

Miscellaneous Guide



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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.

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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.

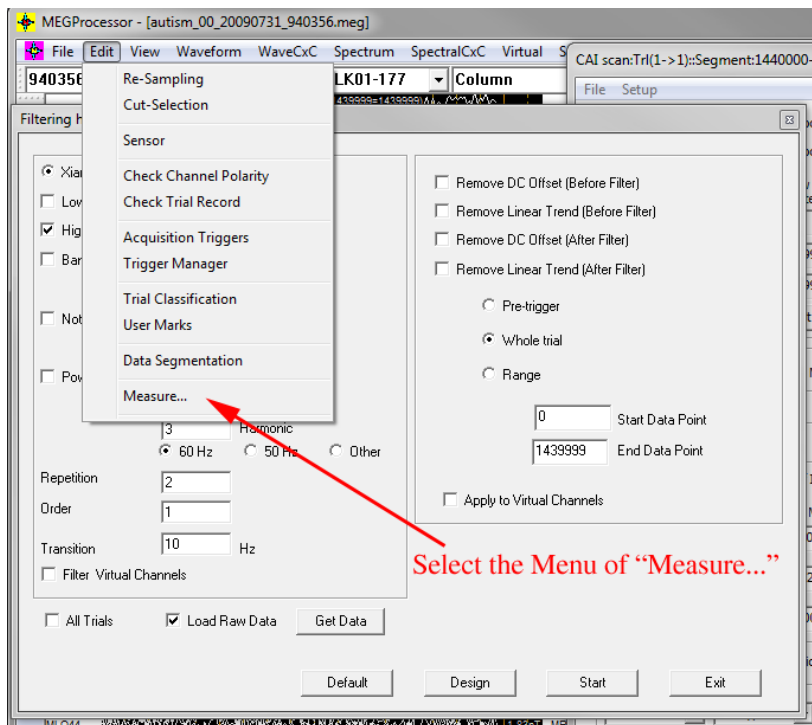
1. What kind of information can we get from the waveforms?

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)



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

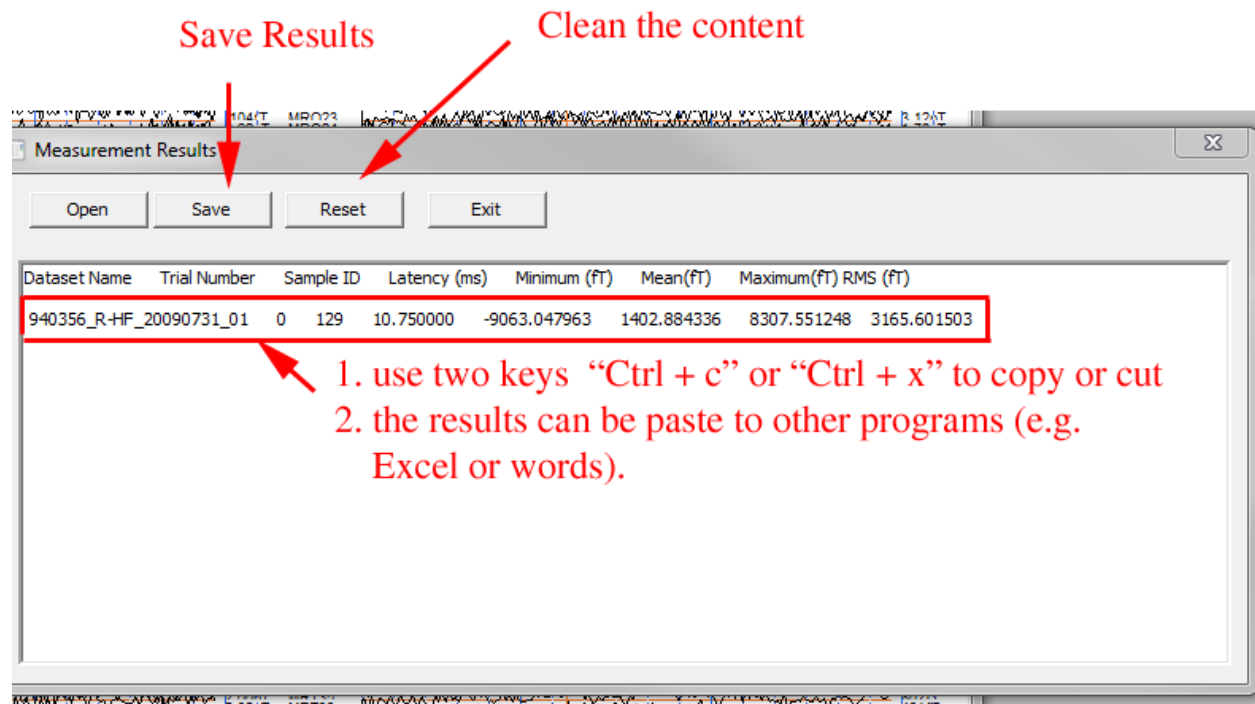
(c) At the “Measuring state”, click the mouse at any interesting of region, the “Measuring Window” will capture the necessary information

(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

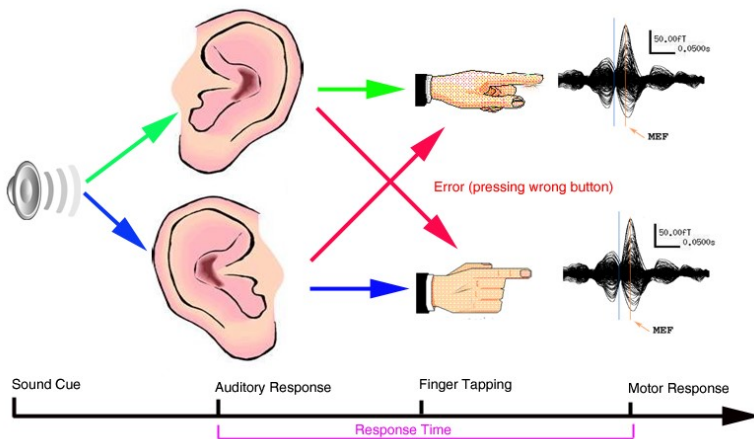
algorithm	Lead field picked sensors (Ldf)	Computed magnetic field sensors (Bcm)	Good reging
LdfPick	180		x
LdfPick	150		CrI(**),Gof(***),Cov(x)
LdfPick	120		CrI(***),Gof(***),Cov(x)
LdfPick	100		Gof(***),CrI(**), Cov(x)
LdfPick	90		Gof(*),CrI(*), Cov(x)
LdfPick	80		Gof(*),CrI(*), Cov(*)
LdfPick	60		Cov(?),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

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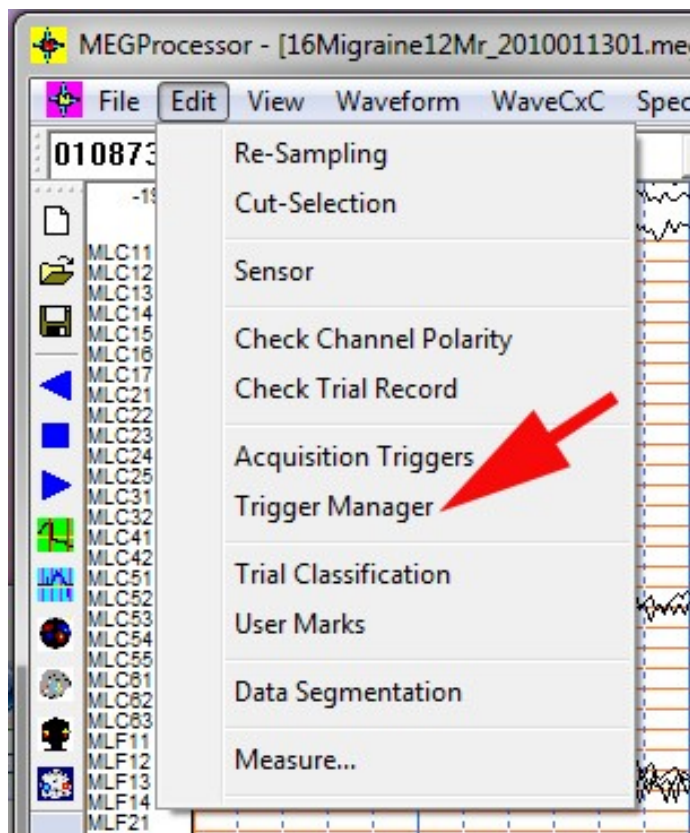
LdfPick	9		x
LdfPick	3		x
BcmPick	180	60	CrI,Gof(?)
BcmPick	120	60	CrI(*),Cov(*), Gof?
BcmPick	120	30	CrI(*),Cov(*), Gof?
BcmPick	120	15	Cov(*), Gof? CrI(x),
BcmPick	120	90	Gof(***) CrI(***),
BcmPick	90	30	CrI(**),gof(x) Cov(?)
BcmPick	90	15	Cov(*)
BcmPick	90	6	Gof(*) Cov(*)
BcmPick	60	60	CrI(**),gof(*)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

Movement Artifact Removal

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

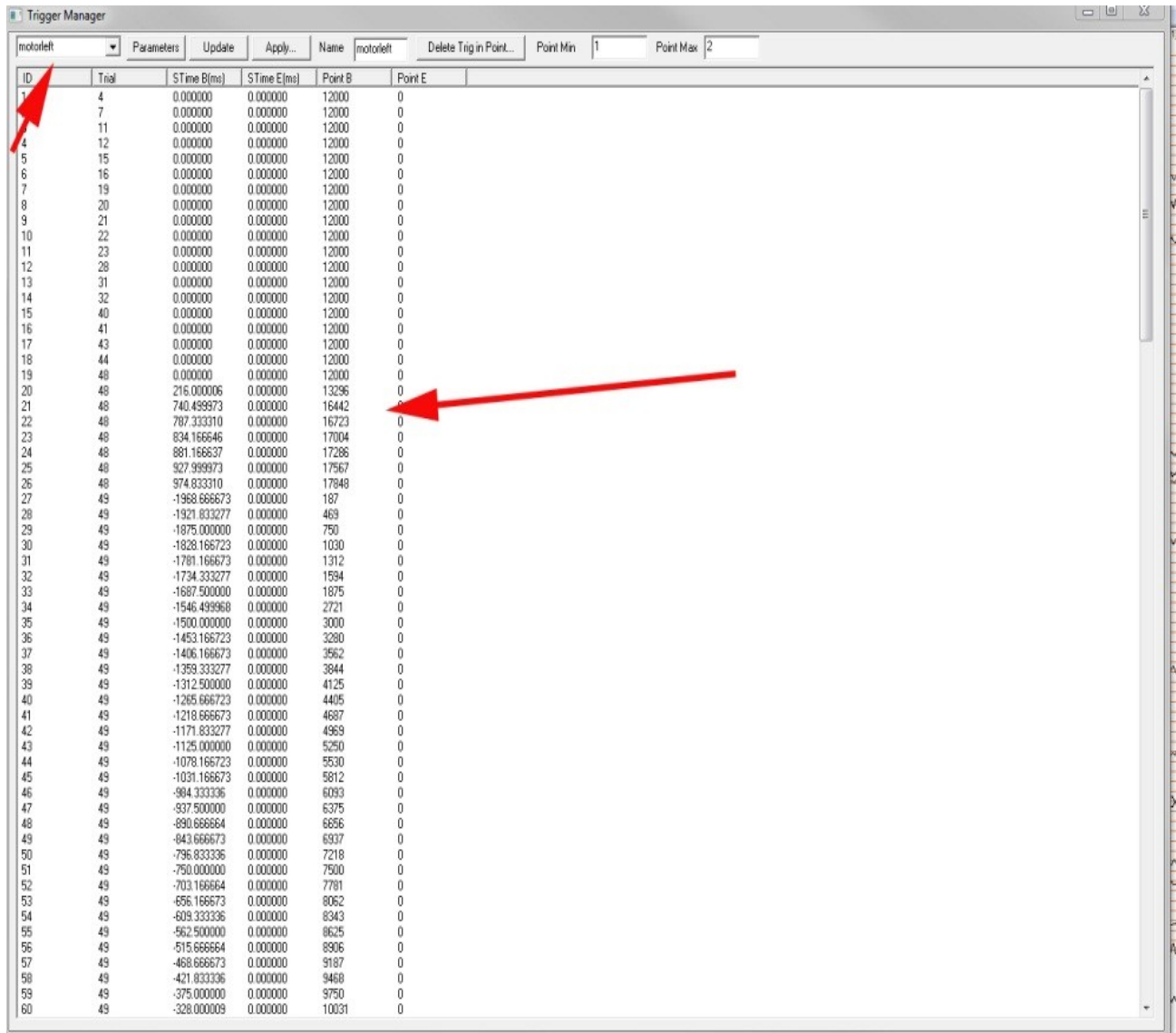


To check and correct the potential problem, a toolbox has been developed in MEG processor (see the following finger).



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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, which initialize the MEG recording (which corresponding to the start time, 0 millisecond), any movement or finger-tapping before or after the trigger is “artifact”. To remove those artifacts, you may simply delete those “triggers” by selecting the item and click “Delete” with pressing right mouse.



ID	Trial	STime B(ms)	STime E(ms)	Point B	Point E
1	4	0.000000	0.000000	12000	0
2	7	0.000000	0.000000	12000	0
3	11	0.000000	0.000000	12000	0
4	12	0.000000	0.000000	12000	0
5	15	0.000000	0.000000	12000	0
6	16	0.000000	0.000000	12000	0
7	19	0.000000	0.000000	12000	0
8	20	0.000000	0.000000	12000	0
9	21	0.000000	0.000000	12000	0
10	22	0.000000	0.000000	12000	0
11	23	0.000000	0.000000	12000	0
12	28	0.000000	0.000000	12000	0
13	31	0.000000	0.000000	12000	0
14	32	0.000000	0.000000	12000	0
15	40	0.000000	0.000000	12000	0
16	41	0.000000	0.000000	12000	0
17	43	0.000000	0.000000	12000	0
18	44	0.000000	0.000000	12000	0
19	48	0.000000	0.000000	12000	0
20	48	216.000006	0.000000	13296	0
21	48	740.499973	0.000000	16442	0
22	48	787.333310	0.000000	16723	0
23	48	834.166646	0.000000	17004	0
24	48	881.166637	0.000000	17286	0
25	48	927.999973	0.000000	17567	0
26	48	974.833310	0.000000	17848	0
27	49	-1968.666673	0.000000	187	0
28	49	-1921.833277	0.000000	469	0
29	49	-1875.000000	0.000000	750	0
30	49	-1828.166723	0.000000	1030	0
31	49	-1781.166673	0.000000	1312	0
32	49	-1734.333277	0.000000	1594	0
33	49	-1687.500000	0.000000	1875	0
34	49	-1546.499968	0.000000	2721	0
35	49	-1500.000000	0.000000	3000	0
36	49	-1453.166723	0.000000	3280	0
37	49	-1406.166673	0.000000	3562	0
38	49	-1359.333277	0.000000	3844	0
39	49	-1312.500000	0.000000	4125	0
40	49	-1265.666723	0.000000	4405	0
41	49	-1218.666673	0.000000	4687	0
42	49	-1171.833277	0.000000	4969	0
43	49	-1125.000000	0.000000	5250	0
44	49	-1078.166723	0.000000	5530	0
45	49	-1031.166673	0.000000	5812	0
46	49	-984.333336	0.000000	6093	0
47	49	-937.500000	0.000000	6375	0
48	49	-890.666664	0.000000	6656	0
49	49	-843.666673	0.000000	6937	0
50	49	-796.833336	0.000000	7218	0
51	49	-750.000000	0.000000	7500	0
52	49	-703.166664	0.000000	7781	0
53	49	-656.166673	0.000000	8062	0
54	49	-609.333336	0.000000	8343	0
55	49	-562.500000	0.000000	8625	0
56	49	-515.666664	0.000000	8906	0
57	49	-468.666673	0.000000	9187	0
58	49	-421.833336	0.000000	9468	0
59	49	-375.000000	0.000000	9750	0
60	49	-328.000009	0.000000	10031	0

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