

# CAST

## I2C/SMBus Driver

### I2C/SMBus Core Software Driver

The I2C/SMBus driver is a complete software controlling packet dedicated to the I2C/SMBus Bus Controller. The I2C/SMBus Bus Controller is an electronic virtual component implementing a serial interface which meets the Philips I2C bus specification and the SMBus specification. The I2C/SMBus Software Driver supports standard I2C and SMBus interface functionality as read or write, and works in both master and slave modes.

#### Applications

- Exchanges data with other slave devices with the I2C/SMBus interface
- Exchanges data with another microcontrollers

#### Functional Description

The functions of the I2C/SMBus Software Driver can be divided into two groups:

- Configuration functions (`i2c_smbus_ioctl`, `i2c_smbus_open`, `i2c_smbus_close`)
- Transfer data functions (`i2c_smbus_write`, `i2c_smbus_read`, `i2c_smbus_write_read`)

Transfer data functions initialize transmission and continue until transmission ends. The transmission performs within the interrupt handler function.

Function `i2c_smbus_ioctl` configures the I2C/SMBus interface parameters, while the `i2c_smbus_open` function initializes the selected I2C/SMBus interface and enables it

#### Standard Deliverables

- C source code
- Project created in the Keil uVision environment
- User Manual

#### Related Products

**R8051XC2** – is a fast, configurable, single-chip, 8-bit microcontroller core that can implement a variety of processor variations, executing the MCS® 51 instruction set. A rich set of optional features and peripherals enables designers to closely match the core with their specific application and hardware requirements (FPGA, ASIC, or structured ASIC). These options include memory pointers, interrupts, interfaces for serial communication, I2C and SPI interfaces, timer system, I/O ports, power management unit, multiplication-division unit, watchdog timer, DMA controller and real-time clock. Integrated on-chip debugging using the native OCDS and EASE debugging system is also available.

#### Features

- Support for both I2C/SMBus and I2C2/SMBus interfaces of the R8051XC2
- I2C/SMBus and I2C2/SMBus can be used at the same time
- Working in two modes (for each interface independently):
  - I2C mode
  - SMBus mode
- The SMBus timeouts support (TMEXT, TSEXT, TOUT)
- Minimum timeout – 1 ms
- Dynamic configuration of the interface parameters:
  - Clock rate
  - Own slave address
  - Timeouts
  - Working mode (I2C or SMBus)
- Three low-level functions for transferring data between Master and Slave device:
  - Master Write
  - Master Read
  - Master Write – Read
- Error control
  - Uniform numeration of all errors

## Third Party Reference

This software was created and verified by using the Evatronix EB-5-Tiny evaluation board with the R8051XC2 processor, along with Keil Tools for 8051 and the EASE debugging system

## Example Application

The picture below shows a block diagram of an example application. The I2C/SMBus driver in this application is used to control three devices: two temperature sensors and the I/O expander. All three peripheral devices have an I2C or SMBus interface. All peripherals work as I2C/SMBus slave while R8051XC2 is the master.

