

11th Gen Intel® Core™ H-Series platform EN 50155 Fanless Computer; Compliant for Rolling stock Applications



ADVANTECH

Advantech ITA-580 Empowers Rapid Digital Transformation In the Railway Industry

[Learn more](#)



Super-cap UPS

Virtualization

24 – 110VDC wide range
power in

ITA-580 Series

Target Markets and Applications

Video AI Assistant /
AI inference



Hybrid

Autonomous trains, **Obstacle detection, PPL counting**

Critical Controller
of Train



Xeon+ECC

Edge server, **Virtualization**

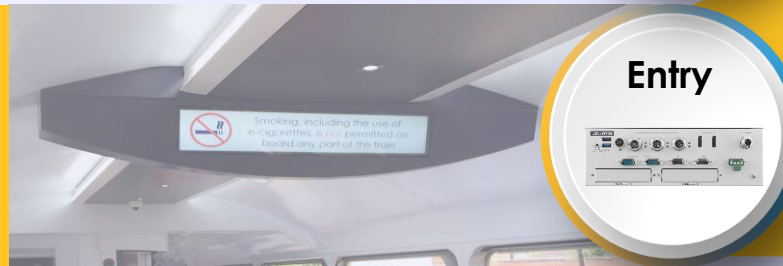
Application
Oriented



Performance

Datalogger, **VMS**, NVR,
Connectivity of Wi-Fi 6 & 5G (T2G)

General
Controller



Entry

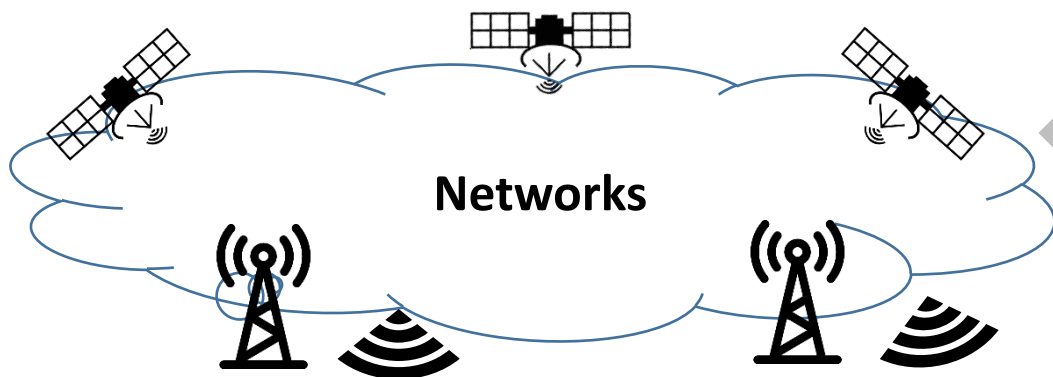
Security gateway, Com.
Gateway, Infotainment,
Diagnostic, PIS

ITA-580 enhances new features and aims to new application in **red color**

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User Scenarios and Value Proposition

Mobile Data management



Control center



Monitor/ control /
communication

5G Train to Ground

WiFi 6 In station / Infotainment

Product offering

New

Existing

PPL counting

i7+MXM

Cybersecurity

LAN bypass & TPM

Gateway(TSN)

SuperCap battery

AI

i7+MXM

Virtualization

SuperCap battery

Infotainment

PIS

LAN bypass

Datalogger

SuperCap battery

ITA-580

(Xeon + ECC + TSN)

ITA-580

(Celeron with LAN by-pass)

ITA-580G (Developing)

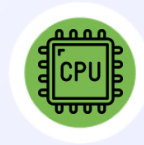
(i7+ MXM module)

ITA-580

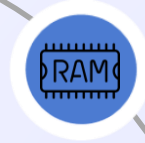
(i5/ i7 + iDoor / expansion)

Product Introduction

EN 50155 Compliant Rolling Stock Computer



11th Gen. Intel® Core H and Xeon series



Soldered 8/16GB DDR4 + 1 SO-DIMM, up to 32GB
ECC featured by ITA-580-W9A2



3 x 2.5 GbE, M12 X-Coded
LAN#1 featured TSN, LAN#2/3 support LAN By-pass)



Wide range 24 – 110Vdc power-in



2 x mPCIe + 3 x M.2



1 x PCIe x16



TPM 2.0



ITA-580 vs. ITA-5831

Category	ITA-580	ITA-5831
CPU	11 th Gen Xeon and Core i7 / i5 / Celeron	6 th Gen Core i7/i5/Celeron
PCH	RM590E	QM170
Memory	Onboard 8 / 16GB + 1 x SO-DIMM, DDR4 3200MHz, Max. 32 GB, ECC featured by RM590E	Soldered 8GB / 16GB + 1 x SO-DIMM, DDR4 2133MHz, Max. 32GB
Ethernet	LAN 1 / 2 / 3: i226-IT, up to 2.5 GbE LAN#1 support TSN; LAN:2 / 3 supports bypass	LAN: 1 / 2 / 3: i210-IT
Expansion slot	2 x mPCIe(Full size) / 2 x M.2, 3052 B+M key for 5G + 1 x M.2, 2230 A+E key for Wi-Fi 6	3 x mPCIe(Full size)
	Expanded thru. iDoor PCM-24D2R4 (2 x Ports Isolated RS-422/485, mPCIe) PCM-27D24DI (24 x Isolated Digital I/O with counter, mPCIe) PCM-26D2CA (2 x Isolated CANBus, mPCIe) ITA-EM-BA62-0001	ITA-EM-SR61-00A1E ITA-EM-CN61-00A1E ITA-EM-BA61-00A1E
SATA port	4 x SATA + 1 x mSATA	3 x SATA + 1 x mSATA
USB	4 x USB3.2 (Type-A) + 1 x USB2.0 (M12 A-Coded)	2 x USB3.0 (Type A) + 1 x USB2.0(M12 A-Coded)
COM	2 x COM RS-232 / 422 / 485	2 x COM RS-232 / 422 / 485
Display port	2 x DP (max resolution up to 4096 x 2304 at 60 Hz)	1 x DVI-I
TPM	TPM 2.0	
PCIe	1 x PCIe16	
Power in	Wide range 24 – 110Vdc	24 / 48 / 72 / 110Vdc
Dimension	260(W) x 197(D) x 88(H)mm	220(W) x 198(D) x 88(H)mm

ITA-580 vs. Others

01



Reliability

CPU, PCH and memory are soldered on mainboard for anti-vibration and shock

03



Storage

1 * mSATA +
4 * SATA up to 31.2 TB,
configurable RAID 0,1,5,10 for
critical application and data mgmt..

02



Wide range DC-IN

Wide range DC input to
cover independent
24/48/72/110Vdc and all
type of train

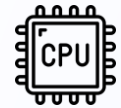
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Type approval

Full complied for EN
50155:2021, EN 50121-3-2,
EN 50121-4, , EN 45545 ,
NFPA 130

Compelling Features



Intel® 11th Gen. platform

Performance raised up 68% vs.6 Gen. and Longevity

Global no.1 performance rolling stock computer



Virtualization Ability

Multi-tasks acceptable

All application in one unit



TSN / TCN

Field bus protocol conversion, low latency

Reliably determine, safe data transmission



LAN Bypass

For failover recovery

Redundant connectivity to communicate with other devices



Supercap-based power module

Safety shutdown

Data and hardware protection



Built-in PCIe16 signal

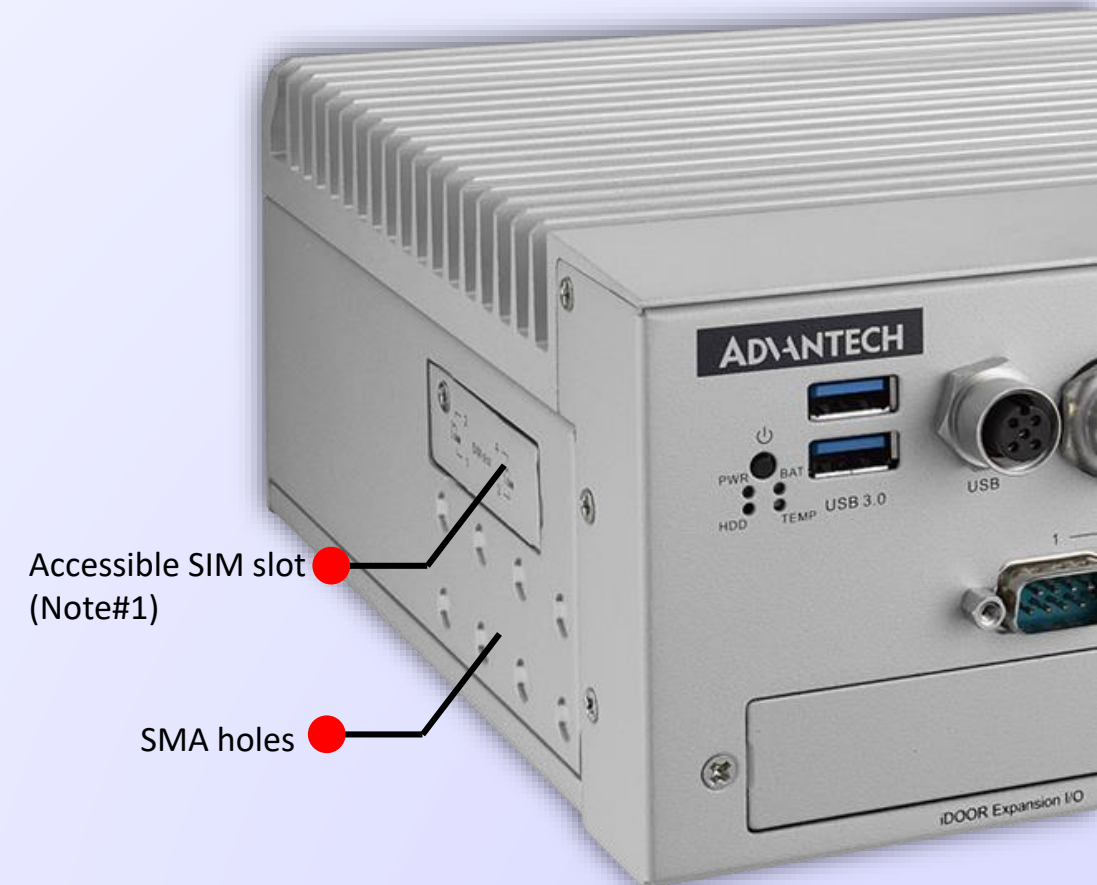
Flexible to customize

Easy to fit-in for any requirement

Add-on Module Compatible Guide

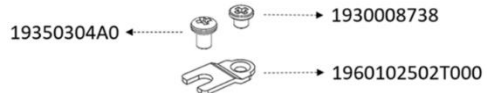
Feature	Availability	Category	P/N
M.2 B+M key	2	5G	AIW-356DQ series
M.2 A+E key	1	Wi-Fi 6	AIW-170BQ-001
Accessory	1	3042 to 3052 Extension kit	1960102502T000 *1 1930008738 * 1 19350304A0 * 1
mPCIe (Full size)	2	GPS	AIW-212HU-001
		COM (iDoor)	PCM-24D2R2
		DI/O (iDoor)	PCM-27D24DI
		Ethernet (iDoor)	XYT-EMPL-G203-W1
			1700034613-01 + 1960107546N001
		Half to full size Extension kit	9656EWMG00E

Please contact sales representative for RED certificate



Note#1: M.2 B+M key slot supports dual micro SIM cards

Add-on Module Compatible List

Category	Feature	P/N	Description	Accessory
M.2 slot (3052, 3042, 2230)	5G	AIW-356DQ	5G NR FR1 /LTE FDD/LTE TDD/WCDMA, M.2 3052 module B key, W/O SIM holder; w/o voice function	Internal RF cable 1751000625-01 * 4
	Wi-Fi	AIW-170BQ-001	IEEE 802.11ax (2.4GHz+5GHz+6GHz)+BT 5.3, Tri-band Dual Concurrent, 2T2R (industrial grade)	Internal RF cable 1751000648-01 * 2
	3042 to 3052 Extension kit	1960102502T000 *1 1930008738 * 1 19350304A0 * 1	3042 to 3052 of M.2 extension kit 	
iDoor/mPCle (Full size)	GPS	AIW-212HU-001	u-blox NEO-M9N, Industrial Multi-GNSS (GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS) module, 92-channel, Accuracy 1.5m CEP	1750006264 *1 1750007991-01 * 1 (external ant.)
	Half to full size Extension kit	9656EWMG00E	Half-size to Full-size Mini PCle Bracket Pack (1960047454T000 x 1, 1930003278 x 2)	
	COM	PCM-24D2R2	2-Ports Isolated RS-232 mPCle, DB9	iDoor bracket 1960065854N001
	DI/O	PCM-27D24DI	24-Channels Isolated Digital I/O with counter mPCle, DB37	
	Ethernet	XYT-EMPL-G203-W1	Dual GbE LAN module wide temp, mPCle	1700034613-01*1
		1960107546N001	iDoor bracket for 2 M12 X-Coded (Printed LAN4 - 5)	
		1960107546N002	iDoor bracket for 2 M12 X-Coded (Printed LAN 5 - 6)	

SuperCap-Based Power Backup Solution



Specification:

1. Supercap-based, 2400 watt-second
2. 500,000 times of charge/discharge cycle
3. OC and OV protection design
4. Power duration approx. 2 -3 mins @ 10 watt
5. Operating temperature from -25 to 55°C (OT1)

ITA-EM-BA62-00A1E Benefits

1. Data storage and safety shutdown within 2 - 3 mins
2. Auto-detect and control power state by embedded controller
3. Offers APP (Windows) and SDK (Windows / Linux) for user's quick set and integrate
4. Supercap-based battery module
5. Long lifecycle and high reliability
6. Compliant with EN 50155



An optional accessory kit for ITA-5231 / 580 / 520 series

Standardization for Time to Market

PPL counter / analysis



Wayside safety system



Obstacle detection



Inspection



Auto / unman pilot

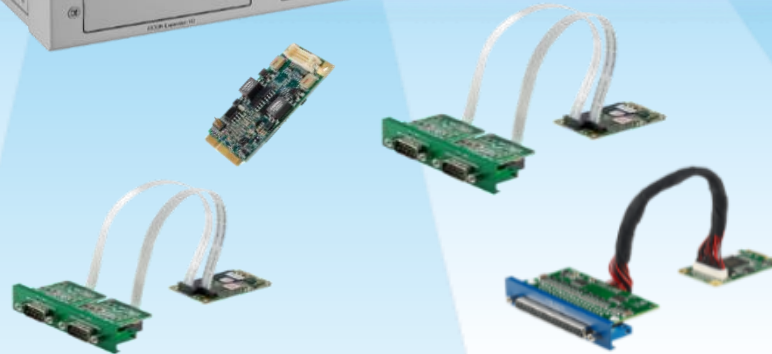


Building standardize product from PoC and PoV to field side through modularization

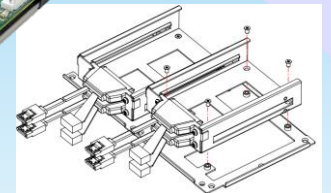
- Standardization
- Quick time to market
- Fulfill diverse application
- Reducing customized efforts



Wireless communication



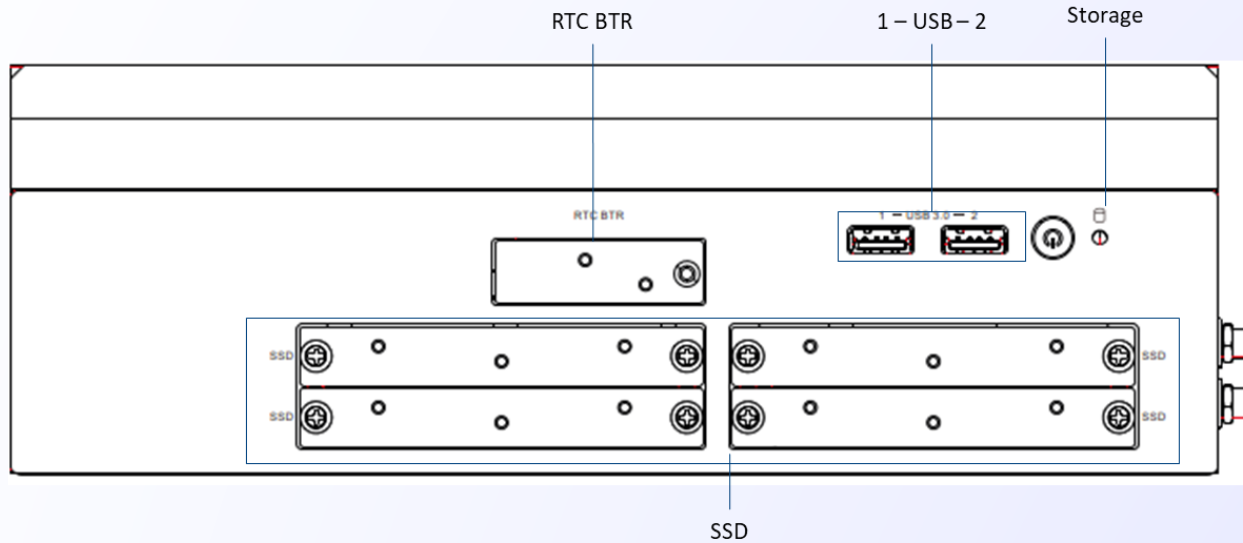
iDoor expandable I/O



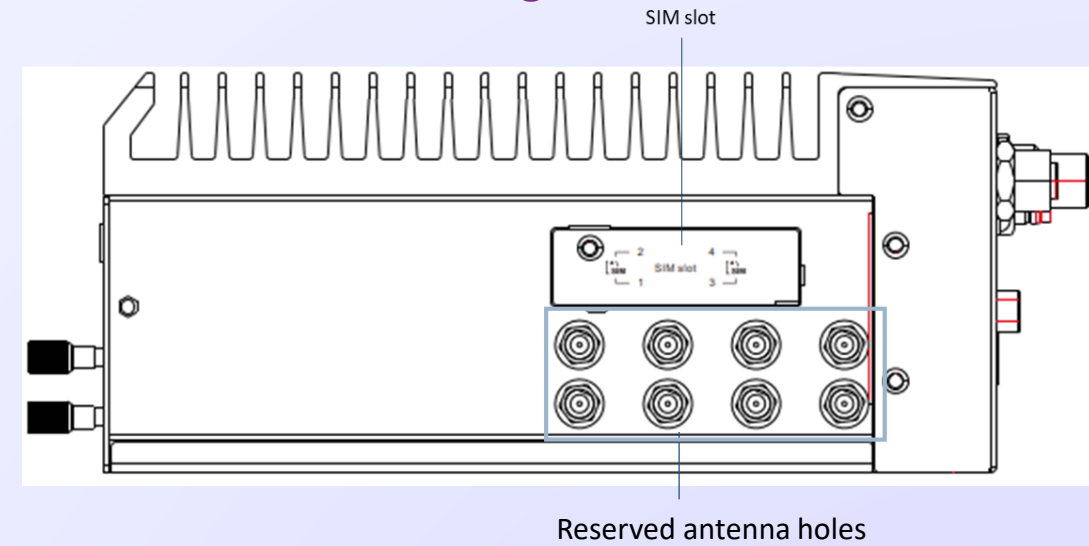
Battery / SSD kit

I/O Indication

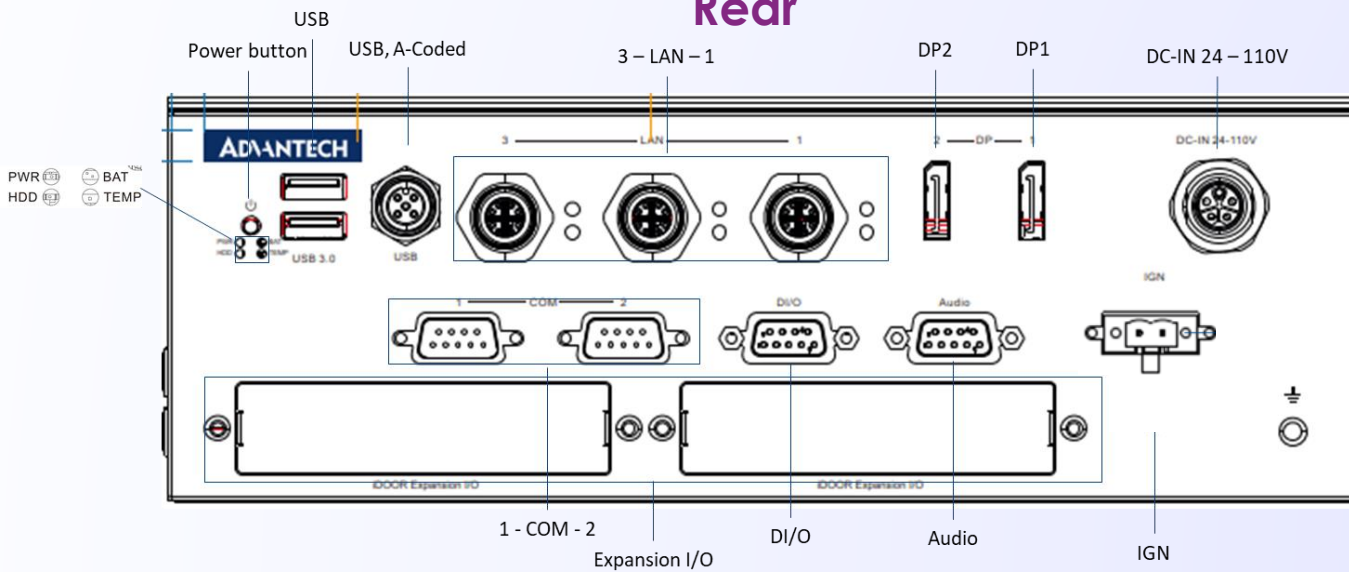
Front



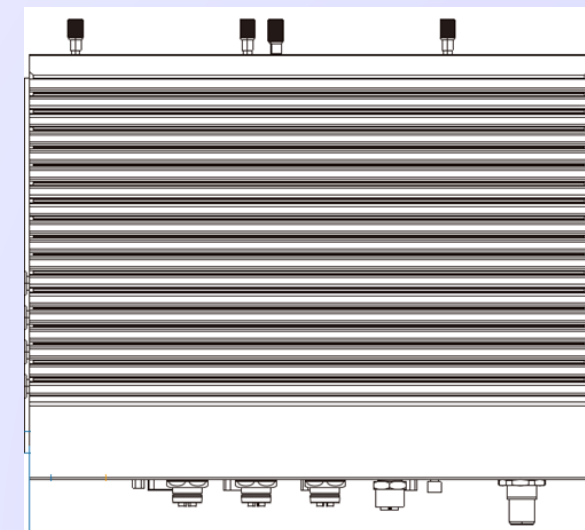
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Rear

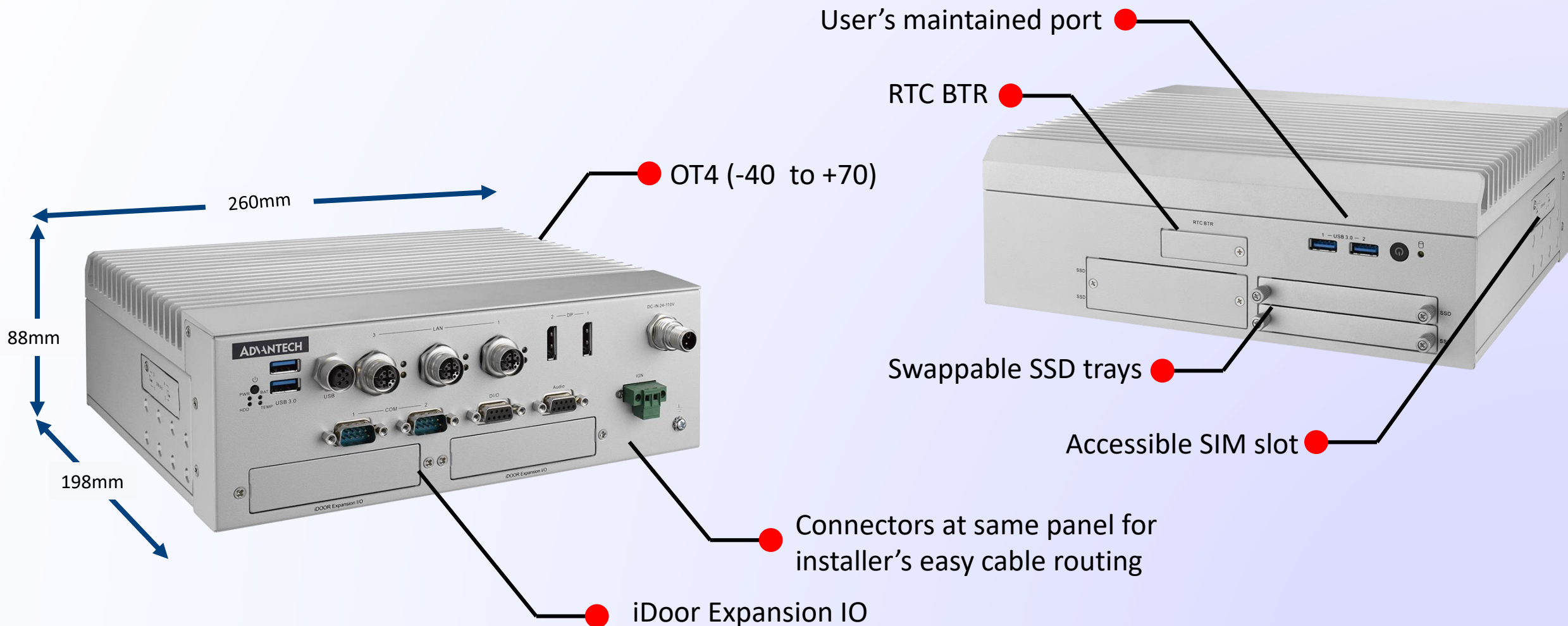


Top



Outlook

Friendly installation & Design for easy maintenance



260 x 198 x 88mm(W x D x H) / 314 x 197.2 x 95 mm (with mounting kit)

Product Offering

Part number	ITA-580-W9A2	ITA-580-W7A2	ITA-580-W5A1	ITA-580-W0A1
Feature	Description			
CPU / PCH	Xeon W-11865MLE / RM590E	i7-11850HE/ RM590E	i5-11500HE/ RM590E	Celeron® 6600HE/ RM590E
Cores/Threads	8 P-core / 16T	8 P-core / 16T	6 P-core / 12T	2 P-core / 2T
Memory	16GB, DDR4 3200MHz + 1 SODIMM, up to 32GB		8GB, DDR4 3200MHz + 1 SODIMM, up to 16GB	
ECC	V	n/a		
TSN	Yes			
LAN bypass	Optional	Optional	Optional	V
Common spec.	a. 2 x DP port			
	b. TPM 2.0			
	c. 3 x 2.5 GbE, M12 X-Coded			
	d. 2 x COM (RS-232/485/422)			
	e. 1 x Audio mic-in + line-out in DB9			
	f. 4 x USB3.2 Type-A + 1 USB2.0 in M12 A-Coded			
	g. 4 x removable 2.5” SSD tray + 1 mSATA			
	h. 2 x mPCIe / 2 x M.2 B and E key (3042, 3052) / 1 x M.2 A+E Key (2230) / 1 x PCIe16 thru. MCIO connector			
	i. Wide range 24 – 110Vdc power input			
Dimension (W x H x D)	260 x 197 x 88mm (W x D x H) / 314 x 95 x 197.2 mm / 12.36 x 3.74 x 7.76 inch with mounting kit			
Ingress Protection	IP40 rating			
Ambient Temperature	EN 50155 OT4 (-40 ~ 70 °C)			
Shock and Vibration	IEC 61373 body mount class B			
Interruptions of Voltage Supply / Supply Change Over	Class S2: 10 ms interruptions / Class C1: at 0,6 Un during 100 ms without interruptions			
Railway certification	EN 50155:2021, EN 50121-3-2:2019, EN 50121-4:2019, EN 45545-2:2020			
EMC, Safety	CE, FCC Class A, CCC, UL, CB, BSMI			

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Ordering Information – Model: ITA-580

Part Number	Description
ITA-580-W9A2	Xeon, W-11865MLE+RM590E, 16GB RAM with ECC, DC-IN 24V-110V
ITA-580-W7A2	i7-11850HE+RM590E, 16GB RAM, DC-IN 24V-110V → Hot selling
ITA-580-W5A1	i5-11500HE+RM590E, 8G RAM, DC-IN 24V-110V → Hot selling
ITA-580-W0A1	Celeron 6600HE+RM590E, 8G RAM, LAN#2/3 with bypass, DC-IN 24V-110V



M12 K-Coded	Part Number	Processor	Onboard RAM	ECC	Ethernet M12 X-Coded	USB2.0 M12 A-Coded	USB 3.2	mPCIe / M.2	2.5" SSD	mSATA slot	COM	Digital I/O	DP port
24V _{DC} ~ 110V _{DC}	ITA-580-W9A2	W-11865MLE	16GB	Yes	3	1	4	2 / 3	Up to 4	1	2	4DI/4DO	2
	ITA-580-W7A2	i7-11850HE	16GB	N/A	3	1	4	2 / 3	Up to 4	1	2	4DI/4DO	2
	ITA-580-W5A1	i5-11500HE	8GB	N/A	3	1	4	2 / 3	Up to 4	1	2	4DI/4DO	2
	ITA-580-W0A1	6600HE	8GB	N/A	3	1	4	2 / 3	Up to 4	1	2	4DI/4DO	2

Optional list

Part Number	Description
ITA-EM-BA62-00A1E	SuperCap-based, 2400 watt-second, 500,000 charge/discharge cycles, OCP and OVP design, operating temperature from -25 to 55°C
FRU-ITAUSB-0002	External M12 A-Coded 4P(F) to USB type-A 50cm
FRU-ITALAN-0003	External M12 X-Coded 8pin(M) Male to RJ45 (F) 100cm
FRU-ITAPWR-0004	External M12 K-Coded 5 pin Female power cable 100cm
FRU-ITAAUD-0001	Audio cable: DB9 (F) -> 3.5mm audio jack, Mic-in and Line-out, 20cm

Part Number	Description
FRU-ITASSD-0001	2 layers of SSD kit
FRU-ITAWL-0001	Heat-sink set of module
1960065854N001	Bracket for iDoor expansion module

SSD tray as optional, not in default configuration

ITA-580G empowers rolling stock with AI to drive efficiency, safety, and passenger experience forward!



- **11th Gen Intel® Core™ H-Series platform with RM590E**
- **Fanless MXM GPU design and support NVIDIA® embedded GPU**
- **Real-time graphic analysis catering to AI Applications**
- **With an MXM GPU module conforming to EN 50155 and EN 50121-3-2/EN 50121-4 standards**
- **SKY-MXM modules provide product life support extending beyond 5 Years**
- **Wide range 24 - 110VDC power input, compliant with EN 50155**



11th Gen. Intel® Core H platform

Soldered 16GB DDR4 + 1 SO-DIMM, up to 32GB

3 x 2.5 GbE, M12 X-Coded

Wide range 24 – 110Vdc power-in

2 x mP1Ce + 3 x M.2

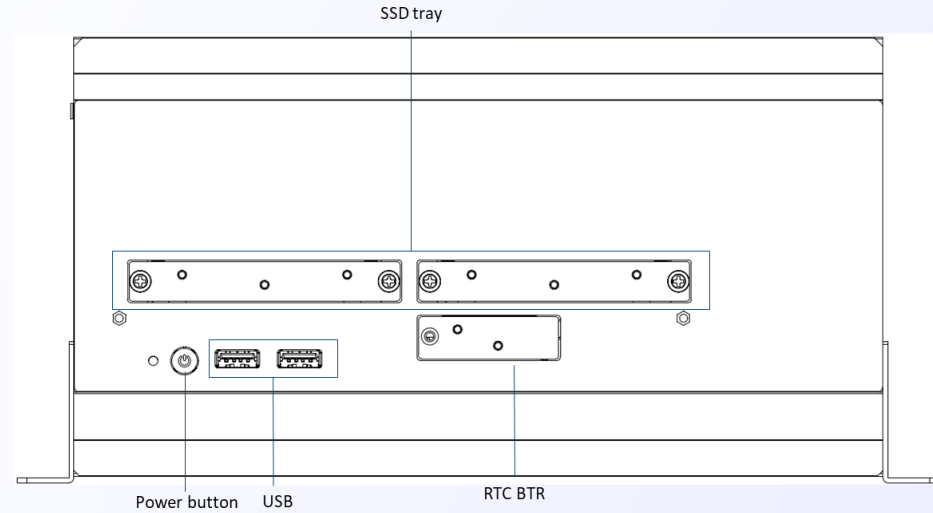
1 x PCIe16 for MXM GPU module expansion

TPM 2.0

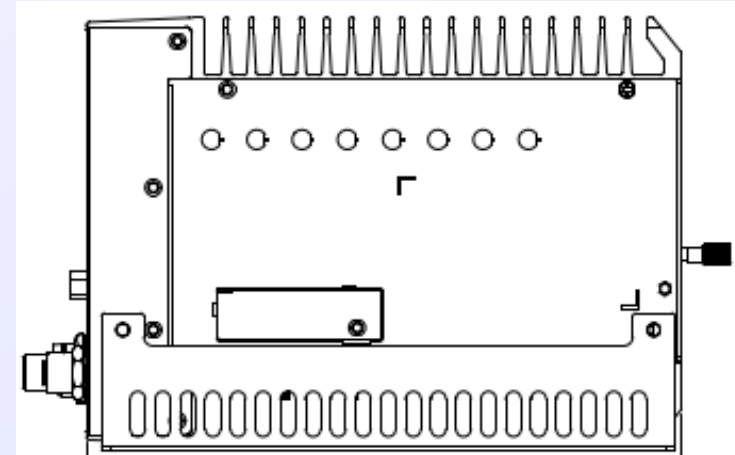


I/O Indication

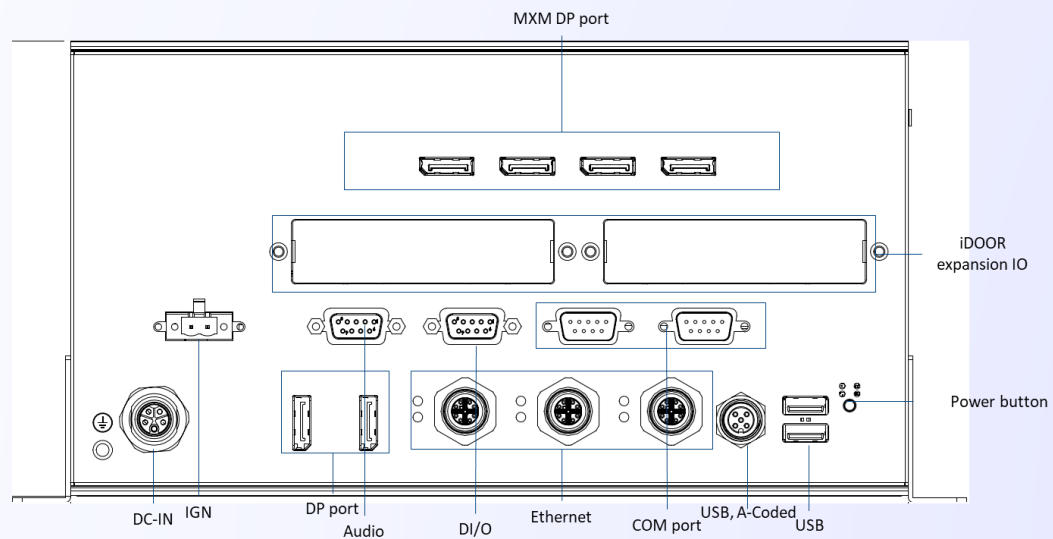
Front



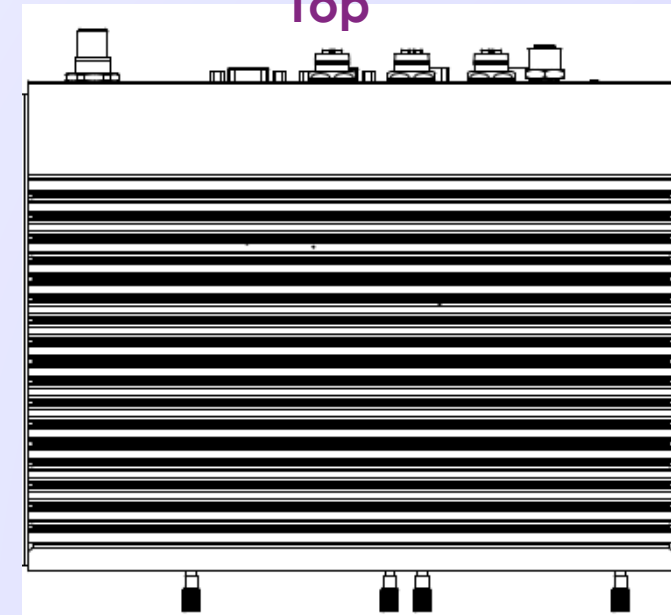
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Rear

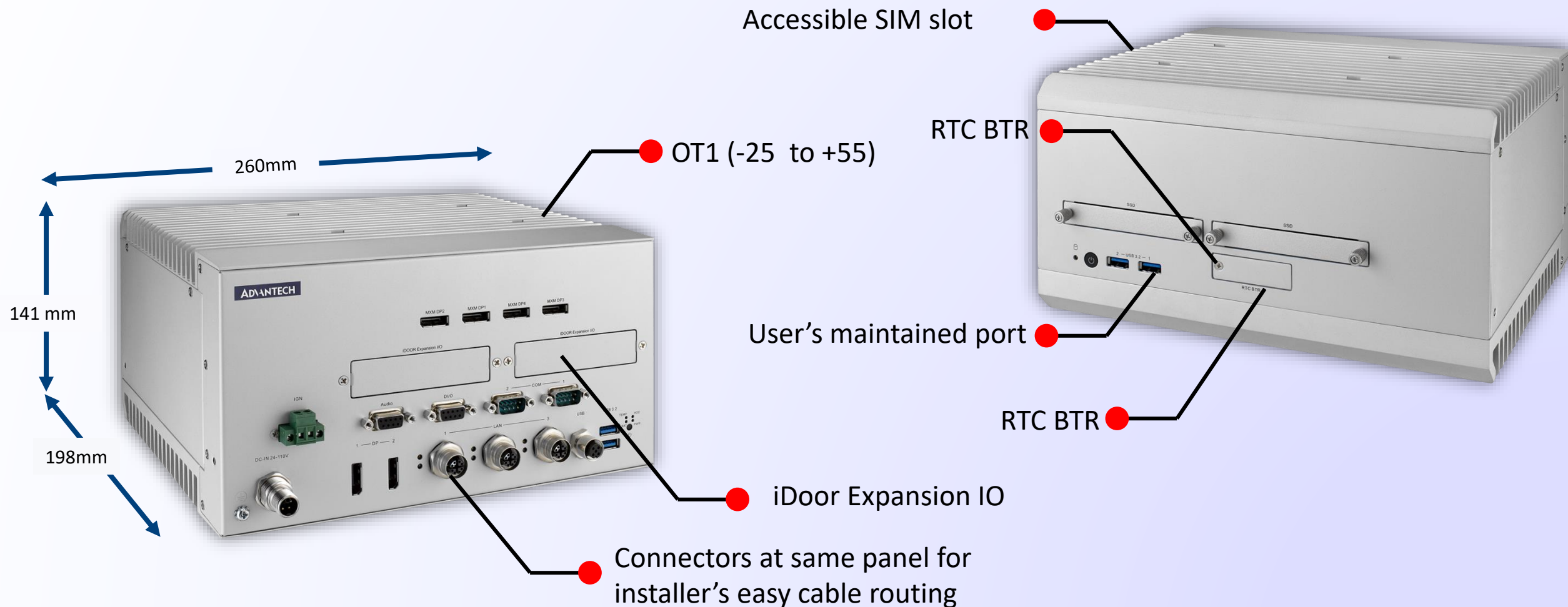


Top



Outlook

Friendly installation & Design for easy maintenance



260 x 198 x 141 mm(W x D x H) / 296 x 197.2 x 142.9 mm (with mounting kit)

MXM GPU Lineup Ready for ITA-580G

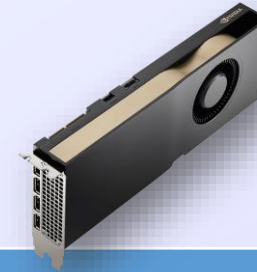
The New Era of Embedded GPU Choice



MXM Type A

Advantech MXM GPU Card – SKY MXM Series				
Model	2000A	A2000	A1000	A500
Architecture	Ada-Lovelace	Ampere	Ampere	Ampere
CUDA Cores	3,072 CUDA®	2,560 CUDA®	2,048 CUDA®	2,048 CUDA®
RT / Tensor	24 RT / 96 TC	20 RT / 80 TC	16 RT / 64 TC	16 RT / 64 TC
Memory	8GB	8GB	4GB	4GB
FP32	12.8 TFLOPS	8.25 TFLOPS	6.66 TFLOPS	6.54 TFLOPS
TGP Power	60W	60W	60W	35W

Quadro MXM GPU and PCIe GPU Comparison



Category	Quadro SKY-MXM GPU Module	GeForce PCIe GPU Card
Form Factor	Mobile PCI Express Module	PCI Express Graphics Cards
Power consumption	35-115 watt	30-300 watt
Thermal Solution	Fan-less or fan-based	Fan-based
Longevity	5+ Years, extended lifecycle program	Various between 1 and 2 years
Features & Benefits	Anti-vibration and shock wide range temp operation	Highest performance

Quadro SKY-MXM Selection Table

Advantech PN	RTX 2000A	RTX A2000	RTX A1000	RTX A500
	SKY-MXM-2000A-8SDA	SKY-MXM-A2000-8SDA	SKY-MXM-A1000-4SDA	SKY-MXM-A500-4SHA
GPU Architecture	Ada-Lovelace	Ampere	Ampere	Ampere
GPU Memory	8GB GDDR6 with ECC	8GB GDDR6 with ECC	4GB GDDR6	4GB GDDR6
Memory Interface Max Clock	128 bit 8000 MHz	128 bit 7000 MHz	128 bit 7000 MHz	64 bit 7000 MHz
Memory BW	256 GB/s	224 GB/s	224 GB/s	112 GB/s
CUDA Cores	3072	2560	2048	2048
RT Cores	24	20(2nd)	16(2nd)	16(2nd)
Tensor Cores	96	80(3rd)	64(3rd)	64(3rd)
Tensor Tflops (Dense/Sparse)	52/104	34/66	26/52	25/50
Max FP 32 Per f	12.8	8.64	6.66	6.54
GPU Clock Boost Clock	1635 MHz 2115 MHz	1117 MHz 1612 MHz	1192 MHz 1624 MHz	652 MHz 1597 MHz
Form Factor	MXM Type A	MXM Type A	MXM Type A	MXM Type A
Dimensions	82 (W) x 70 (D) mm	82 (W) x 70 (D) mm	82 (W) x 70 (D) mm	82 (W) x 70 (D) mm
Interface	MXM 3.1, PCI Express 4.0x8	MXM 3.1, PCI Express 3.0x8	MXM 3.1, PCI Express 3.0x8	MXM 3.1, PCI Express 3.0x4
TGP Power	60W	60W	60W	35W
Display outputs	3x DP 1.4a, HDMI 2.1 4K at 120Hz or 8K at 60Hz	4 x DP 1.4a, HDMI 2.1 4K at 120Hz or 8K at 60Hz		Headless Design No Display Output
NVENC NVDEC	1(8th Gen) 1(5th Gen)	1(7th Gen) 2(5th Gen)	1(7th Gen) 2(5th Gen)	1(7th Gen) 1(5th Gen)

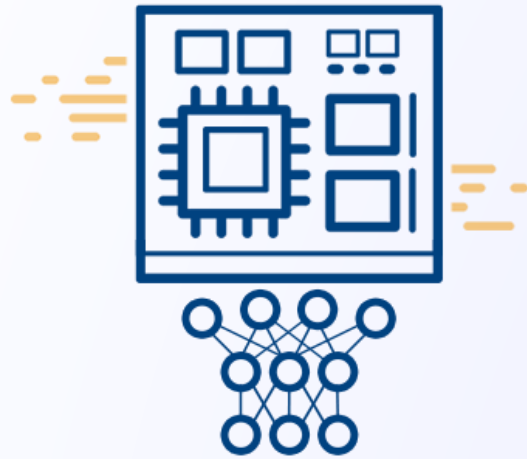
Note: Please contact your distributor or sales representative, if Quadro SKY-MXM-RTX series is required

MXM Feature Highlights



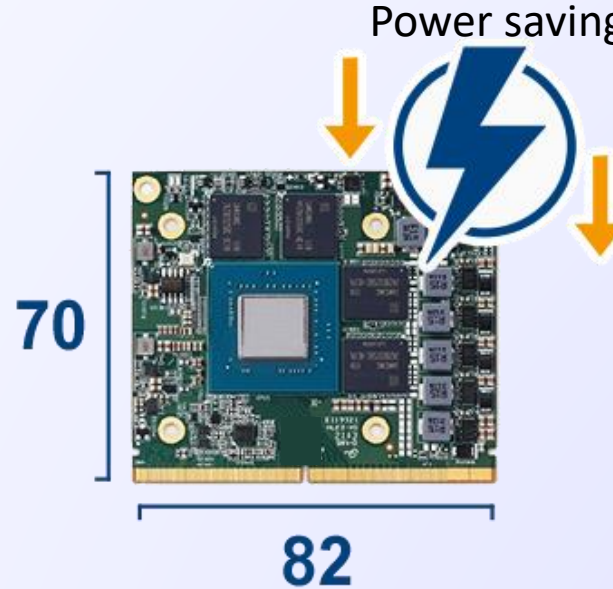
Elite
Partner

ADVANTECH



NVIDIA Certified Embedded MXM GPU Cards with High Performance

- Designed and manufactured by Advantech – NVIDIA's Elite Partner



Easily integrated into diverse x86 systems with the SKY-MXM GPU module

- High-performance, compact design, and low power consumption
- Fits in both fan and fanless systems with customized thermal solutions



Industrial Grade Design with Longevity Supports

- MXM GPU cards feature over 5-year longevity
- Extended product life support with Advantech strict quality control

Ordering Information – Model: ITA-580G

Part Number	Description
ITA-580G-W7A2	ITA-580G,i7-11850HE,16G RAM,w/MXM,24V-110Vdc



M12 K-Coded	Part Number	Processor	Onboard RAM	Ethernet M12 X-Coded	USB2.0 M12 A-Coded	USB 3.2	mPCIe / M.2	2.5" SSD	mSATA slot	COM	Digital I/O	DP port
24V _{DC} ~ 110V _{DC}	ITA-580G-W7A2	i7-11850HE	16GB	3	1	4	2 / 3	2	1	2	4DI/4DO	2

Optional list

Part Number	Description
FRU-ITAUSB-0002	External M12 A-Coded 4P(F) to USB type-A 50cm
FRU-ITALAN-0003	External M12 X-Coded 8pin(M) Male to RJ45 (F) 100cm
FRU-ITAPWR-0004	External M12 K-Coded 5 pin Female power cable 100cm
FRU-ITAAUD-0001	Audio cable: DB9 (F) -> 3.5mm audio jack, Mic-in and Line-out, 20cm
1960065854N001	Bracket for iDoor expansion module

MXM Model	Description
SKY-MXM-A500	MXM 3.1 Type A NVIDIA® Quadro® Embedded A500
SKY-MXM-A1000	MXM 3.1 Type A NVIDIA® Quadro® Embedded A1000 with DP 1.4a
SKY-MXM-A2000	MXM 3.1 Type A NVIDIA® Quadro® Embedded A2000 with DP 1.4a
SKY-MXM-2000A	MXM 3.1 Type A NVIDIA® Quadro® Embedded 2000A with DP 1.4a

Note:

1. Please see product sales kit for more detail
2. Please contact your distributor or sales representative, if Quadro SKY-MXM-RTX series is required

Leading of AI Solution Provider in Rolling Stock

1

Powered by NVIDIA

Embedded MXM GPU

2

Integrated field bus

Train communication bus & field bus communication

3

AI + Wireless comm.

Scalable AI analysis & wireless connectivity 

ITA-580G +
MXM



Radar Detection



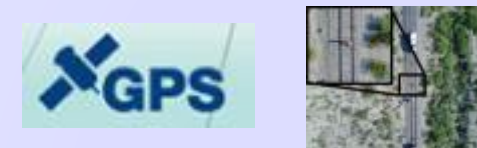
Lidar Detection



Video Detection



Geometry of Location



Summary

RAMS

R

Reliability



Full compliant to **EN 50155:2021**
EN 50121-4, EN 50121-3-2
And EN 61373

A

Availability



Useful for different type of
trains and multi-
applications

M

Maintainability



Flexible & Modularized &
SuperCap backup design

S

Safety



Cybersecurity Safety, UL
62368, NFPA 130 and EN
45545

Let's rolling stock together

ADVANTECH

Co-Creating the Future of the IoT World

