

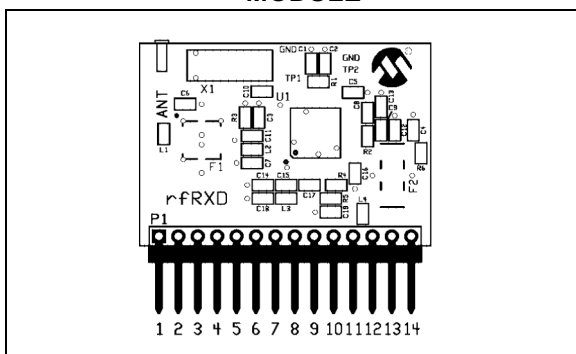
rfRXD0420 Receiver Module

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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

	Order Number	
Frequency	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

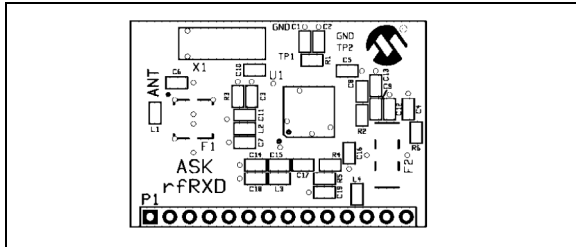


FIGURE 3: rFRXD0420 TOP COPPER

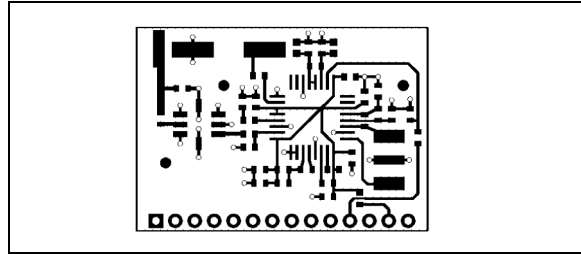
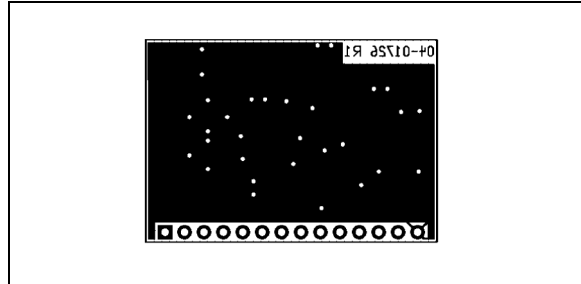


FIGURE 4: rFRXD0420 BOTTOM COPPER



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

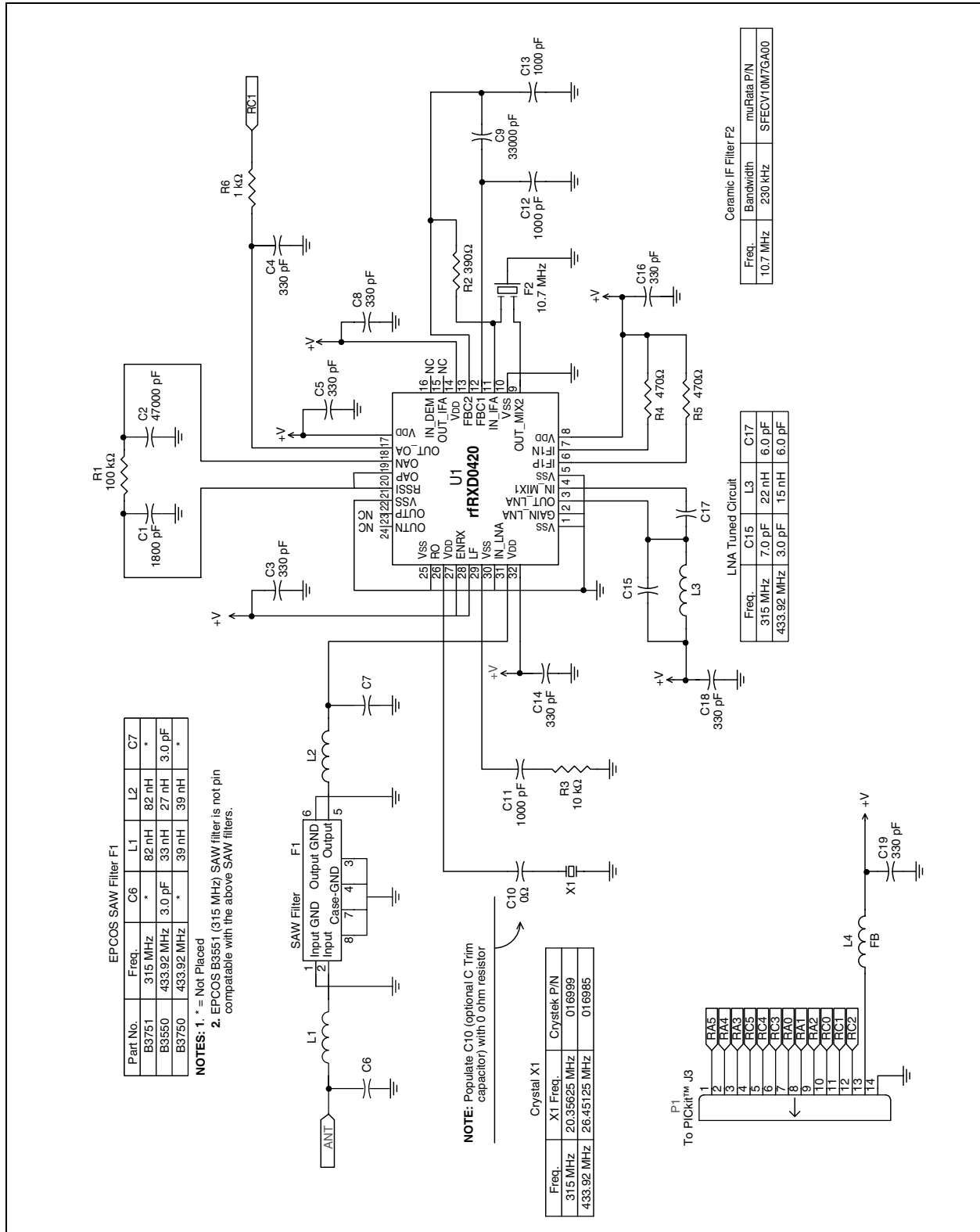


FIGURE 6: rFRXD0420 RECEIVER MODULE BILL-OF-MATERIALS

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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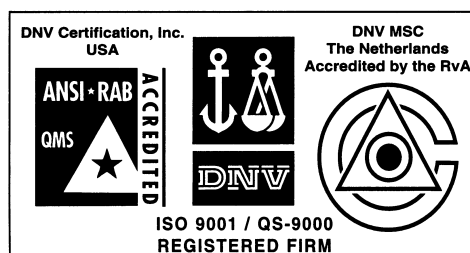
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