

TrainCam Camera specifications

Image sensor	1/3 CMOS
Video compression	optional MJPEG (compression reduces quality)
Resolution	up to 640x480 pixels
Frame rate	up to 60fps in all resolutions
Shutter time	1/2 - 1/10000 second
Security	multiple access levels with password protection
Protocols	TCP/IP, HTTP, SMTP, DNS, DDNS, NTP, PPPoE, DHCP server or client
Platform	Embedded OS with built-in web server
Processor	ARM9 CPU
Memory	up to 8Gb flash memory
Connectivity	Full duplex 10/100Mbit ethernet port optional 802.11g wireless ethernet port optional wireless NextG modem
Options	Night vision sensor Fog penetration sensor Wide angle lens Telephoto lens Day/Night sensor
Accessories	CD-ROM (Setup program, User's guide) Installation manual Front cover Cable (Rear) cover Lens cover

TrainCam Key Features

- Selectable compression formats, or no compression for best image quality
- High Frame Rate up to 60 fps
- Slim and Stylish Design
- Vari-Focal Lens 35-94 degrees
- True Day/Night Function
- Advanced Video Motion Detection
- Unattended Object Detection
- Sensor IN/Alarm OUT Ports
- Image Stream Transfer using FTP/SMTP
- Simultaneous access for up to 20 users

Standards

IEC 61373	Railway application rolling stock equipment: Shock and Vibration testing
IEC 60571	Electronic equipment used on rolling stock
EN 50155	Electronic equipment used on rolling stock
IEC 1287-1	Power converters installed on board rolling stock
EN 50121-3-1	Electromagnetic Compatibility
EN 50121-3-2	Electromagnetic Compatibility
IEC 61000-4-3	EMC standard
BRB/RIA-12	British Rail Standard for transients and surges
AS 3000	Wiring regulations



TRAINCAM

Video Surveillance & Monitoring System



SCHAFFLER are proud to introduce **TrainCam** - a range of live video transmission and recording equipment for use in the Railway Industry. Initially developed by SCHAFFLER and our partners for security applications, the TrainCam products are applicable in a wide range of areas including:

- * Diagnostics
- * Event Recording
- * Safety
- * Security

TrainCam System

The TrainCam system comprises the following off-the-shelf components:

- * TrainCam Camera with LAN
- * TrainCam Camera with Wireless LAN
- * TrainCam Camera with Wireless NextG Modem
- * Wide Angle Lens
- * Telephoto Lens
- * Day / Night option
- * Night Vision option
- * Tripods & permanent fixture mounting options
- * Wireless NextG Modem receiver system
- * GPS option

The TrainCam system has been designed to provide flexibility. The above standard TrainCam products can be combined to suit most applications.



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Technology

TrainCam incorporates a state-of-the-art network camera that provides excellent picture quality. A 1/3 CMOS sensor array is enhanced further by high resolution optics. For easy installation TrainCam provides a variable power input (+5V to +28V), a multi-camera network switch option and a wireless NextG network option for remote access.

Beyond these features TrainCam is breaking new ground by incorporating options for local storage, night-vision, fog penetration and full-colour vision suitable to a wide range of railway applications. The camera is fully certified to railway shock and vibration standards. A frame number, time and date are incorporated in each frame for functionality and video validation.

Employing the latest 1/3-type CMOS technology, TRAINCAM delivers exceptional picture quality for remote and on-board monitoring applications. Minimum illumination required is just 0.4 lux at F 0.95 in colour - as a result the camera operates extremely well in low-light conditions. The frame rate can be set as low as 1 fps or as high as 60 fps at VGA resolution to smoothly view high-quality images. Its built-in web server allows images to be viewed and controlled over a LAN or the internet, either wired or wireless over the NextG network. Compatible with VMS Video Monitoring Software or a range of universal control systems such as Milestone, iCatcher and NetcamWatch. In addition it is possible to customize the camera for railway applications such as motion detection, video logging, passenger security, fog penetration and heads-up displays for the driver.

SCHAFFLER and our partners have developed the TrainCam technology and are in full control of the IP. Where a particular application requires redevelopment or further development of the TrainCam system, we are able to modify, customise or redesign the TrainCam products to suit.

TrainCam Application: Security

Video surveillance is used in many applications as a security device. The primary use is in the protection of key assets. Security cameras are a tool used to identify and prosecute those who would seek to steal and/or vandalise assets. In this way the installation of security cameras becomes a deterrent to such behaviour.

The TrainCam system is ideally suited to the following security applications:

- * Prevention of theft and shoplifting
- * Prevention of employee theft
- * Prevention of harassment
- * Prevention of vandalism
- * Reduction of insurance premiums and taxes

However, these are only a small sample of the applications for video monitoring systems. Often there are dual purposes and advantages for the installation of video monitoring equipment. These additional purposes include:

- * Training tool
- * Standards & procedures compliance
- * Workplace process flow

The railway industry is often the last to benefit from modern technology. In today's workplaces, video monitoring is used in the above applications to solve common issues. Video monitoring has become an inexpensive and easy to use tool. The TrainCam system introduces these advantages and solutions to the railway industry. Further creative uses of the TrainCam technologies continually arise.

TrainCam Application: Critical Function Visual Confirmation

Railway infrastructure contains many high voltage systems over a wide area. Remote controlled circuit breakers are used in applications where high power high voltage switching is needed and personnel cannot be located close-by. In cases when such systems must be isolated for maintenance there needs to be confirmation that the system has been disconnected and rendered safe. By providing live video of the remote circuit breaker, the TrainCam system provides visual confirmation that the circuit breaker has been opened.

TrainCam Application: Level Crossing Safety

Level crossing safety is an issue that is of great concern to rail operators, road users and the community as a whole. The timely awareness of problems at level crossings is of critical importance in the avoidance of accidents. Train stopping distances are very large and any advantage that can be given to train drivers to avoid collisions is a plus. In many cases trains are unable to stop prior to a level crossing once it is in view.

The TrainCam is installed at a level crossing and a wireless modem with GPS is installed on the train. The system incorporates a GPS to establish the location of the train. As a train approaches a level crossing, at a predefined distance from the level crossing, the onboard monitor accesses the level crossing camera via wireless modem connection. This displays the upcoming intersection live on the monitor in the driver's cabin, giving the driver a 180 degree view of the crossing. This gives the driver time to make an assessment if the crossing is safe and has time to stop if required.

"The TrainCam system gives train drivers an advantage in being able to stop the train in time if a level crossing is unsafe."

Additional Benefits

The TrainCam system provides rail owners with multiple benefits. Apart from a train driver being able to see a level crossing before the train is within direct sight of the area, rail operators are also able to independently monitor level crossings from a central location or from any other remote viewing device. The video from a level crossing can be archived on a central server so that the footage can be reviewed. This may be for the purpose of analysing the flow on the level crossing and making improvements, or it could be used to replay and analyse an incident or even be used as evidence. The TrainCam system can also be used on approaches to bridges, stations, turnouts or any location where potential problems may exist and the driver needs that critical few seconds to avert disaster.



The TrainCam system gives the driver an advantage in being able to stop the train in time if a level crossing is unsafe. The system additionally gives rail authorities and accident investigators the ability to view live video or alternatively, view and retrieve video that has been reliably backed up to a central server. Not only does the TrainCam improve safety, it is an essential tool to identify and prove the real cause of an incident.

Level crossing hardware:

- 1 x TrainCam day/night camera with wireless modem
- 1 x Wide Angle Lens for 180 degree views
- 1 x optional solar battery power supply

Train hardware:

- 1 x TrainCam wireless modem with GPS
- 1 x Monitor located in driver's cabin to view video



TrainCam Application: Event Recording

Trains carry an event recorder that records the speed of the train, the G forces, the position of various driver controls and readings of many instruments and sensors. This information can be recovered from a train that has been involved in an incident with a view to determining what occurred and why. Video recording is an additional tool in event recording.

As an addition to the event recorder, the TrainCam system records the view from the driver's cabin to the information. The video information dramatically enhances the ability of experienced incident analysis experts to determine the cause of an incident. The event recorder data and TrainCam video can be used as evidence in legal proceedings. It has been demonstrated that video evidence is far easier to follow and understand than data analysis.

TrainCam Application: Driver Awareness

The TrainCam system has safety applications for increasing driver awareness. The real-time video monitoring units are used to provide a live view to the driver that would not normally be viewable from the driver's cab. For example, a rear-mounted TrainCam allows the driver to see out the back of the train. This is particularly useful when shunting and coupling.

This has the further advantage that the video feed can also be recorded. The video can be replayed and analysed. It could be used as training material. Again, it could also be used to determine the cause of an incident or as evidence in legal proceedings.

The TrainCam system is a flexible, reliable video monitoring system which serves multiple purposes and provides value to customer investment.