MemorEyes Digital Video Recorder

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1 DESCRIPTION

MemorEyes is a solid-state 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 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 device – so you have a wide choice of installation sites within the vehicle.

MemorEyes 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 LCD, 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 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 contains a compact, removable solid state storage device – MemorEyes-to-Go. The user may elect to record to this WAM ("Walk Away Memory") device instead of the fixed internal storage medium. 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). If the fixed internal storage is chosen as the destination medium, then download may be performed via the Ethernet connection at a more convenient time. Internally stored files may also be downloaded to the removeable memory (MemorEyes-to-Go).

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

2 SYSTEM SPECIFICATIONS

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

2.1 System Performance

PARAMETER		SPECIFICATION
General		
Features		• 100BTX Ethernet Download • 3 hour recording capacity full frame-rate colour video highest quality (more for monichrome, or lower quality recording) • Record & Playback • Fixed solid-state storage medium and removable solid-state memory • 4 Channel Composite inputs • Watermarking • PAL & NTSC • Single channel Audio • RS-232 System Control Interface • MJPEG2000 Encoding format (ISO-15444) • 11 to 30 Volt input range
Controls		3 momentary buttons, 1 five-position rotary switch
Indicators		LCD display
Inputs/Outputs		
Video		$1V_{pp}$ 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 [@ 3 10m]		nil
PARAMETER		SPECIFICATION
MemorEyes-to-Go Removeable ("Walk Away") Memory		
Type		solid state ["thumb drive"]
Capacity (GB)		16

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

PARAMETER	SPECIFICATION
MemorEyes-to-Go Removeable ("Walk Away") Memory (cont'd)	
Interface	USB 2.0 high speed, mass storage device
File System	FAT32
Sealing	water proof when inserted into MemorEyes or carry tube

2.2 System Defaults

PARAMETER	SPECIFICATION
Video Standard	US = NTSC, EU = PAL
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})			1.7 {3.74}
Dimensions (mm {"})	**Width**	**body**	127.00 {5}
		overall [2]	146.06 {5.75}
	Height		85.7 {3.37}
	Depth	**overall** [3]	208.3 {8.2}
		Mounting [4]	165 {6.5}
Specific Gravity			> 1 [non-floatation]
Mounting			Dzus fasteners [type PFSC35] 2 per side
Connectors	**rear [I/O]**		MS3474W14-19, 1 plug, 1 socket
	front [utility]		MS3474W12-10, 1 plug

[2] Including mounting flanges.
[3] Including front connector.
[4] Rear surface of mounting flange to rear of unit.

2.4 Communications

PARAMETER		SPECIFICATION
Ports		one Serial port [5]
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 11 to 30V]
Power Consumption (W)	**typical**	21.5W
[@ 28Vdc]	**max. [heater on] [6]**	130

2.6 Environmental

PARAMETER		SPECIFICATION
Temperature [operate] (°C) [7]	**min.**	-40°C [without wind-chill]
	max.	+55 [without solar radiation]
Vibration [MIL-STD-810F, method 514.5]		10 to 2000Hz PSD=0.03g^2/Hz random 11Hz PSD =0.1 g^2/Hz 17 Hz PSD=0.1 g^2/Hz 68Hz PSD=0.1 g^2/Hz 136 Hz PSD=0.1 g^2/Hz 2.5 hours per axis
Shock [MIL-STD-810F, method 516.5]		20g for 11 milliseconds; once in each direction of each axis
Altitude [operating; MIL-STD-810F, method 500.4] (m {ft})		4,572 {15,000}
Sealing [8]		water proof
EMI/EMC	**Conducted Emission**	CE01, CE03
[MIL-STD-461C] [8]	**Conducted Susceptibility**	CS01
	Radiated Emission	RE02
	Radiated Susceptibility	RS03

[5] Shared with power input.
[6] 5 minute warm-up at -40°C, less for higher start-up temperatures.
[7] When used in accordance with procedures in User's Manual.
[8] With compliant line connectors attached.

2.7 Connector/Pin Details

NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP1: Display (RMU) Video & Power Connection: Connector, Milspec, Panel, Plug, Bayonet, 19 Way, 14 Shell, Pin insert, Jam Nut, olive drab, MIL-C-26482 Series 2, MS3474W14-19P					
JP1,1	**Y1_GND**	A	Primary video (composite or luma) GND	coax, 75Ω shield	
JP1,2	**Y1_SIGNAL**	B	Primary video (composite or luma) output (for play-back or pass-thru from JP3)	coax, 75Ω centre	75Ω terminated in display
JP1,3	**Y2_GND**	C	Secondary video (composite or Y) GND	coax, 75Ω shield	
JP1,4	**Y2_SIGNAL**	D	Primary video (composite or luma) output (for play-back or pass-thru from JP3)	coax, 75Ω centre	75Ω terminated in display
JP1,5	**N/C**	E			
JP1,6	**N/C**	F			
JP1,7	**V-**	G	0V power return	power	
JP1,8	**V+**	H	+28V DC power	power	
JP1,9	**V+**	J	+28V DC power	power	
JP1,10	**VIDEO_OUT_IN**	K	Video Input from RMU video output	coax, 75Ω centre	RMU video output feeds in here (or additional video input)
JP1,11	**GND**	L	Video GND	coax, 75Ω shield	
JP1,12	**N/C**	M			
JP1,13	**N/C**	N			
JP1,14	**C1_SIGNAL**	P	Primary chroma output	coax, 75Ω centre	75Ω terminated
JP1,15	**C2_SIGNAL**	R	Secondary chroma output	coax, 75Ω centre	75Ω terminated
JP1,16	**C_GND**	S	Chroma and RS-232 common		
JP1,17	**V-**	T	0V power return	power	
JP1,18	**RS-232_TX**	U	RS-232 transmit (output to RMU)	signal	
JP1,19	**RS-232_RX**	V	RS-232 receive (input from RMU)	signal	

NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP2: Sensor Video Connection: Connector, Milspec, Panel, Socket, Bayonet, 19 Way, 14 Shell, Pin insert, Jam Nut, olive drab, MIL-C-26482 Series 2, MS3474W14-19S					
JP2,1	**Y1_GND**	A	Primary video (composite or luma) GND	coax, 75Ω shield	
JP2,2	**Y1_SIGNAL**	B	Primary video (composite or luma) input	coax, 75Ω centre	75Ω terminated in display
JP2,3	**Y2_GND**	C	Secondary video (composite or Y) GND	coax, 75Ω shield	
JP2,4	**Y2_SIGNAL**	D	Secondary video (composite or Y) input	coax, 75Ω centre	75Ω terminated in display
JP2,5	**Audio_1_IN**	E	Primary Audio input for recording (recorded as Left channel)	signal	
JP2,6	**Audio_2_IN**	F	Secondary Audio input for recording (recorded as Right channel)	signal	
JP2,7	**RS-232_TX**	G	RS-232 Transmit (output from DVR)	signal	Used for serial control of DVR
JP2,8	**RS-232_RX**	H	RS-232 Receive (input to DVR)	signal	Used for serial control of DVR
JP2,9	**N/C**	J			
JP2,10	**VIDEO_OUT**	K	Video output	coax, 75Ω centre	Either RMU video output (pass-thru) or play-back video
JP2,11	**GND_OUT**	L	Video output GND	coax, 75Ω shield	
JP2,12	**Audio_OUT**	M	Audio output for play-back	signal	
JP2,13	**Audio GND**	N	Common for all audio signals	signal	Used for audio in and out.
JP2,14	**C1_SIGNAL**	P	Primary chroma input [or VCR composite input]	coax, 75Ω centre	75Ω terminated in display
JP2,15	**C2_SIGNAL**	R	Secondary chroma input	coax, 75Ω centre	75Ω terminated in display

NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
JP2: Sensor Video Connection (cont'd)					
JP2,16	**C_GND**	S	Chroma and RS-232 common		
JP2,17	**N/C**	T			
JP2,18	**RS-232_TX**	U	RS-232 transmit (output from RMU)	signal	
JP2,19	**RS-232_RX**	V	RS-232 receive (input to RMU)	signal	
JP3: Utility Connection (front panel): Connector, MilSpec, Panel, Plug, Bayonet, 10 Way, 12 Shell, Pattern 105, square flange, Mil-C26482, MS3112E12-10P					
JP3,1	**Ethernet RX-**	A	100M Base T network	signal, twisted pair	connection to PC / Laptop for debrief via network
JP3,2	**N/C**	B			reserved
JP3,3	**N/C**	C			reserved
JP3,4	**N/C**	D			reserved
JP3,5	**N/C**	E			reserved
JP3,6	**ETHERNET 100BTX (TX+)**	F	100BTX	pair	
JP3,7	**ETHERNET 100BTX (TX-)**	G	100BTX	pair	
JP3,8	**ETHERNET 100BTX (RX+)**	H	100BTX	pair	
JP3,9	**NF-ENB**	J	Programming support signal	signal	reserved
JP3,10	**GND**	K	Network GND		
JP4: Removable Memory (MemorEyes-to-Go) Connection (front panel): Connector, USB, customised					

3 SET-UP

3.1 Mounts

The MemorEyes has four mounting points, being type PFSC35 Dzus fasteners, located on the left and right (two per side) of the mounting flange.

Figure 3-1: Mounts

3.2 Connections

The MemorEyes has four connection points, being:

on the underside rear of the unit;
Connector JP1, the Display (RMU) Video & Power Connector,
Connector JP2, the Sensor Video Connector,

on the front of the unit;
Connector JP3, the Utility Connector,
Connector JP4, the MemorEyes-to-Go Connector.

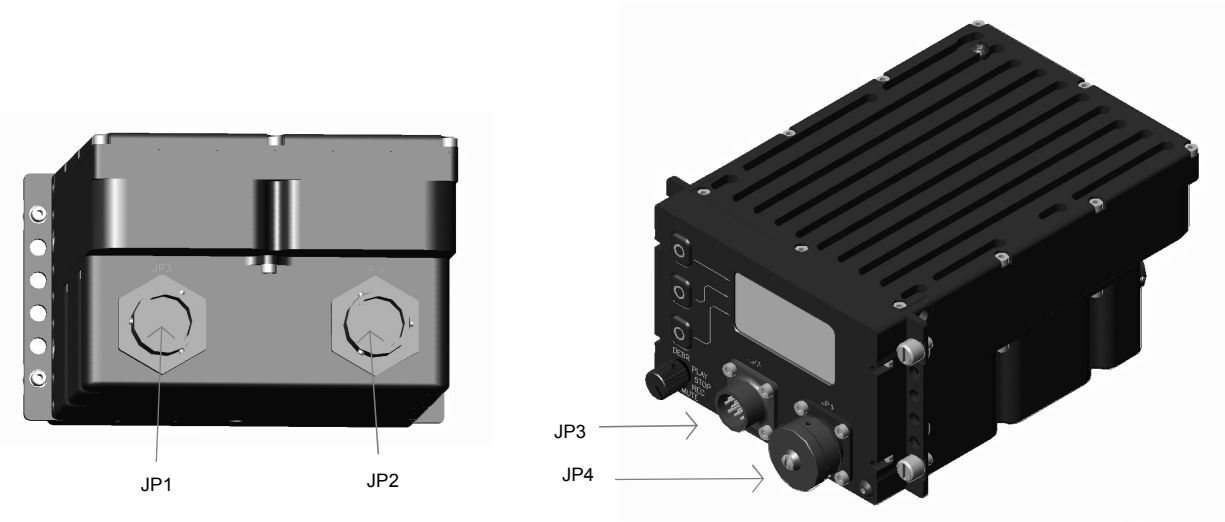

Figure 3-2: Connections

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 required cables to Connectors JP1 & JP2, and to the external imaging system, power source and display.
- See User's Manual for other connection configurations.

4 OUTLINE DRAWINGS

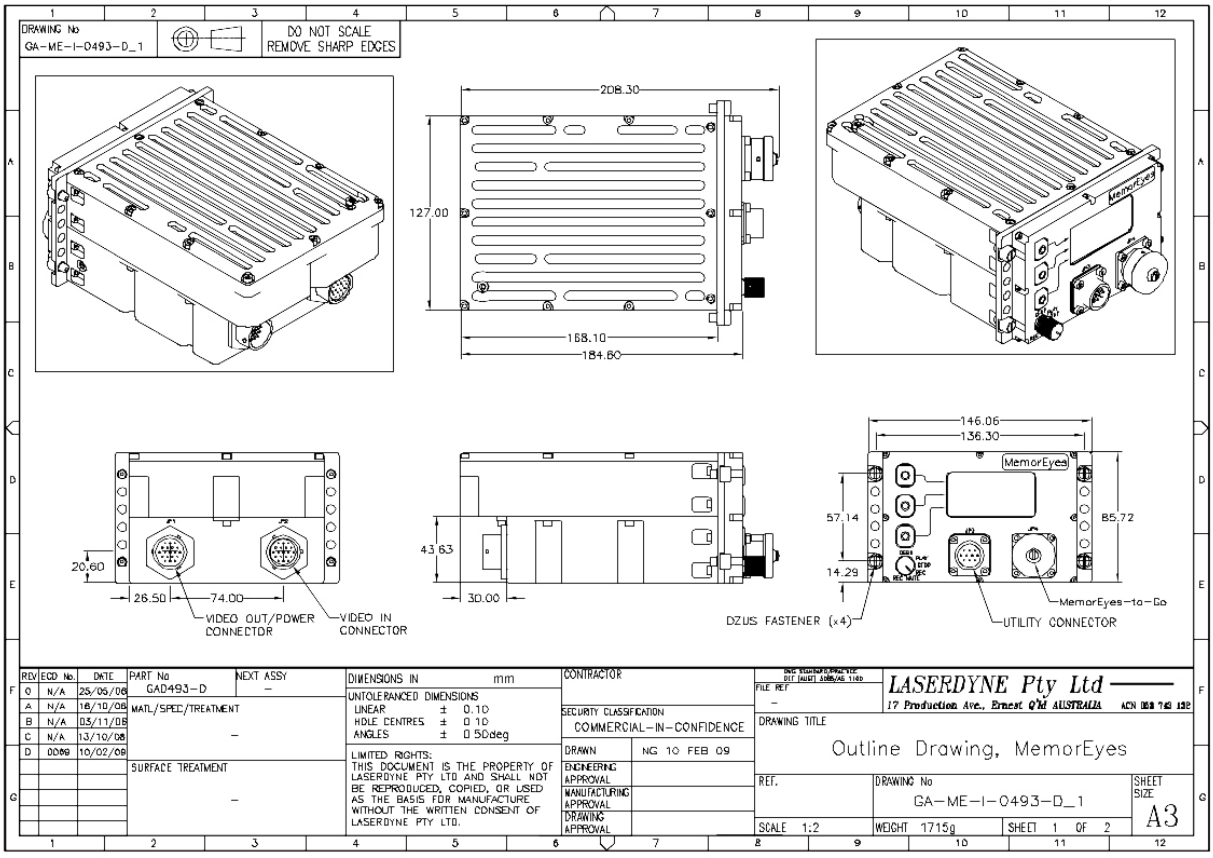

Figure 4-1: Outline Drawing

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