# 1992 COLORADO VIDEO CATALOG

## Corporate Profile

Colorado Video, Inc., headquartered in Boulder, Colorado, designs and manufactures a wide variety of specialized video instruments. This catalog contains technical specifications for all standard products that are available from the factory or through a national and international distributors' network.

Colorado Video's products include video instruments for the positioning, measurement and analysis of video images. A specialty of the company is its line of standalone video frame stores which may be used with a variety of mini- and micro-computers. Other products are integrated into systems for video micrometry, industrial inspection and control, image alteration and synthesis, and scan conversion. In addition to video instruments, Colorado Video is one of the leading manufacturers of freeze-frame (also called slow-scan) video communications equipment. Systems built around these products transmit high quality still video images to one or more locations simultaneously. Colorado Video freeze-frame products are known for their versatility, reliability, performance and price.

Most of Colorado Video's products are available in different scanning rates as well as for use with 50 Hertz, 220V power sources. In addition to our standard products, Colorado Video designs customized equipment to meet OEM and end user requirements.

Since its founding in 1965, Colorado Video has been committed to its role as a pioneer in the design and development of unique video instrumentation and communication equipment. We welcome the opportunity to meet your needs and fulfill your video requirements.

# Contents:

FREEZE FRAME TV



FULL BAND-WIDTH SYSTEMS

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TWX 910-940-3248 (COLO VIDEO BDR)

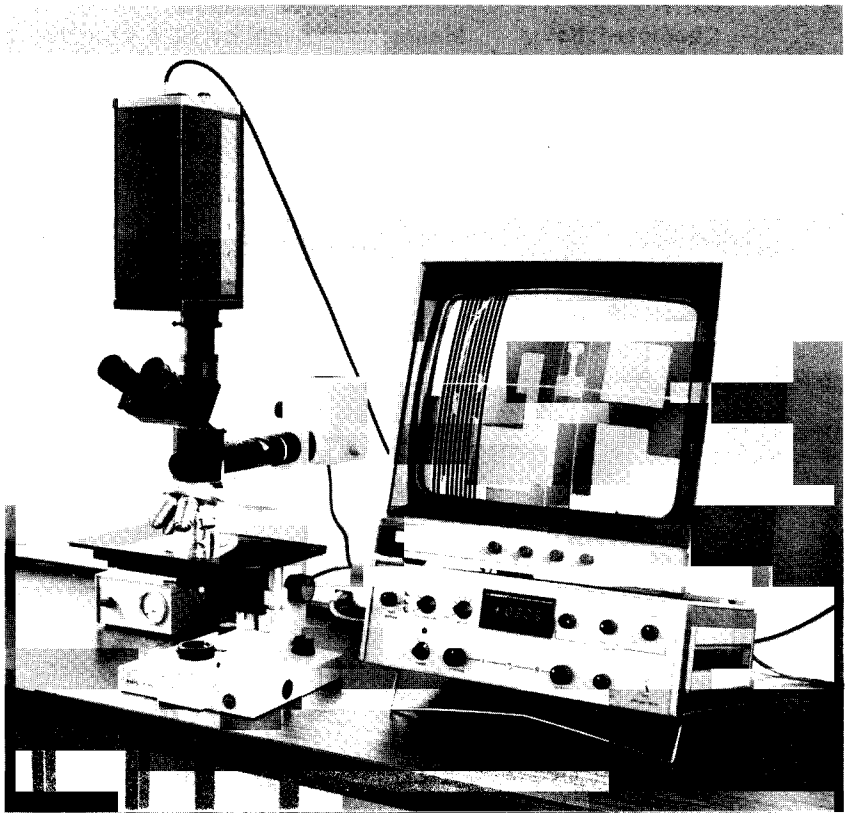
# video micrometer 305

## general description

The Model 305 accepts standard composite video signals and superimposes two vertical white lines on the reproduced image, as seen on a television monitor. The marker lines may be manually positioned over 80% of the active television raster, and separated by as much as 50% of the screen width. Displacement of the two marker lines generates a linear DC voltage change which is displayed on a front panel digital voltmeter. A third horizontal marker may be used as an electronic straight edge.

The primary application of the Model 305 is the dimensional analysis of objects seen by a television camera. To some degree this requires a subjective evaluation of the target boundaries by the human operator, but as a special feature, the Model 305 incorporates a unique video waveform display superimposed on the monitor screen which allows more objective and repeatable determination of soft or fuzzy target boundaries. Image enhancement circuitry is also incorporated in the Model 305 to provide significant contrast range expansion, thus making boundaries of low amplitude targets more easily viewable.

Physically, the Model 305 is a table top mounting device (rack mount optional) and is configured so that a television monitor may be set on top of the unit.

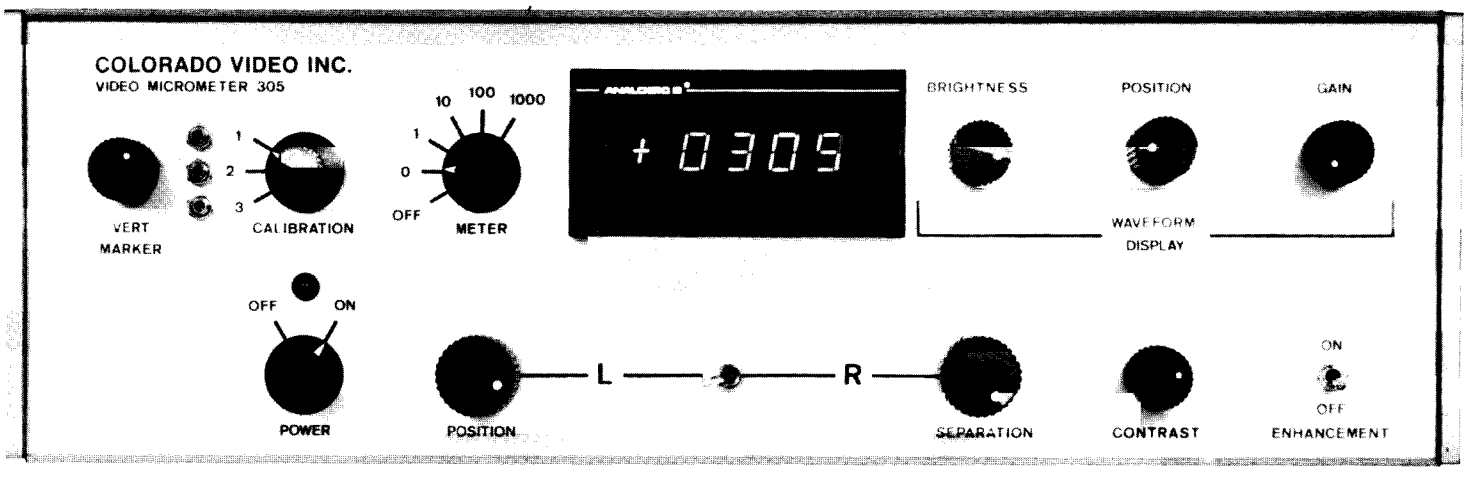


Typical application of 305A Micrometer shown in system with microscope and standard CCTV equipment.

# specifications

| | |
|---|---|
| **Size:** | 5¼" x 17" x 13" |
| **Weight:** | 12 lbs. |
| **Mounting:** | Table Top |
| **Power:** | 100/115/230 VAC, 50/60 Hz - 22 VA |
| **Input:** | Composite video; 1V p-p, 75 ohms |
| **Outputs:** | Video to monitor: 1V p-p, 75 ohms<br>3½ digit BCD data<br>AC outlet |
| **Controls:** | AC Power; Off/On<br>Horizontal Marker position<br>Horizontal Marker separation<br>Calibration<br>Waveform select: Left/Right<br>Enhancement: Off/On<br>Contrast<br>Vertical Marker position<br>Meter: Off/0/1/10/100<br>Display brightness<br>Waveform position<br>Waveform gain |
| **Performance Characteristics:** | 3½-digit LED panel meter<br>Marker positionability: 80% of active raster<br>Marker separation: 0 to 50% of active raster<br>Spatial resolution: to one part in 1500 |
| **Connectors:** | BNC: Video in and out<br>Blue Ribbon: BCD data |
| **Option:** | Model 305A with 4 1/2 digit meter and BCD data; 3 position calibration |

*Specifications subject to change without notice*



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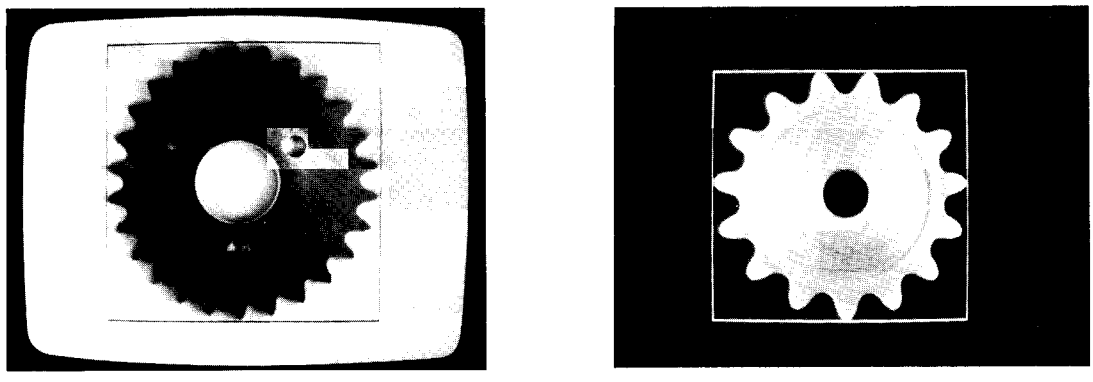
# video caliper 306

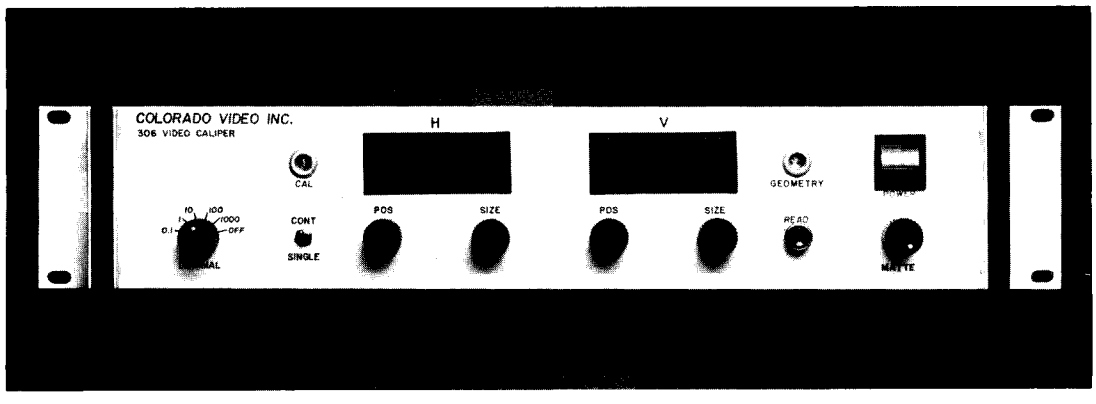
## general description

The Model 306 accepts standard, composite video signals and superimposes a variably sized rectangle on the reproduced images, as seen on a TV monitor. The size of the rectangle may be as large as 80% of the active raster, both horizontally and vertically, and may be positioned anywhere within that 80%. The H and V sizes are displayed on front-panel digital meters. The readouts are calibrated to the desired values by a calibration control and a geometry compensation control.

The primary application of the Model 306 is dimensional analysis of objects seen by a TV camera. This requires a subjective evaluation of the subject boundaries by the human operator. The Model 306 can be used in quality control or process control applications—anywhere rapid, non-contacting measurements, (either microscopic or macroscopic) are required.



**Examples of two settings of the matte control.**



# specifications

| | | |
|---|---|---|
| **Size:** | 3 1/2″ × 19″ × 8″ | |
| **Weight:** | 21 lbs. | |
| **Mounting:** | Rack mount | |
| **Power:** | 100/115/200/230 VAC, 50/60 Hz | |
| **Input:** | Composite video: | 1 V p-p, 75 ohms |
| **Output:** | Composite video: | 1 V p-p, 75 ohms |
| **Controls:** | AC power: | On/Off |
| | Horizontal: | Position |
| | | Size |
| | Vertical: | Position |
| | | Size |
| | Calibration: | Affects both H & V |
| | Geometry: | Affects only V |
| | Decimal: | 0.1, 1, 10, 100, 1000, Off |
| | Matte: | Variable black to white |
| | Single/Continuous | |
| | Read | |
| **Performance:** | Positionability: | 80% of active raster |
| | Size: | 80% of active raster |
| | Linearity: | ±1% (Voltage to time conversion) to 70% of active raster H & V |
| | Marker separation: | 0 to 80% of active raster, H & V |
| | Spatial resolution: | One part in 1500 H |
| | | One part in 380 V |
| **Connectors:** | BNC: | Video in and out |
| **Options:** | Tabletop cabinet | |
| | 625-line, 50 Hz | |

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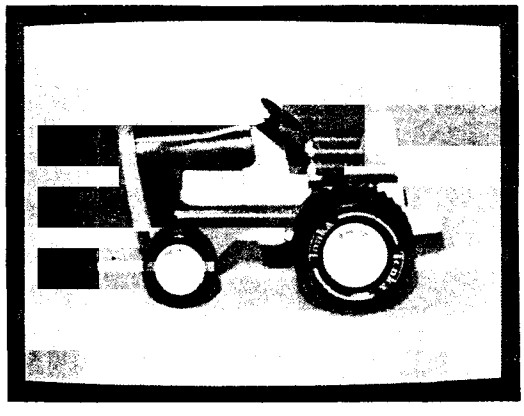
# video position analyzer 635

## general description

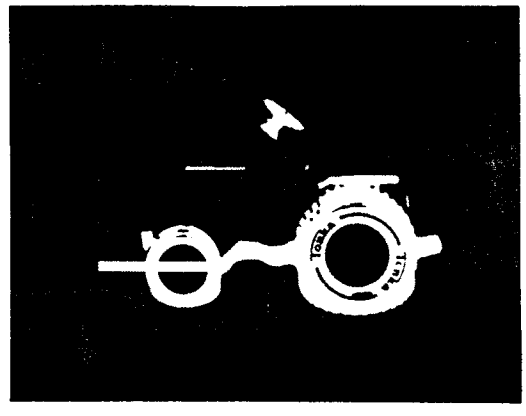
The Model 635 accepts a composite video signal and provides a digital readout of the position of a preselected feature of medium or high contrast.

A precision, digitally-controlled gate is internally generated and used to select the feature of interest. The threshold level of a video slicing circuit is then adjusted to obtain a black or white signal with rapid on/off transitions, and lateral positional variations of the first transition are used to actuate a sampling position-to-voltage converter. The resulting DC voltage level is then continously updated at the field rate of the input signal.

Position data is integrated over the height of the gate, which is internally selectable to 4 or 8 lines per field. The resulting position voltage is fed to a built-in 3½ digit meter for display and the BCD result is available for external use. The meter may be calibrated to give readings corresponding to absolute positions.



635 DISPLAY NORMAL MODE



635 DISPLAY QUANTIZED MODE

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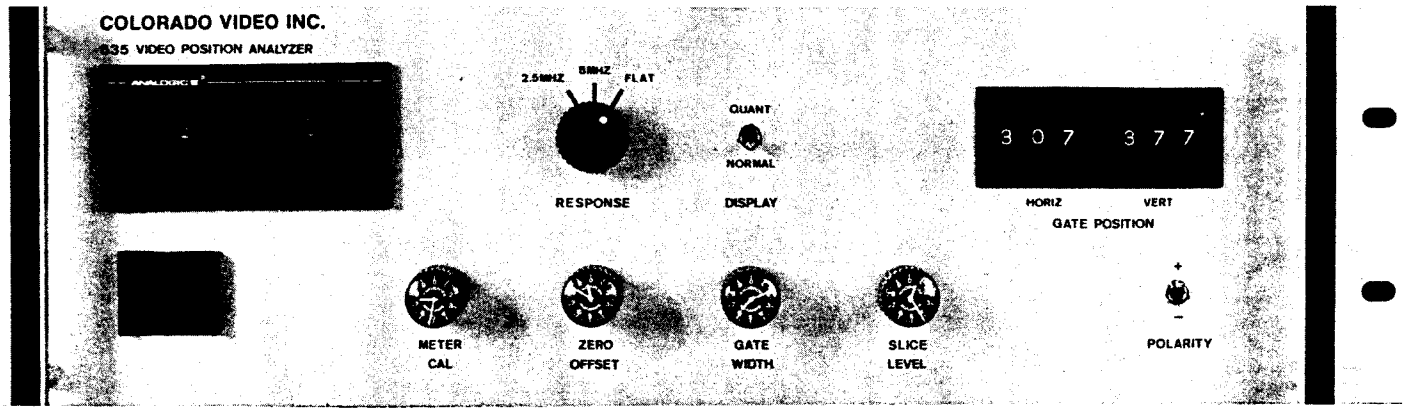
# specifications

| | |
|---|---|
| **Size:** | 5¼" x 19" x 12" |
| **Mounting:** | Standard rack mount |
| **Construction:** | Solid-state, silicon, plug-in card |
| **Power:** | 117 VAC, 60 Hz, single phase |
| **Inputs:** | Composite Video: 1 V p-p, 75 ohms |
| **Outputs:** | Monitor Video: 1 V p-p, 75 ohms<br>Sampled Positional Data: BCD, 3½ digits, TTL<br>Sync: 4 V p-p, 75 ohms |
| **Controls:** | AC Power: On/Off<br>Gate Position - V: Thumbwheel switches (BCO)<br>Gate Position - H: Thumbwheel switches (BCO)<br>Gate Width<br>Slice Level<br>Offset<br>Meter Calibration<br>Polarity: +/-<br>Response: Flat/5 MHz/ 2.5 MHz<br>Display: Normal/Quant |
| **Performance Characteristics:** | Gate Positionability: 90% of active raster height and width<br>Gate Width Range: 5% to 25% of raster width<br>Spatial Resolution: to 1 part in 1500 |
| **Connectors:** | BNC: Video<br>Blue Ribbon - BCD Position Data |



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# video integrator 310a

## general description

The Model 310A Video Ingegrator produces a DC output voltage proportional to the intensity within a selected area of a video image. This user definable area is a rectangle, variable in size and position. Thus, the unit monitors the brightness within a selected area of a scene observed by a television camera. Typical applications include environmental or process monitoring of diffused subjects such as fog, smoke, dust, or fire.

The 310A provides continuous measurement at 60 samples per second. The DC voltage can be displayed on a voltmeter, on the television screen using the Colorado Video 109A Digital Display Generator, or used to directly control the process. It can also sound an alarm when a selected brightness level is exceeded. Averaging over time can be accomplished with a simple external circuit.

## specifications

| | | |
|---|---|---|
| Size: | 3 1/2" x 19" x 8" | |
| Weight: | 7 lbs. | |
| Mounting: | Standard 19" rack | |
| Power: | 117/220 VAC, 50/60 Hz, 12W | |
| Inputs: | Composite Video: | 1 V p-p looping with Hi-Z/75 ohm switch |
| Outputs: | Composite Video: | 1 V p-p into 75 ohms load |
| | DC Output: | 0 to 4 V max |
| Controls: | Front Panel: | Power: On/Off |
| | | Height: 10-step switch |
| | | Width: 10-step switch |
| | | H Position |
| | | V Position |
| | | Marker (Window): On/Off |
| | | Output |
| | Rear Panel: | Video In: 75 ohms Hi-Z |
| Performance: | Video Bandwidth: | 15 MHz |
| | DC Output Bandwidth: | 30 Hz |
| | DC Linearity | 5% |
| | Window Size Range: | 2.5% to 25% of image height and width |

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# video waveform display generator 303

## general description

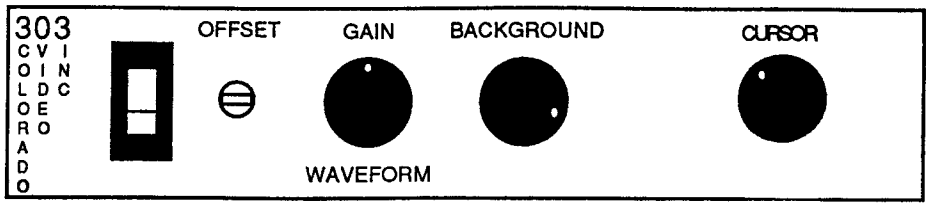
The Model 303 generates a waveform display of the intensity underlying a vertical cursor within a video image. This function provides consistent, objective, measurement of the brightness of selected features in an image. The waveform, similar to an oscilloscope trace in appearance, is superimposed on the left side of the video image. Positions along the Y (vertical) axis correspond with positions under the cursor. The X (horizontal) axis represents amplitude (intensity) increasing from left to right.

The video image underlying the waveform display area can be presented normally, with the waveform superimposed, or blanked, so that the waveform is displayed against a black background.

The cursor is shown as a white vertical line and can be positioned anywhere within 90% of the image by front panel control.

## specifications

| | | |
|---|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" | |
| Weight | 3 lbs | |
| Mounting: | Free standing ($1\frac{3}{4}$" x 19" rack mount optional) | |
| Power: | 117/220 VAC, 50/60 Hz, 5VA | |
| Input Signal: | Video, composite, 1 V p-p, 75 Ω<br>525 line RS-170 (625 line CCIR optional) | |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω | |
| Controls: | Front Panel: | Power: On/Off<br>Cursor Position<br>Background<br>Waveform Gain<br>Waveform Offset (screwdriver adjust) |
| | Rear Panel: | Video In: Hi-Z/75 Ω |
| | Internal: | Vertical Blanking Adjustments |
| Indicators: | Power On | |
| Connectors: | BNC | |

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# video analyzer 321

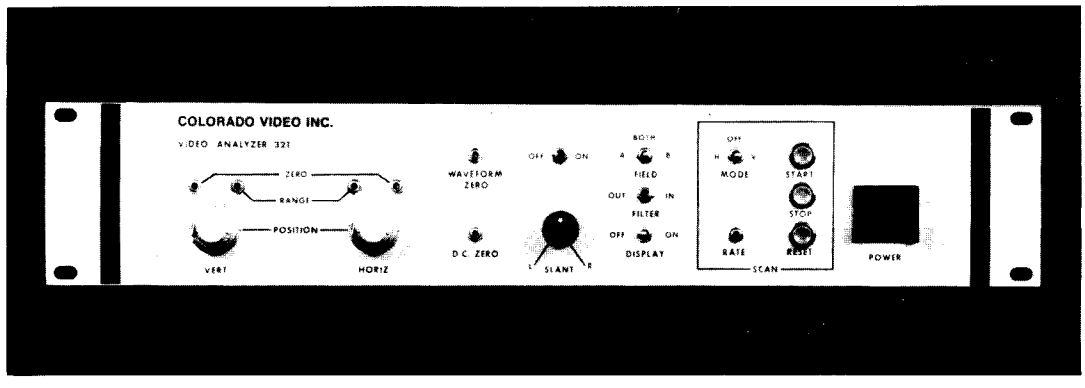
## general description

The Model 321 Video Analyzer provides four unique functions in video data reduction. First, it acts as a sampling oscilloscope to give the equivalent of "line selection" at TV field rates, thus allowing simplified analysis of video signal characteristics on the vertical axis. A DC-coupled, narrow-band signal is produced which may be used externally for observation or data processing. The sampling "row" can be vertical or slanted left or right.

A second feature of the Model 321 allows the display of the vertical "line selected" video signal waveform directly on the screen of a normal TV monitor. This waveform is superimposed on the picture being analyzed in a 1:1 correspondence with vertical and horizontal markers being used to provide rapid identification of any individual picture element. Ten-turn potentiometers are used to control the marker locations, and an electronically generated grating produces a convenient amplitude reference for the waveform display.

An output for chart recording is the third key element of the Model 321. This is derived from a second sampling circuit which provides a DC voltage proportional to the amplitude of the video signal under the marker "crosshairs." The DC readout may be fed either to a voltmeter for static measurements or a chart recorder for line selected waveform reproduction on either the horizontal or vertical scanning axis. A substantial reduction in video noise may also be achieved in this operational mode, simplifying the recovery of low-amplitude video detail. Alternately, a sensitive AC voltmeter connected to this output allows dynamic noise measurements.

A fourth characteristic of the Model 321 is its use as an X-Y coordinate indicator of significant video detail. The positions of both vertical and horizontal markers are linearly voltage-controlled and two closely referenced DC output signals varying from 0 to +5 volts are available for readout purposes. Thus, in combination with the point sampling feature, any specific video element may be described by three DC voltage levels indicating X, Y, and Z characteristics.



# Television Camera Performance Analysis Using Chart Recorder Output Signal

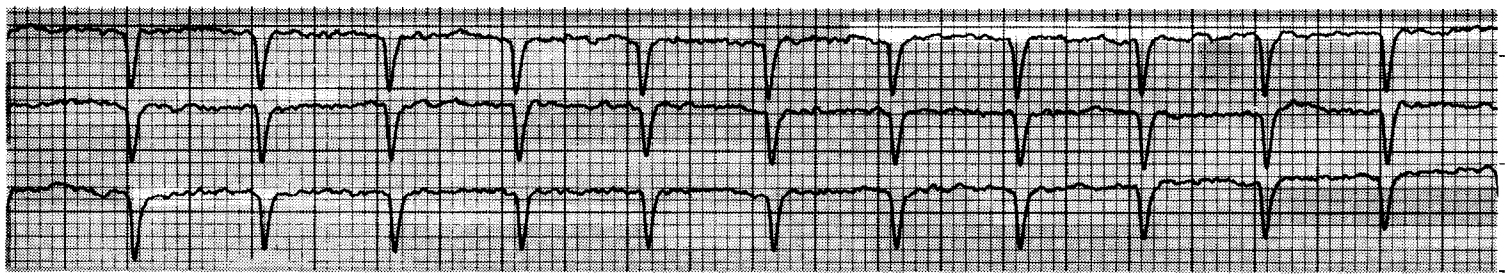


Chart recording showing family of horizontal linearity measurements.

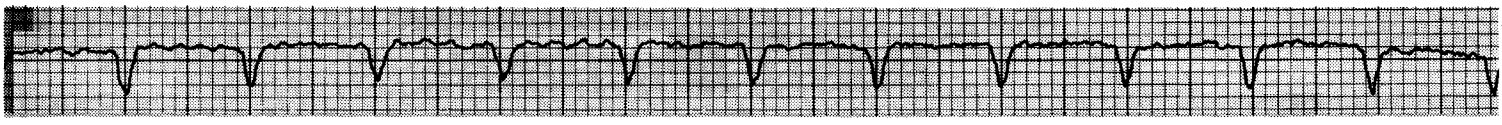
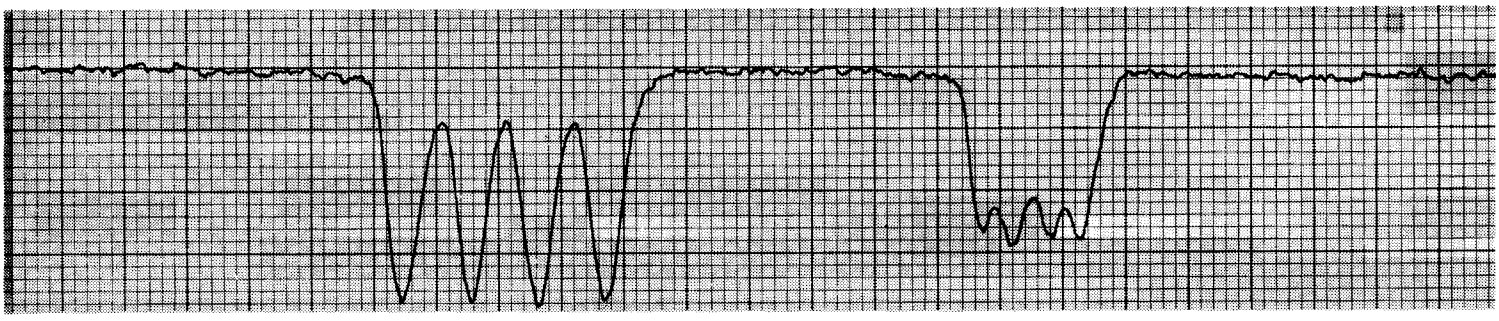
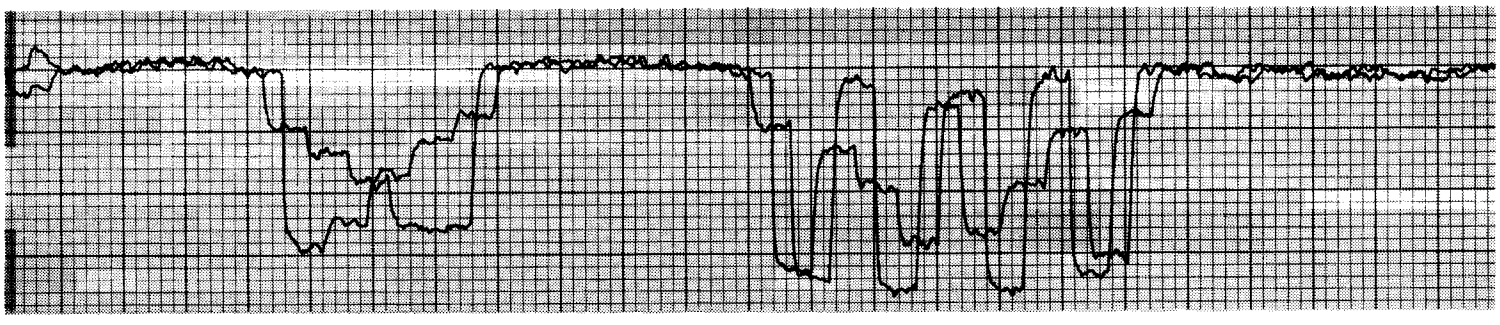


Chart recording showing vertical linearity measurements.

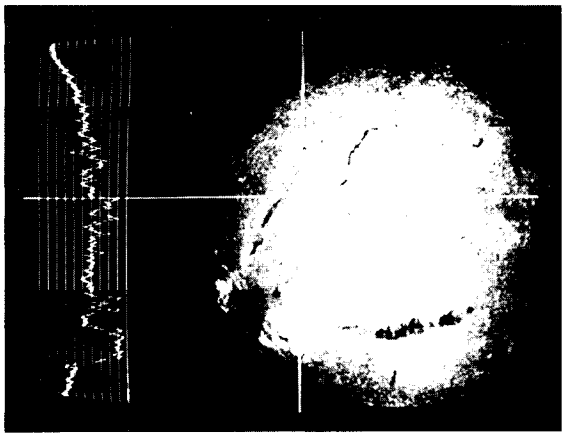


Expanded chart recording of camera horizontal resolution at 300 and 600 lines with test pattern in picture B.

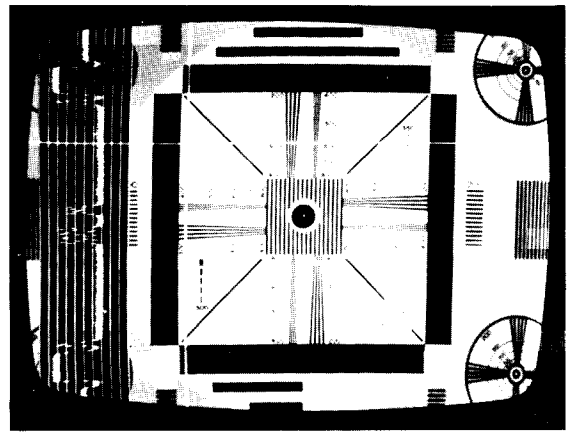


Expanded chart recording of camera vertical resolution at 400 and 200 lines. This measurement requires separate sweeps of field 1 and field 2. Modulation depth is the difference between the two traces. (See picture B.)

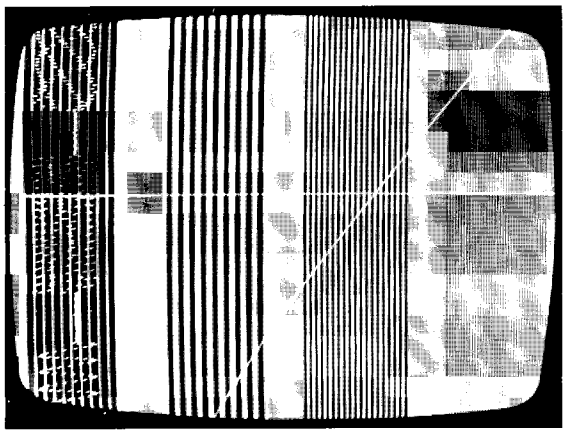
# Typical Displays Produced by 321



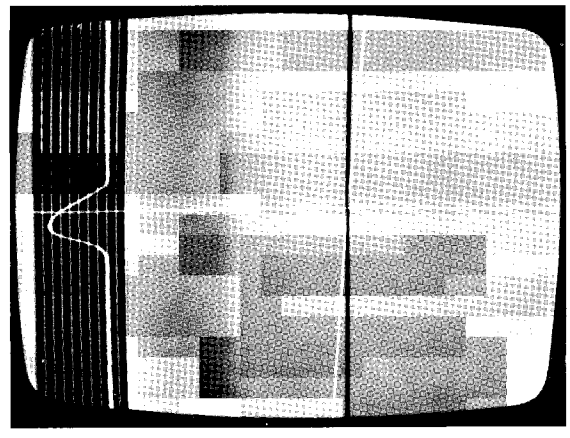
A. Solar image brightness analysis.



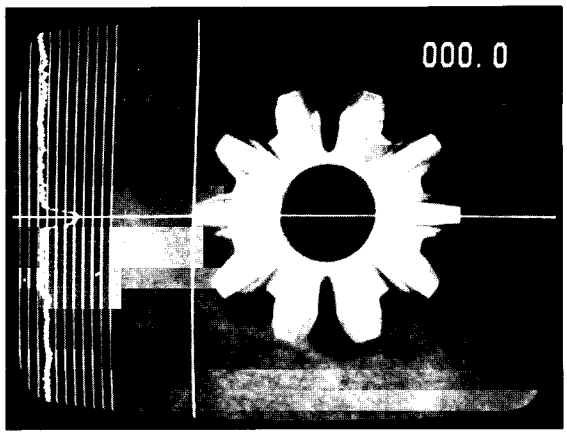
B. Resolution measurements.



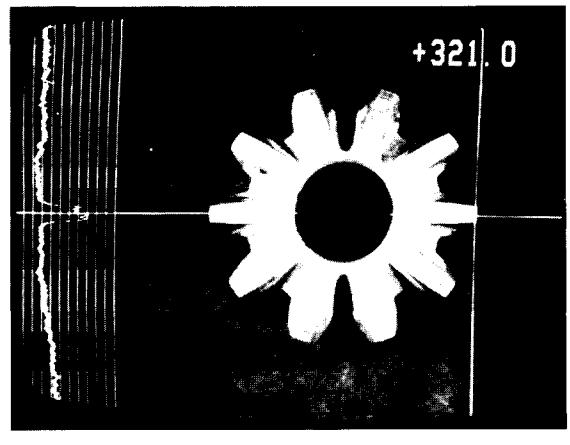
C. Diagonal sample of multiburst signal.



D. Diagonal sample of high resolution detail.




E.




F.

Horizontal dimension analysis using DC signal from H marker position control. An external alphanumeric generator has been used to produce the reading in the upper right corner.

# specifications

| | | |
|---|---|---|
| **Size:** | 3½" x 19" x 8" | |
| **Mounting:** | Standard 19" rack | |
| **Weight:** | 6.5 lbs. | |
| **Power:** | 117/220 VAC, 15 VA, 50-60 Hertz | |
| **Connectors:** | Video & Sync: | BNC |
| | Position, Slow Scan & DC: | 24-Pin Blue Ribbon |
| **Inputs:** | Sync: | 4 V p-p, 1 K ohms |
| | Video: | 1 V p-p, 1 K ohms |
| **Outputs:** | Monitor Video: | 1.2 V p-p, 75 ohms |
| | Slow Scan Video: | 0-5 V p-p, 10 K ohms |
| | DC Readout: | 0-5 V, 10 K ohms |
| | X Position: | 0-5 V, Hi Z |
| | Y Position: | 0-5 V, Hi Z |
| | Sync: | 4 V p-p, 75 ohms |
| **Controls:** | Front Panel | |
| | H Marker Position | |
| | H Range | |
| | V Marker Position | |
| | V Range | |
| | H Zero | |
| | V Zero | |
| | Power | |
| | Display: | Off/Chop/On |
| | Waveform Zero | |
| | DC Zero | |
| | Scan Mode: | Off/V/H |
| | Field: | Both/1/2 |
| | Filter: | In/Out |
| | Slant: | On/Off |
| | Slant: | Left/Right |
| | Scan Rate | |
| | Scan Start | |
| | Scan Stop | |
| | Scan Reset | |
| | Rear Panel | |
| | Sync: | Int/Ext |
| | Termination: | Hi-Z/75 ohms |
| | Video Out: | Composite/Non-composite |

# performance characteristics

| | |
|---|---|
| Video Frequency Response: | 20 MHz |
| Slow Scan Video Bandwidth: | 8 KHz (525-line system)<br>15 KHz (945-line system) |
| Max Chart Readout Bandwidth: | 30 Hz |
| Linearity: | 3% overall (X-Y-Z) |
| Scan Time: | 5 seconds to 1 minute |
| H Sample Range: | 90% active raster width |
| V Sample Range: | 90% active raster height |

# features

Dynamic noise measurements
Vertical " line selector" operation
Large screen waveform display
Point-by-point video amplitude indication
Chart recording output
Reference grating
Video noise reduction
Remote control
Narrow-band video output
X-Y coordinate indication

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# scan reverser 421

## general description

The Model 421 Scan Reverser can reverse and/or invert a video image from a monochrome video camera so that the camera appears to scan from right to left and/or bottom to top (opposite of the video monitor). It is useful in situations where optical systems cause an image reversal or inversion that needs to be corrected for proper image display.

Image reversal and inversion is accomplished by two 512 x 480 pixel memories that are fed by a high speed A/D converter and followed by a D/A converter. A single frame is fed into one memory while the previous frame is being read out of the other memory in reverse direction. A four position front panel control allows the selection of normal, reversed (left to right), inverted (top to bottom), or reversed and inverted output.

## specifications

| | |
|---|---|
| Size: | $3\frac{1}{2}$" x 19" x 15" |
| Weight | 17 lbs |
| Mounting: | Standard 19" rack or tabletop |
| Power: | 117/220 VAC, 50/60 Hz, 75VA |
| Input Signal: | Video, composite, 1 V p-p, 75 Ω |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω |
| Controls: | Power: On/Off<br>Mode: Normal, T-B, L-R, Both<br>White Level<br>Black Level |
| Indicators: | Power On |
| Connectors: | BNC |
| Resolution: | 512 x 480 picture elements |
| Grayscale: | 8-bit (256 gray levels) |
| Delay: | One frame |

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# video mirror 420

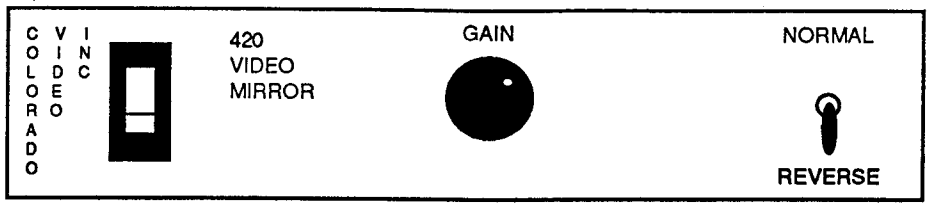
## general description

The Model 420 Video Mirror reverses the image from a monochrome video camera so that the camera appears to scan from right to left (opposite of the video monitor). It is useful in systems where optical mirrors cause an image reversal that needs to be corrected for proper image display.

Image reversal is accomplished by two 768 pixel memories that are fed by a high speed A/D converter and followed by a D/A converter. A single line within the image is fed into one memory while the previous line is being read out of the other memory in reverse direction. A front panel switch allows selection of either a reversed or normal output.

## specifications

| | |
|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" |
| Weight | 4 lbs |
| Mounting: | Freestanding ($1\frac{3}{4}$" x 19" rack mount optional) |
| Power: | 117/220 VAC, 50/60 Hz, 20VA |
| Input Signal: | Video, composite, 1V p-p, 75 Ω Gain control can compensate for inputs from 0.7 to 1.4 V p-p |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω |
| Controls: | Power: On/Off<br>Mode: Reverse/Normal<br>Video Gain |
| Indicators: | Power On |
| Connectors: | BNC |
| Resolution: | 768 pixels per line |
| Grayscale: | 8-bit (256 gray levels) |
| Delay: | One line (normal and reversed modes) |

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# video contrast enhancer 605

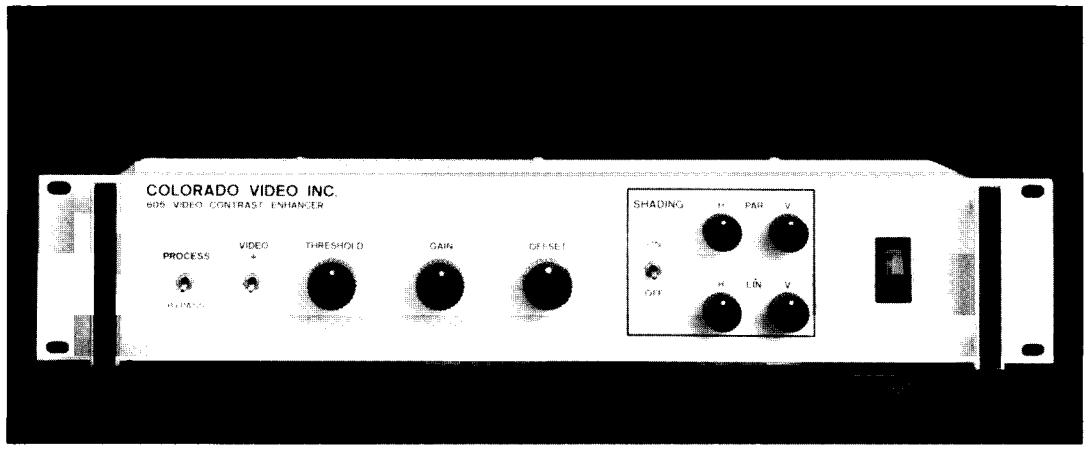
## general description

The Model 605 Video Contrast Enhancer provides three simple but very useful video processing functions. These functions are grayscale enhancement, shading compensation and video inversion.

The grayscale enhancement function allows the stretching of a portion of the grayscale in the input video to occupy a much larger portion of the full grayscale range in the video output. This type of grayscale modification is useful in analyzing images in which the information of importance is inherently of low contrast from the other details within an image. It can aid significantly in the ability of an operator or machine vision system to detect an edge, defect, or other important but low contrast feature within an image.

The shading compensation feature provides input video brightness correction only. Ramp and parabolic waveforms are provided for each axis, with variable polarity and amplitude control. This type of shading correction can be beneficial when thresholding of the video is to be done by some following piece of processing equipment. It is also applicable when mechanical or other restrictions prevent the proper and even lighting of the object being viewed. The shading portion of the 605 precedes the grayscale processing and both may be used when desired.

A switchable inverse video function provides monochromatic reversal of the video output signal. Blacks become white and whites become black. This feature can be advantageously applied in detecting cracks, defects, pits or scratches on a highly reflective background which normally cannot be handled by a processor or video monitor due to blooming or overload. Both shading and contrast enhancement can be used in conjunction with the inverse video feature.



# specifications

| | |
|---|---|
| **Size:** | 3½″ × 19″ × 8″ |
| **Mounting:** | Standard 19″ rack |
| **Weight:** | 7 lbs |
| **Power:** | 117/220 VAC, 50/60 Hertz, 10 VA |
| **Inputs:** | Composite Video, 1 V p-p (75 ohm), terminated while in operation |
| **Outputs:** | Composite Video, nominal 1 V p-p into 75 ohm load |
| **Enhancement Range:** | Off (none) to 10:1 stretch, minimum |
| **Shading Range:** | 0 to .3V, each waveshape |
| **Controls:** | Power<br>Bypass/Operate<br>Normal/Invert (negative video)<br>Offset |
| | Enhancement: On/Off, Gain, Level |
| | Shading: On/Off, Waveshape Polarity & Amplitude (4) |

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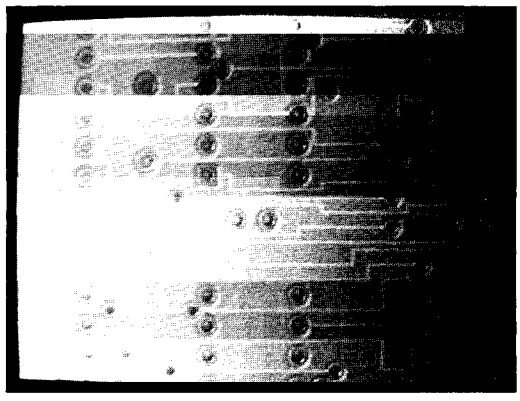

Original Image

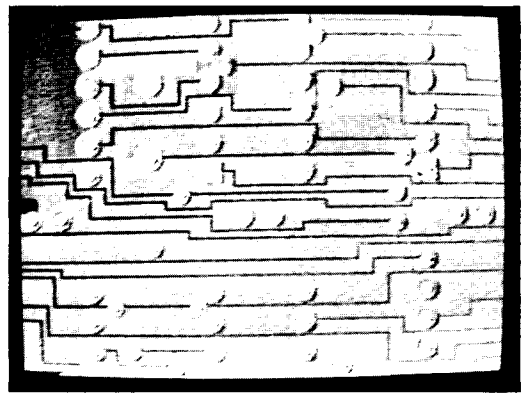

Image after enhancement,
shading compensation and inversion.

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# video quantizer 606h

## general description

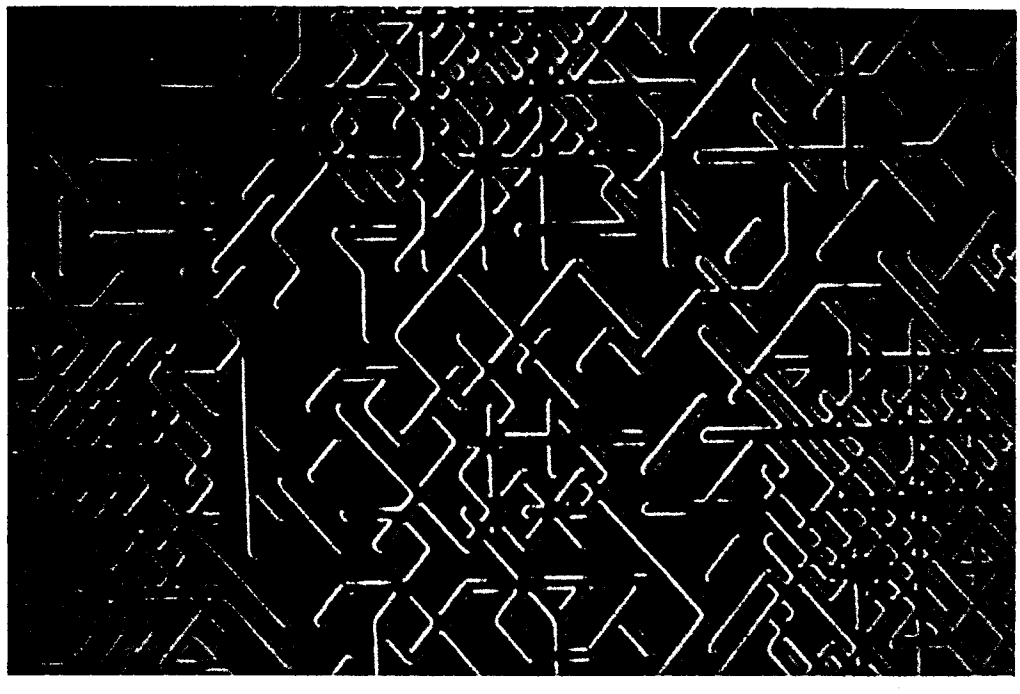
The Model 606H is an instrument designed to process the grayscale characteristics of monochrome video input signals in order to achieve radical alterations in output linearity or, alternately, to synthesize color signals from different shades of gray.

The unit operates on the input video signal by selecting from 1 to 16 separate narrow "slices" which are adjustable to any amplitude level between black and white. Selection of the thresholds may be linear, logarithmic, antilog, or on any other arbitrary basis. The control panel contains adjustments which allow the operator to vary the slice threshold as well as the color output from each of the 16 channels. A wide range of color variations may be produced by adjusting the amount of Red-Green-Blue sent to the output from each channel. The unit also contains a linear video amplifier, the output of which may be mixed as b/w with the quantized color signals for added versatility.

The Model 606H is intended primarily for television studio "special effects" production, but is suitable for a wide range of other uses. Effects achievable include:

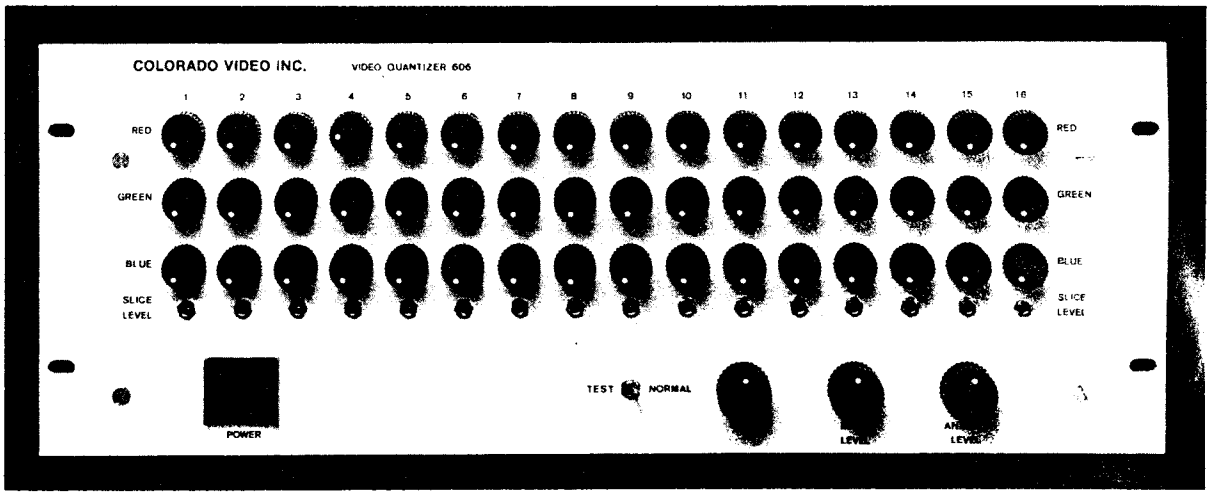
- Keying
- Tone Reduction
- Outlining
- Equal Brightness Contouring
- Grayscale Inversion
- Synthetic Color Generation
- Tinting
- Super-Graphic Pattern Generation

The 606H may be used with either noncomposite or composite video input signals from a television camera, flying spot scanner, video tape recorder, or other source.



# specifications

| | | |
|---|---|---|
| **Size:** | 7" x 19" x 12" | |
| **Mounting:** | Standard 19" rack | |
| **Construction:** | Plug-in cards, solid state, silicon | |
| **Power:** | 117 VAC, 60 Hertz | |
| **Inputs:** | Video | 1V, 75 ohms |
| | External Sync | 4V, 1k ohms |
| | Blanking | 4V, 1k ohms |
| | External Key | 1V, 75 ohms |
| **Outputs:** | Video Red | 1V, 75 ohms |
| | Video Green | 1V, 75 ohms |
| | Video Blue | 1V, 75 ohms |
| | Sync | 3.5V, 75 ohms |
| **Controls:** | AC Power | |
| | Input Level | |
| | Bias | |
| | Analog Level | |
| | Quantizer | Normal/Test |
| | Quantizer Threshold | 1 through 16 |
| | Quantizer Mix Levels | Red 1 through 16 |
| | | Green 1 through 16 |
| | | Blue 1 through 16 |
| **Rear Controls:** | Sync | Int/Ext |
| | Output Levels | Red |
| | | Green |
| | | Blue |
| **Connectors:** | BNC | |



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# video screen splitter 613

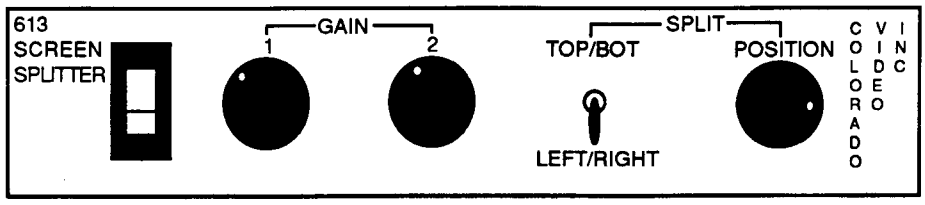
## general description

The Model 613 Video Screen Splitter combines two synchronized video sources so that portions of both images are present in the output signal and thus on a single television screen. A front panel switch selects whether the screen is split top-to-bottom or left-to-right. Gain controls for both inputs are also provided on the front panel.

The unit can be used with either two monochrome or two color video sources or, under some restrictions, one of each. The front panel position control determines what proportion of the screen is dedicated to each source, adjustable from 0% to 100%.

## specifications

| | |
|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" |
| Weight | 3 lbs |
| Mounting: | Free standing ($1\frac{3}{4}$" x 19" rack mount optional) |
| Power: | 117/220 VAC, 50/60 Hz, 3VA |
| Input Signal: | Video, composite, 1 V p-p, 75 Ω<br>525 line RS-170(A) (625 line CCIR optional) |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω |
| Controls: | Power: On/Off<br>Split: Top-Bot/Left-Right<br>Split: Position<br>Video In 1 Gain<br>Video In 2 Gain |
| Indicators: | Power On |
| Connectors: | BNC |
| Bandwidth: | 10 MHz |

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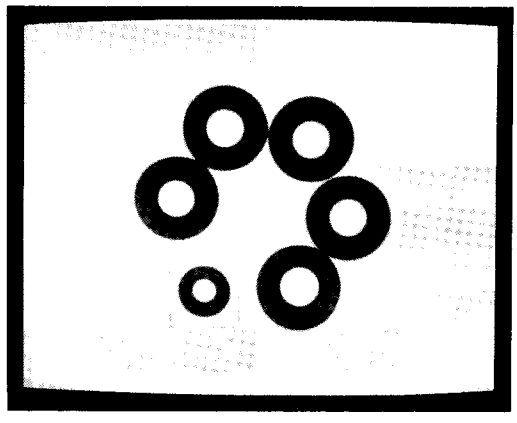
# video pointer 610e

## general description

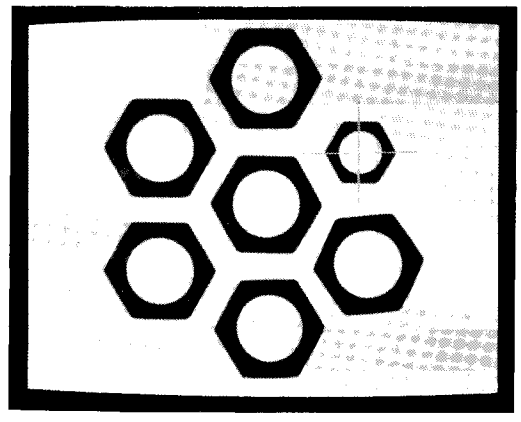
The Model 610E produces a series of oblong and crosshair patterns, as seen on the screen of a television monitor. By use of front panel controls or external control voltages, the patterns may be positioned to any location on the screen and changed in size over a range of ten to one.

The 610E contains two positionable pattern generators. The Box Outline generator section may be used to vary the horizontal and vertical size of the oblong produced, as well as to position the box anywhere in the field, horizontally and vertically. In addition, the separate Crosshair pattern may be positioned anywhere else on the screen, relative to the box, by its H and V controls. When the box is moved, the crosshairs track along with it.

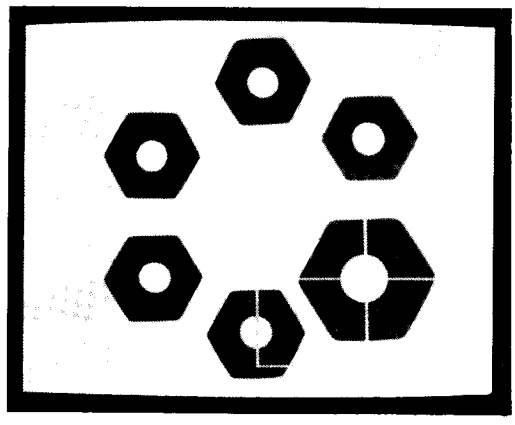
Uses of the Model 610E include calling attention to significant elements in a TV scene, X-Y target coordinate analysis (through internally or externally generated DC voltage), and as a gating signal for video keying. Conventional video signals from a TV camera or other source may be fed into the 610E, and the superimposed patterns may be varied continuously from black to white with the Matt Control.



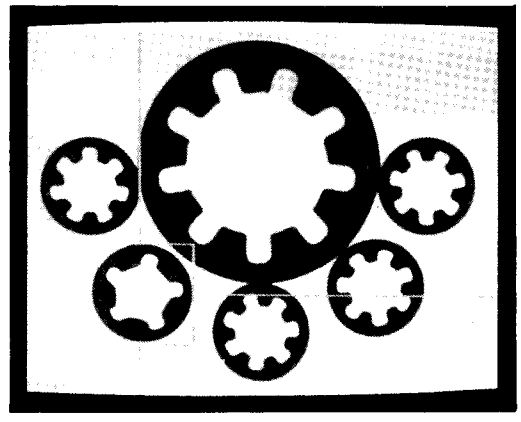
Box Outline



Small Crosshair



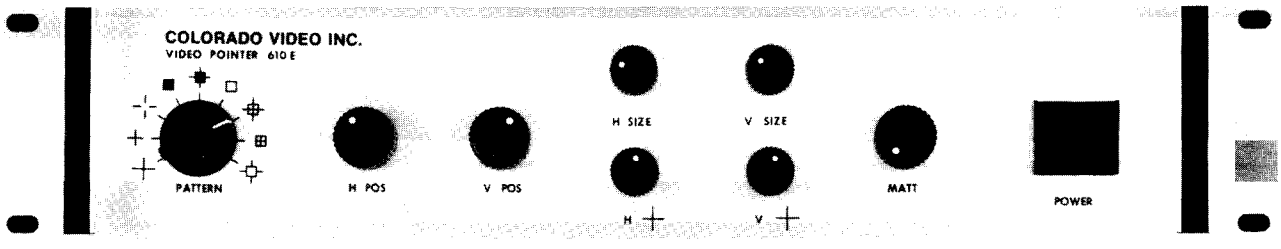
Large Crosshair & Box Outline



Interrupted Crosshair & Box Outline

# specifications

| | | |
|---|---|---|
| **Size:** | 3½" x 19" x 8" | |
| **Mounting:** | Standard 19" rack | |
| **Construction:** | Solid state, silicon | |
| **Weight:** | 7 lbs. | |
| **Power:** | 117/220 VAC, 50/400 Hertz, 7 Watts | |
| **Connectors:** | BNC and Blue Ribbon | |
| **Inputs:** | Video: | 1V, 1K ohms |
| | H-Axis Position: | 0 to +5 V, 5K ohms |
| | V-Axis Position: | 0 to +5 V, 5K ohms |
| | H size: | 0 to +5 V, 5K ohms |
| | V size: | 0 to +5 V, 5K ohms |
| | H crosshair Pos: | +5 to −5 V, 5K ohms |
| | V crosshair Pos: | +5 to −5 V, 5K ohms |
| **Outputs:** | Video: | 1 V p-p, 75 ohms |
| | Oblong: | 1 V p-p, 75 ohms |
| **Controls:** | Pattern Selector: | Large Crosshair<br>Small Crosshair<br>Interrupted Crosshair<br>Solid Box<br>Large Crosshair & Solid Box<br>Box Outline<br>Large Crosshair & Box Outline<br>Small Crosshair & Box Outline<br>Interrupted Crosshair & Box Outline |
| | Horizontal Oblong Position | |
| | Vertical Oblong Position | |
| | Horizontal Oblong Size | |
| | Vertical Oblong Size | |
| | Horizontal Crosshair Position | |
| | Vertical Crosshair Position | |
| | Matt | |
| | AC Power: | On/Off |
| **Indicator:** | AC Power | |
| **Marker:** | Positionability: | 80% or better of active raster height and width |
| **Characteristics:** | Linearity: | (Voltage to time conversion) ± 1% to 70% of active raster height and width. |

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# automatic gain control 675

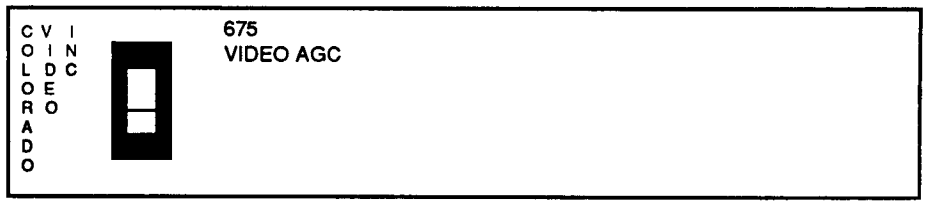
## general description

The Model 675 Automatic Gain Control (AGC) provides a consistent video output level given varying levels of input. It can be configured by internal jumper to set gain in either of two ways. One configuration sets gain based on video (excluding sync) amplitude. This configuration can correct for problems caused by cameras operating in adverse conditions. The second configuration sets gain based on sync amplitude. This configuration is useful when the composite video level may be incorrect because of calibration or transmission problems.

Four additional internal adjustments are available to help tailor the Model 675 at installation. "Attack Time" determines how quickly the unit reduces gain when the input signal amplitude rises. "Release Time" determines how quickly the unit increases gain when the input signal amplitude falls. "AGC" determines the output level that the AGC function works to achieve. "Filter" is a jumper that determines how gain is affected by small bight white peaks in the input video.

## specifications

| | | |
|---|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" | |
| Weight | 3 lbs | |
| Mounting: | Free standing ($1\frac{3}{4}$x 19" rack mount optional) | |
| Power: | 117/220 VAC, 50/60 Hz, 5VA | |
| Input Signal: | Video, composite: 525- to 875- line RS-170 or RS-330, 1 V p-p, looping with Hi-Z/75 Ω switch | |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω | |
| Controls: | Front Panel: | Power: On/Off |
| | Internal: | Attack Time |
| | | Release Time |
| | | AGC Output Level (sync mode) |
| | | AGC Output Level (video mode) |
| | | Filter: In/Out (jumper) |
| | | Mode: Sync/Video (jumper) |
| | Rear Panel: | Video In: Hi-Z/75 Ω |
| Indicators: | Power On | |
| Connectors: | BNC | |
| Max. AGC Gain: | 9.5 db | |
| Bandwidth: | 5 MHz (16 MHz optional) | |



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# digital display generator 109a

## general description

The Model 109A Digital Display Generator inserts a number, corresponding to the value of an analog input voltage, into a video image. It is designed primarily for use with other Colorado Video Instruments including:

Model 310A Video Integrator (DC Output)
Model 321 Video Analyzer (DC Output)
Model 635A Video Position Analyzer (Position Output)

It can also display voltage values between -5.00 V and +5.00 V from other devices.

The size and position of the insert are controlled by DIP switches inside the unit. Four different character sizes are selectable and the insert can be positioned anywhere on the TV raster. The insert can be set to overlay the video or have a black background. The 109A is available in a one input version (109A) or three input version (109A-3).

## specifications

| | | |
|---|---|---|
| Size: | $1\frac{3}{4}$" x 19" x 13" | |
| Weight | 7 lbs | |
| Mounting: | Standard 19" rack mount or table-top. | |
| Power: | 117/220 VAC, 50/60 Hz, 12 VA | |
| Inputs: | Video, composite: 1 V p-p, looping with Hi-Z/75 Ω switch | |
| | DC Voltage: -5 to +5 V; Hi-Z | |
| Output: | Video, composite: 1 V p-p, 75 Ω | |
| Controls: | Front Panel: | Power: On/Off<br>Display: On/Off<br>Background: On/Off<br>Blink: On/Off |
| | Rear Panel: | Video In: Hi-Z/75 Ω<br>Update Rate: 4/30 per second |
| Indicators: | Power On | |
| Connectors: | Video: | BNC |
| | DC Voltage: | Terminal Strip |
| Performance: | Video Bandwidth: | 10 MHz |
| | Readout Accuracy: | ±0.01 V |

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# digital display generator 109b

## general description

The Model 109B Digital Display Generator inserts a number, corresponding to the value of a $3\frac{1}{2}$ or $4\frac{1}{2}$ digit BCD input, into a video image. It is designed primarily for use with other Colorado Video Instruments including:

Model 305 Video Micrometer
Model 305A Video Micrometer
Model 635 Video Position Analyzer

It can also display BCD information from other devices.

The size and position of the insert are controlled by DIP switches inside the unit. Four different character sizes are selectable and the insert can be positioned anywhere on the TV raster. The insert can be set to overlay the video or have a black background.

## specifications

| | | |
|---|---|---|
| Size: | $1\frac{3}{4}$" x 19" x 13" | |
| Weight | 7 lbs | |
| Mounting: | Standard 19" rack mount or table-top. | |
| Power: | 117/220 VAC, 50/60 Hz, 12 VA | |
| Inputs: | Video, composite: 1 V p-p, looping with Hi-Z/75 Ω switch | |
| | BCD Data (TTL levels): | BCD digits 1,2,3,4 & 5 ($4\frac{1}{2}$ digit)<br>or<br>BCD digits 1,2,3 & 4 ($3\frac{1}{2}$ digit)<br>Busy<br>Decimal point location (can be set internally) |
| Output: | Video, composite: 1 V p-p, 75 Ω | |
| Controls: | Front Panel: | Power: On/Off<br>Display: On/Off<br>Background: On/Off<br>Blink: On/Off |
| | Rear Panel: | Video In: Hi-Z/75 Ω<br>305/305A ($3\frac{1}{2}$ digit/$4\frac{1}{2}$ digit) |
| Indicators: | Power On | |
| Connectors: | Video: | BNC |
| | BCD | 24-pin "Blue-Ribbon Female<br>Optional 25-pin "D" Female |
| Performance: | Video Bandwidth: | 10 MHz |

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# X-Y indicator 620

## general description

The Model 620 is an instrument used to generate X and Y coordinates (crosshairs) on a TV screen. It allows rapid alignment of subject material with a predetermined location when used in conjunction with a standard TV camera and monitor.

The Model 620 accepts composite video on a looping high z or terminated input and provides composite video out to a standard TV monitor.

## specifications

| | |
|---|---|
| **Size:** | 1⅔" × 11" × 8" |
| **Weight:** | 3 lbs. |
| **Mounting:** | Freestanding (1¾" × 19" rack mount optional) |
| **Power:** | 117/220 VAC, 50/60 Hz |
| **Input Signal:** | Video, composite, 1V p-p, 75 ohms |
| **Output Signal:** | Video, composite, 1V p-p, 75 ohms |
| **Operating Controls:** | AC Power: On/Off<br>Crosshair: Black/White<br>X & Y Position: ±5%, Front panel, screwdriver adj.<br>X & Y Position: 60% of full screen, internal |
| **Indicators:** | AC Power |
| **Connectors:** | BNC |

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# X-Y indicator 620A

## general description

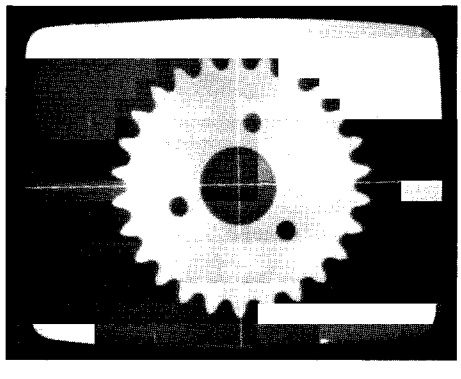
The model 620A accepts a standard, composite video signal and generates a crosshair pattern which is then superimposed on the original picture for display on a television monitor. This function is particularly useful in allowing the rapid alignment of subject material, such as a semiconductor wafer with a predetermined location. The 620A may also be used for bore-sighting or other applications.

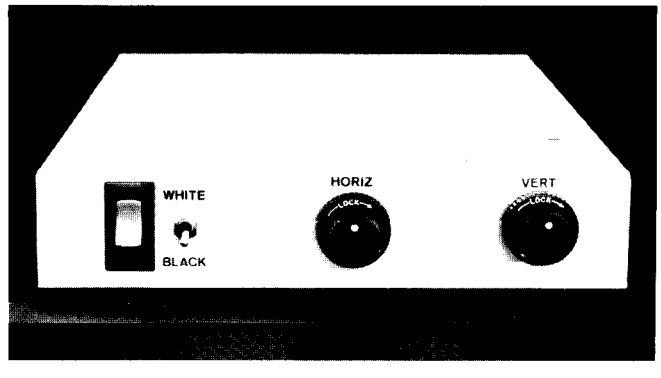
The 620A is a small, freestanding unit with self-contained power supply. Vertical and horizontal positioning of the crosshair is by means of front panel locking knobs. A front panel switch also allows display of either a white or black crosshair pattern in order to accommodate video subjects with differing degrees of brightness.

## specifications

| | | |
|---|---|---|
| **Size:** | 1⅔" X 11" X 8" | |
| **Weight:** | 3 lbs. | |
| **Mounting:** | Freestanding (1¾" x 19" rack mount optional) | |
| **Power:** | 117/220 VAC, 50/60 Hz, 7W | |
| **Input Signal:** | Video, composite, 1V p-p, Hi-Z, looping or 75 ohm | |
| **Output Signal:** | Video, composite, 1V p-p, 75 ohms | |
| **Operating Controls:** | Power: | On/Off |
| | Crosshair: | Black/White |
| | X & Y Position: | 60% of full screen |
| **Rear Panel Control:** | Termination: | Hi-Z/75 ohm |
| **Indicators:** | AC Power | |
| **Connectors:** | BNC | |
| **Options:** | Consult Factory | |

*Specifications subject to change without notice* 5/89





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# 623 multiline generator

## general description

The Model 623 Multiline Generator produces a series of equally spaced vertical lines which are superimposed on a standard video input signal. The number of lines is switch selectable between 2, 4, 8, 16, 32, 64, 128, or 256. The brightness of the lines is continuously variable from black to white by means of a front panel control.

The Multiline Generator is completely solid state, and is mounted in a table top chassis with dimensions of 11"×8"×1⅔'. Operating controls are front panel mounted. Power and signal connections are located on the rear of the chassis.

Applications include alignment of subjects to the vertical axis, and the checking of spacing between objects in an image.

## specifications

| | |
|---|---|
| **Size:** | 11"×8"×1⅔' |
| **Weight:** | 3 lbs. |
| **Mounting:** | Tabletop |
| **Power:** | 117/220 VAC, 50/60 Hertz, 8 volt amperes |
| **Input:** | Composite video: 1 volt p-p, 75 ohms |
| **Output:** | Composite video: 1 volt p-p, 75 ohms |
| **Connectors:** | BNC |
| **Controls:** | Line # selection<br>Line brightness |
| **Indicators:** | AC Power |
| **Option:** | Rack mount |

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# pattern generator 670

## general description

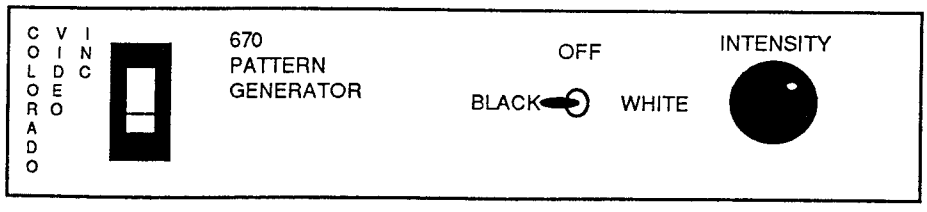
The Model 670 superimposes a fixed pattern over a monochrome or color video signal. It uses a custom programmed PROM for the precise, stable generation of overlays specified by the user. Patterns may be switch-selected as either white or black, to provide the best contrast with the video signal. Pattern intensity may be varied by front panel control.

The 670 can generate any pattern that fits into a 640 x 480 x 1 bit format. Patterns may be range marks, measuring scales, alphanumerics, logos, or other symbols. Typical applications include microscopy, boresighting, alignment, calibration, measuring, and camera or site identification. The 670 is particularly useful with solid state cameras where reticles can not be etched on the sensor face.

A variety of options are available including various TV line rates, other pattern resolutions, and multiple switch-selected patterns.

## specifications

| | |
|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" |
| Weight | 4 lbs |
| Mounting: | Freestanding ($1\frac{3}{4}$" x 19" rack mount optional) |
| Power: | 117/220 VAC, 50/60 Hz |
| Input Signal: | Video, composite, 1 V p-p, 75 Ω |
| Output Signal: | Video, composite, 1 V p-p, 75 Ω |
| Controls: | Power: On/Off<br>Pattern: Black/Off/White<br>Intensity |
| Indicators: | Power On |
| Connectors: | BNC |
| Pattern Resolution: | 640 Horizontal by 480 Vertical |

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# sync stripper 302-2

## general description

This device accepts a standard composite video signal, processes it, and provides four separate pulse outputs: sync, composite blanking, horizontal drive, and vertical drive. This allows virtually any video signal source to be used as an inexpensive "sync generator."

The use of the 302-2 simplifies the interconnection of various pieces of video equipment and allows synchronized operation of cameras, special effects generators, or other devices in conjunction with videotaped or other signals where the original sync pulses are not available.

## specifications

| | |
|---|---|
| **Size:** | 1¾"×9½"×6¾" |
| **Weight:** | 2.5 lbs. |
| **Power:** | 115/230 VAC, 50/60 Hz, 12 VA max. |
| **Input:** | Composite Video: 1V p-p, 1K ohms, looping |
| **Outputs:** | Horizontal Drive: 4V p-p, 75 ohms<br>Vertical Drive: 4V p-p, 75 ohms<br>Sync: 4V p-p, 75 ohms<br>Blanking: 4V p-p, 75 ohms |
| **Connectors:** | BNC |
| **Controls:** | Power: On/Off |

**NOTE:** Output signal voltage levels are negative going per EIA RS-170 (NTSC) television standards. They are not TTL compatible.

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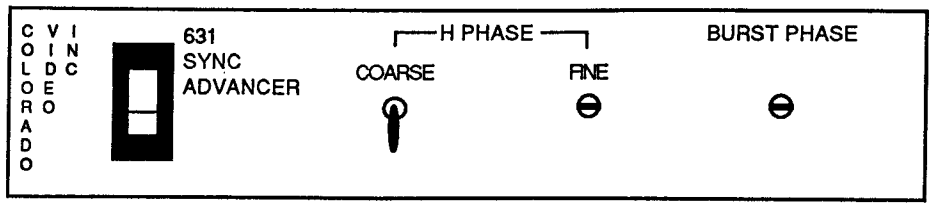
# sync advancer 631

## general description

The Model 631 Sync Advancer facilitates proper genlocking of a distant camera to a master sync source by providing a wide range of H phase adjustment. Proper genlocking between multiple video sources is necessary to maintain satisfactory operation of equipment such as switchers, recorders, or multiplexers. Installed between the sync source and the distant camera, the Sync Advancer can compensate for propagation delays caused by long genlock and video cables.

## specifications

| | |
|---|---|
| Size: | $1\frac{2}{3}$" x 8" x 11" |
| Weight | 3 lbs |
| Mounting: | Free standing ($1\frac{3}{4}$" x 19" rack mount optional) |
| Power: | 117/220 VAC, 50/60 Hz, 3VA |
| Input Signal: | Video, composite, (or black burst) 1 V p-p, 75 Ω<br>525 line RS-170(A) (625 line CCIR optional) |
| Output Signal: | Black Burst, composite, 0.5 V p-p, 75 Ω |
| Controls: | Power: On/Off<br>H Phase: Coarse<br>H Phase: Fine<br>Burst Phase |
| Indicators: | Power On |
| Connectors: | BNC |
| Performance: | Horizontal Phase Adjustment Range: Greater than one line.<br>Burst Phase Adjustment Range: Greater than one cycle. |

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# video scan converter 494

## general description

The Model 494 Video Scan Converter is a solid-state video memory with high-speed analog/digital and digital/analog converters, and is capable of digitizing, storing, and displaying video information while performing a scan format conversion. The video source may be either 525-line, 2:1 interlaced standard format video or 525-line 30 Hz sequential scan format. The output of the scan converter will be in the opposite format from the source.

The conversion mode of the Model 494 must be set to match the conversion desired, either interlaced to sequential or sequential to interlaced. This acquisition and conversion process may be either continuous or intermittent. With the unit set for continuous conversion, the process may be interrupted by pressing the "freeze" button for as long as desired. With the unit set for single conversion, the conversion process proceeds only while the button is depressed.

The Model 494 Video Scan Converter is a digital semiconductor memory made up of random access memory (RAM) integrated circuits capable of storing two complete frames of video information. During conversion, data is entered into one memory in the input format while data is being read from the other in output format. At the end of each frame of video, the functions of the two memories are reversed, resulting in continuous conversion with a one frame delay.

# specifications

| | | |
|---|---|---|
| **Size:** | 5¼" x 19" x 15" | |
| **Weight:** | 21 lbs. | |
| **Mounting:** | Standard rack mount or tabletop | |
| **Construction:** | Card file | |
| **Power:** | 117 VAC, 60 Hertz, single phase, 100 VA | |
| **Inputs:** | Video: | Composite; 1 V p-p, 75 ohms |
| | Digital: | Freeze<br>Mode |
| **Outputs:** | Video | Composite, 1 V p-p, 75 ohms |
| **Controls:** | AC Power:<br>Freeze<br>Mode<br><br>White Level<br>Black Level | On/Off<br>(can be remoted)<br>(sequential-interlaced/interlaced-sequential; can be remoted) |
| **Indicators:** | Power | |
| **Connectors:** | Video:<br>Remote: | BNC<br>15 pin "D" |
| **Resolution:** | 512 x 512 picture elements, TV test chart resolution is 400 lines. | |
| **Frame Store Time:** | 1/30th second | |
| **Grayscale:** | 6-bits (64 gray levels) | |
| **Conversion Linearity:** | ±0.2%, ±1/2 LSB | |
| **Video Bandwidth:** | 5 MHz | |
| **Options:** | Direct Memory Access Digital I/O Module 793 (see 793 data sheet) | |
| | Grayscale: 8-bit (256 gray levels) | |



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# video transceiver 250

## general description

The Model 250 is designed to provide narrowband video communications over standard voice grade telephone circuits. Three basic functions are provided:

1. A "frame freeze" capability which captures a single image that may be assessed for quality before transmission.

2. Conversion of the frozen picture to a "slow-scan" television signal suitable for transmission over audio channels.

3. Reception of slow-scan television signals and reconversion to a still image on a normal television monitor.

In the transmission mode, the 250 accepts a conventional CCTV input signal which is digitized on command and fed to a digital memory. The output of the memory is then displayed on a television monitor which indicates the exact quality of the image to be transmitted. Once a transmit command is given, the memory is read out slowly from left to right, with a white cursor on the television monitor screen showing the degree of picture completion.

In the receiving mode, the 250 accepts properly formatted slow-scan television input signals and reconstructs a conventional television still picture, using the same memory which provided frame freeze for transmission. Image retention is indefinite unless deliberately erased or power to the 250 is lost.

Standard features of the Model 250 include:

- Operation in moving environments
- Plug-in circuit cards for simplified maintenance
- Real time monitoring of A/D operation
- "Gen-lock" to other video sources for systems operation
- Automatic Transmit/Receive switching
- Compact and rugged construction
- Tabletop
- EIA standard 2:1 interlace video output

# specifications

| | | |
|---|---|---|
| **Size:** | 6″ x 17″ x 14″ | |
| **Weight:** | 19 lbs. | |
| **Mounting:** | Tabletop | |
| **Power:** | 100/115/230 VAC, 50/60 Hertz, single phase, 65 VA | |
| **Inputs:** | Video: | Composite, 1 volt p-p, 75 ohms, 2:1 interlace |
| | Phone Line: | FM modulated carrier, 100 millivolts or higher, 600 ohms, balanced |
| **Outputs:** | Video: | Composite, 1 volt p-p, 75 ohms, 2:1 interlace |
| | Phone Line: | FM modulated carrier conforming to FCC standards |
| **Controls:** | Freeze<br>Transmit<br>Receive Start<br>Reset<br>AC Power<br>White Level<br>Black Level<br>Talk/Data | |
| **Indicators:** | Scan<br>Black Level<br>White Level | |
| **Connectors:** | Video: | BNC |
| | Remote: | 24 Pin Blue Ribbon |
| | Phone Line: | RJ-11 |
| | Telephone Set: | RJ-11 |
| **Performance:** | Resolution: | 256 x 240 memory elements; repeats same data in both fields; TV test chart resolution is 135 lines |
| | Transmisson Time: | 35 seconds |
| | Grayscale: | 8-bit (256 gray levels) |
| **Options** | Transmit only<br>Receive only<br>256x240 dual memory<br>512x240 memory<br>256x480/256x240 dual rate<br>Rack mounting<br>4 wire operation<br>Continuous transmission<br>625 line operation (42 second transmission time)<br>Remote control<br>8 KH baseband output (4 second transmission time) | |



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# video frame store 491

## general description

The model 491 Video Frame Store is designed for use in a wide range of industrial and scientific applications. Up to four synchronized video memories are available in a single chassis, thus allowing functions such as image comparison, overlays, subtraction, and R-G-B color synthesis. Direct recording of NTSC color video signals is an optional feature.

A digital I/O option allows individual picture elements in the stored image to be accessed by a computer, processed, and returned to the Model 491 memory. This I/O option can easily be interfaced with most computers or other digital processing equipment. A single 16-bit duplex I/O module in the computer is all that is required for interfacing to modern mini-computers. All digital signals to or from the unit are buffered and are TTL compatible.

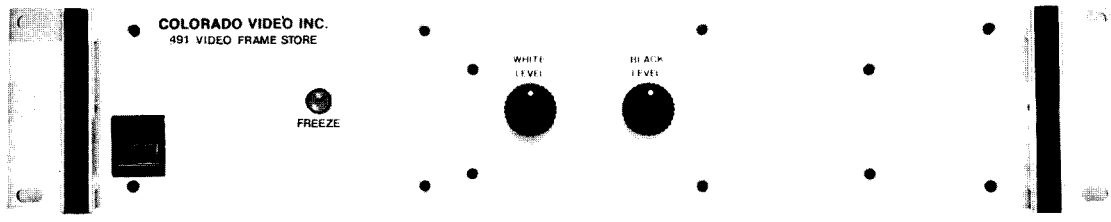
The "frame grab" process can be initiated by means of a front panel pushbutton, a remote pushbutton, a TTL compatible convert signal, or from a computer when an optional I/O module is installed. The unit digitizes and stores the first frame following the conclusion of a convert command. The video output is a standard video signal synchronized to the video input and can be switched or mixed with other video signals or recorded on conventional video tape recorders.

## specifications

**Size:** 3½" x 19" x 15" (Single Memory)
5¼" x 19" x 15" (Multiple Memory)

**Weight:** 16 lbs. (Single Memory)

**Mounting:** Standard 19" rack



| | |
|---|---|
| **Construction:** | Card file |
| **Power:** | 100/115/220 VAC, 50/60 Hertz, single phase, 75 watts |
| **Input/Video:** | Composite video; 1 V p-p, 75 ohms |
| **Input/Control:** | Store: Pulse, ground true, 1 us min. or switch closure to ground<br>Memory control: TTL compatible signals |
| **Output/Video:** | Composite video; 1 V p-p, 75 ohms |
| **Connectors:** | Video: BNC<br>Remote Control: 15-pin D, Female |
| **Controls:** | AC power: On/Off<br>Freeze (can be remoted)<br>White Level<br>Black Level |
| **Indicators:** | AC Power |
| **Resolution:** | 512 × 480 picture elements (525-line)<br>512 × 512 picture elements (625-line) |
| **Frame Store Time:** | 1/30th second (525-line)<br>1/25th second (625-line) |
| **Grayscale:** | 8-bits (256 gray levels) |

# options

- Direct Memory Access Digital I/O Module 793 (see 793 data sheet)
- NTSC Color
- Multiple Memories (4 maximum)

  Output Configurations:

  - Single Output (switchable)
  - Multiple Outputs (simultaneous)
  - Single Switchable plus Multiple
- RGB Sequencer
- 625-line Operation (512 scan line display)



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# video subtractor 492

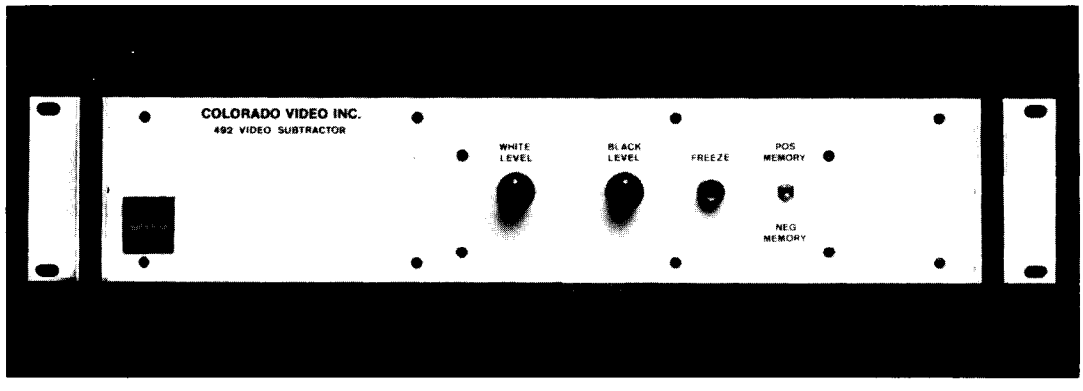
## general description

The Model 492 Video Subtractor is a dual solid-state video memory unit capable of comparing one stored image with the other and displaying the difference. It is intended for use in inspection, registration, quality control, surveillance and other applications where differences between two images can be used for decision making or process control.

In a typical application, a reference image is digitized and stored in one of the two video memories in the Model 492. A subsequent image is stored in the other memory. The image is subtracted from the reference memory and the difference is provided as a video output for display on a standard television monitor. It is also possible to continuously compare the input video with the reference image. Separate video outputs of both memories are also provided. A digital I/O option allows the use of a computer to analyze either of the stored images.

## specifications

| | |
|---|---|
| **Size:** | 3½″ × 19″ × 15″ |
| **Weight:** | 17 lbs. |
| **Mounting:** | Standard 19″ rack or tabletop |
| **Power:** | 100/115/230 VAC, 50/60 Hertz, single phase, 75 VA |
| **Input:** | Composite Video; 1 volt p-p, 75 ohms, 2:1 interlace |

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**Outputs:** Positive Memory and Negative Memory:
Composite Video; 1 volt p-p, 75 ohms, 2:1 interlace

Difference:
Composite Video; 1 volt p-p, 75 ohms, 2:1 interlace

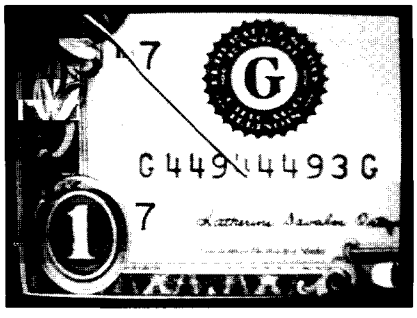
**Controls:** Black Level
White Level
AC Power
Freeze
Positive Memory/Negative Memory

**Connectors:** Video: BNC
Remote Control: 15 Pin D, Female

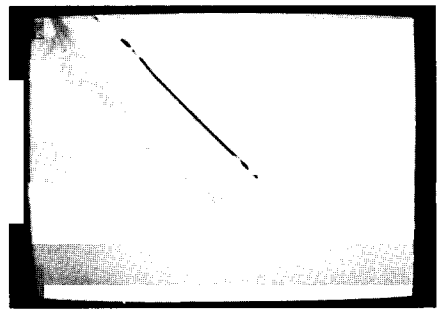
**Performance:** Resolution:
512 x 480 pixel memory

Grayscale:
8-bit (256 gray levels)

**Options:** Digital I/O
625-line operation
NTSC color



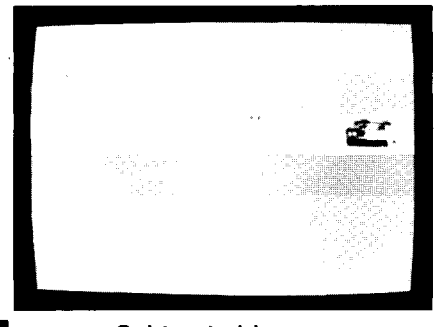
Reference Image



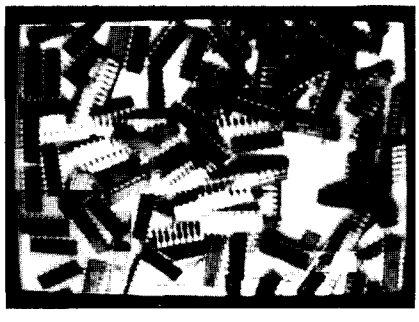
Subtracted Image

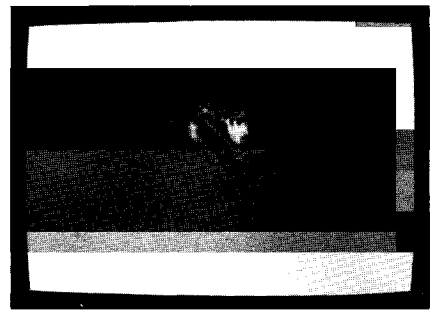
Reference Image

New Image



Subtracted Image







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# video peak store 493

## general description

The Model 493 Video Peak Store is an instrument with unique capabilities. In essence, it is a video field/frame store device which will continually add new information to memory contents, if such new data is of higher amplitude than that already recorded. Processing occurs in "real time" and the video output signal is continuously viewable.

The 493 is not an averaging memory and so transient information is not lost over a period of time unless overwritten by higher amplitude signals. The peak recording process will cause some forms of noise to eventually "smooth" into a DC offset which is equivalent to the peak value of the noise waveforms.

The Model 493 Video Peak Store is a compact unit suitable for operation either in the field or in the laboratory. Options include computer I/O capability and Slow-Scan TV transmission of stored data to remote locations.

Operational modes with the Model 493 are:

1. Field/frame store with manual or remote "freeze" command
2. Peak store, adding "whiter" video information to memory contents
3. Peak store, adding "blacker" video information to memory contents
4. Peak storing on a continuous, manually controlled, or interval basis
5. Optional peak storing of NTSC color video signals

Applications of the 493 include:

SCAN CONVERSION:
Electro-optical scan conversion by means of focusing a TV camera at a CRT. Radar or non-conventional television scanning with image build-up over short or long periods of time.

TRANSIENT RECORDING:
Recording of phenomena such as daylight lightning strokes or use as a "storage" oscilloscope.

TRACKING:
Tracking of either a light target against a dark background or a dark target against a light background, leaving a visible record. Follow vehicles, microscopic biological movements or other subjects.

NOISE SMOOTHING:
Because the 493 is a data accumulating device, some forms of noise will eventually "smooth" into a DC offset, equivalent to the peak amplitude of the noise components.

MISCELLANEOUS:
Stroboscopic image recording, "painting with light," or controlled addition of images to a display.

# specifications

**Size:** 3½" x 19" x 15"

**Weight:** 16 lbs.

**Mounting:** Standard 19" rack or tabletop

**Power:** 100/115/230 VAC, 50/60 Hertz, single phase, 75 VA

**Input:** Composite video; 1 volt p-p, 75 ohms, 2:1 interlace

**Output:** Composite video; 1 volt p-p, 75 ohms, 2:1 interlace

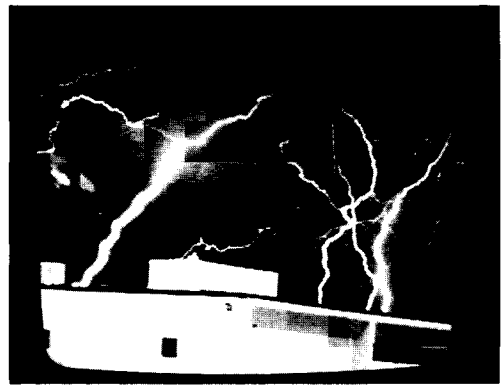
**Controls:**
Video level
Black level
Normal freeze/Peak store mode switch
Continuous freeze/Single record mode switch
Record pushbutton
Erase pushbutton
Peak store mode: white/black
AC power: on/off

**Connectors:** Video: BNC
Remote Control: 15 pin D, female

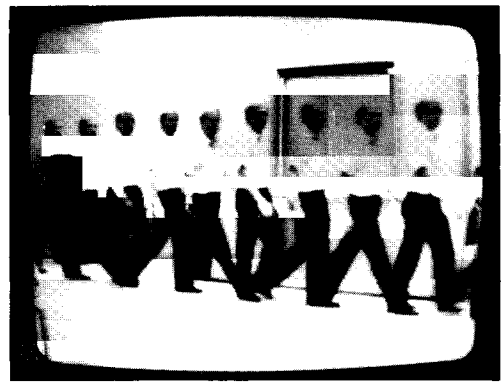
**Resolution:** 512x480 picture elements (525-line)
512x512 picture elements (625-line)

**Grayscale:** 8-bits (256 gray levels)

**Options:**
Digital I/O
NTSC color
Slow-Scan TV output
625-line, 50 Hertz operation
Interval controller

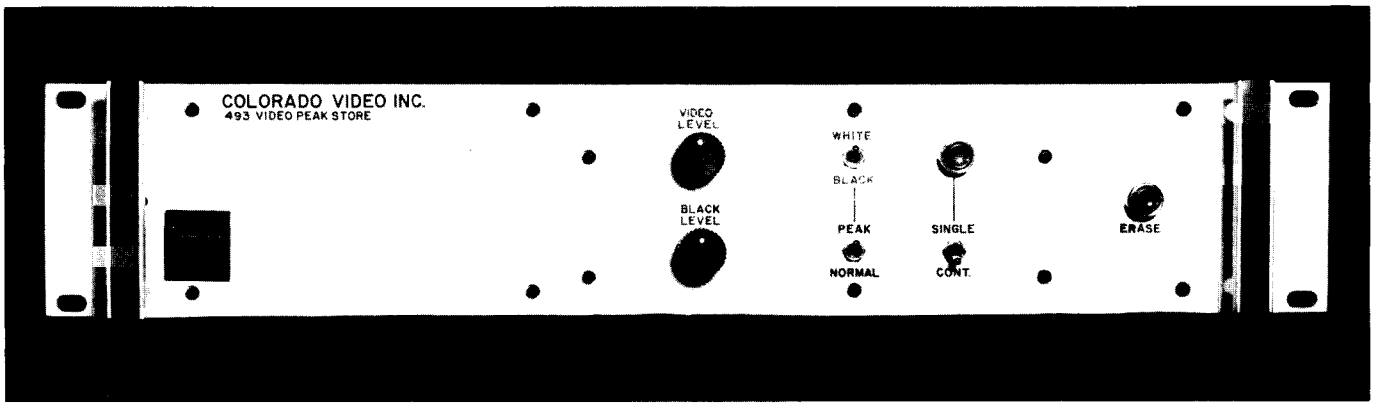


A ten minute daylight capture of multiple lightning strikes



Intrusion recording

A two hour "time exposure" of bird flight patterns



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# asynchronous frame store 495

## general description

The 495 is a unique video frame store which allows the capture of transient events which cannot be synchronized to the timing of a television camera. This special video memory provides a method of random acquision of a field or frame of information from a television signal.

Visual data generated through the use of pulsed lighting and an interlaced television camera gererally will produce only one "good" field for analysis. Random timing usually results in the reproduction of a portion of one field and part of the following field. Because conventional video frame stores require the starting and ending of an acquisition cycle during the vertical retrace, data distortion results. The Asynchronous Frame Store solves this problem by storing the input video on the next horizontal line following a trigger timed to the event in question (i.e. strobe) and continues until the same line occurs in the following field or frame.

Operation with NTSC color video signals is available and a digital I/O option allows easy interface with most computers or other digital processing equipment. All digital signals to or from the 495 are buffered and are TTL compatible.

# specifications

| | | |
|---|---|---|
| **Size:** | 3½" x 19" x 15" | |
| **Weight:** | 16 lbs. | |
| **Mounting:** | Standard rack or tabletop | |
| **Construction:** | Card file | |
| **Power:** | 100/115/220 VAC, 50/60 HZ, 75 watts | |
| **Input:** | Video: | Composite video: 1 volt p-p, 75 ohms, RS-170 |
| | Digital: | Store command: Ground true pulse; TTL |
| **Output:** | Composite video: 1 volt p-p, 75 ohms, RS-170 | |
| **Controls:** | White Level<br>Black Level<br>Frame/Field<br>Power: On/Off | |
| **Indicators:** | Power | |
| **Connectors:** | Video:<br>Remote: | BNC<br>15 pin "D" |
| **Resolution:** | 512 x 480 picture elements (525-line)<br>512 x 512 picture elements (625-line) | |
| **Grayscale:** | 6-bits (64 gray levels) | |
| **Conversion Linearity:** | ±0.2%, ±1/2 LSB | |
| **Video Bandwidth:** | 5 MHz | |
| **Options:** | Direct Memory Access Digital I/O Module 793 (see 793 data sheet) | |
| | Grayscale: 8-bits (256 gray levels) | |
| | NTSC color | |
| | 625-line Operation (512 scan line display) | |

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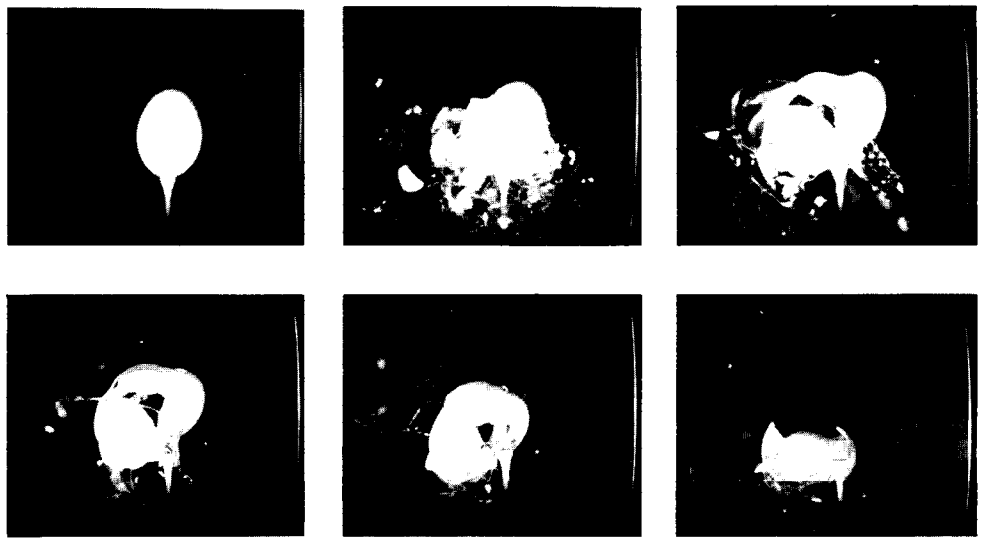
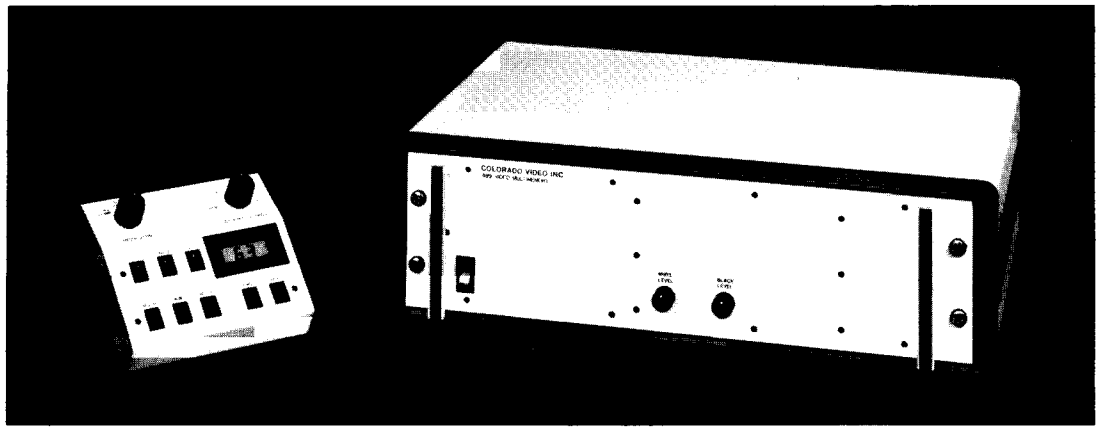
# video multimemory 499

## general description

The Video Multimemory Model 499 sequentially captures and reproduces a relatively large number of video images. Available for either 525 or 625 line TV systems, the 499 can be configured to store from 16 to 256 images depending on resolution and memory capacity. All images are 8 bit, providing 256 shades of gray. Individual images may be displayed by command, or all images may be automatically sequenced at normal rates or selected intervals of up to ten seconds. Both recording and playback rates may be controlled for "time lapse" effects.



**Sequential images captured with the Model 499.**



**The Model 499 occupies a 19" rackmount cabinet. A desk top controller selects various functions.**

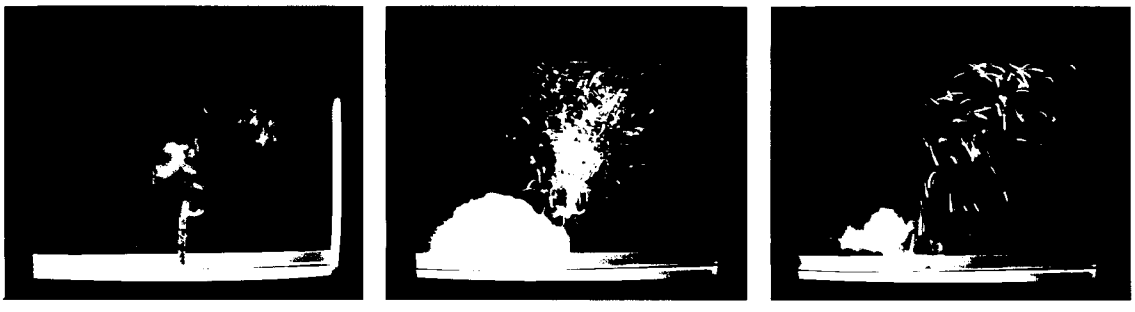
# specifications

| | | | |
|---|---|---|---|
| **Size:** | 499: | 3½" × 19" × 15" | |
| | 499-2: | 5¼" × 19" × 15" | |
| **Weight:** | 499: | 16 lbs. | |
| | 499-2: | 22 lbs. | |
| **Power:** | 100/115/230 VAC, 50/60 Hertz, single phase, 75 VA | | |
| **Construction:** | Card file | | |
| **Video In:** | Composite, 1 volt p-p, 75 ohms, 2/1 interlace | | |
| **Video Out:** | Composite, 1 volt p-p, 75 ohms, 2/1 interlace | | |
| **Connectors:** | Video: | BNC | |
| | Remote Control: | 25-Pin D, Female | |
| **Controls:** | Main Chassis: | Power On/Off | |
| | | Black Level | |
| | | White Level | |
| | Remote Control: | Record | |
| | | Run | |
| | | Forward/Reverse | |
| | | Loop | |
| | | Auto | |
| | | Reset | |
| | | Set/Recall | |
| | | Interval: 1 Frame, .1, .2, .5, 1, 2, 5, 10 sec. | |
| | | Resolution: Full Frame, Single Field, Low Resolution | |

| **Picture Storage:** | Model: | 499 | 499-2 |
|---|---|---|---|
| | Resolution: | | |
| | 512H × 512V | 16 | 64 |
| | 512H × 256V | 32 | 128 |
| | 256H × 256V | 64 | 256 |

**Option:** NTSC color with 512 × 512 or 512 × 256 resolution with some operating restrictions.

Digital I/O Interface Module 799



**Explosion sequence captured by the Model 499.**



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# monitoring memory 593

## general description

A continuing problem in video monitoring operations is the fact that a human can concentrate attention on a television screen for only a limited amount of time. In addition, the need to monitor multiple displays, performance of other duties, or various distractions may cause critical events to go unnoticed.

The Colorado Video Model 593 Monitoring Memory provides a unique solution to the problem of intermittent observation. This is accomplished by a patented method of making video "time exposures" that allow the system operator to review at a glance events that may have occured over seconds, minutes, or even hours.

The 593 is simply connected between the output of a television camera and the input of a video monitor. A simple pushbutton remote control allows the selection of "live" video or the time exposed image. Additional control functions allow the user to keep further information from being added to the 593 memory, or to erase all memory contents and start a new sequence.

## specifications

| | | |
|---|---|---|
| Size: | | 3 1/2" x 19" 15" |
| Weight: | | 16 lbs. |
| Mounting: | | Standard 19" rack |
| Power: | | 100/115/230 VAC, 50/60 Hertz, 75 VZ |
| Video Input: | | 1 volt p-p, 75 ohms, 2:1 interlace |
| Video Output: | | 1 volt p-p, 75 ohms, 2:1 interlace |
| Controls: | Front panel: | AC power<br>Frame/Field<br>White Level<br>Black Level<br>Interval - continuous /.5 second/1 second<br>Store Polarity - white/black |
| | Remote: | Live<br>Start<br>Stop |
| Operating characteristics: | | Resolution - full frame, 480 x 512 pixels<br>Gray scale - 8 bits (256 level)<br>"Shutter interval" 1/2 second or 1 second |
| Options: | | 625 line TV standard<br>NTSC color<br>Digital I/O |

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# video multimemory 599

## general description

The Model 599 Video Multimemory captures a transient event as seen by a video camera or other sensor providing a video output. Sixteen video frames are stored in random access memory with continuous updating in the form of a "loop."

On external command, a pulse from a motion detector for instance, the 599 will store eight additional frames and then switch to a playback mode with eight pre- and eight post-event images stored in memory. The operator may continuously play back the sixteen frame loop or may step through the loop one frame at a time for detailed examination.

Record and playback functions are remotely controllable using either a supplied remote control unit or a computer with an asynchronous RS-232 port. Frame interval is selected with a front panel control. Basic configuration and operation are determined by internal jumpers. 32 and 64 frame versions are also available. All Multimemories are available for monochrome or NTSC color video.

## specifications

| | | |
|---|---|---|
| Size: | 599, 599-2: 3½" x 19" x 15"<br>599-4: 5¼" x 19" x 15" | |
| Weight: | 599: 16 lbs.<br>599-2: 17 lbs.<br>599-4: 22 lbs. | |
| Power: | 115 VAC, 60 Hz, 75 VA (230 VAC, 50 Hz optional) | |
| Video In/Out: | Composite, 1 Vp-p, 75Ω, 2/1 interlace, BNC connector | |
| Alarm Input: | Contact closure or TTL pulse, screw terminal | |
| Controls: | Front Panel: | Power: On/Off<br>Video level<br>Black level (except on color versions)<br>Playback: Field/Frame<br>Record Interval: Frame/.1/.2/.5/1/2 sec.<br>Test (alarm) |
| | Remote Control: | Record<br>Play: Continuous<br>Play: Advance |

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Remote Control: Size: 2½" x 4½" x 3½" with ten foot cable
Connector: DB-25, female, RS-232 compatible

Indicators: Front Panel: Power

Remote Control: Record
Alarm
Cont. (play)
Advance (play)

Memory size: 599: 512 x 480 x 8 bit x 16 frames
599-2: 512 x 480 x 8 bit x 32 frames
599-4: 512 x 480 x 8 bit x 64 frames

Possible Configurations:

Loop Size: Jumper selected:
599: 4, 8, or 16 frames
599-2: 4, 8, 16, or 32 frames
599-4: 4, 8, 16, or 64 frames

Record Intervals: Front panel control:
Real time (30 frame/sec)
0.1 seconds
0.2 seconds
0.5 seconds
1.0 seconds
2.0 seconds

Frames After Alarm: Jumper selected:
599: 2, 4, 8, or 16
599-2: 2, 4, 8, 16, or 32
599-4: 2, 4, 8, 16, 32, or 64

Function after alarm: Jumper selected:
1. Display camera live.
2. Display first frame recorded.
3. Display frame where alarm occurred.
4. Continuous loop playback.

Playback modes: Selected with remote control or RS-232 port:
1. Continuous loop playback.
2. Single step through frames.

Playback display: Front panel switch:
1. Single field (eliminates flicker)
2. Full frame (higher vertical resolution)

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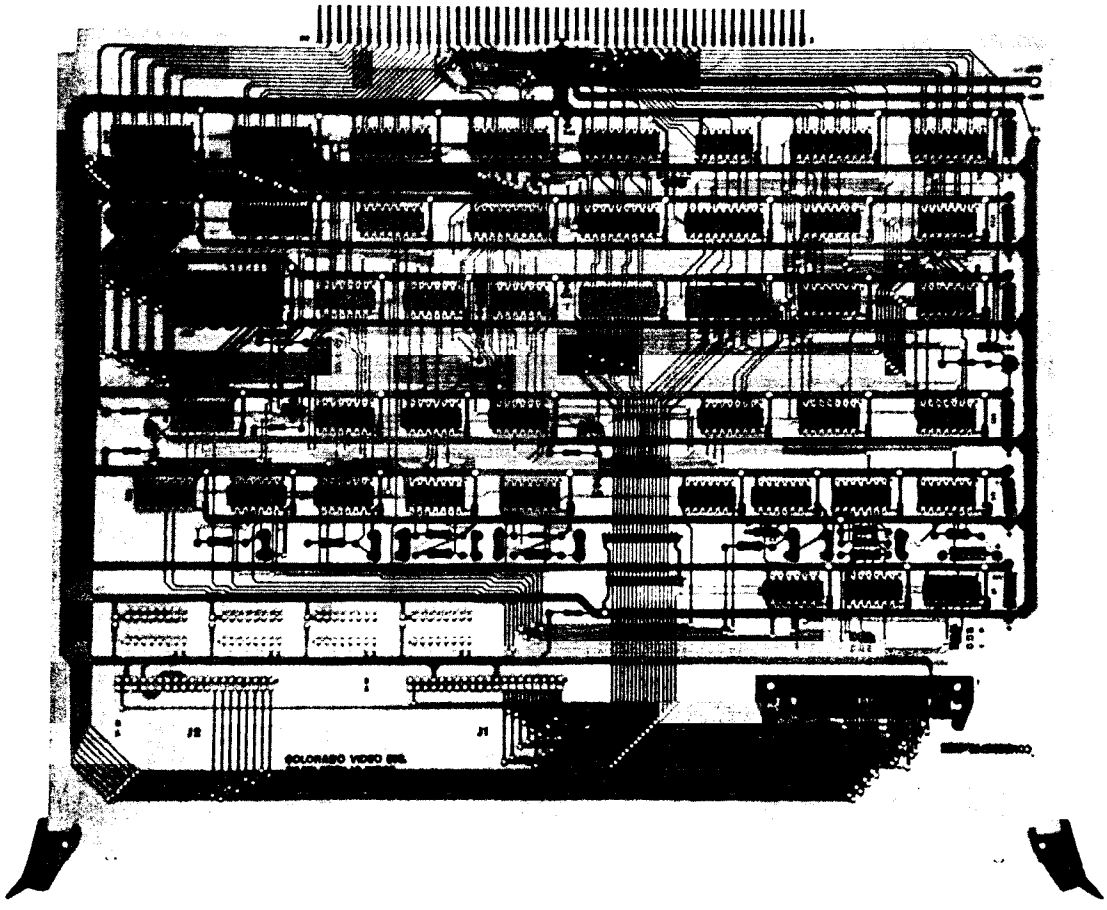
# direct memory access digital I/O module 793

## general description

The 793 DMA Digital I/O Module is intended for use with the Colorado Video 490 series of Frame Store products and the 286 and 290 series of Slow-Scan Transceivers. It allows the rapid transfer of data into or out of those video memory devices, as well as the functions of video frame "freeze", multiple memory selection, and slow-scan start and reset commands. A status output byte is also available to monitor the 793 operational status.

Data transfer rates up to 252,000 pixels per second are possible. Any desired portion of the stored raster, up to a full frame, may be transferred in one DMA burst.

The DMA Module plugs directly into any slot in the chassis of a 490, 286 or 290 series unit. It can be used with most computers which have a 16-bit parallel I/O capability. All signals are TTL compatible, and either "ground true" or "positive true" logic can be accommodated.



# specifications

| | |
|---|---|
| **Configuration:** | Plug-in printed wiring board |
| **Size:** | 12¾" x 10" |
| **Weight:** | 14 oz. |
| **Inputs:** | 15-bit input port with four functions:<br>Data transfer<br>Address load<br>Slow-Scan command<br>I/O & active command<br>Strobe: pulse (initiates selected function) |
| **Outputs:** | 8-bit output port with two functions:<br>Data out (for data read)<br>Status byte (returned on any command)<br>Status: ready/busy |
| **Frame Time:** | 1.05 seconds for full 512 x 512 frame, assuming a computer DMA rate of 252K words/second |
| **Connectors:** | General purpose output: 40-pin Berg<br>DEC DR11-W output: two 40-pin Bergs |

*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

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# direct memory access digital I/O module 799

## general description

The 799 DMA Digital I/O Module is intended for use with the Colorado Video 499 Video Multimemory. It allows the rapid transfer of data into or out of the video memory device, as well as the functions of video frame "freeze" and memory selection. A status output byte is also available to monitor the 799 operational status.

Data transfer rates up to 252,000 pixels per second are possible. Any desired portion of the stored raster, up to a full frame, may be transferred in one DMA burst.

The DMA Module plugs directly into any slot in the chassis of a 499 unit. It can be used with most computers which have a 16-bit parallel I/O capability. All signals are TTL compatible, and either "ground true" or "positive true" logic can be accommodated.

## specifications

| | |
|---|---|
| Configuration: | Plug-in printed wiring board |
| Size: | 12 3/4" X 10" |
| Weight: | 14 oz. |
| Inputs: | 15-bit input port with two functions<br>Data transfer<br>Address load<br>Strobe: pulse (initiates selected function) |
| Outputs: | 8-bit output port with two functions:<br>Data out (for data read)<br>Status byte (returned on any command)<br>Status: ready/busy |
| Frame Time: | 1.05 seconds for full 512 X 512 frame, assuming a computer DMA rate of 252K words/second |
| Connectors: | General purpose output: 40-pin Berg<br>DEC DR11-W output: two 40-pin Bergs |

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# video image storage system 941

## general description

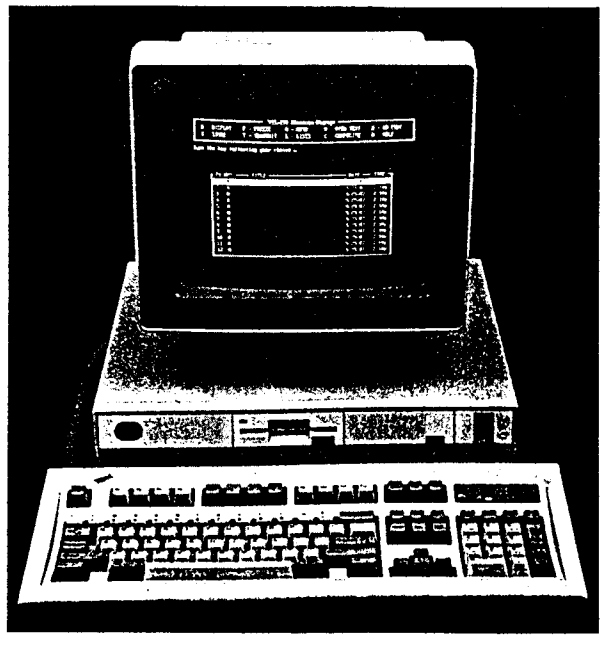
The Video Image Storage System consists of an IBM Personal System/2™ Model 30 computer with internal fixed disk, two special interface cards, cables and proprietary software. It is capable of storing and retrieving a large number of standard black and white or color television images. The 941 interfaces with one of several Colorado Video digital memory units for picture acquisition and display.

The 941 system is intended for applications where rapid access to any picture and long term preservation of information are important requirements. The computer permits the use of simple commands for storage and retrieval, and for keyboard entry of accompanying titles and text, as well as image analysis and transformation.

A 20 MByte internal disk is used to provide picture storage, while operating software is on a 3 1/2" diskette.

Software functions include:

1. Easy selection of operating modes.
2. Picture title and description listing by number.
3. Individual selection of a picture by its corresponding number, along with the ability to insert, edit or delete titles and descriptions.
4. Automatic display of a picture sequence.
5. Protection of selected pictures from accidental overwrite.
6. Picture size reduction for fast previewing (reproduced as a group of monochrome images on one screen).



IBM PS/2™ Model 30 computer control with typical menu

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# specifications

| | |
|---|---|
| **Size:** | System Unit: 16″ × 16″ × 4″; 19 lbs.<br>Keyboard: 2″ × 20″ × 9″; 6 lbs.<br>Monitor: 13″ × 13″ × 13″; 20 lbs. |
| **Power:** | 120 VAC, 60 Hertz, 1.5 amp |
| **Mounting:** | Tabletop |
| **Image Storage Capacity:** | 320 fields at 256 x 240 pixel resolution<br>160 fields at 512 x 240 pixel resolution<br>80 frames at 512 x 480 pixel resolution |
| **Access Time:** | 1-4 seconds to store or display, depending upon the video memory chosen. |
| **Options:** | 10 MByte removable cartridge disk<br>Custom Software |

**Companion Video Memory**
A Colorado Video video memory is required by the 941 system for picture storage and display. These items must be purchased separately. The presently available choices are:

240 VBI Transmitter
286 Digital Transceiver
290 Slow-Scan Transceiver
491 Video Frame Store
492 Video Subtractor
493 Video Peak Store
494 Video Scan Converter
495 Asynchronous Frame Store
497 Video Demultiplexer

Please consult separate data sheets for further information on the items above.

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# video compressor 262

## general description

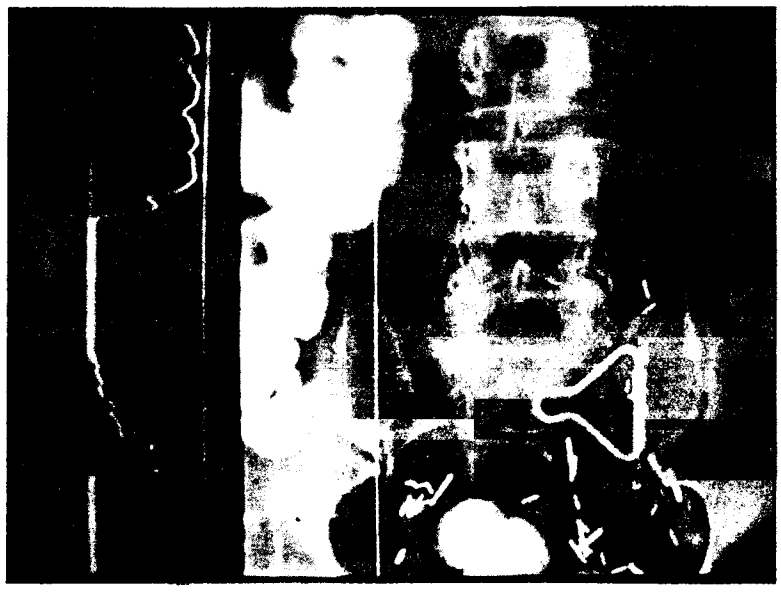
The Model 262 Video Compressor converts standard television signals to narrow bandwidths for transmission over voice-grade communications circuits. These include the normal "dial up" telephone network or dedicated leased telephone lines. The 262 does not have the capability of "freezing" a moving image (as does other Colorado Video equipment), only stationary objects may be transmitted. These typically include X-rays, ultrasound, CT and nuclear scans for remote medical diagnosis, oversized schematics like maps and blueprints, photographs, charts and architectural models or new product designs.

The time required to transmit an image is dependent upon the resolution level and the type of communications circuits utilized. A frame with a resolution of 256 × 480 visible picture elements takes 78 seconds to transmit by telephone; a 512 × 480 resolution takes 152 seconds. A companion device, like the Model 290R Receiver, is used at the receiving location to reconstruct the television image.

As a special set-up aid, the 262 produces a waveform display superimposed over the television image seen on the television monitor. This unique display allows optimum adjustment of video signal levels. It also helps in the assessment of picture composition and focus. As the image is being transmitted, a vertical cursor moves across the video monitor to show the degree of completion of image transmission.

Another feature of the 262 substantially reduces noise picked up in long distance transmissions. When activated, this circuit improves picture quality, and is used with receiving equipment which has matching capability. If it is necessary to communicate with Colorado Video receivers which do not have this feature, the circuit may be turned off.

The 262 may be connected directly to some CT scanners. Transmission may be recorded on conventional audio tapes or cassettes for later playback. Options to the 262 include operation from 625-line video input sources.



# specifications

**Size:** 6" x 17" x 14" **Weight:** 12 lbs.

**Mounting:** Tabletop or 19" rack

**Power:** 100/115/230/VAC, 50/60 Hertz, single phase, 10 VA

**Input:** Composite video; 1 volt p-p, 75 ohms (2:1 interlace)

**Outputs:** Slow scan video; (modulated carrier) 2 volts p-p, 600 ohms; 1500 to 2400 Hertz

Composite video; 1 volt p-p, 75 ohms, white positive (for waveform monitoring)

**Controls:**

| Front: | Back: |
|---|---|
| Video Level | Output Level |
| Black Level | Pre-Emphasis: On/Off |
| Scan Start | Video In |
| Scan Stop | Video Out |
| Fast/Slow | Slow Scan Out |
| Analyze | |
| AC Power: On/Off | |

**Connectors:** BNC
5 Pin Amphenol

**Signal Format:**

Video: A frequency modulated audio tone with sync tips at 1500 Hertz, and peak white at 2400 Hertz. Slow scan TV information content has a baseband of approximately 1000 Hertz, and is preceded by an 800 Hertz frame start burst.

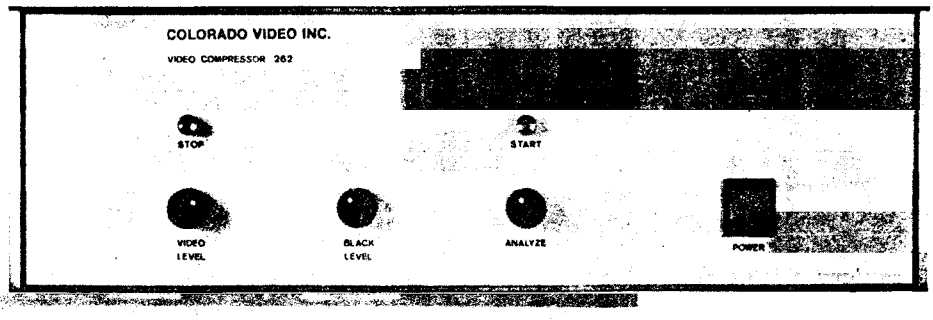
Line: Scans vertically, top to bottom, at a rate of approximately 6.6 lines per second. Each line is composed of sampled data with 240 picture elements (US) or 256 elements (625-line systems). Line blanking and sync are identical. However, two different widths are used to identify the field from which data is taken. Typical sync/blanking intervals are equivalent to 1 and 2 fields of the wide band video input signal. Adjacent slow scan lines are "dot-interlaced" due to the 2:1 characteristic of a normal video input signal. This gives improved subjective picture quality for a fixed number of pixels.

Frame: Scans horizontally from left to right at a rate of approximately 35 seconds (256 x 240 elements) or 78 seconds (256 x 480 elements). 625-line, 50 Hertz systems take 42 and 94 seconds.

**Performance:**

| | |
|---|---|
| Conversion Amplitude Linearity: | Less than 3% distortion (Continuous Gray Scale) |
| Conversion Signal to Noise Ratio: | 40 db, unweighted |
| Conversion Sampling Aperture: | Nominally 50 nanoseconds |
| Horizontal Scanning Linearity: | 1% |

*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*



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# video digitizer 270A

## general description

The Model 270A Video Digitizer converts standard television signals into digital data for computer processing. It does not require special cameras or monitors but will work with any source of standard, 2:1 interlace, composite video signals. Any point in the raster may be selected for encoding by means of a bit-parallel, word-serial address input register.

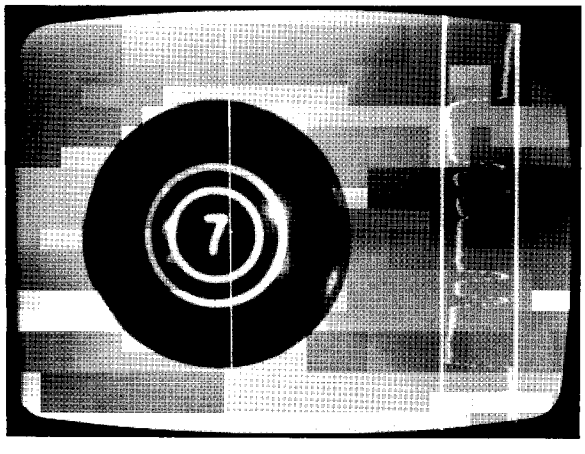
The Model 270A also incorporates a display video output which allows the user to observe the scene being processed and to monitor the encoding process on a standard television monitor. Location of the point being encoded is indicated on this display by a cursor, and a waveform indicating the brightness profile is displayed at the side of the monitor screen. This feature, together with a setup mode, allows quick and accurate setting of grayscale levels without the use of auxiliary equipment.

Another unique feature of the Model 270A is a Z modulation output capability. In this mode, the unit accepts an 8-bit binary word which modulates the intensity of a spot on a television monitor at any selected X, Y position. A photographic time exposure can then be used to produce a hard copy data readout.

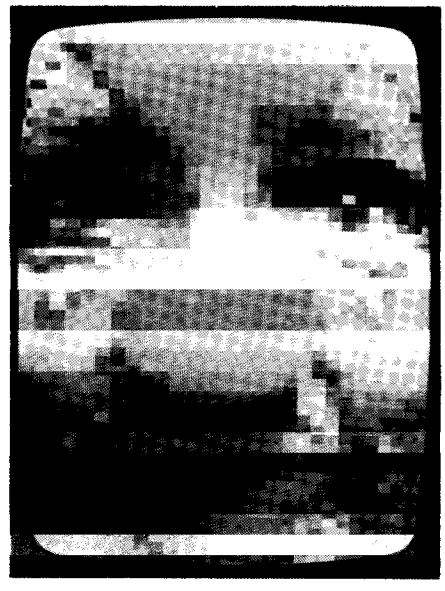
The Model 270A can be easily interfaced with most computers or other digital processing equipment. A single, 16-bit duplex I/O module is all that is required for interfacing to modern minicomputers. All digital signals to or from the unit are buffered and are TTL/DTL compatible. Either Positive True or Ground True logic can be utilized.

The Model 270A is available in three configurations:

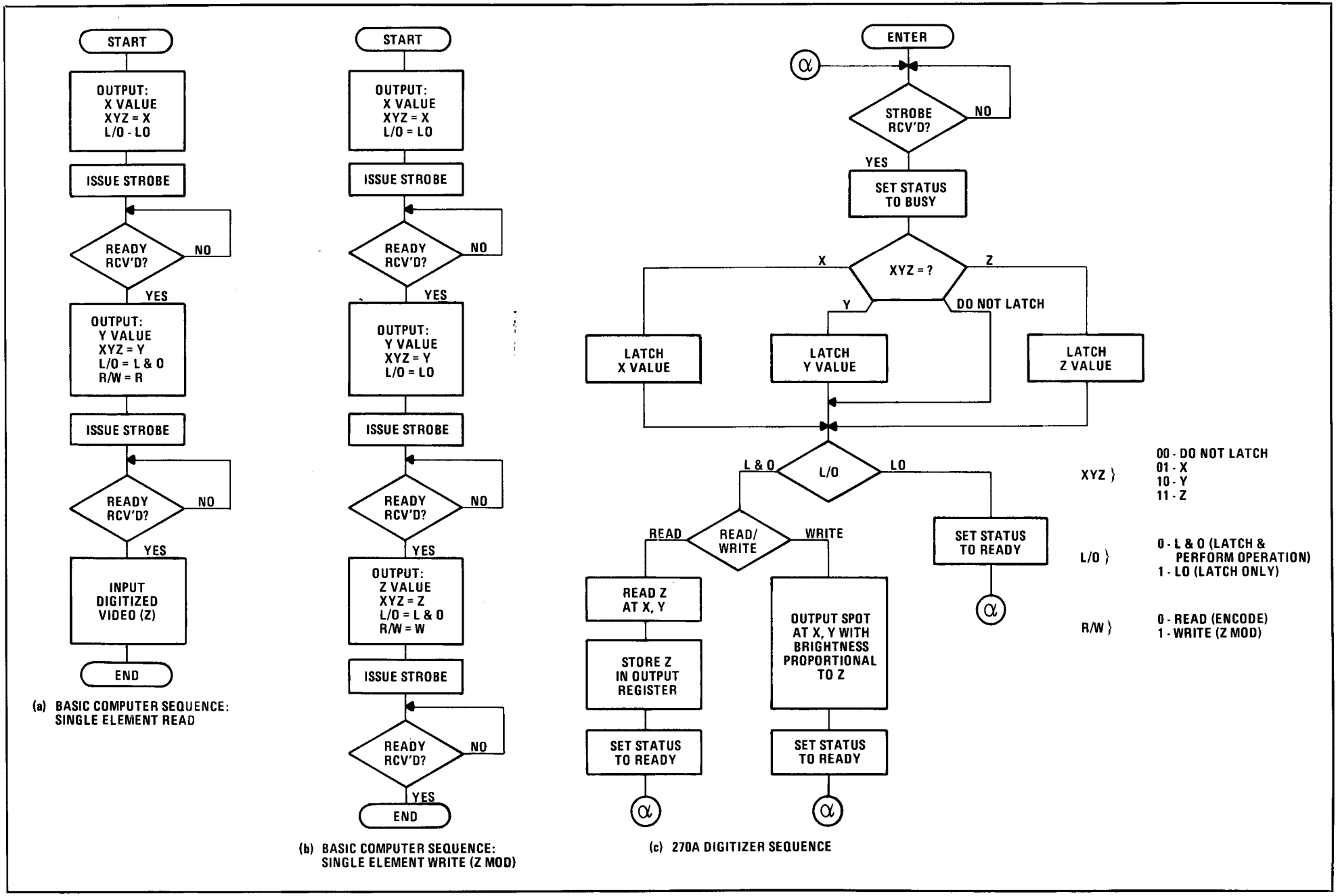
| | | |
|---|---|---|
| 270A | 512 x 480 | Picture Elements |
| 270A-1 | 2,048 x 480 | " " |
| 270A-2 | 1,024 x 950 | " " |



270A MONITOR DISPLAY WITH CURSOR



270A RECONSTRUCTION OF DIGITIZED IMAGE USING Z MOD OUTPUT AND BLOCK PIX PROGRAMMING




**SIMPLIFIED COMPUTER - 270A FLOW DIAGRAMS**

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# video transceivers 290 and 290c

## general description

The Models 290 and 290C (C=color) are designed to provide narrowband video communications over standard voice grade telephone circuits. Three basic functions are provided:

1. A "frame freeze" capability which captures a single image that may be assessed for quality before transmission;

2. Conversion of the frozen picture to a slow-scan television signal suitable for transmission over audio channels;

3. Reception of slow-scan TV signals and reconversion to a still image on a normal TV monitor.

In the transmission mode, the 290 accepts a standard television input signal (the 290C accepts an NTSC color input signal) which is digitized on command and fed to a solid state digital memory. The output of the memory is then displayed on a TV monitor (a color monitor, when using the 290C) which indicates the exact quality of the image to be transmitted. Once a transmit command is given, the memory is read out slowly from left to right, with a white cursor on the TV monitor screen showing the degree of picture completion. Sending speeds are dependent upon resolution; see charts under "specifications."

In the receiving mode, the 290 accepts properly formatted slow-scan TV input signals and reconstructs a conventional TV still picture, using the same memory which provided frame freeze for transmission. With a second memory, the 290 and 290C can both be configured so that the image is not displayed until it has been completely received. A noise-reducing modulation scheme has been added to provide better picture quality for long distance or international communications and can be switched in order to be compatible with older units. Image retention is indefinite unless deliberately erased or power to the unit is lost.

A multiple memory option allows three memory boards to be added to the standard single memory, for a maximum of four. Further memory capability can be added with a Model 940 Video Image Storage System. Computer I/O, portable units and many other options are also available.

Features of the Models 290 and 290C include:

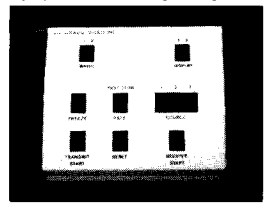
- Portability
- Multipoint operation
- Operation in moving environments
- Real time monitoring of A/D operation
- Remote control (infrared or hard-wired)
- Auto switching between receive and transmit
- Plug-in circuit cards for simplified maintenance
- "Gen-lock" to other video sources for systems operation

Feature of the Model 290C:

- Tested as compatible with AT&T Communications' ALLIANCE 2000® Teleconferencing Services, an audiographic bridge which can link multiple sites.

# specifications

| | | |
|---|---|---|
| **Size:** | Main Chassis: | 3½" x 19" x 15" single memory<br>5¼" x 19" x 15" multiple memories |
| | Remote Control: | 2½" x 7½" x 6" (hard-wired configuration) |
| **Weight:** | 16 lbs. (single memory transceiver) | |
| **Mounting:** | Standard 19" rack or tabletop | |
| **Construction:** | Card file | |
| **Power:** | 100/115/220 VAC, 50/60 Hertz, single phase, 75 VA (single memory transceiver) | |
| **Inputs:** | Data: | Slow-scan video: FM modulated carrier: 100 millivolts minimum level, 600 ohms, balanced |
| | Video: | Composite video (composite NTSC video for 290C): 1 volt p-p, 75 ohms, 2:1 interlace |
| **Outputs:** | Video: | Composite video: 1 volt p-p, 75 ohms, 2:1 interlace (NTSC-like format for 290C) |
| | Data: | Slow-scan video: FM modulated carrier: 1500 to 2400 Hertz, 0 to 2 volts p-p internally adjustable, 600 ohms, balanced |
| **Controls:** | Remote Control (hard-wired): | Video Source: 1-2-3<br>Transmit Start<br>Freeze<br>Reset<br>Manual Receive Start<br>Rate: Slow/Fast (except the 290C with 512 x 240 x 6 resolution) |
| | Main Chassis: | AC Power<br>Single/Continuous Transmission<br>White Level<br>Black Level (290 only) |
| **Indicators:** | Remote Control: | Source: 1-2-3<br>Rate: Slow/Fast<br>Transmit Start<br>Receive Start |
| | Main Chassis: | Scan<br>Black Level<br>White Level<br>Power |
| **Connectors:** | Video:<br>Remote Control:<br>Phone Line:<br>Telephone Set: | BNC<br>15-pin "D"<br>RJ11C Modular Phone Jack<br>RJ11C Modular Phone Jack |



| | | |
|---|---|---|
| **Performance:** | 290 Resolution (switchable): | Slow speed: 256 x 480 picture elements, dot interlace; TV test chart resolution is 270 lines |
| | | Fast speed: 256 x 240 picture elements; repeats same data in both fields; TV test chart resolution is 135 lines |
| | 290C Resolution: | 512 x 240 picture elements; single field, 74 second transmission time. For other frame times, see accompanying chart. |
| | Grayscale: | 6-bits (64 gray levels) |

**Options:**

Receive only
Transmit only
Computer I/O
Multiple memories
512 x 480 pixel resolution
625-line operation (290 only)
Handheld infrared remote control
8-bit grayscale (256 gray levels)
Shipping case
Leather briefcase or molded suitcase
10 kHz transmission bandwidth (8½ second transmission)

## TRANSMISSION TIME CHARTS

| Resolution and Gray Level | Transmission Time | |
|---|---|---|
| | 525 Line | 625 Line |
| MODEL 290 | | |
| 256 x 240 x 6 | 35 seconds | 42 seconds |
| 256 x 480 x 6 or 8 | 76 seconds | 91 seconds |
| 512 x 480 x 6 or 8 | 152 seconds | 182 seconds |
| MODEL 290C | | |
| 512 x 240 x 6 or 8 | 72 seconds | not available |
| 512 x 480 x 6 or 8 | 152 seconds | not available |

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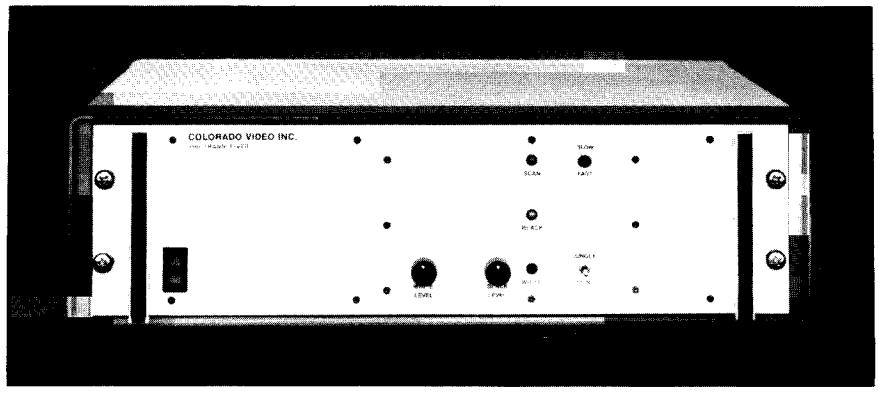
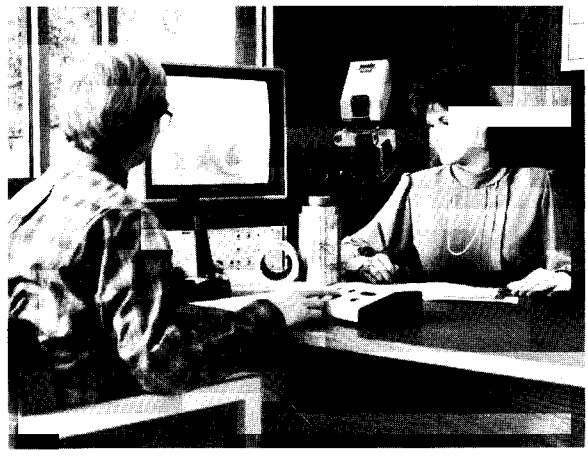
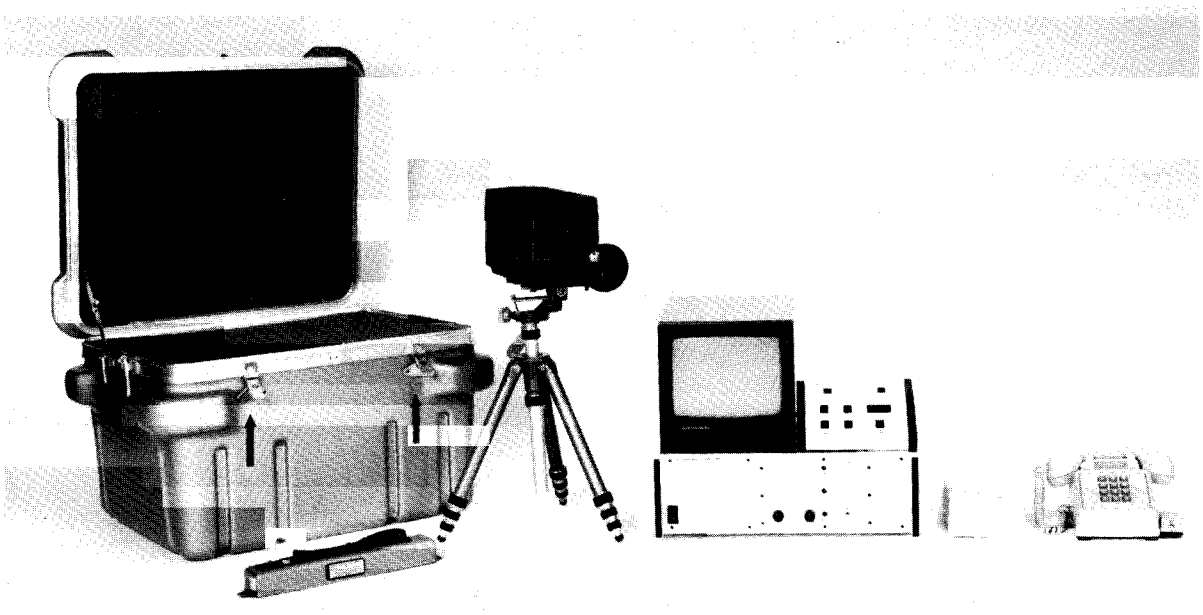



MODEL 290 5¼" CHASSIS MULTIPLE MEMORY CONFIGURATION

# configurations



The 290 is available in a variety of configurations and can be used for many different applications. With its own shipping case, a 290 system can be easily transported. Portable receivers allow home or office use. Systems can be integrated into a formal teleconferencing room or set up wherever they are needed.



## COLORADO VIDEO INC.

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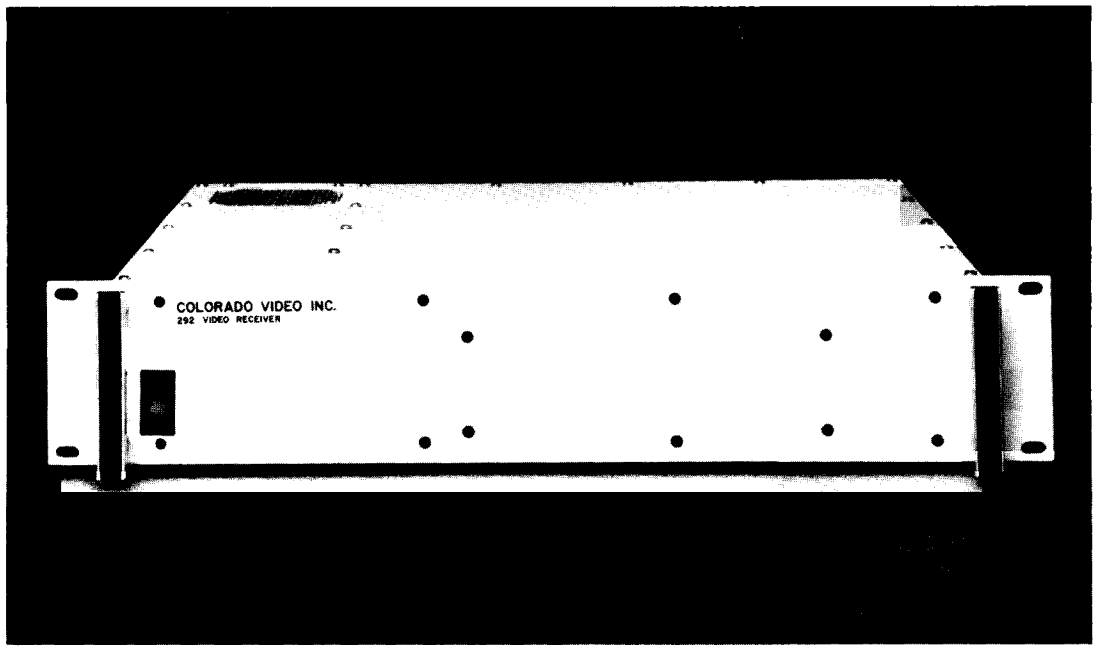
# subtracting receiver 292

## general description

The Model 292 receives images via voice grade telephone circuits, compares them to a reference image, and displays any difference. It is useful for remote surveillance or other applications where differences between two remote images can be used for decision making or process control.

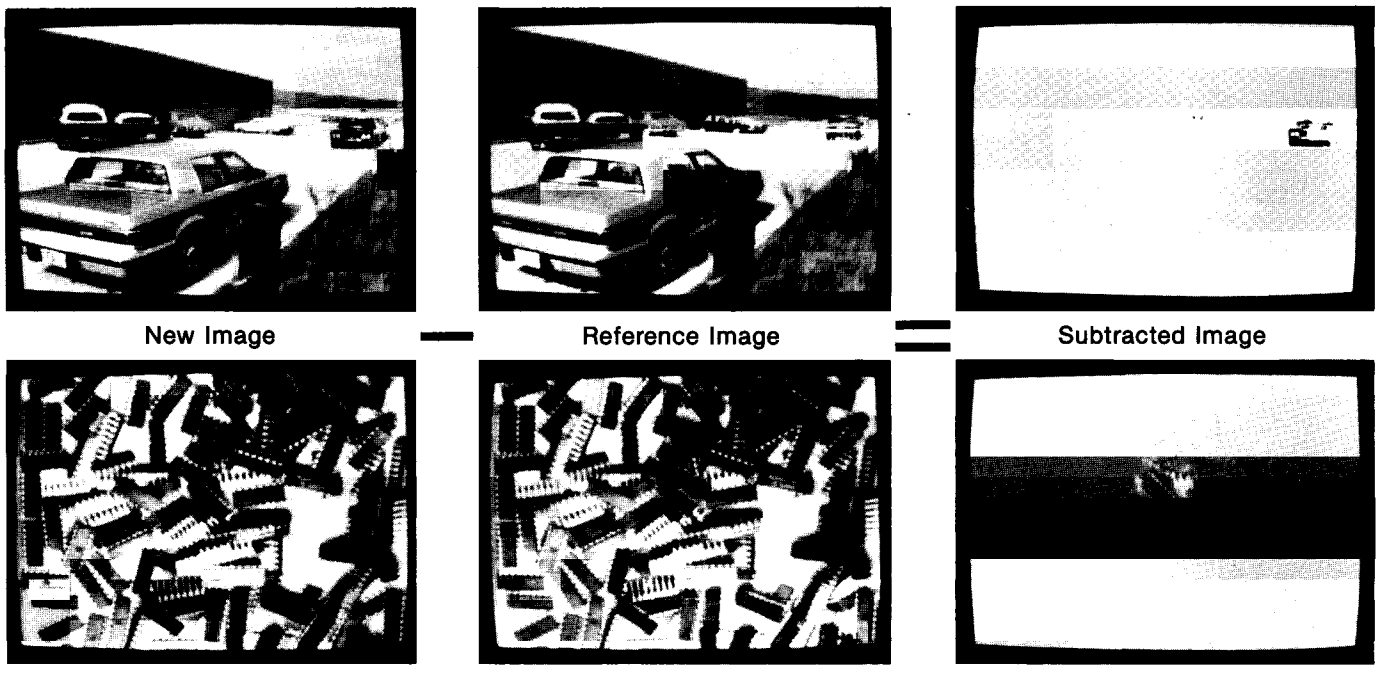
In operation, the 292 uses slow-scan television signals (transmitted by Colorado Video Model 250 or 290) to reconstruct conventional TV still images. The first image received, after power-up or operation of the "Renew Ref" control, is digitized and stored in the reference memory of the Model 292. Subsequent images are stored in the "new" memory. The reference memory contents are then subtracted from the new memory contents. The resulting difference, reference, or new images may be selected with the remote control unit for viewing on a conventional TV monitor.



# specifications

| | | |
|---|---|---|
| **Size:** | 3½" x 19" x 15" | |
| **Weight:** | 17 lbs. | |
| **Mounting:** | Standard 19" rack or tabletop | |
| **Power:** | 115 VAC, 60 Hz, single phase, 75 VA | |
| **Output:** | Composite Video; 1 Volt p-p, 75 ohms, 2:1 interlace | |
| **Controls:** | Power with Indicator | |
| **Remote Controls:** | Renew Reference | |
| | Display: | Reference<br>New<br>Difference |
| **Connectors:** | Video Out: | BNC |
| | Phone Line: | 5-pin Amphenol and RJ-11 |
| | Telephone Set: | RJ-11 |
| | Remote Control: | 15-pin "D" |
| **Resolution:** | 256×256×6-bit picture elements | |
| **Options:** | 256×480, 512×240, 512×480 pixel resolution<br>8-bit grayscale<br>220 VAC, 50 Hz power<br>625-line operation | |

11/89 *Specifications subject to change without notice*




Changes in an image are not always obvious. In each sequence, the 292 stored a reference image. As the 292 received an additional image, the reference image was subtracted from it, yielding a difference image.

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# Video transmitter 293

## general description

The Colorado Video Model 293 is specifically designed for both security and data remoting applications where conventional "freeze-frame" television equipment is unsuited because of the relatively long "dead" time between image capture and a new image transmission.

Using a unique, proprietary memory, the Model 293 accumulates visual information over a period of time before or during transmission, thus presenting the viewer at a remote location with a history of events occurring at the transmission site. In security applications, this provides a graphic simultaneous display of intrusions or other events.

The Model 293 not only solves the basic problem of serious information gaps with ordinary freeze-frame or slow-scan systems, but has the advantages over "real time" television of showing relationships over a period of time as well as providing a unique form of scan-conversion of radar or other non-television forms of visual information.

The Model 293 accepts standard 525 line television signals (alternately 625 line if specified) and generates a slow-scan television signal suitable for transmission over voice grade telephone lines. Receiving equipment may be any of several Colorado Video units such as the Models 250 or 290. Computer storage and retrieval of a large number of received images may also be implemented by a combination of the Colorado Video Model 290 and the 941 Image Storage System.

The Model 293 is completely solid state, and is available in various resolution configurations such as 256×240, 256×480, or 512×480 pixels. Installation is simple, and various options are available.


Three "time exposures" showing applications of weather monitoring, intrusion detection, and radar conversion.

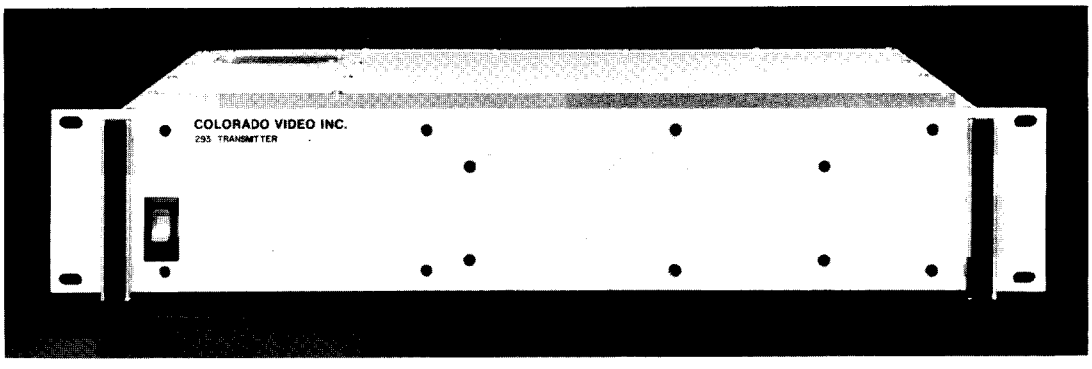
# specifications

| | | |
|---|---|---|
| **Size:** | 3½"×19"×15" | |
| **Weight:** | 16 lbs. | |
| **Mounting:** | Standard 19" rack or tabletop | |
| **Construction:** | Card file | |
| **Power:** | 100/115/220 VAC, 50/60 Hertz, single phase, 75VA | |
| **Input** | Video: | Composite video: 1 volt p-p, 75 ohms, 2:1 interlace |
| **Output** | Video: | Composite video: 1 volt p-p, 75 ohms, 2:1 interlace |
| | Data: | Slow-scan video: FM modulated carrier: 1500 to 2400 Hertz, 0 to 2 volts p-p internally adjustable, 600 ohms, balanced |
| **Control:** | AC Power | |
| **Indicator:** | Power | |
| **Connectors:** | Video: | BNC |
| | Phone Line: | RJ-11 or Phone Jack |
| **Options:** | 256×240, 256×480 or 512×480 pixel resolution<br>6-bit (64 gray levels) or 8-bit (256 gray levels) grayscale<br>Multiple memories<br>625-line operation<br>10 kHz transmission bandwidth (8 1/2 second transmission for 256×480 memory) | |

TRANSMISSION TIME CHART

| Resolution and Gray Level | Transmission Time | |
|---|---|---|
| | 525 Line | 625 Line |
| 256×240×6 | 35 seconds | 42 seconds |
| 256×480×6 or 8 | 76 seconds | 91 seconds |
| 512×480×6 or 8 | 152 seconds | 182 seconds |

***Specifications subject to change without notice***



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# digital transceiver 286

## general description

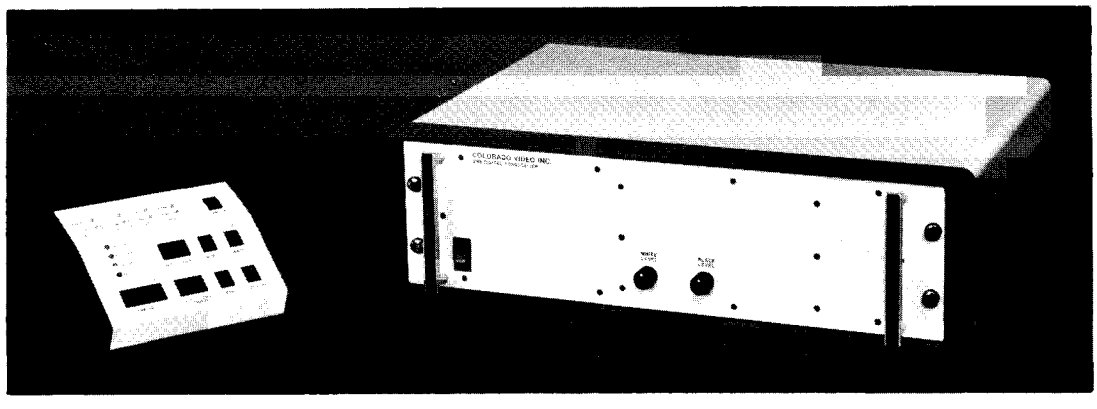
The Model 286 Digital Transceiver is a compact, exceptionally versatile systems oriented device which can transmit and receive still video images over narrowband communications channels. Color or black and white images can be transmitted at synchronous bit rates of up to 500 kilobits/second. The transmission rate is determined by the modem selected which, in turn, depends on the type of channel available. The 286 can be ordered with either a RS-232/V.24 or a V.35 serial interface, and is compatible with the earlier Colorado Video Models 285 and 285C Transceivers.

At the transmit site, a single field or frame from a TV camera is "frozen" in the 286 digital memory. When the operator is satisfied with the stored picture, he initiates the transmission over an established communication channel. The picture can be scanned from left to right or top to bottom.

At the receive location, the picture is automatically received, stored in memory, and displayed on a standard TV monitor. It may also be recorded on a video tape recorder or sent to a video hard copy unit.

The 286 is available in both color and black and white versions, and with single or multiple memories. It is also available in Transmit Only and Receive Only models. An optional computer I/O port can be used to connect to an external computer for mass storage or image processing. Colorado Video also manufactures the 941 Image Storage System for use with the Model 286.

An easy-to-use remote control is supplied with each unit, and is available in both simplified and full-feature versions. Video sources that can be used with the 286 include cameras, VCRs, and video laser disks. Color inputs from VCRs must be time-base corrected.



MODEL 286 WITH MULTI-FEATURE REMOTE CONTROL.

# specifications

| | Main Chassis: | Remote Control: |
|---|---|---|
| **Size:** | 3½" x 19" x 15"<br>(Single memory units)<br>or<br>5¼" x 19" x 15"<br>(Multi-memory units or units with internal modem) | 2½" x 7½" x 6" |
| **Weight:** | 16 lbs. (Single memory)<br>20-22 lbs. (Multi-memory units or units with internal modem) | 3 lbs. |
| **Mounting:** | Standard 19" rack or tabletop | Tabletop |
| **Construction:** | Plug-in cards | Box with cable |

**Power:** 100/115/230 VAC, 50/60 Hertz

| | |
|---|---|
| One memory: | 90W |
| Two memories: | 110W |
| Internal Modem: | +20W |

**Inputs:**

Video: Color Units: NTSC video from camera or other stable source such as time-base corrector.

B&W units: RS-170 525-line US Std or 625-line European Std. Source can be camera, VCR, optical disk, etc.

Modem:
- Transmit Clock
- Receive Clock
- Received Data
- Carrier Detect
- Data Set Ready
- Clear To Send

**Outputs:**

Video:
- Memory Video, 1V p-p, 75 ohms
- Preview Video, 1V p-p, 75 ohms

Modem:
- Transmitted Data
- Request To Send
- Data Terminal Ready
- Signal Rate Select

**Controls:**

Main Chassis:
- Power: On/Off
- Black Level (B&W units only)
- White Level

Remote:

Simplified:
- Send (Holding down button freezes picture, releasing button sends picture)

Full Feature:
- Camera: 1/2/3
- Freeze: Lock/Once
- Hold
- Pause
- Reset
- Send

| | | |
|---|---|---|
| **Controls:** (contd.) | | Scan: Vertical/Horizontal<br>Mode: Single/Continuous<br>Speed: Fast/Slow (Full Frame Units)<br>Gray scale: Fine/Normal (8-bit Units)<br>Receive Start<br>Write: 1/2 (Dual Memory Units)<br>Display: 1/2 (Dual Memory Units)<br>Modem: Norm/Fallback (Int. Modem) |
| **Indicators:** | Main Chassis: | Power On |
| | Remote: | Simplified:<br>Sending<br>Receiving<br><br>Full-Feature:<br>Sending<br>Receiving<br>Pause<br>Hold<br>Camera: 1/2/3<br>Freeze: Lock<br>Gray scale: Fine/Norm<br>Scan: Vertical/Horizontal<br>Speed: Fast/Slow<br>Mode: Single/Continuous<br>Write: 1/2 (Dual Memory Units)<br>Display: 1/2 (Dual Memory Units)<br>Modem: Norm/Fallback (Int. Modem) |
| **Connectors:** | Video: | BNC |
| | Remote Control: | 24-Pin Blue Ribbon |
| | External Modem: | RS-232/V.24: 25-Pin D<br>V.35: 34-Pin V.35 |

**Performance:**

Resolution: Depends on memory size. See Tables

Grayscale: 6-bit (64 level) standard

Scan Times: See Tables

Compatible with Colorado Video Models 285 & 285C Digital Transceivers

**Options:**

8-bit Grayscale
Multiple Memory Planes

Modem Interface Module:
- RS-232/V.24
- V.35
- RS-422—Special Order
- MIL-STD 188C—Special Order

793 Computer I/O Module
941 Image Storage System
Custom Remote Control Special Order

| NTSC COLOR SCAN TIME IN SECONDS | | | | |
|---|---|---|---|---|
| Clock Rate (Bits/Second) | Memory Configuration | | | |
| | Single Field 512 x 240 | | Full Frame 512 x 480 | |
| | 6-Bit | 8-Bit | 6-Bit | 8-Bit |
| 4800 | 166 | 221 | 330 | 439 |
| 9600 | 83 | 111 | 165 | 220 |
| 56 K | 14 | 19 | 28 | 38 |
| 200 K | 4.0 | 5.3 | 7.9 | 10.5 |
| 500 K | 1.6 | 2.1 | 3.2 | 4.2 |

| 525-LINE BLACK & WHITE SCAN TIME IN SECONDS | | | | |
|---|---|---|---|---|
| Clock Rate (Bits/Second) | Memory Configuration | | | |
| | Single Field 256 x 240 | | Full Frame 256 x 480 | |
| | 6-Bit | 8-Bit | 6-Bit | 8-Bit |
| 4800 | 78 | 104 | 155 | 206 |
| 9600 | 39 | 52 | 77 | 103 |
| 56 K | 6.7 | 8.9 | 13 | 18 |
| 500 K | .75 | 1.0 | 1.5 | 2.0 |

| 625-LINE BLACK & WHITE SCAN TIMES IN SECONDS | | | | |
|---|---|---|---|---|
| Clock Rate (Bits/Second) | Memory Configuration | | | |
| | Single Field 256 x 256 | | Full Frame 256 x 512 | |
| | 6-Bit | 8-Bit | 6-Bit | 8-Bit |
| 4800 | 83 | 111 | 165 | 220 |
| 9600 | 41 | 55 | 82 | 110 |
| 48 K | 8.3 | 11.0 | 16.5 | 22 |
| 64 K | 6.1 | 8.3 | 12.2 | 16.6 |
| 500 K | .8 | 1.1 | 1.6 | 2.1 |

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# digital image communications system 951

## general description

The Model 951 Digital Image Communications System combines an IBM Personal System/2™ Model 30 computer and a Colorado Video Model 491 Video Frame Store to provide an efficient means of high quality transmission and reception of still video images over ordinary telephone lines.

The standard version of the 951 displays NTSC color or monochrome pictures with up to 256 shades of gray. It contains an internal 20 megabyte fixed disk for rapid storage and retrieval of up to 80 full-frame images. This feature facilitates the advance preparation of images for transmission to receiving locations. In addition, stored images are easily titled and annotated, with this information being transmitted at the same time as the associated picture.

The 951 system is controlled from the keyboard using easy-to-understand menus. Communications software is DOS-based, and the computer may be readily used with other conventional software such as word processing and spreadsheet analysis programs. System upgrading and improvements can be conveniently made with the simple replacement of a floppy disk. Current software includes a data compression program that may be accessed by a single key stroke, allowing images to be sent 3 to 4 times more rapidly than a non-compressed picture.

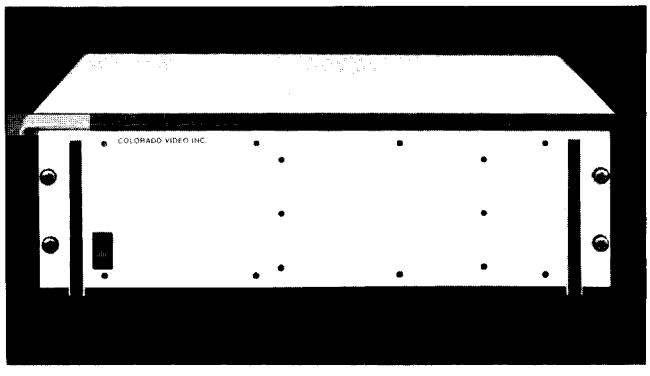
To minimize system complexity, the 951 incorporates an efficient 9600 bit per second modem in the Model 491 chassis. This modem will operate through standard audio bridges and allows simultaneous networking between three or more locations.

Standard video components may be used with the 951 system. These include NTSC or monochrome television cameras, monitors, large screen projectors, video tape recorders or hard copy printers. The 951 is also available with additional video memories for simultaneous side-by-side monitor display of up to four different images, a feature particularly useful in conference rooms.

- ★ Full color NTSC pictures or optional RGB
- ★ IBM PS/2™ Model 30 computer with 20 megabyte storage
- ★ Standard Keyboard operation with floppy disk programming
- ★ Data compression or high quality image transmission
- ★ Networking with three or more locations
- ★ Text transmission of information on computer screen

# specifications

| | |
|---|---|
| **Computer:** | IBM Personal System/2™ Model 30 with 20 MByte fixed disk and 1 MByte floppy disk |
| **Video Memory:** | Colorado Video Model 491 (one to four synchronized memory planes, 512 x 480 x 8-bit, monochrome or NTSC color) |
| **Power:** | 115/230 VAC, 50/60 Hertz, single phase |
| **Video Input:** | Composite, 1 volt p-p, 75 ohms, 2:1 interlace |
| **Video Output(s):** | Composite, 1 volt p-p, 75 ohms, 2:1 interlace |
| **Controls:** | Computer keyboard; Video level |
| **Options:** | 10 MByte removable cartridge disk<br>Custom software |




Colorado Video Model 491 Video Frame Store

IBM Personal System/2™ with typical menu



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# VBI video transmitter 240

## general description

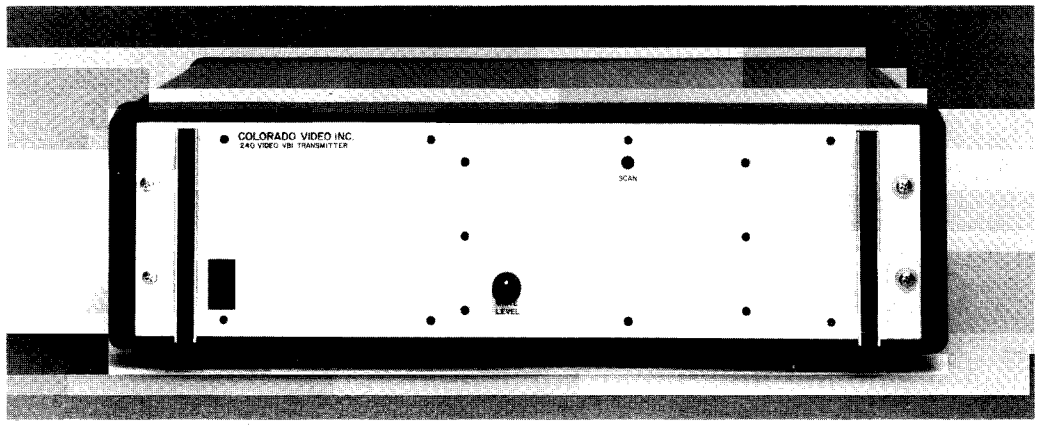
The Model 240 is an instrument designed to transmit still video images during the vertical blanking interval (VBI) of a standard television signal. Using only one line of information per field, an NTSC-like color image may be sent in approximately eight seconds.

Operationally, the Model 240 accepts a standard NTSC or monochrome video signal which may be "frozen" into either of two solid state video memories. An internal video switch allows the selection of two independent video cameras or sources. On operator command, the contents of either memory are converted to a format compatible with vertical interval transmission for input to a conventional VBI multiplexer. Selective addressing codes are used at the beginning of each picture to allow the use of two simultaneous displays at a receiving location.

The 240 can be internally switched to insert the transmit signal onto any line presently approved by the FCC. It is not necessary to synchronize the video inputs of the 240 transmitter to the station video. The transmit memories have simultaneous video outputs so that the same images are displayed at both receive and transmit locations. A remote control provides information about the status of the current memory contents, control of the transmission, and capability to freeze new pictures.

System options which are available include:

- Colorado Video Model 941 Mass Storage System. The 941 allows video images, frozen by the 240, to be digitally stored on a hard disc utilizing an IBM/PS/2™ computer. The images can then be recalled for transmission.
- Up to a total of four memories are available.
- The 240 can be configured to address different receive locations for selective distribution of images.



# 240 specifications

| | | |
|---|---|---|
| **Size:** | 5¼" 19" x 15" | |
| **Weight:** | 16 lbs. | |
| **Power:** | 100/115/220 VAC, 50/60 Hertz, single phase, 75 watts | |
| **Mounting:** | Standard 19" rack | |
| **Inputs:** | 2 - source videos: 1 volt p-p, 75 ohms<br>1 - station video: 1 volt p-p, 75 ohms | |
| **Outputs:** | Display video, 1 volt p-p, 75 ohms (Memory #1)<br>Display video, 1 volt p-p, 75 ohms (Memory #2)<br>Insert video, 1 volt p-p, 75 ohms (black video with insert line added) | |
| **Connectors:** | Video:<br>Remote Control: | BNC<br>15-pin "D" |
| **Controls:** | Main Chassis:<br><br>Remote Control:<br><br><br><br>Indicators: | AC Power<br>Video level<br>Store picture #1<br>Store picture #2<br>Send picture #1<br>Send picture #2<br>Input 1/2<br>Power On<br>Scan |
| **Performance:** | Resolution:<br>Transmission Time:<br>Grayscale:<br>Insert Line: | 512 x 240 picture elements, single field<br>8 seconds<br>8-bit (256 gray levels)<br>Switchable |
| **Options:** | Multiple memories<br>Full frame<br>Computer I/O<br>Receiver select | |

*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

# VBI video receiver 241

## general description

The Model 241 is a special form of video scan converter intended to receive still television images that have been transmitted in the vertical blanking interval of a conventional "real-time" television signal. The 241 detects one line of uniquely formatted video in each field of the host signal and reconstructs a single field video image in approximately eight seconds. Images may be monochrome or NTSC-like color.

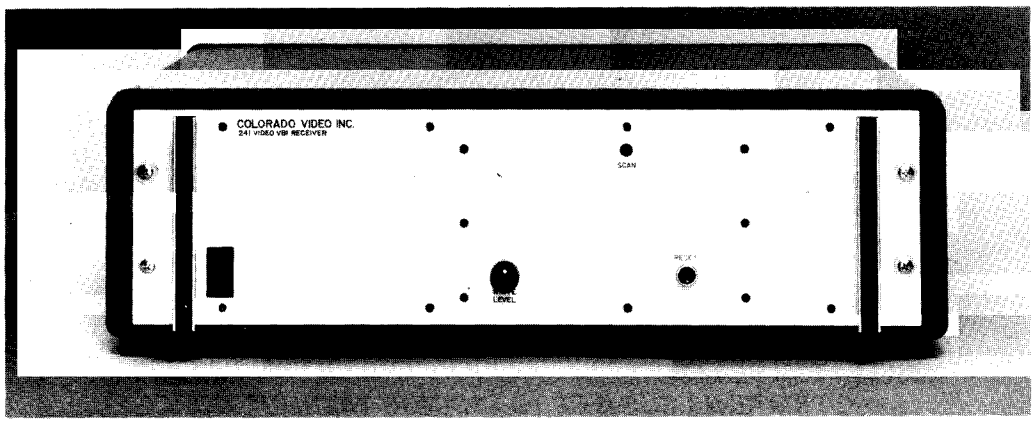
In operation, the Model 241 receiver accepts a baseband video signal with properly encoded information in the vertical blanking interval and provides the functions of line selection and scan conversion. The detected data is reconstructed into a still "frozen" image over an eight second interval, with the viewer seeing an old image being replaced by a new one in the form of a horizontal "wipe".

Two memories are incorporated in the 241 receiver, allowing for the simultaneous display of two separate images. The memories are independently selected by a transmitted code. A third video output is provided for VCR recording of a received program.

Installation of the Model 241 is simple, requiring only an appropriate video input signal from a tuner, microwave receiver, satellite receiver, or other video source. TV monitors are used for display purposes, or an R.F. modulator may be used for local picture redistribution to conventional TV receivers.

System options which are available include:

- Colorado Video Model 941 Mass Storage System. The 941 allows video images, received by the 241, to be digitally stored on a hard disc utilizing an IBM/PS/2™ computer. The images can then be recalled for viewing.
- Up to a total of four memories are available.
- The 241 can be configured as an addressable receiver. This allows reception of images intended only for that location.



# 241 specifications

| | |
|---|---|
| **Size:** | 5¼″ x 19″ x 15″ |
| **Weight:** | 16 lbs. |
| **Power:** | 100/115/220 VAC, 50/60 Hertz, single phase, 75 watts |
| **Mounting:** | Standard 19″ rack |
| **Input:** | Broadcast video, 1 volt p-p, 75 ohms |
| **Outputs:** | Composite video: 1 volt p-p, 75 ohms, 2:1 interlace, NTSC-like format |
| **Connectors:** | Video: BNC |
| **Controls:** | AC Power<br>Video input level<br>Reset |
| **Indicators:** | Power On<br>Scan |
| **Performance:** | Resolution: 512 x 240 picture elements, single field<br>Grayscale: 6-bit (64 gray levels) |
| **Options:** | Additional memories<br>Computer I/O<br>8-bit grayscale<br>Receiver select<br>Full frame |



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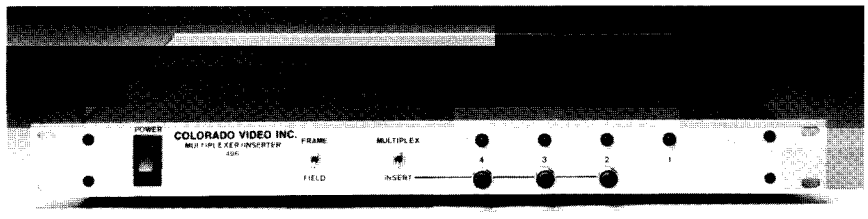
# 496/497 series video multiplexing instruments

## general description

The Colorado Video Model 496 is capable of time multiplexing four synchronized video sources into a single video signal for transmission or recording. The source signals are then separated (demultiplexed) with the 497 and stored in one or more memories for continuous flicker-free display.

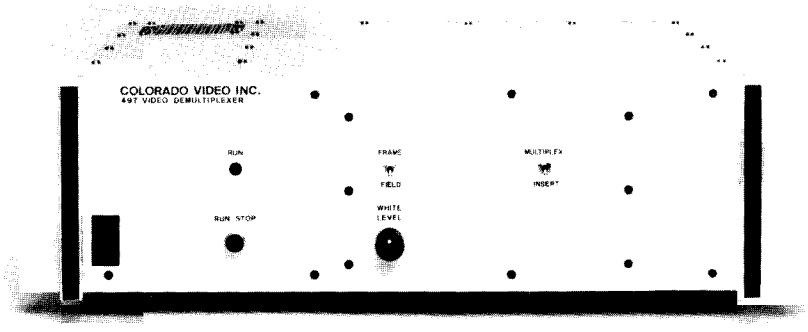
Model 496 Video Multiplexer/Inserter is a device which permits the transmission of two to four video signals over a single channel by time-sharing on a frame or field basis (each frame includes two fields). The frames or fields have identifying source number codes inserted in the vertical blanking interval to allow correct demultiplexing. In the multiplexer mode the 496 automatically sequences through all available input sources.

In the insertion mode, the 496 becomes a special purpose multiplexer which, under operator control, can insert a single frame from separate synchronized video sources into a main video signal. It can be used with the Model 497 to provide "side channel" displays from these separate video sources.




Model 497-4 Video Demultiplexer receives its input from the 496 and performs the function of producing a continuous video output of each of the video signals multiplexed onto a single transmission link. Each incoming video frame or field is identified by its code and stored in a digital memory for continuous output. The resulting displays are nearly indistinguishable from normal video. With the 497, the multiplexed outputs from four sources result in 7.5 frames per second, versus the normal 30 frames per second with conventional video. The 497 is also available in one, two and three memory versions, indicated by 497-1, 497-2, and 497-3.

Applications of the 496/497 series include: teleconferencing, distance education, multichannel tape recording, surveillance, multichannel video data acquisition and display, stereo video transmission and display, and adding still graphics to full-motion teleconference networks.



# 496 specifications

**Size:** 1¾" × 19" × 15"

**Weight:** 6 lbs.

**Mounting:** Standard 19" rack or optional tabletop

**Power:** 100/115/230 VAC, 50/60 Hz., single phase, 10 VA

**Inputs:** Composite Video: 1 volt p-p, 75 ohms or Hi Z, 2:1 interlace (4)

**Outputs:** Composite Video: 1 volt p-p, 75 ohms, 2:1 interlace
Composite Sync: 4 volts p-p, 75 ohms, 2:1 interlace (4); used to genlock all video sources
Separate H and V signals (optional)
Blackburst (optional)

**Controls:**

Front panel:
AC Power: On/Off
Insert/Multiplex
Insert: 2,3,4
Field/Frame

Rear Panel:
Sync Lock: Xtal/Master
Input Z: 75 ohms/Hi Z (4)

**Indicators:** Power
Insert/Multiplex: 2,3,4

**Connectors:** Video In and Out: BNC (5)
Sync: BNC (4)

**Options:** 625-line, 50 Hertz operation
Remote control of Insert/Multiplex and Insert: 2,3,4
Separate H and V Sync output
Blackburst output

# 497 specifications

**Size:** 3½" × 19" × 15" (-1, -2 models)
5¼" × 19" × 15" (-3, -4 models)

**Weight:** 17 lbs. (-1, -2)
22 lbs. (-3, -4)

**Mounting:** Standard 19" rack or optional tabletop

**Power:** 110/115/230 VAC, 50/60 Hertz, single phase, 75 VA

**Input:** Composite Video: 1 volt p-p, 75 ohms, 2:1 interlace

**Outputs:** Composite Video: 1 volt p-p, 75 ohms, 2:1 interlace (1-4)

**Controls:** AC Power: On/Off
White level
Run/Stop
Field/Frame (512×240×8 / 512×480×8)
Multiplex/Insert

**Indicators:** Power
Run

**Connectors:** Video In and Out: BNC (3-5)

**Configurations:** One to four channels

**Options:** Digital I/O interface
NTSC color
Slow-scan TV output
625-line, 50 Hertz operation (512×512)
Remote control of Multiplex/Insert and Run/Stop

*Specifications subject to change without notice.*

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# video multiplexer 496A/B

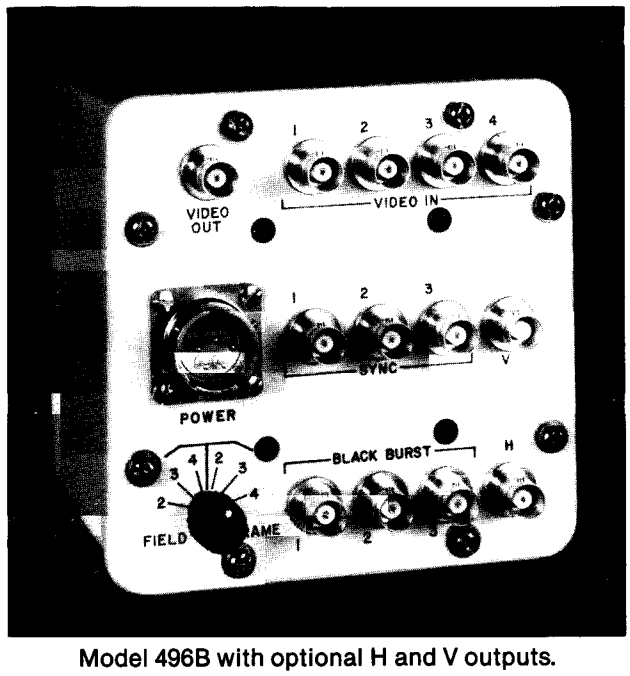
## general description

The Model 496A/B Multiplexer performs the function of time-division multiplexing two to four genlocked color or monochrome video sources to a single output. The multiplexing may be either on a field-by-field or frame-by-frame basis. Minimum update rate for each channel when operating in four channel, full frame mode is 7.5 frames per second, U.S. 525 line standards. The output signal is suitable for demultiplexing with a Colorado Video Model 497 Video Demultiplexer. The signal may be transmitted via cable or RF link or tape recorded for future playback. When color signals are being used, the tape playback should be time-base corrected before demultiplexing.

The unit provides signals for locking all input sources. These can be either separate horizontal and vertical timing or composite sync and black burst.

The 496A is constructed using MIL spec parts or extended temperature range parts whenever practical and may be operated at temperatures from −25° to 70°C. The 496B utilizes standard commercial grade parts and is intended for less demanding applications where temperatures will range from 0° to 50°C.

Both versions are intended to survive relatively harsh acceleration and vibration typically encountered in remotely controlled vehicles or high performance aircraft.




Model 496B with optional H and V outputs.

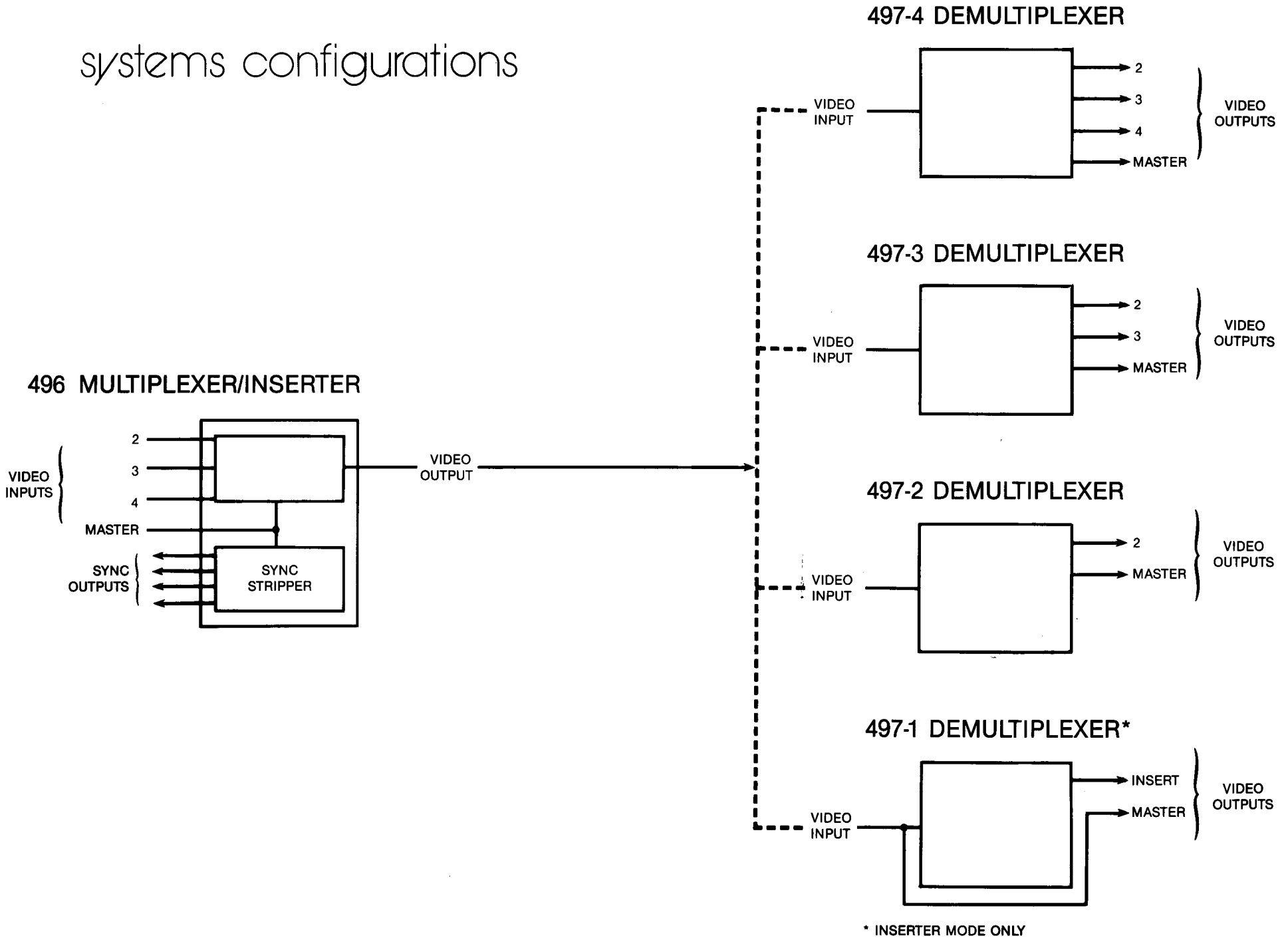
# specifications

| | | |
|---|---|---|
| **Size:** | Basic unit occupies a 5 in. cube exclusive of cabling. Avionics panel, if present, is 5.75″ x 5.25″ | |
| **Weight:** | Less than 5 lb. | |
| **Color:** | Either white with black labeling or black with white labeling | |
| **Power:** | 28Vdc Nominal, 175 mA max | |
| **Inputs:** | Video | 4 Channels<br>525-line, 60 Hz, 2:1 interlace<br>(625-line, 50 Hz, monochrome optional)<br>1V p-p, 75 ohms |
| **Outputs:** | Video | 525-line, 60 Hz, 2:1 interlace<br>(625-line, 50 Hz, monochrome)<br>1V p-p, 75 ohms |
| | Sync | 4 outputs (if present)<br>525-line, 60 Hz, composite<br>(625-line, 50 Hz, optional)<br>4V p-p, 75 ohms |
| | Black Burst | 4 outputs (if present, not available for 625-line)<br>525-line, 2:1 interlace<br>0.4V p-p, 75 ohms |
| | Horizontal | 4 outputs (if present)<br>4V p-p, 75 ohms |
| | Vertical | 4 outputs (if present)<br>4V p-p, 75 ohms |
| **Control:** | Switch | Rotary, 6 position<br>Select Field/Frame, 2, 3, or 4 channels |
| **Connectors:** | Power | MS3470L14-5P Connector (MS27513E10A5P on 496A) |
| | Video/Sync | BNC Connector (Isolated on 496A) |

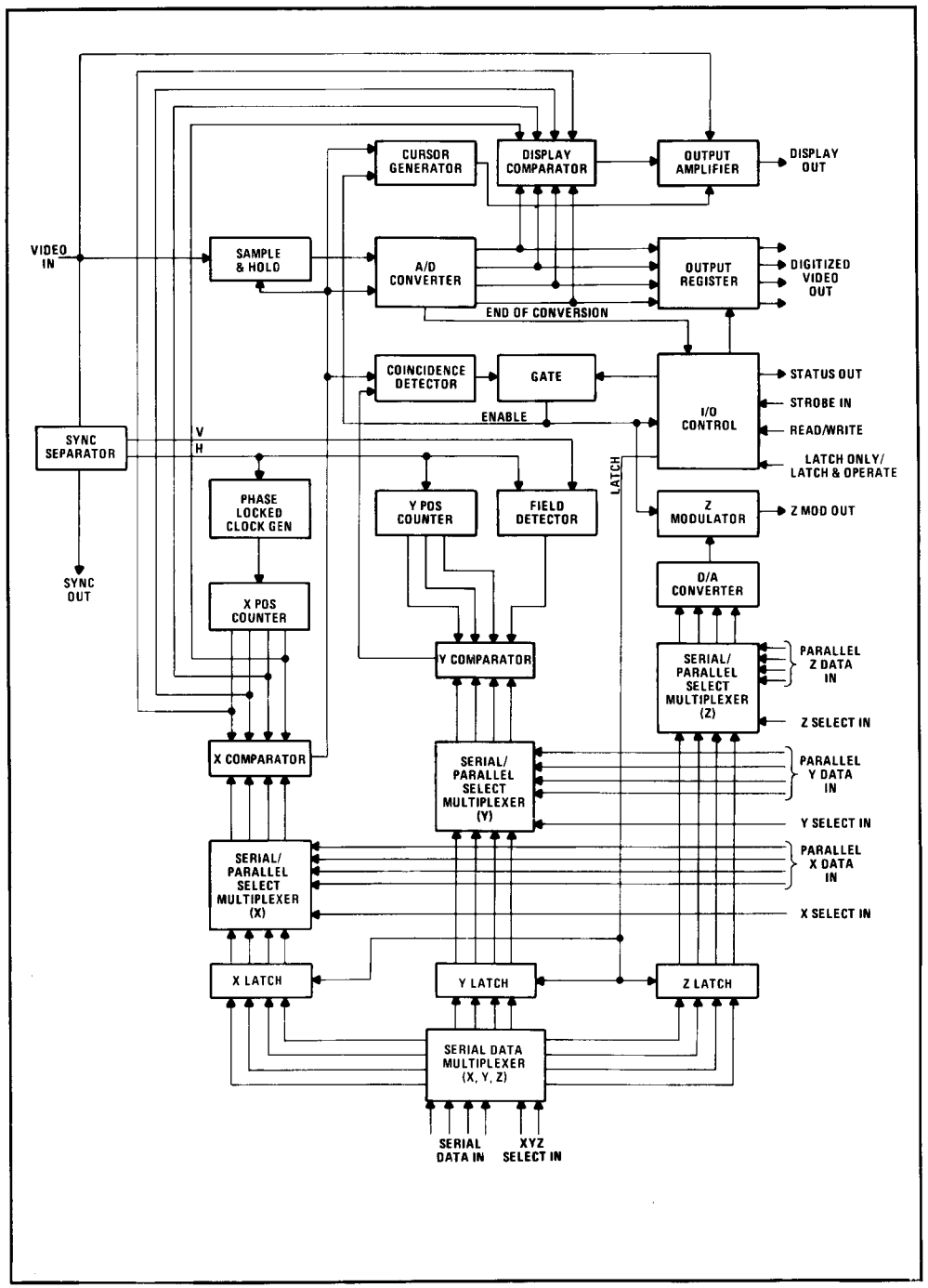


*Specifications subject to change without notice*

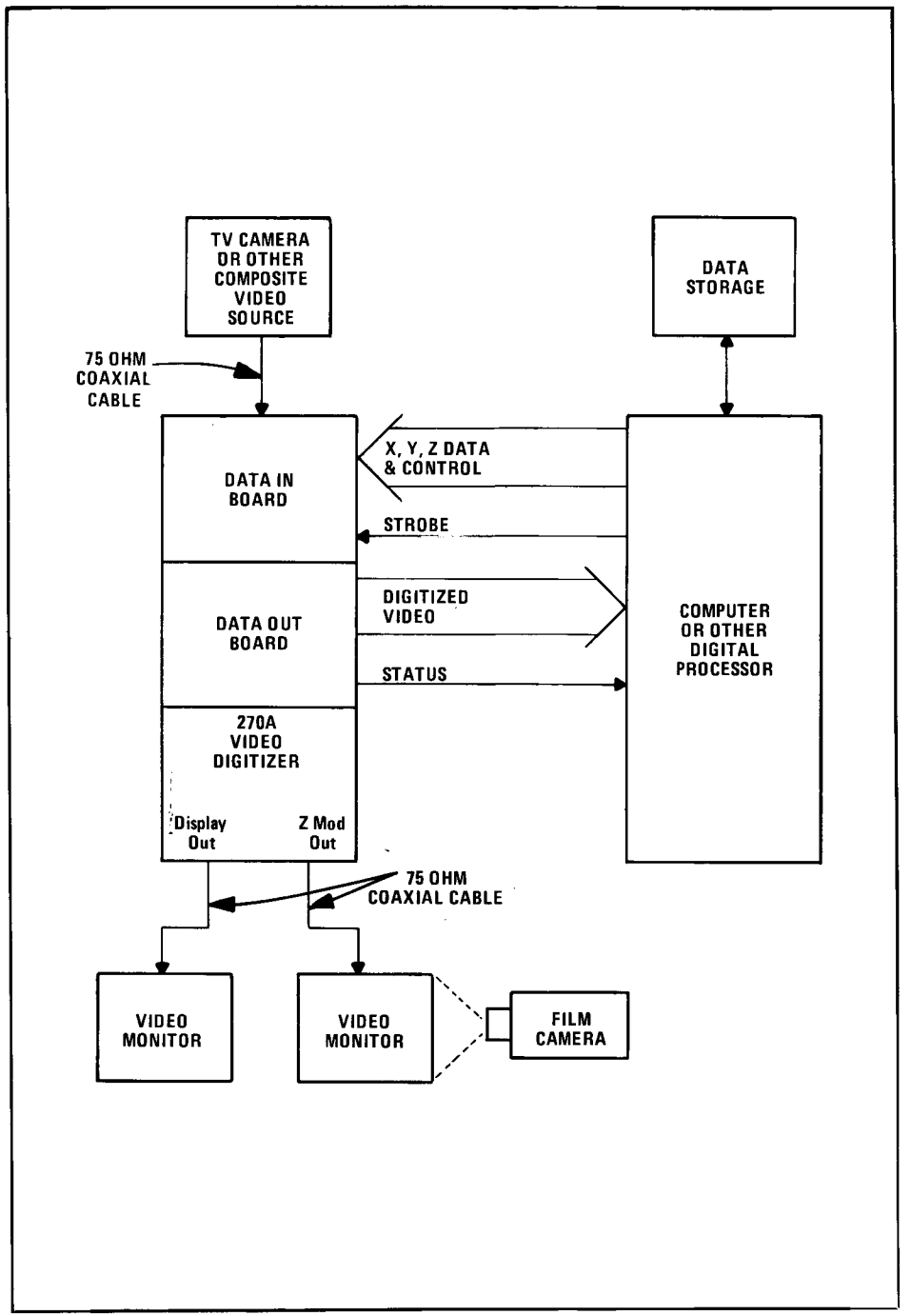
# systems configurations




* INSERTER MODE ONLY




MODEL 270A SIMPLIFIED BLOCK DIAGRAM




TYPICAL 270A INTERCONNECTION

# specifications

**Size:** 5¼" x 19" x 12"

**Weight:** 13 lbs.

**Mounting:** Standard 19" rack

**Construction:** Solid state, card file

**Power:** 100/115/230 VAC, 50/60 Hz, single phase, 40 W max.

**Input/Video:** Composite video; 1 V p-p, 75 ohms, 2:1 interlace

**Input/Sync:** Horizontal Drive: (optional input) 4 V p-p, 75 ohms

**Inputs/Digital/ Word Serial Input:**

| | |
|---|---|
| Data: | Parallel binary (X, Y, or Z)<br>X—9 bits (270A); 10 bits ((270A-2);<br>11 bits (270A-1)<br>Y—9 bits (525 line rate);<br>10 bits (625 or higher line rate)<br>Z—8 bits |
| XYZ: | 01=X<br>10=Y<br>11=Z |
| L/O: | 0—Latch & operate (Read or Write)<br>1—Latch new data only |
| R/W: | 0—Read (Encode)<br>1—Write (Z mod) |
| Strobe: | Pulse, 1 us min; initiates L/O cycle on leading edge; can be strapped for True or False pulse |

**Inputs/Digital/ Word Parallel Input: (270A only)**

| | |
|---|---|
| X Position: | 9 bits, parallel binary |
| Y Position: | 9 bits parallel binary (525 line)<br>10 bits, parallel binary (625 line) |
| Z Mod Data: | 8 bits, parallel binary |
| Strobe: | Pulse, 1 us min; initiates encoding or Z mod process on leading edge; can be strapped for True or False pulse |
| X, Y, & Z Select: | Determines whether X, Y, & Z are entered Word Serial or Word Parallel<br>0= Parallel<br>1= Serial |

**Outputs/Video:**

| | |
|---|---|
| Display: | Composite; 1 V p-p, 75 ohms |
| Z Mod: | Composite; 1 V p-p, 75 ohms |
| Sampled Video: | 10 V p-p 600 ohms, white positive formatted (at rear of Sampling Board) |

**Output/Sync:** Composite Sync: 4 V p-p, 75 ohms

**Outputs/Digital:** (All TTL)

| | |
|---|---|
| Digitized Video: | 8 bits, parallel binary |
| Status (Flag): | 0—Busy<br>1—Ready<br>(Can be strapped for pulse or level) |
| Horizontal Timing: | True pulse; 9 usec |
| Vertical Timing: | True pulse, 1 msec |
| Field Index: | 0—Even field<br>1—Odd field |

**Controls:**

| | |
|---|---|
| Power: | On/Off |
| Setup Position | |
| Video Amplitude | |
| Black Level | |
| Mode: | Setup/Run |
| Display: | On/Off |
| Cursor: | Dot/Line |

**Performance:**

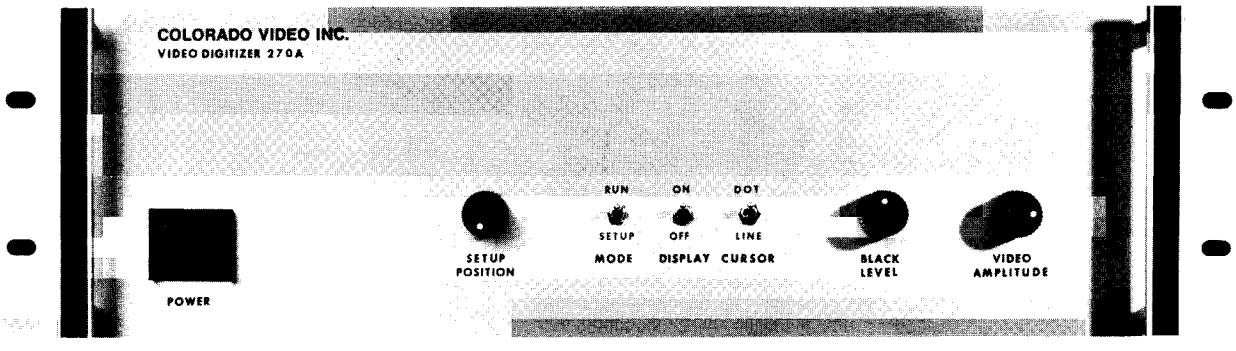
| | |
|---|---|
| Video Bandwidth: | 25 MHz |
| Sample Aperture Time: | 25 nsec |
| Conversion Time: | Single element: 6 usec.<br>Entire raster: (See below) |

| Model No. | Taking Multiple Elements/Line | Taking Single Element/Line |
|---|---|---|
| 270A | 2 sec. (min.) | 17 sec. |
| 270A-1 | 9 sec. (min.) | 68 sec. |
| 270A-2 | 9 sec. (min.) | 34 sec. |

| | |
|---|---|
| Access Time: | 6 usec min. to 1/30 sec max. (dependent on video timing relative to strobe time) |
| Z Mod D/A Settling Time: | 300 nsec |

**Resolution:**

| Model No. | Line Rate | Picture Elements H | V |
|---|---|---|---|
| 270A | 525 | 512 | 480 |
| | 625 | 512 | 580 |
| 270A-1 | 525 | 2048 | 480 |
| | 625 | 2048 | 580 |
| 270A-2 | 1023 | 1024 | 950 |
| | 1125 | 1024 | 1024 |

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*SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE*

colorado video inc
BOX 928 BOULDER, COLORADO 80306 USA
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# graphics adder 860

## general description

The Model 860 enhances full motion videoconference systems by adding a graphic video image transmission capability. Graphic displays, in addition to full-motion video, can be conveyed from one teleconference point to another using the full-motion channel. No additional communications channel is required.

The Model 860 is easily added to an existing full-motion videoconference system. An additional standard TV monitor and genlocked camera are installed at each teleconference location. When a user wishes to send a graphics image, he sets up the image under the camera and pushes a "Send Graphics" button. The Model 860 then uses a single frame of the full motion video to send the graphic image. An 860 at the receiving end recognizes the graphic transmission, stores it in memory and displays it on the second monitor until a new graphic is sent. This entire process interrupts the full-motion video display for only 1/30th of a second.

The Model 860 can be used with any combination of NTSC color or monochrome cameras. In a mixed system the monochrome camera must be genlocked to the color camera. A front panel "Loop Back" switch connects the conference video output to the conference video input providing an easy means of local system testing.

## specifications

| | | |
|---|---|---|
| **Size:** | 3½"×19"×15" | |
| **Weight:** | 17 lbs. | |
| **Mounting:** | Standard 19" rack or tabletop | |
| **Power:** | 115 VAC, 60 Hz, 75 VA | |
| **Inputs:** | Room Camera: | Composite Video, 75 ohm, 1 V p-p |
| | Graphics Camera: | Composite Video, 75 ohm, 1 V p-p |
| | Graphics Send: | Contact Closure |
| | Conference Video: | Composite Video, 75 ohm, 1 V p-p |
| **Outputs:** | Room Camera (for genlock): | Composite Video, 75 ohm, 1 V p-p |
| | Graphics Monitor: | Composite Video, 75 ohm, 1 V p-p |
| | Room Monitor: | Composite Video, 75 ohm, 1 V p-p |
| **Controls:** | Power with Indicator<br>Send Graphics<br>Loop Back | |
| **Resolution:** | 512×480×8-bit picture elements | |
| **Connectors:** | Video: | BNC |
| | Graphics Send: | Terminal Block |
| **Options:** | Receive Only | |



*Specifications subject to change without notice*

# VBI Transmitter/Receiver 240/241 Price List

The Model 240 transmits still video images using the vertical blanking interval (VBI) of a standard television signal. Using only one line per field, a monochrome or NTSC-like color image may be sent in approximately eight seconds. The Model 241 detects the uniquely formatted video in each field of the host signal and reconstructs a single field video image. Single memory units display one image at any given time. New images are written over old images in a left to right wipe lasting eight seconds. Multiple memory units can display up to four images simultaneously, although only one image can be updated at a time. Transmitters and receivers need not have the same number of memories. Please consult Colorado Video for assistance in selecting the most appropriate combination of transmitters and receivers for your application.

| | | |
|---|---|---|
| 240 | Transmitter, single memory | $7,500. |
| | each additional memory- add | $1,000. |
| 241 | Receiver, single memory | $5,800. |
| | each additional memory- add | $1,000. |

Prices subject to change without notice. 10/91

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# 250 Price List

The Model 250 may be ordered in a variety of configurations, all with a full 8-bit (256 level) gray scale. Please consult Colorado Video for assistance in selecting the most appropriate equipment for your application.

250 TRANSCEIVER

| | |
|---|---|
| 256 x 240 x 8-bit single memory | $ 4,000. |
| 256 x 240 x 8-bit dual memory | 4,500. |
| 256 x 240/480 x 8-bit memory | 4,500. |

250T TRANSMITTER

| | |
|---|---|
| 256 x 240 x 8-bit memory | 3,500. |
| 256 x 240/480 x 8-bit memory | 4,000. |

250R RECEIVER

| | |
|---|---|
| 256 x 240 x 8-bit single memory | 3,000. |
| 256 x 240 x 8-bit dual memory | 3,500. |
| 256 x 240/480 x 8-bit memory | 3,500. |

OPTIONS

| | |
|---|---|
| High speed operation with 8 kiloHertz baseband | 250. |
| 625 line, 220 VAC, 50 Hertz operation | NC |
| Remote Control | 250. |
| Transportable shipping case: | |
| For 250 only | 450. |
| For 250 system (holds 250, camera, tripod, 9" TV monitor, telephone, & cables) | 500. |

Special modifications are also available for "Moving Window" displays, color, and small image transmission. Please consult factory.

Prices subject to change without notice.

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# 262 Price List

The Model 262 Video Compressor may be used as a high quality, low-cost monochrome Slow-Scan TV Transmitter when still pictures only are to be viewed. The Model 262 is designed to be used with Colorado Video's Model 250 or Model 290 analog receivers. Please consult Colorado Video for assistance in selecting the most appropriate configuration for your desired application.

| | |
|---|---|
| **262 VIDEO COMPRESSOR** | |
| 1 kHz bandwidth for telephone type circuits | $2,500. |
| **262A VIDEO COMPRESSOR** | |
| 8 kHz bandwidth for special audio circuits | 2,000. |
| **OPTIONS:** | |
| Dual rate — switchable between full frame and single field (525-line only) | 500. |
| Modification of TV input standards — for some CT scanner, ultrasound or computer displays | Consult factory |

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# Security Products
# Price List

| | | |
|---|---|---|
| 286ST | Digital Video Transmitter - 256 x 480 x 6-bit | $6,000. |
| 286SR | Digital Video Receiver - 256 x 480 x 6-bit | 6,000. |
| 292 | Subtracting Receiver - 256 x 240 x 6-bit | 4,000. |
| 293 | Peak Store Transmitter - 256 x 240 x 6-bit | 4,950. |
| | - 512 x 480 x 6-bit | 5,700. |
| 593 | Monitoring Memory - 512 x 512 x 8-bit | 4,950. |
| | Options - NTSC Color | 500. |
| | Model 793 DMA I/O Module | 500. |
| | Special IBM PC XT/AT or PS/2 Model 30 Interface Package: 793, 745, MS-DOS Driver, cable, sample program | 1,000. |
| 599 | Video Multimemory - 512 x 512 x 8-bit - 16 frames | 5,900. |
| 599-2 | Video Multimemory - 512 x 512 x 8-bit - 32 frames | 7,900. |
| 599-4 | Video Multimemory - 512 x 512 x 8-bit - 64 frames | 11,900. |
| | Options - NTSC Color | 500. |
| | Model 799 DMA I/O Module | 900. |

8/91 Prices subject to change without notice.

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# 286 Digital Transceiver
# Price List

The 286 may be ordered in monochrome or NTSC color, with a choice of resolution and additional memories as listed below. The 6-bit gray scale has 64 levels of gray, and the 8-bit has 256 levels of gray. All prices include one serial interface and one remote control (see choices below). Please see our Selection Guide or contact Colorado Video for assistance in selecting the most appropriate combination for your desired application.

## 286 TRANSCEIVER (Monochrome)

| | |
|---|---|
| 256 x 480 x 6-bit memory | $ 10,000 |
| Second memory - additional | 1,500 |
| 256 x 480 x 8-bit memory | 12,000 |
| Second memory - additional | 2,000 |
| 512 x 480 x 6-bit memory | 11,500 |
| 512 x 480 x 8-bit memory | 14,000 |

## 286T TRANSMITTER (Monochrome)

| | |
|---|---|
| 256 x 480 x 6-bit memory | $ 9,000 |
| 256 x 480 x 8-bit memory | 11,000 |
| 512 x 480 x 6-bit memory | 10,500 |
| 512 x 480 x 8-bit memory | 13,000 |

## 286T-LL TRANSMITTER (Monochrome)

| | |
|---|---|
| 512 x 480 x 6-bit memory | $ 10,500 |
| Preview out on front panel | |
| Video in presence LED on front panel | |
| No remote control | |
| RS 422 Interface | |

## 286R RECEIVER (Monochrome)

| | |
|---|---|
| 256 x 480 x 6-bit memory | $ 8,000 |
| Second memory - additional | 1,500 |
| 256 x 480 x 8-bit memory | 9,000 |
| Second memory - additional | 2,000 |
| 512 x 480 x 6-bit memory | 9,500 |
| 512 x 480 x 8-bit memory | 11,000 |

## 286R-LL RECEIVER (Monochrome)

| | |
|---|---|
| 512 x 480 x 6-bit memory | $ 9,500 |
| No remote control | |
| (Companion unit to 286T-LL) | |
| RS 422 Interface | |

(continued)

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286C TRANSCEIVER (NTSC Color)

| | |
|---|---|
| 512 x 240 x 6-bit memory | $ 11,000 |
| Second memory - additional | 1,500 |
| 512 x 240 x 8-bit memory | 13,000 |
| Second memory - additional | 2,000 |
| 512 x 480 x 6-bit memory | 12,500 |
| 512 x 480 x 8-bit memory | 15,000 |

286CT TRANSMITTER (NTSC Color)

| | |
|---|---|
| 512 x 240 x 6-bit memory | $ 10,000 |
| 512 x 240 x 8-bit memory | 12,000 |
| 512 x 480 x 6-bit memory | 11,500 |
| 512 x 480 x 6-bit memory | 14,000 |

286CR RECEIVER (NTSC Color)

| | |
|---|---|
| 512 x 240 x 6-bit memory | $ 8,500 |
| Second memory - additional | 1,500 |
| 512 x 240 x 8-bit memory | 9,500 |
| Second memory - additional | 2,000 |
| 512 x 480 x 6-bit memory | 10,000 |
| 512 x 480 x 8-bit memory | 11,500 |

REMOTE CONTROL CHOICES

The prices above include choice of remote control: either simplified (for easy operation) or full-feature (for maximum operational flexibility). Additional units are $1,000. Custom configurations including a wireless (IR) unit are available on special order.

SERIAL INTERFACE CHOICES

The prices above include choice of serial interface: either RS-232C/CCITT V.24 compatible or CCITT V.35 compatible. Additional units are $500. Please contact our sales representatives for recommended external modems available from Colorado Video.

OPTIONS

| | |
|---|---|
| Computer I/O Module 793 | $ 500 |
| 625-line European configuration (monochrome only) | n/c |

11/90 Prices subject to change without notice

# 290 Price List

The Model 290 may be ordered in a variety of configurations. All models except The Video Briefcase® may be interfaced with a computer I/O board (the Model 793) for use with the 941 Image Storage System.

Full frame systems feature switchable dual resolution. For example, a 256×480 system can also display a 256×240 image. The 8-bit memory has 256 levels of gray.

Any standard video monitor or video hard copy printer may be used with the Model 290. Colorado Video will configure a complete system to meet a customer's specific requirements.

## NTSC COLOR

### VIDEO BRIEFCASE® (290C TRANSCEIVER)

| | |
|---|---|
| 512×240×8-bit memory | $7,000. |
| 512×480×8-bit memory | 7,750. |

The transmitters and transceivers listed below include hard wired remote control units.

### 290C TRANSCEIVER

| | |
|---|---|
| 512×240×8-bit memory | $6,000. |
| second memory-additional | 1,250. |
| 512×480×8-bit memory | 6,500. |
| second memory-additional | 1,500. |

### 290CT TRANSMITTER

| | |
|---|---|
| 512×240×8-bit memory | $5,500. |
| 512×480×8-bit memory | 6,000. |

### 290CR RECEIVER

| | |
|---|---|
| 512×240×8 bit memory | $5,000. |
| second memory-additional | 1,250. |
| 512×480×8-bit memory | 5,500. |
| second memory-additional | 1,500. |

(continued)

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## MONOCHROME

### VIDEO BRIEFCASE® (290 TRANSCEIVER)

| | |
|---|---|
| 256×480×8-bit memory | $6,000. |
| 512×480×8-bit memory | 6,750. |

### 290 TRANSCEIVER

| | |
|---|---|
| 256×480×8-bit memory | $5,000. |
| second memory-additional | 1,000. |
| 512×480×8-bit memory | 5,750. |
| second memory-additional | 1,250. |

### 290T TRANSMITTER

| | |
|---|---|
| 256×480×8-bit memory | $4,500. |
| 512×480×8-bit memory | 5,250. |

### 290R RECEIVER

| | |
|---|---|
| 256×480×8-bit memory | $4,000. |
| second memory-additional | 1,000. |
| 512×480×8-bit memory | 4,750. |
| second memory-additional | 1,250. |

### 292 RECEIVER

| | |
|---|---|
| 256 x 240 x 6-bit memory | $4,000. |

### 293 TRANSMITTER

| | |
|---|---|
| 256 x 240 x 6-bit memory | 4,950. |
| 512 x 480 x 6-bit memory | 5,700. |

### OPTIONS

Transportable Shipping Case:

| | |
|---|---|
| For 290 unit only (will hold 290, telephone, cables, and connectors). | $ 450. |
| For 290 Transceiver System (will hold 290, camera, tripod, 9" TV monitor, telephone, cables, and connectors). | 500. |
| Computer I/O Module 793 | 500. |



*Prices subject to change without notice*

# Video Memory Instrumentation Price List

Colorado Video solid state video memory and memory related products are useful for image analysis, processing, and distribution. These flexible units provide basic frame store capability and optional NTSC or RGB color, multiple frame memories, and freeze-frame television transmission capability. Optional digital interface modules enable all Colorado Video frame stores to run with a wide variety of computers.

| | |
|---|---|
| 491 VIDEO FRAME STORE (maximum of four memories) | |
| 512 x 512 x 8-bit memory | $ 3,450. |
| each additional memory | 1,000. |
| 492 VIDEO SUBTRACTOR--512 x 512 x 8-bit dual memory | 6,000. |
| 493 VIDEO PEAK STORE--512 x 512 x 8-bit memory | 6,000. |
| 494 VIDEO SCAN CONVERTER--512 x 512 x 8-bit memory | 9,000. |
| 495 ASYNCHRONOUS FRAME STORE--512 x 512 x 8-bit memory | 7,000. |
| 499 VIDEO MULTIMEMORY--16 frame 512 x 512 x 8-bit with controller | 9,950. |
| 499-2 VIDEO MULTIMEMORY--64 frame 512 x 512 x 8-bit with controller | 19,950. |

(continued)

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OPTIONS

| | |
|---|---|
| NTSC Color | |
| for 491, 493, and 495--per memory | 500. |
| for 499, and 499-2 | 1,250. |
| RGB Sequencer--for 491 | 950. |
| 761 Interval Controller--for 493 | 750. |
| Digital Interface Accessories: | |
| 793 DMA I/O Module--for 491, 492, 493, 494, and 495 | 500. |
| 799 DMA I/O Module--for 499 | 900. |
| 745 Host Adapter Board for IBM PC XT/AT or PS/2 Model 30 | 500. |
| Cable for Host Adapter Board/793 | 200. |
| Special IBM PC XT/AT or PS/2 Model 30 Interface Package: 793 DMA I/O Module, 745 Host Adapter, MS-DOS Driver, cable, and sample program | 1,000. |

Prices subject to change without notice.

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# Teleradiology Systems
# Price List

Because teleradiology networks have differing requirements, Colorado Video offers a variety of configurations. The most frequently selected are listed below. Our technical sales staff will be pleased to assist you in identifying the most cost-effective system to meet your specific needs.

## TRANSMIT ONLY-FIXED LOCATION

Model 262 Video Compressor
COHU 4800 Solid State Camera
Zoom lens 17.5-105 mm, F 1.8
9" Electrohome black & white monitor
Close-up diopter lens set
TV camera tripod
Cables — $ 5,550.00

## RECEIVE ONLY-FIXED LOCATION

Model 290R Video Receiver with two full-frame video memories (512 x 480 x 8 bit), with grayscale windowing, grayscale reversal, and two-speed operation.
15" Black and white monitor
Cables — $ 6,900.00

## RECEIVE ONLY-PORTABLE SYSTEM

Model 290R Video Receiver in compact plastic molded case. Unit incorporates two full-frame video memories (512 x 480 x 8 bit), with grayscale windowing, grayscale reversal, and two-speed operation.
9" Electrohome black and white monitor (with handle) — $ 7,150.00

over

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TRANSCEIVE-(TRANSMIT/RECEIVE)

| | |
|---|---|
| Model 290 Video Transceiver with one full-frame video memory (512 x 480 x 8-bit), with grayscale windowing, grayscale reversal, and two-speed operation.<br>Cohu 4800 Solid State Camera<br>Zoom lens 17.5-105 mm, F 1.8<br>15" Black and white monitor<br>Close-up diopter lens set<br>Camera tripod<br>Cables | $ 9,050.00 |

Portable Configuration:

| | |
|---|---|
| Model 290 Video Transceiver in compact plastic molded attache case. Unit has one full-frame video memory (512 x 480 x 8-bit) with grayscale windowing, grayscale reversal, and two speed operation. | |
| (Cameras and monitors extra) | $ 6,000.00 |

VIDEO MONITORS (MONOCHROME)

| | |
|---|---|
| 9" Electrohome monitor | $ 715.00 |
| 15" Electrohome monitor | 869.00 |

Prices subject to change without notice.

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# Video Multiplexing Instrument
# Price List

The Colorado Video 496 Multiplexer is capable of time multiplexing several video sources into a single video signal for transmission or recording. The source signals are then separated by the 497 Demultiplexer series and stored in one or more memories for continuous flicker-free display.

| | |
|---|---|
| 496-4 FOUR CHANNEL VIDEO FRAME MULTIPLEXER/INSERTER | $4,000. |
| 496A FOUR CHANNEL VIDEO FRAME MULTIPLEXER | 7,500. |
| 496B FOUR CHANNEL VIDEO FRAME MULTIPLEXER | 4,950. |
| 497-4 FOUR CHANNEL VIDEO DEMULTIPLEXER | |
| 512 x 512 x 8-bit memory | 10,500. |
| 497-3 THREE CHANNEL VIDEO DEMULTIPLEXER | |
| 512 x 512 x 8-bit memory | 9,000. |
| 497-2 TWO CHANNEL VIDEO DEMULTIPLEXER | |
| 512 x 512 x 8-bit memory | 7,500. |
| 497-1 ONE CHANNEL VIDEO DEMULTIPLEXER | |
| 512 x 512 x 8-bit memory | 6,000. |
| OPTIONS | |
| NTSC color operation per 497 memory | 500. |
| Computer I/O to IBM PS/2 (497 Demultiplexer) | 1,500. |

The Colorado Video Model 860 Graphics Adder enhances full-motion videoconference systems by adding a graphic video image transmission capability. Graphic displays, in addition to full-motion video, can be conveyed from one teleconference point to another using the full-motion channel. The graphic is transmitted in 1/30th of a second. No additional communications channel is required.

| | |
|---|---|
| 860 GRAPHICS ADDER | |
| 512 x 480 x 8-bit picture elements | $7,000. |

*Prices subject to change without notice.*

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# ACCESSORIES PRICE LIST

The accessories listed below may be used with Colorado Video television equipment. Please contact us for assistance in selection.

## CAMERAS

| | | |
|---|---|---|
| **Cohu model 4800** | | **$ 1,510.** |

## LENSES

| | | |
|---|---|---|
| 12.5mm | f1.8 | 108. |
| 12.5mm | f1.4 | 172. |
| 25mm | f1.4 | 142. |
| 50mm | f1.4 | 165. |
| 50mm | f1.8 | 102. |
| 75mm | f1.4 | 198. |
| 75mm | f1.8 | 170. |
| Zoom 17.5-105mm | f1.8 | 477. |
| Close-up diopter set for zoom lens | | 75. |

## TV MONITORS

| | |
|---|---|
| 9" Electrohome B&W | 715. |
| 15" Electrohome B&W | 869. |
| 17" Electrohome B&W | 969. |
| 23" Electrohome B&W | 1,135. |

## OTHER ACCESSORIES:

| | |
|---|---|
| Tripod | 240. |
| Tripod dolly | 115. |
| Copy Stand | 455. |
| Modified rotary telephone for still picture transmision | 100. |
| Modified touchtone telephone for still picture transmision | 125. |
| 358T Subcarrier Filter | 95. |

Prices subject to change without notice.

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# 941/951 Price List

## 941 VIDEO IMAGE STORAGE SYSTEM

The Colorado Video 941 Video Image Storage System consists of an IBM PS/2 Model 30 computer plus special interface cards, cabling, and proprietary software for storage, retrieval, and annotation of video images, either monochrome or NTSC color. The system requires the separate purchase of a compatible Colorado Video digital memory.

941 System with internal 20 megabyte disk $ 6,000.

941 System with external IOMEGA 10 megabyte removeable cartridge drive $ 7,500.

Colorado Video memory units that may be used with the 941 system: (please specify the exact memory configuration)

| | |
|---|---|
| 240 | VBI Transmitter |
| 286 | Digital Transceiver |
| 290 | Slow-scan Transceiver |
| 292 | Subtracting Receiver |
| 491 | Video Frame Store |
| 492 | Video Subtractor |
| 493 | Video Peak Store |
| 494 | Video Scan Converter |
| 495 | Asynchronous Frame Store |
| 497 | Video Demultiplexer |
| 499 | Video MultiMemory |

Special software for RGB image storage or picture processing is available. Please consult factory.

## 951 DIGITAL IMAGE COMMUNICATIONS SYSTEM

The 951 system is composed of two major hardware elements: First, an IBM PS/2 Model 30 personal computer. Second, a Colorado Video Model 491 Video Memory with built-in 9600 bit per second modem. Proprietary software provides simple keyboard commands for picture transmission, reception, image storage, and retrieval. Either color or monochrome video may be used, but the system requires a separate TV camera and monitor.

Basic 951 system, including computer, 491 Video Memory, modem, software, telephone and cables: $12,450.

Please contact the factory regarding options and accessories.

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COLORADO VIDEO INC.

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# Instrument Price List

| | | |
|---|---|---|
| 109A | Digital Display Generator - Analog Input | $1,800. |
| 109A-3 | Digital Display Generator - 3 Ch. Analog | $2,200. |
| 109B | Digital Display Generator - BCD Input | $1,500. |
| 270A | Video Digitizer - 512 x 480 pixels | $4,500. |
| 270A-1 | Video Digitizer - 2048 x 480 pixels | $5,000. |
| 270A-2 | Video Digitizer - 1024 x 1024 pixels | $5,000. |
| 302-2 | Sync Stripper | $350. |
| 303 | Video Waveform Display Generator | $1,500. |
| 305 | Video Micrometer - $3\frac{1}{2}$ digit | $3,700. |
| 305A | Video Micrometer - $4\frac{1}{2}$ digit | $4,200. |
| 306 | Video Caliper | $3,100. |
| 310A | Video Integrator | $3,500. |
| 321 | Video Analyzer | $3,000. |
| 420 | Video Mirror | $1,340. |
| 421 | Scan Reverser | $5,100. |
| 605 | Video Contrast Enhancer | $1,500. |
| 606G | Video Quantizer - 8 slice level | $3,500. |
| 606H | Video Quantizer - 16 slice level | $5,000. |
| 610E | Video Pointer | $1,950. |
| 613 | Video Screen Splitter | $995. |
| 615 | Video Generator | $2,750. |
| 615A | Video Generator - with internal sync gen. | $3,000. |
| 615B | Video Generator - remote control capability | $3,500. |
| 620 | X-Y Indicator - screw driver position adjust | $480. |
| 620A | X-Y Indicator - front oanel knob adjust | $580. |
| 622 | X-Y Digitizer | $4,500. |
| 623 | Multiline Generator | $1,000. |
| 630 | Video Detector | $2,000. |
| 631 | Sync Advance | $995. |
| 633 | Video Motion Analyzer | $5,000. |
| 635 | Video Position Analyzer | $6,000. |
| 670 | Pattern Generator<br>Call factory for custom pattern charge. | $1,190. |
| 675 | Automatic Gain Control | $580. |

Prices subject to change without notice.

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