Contec's C5™ embedded computer leverages Intel® technology to bring flexibility to Industrial IoT

Industrial applications are under constant pressure to reduce costs, improve efficiencies, and expand functionality. Trying to migrate legacy technology to address these demands adds yet another requirement to this process. Current system building blocks have reached a price plateau, and advances in enabling technologies like SSDs are reaching the point of diminishing returns.

Further complicating this process is that the total cost of deploying and maintaining a product can be significantly more than the system's original purchase price. Issues such as servicing, reliability, and operational maintenance are key concerns when considering the total cost of deploying a solution.

These factors often lead customers to seek out next-generation embedded technology with features that reduce future expenses related to maintenance, repairs, and upgrades. To address this wide range of market demands, Contec, a 40+ year leader in the industrial and embedded technology markets, has developed the C5 Embedded Computer. The C5 leverages the Intel® Compute Card and its innovative low-power, high-performance platform to enable a compact footprint backed by proven Intel architecture (Figure 1).

Figure 1. *Contec's C5 Embedded Computer (Source: Contec)*

Using Intel's credit-card sized modular platform—shown in Figure 2—gives system designers a recognizable form factor and trusted infrastructure, with multiple development partners. In addition to all the elements of a full computer, including wireless connectivity, the Intel Compute Card also provides a flexible I/O suite for application optimization.

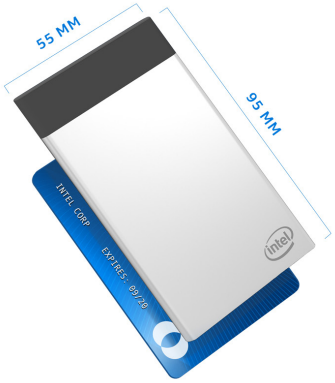

Figure 2. *The Intel Compute Card is a credit-card sized modular computing platform (Source: Intel).*

Cardscale computing

Designed to be externally accessible and handled in the end use environment, the Intel Compute Card allows for upgrades and scalability within a family of products, and remains secure via an integrated locking mechanism. The C5's modular computing architecture differs from other modular platforms by providing added functionality which facilitates field maintenance, servicing, and upgrades in a groundbreaking new way.

Contec's C5 computer supports the latest 7th Generation Intel® Core™ Processors (Including Intel® vPro™ Models) or Intel® Celeron® and Intel® Pentium® processors to ensure that there will be enough compute power for virtually any application.

Expanded I/O and power options

The C5 Embedded Computer builds on the native I/O capabilities of the Intel Compute Card by adding functionality in the platform. As shown in Figure 3, the C5 increases the flexibility by adding M.2 and mini-PCIe expansion to deliver even more robust I/O options. The C5 includes three internal expansion slots which can be customized to support a wide range of application hardware interfaces or additional storage devices. Industrial I/O connections can be configured for PROFINET, Ethernet/IP, EtherCAT, multiple Ethernet, RS-485, or CAN bus connections as well as wireless interfaces like Zigbee, LoRa WAN, and LTE-CAT.

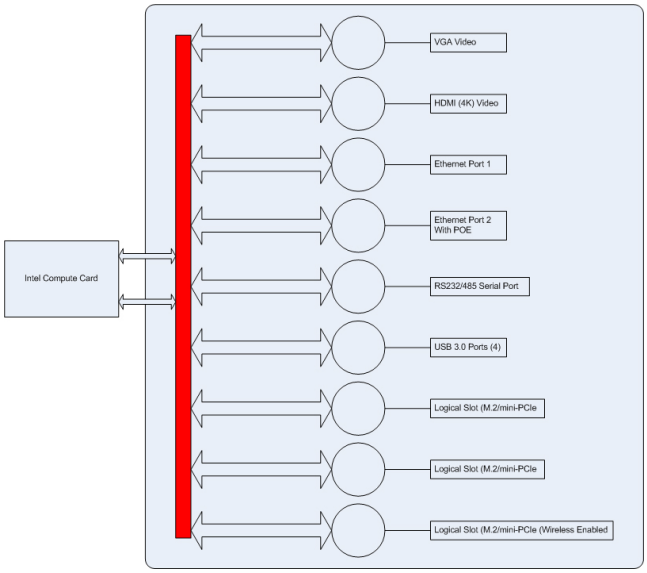

Figure 3. *As shown, Contec's CortexEM platform offers an array of connectivity options.*

Safe and secure

Security is a growing concern, even for systems that are not connected to the Internet. True security must flow through every device in a system. The Contec C5 is designed to support a chain of trust including physical access that allows applications to authenticate any hardware and software needed to operate. The C5 system will not start the boot process until the Intel Compute Card has been authenticated, so the chain of trust starts from power-on and provides the system and application with a known secure starting point.

The C5 also integrates a Cryptographic element that enables a range of security features. Using an ECDH (Elliptic-Curve Diffie-Hellman) security protocol, an ultra-secure method to provide key agreement for encryption/decryption, along with ECDSA (Elliptic-Curve Digital Signature Algorithm) sign-verify authentication, the application has access to the required security element to implement an asymmetrical key-based OpenSSL or X.509 certificate for Amazon AWS IoT authentication. Hardware-based password authentication also enables other security services.

Enhanced operational capabilities

Contec offers increased system-level security with the C5's "service mode," which lets customers create a different security environment for equipment servicing. This mode is obviously different than the normal operation mode. Access to wireless channels, USB ports and backup storage devices can be unrestricted while in service mode, allowing service personnel access to tools or software updates. Then when restarted in normal mode the end application operates in a more restricted and secure hardware configuration.

Service, maintenance, and update operations can be key contributors to the cost of ownership. The Intel Compute Card addresses this by allowing for quick and easy field replacement. Service personnel no longer need to determine the failed component (SSD, cable, motherboard, and software); they simply swap out the Intel Compute Card for a known working unit and the system is restored for normal operation within minutes.

Of course, the Intel Compute Card is only a part of the system, so the Contec C5 provides a unique hardware status display that allows the operating state of the different hardware and peripherals to be determined. Critical for headless applications, the hardware status display helps non-technical staff report on the system's operating state without running hardware diagnostics. The goal is to quickly determine the most likely cause of the failure using onsite non-technical staff and then being able to arrive and repair the system in the shortest possible time.

Platform stability with computing flexibility

In summary, Contec's C5 Embedded Computer is an expandable industrial solution from a known and trusted vendor. The focus on security and connectivity makes the C5 an ideal IoT-ready platform. This innovative product addresses customers' cost concerns while offering new lower cost options for servicing, upgrading. The platform will be available this Fall. More information is available at www.C5compute.com.

CONTEC

intel