

MR Compatible Face Camera



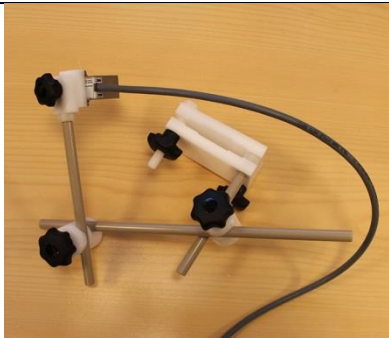
1. Equipment

MR Compatible Face Camera (12M-I MR Compatible Camera), manufactured by MRC Systems GmbH:n, is installed in AMI Centre. The camera is for recording video from subjects face inside the bore.


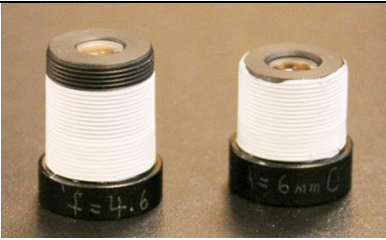


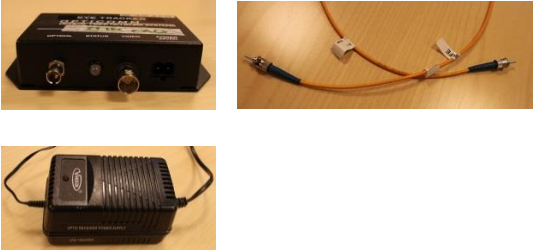
Components

Table 1 includes all the components needed for measuring with the face camera. The locations of the components outside the shielded room are fixed and should be found from their positions all times. On the opposite: equipment that locates inside the shielded room, should be taken out after measuring, and put on the top right self of the white cupboard in the control room.



Table 1: All the main components needed for the video recording. Location shows where the component is, when measuring. If the component is used inside the shielded room, the storage location is the white cupboard in the control room.

COMPONENT	LOCATION IN USE	IMAGE
Camera holder	Shielded room	 <p>Image 1. Camera holder, camera and cord</p>

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Camera	Shielded room	 <p>Image 2. Camera and lens</p>
Spare Lenses	Control room – cupboard	 <p>Image 3. Lenses</p>
Camera cable	Shielded room	 <p>Image 4. Camera cable</p>
Filter box	Inside the wave guide (control room)	 <p>Image 5. Front- and backside of the filter box</p>
Opto-isolators	Control room	 <p>Image 6. Optic transmitter, optic fiber and power supply</p>

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EEG-PC	Control room	 Image 7. Front panel of the EEG PC
Scanner trigger cable	Control room	 Image 8. Trigger cable to the audio jack

2. Wiring

When not in use, MR-camera locates outside the shielded room. Installation is introduced step by step at the below. The first 1-5 steps should already exist, as they include in the permanent installation. You should still check whether they are still in place. Phases 6-14 should be implemented every time. After measurement, return the components to their original locations.

Permanent installation (control room):

1. Filter box locates on the table, under the waveguide.

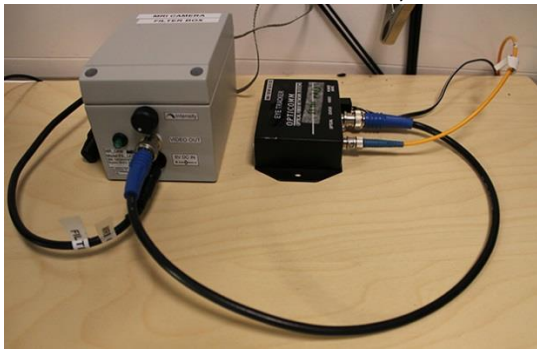


Image 9. Filter box on the left and optic transmitter on the right. These devices are stored on the table in the control room under the waveguide, when not measuring.

2. Filter box and video transmitter are connected with a coaxial video cable.
3. Video transmitter and video receiver are connected with optic fiber.

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Image 10. Cables from left to right: optical fiber, coaxial video cable and power cord.

4. Video transmitter and EEG PC are connected with coaxial cable.



Image 11. EEG PC from the back. Coaxial video cable is attached to the frame grabber card.

5. Attach scanner trigger cable (yellow) to audio jack of EEG PC.

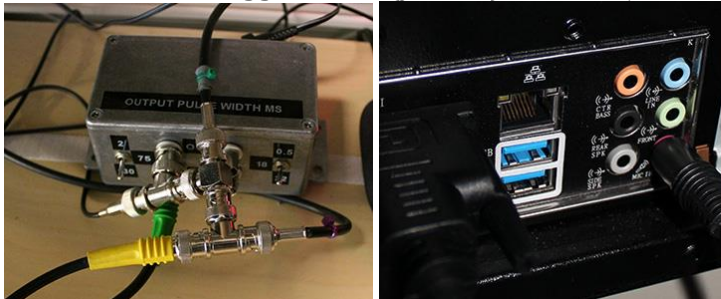


Image 12. The yellow cable on the left image goes to the red audio jack (mic) on the right image.

Temporary installation:

6. Connect power cords (filter box, transmitter and receiver) to the power outlets.
7. Put the Filter box into middle of the waveguide, camera cable connector pointing towards the shielded room.
8. Bring the camera cable inside the shielded room, and connect the other end of the cable to the filter box inside the waveguide.
9. Put the Optic transmitter into middle of the waveguide, connector side pointing towards the control room.
10. Attach the grounding cable of the filter box to the waveguide with its crocodile clip.

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Image 13. Filter box (on the back) and optic transmitter (on the front) inside the waveguide.

11. Attach camera holders to the head coil.

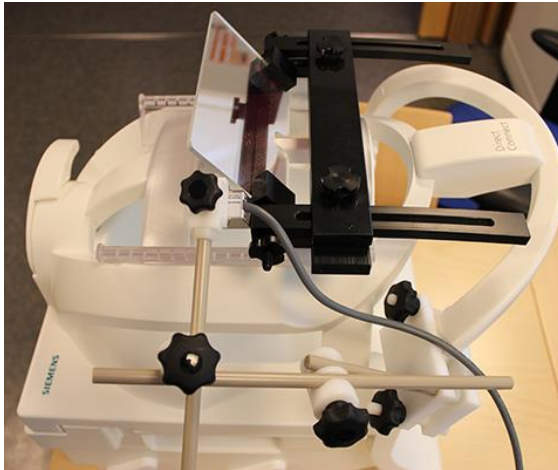


Image 14. Camera is attached to the 20ch coil with the camera holder.

Put the subject on the bed

12. Place top part of the coil on its place.

13. Connect the long camera cable to the short camera cord (which is attached to the camera). Notice that cable should lie next to the subject. Avoid loops of the cable and ask the subject not to hold the connection between the camera cable and the extension cable.

14. Adjust the position of the camera by using the camera holder.

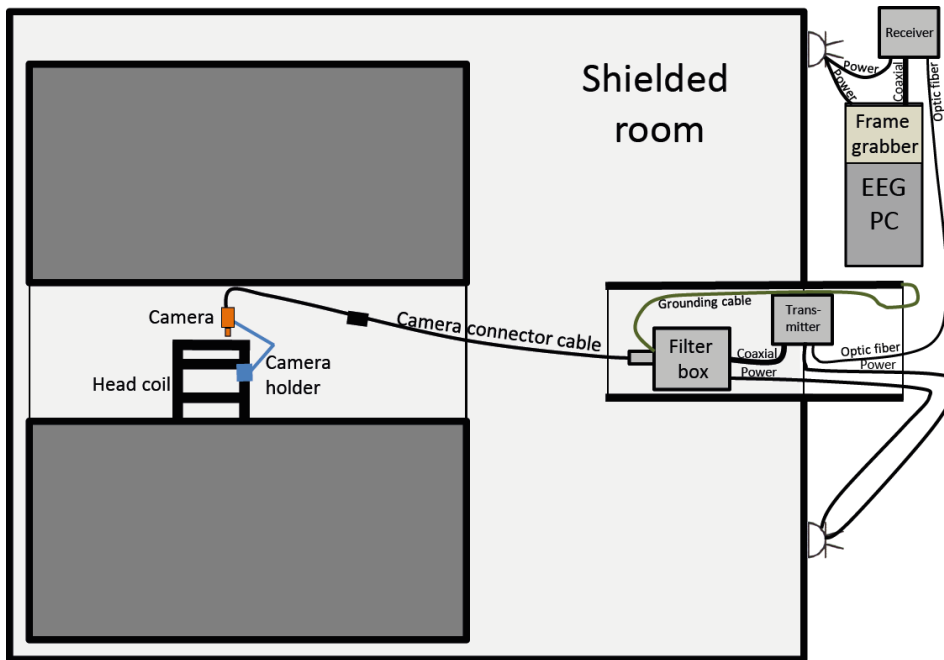


Image 15. Wiring diagram of the camera system

3. Using the camera

Camera setup

Camera is attached to the camera holder, and is aimed to view subject's face. The camera is a color camera, which output is 720x576x25Hz PAL signal. There are 3 different lenses available. Option 1 is used as a default.

- Option 1: $f=4,6^\circ$ C, color lens
- Option 2: $f=6,0^\circ$ C, color lens
- Option 3: $f=4,6^\circ$, infrared lens (for b/w image only)

Camera has a built-in light source for the visible light. The light potential can be adjusted with the potentiometer of the filter box. Light has also on/off switch (green light). Filter box doesn't have a separate power switch, but is turned on every time the power cord is plugged in.

Camera's built in light source is quite bright and it may disturb the subject when placed close to one's eye sight. Scanner's own lights could be useful; as they locate further away from the eyes.

If only black and white image is needed, use "infrared" lens. For the light source you can use eye tracker's IR illuminator. Discuss about this with the personnel.

Different coils

- 20 channel coil: Camera holder can be attached to the projecting part of the coil.



Image 16. Camera holder is attached to the coil directly

- Other coils: Camera holder can be attached to mirror holder.



Image 17. Camera holder is attached to the mirror holder

Recording video signal on EEG PC

Video cable is attached to the frame grabber card, which is installed on the EEG PC. Turn on the EEG PC. VirtualVCR is installed on the computer, which enables video recording. If you want to use other software to record video, discuss with AMI personnel.

Audio track is used for the scanner trigger.

Trigger pulse from the scanner is connected to the audio input of EEG PC. There is an adapter in the between, which converts the TTL pulse into an audio signal. The outcome of this method is a video, which has trigger signals on the audio track.

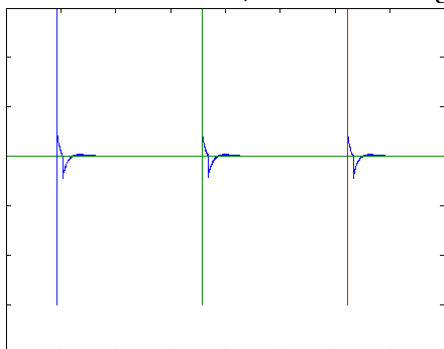


Image 18. Trigger signal on the audio track. Vertical lines show the trigger onsets.

Video recording software

VirtualVCR software is free software, which enables to record and/or view live video stream from the frame capture card. You can start the software by double-clicking “VirtualVCR”- icon on the windows desktop.

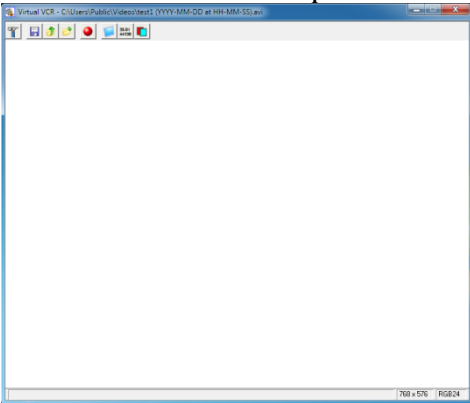


Image 19. Main window of VirtualVCR software

Check the setting below before measuring:

- setting: click “tool” icon
 - Devices -> video: IDS FALCON/EAGLE capture driver

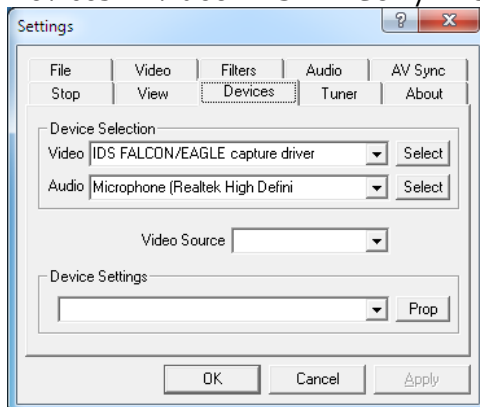


Image 20. Devices Selection: IDS FALCON is the frame grabber card used for the video. Microphone jack on the back side of the computer is used for Audio.

- Devices -> audio: Microphone (Realtek High Defini
- File -> Capture Filename: use any public targets (e.g. /users/Public)

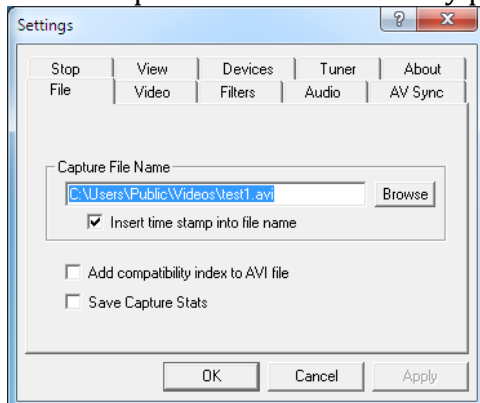


Image 21. Define the output file name. Make sure the output folder is a public folder, so that user has rights to write there.

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- File -> Insert time stamp info file name (Helps to separate different files)
- View -> Use smart Tee Filter for preview (if the preview image is wanted)

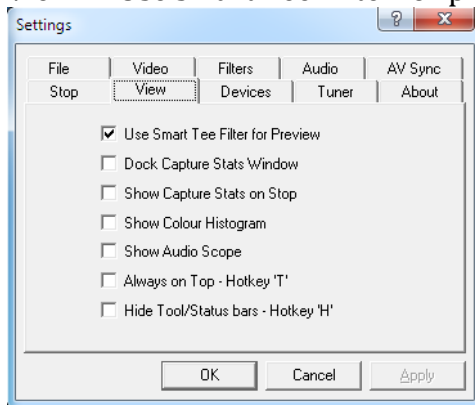


Image 22. Check the box above, if you want to have the option for preview image

- Video -> Use Compression: Xvid MPEG-4 codec (feel free to use any other codecs, though make sure to test the new codec before actual measurement)

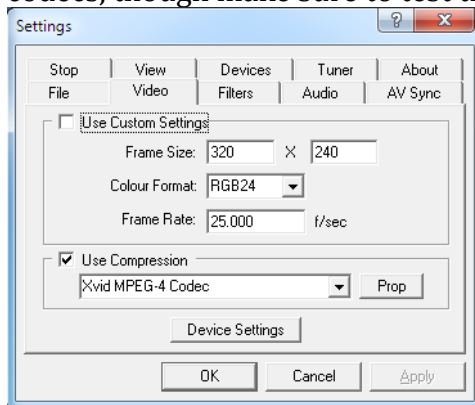


Image 23. Check the Use Compression box, and choose a codec you want to use, from the dropdown list.

- Toggle Preview (display icon)
- Record button -> stats capturing
 - Stop -> stop capture
- After pressing the stop button, you can start a new file by pressing the Record button again.

4. Analysis

As an outcome you get a video file which has video triggers on an audio track.

There also exists a self-made Matlab script, which finds the timings of the triggers. If you need the particular file, contact veli-m@neuro.hut.fi.

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