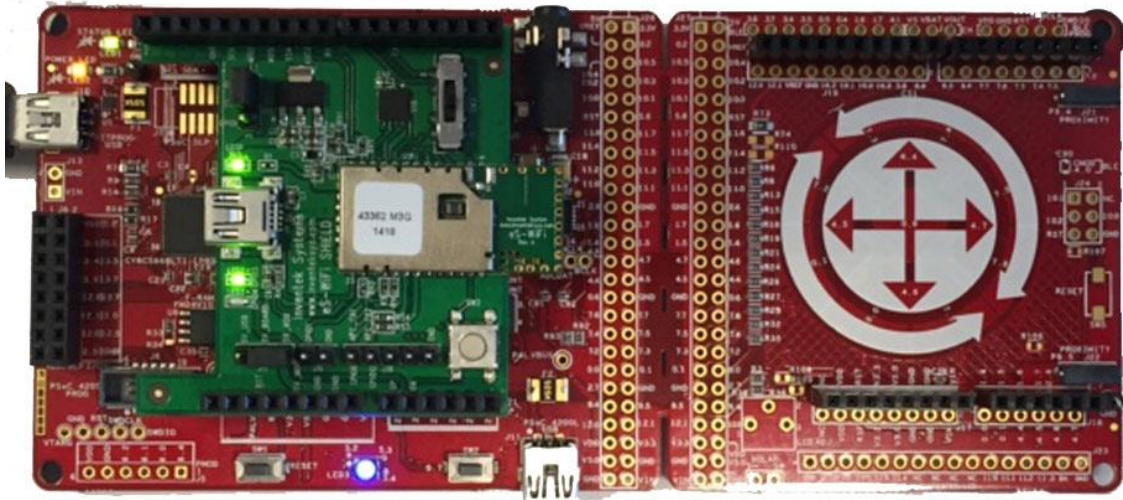




## ISMART

### Inventek Systems Module Arduino Test

Amazon MQTT AWS Demo using IWIN  
AT Commands running on PSoC 4 and  
Cloudbourne Thing-Z Platform



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## 1 Introduction

The Inventek ISMART (Inventek **S**ystems **M**odule **A**rduino **T**est) IoT platform is a user-friendly Arduino form factor (3.3V) shield suited for all of your wireless application needs.

The ISMART platform enables customers to quickly launch IoT products based on the Inventek IWIN AT commands.

This AWS MQTT software example demonstrates how simple it is to connect the Inventek eS-WiFi module to the Amazon AWS servers using the Cloudbourne application.

## 2 Overview of the Software example

The PSoC eS-WiFi AWS software will perform the following:

- Setup a PSoC UART at 115,200 baud to communicate with the Wi-Fi module.
- Configure I/O on the PSoC to use SW2, Reset and LED (RGB)
- Send a series of AT Commands to perform several functions depending on how you configure or modify your project:
  - Start and Run a SoftAP running on the Wi-Fi module
  - Join a Network as a client
  - Join the AWS cloud as a device
  - Control a “Kitchen Light” using the Cloudbourne application
  - Monitor the activity on the PC comm port

## 3 Hardware and Software Required

Hardware:

- Inventek eS-Wifi shield ISMART362-E
- Cypress EVK -CY8CKIT-046
- PC

Software:

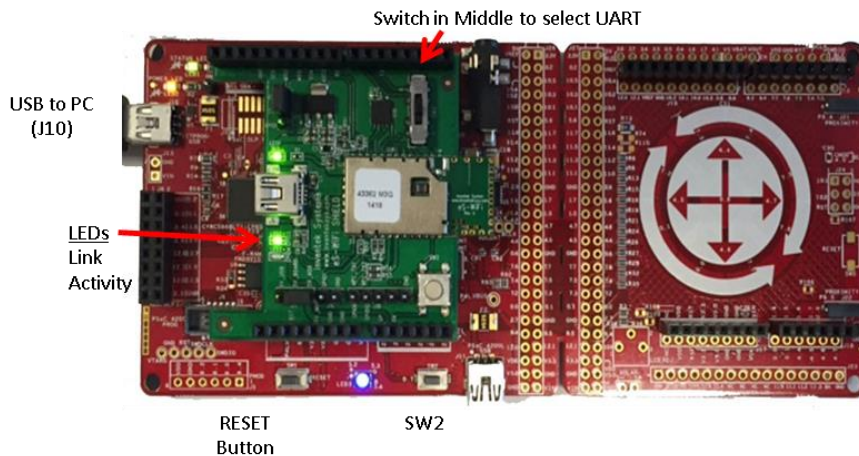
- Inventek eS-Wifi PSoC TCP Client project (esWifi.zip)
- PSoC Creator 3.3
- Cloudbourne Thing-Z Smartphone Application
- Terminal Program (Tera Term)

## 4 Setting up the Hardware

The ISMART (Inventek Systems Module Arduino Test) Shield plugs directly onto a target PSoC 4 (CY8CKIT-046).

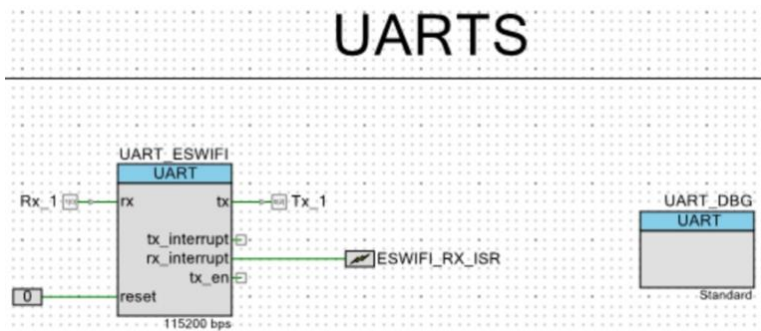
Plug into the target MCU EVK

- i. Power ISMART from Microcontroller board. On J17, Connect 5V\_BOARD to 5V\_MOD.
- ii. SW3 in UART Position 2 (Middle)



eS-Wifi software configures the UART as follow:

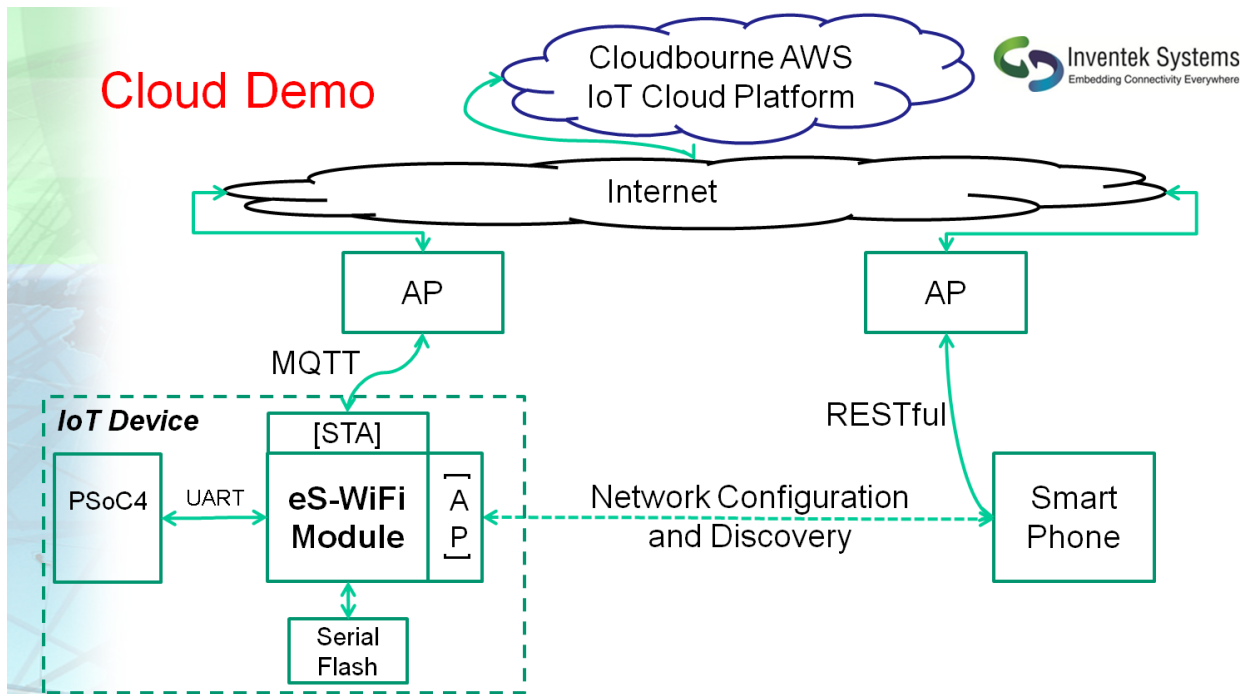
	<u>PSoC --- Arduino</u>
PSoC to ISMART	RX_1 (P1[0]) --- PD2
	TX_1 (P0[2]) --- PB0
PSoC to Arduino UART Debug J10	RX (P3[1]) --- TX
	TX (P3[0]) --- RX



Optional: You can connect the ISMART Shield directly to your PC using the Mini USB connector on the ISMART and then run the Inventek IWIN AT Commands with a terminal program.

- i. Power ISMART from USB. On J17, Connect 5V\_BOARD to 5V\_USB.  
([www.inventeksys.com/IWIN](http://www.inventeksys.com/IWIN) download PC demo app and install drivers)
- ii. RUN Inventek IWIN AT Commands with Tera-term (Baud rate: 115,200, Parity None, Data Width 8, Stop Bits 1)
- iii. Connects eS-WiFi UART to USB on shield with SW3 in position 1
- iv. Send AT commands to module

## 5 Running the AWS Application



Project: eS-WiFi project for CY8CKIT-046 (source code and PSoC design)

1. Program and run the Cypress PSoC 4 with eS-WiFi TCP Client project.
2. Setup Tera Term for interaction and debug information
  - a. Connect USB cable from PC to J10
  - b. Select Serial, then Port (choose COM port with KitProg USB-UART),  
click "OK"
  - c. Change baud rate (Setup>Serial port) to 115200

### 3. Setup Network Connection

On CY8CKIT-046 press and hold SW2 and then press and release Reset. On reset, the PSoC sends the AT command “A0” to the Wi-Fi Module The eS-WiFi module will automatically

- i. Start the SoftAP named “**es\_wifi\_mac address**”
- ii. Start a DHCP Server
- iii. Start DNS
- iv. Start a Web Server (Port 80)

*(You can modify the project to connect manually to a network. You need to enable the define “USEC0” and change the settings for your SSID and Password for your local router in eswifi\_app.h. This will send the C1, C2, C3 AT commands and C0 to join the network)*

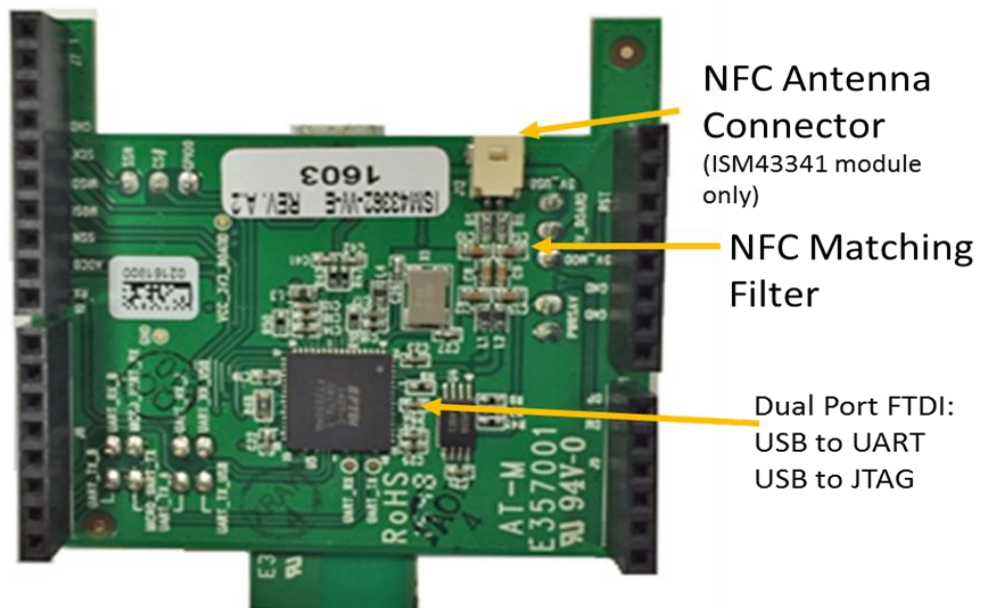
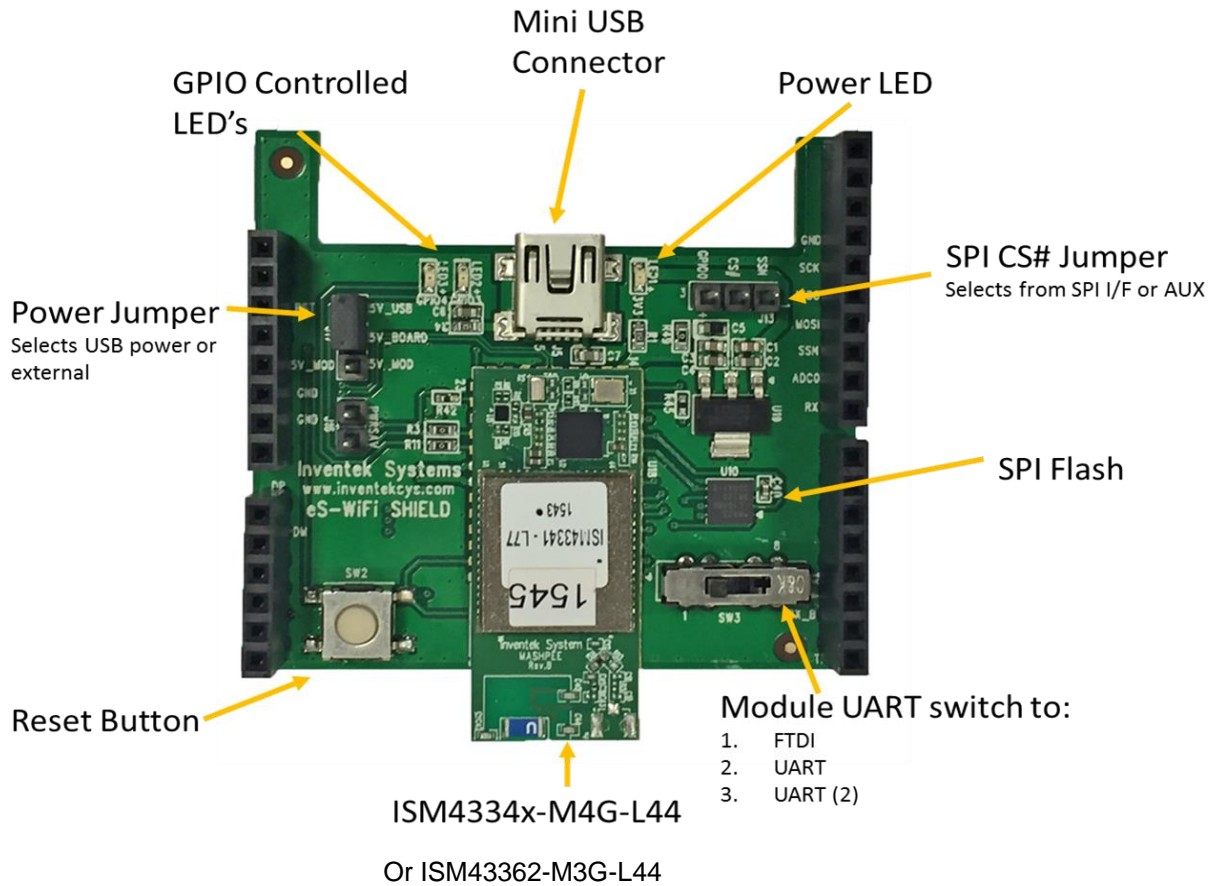
4. Connect a Smartphone or PC to the Access Point shown above  
*Note: Once a successful network connection the software will save the network settings and automatically join that network upon power up.*
5. Open a browser and enter 192.168.10.1 in the address bar. Select the network you want to connect to and follow prompts.

**Note: If the connection to the network succeeds the Access Point information will be save and used on subsequent reset's and power on's. At any time you can follow the process in item 3 to change networks.**

6. The eS-WiFi module will automatically connect to the Amazon AWS server running the Cloudbourne application.
7. Launch the Cloudbourne “Thing-Z” application on your smartphone
  - a. Turn the kitchen light on/off with Thing-Z application or
  - b. Press SW2 on the PSoC to turn Kitchen light on/off
8. You can monitor the state of the cloud on your PC showing the activity.



## 6 SMART Architecture (Top/Bottom)

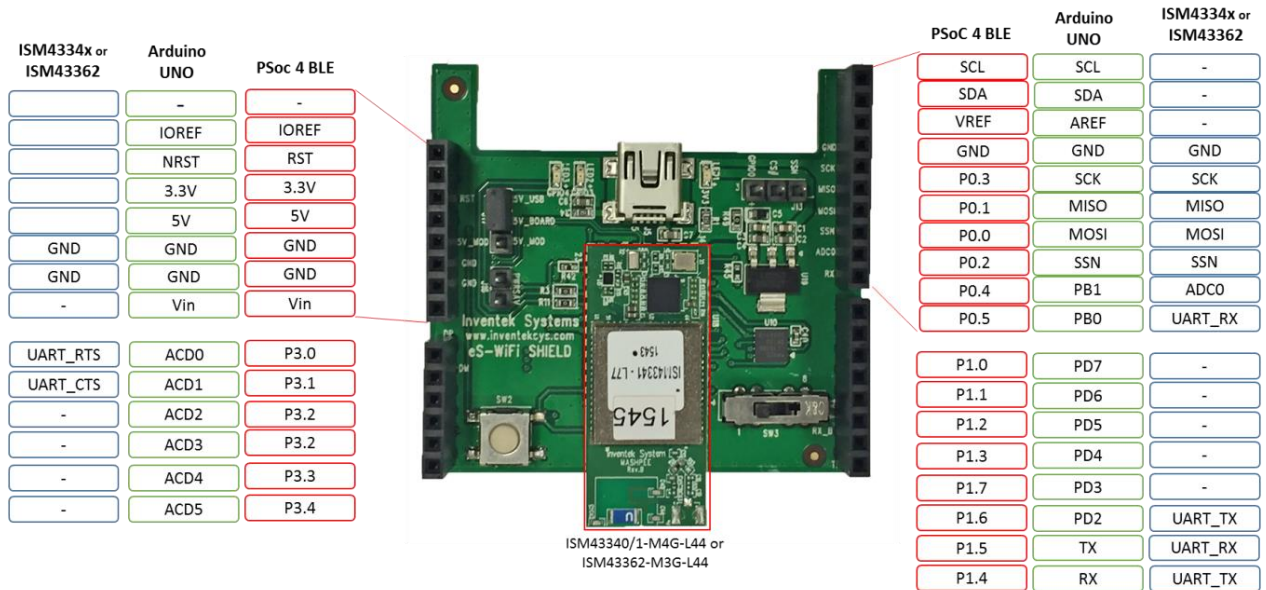


## 7 ISMART Components

Position	Description	Case
U18	eS-WiFi	ISM43362-M3G or ISM43340-M4G or ISM43341-M4G footprint compatible embedded Serial WiFi module
J5	USB	USB Connected to FTDI to eS-WiFi as a VCOM port for UART or JTAG update. USB Driver required (but not required for the Nucleo board)
LED1	LED	3v3 Power LED
LED2	LED	GPIO3 on eS-WiFi module
LED3	LED	GPIO4 on eS-WiFi module
SW3	3 Position	FTDI 2232 dual UART to eS-WiFi module for JTAG or UART USART1 PA9/10 USART2 PA2/2
SW2	Reset	Resets eS-WiFi module
J18	Option	Can be used to connect USART 1 CTS/RTS
R51	Temp.	Thermistor
U10	Flash	External SPI Flash for OTA (Over The Air updates) for the ISM43362 only. The ISM4334x has an option for on board flash
J13	SPI	Selects between SPI I/F or AUX

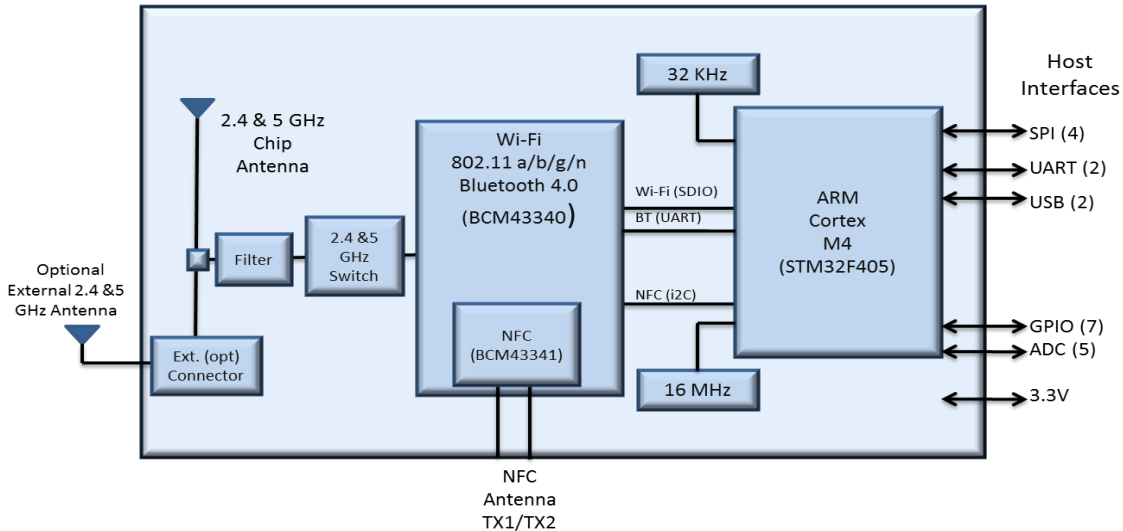


## 8 The ISmart-PSOC-Arduino Pin Out Map

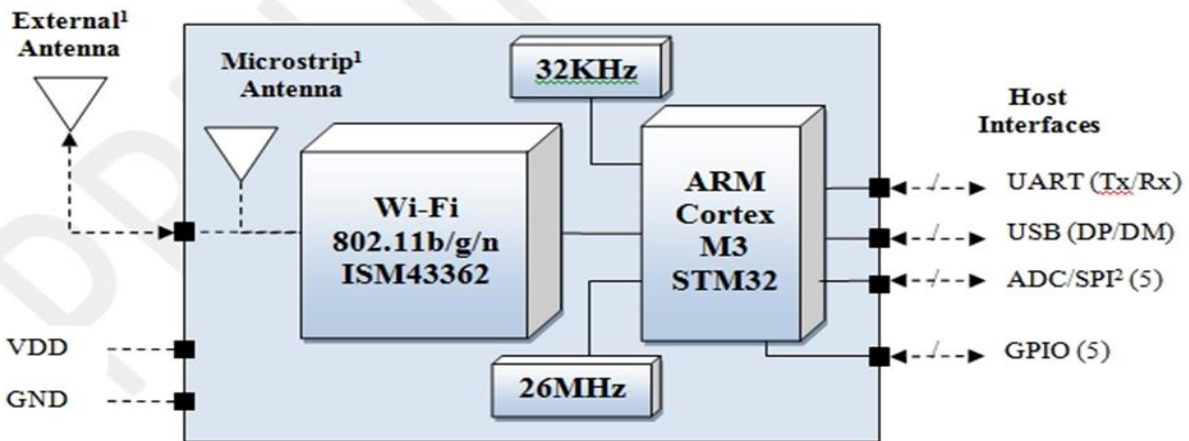


## 9 eS-WiFi Module Block Diagram

### **ISM43340/1-M4G-L44** *(Functional Specifications)*



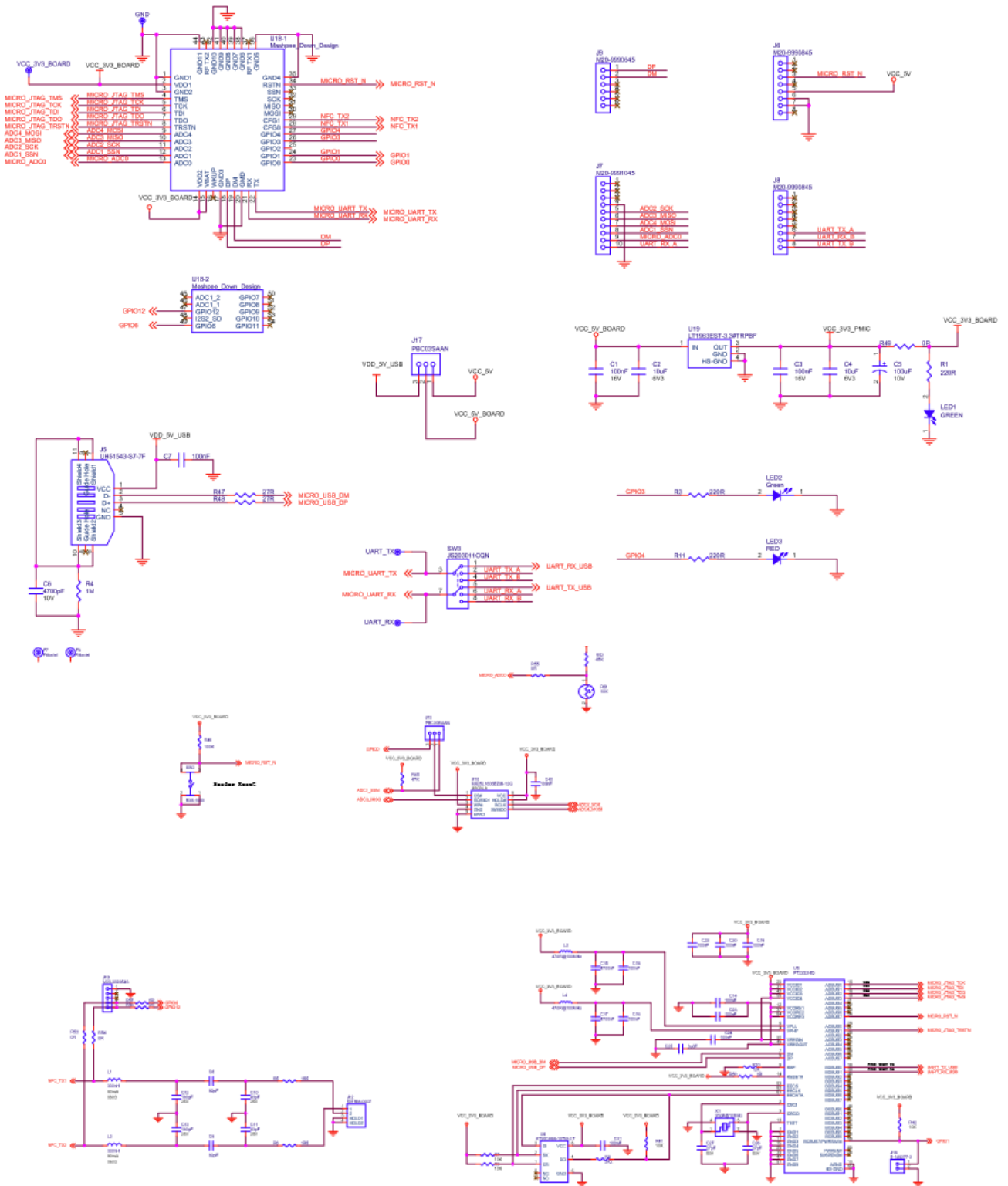
### **ISM43362-M3G-L44** *(Functional Specifications)*



**NOTE:**

- ISM43362-M3G-L44-E
- ISM43340-M4G-L44-C (+BT combo + 2.4 & 5 GHz )
- ISM43341-M4G-L44-C (+BT combo + 2.4 & 5 GHz + NFC )

# 10 ISMART Shield Schematic



## 11 ISMART BOM

Item	Reference	Description	Usage	Manufacturer	Manufacturers P/N
1	C1,C3	MLCC 1 uF 0603 +H 0% I 6V X5R	2	AVX Corporation	0603YCI 05KAT2A
2	C2,C4,C7	MLCC 1 OuF 0603 +f20% 6V3 X5R	3	Yageo	CC0603MR X5R5B B1 06
3	C5	CAP TANT 4.7uF I OV 20% 0603	1	AVX Corporation	F381 A475MMA
4	C6	MLCC 4700nF 0603 +H 0% I OV X5R	1	Yageo	CC0603KR X5R6B B 475
5	C12,C13	180pF 0603 +H 0% 25V X7R	2		
6	C14,C16,C18,C19,C20,C21,C22,C23,C24,C40	MLCC 1 00nF 0402 +H 0% I OV X5R	10	Murata	GRMI 55R61 AI 04KA0I D
7	C15,C17	MLCC 4700nF 0402 +f20% 6V3 X5R	2	Murata	GRMI 55R60J 475ME 47D
8	C25	CAP CER 3.3UF I OV 20% X5R 0402	1	TDK	CI 005X5R1 A335M050B C
9	C26,C27	MLCC 27pF 0402 +H 1% 50V COG	2	Murata	GRMI 555C1 H270F AOI D
10	C41,C42	MLCC 47pF 0402 +f5% 50V COG/NP 0	0	Yageo	CC0402J RNP O9B N470
11	J5	CONN RCP T MINI USB B SMT	1	Foxconn	UH51 543-S-7-7F
12	J6,J8	8POS SIL VERTICAL PIN HE ADER	2	Harwin	M20-9990845
13	J7	10POS SIL VERTICAL PIN HE ADER	1	Harwin	M20-9991 045
14	J9	SIL VERTICAL PC TAIL PIN HE ADER	1	Harwin	M20-9990645
15	J12	CONN HE ADER I MM2P OS R/ASMD	1	Molex	50I 568-0207
16	J13,J17	CONN HE ADER I 00S INGL S TR 3POS	2	Samtec	TSW-I 03-07-T-S
17	J16	HE ADER 2POS PITCH-2P 54 TH	1	Samtec	TSW-I 02-07-T-S
18	LED1, LED2	LED 570NM GREEN DIFF 0603 SMD	2	Lite On	LTS T-C1 90KGKT
19	LED3	LED 630NM RED DIFF 0603 SMD	1	Harwin	HSMS-C1 90
20	LI,L2	FIXED IND 330NH 80MA 750 MOHM	0	Taiyo Yuden	LKI 608R33K-T
21	L3,L4	FERRITE CHIP 470 OHM I 500MA 0603	2	Murata	BLMI 8KG47I SNI D
22	R4	RES SMB 1.5K ohm +f10%	1	Panasonic	ERJ-3GE YJ1 52V
22	R1,R3,R11	RES SMD 220 OHM I 0% I A OW 0402	3	Yageo	RC0402FR-07220RL
23	R5,R6,R49,R53,R54,R55,R56,R57	RES SMD 0.0OHM JUMPER I A OW 0603	8	Panasonic	ERJ-3GE YOR00V
24	R7,R9,R41,R42	RES SMD 10K OHM 5% I A 6W 0402	4	Yageo	RC0402JR-071 0KL
25	R8	RES SMD 2.2K OHM 1% I A 6W 0402	1	Yageo	RC0402FR-072K2L
26	R10	RES SMD 12K OHM 1% I A 6W 0402	1	Yageo	RC0402FR-071 2KL
27	R45,R52	RES SMD 47K OHM 1% I A 6W 0402	2	Yageo	RC0402FR-0747KL
28	R46	RES 30K OHM I A OW 5% 0603	1	Stackpole Electronics Inc	RMCF0603J T30K0
29	R47,R48	Fixed 27R 0402 +H 1% I A 6W	2	Vishay/Dale	CRCW040227R OF KE D
30	R50	Fixed 0R 0402 5% I A 6W	1	Vishay/Dale	CRCW04020000ZOE D
31	SW2	SWITCH TACT 6MM 230GF H=4.3MM 24V 50mA	1	Omron Electronics	B3S-I 000
32	SW3	SWITCH SLIDE DP 3T 300MA 6V	1	C&K Components	JS 2030I I CQN
33	U4	IC EEPROM 1KB IT 2MHZ 8TS SOP	1	Atmel	AT93C46E-TT-B
34	U5	IC USB HS DUAL UART/FIFO QFN-64	1	FTDI	FT232RL-REEL
35	UI0	IC FLASH I 6MB IT 86MHZ 8US ON	1	MXIC	MX25LI 606E ZUIH 2G
36	UI8	Inventek Module Options (Footprint compatible)	1	Inventek	<b>IS M43362-M4G-L44-E</b> or <b>IS M43340-M4G-L44-C</b> or <b>IS M43341-M4G-L44-C</b>
37	UI9	IC REG LDO 3.3V 1.5A LNS OT223-3	1	LINEAR TECHNOLOGY	LTI 963ES T-3.3#TRP BF
38	XI	CRYSTAL 12MHz 20pF SMD	1	FOX	FQ5032B-I 2.000
39	PCB	PCB	1	Atech	Rev B00
40	C8,C9,	CAP CER 82PF 50V NP 0 0603	2	Yageo	CC0603J RNP O9B N82
41	C10,C11	CAP CER 43PF 50V NP 0 0603	2	Kemet	C0603C430J5GACTU
43	J18	Jumper	1	Samtec	TSW-I 05-07-T-S
44	R51	Thermistor	1	Murata	NCP18xHI 03F03RB

## 12 Revision Control

Date	Author	Revision	Comment
10/7/2016	MFT	1.0	Preliminary Release

## 13 Contact Information

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