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High Definition: Canon's way

With extensive 1080i High Definition (HD) capability – recording both High Definition Video (HDV) to standard miniDV cassettes, and exporting uncompressed HD via HD-SDI (High Definition-Serial Digital Interface) – Canon's new flagship camcorder, the XL H1, is a truly versatile production tool. Driven by the DIGIC DV II processing engine, which further supports Standard Definition (SD) production (miniDV and SD-SDI), this new XL series Canon video camcorder is suited to a range of shooting environments, both in the studio and outside it.

The XL H1: for broadcast

The XL H1 records true 1440 x 1080 video at 50i with additional 25f shooting. The HD2 1080/50i standard is the most widely used for broadcast HD. This, in turn, makes the XL H1 more suited to a wide range of professional users whose end goal is broadcast.

Delivering higher quality images on a pixels per frame basis than the 720p HD1 standard, the 1080i HD2 standard also allows the XL H1 to deliver the highest resolution for HDV (as of 15 September 2005), with 1/3" 1.67 Megapixel 3CCD imaging.

HDV

HDV is the new cross-industry video standard, developed by Canon, Sharp, Sony and JVC. It is the next generation successor to SD video and comprises HD1 and HD2 formats: HDV is available at either 1280 x 720 lines of resolution, scanned progressively (720p), or at 1440 x 1080 lines, interlaced (1080i).

While HDV benefits from the increased number of scanning lines per frame that defines HD quality (1,000 or more on the horizontal axis), thanks to efficient MPEG-2 compression, it also benefits from cost savings that can be made by using existing SD media: standard miniDV cassettes. As a result, compared with other HD formats, HDV is an ideal format for studios, production houses and other videographers to upgrade to.

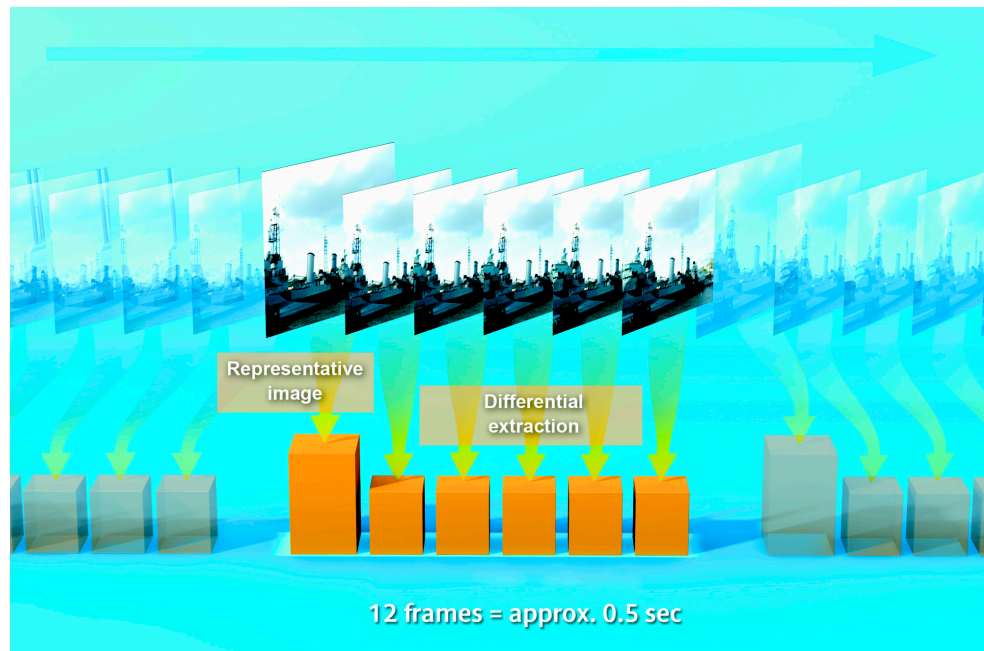
MPEG-2 efficiency

Under the HDV standard, video footage undergoes MPEG-2 compression. Rather than recording each video frame separately, 12 frames are grouped together as successive Groups of Pictures (GOP) under HD2. Within each group, a single representative frame is processed independently (similar to the way that DV data is processed). The remaining 11 frames in the GOP are subsequently compressed according to *the differences between* them and the primary representative frame.



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By processing only one full frame of data accompanied by 11 sets of data that record only slight differences, MPEG-2 compression avoids the unnecessary repetition of image information. Since the images in each GOP are close together (equivalent to approximately 0.5 seconds of video), the differences between them are very small (dependent on recording environment).



HDV HD2: Increased data rates

With MPEG-2, HD1 HDV, as currently favoured by JVC, delivers 1280 x 720 lines of resolution progressively. HD2, adopted by Canon for the new XL H1, delivers 1440 x 1080 lines interlaced. Providing more pixel information per frame than HD1, it has a data rate of 25Mbps after compression versus approximately 19Mbps for HD1. 25Mbps is the highest data rate that miniDV cassettes can hold.

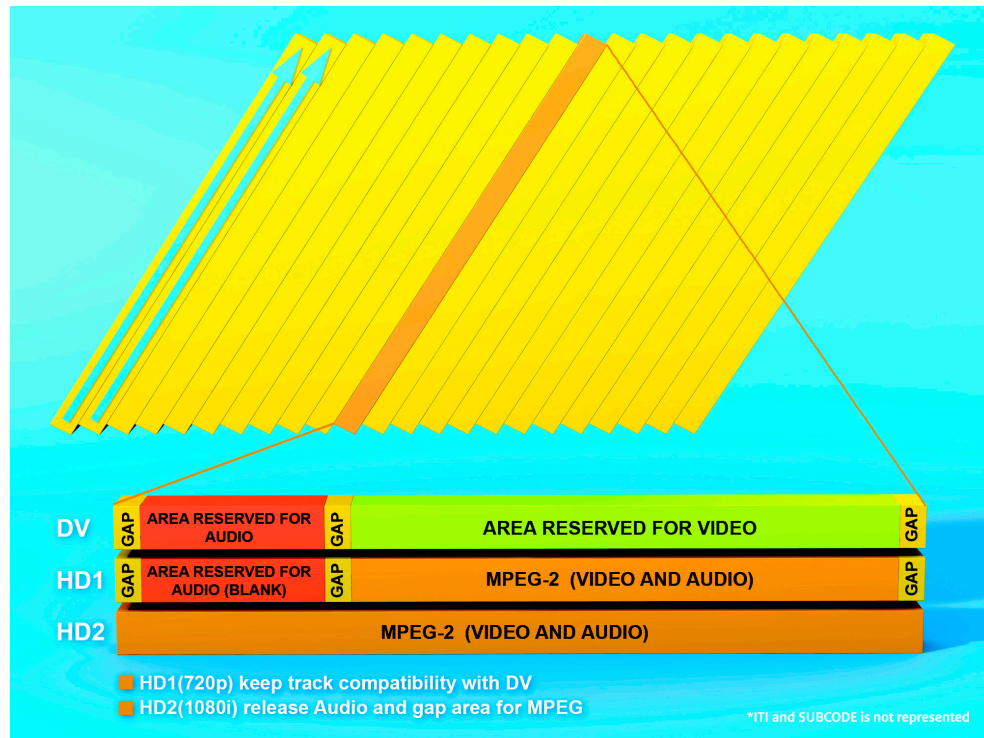
The increased data rate of HDV HD2 can be accounted for by the way that information is stored in the track pattern of tape. According to the DV standard, the track pattern is divided into separate audio and video areas that always remain apart. According to HD1, MPEG-2 data is recorded in the video area of the track pattern. Yet, since MPEG-2 is unlike the DV standard on which it is based, with a combined video and audio signal, the area of the track pattern reserved for audio in DV recording is left blank. This accounts for the lower data rate of HD1, at just 19Mbps. (19Mbps is somewhat short of the highest data rate possible when using miniDV cassettes.)

HD2, on the other hand, makes full use of tape's capacity. HD2 HDV, as it operates with the XL H1, maximises efficiency by releasing the area normally reserved for audio in the DV standard – an area that is unused for HD1 – re-



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assigning it for use for MPEG-2 data: namely, the combined video and audio stream. In sum, with HD2, the whole of the track pattern is made available for use for MPEG-2 and, with extra space, a full 25Mbps of data can be recorded. The increased picture information defines HD2.



HDTV and the XL H1

Since the majority of worldwide digital television distribution systems use data rates of less than 21Mbps, HDV HD2's 25Mbps data rate actually exceeds broadcast capacity. While, compared with HDV, other HD formats can achieve greater data rates, this excess is only discernible on a master monitor: under broadcast conditions, little practical difference is visible. Additionally, the cost of these alternative HD formats is prohibitive for many videographers. In practical terms, HDV HD2 is more than capable of delivering broadcast quality for the viewer that is comparable to far more expensive HD formats.

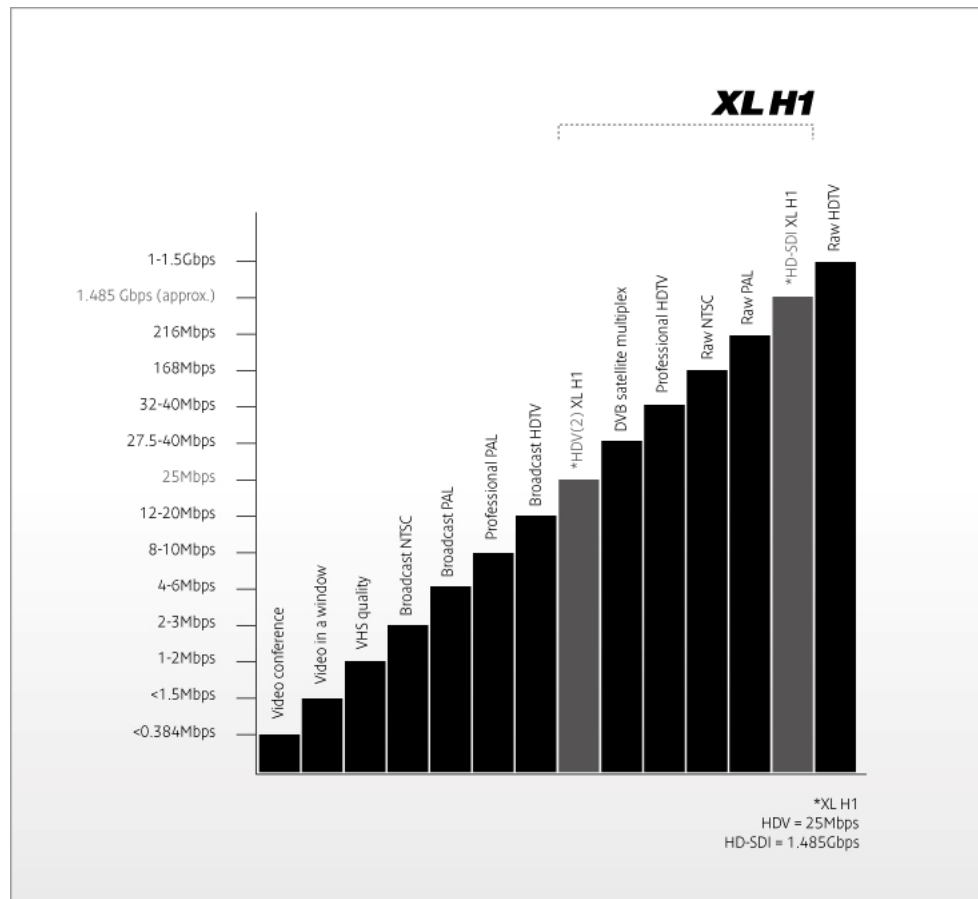
The growth of HD

As a result, HDV is the ideal solution for videographers wishing to upgrade to HD production.

For all professional videographers, the time to upgrade to HD has arrived. The emergence of the HDV format coincides with anticipated growth in the broadcast High Definition market and its corollary, a rapid increase in the sale of consumer HDTV sets. As a result, more so than at any other point in time before, videographers must prepare to meet the likely increased demand for HD content.

Canon's HD functionality

In summary, the XL H1 shoots HDV 1080/50i, delivering video quality suitable for broadcast. But the XL H1, with DIGIC DV II, is also ready to export uncompressed HD (4:2:2) via an in-built HD-SDI output. Such HD functionality is unparalleled in the class.



With additional functionality, the XL H1 is a versatile HD video tool. Although the camcorder's HDV performance exceeds broadcast capacity, the XL H1 can be integrated into a professional studio set-up, via HD-SDI, interfacing with video switchers, cameras, player/recorder VCRs and other external devices.¹

– Ends –

¹ The broadcast standard, SDI (Serial Digital Interface) is the interface connector for the digital transmission of (uncompressed) High Definition signals, as fast as approximately 1.5Ghz.