ERU
Event Request Unit

XMC™ microcontrollers
September 2016



Agenda

1. Overview
2. Key feature: connection flexibility
3. Key feature: external interrupt generation
4. Key feature: configurable logic
5. System integration
6. Application examples

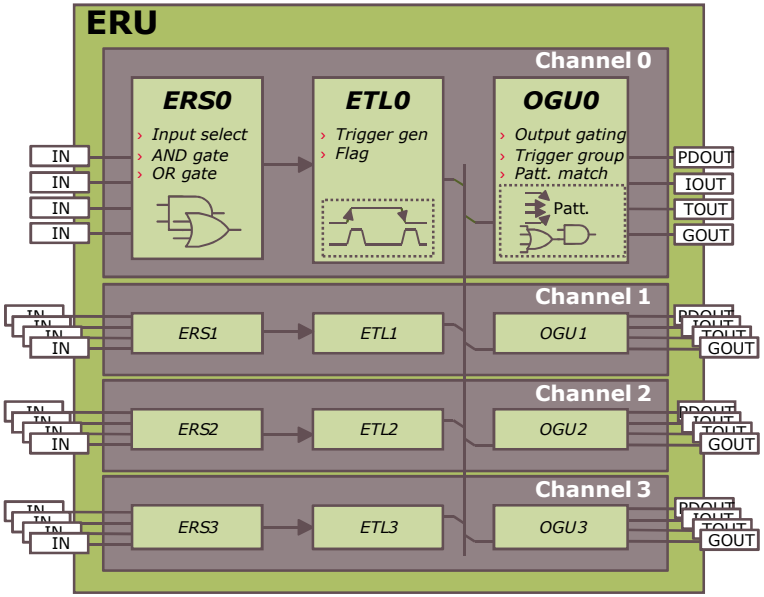
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ERU
Event Request Unit



Highlights

The ERU module can be used to expand the P-to-P connections of the device: ports-to-peripherals, peripherals-to-peripherals and ports-to-ports. It also offers configurable logic, that allows the generation of triggers, pattern detection and real-time signal monitoring.

Key feature

- Connection flexibility
- External interrupt generation
- Configurable logic

Customer benefits

- Connection expansion for small packages; Increased application case coverage for motor control, power conversion, etc.; peripheral/ port-to-peripheral/port
- Multiple and parallel interrupt generation from port pins; Conditioning of interrupts with internal signals
- Real-time conditioning of external signals; Logical functions between peripherals, e.g.: AND, OR

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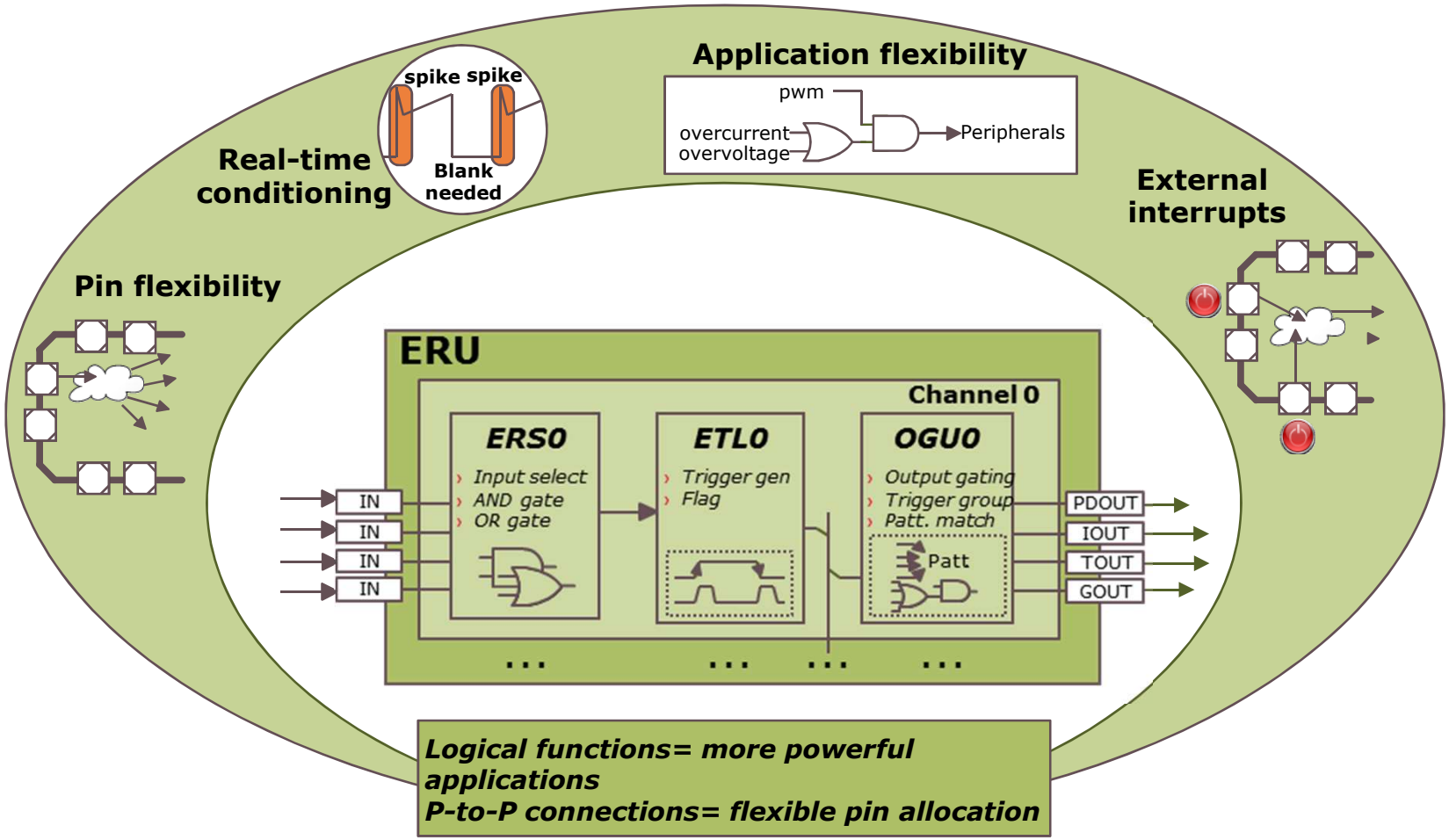
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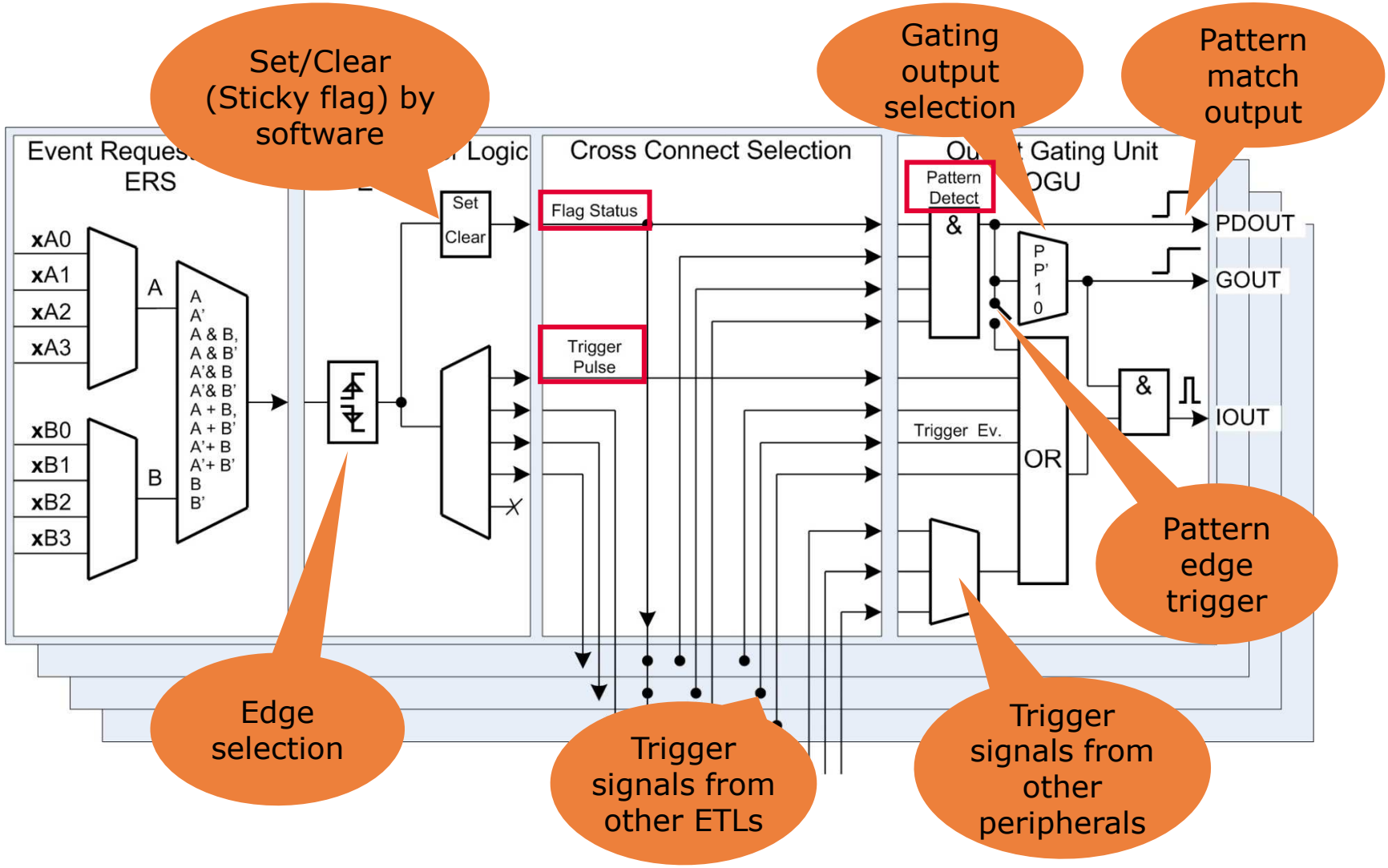
ERU
Connection flexibility (1/2)

- **P-to-P connections**: Port-to-peripheral, peripheral-to-peripheral and port-to-port
- **Configurable logic** for application flexibility and real-time conditioning



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ERU
Connection flexibility (2/2)



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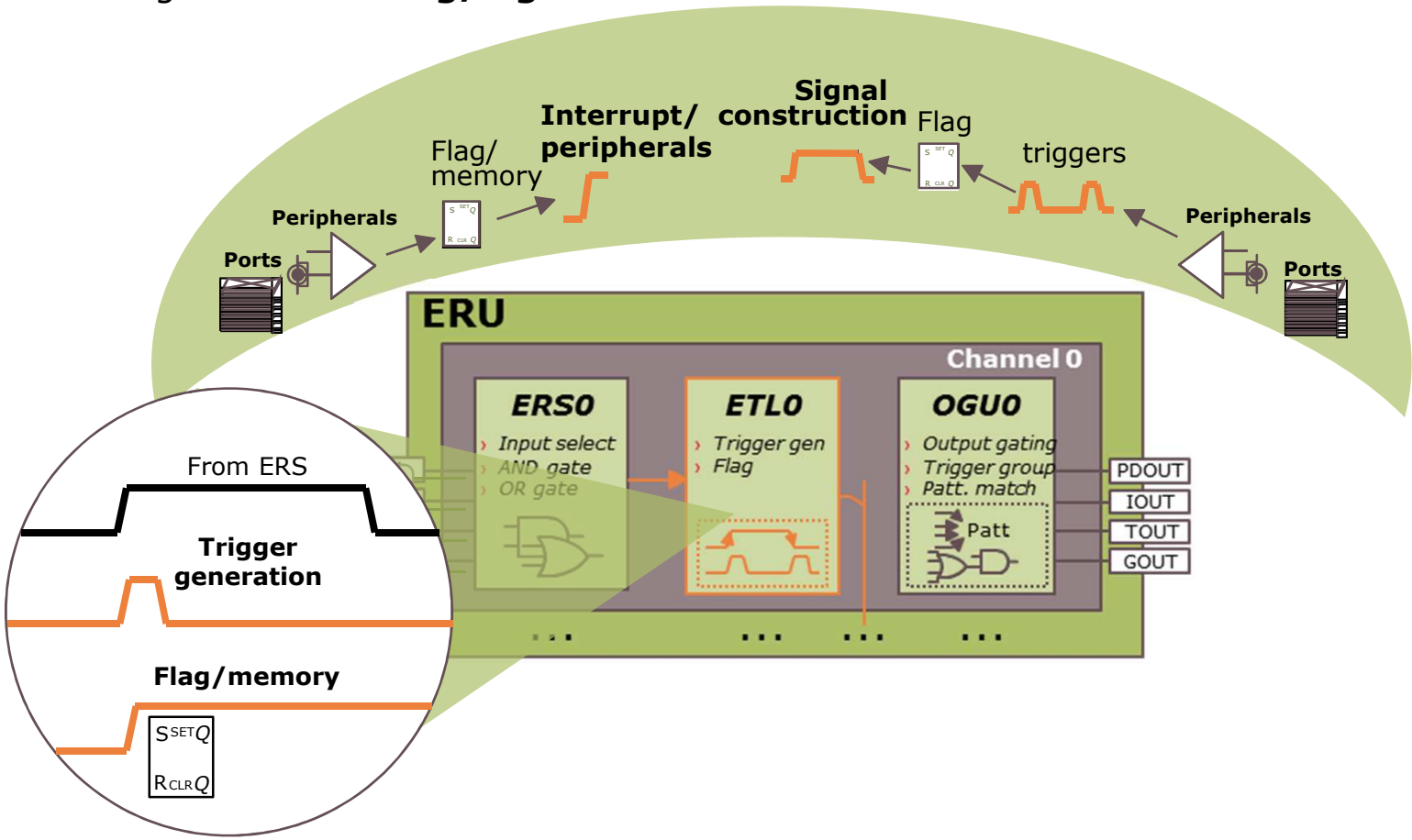
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ERU
External interrupt generation

- Edge detection function – **trigger generation**
- Especially tailored for interrupt generation
- Software flag for **monitoring/signal reconstruction**



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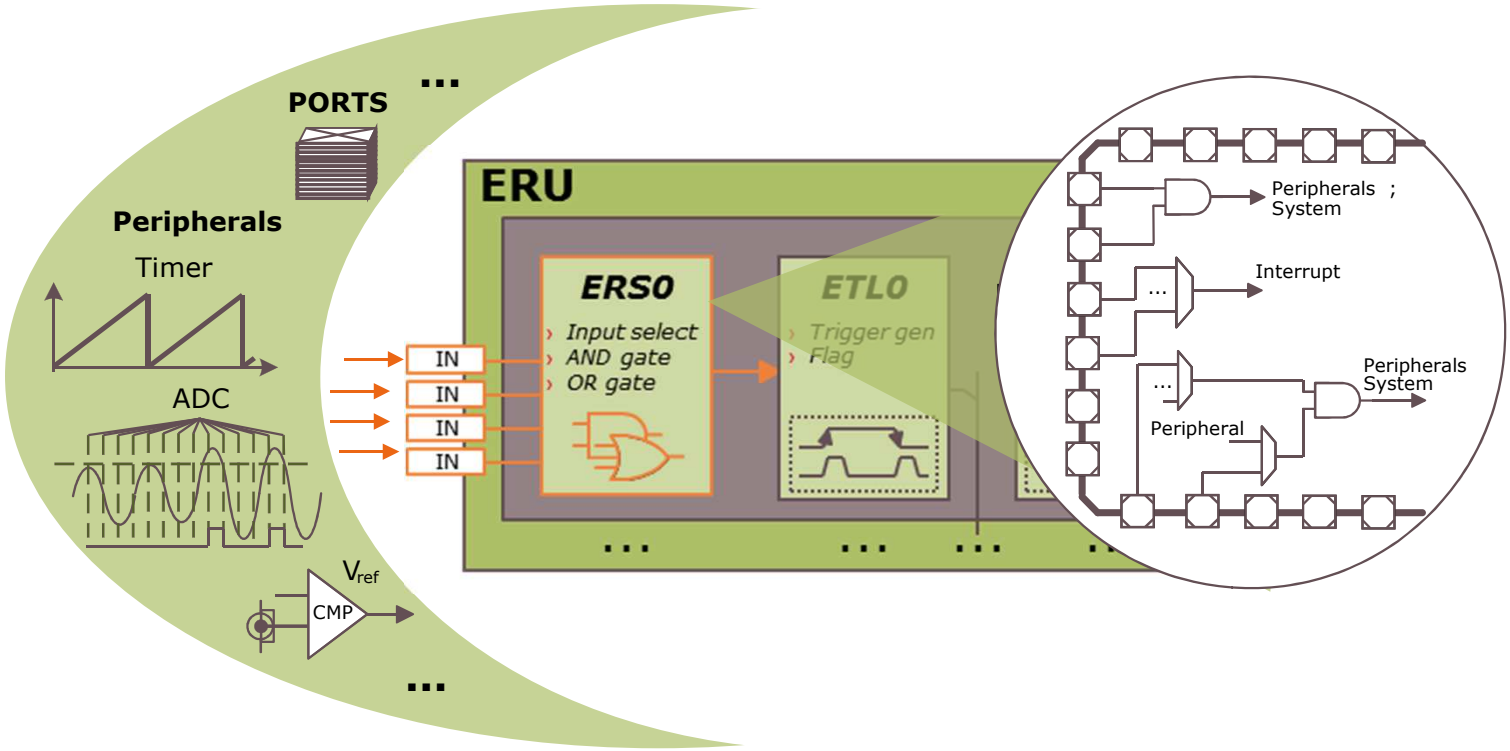
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ERU
Configurable logic (1/2)

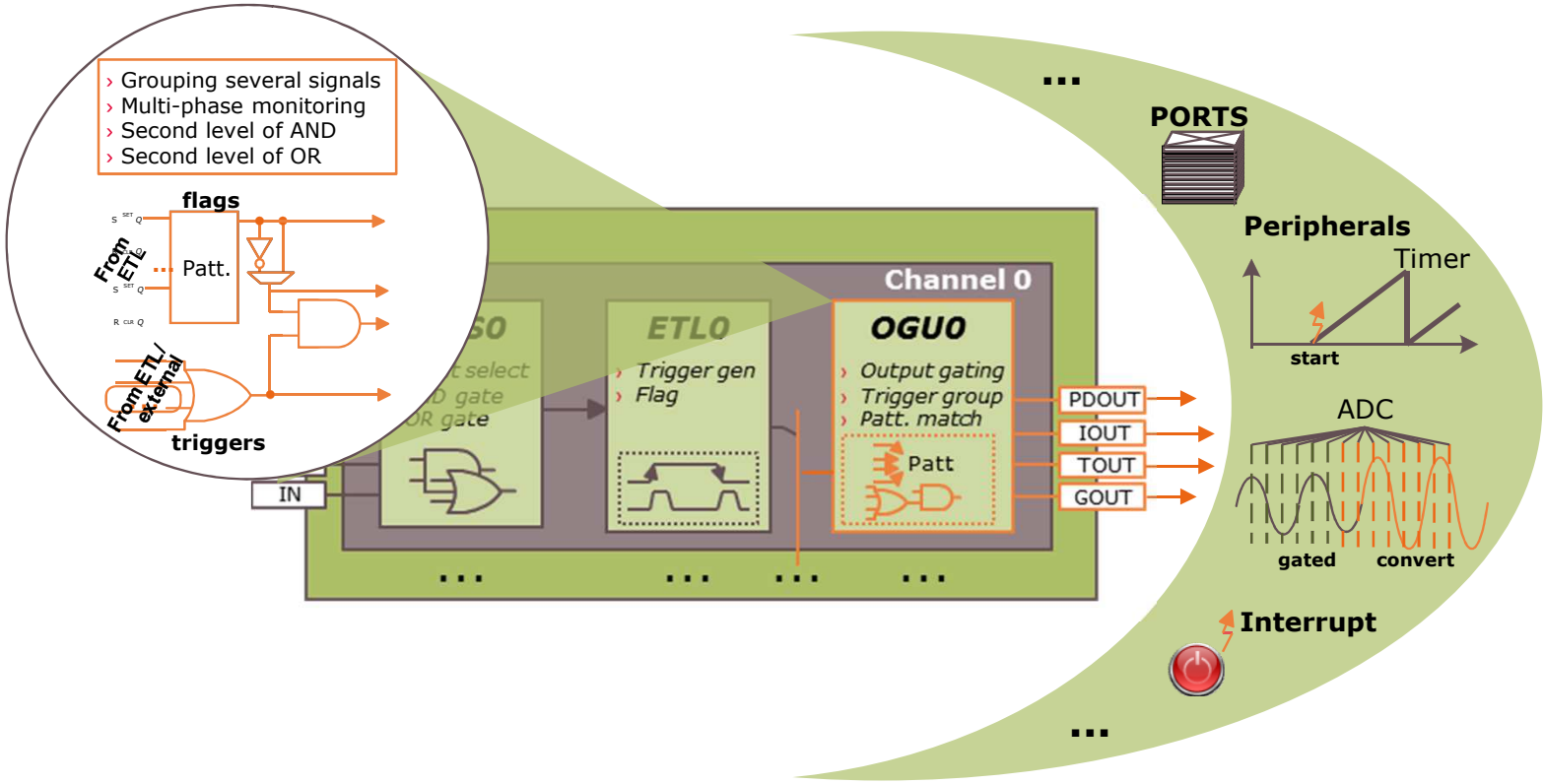
- Logical combination between two signals – **signal conditioning**
- Connection of ports to peripherals – **flexibility even in smaller packages, interrupt generation**
- Connections of peripherals to peripherals – **real-time conditioning** for demanding applications



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ERU
Configurable logic (2/2)

- Signal grouping
- **Output AND and OR gates**
- **Real-time conditioning** for multi-phase systems
- Connections to peripherals/system and ports – **package flexibility**



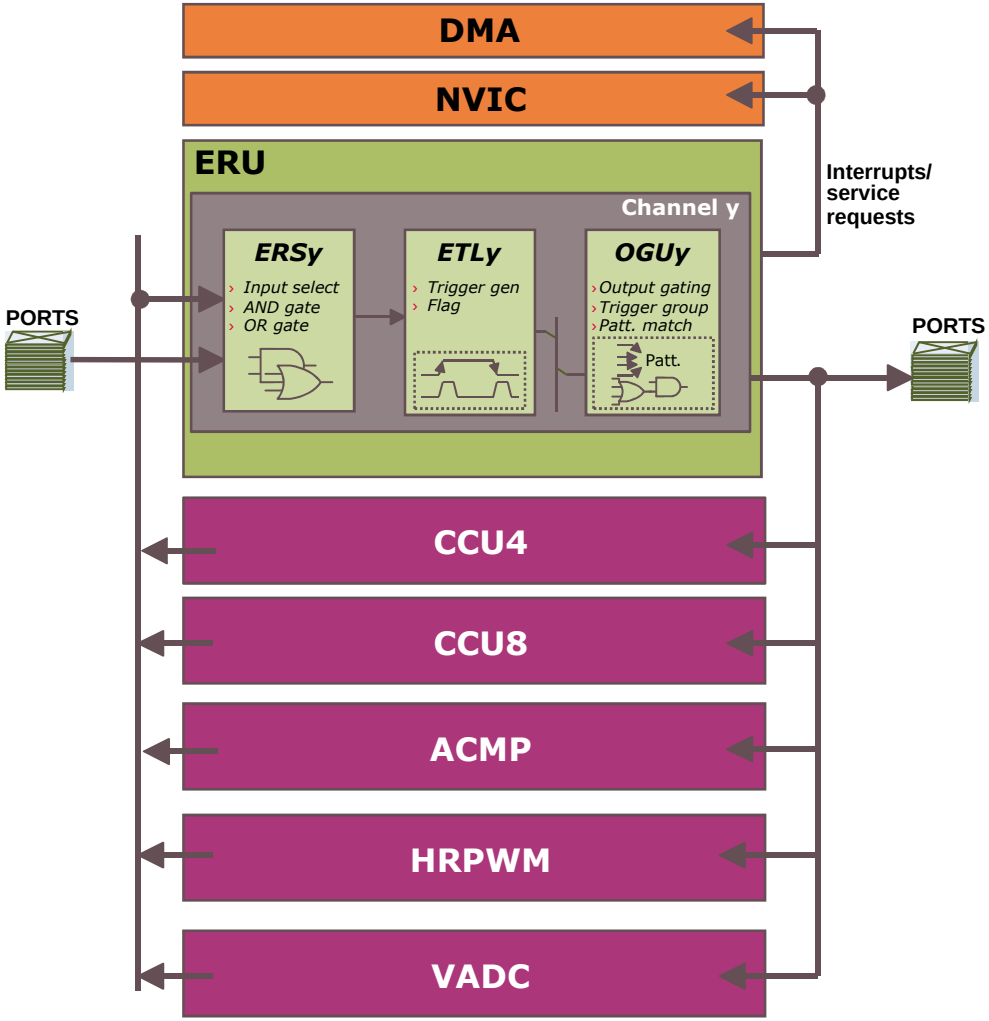
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ERU
System integration



*Several components may be present or not depending on the device



The ERU system integration offers several advantages:

- Integration within timers and mixed-signal peripherals, e.g. ADCs and comparators. Especially suitable for real-time control
- Multiple port connections for pin allocation flexibility
- Multiple interrupt generation from port pins
- Target applications
  - Power conversion
  - Motor control
  - General purpose

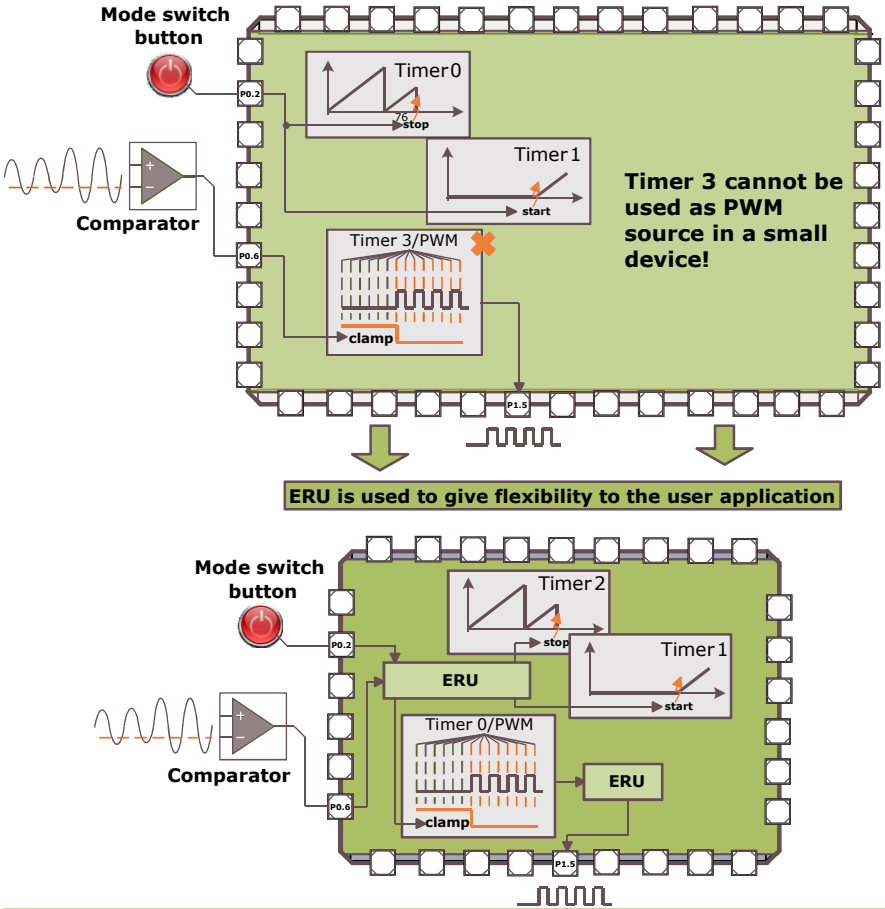
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Application example
Pin flexibility



In brief

ERU gives pin and resource allocation flexibility.

Overview

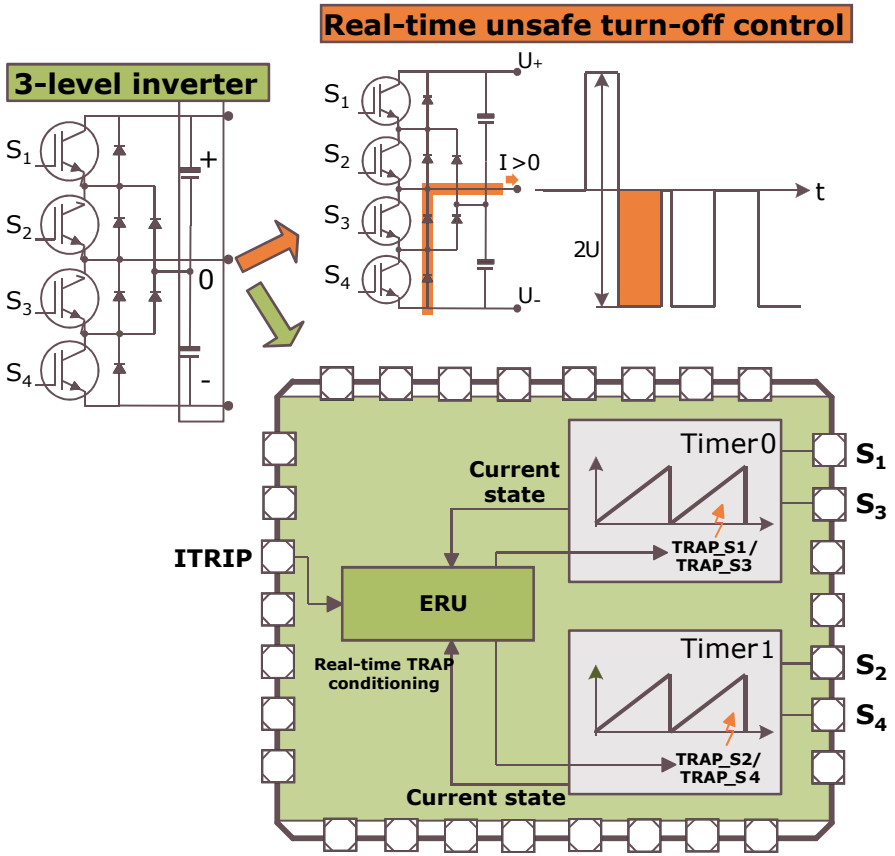
In resource optimized applications, it is necessary to have a good pin-to-peripheral flexibility to be able to map the core of an application in different devices.

The additional flexibility offered by the ERU allows the user to increase the pin routing paths, which helps to compensate for a resource rearrangement.

The same flexibility can also be used to reach a maximum resource utilization due to the expansion of peripheral-to-peripheral connections.

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Application example
3-level inverter real-time conditioning



In brief

ERU combinational logic allows real-time conditioning of a ITRIP signal.

Overview

In a 3-level inverter, it may be necessary to have a real-time monitoring and conditioning of a TRAP/ITRIP signal.

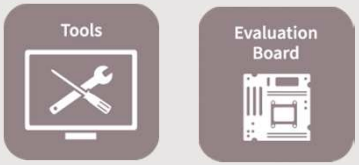
This signal indicates that the PWMs controlling the inverter stage should be shut down, due to an overcurrent event.

Nevertheless in specific time-window of the switching activity this ITRIP signal needs to be delayed/ conditioned to avoid a major overshoot in the voltage output.

This can be done using the combinational logic of the ERU- by monitoring the current PWM states and generate the proper TRAP sequence for the timers.

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Support material

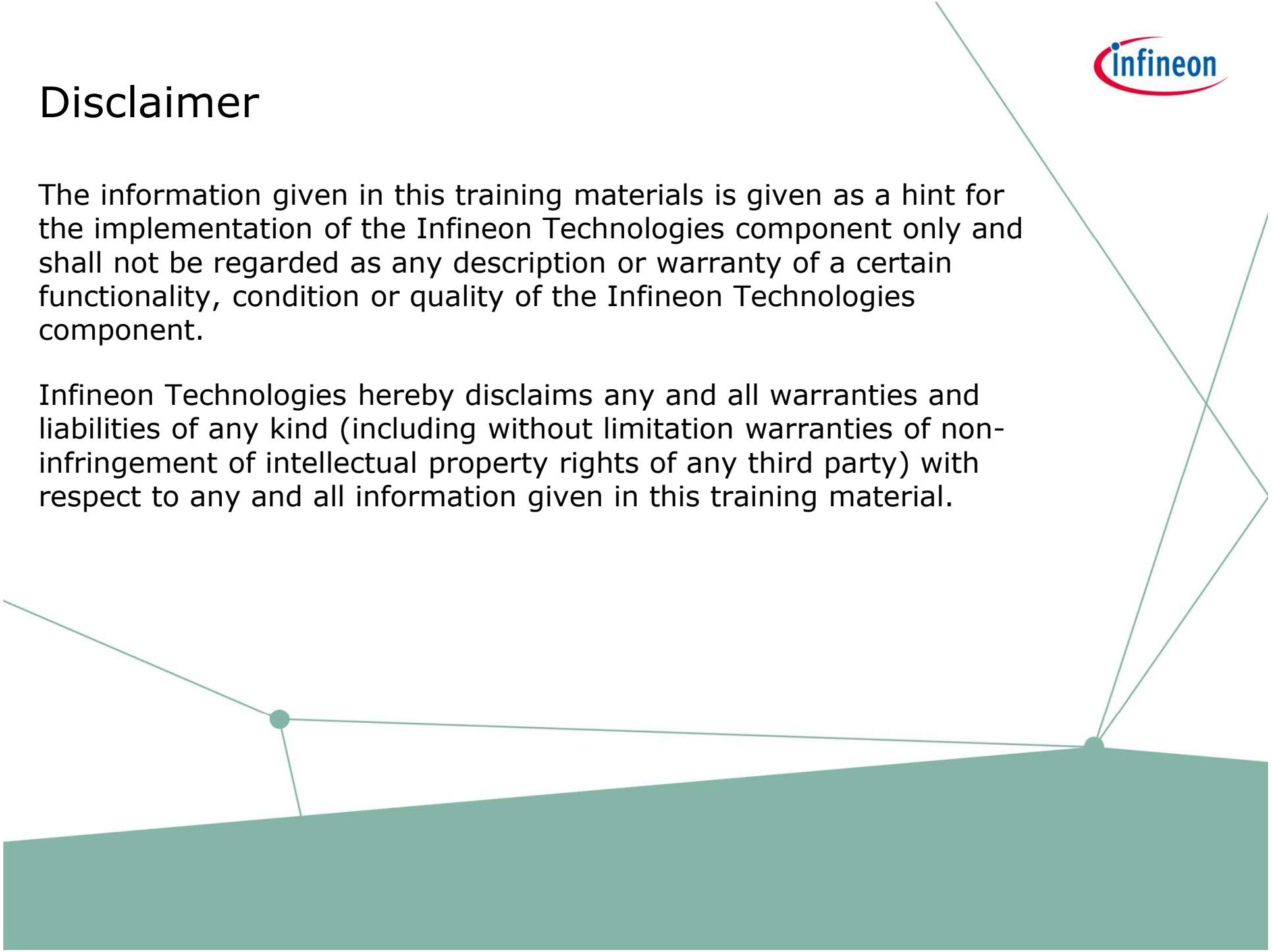
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