KCM Camera Event Handler with Zoom and Auto Focus

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Introduction

ACTi powerful Event Handler system is now available for KCM series cameras using firmware version 5.05 or newer. With the help of Event Handler, the camera is able to process the events independently from VMS. There may be thousands of combinations of different event triggers and responses, fulfilling the needs of every user. ACTi Event Handler can not only command the hosting camera itself to take certain actions, but also any other camera on the network depending on the application scenario and user’s requirements.

Now that KCM series come with optical zoom and auto focus, how can these features be utilized by the Event Handler system?

The Event Handler is linked with optical zoom and auto focus features through the user defined zoom preset points. Please note that the preset point not only remembers the zoom position but also the focus position.

For example, it is possible to create two different preset points, both with same viewing angle, but with different focusable area. Then, combining them with the alarm input or motion trigger of the Event Handler, the camera can shift the focus automatically to the alarm region upon the intrusion.

The two most important scenarios are zooming in and out upon motion event and adjusting the focus for night mode. The following chapters explain the importance of these applications and provide step-by-step instructions of how to set it all up.
**Zoom in and out as responses to motion event**

While using conventional fixed cameras, you would need one for general overview of the whole room and one for entrance perhaps, to get clear details of the person entering the room. One optical zoom camera can replace these 2 cameras.

For example, the guard is monitoring the room via VMS using the wide angle of the zoom camera and when someone enters, the guard would press the zoom-in button of the VMS to get a closer look. When done, the guard could zoom-out again. But what if the guard is not always around, or his response is not fast enough? The golden opportunity to capture the intruder’s face may just be couple of seconds.

Thanks to the Event Handler, it is possible to capture the intruder’s face within a second, and you do not even need to hire a security officer to do that – the camera can do it all automatically:

1. It keeps covering the whole room with wide viewing angle
2. It detects motion at the entrance and zooms in instantly
3. It captures the needed details of the intruder and goes back to wide viewing angle

**Step-by-step configuration instructions**

To set up the system, the following items need to be configured:

1. Motion Detection region
2. Zoom and focus preset points
3. Event handler rule to connect the two of the above

**STEP 1: MOTION DETECTION**

Go to the Motion Detection setup and enable the region 1 and drag it to the area that will be expecting the intruders. You may adjust the Sensitivity and Trigger Threshold according to the size and speed of the expected intruder¹ or keep them as default. The Trigger Interval however depends on how long the user wishes the camera to stay zoomed in upon the event. The Trigger Interval should be about 5 seconds longer than the desired zoom-in duration. This way it is possible to prevent false alarms as a result of the changing scene during zooming out – when the camera zooms out while the Trigger Interval timer of motion detection is still running, the camera will ignore all the motions caused by zooming out. In our example, we wish to stay zoomed in for 15 seconds upon the intrusion event, therefore we set the Trigger Interval to 20.

¹ For more information about how to choose the right Sensitivity and Trigger Threshold, you may refer to the article How to Use Motion Detection in ACTi Cameras, in ACTi Knowledge Base at http://www.acti.com/kb/detail.asp?KB_ID=KB20101108002
STEP 2: PRESET POINTS

Go to Live view page and open the PTZ tab. You can use the "Continuous Zooming" buttons to zoom out to the widest position. The camera will automatically refocus itself to the best possible wide angle focus.

Press the button to be able to mark this position as a preset point. You may name it as "Wide", for example. When done, press the button again.
After that, zoom in to the desired size of the view so that the intruder’s face would appear as big as needed. The camera will automatically refocus itself after that. Mark the preset point and name it as “Tele”, for example.

Before moving on to the Event Handler section, there is one more thing to set up on PTZ section – the PTZ tour. Why do we need to set up a tour? Why cannot we just include the preset points to the Event Handler directly? The reason is that If you assign the zoom-out preset point as the action of the Event Handler upon the END of the motion event, then the zooming out itself would trigger a new (false) motion alarm. We have to force the zoom-out action before the end of the Motion Detection Trigger Interval time runs out. Since tour function has its own timer, we can take a good use of it!

As you remember, we set the Motion Detection Trigger Interval to 20 seconds, because we wished the zoom-in last for 15 seconds before automatic zoom-out. We can use the value 15 seconds in tour as below.

Open the Tour tab, select preset point “Tele”, set timer to 15 seconds and add it by [+] button.
Repeat the same steps to add the preset point “Wide”. Remember to “Save” when done!

After pressing “Save”, the **Tour 1** will look like this:

**STEP 3: EVENT HANDLER**

First, define the Event Server – it is the target server that will be receiving the commands from Event Handler to execute certain tasks. The target server may be the camera itself, another camera, FTP server, SMTP server, a web server on the Internet, etc. In our example, the target will be the camera itself. Please choose HTTP Server 1 Configuration to define it.
Enable the function first. Then key in the right user name and the password of this camera and its IP address. When done, press “Apply” and close the window by [X] button.

Now that the target server has been defined, it is time to define which commands will be sent to the target server upon the event. Open “Event Configuration” and select “Send URL commands”.

Open up the section for “Send Command 1 to HTTP CGI 1” by pressing the [+] button.
In the field of “Command as event is triggered” please type the following command:
/cgi-bin/cmd/encoder?PTZ_TOUR_STATE=TOUR1
In the field of „Command as event becomes inactive“ please type the following command:
/cgi-bin/cmd/encoder?PTZ_TOUR_STATE=DISABLE
Press „Apply” and close the window by [X] button.

Now that you have already set up the target server as well as the description of the command, it is time to create rule that combines them all together. Click on “Event List” and select the first available event rule ID.
Enable the rule first. By default, it is already configured to be active 24/7. So if you like it this way, then you can move on to the “Triggered by” field – select “Motion” there as the trigger type and check the “Region 1”.

Among the responses, please choose “Send URL command”, and check the “URL Command 1”. Press “Apply” and close the window by [X] button.

The camera is now ready to handle the intrusion event. The event handling flow is the following:

1. The camera Motion detection system keeps tracking for possible motion in user defined region one 24 hours a day, 7 days a week.
2. When motion occurs, the Event Handler sends the user defined URL command to itself to start the Tour 1.
3. The camera zooms in according to the first preset point (Tele) of the tour, and waits for 15 seconds. After that it zooms out to the second preset point (Wide) of the tour.
4. Some seconds later, the 20-second timer of the Motion Detection Trigger Interval runs out, and the event is formally over. When it happens, the Event Handler will send out the URL command to stop the Tour 1.
The timeline of the motion event

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Before the event</strong></td>
<td>The camera is monitoring the area with wide viewing angle</td>
</tr>
<tr>
<td><strong>2. The Motion Detection System detects the intrusion</strong></td>
<td>The Event Handler of the camera activates the PTZ Tour – the camera will go to the preset point “Tele” instantly.</td>
</tr>
<tr>
<td><strong>3. Evidence capturing</strong></td>
<td>Intruder’s face is captured clearly.</td>
</tr>
<tr>
<td><strong>4. Evidence capturing</strong></td>
<td>The items taken by the intruder are captured clearly, too.</td>
</tr>
<tr>
<td><strong>5. Returning to the original position</strong></td>
<td>After 15 seconds, the camera zooms out to the preset position “Wide” and Motion Detection system will be ready to respond to future events a couple of seconds later. No false motion events are triggered by the action of zooming out.</td>
</tr>
</tbody>
</table>
**Different focus positions for day and night**

There may be several reasons to have a different focus position for day mode and night mode. One of the reasons may be a specific application – during the day time the focus is on the center of the hall to monitor the people there and at night the focus shifts to the windows across the hall to standby for possible intrusions through the windows.

However, the most common usage to have different focus positions for day and night is to handle the focus shifts caused by different aperture of the auto iris\(^2\) and different light source\(^3\). ACTi KCM zoom cameras come with very intelligent ISP – **upon the day and night switch, the ISP will refocus the camera automatically to get the clear and well-focused night image according to the night time IR light source and the size of the aperture.** As a result, there is a clear focus for both day mode and night mode. You do not have to set anything in the camera to use such method – it is fully automatic and enabled by default. It works very well for the scenes where the day is gradually becoming darker and the camera at one point would switch to night mode and activate IR illuminators.

There may also be the situations when **the visible light is turned off instantly.** It usually happens with indoor applications. In such cases, as long as there is sufficient light\(^4\) for the camera, the ISP will refocus the camera in the moment of day and night switch. However, please note that the ISP is **designed to be careful and protect the image by avoiding the refocusing attempts in situations where the lighting conditions are really poor.** When this happens, the night image may be a bit blur, but it is still better than risking with searching for better focus with very limited information.

The table below describes the focus difference for day and night.

<table>
<thead>
<tr>
<th>The focus in daytime</th>
<th>The same image at night time without refocusing</th>
<th>The night time image after refocusing</th>
</tr>
</thead>
</table>

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\(^2\) Bigger aperture may be needed for low light but it reduces the depth of field at the same time

\(^3\) IR light may require different focus position for most zoom lenses in the market

\(^4\) The sufficient light for the camera is defined by *luma* level, regardless of the light source (IR or visible light)
If you happen to have the scene where the camera does not refocus at night due to sudden switchoff of all lights and not having powerful enough IR illumination, you may have slightly blur night image.

To avoid blur night images, you can take a good use of EVENT HANDLER of the camera to define one focus preset point for daytime and another for night time. By using Event Handler, you can have clear day and clear night focus regardless of lighting conditions.

You will need to configure 2 sections:
1. Preset Points for day and night, carrying focus position information
2. Event Handler rule to activate those preset points upon day and night switch

STEP 1: PRESET POINTS
Go to Live view page and open the PTZ tab. Press the “Refocus” button - the camera will automatically refocus itself to the best possible focus considering current aperture and lighting conditions.

Press the button to be able to mark this position as a preset point. You may name it as “day”, for example. When done, press the button again.
Having the focus preset point for daytime, please turn off the lights and activate the IR illuminators (if any). If the image is not perfectly in focus yet, press the “Refocus” button. The ISP will attempt to find the best possible night focus for you. If you think the night focus is good then you can fix this position by setting a preset point. You may name it as “night”, for example.

Having 2 presets, one for day time, one for night time, we can now set the Focus Control Mode to “MANUAL” to avoid standard auto focus interruption with our preset points at the moment of day and night switch.

You may also use MANUAL Focus Control mode to fine tune the night focus manually. It can be used in very rare cases when the suggested focus by ISP is different from what user prefers. Remember to save the “night” preset point after that again.
STEP 2: EVENT HANDLER

First, define the Event Server – it is the target server that will be receiving the commands from Event Handler to execute certain tasks. The target server may be the camera itself, another camera, FTP server, SMTP server, a web server on the Internet, etc. In our example, the target will be the camera itself. Please choose HTTP Server 1 Configuration to define it.

Enable the function first. Then key in the right user name and the password of this camera and its IP address. When done, press “Apply” and close the window by [X] button.

Now that the target server has been defined, it is time to define which commands will be sent to the target server upon the event. Open “Event Configuration” and select “Send URL commands”.
Open up the section for “Send Command 1 to HTTP CGI 1” by pressing the [+ button.

In the field of “Command as event is triggered” please type the following command:

/cgi-bin/cmd/encoder?PTZ_PRESET_GO=2

In the field of “Command as event becomes inactive” please type the following command:

/cgi-bin/cmd/encoder? PTZ_PRESET_GO=1

Press “Apply” and close the window by [X] button.
Now that you have already set up the target server as well as the description of the command, it is time to create a rule that combines them all together. Click on “Event List” and select the first available event rule ID.

Enable the rule first. By default, it is already configured to be active 24/7. So if you like it this way, then you can move on to the “Triggered by” field – select “Switch to night mode” there as the trigger type.

Among the responses, please choose “Send URL command”, and check the “URL Command 1”. Press “Apply” and close the window by [X] button.
The camera is now ready to provide perfect focus for both day and night time. The event handling flow is the following:

1. When the lighting condition worsens below defined threshold, the camera will switch to night mode (the image goes to black/white and the mechanical IR cut filter goes off).
2. At this moment the Event Handler will send the URL command to itself to force the camera to the preset point "night" which gives perfect night focus.
3. When the lighting condition improves above defined threshold, the camera will switch back to day mode.
4. At this moment the Event Handler will send the URL command to itself to force the camera to the preset point "day" which gives perfect day focus.

**PERFECT DAY FOCUS**

![Perfect Day Focus Image]

**PERFECT NIGHT FOCUS**

![Perfect Night Focus Image]