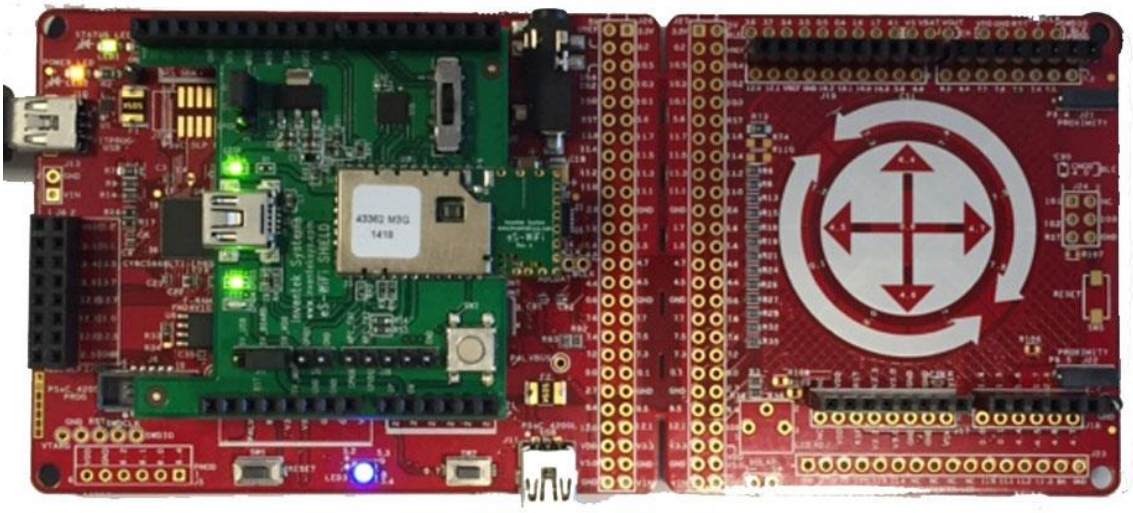
Inventek Systems
Embedding Connectivity Everywhere

ISMART

Inventek Systems Module Arduino Test

TCP Client Demo using IWIN AT Commands running on PSoC 4



Contents

1 Introduction

The Inventek ISMART (**I**nventek **S**ystems **M**odule **Ar**duino **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 TCP client software example demonstrates how simple it is to connect the Inventek eS-WiFi module to the internet for your IoT project.

2 Overview of the Software example

The PSoC eS-WiFi TCP client software will perform the following:

- Setup a PSoC UART at 115,200 baud to communicate with the Wi-Fi
- 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
    - Automatically start sending and receiving a string of date over the network back to your PC running a Hercules Echo server
    - 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:

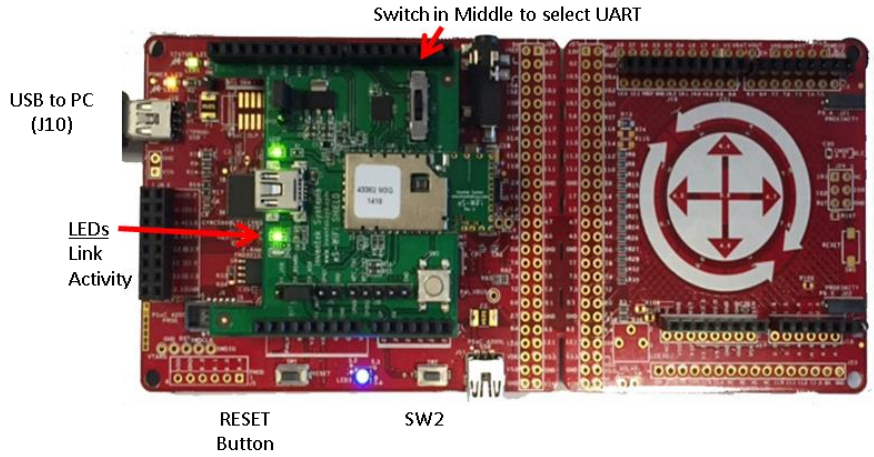
- Inventek eS-Wifi PSoC TCP Client project (esWifi.zip)
- PSoC Creator 3.3
- Hercules
- Terminal Program (Tera-term)

4 Setting up the Hardware

The ISMART (**I**nventek **S**ystems **M**odule **Ar**duino **T**est) Shield plugs directly onto a target PSOC 4 (CY8CKIT-046).

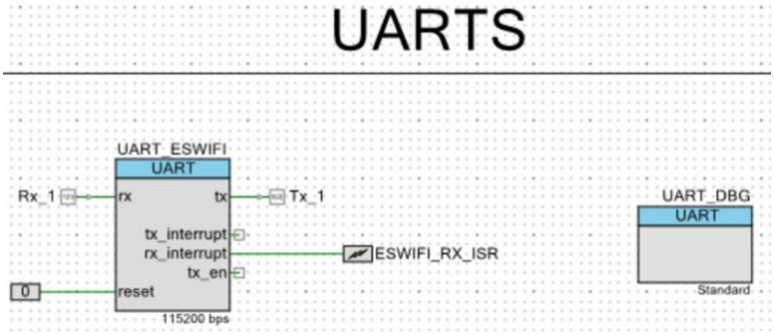
Plug into the target MCU EVK

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:

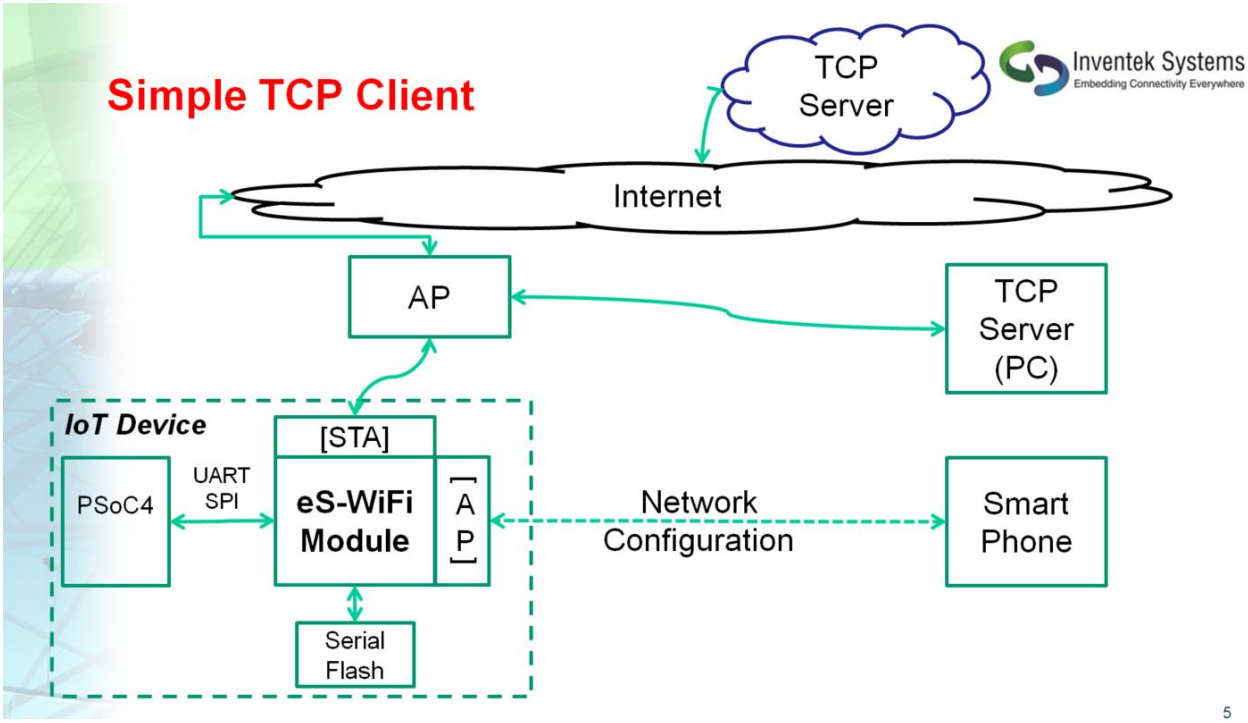
	PSoC4 --- Arduino
PSoC to ISMART	RX_1 (P1[0]) --- PD2 TX_1 (P0[2]) --- PB0
PSoC to Arduino UART Debug J10	RX (P3[1]) --- TX TX (P3[0]) --- RX



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 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 TCP Client 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 Soft AP 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. Hercules for TCP Echo Server (TCP Client App)

   a. Start Hercules app (hercules_3-2-8.exe)

   b. Select "TCP Server" tab

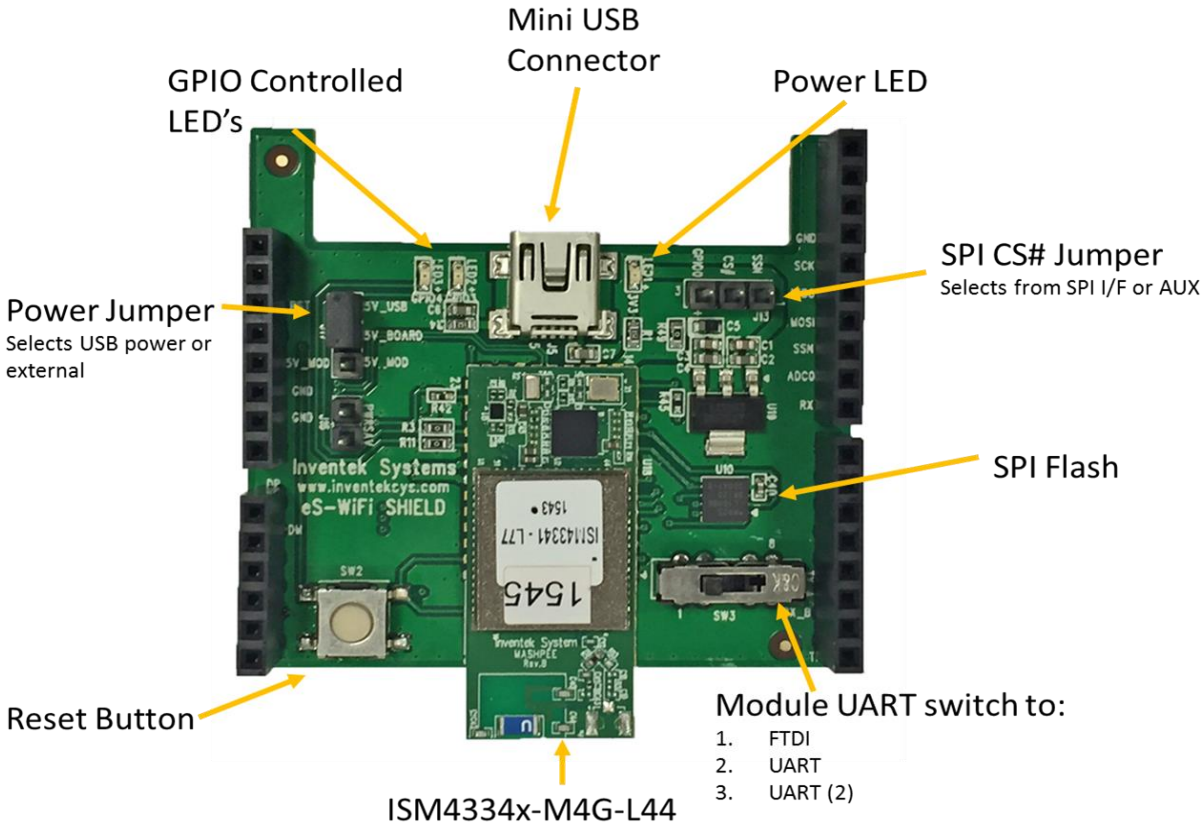
   c. Set Port to “**8002”** (Server Status section) and click "Listen"

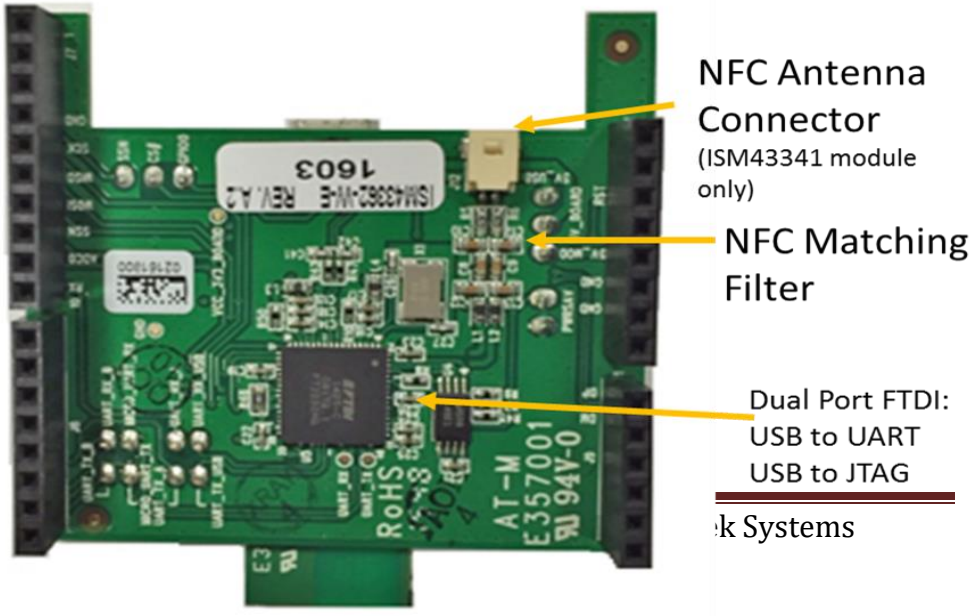
   d. Check Sever echo box (Server settings section)

7. Get PC's IP address

8. When prompted enter your PC's IP address and port if different from the values in parentheses.

6 SMART Architecture (Top/Bottom)



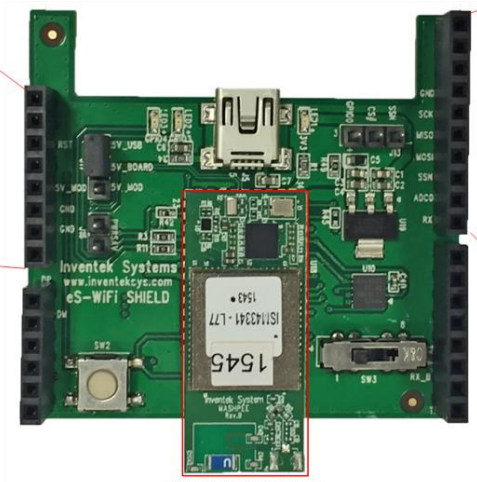


7 ISMART Components

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

ISM4334x or ISM43362	Arduino UNO	PSoc 4 BLE
	-	-
	IOREF	IOREF
	NRST	RST
	3.3V	3.3V
	5V	5V
GND	GND	GND
GND	GND	GND
-	Vin	Vin
UART_RTS	ACD0	P3.0
UART_CTS	ACD1	P3.1
-	ACD2	P3.2
-	ACD3	P3.2
-	ACD4	P3.3
-	ACD5	P3.4

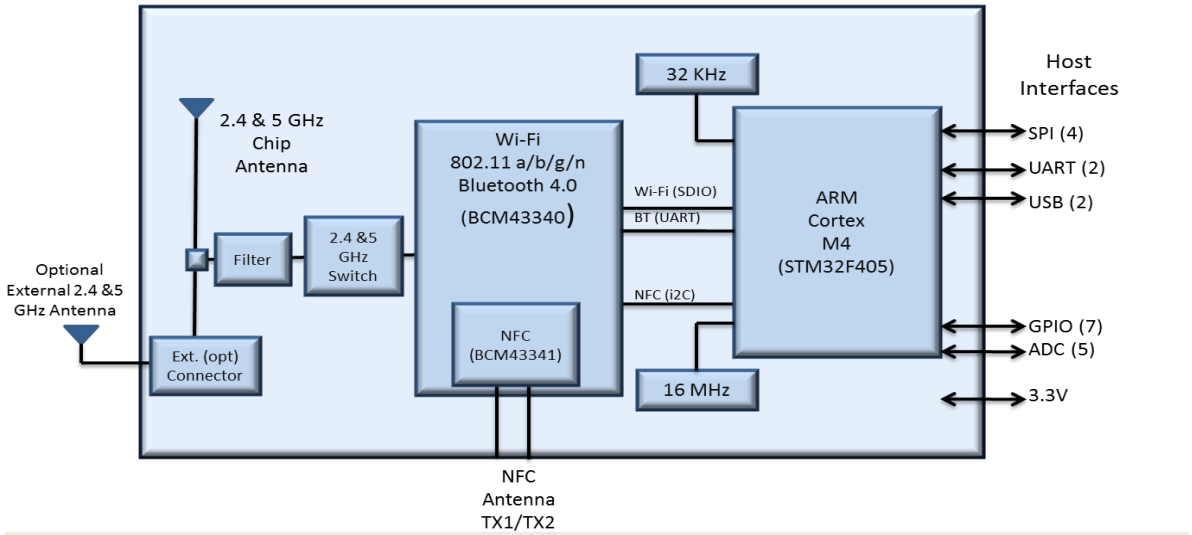


ISM43340/1-M4G-L44 or
ISM43362-M3G-L44

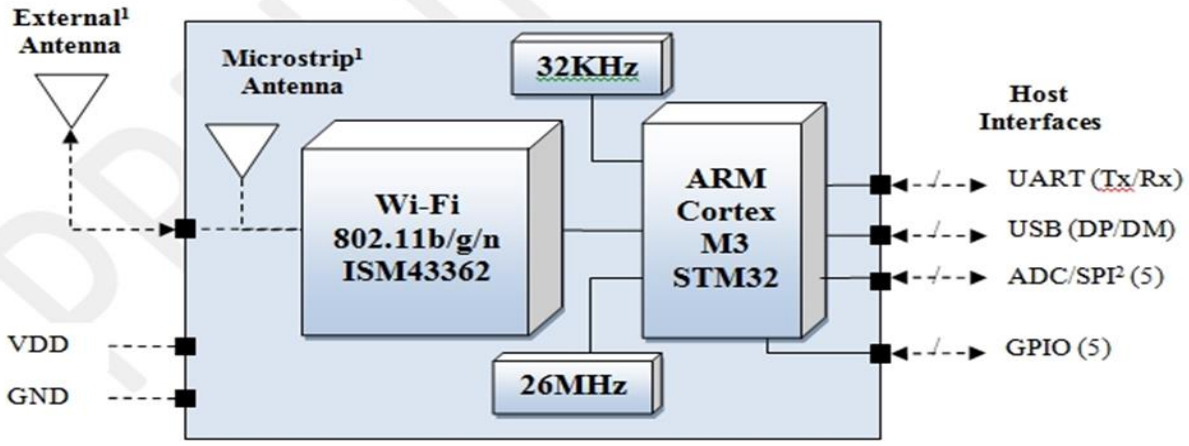
PSoC 4 BLE	Arduino UNO	ISM4334x or ISM43362
SCL	SCL	-
SDA	SDA	-
VREF	AREF	-
GND	GND	GND
P0.3	SCK	SCK
P0.1	MISO	MISO
P0.0	MOSI	MOSI
P0.2	SSN	SSN
P0.4	PB1	ADC0
P0.5	PB0	UART_RX
P1.0	PD7	-
P1.1	PD6	-
P1.2	PD5	-
P1.3	PD4	-
P1.7	PD3	-
P1.6	PD2	UART_TX
P1.5	TX	UART_RX
P1.4	RX	UART_TX

9 eS-WiFi Module Block Diagram

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



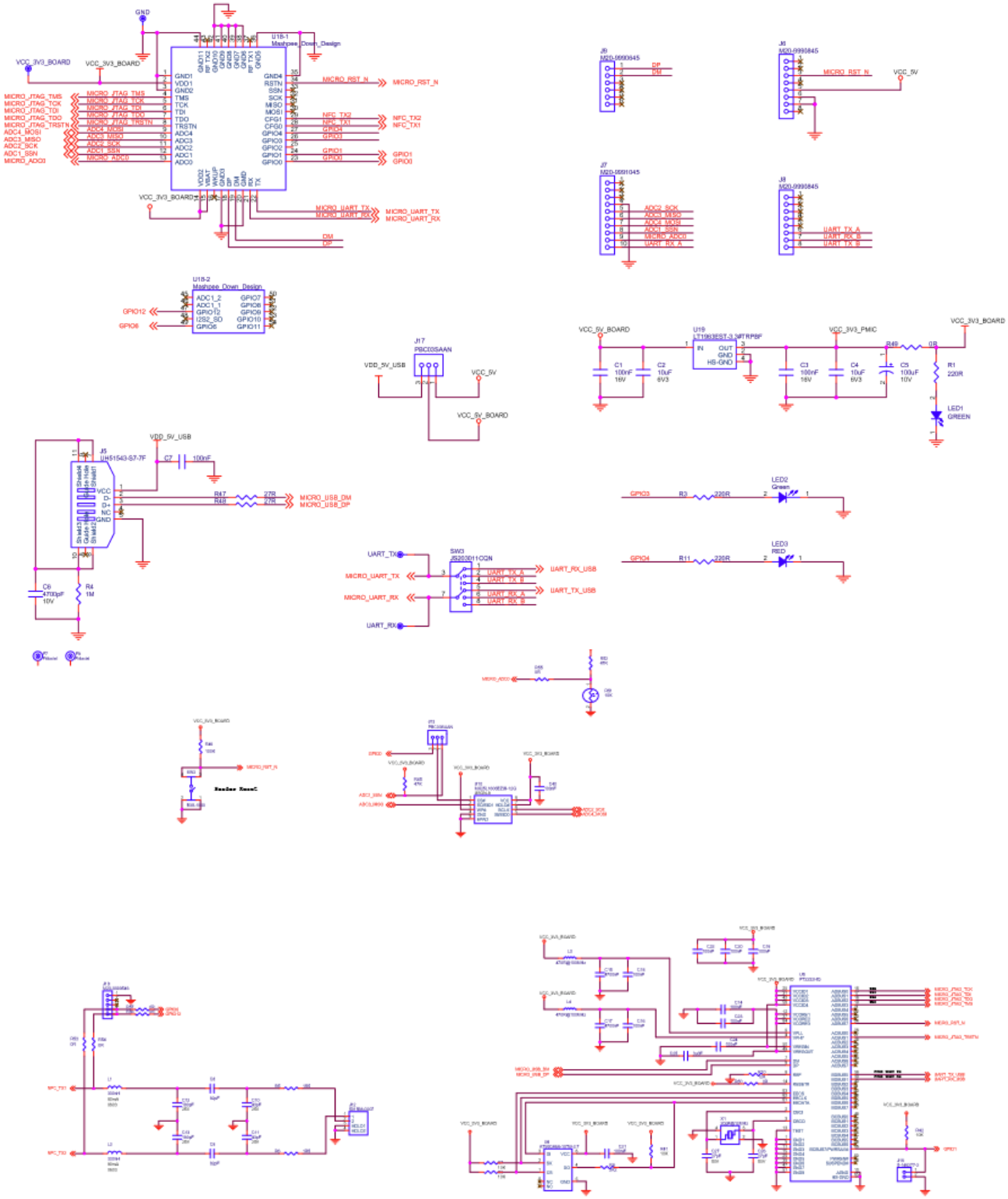
ISM43362-M3G-L44 *(Functional Specifications)*



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 +/-1 0% 1 6V X5R	2	AVX Corporation	0603YC1 05KAT2A
2	C2,C4,C7	MLCC 1 0uF 0603 +/-20% 6V3 X5R	3	Yageo	CC0603MR X5R5BB1 06
3	C5	CAP TANT 4.7uF 1 0V 20% 0603	1	AVX Corporation	F381 A475MMA
4	C6	MLCC 4700nF 0603 +/-1 0% 1 0V X5R	1	Yageo	CC0603KR X5R6BB475
5	C1 2,C1 3	1 80pf- 0603 +/-1 0% 25V X7R	2		
6	C1 4,C1 6,C1 8,C1 9,C20,C21 , C22,C23,C24,C40	MLCC 1 00nF 0402 +/-1 0% 1 0V X5R	1 0	Murata	GRM1 55R61 A1 04KA01 D
7	C1 5,C1 7	MLCC 4700nF 0402 +/-20% 6V3 X5R	2	Murata	GRM1 55R60J 475ME 47D
8	C25	CAP CER 3.3UF 1 0V 20% X5R 0402	1	TDK	C1 005X5R1 A335M050BC
9	C26,C27	MLCC 27pF 0402 +/-1 % 50V C0G	2	Murata	GRM1 555C1 H270F A01 D
1 0	C41 ,C42	MLCC 47pF 0402 +/-5% 50V C0G/NP0	0	Yageo	CC0402J RNP O9BN470
1 1	J5	CONN RCPT MINI USB B SMT	1	Foxconn	UH51 543-S7-7F
1 2	J6,J8	8P OS SIL VERTICAL PIN HEADER	2	Harwin	M20-9990845
1 3	J7	1 0P OS SIL VERTICAL PIN HEADER	1	Harwin	M20-9991 045
1 4	J9	SIL VERTICAL PC TAIL PIN HEADER	1	Harwin	M20-9990645
1 5	J1 2	CONN HEADER 1 MM 2P OS R/A SMD	1	Molex	501 568-0207
1 6	J1 3,J1 7	CONN HEADER .1 00 SINGL STR 3P OS	2	Samtec	TSW-1 03-07-T-S
1 7	J1 6	HEADER 2P OS PITCH=2P 54 TH	1	Samtec	TSW-1 02-07-T-S
1 8	LED1 , LED2	LED 570NM GREEN DIFF 0603 SMD	2	LiteOn	LTST-C1 90KGKT
1 9	LED3	LED 630NM HE RED DIFF 0603 SMD	1	Harwin	HSMS-C1 90
20	L1 ,L2	FIXED IND 330NH 80MA 750 MOHM	0	Taiyo Yuden	LKI 608R33K-T
21	L3,L4	FERRITE CHIP 470 OHM 1 500MA 0603	2	Murata	BLM1 8KG471 SN1 D
22	R4	RES SMB 1 .5K ohm +/-1 0%	1	Panasonic	ERJ-3GE YJ1 52V
22	R1 ,R3,R1 1	RES SMD 220 OHM 1 0% 1 /1 0W 0402	3	Yageo	RC0402F R-07220RL
23	R5,R6,R49, R53,R54,R55,R56,R57	RES SMD 0.0OHM JUMPER 1 /1 0W 0603	8	Panasonic	ERJ-3GE Y0R00V
24	R7,R9,R41 ,R42	RES SMD 1 0K OHM 5% 1 /1 6W 0402	4	Yageo	RC0402J R-071 0KL
25	R8	RES SMD 2.2K OHM 1 % 1 /1 6W 0402	1	Yageo	RC0402F R-072K2L
26	R1 0	RES SMD 1 2K OHM 1 % 1 /1 6W 0402	1	Yageo	RC0402F R-071 2KL
27	R45, R52	RES SMD 47K OHM 1 % 1 /1 6W 0402	2	Yageo	RC0402F R-0747KL
28	R46	RES 30K OHM 1 /1 0W 5% 0603	1	Stackpole Electronics Inc	RMCF0603J T30K0
29	R47,R48	Fixed 27R 0402 +/-1 % 1 /1 6W	2	Vishay/Dale	CRCW040227R0F KED
30	R50	Fixed 0R 0402 5% 1 /1 6W	1	Vishay/Dale	CRCW04020000Z0E D
31	SW2	SWITCH TACT 6MM 230GF H=4.3MM 24V 50mA	1	Omron Electronics	B3S-1 000
32	SW3	SWITCH SLIDE DP3T 300MA 6V	1	C&K Components	JS 2030I 1 CQN
33	U4	IC EEPROM 1 KBIT 2MHZ 8TSSOP	1	Atmel	AT93C46E-TH-B
34	U5	IC USB HS DUAL UART/FIFO QFN-64	1	FTDI	FT2232HQ-REEL
35	UI 0	IC FLASH 1 6MBIT 86MHZ 8USON	1	MXIC	MX25L1 606EZUI-1 2G
36	UI 8	Inventek Module Options (Footprint compatible)	1	Inventek	**ISM43362-M3G-L44-E or ISM43340-M4G-L44-C or ISM43341 -M4G-L44-C**
37	UI 9	IC REG LDO 3.3V 1 .5A LN SOT223-3	1	LINEAR TECHNOLOGY	LT1 963ES T-3.3#TRPBF
38	XI	CRYSTAL 1 2MHz 20pF SMD	1	FOX	FQ5032B-1 2.000
39	PCB	PCB	1	Atech	Rev B00
40	C8,C9,	CAP CER 82PF 50V NP0 0603	2	Yageo	CC0603J RNP O9BN82
41	C1 0,C1 1	CAP CER 43PF 50V NP0 0603	2	Kemet	C0603C430J 5GACTU
43	J1 8	Jumper	1	Samtec	TSW-1 05-07-T-S
44	R51	Themistor	1	Murata	NCP1 8xH1 03F03RB

12 Revision Control

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

13 Contact Information

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