

Hitachi unveils the World's First Blu-Ray Disc Camcorder

Two New Camcorders Capable of Recording One Hour 1920x1080 Full High-Definition Video on a Blu-ray Disc

TOKYO August 2, 2007

Hitachi, Ltd. Consumer Business Group (Makoto Ebata, Group Executive & CEO) unveiled the world's first Blu-ray Disc (BD) Camcorder, which records one hour of 1920x1080 Full High-Definition video onto a BD (single side, single layer.) The new camcorders will start selling in Japan on August 30, 2007, and overseas market sequentially starting from October 2007.

The new DZ-BD7H is a Hybrid Cam with a BD drive and a 30 gigabyte (GB) built-in hard disc drive (HDD) which can record approximately four hours of 1920x1080 full high-definition video, or up to eight hours of 1440x1080 high-definition video. It can also copy the contents from HDD to 8cm BD within the camcorder so that users do not need to use any external devices.

The new DZ-BD70 is a BD single drive camcorder which can record approximately one hour of 1920x1080 full high-definition video (two hours of 1440x1080 high definition video) on a 8cm BD.

The new BD camcorders have a system which captures, records and stores 1920x1080 full high-definition video throughout the whole process with its newly developed full high-definition lens, 5.3 mega pixel progressive CMOS (Complementary Metal Oxide Semiconductor) image sensor (*2) with effective 2.07 mega pixels for video and 4.32 mega pixels for still photo, the newly developed full high definition signal processor "Picture Master Full HD," and the world's first 8cm BD drive, which can record 1920x1080 full high definition video on a 8cm BD which has 5 times more capacity than a 8cm DVD.

■ **Model Name and Introduction (Japan)**

Product	Model Name	HDD	Image Sensor	Selling Starts	Suggested Retail Price	Initial Production/Month
BD Camcorder	DZ-BD7H	30GB	Approx. 5.3Mega Pixels	Aug.30, 2007	Open	20,000 units
	DZ-BD70	-		Aug.30, 2007		

■ **Development background**

Non-tape media camcorders such as DVD and HDD camcorders have grown to dominate more than 80% of the camcorder market (*3). High definition camcorders have taken more than 30% of the consumer camcorder market (*3), and are expected to continue growing.

Hitachi, with its corporate statement "Inspire the Next, " has been creating new product categories and established new standards in the industry. In 2000, Hitachi introduced the world's first DVD camcorder, and in 2006, the world's first hybrid camcorder with a DVD drive and an HDD drive, which makes it easy to dub the contents on the HDD to the DVD. The spirit behind the innovation was always a careful consideration of the customer's needs.

This time, with the keyword "A True Breakthrough in Your Hand," Hitachi developed an 8cm BD/DVD Drive for Camcorders, Full High Definition Signal Processor Engine "Picture Master Full HD", and CMOS Image Sensor for Full High Definition (*2).

With these core technologies, Hitachi adopted BD as a media since it has more than five times the capacity of a DVD and can record 1 hour of 1920x1080 full high definition video on one disc to create two models of the world's first BD camcorders, which shoot, playback, and store full high-definition in every process. Hitachi will continue to mobilize its technology to introduce camcorders that meet the needs of the consumers.

*1 as of August, 2007

*2 5.3 mega pixel CMOS image sensor is developed by AltaSens, Inc. (Thousand Oaks, CA) under the cooperation between Hitachi, Ltd. And AltaSens, Inc. All rights are reserved by AltaSens, Inc.

*3 refers to consumer camcorder market in Japan

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For a comprehensive presentation of the new Hitachi BD camcorders, please visit:

<http://av.hitachi.com/camcorder>

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Main Features for Keeping Fresh and Vivid Memories – 1920x1080 Full High Definition throughout Imaging, Recording, and Playback

1. World’s First (*1) 8cm BD/DVD Drive (plus 30GB HDD for Hybrid model)

(1) Hitachi Original 8cm BD/DVD Drive

Hitachi developed a compact, low power consuming, and reliable 8cm BD/DVD drive which corresponds to five kinds of 8cm discs; BD-RE/-R, DVD-RAM/-RW/-R. (*1)

*1: BD camcorder BD/DVD drive does not comply with dual layer discs.

- 1) The drive carries two optical pick-ups for BD and DVD and a flat pick-up with compact aberration correction function for BD. The size of the drive chassis remains almost the same as the DVD camcorder drive.
- 2) The drive can record and playback full high definition. BD has approximately five times the capacity and approximately three times the rapid transfer rate compared with DVD.
- 3) Low power consumption by intermittent recording technology which is the combination of rapid recording on the disc and memory buffer function.
- 4) P-CAV (Partial-Constant Angular Velocity) Control Technology has been developed for rapid disc rotation speed essential for full high definition recording and also to maintain silence.



8cm BD/DVD Drive

(2) 8cm BD Recording

The camcorder can record one hour of 1920x1080 pixels full high-definition video on a 8cm BD (single side, single layer 7.5GB) which is a convenient media to stock. BD-RE discs are re-writable, whereas BD-R discs can record once.

(3) Large Capacity 30GB HDD (DZ-BD7H)

- 1) **“30GB HDD”** can record long hours without caring about the remaining time on the media. 30GB HDD can record up to four hours of 1920x1080 pixels full high definition video (HX mode), or eight hours of 1440x1080 pixels high definition video (HS mode).
- 2) **“Impact Resistant Damper”** protects the HDD from shock and moderates impact to 50%.
- 3) **“Head Load/Unload Structure”** removes head away from the disc when not in operation in order to prevent the head from touching the disc when impact is given to the HDD.



30GB HDD

2. High Picture Quality Video Engineering for Shooting 1920x1080 Pixels Full High Definition

(1) Full High Definition Distortion-less Lens

10x zoom non-spherical lens has been developed to maintain compact body size. It captures 2400x1800 pixels still photo as well as 1920x1080 full high-definition video. The lens is multi-coated to prevent reflection, flare, or ghost images, and has gradation ND (neutral density) filter to prevent degrading of resolution caused by aperture of iris.

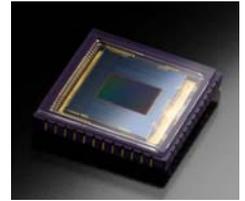
Hitachi Australia Pty Ltd (ABN 34 075 381 332)



Full HD Lens

(2) CMOS Image Sensor for Full High Definition Video and Approximately 4.32 Mega Pixel Still Photo

Approximately 5.3 mega pixel CMOS Image Sensor co-developed with AltaSens, Inc. captures the true nature of the object in progressive format and has RGB primary color filter. CMOS image sensor is capable of reading pixel area randomly at a rapid speed essential for full high definition video imaging. (1920x 1080) It can capture still photo image at 2400x1800 pixels. Pixel size of the CMOS image sensor is 2.09µm, 1/2.8 inches in size, and total pixel size of approximately 5.3 mega pixel has electronic image stabilization function with is controlled outside the range of effective pixels.



Approximately 5.3 MP CMOS Image Sensor

(3) "Picture Master Full HD" High Resolution Image Processing Engine consists of "High Resolution Camera Image Processing LSI for Full High Definition" which effectively processes the massive data captured by the 5.3 mega pixel CMOS image sensor, and "High Quality Audio/Video Codec LSI" which implemented MPEG4 AVC/H.264 CODEC, which is 1.5 to twice efficient compared with MPEG2.



High Definition Camera Image Processing LSI

i) "High Resolution Camera Image Processing LSI" has Adaptive DNR (Dynamic Noise Reducing Method) technology which analyzes the captured image and reduces noise and Advanced CCM (Correlative Coefficient Multiplying Method) Circuit to control false color signal. It improves picture quality by reducing noise and by preventing data to be used up by noise signal during compression at the same time to capture beautiful high definition video.

ii) "High Quality Audio/Video Codec LSI" has a uniquely developed algorithm for high-quality motion picture. It switches process methods between field and frame in macro block depending on the amount of motion happening within the frame to process fine quality video image in scenes with a lot of action. The unique algorithm adaptively judges and switches encoding methods depending on the condition of images judged by the correlation of different frames, or predictions made from a single frame. The algorithm judges the amount of code to allocate by calculating how much picture quality deterioration can be recognized at playback.



High Quality Audio/Video Codec LSI

(4) HDMI Output Terminal

The BD camcorder has HDMI terminal which transfers 1920x1080 pixel full high-definition video and clear audio digital data with one cable. A HDMI cable which is widely available in the market can be used for connection.

3. Dubbing in the Camcorder (DZ-BD7H)

The contents recorded onto the HDD can be easily dubbed in the original high definition quality to BD or converted to standard definition when dubbing to DVD utilizing the camcorder without the hassle of connecting the camcorder to other devices. (*2)

*2: The camcorder must be powered via the AC adapter/charger for dubbing from HDD to disc.

The disc media being copied can be selected from 8cm BD-RE/-R,DVD-RAM/-RW/-R depending on the type of disc that best suits the format of the player. The user can choose from four pre-set dubbing modes, and if the contents do not fit into the disc, the user can also select auto divide dubbing.

- 1) **"New"** selects only the uncopied scenes on the HDD and dubs to disc.
- 2) **"Date"** selects the scenes recorded on the specified date and dubs to disc.
- 3) **"All"** dubs all the contents on the HDD.
- 4) **"Select"** dubs the scenes selected by the user.

4. Editing in the Camcorder

The full high-definition video recorded on the HDD or the 8cm BD-RE can be edited with the camcorder. Easy editing functions such as split, delete, and connect can be made without using a PC. Users can also create a play list, and rearrange the orders of playback within the play list.

5. 4.32 Mega Pixel High Resolution Still Photo

Approximately 4.32 mega pixels high resolution still photos can be recorded on the SD memory card. 10x optical zoom lens will capture images from wide to telephoto angle. (Field angle 35mm at 4x3 still is equal to 34.5-345mm converted to film)

6. "Full High Definition Photo Capture" to Cut Out the Best Shot from Video

The best shot from the recorded full high-definition video can be captured as approximately 2.07 mega pixels photo images and stored into the SD memory card. The captured photo can then be printed out easily with a printer capable of reading SD memory card.

7. One Second "Quick Start"

The BD camcorder can start recording in one second by pressing the "Restart" button instead of turning off the power. It also saves power during stand-by. (*3)

*3: Quick Start mode consumes only 1/2 power compared during shooting with LCD monitor turned off. Power turns off automatically after kept at stand-by for 30 minutes. Zoom ratio will be at 1x when re-started.

8 Simple and Innovative Design

The new BD camcorder distinguishes itself from conventional camcorders with a smooth flowing, simple and innovative design. The lens portion implemented a large aperture expressing its high quality, and the round body is a motif of the BD. The left portion of the camcorder is UV coated to protect the body from scratches and to maintain shine. The operation buttons promote ease of use with a cursor button next to the LCD and an auto lens cover that activates with the power switch.

9. On-Board "Interactive Guide" to Guide the Users through Set-Up and Connections

"Interactive Guide" show the users how to connect with a TV, explain the kinds of discs, how to switch modes, etc. on the screen so that even people who have never used a camcorder can feel comfortable.

10. Provided PC Application

“ImageMixer™ 3 HD Edition for BD Camcorder (*4)” is provided to playback on PC, or to edit and create 12cm BD/DVD copies (*5). (a PC with the equivalent disc drive is required.)

*4 by Pixela Corporation

*5 The created discs are not guaranteed to playback on all players or recorders.

Windows® PC Operation Requirements (Japan models)

OS	Windows® XP Home Edition SP2, Windows® XP Professional Edition SP2, Windows Vista™ (Japanese Edition)
Computer	IBM®PC/AT® compatible, with the above OS preinstalled
CPU	Intel® Pentium® D2.8GHz or higher, Intel® Core™ 2 Duo 1.66Hz or higher (2.66Hz or higher is recommended)
Memory	512MB or more (1GB or more is recommended)
HDD	Free space of at least 300MB to install the application Free space necessary for creating a disc DVD-Video: At least 14GB for work folder (At least 28GB for a double layer disc.) Blu-ray: At least 50 GB for work folder (At least 28GB for a double layer disc.)
USB	Need one port for BD Cam. (May not operate when connected via USB hub)
Graphics	Displayable with at least 1024x768 pixels and 16bits (High color) Graphics accelerator supporting DirectX® 9.0c or later (supporting PCI Express x16 is recommended)
Others	Not compliant with 64 bit versions of the above OS. Compliant with Japanese version of the above OS only Not compliant with self-designed PC or Windows® upgraded environment, or multi-boot environment. User must be logged in with administrative privileges in order to use the software. Not compliant for output to HDD of the camcorder

11. Other Useful Functions

- (1) Approximately 210k Pixels 2.7" Wide LCD
- (2) 8cm BD-RE Packed-In
- (3) SD Memory Card Compatible (for still photo)
- (4) Built-In Flash Light (for still photo)

12. Optional Accessories

- Tele Conversion Lens DZ-TL43
- Wide Conversion Lens DZ-WL43
- Carrying Case DZ-CB7
- Battery Pack DZ-BP14SJ (1360mA)
- Battery Pack DZ-BP21SJ (2040mA)

13. Recording Modes and Recording Time

Picture Quality	Rec. Mode	Bit Rate (Audio) VBR Recording	Compression	Recording Pixels	Recording Time (approximately)		
					HDD 30GB	BD (Single Side) 7.5GB	DVD (Single Side) 1.4GB
High Definition	HX	15Mbps (256Kbps)	MPEG4 AVC/H.264	1920x1080	4 hours	1 hour	-
	HF	11Mbps (256Kbps)		1440x1080	5hr. 20 min	1hr. 20 min.	-
	HS	7.5Mbps (256Kbps)		1440x1080	8 hours	2 hours	-
Standard Definition	SX	9Mbps (256Kbps)	MPEG2	720x480	-	-	20 min.
	SF	6Mbps (256Kbps)		720x480	-	-	30 min.

Product Specification (Japan Models)

Model		DZ-BD7H	DZ-BD70
Image Sensor		1/2.8" Progressive, RGB Primary Color Filter CMOS	
Effective Pixels	Total Pixels	Approximately 5.3 Mega Pixels	
	Video (16x9)	Approximately 2.07 Mega Pixels	
		Still	Approximately 4.32 Mega Pixels
Lens		F 1.8~3.0、 f =5.0~50mm	
Angle (35mm equivalent)		Video: Approximately 47.0~470mm (16x9 Mode) Still: Approximately 34.5~345mm (4x3 Mode)	
Focus		Auto Focus / Manual Focus	
Minimum Illumination		24 Lux (Electronic Shutter 1/30)	
Lens Filter Diameter/ Zoom Ratio		43mm / Optical 10x Electronic Zoom 240x *1	
LCD Monitor/ Viewfinder		2.7" Wide TTF (approx. 210k pixels) / 0.2" Color LCD (approx. 200k pixels)	
Image Stabilization		Electronic Image Stabilization	
Video Flash		Built-In (Auto, On, Off)	
Max. Video Rec. Time (approx.)	Built-In HDD	4hr. (HX) 1920x1080 5hr. 20min. (HF) 1440x 1080 8hr. (HS) 1440 x 1080	—
	Single Side 8cmBD-RE/-R	1hr. (HX) 1920x1080 1hr.20min. (HF) 1440x1080, 2hr. (HS) 1440x1080	
	Single Side 8cmDVD-RAM/-R/-RW	20min. (SX) 720x480	
		30 min. (SF) 720x480	
Still Photo Max. Storage Capacity (with 1GB SD Memory Card)		Approximately 400 Photos (2400x1800 pixels)	
Rec. Method	HDD	MPEG4 AVC / H.264	
	8cmBD-RE、8cmBD-R	MPEG4 AVC / H.264 (BD-RE Ver.3.0, BD-R Ver.2.0 Compliant)	
	8cmDVD-RAM/-R/-RW	MPEG2 (DVD Video Recording, DVD Video Format Compliant)	
	SD Memory Card	JPEG (DCF/Exif 2.2 Compliant)	
	JPEG Pixels	2400x1800	
Audio Recording Format		Dolby Digital 2ch	
Built-In HDD Capacity		30GB	—
Video/Audio Jack		8pin connector (S Video/Audio Output)x1, External Microphone Input x1	
USB Jack		USB2.0 High Speed Mode Compliant	
HDMI Jack		Yes (Output only)	
Power Consumption (LCD Off, HX Mode)		Approximately 5.7W (HDD)	Approximately 6.7W (BD-RE)
Consecutive Recording Time *2		Approximately 100 minutes (HDD)	Approximately 90 minutes (BD-RE)
Size *3 (WxHxD)		Approximately 80x87x165mm	Approximately 77x87x165mm
Weight *4		Approximately 630g	Approximately 575g
Weight at Recording(w/ Supplied Battery)		Approximately 705g	Approximately 650g

Supplied Accessories: 8cm BD-RE Disc, Battery Pack (DZ-BP14S), AC Adapter/Battery Charger, Power Cable, DC Power Cord, AV/S input cable, D pin cable, remote control unit, battery for remote, Shoulder Strap, Disc Cleaning Cloth, USB cable, PC (Windows) Software CD-ROM, Quick Guide.

*1 : Digital Zoom works for video shooting only.

*2 : Measured under the following conditions: HF mode, Auto AE, Manual Focus, LCD monitor off, with battery pack DZ-BP14S.

*3 : Size does not include hand strap.

*4 : Weight does not include battery pack and media.