H.264 and JPEG 2000 Recording and Streaming Codecs

Simulation  Command & Control  C4ISR

UAV Training Systems  Missile Testing  Command Information Centers (CIC)

Highest Fidelity Encoding using H.264 and JPEG 2000 Compression
Concurrent Recording/Streaming and Recording/Replay
Local and Network Recording
Graphics and HD video up to 1920 x 1200
Variable Speed Playback
Event Marking

RGBSPECTRUM®
RGB Spectrum offers an extensive line of leading-edge codecs packed with unique capabilities for streaming and recording. Our innovative DSx™ codecs offer superior high profile H.264 encoding. Our DGy™ codecs provide visually lossless JPEG 2000 encoding for applications requiring the best possible quality for recording.

Our DSx and DGy codecs provide an unmatched combination of exceptional image quality, high performance, and scalability, with exclusive features not found with other codecs, such as concurrent recording/streaming and concurrent recording/playback.

RGB Spectrum's codecs are the de facto standard for mission-critical applications, including vessel and vehicle consoles, command and control, simulation, training, missile testing, and C4ISR. High-profile installations include F35 Joint Strike Fighter mission simulators, P-8 Poseidon WST and PTT trainers, simulators for the Global Hawk UAV, F-16 and F-22 aircraft, Apache, Kiowa, Chinook, and Blackhawk helicopters, and deployments on the U.S. Navy destroyer fleet, the Canada Navy frigate fleet, and the U.S. Missile Defense Agency THAAD and MEADS programs.

The DSx and DGy codecs — 24/7 operation, unrivaled capabilities and performance.

H.264 vs. JPEG 2000

<table>
<thead>
<tr>
<th>H.264</th>
<th>JPEG 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ideal for Streaming</td>
<td>• Ideal for Recording</td>
</tr>
<tr>
<td>• Efficient, Low Bandwidth</td>
<td>• Visually Lossless</td>
</tr>
<tr>
<td>• PC Decoding or</td>
<td>• Encodes Every Frame and</td>
</tr>
<tr>
<td>Dedicated Decoder</td>
<td>Full Color Range (4:4:4 vs. 4:2:0)</td>
</tr>
</tbody>
</table>

F-35 Mission Simulator

Ground Control Station Trainer
Multi-Channel Operation

DSx and DGy codecs can be interconnected to support multi-channel concurrent recording, streaming, and replay. Flexible systems can be configured to support up to 32 independent channels.

The Multi Channel Manager™ (MCM) is a stand-alone software package that controls multiple codecs. An intuitive GUI is easy to use and requires minimal learning time.

- Operates multiple codecs for multi-channel recording, playback & streaming
- Controls up to 32 interconnected codecs from a single control panel
- Record and replay to/from remote NAS storage devices
- Place and randomly access event marks
DSx
— H.264 Graphics and Video Recording and Streaming

Best-in-Class Image Quality
- H.264 high profile compression delivers superior image quality

Concurrent Recording and Streaming
- Exclusive ability to record while streaming

Highest Resolution Encoding
- Industry-leading resolution up to 1920x1200

The DSx™ 300 codec’s advanced H.264 compression provides an unmatched combination of best-in-class image quality and features for the recording and streaming of graphics and video over IP networks. The codec encodes, records, streams, and replays signals up to 1920x1200 resolution. Our H.264 high profile compression delivers the best image quality with sharp, crisp detail versus “softer” imagery depicted in main and baseline profiles used in most other codecs.

The codec offers recording to locally connected USB storage devices, including memory sticks, and to external network storage devices, such as NAS devices and servers. The codec supports concurrent streaming and recording — an RGB Spectrum exclusive.

IP streams can be decoded with commercial off-the-shelf PC software or, where very low latency is required, DSx codecs. Each codec can decode and display one graphics/HD image or four SD images.

Leading-edge features include on-screen display (OSD), external time code synchronization, event marking, variable speed playback, random access, confidence monitoring, and a unique failsafe recording feature which protects recordings-in-process.

Two special models are offered: The DSx 300M secure access model is designed without USB ports, preventing unauthorized access and transfer of confidential data. The DSx MILPACK 300 is a mil-spec ruggedized model designed for challenging, mission critical environments.

To assist with integration, the DSx 300 offers the choice of an external power module or Power-over-Ethernet (PoE). The codec comes in a fanless, compact, rugged enclosure. Remote operation is simple using an embedded, web-based graphical user interface accessible by any standard web browser.
The DGy™ series of JPEG2000 codecs record, transmit, and stream high quality graphics and video at up to 1920 x 1200 resolution. These codecs set a new standard in image quality, using JPEG2000 compression to achieve visually lossless results.

The codecs support recording and streaming of computer, radar, sonar, FLIR, X-Ray, and HD signals at up to 30 frames per second. Models are available with a built-in removable hard disk and an optional fixed drive for storage. All models support external network attached storage devices, such as RAIDs, offering virtually unlimited storage capacity. Dual channel models offer the ability to record two inputs at half rates, with fully synchronized playback.

DGy codecs offer an unparalleled feature set, including external time code synchronization (IRIG-B or Network Time Server), event marking, random access, variable speed playback, frame-by-frame jog/shuttle, and a unique failsafe recording feature which protects recordings-in-process. Simultaneous record/replay capability allows review of imagery while recording is still in process.

### DGy JPEG 2000 Codec Models

<table>
<thead>
<tr>
<th>Feature</th>
<th>201HD</th>
<th>301HD</th>
<th>201x</th>
<th>301x</th>
<th>401x</th>
<th>501x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Recording Storage</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>External Network Attached Recording Storage</td>
<td>Option</td>
<td>Yes</td>
<td>Option</td>
<td>Yes</td>
<td>Option</td>
<td>Yes</td>
</tr>
<tr>
<td>Maximum Record/replay Resolution</td>
<td>1920x1200</td>
<td>1920x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
</tr>
<tr>
<td>Maximum Stream Resolution</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
<td>1600x1200</td>
</tr>
<tr>
<td>Frame Rate at Maximum Resolution: Recording</td>
<td>30fps</td>
<td>30fps</td>
<td>20fps</td>
<td>20fps</td>
<td>10fps/chan.</td>
<td>10fps/chan.</td>
</tr>
<tr>
<td>Frame Rate at 1280x1024 Resolution: Recording</td>
<td>30fps</td>
<td>30fps</td>
<td>30fps</td>
<td>30fps</td>
<td>15fps/chan.</td>
<td>15fps/chan.</td>
</tr>
<tr>
<td>Frame Rate at Maximum Resolution: Streaming</td>
<td>20fps</td>
<td>20fps</td>
<td>20fps</td>
<td>20fps</td>
<td>10fps/chan.</td>
<td>10fps/chan.</td>
</tr>
<tr>
<td>Recording/Playback/Streaming Channels</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Model 201x/201HD with Optional IRIG-B Time Code

Model 401x with Optional IRIG-B Time Code
## Specifications

### Graphics & HD Video Input

<table>
<thead>
<tr>
<th></th>
<th>DSx 300</th>
<th>DGy Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal type</td>
<td>DVI or analog RGB</td>
<td>DVI or analog RGB</td>
</tr>
<tr>
<td>Connector</td>
<td>DVI-I</td>
<td>DVI-I</td>
</tr>
<tr>
<td>Channels</td>
<td>1</td>
<td>Models 201HD, 201x, 301HD, 301x: 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Models 401x &amp; 501x: 2</td>
</tr>
<tr>
<td>Signal formats</td>
<td>Non-interlaced</td>
<td>Interlaced or non-interlaced</td>
</tr>
<tr>
<td>Resolution</td>
<td>1920 x1200 to 640x480</td>
<td>Models 201HD &amp; 301HD: 1920x1200 to 640x480</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Models 201x, 301x, 401x, 501x: 1600x1200 to 640x480</td>
</tr>
</tbody>
</table>

### Audio

#### Analog Input

- Sample rate: up to 48kHz
- Connector: 3.5mm Audio Mini-Jack

#### Digital Input

- Sample rate: up to 48kHz
- Connector: DVI-I

#### Analog Output

- Channels: Stereo
- Connector: 3.5mm Audio Mini-Jack

### Encoding/Recording/Streaming

- Format: H.264, RTSP
- Profiles: High, Baseline, & Main (Level 4.1)
- Bit Stream Bandwidth: User selectable from 96kbps to 6Mbps
- Time Code Synchronization: Network Time Server (NTS/NTP)
- Audio Compression: AAC LC (Low complexity)

### Video Output & Monitoring

- Format: Unprocessed or encoded/decoded image
- Signal type: DVI
- Connector: DVI-I (digital only)

### Recording

- Local Codec Storage: DSx 300: (4) USB Type-A ports
- External Remote Storage: Network Attached Storage (NAS) devices; Linux Network File System (NFS)
- Options: Fixed Drive Option for 201HD, 201x, & 401x models

### Control

- Network Type: 10/100/1000 Base-T Ethernet
- Graphical interface: Internal web server for browser based control
- RS-232 Serial Connector: 9 pin D sub female

### Physical

<table>
<thead>
<tr>
<th></th>
<th>DSx 300</th>
<th>DGy 201HD/201x/401x</th>
<th>DGy 301HD/301x/501x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Power over Ethernet (PoE) (802.3af)</td>
<td>100 - 240 VAC autotuning.</td>
<td>100 - 240 VAC autotuning.</td>
</tr>
<tr>
<td></td>
<td>or external 12-40 VDC power supply</td>
<td>50-60 Hz &lt; 60 Hz</td>
<td>50-60 Hz &lt; 60 Hz</td>
</tr>
<tr>
<td>Size</td>
<td>Width: 8.0&quot; (20.3cm)</td>
<td>17.5&quot; (44.5cm)</td>
<td>17.5&quot; (44.5cm)</td>
</tr>
<tr>
<td></td>
<td>Depth: 9.0&quot; (22.9cm)</td>
<td>19.0&quot; (48.3cm)</td>
<td>12.0&quot; (30.5cm)</td>
</tr>
<tr>
<td></td>
<td>Height: 1.67&quot; (4.24cm)</td>
<td>1.75&quot; (4.45cm)</td>
<td>1.75&quot; (4.45cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 lbs. (1.59 kg)</td>
<td>16.0 lbs (7.26 kg)</td>
<td>11.0 lbs (5.0 kg)</td>
</tr>
</tbody>
</table>
RGB Spectrum Products

**MultiPoint Control Room Management Systems**
A collaborative system to display and control shared computer and visual resources, MCMS integrates a state-of-the-art multi-user KVM system with RGB Spectrum hardware, including video walls, multiviewers, codecs and switchers. Better decisions. Faster.

- Customizable work environment
- KVM access of controlled computers without software installed
- Unique operator GUI for both local and shared resource control
- Full bandwidth, uncompressed video
- Integration with shared display walls

**Multiviewers**
For displaying multiple video and graphics on a single screen, the QuadView™ and SuperView™ product lines provide superb multiviewer functionality with the ability to move, resize and overlap images. Options include KVM control of sources, HDCP compliance, and annotation.

**SuperView 4100 / 5000**
- 4, 8, or 12 windows
- DVI, RGB, HD-SDI, SD/HD video inputs
- Resolutions to 1920x1200
- Smooth scaling, panning, and zooming

**SuperView 4K**
- 8 megapixel multiviewer
- Up to 8 windows
- DVI single-link or dual-link output
- Smooth scaling, panning, and zooming

**Digital Switchers**
The Linx™ Prime and Opto™ series of DVI and fiber optic switchers enable transmission without signal degradation, providing superb tools for A/D conversion, routing and control, with HDCP compliance.

**Linx Prime**
- Single-link and dual-link DVI, RGB, 3G/HD-SDI inputs
- Single and dual-link DVI and scaled DVI outputs
- Fiber and copper I/O
- Chassis I/O up to 32x32

**Opto**
- Industry highest bandwidth - 6.22 GHz
- Chassis I/O up to a giant 320x320
- Simplex or duplex operation
- Single mode or multimode fiber
- Single and dual-link DVI, RGB and 3G/HD-SDI

**MediaWall® Video Processors**
Simultaneously display multiple computer and video signals across an array of high definition monitors or projectors, with the ability to interact with any source via KVM control. Windows can be custom sized, positioned and stretched across any combination of displays.

**MediaWall**
- Real-time operation, no dropped frames
- RGB/DVI, 3G/HD-SDI and analog inputs
- Smooth scaling, panning, and zooming
- Edge blending support and bezel compensation
- HDCP compliant

**Codecs and Recorders**
For streaming and recording video, graphics and audio with the highest fidelity, RGB Spectrum offers two codec families — the DSx™ with H.264 high profile compression and the DGy™ with JPEG 2000 compression.

**DSx**
- Up to 1920x1200 resolution
- Simultaneous recording and replay
- Event marking
- Variable speed playback
- Multi-unit synchronization
- Concurrent streaming and recording
- Recording to local and network storage devices

**DGy**

**Extenders**
For secure transmission of DVI signals over long distances, XtendView® FiberDVI signal extenders represent the state-of-the-art with the industry’s smallest size housing.

- Up to 400M over a single fiber
- Resolutions to 2048x1152
- “All-in-the-headshell” design
- HDCP compliant
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