ReliaCOR 34-19 Solution Overview

Eurotech

Eurotech is a multinational company that designs, develops and supplies Edge Computers and Internet of Things (IoT)solutions – complete with services, software and hardware – to system integrators and enterprises. By adopting Eurotech solutions, customers have access to IoT building blocks and software platforms, to Edge Gateway to enable asset monitoring and to High Performance Edge Computers (HPEC) conceived also for Artificial Intelligence (AI) applications. To offer increasingly complete solutions, Eurotech has activated partnerships with leading companies in their field of action, thus creating a globalecosystem that allows it to create “best in class” solu- tions for the Industrial Internet of Things. Learn more about Eurotech at www.eurotech.com.

The ReliaCOR 34-19 is a modular 4U 19-inch industrial rackmount Edge Computer designed by Advanet (a member of Eurotech Group) built for a variety of high-demanding applications, from high-speed datalogging thanks to the two U.2 NVMe easy-to-swap drives, to secure IIoT operations where a variety of devices are connected thanks to the multiple, lightning-fast ports and virtual machine usage for complex system constructions thanks to the huge amount of equipped RAM and CPU cores.

At its hearth, the CPU-190-01, a cutting-edge COM-HPC server module also developed by Advanet which equips the Intel Xeon D Processor.

Because of the crucial importance the Japanese railway has in the country, a relentless and precise system which carries billions of people throughout the year in all the different prefectures, the ReliaCOR 34-19 has been chosen to handle the important real-time image processing tasks specifically for the rails themselves and their maintenance; this is because of the special and reliable architecture of the system, which was found to be the perfect solution for the challenge.

The Challenge: Image Processing for Railways

Introduction

The ReliaCOR 34-19 is a system capable of many different functions, thanks to how it has been engineered and built. Because of its unique capabilities and reliable features, one of the main functions it is being utilized for is advanced image processing within different industries.

For the railway industry, the ReliaCOR 34-19 has been chosen as the main system to connect to a multitude of cameras installed in proximity of important Japanese railways to monitor their status, checking in real time if any issue emerges and automatically categorize/report them.

This complex and critical task is only possible because of the cutting-edge technology and software running inside the machine, which has at its heart the Intel Xeon D processor.

Japanese Railways Use Case: The Challenge

In Japan, the railway industry is considered one of the very most important public and commercial services. On average, 25 billion passengers are carried via Japanese railways each year, and everyone expects top notch quality in terms of service: to bring an example, each Japanese bullet train “Shinkansen” has an average of less than one minute of delay per train each year.

Additionally, Japan experiences a multitude of natural disasters each year, including earthquakes, typhoons, and floods; this is another reason which justifies the high investment in the whole infrastructure, accompanied by the overall maintenance costs to make sure the service is up and running through the whole year and in vastly different temperatures between the different prefectures.

Specifically for this use case, the challenge comes from being able to monitor 24h per day, 365 days per year the railway tracks in the specific, through thousands of cameras scattered along its full lengths which must quickly identify any physical issue by recording terabytes of data, transmit it to an edge platform with the image processing task and finally making it easily readable to the human staff.

Japanese Railways Use Case: The Solution

To reliably handle the image processing part of this process, the customer selected Advanet’s ReliaCOR 34-19 Edge Computer, designed to be able to handle fast and precise operations like this one in both standard and harsh environments, thanks to its build-type, small energy consumption, high shock/vibration and sudden temperature variation resistance.

The ReliaCOR 34-19 is a modular 4U 19-inch industrial rackmount Edge Computer powered by the next generation Intel® Xeon® D processor, supporting 4 ports each of 10GBASE-T, 2.5GBASE-T, and SFP+ for 10Gb Ethernet optical modules. It is suitable for IIoT applications where a variety of devices are connected.

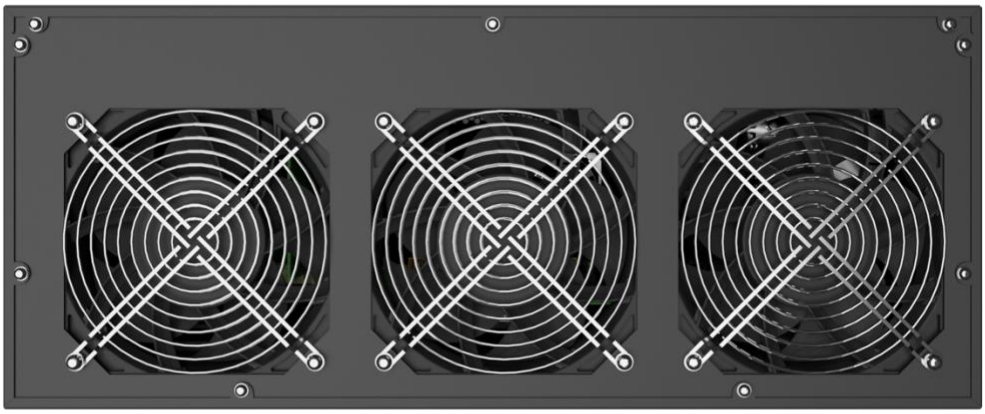
With two U.2 NVMe drive bays that can be easily inserted and removed, it is especially suitable for data loggers that require high speed and large capacity.

It supports more computing cores, RAM, and network interfaces than conventional industrial PCs, and can be used for virtual machine system construction.

In addition to using the COM-HPC CPU 190-01 module for the CPU which sits at its heart (also developed by Advanet), the expansion part also adopts a modular configuration, which allows for flexible semi-customization such as changing functions, connectors, and adding functions according to the customer's application.

Features

- **Next-generation Intel Xeon D Processor**
- **DDR4 DIMM x4 (up to 256GB) ECC/non-ECC support**
- **4U 19-inch industrial rackmount PC**
- **Rich high-speed network interfaces: 4x 10GBASE-T, 1x SFP+, 4x 2.5GBASE-T**
- **Up to 6 PCIe cards can be installed, 4x PCIe Gen4 (x4) or 1x PCIe Gen4 (x16), 2x PCIe Gen3 (x1)**
- **2x U.2 NVMe (PCIe Gen3 x4) removable storage for high speed and high capacity**
- **Support for Real Time Sensitive Networking (planned)**
- **Operating temperature range: 0 to 50°C**
- **CentOS, Windows® 10 IoT Enterprise (planned)**



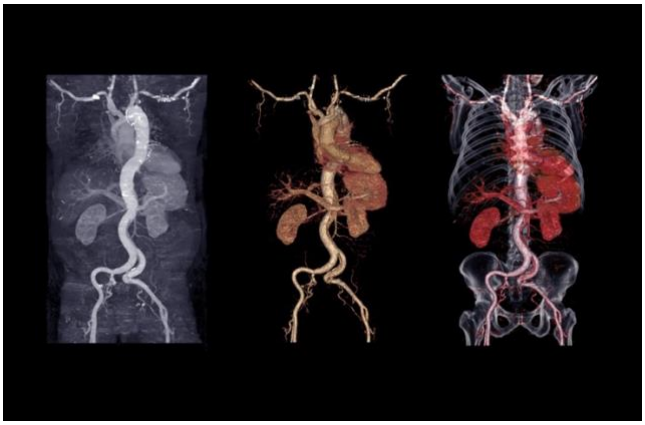
Use Cases for Other Industries

Other applications examples for the advanced Image Processing capabilities of the ReliaCOR 34-19 do include the medical and semiconductor manufacturing industries.

Medical

A medical image processing is important to get enhanced results from the raw 3D data obtained from both CT and MRI scans, which can help the doctor to better understand the anatomy of the patient.

The ReliaCOR 34-19, thanks to the powerful computing power inside a small and easy to implement form factor, is the perfect candidate for the task.

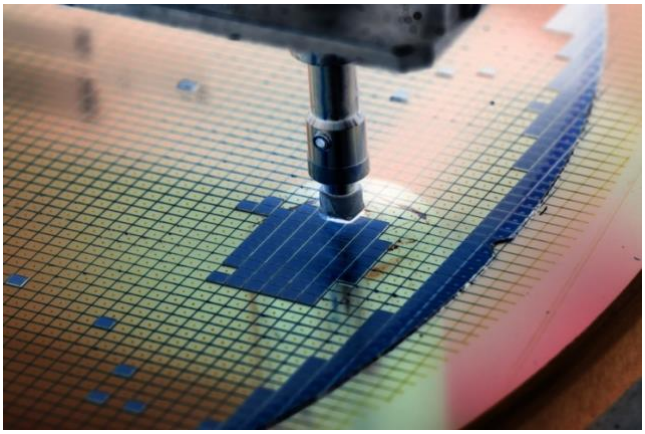


Semiconductor Manufactory

In the semiconductor manufactory industry, image processing is used for inspection purposes and in particular wafer analysis, which can help speed up production time exponentially.

Because of the physical characteristics of the substrate, which can vary by different factors, technical problems might occur which end up with discarding a lot of material.

Thanks to its special architecture, the ReliaCOR 34-19 can handle a constant flow of heavy data and analyze it in real time, making it one of the best choices for this necessity.



The heart of the system: CPU 190-01

The CPU-190-01 is a COM-HPC™ server module equipped with a next-generation Xeon® D series processor. Combining the COM-HPC™ standard, which supports more powerful CPUs and high-speed communication interfaces, with the Xeon® D processor, this product is suitable for AI systems that require high performance and edge computing in 5G high-speed communication networks.

This product can be used by combining it with a carrier board equipped with connectors, PHYs, etc. that match the application. Since the core part of the computer has been designed and verified as a CPU module, it is possible to reduce the cost and time required to develop equipment to suit the application.

In addition, software development can be started ahead of time by using a development kit combined with a carrier board for evaluation.

We also provide professional services such as BIOS customization, carrier board development, and system design including chassis and FW.

Features

- **Next-generation Intel Xeon D Processor**
- **DDR4 DIMM x4 (up to 256GB) ECC/non-ECC support**
- **COM-HPC Server Module**
- **PCI Express: 35 lanes**
- **NBASE-T (2.5G): 1 Port**
- **10GBASE-KR: 5 Ports**
- **Side D (160x160 mm)**
- **CentOS, Windows 10 IoT Enterprise**