Description

The ZWIR4532 Development Kit is a set of three circuit boards intended as an evaluation and application development platform for the ZWIR4532 6LoWPAN module. Each Development Board provides an USB interface and an optional single Ethernet interface to connect with the user's PC. The USB is used as a virtual COM port and provides the power supply for JTAG programming and debugging. The Ethernet interface is provided to easily integrate the 6LoWPAN network into existing network infrastructure. Push buttons and LEDs are available as an on-board user interface. The application circuitry can be easily prototyped.

The Development Kit provides firmware libraries and example programs. Firmware libraries include an operating system, IDT's mesh-routing-enabled 6LoWPAN stack, IP-Security (IPSec) and Internet Key Exchange version 2 (IKEv2) protocol support, as well as support for over-the-air (OTA) updates and different peripheral libraries. Ethernet gateway firmware is provided with the kit, allowing transparent integration of sensor networks into existing Ethernet networks.

Kit Contents

- 3 ZWIR4532 development boards
- 3 HS3001 Humidity and Temperature sensors
- 3 USB to Micro USB cables
- 3 antennas
- 1 Ethernet adapter

Features

- IDT SensorShare firmware libraries and example programs
- License-free 868/915 MHz frequency bands
- IPv6 module addressing
- 4 channels in EU mode; 10 channels in US mode
- Over-the-air update (OTAU) functionality
- Mesh connectivity
- HS3001 Humidity and Temperature Sensor with I2C interface in the Sensor Cube
  - RH accuracy: ±1.5% RH typical (10% to 90% RH, 25°C)
  - Fast RH response time (typical: 6 seconds)
  - Temperature sensor accuracy: ±0.2°C (typ.) at -10°C to +80°C
- Related datasheets are available online:
  - ZWIR4532: www.idt.com/ZWIR4532
  - HS3001: www.idt.com/HS3001
  - ENC28J60H Ethernet Adapter https://www.olimex.com/Products/Modules/Ethernet/ENC28J60-H/resources/ENC28J60-H.pdf
  - Microchip AT86RF212 Transceiver http://ww1.microchip.com/downloads/en/DeviceDoc/doc8168.pdf
  - ST Micro STM32L071 MCU https://www.st.com/resource/en/datasheet/stm32l071v8.pdf

Important Notes

Disclaimer

Integrated Device Technology, Inc. and its affiliated companies (herein referred to as "IDT") shall not be liable for any damages arising out of defects resulting from

(i) delivered hardware or software

(ii) non-observance of instructions contained in this manual and in any other documentation provided to user, or

(iii) misuse, abuse, use under abnormal conditions, or alteration by anyone other than IDT.

TO THE EXTENT PERMITTED BY LAW, IDT HEREBY EXPRESSLY DISCLAIMS AND USER EXPRESSLY WAIVES ANY AND ALL WARRANTIES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, STATUTORY WARRANTY OF NON-INFRINGEMENT, AND ANY OTHER WARRANTY THAT MAY ARISE BY REASON OF USAGE OF TRADE, CUSTOM, OR COURSE OF DEALING.

Restrictions in Use

IDT's SDAWIR03 Demonstration Kit, consisting of the 6LoWPAN-WiFi Hub, Sensor Cube(s), AC/DC Wall Mount Adapters, Hose; USB and HDMI adapters, and the IDT Demo Software, are designed to provide a quick setup for taking Flow, RH%, and temperature measurements with the FS2012 and HS3001 only. IDT's SDAWIR03 Demonstration Kits and IDT Demo Software must not be used for any mission-critical applications, end-customer products, or measurement reference source.

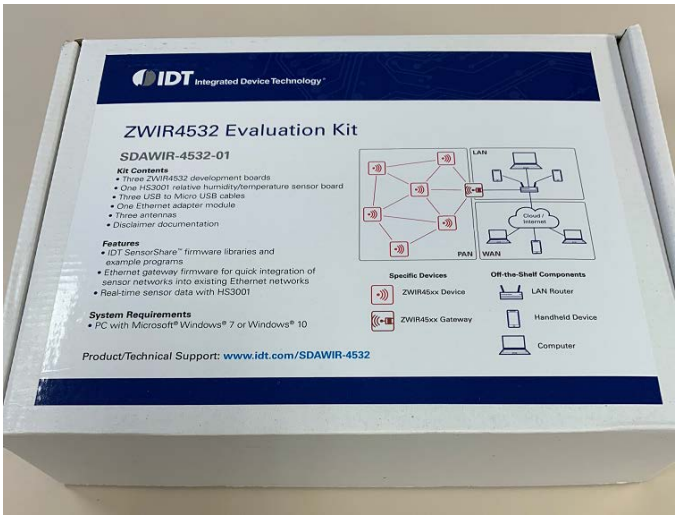
Important Safety Warning: These procedures can result in high currents, which can cause severe injury or death and/or equipment damage. Only trained professional staff should connect external equipment and operate the software.

Important Equipment Warning: Ensure the correct connection of all cables. Supplying the board using the wrong polarity could result in damage to the board and/or the equipment. Check that all jumpers have been removed from the board before applying power.

Contents

List of Figures

1. ZWIR4532 Evaluation Kit Components



2. Setup

2.1 Computer Requirements

Windows 7, Windows 8 and Windows 10; 32-bit and 64-bit are supported. The selection of the development program may limit these choices.

2.2 Setting the Evaluation Kit to Interface the Computer

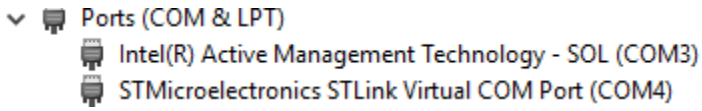
The connection to the evaluation kit is via the computers USB port operating as a serial COMx device. This driver needs to be installed prior to plugging this Evaluation Kit into the PC. ST Micro provides the driver to do this.

1. Connect to www.st.com.
2. In search tab in the upper right corner enter ST-LINK/V2.
3. Click on the STSW-LIN009 option.
4. On the bottom of the page, select the Get Software option and follow the instructions.
5. ST Micro will ask for some information to execute the download.
6. Unzip the download.
7. Execute the resulting .bat file to permit installing the correct version (32-bit or 64-bit).

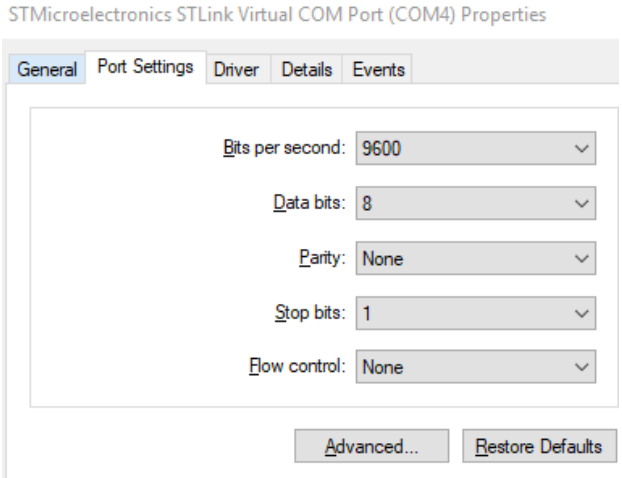
When the evaluation kit is plugged into the PC, the COM LED on the Programming Link part of the board will illuminate:

- Flashing indicates the USB connection is not correct
- Continuously on indicates a working USB connection

The Control Panel and the Device Manager option on the PC will show the connection and the COM port being used. For example, this shows a COM4 connection:

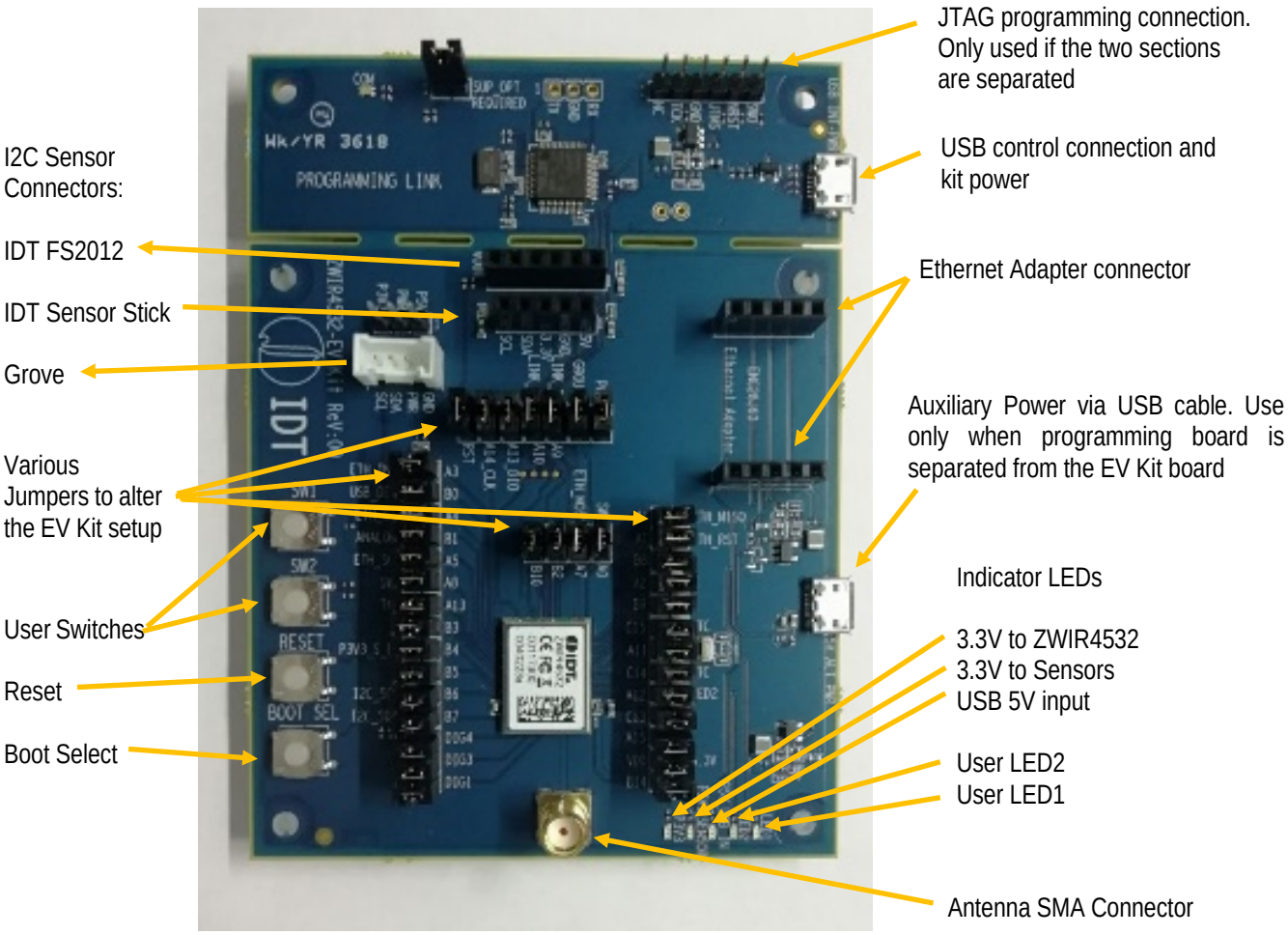


Typical port settings will default to:



2.3 Evaluation Kit Board Connections

Figure 1. Evaluation Kit Board Connections



2.3.1 Antenna

The antenna is to be 50Ω and examples are supplied in the evaluation kit. There is no matching network on the evaluation kit PCB if matching is needed for other antennas–this has to be done after the SMA connector.

2.3.2 Ethernet Connector

The ZWIR4532 accepts the Ethernet expansion module ENC28J60-G (supplied in the evaluation kit).

Ethernet Connector				
Pin	Function	Via Jumper	ZWIR4532 Pad	Function
J18-1	SCK	J27	16	A5
J18-2	MOSI	J29	34	A7
J18-3	MISO	J28	33	A6
J18-4	WOL	NC	---	---
J18-5	INT	J26	14	A3
J19-5 (6)	CLKOUT	NC	---	---
J19-4 (7)	CS	J25	14	A4
J19-3 (8)	RST	J24	6	A1
J19-2 (9)	GND	---	---	---
J19-1 (10)	3.3V	---	---	---

2.3.3 FS2012 Flow Sensor

FS2012 Flow Sensor				
Pin	Function	Via Jumper	ZWIR4532 Pad	Function
J20-1	VDD 5V (USB)	---	---	---
J20-2	I2C – SDA	J12	43	B7
J20-3	I2C – SCL	J11	42	B6
J20-4	GND	---	---	---
J20-5	NC	---	---	---
J20-6	VOUT	Resistors R22, R23; J34	38	B1

2.3.4 IDT Sensor Stick

IDT Sensor Stick				
Pin	Function	Via Jumper	ZWIR4532 Pad	Function
J36-1	VDD 5V (USB)	---	---	---
J36-2	GND	---	---	---
J36-3	3.3V Sensors	---	---	---
J36-4	I2C – SDA	J12	43	B7
J36-5	I2C – SCL	J11	42	B6
5	NC	---	---	---

2.3.5 Grove Sensor

Grove Sensor				
Pin	Function	Via Jumper	ZWIR4532 Pad	Function
J21-1	I2C – SCL	J11	42	B6
J21-2	I2C – SDA	J12	43	B7
J21-3	VDD 5V (USB) or 3.3V Sensor	J55 (next to connector)	---	---
J21-4	GND	---	---	---

2.3.6 User Switch Connections

Switch	Function	Via Jumper	ZWIR4532 Pad	Function
SW1	N.O. to GND Soft pull-up to 3.3V	J33	11	A9
SW2	N.O. to 3.3V Soft pull-down to GND	J43	7	A0

2.3.7 Reset and Boot Select Switch

Switch	Function		ZWIR4532 Pad	Function
SW3	RESET	N.O. to GND	8	RST
SW4	BOOT_SEL	N.O. to 3.3V	13	BSEL

2.3.8 User LED Connections

LED	Function	Via Jumper	ZWIR4532 Pad	Function
LED1	High Level is LED ON	J31	30	A11
LED2	High Level is LED ON	J43	29	A12

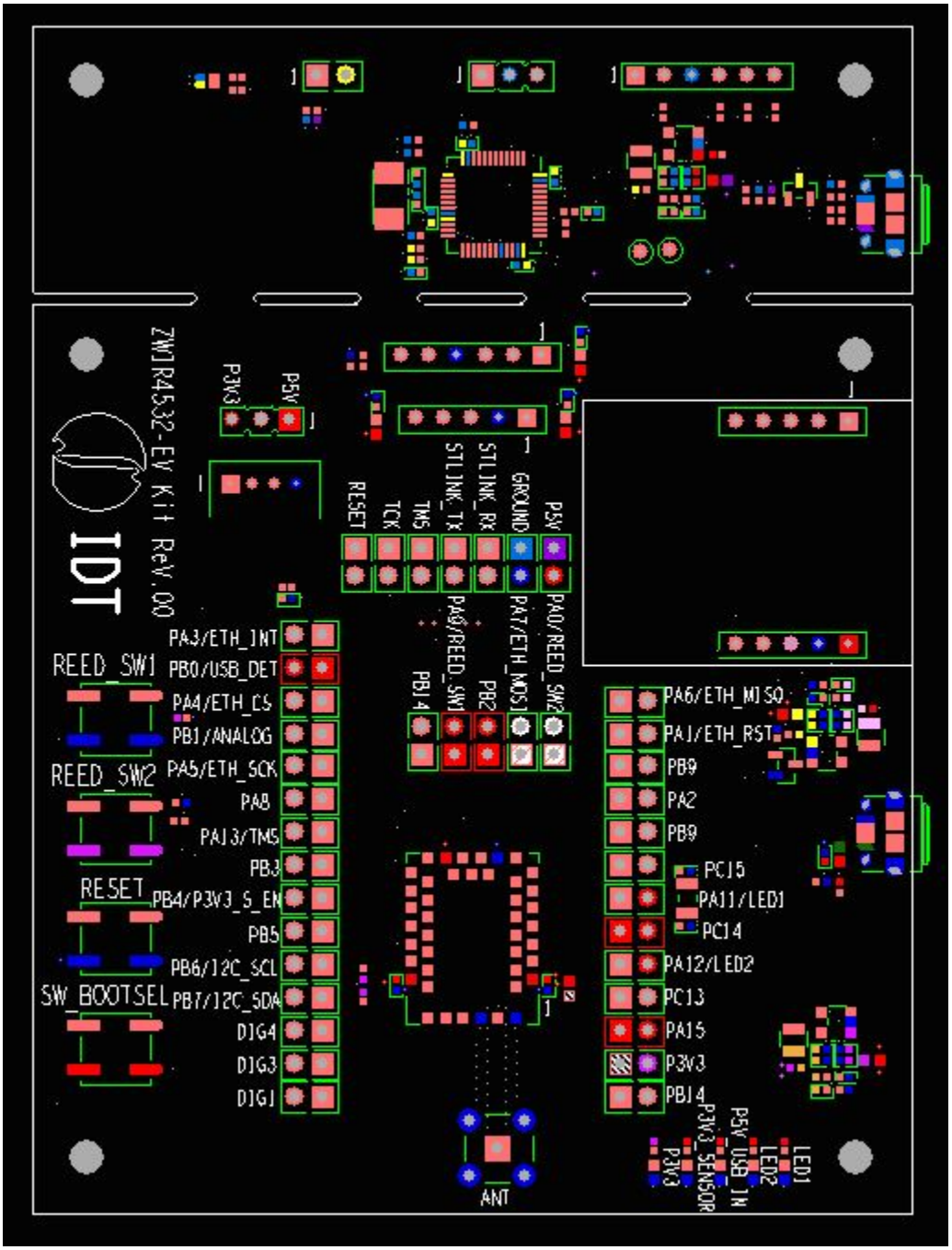
2.3.9 Miscellaneous Jumpers

Signals which are not committed to a function are connected to dual-row jumpers. The pin not connected to the ZWIR4532 is a no connection.

Jumper	ZWIR4532 Pad	Function
J30	23	DIG1
J41	22	DIG3
J56	21	DIG4
J39	5	A2
J45	28	A15
J46	35	B2
J47	40	B3
J10	19	B5
J48	32	B8
J49	31	B9
J50	36	B10
J51	27	B14
J52	2	PC13
J7 (connects 32.768kHz time crystal)	3	PC14
J8 (connects 32.768kHz time crystal)	4	PC15

2.3.10 Jumper Locations on the PCB

Figure 2. Jumper Locations

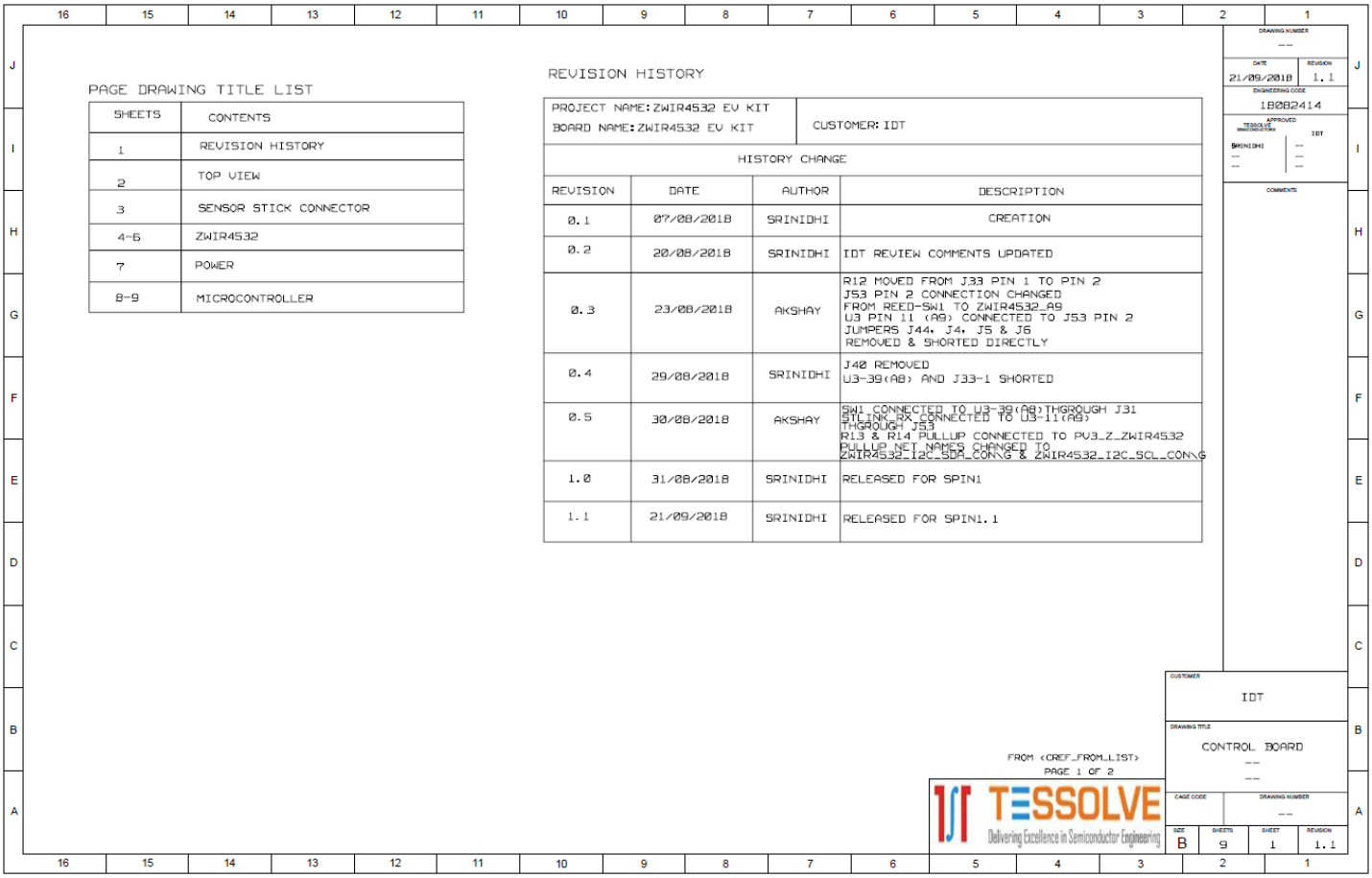


2.4 Kit Power-Off and Operation

The ZWIR4532 evaluation kit will show as a USB connected item. It is best to do a USB eject of the device and then extract the USB cable from the PC.

If the evaluation kit boards have been separated and the Auxiliary USB power connector is being used (no true USB connection to the PC), simply unplug the cable to power off the evaluation kit.

3. Schematics



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3	SENSOR STICK CONNECTOR
4-6	ZWIR4532
7	POWER
8-9	MICROCONTROLLER

REVISION HISTORY

PROJECT NAME: ZWIR4532 EV KIT BOARD NAME: ZWIR4532 EV KIT		CUSTOMER: IDT	
HISTORY CHANGE			
REVISION	DATE	AUTHOR	DESCRIPTION
0.1	07/08/2018	SRINIDHI	CREATION
0.2	20/08/2018	SRINIDHI	IDT REVIEW COMMENTS UPDATED
0.3	23/08/2018	AKSHAY	R12 MOVED FROM J33 PIN 1 TO PIN 2 J53 PIN 2 CONNECTION CHANGED FROM REED-SW1 TO ZWIR4532_A9 U3 PIN 11 (A9) CONNECTED TO J53 PIN 2 JUMPERS J44, J4, J5 & J6 REMOVED & SHORTED DIRECTLY
0.4	29/08/2018	SRINIDHI	J40 REMOVED U3-39(A8) AND J33-1 SHORTED
0.5	30/08/2018	AKSHAY	SW1 CONNECTED TO U3-39(A8)THGROUGH J31 STLINK_RX CONNECTED TO U3-11(A9) THGROUGH J53 R13 & R14 PULLUP CONNECTED TO PV3_Z_ZWIR4532 PULLUP NET NAMES CHANGED TO ZWIR4532_I2C_SDA_CONVG & ZWIR4532_I2C_SCL_CONVG
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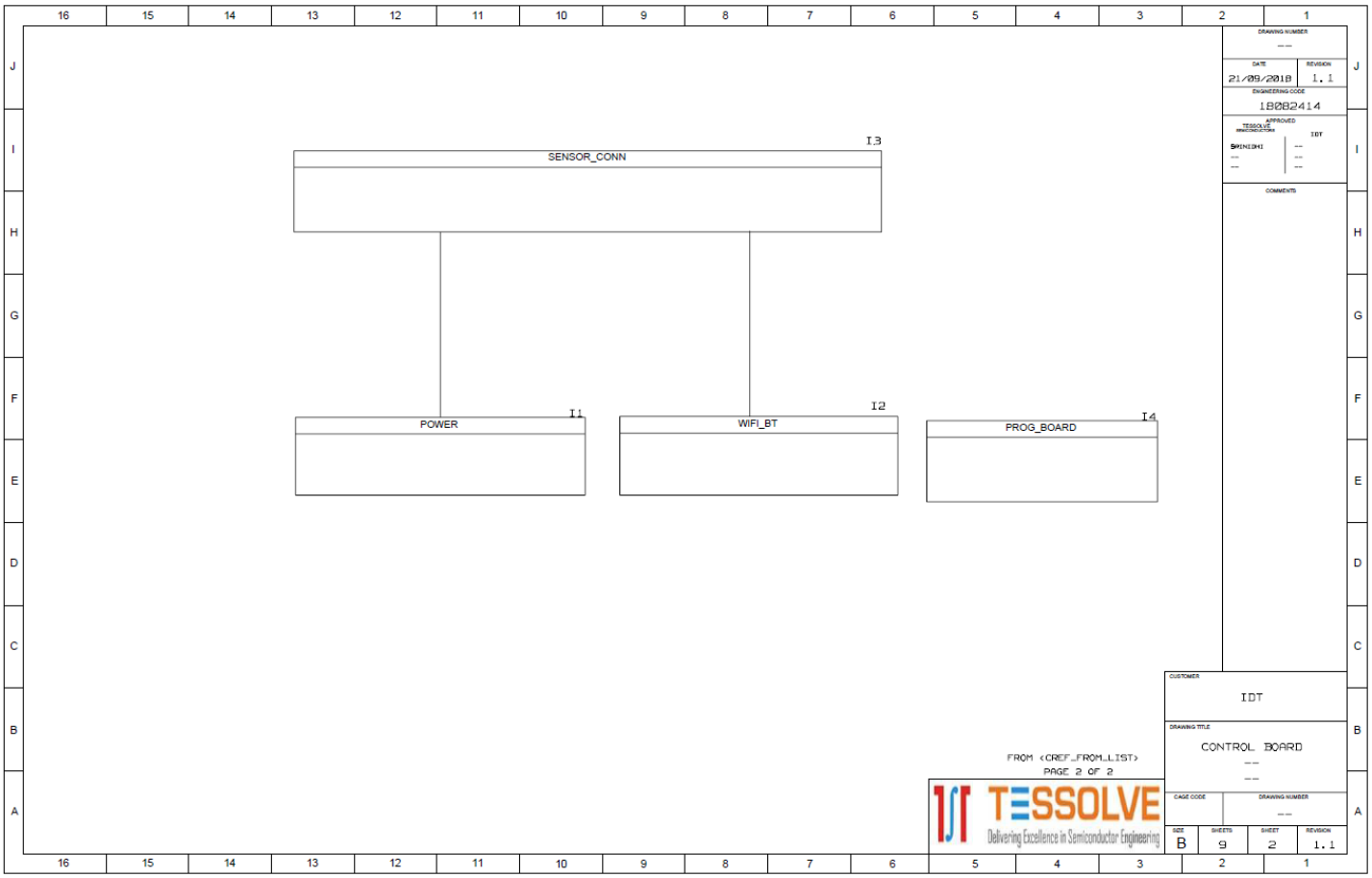
1.1	21/09/2018	SRINIDHI	RELEASED FOR SPIN1.1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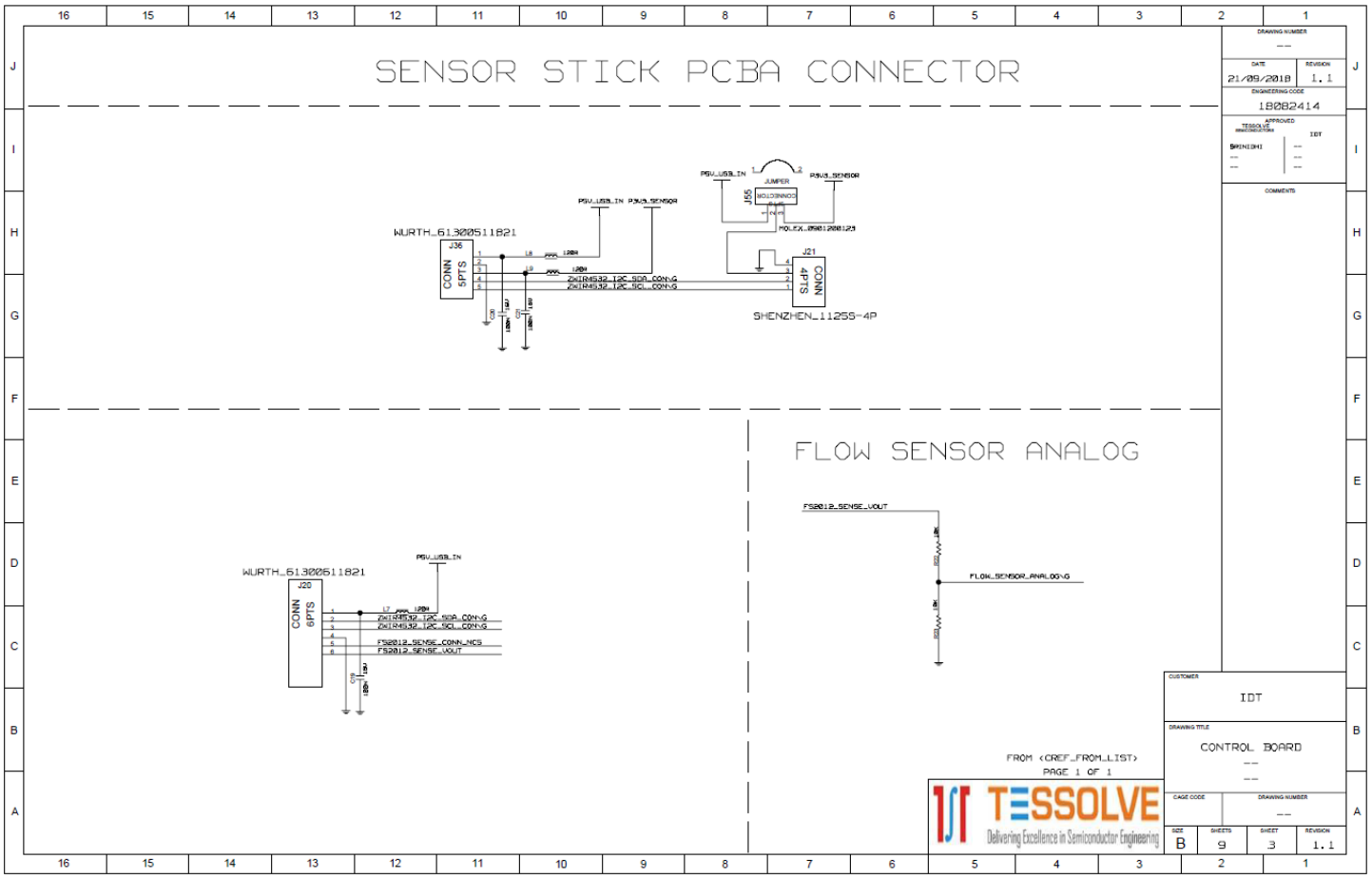
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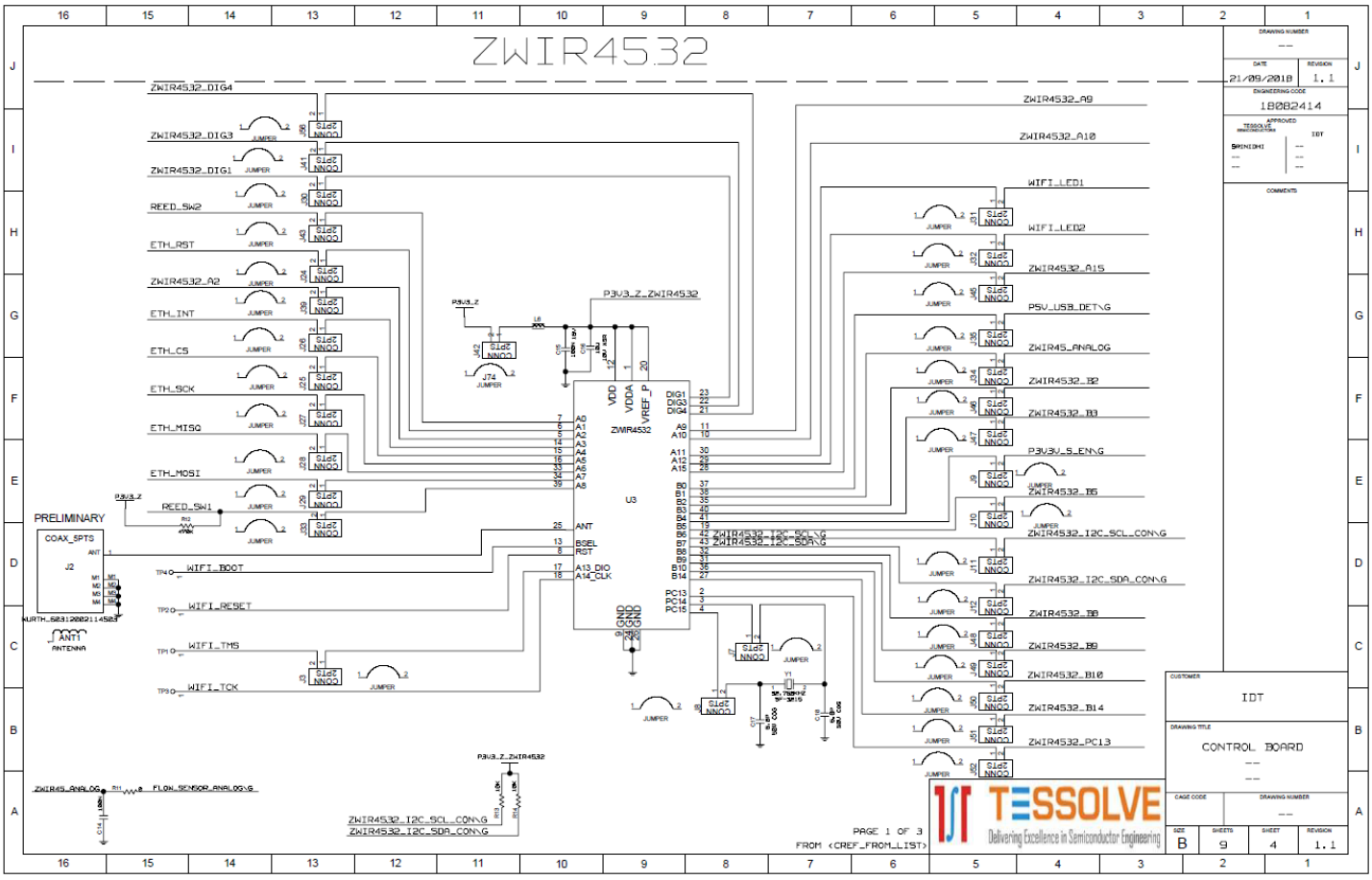
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ETH_CS
ETH_SCK
ETH_MISO
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REED_SW1
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ANT
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A14_CLK
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ZWIR45_ANALOG
ZWIR4532_B2
ZWIR4532_B3
P3V3V_S_EN\G
ZWIR4532_B6
ZWIR4532_I2C_SCL_CON\G
ZWIR4532_I2C_SDA_CON\G
ZWIR4532_B8
ZWIR4532_B9
ZWIR4532_B10
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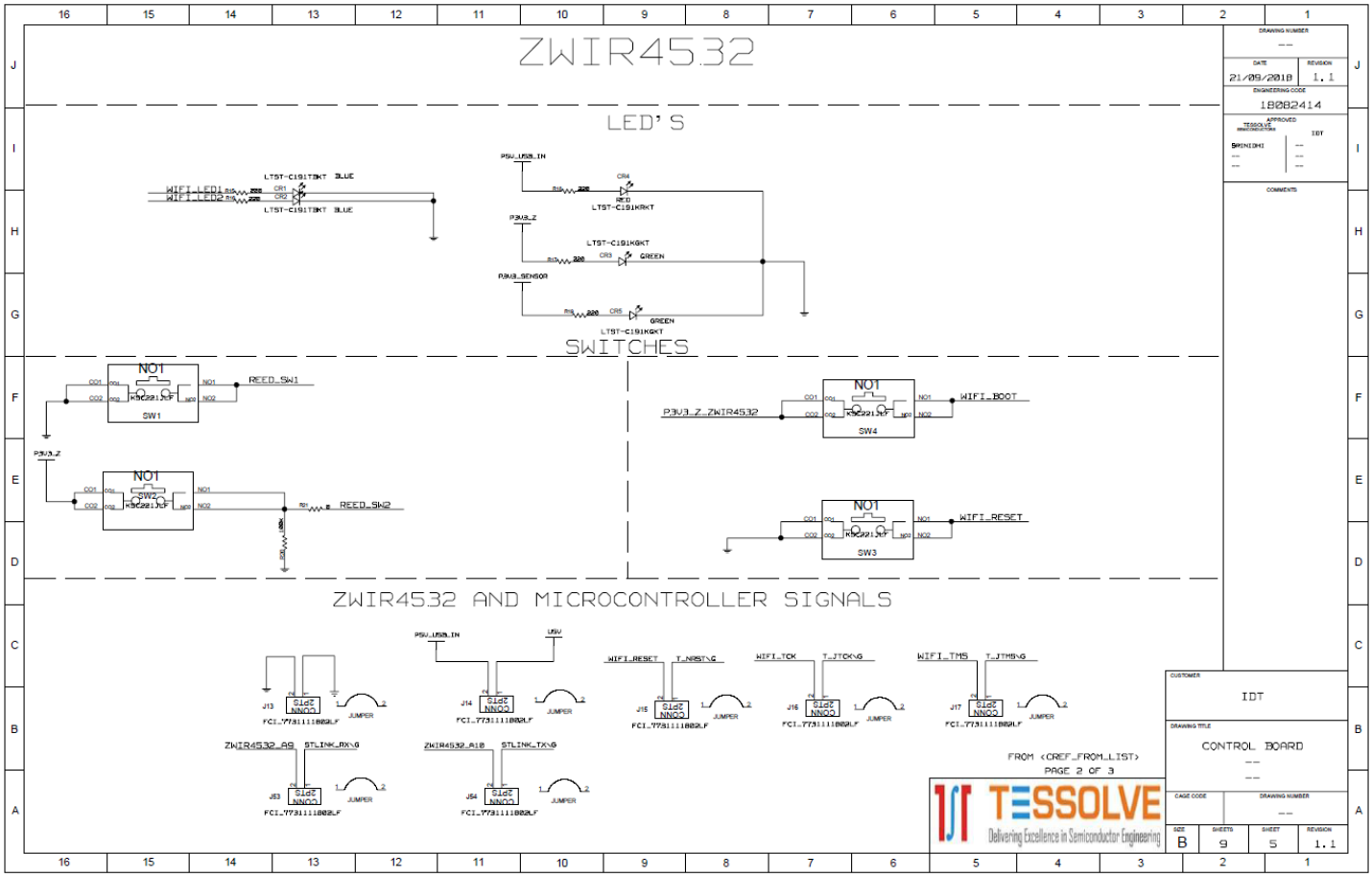
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ZWIR4532 AND MICROCONTROLLER SIGNALS
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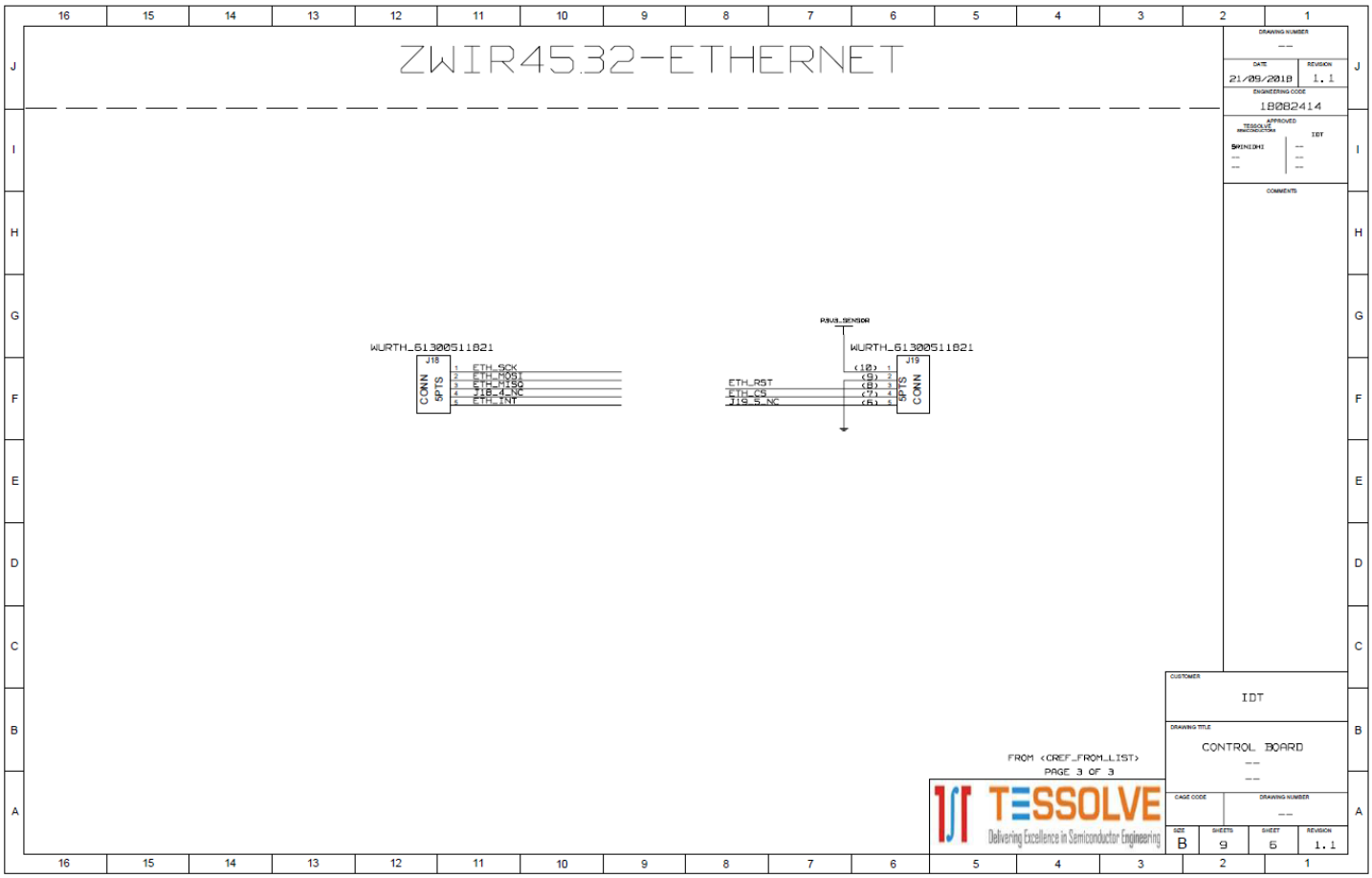
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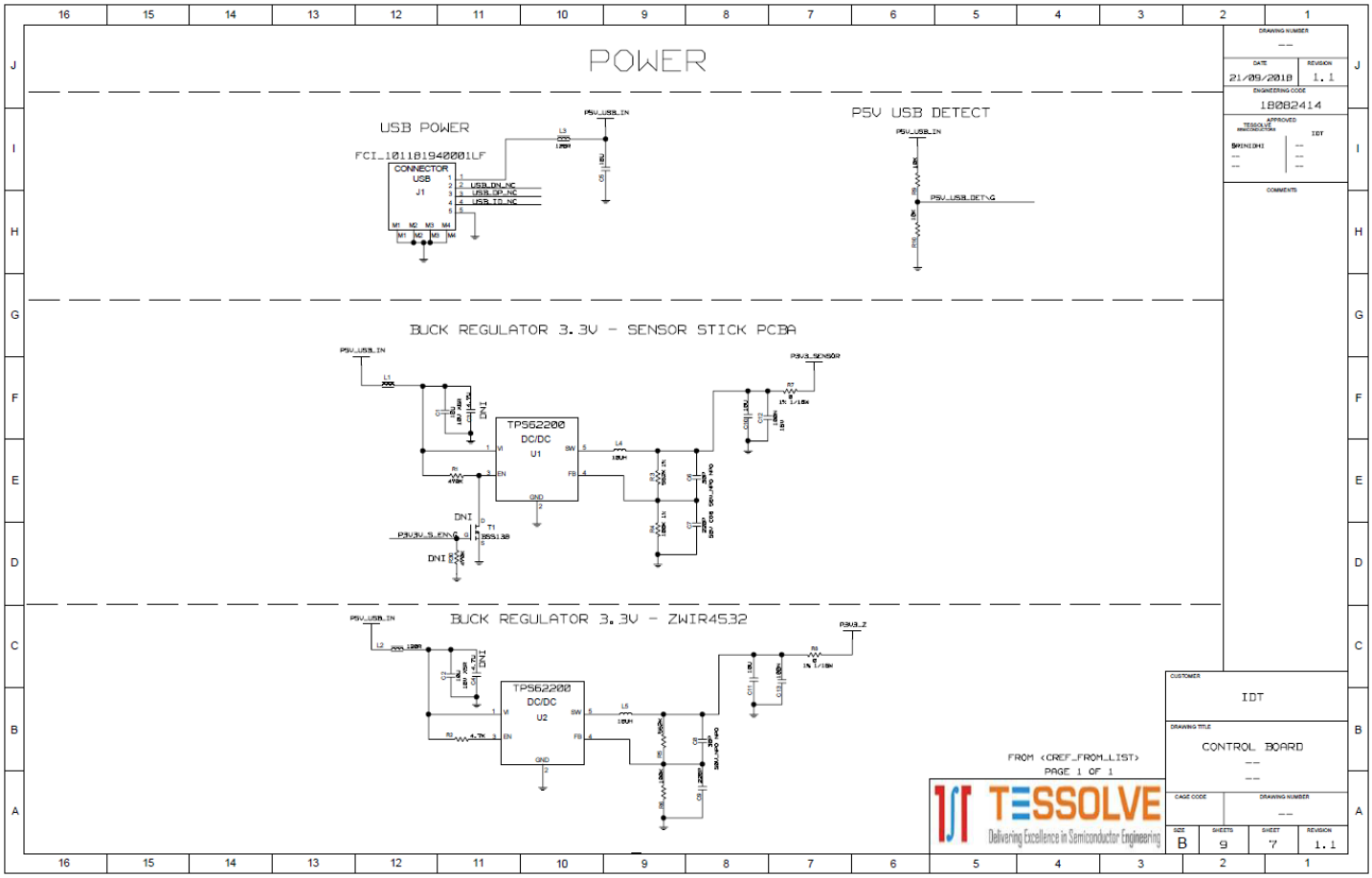
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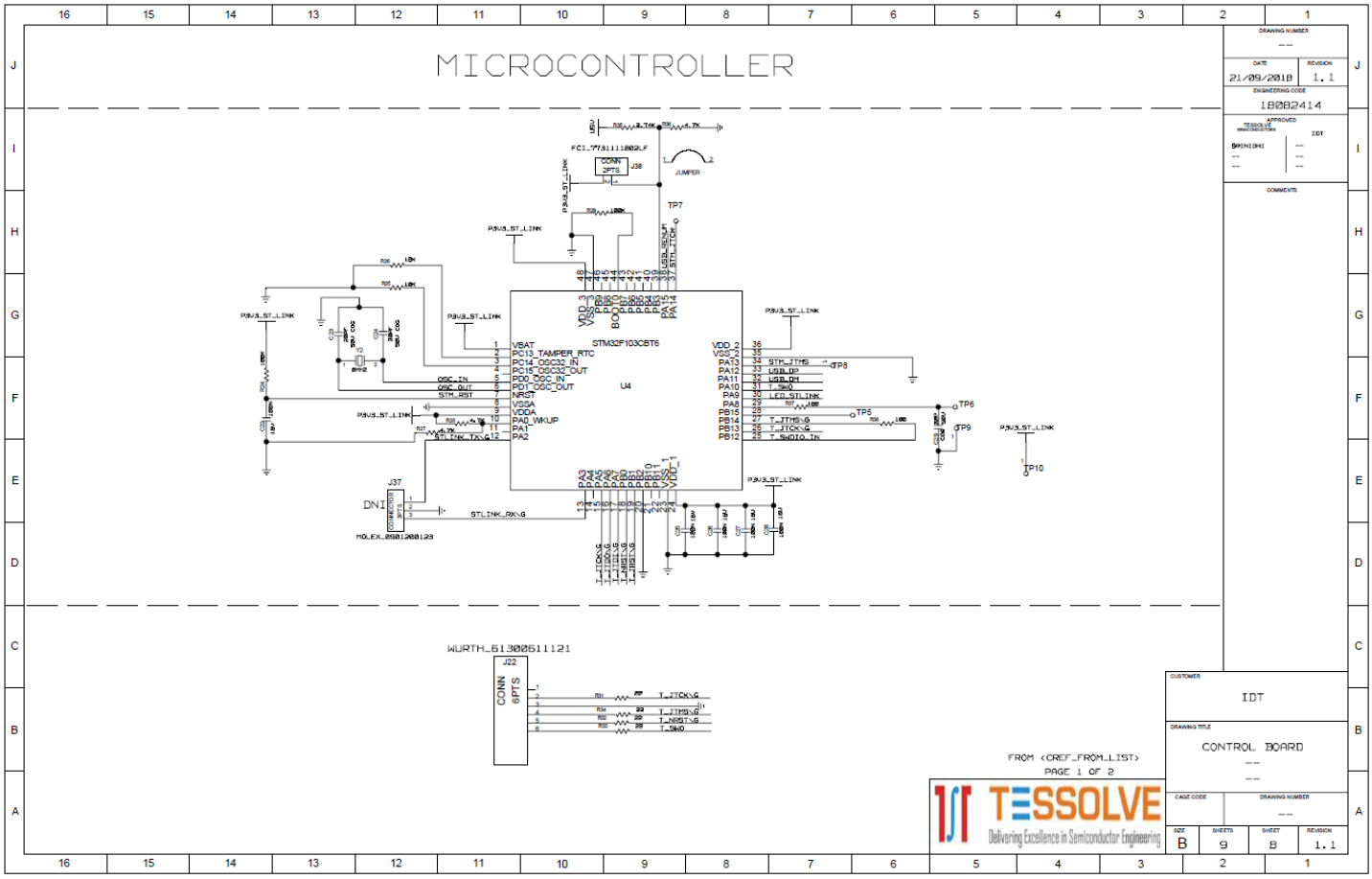
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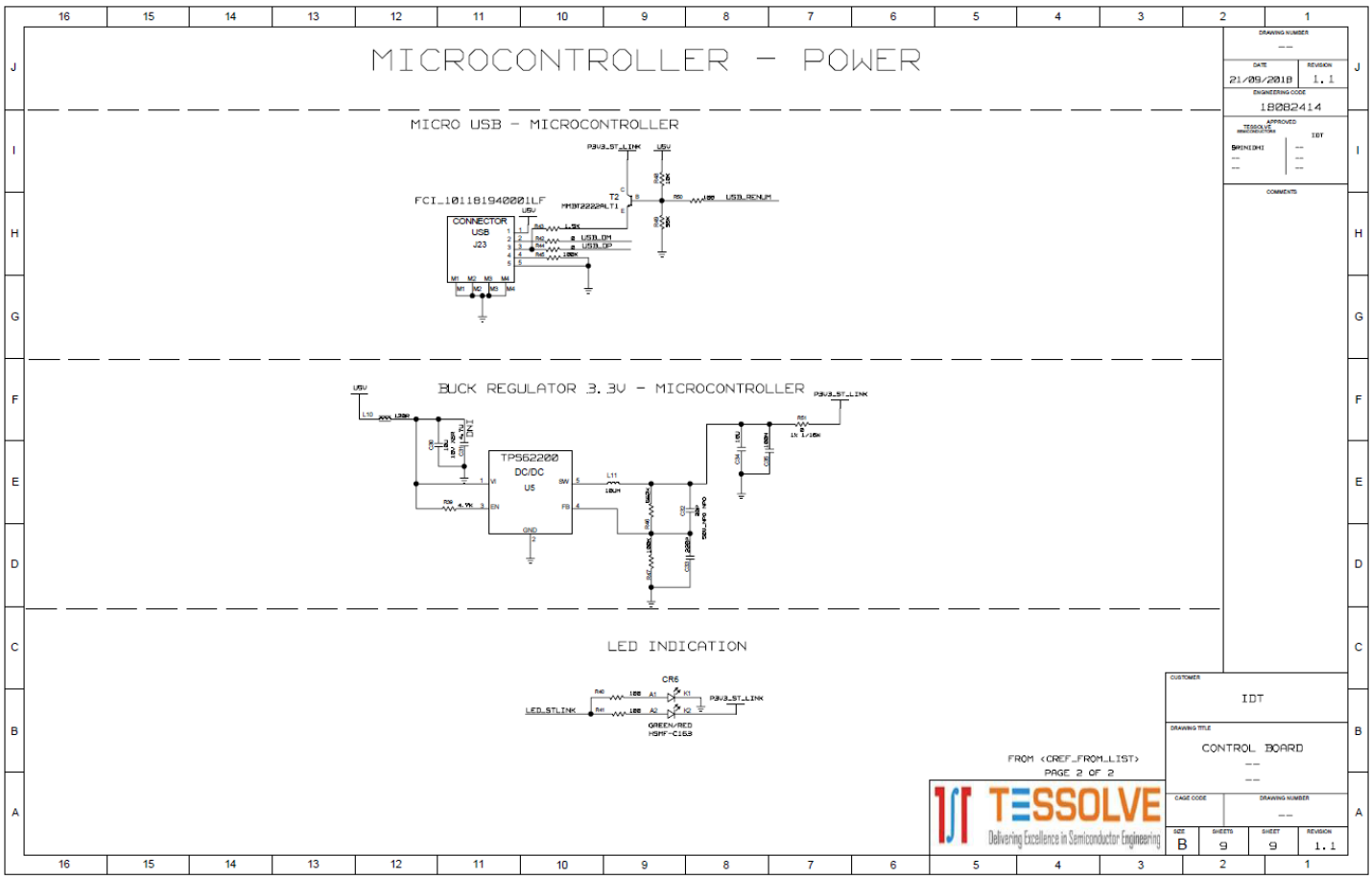
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4. Integrated Development Environment (IDE) Setup and Configuration

This document assumes Rowley CrossWorks for ARM is a commercial toolchain available for Windows and Linux. It provides an integrated development environment (IDE) and a debugger. IDT provides board support packages for ZWIR45xx modules to allow for quick and easy project setup.

4.1 Download Required Files

1. Download CrossStudio from https://www.rowley.co.uk/arm/index.htm.
2. Download ZWIR4532 Firmware Package.zip from IDT.com and unzip to a directory of your choice.
3. Download ST-Link Drivers from ST.com.

4.2 Installing CrossWorks for ARM and Obtaining an Evaluation License

1. Run the installation. Note that the installation requires administrator privileges.
2. Start the CrossStudio IDE.
3. From the main menu bar, select “Tools” → “License Manager”.
4. Choose “Evaluate Crossworks”.
5. Select “Primary operating system disk” as the item to which to lock your license.
6. Click on the “Send e-mail” button and wait for reception of your activation key by email –note that this may take some time.
7. After reception of the activation, copy the email contents to the clipboard.
8. Go back to CrossStudio and open the License Manager again.
9. Choose “Activate CrossWorks”.
10. Paste the clipboard contents in the “Enter activation key” textbox (usually the clipboard content is already there).
11. Click on “Install License”.
12. Click “Close”.

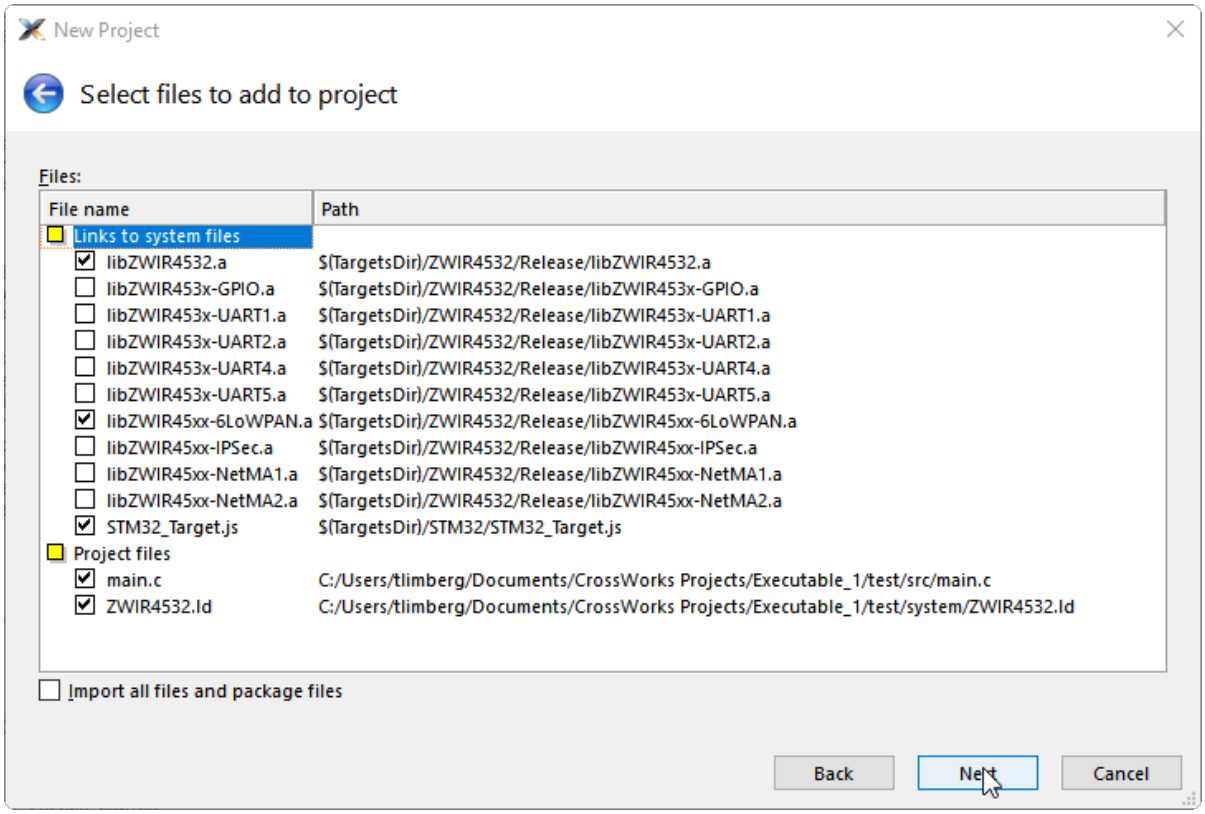
4.3 Setting Up Required Libraries and the ZWIR4532 Board Support Package

1. From the main menu bar, select “Tools” → “Package Manager”.
2. Find the “STM32 CPU Support Package” and mark for installation by double-clicking or right-clicking and “Install Selected Package”.
3. Click “Next” button twice followed by “Finish”.
4. From the main menu bar, select “Tools” → “Packages” → “Manually Install Packages…”.
5. Navigate to the directory where the ZWIR4532 Firmware Package has been unzipped.
6. Select the “ZWIR4532 Board Support Package” and click open.

5. Hello World Test Program

5.1 Creating a New Project

1. From the main menu, select “File” → “New Project”.
2. Select “6LoWPAN project template for ZWIR4532 modules”.
3. Modify the project name and chose a directory where the project will be stored.
4. Click “Next”.
5. Select/deselect libraries as shown below and click “Next”.
6. Click “Finish”.



5.2 Compiling, Loading and Executing the Project

1. The project generated above already includes some functional code that may be left unchanged for this test.
2. Compile the project by pressing “F7” or right-click on the project name in the project explorer and select “Build”.
3. Ensure the development kit is connected through the programming link USB connector.
4. From the main menu, select “”Target” → “Connect” → “STLink/V2”.
5. Press “F5” to load and execute the program.
6. The program will be loaded on the module, start running and stop at function ZWIR_AppInitHardware. Press F5 to continue execution.
7. CrossStudio will show a “Debug Terminal” which displays the outputs of the certain debug_printf functions in the code.

6. Ordering Information

Orderable Part Number	Description
SDAWIR-4532-01	The demonstration kit to develop applications for the ZWIR4532 6LoWPAN module.

7. Revision History

Revision Date	Description of Change
November 1, 2018	Initial release.

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