

## Kodak Ektapro HS Motion Analyser

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**User's manual**  
**Kodak Ektapro HS**  
**Motion Analyser**

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report WFW 97.013

# 1 Introduction and Connections

In this manual the basic operations with the **KODAK EKTAPRO HS Motion Analyser model 4540** are explained. The different operations are divided in three sections containing recording, playbaking and downloading. These are represented in chapter 2,3 and 4. Chapter 5 contains several remarks which are a supplement to the basic information.

Equipment :

- KODAK EKTAPRO HS *Motion Analyser* model 4540
- KODAK *camera*
- Remote Control / *keypad*
- *PC*
- *PC monitor*
- Panasonic *video recorder*
- Panasonic *video monitor*

Connections :

A connection diagram is displayed in figure 1 on page 2.

## **Connecting the *PC* to the *Motion Analyser***

Connect the GPIB port on the PC to the IEEE 488 port on the Motion Analyser.

## **Connecting the *video recorder* to the *Motion Analyser***

Connect the video recorder with the video out 1 port to the video in port on the Motion Analyser .

## **Connecting the *video recorder* to the *video monitor***

Connect the s-video out port on the recorder to the s-video in port on the monitor.

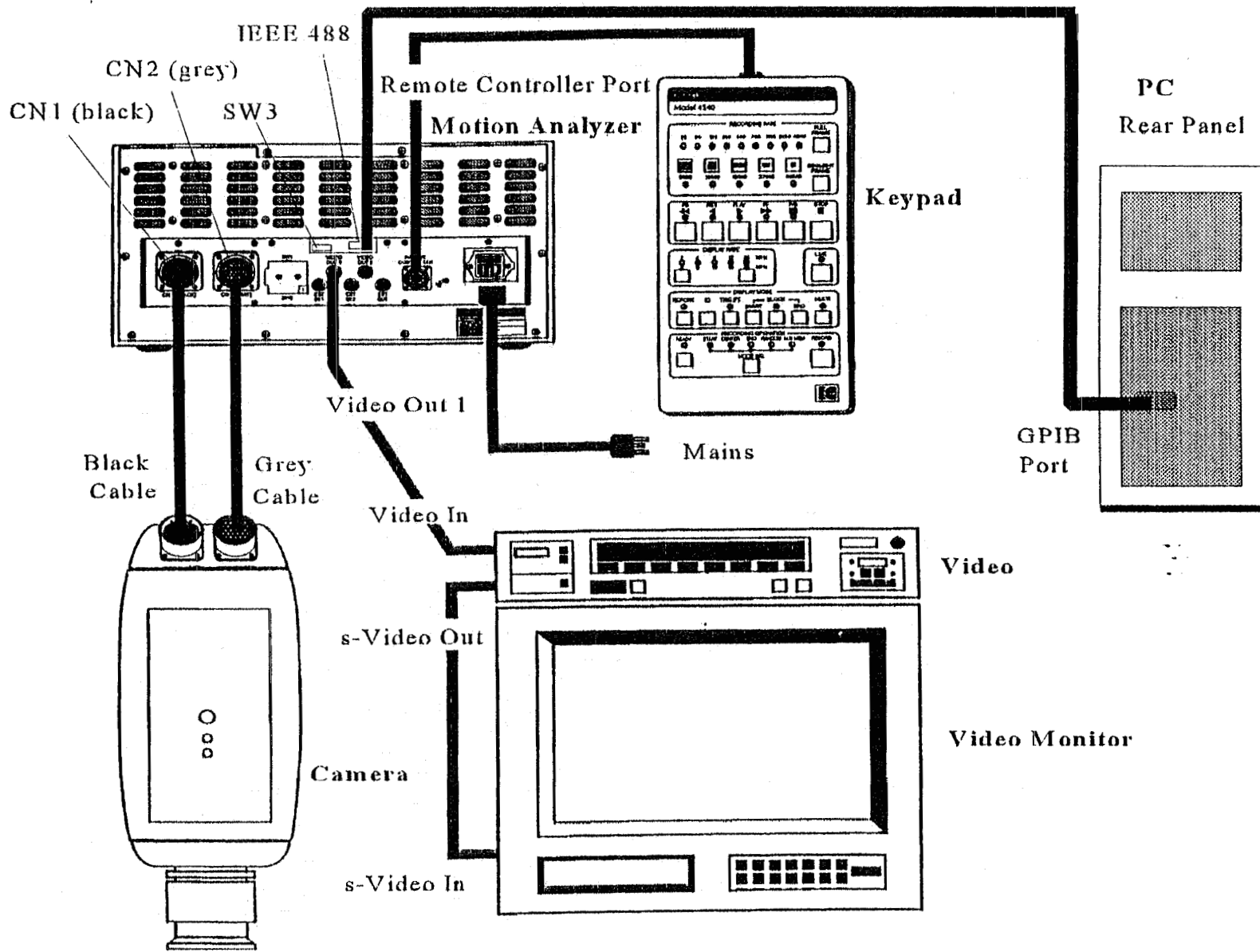
## **Connecting the *camera* to the *Motion Analyser***

The cables are colour coded. Connect the black/grey cable to the black/grey plug on the camera and to the CN1 (black) port / CN2 (grey) port on the rear panel of the Motion Analyser.

## **Connecting the *keypad* to the *Motion Analyser***

Connect the keypad cable to the remote controller port on the rear panel of the Motion Analyser.

Figure 1. Connection diagram



## 2 Recording

1. Turn the power switches of the Motion Analyser, video monitor and video recorder (VTR button) on. The video monitor will display a block of textual information on the right hand side of the screen.
2. Press the LIVE button on the keypad to place the Motion Analyser in LIVE MODE. Check if the following conditions are fulfilled when there is no image displayed on the video monitor :
  - the lenscap is removed from the lens
  - the diaphragm is open
  - the Dedocool lights are turned on, wait for approximately 10 seconds when switching between the three levels of light intensity
  - the video recorder is turned on

### REMARK :

**Wait until the lightfans have stopped cooling down before turning the power off.**

3. The RECORDING RATE can be chosen in the RECORDING RATE section at the keypad. Pressing the FULL FRAME BUTTON will change the recording rate from 30 to 4500 frames/second. By pressing the SEGMENT FRAME button a higher recording rate be reached with loss of image size (see table 1 in chapter 5).
4. Select a RECORD MODE on the RECORDING OPERATION section of the keypad. Press the MODE SEL button to switch between the different options. The different modes are explained below.
5. Press the READY button.
6. The next step depends on the RECORDING MODE :

RECORDING MODES (see also figure 2 on page 5):

#### – START MODE :

Press the RECORD button. The Motion Analyser will record images until its memory has been filled. An external trigger signal input through the ext. in 1 or ext. in 2 port on the Motion Analyser has the same effect as pressing the RECORD button. The first frame which is the trigger point is numbered '1' and the last frame is numbered '+max'.

#### – CENTER MODE :

To begin recording press the RECORD button. The Motion Analyser will record images until a trigger signal is received, by pressing the RECORD button again or by an external trigger signal. The Motion Analyser then records a number of frames equal to half the number of frames available in memory after the trigger point. The trigger point is numbered '1', the first frame and the last frame are numbered respectively '-max/2' and '+max/2'.

– END MODE :

Press the RECORD button. The processor will record images until you press the RECORD button again or when an external trigger signal is received. The video stored in memory will contain images covering events up to the time when the trigger signal was received. The trigger point is numbered '1', the first and the last frame respectively '-max' and '1'.

– RANDOM MODE :

Press the record button. The Motion Analyser will record 1,2 or 4 pictures, each time the RECORD button is pressed, or when an external trigger signal is received. The number of pictures is set by the DIP switch SW1 on the Motion Analyser. If you wish to exit this mode before the memory has been fully loaded press the MODE SEL button.

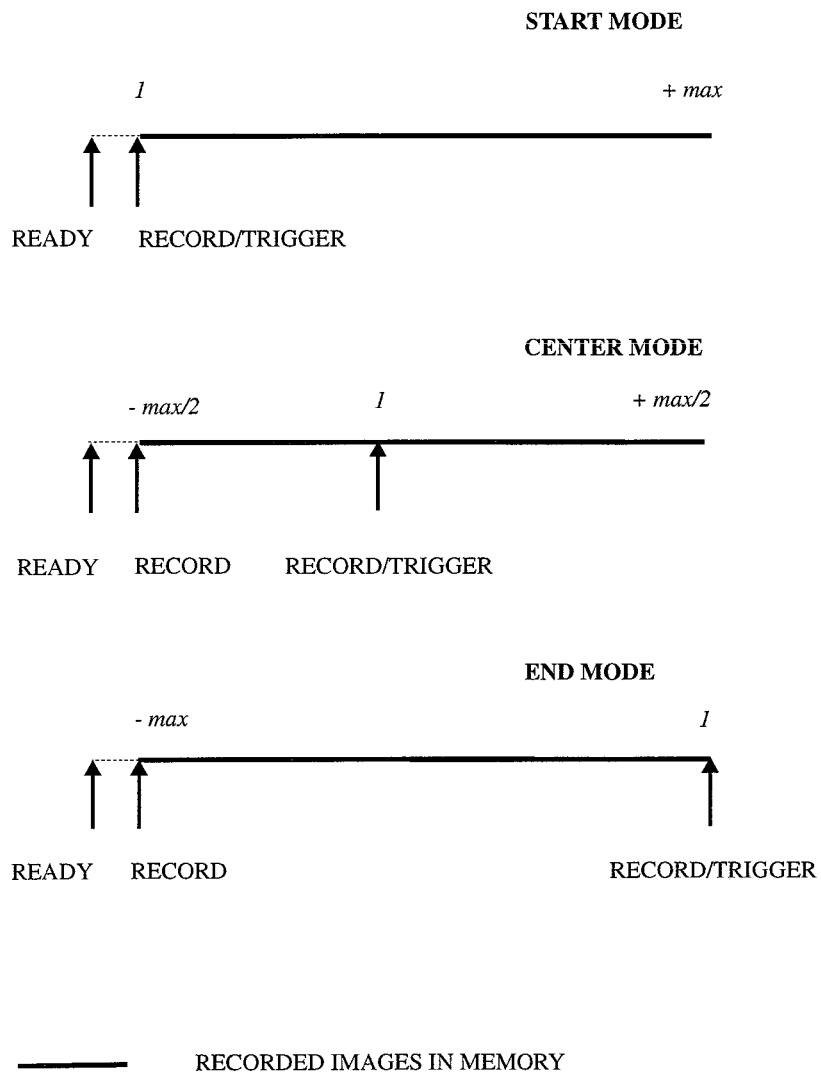
– AUX MEM MODE :

AUX MEM is a special RECORD MODE that is used to calibrate the Motion Analyser before making a recording.

**Note :**

Before getting started an AUX MEM recording with the lens capped must be performed to correct for the pattern noise and shading errors in the pictures seen on the monitor.

- Cover the front of the lens so that no light gets to the sensor
- Set the gamma switch on the camera to 1
- Verify that the gain switch on the camera is at the setting you will be using (normal gain is sufficient in most situations.)
- RECORDING RATE on the keypad should be set for 4500
- Press the MODE SEL button as many times as needed to illuminate AUX MEM
- Press the READY button
- Press the RECORD button
- Uncover the lens and the Motion Analyser is ready for normal operation



*Figure 2. Recording modes*

## 3 Playback of recorded images

To view the recorded images stored in memory the PLAYBACK CONTROL section on the keypad or the PC can be used. Playback is disabled when the Motion Analyser is in LIVE MODE.

### 3.1 Keypad

1. Exit LIVE MODE, press the LIVE button and verify that the LIVE LED is not illuminated.
2. Select the DISPLAY RATE at the DISPLAY RATE section on the keypad.
3. Set the DISPLAY MODE at the DISPLAY MODE section on the keypad. The display modes are explained below.
4. Playback the images.

#### DISPLAY MODES

- The REPORT button can be used to toggle the information display on the monitor on or off.
- Pressing the ID button increases the number displayed in the text on the monitor. This number can be used to identify recordings as you download to the video recorder or PC.
- Press the TRIG PT button to jump to the frame marked as the trigger point in memory.
- The BLOCK display mode plays back a section of the recording. Play through your recording. Press the START button to mark a frame as the beginning of the block and press the END button to mark the end of the block. After pressing the BLOCK button and the PLAY button, the marked recording is played back repeatedly until the BLOCK button is pressed again.
- Press the MULTI button to display multiple pictures on the monitor.

### 3.2 PC

1. Start up Windows. Start up the program Ektahs\_p in group Kodak HS 4540 DDI.
2. Switch to LOCK to set the program in software mode. The playback can be controlled with the PC now.
3. The playback procedure is the same as described before for the KEYPAD MODE. However, the DISPLAY MODE can only be controlled with the keypad.



## 4 Downloading images

The recorded images can be stored on a video tape and/or can be downloaded to the PC.

### 4.1 Video recorder

1. Play back the section of the recording you want to download in BLOCK MODE.
2. Make a recording of the played frames with the video recorder by pressing the PLAY and RECORD button simultaneously on the video recorder.

### 4.2 PC

1. Start up Windows.
2. Create the directory for storing the files with the file manager of Windows. The file path must contain three directory levels (e.g. disk:\level1\level2\level3).
3. Start up the program Ektahs\_p in group Kodak HS 4540 DDI. This program extracts the images from the Motion Analysers memory and converts them to TIFF files.
4. Move to the TIFF DOWNLOAD section and fill in the file path to specify where to save the selected frames. Make sure that all invisible old data is removed from the filepath by pressing backspace before entering a new filepath.
5. Set the START frame number and END frame number from the sequence you want to download. Set the FRAMES TO SKIP number to zero if you wish to download every frame in the sequence.
6. Push the DOWNLOAD button.

The names of the files, the images are stored in, are determined by the ID-number displayed in the text on the video monitor (see paragraph 3.1 DISPLAY MODES) and the frame number, separated by an underscore :

ID-number\_framenumber.tif (e.g. 3\_120.tif)

## 5 Remarks

### Recording

A TTL input trigger can be connected to the EXT IN 1 connector at the Motion Analyser. The EXT IN 2 port requires a contact closure to generate a trigger.

The exposure duration is 1/4500 seconds for all full frame recording rates. This means that you do not have to change the lens aperture as you change between recording rates. The exposure duration for frame segment recording is the reciprocal of the recording rate.

When switching between normal and high gain operation (regulation on the camera) an AUX MEM recording with the lens capped must be performed to correct for the pattern noise and shading errors in the pictures seen on the monitor.

The images are stored in RAM with a capacity of 192 Mb (3072 full frames).

### Playback

The pictures have a resolution of  $256 \times 256$  pixels. Displaying multiple frames reduces the resolution to  $64 \times 64$  pixels.

The recording rate indicated on the keypad when playbacking must match the recording rate of the images in memory to avoid scrambled pictures.

If you did not fill the video memory with the last recording, images from a previous recording can still be seen in playback.

The display rate can be chosen between 2 and 25 frames per second. In the FF MODE and FR MODE on the video recorder the display rate is multiplied by 10.

Pressing the PLAY button while in PAUSE (P/S) MODE will advance the display one frame only.

More information about the images and TIFF-files as a function of the recording rate is shown in table 1 and figure 3.

Recording rate [ $s^{-1}$ ]	Number of frames in memory	Recording time [s]	Time between subsequent images [ms]	Image size in pixels (X × Y)	File size [bytes]
30 - 4500	3072	0,6824	0,222	256 × 256	65696
9000	6144	0,6826	0,111	256 × 128	32928
13500	12288	0,9101	0,074	128 × 128	16544
18000	12288	0,6826	0,056	256 × 64	16544
27000	24576	0,9102	0,037	128 × 64	8352
40500	49152	1,2136	0,025	64 × 64	4256

Table 1. Properties of images and tiff-files as a function of recording rate.

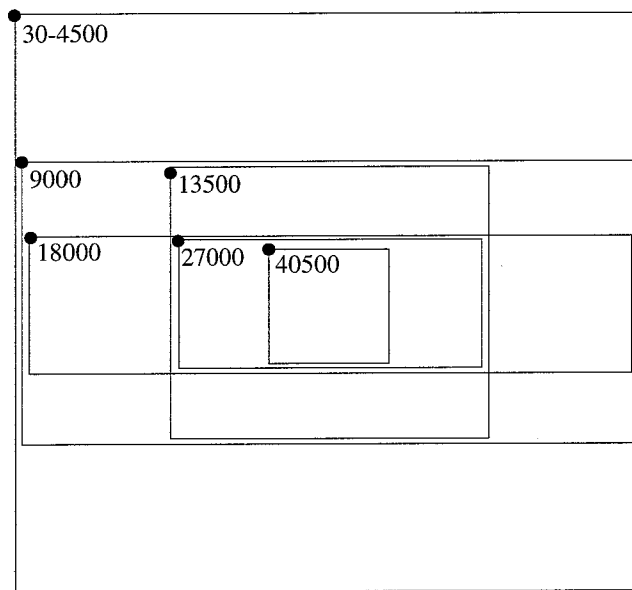


Figure 3. Image size in pixels as a function of recording rate.

**REMARK :**

**Wait until the lightfans have stopped cooling down before turning the power off.**

For more information turn to :

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