

# Wireless Neuro-Recording Systems

## PRODUCT OVERVIEW

Triangle BioSystems, Int'l. has developed high channel count wireless neural recording headstage systems that allow researchers to continuously and simultaneously monitor up to 64 neural electrodes with a single headstage. 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, using its dual-directional antennae, this system provides a wireless connection between the implanted electrodes and the data recording system. If you require multiple animals in the same cage we offer a dual system (2 headstages/receivers) compatibly operating at different frequencies.

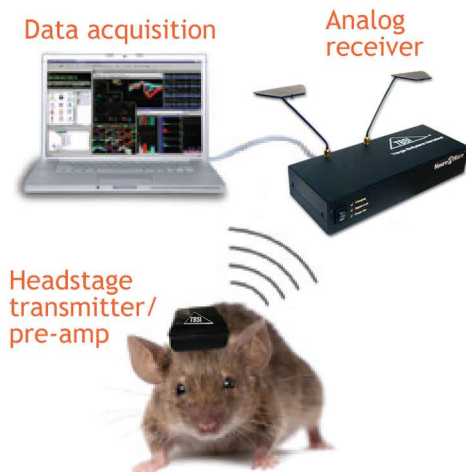
In the development of this system, TBSI utilized custom ASIC technology and proprietary radio design techniques to provide high channel count functionality in a wireless headstage that is both small and light weight from 2.8 to 5.0 grams with a variety of connectors. This design also incorporates neural preamplifier circuitry to create an extremely compact and powerful transmitter. Our wireless hardware is ready for integration with our NeuroWare software and our data acquisition solution.



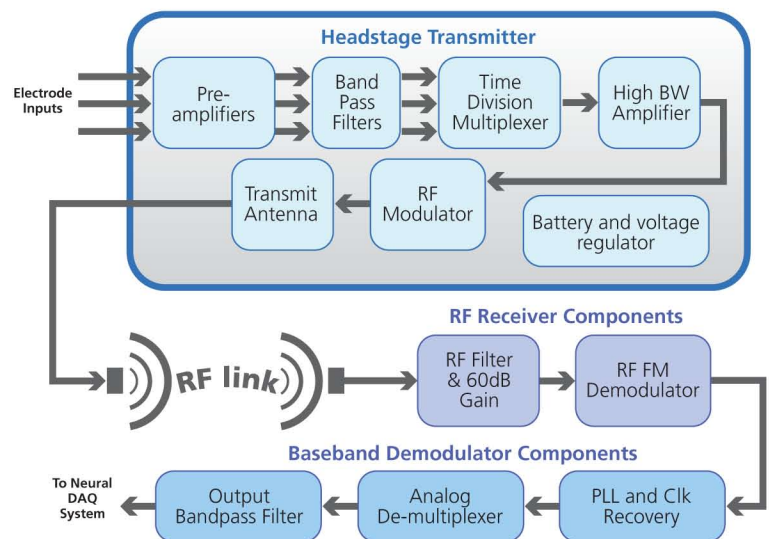
## FEATURES

- Wireless operations across 3 meters
- Conforms to FCC intentional radiator requirements
- Available with 5-64 channels (128ch with dual system)
- Factory configurable gain (800x standard)
- LED options available for video tracking
- NeuroWare software certified
- Rechargeable internal battery power up to 5.5 hours
- External battery options available via backpack
- Typical bandpass filtering per channel .9Hz to 6kHz
- Minimum 50kHz sampling rate per channel
- Weight 2.6-5.0 grams
- Dual radio systems available
- DAQ integrated solutions available

## SYSTEM OVERVIEW



## SYSTEM BLOCK DIAGRAM



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## SPECIFICATIONS

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
<b>Power Supply</b>					
3 volt supply	2.75	2.8	2.85	Volts	Power consumption 9.0ma (typical)
Battery life	3	5	5.5	Hours	Re-chargeable battery with 2 hour recharge time
<b>Analog Input Specs</b>					
Input voltage range		4		mVolts	Maximum Input voltage V <sub>p-p</sub>
Common mode center		.9		Volts	At ACgnd potential
Gain selection	790	800	810		Factory selectable gain
Bandwidth	.8		7000	Hz	-3dB input signal level BW
Input impedance		13M		ohms	At 1kHz
Input referred noise		8.5		μVrms	for DC - 10kHz frequency, 30μV <sub>p-p</sub>
Input referred noise		5.5		μVrms	for 500Hz - 5kHz frequency
Sampling Rates/Channel		50		kHz	Headstage and DAC sampling rates per channel
<b>Mechanical Specs</b>					
Length*	15.5	16	20.5	mm	Edge to Edge
Width*	11.1	17.2	15.1	mm	Edge to Edge mounting holes (#0-80 screws)
Height*	5.0	8	12.2	mm	Not including connector
Weight*	2.6		5.0	grams	2.8 grams for 5 channel and 5.0 grams for 64 channel
Input connectors					Omnetics, Sullins, custom
<b>Radio Specs</b>					
Center frequency		3.05		GHz	With +/- 100 MHz bandwidth
Transmit power			300	μW @ 3 meters	FCC Sec.15.109B(a)
Transmit antenna		3.05		GHz	Tuned chip antenna with circular diversity
Transmit range		3.0		Meters	With receiver on top of cage

\* Minimum/Maximum mechanical specs are for 5 channel headstages and 64 channel headstages respectively.

## ORDERING INFORMATION

NEUROWARE WIRELESS HEADSTAGE SYSTEMS							
Part Number <sup>1</sup>	Channels	Description <sup>2</sup>	Battery Time	Battery Type	Connector Pins <sup>3</sup>	Connector Size <sup>3</sup>	
Neuro5RadioHS	5	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	3 hour	Internal	8	25 mil	
Neuro5RadioHS5H	5	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	5 hour	Internal	8	25 mil	
Neuro5RadioHS24H	5	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	24 hour	External	8	25 mil	
Neuro16RadioHS	16	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	5.5 hour	Internal	18	25 mil	
Neuro16RadioHS50M	16	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	5.5 hour	Internal	20	50 mil	
Neuro16RadioHS24H	16	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	24 hour	External	18	25 mil	
Neuro16RadioHS50M24H	16	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	24 hour	External	20	50 mil	
Neuro32RadioHS	32	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	5.5 hour	Internal	36	25 mil	
Neuro32RadioHS24H	32	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	24 hour	External	36	25 mil	
Neuro64RadioHS	64	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	5.5 hour	Internal	36x2	25 mil	
Neuro64RadioHS24H	64	Wireless headstage: Omnetics Connector, Receiver, Cables, Power	24 hour	External	36x2	25 mil	

<sup>1</sup> All systems are available in both single radio and dual radio output versions

<sup>2</sup> All products are also available individually

<sup>3</sup> Custom Connector options available

## SUMMARY

Our products aid research in neurophysiology for behavioral and cognitive studies, as well as sleep, pain and disease origin for Alzheimer's, Parkinson's and Epilepsy to name a few. Whether you need to record local field potential signals such as EEG, EMG, ECOG, single unit, or spike nerve signals, we have got you covered. Our products can also accurately record many other bio signals from the brain, central nerve and peripheral nervous system.