



# BAD WOLF TECHNOLOGIES LLC

DR I™ AND DR I PARABELLUM™

purpose-built COTS DVR for aviation, shipborne and harsh environment use™

Technical specification for P/N “BW-RHHD-DR.I” is shown below. Other configurations are available in accordance with customer requirements<sup>(3)</sup>

- **Purpose-built DVR for aviation, naval/marine and harsh environment use**
- **Non-ITAR COTS & modified COTS units**
- **Modular Design**
- **Video Input Channel #1** <sup>(2)(3)(4)</sup>
  - 1 x CVBS (RS170/RS170A(NTSC)/PAL) via Micro Coaxial MIL-DTL-D38999 (6 pin) connector, or
  - 1 x Signal & Ground pins for non-coaxial custom cabling options (twisted pair, twinax, etc.)
- **Video Input Channel #2** <sup>(1)(2)(3)</sup>
  - 1 x HDSDI, via Micro Coaxial MIL-DTL-D38999 (6 pin) connector
- **Video Out** <sup>(2)</sup>
  - 1 x Analog Video Out, either channel: CVBS & SDI/HDSDI (output scaled to fit monitor)
  - NTSC 720x480i and PAL 720x576i, via Micro Coaxial 38999 (6 pin) connector
- **Audio Input** <sup>(2)</sup>
  - 1 x Audio In, microphone level
- **Video/Audio Information (abridged)**
  - Codec: MPEG-4 Part 10 Advanced Video Coding (H.264)
  - Resolution: NTSC/PAL, 1080p30/p25, 1080i60, 1080p30, 720p60, 720i60, 720p30
  - Compression: CBR and VBR
  - Video Bitrate: up to 23 Mbps <sup>(7)</sup> CBR, VBR
  - File Format: Transport Stream (.ts)
  - Audio Codec: G711, G726, mp2, mp3, opus
  - Sample Rate: 8000/41000/48000, 8 bits or 16 bits per sample
- **Streaming, low latency**
  - TS, RTP or RTSP unicast and multicast
  - Stream and/or Record single or multiple video streams to/from other network devices

- 100 ms, low latency Video Player available upon request
- **I/O**
  - 1 x RS232 – Console (ENGINEERING USE), API/SDK programming access
  - 1 x RS232 – GPS, Sensor, Data
  - 1 x Ethernet/RJ45 – API/SDK programming access, web server, video download (may be removed or disabled for Cyber Security compliance)
- **GPIO (14)**
  - 4 x Input<sup>(5)</sup>
  - 10 x Output<sup>(5)</sup>
- **Storage Type**
  - 1 x Removable, Universal Serial Bus 2.0 interface with external locking Glenair MILSPEC connector
  - 1 x Internal SD Slot (engineering use – other options available, access via Ethernet/API)
  - Additional customizations and re-design may be performed in accordance with customer requirements<sup>(3)</sup>
- **Recording Media (configurable)**
  - Removable USB 2.x/3.x device – Qualified with Glenair MILSPEC USB 2.0, or
  - Built-in Secure Digital with retrieval via Ethernet or USB OTG (instead of engineering use)
  - Tested in-house with various external SSDs
  - Additional customizations and re-design may be performed in accordance with customer requirements<sup>(3)</sup>
- **File System Support**
  - FAT32, exFAT, EXT3 and EXT4
- **Status LED (4x2), NVIS Bi-Color**
  - NVIS (night vision compatible),
  - 2-in-1, Top-Bottom: Green/Green, Green/Green, Yellow/Yellow & Blue/Blue
  - Embedded in stainless steel protective housing
  - Custom manufactured for Bad Wolf Technologies by Oxley Group UK
- **Chassis**
  - Material: 6061-T6 Aluminum Alloy, coated per MIL-DTL-5541F Type II Class 3
  - Connectors: MIL-DTL-D38999 Series III (QPL)
  - Weight: 7.75 lbs.
  - Dimensions: 4" x 7" x 8.5" (approximate), not including side mounting flanges or connectors<sup>(8)(3)</sup>
- **Technical**
  - Multiple configuration files – ability to save and recall up to four (4) system configuration files via web browser. Program multiple systems from master config file. Restore system on flight line.
  - API/SDK – Application Development Interface available for complete control via UART or Ethernet
  - Operating temp range: -55°C (-67°F) to +85°C (185°F) with +P<sup>(6)</sup> option, and -40°C (-40°F) to +85°C otherwise. To order +P extended low temp option, add +P to the end of the P/N. Note: Configuration **BW-RHHD-DR.I** identifies the **DR.I PARABELLUM™**, which already includes the +P option.
  - Qualifications<sup>(9)</sup>:
    - MIL-STD-461F, MIL-STD-464C, MIL-STD-810G
    - Additional qualification testing performed in accordance with customer requirements
  - Power Supply, MILSPEC:
    - Input: +9.5 VDC to +50 VDC
    - Draw: 10 Watts within operational temperature range
    - Output: Power peripherals or 3<sup>rd</sup> party devices:
      - +5 VDC @ 2A, isolated
      - +12 VDC @ 2A [optional], isolated
  - EMI/RFI filter, Aviation – MILSPEC (MIL-STD-461F, -55 °C to +125 °C operating temp)
- **Other**
  - API/SDK Custom Programming services available

- (1) Optionally, these video receivers may be replaced with 1xAnalog HD, 1xHDMI, 1xCameraLink or 4xCVBS/RS170/RS170A. Only (4) video inputs may be active at one time. Maximum video bitrate is cumulative across all actively encoding (streaming and/or recording) video channels.
- (2) Multiple DRI™ encoders may be installed inside the chassis, proportionally increasing the number of video and audio channels.
- (3) Additional qualification testing may be required.
- (4) Qualified with use of optional single pair of Signal & Ground pins for non-coaxial custom cabling options. Provides customer with a choice of a coaxial or a twisted pair interface.
- (5) GPIOs use +3.3 VDC LVTTTL with isolated signal ground and pull-down resistors. Pull-up resistor option available. Function reassignment may be performed in accordance with customer requirements.
- (6) +P™ is shorthand for Parabellum™, an abbreviation for Latin “*si vis pacem para bellum*,” or “if you want peace, prepare for war.” And the new *DRI Parabellum™* will help you do just that, from the coldest (-55°C/-67°F) to the hottest (+85°C/+185°F) places around the globe using Bad Wolf Technologies modular design and extended operating temperature range components.
- (7) Requires fast media to avoid artifacts normally associated with high data bitrates and slow recording media access times. Recording media must be made for “video recording,” not video or data archiving or storage. Bitrate is cumulative.
- (8) 1U Chassis Option Available (Corsair model)
- (9) Conformance Testing Performed Successfully:
  - Conducted Emissions: MIL-STD-461F CE102, Power Leads
  - Radiated Emissions: MIL-STD-461F RE102, Radio Frequency Electric Field
  - Radiated Susceptibility: MIL-STD-461F RS103, Electric Field
  - Electrostatic Discharge Susceptibility: MIL-STD-464C Section 5.8.4
  - Bonding Measurement Susceptibility: MIL-STD-464C Section 5.11.3
  - External RF EME Susceptibility: MIL-STD-464C Section A.5.3
  - Operating Temperature (High): MIL-STD-810G Method 501.6 Procedure II, 2-hour operating mode @ +85°C
  - Operating Temperature (Low): MIL-STD-810G Method 502.6 Procedure II, 2-hour operating mode @ -55°C
  - Storage Temperature (High): MIL-STD-810G Method 501.6 Procedure I, Cat. A2, 7 cycles/temperature & humidity
  - Storage Temperature (Low): MIL-STD-810G Method 502.6 Procedure I, Cat. C2, 4 hrs @ -40°C
  - Temperature / Low Pressure (Altitude): MIL-STD-810G Method 500.6, Procedure II, 55 k ft for 1 hour
  - Temperature / Low Pressure (Altitude Cycling): MIL-STD-810G Method 520.4 Procedure III, 10 cycles temperature/altitude
  - Acceleration: MIL-STD-810G Method 513.7 Procedures I & II, 60 sec/axis, powered
  - Mechanical Shock: MIL-STD-810G Method 516.7 Procedure I, 20 Gs, half-sine pulses
  - Random Vibration (Buffet): MIL-STD-810G Method 514.7, Cat. 16, Procedure I, 1 hr/axis
  - Random Vibration (Non-Buffet): MIL-STD-810G Method 514.7, Procedure I, 1 hr