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**
- **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
- **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
  - 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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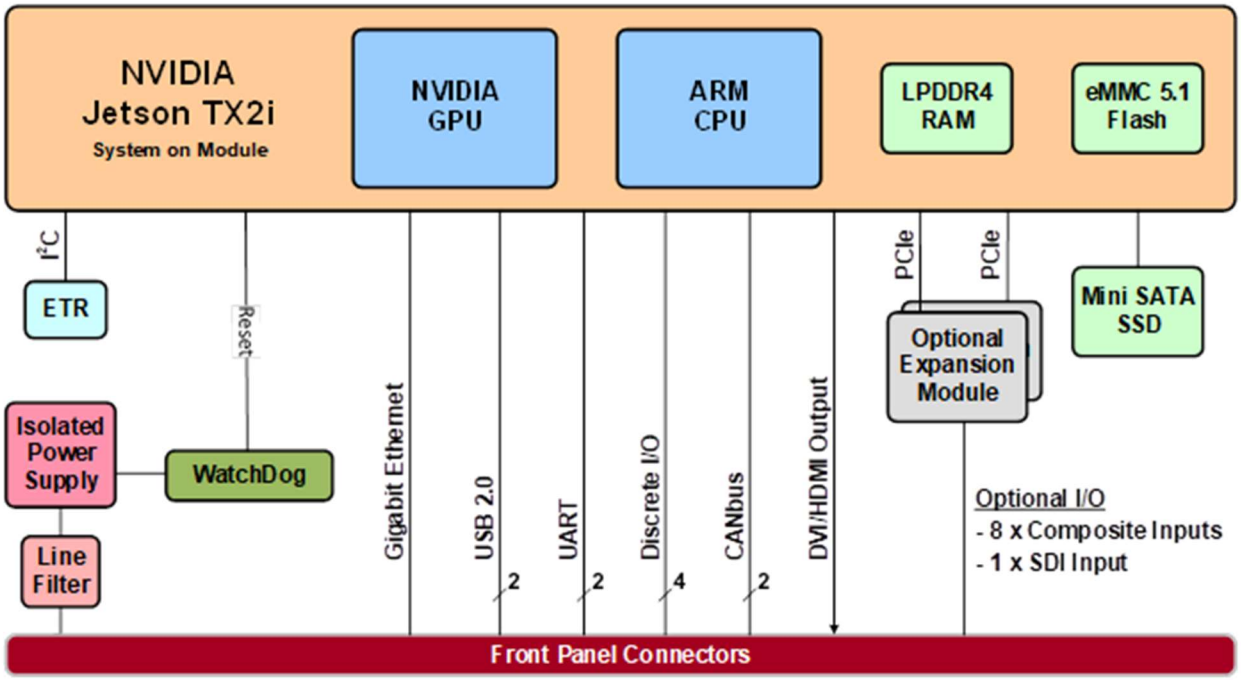

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System Architecture

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
Expansion Options	Main board accommodates up to two optional I/O expansion modules. Available options include: • Composite Frame Grabber • SDI Frame Grabber 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)
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

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 Mini SATA SSD with Quick Erase support (standard SSD options are listed in *Ordering Information* 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)		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	TBD
Weight	TBD

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	• ≤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		Arathane 5750
Bench Handling		MIL-STD-810F, Method 516.5, Procedure VI
Total Ionizing Dose		< 15 krad (Si)
Single Event Effects		Watchdog Mitigated with no more than one Type-2 SEFI per 60 days at the ISS orbit
EMI/RFI		MIL-STD-461

Notes: (1) System on Module power modes are user configurable via software

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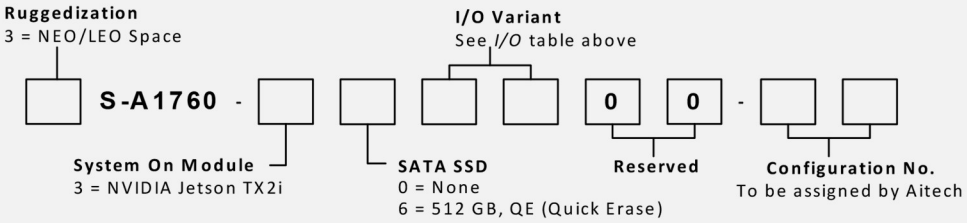

Available Configuration-3S-A1760-300000-00

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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

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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