Mid-Range+ SBC Family



TLE9263 Evaluation Kit EVB2 Getting Started

Abstract

This Evaluation Kit documentation is intended to provide an overview to the hardware and software operation of the TLE9263 Evaluation Kit.

The Demokit is available with the superset devices TLE9263-3BQX or TLE9263-3BQX3V3 devices which cover all variants of the Mid-Range+ SBC Family

For simplification reasons, the document always refers to the TLE9263 Evaluation Board.

In case of question, please contact your local sales person for support.

Note: The following information is given as a hint for the implementation of the device only and shall not be regarded as a description or warranty of a certain functionality, condition or quality of the device.

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1 Introduction

The TLE9263 device belongs to the new generation SBC Mid-Range+ family designed specifically for automotive applications such as Body control modules, Gateway, Climate control, Seat control, Door control and closures, Light control modules, Engine management systems.

The TLE9263 Evaluation Kit is intended to provide a simple, easy-to-use tool to become familiar with the device and to perform first application tests. The evaluation kit contains a TLE9263 application board, which is equipped with a 16-pin connector (uIO connector) to interface to the uIO stick (to be ordered separately), The TLE9263 SPI communication is emulated by the uIO stick which is controlled by a PC-Software (see also installation instructions).

Mid-Range+ SBC Product Features:

- Very low quiescent current consumption in Stop- and Sleep Mode
- Periodic cyclic sense in Normal-, Stop- and Sleep Mode
- Periodic cyclic wake in Normal- and Stop Mode
- Linear Voltage Regulator 3.3V or 5V, 250mA
- Linear Voltage Regulator 5V, 100mA, robust against short to Vbat
- Linear Voltage Regulator with external PNP transistor (configurable)
- CAN FD Transceiver ISO11898-2:2016 & SAE J2284 with up to 5Mbit/s and Partial Networking
- LIN Transceiver LIN2.2, J2602
- Four High-Side Outputs 7Ω typ., e.g. for LED lighting, cyclic sensing, etc.
- Two independent PWM generators and two On/Off Timers
- Three universal High-Voltage Wake Inputs for voltage level monitoring with cyclic sense functionality
- Alternate High-Voltage Measurement Function, e.g. for battery voltage sensing
- Reset Output and Fail Outputs
- Over temperature and short circuit protection feature
- Wide input voltage and temperature range
- Green Product (RoHS compliant) & AEC Qualified
- PG-VQFN-48 leadless exposed-pad power package with Lead Tip Inspection (LTI) feature to support Automatic Optical Inspection (AOI)



2 Hardware

The TLE9263 Evaluation Kit is designed to be compatible with the µIO USB stick, which plugs into the Evaluation Board via a standard 16-pin connector and allows easy interface to the PC via USB for SPI, CAN, and LIN communication.

2.1 Evaluation Kit Contents

The following items are included in the TLE9263 Evaluation Board box:

- Application Evaluation Board
- Infocard

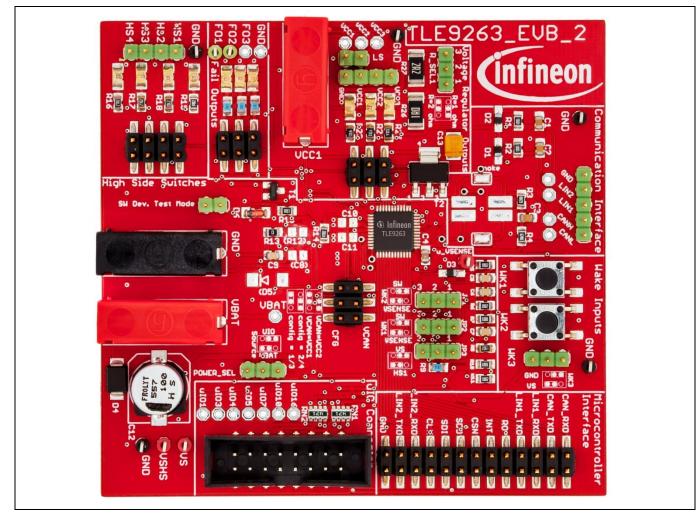


Figure 1 TLE9263 Evaluation Board with µIO USB stick Control



2.2 Evaluation Board Overview

The Evaluation board is a 2 layer PCB, using $35\mu m$ Cu metalization.

The PG-VQFN-48 package has an exposed pad. Hence, for better thermal performance it is soldered on the PCB. Overall 16 thermal vias are placed directly below the exposed pad island. The most obvious heat flow is via the exposed pad through the thermal vias. The footprint is an absolute minimal with no additional copper area.

2.2.1 Power Settings

Connect VBAT and GND via standard power supply, with a nominal voltage of 13.5V. This is the default board supply configuration.

2.2.2 Jumper Overview & Settings

For configuration purposes, there are several jumpers on the application board that can be used as follows:

| Jumper Name | Description | Default configuration |
|-------------------|---|--------------------------------|
| JP1 | WK2 Sensing voltage (switch or sense output) | WK2 connected with SW (button) |
| JP2 | WK1 Sensing voltage (switch or Sense input =Vbat) | WK1 connected with SW (button) |
| JP3 | WK1 Supply voltage (from VS or HS1) | WK1 connected with VS |
| JP4 | HS4 state signalization via LED | closed |
| JP5 | HS3 state signalization via LED | closed |
| JP6 | HS2 state signalization via LED | closed |
| JP7 | HS1 state signalization via LED | closed |
| JP8 | FO1 state signalization via LED | closed |
| JP9 | FO2 state signalization via LED | closed |
| JP10 | FO3 state signalization via LED | closed |
| JP11 | VCC1 state signalization via LED | closed |
| JP12 | VCC2 state signalization via LED | closed |
| JP13 | VCC3 state signalization via LED | closed |
| CFG | SBC configuration mode (Config 1/3 or 2/4) | Config 1/3 |
| VCAN | Choosing CAN power supply (VCAN = VCC1 or VCC2) | VCAN = VCC1 |
| SW Dev. Test Mode | Running SBC in Dev. mode (connect to GND or open) | opened |
| R_SEL1 | Selecting VCC3 shunt Resistor (1 Ohm or 2 Ohm) | 2 Ohm selected |
| POWER_SEL | Selection of power source of the evaluation board | Power from VBAT |
| LS | Load sharing for VCC1 and VCC3 (closed = activated) | Opened = deactivated |
| WK3 | Choosing the level for WK3 input (GND or VS) | WK3 = VS |



3 The μIO-Stick

The μ IO-stick is a testing and development platform that connects the Infineon Evaluation Board with the computer. This kit uses a 32-bit microcontroller of the XMC4000 processor family featuring the ARM Cortex-M4 processor high performance core. The μ IO-stick is especially designed for board extension test capability, i.e. to interface with an application board such as the TLE9263 Evaluation Board. More information can be found at https://www.infineon.com/cms/de/product/evaluation-boards/uio-stick/.

The TLE9263 SPI communication is emulated by the μ IO-stick which is controlled by a PC-Software named Config Wizard. The μ IO-stick firmware can be updated in the Config Wizard (Extras) to the most current version.

| Pin | µIO Name | Туре | TLE9263 Assignment |
|-----|----------|--------|--|
| 1 | TXD1 | Out | TXDLIN1 not connected |
| 2 | GND | GND | GND |
| 3 | RXD1 | In | RXDLIN1 not connected |
| 4 | VDD5 | Supply | not assigned |
| 5 | LIN | I/O | LIN1 not connected |
| 6 | VS | Supply | VS not connected |
| 7 | RESET_5V | Out | not connected |
| 8 | GPIO3_5V | I/O | INT (used as an output from the TLE9263) |
| 9 | SCS_5V | Out | CSN (used as an input for the TLE9263) |
| 10 | GPIO2_5V | I/O | not assigned not connected |
| 11 | SCLK_5V | Out | CLK (used as an input for the TLE9263) |
| 12 | GPIO1_5V | I/O | FO (used as an output from the TLE9263) |
| 13 | MISO_5V | In | SDO (used as an output from the TLE9263) |
| 14 | GPIO0_5V | I/O | RO (used as an output from the TLE9263) |
| 15 | MOSI_5V | Out | SDI (used as an input for the TLE9263) |
| 16 | AD0 | In | not assigned not connected |

Table 1 Pinout of the uIO stick for usage with the TLE9263 Evaluation Board



4 SBC Config Wizard

4.1 Software Installation

Before getting started, please install the Config Wizard software that can be downloaded via the <u>Infineon</u> <u>Toolbox</u>. After successful installation, search for "*Config Wizard for SBC*" in <u>Manage Tools</u> and press Install. After that, the tool symbol appears under <u>My Tools</u> and can be started.

4.2 How the GUI looks like

Starting:



Choosing the MR-SBC TLE9263 (having the evaluation board connected via µIO-stick):

| | | | | Status | | | |
|---|---|---|--|--|---|---|---|
| uIO Stick connect | ted | Target IC accessable | uIO Fimware Version: 2 . 2 . 1 | Thermal Status | Supply Status 2 | Supply Status 1 | Bus Status 1 + 2 |
| RO Pin activated | | INT Pin activated | F01 Pin activated | TSD2 | VS UV | POR VSHS UV | LINZ FAIL |
| NORMAL Normal Sleep / FS Stop | SLEEP STOP TLE92 TLE92 TLE92 TLE92 | 62 VCC2 | | TPW | VCC3 UV VCC3 OT VCC1 OV VCC1 WARN | VSHS OV VCC2 OT VCC2 UV VCC1 SC VCC1 UV PS VCC1 UV | CLEAF LINE FAIL CAN TO SYS ERR CAN FAIL CAN FAIL |
| Soft Reset | i 3.3v | SV VCC2 off | • | CLEAR | CLEAR | CLEAR | CLEAR |
| | | | | Device Status | HE OCIOTIOL Status | Wake Level Status | Weles Chabus 1 |
| | M / HS1-4 Bus Config / | SPIOs and other pins / Watchdog | H51 - H54 | Device Status | HS OC/OT/OL Status | Wake Level Status | Wake Status 1 |
| ake-up / Timer / PW ake-up Voltage Sensing Enable Wake-up Enable Wake-up Enable Wake-up | @WK(1/2 1 2 | | Słutdown on VSHS OV Słutdown on VSHS UV Recover after OV/UV failure | DEV STAT1 DEV STAT0 SPI FAIL FAILURE | HS4_0C_0T HS3_0C_0T HS2_0C_0T HS1_0C_0T | SBC DEV CFGP GPI02 GPI01 | Wake Status 1 |
| ake-up Voltage Sensing ✓ Enable Wake-up ✓ Enable Wake-up | @WK(1/2 1 2 | Timer / PWM | Shutdown or VSHS DV Shutdown or VSHS UV Shutdown or VSHS UV Recover after OV/UV failure HS1 | DEV STAT1 DEV STAT0 SPI FAIL | HS4_OC_OT HS3_OC_OT HS2_OC_OT | SBC DEV | CIN2 CIN1 CAN TIMER |
| ake-up Voltage Sensing Enable Wake-up Enable Wake-up Enable Wake-up | ©WK1/2 1 2 3 | Timer / PWM Enable WK Timer1 Timer1 Period 10 ms Timer1 on-time off, HSix is low | Słutdown on VSHS OV Słutdown on VSHS UV Recover after OV/UV failure | DEV STAT1 DEV STAT0 SPI FAIL FAILURE | H54_0C_0T H53_0C_0T H52_0C_0T H51_0C_0T CLEAR | SBC DEV CFGP GPI02 GPI01 WK3 | LINZ LINI CAN TIMER WK3 |
| ake-up Voltage Sensing Enable Wake-up Enable Wake-up Enable Wake-up K1 Pull Device K2 Pull Device | ©WK1/2 1 2 3 None ▼ | Time / PWH Enable WK Timer 1 Times Period 10 ms Times andme ft, HSx is low Enable WK Timer 2 Times 2 Period 10 ms Times 2 ondme off, HSx is low Times 2 ondme Times 2 | Suddown on VSHS 0/ Skuddown on VSHS 0/ Recover after 0//U/ falure HS1 off | DEV STAT1 DEV STAT0 SPI FAIL FAILURE | HS4_OC_OT HS3_OC_OT HS2_OC_OT HS1_OC_OT CLEAR | SBC DEV CFGP GPI02 GPI01 WK3 WK2 | UIN2 UIN1 CAN TIMER WK3 WK2 WK1 |
| ake-up Voltage Sensing Enable Wake-up Enable Wake-up Enable Wake-up KC1 Pull Device KC2 Pull Device KC3 Pull Device KC3 Filter KC3 Filter | @WK1/2 1 2 3 None * None * None * | Timer / PNM Enable WK Timer 1 Timer 1 Period 10 ms Timer 1 on-time off, HSix is low Enable WK Timer 2 Timer 2 Period 10 ms | Suddown on VSHS 0/ Situadown on VSHS 0/ Situadown on VSHS U/ Situadown on VSHS U/ Situation on VSHS U/ HS1 off | DEV STATI DEV STATO SI FAL FALURE CLEAR | HS4_0C_0T HS3_0C_0T HS3_0C_0T HS1_0C_0T CLEAR HS4_0L HS4_0L | SBC DEV CFGP GPI02 GPI01 WK3 WK2 | LIN2 LIN1 CAN TIMER WK3 WK2 WK1 CLEA GPT02 GPT01 |
| eke-up Voltage Sensing Enable Wake-up Enable Wake-up Enable Wake-up K1 Pull Device | @WK1/2 1 2 3 None * None * None * | Timer / PWH Enable WK Timer1 Timer1 Period 10 ms Timer1 on-time off, HSix is low Enable WK Timer2 Timer2 Period 10 ms Timer2 on-time off, HSix is low Timer2 Period 10 ms Timer2 on-time off, HSix is low PWH1 frequency 00 ns PWH1 frequency 00 ns | Suddown on VSHS 0/ Situadown on VSHS 0/ Situadown on VSHS U/ Situadown on VSHS U/ Situation on VSHS U/ HS1 off | DEV STATI DEV STATO SPI FAIL FAILURE CLEAR | HS4_0C_0T HS3_0C_0T HS3_0C_0T HS3_0C_0T CLEAR HS4_0L HS3_0L HS3_0L HS3_0L HS3_0L | SBC DEV CFGP GPI02 GPI01 WK3 WK2 | LINZ LINI CAN TIMER WKS WKS WKS CLEA GP102 |

Getting Started

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5 Additional Information

A short video tutorial how to setup the board can be found at: <u>https://www.infineon.com/cms/de/product/evaluation-boards/mid-range-sbc-board/#!videos</u>

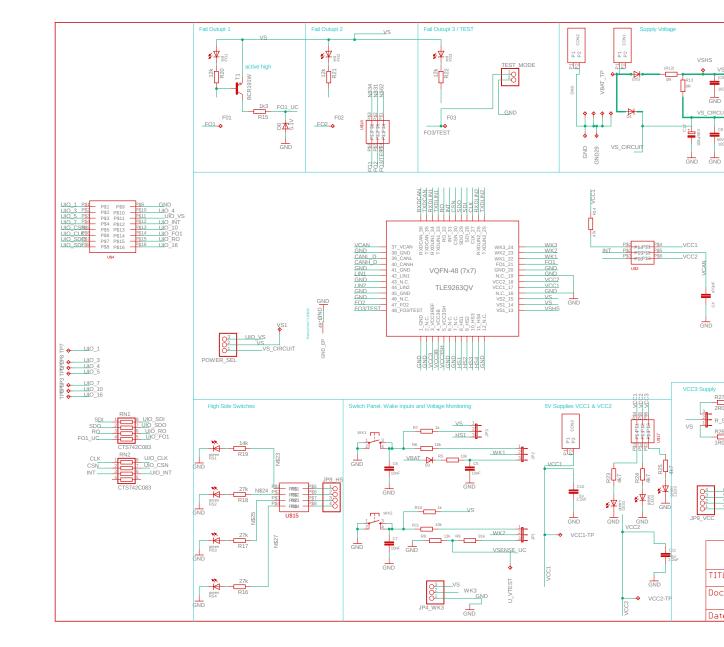
For further information you can contact <u>http://www.infineon.com/sbc</u> or your regional FAE.

Revision History

Major changes since the last revision

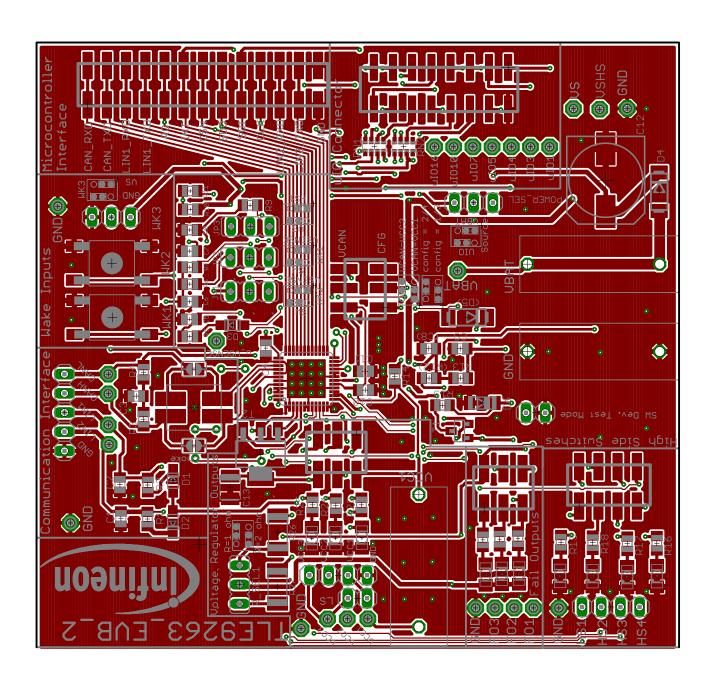
| Page or Reference | Description of change |
|-------------------|---|
| Rev 2.0 | Initial Release for the TLE9263 EVB2 |
| Rev 2.1 | Update with Config Wizard GUI description |
| | |

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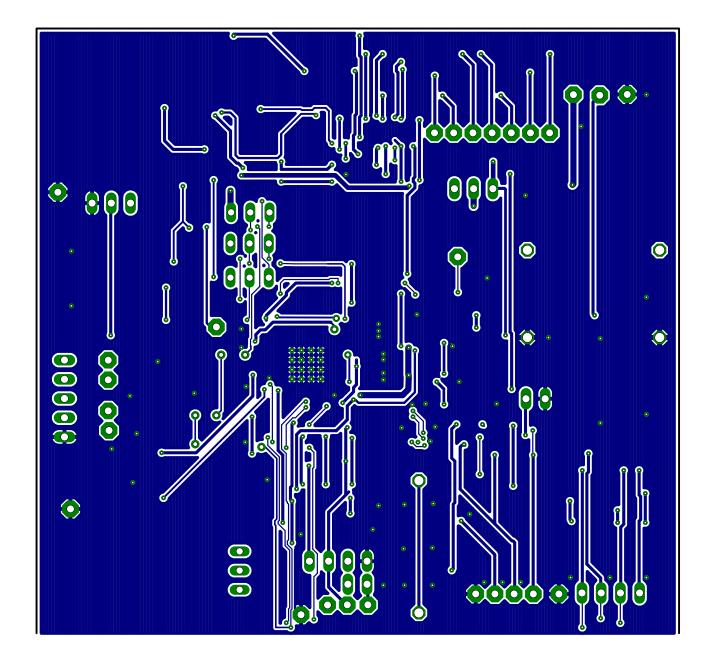


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