



## *Adding Heart to Your Technology*

V 1.4 22 May 2008

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### **CHR S 3G**

### **Contact heart rate measurement system**

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Model with wireless receiver and connectors  
(#94032432)



#### **APPLICATIONS:**

- Commercial exercise equipment

#### **FEATURES**

- Contact heart rate measurement
  - 8s typical detection time
- Optional built in wireless receiver
- ESD protected

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### **DESCRIPTION**

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CHR S 3G is a family of Polar contact heart rate products. The basic operation of the system is to detect the heart rate of a user either from the hands or from the transmitter belt the user wears while exercising. The system calculates the heart rate average and outputs it as digital pulses. The exercise equipment software calculates the time between the pulses and converts it to heart rate value.

This contact heart rate system operates at 5Vdc voltage. Wireless receiver system is optimized on coded signals giving the full benefit on gym environment. System is also capable to keep shortened range while it's looking for a wireless signal. After signal is found, the range is released to normal reception distance. This will help out on environments where several machines are close to each other.

The available options are listed on the last page of this datasheet. Please contact your local sales representative to discuss your requirements. Contact information is found on the footer of each page.

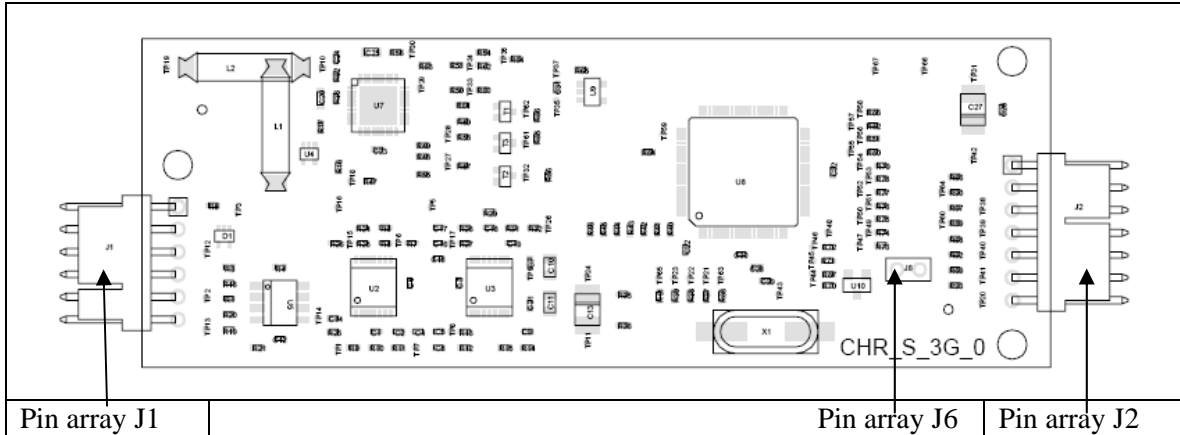
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### PIN CONFIGURATION



Detailed pin description can be found below. Square on each pin array defines the pin number 1.

Pin name	Function
J1 (1)	GND
J1 (2)	Reference
J1 (3)	Vin - electrode
J1 (4)	GND
J1 (5)	Reference
J1 (6)	Vin + electrode
J2 (1)	Ground
J2 (2)	Vcc
J2 (3)	Output 1, Combined / hand measurement output or serial TX (Serial data out)
J2 (4)	Output 2, Hands on / off level indicator or serial RX (Serial data in)
J2 (5)	Output 3, Source status. Used on combined outputs setting.
J2 (6)	Output 4, Separate wireless output.
J2 (7)	External HR input
J6 open	Internal wireless receiver in use
J6 closed	External wireless receiver in use (receiver output connected to J2 (7))

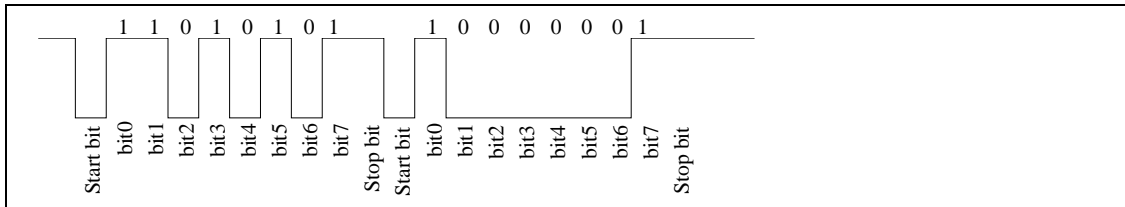


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### SERIAL DATA

Data format is as shown below:



It will only be available on the connector reserved for it if serial communication is selected. Also it will always act as combined output. This means that data sent from serial line depends of the priority settings on the same manner that with combined pulsed output.

Serial communication line is asynchronous 5V TTL logic. Communication speed 1200bps. Communication format is one start bit, eight data bits and one stop bit. Two bytes send, first one is heart rate and second is status. The order of bits in both bytes is standard to UART, the first bit after the start bit is LSB.

Each transmission includes two bytes; heart rate value and status information. Heart rate value is transmitted first with the LSB first. Bits 0 and 1 of the second byte are used for indicating the current status of the heart rate measurement. Please see the following table.

Bit 0	Bit 1	Status
0	0	Every heart rate value is reliable
0	1	Undefined
1	0	The system is searching for a new reliable heart rate value
1	1	Undefined

Bits 2-6 are not used. Heart rate source information is available from bit 7 as follows:

Bit 7	Heart rate source
0	Hand sensors
1	Wireless receiver

Hands on information is sent on serial transmission so that both bytes, heart rate and status, are containing 0. Hands off information is sent on the same sense, except both bytes are containing 1.

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### **ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Min	Max	Unit
Supply voltage	V <sub>cc</sub>	4.75	5.25	V
Storage temperature	T <sub>s</sub>	-10	+50	°C
Operating temperature	T <sub>o</sub>	+5	+50	°C

### **RECOMMENDED OPERATING CONDITIONS**

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Supply voltage	V <sub>cc</sub>	T=25°C		5.0		V
Supply current average	I <sub>avg</sub>	T=25°C V <sub>cc</sub> =5.0V		40		mA
Storage temperature	T <sub>s</sub>			+25		°C
Operating temperature	T <sub>o</sub>			+25		°C
Detection time from hands	Δt	T=25°C V <sub>cc</sub> =5.0V		8		s
Wireless reception range (typical)*	l	T=25°C V <sub>cc</sub> =5.0V	80		105	cm

\*) Can be changed on request

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### ELECTRICAL CHARACTERISTICS BY PIN

Pin name	Function
J1 (1)	GND
J1 (2)	Reference electrode connection. Right hand fingertips.
J1 (3)	Vin – electrode connection. Right hand palm.
J1 (4)	GND
J1 (5)	Reference electrode connection. Left hand fingertips.
J1 (6)	Vin + electrode connection. Left hand palm.
J2 (1)	Ground
J2 (2)	Vcc
J2 (3)	Output 1, Combined / hand measurement output or serial TX (Serial data out)
J2 (4) *)	Output 2, Hands on / off level indicator or serial RX (Serial data in)
J2 (5) **)	Output 3, Source status. Used on combined outputs setting.
J2 (6)	Output 4, Separate wireless output.
J2 (7)	External HR input
J6 open	Internal wireless receiver in use
J6 closed	External wireless receiver in use (receiver output connected to J2 (7))

\*) Level is “0” when hands are not connected and “1” when hands are connected.

\*\*) Combined mode: If on “0”, output source is wireless and if “1”, output source is hand measurement.

\*\*) Separate outputs: “0” means wireless signal is coded and “1” means wireless signal is noncoded.

### BOARD DIMENSIONS

Dimension	Value
Length	102.1 mm
Width	37.2 mm
Height	5.6 mm
Connector spacing	2.54 mm

Note: Dimensions without connectors

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### ORDERING INFORMATION

Currently available versions from stock and list of functions on standard models

Board number	Board name
94032432	CHR S 3G
94034173	CHR S 3G SO
94036437	CHR S 3G L1

	94032432	94034173	94036437
Wireless receiver included	X	X	X
Wireless receiver not included			
Wireless optimized for non coded			
Wireless optimized for coded	X	X	X
Reduced range on code search	X	X	X
Normal range on code search			
Receiving coil assembly L1			X
Receiving coil assembly L2	X	X	
Combined output	X		X
Separate output (Wireless on Output4)		X	
Pulse output	X	X	X
Serial output 1200bps			
Positive output pulse	X	X	X
Negative output pulse			
Output pulse width 10ms	X	X	X
Output pulse width 20ms			
Outputting buffer 4s enabled	X	X	X
Outputting buffer 4s disabled			
Hands on / off pulse	X		X
Hands on / off level indicator (Output2)		X	
Output 3 wireless / hand source information	X	X	X
Output 3 coded / noncoded source information			
Internal wireless receiver used	X	X	X
External wireless receiver enabled			
Wireless prioritized	X		X
Hand measurement prioritized		X	
J1 Molex 22-05-3061	X	X	X
J2 Molex 22-05-3071	X	X	X
J6 pinheader	X		X

Alternate configurations are available upon request

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