Inventek Systems
Embedding Connectivity Everywhere

IoT Evaluation Board User's Manual

Supports:
Cypress WICED™ SDK,
Inventek AT Commands-IWIN
Amazon AWS IoT
MQTT IoT Protocol

Contents

1 DEFINITIONS

1.1 eS-WiFi

1.1.1 Inventek's eS-WiFi (embedded Serial to Wi-Fi) modules (Radio + MCU + Certified Antenna), consist of 802.11a/b/g/n Wi-Fi radios and combinations of these radios with BT/BLE.

1.1.2 Inventek's eS-WiFi module family supports the Inventek standardized L44 and L54 LGA footprint. The L44 and L54 LGA footprints are identical with the exception that the L54 footprint includes an inner ring of an additional 10 pins for GPIO. Because all eS-WiFi module options support the same footprint, customers are able to migrate across the entire eS-WiFi module portfolio for additional and/or derivative eS-WiFi radio application needs without requiring any changes to the original PCB design resulting in maximum scalability and flexibility as well as an accelerated time-to-market.

1.1.3 Inventek's eS-WiFi modules also include certified Chip, Etched, and u.fl antenna options for each module.

1.1.4 The Inventek IoT Evaluation Board supports all of the eS-WiFi module solutions offered.

1.2 IoT EVB

1.2.1 IoT Evaluation Board

- The IoT-EVB can be used either as a standalone EVB or it can plug directly onto any target Arduino compatible MCU/CPU/Sensor Development Board offering.
- The IoT EVB supports the Arduino Shield form factor/footprint with 3.3V I/O.
- The IoT EVB does not support the Arduino Driver SW.
- No additional hardware is required other than a PC to use the IoT-EVB.
- Please Note: The three-way switch on the IoT-EVB must be in the position closest to the Wi-Fi module (Position 1, UART USB), and use a USB cable to plug the IoT-EVB into your PC.

1.3 IWIN AT Commands

1.3.1 Inventek's IWIN (Inventek Systems Wireless Interoperability Network), software is Inventek's proprietary AT Command software.

1.3.2 All associated collateral and documentation can be found at

- https://www.inventeksys.com/iwin/getting-started-guide/

1.3.3 The IWIN AT Command SW requires a host processor to communicate to the **eS-WiFi** module serially.

1.4 Video References

1.4.1 Inventek Systems 802.11 b/g/n Serial to Wi-Fi & IWIN AT Introduction:

- https://www.youtube.com/watch?v=Tq2-CYm-c8Q

1.4.2 Inventek Systems 802.11 b/g/n Serial to Wi-Fi & IWIN AT Command Set Tutorial:

- https://www.youtube.com/watch?v=tkPOLaNAKHo

1.4.3 Inventek 802.11 b/g/n Serial to Wi-Fi Product Overview & AT Command Set Tutorial:

- https://www.youtube.com/watch?v=Mzmi-0DcUu0

2 INTRODUCTION

The Inventek IoT-EVB platform is an Arduino/Shield form factor evaluation board suited for all wireless IoT application needs. (Please note that there is no Arduino software supported with the IoT-EVB.)

The IoT-EVB enables designers to quickly launch IoT products based on Inventek's eS-WiFi portfolio of 802.11a/b/g/n Wi-Fi radios and combinations of those radios with BT/BLE.

The IoT-EVB supports both the Cypress WICED SDK and Inventek's AT Command firmware. Inventek's AT Command firmware simplifies and accelerates IoT design and development and supports either a UART or SPI interface to a host processor. The Cypress WICED SDK allows designers the option of creating and running the system application on the modules microcontroller.

The IoT-EVB can be used either as a standalone EVB or it can plug directly onto any target Arduino compatible MCU/CPU/Sensor Development Board offering. The IoT-EVB also supports complete HW & SW IoT platform projects for various MCU requirements. Examples of the IoT-EVB IoT MCU Reference Design Projects include ST Micro's STM32F MCUs, Analog Devices' Shark DSP and CUP360 MCUs, and Cypress PSoC MCUs. In addition, the IoT-EVB MCU Reference Design Projects also support third party Cloud applications such as AWS. For more information on complete IoT-EVB MCU and Cloud Reference Design Projects, please visit: www.inventeksys.com

This IoT-EVB User's Manual provides a detailed hardware and software requirements overview as well as all required board connections.

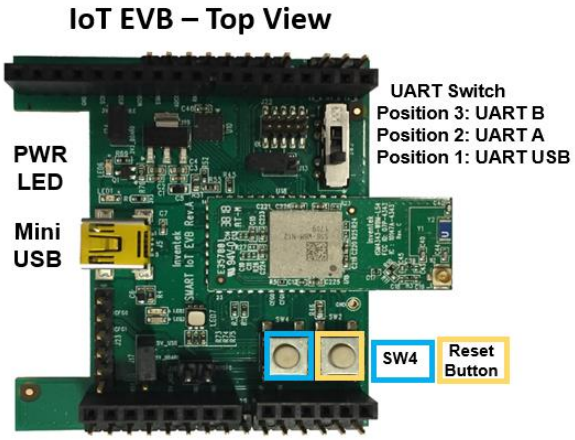
2.1 ORDERING INFORMATION

EVB P/N	Description	Module P/N's
ISMART4343C-EVB	ISM4343 Module with Chip Antenna	ISM4343-WBM-L151, ISM4343-WBM-L54C
ISMART43364C-EVB	ISM43364 Module with Chip Antenna	ISM43364-WBM-L151, ISM43364-WBM-L54C
ISMART43430C-EVB	ISM43340 Module with Etched Antenna	ISM43340-M4G-L44-10CF
ISMART43364U-EVB	ISM43340 Module with U.FL Connector	ISM32230-M4G-L44-10UF
ISMART4343U-EVB	ISM4343 Module with U.FL Connector	ISM4343-WBM-L151, ISM4343-WBM-L54U
ISMART43364U-EVB	ISM43464 Module with U.FL Connector	ISM43364-WBM-L151, ISM43364-WBM-L54U

NOTE:

- All IoT-EVB's are configured for the UART interface option.
- For SPI support, please download the appropriate SPI FW update from Inventek's website, https://www.inventeksys.com/iwin/firmware/
- Please reference the target **eS-WiFi** module for additional information.

2.2 IoT-EVB OVERVIEW



Notes:

- The L44/L54 foot print compatible option for Inventek's eS-WiFi modules enables customers to migrate across Inventek's portfolio as needed without requiring any changes to the original PCB layout, enabling maximum flexibility as future connectivity design requirements change.
- The IoT-EVB is a 3.3V board not a 5V board (5V input & generates 3.3V IO)
- The IoT-EVB Mini USB connects to the Dual Port FTDI (Backside of EVB)
- The IoT-EVB UART Position Switch selects the required UART connection
    - Please reference Section 3 and Section 6 for all details.

*2.3 **IoT-EVB FEATURES***

- The IoT-EVB is a 3.3v I/O board, not a 5v board.
- Input Power: 5.0 V (5V input & generates 3.3V IO)
- FCC/CE/IC Certification is included with all eS-WiFi module options including Etched, Chip or external antenna options.
- Configurable using Inventek IWIN AT Commands FW.
- Host interface: UART, SPI.
- Dual Port FTDI (UART and JTAG) for firmware development and testing.
- SPI Flash for Over-the- Air (OTA) updates (for UART version only).
- All eS-WiFi modules support a standard L44/L54 package option to enable designers to migrate between eS-WiFi module options once in mass production without requiring board layout changes to the original PCB.
- Please note that there is no Arduino software provided for the IoT-EVB development board.

3 IoT-EVB SYSTEM REQUIREMENTS

3.1 IoT-EVB UART CONFIGURATION

3.1.1 The IoT-EVB communication is configured using the UART interface option and a PC with a USB port for all evaluation and test purposes.

3.1.2 Set SW3 to Position 1, UART_USB (Position 1 is the closest position to the eS-WiFi module)

3.1.3 Set the Power source for the IoT-EVB by placing a jumper on J17 from Pin 1 to Pin 2

4 eS-WiFi EVB PC DEMO INSTALLATION

4.1 Installing the eS-WiFi EVB PC Demo SW & Drivers

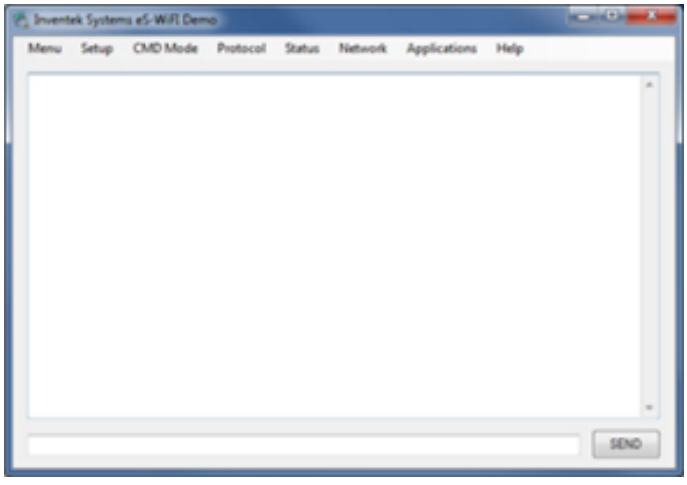
4.2 BEFORE you plug the board into your computer download and install the eS-WiFi PC Demo Software and Drivers:

4.3 https://www.inventeksys.com/iwin/demo-software/

4.4 Save the eS-WiFi Demo.zip. File on to your PC.

4.5 Unzip the eS-WiFi Demo.zip. File.

4.6 The eS-WiFi Demo home screen will appear as follows:



4.7 Select '**Menu**'

4.8 Select '**Install Drivers'**

4.9 Select '**Allow the App to Make Changes'**

4.10 Select '**CYW9WCD1EVAL1**'

4.10.1 For prior **eS-WiFi** PC Demo SW version support, Select '**BCM9WCD1EVAL1(Legacy)**'

4.11 Once the Drivers are installed then plug-in the IoT-EVB to your PC.

4.12 The USB Driver for the IoT-EVB is provided in the above download.

4.13 The IoT-EVB connects to the PC with the USB cable that was provided with your IoT-EVB.

4.14 The USB interface provides +5V power as well as individual programming and UART interfaces to the STM32F Host processor (on the eS-WiFi module).

4.15 Connect the USB cable to your USB port on your PC.

4.16 Connect the other end of your USB cable to the IoT-EVB using the Mini USB connector on the IoT-EVB

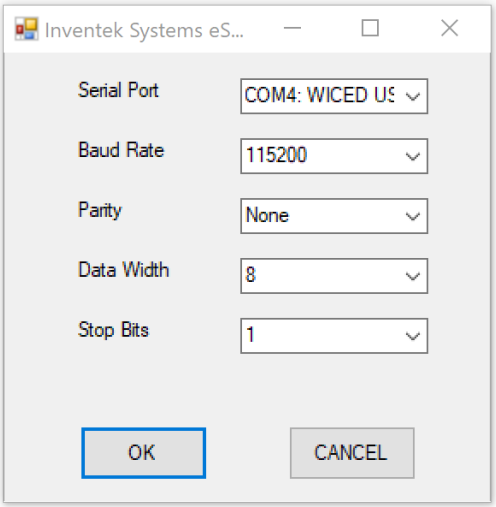
5 eS-WiFi EVB PC DEMO CONFIGURATION

5.1 Select '**Setup**'

5.2 Select '**Serial Port**'

5.3 Select '**Configure/Open**'

5.4 The VSP (Virtual Serial Port) configuration table will appear:



a. Select the '**WICED'** port option (COM4).
b. Set Baud Rate to '**115200**' Baud
c. Set Parity to '**None'**
d. Set Data Width to '**8**' Data bits
e. Set Stop Bits to '**1**' Stop bit

NOTE: When using other Terminal programs (such as Tera Term VT), Select '**None'** for Flow Control.

5.5 Select '**COM4: WICED**' for the Serial Port configuration.

5.6 Select '**OK**'

5.7 Select the '**Reset**' button on the **IoT-EVB** as depicted in Section 2.2 above or a soft '**Reset**' can also be performed using the drop-down menu under '**Setup**' and then selecting '**Software Reset (ZR)**'.

5.8 After '**Reset**', the following banner will appear:

eS-WiFi
Inventek Systems
Embedding Connectivity Everywhere
Copyright (c)2011-2019
>

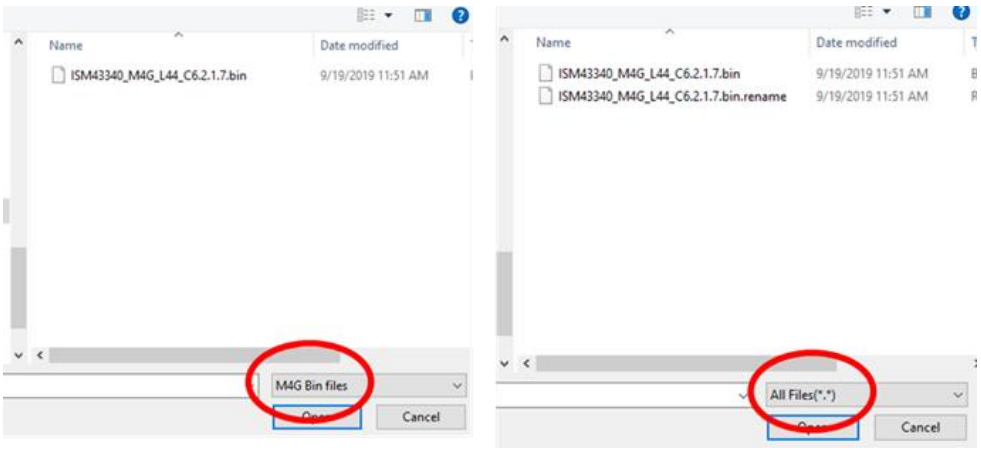
5.9 Type '**I?**' to identify the current version of the **IWIN** FW on the module [use upper case '**I?**' for older **IWIN** FW versions]. For a summary list of **IWIN** AT Commands type '**?**' and press the Enter key.

5.10 Confirm the **IWIN** FW version listed is the most recent version available on Inventek's website. If not, download the latest **IWIN** FW version available :

5.11 https://www.inventeksys.com/iwin/firmware/

5.12 Please make sure that the name of the **IWIN** FW file is a .bin file, otherwise your browser will not find the file in your Downloads folder unless you change your search filter box from '.bin' to 'All Files(*.*)'

5.13 **IWIN** FW Filter Box for .bin File Selection:



6 eS-WiFi EVB PC DEMO OPERATION

*6.1 **eS-WiFi EVB PC DEMO** Setup is Complete.*

*6.2 **eS-WiFi EVB PC DEMO** SW Design References*

6.2.1 **IWIN** AT Command Summary of Functions:

https://www.inventeksys.com/iwin/wp-content/uploads/WiFi_AT_Command-_Set-Quick-Reference-1.pdf

6.2.2 **IWIN** AT Command User's Manual:

https://www.inventeksys.com/iwin/wp-content/uploads/IWIN_Command_Set_Users_Manual.pdf

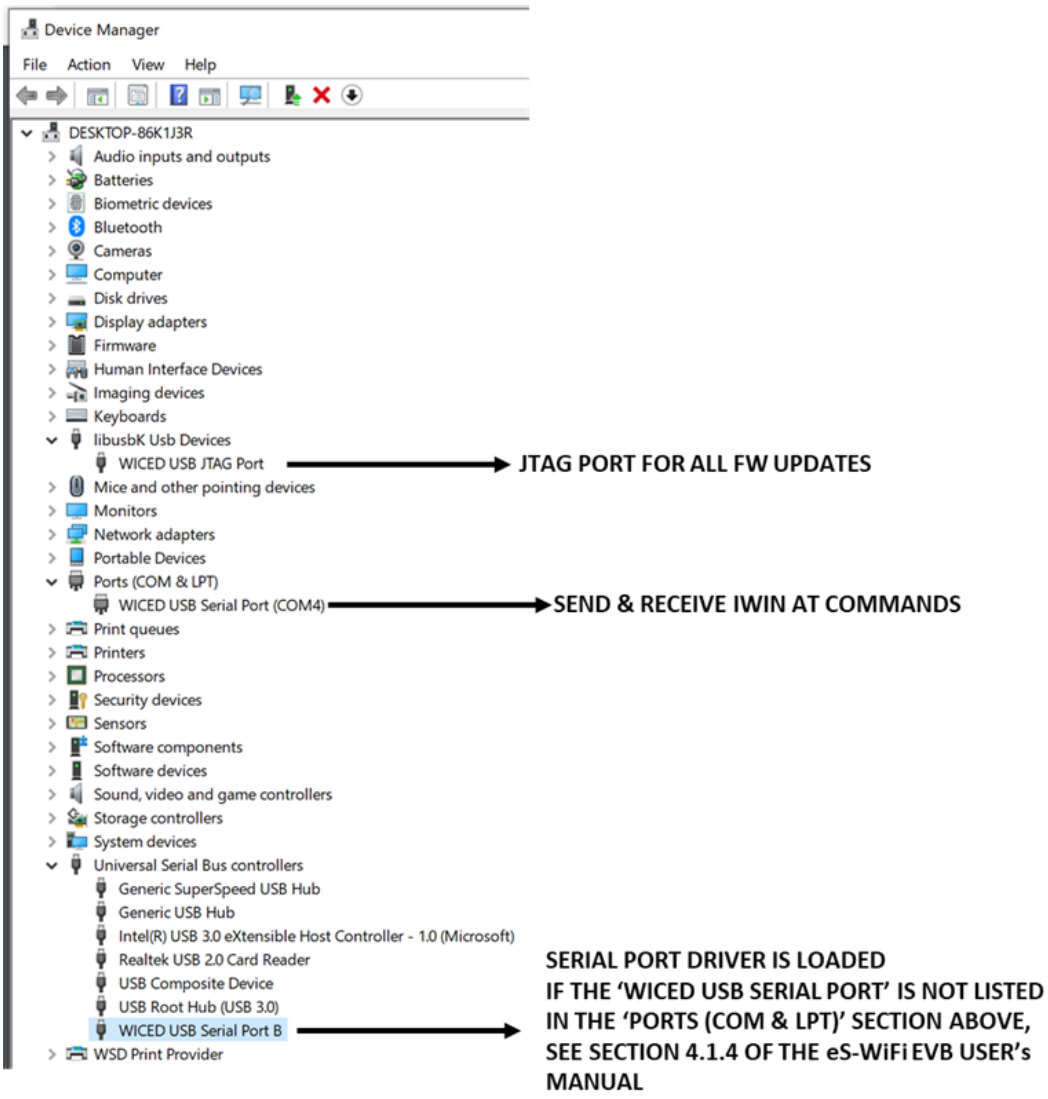
Please reference the Inventek website for product information for each specific eS-WiFi module of interest (schematics, layout, Symbols, Test Reports, etc.)

7 APPENDIX: DEVICE MANAGER

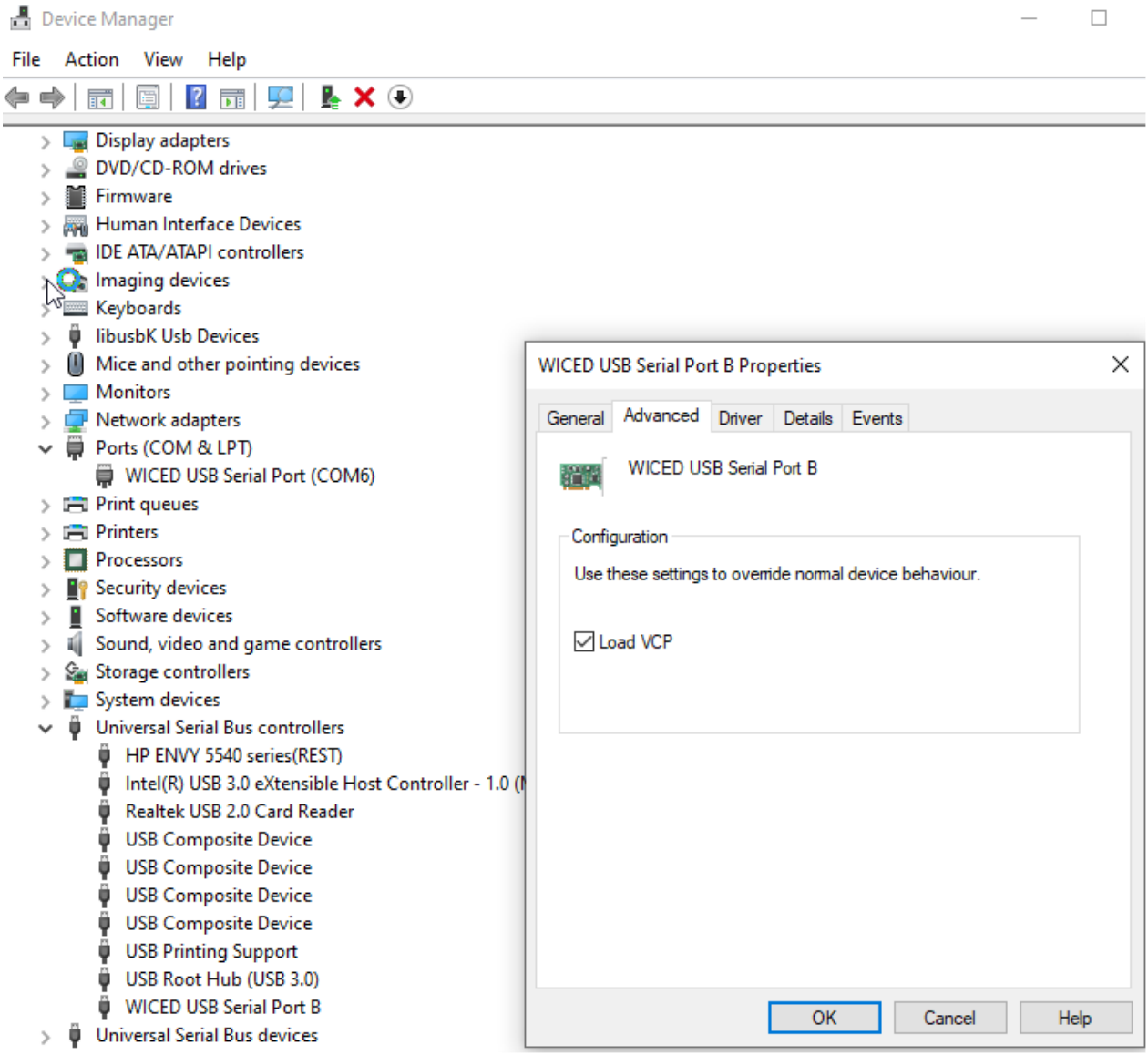
7.1 Required Device Manager Files

7.1.1 Please ensure your Device Manager includes the following:

- WICED USB JTAG PORT (libusbK Usb Devices)
- WICED USB SERIAL PORT (COMM4)
- WICED USB SERIAL PORT B
- Verify that VCP Driver is selected.

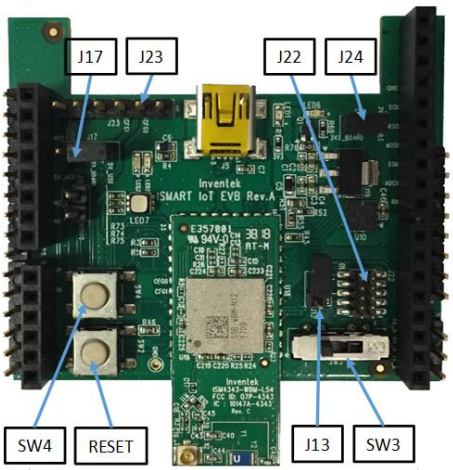


If communication with the IoT-EVB is not working properly go to the WICED USB Serial Port B Properties, Select Advanced and verify that the Load VCP option is checked.
Please refer to the following screen shot of the Device Manager.


Device Manager
File Action View Help
Display adapters
DVD/CD-ROM drives
Firmware
Human Interface Devices
IDE ATA/ATAPI controllers
Imaging devices
Keyboards
libusbK Usb Devices
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
WICED USB Serial Port (COM6)
Print queues
Printers
Processors
Security devices
Software devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers
HP ENVY 5540 series(REST)
Realtek USB 2.0 Card Reader
USB Composite Device
USB Composite Device
USB Composite Device
USB Composite Device
USB Printing Support
USB Root Hub (USB 3.0)
WICED USB Serial Port B
Universal Serial Bus devices
WICED USB Serial Port B Properties
General
Advanced
Driver
Details
Events
WICED USB Serial Port B
Configuration
Use these settings to override normal device behaviour.
Load VCP
OK
Cancel
Help

8 IoT-EVB – ARDUINO PIN OUT MAP

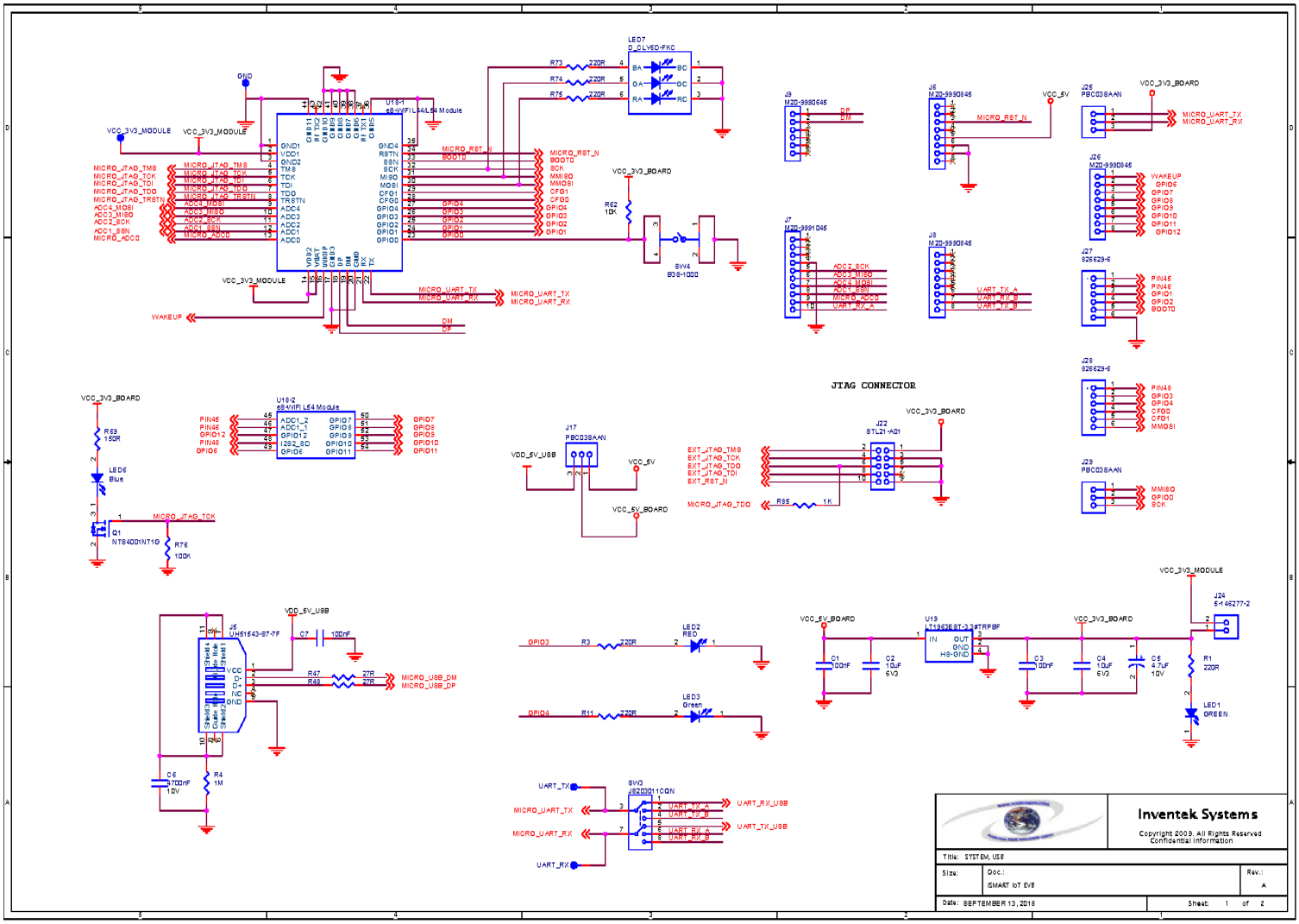
ISMART					Arduino UNO v3				ISMART	
						Digital			J7	
J27	J6	POWER				D15	PC5		1 - NC	
1 - PIN45	1 - NC	NC				D14	PC4		2 - NC	
2 - PIN46	2 - NC	IOREF				AREF	AREF		3 - NC	
3 - GPIO1	3 - NRST	RESET				GND	GND		4 - GND	
4 - GPIO2	4 - NC	3.3V				D13	PB5		5 - ADC2_SCK	
5- BOOT0	5 - 5V	5V				D12	PB4		6 - ADC3_MISO	
6 - GND	6 - GND	GND				D11	PB3		7 - ADC4_MOSI	J26
1 - PIN31	7 - GND	GND				D10	PB2		8 - ADC1_SSN	1 - WAKEUP
2 - GPIO0	8 - NC	Vin				D9	PB1		9 - CMD/RDY(ADC0)	2 - GPIO6
3 - PIN32	J9	AIN				D8	PB0		10 - UART_RX_A	3 - GPIO7
1 - PIN48	1 - Micro_UART_RTS	PC0	A0						J8	4 - GPIO8
2 - GPIO3	2 - Micro_UART_CTS	PC1	A1			D7	PD7		1 - NC	5 - GPIO9
3 - GPIO4	3 - NC	PC2	A2			D6	PD6		2 - NC	6 - GPIO10
4 - CFG0	4 - NC	PC3	A3			D5	PD5		3 - NC	7 - GPIO11
5 - CFG1	5 - NC	PC4	A4			D4	PD4		4 - NC	8 - GPIO12
6 - PIN30	6 - NC	PC5	A5			D3	PD3		5 - NC	J25
J28						D2	PD2		6 - UART_TX_A	3 - 3V3
						D1	TX->		7 - UART_RX_B	2 -Micro_UART_RX
						D0	RX<-		8 - UART_TX_B	1 -Micro_UART_TX



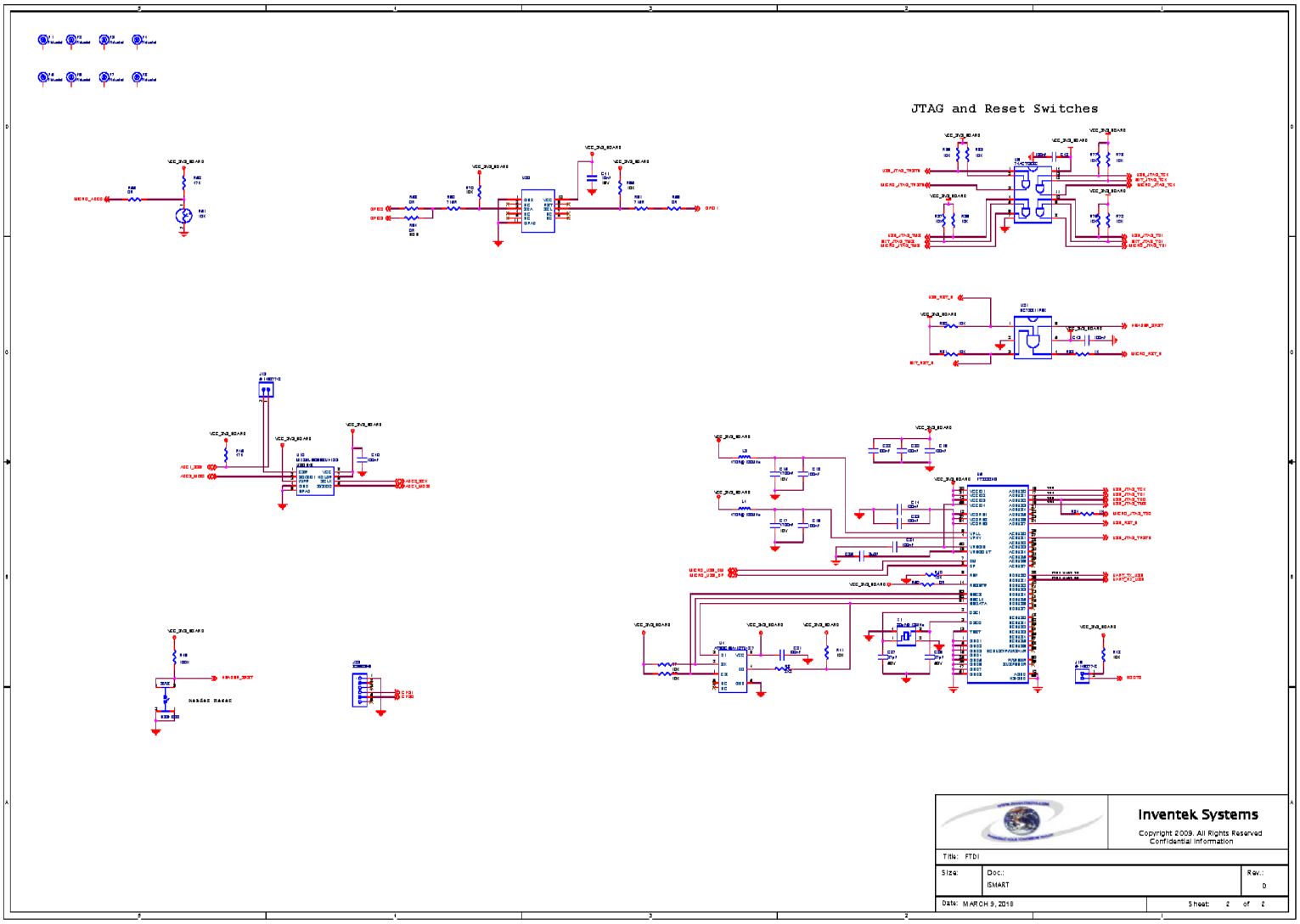
					SW3 - UART Selection		
					1	UART_USB	Default
LED7 - RGB LED			J22 - JTAG		2	UART_A	
Pin 32	R73	Blue	1 - VCC_3V3_BOARD		3	UART_B	
Pin 31	R74	Green	2 - TMS				
Pin 30	R75	Red	3 - GND		J17 - 5V Source		
			4 - TCK		1	VCC_5V (J6-5)	Default: 1-2
LED2			5 - GND		2	VCC_5V_BOARD	
GPIO3	R3	Red	6 - TDO		3	VDD_5V_USB	
			7 - NC				
LED3			8 - TDI		J24 - Module Power		
GPIO4	R11	Green	9 - GND		1	VCC_3V3_MODULE	Default: 1-2
			10 - RST_N		2	VCC_3V3_BOARD	
SW4 - Application Button							
GPIO0	R62 (Pullup)	Momontary Switch(NO)	J23 - AUX UART		J16 - BOOT0 (STM32F uP Only)		
			1 - GND		1	VCC_3V3_BOARD(10K)	Default: Open
Thermistor			2 - NC		2	BOOT0	
Micro_ADC0	R55	NCP18xH103F03RB	3 - NC				
To Isolate remove resistor(s)			4 - CFG1		J13 - On Board SFLASH CS		
			5 - CFG0		1	ADC1_SSN	Default: Open
			6 - NC		2	U10-CS#	

9 IoT-EVB SCHEMATICS

9.1 USB Schematic



9.2 *FTDI Schematic*



10 IoT-EVB TEMP RATING

Symbol	Description	MIN	TYP	MAX	UNIT
TA	Temperature(ambient)	0		70	°C

NOTE: Functionality is guaranteed, but specifications require derating at extreme temperatures

11 IoT-EVB REVISION CONTROL

Document: **IoT-EVB User's Manual**	Evaluation Board
External Release	DOC-DS-202001

Date	Author	Revision	Comment
4/1/19	AS	1.0	Preliminary Release
4/10/19	AS	2.0	Draft Release
4/19/19	AS	3.0	Release
1/31/20	AS/RB	4.0	Updated

12 CONTACT INFORMATION

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