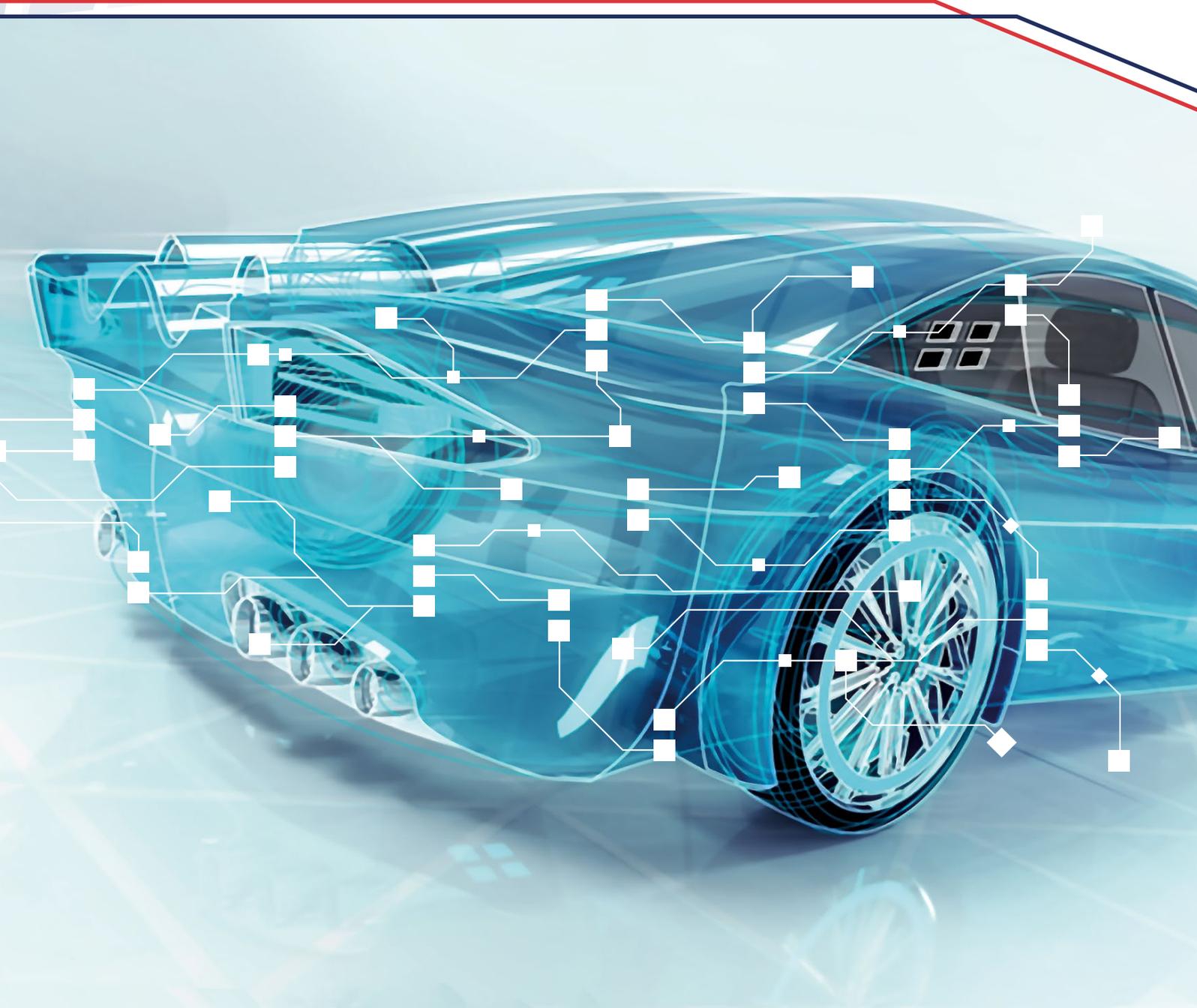


**INO****NET**

A EUROTECH COMPANY

# InoNet Automotive Solutions

**Scalable Computing Solutions  
for Vehicle Development (ADAS & AD)**



# The InoNet Automotive Computing Ecosystem

## The complete range of hardware solutions for the automotive industry

### The challenge in ADAS and AD development

The development and validation of Advanced Driver Assistance Systems (ADAS) as well as the progress in Autonomous Driving (AD) (according to ISO 26262, among others) pose significant challenges for the automotive industry to ensure functionality and safety. Vehicle sensors generate a huge amount of data that needs to be processed in near real-time during test drives. This requires high computing performance (e.g. for AI applications) under extreme environmental conditions. The in-vehicle computer must be able to withstand highest temperatures, severe shock, and vibration in reliable continuous operation. From Autonomous Driving Level 3 to 5, the number of sensors and therefore the amount of data to be collected and processed increases almost exponentially, requiring high data write rates and large mass storage.

### InoNet's solution

To meet these challenges, InoNet offers embedded solutions with enormous computing power and industry-standard ruggedness, optimally designed for in-vehicle use. They can easily withstand high temperatures, shock and vibration and are equipped with wide-range power supplies (with ignition signal support, terminal 15). With data storage capacities of up to 360 TB\* and data write rates of up to 28 GBps / 224 Gbps\*, the in-vehicle PCs are ideal for high-speed data acquisition and logging applications. The use of SSDs in either the removable frame or the QuickTray® enables fast and easy data carrier exchange even for big data. AI applications can be developed and tested both in-vehicle and in the simulation lab (e.g. HiL) by using the latest generation of high-performance GPUs and appropriate cooling technologies such as (hybrid) liquid cooling. The use of 802.1as-capable network cards also enables functions for operating a Time Sensitive Network (TSN) to synchronize sensor data using hardware time stamping.

**Liquid Cooling**



maximum computational density  
up to 164 TFLOPS (TF32)  
in a shoebox

**Largest Bandwidth**



highest data logging speed  
up to 28 GB/s sustained

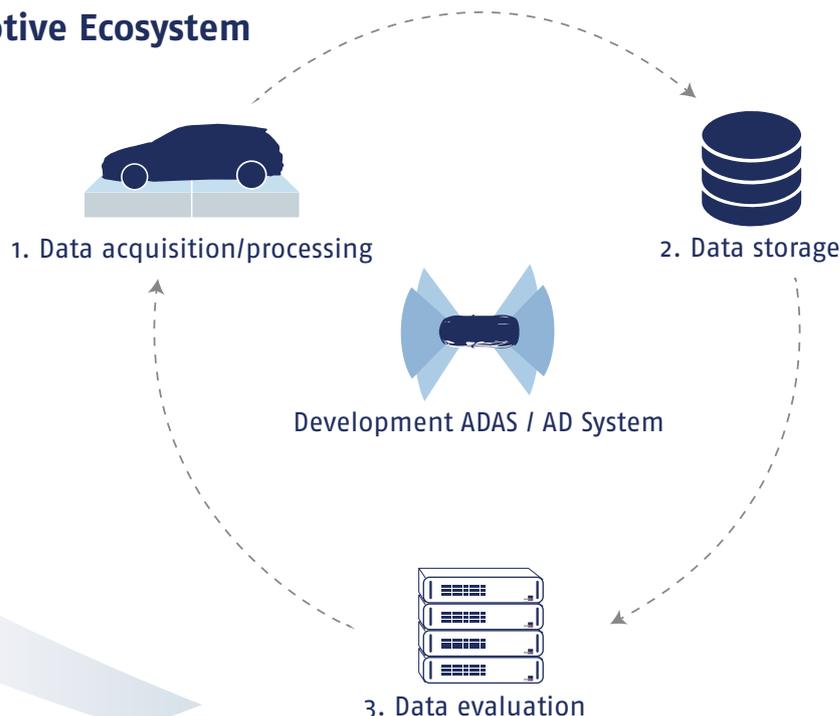
**Automotive Certified**



best-in-class ruggedization  
LV-124-1 certified

\* Depending on SSD type and manufacturer, real measured with Iometer (continuous write mode)

### The InoNet Automotive Ecosystem





# 1. Data Acquisition & Data Processing

The data acquisition and processing systems are suitable for in-vehicle recording or fusion of sensor (raw) data through a wide variety of communication interfaces and also applicable for efficient data processing using powerful CPU/GPU solutions.

## Embedded



### Conception®-hXa-v3

For sensitive audio testing in the vehicle or measurements of individual modules (brakes/ lights etc.).

## Workstation



### Conception®-tXf-L-v3

Often used as copy station but also for smaller AI applications thanks to high performance tensor card.

## Car HPC Server



### Mayflower®-B17-LiQuid

High performance computer specifically designed for ADAS and AD developments in the vehicle. Also regularly used as HiL computer.

## Gateway

### eurotech DynaGATE 10-14



The DynaGATE 10-14 is a Road Vehicle certified, IoT Gateway for Public Transport and Road Vehicles that enables a fast transition to ITxPT in both existing and new deployments.



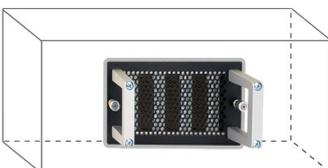
# 2. Data Storage with QuickTray®-v3

InoNet offers a hot-pluggable and encryption-enabled modular solution for fast exchange of collected data between the vehicle recording system and the evaluation stations. Thanks to the InoNet solutions, the expansion of the systems with data storage with the right speed and capacity can be carried out with the simplest and quickest changeover. Write speeds of up to 14 GBps / 112 Gbps\* per QuickTray® (2x QuickTray® up to 28 GBps / 224 Gbps\*) and a storage capacity of up to 120 TB\* can be achieved. This makes our QuickTray® the ideal basis for a data infrastructure.



## Option 1

- Use of an InoNet QuickTray® in customized systems with conventional 2x 5.25" drive bays



## Option 2

- Integration of the InoNet QuickTray® into an individual chassis with flexible data transmission interface

\* Depending on SSD type and manufacturer, real measured with Iometer (continuous write mode)



Conception®-tXf-L-v2

### Option 3

- With our modular InoNet QuickTray® we are able to generate a copy station from many devices for efficient data exchange
- With a small extension on the Conception®-tXf-L with space for one QuickTray® or with a large extension on the Mayflower®-B17-LiQuid with space for two QuickTray®s
- If you have accumulated too much data in a measuring device (logger) on the QuickTray®, you can either copy it to a capacity tier QuickTray® with our copy stations or upload it to a data center via fast GigaBit LAN interfaces
- Our Conception®s can be equipped with antennas for data transmission over a 5G data network



Mayflower®-B17



## 3. Data Evaluation

For the complete solution in vehicle development, existing or new 19" server systems and workstations are used to evaluate and further process the collected data directly at the workstation, for mobile backup or directly into the resident IT infrastructure. Subsequently, the data is available for further processing for computationally intensive AI applications and different simulation and test cases (HiL and SiL) for validation.



Mayflower®-B17-LiQuid-vE with liquid cooling for CPU and tensor cards

## Cooling Systems and Mounting

### Liquid cooling

The Mayflower®-B17-LiQuid has a sophisticated active cooling concept with liquid cooling and external radiator. Since most measuring devices and loggers are installed in the trunk and which is not cooled, the temperature is transported by the cooling liquid from the trunk to the footwell and thus ensures efficient cooling of critical components such as CPU and GPU.



### InoFix

The InoFix Mount allows you to flexibly and securely mount your measuring device even on the back seat. Can be used with any seat with an IsoFix mount. Quick and easy to install. Different systems can be securely screwed to the hard plastic plate so they will not wobble. For prototype use only.



# Product Overview Automotive Computing

## Configuration examples from the InoNet Automotive Ecosystem

	<i>Concepcion®-hXa-v3</i>	<i>Concepcion®-bXa-v3</i>	<i>Concepcion®-jXa</i>	<i>Concepcion®-tXf-L-v3</i>
				
Industrial Mainboard	mini-ITX	mini-ITX	mini-ITX	mini-ITX
CPU	Intel® Core™ i 12 <sup>th</sup> Generation	Intel® Core™ i 12 <sup>th</sup> Generation	12 <sup>th</sup> Gen. on request Intel® Core™ i 10 <sup>th</sup> Gen. or XEON®	Intel® Core™ i 12 <sup>th</sup> Generation
RAM	up to 64GB DDR5	up to 64GB DDR5	up to 64GB	up to 64GB DDR5
Drives (internal)	1x M.2	2x 2.5" / 1x M.2	1x M.2	1x M.2
Drives (external)	1x	2x (Hot-Swap)	2x (Hot-Swap)	2x (Hot-Swap) optionally QuickTray®
Expansion slots	1x PCIe x16 (Gen 5) low profile	2x PCIe x8 (Gen 4)	-	2x PCIe x8 (Gen 4) (already used)
GPU	onBoard	onBoard	onBoard	NVIDIA® A2 TENSOR CORE (NVIDIA® L4 on request)
AI ready	-	-	-	yes
USB	4x 3.2 / 4x 2.0	4x 3.2 / 6x 2.0	6x 3.2 / 2x 2.0	4x 3.2 / 6x 2.0
Communication	1x GBit LAN, 1x 2.5GBit LAN optionally with 2 antennas for Wi-Fi/BT	3x GBit LAN, 1x 2.5GBit LAN optionally with 3 antennas for Wi-Fi/BT/LTE or GNSS	4x GBit LAN optionally with 4 antennas for Wi-Fi/BT Radio remote control (2.4Ghz) for on / off / reset	1x GBit LAN, 1x 2.5GBit LAN 2x 10GBit LAN via slot (25GBit LAN on request) optionally with 5 antennas for Wi-Fi/BT/LTE or GNSS
Power connection	Neutrik (Ignition)	Neutrik (Ignition)	Neutrik (Ignition)	Neutrik (Ignition)
Max. consumption	95 Watt	95 Watt	45 Watt	250 / 300 / 400 Watt
Power Supply	11 ~ 32 VDC	11 ~ 32 VDC	11 ~ 32 VDC	11 ~ 34 VDC o. 16 ~ 30 VDC
Bus Systems	CAN, CAN-FD, FlexRay, LIN®, MOST, etc. (expansion cards required)		-	CAN, CAN-FD, FlexRay, LIN®, MOST, etc. (expansion cards required)
Mounting	InoFix (custom automotive mount designed by InoNet)			
Cooling	Passive	Passive	Passive	Active, 2x 80mm fans
Dim. (WxHxD)	309 x 90 x 243.5 mm	250 x 145.5 x 262 mm	200 x 126 x 206 mm	215 x 131 x 303 mm
Operating Temp.	-10° ~ 55° C	-10° ~ 55° C	-10° ~ 55° C	0° ~ 55° C

### InoNet QuickTray®-v3

Drives	4x SSD (NVMe or SATA) up to 15mm height
Bandwidth	PCIe x4 (Gen 4) connection per SSD (for NVMe)
RAID-Type	Software / Hardware
RAID-Level	0 / 1 / 10
Interface Internal	Power and data connection via host
Interface External	PCIe x16 (Gen 3) / Thunderbolt 3 (USB) on request
Dimensions (WxHxD)	148.30 x 84 x 140 mm
Cooling	Active
Operating Temperature	-20° ~ 70° C (depending on the installed drives and the application area)



Mayflower®-B17-LiQuid-vX with extension for 2x QuickTray®



QuickTray®-v3 Module

# Product Overview Automotive Computing

## Configuration examples from the InoNet Automotive Ecosystem

	<b>Inomotive® Workstation-II</b>	<b>eurotech DynaCOR 40-35</b>	<b>Mayflower®-B17- LiQuid-vE</b>	<b>Mayflower®-B17- LiQuid-vX</b>
<b>intel partner</b> IoT Industrial Specialist				
<b>Industrial Mainboard</b>	mini-ITX / ATX	Embedded	ATX	E-ATX
<b>CPU</b>	12 <sup>th</sup> Gen. on request Intel® Core™ i 10 <sup>th</sup> Generation	Intel® XEON® D-2183IT	4 <sup>th</sup> Gen. on request AMD® EPYC™ 7003/7002	4 <sup>th</sup> Gen. on request Dual Intel® XEON® Scalable (3 <sup>rd</sup> Gen.)
<b>RAM</b>	up to 128GB	64GB DDR4	up to 1TB	up to 4TB
<b>Drives (internal)</b>	2x 2.5" / 1x M.2	up to 123 TB NVMe	1x 2.5" (U.2) / 2x M.2	1x M.2
<b>Drives (external)</b>	3x 5.25" optionally QuickTray®	-	2x (Hot-Swap) optionally QuickTray®	2x 5.25" optionally (int.) QuickTray®
<b>Expansion slots</b>	1x PCIe 3.0 x16 4x PCIe 3.0 x4 2x PCI	-	7x PCIe x16 (Gen 4)	4x PCIe x16 (Gen 4) 2x PCIe x8 (Gen 4)
<b>GPU</b>	up to 160 Watt	onBoard	up to 5x GPU/tensor cards	up to 5x GPU/tensor cards
<b>AI ready</b>	yes	yes	yes	yes
<b>USB</b>	4x 3.2 / 4x 2.0	1x 3.0 / 2x 2.0	2x 3.2 / 1x USB-C 3.2	4x 3.2
<b>Communication</b>	2x GBit LAN 4x 10GBit LAN via slot (25GBit LAN on request)	2x GBit LAN, 4x 10GBit LAN 1x 100GBit LAN with 1 antenna for GNSS	2x 10GBit LAN, 1x IPMI 4x 10GBit LAN via slot (25GBit LAN on request)	2x GBit LAN, 1x IPMI 4x 10GBit LAN via slot (25GBit on request)
<b>Power connection</b>	10 ~ 48 VDC	12 ~ 48 VDC	12/24/48 VDC or 230 VAC	12/24/48 VDC or 230 VAC
<b>Max. consumption</b>	300 / 500 Watt	215 - 500 Watt	400 - 1100 Watt	400 - 1100 Watt
<b>Power Supply</b>	12 VDC (9 ~ 18 VDC) o. 24 VDC (18 ~ 36 VDC) o. 48 VDC (37 ~ 71 VDC)	12 VDC (9 ~ 18 VDC) o. 48 VDC (36 ~ 58 VDC)	12 VDC (9 ~ 18 VDC) o. 24 VDC (18 ~ 36 VDC) o. 48 VDC (37 ~ 71 VDC)	12 VDC (9 ~ 18 VDC) o. 24 VDC (18 ~ 36 VDC) o. 48 VDC (37 ~ 71 VDC)
<b>Bus Systems</b>	CAN, CAN-FD, FlexRay, LIN®, MOST, etc. (internal/external, expansion cards required)	CAN 2.0B	CAN, CAN-FD, FlexRay, LIN®, MOST, etc. (internal/external, expansion cards required)	
<b>Mounting</b>	InoFix (custom automotive mount designed by InoNet)	Docking Station	InoFix (custom automotive mount designed by InoNet)	
<b>Cooling</b>	Active, 120mm fan	Passive / Full liquid cooling	Active / Liquid cooling	Active / Liquid cooling
<b>Dim. (WxHxD)</b>	330 x 196 x 440 mm	177 x 196 x 495 mm	430 x 175 x 400 mm	430 x 176 x 400 mm
<b>Operating Temperature</b>	0° ~ 55° C	5° ~ 45° C	0° ~ 55° C	-20° ~ 70° C with external radiator (25° C)

### Supplementary services and accessories for the automotive industry

- Action button (remote control) for various applications and functions (e.g. reset, recording, etc.) for convenient operation during test drives from the driver's seat
- InoFix mount for the secure mounting of embedded systems in the vehicle on the back seat
- Integration of specific automotive data bus solutions for the desired application
- Integration of FPGA boards
- Uninterruptible power supply (UPS) for bridging in case of disturbances in the power grid
- Partner network to realize your individual requirements and wishes