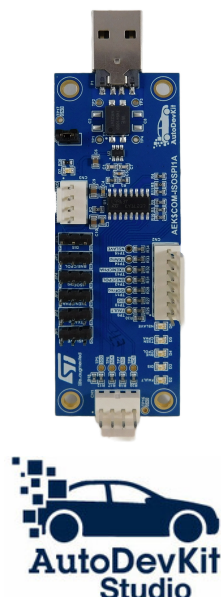


SPI to isolated SPI dongle based on the L9963T transceiver



Features

- Hosts the [L9963T](#) AEC-Q100 qualified automotive general purpose SPI to isolated SPI bi-directional transceiver
- Master/slave configuration through GPIOs or jumpers
- 4 configurable pins for the SPI protocol
- 2 configurable pins for amplitude and frequency of the converted signal (ISOSPI)
- Dimensions: 85mm x 30mm
- Included in the [AutoDevKit](#) ecosystem

Description

The [AEK-COM-ISOSPI1](#) is a SPI to isolated SPI dongle, which allows converting SPI signals in isolated SPI signals, thereby reducing the number of necessary wires from 4 to 2.

The ISOSPI protocol features differential communication to ensure higher noise immunity and robustness for long distance communications. As the ISOSPI signals can travel for several meters, this protocol is particularly suitable for automotive high voltage applications where electrical isolation is required by the safety standards and the cable length can affect the communication among devices located in distant parts of the vehicle.

The [AEK-COM-ISOSPI1](#) is based on the [L9963T](#) general purpose SPI to isolated SPI bi-directional transceiver, which can transfer communication data incoming from a classical 4-wire based SPI interface to a 2-wire isolated interface (and vice versa).

The [L9963T](#) hosted on the [AEK-COM-ISOSPI1](#) can be configured either as a slave or as a master of the SPI bus and supports any protocol of 8-to-64-bit SPI frames. The SPI peripheral can work up to 10 MHz when configured as a slave. The SPI clock frequency can be programmed (250 kHz, 1 MHz, 4 MHz, or 8 MHz) when the device is configured as a master.

The transceiver is natively compatible with the L9963E isolated SPI, allowing its usage in battery management system (BMS) applications. The basic BMS analog front-end node board is the [AEK-POW-BMS63EN](#). From the microcontroller side, the [AEK-COM-ISOSPI1](#) board can be connected via SPI with SPC5, Stellar and STM32 microcontroller families.

In the AutoDevKit ecosystem software package, we created two example demos: SPC582B - ISOSPI1_LEDdriver test application for discovery, to be downloaded on an [AEK-MCU-C1MLIT1](#) MCU board, and SPC58EC - ISOSPI1_LEDdriver test application for discovery, to be downloaded on an [AEK-MCU-C4MLIT1](#) MCU board. The MCU board of both demos communicate with an [AEK-LED-21DISM1](#) LED driver board using two [AEK-COM-ISOSPI1](#) dongles.

The aim of these demos is to show how to configure the [AEK-COM-ISOSPI1](#) to allow the MCU board to communicate with the LED driver board via SPI protocol.

After uploading the demos, the MCU boards can send a command to the LED driver board via SPI protocol through the first [AEK-COM-ISOSPI1](#), which converts the SPI signal into an ISOSPI message and then transmits it to the second [AEK-COM-ISOSPI1](#), which converts it back into a SPI message. Finally, the message is transmitted to the [AEK-LED-21DISM1](#) LED driver that executes the command sent. The commands sent are related to the activation of the bucks and the reading of the status register of the [AEK-LED-21DISM1](#) LED driver.

Product summary	
SPI to isolated SPI dongle based on the L9963T transceiver	AEK-COM-ISOSPI1
Automotive general purpose SPI to isolated SPI transceiver	L9963T
AutoDevKit Studio for 32-bit power architecture MCUs	STSW-AUTODEVKIT
Applications	Battery Management System Isolated communication over SPI protocol

1 Block diagram

Figure 1. Functional block diagram

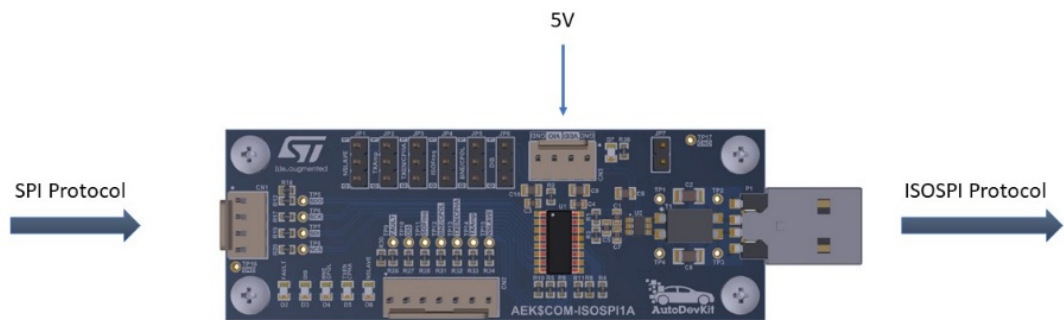


Figure 2. Block diagram of the SPC58EC - ISOSPI1_LEDdriver test application for discovery demo

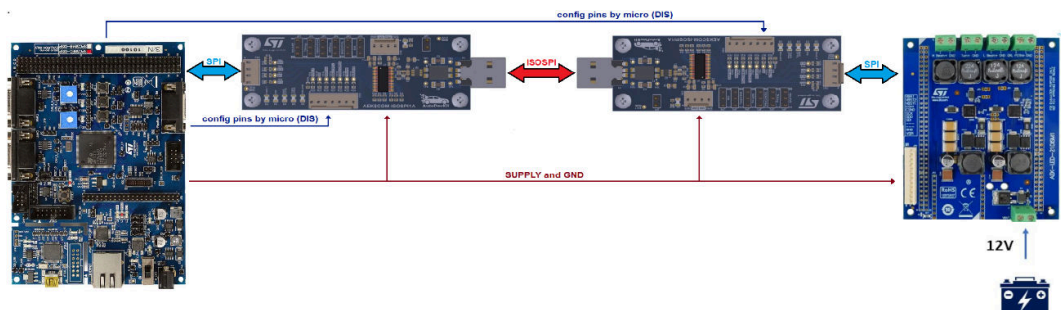


Figure 3. Block diagram of the SPC582B - ISOSPI1_LEDdriver test application for discovery demo

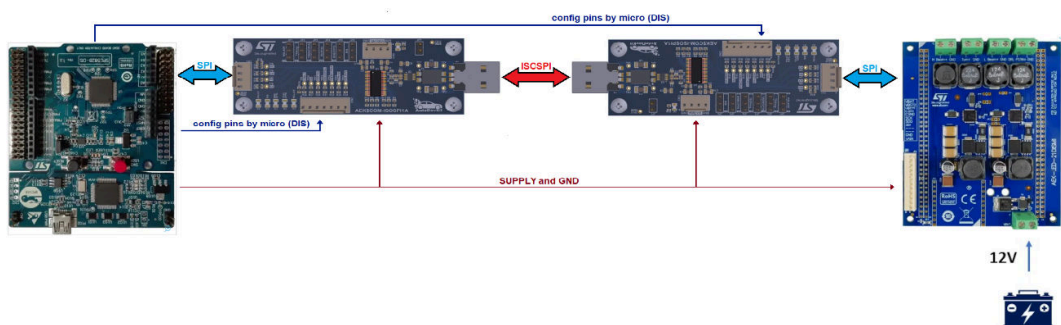
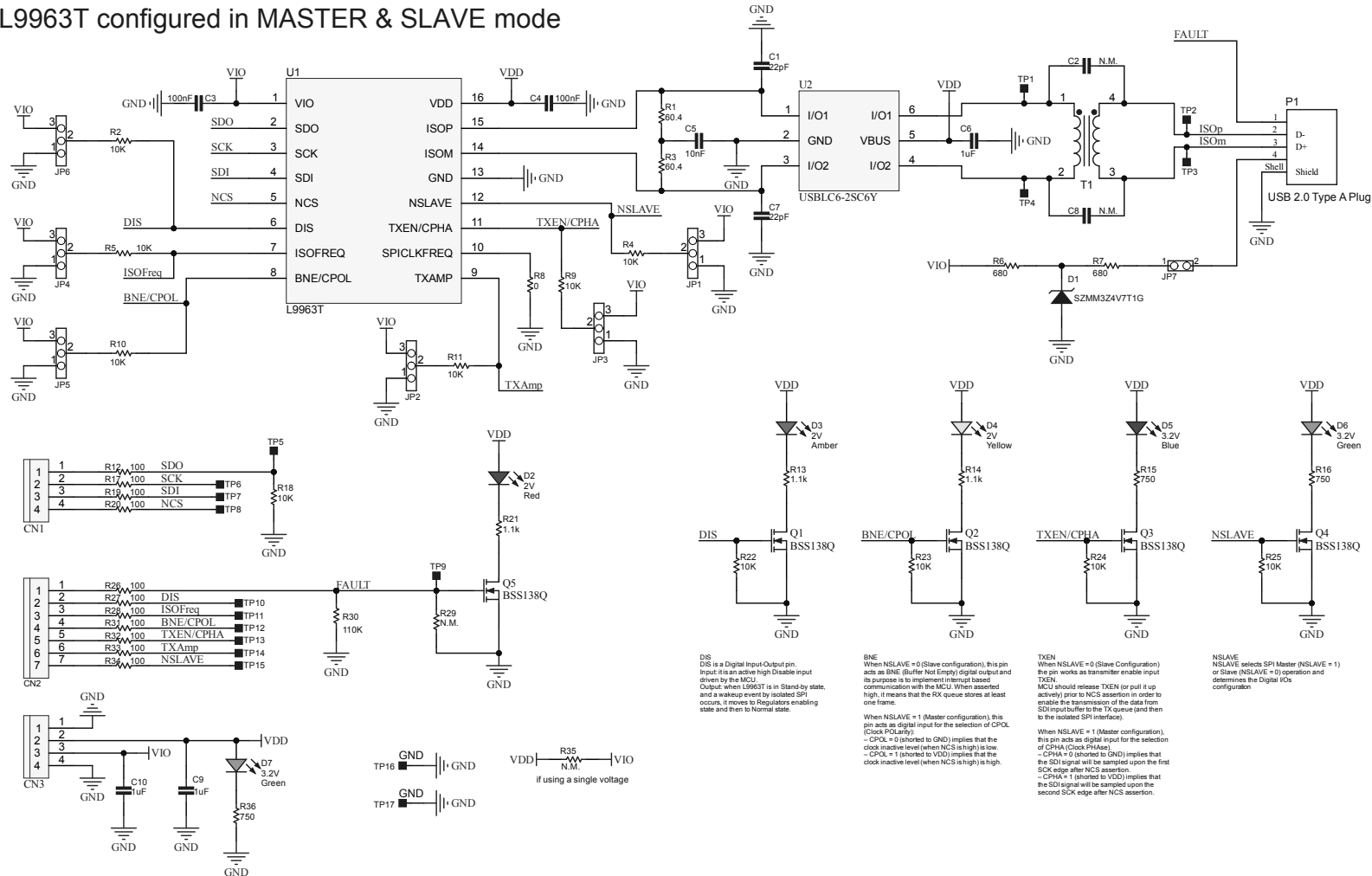


Figure 4. AEK-COM-ISOSPI1 circuit schematic

L9963T configured in MASTER & SLAVE mode





3 Board versions

Table 1. AEK-COM-ISOSPI1 versions

Finished good	Schematic diagrams	Bill of materials
AEK\$COM-ISOSPI1A ⁽¹⁾	AEK\$COM-ISOSPI1A schematic diagrams	AEK\$COM-ISOSPI1A bill of materials

1. This code identifies the AEK-COM-ISOSPI1 evaluation board first version.



Revision history

Table 2. Document revision history

Date	Version	Changes
09-May-2023	1	Initial release.

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