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infocomm

The Evolution of AV-over-IP: DM® Technology The Next Generation

Instructor: Kyle Marles

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DM NVX™ technology products

DM-NVX-350(C)

May 2017

- 2 HDMI® in, 1 HDMI® out
- Analog audio in/out
- Bi-directional USB 2.0
- RS-232, IR and CEC
- Operates either as TX or RX
- Box and card form factors

DM-NVX-351(C)

May 2017

- Same I/O as DM-NVX-350
- DSP for down-mixing audio to blend multi-channel and 2-channel outputs
- Dolby®, Dolby TrueHD, DTS®, DTS Master-HD, PCM formats

DMF-CI-8

May 2017

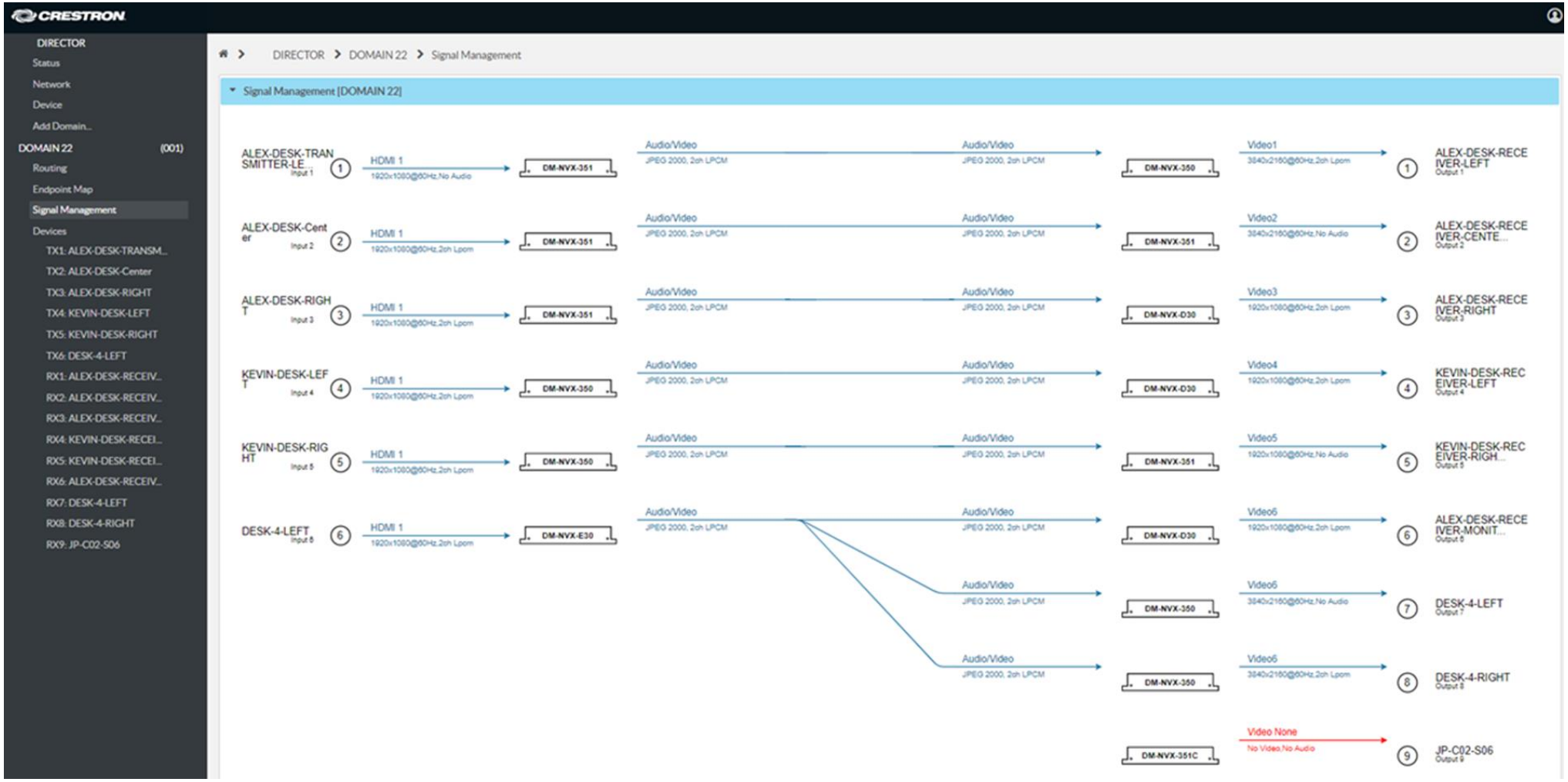
- Rackmount cage to hold DM NVX™ endpoint cards
- Highest density form factor – 8 cards in 2RU
- Provides AC power and LCD for troubleshooting

DM NVX Director™

January 2018

- Master controller for DM NVX™ technology systems
- Provides central control, management, monitoring point
- Available in 80, 160 and 1,000 endpoint versions

DM NVX Director™ Virtual Switching Appliance



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DM NVX™ technology over the last 18 months

To date Crestron has sold over 120,000 DM NVX™ endpoints since it started shipping in September 2017

More than 5,000 engineers/technicians from our industry have attended Crestron DM NVX™ technology training

DM NVX™ technology is the culmination of 10 years of industry leading DigitalMedia™ technology engineering, development, and experience

DM NVX™ Technology Next Generation

New Pixel Perfect Processing Technology

Even Better Performance

Quality

Latency

Free firmware upgrade for existing units

You must upgrade all end points to the current release firmware to ensure compatibly between them.

Pixel Perfect Processing

YES.

DM NVX™ Technology, The 1Gb Network AV Solution that works with any network, any application, any design.

Any network, any ask. DM NVX™ technology says yes.

Every network, every device, every format, every type of content, every type of room. And every picture Pixel Perfect. **DM NVX™ technology says yes, yes and yes.**

Every Picture Perfect. Every time. Yes.

The only Network AV solution that delivers flawless video and Pixel Perfect images.

- Pixel Perfect Processing only available with DM NVX™ endpoints, developed in conjunction with Intel and intoPIX
  - Developed over 18 months
  - Builds on the fundamentals and efficiencies of JPEG 2000
  - Adds to DM NVX™ technology reputation for flawless video
- Delivers the same quality as a direct HDMI® source
- Imperceptibly perfect, see the finest detail in the most dense image

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See the finest detail in the densest image

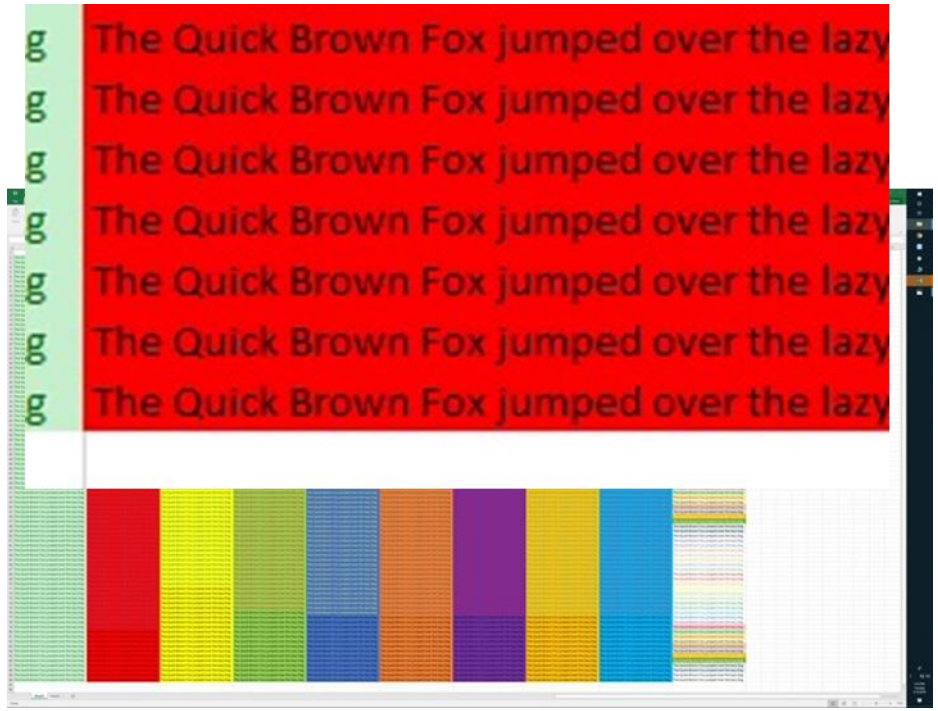
First gen image - JPEG2000

New Image - Pixel Perfect Processing

See the finest detail in the densest image

First gen image - JPEG2000

New Image - Pixel Perfect Processing



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Every movement in real time. Yes.

Experience imperceptibly responsive technology

Meets Human Interface Device standard

- Ensures synchronized camera and audio
- Mouse and keyboard move with you

Feels like an extension of you

Works in real time with real people

Test The Latency

If you don’t believe me about the even lower latency, go try out gaming via DM NVX™ technology downstairs on the stand

What is Pixel Perfect Processing Technology?

A new technology exclusive to Crestron Electronics Powered by intoPIX

Optimized for:

Natural and computer screen content

Low latency

Low power

DM NVX™ Technology, Product Line Updates

DM NVX™ endpoint and Dante® Audio Networking

DM-NVX-352 adds Dante® audio to DM NVX™ technology

Any DM NVX™ endpoint audio input stream can be sent out over the Dante® network

Audio from the Dante® network can be embedded in HDMI® and sent to the analog outputs

Supports AES67 as well

Dante®

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Every option. Every need met. Yes.

Ecosystem of products work as one

Choose the features you need without sacrificing performance or interoperability

Everything you need, nothing you don’t

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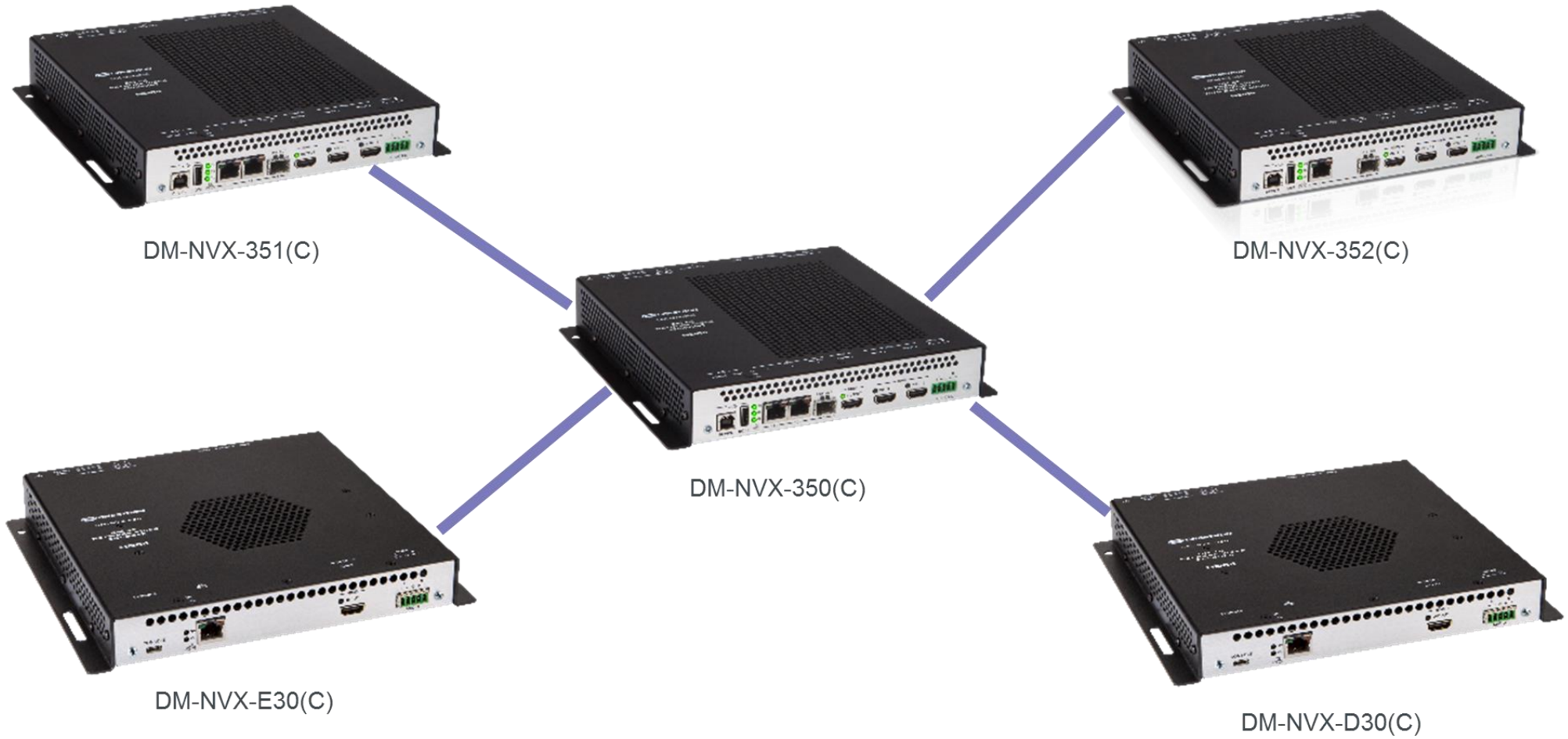
DM NVX

352 NEW	351	350	E30 NEW	D30 NEW
VIDEO				
4K60 4:4:4 HDR with Pixel Perfect Processing				
ENCODER/DECODER				
Encoder & Decoder			Encoder	Decoder
AUDIO				
Stereo 2-Channel and Digital HDMI* *Dolby Digital® • Dolby Digital EX • Dolby Digital Plus • Dolby® TrueHD • Dolby Atmos® • DTS® • DTS-ES • DTS 96/24 • DTS-HD High Res • DTS-HD Master Audio™ • LPCM up to 8 channels				
+ Dante & AES67	+ DSP Downmix			
HDMI				
2 Input & 1 Output			1 Input	1 Output
POWER				
UPoE			PoE+	
SECURITY				
802.1x / AES-128 / Active Directory / TLS / HTTPS / SSH / SSL / SFTP				

All products interoperable



Every format. Every type of content. YES.

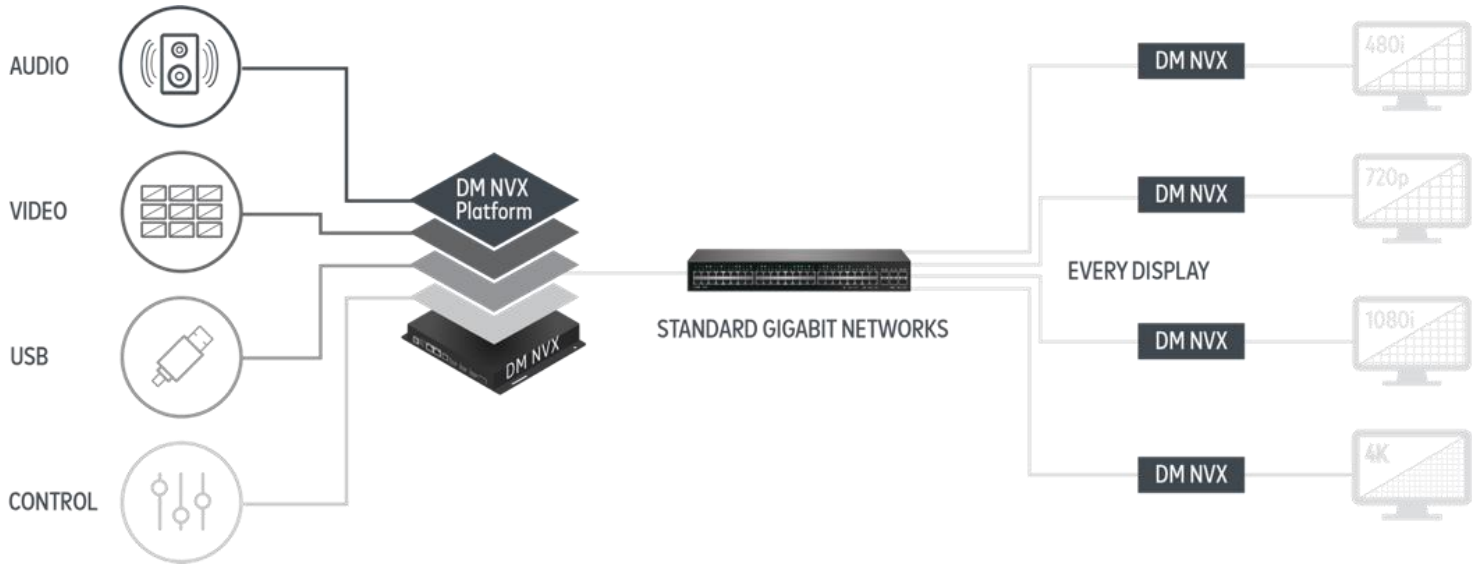
Any professional network

Any type of content

Multilayer technology combines signals onto one platform

Greater flexibility

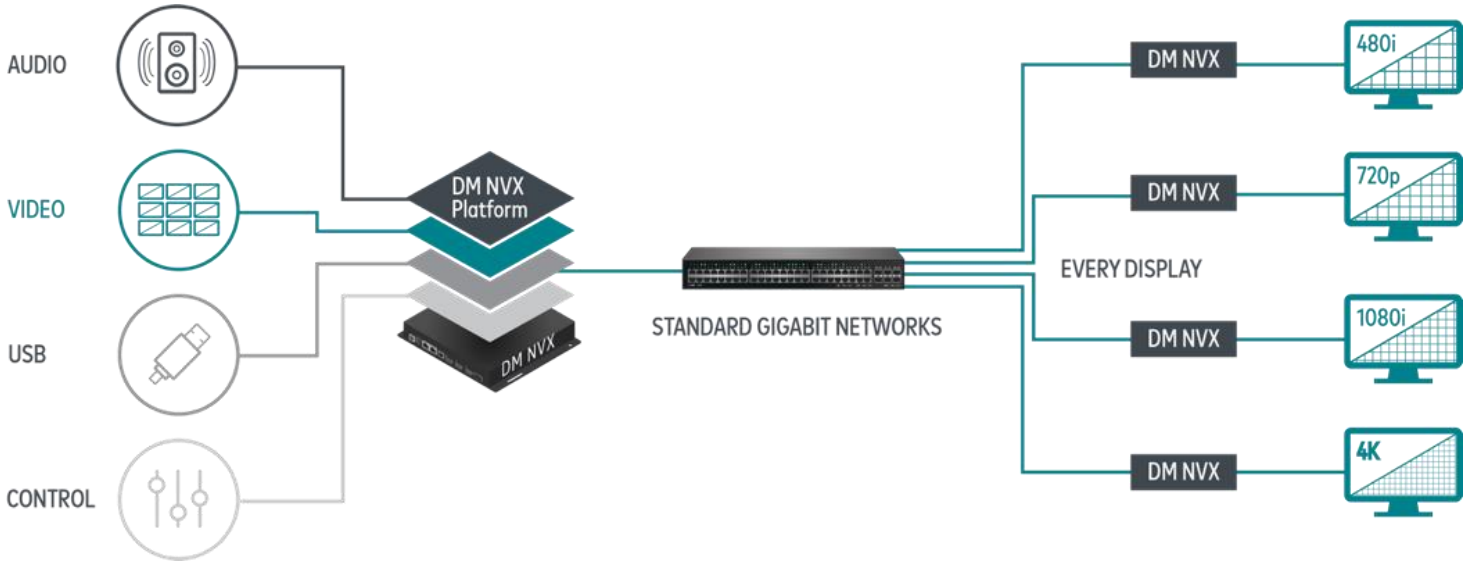
Highly scalable



Every format. Every type of content. YES.

Video

- Routing – any signal on the network to any endpoint
- Formats
  - 480i 720p
  - 1080i 1080p
  - 4K 4:2:0 4K 4:4:4
  - 4K w/ HDR
- Inputs – HDMI® or Network Video Stream
- Outputs – HDMI® or Network Video Stream
- Video Wall Processing – supports 8x8



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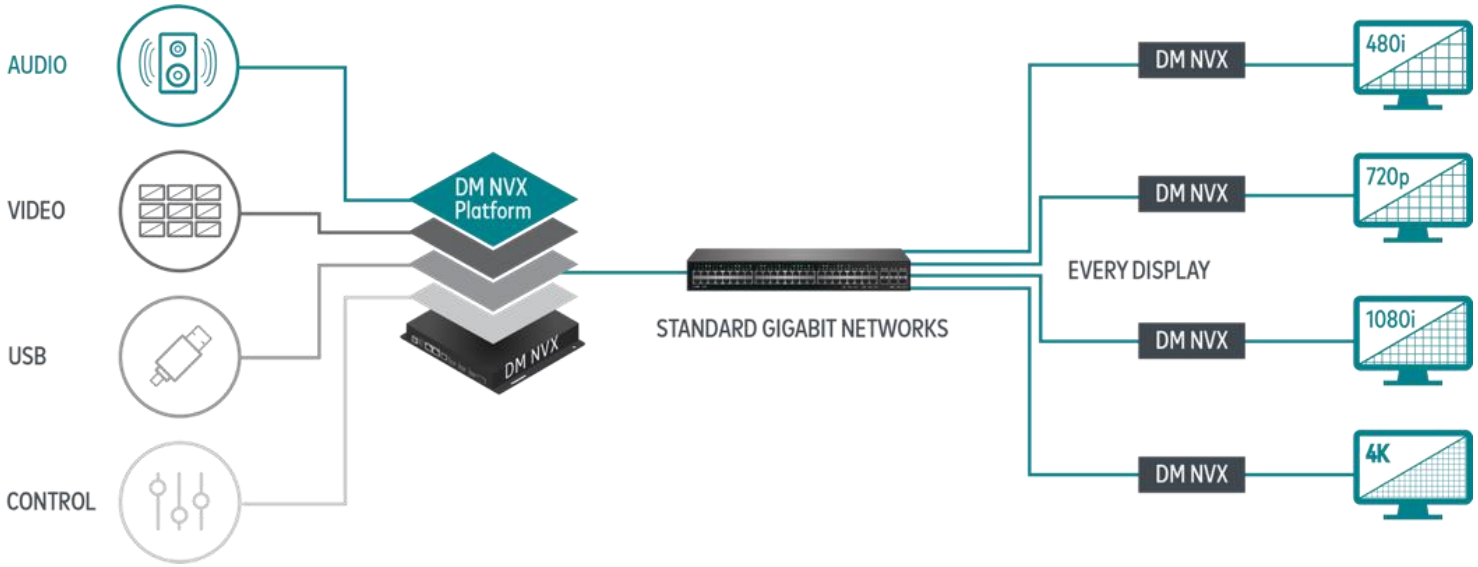
Every format. Every type of content. YES.

Audio

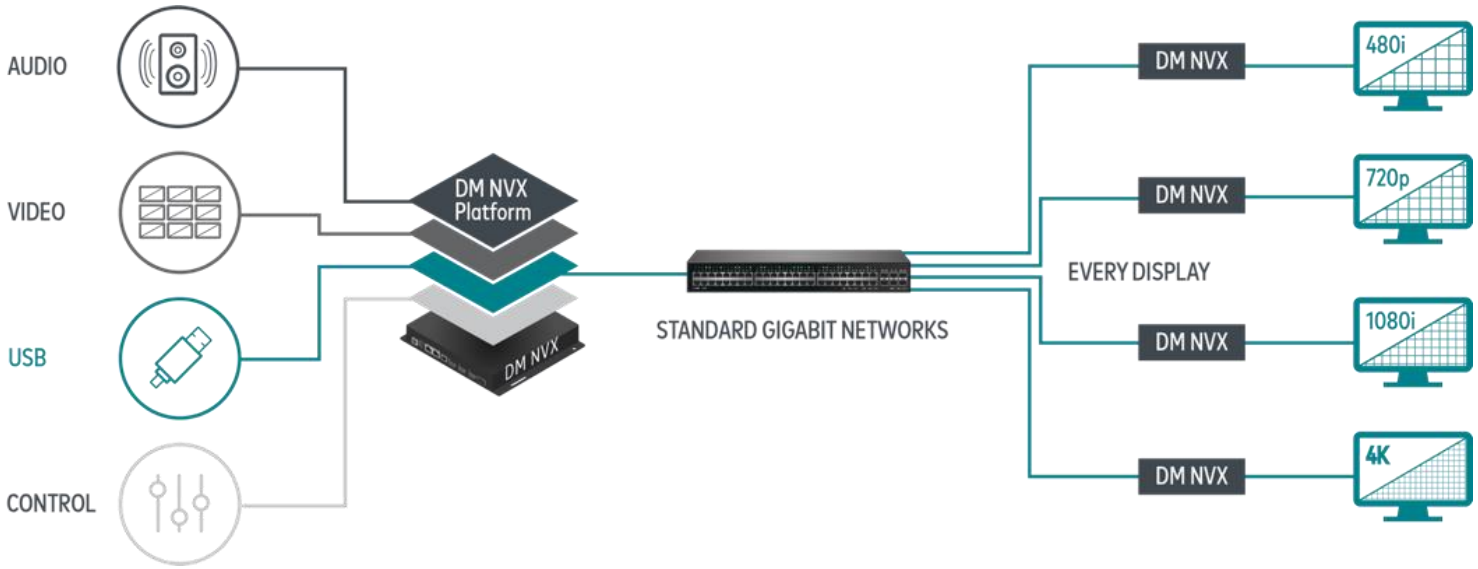
- Routing – any signal on the network to any endpoint or combine audio and video from different sources
- Formats – Digital HDMI® and Stereo 2-channel
  - Dolby Digital®
  - Dolby Digital Plus
  - Dolby Atmos®
  - DTS-ES
  - DTS-HD High Res Audio™
  - LPCM up to 8 channels
  - Dolby Digital EX
  - Dolby® TrueHD
  - DTS®
  - DTS 96/24
  - DTS-HD Master
- Downmixing – 351 includes a DSP
- Dante® & AES-67 Audio – 352 supports



Every format. Every type of content. YES.

USB

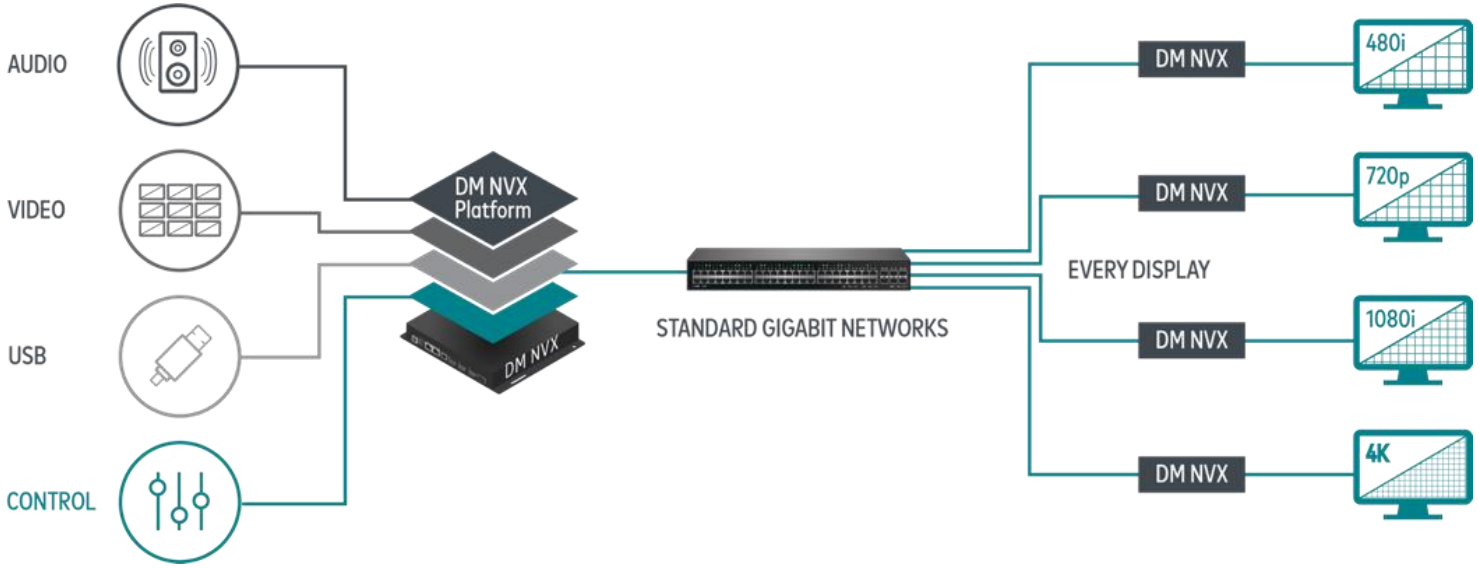
- Routing – any signal on the network to any endpoint
- Interfaces – Full USB 2.0 support
  - Mouse
  - Keyboards
  - Cameras
  - ID readers
  - PCs
  - Printers
  - Thumb drives
  - hard drives
  - video game controllers
- Bi-directional – Route in either direction, regardless of if the unit is in Transmitter or Receiver mode.



Every format. Every type of content. YES.

Control

- IP – Second RJ45 port provides control signals to a local devices
- IR & RS-232 – device acts as a gateway for control of common displays and other devices
- CEC – Built in CEC allows for display control via HDMI®



A single, simple, management system. Yes.

DM NVX Director™ virtual switching appliance is mission control

Configure, monitor and manage every DM NVX™ endpoint network wide

Real time signal routing and control

Edge Routing and Distribution

Deploy. Manage. Monitor. Evolve. Yes.

Reduce installation time by up to 90%

Configure up to thousands of devices in the same time it takes to configure one

Resolve events remotely to improve device uptime

Gather actionable usage data to optimize people, space, and technology, with no programming

Perfect for upgrading all the existing DM NVX™endpoints in on click, no need to visit site to deploy the pixel perfect firmware!

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Every Network. Yes.

Works with 1Gb networks on Cat5E cable

Partners with best in breed technology

Microsoft IoT Partner of the Year

Intel

IntoPIX

All built to the strictest guidelines to ensure the greatest security

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Every Network. Yes.

Network Standards

- Network flexibility
  - DM NVX™ technology is the 1 gigabit solution that works with any network, any application, any design
- Layer 3 Compatibility
  - DM NVX™ technology is capable of transporting data to different sub networks
- Constant Bit Rate (CBR)
  - Constant bit rate provides a predictable environment without surprises. A simple design process makes DM NVX™ technology more reliable in the long-term, helping to avoid outages in the future.

Every Network. Yes. Secured. Yes.

AES Encryption ensures secure audio and video transmission

802.1x Authentication ensures that every device on the network is explicitly authorized

Active Directory® centralized credential management

PKI Authentication authenticates specific devices and enables secure key exchanges

SSH Network Protocol encrypts and protects command line communications

Every Network. Yes. Secured. Yes.

HTTPS – encrypts the data sent between your web browser and the DM NVX™ endpoint web configuration interface

Secure CIP – Ensures secured communications between Crestron control systems and DM NVX™ endpoints

SFTP – Secure File transfer protocol

TLS – end-to-end communications security over networks

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DM NVX™ endpoint 352

Feature Summary

Transmitter Mode:

Dante® or AES67 audio embedding and de-embedding

2x1 HDMI® Switch

2 Port Ethernet Switch

- 1 Copper UPoE Port
- 1 SFP Port (Any SFP Module can be used)

Analog I/O

USB 2.0 Support

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Feature Summary

Receiver Mode:

Dante® or AES67 audio embedding and de-embedding

3x1 HDMI Switch

2 Port Ethernet Switch

- 1 Copper UPoE Port
- 1 SFP Port (Any SFP Module can be used)

Analog I/O

USB 2.0 Support

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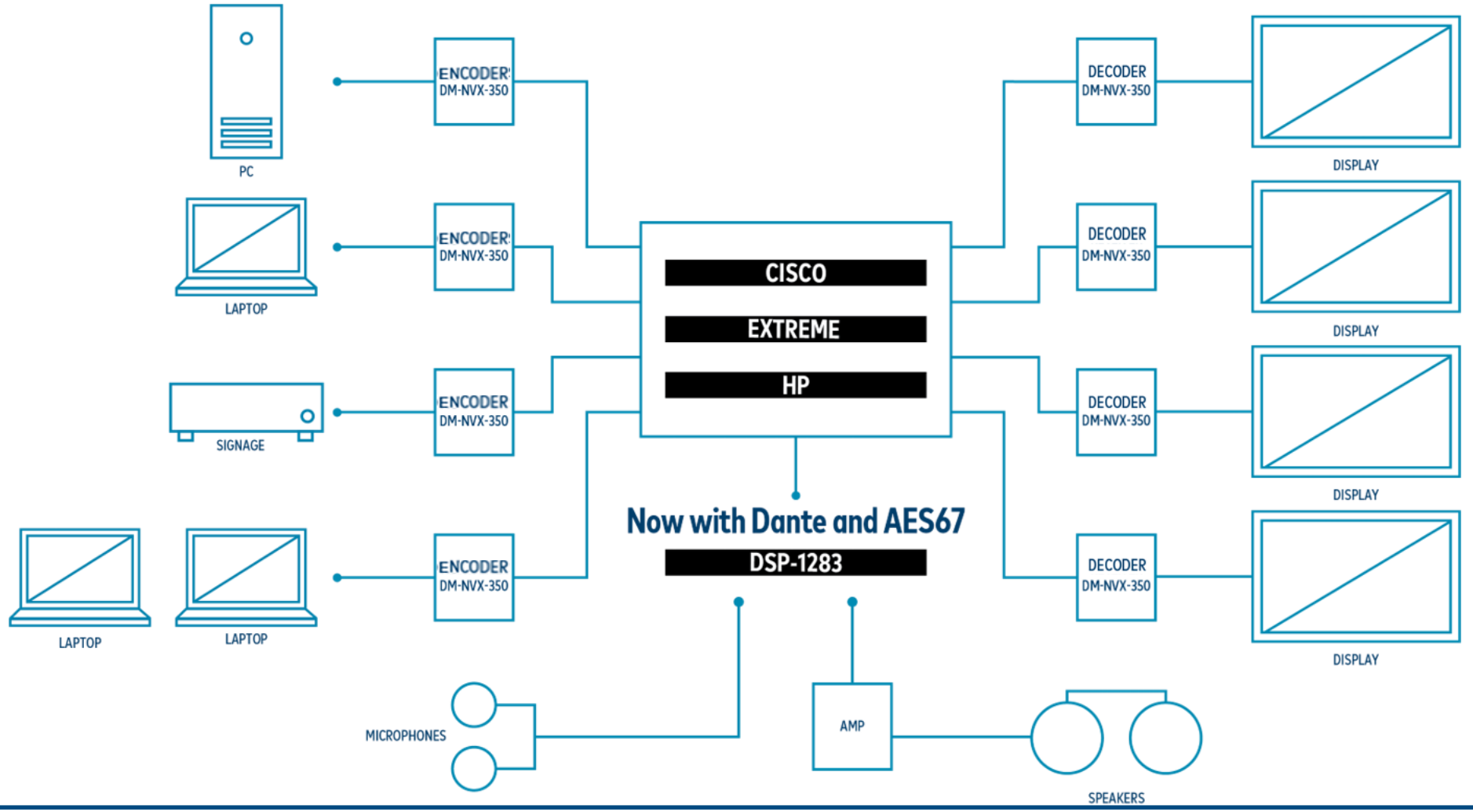
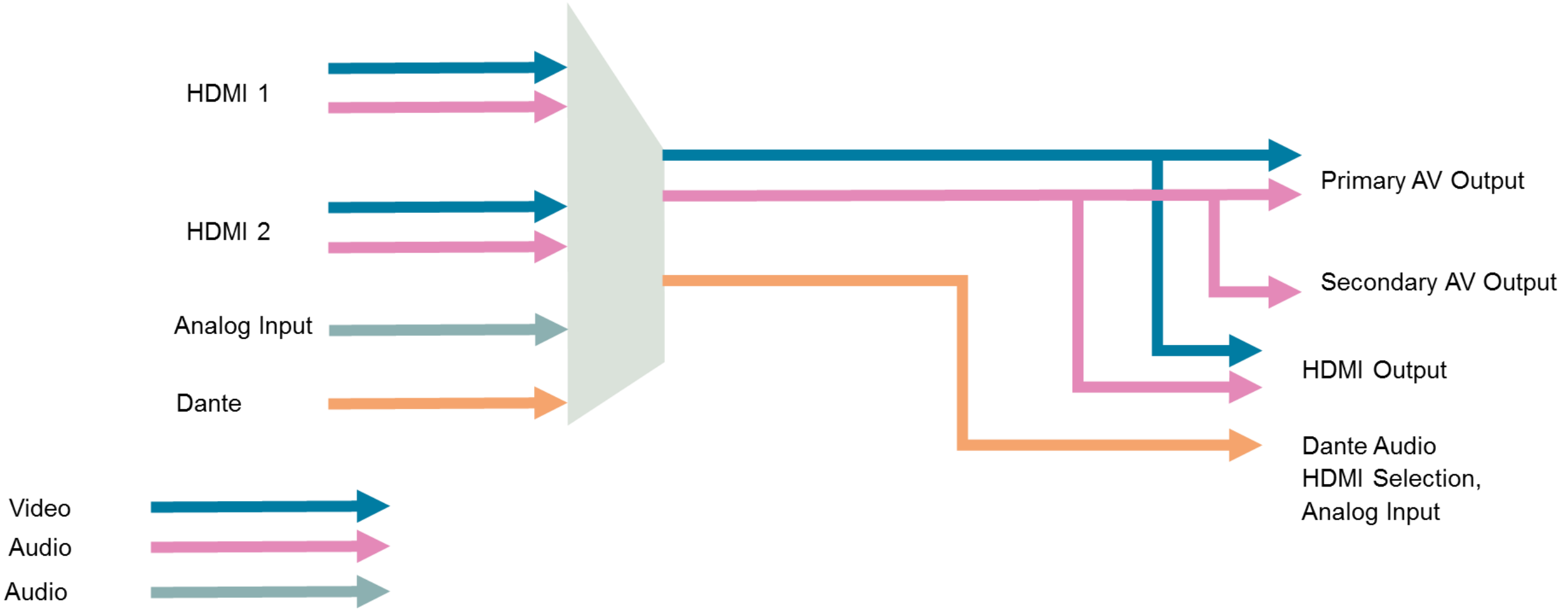
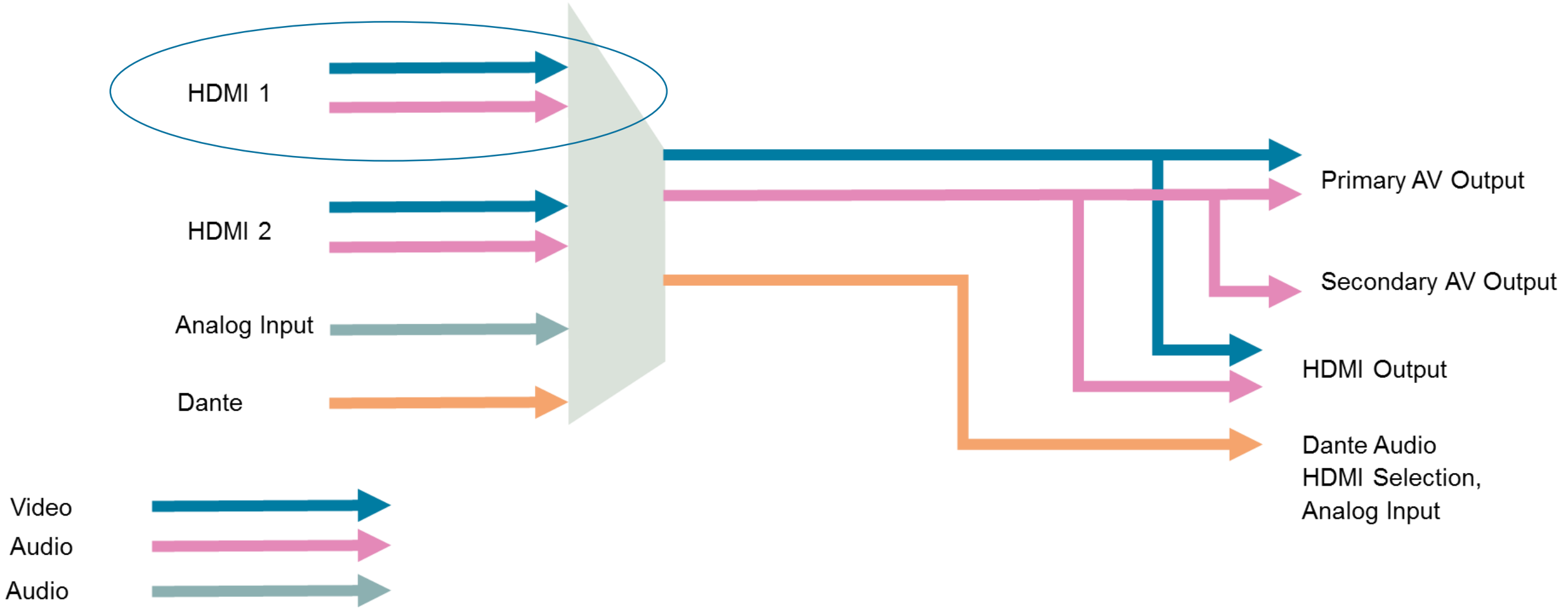
DM NVX™ technology and Dante®



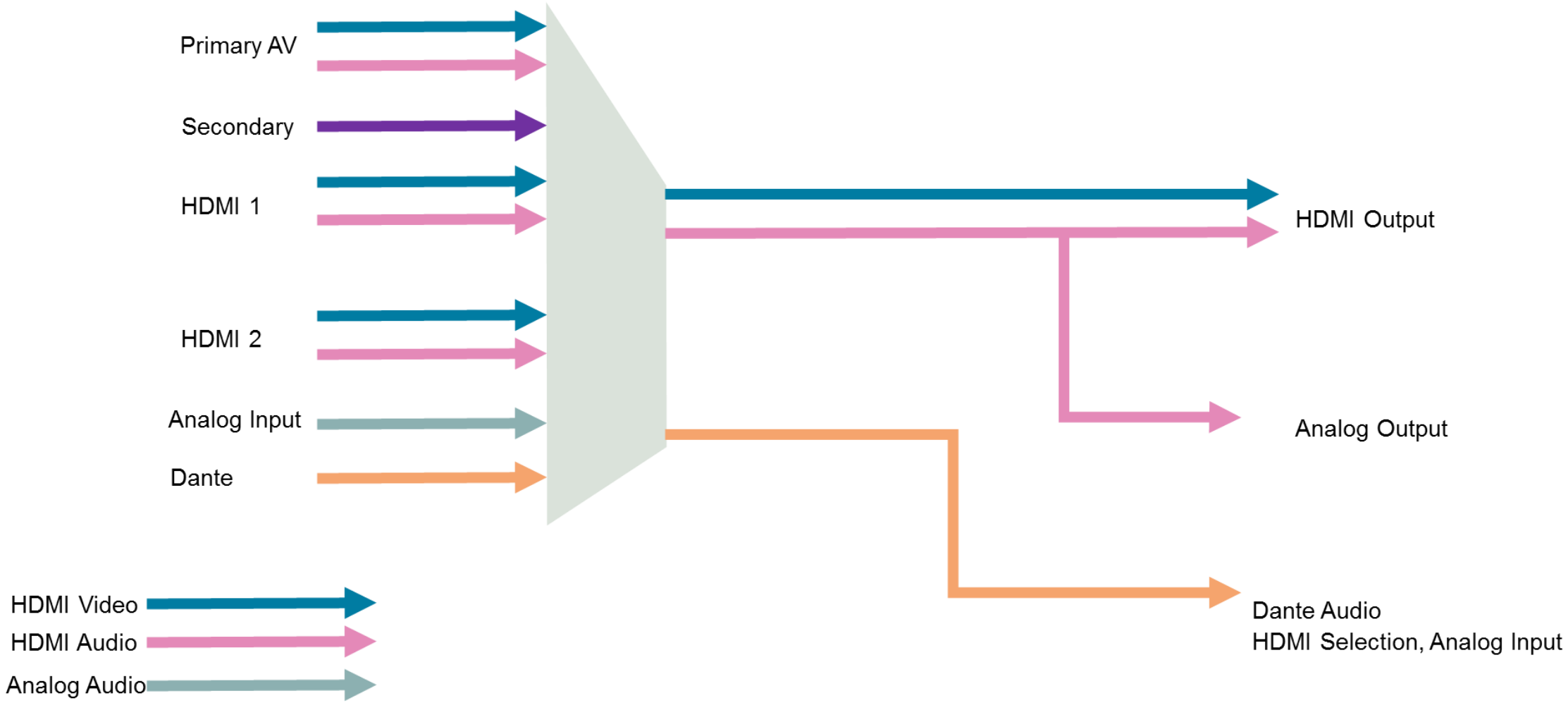
DM-NVX-352 Encode mode block diagram



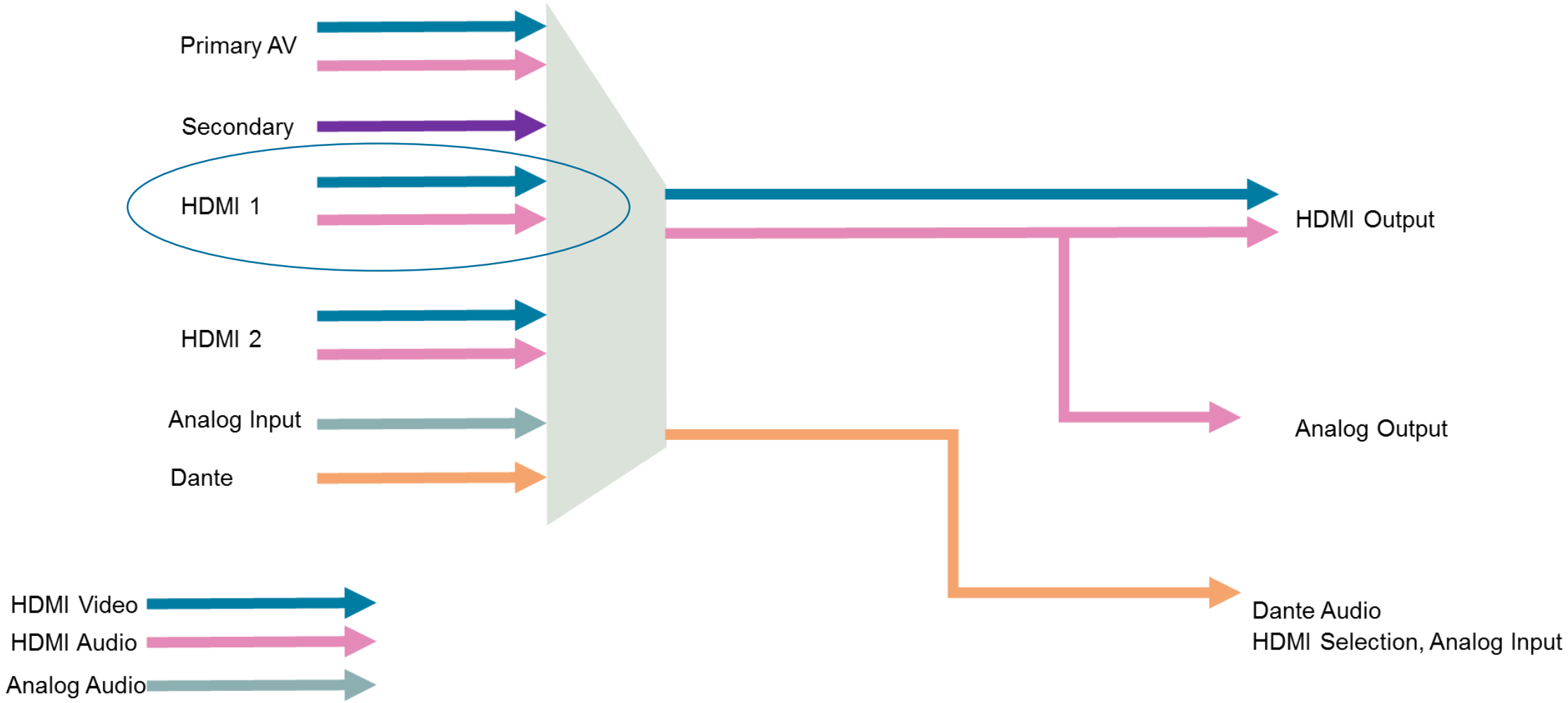
DM-NVX-352 Encode mode block diagram



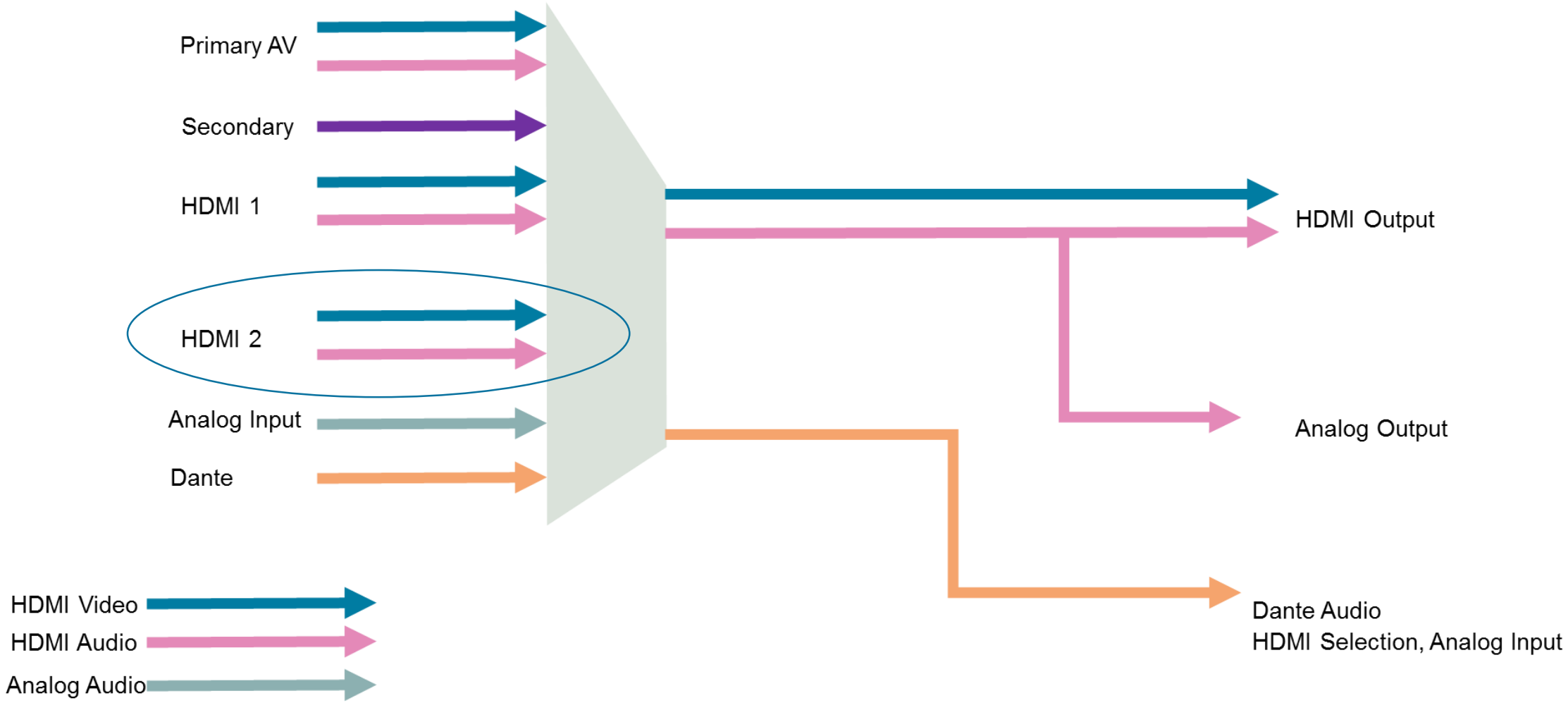
DM-NVX-352 Decode mode block diagram



DM-NVX-352 Decode mode block diagram



DM-NVX-352 Decode mode block diagram



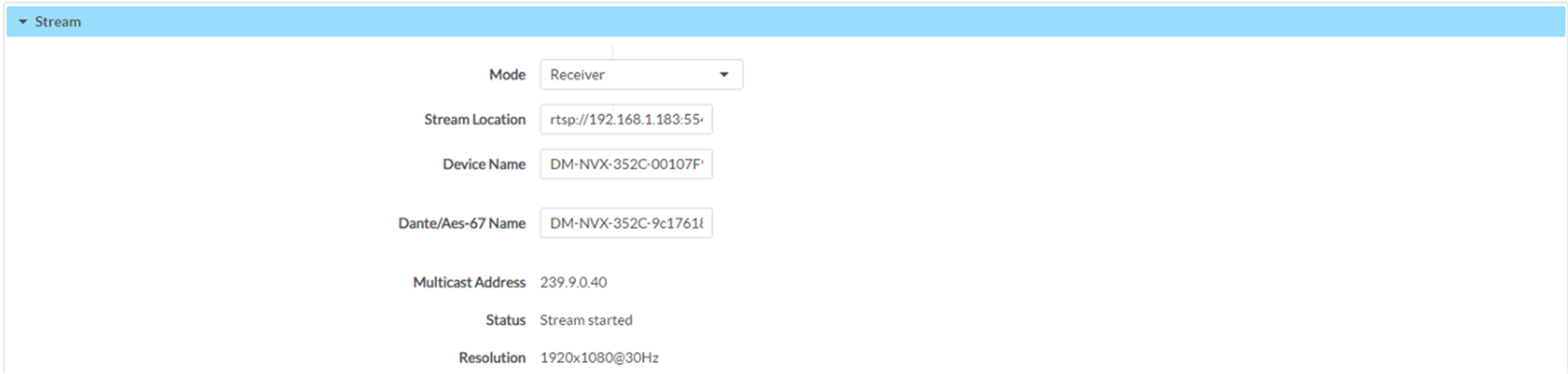
Dante® audio networking in DM NVX™ endpoints

Set through DM NVX™ endpoint Web Page

Default – Same as DM NVX™ endpoint Device Name

- **Model name + DM NVX™ endpoint last 6 mac + Dante® last 6 mac**

2 Mac Addresses from through 1 Port



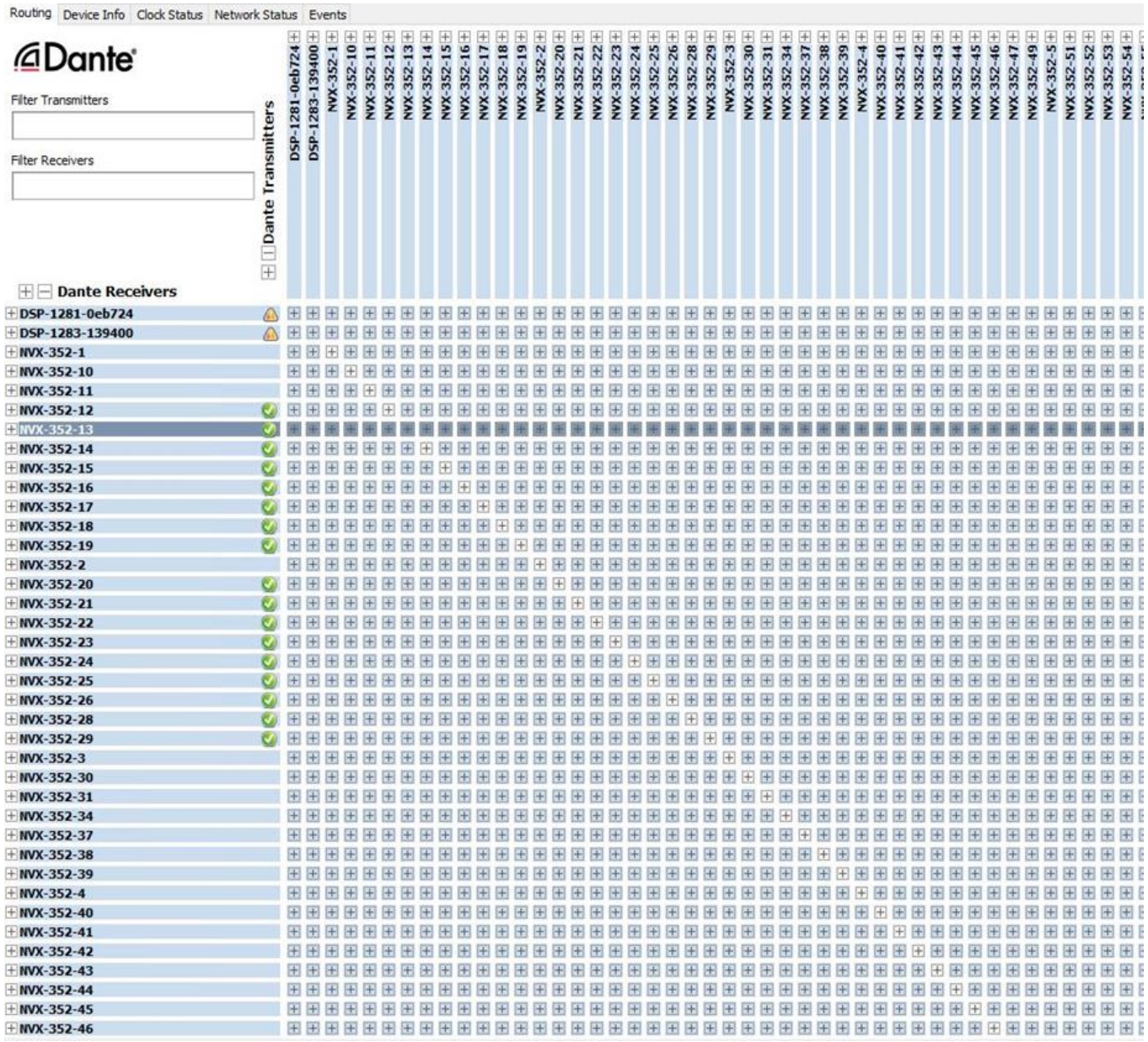
Dante Control Summary

Dante® controller to:

- Route
- Control
- Configure
- Upgrade Dante Firmware

Firmware Versions:

- Dante: 4.x
- DM NVX™ technology 2.x



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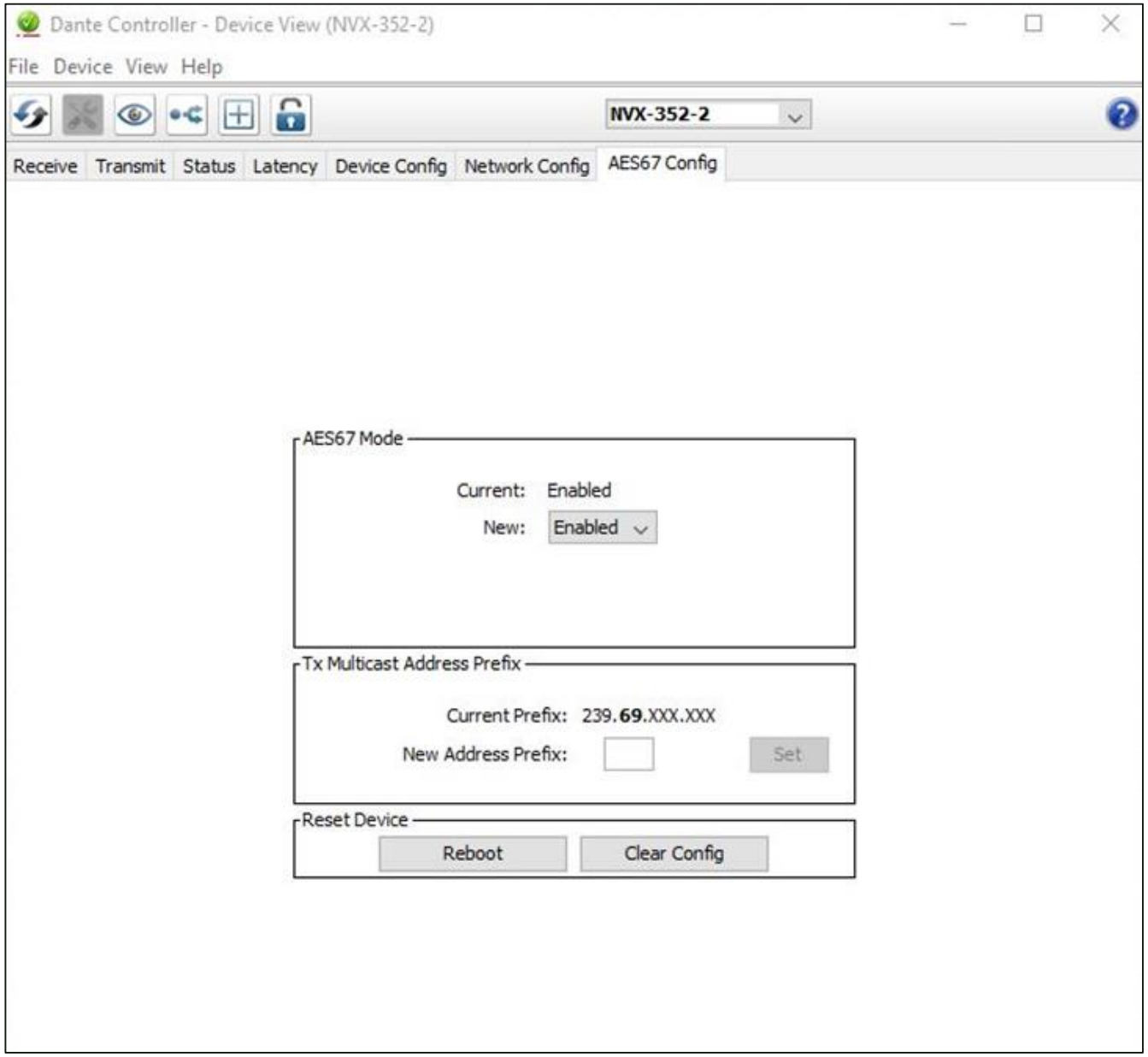
AES-67 Configuration

Using Dante® Configuration Tool



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Simple. Scalable. Flexible. Affordable. Secure. Yes.

One system that does it all

Works with any network

Mix and match to your needs performance.

Infinitely Scalable

IT Friendly

CRESTRON

Simple. Scalable. Flexible. Affordable. Secure. Yes.

24/7 TrueBlue support

Certified switch configurations

Online chat Messaging services

Free advanced technical support

Sales support for:

- Designing
- Recommendations
- Quoting
- Network Switch Configuration Guides

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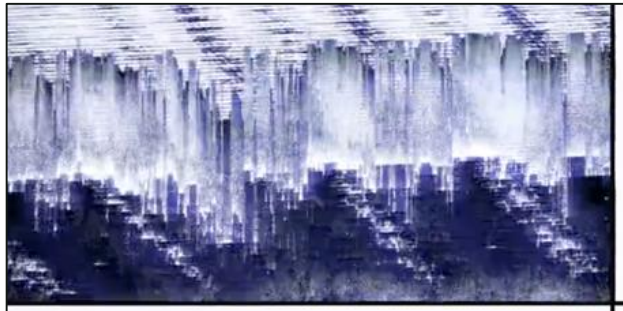
In a world of NO

	NO.	NO.
NO.	NO.	
NO.	NO.	NO.

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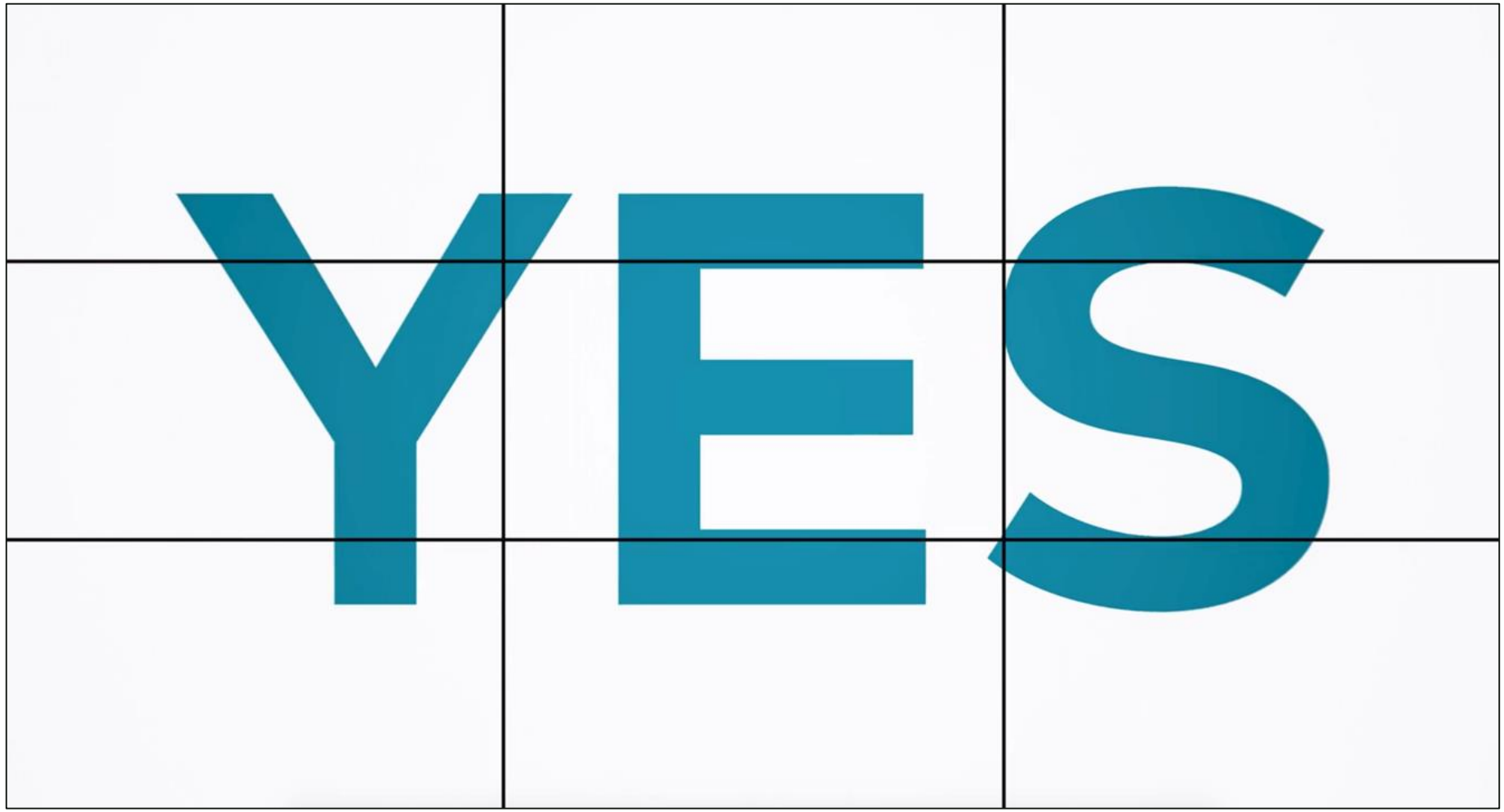
In a world of NO, DM NVX™ Technology Says YES



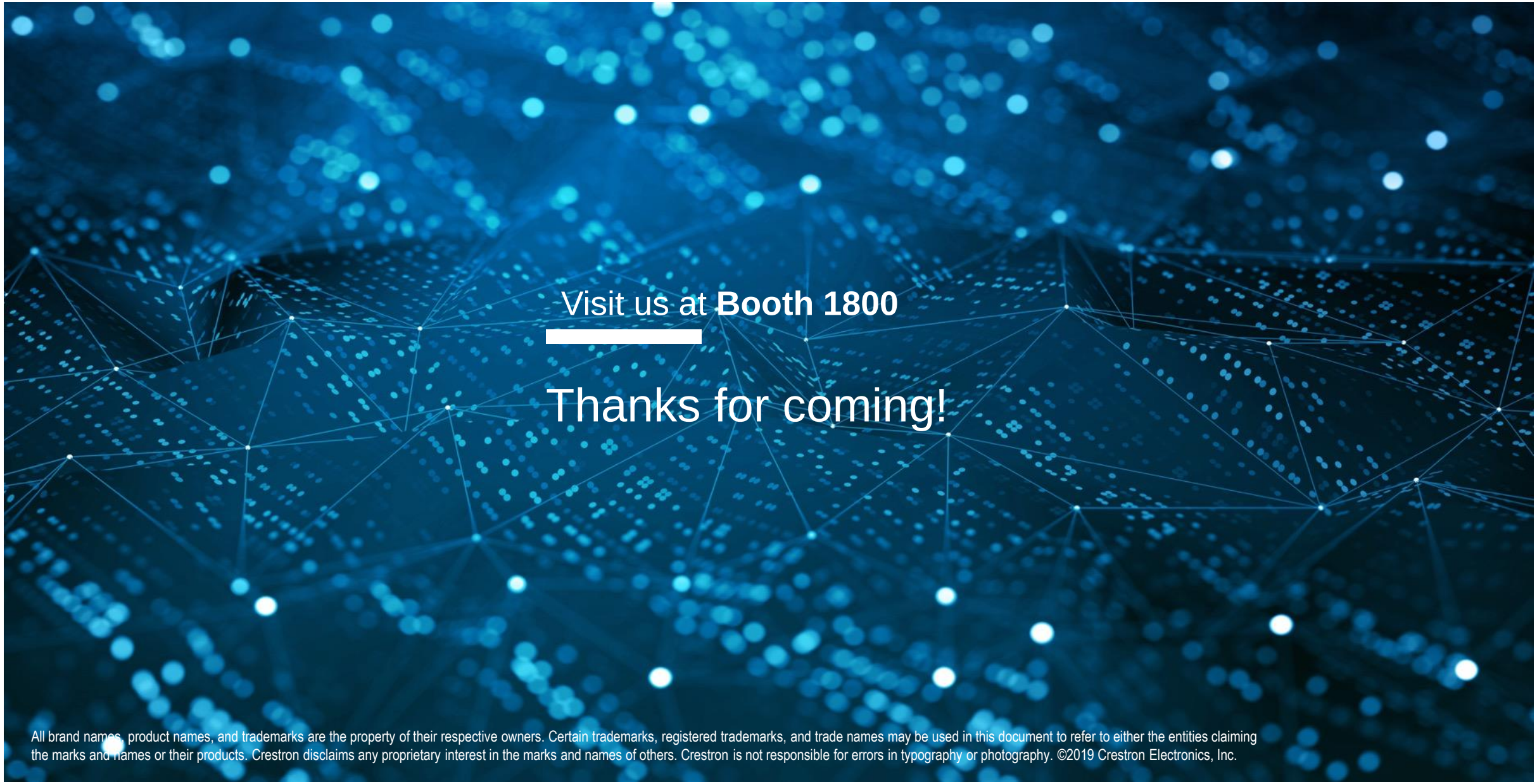
Every live event synced in real time. On every device. Yes.

In the real world. **Yes.** The best sportsbook in Nevada wins with DM NVX™ technology.

“In my opinion, NVX is the future of AV integration.”

Joe Ness, Exec. Director of Entertainment, Electronics and Media

Peppermill Resort Hotel, Reno NV



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