MegaPixel IP Camera

Type numbers NWC-0700, NWC-0800, NWC-0900

BOSCH

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Table of Contents

1   Safety

1.1   Important safety instructions

Read, follow, and retain for future reference all of the following safety instructions. Heed all warnings on the unit and in the operating instructions before operating the unit.

1. **Cleaning** - Unplug the unit from the outlet before cleaning. Follow any instructions provided with the unit. Generally, using a dry cloth for cleaning is sufficient, but a moist fluff-free cloth or leather shammy may also be used. Do not use liquid cleaners or aerosol cleaners.

2. **Heat Sources** - Do not install the unit near any heat sources such as radiators, heaters, stoves, or other equipment (including amplifiers) that produce heat.

3. **Water** - Do not use this unit near water, for example near a bathtub, washbowl, sink, laundry basket, in a damp or wet basement, near a swimming pool, in an outdoor installation, or in any area classified as a wet location. To reduce the risk of fire or electrical shock, do not expose this unit to rain or moisture.

4. **Object and liquid entry** - Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electrical shock. Never spill liquid of any kind on the unit. Do not place objects filled with liquids, such as vases or cups, on the unit.

5. **Lightning** - For added protection during a lightning storm, or when leaving this unit unattended and unused for long periods, unplug the unit from the wall outlet and disconnect the cable system. This will prevent damage to the unit from lightning and power line surges.

6. **Controls adjustment** - Adjust only those controls specified in the operating instructions. Improper adjustment of other controls may cause damage to the unit. Use of controls or adjustments, or performance of procedures other than those specified, may result in hazardous radiation exposure.

7. **Overloading** - Do not overload outlets and extension cords. This can cause fire or electrical shock.

8. **Power cord and plug protection** - Protect the plug and power cord from foot traffic, being pinched by items placed upon or against them at electrical outlets, and its exit from the unit.

9. **Power disconnect** - Units with or without ON/OFF switches have power supplied to the unit whenever the power cord is inserted into the power source; however, the unit is operational only when the ON/OFF switch is in the ON position. The power cord is the main power disconnect device for switching off the voltage for all units.

10. **Power sources** - Operate the unit only from the type of power source indicated on the label. Before proceeding, be sure to disconnect the power from the cable to be installed into the unit.

    – For external power supplied units, use only the recommended or approved power supplies.

    – For limited power source units, this power source must comply with *EN60950*. Substitutions may damage the unit or cause fire or shock.

    – For 9-12 VDC units, voltage applied to the unit's power input should not exceed 12.3 VDC. User-supplied wiring must comply with local electrical codes (Class 2 power levels). Do not ground the supply at the terminals or at the unit's power supply terminals.

    – If unsure of the type of power supply to use, contact your dealer or local power company.

11. **Servicing** - Do not attempt to service this unit yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

12. **Damage requiring service** - Unplug the unit from the main AC power source and refer servicing to qualified service personnel when any damage to the equipment has occurred, such as:

    – the power supply cord or plug is damaged;

    – exposure to moisture, water, and/or inclement weather (rain, snow, etc.);

    – liquid has been spilled in or on the equipment;

    – an object has fallen into the unit;

    – unit has been dropped or the unit cabinet is damaged;

    – unit exhibits a distinct change in performance;

    – unit does not operate normally when the user correctly follows the operating instructions.

13. **Replacement parts** - Be sure the service technician uses replacement parts specified by the manufacturer, or that have the same characteristics as the original parts. Unauthorized substitutions may cause fire, electrical shock, or other hazards.

14. **Safety check** - Safety checks should be performed upon completion of service or repairs to the unit to ensure proper operating condition.

15. **Installation** - Install in accordance with the manufacturer's instructions and in accordance with applicable local codes.

16. **Attachments, changes or modifications -** Only use attachments/accessories specified by the manufacturer. Any change or modification of the equipment, not expressly approved by Bosch, could void the warrantee

or, in the case of an authorization agreement, authority to operate the equipment.

1.2   Safety precautions

DANGER! High risk:
This symbol indicates an imminently hazardous situation such as "Dangerous Voltage" inside the product. If not avoided, this will result in an electrical shock, serious bodily injury, or death.

WARNING! Medium risk:
Indicates a potentially hazardous situation.
If not avoided, this could result in serious bodily injury or death.

CAUTION! Medium risk:
Indicates a potentially hazardous situation. If not avoided, this may result in minor or moderate injury. Alerts the user to important instructions accompanying the unit.

CAUTION!
Indicates a potentially hazardous situation.
If not avoided, this may result in property damage or risk of damage to the unit.

NOTICE!
This symbol indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

1.3   Important notices

Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury and/or serious damage to the unit. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer. When a cart is used, use caution and care when moving the cart/apparatus combination to avoid injury from tip-over. Quick stops, excessive force, or uneven surfaces may cause the cart/unit combination to overturn. Mount the unit per the manufacturer's instructions.

Camera lens - A camera lens must comply and be tested in accordance with *UL/IEC60950*. Any output or signal lines from the camera must be SELV or Limited Power Source. For safety reasons the environmental specification of the camera lens assembly must be within the environmental specification of -10 °C (14 °F) to 50 °C (122 °F).

Disposal - Your Bosch product was developed and manufactured with high-quality material and components that can be recycled and reused. This symbol means that electronic and electrical appliances, which have reached the end of their working life, must be collected and disposed of separately from household waste material. Separate collecting systems are usually in place for disused electronic and electrical products. Please dispose of these units at an environmentally compatible recycling facility, per *European Directive 2002/96/EC*.

Environmental statement - Bosch has a strong commitment towards the environment. This unit has been designed to respect the environment as much as possible.

Pluggable equipment - Install the socket outlet near the equipment so it is easily accessible.

Power disconnect - Units have power supplied whenever the power cord is inserted into the power source. The power cord is the main power disconnect for all units.

Power lines - Do not locate the camera near overhead power lines, power circuits, or electrical lights, nor where it may contact such power lines, circuits, or lights.

Warning - This device is intended for use in public areas only. U.S. federal law strictly prohibits surreptitious recording of oral communications.

> **NOTICE!**
> This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC & ICES INFORMATION

(U.S.A. and Canadian Models Only)

This device complies with *part 15* of the *FCC Rules*. Operation is subject to the following conditions:

– this device may not cause harmful interference, and

– this device must accept any interference received, including interference that may cause undesired operation.

> **NOTICE!**
> This equipment has been tested and found to comply with the limits for a **Class A** digital device, pursuant to *Part 15* of the *FCC Rules* and *ICES-003* of *Industry Canada*. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his expense.
>
> Intentional or unintentional modifications, not expressly approved by the party responsible for compliance, shall not be made. Any such modifications could void the user's authority to operate the equipment. If necessary, the user should consult the dealer or an experienced radio/television technician for corrective action.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: How to Identify and Resolve Radio-TV Interference Problems. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Disclaimer

Underwriter Laboratories Inc. ("UL") has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested fire, shock and/or casualty hazards as outlined in UL's *Standard(s) for Safety for Information Technology Equipment, UL 60950-1*. UL Certification does not cover the performance or reliability of the security or signaling aspects of this product.

UL MAKES NO REPRESENTATIONS, WARRANTIES, OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY SECURITY OR SIGNALING-RELATED FUNCTIONS OF THIS PRODUCT.

> **NOTICE!**
> This user guide has been compiled with great care and the information it contains has been thoroughly verified. The text was complete and correct at the time of printing. The ongoing development of the products may mean that the content of the user guide can change without notice. Bosch Security Systems accepts no liability for damage resulting directly or indirectly from faults, incompleteness or discrepancies between the user guide and the product described.

More Information

For additional information, please contact the Bosch Security Systems location nearest you or visit our web site at www.boschsecuritysystems.com

2   Introduction

Bosch MegaPixel® video cameras are state-of-the-art IP units designed to deliver full-motion, high definition digital video across local area networks. The DiBos software system accommodates multiple cameras connected to a single video server and provides a variety of display and digital archiving modes. Delivering over 45 Mpixels/sec of crystal-clear imagery, Bosch MegaPixel cameras represent a superior alternative to low resolution analog and digital video. To accommodate this level of performance certain minimum system requirements have to be met. Please make sure to read this entire manual and to follow the installation instructions given below. For DiBos8 insallation and operation details, refer to its instructions and manuals.

2.1   Product information

Contact Bosch Security Systems:

– On the web at http://www.boschsecurity.com/

– By post, e-mail, or phone/fax: from the above mentioned webpage click contact, select Security Systems from the drop down menu and scroll down for your region.

2.2   System requirements

The DiBos8 digital video recorder system is the primary viewer and recording system for the Megapixel cameras. In the DiBos8 dongle, the "Network Cameras" must be enabled. Sufficient disk space should be available for the Megapixel cameras files. File size is approximately 200 Kbytes per image.

Camera setup and verification is best done using a dedicated PC with Windows 2000 or Windows XP operating system and running the supplied Bosch Video System.

Personal Computer:

The suggested minimum computer requirements are as follows:

A PC (or laptop) for setup and verification.

– CPU: 1.4 GHz

– RAM: 512 MB

– Video Card: 1024X768, 64 MB RAM

– Network card: 100 base-T

Standard Performance, with live viewing of 16-17 FPS (frames per second) of full-resolution video:

- CPU: 3.0 GHz
- RAM: 512 MB
- Video Card: 1600x1200, 64 MB RAM
- Network card: 100 base-T

High performance, with best frame rate live viewing:

- CPU: Dual CPU or DualCore 3.2 GHz
- RAM: 1 GB
- Video card: 1920x1200, 128 MB RAM (for NWC-0800 resolution)
- Network card: 100 base-T, 2 network cards - one for cameras and one for other network functions

Monitors, for full resolution live viewing:

- 24-inch Wide Aspect Flat Panel LCD Monitor with Height Adjustable Stand (1920x1200 Resolution)
- 24 Inch LCD Display (1920 x 1200 resolution)

For Setup and verification:

- Standard PC monitors can be used, images are automatically scaled to the correct size.

2.3   Network switch or router

Using a 100 Mbps network switch or router is recommended. Simple hubs do not provide collision management and are not suitable for a multi-camera audio/video system. Suggested models:

Power-over-Ethernet routers:

- "Netgear ProSafe 8PT 100Base-TX Switch with PoE #FS108PNA

  10/100Base-TX w/4 PoE 100Base-TX
- "Netgear ProSave 16PT 100Base-TX Switch with PoE #FS116P

  10/100Base-TX w/8 PoE 100Base-TX
- "Netgear ProSafe 24+2 Gigabit Switch with PoE

  1 Gigabit output w/12 PoE 100Base-TX

  (www.netgear.com)
- "D-Link Web Smart #DES-1316 (POE Switch/Hub)

www.dlink.com

10/100Base-TX

8 PoE ports and 8 non-PoE ports

True IEEE 802.3af

– "TRENDnet #TPE-S88 (POE Switch/Hub)

www.trendnet.com

10/100Base-TX

8 PoE ports and 8 non-PoE ports

True IEEE 802.3af

– "PowerDsine #PD-6001/AC (PoE Single port hub)

www.powerdsine.com

10/100Base-TX

Single Midspan POE port

True IEEE 802.3af

> **NOTICE!**
> PoE network equipment must be CE marked for use in Euro-pean Community. Note that the cameras are designed for use with indoor network cabling only.

3   Camera reference

3.1   Introduction

NWC-0700, NWC-0800 and NWC-0900 are megapixel resolution IP cameras capable of delivering crisp, low-noise images at a video frame rate.

NWC-0700 is a 2-megapixel resolution camera having maximum resolution of 1600 by 1200 and achieving a maximum frame rate of 24.

NWC-0800 is a 3.1-megapixel resolution camera having maximum resolution of 2048 by 1536. It is typically viewed at 1920 by 1200 resolution with the frame rate up to 20.

NWC-0900 is a dual-sensor, day-night camera featuring a 3.1-megapixel color sensor paired with a 1.3-megapixel monochrome sensor sensitive to near infrared illumination. When the scene is well illuminated, the 3.1-megapixel sensor is selected to deliver color images of up to 2048x1536 pixels. To provide seamless transition between day and night modes, the color sensor is set to default resolution of 1920x1200 pixels. In low-light conditions, NWC-0900 can automatically switch to the 1.3-megapixel (1280x1024) monochrome sensor, enabling the delivery of clear imagery at illumination levels as low as 0.01 lux. NWC-0900 typically delivers 20 fps in day mode and over 30 fps in night mode.

All cameras are equipped with LAN connector and can deliver image data at a maximum data rate of up to 55 Mbps. Images are sent over the network in a compressed Motion JPEG format using TFTP protocol with the supplied software or using HTTP protocol with DiBos8.

Power for all cameras can be supplied via DC jack (+9 V to +12 V) or Power over Ethernet.

> ⚠ **CAUTION!** Medium risk:
> Never supply power via the Ethernet connection (PoE) when power is already supplied via the power connector.

All cameras feature:

– Automatic exposure (AE) and Gain (AGC) control

– Automatic backlight compensation

– Automatic multi-matrix white balance

– 50/60 Hz selectable flicker control

– Electronic pan, tilt, and zoom (PTZ)

- – Adjustable brightness, saturation, gamma, and sharpness
- – Simultaneous delivery of full-field view and zoomed images at video frame rate
- – Electronic image rotation by 180 degrees
- – On board motion detection
- – Auto iris on NWC-0700 and NWC-0800

3.2 Connectors

NWC-0700, NWC-0800, and NWC-0900 have the following connectors located on the rear side of the camera housing:

- – LAN connector (100 Base-T). The LAN connector also accepts power-over-Ethernet, 48V DC over spare wires or over data pairs. The cameras are compliant with IEEE 802.saf. The polarity is arbitrary. For a list of recommended PoE switches, see "Network Switch or Routers."
- – Via DC jack, accepting 9V-12V (+/-10%) DC supply, 500 mA. The center contact in the power connector is positive.
- – DC-iris connector. NWC-0900 does not support auto-iris so does not have this connector.

3.3 Housing and mounting

All camera models feature durable aluminum housing. The ambient temperature should be maintained between 0 ºC and 40 ºC. The cameras are not to be used outdoors without appropriate protective enclosures. When using outdoor an enclosure with proper protection grade shall be used. The NWC-0900 has two lenses and requires a 3" window to avoid shading; there is no such limitation for the other two models.

Cameras are mounted using a ¼" x 20 threaded hole at the top and bottom of the housing.

CAUTION!
When mounting the camera, make sure the screw that goes into the hole is short in length, 6.35 mm (¼ inch) or less, and does not touch the camera board.

The cameras are to be installed according to the applicable code. The mounting means should be adequate for mounting a ½ kg (1 lb) camera.

3.4   Network cabling

Category 5 cabling or better is recommended. All network cabling must be installed according to applicable codes and regulations.

3.5   Optics

The MegaPixel cameras should be used with a 1/2" or larger optical format lens. The NWC-0900 requires two manual-iris lenses and has a limitation on lens diameter (<38mm).

3.5.1   Using manual iris lenses

Choosing the lens correctly is very important for megapixel cameras. A poorly selected lens may cause the image to appear blurry when the lens iris is fully opened or closed too far. To deliver sharp megapixel resolution images you should:

–   Use megapixel-resolution lenses;

–   Obtain best resolution and depth of focus by having the iris slightly closed.

When setting up the camera, direct it at the scene and try closing the iris by several F-stops. At some point the image will look its sharpest. Leave the iris closed at this value. In situations where motion-blur can be expected, an iris value should be selected that gives best balance of resolution, depth of focus, and motion blur.

3.5.2   Auto-iris lenses

Standard DC auto-iris lenses can be used with the NWC-0700 and NWC-0800 cameras. Cable shall be minimum 20 mm or longer.

3.5.3   Using auto-iris lenses

NWC-0700 and NWC-0800 are available with DC auto-iris option. To use the DC auto-iris lens:

1.   Attach the lens to the camera.

2.   Plug the lens cable into the connector on the back of the camera. Make sure that the lens cable is long enough. Many DC lenses are available with short and long cable options.

The camera will automatically detect the presence of an auto-iris DC lens and start using it. Auto-iris lens operation typically proceeds as follows:

–   If illumination is sufficient, the camera will close the iris within half-a-minute.

– When the iris is closed, the image should become visibly sharper. As the iris is gradually closed, the image brightness may fluctuate slightly.

Note: You can monitor the state of the iris in the Bosch Video System "Settings" dialog. See *Section 3.5.2 Auto-iris lenses* for details.

3.6 Accessing cameras

Cameras can be accessed and controlled by means of:

– Bosch Video System software

– HTTP requests issued from DiBos8 or Internet Explorer

3.6.1 Supported network services

NWC-0700, NWC-0800, and NWC-0900 implement video over TFTP and HTTP network protocols. The HTTP protocol allows direct access to the cameras using DiBos8 and through Internet Explorer or other HTTP-based applications.

The Bosch Video System software utilizes TFTP protocol. TFTP protocol yields the highest live viewing frame rate.

Only 100 Mbps/1 Gbps network switches should be used. Simple hubs do not segregate network segments, and should be replaced in existing networks to be used with MegaPixel cameras.

4 Software

DiBos 8 provides viewing and recording functions for standard analog as well as Network-connected cameras. DiBos8 supports full-resolution recording of the Bosch Megapixel cameras. At playback, the full resolution can be utilized by zooming in on the area of interest. In addition, live viewing supports the zoom function to select display of detail. Refer to DiBos8 manuals for further information.

A typical system consists of a number of cameras connected over the local or wide area network to a server PC running DiBos8.

Fig. 4.1 Cameras connected over a local area network to a server PC running DiBos

The Bosch Video System software is supplied on the CD. This program includes camera setup, live viewing, and firmware upgrade software modules.

4.1 Software installation

To install the Bosch Video System software:

1. Make sure your Windows XP/2K account has administrative privileges;

2. Run the setup.exe from the CD.

Setup process installs software and places the Bosch Application Manager shortcut icon on the desktop. The program also installs Bosch Video System in the Start menu with links to individual applications:

– Application Manger

– Camera Installer

– Firmware Loader

– Video System

Starting the Application Manager opens a window with buttons that access the following program functions:

– Camera Installer: for setting up the network parameters of individual megapixel cameras;

- Video System: live viewing for setting up the camera parameters and motion detection function of the installed cameras;
- Camera Upgrade: for loading firmware upgrades into the Megapixel cameras.

Note: The software is installed in C:\Program Files\Bosch

4.1.1 Configure firewall

As you start the application, your PC may prompt you to permit access to the network. Bosch Video System includes two applications that need access to the network:

- AVInstaller.exe - the camera finding and installation program;
- LocalMachine.exe - the viewing and archiving program;
- FirmwareLoader.exe - the firmware upgrading program.

The executables are located in the installation folder. You should grant access to these applications when the firewall prompts you.

If you are using the Windows XP firewall, add these three programs to the Exceptions Tab of the program.

4.1.2 Bosch Application Manager

Clicking the Bosch Application Manager icon on the user's Desktop provides access to all programs and utilities of the Bosch Video System. Click the Run button to start the individual program modules. Clicking Close ends operation of the program.
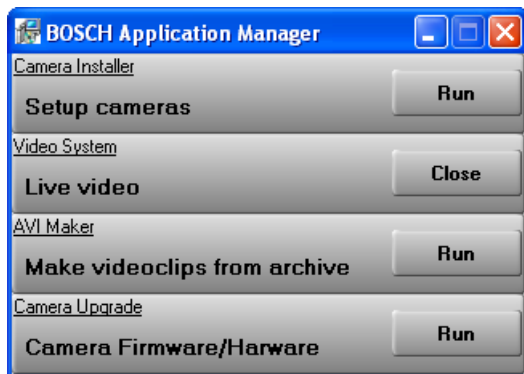

Fig. 4.2 Bosch Application Manager

4.1.3   Camera installer

Camera Installer allows you to find all cameras that are present on the local area network, assign IP addresses to the detected cameras, and to verify that the cameras are accessible and operational. Camera Installer saves information about installed cameras into a dedicated file used by Video System. Camera Installer supports two modes of operation - Basic and Advanced.

–   Basic mode - In this mode, Camera Installer detects all cameras that are within range of the broadcast request (all cameras within the network segment of the host PC) and automatically assigns IP addresses to the cameras. It selects those addresses that belong to the same sub-network as the host PC itself and not yet assigned to other network cameras. To detect and install the cameras automatically, the user should simply press the Automatic button in the Basic mode. The installer will find, configure, and verify the operability of the cameras, and will report installation results as shown below. Once installation is complete, the user should press the Save/Exit button to save the setup information and exit the Installer.
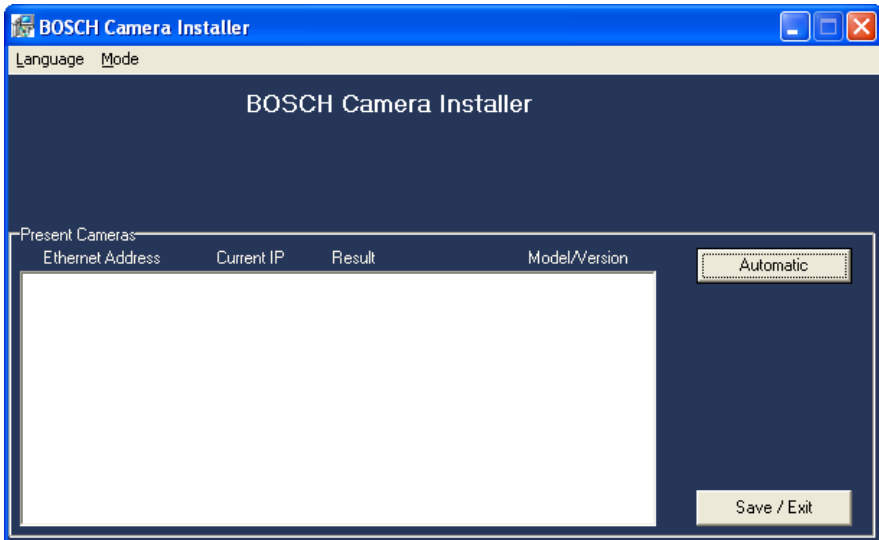

Fig. 4.3   Bosch Camera Installer - Basic mode

–   Advanced mode - In this mode, the user can detect all cameras present on the local area network and choose one or more cameras for the installation. Furthermore, Advanced mode allows you to issue the IP numbers of the cameras

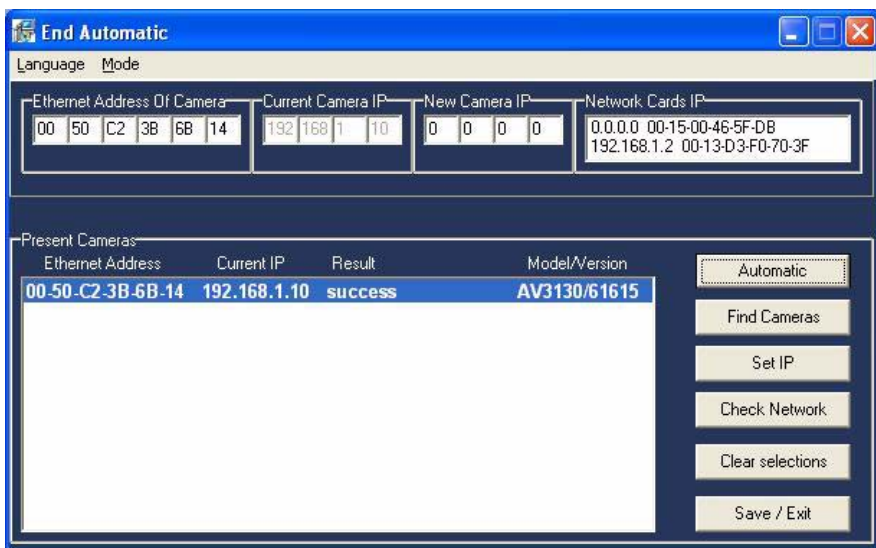either automatically (as in Basic mode) or manually, if specific values of IP addresses are required.

Fig. 4.4 Bosch Camera Installer - Advanced mode

The "Advanced" mode provides the following set-up functions:

| Automatic |

Automatic - this function installs the cameras and verifies their operation. It is similar to the Automatic function in the Basic modes. However, in the Advanced mode the Automatic installation only acts on those devices that were highlighted by the user from among the cameras displayed in the Present Cameras window. Select all active cameras using the Ctrl or Shift click combination.

| Find Cameras |

Find Cameras - this function will locate all cameras that are present on the local network and are accessible by the broadcast request. At the completion of this operation, the installer will show all detected cameras.

| Set IP |

Set IP - this function allows the user to program a specific IP address in the camera. If the camera has already been found by the Find Cameras function, then the user should highlight that camera, type the desired IP address in the New Camera IP window, and click Set IP. If the camera cannot be found by the Find Cameras function due to the fact that the existing firewall settings block broadcast requests, the user may still be able to change the camera IP number. Type both the camera Ethernet (MAC) address and

desired IP number in the boxes at the top of the installer and click the Set IP button.

Check Network - this feature will find the active network adapters on your system. The results will be displayed in the "Network Cards IP" section of the Advanced window.

Clear Selections - this feature will clear/reset any information in the "Present Cameras" section, other than the MAC and IP addresses listed.

Save/ Exit - this feature will save the "successful" set up information of the selected cameras and exit the installer.

4.1.4   Installation tips

Assigning IP addresses

By using devices other than Bosch MegaPixel cameras on the same network segment, the installer program will not find those devices and, consequently, Automatic mode of the installer could assign duplicate IP addresses. In this case, use manual assignment of IP addresses in the Advanced mode.

In addition, the combination of Bosch MegaPixel cameras with a DHCP function for other network devices on the same network segment will run the risk of creating duplicate IP addresses in Automatic mode. Configure the DHCP server to leave a block of IP addresses unassigned. Manually assign IP addresses to the Megapixel cameras in this block of free IP addresses. Finally, segmenting the network with only megapixel cameras used in their own segment, would allow Automatic assignment of IP addresses.

Subnets

When the megapixel camera has an existing IP address belonging to the same network but outside the subnet of the host PC, assign a new IP address manually. After clicking "Set IP" the program will report the correct IP address but may give a Fail result. Select that camera and then Click the Automatic button. The Result will now show success. Be sure to select and save all active cameras.

Keeping a log of MAC addresses

We recommend keeping a written record of the camera's MAC addresses and the location of their installation. This will enable you to know the IP addresses assigned to that location when the camera is added into the DiBos8 configuration. The MAC and IP addresses can also be verified in the Video System viewer. Right click in the viewer window and select "About".

Now the image numbers, MAC, and IP addresses are displayed in the pop up window.

4.2 Operating Bosch Video System

Note: The Bosch Video System is provided as a tool for setting up the megapixel cameras. The program is license free with archiving and playback functions disabled. For extensive recording and playback functions, the DiBos8 system should be used.

After the cameras are successfully installed using the Camera Installer, the Video System can be activated by clicking on the corresponding Run button in the Application Manager.The BOSCH Video System screen will then appear and, if applicable, a pop-up message warning that the display resolution is different from camera resolution. Click OK; the images are automatically scaled to the available screen resolution. Shown below is the Bosch Video System showing video display area for one camera.
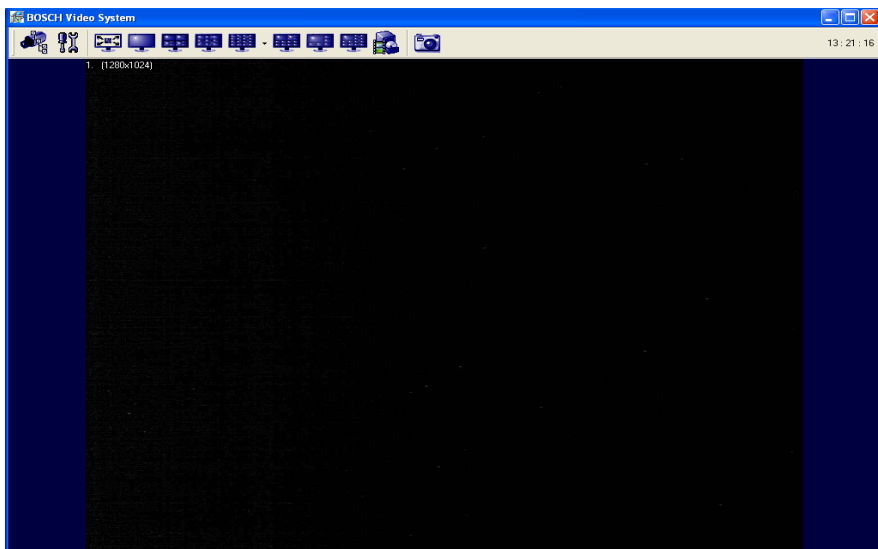

Fig. 4.5   Bosch Video System showing video display area for one camera

4.2.1 Toolbar

The toolbar of the Bosch Video System is located in the upper portion of the screen above the video display area. It contains the following icons:

Turns on/off a drop-down list of the installed cameras. Individual cameras are disabled/enabled by left double-clicking on the camera number. When disabled, a live video image from the disabled camera is replaced with a blue rectangle, and the camera number in the drop-down list is marked with a red cross.

Displays the Settings menu (see Settings section below).

Enables a full screen display without the toolbar and menus. Return to window display by clicking the dedicated icon in the pop-up window or by the Esc button.

Selects screen layout for viewing live video from multiple cameras (from left to right):

– single camera layout; 2x2 camera layout; 3x3 camera layout; 4x4 camera layout;

– 10-camera layout with 2 large and 4x2 smaller images;

– 8-camera layout with 1 large, 3x1 and 1x4 smaller images;

– 13-camera layout with 1 large, 2x2 and 4x2 smaller images.

Depending on the chosen screen layout and the actual number of installed cameras, the unused sections of the layout will be empty blue screens.

Displays the archive controls (not operative in this software version). These are explained in *Section 4.2.6 Archive.*

Takes a snapshot of live video. The snapshot is taken from the camera which is highlighted in the drop-down list of the installed cameras (see above). To highlight another camera, left-click on the camera number; to take the snapshot from all cameras, highlight "cameras" at the root (top) of the drop-down camera list. The snapshot file names contain the camera number, date, and time of the snapshot. To locate/view the snapshots in the snapshot folder, right-click anywhere on screen, then select "photo,"

"browse." Alternatively, snapshots can be taken by right-clicking on the live video image, and then selecting "photo", "save". The directory path to the snapshot folder is specified in the Settings menu (see *Section 4.2.3 Settings*).

4.2.2   Selecting full/reduced resolution and zoom

Selecting Cameras

Click the icon to display the drop-down menu with installed cameras. Cameras shown in the tree can be displayed in any of the image windows of the selected screen layout.

Left-click on a camera in the tree and, while holding down the mouse button, drag to the image window where the image should be displayed - drop by releasing the mouse button.

Full/Half camera resolution

With single camera display selected, the camera operating resolution can be switched between full or half resolution by double-clicking on the image. When the display resolution of the PC is lower than the camera resolution, the Video System program will automatically scale the image down to correctly display the full image size. Camera resolution (in pixels) is displayed in the upper left corner of the image.

Full size/Reduced size display

In order to fit multiple video images on screen, the images are displayed at a reduced display size. The format of the reduced size display is determined by the chosen screen layout (see *Section 4.2.1 Toolbar*).

An individual camera image can be expanded to full size of the single image window or scaled back to its reduced resolution display by double-clicking on the image. Image resolution (in pixels) is displayed in the upper left corner of the image.

Zooming

A method for viewing more detail in the area of interest is the zoom window (see following screenshot).

To zoom in on an area of interest, draw a rectangle with the mouse (by left-clicking and holding down the mouse button). A separate zoom window will open up showing live video of the selected area at full resolution. A green outline of the selected area will appear in the underlying reduced resolution image. Zooming in and out is performed by pressing Page Up and Page Down on the keyboard, or alternatively by rotating the mouse wheel (if available). Panning of the zoomed area is performed

by dragging the green outline across the underlying camera image with the mouse (by left-clicking within the outline and holding down the mouse button), or alternatively with the keyboard arrow keys.

A maximum of four independent live zoom windows can be opened for each camera. Each zoom window will display live video at the image resolution provided by the camera.
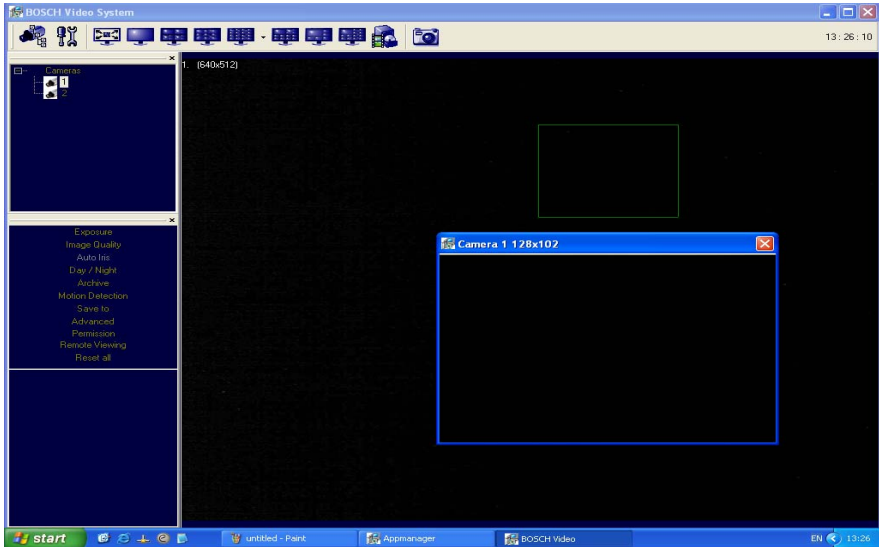

Fig. 4.6   Bosch Video System showing the zoom window

4.2.3   Settings

Settings menu is displayed by clicking on the Settings button

 in the toolbar.

Settings menu (shown on the left) is the top-level menu for all settings provided in the Bosch Video System. Selecting one of the menu items opens up a lower level drop-down menu containing detailed settings and options. Depending on the camera model, some of the listed groups of settings may become unavailable (for example, Day/Night settings are available only for the NWC-0900 camera).

Note: Selecting "Reset all" restores default settings only in the currently displayed lower level drop-down menu, but does not affect other groups of settings listed in the Settings menu. If no lower level menu is displayed, the "Reset all" item is disabled.

The lower level menus contain a "Camera" field that displays the camera number to which the settings apply. The "Camera" field can be expanded to a drop-down list of all installed cameras for selection. The list includes an "All cameras" option to apply settings to all cameras.

4.2.4   Exposure

Exposure is a lower-level menu to adjust exposure related settings:

–   'Illumination' is a group of options to adjust camera's white balance computation to the illumination of the scene. "Automatic" enables the camera to adjust for illumination automatically

–   'Lighting' is a group of options to adjust camera's auto exposure command to select indoor lighting flicker: Europe/eastern Japan (50 Hz) or US/western Japan (60 Hz).

–   'Low Light Mode' is a group of options selectable from a drop-down list to adjust camera's operation under low light conditions:
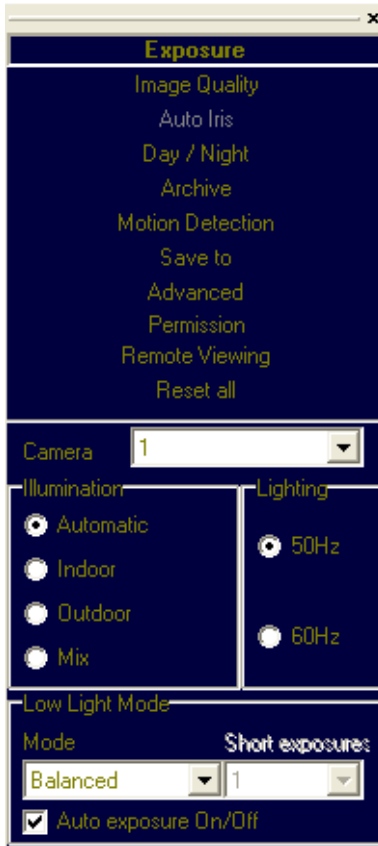
"High Speed" is to enable the shortest exposure time, "Short Exposure" between 1 and 10 ms. This option will reduce motion blur, but may result in a noisier video due to a high gain under low light conditions.

"Speed" is to enable short exposure time of 10 ms in good lighting conditions. In low light situations, the exposure time will gradually increase to 80 ms. This comes at the expense of higher motion blur.

"Balanced" is to enable medium-duration exposures of 20 ms. in average lighting conditions. In low light situations, the exposure time will gradually increase to 80 ms.

"Quality" is to enable longer exposures up to 40 ms, at the expense of the slower frame rate. In low light situations, the exposure time will gradually increase to 80 ms. Motion blur may become high, but video will contain less noise.

"Moon Light™ is to enable very long exposures of up to 500 ms.

- ‘Auto exposure On/Off’ is an option to enable/disable the in-camera automatic exposure computation. Auto exposure enables the camera's electronic shutter and gain control to maintain the target image brightness under changing lighting conditions.

- ‘Single Capture Mode’ is not accessible in this software version.

4.2.5   Image Quality

Image Quality is a lower-level menu to adjust image quality settings.
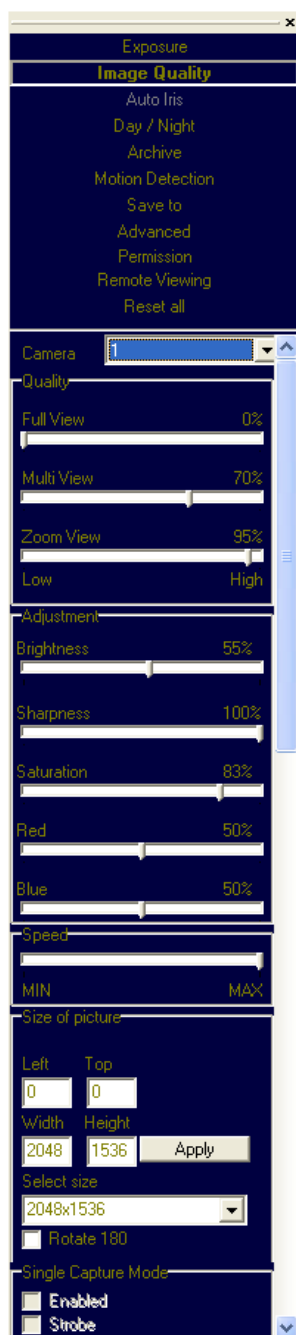
'Quality' (compression) adjusts the level of JPEG compression applied to the images in different display modes:

"Full View" when displaying full resolution video;

"Multi View" when displaying multiple cameras at a reduced size;

"Zoom View" when displaying zoom windows.

Slider at 100% yields best image quality (lowest compression).

'Adjustment'

"Brightness" adjusts image brightness.

"Sharpness" adjusts image sharpness.

"Saturation" adjusts image color saturation.

"Red" adjusts the red tint. This setting changes the target for camera's automatic white balance computation. The effect is gradual: it takes 20-30 seconds for the camera to adjust fully to the new setting.

"Blue" adjusts the blue tint. This setting changes the target for camera's automatic white balance computation. The effect is gradual: it takes 20-30 seconds for the camera to adjust fully to the new setting.

'Speed' adjusts the rate at which the computer requests images from the camera. The maximum rate is limited by the camera (differs for different camera models).

'Size of Picture' adjusts starting coordinates and the image size. Note: affected by "Don't update sensor window" in Advanced settings.

"Rotate 180" is an option for flipping the image vertically and horizontally such that it is rotated 180 degrees.

4.2.6 Archive

Archive is a lower-level menu that is not functional in this software version.
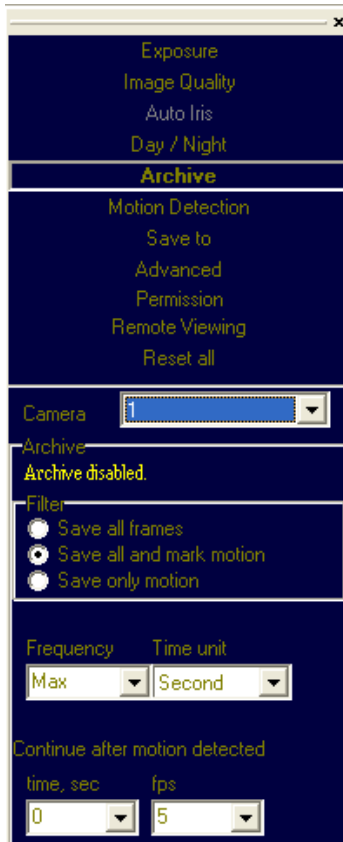
Motion Detection is enabled by making the following 'Filter' selections:

"Save all frames" disables Motion Detection.

"Save all and mark motion" enables motion detection. Select this one when DiBos8 is used with motion-triggered recording.

"Save only motion". With motion detection selected to "Detected by Camera", the camera will only output the images triggered by the motion detection function in the camera.

Select 'Frequency' to Max in order to enable a high frame rate for the Motion Detection window.

4.2.7 Motion Detection

Motion detection is achieved by analyzing inter-frame brightness changes on a pixel-by-pixel basis. There are two modes of Motion Detection supported in Bosch Video System: a software mode and an in-camera mode.

– The software mode performs motion detection by processing the images after transmission from the camera to the computer and works on live images only. In contrast, the in-camera mode performs motion detection prior to trans-

mitting the images to the computer. Thus, the in-camera motion detection significantly reduces both the CPU load and the network load when motion detection is enabled.

– Motion detection is enabled via the Archive settings when one of the two following options is selected: "Save all and mark motion" or "Save only motion." If the Archive is enabled for "Save all frames", motion detection is disabled. The Enabled/Disabled status is displayed in the bottom right corner of the Motion Settings window.

– Motion detection is computed independently in multiple detection zones on a square grid. The largest grid supported for any Bosch camera model and image size is 8 by 8. The actual grid for any particular model is determined by the chosen zone size (a drop-down list in the lower right corner of the Motion Settings screen) and the camera's pixel resolution. The actual grid is displayed in the lower left corner. When motion is present, the Motion Settings window displays green marks (selectable between crosses and boxes) in the zones affected.

– Motion detection can be masked to block motion detection in some of the zones by drawing a rectangle with the mouse (by left-clicking and holding down the mouse button). The masked areas are marked with red crosses. A more complex shape can be created by drawing multiple rectangles. Erasing the mask (or part of the mask) is done by drawing a rectangle with the right mouse button.
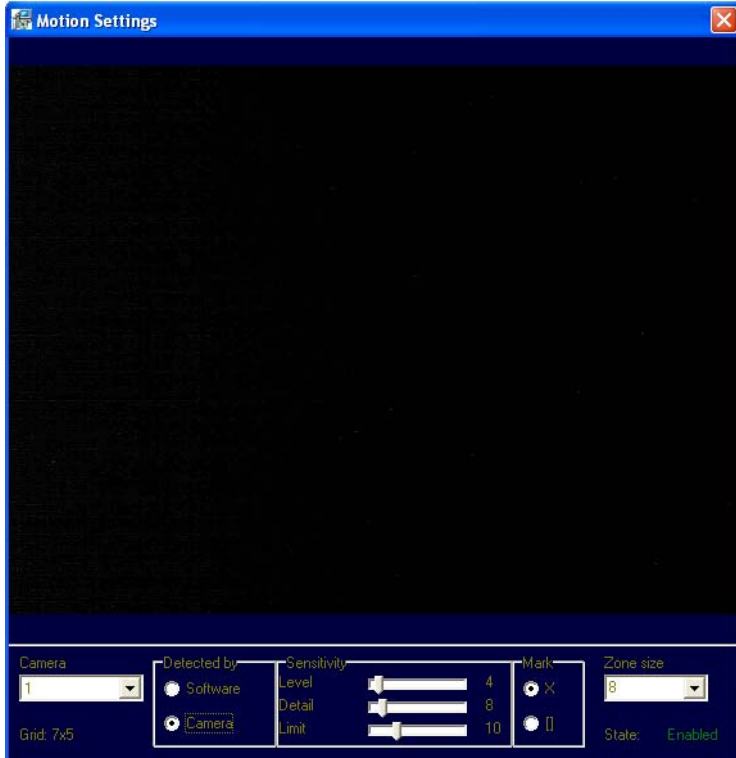
Fig. 4.7 Motion Settings menu showing motion detection settings

Motion detection settings apply only to the camera number displayed in the Camera field on the left of the Motion Settings menu: use the drop-down list to change the camera number. The settings are:

– 'Detected by' provides two selected options, the software motion detection and the in-camera motion detection.

Note: Select to Detected by Camera when Motion Triggered Recording on DiBos8 is used.

– 'Sensitivity' is a group of controls to adjust motion detection computation:

    – "Level" adjusts the inter-frame brightness change threshold that triggers motion detection. Lower settings may cause false motion detection due to noise.

    – "Detail" adjusts the size of the detectable objects within each motion detection zone. Lower settings may cause false motion detection due to noise.

> – "Limit" serves as a guard against false triggering due to a sudden overall change in lighting that would trigger motion detection in a large number of zones simultaneously. If the number of zones activated simultaneously is larger than "Limit," motion detection will be blocked. This parameter cannot exceed the number of zones in the grid (displayed in the lower left corner of Motion Settings).

4.2.8 Save to

A lower level Save to menu allows one to specify the directory path for video archives and snapshot images. Note that the other selections in this menu are for archiving, which is not available in this software version.

4.2.9 Advanced
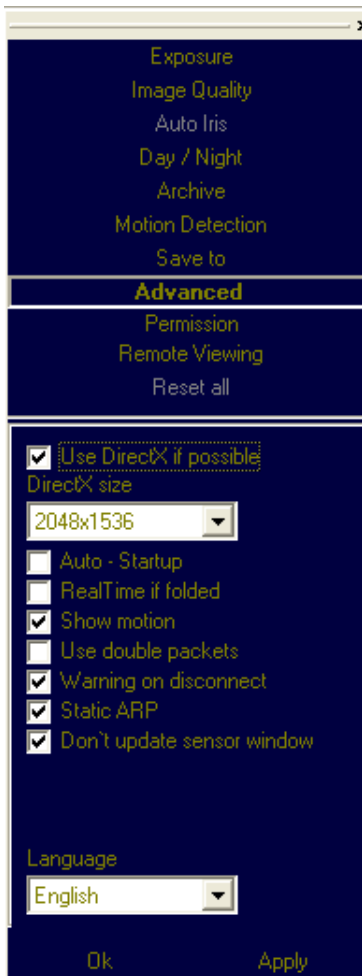
"Use DirectX if possible" is an option to use DirectX functions that utilize graphics card hardware to display images, instead of using the software. This reduces the load on the CPU. The drop-down list "DirectX size" provides options for the graphics area size supported by DirectX.

"Auto - Startup" is an option to start the Bosch Video System automatically when Windows starts up.

"RealTime if folded" is an option to continue running the Bosch Video System application at the top priority level in the Windows Task Manager, after the application was minimized and placed into the system tray of the Windows task bar.

"Show motion" is an option to mark the areas of the image where motion was detected.

"Use double packets" is an option to use data packets with 2904 bytes instead of the regular 1450 bytes for image transmission. This allows for the increase of image transmission bandwidth, but may lead to a less stable performance on overloaded networks.

"Warning on disconnect" is an option to display a red screen warning in place of live video that has been disconnected or temporarily lost. When disabled, the Video System displays the last captured frame.

"Static ARP" is an option to enable a static link between the camera's MAC address and its IP address.

"Don't update sensor window" is an option that determines how the changes to the image size are applied: at a software level or in hardware (the image sensor). Enabling this option

helps to avoid conflicts when multiple users are viewing the same camera (each will be able to set a different image size). Alternatively, disabling this option allows for increase of the camera frame rate due to a smaller image size.

4.2.10   Permission

Permission (access control) is used to set up password-protected access to the Bosch Video System. For any user there are three levels of access available (from the drop-down list):

"Administrator" grants full access to all features of Bosch Video System.

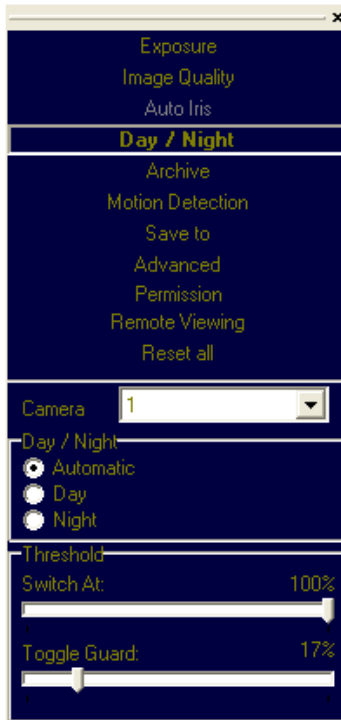"Viewer" grants access to live video and browsing the archives, but not to the settings.

"Live only" grants access to live video only.

Adding, changing, and removing users is done via the three buttons "Add", "Change", and "Remove" on the bottom of the menu.

4.2.11   Remote Viewing

Remote Viewing is disabled in this software version.

4.2.12   Day/Night

Day/Night settings apply only to the NWC-0900 camera.

"Automatic" enables the camera to switch automatically from daylight conditions (using the color sensor) to nighttime conditions (using the monochrome sensor) and vice versa, based on the Threshold settings (see below).

"Day" enables the daylight mode and disables the nighttime mode.

"Night" enables the nighttime mode and disables the daylight mode.

'Threshold' adjusts the automatic switching of the camera:

"Switch At" changes the adjustment level of darkness from daylight to nighttime mode.

"Toggle Guard" changes the adjustment level of brightness from nighttime to daylight mode. Toggle Guard set to 0% corresponds to "Switch At" set to 100%. Toggle Guard should be adjusted to prevent mode toggling during the transitional lighting.

4.2.13   Auto-Iris

The Auto-Iris menu allows monitoring the state of the automatic DC iris. If the scene is too dark, the camera will open the iris fully. This allows more light onto the sensor and will substantially improve the low-light performance. If the scene is too dark when the camera is started, the camera will not close the iris until there is enough illumination.

Camera DC auto-iris can be configured using Auto-Iris menu:
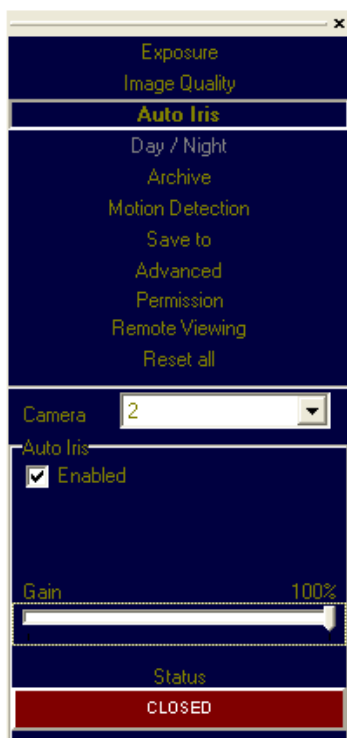
'Auto-Iris' can be disabled by un-checking "Enabled". The camera will open the iris fully and have electronic auto-exposure enabled. This configuration is identical to using a manual lens.

Auto-iris will open the lens fully once the in-camera analog gains exceed a certain level. The "Gain" scroll bar adjusts the point where the auto-iris will open fully: the higher the gain, the later the auto-iris will open as the illumination diminishes.

The 'Status' of the auto-iris is displayed on a color panel, which has six different states:

"Disabled" - the auto-iris is either disabled by un-checking the "Enabled" check box, or is not present;

"Evaluating" - the camera is preparing to close the iris;

"Too Dark" - the camera cannot close the iris because the scene illumination is too low;

"Closing" - the iris is closing down by the number of F-stops appropriate for the illumination level;

"Closed" - the iris is closed to the correct F-stop;

"Opening" - the iris is opening.

4.2.14 Right-click menu

Right-clicking anywhere within the Bosch Video System screen allows you to invoke an additional menu:

'Show' presents two options:

–   "Archive" is not functional in this software version.

–   "Photos" enables access to snapshots taken with the Bosch MegaPixel cameras. The default snapshots location is: My Documents\My Pictures\BOSCH Photos -- a different directory path to the snapshot direc-

tory can be specified in the Settings menu (see Settings).

'Photo' enables saving and printing individual snapshots, as well as browsing:

–   "Save" takes a snapshot of live video and saves it in the snapshot directory. The snapshot is taken from the camera that is highlighted in the drop-down list of the installed cameras (see *Section 4.2.1 Toolbar*). To highlight another camera, left-click on the camera number.

–   "Save/Print" takes a snapshot and prints it instantly.

–   "Browse" opens the snapshot folder for browsing.

'Settings' enables access to changing the main groups of settings as described in Settings (see *Section 4.2.3 Settings*).

–   "Miscellaneous" enables access to the following:
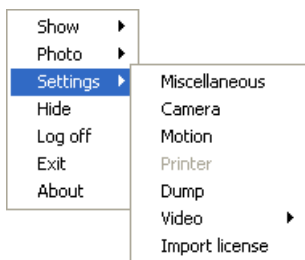
Authentication (see Permission);

Remote Viewing (see Remote Viewing);

Save to (see Save to);

Advanced (see Advanced).

–   "Camera" enables access to a combined menu that includes: Image Quality (see Image Quality), Exposure (see Exposure), Day/Night (see Day/Night), Auto-Iris (see Auto-Iris) and Archive (see Archive). It also includes some of the Advanced settings (see Advanced).

–   "Motion" enables access to Motion Settings (see Motion Settings).

–   "Printer" opens up the "Print Setup" menu.

–   "Dump" logs camera settings to a file named LocalMachine.ini located in the installation directory. Technical Support may request providing the contents of this file.

–   "Import license" is not functional in this software version.

'Hide' minimizes the Bosch Video System application and hides it in the system tray of the Windows task bar.

'Log off' logs off current user and hides the Video System application.

'Exit' exits the Video System application.

'About' shows the version of the Bosch Video System software and the additional information for each of the installed camera(s): camera type, firmware and hardware version, MAC and IP addresses.

4.2.15 User authentication
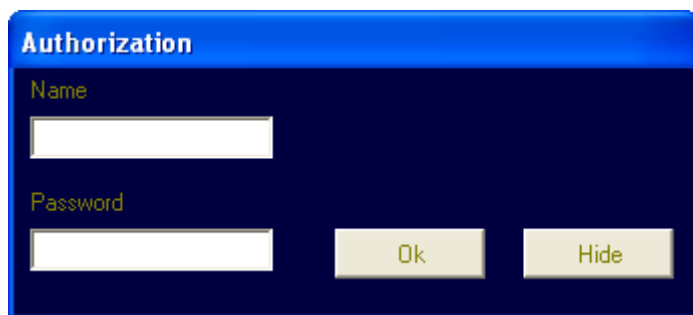
Bosch Video System allows setting up password-protected access (see *Section 4.2.10 Permission*). If one or more user accounts were created, the Bosch Video System will display a log-in dialog prompting for the user name and password, as shown.

4.2.16 Language selection

Bosch Live Video System supports interfaces in English; other languages will be added in future releases. Press the **F2** key to bring up the language menu.

4.2.17 Browsing archives

Archive browsing is enabled by clicking on the archive icon

 in the toolbar. Because the archiving function is not available in this software version, the archive files will be empty.

4.2.18 AVI Maker

The AVI Maker is intended for making AVI clips from the Archive. The program is not functional in this software version.

4.2.19 HTTP access

Bosch MegaPixel cameras can be accessed from Internet Explorer, via the in-camera web page. The web page allows viewing live images and changing some of the camera settings.

The web pages can be addressed by typing in your browser's Address bar:

http://ip_address (or) http://ip_address/index.html

Individual images can be requested from Bosch MegaPixel cameras using a HTTP string.

Please refer to the DiBos8 section of this manual for the string parameters.

4.2.20 Firmware Loader - Upgrading the cameras

Bosch MegaPixel cameras are upgradeable in the field.

The Firmware Loader is the software tool that loads the upgrade files into the cameras.

Always follow the instructions that come with the upgrade file.

4.3 DiBos8 set-up for Bosch Megapixel cameras

DiBos8 is using HTTP requests for live viewing and recording of Megapixel images.

Though DiBos8 may not have display capabilities to view megapixel camera images in full resolution, it does, however, process and record the images in megapixel format. Detail of live and recorded images can be viewed using the DiBos8 zoom function.

The megapixel camera can send up to 5 streams to the same or different clients. The streams can have different frame rates and resolution. In order to save storage space, DiBos8 could record a high resolution low frame rate image of a camera and, at the same time, record images of the area of interest at a high frame rate. In this case, DiBos8 creates two cameras with the same IP address but with different HTTP parameters.

For detail of DiBos8 installation, refer to its respective manuals and instructions.

4.3.1 Preparing Megapixel cameras for DiBos8

For sending the motion trigger signal correctly to DiBos8, you should check that the megapixel camera archive and motion detector settings are correct.

In the settings menu of the Bosch Video System software, first select 'Archive' and verify that the Filter is selected to "Save all and mark motion". Next, select 'Motion Detection' and verify that "Detected by Camera" is selected and the motion detection parameters are set. The megapixel camera sends the 'Motion Detection' trigger to the IP address of the client that last accessed the camera.

4.3.2   Setting up DiBos8 for Megapixel Cameras

Bosch Megapixel cameras are added as JPEG IP cameras in the Network Devices section. The screens to set up are accessible in the "Video and audio" connection screen of Configuration.

1. Mark 'Network' and click the "Add" button in the JPEG IP cameras field.

2. Mark the newly created IP camera in the Network tree and click the "Edit" button in the JPEG IP cameras field.

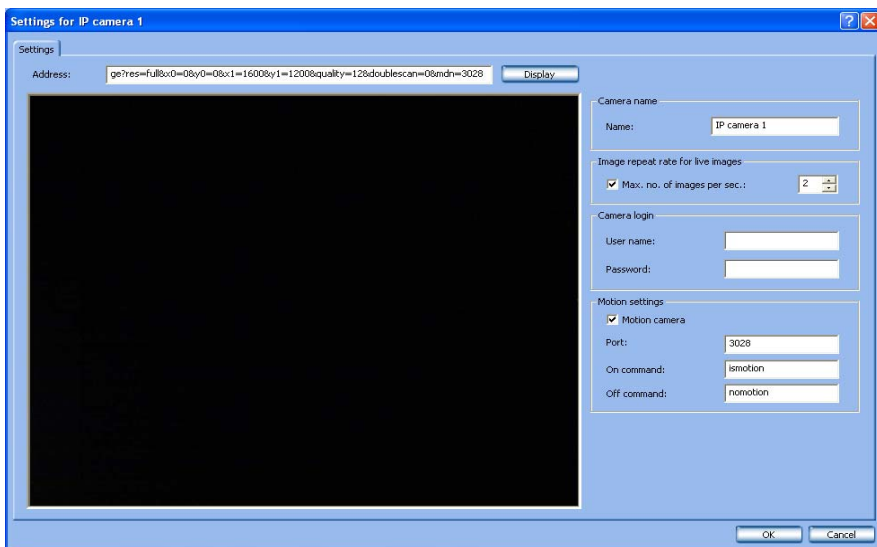3. The Settings screen will now open.

Fig. 4.8   Settings screen in DiBos8

4. In the settings screen enter the address followed by a string of parameters as defined in the HTTP command string parameters section below:

    a. Edit the Camera name if necessary.

    b. Select the number of images per second for live viewing.

    c.   Check "Motion camera" if motion-triggered recording is used with this camera.

    d.   Enter the port number as defined in the HTTP command string.

    e.   For "On command" enter: ismotion

    f.   For Off command enter: nomotion

    g.   Click OK to save the entered configuration.

All remaining DiBos8 recording settings are standard.

4.3.3 HTTP command string parameters

The generic HTTP command string has the following format:

http://<ip_address>/
image?res=<resolution_value>&x0=<x0_value>&y0=
<y0_value>&x1=<x1_value>&y1=<y1_value>&qualty=
<quality_value>&doublescan=<doublescan_value> [&mdn=
<port_no>]

Table 3.1 describes the parameters.

The requested image can have a smaller size (electronic zoom function) than the camera sensor size. The image size is defined by the x0, y0, x1, and y1 coordinates on the sensor. For the NWC-0700 and NWC-0800, the coordinates are defined in pixels. The NWC-0900 has two sensors of differing resolution. Set the x and y coordinates for the 3.1 MegaPixel sensor.

x0 and y0

These two parameters define the left-hand, top-corner point of the requested image. For the NWC-0700 and NWC-0800 the values are in pixels.

x1 and y1

These two parameters define the right-hand, bottom-corner point of the requested image on the imaging device. For the NWC-0700 and NWC-0800 the values are in pixels.

> **NOTE!** DiBos8 automatically scales an image to a 4 (H) x 3 (V) aspect ratio for display. Always maintain the selected image area to be displayed at a 4x3 aspect ratio.

PARAMETER	DESCRIPTION	COMMENT
<ip_address>	The IP address of the camera	e.g. 192.168.2.75
/image?	Image request command	
<resolution_value>	Specifies whether the camera should decimate the image by the factor of 2 in each direction	full or half, e.g. res=half=> an image with 1600x1200 will become 800x600
<x0_value>	The left hand coordinates of the requested image window	default: x0=0
<y0_value>	The top coordinates of the requested image window	default: y0=0
<x1_value>	The right hand coordinates of the requested image window	e.g. x1=1600
<y1_value>	The bottom coordinates of the requested image window	e.g. y1=1200
<quality_value>	The compression quality of the JPEG image with the range from 1 to 21	default: quality=12. 21 gives highest quality
<doublescan_value>	Doublescan is the parameter that allows the user to specify whether the camera should delay the image output until the new image is scanned (doublescan=0) or the image request should be serviced immediately by outputting the content of the current image in the image buffer (doublescan=1) (the image will be displayed faster on the screen)	e.g. doublescan=0
<port_no>	The camera sends "ismotion" to the specified port No. if motion is detected and "nomotion" if motion is not detected.	e.g. port_no=3028 This parameter is optional.

Table 4.1   HTTP command string parameters

Example of zoomed image:

The drawing below shows the size of the 3.1 megapixel sensor in pixels.

The sensor has 2048 px (pixels) in the horizontal direction and 1536 px vertically. An image request at full image size would have the following parameters: x0=0&y0=0&x1=2048&y1=1536.

Taking the shaded area as a zoomed image, with size 1024 px (H) X 768 px (V) at the drawn location, the parameters would have the following values: x0=410&y0=492&x1=1434&y1=1260.
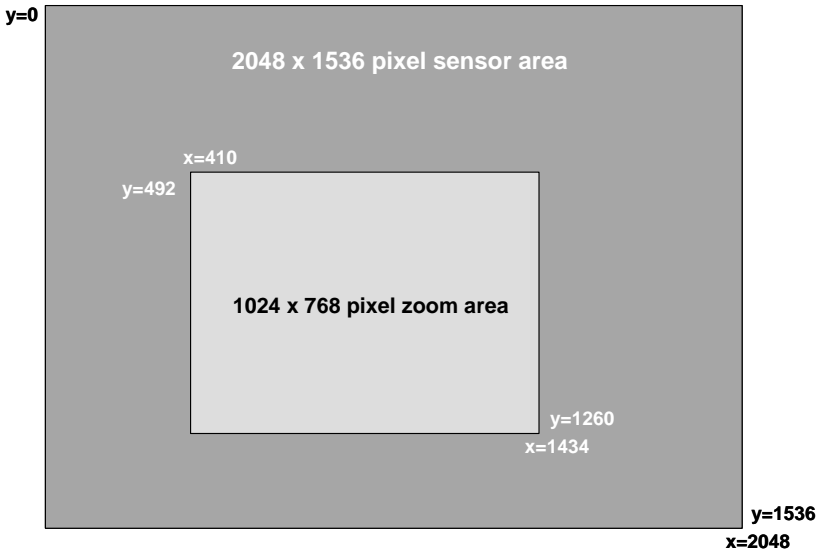

Fig. 4.9   Size of the 3.1 megapixel sensor area in pixels and percentage.

NOTE: Image sensor resolution:

NWC-0700: 1600x1200 (hxv) pixels

NWC-0800, NWC0900: 2048x1536 (hxv) pixels

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