

FCC ID: NRFET9744

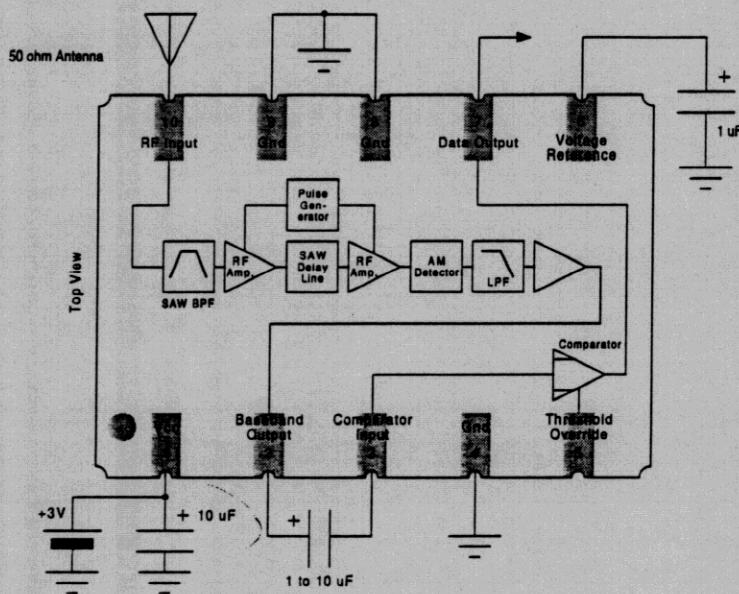
FCC requirements § 2.1033 (b)(4), (5)

**BLOCK DIAGRAM
CIRCUIT DESCRIPTION
PCB DRAWINGS**

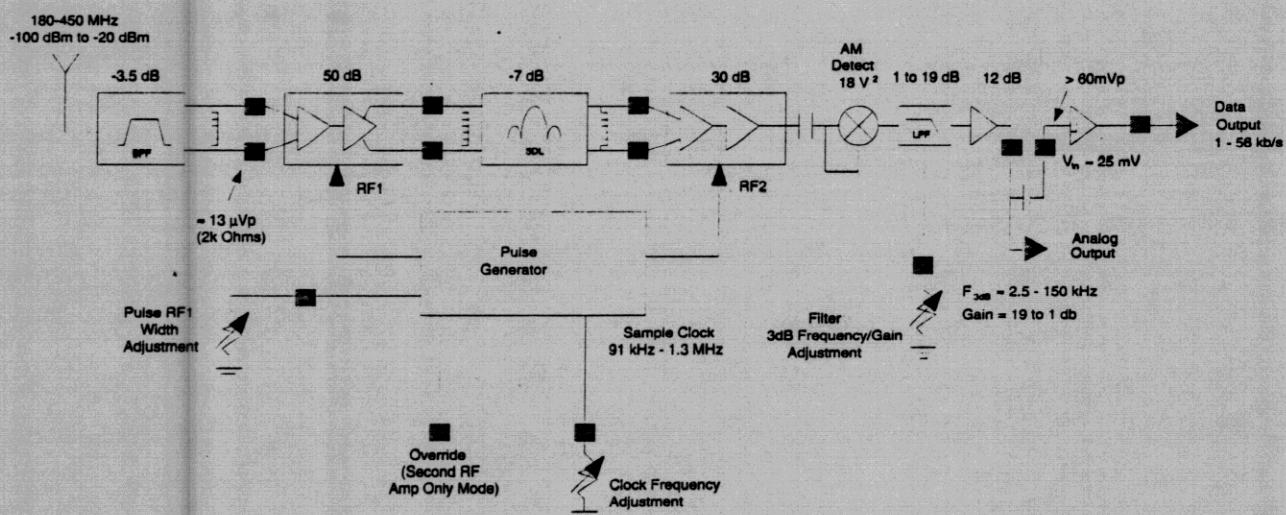
This page is followed by the Exercitor™ 21 receiver (RX2020 ASH receiver) block diagram, the RX2020 receiver description, typical antenna description and PCB drawings on 4 pages.

The RX Series SMT Hybrid ASH Receivers

Functional Block Diagram and Electrical Connections



Detailed Block Diagram



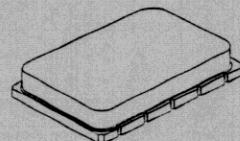
RX2020

- Ideal for 916.5 MHz, 3 V Data Receivers in the USA and Canada
- Passive Design with No RF Oscillation
- Baseband Data Rate of 20 kb/s
- Simple to Apply with Low External Parts Count
- Rugged, Surface-Mount Package with 130 mm² Footprint

This amplifier-sequenced hybrid (ASH) receiver is based on several leading-edge technologies that allow outstanding performance in a small and simple-to-apply module. Two surface-acoustic-wave (SAW) devices are employed. Front-end filtering by a low-loss coupled-resonator SAW filter provides excellent selectivity. Typical sensitivity of -80 dBm is achieved with no RF oscillating or regenerative circuits. This results in virtually no RF spurious emissions. A low-loss SAW delay line provides the time delay necessary to sequence the two RF amplifiers. Time sequencing of the RF gain eliminates the need for frequency conversion prior to AM detection. This receiver is designed to operate from a 3 V lithium battery with typically 2.5 mA current. For system design flexibility, the baseband output is accessible, and the comparator threshold can be changed externally between two settings. Typical applications include unlicensed wireless remote controls and digital data links operating in the USA under FCC Part 15.249 and in Canada under DOC RSS-210.

Absolute Maximum Ratings

Rating	Value	Units
Incident RF Power	+10	dBm
Power Supply Voltage (V _{CC} to Ground) (Observe ESD Precautions)	-0.3 to +4.0	VDC
ESD (100 pF, 1.5 kΩ)	Terminals 2, 3, or 7 to Ground	±2000
	All Other Terminals to Ground	±300
Case Temperature ¹	-45 to +100	°C

916.5 MHz
ASH
Receiver

SM-10 Case

Electrical Characteristics

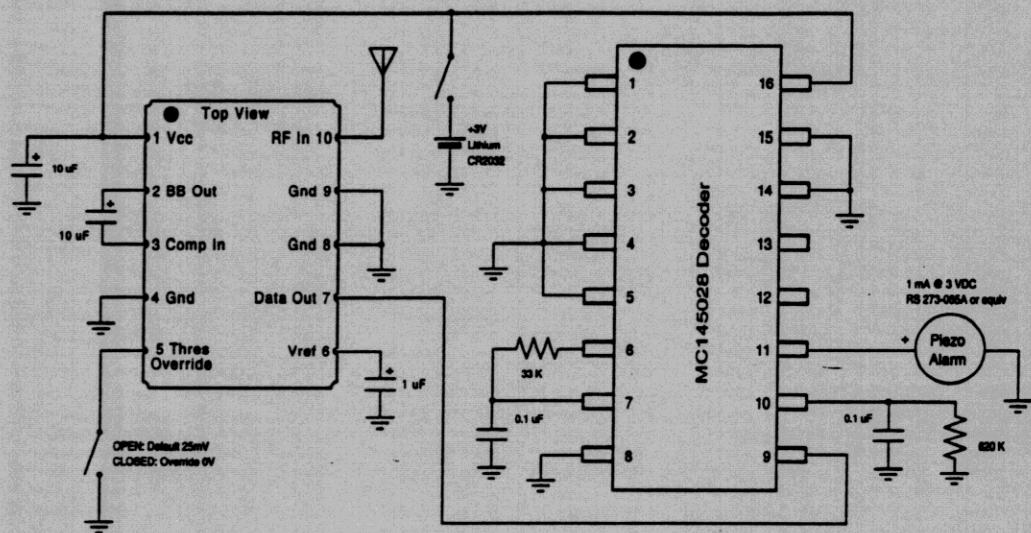
Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Radio Frequency	f _C	2, 3	916.50 Nominal			MHz
Received Carrier Modulation Type		4, 5	Pulse Modulation (OOK)			
RF Band			-80			dBm
Sensitivity				-10		
Operating Signal Strength						
Channel Width		6	f _C ±200			kHz
Noise Equivalent Bandwidth	NEB		48			
Input Impedance	Z _{IN}		50 Nominal			Ω
Interference Rejection		7	80			
Half-Frequency Spurious			15			
f _C ± 1 MHz						
Sequencing (Sampling)		8	700			ns
Sample Duration			625			
Sample Repetition Rate						kHz
Baseband		9	20			kb/s
Data Rate						
3 dB Bandwidth			24			kHz
Comparator Threshold		10	25			mV
Default (Terminal 5 NC)			0			
Override (Terminal 5 LOW)						
Digital Output			10			pF
CMOS Load Capacitance						
Output HIGH Voltage	V _{OH}		V _{CC} - 0.2		V _{CC}	V
Output LOW Voltage	V _{OL}		0.0		0.2	
Rise Time	t _R		3			
Fall Time	t _F		3			μs
Power Supply	V _{CC}	1	2.7	3.0	3.5	VDC
Operating Voltage						
Current at 25°C and 3.0 V	I _{CC}		2.5	3.0	3.5	mA
Operating Ambient Temperature	T _A	1	-40		+85	°C

Lid Symbolization (In Addition to Date Code)

RFM RX2020

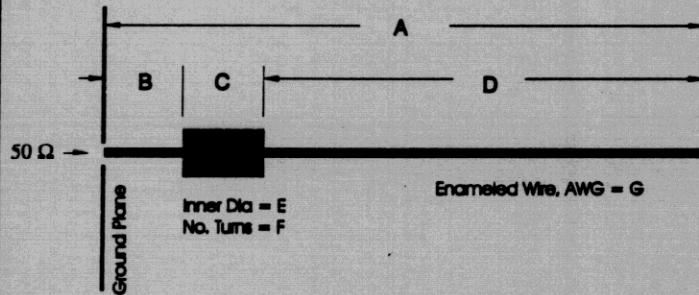
The RX Series SMT Hybrid ASH Receivers

Demonstration Circuit

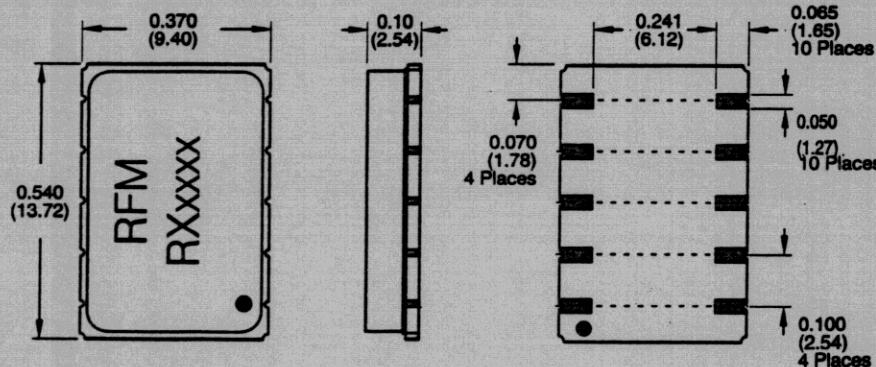


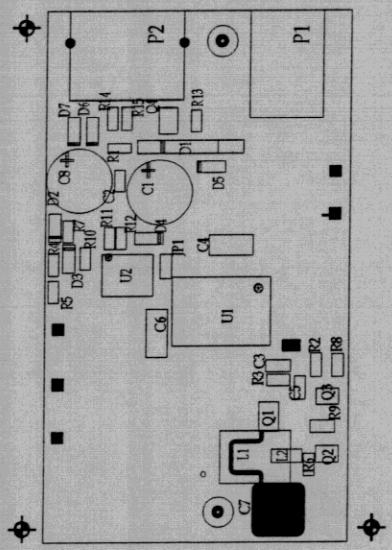
Typical Antennas

Dimension	Units	Frequency (MHz)			
		303.825	418.0	433.92	916.5
A	Inches	5.35	3.9	3.55	1.58
	Millimeters	136	99	90	40
B	Inches	1.4	0.6	0.6	0.4
	Millimeters	36	15	15	10.2
C	Inches	0.25	0.6	0.55	0.18
	Millimeters	6	15	14	4.4
D	Inches	3.7	2.7	2.4	1.0
	Millimeters	94	69	61	25.4
E	Inches	0.375	0.1	0.1	0.1
	Millimeters	10	3	3	3
F	Number of Turns	4 T	16 T	15 T	7 T
G	AWG	#20	#22	#22	#24

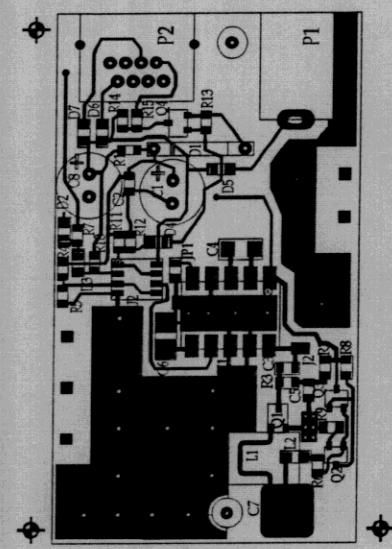


Case Design

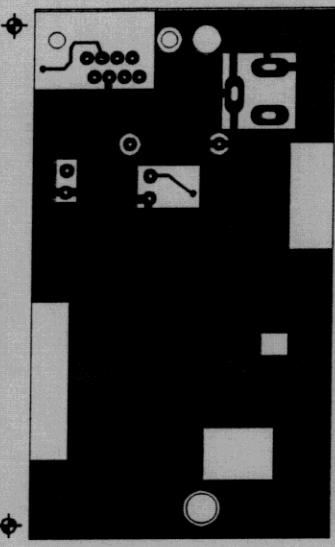




Components placing - Components Side .



Components placing - Print Side .



Components placing - Print Side .

Keytron Electronics & Technologies Ltd.

INFORMATION

Project / Customer

TITLE

Exercitor 21

Receiver Adapter 916MHz -PCB Drawing

SIZE	FSM NO.	DWG NO. / FILE NAME
A4		EXR7101.skd
SCALE	1mm = 1mm	DATE 12-AUG-97 SHEET 1 of 2