



Application Note

Portwell, Inc.

PCOM-B658VGL : A COM Express Type 6 Module Featuring 13th Gen Intel® Core™ Processors for Medical Devices, Industrial Control and Edge Computing Solutions



Over the last few years, the widespread adoption of digitization across industries has been propelling innovative embedded computing designs to accelerate the digital transformation of applications such as medical devices, industrial control, and edge/network communications. To cope with the growing computational needs for optimized performance per watt, richer I/O interfaces, and greater memory/storage capacity, among others, there has been an increasing demand for embedded computers to provide faster and more efficient computing and processing capabilities while meeting strict, yet ever-evolving, reliability requirements.

In other words, “scalability” and “upgradability” have become fundamentally critical considerations for computing technology innovations and solution designs.

Enter the highly accepted computer-on-module (COM) modular computing design concept, and the latest COM Express® Module Base Specification Rev 3.1 that extends the usability of COM Express with ratification to support high-speed serial interfaces such as PCIe Gen 4 and USB4. This upgrade aims to expand the highly scalable modular embedded computing design approach, and provide a new computer module solution that enables even greater upgradability and configuration flexibility, combined with next-generation CPU technologies and high-speed input/output interfaces.





Extending the Dynamics of High Performance and Power Efficiency

Acting in response, Portwell has expanded its COM Express computer-on-module product line, and introduced the PCOM-B658VGL COM Express Type 6 module (basic size 125mm x 95mm), based on the COM Express Module Base Specification Rev 3.1 specification, and featuring the 13th Gen Intel Core Mobile Processors.

Built upon the well-established COM Express Type 6 architecture, Portwell's PCOM-B658VGL utilizes the 13th Gen Intel Core mobile processor series. Manufactured using Intel 7 process, and delivering excellent energy efficiency, this processor series is particularly ideal for fanless and small-form-factor system solutions designed for edge computing applications.

Furthermore, this 13th Gen Intel Core processor platform provides up to 14 cores, including 6 performance cores (P-cores) and 8 efficient cores (E-cores), with computing capability of up to 20 threads; 24MB of Intel Smart Cache; and integrated Intel Iris X^e Graphics with up to 96 execution units (EUs), enhancing fast and dynamic visual processing, while also enabling AI inference capabilities for various power- and space-restrained field applications. Additionally, it offers industrial-grade features that accelerate real-time performance and intelligence in challenging IoT edge computing environments.

Empowering Diverse Applications Across Industries

The Portwell PCOM-B658VGL COM Express Type 6 module offers high scalability and input/output performance, making it suitable for diverse use cases. It can be designed as an enabler for edge servers and a core computing component for small, high-performance embedded computers. When equipped with onboard PCIe NVMe storage, it provides efficient storage, management and data access for applications in the fields of medical devices, industrial instruments, transportation systems, rugged outdoor computers, defense systems, and much more.

In medical devices, while designed on a compact footprint, the PCOM-B658VGL supports various high-speed input/output interfaces, including PCIe Gen4 x8 lanes. These interfaces are well-suited for pairing with FPGA/accelerator chips to optimize high-performance connectivity enabling computing acceleration for various medical/healthcare devices such as ultrasound, CT, MRI, and many more.

Moreover, the PCOM-B658VGL delivers enhanced CPU/GPU computing power while ensuring stable and reliable operations under thermal-constrained use conditions. For example, in manufacturing facilities, the PCOM-B658VGL can be combined with

security cameras to implement AI edge computing for identification and verification of each individual's access permission to the factory premises as well as enforcing compliance with personal protective equipment requirements.

For small-form-factor embedded computing devices and systems, the Portwell PCOM-B658VGL can be designed to support onboard PCIe NVMe SSD, lifting up the need for deploying additional storage on the carrier board. This in turn facilitates optimal system configuration resulting in physical size reduction to meet the challenging requirements of placement- and space-limitation for an extensive array of edge computing use cases.

Complete Product Design, Technical Expertise and Project Experience

As a trusted partner of industrial and embedded computing solutions, Portwell has over 30 years of experience in delivering comprehensive project support, including product design, design guidelines, circuit diagram reviews, technical expertise, production, and certification processes. Portwell also offers customers the latest product roadmap to facilitate advanced planning for next-generation product upgrades and new projects.

Portwell's PCOM-B658VGL COM Express Type 6 module is a high-performance and highly reliable computer-on-module solution that builds upon the longstanding COM Express standard that balances cost, features and performance. It provides highly scalable embedded computing design options for applications in medical devices, industrial control, and edge/network communications among others.

PCOM-B658VGL, COM Express Type 6 Basic Size Module with 13th Gen Intel® Core™ Processors on Intel 7 Process

- Up to 14 cores compute capabilities with 6 Performance-cores (P-cores) and 8 Efficient-cores (E-cores)
- Intel Iris X^e graphics with up to 96 EUs
- 2x DDR5-4800 non-ECC SO-DIMMs up to 64GB
- 1x PCIe Gen4 x8 (H-series CPU), 2x PCIe Gen4 x4, and 7x PCIe Gen3 x1
- 4x USB3.2 Gen 2, 8x USB2.0, 2x SATA III, 3x DDI (optional 2x USB4), 1x VGA, 1x eDP/LVDS
- 2.5GbE based on Intel Ethernet Controller I226 Series (TCC/TSN option via selected CPU SKUs)



PCOM-B658VGL

COM Express® Type 6 Module with 13th Gen Intel® Core™ Processor for Medical Equipment and Industrial Control Solutions

About Portwell

Portwell, Inc., founded in 1993, has focused herself towards a high-technology scope that brings company value through the state-of-the-art. For the past years, continuous leading product development and revenue growth have made Portwell a major Mission-Critical Application Platform Provider in the world. The in-house design of industrial computers and application platforms by Portwell has also been targeted to meet our customer needs for flexibility. Portwell, Inc., an IoT Solutions Titanium Partner of the Intel® Partner Alliance, a community of communications and embedded developers and solution providers, designs and manufactures Communication Appliances along with a full range of Industrial Platform Service (Computer on Module, Embedded Computing, Industrial Computer), Communication Appliance Service (Software Defined Wide Area Network, ANS series, AnnA ANS Network Associate), Vertical Market Service (Advanced Network Solutions, Gaming, Medical, industrial Automation, Smart Transportation, Energy, Smart Manufacturing, Internet of Things(IoT), AI Solutions, Mobility & Barcoding Solutions, EMS/DMS), Panel Device Service (Panel PC, LEAD Series) . With streamline access to the latest Intel technology, we paved the way with the broadest array of building blocks, delivering cutting-edge solutions to meet and even exceed the demanding needs of the ever-changing telecommunication, medical electronics, industrial automation, defense and life automation markets. Committed to supplying customers with a one-stop shopping approach of full product selection, competence and sophisticated customer support, Portwell helps all our customers pave the royal road to success and stay ahead of competition.



intel
partner Titanium
IoT
Solutions

Portwell, Inc., an IoT Solutions Titanium Partner of the Intel Partner Alliance, designs and manufactures a full range of IPC products (SBC, backplane, redundant power supply, rack mount & node chassis), embedded architecture solutions, DVR system platforms, and communications appliances. We provide complete R&D and project management services to decrease customers' time to market and reduce project risk and cost. Portwell is also an ISO 13485, ISO 9001, and ISO 14001-certified company that deploys quality assurance through product design, verification, and manufacturing cycles.



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