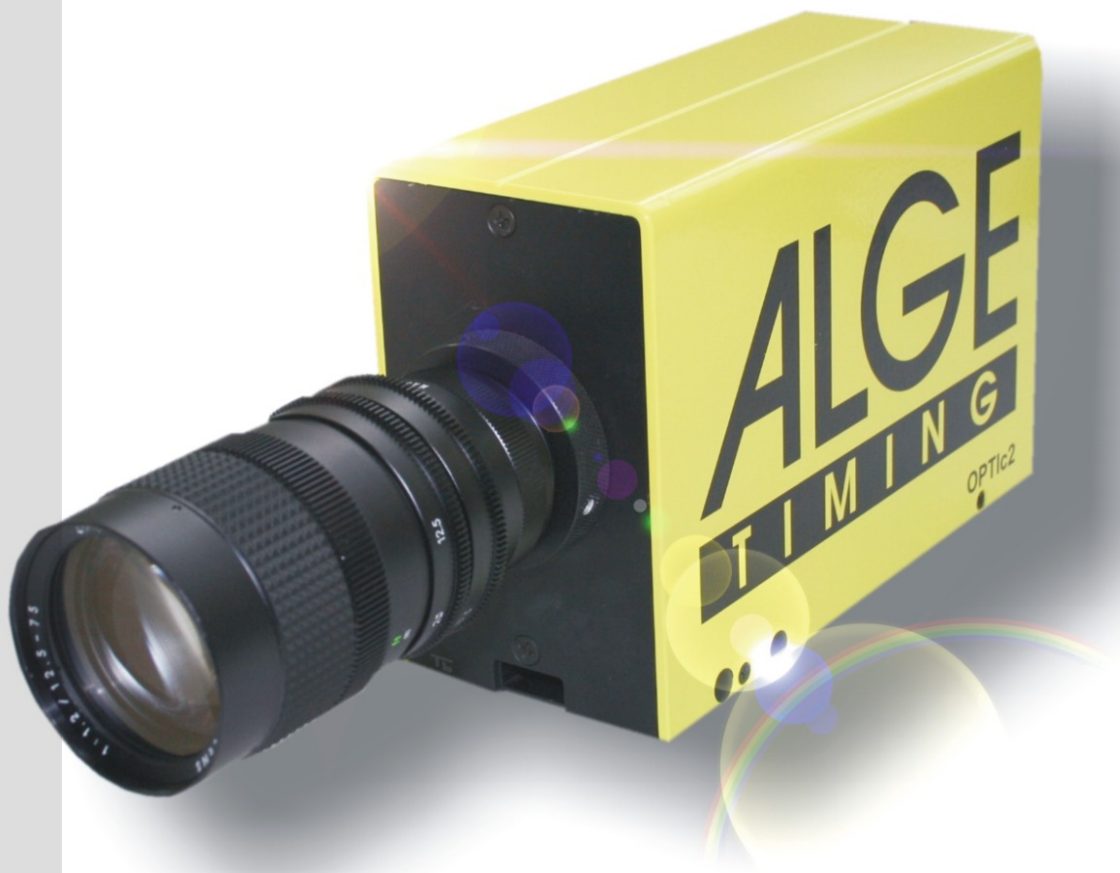


OPTic2



ALGE-TIMING

Manual

Important Information

General

Before using your **ALGE-TIMING** device read the complete manual carefully. It is part of the device and contains important information about installation, safety and its intended use. This manual cannot cover all conceivable applications. For further information or in case of problems that are mentioned not at all or not sufficiently detailed, please contact your **ALGE-TIMING** representative. You can find contact details on our homepage www.alge-timing.com

Safety

Apart from the information of this manual all general safety and accident prevention regulations of the legislator must be taken into account.

The device must only be used by trained persons. The setting-up and installation must only be executed according to the manufacturer's data.

Intended Use

The device must only be used for its intended applications. Technical modifications and any misuse are prohibited because of the risks involved! **ALGE-TIMING** is not liable for damages that are caused by improper use or incorrect operation.

Power supply

The stated voltage on the type plate must correspond to voltage of the power source. Check all connections and plugs before usage. Damaged connection wires must be replaced immediately by an authorized electrician. The device must only be connected to an electric supply that has been installed by an electrician according to IEC 60364-1. Never touch the mains plug with wet hands! Never touch live parts!

Cleaning

Please clean the outside of the device only with a smooth cloth. Detergents can cause damage. Never submerge in water, never open or clean with wet cloth. The cleaning must not be carried out by hose or high-pressure (risk of short circuits or other damage).

Liability Limitations

All technical information, data and information for installation and operation correspond to the latest status at time of printing and are made in all conscience considering our past experience and knowledge. Information, pictures and description do not entitle to base any claims. The manufacturer is not liable for damage due to failure to observe the manual, improper use, incorrect repairs, technical modifications, use of unauthorized spare parts. Translations are made in all conscience. We assume no liability for translation mistakes, even if the translation is carried out by us or on our behalf.

Disposal

If a label is placed on the device showing a crossed out dustbin on wheels (see drawing), the European directive 2002/96/EG applies for this device.

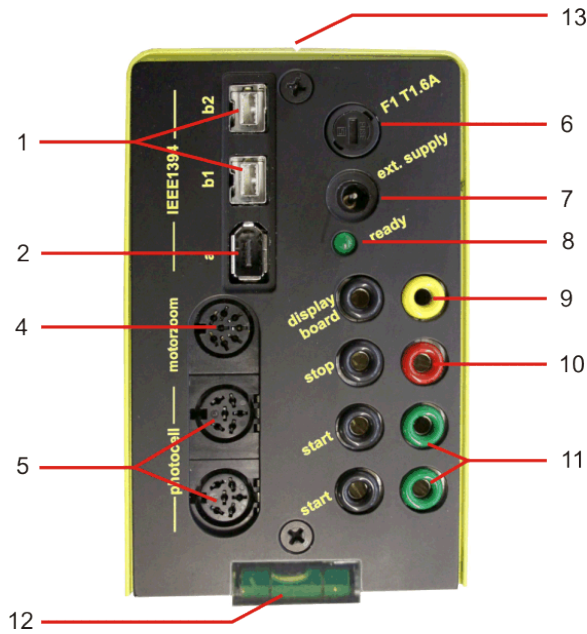
Please get informed about the applicable regulations for separate collection of electrical and electronical waste in your country and do not dispose of the old devices as household waste. Correct disposal of old equipment protects the environment and humans against negative consequences!



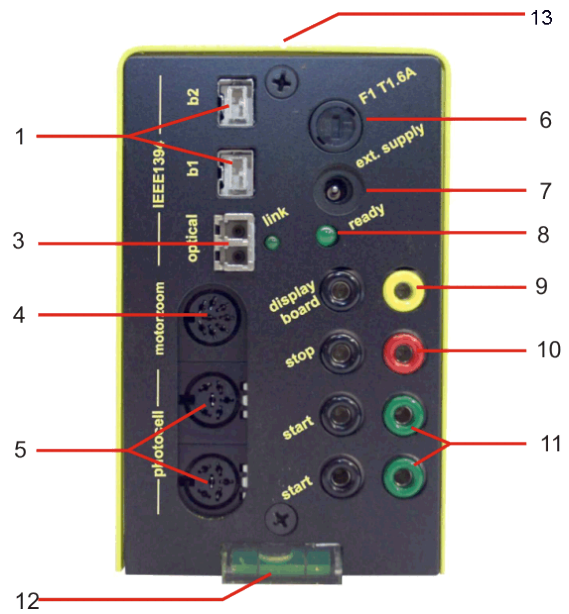
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Model OPTIc2



Model OPTIc2o



Model OPTIc2n

- 1..... IEEE 1394b 9-pol bilingual (2 x)
- 2..... IEEE 1394a 6-pol
- 3..... GOF (LC duplex glass optical fiber connector)
- 4..... Socket for motor zoom
- 5..... Socket for photocell (2 x)
- 6..... Fuse for camera - F1 T1.6A
- 7..... Input for external power supply (+9 to 36 VDC)
- 8..... LED for OK status
- 9..... Banana Socket – Data output for display board
- 10.... Banana Socket – Finish Impulse
- 11.... Banana Socket – Start Impulse (2 x)
- 12.... Spirit level
- 13.... Sight to aim the camera at the finish line
- 14.... RJ45 socket for CAT5 cable

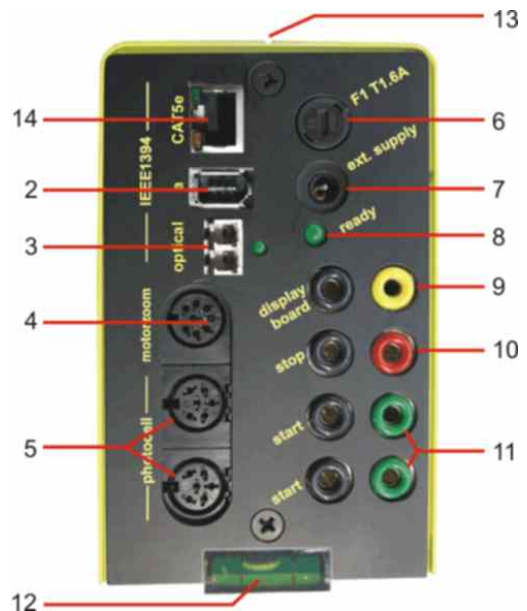


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1 Introduction

The **ALGE** OPTIc2 system is an electronic photo finish system with integrated evaluation software. The Line Scan Camera (CCD image sensor) scans every movement on the finish line, records it on the hard disk of the PC and displays it on the PC screen. It is always possible to print the picture.

The photo finish system is built with latest technology. The camera has an improved CCD-line scan sensor that is suited to take excellent pictures at all possible light conditions. The system allows up to 3000 lines per second. A vertical resolution is possible of up to 1360 pixel at 16.8 million colors (24 bit).

1.1 Models

We offer three photo finish cameras. The standard model OPTIc2 has only standard firewire connections (IEEE1395), whereas the model OPTIc2o additionally has an optical firewire connection (for long distance between camera and PC).

OPTIc2:

The standard model has firewire connections (IEEE 1394) to connect a PC. The maximum cable length for such a cable is 10 m. **ALGE** offers longer cables with integrated repeaters.

OPTIc2n:

This model has in addition to the firewire connections (IEEE1394) an optical connection GOF (LC duplex glass optical fiber connector) and a connection for a network cable with RJ45 plug. This allows transmitting data with a CAT7 cable over a distance of up to 80 m.

OPTIc2o:

This model has in addition to the standard firewire connections (IEEE1394) an optical connection GOF (LC duplex glass optical fibre connector). This allows transmitting data from the camera over a distance up to 300 m.



1.2 Components of the System

The OPTIc2, OPTIc2o and OPTIc2n include the following parts:

- Photo finish camera OPTIc2, OPTIc2o or OPTIc2n
- C-Mount adapter (between lens and camera)
- OPTIc2 CD with PC-software and manual

1.3 System Requirements

PC Requirements:

- Intel Pentium 4 or Athlon or faster
Attention: The system does not run with a Celeron processor!
- Windows XP with service pack 3, Windows Vista (Servicepack 2) or Windows 7 (32 or 64 Bit version)
- 512 MB RAM (the higher the better)
- Hard disk with min. 80 GB (the faster the hard disk, the longer the recording time)
- CD-Player
- Keyboard for PC
- Mouse for PC
- Graphic board with min. 32 MB RAM
- Monitor with min. 1024 x 768 resolution and true color
- OHCI compatible IEEE 1394 interface
- Color printer to print the pictures and result lists (color laser or ink jet)

1.4 Accessory

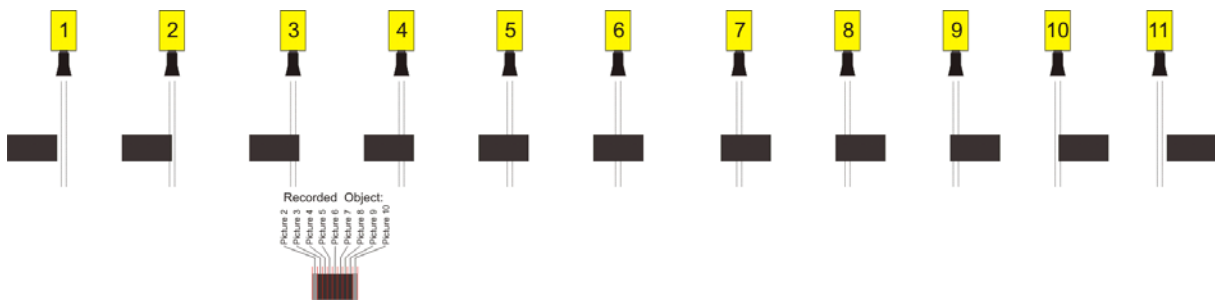
For the all OPTIc models we can offer several additional products. Please contact your **ALGE**-dealer for further details:

- IEEE 1394 PCI card for inserting in the PC
- IEEE 1394 PC-card for notebooks
- Camera tripod TRIMAN for camera
- Gear head 410 for camera adjustment (3-dimensional camera adjustment)
- Motor Zoom MZ75 (12.5 - 160 mm / F1.2), remote control from PC
- Motor Zoom MZ160 (16 - 160 mm / F1.8 – 1400), remote control von PC
- Wide angle lens L8.5 (8.5 mm / F1.0)
- Weather protection case for camera
- Different IEEE1394 cable
- Adapter RJ45-1394 from IEEE1394 cable to network cable
- Adapter GLAS1394 from IEEE1394 cable to glass optical fibre cable
- Cables and cable reels with network cable
- Cables and cable reels with glass optical fiber cable
- Startmicrophone SM8
- Startgun STP with 9 mm or 6 mm blanks
- Speech Amplifier SV4/SM
- Headset HS2-2 or HS2-1
- Photocell PR1a-R (Distance: 1 to 25 m)
- Photocell PR1a-d (Distance: up to 150 m)
- 3-fold Photocell RLS3c with tripod (for athletics)
- Push Button 020-02
- Numerical Display Boards (e. g. GAZ4 or D-LINE)
- Matrix Display Systems for stadiums
- Cable Reel with 2-core steel cable (extra strong military production)
- Anemometer Windspeed WS2

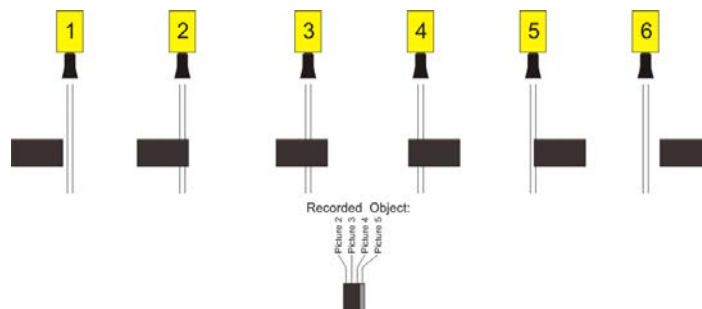
1.5 Function

The line scan camera has not the usual aerial sensor (e.g. like a video camera), but a CCD-line scan sensor. The photo finish camera does not record a complete picture at once, but only one vertical line. The recording speed for this vertical line is adjustable until up to 3000 times per second. Each line is stored on the hard disk and is shown on the screen in chronological order. If something moves in front of the camera (e.g. an athlete) you receive a picture of it. Each vertical line is allocated to a time.

The following example shows how a picture is recorded. If you use a scan rate of 1/1000 seconds it means that the finish line is scanned 1000 times per second. Each of these pictures records a small piece of the object. If the speed is adjusted correctly, it shows the object in the right size.



The next example shows the same object, but now crossing the finish line with a higher speed and the same scan rate of 1/1000. The shape of the recorded picture depends on the speed of the picture and the scan rate. Therefore, it is very important to record with the correct scan rate to get the realistic shape of the image. The image below shows the object shortened if using the same scan rate as at a faster speed. Of course, the object is scanned less often under such circumstances.

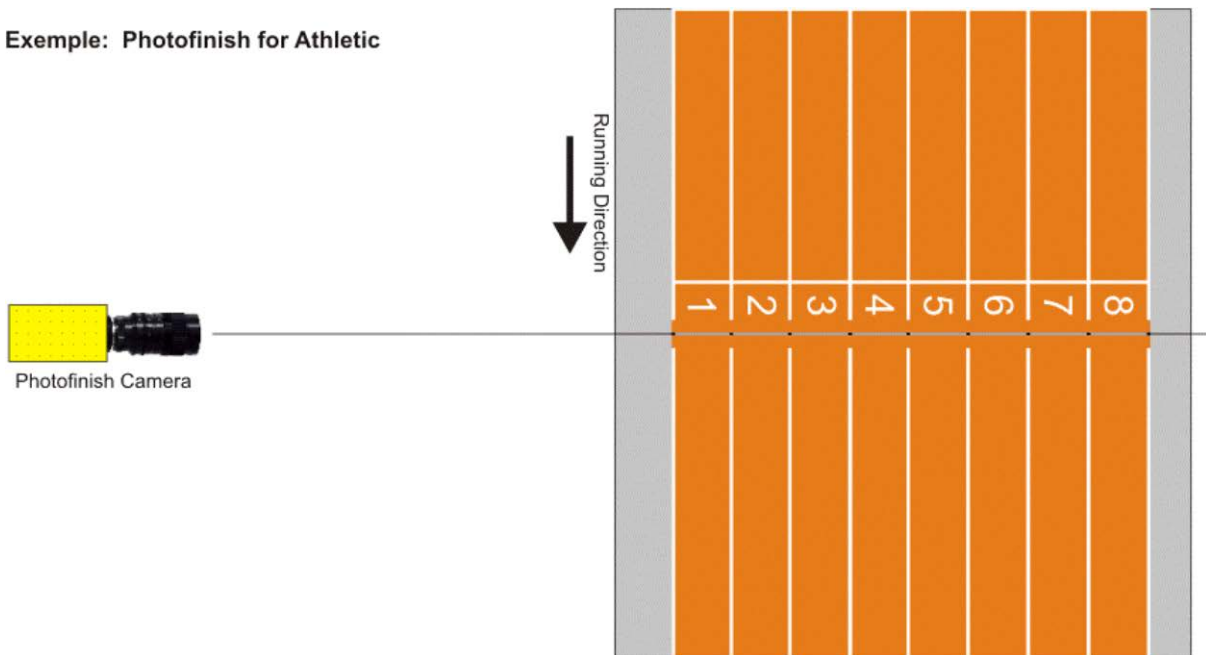


Part of the OPTIc2 is an electronic image processing system. The recorded picture is stored on the hard disk of the PC (bitmap format) and can be printed anytime with a printer that supports Windows.

2 Camera Position

The camera of the photo finish system must be set exactly on a straight line with the finish line. Depending on the sport discipline it needs a different angle to the finish line (2.1 Lens Angle).

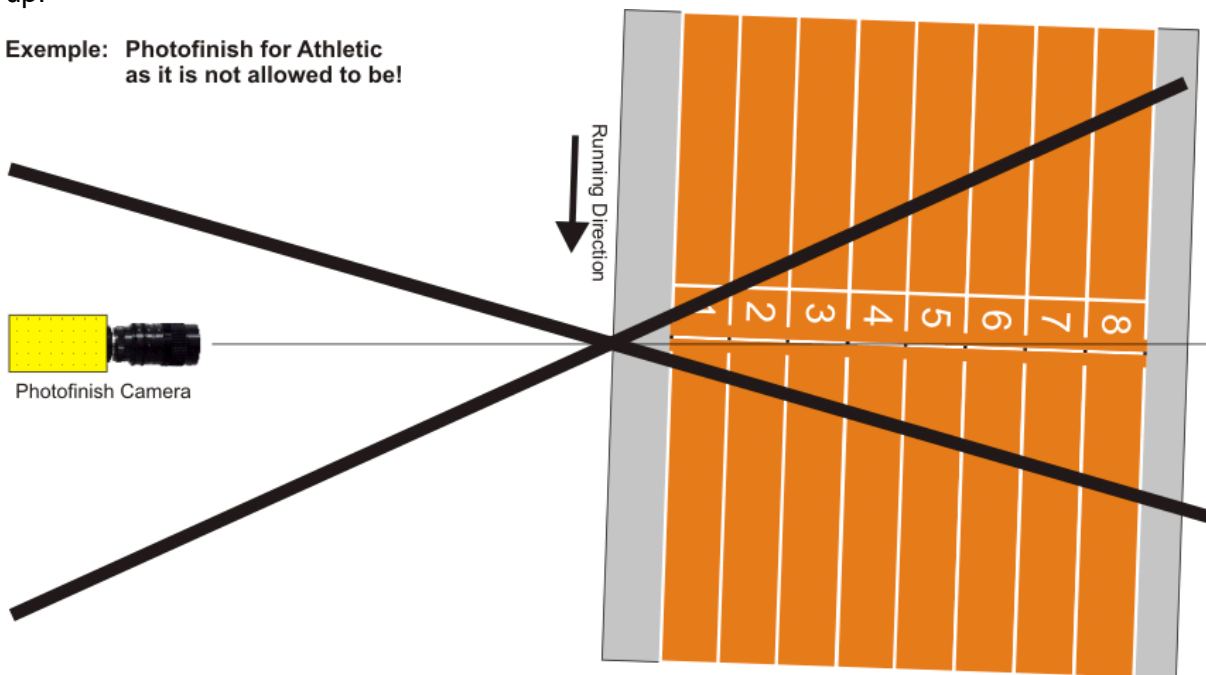
Example: Photofinish for Athletic



The picture above shows the camera straight to the finish line. This is the correct way to set the camera.

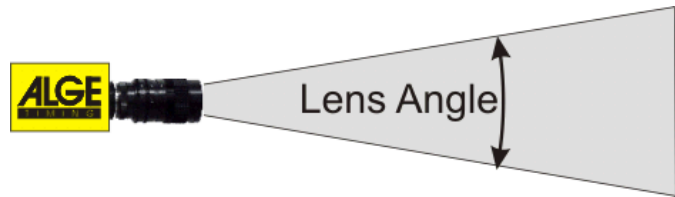
The picture below shows the camera not straight to the finish line. This is not a correct set up!

Example: Photofinish for Athletic
as it is not allowed to be!



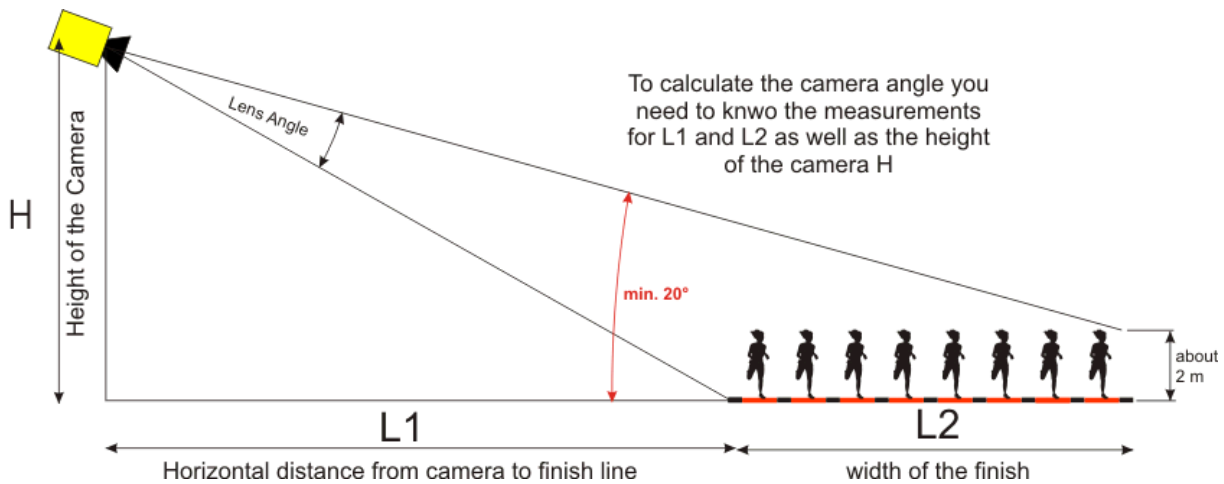
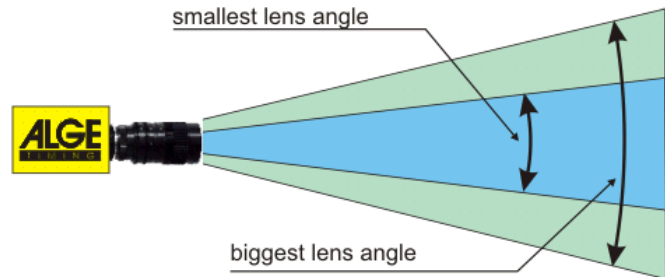
2.1 Lens Angle

The lens angle is the recording angle of the camera lens in vertical direction.



Zoom Lenses:

To select the right lens for the camera the lens angle is most important. A zoom lens has a variable lens angle, a fix lens has not.



From the horizontal distance of the camera to the finish line (L1), the width of the finish and the camera height the camera angle can be calculated.

Our most commonly used C-Mount zoom lens Z75 has an adjustable camera angle from 7° (75 mm) to 31° (12.5 mm).

Camera angles for C-Mount Lenses:

- 8.5 mm 1360 pixel resolution about 58°
- 12.5 mm 1360 pixel resolution about 31°
- 16 mm 1360 pixel resolution about 28°
- 75 mm 1360 pixel resolution about 7°
- 160 mm 1360 pixel resolution about 3°

To adjust the camera it is very important that the camera is horizontally leveled. To guarantee this, the camera is equipped with a spirit level on its back.

2.2 Focusing the Camera

An important factor to get good quality photo finish images is to focus the camera. Only a good adjustment of the aperture (focus) guarantees good pictures. Additionally, it is important that you select the correct scan rate.

2.2.1 Adjustment of Focus (Aperture)

Adjust the aperture through the first (front) ring of the lens (for manual lenses). If you have a motorized zoom execute the adjustment from the OPTIc2 software on the PC (see chapter "Motorzoom and Electronic Gear head").

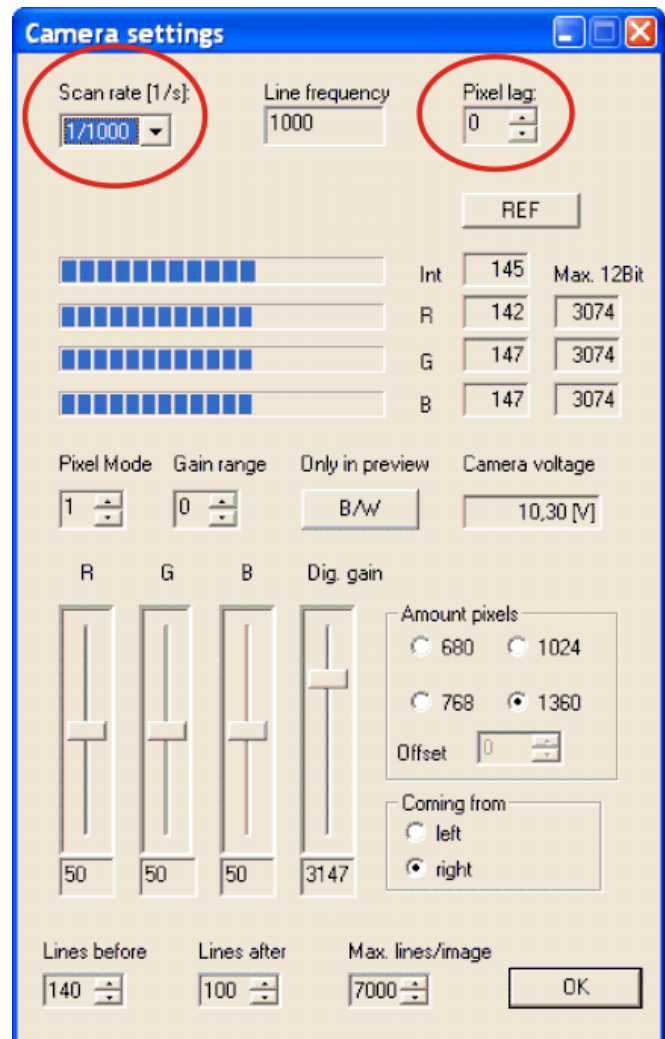
Adjust the zoom so that you see the required finish area in the monitor. Look at the middle part of the finish line. The more details you see at this part of the picture the better is the adjustment.

2.2.2 Scan Rate

The finish line is scanned by the photo finish camera between 100 and 3000 times per second. The adjustable scan rate depends on the speed of the object that you want to record and of the distance between the camera and the recorded object.

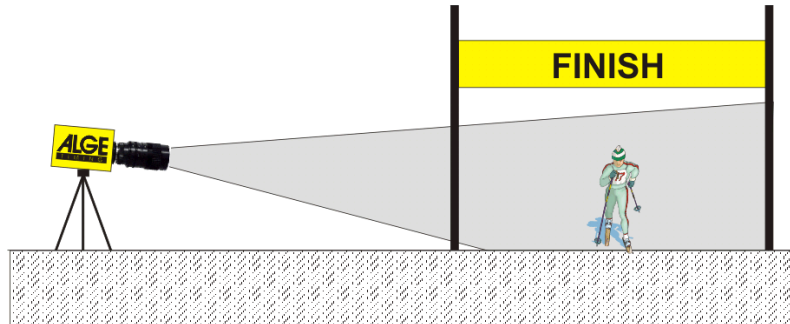
As reference value for the scan rate for different sports at a full vertical camera resolution of 1360 pixel, refer to below stated table (please note that the given values may vary extremely if one of the above given parameter does not apply, values stated in lines per second).

- Athletics: 1200 to 1800
- Horse Racing – Gallop: 1200 to 3000
- Horse Racing – Trotting: 1200 to 2000
- Rowing: 100 to 250
- Cycling – Street: 2000 to 3000
- Cycling – Track: 2500 to 3000
- Greyhound: 1000 to 1500
- Short Track: 400 to 1000
- Cross Country Skiing: 1700 to 2700
- Biathlon: 1700 to 2700
- Ski Cross: 2000 to 3000
- Boarder Cross: 2000 to 3000
- Ski Alpine: 2000 to 3000



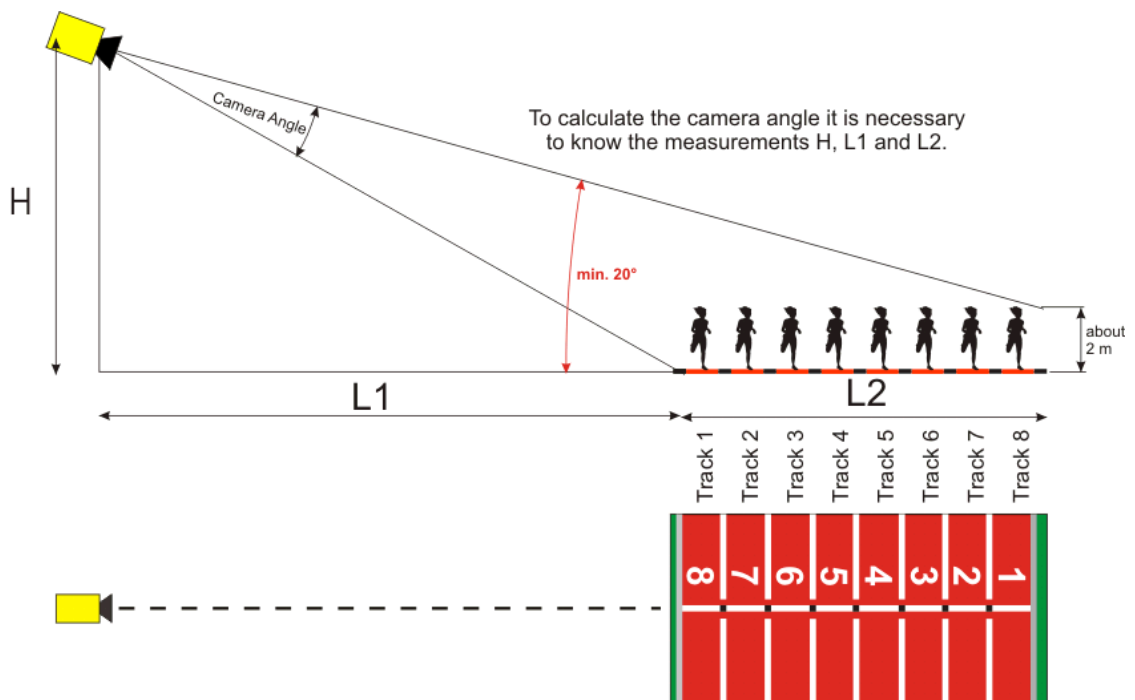
2.3 Sports with Individual Starts

The camera can be directed straight to the finish line, as the athletes cannot be occluded by others.



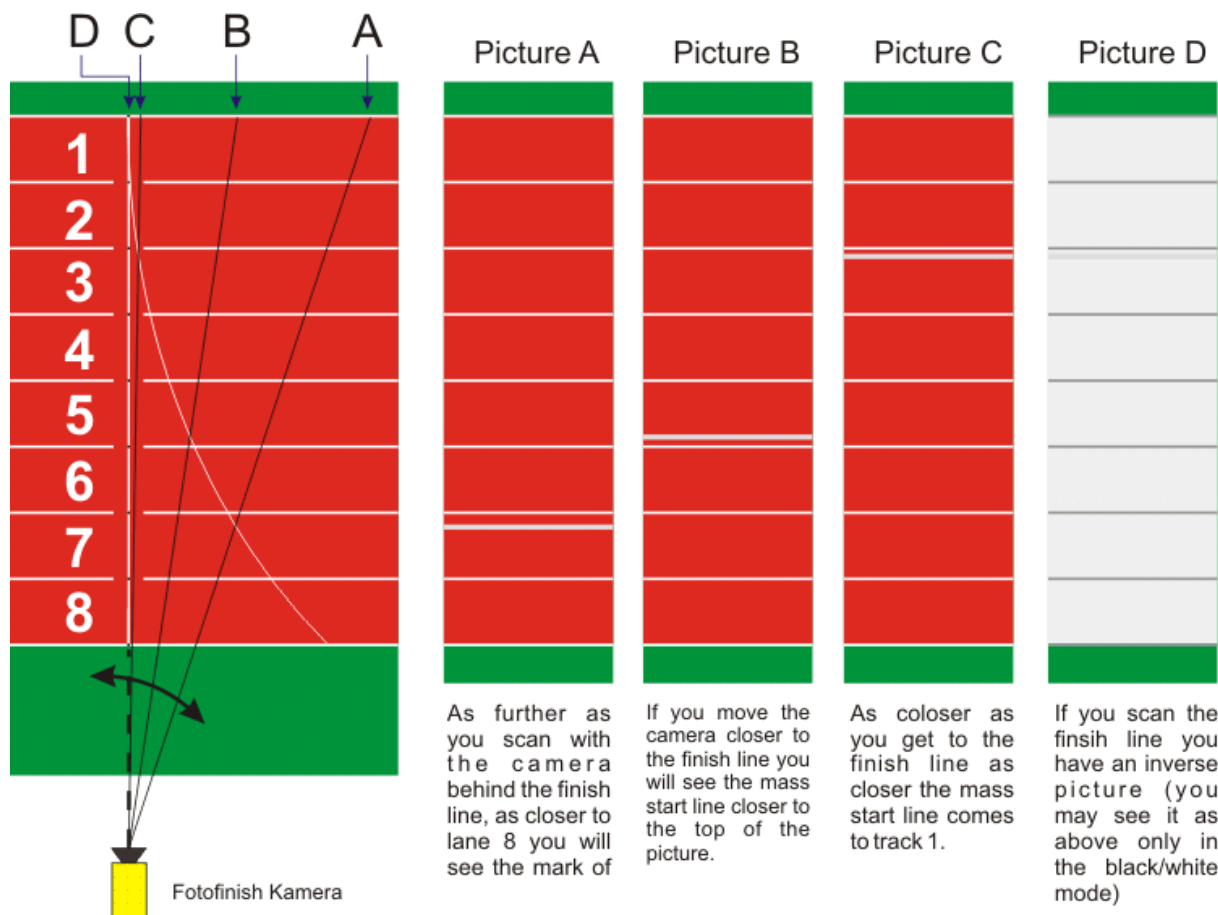
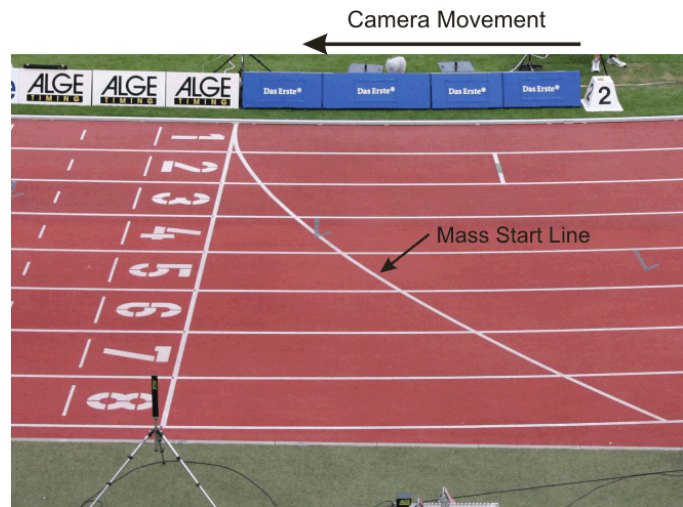
2.4 Track and Field (Athletics)

For track and field you should have an angle of the camera to the outside lane of a minimum of 20°. If you have a smaller angle it is possible that athletes occlude other athletes. The maximal angle should not be more than 50°. The camera has to be directed straight to the finish line.



The easiest way to adjust the camera to the finish line is with the help of the mass start line.

For the example below the camera is situated outside the track. The camera is moved slowly from behind the finish line towards the finish line. If you follow these instructions it should be easy to align the camera with the finish line.



You can learn from the following table the necessary distance of the camera to the nearest lane as well as the necessary camera height for a track with 6 or 8 lanes.

The upper number in each box of the table is the camera angle (see sketch two pages back). For a camera with standard lens Z75 and MZ75 at the highest resolution of 1360 pixel this angle should be between 6.8° and 31.4°. If the first stated angle is more than 31.4° it is not possible to capture all athletes on the picture.

The bottom number in each box of the table shows you the angle to the runner on the outer lane. If possible, this angle should be more than 20°, so that the runners cannot be occluded by each other.

The below table shows good camera positions with black (normal figures) numbers for both upper and bottom values. Blue (italic figures) means that the value ranges in a border area, and red (bold figures) means that the camera position with this lens is not recommendable.

Stadium with 6 tracks (7,32 m)								
Standard Zoom lens Z75 or MZ75 (12,5 - 75 mm)								
6 Tracks		Horizontal A						
		3 m	4 m	5 m	6 m	7 m	8 m	9 m
Vertikal B	3,7 m	42,2°	35,0°	29,4°	25,1°	22,8°	19,1°	17,0°
	F-STATIV6	11,0°	10,0°	9,22°	8,5°	7,9°	7,4°	7,0°
	5 m	42,8°	36,5°	31,3°	27,1°	23,8°	20,9°	18,6°
		16,2°	14,8°	13,7	12,7°	11,8°	11,8°	10,4°
	6 m	42,2°	36,8°	32,2°	28,3°	25,0°	22,2°	19,9°
		21,2°	19,7°	18,0°	16,7°	15,6°	14,6°	13,7°
7 m	40,9°	36,4°	32,4°	28,8°	23,7°	23,1°	20,8°	
	24,8°	23,8°	22,9°	20,6°	19,2°	18,1°	17,3°	
8 m	39,3°	35,5°	32,0°	28,9°	26,1°	23,6°	21,4°	
	30,2°	27,9°	26,0°	24,2°	22,7°	21,4°	20,19°	
9 m	37,4°	34,3°	31,4°	28,6°	26,0°	23,8°	21,8°	
	34,1°	31,7°	29,6°	27,7°	26,0°	24,6°	23,2°	

Stadium with 8 tracks (9,76 m)								
Standard Zoom lens Z75 or MZ75 (12,5 - 75 mm)								
8 Tracks		Horizontal A						
		3 m	4 m	5 m	6 m	7 m	8 m	9 m
Vertikal B	3,7 m	43,9°	35,7°	29,9°	25,5°	22,1°	19,3°	17,2°
	F-STATIV6	7,6°	7,0°	6,6°	6,2°	5,8°	5,5°	5,2°
	5 m	45,8°	39,0°	33,5°	29,0°	25,4°	22,4°	20,0°
		13,2°	12,3°	11,5°	10,8°	10,1°	9,6°	9,1°
	6 m	46,0°	40,1°	36,0°	30,8°	27,2°	24,2°	21,6°
		17,4°	16,2°	15,1°	14,2°	13,4°	12,7°	12,0°
7 m	45,4°	40,29°	35,7°	31,8°	28,4°	25,5°	22,9°	
	21,4°	20,0°	18,7°	17,6	16,6°	15,7°	14,9°	
8 m	44,3°	39,9°	35,9°	32,3°	29,1°	26,3°	23,9°	
	26,2°	23,6°	22,1°	20,8°	19,7°	18,7°	17,7°	
9 m	42,8°	39,0°	35,6°	32,4°	29,5°	26,8°	24,5°	
	28,7°	27,0°	25,4°	23,9°	22,7°	21,5°	20,5°	



If you use the OPTIc2 with a **Tripod F-STATIV6** with a height of 3.66 m for the camera, you should use a wide angle lens for a track with 8 lanes. Otherwise you do not cover all 8 lanes or you are too far away and have a very flat angle with the runners not being captured completely.

Wide Angle Lens L8.5 (8.5 mm):

Stadium with 6 Tracks:

Tripod about 1.5 m from the nearest track

Stadium with 8 Tracks:

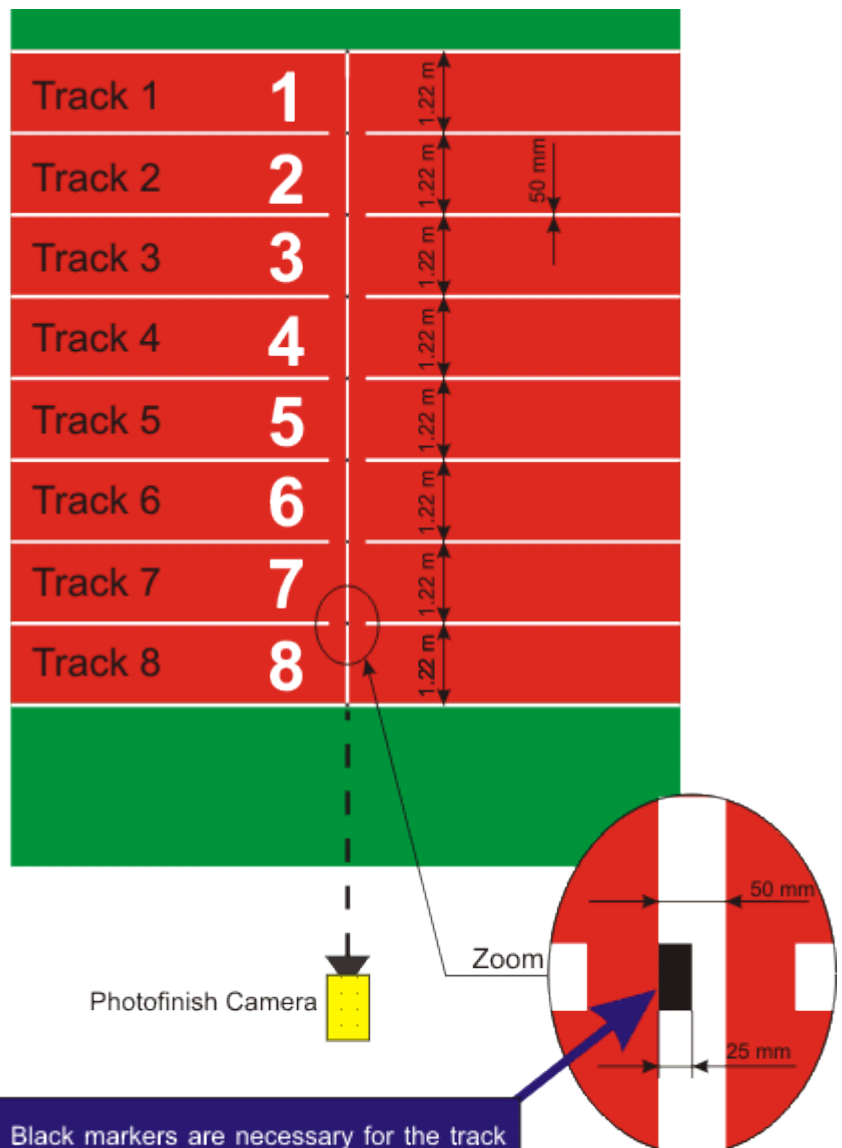
Tripod about 1.7 m from the nearest track

Finish Line of the Athletic Track:

The finish line must be painted in white on the track. At the point where the track markings cross each other on the finish line you must have a black marker (see drawing). This marker is necessary so that you see on the monitor the lanes white and the lane markers black (if picture set on black and white mode)

If you have the picture of the track and markers inverse, you are not positioned on the finish line. The camera has an aim to make a rough adjustment.

The final adjustment you have to control on the monitor. For this adjustment we recommend to set the camera picture on the PC-monitor on black and white.

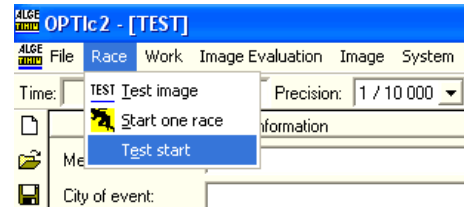


Black markers are necessary for the track finish line. We recommend to make these over the half finish line (25 mm - at the beginning of the line seen from the running direction). This will help to make the adjustment of the photofinish camera more precise to the finish line.

2.4.1 Zero Control for Athletics (Start Control):

There is the possibility to record the flame of the start gun fired on the start line. With this test the referee can see, that the time in the picture is correct without any delay. If you select this mode the start sequence is also recorded.

- Adjust the camera as usual for a race.
- Click on <Race>
- Click on <Test start>
- Input the name of the race (test start)
- Press <ENTER> or click on <OK>
- Adjust the precision on 1/1000 or smaller
- Prepare the start gun as for a normal race at the finish line
- Lay the start gun on the finish line and if possible put something dark (e.g. black paper) under the start gun (at the point where the smoke gets out of the barrel to get a better contrast)
- Fire the start gun
- The start shot is automatically recorded and is shown in the picture on the screen.



At the start of the flame in the picture the time must show 0.000.

If you move the time cursor inside the flame you must see that the time increases (e.g. 0.001 sec.)



It is possible that the flame is not shown very sharp in the picture. The reason for this is the pixel lag. Either you must correct the pixel lag or you must switch to the black/white mode.



Switch between color picture and black/white picture with button



2.5 Horse Races

Please read the description for track and field. For horse races no painted finish line exists, but there might be a mirror that should be focused on.

As the picture of a photo finish camera always shows the same pixels it is often difficult to focus correctly on the finish line. We recommend following trick:

- Set the camera with the sight before the finish line
- Activate the race mode and record
- Move the camera slowly in running direction over the finish line (e.g. move the gear head with constant speed in horizontal direction)
- A normal (deformed) picture of the finish area is originated
- Print that part of the picture that shows the finish line
- End the race and start the test mode
- Move the camera until the pixels show a similar pattern as in the area of the finish line in the printed picture.
- If a mirror is installed, test if the mirror is also captured by the camera if someone moves across the finish line.

2.6 Rowing or Canoe

Please follow the instructions for athletics and horse racing. For rowing and canoeing you have no finish line and the buoys are often not fixed exactly on the finish line. If possible, have the buoys adjusted so they are exactly on the finish line. This facilitates adjustment and evaluation a lot (lane identification).

Usually, a finish line is situated on the opposite shore on which the photo finish camera is focused. If the camera is aligned with this line it can be swiveled vertically until all lanes are displayed.

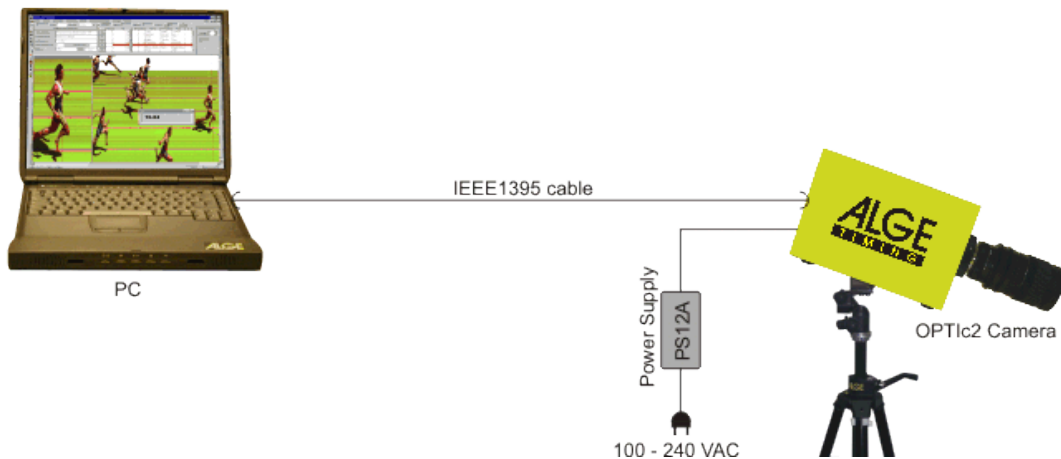
2.7 Cycling Races

Please follow the instructions for athletics and horse racing.

3 Connection of the Camera

3.1 Camera connected to IEEE1394

The OPTIc2 camera can be connected directly with the IEEE1394 cable at the PC. The maximum cable length of the IEEE1394 cable is 10 m.

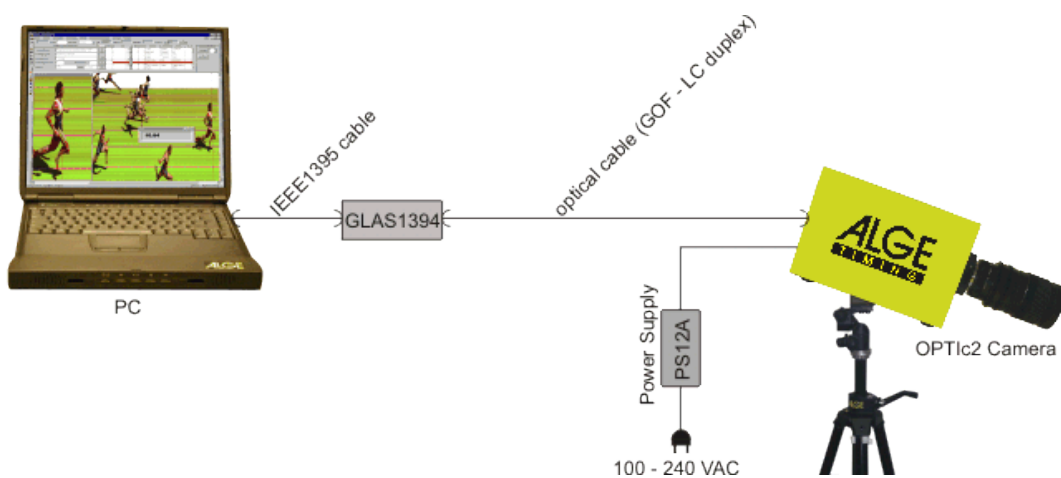


Attention:

There are different types of IEEE1394 cables. Depending on the PC connection and the camera model you have to use a certain IEEE1394 cable (see point 5.2 IEEE1394 cables and connectors).

3.2 Camera connected to an optical cable

If you connect a camera with an optical cable, you need an adapter GLAS1394 or Distribution Box OCD2 between camera and PC. The camera model OPTIc2o and OPTIc2n can be connected directly with the optical cable without adapter GLAS1394. The optical cable is used for distances from 80 m onwards. You can use it for distances of more than 600 m.

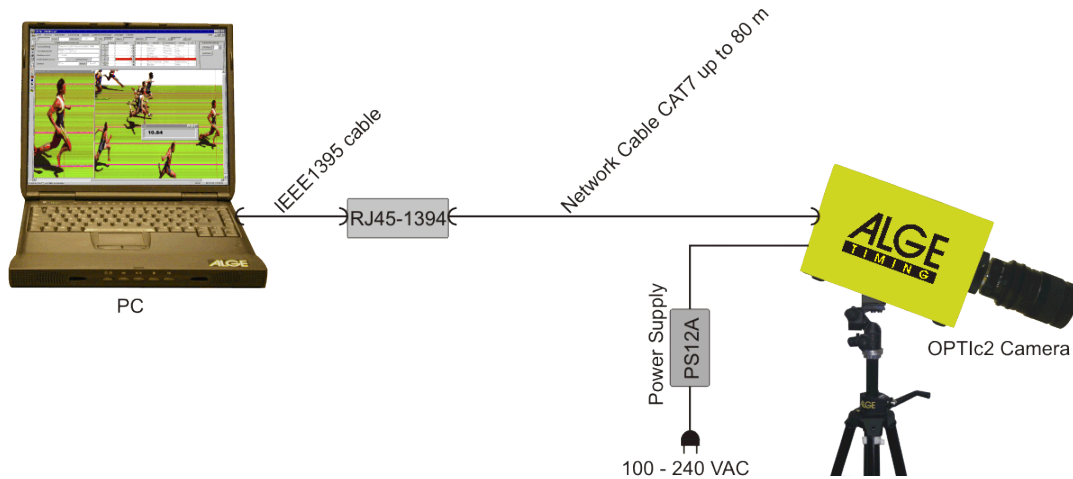


Specifications for the optical cable:

GOF (LC duplex fiber optical cable), 50 µm fiber optical cable

3.3 Camera connected with Network cable

If you connect an OPTIc2 camera with a network cable, you need an adapter RJ45-1394 or a Distribution Box OCD2. The camera model OPTIc2n and Distribution Box OCD2 can be connected directly with the network cable without additional adapter RJ45-1394. The network cable is used for distances from 10 to 80 m.



Specifications of the network cable:

- Cross cable CAT5 – max. 50 m
- Cross cable CAT6 – max. 65 m
- Cross cable CAT7 – max. 80 m

The network cable reels offered by ALGE-TIMING with 50 m or 80 m cable have a larger copper diameter and are made for heavy duty. The larger copper diameter is important to supply the camera directly from the Distribution Box OCD2 via network cable.

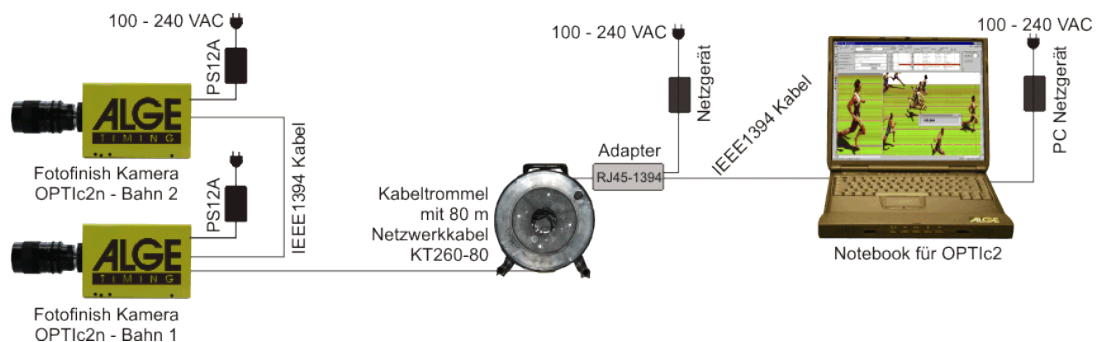
3.4 Connection of several cameras

You can connect up to three cameras at one PC and select the camera that you want to use.

No matter where you connect the camera(s), they work with the PC in an IEEE1394 network. You can connect the cameras at the following sockets:

- PC: IEEE1394-sockets
- OPTIc2-Camera: IEEE1394-sockets
- OPTIc2o-Camera: IEEE1394-sockets, GOF-sockets
- OPTIc2n-Camera: IEEE1394-sockets, GOF-sockets, RJ45-sockets

Example: Camera connected with network cable



4 Setting of the Camera

4.1 Possible Camera Settings:

A Scan rate (1/s):

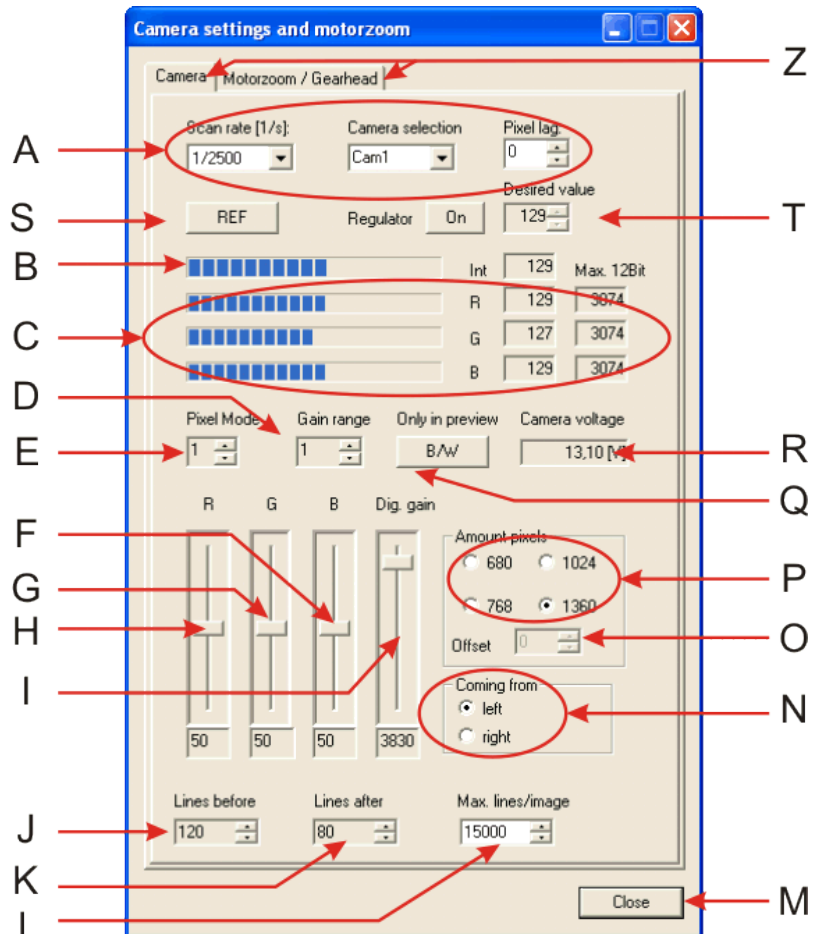
The photo finish scans the finish line. Set how many lines per second you want scanned (settings between 1/100 and 1/3000 seconds).

Line frequency:

This value is not adjustable but depends on the scan rate value. It shows how many times the finish line is scanned per second.

Pixel lag:

The pixel lag is a delay between red, green and blue sensor of the CCD-chip. If you set the pixel lag at zero and the scan rate is correctly adjusted, you will obtain a homogenous picture. If the scan rate is not correctly set or the "Coming from" (N) is incorrect, the picture will not be congruent.



B Intensity – Brightness:

It shows the level of brightness (small bar = dark picture, large bar = bright picture). You can adjust the brightness at the lens or through the lever (I).

C Intensity of the Colors:

R = Red, G = Green, B = Blue

The color modulation is shown. Colors can be adjusted by using levers (F), (G) and (H).

E+D Electronic Gain:

The brightness can be enhanced electronically. The adjusted value for (E) should be 1. If you use 3 it adds the light of the surrounding pixel (picture quality will be not as good as on zero). The adjusted value of the "Gain Range" (D) should be 0. If you move it up it will also make the picture brighter (picture quality decreases).

F Lever for Blue:

To adjust the blue of the camera. At day light we recommend to leave all three levers of red, green and blue in the middle on 50.

- G Lever for Green:**
To adjust the green of the camera. At day light we recommend to leave all three levers of red, green and blue in the middle on 50.
- H Lever for Red:**
To adjust the red of the camera. At day light we recommend to leave all three levers of red, green and blue in the middle on 50.
- I Intensity/Brightness:**
To adjust the brightness electronically. If possible do not move this lever all the way to top or bottom. Such an adjustment will influence the picture quality in a negative way.
- J Lines before:**
It is possible to adjust the recorded lines before triggering (e. g. by the photocell). This adjustment is very important for many sports to obtain a picture of the whole competitor. Recommendation for most sports: 140 pixels
Attention: The new adjusted value is only applied after you restart the OPTIc2 software
- K Lines after:**
It is possible to adjust the recorded lines after triggering (e. g. by the photocell). This adjustment is very important for many sports to obtain a picture of the whole competitor. Recommendation for most sports: 100 pixels
Attention: The new adjusted value is only applied after you restart the OPTIc2 software
- L Maximum Lines per Image:**
The photo finish camera stores the finish in picture(s). It is possible to adjust the maximum picture size. You can input the maximum size in lines. E. g. if you record with 2000 lines per second you need 2000 lines for each recorded second. With 6000 lines you can record up to 3 seconds. If a picture is full a new picture is created. From one picture to the next picture we have a transition area that can be seen on both pictures.
Attention: If you use an older PC you may have problems with too large pictures.
- M OK:**
Button to close the window
- N Coming from – Finish Direction:**
This adjustment is very important to have the competitors recorded correctly in the picture. "Coming from left" means the competitors runs into the finish from the left side (seen from the camera).
If you select the finish direction incorrectly this results in a pixel delay between the red, green and blue sensor. The bibs would then be shown mirror-inverted.
- O Offset:**
If you set the "Amount of pixel" on 1360 (P) this function is inactive. For all other values you can move the recording section vertical up or down.
- P Amount Pixels:**
To select the vertical resolution of the camera. The highest vertical resolution is 1360 pixel. If you want to use smaller picture resolutions you can select between 680, 756 and 1024 pixel.

Q B/W – Switching picture to black/white:

You can switch the preview picture from color to black and white. In the b/w mode it uses only the middle sensor (green). This is a simple way to check if you set the camera correctly on the finish line.

R Camera Voltage:

It shows the supply voltage of the camera. The value must always be above 9 V.

S REF - Reference:

Adjustment for the reference value of the internal check for light condition. In the <start dialog> it shows the „Deviation intensity” of the reference value to the current value. If the value is negative the light is below the reference value. A positive value means more light. If you adjusted a good reference value, the difference should stay below 20%. If it is above 20% you probably have to readjust the brightness of the picture.

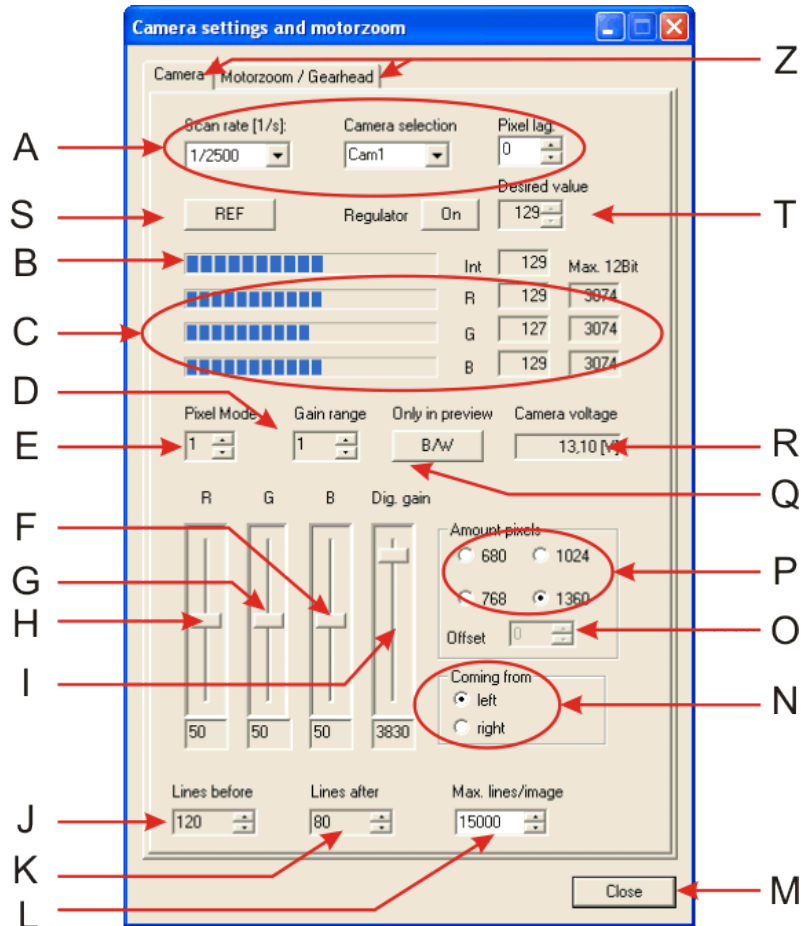
S Regulator and Desired Value:

If you activate the Regulator it will adjust the brightness automatically to the Reference Value (S) which is also shown as Desired Value. The automatic brightness adjustment works only in a limited area. This function does control the digital gain (I) automatically. If you want to change the adjustable value you can use the arrows from the Desired Value to set a new reference setting.

4.2 Image Adjustments:

The camera is a line scan camera, which means it takes pictures by scanning the finish line not by taking a complete picture like normal cameras.

1. Connect OPTIc2 camera with PC with IEEE1394 cable, network cable or glass fiber optical cable.
2. Connect external devices for start and finish.
3. Connect power supply for OPTIc2 camera (green LED „ready“ of the camera must be on).
4. Start OPTIc2 software on PC.
5. The PC monitor must display „Camera 1 is ready“ after a few seconds.
6. Press button **TEST**.
7. Adjust scan rate (A) (this is a sport specific value that is special for each sport or stadium. It depends on the speed of the object, the distance, and the zoom value (focal length)).
8. Set pixel lag (A) on zero. This adjustment is optimal, if the scan rate is corresponding with the actual speed.
9. Depending on the brightness of the picture that you see on the monitor set the brightness of the lens or do it electronically on lever Dig. Gain (I).
10. Aim the camera at the finish line by looking along the sight (13, page 3).
11. On the lens adjust the focus.
12. On the lens adjust the section that you want on the screen. You might have to set the „Amount pixel“ (P) to the vertical resolution that you want to use first.
13. Adjust camera that it scans the finish line and that it records the picture including the complete finish line and everybody moving through it.
14. Check if you are on the finish line by pressing B/W (Q).
15. Readjust the focus of the camera.



4.3 Motorzoom and Electronic Gear Head

You can switch with a flyer (Z) between <Camera> and <Motorzoom/Gear head>

4.3.1 Motorzoom:

When using a motorzoom you can adjust the zoom lens via the PC. This means you adjust the iris (brightness), focus and zoom directly via your PC. The control electronics for the motor zoom is built in the photo finish system and ready to go.

We can offer the following Motorzoom:

MZ75 12.5 – 75 mm / F1.2
MZ160 16 – 160 mm / F1.8

a) Focus: click on <near> (b) and the picture sharpens for the close range or click <far> (c) and the picture sharpens for pictures in larger distances.

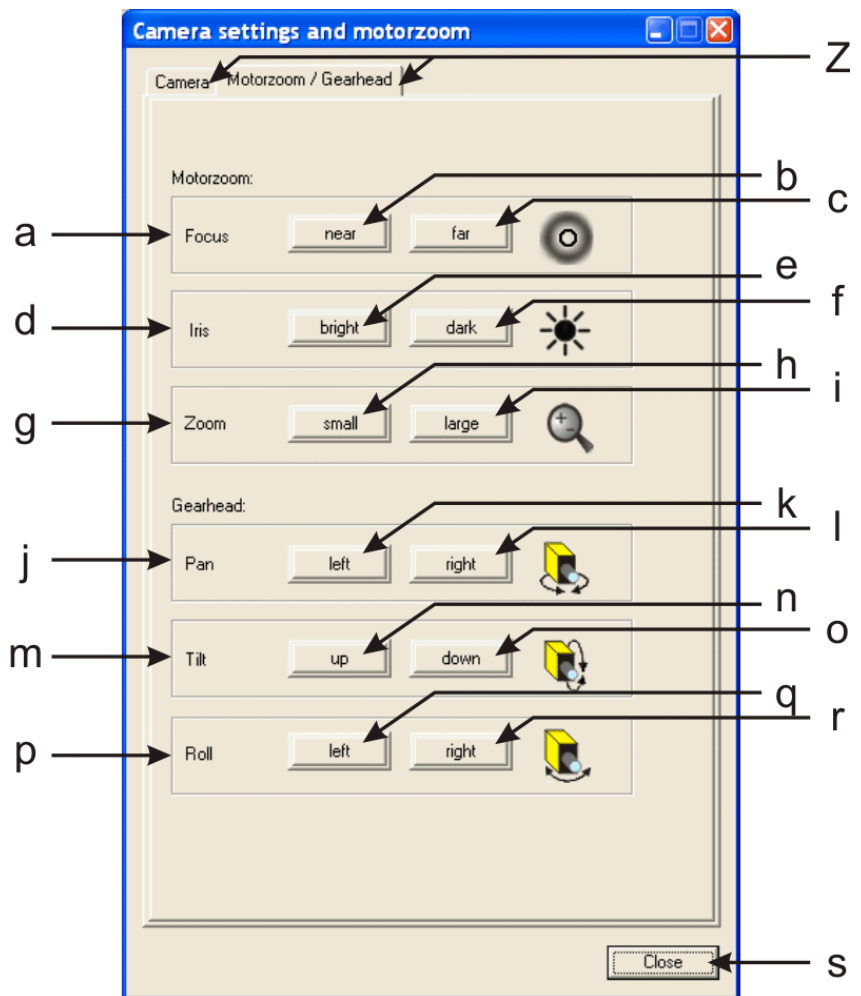
d) Iris (brightness): click on <bright> (e) and the picture brightens up; click on dark (f) and the picture darkens

g) Zoom: click on <small> (h) and you zoom into the picture or click on <large> (i) and you zoom out

4.3.2 Gear Head

For the photo finish we offer an electronic gear head. To use the gear head you need to add driver electronics to the camera. Please contact your ALGE dealer in case you want to use the electronic gear head.

The gear head is very useful, if the camera is far away from the PC or at a place that you cannot reach (e. g. under the roof of the stands).



j) Pan: click on <left> (k) and the camera moves to the left (if you look at the camera from the back), or click on <right> (l) to move to the other side.

m) Tilt: click on <up> (n) to move the camera up or click on <down> (o) to move the camera downwards.

p) Roll: click on <left> (q) to move the roll the camera to the left, or click on <right> (r) to roll the camera to the right. This adjustment you should make first to level the camera (spirit level 12 on the camera).

5 PC-Software for OPTIc2

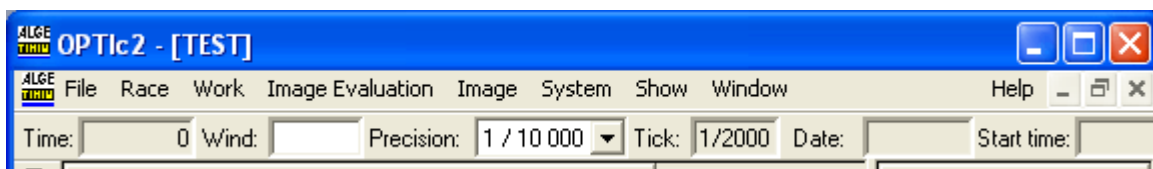
The software for the OPTIc2 runs with Windows XP (Service Pack 3) and Windows Vista (Service Pack 1).

If you record with the OPTIc2 you should close all other programs. These other programs can block tasks, processor power or use the hard disk. This could reduce the stability and recording time of the OPTIc2 system.

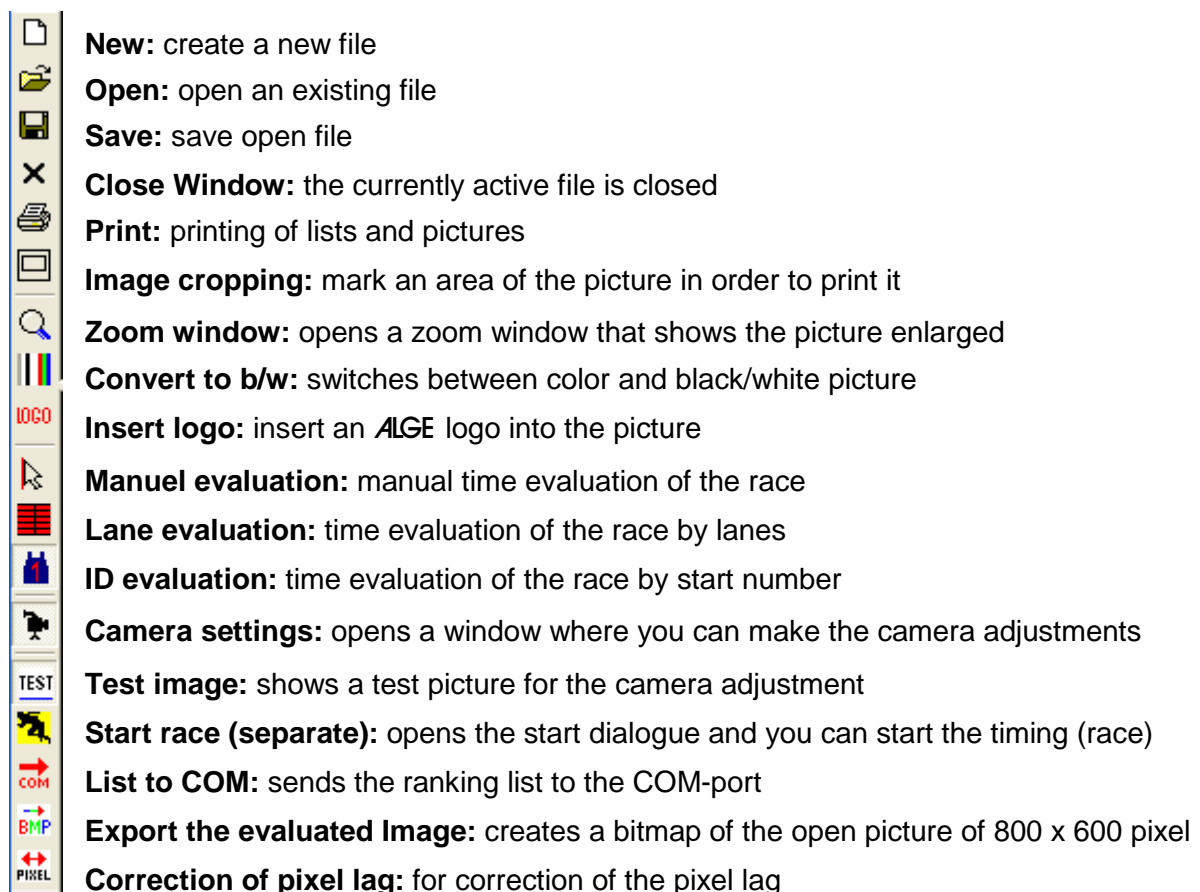
If the OPTIc2 PC is not operated in a network we also recommend closing the antivirus software. Make sure that at least such software should not start an automatic check of the hard disk during the photo finish operation.

The OPTIc2 software is designed in the Windows standard look and tries to follow the rules for Windows programming. This makes the operation for Windows experienced operators very easy.

All functions of the OPTIc2 are integrated in the menu bar.



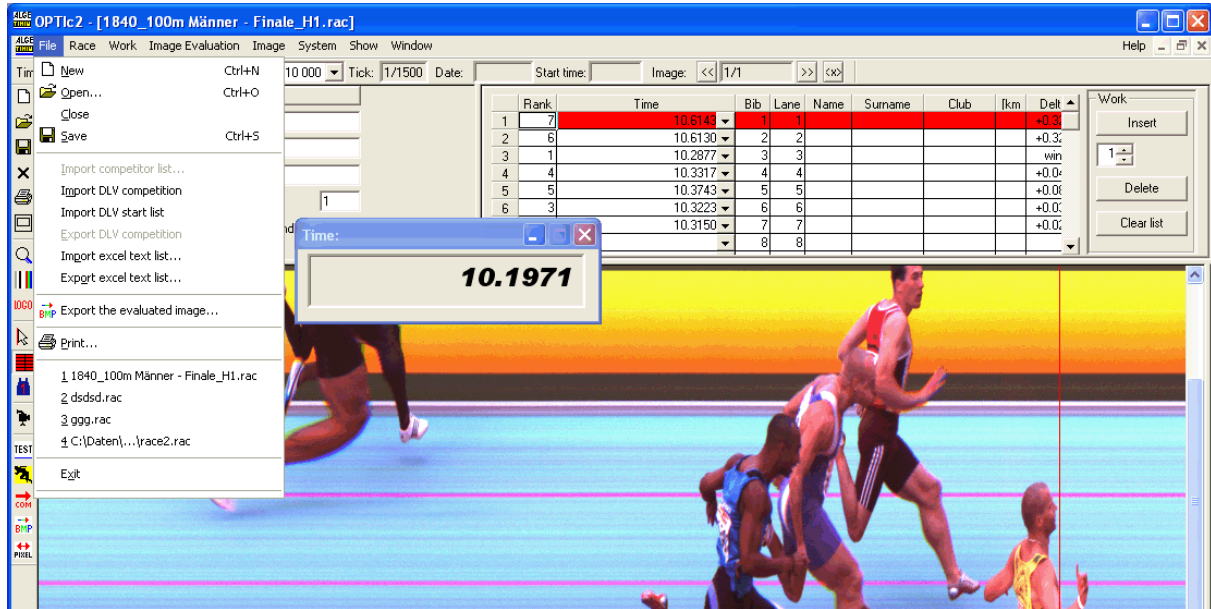
The most important functions are in the icon list on the left screen border.



5.1 Menus of the Software

The OPTIc2- software has sub menus as is usual for Windows software.

5.1.1 Menu <File>



The menu <File> includes as in most Windows programs tools to open, save, print, etc.

NEW: create a new file (race)

OPEN: open an existing file (race)

CLOSE: close an existing file (race)

SAVE: save the active file



IMPORT COMPETITOR LIST: import an existing competitor list e. g. from previous race

IMPORT DLV COMPETITION: import data from a DLV program

IMPORT DLV START LIST: import start list from a DLV program

EXPORT DLV COMPETITION: export data to a DLV program

IMPORT EXCEL TEXT LIST: import a tab-separated text file from e.g. EXCEL

EXPORT EXCEL TEXT LIST: export a tab-separated text file for e.g. EXCEL

EXPORT THE EVALUATED IMAGE: creates a bitmap of the open picture of 800 x 600 pixels



PRINT: printing of lists and pictures



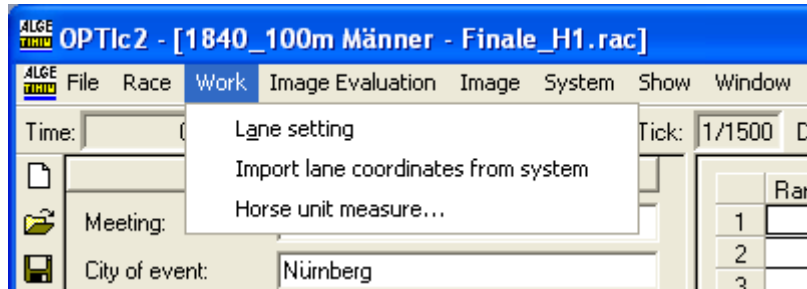
EXIT: exit the program

5.1.2 Menu <Race>

- TEST IMAGE:** for adjusting the camera
- START ONE RACE:** start the „Start dialog” for a race. Now you can start a race and record the finish.
- TEST START:** for checking the start trigger (control for the referee to see if the system starts from zero)



5.1.3 Menu <Work>



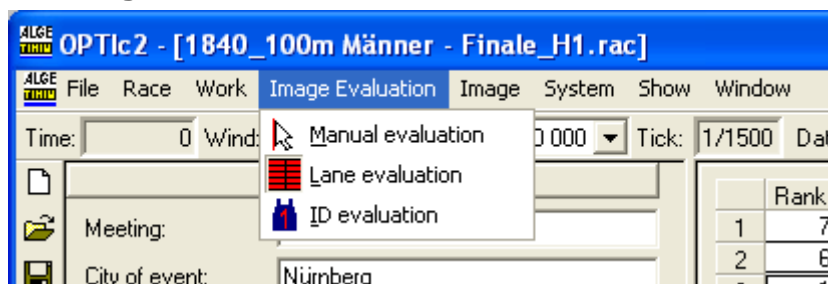
LANE SETTING: to input the lanes for a prompt and automatic evaluation during races where each competitor has his own lane (see point 7.3.2 lane evaluation)

IMPORT LANE COORDINATES FROM SYSTEM:

With this function you can import the lane settings of a previous race. You can only use this function if you have exactly the same camera settings and position. First you have to open the race from which you want to take over the lane setting. Open now <WORK> and click on <IMPORT LANE COORDINATES FROM SYSTEM>.

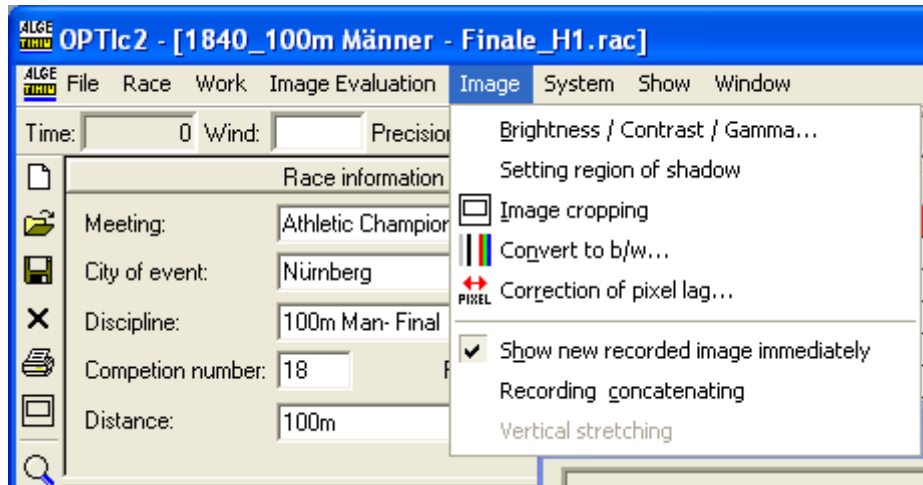
HORSE UNIT MEASURE: This function can be used in horse racing to define the length of a horse. In the result it calculates how far the other horses are behind (nose, neck, head, etc.)

5.1.4 Menu < Image Evaluation >



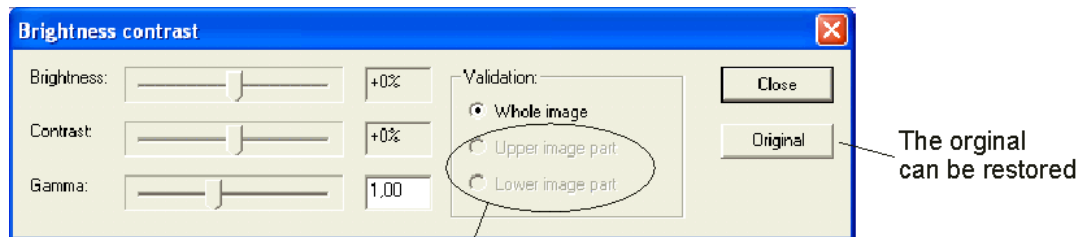
- MANUAL EVALUATION:** see point 7.3.1
- LANE EVALUATION:** see point 7.3.2
- ID EVALUATION:** see point 7.3.3

5.1.5 Menu <Image>



BRIGHTNESS / CONTRAST / GAMMA:

After the race you can modify the picture in order to obtain a better picture quality. You can adjust the brightness, contrast and gamma curve. With these functions you should be able to essentially improve a picture.



Upper and lower image part is splitted by a border line. Here you can choose which part of the image is edited in brightness, contrast and gamma.

SETTING REGION OF SHADOW:

With this dialog you can define the border line between light and shadow (lower- and upper image part). Click with the mouse where the border line should be and then click OK.

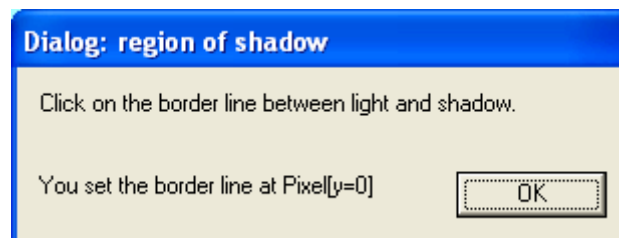


IMAGE CROPPING: with this function you can mark an area of the picture, if you want to print this part. Click with the mouse on the picture and keep the mouse pressed. Now move the mouse in the picture. You will see now a rectangle that marks the part of the picture that you want to print.



CONVERT TO B/W: you can switch between color and black/white picture. Especially if you need more sharpness in your picture you can switch to the b/w picture. This function is very handy if you have a wrong pixel lag adjusted. In the b/w picture it always takes the green (middle) sensor as reference.



CORRECTION OF PIXEL LAG: if the RGB colors do not cover each other (e. g. wrong speed adjusted) you can correct it. As reference we always take the green (middle) sensor.



SHOW NEW RECORDED IMAGE IMMEDIATELY: if you activate this function (small pick) it always shows you automatically the current picture (last picture recorded) on the monitor. Normally, this function is only used for control function.

RECORDING CONCATENATING: if you activate this function (small pick) it does not take a separate picture for each trigger impulse, but enlarges the file. Use this function especially for competitions where you have lanes (e. g. athletic sprints). If you do not have the picture automatically after the race you must finish it by pressing "finish race"

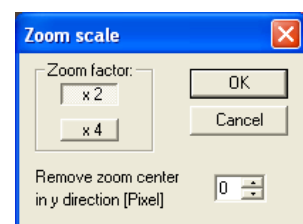
5.1.6 Menu <System>



CAMERA SETTINGS: see point 4. "Adjustment of the Camera"



ZOOM SCALE: you can adjust the zoom factor (2 or 4) for the zoom window. Further you can move the zoom center. This helps you especially in lane races.



ZOOM WITH WINDOWS MAGNIFY: alternatively you can use the Microsoft zoom program "Windows Magnify".

TYPE OF SPORT: you must adjust the correct sport in order to activate the sport specific rules

COLOR OF TIME LINE: you can select the color for the time line. Use always a color that has a high contrast with the background of the picture.

LIST SETTINGS: To adjust the fields of the competitor list.

With the marker in the fields you activate the column. The text that you write in the field is the text shown in the printed list of the column.

- Rank:** always active
- Time:** always active
- Bib:** always active
- Lane:** you can turn it on or off
- Name:** you can turn it on or off
- Surname:** you can turn it on or off
- Club:** you can turn it on or off
- Age:** you can turn it on or off
- Distance:** you can turn it on or off. If you want to calculate the average speed and not all competitors have the same distance (e.g. handicap start) you have to input the distance of each competitor.
- Kilometer time:** you can turn it on or off. For horse racing the kilometer time is often important. In different countries different methods are used to calculate the kilometer time.
- Speed:** you can turn it on or off. Average speed of each competitor. To calculate the speed you need to input the distance.
- Delta Time:** you can turn it on or off. The delta time is the time of each competitor behind the winner.

- Horse units:** you can turn it on or off. It states the distance of each horse in horse units compared to the horse before. Attention: you have to select the horse units!
- Missing laps:** you can turn it on or off. To input the number of missing laps compared to the winner. This function is important for the ranking if you have lapped competitors and the lapped competitors finish after the winner finishes.
- Reserved:** you can turn it on or off. This field you can use for any text.
- List length:** The number you enter is the number of lines in the list (competitors) when you start a new race (e.g. if you have a track with 8 lanes we recommend to use 8).
- Horse unit for:** You can use the horse units for harness and gallop races. Depending on the selected discipline it uses different expressions.
- Calculation of Kilometer time:** There are different methods to calculate the kilometer time.
- A horse unit:** It is possible to measure a horse unit or to fix it with a time.
- Ranking with rounded time:** This adjustment is very important for the ranking. If you activate "ranking with rounded time", the time that is written in the ranking list is used. If you do not activate this function, it will calculate the rank with the internal precision which might be much higher. This is for instance important in athletic where the result list expresses 1/100th of seconds, but the ranking is by the 1/1000th.

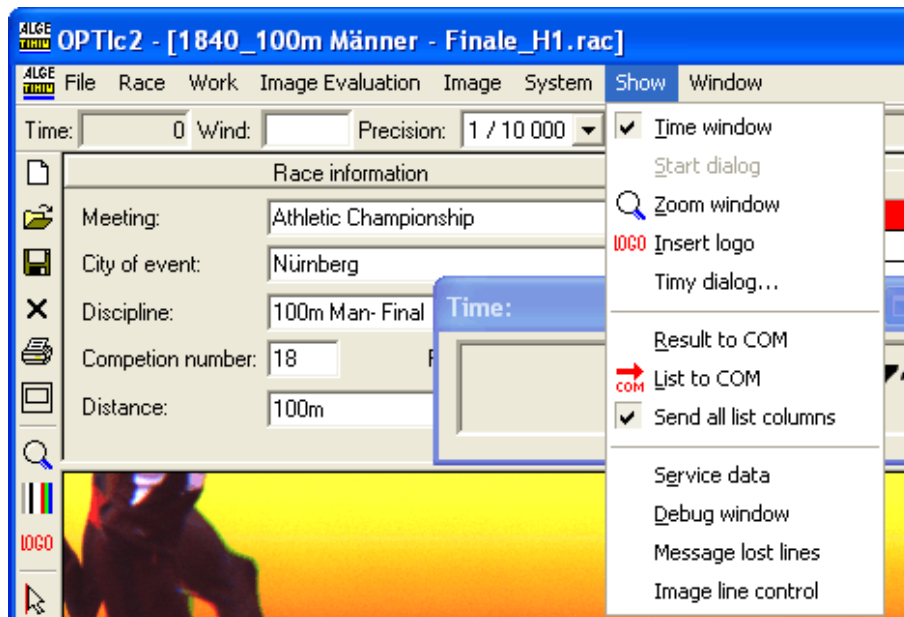
FLASHING DEVICES:

With this function you can update the camera with new hardware settings and software. If you use more than one camera or a distribution box you have to select the device that you want to update.

OCD2 SETTING:

This is to adjust which channels are used by which camera, and if a distribution box is the master for the timing.

5.1.7 Menu <Show>



TIME WINDOW: the marker shows that the time window is active

START DIALOG: the marker shows that the race is active (ready for start or recording)

ZOOM WINDOW: the marker shows that the zoom window is active

TIMY DIALOG: to control and check the Terminal Timy for the anemometer in athletics.

INSERT LOGO: the marker shows, that the ALGE LOGO is active

RESULT TO COM: during the evaluation the time is written into the result list and output the data of the active competitor is released through the RS 232 interface (COM 1 or 2)

LIST TO COM: if you click on <LIST TO COM> a complete result list is released to COM port.

SEND ALL LIST COLUMNS: If you set the marker all the data of the result is sent through the COM port (e.g. also fields that you do not see like original times (not rounded))

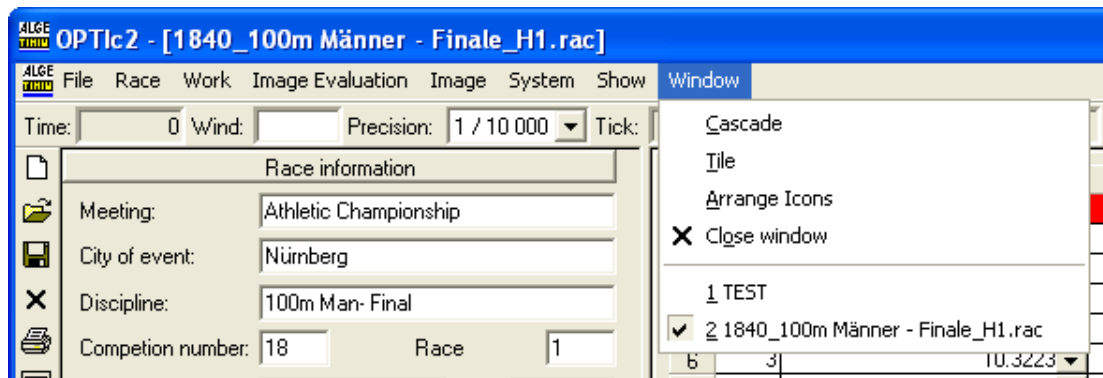
SERVICE DATA: to check the system (for service)

DEBUG WINDOW: shows the system messages and orders and is used to find problems in the system.

MESSAGE LOST LINES: If you have a bad tuning at your PC or a very slow PC system it can happen that the camera sends data to the PC but the PC loses it. To check the system for such problems you can use this function.

IMAGE LINE CONTROL: To check if and how many data is lost between camera and PC at bad tuned systems.

5.1.8 Menu <Window>



Adjustment of the menu <WINDOW> like for every standard Windows program. Additionally, it shows all open races. In order to have a stable PC (enough available RAM) you should close the races that are evaluated.

6 Executing a race



To start a race you have to click on the start icon on the toolbars. You have to fill in the name of the file (name of the race).

Racemode:

- Not ready for start
- Ready for start
- Recording deactivated
- Intermediate time
- Recording

Recording with stop impulse

No recording with stop impulse (e.g. lap timing), display boards stops for 3 seconds and continues with running time

Activating or deactivating of start impulse trigger with button or key F5

Manual start impulse with button or key F6

Start with radio TED (startdelay of 0.1 sec.)

Free memory of system

Selection of the active camera

Time of the race also shown on display board

Button to reset the time to zero in case of a false start

To change from a stopped time to a running time (display board)

Race is finished, no further recording

input time (e.g. time of day)

Activating or deactivating of finish impulse trigger with button or key F7

Manual finish impulse with button or key F8

Deviation of the light conditions compared to reference

Recorded pictures in the memory that are not developed

- The timing is ready now. After the start is triggered the time begins to run. False Start: The time can be reset to zero with the “false start” button.
- If the recording is “activated” the system records picture(s). The recording starts with the beginning of a stop impulse (including the adjusted “lines before”) and ends with the end of the stop impulse (including the adjusted “lines after”). With the stop impulse the time stops (also on the display board). If you click on “Running GAZ” the time continues to run (like after an intermediate time).
- If the recording is “deactivated” the time stops for about 3 seconds on the display board and starts running again. It does not record a picture.
- Evaluation of the pictures: see point 7.

Race Mode:



Not ready for start, close the start dialogue and open it again.



Ready for start impulse



Recording is inactive (no recording with a finish impulse)



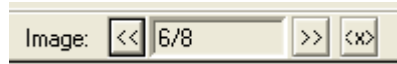
Intermediate time is shown on display (no recording)



Recording of the camera



7 Evaluation

The first picture of the photo finish appears automatically on your screen. With the picture number you can move forward or backward picture by picture.



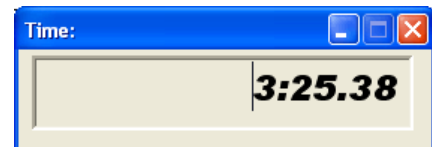
7.1 Showing the Time Line on the Screen

If a finish picture is shown on the monitor you press the left mouse button and move the mouse over the screen. Together with the mouse cursor the finish line moves. The time is shown in the "Time Window".

With key  you can move the finish line pixel by pixel to the left, with  to the right. The color of the finish line can be changed so that it has a good contrast in the picture with the function "System" and "Color of time line".

7.2 Time Window

A freely movable time window is automatically shown. This window shows only the time of the evaluation (not the running time).



7.3 Transfer Times to the Competitor List

There are three possibilities to enter times for the photo finish picture into the competitor list:

- Manual evaluation
- Lane identification
- Start number identification

Use the **manual identification** if you want to transfer the time to any individual competitor in the competitor list (normally not used).

Use the **lane identification** if every competitor has his own lane (e. g. for sprint races in athletics, rowing, and canoeing).

Use the **start number identification** if you can read (or have registered) each start number of the finish arrival (e. g. long distance races of athletics, cycling, horse races)

7.3.1 Manual Evaluation

You select the manual evaluation by clicking with the mouse on the button shown here or if you click on <Image Evaluation> and then on <Manual Evaluation>.




Mark the competitor in the competitor list who you want to evaluate (click on the field of the competitor list of the competitor). The field of the competitor is marked blue if he has no time and red if he already has a time.

Press the left mouse button and move the time line to the competitor that you want to evaluate. As soon as you press the right mouse button it transfers the time to the marked competitor in the competitor list.

7.3.2 Lane Evaluation

If each competitor runs in fixed lanes (e. g. sprint races in athletics) it is the easiest way to use the track identification for the evaluation. The finish line has to be white and the borders have to be black.



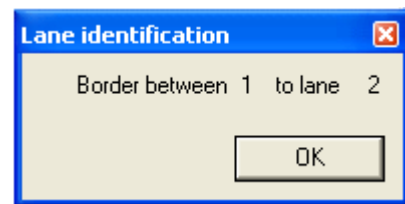
You can select the Lane Evaluation by clicking on , or by clicking <Image Evaluation> and <Lane evaluation>.

First you must enter the lane markers for the automatic lane identification. This you do once before you start the races if you do not move the camera or leave the program.



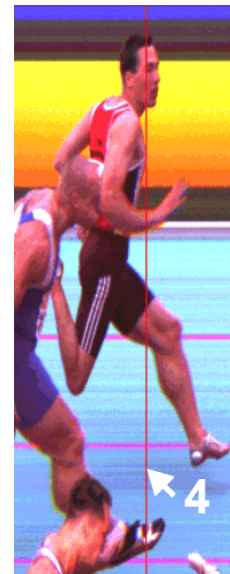
Lane Identification:

- Click on <Work>
- Click on <Lane setting>
- A window opens that describes the lane border (e. g. "Border between 1 to lane 2").
- Click with the mouse on the border between the two described lanes.
- When you have entered all lane borders click on <OK>.




Evaluation (e. g. for athletics):

- Move the time line (press left mouse button) to the chest of the athlete. The mouse arrow has next to it the lane number. This arrow must be on the correct lane. The competitor of the lane is marked in the competitor list.
- Press the right mouse button to transfer the time to the competitor list.
- Execute the same procedure for the next competitor to transfer his time to the competitor list.





7.3.3 Start Number Evaluation

Use the start number identification, if every competitor has a start number that you can read in the picture or if you have recorded the start numbers in order of finish (e. g. for cycling races, horse races, long distance races in athletics). Activate the start number evaluation by clicking with the mouse on the button , or by clicking on <Image Evaluation> and then <ID evaluation>.

- press the left mouse button and move the time line to the correct timing point of the competitor
- now release the left mouse button
- press briefly on the right mouse button
- the window to enter the start number opens:
 - input the start number with the keyboard
 - click with mouse on <OK>
- move the time line to the next competitor
- etc.

For cycling races you can also make group times. This means always the time of the group is transferred into the result list. The order is according the actual time.

Evaluation for a group in cycling:

- press the left mouse button and move the time line to the correct timing point of the first competitor of the group, release the left mouse button
- press briefly on the right mouse button
- the window to enter the start number opens:
 - click on group time
 - input the start number with the keyboard
 - click on <OK> with the mouse
- move the time line to the next competitor in the group
- press briefly on the right mouse button
- the window to enter the start number opens:
 - the group time is already activated
 - input the start number with the keyboard
 - click on <OK>with the mouse
- move the time line to the next competitor in the group
- etc.
- move the time line to the first competitor outside of the group
- press briefly on the right mouse button
- the window to enter the start number opens:
 - click on group time so the check is disabled
 - input the start number with the keyboard
 - click on <OK> with the mouse
- etc.

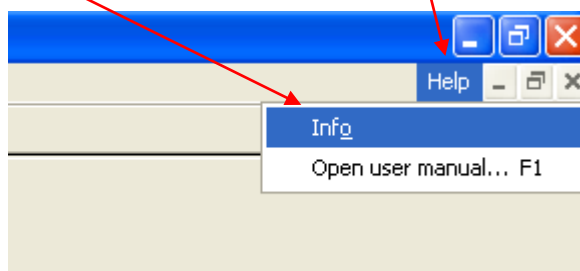
8 How to keep the OPTIc2 updated

In order to keep your photo finish system OPTIc2 updated, regularly check the homepage of ALGE-TIMING for updates (www.alge-timing.com). You find all the software that you need to download in the section <Download>.

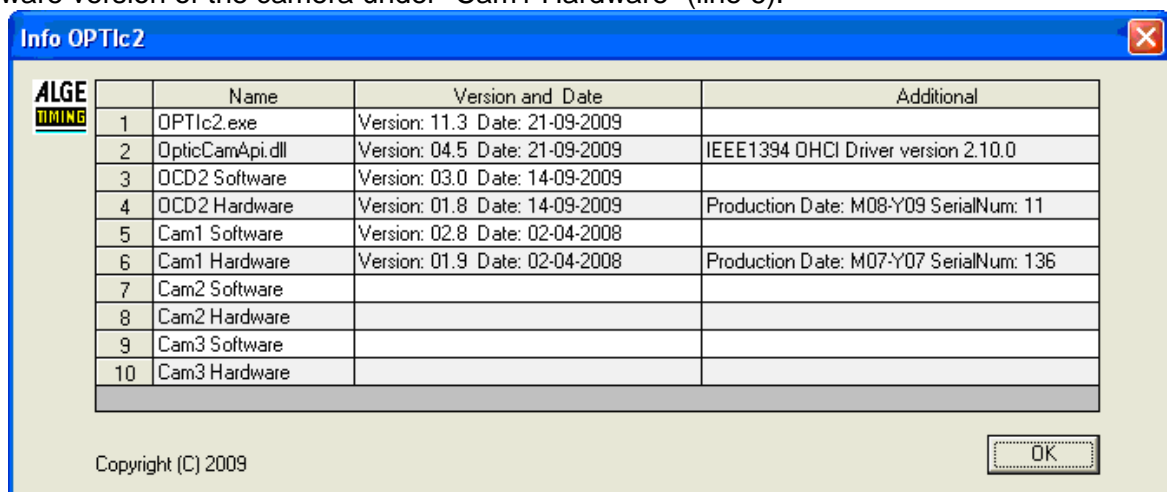
All software updates, driver updates and camera updates are free of charge for ALGE customers. It is our goal that you have the best available system with the latest innovations and bug fixes.

To check what software you have installed please do the following.

- Open the OPTIc2 software. The hardware (camera) must be connected.
- Click on <Help> in the right upper corner of the OPTIc2 window.
- Click on <Info> in the Help menu.



- It shows the software version of the camera under “Cam1 Software” (line 5) and the hardware version of the camera under “Cam1 Hardware” (line 6).



- Line 1: Software from OPTIc2 that runs on the PC under Windows
- Line 2: DLL-file for the OPTIc2 software – installed with OPTIc2 software (Line 1)
- Line 3: OCD2 Software: only an entry if you use a Distribution Box
- Line 4: OCD2 Hardware: only an entry if you use a Distribution Box
- Line 5: Cam1 Software: software of the camera. If the software does not fit with the software of the Windows OPTIc2 software, the system issues a warning.
- Line 6: Cam1 Hardware: hardware of the camera. If the hardware does not fit with the software of the Windows OPTIc2 software, the system issues a warning. Attention: the hardware can be upgraded with an update of the camera. For an update you only need to install the latest hardware update.
- Line 7: Cam2 Software: only an entry if you use a second camera.
- Line 8: Cam2 Hardware: only an entry if you use a second camera.
- Line 9: Cam3 Software: only an entry if you use a third camera.
- Line 10: Cam3 Hardware: only an entry if you use a third camera.

8.1 Direct links to download the updates

PC-Software for the OPTIc2/OPTIc2n/OPTIc2o:

<http://www.alge-timing.com/alge/download/software/OPTIc2Setup.exe>

IEEE1394 Driver for OPTIc2:

<http://www.alge-timing.com/download/Software/Driver/OPTIc2Driver.exe>

Camera Hardware and Software:

<http://www.alge-timing.com/alge/download/uC/OPTIc2CameraFlash.exe>

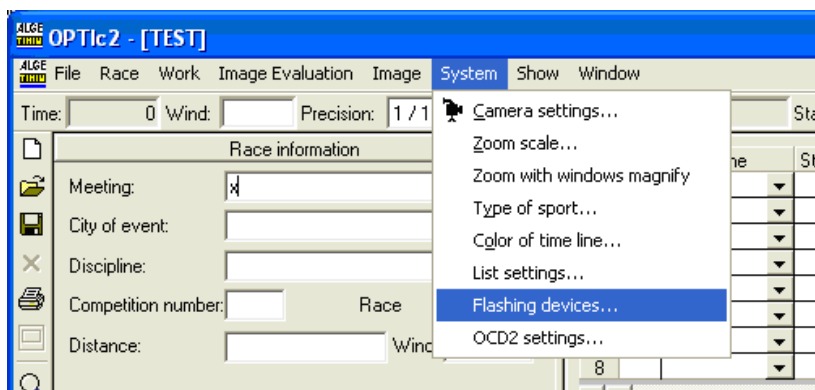
8.2 Update of the OPTIc2 PC-Software

Before you update the new OPTIc2 software, we recommend deleting the old software. The update software is installed like any PC software by double clicking on the file OPTIc2Setup.exe. Please follow the instructions of the install program.

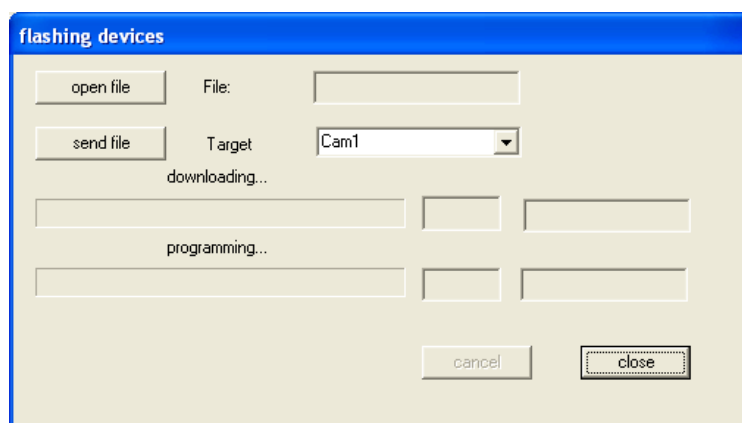
8.3 Update of the Camera

To update the camera start the OPTIc2 software with a connected camera. For the update the camera must not be in test nor record mode.

- Click on <System>
- Click on <Flashing devices...>



- Now the flash communication opens.
- Select the device that you want to flash (usually Cam1)
- Open the file that you downloaded. There is a hardware and software file that you must upload. It is necessary to upload both files. It does not matter which one first.



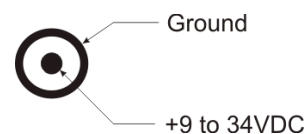
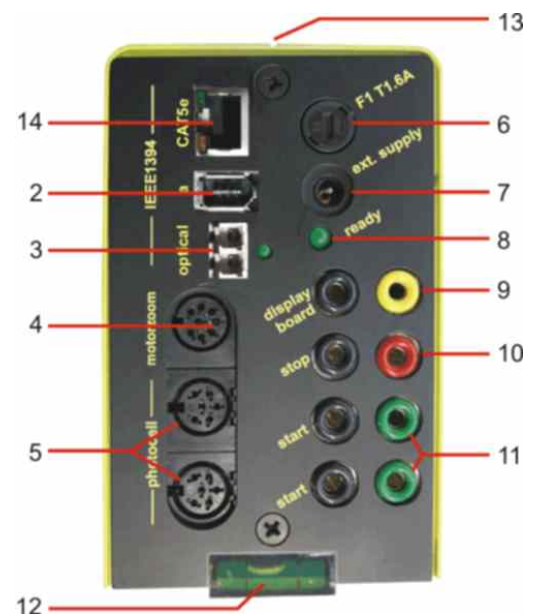
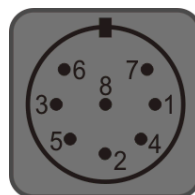
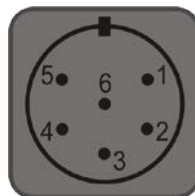
9 Technical Data of the OPTIc2n

All technical data is the same for the camera OPTIc2 and OPTIc2o, but the OPTIc2n has different connections:

Measuring Range:	23 hours, 59 minutes, 59.9999 seconds
Quartz Frequency:	TCXO 20,000 MHz (temperature compensated quartz oscillator)
Frequency Deviation:	Temperature: +/-2.5 ppm at -10 to 70°C (+/-0.009 sec. per hour) Ageing: +/- 1 ppm per year Frequency Adjustment: +/- 0.1 ppm at 25°C
Power Supply:	+9 to 34 VDC
Temperature Range:	0° to 50°C (32° to 122° F)
Recording of Pictures:	on the hard disk of PC
Storing the Races:	- internal hard disk - external hard disk - recordable CD, recordable DVD - memory stick, etc.
Input Impulse:	input resistance 10 kOhm against +5V resolution with <1 Volt (falling flank) hysteresis about 2 Volt
Output 5V DC stabilized:	total max. 120 mA
Operation keys:	PC keyboard and mouse

Connections:

- 11 ...start input (banana socket)
Green.... input channel 0 (start)
Black..... ground
- 10finish input (banana socket)
Red..... input channel 1 (finish)
Black..... ground
- 5DIN-socket
 - 1 input channel 0 (start)
 - 2 input channel 1 (stop)
 - 3 common ground
 - 4 input external supply (9 - 34 VDC)
 - 5 output +5 VDC stabilized
 - 6 input channel 2 (intermediate time)
- 9display board (banana socket)
Yellow... output data
Black..... ground
- 4motor zoom
 - 1 empty
 - 2 empty
 - 3 Zoom in
 - 4 Iris close
 - 5 Focus near
 - 6 Iris open
 - 7 Zoom out
 - 8 Focus far
- 2IEEE 1394a 6-pol
- 3GOF (LC duplex glass optical fiber connector)
- 14CAT5e cable with RJ45 plug
- 7power supply



Requirements for IEEE 1394 interface for PC:

Compatibility: IEEE 1394A or 1394B, OHCI compatible
 Transfer Rate: min. 400 MBit per second

Minimum Requirements for the PC (Desktop or Notebook)

Operating system: Windows XP, Windows Vista or Windows 7
 Processor: Intel Pentium Dual Core (or better)
 Hard Disk: minimum 60 GB (the faster the better)
 Storage: minimum 1 GB RAM
 Graphic: minimum 32 MB graphic RAM
 Monitor resolution: minimum 1024 x 800, better 1600 x 1200 or 1920 x 1200
 Interface: IEEE 1394A or 1394 OHCI compatible

Display Board Interface "display board":

Transfer Format: 1 start bit, 8 data bit, no parity bit, 1 stop bit
 Transfer Speed: 2.400 Baud
 Transfer Protocol: ASCII

Data Format:

The data format has 24 ASCII characters. The 24th character is carriage return. It sends every 1/10 second one data string. The fourth character is a point for the running time (running time), a blank for a zero time, or a C for a stop time (run time). For a standing time (run time) you can have, depending on the adjusted precision, 1/10, 1/100, 1/1000, or 1/10.000 seconds. Using this adjustment only the winner time is sent to the interface (and intermediate times)

	1	2	
123456789012345678901234			Number of ASCII characters
C	HH:MM:SS.zht	(CR)	run time with 1/10000 th precision
.	HH:MM:SS.z	(CR)	running time

.the fourth character for running time, the 17th character for separation between seconds and 1/10 seconds

HH.....hours

MM.....minutes

SSseconds

Z.....1/10 seconds

H1/100 seconds (depending on the precision)

T.....1/1000 seconds (depending on the adjusted precision)

(CR) ...the 24th character is Carriage Return

10 Accessories for Photo Finish

For the ALGE photo finish we offer very useful accessories.

10.1 IEEE 1394 PC-Interface

Depending on the PC there are different possibilities for the IEEE1394 connection to the camera. Depending on the connectors of the PC and camera, as well as the camera distance to the PC you have to select the ideal cable (see next page).

Desktop PC:

Most desktop PCs have an IEEE1394 interface included. You can use this interface, but in most cases these interfaces do not allow to supply the camera or cable with repeater directly from the PC by using the IEEE1394 cable. Alternatively, you can insert a PCI-card or PCI-Express-card in a desktop PC.

Most IEEE1394 interfaces of desktops have a type A or C plug.

Notebook:

Most notebooks have an IEEE1394 interface included. In most cases this is the 4 pin C-type. This plug does not supply other devices (camera, repeater) through IEEE1394.

Alternatively, it is possible to plug a PC-card (also called PCMIC or CardBus) or Express-card for the Notebooks.

ALGE-TIMING sells tested cards for IEEE1394 to use with different PC types:






PCI Card with IEEE 1394 sockets - Desktop PC	1394PCI
PCI-Express Card with IEEE1394 sockets - Desktop PC	1394PCle
PC Card (PCMCIA or CardBus) with IEEE1394 sockets - Notebook	1394PC
Express Card with IEEE 1394 sockets - Notebook	1394EXP
Power Supply for IEEE1394 Notebook Interface Cards - 16 VDC	PS16F

10.2 IEEE 1394 Cable and Connections

As many possible combinations of different plugs for IEEE1394 exist, the cable is not included in the normal scope of supply. Check the connection on your PC and camera, decide what length you require and then specifically order the correct cable for your demands.

OPTIc2: connectors of type A and C
OPTIc2o: connectors of type C
OPTIc2n: connector for type A

Depending on the PC you can have connectors of type A, B or C.

ALGE-CODE	DESCRIPTION	PICTURES
AA-	6 to 6 Pin	
AB-	6 to 4 Pin	
AC-	6 to 9 Pin	
CC-	9 to 9 Pin	
BC-	9 to 4 Pin	

The following cables are available from ALGE:

IEEE 1394a cable, 2 m (6 pin to 6 pin)	AA-2
IEEE 1394a cable, 4.5 m (6 pin to 6 pin)	AA-4.5
IEEE 1394a cable, 10 m (6 pin to 6 pin)	AA-10L
IEEE 1394a cable, 2.5 m (6 pin to 4 pin)	AB-2
IEEE 1394a cable, 4.5 m (6 pin to 4 pin)	AB-4.5
IEEE 1394a cable, 10 m (6 pin to 4 pin)	AB-10
IEEE 1394b cable, 2 m (9 pin to 9 pin)	CC-2
IEEE 1394b cable, 4.5 m (9 pin to 9 pin)	CC-4.5
IEEE 1394b cable, 10 m (9 pin to 9 pin)	CC-10
IEEE 1394b cable, 4.5 m (9 pin to 6 pin)	AC-4.5
IEEE 1394b cable, 10 m (9 pin to 6 pin)	AC-10

10.3 Network Cable with RJ45 Plug

The OPTIc2n and the Distribution Box OCD2 have a network adapter built in. This adapter is the interface between IEEE1394 and RJ45 cable connection. A built in adapter reduces the number of cables and makes the system more reliable.

The advantage of the network cable is the maximum cable distance you can operate with. With an IEEE1394 cable the maximum cable distance between PC or Distribution Box and camera is 10 m. With a network cable you can operate with distances of up to 80 m.

The network cable **ALGE** uses for 50 or 80 m is a CAT7 cable with a bigger copper diameter. This allows us to also send the power supply through the network cable from a Distribution Box to the camera. This cable is made for outdoor use and supplied with a rugged cable reel.

Network Cable for OPTIc2n - 10 m	260-10
Network Cable for OPTIc2n - 20 m	260-20
Cable Reel with Network Cable for OPTIc2n - 50 m	KT-260-50
Cable Reel with Network Cable for OPTIc2n - 80 m	KT-260-80

10.4 Optical Cable and Fiber Optic Adapter

The OPTIc2o, OPTIc2n and the Distribution Box OCD2 have an integrated adapter for fiber optic cable. This adapter is the interface between the IEEE1394 and the optical cables. A built in adapter reduces the connected cables and makes the system more reliable.

The big advantage of an optical connection between PC or Distribution Box and camera is the distance you can bridge. With the IEEE1394 cable you can go a maximum of 10 m (without repeater), but the optical cable allows you a cable of a several hundred meters.

From **ALGE-TIMING** you can obtain the following optical adapter and fiber optic cables:

Adapter IEEE1394 to glass fiber including power supply (with cable, 1 piece)	GLAS1394
Glass Fiber Optic Cable 50 m, LC-plugs, fix wiring, 2 core	G2-LC50
Glass Fiber Optic Cable 100 m, LC-plugs, fix wiring, 2 core	G2-LC100
Cable reel with glass fiber optical cable, 100 m, LC-plug, 2 core, fix wiring	KT-G2-LC100
Cable reel with glass fiber optic cable, 50 m, LC-plug, 4 core, rugged	KT-G4LC50
Cable reel with glass fiber optic cable, 100 m, LC-plug, 4 core, rugged	KT-G4LC100
Cable reel with glass fiber optic cable, 200 m, LC-plug, 4 core, rugged	KT-G4LC200

10.5 Lenses for the OPTIc2

The photo finish includes no lens as each sport has different requirements. ALGE-TIMING offers different lenses that suit optimal to the camera.

Universal Lens Z75:

- manual zoom lens
- very light sensitive
- usable for most sports
- 12.5 to 75 mm, F1.2



Motor Zoom Lens MZ75:

- motorized zoom lens
- operated from OPTIc2 PC software
- very light sensitive
- usable for most sports
- recommended if camera is not easily reachable
- 12.5 to 75 mm, F1.8



Motor Zoom Lens MZ160:

- motorized zoom lens
- operated from OPTIc2 PC software
- light sensitive
- used in big stadiums if the finish line is far away
- 16 to 160 mm, F1.8



Wide Angle Lens L8.5:

- wide angle lens
- very light sensitive
- used if the camera is very close to the finish line
- 8.5 mm, F1.3



10.6 Tripod and Gear Head

Tripod TRIMAN:

ALGE-TIMING offers a professional tripod (max. height 2.27 m or 89.4 in). A stable tripod is important for good pictures with a photo finish system.

Gear Head 410:

Manual gear head to adjust the camera easily to the finish line. The gear head allows a three-dimensional adjustment of the camera.

Electronic Gear Head 410-E:

Electrical gear head to adjust the camera easily to the finish line. The gear head allows a three-dimensional adjustment of the camera from the software of the OPTIc2. It is ideal for a camera that is mounted out of reach of the operator (e. g. on a high tripod, ceiling).



10.7 Distribution Box OCD2:

The Distribution Box OCD2 is a professional accessory for your photo finish system. It is of major advantage, if the camera is far from the operator. You can connect all cables from external devices to the OCD2. From the OCD2 to the camera you can use a network cable or an optical cable.

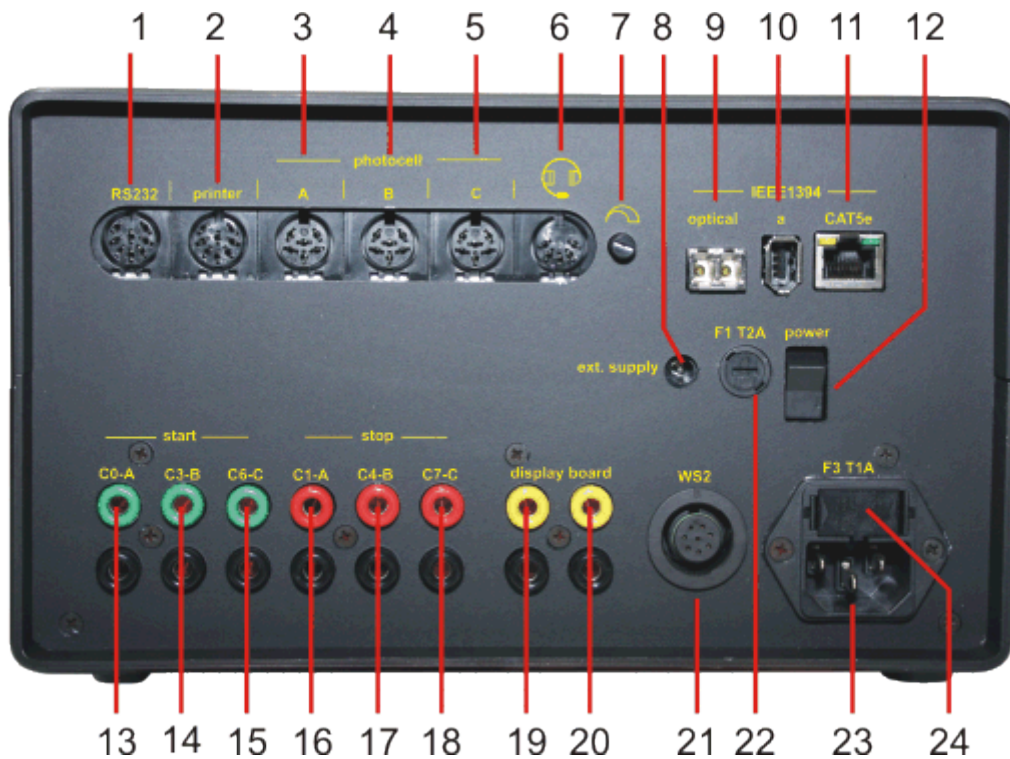
The Distribution Box OCD2 has an internal backup battery that also supplies the camera in case of a power failure for about one hour (if you use a cable with power supply, e. g. network cable 260-xx). Further, it includes a speech amplifier for communication between starter and timing operator.



Advantages of the Distribution Box:

- Synchronization of up to three connected photo finish cameras
- Connection of external devices next to the operator and not at the camera
- Built-in converter for optical cable or network cable (CAT5e with RJ45)
- Built-in speech amplifier to connect a headset for communication between starter and timing operator
- Connection of up to three independent input signals (start, IT, finish) for up to three different photo finish cameras
- Built-in battery pack to run the OCD2 and photo finish camera independently from mains
- Connection for the anemometer (athletics)
- Connection for protocol printer P5

10.7.1 Connections of the Distribution Box OCD2:

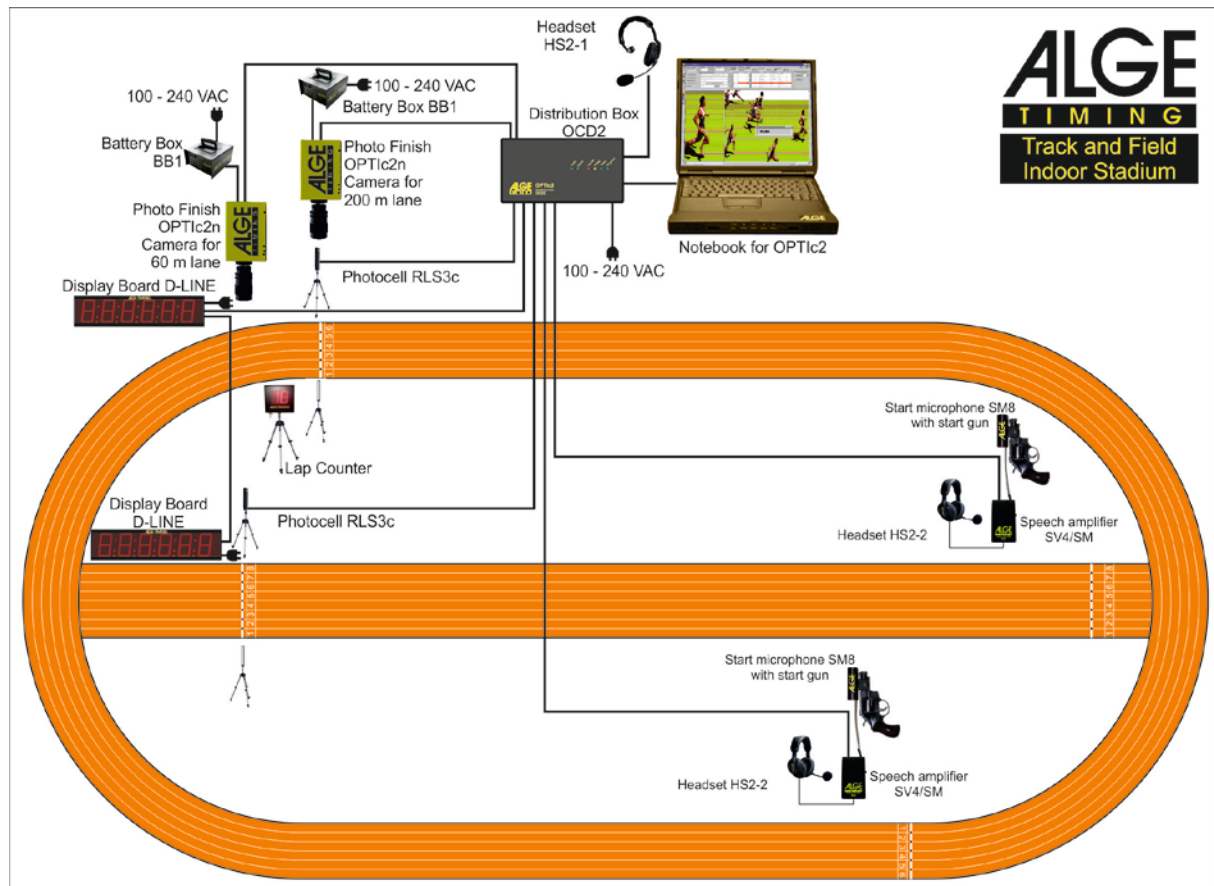


- 1.....Socket for RS232 interface
- 2.....Socket for protocol printer P5-8
- 3.....Socket for photocell A
- 4.....Socket for photocell B
- 5.....Socket for photocell C
- 6.....Socket for headset
- 7.....Volume for headset
- 8.....External power supply input (+10,5 to 14 VDC)
- 9.....Socket GOF – LC Duplex fiber optic cable to camera
- 10.....Socket IEEE1394a – 6-pin connection (to PC)
- 11.....Socket RJ45 for Network cable to camera (cross cable)
- 12.....On-switch
- 13.....Banana socket – Impulse Start A-C0
- 14.....Banana socket – Impulse Start B-C3
- 15.....Banana socket – Impulse Start C-C6
- 16.....Banana socket – Impulse Stop A-C1
- 17.....Banana socket – Impulse Stop B-C4
- 18.....Banana socket – Impulse Stop C-C7
- 19.....Banana socket – display board (identical with 20)
- 20.....Banana socket – display board (identical with 19)
- 21.....Socket for anemometer Windspeed WS2
- 22.....Fuse for device (2 A, time lag fuse)
- 23.....Mains Power Supply (90 – 260 VAC)
- 24.....Fuse for power supply (1 A, time lag fuse)

10.7.2 Examples for the Connection of the Camera

10.7.2.1 Indoor Track and Field:

In indoor arenas it is standard to have two different finishes. One is for the sprints of up to 60 m and the other one is for the oval. Therefore, it is necessary to have two different selectable photo finish cameras. If you use the distribution box for such an installation it is easy to install the cabling for the complete system.

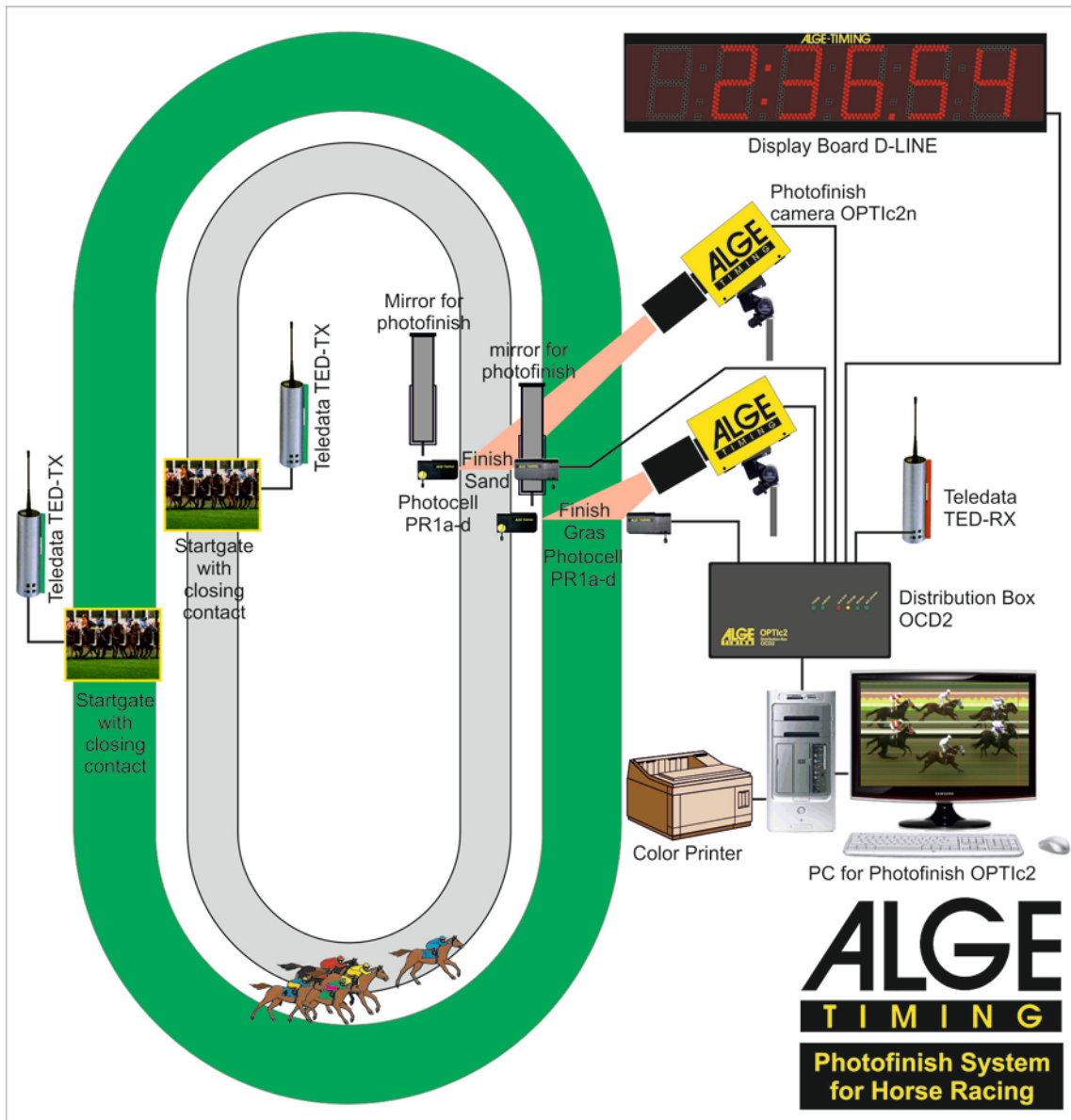


It is possible to adjust the channels of the distribution box in a way that you can trigger the recording of the photo finish of the sprint only with the sprint photocell and the oval with the photocell of the oval.

The Distribution Box OCD2 has a built-in speech amplifier for the communication between starter and timing operator. This means the timing operator connects the headset to the OCD2 and is able to communicate with the starter using the start wire for the communication. No additional cable is necessary.

10.7.2.2 Horse Racing with Several Tracks

Horse race tracks often have more than one track next to each other (e. g. sand track and grass track). For such an installation a Distribution Box makes the cable installation for the cameras and external devices much simpler.



10.7.3 Technical Data of the Distribution Box OCD2

Quartz Frequency: TCXO 20.000 MHz (temperature compensated quartz oscillator)

Measuring Range: 23 hours, 59 min., 59.999 sec.

Frequency Deviation: Temperature: +/- 2.5 ppm at -10 to 70°C (+/- 0.009 sec. per hour)
Ageing: +/- 1 ppm per year
Frequency Adjustment : +/- 0.1 ppm at 25°C

Internal Battery: lead battery 12 V / 2.2 Ah

Power Supply: +9 - 15 VDC

Temperature Range: 0 to 50°C

Connections:

- 3 x start input (banana socket)
- 3 x finish input (banana socket)
- 3 x finish input (DIN-socket)
- 2 x display boards (banana socket)
- 1 x RS232 – DIN-socket
- 1 x Printer – DIN-socket
- 3 x Photocells – DIN-socket
- 1 x Headset – DIN-socket
- 1 x Windspeed WS2
- 1 x Camera – IEEE1394a 6pol-bilingual
- 1 x Camera - GOF (LC duplex glass optical fiber)
- 1 x Power Supply +9 - 15 VDC
- 1 x Mains 100 – 240 VAC

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