

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

XTREME
AIR 8



TABLE OF CONTENTS

| Chapter | Page |
|------------------------------|------------|
| 1 DESCRIPTION | 1-1 |
| 2 SPECIFICATIONS | 2-1 |
| 2.1 System Performance | 2-1 |
| 2.2 Controls | 2-3 |
| 2.3 Communications | 2-3 |
| 2.4 Physical Characteristics | 2-3 |
| 2.5 Electrical Requirements | 2-4 |
| 2.6 Environmental | 2-4 |
| 2.7 Connector/Pin Details | 2-4 |
| 3 SET-UP | 3-1 |
| 3.1 Mounts | 3-1 |
| 3.2 Connections | 3-1 |
| 3.3 Set-up Procedure | 3-2 |
| 3.4 Heating and Cooling | 3-2 |
| 4 OUTLINE DRAWING | 4-1 |
| LIST OF FIGURES | |
| Figure 3-1: Mounts | 3-1 |
| Figure 3-2: Connections | 3-2 |
| Figure 4-1: Outline Drawing | 4-1 |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

1 DESCRIPTION

Laserdyne's Black Opal displays have been engineered for a wide range of land-, sea- or air-borne display applications including remote/indirect viewing of video images generated by day, night or thermal cameras.

The Xtreme Air 8 model is an 8.4" [with SVGA (800 x 600) resolution] version of the Black Opal display type, specially designed for airborne use.

This is a reduced weight/reduced cost model, where some of the stringent sealing and other measures required for land and seaborne operations have been relaxed. It retains the advanced video features and generally high level of ruggedisation for which Black Opal displays are renowned.

This model is fitted with a high brightness LED backlight module. LED backlighting improves reliability when compared with standard CCFL (lamp) backlights – not only by substituting solid-state components for fragile lamps, but also by the graceful nature of LED backlight degradation as the unit ages – a missing lamp may make an LCD unreadable, but a few fading LEDs make little difference.

Each Xtreme Air model consists of a LED backlit LCD, a low reflection high clarity window, a microprocessor unit, and power & control electronics. All items are housed within a rugged enclosure containing heating and cooling mechanisms. The LCD is protected by a tough, antireflection-coated window which also provides EMI/EMC shielding. The window is matched to the LCD glass with index-matched materials to minimise internal reflections, eliminating potential internal window fogging and maximising window strength. All models are button operated.

Each model features MultiVision, allowing for multiple analogue and SDI video inputs (for SD, HD and other analogue video formats, and PC RGB inputs), and providing simultaneous display of up to 6 inputs.

Images are displayed on a LED backlit LCD that may be viewed in full direct sunlight down to full darkness and feature backlight settings suitable for low light viewing, for viewing with Night Vision Devices and completely off for black-out conditions.

Black Opal displays have several features designed to increase the effectiveness of surveillance, sighting and security systems, including:

Image Enhancement: video inputs are compensated for obscuration (e.g. rain, fog, snow, mist or smoke) within an adjustable central window where contrast and colour are enhanced. For a chosen window size, the enhancement is applied to that portion of the displayed image;

Digital Zoom: a fully X & Y interpolated "smart" zoom, not merely pixel multiplying, yields a clear zoomed image without the blocky "pixelated" appearance often seen with digital zooming; and

Freeze Frame: freezes the current prime video channel while leaving live any video inset.

Colourisation: applies preloaded colour palettes to monochrome imagery.

Motion ("edge tearing") compensation: minimises the jagged edges that can occur with motion in video on LCDs.

These displays also provide overlay (chroma keying) capability.

Black Opal display software is easily upgradeable, upgrades can be downloaded in the field via a PC.

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

2 SYSTEM SPECIFICATIONS

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

2.1 System Performance

| PARAMETER | | SPECIFICATION |
|---|--------------------|---|
| Designation | | |
| Xtreme Air 8 | | Black Opal airborne special - helicopter-dedicated design, 8", high brightness, SVGA resolution |
| Control | | |
| Control Functions [factory configurable to customer requirements] | | On/Off; backlight intensity; menu select; select screen lay-out; select image enhancement feature; digital zoom; freeze frame |
| Controls | | 9 tactile LED-backlit buttons |
| Display | | |
| Type | | Amorphous Silicon Active Matrix Colour (24-bit colour) LCD Module |
| Display Size (" {cm}) | diagonal | 8.4 {21.34} |
| | active area | 6.73 {17.09} x 5.1 {12.96} |
| Aspect Ratio [width:height] | | 4:3 |
| Pixel Number [1 pixel is RGB trio] | | 800 x 600 |
| Colour | | 16 M [8-bit each colour] |
| Grey Scale | | 256 [8-bit] |
| Backlight Luminance [LED type; approx.; adjustable] (cdm⁻²)¹ | minimum | 0 |
| | maximum | > 1,000 |
| Contrast Ratio [limiting; LCD] | | 300:1 |
| Response Time [typical] (ms) | | 25 [T _r = 16; T _f = 9] |
| Readability [ambient conditions] | | black-out to full direct sunlight [10 ⁵ lux] |
| Night Vision Device compatible? | | yes [low intensity green; red selectable] |
| Viewing Angle [full angle] (°) | vertical | ±80 |
| | horizontal | +80/-60 |

¹ 1 cdm⁻² = 1 nit.

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| PARAMETER | | SPECIFICATION |
|---------------------------------|------------------------------|---|
| Inputs | | |
| Physical Connections | Low resolution group | 4 simultaneous channels, each channel being either 1 x Y/C or 2 x CVBS |
| | High Resolution group | 1 simultaneous channel, selectable from 6 general purpose analogue inputs. Connections supported are 6 x CVBS, or 3 x Y/C, or 2 x YPrPb, or 2 x RGsB, or 2 x RGBHV. |
| | SDI group | 1 simultaneous channel, selectable from 2 inputs |
| Signal Formats supported | Low resolution group | Standard definition (SD) only: (PAL/NTSC/SECAM/CCIR-601/RS170; interlaced and non-interlaced) |
| | High Resolution group | SD using CVBS or Y/C: (PAL/NTSC/SECAM/CCIR-601/RS170; interlaced and non-interlaced) HD using YPrPb or RGB: (720p, 1080i, 1080p); PC RGB input: VESA RGB analogue (UXGA maximum resolution) Other analogue video standards supported on request (i.e. STANAG 3350) |
| | SDI group | SMPTE 259M, SMPTE 292M (SMPTE 424M optional) |
| Connection Formats | Low resolution group | CVBS, Y/C. All analogue inputs are 75ohm terminated |
| | High resolution group | CVBS, Y/C, YPrPb, RGBHV, RGsB. All analogue inputs are 75ohm terminated. |
| | SDI group | SD-SDI, HD-SDI (3G-SDI optional). BNC, 75 ohm. |
| Outputs | | |
| Physical Connections | Analogue output group | 1 output channel, available from 3 general purpose analogue outputs. Connections supported are SD: (CVBS and Y/C simultaneous) or RGB or YPrPb; or HD: YPrPb or RGB or PC: RGBHV/RGsB [XGA maximum resolution] All analogue outputs are 75ohm |
| | SDI output group | 2 x BNC, 75ohm |






Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| PARAMETER | | SPECIFICATION |
|--------------------------------|-----------------------|--|
| Signal Formats supported | Analogue output group | SD: PAL/NTSC/SECAM/CCIR-601/RS170 HD: SMPTE 274M 1080p30, 1080i60, 720p60 (maximum resolution) PC: VESA (XGA maximum resolution) |
| | SDI group | SMPTE 259M, SMPTE 292M (SMPTE 424M optional) |
| Connection Formats | Analogue output group | CVBS, Y/C, YPrPb, RGBHV, RGsB |
| | SDI group | Output 1: Re-clocked copy of the selected SDI input channel (same format as the input) Output 2: Configurable to be either (a) any other video input (same format); or (b) A specified format |
| Functionality | Analogue output group | Configurable to be either (a) pass through any other video input (with a compliant format); or (b) a specified format and image configuration using any of the available inputs (limits apply) |
| | SDI group | Output 1: Re-clocked copy of the selected SDI input channel (same format as the input) Output 2: Configurable to be either (a) pass through any other video input (with a compliant format); or (b) a specified format and image configuration using any of the available inputs (limits apply) |
| Safety & Protection | | |
| Cooling | | thermal transfer by internal and external convection |
| Display Window | | Antireflection, hard-coated, sealed, EMI/EMC shielded; index-matched to LCD glass |
| Electrical Protection | | conforms to: QSTAG 307; MIL-STD-704E; MIL-STD-1275D; STANAG 3350 (all analogue video inputs) RTCA/DO-160D, Category Z, power input 18 to 30.3Vdc [min. max. & emergency operation, interrupts, abnormal surge (48Vdc for 1s), engine starting undervoltage]; RTCA/DO-160D, Category A, voltage spike [600Vdc for 10µs] |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| PARAMETER | SPECIFICATION | |
|--|-------------------------|----------|
| Audible Emission [@ ≥ 10m] | nil | |
| Support | | |
| MTBF [@30°C; 100% duty cycle] (hours) | Ground Mobile [wheeled] | > 14,700 |
| | Airborne Rotary Wing | > 6,500 |
| Operational Life (years) | 10 | |

2.2 Controls

| Control Type | Location | | Primary Label | Primary Function | |
|--------------|----------------------|-----------------------|---|---|------------------------------------|
| Button | top of | left |  | toggle between active and standby | |
| Button | front face | right |  | toggle between Day and Night backlight modes | |
| Button | bottom of front face | left |  | menu | |
| Button | | 2 nd left | | show assigned screen lay-outs for selection | |
| Button | | 3 rd left | | enhance | |
| Button | | centre | | zoom | |
| Button | | 3 rd right | | freeze | |
| Button | | 2 nd right | |  | backlight down; scroll/adjust down |
| Button | | right | |  | backlight up; scroll/adjust up |

2.3 Communications

| PARAMETER | SPECIFICATION | |
|-----------|------------------------------|---|
| Ports | three Serial ports (maximum) | |
| Data | Format | 2 x RS-232, 1 x RS-422 (other configurations available on request – maximum capacity is 2 x RS422 or 4 x RS232) |
| | Rate (Baud) | 115200,n,8,1 standard, others available on request |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

2.4 Physical Characteristics

| PARAMETER | | | SPECIFICATION |
|---------------------|--------------------|---|---------------|
| Mass [approx.] (kg) | | | 1.9 |
| Dimensions (mm) | Width | body | 209 |
| | | overall ² | 221 |
| | Height | body | 182 |
| | | overall ² | 194 |
| | Depth ³ | body | 55.8 |
| | | overall ² | 68.9 |
| Mounting | Panel Mount | 4 x 4.5mm diameter holes in corners | |
| | Side Mount | 4 x M4 tapped holes, 8mm deep, on each side | |
| | Rear Mount | VESA 75 type, 4 x M4 tapped holes, 8mm deep | |

2.5 Electrical Characteristics

| PARAMETER | | SPECIFICATION |
|---|------------|-----------------------|
| Supply Voltage (Vdc) [MIL-STD-704C] | | 18 to 33 [28 nominal] |
| Current Drain [@ 28Vdc; typical] (A) | heater on | < 3 |
| | heater off | < 1 |

2.6 Environmental

| PARAMETER | | | SPECIFICATION | |
|---|----------------------|-------------------|----------------|-----|
| Temperature (°C) [RTCA/DO-160D, class A1] | Operate ⁴ | min. ⁵ | -25 | |
| | | max. ⁶ | +55 | |
| | Survive | long term | | +55 |
| | | short term | | +70 |
| | | min. ⁵ | | -40 |
| | | max. ⁶ | | +85 |
| Vibration [RTCA/DO-160D, Helicopter Category R] | | | sine on random | |

² Including mounting flange.

³ Excluding connectors.

⁴ When used in accordance with procedures in User's Manual.

⁵ Without wind-chill.

⁶ Without solar radiation.

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| PARAMETER | SPECIFICATION |
|---|---|
| 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] ⁷ | water resistant [drip proof] |
| Altitude/Low Pressure [operational; RTCA/DO-160D, class A1] | 15,000 feet |
| EMI/EMC ^{7,8} | RTCA/DO-160D; MIL-STD-461D |

2.7 Connector/Pin Details

| No. | Name | Pin Marking | Purpose | Notes for Harness |
|---|----------|-------------|--------------------------------|---|
| J1: Power & Comms Connection: Connector, MilSpec, 38999/24WB35PN, 11-35, Panel, Plug, 'click' screw-on, 13 Way | | | | |
| J1-1 | DC+ | 1 | Power input, +28V nominal | 3A maximum current |
| J1-2 | 0V | 2 | Power return | 3A maximum current |
| J1-3 | GND1 | 3 | Communication channel 1 GND | Common for TX/RX for comm. channel 1; |
| J1-4 | TX1/TX1- | 4 | RS232 TX1, or RS422 TX1- | Dual purpose comm. channel 1 |
| J1-5 | TX1+ | 5 | RS422 TX1+ | Used if RS422 interface is selected for comm. channel 1 |
| J1-6 | RX1/RX1- | 6 | RS232 RX1, or RS422 RX1- | Dual purpose, comm. Channel 1 |
| J1-7 | RX1+ | 7 | RS422 RX1+ | Used if RS422 interface is selected for comm. Channel 1 |
| J1-8 | TX2/TX2- | 8 | RS232 TX2, or RS422 TX2- | Dual purpose comm. Channel 2 |
| J1-9 | RX2/RX2- | 9 | RS232 RX2, or RS422 RX2- | Dual purpose, comm. Channel 2 |
| J1-10 | GND2 | 10 | Communication channel 2 GND | Common for TX/RX for comm. Channel 2; |
| J1-11 | GND3 | 11 | Communication channel 3 GND | Common for TX/RX for comm. Channel 3; |

⁷ With compliant line connectors attached.

⁸ Refer to manufacturer for details.

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| No. | Name | Pin Marking | Purpose | Notes for Harness |
|---|----------|-------------|---|--|
| J1: Power & Comms Connection (cont'd) | | | | |
| J1-12 | TX3/TX2+ | 12 | RS232 TX3, or RS422 TX2+ | Dual purpose comm. Channel 2/3. RS422 (oncomm. Channel 2) and RS232 (comm. channel 3) are mutually exclusive as they share common pins. |
| J1-13 | RX3/RX2+ | 13 | RS232 RX3, or RX422 RX2+ | Dual purpose comm. Channel 2/3. RS422 (on comm. Channel 2) and RS232 (comm. channel 3) are mutually exclusive as they share common pins. |
| J2: SD Video In/Out Connection: Connector, MilSpec, 38999/24WC35SN, 13-35, Panel, Socket, 'click' screw-on, 22 Way | | | | |
| J2-1 | Y1/CVBS1 | 1 | Video channel 1 luma/composite signal | 75 ohm terminated |
| J2-2 | C1/CVBS5 | 2 | Video channel 1 chroma signal/second composite signal for channel 1 | 75 ohm terminated |
| J2-3 | Y2/CVBS2 | 3 | Video channel 2 luma/composite signal | 75 ohm terminated |
| J2-4 | C2/CVBS6 | 4 | Video channel 2 chroma signal/second composite signal for channel 2 | 75 ohm terminated |
| J2-5 | Y3/CVBS3 | 5 | Video channel 3 luma/composite signal | 75 ohm terminated |
| J2-6 | C3/CVBS7 | 6 | Video channel 3 chroma signal/second composite signal for channel 3 | 75 ohm terminated |
| J2-7 | Y4/CVBS4 | 7 | Video channel 4 luma/composite signal | 75 ohm terminated |
| J2-8 | C4/CVBS8 | 8 | Video channel 4 chroma signal/second composite signal for channel 4 | 75 ohm terminated |
| J2-9 | Out1 | 9 | CVBS output (SD), or Y/G output (HD/PC) | Video output, 75 ohm impedance. |
| J2-10 | GND_Out1 | 10 | Video output 1 GND | Return for Out1 |
| J2-11 | Out2 | 11 | Luma output (S-VIDEO), or Pb/B output (HD/PC) | Video output, 75 ohm impedance. |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| No. | Name | Pin Marking | Purpose | Notes for Harness |
|--|-------------|-------------|---|---|
| J2: SD Video In/Out Connection (cont'd) | | | | |
| J2-12 | GND_Out2 | 12 | Video output 2 GND | Return for Out2 |
| J2-13 | Out3 | 13 | Chroma output (S-Video), or Pr/R output (HD/PC) | Video output, 75 ohm impedance. |
| J2-14 | GND_Out3 | 14 | Video output 3 GND | Return for Out3 |
| J2-15 | GND1 | 15 | Video channel 1 GND | Common for Y1 and C1 |
| J2-16 | GND2 | 16 | Video channel 2 GND | Common for Y2 and C2 |
| J2-17 | GND3 | 17 | Video channel 3 GND | Common for Y3 and C3 |
| J2-18 | GND4 | 18 | Video channel 4 GND | Common for Y4 and C4 |
| J2-19 | HS_Out | 19 | Horizontal sync output | Synchronisation signal if sync-on-green or sync-on-Y is not used. |
| J2-20 | VS_Out | 20 | Vertical sync output | Synchronisation signal if sync-on-green or sync-on-Y is not used. |
| J2-21 | Sync_GND | 21 | HS,VS Ground | Common for HS and VS signals |
| J2-22 | Dimming | 22 | Analog Input, used to externally control the backlight (if enabled) | 0 to 32V range, maximum detected input is 60V. |
| J3: HD Video Connection: Connector, MilSpec, 38999/24WC35PN, 13-35, Panel, Plug, 'click' screw-on, 22 Way | | | | |
| J3-1 | GREENA1 | 1 | Analog video input: GreenA1 / YA1 / YA1/ CVBSA1 input | 75 ohm terminated. Use as Green for PC input (with pins 3 and 5). Also can be used as Y for component (with pins 3 and 5 for Pr, Pb), Y for s-video (with pin 7 for chroma), or as a CVBS input |
| J3-2 | GREENA1_GND | 2 | GND return for pin 1 | |
| J3-3 | BLUEA1 | 3 | Analog video input: BlueA1 / PbA1 / YA2/ CVBSA2 input | 75 ohm terminated. Use as Blue for PC input (with pins 1 and 5). Also can be used as Pb for component (with pins 1 and 5 for Y, Pr), Y for s-video (with pin 9 for chroma), or as a CVBS input |
| J3-4 | BLUEA1_GND | 4 | GND return for pin 3 | |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| No. | Name | Pin Marking | Purpose | Notes for Harness |
|---|-------------|-------------|---|--|
| J3: HD Video Connection (cont'd) | | | | |
| J3-5 | REDA1 | 5 | Analog video input: RedA1 / PrA1 / YA3/ CVBSA3 input | 75 ohm terminated. Use as Red for PC input (with pins 1 and 3). Also can be used as Pr for component (with pins 1 and 3 for Y, Pb), Y for s-video (with pin 11 for chroma), or as a CVBS input |
| J3-6 | REDA1_GND | 6 | GND return for pin 5 | |
| J3-7 | REDA2 | 7 | Analog video input: RedA2 / PrA2 / CA1/ CVBSA4 input | 75 ohm terminated. Use as Pr for HD input (with pins 9 and 11). Also can be used as Red (with pins 9 and 11), C for s-video (with pin 1 for luma), or as a CVBS input |
| J3-8 | REDA2_GND | 8 | GND return for pin 7 | |
| J3-9 | BLUEA2 | 9 | Analog video input: BlueA2 / PrA2 / CA2/ CVBSA5 input | 75 ohm terminated. Use as Pb for HD input (with pins 7 and 11). Also can be used as Blue (with pins 7 and 11), C for s-video (with pin 3 for luma), or as a CVBS input |
| J3-10 | BLUEA2_GND | 10 | GND return for pin 9 | |
| J3-11 | GREENA2 | 11 | Analog video input: GreenA2 / YA2/ CA3/ CVBSA6 input | 75 ohm terminated. Use as Y for HD input (with pins 7 and 9). Also can be used as Green (with pins 7 and 9), C for s-video (with pin 5 for luma), or as a CVBS input |
| J3-12 | GREENA2_GND | 12 | GND return for pin 11 | |
| J3-13 | DDC_SCL | 13 | DDC channel clock (RGB1) | Optional |
| J3-14 | DDC_SDA | 14 | DDC channel data (RGB1) | Optional |
| J3-15 | HSA1 | 15 | Horizontal Sync, for RGB A1 | TTL level |
| J3-16 | VSA1 | 16 | Vertical Sync, for RGB A1 | TTL level |
| J3-17 | GND A1 | 17 | GND for HSA1, VSA1 | |
| J3-18 | HSA2 | 18 | Horizontal Sync, for RGB A2 | TTL level |
| J3-19 | VSA2 | 19 | Vertical Sync, for RGB A2 | TTL level |

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

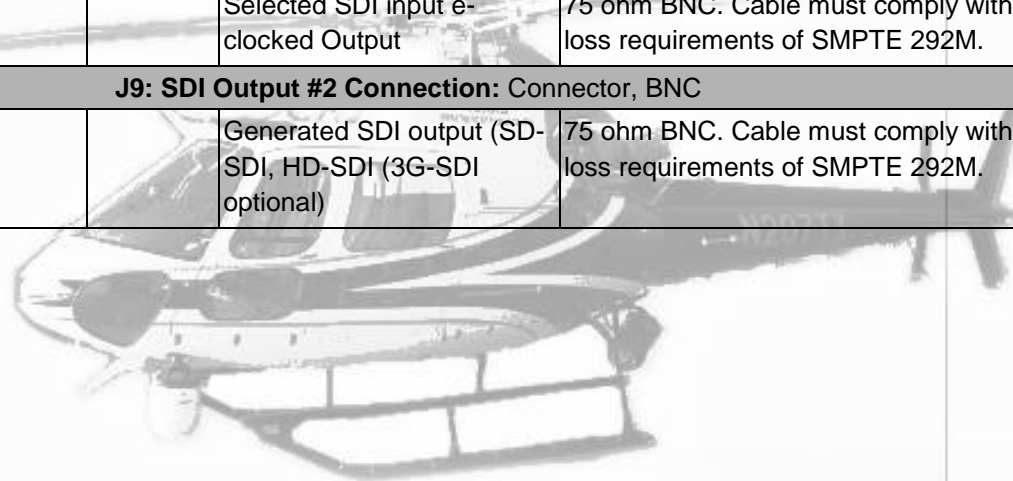
| No. | Name | Pin Marking | Purpose | Notes for Harness |
|---|---------------|-------------|-------------------------------|---|
| J3: HD Video Connection (cont'd) | | | | |
| J3-20 | GND A2 | 20 | GND for HSA2, VSA2 | |
| J3-21 | DDC_+5V | 21 | DDC channel +5V | Optional |
| J3-22 | DDC_GND | 22 | DDC channel GND | Optional |
| J4: Earth Point Connection: M5 threaded stud | | | | |
| J5: Misc. Connection: Connector, MilSpec, 38999/24WC35PA, 13-35, Panel, Plug, 'click' screw-on, 22 Way | | | | |
| J5-1 | TX+ | 1 | Ethernet TX+ pin 1 | Fully protected against transients. |
| J5-2 | TX- | 2 | Ethernet TX- pin 2 | Fully protected against transients. |
| J5-3 | RX+ | 3 | Ethernet RX+ pin 3 | Fully protected against transients. |
| J5-4 | RX- | 4 | Ethernet RX- pin 6 | Fully protected against transients. |
| J5-5 | SHIELD | 5 | Shield for Ethernet (chassis) | tied to chassis |
| J5-6 | USB_+5V | 6 | USB Pin 1 | factory configured, ESD protection only |
| J5-7 | USB_-DATA | 7 | USB Pin 2 | factory configured, ESD protection only |
| J5-8 | USB_+DATA | 8 | USB Pin 3 | factory configured, ESD protection only |
| J5-9 | USB_GND | 9 | USB Pin 4 | factory configured, ESD protection only |
| J5-10 | Audio_L_in | 10 | Audio input, Left | Fully protected against transients. |
| J5-11 | Audio_R_in | 11 | Audio input, Right | Fully protected against transients. |
| J5-12 | Audio_L_out | 12 | Audio output, Left | Fully protected against transients. |
| J5-13 | Audio_R_out | 13 | Audio output, Right | Fully protected against transients. |
| J5-14 | Audio GND. | 14 | Common for audio | tied to chassis |
| J5-15 | PS2_DATA | 15 | PS2 pin 1, or USBOTG D+ | factory configured, ESD protection only |
| J5-16 | PS2_GND | 16 | PS2 pin 3, or USBOTG GND | factory configured, ESD protection only |
| J5-17 | PS2_VCC | 17 | PS2 pin 4, or USBOTG VBUS | factory configured, ESD protection only |
| J5-18 | PS2_CLK | 18 | PS2 pin 5, or USBOTG D- | factory configured, ESD protection only |
| J5-19 | Audio_GND_IN | 19 | | tied to chassis |
| J5-20 | Audio_GND_OUT | 20 | | tied to chassis |

Product Specification



Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

| No. | Name | Pin Marking | Purpose | Notes for Harness |
|---|----------|-------------|--|---|
| J5: Misc. Connection (cont'd) | | | | |
| J5-21 | spare1 | 21 | unused, or Ethernet LED+ for SPD LED, or USBOTG ID | factory configured, ESD protection only |
| J5-22 | spare2 | 22 | unused, or Ethernet LED+ for LINK LED. | factory configured, ESD protection only |
| J6: SDI Input #1 Connection: Connector, BNC | | | | |
| | SDI In1 | | SDI input #1 for SD-SDI, HD-SDI (3G-SDI optional) | 75 ohm BNC. Cable must comply with loss requirements of SMPTE 292M. |
| J7: SDI Input #2 Connection: Connector, BNC | | | | |
| | SDI In2 | | SDI input #2 for SD-SDI, HD-SDI (3G-SDI optional) | 75 ohm BNC. Cable must comply with loss requirements of SMPTE 292M. |
| J8: SDI Output #1 Connection: Connector, BNC | | | | |
| | SDI Out1 | | Selected SDI input e-clocked Output | 75 ohm BNC. Cable must comply with loss requirements of SMPTE 292M. |
| J9: SDI Output #2 Connection: Connector, BNC | | | | |
| | SDI Out2 | | Generated SDI output (SD-SDI, HD-SDI (3G-SDI optional) | 75 ohm BNC. Cable must comply with loss requirements of SMPTE 292M. |



Copyright. All Rights Reserved. Laserdyne Pty Ltd

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

3 SET-UP

3.1 Mounts

The unit has three mounting methods:

1. Panel Mount: one 4.5mm diameter hole in each corner of the front bezel.
2. Side Mount: four M4 tapped holes, 8mm deep, on each side of the rear section.
3. Rear Mount: VESA 75 type, four M4 tapped holes, 8mm deep, on the rear face of the unit.

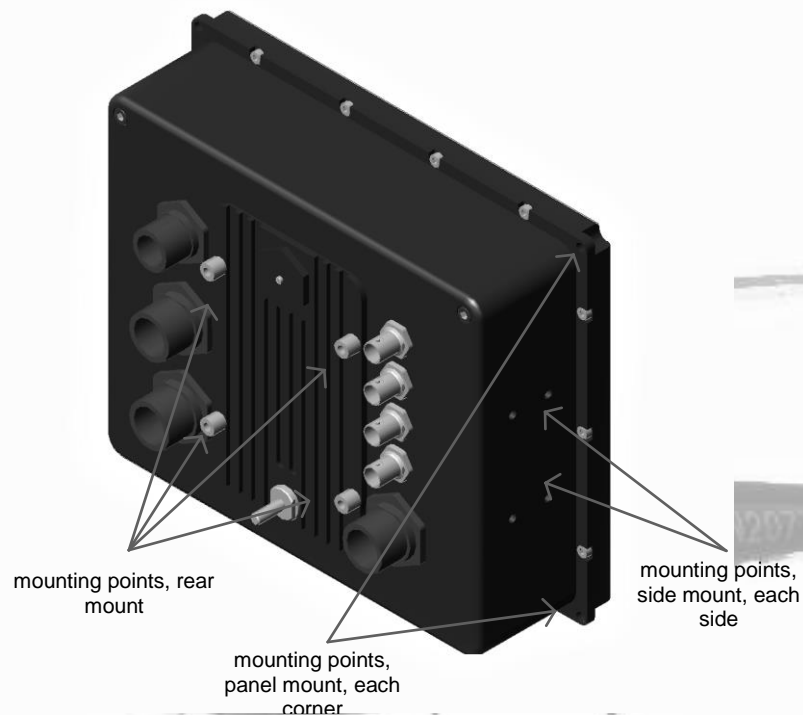


Figure 3-1: Mounts

3.2 Connections

The unit has nine connection points located on the rear:

Connector J1, the Power & Comms connection;

Connector J2, the SD Video In/Out connection;

Connector J3, the HD Video connection;

Connector J4, the Earth Point connection;

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

- Connector J5, the Miscellaneous connection;
- Connector J6, the SDI Input #1 connection;
- Connector J7, the SDI Input #2 connection;
- Connector J8, the SDI Output #1 connection; and
- Connector J9, the SDI Output #2 connection.

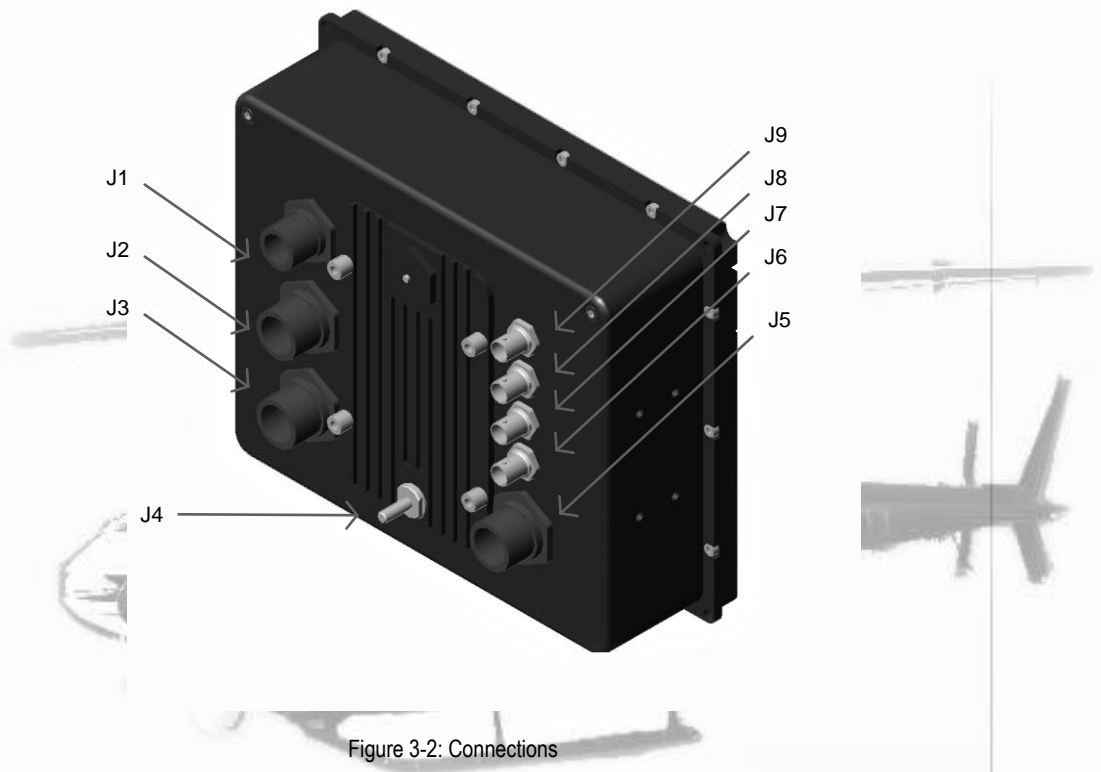


Figure 3-2: Connections

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.

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

- Mount the unit to the vehicle or platform, using one of the mounting methods provided.
- Connect the earth point on the unit to an appropriate point on the vehicle.
- Connect the required cables for video in/out to the unit and to the external imaging system(s).
- Connect the required power/data cable to the unit and to the external power source, and to the communication data source.

3.4 Heating and Cooling

The unit contains internal heating and cooling mechanisms that are triggered at certain internal temperatures.

The approximate warm-up rate is 17s/°C (e.g. with starting internal temperature of -40°C, unit will power up in about 11 minutes; with starting internal temperature of -25°C, unit will power up in about 7 minutes).

Once the unit has warmed it will operate normally provided that the ambient temperature stays within the specified operating temperature range.

The operating procedures, internal temperatures and resulting operating conditions are shown in the following table.

| Ambient Temp. (°C) | Procedure | Internal Temp. (°C) | Operating Condition |
|--------------------|---------------------------------------|---------------------|--|
| < -40 | do not attempt to operate unit | | |
| -40 to 0 | de-ice unit prior to start-up | ≤ 0 | unit will not power up; heater on |
| | | > 0 | unit will power up; internal convection on |
| 0 to +55 | none | ≥ 10 | heater off |
| | | ≥ 55 | backlight reduces |
| +55 to +70 | provide forced air cooling (e.g. fan) | | |
| > +70 | do not attempt to operate unit | ≥ 75 | unit will not power up |

Product Specification

Black Opal Xtreme Air 8 Airborne Special Flat Panel Display System

4 OUTLINE DRAWING

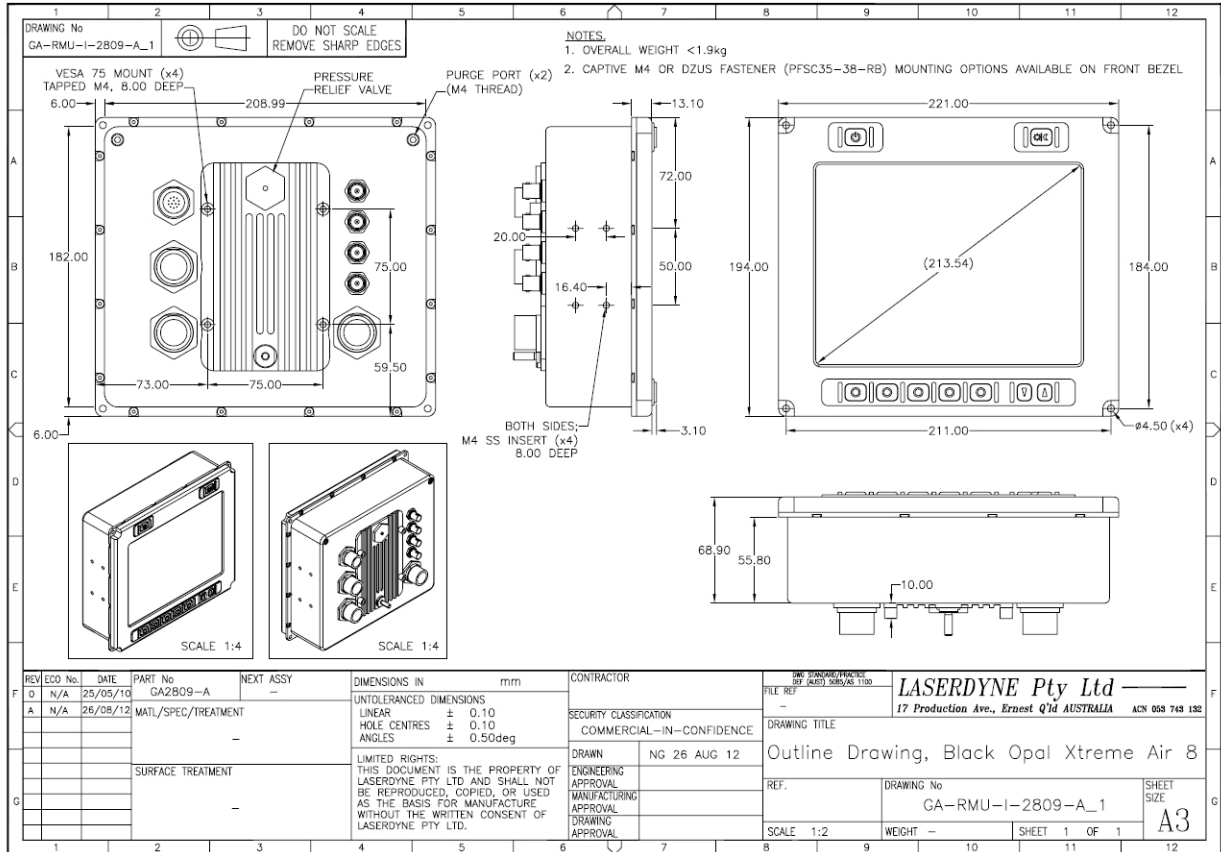


Figure 4-1: Outline Drawing



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

The information contained herein is proprietary to Laserdyne Pty Ltd. No part of this work may be reproduced or copied in any way without prior written permission of Laserdyne Pty Ltd.
 Note: specifications herein are subject to change without notice.

Copyright. All Rights Reserved. Laserdyne Pty Ltd

| | | | | |
|-------------------------|---------------|----------------|---------------------|----------|
| File: PS-RMU-S-2700-B_1 | Author(s): TW | Authorised: TW | Rev. Date: 22.10.12 | Page 4-1 |
|-------------------------|---------------|----------------|---------------------|----------|