

FCC requirements § 2.1033 (b)(4)

**CIRCUIT DESCRIPTION
SCHEMATIC DIAGRAM
PCB DRAWINGS**

The Exercitor™ 21 transmitter board consists of the RFM hybrid, type HX2000, and helix miniature antenna. This board is attached to the Exercitor™ 21 main PCB, comprising analog ECG and acceleration amplifiers, standard Motorola µC of P9 series and DC-DC converter driven by 1.5 V battery. DC-DC converter provides the stable 3.6 V for the transmitter hybrid. Both boards are enclosed in hermetically sealed plastic belt and the user has no access to this parts. The user has access only to the battery compartment for the battery replacement. From the Exercitor™ 21 schematic diagram it can be seen that the transmitter board DATA input is driven by the microcontroller port via R32 = 4.7 kOhm resistor.

This page is followed by the Exercitor™ 21 transmitter schematic diagram, the HX2000 hybrid transmitter description, transmission timing diagram, antenna and PCB drawings on 4 pages.

JHP1 = VDD - EGG TEST MODE Operation
 JHP2 = VSS - NORMAL Operation

JHP3 = VDD - FOR 900MHz Transmitter
 JHP4 = VSS - FOR 433MHz Transmitter

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111

RFM**HX2000**

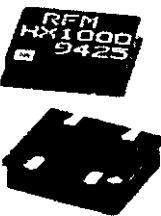
- Ideal for 916.5 MHz Unlicensed Transmitters in the USA and Canada
- Self-Contained RF Functions Shorten Development Time
- Compact, Surface-Mount Case with <90 mm² Footprint

The HX2000 is a miniature transmitter module that generates on-off keyed (OOK) modulation from an external digital encoder (not included). The carrier frequency is quartz, surface-acoustic-wave (SAW) stabilized, and output harmonics are suppressed by a SAW filter. The result is excellent performance in a simple-to-use, surface-mount device with a low external component count. The HX2000 is designed for unlicensed remote-control, wireless security, and data-link transmitters operating in the USA under FCC Part 15.249 and in Canada under DOC TRS RSS-210.

Absolute Maximum Ratings

Rating	Value	Units
Power Supply and/or Modulation Input Voltage	10	V
Nonoperating Case Temperature	-40 to +85	°C
Ten-Second Soldering Temperature	230	

916.5 MHz Hybrid Transmitter



SM-4 Case

Electrical Characteristics

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Operating Frequency	f_0	1, 2, 3, 4	916.300		916.700	MHz
	Δf_0				± 200	kHz
RF Output Power into 50 Ω at 25 °C	P_o	2, 4, 5	-3	0		dBm
		2, 3, 4, 5	-5	0		
Harmonic Spurious Emissions		2, 3, 4, 5		-40	-32	dBc
	V_{IH}		2.5		V_{CC}	V
Modulation Input	V_{IL}	3, 4, 5	0.0		0.3	
	I_{IH}				100	μA
	I_{IL}		0.0			
			5	18		kΩ
Dynamic Input Resistance	t_R	3, 4, 5, 6			60	μs
	t_F				30	
Data Timing Parameters	V_{CC}	5, 7	2.7	3	3.3	VDC
	I_{CC}	3, 4, 5, 8		9	11	mA
		5, 9			1.0	μA
Power Supply	T_C	5	-40		+85	°C
Operating Case Temperature Range						

RFM HX2000

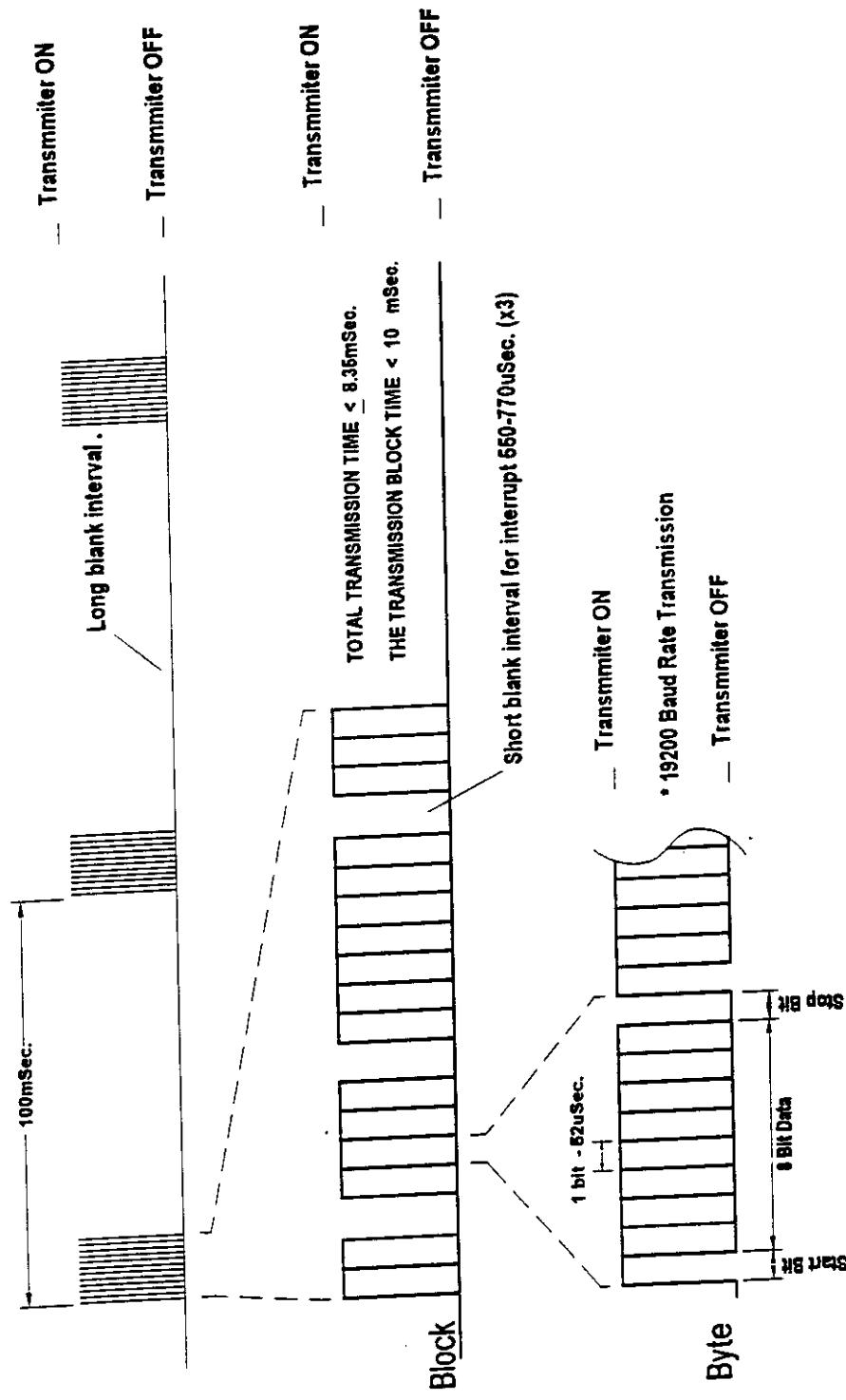
Lid Symbolization (In Addition to Lot and/or Date Code)



CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

NOTES:

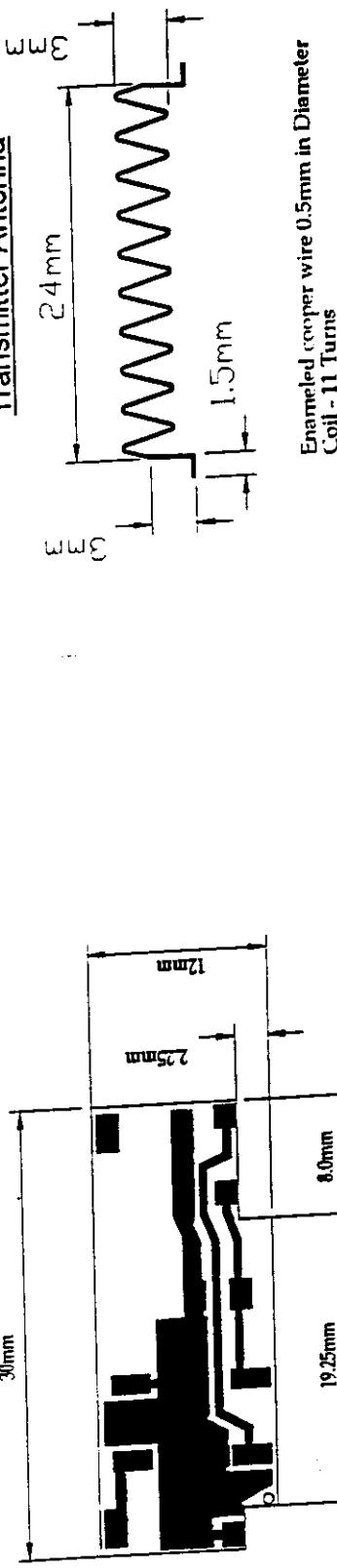
1. One or more of the following United States patents apply: 4,454,488; 4,616,197; 4,670,681; and 4,760,352.
2. Typically, equipment utilizing this device requires emissions testing and government approval, which is the responsibility of the equipment manufacturer.
3. Applies over the specified range of operating temperature.
4. Applies over the specified range of operating power supply voltage.
5. The design, manufacturing process, and specifications of this device are subject to change without notice.
6. The maximum data rate is dependent on the characteristics of the external encoding circuitry (not included).
7. Unless noted otherwise, case temperature $T_C = +25^\circ\text{C} \pm 2^\circ\text{C}$, test load impedance = 50 Ω, and modulation input is at logic HIGH.
8. The maximum operating current occurs at the maximum specified power supply voltage and maximum specified operating temperature.
9. Standby current is defined as the supply current consumed with the modulation input at logic LOW.



EXERCITOR 21 - 900MHz Transmission Timing Diagram.

Project / Customer		TITLE		Exercitor 21	
SPECIFICATIONS		900MHz Transmission Timing Diagram.		DWG NO. / FILE NAME	
DRAWN BY		FSCM NO.		DATE	
Eli Z.					
DESIGNED BY	E. K.				
DESIGN ACTIVITY					
CUSTOMER					
SCALE	1mm = 1mm	DATE	8-DEC-97	SHEET	1 of 1

Transmitter Antenna



Materials : PCB - Glass Epoxy FR-4 ; 0.8mm Thickness

Keytron Electronics & Technologies Ltd.

SPECIFICATIONS		DRAWN BY	DATE	Project / Customer		Exercitor 21	
		DESIGNED BY		TITLE		Transmitter PCB (900MHz)	
		DESIGN ACTIVITY		SIZE	FSCH NO.	DWG NO. / FILE NAME	
30mm	19.25mm	At		30mm	19.25mm	EXR7107.skd	
8.0mm	12mm			8.0mm	12mm	1.0f	1

