RFM2530 OEM Installation Manual
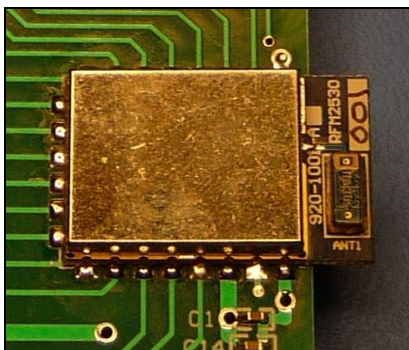
Date: Jan. 22, 2010
Revision: 1.1

Hardware Specifications

Parameter	Value	Units	Conditions
Transmit Power	+4.5	dBm	(typical)
Antenna Gain	0	dBi	
Programmable O/P Power Range	32	dB	
Receive Sensitivity	-97	dBm	(typical) PER = 1%
Transmit current	33.5	mA	(typical) At max TX power, CPU idle
Receive current	24	mA	No peripherals active
Modulation	DSSS		
Data rate	250	Kbps	
MAC layer protocol	802.15.4		ZigBee/RF4CE compliant
I/O Ports	18		multiplexed with alternate fns (below)
Serial Ports	2		Interchangeable as SPI or UART
Analog Inputs	7		Up to 14 bit resolution

Environmental

Temperature: -20C to +70C (operational)
                       -40C to +125C (non-operational)

Humidity: 5 – 95% (non-condensing)

Approvals

FCC (full modular approval)
Industry Canada

Mechanical Specifications

Module Size: 1.1" x 0.71" x 0.151" (tall)
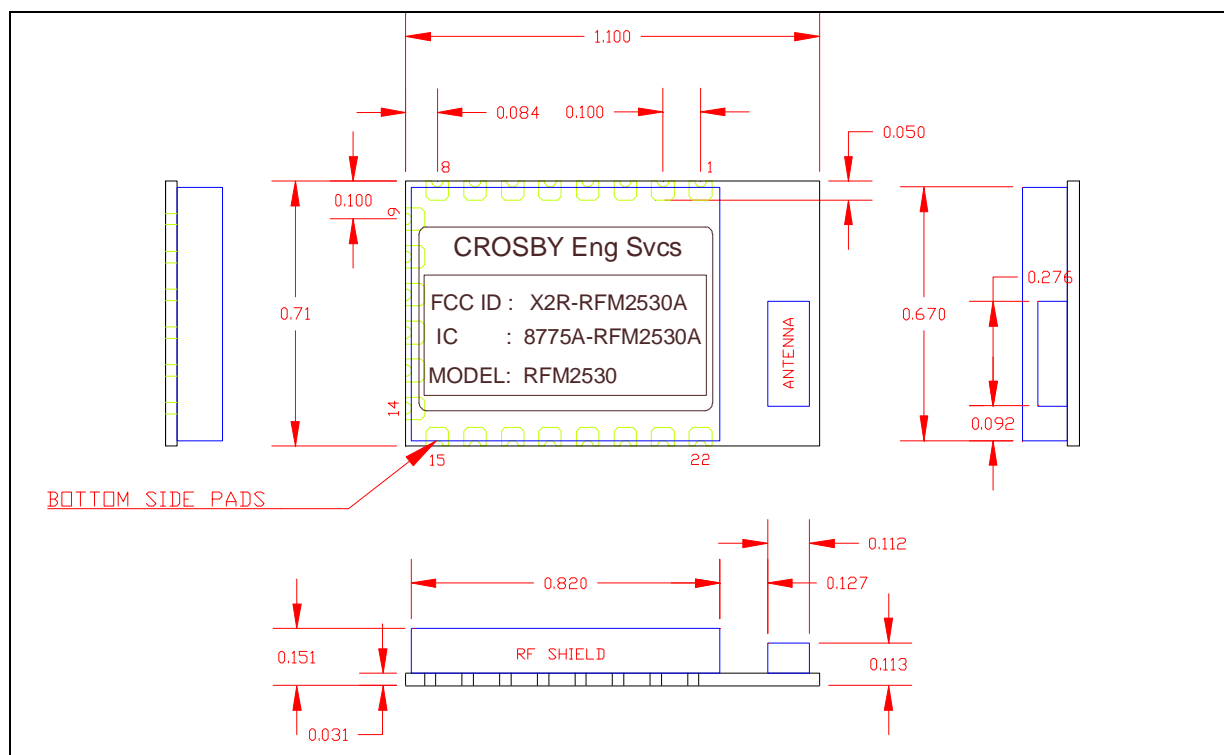Manufacturing: RoHS compliant assembly

Figure #5: Module Dimensions

Mounting Instructions

Use the PCB footprint shown in Figure #6 for the PCB layout (Note: the dotted outline shows the expected board outline of a future product release and can be ignored). The RFM2530 module should mount so that the antenna end of the PCB is along the edge of the board, and this edge of the board should be located near the top, side, or bottom of the product, depending on its mounting orientation. The antenna should be kept at least 2mm away from enclosure plastics and metal surfaces should be kept at least 0.75" away from the antenna. Notch the host PCB under the antenna area as shown for the best antenna efficiency. Avoid putting components and/or traces in the areas shown in the vicinity of the antenna.

The RF Modem may be hand soldered or reflow soldered as part of a normal SMT process flow. When using SMT reflow processing, the maximum reflow time/temperatures should be controlled according to the lead-free reflow standards of IPC/JEDEC J-STD-020C.

NOTE: This module has been manufactured as a RoHS compliant (lead-free) assembly. If RoHS compliance is desired in the end product, then lead-free solder should be used when assembling this module to the mother-board.
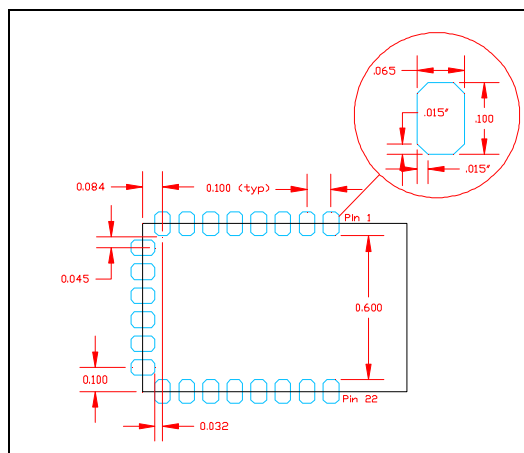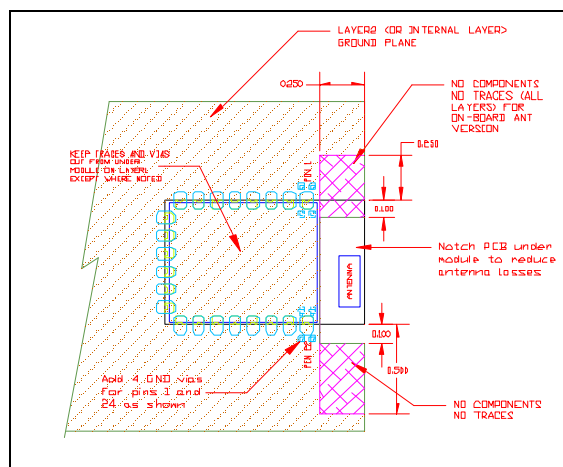

Figure #6: PCB Mounting Footprint

Figure #7: Host Board Mounting

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Application Information

The schematic (Figure #8, below) shows the electrical connections to the module when installed on a host circuit board. The emulation/programming header (J1) is a 5x2 position 0.1" header for direct compatibility with the Texas Instruments SmartRF05EB programming/development board.
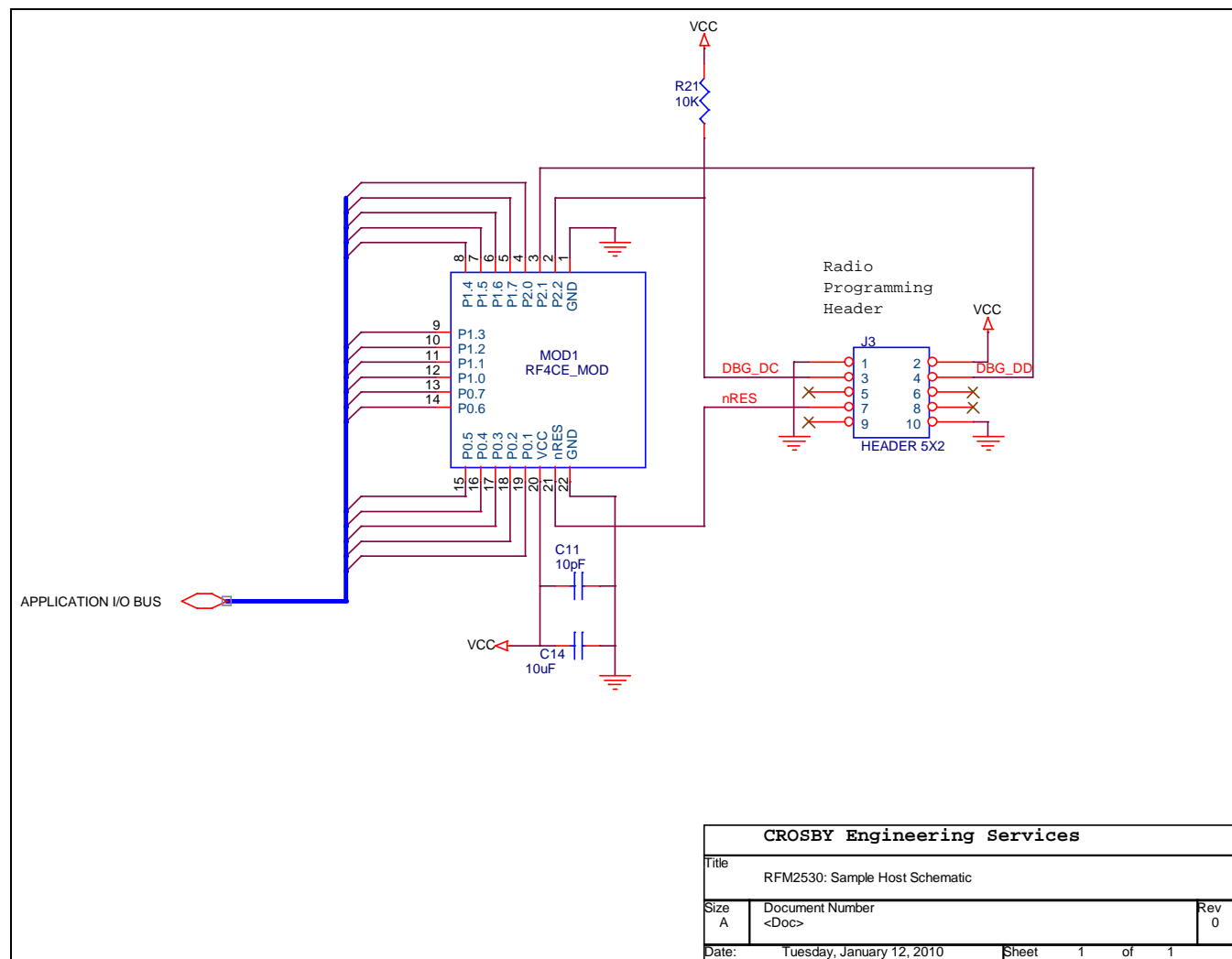

Figure #8: Sample Host Schematic

Module Pin Descriptions

Pin #	Name	Function
1	GND	Module Ground
2	P2.2/DBG_CLK	Digital I/O / Program/Debug CLK
3	P2.1/DBG_DATA	Digital I/O / Program/Debug DATA
4	P2_0	Digital I/O
5	P1_7	Digital I/O
6	P1_6	Digital I/O
7	P1_5	Digital I/O
8	P1_4	Digital I/O
9	P1_3	Digital I/O
10	P1_2	Digital I/O
11	P1_1	Digital I/O
12	P1_0	Digital I/O
13	P0_7	Digital I/O or Analog I/P
14	P0_6	Digital I/O or Analog I/P
15	P0_5	Digital I/O or Analog I/P
16	P0_4	Digital I/O or Analog I/P
17	P0_3	Digital I/O or Analog I/P
18	P0_2	Digital I/O or Analog I/P
19	P0_1	Digital I/O or Analog I/P
20	VCC	VCC (2.0 to 3.6VDC)
21	RESET_N	Active low reset pin
22	GND	Module Ground

Labeling Requirements

The RFM2530 module is supplied with a label identifying the FCC ID and Industry Canada certifications (see Figure #9). If this label will not visible to the end user in the final product configuration, another label must be affixed to the exterior of the final (host) product identifying the presence of the radio module inside and the FCC ID and Industry Canada code. Use the template in Figure #10 for this labeling requirement or contact CROSBY Engineering Services for label artwork.
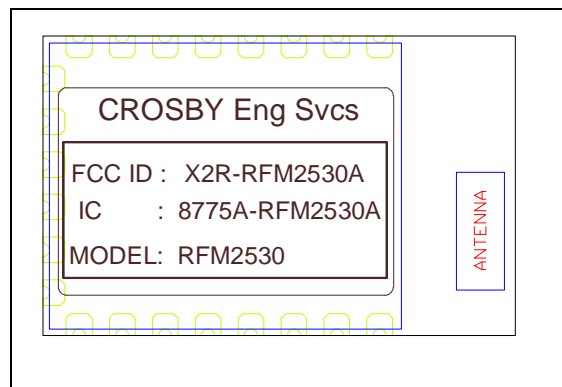
CROSBY Eng Svcs

FCC ID : X2R-RFM2530A

IC   : 8775A-RFM2530A

MODEL: RFM2530

ANTENNA

Figure #9: RFM2530 Module Label

This product Contains Transmitter Module
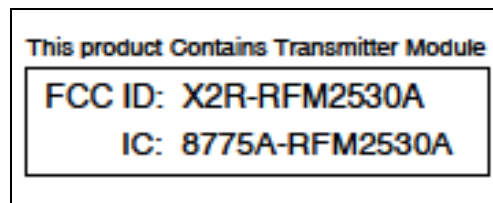
FCC ID: X2R-RFM2530A

IC: 8775A-RFM2530A

Figure #10: Host Label

Regulatory Statements, Precautions and Warnings

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.

This module generates RF energy. DO NOT use this module in any application where in normal operation, the antenna will be located within 20 cm of the head or body of the operator.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

o Reorient or relocate the receiving antenna
o Increase the distance between the equipment and the receiver.
o Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
o Consult the dealer or an experienced radio/TV technician for help.