



# EASYCAP

EEG Recording Caps and Related Products

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## EasyCap Electrode Layouts based on 10%-System

Easycaps can be built with any electrode layout. This file lists electrode layouts based on the 10%-System, including some for special investigations at the end.

The majority of EEG data worldwide are acquired from 10%-based electrode positions. Thus new data can be compared to a huge data base and can be published without further explanations. However, the electrodes can be picked only from a limited number of positions (next page).

If it is preferable to distribute any given number of electrodes on any desired area in a strictly equidistant fashion, this is done by triangulation.

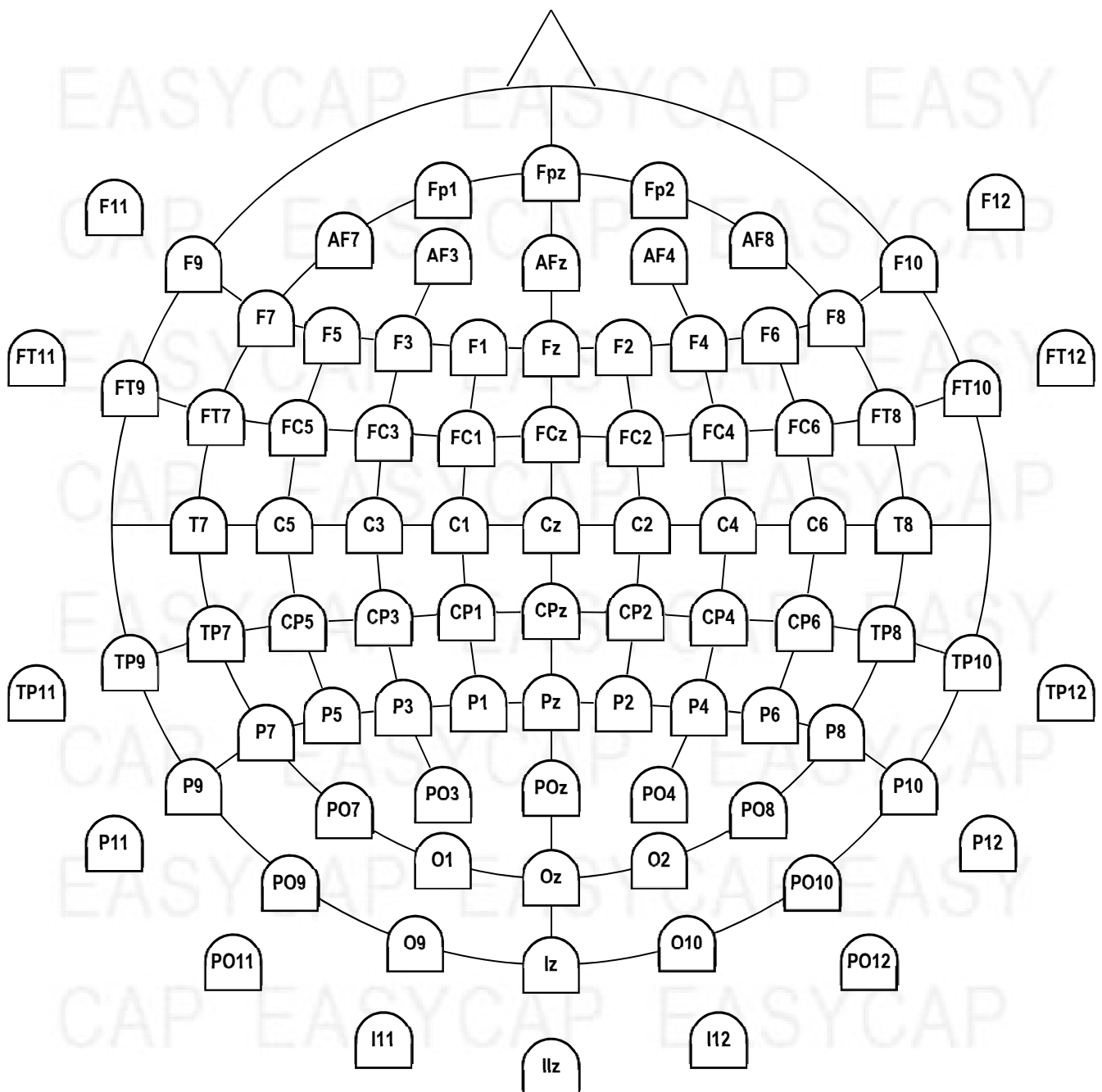
Please find these "equidistant layouts" in [EasyCap Equidistant Layouts.pdf](#)



The diagram illustrates the standard 10-20 EEG system. It features a circular arrangement of electrodes on a head template. The electrodes are organized into several layers:

- Top Layer (Frontal):** Includes Fpz (frontal midline), Fp1, Fp2 (frontopolar), and AF7, AF3, AFz, AF4, AF8 (frontal/central).
- Central Layer:** Includes F9, F7, F5, F3, F1, Fz, F2, F4, F6, F8, F10, F11, F12 (frontal/central).
- Temporal/Parietal Layer:** Includes FT9, FT7, FC5, FC3, FC1, FCz, FC2, FC4, FC6, FT8, FT10 (frontal/central).
- Middle Layer:** Includes T7, C5, C3, C1, Cz, C2, C4, C6, T8 (temporal/central).
- Parietal/Occipital Layer:** Includes TP9, TP7, CP5, CP3, CP1, CPz, CP2, CP4, CP6, TP8, TP10 (parietal/occipital).
- Bottom Layer (Occipital/Posterior):** Includes P9, P7, P5, P3, P1, Pz, P2, P4, P6, P8, P10, P11, P12 (parietal/occipital).
- Very Bottom Layer (Occipital/Posterior):** Includes PO9, PO7, PO3, POz, PO4, PO8, PO10, PO11, PO12 (occipital/posterior).
- Base Layer:** Includes Oz (occipital midline), I11, Iz, I12 (occipital/parietal).

The diagram shows the spatial distribution of these electrodes across the scalp, with labels indicating specific anatomical locations.



## Differences between the 10%-Systems of the American Electroencephalographic Society and the Deutsche EEG-Gesellschaft

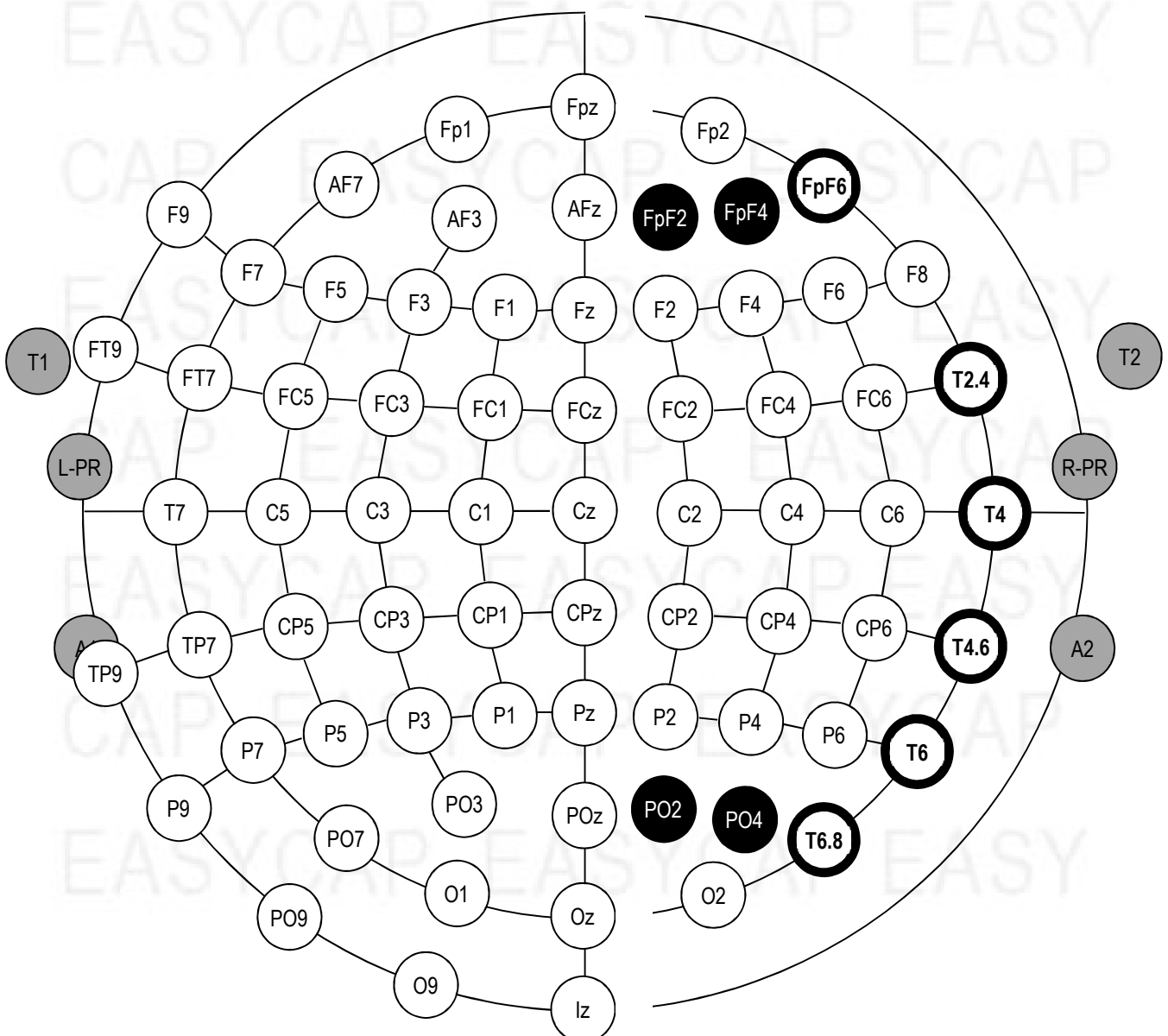
This graph shows the American electrode positions and their names on the left side, the German ones on the right side. The differing positions are marked in black, the differing names are in bold print.

**Note: Meanwhile the Deutsche EEG Gesellschaft has adopted the American nomenclature, which is now the only correct system for publications.**

**Yet, due to its wide spreading, this comparison might stay useful.**

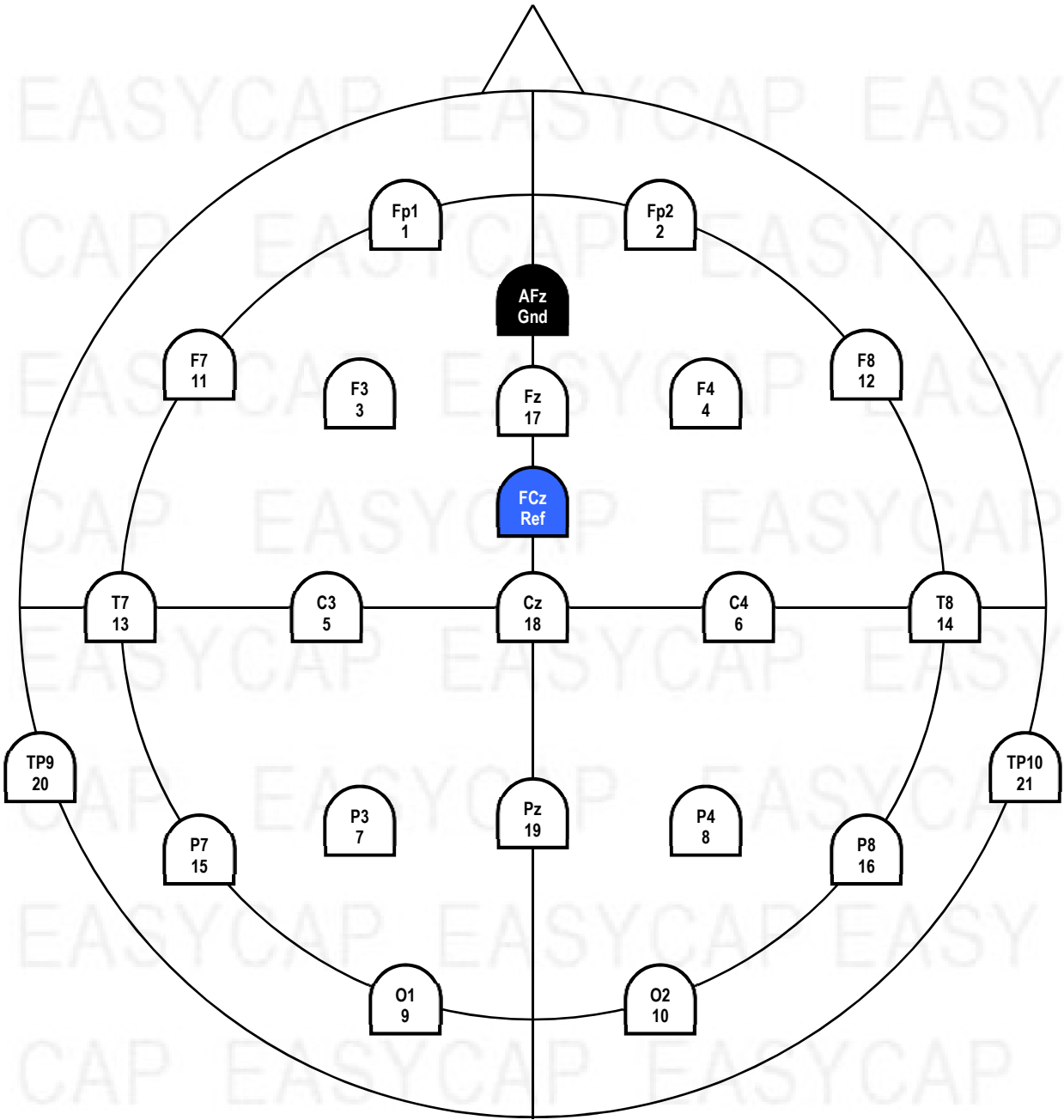
The grey electrode positions designate some further useful placements possible in an EasyCap:

- T1/T2 are situated above the tip of temporal lobe, 2/3 the distance between canthus and preauricular point and from there 1 cm down.
- L-PR/ R-PR designate the preauricular points. The exact 10%-positions T9/T10 would come to lie inside the ear.
- A1/A2 stand for the mastoids. These can be either buttoned into the cap or, through the ear slit of the cap, placed right onto the skin.



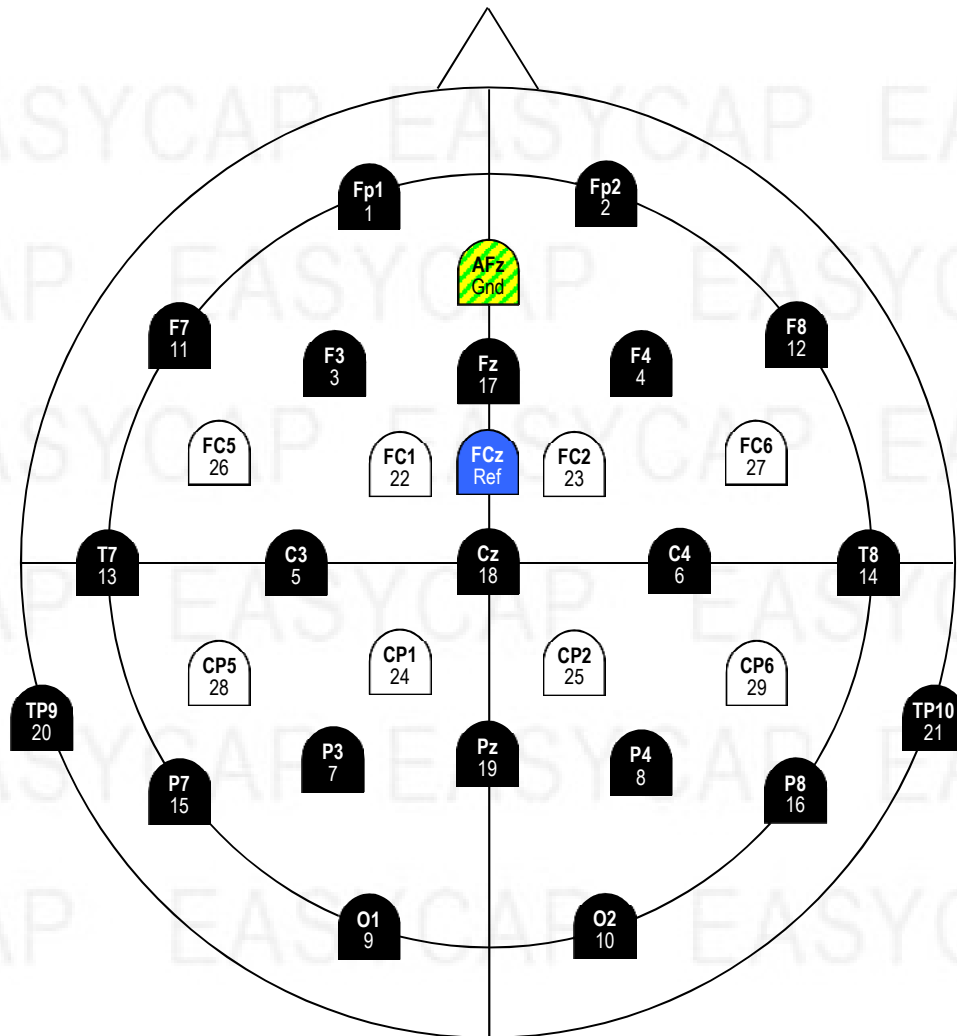
21 Channels: Classic 10/20-System: 19 electrodes plus TP9/TP10 (near mastoids) plus Ref plus Gnd

M25



29 Channels: These 29 electrode positions show the best possible equidistant selection of 10%-positions within the area of the 10/20-system.

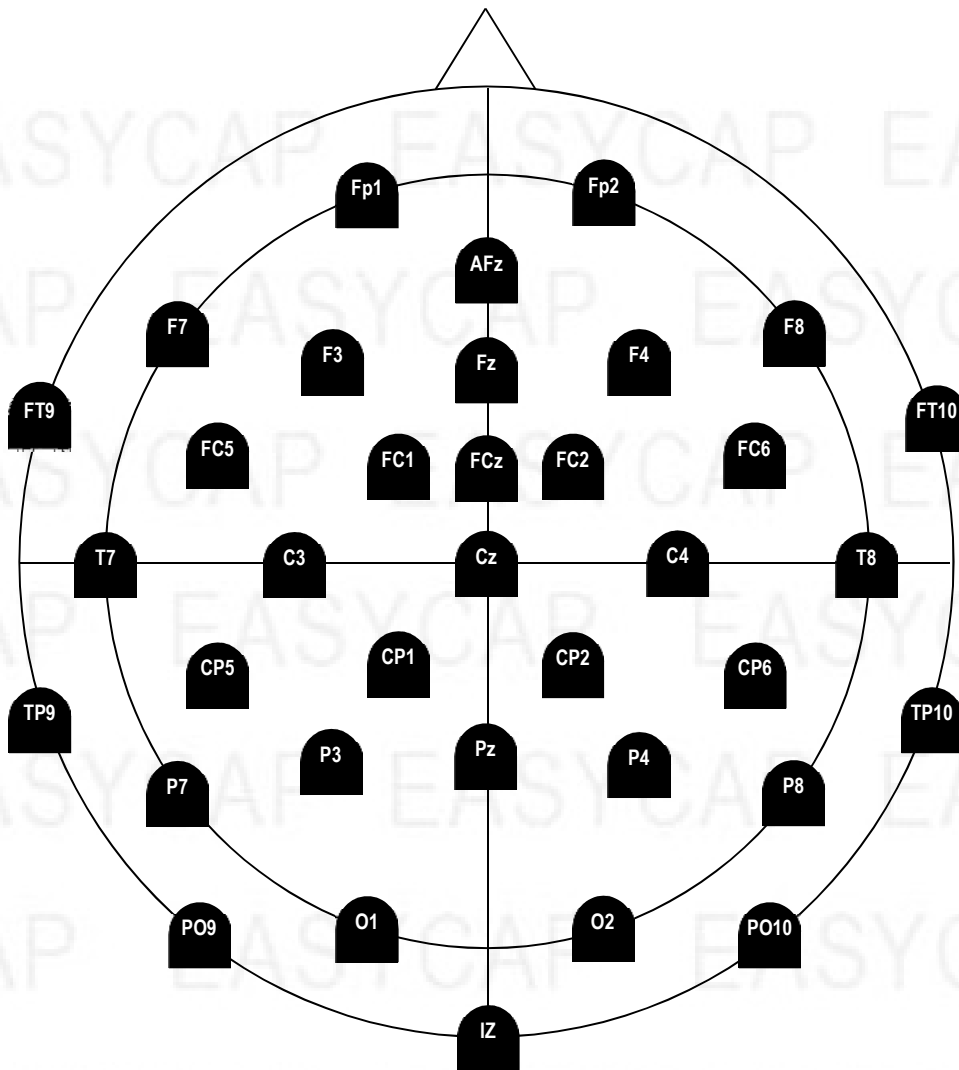
## M22



Unused channels of your amplifier can be used for EOG, ECG or other polygraphies.

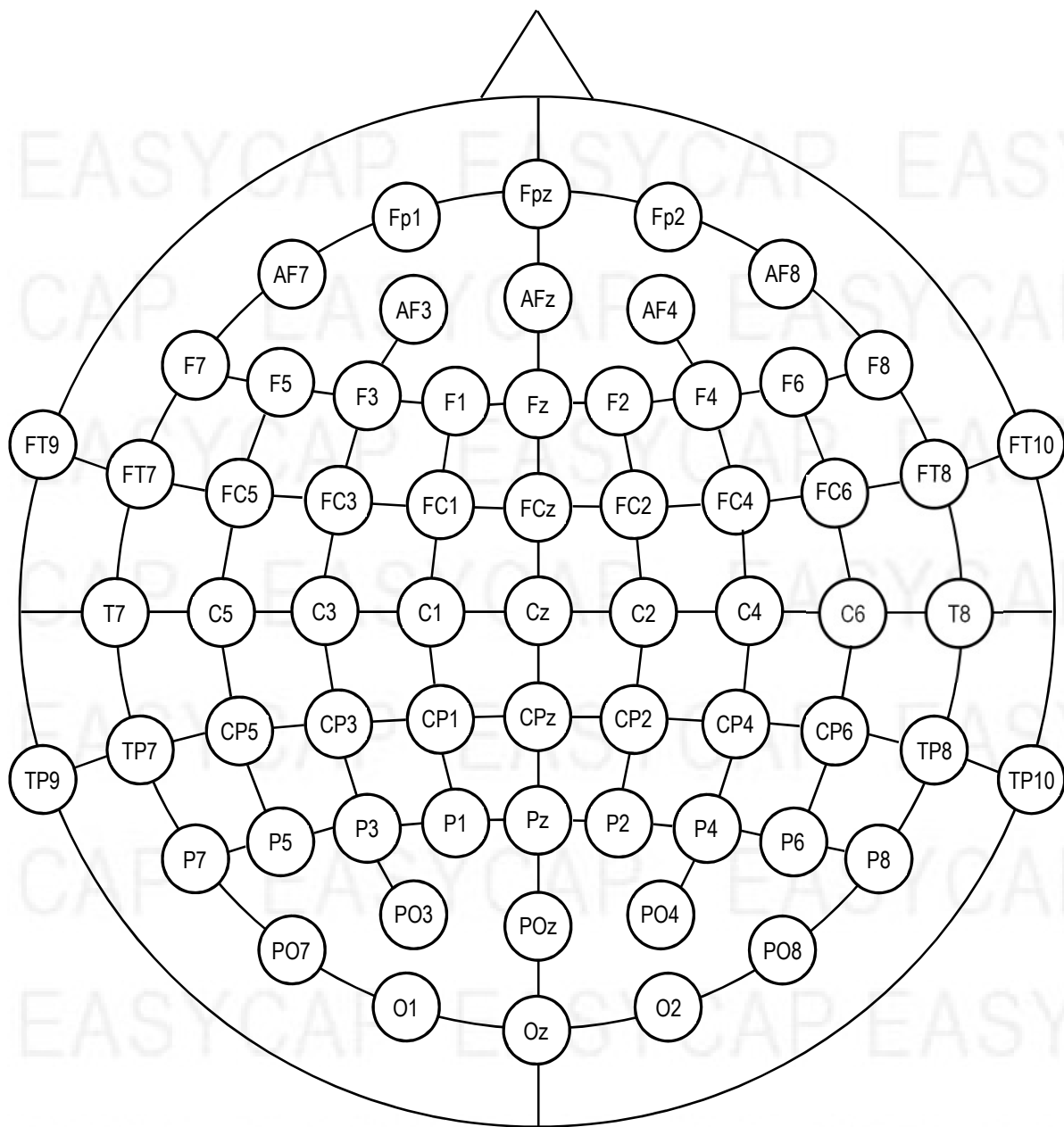
34 Channels: Covering a larger area than M22.

## M24



64 Channels: Full 10% System covering the 10/20 area

M64

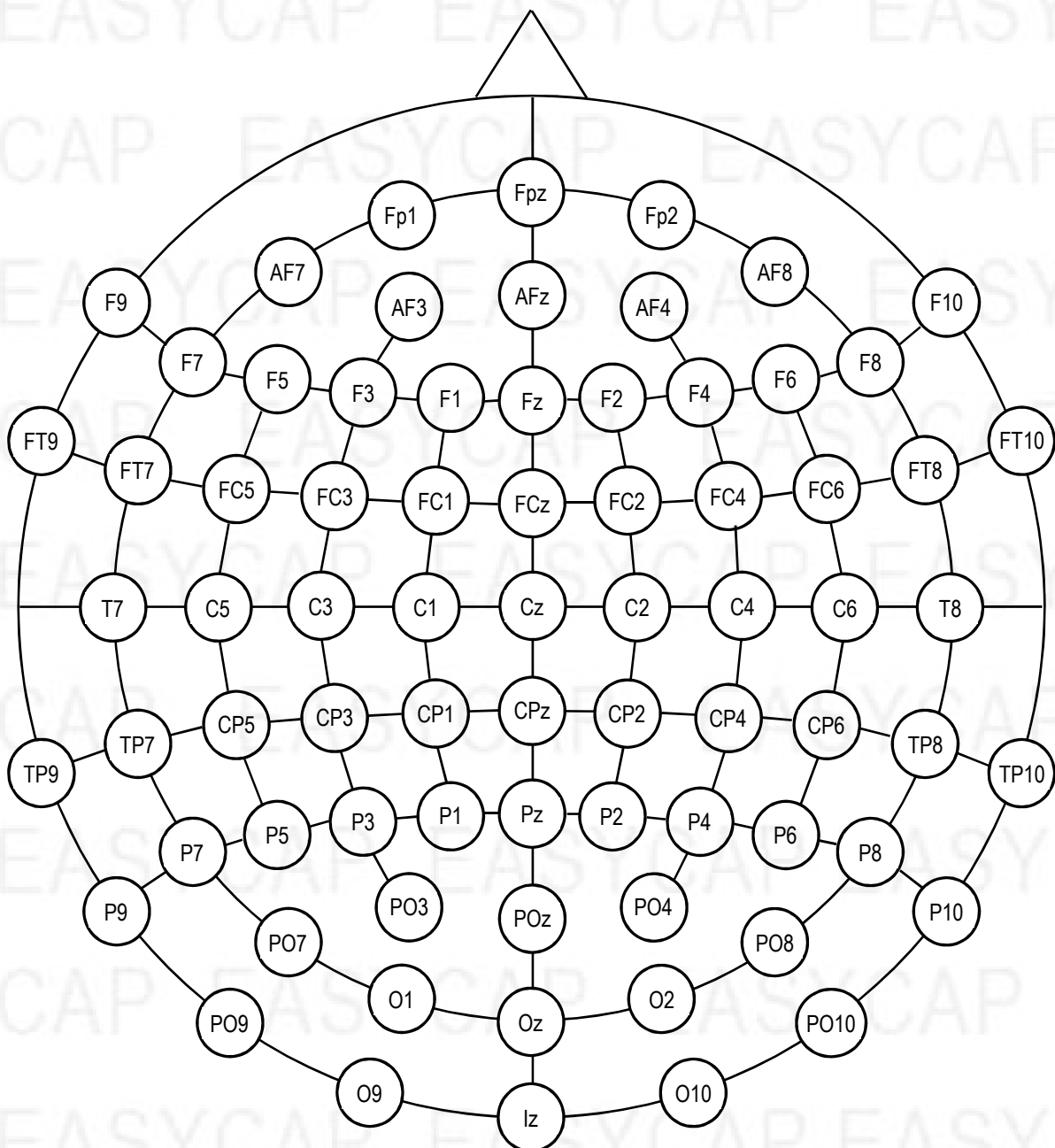




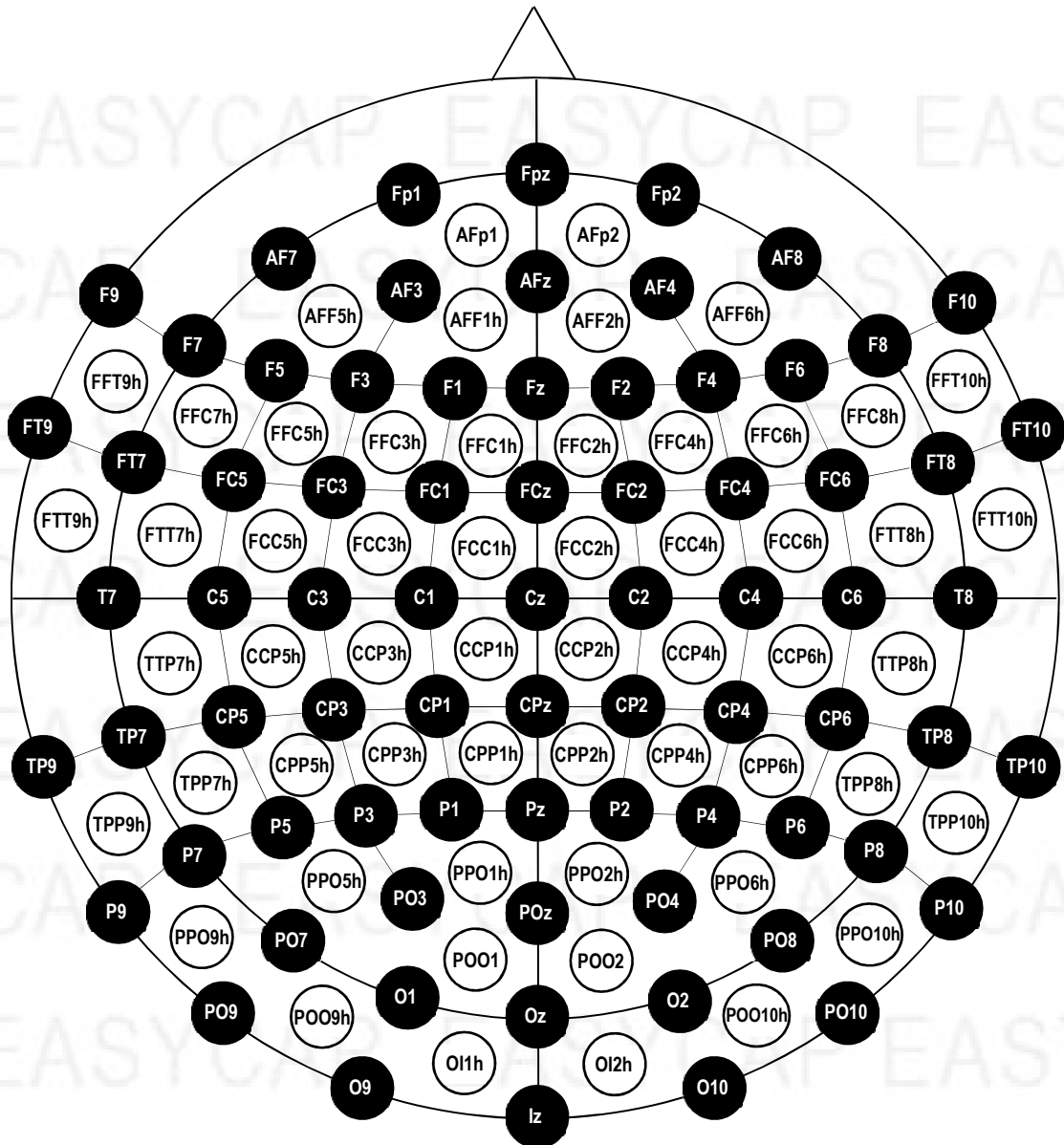
74 Channels: Full 10%-System one row further down covering the area down to a line from the canthii to the Inion.

## M1

Official 10%-System according to *J.Clin.Neurophysiology* Vol.8, No. 2, 1991: American Electroencephalographic Society Guidelines for Standard Electrode Position Nomenclature

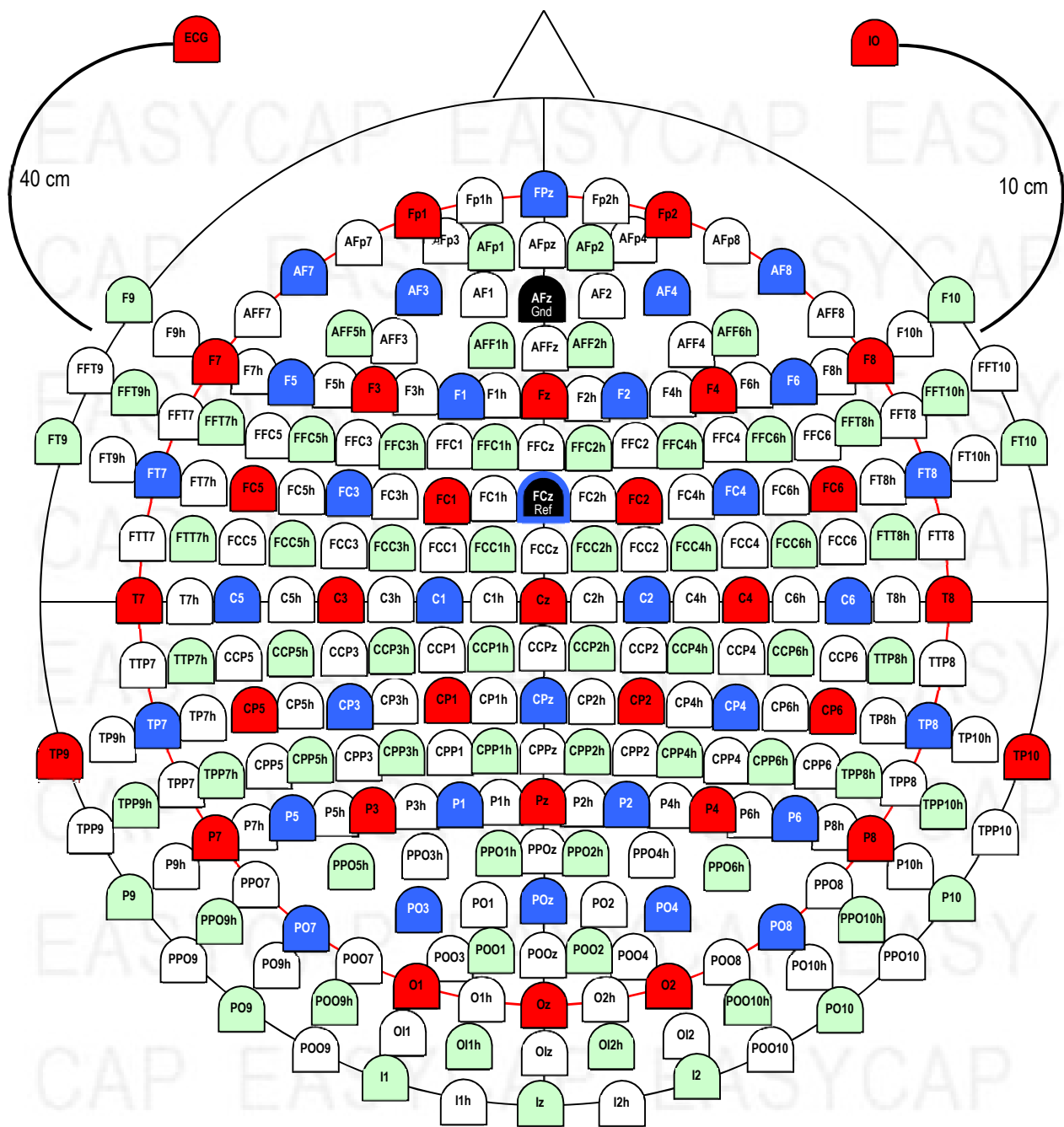


**M15**



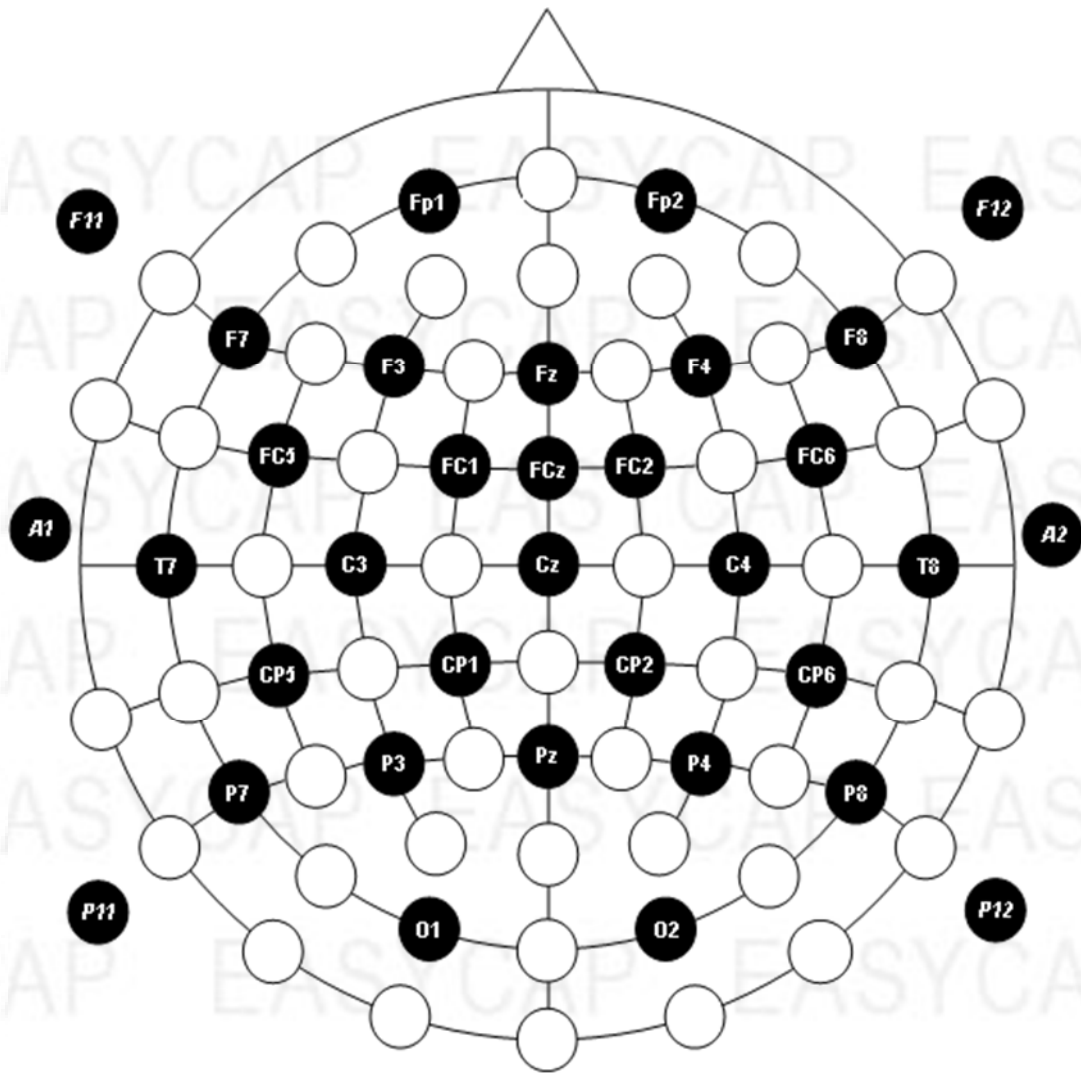
256 Channels: Full 5% System

M50



BESA EEG33: Dipole Analysis from 32 channels as recommended by BESA.

### EEG33



LLName	Cap Position as defined by 10%-System	Ideal, anatomically defined, Position
F11/F12	20% inferior to F7/F8	On the edge of the cheek bone (distal plane of os zygomaticum)
A1/A2	In front of the ear slit, 1 cm lower than T9/T10	1 cm inferior of the preauricular point
P11/P12	20% inferior to P7/P8	On the edge of the skull, Inferior to P7/P8

Language Research from 28 Channels: The black electrodes are placed anterior, above and posterior to Wernicke-Area and defined as follows:

**LT/RT** (Left/Right-Temporal): 33% down from Cz, where 100% is the distance from the left to right auditory meati via Cz.

**LTP/RTP** (Left/Right-Temporo-Parietal): 30% down from Cz and 13% of the distance Nasion-Inion to posterior.

**LP/RP** (Left/Right-Parietal): 50% between LTP and PO7, respectively RTP and PO8.

M17

