



# Vision Monitor

## Sweep VEP



(\* this feature is not available for sale in the United States of America)

### Examination principle

The purpose of this exam is to provide an objective and fast estimation of visual acuity.

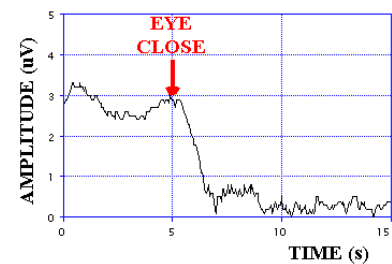
This is particularly useful for the examination of non-verbal children and of malingering patients.

For this purpose, the program generates a pattern stimulus that is alternated at a high temporal frequency rate (in the range of 5 to 15 Hz), producing a steady state visual evoked response.

A discrete Fourier transform (DFT) is performed on the recorded signals and provides a real time measurement of the amplitude and phase of the response. This technique can detect a response extremely rapidly.

The example hereby shows the evolution of the amplitude of the response when the subject closes his eyes.

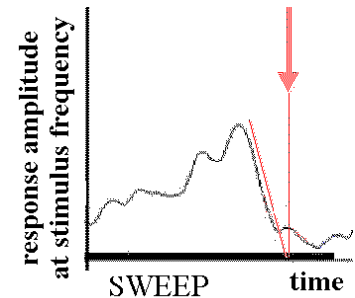
In less than 2 seconds, the response amplitude decreases down to the noise level.



In order to measure visual acuity, the size of the pattern is reduced rapidly.

Within 10 seconds, 20 different pattern sizes are presented in succession.

This sweep of the spatial resolution domain allows an estimation of visual acuity from the smallest pattern size producing a response.



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### Specifications

Compatible stimulator : Universal stimulator **MonPack** One

Testing distance	Size of stimulation field (degrees)	Range of visual acuity
0.7m 2 ft	26	0.03 to 0.28 20/600 to 20/60
1.0m 3 ft	20	0.04 to 0.41 20/500 to 20/50
1.5 m 4 ft	13	0.06 to 0.61 20/330 to 20/30
2.0 m 6 ft	10	0.08 to 0.81 20/250 to 20/25

**Stimulation frequency** 12 Hz

**Analysis window** 1.3 s

**Sweep duration** 11 s

**Recorded channels** 1 or 2 channels

These parameters can be modified with the editing program.



The camera is placed over the top of the **MonPack One** stimulator (option reference HVM-camera).

It includes a near infrared illumination and allows viewing the patient at a distance of about 1 meter.

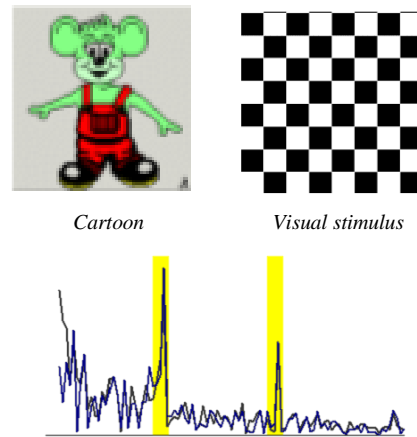
## Realization of examinations

The program starts by generating a cartoon in order to attract the attention of the child. This cartoon is followed by the presentation of a checkerboard with large dimensions.

The frequency spectrum of the recorded signal is displayed in real time on the control monitor. It allows the operator to visualize the response characterized by a peak at the stimulation frequency.

The operator can then trigger sweep stimulations that generate a rapid succession of 20 different patterns of decreasing sizes. The total duration of each sweep is 10 seconds.

A video of the entire exam can be recorded and replayed in synchrony with the recorded VEP responses. This option (reference PVM-CF) is useful for the control and interpretation of responses.



Frequency spectrum shown during the exam. The two vertical bars with yellow color indicate the stimulation frequency and its harmonic.

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## Example of examination result – from a 3 months old baby

The opposite graph shows the temporal responses obtained during the exam.

4 sweeps have been recorded.

Each sweep beginning is indicated by a vertical line and its duration by a thick horizontal line.

As the size of the pattern decreases, the amplitude of the response (green curve on top) first increases, reaching a maximum and then decreases rapidly.

A response amplitude larger than the noise amplitude (dotted curve) and a stable phase (continuous curve on bottom) both indicate that the response is reliable.

This graph shows the vector average of the different sweep responses recorded during the exam.

Vector averaging is an efficient way to reduce the noise level and to evaluate the reproducibility of responses.

From this vector average, the program automatically determines visual acuity as the smallest size of pattern that produces a response (20/82 in the present example).

