

# T2 Express, Pro and Elite

## Intelligent Digital Disk Recorders



Each of the three T2 intelligent digital disk recorder (iDDR) models (T2 Express, Pro, and Elite) brings full high-definition capture and playback to the video professional. Additionally, T2 iDDRs support real-time HD crossconversion and faster than real-time playlist rendering.

Grass Valley, a Belden Brand, T2 iDDRs are complete and self-contained SD and HD audio/video playout centers. The front-panel transport controls have the look and feel of a traditional VTR, and its two output and one record channels support SD and HD content. The crisp, clear LCD front panel can display high-quality images and is complemented by a software application suite for managing and selecting media clips, clip editing and trimming, and playout — including playlist creation.

Featuring extensive rear-panel audio/video connectivity, T2 iDDRs can also accept files via USB 2.0, or by data transfer over a standard Gigabit Ethernet network. T2 iDDRs also accept media from other applications including Grass Valley HQ, XDCAM, P2, AVCHD, MPEG-2, QuickTime, TIFF and TGA files.

Further, the T2 iDDR can be controlled by video production switchers, presentation mixers and audio mixers — to create a powerful presentation system. Every T2 iDDR has two playout channels for independent editing and previewing, or for delivering content to two different display systems simultaneously, useful for edge-blending and displaying 3D content.

### T2 iDDR Express (HDD)

- RAID-0 (500 GB HDD x2)
- 1 TB data disk — 14 hours recording capacity (Grass Valley HQ: 150 Mb/s) — 36 hours of XDCAM HD422 @ 50 Mb/s

### T2 iDDR Pro (HDD)

- RAID-10 (500 GB HDD x4)
- 1 TB data disk — 14 hours recording capacity (Grass Valley HQ: 150 Mb/s) — 36 hours of XDCAM HD422 @ 50Mb/s

### T2 iDDR Elite (SSD)

- RAID-0 (480 GB SSD x2)
- 960 GB data disk — 14 hours recording capacity (Grass Valley HQ: 150 Mb/s) — 36 hours XDCAM HD422 @ 50Mb/s

## T2 Intelligent Digital Disk Recorders

### KEY FEATURES

- True HD support — 720p, 1080i, and 1080p24
- Up/downconversion for a wider range of resolutions and application support
- Native import/playback for most standard formats (see list below)
- Multiformat support (transcoding to Grass Valley HQ AVI) for most standard and broadcast formats (see list below)
- Three decks for the price of one – 1 record and 2 playback channels work independently and simultaneously
- 2-channel synchronized playback for key/fill rolls, edge blend displays, multi-screen, and 3D applications
- Embedded audio (8 channels per SDI connection)
- AES/EBU audio supported
- Easy-to-use front panel interface
- Workstation mode included as standard
- Simple on-the-fly editing, including trimming, mark in/out, basic transition effects and insertion of placeholders for playlists
- New, robust design – engineered to withstand punishing live event and mobile production environments
- Integration support for third-party control (BWV, GPIO and AMP)
- Ingest management including:
  - MXF XDCAM format support with closed caption data
  - Direct ingest to external media/storage
  - User-defined clip names
  - Scheduler
- Import from Final Cut Pro in QuickTime format using the free Grass Valley HQ codec for Mac onto an exFAT HDD
- Fast playlist rendering speed (up to 10 times real-time)
- Supports 720p to 1080i real-time crossconversion
- File-based operation enhancements including:
  - FTP transfer rate limit to maintain playback performance
  - NTP Synchronization
  - Watch folder transfers
- Export a growing MXF (XDCAM) file via FTP
- Export to Sony XDCAM drive (U1/U2)

### Applications

- Events and staging
- Auditoriums
- Corporate A/V centers
- Educational facilities
- Broadcast display support
- Regional sports companies
- Switcher support for playback

### Full-Featured Front Panel



### NATIVE IMPORT/PLAYBACK FORMATS

AVCHD (H.264/AVC)  
AVI (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, Grass Valley HQ)  
GF (DV, DVCPRO 25, DVCPRO 50, MPEG-2)  
MXF (Grass Valley HQ, AVC-Intra 50, AVC-Intra 100, D10, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, MPEG-2)  
P2 (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100)  
XDCAM (DV, IMX, MPEG-2)  
XDCAM EX (MPEG-2)

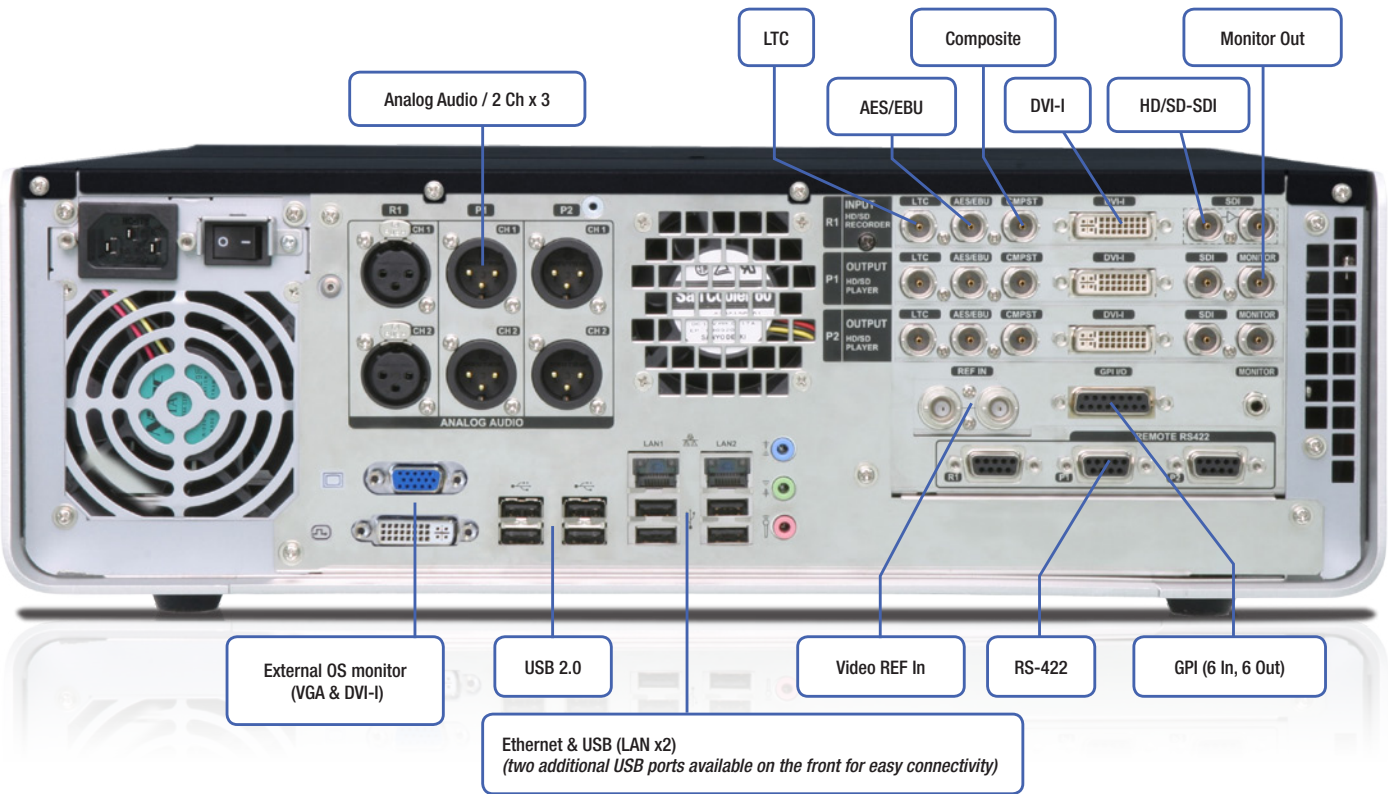
### FILE FORMAT SUPPORT

#### Transcoding to Grass Valley HQ AVI

AVCHD (H.264/AVC)  
AVI (Grass Valley HQX, Grass Valley Lossless, uncompressed)  
GF (DV, DVCPRO 25, DVCPRO 50, MPEG-2)  
MPEG-2  
MXF (Grass Valley HQX, Grass Valley HQ, AVC-Intra 50, AVC-Intra 100, D10, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, JPEG2000, MPEG-2)  
P2 (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100)  
QuickTime (Grass Valley HQ, Grass Valley HQX, DV, DVCPRO HD, H.264, ProRes 422, ProRes 4444, JPEG2000, animation, MPEG-4, Photo JPEG, PNG, uncompressed)  
Windows Media (Windows Media Video)  
XDCAM (DV, IMX, MPEG-2)  
XDCAM EX (MPEG-2)  
Sequenced files (TGA, BMP, JPG, TIFF, PNG, GIF)

#### Rewrapping MXF (OP-1a)

GXF (AVC-Intra 100, AVC-Intra 50, D10 DVCPRO HD, DVCPRO50, DVCPRO 25, DV, MPEG-2)  
P2 (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100)



**Import File Compatibility – Transcode Import**

Container	Video Codec	Audio Codec	Native Import/ Playback	Transcoding (AVI (HQ))	Rewrap MXF (OP-1a)
AVCHD	H.264/AVC	Dolby Digital (AC-3), Linear PCM	Yes	Yes	—
AVI	Grass Valley HQ, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD	Linear PCM	Yes	—	—
AVI	Grass Valley Lossless, Grass Valley HQX, uncompressed	Linear PCM	—	Yes	—
GF	DV, DVCPRO 25, DVCPRO 50, MPEG-2	Linear PCM (48 kHz, 16-bit/24-bit)	Yes	Yes	—
GXF	AVC-Intra 100, AVC-Intra 50, D10, DVCPRO HD, DVCPRO 50, DVCPRO 25, DV, MPEG-2	Linear PCM, A-law	—	—	Yes
MPEG-2	MPEG-2	MPEG-1 Audio Layer-2, Dolby Digital (AC-3), Linear PCM	—	Yes	—
MXF	AVC-Intra 50, AVC-Intra 100, D10, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, MPEG-2	Linear PCM, A-law	Yes	Yes	—
MXF	JPEG 2000	Linear PCM, A-law	—	Yes	—
MXF	Grass Valley HQ	Linear PCM	Yes	Yes	—
MXF	Grass Valley HQX	Linear PCM	—	Yes	—
P2	DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100	Linear PCM (48 kHz, 16-bit/24-bit)	Yes	Yes	Yes
QuickTime	Grass Valley HQ, Grass Valley HQX, DV, DVCPRO HD, H.264, ProRes 422, ProRes 4444, JPEG 2000, Animation, MPEG-4, Photo JPEG, PNG, uncompressed	AAC, Apple Lossless, MP3, ADPCM, A-law, U-law, Linear PCM	—	Yes	—
Windows Media	Windows Media Video	Windows Media Audio	—	Yes	—
XDCAM	DV, IMX, MPEG-2	8 channels AES3, Linear PCM, A-law	Yes	Yes	—
XDCAM EX	MPEG-2	Linear PCM (48 kHz, 16-bit)	Yes	Yes	—

## T2 Intelligent Digital Disk Recorders

### SPECIFICATIONS

#### T2 iDDR Configurations

1 SD/HD input, 2 SD/HD outputs

#### Video Input

**Format Support Types:** High-definition, standard-definition

**Connections:** SD/HD SDI, analog component (Y-Pb-Pr), DVI-I, composite

**Recording Format:** AVI-Grass Valley HQ, 4:2:2, XDCAM HD422 (50 Mb/s), HD (25 Mb/s), IMX, DVCAM

Beginning with SP1, T2 can record directly in XDCAM format

**Bit Rate:** Up to 200 Mb/s

**Resolutions SD/Frame Rate:** 720x576i50, 720x486i59.94

**Resolutions HD/Frame Rate:** 1920x1080i59.94, 1920x1080i50, 1920x1080p24, 1920x1080PsF24, 1920x1080p23.98, 1920x1080PsF23.98, 1440x1080i59.94, 1440x1080i50, 1440x1080p24, 1440x1080PsF24, 1440x1080p23.98, 1440x1080PsF23.98, 1280x720p59.94, 1280x720p50

#### Video Outputs

**Format Support Types:** High-definition, standard-definition, computer

**Connections:** SD/HD SDI (one for each playback channel), analog component, DVI-I (one for each playback channel, except RGB), composite

#### Playback Format (Native Import/Playback):

AVCHD – H.264/AVC

AVI – Grass Valley HQ, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD

GF – HD I-Frame only (100 Mb/s), HD Long GOP (50 Mb/s), DVCPRO 50, DVCPRO 25, DV, MPEG-2

MXF – Grass Valley HQ, AVC-Intra 100, AVC-Intra 50, DVCPRO HD, DVCPRO 50, DVCPRO 25, DV, D10, MPEG-2

P2 – AVC-Intra 100, AVC-Intra 50, DVCPRO HD, DVCPRO 50, DVCPRO 25, DV

XDCAM – HD422 (50 Mb/s), HD (35 Mb/s, 25 Mb/s, 18 Mb/s), IMX, DVCAM

XDCAM EX – HD (35 Mb/s, 25 Mb/s)

**Bit Rate:** Up to 200 Mb/s per channel

**Resolutions SD/Frame Rate:** 720x576i50, 720x486i59.94

**Resolutions HD/Frame Rate:** 1920x1080i59.94, 1920x1080i50, 1920x1080p24, 1920x1080PsF24, 1920x1080p23.98, 1920x1080PsF23.98, 1280x720p59.94, 1280x720p50, 1280x720p23.98

**Computer Resolutions:** 1280x1024, 1024x768, 800x600, 640x480

#### Audio Input

**Analog Audio:** 2 channels, XLR connections

#### Digital:

AES/EBU (2 channels), BNC connections  
Embedded audio on SDI, HD, or SD (8 channels)

**Recording Format:** 24-bit, PCM, 48 kHz sampling (20-bit PCM for SD-SDI)

#### Audio Output

**Analog Audio:** 2 channels per output video, XLR connections

#### Digital:

AES/EBU (2 channels), BNC connections  
Embedded audio on SDI, HD, or SD (8 channels)

**Recording Format:** 24-bit, PCM, 48 kHz sampling (20-bit PCM for SD-SDI)

#### Export File Compatibility

**Export:** Grass Valley HQ, MXF (XDCAM HD422 (50 Mb/s), HD (25 Mb/s), IMX, DV)

#### Transcoding to Grass Valley HQ AVI:

AVCHD (H.264/AVC)

AVI (Grass Valley HQX, Grass Valley Lossless, uncompressed)

GF (DV, DVCPRO 25, DVCPRO 50, MPEG-2)  
MPEG-2

MXF (Grass Valley HQX, Grass Valley HQ, AVC-Intra 50, AVC-Intra 100, D10, DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, JPEG2000, MPEG-2)

P2 (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100)

QuickTime (Grass Valley HQ, Grass Valley HQX, DV, DVCPRO HD, H.264, ProRes 422, ProRes 4444, JPEG2000, animation, MPEG-4, Photo JPEG, PNG, uncompressed)

Windows Media (Windows Media Video)

XDCAM (DV, IMX, MPEG-2)

XDCAM EX (MPEG-2)

Sequenced files (TGA, BMP, JPG, TIFF, PNG, GIF)

#### Rewrapping MXF (OP-1a):

GXF (AVC-Intra 100, AVC-Intra 50, D10

DVCPRO HD, DVCPRO50, DVCPRO 25, DV, MPEG-2)

P2 (DV, DVCPRO 25, DVCPRO 50, DVCPRO HD, AVC-Intra 50, AVC-Intra 100)

#### Control

**Protocol:** BWW (pre-roll/post-roll, variable control in sync mode, audio monitoring with variable speed), GPI, AMP (Advanced Media Protocol) for Indigo A/V Mixer and external control software

**Connections:** RS-422 (9-pin D Conn per channel), Ethernet

#### Technology

**Connections:** Gigabit Ethernet, USB 2.0, VGA, DVI-I

#### Storage Capacity:

Express: 1 TB (RAID-0, 500 GB HDD x2), Approx. 14 hours of HD @ Grass Valley HQ (150 Mb/s) – 36 hours XDCAM HD422 @ 50Mb/s  
Pro: 1 TB (RAID-10, 500 GB HDD x4), Approx. 14 hours of HD @ Grass Valley HQ (150 Mb/s) – 36 hours of XDCAM HD422 @ 50Mb/s  
Elite: 960 GB (RAID-0, 480 GB SSD x2), Approx. 14 hours of HD @ Grass Valley HQ (150 Mb/s) – 36 hours of XDCAM HD422 @ 50 Mb/s

**Service Pack:** Updated for Service Pack 1.3 (March 2014)

#### Physical

**Dimensions:** 550x430x140 mm (21.6x16.9x5.5 in.)

**Weight:** 15 kg (33 lbs.)

**Operating Temperature:** 5°C to 35°C (41°F to 95°F)

#### Options and Accessories

##### Rackmount Kit

**SNFS Option:** Required to connect the T2 to a K2 SAN using the SNFS file system. This option is only supported by Service Pack 1.1 or later.

Note: The T2 can connect to a K2 SAN via FTP without this option.



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