



Radio[®] Ahead
Digital AM & FM

HD for FM, featuring the HDMC+

Making HD Radio Deployments
Easier and More Affordable

Jeff Welton, Regional Sales Manager, Central U.S.

Speakers



Jeff Welton

Sales Manager - Central USA
Nautel



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Customer Service Technologist
Nautel

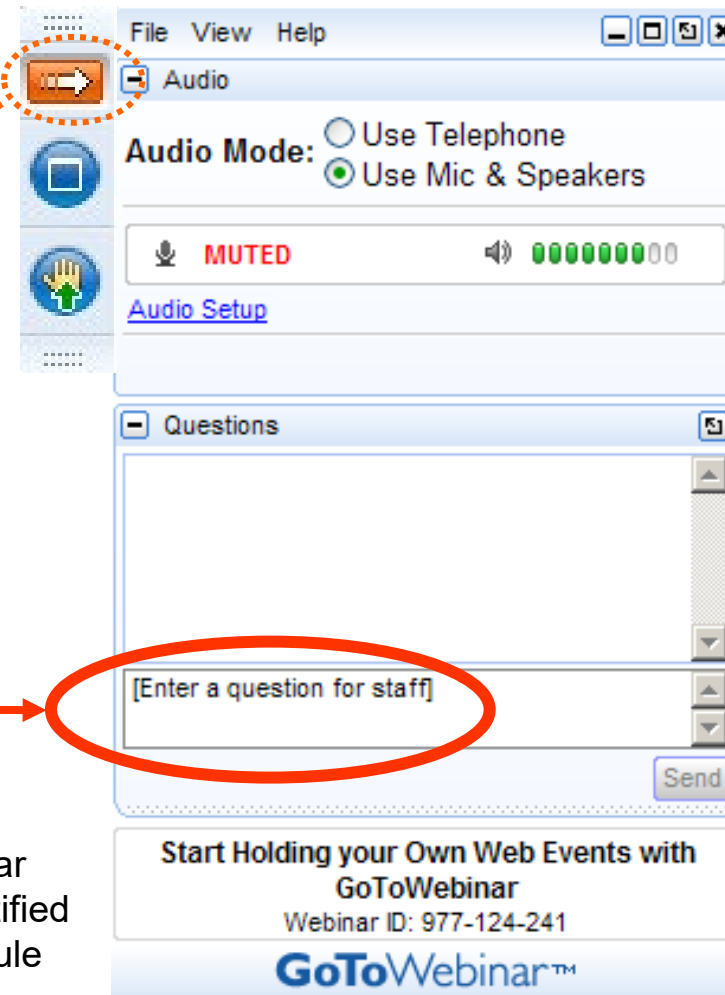
Agenda

- Welcome
- Why Nautel?
- A deep dive – things to know
- Other ideas and things you can do
- Where is it all going?

Your questions please?

(if you don't see the control panel, click on the orange arrow icon to expand it)

Please enter your questions in the text box of the webinar control panel (remember to press send)



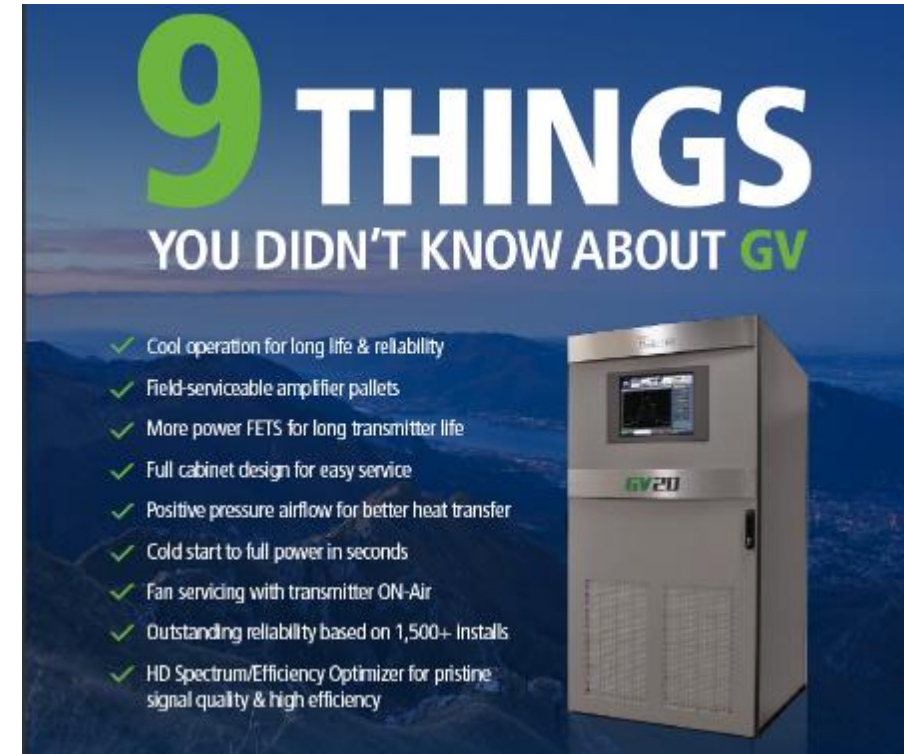
The screenshot shows a GoToWebinar control panel with two main sections: 'Audio' and 'Questions'. The 'Audio' section includes a menu icon, an orange arrow icon (circled in red), 'Audio Mode' options (Use Telephone and Use Mic & Speakers), a 'MUTED' status indicator, and an 'Audio Setup' link. The 'Questions' section features a large empty text box and a smaller input field containing the placeholder text '[Enter a question for staff]' (circled in red), with a 'Send' button to its right. At the bottom, there is a promotional banner for GoToWebinar with the text 'Start Holding your Own Web Events with GoToWebinar' and 'Webinar ID: 977-124-241'.



Remember: The completion of a Nautel webinar qualifies for ½ SBE re-certification credit, identified under Category I of the Re-certification Schedule for SBE Certifications.

Why Nautel for HD?

- Transmitter:
 - Optimized HD performance:
 - HD Spectrum Efficiency Optimizer
 - High HD Efficiency
 - More Power:
 - HD PowerBoost advantage over PAR2
 - Longer life and cooler operation
 - more power FETs per Watt
 - Coming soon... continued improvements and innovation
 - History of upgrades:
 - New mode support and legacy product updates



9 THINGS
YOU DIDN'T KNOW ABOUT **GV**

- ✓ Cool operation for long life & reliability
- ✓ Field-serviceable amplifier pallets
- ✓ More power FETS for long transmitter life
- ✓ Full cabinet design for easy service
- ✓ Positive pressure airflow for better heat transfer
- ✓ Cold start to full power in seconds
- ✓ Fan servicing with transmitter ON-Air
- ✓ Outstanding reliability based on 1,500+ Installs
- ✓ HD Spectrum/Efficiency Optimizer for pristine signal quality & high efficiency

Why Nautel for HD?

- HD MultiCast+ Importer/Exporter
 - Fast innovation vs closed box approaches
 - 64 bit CPU with extensive driver and application support
 - Flexible functionality:
 - Audio processing, CODECs, Disaster Recovery, Multiple Importer instances
 - Flexible deployment:
 - Traditional Site Server only
 - or with Cloud back-up
 - or Cloud-primary with site server back-up
 - Investment protection



What broadcasters say about their HD MultiCast+

Reliability rating: 

“Easy to setup”

“It’s rock steadiness”

“Reliability”

“integration of Artist Experience / MSAC is a huge bonus!”

“It's an all in one solution - and is stable.”

“HD Reliable Transport....worked without using up STL bandwidth.”

The power of software implemented HD:

Accelerated innovation

Only Nautel

- Accelerated Innovation Path
- Future-proof platform
- Eliminating blend issues
- Incorporating virtualization
- Flexible, Cost effective
- Investment protected
- Standards

Flexible



1st Gen4 2017

- Software based



Applications



- Audio processing
- Codecs

Virtualization



- Virtual Audio processing
- Blend issue elimination
- Disaster recovery
- Implementation flexibility

advanced features



Other Gen4 platforms

- Shipping in 2019
- Fixed box approach
- Blend issue correction

? years

11 years between major releases

Gen3 2008



Why Windows LTSB?

It's about drivers, fast development, quick implementation of new capabilities

- **LTSB is not your normal windows:**
 - Think embedded but with access to the rich catalog of broadcast drivers
 - **LTSB is only for mission-critical devices.**
 - Medical, banking, SCADA, and may even be in your Audio Processor
- **Windows 10 LTSB eliminates bloat**
 - No Windows Store, Cortana, Microsoft Edge, Calendar
 - No Camera, Clock, Mail, Money, Music, News, OneNote, Sports, etc
- **Stable locked version**
 - No unscheduled updates to take you off air while they install.
 - Typical 10-year support commitment
 - No surprises with updates killing drivers
 - Updates are bundled into new releases every few years



HD *MULTICAST+* Combined Importer/Exporter



HD *MULTICAST*+

Importer/Exporter

- **User-configurable:**
 - Importer/Exporter
 - Exporter
 - Importer
- **HD Radio Gen4**
 - Gen3 compatible
- **Expandable Platform**
 - Add hardware
 - Add software
- **HD Reliable Transport**
- **2 Orban 1101e (option)**
- **Virtualization-ready**
- **Multi-Importer support**
 - Multiple instances (Option)
- **Windows LTSC**
 - Long-Term Servicing Branch
 - 2-3 year upgrade cycle
 - Maintained security

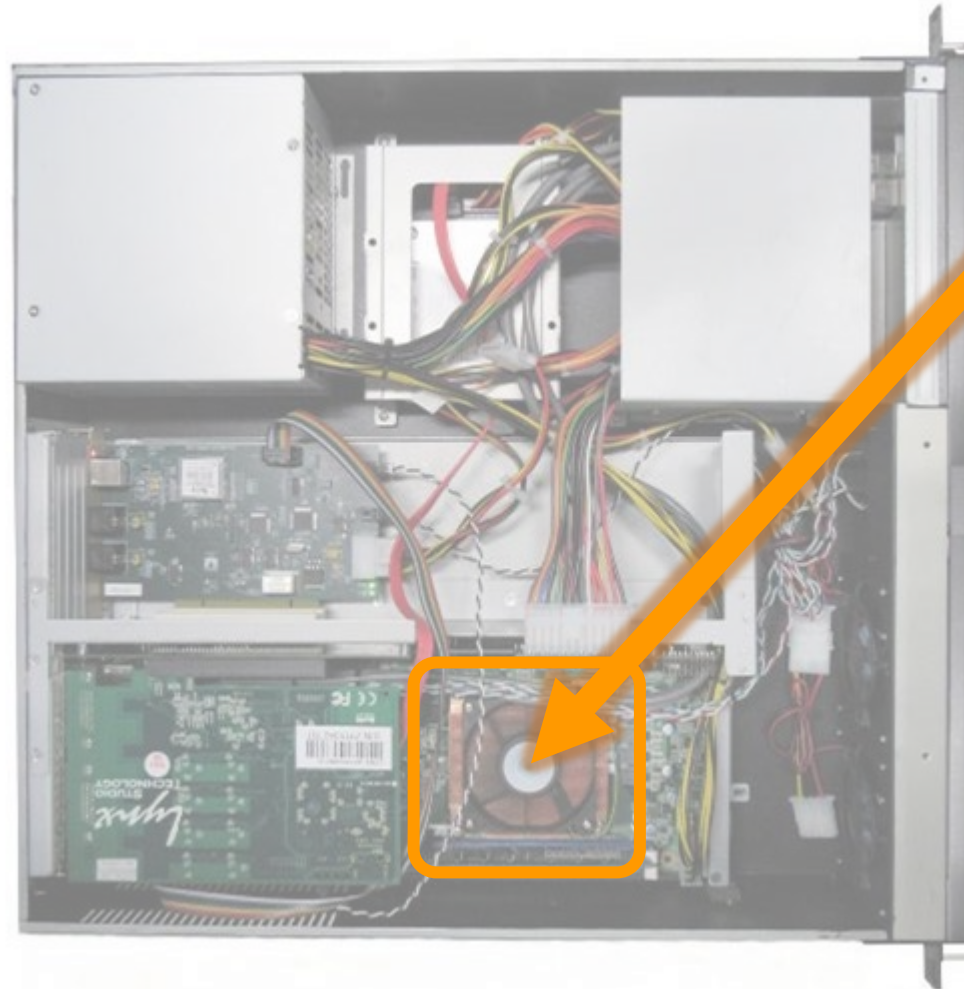
Inside the Box

Intel Core i5-6500

6th Generation

Intel Quad-Core i5
processor

- Powerful
- Fast
- 64-bit



Inside the Box

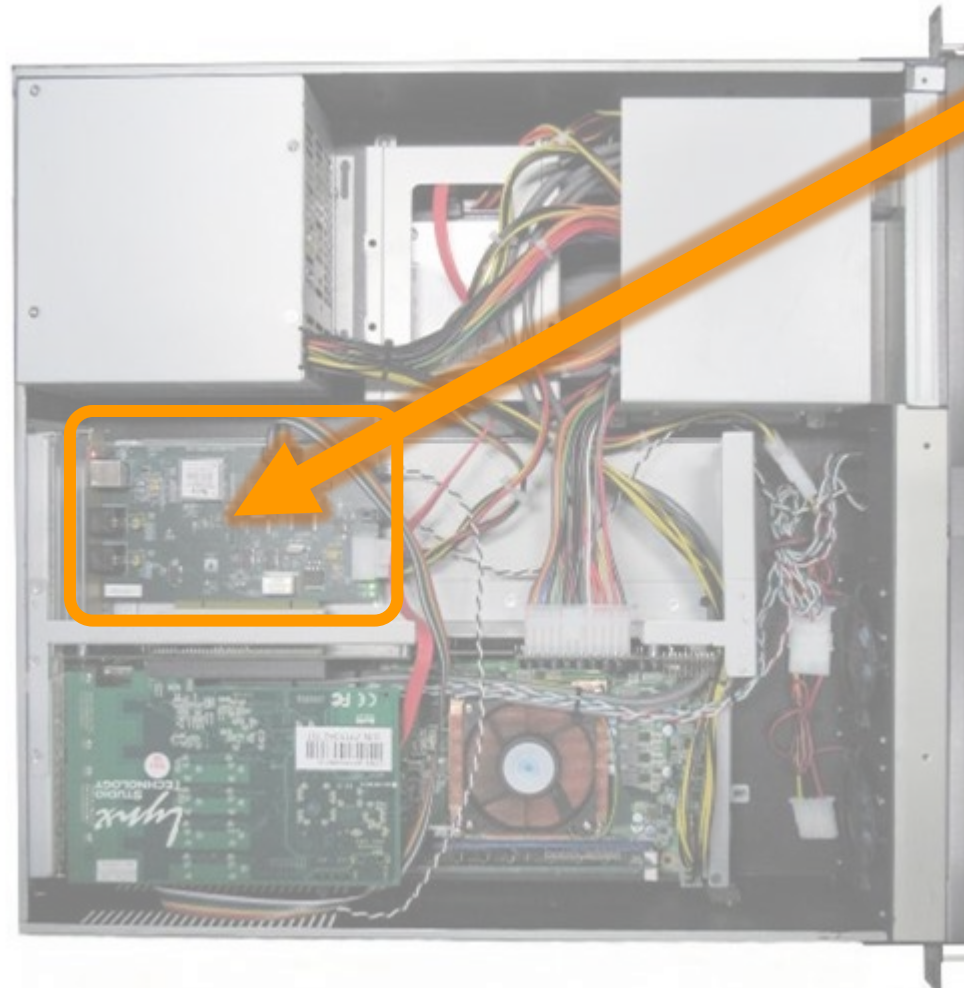
Outdoor GPS antenna and feed line included.



Monitor app

A screenshot of a software application window titled 'GPS_Monitor'. The window displays the Nautel logo and 'GPS MONITOR' in a header. Below is a table with GPS data.

GPS MONITOR	
SATELLITES	8
HDOP	1.7
NAV VALID	YES
LATITUDE	44.5712
LONGITUDE	-63.9170
UTC	2017/5/01 14:15:16



Integrated GPS receiver

1 PPS is system heart beat

Ovenized 10 MHz Crystal

- 10 ppb temperature stability
- great holdover capability

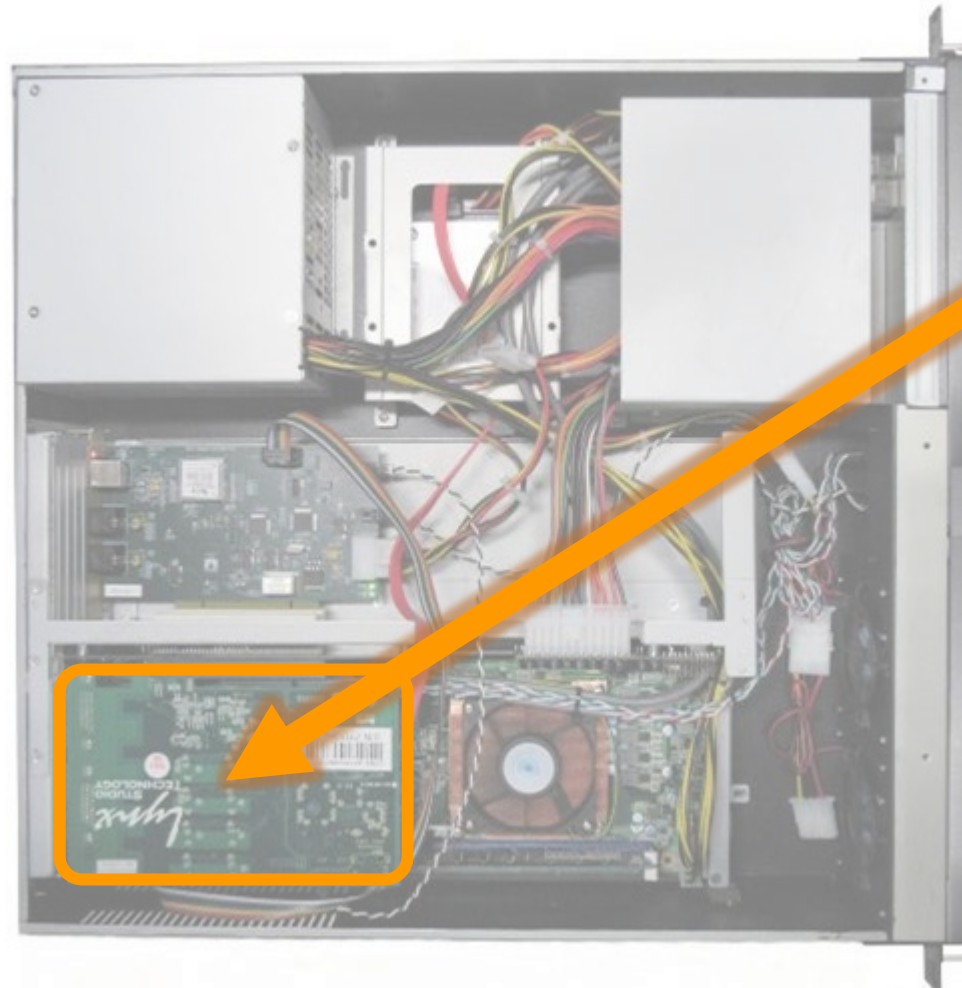
2 External BNCs

- 10 MHz or 44.1 kHz word clock

Internal 44.1 kHz word clock

Inside the Box

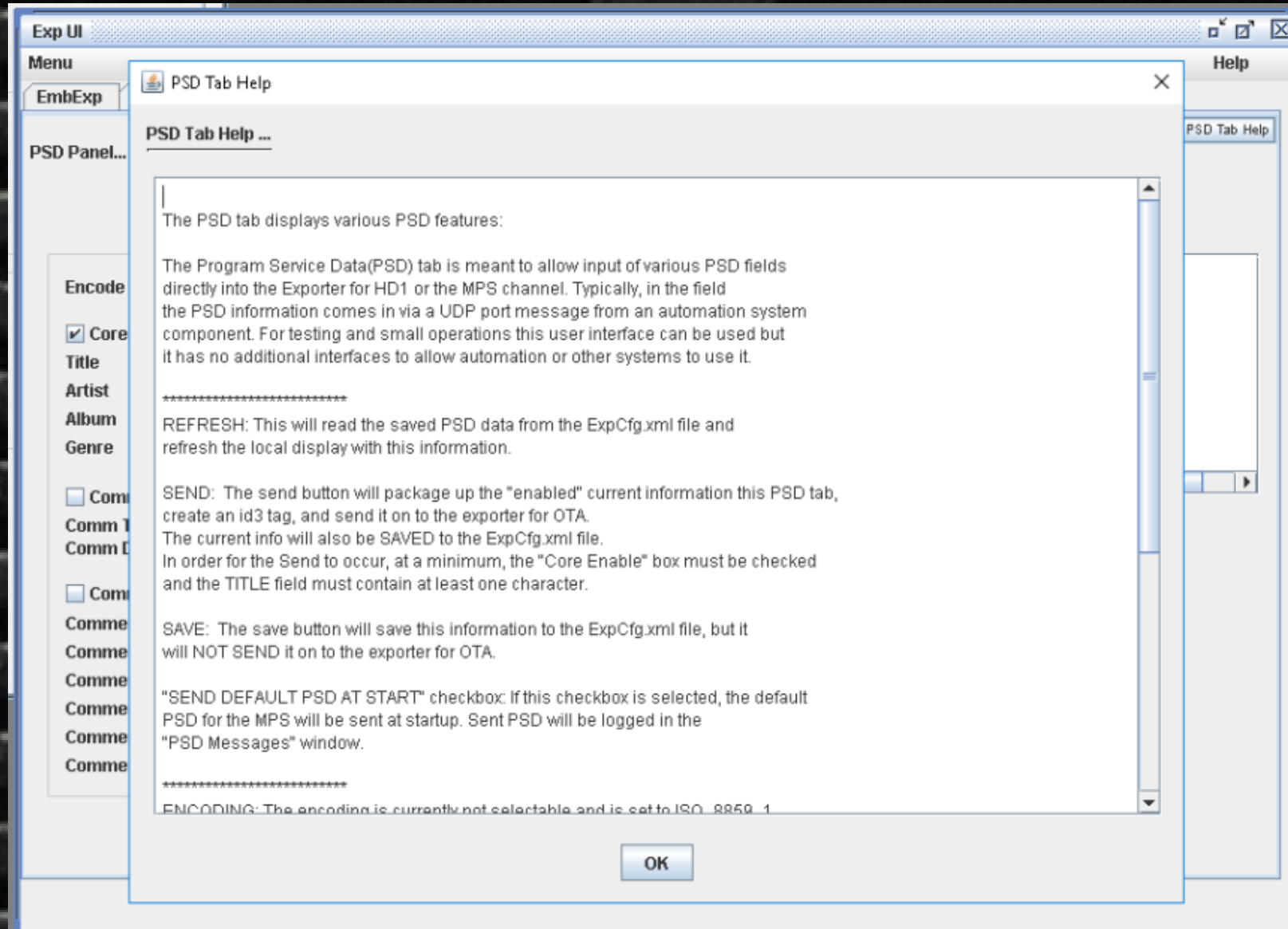
Lynx Mixer



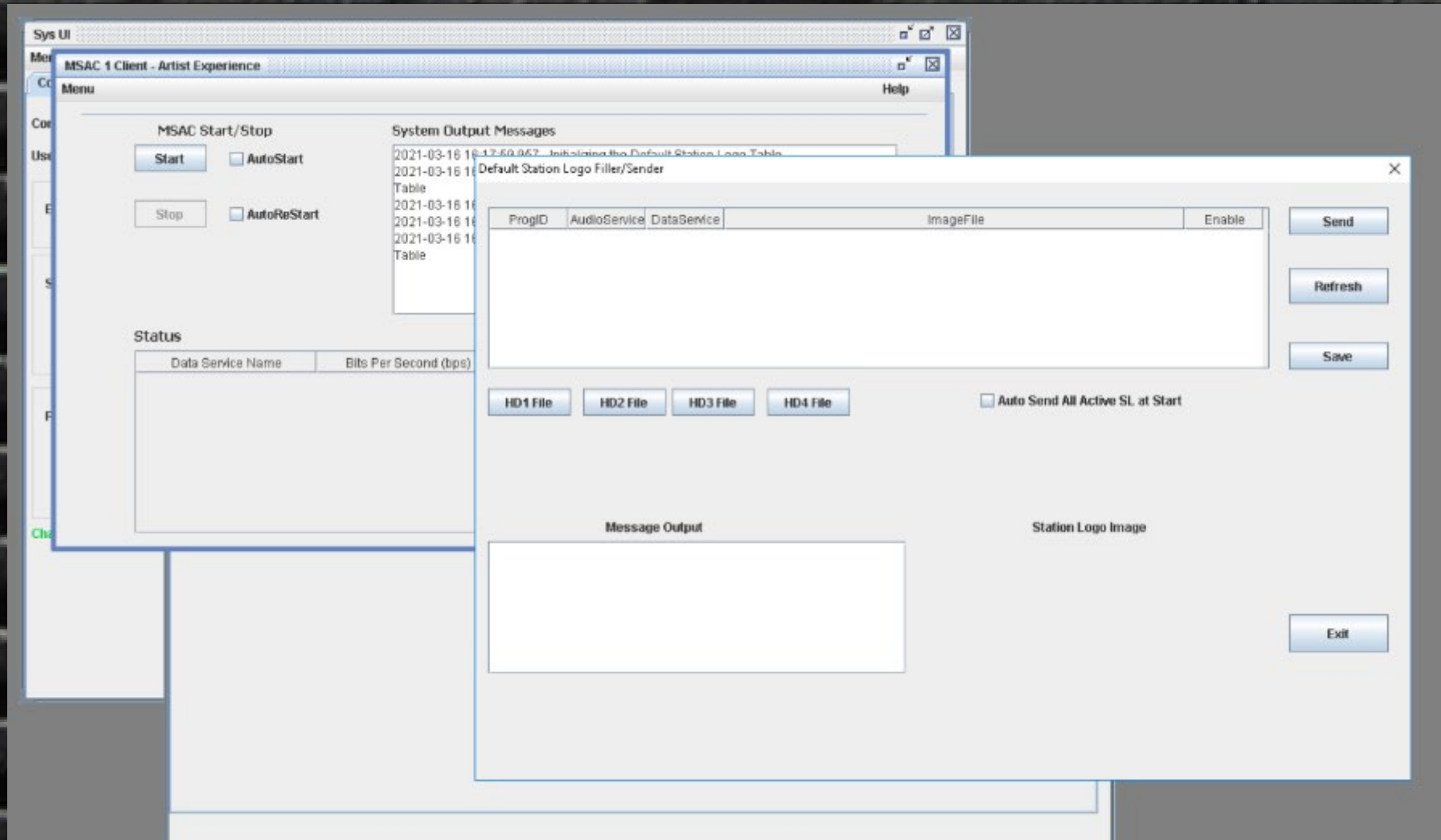
Lynx AES16e PCIe card

- 8 audio capture and play
- Asynchronous sample rate converters (ASRCs)
- Internal 44.1 kHz word clock from GPS card

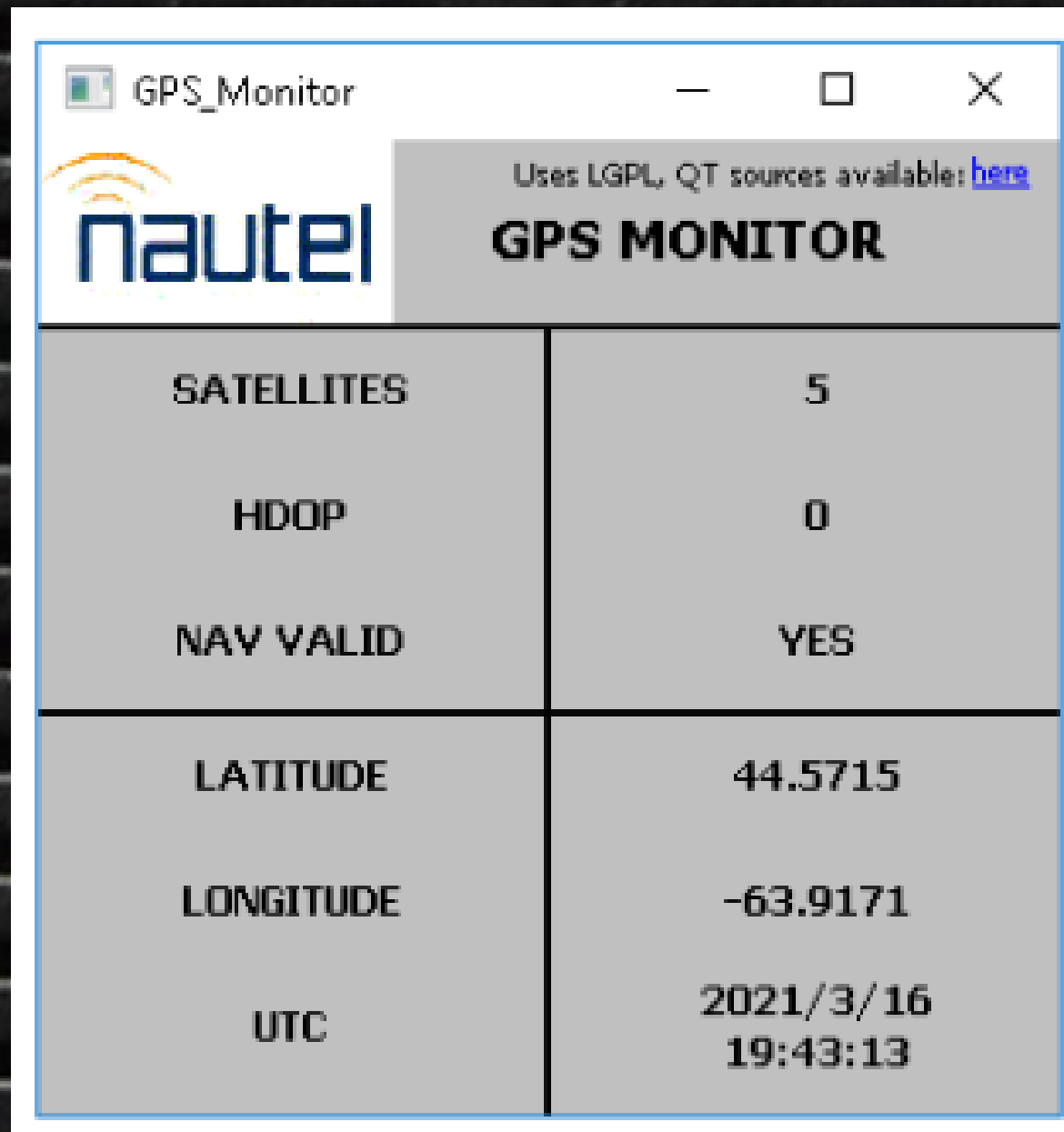
Inside the HDMC+



Inside the HDMC+



Inside the HDMC+



The screenshot shows a window titled "GPS_Monitor" with standard window controls. The application header includes the Nautel logo and the text "Uses LGPL, QT sources available: [here](#)". The main content area is titled "GPS MONITOR" and displays the following data:

SATELLITES	5
HDOP	0
NAV VALID	YES
LATITUDE	44.5715
LONGITUDE	-63.9171
UTC	2021/3/16 19:43:13



Sys UI Help

Menu Comm License Cfg/Utility SysCfg

Comm Panel... Comm Tab Help

User Message: CommControl Sync Changed From: DISABLED To: ENABLED

Engine IP:
 (See SysCfg Panel To Change IP)

Sync State ● ● ● NOT_SYNCHRONIZED

Active Configuration: AM_MA3_1HD_AE

AM_MA3_1HD_AE Active Services: HD1

Run State ● ● ●

- AM_MA3_1HD_AE
- FM_MP2_2HD_HD-EVEN_AE
- FM_MP2_1HD_AE
- FM_MP3_4HD_HD-EVEN
- FM_MP3_4HD_HD-EVEN_AE
- FM_MP3_4HD_HD1.MID
- FM_MP3_4HD_HD1.MID_AE
- FM_MP3_4HD_HD1.MID_HD2-HI
- FM_MP3_4HD_HD1.MID_HD2-HI_AE

ChangeSysRunState message completed

PSD Help

TSM ADD

PSD Tab Help

Send Default PSD At Start

ISO 8859_1

HD Radio...www.HD-Radio.com [125 Char Limit]

[125 Char Limit]

[125 Char Limit]

[125 Char Limit]

[127 Char Limit] Short Content Description

[127 Char Limit] Actual Text

Currency Amount

USD 10.00 [Currency Code and Price Amount String]

URL www.HD-Radio.com [127 Char Limit]

20171124

Other

Commercial Recv As

Commercial Seller Name [127 Char Limit]

Commercial Seller Desc [127 Char Limit]

PSD Messages

Inside the HDMC+ (the manual, this time)

Table 1.1: FM_MP1_<BWOption> - Default Configurations and Bitrates

Service Name:	HD1	HD2	HD3	AE
Service Provider:	SELF	SELF	SELF	SELF
Service Type:	Audio	Audio	Audio	DATA
Program Id:	0	1	2	N/A
Channel:	P1	P1	P1	P1
BW Option	(bps)	(bps)	(bps)	(bps)
FM_MP1_3HD_HD-EVEN	32994	32132	32132	
FM_MP1_3HD_HD-EVEN_AE	32132	28859	28859	6384
FM_MP1_3HD_HD1-MID	47464	24897	24897	
FM_MP1_3HD_HD1-MID_AE	45569	22141	22141	6379
FM_MP1_3HD_HD2-HI	47464	29893	19902	
FM_MP1_3HD_HD2-HI_AE	45569	26620	17662	6379
FM_MP1_3HD_HD1-HI	63313	16973	16973	
FM_MP1_3HD_HD1-HI_AE	59350	15250	15250	6379
FM_MP1_2HD_HD1-HI	63657	33855		
FM_MP1_2HD_HD1-HI_AE	60384	32132		4290
FM_MP1_2HD_HD1-MID	53838	43674		
FM_MP1_2HD_HD1-MID_AE	51771	40746		4290
FM_MP1_2HD_HD-EVEN	48842	48670		
FM_MP1_2HD_HD-EVEN_AE	46775	45741		4290
FM_MP1_1HD	97766			
FM_MP1_1HD_AE	94493			2885




Sys UI Help

Menu
Comm License CfgUtility SysCfg

Comm Panel... Reload Page Comm Tab Help


User Message: CommControl Sync Changed From: DISABLED To: ENABLED List

Engine IP: Set IP
(See SysCfg Panel To Change IP)

Sync State  NOT_SYNCHRONIZED

Active Configuration: AM_MA3_1HD_AE

Set Active Config Active Services: Update

Run State  STOPPED

Run AutoRun/Restart

Stop

ChangeSysRunState message completed

Exp UI Help

Menu
EmbExp MPS PSD TSM ADD

EmbExp Panel... Refresh Save Importer Active

Core: Primary Carrier Cfg

SMDC	Bandwidth	MPS Size	AAS Size
P1		<input type="text" value="483"/>	<input type="text" value="0"/>
P2		<input type="text" value="0"/>	<input type="text" value="0"/>
P3		<input type="text" value="002E"/>	<input type="text" value="894"/>
P4		<input type="text" value="0"/>	<input type="text" value="0"/>

ImporterToExporter Delay

MPS: Decode Digital Enable

Service Prog Type

Sound Exp

Core Channel Mode

SIS:

Country Code [A-Z][A-Z]

FCC ID [1-524287]

Station Name (Call Sign)

Short Name Append "FM"

UnivShort Name Append "FM" Encode

Slogan

Name Encode

Station Message

Info Encode High Priority

Inside the HDMC+

Sys UI Help

Menu Comm License CfgUtility SysCfg

SysCfg Panel...

Note: 'Save' button applies changes on next restart, 'Reload Page' reloads values from startup
'GetSavedData' reloads values saved to SysCfg file, values used On Restart

Select Component

protocol

port

ip

timeout

retry

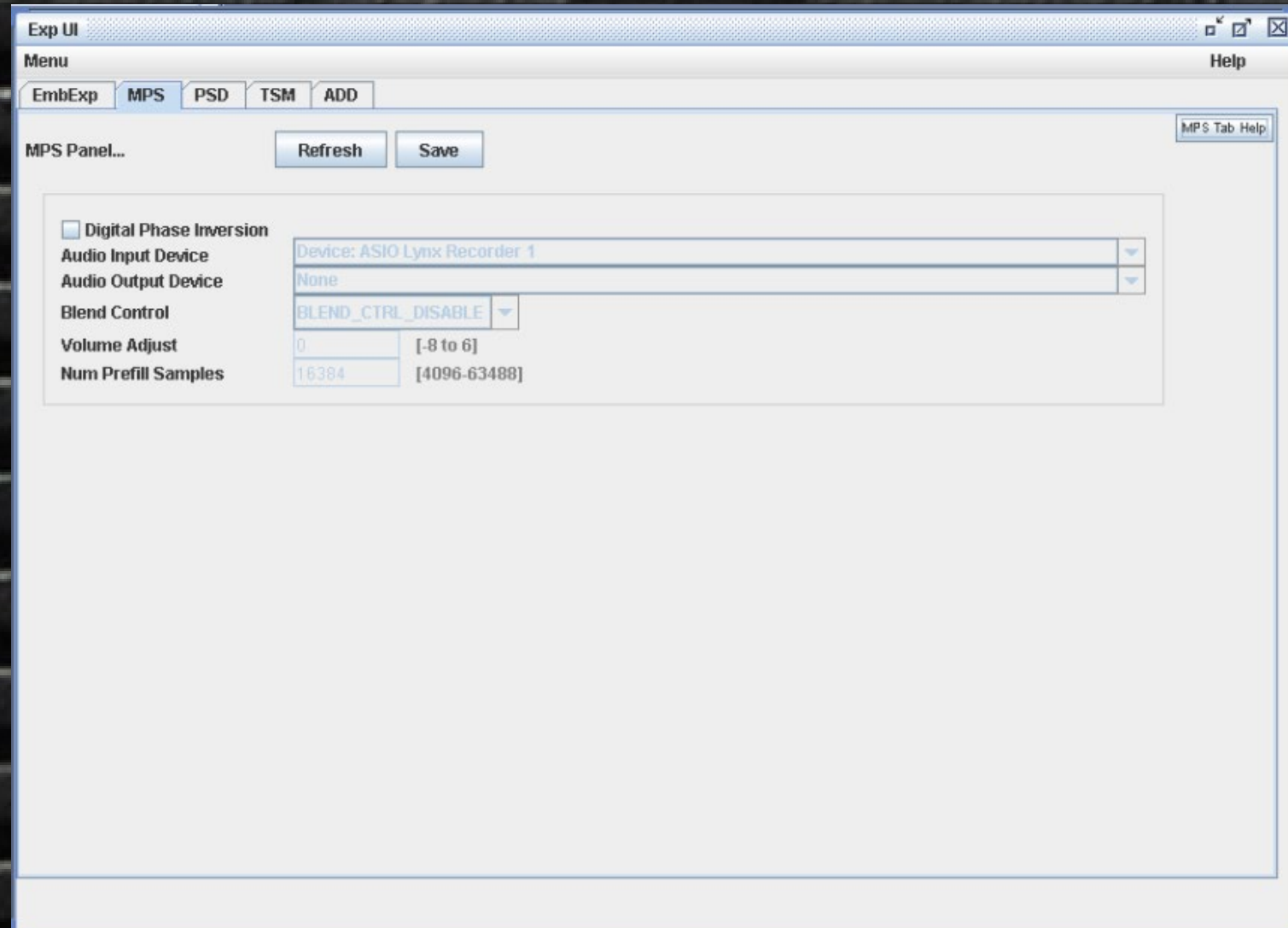
linkName

linkDesc

commandLineArgs



Inside the HDMC+



Inside the HDMC+

Exp UI Help

Menu: EmbExp MPS **PSD** TSM ADD

PSD Panel... PSD Tab Help

Refresh Save Send

Send Default PSD At Start

Encode ISO_8859_1

Core Enable

Title [125 Char Limit]

Artist [125 Char Limit]

Album [125 Char Limit]

Genre [125 Char Limit]

Comment Enable

Comm Title [127 Char Limit] Short Content Description

Comm Desc [127 Char Limit] Actual Text

Commercial Enable

Commercial Price Currency Amount
USD [Currency Code and Price Amount String]

Commercial Contact URL [127 Char Limit]

Commercial Valid Until ?

Commercial Recv As Other

Commercial Seller Name [127 Char Limit]

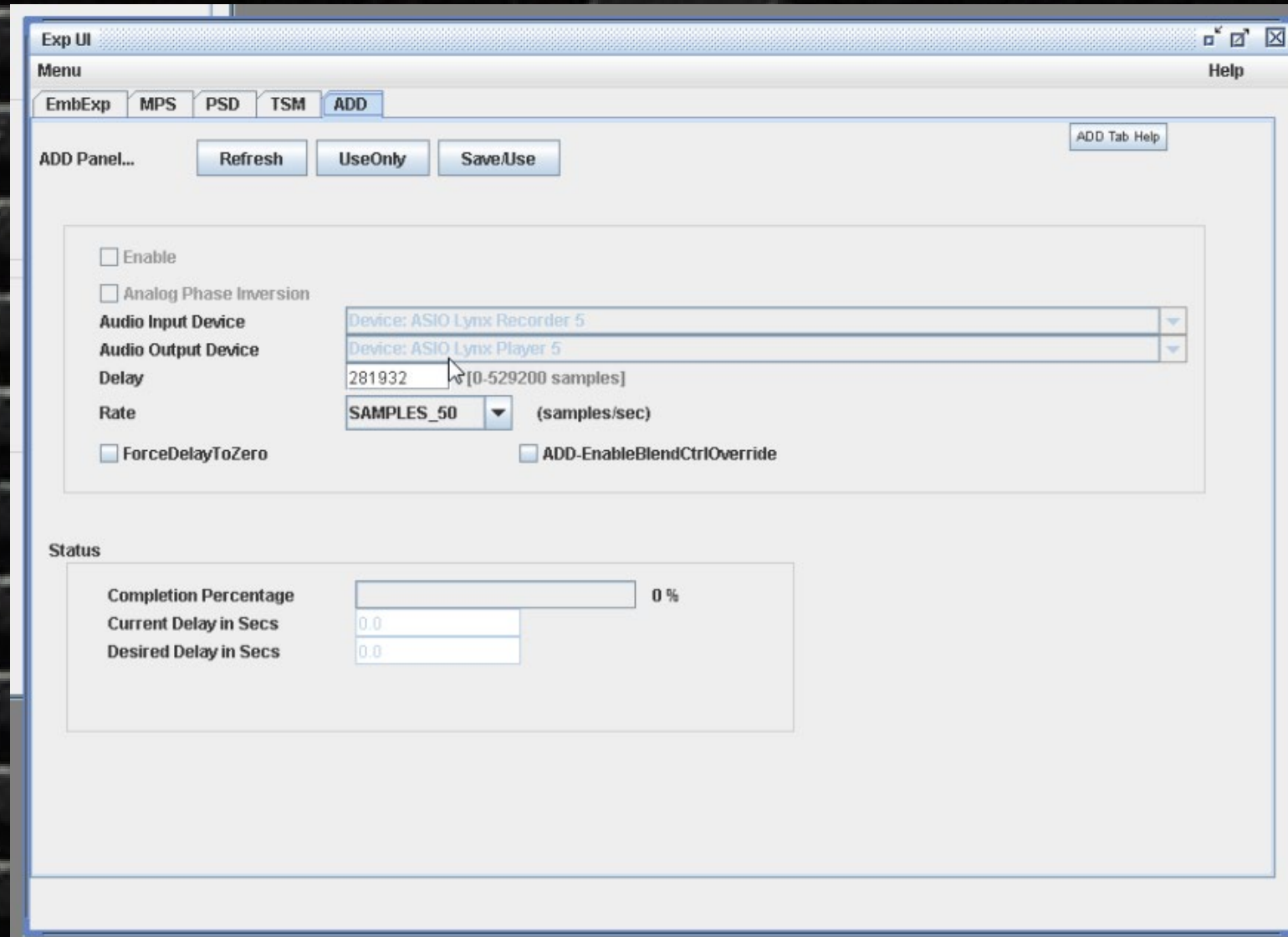
Commercial Seller Desc [127 Char Limit]

PSD Messages

← | →



Inside the HDMC+



Inside the HDMC+

Sys UI Help

Menu Help

Comm License CfgUtility **SysCfg**

SysCfg Panel...

Note: 'Save' button applies changes on next restart, 'Reload Page' reloads values from startup
'GetSavedData' reloads values saved to SysCfg file, values used On Restart

Select Component

SysApp

inUdpPort

processTimeout

opMode

autoRun

commandLineArgs



Inside the HDMC+

Sys UI Help

Menu Help

Comm License CfgUtility **SysCfg**

SysCfg Panel...

Note: 'Save' button applies changes on next restart, 'Reload Page' reloads values from startup
'GetSavedData' reloads values saved to SysCfg file, values used On Restart

Select Component

ControlPanel

embedded

All Clients as Process

Importer as Processes

Start All Clients Only

HD2 load	<input type="text" value="true"/>	HD2 IP	<input type="text" value="127.0.0.1"/>	MSAC1 load	<input type="text" value="false"/>	MSAC1 IP	<input type="text" value="127.0.0.1"/>
HD3 load	<input type="text" value="true"/>	HD3 IP	<input type="text" value="127.0.0.1"/>	MSAC2 load	<input type="text" value="false"/>	MSAC2 IP	<input type="text" value="127.0.0.1"/>
HD4 load	<input type="text" value="false"/>	HD4 IP	<input type="text" value="127.0.0.1"/>	MSAC3 load	<input type="text" value="false"/>	MSAC3 IP	<input type="text" value="127.0.0.1"/>
HD5 load	<input type="text" value="false"/>	HD5 IP	<input type="text" value="127.0.0.1"/>	MSAC4 load	<input type="text" value="false"/>	MSAC4 IP	<input type="text" value="127.0.0.1"/>
HD6 load	<input type="text" value="false"/>	HD6 IP	<input type="text" value="127.0.0.1"/>				
HD7 load	<input type="text" value="false"/>	HD7 IP	<input type="text" value="127.0.0.1"/>				
HD8 load	<input type="text" value="false"/>	HD8 IP	<input type="text" value="127.0.0.1"/>				




Inside the HDMC+


MainWindow

Reliable HD Transport Configuration

Subject Title	Parameter	Note
exginelp0	10.10.10.200	Exgine's IP address (255.255.255.255 for bcast)
exgineMac0	00:50:c2:59:73:17	Exgine MAC address (0-uses ARP)
exginelp1	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac1	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp2	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac2	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp3	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac3	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp4	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac4	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp5	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac5	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp6	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac6	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)
exginelp7	0.0.0.0	Exgine's IP address (255.255.255.255 for bcast)
exgineMac7	00:00:00:00:00:00	Exgine MAC address (0-uses ARP)

 Recover Save Apply EXIT

Uses LGPL, QT sources available: [here](#)



Nautel's HD Vision

- **Dramatically** easier and more affordable Digital
 - engage the next 2000 stations
 - Un-boxing HD, holistic air chain approach
 - Eliminate blend issues not just correct
- Current hardware approaches limit innovation:
 - ...slow incremental improvement
 - ...ignore the power of integration with other apps in the AIR-Chain

Nautel's HD Vision

- **Dramatically** easier and more affordable Digital
 - engage the next 2000 stations
 - Un-boxing HD, holistic air chain approach
 - Eliminate blend issues not just correct
- Current hardware approaches limit innovation:
- **Software and virtualization are the game changers**
 - Cut costs, eliminate boxes/STLs, virtual applications, not just transport
 - New maintenance models, new business models, flexibility
 - Real innovation, disruption, improvement
 - Think about what happened with COVID & main studio Rule

The power of software implemented HD:

Accelerated innovation

Only Nautel

- Accelerated Innovation Path
- Future-proof platform
- Eliminating blend issues
- Incorporating virtualization
- Flexible, Cost effective
- Investment protected
- Standards

Flexible



1st Gen4 2017

- Software based



Applications



- Audio processing
- Codecs

Virtualization



- Virtual Audio processing
- Blend issue elimination
- Disaster recovery
- Implementation flexibility

advanced features



Other Gen4 platforms

- Shipping in 2019
- Fixed box approach
- Blend issue correction

? years

11 years between major releases

Gen3 2008

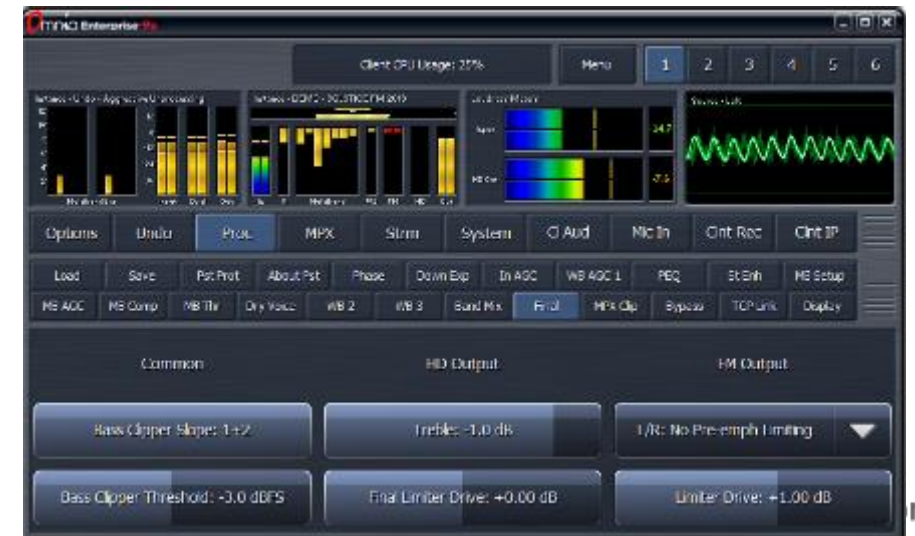


Why cloud? Virtualization vs Physical Equipment

- Alignment with the IT industry (IP Based)
 - The source of many of our standards (incl security)
 - The source of much of our hardware
- Customizable and Flexible
 - Workflows vary widely and can change (hybrid options)
 - Spin up and down instances as needed
 - Example: Telos Alliance Omnia Enterprise 9s
- More future friendly as standards and operating systems change
- Reliability/Availability/Maintainability
 - Reduce traditional dedicated broadcast hardware
 - (i.e., one box per purpose) for greater redundancy
 - Less wiring / fewer site visits / remote management

Watch the Telos Webinar - BBC
80 Studios collapsed into
2 data centres

<https://www.telosalliance.com/News/Telos-Alliance-Announces-Studio-Anywhere-Virtual-Showcase>



Software implementation vs Physical Equipment

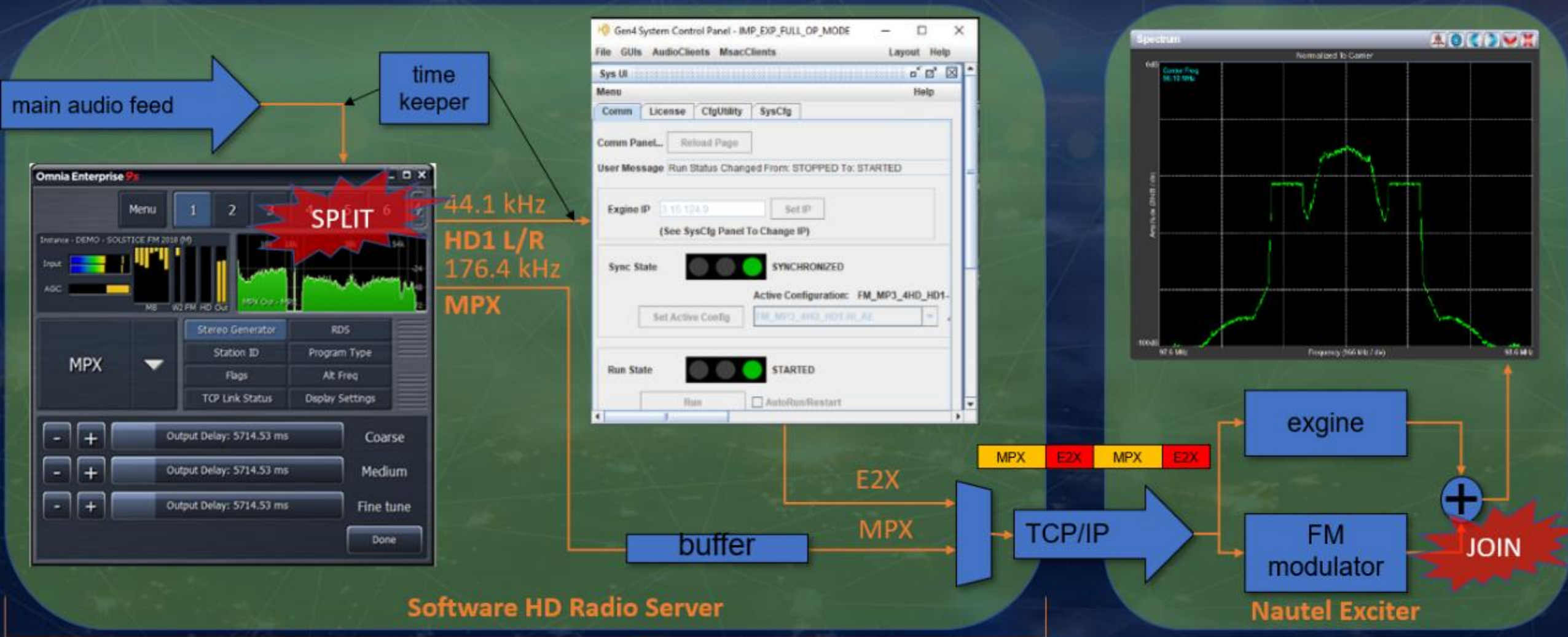


- Embedded Windows
- Accelerated Innovation Path
- Flexible, Cost effective
- Standards
- Multi-function
- Future-proof: Drivers, Apps
- Future:
 - Incorporating virtualization
 - Eliminate blend drift
 - Integrated Audio Processing
 - Disaster recovery
 - Implementation flexibility



- Embedded Linux
- Innovation Path Limitations
- Less flexible, Higher Cost
- Proprietary Hardware
- Single function
- Closed box design
- Future upgrades:
 - Replace Box

Synchronous System from SPLIT to JOIN



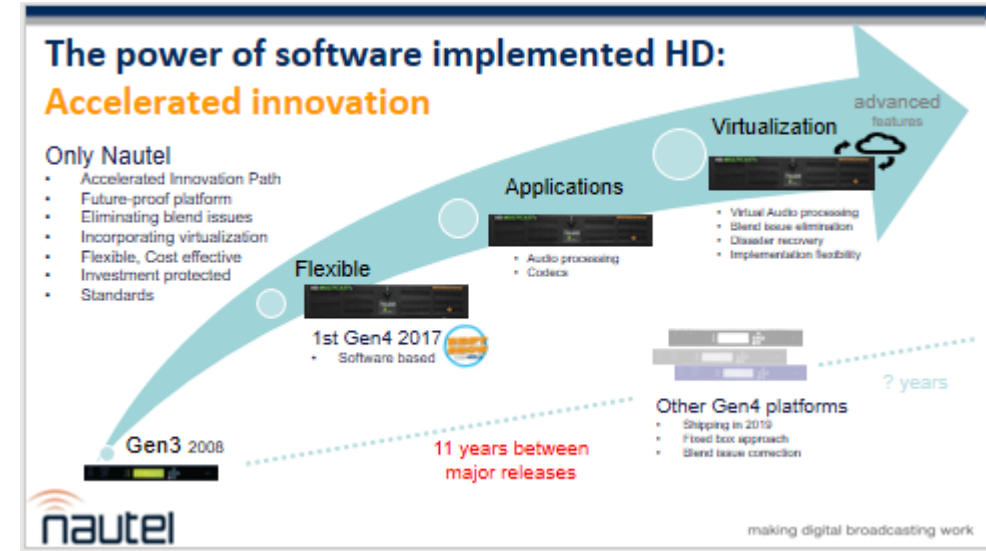
Considerations:

- Flexibility – ability to add software as needed.
- Configuration – don't forget the gotchas!
- Future proofing
- Long Term Service and Support

Other Questions?

Summary: Why Nautel for HD?

- Rugged, proven HD Transmitters:
 - Exceptional HD performance, efficiency, control
 - Longer life and cooler operations
- HD Implementation:
 - Flexible multi functional Importer/Exporter
 - Audio Processing, CODECs, Disaster recovery
 - Unique software implementation
 - Fastest innovation path to new capabilities
- Nautel HD Vision
 - Leveraging software implementation strategy to create **dramatically easier and more affordable digital**



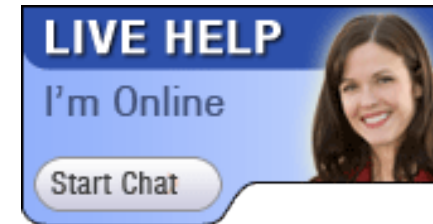
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making digital broadcasting work

Learn More / Stay in touch

- Nautel Waves Newsletter
<https://www.nautel.com/newsletters/>
- Webinars
<https://www.nautel.com/resources/webinars/>
- YouTube
<http://www.youtube.com/user/NautelLtd>



Thank You