



I2C

Inter-Integrated Circuit Module

AURIX™ TC4xx Microcontroller

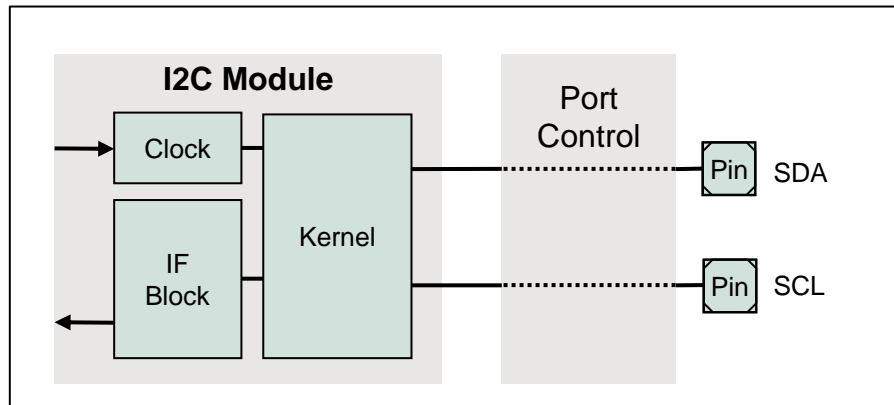
V1.0.0 2024-09

[Please read the Important Notice and Warnings at the end of this document](#)



I2C

Inter-integrated circuit module



Highlights

- › 2-wire communication in multi-master mode, master mode and slave mode
- › Supporting all speed grades including High-speed mode with up to 3.4 Mbit/s
- › Fully compatible with I2C-bus specification version 2.1

Key Features

Automatic execution of low-level tasks

FIFO operation

Customer Benefits

- › Off-loading CPU from I2C specific tasks
- › Allows reading and writing of multiple bytes without software intervention

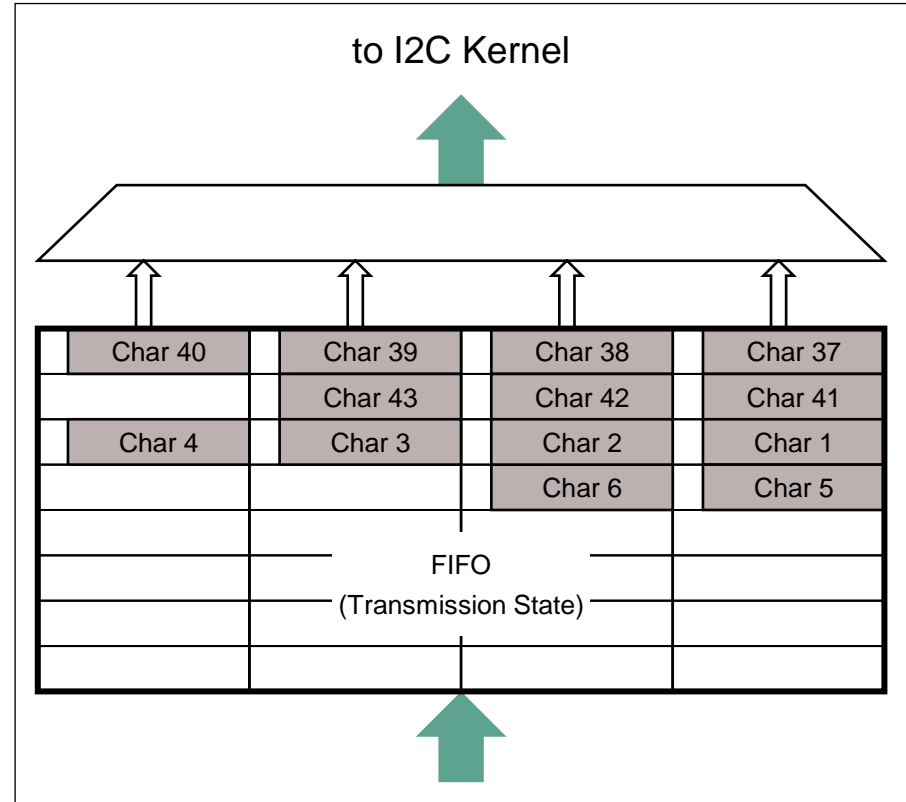
Automatic execution of low-level tasks

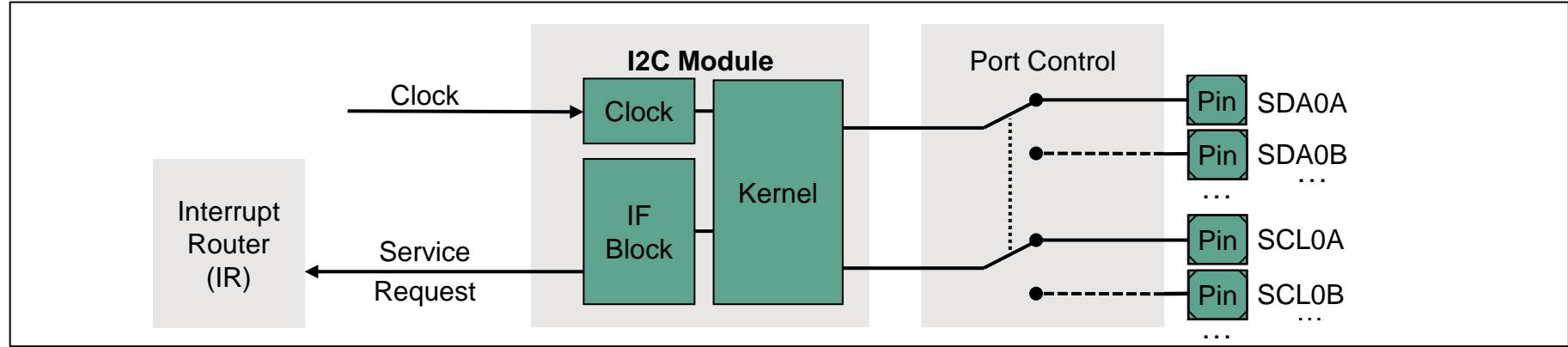
- › Serialization/de-serialization of the I2C bus data
- › Generation/detection of start and stop signal
- › Generation/detection of acknowledge signal
- › Bus state detection
- › Bus access arbitration in multi-master mode
- › Recognition of device address in slave mode
- › Configurable detection of general call address
- › Configurable repeated start in master mode

I2C

FIFO operation

- › The picture on the right shows a byte aligned FIFO, keeping two transmit packets
- › The 1st packet is currently being transmitted by the I2C kernel. Characters 37-40 will be transmitted next. Char43 is the last character
- › The 2nd packet consist of 6 characters, waiting to be transmitted
- › FIFO can be filled by continuous write access to a 32-bit register via software or DMA
- › FIFO also supports half-word (16-bit) or word aligned (32-bit) characters

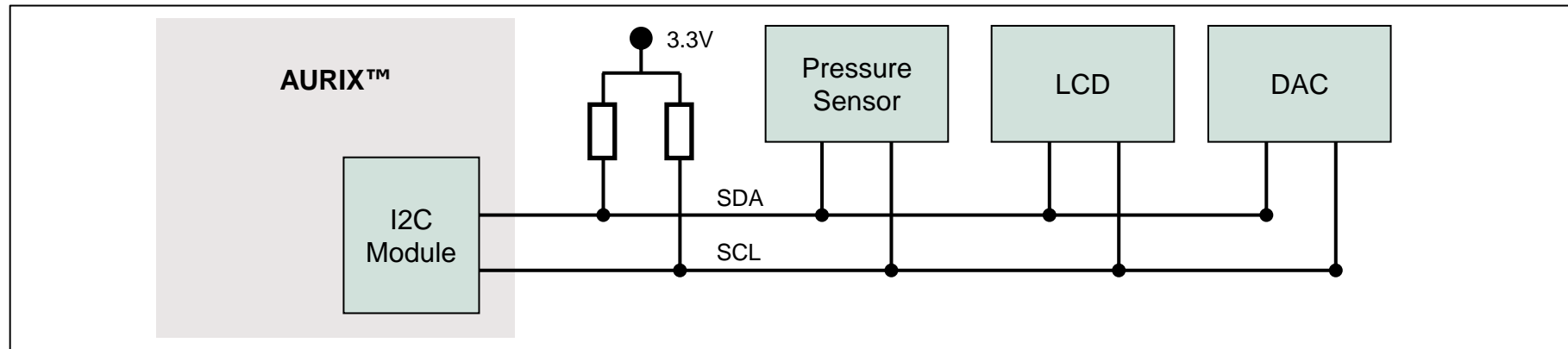




- › Several I2C service requests can be routed to the Interrupt Router (IR)
 - Service requests for FIFO handling
 - I2C protocol specific requests e.g. “Transmission End Request”
 - Error service requests e.g. FIFO full or empty
- › The external I2C lines SDA and SCL can be connected to one out of several port pin pairs

Application example

AURIX™ with 3 slave devices



Overview

- › AURIX™ is the I2C bus master, the other devices acting as I2C bus slaves
- › The master always provides the clock signal at SCL and starts the transmission by addressing a slave
- › Each slave has a unique slave address

Advantages

- › Communication (read/write) with many different external devices consumes only 2 pins for the data line (SDA) and clock line (SCL)

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_Inter-
Integrated_Circuit_Module**

IMPORTANT NOTICE

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

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.

