

MemorEyes HD High Definition Digital Video Recorder



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MemorEyes HD High Definition Digital Video Recorder

1 DESCRIPTION

MemorEyes HD is a solid-state high definition digital video recorder for those conducting intelligence-gathering operations, especially in demanding environments such as on-board rotary wing aircraft.

The device has no moving parts and has a large recording capacity (several hours of video). It features a rugged machined aluminium housing, integral heating and cooling mechanisms, tactile button operation, and Dzus fastener system.

MemorEyes HD may be used in conjunction with Laserdyne's Black Opal family of flat panel display systems, allowing the operator to:

- set different video channels for recording or playback;
- control playback; and
- set event markers;

all without ever touching the MemorEyes HD device – so you have a wide choice of installation sites within the vehicle.

MemorEyes HD may also be used as a stand-alone recorder, utilising the local record and playback controls. Full control of the device is provided locally via the Graphic User Interface (GUI), a combination of AMOLED display, rotary switch and 3 momentary buttons. The main control modes are:

- Debrief;
- Play;
- Stop;
- Record; and
- Record Mute.

The device may be installed:

- in series with a Black Opal display (when in close proximity to it – only one short cable extra required, no other cabling changes); or
- peripheral to a Black Opal display (when remote from it – some extra cables and cable modifications required).

MemorEyes HD may also be installed in series with or peripheral to other brands of display, depending upon video signal availability and other features of that display, or it may be installed in a stand-alone fashion, if replacing an existing recorder or installing without a display.

Video footage is broken up and is stored in files of a configurable length. The video files are marked with start time and date. Files are stored on a non-volatile medium with data retention of 10 years.

MemorEyes HD also features a waterproof external USB memory module, where video recorded to the fixed internal storage medium is duplicated. More than one may be carried to allow quick memory swap-out and mission continuity, retrieving files in between mission stages (e.g. during crew change/refueling stops).

The MemorEyes HD DVR is field upgradeable. All software and firmware can be loaded via the Ethernet or RS-232 interface.

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2 SYSTEM SPECIFICATIONS

Notation - use of brackets in tables: [notes & qualifications] (units) {alternate units}.

2.1 System Performance

PARAMETER	SPECIFICATION
General	
Features	<ul style="list-style-type: none"> • 1000BTX Ethernet Download • 6 hour recording capacity full frame-rate colour video highest quality (more for monochrome, or lower quality recording) • Record & Playback • Fixed solid-state storage medium and removable solid-state memory • Watermarking • HD to 720p, 1080i, & 1080p • PAL & NTSC • Dual channel Audio • RS-232 System Control Interface • H.264 Encoding format • 9 to 30 Volt input range • SDI connection
Controls	3 momentary buttons, 1 five-position rotary switch
Indicators	AMOLED display
Storage Capacity	up to 6 hours to internal storage medium
Inputs/Outputs	
Video	3G-SDI, HD-SDI, SDI; 1V _{pp} Composite [NTSC or PAL] & S-Video, 75Ω
Audio	input 3.3V _{pp} [max.]
	output 4V _{pp} [max.]
Safety & Protection	
Cooling	thermal transfer by internal & external convection
Backfill	purged & backfilled [N ₂]
Electrical Protection	conforms to QSTAG 307, MIL-STD-704A, DO-160E ¹
Audible Emission [@ ≥ 10m]	nil

¹ Refer to Laserdyne for applicable issues, clauses & tests.

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PARAMETER	SPECIFICATION
MemorEyes-to-Go External Waterproof (“Walk Away”) Memory	
Type	solid state [“thumb drive”]
Capacity (GB)	64
Interface	USB 2.0 high speed, mass storage device
File System	FAT32
Sealing	water proof when inserted into MemorEyes HD

2.2 System Defaults

PARAMETER	SPECIFICATION
Video Standard	AUTODETECT
Video Compression Quality	Highest
Video Input Channel	Channel 1
Video Output Channel	Channel 1
Audio Channel	Channel 1
Video File Length	60 SEC
IP Address	10.1.1.1
Time & Date	GMT
Serial BAUD rate	115200
Serial Configuration	8 N 1

2.3 Physical Characteristics

PARAMETER	SPECIFICATION	
Mass [approx.] (kg {lb})	1.3 {2.86}	
Dimensions (mm {“})	Width	
	body	127 {5}
	overall ²	146 {5.75}
	Height	66.7 {2.63}
	Depth ³	177.5 {6.99}
Specific Gravity	> 1 [non-floatation]	
Mounting	4 x Dzus fasteners [type PFSC35] in corners of mounting flange; 8 x M4 tapped holes [4 in each side]	

² Including mounting flanges.

³ Rear surface of mounting flange to rear of unit.

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2.4 Communications

PARAMETER		SPECIFICATION
Ports		one Serial port ⁴
Data	Format	RS-232
	Rate (Baud)	115,200 [1,200 to 230.6k optional]

2.5 Electrical Requirements

PARAMETER		SPECIFICATION
Supply Voltage (Vdc)		MIL-STD 704E [for 9 to 30V]
Power Consumption (W) [@ 28Vdc]	typical	15
	max. [heater on] ⁵	90

2.6 Environmental

PARAMETER		SPECIFICATION	
Temperature (°C) Operate ⁶ [RTCA/DO-160D, class A1]	min. ⁷	-25	
	max. ⁸	long term	+55
		short term	+70
	Survive	min. ⁷	-40
max. ⁸		+85	
Vibration [RTCA/DO-160D, Helicopter Category R]		sine on random	
Shock [RTCA/DO-160D, Helicopter Categories B & C, drop shock]	operational	6g, 11ms; 3 shocks in each orientation	
	crash safety	20g, 11ms; 3 shocks in each orientation	
Sealing [RTCA/DO-160D, Category W] ⁹		water resistant [drip proof]	
Altitude/Low Pressure [operational; RTCA/DO-160D, class A1]		15,000 feet	
EMI/EMC ^{9,10}		MIL-STD-461E	

⁴ Shared with power input.

⁵ 5 minute warm-up at -40°C, less for higher start-up temperatures.

⁶ When used in accordance with procedures in User's Manual.

⁷ Without wind-chill.

⁸ Without solar radiation.

⁹ With compliant line connectors attached.

¹⁰ By design, simulation and analysis. Refer to manufacturer for details.

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2.7 Connector/Pin Details

NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP1: Display [RMU] Video & Power Connection (rear panel): Connector, MilSpec, 38999, 13-35, Panel, Plug, 'click' screw-on, 22 Way. Typical line connector matching part is Amphenol D38999/26WC35SN					
JP1,1	SC_GND	1	S-video chroma GND	coax, 75Ω shield	
JP1,2	SC_OUT	2	S-video chroma output	coax, 75Ω centre	75Ω terminated in display
JP1,3	CVBS_GND	3	Composite video GND	coax, 75Ω shield	replicated on JP2,9
JP1,4	CVBS_OUT	4	Composite video output	coax, 75Ω centre	75Ω terminated in display; replicated on JP2,10
JP1,5	Y_OUT	5	Component Y output	coax, 75Ω centre	75Ω terminated in display
JP1,6	Y_GND	6	Component Y GND	coax, 75Ω shield	
JP1,7	N/C	7			
JP1,8	RS-232_TX	8	RS-232 transmit (output to RMU)	signal	
JP1,9	RS-232_RX	9	RS-232 receive (input from RMU)	signal	
JP1,10	N/C	10			
JP1,11	N/C	11			
JP1,12	V-	12	0V power return	power	
JP1,13	V+	13	+28V DC power	power	
JP1,14	SY_OUT	14	S-video luma output	coax, 75Ω centre	75Ω terminated
JP1,15	SY_GND	15	S-video luma GND	coax, 75Ω shield	
JP1,16	C_GND	16	RS-232 GND		
JP1,17	PB_OUT	17	Component Pb output		
JP1,18	PB_GND	18	Component Pb GND	coax, 75Ω shield	
JP1,19	PR_GND	19	Component Pr GND	coax, 75Ω shield	
JP1,20	V-	20	0V power return	power	

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NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP1: Display [RMU] Video & Power Connection (cont'd)					
JP1,21	V+	21	+28V DC power	power	
JP1,22	PR_OUT	22	Component Pr output	coax, 75Ω centre	75Ω terminated in display
JP2: Sensor Video Connection (rear panel): Connector, MilSpec, 38999, 13-35, Panel, Socket, 'click' screw-on, 22 Way. Typical line connector matching part is Amphenol D38999/26WC35PN					
JP2,1	VID1_GND	1	Video 1 (Composite 1, S-video 1 luma or component Y) GND	coax, 75Ω shield	
JP2,2	VID1_IN	2	Video 1 (Composite 1, S-video 1 luma or component Y) input	coax, 75Ω centre	75Ω terminated in display
JP2,3	VID4_GND	3	Video 4 (Composite 4 or S-video 2 luma) GND	coax, 75Ω shield	
JP2,4	VID4_IN	4	Video 4 (Composite 4 or S-video 2 luma) input	coax, 75Ω centre	75Ω terminated in display
JP2,5	Audio_1_IN	5	Primary Audio input for recording (recorded as Left channel)	signal	
JP2,6	Audio_2_IN	6	Secondary Audio input for recording (recorded as Right channel)	signal	
JP2,7	RS-232_TX	7	RS-232 Transmit (output from DVR)	signal	Used for serial control of DVR
JP2,8	RS-232_RX	8	RS-232 Receive (input to DVR)	signal	Used for serial control of DVR
JP2,9	GND	9	Connected to JP1,3		Alternate CVBS out connection ¹¹
JP2,10	CVBS OUT	10	Connected to JP1,4		
JP2,11	Audio_2_OUT	11	Audio output for play-back (right channel)	signal	
JP2,12	Audio_1_OUT	12	Audio output for play-back (left channel)	signal	
JP2,13	Audio GND	13	Common for all audio signals	signal	Used for audio in and out.
JP2,14	VID3_IN	14	Video 3 (Composite 3, S-video 1 chroma or component Pr) input	coax, 75Ω centre	75Ω terminated in display
JP2,15	VID2_IN	15	Video 2 (Composite 2, S-video 2 chroma or component Pb) input	coax, 75Ω centre	75Ω terminated in display

¹¹ Use only one CVBS out connection (i.e. JP1, 3 & 4, or JP2, 9 & 10).

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NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP2: Sensor Video Connection (cont'd)					
JP2,16	VID3_GND	16	Video 3 (Composite 3, S-video 1 chroma or component Pr) GND	coax, 75Ω shield	
JP2,17	RS-232_GND	17	RS-232 GND		
JP2,18	N/C	18			
JP2,19	N/C	19			
JP2,20	N/C	20			
JP2,21	VID2_GND	21	Video 2 (Composite 2, S-video 2 chroma or component Pb) GND	coax, 75Ω shield	
JP2,22	N/C	22			
JP3: Primary SDI Video In Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP4: Secondary SDI Video In Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP5: Reclocked SDI Video Out [pass-through] Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP6: SDI Video Out [play-back] Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP7: Ethernet RJ45 Connection (rear panel): Connector, Panel, Amphenol RJF6B, IP67. Typical line connector shell matching part is Amphenol RJFTV6MG.					
JP8: Removable Memory Connection (front panel): Connector, USB, waterproof					
JP9: Earth Point: M5 threaded stud [if provided]					

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3 SET-UP

3.1 Mounts

The MemorEyes HD has two methods mounting:
four mounting points, being type PFSC35 Dzus fasteners, located in the corners of the mounting flange; and
eight M4 tapped holes, 4 in each side.

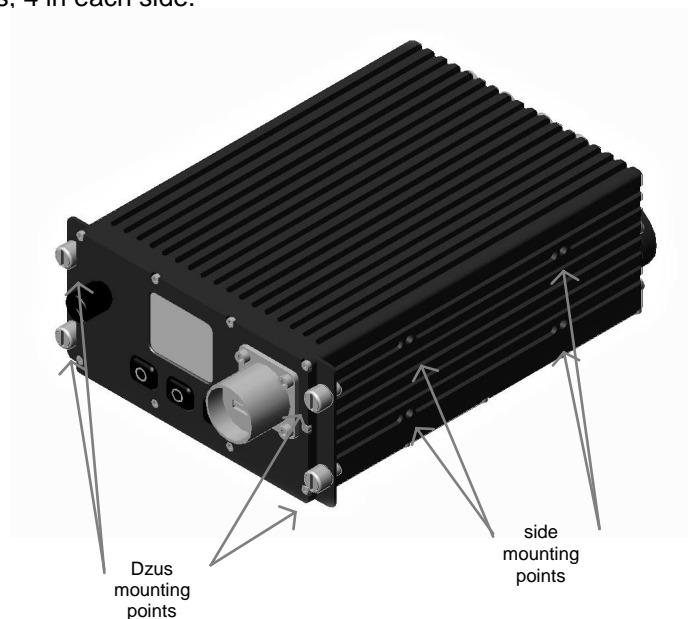


Figure 3-1: Mounts

3.2 Connections

The MemorEyes HD has nine connection points, being:

on the rear of the unit;

- Connector JP1, the Display (RMU) Video & Power Connector,
- Connector JP2, the Sensor Video Connector,
- Connector JP3, the Primary SDI Video In Connector,
- Connector JP4, the Secondary SDI Video In Connector,
- Connector JP5, the Reclocked SDI Video Out [pass-through] Connector,
- Connector JP6, the SDI Video Out [play-back] Connector,
- Connector JP7, the Ethernet RJ45 Connector,
- Connector JP9, the Earth Point (if provided), and

on the front of the unit;

- Connector JP8, the Removable Memory Connector.

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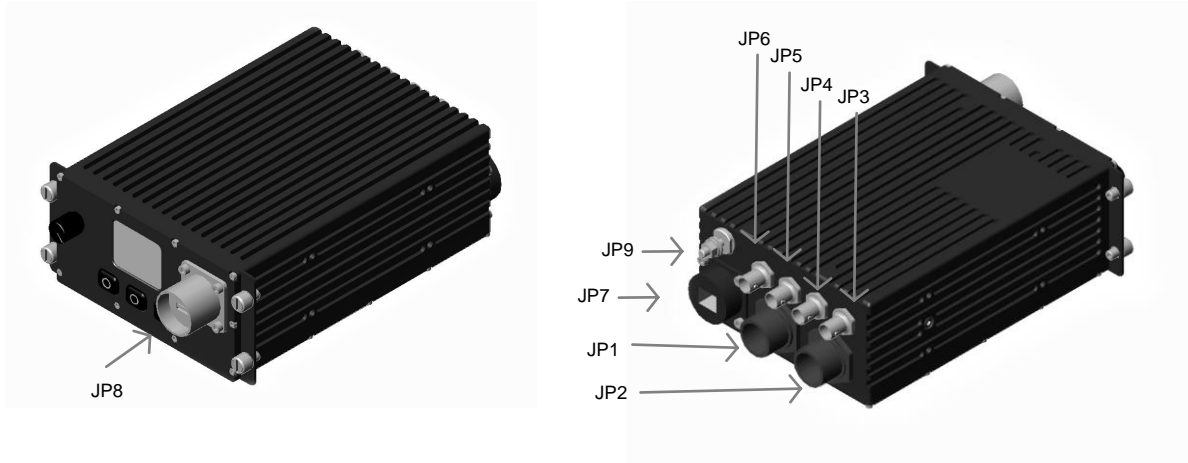


Figure 3-2: Connections

3.3 Set-up Procedure

CAUTION: User-supplied cables must be correctly wired (see list of Connector/Pin Details).

Ensure that external power is within the range specified herein.

Ensure that external power is OFF before proceeding with set-up.

- Mount the unit to the vehicle or platform, using the four Dzus fasteners provided.
- Connect the earth point [if provided (configuration dependent – needed only if video and comms connections are direct to the unit not via a display)] to an appropriate point on the vehicle.
- Connect the required cables to Connectors JP1 to JP6, and to the external imaging system, power source and display (JP7 need only be connected when the Ethernet connection is required, e.g. for download of video files).
- Ensure that the external memory module is firmly seated into and sealed to JP8.
- See User's Manual for other connection configurations.

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4 OUTLINE DRAWING

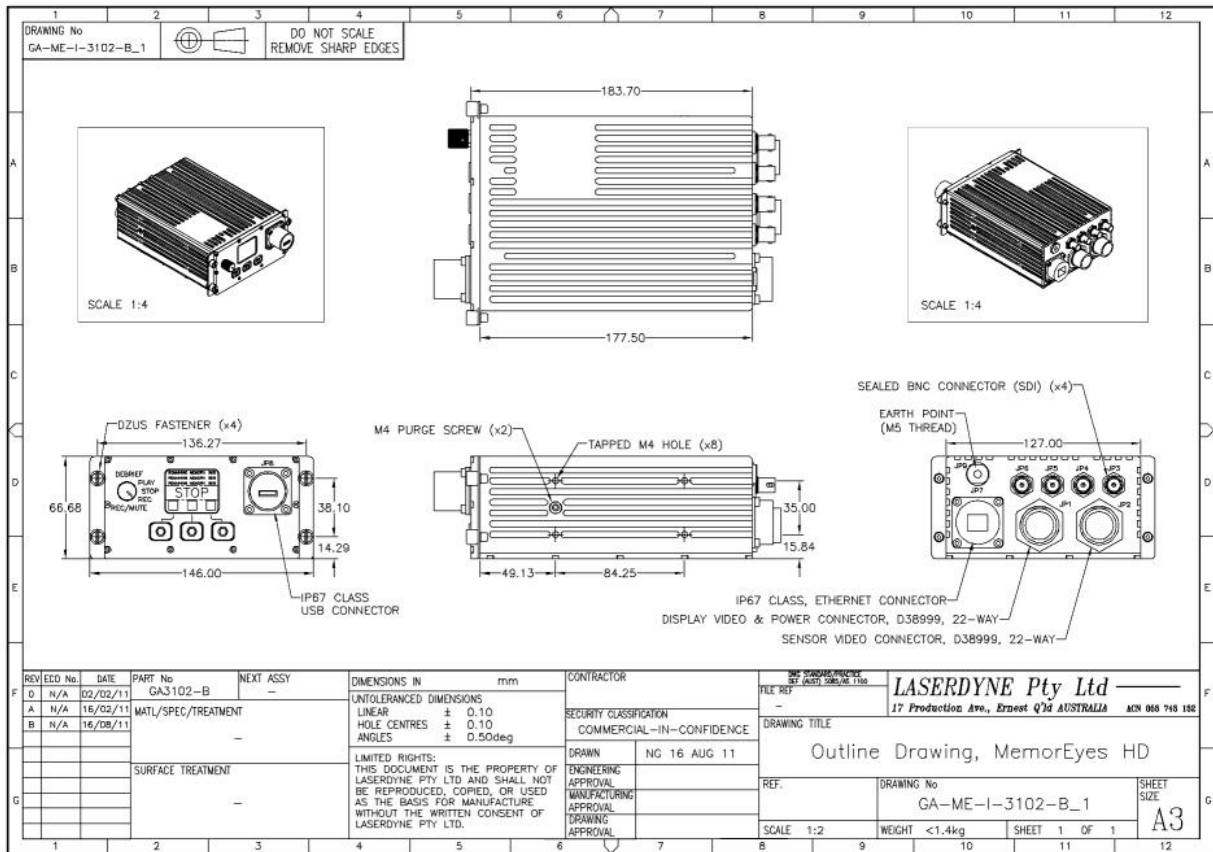


Figure 4-1: Outline Drawing



A Division of Laserdyne Pty Ltd
A.C.N. 053 743 132

P.O. Box 6541 17 Production Ave
GCMC Bundall Molendinar
Queensland 9726 Queensland 4214
Australia Australia

Tel: (07) 5594 9772 Int'l Tel: 61 7 5594 9772
Fax: (07) 5594 9981 Int'l Fax: 61 7 5594 9981

email: laserdyne@laserdyne.com.au
website: www.laserdyne.com.au

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