PRODUCT SPECIFICATION:

Black Opal RMU15

Remote Monitor Unit, 15.1″

15″ Series

Specification Type (✓): Preliminary ✓   Firm ☐

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

SYSTEM DESCRIPTION

General:

Rugged, sealed, high performance, light weight, flat panel display system, suitable for demanding environments especially airborne vehicles. Readable in full daylight (Standard brightness models) or full direct sunlight (High brightness models). Low light/NVG readability (High brightness models). Extended temperature operation. Simultaneous multi-channel display (*MultiVision*). Accepts video and PC inputs. Provides for image enhancement.

Construction:

Machined metal housing with dessicant/breather valve and rapid bidirectional breather valve for rapid decompression. Antireflection coated, EM shielded (with ITO coating), toughened glass window. Integral heating and cooling mechanisms. Tactile button operation. 19" rack mount compatible.

Models:

RMU15H: **R** emote **M** onitor **U** nit, **15** ″, **H** igh brightness; and
RMU15S: **R** emote **M** onitor **U** nit, **15** ″, **S** tandard brightness.

SYSTEM PERFORMANCE

PARAMETER		SPECIFICATION
Control		
Control Functions [this is factory configurable to customer requirements]		power On/Off; backlight intensity; menu select; select screen lay-out; select image enhancement feature; digital zoom; freeze frame
Controls		8 momentary buttons
Display		
Type		Active Matrix Colour (24-bit colour) LCD Module
Display Size (² {cm})	**diagonal**	15 {38}
	active area	11.97 {30.4} x 8.98 {22.8}
Aspect Ratio [width:height]		4:3
Pixel Number [1 pixel is RGB trio]		1,024 x 768
Colour		16 million [8-bit each colour]
Grey Scale		256 [8-bit]

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SYSTEM PERFORMANCE (cont'd)

PARAMETER			SPECIFICATION
Display (cont'd)			
Backlight Luminance	minimum		0
[CCFT type; approx.;	maximum	**Standard**	220
adjustable] (cdm^{-2})[1]		**High**	1,200
Contrast Ratio [limiting; LCD]			300:1
Response Time [max.] (ms)			40
Readability	ambient	**Standard**	black-out to full daylight [10^4 lux]
	conditions	**High**	black-out to full direct sunlight [10^5 lux]
	Night Vision	**Standard**	no
	Device compatible?	**High**	yes [low intensity red]
Viewing Angle	vertical		±55
(°)	horizontal		±70
Inputs			
Inputs			2 video and 1 PC [4 and 1 optional]
Signal Formats	video		PAL [all forms], NTSC [all forms], SECAM [all forms], CCIR-601, RS170; interlaced and non-interlaced
	PC		non-interlaced, 60Hz, RGB, separate Hsync. & Vsync., 640 x 480 [standard PC VGA]
Connection Formats	video		Composite, S-Video [Y-C]
	PC		RGB + Hsync. + Vsync.
Outputs			
Video			prime video input is output [what comes in goes out]
VGA			analogue VGA of full screen is output [what you see goes out]
Safety & Protection			
Cooling			thermal transfer by internal & external convection
Backfill			purged & backfilled [N_2]
Display Window			Antireflection, hard-coated, sealed, EMI/EMC shielded
Electrical Protection			conforms to QSTAG 307 & MIL-STD-704A
Audible Emission [@ ³ 10m]			nil
Support			
MTBF [ground mobile] (hours)			> 8,000
Operational Life (years)			10

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[1] 1 cdm^{-2} = 1 nit.

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CONTROLS

Control Type	Location		Primary Label	Primary Function
Button	membrane	top	⏻	toggle between active and standby
Button	on left of	2nd top	**1**	menu
Button	front face	3rd top	**2**	show assigned screen lay-outs for selection
Button		middle	**3**	enhance
Button		3rd bottom	**4**	zoom
Button		2nd bottom	**5**	freeze
Button		bottom left	**-**	backlight down; scroll/adjust down
Button		bottom right	**+**	backlight up; scroll/adjust up

COMMUNICATIONS

PARAMETER		SPECIFICATION
Ports		one Serial port [2]
Data	**Format**	RS232 [RS422 optional]
	Rate (Baud)	9,600 [1,200 to 230.6k optional; or to 10 MBaud for RS422]

PHYSICAL CHARACTERISTICS

PARAMETER			SPECIFICATION
Mass [approx.] (kg)	**Standard**		8.0
	High		8.8
Dimensions (mm)	**Width [3]**	**body**	363
		overall [4]	402
	Height [3]	**body**	314
		overall [4]	354
	Depth [5]	**Standard**	73
		High	100
Specific Gravity			> 1 [non-floatation]
Mounting			19" rack-mount side plates [8U high], 8 x 6mm dia. clearance holes [4 per side], or Dzus fasteners [type PFSC35] optional

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[2] Shared with power input.
[3] Same for Standard and High brightness models.
[4] Including mounting flange.
[5] Excluding connectors.

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ELECTRICAL REQUIREMENTS

PARAMETER	SPECIFICATION
Supply Voltage (Vdc)	20 to 33 [28 nominal]
Current Drain [@ 28Vdc; typical] (A)	< 4

ENVIRONMENTAL

PARAMETER			SPECIFICATION
Temperature	Operate [6]	min.	-18°C [without wind-chill] with less than 15 minutes warm-up -5°C (without wind chill) with less than 10 minutes warm-up
(°C)		max.	+45 [without solar radiation]
	Survive	min.	-21 [without wind-chill]
		max.	+70 [without solar radiation]
Vibration			15-2000Hz 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			20g for 11 milliseconds; once in each direction of each axis LCD panel tested to 50g for 11 msec. full sine, 6 axes
Altitude (m {ft})			Tested for Rapid Decompression at 30,000 feet (9100 metres)
Sealing [7]			water proof [without immersion]
EMI/EMC [7]			MIL-STD-461D

CONNECTOR/PIN DETAILS

No.	Name	Pin Marking	Purpose	Notes for Harness	Comment
A: PC Input: Connector, MilSpec, Mil-C26482, Panel, Plug, Bayonet, 19 Way, 14 Shell, Pattern 105, square flange, AB05 2100 14-19P N00					
A1	RED OUT	A	VGA RED OUTPUT	coax (A,P), 75Ω	only for video out
A2	RED IN	B	RED INPUT	coax (B,P), 75Ω	DB15 pin 1. Also Pr input for component video
A3	GREEN OUT	C	VGA GREEN OUTPUT	coax (C,R), 75Ω	only for video out
A4	GREEN IN	D	GREEN INPUT	coax (D,R), 75Ω	DB15 pin 2. Also Y (and SOG) input for component video
A5	BLUE OUT	E	VGA BLUE OUTPUT	coax (E,S), 75Ω	only for video out

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[6] When used in accordance with procedures in User's Manual.
[7] With compliant line connectors attached.

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CONNECTOR/PIN DETAILS (cont'd)

No.	Name	Pin Marking	Purpose	Notes for Harness	Comment
A: PC Input (cont'd)					
A6	BLUE IN	F	BLUE INPUT	coax (F,S), 75Ω	DB15 pin 3. Also Pb input for component video
A7	HS OUT	G	VGA HSYNC OUTPUT	signal wire	only for video out
A8	HS IN	H	HSYNC INPUT	signal wire	DB15 pin 13
A9	VS OUT	J	VGA VSYNC OUTPUT	signal wire	only for video out
A10	VS IN	K	VSYNC INPUT	signal wire	DB15 pin 14
A11	DDC_5V	L	DDC CHANNEL +5V	unused	DB15 pin 9
A12	DDC_SDA	M	DDC CHANNEL DATA	unused	DB15 pin 12
A13	DDC_SCL	N	DDC CHANNEL CLOCK	unused	DB15 pin 15
A14	RED GND	P	RED coax GND	coax braid	DB15 pin 6
A15	GREEN GND	R	GREEN coax GND	coax braid	DB15 pin 7
A16	BLUE GND	S	BLUE coax GND	coax braid	DB15 pin 8
A17	DIGITAL GND	T	HSYNC GND	signal wire	DB15 pin 5
A18	DIGITAL GND	U	VSYNC GND	signal wire	DB15 pin 10
A19	N/C	V	UNUSED	unused	DB15 pin 4,11
B: Video Input: Connector, MilSpec, Mil-C26482, Panel, Socket, Bayonet, 19 Way, 14 Shell, Pattern 105, square flange, AB05 2100 14-19S N00					
B1	Y1_GND	A	Primary video (composite or luma) GND	coax, 75Ω shield	
B2	Y1_SIGNAL	B	Primary video (composite or luma) input	coax, 75Ω centre	75Ω terminated in display
B3	Y2_GND	C	Secondary video (composite or Y) GND	coax, 75Ω shield	
B4	Y2_SIGNAL	D	Secondary video (composite or Y) input	coax, 75Ω centre	75Ω terminated in display
B5	RS485+	E	RS485+ connection	signal	
B6	RS485-	F	RS485- connection	signal	
B7	V-	G	dc- (GND) connection	5A dc	internally isolated from comms and video GND.
B8	V+	H	Output power (+28V)	5A dc	Same as input dc
B9	V+	J	Output power (+28V)	5A dc	Same as input dc
B10	VIDEO_OUT	K	Switched video output	coax, 75Ω centre	either Y1 or Y2 output, 75Ω double terminated
B11	GND_OUT	L	Video output GND	coax, 75Ω shield	
B12	REC_LED	M	Record LED input	signal	>3V to show LED
B13	DISPLAY_SEL	N	Display select input	signal	>3V to swap to secondary channel

CONNECTOR/PIN DETAILS (cont'd)

No.	Name	Pin Marking	Purpose	Notes for Harness	Comment
B: Video Input (cont'd)					
B14	**C1_SIGNAL**	P	Primary chroma input [or VCR composite input]	coax, 75Ω centre	75Ω terminated in display
B15	**C2_SIGNAL**	R	Secondary chroma input	coax, 75Ω centre	75Ω terminated in display
B16	**C_GND**	S	Chroma common [or VCR composite input]	coax, 75Ω shield	
B17	**V-**	T	dc- (GND) connection	5A dc	internally isolated from comms and video GND.
B18	**RS232_TX**	U	RS232 transmit (output from display)	signal	
B19	**RS232_RX**	V	RS232 receive (input to display)	signal	
C: dc Power Input & Comms Port Connection: Connector, MilSpec, Mil-C26482, Panel, Plug, Bayonet, 12 Way, 14 Shell, Pattern 105, square flange, AB05 2100 14-12P N00					
C1	**COMMS_GND**	A	common for comms	signal	
C2	**N/C**	B	unused		
C3	**RS232_RX**	C	RS232 receive (input to display)	signal	
C4	**RS232_TX**	D	RS232 transmit (output from display)	signal	
C5	**nRESET**	E	active low display reset control	reserved	
C6	**MODAB**	F	active low display bootload control	reserved	
C7	**RS485-**	G	RS485- connection	signal	
C8	**RS485+**	H	RS485+ connection	signal	
C9	**V-**	J	dc- (GND) connection	5A dc	internally isolated from comms and video GND.
C10	**V-**	K	dc- (GND) connection	5A dc	internally isolated from comms and video GND.
C11	**Vheat**	L	Input power (+28V) for heater	5A dc	connect if heater required (automatically enabled internally on low temperatures)
C12	**V+**	M	Input power (+28V) for display	5A dc	+20..+33V input