

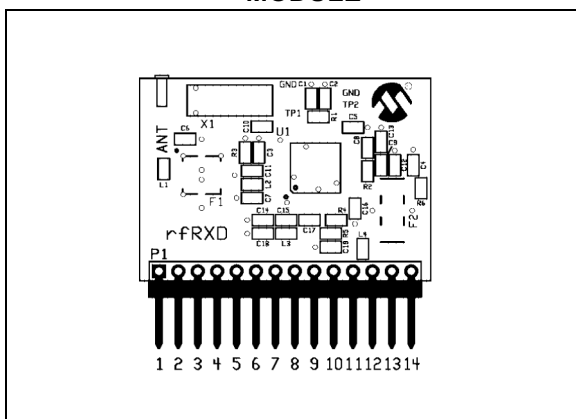
## rfRXD0420 Receiver Module

*Author: Steven Bible  
Microchip Technology Inc.*

### INTRODUCTION

The rfRXD0420 Receiver Module (see Figure 1) is a low cost, high performance UHF short-range radio ASK receiver design using the Microchip Technology rfRXD0420.

**FIGURE 1: rfRXD0420 RECEIVER MODULE**



The module design is suitable for:

- Wireless remote command and control
- Remote Keyless Entry (RKE)
- Security systems
- Low power telemetry applications

The specifics of the receiver module design are:

- Single channel, fixed frequency at 315 MHz and 433.92 MHz
- ASK modulation
- Signal rate: 4800 baud

Schematics, PCB layout, and Bill-of-Materials (BOM) are provided in the following sections. Gerber files are available on the rfPIC™ Development Kit 1 CD-ROM.

The receiver module can be purchased separately or in packs of 5. See Table 1

**TABLE 1: RECEIVER MODULE ORDERING INFORMATION**

Frequency	Order Number	
	Single	5 Pack
315 MHz	AC164104	AC164106
433.92 MHz	AC164103	AC164105

### rfRXD0420 DESCRIPTION

The rfRXD0420 is a stand-alone receiver module that can be used in a variety of ways.

- It can be plugged into the PICKIT™ 1 FLASH Starter Kit expansion header J3 for demonstration and development.
- The receiver module can be installed in any project for proof-of-concept, demonstration, or development purposes. Once project proof-of-concept and demonstration have been proven, the designer can use the available Gerber files or complete a design of their own.

A detailed description of the rfRXD0420 UHF ASK/FSK/FM Receiver is provided in the data sheet, DS70090.

A detailed description of the rfRXD0420 receiver module design is provided in application note, AN860.

Table 2 lists the pinout for the rfRXD0420 receiver

**TABLE 2: rfRXD0420 RECEIVER MODULE PINOUT**

Pin	Description
1-10	No Connection
11	Receive Data In
12	No Connection
13	Power: 2.5-5.5 VDC
14	Ground
ANT	Antenna Connection

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The antenna connection is a 0.055 inch pin receptacle. A simple small diameter wire (AWG 24) antenna can be constructed and inserted into the receptacle. The length of the wire depends on the frequency.

$$\lambda \text{ (meters)} = c / f \text{ (Hertz)}$$

where

$$c = 3 \times 10^8 = \text{speed of light (meters per second)}$$

$$f = \text{receive frequency (Hertz)}$$

$$\lambda = \text{wavelength (meters)}$$

The length of the antenna wire in inches can be found for a given frequency using the following formula:

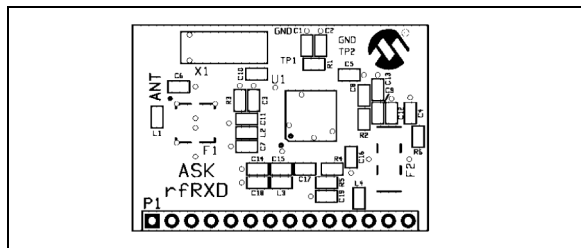
$$\text{wire antenna length (inches)} = 2952.8 / f \text{ (MHz)}$$

Alternatively, the pin receptacle can be removed and an alternate antenna connection can be made. For example, a coaxial wire can be connected to the antenna pad on the front side of the PCB and ground pad on the back side of the PCB.

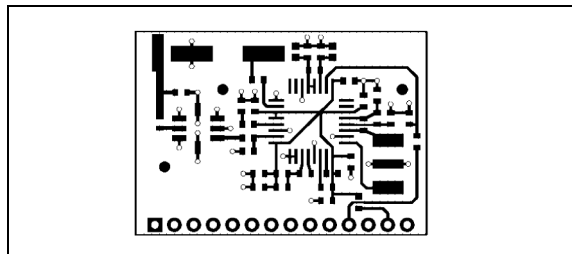
## PCB LAYOUT

The following figures illustrate the various layers of the rFRXD0420 receiver module printed circuit board.

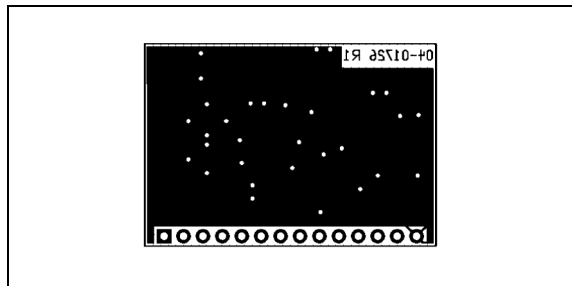
**FIGURE 2: rFRXD0420 TOP SILK-SCREEN**



**FIGURE 3: rFRXD0420 TOP COPPER**



**FIGURE 4: rFRXD0420 BOTTOM COPPER**



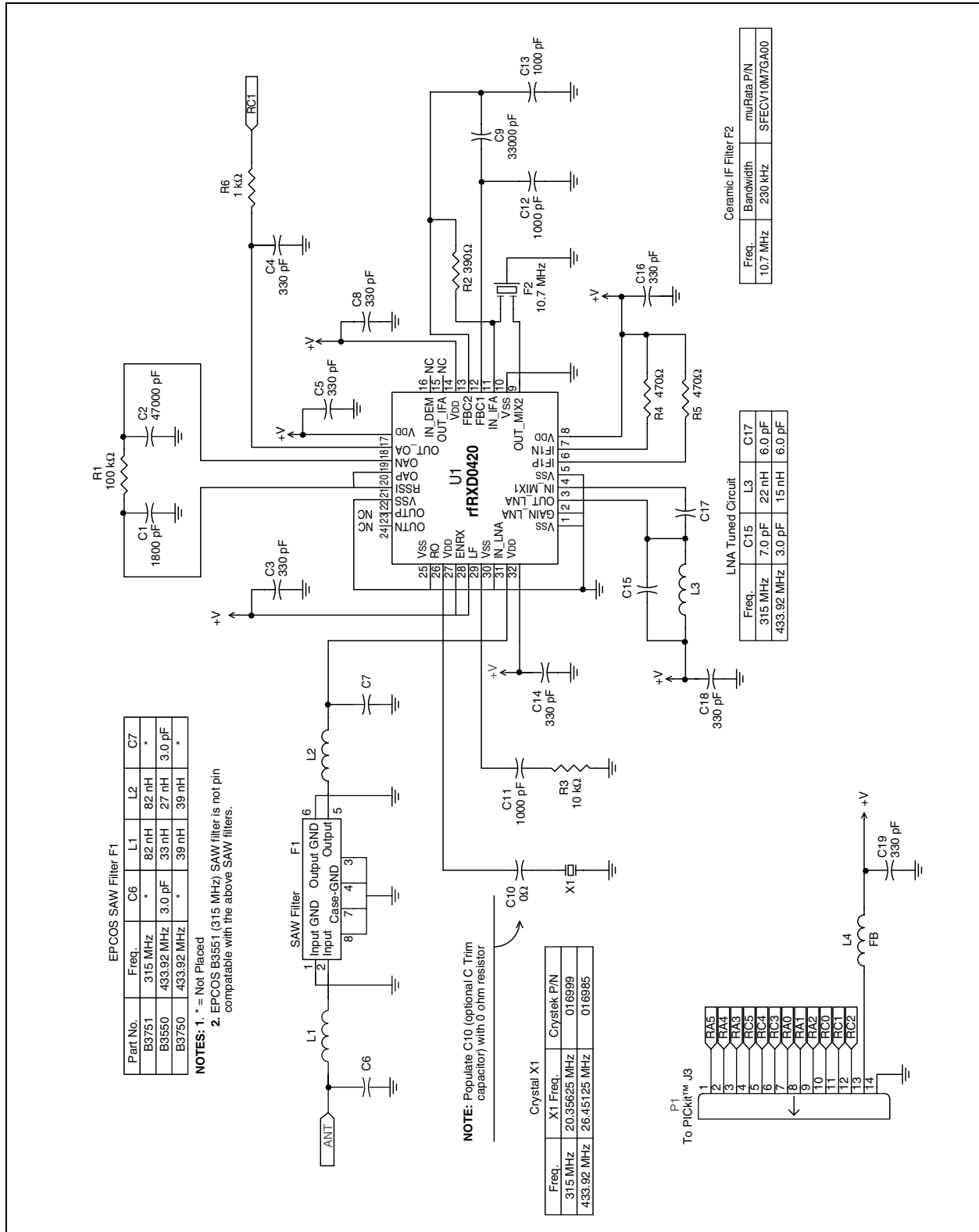
## GERBER FILES

Gerber Files for the rFRXD0420 are available on the rPIC Development Kit 1 CD-ROM.

## rFRXD0420 SCHEMATIC

Figure 5 is a detailed schematic of the rFRXD0420 module.

**FIGURE 5: rFRXD0420 RECEIVER MODULE**



**FIGURE 6: rFRXD0420 RECEIVER MODULE BILL-OF-MATERIALS**

rFRXD0420 Receiver Module Bill-of-Materials						
Quantity	Designator	Value	Description	Order From	Part Number	
2	C6, C7	Not Placed				
1	C15 - 433.92 MHz	3 pF, NP0, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC030CVTR-ND	
1	C17	6 pF, NP0, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC060CVTR-ND	
1	C15 - 315 MHz	7 pF, NP0, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC070CVTR-ND	
8	C3, C4, C5, C8, C14, C16, C18, C19	330 pF, X7R, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC331ACVTR-ND	
3	C11, C12, C13	1000 pF, X7R, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC1772TR-ND	
1	C1	1800 pF, X7R, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC1775TR-ND	
1	C9	33000 pF, X7R, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC1769TR-ND	
1	C2	47000 pF, X5R, 0603	Capacitor, Ceramic Chip	Digi-Key	PCC1771TR-ND	
1	C10	0 ohm, 0603	Resistor, Chip, Thick Film	Digi-Key	P0.0GTR-ND	
1	R2	390 ohm, 0603	Resistor, Chip, Thick Film	Digi-Key	P390GTR-ND	
2	R4, R5	470 ohm, 0603	Resistor, Chip, Thick Film	Digi-Key	P470GTR-ND	
1	R6	1K ohm	Resistor, Chip, Thick Film	Digi-Key	P1.0KGTR-ND	
1	R3	10K ohm, 0603	Resistor, Chip, Thick Film	Digi-Key	P10KGTR-ND	
1	R1	100K ohm, 0603	Resistor, Chip, Thick Film	Digi-Key	P100KGTR-ND	
1	L3 - 315 MHz	22 nH, 0603	Inductor, Chip	Digi-Key	TKS3715TR-ND	
1	L3 - 433.92 MHz	15 nH, 0603	Inductor, Chip	Digi-Key	TKS3713TR-ND	
2	L1, L2 - 315 MHz	82 nH, 0603	Inductor, Chip	Digi-Key	TKS3722TR-ND	
2	L1, L2 - 433.92 MHz	39 nH, 0603	Inductor, Chip	Digi-Key	TKS3718TR-ND	
1	L4	600Z, 0603	Ferrite Bead Chip	Digi-Key	240-1143-2-ND	
1	P1	14-Pin Right Angle Header	Single row 0.025" square right angle post	Digi-Key	A26510-ND	
1	F1 - 315 MHz		SAW Filter - 315 MHz	EPCOS	B3751	
1	F1 - 433.92 MHz		SAW Filter - 433.92 MHz	EPCOS	B3750	
1	F2		10.7 MHz Ceramic Filter, 230 kHz BW	muRata	SFECV10M7GA00	
1	X1 - 315 MHz	20.35625 MHz	Crystal, HC-49/S	Crystek	016999	
1	X1 - 433.92 MHz	26.451250 MHz	Crystal, HC-49/S	Crystek	016985	
1	U1	rFRXD0420	UHF ASK/FSK/FM Receiver	Microchip	rFRXD0420	

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### **Crystek Crystal Corporation**

12730 Commonwealth Drive  
Fort Myers, FL 33913  
Toll Free: 1-800-237-3061  
Phone: 1-239-561-3311  
Fax: 1-239-561-1025  
E-mail: [salesdept@crystek.com](mailto:salesdept@crystek.com)  
Internet: <http://www.crystek.com>

### **Murata Electronics North America, Inc.**

Corporate Headquarters  
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Smyrna, GA 30080-7604  
Phone: 1-770-436-1300  
Fax: 1-770-436-3030  
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Iselin, NJ 08830  
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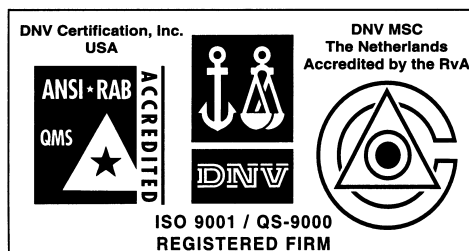
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2107 North First Street, Suite 590  
San Jose, CA 95131  
Tel: 408-436-7950 Fax: 408-436-7955

#### Toronto

6285 Northam Drive, Suite 108  
Mississauga, Ontario L4V 1X5, Canada  
Tel: 905-673-0699 Fax: 905-673-6509

### ASIA/PACIFIC

#### Australia

Microchip Technology Australia Pty Ltd  
Marketing Support Division  
Suite 22, 41 Rawson Street  
Epping 2121, NSW  
Australia  
Tel: 61-2-9868-6733 Fax: 61-2-9868-6755

#### China - Beijing

Microchip Technology Consulting (Shanghai)  
Co., Ltd., Beijing Liaison Office  
Unit 915  
Bei Hai Wan Tai Bldg.  
No. 6 Chaoyangmen Beidajie  
Beijing, 100027, No. China  
Tel: 86-10-85282100 Fax: 86-10-85282104

#### China - Chengdu

Microchip Technology Consulting (Shanghai)  
Co., Ltd., Chengdu Liaison Office  
Rm. 2401-2402, 24th Floor,  
Ming Xing Financial Tower  
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Chengdu 610016, China  
Tel: 86-28-86766200 Fax: 86-28-86766599

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Microchip Technology Consulting (Shanghai)  
Co., Ltd., Fuzhou Liaison Office  
Unit 28F, World Trade Plaza  
No. 71 Wusi Road  
Fuzhou 350001, China  
Tel: 86-591-7503506 Fax: 86-591-7503521

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Microchip Technology Hongkong Ltd.  
Unit 901-6, Tower 2, Metroplaza  
223 Hing Fong Road  
Kwai Fong, N.T., Hong Kong  
Tel: 852-2401-1200 Fax: 852-2401-3431

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Microchip Technology Consulting (Shanghai)  
Co., Ltd.  
Room 701, Bldg. B  
Far East International Plaza  
No. 317 Xian Xia Road  
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Tel: 86-21-6275-5700 Fax: 86-21-6275-5060

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No. 5022 Binhe Road, Futian District  
Shenzhen 518033, China  
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Tel: 86-532-5027355 Fax: 86-532-5027205

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Microchip Technology Inc.  
India Liaison Office  
Marketing Support Division  
Divyasree Chambers  
1 Floor, Wing A (A3/A4)  
No. 11, O'Shaughnessey Road  
Bangalore, 560 025, India  
Tel: 91-80-2290061 Fax: 91-80-2290062

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Microchip Technology Japan K.K.  
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Kohoku-Ku, Yokohama-shi  
Kanagawa, 222-0033, Japan  
Tel: 81-45-471-6166 Fax: 81-45-471-6122

### Korea

Microchip Technology Korea  
168-1, Youngbo Bldg. 3 Floor  
Samsung-Dong, Kangnam-Ku  
Seoul, Korea 135-882  
Tel: 82-2-554-7200 Fax: 82-2-558-5934

### Singapore

Microchip Technology Singapore Pte Ltd.  
200 Middle Road  
#07-02 Prime Centre  
Singapore, 188980  
Tel: 65-6334-8870 Fax: 65-6334-8850

### Taiwan

Microchip Technology (Barbados) Inc.,  
Taiwan Branch  
11F-3, No. 207  
Tung Hua North Road  
Taipei, 105, Taiwan  
Tel: 886-2-2717-7175 Fax: 886-2-2545-0139

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#### Austria

Microchip Technology Austria GmbH  
Durisolstrasse 2  
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Fax: 43-7242-2244-393

#### Denmark

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Regus Business Centre  
Lautrup høj 1-3  
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Tel: 45-4420-9895 Fax: 45-4420-9910

#### France

Microchip Technology SARL  
Parc d'Activite du Moulin de Massy  
43 Rue du Saule Trapu  
Batiment A - Ier Etage  
91300 Massy, France  
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

#### Germany

Microchip Technology GmbH  
Steinheilstrasse 10  
D-85737 Ismaning, Germany  
Tel: 49-89-627-144-0  
Fax: 49-89-627-144-44

#### Italy

Microchip Technology SRL  
Via Quasimodo, 12  
20025 Legnano (MI)  
Milan, Italy  
Tel: 39-0331-742611 Fax: 39-0331-466781

#### United Kingdom

Microchip Ltd.  
505 Eskdale Road  
Wokingham  
Wokingham  
Berkshire, England RG41 5TU  
Tel: 44-118-921-5869 Fax: 44-118-921-5820

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