

GPIO

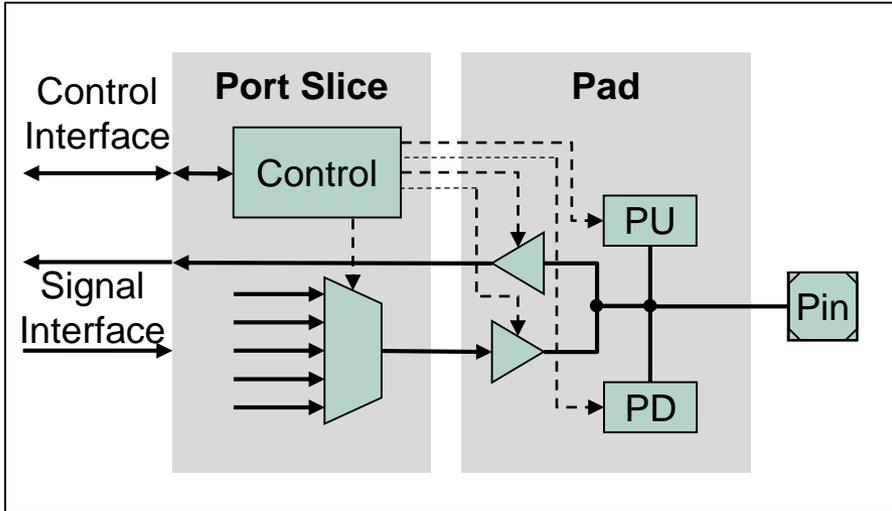
General Purpose Input Output

AURIX™ Microcontroller Training
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GPIO

General Purpose Input Output



Highlights

- › Digital input and output pins controlled by software or by peripherals
- › Capable to drive 5 V or 3.3 V output level
- › TTL or CMOS input hysteresis
- › Pin toggle with one CPU instruction

Key Features

High configuration capabilities

Access protection

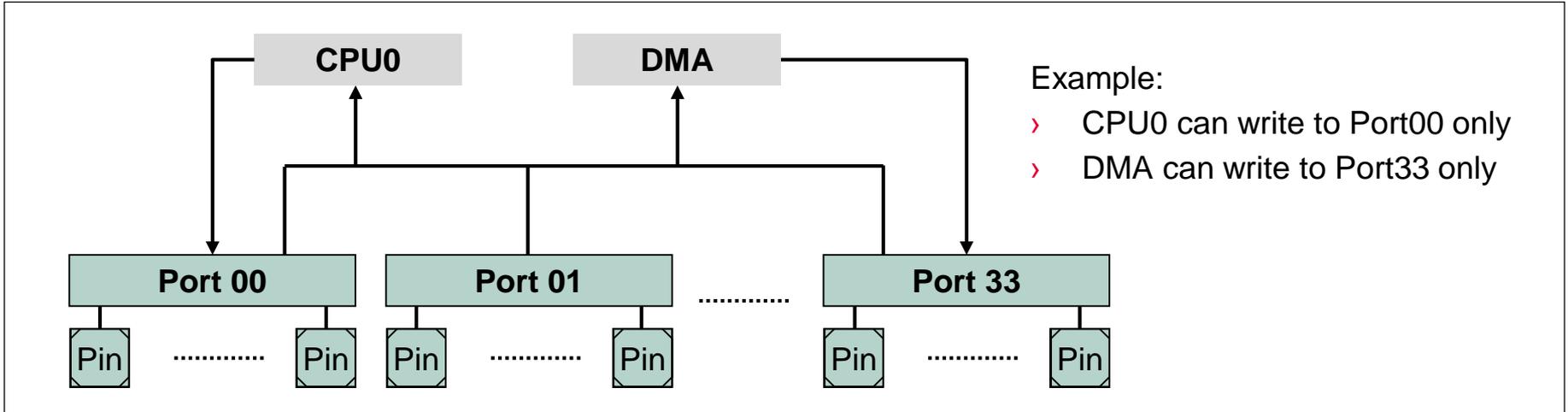
Port emergency stop

Customer Benefits

- › Flexible adaption of pin characteristics to application needs e.g. EMC
- › Protection against unintended modification of port configuration
- › Pre-defined pin states for critical situations without software intervention

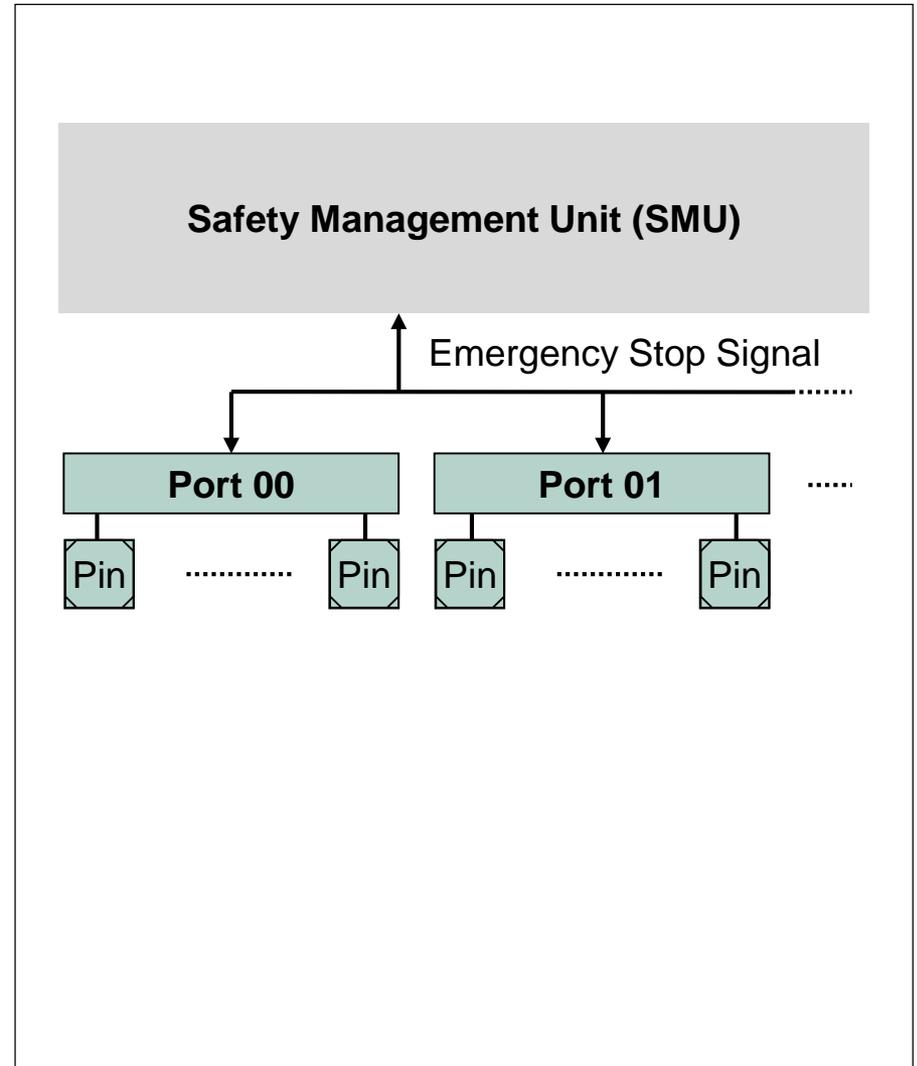
High configuration capabilities

- › Each port pin can be configured and controlled by software for input or output operation (general-purpose mode)
- › A port pin can be assigned to one of 7 peripheral **outputs**
- › Peripherals decide which **input** port pin to use as input
- › The level of a pin can always be read by software independent of whether the port pin operates as input or output
- › Configured as input:
 - an internal **pull-down** or **pull-up** devices can be connected
 - the user can select between 2 different **input hysteresis**
- › Configured as output:
 - **Push-pull** mode or **open-drain** mode can be selected
 - up to 4 different **speed grades** are available to apply the optimal balance between speed needs and EMC behavior of the application



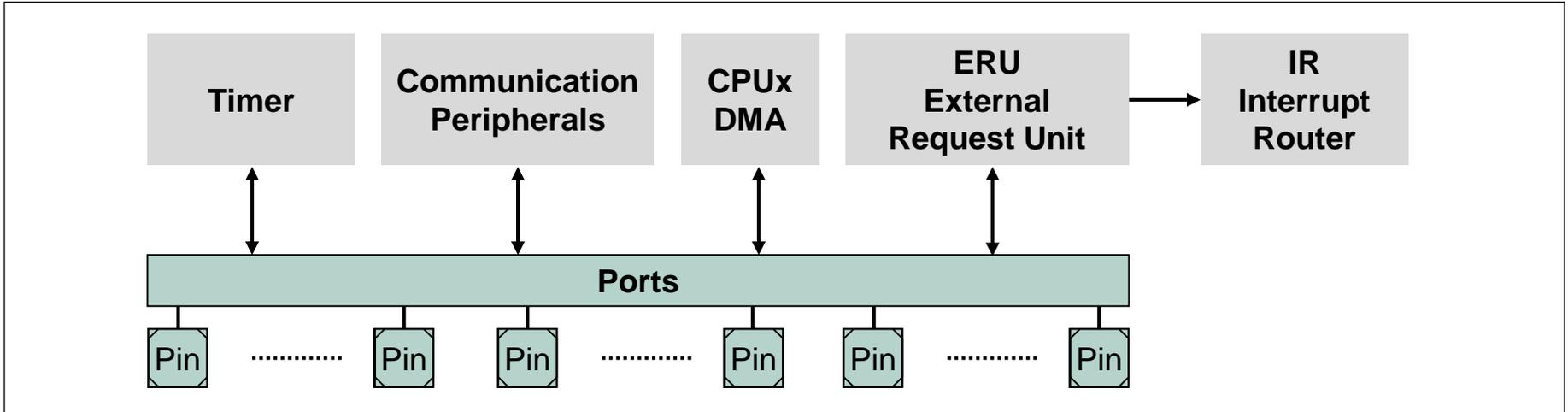
- > Unintended settings of port pins could cause serious and irreversible damages of the application hardware especially in high power applications
- > To avoid unintended modifications of port pin configurations during operation, AURIX™ provides a write protection for ports
 - The registers group of each port (e.g. P00, P01, P33, ...) can be protected against write accesses
 - Write accesses can be disabled separately for each bus master like e.g. CPUx, DMA, and HSSL

- › The emergency stop signal from the Safety Management Unit (SMU) forces port pins from output mode to general-purpose input mode
- › Emergency stop logic can be enabled for each port pin individually



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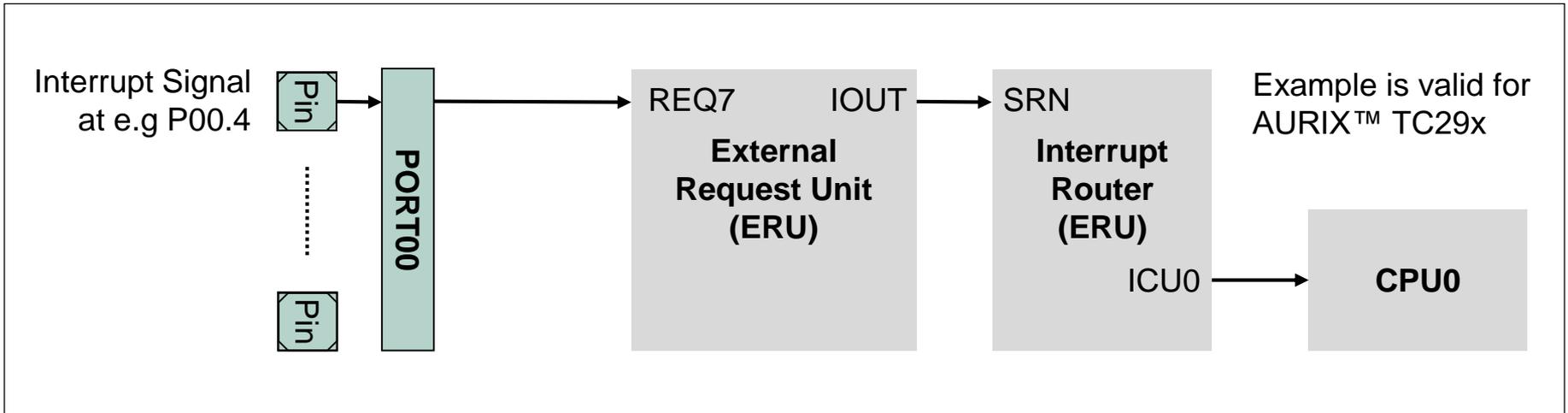
System integration



- › Almost all peripherals are interacting with port pins used as connection to the outside world
- › External interrupt signals (service requests) can be routed via the External Request Unit (ERU) to the Interrupt Router (IR)

Application example

External interrupt



Overview

- > The selected interrupt input pin P00.4 must be configured to input (optional: open drain mode, pull-device activated)
- > In the ERU the input REQ7 must be selected and routed to an output

Advantages

- > Several interrupt signals can be combined in the ERU and routed to one interrupt node
- > Up to 16 possible external interrupt inputs

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