S-A1760 – Venus™

Radiation-characterized Space AI GPGPU

POWERED BY NVIDIA

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 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.

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
- **Optional embedded 1TB SATA ASSD™ (for Series-300 only)**
- **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
  - UART Serial
  - USB 2.0
  - Discretes
  - DVI/HDMI Output
  - Composite Input
  - SDI Input
  - CANbus
- **CUDA®, OpenGL, OpenGL ES, EGL**
- **Low Power Consumption**
- **Radiation Characterized**
- **Development Platforms Available**

PRELIMINARY

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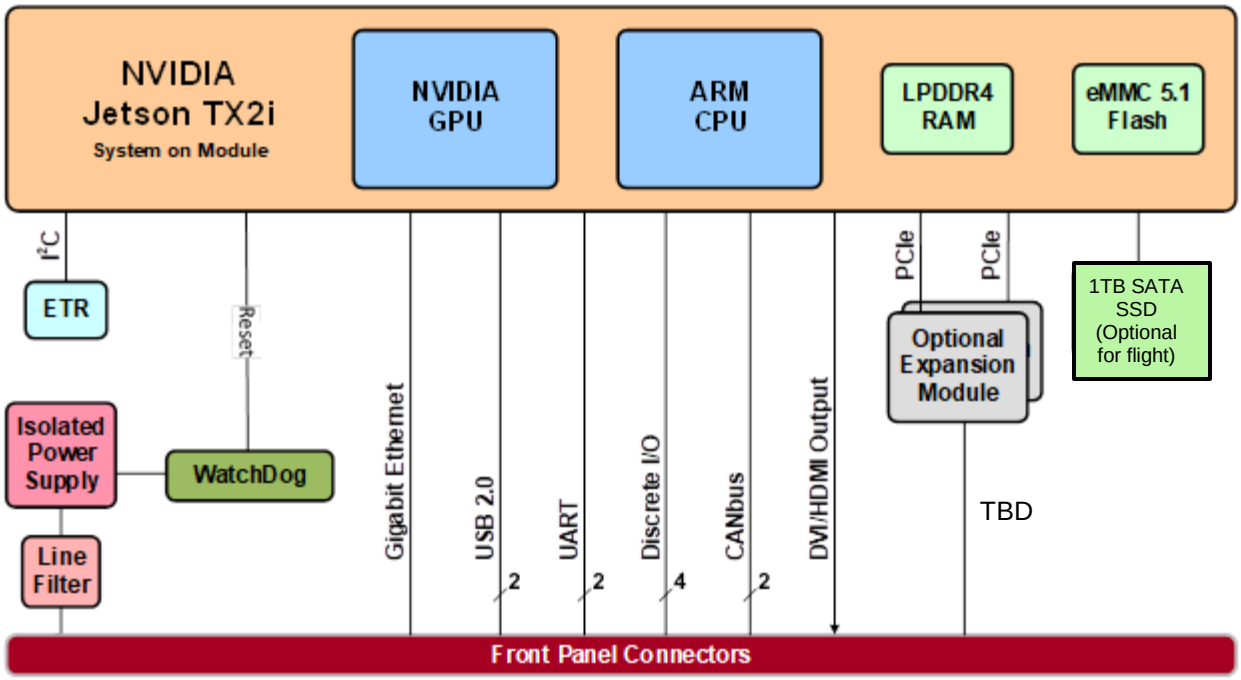

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Aitech

System Architecture

System on Module	NVIDIA Jetson TX2i
GPU	• 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) • 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 • 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
Security	• 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	• 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

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Memory Resources

RAM	8 GB LPDDR4, 128-bit interface, TX2i operating @ 1600 MHz w/ECC
eMMC	32 GB eMMC 5.1 (boot source)
SATA SSD	Optional 2.5” radiation tolerant 1TB SATA SSD in Aitech ASSD™ embedded in the flight configuration only Contact an Aitech representative for more info.

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I/O

		I/O Configuration
		00
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		–
SDI Input 480/60i, 576/50i, 720/60p, 1080/60i, 1080/30p, dedicated H.264 encoder		–
Gigabit Ethernet (10/100/1000Base-T)		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"] (estimate)
Weight	< 1 kg [2.2 lbs.] (estimate)

Power

Input Power	• 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	• ≤5W idle • 8-10W under typical CUDA load • 20W 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		Arathane 5750
Bench Handling		MIL-STD-810F, Method 516.5, Procedure VI
Total Ionizing Dose		> 1.5 krads (Si)(2)
Single Event Effects		Watchdog Mitigated with no more than one Type-2 SEFI per 158 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 with final characterization to be done for updates at the box-level characterization later in 2021.

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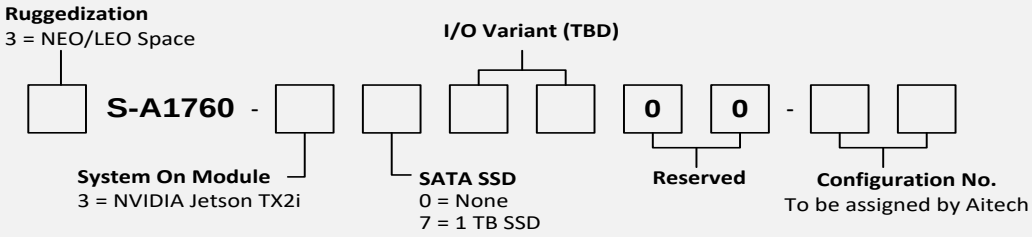
Ordering Information



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

Optional Accessories

MCS1760-1-00	Set of Front Panel Mating Connectors
TCSA1760-SK (Starter Kit)	• External Power Supply • J1 Power Cable • J2 I/O Cable

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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.

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for Germany, Austria and Switzerland:

EMCOMO Solutions AG
Industriestr. 10
89231 Neu-Ulm

Ph: +49 (731) 8803510
aitech@emcomo.de

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