

BuiltSAFE™ VGP-2870

3U OpenVPX™ Video I/O Graphics Conduction-cooled Processor Module

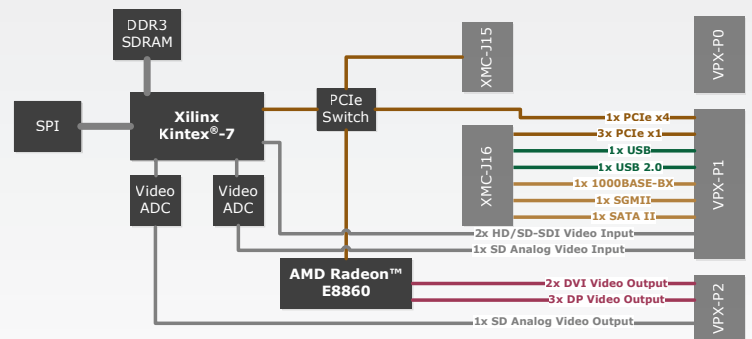
- DAL-C (DO-178C/DO-254) optional certifiable
- Embedded AMD Radeon™ E8860-powered GPGPU processing engine
- Low-SWaP with XMC host processor and site
- 2D and 3D graphics generation - Capture and overlay
- On-board analogue and digital video input (to 6 independent video outputs)
- Safety Optimized Board Management



Mercury's BuiltSAFE™ products bring the highest level of flight safety assurance to aerospace and defense applications. Our proven, reusable Design Assurance Level (DAL) certified artifacts for mission computing, avionics, networking and datalink comms processing save time and cost while decreasing risk.

Mercury's BuiltSAFE VGP-2870 is a DAL C (other levels upon request) certifiable E8860-powered GPGPU processing engine for the most stringent aerospace and defense applications that require certification to DO-178C/DO-254. The VGP-2870 can be delivered with all documentation, certification evidence and supporting artifacts required to prove compliance for avionics certification. Leveraging the VGP-2870 ensures a smooth development process supported by Mercury's safety engineering team and their deep domain expertise. The BuiltSAFE VGP-2870 has been engineered with DAL safety certification in mind from the top down, with DO-178C/DO-254 best design practices systematically applied throughout all phases of development.

Driven through via OpenVPX PCIe bus, the Avionics VGP-2870 GP-GPU processing module is capable of performing 2D and 3D graphic generation functions and operate as a GPGPU for intensive data computation. Featuring 6 independent video outputs and 2 video inputs, the BuiltSAFE VGP-2870 can overlay captured video stream with generated 2D and 3D graphics elements all within safety-critical environments. The BuiltSAFE VGP-2870 is engineered for the most stringent aerospace and defence applications.



BuiltSAFE for Avionics

Mercury's expertise and experience in safety certifiable solutions has been built on successful execution of dozens of programs over three decades. This domain knowledge is the foundation of our BuiltSAFE portfolio of open architecture modules, systems and software for avionics, communications, video servers, and mission computing.

Visualize more

With 6 independent video outputs, the Avionics VGP-2870 displays more of your application, making no compromises on the information, feedback or data that can be simultaneously visualized.

Mercury Systems is a leading commercial provider of secure sensor and mission processing subsystems. Optimized for customer and mission success, Mercury's solutions power a wide variety of critical defense and intelligence programs.



Low-SWaP processing subsystems

With Mercury's BuiltSAFE MFCC-8557 XMC processor installed, the VGP-2870 turns into a powerful subsystem, tailorable to compute-intensive video and graphics applications - all packed in a single 3U, OpenVPX slot. The BuiltSAFE VGP-2870 and the MFCC-8557 capture, overlay, record and stream from a single 3U OpenVPX slot solution instead of the industry two slot approach, reducing cost and SWaP while increasing reliability.

Technical Specifications

Compliance

3U OpenVPX (VITA 65)/VPX-REDI (VITA 48)
XMC baseline 2.0 (VITA 61), XMC PCIe (VITA 42.3)
Certifiable to DAL-C (DC-178C/DO-254)
Peripheral slot profile SLT3-PER-1F-14.3.2

Power Consumption

minimum	typical	maximum	units
28	42	50	Watts

Processor

AMD Radeon E8860 GPU @ 625 MHz
512 KB internal L2 cache with ECC protection
H.264/AVC compression

Memory

2 GB GDDR5 dedicated video memory (72 GB/s peak)
256 MB DDR3 processing memory

Software

VxWorks®653 with OpenGL SC 1.0 (Safety Critical)
Linux for Intel® processors
Built-in test interface and logging

FPGA

Xilinx Kintex®-7 FPGA
256 MB DDR3 SDRAM dedicated to video capture and output formatting

High-Speed Links / Connections

1x PCIe Gen2 x4 from PCIe switch to VPX-P1
1x XMC 2.0 (VITA 61) site to interface an MFCC-8557

- 3x PCIe Gen2 x1 on XMC-J16
- 1x PCIe Gen2 x4 on XMC-J15
- 1x SGMII interface on XMC-J16
- 1x 1000BASE-BX interface on XMC-J16
- 1x USB 2.0 OTG on XMC-J16
- 1x USB for serial link on XMC-J16
- 1x SATA II on XMC-J16

Safety Optimized Board Management

Voltage monitoring
Temperature monitoring (thermal sensors on critical positions)
Elapsed time counter
Error reporting
Reset management

Video Inputs ⁽¹⁾

2x HD/SD-SDI
1x SD analog video: CVBS, S-Video, RGB, STANAG-3350

Video Outputs ⁽¹⁾

2x DVI on VPX
3x DisplayPort on VPX
1x SD analog: CVBS, S-Video, STANAG-3350
2x HD/SD-SDI

(1) Depends on configuration. See "Video IO Configuration" table for more information.

Product Ordering

VGP-2870 3U OpenVPX video I/O graphics processor

Environmental

☐ A1 : 0°C to 55°C ☐ C4 : -40°C to 85°C

Safety Artifacts

☐ D0-254⁽²⁾ ☐ D0-178C⁽²⁾

Software

☐ Green Hills INTEGRITY-178 tuMP ☐ Linux ⁽⁴⁾
☐ WindRiver VxWorks® 6.x and 653 3.x ☐ SYSGO PikeOS
☐ DDC-I Deos

(1) For other configurations contact factory

(2) Please consult factory

(3) Only two simultaneous video inputs

(4) Contact factory for more information

Video IO configuration

	Out		In					
	DP	DVI	SDI	SDI Analog	DP	DVI	SDI	SDI Analog
<input type="checkbox"/> Default	3	2	2	–	–	–	1	1
<input type="checkbox"/> Analog	1	2	2	1	–	–	2 ⁽³⁾	1 ⁽³⁾

Related Hardware Products

AVIO-2353 3U OpenVPX avionic I/O board
MFCC-8557 Freescale QorIQ™ P3041 XMC safety critical Single Board Computer
ROCK-2 3U OpenVPX, low-SWaP, rugged, modular, pre-qualified subsystems

Ruggedization Levels

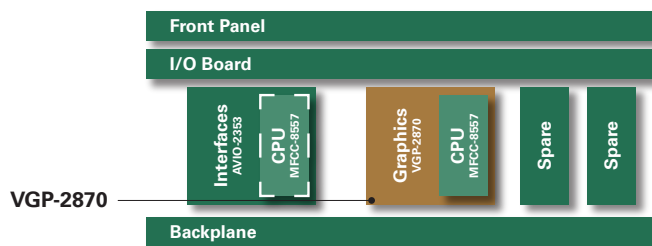
Level	Description	Cooling Type	Operating Temperature	Vibration (1 hour per axis)	Operating Shocks
A1	Commercial AC	Forced air*	0°C to 55°C [AC1]	5-100 Hz: increase at 3 dB/octave, 100-1000 Hz: 0.04 g ² /Hz, 1000-2000Hz: decrease at 6 dB/octave [V2]	20g, 11ms saw-tooth, three axes [OS1]
C4	Extended range CC	Conduction	-40°C to 85°C [CC4]	5-100 Hz: increase at 3 dB/octave, 100-1000 Hz: 0.1 g ² /Hz, 1000-2000Hz: decrease at 6 dB/octave	40g, 11ms saw-tooth, three axes

Environmental Specifications

Condition	Limits, standards	Comments
* Non-operating temperature <small>The required air-flow is defined separately for each product</small>	-55°C to 105°C [C4]	
Humidity	95%	
Altitude	-1,500 to 60,000 feet	May require conformal coating
Fungus resistance	No nutrient materials	
Workmanship	IPC-A-610 class 3	
Soldering	IPC J-STD-001 class 3	
PCB Manufacturing	IPC-A-600 class 3	
Conformal coating	IPC-CC-830	Optional
Materials	REACH compliant	ROHS variants as an option
Flammability	UL 94 Class V-0	
Quality	EN 9100:2008	

Less space for more functions

Mission computer featuring stacked XMCs for low-SWaP



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INNOVATION THAT MATTERS™

MERCURY MISSION SYSTEMS INTERNATIONAL S.A.

Avenue Eugène-Lance 38, PO Box 584
CH-1212 Grand Lancy 1 • Geneva – Switzerland
+41 (0)22 884 51 00

CORPORATE HEADQUARTERS

50 Minuteman Road • Andover, MA 01810 USA
(978) 967-1401 • (866) 627-6951 • Fax (978) 256-3599