

ThirdEye dental cameras



**intraoral shots from extraoral
easily and instantly !**

ThirdEye the dental camera of the future

Assembly instruction

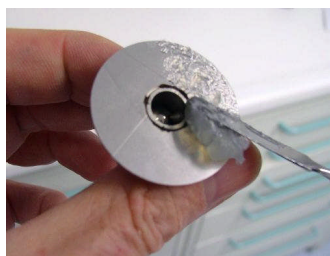
Assembly of the miniature camera stand



Independently of the type of dental light the miniature stand is stuck on the center of the dental light front.

Before sticking the miniature camera stand to your dental light all the adhesive surfaces of the light and stand baseplate must be cleaned and degreased with alcohol and a clean cloth.

For the later adjustment of the camera stand on the dental light a cross from adhesive tape is stuck on the camera plate of the stand, so that all free ends of the tape exceed at least one centimeter over the stand baseplate.

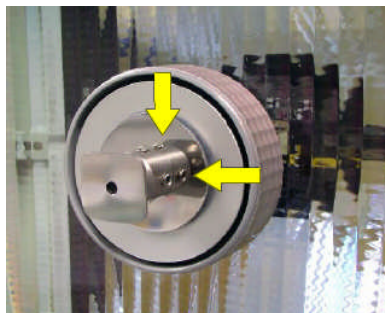


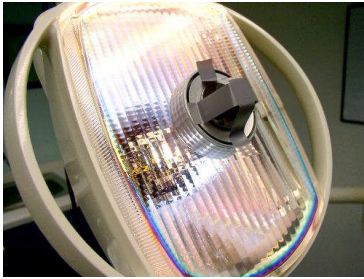
With a cement spatula a thin layer Hylosil[®] silicone glue is painted on the lower surface of the stand baseplate. For dental lights with a relief on their front side (e.g. Siemens M1, Sirona E, Pelton Crane etc.) the silicone layer must be somewhat thicker.

The stand fed with silicone adhesive is put on the center of the light front and pressed on slightly, until some silicone outpours the baseplate at the edges.

Recommendation:

For the temporary attachment of the miniature stand you can use a polyether impression material like e.g. Impregum[®]. It is important to fix the stand in the correct positioning, so that the fixing screws are well attainable afterwards. For right handed persons the screws should show to the right and upward (with the view of the light front side).





Now the ends of the tapes are fixed at the light and the light screen is turned upward. The curing of the silicone takes 2-12 hours depending upon thickness of the silicone joint (the more thickly the joint, the longer the hardening by precipitation phase). The hardening by precipitation can be accelerated however by warmth. For this reason the light should remain switched on for 2-3 hours.

Laying of the camera cable

The camera cable can be laid with its diameter of only 5 mm into the tubing linkage of your dental light (max. diameters of the cable plug: 12 mm).



Please notice: For laying the camera cable into the inner tube of the dental light one has to drill a small hole into the front side of the dental light tube (often plastic parts). This bore hole will lead your dental light to lose its registration and warranty (medical products law). We leave it up to you to drill this hole by yourself or have a technician from your dental supplier drill this hole and lay the cable for you. A more comfortable, but less attractive way to lay the camera cable is through the use of cable clamps, cable canals or adhesive tape stuck to the outside of the dental light tubes.

Important: In order to ensure the full mobility of the light head, a cable reserve must be present. The best way to test the length of the necessary cable reserve is to attach the camera to the stand, connect the cable plug to the camera socket and hold the camera cable to that point, where the cable is to be laid into the light tube. Now move the light head to any possible direction. The cable should not be strained in any position or be in contact to hot surfaces of the dental light.

Note: The camera cable may be broken when squeezed or be laid in to close bends.



Connecting the monitor



The plug of the camera cable is connected with the camera socket at the connection box.

Simply latch the plug (possible in one position only!) into the socket. To loosen the plug just pull out the high-grade steel ring.

From the connection box the video cable leads to the video-in and the audio cable leads to the audio-in of the monitor. These two cables must possess so-called RCA plugs. Professional monitors have so-called BNC sockets. In this case you need a BNC-Cinch adapter.

Most TV devices have so-called Scart connectors. In order to attach the camera to ordinary TV equipment, you need a Scart adapter, which has Cinch sockets. LCD monitors, which are suitable for video and/or TV, often possess Scart and Cinch sockets.



Scart adapter

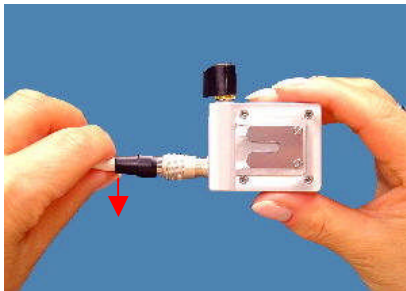
Regarding the monitor:

Unfortunately the image quality of most LCD monitors yet cannot be compared to the image quality of a professional broadcast monitor (CRT = cathode ray tube = picture tube). That is not at resolution lacking, but of the weak contrast ratio of the LCD monitors. Nevertheless, if you want to use a LCD monitor (= TFT monitor) in your practice, then the contrast ratio of the monitor should be at least 1.000: 1.

Right now, there are monitors with a contrast ratios 400:1 up to even 50.000:1 on the market and the technology of flat monitors is advancing very fast.

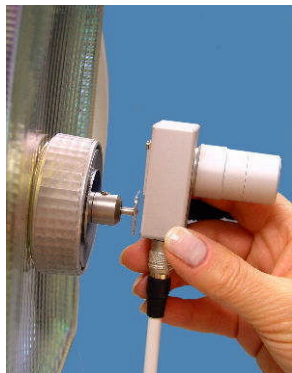
Attachment of the camera

Once the monitor is connected to the connector box the camera is attached on the dental light.



First you should plug the cable plug into the socket of the camera housing. Since this is possible only in one position, you should turn camera and cable plug somewhat in opposite directions, until the plug engages. switch the monitor on.

Now the camera with the groove on its rear side can be pushed onto the disk of the miniature stand. Now you can plug the power supply plug of the connector box into the socket and



Adjustment of the camera

Now the optic axis of the camera lens must be aligned to the central beam of the dental light.



For this reason stick one of the test mouth labels on the neck restraint of your dental chair. Turn the dental light on and direct the light beam of the dental light towards the test mouth.

Having guided the camera with the left hand so that the test mouth appears in the center of the light beam, the right hand tightens the fixing screws of the miniature stand with the enclosed allen screw driver (*this explanation is for right handed dentists only*)



The test mouth should be visible something *above* the center of the light bundle. Thus dazzling of your patient can be prevented later. Shake something at the camera as a check. The image always should remain fixed on the centre of the light beam of the dental light !

Finished!

By the way: The camera is appropriate for continuous operation. With a current consumption of fewer than a Watt you need not constantly separate the camera from the power supply. It is sufficient switching off the connector box in the evening after the work.

Installation on a Sirona C4 or XO-Flex dental lights

The Sirolux Fantastic dental light has an internal fan. To guarantee the sufficient cooling of the light bulb and to keep the light bulb accessible for exchange, we deliver a removable mount adapter to attach the mini camera stand of our ThirdEye dental camera..



Sirona C4

the aluminum ring of the mount adapter should be slid onto the plastic housing of the fan, so that the front edge of the aluminum ring is on the level with the front end of the dental light.

The threads of the aluminum ring should be located on the upper and lower parts of the ring. Otherwise you might not be able to tighten or loosen the screws later.

Before installing the mount adapter, please check, if the aluminum ring fits onto the plastic housing of the fan. We recommend fixing the aluminum ring with Impregum®. Impregum® is not only for temporary fixation, but will keep the mini mount in place for years (if desired). Mix a small portion of Impregum® with a spatula and spread it in a *very thin* layer (with a cement spatula) onto the plastic front of the dental light, just behind its front edge. It is sufficient to spread the Impregum® onto three different points on the plastic housing. The Impregum® should not cover more than half of the width of the turnable plastic front cap.

Now slip the aluminum ring onto the plastic housing of the dental light (the front edge of the ring being on the level with the front end of the dental light!).

The Impregum® will take three to five minutes (depending on the temperature of the plastic housing) to harden. After hardening remove the surplus of Impregum® with your finger nails, do not use metal instruments.

If you should use the Hylosil®-Silicone glue we deliver together with the camera for a (ever)lasting fixation, the hardening of the Hylosil®-Silicone glue takes from two to eight hours. To accelerate the hardening you can switch on the dental light for about two hours. Do not forget to secure the aluminum ring with adhesive tape during hardening time.

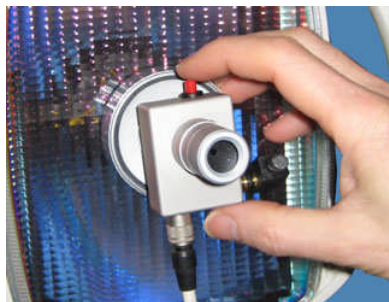
After hardening of the Impregum® or the Hylosil®-Silicone glue, the punched aluminum box with the mini camera stand is slipped over the aluminum ring. Please secure the punched aluminum box on the aluminum ring by spreading some drops of mixed Impregum® (*never* use Hylosil®-Silicone glues for this!) inside the back end of the box at three different locations before slipping it over the aluminum ring. Now tighten both screws with the allen screw driver,

Because it is essential for later camera adjustments (see installation manual), the screws of the mini camera stand should show to the right* side for right handed dentists and to the left* side for left handed dentists.

(*standing in front of the dental light)

Adjusting the manual white balance

ThirdEye dental camera can be operated both in automatic or manual white balance modus.



The preferred modus should be the manual white balance, because in this modus only you will have optimal color reproduction under any lighting conditions.

To adjust the manual white balance direct your dental light with the camera onto a white sheet of paper in front of your patients mouth or in front of the head rest of the dental unit. Now push the red button on top of the camera towards the housing (short button). That's all ! Check the colors of the gingiva of your patient or the colors of your skin on the monitor.

The depth-of-focus

The depth of focus of a lens varies with the focal length, the aperture (the size of the opening of an iris or diaphragm) of the iris and the working distance (distance between lens and object). The depth of focus further depends on the illumination of the object to be shot. The higher the illumination (measured in lux) by the dental lamp, the smaller the aperture of the iris (and electronic iris !) can be and the wider the depth of focus will be.

The lens of the ThirdEye dental camera has a fixed iris (besides the electronic iris built in the ccd chip) with a diameter (aperture) of 3mm. This aperture ensures sufficient light falling onto the ccd chip with *all* dental lights on the market even those with less lighting intensity.

Fokussing the lens

We all prefer a certain working-distance - distance of the front of the dental light to the mouth of the patient - of our dental-light. With good illumination the camera must be focused to the tooth we are treating only once. Slight changes of the position of the dental light do not need new focussing but are compensated by the wide depth of field of the system and the image remains sharp.

However, if the alteration of the distance is big - more than 10 to 20 cm - you have to focus again. To focus just turn the outer tubus of the lens.



Why no autofocus ?

You wonder, why there is no autofocus integrated in the ThirdEye dental camera ? There is a simple reason for that. It wouldn't work ! An autofocus normally adjusts the focus to the middle of the shot, in our case our working area. Now, if we were not working in the patients' mouth all would be fine. The autofocus would focus to the tooth you want to show to the patient. But, as soon as the patient would move his head or we would be working with our dental mirror or fingers in front of that tooth surface the autofocus would nervously focus back and forth, the image never would be sharp at all. You won't be able to video tape a whole treatment with an built-in and activated autofocus !



The lens hood

The outer tube of the lens is the only part of the camera touched by our hands. To prevent a contamination of the lense, we deliver a special lense-protection. This lens hood is made out of polypropylene. This material can be disinfected in the disinfection bath or even be autoclaved. The lens hood simultaneously serves as sun shade and ray shade. It prevents other light sources - for example your light on the ceiling, day light falling through a window - falling onto the front lens, thus reducing contrast of the system. The lens hood allows focussing.

Taking shots with the dental mirror

If you want to shoot subjects or tooth surfaces only visible with your mirror the light of your dental light should come out of the direction of your head. The central beam of the dental light then will be parallel to your visual axis. What you see in your dental mirror will be what you get on the monitor screen*.

* provided your dental assistant controls the focus



Rotation of the camera

You can rotate the camera on the miniature camera stand for about 180 degrees.

Thus you always can adjust the lip line or the teeth arch to the horizontal in whatever the position the patient's head might be.

Maintenance and Care

The ThirdEye dental camera and the connectors are well protected against sprays, yet you should never spray the camera itself with any disinfectant. The camera and the lens, the lens being the only part touched with the hand, can be wiped off with a disinfection cloth. Best you should use the camera with the enclosed lens hood only. Since the lens hood screens light coming through windows (e.g. sky light) or from ceiling lights, the contrast of the camera will even improve by using the lens hood.

The lens hood itself (polypropylene) can be cleaned and desinfected in any disinfectant solution and even be autoclaved (at 135° C)

For cleaning the front lens you should use a soft lens pencil, if only dust is to be removed. To remove stain from the water spray, greasy finger-prints or splashes of disinfectant you should use a soft rag or a soft cotton swab. Simply breathe on the lens and wipe off carefully. In the case of strong or greasy contamination on the lens you can use some petroleum ether or isopropylalcohol (70%) on a soft rag or cotton swab for the cleaning. If, after some time, the lens should become dirty inside (e.g. penetrating steams, humidity), then the front part of the lens can be screwed off and the lens can be cleaned from inside. Breathe on the inner lens surface and use a new cotton swab to clean the lens. Carefully rotating the tip of the swab over the surface of the lens. Be sure not to touch any part of the inner lens housing with the swab, because these parts are greasy from the optical grease !

If the inner surface of the lens should be contaminated with optical grease or if touched with fingers, you should clean it with a cotton swap with a drop of isopropylalcol (70%) on it.

During cleaning the inner lens surface always slip the lens hood over the inner telescope, so no dust can fall onto the IR filter covering the CCD Chip in the camera housing.

Maintenance

The ThirdEye Dentalkamera is maintenance-free for a long time. Because of contamination or lack of optic fat (only use special optics fat; not use vaseline!) the lens can become difficult to focus in the course of the years. In this case please return the camera to us for professional cleaning (only small fee).

Cleaning the CCD Chip

The CCD chip might be contaminated with dust coming through the iris during changing the lenses or during cleaning the inner surface of a lens. If a dust particle is on the CCD-chip (that is on the IR-filter of the CCD-chip) you will see a dark round shadow on the monitor image. You then can clean the CCD surface with a new and dust free bonding brush or foam applicator (you'll need good eyesight or a loupe). Just pick up the dust particle with the applicator.

If you have clean *water and oil-free air pressure* at your unit you can try to blow the CCD chip to remove the dust particle(s) from the CCD-chip.

If you intend not using the camera for a longer period of time, keep the camera in the ThirdEye black box in a dry dust-free place.

Technical Data

Camera

Image sensor	1/3" CCD Sony
CCD total pixels	PAL 470.000 NTSC 410.000
Resolution	540 TVL
Video Signal	FBAS, Composite
Video System	PAL/NTSC
Signal to Noise Ratio	> 50 dB (ACG off)
Camera Iris	CCD Auto Iris
White Balance	AWB (automatic white Balance) and manual white balance
Power Supply	12 Volt DC +/- 10%
Power Consumption	1,8 Watt
Color	silver
Material	Aluminum anodized
Dimensions (LXWXH)	48 x 38 x 20 mm
Weight	75 grams (with lens)

Microphone (integrated)

Frequency	20-16.000 Hz
Signal to Noise Ratio	> 58dB
Impedance	150 Ohm +/- 20% (at 1000Hz)
Power Supply	12 Volt DC
Power Consumption	0,3 Watt

Lens (integrated)

Focal Length	35 mm (50mm optional)
Focussing	manual
Range of Focus	30 cm - 150cm (12"- 60")
Depth-of-focus	6-15 cm (depending on working distance and illumination)
Iris	fixed Iris
Material	Aluminum anodized

Accessories

Power supply
with camera-in + video/audio-out
Cable (white; 6 pol, 6 m)
Miniature camera mount

The system



There are many possibilities to archive all your photos and videos. You can use a DVD recorder with integrated hard disc, a digital video recorder (DVR), a DV recorder (e.g. Sony GV-HD700E) or even a digital camcorder with a *analogue* video-inputs (e.g. Canon HV10 or HV20). The other way, you capture directly to the hard disc of your computer by connecting the ThirdEye dental camera via TV video card, AV-USB adapter (e.g. TerraTec Grabster AV 250MK) or AV-Firewire adapter (e.g. Canopus ADVC55) to your computer and edit the captured videos and grabbed photos with a (semi)-professional video editing software (z.B. Canopus „Edius“ or „Let’s Edit“, Sony „Vegas“, Adobe „Premiere“, Apple „Final Cut“ or others). VHS and S-VHS video recorders today are out of date because of their low resolutions (330/400 lines)

The most simple solution to record your dental videos is using a DVD (RAM) recorder with integrated hard disc or a DVR (= digital video recorder) with the possibilities of docking of an external USB-hard disc. Using a DVD recorder or a DVR you can record high resolution videos or grab photos chair-side and you can save the media at an instant by pushing the record button on your remote control. No time consuming navigation with the PC mouse or trackball.

If you want to edit your videos professionally, you should not use a DVD recorder, because DVD recorders encode your analogue camera signals into the MPEG-2 format, which is not easy to edit with most editing softwares. In this case you should use a (semi)professional video editing software with an AV-USB or AV-Firewire adapter. Thus you can capture your videos and grab your photos in many different video or photo formats (we recommend .avi format for videos and .raw or .png formats for photos) and different resolutions directly to your computer’s hard disc.

If you want to see your shots simultaneously on your preview monitor in your surgery room and on a large scale video screen (projected by a video projector) or a big LCD or plasma tv screen, then you should use a high quality video splitter (= video distributor amplifier). We recommend the Kramer VM-30AV (www.kramergermany.com), which has one input and three outputs (with stereo audio). There are cheaper video splitters on the market, but do not save money on the wrong end. An amateur video splitter can ruin the best image quality!

www.canopus.com www.terratec.net www.sonycreativesoftware.com www.apple.com



Declaration of Conformity

The manufacturer

Dr. Benno Raddatz
Verlag Neue Medien
Grenzstr. 60
76448 Durmersheim
Germany

hereby declares, that the product

***ThirdEye* video camera**

is in conformity with the protection requirements of the following EC Council Directives

89/336/EEC EMC directive

Elektromagnetic compatibility

73/23/EEC LVS directive

Low voltage safety

based upon compliance of the product with the following harmonized norms/standards:

EN 50081-1:1992

EN 50082-1:1997

EN 55022:1998

EN 55024:1998

EN 60950:2000

Manufacturer/Importer

A handwritten signature in black ink, appearing to be 'DR' or similar initials, written in a cursive style.

Durmersheim, 01/01/2005

Dr. Benno Raddatz, C.E.O.