Extremely Rugged Computer Solution
based on Intel® 9th Generation Processor

General Description

The PIP40 Product Family is a high performance, low power and highly integrated Rugged Embedded Computer, based in the latest Intel technology. The solution is available in a compact aluminum housing with DIN-Rail or Flange mount, a rugged MIL IP67 enclosure, a 19" rack system or an open frame solution with cooling plate. All configurable depending on your application or needs. The design integrates standard connectors for easy connection or lockable headers, depending on housing choice or needs.

PIP40 Family Highlights

The PIP housings offer sufficient space for 2.5" SSD or other expansions like UPS, RAID..). Two mPCIe and three m.2 slots allow to expand the system very easy. The internal expansion bus allows to integrate PCIe/104 or PCIe cards. These expansion possibilities give a maximum on customization for additional interfaces and features. Particular precautions during the design have been taken that the entire system EMC is within the CE and FCC limits and standards like EN50155, IEC 60945 or MIL-STD-810 can be met.

Key features are:

- Up to 64GB DDR4 memory *
- Fanless operation, also from -40°C to +65°C
- Rugged design
- Long term availability
- Extremely flexible
- AMT / vPro support *

* depending on selected CPU

The PIP40 Family has been designed to withstand any harsh environments and extreme temperature conditions. The special rugged design, combined with the best industrial-grade components, offer high reliability and long-term performance.

All MPL products are 100% engineered & manufactured in Switzerland (since 1985).

PIP4x in standard housing with flange & LTE / WLAN

PIP4x in MIL enclosure with 1553 and removable SSD

PIP4x-S Open Frame on cooling plate

Dual PIP4x with RAID in 19" housing

The PIP40 Family is available for different Industries and is the perfect solution for industrial environments, Railway, MIL/COTS, SWaP-C applications, or whenever a rugged long-term available computer is needed.

RAIL-PIP4x used in rugged Railway Applications

OPEN-PIP4x-S for integr. in existing housings

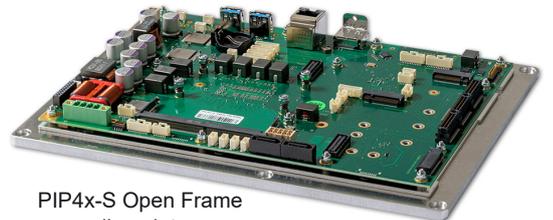MIL-PIP4x for use in Military Environments

MIL-PIP4x used in Avionics

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Technical Features

	PIP41R	PIP44R	PIP46R	PIP49R	
Processor	Celeron G4930E	Intel i3-9100HL	Intel i7-9850HE	Xeon E-2276ME	additional
# of cores / threads	2 / 2	4 / 4	6 / 12	6 / 12	CPUs are
Clock speed	2.4 GHz	1.6 / 2.9 GHz	2.7 / 4.4 GHz	2.8 / 4.5 GHz	available
Passmark	2624	6354	12258	14397	IOTG
L2 Cache	2 MB	6 MB	9 MB	12 MB	roadmap
TDP	35W	25W	45W	45W	

Board Key Data

Chipset	Intel CM246
Memory	2x dual-channel ECC DDR4 SODIMM slot, supports up to 32GB modules, total board memory 64GB* (PIP46 DDR4 only, no ECC)
BIOS	On-board soldered 32MB Flash, MPL engineered BIOS (AMI), customizable
TPM	Trusted Platform Support TPM 2.0
Watchdog Timer	Config. granularity 1-255 sec. or 1-255 min.
Indicator LED	Power, HDD, LAN

Mass Storage

SATA	2x SATA 3.0 ports
mSATA	2x mSATA Full-Mini Card combo socket with SATA 3.0 & USB 2.0
m.2	1x NVMe or SATA SSD
RAID	RAID 0/1/5/10 on SATA or mSATA (Intel RST)

Interfaces

Graphics	Display Port (DP) up to 4096x2160 (DP) and DVI-D (LVDS / eDP up to 1920 x 1200 opt.) Triple display capable, ESD protected. Gen3 PCIe port x16 (PEG) for graphic card.
USB	8x USB 3.1 ports, supports USB keyboards and mice as legacy devices 4x additional internal USB2.0 ports
LAN	AMT / vPro support*, opt. up to 5 LAN ports

depending on selected CPU

Specifications are subject to change without notice

Interfaces

Serial Ports	Internal 4x full modem TTL (optional RS232 or RS422/485 ports on DB9 connectors)
HDAudio	Intel HDAudio signals, available on a 1 mm header, sound card (HDSOUND-1) is avail.

Expansions

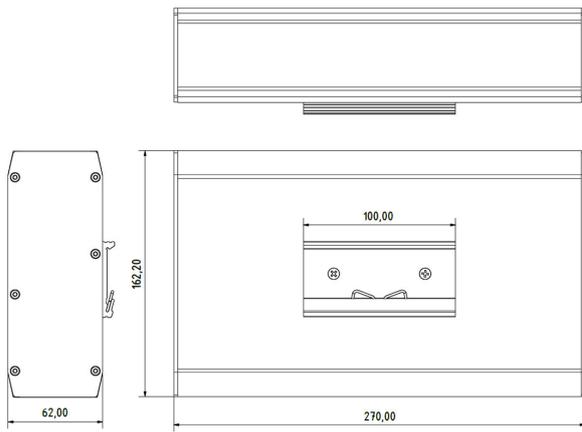|	
mPCIe	2x mPCIe PCI Express Gen3, x1 lane & USB 2.0 (combined with mSATA)
m.2	2x communication slot (1x Key-A, PCIe/USB 2.0 & 1x Key-B, USB 3.x/ PCIe/SATA), dual SIM connector
PCIe/104	1x PCIe/104 slot (4x PCIe x1 lane, x16 PEG port, 2x USB 2.0)

Power

|	
Input Voltage	10 - 36 VDC input range, ESD and EMC protected input (optionally up to 110VDC) Protection against reverse polarity, up to 150V load dump Combinded power button and ignition input
Consumption	5-100 Watt (Enhanced Speed Step Tech.)

Environment

Storage Temperature	-45°C up to +85°C (-49°F to +185°F)
Operating Temperature	-20°C to +60°C (-4°F to +140°F)
Ext. Temp. (optional)	-40°C to +85°C (optional screening) performance depends on thermal conduction
Relative Humidity	5% to 95% non condensing, optional coating available

Standard Compliance

The PIP40 Family is designed to meet or exceed the most common standards. Particular references are:

EMC	EN 55022, EN 55024, EN 61000, MIL-STD-461

  - Conducted Emissions CE   - Conducted Susceptibility CS
  - Radiated Emissions RE   - Radiated Susceptibility RS

Shock & Vibration	EN 60068
Environmental & Safety	EN 50155, EN 60601, IEC / EN 62368, MIL-STD-810

  - Low Pressure (Altitude)   - High Temperature
  - Low Temperature   - Temperature Shock
  - Contamination by Fluids   - Solar Radiation (Sunshine)
  - Rain (Wind/Blown Rain)   - Fungus
  - Salt Fog   - Sand and Dust
  - Explosive Atmosphere   - Leakage
  - Acceleration   - Vibration
  - Acoustic Noise   - Shock
  - Gunfire Vibration   - Temp, Humidity, Vibration

Approval List	CE, IEC 60945, IACS E10

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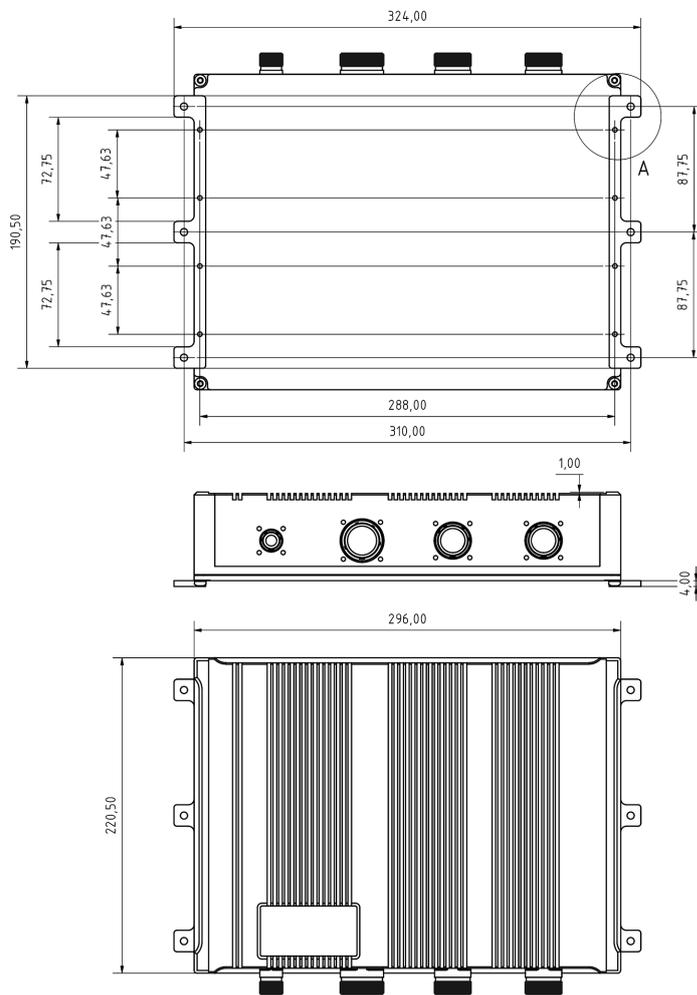**MPL**
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PIP4x DIN-Rail mount
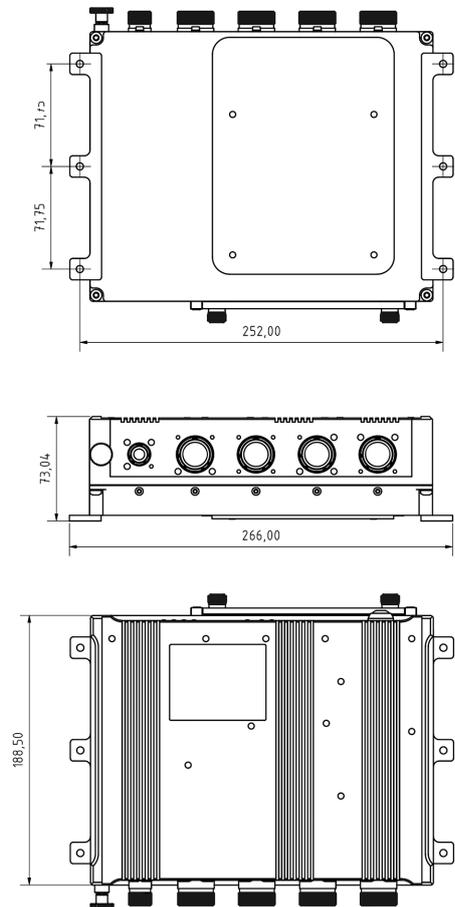optional 83/120mm depending on required features

PIP4x Flange mount
optional 83/120mm depending on required features
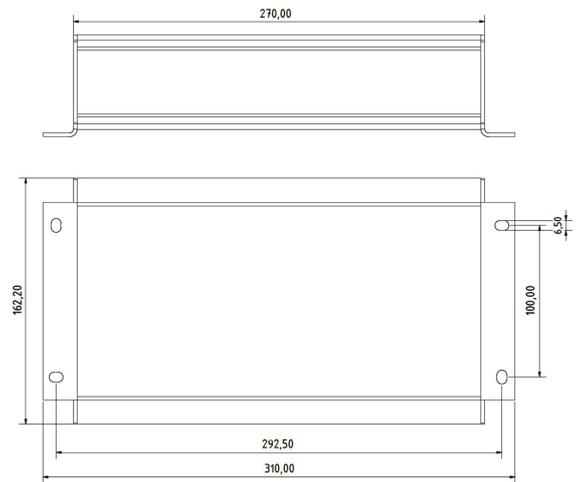
MIL-PIP4x Rugged IP67 housing

MIL-PIP4x-S Rugged IP67 housing
(short version)

Packaging

Chassis version	length		width		heights	
DIN Rail	270	x	162	x	62/83/120mm	(custom color or foil available)
Flange	290	x	162	x	62/83/120mm	(custom color or foil available)
IP67 MIL PIP4x	324	x	220.5	x	66mm (min.)	(custom housings and connectors available)
IP67 MIL PIP4xS	266	x	188.5	x	73mm (min.)	(custom housings and connectors available)
Open Frame	288/242	x	177.5	x	33mm (min.)	(custom cooling plate available)

The aluminum housings are internally chromated, externally powder coated or anodized, no ventilation holes.
The cooling plate for the open frame versions is chromated. Depopulated solutions with headers can be offered.

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Expansion Options for the PIP4x

GRIP
MXM graphic expansion

FINE
mPCIe expansion

BOLERO
integrated UPS and RAID

General Description

Although the MPL embedded processor boards are traditionally equipped quite well, special interfaces like sound or standard PCIe slots are sometimes required in industrial applications. Therefore, we provide you with a wide selection of optional expansion modules to further extend the capabilities of the MPL processor boards.

Key features are

- Low power usage
- Rugged design
- Long-term availability *
- Environment temperature up to -40°C to +85°C

MPL expansions options have been designed to withstand harsh environments and extreme temperature conditions. The special rugged design, combined with the best industrial-grade components, offer high reliability and long-term performance.

All MPL products are fanless, shock and vibration proof, low power, rugged, and long-term* available. The perfect solution for a system to be used in rugged environments.

* Typically 10 years or more, 20+ repair

PIP Options

Power options

PIP4x-SB-x	Smart battery charger 0°C to 45°C charge
SM BATT	Smart battery -20°C to 60°C discharge
PIPVIN	9-36V/18-72V/43-160V input
REDPI	Redundant power input

Mass storage options

HSRAID	Hot swap RAID expansion
SATA-REMOVE	External mass storage access

Expansion options

PIPPCIe	PCIe x16 slot expansion
PIPPMC	PMC expansion
PIPXMC	XMC/PMC expansion
FINE	mPCIe expansion (GPS, WLAN, CAN, ...)
GRIP	MXM/GPGPU graphic expansion with mPCIe slots
ICC	Customized interconnect board

Networking options

UNIGET	Gigabit Ethernet controller with PoE+
MAGBES	5-port managed Gbit switch
µMAGBES	10-port managed Gbit switch
MAXBES	10-port managed switch with 2x 10Gbit SFP+ ports
TX2FX	Fiber optical converter / unmanaged switch
µTX2FX	Media converter (copper to fiber)
UNIGET	10Gbit Ethernet controller board
µEPI	PoE for PIP
IEBY	LAN bypass solution
PIP4x-LAN-x	LAN expansion, up to 4 ports

Various add-on

DP2DVI	Dual Display expansion
SERIF	RS232/422/485 module
HDSound	Sound module

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