

OEM MANUAL

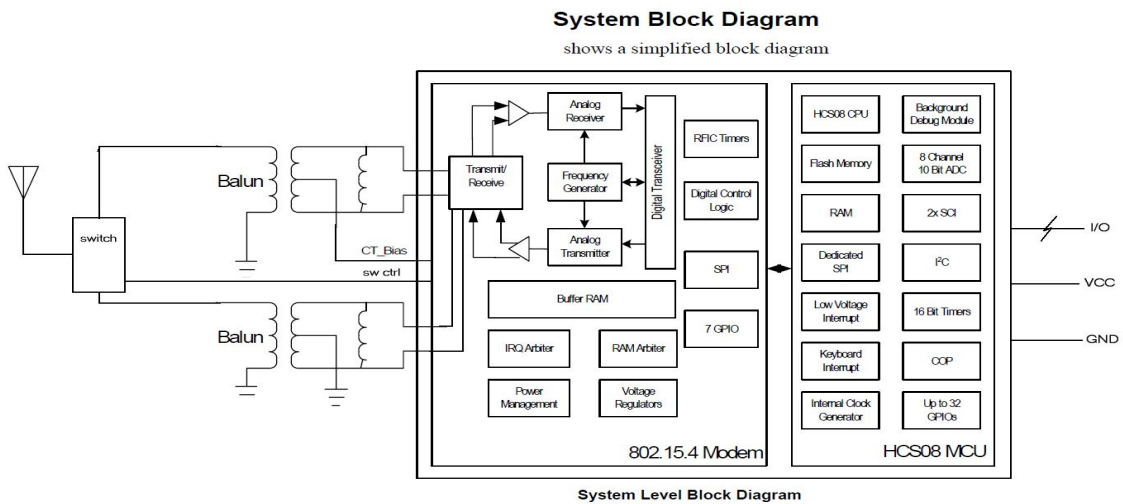
Refer to Freescale MC13213 operations manuals for complete descriptions.

Microcontroller Features

- Low voltage MCU with 40 MHz low power HCS08 CPU core
- Up to 60K flash memory with block protection and security and 4K RAM
 - MC13211: 16KB Flash, 1KB RAM
 - MC13212: 32KB Flash, 2KB RAM
 - MC13213: 60KB Flash, 4KB RAM
- Low power modes (Wait plus three Stop modes)
- Dedicated serial peripheral interface (SPI) connected internally to 802.15.4 modem
- One external 4-channel (5-channel internal) 16-bit timer/pulse width modulator (TPM) module and one external 1-channel (3-channel internal) 16-bit timer/pulse width modulator module, each with selectable input capture, output capture, and PWM capability.
- 8-bit port keyboard interrupt (KBI)
- 8-channel 8-10-bit ADC
- Two independent serial communication interfaces (SCI)
- Multiple clock source options
 - Internal clock generator (ICG) with 243 kHz oscillator that has $\pm 0.2\%$ trimming resolution and $\pm 0.5\%$ deviation across voltage.
 - Start-up oscillator of approximately 8 MHz
 - External crystal or resonator
 - External source from modem clock for very high accuracy source or system low-cost option
- Inter-integrated circuit (IIC) interface with 100 kbps operation
- In-circuit debug and flash programming available via on-chip background debug module (BDM)
 - Two comparator and 9 trigger modes
 - Eight deep FIFO for storing change-of-flow addresses and event-only data
 - Tag and force breakpoints
 - In-circuit debugging with single breakpoint
- System protection features
 - Programmable low voltage interrupt (LVI)
 - Optional watchdog timer (COP)
 - Illegal opcode detection
- Up to 32 MCU GPIO with programmable pull-ups

RF Modem Features

- Fully compliant 802.15.4 Standard transceiver supports 250 kbps O-QPSK data in 5.0 MHz channels and full spread-spectrum encode and decode
- Operates on one of 16 selectable channels in the 2.4 GHz ISM band
- -1 to 0 dBm nominal output power, programmable from -27 dBm to +3 dBm typical
- Receive sensitivity of <-92 dBm (typical) at 1% PER, 20-byte packet, much better than the 802.15.4 Standard of -85 dBm
- Integrated transmit/receive switch



VOLTAGE INFORMATION:

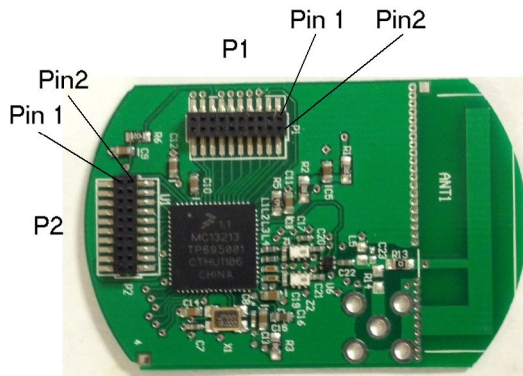
Table 7. Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Power Supply Voltage ($V_{BATT} = V_{DDINT}$) ¹	V_{BATT}, V_{DDINT}	2.0	2.7	3.4	Vdc
Input Frequency	f_{in}	2.405	-	2.480	GHz
Operating Temperature Range	T_A	-40	25	85	°C
Logic Input Voltage Low	V_{IL}	0	-	30% V_{DDINT}	V
Logic Input Voltage High	V_{IH}	70% V_{DDINT}	-	V_{DDINT}	V
SPI Clock Rate	f_{SPI}	-	-	8.0	MHz
RF Input Power	P_{max}	-	-	10	dBm
Crystal Reference Oscillator Frequency (± 40 ppm over operating conditions to meet the 802.15.4 Standard.)	f_{ref}	16 MHz Only			

¹ If the supply voltage is produced by a switching DC-DC converter, ripple should be less than 100 mV peak-to-peak.

MODULE PINOUTS:

Connector is 2 each 2x20 pins, 1mm x 1mm pitch



MC13213 PORT BOARD CONNECTIONS:

P1:

- 1 – D5
- 2 – D6
- 3 – D4
- 4 – D7
- 5 – GND
- 6 – B0
- 7 – GND
- 8 – B1
- 9 – VCC
- 10 – B2
- 11 – VCC
- 12 – B3
- 13 – VCC
- 14 – B4
- 15 – VCC
- 16 – B5
- 17 – GND
- 18 – B6
- 19 – GND
- 20 – B7

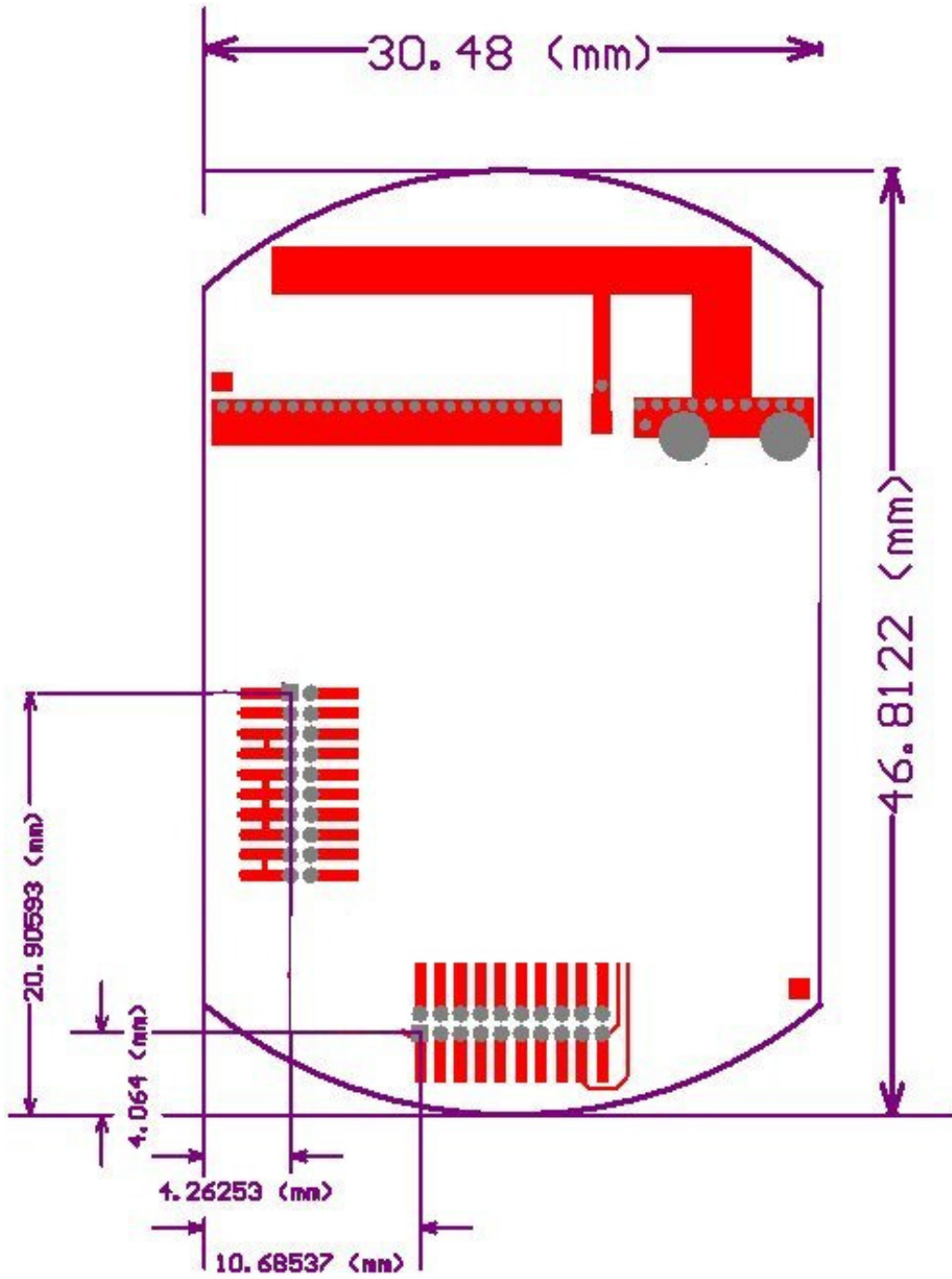
P2:

- 1 – A0
- 2 – A1
- 3 – E1 (RXD1)
- 4 – A2
- 5 – D0 (TXD1)
- 6 – A3
- 7 – C7
- 8 – A4
- 9 – C6
- 10 – A5
- 11 – C5
- 12 – A6
- 13 – C4
- 14 – A7
- 15 – C3 (SCL)
- 16 – BKGD
- 17 – C2 (SDA)
- 18 – RESET
- 19 – C1 (RXD2)
- 20 – C0 (TXD2)

BOARD LAYOUT:

BOTTOM VIEW (TO BE MOUNTED FACE DOWN ON HEADER PINS):

1



CHANNEL NUMBER TO FREQUENCY RANGE:

* Channel number (0-15)

* Channel frequencies :

* 0 : 2.405GHz

* 1 : 2.410GHz

* 2 : 2.415GHz

* 3 : 2.420GHz

* 4 : 2.425GHz

* 5 : 2.430GHz

* 6 : 2.435GHz

* 7 : 2.440GHz

* 8 : 2.445GHz

* 9 : 2.450GHz

* 10: 2.455GHz

* 11: 2.460GHz

* 12: 2.465GHz

* 13: 2.470GHz

* 14: 2.475GHz

* 15: 2.480GHz

§ 15.19 Labeling requirements

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§ 15.21 Information to user

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.