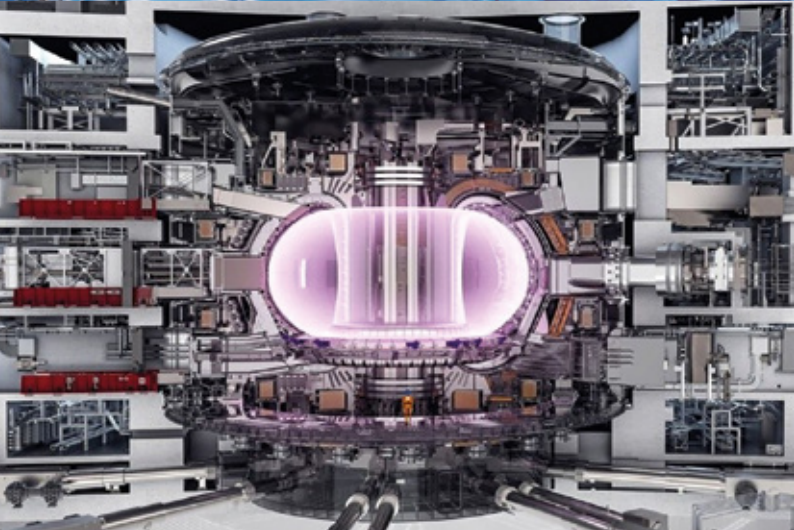
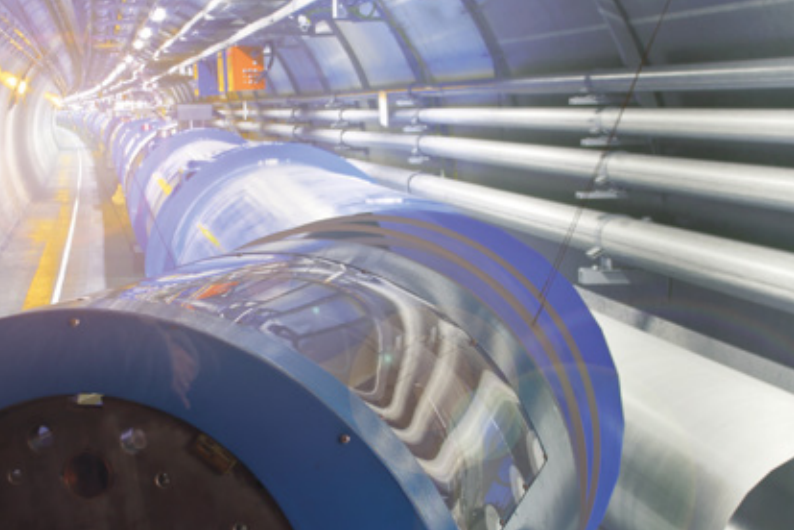


Computer Solutions for Challenging Applications



About Us

powerBridge Computer provides computer systems and boards from leading manufacturers since 1993.

We design and integrate industrial computer systems, communication systems and boards according to the requirements of our customers

We deliver standard systems or individual industrial computers. We complete these with communication modules, analogue and digital interfaces, FPGA solutions, as well as drivers, operating system and management software.

Facts & Figures

- ▶ Over 30 years on the market
- ▶ Privately owned
- ▶ Own laboratory and integration facilities
- ▶ PICMG member
- ▶ ISO 9001:2015 and 14001:2015 certified

Applications



Research



Industry



Aerospace



Medical Technology



Telecommunication

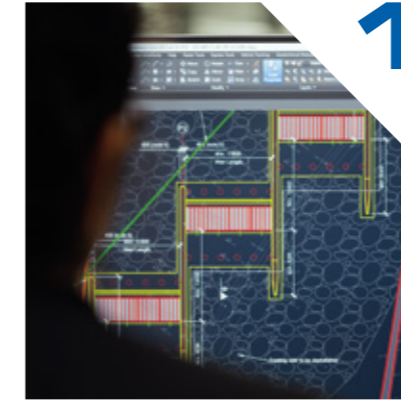


Transport



Defense

Development Process



1

Creation of a specification and definition of the system architecture



2

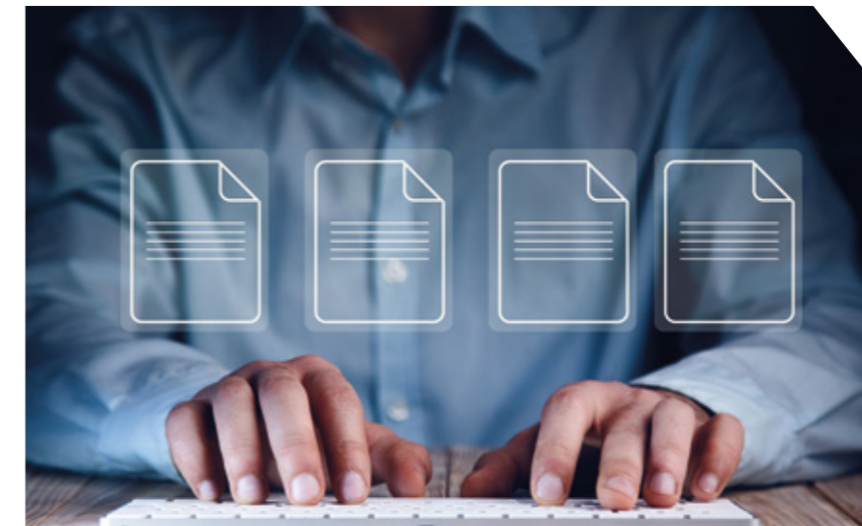
Setup of a laboratory system, integration of the software and system testing



3

Customization of the system to the environmental requirements

Quality Management



The fundamentals of our high quality are Device Master Records and Device History Records.

Device Master Records describe the complete manufacturing process. This allows the exact reproduction of products.

Device History Records track the production of each batch. They enable the identification of quality problems at any time.

Customized Solutions

Where standard products are no longer sufficient or extreme environmental conditions prevail, powerBridge Computer offers individual solutions. We develop specific boards and backplanes including BSP's and integrate them into the right chassis to cope any challenge. Our systems are working reliably for decades and are used successfully from the deep sea to outer space.



Customized Boards & Carrier Boards

Whether hybrid backplane, carrier board or customized I/O board: We at powerBridge Computer develop in close consultation your specific board: from the technical specification to series production – even for small quantities.



Chassis for Challenging Environments

Chassis are essential for the function of a system under harsh environmental conditions. With our wide know-how we realize technically complex chassis at economic conditions.

Individual Board Support Package (BSP)

You need an individual BSP for your board? We develop this for you – no matter if Linux, VxWorks, Windows or other operating systems.



Commercial off-the-shelf Solutions

The long-term availability of your system is defined by the choice of components. With an intelligent selection of 'Commercial off-the-shelf' products, most applications can be realized without customized components.

Most important for a successful system integration is the deep knowledge of the existing product

range and a close dialog with the engineers of the manufacturers.

With high real-time signal processing requirements MicroTCA systems enable powerful signal generation and control loops; for this reason, MicroTCA is used in SDR, vision or timing applications.



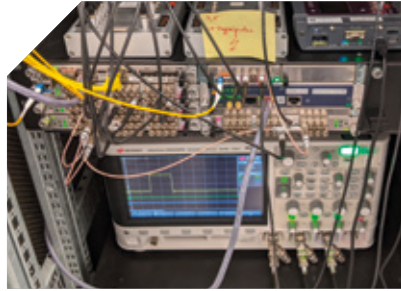
Starter-Kits

You want to get an easy start with a perfect development environment? We created Starter-Kits: These are different chassis variants, which are shipped fully functional with an operating system - just plug in your payload and get started.

Chassis Designs

From a small box to a redundant 9U 19" chassis - depending on the requirement, the fitting COTS solution is available. Water-cooled, conduction-cooled or rugged systems are also available on request.





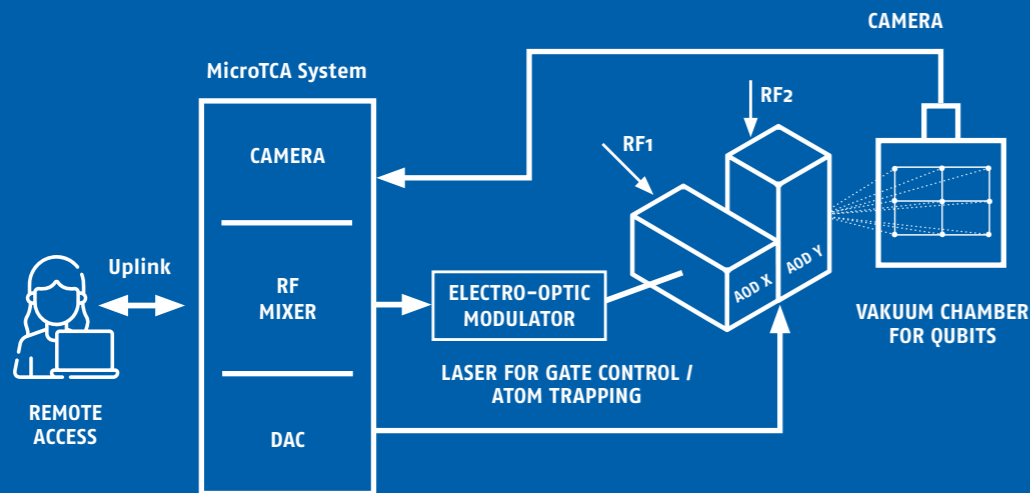
MicroTCA Functionality

The control of quantum computer systems requires high challenges on real-time signal processing: MicroTCA systems enable high performance signal generation and control loops with large data transfers. In a standard chassis, for example, up to 12 modules with these functions can be integrated:

- ▶ 4 High frequency receiver/transmitter
- ▶ 24 ADC channels
- ▶ 12 DAC channels
- ▶ 128 TTL I/O

Selective Addressing of Multiple Qubits with Acousto-Optic Deflectors (AOD)

MicroTCA processes and generates high-frequency signals with a bandwidth of 6 GHz or more. This is realized by a multitude of powerful FPGA boards based on MPSoc or RFSoc. With, for example 8 DAC channels, relevant qubit gates can be stimulated. With MicroTCA in just one single system, the high-frequency lasers are controlled, the machine system is monitored and the camera images are analyzed. The timing is almost without jitter (<10ps). The remote access is done via an uplink to the desktop server or directly at the MicroTCA system.



Systems for Quantum Computing

Even a quantum computer requires a conventional computer system for control and monitoring. MicroTCA is ideally qualified for this application. The requirements for reliability, redundancy and long-term availability are

identical to those of accelerators and fusion reactors. In America MicroTCA is already being used for quantum computers - a.o. like for the control of lasers.

Image Processing

Your application requires 4K or 8K cameras with transfer rates up to 100GigE or 12G SDI capture cards? The application should interact with artificial intelligence?

For this task FPGA-based systems are perfectly qualified. Should the size be as small as possible? We realize your vision application, e.g. by using NVIDIA Jetson modules.



Small Vision System

Your vision application requires a compact and cost-efficient system? By using NVIDIA Jetson SOM modules, the development process is only focused on the customization of the carrier and not on the GPU.

The carrier is custom-built to meet the requirements for I/O's, voltages, antennas and other. Depending on the industry different limits for operating temperature or noise emission are necessary for the system - We adapt the housing to your requirements.



MicroTCA Vision

By using intelligent FMC stacks, we can connect up to 4 x 10 GigE (optionally CoaXpress or 100 GigE) per FPGA. This enables the use of up to 24 cameras in a 2U 19" chassis. Of course, the outputs support PoE (Power over Ethernet) and each Vision Board is additionally equipped with its own HDMI 2.0 output and HDMI capture input.



Beamforming

Spatial Multiplexing

Beamforming, Full-Duplex Communication, Spatial Multiplexing

- ▶ Simultaneous transmission and reception of signals with active antennas
- ▶ TX/RX Signal Power >100 dB, compensation of interfering signals (radio interference suppression)
- ▶ Bandwidth: 200MHz - to 6GHz
- ▶ On request: <200MHz - 18GHz bandwidth

Man-in-the-Middle / Cell Phone Control (CPC)

Surveillance operations and electronical warfare is also possible (within the legal regulations).

TV TOWER

TARGET

SDR

Object Detection via Passive Signal Analysis / Passive Radar

Mode of operation:

- ▶ Receiving direct and reflected signal (E.g.: radio- or TV broadcasting)
- ▶ Differencing of the signals
- ▶ Calculating of size and distance of objects

$A - B = \text{LENGTH}$

Software Defined Radio

Whether radio communication, beamforming, spatial multiplexing, cell phone control (CPC) or full-duplex communication - all these applications are possible with our systems. Due to fastest FPGAs (Xilinx USC+)

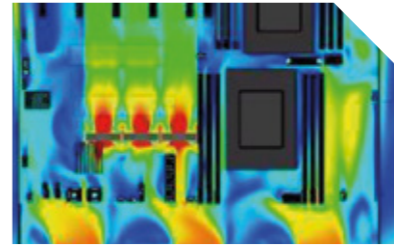
and high-performance AD converters, we can support you with MPSoC or RFSoc on MicroTCA basis. Our Starter Kits allow a quick start with Amarisoft and ready-to-use drivers.



Medical Technology

The strict requirements of medical technology, like IEC 60601-1-2:2014 or ISO 13485:201 are common for us. After understanding the customer requirement, we start with a

conceptual design, followed by the realization and certification – from control computers, to vision applications on System-On-Modules (SOM)-basis until high-performance systems.



Flotherm Analysis

For applications in critical thermal environments, the heat dissipation gets simulated before building a prototype system. This gives us the possibility to optimize the system for the environmental conditions of your application.



Factory Acceptance Test (FAT)

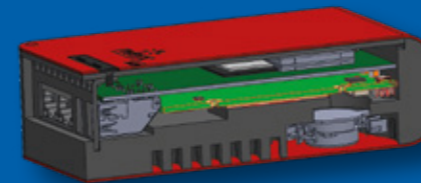
All systems run through the „Factory Acceptance Test“ in our quality inspection. This test is defined with the customer and allows him to use the system directly without any further technical quality inspections.



HPC – High Performance Computing

For high-performance applications, such as latency-free image processing or AI, we have suitable HPC systems:

- ▶ Dual Socket Intel (4th Generation), AMD (Zen4)
- ▶ Up to 6 NVIDIA RTX Ada 6000
- ▶ Adapted to your requirements (volume, dimensions etc.)



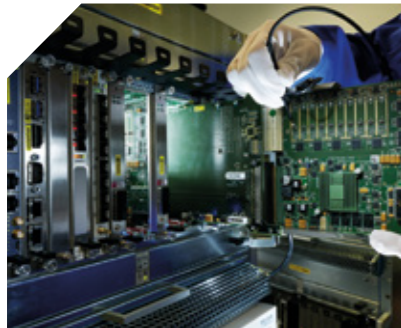
Small-Vision-System

By using modular solutions with NVIDIA Jetson, the development process is focused on the customization of the carrier. The carrier is specifically designed for the required I/Os, voltages, antennas and other requirements of the customer. Depending on the industry different limits for operating temperature or noise emission are necessary specified for the system – We fully customize the housing to your requirements.



PXIe

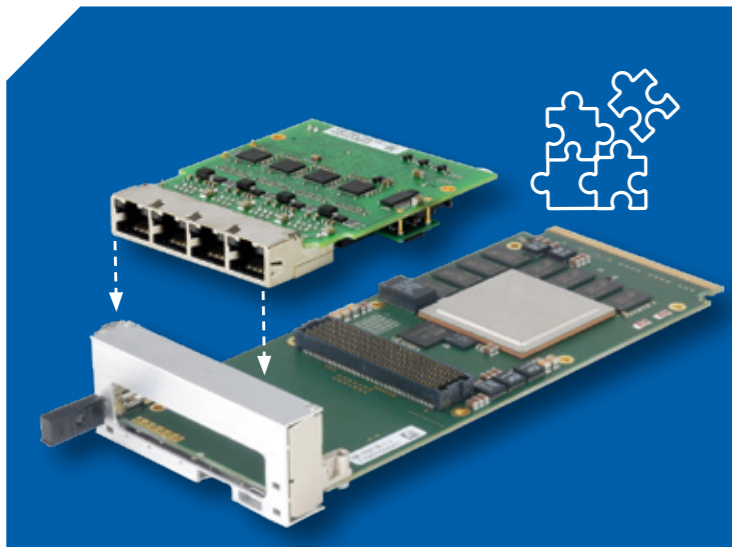
A measuring system with PXIe (PCI eExtensions for Instrumentation) is a high-performance slot-based system. It enables fast and precise measurements with high resolution and bandwidth. It allows a high data throughput. We offer a wide range of high-performance processor cards, data acquisition cards and various housings for PXIe.



MicroTCA in Measurement

MicroTCA offers many advantages in relation to conventional measurement systems:

- ▶ The flexibility allows an easy scaling of the system
- ▶ High latency-free data transfer rates enable real-time applications
- ▶ Large availability of high-performance boards for data acquisition



FPGA, FMC

The precise quantization and fast processing of analog or digital signals are realized by FPGA boards. One important component is the FMC, which presents the I/O interface of the FPGA. A wide range of data acquisition can be performed on the same FPGA board by using different FMCs.



Measurement

Reliable measurement systems play an important role in research and industry. Whether redundancy, accuracy or speed: Slot-based systems such as PXIexpress or MicroTCA in combination with

FPGAs, FMCs or DAQs and ADCs offer a wide range of functionalities. At powerBridge Computer you will get your individual measurement system concept.

Technical Standards

powerBridge Computer has the right hardware architecture depending on your requirements: From VPX to CPCI and MicroTCA to proprietary systems,

we independently provide you with advice and let you benefit from our decades of experience.



MicroTCA

MicroTCA defines compact backplane-based computer systems based on AdvancedMC (AMC) modules. MicroTCA systems are used in industry, research, medical technology, transportation, defense, telecommunications and networking. MicroTCA systems are always used when a lot of data (analog/digital) have to be processed in real time, e.g. by FPGAs. Examples for this are SDR systems, among others.



PXIe

PXIe stands for „PCIeXtension for Instrumentation“ and is a modular computer system which is especially designed for measurement and automation technology. It is based on the PCI Express bus and offers a high bandwidth and fast data transfer rates. PXIe is a flexible and powerful platform for the development and integration of test and measurement systems.



COM Express

COM Express is a specification of the PICMG for x86-based Computer-on-Modules. These modules integrate the core functionality of a bootable PC such as: CPU, graphics processor, main memory and standard interfaces on one board, which is connected via two connectors to a specific carrier board.



CPCI / CPCI-S

CompactPCI is an American industrial bus system with single or double-Euro card format and is normally used with passive backplanes. CompactPCI Serial is the further development of the CompactPCI standard. In contrast to CPCI, CPCI-S uses serial point-to-point connections and supports the PCIe bus.



HPC

High Performance Computing describes high performance systems, which represent what is technically possible. Usually these are equipped with PCIe slots and allow the use of the newest GPUs and CPUs. The preferred use of these systems are image and AI applications.



VMEbus

The VMEbus is a multiprocessor bus system. This means that several CPU Boards can be connected to 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 can be found at countless applications in industry, research, medical technology, aerospace and defense.



VPX (VITA 46)

The VPX standard (Virtual Path Cross-Connect) consists of a range of norms that define a bus system with computer boards in 3U and 6U sizes. The communication takes place via serial high-speed connections on passive or switched-fabric backplanes. VPX is mainly used for rugged high-performance applications, like mission computers in defense applications.



OpenVPX (VITA 65)

Based on VPX, OpenVPX standardize more stringent system architectures in 3U or 6U format. OpenVPX enables the compatibility of products from different manufacturers. Especially it defines the architecture of the highspeed interfaces between payload, switches, backplanes and chassis.



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