

## COMPACT AI Railway Series

Computer Vision Edge Unit with NVIDIA Jetson AGX Xavier

LTE / GNSS / Wi-Fi



Dual nanoSIM  
CFast  
microSD

image similar



DC supply

2x CAN

4x PoE LAN  
M12 x-coded

2x LAN  
M12 x-coded

2x USB 3.1

DP

## IPC/COMPACT A3 - RML

This fanless RML COMPACT-A3 generation is based on the Jetson AGX Xavier processor module and offers a wide range of interface options.

The robust and uncompromising industrial design allows the implementation in the most demanding AI railway and rolling stock applications and guarantees long term availability.

- 24/7 continuous operation
- Railway approved EN50155
- Power over Ethernet (PoE+), 48VDC out
- Passively cooled, no moving parts
- Long term availability with fixed BOM



**nvidia.** Linux for Tegra (L4T)

### Product Highlights

No moving parts / passively cooled  
Shock and vibration resistant  
Galvanically isolated railway power supply  
Each LAN interface has its own dedicated NIC  
Long term availability (fixed BOM)  
Maintenance free  
Goldcap instead of battery backup for RTC

### Product Features

512-Core NVIDIA Volta™ GPU with 64 Tensor Cores  
8-Core ARM v8.2 64-bit NVIDIA Carmel CPU  
32GB 256-Bit LPDDR4x RAM soldered on board  
Storage options: NVMe M.2 2280 & CFast  
Ethernet, USB, Passive or Active CAN  
LTE, GNSS and WiFi options  
Aluminum & stainless steel housing

### Industries / Applications

Railway (rolling stock)  
Transportation



Processor module / Performance		
NVIDIA Jetson AGX Xavier (JAX)   512-Core NVIDIA Volta™ GPU with 64 Tensor Cores		
8-Core ARM v8.2 64-bit NVIDIA Carmel CPU		
AI Performance	32 TOPs	32 TOPs
Memory / Storage		
Data L3 Cache Size	4MB	4MB
256-Bit LPDDR4x RAM soldered on board	32GB	32GB
eMMC 5.1 Flash Storage on board	32GB	32GB
microSD Card socket	1	1
M.2 2280 Key M socket (for NVMe SSD) <sup>2</sup>	1	1
CFast socket with retention frame <sup>2</sup>	1	1
Features		
Inertial measurement unit (IMU) STMicroelectronics ISM330DHCXR	on request	on request
Real time clock (RTC) with goldcap backup (charge holds typ. 48h)	•	•
Communication Interfaces		
Graphic interface	DisplayPort 1.2	DisplayPort 1.2
USB version 3.1 (10 Gbit/s) (Type A)	2	2
Internal USB version 2.0 OTG <small>behind the cover</small> (micro USB Type AB)	1	1
Ethernet 10/100/1000 BASE-T (M12 female x-coded)	2	2
Power over Ethernet - IEEE802.3at 10/100/1000Mbit PSE - Power sourcing equipment, producing 48VDC out (M12 female x-coded)	4 (total max power: 39W)	4 (total max power: 39W)
CAN 2.0A / CAN 2.0B (active/passive), CAN FD supported, isolated (DSUB9)	2	2
RS232 / RS422/485 (DSUB9)	on request	on request
Digital I/O's, 24VDC (up to 4 inputs & 4 outputs)	on request	on request
Analog input <sup>1</sup> , 0-20mA or -10...+10V / 0... 30V <small>(16bit resolution Accuracy: +/- 0.1%)</small> (up to 4 inputs)	on request	on request
Mini PCIe socket <sup>2</sup> - used for extensions depending on configuration	2 full-size / 1 half-size	2 full-size / 1 half-size
MIPI CSI-2 / GMSL 1&2 Camera interface <sup>1</sup>	on request	on request
Wireless Connectivity		
Cellular 4G Module (LTE/UMTS/GSM) with built-in GNSS Telit LE910C4-WWX <sup>6</sup> (Dual nano SIM support)	3x SMA	none
Wireless LAN IEEE 802.11a/b/g/n/ac dual-band 2x2 MIMO & Bluetooth 5.0 Emwicon WMX6218 <sup>6</sup>	2x RP-SMA	none
High Accuracy GNSS Positioning Module w/ RTK & optional heading support <sup>1</sup> u-blox ZED F9R / F9P	on request	none
Cellular 5G Module (4G/3G fallback) with GNSS	on request	on request
Wireless LAN (Wi-Fi 6) 802.11ax/ac/a/b/g/n 2T2R	on request	on request
Technical Data		
Dimensions [mm] (housing, incl. mounting plate)	w256 x h95 x d127	w256 x h95 x d127
Net weight in gram	~2800	~2800
Isolated input voltage with ignition controller and reverse polarity protection (M12 5P male a-coded)	16.8 ... 45VDC	16.8 ... 45VDC
Interruption of voltage supply time	>10ms	>10ms
Power consumption <sup>3</sup>	depends on power mode (15W, 30W, MAXN)	
Environmental Conditions		
Operating temperature <sup>3</sup>	-25°C ... +55°C	-25°C ... +55°C
Storage temperature	-25°C ... +80°C	-25°C ... +80°C
Ingress protection standard according to EN60529	IP20	IP20
Conformal coating <sup>4</sup>	PCX	PCX
Shock	IEC/EN 61373	IEC/EN 61373
Vibration	IEC/EN 61373	IEC/EN 61373
EMC-Conformity	EN 50121-3-2(IEC 62236-3-2)	EN 50121-3-2(IEC 62236-3-2)
Fire protection (designed to meet)	EN 45545-2 HL3	EN 45545-2 HL3
Safety (designed to meet)	EN 62368-1	EN 62368-1
Radio and Telecommunication (designed to meet)	RED	none
MTBF @ 25°C ambient <small>according to Telcordia SR-332, environment GB</small>	~280 000h	~355 000h

<sup>1</sup> Please contact factory for minimum order quantities

<sup>2</sup> Internal connector

<sup>3</sup> Depending on installation situation and interface connection. Please see user documentation.

<sup>4</sup> On all possible components (excl. NVIDIA Xavier Module, connectors and wireless devices)

<sup>6</sup> These LTE and Wi-Fi modules have replaced the previously used Sierra Wireless MC7455 and SparkLAN WPEB-263ACNI(BT) due to these modules going EOL (previous products: IPC/RMLA3K22-A201S)

Product specifications subject to change without notice. | All data is for information purposes only and not guaranteed for legal purposes. Information in this data sheet has been carefully checked and is believed to be accurate. However, no responsibility is assumed for inaccuracies. Please refer to the user documentation for additional product specification.

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industrial computing

**Processor module / Performance**

NVIDIA Jetson AGX Xavier Industrial | 512-Core NVIDIA Volta™ GPU (ECC) with 64 Tensor Cores

8-Core ARM v8.2 64-bit NVIDIA Carmel CPU

Dual Arm® Cortex®-R5 in lockstep (Safety Cluster Engine)

AI Performance (INT8)

30 TOPs

30 TOPs

**Memory / Storage**

Data L3 Cache Size

4MB

4MB

QSPI NOR Flash Storage

64MB

64MB

256-Bit LPDDR4x ECC RAM soldered on board

32GB

32GB

eMMC 5.1 Flash Storage on board

64GB

64GB

microSD Card socket

1

1

M.2 2280 Key M socket (for NVMe SSD)<sup>2</sup>

1

1

CFast socket with retention frame<sup>2</sup>

1

1

**Features**

Inertial measurement unit (IMU) STMicroelectronics ISM330DHCXTR

on request

on request

Real time clock (RTC) with goldcap backup (charge holds typ. 48h)

not possible

not possible

**Communication Interfaces**

Graphic interface

DisplayPort 1.2

DisplayPort 1.2

USB version 3.1 (10 Gbit/s)

(Type A)

2

2

Internal USB version 2.0 OTG behind the cover

(micro USB Type AB)

1

1

Ethernet 10/100/1000 BASE-T

(M12 female x-coded)

2

2

Power over Ethernet - IEEE802.3at 10/100/1000Mbit

(M12 female x-coded)

4

4

PSE - Power sourcing equipment, producing 48VDC out

(total max power: 39W)

(total max power: 39W)

CAN 2.0A / CAN 2.0B (active/passive), CAN FD supported, isolated

(DSUB9)

2

2

RS232 / RS422/485

(DSUB9)

on request

on request

Digital I/O's, 24VDC

(up to 4 inputs &amp; 4 outputs)

on request

on request

Analog input<sup>1</sup>, 0-20mA or -10...+10V / 0... 30V (16bit resolution Accuracy: +/- 0.1%)

(up to 4 inputs)

on request

on request

Mini PCIe socket<sup>2</sup> - used for extensions depending on configuration

2 full-size / 1 half-size

2 full-size / 1 half-size

MIPI CSI-2 / GMSL 1&2 Camera interface<sup>1</sup>

on request

on request

**Wireless Connectivity**Cellular 4G Module (LTE/UMTS/GSM) with built-in GNSS Telit LE910C4-WWX<sup>6</sup> (Dual nano SIM support)

3x SMA

none

Wireless LAN IEEE 802.11a/b/g/n/ac dual-band 2x2 MIMO & Bluetooth 5.0 Emwicon WMX6218<sup>6</sup>

2x RP-SMA

none

High Accuracy GNSS Positioning Module w/ RTK & optional heading support<sup>1</sup> u-blox ZED F9R / F9P

on request

none

Cellular 5G Module (4G/3G fallback) with GNSS

on request

on request

Wireless LAN (Wi-Fi 6) 802.11ax/ac/a/b/g/n 2T2R

on request

on request

**Technical Data**

Dimensions [mm] (housing, incl. mounting plate)

w256 x h95 x d127

w256 x h95 x d127

Net weight in gram

~2800

~2750

Isolated input voltage with ignition controller and reverse polarity protection

(M12 5P male a-coded)

16.8 ... 45VDC

16.8 ... 45VDC

Interruption of voltage supply time

&gt;10ms

&gt;10ms

Power consumption<sup>3</sup>

depends on power mode (15W, 30W, MAXN)

**Environmental Conditions**Operating temperature<sup>3</sup>

-40°C ... +65°C

-40°C ... +65°C

Storage temperature

-40°C ... +85°C

-40°C ... +85°C

Ingress protection standard according to EN60529

IP20

IP20

Conformal coating<sup>4</sup>

PCX

PCX

Shock

IEC/EN 61373

IEC/EN 61373

Vibration

IEC/EN 61373

IEC/EN 61373

EMC-Conformity

EN 50121-3-2(IEC 62236-3-2) EN 50121-3-2(IEC 62236-3-2)

Fire protection (designed to meet)

EN 45545-2 HL3

EN 45545-2 HL3

Safety (designed to meet)

EN 62368-1

EN 62368-1

Radio and Telecommunication (designed to meet)

RED

none

MTBF @ 25°C ambient according to Telcordia SR-332, environment GB

~270 000h

~340 000h

<sup>1</sup>Please contact factory for minimum order quantities<sup>2</sup>Internal connector<sup>3</sup>Depending on installation situation and interface connection. Please see user documentation.<sup>4</sup>On all possible components (excl. NVIDIA Xavier Module, connectors and wireless devices)<sup>6</sup>These LTE and Wi-Fi modules have replaced the previously used Sierra Wireless MC7455 and SparkLAN WPEB-263ACNI(BT) due to these modules going EOL (previous products: IPC/RMLA3K22-A201E)

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