lightning

MCS1000

Rugged Small Form Factor Mission/Display Computer Enabled by Lightning

The rugged small form factor MCS1000 mission computer is enabled by the Abaco Lightning systems architecture, and features the Intel® Xeon® E3 processor combined with a CoreAVI (or AMD) E8860 GPU and the I/O flexibility of the Abaco expansion module to deliver high performance and remarkable flexibility.

Abaco's revolutionary expansion module allows the MCS1000 to accommodate almost any custom I/O requirements with minimal to no NRE costs and a minimal development time. This feature means various specific I/O requirements can be available in a truly COTS product.

The Intel Xeon E3 processor offers integrated graphics and memory controller plus quad core processing up to 2.8 GHz - all in one device. Coupled with the CM236 chipset, this provides an upgraded level of I/O bandwidth for both on board and off-board functions.

The CoreAVI (or AMD) E8860 GPU graphics mezzanine card is designed to support the needs of the rugged marketplace, bringing modern graphics performance to demanding 2D and 3D applications.

Available in fan-cooled or base plate-cooled versions, the MCS1000 is designed to meet the requirements of a wide range of applications from industrial through to fully rugged defense and aerospace

programs - with precisely the I/O mix required by the application.

The MCS1000 is an ideal mission- or graphics computer with highly configurable I/O options. This system is an ideal fit for symbol generation, mission computing, control of highly diverse I/O and many other rugged applications.

The MCS1000 shares its footprint with all other systems enabled by the Lightning architecture. This commonality enables customers to build this system into a new design with confidence that other Lightning-enabled products with differing capabilities will benefit from an identical form factor, making integration easier.

Abaco's ECM tiles allow a user to select from a broad range of I/O according to the specific needs of the application. Up to four of these tiles can be configured in the MCS1000. Available I/O capabilities include analog to digital conversion, general purpose discrete I/O, audio inputs, specialty avionics I/O and many others.

The MCS1000 benefits from a highly robust qualification test plan comprising elements from MIL-STD-461G, DO-160G, MIL-STD-704F and MIL-STD- 810G outlined below. This test plan ensures the MCS1000 will meet an application's toughest requirements with little to no additional testing needed.

FEATURES:

- Intel Xeon E3-1505M quad core CPU (6th Generation Intel Core technology)
- CoreAVI or AMD E8860 GPU available
- Up to 16 GB DDR4 SDRAM with ECC
- I/O customization with up to four ECM modules
- Qualification tests based on MIL-STD-461G, DO- 160G, MIL-STD-704F, MIL-STD- 810G
- XPM Additional I/O:
  - 4x 1G Ethernet port
  - 4x RS232/422/485 Ports
  - 2x USB2.0
  - 2x USB3.0
- -40º C to +71º C operating temperature
- Base plate or fan cooled
- Optional removable SSD up to 1 TB
- Optional 50 ms hold-up
- VxWorks® current operating system, capable of Windows®, and Linux® support

abaco
SYSTEMS

MCS1000 *Rugged Small Form Factor Mission/Display Computer Enabled by Lightning*

Specifications

CPU
- 2.8 GHz Intel Xeon E3-1505M v5 standard
- Quad-core CPU
- 16 GB DDR4 SDRAM with ECC
- 32 GB onboard SSD (On SBC)
- x4 PCIe Gen2 to GPU
- x4 PCIe Gen2 to Avionics I/O

Graphics Options
- CoreAVI or AMD E8860 GPU
- 2 GB GDDR5

Video Outputs
- 4x DVI
- 2x VGA

Avionics I/O
- 8x ARINC 429 TX
- 10x ARINC 429 RX
- 4x MIL-STD-1553 (dual-redundant)
- 6x Avionics Open / GND discretes

General I/O
- 6x 1000BASE-T Ethernet
- 4x USB 2.0
- 2x USB 3.0
- 4x RS232/422/485 (configurable 4-Wire)
- 2x RS232 (2-Wire)
- 1x DVI (Optional from SBC, will lose some SBC I/O)

ECM Expansion
- 4 EMC slots
- Can handle many standard I/O requests.
- Removable or Fixed SSD
- 128 GB - 1 TB

Software Support
- VxWorks 7 currently supported (CoreAVI GPU)
- RedHat 7.2 capable (AMD GPU)
- Windows 10 capable (AMD GPU)
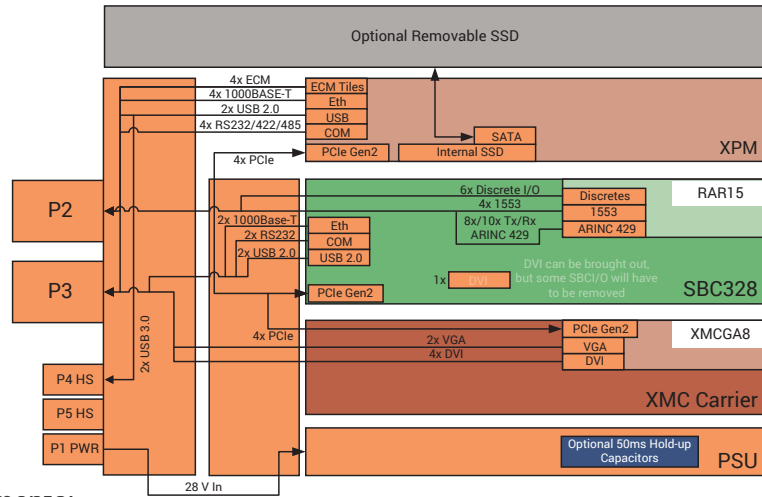- RTOS OpenGL Support

Environment
- Base plate cooled
- Fan-blown
- Convection Cooled
- Operating Temperature: -40ºC to + 71ºC

Qualification:
- Select DO-160G
- Select MIL-STD-810G
- Select MIL-STD-461G
- Select MIL-STD-704F

Block diagram

Environmental

Standard	Required Test/Category	Notes
MIL-STD-810G Method 514.7	12	Vibration, Procedure I for Category 12 equipment (Aircraft, Jet) with spectrum described below: 0.04g2/Hz, 15 Hz to 150 Hz; 4 dB/octave increase, 150 Hz to 300 Hz; 0.1g2/Hz, 300 Hz to 1000 Hz; 6dB/octave decrease, 1000 Hz to 2000 Hz
MIL-STD-810G Method 516.6	I	Shock − Functional, 40G for 11ms
MIL-STD-810G Method 516.6	V	Shock − Crash, 40G for 11ms
DO-160G Section 4	B2	Temperature and Altitude: Tested using the methodology of category B2 (but not the operational test levels); Operating low temperature = -40ºC; Operating high temperature = +71ºC; Non-operational ground survival low temperature = -55ºC; Non-operational ground survival high temperature = +85ºC; Altitude = 50,000ft
DO-160G Section 4	−	Temperature and Altitude, overpressure test, test in accordance with section 4, figure 4-8 (170kPa)
DO-160G Section 5	B	Temperature Variation: Tested using the methodology of category B; High temperature = +71ºC; Low temperature = -40ºC
DO-160G Section 6	B	Humidity
DO-160G Section 7	B	Shock
DO-160G Section 8	U	Vibrations, Curve G
DO-160G Section 9	E	Explosive atmosphere

Standard	Required Test/Category	Notes
MIL-STD-461G	CE101	Power Leads 30 Hz to 10 KHz, Figure CE101-4
MIL-STD-461G	CE102	Power Leads 10 Hz to 10 MHz
MIL-STD-461G	RE101	Magnetic field radiated emissions, Figure RE101-2
MIL-STD-461G	RE102	Electric field radiated emissions, Figure RE102-4
MIL-STD 704	F	Limited to 50 ms of hold-up
DO-160G Section 15 Magnetic Effect	Z	
DO-160G Section 16 Power Input 28 Volt	Z	
DO-160G Section 17, Voltage Spike	A	
DO-160G Section 18, Audio Frequency Conducted Susceptibility	Z	
DO-160G Section 19, Induced Signal Susceptibility	ZC	
DO-160G Section 20, Radio Frequency Susceptibility (Conducted)	Y	
DO-160G Section 20, Radio Frequency Susceptibility (Radiated)	Y	
DO-160G Section 21, Emission of Radio Frequency Energy (Conducted)	M	
DO-160G Section 21, Emission of Radio Frequency Energy (Radiated)	L	
DO-160G Section 22, Lighting Induced Transient Susceptibility	XXG3L3 (unshielded) XXJ3L3 (shielded)	
DO-160G Section 25, Electronic Discharge	A	
DO-160G Section 10	W	Waterproofness
DO-160G Section 11	F	Fluid susceptibility
DO-160G Section 12	S	Send and Dust
DO-160G Section 13	F	Fungus Resistance
DO-160G Section 15	S	Salt Spray
DO-160G Section 16	C	Fire Flammability

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GVC2000

Rugged Small Form Factor HPEC Display Computer Enabled by Lightning

The rugged small form factor GVC2000 small form factor display computer is enabled by the Abaco Lightning systems architecture, and features the Intel® Xeon® D processor in combination with an NVIDIA® GM107 GPU and the unique I/O flexibility of the Abaco expansion module to deliver high performance plus remarkable flexibility.

Abaco's revolutionary expansion module allows the GVC2000 to accommodate almost any custom I/O requirements with minimal to no NRE cost and minimal development time.

The high-performance Intel Xeon D processor, with up to 16 cores, is a dense, low power system-on-chip solution, ideal for High Performance Embedded Computing (HPEC) applications where high core count and substantial memory capacity are paramount.

NVIDIA's GM107 GPU enables significant gains in SIGINT, radar and video- or image processing applications. With 640 processing cores and single- and double-precision floating point units, together with faster atomic operations, the GM107 GPU is capable of CUDA™ Compute Capability v3.0.

Transfers between the CPU and GPU are provided by 16x PCIe™ Gen3 lanes to ensure maximum data rates between both. Additionally, 4x lanes of PCIe between the Expansion Module (XPM) and SBC ensure minimal latency from XPM I/O.

Available in fan-cooled or base plate-cooled versions, the GVC2000 is designed to meet the requirements of a wide range of applications from industrial to fully rugged defense and aerospace programs - with precisely the I/O mix required by the application.

The GVC2000 is an ideal mission- or graphics computer with highly configurable I/O options. It is an optimum fit for symbol generation, mission computing, demanding graphics generation applications, and GPU accelerated data processing.

The GVC2000 shares its footprint with all other 3U VPX 2-slot systems enabled by the Lightning architecture. This commonality enables customers to build this system into a new design with confidence that other Lightning-enabled products with differing capabilities will benefit from an identical form factor, making integration easier.

Abaco's ECM tiles allow a user to select from a broad range of I/O according to the specific needs of the application. Up to four of these tiles can be configured in the GVC2000. Available I/O capabilities include analog to digital conversion, general purpose discrete I/O, audio inputs, specialty avionics I/O and many others.

The GVC2000 benefits from a highly robust qualification test plan comprising elements from MIL-STD-461G, DO-160G, MIL-STD-704F and MIL-STD- 810G outlined below. This test plan ensures the GVC2000 will meet an application's toughest requirements with little to no additional testing needed.

FEATURES:

- Intel Xeon D 12-core processor standard
- Up to 32 GB DDR4 SDRAM with ECC
- NVIDIA GM107 GPU
- I/O configuration with up to four ECM modules
- Qualified to MIL-STD-461G, DO-160G, MIL-STD-704F, MIL-STD-810G
- XPM additional I/O:
  - 4x 1G Ethernet port
  - 4x RS422/485 ports
  - 2x USB2.0
  - 2x USB3.0
- -40°C to +71°C operating temperature
- Base plate or fan cooled
- Optional removable SSD up to 1 TB
- Optional 50 ms hold-up
- Redhat 7.2 or Windows 7 OS currently supported
- Capable of Windows® 10

GVC2000 *Rugged Small Form Factor HPEC Display Computer Enabled by Lightning*

Specifications

CPU
- Xeon D high density, low power SoC
- 12-core CPU standard
- 32 GB DDR4 SDRAM with ECC
- 32 GB onboard SSD (On SBC)
- x16 PCIe Gen 3 to GPU

Graphics Options
- NVIDIA GM107 GPU
- 640 Cores
- 2 GB GDDR5

Video Outputs
- 4x DVI
- 2x VGA

Additional I/O
- 6x 1000BASE-T Ethernet
- 2x 10GBASE-T Ethernet
- 4x USB 2.0
- 2x USB 3.0
- 2x RS232
- 4x RS232/422/485
  - Configurable

ECM Expansion
- 4 EMC slots
  - Can handle many standard I/O requests.

Removable or Fixed SSD
- 128 GB - 1 TB

Software Support
- RedHat 7.2
- Windows 7 capable
- Windows 10 capable
- OpenGL 4.1 and DirectX 11 drivers for Microsoft Windows & Linux on Intel Host Card.
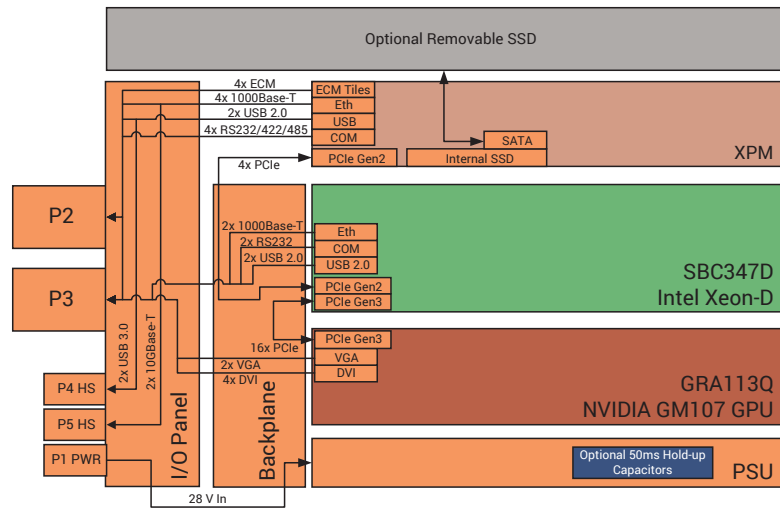
Environment
- Base plate cooled
- Fan-blown
- Convection cooled
- Operating temperature: -40ºC to +71ºC

Qualification:
- Select DO-160G
- Select MIL-STD-810G
- Select MIL-STD-461G
- Select MIL-STD-704F

Block diagram

Standard	Required Test/Category	Notes
MIL-STD-810G Method 514.7	12	Vibration, Procedure I for Category 12 equipment (Aircraft, Jet) with spectrum described below: 0.04g2/Hz, 15 Hz to 150 Hz; 4 dB/octave increase, 150 Hz to 300 Hz; 0.1g2/Hz, 300 Hz to 1000 Hz; 6dB/octave decrease, 1000 Hz to 2000 Hz
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MIL-STD-810G Method 516.6	V	Shock − Crash, 40G for 11ms
DO-160G Section 4	B2	Temperature and Altitude: Tested using the methodology of category B2 (but not the operational test levels); Operating low temperature = -40ºC; Operating high temperature = +71ºC; Non-operational ground survival low temperature = -55ºC; Non-operational ground survival high temperature = +85ºC; Altitude = 50,000ft
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DO-160G Section 6	B	Humidity
DO-160G Section 7	B	Shock
DO-160G Section 8	U	Vibrations, Curve G
DO-160G Section 9	E	Explosive atmosphere

Standard	Required Test/Category	Notes
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MIL-STD 704	F	Limited to 50 ms of hold-up
DO-160G Section 15 Magnetic Effect	Z	
DO-160G Section 16 Power Input 28 Volt	Z	
DO-160G Section 17, Voltage Spike	A	
DO-160G Section 18, Audio Frequency Conducted Susceptibility	Z	
DO-160G Section 19, Induced Signal Susceptibility	ZC	
DO-160G Section 20, Radio Frequency Susceptibility (Conducted)	Y	
DO-160G Section 20, Radio Frequency Susceptibility (Radiated)	Y	
DO-160G Section 21, Emission of Radio Frequency Energy (Conducted)	M	
DO-160G Section 21, Emission of Radio Frequency Energy (Radiated)	L	
DO-160G Section 22, Lighting Induced Transient Susceptibility	XXG3L3 (unshielded) XXJ3L3 (shielded)	
DO-160G Section 25, Electronic Discharge	A	
DO-160G Section 10	W	Waterproofness
DO-160G Section 11	F	Fluid susceptibility
DO-160G Section 12	S	Send and Dust
DO-160G Section 13	F	Fungus Resistance
DO-160G Section 15	S	Salt Spray
DO-160G Section 16	C	Fire Flammability

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