Tektronix

Profile® Family of Networked Video File Servers — PDR200 & PDR300



MPEG 4:2:2 or Motion JPEG Compression up to 50 Mb/s

Fibre Channel Networking with Faster than Real-Time Data Transfers

2-8 Channels of Broadcast Quality Video

Serial Digital I/O, Analog Composite I/O, and Analog Component Inputs

NTSC (525 line) & PAL (625 line) Support

16 or 32 channels of AES/EBU, Embedded or CD Quality Analog Audio

Up to 96 Hours of RAID Protected Storage

Up to 30 (JPEG) or 60 (MPEG) Hours of Low Cost Non-RAID Storage

Centralized Storage for up to 8 channels, distributed storage for hundreds of channels

Modular Design, Easy Upgrades, Unlimited Expansion Capability

Open Systems Platform supported by over 35 application developers

The Profile family of products offer a wide range of capabilities, from standalone digital disk recorders to a large network of video file servers. Key to Tektronix' Digital Media Foundation, the Profile can be used in a wide variety of applications from spot insertion, program delay, store and forward, to more complex applications such as live event coverage, news operations, and non-linear editing.

The PDR300 compliments the PDR200 by adding professional MPEG compression, adopting the MPEG 4:2:2 profile @ main level standard. Optimized for play-to-air applications, the PDR300 can have up to 8 play-out channels, which combined with the storage efficiencies of MPEG, provides a very low cost per channel playout device, even for long form programs.

Applications

The success of Profile has come from the wide variety of applications available. By adopting an open architecture, implementing industry standard protocols, and making available the Profile's own direct control protocol, it's been easy for developers to integrate the Profile into their applications. With this strategy, customers can choose the "Best in Class" applications for their operations rather than select from a few custom applications.

The multi-tasking capability of Profile allows it to do the work of multiple VTRs — four in the case of the PDR200 and eight in the case of the PDR300. This makes Profile extremely cost effective in traditional VTR applications such as program delay, store and forward, Near Video on Demand, and multi-channel replay operations.

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Fibre Channel Video Networking

A key aspect of the Tektronix Digital Media Foundation is the ability to move video around the facility, either as video with a traditional routing system or as data over a high speed network. Fibre Channel has become the adopted standard for networking of video within a facility and the Profile was the first to implement and customize Fibre Channel for video applications. Using the Profile Video Gateway a facility in New York can move a video clip or program to their Profile in Los Angles over a high speed ATM network.

In a typical broadcast environment, a single video clip undergoes numerous reviews and changes during the production process. It typically enters the facility on tape, is edited, often several times, and moved to storage before being dubbed into a cart machine for on-air playback. With Fibre Channel, once the tape is digitized into the Profile, it can be moved around the Fibre Channel network at 3-5 times real-time speeds or faster with MPEG's lower bit-rate files and there is no need to QA the material after a transfer — networking protocols ensure that the file integrity is maintained during each transfer.

Fibre Channel Streaming

Fibre Channel streaming enables the file to be played, edited, copied, or viewed while the file transfer is still in progress. This provides a very efficient mode of operation for working within a networked environment.

Digital or Analog Video

The vast majority of facilities today are still analog based, but as facilities upgrade, most are converting to a Serial Digital infrastructure. Few facilities can rebuild a new facility from scratch and most must adopt a migration strategy from analog to digital.

Profile's video and audio capability supports this with options to inexpensively convert an analog based Profile to Serial Digital or even to support both I/O formats simultaneously.

Digital Audio Standard

Digital audio is becoming more important in the design/remodeling of a facility. Digital audio is also critical in the migration to DTV. Profile has spent considerable effort in the design of an audio system that is compatible with today's analog facilities as well as tomorrow's digital facility.

Sixteen or thirty-two channels of digital audio is available inside the Profile. The digital audio can come into the system via XLR or BNC connections or embedded with the serial digital video stream. For Analog audio, the 8/16 channel PAC208/216 digitizes the audio to AES/EBU digital audio for processing inside the Profile. The PAC208/216 also supports the conversion to digital by including AES/EBU XLR connections.

A unique feature of the Profile is its ability to simultaneously support all three audio formats. Users could have analog audio on one channel, AES/EBU on another, and embedded on a third. This highlights the power of Profile to accommodate any type of audio transition strategy.

Audio processing capabilities include audio editing, voice-overs, level adjustments, scrub, split edits, and sample rate conversion.

Srub Audio

Srub audio is standard on both the PDR200 and PDR300. Scrub audio provides a tape like sound when shuttling back and forth to trim a clip or for fast and accurate cueing.

Low Cost Analog Monitor Option

As facilities move to an Serial Digital infrastructure, monitoring of channels is more expensive if each channel requires an SDI monitor. The Profile offers a four channel analog monitor card for in-studio monitoring. This card has the option of timecode display, or it can be programmed with a character display to indicate what is being monitored (on-air channel, satellite east, preview, etc.).

Profile Storage Options

Profile offers two storage options; RAID and non-RAID. When a fully redundent mirrored operation is required, non-RAID storage offers the most cost effective solution. For other configurations, RAID may be the better choice.

Non-RAID Storage With PDX218 Expansion storage

The Profile's internal array of Ultra-SCSI disk drives are non-RAID. These can be expanded by adding one or two external 8-drive expansion units.

PRS250/255 RAID Storage

The Profile PRS250/255 RAID Storage system provides both increased storage - up to 96 hours - and data protection. The PRS250/255 (9 GB/18 GB) uses RAID-3 technology and is capable of rebuilding video and audio information on-the-fly if an individual drive fails. The faulty drive can be replaced and the missing information reconstructed - all without taking the Profile offline. The data protection afforded by the PRS250/255 can be crucial to on-air and other mission critical applications. (refer to the PRS250/255 Data sheet #2AW-1059-3 for more details).

PDR200 Production Server & PDR300 Streaming Server

The PDR200 is a powerful broadcast quality Production Server with extensive editing capability and 2 or 4 input channels. A production server like the PDR200 differs from a Streaming server like the PDR300 in that it is optimized for editing and digitizing. A streaming server is optimized for play-out with more playout channels and less editing capabilities. The application will determine which is the right server for you.

Selecting PDR200 or PDR300

PDR200	PDR300
Applications — Ideal for editing applications and applications that require lots of input channels	**Applications —** Ideal for play-to-air applications that require lots of output channels, few input channels, and lots of storage capacity.
Markets — News, complex editing, live events coverage, sports	**Markets —** spot insertion, video on demand, multiple channel playout, long form playout, simple editing (cuts only)
Cost Effectiveness — More cost effective for maximum input channels	**Cost Effectiveness —** More cost effective for maximum output channels, large amounts of storage

PDR200 & PDR300 Comparison

Feature	PDR200	PDR300
Compression Formats	Motion JPEG	MPEG 4:2:2 profile @ main level
Maximum bit-rates	48 Mb/s	50 Mb/s for 3 channels 24 Mb/s for 4-8 channels
Video Channels	2 or 4	3, 6, 7, or 8
Codecs	2 or 4 bi-directional codecs	1 encoder, 2 decoders 2 encoders, 4 decoders 1 encoder, 6 decoders 0 encoders, 8 decoders
Video I/O Formats	Serial Digital I/O Analog Composite I/O Analog Component Inputs	Same
Audio Channels	16 or 32	Same
Digital Audio Formats **Analog Audio Formats**	AES/EBU Embedded Analog (w/PAC208/216)	Same
Audio Interfaces	XLR (AES/EBU & Analog) BNC (AES/EBU)	Same
Video Networking	Fibre Channel	Same
Processor Section	Pentium CPU 64 MB Memory	Same
Ethernet	10/100 BaseT	Same
Non-RAID Storage	72 GB Internal plus 144 GB with expansion (PDX208)	Same
RAID Storage (PRS250/255)	> 1 TeraByte	Same
Storage Interface	Ultra-SCSI	Same
User Interfaces	VDR Panel (Standard) ToolBox (Optional)	VDR Panel (Standard) ToolBox (Optional)
Control Panels	PRC100 LVS100	PRC100
Library/Archive	PLS20 PLS200	Same

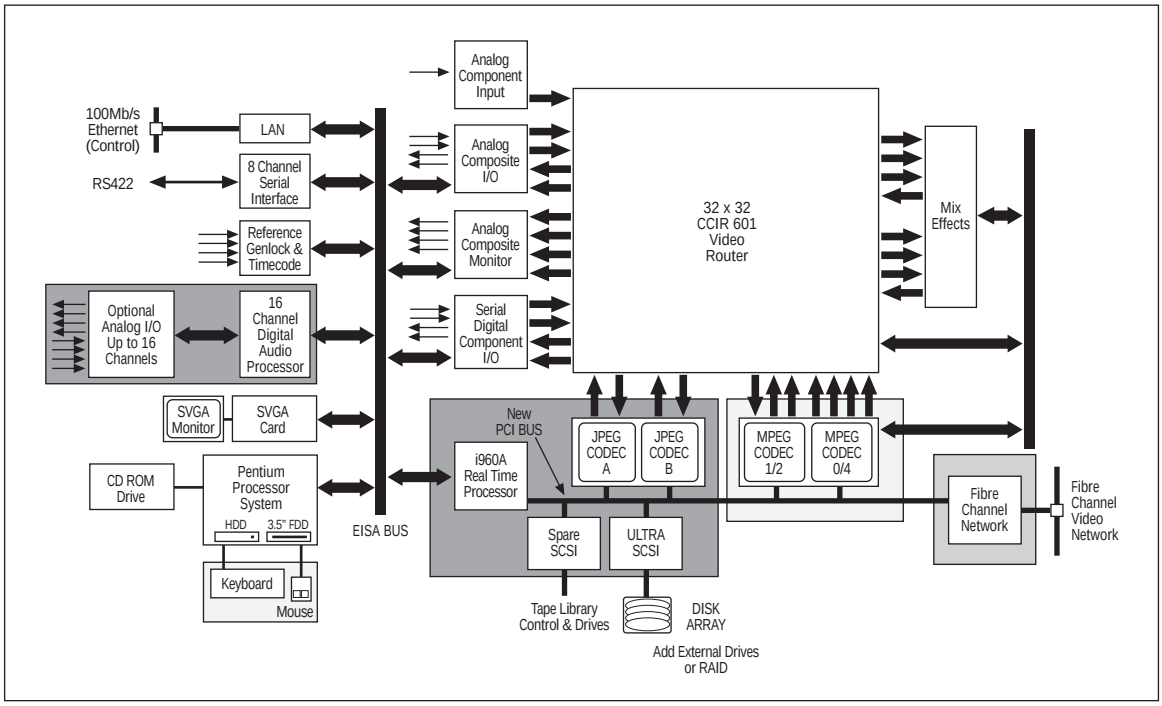


Figure 1. The above block diagram of a PDR300 shows the basic architecture of the Profile.

PDR300 Streaming Server

- MPEG 4:2:2 Profile @ Main Level
- Variable I/O Configurations
- 4 Mbit/s to 50 Mbit/s Bit rates
- Variable GOP structures from 1 to 16 pictures
- l, IB, IBBP encoding
- 4:2:0 and 4:2:2 sampling
- 16 or 32 audio channels
- Frame accurate cuts editing with any GOP
- Smooth off-speed play
- Single frame jog forward and backward with any GOP

Professional Broadcast Compression Standard

Today's professional broadcast facilities need to select a compression standard that will provide them with the video quality they need today and the framework required for their eventual transition to digital TV. MPEG 4:2:2 Profile @ Main Level has been selected as the industry standard for professional broadcasters. It's high bit rate and variable GOP structure allows broadcasters to select the video quality appropriate for their application.

Flexibility

An important feature that has made Profile Video File Servers a leader in installed systems has been its superior video quality and its flexibility. The PDR300 is no different. Unlike fixed bit rate MPEG-2 systems or low bit rate 4:2:0 systems, the PDR300 enables you to vary the bit rate and GOP structure as video progresses through your facility. For instance, you may initially bring material in and encode it at a high bit rate, short GOP (such as 50 Mb/s I frame only), edit the material and then transcode it to a low bit rate and long GOP structure for efficient storage and transmission.

4:2:2 Support

Both the PDR200 and PDR300 supports 4:2:2 video compression. 4:2:2 refers to the sampling rate of luminance and chrominance. 4:2:2 contains double the chrominance (color) information of a 4:2:0 signal accepted and is the industry standard for broadcast quality production. 4:2:2 has three major advantages over 4:2:0;

- 4:2:2 produces an excellent picture when up-converted to HDTV
- 4:2:2 supports multi-generation copies with minimal quality loss
- 4:2:2 provides a superior analog composite signal after NTSC transmission

When using lower bit-rates below approximately 8-12 Mb/s, 4:2:0 may provide a sharper picture than 4:2:2 because the "bits" are better used for picture quality than color. With Profile, you make the choice.

MPEG-2 Compression

While M-JPEG video quality is mainly dependent upon bit-rate for video quality, MPEG-2 video quality is dependent upon both bit rate and Group of Pictures (GOP) structure (see Tektronix white paper on MPEG-2, #2AW-1061). M-JPEG compresses video on a frame by frame basis and selects a quantization factor for a whole frame. MPEG-2 streams containing only I frame pictures is very similar to M-JPEG but improves video quality by varying the quantization table block by block through- out the picture, using the bits where they are most effective.

The real strength of MPEG-2 compression is seen when compressing a series of frames or Group of Pictures (GOP). This temporal compression uses motion estimation and encodes only the differences between pictures rather than the whole picture. When using a long GOP, video quality can be maintained with approximately half the bit rate of M-JPEG thus doubling your storage efficiency.

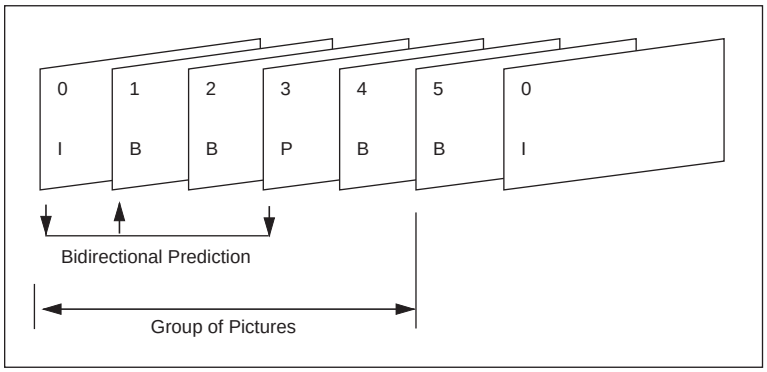


Figure 2. A Group Of Pictures (GOP) is comprised of I frames (complete information), P frames (predicted frames from I frames), and B frames (bi-directional predicted frames from I and P frames). The Profile can vary GOPs from 1 to 16.

Frame Accurate Editing with MPEG 4:2:2 -the Profile Approach

A major need when playing out clips such as commercials is the ability to set the in-point and out-point on any frame, regardless of GOP structure. This was never an issue in the PDR200 as M-JPEG files compress each frame independently. With the temporal compression of MPEG, the system had to be engineered differently to keep this frame accurate capability.

In the PDR300, each output channel contains two decoders, each with their own independent buffers. Figure 3 shows how these two decoders are used. When clip 1 is being played out of the first decoder, the second clip is being decoded, ready to play out starting at any frame. Since the switch is being made in the digital video domain seamless cuts can be made between clips at any frame, regardless of GOP length.

Editing is done the same way. When cutting an MPEG-2 file, the in-point and out-point can be set to any frame number (or timecode). When trimming the head or tail of new material, data is efficiently eliminated to the previous or next I frame while maintaining the ability to start and end on any frame in the GOP structure.

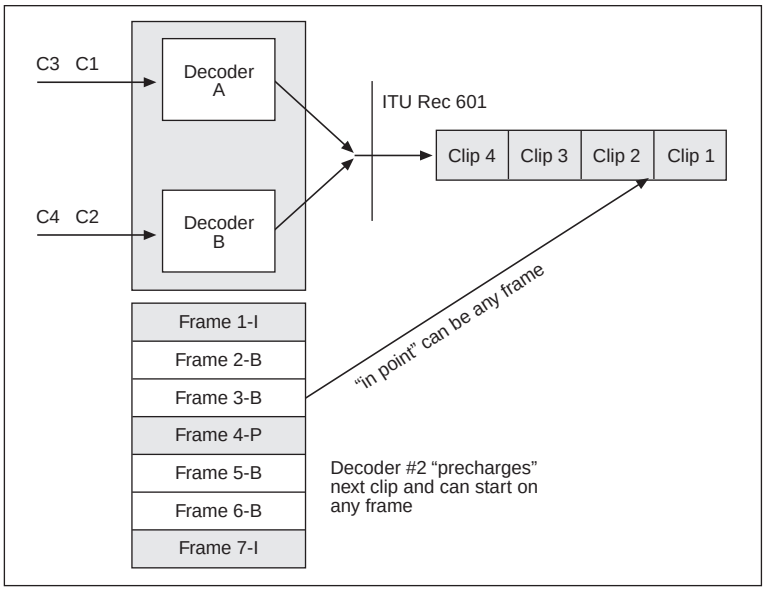


Figure 3. By using two decoders for each channel of output (an 8 channel system uses 16 decoders), seamless cutting and transitions can be made from clip to clip with in-points and out-points being set on any frame in the GOP, including I, B, and P frames.

Transcoding from M-JPEG to MPEG-2

When integrating a PDR300 into a network of existing PDR200s, compatibility is achieved with a transcoding utility that will transcode M-JPEG clips to MPEG in the PDR300. Because M-JPEG is 4:2:2 coded, there is neglible loss when transcoding.The transcoding is done entirely within the Profile in real-time, independent of encoded bit rates. Conversions can be done file by file or in batch mode in the background. After conversion the M-JPEG files can be automatically or manually deleted.

Both M-JPEG and MPEG-2 files can coexist on the PDR300, however only MPEG or JPEG clips can be played on any single output channel.

Product Support

Time is money. At Tektronix, our first priority is to keep your system up and running. Every Profile family product comes with a one-year hardware an software warranty that includes TekLine Hotline Support (6am-5pm, Monday through Friday), Advance Module Exchange, web information access, and software maintenance releases.

The in-depth knowledge of Tektronix's video experts is unsurpassed. Basic warranty coverage can be upgraded to On-Site and/or 24x7 Hotline Support to maximize your access to these experts. Additional services available include Installation, Configuration, and Training. With these options, each Profile user can decide what level of service is most cost-effective for their operation.

Specifications

Profile Networked Video File Server

System (Standard)

Windows NT 4.0
233 MHz Pentium w/64 MB memory
3 GB system disk
SVGA video, keyboard, mouse
10/100 BaseT Ethernet

Mainframe Bandwidth

30 MB/s (approx.) bandwidth.

Network (optional)

Fibre Channel @ 1Gb/s

Video Channels (CODECs)

JPEG 2 or 4

MPEG (Inputs/encoders & Outputs/decoders)
- 3 ch - (1 in/2 out)
- 4 ch - (0 in/4 out)
- 6 ch - (2 in/4 out)
- 7 ch - (1 in/6 out)
- 8 ch - (0 in/8 out)

Reference Genlock (standard)

Locks to nominal NTSC or PAL color black signal

Time Code I/O (standard)

Longitudinal — LTC
4 separate read/write channels

Vertical Interval - VITC
Each video input has a VITC reader and each output has a VITC inserter

Time Code Generators (standard)

Four time code generators that can be preset, locked to an external source, and routed to disk recorder channels or outputs.

RS-422 Ports (standard)

Eight RS-422 ports provided in a 1 RU chassis.

Power Supply

1184 VA (750W)

Control Panels (optional)

LVS100, PRC100

Serial Digital Video I/O
Each module contains 2 input and 2 output (BNC) serial digital component video channels.
- 625 and 525 lines rates supported
- 8 or 10 bit Input resolution
- 8 bit output resolution
- Video input at 270 MHz (CCIR 601, SMPTE 259M)
- Audio output is 20-bit AES/EBU
- Audio input at 48 kHz (SMPTE 272M level A format)
- Supports 8 ch of embedded audio (4 pairs) per video channel

Analog Composite Video I/O

Each module contains 2 input and 2 output (BNC) analog composite video channels.
- 625 and 525 lines rates supported
- S-Video Input (Time-Base corrector only)
- Onboard TBC for Composite or S-Video inputs
- Input/Output Return Loss - ≥40 db to 5 MHz
- Input decoding modes — Notch, Comb and Adaptive
- Output Signal-to-Noise - >58db
- K-factor - ≤2%

Analog Composite Monitor Card

Each module contains 4 monitor outputs.
- 625 and 525 lines rates supported
- 4 monitor quality analog composite outputs
- Time-code burn-in all 4 channels
- Character display large/small text (13 char. by 6 rows or 24 char by 12 rows)

Audio Specifications

Channels
- 16 standard or 32 (with option 15)

Formats
- 8/16 pairs of AES/EBU digital audio
- 16/32 ch embedded audio
- 8/16/24/32 ch of CD quality analog audio (balanced 24 dBm, 20-bit resolution)

Configuration
- 4 to 8 channels/video channel (Assigned in groups of 4 channels)
- Can be configured to use all three types of audio simultaneously

Audio Processing
Audio processed in floating point @ 48 kHz

Audio Storage
16 bits @ 48 kHz

Audio Clocking
- AES inputs may be individually clocked in groups of 4 from 30-50 kHz
- Sample rate conversion to 48 kHz on AES inputs
- Any source locked to video
- Output clocking is synchronous to a selected reference

Audio Analog Options

PAC208 - 8 Analog Audio Channels
The PAC208 is comprised of the PAC200 Profile Audio Chassis which contains A/D and D/A converters for converting analog audio to AES/EBU digital audio. The PAC208 contains 16 XLR connectors for 8 analog input and 8 output channels. Additionally it provides 4 stereo pairs of AES/EBU digital I/O on 8 XLR connectors.

Size: 2 RU (3.5” H, 18” D, 17” W)

PAC2I6 - 16 Analog Audio Channels
The PAC216 is comprised of the PAC200 Profile Audio Chassis and a small breakout panel. The breakout panel contains 16 XLR connectors for 8 analog input and 8 output channels for a total of 16 analog I/O channels. Additionally it provides 8 stereo pairs of AES/EBU digital I/O on 8 XLR connectors for a total of 8 stereo pairs. This small breakout panel can reside behind the PAC200 in a rack.

Size: 2 RU (3.5” H, 4” D, 17” W)

Audio Breakout Panel Options

XLR216
- AES/EBU digital audio connector box.
- Contains 16 XLR connectors

Size: 2 RU (3.5” H, 4” D, 17” W)

BNC216
- AES/EBU digital audio connector box.
- Contains 16 BNC connectors.

Size: 1 RU (1.75” H, 4” D, 17” W)

Storage & Bit Rates

Drives	PDR304 PDR312	PDR316 PDR324 PDR308	PDR202	PDR204
3	18 Mb/s	NA	48 Mb/s	NA
5	24 Mb/s	18 Mb/s	48 Mb/s	48 Mb/s
8	50 Mb/s	24 Mb/s	48 Mb/s	48 Mb/s

Note: The specifications include one channel of shuttle, 4 audio channels, & timecode.

Specifications

Profile Networked Video File Server Continued

PDX218

The PDX218 is a 3 RU expansion mainframe with eight 18 GB Ultra-SCSI drives housed in easy to change caddies. Two PDX218s can be connected to the Profile.

Size: 3 RU (5.25" H, 17.75" W, 20" D)

Fibre Channel (Opt 1F)

Connection — 9-pin DB connector for connection to a copper Fibre Channel cable (5 meter cable included)

Performance — 1 Gb/s loop transfer speeds, approximately 144 Mb/s effective transfer rate per Profile

Profile Connections — Up to 16-24 Profiles on a single Fibre Channel loop is recommended (depending on load anticipated)

Accessories

Switch — 8 Channel Switch (PFCSW8) and 16 Channel Switch (PFCSW16)

Hub — 9 Channel Copper Fibre Channel Hub (PNFCHUB)

Copper Cables — 5m (PNFCO5), 25 m (PNFC2S)

Optical Cable — 5m, 10m, 25m, 50m, 100m

Optical to copper converter — Used to connect optical cable to the Profile and/or hub — 2 required (PNFOM1A)

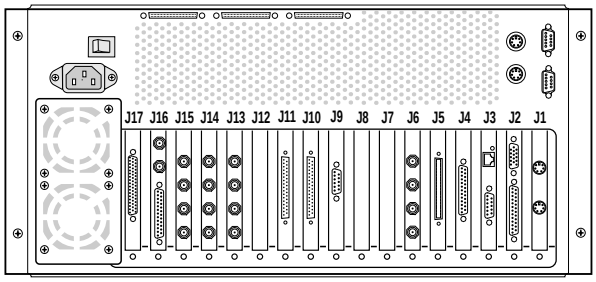
Ethernet Accessories

8 Channel 10 BaseT Ethernet Hub (PNETHUB)

Ethernet Cables

Category 5 unshielded twisted pair cables

- 5.49 m (PNETO5)
- 25 m (PNET25)



Sample Backplane Configuration

J1 System CPU (keyboard, mouse)
J2 SVGA, Parallel Port
J3 10/100 BaseT LAN
J4 System SCSI
J6 Analog Composite In
J8 Fibre Channel
J9 Master Disk Recorder, SCSI A
J10 Slave Disk Recorder, SCSI B
J11 Serial Digital I/O (2 channels)
J12 Analog Composite Out (4 ch, monitor)
J13 Digital AES/EBU Audio
J16 Reference (analog video, timecode)
J17 Remote RS-422 I/O

Storage & Times

Drives	8 Mb/s MPEG	12 Mb/s MPEG	18 Mb/s MPEG	24 Mb/s MPEG/JPEG	36 Mb/s MPEG/JPEG	48 Mb/s MPEG/JPEG
3	10.2 hrs	7.4 hrs	5.2 hrs	4 hrs		
5	17 hrs	12.3 hrs	8.7 hrs	6.5 hrs	4.5 hrs	3.5 hrs
8	27.2 hrs	19.75 hrs	14 hrs	10.5 hrs	7.25 hrs	5.5 hrs

Note: The above times are estimates (within 10%) and are calculated with 2 audio channels and 2 timecode.

Transcode Utility (Standard)

Batch or single file conversion. Transcoding is done in real-time within the PDR300.

PDR200 & PDR300 Physical Dimensions

Size (H x W x D)

- 8.72 x 19 x 24.8 inches
- 21.8 x 48.2 x 63.0 cm
- 5 RU

Weight

65 lb (29.5 kg)

Environmental Characteristics

Operating Temperature

0 to +40 deg C

Storage Temperature

-40 to +75 deg C

Operating Altitude

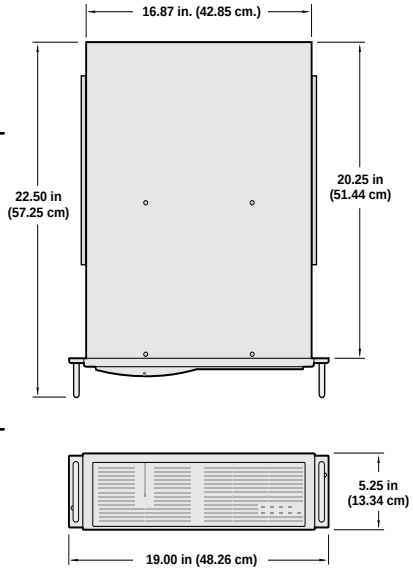
Up to 15,000 feet (4572 m)

Storage Altitude

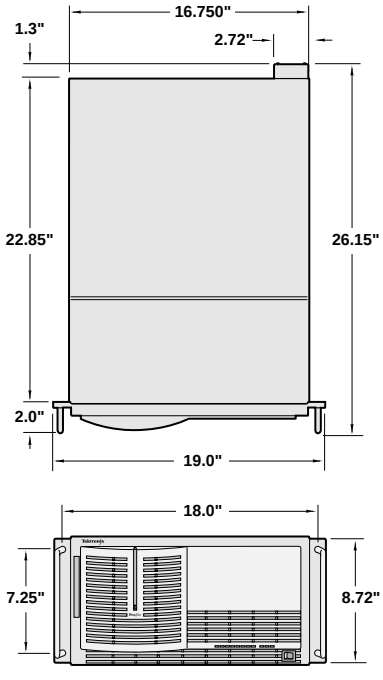
Up to 50,000 feet (15,240 m)

Warranty

One year parts and labor, includes hardware and software



PDX208



PDR300/PDR200

Ordering Information

PDR312D — Three ch disk recorder with 1 MPEG encoder, 2 MPEG decoders, 2 JPEG codecs, 2 ch Serial Digital inputs, 2 ch Serial Digital outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR312A — Three ch disk recorder with 1 MPEG encoder, 2 MPEG decoders, 2 JPEG codecs, 2 ch Analog Composite inputs, 2 ch Analog Composite outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR324D — Six ch disk recorder with 2 MPEG encoders, 4 MPEG decoders, 4 JPEG codecs, 4 ch Serial Digital Inputs, 4 ch Serial Digital outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR324A — Six ch disk recorder with 2 MPEG encoders, 4 MPEG decoders, 4 JPEG codecs, 4 ch Analog Composite Inputs, 4 ch Analog Composite outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR316D — Seven ch disk recorder with 1 MPEG encoder, 6 MPEG decoders, 2 JPEG codecs, 6 ch Serial Digital Inputs, 6 ch Serial Digital outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR316A — Seven ch disk recorder with 1 MPEG encoder, 6 MPEG decoders, 2 JPEG codecs, 2 ch Analog Composite Inputs, 6 ch Analog Composite outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR304D — Four ch disk recorder with 4 MPEG decoders, 2 JPEG codecs, 4 ch Serial Digital outputs, 4 ch Serial Digital inputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR304A — Four ch disk recorder with 4 MPEG decoders, 2 JPEG codecs, 4 ch Analog Composite outputs, 4 ch Analog composite inputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR308D — Eight ch disk recorder with 8 MPEG decoders, 2 JPEG codecs, 8 ch Serial Digital outputs, 8 ch Serial Digital inputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR308A — Eight ch disk recorder with 8 MPEG decoders, 2 JPEG codecs, 8 ch Analog Composite outputs, 8 ch Analog composite inputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR202D — Two ch disk recorder with 2 JPEG codecs, 2 ch Serial Digital inputs, 2 Serial Digital outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR202A — Two ch disk recorder with 2 JPEG codecs, 2 ch Analog Composite inputs, 2 ch Analog Composite outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR204D — Four ch disk recorder with 4 JPEG codecs, 4 ch Serial Digital inputs, 4 ch Serial Digital outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

PDR204A — Four ch disk recorder with 4 JPEG codecs, 4 ch Analog Composite inputs, 4 ch Analog Composite outputs, 16 ch digital embedded audio, Pentium MPU w/Win NT and LAN

		MPEG					JPEG			
Opt	**Description**	**312A/D**	**324A/D**	**316A/D**	**308A/D**	**304A/D**	**202D**	**202A**	**204D**	**204A**
03	3 18 GB Drives	X				X	X	X		
05	5 18 GB Drives	X	X	X	X	X	X	X		
10	10 18 GB Drives	X	X	X	X	X	X	X	X	X
15	Add 16 Audio ch (32 total)	X	X	X	X	X	X	X	X	X
21	2 ch Analog Composite I/O						X		X	X
22	4 ch Analog Composite Output						X		X	X
23	4 ch Monitor Output	X	X	X	X	X	X	X	X	X
25	1 ch Analog Component Input						X	X	X	X
30	2 ch Serial Digital I/O							X		X
ME	Mix Effects	X	X	X			X	X	X	X
1F	Fibre Channel	X	X	X	X		X	X	X	X

For further product information or to find the sales office nearest you, please contact:

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