MD1 Family of Digital Image Recorders

Digital Image Recorders

The MD1 family from Datacube® offers integrated component solutions for storing and recalling still and motion digital imagery. Select from a range of models or choose a combination of models with the bandwidth and capacity to best meet your application needs. When you need more performance, you can add capacity and bandwidth without significant software changes. Designed to seamlessly integrate with MaxVideo 250 and MaxVideo 200 image processors, the MD1 family presents a component storage solution for every application — from Medical Imaging Systems to Statistical Process Control.

Each MD1 is a lossless digital storage subsystem comprising a specialized channel controller; ImageFlow® Constrained-Latency, High-Bandwidth (CL/HB) software; and an appropriate storage chassis. A unique 16 MB Image Silo is incorporated to buffer data and offer "Ram Disk" performance.

MD1 systems are expandable by cascading multiple channel controllers in a MultiMD configuration. This flexibility allows you to specify the model or combination of models you need, offering capacity from 1.5 GB to over 128 GB. All systems burst data at up to 40 MB/sec. for recording or playback, and can be configured to sustain rates ranging from 4 MB/sec. to 32 MB/sec.

MD1 family members share the same sophisticated channel controller hardware and ImageFlow CL/HB software, and only differ in the capacity and bandwidth attributes of the individual storage chassis. This subsystem component solution eliminates the problems of software compatibility and added integration costs often associated with third-party solutions.

Unlike competitors' systems, the MD1 family will store multiple images of varying sizes (256x256x2Kx2K) and bit precisions (4-, 8-, 12-, and 16-bit), together on the same disk. There is never a need to format for bit depth or image size, as the MD1 controller packs all data within the Image Silo and onto disk under dynamic software control.

Building on our long term commitment to deliver a full spectrum of systems solutions, Datacube has engineered a family of digital image recorders that are continually evolving to meet the changing image storage requirements of its customers. MD1 is unsurpassed in capacity, bandwidth, reliability, and flexibility.

MD1 Family Models

Single-Disk, RAID-0	**MD1/2G(LP)**	One Slot/One Disk, Small Footprint, 2 GB, Up to 5 MB/sec. — ***Lowest Cost***
	MD1/4G	One Slot/One Disk, Small Footprint, 4 GB, Up to 6 MB/sec. — ***Better Single-Disk Capacity***
	MD1/8GX	One Slot/One Disk, Small Footprint, 8 GB Up to 10 MB/sec. — ***Best Disk Bandwidth***
Array, RAID-3	**MD1/8GB**	One Slot/One Array, RAID-3 (4+1) Array, 8 GB, Up to 16 MB/sec. — ***Best Combination Buy***
	MD1/16GB	One Slot/One Array, RAID-3 (8+1) Array, 16 GB, Up to 17 MB/sec. — ***Better Capacity Buy***
	MD1/32GB	One Slot/One Array, RAID-3 (8+1) Array, 32 GB, Up to 18 MB/sec. — ***Best Capacity Buy***

Specifications

Channel Controller

ImageFlow Software

- ImageFlow is embedded in the controller and is downloaded from the host at system start-up.
- Software upgrades require no PROM changes.
- All MD1 systems require a current ImageFlow software license.

Constrained-Latency, High-Bandwidth Software

- CL/HB ImageFlow specialist software manages the integral 16 MB Image Silo.
- User-provided "hinting" can improve performance.

Host Support

- VMEbus host CPU required to execute the ImageFlow host software.
- During run time, minimal support is needed from the host. In normal operation, excluding archival backup/restore, no image data needs to be moved over the host bus.

Electrical

Embedded 25 MHz CPUs

- Motorola 68ECO20 — primary embedded CPU providing fast high-level code execution
- NCR 53C720 — SCSI scripts processor dedicated to serving the SCSI bus
- 32-bit internal data bus provides high-bandwidth for data movement
- Synchronous 100 MB/sec. bus connecting the embedded processors, 2 MB of fast SRAM, the shared VMEbus dual-port SRAM, and other non-video control elements

Power

Channel Controller Power Requirement	4.0 Amps @ +5 Volts
(All voltages are +/-5%)	0.2 Amps @ +12 Volts
	0.2 Amps @ -12 Volts

Physical

The MD1 Channel Controllers are single, dual-height VMEbus compatible (Eurocard) devices. Dimensions: 5.20" x 4" x 0.62'

Environmental

Operating Temperature:	0° to 55° C (32° to 131° F)
Storage Temperature:	-40° to 100° C (-40° to 212° F)
Humidity:	10% to 90% Relative Humidity (Non-condensing)
Air Flow Requirement:	50 CFPM (minimum)
Altitude:	0 to 10,000 ft. (operating)

		MD1/2G(LP) MD1/4G MD1/8GX	MD1/8GB MD1/16GB MD1/32GB
Disk Technology		Single, 3.5” Disk	RAID-3 (4+1 or 8+1)
Power Requirements		1 Amp @ 110 Volts	6 Amps @ 110 Volts
Physical Dimensions	Width:	5.0” 127 mm	7.0” 178 mm
	Height:	6.0” 152 mm	17.0” 432 mm
	Depth:	9.0” 229 mm	22.0” 559 mm

Storage Chassis Specification

MultiMD System Capabilities

Multiple MD1 channels can be cascaded to achieve linear increases in bandwidth and capacity. Two channels effectively double the sustained bandwidth. MultiMD allows users to configure storage systems that better match their capacity, bandwidth, and budget requirements. MultiMD systems can only be comprised of multiple channels of the same model. These configurations allow users to focus on their current application needs while retaining the ability to expand as needs change. Storage capacity and bandwidth specifications are based upon bench tests reflecting typical usage. Actual maximum capacity and bandwidth can be higher or lower, depending upon actual conditions of usage.

Disk Technology

- MD1/2G(LP), MD1/4G, and MD1/8GX utilize a single high-performance 3.5-inch disk drive with over 500,000-hour MTBF.
- MD1/8GB, MD1/16GB and MD1/32GB utilize RAID-3.
- Each of the nine high-performance 3.5-inch SCSI drive MD1 Digital Image Recorders feature over 500,000-hour MTBF

		4 Channels	3 Channels	2 Channels	1 Channel
Single-Disk, RAID-0	MD1/2G(LP)	8 GB 16 MB/sec.	6 GB 12 MB/sec.	4 GB 8 MB/sec.	2 GB 4 MB/sec.
	MD1/4G	16 GB 20 MB/sec.	12 GB 15 MB/sec.	8 GB 10 MB/sec.	4 GB 5 MB/sec.
	MD1/8GX	32 GB 32 MB/sec.	24 GB 24 MB/sec.	16 GB 16 MB/sec.	8 GB 8 MB/sec.
Array, RAID-3	MD1/8GB	32 GB 32 MB/sec.	24 GB 32 MB/sec.	16 GB 28 MB/sec.	8 GB 14 MB/sec.
	MD1/16GB	64 MB 32 MB/sec.	48 MB 32 MB/sec.	32 MB 30 MB/sec.	16 MB 15 MB/sec.
	MD1/32GB	128 GB 32 MB/sec.	96 GB 32 MB/sec.	64 GB 32 MB/sec.	32 GB 16 MB/sec.

Operating Systems & Software

- MD1 systems operate with all ImageFlow-supported host operating systems, including SunOS, LynxOS, OS-9, and VxWorks.

Additional Information

For more information about the products mentioned in this document, please refer to the following Datacube literature:

MaxVideo 250 Data Sheet
ImageFlow Data Sheet

D A T A C U B E

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