

# EEG Easy Cap System Setup

The Easy Cap is a modular EEG-recording cap system with 64 ring adaptor locations using Ag/AgCl sintered electrodes. \*Other application methods may be used, however, careful attention should be given to the choice of electrodes.

## Measuring / Marking Frontal Polar, Cz & Occipital Locations

1. Measure the nasion – inion distance. Place a mark at 50% of the total distant. **This marks Cz.**
2. From the nasion place a horizontal mark at 10% of the nasion – inion distance. **This marks FPz.**
3. Place a vertical mark on the forehead midline nasion. For accuracy measure the distance between the eyebrows; mark midway crossing the horizontal mark. **This completes Fpz.**
4. From the inion place a horizontal mark at 10% of the nasion - inion distance. **This marks Oz.**
5. Measure head circumference from the Fpz position. Place a vertical mark at 50% of the distance of the circumference. **This completes Oz.**
6. Measure and mark 5% of the circumference distance on the left of FPz (on the same horizontal plane). **This completes Fp1.**
7. Measure and mark 5% of the circumference distance on the right of FPz (on the same horizontal plane). **This completes Fp2.**
8. Measure and mark 5% of the circumference distance on the left of Oz (on the same horizontal plane). **This completes O1.**
9. Measure and mark 5% of the circumference distance on the right of Oz (on the same horizontal plane). **This completes O2.**
10. Measure from left to right preauricular points. Mark the midpoint. **This completes Cz.**

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## Mounting The Cap

1. Place the chest belt on the subject at the upper chest (under the arms).
2. Select a cap size based upon the head circumference measurement:

Small	Med	Large
≤ 56cm	≤ 58cm	≤ 60cm

3. Rotate the adaptors in the cap so that the narrow opening is toward the back of the head.
4. Place an anchoring adhesive washer on the inside of the cap on the adaptors at Fp1 & Fp2 locations.
5. Press Fp1 & Fp2 with the attached adhesive washers onto the forehead at the marked locations.
6. Have the subject hold Fp1 & Fp2 in place while pulling the cap over the head.
7. Gently pull the cap over the head and ears into place.
8. Check and adjust the cap so that the Cz electrode is at the Cz mark.
9. Check and adjust Fp1 & Fp2 and O1 & O2 to assure that they are placed correctly; if not, readjust the cap or choose another cap size.
10. Anchor the cap to the chest belt.
11. Snap the electrodes into the adaptors in a systematic manner starting at the back of the head. Insert the electrodes so that the lead wire points toward the narrow side of the adaptor.
12. Using an old ballpoint pen (or the fingers) where the mine (point) has been removed push the electrode into the adaptor.



*Please remember: Do not to bend or place excessive pressure on the lead wire where it attaches to the electrode.*

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## Checking Impedances

After the electrodes are attached to the subject's scalp, the impedance should be checked to ensure good contact. The impedances measured should only be used to judge scalp contact and should not be considered a precise measure of actual impedance. Ideal impedances for scalp electrodes typically range from 1-5kohms. Impedances for other non-cerebral electrodes ideally should be  $\leq 50$ kohms.

### A. Using the Grass Impedance Meter

An external impedance check should be performed on all electrodes used for EEG or EMG using the Grass S88 Impedance Meter. The Grass Impedance Meter measures AC impedance (resistance and capacitance). When two or more electrodes are plugged into the electrode switch positions, all electrodes except the one selected electrode being measured are connected together and provide the reference for the one being measured.

1. Plug the ground electrode (FPz) into electrode jack 1 position.
2. The **Electrode Selector Switch** should be at position 2 - 10.
3. Plug the other electrode(s) into the jack 2 - 10 positions in a systematic manner one at a time.
4. Press the Red ON Button to activate the impedance check. The power will automatically shutoff after approximately 2 minutes. (There is no OFF button.)
5. **If the impedance is too high** - take a cotton tip swab dipped in Nuprep (Abralayt or other skin prep) and rub or twirl against the skin until the impedance is at an appropriate level, generally for EEG scalp electrodes  $< 5$ kohms and for EMG electrodes (non-cerebral, i.e., EOG, ECG, etc.)  $< 50$  kohms should be adequate. Then re-insert electrolyte.

*Note: If the electrode impedance exceeds 199.99K ohm, a "1" will appear in the left display window with all other digits blanked out indicating the **impedance is too high**. If using a cap application, take a cotton swab that has been dipped in a skin prep and insert it through the electrode opening and twirl against the skin. Re-apply electrolyte then re-check the impedance.*

### B. MEG System Impedance Check

1. Plug the electrodes into the electrode jackbox then attach jackbox to the amplifier unit. \*Touch the static discharge button before connecting to the amplifier unit.
2. Run Acq; select the appropriate program.
3. Select the EEG Setup Window menu.
4. Highlight desired channels.

# EEG Easy Cap System Setup

5. Click on CHECK IMPEDANCE.

## Checking Impedances cont.

- a. The results are displayed in the appropriate columns.
  - b. To check the impedance of all active EEG channels press the CTRL key on the keyboard at the same time as clicking on the impedance check button.
  - c. Please note: The impedance check requires 3 electrodes: The electrode being measured and at least 2 other electrodes.
6. Click OK / EXIT.

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