



RHP-IS
DESKTOP IMAGE STABILIZER

Instruction Manual

Firmware release 2.1 and above

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1 Introduction

RHP-IS is a real-time closed-circuit TV appliance that plugs in between a standard analog security camera and a downstream device, such as a recorder, multiplexer or transmission system.

The appliance utilizes DynaPel's patented PelKinetics[?] and IsoCAMTM technologies to analyze the source video and remove the effects of unintended camera motion inherent in hand-held or vehicle-mounted cameras, or the effects of wind or machinery vibration on stationary cameras.

Video output from the **RHP-IS** appliance is suitable for recording or viewing. Video processed by the appliance is less fatiguing to watch, and is digitally encoded more efficiently for storage or streaming.

RHP-IS accepts composite video in NTSC or PAL formats. The appliance has DIP switches and a six-button keypad for user configuration.

Important note: Camera motion also introduces *motion blur* at low shutter speeds. For best performance with fast shaking cameras you may need to choose shutter speeds of at least 1/200 second.

2 Installation

To ensure compliance with FCC and CE rules, read chapter 4.2, *Approval of Standards* and heed the *Installation Advice* given in chapter 4.2.1.

2.1 What you need to get started

- ? **External Devices:** **RHP-IS** requires a standard analog security camera for input, and a display or recording device downstream of the appliance for viewing or storing the processed video.
- ? **Cables and Power Source:** The requirements for installing **RHP-IS** into a video security system are an additional cable to connect the appliance to the display or recording device and a 12V power source for the **RHP-IS** appliance.

2.2 Installation Procedures

1. Turn off power to all components involved in installation.
2. Attach camera cable to *Video In* connector on appliance.



3. Attach cable from *Video Out* connector to the display or the recording device.
4. Attach appliance power cable to power source.

2.3 Safety Precautions

While installing the **RHP-IS** appliance, ensure that you take the following precautions to avoid equipment damage or personal injury:

- To reduce the risk of fire or shock hazard, do not expose this equipment to rain or moisture.
- To prevent electric shock or mechanical damage of the internal circuitry, do not open the box. There are no user-serviceable parts inside. Refer servicing to qualified service personnel.

3 Setup and System Configuration

3.1 Overview

RHP-IS is designed to require little or no configuration in most cases; however some options help to adapt the performance to a wide range of operating conditions. The parameters, which are controlled through setup options, include types of unintended camera motion corrected in processing (x-axis, y-axis, zoom, rotation), and cropping of output video. Additionally, a demo mode, which allows the user to compare input and output video, is available for optimizing output video during setup.

The appliance has DIP switches and a six-button keypad for user configuration. Use the keypad to set up the **RHP-IS** appliance using on-screen menus (in OSD-Settings Mode). OSD-Settings Mode requires the appliance to be connected to an input video signal and an output TV monitor. If no video signal or monitor is available, a set of 12 DIP switches is used to set up the appliance (in DIP-switch Settings Mode).

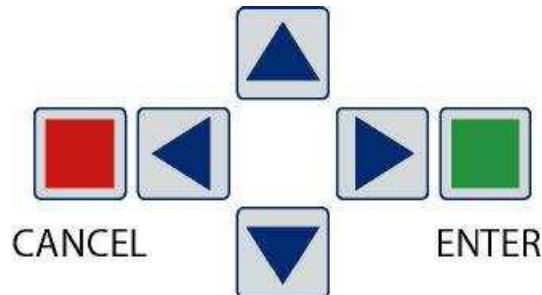
You can use OSD-Settings Mode or DIP-switch Settings Mode to choose different settings. The OSD-Settings Mode provides you with enhanced features for dealing with the on-screen text not available in DIP-switch Settings Mode. These features are described in chapter 3.2

Optimize the quality of the output video by choosing the types of unintended image motion in the source video that need to be cancelled out, and by managing the trade off between image stabilization and image resolution.

The **RHP-IS** appliance also copes with on-screen lettering that disturbs the motion estimation in the steady algorithm. For more information, see chapter 3.2.6

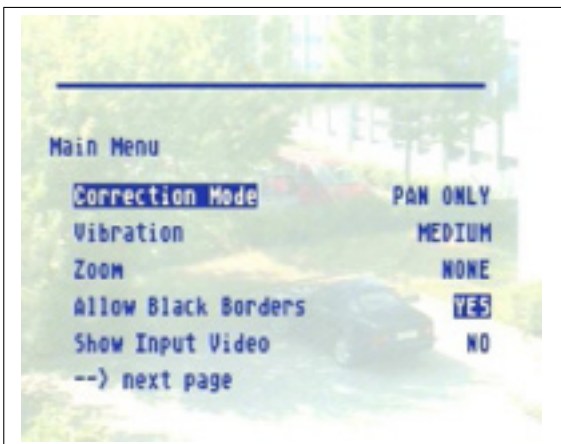
3.2 Configuration Using OSD-Settings Mode

The OSD-Settings Mode is controlled by the six-button keypad in front of the box. The green button is the *ENTER* key, the red button means *CANCEL* (or BACK). The arrow buttons used to navigate through the menu tree are *UP*, *DOWN*, *LEFT*, and *RIGHT*.



Settings selected in the menu are stored in an *EEPROM* (electrically erasable programmable read-only memory) to protect them from power failure. Using the OSD menu requires an output TV monitor to be connected.

Activate the **Main Menu** by pressing the **ENTER** button. Access the submenus by scrolling the highlighted selection bar (using the **UP/DOWN** buttons) and pressing the **ENTER** button.



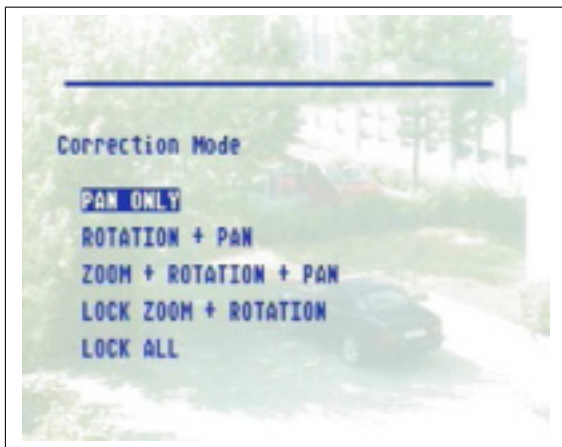
The main menu contains the following sub-menus:

- **Correction Mode**
- **Vibration**
- **Zoom**
- **Allow Black Borders**
- **Show Input Video**
- **Lettering**
- **Advanced**
- **Configuration**

3.2.1 Correction Mode

Using the default setting **PAN ONLY**, only horizontal and vertical motion in the image (also called x/y motion, translatory motion or *pan*) are estimated and steadied.

Switching to **ROTATION + PAN** enables also the steadying of rotation along the optical axis. Due to the computational cost of this algorithm, the resolution of the output video had to be decreased to achieve real-time performance, resulting in a slight loss of image quality.



When selecting **ZOOM + ROTATION + PAN**, even a jerky zoom is turned into a smooth motion.

The two additional modes, **LOCK ZOOM + ROTATION** and **LOCK ALL**, are especially suited for demonstration purposes, as they completely remove all measured motion. The initial view becomes literally *locked*; thus, it is possible to turn the camera upside down, while still seeing an upright output video.

In **LOCK ZOOM + ROTATION** mode, the estimated pan is dampened but not completely removed. **LOCK ALL** mode removes all motion. If the camera is pointed in a direction that is too far away from the locked view, no output is generated at all.

3.2.2 Vibration



The **Vibration** menu is only accessible if **Rotation Correction** is not set to **LOCK ZOOM + ROTATION** nor **LOCK ALL**. It changes the way detected motion is split into a wanted component and an unwanted shake.

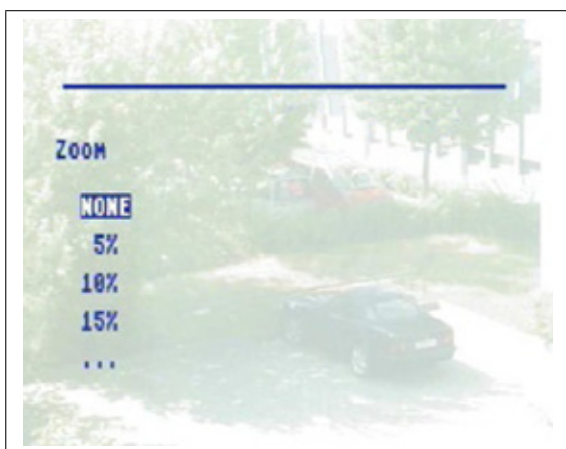
Select **FAST** if you only encounter high frequency shake. Settings of **MEDIUM**, **SLOW** or **VERY SLOW** allow for removal of lower shake frequencies, for example, as induced by the swaying of a camera post in windy conditions.

If **RHP-IS** is connected to a statically mounted camera, then this parameter can be

set to **VERY SLOW** in most cases, as any motion of the camera can be regarded as unwanted shake.

If **RHP-IS** is in the line of a PTZ (pan-tilt-zoom) camera, then for this parameter the right trade off setting has to be found, to separate the controlled “slow” motion of the camera from unwanted “fast” shaking.

3.2.3 Zoom



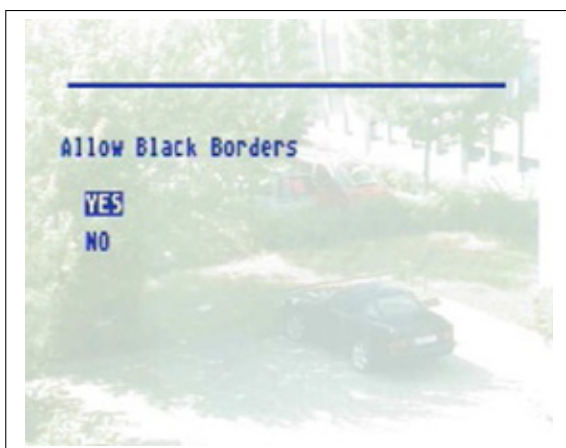
The stabilization of the input video is performed, by shifting (and rotating or even zooming) the output image contrary to the camera motion. This may result in black borders, when areas become shifted in, that are not visible in the input video.

To reduce the annoying effect of these borders, a slight zoom can be applied to the output image. In this case the content of the output video corresponds to the content of a *window* inside the input image, that can be shifted around without leaving the visible

area.

The higher the **Zoom** value is chosen, the bigger is the possible correction, that can be performed before black borders appear. The drawback of a larger zoom value is a slight degradation in the image quality.

3.2.4 Allow Black Borders



This parameter can only be changed, if a zoom is applied to the output image (see chapter 3.2.3). If set to **NO**, the stabilization is limited to the visible area of the input video, so black borders can never appear. But if the shake becomes too great, it can no longer be corrected for.

Example: If **Zoom** is set to **10%**, the visible area in the input video is $720 \cdot 0.1 = 72$ pixels wider than needed for the output video. This allows a maximum correction shift of ± 36 pixels.

3.2.5 Show Input Video

Use the **Show Input Video** modes to simultaneously view steadied and unsteadied video on the same output screen. This option is also referred to as *demo mode*. To see both videos can also be useful for parameter tuning. You can see input and output video in parallel by choosing **PIP** (picture in picture, see below), or **SIDE BY SIDE**. If **MANUAL** is selected, the red CANCEL button switches between input and output video, once the OSD menu has been left.



3.2.6 Lettering

Text overlays, such as a camera name or time and date, can confuse the **RHP-IS** algorithm, as they remain at their fixed positions in the image. Therefore, areas with lettering should be excluded from the shake estimation. You can define up to 8 exclusion areas with the **Lettering** submenu.

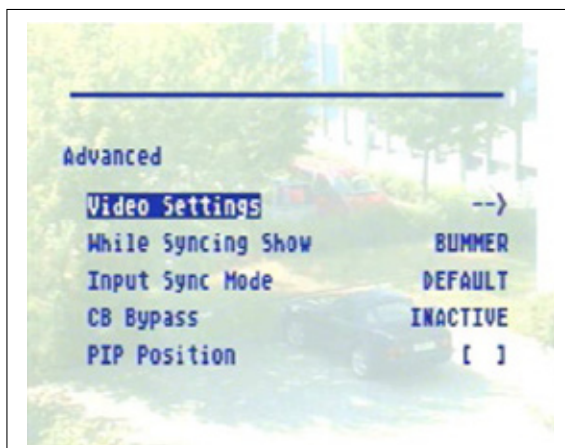


Active (YES/NO) turns the exclusion area on and off. The area is defined by its rectangular bounding box.



When selecting **Define**, two opposite corners of this box can be alternately moved using the UP/DOWN and LEFT/RIGHT buttons. Press ENTER and CANCEL to switch forward and backward between the corners and the menu.

3.2.7 Advanced



The first submenu **Video Settings** allows the change of basic video parameters like brightness or contrast. The standard settings have been chosen to be optimal in most applications.

The last submenu **PIP Position** allows to change the size and position of the PIP window, which shows the input video, if activated (see chapter 3.2.5).

The other settings in the **Advanced** menu should not be changed unless explicitly advised by DynaPel support staff.

3.2.8 Configuration



To make the selected configuration persistent through a power loss, it is saved to a non-volatile EEPROM memory. The stored settings are only reloaded during power-up if DIP switch 1 is set to ON (Refer to Section 3.3 for more information on DIP switches). **Reset All** puts all parameters at sensible default values (see chapter 3.2.9). **Firmware Release** displays a release number such as 2.1.0.3. Have this information at hand if you are reporting problems.

3.2.9 Default OSD Settings

After activating **Configuration - Reset All**, RHP-IS uses a parameter set suitable for most applications:

Correction Mode:	PAN ONLY
Vibration:	MEDIUM
Zoom:	NONE
Allow Black Borders:	YES
Show Input Video:	NO

The first two exclusion areas for **Lettering** are set to the top and bottom 50 lines of the image.



3.3 Configuration Using DIP Switches

If no monitor is available, a set of 12 DIP switches can be used to set up the appliance. The position of these switches is only sampled once during power-up.

3.3.1 Switch 1 - OSD Parameter Selector

OFF: DIP-switch Settings Mode. The actual position of the DIP switches determines the initial parameters. Parameters can still be modified online using the OSD menu and keypad.

ON: OSD-Settings Mode. The parameters stored to the EEPROM through the OSD menu are reloaded at power-up. If no previously stored parameters are available, then default settings are used instead.

3.3.2 Switch 2,3 - Correction Mode

<u>2</u>	<u>3</u>	corresponding OSD setting
OFF	OFF	PAN ONLY
ON	OFF	ROTATION + PAN
OFF	ON	ZOOM + ROTATION + PAN
ON	ON	LOCK ZOOM + ROTATION

3.3.3 Switch 4,5 - Vibration

<u>4</u>	<u>5</u>	corresponding OSD setting
OFF	OFF	MEDIUM
ON	OFF	FAST
OFF	ON	SLOW
ON	ON	VERY SLOW

3.3.4 Switch 6,7 - Zoom

<u>6</u>	<u>7</u>	corresponding OSD setting
OFF	OFF	NONE
ON	OFF	5%
OFF	ON	10%
ON	ON	15%



3.3.5 Switch 8 - Allow Black Borders

8 corresponding OSD setting

OFF **YES**

ON **NO**

3.3.6 Switch 9 - Show Input Video

9 corresponding OSD setting

OFF **NO**

ON **PIP**

3.3.7 Switch 10 - Include Top Portion for Shake Estimation

OFF: The top portion (50 lines) of the input video is excluded from the steady algorithm to avoid confusion of shaky video and stable lettering.

ON: The top portion of the video is also included in the shake estimation.

3.3.8 Switch 11 - Include Bottom Portion for Shake Estimation

OFF: The bottom portion (50 lines) of the input video is excluded from the steady algorithm to avoid confusion of shaky video and stable lettering.

ON: The bottom portion of the video is also included in the shake estimation.

3.3.9 Switch 12 - Advanced

Leave this switch OFF.

3.3.10 Default DIP-Switch Settings

Setting all switches to OFF results in the same default setting as mentioned in chapter 3.2.9.

4 Technical Information

4.1 Specifications

Video In:	CVBS (Color or BW), 75 Ohm BNC connector. Auto sensing for NTSC/PAL
Video Out:	CVBS, 75 Ohm BNC connector. NTSC/PAL (same as input)
Power:	External power supply 12V DC, 1.2A
Metrics:	Height: 2.2" (5.5 cm) Width: 6.7" (16.9 cm) Length: 7.3" (18.5 cm) Weight: 2.4 lbs (1.1 kg)
Operating conditions:	Temperature: 30-120°F (0-50°C) Humidity: 20-95%, non-condensing

Design and specifications are subject to change without notice.

4.2 Approval of Standards, FCC & CE conformance

Conformance to FCC and CE standard will only be ensured, if the Installation Advice of chapter 4.2.1 is heeded.

Information to the user

Note: 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. 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 can radiate 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 own expense.

Hints to resolve interference problems

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



Changes or modifications

Changes or modifications not expressly approved by DynaPel Systems, Inc. may void the warranty and violate FCC, CE, Federal, State or local rules, regulations and laws.

4.2.1 Installation Advice

We recommend to use RG59 75 Ohm coaxial cables to connect the video input and output. The video input cable has to be provided with a NiZn-ferrite. The ferrite has to be positioned near to the Video-In BNC connector. Proposed ferrite:

74271112 STAR-TEC Round cable snap ferrite
Würth Elektronik <http://www.we-online.com>

or

28A2025-0A0 STEWARD Ferrit tube box
Digi-Key <http://www.digi-key.com>
Part # 240-2074-ND



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