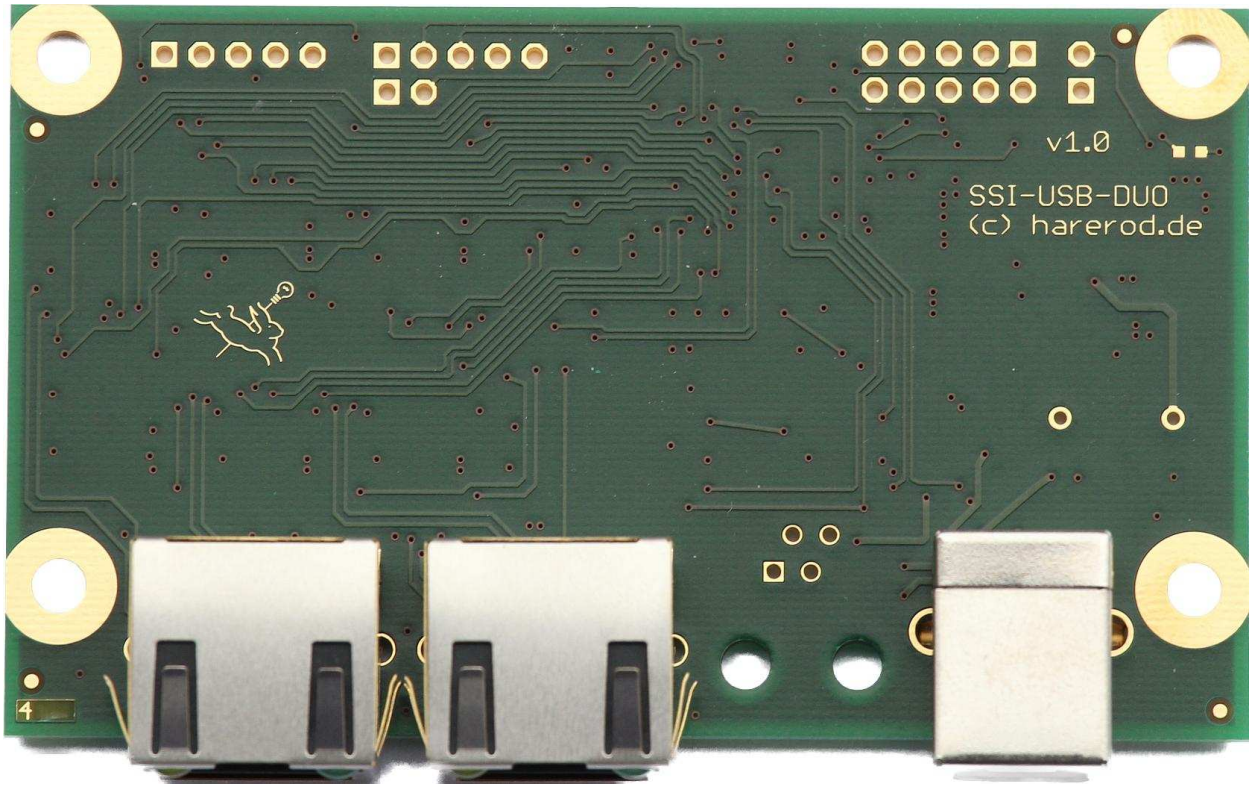


SSI-USB-DUO

Flexible Embedded Platform

Brief – English Version

Hardware v1.0
Dokument: 1401171103

1 Preface

The SSI-USB-DUO-module offers flexibly programmable interfaces.
The module implements an encoder-interface to the application complex via six RS485-transceivers.
Using dedicated firmware-options, different interfaces can be represented, e.g. SSI, ABZ, RS485.
The module connects to a host computer via USB or RS232.
Usually the module is powered via USB, alternatively via the 3V3-RS232 or the encoder-interface.

2 Applications

2.1.1 User specific functions

User specific functions become possible through a powerful embedded controller. We're looking forward to your inquiries. Standard applications are:

2.1.2 SSI Encoder-Simulator

- USB-/3V3-RS232 to SSI converter
- Hardware requirements
  - SSI-USB-v1.0
  - 3V3-RS232: SSI-USB-v1.0-o1
- Communications protocol according to IB Kirchen "SSI-Encoder-Simulator"
  - Refer to *„Bedienungs- und Programmieranleitung für den SSI-Encoder-Simulator"*
    - *„4) Serielle Schnittstelle"*
  - *Possible data rate is e.g.. 32bit 2MHz*

2.1.3 ABZ Encoder-Simulator

- USB-/3V3-RS232 to ABZ converter
- Hardwarevoraussetzungen
  - SSI-USB-v1.0-o2
  - 3V3-RS232: SSI-USB-v1.0-o1-o2

2.1.4 SSI to USB-Virtual-Serial-Interface-Converter

- SSI to USB-/3V3-RS232 converter
- Hardware requirements
  - USB: SSI-USB-v1.0
  - 3V3-RS232: SSI-USB-v1.0-o1

2.1.5 USB-/3V3-RS232 to RS485 converter

- USB-/3V3-RS232 nach RS485 converter
- Hardware requirements
  - SSI-USB-v1.0-o2
  - 3V3-RS232: SSI-USB-v1.0-o1-o2

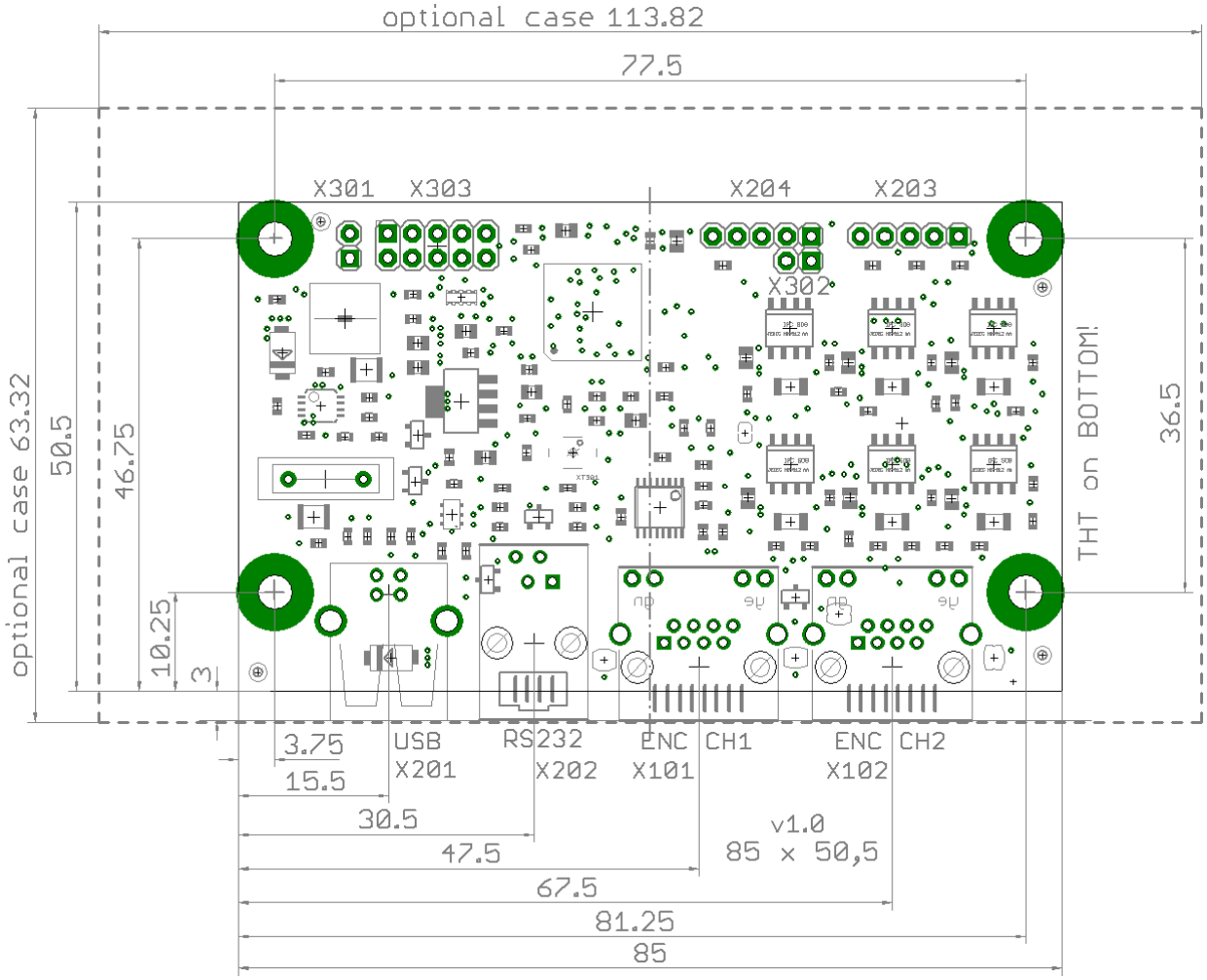
2.1.6 RS485 to RS485 converter, encoder resolution converter

- Input from one RS485-interface (SSI, ABZ, serial) and output to a second RS485-interface (SSI, ABZ, serial). In between the data is scaled by a given factor.
- Hardware requirements
  - SSI-USB-DUO-v1.0

3 Hardware specifications

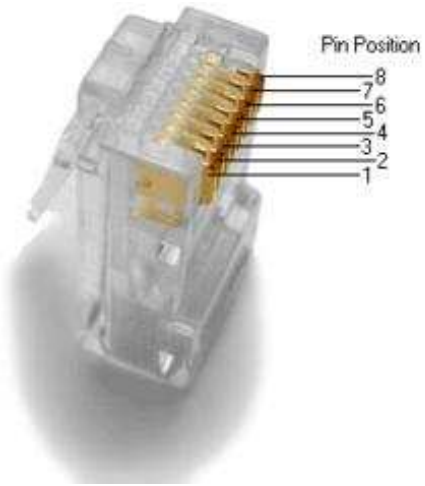
3.1 Setup

- measurements
  - plastic case (optional)
    - measures ca. 114mm x 64mm x 32mm
  - PCB 85mm x 50,5mm
  - Components heights: bottom < 5mm / top < 15mm / LP < 2mm
  - Mounting holes
    - Drill 3.5mm
    - Outer copper diameter 8mm



3.2 Interfaces on PCB

3.2.1 Encoderinterface X101 / X102



Drawing 1 - http://en.wikipedia.org/wiki/Modular_connector

- RJ45 8p8c, shielded, Typ CAT5, Amphenol RJHSE-5381
  - 1: DATA+ / A+
  - 2: DATA- / A-
  - 3: CLOCK+ / B+
  - 4: Z+
  - 5: Z-
  - 6: CLOCK- / B-
  - 7: Power Input
    - Standard
      - 4.1V .. **5V** .. 5.3V
      - Polarity guard via diode
    - Option o7: Industrial 24V
      - 19.2..**24V**..28.8V
      - Switched DCDC-converter
  - 8: GND
  - Shield : may be connected to GND via solder-jumpers
- LEDs at the Encoderinterface
  - LED Alive
    - green
    - Blinking during operation at 0,5Hz
  - LED Activity
    - orange
    - application specific behaviour
- Transceivers
  - ADM3485(E)ARZ
    - 3.3 V Versorgung
    - 5 V logic compatible
    - EIA RS-422 and RS-485 conform over full common mode range
    - Data rate: 10 Mbps
    - Half- and Full-Duplex options
    - Reduced slew rate for reduced EM-emission available
      - ADM3483, reduced data rate 250kbps
    - Up to 32 transceivers on the bus
      - CAVEAT: adhere to power and terminator limitations
    - −7 V to +12 V bus common mode range
    - 8 ns delay through ADM3485

3.2.2 RS232 – X202 - Option o1

- The RS232-interface comes in two options:
  - o1a – 3V3-RS232 – for direct connection to 3V3-hardware
  - o1b – RS232 – for connection to standard RS232-interface
- RS232 Interface
  - RJ10 4p4c
    - 1: VSUP_RJ11
    - 2: TX RS232 - Output
    - 3: RX RS232 - Input
    - 4: GND
- Power configuration
  - Standard Power configuration
    - VSUP_RJ10 is connected to the internal power regulator via a choke. Application:
      - If powered over USB or Encoderinterface this voltage can supply an external level converter (e.g. IBK 01009-11)
      - The user may feed an external voltage of 4.1V .. **5V** .. 5.3V into the module
  - Option o7: Industrial 24V
    - 19.2..**24V**..28.8V
    - Switched DCDC-converter

3.2.3 USB – X201

- USB-interface
  - Standard USB-B
  - This is the standard power supply for the module
  - Power requirements depend on application, between 30..200mA, diode for reverse feed protection
  - Communications interface to the host

3.2.4 Extension - Serial – X204

- Option o5
- Pinout 0,1“ connector
  - 1: GPIO11
  - 2: GPIO12 / TX
  - 3: GPIO13 / RX
  - 4: GND
  - 5: +3V3
- The connector provides power and communication to an optional extension card, e.g. display, keyboard, etc.

3.2.5 Extension – I^2C – X203

- Option o4
- Pinout 0,1“ connector
  - 1: GPIO21
  - 2: GPIO22 / I2C-SDA
  - 3: GPIO23 / I2C-SCL
  - 4: GND
  - 5: +3V3
- The connector provides power and communication to an optional extension card, e.g. display, keyboard, etc.

3.2.6 Equipotential bonding

- The four fixation holes are connected to GND
- The encoder interface shield may be connected to GND
- CAVEAT
    - **To stay within the RS485-transceiver's common-mode-range, equipotential equalization between module and signal source is mandatory**

3.2.7 JTAG – X303

- The JTAG-interface connects the MCU to the programmer (production and advanced usage only).
    - 1: MCU-Reset
    - 2: JTAG-Reset
    - 3: TMS
    - 4: VTARGET
    - 5: TDO
    - 6: GND
    - 7: TDI
    - 8: GND
    - 9: TCK
    - 10: GND

3.2.8 BOOT0 – X301

- If pins 1&2 of X202 are shorted on power-up, the MCU enters bootloader-mode. The user may than initiate a Device Firmware Update.
    - 1: BOOT0
    - 2: +3V3

3.3 Hardware-Options

- Standard
  - 2x2 RS485-Transceiver e.g. SSI
    - DATA+ / A+
    - DATA- / A-
    - I+ / CLOCK
    - I- / CLOCK
  - USB-B-interface
- Option o1a
  - 3V3-RS232
- Option o1b
  - Standard-RS232
- Option o2
  - Channel 1 - third RS485-Transceiver e.g. for ABZ-operation
    - B+
    - B-
- Option o3
  - Channel 2 - third RS485-Transceiver e.g. for ABZ-operation
    - B+
    - B-
- Option o4:
  - I^2C-extension
- Option o5:
  - 3V3-RS232-extension
- Option o6:
  - JTAG-interface
- Option o7:
  - Industrial 24V switched power supply