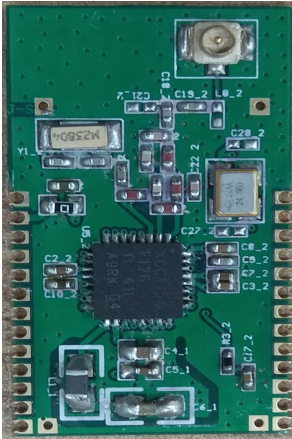


CC1310 868/915MHz RF Module



Description

The MO-CC1310 RF module is based on CC1310F128RHBR, CC1310 device is a cost-effective, ultra-low-power, Sub-1 GHz RF device from Texas Instruments™ that is part of the SimpleLink™ microcontroller (MCU) platform.

The MO-CC1310, which supports low active RF and MCU current consumption, in addition to flexible low-power modes, the CC1310 device provides excellent battery life and allows long-range operation on small coin-cell batteries and in energy harvesting applications.

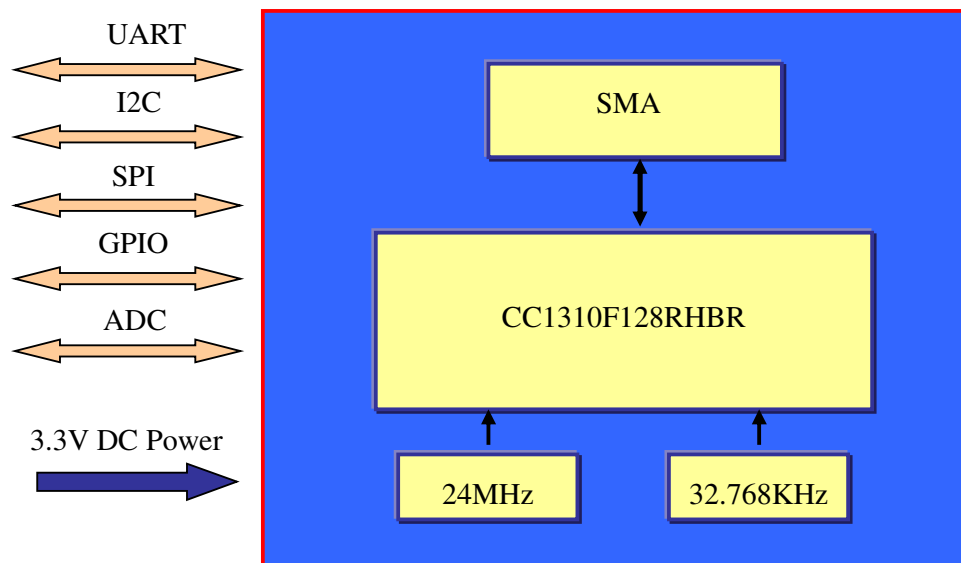
Features

- Microcontroller
 - Powerful Arm®Cortex®-M3 Processor
 - EEMBC CoreMark® Score: 142
 - EEMBC ULPBench™ Score: 158
 - Clock Speed up to 48-MHz
- Features
 - All Digital Peripheral Pins Can Be Routed to Any GPIO
 - Four General-Purpose Timer Modules (Eight 16-Bit or Four 32-Bit Timers, PWM Each)
 - 12-Bit ADC, 200 ksamples/s, 8-Channel Analog MUX
 - Continuous Time Comparator
 - Ultra-Low-Power Clocked Comparator
 - Programmable Current Source
 - UART
 - 2× SSI (SPI, MICROWIRE, TI)
 - I2C, I2S
 - Real-Time Clock (RTC)
 - AES-128 Security Module
 - True Random Number Generator (TRNG)
 - Support for Eight Capacitive Sensing Buttons
 - Integrated Temperature Sensor
- Low Power
 - Wide Supply Voltage Range: 1.8 to 3.8 V
 - RX: 5.4 mA
 - TX at +10 dBm: 13.4 mA
 - Active-Mode MCU 48 MHz Running Coremark: 2.5 mA (51 µA/MHz)

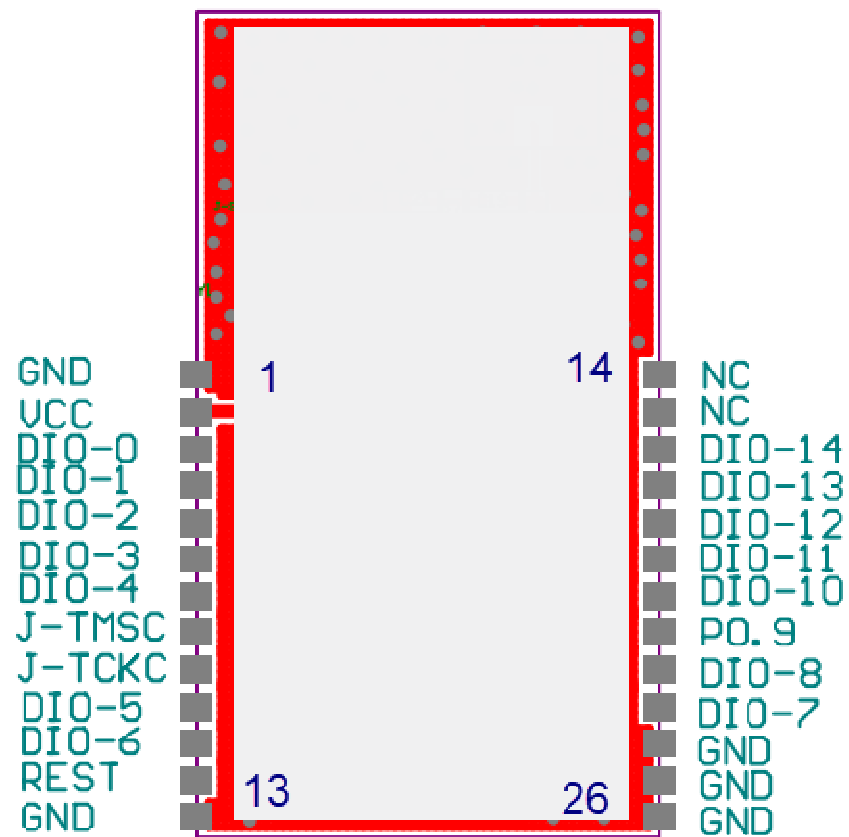
- 8KB of SRAM for Cache
(or as General-Purpose RAM)
- 20KB of Ultra-Low-Leakage SRAM
- 2-Pin cJTAG and JTAG Debugging
- Supports Over-the-Air (OTA) Update
- External System◦ On-Chip Internal DC/DC Converter

MO-CC1310

Block Diagram :



Pin-Out Assignment :



MO-CC1310

Pin Description :

Pin	Name	Pin Type	Description
1	GND	GND	Ground
2	VCC33	Power	2.0-3.6V power supply connection
3	DIO-0	Digital I/O	General-purpose digital I/O 0
4	DIO-1	Digital I/O	General-purpose digital I/O 1
5	DIO-2	Digital I/O	General-purpose digital I/O 2
6	DIO-3	Digital I/O	General-purpose digital I/O 3
7	DIO-4	Digital I/O	General-purpose digital I/O 4
8	J-TMSC	Debugger Pin	JTAG TMS
9	J-TCKC	Debugger Pin	JTAG TCK
10	DIO-5	Digital I/O	General-purpose digital I/O 5
11	DIO-6	Digital I/O	General-purpose digital I/O 6
12	REST		Reset
13	GND	GND	Ground
14	NC		
15	NC		
16	DIO-14	Digital I/O	General-purpose digital I/O 14
17	DIO-13	Digital I/O	General-purpose digital I/O 13
18	DIO-12	Digital I/O	General-purpose digital I/O 12
19	DIO-11	Digital I/O	General-purpose digital I/O 11
20	DIO-10	Digital I/O	General-purpose digital I/O 10
21	DIO-9	Digital I/O	General-purpose digital I/O 9
22	DIO-8	Digital I/O	General-purpose digital I/O 8
23	DIO-7	Digital I/O	General-purpose digital I/O 7
24	GND	GND	Ground
25	GND	GND	Ground
26	GND	GND	Ground

■ **Absolute Maximum Ratings**

		MIN	MAX	UNIT
Supply voltage, VDD _S ⁽³⁾	VDDR supplied by internal DC/DC regulator or internal GLDO	−0.3	4.1	V
Supply voltage, VDD _S ⁽³⁾ and VDDR	External regulator mode (VDD _S and VDDR pins connected on PCB)	−0.3	2.25	V
Voltage on any digital pin ⁽⁴⁾		−0.3	VDD _S +0.3, max 4.1	V
Voltage on crystal oscillator pins, X32K_Q1, X32K_Q2, X24M_N and X24M_P		−0.3	VDDR+0.3, max 2.25	V
Voltage on ADC input (V _{in})	Internal fixed or relative reference, voltage scaling enabled	−0.3	VDD _S	V
	Internal fixed reference, voltage scaling disabled	−0.3	1.49	
	Internal relative reference, voltage scaling disabled	−0.3	VDD _S / 2.9	
	External reference, voltage scaling enabled	−0.3	min (V _{ref} × 2.9, VDD _S)	
	External reference, voltage scaling disabled	−0.3	V _{ref}	
Voltage on external ADC reference (V _{ref})		−0.3	1.6	V
Input RF level			+5	dBm
T _{stg}	Storage temperature	−40	150	°C

(1) All voltage values are with respect to VDD_S, unless otherwise noted.

(2) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(3) VDD_{S2} and VDD_{S3} needs to be at the same potential as VDD_S.

(4) Including analog capable DIO.

■ Recommended Operation Condition

		MIN	MAX	UNIT
Ambient temperature range		−40	85	°C
Operating supply voltage (VDD _S and VDDR), external regulator mode	For operation in 1.8 V systems (VDD _S and VDDR pins connected on PCB, internal DC/DC cannot be used)	1.7	1.95	V
Operating supply voltage (VDD _S)	For operation in battery-powered and 3.3 V systems (internal DC/DC can be used to minimize power consumption)	1.8	3.8	V

■ Electrical Specifications

● Current Consumption

T_A = 25°C and VDD = 3 V

PARAMETER		TEST CONDITIONS	TYP	UNIT
I _{core}	Core current consumption	Reset. RESET_N pin asserted or VDD5 below power-on-reset threshold	100	nA
		Shutdown. No clocks running, no retention	185	
		Standby. With RTC, CPU, RAM and (partial) register retention. RCOSC_LF	0.6	μA
		Standby. With RTC, CPU, RAM and (partial) register retention. XOSC_LF	0.7	
		Standby. With Cache, RTC, CPU, RAM and (partial) register retention. RCOSC_LF	1.6	
		Standby. With Cache, RTC, CPU, RAM and (partial) register retention. XOSC_LF	1.7	
		Idle. Supply Systems and RAM powered.	570	
		Active. MCU running CoreMark at 48 MHz	1.2 mA + 25.5 μA/MHz	
		Active. MCU running CoreMark at 48 MHz	2.5	mA
		Active. MCU running CoreMark at 24 MHz	1.9	
		Radio RX	5.5	mA
		Radio TX, 10-dBm output power	12.9	
		Radio TX, boost mode (VDDR = 1.95 V), 14-dBm output power	22.6	
		PERIPHERAL CURRENT CONSUMPTION ⁽¹⁾⁽²⁾⁽³⁾		
I _{peri}	Peripheral power domain	Delta current with domain enabled	20	μA
	Serial power domain	Delta current with domain enabled	13	
	RF Core	Delta current with power domain enabled, clock enabled, RF core idle	237	
	μDMA	Delta current with clock enabled, module idle	130	
	Timers	Delta current with clock enabled, module idle	113	
	I ² C	Delta current with clock enabled, module idle	12	
	I ² S	Delta current with clock enabled, module idle	36	
	SSI	Delta current with clock enabled, module idle	93	
	UART	Delta current with clock enabled, module idle	164	

■ General Characteristics

TA = 25°C and VDD = 3 V, unless otherwise noted.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Wake-up and Timing					
Idle -> Active			14		μs
Standby -> Active			151		μs
Shutdown -> Active			1015		μs
Flash Memory					
Supported flash erase cycles before failure		100			k Cycles
Flash page/sector erase current	Average delta current		12.6		mA
Flash page/sector erase time ⁽¹⁾			8		ms
Flash page/sector size			4		KB
Flash write current	Average delta current, 4 bytes at a time		8.15		mA
Flash write time ⁽¹⁾	4 bytes at a time		8		μs

■ RF Characteristics

RX Sensitivity

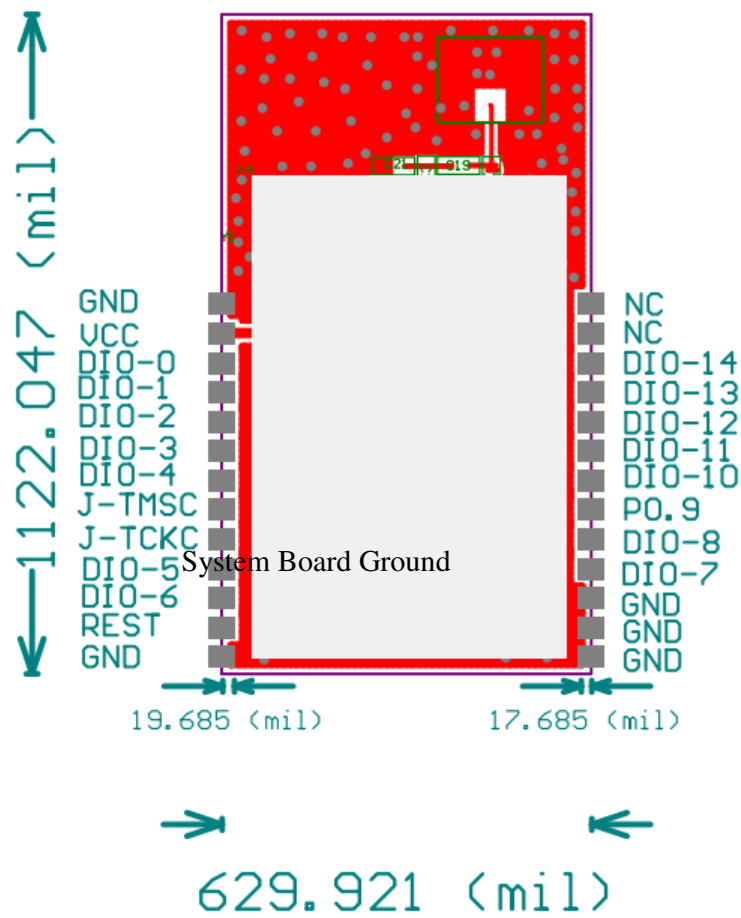
868Mbps, GFSK, 25KHz deviation, IEEE802.15.4g PHY

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Data rate			50		kbps
Data rate offset tolerance, IEEE 802.15.4g PHY	50 kbps, GFSK, 25-kHz deviation, 100-kHz RX BW (same modulation format as IEEE 802.15.4g mandatory mode), BER = 10^{-3}		1400		ppm
Data rate step size			1.5		bps
Digital channel filter programmable bandwidth	Using VCO divide by 5 setting	40		4000	kHz
Receiver sensitivity, 50 kbps	50 kbps, GFSK, 25-kHz deviation, 100-kHz RX BW (same modulation format as IEEE 802.15.4g mandatory mode), BER = 10^{-2} 868 MHz and 915 MHz		-110		dBm

TX output Power

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Max output power, boost mode	VDDR = 1.95 V Min VDDS for boost mode is 2.1 V 868 MHz and 915 MHz		+14		dBm
Max output power	868 MHz and 915 MHz		+12		dBm

Dimension and Layout Guide :



Remarks:

1. CC1310 Product Web Site : <http://www.ti.com/product/CC1310>

2. For purchase information, please contact EBWISE Technology Corporation

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