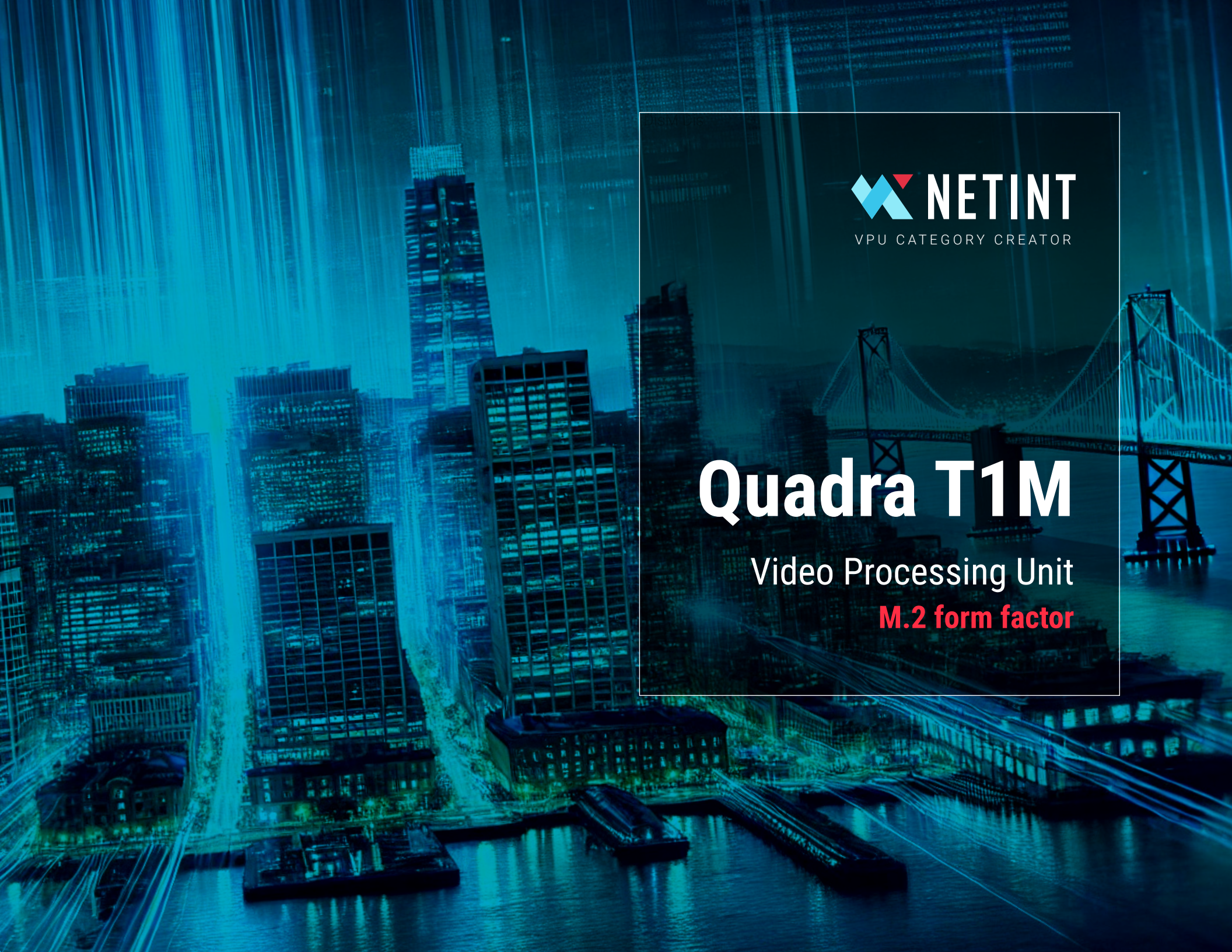
NETINT
VPU CATEGORY CREATOR
Quadra T1M
Video Processing Unit
M.2 form factor

Quadra T1M

VPU in M.2 form factor

Quadra is the Emmy award-winning VPU (Video Processing Unit) family unlocking new levels of cost efficiency, performance, and video quality for streaming platforms and services around the world.

NETINT's T1M video processing unit extends this legacy with its incredible performance envelope and ultra-compact size. Built for OEM hardware applications, the T1M will benefit from having a purpose-built video processing and encoding engine.

T1M Target Applications:

- **High Density Video Encoding & Streaming**
- **Digital Signage / Video Walls**
- **Security and Surveillance**
- **Cloud PC / VDI**

T1M is built on the Quadra Codensity G5 ASIC, optimized for enterprise-class video transcoding at scale and infrastructure efficiency through high encoding density, multi-codec hardware support and easy integration into media workflows.

T1M employs a dynamic, intelligent power-savings methodology to balance and optimize performance within the constraints of the low power M.2 specification enabling up to 4Kp60 support for space and thermal constrained systems.

Real-time and ultra-low latency (ULL) video platforms and services can utilize T1M in their x86 and Arm-based servers to reduce video infrastructure cost and carbon emissions as compared to software-based video encoders and transcoders, while maintaining high fidelity broadcast video quality.

The Quadra T1M module is a custom PCI Express M.2-2260 (M-Key) compatible design using a 30x60mm board that can be used in small form factor cloud or edge applications.

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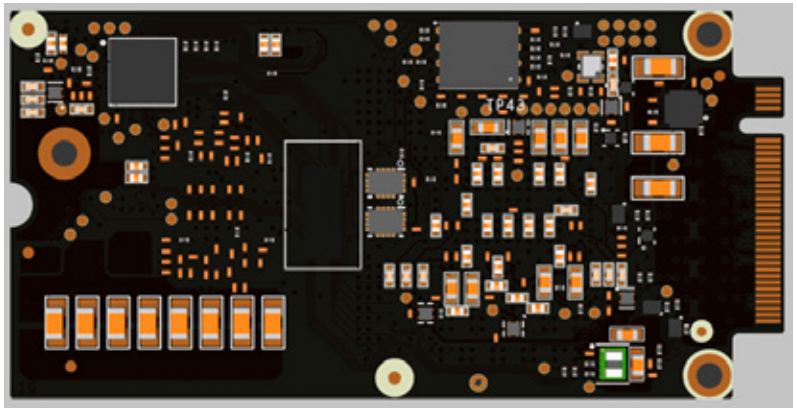
T1M Product Module

Top View



Bottom View

Standards & Throughput

Video Encoding Standards/Formats	AVC/H.264 Baseline, Main, High, High 10 HEVC/H.265 Main, Main 10 AV1 Main JPEG YUV 420 8 bit/10 bit Encoding. HDR10/10+, HLG HRD, VBR, FIXP, CBR, CRF, ROI SEI/Meta Data Insertion, Closed Captions and Look Ahead
Video Decoding Standards/Formats	AVC/H.264 Baseline, Main, High, High 10 HEVC/H.265 Main, Main 10 VP9 Profile 0, Profile 2 JPEG YUV 420 8 bit/10 bit Decoding HDR10/10+, HLG SEI/Meta Data Extraction Closed Captions and Error Concealment
2D Processing Engines	Cropping and Padding, Scaling, Video Overlay YUV and RGB Conversion
Software Integration	Windows, MacOS, Linux and Android OS Support *(See Quadra Quickstart Guide for OS version support)* Virtual machine and container virtualization support Single Root I/O Virtualization (SR-IOV) libxcoder API for encoding, decoding, and 2D support Libavcodec, a library of codecs, for video and audio FFmpeg / GStreamer integration
Performance / Throughput *(Restricted to M.2 Power Limit)*	**Encode**: Up to 20x 1080p30 Up to 5x 4Kp30 **Decode:** Up to 25x 1080p30 Up to 6x 4Kp30 **Transcode** Up to 20x 1080p30 Up to 4K-4K: 2 Streams @ 30 FPS **ABR Ladder:** Up to 10 Ladders @ 30 FPS Input: 1080p Outputs: 1080p, 720p, 352p (cif30), 352p (cif15)

Technical Specifications

Form Factor	Custom PCI Express M.2-2260 (M key) compatible design
ASIC	G5
Dimensions	Without heatsink = 30 mm x 60 mm x 4.3mm (over PCB 2.1mm) With heatsink = 30mm X 60mm X 17.2mm
Weight	Without heatsink = 24g
Power	Standard M.2 Adapter Spec: < 10W Max Under Full Load Power supply input +3.3V with ±5% variation Max Power Input Current (standard M.2 adaptor): 3.5A (average) Max Power Input Current (standard M.2 adaptor): 5A (peak) No special power sequence required
Compliance	NVM Express 1.4 PCI Express 3.0
PCIe Endpoint	4x Lanes, PCI Express Gen 3.0 ECRC Generation and Checking Advanced Error Reporting (AER) Function Level Reset Legacy Pin Base Interrupt MSI-X Hardware Controller Latency Tolerance Reporting (LTR)
Memory Configuration	64bit Single Channel, LPDDR4-3200 4GB Memory
Operating Temperature	Operation Ambient Temperature: +0 to +35° C (300LFM active airflow with heatsink) Temperature monitoring (In band and out of band) Thermal Throttling Activation: +70° C composite temp Thermal Shutdown: +80° C composite temp
Absolute Maximum Ratings	+3.3V min = -0.5V, +3.3V max= 3.6V Non-Operation Storage (Ambient) Temperature: -55 to 95° C
Storage and Handling	Transportation temperature (ambient) -40° C to +85° C Maximum Storage Life 5 years from shipment to customer Storage humidity 30% to 70% RH
Certifications	FCC, CE, EU, RoHS, REACH, HF, WEEE and UL
Usage	24/7 Operation

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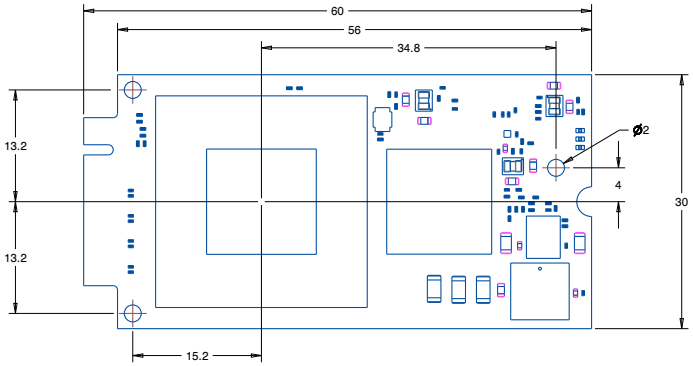
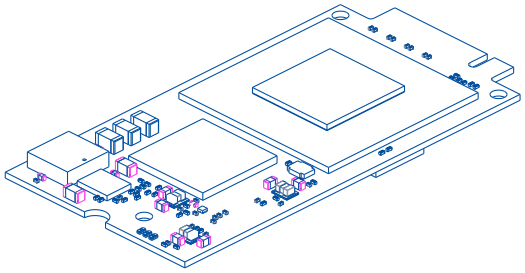
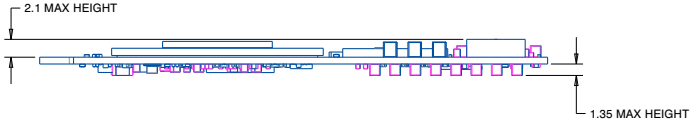
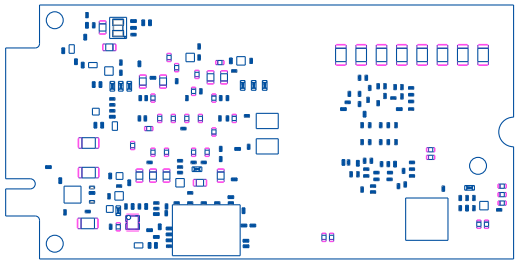
Mechanical Drawings: T1M (PCBA)



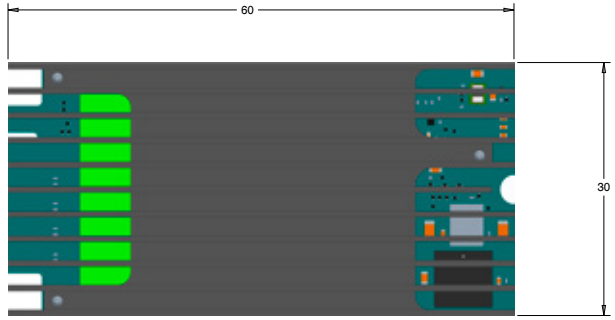


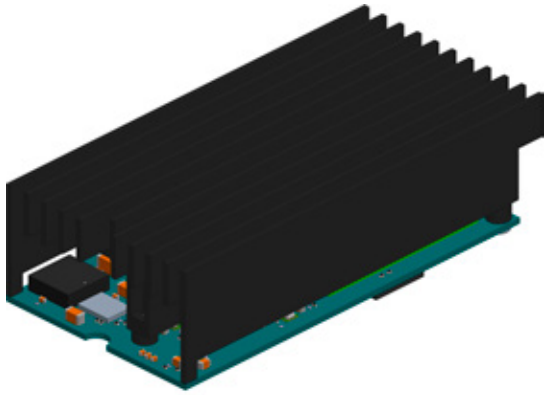


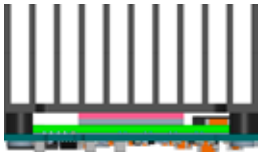


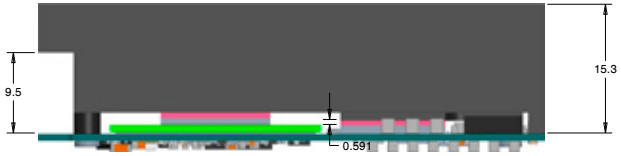
PROJECT: QUADRA T1M	
INSERT MODEL GEOMETRIC TOLERANCE FRAME HERE: TOLERANCES PER ASME Y14.5M-1994 STANDARD	UNITS: MM [INCHES] UNLESS SPECIFIED OTHERWISE
DATE: JULY 8, 2024	SCALE: 4.000
DESIGNER: T KEMP	SIZE: D
SPECIFICATIONS: SEE NOTES	SHEET: 1 of 1
DOCUMENT NUMBER: QUADRA-T1M-PCB-NO-HSINK	REVISION: A
TITLE: QUADRA T1M PCB ASSEMBLY	3RD ANGLE PROJECTION
NETINT Vancouver | Toronto | Shanghai	306 - 3500 Gilmore Way, Burnaby, British Columbia, V5G 0B8, Canada Netint.ca

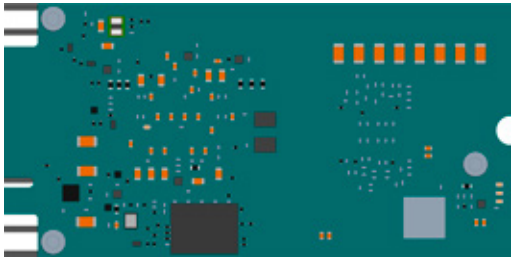
Mechanical Drawings: T1M with heatsink











PROJECT: QUADRA T1M	
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DATE: MAY 16, 2024	SCALE: 4.000
DESIGNER: T KEMP	SIZE: D
SPECIFICATIONS: SEE NOTES	SHEET: 1 of 2
DOCUMENT NUMBER: QUADRA-T1M-PCB	REVISION: D
TITLE: QUADRA T1M PCB ASSEMBLY	3RD ANGLE PROJECTION
NETINT Vancouver | Toronto | Shanghai	306 - 3500 Gilmore Way, Burnaby, British Columbia, V5G 0B8, Canada Netint.ca

M.2 Connector Pinout and Used Signals

The T1M Video Processor Unit meets compliance for both +1.8V and +3.3V I/O voltage requirements.

PCIe signals are defined from the M.2 connector point of view.

Supports SMBUS function with 1.8V interface based on the M.2 socket 3 (M-Key) specification.

Note: using higher voltages like 3.3V can damage the T1M VPU.

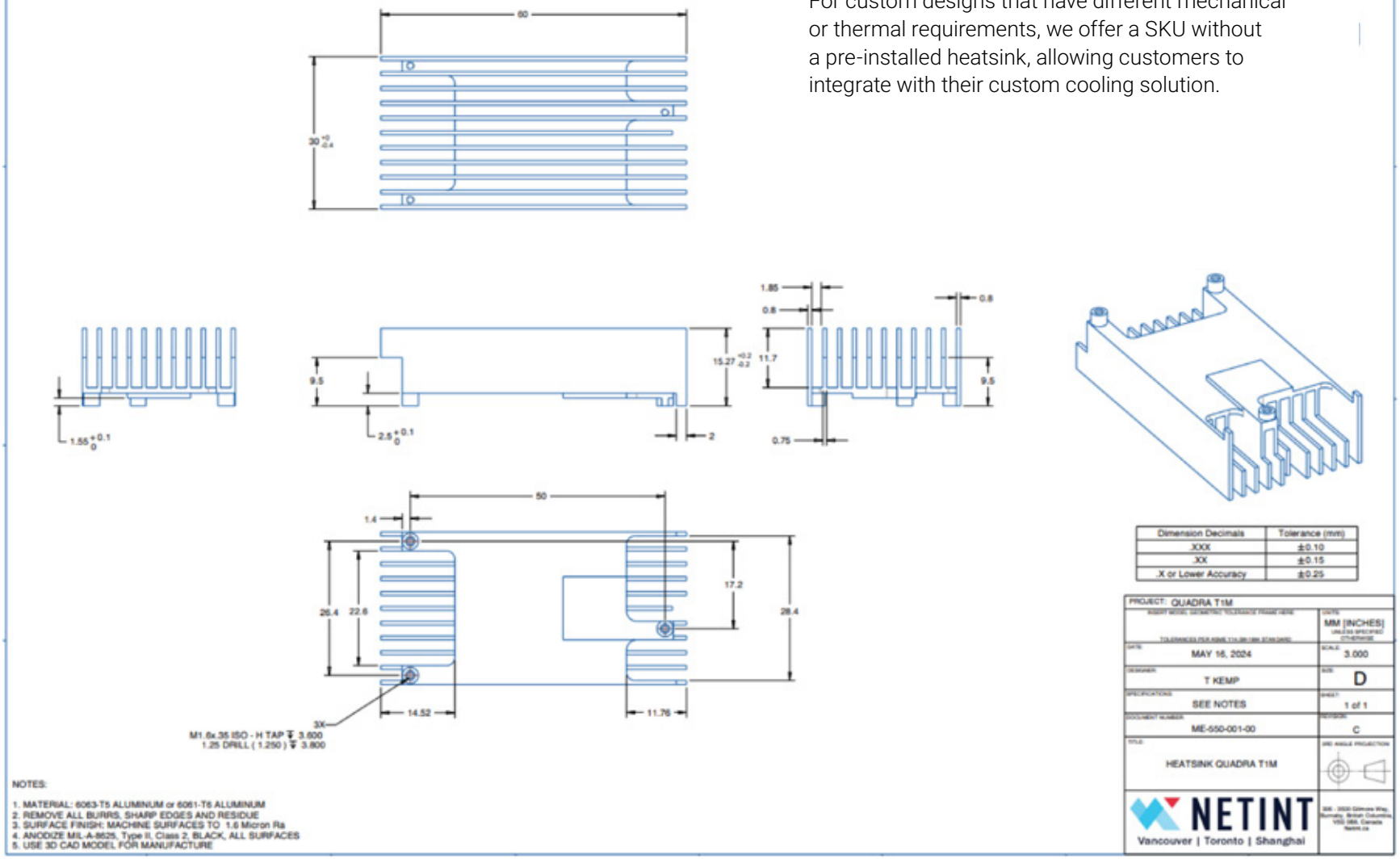
Number	Signal	Comments
1	GND1	
3	GND2	
5	PERn3	T1M Module PCIe TX
7	PERp3	T1M Module PCIe TX
9	GND3	
11	PETn3	T1M Module PCIe RX
13	PETp3	T1M Module PCIe RX
15	GND4	
17	PERn2	T1M Module PCIe TX
19	PERp2	T1M Module PCIe TX
21	GND5	
23	PETn2	T1M Module PCIe RX
25	PETp2	T1M Module PCIe RX
27	GND6	
29	PERn1	T1M Module PCIe TX
31	PERp1	T1M Module PCIe TX
33	GND7	
35	PETn1	T1M Module PCIe RX
37	PETp1	T1M Module PCIe RX
39	GND8	
41	PERn0	T1M Module PCIe TX
43	PERp0	T1M Module PCIe TX
45	GND9	
47	PETn0	T1M Module PCIe RX
49	PETp0	T1M Module PCIe RX
51	GND10	
53	REFCLKn	PCIe REF CLK
55	REFCLKp	PCIe REF CLK
57	GND11	
67	NC9	
69	PEDET	not connected (PCIe)
71	GND12	
73	VIO_CFG	+1.8V or ignore
75	GND13	

Number	Signal	Comments
2	3.3V1	+3V3 Power
4	3.3V2	+3V3 Power
6	PWRDIS (I)	Power Disable, active high
8	PLN# (I)	Power Loss Notification
10	LED1# (O)	LED control, active low
12	3.3V3	+3V3 Power
14	3.3V4	+3V3 Power
16	3.3V5	+3V3 Power
18	3.3V6	+3V3 Power
20	NC1	
22	VIO 1.8V	not in use
24	NC2	
26	NC3	
28	NC4	
30	PLA_S3# (O)	Power Loss Acknowledge (not in use)
32	GND14	
34		USB full-speed interface
36		USB full-speed interface
38	GND15	
40	SMB_CLK(I/O)	SMBUS CLK
42	SMB_DATA(I/O)	SMBUS DATA
44	ALERT#(O)	SMBUS ALERT
46	NC5	
48	NC6	
50	PERST# (I)	PCIe RESET#
52	CLKREQ#(O)	always active low
54	PEWAKE#(O)	not in use
56	MFG_DATA	NETINT defined
58	MFG_CLOCK	NETINT defined
68	SUSCLK(I)	not in use
70	3.3V7	+3V3 Power
72	3.3V8	+3V3 Power
74	3.3V9	+3V3 Power

T1M Module Thermal Management

The T1M module with a NETINT supplied heatsink is designed to operate at 0-35° C with a minimum airflow of 300LMF. Engineered for power efficiency, the module complies with the M.2 specification.

For custom designs that have different mechanical or thermal requirements, we offer a SKU without a pre-installed heatsink, allowing customers to integrate with their custom cooling solution.



Quadra T1M VPU in M.2

This product is available for large quantity OEM applications. If you are interested in discussing how to get T1Ms into your video product, please contact us.

Quadra VPU Product Line

		Quadra Video Servers		Mini Server	Smart VPU T1U	Smart VPU T1A	Smart VPU T2A	OEM VPU T1M
Architecture		x86	ARM	x86				
CPU		AMD® EPYC	Ampere® Altra Max	Intel® 13th Gen i7				
Server Chassis		Supermicro® 1114S-WN10RT	Supermicro Mega DC ARS-110M-NR	Advantech® Vega 6321				
ASIC Hardware		10x T1Us		T1M	G5	G5	2x G5	G5
Size / Form Factor		1RU		1RU Half Rack	U.2	AIC	AIC	M.2
Power Consumption		~500W		~138W	17W	20W	40W	8-10W
Artificial Intelligence		150 TOPS		0	15 TOPS	15 TOPS	36 TOPS	0
Software		Preloaded with NETINT Bitstreams™ Live stream workflow automation and management tool						
Performance	**Encode**	320x 1080p30 80x 4Kp30 20x 8Kp30		20x 1080p30 5x 4Kp30	32x 1080p30 8x 4Kp30 2x 8Kp30		64x 1080p30 16x 4Kp30 4x 8Kp30	20x 1080p30 5x 4Kp30
	Decode	480x 1080p30 120x 4Kp30 30x 8Kp30		25x 1080p30 6x 4Kp30	48x 1080p30 12x 4Kp30 4x 8Kp30		96x 1080p30 24x 4Kp30 8x 8Kp30	25x 1080p30 6x 4Kp30
Codecs	**Encode**	H.264, HEVC, AV1, JPEG, HEIF, AVIF						
	Decode	H.264, HEVC, VP9, JPEG						
Features		Capped bitrate CRF / scaling / cropping / padding / graphic overlay / color conversion						

We were first.

We created the VPU category to exponentially reduce costs, shrink server footprint and expand global reach.

100,000
VPUs sold

ONE TRILLION
minutes streamed

NETINT

sales@netint.com
netint.com