Installation and use of the BOSCH Sensortec Evaluation Board V1.1

ABSTRACT

Based on the experience of 500 million MEMS sensors and testing to highest quality standards, BOSCH Sensortec has developed a sensor family, consisting out of pressure- acceleration and yaw rate sensors with best-of-the-market performance and out-standing reliability. All Sensors from Bosch Sensortec are specifically designed for digital low-power applications to enhance functionality in consumer electronic devices as well as in health, logistics and security systems. These sensors are available in small and thin standard packages.

This application note shows how to set up and how to use the Evaluation Board for functionality demonstration and evaluation purposes or application development using Bosch Sensortec products.

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The Board Concept includes two parts:

- The versatile Evaluation Board
- The sensor specific Sensor Shuttle Boards

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REQUIREMENTS

- IBM-compatible PC (min. 1.5 GHz and 128 MB RAM)
- Operating system: Windows2000® or WindowsXP®
- CD-ROM Drive
- Temporary administrator rights to install software
- Free USB 2.0 Full Speed Port or higher or RS232 Serial Port

OPERATING CONDITIONS:

- Temperature: 0 – 55°C

Content

1 Introduction

Sensors from Bosch Sensortec provide many capabilities for consumer products, offering a wide range of new functions. By measuring acceleration, pressure and angular rate, they make operating devices simpler and more intuitive. BOSCH Sensortec MEMS sensors also contribute to more efficient medical care. Divided into acceleration, pressure and yaw-rate sensing, the applications are typically realized in the fields of

Acceleration Sensing

- Mobile phones and PDAs
- Portable music players
- Toys and gaming
- Portable city- and outdoor navigation
- Leisure and sports
- Camera and video equipment
- Mobile computing
- Security systems
- Health
- Home appliances
- Logistics

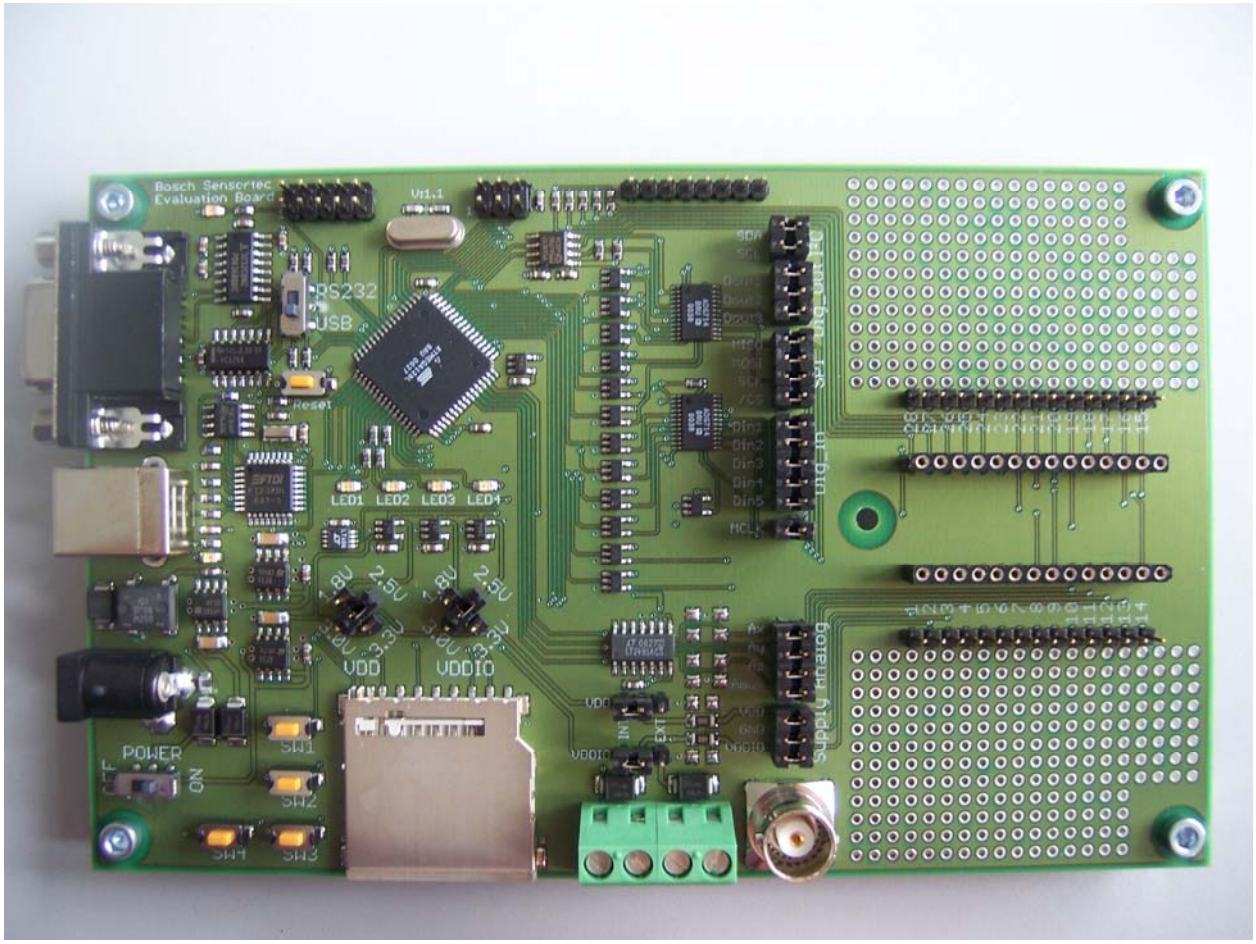
Pressure Sensing:

- Portable city- and outdoor navigation
- Dead reckoning
- Leisure and sports
- Weather forecast
- Vertical velocity indication (rise / sink speed)
- Security systems

Yaw Rate Sensing

- Optical Image Stabilization
- Electronic Image Stabilization
- Gyro Mouse
- Man Machine Interface

1.1 Board overview



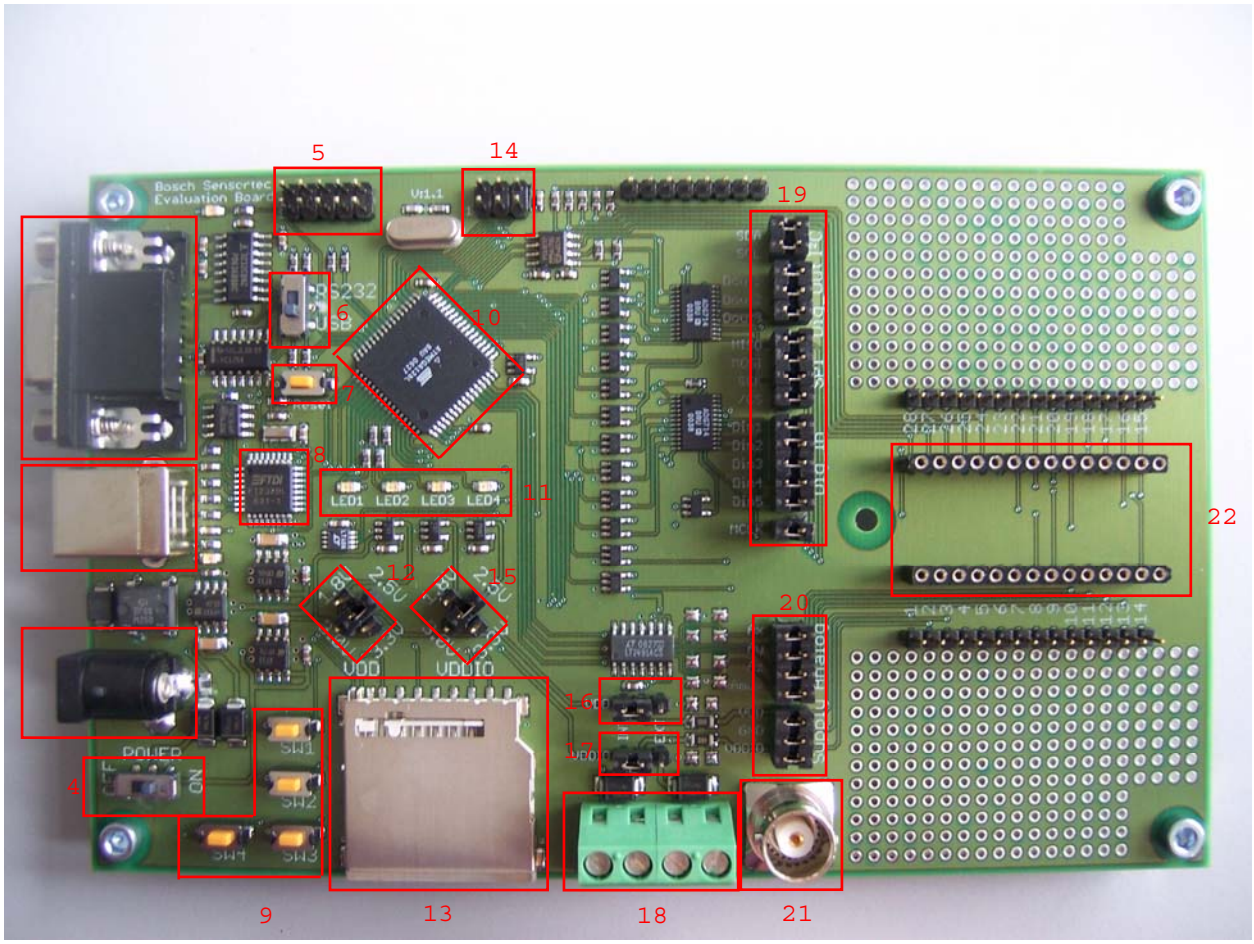
The versatile Evaluation Board controls by an integrated microcontroller the sensor functionality on the attached Sensor Shuttle Board and establishes communication between a linked PC and the sensor. Furthermore is provides a flexible power supply. All pins of the sensor are accessible. It allows precise measurements of the power consumption of the different power supply chains. The Sensor Shuttle Boards provide an identification so the Evaluation Board can auto detect which board is plugged to the system and the embedded FW can auto configure all needed settings for power supply and communication. As the system provides the possibility for a firmware upgrade in the filed it is future proven for new Sensor Boards that will come up.

The Bosch Sensortec Evaluation-Board in combination with its EvalutionDesktop software was built for the simultaneous demonstration and evaluation of various sensors that can be applied to the Evaluation Board. All either wire bound via USB or via RS232

1.2 Board constituents

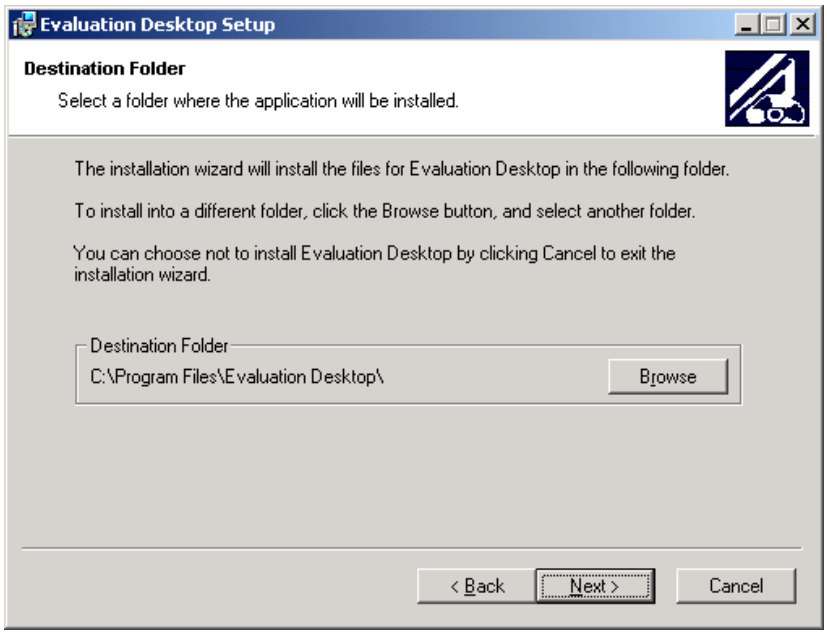
The following illustration describes the main elements of the Evaluation Board. Main components are:

Number	Component
1.	RS232 Connector
2.	USB Connector
3.	Power Jack
4.	On/Off switch
5.	JTAG Connector
6.	USB/RS232 Switch
7.	Reset Button
8.	USB Transceiver
9.	Button SW1-4
10.	Microcontroller
11.	LED 1-4
12.	Voltage Selector for Sensor Shuttle Board VDD
13.	SD-Card Slot
14.	ISP Connector
15.	Voltage Selector for Sensor Shuttle Board VDDIO
16.	VDD internal/external selector
17.	VDDIO internal/external selector
18.	external power supply connector
19.	Signal Pins to Sensor Shuttle Board
20.	Signal Pins to Sensor Shuttle Board
21.	clock input/output
22.	socket for Sensor Shuttle Board

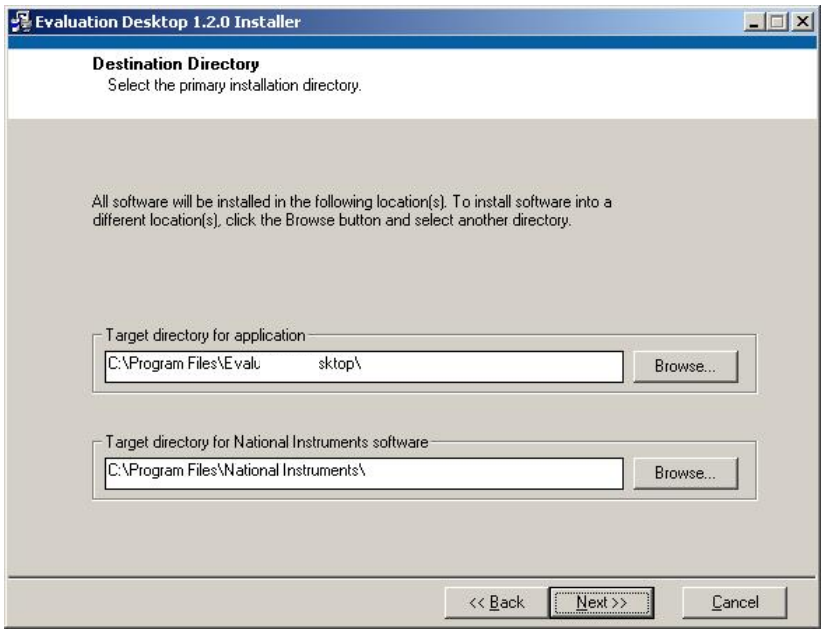


2 Hard- & Software Installation

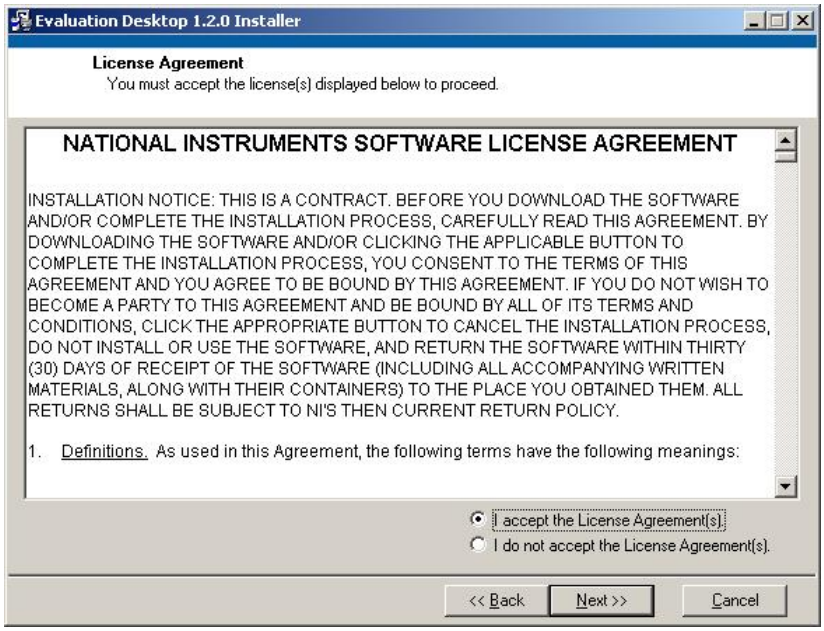
1. Insert EvalutionDesktop-CD
2. Run “setup.exe” from the directory ...:\ EvalutionDesktop_DemoSoftware
3. The following message box appears



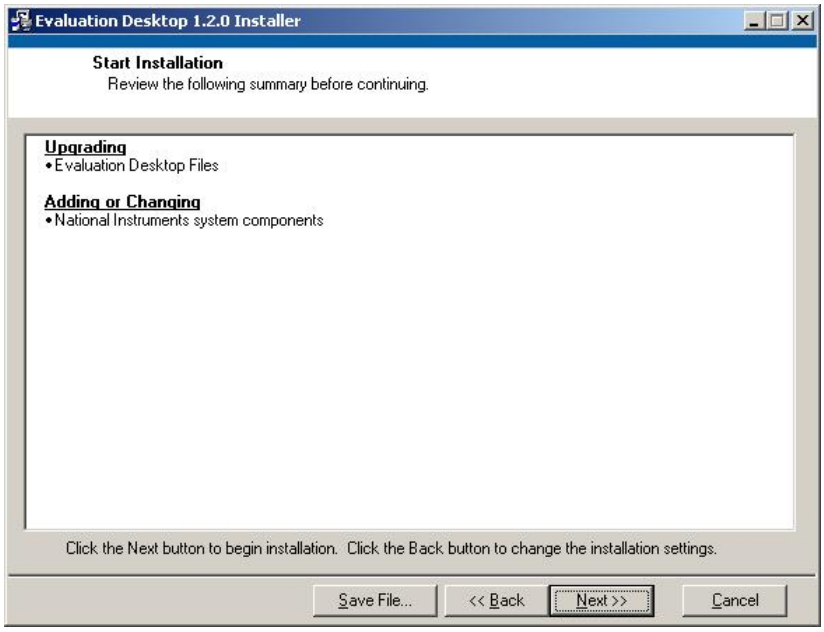
4. Click “Next”
5. The following message box appears



6. Select the primary installation directories “BST_EvalutionDesktop” and “National Instruments” in the user specific directory “Program Files” (drive may vary from C:\)
7. The following message box appears

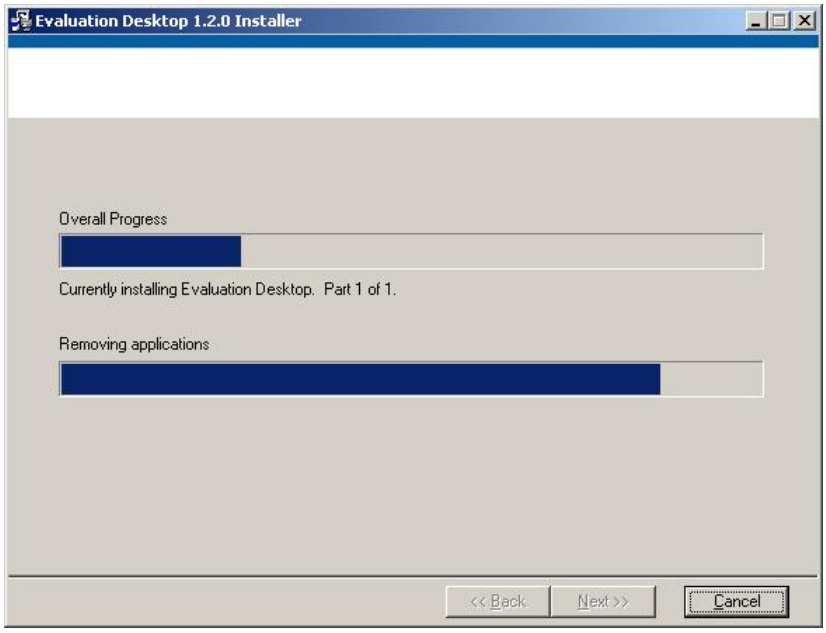


8. Accept the License Agreement(s) as described above.
9. Click “Next”
10. The following message box appears

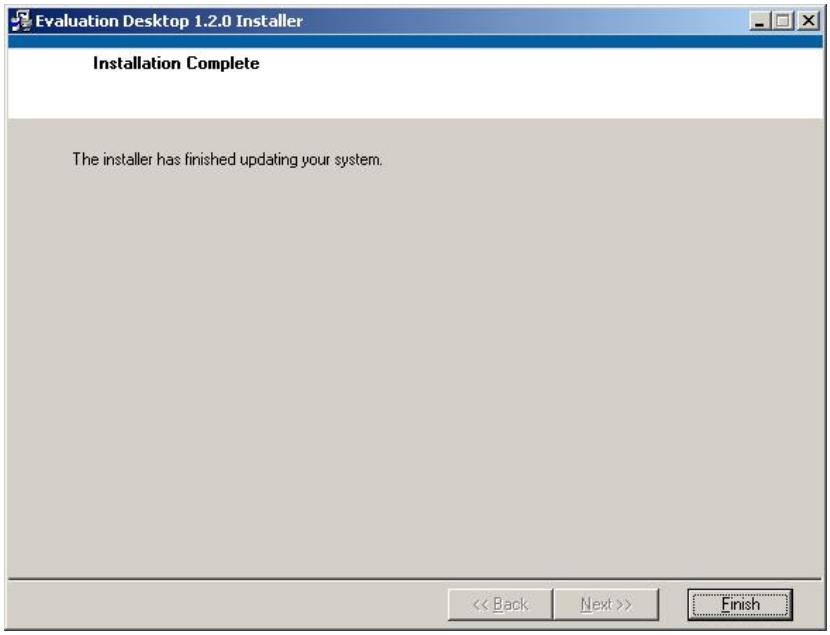


11. Confirm installation by clicking on “Next”

12. While the installation is in progress, the following message box appears



13. Wait until the installation is finished
14. When the installation of EvalutionDesktop is finished, the following message box appears



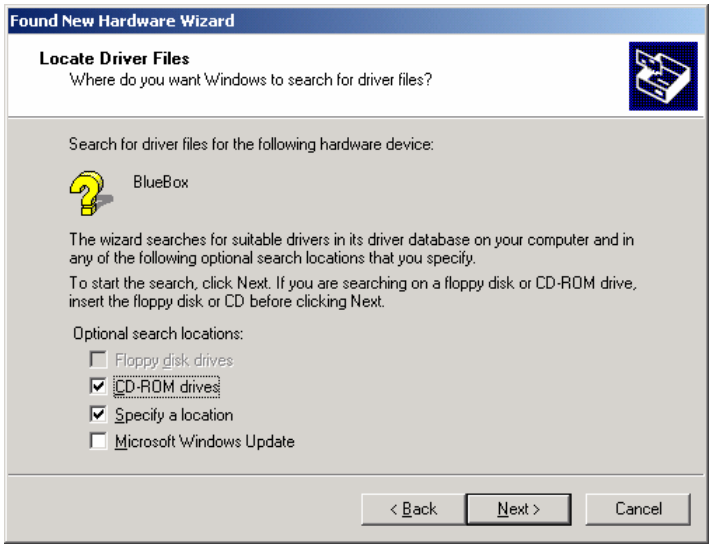
15. Click finish and restart computer if necessary

16. After restarting the computer, connect the Evaluation demo board to a free USB port
17. Turn on the Evaluation Board The following message boxes appears

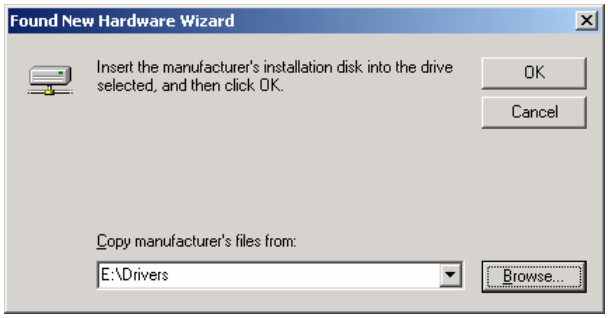
18. Click “Next”
19. The following message box appears

20. Install Hardware Device Drivers by recommended selection as described above
21. Click “Next”

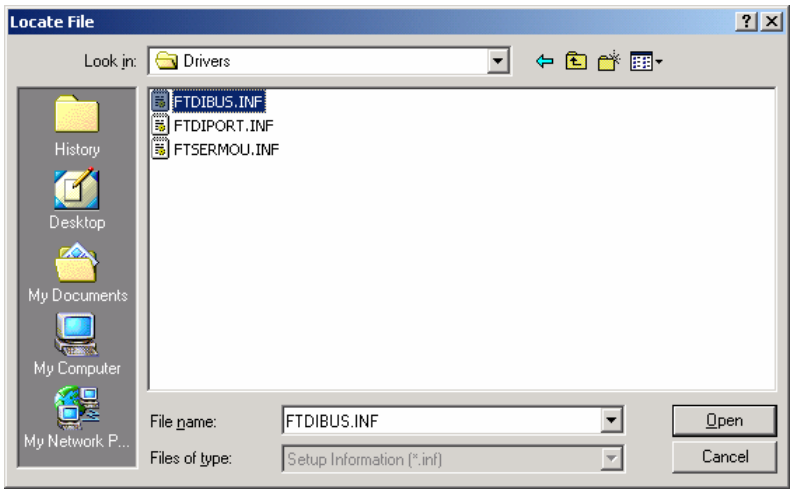
22. The following message box appears



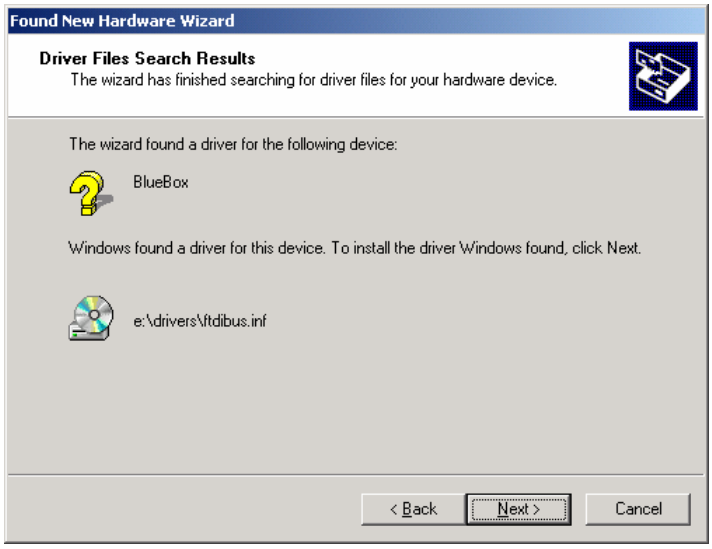
23. Locate Files by selecting “CD-ROM drives” and “Specify a location” as described above
24. Click “Next”
25. The following message box appears



26. Make sure that the correct CD-ROM is inserted and confirm by clicking “OK”
27. Select “FTDIBUS.INF” as Hardware Device Driver



28. Click “Open”
29. If driver file has been successfully found, the following message box appears

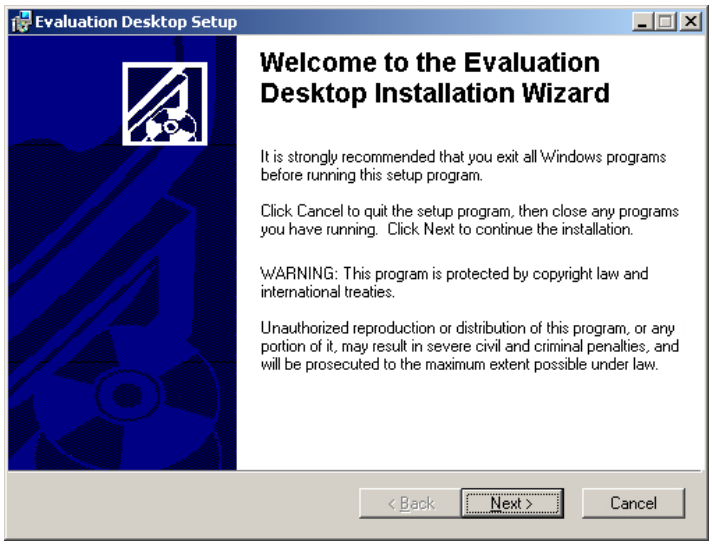


30. Confirm the selection by clicking “Next”

31. If the driver file has been successfully installed, the following message box appears

32. Click “Finish” to complete the FTDIBUS.INF Device Driver installation

33. After finishing of the FTDIBUS.INF Device Driver installation the following message boxes appears



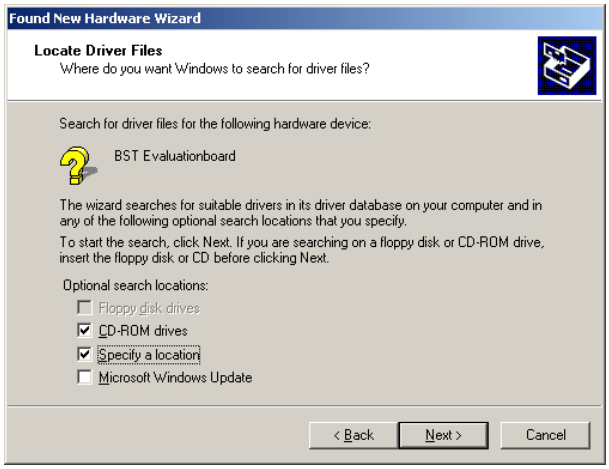
34. Click “Next”

35. The following message box appears

36. Install Hardware Device Drivers by recommended selection as described above

37. Click “Next”

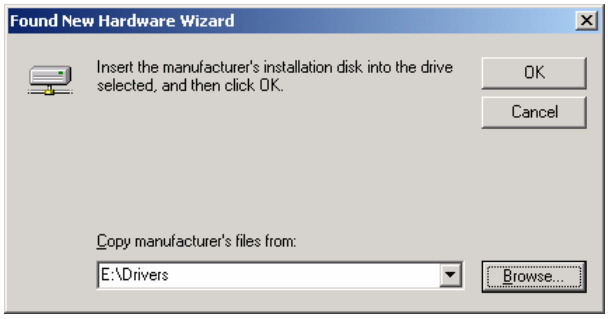
38. The following message box appears



39. Locate Files by selecting “CD-ROM drives” and “Specify a location” as described above

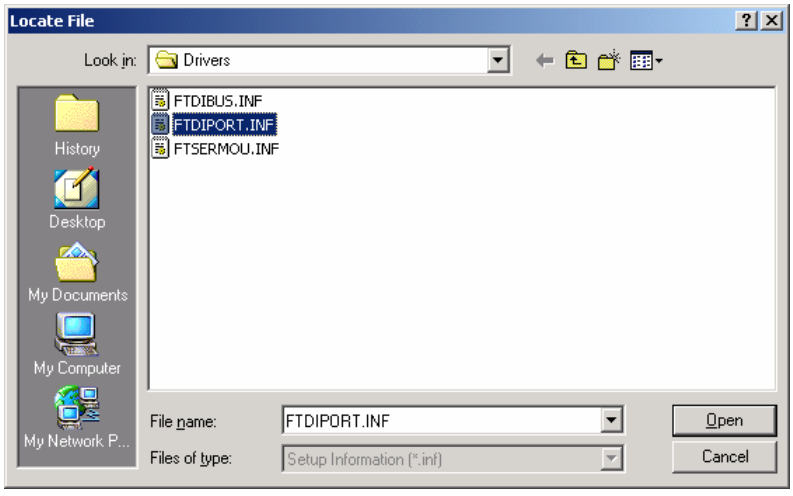
40. Click “Next”

41. The following message box appears



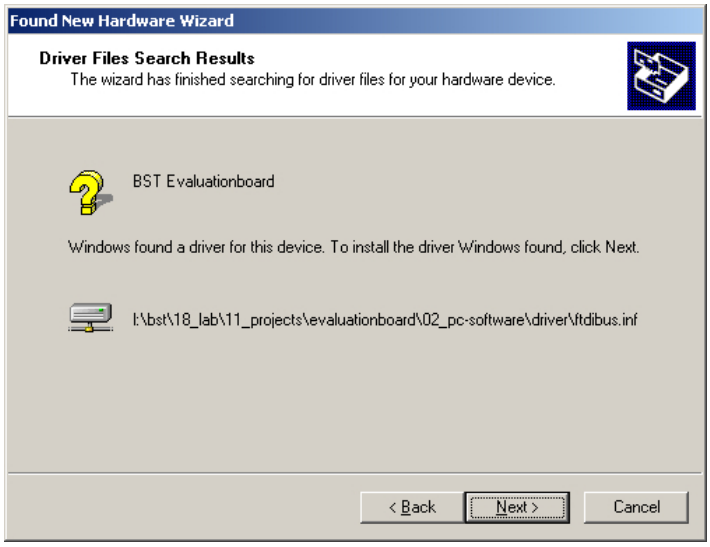
42. Make sure that the correct CD-ROM is inserted and confirm by clicking “OK”

43. Select “FTDIPORT.INF” as Hardware Device Driver



44. Click “Open”

45. If the driver file has been successfully found, the following message box appears



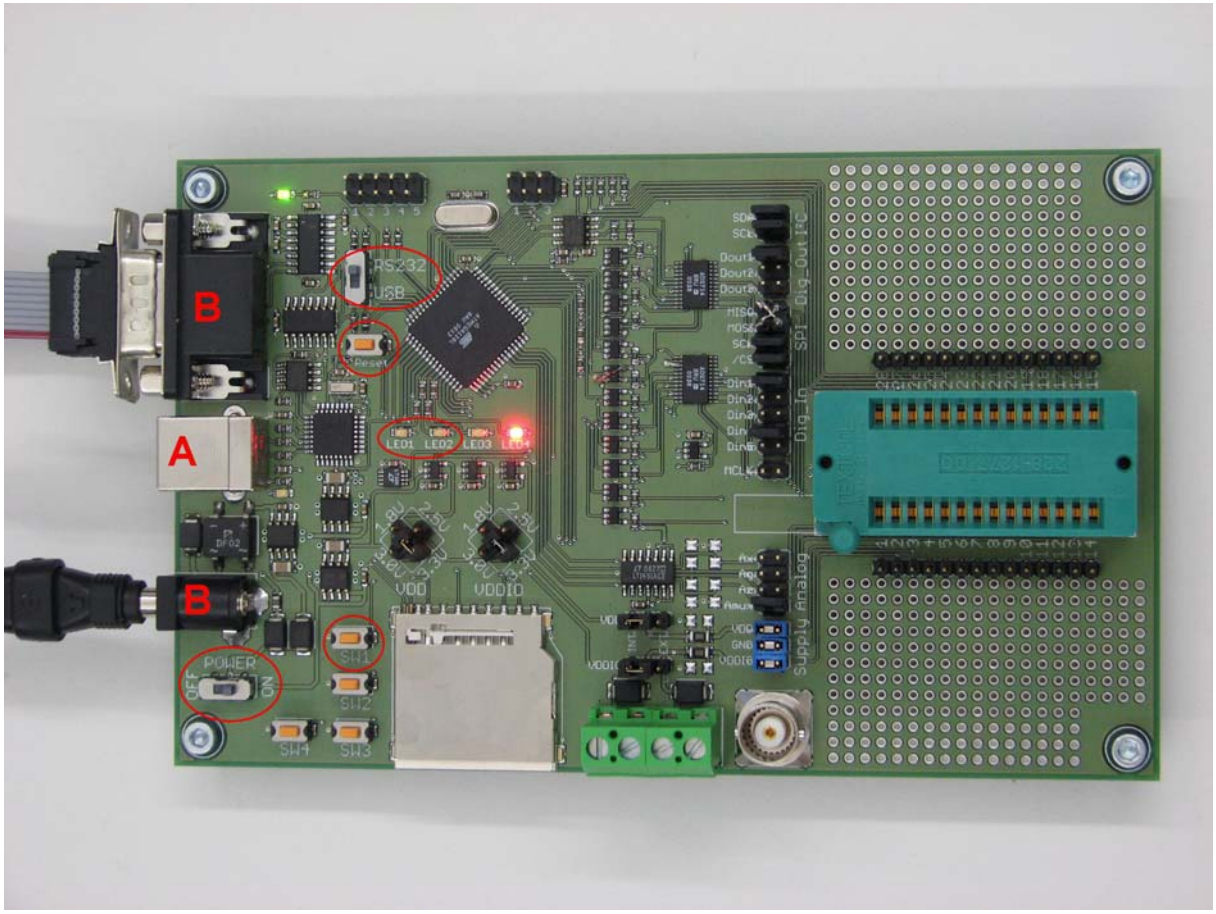
46. Confirm the selection by clicking “Next”

47. If the driver file has been successfully installed, the following message box appears

48. Click “Finish” to complete the Device Driver installation

3 Firmware Update

To perform a firmware update is necessary to perform the following steps:

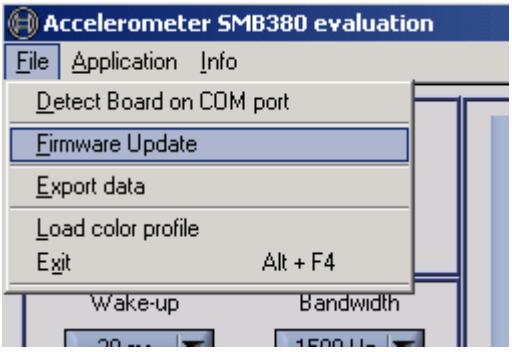


- make sure the board is connected to the PC either via USB (A) or via serial port with extra power supply (B)
- select the connection modus with the RS232 / USB switch
- turn the board's power switch on
- while keeping the pushbutton SW1 pushed, press short the Reset pushbutton, then release SW1
- now the green LED 2 is glowing

In order to start the firmware download from EvalutionDesktop software:

- No Sensor Shuttle Board attached to the socket:

- Sensor Shuttle Board attached to the socket:



To start firmware download perform the following steps:

- choose the .hex file you like to transfer to the board and press the OK button
- LED 2 goes off
- the green LED 1 is flashing while the new firmware is updated
- if you get an error message, return to step 1 and try again
- a popup window will appear when the update has been completed successfully and the green LED 1 goes off

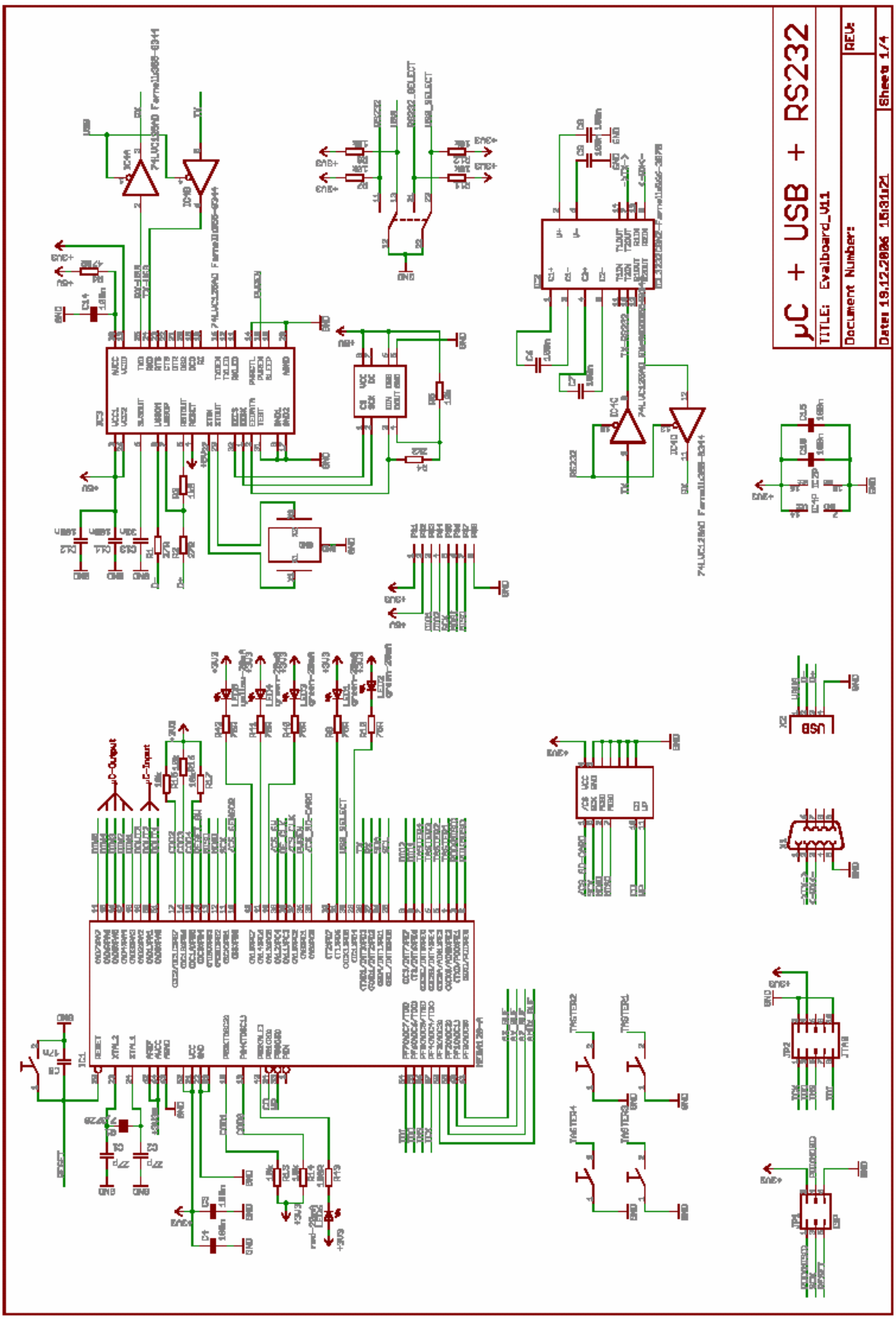
4 Operation

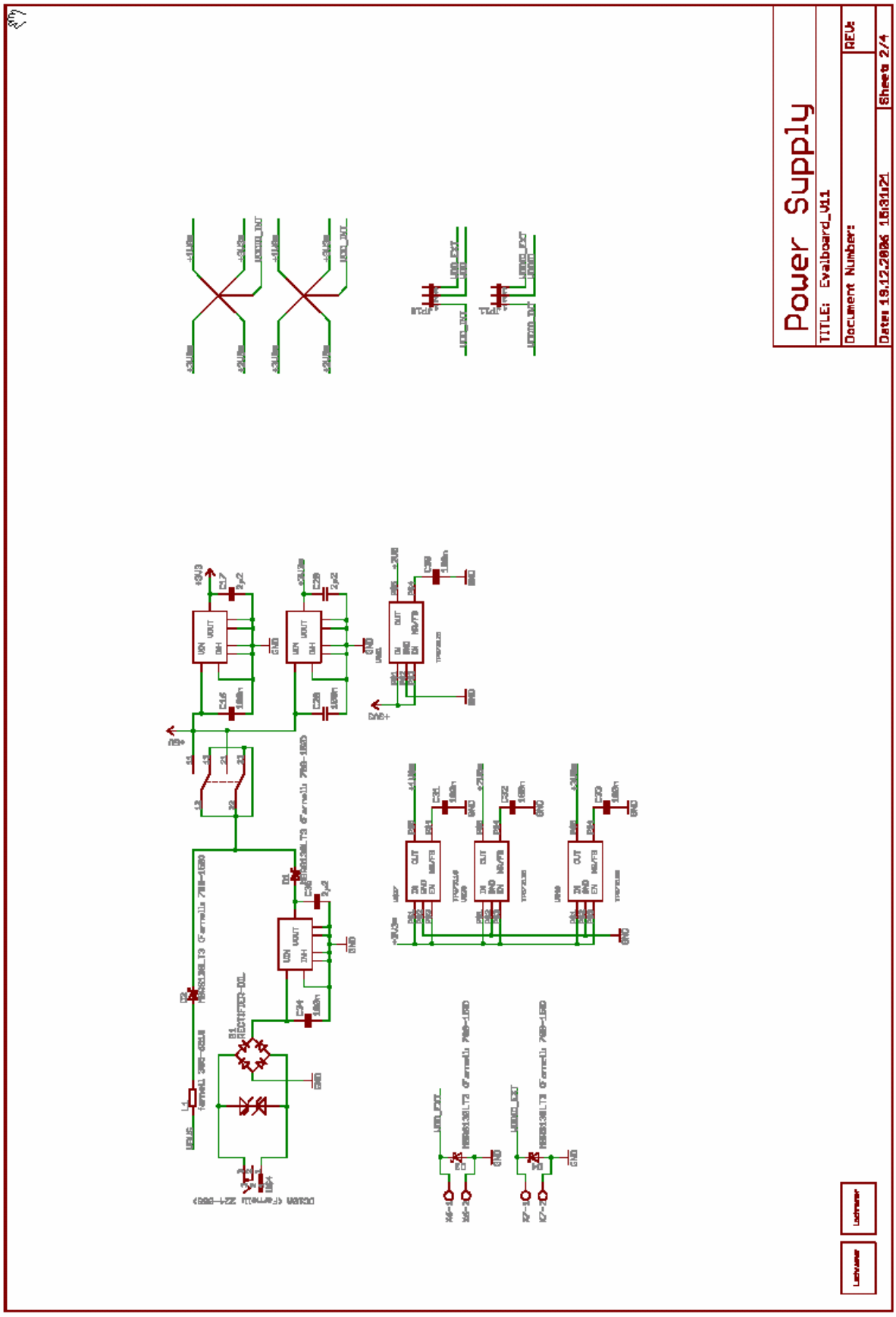
The operation depends on the used Shuttle board and will be described in respective documentation of the Sensor Shuttle Boards.

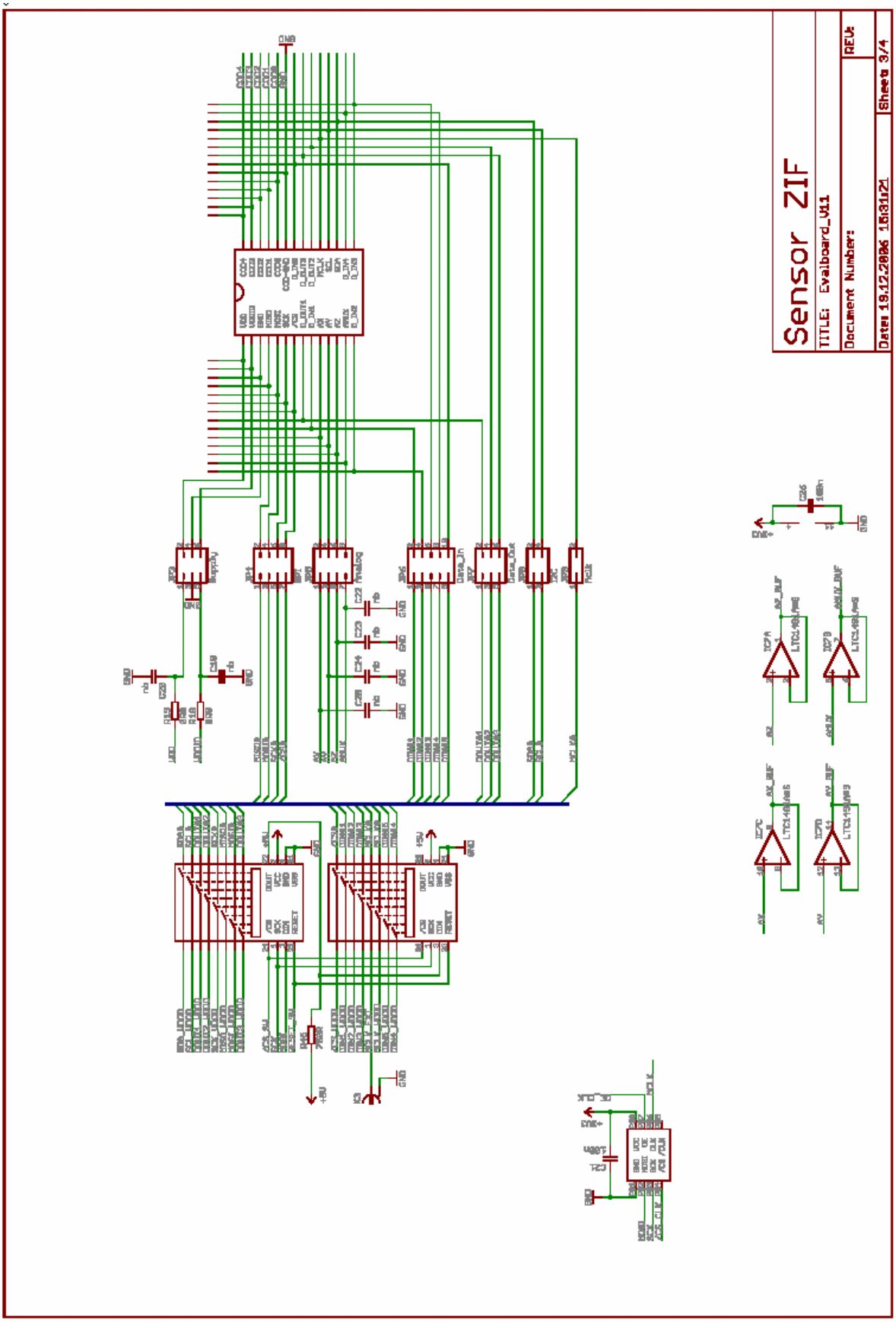
If no Shuttle board is attached the operation is limited to Firmware upgrade.

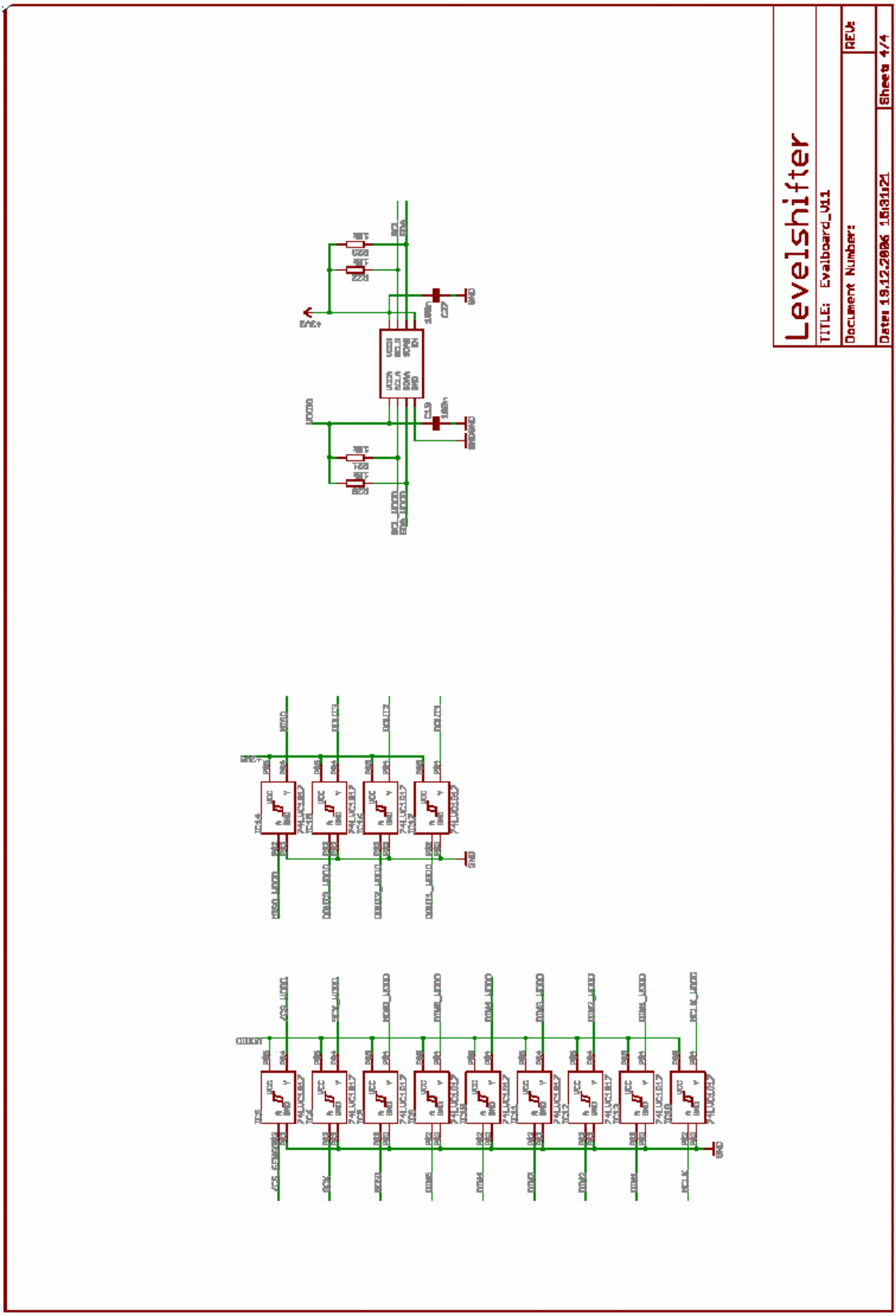
The Shuttle boards are all marked with a “1” for proper orientation of the board in the socket of the Evaluation Board. The Evaluation Board shows also pin 1 identifier in the respective socket.

5 Circuit Diagram









6 Disclaimer

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Document History and Modification

Rev. No	Chapter	Description of Modification/Changes	Name	Date
0.0	All	Basic Description	Möller	08-Dec-06
1.0	All	Complete review	Möller	19-Jan-07
1.1	All	Hardware Revision 1.1	Möller	05-Feb-07

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No.:	Date:	Signature:

Department:	Date:	Signature:
BST/ENG	05.02.2007	*Möller, BST/ENG*