

GTM

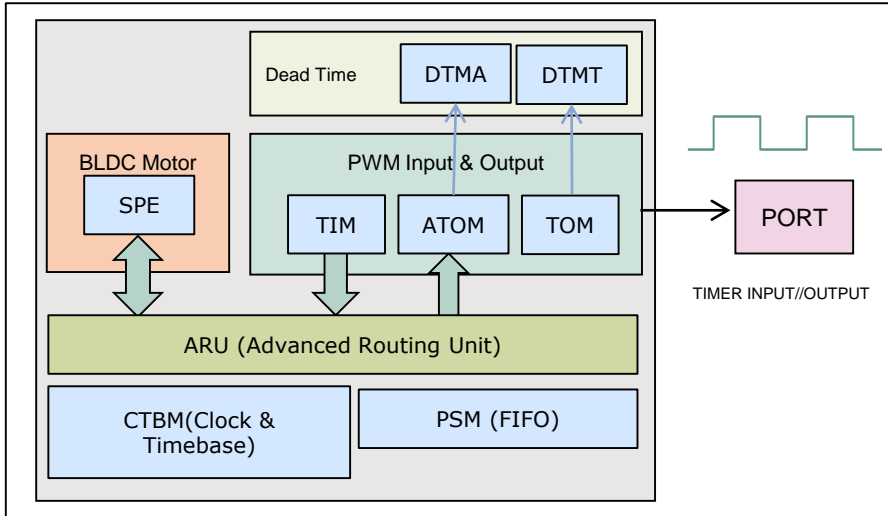
Generic Timer Module

AURIX™ TC3xx Microcontroller Training
V1.0 2020-09



GTM

Generic Timer Module



Highlights

GTM is a modular timer unit designed to accommodate many timer applications including dynamic digital PWM output, digital acquisition with filtering, motor control including BLDC. Timer resolution up to 24 bits with up to 10 ns time granularity

Key Features

Advanced routing

Brush-less DC motor (BLDC) Support

Common time base

Customer Benefits

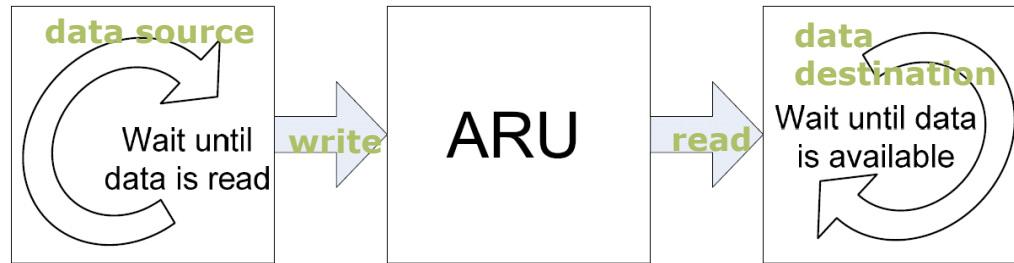
Route information in hardware between sub-modules

Brush-less DC motor control in HW.
Reduced software overhead

Synchronize events in the timer using a common time base (CTBM)

GTM

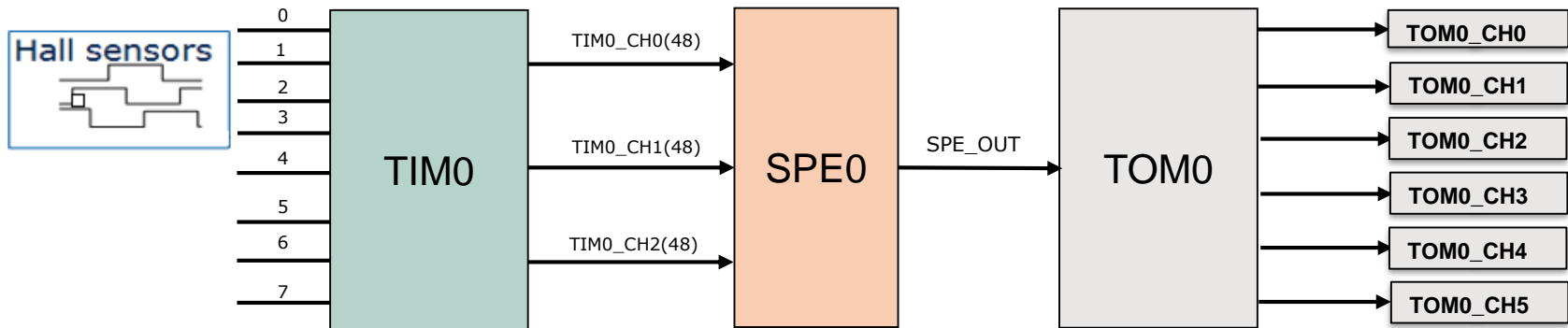
Advanced routing



- › GTM has an inbuilt advanced router unit (ARU) that can be used to exchange specific data between sub-modules
- › Routing follows round-robin scheduling
- › Benefits:
 - Fixed round-trip time leads to deterministic scheduling
 - No need for an internal interrupt mechanism to exchange data

GTM

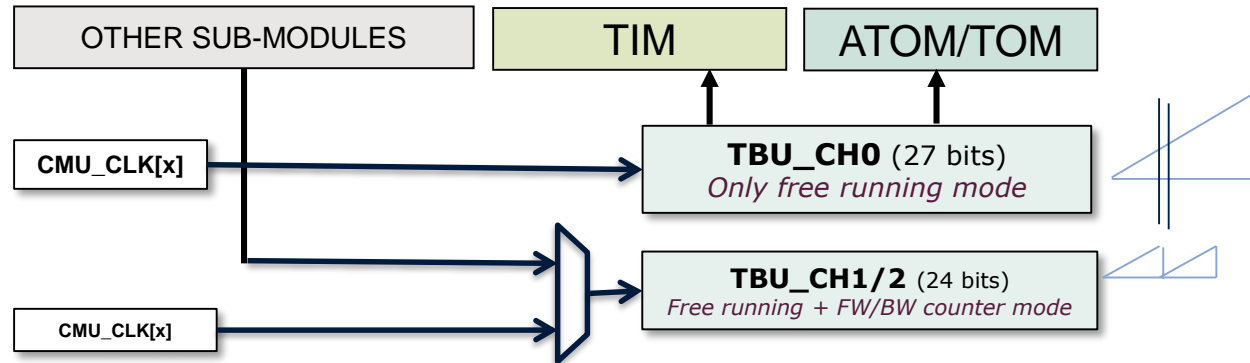
BLDC motor support



- › Hardware support for Brush-less DC motor drive using the Signal pattern evaluation (SPE) sub-module along Timer input and output modules (TIM/(A)TOM) respectively
- › Benefits:
 - Pattern matching algorithm in hardware
 - Rotation direction & validity detection
 - Possible to generate interrupts on specific rotation

GTM

Common time base

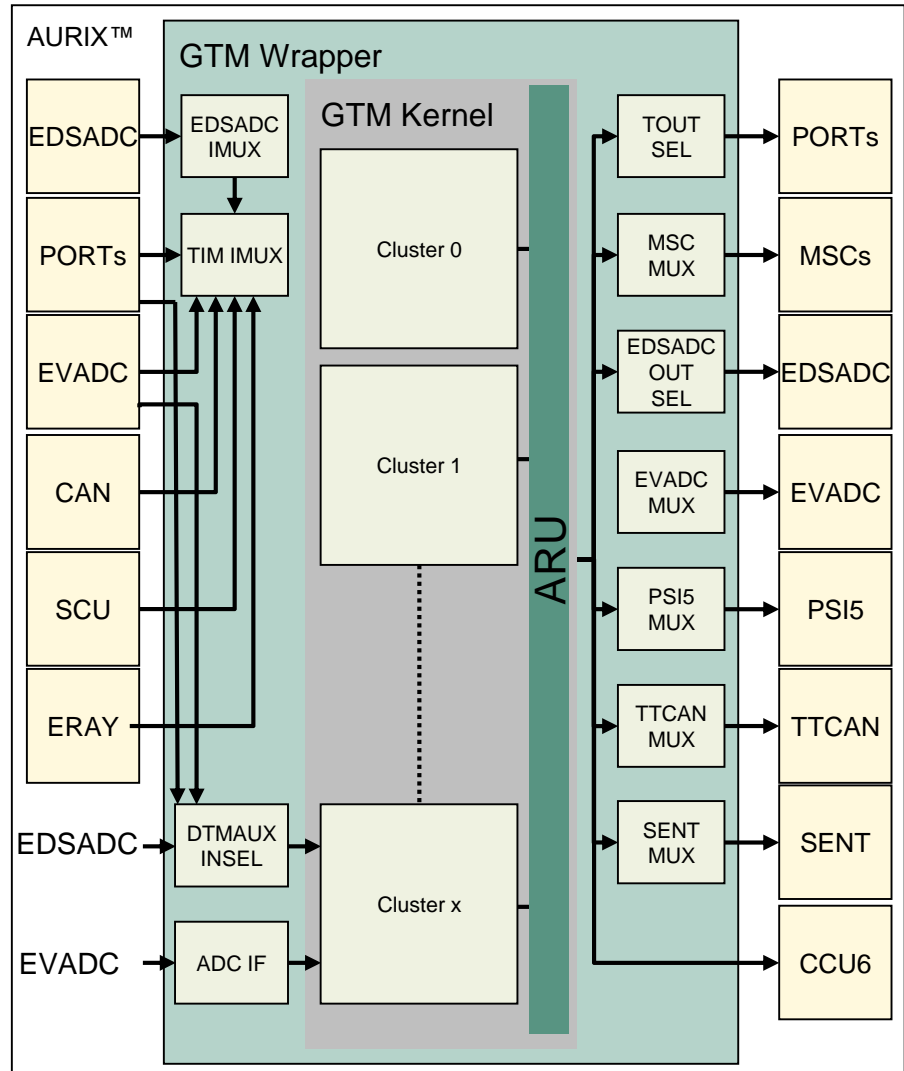


- › GTM provides common-time base through the Time Base Unit (TBU) within the CTBM (Common time-base module) sub-module
- › Common time-base provides ability to synchronize events in different sub-modules within GTM
- › Benefits:
 - Timestamp from TBU on input events
 - Use timestamp from TBU as reference to achieve synchronous start of events between various timer outputs

GTM

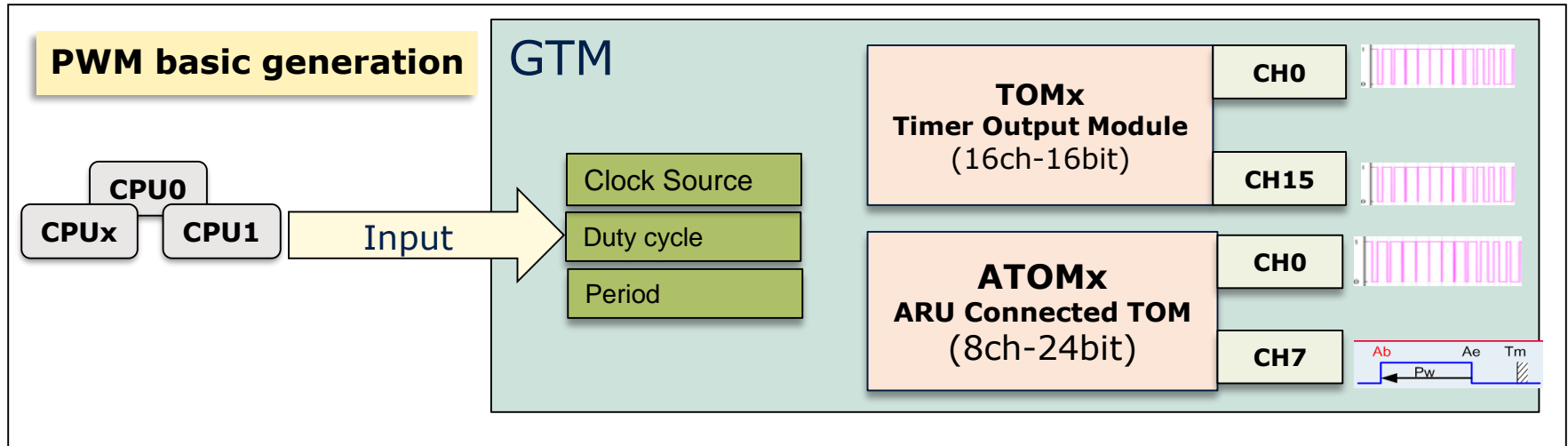
System integration

- › GTM is integrated in AURIX™ to provides flexible set of connections to other peripherals
- › This includes:
 - PWM output & input to/from multiple ports
 - Trigger inputs to ADCs as well services request event inputs from ADC to GTM-TIM/DTMx
 - Trigger inputs to SENT, CAN, MSC and PSi5/PSi5S
 - Direct internal connectivity of timer output to CCU6 timer input for measurements



Application example

Digital PWM output



Overview

- › PWM generation with multiple channels with 16 or 24-bit resolution with as low as 10 ns granularity
- › ATOM has variety of modes of operation to support different PWM outputs
- › Data reception using the ARU on ATOM

Advantages

- › Dynamic PWM generation with input of period/duty via the ARU
- › Channel counter can be triggered/reset by its predecessor to achieve control of multiple channels with a reference channel

Application example

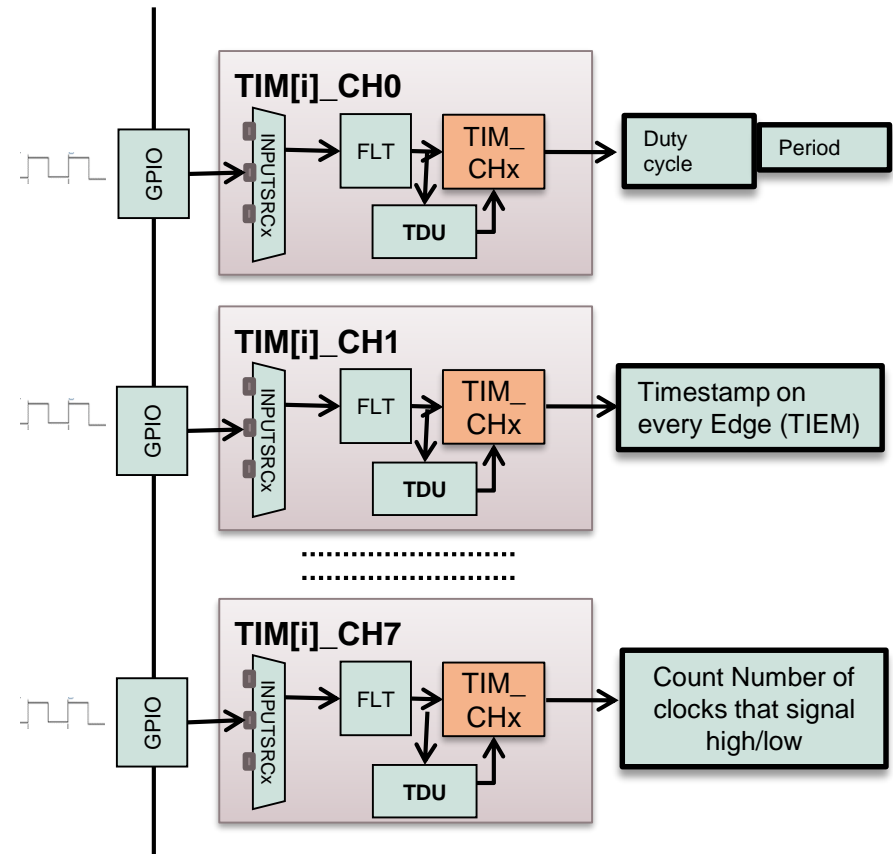
Digital input acquisition

Overview

- › Each Timer input module (TIM) with 8 independent channels for input capture/measurements, each with its own filter module
- › Multiple modes to support different measurements including period/duty, timestamp on desired active edges

Advantages

- › Digital filtering of input PWM with glitches in hardware
- › Time out detection using TDU (Timeout Detection Unit) within each TIM channel
- › Routing TIM channel output results via ARU to other sub-modules without interrupts



Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2020-09

Published by

Infineon Technologies AG

81726 Munich, Germany

© 2020 Infineon Technologies AG.

All Rights Reserved.

Do you have a question about this document?

Email: erratum@infineon.com

Document reference

AURIX_Training_2_

Generic_Timer_Module

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.