CC320FxA Wi-Fi IoT Wireless Module

Features

- Pin-to-pin compatible with CC3200MOD Wi-Fi CERTIFIED™ module
- External RF antenna for greatest flexibility
- Few external BOM-count to create a fully functional application circuit
- Texas Instrument CC3200 Wireless System-on-Chip
- ARM Cortex-M4 Core running at 80 MHz
- 256-KB RAM, Peripheral Drivers in ROM
- +17dBm output power in 802.11b mode
- Hardware accelerator engine for encryption and authentication operations
- AES, DES, 3DES, SHA, MD5, and CRC hardware-based algorithm
- Low-power consumption, 7uA hibernate mode with Real Time Clock (RTC)
- Dual UART, dual SPI, I2C, 12S, SDIO, Quad 12-bit ADC, PWM, GPIO
- 8-Bit, Fast, Parallel Camera Interface
- Built-in 1-MB SPI Serial Flash, RF Filter, and 32.768-kHz Crystal
- 802.11 b/g/n protocol
- Wi-Fi 2.4 GHz, support WEP / WPA / WPA2 authentication
- Full Wi-Fi and TCP/IP (Ipv4) protocol stack
- 8 Simultaneous TCP, UDP, or RAW Sockets up to 16 Mbps throughput
- 2 Simultaneous TLS v1.2 or SSL 3.0 secured and encrypted connections
- Station / softAP / Station+AP mode support
- Wi-Fi Direct (P2P) support
- Integrated RF Shied can models available (CC320FNA-S / CC320FIA-S)
- FCC Certification: Available for CC320FNA-S and CC320FIA-S
- REACH / RoHS compliant
- Dimensions:
  - 20.5 × 17.5 x 2.1 mm (CC320FNA)
  - 20.5 × 17.5 x 2.1 mm (CC320FIA)
  - 20.5 × 17.5 x 2.7 mm (CC320FNA-S)
  - 20.5 × 17.5 x 2.7 mm (CC320FIA-S)

Applications

- Internet of Things (IoT) Devices
- Remote Control and Assisted Living
- Medical and Healthcare Monitors
- Sports and Fitness Equipments
- RC and Interactive Toys
- Home/Building Automation
- Machine-to-Machine Data Transfer
- Remote Sensor Networks
- Wireless Alarm and Security
- Wireless Doorbell and Camera
- Message Display
- Lighting and HAVC Control

Standard Firmwares Available

- Check out CC32xx SDK Sample Applications available on TI web site

General Electrical Specification

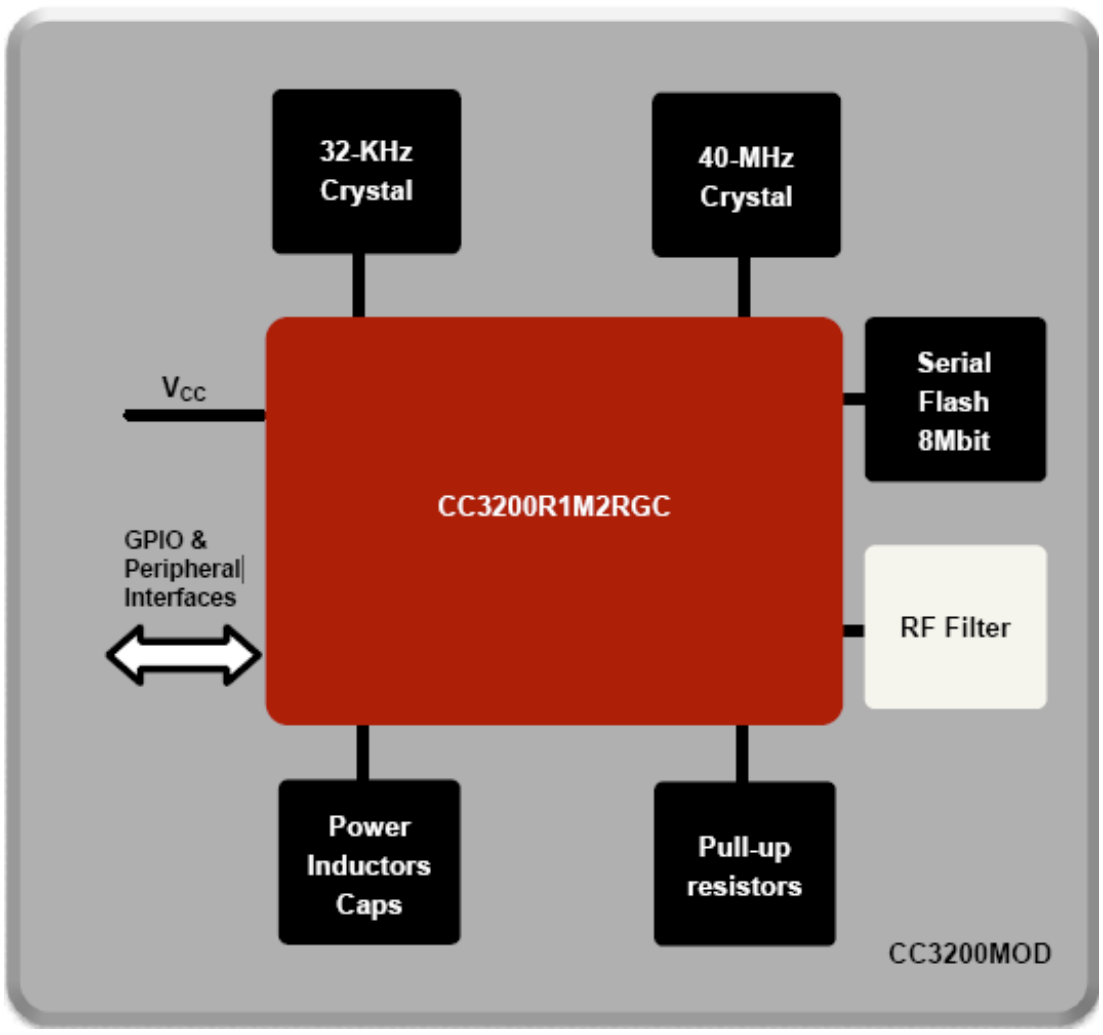
Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 ℃	+85 ℃
Supply Voltage VDD	-0.5 V	3.8 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range	-20 ℃	+70 ℃
Supply Voltage VDD, VDDIO	2.3 V	3.6 V

Parameter	Description	Min.	Typ.	Max.	Units
Operating Frequency		2412MHz-2484MHz			
Modulation Method	802.11b mode 802.11g mode 802.11n mode	DSSS OFDM OFDM			
Air transmission rate		Adaptive			
RF Output Power	DSSS-1Mbps CCK-11Mbps OFDM-54Mbps			+17 +17 +13	dBm dBm dBm
RX Sensitivity	DSSS-1Mbps CCK-11Mbps OFDM-54Mbps			-94 -87 -73	dBm dBm
Current Consumption – TX	OFDM-54Mbps		230		mA
Current Consumption – RX	OFDM-54Mbps		60		mA
Current Consumption – Standby	DTIM1		0.9		mA
Current Consumption – Deep Sleep	LPDS @			275	uA
Current Consumption – Hibernate	with RTC		7		uA

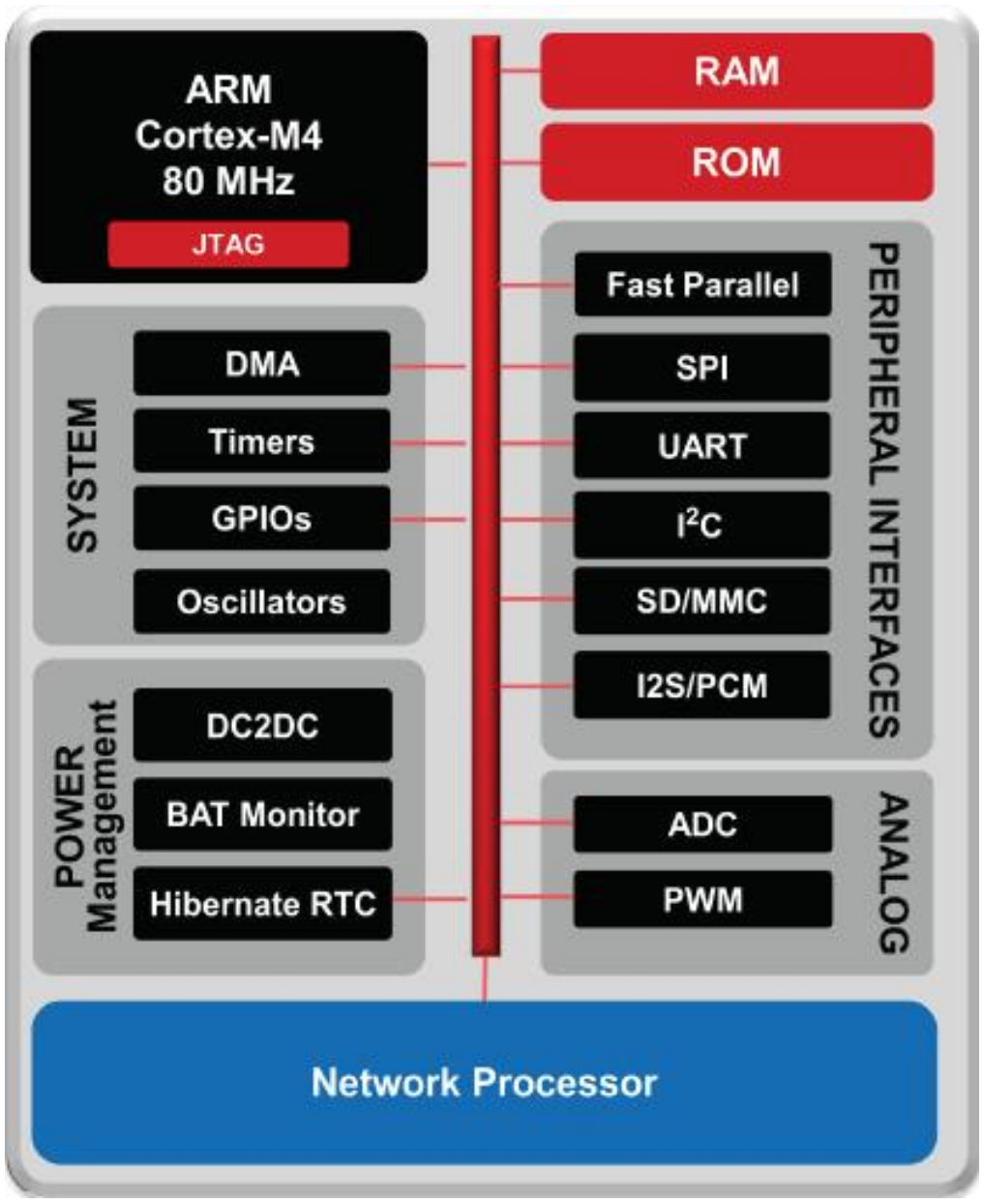
* Current consumption figure are at 3.6V

Block Diagram

Module Functional Block Diagram



CC3200 Hardware Overview



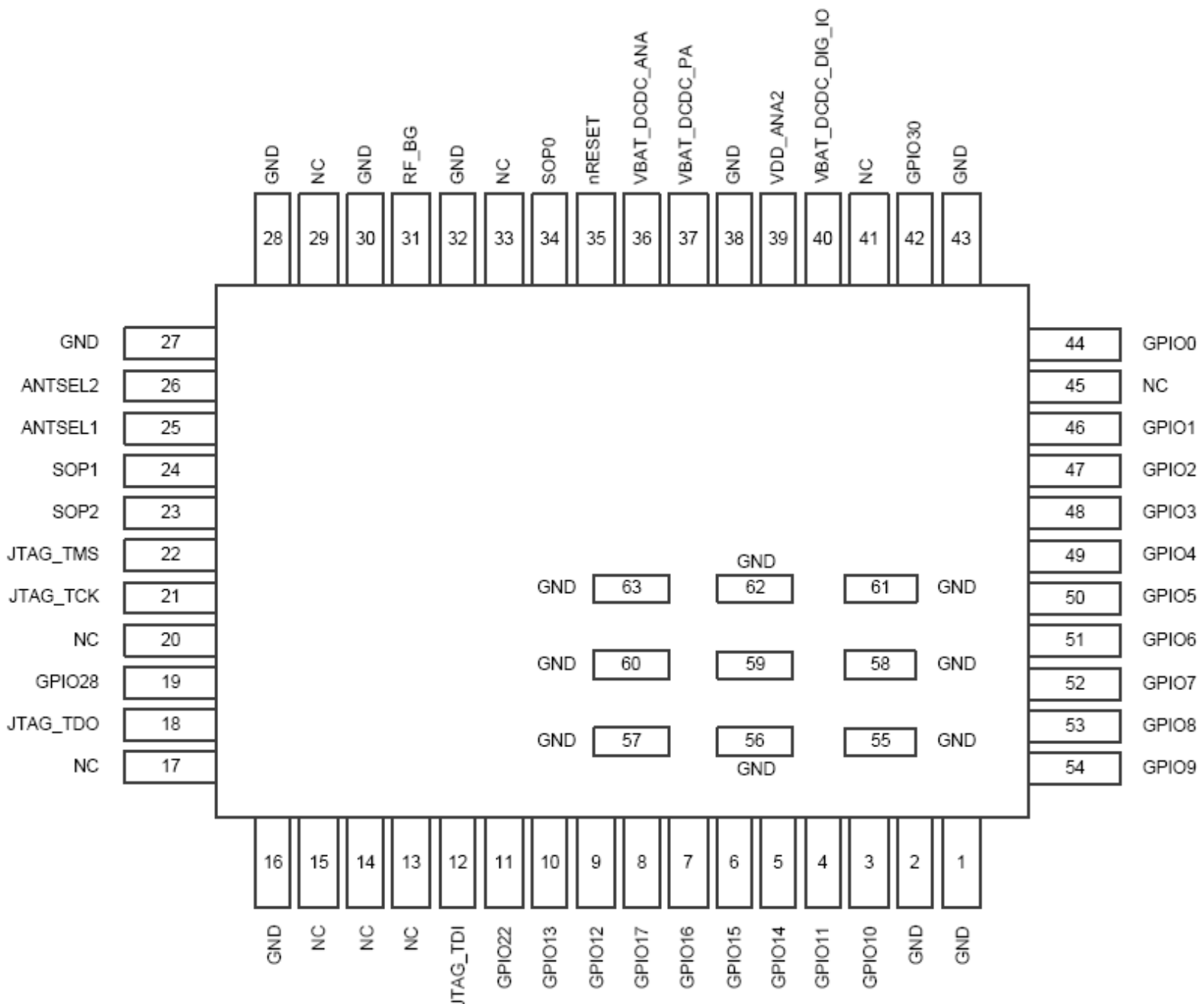
Pins Configurations

PIN	NAME	TYPE	FUNCTION	TYPICAL USAGE[1]
1	GND	Power	Ground	
2	GND	Power	Ground	
3	GPIO10	Digital I/O	GPIO [2 3 4]	
4	GPIO11	Digital I/O	GPIO [2 3 4]	
5	GPIO14	Digital I/O	GPIO [2 3 4]	
6	GPIO15	Digital I/O	GPIO [2 3 4]	
7	GPIO16	Digital I/O	GPIO [2 3 4]	
8	GPIO17	Digital I/O	GPIO [2 3 4]	
9	GPIO12	Digital I/O	GPIO [2 3 4]	
10	GPIO13	Digital I/O	GPIO [2 3 4]	
11	GPIO22	Digital I/O	GPIO [2 3 4]	
12	JTAG_TDI	Digital I/O	GPIO [2 3 4] / JTAG_TDI	GPIO, Debug port
13	NC	-	Reserved	
14	NC	-	Reserved	
15	NC	-	Reserved	
16	GND	Power	Ground	
17	NC	-	Reserved	
18	JTAG_TDO	Digital I/O	GPIO [2 3 4] / JTAG_TDO	GPIO, Debug port
19	GPIO28	Digital I/O	GPIO [2 3 4]	

20	NC	-	Reserved. Do not connect	
21	JTAG_TCK	Digital I/O	JTAG_TCK (needs 100-kΩ pulldown resistor to ground)	Debug port
22	JTAG_TMS	Digital I/O	JTAG_TMS (leave unconnected if not used on product)	Debug port
23	SOP2	-	SOP	Add 2.7-kΩ pulldown resistor to ground needed for functional mode. Add option to pullup required for entering the UART load mode for flashing
24	SOP1	-	Reserved. Do not connect	
25	ANTSEL	Digital I/O	GPIO [2 3 4] / Antenna selection control	
26	ANTSEL	Digital I/O	GPIO [2 3 4] / Antenna selection control	
27	GND	Power	Ground	
28	GND	Power	Ground	
29	NC	-	Reserved	
30	GND	Power	Ground	
31	RF_BG[6]	RF I/O	2.4-GHz RF input/output	Connect to antenna
32	GND	Power	Ground	
33	NC	-	Reserved	
34	SOP0	-	SOP	Optional 10-kΩ pullup if user chooses to use SWD debug mode instead of 4-wire JTAG
35	nRESET	Digital Input	Power on reset (external RC not needed)	Held low until the VBAT supply to the module is driven and stable
36	VBAT_DCDC_ANA	Power	2.3v to 3.6v main power supply [5]	3.3v power input
37	VBAT_DCDC_PA	Power	2.3v to 3.6v main power supply [5]	3.3v power input
38	GND	Power	Ground	
39	NC	-	Reserved. Do not connect	
40	VBAT_DCDC_DIG_IO	Power	2.3v to 3.6v main power supply [5]	3.3v power input
41	NC	-	Reserved	
42	GPIO28	Digital I/O	GPIO [2 3 4]	
43	GND	Power	Ground	
44	GPIO0	Digital I/O	GPIO [2 3 4]	
45	NC	-	Reserved	
46	GPIO1	Digital I/O	GPIO [2 3 4]	
47	GPIO2	Digital I/O	GPIO [2 3 4]	
48	GPIO3	Digital I/O	GPIO [2 3 4]	
49	GPIO4	Digital I/O	GPIO [2 3 4]	
50	GPIO5	Digital I/O	GPIO [2 3 4]	
51	GPIO6	Digital I/O	GPIO [2 3 4]	
52	GPIO7	Digital I/O	GPIO [2 3 4]	
53	GPIO8	Digital I/O	GPIO [2 3 4]	
54	GPIO9	Digital I/O	GPIO [2 3 4]	
55	GND	Power	Thermal Ground	Thermal Pad
56	GND	Power	Thermal Ground	Thermal Pad
57	GND	Power	Thermal Ground	Thermal Pad
58	GND	Power	Thermal Ground	Thermal Pad
59	GND	Power	Thermal Ground	Thermal Pad
60	GND	Power	Thermal Ground	Thermal Pad
61	GND	Power	Thermal Ground	Thermal Pad
62	GND	Power	Thermal Ground	Thermal Pad
63	GND	Power	Thermal Ground	Thermal Pad

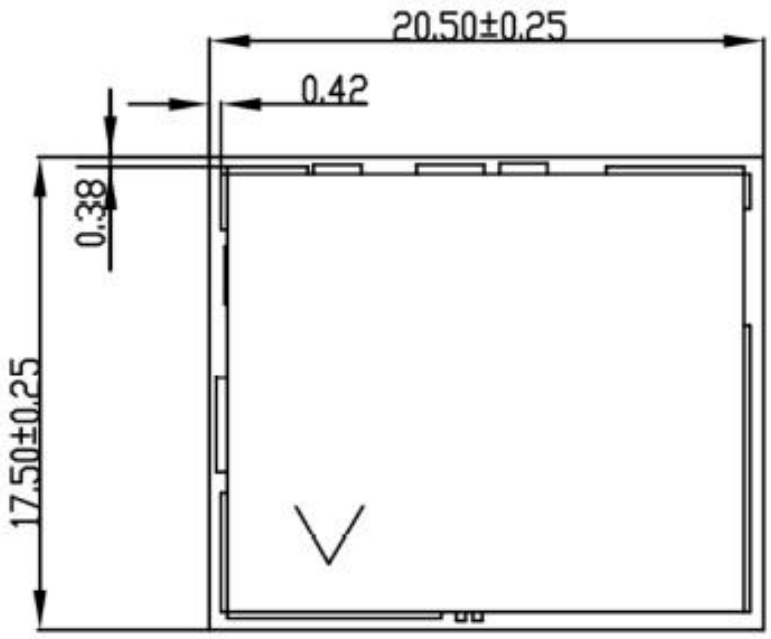
Note:

1. Typical usage is firmware dependent. Please check with standard firmware application note or your firmware designer for the actual pin definition.
2. All I/Os support drive strengths of 2, 4, and 6 mA. Drive strength is configurable individually for each pin.
3. All I/Os support 10-µA pullups and pulldowns. These pulls are not active and all of the I/Os remain floating while the device is in Hibernate state.
4. All digital I/Os are nonfail-safe.
5. The VIO and VBAT supply must be tied together at all times.
6. For CC320FNA and CC320FNA-S model only.

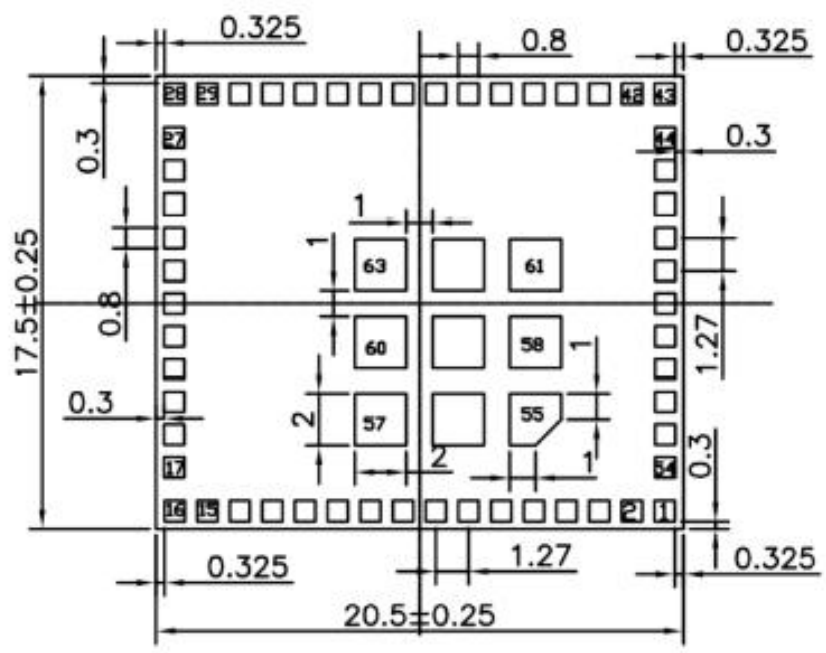


Module Outline

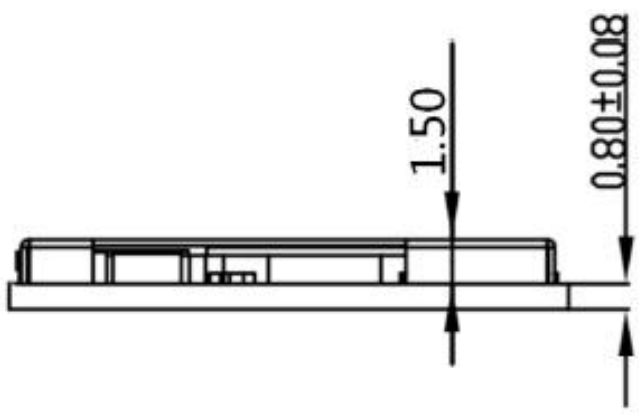
TOP View



Bottom View



Side View



Remark : +/- 0.1mm or 1.5% whichever is greater for all module outline measurements.

Recommended PCB Layout

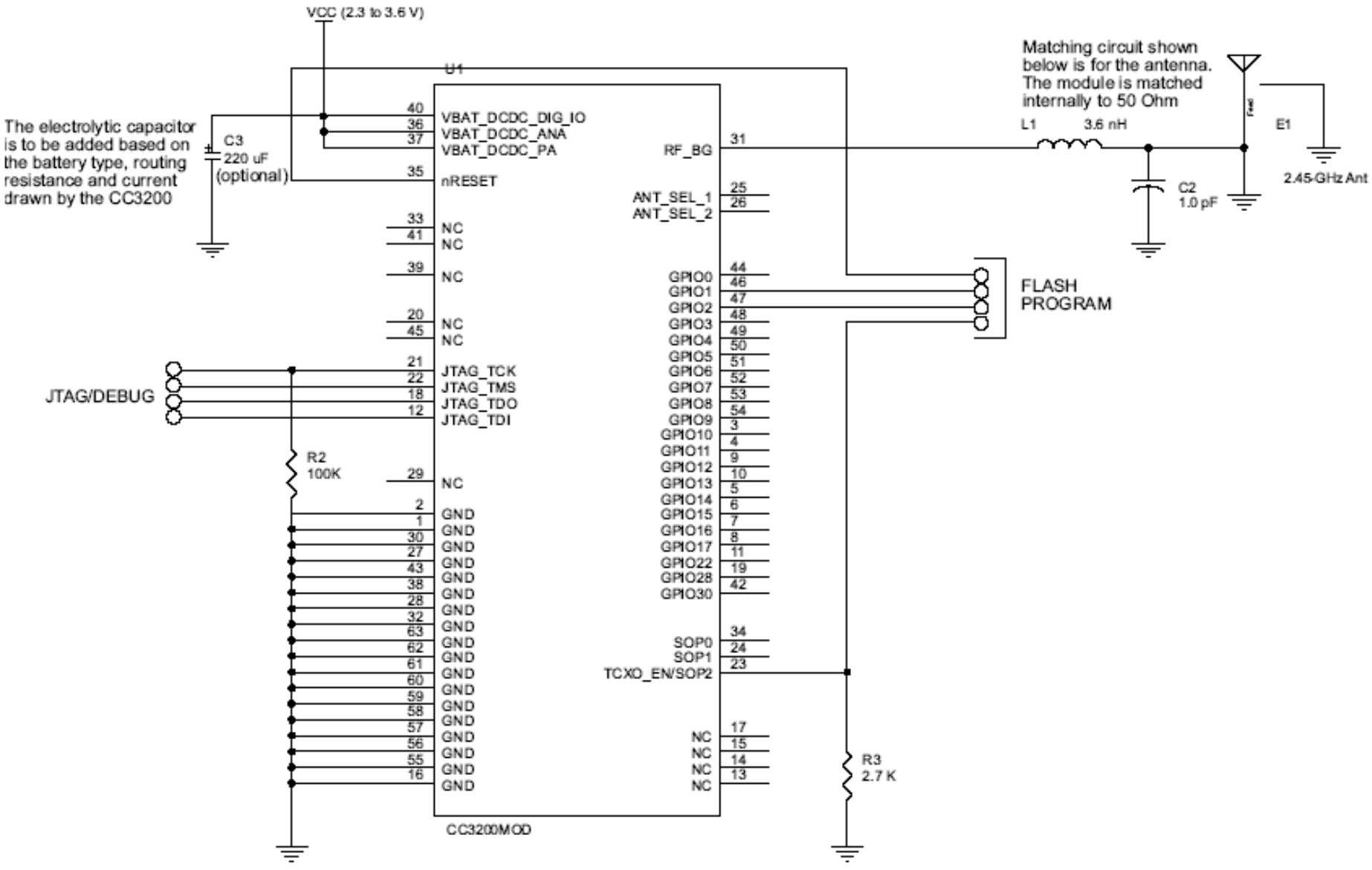
General Layout recommendation for RF design:

- Have a solid ground plane and ground vias under the module for stable system and thermal dissipation.
- Do not run signal traces underneath the module on a layer where the module is mounted.
- RF traces must have 50-Ω impedance.
- RF trace bends must be gradual with a maximum bend of approximately 45 degrees and with trace mitered.
- RF traces must not have sharp corners.
- There must be no traces or ground under the antenna section.
- RF traces must have via stitching on the ground plane beside the RF trace on both sides.
- RF traces must be as short as possible. The antenna, RF traces, and the module must be on the edge of the PCB product in consideration of the product enclosure material and proximity.

General Layout recommendation for antenna design:

- Place the antenna on an edge or corner of the PCB.
- Make sure that no signals are routed across the antenna elements on all the layers of the PCB.
- Most antennas, including the chip antenna used on the booster pack require ground clearance on all the layers of the PCB. Ensure that the ground is cleared on inner layers as well.
- Ensure that there is provision to place matching components for the antenna. These need to be tuned for best return loss once the complete board is assembled. Any plastics or casing should also be mounted while tuning the antenna as this can impact the impedance.
- Ensure that the antenna impedance is 50 Ω as the module is rated to work only with a 50-Ω system.
- In case of printed antenna, ensure that the simulation is performed with the solder mask in consideration.
- Ensure that the antenna has a near omni-directional pattern.
- The feed point of the antenna is required to be grounded.

Recommended Schematics



Precautions

- **Storage Condition**

  This product should be stored without opening the packing, and under temperature 0-60 °C and humidity 30-70% RH. It should be used within 15 months after reception. Baking may be required before mount, if product is not used immediately after opening the packing.

- **ElectroStatic Discharge (ESD)**

  This product is sensitive to ElectroStatic Discharge (ESD). Observe precautions for handling electrostatic sensitive devices. Such precautions are described in the ANSI/ESD S20.20, IEC/ST61340-5, JESD625-A or equivalent standards.

- **Module Reflow Installation**

  For RoHS/Pb-free applications, Sn96.5/Ag3.0/Cu0.5 solder is recommended.

Profile Feature	Recommended Parameters
Ramp-up rate before liquidous	< 2°C / second
Preheat	150-180°C 60-90 seconds
Maximum time at liquidous	20 – 40 seconds
Maximum peak temperature	230° - 240°C (below 250°C) 15-20 seconds
Ramp-down rate	< 6°C / second

Ordering Information

Part Number	FW Code Available	Description
CC320FNA	Please check with your sales rep	Wi-Fi module, external antenna
CC320FNA-S		Wi-Fi module with shield can, external antenna
CC320FIA		Wi-Fi module, IPEX antenna port
CC320FIA-S		Wi-Fi module with shield can, IPEX antenna port
CC320FNA-S3		Wi-Fi module with shield can, external antenna (3-pack)
CC320FIA-S3		Wi-Fi module with shield can, IPEX antenna port (3-pack)

Revision History

Rev.	Date	Description	By
01	2016-08-18	Initial release	Paul
02	2017-03-08	Added CC320FIA models	Paul
03	2017-07-27	Added new part numbers for multi-pack	Dominic