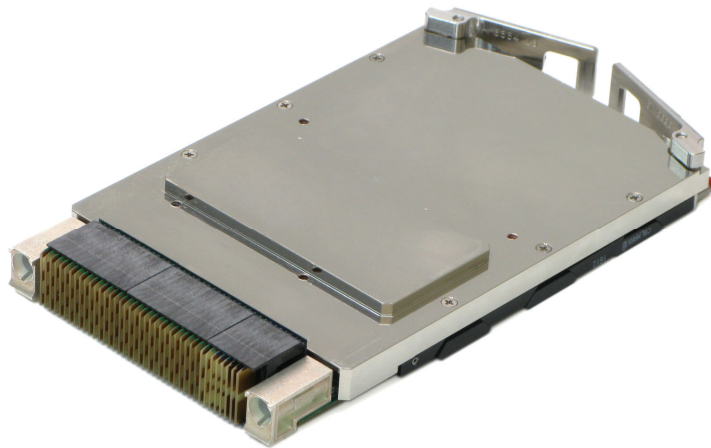


# C535 – Typhoon

## GPGPU 3U VPX Supercomputer Board



Embedded Computing  
without Compromise



The new C535 Typhoon is ideally suited to add revolutionary GPGPU supercomputer capabilities to any 3U VPX system.

Combining the CPU and the GPGPU on a single board, the C535 replaces separate SBC + GPGPU boards, with drastically reduced power consumption.

The C535 Typhoon opens up a world of new possibilities with enhanced video and signal processing capabilities for the next generation of autonomous vehicles, avionics and flight systems, surveillance and targeting systems, EW systems, and many other applications.

Rugged **GP GPU** is Aitech

- Rugged 3U VPX HPEC Board – SBC with on-board GPGPU
- NVIDIA Jetson TX1 System on Module
  - ▶ NVIDIA Maxwell™ Architecture GPU, with 256 CUDA cores
  - ▶ ARM® Cortex® A57 Quad-Core CPU
  - ▶ 1 TFLOPS
  - ▶ H.264/H.265 HW Encoder
- Best Available Performance per Watt – 60 GFLOPS/W
- SATA SSD with Quick Erase & Secure Erase
- 4 GB LPDDR4
- OpenVPX Compliant
- I/O
  - ▶ Gigabit Ethernet
  - ▶ USB 2.0
  - ▶ UART Serial
  - ▶ Discretes
  - ▶ Video Outputs
    - DVI/HDMI
    - Composite
    - SDI
    - STANAG
  - ▶ Video Inputs
    - Composite
    - DVI/HDMI
    - SDI
    - Camera Link
  - ▶ Stereo HD Audio Output
- CUDA, OpenGL, OpenGL ES, EGL
- 8-10W Typical, 17W Max
- Development Platforms Available

PRELIMINARY

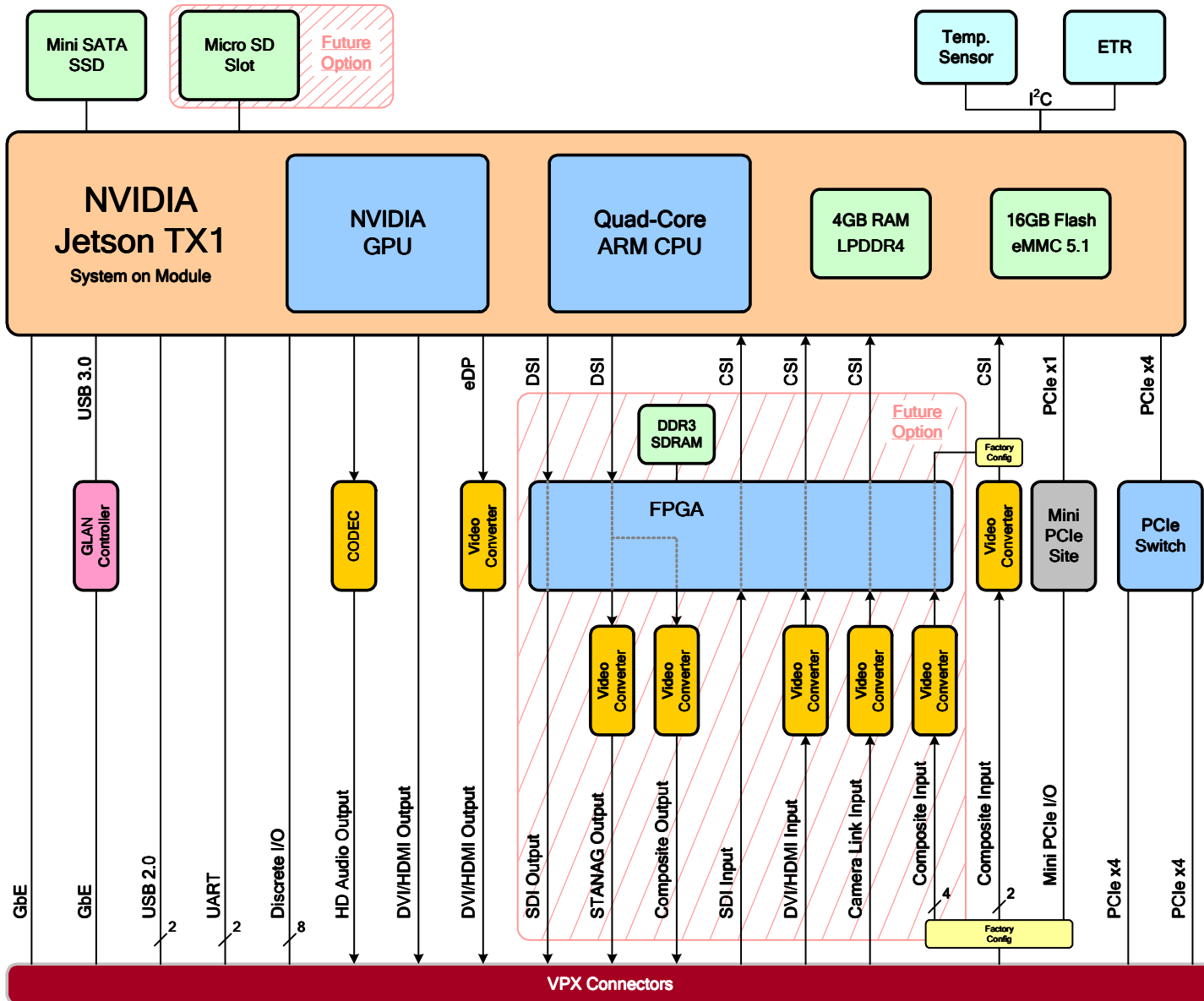


# C535 – T<sub>phoon</sub>

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# C535 – T<sub>o</sub>phoon

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### Board Architecture

<b>System on Module</b>	NVIDIA Jetson TX1
<b>GPU</b>	<ul style="list-style-type: none"><li>• NVIDIA Maxwell GPU Architecture</li><li>• 256 Shaders/CUDA cores</li><li>• OpenGL ES Shader Performance up to 1024 GFLOPS (fp16)</li><li>• CUDA 7.0</li><li>• OpenGL 4.5</li><li>• OpenGL ES 3.1</li><li>• Two independent display controllers</li></ul>
<b>CPU</b>	<ul style="list-style-type: none"><li>• ARM® Cortex® A57 Quad-Core CPU @ 1.9 GHz</li><li>• L1 Cache: 48 KB instruction, 32 KB data per core; L2 Cache: 2 MB Unified</li></ul>
<b>Board Resources</b>	<ul style="list-style-type: none"><li>• Multi-standard Video/JPEG Decoder/Encoder, HW Encoding for H.264/H.265</li><li>• Dynamic voltage and frequency scaling</li><li>• On-board Temperature Sensor</li><li>• Elapsed Time Recorder</li></ul>
<b>OpenVPX (VITA 65) Slot Profile</b>	SLT3-PAY-2F2T <ul style="list-style-type: none"><li>• Payload board</li><li>• Two Fat Pipes (PCIe x4 ports)</li><li>• Two Thin Pipes (1000Base-T ports)</li></ul>

### Memory Resources

<b>RAM</b>	4 GB LPDDR4 in dual channels operates at 3200 MT/s
<b>eMMC</b>	16 GB eMMC 5.1 (boot source)
<b>Mini SATA SSD</b>	32 GB Mini SATA SSD – SLC Flash with Quick Erase and Secure Erase support (additional options may be available per customer request, contact an Aitech representative for more information)
<b>Micro SD</b>	Micro SD Slot (future option)

### Security

- HW acceleration for AES 128/192/256 encryption and decryption
- HW acceleration for AES CMAC, SHA-1, and SHA-256 algorithms
- 2048-bit RSA HW
- HW Random Number Generator (RNG) SP800-90
- Quick Erase and Secure Erase SSD support

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# C535 – T<sub>h</sub>phoon

## GPGPU 3U VPX Supercomputer Board



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### I/O

<b>USB 2.0</b>		2
<b>Gigabit Ethernet (10/100/1000Base-T)</b>		2
<b>Serial Ports (RS-232 UART)</b>		2
<b>Discrete I/O (Single-Ended)</b>		8
<b>Audio Output (Stereo HD)</b>		1
<b>Video Outputs</b> <sup>(1)</sup>	<b>DVI (single-link) / HDMI</b>	2
	<b>SDI (480/60i, 576/50i)</b>	1 (future option)
	<b>Composite (RS-170A [NTSC]/PAL)</b>	1 <sup>(2)</sup> (future option)
	<b>STANAG 3350 (Class B and C)</b>	1 <sup>(2)</sup> (future option)
<b>Video Inputs</b>	<b>Composite (RS-170A [NTSC]/PAL)</b>	2 (only one channel available at a time), or 8 (with optional mini PCIe frame grabber, all channels available simultaneously), or 4 (future option, only one channel available at a time)
	<b>DVI (single-link) / HDMI</b>	1 (future option)
	<b>SDI (480/60i, 576/50i)</b>	1 (future option)
	<b>Camera Link</b>	1 (future option)

Notes: (1) Up to two independent video outputs can be active simultaneously  
(2) Composite Output and STANAG Output channels are clones

### Expansion Options

<b>Site Specifications</b>	<ul style="list-style-type: none"> <li>Supports standard mini PCIe modules</li> <li>PCIe x1 interface</li> <li>I/O signals from installed mini PCIe modules routed to VPX backplane connectors</li> </ul>
<b>Available Modules</b>	<ul style="list-style-type: none"> <li>Composite Frame Grabber – provides 8 composite video inputs, all channels available simultaneously</li> <li>Additional options may be available per customer request, contact an Aitech representative for more info</li> </ul>

### Software

Linux OS pre-installed – L4T (Linux for Tegra), a lightly modified Ubuntu-based distribution

### Mechanical

	<b>Form Factor &amp; Dimensions</b> <sup>(1)</sup>	<b>Weight</b>
<b>Air-Cooled</b>	3U VPX REDI per ANSI/VITA 48.1	< 850 g (1.9 lbs)
<b>Conduction-Cooled</b>	3U VPX REDI per ANSI/VITA 48.2	< 800 g (1.8 lbs)
<b>Conduction-Cooled 2LM</b>	3U VPX REDI 2LM (Two Level Maintenance) per ANSI/VITA 48.2	< 850 g (1.9 lbs)

Notes: (1) Pitch per ordering information

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# C535 – T<sub>phoon</sub>

## GPGPU 3U VPX Supercomputer Board



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### Power

<b>Input Power</b>	Powered by standard VPX backplane connector power supplies
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• ≤5W idle</li> <li>• 8-10W under typical CUDA load</li> <li>• 17W when System on Module is fully utilized</li> </ul>

### Environmental

Specs per VITA 47	Air-Cooled			Conduction-Cooled	
	Commercial	Rugged	Military	Rugged	Military
<b>Operating Temp.</b>	AC1 (0 to +55°C) <sup>(2)</sup>	AC3 (-40 to +70°C) <sup>(2)</sup>	AC4 (-40 to +85°C) <sup>(1,2)</sup>	CC3 (-40 to +70°C) <sup>(3)</sup>	CC4 (-40 to +85°C) <sup>(1,3)</sup>
<b>Non-Operating Temp.</b>	C1 (-40 to +85°C)	C3 (-50 to +100°C)	C4 (-55 to +125°C)	C3 (-50 to +100°C)	C4 (-55 to +125°C)
<b>Vibration</b>	V1	V2	V2	V3	V3
<b>Operating Shock</b>	OS1	OS1	OS1	OS2	OS2
<b>Altitude</b>	15,000 ft.	35,000 ft.	70,000 ft.	35,000 ft.	70,000 ft.
<b>Relative Humidity<sup>(4)</sup></b>	0 - 90%	0 - 95% with Acrylic (Standard),			
<b>Conformal Coating</b>	N/A	0 - 100% with Urethane (Optional)			

Notes: (1) -55°C available, contact an Aitech representative for more information  
 (2) Operating ambient air temperature (with sufficient airflow)

(3) Operating card edge temperature  
 (4) Non-condensing

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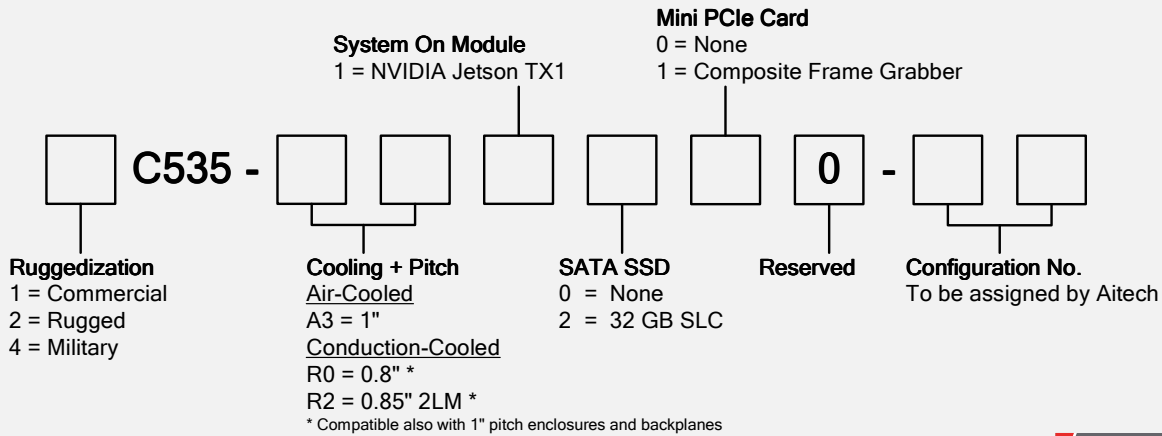
# C535 – T<sub>h</sub>phoon

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### Ordering Information



Example: 4C535-R01210-00

Rugged **GPGPU** is Aitech

### Development Platform

Development platforms are available as an option, which include:

- EV535 – C535 Evaluation System
- I/O Cables and Power Supply
- Software installed/configured by Aitech – latest available OS release, development tools, CUDA examples

Contact your Aitech representative for additional information



### Contact Aitech

Contact your Aitech sales representative for additional product information, and for inquiries regarding customized configurations of the C535 and additional software support.

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