



Triangle BioSystems, Int'l.

5-Channel Wireless Neural Headstage System for mice



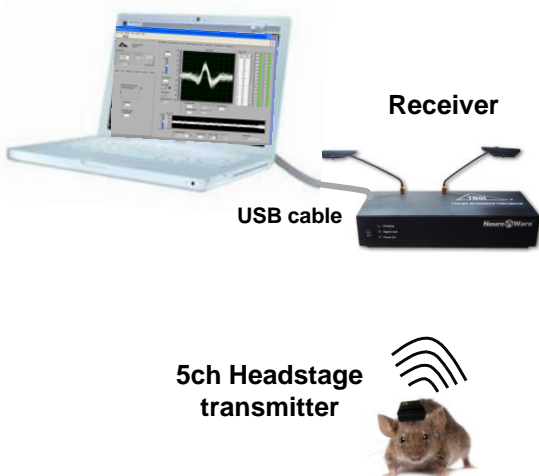
Headstage Features

- Wireless operations across 4 meters
- Operates in unlicensed radio band below FCC limits
- Available with 5 channels
- Factory configurable voltage gain is 800.
- Rechargeable battery power with 3.5 hours battery life
- Bandpass filtering per channel .8Hz to 7kHz typical
- 50kHz sampling rate per channel
- Weight: 2.6 grams (okay for mice)
- Dipped and covered headstage covers available

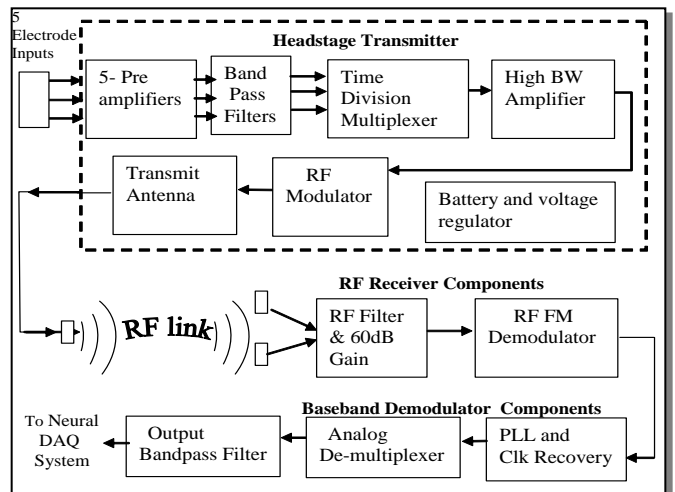
Triangle BioSystems, Int'l. has developed a high channel count wireless neural headstage system that allows researchers to continuously and simultaneously monitor up to 5 neural electrodes. No longer do experiments have to be constrained by wiring a test subject to the recording system. The complete system is comprised of a wireless headstage transmitter with integrated battery, RF signal receiver/baseband demodulator, power supply and all required cables. With an effective range of 4 meters, this system provides a wireless connection between the implanted electrodes and the data recording system.

In the development of this system, TBSI utilized custom ASIC technology and proprietary radio design techniques to provide high channel count functionality in a wireless headstage that is both small and light weight (2.6 grams). This design also incorporates neural preamplifier circuitry to create an extremely compact and powerful transmitter.

Neural Recording System Overview



System Block Diagram



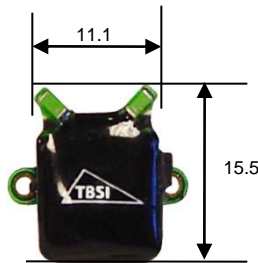
Headstage Specifications

Electrical

Parameter	Min	Typ	Max	Units	Notes
Power Supply					
3 volt supply		2.95	3.0	Volts	Power consumption 11.0ma (typical)
Battery life		3.5		Hours	Re-chargeable battery with 1 hour recharge time
Analog Input Specs					
Input voltage range		4		mVolts	Maximum Input Vp-p
Common mode center		.9		Volts	At ACgnd potential
Voltage Gain	790	800	810		
Bandwidth	.9		7000	Hz	-3dB input signal level BW
Input impedance		11M		ohms	At 1kHz
Input referred noise		8.5		μ Vrms	for DC - 10kHz frequency
Input referred noise		5.5		μ Vrms	for 500Hz - 5kHz frequency
Sampling Rates		50		kHz	Headstage and DAC sampling rates
Mechanical Specs					
Width		11.1		mm	Width of internal battery with dipped package
Length		15.5		mm	Length of internal battery with dipped package
Height		5.0		mm	To surface of connector
Weight			2.6	grams	Dipped headstage with connector Boxed Headstage weighs 3.1 grams
Input connector					Sullins Male GRPB06VWQS-RC
Radio Specs					
Center frequency		3.05		GHz	With +/- 100 MHz bandwidth
Transmit power			300	μ W @ 4 meters	FCC Sec.15.109B(a)
Transmit antenna		3.05		GHz	Tuned chip antenna with circular diversity
Transmit range		4.0		Meters	With receiver on top of cage

Mechanical (mm) Dipped Headstage

Top View



Side View

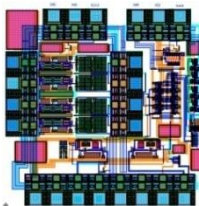


Dual row, 8-pin Male Omnetics connector



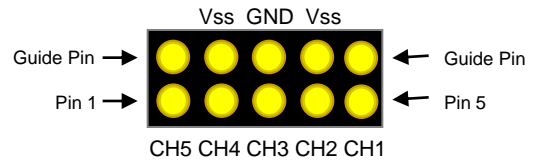
Dual row, 10-pin Male Sullins connector

Analog RF ASIC



Connector Information (Omnetics)

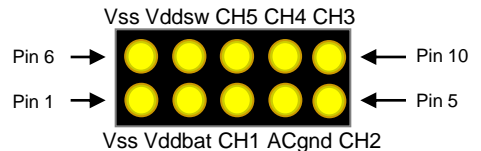
Female Omnetics P/N **A70008**



Male mating connector for electrode side
Omnetics P/N **A70009**

Connector Information (Sullins)

Male, P/N **GRPB06VWQS-RC** (Digikey P/N **S9012E-05-ND**)



Female mating connector for electrode side
P/N **LPPB052CFFN-RC** (Digikey P/N **S9009E-05-ND**)

Ordering Information

-Channel Wireless Headstages

Part No.	Battery Operating Time	Battery Type	Connector Pins
5RadioHS_050_10	5 hour	Internal	8 or 10
5NeuroRadioRX	Wireless Receiver/Demodulator		