

MemorEyes 3G High Definition Digital Video Recorder

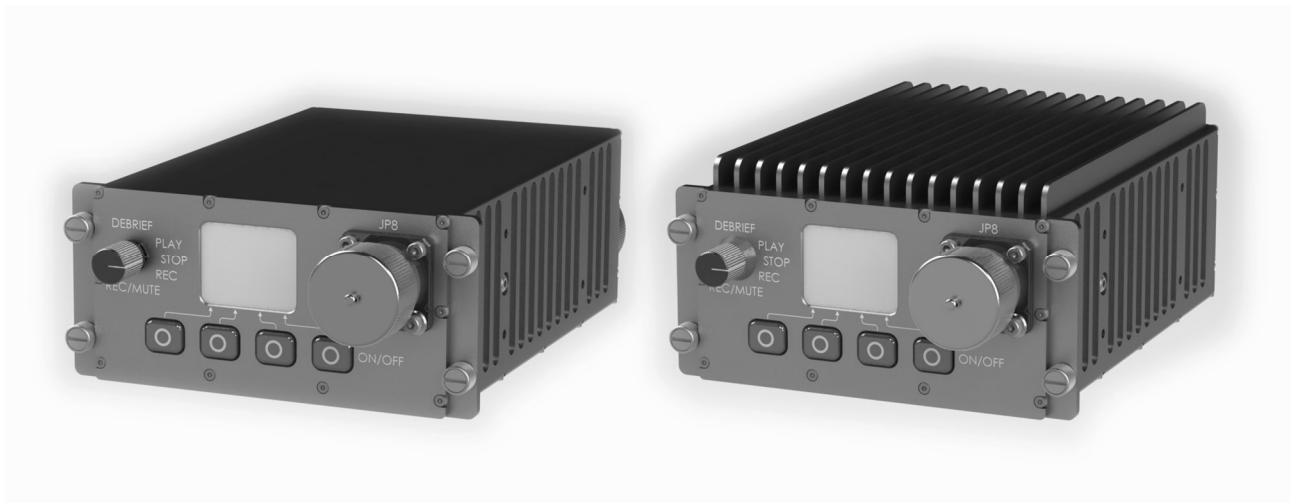


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MemorEyes 3G High Definition Digital Video Recorder

1 DESCRIPTION

MemorEyes 3G 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. It is available in two versions: a slim-line version (ST model), and a slightly larger version (ET model) for extended temperature operation.

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 3G has several features designed to increase the effectiveness of surveillance and security systems, including:

- Ability of simultaneous recording and independent playback of recorded video footage;
- Simultaneous recording of up to 4 CVBS or 2 SDI channels;
- Ethernet streaming of recorded and played back video;
- Tamper protection by watermarking recorded video with date/time stamp.

MemorEyes 3G 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 3G device – so you have a wide choice of installation sites within the vehicle.

MemorEyes 3G 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 4 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 3G 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 3G 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 3G 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		
Local Controls		4 tactile LED-backlit (green or red selectable) buttons, 1 five-position rotary switch
Remote Controls		RS-232 1000BASE-TX Ethernet Dimming and Day/Night control lines
Indicators		160x128 AMOLED display
Night Vision Device Compatibility		MIL-STD-3009 RTCA/DO-275 [low intensity green; red selectable]
Recording		
Video Format		H.264 BP, MP, and HP up to Level 5.1
Video Bit Rate		1Mb/s – 40Mb/s
Audio Format		AAC
Audio Bit Rate		24Kb/s
Internal Storage		128-1024GB SATA SSD
Recording Capacity		>6 hours at 40Mb/s
Inputs		
Physical Connections	SD Video	4 simultaneous CVBS channels 75ohm terminated and ESD protected
	SDI Video	1 or 2 simultaneous channels BNC, 75 ohm, ESD protected
	Audio	2 channels, ESD protected
Signal Formats supported	SD Video	1V _{pp} Composite [PAL/NTSC]
	SDI Video	SMPTE 259M, SMPTE 292M, SMPTE 424M
	Audio	3.3V _{pp} [max.]

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PARAMETER		SPECIFICATION
Outputs		
Physical Connections	SD Video	1 CVBS channels 75ohm terminated and ESD protected
	SDI Video	2 channels BNC, 75 ohm, ESD protected.
	Audio	2 channels ESD protected
Signal Formats supported	SD Video	1V _{pp} Composite [PAL/NTSC]
	SDI Video	SMPTE 259M, SMPTE 292M, SMPTE 424M Output 1: Re-clocked copy of the SDI1 input channel (same format as the input) Output 2: Any selected input (any format)
	Audio	3.3Vpp [max.]
Safety & Protection		
Cooling	thermal transfer by internal & external convection	
Backfill	purged & backfilled [N ₂]	
Electrical Protection	conforms to: QSTAG 307; MIL-STD-704E; MIL-STD-1275D; RTCA/DO-160E ¹	
Audible Emission [@ ≥ 10m]	nil	
MemorEyes-to-Go External Waterproof (“Walk Away”) Memory		
Type	solid state [“thumb drive”]	
Capacity (GB)	128/256/512	
Interface	USB 3.0, mass storage device	
File System	FAT32, NTFS	
Sealing	water proof when inserted into MemorEyes 3G or capped	

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

Product Specification

2.2 System Defaults

PARAMETER	SPECIFICATION
Video Standard	AUTODETECT
Video Compression	H.264 high profile level 4.1, 5Mb/s for SD video, 20Mb/s for HD video
Video Input Channel	CVBS1
Video Output Channel	Simultaneous SDI / CVBS
Audio Channel	Channel 1
Video File Length	600 SEC
IP Address	10.1.1.1
Time & Date	GMT
Serial BAUD rate	19200
Serial Configuration	8 N 1

2.3 Physical Characteristics

PARAMETER		SPECIFICATION	
Mass [approx.] (kg {lb})	ST model	1.5 {3.31}	
	ET model	1.6 {3.53}	
Dimensions (mm {"})	ST model	Width body	127 {5}
		overall ²	146 {5.75}
		Height	66.7 {2.63}
		Depth ³	177.5 {6.99}
	ET model	Width body	127 {5}
		overall ⁴	146 {5.75}
		Height	76.7 {3.02}
		Depth ⁵	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.

⁴ Including mounting flanges.

⁵ Rear surface of mounting flange to rear of unit.

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2.4 Communications

PARAMETER		SPECIFICATION
Ports		one Serial port ⁶
Data	Format	RS-232
	Rate (Baud)	19,200 to 115,200 [1,200 to 230.6k optional]

2.5 Electrical Requirements

PARAMETER		SPECIFICATION
Supply Voltage (Vdc)		MIL-STD 704E [for 10 to 30V]
Power Consumption (W) [@ 28Vdc]	typical	20
	max. [heater on] ⁷	90

2.6 Environmental

PARAMETER		SPECIFICATION	
Temperature (°C) [RTCA/DO-160E, class B4]	Operate ⁸ min. ⁹	-40	
	ST model ¹⁰ long term	max. ¹⁰	+40
		short term	+55
	ET model ⁸ long term	max. ⁸	+55
		short term	+70
	Survive ⁷	min. ⁷	-40
max. ⁸		+80	
Vibration [RTCA/DO-160E, Helicopter Category R]		sine on random	
Shock [RTCA/DO-160E, 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-160E, Category W] ¹¹		water resistant [drip proof]	
Altitude/Low Pressure [operational; RTCA/DO-160E, class B4]		25,000 feet	
EMI/EMC ^{9, 12}		MIL-STD-461E	

⁶ Shared with power input.

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

⁸ When used in accordance with procedures in User's Manual.

⁹ Without wind-chill.

¹⁰ Without solar radiation.

¹¹ With compliant line connectors attached.

¹² 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	N/C	1			
JP1,2	N/C	2			
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 DVR; replicated on JP2,10
JP1,5	PR_OUT	5	Component Pr output	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only
JP1,6	PR_GND	6	Component Pr GND	coax, 75Ω shield	
JP1,7	N/C	7			
JP1,8	RS-232_TX	8	RS-232 transmit (debug output)	signal	
JP1,9	RS-232_RX	9	RS-232 receive (debug input)	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	N/C	14			
JP1,15		15			
JP1,16	C_GND	16	RS-232 GND		
JP1,17	PB_OUT	17	Component Pb output		75Ω terminated in DVR, ESD protection only
JP1,18	PB_GND	18	Component Pb GND	coax, 75Ω shield	
JP1,19	PY_GND	19	Component Y GND	coax, 75Ω shield	
JP1,20	V-	20	0V power return	power	
JP1,21	V+	21	+28V DC power	power	
JP1,22	Y_OUT	22	Component Y output	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only

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NO.	NAME	PIN MARKING	PURPOSE	NOTES FOR HARNESS	COMMENT
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) GND	coax, 75Ω shield	
JP2,2	VID1_IN	2	Video 1 (Composite 1) input	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only
JP2,3	VID2_GND	3	Video 4 (Composite) GND	coax, 75Ω shield	
JP2,4	VID2_IN	4	Video 4 (Composite 4) input	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only
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, ESD protection only
JP2,8	RS-232_RX	8	RS-232 Receive (input to DVR)	signal	Used for serial control of DVR, ESD protection only
JP2,9	GND	9	Connected to JP1,3		Alternate CVBS out connection, ESD protection only ¹³
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) input	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only
JP2,15	VID4_IN	15	Video 2 (Composite 2) input	coax, 75Ω centre	75Ω terminated in DVR, ESD protection only

¹³ 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)					
JP2,18	N/C	18			
JP2,19	NIGHT	19	Day/night operation control		28V control, ESD protection only
JP2,20	BRIGHT	20	Screen and backlight dimming control		RTCA/DO-275 28V dimming control, ESD protection only
JP2,21	VID4_GND	21	Video 2 (Composite 2) GND	coax, 75Ω shield	
JP2,22	N/C	22			
JP3: Reclocked SDI Video Out [pass-through] Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP4: SDI Video Out [play-back] Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP5: Primary SDI Video In Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP6: Secondary SDI Video In Connection (rear panel): Connector, Panel, BNC, 75Ω					
JP7: Ethernet RJ45 Connection (rear panel): Connector, Panel, Amphenol RJF6B, IP67, ESD protection only. Typical line connector shell matching part is Amphenol RJFTV6MG.					
JP8: Removable Memory Connection (front panel): Connector, USB, waterproof, ESD protection only					
JP9: Earth Point: M5 threaded stud [if provided]					

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3 SET-UP

3.1 Mounts

The MemorEyes 3G 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.

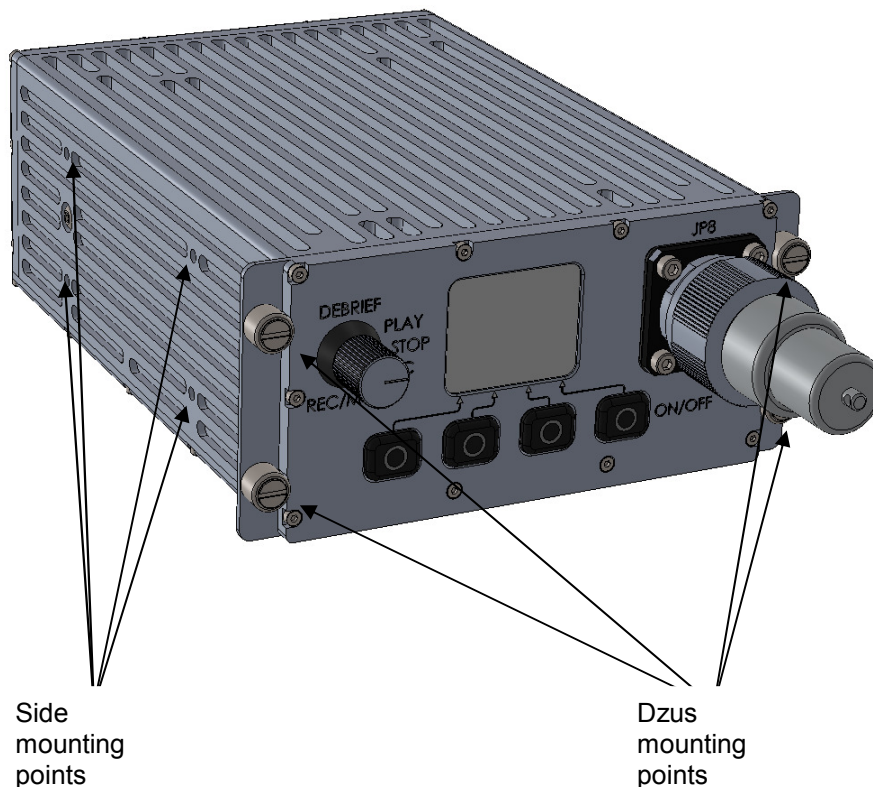


Figure 3-1: Mounts

3.2 Connections

The MemorEyes 3G 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 Reclocked SDI Video Out [pass-through] Connector,
- Connector JP4, the SDI Video Out [play-back] Connector,
- Connector JP5, the Primary SDI Video In Connector,
- Connector JP6, the Secondary SDI Video In 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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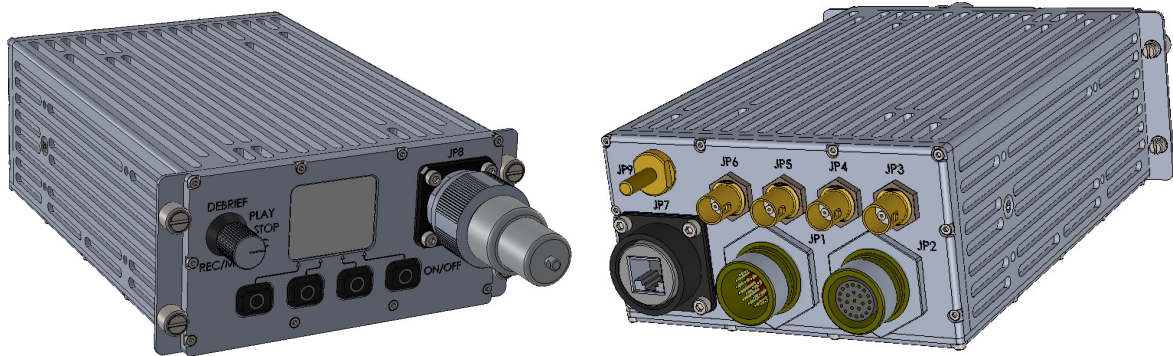


Figure 3-2: Connections

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

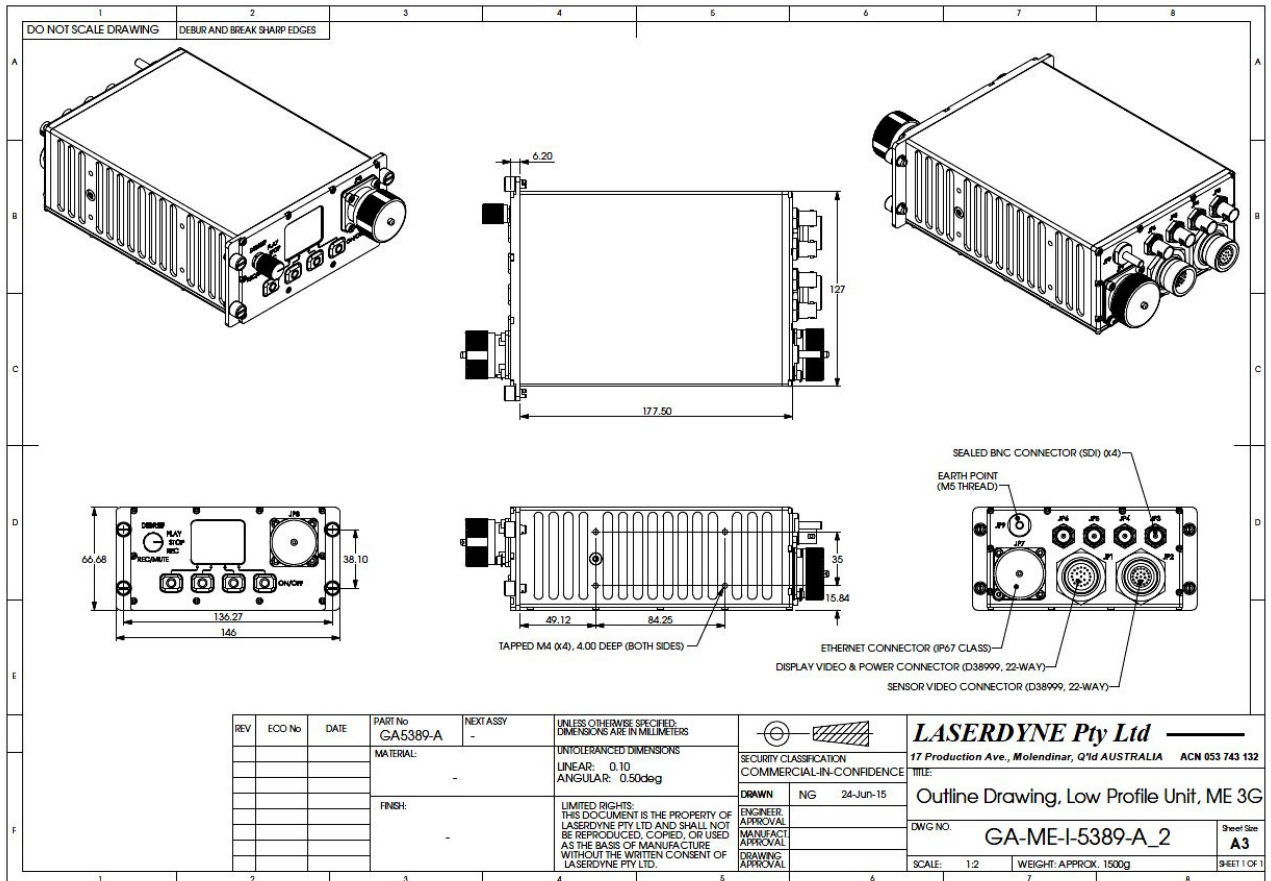


Figure 4-1: Outline Drawing, ST Version

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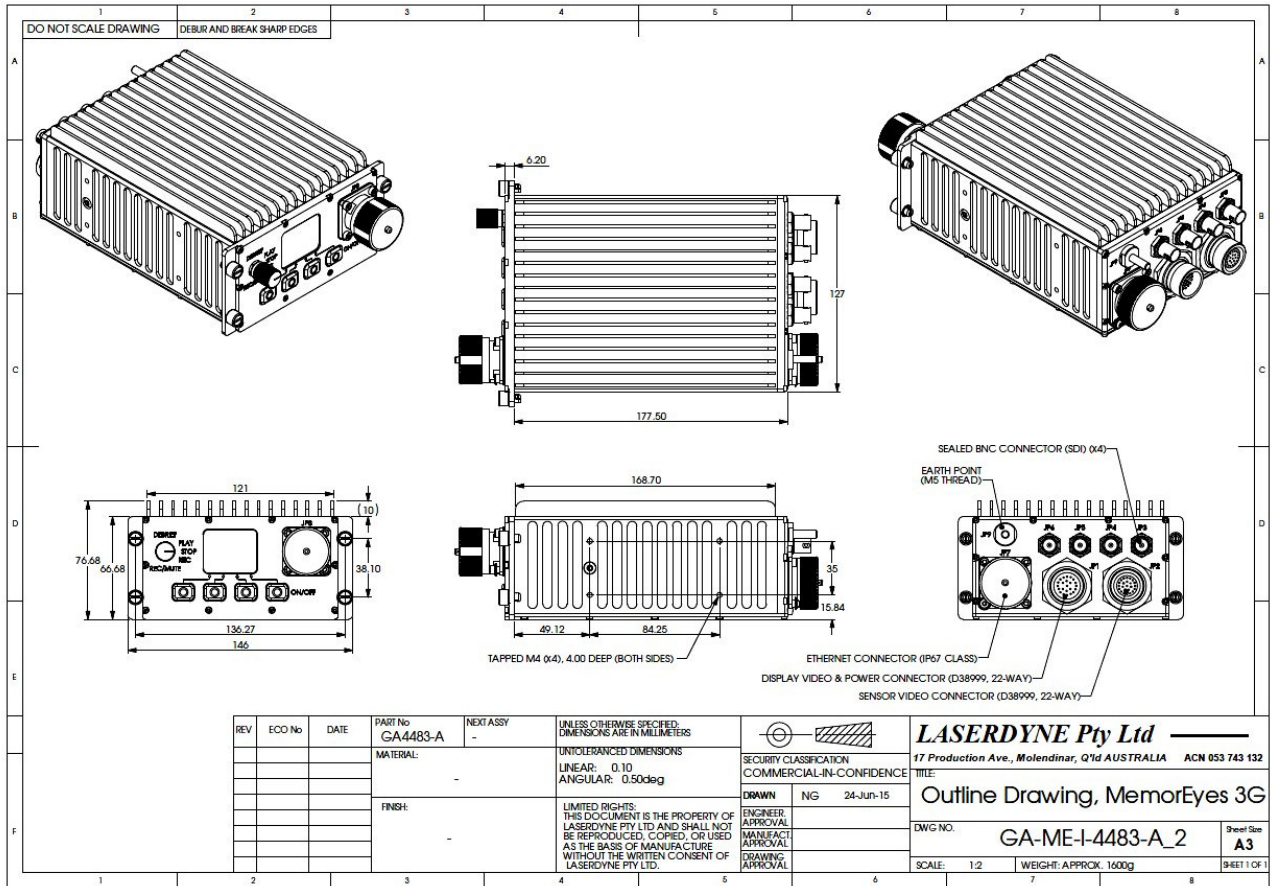


Figure 4-2: Outline Drawing, ET Version



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