



# TI Filter Solutions

## for Concurrent EEG Recording



## What are the TI Filters?

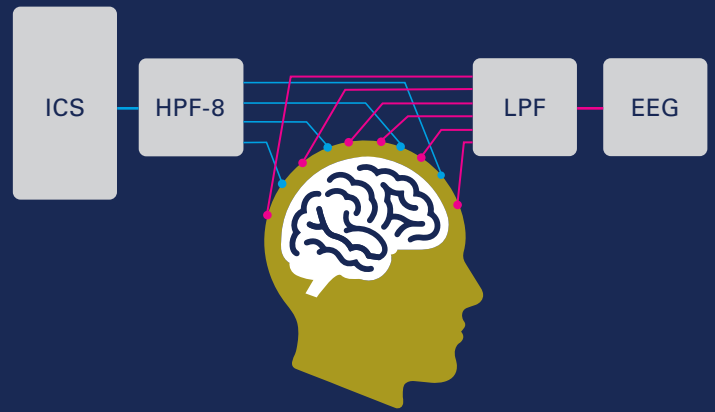
The unique TI Filter solution of the IT<sup>IS</sup> Foundation allows for artifact-free concurrent electroencephalography (EEG) recording during temporal interference (TI) stimulation in the 2 – 50 kHz frequency range. The 2<sup>nd</sup>-order intermodulation products (IM2)

remain under 30 nVrms at 2 mA. TI filters are currently available for EEG systems from Electrical Geodesic Inc. (EGI) and Brain Vision LLC. Solutions for other EEG systems can be developed upon request.

## Components of TI Filter Solutions

The 8-channel passive current mode high-pass filter (HPF-8) is positioned between the Electrode Connector Box and the stimulation electrodes to further reduce the low frequency components and noise generated by the Intelligent Current Source (ICS), while preserving the TI stimulation currents. For typical use cases, IM2 products are attenuated below 30 nVrms.

The low pass filter (LPF) is placed between the EEG recording electrodes and the EEG amplifier. It is engineered to prevent TI carrier signals from causing compression or intermodulation distortion in the EEG amplifier. The active 7<sup>th</sup>-order, ultra-low noise, ultra-low distortion design provides a flat response up to 90 Hz, while attenuating carrier signals of 1 kHz and higher by > 130 dB. Each EEG channel has its own filter, referenced to the COM / GND electrode of the EEG cap.



### HPF-8

Filter type	Passive current mode high-pass filter
Compatibility	TIBS-R (TI Solutions AG, Switzerland) *
Number of channels	8
Connector type	Touch proof
Attenuation	> 60 dB up to 60 Hz > 40 dB up to 100 Hz (4 <sup>th</sup> order, $f_c = 350$ Hz)
TI carrier frequency range	2 – 30 kHz (recommended) 1 – 50 kHz (with reduced performance)
Output Impedance	> 35 kOhm between 2 – 10 kHz
Typical IM2 magnitude	< 30 nVrms
Current monitoring port gain	2 V / mA



HPF-8: 8-channel high-pass filter for TIBS-R

### LPF-32BP (stackable)

Filter type	Active
Compatibility	BrainAmp Standard, DC, MR actiCHamp Plus (via adapter, passive electrodes only)
Number of channels	32 (stackable)
Connector type	50-pin KEL
Attenuation	> 130 dB at 1 kHz and above (7 <sup>th</sup> order, $f_c = 90$ Hz)
Input impedance	3.3 MOhm
Battery life	12 h



LPF-32BP: 32-channel low-pass filter for BrainAmp EEG amplifiers (stackable)

### LPF-128EGI/LPF-256EGI

Filter type	Active
Compatibility	Electrical Geodesic Inc Net Amps Series
Number of channels	128/256
Connector type	EGI 128/256
Attenuation	> 130 dB at 1 kHz and above (7 <sup>th</sup> order, $f_c = 90$ Hz)
Input impedance	3.3 MOhm
Battery life	LPF-128EGI: 6 h, 18 h with extended battery option LPF-256EGI: 3 h, 9 h with extended battery option



LPF-128EGI: 128-channel low-pass filter for EGI Net Amps Series



LPF-256EGI: 256-channel low-pass filter for EGI Net Amps Series

\* For further information, visit [www.temporalinterference.com](http://www.temporalinterference.com)