VNR 100

VN-MATRIX
SINGLE CHANNEL RECORDER

High Performance Streaming Recorder

▸ Records PURE3 streams from VN-Matrix encoders or codecs

▸ Plays back recorded streams to VN-Matrix decoders or codecs

▸ Simultaneous record and playback capability

▸ Time-shifted playback of live events

▸ Synchronize playback across units

Extron Electronics
INTERFACING, SWITCHING AND CONTROL

Introduction

The **VNR 100** digitally records and plays back high-definition computer graphics, video, audio, and data streamed in VN-Matrix® systems. It can record and play back at the same time, increasing duty cycles for expensive source equipment and presentation systems by utilizing both recording and playback features simultaneously. The time-slip feature allows a live event to be recorded while a previous event is played back, and the chase-play feature allows a recording in progress to be streamed with a time-shifted delay. VN-Matrix systems can be configured with multiple VNR 100 units to record and play back synchronized multi-source AV presentations or multi-screen display systems.

Quality-Critical Recording Applications

The VNR 100 is used in applications with the most demanding quality and performance requirements and is ideal for customers using imagery from sophisticated, high resolution devices such as cameras, sensors, and visualization or simulation equipment. VNR 100 allows documentation of unique experiences that would be cost-prohibitive or impossible to reproduce, such as surgical procedures, mission simulation, experiential training, and testing systems, or critical events that occur in command and control environments.

PURE 3® CODEC

OPTIMIZED FOR NETWORKS

PURE3® Codec

The Extron PURE3® codec applied in VN-Matrix systems streams audio and video across networks with very low latency, maintaining native resolutions, supporting visually lossless image quality, 4:4:4 color sampling, and 8-bit color depth, preserving original source quality. The PURE3 codec's extensive bit rate management and error concealment make the VNR 100 very adaptable to different network conditions, with flexibility to support a wide range of streaming and recording applications. The demanding quality requirements of production and broadcast applications will be well served using higher bit rates, while presentation, collaboration, and monitoring applications may use moderate to low bit rates.

PURE3 encodes video on an absolute frame basis, providing greater reproduction accuracy than predictive compression systems. It also makes possible tight playback synchronization in multi-channel playback systems.

Simultaneous Record and Playback

Many AV streaming applications require the ability to record and play back simultaneously, supporting random access playback of existing material while a live event is recorded. VN-Matrix streaming systems using VNR 100 allow recording and playback activities to be conducted in different locations independently. Time-slip recording increases accessibility to content, leveraging the value of unique or expensive source equipment and presentation systems. Training and simulation activities benefit greatly from this feature.

Time-Shifted Playback

Time-shifted playback allows a recording in progress to be played before it has been completed. The playback can be initiated on demand or a pre-programmed delay can be applied. Applications with live but delayed playback requirements are frequently referred to as chase-play, tape-delayed, or time-shifted. This capability is valuable in one-way, live streaming applications where activities in two locations cannot be synchronized. The origination site can start its program and record events while the distant site conducts activities at its own pace, starting playback of the recording at the time of its choosing. House of worship and entertainment applications benefit from this feature.
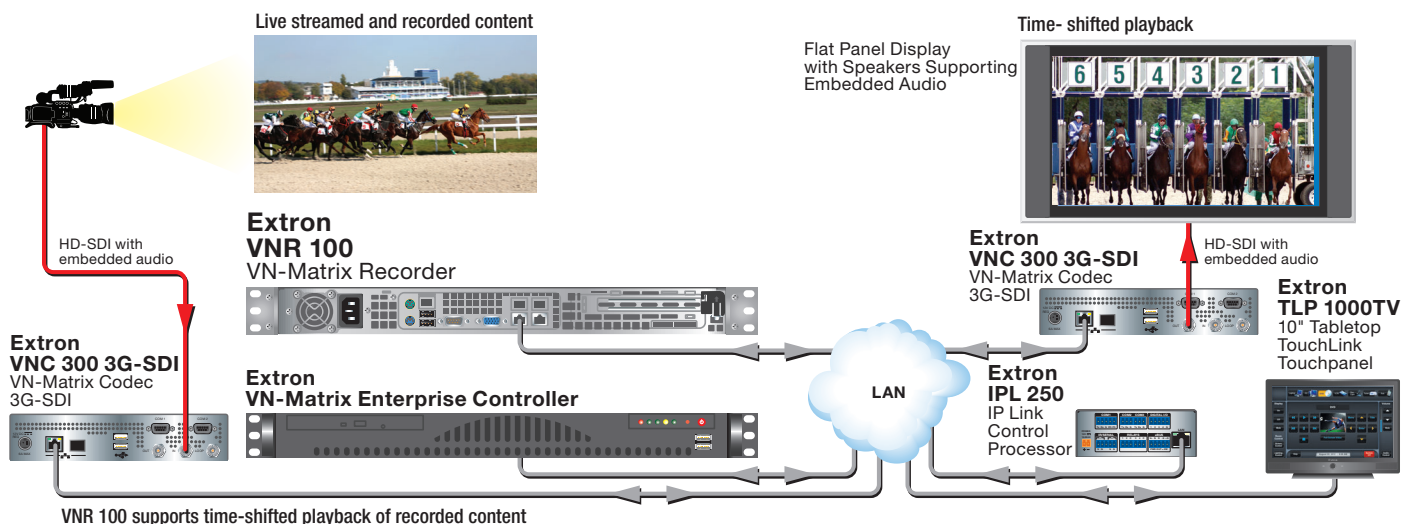
Storage Packaging

The VNR 100 includes 1 TB of hard disk storage for recording content. The operating system and recording application are held on solid state media. Both the hard disk and operating system are removable and can be secured in data-sensitive applications. A lockable front cover conceals storage media.

VNR 100

Managed by VNM Enterprise Controller

VNR 100 is managed by VNM Enterprise Controller as part of a system that includes VN-Matrix encoders and decoders or codecs. The VNM Enterprise Controller allows dynamic control over multiple VN-Matrix units from a single user interface. A highly scalable solution, small or large systems can be constructed that are expandable over time. Complex multi-channel streaming and

Live streamed and recorded content

Time- shifted playback

Flat Panel Display with Speakers Supporting Embedded Audio

HD-SDI with embedded audio

Extron VNR 100 VN-Matrix Recorder

Extron VNC 300 3G-SDI VN-Matrix Codec 3G-SDI

Extron TLP 1000TV 10" Tabletop TouchLink Touchpanel

Extron VNC 300 3G-SDI VN-Matrix Codec 3G-SDI

Extron VN-Matrix Enterprise Controller

LAN

Extron IPL 250 IP Link Control Processor

VNR 100 supports time-shifted playback of recorded content

recording systems can be programmed and managed from a single point using VNM Enterprise Controller.

Transport Controls

The VNR 100 offers transport controls including play, pause, and variable speed playback at 2x 4x 8x speeds in forward or reverse as well as single frame advance in forward or reverse. This range of control allows for efficient and detailed review of content using a simple control interface.

System Synchronization

The VN-Matrix uses Real Time Protocol – RTP, which applies timestamps to streamed and recorded packets. Encoding of video on an absolute frame basis using the PURE3 codec, coupled with RTP timestamping and Real Time Control Protocol – RTCP, supports tight synchronization of video stream playout and decoding

of recorded video, audio, and data sources. This supports several notable applications including audio-video lip sync, genlocked video decoding, and synchronization of multisource video presentations across multiple VNR 100 units.

Applications

- Command and Control
- After Action Review
- Experiential Training Systems
- Simulation Systems
- Advanced Presentation Systems
- Medical Collaboration
- Scientific or Geological Visualization Systems
- Video Documentation Systems
- Recording of videowalls or multi-screen presentations
- Multi-Site House of Worship Systems

## VNR 100 IS PART OF THE VN-MATRIX STREAMING SERIES

VN-Matrix Multi-Channel Recorder

VN-Matrix 225 DVI RGB/DVI Codec

Encoder and Decoder Models also available

VN-Matrix 300 3G/HD/SDI Codec

VN-Matrix Enterprise Controller

Application Diagram
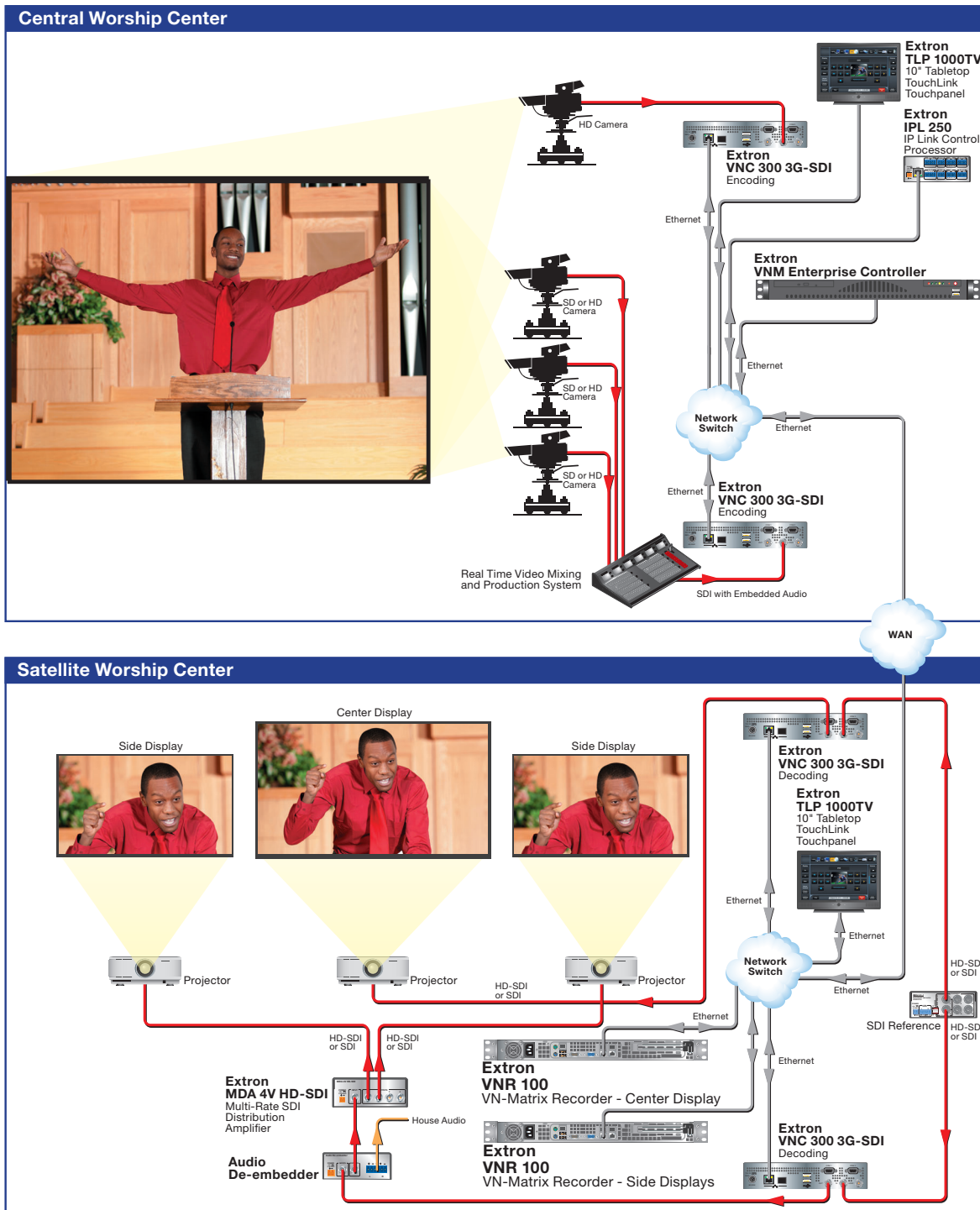
RECORDING OF MEDICAL PROCEDURES

In this application, audio, HD camera video, and graphic patient data from computers monitoring vital statistics and fluoroscopy data in an Operating Theater are managed by an Extron DVS 605 scaler located in an Observation Room. The DVS 605 A offers seamless switching, scaling, and picture-in-picture capabilities for two signals. Live video and audio signals from the DVS 605 A are encoded and streamed from an Extron VNC 225 DVI codec to a VNR 100 recorder during surgical procedures. The live streams can be decoded by a VNC 225 codec located in the Research Room and viewed in real time or a pre-recorded event can be selected and played back from VNR 100 for post-procedure review independent of live event streaming and recording. The VNR 100 offers playback at 2x, 4x, and 8x speeds for rapid navigation through recorded events. Content can also be paused and presented step-by-step for detailed examination and analysis.
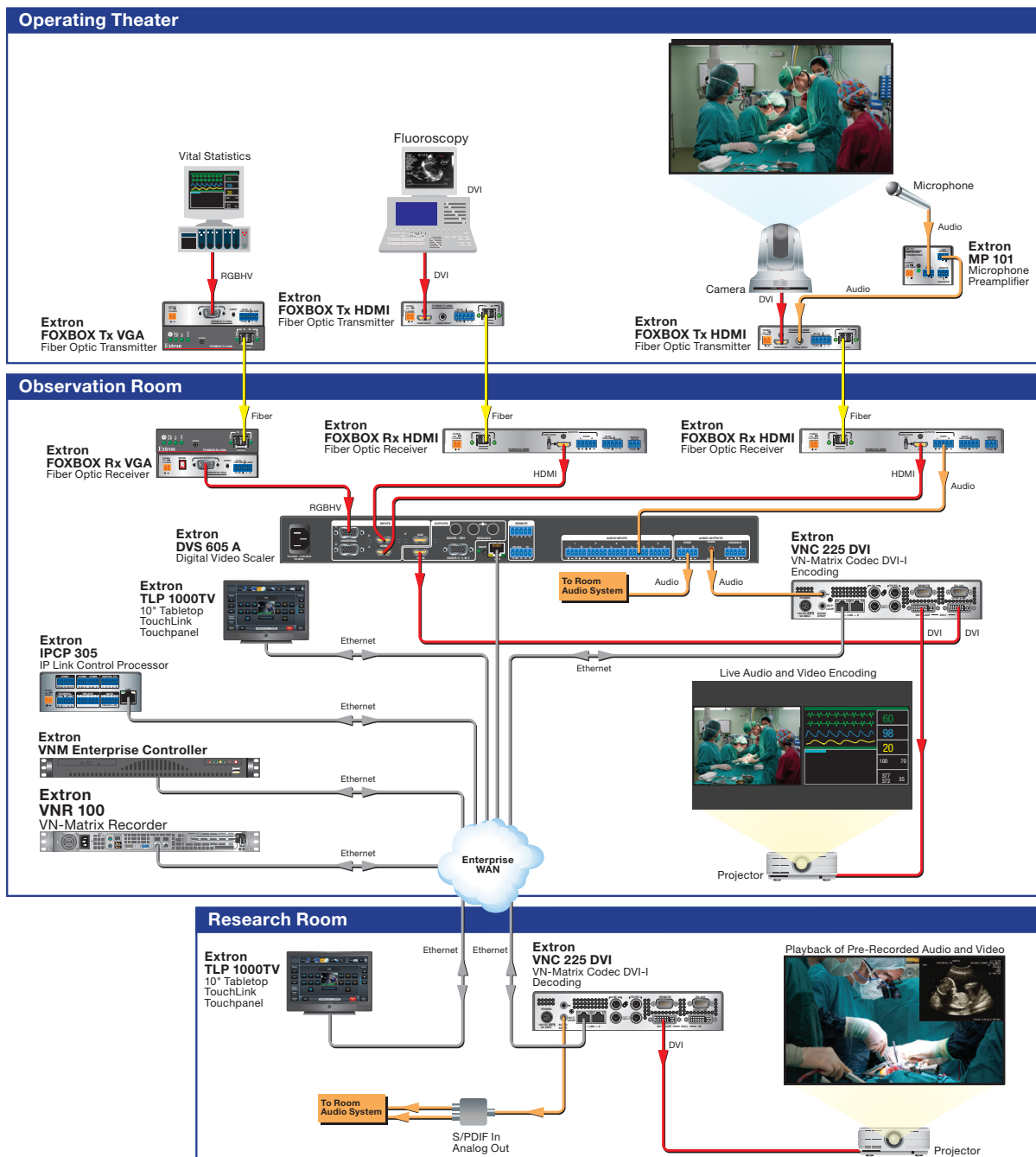
Application Diagram

HOUSE OF WORSHIP TIME-SHIFT STREAMING

Contemporary worship centers use live streaming to extend the reach of sermons by charismatic teaching pastors. VN-Matrix 300 codecs offer the capability to stream HD-SDI video in real-time between worship centers. Use of Extron VNR 100 adds the ability to record the content and stream time-shifted video and audio, allowing a distant worship center to conduct its service at its own pace. The recorded sermon can be played at the time the remote worship center requires it.

Central Worship Center

- HD Camera
- **Extron TLP 1000TV** 10" Tabletop TouchLink Touchpanel
- **Extron VNC 300 3G-SDI** Encoding
- **Extron IPL 250** IP Link Control Processor
- Ethernet
- **Extron VNM Enterprise Controller**
- Ethernet
- SD or HD Camera
- SD or HD Camera
- SD or HD Camera
- Network Switch
- Ethernet
- Ethernet
- **Extron VNC 300 3G-SDI** Encoding
- Real Time Video Mixing and Production System
- SDI with Embedded Audio

WAN

Satellite Worship Center

- Center Display
- Side Display
- Side Display
- **Extron VNC 300 3G-SDI** Decoding
- **Extron TLP 1000TV** 10" Tabletop TouchLink Touchpanel
- Ethernet
- Ethernet
- Network Switch
- Ethernet
- Ethernet
- Projector
- Projector
- Projector
- HD-SDI or SDI
- HD-SDI or SDI
- SDI Reference
- HD-SDI or SDI
- HD-SDI or SDI
- HD-SDI or SDI
- HD-SDI or SDI
- Ethernet
- **Extron VNR 100** VN-Matrix Recorder - Center Display
- **Extron MDA 4V HD-SDI** Multi-Rate SDI Distribution Amplifier
- House Audio
- Ethernet
- **Extron VNR 100** VN-Matrix Recorder - Side Displays
- **Audio De-embedder**
- **Extron VNC 300 3G-SDI** Decoding

Application Diagram

AFTER ACTION REVIEW

Training and simulation activities benefit greatly from recording sessions. The ability to record and document the synthetically produced computer-video used to create lifelike simulations provides great value in analyzing human decision making under different operational conditions. VN-Matrix streaming systems using Extron VNR 100 units can record multiple channels of streamed video, audio, and data from aircraft simulators and visual displays used in the training environment. Multi-screen recordings can be played back at the same time a live experiment is being recorded, allowing customers to use simulation assets, specialized staff, and AV presentation systems independently in different workflows. VNR 100 storage media can be removed and secured, allowing it to be used in activities with different levels of security classification.
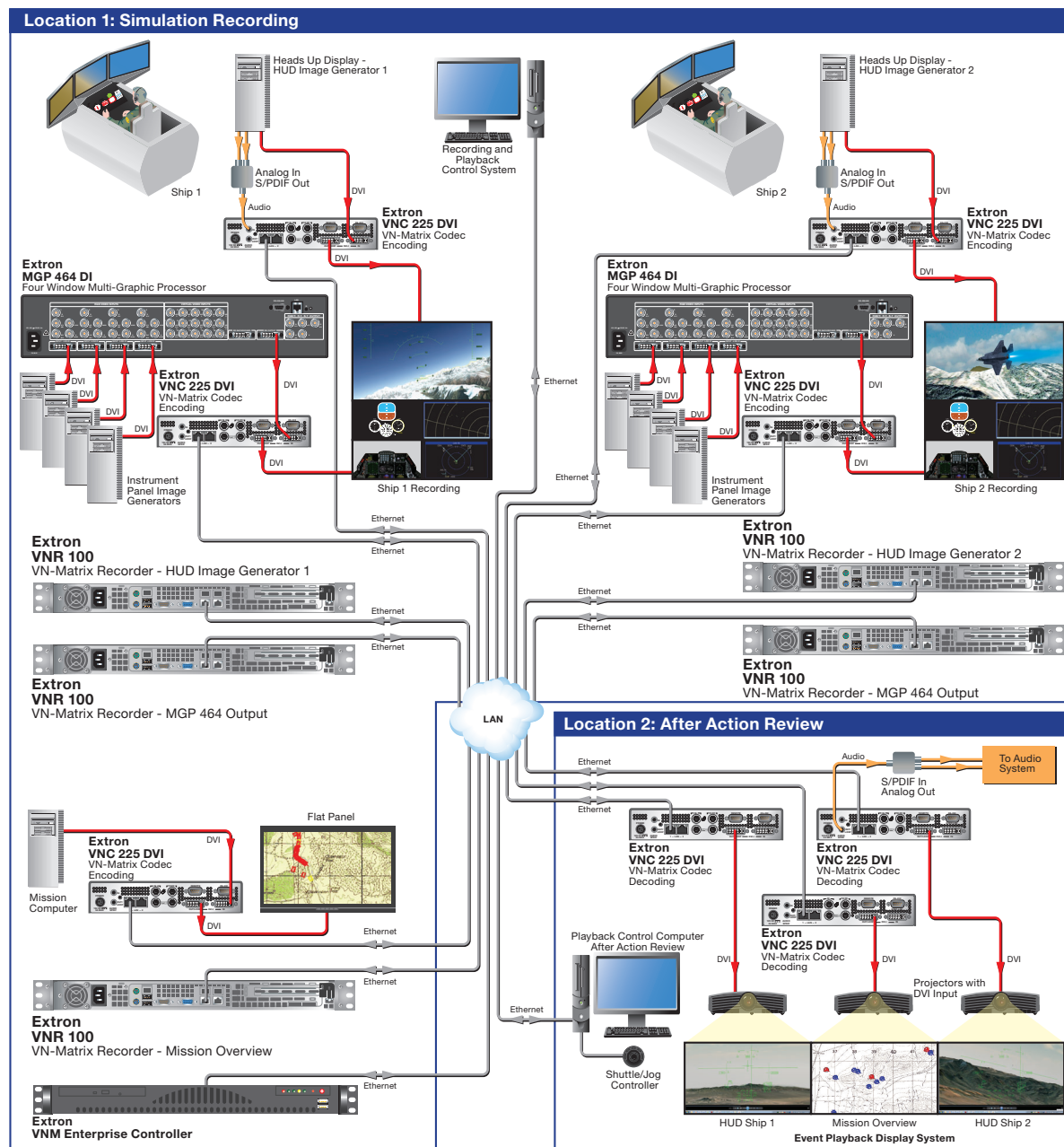
Application Diagram

RECORDING OF A 4K COLLABORATION VIDEOWALL

Videowalls and multi-screen display systems can present unique combinations of video and high resolution graphics in a variety of presentation and data visualization applications. Extron VNR 100 units can be managed as a system with VN-Matrix encoders and decoders to record the content displayed across a videowall during events or presentations. The multiple channels of recorded high resolution video can be played back maintaining tight synchronization between displays. Pre-recorded material can be played and presented in Location 2 while the videowall is being recorded in Location 1.
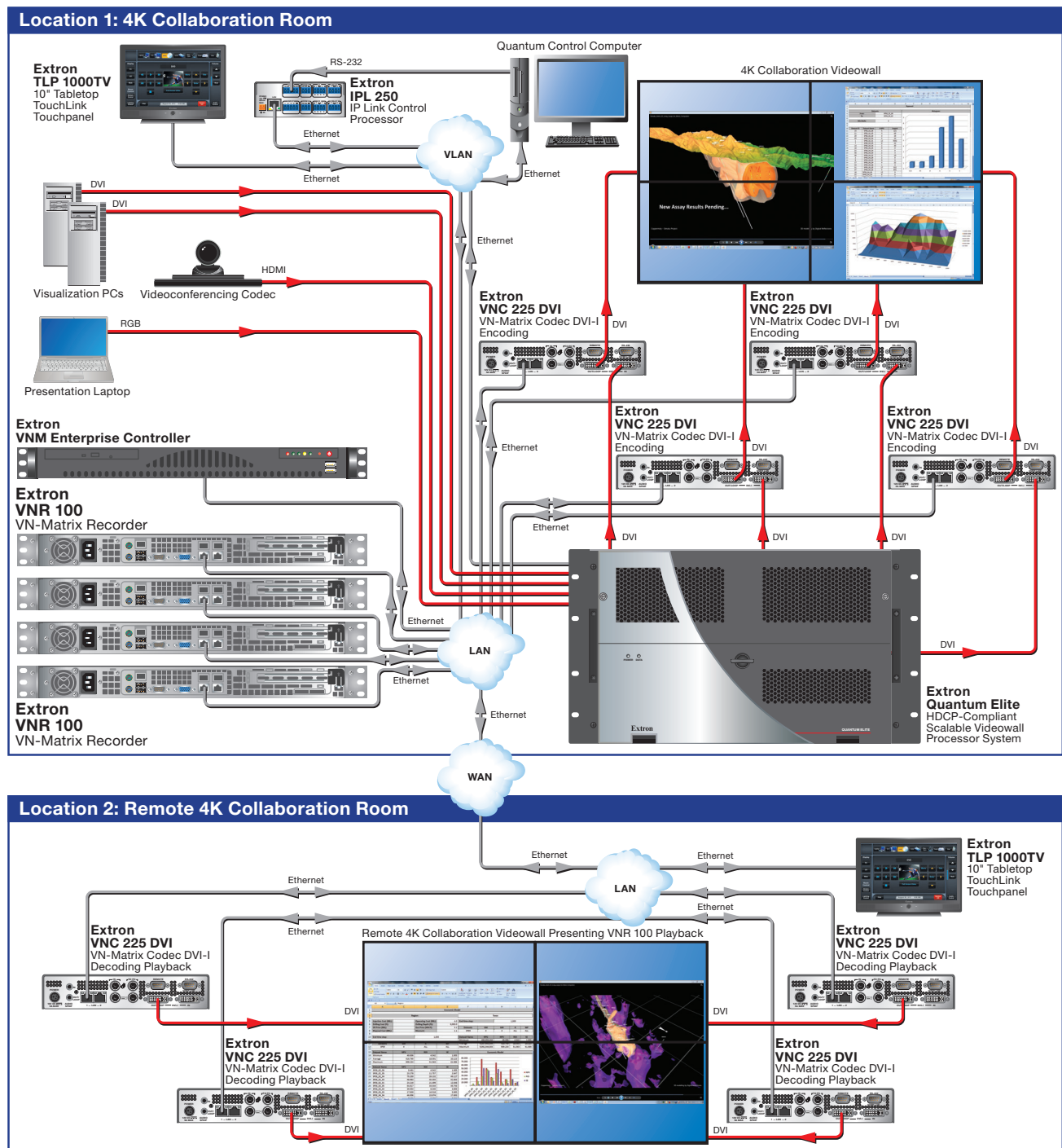
Specifications

Storage Capacity

VN-Matrix streaming bit rates will vary by application. The table below presents the range of storage capacity available from the 1 TB media drive in VNR 100. External storage can be used to archive recordings that do not need to be randomly accessible for playback. Files can be transferred between devices using protocols such as secure copy – SCP or Win SCP.

Example Content	Average Bit Rate (Mbps)	Approximate Capacity (Hours)
Data Screens, Maps, Photographs, Static Desktop	2	1,050
Static Graphic Visualizations, Aircraft Instrument Panels	5	440
Low Motion Graphic Visualizations	10	210
Windowed Video and Static Graphic Information	25	85
Presentation of HD Video, Full Motion UXGA Simulator Content	50	40
Production Quality Broadcast Video – Sports	100	20

Note: Bit rates for stereo audio or ancillary – ANC data for serial digital video sources are not included in values above. The bit rate for stereo audio will range between 0.5 Mbps for compressed voice quality and 2.5 Mbps for uncompressed program quality. Bit rates for transporting complete ANC audio payloads will be 8 Mbps for SDI and 16 Mbps for HD-SDI, and 3G-SDI.

SPECIFICATIONS

HARDWARE

Motherboard	1 Supermicro X8SI6-F
	1 of 32 bit PCI
	1 of PCI-E 2.0 (using x16 slot)
	4 of (x4) PCI-E (using x8 slot)
Chipset	Embedded Core™ i3-540 Processor, 4MB cache, 3.06 GHz
RAM	4 GB DDR3, 1333 MHz, ECC Unreg CL9 with TS
RJ-45	2 (two) 1 Gbs network ports on board
Media storage	1 (one) 1 TB SATA, 6 Gbs removable
	64 MB cache, 7200 rpm, 600 MB/s I/O data transfer rate
Operating System Storage	1 (one) 80 Gbyte SSD, 2.5" SATA (rev 2.5) 3 Gbs, removable

SOFTWARE

Operating system	Red Hat® Linux v5.7

VNM ENTERPRISE CONTROLLER CONTROL FUNCTIONS

NOTE: The VNR 100 can be controlled using an internal Web page, the VNM Enterprise Controller, or external control systems.

System configuration and management	• Compression and bandwidth control settings • Stream selection (video, audio, data) • Logical grouping of devices • Preset create and control
Recording/playback	• Record, stop • Play, pause, stop, play speed x1, x2, x4, x8 (FWD and REV), step (FWD and REV)
File management	• Create and delete bookmarks • Create and delete recording sessions • Create and delete project

RECORDING/PLAYBACK

Maximum bit rate (streaming)	150 Mbs, aggregate (simultaneous record and playback)
Number of channels	1 record and 1 playback supporting image, audio, and data streams
Simultaneous record and playback	Yes
Device Synchronization	Yes

RECORDING FRAME RATE SUPPORT

Rates	VGA-UXGA: 50 Hz - 85 Hz, 60 fps
	WUXGA: 30 Hz - 65 Hz, 30 fps
	640p, 720p: 60 Hz, 60 fps
	1080p: 23.97, 29.94, 30, 60 Hz; 23.97, 29.94, 30, 60 fps
	1080i: 23.97, 59.94 Hz; 23.97, 59.94 fps

GENERAL

Power supply	Internal
	100-240 VAC, 50-60 Hz
Power consumption	280 watts
Cooling	Fan, air flows front to back
Lockable front cover	Yes
Enclosure dimensions	1.7" H x 17.2" W x 19.8" D (1U high, full rack wide)
	(4.3 cm H x 43.7 cm W x 50.6 cm D)
Product weight	31.0 lbs (14.1 kg)

NOTE: All nominal levels are at ±10%.

Model	Version Description	Part number
VNR 100	VN-Matrix Single Channel Recorder	60-1291-01
VNR 100 OS	VNR 100 OS Drive 80 GB in Caddy	70-1002-01
VNR 100 MD	VNR 100 Media Drive 1 TB in Caddy	70-1003-01

For complete specifications, please go to www.extron.com
Specifications are subject to change without notice.

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