 Switch Inputs	33
3.0 WorldCast WEB-Browser GUI	34
3.1 The WorldCast WEB GUI - Overview	34
3.1.1 WEB GUI – Technical Requirements	34
3.1.1.1 Browser Cache	34
3.1.2 WEB GUI – Default Network Settings	35
3.2 WEB GUI – Getting Started	36
3.2.1 Default LogIn	36
3.2.2 Loading and Locking	37
3.2.3 Additional Status Indications	38
3.2.3.1 Activated Licenses	38
3.2.3.2 CPU Utilization	38
3.2.4 Status Page	39
3.2.5 Session Close/Session Time Out	39
3.2.6 Main Menu	40
3.3 Main Menu - Status	41
3.3.1 Current Status Frame	43
3.3.2 Alarms Status	44
3.3.3 GPIO Status	46
3.3.4 Performance Monitor	47
3.3.4.1 IP Statistics – Details	48
3.3.4.2 IP Statistics – Receive Buffer Level	48
3.3.4.3 About Streams Tables (general)	49
3.4 Main Menu – Connection	50
3.4.1 Profile Wizard – Creating a Profile	52
3.4.2 Profile Wizard – Encoder Settings	53
3.4.3 Embedded AUX Data	54
3.4.4 Profile Wizard – Decoder Settings	55
3.4.5 Profile Wizard – IP Streams Configuration	56
3.4.6 Profile Wizard – Saving a Profile	57
3.4.7 IP Stream Configuration - general	58
3.4.7.1 About Stream Types	59
3.4.7.2 Audio Stream Configuration	60
3.4.7.3 AUX data or Opto/Relay Stream Configuration (Tx)	63
3.4.7.4 About Packet Size of AUX Data and Opto/Relay Streams	65
3.4.7.5 IP Forwarding	65
3.4.7.6 Receive Audio Stream, Decode and Forward	66
3.4.7.7 Forwarding an IP Stream (Tx)	68
3.4.8 Advanced Configuration	70
3.4.8.1 Validation Engine	72
3.4.9 Digital MPX Link over IP – AES FS 192 kHz	74



3.4.9.1 Digital MPX Link – Stream Configuration	/5
3.4.9.2 Digital MPX Link – Technical Specifications	76
3.4.9.3 Digital MPX Link – Typical Application	76
3.5 Main Menu – System	77
3.5.1 Date and Time	77
3.5.2 User Management	78
3.5.3 Network Settings	78
3.5.3.1 Network Page	78
3.5.3.2 Dynamic DNS	80
3.5.3.3 NAT Traversal Mode – UPnP	82
3.5.4 DNS Server – Look Up	83
3.5.5 Local Loopback IP Address	83
3.5.6 Diagnostic Page	83
3.5.7 SMTP (Mail Setup)	84
3.5.8 SNMP	85
3.5.8.1 SNMP Agent	86
3.5.8.2 SNMP Trap Management	87
3.5.8.3 SNMP Notifications Management	88
3.5.9 System – ScriptEasy	89
3.5.9.1 About ScriptEasy	89
3.5.9.2 ScriptEasy – Script Example	90
3.5.9.3 ScriptEasy – Configuration	90
3.5.9.4 ScriptEasy – Remove a Script	91
3.5.10 Event Log	91
3.5.10.1 Event Log Export	92
3.5.10.2 Event Log History	93
3.5.11 (Firmware) Update	94
3.5.12 Licenses	94
3.5.13 System	95
3.5.13.1 Chat Box	96
3.6 Main Menu – Configuration	97
3.6.1 Audio Configuration	97
3.6.1.1 Advanced Routing & Decoder Mono Mode	98
3.6.1.2 Audio Configuration Options	99
3.6.2 Network Alarms	102
3.6.3 AUX/GPIO Configuration	103
3.6.4 Alarms Configuration	105
3.6.5 Alarms - Customer Alarms	106
4.0 SureStream Option	107
4.1 About SureStream	107
4.1.1 SureStream Encoder	108



4.1.2	SureStream Decoder	108
4.2 Sures	Stream – Encoder Configuration	109
4.2.1	About Diversity Generator Levels	110
4.2.2	Creating a Set of redundant Streams	111
4.3 Sures	Stream – Decoder Configuration	112
4.3.1	SureStream - Decoder Performance	114
5.0 System	n – Firmware Update	115
5.1 Firmv	vare Update	115
5.1.1	Firmware Update - Step 1	115
5.1.2	Firmware Update - Step 2	116
5.1.3	Firmware Update - Step 3	117
5.1.4	Firmware Update - Step 4	118
5.1.5	Firmware Update - Step 5	119
5.1.6	Firmware Update - Step 6	120
6.0 Specif	ications	121
6.1 Speci	ification Horizon NextGen & IP Decoder	121
6.2 Framed Algorithms – Packet Sizes 1		



Safety Notices

TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER THERE ARE NO USER-SERVICEABLE PARTS INSIDE THIS UNIT. PLEASE REFER SERVICING TO QUALIFIED APT SERVICE PERSONNEL.

GB Important Safety Notice

This unit complies with the safety standard EN60950. To ensure safe operation and to guard against potential shock hazard or risk of fire, the following must be observed:

- → If the unit has a voltage selector, ensure that it is set to the correct mains for your supply. If there is no voltage selector, ensure that supply is in the correct range for the input requirement of the unit
- ➤ Ensure fuses fitted are the correct rating and type as marked on the unit.
- → The unit must be earthed by connecting to a correctly wired and earthed power outlet. The power cord supplied with the unit must be wired as follows:

Green/Yellow = Earth Blue = Neutral Brown = Live

- ➤ The **green/yellow** colored wire must be connected to the supply plug terminal marked with the letter E or by the earth symbol (I) and is colored green or green/yellow.
- → The blue colored wire must be connected to the supply plug terminal marked with the letter N or colored black or blue.
- The brown colored wire must be connected to the supply plug terminal marked with the letter L or colored red or brown.
- → The unit shall not be exposed to dripping or splashing and no objects filled with liquids, such as coffee cups, shall be placed on the equipment.

(D) Wichtiger Sicherheitshinweis

Dieses Gerät entspricht der Sicherheitsnorm EN60950. Für das sichere Funktionieren des Gerätes und der Unfallverhütung (elektrischer Schlag, Feuer) sind folgende Regeln unbedingt einzuhalten:

- → Verfügt das Gerät über einen Spannungswähler, muss dieser Ihrer Netzspannung entsprechend eingestellt sein.
- → Die Sicherungen müssen zu jeder Zeit in Typ- und Stromwert mit den Angaben auf dem Gerät und den Hinweisen in diesem Handbuch übereinstimmen.
- → Die Erdung des Gerätes muss über eine geerdete Steckdose gewährleistet sein.
- ➤ Das mitgelieferte Stromkabel muss wie folgt verdrahtet werden:

Braun = Phase Blau = Nullleiter Grün/Gelb = Erde

→ Das Gerät darf nicht mit Flüssigkeiten (Spritzwasser, usw.) in Berührung kommen. Stellen Sie niemals Gefäße mit Flüssigkeiten, z.B. Kaffeetassen auf das Gerät!





Important - Note de Sécurité

Ce matériel est conforme à la norme EN60950. Pour vous assurer d'un fonctionnement sans danger et pour prévenir tout choc électrique ou tout risque d'incendie, veillez à observer les recommandations suivantes:

- → Le sélecteur de tension doit être placé sur la valeur correspondante à votre alimentation réseau.
- ➤ Les fusibles doivent correspondre à la valeur indiquée sur le matériel.
- ▶ Le matériel doit être correctement relié à la terre.
- → Le cordon secteur livré avec le matériel doit être câblé de la matière suivante:

Brun = Phase Bleu = Neutre Vert/Jaune = Terre

Ne pas exposer cet appareil aux éclaboussures ou aux gouttes de liquide. Ne pas poser d'objets remplis de liquide, tels que des tasses de café, sur l'appareil.

Norme di Sicurezza - Importante

Questa apparecchiature è stata costruita in accordo alle norme di sicurezza EN60950. Per una perfetta sicurezza ed al fine di evitare eventuali rischi di scossa elettrica o d'incendio vanno osservate le seguenti misure di sicurezza:

- → Assicurarsi che il selettore di cambio tensione sia posizionato sul valore corretto.
- → Assicurarsi che la portata ed il tipo di fusibili siano quelli prescritti dalla casa costruttrice.
- → L'apparecchiatura deve avere un collegamento di messa a terra ben eseguito; anche la connessione rete deve avere un collegamento a terra.
- → Il cavo di alimentazione a corredo del l'apparecchiatura deve essere collegato come segue:

Marrone = Filo tensione Blu = Neutro Verde/Giallo = Massa

→ Il prodotto non deve essere sottoposto a schizzi, spruzzi e gocciolamenti, e nessun tipo di oggetto riempito con liquidi, come ad esempio tazza di caffè, deve essere appoggiato sul dispositivo.

(E)

Avicio Importante De Seguridad

Esta unidad cumple con la norma de seguridad IEC65. Para asegurarse un funcionamiento seguro y prevenir cualquier posible peligro de descarga o riesgo de incendio, se han de observar las siguientes precauciones:

- → Asegúrese que el selector de tensión esté ajustado a la tensión correcta para su alimentación.
- → Asegúrese que los fusibles colocados son del tipo y valor correctos, tal como se marca en la unidad.
- La unidad debe ser puesta a tierra, conectándola a un conector de red correctamente cableado y puesto a tierra.
- ▶ El cable de red suministrado con esta unidad, debe ser cableado como sigue:

Marrón = Vivo Azul = Neutral Verde/Amarillo = Tierra

➤ La unidad no debe ser expuesta a goteos o salpicaduras y on deben colocarse sobre el equipo recipientes con líquidos, como tazas de café.





Belangrijke veiligheids voorschriften

Dit apparaat voldoet aan de veiligheidsnormen volgens de EN60950 standaard. Om veilig gebruik te waarborgen en mogelijke spanningsschokken of brand te voorkomen is het belangrijk de volgende regels in acht te nemen:

- → Als het apparaat over een spanningskeuze schakelaar beschikt, zorg dan dat het juiste voltage gekozen is. Indien er geen spanningskeuze schakelaar beschikbaar is, verzeker u er dan van dat de lokale netspanning binnen het ingangsbereik van de voeding valt.
- Zorg ervoor dat de gebruikte zekeringen van de juiste waarde en type zijn, zoals aangegeven op het apparaat.
- ► Het apparaat moet geaard worden via een correct aangesloten en van randaarde voorzien stopcontact. De bij het apparaat meegeleverde spanningssnoer moet op de volgende manier aangesloten zijn:

Groen/Geel = Aarde Blauw = Neutraal Bruin = Fase

- De groen/geel gekleurde draad moet verbonden worden met het aardpunt van de stekker, gemarkeerd met de letter E of met het aarde symbool (I) en heeft de kleur groen of groen/geel.
- ➤ De blauw gekleurde draad moet verbonden worden met de neutrale pin van de stekker, gemarkeerd met de letter N of een zwarte of blauwe kleur.
- ➤ De bruin gekleurde draad moet verbonden worden met de fase pin van de stekker, gemarkeerd met de letter L of een rode of bruine kleur.
- → Het apparaat mag niet gebruikt worden in een vochtige omgeving, en dient ook niet gebruikt te worden als onderzetter voor drinkbekers of andere voorwerpen die vloeibare stoffen bevatten.



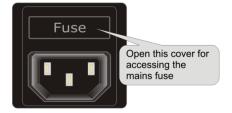
Power and Low Voltage Ports

Main Fuse Characteristics

The mains supply fuse is located on the rear panel inside the IEC power receptacles.

Voltage rating (Vu) = 250VAC Current rating = 1AH

Characteristics = Quick Blow



Any replacement of fuse must be conformal to IEC127 specifications with the same above characteristics.

SELV Ports

➤ SELV stands for Safe Extra Low Voltages as defined in EN60950. All SELV ports must only be connected to SELV type equipment.

TNV1 Ports

➤ TNV1 stands for Telecommunications Network Voltages type 1. All TNV1 ports must only be connected to TNV1 networks.

Output XLR Connectors

→ Do not supply any power source including phantom power to the Output XLR connectors. Failure to observe this warning may cause your unit to malfunction and invalidate your warranty.

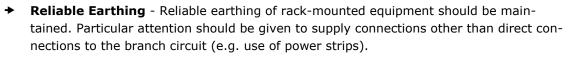
Notes:			



General Precautions

- ➤ Elevated Operating Ambient If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- → Reduced Air Flow Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- ➤ Mechanical Loading Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- ➤ **Circuit Overloading** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.







- ➤ Ventilation and Airflow Slots and openings on the units are provided for ventilation that is needed to ensure reliable operation. To avoid overheating and ensure that the ventilation slots are not blocked. If the equipment is placed in a closed area, such as a rack or a case, ensure that proper ventilation is provided and that the internal rack operating temperature does not exceed the maximum rated temperature at the location of the unit.
- ➤ Radio Interference Class-A ITE Warning This is a Class-A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Notes:		



1.0 About this Codec Manual

Thank you for purchasing the audio Codec from WorldCast Systems. We have developed this unit to be as user friendly as possible, and it contains many advanced features which are designed to make the use of this product simple and straightforward.

This operations manual is intended for installers and operators of the WorldCast Horizon NextGen and IP Decoder. This manual describes the function, the installation and use of the unit.

It is recommended that new users should read the full manual before switching it on for the first time, to get a better feel for the functionality and to eliminate any possible area of confusion.

1.1 Release Notes

This Manual describes the WorldCast Horizon NextGen and IP Decoder and is the primary reference covering the configuration, installation, operation and troubleshooting.

This Manual refers to System Release 1.5.2 - April 2015

As of this publication date, this document is the current manual revision. We recommend that you check with your distributor or on the APT website for updates.

1.1.1 Additional Applications for SR.1.5.2:

- Optional ScriptEasy version 2.6.1.001
- Optional MasterView version 1.4.20.001

1.2 Important Security Advices

1.2.1 This IP Audio Codec is a network device!

For further information, please also refer to section 1.8.



- (i) Before commissioning, we strongly recommend to change the default LogIn on the WEB GUI (refer to section 3.5.2)!
- (i) Before connecting to your Network, please check the SNMP community strings. Don't use the trivial default names (refer to section 3.5.8.1)



1.3 Company Profile

WorldCast Systems is a highly respected provider of professional, reliable and innovative solutions to the Radio & TV industry worldwide.

Encompassing the industry-leading brands of APT, Ecreso and Audemat, WorldCast Systems offers high-performing broadcast systems including audio codecs, FM transmitters and RF signal monitoring designed to meet the needs of both large international broadcast networks and small private stations alike. WorldCast Systems' products are deployed throughout the networks of many major public and commercial broadcasters such as the BBC, ARD, the EBU, RTE, TDF, RNE, Teracom, RAI, ORF and Clear Channel Radio

- → APT codecs deliver audio over IP, T1, ISDN & Leased Lines. Our award-winning SureStream technology enables high quality audio transport over cost-effective IP links.
- **Ecreso** offers highly efficient FM transmitters with extensive inbuilt functionality, highly competitive Total Cost of Ownership and an industry-leading 10 year warranty.
- ➤ Audemat provides a range of professional monitoring and measurement tools for Radio & TV, complemented by an extensive range of remote control systems for management, configuration and monitoring of broadcast networks.

Three core values have shaped the growth and direction of WorldCast Systems

1. Product innovation:

Audemat places a key emphasis on Research & Development and its innovative approach has been repeatedly recognized by the industry. WorldCast Systems has won awards for innovation at consecutive NAB Shows for over 10 years.

2. Customer satisfaction:

Audemat is dedicated to ensuring the best quality, value and service for its customers and has achieved ISO 9001 certification.

3. Sustainable Development:

Audemat is committed to sustainable development and demonstrates this commitment in several ways: it has been ISO 14001 certified since 2007, adheres to the UN Global Compact project and all new products are developed in keeping with an eco-design philosophy and built within Audemat's low energy consumption factory.

Headquartered in Bordeaux-Merignac, France, WorldCast Systems employs nearly 100 people worldwide with an R&D center in Northern Ireland and sales offices in the UK, Germany, India and the US. A global distributor network works together with our international sales and support staff to offer local assistance to our international customer base.



1.4 Unpacking and Inspection

After unpacking:

- Check the unit for damage during shipping. Immediately report any damage back to the distributor or APT.
- ➤ Check that the list of contents is complete as follows:

WorldCast Horizon NextGen / IP Decoder Unit

Serial Number located on the rear panel:

Horizon: H0000IP Decoder: J0000-

(please complete)

Power Supplies

Please confirm that the local power supply voltage matches the required voltage levels of 100-240VAC

Cables

A power cable will be supplied with the unit together with any other special cables as ordered.

O CD box

A CD box including a Quick Start guide and a CD where you will find the documentation for this product.





If the equipment supplied does not match the items requested please contact APT or your local distributor immediately and report any shortages. Please do not connect the system to the telecom network or apply power to the unit if you are in any doubt about the contents as this could lead to damage of the hardware.

Detailed information for installation and wiring is provided in section 3 "Installation and Wiring" of this manual.



1.5 Introduction

The "Next Generation" audio Codecs are based on the new APT Codec core engine. This new engine is designed to be as flexible and versatile in use as possible. The core is powerful and addresses more than ever the needs of professional IP audio transmissions.

The WorldCast Horizon NextGen is a full duplex, multi-algorithm audio codec offering conventional analog left and right audio connections and AES/EBU digital audio connections operating through IP, while the IP Decoder uses the same hardware, but it is limited to decoder operations. The new Codec generation incorporates the enhanced versions of the apt-X® algorithm (real time transmission on the network with data reduction by factor 4:1), Linear PCM 16 and 24 bit, MPEG 1/2 Layer II and the full MPEG AAC suite of algorithms including HE-AAC. More audio algorithms may be available on coming firmware releases.

The units are capable of delivering high quality audio used for inter-studio networking, remote/outside broadcasts and STL/TSL applications. The new generation is even more suitable for use in either AM, FM, DAB and many other broadcast and professional audio environments.

The WorldCast Horizon NextGen and the IP Decoder run an embedded WEB GUI which can be accessed from a web browser or the APT NMS. A headphone socket provides for additional monitoring of the audio input or output. The rear panel audio I/Os can be switched to accept either analog or digital signals, and if required the digital output can be synchronized with an external digital reference signal.

Additional interfaces allow for the connection of auxiliary data, alarms and opto-coupled control inputs.

The IP Decoder is identical to the WorldCast Horizon NextGen except it is a decoder only product so has no audio inputs.



1.5.1 System Options

The following soft- and hardware options are available:

- **Redundant PSU**: increase the reliability of your Codec
- Full Front Panel: directly set and control your codec (available in later release).
- **SureStream**: reliable and lossless connectivity over xDSL links
- **ScriptEasy**: A scripting language for enhanced management and control of a Codec device. In addition ScriptEasy allows the user to communicate and control external equipment using SNMP protocol GET/SET commands.
- **MasterView**: it allows to create customized dashboards to be able remotely to check the equipment status and to perform user remote actions
- **Digital MPX over IP:** This option provides a digital signal path with 192 kHz FS through the AES input of the unit. With this option a digital MPX signal can be transmitted either as 16 Bit or 24 Bit linear PCM stream.
- **Advanced Audio Backup**: playlist for SD card/USB & Play out from Shoutcast server (available in later release)

Notes:		



1.6 Getting Connected

This chapter outlines how you can quickly connect your WorldCast Horizon NextGen and start sending audio. The following chapter describes all of the interfaces in more detail.

Begin by connecting mains power to the unit.

Making a connection and send audio:

- set up the WorldCast Horizon NextGen for analog or digital audio
- set up the configuration
- apply this configuration to the unit

The audio connections are made on the rear panel using XLR-3 connectors for analog and digital connections.

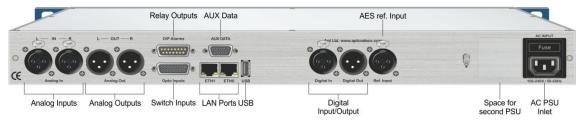


Figure 1-1: Horizon NextGen rear panel view

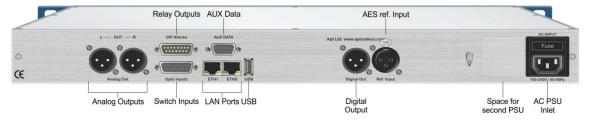


Figure 1-2: IP Decoder rear panel view

Note: The Horizon NextGen and the IP Decoder provide analog and digital audio output always simultaneously. Selecting the analog or the digital mode affects the signal inputs only.



1.7 The WorldCast Codec Management System - Overview

The WorldCast Network Management System (NMS) allows viewing multiple units from one control point. The program has an intuitive look and feel that is easy to understand by both the experienced technician and the casual user.

The graphical user interface provides access to an embedded WEB GUI to the Horizon NextGen / IP Decoder when accessed from the NMS family tree view. The presentation of the GUI of the Horizon NextGen and the IP Decoder is the same when opened from the family tree view (NMS) or directly from a WEB browser.

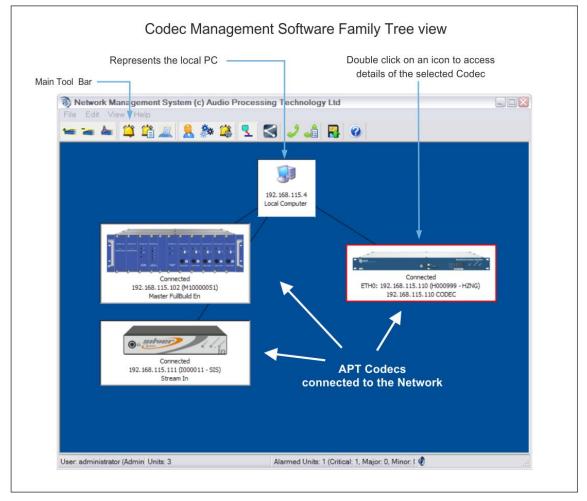


Figure 1-3: Family Tree of the Network Management System (NMS)

- The presentation of the Horizon NextGen and the IP Decoder configuration pages is the same whether it is opened from the family tree view (NMS) or directly from a WEB browser.
- The NextGen codec range provides a context menu by right-clicking on the device (once it is connected). This context menu provides an option called "Open Free View" this option opens as many independent views of the GUI as required but only one instance in read-write mode. All other instances are locked to read-only mode.



The Codec Management System – (continued)

The Codec Management System is designed to operate as a program under Windows as a single task. This means that only one instance of the NMS software can be installed on the same PC.

Nevertheless, it's possible and allowed to have more than one installation of the **NMS** in the network. The NMS software design does not allow a simultaneous access to the same Codec device from different seats. If one seat has opened a Codec device on the family tree, the software inhibits any attempt of accessing the same unit from another seat in read/write mode. The first user gets the read-write control of this particular device, and any other user will be prompted to be restricted on read-only permissions. This feature avoids configuration conflicts caused by several seats.

Whenever a user opens a device on the family tree, the NMS sends out a broadcast request/announcement to the network looking for any other user actually configuring this particular unit.

If the network does not allow broadcasting, i.e. in public domain networks like the internet, this protection becomes ineffective.

Notes:			



1.7.1 Installing the Network Management System

Prior to installing and running the NMS software, please ensure that your service PC meets the minimum hard- and software requirements:

- Microsoft Windows[®] XP, Windows[®] Vista, Windows[®] 7/8
- → 30 MB free Hard Disc space
- → 1024 px x 768 px Screen Resolution or better
- ➤ CD ROM Drive (optional)
- (i) Running any NextGen-Codec with the current system release on the NMS software requires the NMS build version #1183 or higher (supplied with the Codec).

The NMS requires IP port 7777 and 7778 to be opened on your network!

The NMS software is generally supplied as a self-extracting application. Run the application and follow the instructions of the following screens:

First Screen

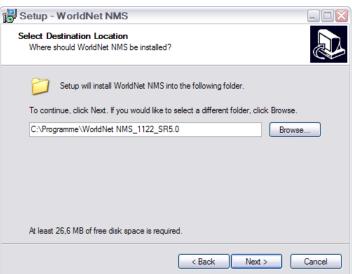
It shows the NMS build version; please make sure that you're installing the correct version, here build #1122.

SR 1.5.2 requires NMS version 1183 or higher!



Next Screen

Please choose the folder where you like to install the NMS application.





Installing the Codec Management System (continued)

Next Screen

Journalist Panel is available for Eclipse/Meridian type Codecs only – do not select it unless you are also running Eclipse or Meridian units in your network.



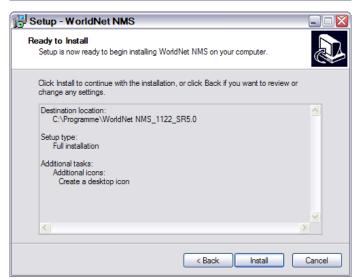
Next Screen

You can create a desktop and/or a quick launch icon as required.



Final Screen

Now you need to complete the installation by clicking on "Install".





1.7.2 Getting Started

Before you can launch the Management System please ensure the following pre-conditions of your network settings:

- To get started with the NMS application, ensure that the cabling is properly connected from the Codec to the PC, and that your service PC's Ethernet cards has an IP address within the range of 192.168.100.0 to 192.168.100.255. The Horizon NextGen and IP Decoder are set to an IP address within this range as a factory default usually 192.168.100.110.
- The NMS application will remain inactive until a link is established between the service PC and an active Codec device.

Release Notes

As of this publication date, system release 1.3.0 is shipped with the Codec device. We recommend that you check the APT website for updates.

Launch the Management System application. You will find the program located in the Windows Start Menu under "Program ➤ WorldNet NMS". Start the program and you will be prompted to log in:

NMS Log-In:

There are three levels of access to the WorldNet Codec Management System:



All accounts, the "Administrator", "Normal" and the "Read Only", require Username and Password login. When shipped only an Administrator account is configured with the default login. We recommended that you change the Administrator login as soon as possible.

Default Username: administrator
Default Password: password

The manual of the WorldCast NMS system is provided with the software. You will find the full documentation as help file: Click on the menu "Help->Help"

① Do not forget to change the default password before connecting to an unprotected network!



1.8 IT Security Recommendations

1.8.1 IP Codecs – Network Connection

IP Codecs are network devices! Therefore they should be seen as such. An IP Codec must be connected to the IP network via a switch or router providing sufficient firewall mechanisms in order to protect the audio service and the connected network against external attacks. All network related security rules are valid for an IP Codec as well.

The image below shows the principal of the network connection via two ETH ports. Both ports are configured for different networks. With the current firmware both ETH ports can be used for management access. Therefore care must be taken that the management ports are inaccessible on the streaming network (the external network).

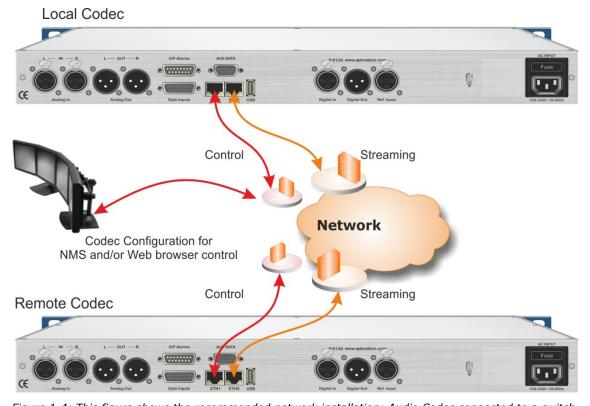


Figure 1-4: This figure shows the recommended network installation: Audio Codec connected to a switch with firewall mechanism.

On this principal installation ETH0 is shown for management and ETH1 for WEB GUI control. It is a user decision to use either a single port for management and data streaming, or to separate the services using both ports; one for management and one for data streaming, but on different networks.

Default IP address for ETH 0: 192.168.100.110 - DHCP disabled on default.

Default IP address for ETH 1: 192.168.101.111 - no DHCP support on ETH1



1.8.2 Management Ports

The following table shows the TCP/UDP ports that should be protected if the Codec is connected to a public network.

Management Ports that should be closed on external connections

TCP 80	WEB Server access
TCP/UDP 111	RPC
UDP 161	SNMP
UDP 162	SNMP TRAP
UDP 2004	Internally used
UDP 5353	MDNS
UDP 5577	Internally used
UDP 7777	APT NMS communication
UDP 7778	APT NMS communication

1.8.3 Default LogIn and Services

Passwords

The Web GUI and the NMS are protected by a user login. The default passwords are trivial password only, like "admin" or "password". It is obvious, that these passwords are insufficient for a regular use. Furthermore, it is a negligent behavior if this default login was not changed before connecting to a network. Please refer to section 3.5.2 about how to change the Web GUI logIn.

Never use the default login for regular operation in an unprotected network!

SNMP

The default names of the community strings must not be used for regular operation. The default names of community strings, in particular of the Private Community, are widely used and therefore commonly known. Because SNMPv2c does not support password protection of the strings, the recommendation is clearly to create the names as "cryptic" as possible. Refer to section 3.5.8.1 about how to change the community string name.

The names of the SNMP community strings must be changed even if SNMP is not used!

FTP Account

The firmware provides an FTP account that is disabled on default. There is no risk from this service as long as it is kept disabled. FTP service is only used by the ScriptEasy option when a new script is loaded to the unit. FTP must be switched off for normal operation because of security considerations. After a system reboot, the FTP is disabled on default. The FTP login cannot be managed by the user (system immanent). Also refer to section 3.5.6 about how to control the FTP service.

Make sure that FTP is disabled before connecting the Codec to an unprotected network!



2.0 Installation and Wiring

This chapter describes the general installation procedure and the wiring schemes of the WorldCast Horizon NextGen rear panel connectors. This section consists of two parts:

- ▶ Preparing for installation of the WorldCast Horizon NextGen
- ➤ Wiring power and signal connectors

2.1 Pre-Installation Notes

Always pre-test the system on the bench in its intended configuration prior to installation at a remote site.



Avoid cable interconnection length in excess of 1 meter (3.3 feet) in strong RF environments.

Do not allow the audio level to light the red "clip" LED on the front panel bar graph or on the detail screens on the CMS(NMS or the WEB GUI, as this causes severe distortion (digital audio overload).

All network interface ports and mains power connection must be externally protected from lightning strikes – damage from lightning strikes is not covered by the product warranty.

2.1.1 Basic Installation Guide

2.1.2 Tools and Cables Required

In addition to the content of the packing list, the following items are necessary to complete the installation, depending on your WorldCast Horizon NextGen configuration.

Tools:

One flat and Phillips screwdriver suitable for M6 rack mounting bolts. A basic electronics toolkit is useful for individual cabling.

Rack mounting hardware:

Four M6 bolts with plastic protection washers.

Network connection cables

For Ethernet (IP) connection at least one CAT5 cable

Management connection:

One CAT5 Ethernet cable either straight through wired to connect to a hub (recommended) or a cross-over CAT5 cable to connect the WorldCast Horizon NextGen with a PC (without network devices).

Ethernet hub or switch:

Providing an Ethernet hub or switch facilitate the connection and configuration of more than one WorldCast Horizon NextGen frame simultaneously.

Cables for each payload channel:

At least one male or female standard audio cable, equipped with balanced wired XLR connectors.

Power cables:

AC power cables are supplied with the WorldCast Horizon NextGen.



2.1.3 Front panel Components



Figure 2-1: Horizon NextGen front panel components

2.1.3.1 Power- Connection- and Alarm Status

- The Power indicator LED indicates that power is applied to the unit
- ➤ The Alarm indicator LED indicates that an alarm condition exists. There are a number of alarm condition which can be enabled on the Horizon NextGen or IP Decoder – refer to section 4.6.3 for more information.
- → The Connected LED shows the presence of a connection. The following table shows the different states of the LED.

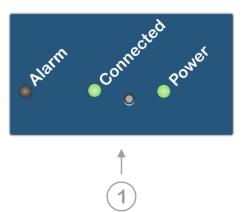


Figure 2-2: Status indications

Connected LED Color:	Off/Grey	Green	Red
No Stream enabled	X		
Receiving & Transmitting ok		Х	
Connection Error			Х

2.1.3.2 Reset Switch - Default IP Addresses

Between the "Connected" and the "Power" LED there is a small hole in the front panel. Behind this hole sits the IP Address Reset Switch. To change the IP Address of the Horizon NextGen & IP Decoder to the default addresses, insert a small tool until and press the switch. Hold it in place until the Connected LEDs start to flash (about 5 seconds) – then remove it.

The unit will then have changed IP address; it does not need to reboot. It will take a short while (\sim 10sec) until the Web GUI will be accessible again on the default addresses.

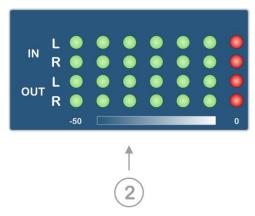
The default IP address

for ETH0: **192.168.100.110** for ETH1: **192.168.101.111**



2.1.3.3 Audio Level Indication

Horizon NextGen:



IP Decoder:

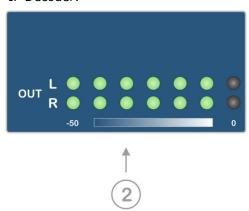


Figure 2-3: Audio Level Indication on Horizon NextGen and IP Decoder (outputs only)

The Input and Output level LEDs on the front panel indicate the level of the digital Input ("0" equals full scale dBFS) or the digital equivalent from the attenuated analog signal. The WEB GUI allows adjusting the analog clip levels on the Input and Output in reference to the digital signal.

The front panel audio level indicators display levels for both audio Inputs and audio Output and for both Left and Right channels. Note that the IP Decoder only as output level meters.

2.1.3.4 Monitoring and SD-Card

- ➤ The 6.3mm jack socket is provided for audio monitoring with a headset or active monitor speaker. It is possible to monitor either the audio input or audio output; selected by pressing the small selector switch beside the jack socket.
- ➤ The SD-Card will be available as an audio backup source. In cases of no network connectivity, program audio can be played out from the SD-Card (future option!)

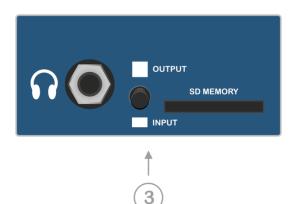


Figure 2-4: Monitoring facility and SD-Card slot



2.2 Wiring Information

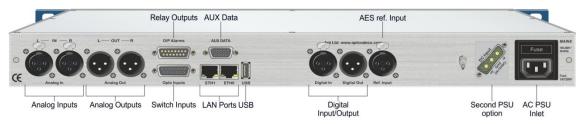


Figure 2-5: Horizon NextGen rear panel components

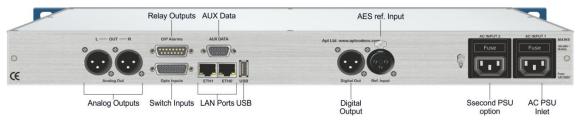


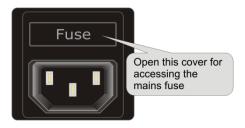
Figure 2-6: IP Decoder rear panel components

2.2.1 Power Supplies

a AC Power Inlet

The AC power interface is supplied in an IEC inlet and allows the connection of a suitable AC supply between 100V and 260VAC.

This inlet also holds the AC mains fuse. Please refer to the safety instructions for replacement.

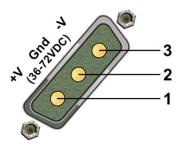


AC Power inlet (IEC)

DC Power Inlet

The DC power input is supplied on a 3 pin D-Type male power connector and allows the connection of a suitable DC supply between 36 V DC to and 72 VDC. The DC input is floating (isolated from ground); please take care of the correct polarity!

(i) Connection to incorrect pins may result in damage to the power supply!



DB-3 Power D connector, view to the pins (not to solder side)

Power Supply:

Max. Input: 72 VDC between Pin 1 and 3

Max current: 0.6 A (full load)

DC apply is always between pin 1 and 3

Pin	Description
1	+ve (pos. voltage relative to GND)
2	Ground
3	-ve (neg. voltage relative to GND)



2.2.2 Audio Inputs and Outputs

Page 6

Standard XLR-3 female socket

Input analog or digital

Pin	Description
1	screen
2	hot (+ve)
3	cold (-ve)

Digital audio levels are fixed and the unit will accept levels up to a full-scale range of +24dBu.

Analog input levels can be adjusted in reference to the digital clip level via the Web GUI in increments of 0.1 dBu. The input impedance is selectable between 600Ω and $>10\,k\Omega$ via the Web GUI; digital input impedance is fixed at $110\,\Omega$.

Output analog or digital

Pin	Descripti
1	Screen
2	hot (+ve)
3	cold (-ve)

Digital audio levels are fixed and the unit will accept levels up to a full-scale range of +24 dBu.

Analog output levels can be adjusted in reference to the digital clip level via the Web GUI in increments of 0.1 dBu. The output impedance is selectable between 600 Ω and 50 Ω via the Web GUI; digital output impedance is fixed at 110 Ω .



Standard XLR-3 male socket

Digital reference input

Pin	Description
1	screen
2	hot (+ve)
3	cold (-ve)

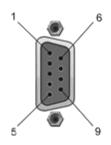


Standard XLR-3 female socket

This AES11 reference input accepts an AES/EBU clock signal in order to synchronize the Sample Rate Converter (SRC) at the AES/EBU outputs to a master (house) clock. Ideally, the sampling frequency of the incoming audio signal should be at the same frequency as the reference signal. However, if the two frequencies differ by a factor of less than 16:1 then the SRC module will function satisfactorily and pass audio to the output. The sampling frequency of the output audio will be been up- or down- converted to match the frequency of the reference signal.



2.2.3 Auxiliary Data Interface



9 pin female connector contact view

RS-232 (DTE) Serial Inputs

Pin	Signal	Description
1	N-C	No Connection
2	Rx	RS-232 Receive
3	Tx	RS-232 Transmit
4	DTR	RS232 Data Terminal Ready
5	GND	Ground
6	N-C	No Connection
7	N-C	No Connection
8	N-C	No Connection
9	N-C	No Connection

This is a SELV connection and must only be connected to other SELV ports.

The RS232 auxiliary data channel of the Horizon NextGen unit offers continuous data transfer rates from 1.200 to 115.200Baud (non-embedded on AUX IP-Streams).

2.2.4 Ethernet Interfaces



10BaseT socket wiring scheme

Ethernet Interfaces (ETH0/1)

Pin	Signal	Description
1	Tx +	transmit data +ve
2	Tx -	transmit data -ve
3	Rx -	receive data -ve
4	N-C	Not connected
5	N-C	Not connected
6	Rx +	Receive data +ve

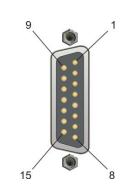
These Ethernet interfaces are available for both connecting to a PC running the WorldCast NMS (or WEB browser) and for sending and receiving audio data.

These ETH ports are auto MDI/X enabled. An **Auto-MDI/X** port detects if the connection would require a crossover link, and automatically chooses the MDI or MDIX configuration to match the other end of the link properly.



2.2.5 Relay Contact Closures

Relay Contact Closures



15 pin male connector contact view

Pin	Description	Function
1	Relay 1 com	Configurable
2	Relay 1 n.c.	Configurable
3	Relay 1 n.o.	Configurable
4	Relay 2 com	Configurable
5	Relay 2 n.c.	Configurable
6	Relay 2 n.o.	Configurable
7	Relay 3 com	Configurable
8	Relay 3 n.c.	Configurable
9	Relay 3 n.o.	Configurable
10	Relay 4 com	Configurable
11	Relay 4 n.c.	Configurable
12	Relay 4 n.o.	Configurable
13	Alarm 5 com	Not Configurable
14	Alarm 5 n.c.	Not Configurable
15	Alarm 5 n.o.	Not Configurable

* n.c. = normally closed

* n.o. = normally open

* N-C = not connected

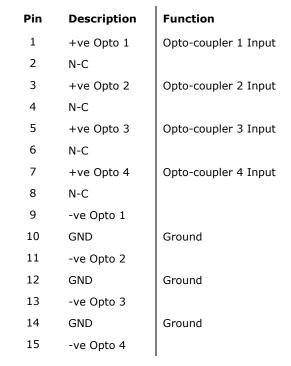
This relay port supplied on a 15pin D-type male connector provides five relay contact closures to indicate either the status of the assigned alarms; or these relays are used as GPOs (general purpose output). Each relay provides three contacts where the "com" pin is toggling between normally open (n.o.) and normally closed (n.c.). The summary alarm (relay #5) is also indicated by an LED on the front panel.

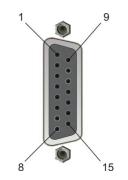
Relays #1-4 are configurable for any alarm event and relay #5 is assigned to the summary alarm.



2.2.6 Switch Inputs

Switch Inputs (opto-isolated)





15 pin female connector contact view

* N-C = not connected

The switch inputs accept any mix of up to a maximum of four DC inputs. An input is active whenever a voltage is applied between +ve and -ve connections (7.5 to 30 V). These signals are then converted and transmitted over the IP link. GND is not connected to -ve; but for a common connection PIN 9, 11, 13 and 15 can be connected to (chassis) GND.



3.0 WorldCast WEB-Browser GUI

The WorldCast Web GUI is the control and monitoring tool which communicates with the new Horizon NextGen, the IP Decoder and the Silver IP-Streamer. The next generation units run their own Webserver with can connect to standard Web Browsers or to the APT NMS. It is used to configure the unit, create audio streams and to get status and alarm information. It is also possible to make and to drop calls by using predefined profiles (presets).

This section outlines this application and provides a detailed description of all aspects of the Horizon NextGen configuration options.

3.1 The WorldCast WEB GUI - Overview

The WorldCast Web GUI allows you to view and control a single instance of the WorldCast Horizon NextGen, IP Decoder or the Silver IP-Streamer. The application has an intuitive look and feel that is easy to understand by both the experienced technician and the casual user. All configuration instructions described in this section relate to the WEB GUI. This section provides detailed step-by-step instructions on how to set up the WorldCast Horizon NextGen.

3.1.1 WEB GUI - Technical Requirements

- The WorldCast Web GUI can be run from a standard web browser such as:
 - 1. Mozilla Firefox
 - 2. Google Chrome
 - 3. Safari
 - 4. Internet Explorer v9 and higher
- Recommended screen/window size: min. 1280px by 1024px

The GUI is based on a web application using inherent browser technologies only: Java Script, Cookies and CSS (2.0/3.0). The application does not require installing any additional browser Add-On. The Cookies are session Cookies and used as temporary memory for configuration changes until they are uploaded to the hardware. A session Cookie expires after the actual session was closed.

3.1.1.1 Browser Cache

The browser cache is used to hold mainly static parts of the web pages in the PC memory. However, there are situations where the browser cache cannot be updated correctly and a manual page refresh will be necessary (reload, ignoring cache).

After the following actions we recommend to refresh the web page manually:

- 1. After firmware update.
- 2. If any kind of page error appears (corrupted appearance).
- 3. If an IP address is re-used for a Codec which was assigned to another Codec device previously.



3.1.2 WEB GUI – Default Network Settings

The WorldCast Horizon and IP Decoder provide two IP interfaces: ETH0 and ETH1. Both interfaces can be used for control and streaming. Currently on both physical Ethernet interfaces the IP port #80 is open and watched by the internet daemon of the internal web server. This implies that a web browser connection is possible on both interfaces, even if the particular ETH is also used for audio streaming.

The default settings for accessing the web server are (port #80):

ETH	IP Address	Netmask	Gateway
0	192.168.100.110	255.255.255.0	192.168.100.1
1	192.168. 101 .111	255.255.255.0	192.168. 101 .1

Notes:	



3.2 WEB GUI – Getting Started

Open your preferred web browser and type in the IP address of the Codec you like to configure, and you will be prompted with the LogIn screen.

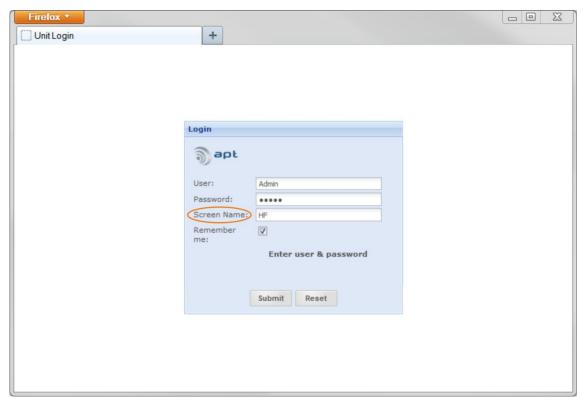


Figure 3-1: The WEB GUI LogIn screen

The entry field "Screen Name" has been added. The entry of this field appears as user name on the inter-communication chat box. The chat box is described in section 3.5.13.1.

Activating the tick box "Remember me" allows the browser to remember your last user name for a new session.

3.2.1 Default LogIn

By default the Administrator account is selected. The user management allows modifying this account and it also allows setup a read-only account.

Default LogIn, User: Admin - Password: admin

A security alert will pop up as long as the default login has not been changed. This alert can be remedied only by changing the login.



We strongly recommend changing the Default Account before commissioning!



3.2.2 Loading and Locking

After you have submitted correctly the web browser starts loading the web application.

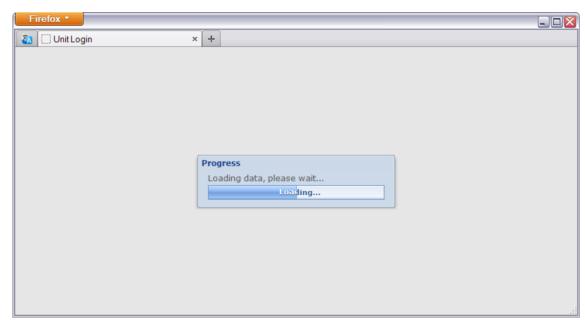


Figure 3-2: Loading data - depending on your connection speed, this may take a short while

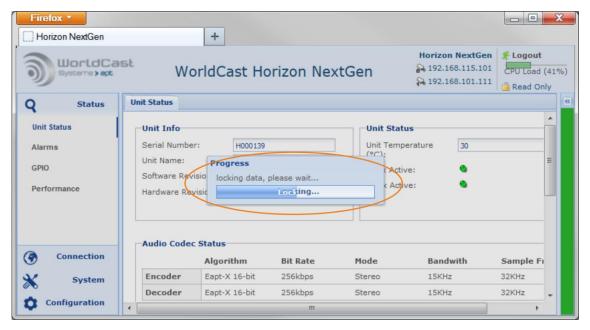


Figure 3-3: After loading the status page the GUI tries to lock the current session for read/write access

For a full read/write access the GUI must lock the current session. Read/write is an exclusive status and is applied to the first user who logs in. Any other user who tries to log in after will be set to a read-only status. The current status is shown on the top right corner of the window.



3.2.3 Additional Status Indications

3.2.3.1 Activated Licenses

In dependence of already applied option licenses the unit may show additional warnings during loading the control interface. The image below shows a unit with the ScriptEasy license enabled. If ScriptEasy is enabled the currently loaded control script will be activated during start-up. An alert window indicates this status and asks the user to acknowledge. Clicking on the "OK" button enables the normal access to the control interface.

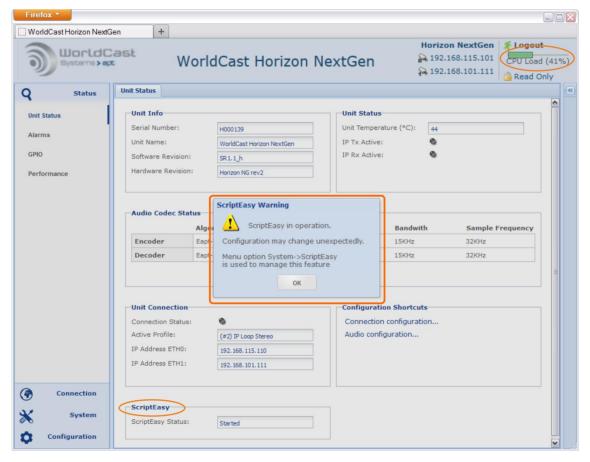


Figure 3-4: Shows the ScriptEasy alert window during start-up

- Note: Whenever a ScriptEasy script is loaded, this script is automatically active after booting the unit!
- More information about the use of ScriptEasy is provided in section 3.5.8.3

3.2.3.2 CPU Utilization

With this release a CPU utilization bar is added on the top right corner of the Main Page. This indication provides information about the CPU load in real-time. In dependence of the number of IP streams and the selected audio algorithm the CPU load can vary significantly.

It is important not to overload the CPU!



3.2.4 Status Page

Once the Web GUI has downloaded the application data from the Codec it will show the "Status Page" of the WEB application. This "Status Page" consists of three sections: The main menu (1) on the left hand side, the main pages (2) in the middle and the "Current Status" frame (3) on the right hand side which can be hidden and its status is indicated by a colored bar: green, orange, or red in dependence of current alerts.

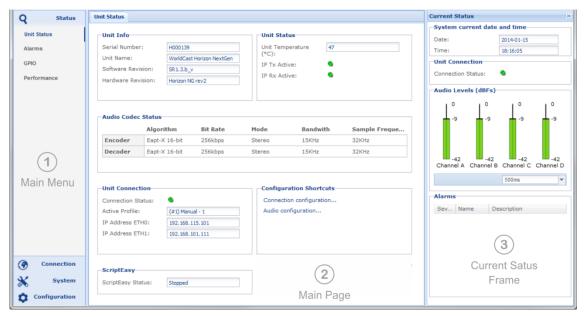


Figure 3-5: Shows the Main Page with "Current Status" frame open

The default Main Page (2) is always the Unit Status page summarizing the status of the hardware unit, the current Audio Codec settings and the Connection Status. The color of the stylized LEDs indicates the current status condition (either green or red). It also may show additional features in dependence of applied option licenses (e.g. SureStream or ScriptEasy).

This is a "Read-Only" Page. No entries can be changed on this browser page.

3.2.5 Session Close/Session Time Out

The WEB GUI allows connecting to a NextGen Codec in read/write mode only on one instance at once. While in "Read Only" mode many instances can monitor a single Codec simultaneously. Each time the browser connects to the hardware in read/write mode (Admin account) a new session will be opened. This session must be closed after a period of time in order to allow another seat connecting to the Codec in read/write mode. A timer ensures that a session cannot keep open accidently and closes the session after 70 minutes automatically.

A session can be closed manually by using the "Logout" button, closing the browser or the browser tab or by forcing a reloading of the application data by pressing the F5 key.



3.2.6 Main Menu

The main menu (1) is always present on the left hand side of the browser window. In dependence of the selected menu item it will expand and show related submenu items.

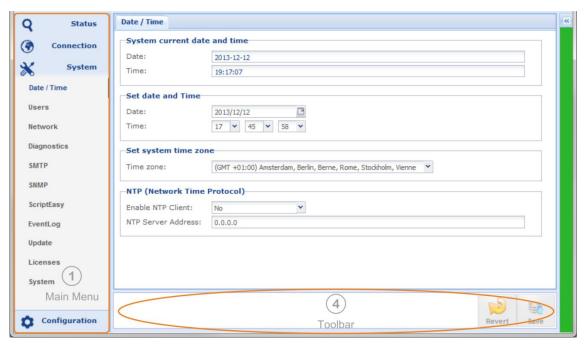


Figure 3-6: The Main Menu expands in dependence of the selected menu item. The "Current Status" frame is hidden and actually indicated by the green bar on the right hand side ("good" condition).

The screen shot above shows the Main Menu (1) with related sub menu entries of the System menu. This figure also displays the hidden "Current Status" frame. This frame is indicated by the currently green color ("good" condition). Clicking on this colored bar pops up this frame.

A selected menu entry opens the corresponding page and the tool bar (4) on the bottom of the browser window which provides related toolbar items.

The "Current Status" bar changes its color in dependence of the current conditions. Possible colors are: GREEN (no error), ORANGE (minor error), RED (major error) and light BLUE (no active configuration).



3.3 Main Menu - Status

Starting the WEB application will always open the Main Menu "Unit Status" item with the Unit Status page and the corresponding sub menu items loaded. The Unit Status page is organized in various sections.

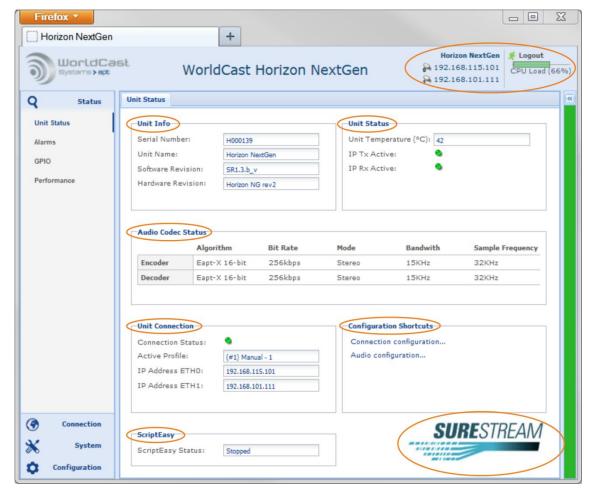


Figure 3-7: Main Menu Status - Unit Status page

Browser Main Frame

The Browser window shows on the top right corner the IP addresses of ETH0 and ETH1 and the unit name which was applied to the unit (refer to sec. 3.5.13); it also provides information if the browser is connected in Read-Only Mode and presents the link for logging out from the unit.

Unit Info

This section displays the hardware and release version:

- 1. Hardware Serial Number
- 2. Unit Name (individual Name as applied)
- 3. Firmware Revision
- 4. Hardware Revision



Unit Status (continued)

Unit Status Section

1. Unit Temperature

This shows the current Engine temperature of the unit and is not the environmental temperature. This value can exceed 40°C without causing a critical situation. There are no fans fitted as default for two reasons; the emitted noise, and fans are wear and tear items which need to be replaced periodically.

2. IP Transport Status

This status indication is related to IP data streams. If a stream is enabled on the streams table it broadcasts any IP error to this status indication.

Audio Codec Status

The Horizon NextGen can be setup for asymmetric audio operation. This section provides information about the currently active Codec settings for the Encoder and the Decoder.

Unit Connection

This section shows the currently active connection, i.e. the status, the name of the loaded profile and the IP addresses of both Ethernet ports (ETH0/1). The stylized LED also indicates a physical "Loss of Connection" on either of activated IP interfaces if a stream is assigned to the interface (this is a copy of the "Current Status" frame item).

Configuration Shortcut

This section provides direct links to:

- 1. Connection Configuration page (advanced configuration)
- 2. Audio Configuration Page

Optional Information

In dependence of applied options licenses this page also shows status information about these options, e.g. for SureStream the SureStream logo, for ScriptEasy the current activity status, etc.

ScriptEasy activity status

- 1. "Unlicensed" either no ScriptEasy license was applied OR no script was loaded
- 2. "Started" Script loaded and active (running)
- 3. "Stopped" Script loaded but temporarily stopped

Notes:		



3.3.1 Current Status Frame

This "Current Status" frame allows a quick inspection of the current condition of a running configuration. Clicking on the little arrows on top of the bar opens it as browser frame. In this mode it is re-sizable and parameters can be changed (e.g. refreshment cycles). Clicking on the colored bar opens this window as popup window with a fixed size and in read-only mode.

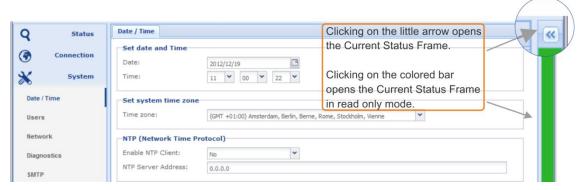


Figure 3-8: Two methods to open the "Current Status" frame; re-sizable or in read-only mode.

The "Current Status" bar changes its color in dependence of the current conditions. Possible colors are: GREEN (no error), ORANGE (minor error), RED (major error) and BLUE (no active configuration).

Date and Time (5)

Indicates the current system date and time. Date and time settings are located in the "System" menu

Unit Connection (6)

The stylized LED indicates the IP connection status of either of activated IP interfaces, i.e. if a stream is assigned to the interface.

Audio Levels (7)

These level bars are representing always the digital signal domain reading as dBFS. The analog levels can be adjusted on inputs and outputs defining the equivalence from the digital clip level of 0 dBFS. The refresh period can be set from 500 milliseconds to 10 seconds.

Alarms (8)

This window shows current system or connection alarms in real time. It indicated the level of severity by LED colors (red and orange), the alarm name and the alarm description.

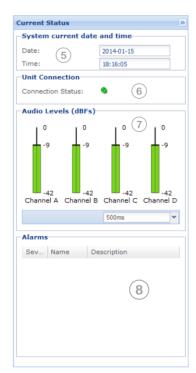


Figure 3-9: Current Status frame details



3.3.2 Alarms Status

The following screen shows the alarm status page. Note that a Red stylized LED means the alarm has been raised. Green means everything is working normally and Grey means this alarm is not enabled or not applicable.

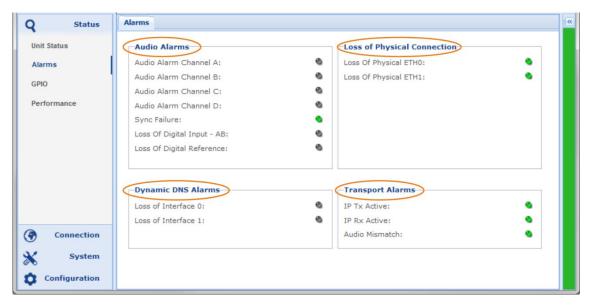


Figure 3-10: Main Menu Status - Alarms page

Note that none of the IP Transmit Alarms or Input Silence Detection alarms will appear for the IP Decoder Product.

Audio Alarms Section

This section shows the status of the audio alarms. The alarms covered in this section are Silence Detection for channels A/B/C/D, Sync alarm, Loss of Digital Input, Loss of Digital Reference, Audio Mismatch and I/O Card (rear panel) detection.

1. Audio Alarms (Silence Detection)

The Audio signal has decreased below the threshold and timeout specified in the audio configuration menu. This alarm will be flagged if silence is caused by a network fault, or the call was dropped on the TX side, or just because audio source has stopped.



Alarms Page (continued)

2. Sync Failure (AutoSync Alarm)

This Alarm indicates a general sync failure in situation where an excessive amount of packets were dropped or out-of-sequence that results in a gap to the audio stream significant enough to generate the Sync alarm. The different audio algorithms or linear PCM have their specific sync-failure sensitivity.

For Enhanced apt-X this alarm corresponds to the AutoSync Alarm. AutoSync is a bit pattern sent embedded in the Enhanced apt-X audio stream that allows a very rapid resumption of decoding after a gap in the bit stream. This alarm will be flagged if the following conditions occur (for network faults, usually along with other network specific alarms too):

- Mismatch of audio algorithms on Transmit and Receive units
- Connection or transport errors
- A Call being dropped by the Transmit unit

3. Digital Alarms

Loss of digital input indicates the loss of the AES input signals.

Loss of digital reference indicates the loss of the external AES clock

Transport Alarms

This section covers IP alarms only such as IP Rx and Tx errors and audio mismatch.

1. IP Transmit (Tx) Error

The packets from the Tx unit have not been confirmed as hitting the Rx unit – either the Rx unit is stating in its RTCP stream that there has been no packets, the RTCP port has been blocked, or there is another form of network fault resulting in no line of sight to the Rx codec.

2. IP Receive (Rx) Error

Packets are not arriving to the Codec, and it is expecting to see traffic. This can be caused by stream being dropped on the Transmit Codec, a network fault or mismatch in audio algorithm settings.

3. Audio Mismatch

This is likely to be raised if the algorithm and packet size do not match on both sides of the link.

Dynamic DNS Alarm

This alarm indicates the loss of connection to the Dynamic DNS service. The Dynamic DNS service configuration is located on the Network/DynDNS configuration page (system menu).

Loss of Physical Connection (ETH0/1)

- 1. Physical loss of connection to network directly (lead pulled)
- 2. Physical loss of connection to network directly or indirectly by remote codec



3.3.3 GPIO Status

The following screen shows the GPIO switch and relay status.

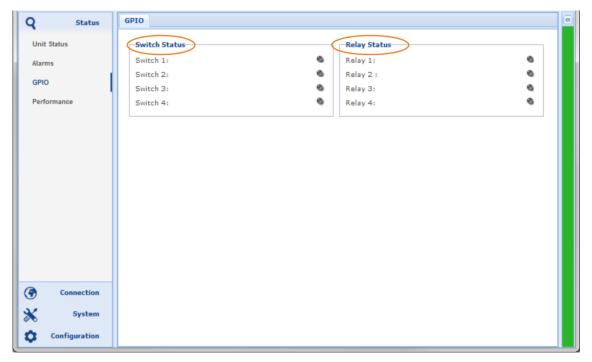


Figure 3-11: Main Menu Status - GPIO page

Switch Status

This section displays whether the switch input is active by showing a green LED on the particular switch. Grey the switch input is inactive.

Relay Status

This section displays whether the relay is active by showing a green LED on the particular relay number. Grey means the relay is in-active.



3.3.4 Performance Monitor

The Performance Monitor is for all active transmit and receive streams. Clicking on an individual stream in the Stream Performance Table will display the performance details below the table. The time interval for the data update is set to 1 second as default, but it is user selectable down to 500 ms and up to 10 seconds. The Buffer Level Display is the graphical equivalence of the current receive buffer condition (shown on receive routes only).

Clicking on the "Reset" button resets the IP statistics. A shortcut allows the direct navigation to the stream configuration page "Connection Configuration".

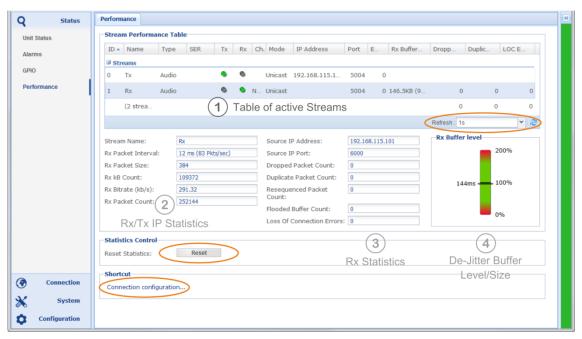


Figure 3-12: Main Menu Status - Performance Monitor page

Notes:			



3.3.4.1 IP Statistics – Details

This section shows the IP statistics (2) & (3) on Figure 3-12 of a selected stream. The table below provides the description of each of the statistics.

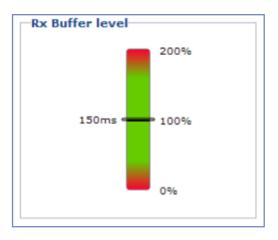
Statistic	Description
Stream Name	Shows the name of the analyzed stream
Rx or Tx Packet Inter- val	Shows the packet time (p-time in msec.) and the packet rate per second
Rx or Tx Packet Size	Size of received or transmitted packet in Bytes
Rx or Tx kB Count	Kilo Bytes received or transmitted
Rx or Tx Bit Rate	Bit rate of receive or transmit stream (data & IP overhead)
Rx or Tx Packet Count	Number of packets received or transmitted
Rx Source IP Address	IP Address of the transmitting Codec
Rx Source IP Port	IP Port on which the transmitting Codec is sending the stream
Rx Dropped Packets Count	Number of dropped packets
Rx Duplicated Packets Count	Number of duplicated packets arrived on the Rx stream.
Rx Re-Sequenced Packets Count	Number of packets that reached the de-jitter buffer out of sequence (indicates also the level of re-sequencer activities)
Rx Flooded Buffer Count	The Buffer has detected above 180%. Buffer level has been normalized to mid-point by the engine
Loss of Connection	Loss of connection, the buffer has dropped to less than 10% and the receiver has reset the buffer

Statistics records can be reset by clicking on the "Reset" button (refer to Figure 3-12).

3.3.4.2 IP Statistics - Receive Buffer Level

This Buffer Level display is the graphical equivalence of the current receive buffer condition (shown on receive routes only). This example shows a buffer which is set to 150 ms nominal. In dependency on the delay jitter behavior of the network the actual level marker will swing around the nominal value. As long as the maker stays in the green area the buffer management can cope with this amount of deflection.

A high value of deflection indicates that the nominal buffer level is set too low. Increasing the value keeps the marker closer to the mid-point.



(i) A high deflection of the level marker indicates that the nominal buffer level may be too low. Increasing the nominal level reduces these deflections.



3.3.4.3 About Streams Tables (general)

In general, a Stream Table (1) is a list of IP-Stream configurations organized as table. In dependence on where a stream table is accessed it will appear as read-only table, like on the performance monitor page, or the table can be directly accessed for changing values and entries on the connection pages.



Figure 3-13: Shows a Stream Table with two active streams in read-only mode (Performance Monitor)

Streams Table Exposure Options

The exposure of the Stream Table is flexible and can be widely controlled by the user. Clicking on the little arrow on each of the columns opens a context menu and allows sorting the table ascending or descending. Another submenu provides tick boxes for controlling the columns visibility. In general the stream table exposure also depends on the size of the current browser window. The width of the columns can be adjusted by clicking between the columns and drag the border as appropriated.

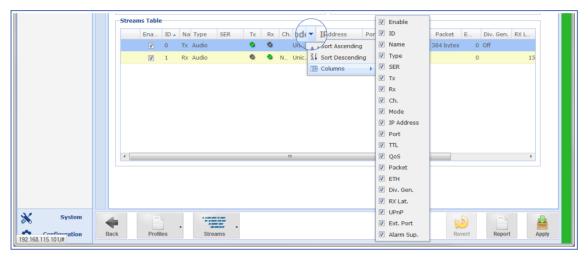


Figure 3-14: Exposure options on the Streams Table (connection page)



3.4 Main Menu – Connection

The connection page is the page where Connection Profiles can be created and IP streams can be enabled or disabled. This page also provides a Profile Wizard for a step-by-step procedure.

A connection profile is a set of configuration parameters related to IP connections. A profile stores audio Codec settings and IP stream configurations

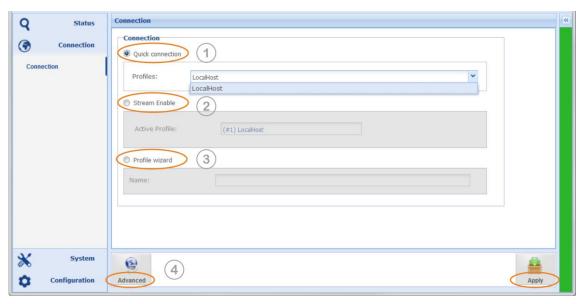


Figure 3-15: Shows the Connection Page

The WEB GUI offers three ways to create, manage and to apply a Connection Profile:

- 1. Quick Connection loads an existing profile (1)
- 2. Stream Enable allows enabling and disabling of streams of the current profile (2)
- 3. Profile Wizard provides a step-by-step procedure (3)
- 4. Advanced Configuration manual stream configuration procedure (4)
- Note: All changes made on the WEB GUI can be reverted and will not become active until it was applied to the Codec hardware!



Connection Page (continued)

Quick Connection (1)

A "Quick Connection" is basically a pre-configured and previously stored profile. This profile was created and merged from a Codec configuration and an IP stream setup. Before a profile can be used, a profile must have been created first.

Clicking on the little arrow opens a list with available profiles. Once the required profile was selected it can be applied to the Codec by clicking the "Apply" button on the bottom right corner.

Stream Enable (2)

This section allows enabling or disabling each single stream of a loaded profile. The profile on the screen shot below has one Rx and two Tx streams. The stream labelled as Tx1 is disabled. Clicking on the "Push to Enable" button will enable this stream immediately. It is not necessary to confirm this change. The "Apply" button disappears for this function.

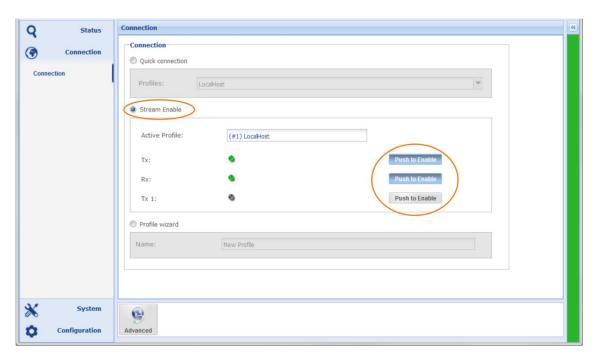


Figure 3-16: Shows the Connection Page - Stream Enable

Profile Wizard (3)

The "Configuration Wizard" guides to a step-by-step procedure creating a profile. It prompts for audio settings and for IP settings. Finally it creates a profile by merging both components. Once a profile was created it appears on the Quick Connection drop down list

Advanced Configuration (4)

The "Advanced" configuration procedure provides all configuration and management options on a single page. Other than the Configuration Wizard the "Advanced" configuration allows modifications on the currently applied profile and configuration. It also provides options and tools to edit already created profiles.



3.4.1 Profile Wizard – Creating a Profile

Profile Wizard - Profile Name

Selecting the radio box "Connection Wizard" on the connection page starts the Wizard. Firstly a profile name must be entered in the Name field. Once a name is entered the "Next" button becomes active. Clicking on this button opens the next page prompting the audio Codec settings.

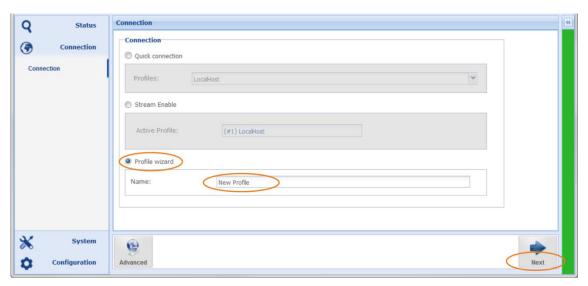


Figure 3-17: Shows the Profile Wizard's first page

Notes:		



3.4.2 Profile Wizard – Encoder Settings

The next page guides to the Audio Codec settings. The Horizon NextGen allows asymmetric audio configurations, hence a separate Audio -Encoder and -Decoder configuration page is provided (for Horizon NextGen only)

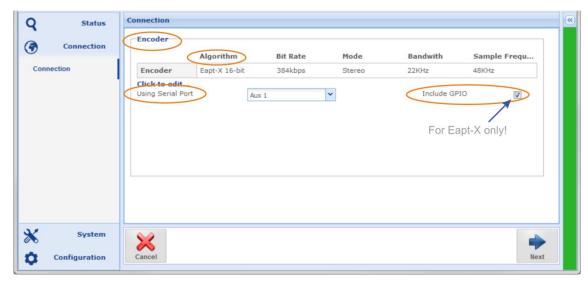


Figure 3-18: Encoder options of the profile wizard

Algorithm

Clicking on the Algorithm menu ("Codec disabled" on default) opens a drop down list of available algorithms – refer to next chapter for details.

Sembedded AUX Data

For the majority of audio algorithms (except Liner PCM) auxiliary data can be embedded into the audio stream. Once a suitable audio algorithm is selected and configured, the Serial Port drop down list becomes active. The embedded data channel accepts RS232 data up to 9.600Baud. Audio algorithms have baud rate constraints in dependence of the selected audio bit rate.

Include GPIO

Enabling this check box embeds the GPIO data into the audio data stream.

1 Note, only Eapt-X allows embedding GPIO data!



Profile Wizard - Encoder Settings (continued)

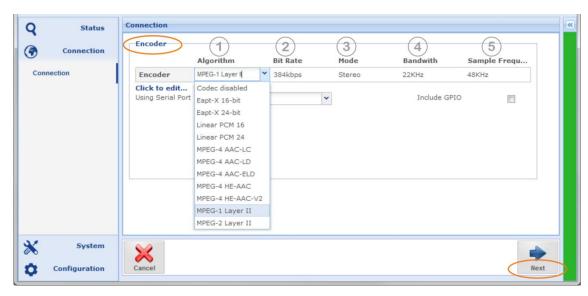


Figure 3-19: Shows the Encoder configuration page

Algorithm (1)

Clicking on the "Algorithm" field opens the drop down list offering the available audio codec formats. Currently Enhanced apt-X and Linear PCM are available. Select the desired format then click on the "Bit Rate" field.

Bit Rate (2)

Corresponding to the chosen audio format this drop down list presents the available bit rates. After selecting the bit rate, the "Mode, Bandwidth and resulting Sample Frequency" entries may be filled automatically in dependency of the chosen audio algorithm and bit rate.

Audio Mode, Bandwidth and Sample Frequency (3, 4, 5)

These fields are in read only mode for some algorithm and bit rate settings.

3.4.3 Embedded AUX Data

Aux data can be embedded in the Audio Data Stream. For the majority of audio algorithms (except Liner PCM) auxiliary data can be embedded. Once an audio algorithm is selected and configured, the Serial Port drop down list becomes active. The embedded data channel accepts RS232 data up to 9.600Baud. Audio algorithms may have baud rate constraints in dependence of the selected audio bit rate.

Include GPIO

Enabling this check box includes the GPIO data into the embedded aux data stream.

Note, only Eapt-X allows embedding GPIO data!



3.4.4 Profile Wizard – Decoder Settings

Once all parameters for the Encoder part have been set, click on the "Next" button to enter the configuration page for the Decoder path.

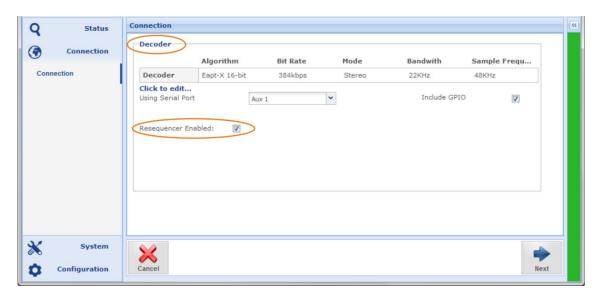


Figure 3-20: Shows the Decoder configuration page

The principal of the Encoder and Decoder configuration is almost identical. But there is one important setting option on the Decoder page: The Re-Sequencer check box – keep this enabled! This ensures that packets arriving out of order can be re-ordered inside the de-jitter buffer.

Decoder Packet Re-Sequencer

The Decoder can utilize the Packet Re-Sequencer to keep arriving packets in the right order even if they arrive in the wrong sequence because of the network delay jitter behavior. The Re-Sequencer needs a minimum number of packets in the buffer for performing efficiently. This value is set to a minimum of six (6) packets and cannot be changed. In consequence the de-jitter buffer size must be chosen in accordance with the packet size. The validation engine prompts you to modify this setting whenever a mismatch of packet size and buffer size is identified (also refer to section 3.4.8.1).

After completing the Decoder settings, click on the "Next" button to enter the IP Stream configuration page.

• For an ultra-low delay application in a managed network (nearly 0 ms delay jitter) the resequencer might be disabled in order to allow a minimum buffer size of three (3) IP packets.



3.4.5 Profile Wizard – IP Streams Configuration

Reaching this window within the Connection Wizard implies that your Codec settings are completed. The audio settings can be changed using the "Advanced" configuration option, but not within the Connection Wizard.

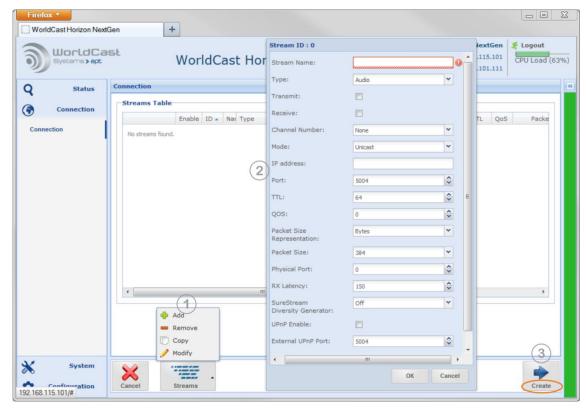


Figure 3-21: Shows the IP Stream configuration page with the stream setup window open

From the audio settings page the Wizard first presents an empty stream table.

Adding an IP Stream

Clicking on the "Stream Management" button (1) provides all options for creating and editing IP streams. Clicking on "Add" opens the Stream Configuration window (2). This Window provides all setting options for the desired IP connection. Once the first stream is completed a second or more streams can be added by clicking on the "Add" button again. Each stream gets a unique ID assigned by the system. This ID cannot be modified by users.

As long as the profile is not yet created a stream can be edited by double clicking on the stream or can be deleted by using the "Remove" function. The "Copy" function allows copying a selected stream.

If the "Cancel" button is clicked, all configurations will be deleted including the audio settings and the profile name.



3.4.6 Profile Wizard – Saving a Profile

After all streams were created they are now appearing on the Streams Table. The little blue marker on the table fields indicate that the stream was not yet saved in a profile and can be modified.

Finally the streams should be enabled before they can be merged into a profile. The most left column on the stream table presents the "Enable" checkbox.

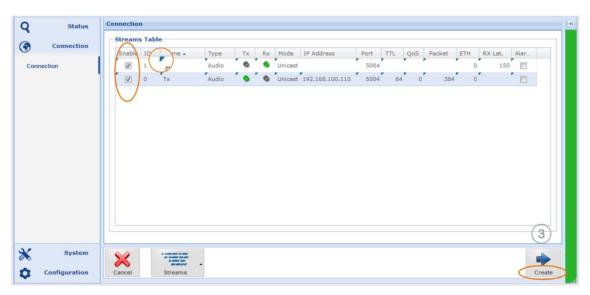


Figure 3-22: Shows two streams ready for being merged into a profile

Clicking on the "Create" button (3) now merges the audio settings with the IP stream configuration into the "New Profile". This completes the Connection Wizard and opens the "Advanced" configuration window.

Notes:		



3.4.7 IP Stream Configuration - general

The stream configuration window can provide many options for different stream types and operational modes. Adding a new stream shows the configuration window with basic options only. The default values of the advanced configuration window suit for many applications. However, if these must be inspected or changed the "Show Advanced Options" tick box allows access to all parameters.

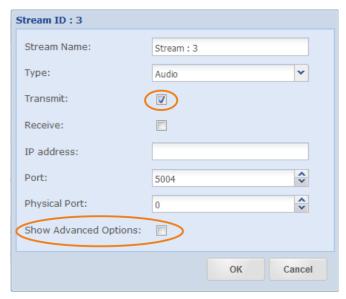


Figure 3-23: Shows the basic configuration options for Audio Tx

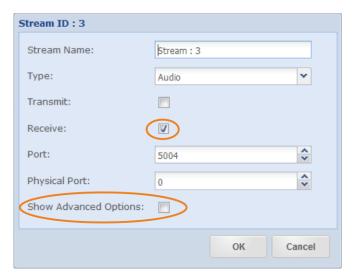


Figure 3-24: Shows the basic configuration options for Audio Rx

Enabling the "Show Advanced Options" tick box expands the window offering all configuration options. The following sections discuss the complete configuration.

Note: In dependence of the selected stream type, the options provided are different.



3.4.7.1 About Stream Types

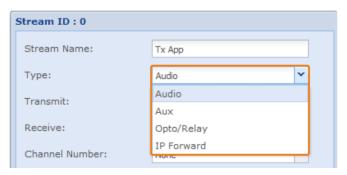


Figure 3-25: Shows the stream type selection menu

Audio Stream

An Audio stream is send via RTP/UPD. The possible streaming modes are:

- 1. Simplex (RX or TX)
- 2. Duplex (bi-directional)

AUX Data Stream

An AUX data stream is send via UDP datagrams only. This is different from the RTP/UDP mode and is not treated by the RTP engine at all. In consequence an AUX stream does not pass the de-jitter buffer on the receiving side. As a result, an AUX data stream is not synchronized with the audio content – it is always faster than the audio by the amount of the de-jitter buffer size.

1. Simplex only (Rx or TX)

Opto/Relay Stream

This stream type is from the same nature of the AUX Data stream.

1. Simplex only (Rx or TX)

IP Packet Forwarding

The IP packet forwarding mode is data agnostic and can consist of UDP or RTP/UDP payload (in dependence of the received and forwarded stream type).

The possible streaming modes are:

1. Simplex only (Rx or TX)



3.4.7.2 Audio Stream Configuration

The following screen shots show all options for a bidirectional audio stream.

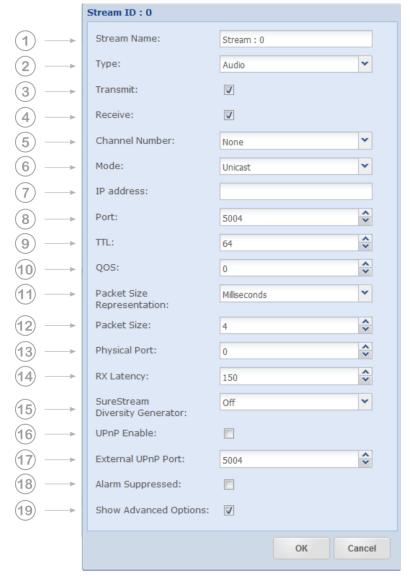


Figure 3-26: The IP Stream configuration window showing all available audio options

- In dependence of the selected stream type: Audio, AUX, Opto/Relay, IP Forwarding and the streaming mode: Transmit, Receive or bidirectional, the available options will change.
- (i) SureStream is a cost-option and will appear only if a license is applied to the Codec. For more details refer to the SureStream section in this document (4.0)



Audio Streams Configuration (continued)

1. Name: Enter the name for this stream

2. Type: Selected Stream Type is Audio

3. Select: Transmit or

4. Receive or both for duplex

Note: Duplex mode allows usually passing a NAT gateway without any further configuration: The port will be opened from "inside" and expect the return stream on the same port. In simplex mode, manual port forwarding must be configured in the gateway or the UPnP NAT feature must be used.

- 5. Channel Number: This selection is for IP Forwarding. On Receive Streams: If the selected stream type is set to "Audio" (pos. 2) the stream received from the selected IP port (e.g. 5004) is decoded as audio. If a channel number is selected, the stream is also "copied" to this channel and available for forwarding on a transmit stream (stream type: IP Forward on pos. 2). On Transmit Streams: If the selected stream type is set to "Audio" (pos. 2), the Channels cannot be selected.
- 6. Casting Mode: Unicast is a point-to-point connection. The stream can be received from one decoder only. Multicast allows point-to-multi point streaming and uses the IGMP protocol for managing multicast joins and leaves.
- 7. IP-Address: Enter the destination IP address or the hostname of the remote unit. For unicast: This is the unique IP address of the remote receiver or the gateway. For unicast: Entering a hostname requires active Dynamic DNS (refer to section 3.5.3.2). For multicast: Enter the multicast group address.
- 8. Port: This is the IP port number of the remote Codec (destination IP port). The number selected here means, that the stream must be received at the remote site on this port number. Each stream must use a separate port number. UDP/RTP port numbers are defined as even numbers in the 5000 range (5004/5006/5008 and so on); the odd numbers are reserved for the RTCP protocol and should not be used.
- 9. TTL: Time to live describes the number of network hops the packet can pass. Each passed hop reduces the TTL number by 1. If the TTL value becomes 0 and has not reached the destination, it will be deleted. This avoids flooding the network with "blind" packets.
- 10. QoS: Quality of Service: If the network supports QoS mechanisms (not the Internet), the here entered values (DSCP / DiffServ) can be evaluated by the QoS enabled routers. QoS defines a mechanism for prioritizing this RTP stream against other IP traffic in the network.
 - Note, QoS is a network feature, the Codec allows the QoS tagging of the stream only. The range is from 0 (off) to 63 (highest priority). It is important to know about the QoS implementation of the network, before entering a value not all values will be accepted by the network router.
- 11. Packet Size Representation: A packet size can be described in Bytes/Packet or in (audio) Time/Packet (packet time, p-time). The option "Full Frame" is required for all framed algorithms. Framed algorithms are all MPEG formats; these formats define the packet size in accordance with the algorithm settings.



Audio Stream Configuration (continued)

12. Packet Size: Packet size describes the size of the payload in the UDP packet. It can be selected in bytes per packet or time per packet for all non-MPEG algorithms. For MPEG algorithms, use "Full Frame". If p-time is the representation mode, the value in milliseconds describes the amount of audio in a packet. The recommendation is 4ms or higher – also less than 4ms is possible. Refer to the description below.

About Packet Sizes

A small packet size allows a lower latency transmission, but adds significant packet overhead into the network.

A large packet size need more time to get "loaded" with payload and adds latency into the link. The packet overhead is significant lower.

It depends on the network which packet size can be used. A lower performing network may require a larger packet size, while a high performance network can cope with very small packets.

The Codec engine can create a number of unicast streams. Streams with a small packet size require more engine power as larger packet sizes. The CPU utilization bar on the top frame of the GUI gives an indication about the available performance.

- 13. Physical Port: Select the physical ETH port (0 or 1) for this particular stream. Both ports can be used.
- 14. SureStream Diversity Generator: This allows setting the diversity generator level for SureStream component streams in Encoder Mode (Tx). It should be used in situations where more than one component streams are connected to the same network via the same ETH port. This setting ensures that the stream diversity is maintained under this condition (refer to section: 4.2.1)
- 15. RX Latency: This is the setting of the de-jitter buffer in Decoder Mode (Rx). It describes the buffer size in time. The required buffer size depends on the network performance and the packet size. The goal is to have an appropriate timing window able to cope with the delay jitter in the network and maintaining the minimum number of packets required for reliable operation. The minimum number of packets is set to 6 packets (with resequencer enabled). If the packet size is represented as p-time, the calculation is obvious. For low latency: 6 packets at 4ms = 24ms plus delay jitter of the network ends up in approx. 30-40ms in a good managed network.
- 16. UPnP Enable: This check box enables the UPnP IGD feature (refer to section 3.5.3.3)
- 17. External UPnP Port: If UPnP is enabled, on default the internal port equals the external port. This is a 1:1 port mapping performed in the router. In some cases it might be necessary reconfiguring this. This setting allows an individual port mapping. It is recommended not to change the 1:1 assignment without good reason.
- 18. Alarms Suppressed (hidden in this view): Enabling this check box suppresses all alarms generated by this stream. Sometimes it is useful suppressing alarms on a stream which are not applicable in the particular situation. This can be enabled for each stream individually.
- 19. Show Advanced Options: Allows changing from "Basic Options" to "Advanced Options". This tick box expands the configuration window.



3.4.7.3 AUX data or Opto/Relay Stream Configuration (Tx)

Creating an AUX or GPIO data stream follows the same principal as described for the audio stream. An Aux data stream is an UDP stream for transmit or receive the RS232 or GPIO data. An Opto/Relay stream sends the switch input commands or receives commands and triggers the corresponding relays – the options on the configuration window are the same for both data types.

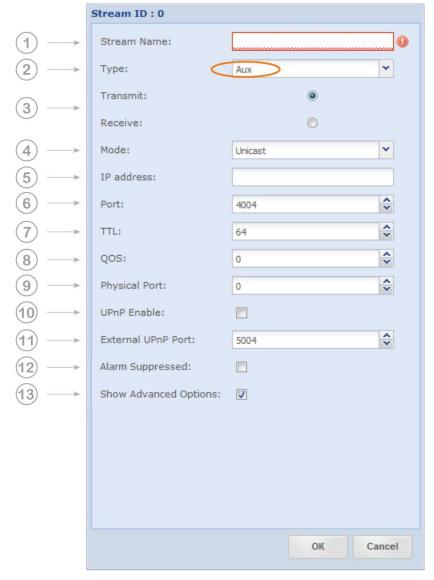


Figure 3-27: Shows the configuration options for AUX or Opto/Relay streams



AUX data or Opto/Relay Stream Configuration (Tx) (continued)

- 1. Name: Enter the name for this stream
- 2. Type: Select Stream Type: AUX or Opto/Relay
- 3. Select: Transmit or Receive (no duplex mode possible)
- 4. Casting Mode: Unicast is a point-to-point connection. The stream can be received from one decoder only. Multicast allows point-to-multi point streaming and uses the IGMP protocol for managing multicast joins and leaves.
- 5. IP-Address: Enter the destination IP address or the hostname of the remote unit. For unicast: This is the unique IP address of the remote receiver or the gateway. For unicast: Entering a hostname requires active Dynamic DNS (refer to section 3.5.3.2). For multicast: Enter the multicast group address.
- 6. Port: This is the IP port number of the remote Codec (destination IP port). The number selected here means, that the stream must be received at the remote site on this port number. Each stream must use a separate port number. UDP port numbers are defaulted by the GUI as even numbers in the 4000 range (4004/4006/4008 and so on). The odd numbers can be used for UDP streams if necessary; the GUI allows overwriting the default numbers.
- 7. TTL: Time to live describes the number of network hops the packet can pass. Each passes hop reduces the TTL number by 1. If the TTL value becomes 0 and has not reached the destination, it will be deleted. This avoids flooding the network with "blind" packets.
- 8. QoS: Quality of Service: If the network supports QoS mechanisms (not the Internet), the here entered values (DiffServ) can be evaluated by the QoS enabled routers. QoS defines a mechanism for prioritizing this RTP stream against other IP traffic in the network. Note, QoS is a network feature, the Codec allows the QoS tagging of the stream only. The range is from 0 (off) to 63 (highest priority). It is important to know about the QoS implementation of the network, before entering a value not all values will be accepted by the network router.
- 9. Physical Port: Select the physical ETH port (0 or 1) for this particular stream. Both ports can be used.
- 10. UPnP Enable: This check box enables the UPnP IGD feature (refer to section 3.5.3.3)
- 11. External UPnP Port: If UPnP is enabled, on default the internal port equals the external port. This is a 1:1 port mapping performed in the router. In some cases it might be necessary reconfiguring this. This setting allows an individual port mapping. It is recommended not to change the 1:1 assignment without good reason.
- 12. Alarms Suppressed: Enabling this check box suppresses all alarms generated by this stream. Sometimes it is useful suppressing alarms on a stream which are not applicable in the particular situation. This can be enabled for each stream individually.
- 13. Show Advanced Options: Allows changing from "Basic Options" to "Advanced Options". This tick box expands the configuration window.



3.4.7.4 About Packet Size of AUX Data and Opto/Relay Streams

Serial (Aux) data packet size is set automatically by the unit – this is not a configurable value. It is read from each serial port to a maximum block size of 1400 bytes (UDP MTU) and is sent in UDP packets with a maximum interval of approximately 16 ms.

For example, a constant 9600 baud serial stream will send approximately 16 bytes per packet on an aux data stream in UDP.

For higher bitrates, this average number of bytes per packet increases

UDP packets for Opto data are sent every 15 ms with a fixed amount of data therein. This size and packet interval is not configurable.

3.4.7.5 IP Forwarding

About IP Forwarding

IP Forwarding is payload agnostic.

It allows forwarding and simultaneous decoding a received audio stream to another destination via the streams table (RTP/UDP). In a common situation a received stream will be decoded as audio and forwarded to another destination which is configured in the streams table.

Also any UDP stream which contains non-audio data can be received by the Codec and will forwarded to the final destination device which can be any type of equipment.

Stream characteristics

In IP Forward mode, the forwarding device does not manipulate the received stream. The stream configuration is done on the sender site (packet size, payload format etc.).

Operational Modes:

- 1. Receive Audio Stream decode and forward (Rx)
- 2. Forward Audio Stream (Tx)
- 3. Receive non-Audio Stream (PAD data or others) forward to end device

Notes:			



3.4.7.6 Receive Audio Stream, Decode and Forward

With this configuration an audio stream is received and decoded. Simultaneously it is made available in Channel Number 1 for IP forwarding.

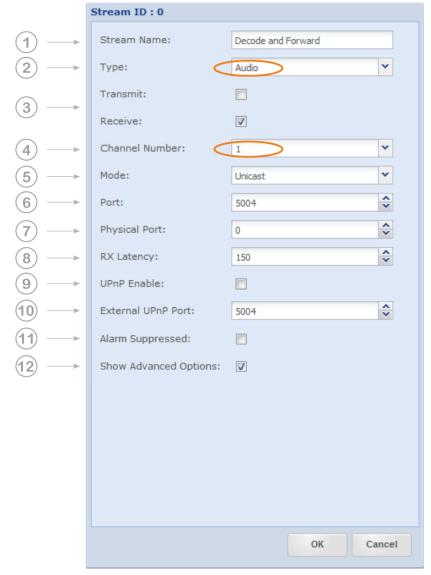


Figure 3-28: Shows the configuration options for Decode and Forward



Receive Audio Stream, Decode and Forward (continued)

1. Name: Enter the name for this stream

2. Type: Select Stream Type: Audio

3. Select: Receive

- 4. Channel Number: Six data channels are provided for stream forwarding. A channel represents the forwarding destination of a received stream or the data source for a transmit stream (in forward mode). Select a channel number into which the received stream should be copied.
- 5. Casting Mode: Unicast is a point-to-point connection. The stream can be received from one decoder only. Multicast allows point-to-multi point streaming and uses the IGMP protocol for managing multicast joins and leaves.
- 6. Port: Select a port number on which the stream must be received (defined on the sender). For audio stream this will be a port in the 5000 range (refer to section 3.4.7.2).
- 7. Physical Port: Select the physical ETH port (0 or 1) for this particular stream. Both ports can be used.
- 8. RX Latency: This is the setting of the de-jitter buffer in Decoder Mode (Rx). It describes the buffer size in time. The required buffer size depends on the network performance and the packet size. The goal is to have an appropriate timing window able to cope with the delay jitter in the network and maintaining the minimum number of packets required for reliable operation. The minimum number of packets is set to 6 packets (with resequencer enabled). If the packet size is represented as p-time, the calculation is obvious. For low latency: 6 packets at 4ms = 24ms plus delay jitter of the network ends up in approx. 30-40ms in a good managed network.
- 9. UPnP Enable: This check box enables the UPnP IGD feature (refer to section 3.5.3.3)
- 10. External UPnP Port: If UPnP is enabled, on default the internal port equals the external port. This is a 1:1 port mapping performed in the router. In some cases it might be necessary reconfiguring this. This setting allows an individual port mapping. It is recommended not to change the 1:1 assignment without good reason.
- 11. Alarms Suppressed: Enabling this check box suppresses all alarms generated by this stream. Sometimes it is useful suppressing alarms on a stream which are not applicable in the particular situation. This can be enabled for each stream individually.
- 12. Show Advanced Options: Allows changing from "Basic Options" to "Advanced Options". This tick box expands the configuration window.



3.4.7.7 Forwarding an IP Stream (Tx)

A forwarded stream must have been received and made available first (refer to section 3.4.7.6). With this configuration an already received stream is forwarded to the next or final destination. The IP Forwarding option is data agnostic. The configuration for audio or non-audio data is the same.

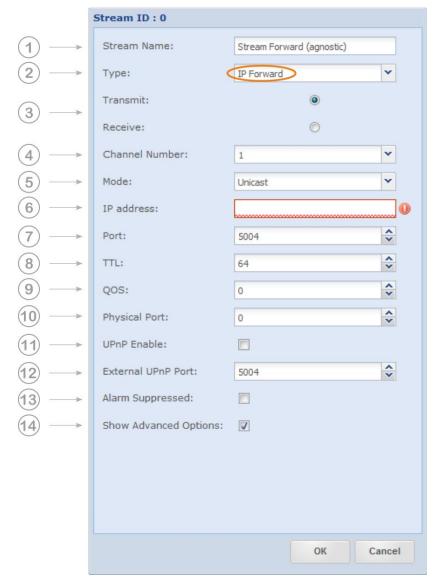


Figure 3-29: Shows the configuration options for IP Forwarding

For "IP Forward" the data source is the "Channel Number"! The example above reads from channel 1 and forward the IP stream.



Forwarding an IP Stream (Tx) (continued)

1. Name: Enter the name for this stream

2. Type: Select Stream Type: IP Forward

3. Select: Transmit

- 4. Channel Number: Six data channels are provided for stream forwarding. A channel represents the forwarding destination of a received stream or the data source for a transmit stream (in forward mode). Select a channel from which the stream should be forwarded (this is the content source).
- 5. Casting Mode: Unicast is a point-to-point connection. The stream can be received from one decoder only. Multicast allows point-to-multi point streaming and uses the IGMP protocol for managing multicast joins and leaves.
- 6. IP-Address: Enter the destination IP address or the hostname of the remote unit. For unicast: This is the unique IP address of the remote receiver or the gateway. For unicast: Entering a hostname requires active Dynamic DNS (refer to section 3.5.3.2). For multicast: Enter the multicast group address.
- 7. Port: This is the IP port number of the remote Codec (destination IP port). For audio stream this will be a port in the 5000 range (refer to section 3.4.7.2 pos. 8). For non-audio data it should be in the 4000 range (refer to section 3.4.7.3 pos. 6)
- 8. TTL: Time to live describes the number of network hops the packet can pass. Each passes hop reduces the TTL number by 1. If the TTL value becomes 0 and has not reached the destination, it will be deleted. This avoids flooding the network with "blind" packets.
- 9. QoS: Quality of Service: If the network supports QoS mechanisms (not the Internet), the here entered values (DiffServ) can be evaluated by the QoS enabled routers. QoS defines a mechanism for prioritizing this RTP stream against other IP traffic in the network. Note, QoS is a network feature, the Codec allows the QoS tagging of the stream only. The range is from 0 (off) to 63 (highest priority). It is important to know about the QoS implementation of the network, before entering a value not all values will be accepted by the network router.
- 10. Physical Port: Select the physical ETH port (0 or 1) for this particular stream. Both ports can be used.
- 11. UPnP Enable: This check box enables the UPnP IGD feature (refer to section 3.5.3.3)
- 12. External UPnP Port: If UPnP is enabled, on default the internal port equals the external port. This is a 1:1 port mapping performed in the router. In some cases it might be necessary reconfiguring this. This setting allows an individual port mapping. It is recommended not to change the 1:1 assignment without good reason.
- 13. Alarms Suppressed: Enabling this check box suppresses all alarms generated by this stream. Sometimes it is useful suppressing alarms on a stream which are not applicable in the particular situation. This can be enabled for each stream individually.
- 14. Show Advanced Options: Allows changing from "Basic Options" to "Advanced Options". This tick box expands the configuration window.



3.4.8 Advanced Configuration

The "Advanced" configuration page can be opened directly from the Connection Page, from a short cut on the Status Page or after the Configuration Wizard procedure was completed.

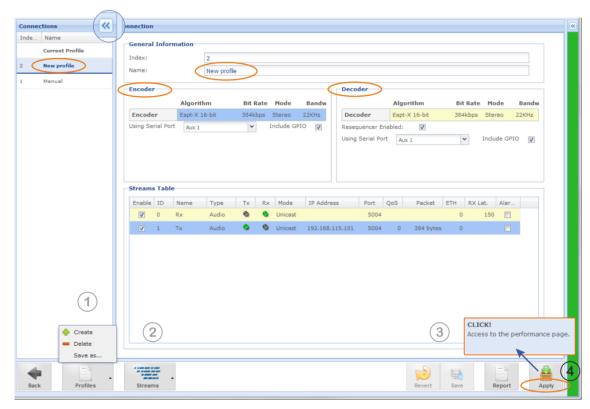


Figure 3-30: Shows the Advanced configuration window

The Connection Wizard as described earlier has created the "New Profile" from the audio settings and the IP stream configurations. The "New Profile" now appears on top of the list of profiles on the left hand side (Current Profile). This list of profiles is also accessible with the "Quick Connection" tool. A click on the little arrow on top closes the profile list.

The Advanced configuration page offers all options for creating new profiles, copying a profile or modifying an existing one or deleting profiles from the list. It also allows changing the currently applied (and active) profile on the fly.



Current Profile

"Current Profile" shows the currently active profile name. On the example above the current profile is "New Profile". Clicking on the headline "Current Profile" shows the currently loaded profile on the configuration page in read-only mode. This cannot be changed at this stage. Clicking on "New Profile" in this section loads the configuration of this profile on the configuration page and can be edited but not deleted! If this profile was edited it MUST be applied to the unit in order to save it. Saving the "Current" profile without applying it to the hardware is not possible, but it can be copied by using the "Save as..." function (1).

1 Note: Applying a modified "Current" profile interrupts or disturbs an active transmission.

Second Profile

Clicking on any other than "Current" profile in the list loads the configuration into the main Connection Page. At this stage the profile can be modified (2) and saved by a click on the "Save" button on the tool bar (3). This action does not affect the currently running profile. The modified profile is now stored and can be applied to the hardware by clicking on the Apply button (4).

Creating and Deleting a new Profile

Clicking on the "Create" button (1) creates a new and empty profile. A new configuration can now be merged and saved to a new profile. Clicking the "Delete" button deletes a selected profile from the list.

Copying a Profile

After a profile was selected from the list and loaded into the Connection Page it can be copied by using the "Save as..." function (1). A new name must be applied to this profile.

Applying a Profile to the Codec

Clicking on a profile in the profile list loads the configuration into the Connection Page. Clicking the "Apply" button (4) loads the profile to the Codec hardware and appears as "Current Profile" in the list. This action always interrupts the IP transport.

(1) After a profile was applied to the hardware a popup alert (3) appears providing a short cut link to the Performance Page. This popup alert stays for several seconds and will disappear after a time out.



3.4.8.1 Validation Engine

The Validation (Valex) Engine protects the user against incorrect inputs and obvious configuration mistakes. It validates IP stream configurations made on the local unit in terms of consistency and correctness.

The Valex Engine cannot judge e.g. wrong destination IP addresses, or inconsistent configurations on a local encoder compared with a remote decoder.

The image below shows and example about how the Valex Engine intervenes and how it presents information about mistakes on the GUI.

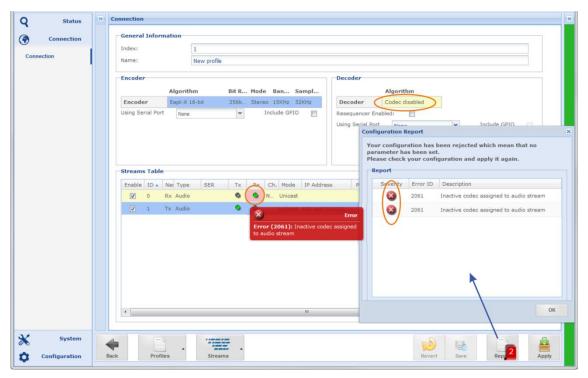


Figure 3-31: Shows how the Validation Engine presents error conditions and warnings

The detected mistake on this example is the disabled Decoder while an Rx stream is enabled and assigned to an ETH port. The Valex Engine highlights the mistake as error on all affected instances; i.e., on the "Codec disabled" setting and on the enabled Rx stream on the table. A mouse over event pops up a clear error description.

Whenever a mistake is detected the Validation report appears automatically and lists all instances where the mistake takes effect.



Validation Engine (continued)

The image below shows another example about how the validation engine warns for critical configurations.

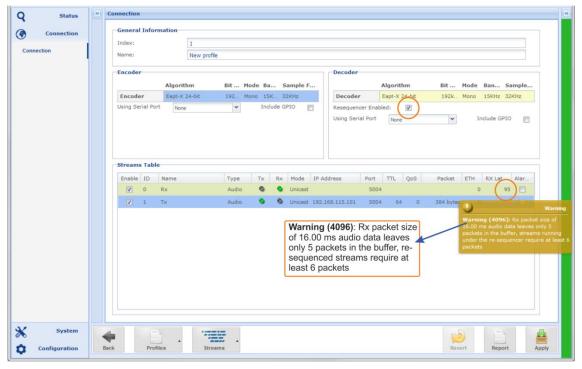


Figure 3-32: Shows a yellow warning from the Validation Engine

The Validation Engine identified a problem on this profile configuration. On this configuration example the de-jitter buffer was set to 95 ms. The Valex Engine has calculated 16 ms of audio in a packet and indicates that the buffer must take at least 6 packets in order to get the full performance from the re-sequencer. Either the buffer size must be set to 96 ms (6x $16 \, \text{ms} = 96 \, \text{ms}$) or the re-sequencer should be disabled (not recommended).

This is a "Yellow" warning and not a critical alarm. The validation report does not pop up automatically, but with a mouse over on the highlighted fields the warning will be presented.

Due to the nature of the Validation Engine, it cannot foresee a misconfiguration especially on a Rx stream before the configuration was applied and becomes active. On the example above the Valex Engine must firstly receive packets before the required buffer size can be calculated.



3.4.9 Digital MPX Link over IP - AES FS 192 kHz

This transmission mode is an option and is available only if the license has been applied to the unit. How to apply a license is described in "Main Menu – System".

A digital MPX signal at FS 192 kHz can carry a frequency spectrum of up to 96 kHz. A good recommendation is to provide a data path bandwidth of max. 80 to 96 kHz.

In the MPX transmission mode of the Codec card accepts sample rates up to 192 kHz providing a data path of 88 kHz. The digital MPX signal is sampled with FS 192 kHz. The transmission format is always linear PCM, and the user can select the bit resolution of 16 or 24 Bit.

The audio format and stream configuration basically follows the standard procedure as described in section 3.4.2 and 3.4.9. For digital MPX only linear PCM 16 or 24 Bit must be used.

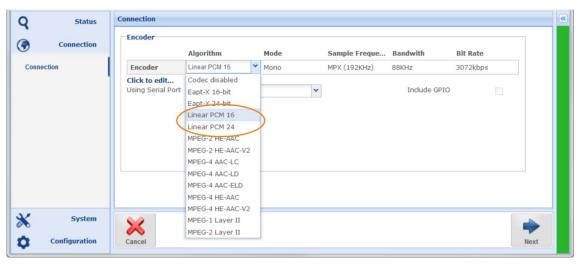


Figure 3-33: Shows the audio format selection list – Linear PCM provides the MPX option

Only linear PCM MONO offers FS 192 kHz for digital MPX!

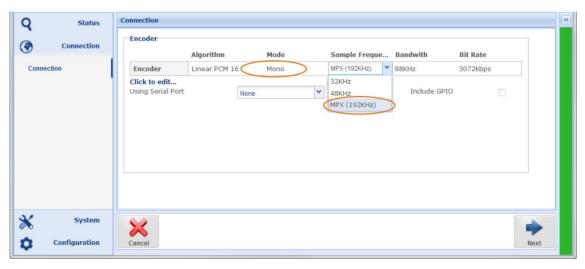


Figure 3-34: Linear PCM in MONO provides FS 192 kHz



3.4.9.1 Digital MPX Link – Stream Configuration

This transmission mode is an option and is available only if the license has been applied to the unit. How to apply a license is described in "Main Menu – System".

Basically the stream configuration follows exactly the procedure of generating an audio IP stream. Due to the high bit rate of the high sample frequency the packet time cannot exceed 3 ms for a 1 6 Bit transmission and 2 ms for a 24 Bit transmission. The maximum payload of a packet is 1350 Byte.

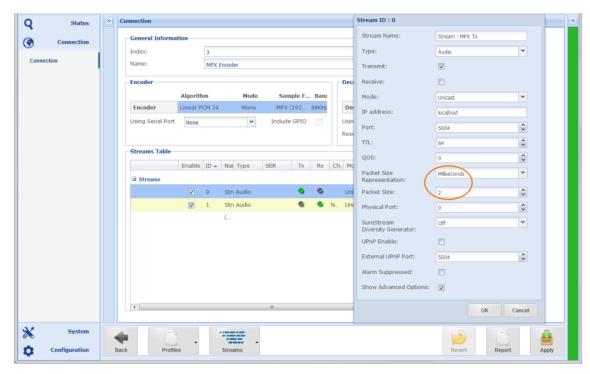


Figure 3-35: Digital MPX over IP at 24 Bit and FS 192 kHz - packet time: 2 ms (1152 Bytes)

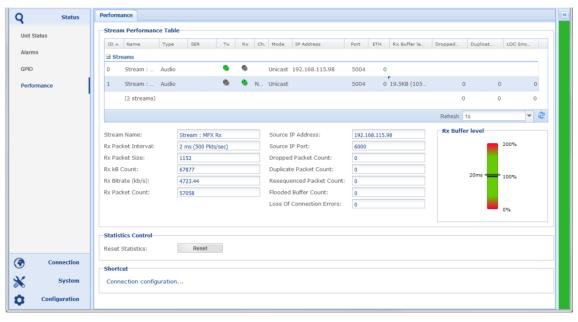


Figure 3-36: Performance monitor of the receive stream (~4.750 kbps, 500 packets/s)



3.4.9.2 Digital MPX Link – Technical Specifications

- Digital MPX input, AES-3 format (mono, left channel only)
- 24 Bit resolution digital I/O only
- 192 kHz Fs Bandwidth input/output: 88 kHz
- Linear transmission with 16 Bit and 24 Bit resolution
- Bit rates (payload): PCM 16 Bit mono 3.072 kbps, PCM 24 Bit mono 4.608 kbps
- IP Packet time max: 3 ms at 16 bit, 2 ms at 24 Bit (max packet size 1152 bytes)
- Advanced error concealment algorithm, minimizing negative effects of packet losses on the FM deviation – as standard
- Fully compatible with existing reliability mechanisms like SureStream and IP packet forwarding
- Sample rate converter on Input and Output
- Meadphone monitoring of L+R/2 (mono mix)

3.4.9.3 Digital MPX Link – Typical Application

Central signal processing and digital MPX generation

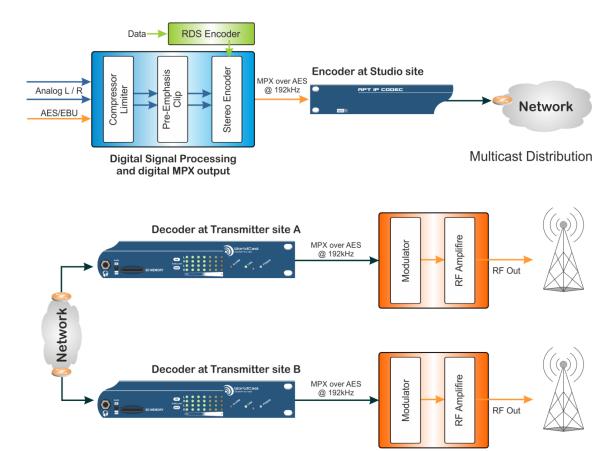


Figure 3-37: Shows a typical MPX distribution application



3.5 Main Menu – System

This section provides the general system setup items and sub menus.

3.5.1 Date and Time

The Horizon NextGen runs its own internal timing reference. This reference is always UTC. This UTC reference can be set either manually or via the NTP Client. The **System Time** where all timing related actions are referring to is derived from this UTC timing reference taking into account the Time Zone shift.

System current date and time

This section is read only and shows the current system date and time calculated from the selected timing references below.

Set Date and Time

Date and Time entered here set the System Time in reference to the selected Time Zone: Manually entered time \pm - Time Zone = UTC timing reference UTC \pm - Time Zone = System Time

Set System Time Zone

Select the time zone where the unit is installed.

The Time Zone setting influences the local System Time. The System Time is calculated from the UTC and the Time Zone shift. If the Time Zone is set correctly, the Date/Time entry re-sets the UTC timing reference correctly. If the Time Zone is set wrong, then the UTC time is calculated accordingly: NTP time = UTC timing reference UTC timing reference +/- Time Zone = System Time

NTP Client Settings

This entry allows enabling/disabling the NTP client (Network Time Protocol) as well as entering the NTP server IP address.

If the NTP Client is enabled ("Yes") the internal timing reference will be synchronized with the NTP time reference (always UTC). This synchronization action is a single process whenever the client is enabled. The NTP Client starts the synchronization process after a randomly configured delay. Once the NTP reference was applied to the internal timing reference the NTP protocol does not periodically re-synchronize the internal time. It rather adjusts the system clock to stay in sync with the NTP reference. In cases where the timing is totally out of sync from the NTP reference, a re-synchronization can be forced be disabling and re-enabling the NTP Client.

- It is important to set the Time Zone correctly; otherwise the NTP Client (when enabled) may change the System time unintended:
- (1) Any setting on this page must be saved before it becomes active on the hardware.



3.5.2 User Management

Web Accounts

The user management offers a two-level hierarchy. The Administrator account allows full access to the entire system, while the Read-Only Account (Guest) may be used for monitoring purposes only.

Do not forget to change the default password before connecting to an unprotected network!

The user management allows only one Admin user being logged in. If another Admin user tries to connect from another seat while the first Admin user is logged in, this second LogIn attempt will be treated like a Guest user (read only).

3.5.3 Network Settings

This section consists of three pages organized by three tabs on the top:

- 1. Network settings
- 2. Dynamic DNS
- 3. UPnP configuration.

3.5.3.1 Network Page

This page shows the manually entered network configuration and the current network settings provided by a DHCP server, if enabled.

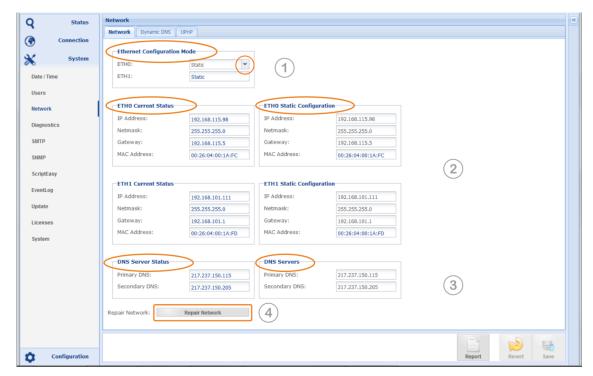


Figure 3-38: Shows the options on the Network configuration page Text entries in grey are read-write; text in blue is read-only and set by the system



Network Page (continued)

(1) Ethernet Configuration Mode

For IP interface ETH0 the mode can be chosen:

- 1. Static Mode for manual IP address settings
- 2. DHCP Mode that takes the IP settings from a DHCP server
- The IP interface ETH1 is locked to Static IP address!

Sections (2 & 3) show the "Current" Status and the "Static Configurations" for both ETH ports even that ETH1 is locked to Static Mode. In dependence of the configuration mode the "Current Status" shows either the static configuration (manually edited) or the configuration applied by a DHCP server while keeping the static settings in memory.

(2) Static configuration for ETH0/1

- 1. IP Address these are the static (non-DHCP) IP addresses for your unit
- 2. Netmask a static Netmask in accordance with your network configuration
- 3. Gateway necessary if a gateway is configured in the network
- 4. MAC address displayed (read only)

(2) Current Status for ETH0/1

These currently valid values are set by either the DHCP server (in DHCP mode) or taken from the static configuration values in static mode. If the DHCP client is active, the static configuration stays available and must not be entered again when the mode has changed to "Static".

(3) DNS Server Status

- 1. Primary DNS from static or DHCP mode
- 2. Secondary DNS from static or DHCP mode
- (i) On static IP address settings, these DNS addresses must be entered manually. In DHCP mode it will read from the DHCP server and displayed.

(4) Repair Network

Clicking on this button reapplies the network settings to the unit. It brings the ports down and up again. Bringing the ports down and back up also has effect of resetting equipment that is external to the system (routers etc.).



3.5.3.2 Dynamic DNS

Dynamic DNS is a method of automatically updating a name server in the Domain Name System (DNS) with the active DNS configuration of a configured hostname, address or other information.

The NextGen Codec devices offer an integrated Dynamic DNS client allowing communication with the most popular Dynamic DNS service providers. With this service enabled, each network interface of the audio codec can be addressed (in a WAN environment) independently of its allocated numeric IP WAN address. Each interface should be configured with a unique hostname that can be used instead of a destination IP address for WAN-based audio streaming.

Usually on xDSL lines, the DSL router receives an allocation of IP address by the Internet service provider. The assigned address may either be fixed (*static*), or may change from time to time (*dynamic*).

① Once a hostname is registered and applied to an interface this hostname can be used on the streams table as destination address. Regardless of where the unit is (globally) connected, the stream will find this Codec automatically.

The screen shot below shows the Dynamic DNS configuration page. Before this DDNS client can be used, at least one hostname must have been registered on one of the DDNS services provided on the drop down list (1).

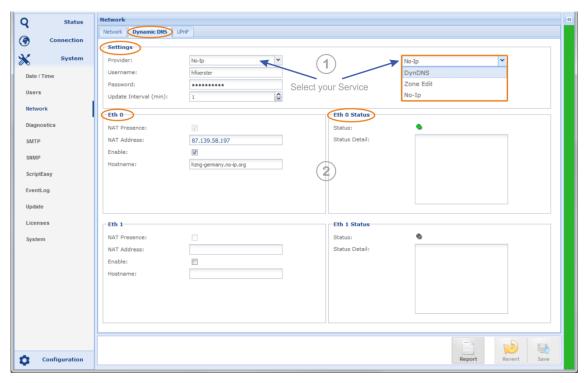


Figure 3-39: shows the Dynamic DNS client settings and status information



Dynamic DNS (continued)

The example above uses the No-IP service (www.noip.com). With the username and the password the client connects to this DDNS service provider if the "Enable" checkbox is ticked on one or both ETH ports and the entries were saved.

The registered hostname for the Codec interface for this example is: hzng-germany.

The full hostname entry for the No-IP account is: hzng-germany.no-ip.org.

Once DDNS is enabled, the software client automatically enters the external IP address of the current (xDSL) Link in the "NAT Address" field (2) – this is for information only (read-only field). Further the status field presents messages from the DDNS provider if applicable. This can be error messages or other information.

The stylized LED on top of this field indicates the status of the DDNS service:

Green: active and ok Red: active but not ok

Grey: inactive (not enabled)

Example of an error message from the status field:

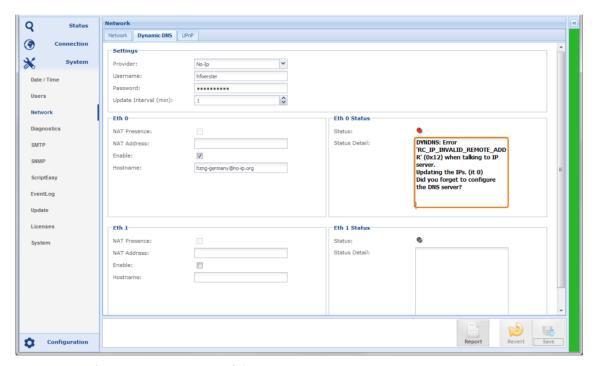


Figure 3-40: Shows an error message of the DDNS status

This error message was caused by having no DNS server information entered in the network configuration page. The messages are almost in clear words and guide to the current misconfiguration.



3.5.3.3 NAT Traversal Mode – UPnP

The NAT traversal mode enables the codec to request port mappings from an Internet Gateway device using a sub-section of the UPnP protocol (Universal Plug and Play) called the Internet Gateway Device Protocol (IGD Protocol).

IGD is the only part of the UPnP protocol which is used in the Codec device.

When enabled in a router, this allows an UPnP-enabled device to request port mappings to be added and removed automatically without the need to maintain a configuration on the router itself - allowing for ease of maintenance and a single device for configuration. Router configurations do not need to be backed up or transferred etc.

IGD protocol, provided by UPnP, ensures that port mapping operations are "hidden" from the user and allows a seamless plug and play operation. No server assistance or specific network infrastructure is required

On the WEB GUI, there are two instances requiring entries from the user for UPnP. For audio streaming, the configuration has to be done on the stream configuration window (refer to section 3.4.7). For general settings the UPnP page provides the controls as shown on the screen shot below.

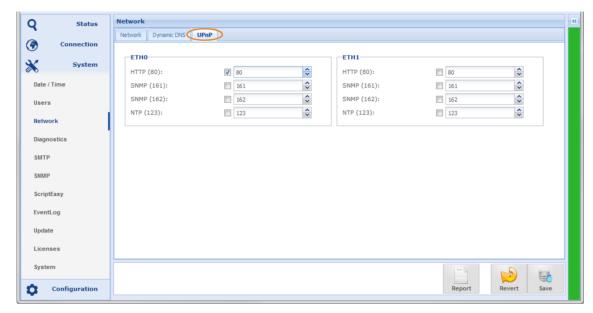


Figure 3-41: shows the general UPnP port settings

This page allows the manual port mapping of common services utilized by the Codec.

At least forwarding of port 80 must be enabled for a Codec access from the WAN (from external). Each Codec connected to the same Gateway must be configured individually. A unique port number must be assigned to each device only. E.g., for port 80:

Single Codec - 80/80 (external port 80 is forwarded to the internal port 80)

Multiple Codecs - A: 80/8080 B: 80/8081 and so on. On the WEB browser any other port than port 80 must be added to the external IP address: e.g. 217.117.10.10:8080.

This rule is the same for all ports listed on the screen shot.



3.5.4 DNS Server - Look Up

DNS look up allows the connection to the unit in a local LAN without knowing the current IP address! Using mDNS requires Zeroconf installed on the PC. The easiest solution for this is to install Apple's implementation of Zeroconf for Windows (Bonjour Service). In the case that DHCP must be used in order to get a network access, the DNS look up feature may help to identify the current IP address of the unit that was dynamically applied. With DNS look up the unit can be accessed by using the so called mDNS name for the browser navigation.

- Your management PC must be connected to the same network as your codec unit and "Zeroconf" must be installed on your PC".
- mDNS Look Up is enabled on ETH0 only

For Horizon NextGen units the mDNS name has this format:

For System Release 1.0.4:

wcsphoenixSerialNumber.local – e.g. for a Horizon NextGen with serial number H000139: http://wcsphoenixH000139.local

Since System Release 1.1.0:

The syntax has been changed on SR 1.1.0

wcs-SerialNumber.local – e.g. for a Horizon NextGen with serial number H000139:

http://wcs-H000139.local

The serial number is available on all production units on a label at the side of Horizon and IP Decoder units. The "Local" domain is the standard domain of your PC.

3.5.5 Local Loopback IP Address

With system release 1.4.0 the unit can resolve the local IP address of the selected interface by using the keyword "localhost" as the destination in the transmit stream. This feature allows a quick check of configurations by streaming to the local address, which equals a local IP loop. This works for ETHO and ETH1.

3.5.6 Diagnostic Page

Restart

This forces a unit Reboot – the unit will reboot without configuration changes.

Default Configuration

Resets the System and set all Configurations to factory defaults but keeps the IP address settings.

The "Reset System to Default Configuration" action deletes all profiles ScriptEasy Scripts (save first!) and all other user configurations BUT NOT the IP address!

FTP Service

This is an administrator function – FTP should be <u>off</u> all the time due to security considerations. FTP is only required when ScriptEasy (optional) uploads a script to the Codec. After a reboot of the system the FTP service will be disabled on default.

Please ensure that FTP is disabled for normal operation!



3.5.7 SMTP (Mail Setup)

The Horizon NextGen supports email alerts on pre-configured operational conditions. E.g. any alarm condition can send an email message to one or more addresses.

(i) SMTP sends email on ETH0 only (not on ETH1).

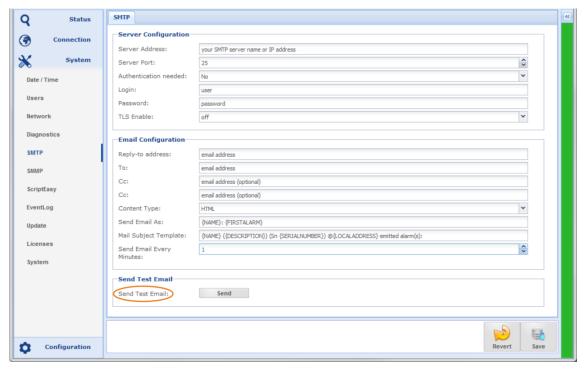


Figure 3-42: Shows the SMTP (email) configuration page

Basically this configuration page follows a standard procedure for setting up an email account. Once this configuration is completed and tested the mail alert feature can be used on the alarm configurations. This page provides an option for sending a test mail. The content of an alert email consist of system variables that cannot be changed. A variable is inside a curly bracket. All other content can be changed or added if desired.

E.g.: {NAME} ({DESCRIPTION}) can also be: (My {NAME}) (unit type: {DESCRIPTION})

Standard System Variables:

- 1. {NAME}: Unit name which was applied to the unit
- 2. {FIRSTALARM}: Alarm Status (Alarm active / Alarm cleared)
- 3. {DESCRIPTION}: Information about unit Type i.e., HorizonNextGen
- 4. {SERIALNUMBER}: Serial number of alarming unit
- 5. {LOCALADDRESS}: IP address of port ETH0 of alarming unit



3.5.8 SNMP

SNMP has been enabled as standard on all NextGen Codecs. WorldCast Systems' SNMP implementation supports both SNMPv1 and SNMPv2c.

SNMP (Simple Network Management Protocol) is an interface used to control and to monitor network elements. The Simple Network Management Protocol (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices. It is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suite.

The GET, GETNEXT and SET operations used in SNMPv1 are exactly the same as those used in SNMPv2. However, SNMPv2 adds and enhances some protocol operations. The SNMPv2 Trap operation, for example, serves the same function as that used in SNMPv1, but it uses a different message format and is designed to replace the SNMPv1 Trap.

The WorldCast Systems MIB files comply with the SNMPv2c-SMI (Structure of Management Information) and preliminary allow polling for status and alarm conditions and to SET configuration profiles. The philosophy is that SNMP is used to manage alarm conditions and to reconfigure a unit by loading pre-configured profiles via SET commands.

The configuration of the audio Codecs is preferred and better suited to the Codec Management WEB GUI. Therefore the SNMP implementation is mainly designed for alarm and error management.

Two MIB files are delivered with the firmware. The common company MIB that must be mandatorily loaded to the SNMP manager and the particular unit MIB file.

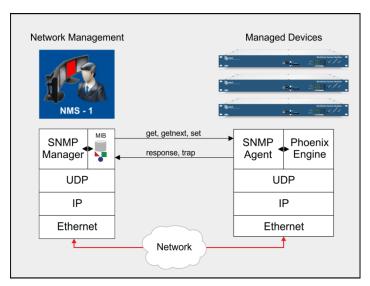


Figure 3-43: Shows the principal of SNMP communication

SNMP RFC compliances

- RFC 1901 Introduction to Community-based SNMPv2c
- RFC 1905 (replaced 1448) Protocol Operations for version 2 of SNMP (SNMPv2c)
- RFC 1213 Management Information Base for TCP/IP based networks: MIB-II
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 1442 Structure of Information for SNMPvc2 (SMI)
- RFC 2579 Textual Conventions for SMIv2



3.5.8.1 SNMP Agent

This page will be presented from the Main Menu and provides the configuration options of the inbuilt SNMP agent. These are the basic settings to get the SNMP protocol connected to the SNMP manager. The Trap configuration page and the notification management are accessible from page tabs.

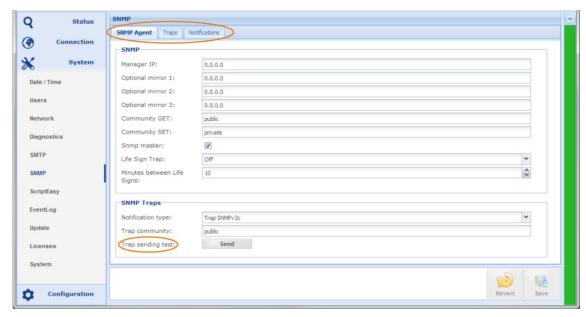


Figure 3-44: Shows the SNMP-Agent configuration page

SNMP options on this page

- 1. SNMP Manager IP address: this is the IP address where Traps will be sent (port 162)
- 2. Optional Mirror 1-3: these are entry fields for more trap destination IP addresses
- 3. Community Get: this is the public community; any name can be entered here (connect to port 161)
- 4. Community SET: this is the private community; any name can be entered here (connect to port 161)
- 5. SNMP Master check box
- 6. Life Sign Trap: this is keep-alive trap (heart beat) and can be enabled, disabled and managed here.
- **(1)** For security reasons it is strongly recommended NOT to use the default names of community strings! Enter some more cryptic names instead!

SNMP Traps

- 1. Notification Type: this can be TRAPs SNMPv1, SNMPv2c or Inform notification SNMPv2c (sent on port 162)
- 2. Trap community: some SNMP manager offer a selection of trap communities
- 3. Trap sending test: clicking on this button sends an empty trap for connectivity test.



3.5.8.2 SNMP Trap Management

This page allows a precise trap management for each individual alarm condition. The list of traps represents all available alarms of the system. Clicking on the little arrow beside the name of traps opens the individual configuration options.

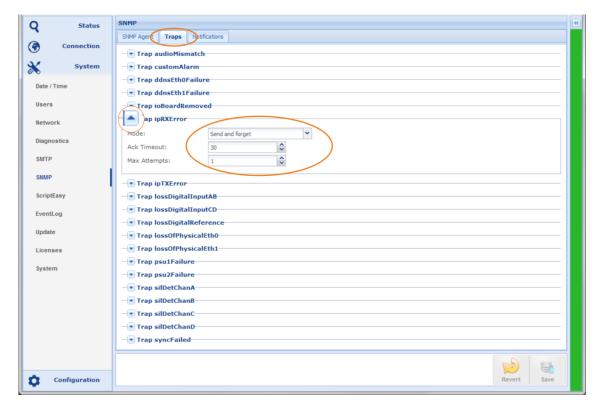


Figure 3-45: Shows the trap management page.

For each alarm the trap sending behavior can be controlled:

- 1. Send and Forget: this option sends a trap once and expect no acknowledgement from the SNMP Manager
- 2. Resend until acknowledged: this option expects an acknowledgement from the SNMP Manager (for SNMPv2 only).
 - Ack Timeout: defines the time window in which an acknowledgement must arrive
 - Max. Attempts: defines the number of sending attempts if the acknowledgement was not received within the pre-configured time window.
- [i] <u>Important</u>: "Resend until acknowledged" is a feature of SNMPv2 only! If this is selected make sure that the SNMP manager can cope with acknowledgement requests. Be aware that the number of Traps re-sent without acknowledgement may overload the memory!
- This page allows controlling the general sending behavior of a trap, if a particular alarm notification (TRAP) should be sent or not must be configured on the alarm configuration page (refer to section 3.6.4).



3.5.8.3 SNMP Notifications Management

The third tab on the SNMP page allows control of the SNMP pending actions. A pending action is a non-acknowledged trap. This trap is stored in the unit until it was deleted on this page.

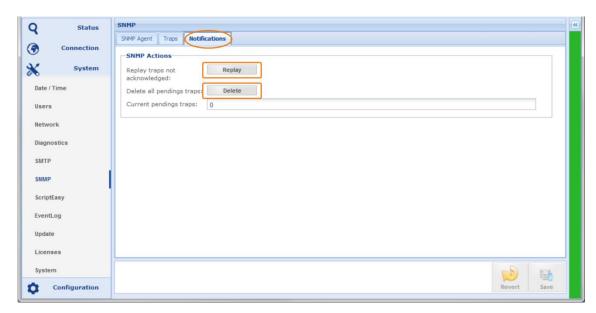


Figure 3-46: Shows the Notifications management page

This page provides information of pending traps which were not acknowledged since they were sent in accordance with the trap sending configuration (no. of attempts and timeout). These traps can be deleted or re-sent.

Notes:			



3.5.9 System – ScriptEasy

3.5.9.1 About ScriptEasy

Since system release 1.1.0 all NextGen Codecs can be controlled by WorldCast Systems' powerful scripting language "ScriptEasy". ScriptEasy must be licensed and doesn't come as a standard feature. With the license the full user/developer manual is provided.

ScriptEasy enables the user to setup a precise Codec behavior dependent of pre-defined conditions. It allows to link and combine features to operational conditions, e.g. a GPI switch event can load a new profile on the local and/or remote unit (1). Or a combination of alarm conditions can re-configure the unit completely (2), etc. etc.

ScriptEasy comes with as a separate PC application and consists of a graphical script designer and the MasterView dashboard viewer. The IDE (Integrated Development Environment) allows to create the logic of a script and the view designer is used to design individual dashboards. A dashboard can be used, but it is not mandatory. The following screen shot shows a little example about how ScriptEasy can be used on a Horizon NextGen

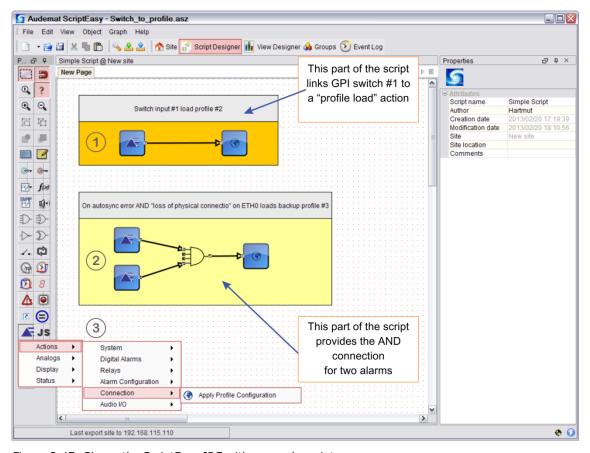


Figure 3-47: Shows the ScriptEasy IDE with a sample script

The figure above shows a single script but with two operations included (a script can provide as many operations as required). The script resides on the Horizon NextGen hardware and can be controlled by a dashboard or from the unit conditions. The following section discusses the sample script as shown above.



3.5.9.2 ScriptEasy - Script Example

Example Script – part (1)

Part 1 of the script consists of two components, the "Opto-Status 1" object and the "load profile n" action object. Whenever the status of switch 1 changes either remotely (on the switch input connector) or by the WEG GUI the action object will load the pre-defined profile to the unit.

Example Script - part (2)

Part two consists of four objects, the alarm status object for "Loss of physical connection", an object for "AutoSync failure alarm", the AND connection and the "load profile n" action object.

The AND connection avoids that the "AutoSync" alarm on its own changes to a particular configuration. Only if both alarms occur then the new profile will be loaded which reroutes the IP streams to the second IP port. AutoSync on its own can occur for many reasons and must not necessarily point to an IP connectivity problem.

ScriptEasy Codec Objects (3)

The IDE provides a number of special objects used for the audio Codecs organized as status objects, input and output objects, action (set) objects for value manipulation and also SNMP GET, SET and TRAP objects for external communication.

With the ScriptEasy license the full user/developer manual is provided.

3.5.9.3 ScriptEasy - Configuration

The ScriptEasy page in the system menu offers the controls for the loaded script.

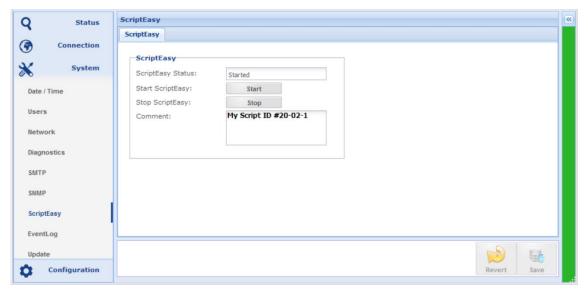


Figure 3-48: Shows the ScriptEasy controls



ScriptEasy - Configuration (continued)

The ScriptEasy page is used to start and to stop an uploaded script. It shows the current status and allows entering a comment that describes the script.

Once uploaded to the Horizon NextGen the script becomes "invisible". It starts whenever the units is booted and can be stopped temporarily. If a script is loaded the WEB GUI shows a warning when a user logs in. A script may overwrite user actions on its own!

- A script becomes automatically active after system boot-up.
- (i) Only one script can be loaded.
- 1 A script can be stopped but only temporarily. It becomes active again after re-boot!
- ScriptEasy requires the FTP service for the initial script upload make sure that FTP is enabled (FTP is disabled on default).

3.5.9.4 ScriptEasy – Remove a Script

Once a script was uploaded to a unit it cannot be deleted again. In order to permanently deactivating a script, it must be overwritten by an empty script (a script without content).

3.5.10 Event Log

A basic logging system is provided with system release 1.1.0. It records all events on a single log file that can be inspected, exported and deleted. A history page allows searching for events in a defined time frame in order to limit the maximal shown log entries.

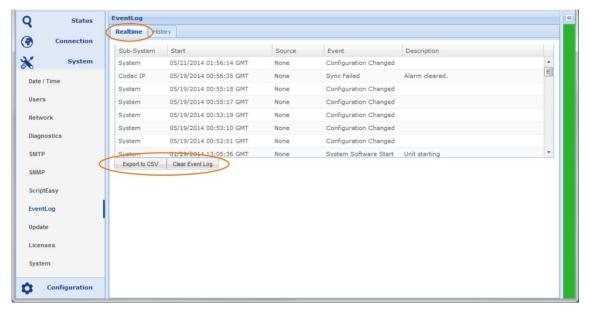


Figure 3-49: Shows Event Logs in the real time

This page shows the system event in real-time. It also provides a page tab for the history search as well as the controls for deleting and exporting the log entries.



3.5.10.1 Event Log Export

Clicking on the "Export in CSV" button opens a second window with all log entries. The content is formatted as a CSV file and can be exported to any spread sheet application by copy and paste.

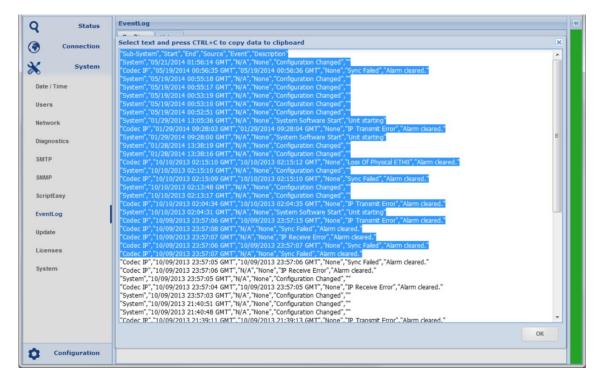


Figure 3-50: Shows the CSV formatted log file entries

Notes:		



3.5.10.2 Event Log History

Clicking on the "History" tab opens a page that allows searching for entries in a defined time frame. Opening this page the first time it will present an empty page. Enabling the "Filter" check box opens the retrieval options.

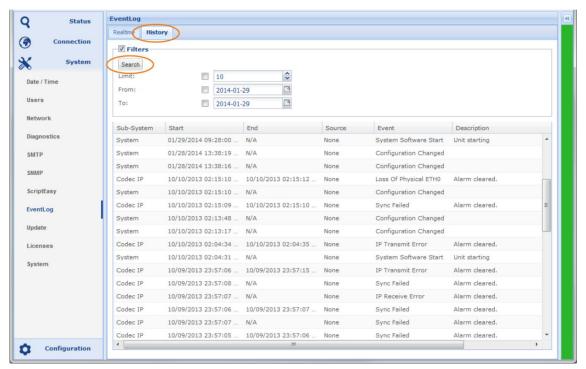


Figure 3-51: Shows the history retrieval options

The search options allow the definition of a time frame and the number of records that will be presented. Clicking on the "Search" button starts the retrieval process. All records of the specified time frame will be presented but limited by the previously chosen number of records.



3.5.11 (Firmware) Update

For a Firmware Update section 5.0 MUST be consulted!

3.5.12 Licenses

This page provides the Unit Details necessary for creating and applying an options license. License options are e.g. SureStream, ScriptEasy or additional audio algorithms etc. Licenses which are already purchased and applied to the unit will be displayed on this page.

For getting an option license key, the details displayed on this page must be forwarded to the responsible sales office (MAC address and serial number). This can be done efficiently by email. Clicking on the link "Request a SureStream/ScriptEasy License" opens the standard email client of the PC with the email address and MAC address already filled in.

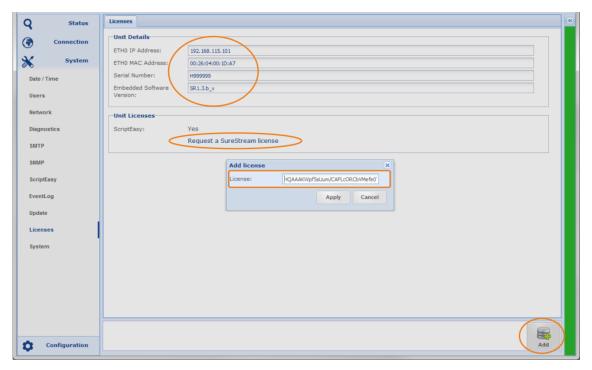


Figure 3-52: Shows the unit parameter for getting an options license

Once the Unit Details are forwarded to the sales office, a Key-Code will be delivered. By clicking on the "Add" button the "Add License" window appears where the Key-Code must be entered and applied.

This Key is dedicated to the particular unit and cannot be transferred to any other unit. Once the license key was applied, it cannot be removed and will not be overwritten by a firmware update.



3.5.13 System

On the "System" page the current unit hard- and software versions are shown

The entry field "Unit Name" allows entering an individual name for this particular unit. This name appears on the browser tab as well as on the unit's status page.

It also provides a little chat box that allows sending short messages to other actually logged in users.

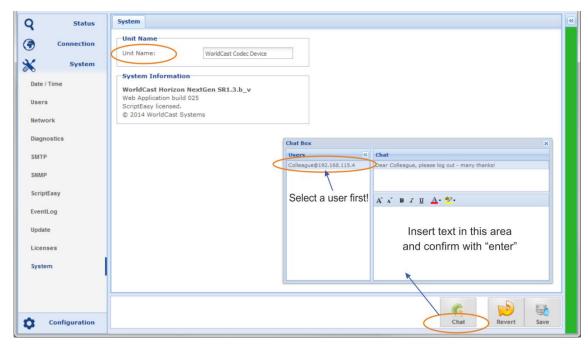


Figure 3-53: shows the "About" page of the System menu with Chat Box open

The chat box shows all currently logged in users regardless of the user status (Admin or Guest). A message can be sent to any user by selecting the user first and typing a text in the text area. The message will be sent after confirming with "Enter".

On the receiving end the chat box pops up and presents the text message and the source where this message comes from (see on next page).

The chat box uses UDP datagrams for sending these messages.

The user name which appears on the chat box is the "Screen Name" entered in the Log In window.



3.5.13.1 Chat Box

If a message is received the chat box pops up on any page which is currently open.

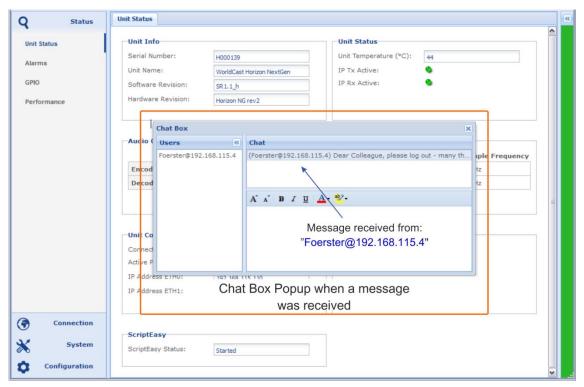


Figure 3-54: The chat box pops up when a message is received



3.6 Main Menu - Configuration

The configuration menu provides four submenu items, the Audio Configuration page, Network Alarms, the AUX Data/GPIO page and the alarm configuration page. These are basic configurations controlling operational modes and system behaviors.

3.6.1 Audio Configuration

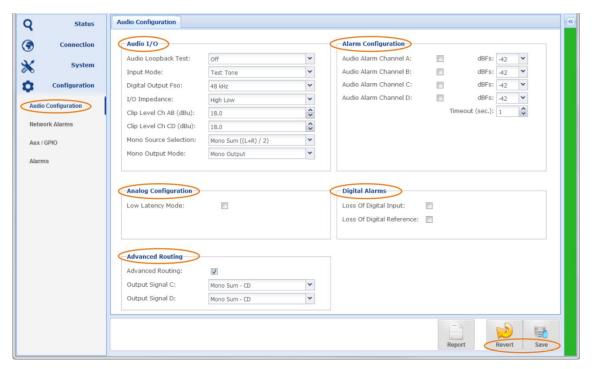


Figure 3-55: Shows the Audio Configuration page

All setting can be reverted or saved by clicking on either of the buttons as shows above. All configuration options are described on the following pages.

Notes:			



3.6.1.1 Advanced Routing & Decoder Mono Mode

With system release 1.4.0 the Decoder options (Horizon NextGen and IP Decoder) are extended by two features combined in the section "Advanced Routing"

- 1. Creation of Mono signals from incoming stereo IP streams
- 2. Advanced Routing of the output signal

Advanced Routing & Mono Sum

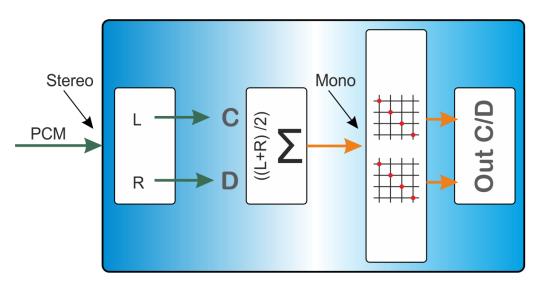


Figure 3-56: Shows the principle of this feature of the Decoder

Decoder Mono Mode

This feature allows to create a mono signal (mono sum) from an incoming stereo stream. The mono sum is performed in the Decoder section and does not affect the stereo IP stream. Other than the mono sum option on the Encoder, the mono sum on the Decoder is algorithm agnostic. In a distribution network, the same stereo program can be decoded as stereo feed for e.g. FM supply and as a mono feed for an AM supply – the mono/stereo signal is generated from the same stereo stream.

Advanced Routing

This feature allows the routing of the decoded PCM signal from the DSP output to the physical output connectors on the rear panel of the Codec or Decoder. By default and if the advanced routing feature is disabled, the signals are routed 1:1. For more details refer to the section below.



3.6.1.2 Audio Configuration Options

Audio I/O

This section provides the following configuration options:

Configuration	Options	Description
Audio Loopback Test	Off	This is the normal operational mode
	Local Loopback	Enables a local audio loop between Input and Output
Input Mode ¹	Analog	Selects the Analog Inputs to be active
	Digital	Selects the Digital Inputs to be active
	Test Tone	An internal Tone generator applies a 1kHz tone for test purposes to the audio inputs
Digital Output Fso	32, 44.1, 48, 96, 192 ² kHz	Sets the Digital Output sample frequencies
	Ref.	Allows synchronizing the Digital Outputs to an external clock such as AES-11
I/O Impedance	High/Low	Analog I/O impedance: In: >10 k Ω , Out: <50 Ω
	600 Ω/600 Ω	Sets the I/O impedance to $600/600\Omega$
Input Clip Level (dBu)	Values 0-24 dBu	Adjusts the analog Input level in reference to the digital dBFS in increments of 0.1 dB
Output Clip Level (dBu)	Values 0-24 dBu	Adjusts the analog Output level in reference to the digital dBFS in increments of 0.1 dB
Mono Source Selection	Left Channel only	This describes the signal source (input) for a mono mode of an audio algorithm.
	Mono Sum ((L+R)/2)	This selection takes both signals (left & right) and divides it by 2 (-3dB)
Mono Output Mode ³	Mono Output	Output on left channel only
	MonoFill	MonoFill copies the signal also to the idle channel; mono output on L & R connectors

¹ The analog and the digital outputs are always active simultaneously

Analog I/O Clip Levels

These settings allow adjusting the analog levels in reference to the digital level:

All level readings are referenced to the digital domain where $0 \, dBFS = 24 \, dBu$. For example, if the analog level of $+6 \, dBu$ shall equal $-9 \, dBFS$ then the analog **clip** level must be set to $+15 \, dBu$ ($0 \, dBFS = 15 \, dBu$ hence $-9 \, dBFS = +6 \, dBu$).

² Analog Outputs are non-functional when 96 or 192 kHz is selected.

³ MonoFill cannot be used together with the advanced routing option as the two features stay in a conflict



Audio Configurations (continued)

Tencoder Mono Modes

This mono setting takes effect only if a mono algorithm is selected. The mono setting is ignored if a stereo algorithm is selected. This concerns both the Encoder (Mono Source Selection) and the Decoder setting (Mono Output Mode).

Advanced Routing & Decoder Mono Mode

Advanced Routing must be enabled to become active by clicking the check box "Advanced Routing" and on "Save" on the bottom of the page.

"Output Signal C" and "Output Signal D" describe the physical outputs on the rear of the codec (XLR L/R outputs).

The drop down list shows the available signals:

"Mono Sum – CD" this is the mono sum from the equation ((C+D)/2).

Signal "C" and "D" represent the signals L/R from the received stereo stream.

If enabled, the advanced routing and mono mode feature offers the mono signal on both outputs C and D. This takes effect on the digital and the analog outputs.

Analog Configuration – Low Latency Mode

This "Low Latency Mode" effects the **analog** signal processing and improves the system latency by approx. -1.5 ms. This mode disables and bypasses the **input** Sample Rate Converter which is obsolete in these modes:

- Linear PCM at Fs = 48kHz (any linear PCM mode that uses 48kHz Sample Frequency)
- Eapt- $X^{(8)}$ at Fs = 48 kHz (any Eapt- $X^{(8)}$ mode that uses 48 kHz Sample Frequency)

Configuration	Options	Description
Low Latency Mode	Enable/Disable	Ticking this box enables the low latency mode

Note: This latency improvement takes place on audio formats (as listed above) that run at $48\,\text{kHz}$ sampling frequency. Whenever another mode is selected, e.g. Linear PCM with up to $15\,\text{kHz}$ frequency response (equals $F_s = 32\,\text{kHz}$) then this mode is automatically deactivated regardless of the enable/disable status on this configuration page. As long as this mode is enabled it automatically takes place if an audio mode at $48\,\text{kHz}$ is selected.

Notes:		



Audio Configurations (continued)

Digital Alarms

Configuration	Options	Description
Loss of Digital Input	Enable/Disable	Enabling this checkbox will flag this alarm if the digital source at the audio input is lost
Loss of digital Reference	Enable/Disable	Enabling this checkbox will flag this alarm if the digital reference signal at the reference input is lost

Alarm Configurations

These alarms are Silence Detector alarms for the audio Inputs and Outputs. These settings allow enabling the alarm for each Input and Output channel, and the threshold level can be set individually. The Timeout setting is also provided defining the period of time the signal must be below the threshold level before the Silence Detector will flag those.

Configuration	Options	Description
Audio Alarm Input L/R	Enable/Disable	Ticking the boxes enable these alarms
	Threshold Level	Level setting from -3 dBFS to -42 dBFS in increments of 3 dB
Audio Alarm Output L/R	Enable/Disable	Ticking the boxes enable these alarms
	Threshold Level	Level setting from -3 dBFS to -42 dBFS in increments of 3 dB
Timeout	Value	This setting defines the period of time the signal has to be below the threshold level before the audio alarm is flagged.



3.6.2 Network Alarms

This page provides the alarm options of the Ethernet interfaces and Dynamic DNS.

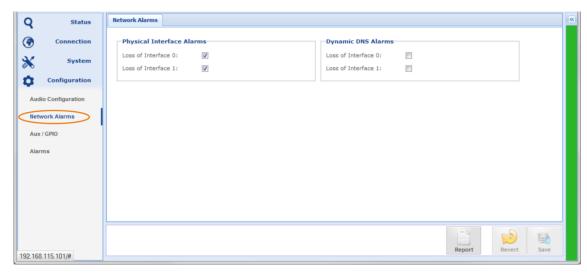


Figure 3-57: Alarm configuration options of Ethernet ports

Tenable Disable alarms for physical loss of connections.

If this alarm disabled, a physical loss of connection will not be recognized as alarm

Tenable Disable alarms of Dynamic DNS connection

If this alarm is disabled, a loss of connection to the dynamic DNS service will not be recognized as alarm; this option is disabled on default.

Notes:			



3.6.3 AUX/GPIO Configuration

This page manages the Switch Inputs (GPI), the relay behavior (GPO) and the Aux data rate settings.

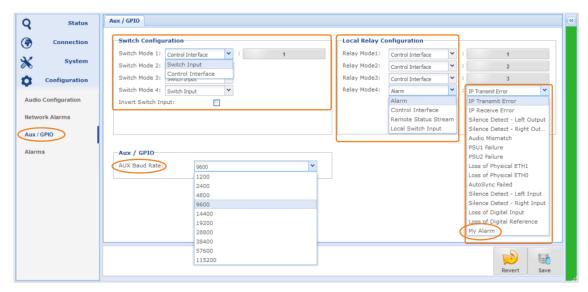


Figure 3-58: Shows the AUX Data and GPIO configurations

The GPIO system consists of four relay contact closures and four opto-isolated switch inputs.

The input source for the opto-isolated switches can be selected to be either the D-Type connector on the rear panel of this unit or a button on this page. This is for each switch input selectable individually.

The relay contact closures can now be controlled in four ways:

- 1. For an individual alarm per relay or a group of alarms (custom alarms)
- 2. From a switch button on this page
- 3. By GPI commands from the remote site via IP connection
- 4. By the LOCAL switch input of this unit

The AUX data interface allows sending and receiving RS232 data with baud rates selectable from 1.200Baud to 115.200Baud.

1 Note: For embedded mode, the max. data rate is 9.600baud.



AUX / GPIO Configuration Options

Configuration	Options	Description
Switch Configuration	Switch Mode	Controlling the <u>remote</u> and/or the local relays on the far end receiver by using the switch input on the rear of the <u>local</u> Codec.
	Control Interface	The control interface is the WEB GUI. Selecting this mode allows controlling the remote and/or the local relays from this configuration page.
Invert Switch Input	Enable/Disable	Non inversion: Local switch active, remote/local relay active
		Inverted Mode: Local switch inactive, remote/local relay active
		This inversion is valid for all four switches
Local Relay Configura- tion	Alarm	The selected alarm condition activates this relay
	Control Interface	Allows activating a relay by a control button on this page
	Remote Status Stream	Follows the switch command received from the remote end
	Local Switch Input	Follows the <u>local</u> Switch Input commands
AUX Data Baud Rate	Value	The drop down list provides baud rate setting from 1.200 to 115.200Baud

1 Note: For embedded mode the max. rate is 9.600baud.



3.6.4 Alarms Configuration

With system release 1.1.0 all system alarms are configurable individually. The alarm configuration page shows all available alarms and provides option to control the alarm behavior.

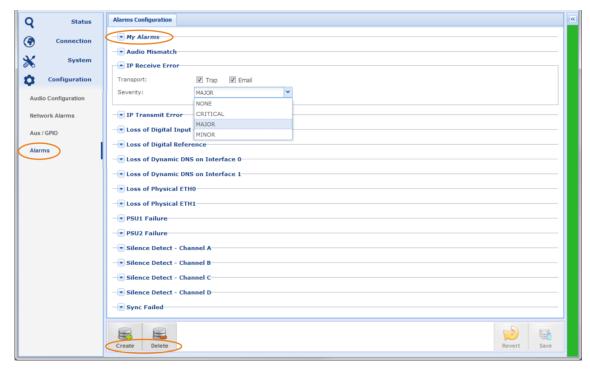


Figure 3-59: Shows the Alarms Configuration page

All system alarms are listed here. Clicking on the little arrow beside each alarm opens the configuration options. These options are:

Sending a SNMP trap

If this check box is enabled this alarm sends a trap to the SNMP manager. The trap management can be found on the SNMP page.

Sending an email alert

If this check box is enabled this alarm sends an email alert.

Severity

This drop down list presents the severity levels. The alarms will be presented on all instances in accordance with these settings.



3.6.5 Alarms - Customer Alarms

Creating an individual alarm allows to create groups of alarms which will be treated as a single alarm (OR logic). The advantage of this option is that a group of alarms (created here) can be assigned to a single relay.

The alarm configuration page offers the option for creating and managing customer's alarm groups. The figure below shows an example for "My Alarm".

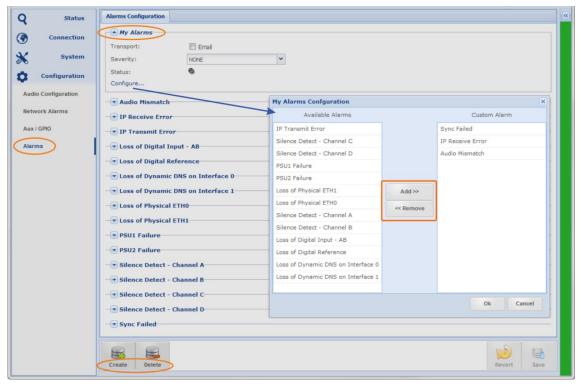


Figure 3-60: Shows how to create an alarm group

How to create an Alarm group

- Clicking on the "Create" button prompts you to enter a name for the alarm group (My Alarms). After applying the name, this setting must be saved first before the group can be configured.
- 2. After saving the "My Alarms" group, this alarm appears on the bottom of the list of alarms. As many groups as required can be created.
- 3. Clicking on the little arrow beside opens the alarm options and the "Configure..." link.
- 4. Following the configuration link opens the Alarm configuration window. This window shows all available alarms on the left hand side. Alarms can be added to the group on the right hand side by selecting the desired alarms and clicking on the "Add" button.
- 5. Once this alarm group is created the email alert can be enabled, and this group can be assigned to a relay.



4.0 SureStream Option

The SureStream option is not a standard feature and must be applied to the unit by entering a license key. Once a SureStream license was applied to the unit the Status Page will indicate the availability of SureStream by presenting the SureStream Logo. For requesting a SureStream License please refer to section 3.5.12 (System Licenses).

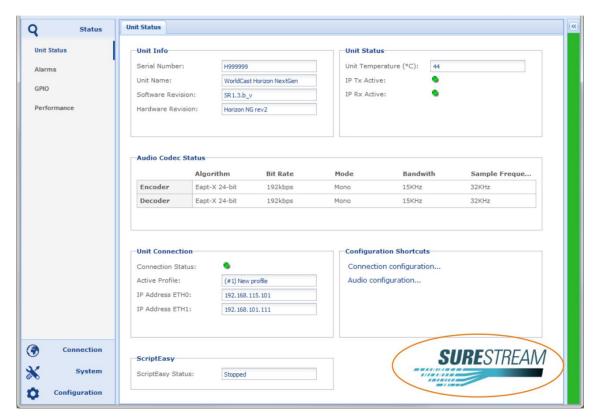


Figure 4-1: Shows the Status Page with SureStream license applied

4.1 About SureStream

SureStream technology is a revolutionary innovation from APT that enables broadcasters to use inexpensive IP links and still maintain professional broadcast-grade audio quality and reliability. It delivers the audio quality and reliability known from a synchronized TDM based link at a fraction of the associated cost.

The technology approach of SureStream is based on redundant streaming. SureStream replicates a single program audio stream and passes it through the Statistical Diversity Generator. Following this process the redundant program streams appear on the network as unique streams generated from different or the same ETH port (depending on the IP interface the stream is transmitted from).

In practice a single stream will be generated on each port, the so called component streams. Nevertheless this feature works on a single physical port as well, but with slightly less efficiency (cannot cover a "Loss of Connection" event).

SureStream is highly efficient on potentially lossy networks like the public Internet. It can also be used for permanent redundant streaming on managed networks.



About SureStream (continued)

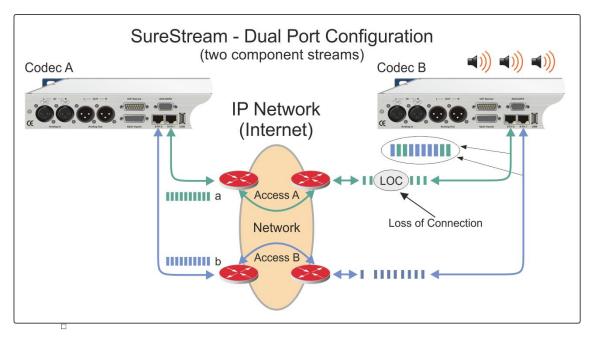


Figure 4-2: Shows a typical Dual Port Configuration running SureStream

The configuration example above shows a typical SureStream configuration using both streaming ports. This example uses the internet with standard xDSL access services. Diverse streaming on the internet has the effect, that the access routers treat each SureStream component stream individually by passing it randomly on different paths to the destination IP address.

On the receiving end, the Enhanced Re-Sequencer generates from all component streams the single packet stream on a first-in-first-out packet basis. All duplicated/redundant packets will be dropped.

This configuration utilizes the full potential of the SureStream technology.

4.1.1 SureStream Encoder

On the Encoder side the heart of SureStream is the Statistical Diversity Generator. This generator ensures that the redundant streams appear on the network as diverse as possible. This generator runs an algorithm that can be setup with three different sets of parameters (called "levels") allowing the use of more than one redundant stream while keeping each stream divers from each other.

4.1.2 SureStream Decoder

Once SureStream has generated duplicated streams with the same payload intended to reach the same receiver, the Decoder on the receiving end must cope with a massive amount of redundant packets arriving from a single or different networks. Allowing the Decoder to cope with duplicated packets it must run the complementary algorithm as on the Encoder side; this is the Enhanced Packet Re-Sequencer Engine.



4.2 SureStream – Encoder Configuration

Creating a SureStream component stream follows basically the same procedure as a normal stream configuration. A set of component streams will be identified as part of a SureStream group by the equal packet size. This is an important indication, because within a set of redundant streams the packet sizes must be equal. If a set of component streams are configured correctly, the connection page will indicate this by grouping the corresponding streams (SureStream group). If the packet size is not equal on all component streams, the streams will be treated separately and no SureStream group will be generated.

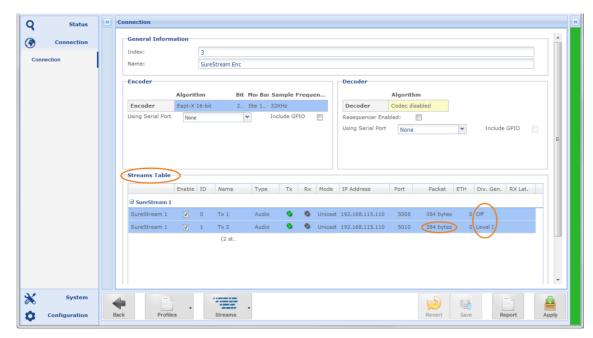


Figure 4-3: Shows a SureStream configuration on the Encoder

(i) A SureStream group will be displayed only if the packet sizes on ALL streams are equal!

The figure above shows a working Encoder configuration in principal. But, both streams are assigned to the same destination IP address, hence they are received on a single port at the Decoder end. This implies that both streams are going out on the same ETH port on the Encoder into a single network. – In a real world application this configuration would not utilize the full potential of the SureStream technology.

A better way to configure the Encoder is to use both ETH ports, one for each stream on separate networks, e.g. two DSL lines preferably supplied by different providers. By doing this the chance getting the streams routed differently is much higher, hence the reliability of the link increases significantly.

The next section outlines the recommended and mandatory settings for a group of component streams.



SureStream - Encoder Configuration (continued)

Once the SureStream license was applied to the unit the Diversity Generator option appear on the stream configuration window. Again, creating a group of component streams follows the normal procedure.

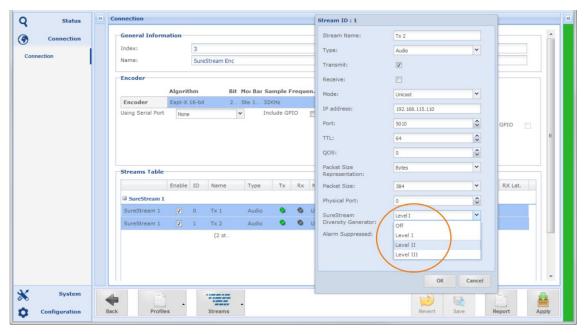


Figure 4-4: Shows the Diversity Generator options on the stream configuration window

4.2.1 About Diversity Generator Levels

The SureStream Diversity Generator can be either disabled or set from "Level I" to "Level III". A "Level" does not indicate the level of severity of SureStream. A "Level" is a set of parameters used by the Diversity Generator to ensure the stream diversity. All three "Levels" work on the same level of severity but differently from each other.

Having three sets of parameters allows to configuring more than one redundant stream and keeping all streams processed individually by the Diversity Generator. It has been seen sometimes that a particular "Level" delivers better results than another.

Therefore it is worthwhile to trying out what Level delivers the best results in a particular network environment.

In situations where both ETH ports are connected to different networks, the diversity generator might become obsolete because the networks already ensure sufficient diversity.

In a configuration where both ETH ports are used for only one component stream on each port (two streams in total) the Diversity Generator Level settings should be switched OFF on both streams. With this condition the different networks create already the desired diversity on the component streams.



4.2.2 Creating a Set of redundant Streams

A set of component streams processed by the Diversity Generator is not limited to a particular number of streams. In practice a set of two component streams work reliably. However, APT Codecs allow creating more than one redundant stream on both ETH ports.

Field (SureStream)	Description	
Stream Name	A name must be given – there are no constraints applying a name	
Stream Type	SureStream supports "Audio" streams only	
Transmit Mode	SureStream supports "Transmit" mode	
Receive Mode	SureStream supports "Receive" mode	
Transmit/Receive	SureStream supports "Duplex" mode	
Mode	SureStream supports "Unicast and Multicast"	
Dest. IP Address	This can be equal on all streams, but SureStream works more efficient if both ETH ports are used, hence the dest. IP address should be different (receiver uses two ETH ports – on different networks)	
Port	For each stream - the IP port must be different	
TTL	For all streams - the TTL value must be equal	
QoS	For all streams - the QoS setting must be equal	
Packet Size	For all streams - the Packet Size must be equal!	
Physical Port	Streams can/should use both ports: ETH0 and ETH1	
Rx Latency	All received component streams of a SureStream group MUST be configured with the same buffer size (Rx Latency setting)!	
SureStream Diversity Generator	The SureStream Diversity Generator can be setup with three different sets of parameters. These three sets of parameters are different and allow the Diversity Generator creating a variety of different component streams if more than one is configured	
Alarms Suppressed	Checking this box, disabled all alarms generated by this IP stream – not influenced by SureStream	



4.3 SureStream – Decoder Configuration

Configuring the Decoder for using SureStream follows the normal procedure creating as many as necessary receive streams (component streams).

A SureStream group will be displayed only if the RX Latency settings are equal on all component streams of a group. This is a very important setting and must not be ignored!

On the Decoder section, the Re-Sequencer as the complementary part of the Diversity Generator MUST be enabled!

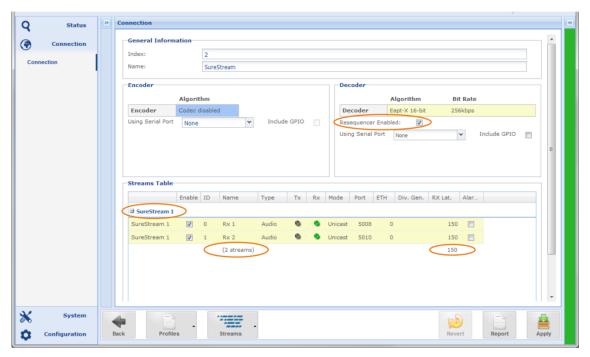


Figure 4-5: Shows a SureStream configuration on the Decoder with two streams received

The figure above shows a working Decoder configuration in principal. Again, both component streams are received on the same ETH port hence they are transmitted on a single port at the Encoder end (as shown in the Encoder section). This implies that the component streams are traveling through a single network. – In a real world application this configuration would not utilize the full potential of the SureStream technology.

- For SureStream the Re-Sequencer must be enabled on the Decoder if more than one component stream will be received from the same Encoder, regardless of the Diversity Generator level settings of the Encoder!
- The RX Latency setting must be equal on each component stream of a SureStream group!



SureStream - Decoder Configuration (continued)

SureStream does not offer specific configuration option for creating a receive stream.

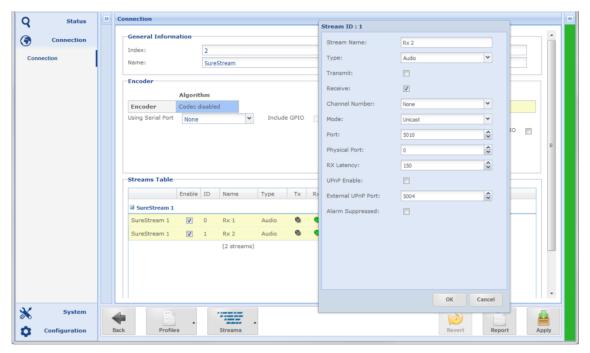


Figure 4-6: Shows the normal Stream configuration window

for SureStream the Re-Sequencer must be enabled on the Decoder if more than one component stream will be received from the same Encoder, regardless of the Diversity Generator level settings of the Encoder!



4.3.1 SureStream – Decoder Performance

The performance monitor delivers precise information about the component streams treated by SureStream and the summary performance of the SureStream group.

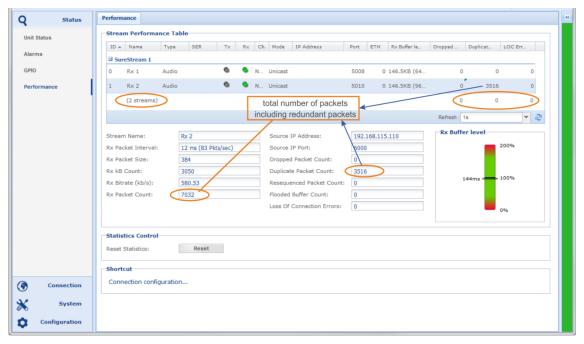


Figure 4-7: Shows the stream performance of component streams and the SureStream group

The figure above shows a perfectly working SureStream configuration on a Decoder. The SureStream group consists of two component streams (Rx1/Rx2). While Rx1 shows no Dropped Packets, no Duplicated Packets and no LOC errors, the Rx2 shows a huge amount of duplicated packets. This is exactly how the Enhanced Re-Sequencer works. It re-combines the component streams and creates an error-free packet streams for decoding and discards all redundant packets.

In a real world environment, the component streams may show lost packets and also LOC errors.

The statistic below the SureStream group shows the performance of the re-combined stream (0 dropped, 0 duplicated, 0 LOC). If any error (dropped packets or LOC error) appears on this line, the decoder will be affected and artifacts may be audible. In this case it is worthwhile trying to use another Diversity Layer on the Encoder or, if possible, adding another component stream to the SureStream group.

Note: In a SureStream configuration the component stream with the highest index number displays the IP statistics from the re-combined stream. In result the IP bitrate is always the total amount of all component streams. Only this stream displays the redundant packets before they get discarded.



5.0 System - Firmware Update

This section is the step-by-step instruction for performing a firmware update successfully. This is a straight forward and intuitive procedure.

1 A firmware update can be processed on the Admin Account only

5.1 Firmware Update

A Firmware release consists of a set of inter-compatible firmware files. These are system files for the DSP, the system operational system and the WEB GUI. A system release will be delivered always as a Zip-Archive.

The firmware zip- archive must never be unzipped on a PC. The system upload procedure requests this zipped archive.

5.1.1 Firmware Update - Step 1

Open the "Update Page" on the main menu (System – Update). The following screen will be presented:

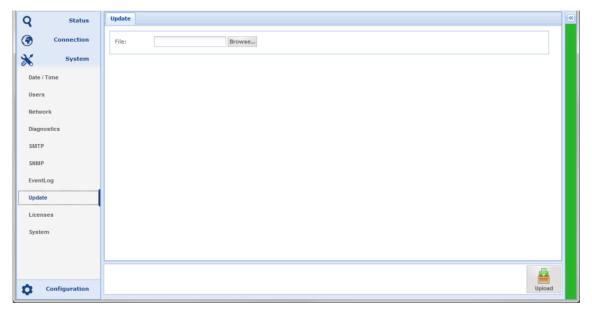


Figure 5-1: Shows the Firmware Update page for Horizon and IP Decoder

i It is strongly recommended to read and to follow this step-by-step instruction!



5.1.2 Firmware Update – Step 2

Clicking on the "Browse" button opens the PC file browser. Navigate to the folder where the firmware file is stored and select the zip-archive (HZNG_SR_x.x.x.zip)

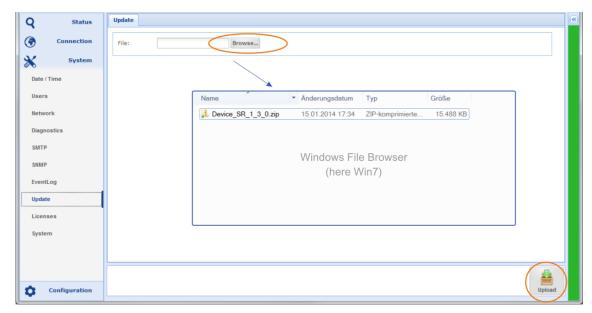


Figure 5-2: Shows the file browser on the firmware update page

Once the correct firmware file was selected and appears in the "File" section click on the "Upload" button on the bottom right corner of the browser window.

- For Horizon NextGen: HZNG_SR_x_x_x.zip
- For IP Decoder: IP_DECODER_SR_x_x_x.zip
- (i) Note: The WEB GUI will reject any firmware file which does not match the hardware version!



5.1.3 Firmware Update – Step 3

The system prompts you to confirm the firmware upload.

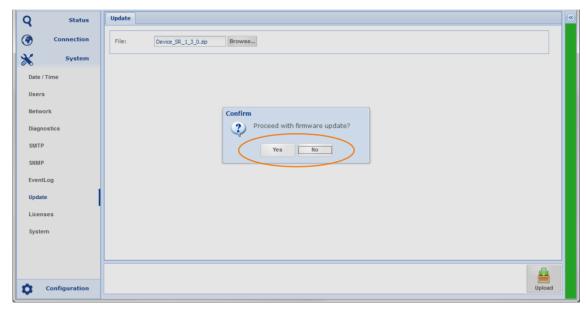


Figure 5-3: The system asks for final confirmation for starting the firmware upload

(1) After clicking on the "Upload" button the System prompts you again to confirm the update process (or to cancel). Once you have confirmed the upload procedure the unit loads the new firmware and indicates the re-programming period by ORNAGE LED indications on the Alarm- and Connected LED on the hardware.





① DO NOT DISCONNECT THE UNIT FROM MAINS OR TRY TO RE-START THE UNIT UNTIL THIS PROCESS IS COMPLETED!



5.1.4 Firmware Update – Step 4

During the update the browser shows this screen indicating the update procedure.

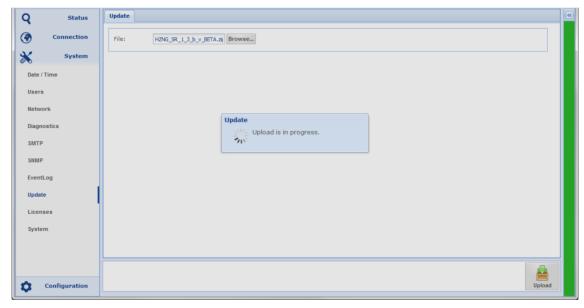


Figure 5-4: This page appears after the upload process was confirmed

- The Firmware Upload process stops any actual process on the unit: it discontinues streaming or receiving for approx. 4 minutes.
- (1) All profiles and the current configuration are NOT affected by the firmware update.
- ① During the update process the hardware LEDs on the front of the unit appear ORANGE indicating the running process (Alarm & Connected LEDs).



5.1.5 Firmware Update - Step 5

The firmware update is a completely hidden process in order to avoid any user interaction. Once you have clicked the "Upload" button the system prompts you to confirm the process. This is the only user action necessary after initializing the update procedure!

- After approximately 20 seconds the browser shows the LogIn page
- The LogIn page is inactive for another 4 minutes
- $4 \frac{1}{2}$ minutes after initializing the upload process, the unit will allow to log in again. This is the point in time the unit continues to operate in the same way as previously.

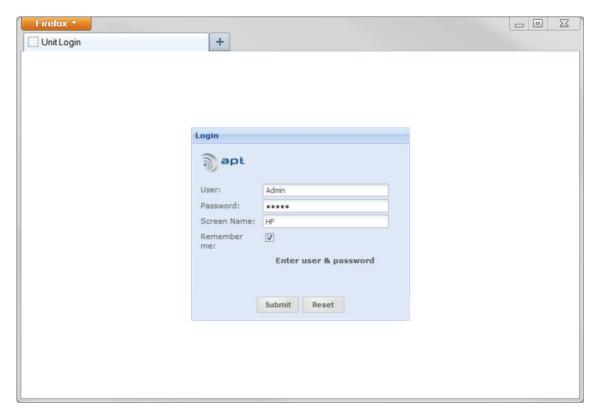


Figure 5-5: This browser switches to the LogIn page after approximately 20 seconds.

It is not necessary to re-start the unit after the update process. All settings will appear as configured. On a live-link, the stream will be re-established automatically. No user action is necessary to re-connect a running system.

Nevertheless, it is sometimes useful to power-circle the system AFTER the firmware update procedure has been completed (when the login is possible again).

It is recommended to delete the browser cache before you login again. This deletes all previously written temporary files.



5.1.6 Firmware Update – Step 6

After completing the firmware update, the Status Page will present the new firmware successfully loaded.

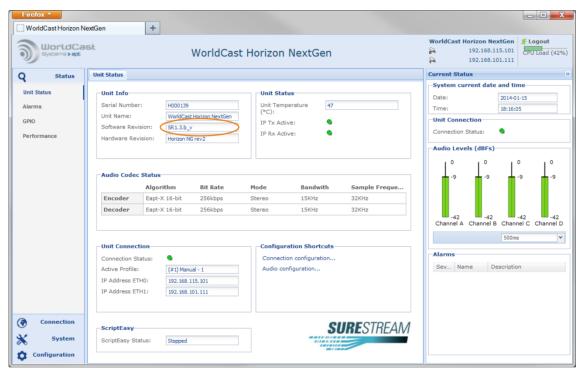


Figure 5-6: Shows the Status Page - System running and new firmware loaded



6.0 Specifications

6.1 Specification Horizon NextGen & IP Decoder

Physical

Dimension 1U x 19" rack mount

44mm x 480mm x 160mm - 1.73" x 19" x 6.3"

Weight <1.5kg / <3.355lbs
Power Supply 100-250VAC, 50-60Hz

Power Consumption <20W

Environmental 0°C to +55°C, 95% humidity (non-condensing)

Analog Interfaces

Interface Type electronically balanced, capacitive isolated

physical: on XLR3 connector

Audio channels Duplex Mode: 2x Input **and** 2x Output (analog & digital outputs

simultaneously active)

IP Decoder: 2x Output (analog & digital simultaneous active)

I/O impedance High >10 k Ω Low <50 Ω

IP Decoder: Low <50 Ω

Modes of operation Stereo, Mono

Audio characteristics Input to output: clip level: +24dBu

Analog Input/Output: adjustable by 0.1dB increments in refer-

ence to the digital domain

Digital Interfaces (AES/EBU)

Interface Type AES3 transformer balanced or AES unbalanced (compatible with

 75Ω interfaces)

physical: on XLR3 connector

I/O impedance AES3: 110Ω / AES: 75Ω

Audio channels Duplex Mode: 1x AES Input **and** 1x AES Output

IP Decoder: 1x AES Output

Modes of operation Stereo, Mono

Output sampling rates 32/44.1/48 kHz – software configurable

AES Reference AES-11 reference input on XLR3 connector

SRC Sample Rate Converter at Inputs and Outputs



General

Diagnostics Local loop back

Integrated Test tone generator

IP Decoder: non

Audio Modes Mono (L&R/2 on encoder) and MonoFill mode on decoder which

copies a mono channel to both outputs;

Stereo

Audio Bandwidth 10 Hz - 22.5 kHz and 88 kHz for digital MPX (optional)

Dynamic Range Up to >110 dB @ 24 Bit
Signal Processing 24 Bit Audio processing

Audio Formats and Coding Algorithms

Linear PCM 16/24 Bit

Fs = 32 kHz, 1024/1536 kbps (stereo) Fs = 48 kHz, 1536/2304 kbps (stereo)

optional: Fs = 192 kHz, 3072 kbps or 4608 kbps (digital MPX mono)

Enhanced apt-X[®] Sampling rates: 8/16/24/32/48 kHz

Bit-Resolution: 16/24Bit Bit Rates: 64 - 576kbps

MPEG 1 Layer II Bit Rates: 64 - 384 kbps

Mono, Dual-Mono, Stereo, Joint-Stereo

MPEG 2 Layer II Bit Rates: 64 & 128 kbps

Mono, Dual-Mono, Stereo, Joint-Stereo

MPEG 2 HE-AAC Bit Rates: 8 – 64 kbps

Stereo, Fs 24/32/48 kHz

MPEG 4 AAC: Advanced Audio Coding

AAC-LC AAC (low complexity): 8 - 384kbps (Mono/Stereo)
AAC-LD AAC (low delay): 24 - 256kps (Mono/Stereo)

AAC-ELD AAC (enhanced low delay): 64 - 256kbps (Mono/Stereo)

HE-AAC (high efficiency): 8 - 128 kbps (mono/Stereo)

HE-AACv2 (high efficiency + PS): 8kbps - 64kbps) Mono/Stereo

DATA

AUX Data RS232

Aux data Mode Embedded & Non-embedded

Data Rates embedded & non-embedded:1200/2400/4800/9600

non-emb.: 14400/19200/28800/38400/57600/115200 Baud

GPI Non-embedded: 4x opto-isolated switch inputs - 2x per stereo

signal

embedded: on Eapt-X only

IP Decoder: non

Relay contacts 4x relay contacts carried out as 2 pin switches, normally open to

common - 2x per stereo signal



IP - Audio and Control

IP Interface Physical Dual IP ports, 2x RJ45

IP Interface electrically Separate PHY per interface

2x MAC addresses

2x network address settings

Port speeds: auto 10/100/ BaseT/Tx, Auto MDI-X

Ethernet IEEE 802.3x

IP Protocol IPv4

DHCP on port ETH0

ICMP PING responds on both ports

IGMP Version v2 and v3 (v3 limited features support)

TCP/IP for control

UDP for audio/aux streaming

RTP/RCTP for audio

FTP for firmware management

HTTP for web application SMTP Mail notifications

SNMP SNMPv2c, trap v1, v2 and v2c – trap send behavior configurable

per individual trap (enable, disable, send and forget, send until

acknowledged etc.)

NTP NTP client integrated

DNS look up and hostname streaming

DynDNS Client supports dynamic DNS services on ETH0 and ETH1

NAT traversal Mode UPnP is used for NAT traversal mode. It allows to auto-configure

an UPnP-enabled NAT router (typical: xDSL services)

IP Audio (AoIP)

Casting modes Unicast, multiple unicast, multicast

Stream Types Audio (RTP): Rx, Tx, duplex

AUX (UDP): Rx, Tx GPIO (UDP): Rx, Tx IP Forwarding: Rx, Tx

Clock 2 clock domains per module (Tx/Rx or dual Tx or dual Rx)

De-Jitter Buffer Size from 1 ms to 5.000 ms independently per stream

Streaming Tx Stereo audio x n IP-streams

Rx Stereo audio

Asymmetrical audio Encoder/Decoder on separate audio modes/clocks/networks

Quality of Service DiffServ with separate DSCP values per stream

SureStream Technology, based on redundant packet streaming

(Statistical Stream Diversity) - license option



6.2 Framed Algorithms - Packet Sizes

Framed algorithms like the MPEG formats require packet sizes containing a full algorithm frame. For each algorithm the frame size is different and presented in milliseconds of audio.

The packet size is set automatically for these algorithms and cannot be changed manually.

Coding Algorithms – Packet Sizes			
MPEG4 AAC LC	min. 21.3ms	variable	
MPEG4 AAC LD	min.10.6ms	variable	
MPEG4 AAC ELD	min.21.3	variable	
MPEG4 HE AAC	min.42,6	variable	
MPEG1 Layer II	min.24ms	variable	
MPEG2 Layer II	min.48ms	variable	

End of Document