

Tapeless Acquisition (What's the point?... er... ever decreasing budgets!)

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What will happen in 5 years?

- Producers expected to produce same. quality programmes at the same or less budgets now on HD.
- This has happened a bit early!
 - HD is becoming the norm.
 - PS – there isn't any more money in the budget!

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Tapeless Acquisition

1. Concept.
2. Tapeless vs. conventional workflows.
Native Compression – why this is great!
3. Options – XDCAM vs. P2 & AVC Intra.
4. Safety net – sensible precautions.
5. Changing Role of the Camera Op/AC.
6. Case Study.
7. Practical Options.

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1. Tapeless Cameras - intro

- Tight Budgets for SD
- How to migrate to HD
- Explaining the concept

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Budgets are becoming tighter

- Producers are continually being squeezed.
- Budgets are not increasing.
- HD is becoming the norm for commissioning.

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Residual Programme Value

- Increased if you acquire on HD.
- So far – pretty obvious!
 - So what can be done?

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Old Problem

- Budget is based upon DVCAM acq. and Digi Beta mastering.
- So can't migrate to HD without external money.

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So What Happens?

- Programme stays SD.
- Limits the value and life of the programme.

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In the HD World

- Equipment isn't any cheaper.
 - Cameras
 - Lenses
 - Matte Boxes
 - Filters
 - Monitors
 - VTRs
 - Accessories

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Tapeless technology changes this

- Tapeless workflow enables you to do more yourself in Post.
- So you save money in Post.
 - to compensate for slightly more expensive camera kit.
- However you end up with an HD master instead of an SD master!

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Starwinder BBC Research Project

- Found that conventional production.
 - Shoot Digi Beta
 - Off-line Digitise
 - AVID Off-line
 - EDL
 - Auto-Conform
 - On-line
- **Digi-Beta mastering.**

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Was more expensive than...

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Starwinder BBC Research Project

- Modern HD production.
 - Shoot DVCPro HD (tape)
 - FCP/AVID HD edit (using firewire)
- DVCPro HD mastering

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Starwinder BBC Research Project

- Conventional Digi Beta Production.
- Is more expensive than Modern 'native-codec' HD Production
- Even when using tape!

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...and tapeless is better still!

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HD 'Native' Tapeless Edit

- More reliable than tape.
 - Make safety clones of your media.
- See mistakes early!
 - Don't wait until the On-line to see that your images are out of focus.
 - Using 'native-codec' editing, your off-line edit means that you work with full-frame HD images, same as the on-line!
- £££ Cheaper!!

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2. Tapeless Post Workflow

- Conventional Workflow.
- Native software compression.
- Tapeless post workflow.
 - Demystifying the process

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Conventional Post Workflow

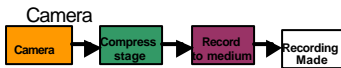


- Lots of duplication.
- Costly.
- Time consuming.

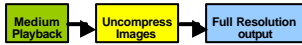
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What's actually going on



VTR Playback

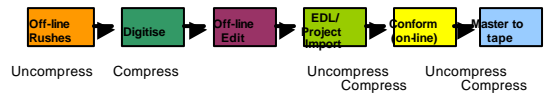


- Images move in and out of compressed form when recorded and when digitised.

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Conventional Post Workflow

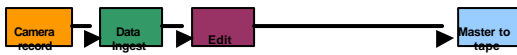


- Data goes in and out of compression codecs many times.
- More processing requires more expensive post tools.
- Costly & Time consuming.

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'Native' Post Workflow



Compress

- That's it!

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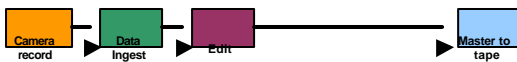
Native Post Production

- The computer edit system works in the same compressed 'flavour' as the camera.
- Consequently, data is only compressed at the camera.
- The pictures remain in the 'native' compression scheme thro'out the process.
- Quality is uncompromised.

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'Native' Post Workflow



Compress

- Data recorded on the camera is stored in a 'native codec'
- The edit system works in the same compression system, so no extra processing.
- Save £££.

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Save £££ on...

- Off-line Digitise.
- Camera Stock Costs.
- On-line Digitise.
- On-line Conform.
- Easier edit (auto thumbnails etc).
- Mistakes in the edit.
 - (You edit your off-line in HD instead of SD, so fewer mistakes)

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Examples of 'Native' Edit

- DVCPro 50
- DVCPro HD
- P2
- AVC Intra
- XDCAM EX
- XDCAM HD
- RED

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4. The nitty-gritty sensible precautions!

- What do you need?
- How will I make Hard Drives copies of data?
- What do I take to the grading suite?
- How do I archive without any tapes?
- Compatibility with existing systems.

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What do I need?

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1. Tapeless Camera.



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2. Some Storage.



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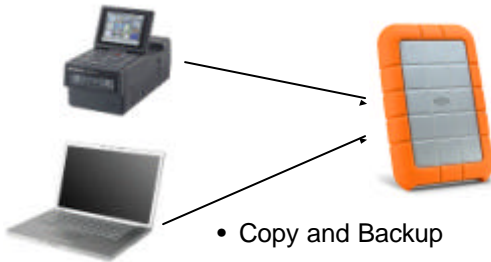
3. Some Hard Drives.



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4. Transfer Station.

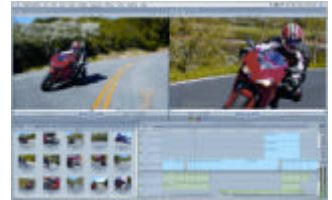


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5. Edit Application.

- Recent version of
 - Final Cut Pro
 - AVID
 - Canopus
 - Edius
 - Matrox Axio
 - Sony Vegas
 - Lightworks
 - Aurora



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PC or Mac (it doesn't mind).

- Non Linear Editor (NLE) with firewire
- HD compliance
- Version compatibility with format/codec (check www.vmi.tv useful information)
- Latest drivers (upload from www.vmi.tv useful information)

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6. Hard Drive to take to grade.

- Edit Media (MXF)
- Project Info
- Audio
- Timecode
- Metadata
- Everything you need!



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7. On-line Finishing.

- Ingest (plug in the hard drive)
- On-line/DI/Grade
- HD Finish
- Play-Out

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8. Hard Drive to finish.

- Copy everything that might have changed in the edit.



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9. Hard Drive for Archive.

- Put it on your shelf.
- If you ever need to access your media, plugging this into your edit system will allow access to all original media and edit info!
- Costs IRO £100
- Stores 8 hours HD.



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Do a test

- Don't assume that it will work.
- Do a test in advance of the shoot.

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Strategy for data Management

- Copy Media to Hard Drives (HDD) daily.
- Make safety backups daily.
- Can use copy and verify option for secure transfer.
- Make backups of backups so you always have a safety copy!

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Use Ruggedised Hard Drives

- Ruggedised Hard Drives are really robust!
- They are up to ½ TB (500GB) in size (up to 16 hours of P2).
- They send power and data on one cable.



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Are they really robust?

- This one has gone all over the world with only a small dent in the casing.
- (It still works fine!)
- Data rescue programs can fix problems.



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3. Tapeless Cameras - options

- P2
- XDCAM - HD
- XDCAM-EX
- RED
- Anything working with Flash XDR

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Solid State is v. reliable!

- No moving parts.
- Low power consumption.
- Multi-frame rate.
- Real-time slow motion.
- Real-time viewing on set.
- Uninterrupted recording.
- Retro-record and time-lapse record etc.

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Panasonic P2

- Based on P2 Cards.
- Large and small cameras work in the same compression codec for seamless integration.
- Up to 1 hour of HD per card at present*.
- Well proven.
- Solid-state archive units* 720Pn using 32GB cards without PCs.



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P2

- HPX-500 is a very popular workhorse.
- Uses standard HD interchangeable lenses.
- Fits into a DVCAM production budget.



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Premium quality

P2/AVC Intra

- HPX-3000.
- HPX-3700.
- Top quality cameras with true 1080 accepted by all Broadcasters and work on the new AVC Intra codec.



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Budget camera

P2

- Small Cameras work same codec as large ones.
- HPX-171.
- HVX-201.
- Amazing Value for the money!



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Long GOP vs. Intra-frame

- Long GOP means that you record a sequence of frames.
- Very efficient.
 - Data bit rate is kept small.
- You only record what information changes.
- Long GOP can struggle with strobe/flash photography etc.
- This is very rare.

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Long GOP vs. Intra-frame

Long GOP used by:

- DV
- DVCAM
- XDCAM EX
- XDCAM HD

Not used by:

- DVCPRO HD
- P2

AVC Intra uses modified codec.
RED similarly so.

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XDCAM EX

- Based on SxS Express Cards.
- Used for small cameras only.
- Integrates in post with larger cameras using XDCAM HD.
- Up to 3 hours of HD per card at present*.
- Native 1080 images.
- Modern PC & Macs have SxS Slot as standard.



* 1080 SP mode
using 32GB cards

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XDCAM EX

Budget camera

- EX-1.
- EX-3.
- Superb quality.
- 1080-line resolution.
- EX-3 has excellent v/f, interchangeable lenses and can be used in multi-camera mode.



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XDCAM HD

- Shoots onto Magneto-optic discs. (Think of flat tapes).
- High Quality 1080 material is accepted by *all* Broadcasters.
- Media is cheap.
- Can play-in off the camera or via a separate reader.
- Post interfaces with XDCAM EX.



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XDCAM HD

Premium quality

- PDW-700 is the top-of-the-range XDCAM HD Cam.
- True 1080 lines accepted by all Broadcasters.
- Record HD at up to 50Mb/s onto Dual Layer Disc.
- Keep media and great post workflow.
- New solid state option to permit dual recording to card and disc. (coming Summer 09)



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RED

Premium quality

- New kid on the block.
- Very sexy images.
- Very sexy name.
- 35mm depth of field.
- Very good slow motion (to 150fps).
- Native edit to FCP.
- Perceived to be cheap.



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Premium quality

RED

But

- Labour Intensive.
- Cam have issues in production and Post.
- ...and it's not cheap either!



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Flash XDR

- Brand new technology.
- Shoots onto SD memory cards.
- Very inexpensive.
- Works with every HD Camera
- Converts conventional HD camcorders to shoot tapelessly.
- Uses XDCAM HD codec.



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5. Changing role of the AC

- Who is responsible for data management?

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Who does the data management?

- Normally the Camera Assistant.
- Camera Assistant has a new Job Description!
- Smart production scheduling should allow the 1AC/operator to also complete data management at the end of the day/lunchtime etc.
- Important to use correct Manufacturer transfer software.
- Crews remains the same as conventional but no stock costs!

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Plan the days

- Plan the daily schedule to allow data transfer.
 - Don't plan for 12 hour shoot days and then expect the operator to transfer afterwards!
- Sensible schedule to allow time for media data transfer.
- Consider using dedicated hardware for archive.
 - (e.g. Pana G10)
 - Less reliance on laptop PCs on location.

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6. Case Study

- Bill & Ben Productions
Python 40th Anniversary documentary

"Monty Python – almost the truth (the Lawyer's Cut)"

- 6 x 1hr documentary
- plus 100min DocuFeature
- For Independent Film Channel (IFC)
- Broadcasting for world release October 09

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Python 40th Anniversary Doc, Bill & Ben Productions

- Shooting on Panasonic HPX-3000 Camera onto P2 cards using DVCPPro HD codec.
- Camera used for UK and US interviews and supplementary material.
- Transfer using MacBook Pro and P2 5 x card readers for London and US.
- HD Off-line using FCP in native DVCPPro HD codec.
- On-line/conform using FCP On-line.

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7. Practical Advice

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Shooting P2

- Can shoot in 1080 mode or 720 modes.
- In 1080 mode, storage is 1min/GB.
- If you shoot in 720 mode, then choose 720 25Pn – this records 2min/GB.
- It also means that transfer times are also twice as fast! (2.5x real-time).
- If you shoot in 1080 mode, (0.8x transfer time).

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P2 Cont

- 4 x 16GB cards is fine to shoot 2 hours of 720 material. 4 x 32GB to shoot 1080/AVCi for doc.
- 2 hrs of material is usually OK for the morning shooting.
- Transfer to hard drive over lunch using dedicated archive unit (Pana G10).
- 2 hrs 720 material takes 45 mins to copy to HDD.
- Shoot 2 hrs in the afternoon and tx to HDD in evening.

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P2 Cont.

- Shoot with large and small cameras simultaneously.
- They actually do inter-cut really well.
- If you use P2 and have a modern laptop, then you will need to hire a P2 reader.
- But dedicated archive units are best of all and you don't need to have a laptop on location!

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AVC Intra

- AVC Intra is an AMAZING codec.
- Much better than DVCPPro HD for chroma key, compositing and grading.
- However, it currently doesn't work very well with AVID (It crashes).
- Works very well with MACs and FCP but the high processing requirement may mean that post is slower than normal.

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XDCAM

- Excellent workflow with FCP and AVID.
- Sony plug-in tools to AVID and FCP work well to seamlessly intercut between XDCAM EX and XDCAM HD.
- XDCAM can be digitised effectively into a PC/Mac from the camera.
- You will be able to record to solid state and XDCAM HD from the Summer!

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XDCAM HD Cont.

- Proxy editing allows low resolution editing (15:1 AVID equivalent) for off-line.
- Very fast transfer speeds (32GB tx 6.5 mins to HDD).
- You can buy single and double layer disks but not all readers read them – so beware!
- Then re-dig images at full res.
- Low rez Proxy edit only compatible with AVID. **(FCP does not support proxy edit XDCAM)**

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XDCAM HD cont.

- AVID proxy files do not support:
 - Slow motion Ramping
 - Frame Grabs
 - Interval recording
- Proxy files use low qual. audio and images.
- But, low res audio is poor.
- Mog Technologies make an application called Taboggan which fixes all of the above and allows low res images with HQ audio to work together for off-line! www.mog-solutions.com

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XDCAM HD Cont.

- XDCAM is supposed to allow email of proxy files.
 - and then have someone remotely editing off-line material.
 - then allow full-res. digitise of images.
- But remote email of Proxy files does not work well, as meta data not automat. included in email of proxies.

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HDCAM

- HDCAM is not tapeless!
- BUT for drama, use HDCAM Camcorder (Sony HDW-F900R) and Flash XDR solid-state flash recorder
 - Simult. record to tape and solid-state.
- Very good workflow, better quality and very safe (tape backup)!

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For information on equipment, formats, techniques, technical information and useful links

Visit our website!

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VMI Events 2009

19 Feb 09	Non-linear Acquisition	Broadcast Live
24 Feb 09	XDCAM workshop	VMI Soho
11 Mar 09	P2 & AVC Intra workshop	VMI Soho
17 Mar 09	RED DIT workshop for ACs	VMI Soho
15 Apr 09	HD for Producers seminar	VMI Soho
15 Apr 09	HD DoP Camera workshop	VMI Soho
2 Jun 09	RED DIT workshop for ACs	VMI Soho
9 Jun 09	P2 & AVC Intra workshop	VMI Soho
30 Jun 09	XDCAM workshop	VMI Soho
13 July 09	HD for Producers seminar	VMI Soho

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Thank You!

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