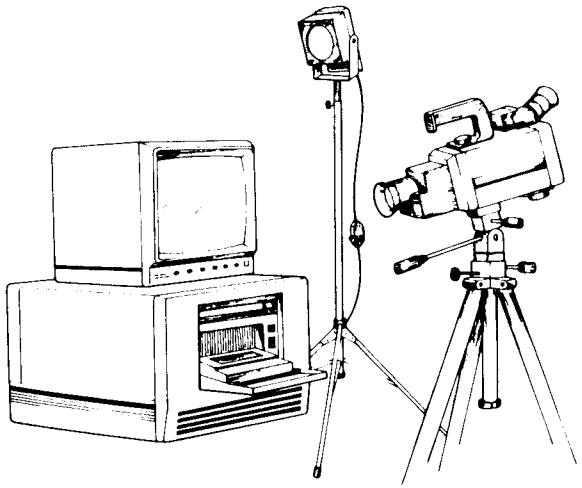
THIS MANUAL

CHAPTER 1.
Getting Started, explains how to connect and operate the EKTAPRO 1000 Motion Analyzer. The step by step instructions in Chapter 1 will assist you in setting up and connecting the system components, and recording and playing back an experiment.

CHAPTER 2.
Keypad Control, should be read with the system operating, to familiarize yourself with the range of functions which the system offers. The Quick Reference Card will then serve as a useful resource and reminder for all functions of the system.

CHAPTER 3.
Saving Your Work shows how to copy the contents of the system tape onto a standard VHS video cassette.



INTRODUCTION

The EKTAPRO 1000 Motion Analyzer is designed to be a valuable addition to the scientist's or engineer's problem solving tool kit. The menu driven keypad and interactive displays make evaluating your most difficult motion related problems simple.

The live setup feature allows the user to be sure that the image is exactly what is required to solve the problem. There is no guesswork about exposure levels or image composition. What the user sees on the television monitor is what will be captured on tape when the record button is pressed.

The images recorded are immediately available for analysis. The elapsed time display and built in reticle make time and distance measurements quick and accurate.

The information in this manual will teach you how to operate the EKTAPRO 1000 Analyzer, and take advantage of the many features of the system designed to speed up and simplify the task of motion analysis.

HOW TO USE THIS MANUAL

CHAPTER 4.
System Theory describes how the system works. Knowledge about the logic of the EKTAPRO 1000 Analyzer may increase your technical mastery of its applications.

CHAPTER 5.
Lenses describes the functions and capabilities of lenses available for the system and will assist you in finding solutions to problems involving critical focus or depth of field.

CHAPTER 6.
Lighting Theory provides a thorough and concise explanation of lighting techniques for videography including some solutions specific to motion analysis experiments.

CHAPTER 7.
Routine Care explains how to take the best care of the system for the best results and to avoid problems.

Familiarize yourself with the table of contents. The manual can then be consulted as needed for information about specific topics such as, lighting, lenses and care and maintenance of the system.

If you require more technical information not included in this manual regarding the care, technical service and operation of the EKTAPRO 1000 Analyzer or its components, please contact a field service representative by calling:

Outside California
800-854-7006
In California
800-542-6417

TABLE OF CONTENTS

CHAPTER 1. GETTING STARTED.

CHAPTER 2. USING THE KEYPAD.

CHAPTER 3. SAVING YOUR WORK.

REVISED 10/87

TABLE OF CONTENTS

CHAPTER 4. HOW THE SYSTEM WORKS

CHAPTER 5. LENSES

CHAPTER 6. LIGHTING AND EXPOSURE CONTROL

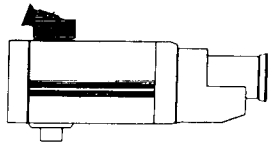
TABLE OF CONTENTS

CHAPTER 7. ROUTINE CARE AND MAINTENANCE

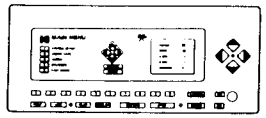
CHAPTER 8. APPENDICES

SYSTEM START UP
INTRODUCTION

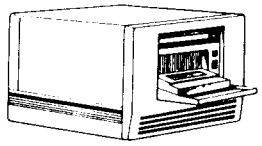
IMAGER



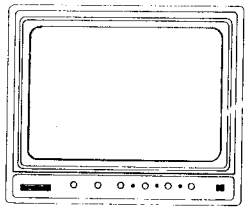
KEYPAD



PROCESSOR



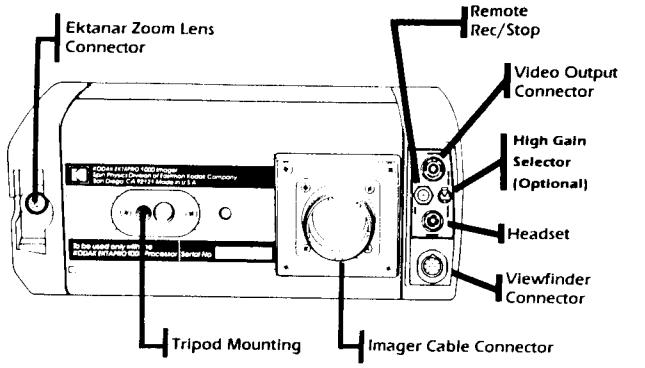
MONITOR

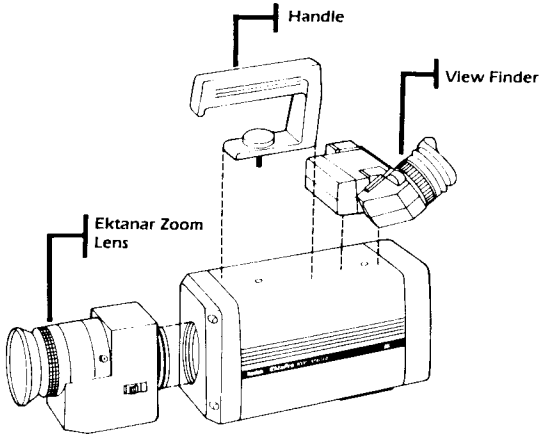


CASSETTE

CONTROLS AND CONNECTORS

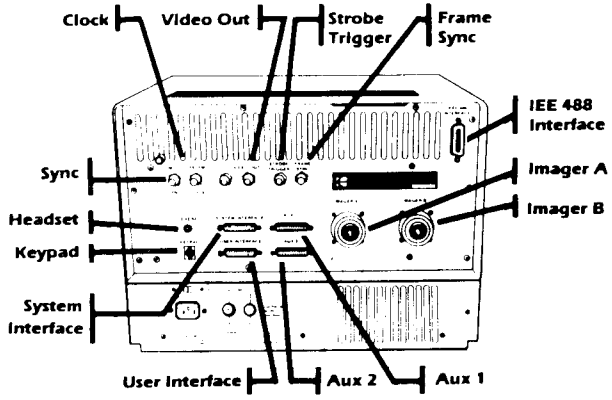
IMAGER

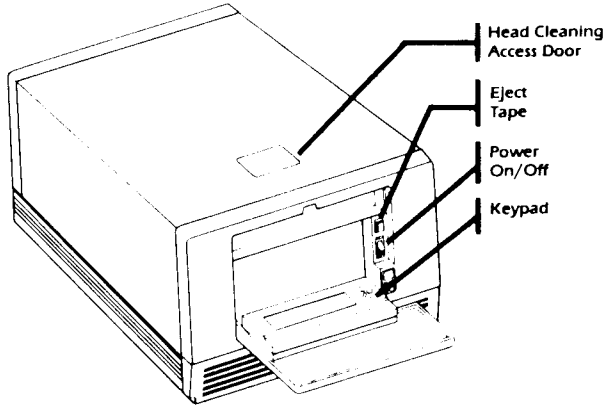




CONTROLS AND CONNECTORS

PROCESSOR





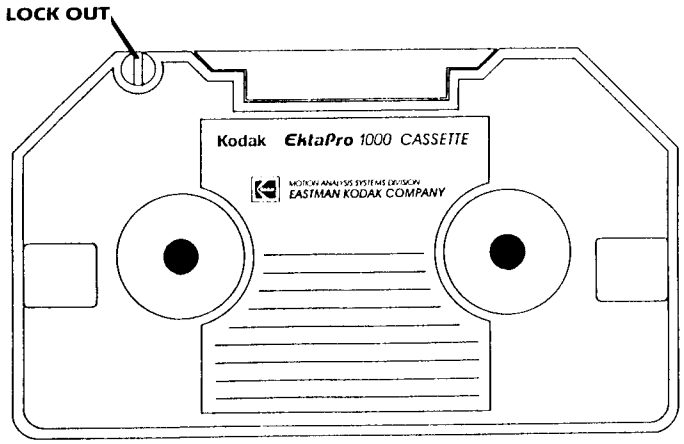
CASSETTE

RECORD LOCKOUT

The Record Lockout dial prevents accidental recording over an existing recorded tape. When the dial is in the vertical position, the cassette will not record. By turning the dial to a horizontal position, the cassette is open to record.

PLAY ONLY

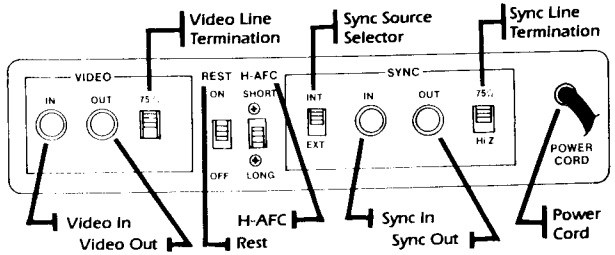
RECORD

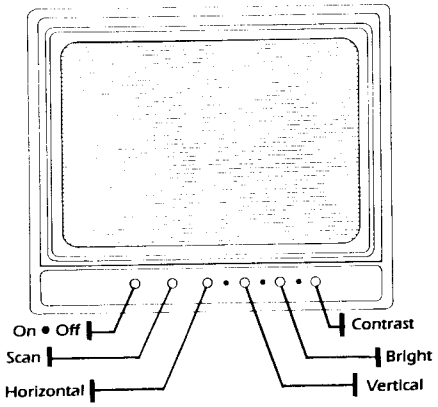


If you wish to make a recording, the dial must be in the horizontal or record position.

MONITOR

Back of Monitor





GETTING STARTED

What follows is a short step by step procedure that will teach you how to connect the KODAK EKTAPRO 1000 Motion Analyzer components and then use them to make a recording.

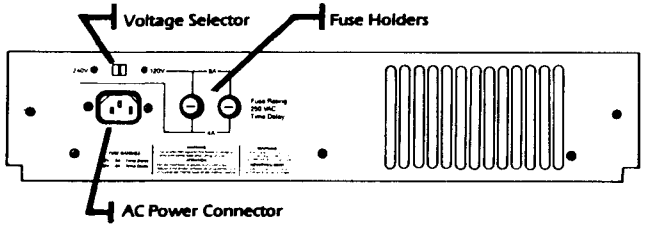
POWER SUPPLY

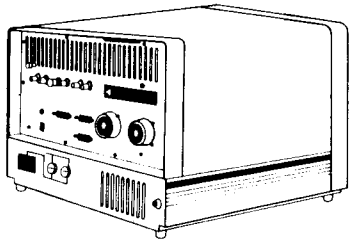
Do not connect the system to the AC power source unless you are certain that the power switch on the front panel is off and that the voltage selection switch above the power connector is set for the AC voltage that you are using.

If the AC voltage available is between 95 and 132 volts, set the voltage selection switch to 115. Both fuses should be rated at 8 amps.

If the AC voltage available is between 180 and 264 volts, set the voltage selection switch to 230. Both fuses should be rated at 4 amps.

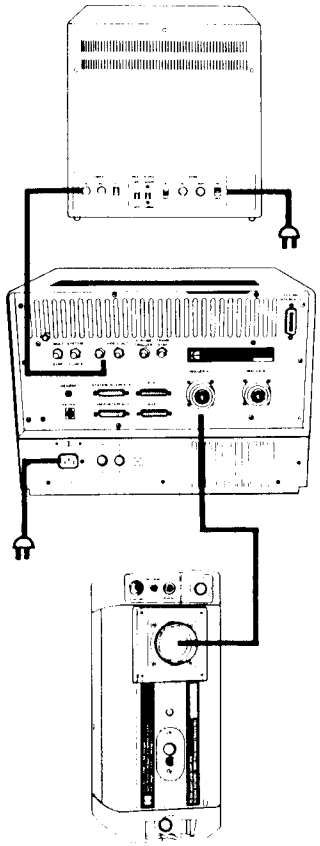
Do not connect the EKTAPRO 1000 Analyzer to the AC power unless the voltage measured falls between 90 and 132 volts or between 180 and 264 volts.





Voltage selection switch and fuse location on the back of Processor

CONNECTING THE SYSTEM



MONITOR
Connect the Video Monitor to the Processor using the coaxial cable supplied with your system.

PROCESSOR
Connect the Imager cable to the Processor. There are two Imager cable connections on the rear panel of the processor. Because the Processor automatically selects Imager A when the power is first turned on, use the Imager A connector until you become familiar with the Imager selection process using the keypad.

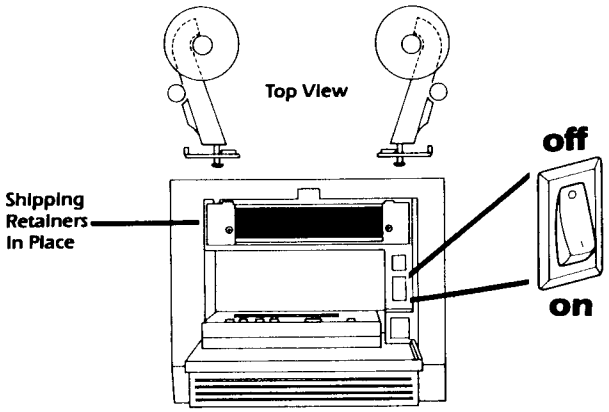
IMAGER
Mate the other end of the Imager cable to its connector on the bottom plate of the Imager.

CAUTION:
Do not use force, as there are several locating keys on the cable which allow it to be inserted only when the cable is rotated to the correct position. After inserting the cable, turn the knurled ring on the cable until it is firmly attached to the connector.

POWER ON

Before turning the processor power on, you must remove the protective shipping retainers holding the supply and take-up swing arms inside the cassette compartment.

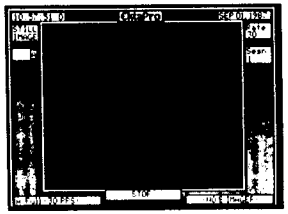
To remove the retainers, loosen the phillips head screws holding the retainers in place. Push the retainers towards the center of the cassette compartment, and gently pull them out of the processor.



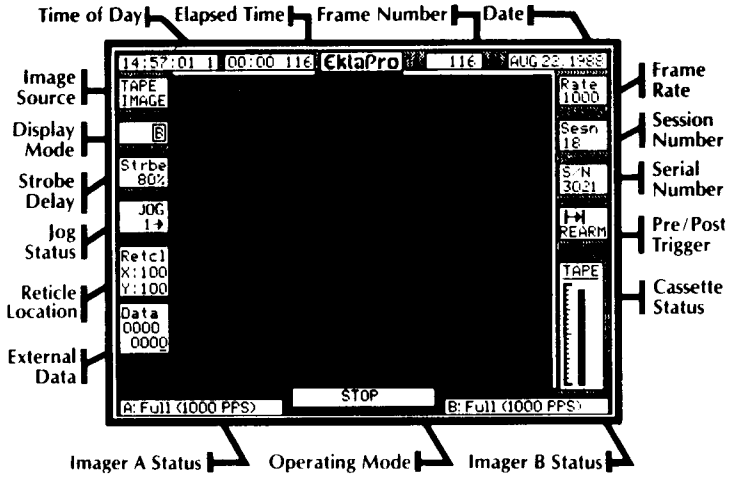
These retainers should be re-installed any time the processor is moved or shipped.

TURN THE POWER ON

When the picture appears on the television monitor it should look like this.



DATA-FRAME™ BORDER



TIME OF DAY

In live mode the current time of day is displayed and may be reset using the keypad. During playback the time that the recording was made is displayed.

DATE

In live mode the current date is displayed and may be reset using the keypad. During playback, the date that the recording was made is displayed.

FRAME RATE

In live mode the current frame rate is displayed. During playback, the frame rate at which the recording was made is displayed. The frame rate is expressed in frames per second.

FRAME NUMBER

The frame number window only appears during playback. The frame count always starts at zero for each recording and numbers each frame. The frame number and the frame rate of the recording are used to calculate elapsed time.

ELAPSED TIME

The elapsed time window only appears during playback. The elapsed time starts at zero at the beginning of each recording and shows the amount of time that has elapsed between the beginning of the recording and the current frame displayed.

DISPLAY MODE

The display mode tells the user which Imager or combination of Imagers is selected for display in live mode or was selected when a recording was made. The different display modes are denoted in the following way:

- [A] Imager A displayed.
- [B] Imager B displayed.
- [A][B] Imager A windowed into B.
- [A][B] Imager B windowed into A.

RETICLE LOCATION

The reticle location window is present only when the reticle has been turned on from the keypad. The X and Y coordinates are for the point at which the vertical and horizontal cursors intersect. The origin of the coordinate set (x= 1, y= 1) is in the lower left corner of the Imager display area.

CASSETTE STATUS

The cassette status window is present only when a cassette is in the Processor. The top of the gauge represents the beginning of tape (BOT) and the bottom of the gauge represents the end of tape (EOT). The words "PLAY ONLY" appear in the window beside the tape gauge when the cassette record lockout is set.

IMAGER STATUS

There are two Imager status windows, the left window for Imager A and the right for Imager B. The Imager status is current during live mode and indicates the Imager status at the time the recording was made during playback.

The Imager status windows indicate what portion of a frame a picture occupies and the effective frame rate as pictures per second (pps). When the word "Full" appears in the window a picture occupies a full frame and the pictures per second indicator is the same as the frame rate. When the word "Half" appears in the window a picture occupies half of the frame and the pictures per second is twice the frame rate. As many as six pictures may occupy a single frame permitting the EKTAPRO 1000 Analyzer to take 6000 pictures per second. The selection of the frame rate and the division of the frame are made from the keypad using the "Rate/ Division" submenu.

OPERATING MODE

The operating mode window informs the user what the system is doing. [STOP], [PLAY] and [RECORD] are examples of the messages that will appear in the window letting the user know that the system has responded to input from the keypad.

SESSION NUMBER

The session number window indicates the current session number in live mode and the recorded session number during playback. The session number can be changed using the keypad.

Some users have found that it is useful to keep a log of each recording, using a session number to identify the recording, along with a brief description of the event recorded.

SERIAL NUMBER

The number displayed in this window is the serial number of the Processor assigned to the unit at the factory. It is used, when talking to your service representative, to identify your unit. The serial number display is turned on and off from the Keypad's Video Menu.

IMAGE SOURCE

This window informs the user where the Image on the monitor originated.

LIVE IMAGE -
What the Imager is seeing at the moment.

STILL IMAGE -
The last frame taken by the Imager before pressing **[STOP]**.

TAPE IMAGE -
The image on the monitor originated on tape.

SAVED IMAGE -
A single frame of video that was stored in memory using the Save Frame feature.

DATA-FRAME ™
BORDER

STROBE DELAY

This window indicates the strobe trigger delay selected using the System Setup Menu. The instant the strobe fires it creates a minor disturbance in the image. The strobe delay is used to position this disturbance in a non-critical area of the image. The range of delay is from 0% to 99% (e.g. 50% would put the line through the middle of the picture, halfway from the top).

JOG STATUS

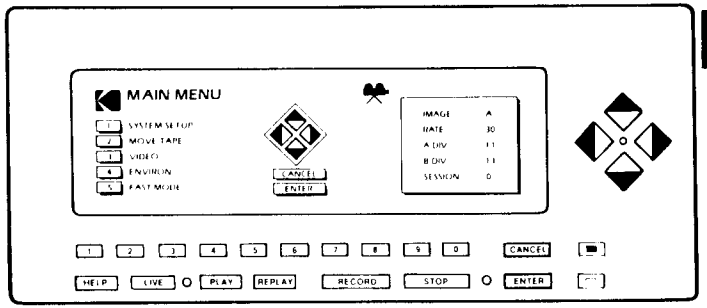
Jog rate and direction are displayed in this window. This window only appears when the Processor is in Jog. In the jog mode, the EKTAPRO displays successive frames, forward or reverse, at a slow, continuous rate (e.g. 1 to 4 frames per second).

KEYPAD

When the EKTAPRO 1000 Analyzer is powered up, the right hand side of the Keypad window displays information about the current status of the system. Imager A will be selected, the rate will be 30 frames per second and the monitor should indicate that the system is in Live Mode.

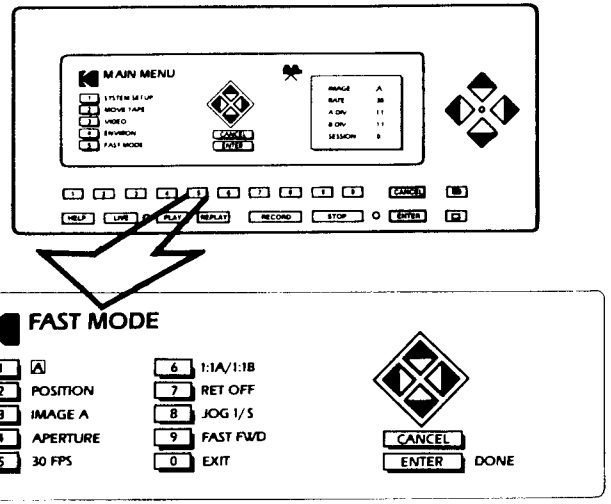
If you are working in an area with normal office lighting and you have removed the lens cap, you should have the beginning of an image on the television monitor. Adjust the lens focus, aperture and focal length, if you are using a zoom lens, to obtain a good picture on the monitor. If you are using the Kodak Ektanar zoom lens you will have to read the following paragraph to learn how to set the aperture, focus and focal length.

The Keypad display will look like this after powered up.



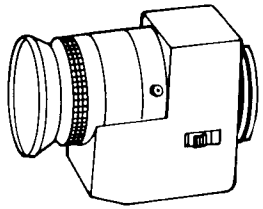
THE EKTANAR ZOOM LENS

From the MAIN MENU press: [5] FAST MODE.



This is the Fast Mode display on the Keypad.

With this menu displayed, press the [3] key to adjust Imager A zoom and focus using the arrow keys. Pressing the [4] key will allow you to adjust Imager A aperture using the arrow keys. After pointing the imager at something interesting, use the Keypad controls to adjust the lens for a good looking picture on the video monitor.

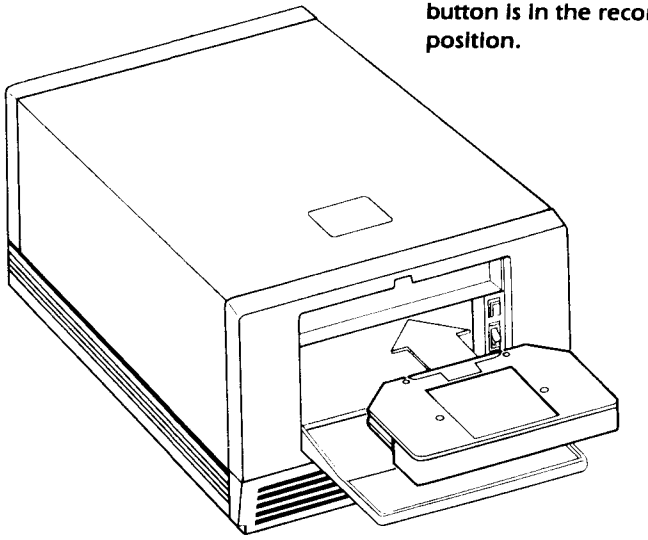


LOADING A CASSETTE

We have just finished pointing the Imager at something interesting and adjusting the lens for a good looking picture on the video monitor. Next we will record our picture on a cassette.

Now a cassette can be put into the Processor by pressing it in all the way and holding it until you hear the cassette latching mechanism quit operating.

Before inserting the cassette, make sure that the record lockout button is in the record position.

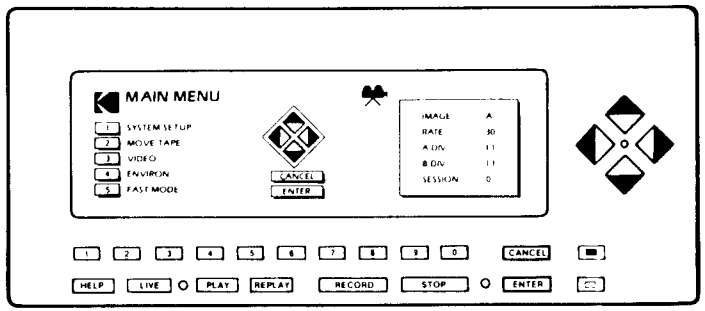


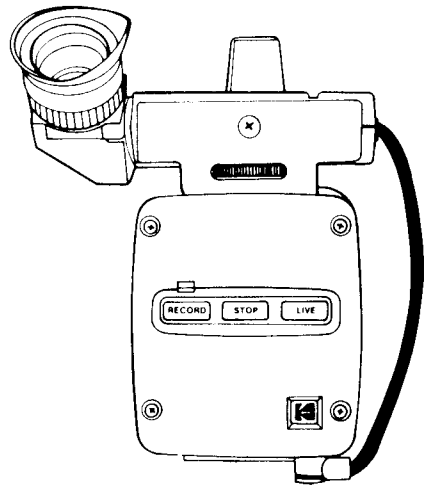
Inserting the Cassette.

YOUR FIRST RECORDING

PRESSING THE RECORD BUTTON

Once the cassette has been seated and latched in place, press the [RECORD] button on either the back of the Imager or the keypad to start the record function. To stop the recording, press the red [STOP] key on the Imager or the keypad.





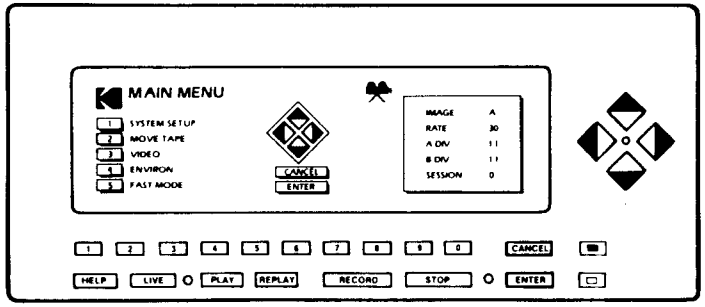
YOUR FIRST RECORDING

TAKING A LOOK AT YOUR FIRST RECORDING

To view the recording you have just made, press [REPLAY] key on the keypad. The tape will rewind to the start of the recording just made and then automatically play it back. Press the red [STOP] key on the Imager or keypad at any time to stop the playback. The image displayed when you press stop will be the frame being scanned at the moment the stop button was pressed.

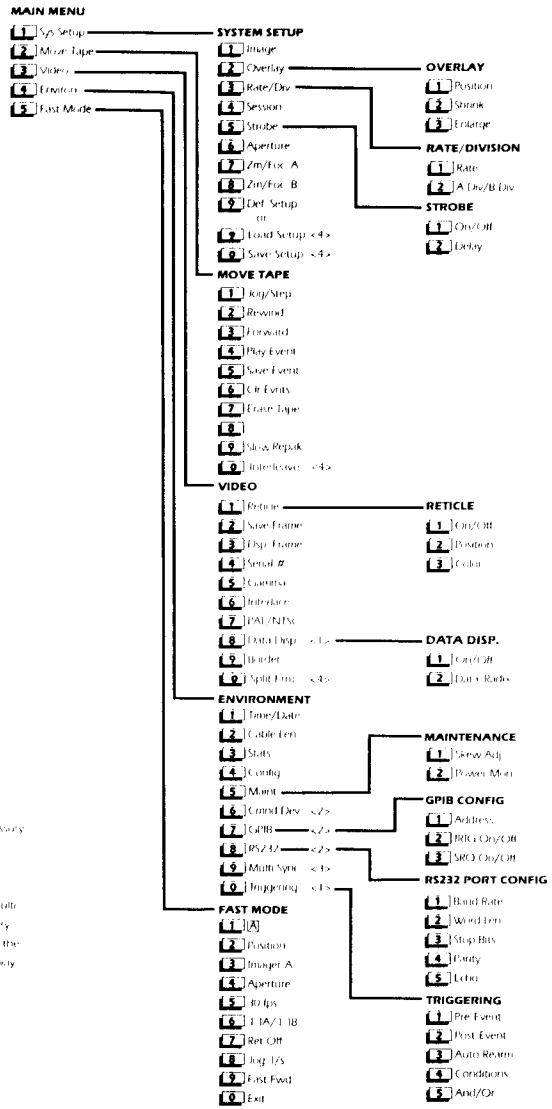
You have just recorded and played back at 30 frames per second. Any motion that occurred during the recording was not slowed down because the record and playback speeds were the same. To slow events down you must learn how to make recordings at the higher frame rates.

As you attempt to make recordings at frame rates above 30 fps additional light will be required and you will need an understanding of the Keypad. Turn to the next chapter for detailed information on the Keypad.



KEYPAD CONTROLS/HELP

2.1



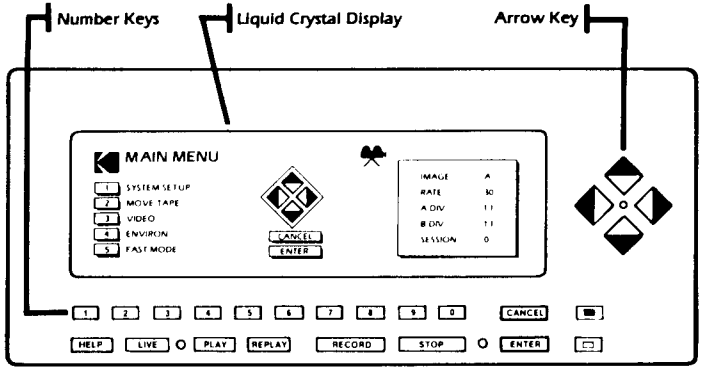
<1> Requires the KODAK External Data Interface accessory.
<2> Requires the KODAK Communications Interface accessory.
<4> Requires the KODAK Multi System Sync Trigger accessory.
<4> Will only appear when the KODAK Electronic Data Display Software/6000 accessory is installed.

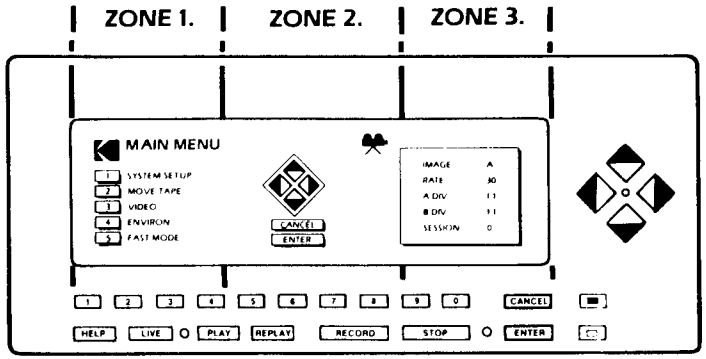
REVISED 9/89

KEYPAD CONTROLS/HELP

2.2

The EKTAPRO 1000 Keypad has a large liquid crystal display and a number of control keys that allow the user to manage all of the system functions. The display gives the user information about system status and what pressing a particular key will do. The keypad uses a series of menus permitting the numbered keys and the arrow keys to be used for different purposes in different menus. The remaining keys are labeled on the key and perform the indicated function. For example, the [PLAY] key will put the system in play mode from any point in the menu structure. The illustrations and explanations that follow will familiarize you with the keypad.





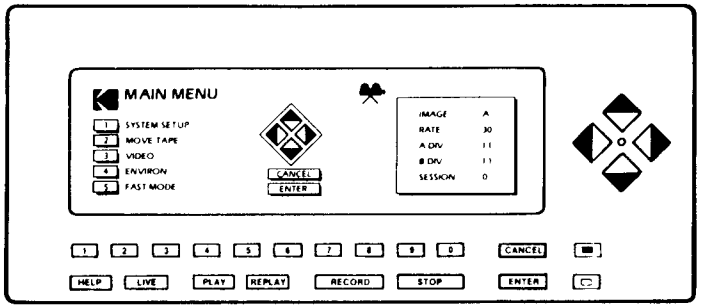
ZONE 1. The title of the menu being displayed appears next to the stylized Kodak logo at the top of zone 1. The numbered boxes down the left hand side of the display represent the numbered keys just under the display window. The label "System Setup" to the right of a numbered box indicates that pressing the corresponding key selects the System Setup menu.

ZONE 2. Zone 2 in the center of the display window defines the use of the arrow, cancel and enter keys. Labels may appear above the up arrow and also to the right of the cancel, enter and right arrow. These labels tell you what effect pressing the keys will have.

ZONE 3. Zone 3 on the right side of the display presents system status information. Parameters that can be changed from a menu appear in this zone and as the operator presses the control keys the information displayed is updated.

KEYPAD
CONTROLS/HELP

[1]–[9] The number keys perform the function indicated in each different menu display.



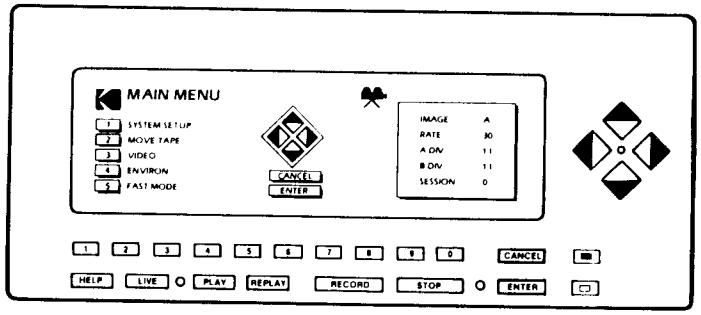
LIVE — Places the system in live mode.

PLAY — Plays back recorded images and information.

REPLAY — Finds the beginning of the most recent recording and then goes into play.

RECORD — Records the Image appearing on the monitor on tape.

CAUTION: **Images previously recorded on tape will be erased when [record] key is pressed.**



STOP Stops tape with the monitor displaying the last Image before the stop key was pressed.

Darkens the display window increasing contrast.

Lightens the display window decreasing contrast.

The arrow keys change system parameters as indicated in each menu.

CANCEL Stops the action and returns the display to the previous menu.

ENTER Enters and saves the changes input by the user.

HELP Pressing the help key and a number key at the same time will provide immediate access to selected functions without having to go through the normal menu sequence.

HELP [0] EJECT

Pressing [HELP] and [0] simultaneously will eject the tape cassette.

HELP [1] MAIN MENU

Pressing [HELP] and [1] simultaneously will return you to the Main Menu.

HELP [2] RETICLE

Pressing [HELP] and [2] simultaneously will toggle the reticle on or off.

HELP [3] SAVE FRAME

Pressing [STOP] and then [HELP] [3] simultaneously will store the frame appearing on the monitor in memory.

HELP [4] DSP. FRAME

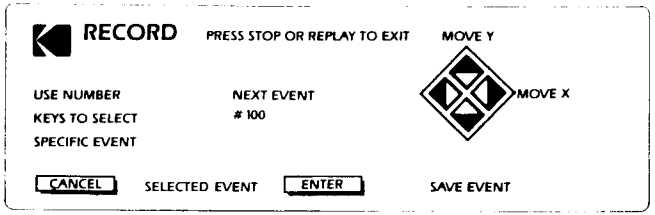
Pressing [STOP] and then [HELP] [4] simultaneously will display the frame stored in memory on the monitor.

HELP [5] SKEW ADJ.

Pressing [HELP] [5] at the same time turns skew correction on or off.

RECORD MARKING EVENTS

In order to make it easier to find events recorded on tape, a means of marking a point of interest while the recording is being made has been provided. When the Processor is in record, the keypad will display the screen below.



The Next Event number that appears in the center of the window is used to identify an event. When you see something on the monitor that you wish to mark for special review, press [ENTER]. The location on tape is identified with the event number and saved. The Next Event number then increments by one in preparation for the next point you wish to mark. An event number may also be entered using the number keys, up to 100 events may be marked.

To play back an event from the Main Menu press [2] Move Tape. From the Move Tape Menu press [4] Play Event. Enter the event number you wish to review and press enter. The Processor will automatically move the tape to that event and play it back for you.

The Processor stores the event markers in memory that is not erased when the power is turned off. If events are marked on a cassette that was started at the beginning of tape. The same cassette can be inserted the next day, rewound to the beginning of the tape and the event markers will still be reasonably accurate.

PLAY MARKING EVENTS

In order to make it easier to find events recorded on tape, a means of marking a point of interest while playing back a tape has been provided. When the Processor is in Play the Keypad will display the screen below.

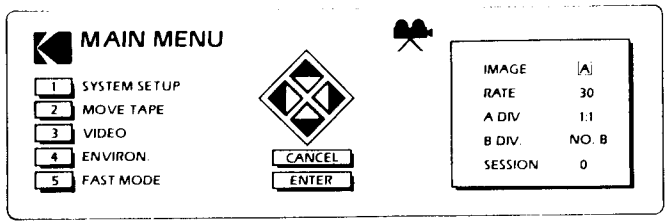
The Next Event number that appears in the center of the window is used to identify an event. When you see something on the monitor that you wish to mark for special review press [ENTER]. The location on tape is identified with the event number and saved. The Next Event number then increments by one in preparation for the next point you wish to mark. An event number may also be entered using the number keys, up to 100 events may be marked.

To play back an event, from the Main Menu press [2] Move Tape. From the Move Tape Menu press [4] Play Event. Enter the event number you wish to review and press enter. The Processor will automatically move the tape to that event and play it back for you.

The Processor stores the event markers in memory that is not erased when the power is turned off. If events are marked on a cassette that was started at the beginning of the tape. The same cassette can be inserted the next day, rewound to the beginning of the tape and the event markers will still be reasonably accurate.

MAIN MENU

1 SYSTEM SETUP
2 MOVE TAPE
3 VIDEO
4 ENVIRON.
5 FAST MODE



1 SYSTEM SETUP

Pressing [1] from the Main Menu displays this menu of options to allow you to set up the Imager format and frame rate features before recording.

2 MOVE TAPE

Pressing [2] from the Main Menu displays options for tape movement during playback such as Rewind, Fast Forward, Jog Mode, etc.

3 VIDEO

Pressing [3] from the Main Menu presents a menu of options that affect the way the video information is displayed on a monitor.

4 ENVIRON.

Pressing [4] from the Main Menu presents options which allow you to set the time of day and date.

5 FAST MODE

Pressing [5] from the Main Menu displays a quick access menu for some of the most frequently used operating functions.

Press HELP 1 Together returns you to MAIN MENU

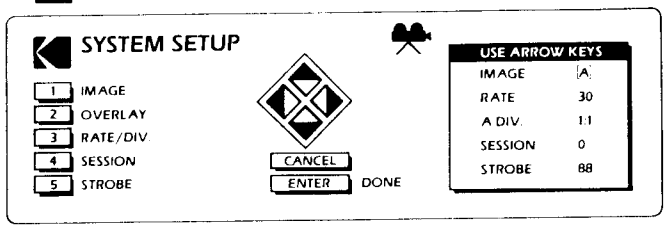
REVISED 10/87

SYSTEM SETUP

1 IMAGE
2 OVERLAY
3 RATE/DIV.
4 SESSION
5 STROBE

From the MAIN MENU press:

1 SYSTEM SETUP

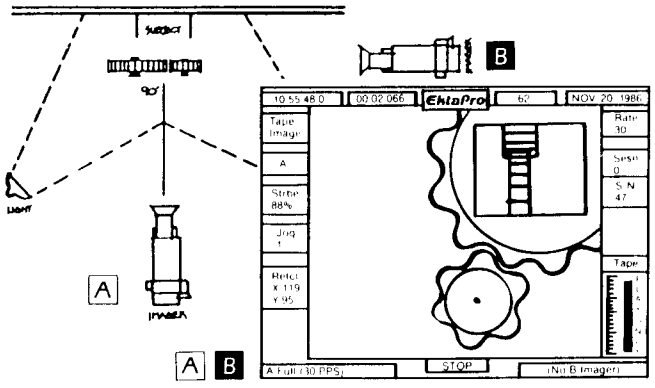


1 IMAGER

After pressing [1] from the System Setup Menu use the up or down arrow key to select the Imager or combination of Imagers to be recorded. The options are as follows:

- [A] Imager A only
- [B] Imager B only
- **A** [B] A as a window in B
- [A] **B** B as a window in A

One of the two windowing options must be selected before the [2] Overlay key has any effect.



Press HELP 1 Together returns you to MAIN MENU

SYSTEM SETUP

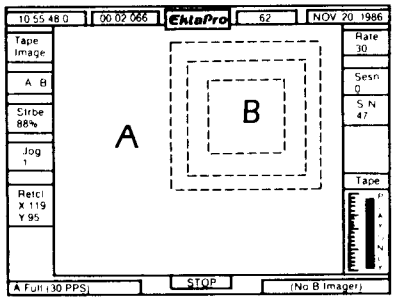
1 IMA
2 OVERLAY
3 RATE/DIV.
4 SESSION
5 STROBE

From the MAIN MENU press: 1 SYSTEM SETUP

2 OVERLAY

Pressing [2] from the System Setup Menu opens the Overlay sub menu that allows the user to change the size and position of the window containing the second Imager.
See page 2.13 for Overlay function menu options.

A B



3 RATE/DIV.

Pressing [3] from the System Setup Menu opens the Rate/Div.sub menu that allows you to set the frame rate and partial frame mode for both Imagers. See page 2.14 for Rate/Division menu options.

4 SESSION

Allows you to assign a session ID number from 0 to 9999 to each recorded segment. A session number may be entered by using the vertical arrow keys or the number keys

5 STROBE

Allows you to set the time delay of the strobe output pulse.

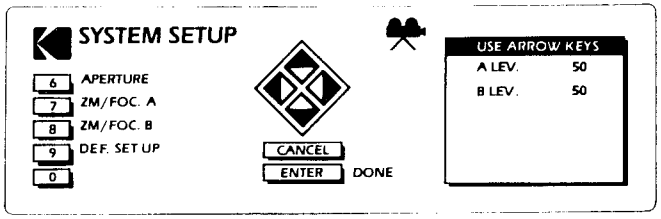
The strobe delay is adjustable from 0 to 99. The parameter is preset to 88. Setting appears in the LCD status zone display.

SYSTEM SETUP

MENU PAGE 2

6 APERTURE
7 ZM/FOC A
8 ZM/FOC B
9 DEF. SETUP
0

From the MAIN MENU press:
1 SYSTEM SETUP then
up or down arrow key.



6 APERTURE

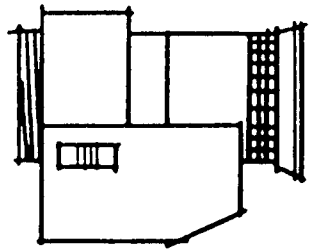
After pressing [6] the up or down arrow keys control the Imager A aperture and the left or right arrow keys control the Imager B aperture.

7 ZOOM/FOC A

Enables the power zoom and focus controls for Imager A. The up and down arrows adjust zoom. The right and left arrows adjust focus.

8 ZOOM/FOC B

Enables the power zoom and focus controls for Imager B. The up and down arrows adjust zoom. The right and left arrows adjust focus.



REVISED 10/87

SYSTEM SETUP

MENU PAGE 2

6 APERTURE
7 ZM/FOC A
8 ZM/FOC B
9 DEF. SETUP
0

SYSTEM SETUP

9 DEF. SETUP

After pressing [9] press the [ENTER] key to perform a software reset of the EKTAPRO 1000 Processor. This has the effect of returning the system to a basic operating configuration. For example the Imager will be reset to full frame 30 fps Live operation.

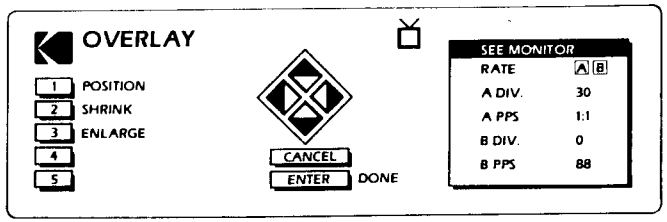
OVERLAY

1 POSITION
2 SHRINK
3 ENLARGE
4
5

From the MAIN MENU press:

1 SYSTEM SETUP then

2 OVERLAY from the SYSTEM SETUP



1 POSITION

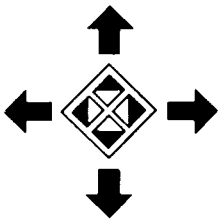
Use the arrow keys to move a window with the second imager in it around the frame.

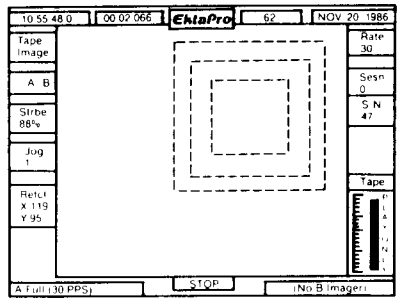
2 SHRINK

Use the arrow keys to reduce the area covered by an overlaid image.

3 ENLARGE

Use the arrow keys to increase the area covered by the overlaid image.





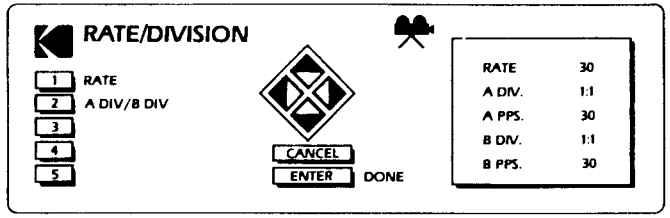
Press HELP 1 Together returns you to MAIN MENU

RATE/DIVISION

1 RATE
2 A DIV/_ DIV
3
4
5

From the MAIN MENU press:

1 **SYSTEM SETUP then**
3 **Rate/Div.**

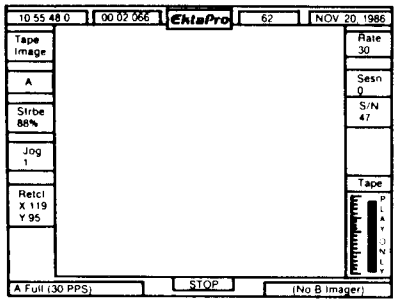


1 RATE

Allows you to set the frame rate. Use up and down arrow keys to change the frame rate.

2 A DIV/B DIV

Allows you to set partial frame recording for each Imager. The vertical arrow keys change the partial frame format for Imager A and the horizontal arrow keys control Imager B. The resulting frame rate is displayed in the status zone as pictures per second (pps).



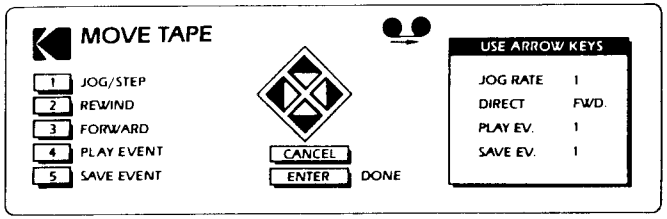
Press HELP 1 Together returns you to MAIN MENU

MOVE TAP[illegible]

1 JOG/STEP
2 REWIND
3 FORWARD
4 PLAY EVENT
5 SAVE EVENT

From the MAIN MENU press:

2 **MOVE TAPE**



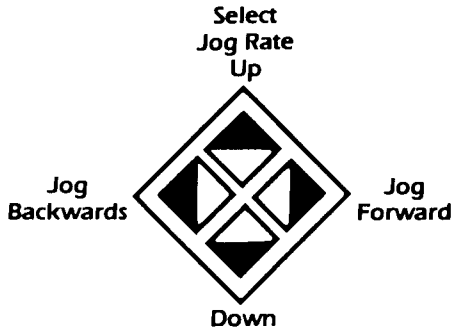
1 JOG/STEP

Allows you to set the rate and direction of jog mode.

Use the up and down arrows to select single step or a jog rate of 1, 2, 3, or 4 frames per second.

The right arrow causes the tape to step or jog forward. The left arrows causes the tape to step or jog backwards.

Pressing the red [STOP] key on the keypad stops the jog.



Press HELP 1 Together returns you to MAIN MENU

2 REWIND

Rewinds the tape. The tape will stop rewinding automatically at the beginning of the tape or the [STOP] key may be used to stop the tape at any point.

3 FORWARD

Fast forwards the tape. The tape will stop automatically at the end of the tape or the [STOP] key may be used to stop the tape at any point.

4 PLAY EVENT

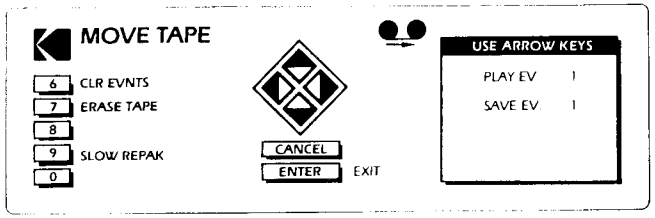
Press the [STOP] key, select an event number and press [ENTER]. The machine will find the selected event and play it back.

An event number may be entered using the number keys or by using the up or down arrow key to scroll to a number. If the event number is not changed, the event number displayed will be used when [ENTER] is pressed.

5 SAVE EVENT

Press the [STOP] key, select an event number and then press [ENTER].

An event number may be entered using the number keys or by using the up and down arrow key to scroll to a number. If the event number is not changed, the event number displayed will be used when [ENTER] is pressed. The event number displayed increments by one after [ENTER] is pressed.



6 CLR EVNTS

After pressing [6] pressing the [ENTER] key will erase the event locations saved in memory.

7 ERASE TAPE

WARNING: This function destroys all information recorded on the cassette loaded in the Processor.

This operation may be aborted at any point by pressing [STOP].

Pressing [7] causes the tape transport to rewind to BOT, engage the erase head, fast forward to EOT, release the erase head, and then return to BOT. A cassette that has been set to "play only" will not be erased by this operation.

MOVE TAPE

6 CLR EVN
7 ERASE TA.. E
8
9 SLOW REPAK

9 SLOW REPAK

Pressing [9] will cause EKTAPRO 1000 Processor to immediately begin a slow speed repack of the cassette. The message "Repacking" will appear in the Operating Mode window on the monitor. It takes about three minutes to complete and can be aborted by pressing the [STOP] key.

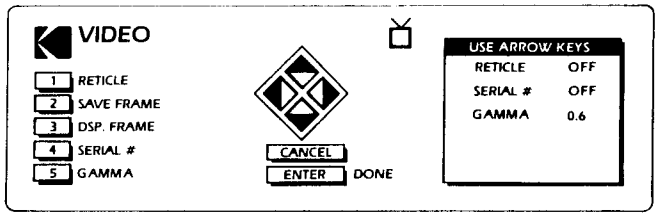
Slow Repack is used when it is suspected that a cassette has a problem, such as a loose or uneven pack. Slow Repak cycle does the same thing to a cassette that an Auto Repack does only at slower speeds in the fast forward portion.

VIDEO

1 RETICLE
2 SAVE FRAME
3 DSP. FRAME
4 SERIAL #
5 GAMMA

From the MAIN MENU press:

3 VIDEO



1 RETICLE

Allows you to control the reticle and displays the coordinates of the the reticle intersection in the status zone of the LCD display and also in a window on the upper left side of the Data-Frame™ Border.

2 SAVE FRAME

Press [STOP] and then press [2], the frame that is displayed on the monitor will also be stored in memory.

3 DSP. FRAME

Press [STOP] and then press [3], the frame of video that was stored, using the save frame feature, will be displayed on the monitor.

4 SERIAL #

Successive key presses will toggle the serial number display on and off.

5 GAMMA

Use the up and down arrow keys or the number keys to select the value for gamma correction.

Press HELP 1 Together returns you to MAIN MENU

VIDEO

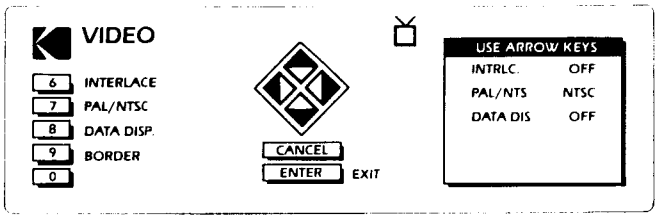
MENU PAGE 2

6 INTERLACE
7 PAL/NTSC
8 DATA DISP.
9 BORDER
0

From the MAIN MENU press:

3 VIDEO then

up or down arrow key.



6 INTERLACE

Successive key presses will toggle video interlace on and off. Interlace on is indicated by a down arrow on the right side of the Operating Mode window on the monitor. When you wish to down load a recording to a VHS home video recorder interlace should be turned on with the down arrow showing in the Operating Mode window.

7 PAL/NTSC

Successive key presses will toggle between PAL and NTSC video standards.

The United States and Japan use the NTSC standard. The rest of the world uses the PAL television standard.

8 DATA DISP.

Allows the windows for the KODAK External Data Display Program to be turned on and off.

Successive key presses will toggle the Data Display window on and off.

This option requires the KODAK External Data Interface accessory.

VIDEO

MENU PAGE 2 CONTINUED

6 INTERLACE
7 PAL/NTSC
8 DATA DISP.
9 BORDER
0

9 BORDER

Allows you to turn on and off the DATA-FRAME Border display.

Successive key presses will toggle the DATA-FRAME Border display on and off.

This option does not require an accessory.

Press HELP 1 Together returns you to MAIN MENU
REVISED 7/88

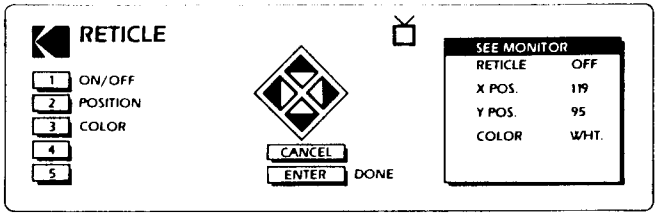
RETICLE

1 ON/OFF
2 POSITION
3 COLOR
4
5

From the MAIN MENU press:

3 VIDEO

1 RETICLE



1 ON/OFF

Successive key presses will toggle the reticle on and off.

2 POSITION

Allows you to use the arrow keys to change the position of the reticle on the screen.

3 COLOR

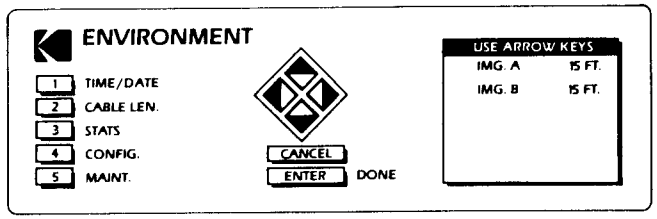
Successive key presses will toggle the reticle between black and white.

ENVIRONMENT

1 TIME/DATE
2 CABLE LEN.
3 STATS
4 CONFIG.
5 MAINT.

From the MAIN MENU press:

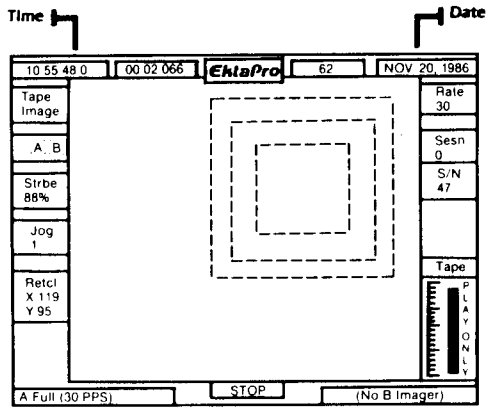
4 ENVIRONMENT



1 TIME/DATE

Allows you to input the time of day and date. The information is displayed in the Data Border and is recorded along with the video on tape.

The arrow keys move a cursor across the time and date field, on the keypad display. The number keys are used to input the correct information.



2 CABLE LEN.

Use the arrow keys to select the cable length showing in the Keypad display window closest to the length of cable actually connecting the Imager to the Processor.

3 STATS

Pressing [3] will display the system statistics in the Keypad display window. The statistics displayed are:

Footage to Date	This is the number of feet of tape passed over the heads.
Total Hours of Use	This is the number of hours that the Processor has been on since leaving the factory.
Longest Session	The longest time recorded between power on and power off of the Processor
Current Session	Length of time since the power was last turned on.

4 CONFIG.

Pressing [4] displays System Configuration data in the Keypad display window.

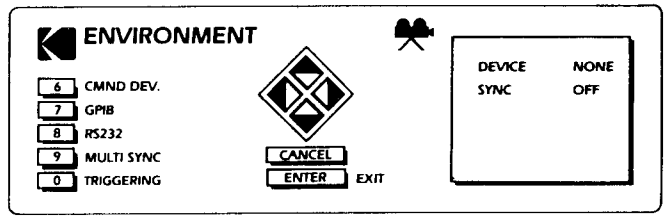
5 MAINT.

Press [5] to access the maintenance sub menu.

From the MAIN MENU press:

4 ENVIRONMENT then

up or down arrow key.



6 COMND DEV.

Allows you to select which port the KODAK Communications Interface accessory will use for communications.

This option requires the KODAK Communications Interface accessory.

7 GPIB

Allows you to select the address and operational modes of the GPIB port.

This option requires the KODAK Communications Interface accessory.

8 RS232

Allows you to set the conditions that the KODAK Communications Interface accessory will use to communicate using the RS-232-C serial port.

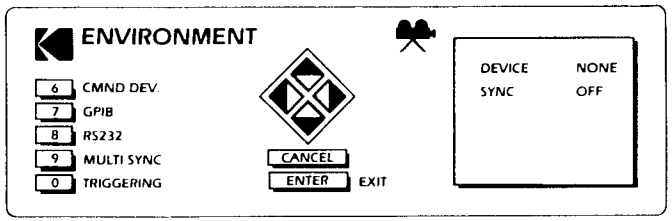
This option requires the KODAK Communications Interface accessory.

ENVIRONMENT

6 CMND DEV.
7 GPIB
8 RS232
9 MULTI SYNC
0 TRIGGERING

From the MAIN MENU press:

4 ENVIRONMENT then
up or down arrow key.



9 MULTI SYNC

Successive key presses will toggle SYNC ON and OFF.

This option requires the KODAK Multi-System Sync Trigger accessory.

NOTE: IF you can not get the motion analyzer to go from RECORD to RECORDING, then you may have left SYNC ON. SYNC can be turned OFF by using the Environment menu or by turning the power off and then back on.

0 TRIGGERING

Allows you to select the triggering requirements to start recording or stop recording with the motion analyzer.

This option requires the KODAK External Data Interface accessory.

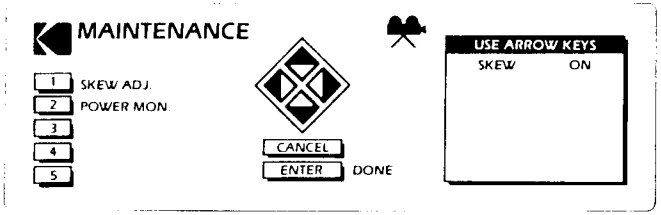
NOTE: IF you can not get the motion analyzer to go from PRE-TRIGGER to RECORDING or from POST-TRIGGER to STOP, then you may have left PRE or POST ON. You can turn OFF either of these conditions by using the Environment and then the Triggering menus or by turning the power off and then back on.

MAINTENANCE

1 SKEW ADJ.
2 POWER MON.

From the MAIN MENU press:

4 ENVIRONMENT then
5 MAINTENANCE



1 SKEW ADJ.

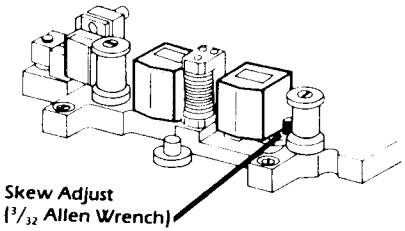
Toggles the electronic skew correction on or off. The skew corrector is turned off only when adjustment of mechanical skew on the head assembly is performed. Do not attempt this adjustment without proper training.

REPRODUCE SKEW ADJUST

When setting up the reproduce head, use the test tape and adjust skew during playback. When in the field, the skew may be adjusted at any time to compensate for differences in playback between cassettes.

INTERNAL SKEW ADJUST

The internal skew adjust is located under the "ENVIRONMENT" (4) menu, under "MAINT." (5). Turn the skew adjustment OFF to make the adjustments. After adjustments are made turn skew adjustment back ON.



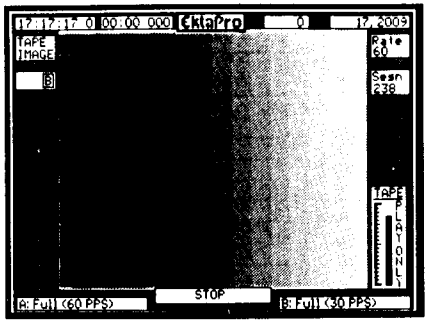
Press HELP 1 Together returns you to MAIN MENU

2.23 A

Insert $^{3}/_{32}$ Allen wrench and turn the adjust screw until the results equal illustration C.

Skew out of adjustment with skew corrector on.

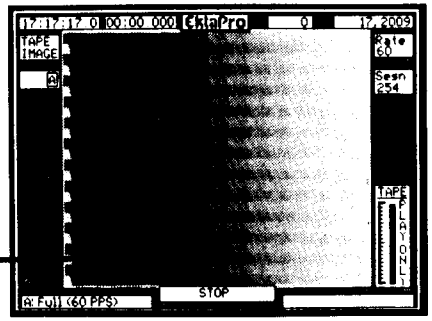
Ⓐ



Skew corrector turned off.

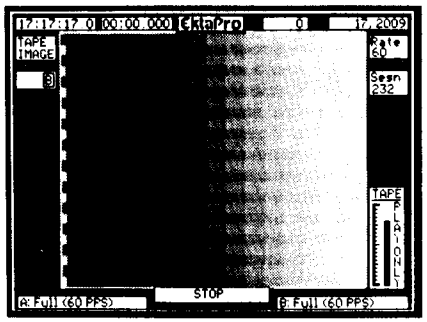
Ⓑ

Straight Line Desired



Skew adjusted correctly with skew corrector off.

Ⓒ



REVISED 10/87

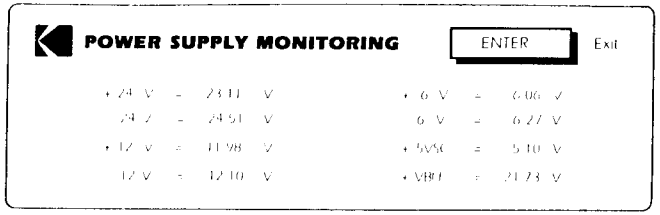
MAINTENANCE

1 SKEW ADJ.
2 POWER MON.

2.23.A.1

From the MAIN MENU press:

4 ENVIRONMENT then
5 MAINTENANCE then
2 POWER MON.



Displays the power supply voltages. This selection will take approximately 5 seconds to read the power supply voltages and put the values on the display.

The following are used by the system during normal operation:

+24V and -24V should be between 22 and 26 volts.
+12V and -12V should be between 11 and 13 volts.
+ 6V and - 6V should be between 5 and 7 volts.

The following are used by the transport only during an emergency stop and do not effect routine operation. An emergency stop is when the motion analyzer looses AC power source and a cassette is loaded in the transport.

+5VSC should be between 4.7 and 5.3 volts.
+ VBU should be between 20.0 and 24.0 volts.

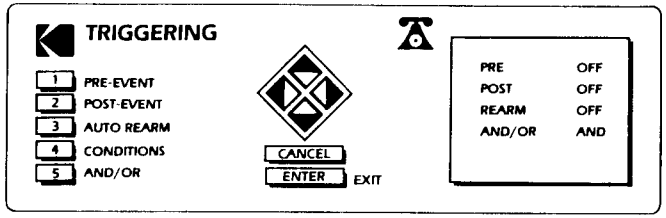
If either transport emergency stop power supplies are out of tolerance, leave the motion analyzer AC power source on to charge the batteries. The battery charging may take as long as 8 hours.

REVISED 9/89

TRIGGERING

[1] PRE-EVENT
[2] POST-EVENT
[3] AUTO REARM
[4] CONDITIONS
[5] AND/OR

From the MAIN MENU press:
[4] ENVIRONMENT then
[0] TRIGGERING



[1] PRE-EVENT
Allows you to turn Pre on and off. Works with the KODAK External Data Interface accessory and must be left off for normal operation.

[2] POST-EVENT
Allows you to turn Post on and off. Works with the KODAK External Data Interface accessory and must be left off for normal operation.

[3] AUTO REARM
Allows you to turn Rearm on and off. Works with the KODAK External Data Interface accessory and must be left off for normal operation.

[4] CONDITIONS
Allows you to set the triggering conditions for Pre-Event and Post-Event. See KODAK External Data Interface Manual for details.

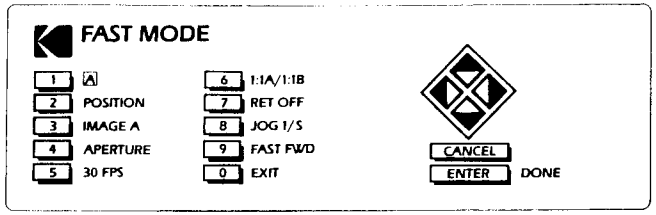
[5] AND/OR
Allows you to further define triggering conditions for Pre-Event and Post-Event. See KODAK External Data Interface Manual for details.

REVISED 7/88

FAST MODE

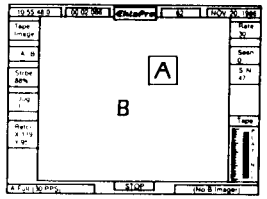
[1] A
[2] POSITION
[3] IMAGE A
[4] APERTURE
[5] 30 FPS
[6] 1:1A/1:1B
[7] RET OFF
[8] JOG 1/S
[9] FAST FWD
[0] EXIT

From the MAIN MENU press: [5] FAST MODE



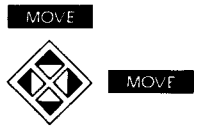
[1] A
The up and down arrows will scroll through the available Imager display modes.

[A] Imager A only
[B] Imager B only
[A] [B] Imager A windowed into B
[A] [B] Imager B windowed into A



[2] POSITION
Enables the overlay window functions. Successive presses of [2] selects between POSITION, ENLARGE and SHRINK.

Use the four arrow keys to move the position of the overlay box when POSITION is displayed by the Keypad.



In EXPAND an arrow key will move the corresponding side of the overlay box outward expanding the size of the box. In SHRINK an arrow key will move the corresponding side of the overlay box inward shrinking the size of the box.

Press [HELP] [1] Together returns you to MAIN MENU

FAST MODE

[1] A
[2] POSITION
[3] IMAGE A
[4] APERTURE
[5] 30 FPS
[6] 1:1A/1:1B
[7] RET OFF
[8] JOG 1/S
[9] FAST FWD
[0] EXIT

From the MAIN MENU press: [5] FAST MODE

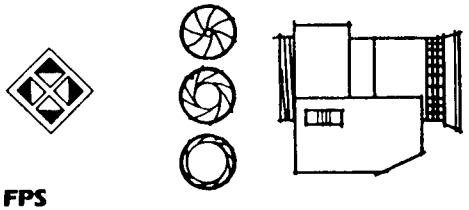
[3] IMAGE A

Enables the Imager selection function. Successive presses of the [3] key switches control between Imager A and Imager B.

The up and down arrows control zoom setting. The left and right arrows control focus.

[4] APERTURE

Enables control of the aperture of both Imagers.
The up and down arrows control Imager A aperture. The left and right arrows control Imager B aperture.



[5] 30 FPS

The up or down arrow will scroll through the available frame rates.

[6] 1:1A/1:1B

The up or down arrow will scroll through the split frame divisions for Imager A. The left or right arrow will scroll through the split frame divisions for Imager B.

Press [HELP] [1] Together returns you to MAIN MENU

REVISED 10/87

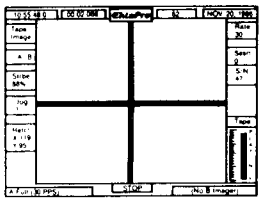
FAST MODE

[1] A
[2] POSITION
[3] IMAGE A
[4] APERTURE
[5] 30 FPS
[6] 1:1A/1:1B
[7] RET OFF
[8] JOG 1/S
[9] FAST FWD
[0] EXIT

From the MAIN MENU press: [5] FAST MODE

[7] RET OFF

Successive presses of [7] toggle the Reticle on and off. The arrow keys move the Reticle around the frame.



[8] JOG 1/S

The up or down arrow will in sequence select Single Step, or a jog rate of 1, 2, 3 or 4 frames per second.

Pressing the left or right arrow will select the jog direction and start the tape moving.

Pressing the [STOP] key will stop the tape.

[9] FAST FWD

Pressing the right arrow will fast forward the tape.

Pressing the left arrow will rewind the tape.

Pressing the [STOP] key will stop the tape.

[0] EXIT

Selects the MAIN MENU.

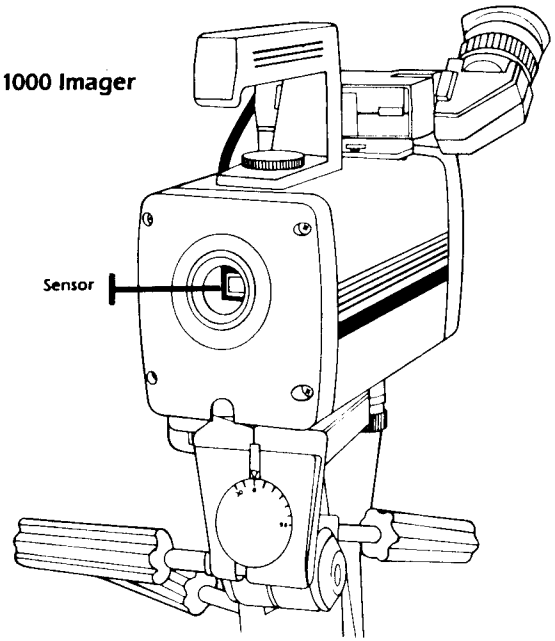
Press [HELP] [1] Together returns you to MAIN MENU

IMAGER

4.1

Light enters the Imager through the lens and is converted into an electrical or video signal. The video signal corresponds precisely to the variation in intensity and spatial relationships of the image captured by the lens. The intensity of light coming from different objects in the image varies the amplitude of the video signal. The time difference between video amplitude changes represents the spatial relationship between the objects. The video signal created in the Imager is amplified and processed so that it can be transmitted through the Imager cable to the Processor. To understand the Imager, it is first necessary to understand how the Sensor works.

EKTAPRO 1000 Imager

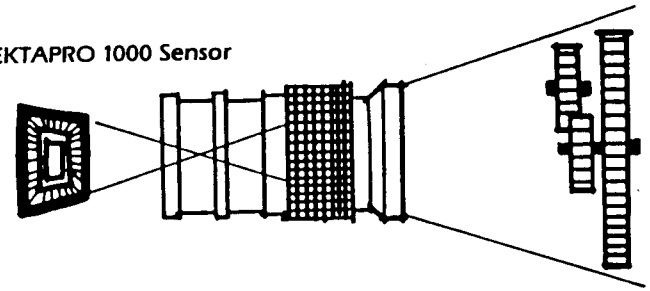


SENSOR

4.2

The Sensor is a "solid state imaging array". This array has thousands of photo capacitive cells that convert light focused by the lens into measurable electrical charges. The amount of charge in each cell varies according to the intensity of the light received by each cell. The electrical charge stored in each cell called a "pixel " is an analog for the amount of light the cell received. In the Sensor, the charge that is stored by each cell is picked up once per frame by a scanning process which takes the charge from each cell in the array, one after another. As each cell releases its charge, a new charge begins to accumulate for the next scan, based on the light that it then receives. The video signal is nothing more than a lineal sequence of varying amounts of charge from each pixel scanned.

EKTAPRO 1000 Sensor

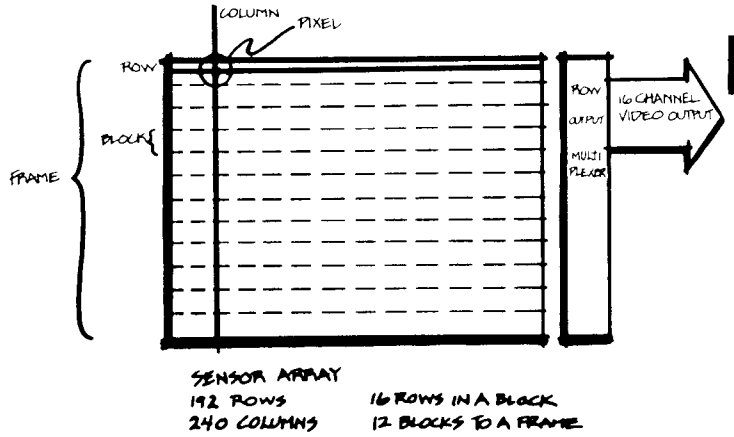


The pixel array is organized into a structure containing 240 columns and 192 rows. In conventional television technology, the cell in the first row is read to obtain the first pixel, then the next cell in the same row is read and so on. This process continues until each pixel in the first row has been scanned. Then the second row of pixels is read in the same fashion and this process continues down the array until all 192 rows of 240 pixels per row have transferred their charges to the output of the sensor. Since each scanning cycle must read 46,080 pixels before starting over, scanning the sensor in this fashion limits frame rates to about 60 frames per second.

SENSOR STRUCTURE

To achieve a frame rate of 1000 frames per second it is necessary to scan the array 16 times faster. The KODAK EKTAPRO 1000 Motion Analyzer achieves this speed increase by scanning sixteen rows of pixels simultaneously. The scanning sequence reads the first pixel in each of sixteen rows at the same time, then reads the next pixel in each of the same 16 rows at the same time, continuing this process until the sixteen rows have been output from column one through column 240 of the pixel array.

Pixel array pattern.
16 Rows of Pixels are read simultaneously

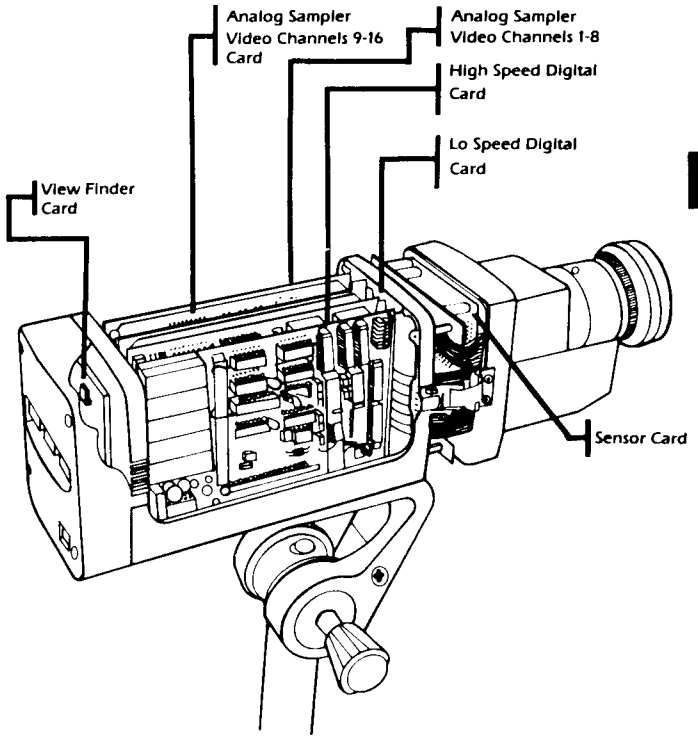


Moving sixteen pixels at a time requires a separate output from the sensor for each pixel. The Sensor does have 16 output channels that are switched internally from one group of 16 rows to the next group of 16 rows as the scanning of the array proceeds. For convenience a group of sixteen rows is referred to as a block. It takes 12 blocks to make up a single frame of 192 pixel rows.

IMAGER CIRCUIT BOARDS

The video analog signal resulting from the scanning process at the output of the Sensor is not immediately useable. About half of the circuits in the Imager are devoted to amplifying the sixteen channels of video information to a level suitable for transmission and receipt by the Processor via the Imager cable. The remaining circuitry in the Imager is dedicated to the generation of the digital waveforms required to scan the Sensor.

EKTAPRO 1000 Imager Circuit Boards



IMAGER ELECTRONICS

SENSOR

The Sensor board carries the Imaging Array and is precisely located at the correct distance behind the lens.

ANALOG SAMPLE

The two Analog Sample boards each handle eight channels of video information.

HIGH SPEED DIGITAL

The High Speed Digital board generates the digital waveforms that scan the columns of the imaging array.

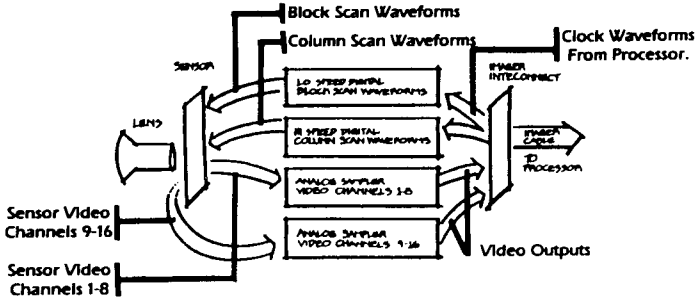
LOW SPEED DIGITAL

The Low Speed Digital board generates the digital waveforms that connect each of the twelve blocks of the image array to the sensor output at the correct time.

VIEWFINDER

The Viewfinder board provides connections for the control buttons on the back of the Imager and also supports the Viewfinder.

Simplified block diagram of the Imager electronics.

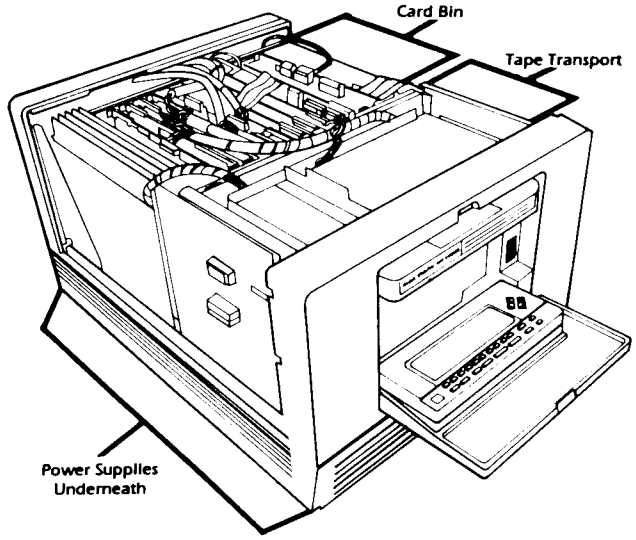


REVISED 10/87

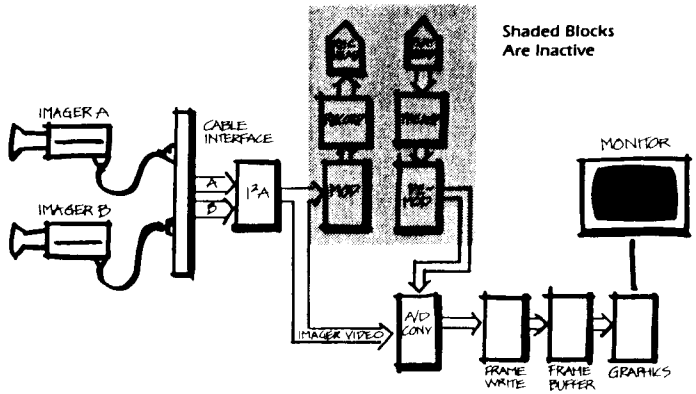
PROCESSOR

The processor card bin contains eleven printed circuit cards. The cards are required to control the System and process the video. The Keypad is used to set operating parameters and configure the system for the desired mode of operation. The system operates in either the Live, Record or Play mode.

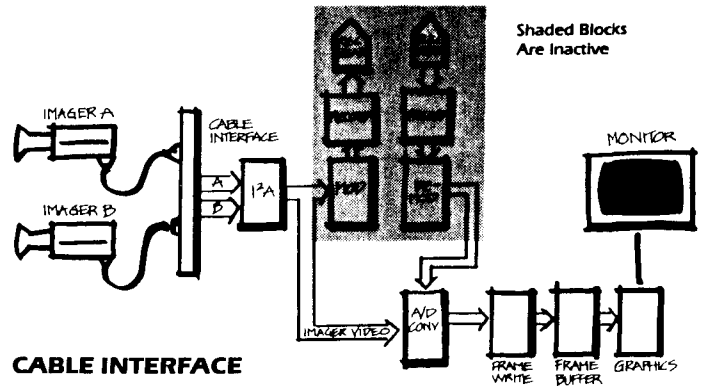
The EKTAPRO 1000 Processor contains an electronics card bin, a tape transport, and the power supplies for the System.



When operating in the Live mode, the processor monitor displays the picture that will be recorded. The picture composition, exposure and focus are all exactly as they appear when a recording is played back. The image displayed appears exactly as it would if recorded at the selected frame rate and the Processor electronics are configured to present the Imager output on the monitor without using the Record or Play electronics.



Simplified Video Block diagram showing the Live mode.



CABLE INTERFACE

The Cable Interface board facilitates the routing of Imager video from both Imagers to the Analog Imager Interface and the routing of timing signals from the Digital Imager Interface to the Imagers. There are no active circuits on the Cable Interface.

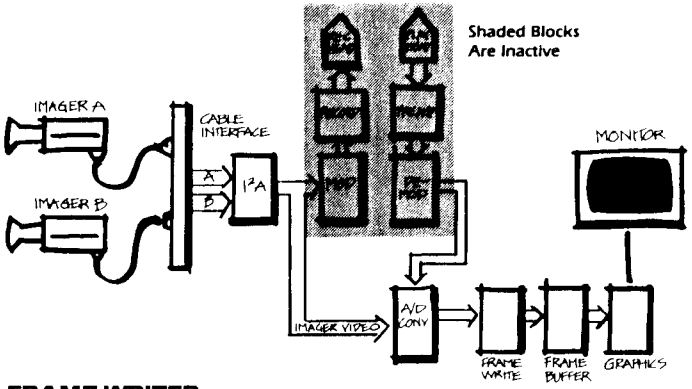
IMAGER INTERFACE ANALOG (I²A)

The Analog Imager Interface selects the Imager or combination of Imagers to be displayed and recorded. [illegible] circuits for both Imagers are also located on this board.

ANALOG/DIGITAL CONVERTER (A/D CONV.)

The Analog to Digital Converter board converts the analog video from the Analog Imager Interface board to a digital signal. In the digital video signal, a group of eight bits represents the amplitude of one pixel. The digitized video signal is stored in the Frame Buffer in the same way that a personal computer stores data in its memory.

LIVE MODE



FRAME WRITER

The Frame Writer board takes the digital video from the Analog to Digital Converter board and stores this digital information in the Frame Buffer.

FRAME BUFFER

The Frame Buffer has storage capacity for 1.5 million bits of digital information permitting storage of four complete frames of video image.

GRAPHICS

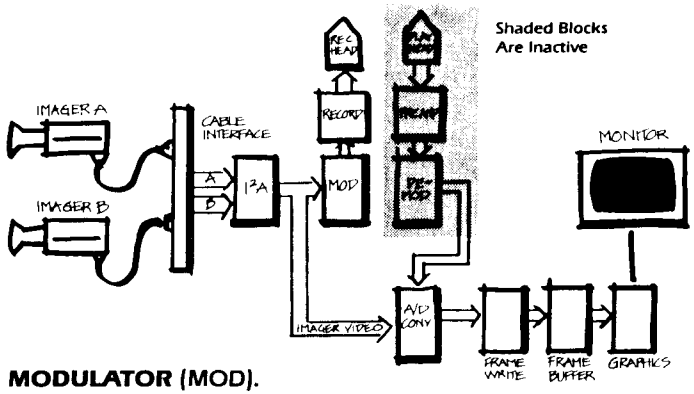
The Graphics board reads the Frame Buffer in a way suitable for generation of a standard video picture and also takes other graphic information from the System Control Unit (SCU) to form the Data-Frame™ Border. The graphic information from the SCU then appears on the monitor in the border area and the video from the Frame Buffer is used to produce the live image at the center of the monitor.

RECORD MODE

Once the user is satisfied that the live picture will provide the necessary data, a recording of the object of interest is made. In the Record mode the Processor continues to put the Image on the monitor exactly as in the Live mode, however, the Tape Transport is commanded to move tape at the user selected speed and the Modulator and Record boards are turned on, sending the video signal to the Record Head.

The speed at which the Transport moves the tape varies according to the frame rate. The higher the frame rate, the faster the tape is moved during record. At 1000 frames per second the tape is driven at 250 inches per second.

Simplified Record mode Video block diagram



MODULATOR (MOD).

The Modulator board converts the Imager video into a frequency modulated signal.

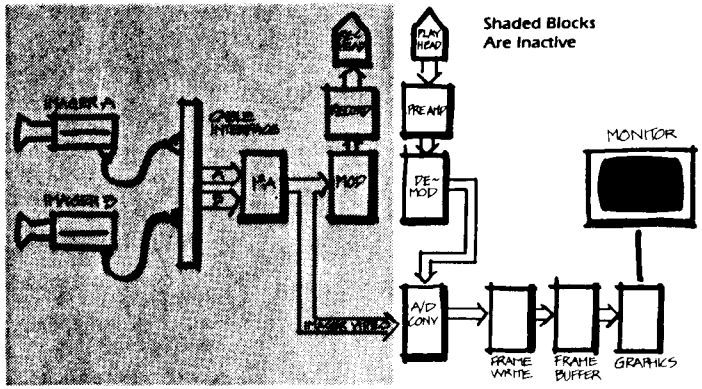
RECORD

The Record board provides the energy required to drive the Record Head.

PLAY MODE

To review a recorded event in slow motion the Processor must be in Play mode. In the Play mode, the tape is first rewound to the beginning of the recording and then moved forward at 7.5 inches per second; the replay function can be used to review the latest recording. The Processor enters Play mode when the Tape Transport signals that it is moving the tape forward at the correct speed.

Play mode block diagram.



DEMODULATOR (DEMOD)

The Demodulator board converts the frequency modulated signal from the Reproduce Head back to a video signal.

ANALOG/DIGITAL CONVERTER

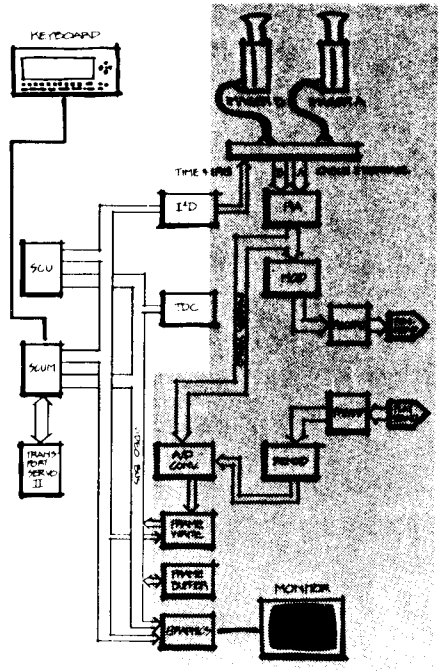
The Analog to Digital Converter now uses the output of the Demodulator instead of the signal coming from the Imagers.

TIMING AND SYSTEM CONTROLS

The previous pages illustrate how the video processing in the system is accomplished. In addition to video processing, there is also circuitry in the processor card bin dedicated to timing and control functions. The video from the Imagers and the processes that go on in the card bin during live and record mode must be synchronized in time. The video being played from tape must also be synchronized with the playback circuits. All of these functions and operating modes are controlled by a microprocessor.

Block diagram of timing and control circuits

Shaded Blocks are not part of timing and control circuits



TIMING AND SYSTEM CONTROLS

TDC

The Timing and Data Controller generates the clock waveforms that synchronize both the record electronics and the Imagers. This board also generates a timing track that is recorded along with the video on the magnetic tape. The timing track is used to synchronize the playback process, sending timing information to the Analog to Digital Converter and the Frame Writer boards.

IMAGER INTERFACE DIGITAL (I^2D)

The Imager Interface Digital passes the timing information from the Timing and Data Controller on to the Imagers. This board also provides many of the signal lines controlling the video processing boards.

SCU

The System Control Unit is the board that carries the microprocessor that is managing the entire system.

SCUM

The System Control Unit Memory board contains the rest of the circuitry required to support the operation of the microprocessor on the SCU. The SCUM also carries the communications circuitry for the Keypad and the Transport.

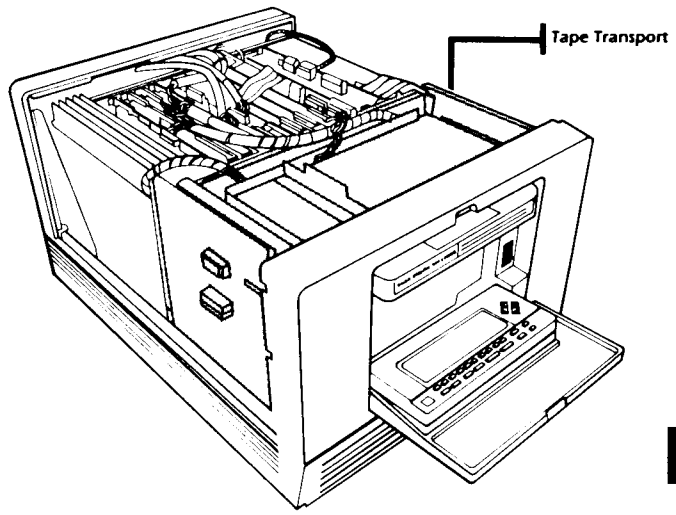
TAPE TRANSPORT

TAPE TRANSPORT

The tape transport accepts the cassette that carries the magnetic tape and provides the mechanics and electronics to control tape speed and direction.

The tape transport is a key component in producing slow motion video images. When the Processor is making a recording at 1000 frames per second the tape is moving past the record head at 250 inches per second. During replay the tape is rewound to the beginning of the recording and then moved across the playback head at the relatively slow speed of 7.5 inches per second. It is the ratio between record and playback speeds that gives us the slow motion effect.

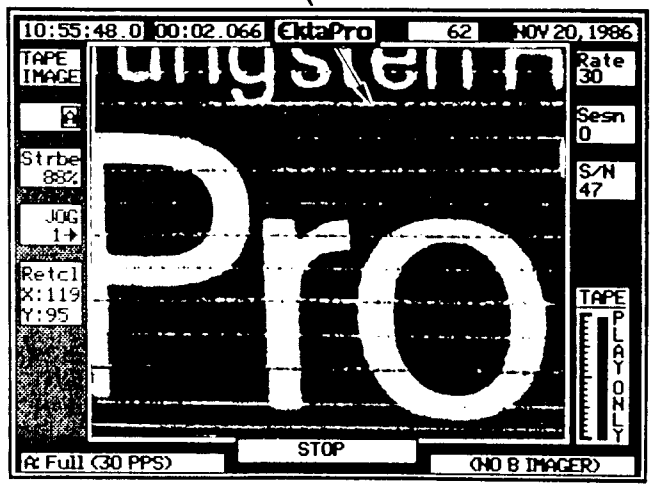
EKTAPRO 1000 Tape Transport



CLEANING THE HEADS

To realize best picture quality, it is necessary to clean both the record and reproduce heads occasionally. Cleaning the heads at the beginning of each day of use will ensure that you are getting the best picture possible. Dirty heads may cause one or more lines to be masked by noise as in the illustration below.

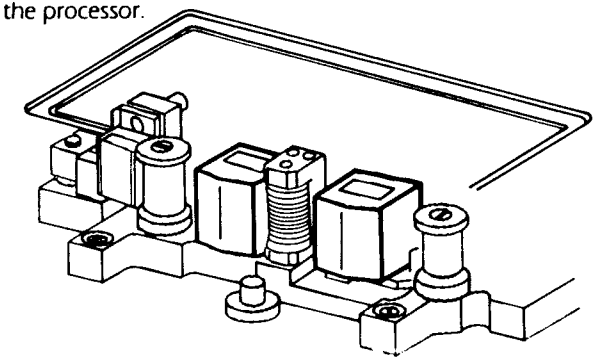
GAP CLOGGED



CLEANING THE HEADS

7.2

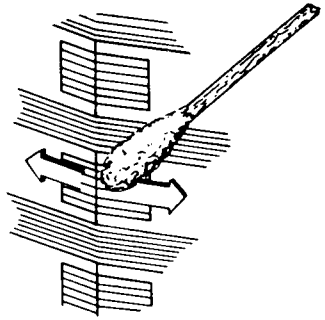
To clean the heads, lift and remove the tape head assembly cover on top of the processor.



Use only the solvent and swabs provided in the cleaning kit. Swab the heads in the same direction as the tape travels. Use a fresh swab tip on each stack and never dip a dirty tip back into the clean solvent.

If it should be necessary to clean the heads and you do not have a complete cleaning kit, NEVER use swabs with plastic sticks. An adhesive is used on these swabs that would contaminate the heads.

CAUTION: Do not allow cleaning solvent to get into the bearings on the roller guide located between the Record and Reproduce heads.



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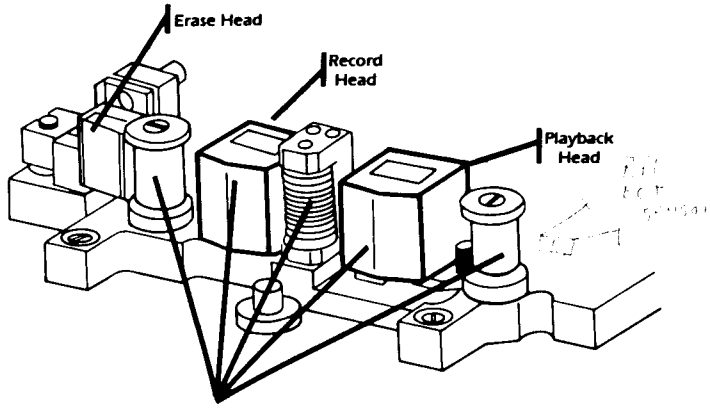
DEMAGNETIZING THE HEADS

7.3

Over time, a magnetic flux may build up in the heads that can partially erase the tape passing over them and degrade picture quality. It is very difficult to predict the intervals at which heads should be degaussed. You may choose to demagnetize the heads once a month or wait until you notice some degradation in picture quality. Heads that need demagnetizing will cause the bright areas of the recorded picture to appear grainy or noisy.

Demagnetizing procedures will depend on the type of demagnetizer you are using. Follow the instructions provided with your unit. If you do not already possess a head demagnetizer, any of the several head demagnetizers available at your local electronic or video store are satisfactory.

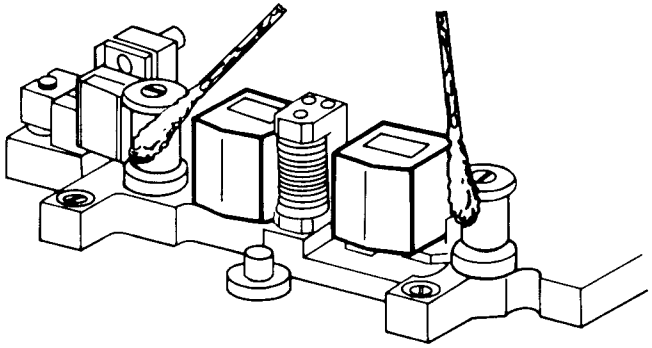
DO NOT DEMAGNETIZE



DEMAGNETIZE THESE SURFACES

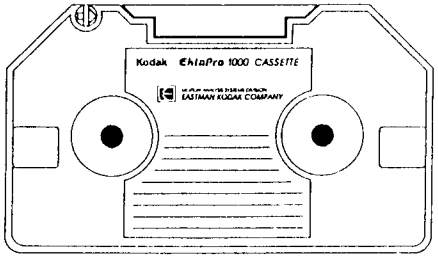
CLEANING THE TAPE PATH

Over time, the items in contact with the oxide coated side of the tape will require cleaning. Using the solvent provided, or alcohol, clean the tape path as indicated below.



REPLACING THE TAPE.

After long use or rough handling, the tape oxide coating will eventually deteriorate to the point where tape noise will obscure data. When this occurs, the cassette must be replaced. New cassettes may be ordered from your Motion Analysis Systems Division representative.



REVISED 9/89

TAPE CASSETTE CARE AND HANDLING

The 19-track microgap tape heads used in the KODAK EKTAPRO 1000 Motion Analyzer uses half inch high density magnetic instrumentation tape. The tape is enclosed in a cassette manufactured to close tolerances. The hubs that the tape is wound on and the cassette exit guides are part of the tape transport system. Both the hubs and guides are precision machined to be perpendicular to the transport base plate when the cassette is locked into place.

The cassette contains 800 feet of tape which provides about 35 seconds of record time at 1000 frames per second. A 35 second recording will run approximately 19 minutes in normal play mode. Reasonable care must be taken to prevent the deterioration of the oxide coating of the tape and to prevent dirt from entering the system. Dirt, excessive heat and moisture are the three enemies of magnetic recording media.

Dirt and oils will clog and erode the tape heads. Excessive heat will damage the adhesive on the tape causing the oxide particles to fall off. Moisture can induce the growth of organic material which deteriorates both heads and tape. Following the below listed procedures will assist you in prolonging tape life:

1. Tapes should be in their cases when they are not being used.
2. Tape surfaces should never be touched. Handle cassettes carefully so that the tape is never touched.
3. Store tapes in a reasonably cool and dry place. Do not leave in sun or close to any heat source, lamp or vent.

The information on recorded tapes is also subject to deterioration. A magnetic field will damage the signal recorded on a tape. To preserve data, keep tapes away from electric motors, sound system speakers or other magnets.

PROCESSOR

Controls

Menu-driven Keypad: LCD display provides user access to all system functions. Includes six dedicated functions keys and ten-multi-function keys.

Power Switch: Easily visible and accessible.

Eject Switch: Ejects tape cassette.

Operating Features:

Recording Technique: Linear FM.

Recording Medium: ½" high-density, instrumentation tape.

Tape Handling: Cassette (700 ft.)

Frame Rates: Records at 30, 60, 125, 250, 500, 1000 full frames/second. Up to 6,000 pictures/second.

FRAMES PER SECOND		MINIMUM RECORDING TIME	
1,000 fps	=	30 sec	(½ min.)
500 fps	=	60 sec	(1 min.)
250 fps	=	120 sec	(2 min.)
125 fps	=	240 sec	(4 min.)
60 fps	=	480 sec	(8 min.)
30 fps	=	960 sec	(16 min.)

Frame Formats: 1, 2, 3, 4 or 6 pictures/frame.

Recording Time: A minimum of 16 minutes at 30 fps and a minimum of 30 seconds at 1000 fps.

Normal Playback: 30 frames per second.

Single Step: Displays one frame at a time, forward or reverse.

Jog: Displays successive frames, forward or reverse, at a slow, continuous rate (e.g. 1 to 4 frames per second.

Fast Forward/Rewind: Moves tape at 300 ips forward or reverse. This rate is faster than the highest recording speed (250 ips).

BOT/EOT: Optically senses the Beginning of Tape and the End of Tape to prevent overruns.

Search: Moves the tape to a given video frame using event number.

Default: Stops tape transport and ejects the cassette if a load fault or sudden power failure occurs.

Heads

Record & Playback: Two Microgap heads, each providing 19 channels — 16 video, 2 timing, and 1 unsupported.

Erase: Permanent magnet.

Video Output

Compatible with: NTSC or PAL

Gamma Correction: Variable from 0.1 to 1.0

Grey Scale: 256 levels.

Size: 17"x22"x12¼".

Weight: Approximately 80 lbs.

Power: 110/220 VAC, 60/50 Hz, 8 amps/4 amps.

SPECIFICATIONS IMAGER

IMAGER

Control Keys:	Live, Record & Stop.
I/O Jacks:	Video, Audio & Remote Trigger.
Sensor:	192x240 pixel NMOS array.
Lens Mount:	C-Mount, with electronic remote control capability for zoom, focus and exposure.
Tripod Mount:	1/4-20 and 3/8-16 with standard ANSI hole pattern.
Cables (Imager to Processor):	15 ft. standard (available in 15 ft. & 50 ft. increments).
Size:	Approximately 9"x4"x5" (without lens and viewfinder).
Weight:	Approximately 5 lbs. (without lens and viewfinder).
Power:	Derived from processor.

SPECIFICATIONS KEYPAD

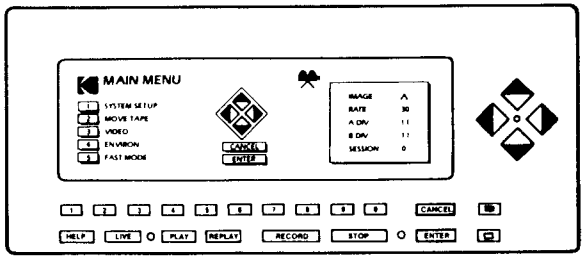
KEYPAD

Dedicated-function Keys

Live:	Displays live limage on viewfinder and/or monitor.
Record:	Starts a recording.
Stop:	Stops recording or playback and freezes the last image in frame store.
Replay:	Moves tape to first frame of most recent recording session and plays back at 30 fps.
Play:	Plays a recording in any selected playback mode, i.e., Jog-Mode™ or single-step.
Help:	Provides short cut paths through menu tree.

System Software Menu

System Setup:	Controls Imager selection, overlay format, position and size, frame rate and division factor, automatic lens functions, and session numbers.
Move Tape:	Controls playback mode and event markers.
Video Display:	Enables reticle, gamma adjustment, interlaced video and saved image.
Environment:	Controls time and date.



REVISED 10/87