

# miriac™ EK5744

## Functional Safety Evaluation Kit

### Product Description



#### Overview

The **miriac™** EK5744 Functional Safety Evaluation Kit is a platform for evaluation, design and prototyping devices based on Freescale's MPC5744P MCU.

It provides a solid base for custom developments und shows how to use the MPC5744P for devices meeting any of the standards IEC 61508/62061 (SIL1 and SIL2), ISO 13849 categories 1 and 2 and performance levels a-d or similar.

A project to provide evidence to support an IEC 61508/62061 SIL3 and ISO 13849 Kat.3 safety claim for the MPC5744P and PowerSBC Subsystem is ongoing work.

Typical applications for devices based on the EK5744 will run in the fields of manufacturing systems engineering, plant engineering, transportation, automotive, traction and avionics where safety standards as shown above have to be implemented.

The MPC5744P microcontroller consists of two e200z4 Power Architecture cores running in delayed lockstep mode. Any of these two cores monitors and supervises the other. Additionally, the MCU implements system wide error detection strategies.

384KB ECC-RAM and 2,5MB ECC flash memory are provided for storing and running custom applications.

EK5744 provides analog and digital inputs and outputs that have been implemented following the safety requirements of IEC 61508 and ISO 13849 (SIL1/SIL2, up to Kat.2). Single-channel architecture is provided for lower safety requirements; dual-channel architecture will allow to even fulfilling higher safety requirements.

The platform is equipped with two industry standard CAN2.0 interfaces, for prototyping of safe communication protocols or the application of existing black channel protocols for CAN such as CANOpenSafety and many other standards.

For integration into a network, the board provides a 10/100MBps Ethernet interface (RJ45). Utilizing an appropriate black-channel protocol stack, this interface may also be used for safety-related communication (e.g. using openSAFETY or SoE, PowerLink, Ethercat).

In addition, the evaluation kit allows full access to all MCU signals, which is a perfect means to develop custom applications.

EK5744 is shipped with a basic demonstration firmware. This firmware contains safety functions and an API ("application programming interface") used to access the MCU and EK5744 features. Using this firmware and API makes it easier to design own devices conforming to the safety standards IEC 61508/62061 and ISO 13849.

#### Creation of safety devices based on the EK5744

The EK5744 has been designed to show how to use the CPU in a safety application as well as how to build I/Os for the industrial domain.

The concepts, design, documentation and firmware have been audited by a notified body and are commercially available. Using these building blocks it is a perfect fit to build custom industrial grade devices.

As a key result, project risk, cost are reduced and the timeline can be optimized.

On request, we provide professional services up to a complete custom device development.

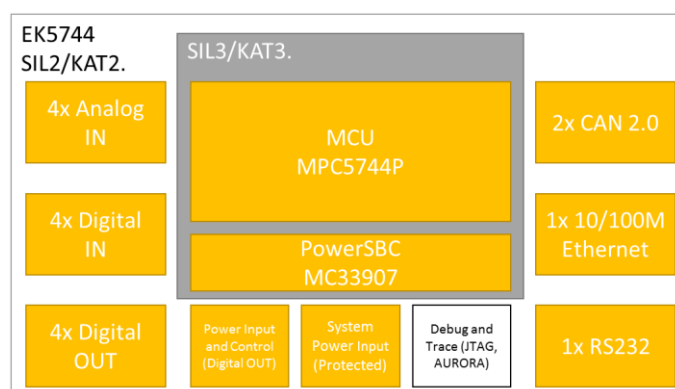
## miriac EK5744 at a glance...

Functions for SIL1- and cat.1/2	Functions for SIL2/3- and cat.3	Additional functions
<ul style="list-style-type: none"> <li>4 safe analog inputs, single channel</li> <li>4 safe digital inputs, single channel</li> <li>4 safe digital outputs</li> <li>Advanced Diagnostics on all I/Os and Power Inputs</li> <li>customized firmware</li> <li>CANopen Safety (CIA304). Safety over EtherCAT, openSAFETY on request</li> </ul>	<ul style="list-style-type: none"> <li>2 safe analog inputs (redundant)</li> <li>2 safe digital inputs (redundant)</li> <li>4 safe digital outputs (supports redundant use, depending on application)</li> <li>Advanced Diagnostics on all I/Os and Power Inputs</li> <li>customized firmware</li> <li>CANopen Safety (CIA304). Safety over EtherCAT, Profisafe, openSAFETY on request</li> </ul>	<ul style="list-style-type: none"> <li>full access to MCU pins; may e.g. be used for additional I/O like the ones provided on-board</li> <li>Ethernet</li> <li>Additional field busses, e.g., EtherCAT, Profinet, Powerlink, on request</li> <li>PLC on request</li> <li>Basic abstraction layer for bus interfaces (no protocol support)</li> </ul>

## Functional description

- MCU MPC5744, 2xPower Architecture e400z4 cores, 180MHz, 384KB RAM (ECC), 2,5MB Flash (ECC)
- PowerSBC 33907 System Basis Chip with Safe State Machine, Signature Watchdog, CAN-Transceiver and primary wide input range SMPS regulators
- Ethernet (10/100MBit), may be used as black channel, e.g. for Profisafe/Safety over EtherCAT
- 2x CAN 2.0B, may be used for CANopen Safety
- 4 analog inputs, 0..20mA (acc. to ISO61131)
- 4 digital inputs, 24V (acc. to ISO61131)
- 4 digital outputs, 24V (acc. to ISO61131)
- FlexPWM Ready Outputs
- 1x RS232
- 12-24V System Power Supply (acc. to ISO61131)
- Separate Digital Output Supply with Diagnostics, 24V
- Standard JTAG and Nexus AURORA Debug+Trace Interface

Figure 1: Functional overview miriacEK5744 Kit



**Software-Support:** Firmware including test and safety functions usable for applications up to SIL2/Kat.2  
API for access to I/O and communication ports, including handling of redundant I/O

## Ordering Information

Order #	Order text	Status
852410	miriac EK5744 Safety Evaluation Kit MPC5744P@ 180 MHz, 384KB ECC SRAM, 2,5MB ECC Flash Memory, includes power supply, RS232 cable, cabinet for DIN rail	Q4/2015

StI: 'Stock Item' – normally available ex stock

BoO: Build on Order – will be built after order received

**You are interested in a different variant?**

**You are very welcome to contact us!**

**MicroSys** Electronics GmbH  
Muehlweg 1  
82054 Sauerlach  
Germany [www.microsys.de](http://www.microsys.de)

Phone: +49 (0)8104 801-0  
Hotline: +49 (0)8104 801-130  
Fax : +49 (0)8104 80-110  
Email: [info@microsys.de](mailto:info@microsys.de)