

# A176 – Cyclone

GPGPU Fanless Small FF RediBuilt™ Supercomputer



The A176 Cyclone is the smallest and most powerful Rugged-GPGPU, ideally suited for distributed systems. Originally available with the TX1, the A176 is now available with the even more powerful and more efficient TX2 / TX2i.

Its 256 CUDA cores reach 1 TFLOPS at a remarkable level of energy efficiency, providing all the power you need for local processing right where you need it, next to your sensors.

With its compact size, the A176 Cyclone is the most advanced solution for video and signal processing for the next generation of autonomous vehicles, surveillance and targeting systems, EW systems, and many other applications.

POWERED BY



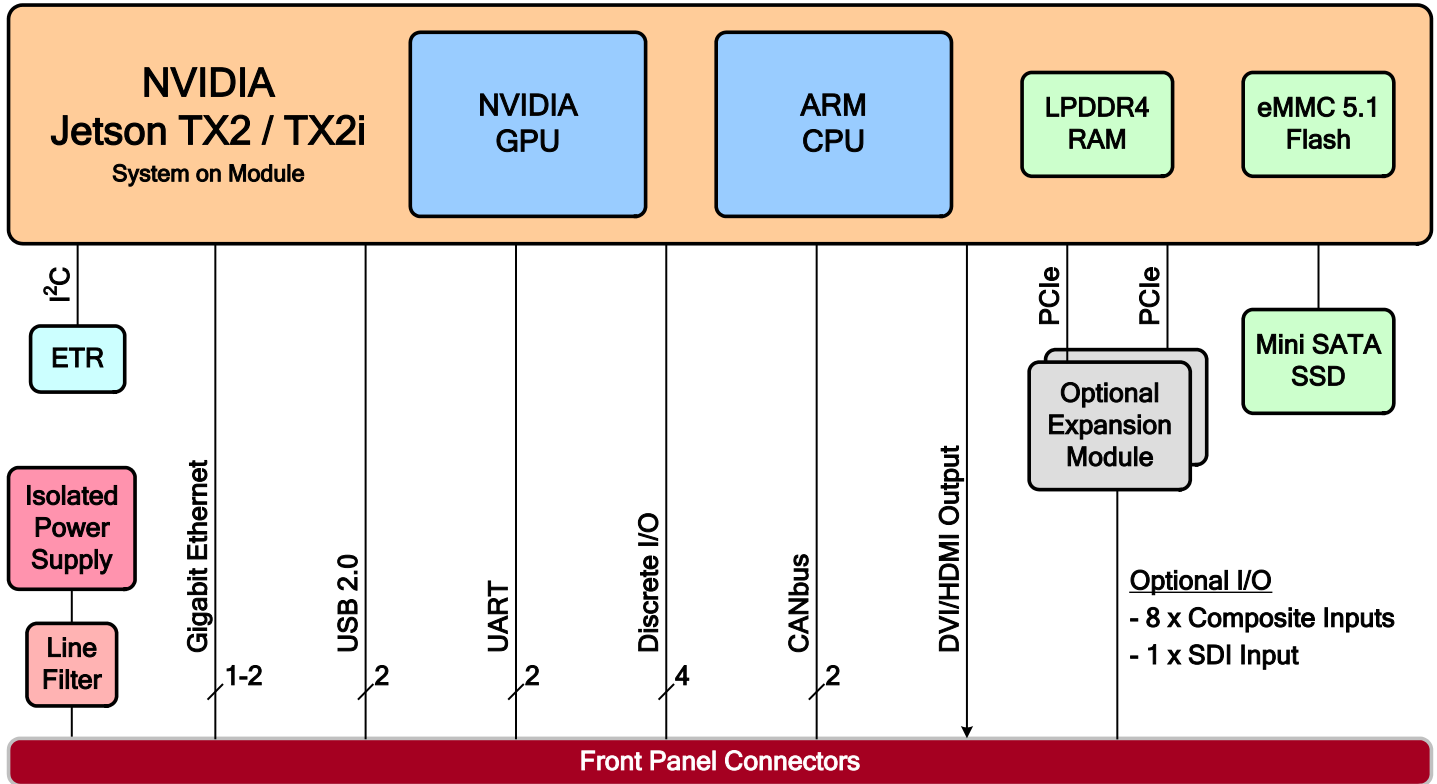
RuggedAI™ is Aitech

- SWaP Optimized Rugged HPEC
- Ultra Small Form Factor – 129 mm [5.1"] square, < 1 kg [2.2 lbs.]
- NVIDIA® Jetson™ TX2 / TX2i
  - ▶ Pascal™ Architecture GPU w/256 CUDA® cores
  - ▶ NVIDIA Denver 2 Dual-Core ARM® CPU + Cortex® A57 Quad-Core ARM® CPU
  - ▶ 1 TFLOPS
  - ▶ H.264/H.265 HW Encoder
  - ▶ Best Available Performance per Watt – 60 GFLOPS/W
- SATA SSD with Quick Erase
- 8 GB LPDDR4
- Video Capture
  - ▶ SDI (SD/HD) w/dedicated H.264 encoder
  - ▶ Composite (RS-170A [NTSC]/PAL), 8 channels available simultaneously
- I/O
  - ▶ Gigabit Ethernet
  - ▶ DVI/HDMI Output
  - ▶ UART Serial
  - ▶ Composite Input
  - ▶ USB 2.0
  - ▶ SDI Input
  - ▶ Discrettes
  - ▶ CANbus
- CUDA®, OpenGL, OpenGL ES, EGL
- Low Power Consumption
- Environmentally Sealed (IP67)
- Development Platforms Available



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## GPGPU Fanless Small FF RediBuilt™ Supercomputer

### System Architecture

|                          |  |
|--------------------------|--|
| <b>System on Module</b>  | NVIDIA Jetson TX2 or TX2i  |
| <b>GPU</b>               | <ul style="list-style-type: none"><li>• NVIDIA Pascal GPU Architecture</li><li>• 256 Shaders/CUDA cores</li><li>• &gt; 1 TFLOPS (fp16)</li><li>• CUDA</li><li>• OpenGL</li><li>• OpenGL ES</li></ul>   |
| <b>CPU</b>               | ARMv8 (64-bit) heterogeneous multi-processing (HMP) architecture with two CPU clusters (6 processor cores) <ul style="list-style-type: none"><li>• NVIDIA Denver 2 Dual-Core @ 2.0 GHz (TX2) / 1.95 GHz (TX2i), 128 KB L1 instruction cache + 64 KB L1 data cache per core, 2 MB L2 Unified Cache</li><li>• ARM® Cortex® A57 Quad-Core @ 2.0 GHz (TX2) / 1.92 GHz (TX2i), 48 KB L1 instruction cache + 32 KB L1 data cache per core, 2 MB L2 Unified Cache</li></ul> |
| <b>Security</b>          | <ul style="list-style-type: none"><li>• HW acceleration for AES 128/192/256 encryption and decryption</li><li>• HW acceleration for AES CMAC, SHA-1, SHA-256, SHA-384, and SHA-512 algorithms</li><li>• 2048-bit RSA HW</li><li>• HW Random Number Generator (RNG) SP800-90</li></ul>  |
| <b>Expansion Options</b> | Main board accommodates up to two optional I/O expansion modules. Available options include: <ul style="list-style-type: none"><li>• Composite Frame Grabber</li><li>• SDI Frame Grabber</li></ul> Included expansion modules are determined by system I/O Variant, see the I/O section below for details (additional options may be available per customer request, contact an Aitech representative for more info)   |
| <b>System 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>• Temperature Sensors</li><li>• Elapsed Time Recorder</li><li>• Status Indicator LED</li></ul>  |

### Memory Resources

|                 |   |
|-----------------|---|
| <b>RAM</b>      | 8 GB LPDDR4, 128-bit interface, TX2 operating @ 1866 MHz (non-ECC), TX2i operating @ 1600 MHz w/ECC   |
| <b>eMMC</b>     | 32 GB eMMC 5.1 (boot source)  |
| <b>SATA SSD</b> | Optional Mini SATA SSD with Quick Erase support<br>(standard SSD options are listed in <i>Ordering Information</i> below, additional options [with Secure Erase support, different types of Flash, etc.] may be available per customer request, contact an Aitech representative for more info) |

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| I/O                                  |   | I/O Variant            |    |    |    |
|--------------------------------------|---|------------------------|----|----|----|
|                                      |   | 00                     | 01 | 02 | 03 |
| Expansion Card Options               | Composite Frame Grabber   | –                      | ✓  | –  | ✓  |
|                                      | SDI Frame Grabber   | –                      | –  | ✓  | ✓  |
| Composite Input                      | RS-170A (NTSC)/PAL, supports simultaneous capture of all channels at full frame rates | –                      | 8  | –  | 8  |
| SDI Input                            | 480/60i, 576/50i, 720/60p, 1080/60i, 1080/30p, dedicated H.264 encoder                | –                      | –  | 1  | 1  |
| Gigabit Ethernet (10/100/1000Base-T) |   | 2 (w/TX2) / 1 (w/TX2i) |    |    | 1  |
| DVI (single-link) / HDMI Output      |   | 1                      |    |    |    |
| USB 2.0                              |   | 2                      |    |    |    |
| Serial Ports (RS-232 UART)           |   | 2                      |    |    |    |
| Discrete I/O (Single-Ended)          |   | 4                      |    |    |    |
| CANbus                               |   | 2                      |    |    |    |

### Software

- Linux OS pre-installed – L4T (Linux for Tegra), a lightly modified Ubuntu-based distribution
- Video capture drivers and sample applications pre-installed, in variants equipped with optional frame grabber(s)
- BIT (Built-In Tests) are available, contact an Aitech representative for more information

### Mechanical

|            |                                       |
|------------|---------------------------------------|
| Dimensions | 127 x 129 x 52 mm [5.0 x 5.1 x 2.05"] |
| Weight     | < 1 kg [2.2 lbs.]                     |

### Power

|                   |  |
|-------------------|--|
| Input Power       | <ul style="list-style-type: none"><li>• Wide input voltage range: 11 – 36 V<sub>DC</sub> steady state operation</li><li>• Input reverse polarity protection</li><li>• EMI/RFI input filter</li><li>• On-board supplies isolated from external supply</li><li>• MIL-STD-704 and MIL-STD-1275 compliant (no hold-up)</li></ul> |
| Power Consumption | <ul style="list-style-type: none"><li>• ≤5 W idle</li><li>• 8 – 10 W under typical CUDA load</li><li>• 20 W when System on Module is fully utilized</li></ul> Total power consumption depends on system configuration and expansion options  |

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## GPGPU Fanless Small FF RediBuilt™ Supercomputer



### Environmental

|                            |             |  |
|----------------------------|-------------|--|
| <b>Operating Temp.</b>     | <b>Min.</b> | -40 °C   |
|                            | <b>Max.</b> | +65 °C w/System on Module in Max-N power mode <sup>(1)</sup><br>+71 °C w/System on Module in Max-Q power mode <sup>(1)</sup> |
| <b>Non-Operating Temp.</b> |             | -55 to +105 °C   |
| <b>Vibration</b>           |             | V2 per VITA 47   |
| <b>Operating Shock</b>     |             | OS2 per VITA 47  |
| <b>Altitude</b>            |             | -1,500 to +60,000 ft. <sup>(2)</sup>   |
| <b>Relative Humidity</b>   |             | 0 – 100%   |
| <b>Ingress Protection</b>  |             | IP67 <sup>(3)</sup>  |
| <b>Rain</b>                |             | MIL-STD-810F, Method 506.4, Procedure III  |
| <b>Dust</b>                |             | MIL-STD-810F, Method 510.4, Procedure I & II   |
| <b>Salt Fog</b>            |             | MIL-STD-810F, Method 509.4   |
| <b>Bench Handling</b>      |             | MIL-STD-810F, Method 516.5, Procedure VI   |
| <b>Fungus</b>              |             | Fungus Resistant   |
| <b>EMI/RFI</b>             |             | MIL-STD-461  |

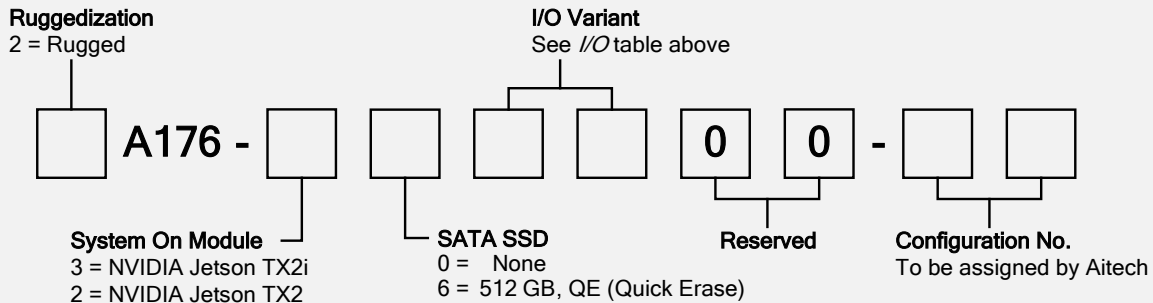
- Notes:
- (1) System on Module power modes are user configurable via software
  - (2) Depending on temperature and system power dissipation
  - (3) With appropriate connections to system I/O and power connectors

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## GPGPU Fanless Small FF RediBuilt™ Supercomputer

### Ordering Information



Example: 2A176-260300-00

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### Optional Accessories

|                                   |   |
|-----------------------------------|---|
| <b>MCS176-1-00</b>                | Set of Front Panel Mating Connectors  |
| <b>TCA176-SK</b><br>(Starter Kit) | <ul style="list-style-type: none"> <li>External Power Supply</li> <li>J1 Power Cable</li> <li>J2 I/O Cable</li> </ul> |



### Development Platform

Development platforms are available as an option, which include:

- EV176 – A176 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 A176 and additional software support.

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