

S-A1760 – Venus™

Radiation-characterized Space AI GPGPU



The S-A1760 Venus™ is the smallest and most powerful Rugged-GPGPU, ideally suited for distributed systems. S-A1760 available with powerful and efficient TX2i for LEO Space platforms.

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 small form factor (SFF) S-A1760 Venus™ is the most advanced solution for video and signal processing for the next generation of short duration spaceflight, NEO and LEO satellites applications.

POWERED BY



RuggedAI™ is Aitech

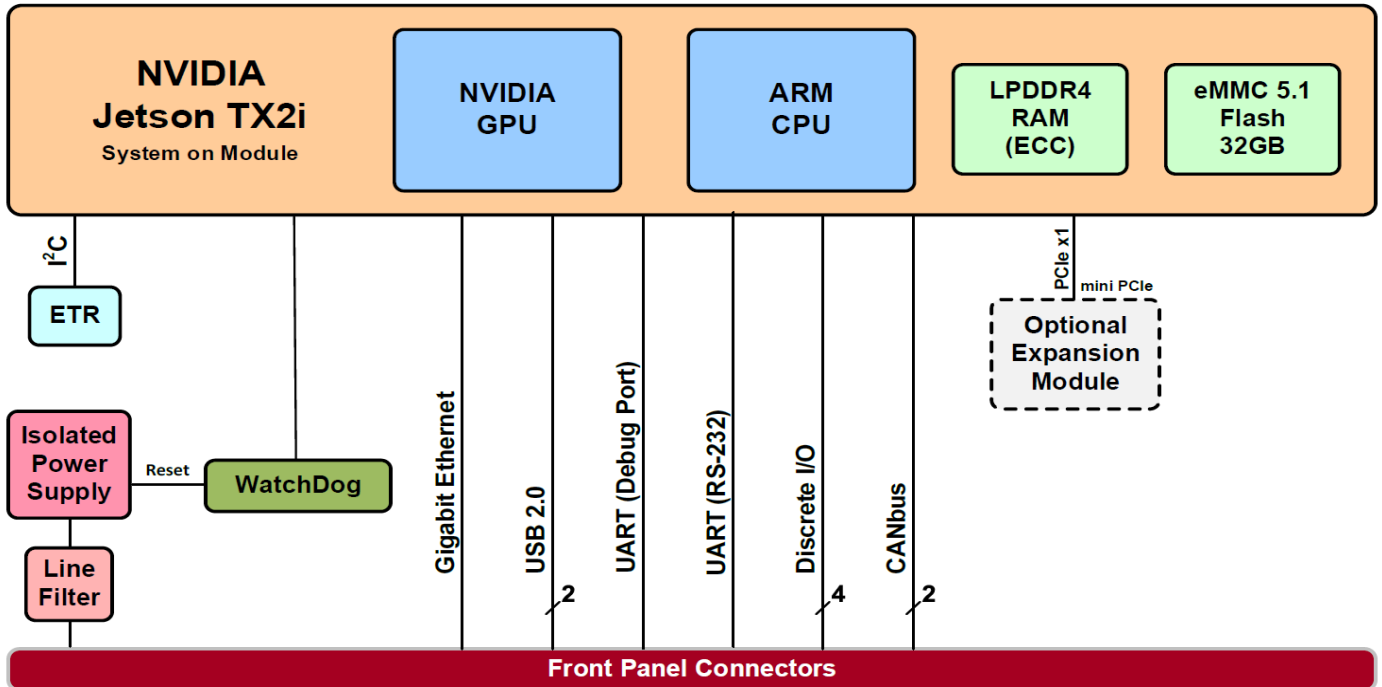
- SWaP Optimized Rugged AI Space System
- Small Form Factor
129 mm [5.1"] square, < 1 kg [2.2 lbs.]
- NVIDIA® Jetson™ TX2i
 - ▶ Pascal™ Architecture GPU w/256 CUDA® cores
 - ▶ NVIDIA Denver 2 Dual-Core ARM® CPU + Cortex® A57 Quad-Core ARM® CPU
 - ▶ 1 TFLOPS
 - ▶ H.264/H.265 HW Encoder
 - ▶ Best Available Performance per Watt – 60 GFLOPS/W
- 8 GB LPDDR4 with ECC
- I/O
 - ▶ Gigabit Ethernet
 - ▶ Discretes
 - ▶ UART Serial
 - ▶ CANbus
 - ▶ USB 2.0
- CUDA®, OpenGL, OpenGL ES, EGL
- Low Power Consumption
- Radiation Characterized
- Development Platforms Available
- 32 GB SSD



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System Architecture

System on Module	NVIDIA Jetson TX2i
GPU	<ul style="list-style-type: none">• NVIDIA Pascal GPU Architecture• 256 Shaders/CUDA cores• > 1 TFLOPS (fp16)• CUDA• OpenGL• OpenGL ES
CPU	ARMv8 (64-bit) heterogeneous multi-processing (HMP) architecture with two CPU clusters (6 processor cores) <ul style="list-style-type: none">• NVIDIA Denver 2 Dual-Core @ 1.95 GHz (ECC protected L2 cache) 128 KB L1 instruction cache + 64 KB L1 data cache per core, 2 MB L2 Unified Cache• ARM® Cortex® A57 Quad-Core @ 1.92 GHz (ECC protected L1 and L2 cache) 48 KB L1 instruction cache + 32 KB L1 data cache per core, 2 MB L2 Unified Cache
Security	<ul style="list-style-type: none">• HW acceleration for AES 128/192/256 encryption and decryption• HW acceleration for AES CMAC, SHA-1, SHA-256, SHA-384, and SHA-512 algorithms• 2048-bit RSA HW• HW Random Number Generator (RNG) SP800-90
System Resources	<ul style="list-style-type: none">• Multi-standard Video/JPEG Decoder/Encoder, HW Encoding for H.264/H.265• Dynamic voltage and frequency scaling• Temperature Sensors• Elapsed Time Recorder• Status Indicator LED

Memory Resources

RAM	8 GB LPDDR4 with ECC, 128-bit interface, TX2i operating @ 1600MHz w/ECC
eMMC	32 GB eMMC 5.1 (boot source)

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I/O	I/O Configuration
	00
Expansion Card Options	–
Gigabit Ethernet (10/100/1000Base-T)	1
USB 2.0	2
Serial Ports (RS-232 UART, Debug Port)	1
Serial Ports (RS-232 UART)	1
Discrete I/O (Single-Ended)	4
CANbus	2

Software

- Linux OS pre-installed – L4T (Linux for Tegra), a lightly modified Ubuntu-based distribution
- 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">• Wide input voltage range: 11 – 36 V_{DC} steady state operation• Input reverse polarity protection• EMI/RFI input filter• On-board supplies isolated from external supply• MIL-STD-704 and MIL-STD-1275 compliant (no hold-up)
Power Consumption	<ul style="list-style-type: none">• ≤5 W idle• 8-10 W under typical CUDA load• 20 W when System on Module is fully utilized Total power consumption depends on system configuration and expansion options

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Environmental

Operating Temp.	Min.	-40 °C
	Max.	+65 °C w/System on Module in Max-Q power mode (1)
Non-Operating Temp.		-62 to +125 °C
Vibration		V2 per VITA 47
Operating Shock		OS2 per VITA 47
Vacuum		10 ⁻³ Torr
Relative Humidity		0 – 100%
Conformal Coating		Parylene-C
Bench Handling		MIL-STD-810F, Method 516.5, Procedure VI
Total Ionizing Dose		1.05 kRad (Si) ⁽²⁾
Single Event Effects		Watchdog Mitigated with no more than one Type-2 SEFI per 365 days at the ISS orbit
EMI/RFI		MIL-STD-461

Notes:

- (1) System on Module power modes are user configurable via software
- (2) Aitech has characterized the TX2i module in proton irradiation

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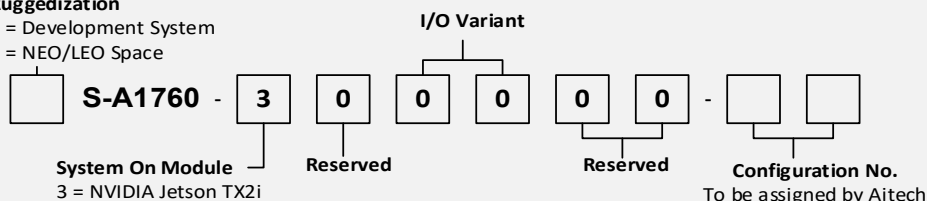


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Ordering Information

Ruggedization

1 = Development System
3 = NEO/LEO Space



Orderable Products: 1S-A1760-300000-00 for development; 3S-A1760-300000-00 for space flight

Optional Accessories

RuggedAI™ is Aitech

3S - Series

MCS1760-1-00 Set of Front Panel Mating Connectors
Electroless Nickel

TCSA1760-SK (Starter Kit)
Electroless Nickel

- External Power Supply
- J1 Power Cable
- J2 I/O Cable

1S - Series

MCS176-1-00 Set of Front Panel Mating Connectors

TCA176-SK (Starter Kit)

- External Power Supply
- J1 Power Cable
- J2 I/O Cable



1S-A1760 – DevKit (EM)



3S-A1760 – Flight Unit (FM)



Systems Differences

1S-A1760 – DevKit (EM)	3S-A1760 – Flight Unit (FM)
Convection Cooled	Cold Plate
Military Coating	Space Coating
NA	Space Graded Watchdog
MIL-STD-810F	Radiation Characterized for LEO/NEO
Operational DVI output	NA

Contact Aitech

Contact your Aitech sales representative for additional product information, and for inquiries regarding customized configurations of the S-A1760 and additional software support:

EMCOMO Solutions AG - Industriestr. 10 - 89231 Neu-Ulm - Germany - aitech@emcomo.de - +49 731 8803510



Aitech USA
19756 Prairie Street
Chatsworth, CA 91311
Ph: (818) 700-2000
Toll Free: (888) 248-3248
sales@aitechsystems.com



Aitech Israel
1 Atir Yeda
Kfar Saba 4464301, Israel
Ph: +972 (9) 960-0600
sales@aitechsystems.com



Aitech India
No. 91 Prestige South End Road
Basanvagudi, Bengaluru, Karnataka,
560004, India
Ph: +91-80-4866-8105
sales@aitechsystems.com

AitechSystems.com

