

A195

GPGPU Based Rugged RediBuilt™ HPEC



Embedded Computing
without Compromise



Rugged **GP GPU** is Aitech

- GPGPU Based Rugged High Performance Embedded Computer (HPEC)
- 5th Gen. Intel® Core™ i7 CPU, Quad Core @ 2.7 GHz
- NVIDIA® GeForce® GTX 965M GPU
 - ▶ Maxwell Architecture
 - ▶ 1892 GFLOPS
 - ▶ 1024 CUDA Cores @ 950 MHz
 - ▶ 4 GB GDDR5 @ 1600 MHz
 - ▶ CUDA, PhysX, OpenCL, OpenGL, DirectX 12
- I/O
 - ▶ Gigabit Ethernet
 - ▶ UART Serial
 - ▶ USB 2.0
 - ▶ Discrete I/O
 - ▶ DVI/HDMI Output
 - ▶ RGBHV Output
 - ▶ Composite Input
 - ▶ SDI Input
 - ▶ Audio Output
 - ▶ 1553B
 - ▶ ARINC-429 Rx & Tx
- Up to 16 GB DDR3L with ECC
- SATA Flash SSD Mass Storage
- Gigabit Ethernet Switch (optional)
- Windows® Support
- Fully Integrated and Ready to Use
- D38999 I/O and Power Connectors
- Internally Conduction-Cooled 3U VPX
- Fully Sealed Faraday Cage
- EMI/RFI Filtering
- Environmentally Sealed (IP65)
- Two External Cooling Configurations
 - ▶ Forced Convection (Fan) Cooling
 - ▶ Cold Plate-Cooling



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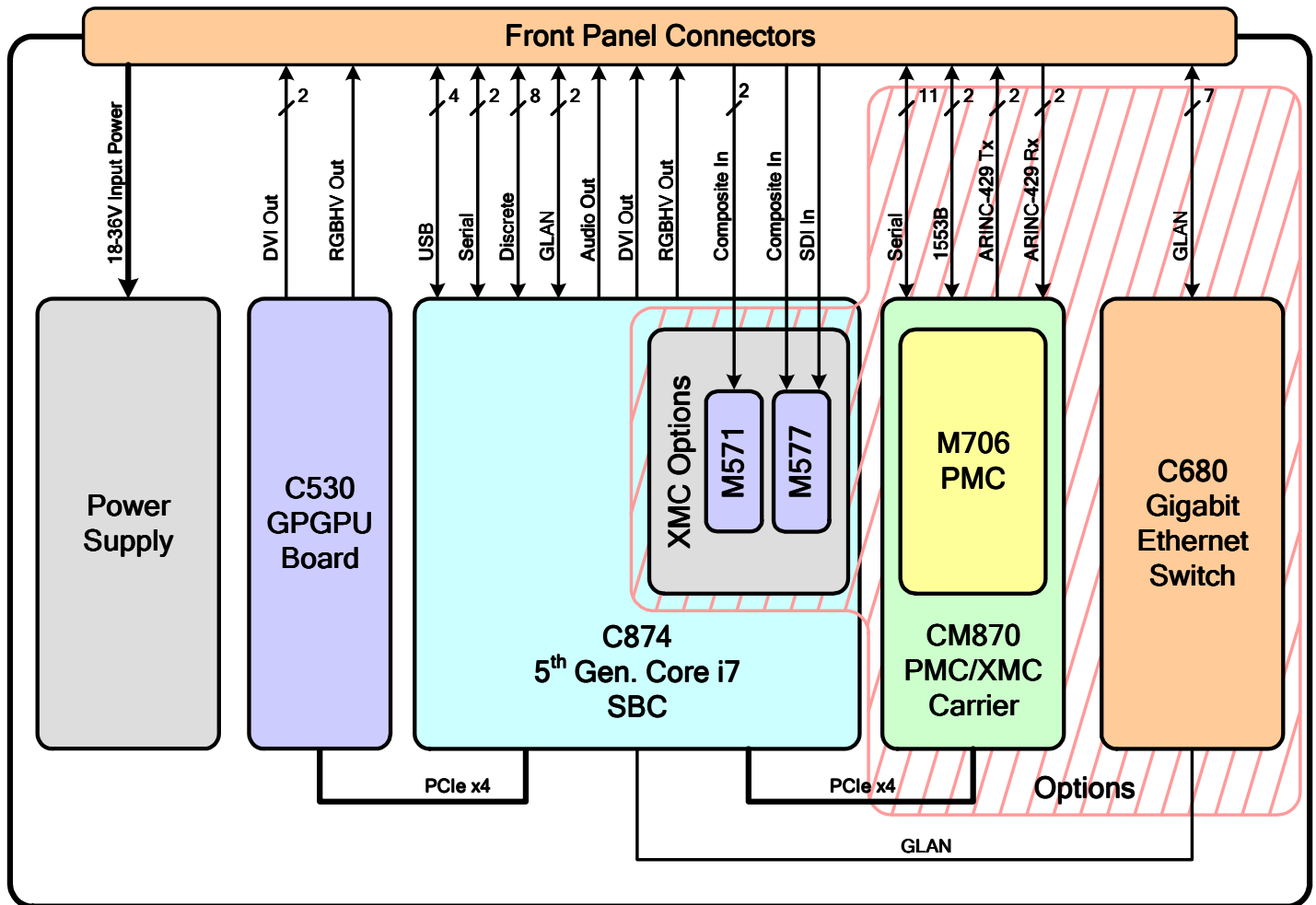
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Modern, high-performance GPUs have tremendous processing potential. Utilizing this processing capability for non-graphical applications is known as GPGPU (General Purpose GPU) processing.

Aitech's A195 RediBuilt™ provides GPGPU processing in a fully integrated, ready-to-use system.

The A195 is based on Aitech's C874 SBC and C530 GPGPU Board. System functionality is enhanced with the addition of optional boards including the M706 I/O PMC, C680 Gigabit Ethernet Switch, and M577 or M571 frame grabber XMCs.

These boards are packaged in a rugged Aitech enclosure along with a high-efficiency power supply, providing a complete ready-to-use High Performance Embedded Computer (HPEC) system.



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System Architecture

CPU (C874 SBC)	i7-5850EQ – 5 th Gen. Intel® Core™ i7, Quad Core @ 2.7 GHz, Iris™ Pro Graphics 6200, 6 MB Last Level Cache Supports Hyper-Threading, Intel® Virtualization Technology (VT-x), SSE4.1/4.2, AVX 2.0
GPU (C530 GPGPU Board)	NVIDIA® GeForce® GTX 965M <ul style="list-style-type: none">Maxwell ArchitectureGM204 Graphics Processor1892 GFLOPS1024 CUDA Cores950 MHz GPU Clock4 GB GDDR5 @ 1600 MHz128-bit Memory Interface WidthOpenGL 4.5OpenCL 1.1DirectX 12, Shader 5.0CUDA, PhysXOptimus Technology
Additional System Board Options	<ul style="list-style-type: none">Two Frame Grabber XMC options (M571 or M577), provide different types/quantities of video input interfacesI/O Board (M706 PMC mounted on VPX carrier), provides ARINC-429 Tx & Rx, 1553, additional serial portsGigabit Ethernet Switch, connected to SBC via backplane port, additional ports routed to system I/O connectors See the <i>Configuration Variants</i> section below for more information
System Resources	<ul style="list-style-type: none">Windowed Watchdog TimerTemperature SensorsElapsed Time RecorderReal Time Clock (optional backup battery)Dynamic clock frequency scaling support
VPX Fabric	<ul style="list-style-type: none">PCIe x4 link between SBC and GPGPU boardPCIe x4 link between SBC and optional I/O board (I/O PMC mounted on VPX carrier)Gigabit Ethernet link between SBC and optional Gigabit Ethernet Switch

Memory Resources

RAM	Up to 16 GB of DDR3L SDRAM in dual channels with ECC operates at 1600 MT/s
Flash Mass Storage	Up to 512 GB SATA SSD on-board the SBC SLC (Single-Level Cell) and MLC (Multi-Level Cell) options available as specified in <i>Ordering Information</i> below (additional options may be available per customer request, contact an Aitech representative for more information)
BIOS Flash	Dual BIOS Flash devices (Primary device for normal operation, Alternate device for system maintenance)

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Configuration Variants		Variant ⁽¹⁾ ⁽²⁾				
		A	B	C	D	E
SBC / CPU		C874 (i7-5850EQ)				
GPGPU Board / GPU		C530 (NVIDIA GeForce GTX 965M)				
Frame Grabber XMC		M577	–	–	–	M571
I/O PMC		–	M706	–	M706	M706
Ethernet Switch		–	–	C680	C680	–
Gigabit Ethernet Ports (10/100/1000Base-T)		1	1	8 ⁽³⁾	8 ⁽³⁾	2
USB 2.0 Ports		4	4	4	4	2
UART Serial Ports ⁽⁴⁾		2	13	2	13	5
Discrete I/O Lines ⁽⁵⁾		8	8	8	8	–
Video Outputs	DVI (single-link) / HDMI	3 ⁽⁶⁾	3 ⁽⁶⁾	3 ⁽⁶⁾	3 ⁽⁶⁾	2 ⁽⁷⁾
	RGBHV	2 ⁽⁷⁾	2 ⁽⁷⁾	2 ⁽⁷⁾	2 ⁽⁷⁾	–
Video Inputs	SDI (480/60i, 576/50i) ⁽⁸⁾	1	–	–	–	–
	Composite (RS-170A [NTSC]/PAL)	1	–	–	–	2
Audio Output		1	1	1	1	–
ARINC-429 Tx		–	2	–	2	–
ARINC-429 Rx		–	2	–	2	–
1553B		–	0-2 ⁽⁹⁾	–	0-2 ⁽⁹⁾	–

- Notes:
- (1) Configuration Variants specify the boards used in the A195 system, and determine the type of CPU and GPU, available I/O, and system power consumption
 - (2) Previous configuration options, with C873 i7-4700EQ SBC and NVIDIA GeForce GTX 770M, are also available but are not recommended for new designs
 - (3) 8 ports at system I/O connectors – 1 from SBC, 7 from Ethernet Switch (SBC and Switch are interconnected via an additional GbE link over the backplane)
 - (4) Software configurable as RS-232/422/485
 - (5) Groups of two lines are software configurable as two single-ended channels or one differential RS-422 channel
 - (6) One channel from SBC, two channels from GPGPU board
 - (7) One channel from SBC, one channel from GPGPU board
 - (8) Factory configured for 75 Ω single-ended SDI operation mode
 - (9) Number of 1553B channels specified in *Ordering Information*

Software

- Windows operating system supported
- Available with or without operating system pre-installed

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Enclosure Options

Forced Convection (Fan) Cooling	Heat conducted through aluminum sidewalls, dissipated by exterior heat exchanger to surrounding air by fan forced convection.
Cold Plate Cooling	Sidewalls conduct heat to enclosure base for cooling via the cold plate. Cold plate cooling is supplemented with convective cooling via sidewall fins.

Mechanical

Enclosure Type	Dimensions (max. including handle)			Weight
	Depth	Width	Height	
Forced Convection (Fan) Cooled	329 mm (12.96")	145 mm (5.71")	194 mm (7.64")	<11 kg (24.3 lbs.)
Cold Plate Cooled	242 mm (9.53")	164 mm (6.46")		

Power

Input Power	<ul style="list-style-type: none">• 85% Typical Efficiency Internal Power Supply• 18 – 36 V_{DC} Input Range• EMI/RFI Input Filter	<ul style="list-style-type: none">• Input Transient Protection• Input Reverse Polarity Protection• MIL-STD-704D/E Compliance
Power Consumption	Maximum power consumption is dependent on system configuration	

Environmental

Operating Temp.	Min	-40 °C
	Max	Dependent on system configuration and power dissipation
Non-Operating Temp.	-55 to +105 °C	
Vibration	V3 per VITA 47	
Operating Shock	OS2 per VITA 47	
Altitude	-1,500 to +60,000 ft. ⁽¹⁾	
Relative Humidity	0 – 100%	
Ingress Protection	IP65	
Rain	MIL-STD-810F, Method 506.4, Procedure III	
Dust	MIL-STD-810F, Method 510.4, Procedure I & II	
Salt Fog	MIL-STD-810F, Method 509.4	
Bench Handling	MIL-STD-810F, Method 516.5, Procedure VI	
Fungus	Fungus Resistant	
EMI/RFI	MIL-STD-461	

Notes: (1) Depending on temperature and system power dissipation

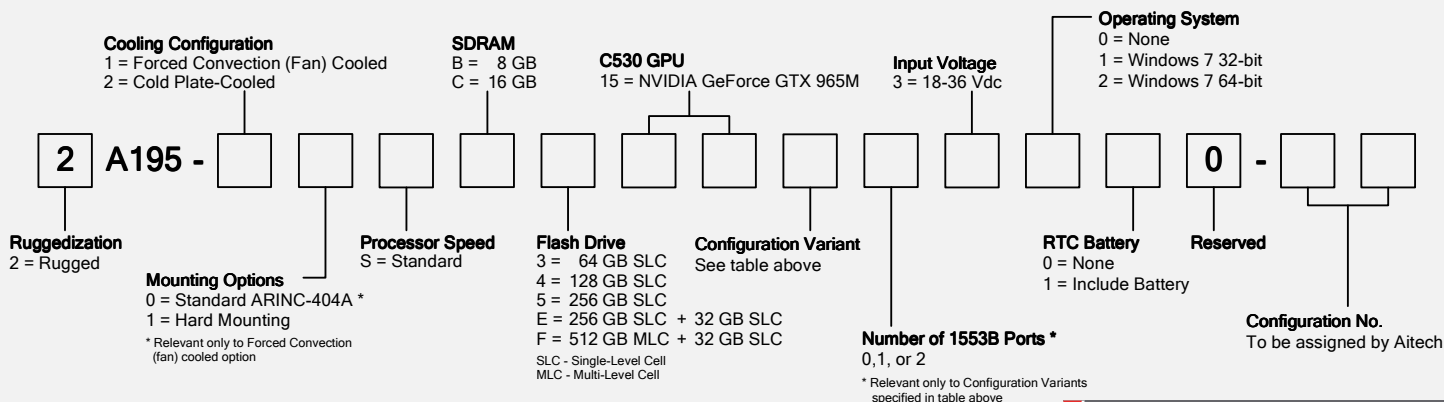
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Ordering Information



Example: 2A195-11SCE15A03200-00

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Optional Accessories

MCS195-1-00	Set of Front Panel Mating Connectors
TC195-J1-00	J1 Power Cable
TC195-J2-xx	J2 I/O Breakout Cable
TC195-J3-xx	J3 I/O Breakout Cable
TC195-J4-xx	J4 I/O Breakout Cable
TC195-J5-xx	J5 I/O Breakout Cable
PS28-150-00	28 V _{DC} /150 W External Power Supply (100 - 240 V _{AC} input)



Contact Aitech

Contact your Aitech sales representative for additional product information, and for inquiries regarding customized configurations of the A195 and additional software support.

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