
# HITACHI

## CR-D10 DVD-RAM DOCKABLE RECORDER

DVD

**The World's First Professional DVD-RAM/DVD-R Camera Recorder**

HITACHI CR-D10

DVD-RAM DOCKABLE RECORDER

## HITACHI Presents the World's First DVD-RAM/DVD-R Camera-Recorder for Professional Video Applications.

The HITACHI CR-D10 DVD Camera-Recorder modernizes content acquisition and revolutionizes editing for News, Institutional, Corporate and Government television program productions by completely eliminating the traditional videotape as a recording medium.

Today's television program production techniques embrace the benefits of high-speed computers, digital data transport and storage systems. The implementation of DVD-RAM/ DVD-R discs in optical drives, reduce the costs of traditional production by allowing users to work completely in the digital video-editing environment. The CR-D10 is a tool that brings advanced digital acquisition and production capabilities to within today's cost-constrained budgets and work timelines.

The realization of DVD as a viable medium for digital video and audio storage is the spearhead factor for HITACHI's CR-D10 Camera-Recorder. This new camera-recorder bypasses all the traditional and time-consuming functions associated with videotape by directly recording data files representing the video in non-linear fashion on the DVD disc.

## *DVD-VR: A Video Recording Format*

The DVD video recording method brings the ultimate flexibility to users. No longer do users feel the need to be corralled into a video tape recording format by a particular video equipment manufacturer.

The DVD Forum is the official world-recognized certification authority responsible for assuring that all DVD related technologies by member companies are non-exclusive and hold the greatest amount of promise and flexibility for consumers. HITACHI Ltd. is a member of the ◊DVD Forum as well as other world-renowned companies sharing this universal vision.

DVD-RAM/DVD-R Products manufactured by HITACHI conform to the ◊DVD Forum's Book, Part II Standards. This standard is the cornerstone of technology that HITACHI brings to market with its new CR-D10 camera-recorder. Many computer hardware and software manufacturers have already leveraged this very same standard thereby giving their products additional flexibility in the adoption and implementation of PC-based professional video production.

***Industry-wide Compatibility***

The Universal Disc Format (UDF) is accepted by the world's major computer operating systems (◊Apple's Mac OS, ◊Microsoft Windows 98SE/NT/2000/Millenium/XP, ◊Unix and ◊Linux). The pre-formatting of the DVD-RAM disc in UDF offers the most universal and convenient method to exchange, archive, and backup audio and video recorded on the HITACHI CR-D10. UDF supports volume sizes greater than the size allowed by the original operating system and file names up to 255 characters. It also offers an optimal data transfer rate.

*8mm DVD-RAM Drive with loader*

## HITACHI Innovation

## *DVD-RAM Microdrive*

- World's first Emmy-Award-winning thin and small 8cm DVD-RAM drives.
- Electromechanical shock protection system during read/write operations.
- Unique separate laser head unit on drive - Reduces vibrations during read/write.
- Built-in vibration sensor - Controls the laser head unit.
- Recording protection - Up to 1G of force.
- Smooth real-time read/write - Due to double speed drive (22.16Mbit/s).
- Mechanically simple - Easy to service and or replace
- Less moving parts – Spindle motor, actuator head, cartridge support

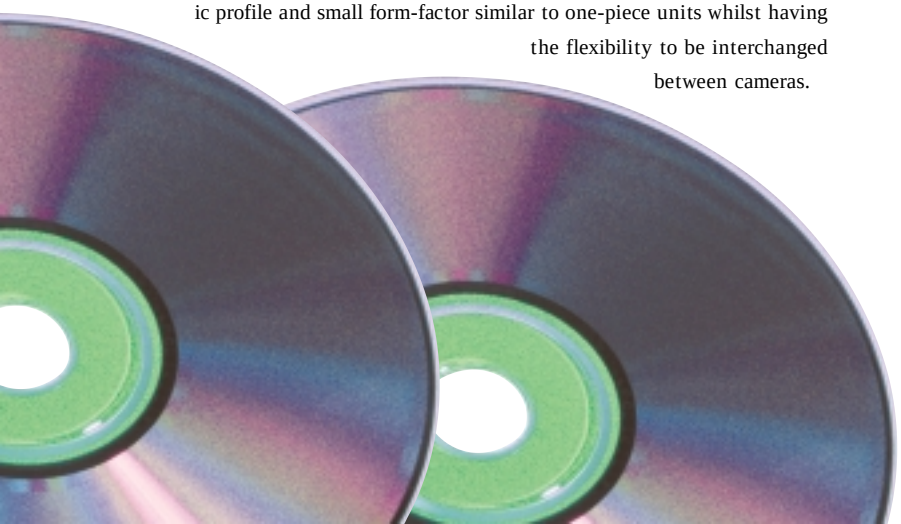
## *CR-D10 Features and Functions*

### *Direct Docking to Hitachi V-21/ S-3000 Digital Processing professional video cameras*

The HITACHI CR-D10 is designed to make the most of the outstanding video quality and advanced video recording functions provided by the popular V-21 (PAL) and S-3000 (PAL) cameras.

### *Professional Camera-Recorder feel and features*

The docked camera-recorder configuration offers a lightweight, aesthetic profile and small form-factor similar to one-piece units whilst having the flexibility to be interchanged between cameras.



### *Stand-alone recorder*

The CR-D10 can be used as a stand-alone DVD-RAM recorder by simply providing DC Power and composite or S-video analog video inputs. The recorded audio and video can be directly monitored on the LCD screen and incorporated speaker avoiding the need to carry additional support equipment.

### *Support of 4:3 and 16:9 Aspect Ratios*

The HITACHI V-21W/ S-3000W/ CR-D10 camera-recorder packages support the recording of 16:9 Aspect Ratio screen as provided by the "W" (Wide) versions of HITACHI V/S-series cameras.

### *Comprehensive audio*

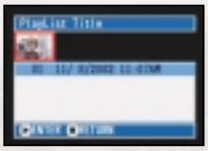
Two channels of high-quality audio are incorporated. Inputs for camera and external sources can be switched between line-level or microphone-level audio. Audio can be monitored via the on-board speaker or the mini-earphone jack on the rear connector panel of the CR-D10.

### *Disk Navigation System*

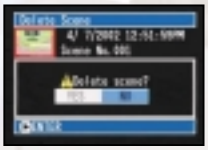
The random-access nature of DVD-RAM discs allows for advanced in-recorder features not possible with traditional videotape units.

**Program Review:** Recorded clips are represented by icons containing the first frame of video.


**Playlist Function:** Customized playlists can be constructed, stored, viewed on the CR-D10 LCD screen and even imported into the NLE timeline. The playlist file can be identified by a user-defined name.

**In-recorder editing:** The CR-D10 allows for in-recorder editing such that user-defined entry and exit points on different clips can be seen as one continuous flow of video.

**Disc information:** Comprehensive disc information can be displayed on the LCD via the disc-navigation system.

### *Top-loading disc mechanism*

The drive is mounted with a top-loading mechanism to facilitate the insertion and removal of the disc. This also makes the drive very easy to keep clean.

### *Camera viewfinder monitor*

When docked to HITACHI cameras, functions such as audio recording level, remaining/ elapsed disc time and playback can be viewed in the camera viewfinder.

### *Audio Level control from camera head*

The CR-D10s audio level can be controlled by the audio level control under the lens on Hitachi V-21 and S-3000 series cameras.

### *Power for wireless microphone receivers*

A power connection is conveniently provided on the rear panel of the CR-D10 to be used with 12VDC wireless microphone systems.

### *LCD Monitor*

The LCD monitor on the CR-D10 conveniently stores in the chassis either facing in or out. When facing out, it becomes a versatile on-camera video-reviewing screen.


When locked in place facing in, the LCD panel is protected and ready for transport.

Behind the LCD panel, an audio monitor speaker allows the recorded sound to be heard with the panel in the open or closed position. This section also contains the input source switch, reset button and screen display controls.

### *Video Interfaces*

Located on the lower left of the CR-D10 chassis are the composite, S-video and Digital video connectors. The composite and S-video connectors act as both and input and output depending on the input video selection made and operational mode of the unit. The digital video output is a USB interface and serves for connection directly to a PC thus, making the CR-D10 act like another drive or device on the NLE PC with the supplied UDF drivers installed.


### *DVD-RAM/ DVD-R Blank Media*

You have choices in brands of blank media. HITACHI Kokusai Electric Inc. recommends the use of Maxell brand 8-cm DVD-RAM and DVD-R discs.

### *Remote Trigger*

The CR-D10 provides a connector to trigger the recording ON or OFF for shooting situations where the camera-recorder unit is mounted on a boom, jib or other inaccessible place.

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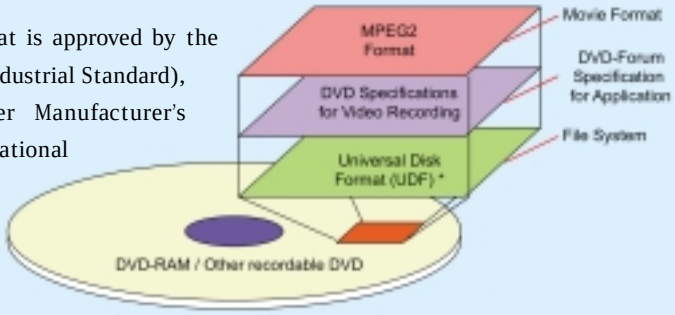
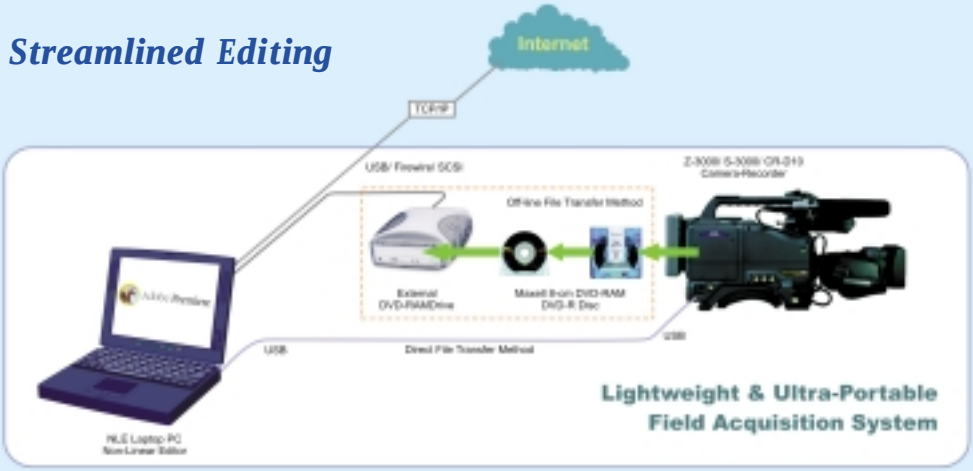
## *DVD-RAM Disk Format*

The disc format is the method by which files are read and written to DVD. Established by OSTA (Optical Storage Technology Association), it makes files on DVD "visible" to the computer operating system.

The DVD-RAM disc format is approved by the DVD Forum, JIS (Japanese Industrial Standard), ECMA (European Computer Manufacturer's Association) and ISO (International Standards Organization).




## *Streamlined Editing*




Modern non-linear editing software solutions and personal computers have opened opportunities to gain access into the television program production business unlike any other hardware-based one before it.

Today's full-featured DV editing and authoring tools have a rich range of professional capabilities at the price professional videographers, smaller news departments, institutional, commercial and government can afford.

With increasing support of the DVD-VR format by Non Linear Editor companies, content editors can conveniently drag and drop audio and video clips recorded with the HITACHI CR-D10 into the NLE timeline. No longer does the editor need to digitize or linearly (and slowly) transfer video from a tape machine. The editing process at this point would be as specified by the NLE software manufacturer.

NLE software suites are beginning to incorporate DVD authoring within the same application foregoing the need for a separate authoring application. Upon completion of the TV program production, the MPEG encoded NLE project is written back to the economical high capacity DVD-RAM/DVD-R media. From that point, the individual user has a video that is immediately ready for a lifetime of use on a growing number of DVD-RAM devices.

In a more complex and server-based production environments, DVD library systems are gaining acceptance, as a "near-online" content storage where the discs recorded by the HITACHI CR-D10 would be processed.

## Advantages of DVD-RAM over Videotape:

- Inexpensive - At less than a (Euro ¢ 0.01/Mb) Cent per megabyte, cartridges are extremely inexpensive
- Durable – Can be re-used over 100,000 times
- Phase change technology - There is no physical contact between the read/write lens and the media, eliminating head crashing and wearing due to frequent reading and repeated access like on hard-disc recorders
- Reliable – Mechanically less complex with a minimum 30-year storage life
- Lightweight & Small – The disc weights a mere 6oz and has same form factor as a floppy disc.
- Non-linear access to data – No need to FFWD or RWD to find and review specific video clips on the recorded DVD-RAM disc
- Advanced in-recorder functions – Disc navigation, customized playlists, clip metadata
- Wider manufacturer base – Better choice of hardware and peripherals manufacturers to record, playback, and archive professional video using DVD-RAM discs.
- Impervious to magnetic fields, RFI/ESD & X-rays.

## *Specifications*

| | |
|---|---|
| **Color system** | NTSC/ PAL |
| **Record medium** | 8cm dual-sided DVD-RAM, single-sided DVD-R. |
| **File System** | DVD-VR Video Recording standard |
| **Video signal record** | |
| Encoding scheme | MPEG-2 MP@ML, IBP-frame |
| Video Format | Rec.601 ~704x480 pixels (525/59.94) NTSC ~704x576 pixels (625/50) PAL. |
| MC Prediction and DCT | Adaptive frame/ field prediction, adaptive frame/ field DCT. |
| Encoding rate control | Modified TM5 algorithm. |
| Encoding quality | 3-settings: Standard, Fine, Extra Fine |
| Encoding rate | Std CBR @ 3Mbps, Fine CBR @ 6Mbps, Extra Fine VBR @ 3~9Mbps |
| **Record time per disc side** | Approx. 18 minutes ~ 60 minutes (VBR method) for DVD-RAM. |
| | Approx. 30 minutes (CBR method) for DVD-RAM/R. |
| **Video signal playback & decode** | MPEG-2 MP@ML, MPEG-1, audio & video of all compliant bit streams. |
| **Audio signal record & encode** | MPEG layer-2 (fs=48KHz 2ch). |
| **Camera video input** | (Via Multi-Pin interface connector from Camera) |
| | Y: 1.0Vp-p, 1kΩ. |
| | C: 0.286Vp-p, 1kΩ (Burst, NTSC). |
| **External Video input** | Chassis BNC connector: VBS 1.0Vp-p, 75Ω. |
| | Chassis Y/C connector (S-Video): Y 1.0Vp-p, 75Ω, C: 0.286Vp-p, 75Ω(Burst, NTSC), 0.3Vp-p, 1kΩ (Burst, PAL). |
| **Audio input** | Audio 1 CAM MIC input: (via Multi-Pin interface connector from Camera) ~ 20dBs. |
| | Audio 1 (Chassis rear XLR connector): MIC / LINE switchable |
| | Audio 2 CAM MIC input: (via Multi-Pin interface connector from Camera) ~ 20dBs. |
| | Audio 2 (Chassis rear XLR connector): MIC / LINE switchable |
| **Power supply input** | 12VDC via 4-pin chassis rear XLR connector |
| **Battery power operation range** | 10.5VDC ~ 17.0VDC. |
| **Audio output** | Female RCA, 2 channels (balanced audio optionally available) |
| **Digital output** | USB1.1 |
| **DC output** | 12VDC via 5-pin chassis rear connector |
| **Remote record trigger** | Record on/off via 6-pin chassis rear connector |
| **Display** | LCD: 2.5"color TFT LCD (NTSC: 120K pixels) (PAL: 60K pixels). |
| **Operation temperature** | 0°C ~ +40°C. |
| **Operation Voltage Rating** | 10.5 ~ 17.0V |
| **Power consumption** | 7W (LCD monitor off). |
| **Dimensions** | 120 (width) x 200 (height) x 285 (length) mm (mounted on camera) |
| **Mass** | Approx. 2.3 kg (Excluding: Camera, lens, viewfinder and battery). |

## *Accessories*

**Included:**

- Battery mounting plate
- (1) One blank Maxell 8-cm DVD-RAM
- Operation manual (P/N) Driver CD
- USB digital connection cable

**Optional:**

- Batteries
- Chargers
- DVD-RAM Internal/External PC Drive
- Professional Editing Software


# Hitachi Kokusai Electric, Inc.

**Head Office** : 14-20, Higashi-Nakano 3-choume, Nakano-ku, Tokyo 164-8511, Japan
Phone: +81 (0) 3-3368-6111, Fax: +81 (0) 3-3365-9119, http://www.h-kokusai.com

**Beijing Office**
Beijing Fortune Building 5, Dong San Huan Bei-lu, Chao Yang District, Beijing, 100029 China Phone: +86 (0) 10-6590-8755/8756
Fax: +86 (0) 10-6590-8757

**Hitachi Denshi America, Ltd.**
**Headquarters and Northeast Office** : 150 Crossways Park Drive, Woodbury, New York 11797, U. S. A. http://www.hdal.com
Phone: (+1) 516-921-7200, Fax:(+1) 516-496-3718
**West Office** : 371 Van Ness Way, Suite 120
Torrance, CA. 90501, U. S. A.
Phone: (+1) 310-328-6116, Fax: (+1) 310-328-6252
**Midwest Sales** : Phone: (+1) 877-326-8104
Fax: (+1) 516-496-3718, Service (+1) 734-721-6180
**South Sales** : Phone: (+1) 877-326-8105, Fax: (+1) 516-496-3718, Service (+1) 678-937-0201
**Parts Center** : Phone: (+1) 516-682-4435, Fax: (+1) 516-921-0993
**Latin Sales** : Phone: (+1) 516-682-4420, Fax: (+1) 516-496-3718

**Hitachi Denshi Canada, Ltd.**
**Head Office** : 1 Select Avenue Unit #11 Scarborough, Ontario M1V 5J3, Canada, http://www.hitachidenshi.ca
Phone: (+1) 416-299-5900, Fax: (+1) 416-299-0450
**Eastern Office** : 5795 Chemin St. Francois St. Laurent, Quebec H4S 1B6, Canada, Phone: (+1) 514-332-6687
Fax: (+1) 514-335-1664
**Ottawa Office** : 9 Antares Drive, Nepean, Ontario, K2E 7V5, Canada
Phone: (+1) 613-727-3930, Fax:(+1) 613-825-4253

**Hitachi Denshi (Europa) GmbH**
**Head Office** : Wesikircher Straße 88, Jügesheim D-63110 Rodgau, Germany, Phone: +49 (0) 6106-69920
Fax: +49 (0) 6106-16906, URL: www.hitachi-denshi.de
General email address: webmaster@hitachi-denshi.de

**Hitachi Denshi (U. K.) Ltd.**
**Head Office** : 14 Garrick Industrial Centre, Irving Way, Hendon, London, NW9 6AQ, United Kingdom
Phone: +44 (0) 208-202-4311
Fax: +44 (0) 208-202-2451
**Leeds Office** : Brookfield House, Selby Road, Garforth, Leeds LS25 1NB United Kingdom, Phone: +44 (0) 113-287-4400
Fax: +44 (0) 113-287-4260
URL: www.hitachi-denshi-uk.com
General email address: sales@hitachi-denshi-uk.com

Hitachi Denshi (Europa) GmbH
Weiskircher Str. 88,
63110 Rodgau
Telefon : 06106-6992-0
Telefax : 06106-16906
http://www.hitachi-service.net
Hausanschrift/Delivery address:
Weiskircher Str. 88, Jügesheim
D-63110 Rodgau, Germany
Postf.-Adresse/Adress for correspondence:
Postf./P.O. Box 1270
D-63084 Rodgau, Germany

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