



USB Camera Glasses for the Blind

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Instructions

Before buying camera glasses, double-check that the technical specifications of the vendor include mention of using the glasses as a PC camera or webcam, because not all camera glasses support that functionality! The package description should also mention a driver disk or equivalent for the webcam driver software. When your glasses arrive, the two plastic lenses - the ones located in front of your eyes while wearing the glasses - usually come with a protective plastic film that should be peeled off. Both sides of each lens may be covered by this plastic film. With the plastic film still in place, any residual eyesight that you may have will be further blurred, so it is best to first remove the plastic film.

Make sure that you have a (formatted) microSD card inserted in the glasses, because the webcam functionality is only available with a microSD card in the glasses, even when not recording any video on the microSD card. The first time that you then connect the glasses to your PC with the USB cable, the Microsoft Windows New Hardware Found process runs while it recognizes the microSD card (8 GB maximum) in the glasses as a USB drive. This may take several minutes to complete, so be patient until Windows finally indicates via the system tray popup messages that the device is ready for use.

The webcam driver (PC camera driver) and other software for use with the glasses are on the mini-CD that comes with the camera glasses package. The setup program for the software installation, which also installs the webcam driver, is named `SPCA1528_V2220_MultiLan_090217.exe` (or similar in case of later version updates), and this executable resides on the mini-CD in the subfolder

```
  \minidv user manual\Sunglasses Camera user  
manual\SPCA1528_V2220_MultiLan_090217\
```

In case you have a netbook without a CD drive, you can use another PC that has a CD drive to copy the executable from the mini-CD to a USB memory stick, and use that to get the file on your netbook. When you run the setup program, you get a setup language dialog that lets you choose between Chinese (Simplified) and English, and it is assumed here that you want the English installation. However, on some systems all dialog text appears garbled, such that it then becomes a gamble which of the two choices gives you the English installation. Worst case therefore you will after inadvertent installation of the Chinese software version have to run the executable a second time, checking the radio button to let it uninstall, and next install again but then selecting the other (then English) language option. The whole installation otherwise runs via a standard InstallShield Wizard interface. The installation progress

bar may seem to get stuck at some point, but just wait and it proceeds within a minute or so.

Once the installation is done you will have a number of files in a new folder

```
C:\Program Files\SPCA1528\
```

or on Windows 7 64-bit this is

```
C:\Program Files (x86)\SPCA1528\
```

This folder then includes the Microsoft video program Amcap, but you can also use The vOICe Learning Edition to check if the webcam functionality works.

To avoid that The vOICe detects and sounds the view of your PC's built-in camera (if there is one in your netbook PC or notebook PC), it is most convenient to first disable the built-in camera: go to Control Panel | [System] [Hardware tab, if there is one] Device Manager | Imaging devices, and select the driver of the built-in camera. Right-click to get the context menu and disable the driver (the relevant option may be in the context menu directly, or else found via the Properties entry). Press OK until you have left all open dialogs. Note: with Asus Eee PCs you may find the option to disable the built-in camera via a right-click on the Asus EeePC Tray Utility icon in the system tray, where you can select "Disable Camera".

Now connect the glasses by USB cable to your (netbook) PC if not connected already. The very first time you need to give Microsoft Windows some time to prepare the glasses for use as a memory card (through the automatic New Hardware Found process), and in later cases you still need to give Microsoft Windows a few seconds to let it recognize the glasses as a memory card. Next, press the power button of the glasses for a few tenths of a second to activate the webcam driver. The power button is the rearmost of the two buttons on the left leg of the glasses. Here too, the very first time will cause the Microsoft Windows New Hardware Found process to run for up to several minutes as it recognizes the camera, but in later runs this will not happen. The driver will only then show up in Device Manager as the SPCA1528 PC Driver and be available for use with The vOICe. If The vOICe was already running without another capture device connected, it will automatically detect that a new video capture device is connected and start sounding the live view of the glasses. Note also that the power button acts as a toggle: pressing it another time switches the glasses back to memory card mode, and pressing it yet another time switches the glasses back to webcam mode, and so on. Beware that with some other types of camera glasses one must first turn on the glasses before connecting them to the USB port of the PC in order to get to the webcam mode.

In normal use with The vOICe, you only need to **connect the USB cable and after several seconds press the power button of the glasses to activate the webcam function**, making it very user-friendly and without the wire tangle that one gets with analog video sunglasses, USB video capture device and battery pack. The consistent alignment with the head helps to master seeing-with-sound, while the low price adds to making this an attractive head-mounted camera option for blind starters. The left leg of the glasses contains a tiny hidden microphone that can be used for giving

[speech commands](#), but this will generally work less reliably than with the microphone boom of an audio headset.

“My vision is getting more detailed now with the new glasses and I am actually choosing patterns of things because I like them, I can go shopping and say "I like the pattern of that rug so I will have that one", or clothes, etc. it is very interesting to see things in such detail. I did not know what quite a lot of objects looked like and could not visualise them. I seem to like patterns of Moroccan tiles because they have a repetitive sound, rather like the chorus of a song.”

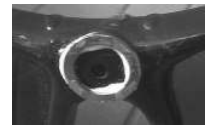
CC, female blind user of The vOICe, March 5, 2010.

[First run with my new MINI DV D008 USB camera sunglasses \(Technology Esoterica blog\)](#)

Pranav Lal, early blind user of The vOICe, April 24, 2010.

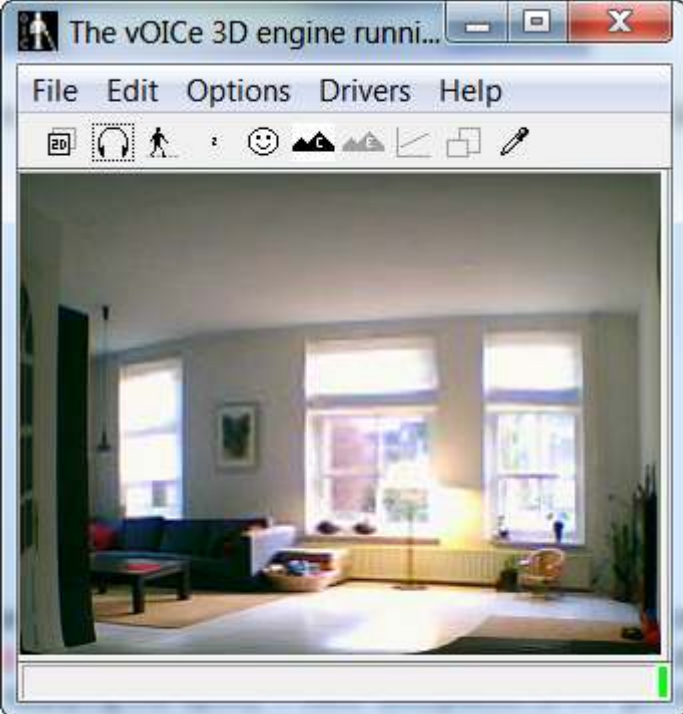
Wide-angle lens accessory (recommended for use in combination with foveal mapping, Shift Alt F4)

Image quality is acceptable for a CMOS webcam, even under low light conditions, as The vOICe makes use of the live view and not heavily compressed recorded video. A key disadvantage remains the rather narrow field of view (FOV), spanning only about 40 degrees horizontally and slightly over 30 degrees vertically. This makes it harder to detect obstacles to the side, harder to quickly build a mental overview of the visual environment, and harder to notice obstacles ahead at floor level. However, it is possible to use the USBfever ["170°"](#) or ["180°"](#) fish-eye lens, which does not require removal of the original lens but is simply magnetically mounted in front of the existing lens, and is therefore easily added and removed depending on the situation. In combination with the glasses, the horizontal field of view becomes some 2 to 3 times wider than without the add-on lens (up to a maximum of about 180°, e.g., 80° to 120° in case the view was 40°. The magnetic attachment ring is put on the glasses with adhesive tape, but its very viscous glue slowly gives in to the force of gravity such that the add-on lens slides off the glasses, and it is therefore recommended to later on fix the magnetic ring (and only the ring) to the glasses with for instance super glue - while taking extreme care that no glue gets on the pinhole camera! In order to have a large contact area between metal ring and glasses, it is useful to first wiggle the metal ring around a bit to reshape the somewhat plastic and spongy tape material for a better fit, and only then apply the super glue.



The image snapshots below show how the 170° wide-angle lens greatly expands the peripheral view to the sides and at floor level, at the expense of making items at the center of the view appear much smaller (the slight blurring and distortion near the borders of the view is acceptable for our purposes). Both snapshots were taken from the same position, and the distance to the room's windows was about five meters. A disadvantage of the wide-angle add-on lens remains that it goes at the expense of the unobtrusive appearance of camera glasses.





To give a further impression, a video recording with visual sounds of a [walk in the garden](#) was made using the camera glasses and the USBfever 170° fish-eye lens, and using The vOICe's default video resolution setting of 176 × 144 pixels.



[Walk in the garden](#)

This same five-minute video clip is also available - with [closed captioning](#) - on [YouTube](#).

Foveal mapping (recommended with wide-angle lens)

To offer a better trade-off between visual detail and peripheral sight, The vOICe offers a foveal mapping option (toggled by Shift Alt F4) that enlarges the central part of the view. In combination with a wide-angle lens this preserves the peripheral view for detecting obstacles and




events in the visual periphery, while offering a detailed central view. In tests it was observed that - despite the name - the above-mentioned 170° lens in combination with the camera glasses in fact gave a wider field of view than the 180° lens, and this may therefore be preferred for a wider visual context and easier detection of items at floor level in front of the user, at the expense of somewhat less detail near the center of the view.



The vOICe's foveal mapping has the additional property that horizontal and vertical straight lines remain perfectly straight, thus limiting the inevitable distortion associated with a foveal mapping. Unlike with for instance barrel distortion, an upright rectangle remains a rectangle with straight edges no matter if the rectangle appears in the foveal area, in the periphery, or in both. A settings menu (toggled by Shift Alt 4) enables correction for a camera view that is often physically somewhat misaligned with the frame of the glasses. It lets you adjust the effective viewing direction through software!

Known issues and their solutions

An issue remains the fragility of the mini-USB connector of the glasses, which reportedly starts failing already after a short period of mobile use, possibly due to poor internal soldering connections as the connector can freely wiggle, albeit slightly, with respect to the left leg of the glasses. Therefore **it is strongly advised to completely fix the plugged-in mini-USB connection with the glasses using a hardening filler epoxy** for maximum mechanical stability and longevity of the electronic connections. To avoid accidentally getting epoxy inside the nearby microSD card slot, it is advisable to temporarily cover this slot with tape while applying the epoxy. Power dissipation of the glasses is less than 0.4 W, such that having it powered by a netbook PC should not dramatically reduce battery life of the netbook PC.

User reports indicate that with some camera glasses it is necessary to keep the power button of the glasses pressed while plugging in the USB connector.

In case the glasses keep slipping off your nose, especially when looking down, you can make use of adjustable eyewear retainers such as the so-called  "[croakies](#)" attached to the legs of your glasses.

The video capture driver SPCA1528_V2220_MultiLan_090217.exe has an **annoying bug** in that with certain types of complex views The vOICe - as well as any other video capture applications! - will seem to hang. This occurs most often with irregular textures that contain many similar shapes, such as with leafs in vegetation, or with gravel tiles or a bed of pebbles. However, capturing resumes as soon as - and only for as long as - the view content qualitatively changes, such as when you wave your hand in front of the camera (you can always use this as a check of what is going on). A newer driver version SPCA1528_V2237_WebCam_Eng.exe was also tested but does not help here, as it shows exactly the same freezing problem. You may check  <http://chucklohr.com/808/> for other information about SPCA1528 drivers, or inquire with  [Sunplus Technology Company Limited](#), the company that developed the drivers. The problem is probably caused by a broken image stabilization

implementation, because the symptoms suggest that this Sunsoft driver occasionally hangs due to block matching problems in comparing subsequent video frames.

In rare situations, for instance after a system crash, it can happen that the camera glasses are no longer recognized by the computer at all - not even in their default memory card mode. This need not mean that the glasses are broken, but that a **reset of the glasses** is needed to solve the problem. On the inner side of the left leg, where on the bottom side there is the mini-USB connector, there are two tiny holes. The one closest to the mini-USB connector is just a hole for a small red LED light (hard to tell when it is off or when you are blind), but the other - still smaller - hole about 4 millimeter above it can be used to reset the camera glasses using a needle to click a switch inside this tiny hole. The switch gives a clear tactile click when depressed. Be careful not to push too hard and risk damaging the switch, and also do not attempt to use a Braille stylus because it is way too thick for entering this tiny hole!

Whether you are blind or not, beware of possible legal and security implications of buying and wearing a (concealed) camera in your country. The relevant laws differ per country.