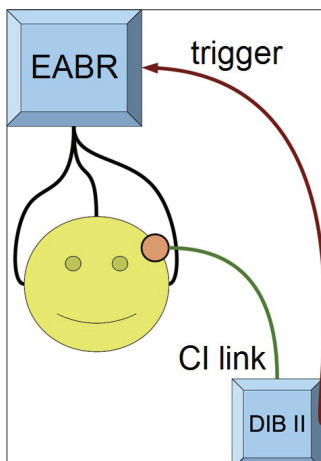# EABR Test

Usage of EABR

Objective measurement of progress with a CI (cochlear implant) is clearly of interest to both clinicians and researchers. The electrically-evoked ABR (EABR) has been used for this purpose in several studies that have shown correlations between EABR characteristics and speech scores in groups of adult CI users (Abbas & Brown, 1991; Gallégo et al., 1998;Maurer et al., 2002).

Gordon and her colleagues (2006, 2007) found that children's EABR latencies improved with CI experience. Thus, monitoring EABR latencies could be a clinically useful objective method for determining auditory plasticity in children with CIs who are too young or who have other disabilities that make it difficult to measure speech perception outcomes. There have been attempts to use EABR thresholds for objective setting of CI current levels, however, intra-and inter-subject variability has limited the success of this approach (Brown, Hughes, Lopez, & Abbas, 1999; Hughes, Brown, Abbas, Wolaver, & Gervais, 2000).

Equipment needed:

- ABR system (Neuro-Audio 2010)
- Cochlear Implant (CI) system (MED-EL Maestro)
- Diagnostic Interface Box (MED-EL DIB II)

Electrode montage: Cz (or Fpz) – M1 – M2
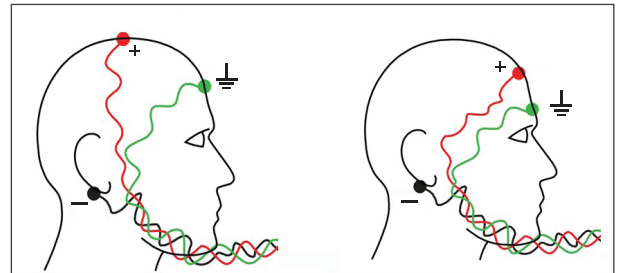
Neuro-Audio.NET ABR test template settings:

Parameters:
- Zero after stimulus: 0.5-1.0 ms
- Analysis epoch: 10 ms

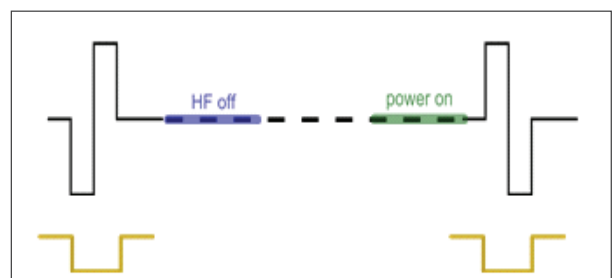*Hardware/Stimulator:*
- Check **Third-party firm stimulator**

CI Trigger

- Length: 100 µs
- Amplitude: up to 10 mV
- Shape: Rectangular, Negative polarity

DIB Stimulation Settings

- Biphasic pulse, Negative initial phase, Alternating polarity
- Duration: 25-30 µs
- Cycles number: up to 5000
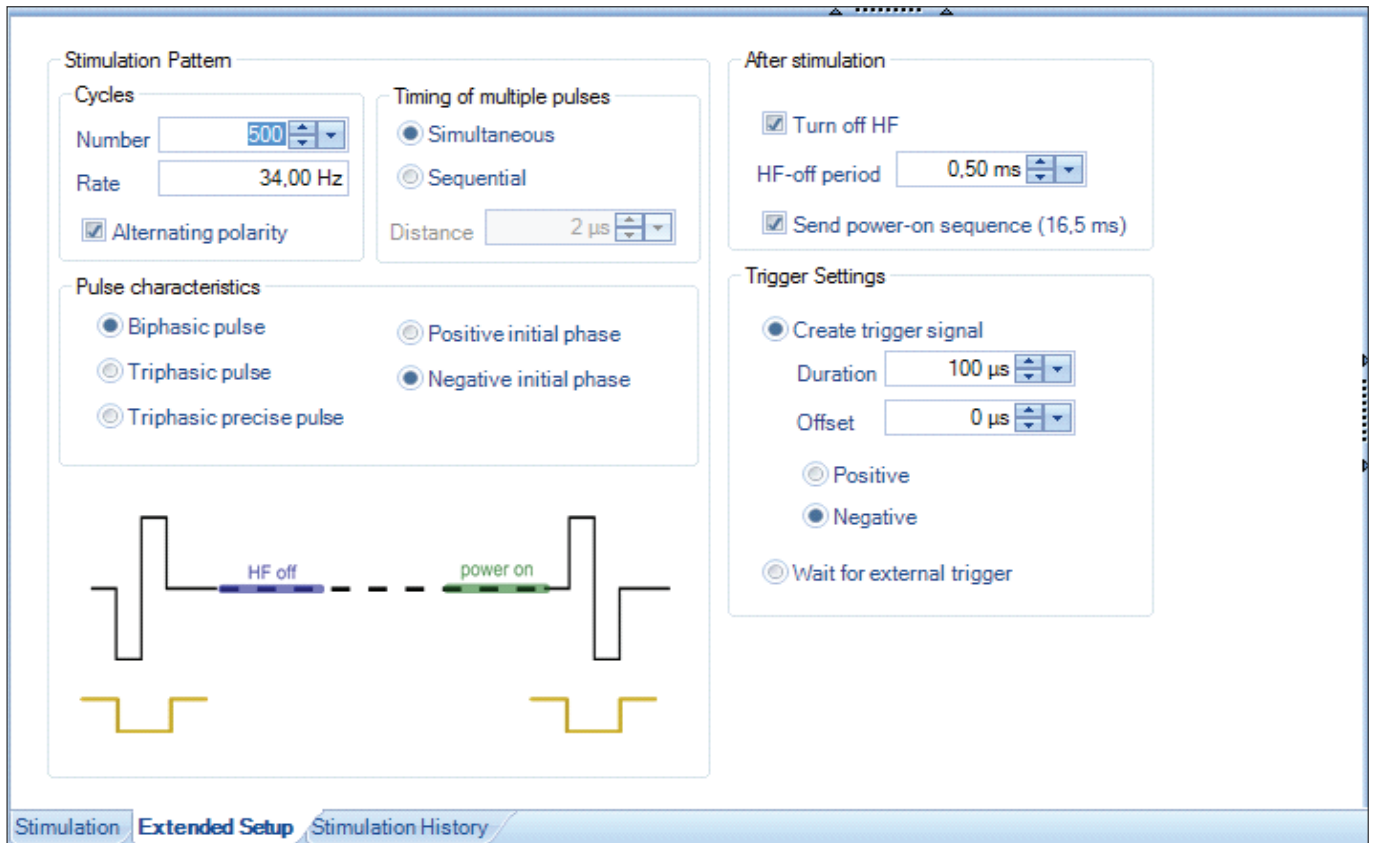- Cycles rate: 11-43 Hz
- Turn off HF

EABR Test

Fig. 1: MED-EL DIB software: Extended Setup tab

Fig. 2: MED-EL DIB software: Stimulation tab

MED-EL CI and DIB are used as example here. Similar settings should be available for cochlear implants made by other manufacturers.
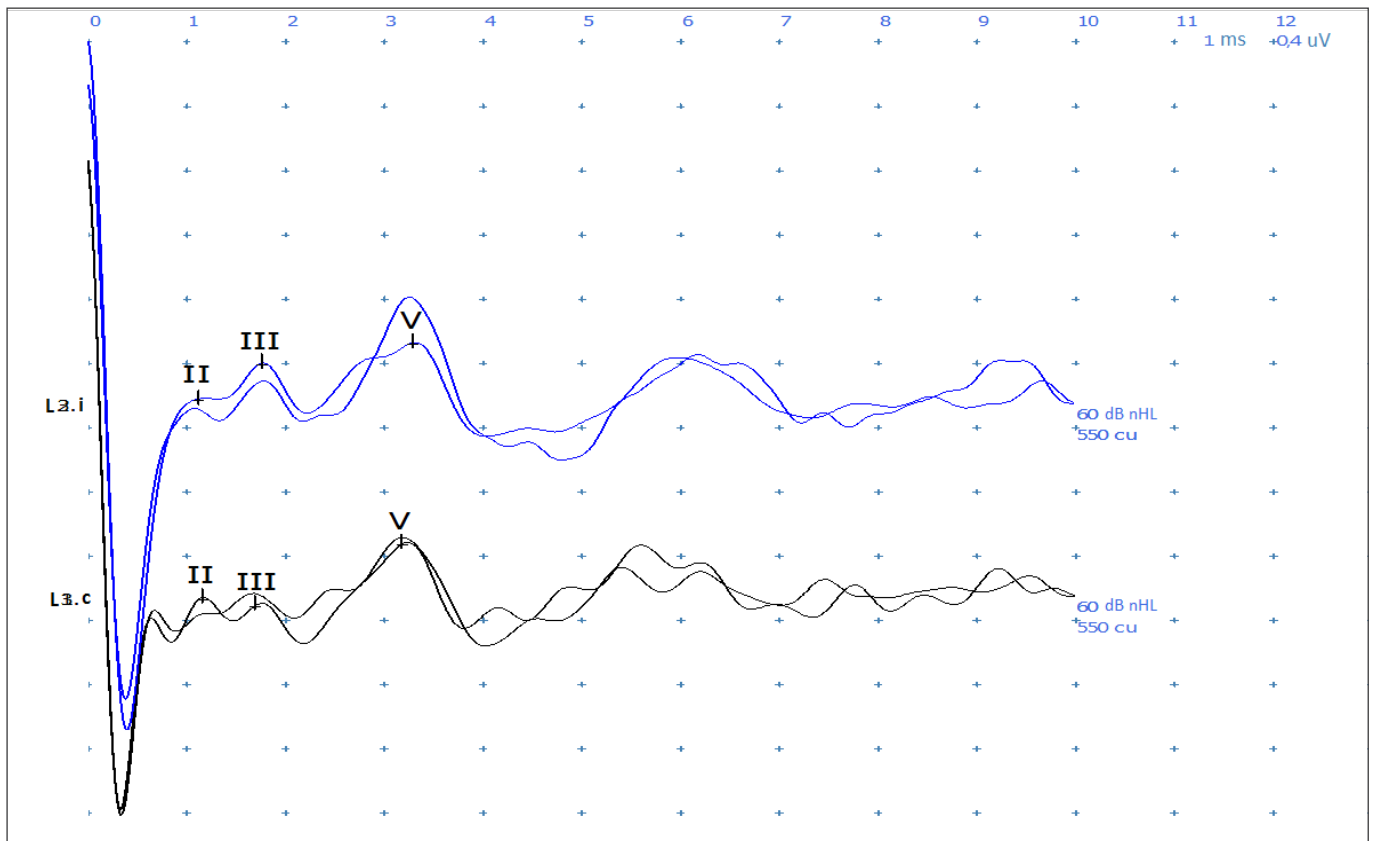
EABR Test

Fig. 3: EABR Response Morphology

EABR Wave V latencies: 3.15 – 4.15 ms

Connecting DIB to Neuro-Audio

Trig-In

BNC connector
(DIB trig-out)

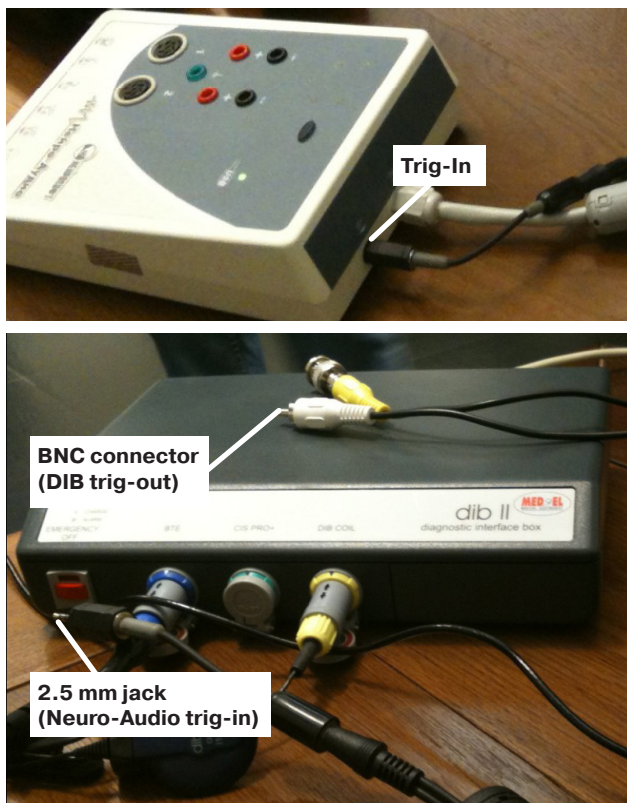2.5 mm jack
(Neuro-Audio trig-in)

Fig. 4: Special cable to connect DIB trig out (BNC connector) to Neuro Audio trig in (2.5 mm jack)

References

1. Suzanne C Purdy - AEP and CI Research Findings and Clinical Applications in Children, 2009.
2. Proceedings of the VIII International Symposium "Modern Problems of Physiology and Pathology of Hearing", Suzdal, Russia, 2011.

Information Needed from the Cochlear Implant Manufacturer

Not all cochlear implants processors are designed to support EABR testing. You will need to confer with your CI manufacturer representative to determine whether EABRs are feasible with the combination of CI hardware and software that you use.

Also contact the CI manufacturer for details about the interface connection into the CI processor so you can obtain the correct adapter for connecting the CI processor trigger out to **Neuro-Audio** trigger in cable.

Neurosoft

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