



## IPC/RML-R 81

This fanless RML-R COMPACT81 generation is based on the Intel® Atom™ E3900 (Apollo Lake) processor technology and offers a wide range of interface options. The robust and uncompromising industrial design allows the implementation in the most demanding rolling stock applications and guarantees long term availability.

- **Railway approved (EN50155 & EN45545)**
- **24/7 continuous operation**
- **M12 connectors for Power and LAN**
- **Shock and vibration resistant**
- **Full -40...+85°C on component level**



### Product Highlights

Each LAN interface has its own dedicated NIC  
 Power Ignition controller  
 Inertial Measurement Unit (IMU)  
 GNSS with dead reckoning  
 Fanless, No moving parts  
 Maintenance free  
 Long term availability

### Product Features

Intel® Atom™ E3900 Series  
 up to 2.0GHz, 4 Cores  
 RAM soldered on board 8GB  
 Socket for CFast storage card  
 Gbit Ethernet, PoE, USB 3.1, CAN  
 Digital I/Os  
 Optional 5G, 4G, Wi-Fi & Bluetooth options  
 Rugged M12 connectors  
 Stainless steel housing  
 Protection class IP40

### Markets / Applications

Railway (rolling stock)  
 Transportation

**Processor / Performance**

Intel® Atom™ x7-E3950 2.00GHz (Burst)   1.6GHz Clock - Quad Core   8GB RAM	•
Intel® Atom™ x5-E3940 1.80GHz (Burst)   1.6GHz Clock - Quad Core   4GB RAM	optional

**Memory**

L2 cache	2MB
RAM DDR3L 1866MT/s soldered on board	8GB

**Features**

Inertial measurement unit (IMU) STMicroelectronics ISM330DHCXR	•
Real time clock (RTC) with goldcap backup (holds charge for 48h)	•
Hardware watchdog & Temperature supervisor	•
Intelligent power management (Ignition controller)	•
TPM 2.0 according to ISO/IEC11889 Infineon SLB9665	•

**Communication Interfaces**

DisplayPort 1.4 (up to 7680 x 4320 @ 60Hz)		1
USB version 3.1	(Type A)	2
Ethernet 10/100/1000 Mbit (Intel I210-IT) <small>Four ports can optionally be configured with PoE</small>	(M12 female x-coded)	6
CAN 2.0A/2.0B & CAN FD (PEAK FPGA chip, SJA1000 compatible), isolated, The CAN signals give no network feedback and are attached via non-volatile I/O port on the I2C bus	(DSUB9)	2
Digital I/O, 24VDC (latency <1ms)	(Weidmüller terminal block)	4 inputs, 4 outputs
Analog input, 16bit resolution, voltage input: -10 ... +10V / 0 ... 30V <small>Accuracy: +/- 0.1%</small>		optional
Analog input, 16bit resolution, current: 0-20mA		optional
CFast socket with retention frame <sup>2</sup>		1
M.2 Key B socket <sup>2</sup>	(M.2 3042)	1
M.2 Key E socket <sup>2</sup>	(M.2 2230)	1
Mini PCIe socket <sup>2</sup>		1
MicroSD Card socket <sup>2</sup>		1
Buzzer <sup>2</sup>		1
I2C bus <sup>2</sup>		1

**Wireless Connectivity**

Cellular 4G module (3G/2G fallback) Sierra Wireless EM7455 - M2M only! with dual nano SIM support		2x SMA
Wireless LAN IEEE 802.11ac/a/b/g/n/ dual-band 2x2 MIMO SparkLAN WxxB-263ACNI(BT)		2x RP-SMA
GNSS positioning module with dead reckoning u-blox NEO-M9 Module <sup>3</sup>		1x SMA
Cellular 5G module (4G/3G fallback) Sierra Wireless EM9191 - M2M only!	(4x SMA)	optional
High accuracy GNSS positioning module w/ RTK support u-blox ZED F9P module	(1x SMA)	optional

**Technical Data**

Exterior dimensions [mm]		w262 x h64 x d137
Net weight [gram]		~ 1900
Input voltage (isolated and reverse polarity protected)	(M12 4P male a-coded)	16.8 ... 45VDC
Wide input voltage 14.4 .. 137.5VDC (isolated and reverse polarity protected)	(M12 4P male a-coded)	optional
Uninterruptible power supply (UPS), interruption time of supply voltage		~ 10-15s
Current consumption typ. in mA @ 24V without Add-Ins, idle		~ 500
Power consumption typ. in Watt @ 24V without Add-Ins, idle		~ 12

**Environmental Conditions**

Operating temperature (complies with EN50155 class OT4) <sup>4</sup>		-40°C ... +70°C
Storage temperature		-40°C ... +85°C
Ingress Protection standard EN60529		IP40
Conformal coating <sup>5</sup>		PCX
Shock		EN61373
Vibration		EN61373
EMI-Conformity		EN50121-3-2
Safety (designed to meet)		EN62368-1
Fire protection		EN45545-2 HL3
Radio and Telecommunication (designed to meet)		RED
MTBF @ 25°C according to Telcordia SR-332, Environment GB, excluding optional extensions		~ 480 000h

<sup>1</sup> Please contact factory for minimum order quantities<sup>2</sup> Internal connector<sup>3</sup> NEO M9 Series, NEO-M9L (with dead reckoning) is planned, however subject to availability the NEO-M9N (without dead reckoning) may be used prior.<sup>4</sup> Depending on installation situation and interface connection. Please see user documentation.<sup>5</sup> On all possible components (excl. connectors and wireless devices)

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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