

# Multiplexer Neuro-Recording Systems

## PRODUCT OVERVIEW

Triangle BioSystems, Int'l. offers a family of channel multiplexing analog headstage sub-assemblies that are used to significantly reduce wires connected to implanted electrodes and neural recording and analysis equipment. The main function of the headstage is to precondition the neuron pulse signals into a single output and provide a high gain, bandpass filtered buffered connection.

Each headstage design is based on a custom, low power VLSI developed by TBSI. The result is a solution with superior performance and reduced wire connection in a very small form-factor with less weight. The high gain, bandpass filter headstages are available with system gain of 800 with an adjustable bandpass filtering from the factory. The complete system also includes a de-multiplexer unit and commutator to further optimize the low wire counts. These systems are ideal when higher channel counts are required than are offered in our wireless and tethered solutions while maintaining mobility freedom. Our multiplexing hardware is ready for integration with our NeuroWare software and our data acquisition solution.



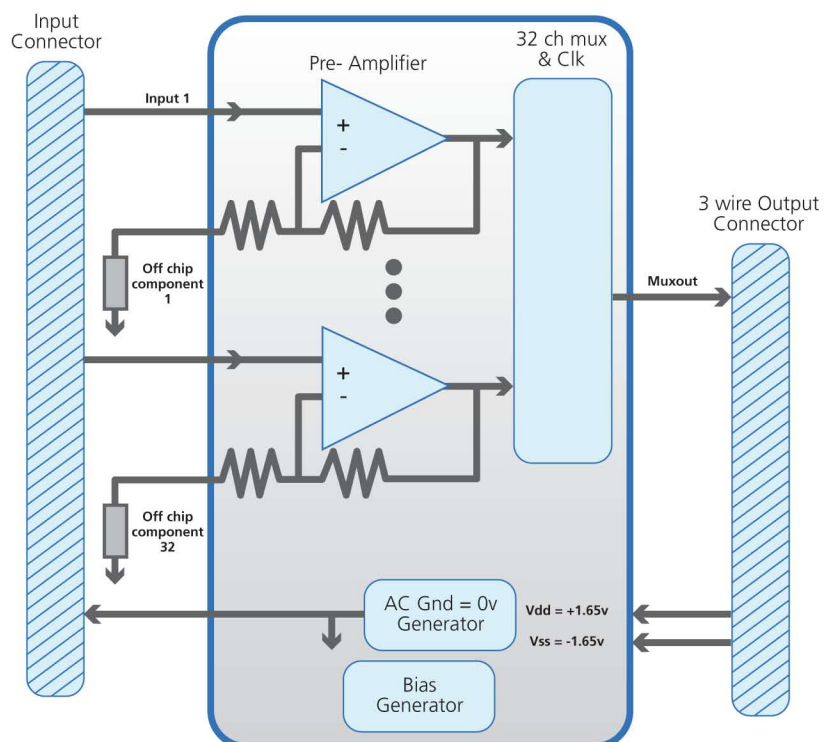
## FEATURES

- 3 wire interface cable for first 32 channels and 1 wire for each additional 32 channels
- Headstage Weight < 0.8 grams
- Available headstage choices from 32 – 224 channels with 3 – 9 wires at 5 ft. standard length
- NeuroWare software certified
- Available with system gain of 800
- Standard Omnetics connectors
- Bandpass filtering of .8Hz to 7kHz
- 50kHz sampling rate per channel
- Optional Blue, Red or Green LED mounting options for video tracking
- Top or side exit headstage wire
- Pre-wired recording assemblies
- Commutator options
- DAQ integrated solutions available

## SYSTEM OVERVIEW



## SYSTEM BLOCK DIAGRAM



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## SPECIFICATIONS

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
<b>Power Supply</b>					
Headstage Power supply	2.99	3.0	3.01	Volts	3.0 Bipolar power supply (+2.1v, -.9v and ACgnd @ 0v)
Average Icc 3.0v	5.6	6.1	6.7	ma	Without LEDs
<b>Analog Input Specs</b>					
Input voltage range	-3.0		+3.0	mVolts	For Gain 800 Headstage
Output voltage range	-2.4		+2.4	Volts	Measured at DB37 connector of receiver
Common mode center		0		Volts	ACgnd @ 0v
dc Offset	-10	0	10	mVolts	For bipolar power supplies only
System Gain 800	790	800	810		Factory selectable gain
Bandwidth @ 3v	.8		6000	Hz	-3dB input signal level BW
Input impedance		50		Mohms	At 1kHz
Output impedance		158		ohms	At 1kHz
Input referred noise		6.2		µVrms	for DC - 10kHz frequency with all inputs grounded
Sampling Rate		50		kHz	Per channel sampling rate
<b>Mechanical Specs</b>					
Headstage Length		20		mm	Edge to Edge of connector pins
Headstage Width		15		mm	Edge to Edge
Headstage Height		5		mm	Edge to Edge
Headstage Weight			.8	grams	Per Headstage
<b>Miscellaneous</b>					
Reference Bias Current		78		uA	Included inside headstage
Operating Temperature	62	72	82	F	Recommended Temperature Operation

## ORDERING INFORMATION

MULTIPLEXER HEADSTAGE SYSTEMS							
Part Number <sup>1</sup>	Channels <sup>2</sup>	Description <sup>3</sup>	Number of Headstages	Number of Wires	Commutator	Connector Size <sup>4</sup>	
Multi32Mux	32	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	1	3	Yes / 4 Wire	25 mil/36 Pin	
Multi32MuxNC	32	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	1	3	No	25 mil/36 Pin	
Multi64Mux	64	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	2	4	Yes / 4 Wire	25 mil/36 Pin	
Multi64MuxNC	64	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	2	4	No	25 mil/36 Pin	
Multi96Mux	96	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	3	5	Yes / 6 Wire	25 mil/36 Pin	
Multi96MuxNC	96	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	3	5	No	25 mil/36 Pin	
Multi128Mux	128	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	4	6	Yes / 6 Wire	25 mil/36 Pin	
Multi128MuxNC	128	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	4	6	No	25 mil/36 Pin	
Multi160Mux	160	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	5	7	Yes / 10 Wire	25 mil/36 Pin	
Multi160MuxNC	160	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	5	7	No	25 mil/36 Pin	
Multi192Mux	192	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	6	8	Yes / 10 Wire	25 mil/36 Pin	
Multi192MuxNC	192	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	6	8	No	25 mil/36 Pin	
Multi224Mux	224	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	7	9	Yes / 10 Wire	25 mil/36 Pin	
Multi224MuxNC	224	Multiplexer Headstage: Omnetics Connector, Demux Receiver, Cables, Power	7	9	No	25 mil/36 Pin	

<sup>1</sup> All products are also available individually

<sup>2</sup> Actual usable channels are 1 less per headstage due to ground

<sup>3</sup> All systems available with total gain of 120 or 600, headstage gain 5 and 100 respectively

<sup>4</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.