CamOcr – Optical Readout Module

Operation manual

Content

1. Application

CamOcr camera module extends possibilities of MEATEST automatic calibration software Caliber. CamOcr is designed for scanning of seven-segment digital displays of measuring instruments – devices under test.

Using CamOcr can be "connected" to the computer also instruments (UUT) that are not equipped with any kind of PC interface. UUT display is scanned by digital camera. CamOcr converts scanned pictures to numbers. These numbers (measuring results) are used in for further calculations. It is very easy to do repeated measurements and calculate uncertainty type A for every calibration point.

1.1. Application limits

CamOcr is designed for scanning 7-segment displays. Number of displayed digits must be at least 3 and no more than 8.

Mechanical construction of CamOcr module
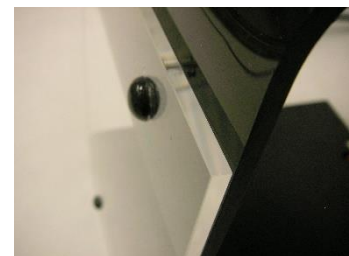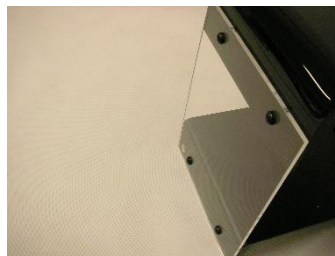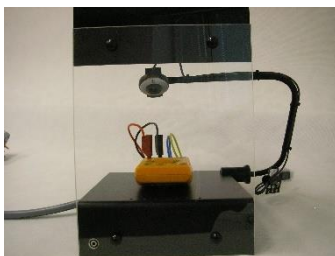
1.2. System requirements

- Control unit, PC 1.5 GHz or better, RAM 1 GB
- Operation system MS Windows XP / Vista / 7 / 8 / 10
- Caliber software
- CamOcr module (holder for fixing the camera module, shield cover, camera)
- Instruments with test cables

1.3. Mechanical installation

Put together the shield cover with the base plate (Option 140-01). Shield cover consists of two parts, which are connected with screws M4x14. The black mate surface of shield cover is faced to the base plate. Shield cover is fixed to the base plate with screws M4x14. The screw connection is mutually fitted with transparent pads and matte black pads.

Note: Older base plates don't contain screw holes for the shield cover. Screw holes must be made using drill 4,5mm in this case.

Camera module is delivered together with camera holder. The holder is equipped with slot, which enables to fix the holder to the Option 140-01 Cable adapter base plate. The base plate can be inserted into the slot in camera holder and fixed with the screw from bottom side. Slope of camera holder and its distance to the UUT display is recommended to keep in range from 15 to 20 cm. The distance and angle as well can be set by releasing and fixing twill nut on the camera holder. To obtain reliable results camera lens must be focused. The right focus and size of the picture can be achieved with the lens on the top side of camera body and with appropriate functions in application SW. The size of the picture should be in such way, that the displayed number covers whole life video window.

1.4. SW installation

Use link from purchased license file to download [Caliber/CamOCR] installation package. Description of installation can be found in the link received.

Note: Camera must not be connected to the USB port before the driver is installed. Camera connection is asked during installation process. Restart of computer can be required after driver installation.

Note: For correct function at least 16-bit color depth must be set in Windows operation system (High color).

1.5. Program registration

There is not required additional registration when purchasing CamOcr together with the Caliber software. CamOcr is registered automatically with the Caliber software.

There is required new registration of Caliber software for separately purchased CamOcr module.

You will find more detailed information about the CamOcr module in the Caliber user's manual.

2. Scanning picture setting

Correct, homogeneous and sufficient light is necessary for reliable scanning. Very important is to prevent various reflexes from display cover. The best environment is laboratory room with fluorescent lamps, less suitable is spotlight. Direct sunlight, which has non-stable intensity and also generates reflexes, is not suitable.

In following text optimal setting of camera model Creative WebCam3 is described. For other camera models similar rules are valid, but control panel can be of different outside. During camera setting follow the procedure:

- Resolution setting. Menu for resolution setting is started after pushing the button "Format" under the window "Camera" in Caliber program. Place the UUT under the camera body and set resolution 320x240 points which is the best for most of the instruments. Size of scanned display is enlarged (or reduced) by changing the resolution. Item „Pixel depth …" must contain the implicit setting „I420".
- „Video signal source". Appropriate menu is called by pushing the button "Setting" in Caliber program.
- The first set the "Exposure" item to a value, where the scanned picture is well visible on the screen. To enable this feature, automatic setting "Auto" in the same row must be cancelled.
- Switch the camera scanning to black-white mode BW (switch off mode „Color enable").
- Set type of ambient light, item „Lighting". Select „FL" for fluorescent lamp or „Tungsten" for standard bulb.
- „Cancel Flicker" button can be used to reduce interference of AC source of light, if necessary. With the button the function is activated or deactivated. Set the position, where the scanned picture is the best and without flickers.
- Set „Contrast" function to a value with the best quality of the scanned picture.

- Item „Sharpness" is recommended to set to the lowest value, which gives usually the best result.
- „Backlight" should be set to position 0. Parameter 1 gives better results when ambient light has lower intensity.
- „Brightness". Default setting gives the best picture mostly (item „Auto" selected). In some special cases can be better result achieved by manual setting of the parameter.

- Set " Mechanical orientation" of the camera holder to get whole maximal length of the display including sign plus or minus in the camera window on the PC monitor. If the UUT display is too large to project it in the camera window, decrease resolution to the value 176x144 dots and reduce distance between camera and UUT display. Better is also the camera lens to lead to the UUT display slightly from bottom side, which gives lower distortion and higher contract.
- When the camera parameters are set, scanned picture can be focused by objective on the camera body.

Generally for camera setting following hints are useful:

1. Size of the UUT display on the PC monitor should be as large as it is possible without losing any digit or polarity sign.
2. Avoid light reflexes from the UUT display glass or plastic cover. Don't use direct sun or spot light.
3. Avoid shades in the UUT display area.
4. The scanned picture must have good contrast. Some of meters can lose contrast when battery becomes discharged.
5. The picture must not be geometrically deformed. It can happen, when the angle between camera and UUT display plane is too low

Correct setting of the 31/2 UUT display is shown in following picture.