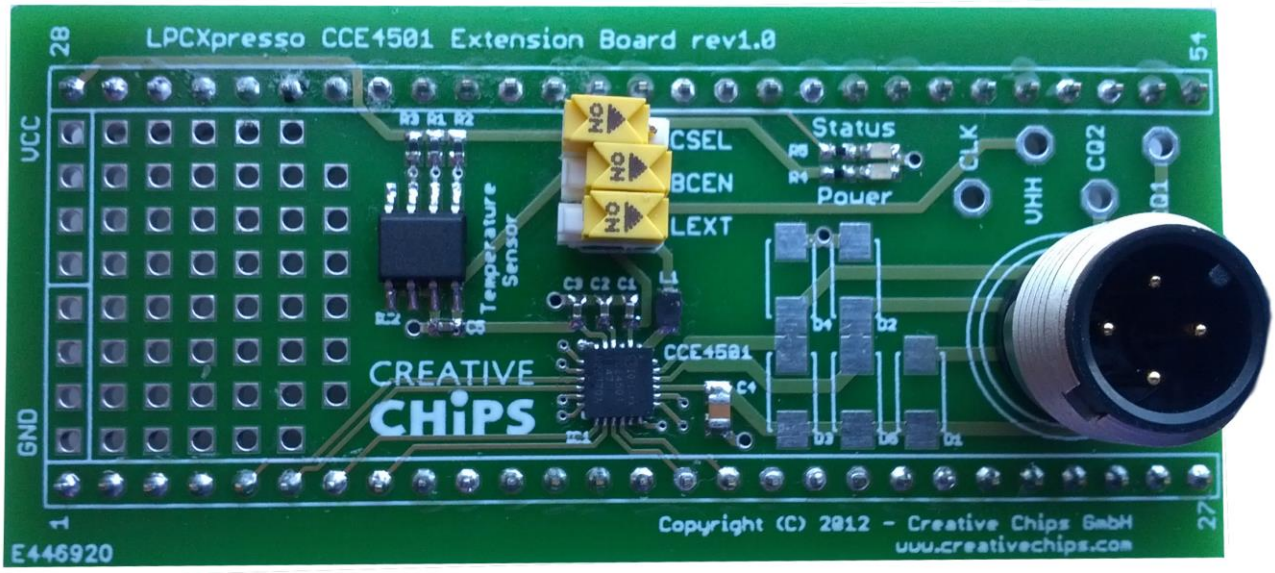
CREATIVE CHiPS®

MICROELECTRONICS

CCE4501

LPCXpresso Extension Board v1.0



Document No. D0050

Contents

General

This extension board is designed as a simple IO-Link Device demonstrator for a NXP LPCXpresso LPC1114 board.

The CCE4501 IC is used as physical interface for IO-Link communication. The communication between the LPC microcontroller and CCE4501 runs over SPI and uses the integrated frame handler of the CCE4501.

A NXP LM75B temperature sensor is used for generating cyclic new process data, which is read via the I²C interface of the LPC microcontroller.

Power Supply

The 24V L+ voltage is applied through the M12 connector defined by the IO-Link standard.

The 7V VHH voltage is generated by the internal DC/DC converter or externally applied through the VHH terminal. *(for more details see chapter DC/DC Converter)*

The CCE4501 integrates a low drop voltage regulator that generates a voltage VDD that is 3.3V. This voltage supplies the LPCXpresso Board and the LM75B temperature sensor.

DC/DC Converter

The integrated DC/DC converter is enabled by setting BCEN and LEXT into position ON. The generated voltage can be measured at the VHH terminal.

If an external voltage should be applied as VHH, the DC/DC converter must be disabled by setting BCEN and LEXT into position OFF.

Oscillator

The internal RC oscillator of the CCE4501 is active, while CSEL is in position OFF. It can be measured at the CLK terminal.

To clock the CCE4501 over an external source, CSEL needs to be set in position ON. An external clock of 3.6864 MHz can be applied at the CLK terminal.

IO-Link Stack

The IO-Link Device Stack is designed by TMG. The source code is delivered with this board and can be used and adapted for testing purposes.

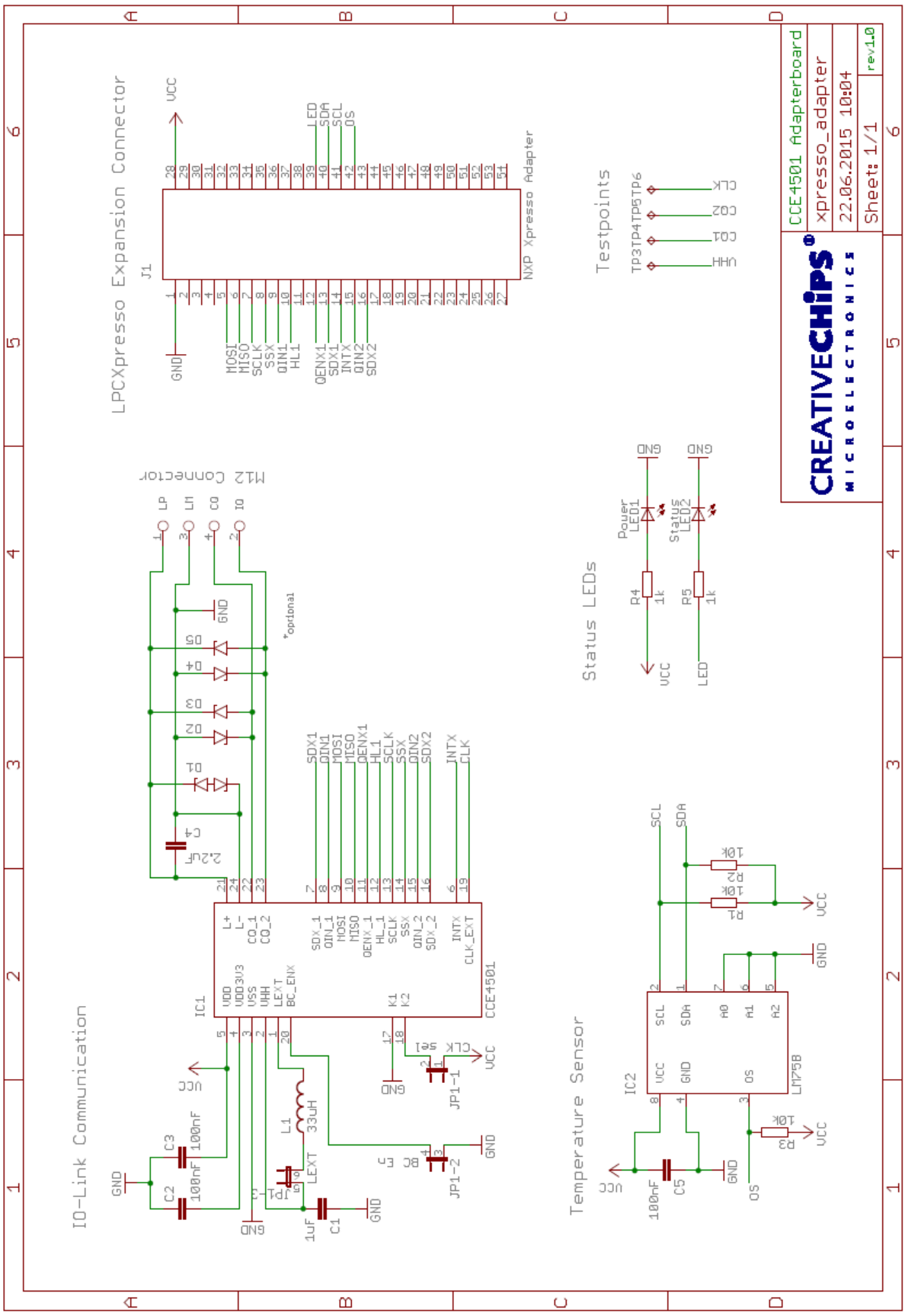
By default, the IO-Link communication is set to COM3 mode. Process data length is 10 bits, where the lower 8 bits represent the current temperature value from 0 – 127 °C using a scale of 0.5 °C. For more details see the TMG Stack documentation.

LEDs

The red LED (Power) indicates if the 3.3 V VDD power is generated.

The green LED (Status) indicates if the IO-Link communication is active.

Schematics



*TVS diodes are not equipped.

Bill of Materials

Part	Value
R1	10kOhm (0402)
R2	10kOhm (0402)
R3	10kOhm (0402)
R4	1kOhm (0402)
R5	1kOhm (0402)
C1	1µF/10V (0402)
C2	100nF (0402)
C3	100nF (0402)
C4	2.2µF/35V (0804)
C5	100nF (0402)
L1	33µH LQH2MCN330K02
IC1	CCE4501
IC2	LM75BD
D1	SMAJ33CA (BI)
D2	SMAJ33A (UNI)
D3	SMAJ33A (UNI)
D4	SMAJ33A (UNI)
D5	SMAJ33A (UNI)
D6	LED red (0603)
D7	LED green (0603)
X1	IO-Link M12
X2	CLK
X3	VHH
X4	CQ2
X5	CQ1
JP1	CSEL
JP2	BCEN
JP3	LEXT

Usage Restrictions

Creative Chips GmbH provides this board only for evaluation purposes in laboratory environments. It is not allowed to use this board or any part of it in production systems or any other installations.

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