

Intelligent, Integrated Rugged Systems

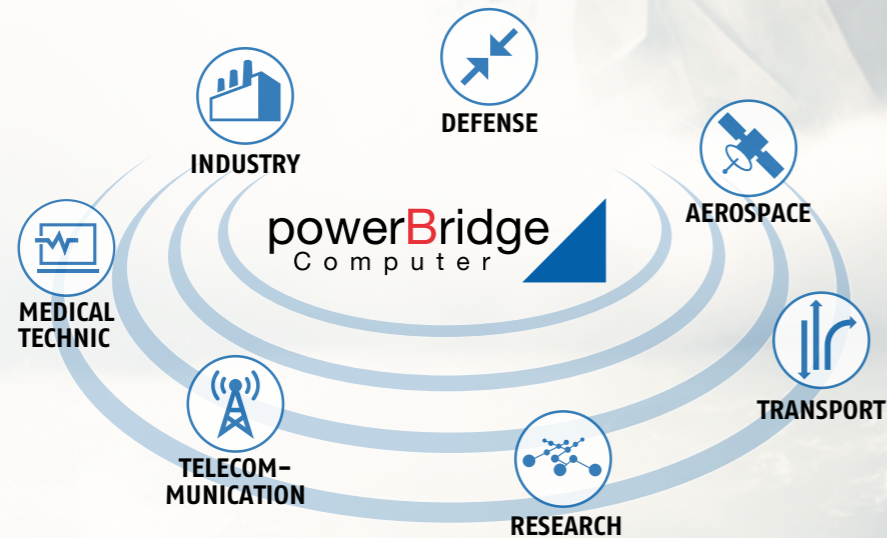


powerBridge Computer – Intelligent Solutions for Complex Applications

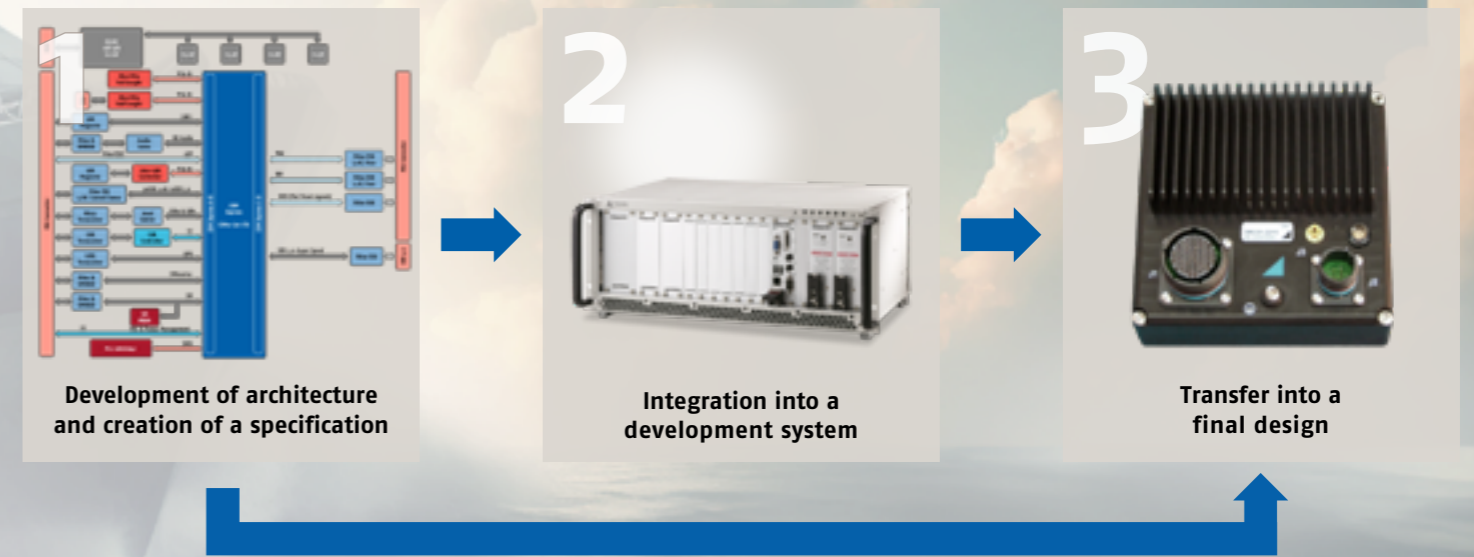
powerBridge Computer has been supplying computer systems and computer boards from leading manufacturers since 1993. We develop and manufacture industrial computers, communication systems and boards according to the requirements of our customers. We deliver standard systems or individually manufactured industrial computers according to your requirements.

Facts and Figures

- Over 30 years on the market
- Owner managed company
- Over 30 years of embedded experience
- Own laboratory and integration facilities
- PICMG member, actively working on the MTCA.4 and Next Gen specification
- ISO 9001:2015 and 14001:2015 certified



Project Assistance





Chassis Solutions for Extreme Environments

Enclosures are critical to the function of a system in extreme environmental conditions. powerBridge Computer chassis are flexible when, among other things, already existing peripherals with customer-specific boards are to be integrated. Due to intelligent designs and our broad know-how, powerBridge Computer realizes technically sophisticated enclosures at economic conditions.

500G Shock Resistance

Depending on the requirement, up to 500G shock resistance according to MILSTD901-D, STANAG, IEC can be realized.



Hybrid Backplane

You want to use your proprietary board with a VPX/OpenVPX CPU or operate a VME board in combination with VPX? Our hybrid backplanes combine COTS products with individual customer solutions.



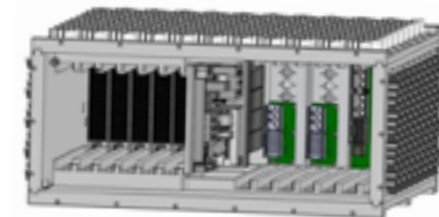
Combination of COTS and Individual Solutions

The key to success is the intelligent combination of existing products in combination with individual customer-specific solutions. Due to decades of experience in various industries, powerBridge Computer realizes technically 100% suitable solutions at economic conditions.



250G shock Absorption

- Chassis, hardened according to the MIL standard, for the installation of platform independent COTS subracks
- Forced air cooled, IP67

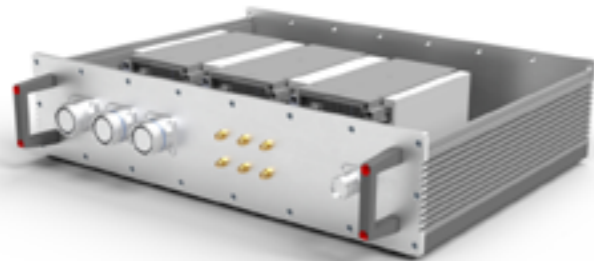


3U VPX Chassis

- Conduction Cooled
- Hybrid backplane
- MOSA-profile
- Proprietary backplanes for customer-specific boards

Integration of Multi-Functional Tasks Similar to C5ISR

Individual systems are often produced and installed in separate rugged chassis for different tasks, e.g. SDR communication, mission computer and navigation. This requires a lot of space and the communication among each other must be ensured via appropriate data lines. powerBridge Computer has decided to change this, analogous to the C5ISR standard (Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance) which is widely used in the USA.

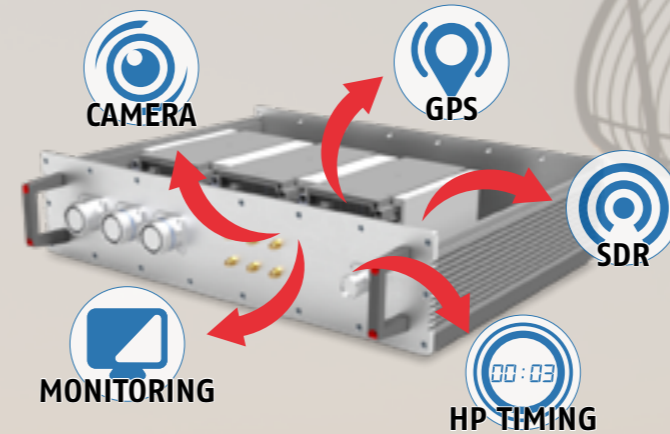


2U VPX Chassis

- SOSA backplane with up to 9 slots
- Optional OpenVPX
- 350W TDP
- Conduction Cooled
- Front I/O according to the boards (e.g. Firefly, USB, GPIO, etc.)

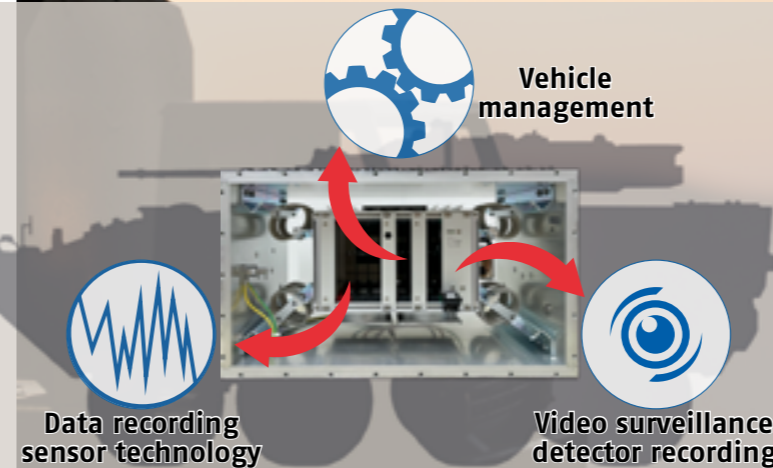
System Integration

From navigation, timing and communication boards to CPUs and storage – up to 9 boards can be combined in a 2U rugged system. This combination, similar to the American C5ISR, enables a high functional range with high power density and communication speeds between the boards. Instead of three to four individual systems, this is realized using the VPX standards OpenVPX or SOSA by powerBridge Computer.



Networking

Depending on the requirement, such as combat value increase, it makes sense to connect the main computer with suitable subsystems.

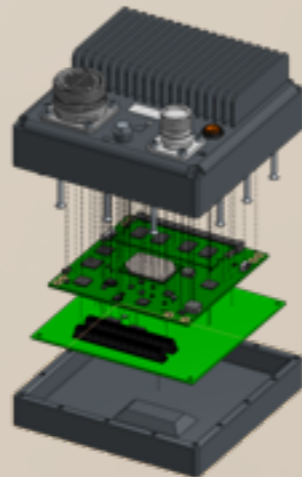




Modular Design

A large part of the development costs are generated during the implementation of CPUs and FPGAs. Due to modular solutions, such as PICMG ComEx6 or ComEx7 CPUs, the development focus is now only on the suitable carrier. This carrier is individually adapted to the I/Os, voltages, antennas etc., according to the requirements of the customer.

Of course, this also applies to FPGAs. There are also solutions available for e.g. Xilinx ZynqUP+ ZU11/15 EG, as well as for various RFSOC or MPSOC variants.



FPGA

More and more SDR and vision applications are being realized using high-performance FPGAs, which means that GPUs are no longer necessary. For example, powerBridge Computer uses the Zynq UP+ ZU11EG for vision applications. In connection with the Analog Device ADRV9009, powerful SDR solutions e.g. for beamforming, monitoring, eavesdropping or for setting up campus networks can be installed.



Mission Computer

The mission computer is designed to withstand the most challenging environmental conditions without compromising on functionality and performance. The size, weight and power (SWaP) optimized design makes it ideal for use in small air and ground vehicles (UAVs, UGVs), surveillance and HD video applications, etc.



Small Rugged Computer System

- ComEx6/7 CPU
- Alternative Xilinx USC+ ZU11EG or similar
- Customer-specific carrier
- IP67
- MIL-STD-810



VPX Based Mission Computers

- OpenVPX
- 7th Gen Intel XEON CPU
- 3G SDI
- Avionics interfaces (optional)
- Multiple I/O
- DO-160G certified
- MIL-STD-810/MIL-STD-461



1/2 ATR VPX Based Mission Computers

- OpenVPX
- 9th Gen Intel XEON CPU
- 3G SDI
- NVIDIA GPU
- Multiple I/O
- DO-160G certified
- MIL-STD-810/MIL-STD-461

Rugged Server

Extreme rugged servers combining superior robustness with high performance computing technology, designed for applications that require MIL-grade qualified equipment, suitable for operations in very critical environments.



Rugged Server:

MIL-grade servers and workstations for critical applications

- Intel Xeon processor
- Single/Dual socket
- MIL 38999 connectors optional
- 1U – 3U
- MIL-grade certification
- Conformal coating



Extreme Rugged Server:

IP54 rated MIL-grade Servers for very critical applications

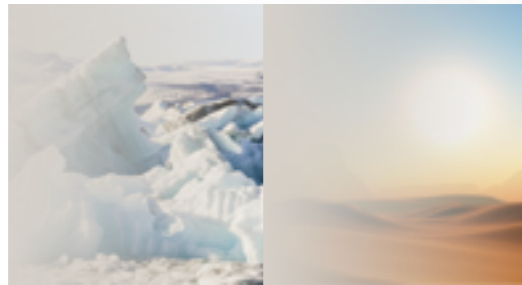
- Dual socket
- Intel Xeon processor
- IP54
- MIL 38999 connectors
- Conformal coating
- MIL-grade certification
- 3U



MIL Grade Certifications (up to):

Operating Temperature	Standard: 0°C / +50°C MIL-STD-810H, method 501.7 & 502.7 Extended: -20°C / +60°C (depending on configuration)
Storage Temperature	-40°C / +70°C MIL-STD-810H, method 501.7 & 502.7
Humidity	8% to 95% non-condensed (depending on the configurations) MIL-STD-810H 507.6
Fungus	Conformal coating required, MIL-STD 810G, method 508.6
IP Protection	Up to IP54
Shock	Logistical 40G/11ms (3 shocks per axis and direction); Tactical 35G/20ms + 80G/2ms half sine (1 shock per axis and direction) or 20g / 11ms – half sine MIL-STD-810G, method 516.7
Operating Vibrations	MIL-STD-810G, method 514.7 or MIL-STD-167-1A, Type I
Electromagnetic Compatibility	Directive 2014/35/UE-LVD Directive 2014/30/UE EMC Directive 2011/65/UE – RoHS Regulation EC No 1907/2006 MIL-STD-461G (on request)

All systems are tested and certified according to customer specifications. Depending on the requirements, we work together with highly specialized accredited test laboratories. It does not matter which standards are involved: from military to medical standards, we cover the complete range. From the development of test plans to development-accompanying tests and accredited approval tests – at powerBridge Computer you get everything from a single source.



Temperature Tests

Especially for the durability of material combinations and electronic components, in addition to the absolute temperatures, the frequency and speed of temperature changes are critical.

Standards and procedures include (extract):

- MIL-STD-810 temperature shock
- ISO 16750-4 climatic stress
- LV124 VW 80000 thermal shock (component),
- Thermal shock (without housing)
- AECTP 300 (3) thermal shock



Climate Tests

Whether jungle or ice desert, the combination of temperature and humidity is a challenge for every product.

Standards and procedures include (extract):

- MIL-STD-810 high temperature, low temperature, humidity
- MIL-STD-810 high temperature, low temperature, humidity
- RTCA DO-160 temperature, temperature variation, humidity
- DNVGL-CG-0339 dry heat test, damp heat test, cold test
- AECTP 300 (3) high temperature, low temperature



EMC Resistance

Unintended electromagnetic interactions can lead to negative effects or even damage the device or its surroundings. According to requirements, devices manufactured by us are tested for conducted and radiated emissions and immunity to interference.

Conducted Emissions, EMC Tests:

- MIL-STD-461 RE101 – magnetic fields
- MIL-STD-461 RE102 – electric fields

Conducted Immunity: EMC Burst & Surge Tests

- MIL-STD-461 CS115 – ns pulse
- MIL-STD-461 CS116 – damped vibrations
- IEC 61000-4-4 -4-11 burst, surge,
- conducted RF,
- AC mains fluctuations, audio frequencies

Radiated Immunity: EMC Tests

- IEC 61000-4-3 – high frequency EM fields
- IEC 61000-4-9 – pulsed magnetic fields
- MIL-STD-461 RS103 – electric fields

powerBridge Computer has the right hardware architecture depending on your requirements: From VPX to CPCI and MTCA to proprietary systems, we independently provide you with advice and let you benefit from our decades of experience.



VMEbus

The **VMEbus** is a multi-processor bus system, i.e. several CPU boards can communicate with each other or with several I/O boards. VMEbus systems have up to 20 slots. VME64 systems have 64-bit bus width for data and addresses. All common processor types can be used on VMEbus cards. Today, VMEbus systems are used in countless applications in industry, research, medical technology, aerospace and defense technology.



MTCA

MicroTCA defines compact backplane-based computer systems on the basis of AdvancedMC (AMC) modules. MicroTCA systems are used in industry, research, medical technology, traffic engineering, defense technology, telecommunications and network technology. MTCA systems are always used when a lot of data (analog/digital) e.g. by means of FPGA have to be processed in real time. Examples for this are SDR and vision systems.



CPCI

CompactPCI is a computer bus connection for industrial computers, which combine a connector of the type Eurocard with PCI signals and protocols. The boards are standardized on 3U or 6U and are usually connected to each other via a passive backplane. One of the best known CPCI applications is the main computer in the Mars rover Curiosity.



CPCI-S

CompactPCI Serial is the further development of the CompactPCI standard. Unlike CPCI, CPCIS exclusively uses point-to-point connections and supports the PCIe bus. The mechanical dimensions do not differ from CPCI systems.



VPX (VITA 46)

VPX (Virtual Path Cross-Connect) refers to a set of standards that are commonly used by the defense industry. VPX provides VMEbus-based systems with support for switched fabrics over a new high-speed connection. VPX is predominantly used in rugged high performance applications, such as vision systems.



OpenVPX (VITA 65)

The **OpenVPX** is a system-level VPX specification that is intended to improve the interoperability of VPX. The OpenVPX system specification describes technical implementation details for 3U and 6U VPX payload and switch modules, backplane topologies and chassis products that provide guidance for building interoperable computing and communications systems. OpenVPX is an evolution of VPX and complements it.



SOSA (Sensor Open Systems Architecture)

The **SOSA** approach establishes guidelines for command, control, communications, computer, cyber, intelligence, surveillance, and reconnaissance (C5ISR) systems. The goal is to enable flexibility in the selection and procurement of sensors and subsystems that provide sensor data acquisition, processing, evaluation, communications, and related functions throughout the life cycle of the C5ISR system.

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