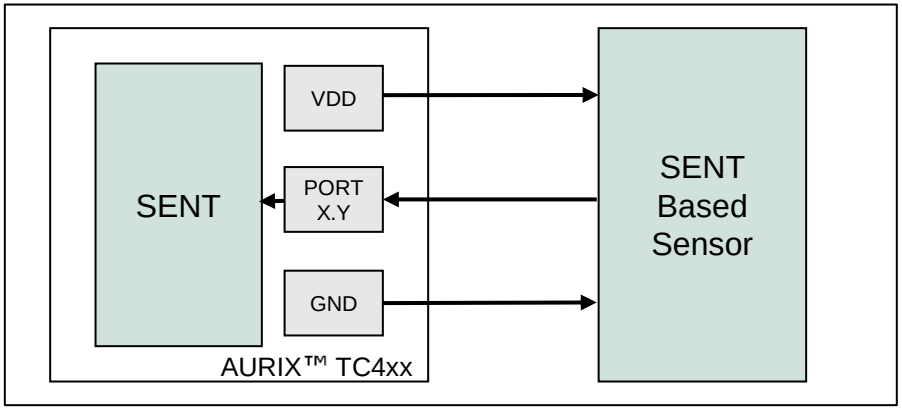
SENT
Single Edge Nibble Transmission

AURIX™ TC4xx Microcontroller

V1.0.0 2024-09

Please read the Important Notice and Warnings at the end of this document

SENT
Single Edge Nibble Transmission



Highlights

- SENT J2716_201604 standard compatible module supporting standard SENT unidirectional communication as well as supports bidirectional communication with multiple sensors on a single SENT bus using SPC. Supports ticks time in the range of 0.2 us to 1024 us

Key Features

- Extended feature set
- Programmable nibble sorting
- Support for SPC

Customer Benefits

- Supports different range & modes of SENT based sensors
- Flexible configuration of readout of the received data nibbles to relief CPU
- Enable bidirectional communication with multiple SENT sensors

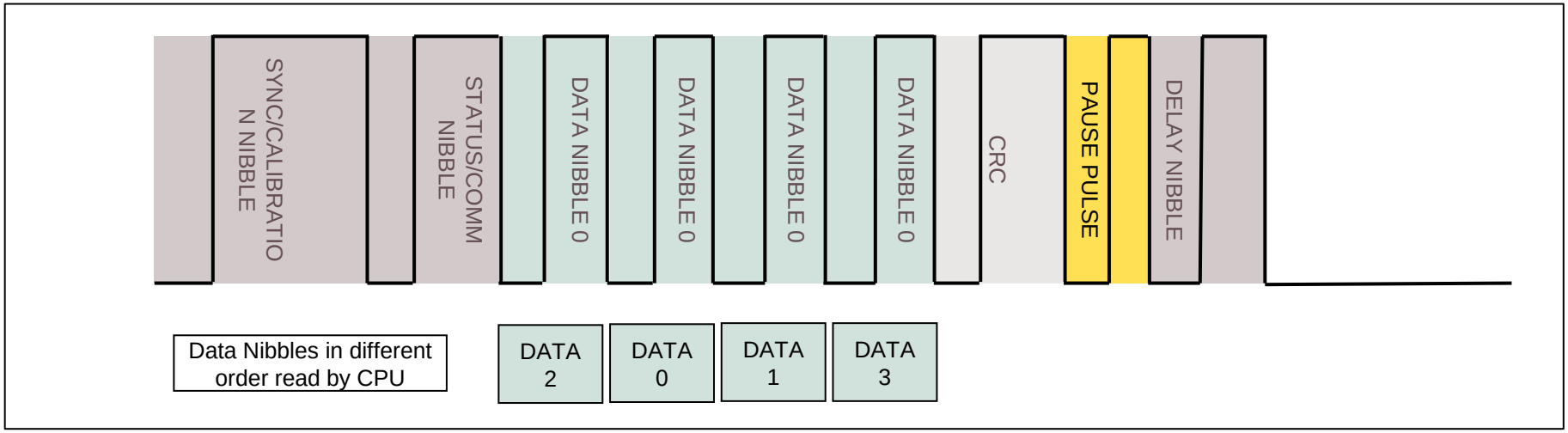
Copyright © Infineon Technologies AG 2024. All rights reserved.

SENT
Extended feature set

- SENT on AURIX™ TC4xx implements extended features beyond the J2716 SAE standard
- Message tick time range is extended to support 0.2 us as compared to 3 us
- Option for bigger frame lenth with upto 255 data nibbles as compared to 6 nibbles as per standard
- Watchdog on incoming frames to detect timeouts
- Optional output inversion for use of external open drain transistor
- Optional input inverison for use of external open drain transistor or level shifting
- Support of FDFL support for check of frequency range drift based on complete frame length instead of just synchronization pulse

Copyright © Infineon Technologies AG 2024. All rights reserved.

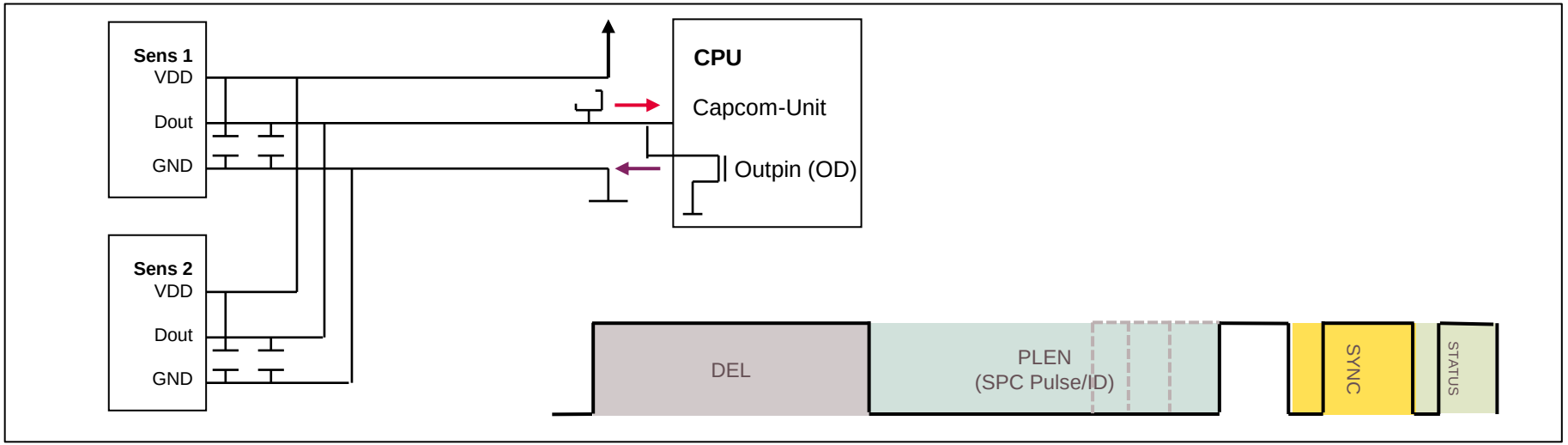
SENT
Programmable nibble sorting



- SENT provides an in-built feature which allows to sort the received data nibbles directly in HW without software intervention leading to off-loading the CPU
- Provides a VIEWx register which can be used by the user to define a desired order of the received data nibbles in the receive register

Copyright © Infineon Technologies AG 2024. All rights reserved.

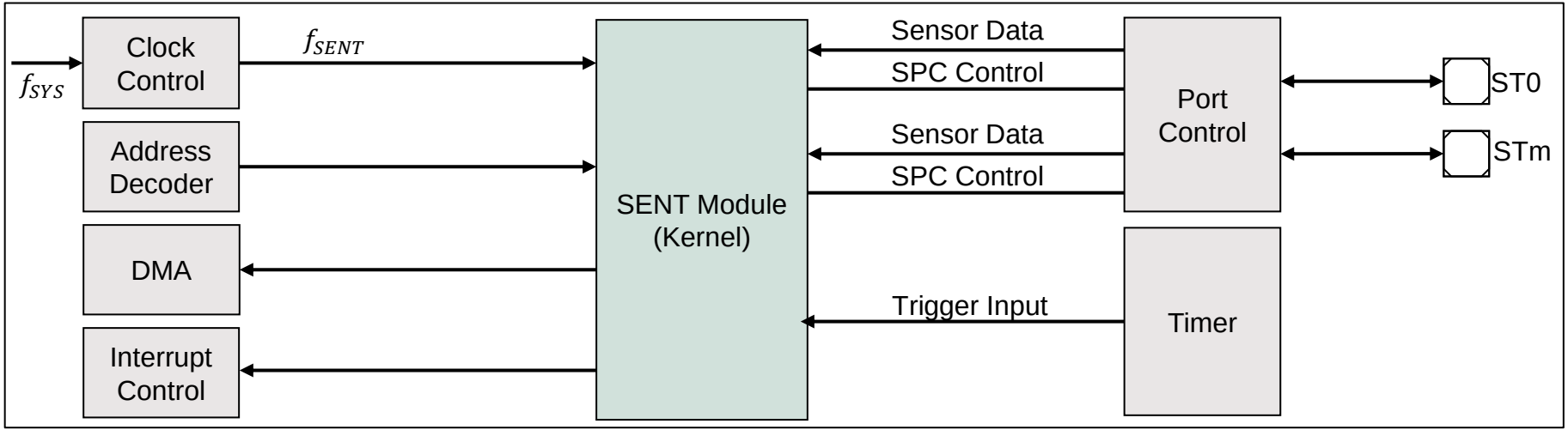
SENT
Support for SPC



- SPC (Short PWM Code) is an Infineon proprietary standard which allows the AURIX™ to communicate with a SENT sensor
- SENT based communication is bidirectional
- Provides the ability to multiplex up to 4 sensors on a single SENT input while each sensor can be individually addressed with an address ID encoded in the SPC pulse from AURIX™

Copyright © Infineon Technologies AG 2024. All rights reserved.

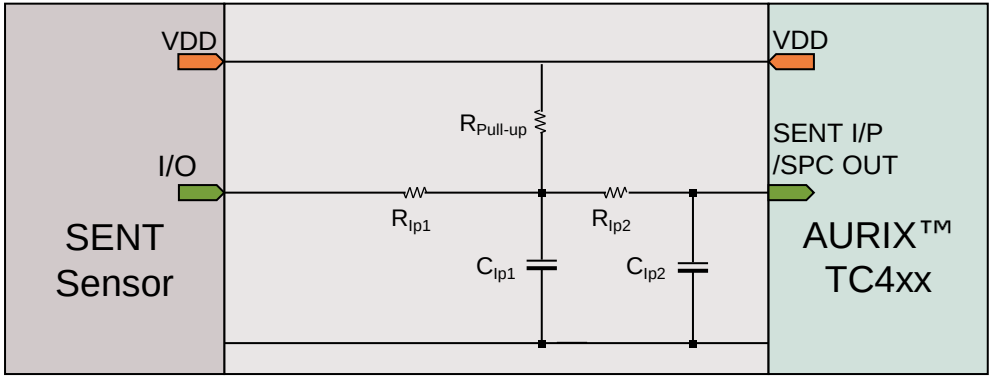
OCDS
System integration



- SENT is integrated to provide flexible connectivity to multiple GPIOs
- SENT generates various interrupts signals including error interrupts signals to the interrupt router to instant action
- SENT gets a trigger input from timer like GTM (Generic Timer Module) and eGTM (Enhanced Generic Timer Module) to synchronize SENT communication with other events on system level

Copyright © Infineon Technologies AG 2024. All rights reserved.

Application example
Interfacing with angle/temperature sensor



Overview

- This application example shows typical usage of SENT module in an EPS(electronic Power steering) application
- SENT is connected to an external SENT complaint sensor to provide angle based position information

Advantages

- Various format of data encoded by different sensors supported including:
  - Single sensor secure A3 encoding
  - Dual throttle position sensor A1 encoding

Copyright © Infineon Technologies AG 2024. All rights reserved.

Trademarks

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

Edition 2024-09
Published by
Infineon Technologies AG
81726 Munich, Germany

© 2024 Infineon Technologies AG.
All Rights Reserved.

Do you have a question about this document?
Email: erratum@infineon.com

Document reference
AURIX_3_Single_ Edge_ Nibble_Transmission

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.

Copyright © Infineon Technologies AG 2024. All rights reserved.

Infineon