

EVERYTHING THAT YOU WANTED TO KNOW ABOUT P2 BUT WERE TOO AFRAID TO ASK...

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INTRODUCTION

This essay is for those wishing to know about P2 and seeks to answer the following in the same order:

- What is P2?
- What does it do and how can I use it?
- What equipment is available
- What do I need to do to prepare for my first P2 Production
- Detailed discussion about Post Production workflow.
- Compatibility issues with edit systems
- Technical Stuff

WHAT IS P2?

P2 HD is a full production quality, high definition recording system that utilizes removable solid state memory cards. This approach eliminates the mechanical wear and environmental limitations of tape, hard disk, and optical disc based systems. P2 HD ensures the highest reliability, especially in challenging conditions of extreme temperature, shock, and vibration.



What are the major advantages of using P2?

Traditionally video is shot onto tape. A separate digitise process from a VTR will play into the Edit suite and this is usually in uncompressed form HD-SDI at 1/2TB per hour of media.

[P2 Card](#)

Panasonic developed a series of video equipment recording onto the DVCPRO HD format which utilised Firewire to digitise and edit in a 'native' DVCPRO HD format onto the post production system. This meant that 1 hour of material now took only 60GB but would still need to be digitised from a VTR transport mechanism (either off the camcorder or from an external VTR)



The P2 cards, now permit recording onto solid-state memory for easy transfer to PC or Mac ('ingest') and using a new frame rate called 25Pn, uses only 30GB per Hour.

What about the workflow?

The idea is that a common compression scheme does not have to always shoot onto tape - instead, a new workflow exists whereby a non-volatile memory card is used as a transitory medium, prior to archiving onto hard disks, where it will remain for life!

This is a relatively new idea, which is interesting since the cost of hard drive storage has plummeted so that hard drive storage is now **cheaper than buying tapes!** For example, a 250GB Drive costs little more than £100 and stores 8



Everything that you wanted to know about P2 but were afraid to ask.

hours of HD material – roughly ½ to 2/3 the cost of DVCPRO tape stock!
[Lacie Ruggedized Hard Drive](#)

P2 is no longer a new HD format - the workflow is now very proven and the native codecs widely adopted by post-production software applications. Invented by Panasonic, this workflow uses non-volatile memory sticks to record pictures on for easy post production.

The idea is that pictures can be recorded onto DVCPRO HD for the main production and that the memory cards provide a temporary transient storage medium, prior to being transferred to the main storage medium where it can be used and then later archived.

It is supported by small and large camcorders that record using the same compression scheme onto memory cards and tapes for a totally seamless HD post production.

How does it work?

1. You shoot onto memory cards on location - currently 16GB cards are the most common storage used (but 32 GB cards have just come out) which give 16mins of HD at 25p (or 38mins of HD in 25pn) or 64 mins of SD in 25p
2. At lunchtime, with 4 x cards worth of material filled up, you use a box called a G10 P2 reader archive unit, to copy all media onto standard cheap removable firewire drives. This unit has a built-in screen, so that transferred media can be checked for peace of mind. The P2 cards are then wiped ready for reuse
3. The firewire drive (1 TB can store more than 40 hours of HD material in 25Pn mode) can then be plugged directly into your post-production unit, like Final Cut Pro or AVID Media Composer Express, and then the images edited directly in the native HD format without the need for digitising or low quality off-line editing
4. On completion of the programme, the drive complete with edited timeline, graphics etc, can be given to the post-production

(38 mins of HD when shooting 25pn - note 25pn only compatible with FCP)

The advantages of P2 over HDCAM are that all editing, including off-line are at the same HD quality, post-production machinery is cheap (all based around using HD firewire with Final Cut Pro and AVID Xpress) and the net result is that post-production ought to be cheaper than using conventional post production. These memory cards are currently quite expensive but the workflow is excellent - the success of the format will depend on how well producers adopt its novel post-production workflow but a strategic acceptance by the BBC that DVCPRO HD using non-linear acquisition is its preferred choice should ensure the continued success of the format.

Also, if you are worried about hard drive failures, there are a range of new RAID 0 hard drives which record all data twice independently, so that in the event of drive failure, you can be confident that your data will survive.

WHICH CAMERAS SUPPORT P2?

Panasonic HVX-200

This was the first P2 based non-linear capture unit released in late 2006. It is a great unit with excellent optics which comes in either UK or US versions. It shoots HD format images of 720/50 or 1080 DVCPRO HD modes onto P2 cards only and also records standard definition miniDV images onto mini-DV tape.

It is small, lightweight and a perfect accompaniment to a single unit package using either the HDX-900, Varicam or now HPX-500 units, as it uses the same compression scheme for easy post-production and the pictures closely match these camcorders too!



Everything that you wanted to know about P2 but were afraid to ask.

The UK version records in 1080 mode in 25p or 50i or in 720/50 mode in 25p or 50p. 50p would be used for slow motion. It is also capable of shooting 25Pn and 50Pn modes - see HPX-500 description below.

DVCPro HD 720/50 or 720/60 Modes

One irritation of the Panasonic 720 format is the existence of 2 x discrete versions for European and US production, namely 720/50 and 720/60. This is analogous to the PAL and NTSC formats and some camcorders are only capable of shooting on one of these versions. - Also the first Panasonic DVCPro HD VTR, the AJ-HD-1200 only supports the earlier 720/60 format, so it won't play back the Panasonic HVX-200 material if shot in 720/50 mode (either 25P or 50P). The later AJ-HD-1400 VTR overcomes this and is compatible with all DVCPro frame rates, both SD and HD.

For reference, the HDX-900 and HPX-500 are capable of 720/50 and 720/60 but the HVX-200 is only capable of shooting in 720/50 mode for 25p and 50p. All of the above can shoot in 25p and 50i in 1080 mode. Confusing huh?!

Put simply, you need to decide whether you are shooting for Europe (in which case you shoot 25fps) or The US (24p or 30 fps) and then whether you shoot in either 1080 mode or 720 mode – that's pretty much it!

[HVX200 Panasonic site](#)
[HVX200 Instruction _manual](#)

Panasonic HPX-500



Panasonic HPX-500 P2 Camcorder

This is a low-cost 2/3" 'World camera' which means that it works in all frame rates including 23.98p, 24p, 25p and the US frame rates too. It only records onto P2 memory cards and works in the 1080 DVCPro HD codec and also 720 mode as well.

On paper it does everything - 1080i and 1080p, slow motion ramping up to 60p using 720/50 and 720/60 modes; firewire output; non-linear capture; great workflow; 2/3" lens mounting which means that a vast lens selection is available to hire for it. It delivers too but don't expect it to perform like an HDCAM HDW-790 or Panasonic Varicam

because this is a low cost camcorder, although we have performed latitude tests on this unit and found that it can resolve 7.5 stops, similarly to the Digi Beta DVW-790P

It also can switch between shooting in 720/50 or 720/60 modes for true US or European HD acquisition.

The really clever thing about this camcorder is that it can shoot in the Pn format DVCPro HD, which means that you can shoot slow motion images without recording replicated frames (like the varicam), so providing this format is compatible with your post-production suite (the latest AVIDs and FCP 6 can do this), then you can shoot slow-motion images up to 60 frames per second (60Pn) and edit them directly without the need for costly frame-rate conversion, necessary on Varicam.

In a nutshell, this is set to be the camcorder to replace the Sony DSR-570 DVCAM Camcorder. In my opinion it is designed to fit into the DVCAM acquisition and Digi Beta production budget but now deliver in true HD. Costs can be saved in post-production to help the budget and cameramen will be pleased with its standard size, weight and layout.

[HPX500 Panasonic site](#)

[HPX500 Instruction Manual](#)



HDX-900 DVCPro HD Camcorder

Everything that you wanted to know about P2 but were afraid to ask.

Panasonic HDX-900

Panasonic Multi-format 1920x1080 and 1280/720 line HD Camcorder shooting native 720 or 1080 lines in all frame rates. Very filmic images with the popular Panasonic camera interface and processing. This is Panasonic's direct alternative to the Sony HDW-750P HDCAM Camcorder and has enhanced firewire capability. This camcorder is capable of recording data only if used with the FS-1 Firestore. Also interestingly, it can have a G10 archive unit mounted on it and then record to P2, though this is a bit clunky.

[HDX-900 Panasonic site](#)

[HDX900 Operating Instructions](#)

Panasonic HPX-2100



HPX-2100 P2 Camcorder

The AJ-HPX2100 is the same model camcorder as the Panasonic HDX-900 but with a P2 mechanism instead of recording to DVCPRO HD tape.

Like the HDX-900, it is a multi-format 1920x1080 and 1280/720 line HD Camcorder shooting native 720 or 1080 lines in all frame rates but only records to P2 cards. Very filmic images with the popular Panasonic camera interface and processing. This camcorder will have a greater latitude than the HPX-500.

Also, it can be purchased with an AVC Intra option to also record in 1920x1080 on the AVC Intra codec, but I do not expect this to be that popular, since the camcorder only sub-samples at 1440x1080, unlike its big brother, the HPX-3000.

[HPX2100 Panasonic Site](#)

HPX-3000

Panasonic's new AVC Intra High Definition camcorder recording 1920x1080 resolution with 10 bit 4:2:2 sampling. 24P/25P AVC Intra acquisition on P2 memory cards (5 x slots) at 50Mb and 100Mb modes. 14 bit A-D processing for film and TV style work. This is designed to work as a very high-end camcorder and will shoot true 1920x1080 (as opposed to the other Panasonic camcorders in the range, which actually sub-sample at 1440x1080). However, full sampling of 1920x1080 at 4:2:2 actually puts the specification of this camcorder at a level to compete with the Panavision Genesis, Arri D20 etc and usurps even the Sony HDW-F900R in performance.



HPX-3000 AVC Intra Camcorder

One thing to bear in mind with this camcorder, is that it does not shoot any 1280x720 material, so no slow motion ramping capability is provided for – unlike the HPX-2100, HPX-500, HDX-900 and HVX-200.

[HPX3000 Panasonic Site](#)

PANASONIC ARCHIVE AND TRANSFER UNITS

P2 Store

Since P2 cards are a transitory storage medium, it will always be necessary to copy the data off the P2 cards onto some hard drives. The Panasonic P2 Store offers a portable 60GB storage device to transfer up to 120 minutes of P2 storage onto a portable hard drive without the need of a



P2 Store

Everything that you wanted to know about P2 but were afraid to ask.

portable PC or Mac and then transfer the footage onto hard drives back at base.

One of the drawbacks of the P2 store is that it does not have a display to have a visual check of the data that you are transferring - a green LED works when you have confidence in the technology but some of us need more than this, so we have the AG-HPG10 archive unit. However saying that, the P2 store is a very convenient unit to lay off some P2 material in the field without any ancillary equipment or external drives being needed – so don't rule out its usefulness altogether.

[P2 Store](#)

Panasonic G10 Archive Unit (P2 Gear)

The AG-HPG10 is a portable P2 playback device, which has 2 x P2 slots and runs off batteries. What is remarkable about this device is that it can drive USB2 or firewire hard drives without using a portable Mac or PC, so you are not limited to using small drives.

Once you transfer your material onto hard drive, you can check the clip icons and metadata off the hard drive to give you peace of mind.

This means that you no longer need to carry a PC or mac with you on a long trip and can make safety archive copies of all of your media with confidence. It also has analogue and digital outputs, so that you are able to play P2 material directly on larger monitors.



One further comment here about drives - it may seem that the best thing to do is to use massive drives on location so that you have limited numbers of drives to work with but this is not necessarily the case. Firstly, only drives 250GB or less can be powered from the G10 unit via USB2, so it makes sense to use these and also, the latest Mac OS only allows certain quantities of drive numbers, so increasing the quantity of P2 cards used uses up this capacity quite quickly - we have found that the combination of using 16GB P2 cards and 250GB ruggedised USB-2 hard drives are the best combination when using the G10 archive unit.

[G10 Panasonic Site](#)

Firestore

External battery operated firewire storage drive for HVX-200, HDX-900 & HPX-500 Camcorders. Kit includes 100 minute storage drive, 3 x external batteries plus charger and Bebob box unit. The drive can quickly be uploaded via firewire to a laptop PC with a firewire port and the media immediately used for HD post production on Final Cut Pro.

[Firestore Unit Focus Enhancements Site](#)



FS-100 Firestore portable hard drive

Everything that you wanted to know about P2 but were afraid to ask.

P2 Reader (using P2 with a MC or Mac with no PCMCIA P2 Slot)

P2 Cards use PCMCIA technology which is not built into every PC or laptop. As a result, Panasonic has created a P2 reader unit which has 5 x P2 slots and has a USB cable for compatibility with machines with USB slots but no PCMCIA. It is called an AJ-PCD20



AJ-PCD20 P2 Reader

[P2 Reader](#)

If you have a desktop Mac or PC, then a company called Amtron has a range of desktop PCMCIA P2 readers for sale.

http://www.amtron.com/reader/p2card_reader.htm

Adapters are now available to convert P2 (PCMCIA) cards into PCs and Macs which only have Express card slots. The unit is called a Duel Adapter and is available over the web on <http://www.duel-systemsadapters.com/?productid=DP-0001>



WHAT'S THE RECORDING CAPACITY OF P2 CARDS?

In order to answer the question of how much recording time a P2 Card is capable of, you have to determine two factors: what recording format you will use, and what capacity of P2 Card you're planning on using.

The calculation is quite simple after that:

- For DVCPRO or DV, the data rate is 4 minutes per gigabyte
- For DVCPRO50 or AVC-Intra 50, the data rate is 2 minutes per gigabyte
- For DVCPRO HD or AVC Intra 100, the data rate is 1 minute per gigabyte

A 32GB P2 Card is capable of storing over two hours of DVCPRO footage (32 gigabytes X 4 minutes per GB), or more than one hour of DVCPRO50 (32 GB X 2 minutes per GB) or 32 minutes of AVC-Intra 100 or DVCPRO-HD.

Please note, even more storage capacity is available in DVCPRO-HD 720P and AVC-Intra 720P and 1080P modes. Please review the included charts for further information.

32GB P2 Card DVCPRO Storage Totals (minutes per card)

Model	1080 / HD			720 / HD				SD	
	60i/30/24p	50i/25p	60p/30p/24p	50p/25p	30pN	25pN	24pN	DVCPRO 50	DVCPRO/DV
AJ-HPX2100	32	32	32	32	64	64	80	64	128
AG-HPX500	32	32	32	32	64	64	80	64	128
AG-HVX200	32	X	32	X	64	X	80	64	128

Everything that you wanted to know about P2 but were afraid to ask.

AVC Intra uses a different codec and using this different compression scheme, this also affects the recording durations. This is only an issue if you are using the HPX-3000 AVC Intra Camcorder or HPX-2100 with the AVC Intra option

16GB P2 Card DVCPRO Storage Totals (minutes per card)

Model	1080 / HD		720 / HD				SD		
	60i/30/24p	50i/25p	60p/30p/24p	50p/25p	30pN	25pN	24pN	DVCPRO 50	DVCPRO/DV
AJ-HPX2100	16	16	16	16	32	32	40	32	64
AG-HPX500	16	16	16	16	32	32	40	32	64
AG-HVX200	16	X	16	X	32	X	40	32	64

PREPARING FOR YOUR FIRST P2 PRODUCTION

Software Drivers

Please make sure you have the following software click accept on the website and continue to download.

Panasonic Contents Manager Software download (freeware)

https://www.pavc.panasonic.co.jp/pro-av/support/cs/csregistp2m/ep2main/p2cms_li_e.htm

P2 Drivers for Mac and PC

https://www.pavc.panasonic.co.jp/pro-av/support/cs/csregistp2m/ep2main/pcdriver_li_e.htm

P2 Drivers and Camera Drivers main download site:

<https://www.pavc.panasonic.co.jp/pro-av/support/desk/e/index.htm>

Recommended Hard Drives

If you are using the G10 archive unit, then this will power hard drives using a single USB2 cable up to 250GB. We have experimented and found that the Lacie Ruggedised 250GB Drives have been very successful and only need one USB2 cable to transfer data and power down one cable.

One caveat in the selection of the size of the drives is that every time that a P2 card is copied to hard drive using the G10 archive unit, the G10 creates a new hard drive partition on the hard drive. This means that when you plug the drive into a PC or Mac, each partition appears as a separate hard drive letter. There is however a limit of only 15 drive partitions allowed per drive, as Windows assigns each drive an alphabetic letter to define it. This means that you can only copy a maximum of 15 P2 cards to one drive **irrespective of whether the drive is full or not.**

Our recommendation is that since only up to 250GB drives are powerable by USB2 and that this will permit 15 full 16GB P2 cards, this is the optimal size for location media drives in our opinion.



Everything that you wanted to know about P2 but were afraid to ask.

[Lacie Ruggedized Hard Drive](#)

Hard Drive Formatting

If you are using a PC or Mac to transfer P2 material using the Panasonic Contents Manager software, then the hard drive formatting type is irrelevant.

However, if you are planning to use the Panasonic G10 archive unit, then format the drive from the G10 which performs an 'S' format, otherwise other format options are incompatible with the G10 archive unit and the G10 unit will not recognize the drive. Worse still, if you initialize a drive with existing data on it, then you will lose this data.

If you don't have a P2 Slot on your PC or Mac

[P2 Reader \(using P2 with a MC or Mac with no PCMCIA P2 Slot\)](#)

P2 WORKFLOW

How can I copy, backup or archive my P2 material?

Keep in mind that P2 Cards are storage devices for computer data. Because of that, you can use any computer and any storage device that you would use for any other computer data. There's nothing special to the process; there's nothing proprietary. If you've ever made a backup of your computer's hard disk, you already know everything you need to know to back up or archive a P2 Card's contents.

For data management and copying the P2 Card contents, Panasonic makes available the P2 Contents Management System (also known as "P2CMS"). This free software utility organizes your P2 footage into an easily-managed database and gives you the ability to re-name and annotate clips and enter all sorts of descriptive metadata. P2CMS also provides the ability to copy P2 Card contents to a hard disk or a P2 Card.

With P2 Cards, you're just working with computer data. To archive, you can use any commercially-available off-the-shelf archival method including DVD-R, Blu-Ray data discs, or computer tape archive systems such as DLT or LTO2/LTO3/LTO4. Some companies make archival systems designed specifically to work with MXF files (such as is found on P2 Cards). An example would be the Quantum SDLT-600A DLT tape drive, which is optimised for working with MXF files.

How do my P2 cards show up on my Mac desktop?

On a Macintosh computer, a P2 Card pops up on your desktop with a distinctive P2 icon or, on earlier versions of the Macintosh operating system, it'll show up as a generic storage icon. On the Macintosh operating system, the P2 Card will have a name of "No Name." If you explore the contents of the P2 Card, you'll see that it operates just like any storage volume, such as a hard disk – you can explore the contents, copy files, and delete files. Panasonic has provided the ability to copy or delete clips for free using our P2CMS Contents Management Software.

In addition, leading software development companies like Imagine Products offer programs like P2 Log Pro or HD Log for purchase, and a user can also utilize his NLE browser for the same functionality.

How do I get the video to play from the hard drive so I can review the material or copy to a videotape?

You can use your P2-compliant NLE system or when not using an NLE system,

Panasonic's P2CMS software includes a free viewing application for both the Macintosh and Windows systems. You can simply open a clip in the P2CMS application (or, on Windows, you can also use the P2 Viewer application). You can view clips in a small window or full-screen, and you can view clips directly from the P2 Cards or you can view them from folders

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on your hard disk (also known as “virtual cards”). However, playback performance is dependent on the speed and power of your computer hardware, of course.

What software do I need to view P2 material on my PC? On my MAC?

Panasonic offers free viewing and data management software, the P2 Contents Management System for both Windows and Macintosh platforms, and P2 Viewer for the PC. You can also use virtually all of the popular nonlinear editing software applications to view P2 footage on your computer.

Can I write back to my P2 card?

Yes, on Windows systems the P2 Card is treated just like any other removable storage device; you can format it, copy files off of it, or copy files to it, at will. In addition, P2-compliant NLE systems also allow you to write back to the card. You can also use the P2 Contents Management System software to copy entire clips or groups of clips onto or off of your card.

The Macintosh operating system won't let you copy files to a P2 Card from the Finder. However, you can use P2CMS to copy files to the card. In addition, Raylight for MAC software allows you to write back to a MAC.

What Nonlinear editing systems works with P2 ?

Virtually every popular nonlinear editing system works with P2 Footage, including:

- Apple Final Cut Pro 5.0.4 and later
- Adobe Premiere Pro CS3 version 3.1 and later
- Newtek Speed Edit
- Grass Valley EDIUS Broadcast
- Avid XPress Pro HD 5.2.3 or later
- Avid Liquid 7.2 or later
- Avid Media Composer
- Avid NewsCutter
- Avid Unity
- Quantel
- Grass Valley News Edit
- Leitch Nexio Server
- Leitch DPS NLE



Final Cut Pro 6 Non-linear edit system

Please check with your NLE supplier for current capabilities.

One further advantage of P2 is that because it is so well established, you will not necessarily need the latest version of any software programme for it to be compatible with P2. You would be well advised to ensure that the drivers are up to date to ensure that the latest P2 cards and peripherals are compatible.

In addition, if your chosen editing application isn't on the list above, a third-party application may enable you to be able to use P2 footage. For example, Vegas users and Premiere Pro users can use P2 footage if they use the Raylight plug-in from www.dvfilm.com/raylight

What Nonlinear editing systems support AVC-Intra?

Apple Final Cut Pro 6.0.2 and EDIUS Broadcast 4.6 support AVC-Intra. Other NLE editing and server companies have announced future support.

Everything that you wanted to know about P2 but were afraid to ask.

Error Codes of Clips

When I view thumbnail clips from my P2 card, I often see a letter, color or punctuation mark such as an exclamation point. Please explain what these are and what they mean?

There are several possible descriptive or explanatory icons that can show up on a P2 file's icon, including:

- M:** This means this particular clip has a "shot mark" on it; you (or someone) have "marked" this clip as being "good".
- P:** This means this particular clip has a proxy file attached to it. Proxies can be generated by some of the P2 cameras if the optional AJ-YAX800G Proxy Card is installed. The HPX500 and HVX200 cannot generate proxy files.
- T:** This means this particular clip has at least one Text Memo marker attached to it. You can view the contents of the Text Memos in P2 Viewer, P2CMS, or in a P2HD camcorder by selecting CLIP PROPERTIES for this clip.
- E:** This means that this particular clip is not camera-original footage, but was either edited on a computer or was created by copying a previous clip. A clip that was created by exporting a portion of a clip between two Text Memo markers (known as Text Memo Subclipping) would also bear this "E" mark.
- W:** This shows up for standard-definition clips that were recorded in the 16:9 aspect ratio. The "W" stands for Widescreen. This "W" mark doesn't show up on high-definition clips because all high-definition clips are always 16:9.
- !:** This indicates that the clip you're viewing is part of a multiple-clip "spanned clip", and that the remaining portions aren't currently present. For example, if you recorded one big long clip that spanned across two P2 Cards, yet you only loaded one P2 Card into your computer, this ! indication would be displayed to let you know that the system only has access to part of the full footage. If you loaded the P2 Card that contains the rest of this clip, the ! indicator would disappear.
- X:** This indicator means that there's something wrong with your clip. If the "X" appears with a yellow background, you can usually repair the clip (using the "Repair Clip" function in the P2 Thumbnail menus). Usually this X will show up if you eject a P2 card while that card is being recorded to, or if the power goes off (battery dies, or AC power goes out) while recording. The P2 system is prepared for such issues and automatically saves the recorded files every two seconds, so if an interruption does occur you will usually only lose a few frames (up to the last two seconds). However, if you see a red X, that clip is damaged beyond repair and should be deleted.
- ?:** This indicator means that the system cannot recognize your clip. This might happen if Panasonic introduces a new format, and your existing camera was made before that format was created (for example, if you put a P2 Card with an AVC-Intra clip into a AJ-SPX800 camcorder, the SPX800 wouldn't understand what the AVC-Intra clip was, and would therefore displays the ? indicator). This doesn't necessarily mean there's anything wrong with your clip, but that your camcorder doesn't understand that clip (a more up-to-date camcorder probably would).

Can I use IEEE 1394 (Firewire) mode with AVC-Intra?

Not for live footage streaming; AVC-Intra is not supported over IEEE 1394 (Firewire) as a live data stream.

USB Host Mode on Camcorders

I heard that some P2 HD camcorders have USB or 1394 Host mode. What is it and how does it work? What's the difference between these two modes?

The Host Mode allows the P2HD camcorder (or P2HD field recorder such as the P2 Gear or P2 Mobile) to take direct control of an external hard disk. Using Host Mode, you can plug a hard disk directly into your camcorder (or field recorder) and format the hard disk and copy the contents of your P2 Cards directly onto the hard disk, all without using a computer.

Everything that you wanted to know about P2 but were afraid to ask.

The AG-HVX200 and AG-HPX500 P2HD Camcorder support 1394 Host Mode, and the AJ-HPX3000, AJ-HPX2000, AH-HPG10 P2 Gear and AJ-HPM100 P2 Mobile support USB Host Mode. In 1394 Host Mode, you need to connect to a 1394 ("firewire") hard disk, and you can then copy up to 15 Cards onto the hard disk. 1394 Host Mode does not supply Bus Power, so you'll need a self-powered hard disk.

USB Host Mode provides even more capability. With USB Host Mode, the P2 HD camcorders (HPX2000 or HPX3000) or Field Recorder can supply Bus Power to power the hard disk. You can copy up to 23 Cards onto the hard drive, assign individual names, partition the drive and review thumbnails.

Does P2 HD support proxies?

Yes, the P2 HD system supports the creation and management of proxy files in three bit rates -- 192Kbps, 768 kbps or 1.5 Mbps can be selected. Proxy information is low resolution A/V and time code that is recorded via the optional AJ-YAX800 MPEG4 encoder, simultaneously with the high resolution (DVCPROHD /50/25) that is being recorded to the same P2 card.

Proxy video can be recorded to both the P2 card, as well as a separate SD Memory card, which allows for quick movement of low-resolution files through internal and web based networks for quick logging and viewing of dailies or footage before it arrives at the local station.

Not all P2 HD camcorders can create or play proxy files; only cameras that can accept the optional AJ-YAX800G Proxy Card can create or play back proxy files. This includes all AJ-series P2HD camcorders, but doesn't include the AG-HVX200 or AG-HPX500.

P2 and Metadata support

What type of metadata files does P2 HD support? Can I customize this metadata for my application?

All P2 camcorders record video with some standard metadata fields, including individual camera type, camera serial number, and unique user clip ID. In addition, P2 supports 30 user-definable metadata files including shooter, reporter, location, scene, text memo and GPS coordinates.

The Metadata can be uploaded to the camera after first being composed on the computer. This is done using the free P2 Viewer and P2CMS applications, as well as by the TEP-HD and P2 Log family of products from Imagine Software. The Metadata is then saved onto an SD Card and inserted into the camera whereby it can be uploaded into the camera by using the Metadata upload function under the Thumbnail menus.

All P2 cameras will allow for incrementing the User Clip Name if you have the camera under the Metadata Type 2 operation. This is also in the Metadata menus in the Thumbnail mode.

Chromatic Aberration Compensation (CAC) and what does it do?

Chromatic aberration correction (CAC) can correct chromatic aberrations (color fringing) introduced by the lens optics. Chromatic aberrations are caused when the red green and blue images do not match up exactly at all points in the image. A camera / lens pair, capable of CAC operation can introduce appropriate offsets to better match red green and blue images, thus reducing or eliminating any color fringing. Chromatic aberrations are normally only observed at the extreme positions of focus and zoom, with the iris wide open.

CAC will only work when both the camera and lens support the feature. The camera needs to have an offset look up table stored in memory, and the lens and camera must be able to communicate for CAC to operate properly. The AG-HPX500 and AJ-HPX3000 support CAC, using compatible Canon and Fujinon EFP style zoom lenses

As more affordable HD lenses have been designed, CAC has been helpful in reducing chromatic aberrations which tends to be the most objectionable potential flaw in more

Everything that you wanted to know about P2 but were afraid to ask.

affordable lens designs. With CAC the performance of lower cost lenses approach that of the top-of-the-line models in terms of color fringing. With the unprecedented resolution of the AJ-HPX3000, chromatic aberrations can be observed that would not have been visible in earlier cameras (particularly after recording). With the AJ-HPX3000 CAC has shown an effective improvement to the performance of some of the best quality HD zoom lenses on the market. A full list of available CAC lenses can be viewed at

https://www.pavc.panasonic.co.jp/pro-av/support/cs/csregistp2m/ep2main/cac_note_e.htm

TECHNICAL STUFF

How does P2 record?

P2 cards record the same way that digital still cameras record onto memory cards – they store the footage as pre-digitized computer files. Instead of recording the video as “video data,” they record the footage as computer data files. These files are instantly editable and can be transferred to other computer storage media directly, without the restrictions of needing proprietary video decks or having to wait for real-time transfers. In fact, you can edit footage directly from a P2 Card, without having to transfer to a computer at all.

Because P2 Cards record in universally interchangeable MXF data files, they are immediately usable by properly-configured Windows and Macintosh computers. The P2 Cards eliminate the need for VTRs, they eliminate the need for proprietary video hardware to read or transfer their contents, and they eliminate the need to “capture” or “digitize” your footage.

As for the actual recordings themselves, P2 Cards record footage in the MXF (Material eXchange Format), a SMPTE-codified cross-platform universal file format. The MXF files use operational pattern OP-Atom, which means that each element of the footage (the audio tracks, the video footage, an “icon” or thumbnail, and the descriptive metadata) all get stored in their own sub-directories. The MXF file format is supported by nearly every major nonlinear editing program, and file conversion utilities exist to convert MXF files into other types of files if needed.

The P2 Card itself uses the FAT32 file system, which makes the card compatible with both Macintosh and Windows systems.

What’s inside a P2 card?

P2 Cards are high-precision micro-computers with their own processors, firmware, a RAID controller, and gigabytes of the highest-quality zero-fault solid-state memory chips. A P2 Card is an intelligent device that manages the data files, and even does a write-verification step for every byte of memory that gets written to the card (thus assuring fault-free operation). Early P2 Cards were manufactured using actual SD memory cards in a striped RAID array, thus increasing the performance far beyond any individual memory chip’s speed. The newest generation of P2 Cards dispenses with using individual SD memory cards and actually uses the core memory components.

What sizes of P2 cards are available?

P2 Cards have been manufactured in 2GB, 4GB, 8GB, 16GB, and 32GB capacities. The current cards offered on the market are 16GB and 32GB in size.

What is the transfer speed of the P2 card?

Today’s P2 Cards are capable of a transfer rate of 640 megabits per second (80 megabytes per second). That’s fast enough to allow real-time editing of six streams of full-bandwidth DVCPRO HD simultaneously. As always, transfer speeds of IT storage device are subject to hardware configurations.

Because there are no moving parts and no read/write heads to move or reposition, there’s no “seek time” – switching from one stream to the next is instantaneous. Because of the high

Everything that you wanted to know about P2 but were afraid to ask.

speed design of P2 Cards, they can be used as an edit media – in other words, there's no requirement to transfer the footage off of the cards before editing; you could actually edit immediately right from the cards. In fact, in tests, we have achieved real-time playback of 3 x streams of P2 1080 material directly off P2 cards using an AVID Media Composer on a laptop PC, though this was about the limit on this particular system.

Mixing resolutions on the same P2 Card

Can I put 1080i and 720p and/or standard definition footage on the same P2 card?

Yes, you can freely inter-mix any type of footage. You can put high-definition and standard-definition, 625 (PAL) and 525 (NTSC), DVCPRO and AVC-Intra, interlaced or progressive or variable-frame-rate footage, or any combination of formats and frame rates all on the same P2 Card. Remember, P2 Cards are treated by the system as removable storage devices – they don't care what type of information gets stored on them. This gives you an unprecedented amount of freedom and flexibility to work with any format or media as you see fit.

P2 Equipment Compatibility

Can a P2 card be used in all P2 HD and P2 camcorders, recorders and drives?

Yes, the P2 Card is interchangeable across the entire P2 HD/P2 lineup of products. Any P2 Card can be used in any P2-compatible device*. This gives you immediate interchangeability, upgradeability, and compatibility with the massive installed base of P2 equipment.

Additionally, because P2 Cards were deliberately over-engineered to far exceed the needs of today's equipment, this means that they can support new future formats as well. There's no need to change out or upgrade your hardware when a new format comes along; your same P2 Cards and P2 Readers will work. As a case study, when the P2 HD system was first introduced it included the option to use 720p or 1080p/i DVCPRO HD.

Now Panasonic has introduced the new AVC-Intra format. With the introduction of AVC-Intra, all the same P2 Cards and P2 Readers work immediately with the new format. No longer do you have to replace a whole rack of proprietary video hardware just to be able to take advantage of advances in recording formats. P2 is designed to accommodate today's formats as well as tomorrow's.

What is the future path for P2 card sizes?

And will those future sizes be compatible with the camera I purchased?

The P2 Roadmap (first introduced in 2004) calls for P2 Cards to grow in capacity to 128GB sizes by 2009. With the introduction of a 32GB P2 card in 2007, Panasonic is on track to fulfill this roadmap.

Can I record to a P2 card and FireStore at the same time?

Yes, every P2 HD camcorder allows for simultaneous recording to its internal P2 Cards as well as to an external recorder attached by 1394 (aka "firewire") when recording to DV, DVCPRO, DVCPRO50 or DVCPRO HD formats.

There are, however, a couple of exceptions due to the nature of external recording units and the 1394/firewire transport protocol. If recording using AVC-Intra, AVC-Intra doesn't travel across the 1394 port and so a FireStore would not be capable of recording that mode. Also, when using the special space-saving 720pN mode, firewire transport is



FS-100 FireStore portable hard drive

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disabled so a FireStore or other 1394 recording device could not be used for simultaneous recording when in DVCPRO-HD 720pN mode.

You cannot record on HVX-200 and miniDV simultaneously.

Are there third-party companies making P2 cards?

Yes. Panasonic has a long history of third-party support for its recording media. For example, Fuji Film recently announced it will introduce a series of P2-compatible solid-state memory cards in Spring, 2008.

Barry Bassett, VMI Broadcast. April 08

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