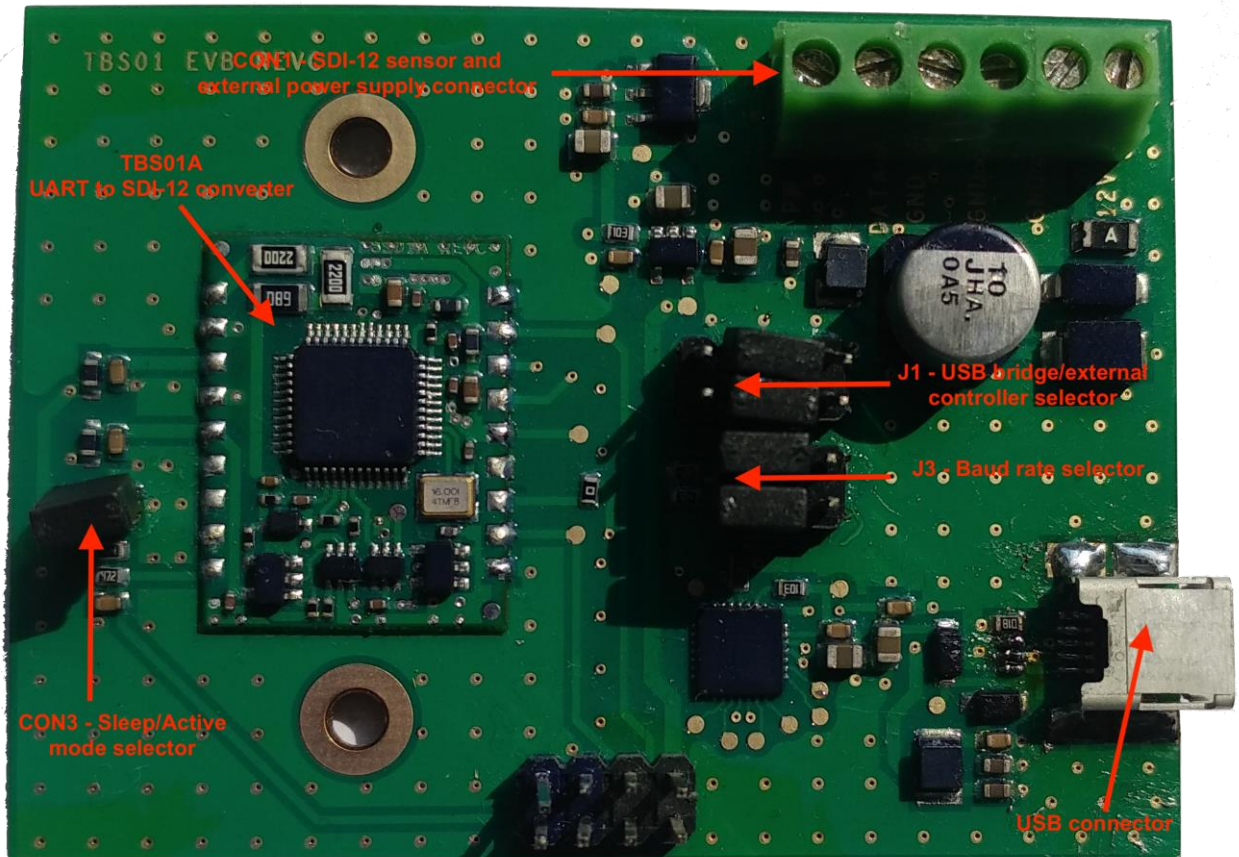


# Index

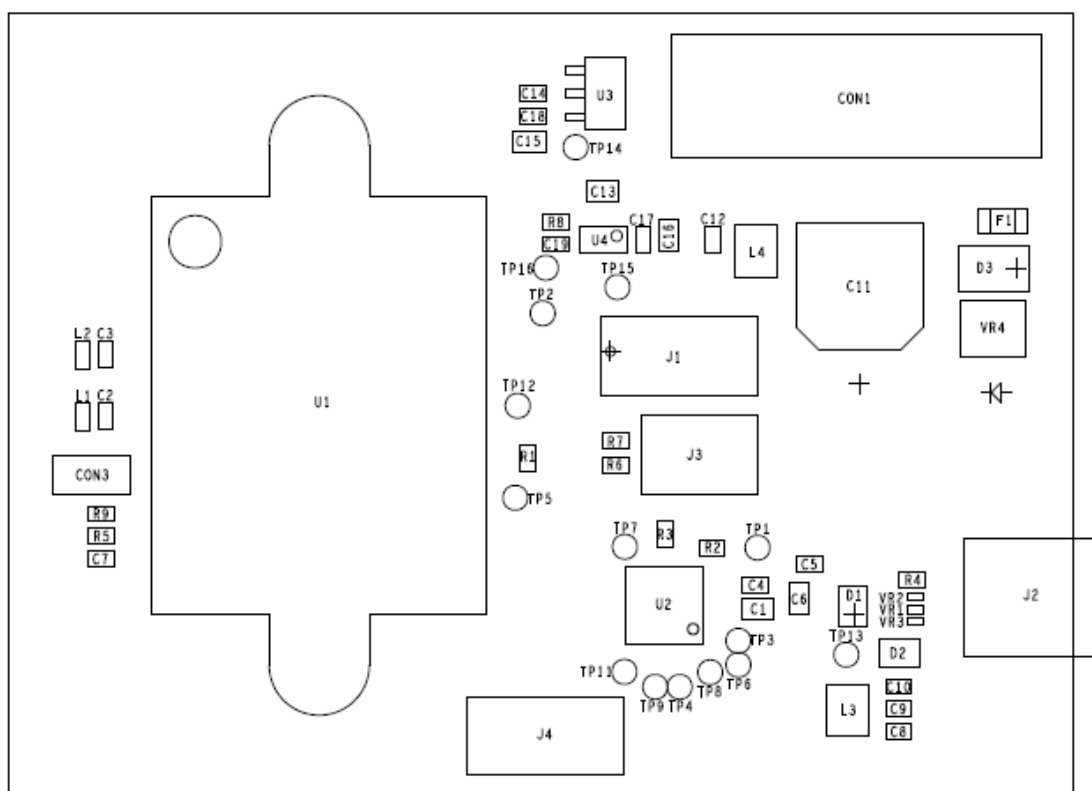
1	Assembly Plot .....	2
2	SDI-12 sensor connection and power supply .....	3
3	Configuration of the controller/evaluation board communication .....	3
3.1	Baud rate selection .....	4
3.2	USB / UART selection .....	5
4	Sleep Mode Select, CON3 .....	5
5	Set Up .....	5
5.1	Step 1 – Driver installation .....	5
5.2	Step 2 – Connect the TBS01A EVB with sensor(s) .....	6
5.3	Step 2 – Set Up Hyper Terminal .....	7
5.4	Step 3 – Communicate with sensor(s) .....	9
6	Revision History .....	10

## 1 Assembly Plot

The evaluation board provides the user several connectors to interface with the remote controller and configure the communication and operation mode.



- Connection to the remote controller:
  - Over USB connector: provided the [CP210x driver is installed](#), a serial COM port will be mounted
  - Direct UART connection through RX&TX
  - J1 is used to select USB or direct UART communication
- CON1: SDI-12 sensor connector
  - Provides connectivity to SDI-12 bus
  - Optional external power supply connection
- CON3: sleep/active mode selector
  - By default, set to active (sleep mode disabled)
- J3: baud rate selector
  - 4800, 9600, 19200, 38400



## 2 SDI-12 sensor connection and power supply

Connecting SDI-12 sensors to the evaluation board is done on CON1.

### CON1 pins description

Pin number	Board silkscreen	Description
1	12V	External power supply Vcc
2	GND	External power supply ground
3	GND	SDI-12 sensor shield (optional)
4	GND	SDI-12 sensor ground
5	DATA	SDI-12 sensor data line
6	PW	SDI-12 sensor power line

The TBS01A Evaluation Board needs to be supplied with an external Power Supply (+12V) (CON1 – 12V), if the sensor supply is connected to the “SDI-12 Power” Pin of the screw terminal block (CON1 - PW).

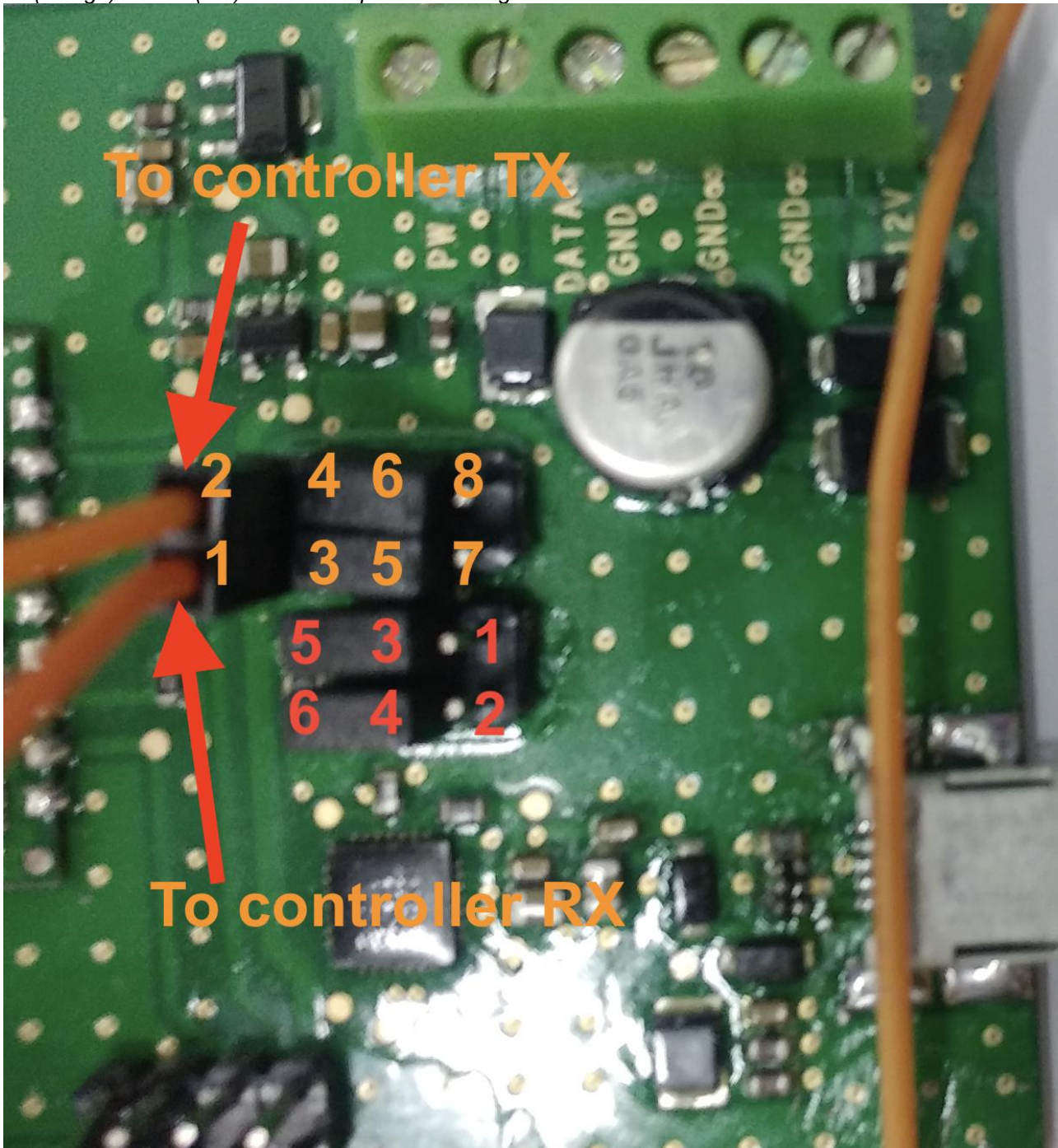
In case of SDI-12 compatible sensors which work with a wider supply voltage range (such as 5V...16V), an external supply may not be required, as by default, 5V from USB is available at the “SDI-12 Power” Pin.

## 3 Configuration of the controller/evaluation board communication

J1 and J3 connectors are used to configure the communication between the controller and the evaluation board as follows:

- J1: select USB or direct UART interface
- J3: configures the baud rate

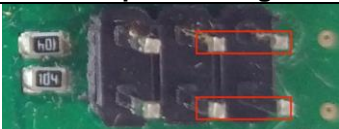
J1 (orange) and J3 (red) connectors pins numbering






### 3.1 Baud rate selection

The evaluation board is configured by default to have TBS01A UART running at 9600 bauds.

This can be changed by setting 2 jumpers on J3 connector as follows  
 J3 provides two jumpers to select the Baud Rate of the TBS01A UART interface:

Baud rate	Pins shorted with jumpers	Jumpers setting
4800	1-3 2-4	



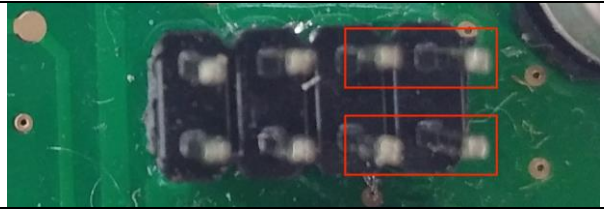
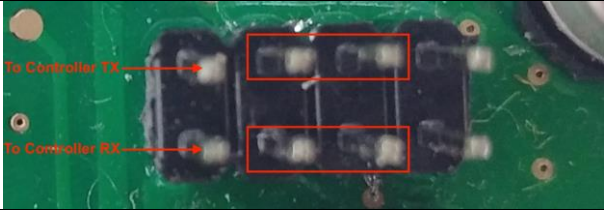
9600	3-5 2-4	
19200	1-3 4-6	
38400	3-5 4-6	

### 3.2 USB / UART selection

TBS01A UART can be connected to the controller either over USB bridge or directly to the external controller UART depending on the settings of J1 connector.

The TBS01A evaluation board is delivered with RX and TX connected to the USB bridge CP2102.

USB or direct UART operation is selected by setting jumpers as follows on J1:

Communication mode	Pins shorted with jumpers	Jumpers setting
USB bridge	5-7 6-8	
Controller's UART	3-5 4-6 Pin 1: to controller RX Pin 2: to controller TX	

## 4 Sleep Mode Select, CON3

The TBS01A module is delivered with the sleep mode Pin jumpered to "HIGH"

To select "Run-Mode", set a jumper on CON3 (High).

If using sleep mode, remove the jumper from CON3 and connect the sleep mode control line to Pin2 of CON3.

## 5 Set Up

### 5.1 Step 1 – Driver installation

Silicon Labs CP210x driver must be installed on PC (on CD supplied with TBS01A EVB or download from [Silicon Labs](#))

**Do not connect TBS01A EVB to the PC, when starting the CP2102 driver installation process!**

- 1) Start the driver installation executable
- 2) Follow the installation instructions step by step until the driver installation process is finished
- 3) The system may have to restart.

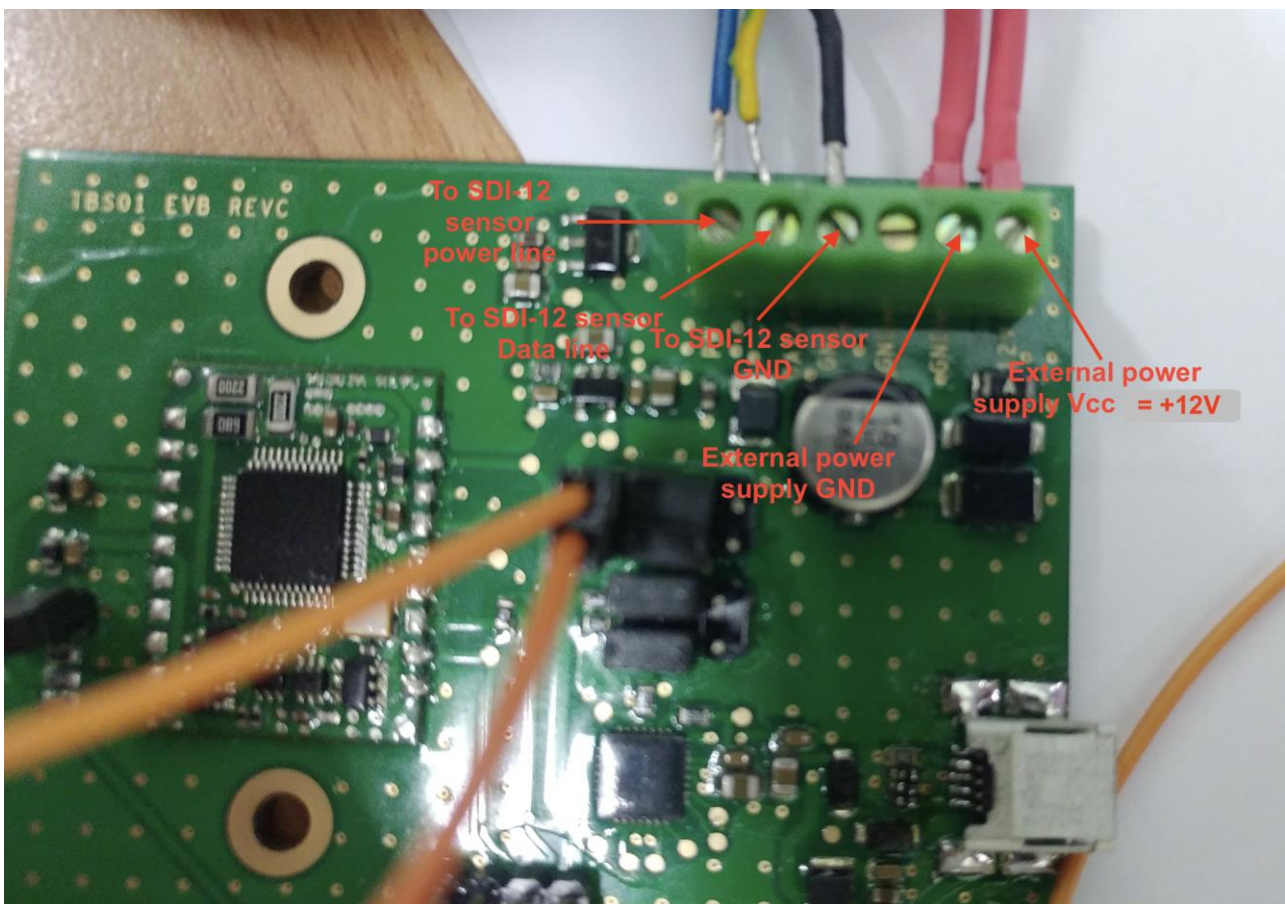
- 4) Upon restart after successful driver installation – **and not before**-, connect the TBS01A EVB to the USB interface of the PC (no external power required, just connect via USB cable).
- 5) wait until you get the notification, that new hardware is installed and ready to use.



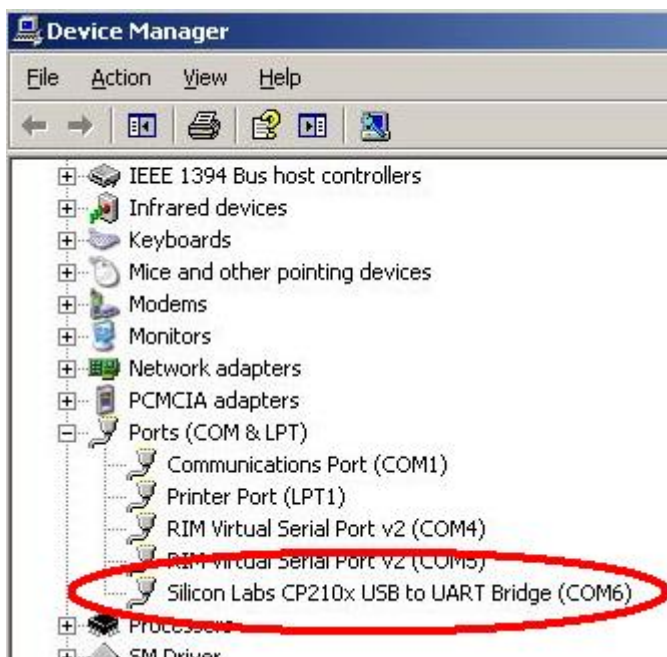
Some terminal programs need manual COM port set up. Open the hardware manager to check the COM port number assigned to the Silicon Labs USB bridge.

## 5.2 Step 2 – Connect the TBS01A EVB with sensor(s)

Connect the TBS01A Evaluation Board to a SDI-12 compatible sensor and to an external 12V power supply



Make sure that the external power supply is set to +12V and switch it on  
Connect the USB cable and check if the TBS01A EVB got assigned to a virtual COM PORT.



### 5.3 Step 2 – Set Up Hyper Terminal

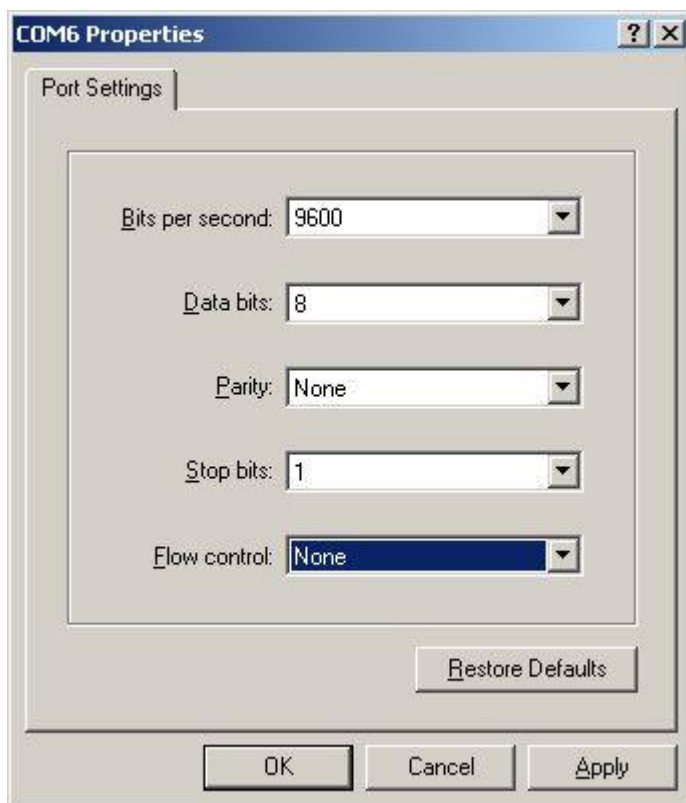
- 1) Open the hardware manager to check the COM port number assigned to the Silicon Labs USB bridge
- 2) Start the Windows HyperTerminal application



- 3) Connect to the COM Port assigned to the TBS01A EVB

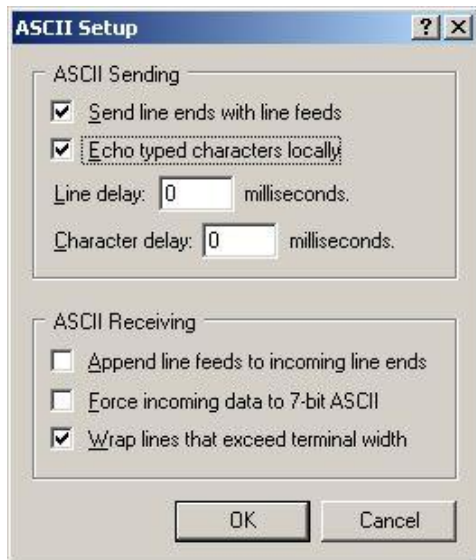


- 4) Set the COM speed to 9600, 8 Bits, No Parity, 1 Stop Bit, No Handshake



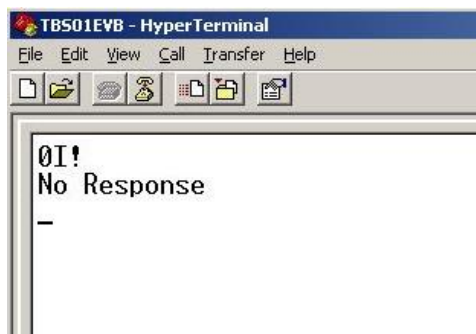
- 5) In Menu - File / Properties / Settings, click “ASCII Setup” and activate “Send line ends with line feed” and “Echo typed characters locally”





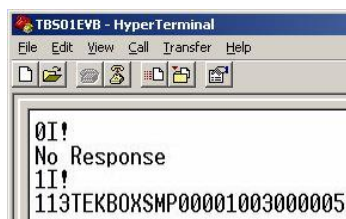
#### 5.4 Step 3 – Communicate with sensor(s)

- 1) In Hyper Terminal, enter the SDI-12 ID command: Type 0I! and press the ENTER key



The TBS01A EVB responds the string “No Response”. This means that there was no sensor at all, or no sensor with address 0 at the SDI-12 interface, however “No Response” shows, that the Hyper Terminal is successfully set up and the communication link between PC and TBS01A EVB is working correctly.

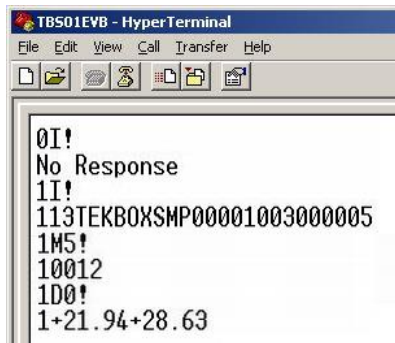
- 2) In our example we have intentionally connected a sensor with SDI-12 address “1”, so as a next step we type 1I! and press the ENTER key.



We receive a response indicating the presence of a Tekbox Soil Moisture Sensor with SDI-12 address “1”.

- 3) Now we enter a measurement command. This may depend on the sensor. Check the manual of your sensor for appropriate commands. In our case we type the command 1M5! and press the ENTER key as an inquiry for a soil moisture and soil temperature measurement. Sensor 1 responds with 10012, which means that 2 measurement values will be available after 1 second. Upon entering

1D0! and pressing the ENTER key, the sensor delivers the string 1+21.94+28.63 which means the soil moisture value is 21.94% and the soil temperature is 28.63 °C.



```

TBS01EVB - Hyper Terminal
File Edit View Call Transfer Help
0I!
No Response
1I!
113TEKBOXSMP00001003000005
1M5!
10012
1D0!
1+21.94+28.63

```

## 6 Revision History

Version	Date	Author	Changes
V1.0	29.11.2010	Nguyen Phu Thinh	Creation of the document
V1.1	08.02.2011	Mayerhofer	Chapter 7 added
V1.2	20.02.2011	Mayerhofer	formatting
V1.3	31.08.2020	Philippe Hervieu	Update photos and add connectivity details / Update chapters and footers.