



# Inventek Systems

Embedding Connectivity Everywhere

## **eS-WiFi Module Evaluation Board**

### **'Embedded Serial-to-WiFi'**

User Manual

**Inventek System, Inc.  
User Manual Set Copyright and Company Information****Contact Information:****Telephone: +1 978-667-1962****Fax : 1 978-667-1949****Location/Mailing Address:****Inventek Systems  
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Embedding Connectivity Everywhere!  
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At Inventek Systems we pride ourselves in being a USA-based, full service GPS and Wi-Fi company. While GPS modules and GPS antennas has been our primary focus, we are expanding to provide a full line of Wi-Fi products. We also provide complete GPS services from consulting to custom design, manufacturing and training.

For more information, call 978-667-1962 or email [Sales Support](#) or [Technical support](#)

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**Hours of Operation****Monday - Friday****U.S. EST 08:00 a.m. - 05:00 p.m.****Send E-mail inquiries to:****Sales Support:**[Sales@inventeksys.com](mailto:Sales@inventeksys.com)**Support:**[Engineering@inventeksys.com](mailto:Engineering@inventeksys.com)

## Evaluation Board User Manual Table of Contents

### Table of Contents

<b>1.0 SCOPE .....</b>	<b>4</b>
1.1 SUPPORTED PRODUCT VERSIONS	4
5.6.1.2	4
<b>2.0 ORDERING INFORMATION .....</b>	<b>5</b>
2.1 REGULATORY COMPLIANCE	5
FCC USERS MANUAL STATEMENTS:	6
INDUSTRY CANADA USERS MANUAL STATEMENTS:	8
<b>3.0 HARDWARE INTERFACE AND MODULE OPERATION.....</b>	<b>9</b>
3.1 CONNECTOR PIN DETAIL	11
3.2 CONNECTOR J12 - EXPANSION HEADER	12
3.3 CONNECTOR J11 - JTAG	12
3.4 CONNECTOR J8 - JTAG SELECT	13
3.5 CONNECTOR J5 - USB RESET (FUTURE)	13
3.6 CONNECTOR J7 - EXTERNAL POWER	13
3.7 CONNECTOR J9 - USB (VIRTUAL SERIAL PORT(VSP)/JTAG/POWER)	13
3.8 CONNECTOR J10 (FUTURE)	13
<b>4.0 POWER SUPPLY .....</b>	<b>14</b>
4.1 RS-232 SERIAL COMMUNICATION	14
4.2 FLOW CONTROL	14
4.3 SUPPORTED BAUD RATES	14
4.4 DEFAULT SERIAL CONFIGURATION	14
<b>5.0 GETTING STARTED .....</b>	<b>15</b>
<b>6.0 EVB TOP LEVEL SCHEMATIC (PAGE 1 OF 2) .....</b>	<b>18</b>
6.1 EVB TOP LEVEL SCHEMATIC (PAGE 2 OF 2)	19
6.2 USB TO UART	20
6.3 CONNECTING MICROCONTROLLER TO ES-WiFi UART	21
6.4 JTAG AND RESET CONNECTIONS	22
6.5 ES-WiFi PROGRAMMING OPTIONS	23
6.6 ES-WiFi USB DIRECT CONNECTION OPTION	23
6.7 ES-WiFi TEST POINTS AND SENSOR INPUTS	24

## 1.0 Scope

The scope of this document is to introduce users to Inventek Systems' evaluation board for the family of eS-WiFi Module products, and to explain how to take use the platform.

The es-Wifi evaluation board is designed as a complete development platform of the Inventek es-WiFi serial to Wi-Fi modules. The input to the modules can be UART, SPI or USB, however this document focus only on the UART interface. The evaluation board is designed for the 44 pin LGA module with a variety of Cortex M3 microcontrollers (See Section 1.2), with integrated etch antenna, ceramic antenna or external antenna. All three antenna configurations have passed FCC and CE testing.



1.1

**Supported Product Versions**

This document covers the following currently available eS-WiFi modules:

- |                   |  |
|-------------------|--|
| ISM4319-M3-L44-C  | (Ceramic Antenna w/ STM32F103)                     |
| ISM4319-M3-L44-E  | (Printed Micro-strip Antenna w/ (STM32F103)        |
| ISM4319-M3-L44-U  | (U.FL Connector to external antenna w/ (STM32F103) |
| ISM4319-M3E-L44-E | (Printed Micro-strip Antenna w/ STM32F205RE)       |
| ISM4319-M3G-L44-E | (Printed Micro-strip Antenna w/ STM32F205RG)       |

## 2.0 Ordering Information

Device	Description	Ordering Number
ISM4319-M3-EVB-E	ISM4319-M3-L44-E (etched antenna w/ Cortex M3 STMF103- 512K flash)	ISM4319-M3-EVB-E
ISM4319-M3-EVB-U/C	ISM4319-M3-L44-E (U.fl connector & Ceramic antenna w/ Cortex M3 STMF103- 512K flash)	ISM4319-M3-EVB-UC
ISM4319-M3G-EVB-E	ISM4319-M3-L44-E (etched antenna w/ Cortex M3 STMF205- 1M flash)	ISM4319-M3G-EVB-E

## 2.1 Regulatory Compliance



Regulator	Device ID
FCC	O7P-ISM4319F1
IC	10147A-ISM4319F1
CE	Compliant
RoHS	Compliant

The ISM4319F1 is the Inventek part number for the Broadcom BCM4319 Wi-Fi radio SIP.

## FCC Certification Requirements and Statements:

### OEM INSTRUCTIONS:

Installation: This module is limited to OEM installation only.

OEM integrators must ensure that the end-user has no manual instructions to remove or install the module.. OEM's must comply with FCC marking regulation part 15 declaration of conformity (Section 2.925(e)).

This module is to be installed only in mobile or fixed applications ( Please refer to FCC CFR 47 Part 2.1091(b) for a definition of mobile and fixed devices).

Separate approval is required for all other operating configurations, including portable configurations with respect to FCC CFR 47 Part 2.1093, and different antenna configurations.

The antenna used with this module must be installed to provide a separation distance of at least 20cm from all persons, and must not transmit simultaneously with any other antenna or transmitter, except in accordance with FCC multi transmitter product procedures.

The ISM4319 Module has been designed to operate with the following antennas and gains. Use with other antenna types or with these antenna types at higher gains is strictly prohibited.

Manufacturer	Type of Antenna	Model	Gain dB	Type of Connector
Inventek	U.FI port Antenna	W24-SSMA-M	2.15	Unique Connector
Pulse Technology	Surface Mount	W3043	1.85 (4 dBic)	Permanent integral
Inventek	Trace Antenna	NA	0	Permanent integral

**The Following FCC Information must be included in the end-user's operating manual:****FCC Notice-**

*This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this equipment not expressly approved by manufacturer could void the user's ability to operate the equipment.

A clearly visible label is required on the outside of the user's (OEM) enclosure stat the following text:

Contains FCC ID: O7P-ISM4319F1

Contains IC: 10147A-ISM4319F1

*This transmitter module has been certified for FCC Part 15 operation; when installed in a host device, the host manufacturer is responsible for making sure that the host device with the transmitter installed continues to be compliant with Part 15B unintentional radiator requirements.*

## Industry Canada User's Manual Statements:

### IC RSS-210/RSS-Gen Notices:

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le operation est soumise aux deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter toute interference, y compris les interferences qui peuvent causer un mauvais fonctionnement l'appareil.

Under Industry Canada Regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (eirp) is not more than necessary for successful communication. Antenna types not included in the list above, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device

Sous la réglementation d'Industrie Canada, ce transmetteur radio ne peut fonctionner en utilisant une antenne d'un type et un maximum (ou moins) gain approuvées pour l'émetteur par Industrie Canada. Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisis de manière que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie. Types d'antennes ne figurent pas dans la liste ci-dessus, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdites pour une utilisation avec cet appareil.



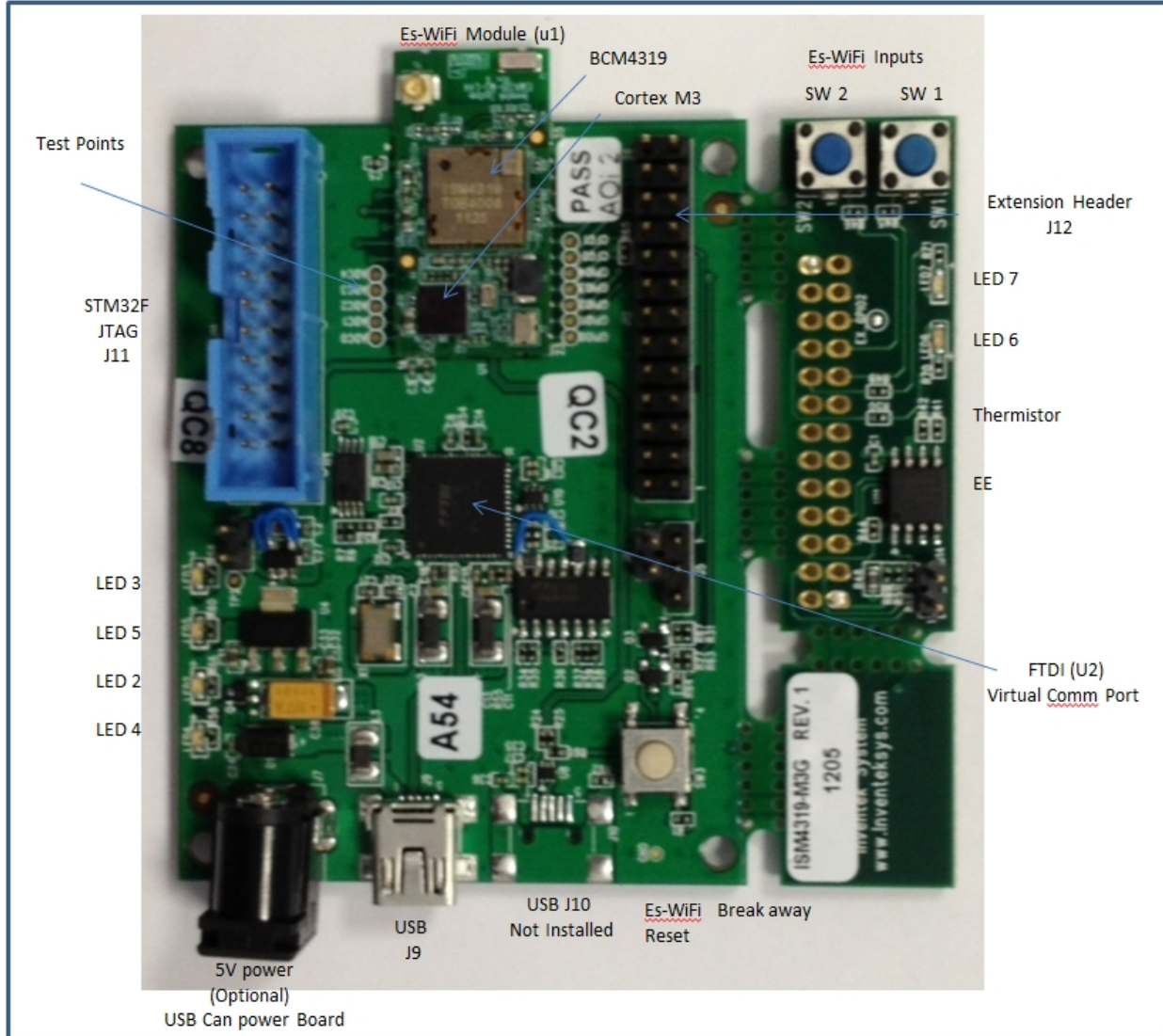
## 1.4. Complimentary Documentation

- ISM4319-M3-EVB Evaluation Board Specification
- AT Command set
- Es-WiFi Demo software (includes EVB Drivers)
- EVB Users Guide
- Quick Start Guide
- OrCAD Schematic Symbol
- PADS Land Pattern
- ISM4319 specification and Product Brief
- FCC Test Report
- NDA/ SLA documents

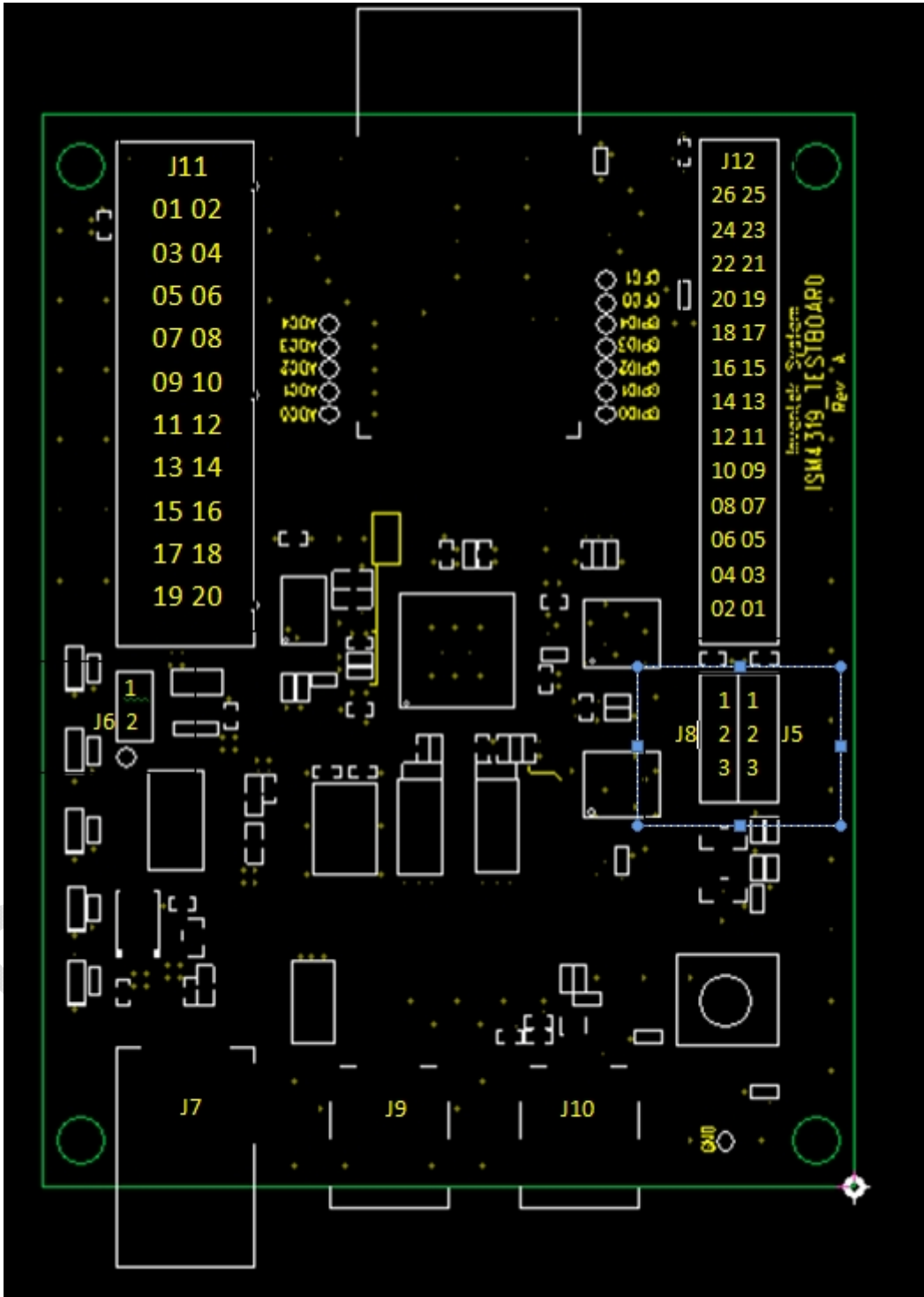
## 3.0 Hardware Interface and Module Operation

The eS-WiFi module supports RS-232 Serial Communications Universal Serial Bus (USB), and Serial Peripheral Interface Bus (SPI). A Micro-Controller or System Host can easily interface up to the eS-WiFi module using one of the support hardware interfaces.

The eS-WiFi module has two modes of operation: Human Readable Mode and Machine Readable Mode.



### 3.1 Connector Pin Detail



### 3.2 Connector J12 - Expansion Header

Signal	Pin	Pin	Signal
+3.3V	26	25	GND
CFG1	24	23	GND
CFG0	22	21	GPIO2
GPIO4	20	19	GPIO1
GPIO3	18	17	GPIO0
SPI_SS_L	16	15	SPI_SCK
SPI_MISO	14	13	SPI_MOSI
UART_RX	12	11	UART_TX
HEADER_SRST_L	10	09	WAKE_UP
GND	08	07	ADC4
ADC3	06	05	ADC2
ADC1	04	03	ADC0
<b>GND</b>	<b>02</b>	<b>01</b>	<b>+3.3V</b>

### 3.3 Connector J11 - JTAG

Signal	Pin	Pin	Signal
+3.3V	01	02	NC
JLINK_TRST_L	03	04	GND
JLINK_TDI	05	06	GND
JLINK_TMS	07	08	GND
JLINK_TCK	09	10	GND
GND	11	12	GND
JLINK_TDO	13	14	GND
JLINK_RESET	15	16	GND
NC	17	18	GND
NC	19	20	GND

### 3.4 Connector J8 - JTAG Select

Signal	Pin	Function
+3.3V	01	Via J9
JLINK_SELECT	02	Common
GND	03	Use J3

### 3.5 Connector J5 - USB Reset (Future)

Signal	Pin	Function
GPIO4	01	Enabled
USB RESET	02	Common
GND	03	Disabled

### 3.6 Connector J7 - External Power

Signal	Pin
+5.0V	Center
GND	Shield

### 3.7 Connector J9 - USB (Virtual Serial Port(VSP)/JTAG/Power)

Signal	Pin
USB_5V	01
D-	02
D+	03
NC	04
GND	05

### 3.8 Connector J10 (Future)

Signal	Pin
USB_5V	01
D-	02
D+	03
NC	04
GND	05

## 4.0 Power Supply

The es-WiFi evaluation board can be powered by either USB (Power) or external 5 V DC power adapters. It is recommended that you do not use both USB and external power, select one.

### 4.1 RS-232 Serial Communication

When the eS-WiFi module is interfaced serially, the serial interface needs to be configured for : 8 bit data, no parity, and one stop bit -- (8-n-1).

### 4.2 Flow Control

The eS-WiFi module doesn't require or support Flow Control, so Flow Control should be 'None'

### 4.3 Supported Baud Rates

The eS-WiFi module support the following serial baud rates:

1200  
2400  
4800  
9600  
19200  
38400  
57600  
115200  
230400  
460800  
921600

### 4.4 Default Serial Configuration

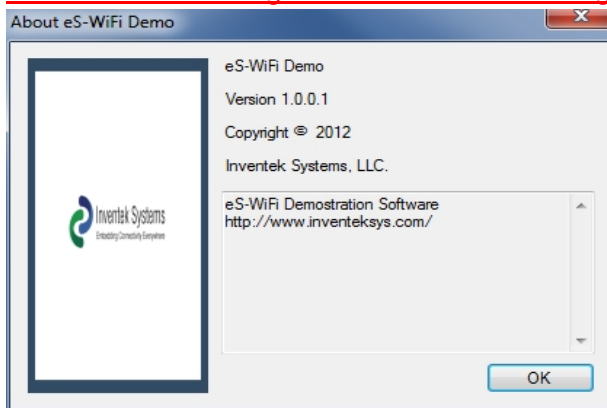
The eS-WiFi module is shipped with the default serial configuration of 115200 baud, 8 data bits, no parity, and 1 stop bits.

## 5.0 Getting Started

**5.1** Start the eS-WiFi Demo Software. This can be downloaded from the Inventek Systems web page or CD and contact sales for the password. Download the file, unzip and run as Administrator. The software will create an Inventek Systems folder under Program Files on a Windows 32 bit and Program Files (x86) folder on Windows 64 bit.

<http://www.inventeksys.com/products-page/wifi-eval-kits/ism4319-m3-l44-e-embedded-serial-to-wifi-module-duplicate/>.

**5.2** The Demo software package will create a folder on your PC, called Inventek Please visit the website for updated documents and software, [www.inventeksys.com](http://www.inventeksys.com). **Use the Inventek “es-WiFi Help document” for running the evaluation board along with the “AT Command Set document”.**



### 5.3 Install Drivers



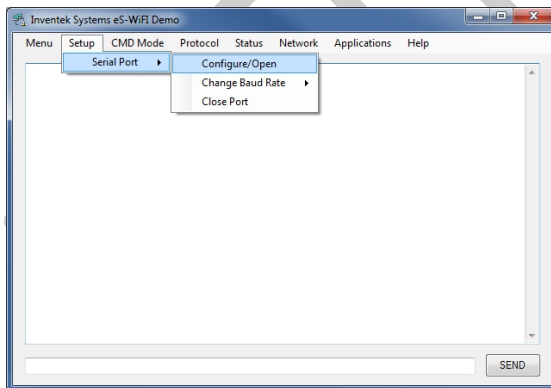
Check website for latest version of software

5.4 Connect the ISM4319-M3-EVB board to a USB port on your computer. Once the Install device driver software message have completed the EVB is ready for use.

Now that the drivers have been installed on your PC, plug the USB cable into USB (J9) located next to the power jack. You do not need DC power to run the evaluation. Power is provided by the USB port.



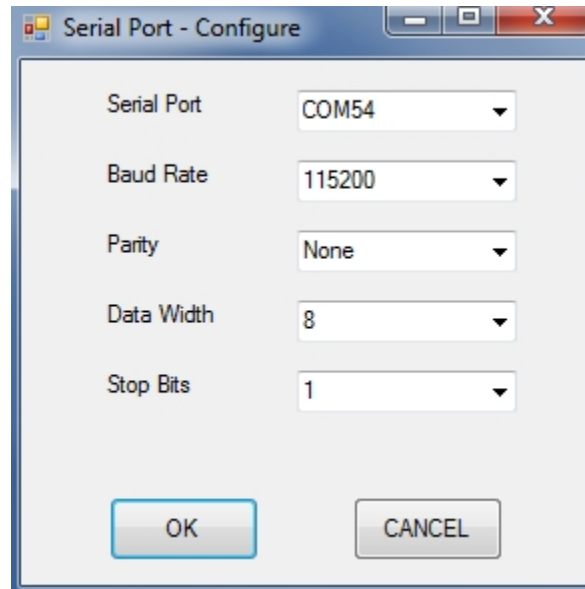
5.5 Connect to the board by selecting Setup > Serial Port > Configure/Open.



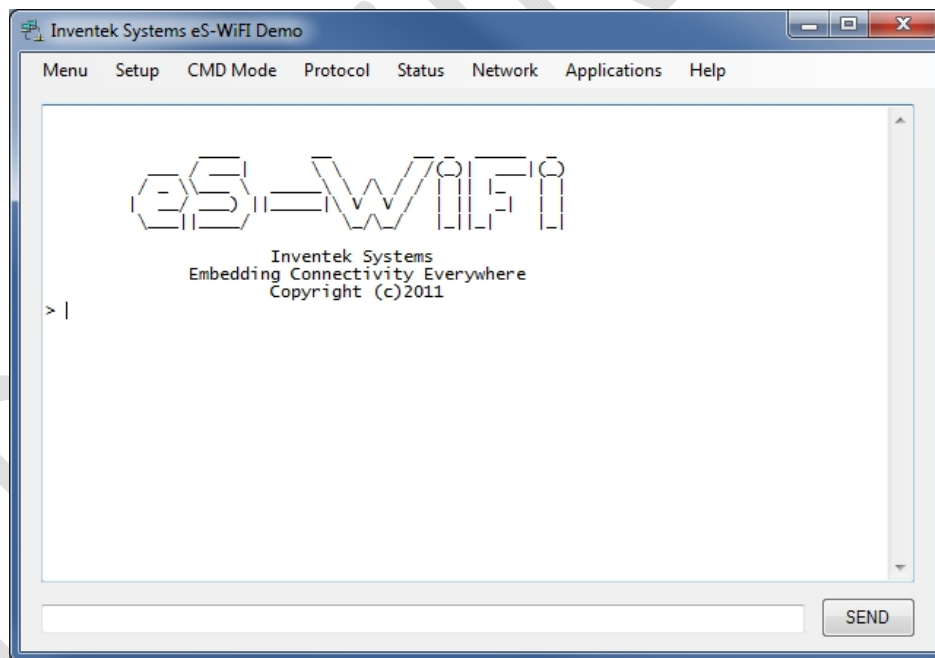
You will now configure the VSP (Virtual Serial Port) connection the EVB. You will need to determine what COM port is attached to the EVB. This can be done by using Windows Device Manager. In this case, COM54 is the port connected to the EVB.

The default setting for the EVB is 115200, None, 8, 1.



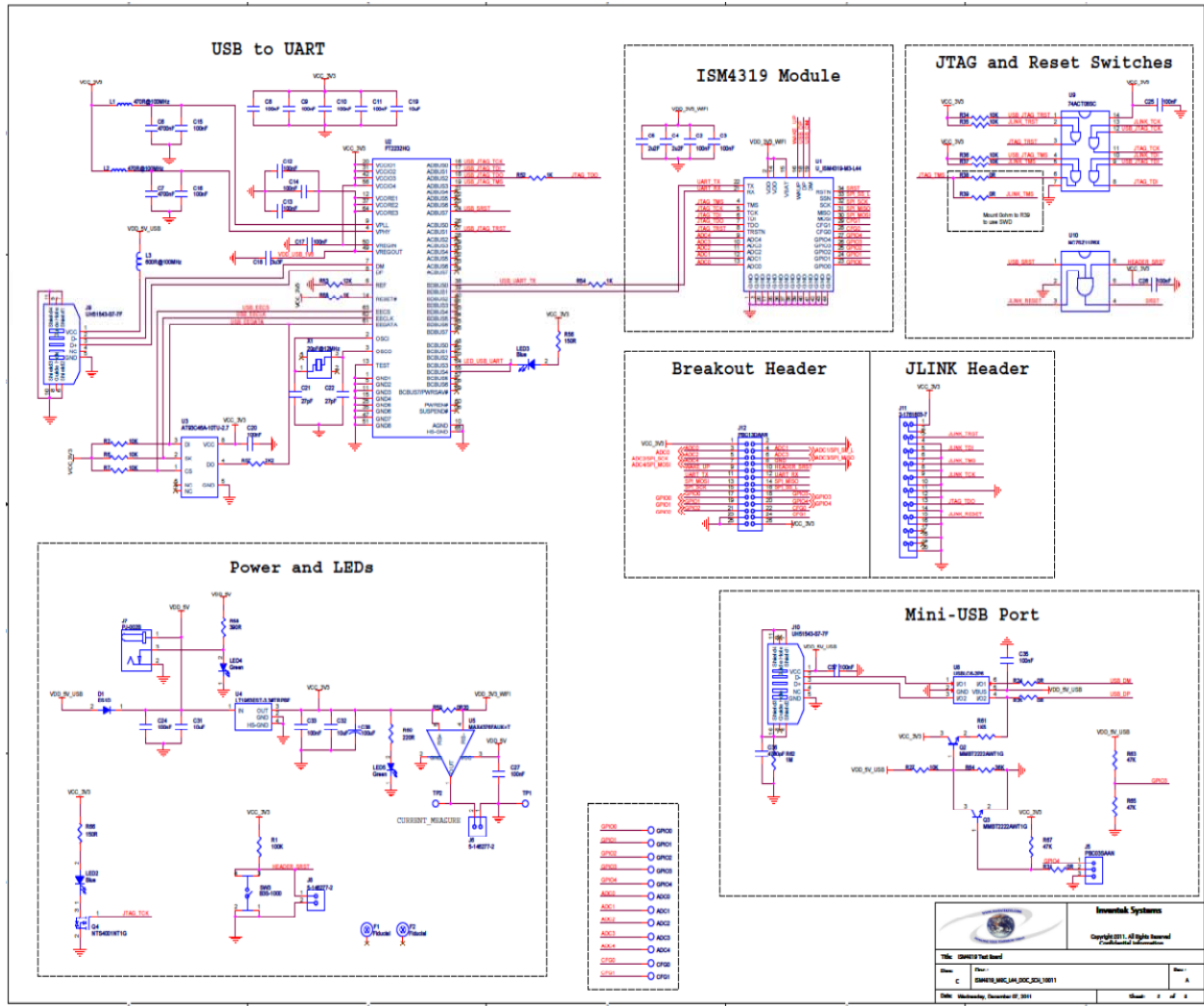


Click the OK button and press the Reset button on the EVB (SW2). You will now see the reset banner.



**The eS-WiFi module is shipped with the default serial configuration of 115200 baud, 8 data bits, no parity, and 1 stop bits.**

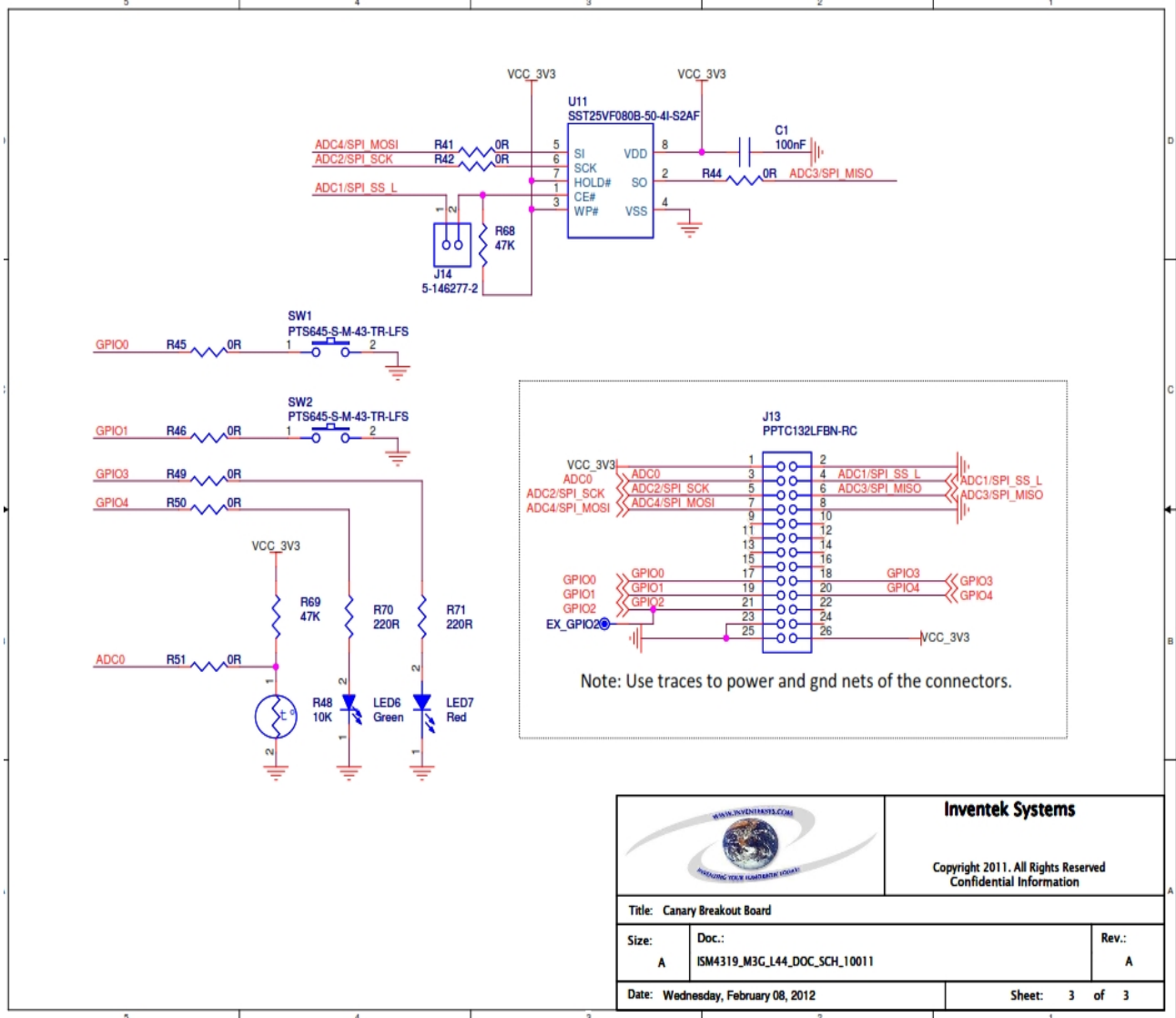
## 6.0 EVB Top Level Schematic (Page 1 of 2)




Note: Second USB port J10 is not installed on the evaluation boards. Please contact Inventek if you want to use USB or SPI mode.

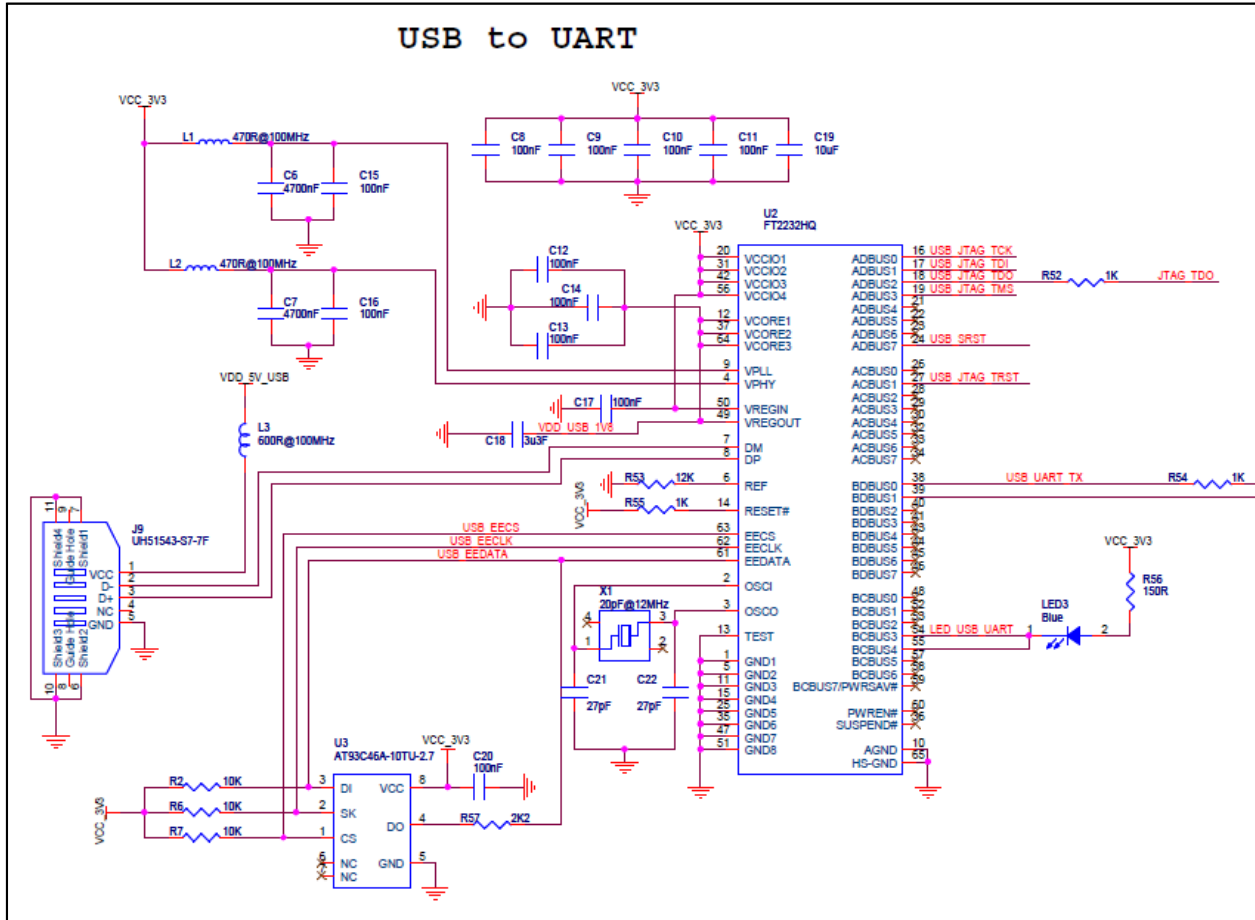
Typical application circuits please refer to schematic below. For a \*.pdf version please visit the Wi-Fi evaluation board website, [www.Inventeksys.com](http://www.Inventeksys.com).

### 6.1 EVB Top Level Schematic (Page 2 of 2)

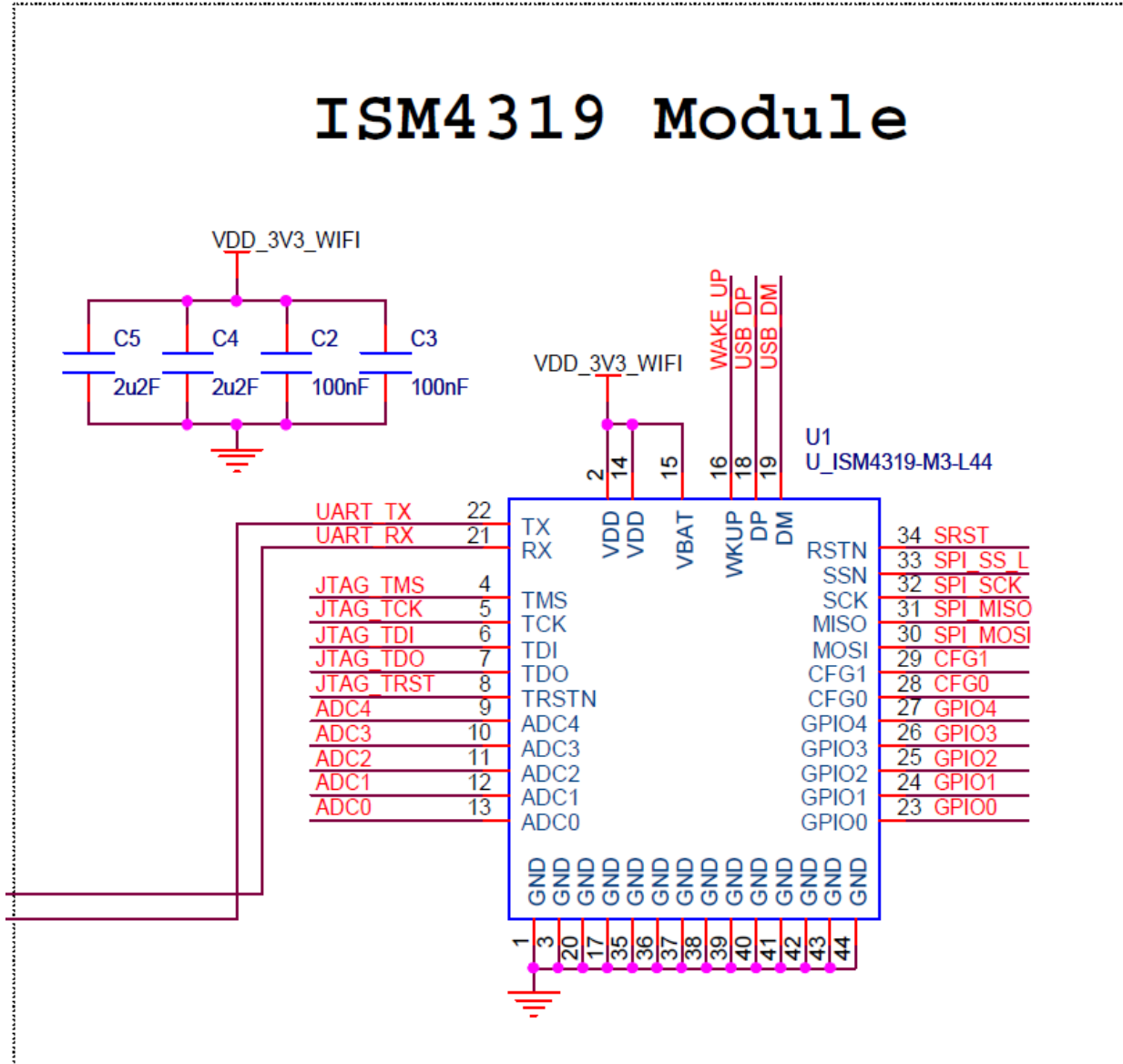


		<b>Inventek Systems</b> Copyright 2011. All Rights Reserved Confidential Information	
Title: Canary Breakout Board			
Size:	Doc.:	Rev.:	
A	ISM4319_M3C_L44_DOC_SCH_10011	A	
Date: Wednesday, February 08, 2012		Sheet: 3 of 3	

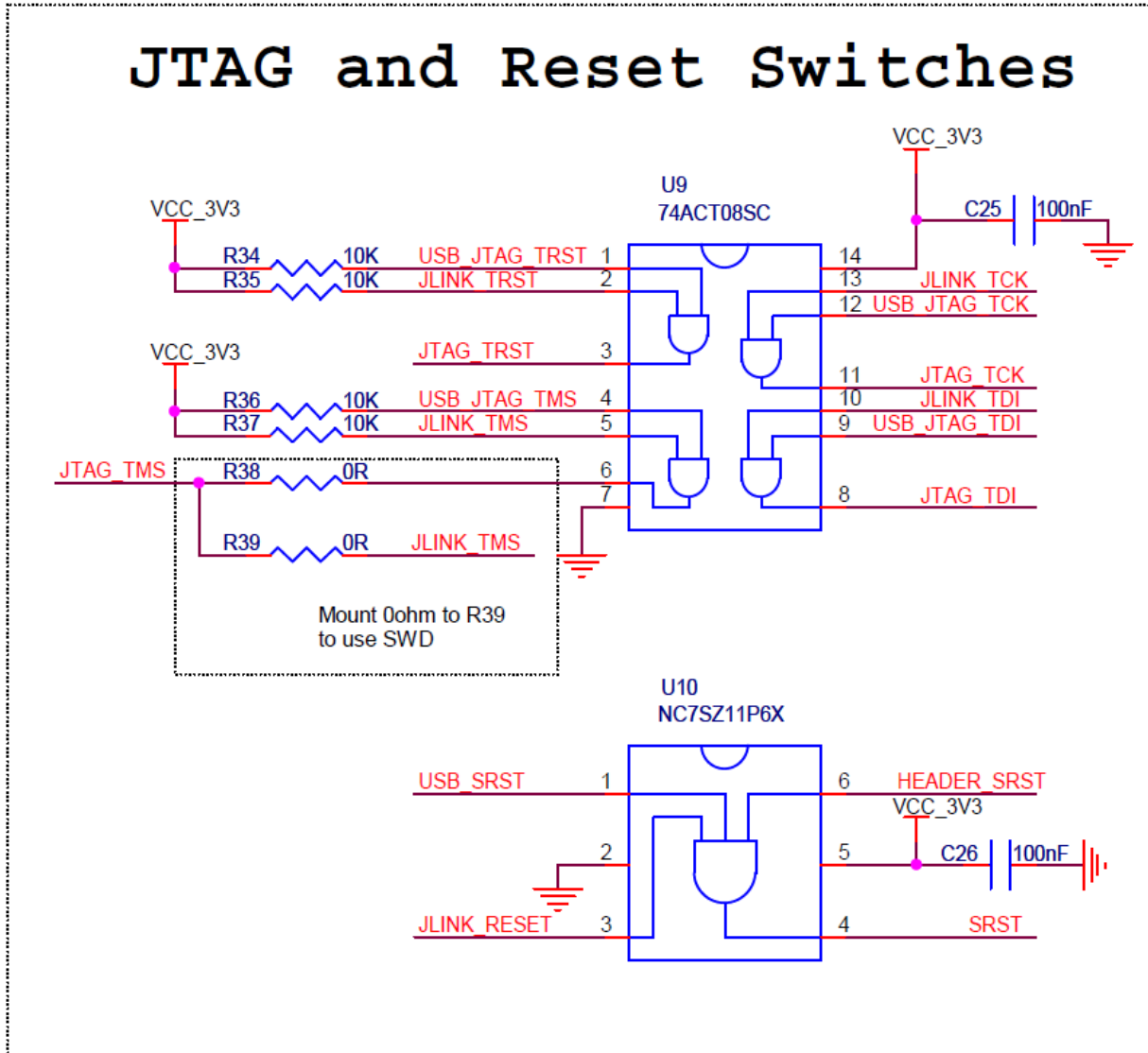
## 6.2 USB to UART



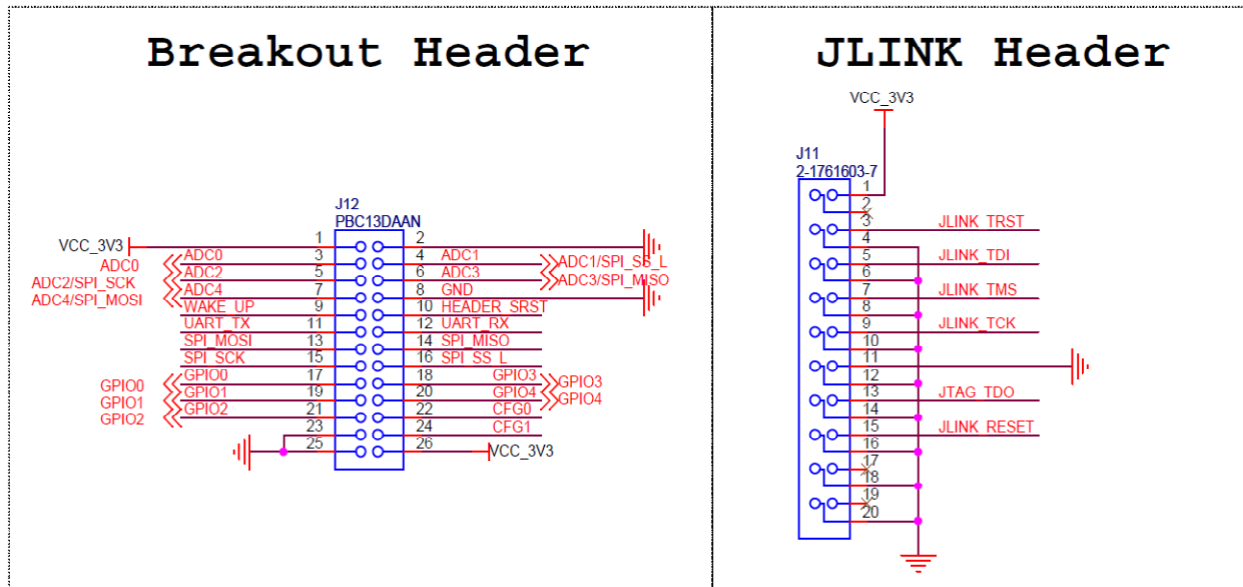
### 6.3 Connecting Microcontroller to eS-WiFi UART



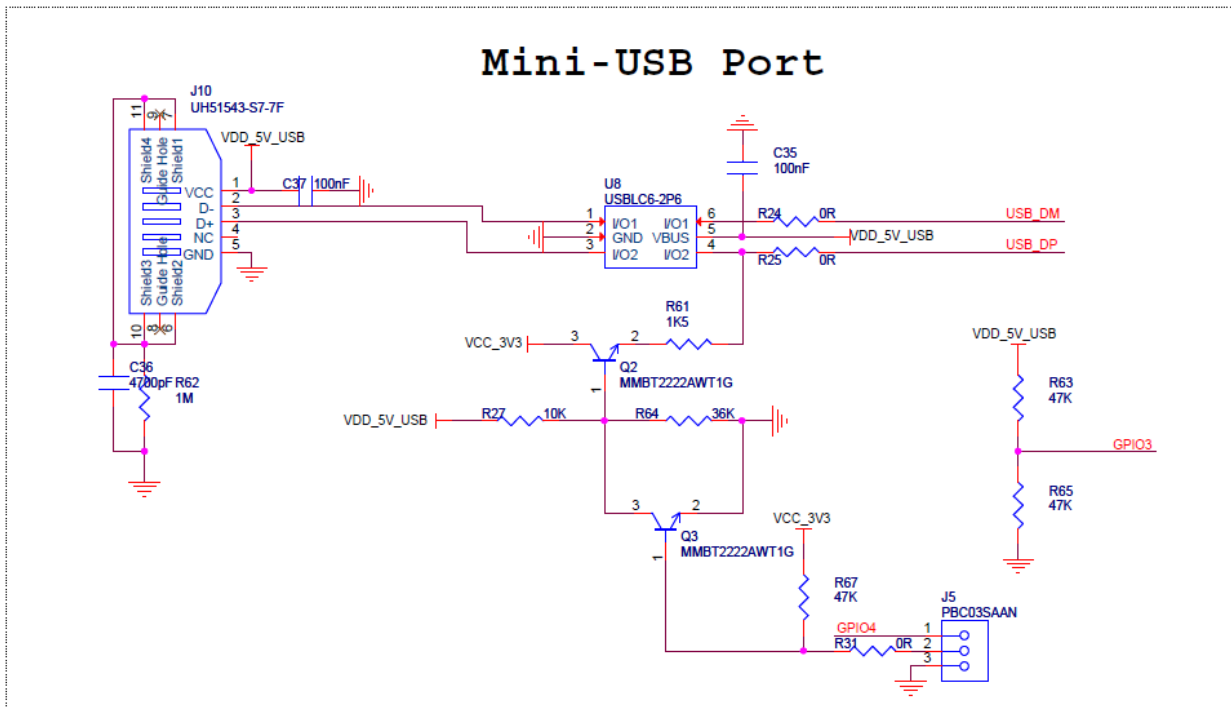
## 6.4 JTAG and Reset Connections



## 6.5 eS-WiFi Programming Options

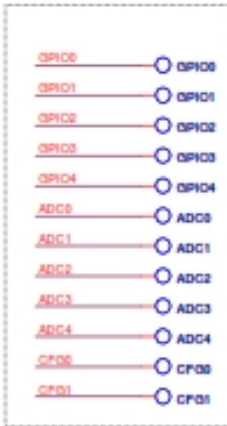


## 6.6 eS-WiFi USB Direct Connection Option (Contact Inventek for this mode)



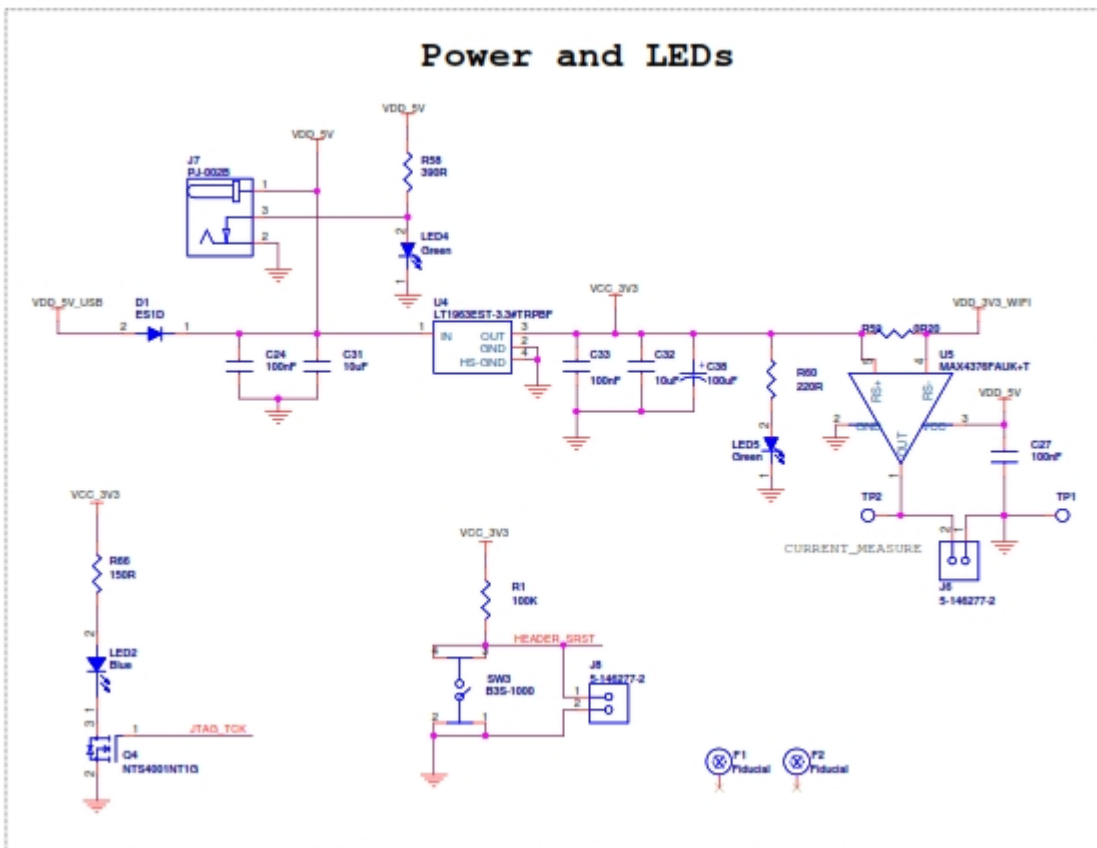
Note: Second USB port J10 is not installed. This is a direct USB connection to the es-WiFi module. This evaluation board is for UART only. Contact Inventek if you are interested in USB

## 6.7 eS-WiFi Test points and Sensor Inputs



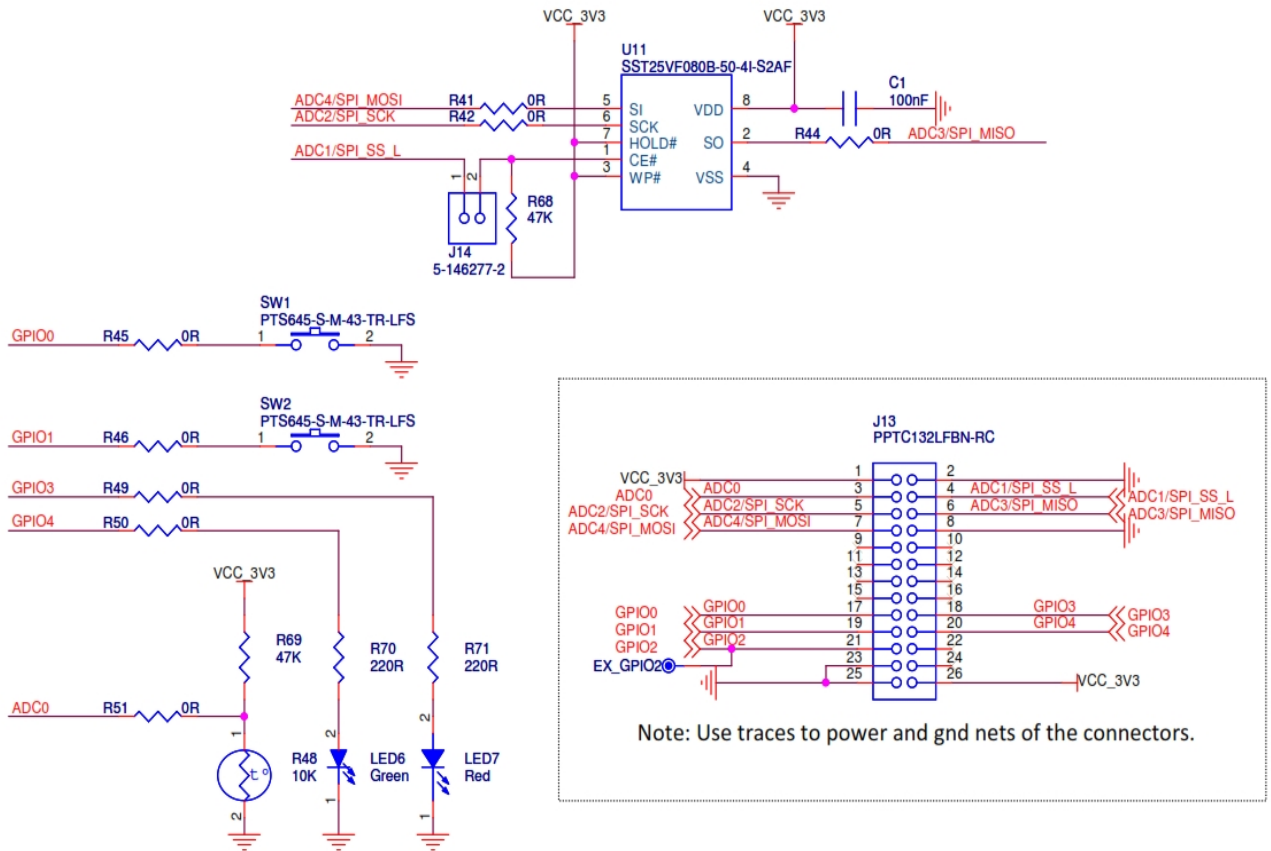
(

DRY



Errata: Current measurements are not supported with the EVB. U5 pins 4 and 5 are reversed on the PCB. So you cannot take current measurements as delivered. Inventek will fix this on our future EVB builds.





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## Document Revision History

<b>Date</b>	<b>Name</b>	<b>Description</b>	<b>Revision</b>	<b>File Name</b>
1/02/11	MFT	Initial Creation	1.0	User Manual Initial Release
3/27/11	MFT	Added FCC IC and Canada	1.1	Update
5/7/2011	MFT	ERRATTA	1.2	Current measurement bug

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