Miscellaneous Guide

DISCLAIMER

We have used reasonable effort to include accurate and up-to-date information in this manual; it does not, however, make any warranties, conditions or representations as to its accuracy or completeness. We assume no liability or responsibility for any errors or omissions in the content of this manual. Your use of this manual is at your own risk. Under no circumstances and under no legal theory shall the authors be liable for any indirect, direct, special, incidental, punitive, exemplary, aggravated or consequential damages arising from your use of this manual.

Features and specifications of this software program are subject to change without notice. This manual contains information and images about MEG Processor, its user interface, GUI and its other signal processing algorithms, publications that are protected by copyright.

Sending Your Comments and Critiques: We'd like to hear from you. Your comments and suggestions for improving this document are welcome and appreciated. Please e-mail your feedback to MEG_Processor@live.com

Thank you.

How to analyze MEG waveform?

Once a MEG researcher knows how to perform averaging and digital signals filtering, the most frequently asked question in MEG data analysis, according to our experience, is actually about the analysis of the waveforms.

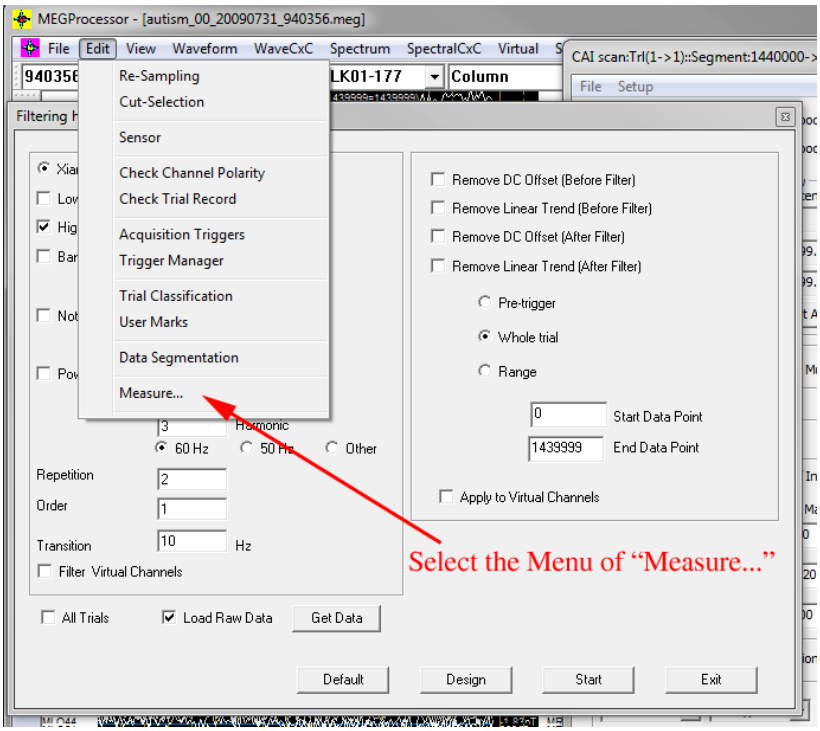
1. What kind of information can we get from the waveforms?

There are several pieces of information can be gotten from the waveforms:

(a) The morphology of the waveform
(b) The number of components (responses or deflections)
(c) The latency of each component
(d) The amplitude of each component
(e) The ratio of the latency/amplitude of every two components
(f) Others

2. How to measure the latency and amplitude of waveforms

(a) Select the Menu: Edit->Measure… (see the following Figures)



(b)Select the “Measure…” Menu: the Cursor will change to “Measuring state” and a “Measuring Window” will show up to show the measuring results.

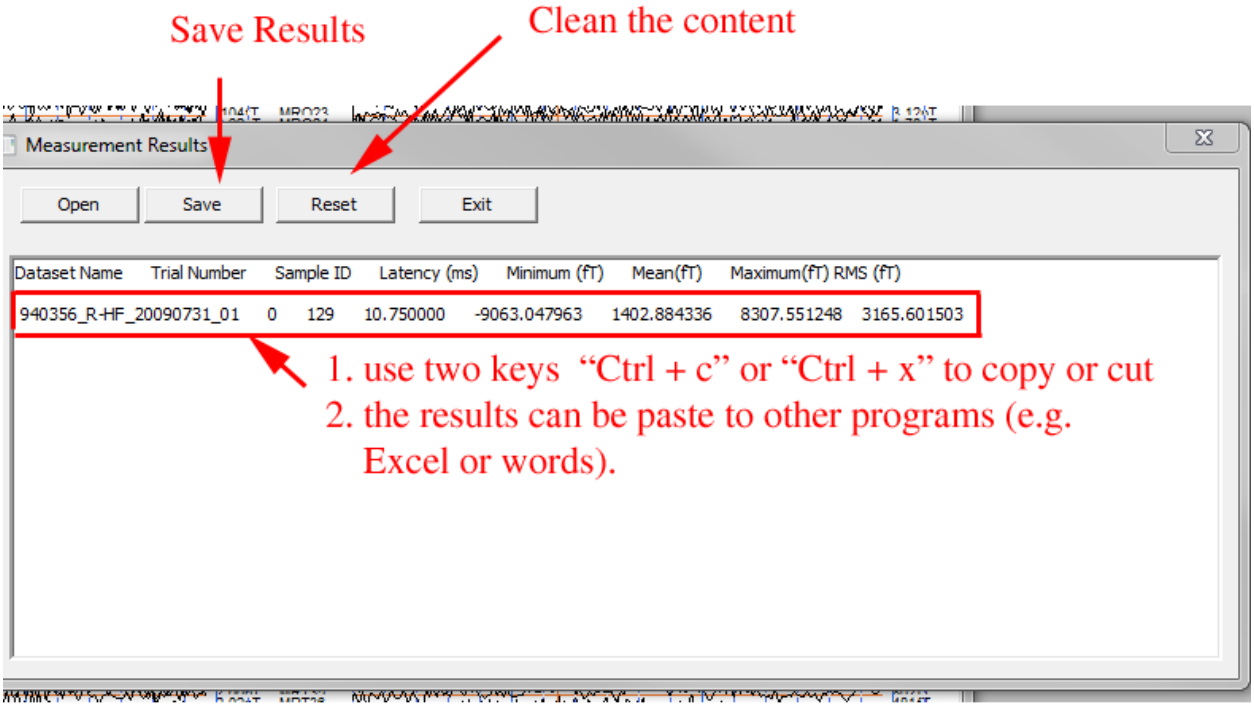
(c) At the “Measuring state”, click the mouse at any interesting of region, the “Measuring Window” will capture the necessary information

(e.g:

“Dataset Name Trial Number Sample ID Latency (ms) Minimum (fT) Mean(fT) Maximum(fT) RMS (fT)”).

(d) User can either copy (or cut) the results by using “Ctrl + C” keys in computer keyboard to other programs (e.g. Microsoft Excel or Word) or simply save the results to a text.

(f) A variety of statistical analyses can be done with the measured data.



How to perform spectrum-based source scan?

Typically, you need a lot memory to perform spectrum-based source scan. First, you need to transform waveform data to spectral data and then decide the frequency-time ranges. Second, select the parameters for source localization or source scan. Here are some examples and experimental data.

The sampling rate is 6000 Hz

1. The best Morlet computing method for source localization

STD 3P01:

2. The best frequency for source localization

2100-2800 Hz

3. Source localization parameters

Lead field (Lfd) picked sensors: computed magnetic field (Bcm) →

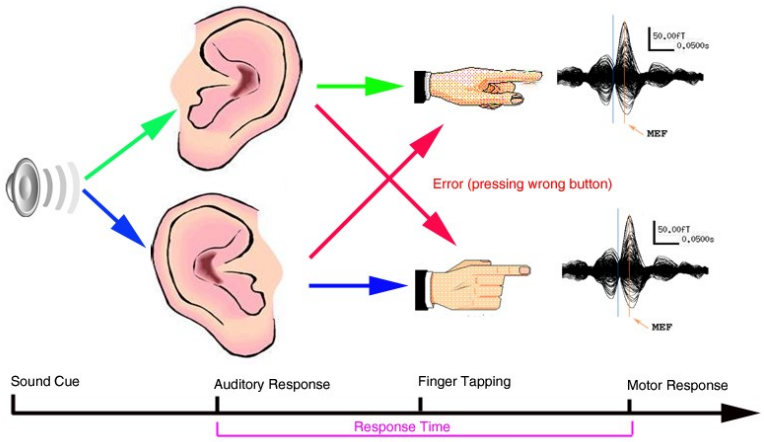
Table 1 Assessment of auditory results with various algorithms

algorithm	Lead field picked sensors (Ldf)	Computed magnetic field sensors (Bcm)	Good reging
LdfPick	180		x
LdfPick	150		Crl(**),Gof(***),Cov(x)
LdfPick	120		Crl(***),Gof(***),Cov(x)
LdfPick	100		Gof(***),Crl(**), Cov(x)
LdfPick	90		Gof(*),Crl(*), Cov(x)
LdfPick	80		Gof(*),Crl(*), Cov(*)
LdfPick	60		Cov(?), Gof(?), Crl(?)
LdfPick	36		Cov(**)
LdfPick	30		Cov(**)
LdfPick	27		Cov(**)
LdfPick	20		Cov(*)
LdfPick	18		Cov(*)

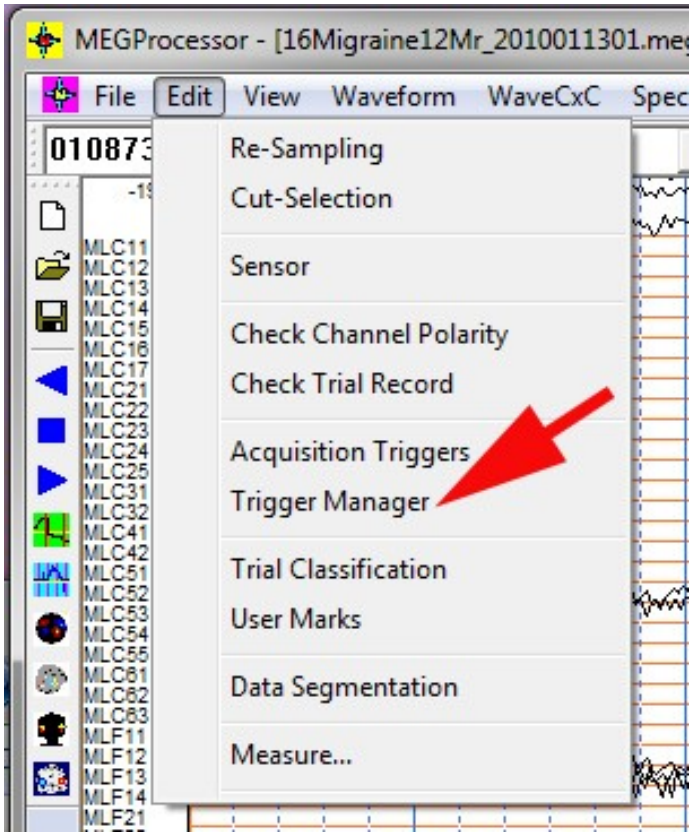
LdfPick	9		x
LdfPick	3		x
BcmPick	180	60	Crl,Gof(?)
BcmPick	120	60	Crl(*),Cov(*), Gof?
BcmPick	120	30	Crl(*),Cov(*), Gof?
BcmPick	120	15	Cov(*), Gof? Crl(x),
BcmPick	120	90	Gof(***) Crl(***),
BcmPick	90	30	Crl(**),gof(x) Cov(?)
BcmPick	90	15	Cov(*)
BcmPick	90	6	Gof(*) Cov(*)
BcmPick	60	60	Crl(**),gof(*)
BcmPick	60	30	Crl(**),Cov(*), gof(x)
BcmPick	60	20	Crl(?),Cov(?), gof(x)
BcmPick	60	10	Cov(*), gof(*)
BcmPick	60	3	Cov(?),
BcmPick	36	6	x
BcmCxC	120	90	Gof(***) Crl(***),
BcmCxC	120	20	Cov (*), Gof(*)
BcmCxC	36	6	Cov
BcmCxC	90	30	Crl
BcmCxC	36	30	

Movement Artifact Removement

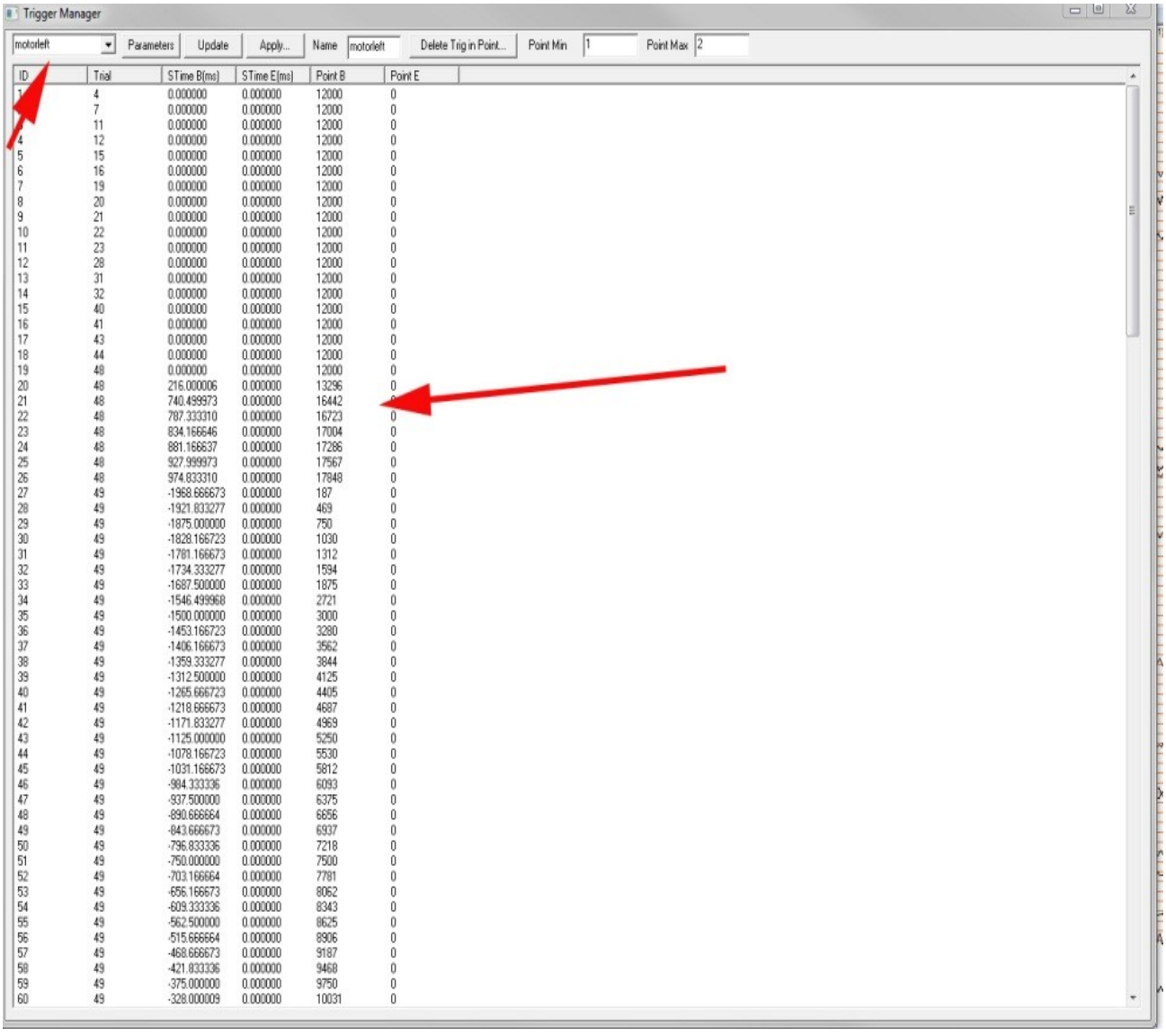
The finger tapping task (see the following figure) is good for eliciting movement related magnetic fields, one methodoligcal isssue in pediatric patients is that children may not follow the instruction well and may typ more than one time during a recording even though a sound cue is present. The worsest situation is that the children may simply press the button consistently that may produce “repetitative tapping”.



To check and correct the potential problem, a toolbox has been developed in MEG processor (see the following finger).



Though this can vary among research projects, sound-cued (or visual-cued) movement study typically use the finger-tapping as a trigger to start MEG/EEG recordings. Since the finger-tapping is typically synchronized with trigger, wich initialize the MEG recording (which corresponding to the start time, 0 millisecond), any movment or finger-tapping before or after the the trigger is “artifact”. To remove those artifacts, you may simply delete those “triggers” by selecting the item and click “Delect” with preseeing right mouse.



EEG Studio: Miscellaneous Guide