High Speed Data Recording: Video Recorders Find A New Application

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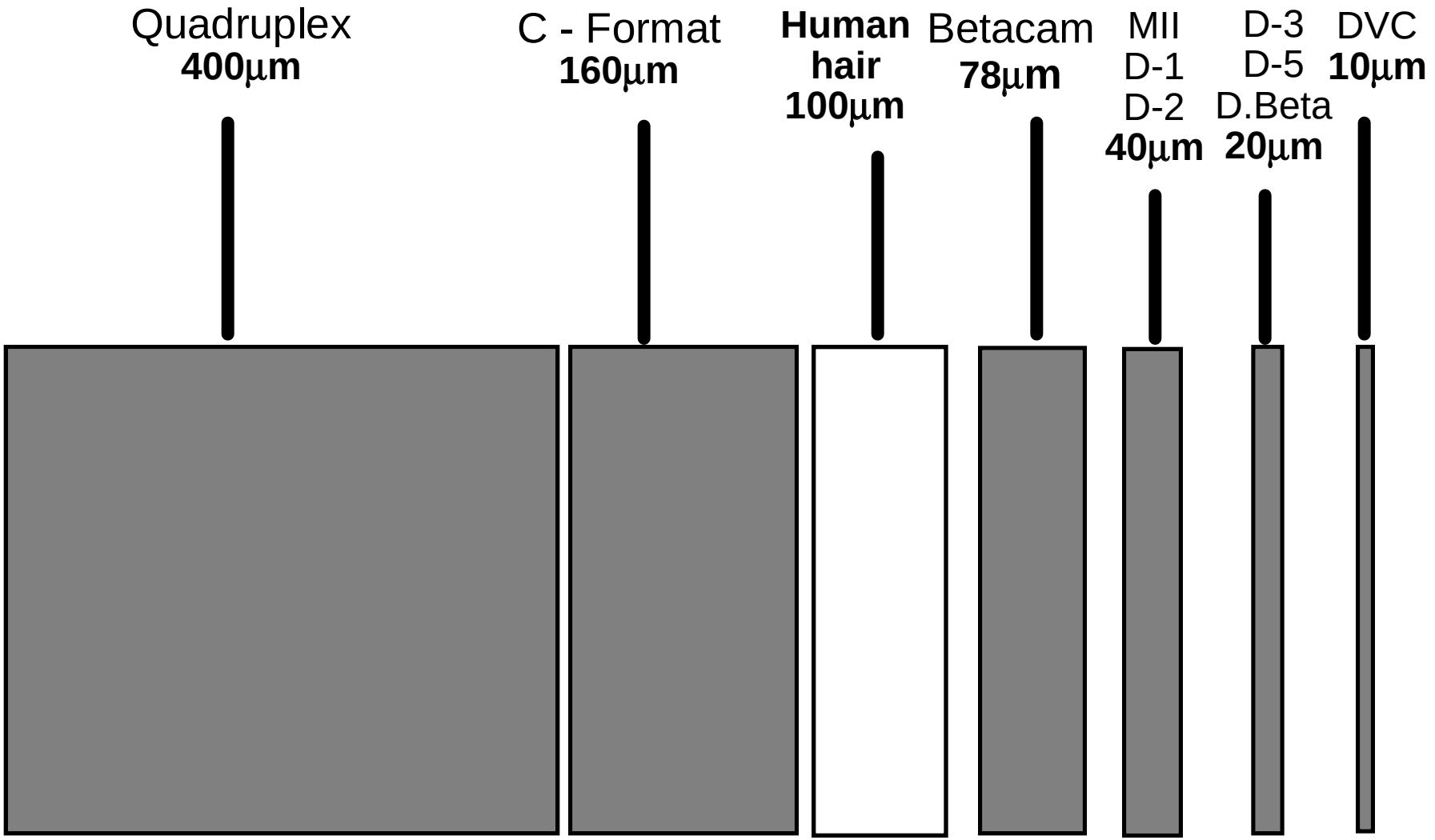
VTR Track Widths 1956 to Present Day



D-5

1/2” Component Digital Tape Recorder

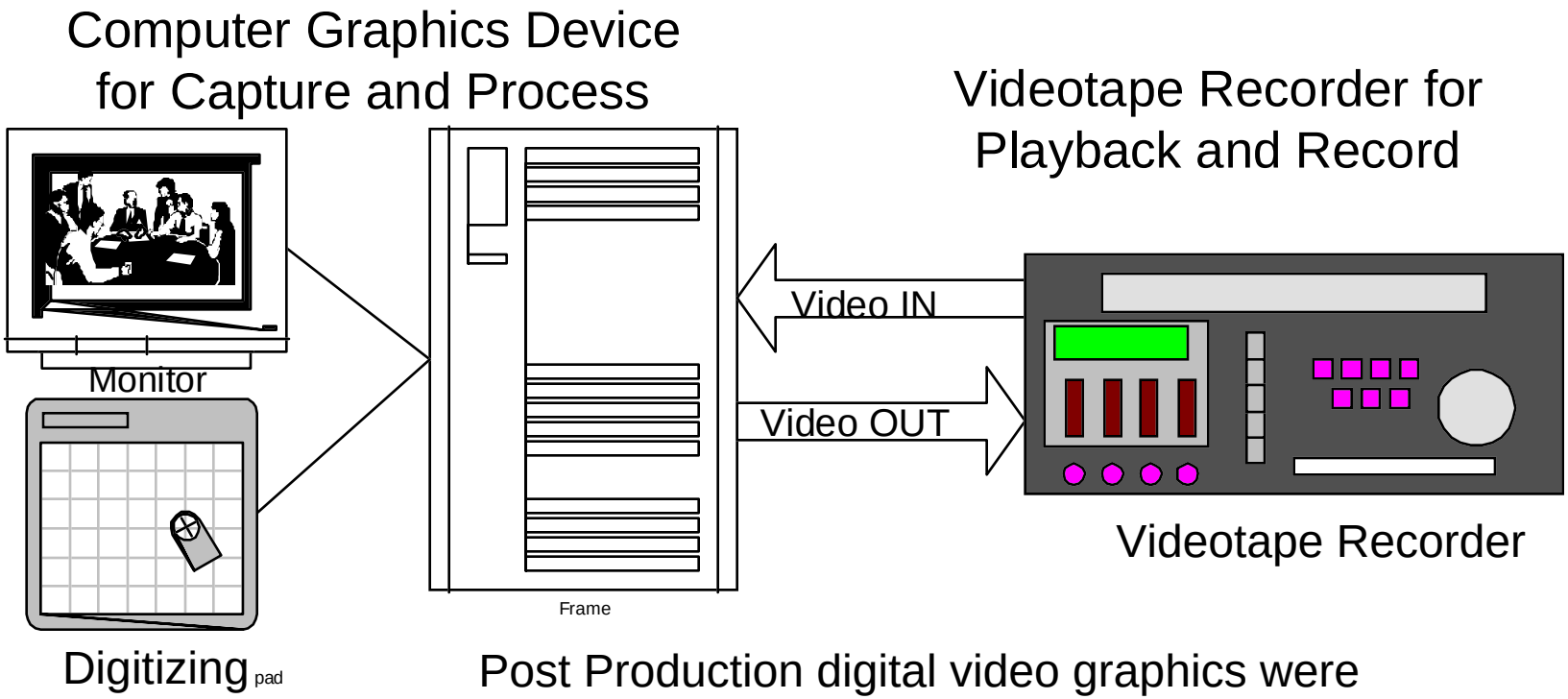
- Based Upon 1/2” D-3 (composite) Format
- Same Heads & Transport
- Same Cassette (S, M, L)
- Same Track Pitch (20 um)
- Same 8-14 Channel Coding

Serial Digital Interface

SMPTE 259

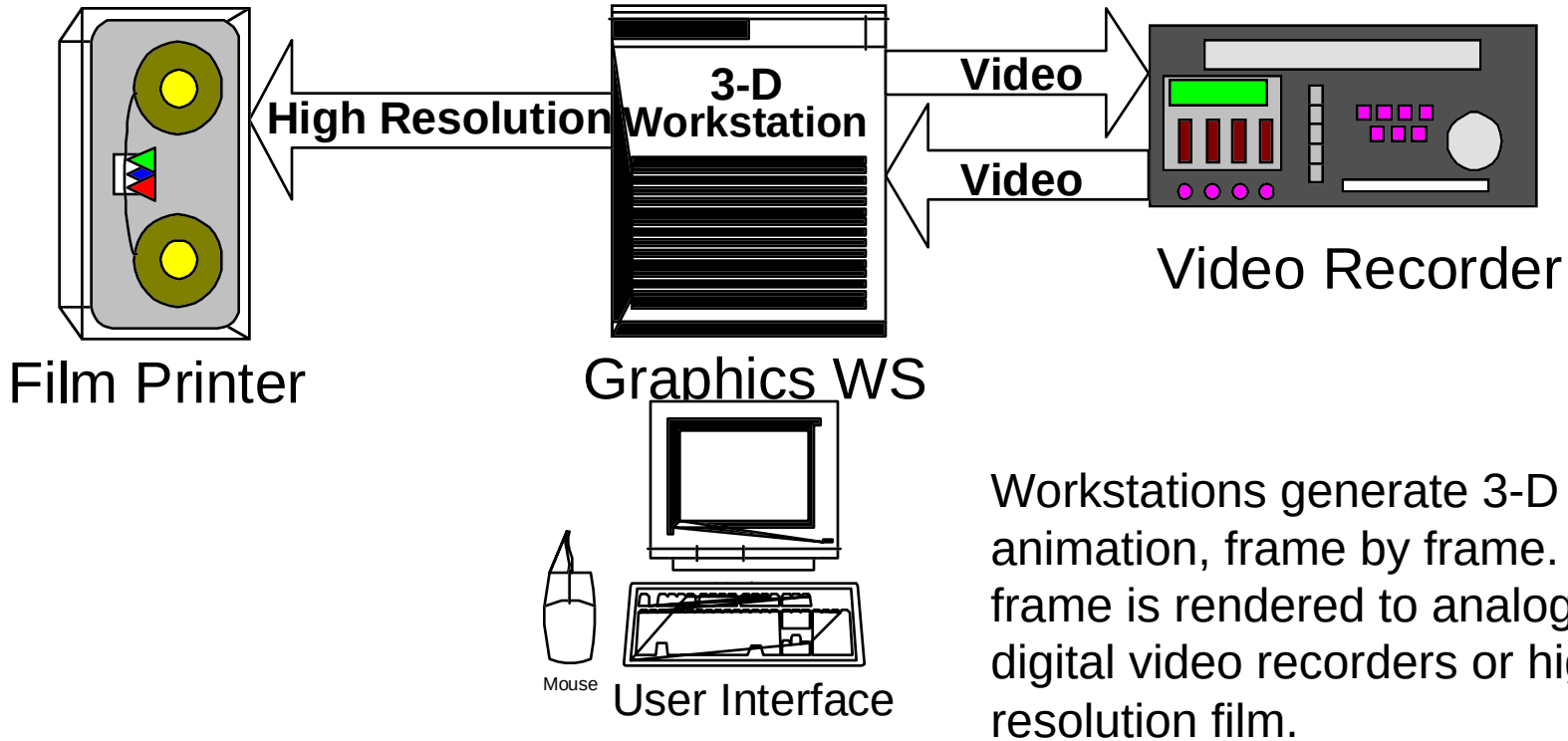
- Designed to carry Video, Audio & Data on a single COAX
- Permits Simple Interconnection and Routing of Signals
- Interface can handle 10 bit 525 or 625 line, Composite or Component Signals
- Horiz.+Vert. Blanking can be used for Audio and Ancillary Data

First Generation Digital Graphics Workstations



Post Production digital video graphics were processed at D-1 resolution. Performing video image manipulation in real time required dedicated hardware. Images were captured and output from analog component or D-1 video formats.

Second Generation Digital Graphics Workstations

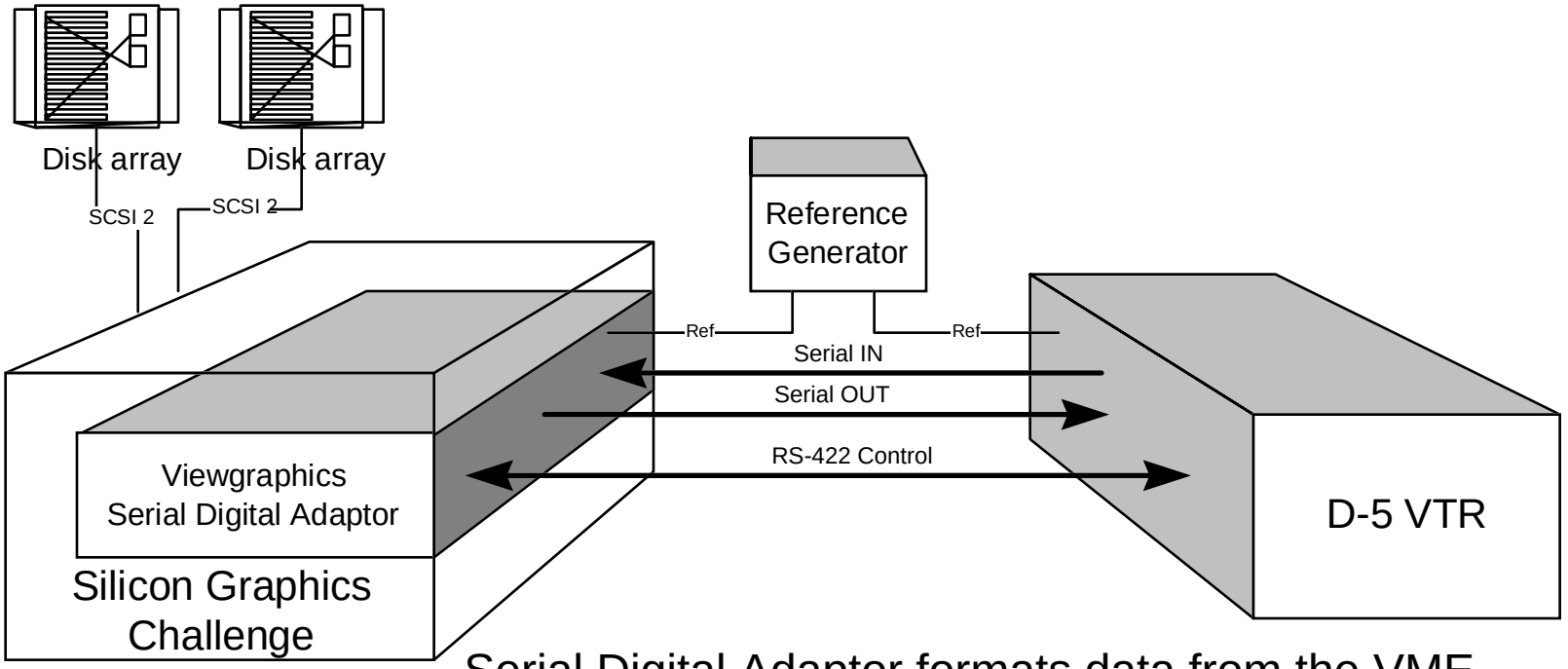


Workstations generate 3-D animation, frame by frame. Each frame is rendered to analog or digital video recorders or higher resolution film.

Frame Resolution & Data Rate

Format	D-1	D-5	Film
H Res	1440	1440	2048
V Res	500	500	1536
Bits/pixel	8	10	10
Frame Size	5.76 Mb	7.2 Mb	31.45 Mb
FPS	30	30	24
Mbps	172.8	215.8	754.8

Viewgraphics Serial Digital Adaptor "Data on D-5"
“DOD5”

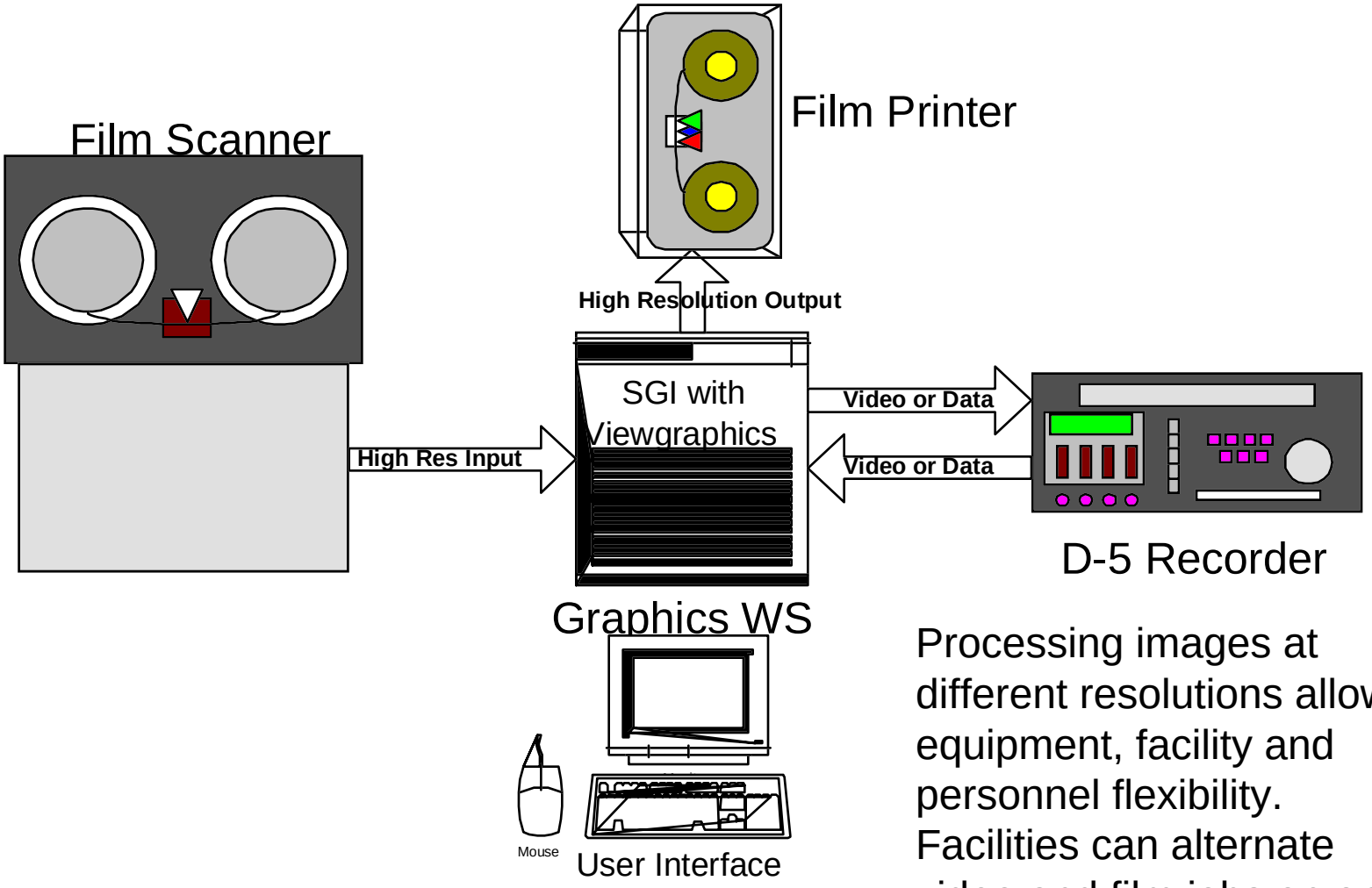


Serial Digital Adaptor formats data from the VME bus into a data compatible with serial digital devices. This allows either data or video to be recorded by the digital VTR.

Viewgraphics Dataview SDA Applications

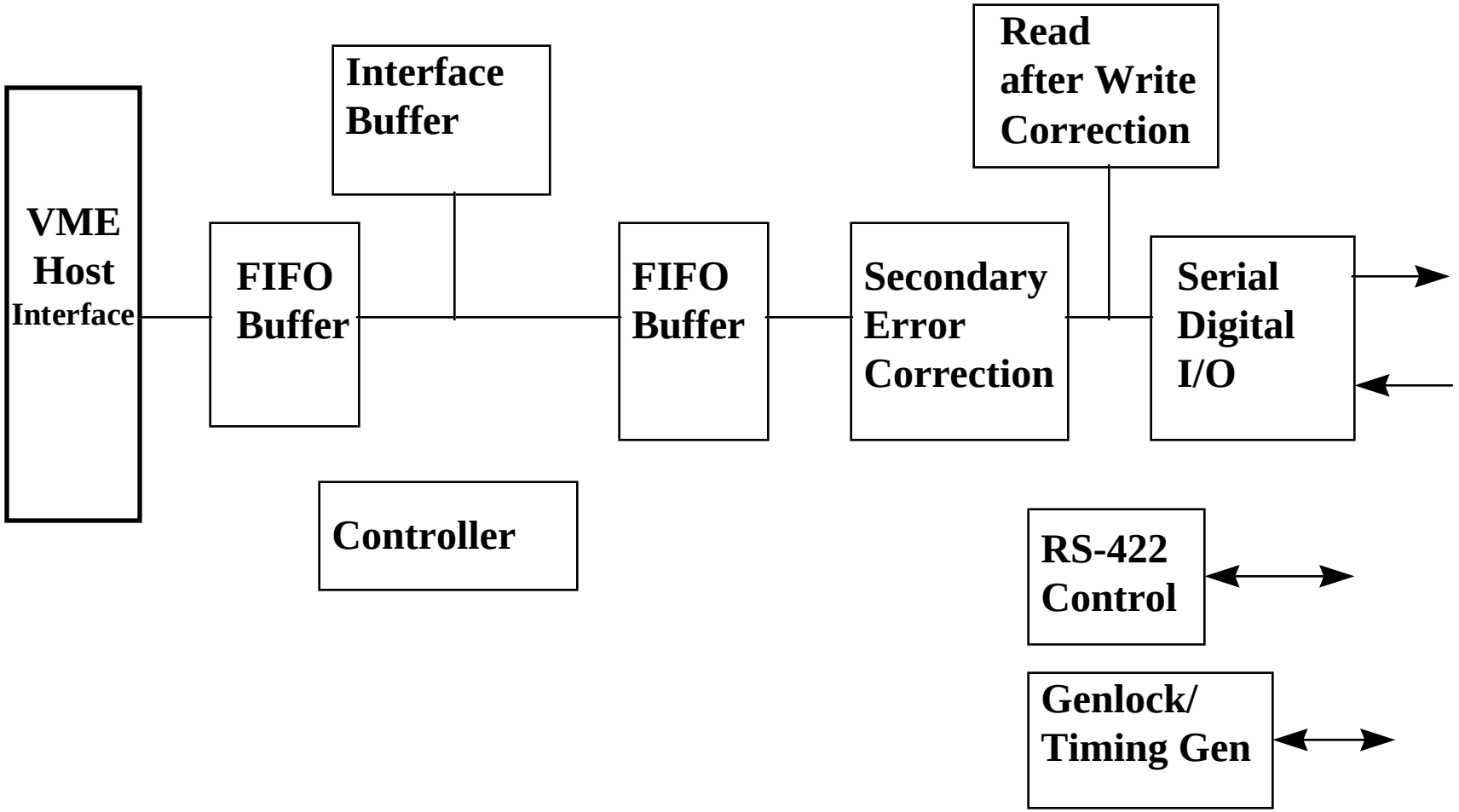
- Dedicated Fast archival for Onyx graphics
- Networked in Challenge server environment
- Integrated in serial digital video system

Third Generation Digital Graphics Workstations



Processing images at different resolutions allows equipment, facility and personnel flexibility. Facilities can alternate video and film jobs on an hour by hour basis.

Dataview SDA Blocks



Dataview SDA Features

- Up to 256 MB onboard RAM
- Full control of VTRs
- Read after Write data validation
- On-tape directory in table of contents
- Full bandwidth video capture to VME bus
- Data interchange media
  - High capacity (up to 127 GB/cassette)
  - High speed (up to 17.5 MB/sec)

Serial Digital Interface

Physical	75 ohm Co-axial
Clock Rate	270 MHz
Coding	Scrambled NRZ
Data Start Flag	SAV (Start Active Video)
Data End Flag	EAV (End Active Video)

Viewgraphics Transfer Rate

D-1	14 MB/s		
D-5	17.5 MB/s (10 bit mode)		
Comparison (average)			
DLT	1.2 MB/sec	8 mm	.5 MB/s

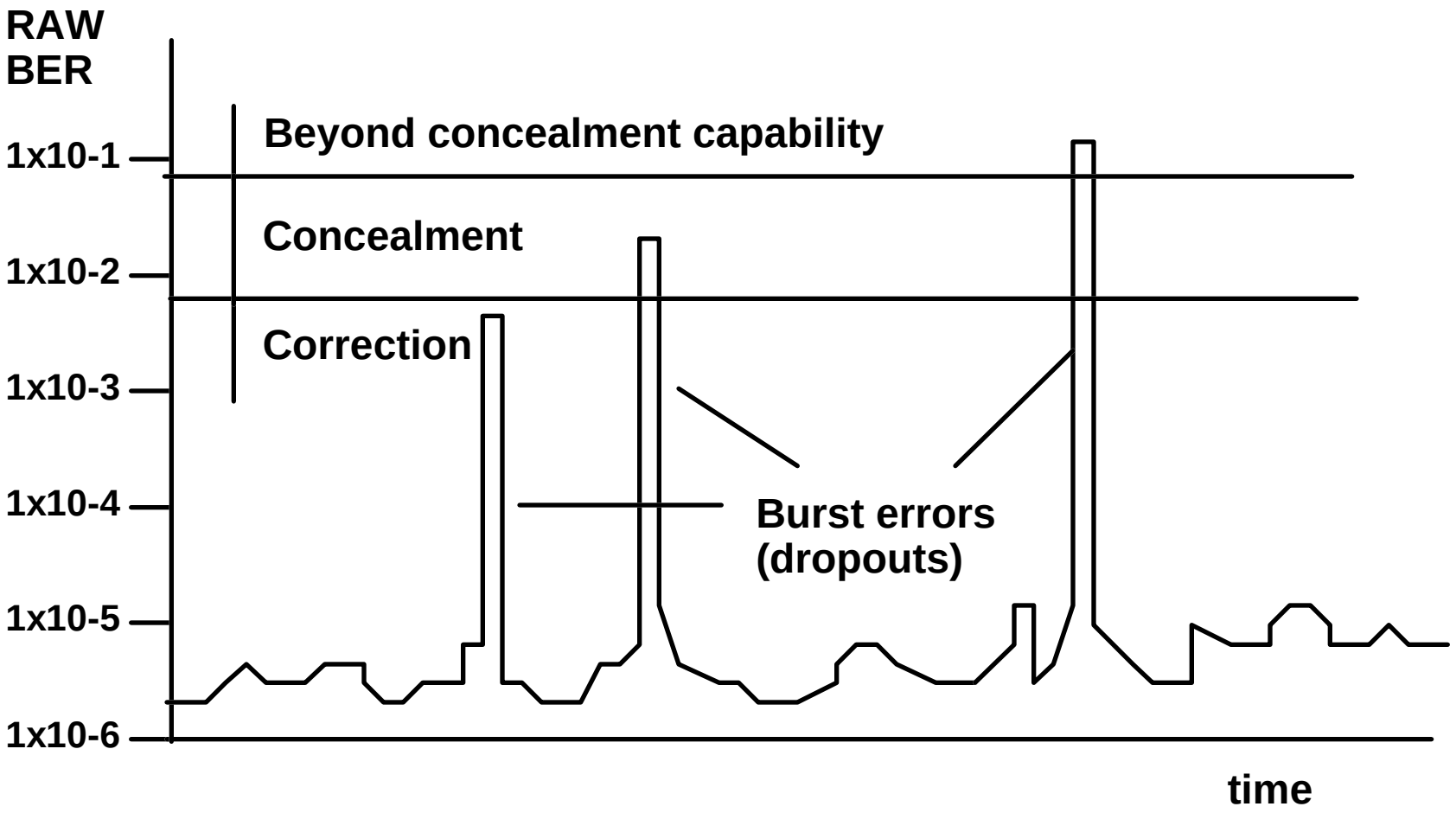
Maximum File Size

UNIX	4 GB
SGI XFS	127 GB (D-5 Large Tape)

Error Correction Systems

- Error Correction Systems can provide very powerful correction
- D-3 & D-5 EC Systems have about a 1,000,000 : 1 correction range
- They provide almost perfect correction until the EC range is exceeded
- Once overloaded ECC systems tend to collapse abruptly

Bit Error Rate vs ECC Headroom



Dataview Data vs. Video Mode Recording

	Data Mode 525 D-5 VTR	Video Mode 525 D-5 VTR
Bytes/Line	1260	1800
Lines/Frame	486	486
Frames/Sec.	30	30
X-Fer Rate MB/sec	17.52	25.03
Additional ECC	20%	
Corrected BER	10^{-10} to 10^{-13}	10^{-12}

Tape Capacity of D-5 Standard Cassettes
(Gigabytes)

	525 VTR
Small	23.61
Medium	64.67
Large	127.29

DOD5 Backup Time is approximately
1 minute per Gigabyte

D-5 & HDTV

- D-5 is a 300.6 Mbs Digital Recorder
- D-5 Does Not Use Compression Internal to the VTR
- D-5 can thus accept "non-video" Data signals
- D-5 Uses an External 4:1 HDTV Compressor to Provide Superb Quality HDTV Today
- D-5 plays D-3 tapes, Records D-5 in 13.5/18MHz and accepts Compressed HDTV.

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