# TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1

## About this document

### Scope and purpose

The aim of this guide is to present the scope, the implementation, the algorithm and a demonstration of the **TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1** example code for the TLE988x/TLE989x Infineon Embedded Power ICs based on Arm® Cortex® M3. This example code can be found in the Keil µVision Pack Installer.

The full functionalities and characteristics of the embedded power devices are described in the datasheets and user's manual. Please refer to these documents for more detailed information. Furthermore, a low level (line-by-line) description of the code is not the aim of this document, although occasionally some code blocks might be reported if necessary to the comprehension.

*Note:* *The following information is given as a hint for the implementation of the system only and shall not be regarded as a description or warranty of a certain functionality, condition or quality of the referred devices or presented software example.*

### Intended audience

Design engineers, system engineers, embedded power designers

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# 1 Introduction

In this example, the SSC0 module sends a magic value (0xC001CAFEBADC0DED) to the SSC1 module.

The SSC0 is configured as master, the SSC1 is configured as slave. The serial output pin (P0.1) of the master module is connected with the serial input pin (P1.1) of the slave module. The clock pins of SSC0 (P0.3) and SSC1 (P1.0) are connected as well.

Figure 1 shows the capture of the clock (yellow) which has a period of 1us (1Mbaud). The blue signal shows an excerpt of the transmitted magic value stream. The sub-stream shown in the blue signal is 0xCAFE (1100101011111110b) which is transmitted with least significant bit (LSB) first.

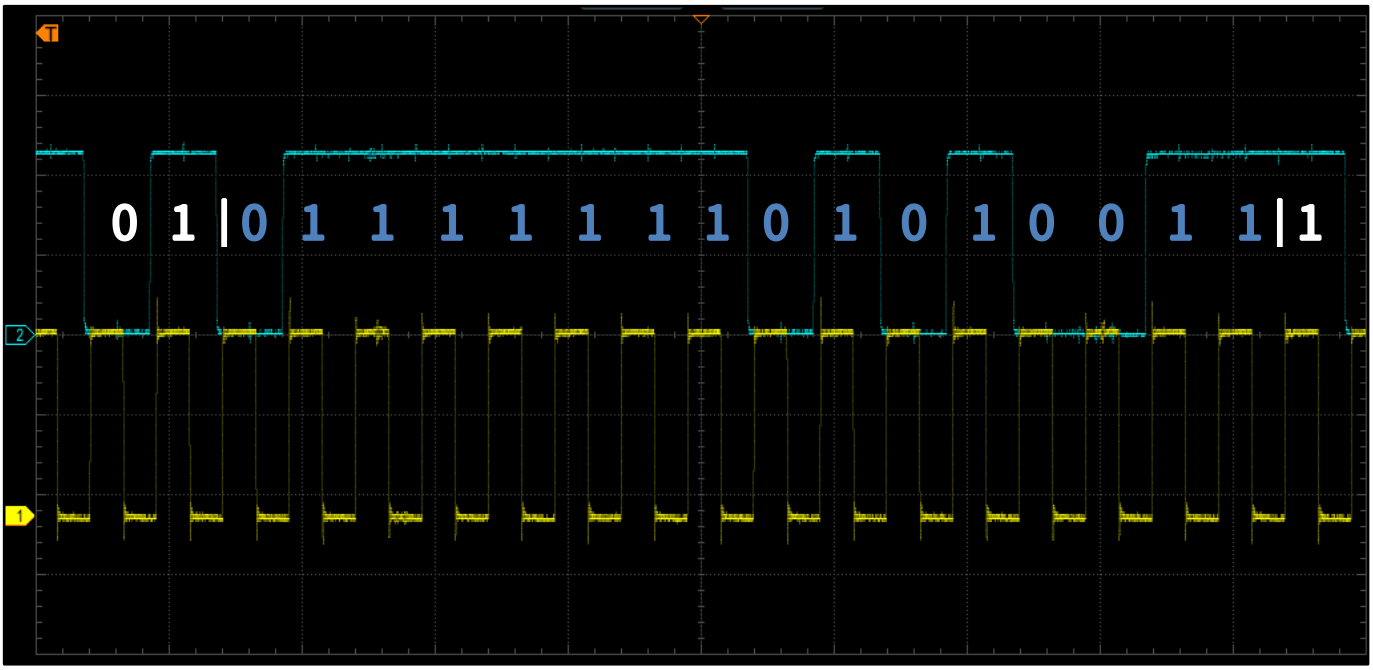


*Figure 1 Capture of serial output pin P0.1 (blue) and clock output (yellow)*

# 2 Hardware

This chapter shows how to run the TLE9893_2QKW62S_SSC1 example with the TLE988X/TLE989X evaluation board. For this the SSC0 LOOPBACK SSC1 project must be opened and a build must be executed.

Figure 2 shows the TLE988X/TLE989X evaluation board. The application code must be loaded via a debugger (e.g. ULINK or J-Link) to the board. The board must be powered with 12V (red and black connections).

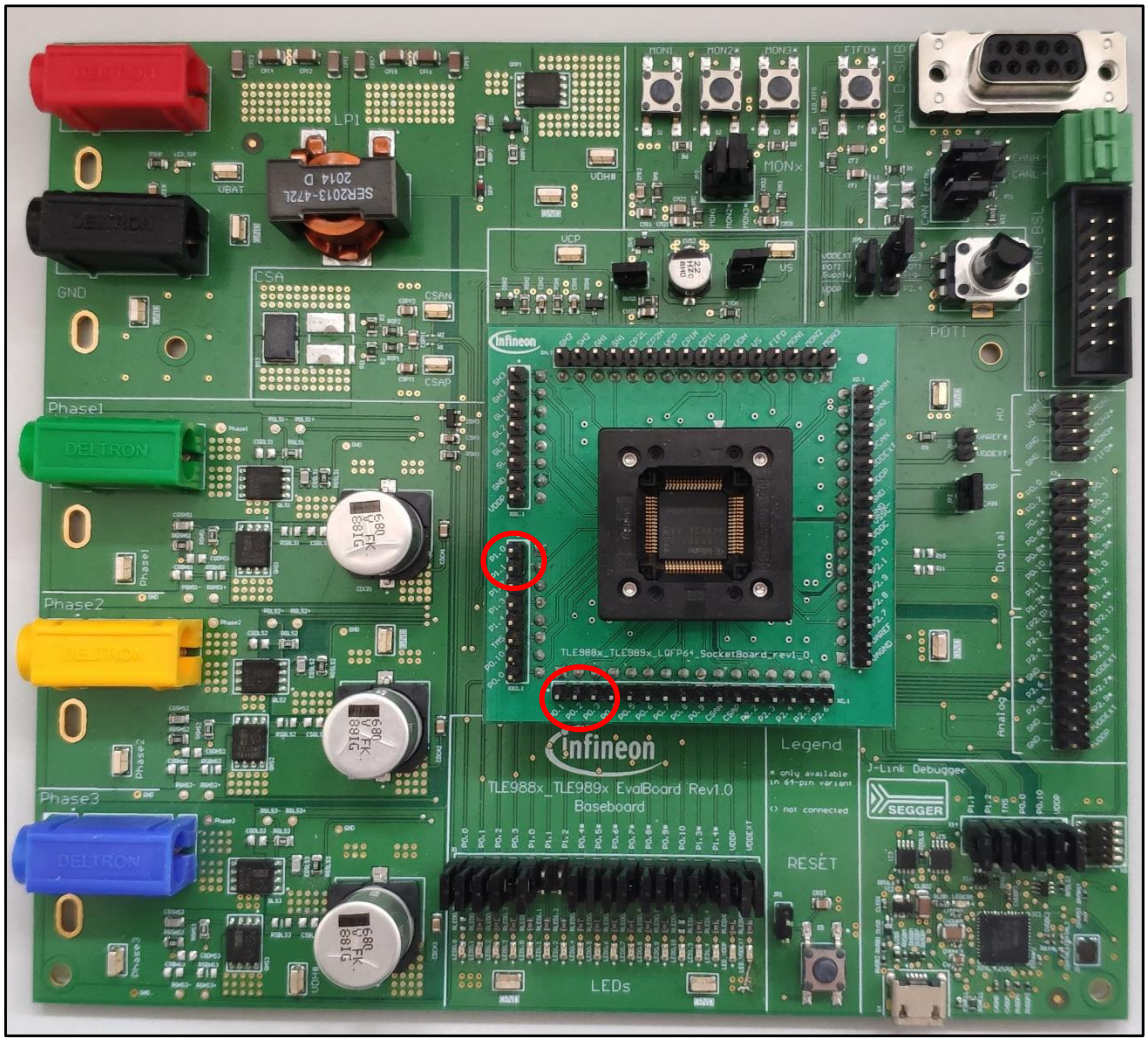


*Figure 2 TLE988X/TLE989X evaluation board*

The output signals of the SSC0 module can be tapped on pin P0.1 (serial output) and pin P0.3 (clock output).

To have the loopback on the SSC1, the SSC0 serial output pin P0.1 must be connected with the SSC1 serial input pin P1.1 and the clock signal generated by SSC0 on pin P0.3 must be connected with the pin P1.0.

# 3 Implementation

This chapter shows the process to follow to get a working TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1 example.

## 3.1 Get the example via the Pack Installer for Keil

Open the Pack Installer within the Keil IDE. See Figure 3 below.

Choose the appropriate device (here TLE9893_2QKW62S) on the left-hand side. On the right-hand side, select the tab Examples, where you can access the TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1 example.

Clicking on “Copy” will copy the example on your computer and open it.

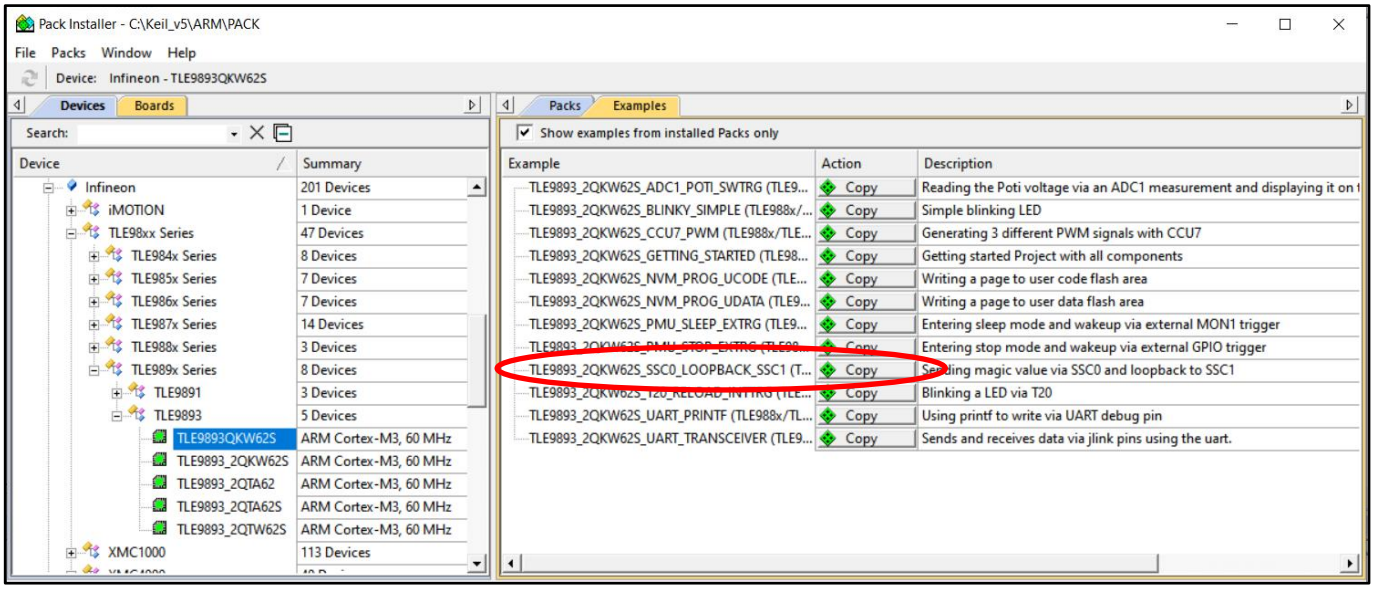


*Figure 3 Keil Pack Installer*

## 3.2 Configuration

In order to see the configured output pin for the LED, start the tool Config Wizard can be started. It is available within the Keil IDE through a shortcut in the Tools menu.

The Config Wizard opens and shows an overall status of the current pin configuration. In Figure 4, the pin P0.1 is used as serial output pin (SSC0 MTSR) and the pin P0.3 is used as 1Mbit clock signal (SSC0 SCLK) for the SSC0 master. The pin P1.1 is used a serial input pin (SSC1 MTSR) and the pin P1.0 is used as the clock signal (SSC1 SCLK) for the SSC1 slave.

Furthermore, the pin P0.2 is defined as output to evaluate the successful transmission/reception of the data.

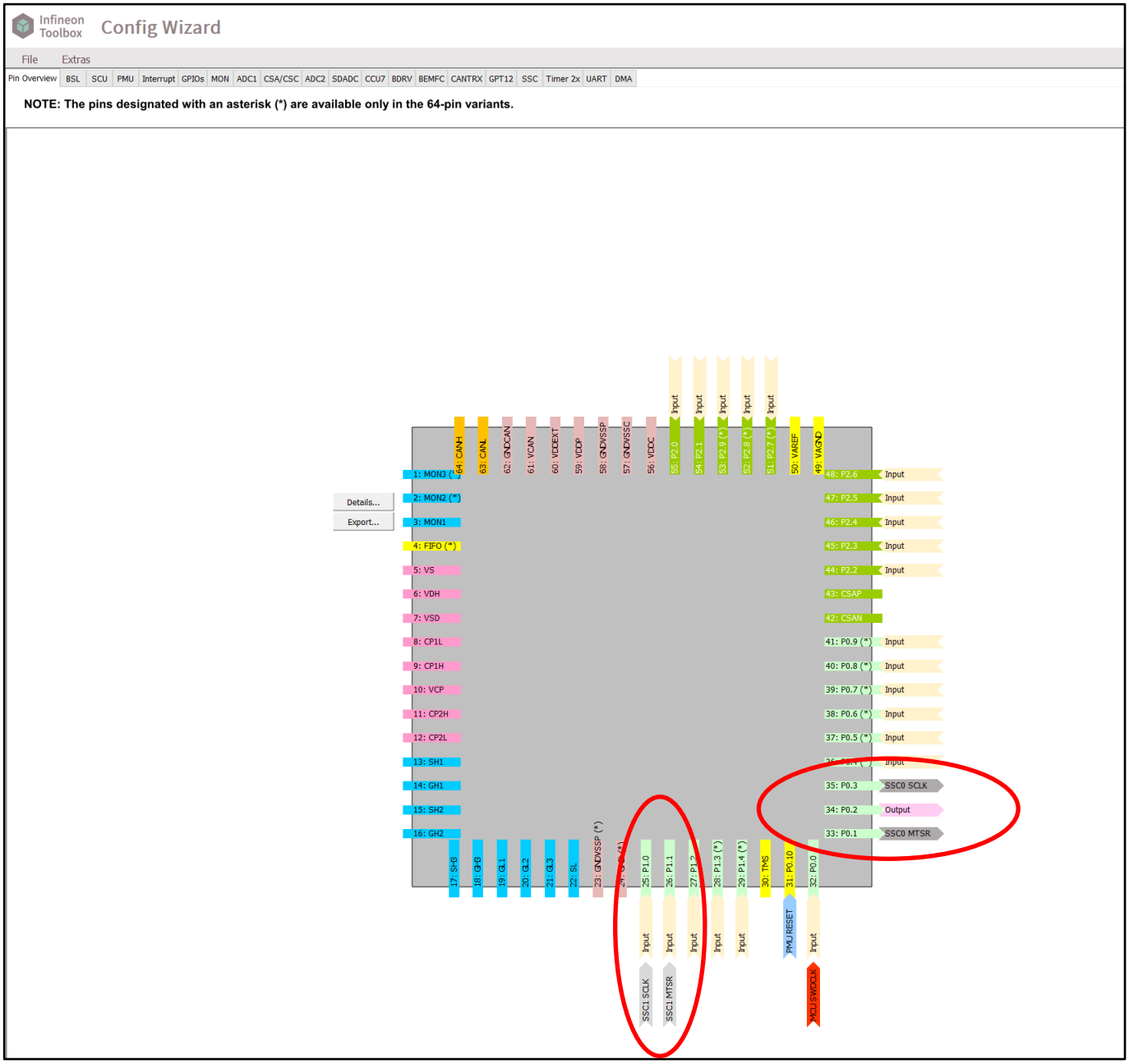


*Figure 4 Config Wizard pin overview*

In order to configure the SSC0/1 modules for the TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1 example, select the SSC tab.

Figure 5 shows the available settings for the SSC0 module. In the blue box Mode Settings, the SSC0 is configured as master, with a data width of 64 bits, LSB first for the data to transfer.

In the green box Baudrate Generation, select the automatic configuration with a baudrate of 1Mbaud.

In the pink box for the Pin Selection, the pin P0.3 is used as clock signal output and the pin P0.1 is used as serial output.

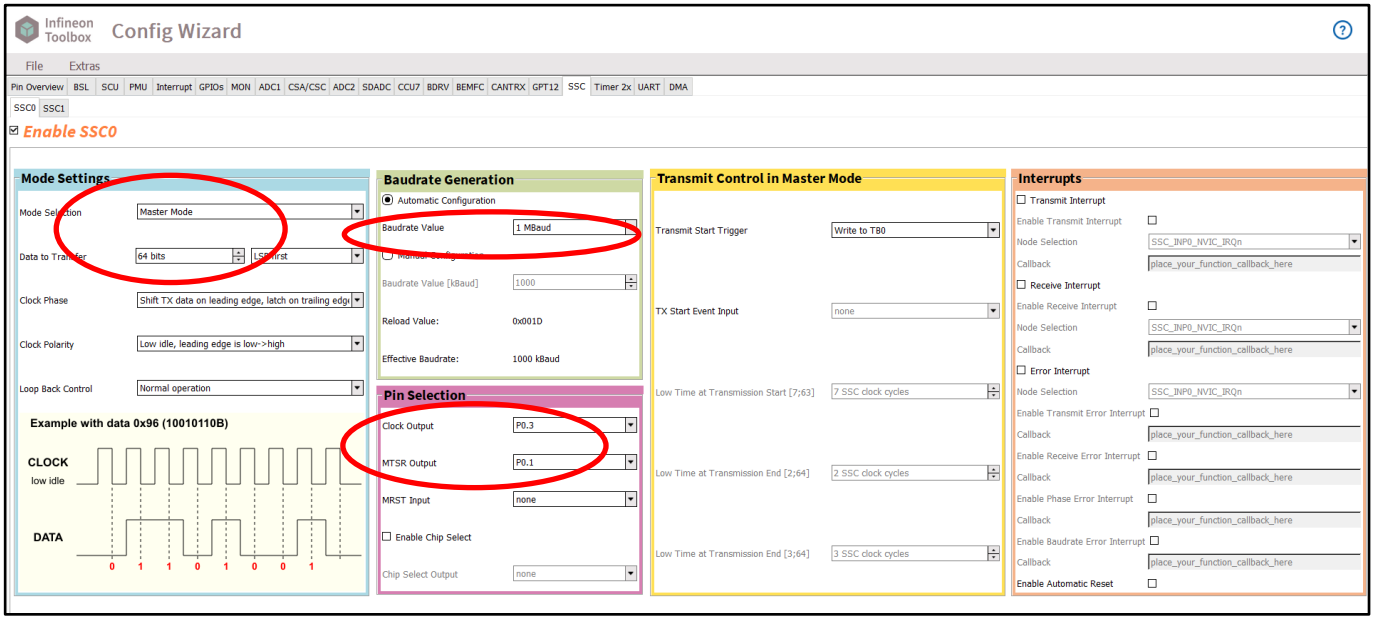


*Figure 5 Config Wizard, module SSC0*

Figure 6 shows the available settings for the SSC1 module. In the blue box Mode Settings, the SSC0 is configured as slave, with a data width of 64 bits, LSB first for the data to transfer (same than for SSC0 master).

In the green box Baudrate Generation, select the automatic configuration with a baudrate of 1Mbaud (same than for SSC0 master).

In the pink box for the Pin Selection, the pin P1.0 is used as clock signal input and the pin P1.1 is used as serial input.

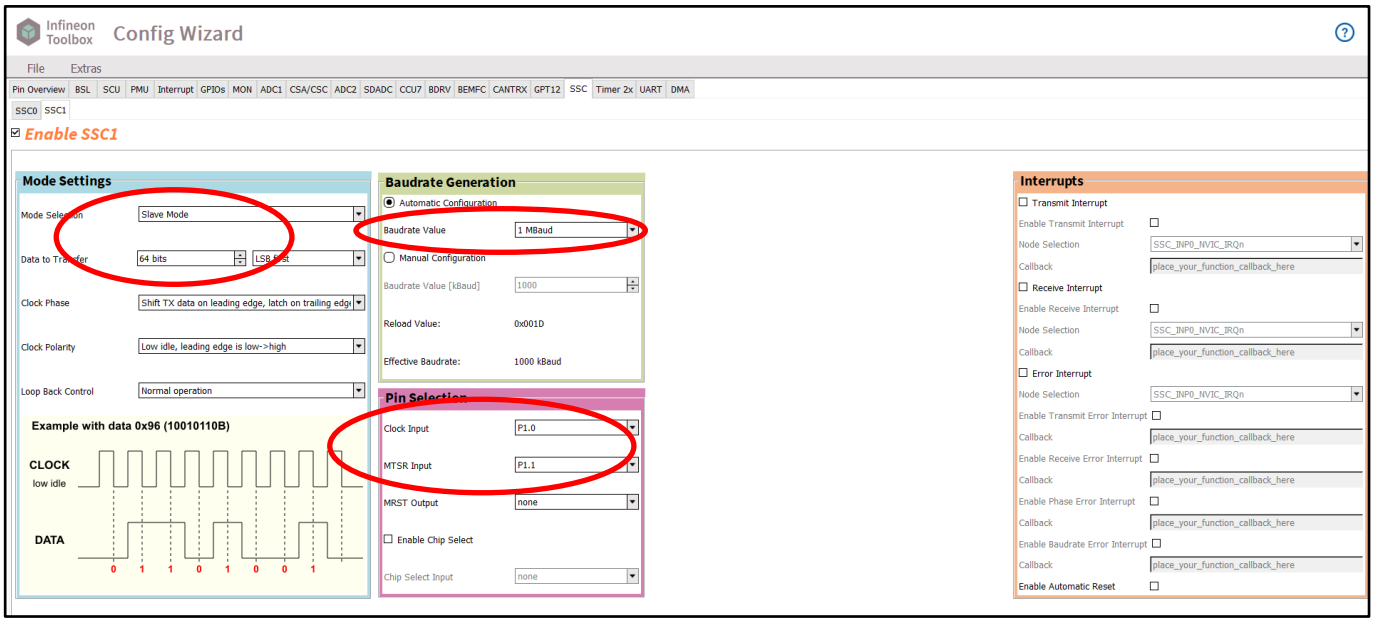


*Figure 6 Config Wizard, module SSC1*

Finally, save your configuration to take these changes into account (File -> Save).

## 3.3 Sample code

Figure 7 shows the application code of the TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1 example.

Within the main endless loop, the SSC0 sends the `MAGIC_TRANSFER` value `0xC001CAFEBADC0DED` via the API call `SSC0_setTXvalue((uint64) MAGIC_TRANSFER)` continuously.

The SSC1 receives the value via the API call `SSC1_getRXvalue()` and checks it against correctness.

If the expected magic value is received by the SSC1 module, the GPIO pin P0.2 is set to low (line 113). If the received value does not match the MAGIC_TRANSFER value, the GPIO pin P0.2 is set to high (line 116).

```
 99    for (;;)
100    {
101      /* Main watchdog service */
102      (void) PMU_serviceFailSafeWatchdog();
103
104      /* Send the magic value with SSC0 */
105      SSC0_setTXvalue((uint64) MAGIC_TRANSFER);
106
107      /* Store the RX buffer value of SSC1 */
108      u64_receiveValue = (uint64) (sint64) SSC1_getRXvalue();
109
110      /* Compare received value with expected MAGIC_TRANSFER define */
111      if (u64_receiveValue == MAGIC_TRANSFER) {
112        /* In case of a match, the GPIO pin P0.2 is set to low */
113        GPIO_setP02State(GPIO_STATE_LOW);
114      } else {
115        /* If there is no match, the GPIO pin P0.2 is set to high */
116        GPIO_setP02State(GPIO_STATE_HIGH);
117      }
118    }
119  }
120
```

*Figure 7 TLE9893_2QKW62S_SSC0_LOOPBACK_SSC1 application code*

## References

See the code examples at **www.infineon.com**

## Revision history

| Document version | Date of release | Description of changes |
|---|---|---|
| 1.0 | 2021-04-28 | Initial version |
| 1.1 | 2022-10-13 | Editorial changes |

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**Edition 2022-10-13**

**Published by**

**Infineon Technologies AG**

**81726 Munich, Germany**



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**Document reference**

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