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# ISMART

## Inventek Systems Module Arduino Test

### User's Manual

*Wi-Fi, BT/BLE & NFC IoT Arduino Shields*



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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 compliant shield suited for all of your wireless application needs.

The ISMART platform enables customers to quickly launch IoT products based on a host MCU of your choice and Broadcom's Wi-Fi, BT/BLE and NFC combo radios. The robust user friendly Inventek AT command set FW, IWIN (Inventek Wireless Interoperability Network), makes it easy to take any Host microcontroller and communicate with any Inventek eS-WiFi (embedded Serial Wi-Fi), module, thus allowing customers to quickly get a Wi-Fi connected application up and running.

The document provides a detailed hardware requirements overview and all associated board connections for ISMART.

## 2 Overview

The ISMART shield is an embedded wireless internet connectivity platform that operates in the 2.4 & 5.0 GHz spectrum. The ISMART hardware includes the option for an Inventek eS-WiFi module consisting of the Broadcom BCM43362 (2.4GHz), or BCM43341/0 Dual-Band (2.4GHz / 5GHz) 802.11 a/b/g/n MAC/Baseband/Radio with Integrated Bluetooth 4.0 and NFC.

The ISMART shield is compatible with the Arduino UNO R3 connector layout. The Inventek eS-WiFi module options supported by ISMART require no operating system and contain an integrated TCP/IP stack. The Inventek eS-WiFi modules can be used with Inventek's AT Command Set FW, IWIN (Inventek Wireless Interoperability Network), or with Broadcom's WICED™ (Wireless Internet Connectivity for Embedded Devices ), SDK 3.1.2 or later.

### ***ISMART Hardware Features:***

- Uses the Inventek ISM43341/0 or ISM43362 eS-WiFi modules leveraging Broadcom's leading edge radio devices.
- Includes an ST Microcontroller Cortex M3 STM32F204 (ISM43362) or Cortex M4 STM32F405 (ISM43341/0), MCU.
- Bluetooth 4.0 including BLE support.
- 2.4GHz (ISM43362) or 2.4/5 GHz (ISM43341/0), chip antenna on module.
- U.FL external antenna connector option for both modules
- Configurable using Inventek AT Commands FW (IWIN).
- Host interface: UART, SPI.
- Input Power: 5.0 V

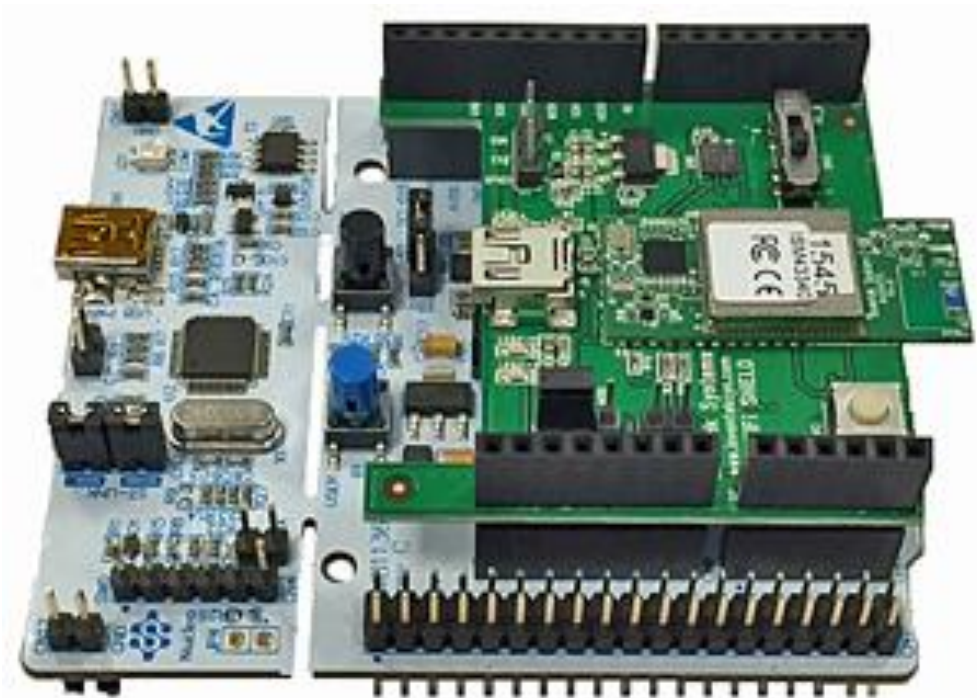
- Near Field Communication (NFC option), with the ISM43341/0 modules.
- Dual Port FTDI for firmware development and testing.
- SPI Flash for Over The Air (OTA) updates
- FCC, IC and CE approval on all module options.
- All eS-WiFi module options also support a standard L44 form factor to enable customers to migrate between module options once in mass production without requiring any board layout changes.

### 3 Hardware Requirements

The ISMART (Inventek Systems Module Arduino Test) Shield plugs directly onto a target Host Arduino compatible MCU:

**Figure 3.1 Inventek ISMART & ST Micro STM32 Nucleo example:**

- The Inventek ISMART plugs directly onto any target STM32 Nucleo board.



The interconnection between the STM32 Nucleo and the ISMART Shield can be configured as a UART or SPI interface.

## 4.0 System Requirements

The ISMART Shield requires the following hardware:

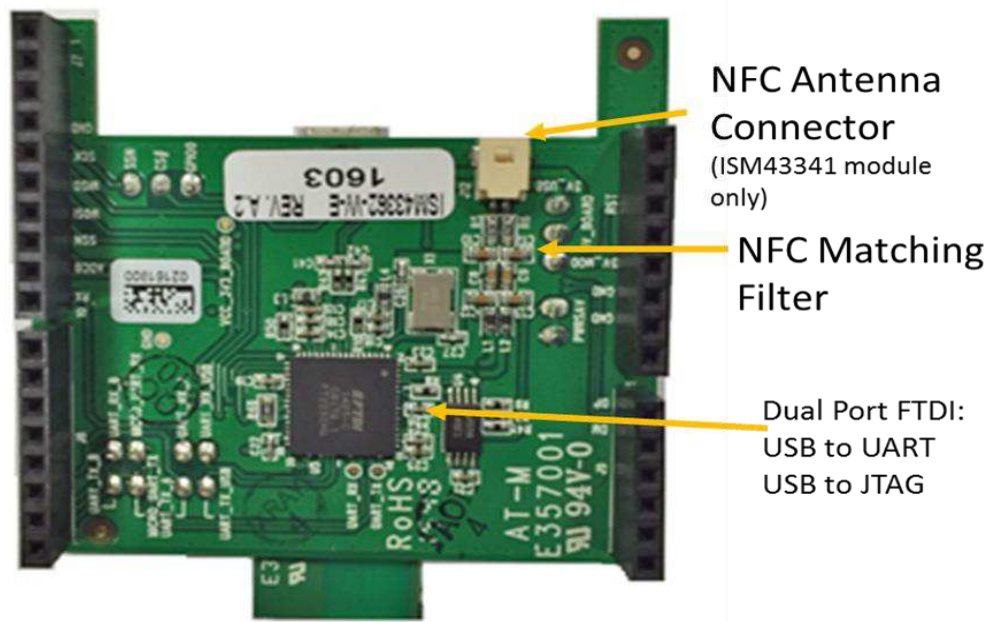
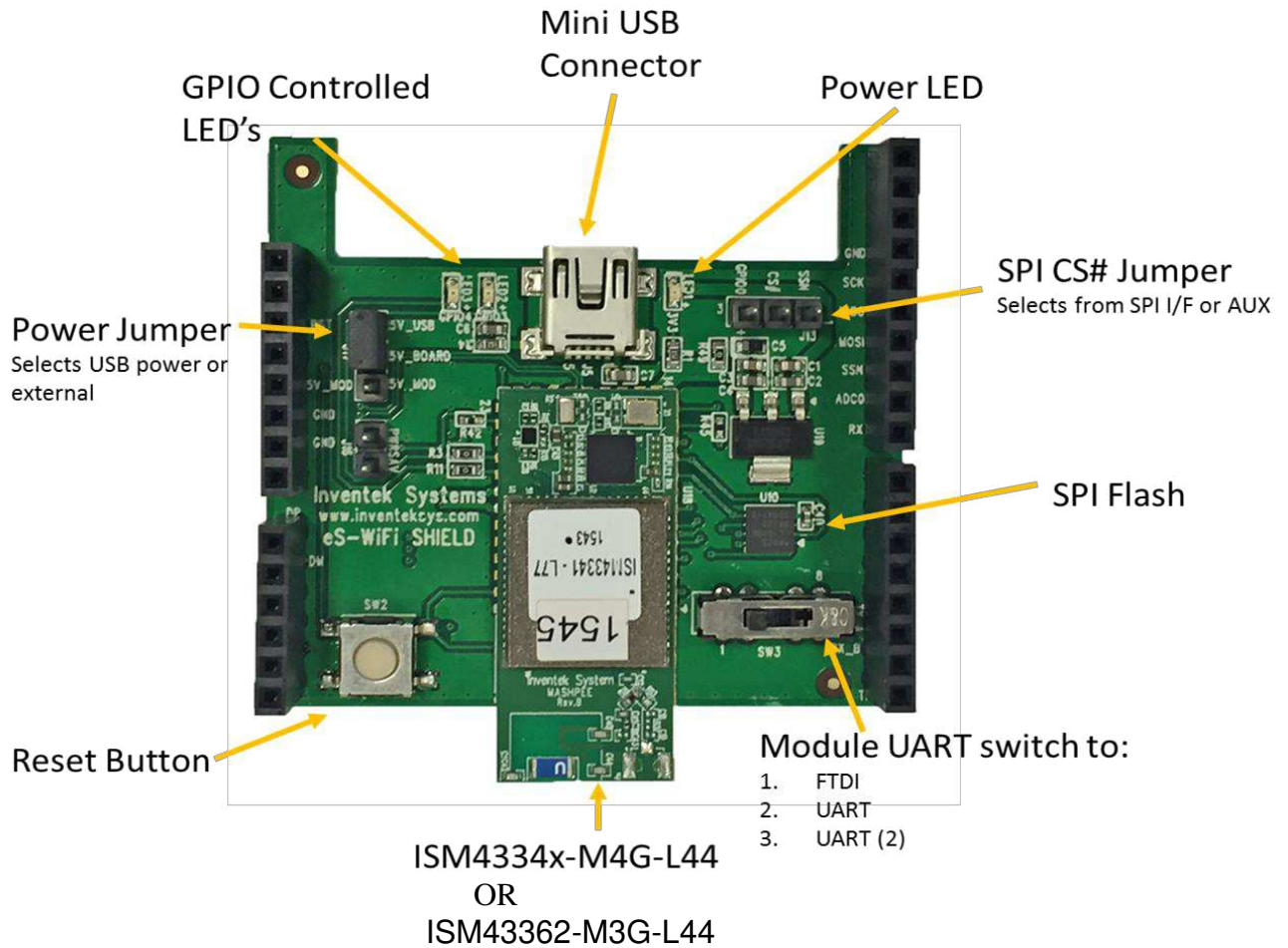
Option 1: Communicating using STM32 Microcontroller

1. Windows PC to install target MCU software package
  - a. Example: X-Nucleo-ISMART-XXX for the **ISMART & STM32 Nucleo**
    - i. Any target ST Micro Nucleo board
    - ii. Target MCU Design Environment SW
      1. Example: X-CUBE-ISMART firmware for the **ISMART & STM32 Nucleo**
        - a. Related documents found on ST.com

Option 2: Communicating using PC over USB for evaluation

1. Windows PC to install Inventek [PC Demo software](#)
  - a. Load Drivers on Windows PC
  - b. Send AT commands using demo software

## 4.1 ISMART Architecture (Top/Bottom)



## 4.2 ISMART Components

<b>Position</b>	<b>Description</b>	<b>Case</b>
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 <i>USART1 PA9/10</i> <i>USART2 PA2/2</i>
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

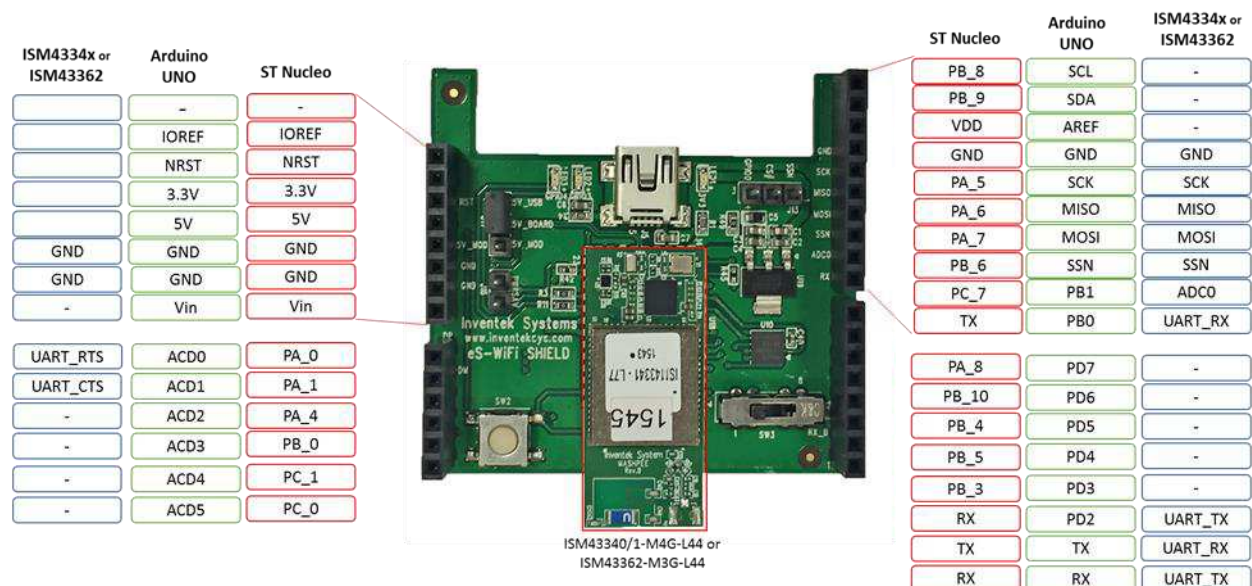


## 4.3 ISMART Connections

The ISMART Shield connection scheme option:

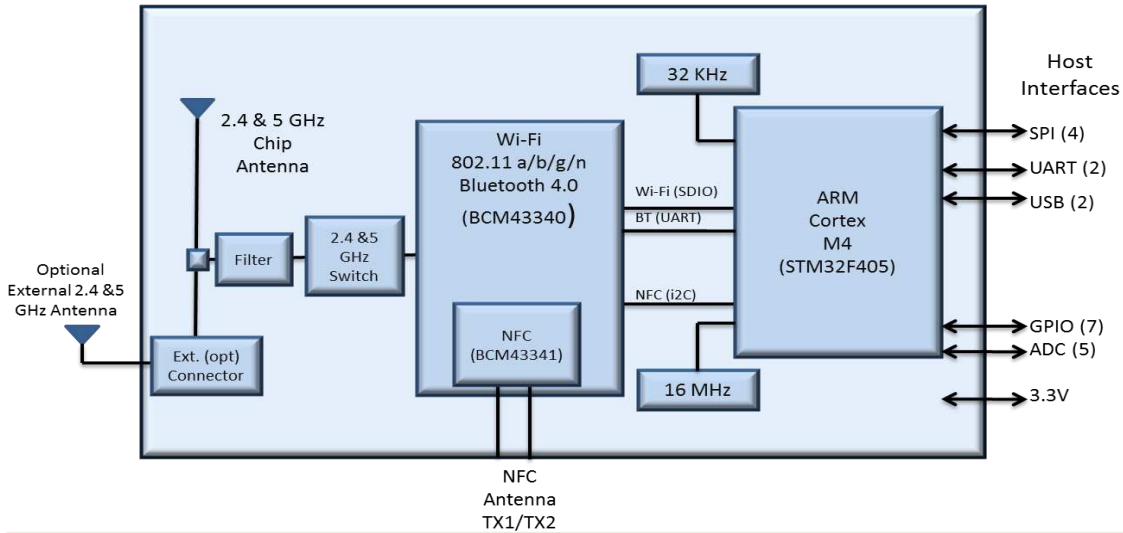
1. Connects directly to your PC using the Mini USB connector and then run the Inventek IWIN AT Commands FW.
  - a. Power Jumper in 5V\_USB
  - b. [www.inventeksys.com/IWIN](http://www.inventeksys.com/IWIN) download PC demo app and install drivers
  - c. RUN Inventek IWIN AT Commands with Tera-term
    - i. Baud rate: 115,200, Parity None, Data Width 8, Stop Bits 1
    - ii. SW3 in FTDI position 1
2. Plug into the target MCU EVK
  - a. Example: STM Microcontroller board and run the Nucleo software
    - i. Power Jumper 5V\_VDD
    - ii. ST Nucleo SDK
    - iii. SW3 in UART Position 2

## 4.4 The ISMART–ST Nucleo-Arduino Pin Out Map

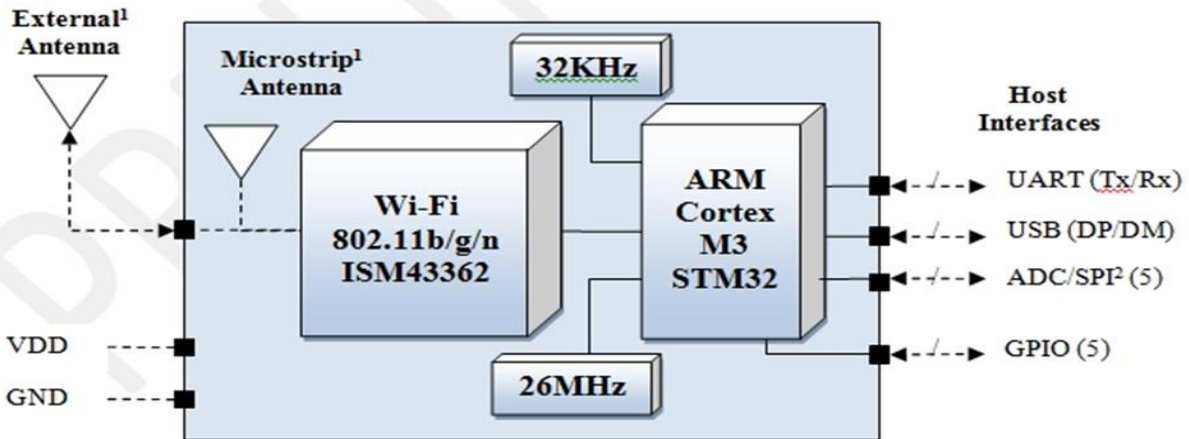


## 4.5 eS-WiFi Module Block Diagram

### ISM43340/1-M4G-L44 [\(Functional Specifications\)](#)



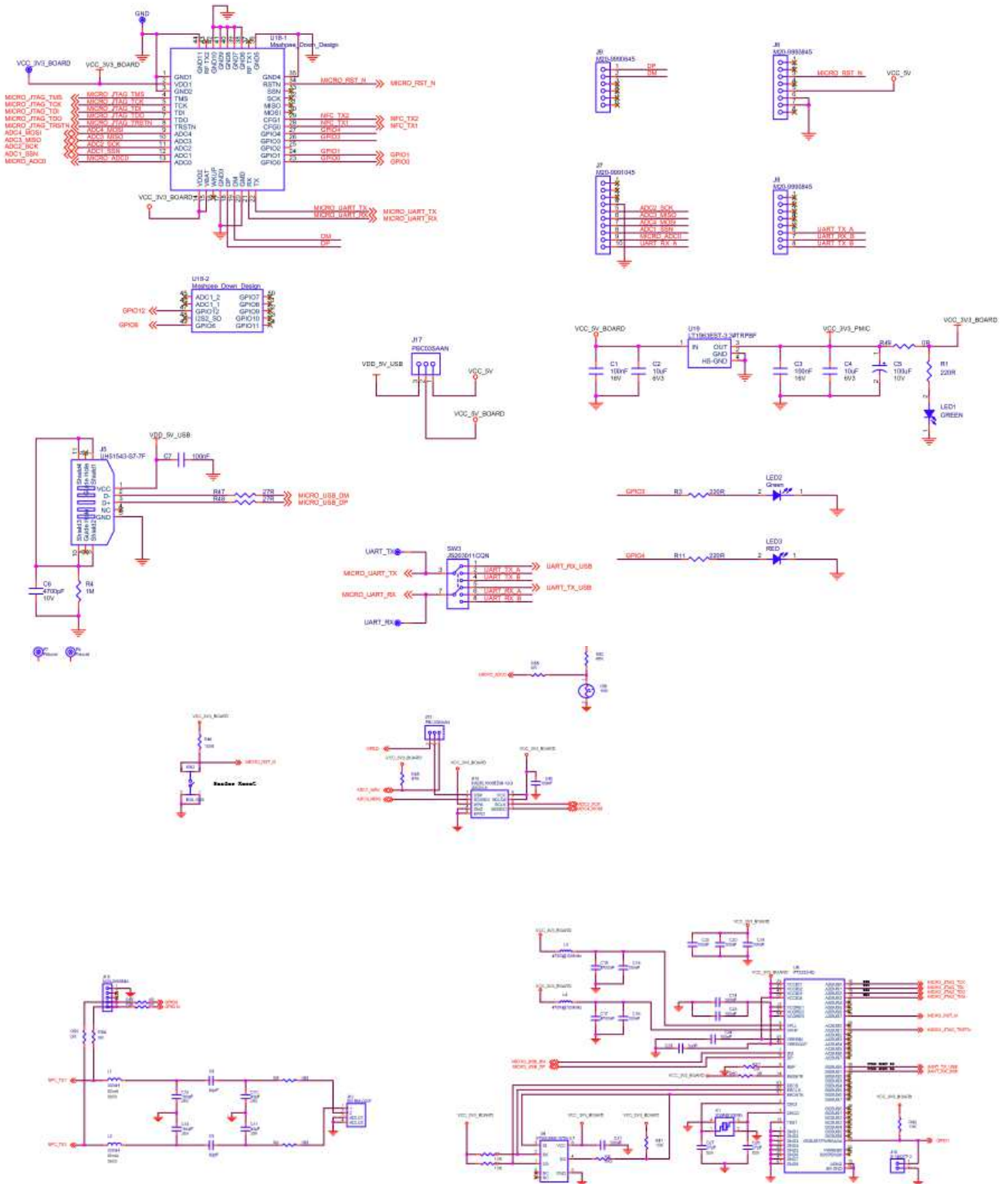
### ISM43362-M3G-L44 [\(Functional Specifications\)](#)



#### 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 )

## 5.0 ISMART Shield Schematic



## 6.0 ISMART BOM

Item	Reference	Description	Usage	Manufacturer	Manufacturers P/N
1	C1,C3	MLCC 1uF 0603 +/-10% 16V X5R	2	AVX Corporation	0603YC105KAT2A
2	C2,C4,C7	MLCC 10uF 0603 +/-20% 6V3 X5R	3	Yageo	CC0603MRX5R5BB106
3	C5	CAP TANT 4.7uF 10V 20% 0603	1	AVX Corporation	F381A475MMA
4	C6	MLCC 4700nF 0603 +/-10% 10V X5R	1	Yageo	CC0603KRX5R6BB475
5	C12,C13	180pf- 0603 +/-10% 25V X7R	2		
6	C14,C16,C18,C19,C20,C21, C22,C23,C24,C40	MLCC 100nF 0402 +/-10% 10V X5R	10	Murata	GRM155R61A104KA01D
7	C15,C17	MLCC 4700nF 0402 +/-20% 6V3 X5R	2	Murata	GRM155R60J475ME47D
8	C25	CAP CER 3.3UF 10V 20% X5R 0402	1	TDK	C1005X5R1A335M050BC
9	C26,C27	MLCC 27pF 0402 +/-1% 50V COG	2	Murata	GRM1555C1H270FA01D
10	C41,C42	MLCC 47pF 0402 +/-5% 50V COG/NP0	0	Yageo	CC0402JRNPO9BN470
11	J5	CONN RCPT MINI USB B SMT	1	Foxconn	UH51543-S7-7F
12	J6,J8	8POS SIL VERTICAL PIN HEADER	2	Harwin	M20-9990845
13	J7	10POS SIL VERTICAL PIN HEADER	1	Harwin	M20-9991045
14	J9	SIL VERTICAL PC TAIL PIN HEADER	1	Harwin	M20-9990645
15	J12	CONN HEADER 1MM 2POS R/A SMD	1	Molex	501568-0207
16	J13,J17	CONN HEADER .100 SINGL STR 3POS	2	Samtec	TSW-103-07-T-S
17	J16	HEADER 2POS PITCH=2P54 TH	1	Samtec	TSW-102-07-T-S
18	LED1, LED2	LED 570NM GREEN DIFF 0603 SMD	2	LiteOn	LTST-C190KGKT
19	LED3	LED 630NM HE RED DIFF 0603 SMD	1	Harwin	HSMS-C190
20	L1,L2	FIXED IND 330NH 80MA 750 MOHM	0	Taiyo Yuden	LK1608R33K-T
21	L3,L4	FERRITE CHIP 470 OHM 1500MA 0603	2	Murata	BLM18KG471SN1D
22	R4	RES SMB 1.5K ohm +/- 10%	1	Panasonic	ERJ-3GEYJ152V
22	R1,R3,R11	RES SMD 220 OHM 10% 1/10W 0402	3	Yageo	RC0402FR-07220RL
23	R5,R6,R49, R53,R54,R55,R56,R57	RES SMD 0.0OHM JUMPER 1/10W 0603	8	Panasonic	ERJ-3GEY0R00V
24	R7,R9,R41,R42	RES SMD 10K OHM 5% 1/16W 0402	4	Yageo	RC0402JR-0710KL
25	R8	RES SMD 2.2K OHM 1% 1/16W 0402	1	Yageo	RC0402FR-072K2L
26	R10	RES SMD 12K OHM 1% 1/16W 0402	1	Yageo	RC0402FR-0712KL
27	R45, R52	RES SMD 47K OHM 1% 1/16W 0402	2	Yageo	RC0402FR-0747KL
28	R46	RES 30K OHM 1/10W 5% 0603	1	Stackpole Electronics Inc	RMCF0603JT30K0
29	R47,R48	Fixed 27R 0402 +/-1% 1/16W	2	Vishay/Dale	CRCW040227R0FKED
30	R50	Fixed 0R 0402 5% 1/16W	1	Vishay/Dale	CRCW04020000Z0ED
31	SW2	SWITCH TACT 6MM 230GF H=4.3MM 24V 50mA	1	Omron Electronics	B3S-1000
32	SW3	SWITCH SLIDE DP3T 300MA 6V	1	C&K Components	JS203011CQN
33	U4	IC EEPROM 1KBIT 2MHZ 8TSSOP	1	Atmel	AT93C46E-TH-B
34	U5	IC USB HS DUAL UART/FIFO QFN-64	1	FTDI	FT2232HQ-REEL
35	U10	IC FLASH 16MBIT 86MHZ 8USON	1	MXIC	MX25L1606EZUI-12G
36	U18	Inventek Module Options ( Footprint compatible)	1	Inventek	<b>ISM43362-M3G-L44-E or ISM43340-M4G-L44-C or ISM43341-M4G-L44-C</b>
37	U19	IC REG LDO 3.3V 1.5A LN SOT223-3	1	LINEAR TECHNOLOGY	LT1963EST-3.3#TRPBF
38	X1	CRYSTAL 12MHz 20pF SMD	1	FOX	FQ5032B-12.000
39	PCB	PCB	1	Atech	Rev B00
40	C8,C9,	CAP CER 82PF 50V NP0 0603	2	Yageo	CC0603JRNPO9BN82
41	C10,C11	CAP CER 43PF 50V NP0 0603	2	Kemet	C0603C430J5GACTU
43	J18	Jumper	1	Samtec	TSW-105-07-T-S
44	R51	Themistor	1	Murata	NCP18xH103F03RB

## 7.0 Revision Control

Document : ISMART User's Manual	Arduino Shield
External Release	DOC-DS-200107

Date	Author	Revision	Comment
12/27/2015	KMT	1.1	Preliminary Release

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