



**KSENOS**  
DIGITAL VIDEO SURVEILLANCE

# Ksenos Prime Installer's handbook

Version 10.121

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Now that the physical installations are done, it is time to configure Ksenos Prime DVR to work as the system's core. This small handbook offers helpful points and examples on how to get Ksenos to work seamlessly with cameras, video servers, controllers, and other devices. Ksenos supports a wide range of hardware by default, so installation should be as painless as possible. Have a nice time reading this handbook!

As the computer starts up, you will have a pre-installed Ksenos Digital Video Recorder in front of you. By default, the system consist of recorder software and essential drivers. Ksenos can also be installed for remote use on most modern computers with sufficient specifications.

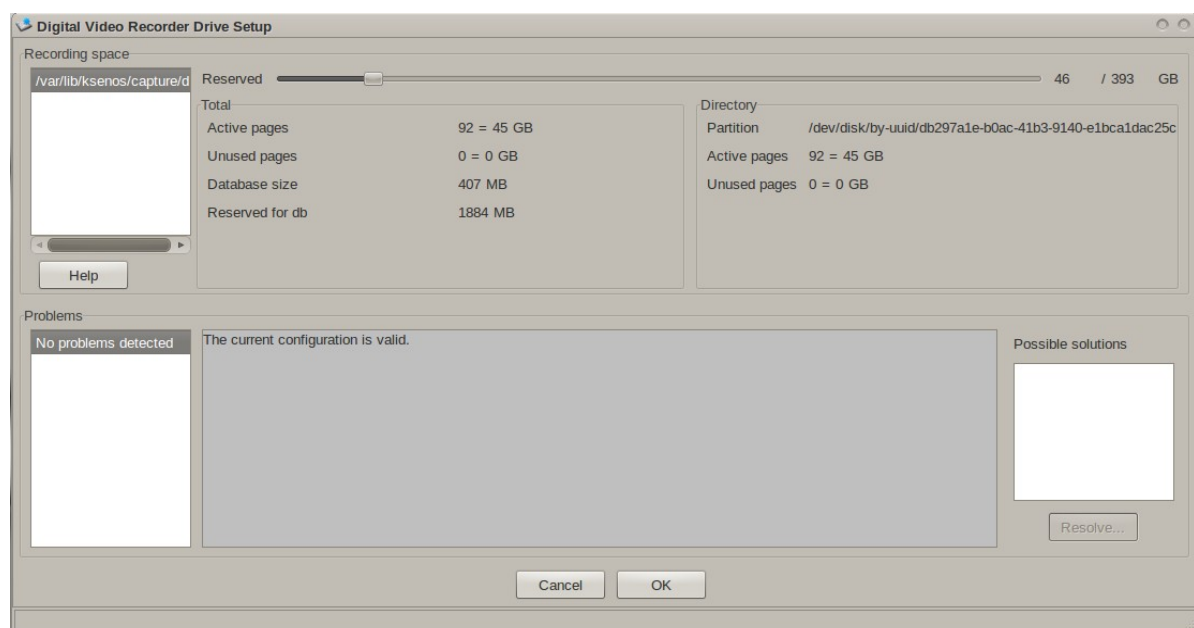
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# 1. Setting up devices and servers

## 1.1 Recording space and database

Normally, a recorder has at least two hard drives. The first one is a traditional mechanic disk for the system and recordings, and second one is a fast SSD drive for the database. To set up suitable space for recordings and database, a bundled application called "DriveSetup" is provided. On Windows systems this application can be found under "Ksenos" folder. On Linux, the DriveSetup tool can be started by pressing "Alt+F2" and typing "drivesetup" in the dialog. Partition "D" is always meant to be used by the database, and partition "E" is for recordings. These names for locations are used in all systems, regardless of operating system or physical path.



DriveSetup can also be used to set smaller recording areas

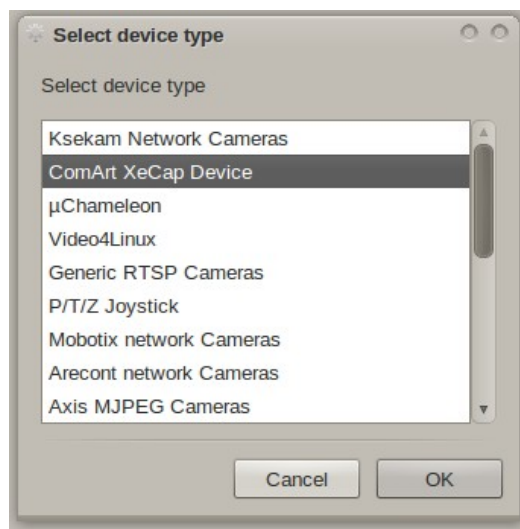
DriveSetup guides you through reserving space and creating database. The application tells you if some parts of the setup is not within recommended values. The "Create" or "Resolve" button reserves space for recordings and creates empty database. If everything is OK within database and recording space, you can move on to add cameras and other devices. Please note that Ksenos must not be running when using DriveSetup.

How much recordings will fit on a 2-terabyte hard disk? There's no simple answer to that question. It depends completely on the quality of recorded images and how much movement is expected on those cameras. The question "How much SSD space does a database require?" can be answered much more easily. The recommended setup for database space is five per cent of the recording space. Less than two per cent ratio can

cause faulty function of the recorder. For example, 2TB recording space would need 100GB of database space and 4TB would need 200GB space, respectively. Database space can never be too big compared to recording space. Sufficient database space will make browsing recordings faster and reduce possibility of errors.

## 1.2 Analog signals

Ksenos uses Xed4040 capturing board for capturing analog signals on a 16-channel recorder. If your new recorder software doesn't have capturing devices added, board can be added as a device. In the Settings window press the "Add..." button and select "ComArt Xecap Device". Next, you can add analog cameras by pressing the "Add..." button again, but now with "Xecap" activated in the tree view. Select how many signals you have connected to the recorder. Ksenos now recognizes analog signals by default.

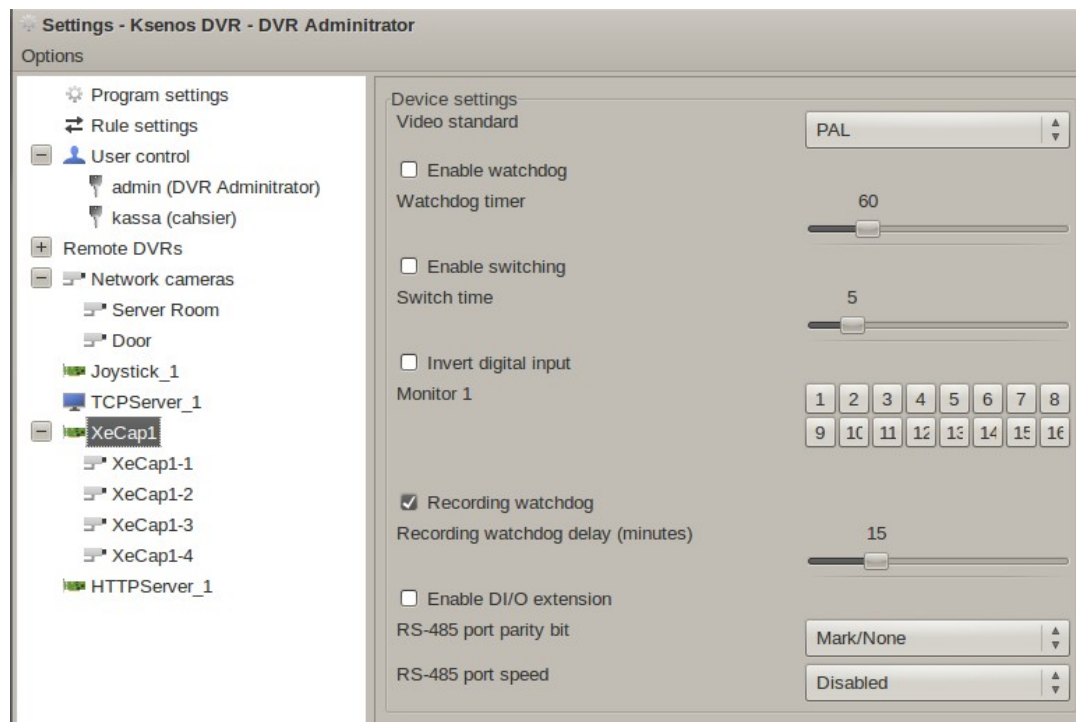


"Add devices" open this dialog

Analog camera settings can now be configured within Ksenos. Most important settings are:

- **Frame rate** - how many frames are captured in one second,
- **Compression** - what codec will be used to compress analog signals for recording
- **Resolution** - in what size images are being recorded at.

**Attention!** When installing signals, input connectors must be filled in numeric order. If there are empty connectors in between, operation of recorder may become unstable.



Settings screen for XeCap

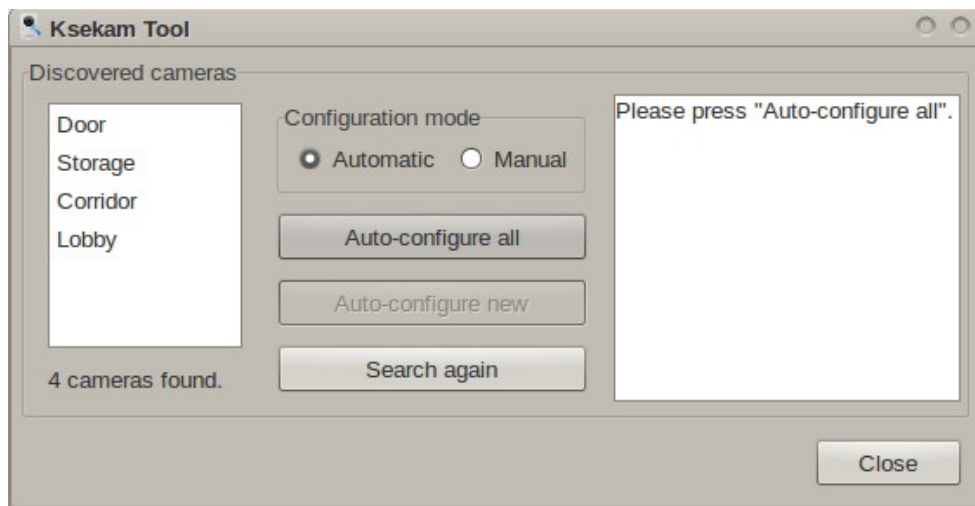
In a normal setup it's possible to use these example settings in 16-channel recorder.

**Frame rate: 25 fps (frames per second)**  
**Compression: MPEG-4**  
**Image size: 2CIF (704x288 pixels)**

Other settings are subject to lighting conditions of the location and personal preferences. Settings from one camera can be copied to all other by pressing the "..."-button in one camera's settings.

### 1.3 Ksekam network cameras

Setting up Ksekam network cameras is easy with a tool called "Ksekam-Tool". On Linux environment KsekamTool can be run by pressing "Alt+F2" and typing "ksekamtool" in the dialog. On Windows, KsekamTool can be found in "Ksenos" -folder and it can be started by double-clicking its icon. Ksekamtool will list all Ksekam cameras in the network by pressing the "Search" button. These can be configured by either pressing "Auto-configure all" or by setting wanted IP-addresses and names for each camera. Names for cameras can also be changed later from inside Ksenos.



KsekamTool has found four cameras

Example: Small retailer has four installed Ksekam cameras. To utilize these, you can use KsekamTool. If the network is configured right, you'll be able find all four using the "Search" button. Now you can use automatic setup or set IPs manually. When all wanted changes are applied, KsekamTool can be closed. Now all four cameras can be added and used from Ksenos's settings.

## 1.4 Other network cameras and servers

Most of modern cameras using RTSP protocol will work straight out of the box with Ksenos's "Generic RTSP" support. General settings for these cameras should be done from camera itself by accessing its own setup through a web browser. This can be achieved by pointing browser to the IP address of the camera and logging in. Most cameras have default user and passwords of admin:admin. You should always check camera's manual for correct default IP and user information.

Many video servers use the same RTSP protocol for transforming analog signals to digital. You can give IP addresses for each channel of this kind of server. Servers can be configured in same manner as normal RTSP cameras. Help for these situations can be found from device's manual.

*RTSP stands for "Real Time Streaming Protocol". Using RTSP gives larger support base for devices.*

### 1.5.1 Default ports for network cameras

**RTSP - 554**  
**HTTP - 80**



## 1.5.2 Default RTSP-paths for most common manufacturers

4XEM	- rtsp://ip_address/live.sdp
ACTi	- rtsp://ip_address/
Acumen	- rtsp://ip_address/mpg4/rtsp.amp
Airlink101	- rtsp://ip_address/mpeg4
Airlive	- rtsp://ip_address/video.mp4
ALinking	- rtsp://ip_address/cam1/mjpeg
	- rtsp://ip_address/cam1/mpeg4
	- rtsp://ip_address/cam1/h264
Alliede	- rtsp://ip_address:555/0/1:1/main
Aviosys	- rtsp://ip_address(:8554)/mpeg4
AVS Uriel	- rtsp://ip_address/mpeg4
Axis	- rtsp://ip_address/axis-media/media.amp
	- rtsp://ip_address/mpeg4/media.amp
Basler	- rtsp://ip_address/h264
	- rtsp://ip_address/mpeg4
BlueJay	- rtsp://ip_address/mpeg4
Brickcom	- rtsp://ip_address/channel1
CNB	- rtsp://ip_address/
	- rtsp://ip_address/mpeg4
Edimax	- rtsp://ip_address/ipcam.sdp
Hunt Electr.	- rtsp://ip_address/video1+audio1
Infinova	- rtsp://ip_address/1.AMP
IOimage	- rtsp://ip_address/ioImage/1
IQinVision	- rtsp://ip_address/now.mp4
Linksys	- rtsp://ip_address/img/video.sav
Lorex	- rtsp://ip_address:554/video.mp4
Lumenera	- rtsp://ip_address/
Merit Li-Lin	- rtsp://ip_address/rtspH264
Messo	- rtsp://ip_address/livestream/
Moxa	- rtsp://ip_address/multicaststream
MultiPix	- rtsp://ip_address/video1
Onix	- rtsp://ip_address/cam0_0
Optelecom	- rtsp://ip_address/mpeg4
Panasonic	- rtsp://ip_address/nphMpeg4/g726-640x480
	- rtsp://ip_address/MediaInput/mpeg4
	- rtsp://ip_address/MediaInput/h264
Samsung	- rtsp://ip_address/mpeg4unicast
Sanyo	- rtsp://ip_address:554/VideoInput/1/h264/1
Sentry	- rtsp://ip_address/mpeg4
Seyeon Tech	- rtsp://ip_address/cam0_1
Sharx	- rtsp://ip_address/live_mpeg4.sdp
Siemens	- rtsp://ip_address/img/video.asf
	- rtsp://ip_address/livestream
Sony	- rtsp://ip_address/media/video1
Sparklan	- rtsp://ip_address/mpeg4
Speco	- rtsp://ip_address/
Swann	- rtsp://ip_address/mpeg4
TCLink	- rtsp://ip_address/live.sdp
TP-Link	- rtsp://ip_address/video.mp4
TRENDnet	- rtsp://ip_address/mpeg4
Truen	- rtsp://ip_address/video1
Videolarm	- rtsp://ip_address/mpeg4/1/media.amp
Vivotek	- rtsp://ip_address/live.sdp
Y-cam	- rtsp://ip_address/live_mpeg4.sdp
Zavio	- rtsp://ip_address:554/video.mp4

It is also possible to use "Search for network cameras" button in Ksenos's settings. This will automatically add all Ksekam cameras on the same network to Ksenos's settings.

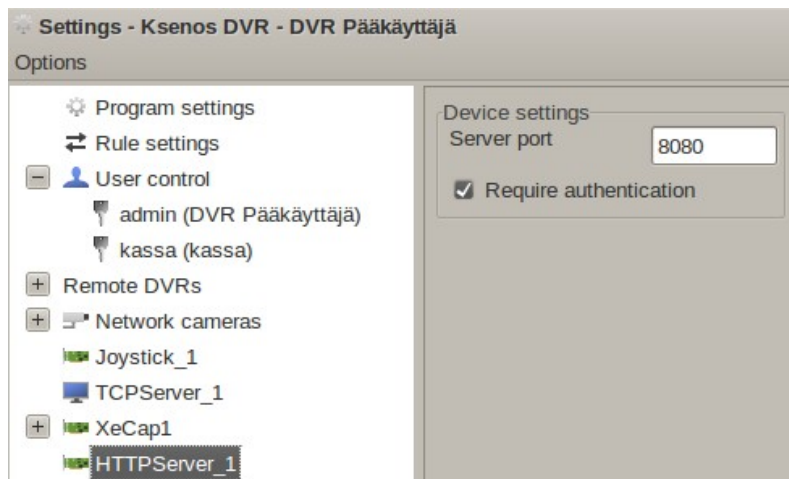
You can change settings of individual cameras from context menus of the camera windows. This is good practice to quickly test different settings. From settings it's possible copy camera settings from one camera to all existing cameras using the "..." button.

*It's good practice to name the cameras with descriptive names to make browsing recordings from them easier.*

## 1.6 Adding servers and remote clients

Adding Ksenos Web Server (HTTP) and Ksenos Server (TCP) is done in same manner as adding cameras or other devices. In the Settings window, press the "Add new..." button and depending on need, choose either "Ksenos Server" for TCP-server to be used with client software, or "Ksenos Web Server" for HTTP-server to be used with web browser.

**Ksenos Web Server** – With this server it's possible to stream live images from recorder to any web browser with access to the recorder. Point the browser to recorder's IP-address and port used by HTTP server. By default the port is 8080. For example, with address 192.168.38.1:8080 you can view live images from recorder at that IP address. This server is limited to viewing live images from active cameras on recorder only. Testing that the server is running can be done on the recorder by pointing browser to the local host, address 127.0.0.1:8080.



Settings screen for Ksenos Web Server

There are few possible configurations on the client end of Ksenos Web Server. For example, by pointing web browser to address:

**`http://ip_address:8080/index.html?view=3&width=1024&height=768`**

will result in 3x3 grid on 1024x768 pixel viewing area.

**`http://ip_address:8080/index.html?view=4`**

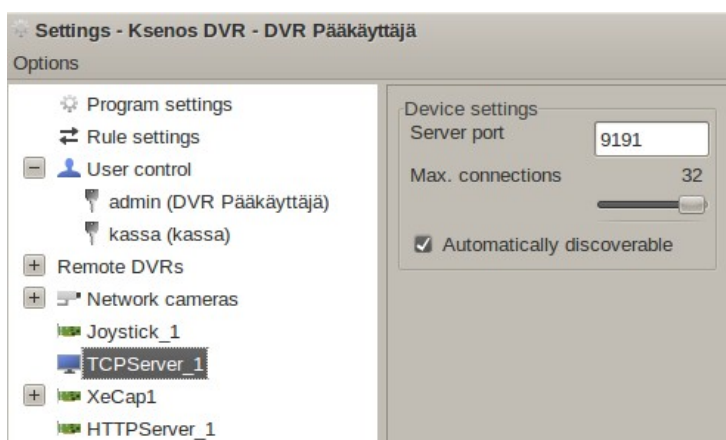
Will result in 4x4 grid. It's also possible to use 5x5 grid, simply giving address' view option value 5.

Width and height can be adjusted to fit the screen of computer used to view the images through web browser. Here's example address for a 5x5 grid for 1280x1024 resolution display:

**`http://ip_address:8080/index.html?view=5&width=1280&height=1024`**

**Ksenos Server** – With this server it's possible to use recorder from any other computer with Ksenos installed. Add a device “Ksenos DVR Server” on the recorder. Now you can use the “Search DVR servers” button on the installed client, or you can connect the client by using IP address of the recorder.

By default, server uses port 9191 for remote client's connection. It is mandatory to leave this port open from any possible firewall and do port-forwarding based on MAC addresses, if needed. Client's settings also need user name and password. Connection can be set to establish itself automatically by ticking the box “Connect automatically”. This server works on remote client in exactly same way that recorder itself. User privileges for remote users are set in the same manner as for local users.



Settings screen for Ksenos Server

Servers require set user privileges. For security reasons, using remote client without user authentication is not possible. The Ksenos Web Server can be made accessible to all user in network, although this is not recommended for larger networks. As mentioned earlier, this also needs ports to be open from any firewall in the network.

## 1.7 Viewing settings for cameras

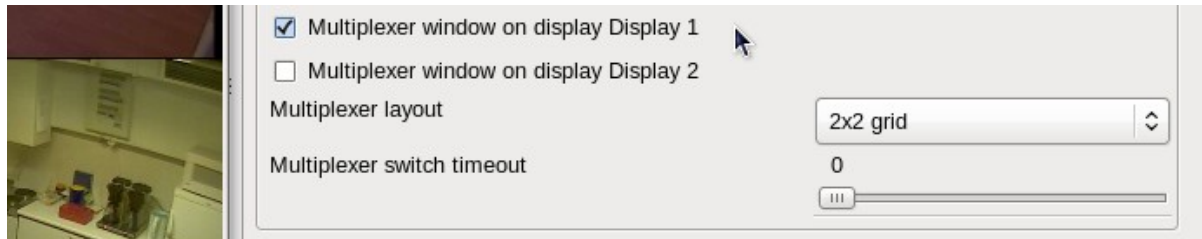
You can set overlay to display certain information over the images. This setting can be set for individual cameras as well as for all cameras. These overlays tell vital information about images being recorded.

- **“Show state”** — Shows encoded size, frame rate in seconds, average size, number of saved images, and image resolution in values that recorder gets from cameras.
- **“Show movement”** — Shows minor movement in transparent green over image. Transparent red represents major changes in images. With this function it's easy to follow changes in images.
- **“Show mask”** — You can draw mask over image, meaning the portion of

the picture that you don't want to use for motion detection. Example of this kind of behavior in image would a be bush moving in the wind all the time. Mask can be drawn using mouse as a brush.

## 1.8 Multiplexer

In program settings, we can initialize multiplexer for use in display attached to the recorder or for use in a remote client.



Multiplexer settings on recorder with two display

Multiplexer starts up in fullscreen mode once the check-box is ticked. Fullscreen mode can be enabled or disabled by pressing the "F" key on an active multiplexer window.

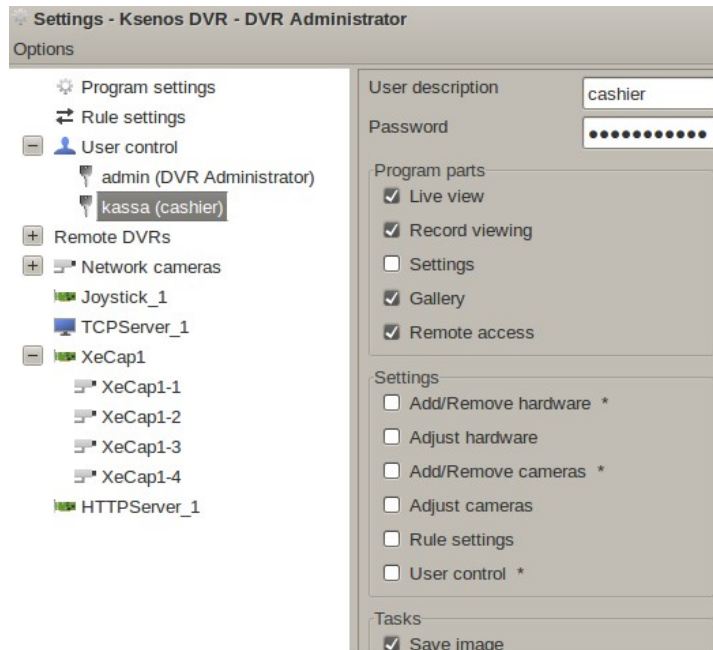
It is possible to choose the amount of cameras that are visible at the same time, for example on a 2x2 or 4x4 grid. If there are more cameras than fit to any grid, it is possible to use the switcher. Timeout of the switcher can be changed to desired value.

## 1.9 Default user information

On Linux systems, default username is "ksenos", with password "sonesk". On Windows systems, username "ksenos" with password "KSENOS" are for the default account. These users and passwords are for the operating systems only. All usernames and passwords are case sensitive. Ksenos itself does not have default users, so please store Ksenos's passwords securely.

## 2. Users

Users and groups can be added as needed. First user to be created must be administrator. This user can then create other users and set their privileges. Administrator has all privileges.



Settings for user management

Privileges for users can be set as follows:

### 2.1 Program Parts

- **Live view** – Viewing and arranging camera windows
- **Record viewing** – Usage of replay, timeline operation and search functions
- **Settings** – User's privilege to the Settings window (Ksenos will ask for another user account, if user has no privileges to access settings – Account will stay changed until changed user logs out)
- **Gallery** – User's privilege to access the gallery
- **Remote access** – User's privilege for using remote client

### 2.2 Settings

- **Add/Remove hardware** – Right to add and remove devices from settings
- **Adjust hardware** – Right to change hardware's settings
- **Add/Remove camera** – Right to add and remove camera

- **Adjust cameras** – Right to adjust cameras viewing and recording settings (applies also to context menus in camera windows)
- **Rule settings** – Right to add/remove/modify rules
- **User control** – Right to change user's settings

## 2.3 Tasks

- **Save image** – Right to save images to the gallery
- **Export video** – Right to save videos to the gallery
- **Quit program** – Right to shutdown Ksenos (Not recommended for others than administrator)
- **Camera preset control** – Right to switch PTZ-cameras to defined presets
- **Camera PTZ control** – Right to control PTZ-cameras with joystick or mouse

## 2.4 Access groups

- **Access group 1-4** – User can be set to group 1-4
- **Deleted cameras** – Determines if users have privileges to view recordings from previously deleted cameras

## 2.5 Examples for creating users

**Example 1:** On the gate of a logistics terminal, guards need privileges to control PTZ cameras. We don't want to give them full rights, so we'll create user "gate", with password "Gu4rd5". We can give needed privileges by checking boxes in settings. We can leave "Remote access", "User control" and "Quit program" unchecked. Now guards have almost same privileges as administrative user, but they can't modify users or shut down Ksenos.

**Example 2:** Local market is using the Ksenos Web Server for streaming images to a cashier. The cashier is not meant to see images from loading platform. In this situation, we could set users like this; In addition to administrative user, we'll create user "cashier" with password "l0c4l5t0r3". We'll check boxes for "Live images" and "Remote access". Next we'll add this user to user group number 2. Now we can set groups for each camera, in manner that doesn't let this user see all cameras.

Now we can open web browser on cashier's machine and point its address and port of the recorder (for example 192.168.38.1:8080). Now all permitted cameras will be shown to cashier, after the browser asks for authentication.

*It's important to keep user names and passwords safe. User name "user" with password "1234" IS NOT a safe combination.*

## 3. Rules

With rules we can set recorder to react to certain events automatically. Basically, change in external state can be set to launch action. It's possible to automatically reset recorder state after action. For example, when recorder detects movement in one camera, with rules we can set other camera's dome control to move to desired preset. In this example, movement detection launched dome's control. Rules are made of two main components: conditions and actions.

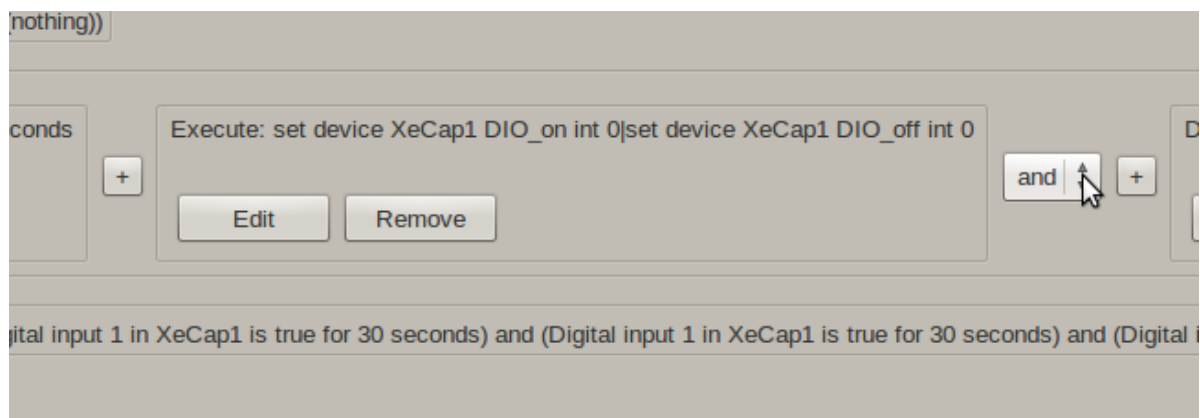
*Please note, that some of the new rules might need restarting of Ksenos before they take effect.*

### 3.1 Rules in general

"Create rule → Add condition → Add action" is the work flow of creating basic rule. Actions are added like conditions, just choose action.

Rules can be used to change recording to continuous instead of motion based recording. For example, a magnet lock on door can be set to change recording to continuous with DIO port when the door is opened. In this case, rule doesn't apply anymore when door is closed. Now recording continues normally, based on motion on images.

Rules that take effect can be set to release after determined time. Actions offer this when configuring rules.



Boole's operator between two conditions

Rules can have more than one condition. Relationship of conditions is determined in Boolean operators. In general, we can set condition to be active on weekdays between 08:00 and 18:00. We can add another condition, which action is based on motion detection. Now we have selection of "And", "Or" and "XOR" between conditions.



**And** - Action is launched only when both conditions are active.  
**Or** - Action is launched when either one of the condition is active, or both are.  
**XOR** - Action is launched when either one of conditions is active, but not when they both are.

### 3.2 Conditions and actions

**Condition** can be any of the following:

- **Timetable** - Rule is based on timer
- **Digital input** - Rule is based on DIO-port's state
- **Loss of video signal** - From selected camera
- **Another rule** - Other rule launches action
- **Motion detection** - Motion detection of selected camera
- **Wait for another rule** - Other rule must be applied
- **Timer pulse** - Action is launched periodically (1-60 seconds)
- **Text condition** - Input from bar code reader or other device

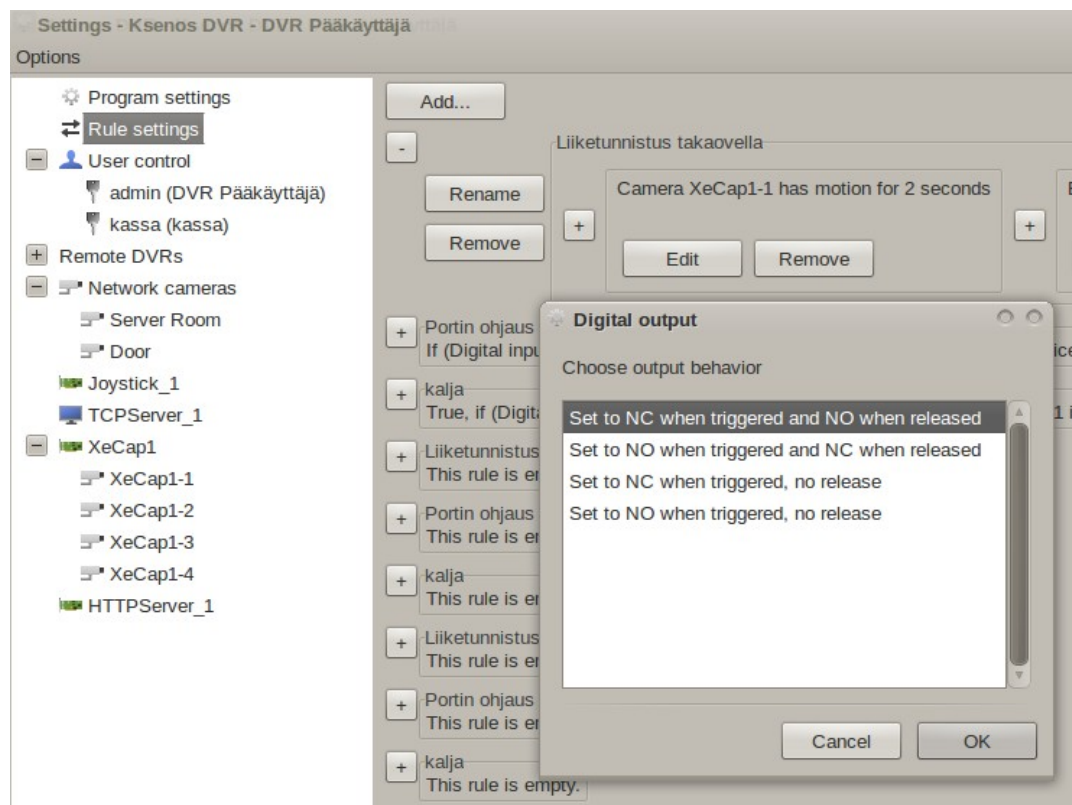
**Action** can be any of the following:

- **Control a digital output** - Changes state of DIO-port
- **Switch analog video output** - Changes desired image to analog output
- **Call dome preset** - Sends signal to change camera's preset

### 3.3 Digital out controlled with rules

Digital output uses standard acronyms NC (normal close) and NO (normal open) when describing output state. NC stands for closed circuit and NO for open circuit. When configuring DIO-extension's output, we can choose behavior as follows;

- Set to NC when triggered and NO when released
- Set to NO when triggered and NC when released
- Set NC when triggered, no release
- Set NO when triggered, no release



NO and NC in action

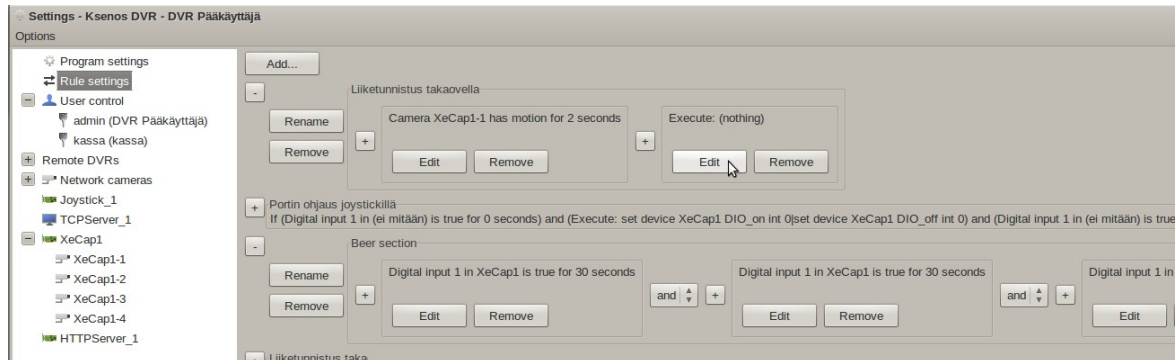
### 3.4 Examples for creating rules

Rule can be set to behave like in these examples:

Example 1: On industrial building's reception desk, we want to see images from door on separate monitor whenever there's movement. This feature should only be active during business hours.

We'll create rule and give it a name. We'll set first condition to be timetable. Then we'll choose desired hours from calendar view of timetable condition. These hours could be 8:00 – 18:00, from Monday through Friday. Then we'll set another condition to be motion detection

and add this to selected camera. Next we'll set action to control analog video output. Finally we'll set Boolean operator to "And". Now any motion on front door will send images from there to external analog monitor during business hours.

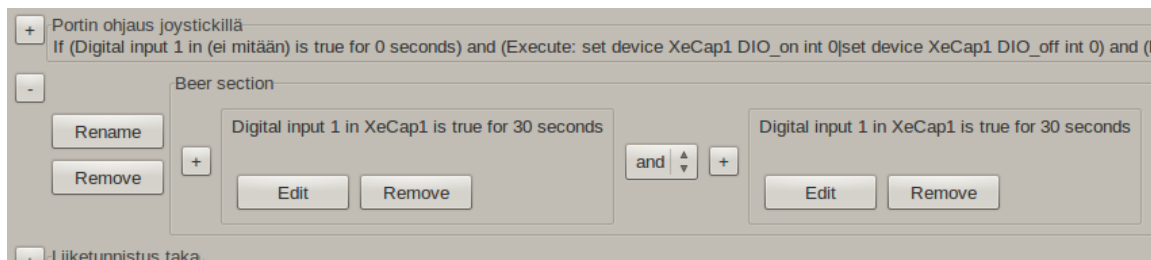


Screen for rule settings

Example 2: At a local store's cash register, camera on beer section is needed to record continuous images whenever there is suspicious movement. We want to activate recording for one minute by pressing a simple switch button from the register. The switch button can be connected to XeCap card's DIO extension.

We'll create rule and give it a name. We'll set digital input as condition and set it so that it listens to XeCap's input number one. Then we'll set time that rule applies after pressing the switch in seconds; 60 seconds. Next, we'll set camera to record continuously from camera's settings by this rule. Now single flick of the switch changes camera to record one minute continuously.

By combining rules, the recorder and peripherals can be controlled in a very versatile way.

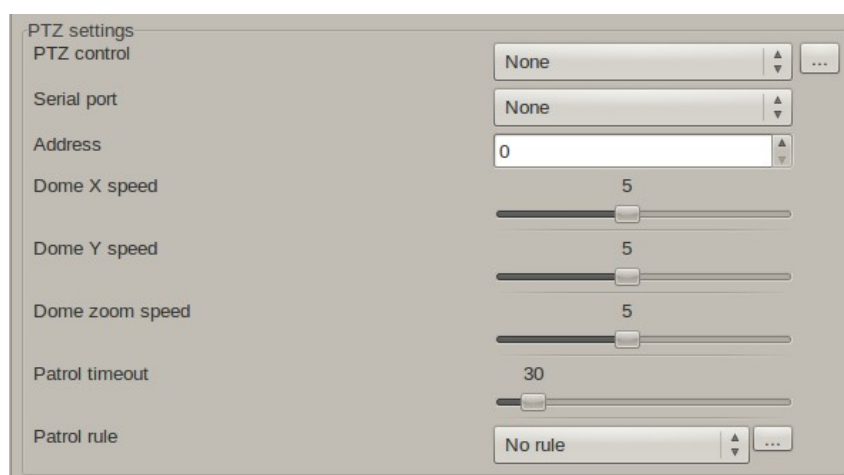


Screenshot from example 2

## 4. PTZ-control and joysticks

### 4.1 General settings

Ksenos supports Pelco-P, Pelco-D, and Sony's, Panasonic's and Axis' IP dome control protocols out-of-the-box. Control can be utilized from camera's settings by setting "PTZ-control" to wanted protocol. For analog control, also serial port information is needed. With these settings it's already possible to control pan, tilt and zoom by dragging images inside camera windows with the mouse. In settings we must identify dome cameras by address. By address, we mean address that can set from camera's DIP switch. With these addresses we can give control to different cameras or camera groups. Speed of the control can be set from sliders in Settings window.



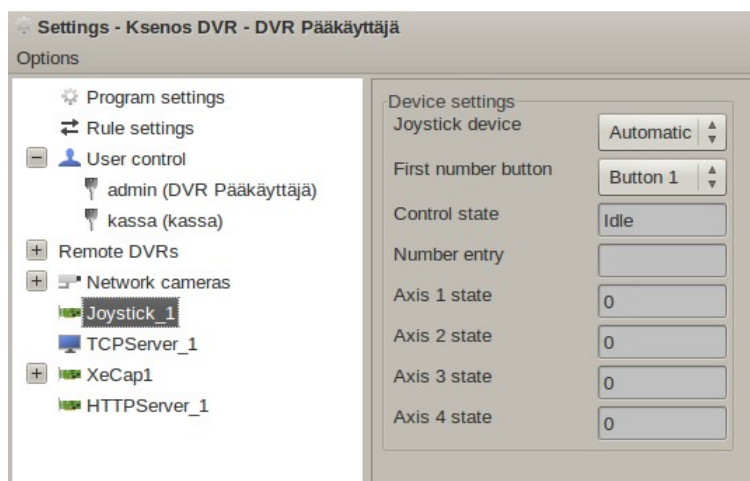
Default PTZ-settings for analog dome camera

### 4.2 Patrol

We are able to program patrol rounds for dome cameras with graphical tools from camera window's context menus. Each dome camera can have its own patrol round. Patrol stops when camera is controlled manually. Time that it takes for camera to go back to patrol after manual control can be set from camera's settings.

### 4.3 Joystick controllers

Joysticks can be used to control PTZ cameras or to use joystick's buttons to control digital inputs. Therefore buttons can be used to select cameras, control gates and electric locks as well.



Settings for joysticks

Joystick controllers are added like any other devices. When added, we can change its settings by selecting a joystick in the tree view. It's possible to add several controllers to one recorder, so first we'll need to set controller's physical address. If recorder has only one controller, we can set that controller address to "automatic". Current state of controller and its buttons are shown in the settings window.

*Some manufacturers don't use standard mapping of the buttons. This can be ignored by selecting first button's number from Ksenos' settings.*

#### 4.3.1 Joystick and rules

Controller in use can be seen in settings as digital input. This means that we can control any rule with the joystick's buttons. Let's take an example. We'll want to open gate from a control room, when a known vehicle is seen on the cameras. Now we can create a rule with digital input as condition. When input's state is defined, we can set digital output as action. Then we'll set this digital output to control a DIO extension which is connected to gate's opening and closing system. Closing of the gate can be timed within the rule, or another button can be used for closing the gate.

## 5. Some possible error situations

### 5.1 Error notifications

Ksenos has a notification system of its own that displays errors as red triangle and blinking red timeline. This applies to errors that may happen inside Ksenos. Error messages about the system will be displayed as new windows. Next we'll go through few error messages and solutions for them.

#### 5.1.1 System's error notifications

**"Another program instance is already running, aborting"** – This error message presents itself when system has not shut down cleanly. For runtime security, Ksenos locks itself for one process ID for each session that it's used. This locking is removed when Ksenos shuts down normally. Usually this error goes away by restarting the recorder (i.e. the whole computer).

#### 5.1.2 Ksenos's error notifications

**"The database file is missing! Nothing will be recorded!"** - This error message presents itself when Ksenos is started without database. Shut down Ksenos and run DriveSetup.

**"File open failed"** – This error message presents itself if Ksenos can't write to recording folder. Check read/write permissions. If permissions are correct, check hard drive's state.

**"Failed to open database"** – This error message presents itself if database is corrupted or unwritable. If Ksenos is writing to database exactly at the same moment that power failure occurs, it can lead to writing corrupted data to database. If error doesn't go away after reboot, it's possible to remove corrupted database (capture/d/index.db) and create new one with DriveSetup. Attention! This will result in loss of current recordings! In situations where recordings can't be lost, it's possible to recreate database from recordings. In these situations, please contact your Ksenos support by phone or email.

### 5.2 Network

Usually Ksenos will be set with two networks. One for cameras and other for possible remote connections. Problems within these networks can be traced with program called "Ping". Every device in network has its own IP address that can be pinged from Linux terminal or command prompt from Windows to see if connection is possible. Command "ping 192.168.38.3" will tell if connection to that address is OK. If Ping shows times that it took for ping to travel between devices this device is in the same network and

working.

On a network with several recorders it's good to remember, that two devices can't have same host names or IP addresses. Recorders must be named differently in same network. For example we could use names like "Ksenos1" and "Ksenos2".

Many of the common network problems are due to network settings in local network. In these situations it's recommended to contact administrator of that network for solutions and more information.

### 5.3 Remote access

Local network configuration needs to allow usage of ports using remote access. Firewalls must be set to allow traffic on port 8080 for HTTP server and port 9191 for remote client using TCP.

When configuring remote access from outside local network, it's recommended to take precautions when opening ports on firewalls.

Older versions of Intel graphics card drivers are known to behave slowly and erroneously. When running Ksenos on remote machine with Intel GPU, it's recommended to update graphics driver to the latest version provided by device manufacturer or Intel itself.

## 6. Technical information

<b>Image</b>	
<b>Camera inputs</b>	<ul style="list-style-type: none"><li>- 16 analog @ 400 fps*</li><li>- 32 analog @ 200 fps*</li><li>- 64 network cameras*</li></ul>
<b>Analogic frame size</b>	<ul style="list-style-type: none"><li>- Max. 4CIF (704x576)</li></ul>
<b>Image compression method</b>	<ul style="list-style-type: none"><li>- MPEG-4</li><li>- MJPEG</li><li>- H.264</li></ul>
<b>Video clip export</b>	<ul style="list-style-type: none"><li>- MPEG1</li></ul>
<b>Single image export</b>	<ul style="list-style-type: none"><li>- JPEG</li><li>- PNG</li></ul>
<b>Remote client protocol</b>	<ul style="list-style-type: none"><li>- TCP/IP with client</li><li>- HTTP with browser</li></ul>
<b>PTZ- and Dome-protocols</b>	<ul style="list-style-type: none"><li>- Pelco-P</li><li>- Pelco-D</li><li>- Sony IP</li><li>- Axis IP</li></ul>

*\*Depending on license*



[illegible]