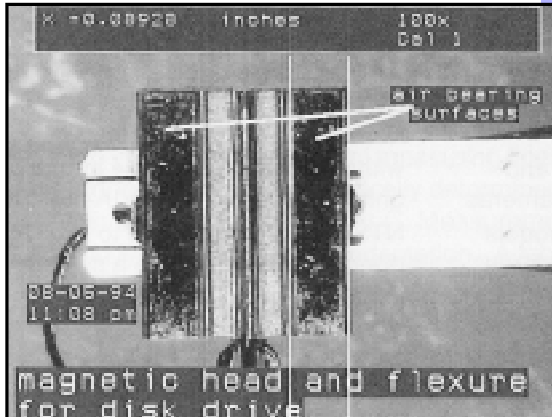


BOECKELER® VIDEO MICROSCOPY CATALOG

Image Marker, Measurement and Enhancement Systems

To Measure . . .

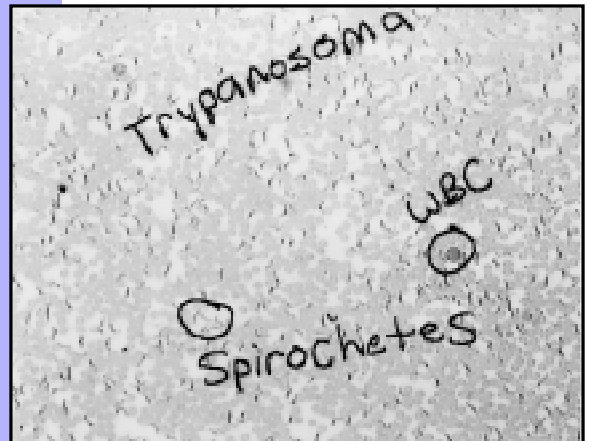


The X measurement mode of the VIA-®170. Also shown are some of the marking features including text and date/time label.

- quickly measure the length, distance, angle, radius, circumference or area of a video image.
- easily document the dimensions of a microscopic or macroscopic object.
- transmit measurements in ASCII format to a printer or computer via an RS-232 port.

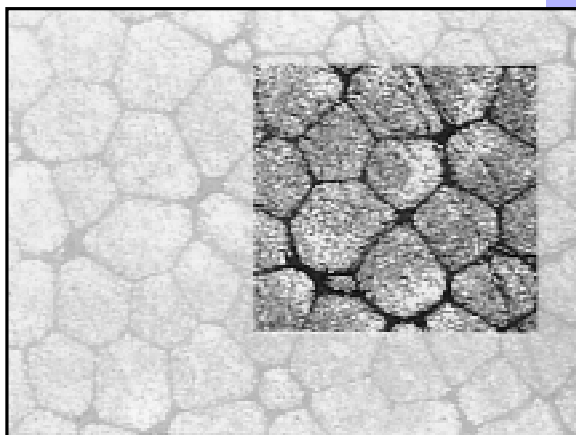
Or Mark . . .

- add relevant data to the video image.
- create a go/no-go overlay for quick visual comparisons.
- mark areas of interest before or during presentations.
- communicate more effectively while training or videoconferencing.



Freehand drawing is one marking feature offered on many VIA models.

. . . Or Enhance



Enhancing the low contrast of a video image with the Boeckeler IMG-100™ image contrast controller.

- optimize the video image before measuring or before outputting the image to a video printer.
- enhance the quality of low-contrast video images.
- provide a means for a non-subjective repeatable focus of a specimen by referring to a focus indicator number.

BOECKELER®

— BOECKELER VIA-® PRODUCTS —

When installed between a camera and monitor, VIA-products provide overlays to mark and measure objects displayed on a video monitor using a variety of positionable markers or reticles. Operators control the VIA- with a keyboard, joystick, knob controller, light pen, mouse pen or mouse. The knob controller is ideal for quick and precise positioning of measurement lines. The joystick works well for diagonal movement and for rapidly positioning markers. The keyboard is chosen for quick and extensive labelling, while the light pen, mouse pen or mouse aids in drawing or positioning markers on screen.

Models are designed for use with either monochrome RS-170 or color NTSC composite cameras and monitors. Boeckeler also manufactures models compatible with CCIR or color PAL video standards.

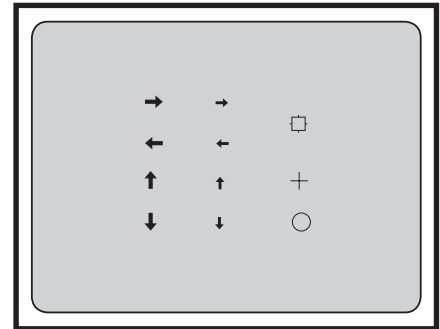
Add-on devices are available to interface with RGB and Y/C cameras and monitors.

The VIA- models with measurement capabilities have a pixel resolution of 1024 (H) x 482 (V) for NTSC units and 512 (H) x 574 (V) for CCIR/PAL units. One pixel of the VIA- overlay is 1/1024 of the horizontal field of view and 1/482 of the vertical field of view for NTSC units (1/512 and 1/574 for CCIR/PAL units). The accuracy of the system is operator-dependent. For distance measurements, careful operators can repeatedly position the measuring lines to within 2 pixels horizontally and 1 pixel vertically with NTSC units and within 1 pixel horizontally and vertically with CCIR/PAL units. Therefore, if the VIA- horizontal resolution for an NTSC unit is calculated to be 0.5 μm , a consistent operator could achieve a system accuracy of $\pm 1.0 \mu\text{m}$.

PRODUCT DESCRIPTIONS

■ VIA-®20J Video Pointer

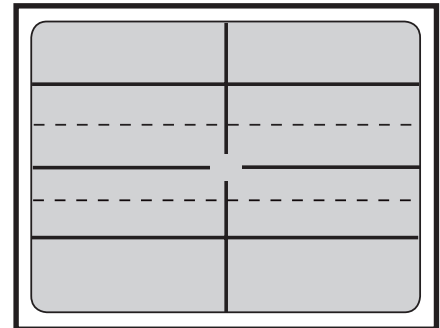
The VIA-20J lets users choose one of 11 different pointers. At the touch of a button, individual pointers may be anchored at any location on the screen. Any combination of pointers may be used. In addition, anchored pointers may be erased one at a time until the screen is cleared, or all at once, at the touch of a button. The VIA-20J is available with a joystick controller only.



The 11 pointers available in the VIA-20J.

■ VIA-®30J Video Crossline Generator

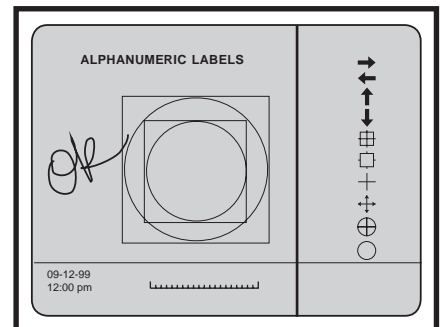
The VIA-30J provides three types of positionable lines -- vertical, horizontal or crossed lines. Each line may be displayed in one of ten different line patterns: solid fine, medium or bold; dotted fine or bold; dashed fine, medium or bold; scaled fine or bold. An intersection option allows users to select an intersection which is closed or open. A centering option automatically places an intersection in the center of the screen or leaves positioning up to the operator. On-screen menu options let users clear the screen entirely or erase lines one at a time. The VIA-30 is available with a joystick controller only.



This combination of line patterns and intersections available in the VIA-30J and the VIA-170.

■ VIA-®70 Video Image Marker

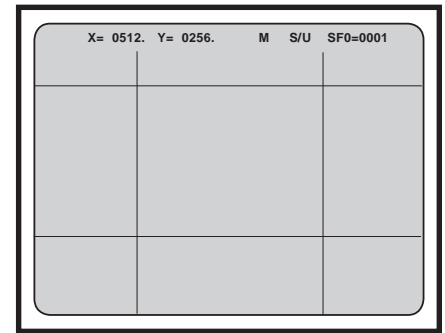
The VIA-70 provides eight marking tools -- typed text, pointers, grids, scales, circles, boxes, lines and a date/time label. The grids, scales, circles and boxes can be sized on-screen. With the optional light pen, mouse pen or mouse, the operator can also freehand draw over the video image. Combinations of different marker types may be created in one overlay and simultaneously displayed. The align mode allows users to position markers in unison over important aspects of the video image. Up to 10 different overlays can be stored and recalled for later use. The VIA-70 comes standard with a keyboard; an optional light pen, mouse pen or mouse can be added to the system.



Some of the graphics available in the VIA-70 and the VIA-170.

■ **VIA-®100 Video Measurement System**

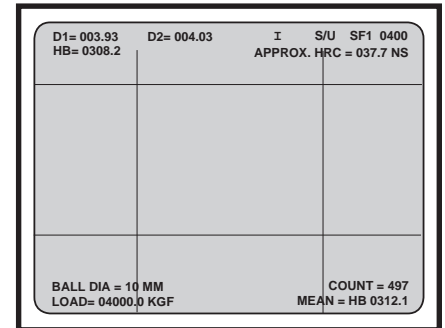
The VIA-100 enables an operator to perform horizontal (X), vertical (Y), two dimensional (XY), diagonal (point-to-point), circle (radius and circumference) and angle measurements. Separate X-axis and Y-axis calibration ensures accuracy for all measurements. Ten separate calibrations can be stored and retrieved for multiple measurement setups. The VIA-100 has RS-232 output so that users can transmit ASCII data of measurements to printers or computers. Available with a joystick or knob controller.



The VIA-100, VIA-110, VIA-150, VIA-170, VIA-200 and VIA-300 measure X and Y dimensions.

■ **VIA-®110 Video Hardness Measurement System**

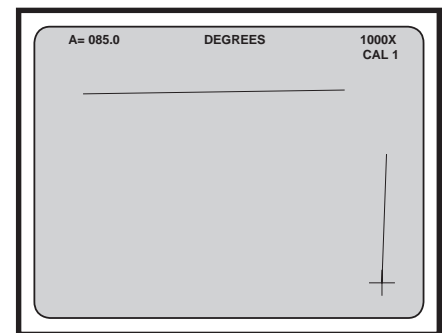
Used with a hardness tester, the VIA-110 provides the capability to measure an indentation using vertical and horizontal measuring lines. A Knoop, Vickers or Brinell hardness value is automatically determined. With the knob controller, up to 500 of these values can be entered into a statistics table, which displays the count, mean, standard deviation, range, and high and low hardness values. Ten calibrations may be stored and used for multiple measurements. Approximate conversions to Rockwell B or C can also be displayed. A labelling option features date, operator ID, lot number, sample size, load utilized, dwell time and magnification. In Brinell mode, label information also includes the ball diameter. The VIA-110 has RS-232 output so that users can transmit ASCII data of measurements and statistics to printers or computers. Special RS-232 for output to Mitutoyo™ SPC products is accommodated as well. Available with a joystick or knob controller.



The VIA-110 measurement mode displays the count and mean calculations from the statistics table at the lower right of screen.

■ **VIA-®150 Video Image Marker-Measurement System**

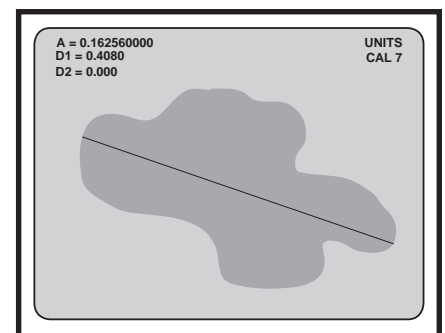
The VIA-150 is the first Boeckeler product to combine marking and measuring features. Markers include lines (solid, dashed or dotted), 10 different pointers such as arrows and cross hairs, vertical and horizontal scales, boxes, circles, alphanumeric labels, grids (solid or dotted; horizontal, vertical or crossed) and a positionable date/time label. With the VIA-150, operators can measure the horizontal (X) dimension, vertical (Y) dimension, horizontal-vertical (XY) dimensions, diagonals (point-to-point), angles and circles. Up to 10 different marker overlays and 10 different calibrations may be stored for future retrieval. The VIA-150 has RS-232 output so that users can transmit ASCII data of measurements to printers or computers. Available with a joystick or knob controller.



The VIA-100, VIA-150, VIA-170, VIA-200 and VIA-300 offer the ability to measure angles (shown above) and circles.

■ **VIA-®170 Video Image Marker-Measurement System**

The VIA-170 combines all the measurement features of the VIA-100, except that instead of on-screen menus, operators simply press a keyboard function key to activate a measuring function, with all the marking features of the VIA-30 and VIA-70. Along with X, Y, XY, point-to-point, angle and circle measurement modes, the VIA-170 offers an elapsed time mode to track on-screen events and can display path length. This product can also calculate the area of a cell or shape, measure the long and short chords of a cell or object, count cells or particles and group the cells or particles into ten different categories. A statistics table displays the count, mean, standard deviation, range, high and low readings for up to 500 measurements. A security menu allows users to protect overlays and calibrations from inadvertent changes. The VIA-170 is the product of choice when an image requires measurement and then quick or extensive typewritten labelling for video prints or other recording. The VIA-170 comes standard with a keyboard; an optional joystick or knob controller may be used simultaneously with the keyboard, as can an optional light pen, mouse pen or mouse.



The VIA-170 assists operators in calculating the area of an object (A=), as well as short and long chords (D1=, D2=). Above, the area has already been calculated by tracing the optional light pen around the perimeter of the object. A line has been drawn between two points selected by the operator to designate the long chord.

— NEW PRODUCTS —

■ VIA-200 MVS Video Image Marker-Measurement System with Hardness Measurement

This multiple-video standard (MVS) model gives users all of the video measuring and marking features of the VIA-180 — AND immediate compatibility with RGB, Y/C (S-Video), or composite video sources and displays (no plug-in color interface required). Measurements can be displayed for X and Y dimensions, point-to-point, angle, circumference, area, and time, and can include hardness values for Knoop, Vickers, and Brinell hardness tests. A statistics table displays the count, mean, standard deviation and range, high and low readings for up to 500 measurements. The VIA-200 comes standard with a keyboard. An optional joystick or knob controller may be used simultaneously with the keyboard, as can an optional light pen, mouse pen or other mouse device. Like the VIA-180, the VIA-200 also features the option to lock calibrations and marker overlays. RS-232 output is also standard, so that users can transmit ASCII data of measurements and statistics to printers or computers.

*(*Future release; call for availability. Also, specifications differ than those listed on page 8, so call for a VIA-200 data sheet.)*

■ VIA-300 Windows-based Measuring, Archiving and Transmittal System

The VIA-300 is Windows-based video measuring, marking and archival software with a standard knob controller and interface card. The knob controller gives users the precise and quick feel of measuring that is the hallmark of other Boeckeler VIA- measuring products. The software includes measurement features X, Y, XY, diagonals (point-to-point), area, angle, circumference, particle counting, hardness measurement, and a timer. Marking features include pointers, scales, grids, boxes, circles, crosslines, freehand draw (with a mouse or optional light pen), straight line draw, text labeling, and the ability to align the markers over the image as a “go/no go” gage.

The VIA-300 software can also store and retrieve the image, overlay the image with measuring and marking features, then transmit the image to another VIA-300 workstation for review, via LAN, the internet, or through a modem. A live and stored image can be displayed together for comparison. Images can be saved and transmitted with or without the measurement/marker overlay as TIFF, BMP, JPEG, or other standard formats. Images can also be appended with voice and text files describing each case. E-mail can be sent and received using a standard E-mail program such as Microsoft™ Exchange or Microsoft™ Outlook. Query the database by fields or combinations of fields, or use a thumbnail search. Clip all or part of an image and insert it into a document, presentation application, or spreadsheet. Statistics can also be exported to a spreadsheet. In addition, with a compatible frame grabber, the VIA-300 can be used to grab 640 x 480 pixel resolution images. Please contact your authorized Boeckeler dealer for information on a complete turn-key computer system or on integrating the VIA-300 software on an existing computer system.

*(*Future release; call for availability. Also, specifications differ than those listed on page 8, so call for a VIA-300 software data sheet).*

The new VIA-200 MVS video image marker-measurement system (Multiple Video Standard) with optional knob controller.



—BOECKELER IMG™ PRODUCTS—

The Boeckeler IMG- products provide a means to enhance or focus an image prior to video measurement or analysis. An IMG- product may be used with or without a Boeckeler VIA- product, making the IMG-

product line useful for many applications.

Among applications are those which require quality video prints used in later analyses.

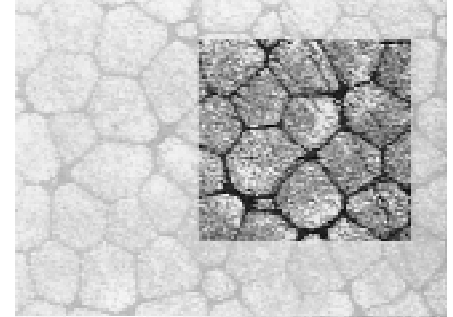
PRODUCT DESCRIPTIONS

■ IMG-40™ Focus Indicator

The IMG-40 focus indicator features a numeric display of focus. The higher the number, the more in focus the video image. The display is positionable, and a selectable window allows the focus area to be targeted. This product is used to achieve an objective focus (rather than subjective) and to provide a means for a repeatable focus. An RS-232 port allows ASCII transmission of the focus indicator's numeric display, giving operators a means to store focus levels for future viewing of the same or similar images. The IMG-40 can also be used to provide a quick means for obtaining feedback when connected to auto-focusing systems.

■ IMG-100™ Image Contrast Controller

The IMG-100 image contrast controller features contrast, shading and inversion controls which serve to enhance microscopic images from the video end of the system. This enhancement would be desired before measuring or analysis takes place, or before outputting the image to a video printer. Low-contrast images may be displayed with high contrast and sharp definition. Shading controls allow for easy positioning and sizing of shadows on an image. This creates an effect similar to adjusting the microscope's light sources. Inversion and color switches allow operators to achieve a quick negative/positive image or an image without color. A process bypass switch allows users to view the image unaltered.



The IMG-100 window is activated to target the area needing contrast enhancement.

■ IMG-RGB™ Controller

Connected to the IMG-100 and an RGB camera and monitor, the IMG-RGB controller can be used to control red, green and blue signals independently. For example, the IMG-RGB can be used to eliminate or tone down the color red in a blood sample so that other details in the sample may be fully displayed.

—VIA- and IMG- APPLICATIONS —

VIA- and IMG- products are ideal for clinical, research, industrial and educational use. Wherever a VIA- product is used, an IMG- product may be used to obtain accurate and repeatable focus for calibration or to enhance the images being marked or measured.

VIA- marking systems can be used wherever video overlays are used—for video presentations, image annotation and go/no go comparisons to a preset standard. Marking can be used to highlight features of interest, center an image, verify image size and label specific features.

Numerous applications for VIA- measuring systems are found in the life sciences and industry. Life science applications include the measurement of cell or particle dimensions, tissue cross sections, blood vessel diameters and cell motion. Biomedical engineering applications include the dimensional measurements of pacemaker components, catheters and synthetic filters. Forensic (crime) labs use VIA- products for measurement and comparison of ballistic samples,

fingerprints, footwear and the labeling of video prints and transparencies for courtroom presentations.

Electronics applications include the analysis of semiconductor wafers, printed circuit boards, packaging, components, leads, connectors and hybrid microelectronics; the measurement of line widths and bonding pads, wire bond characteristics and dimensions, plating thickness, wafer patterns, screen registration, ceramic substrate dimensions, hole diameters, J-lead planarity and connector tolerances and the placement of surface mount components.

Applications can also be found in such diverse industries as automotive, food and textile manufacture, aerospace and fiber optics. Specifically, industrial applications include the determination of fiber optic diameters, concentricity of connectors, thickness of packaging, insulation, urethane and silicon coatings, bubble size in glass, textile thread size, solar cell alignment, adhesive squash out and verification of the centers on hard disk drives.

— VIA- OPTIONS AND ACCESSORIES —

VIDEO INTERFACE UNITS

A video interface unit provides access to virtually any video environment. The video interfaces connect easily to standard VIA- products and can be used to generate overlays in any one of several thousand colors to optimize contrast against nearly any background image.

■ VIA-® RGB Unit

The VIA-RGB unit is designed for use with analog RGB cameras and monitors. To connect with this unit, cables with four male BNC connectors are required.

■ VIA-® Y/C Unit

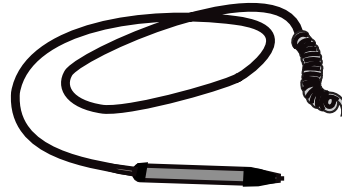
The VIA-Y/C can be used with Y/C (S-Video) cameras and monitors. To connect with this unit, cables with standard Y/C connectors at each end are required.

■ VIA-® COLOR Unit

The VIA-COLOR unit is designed to provide colored VIA- overlays with color NTSC composite cameras and monitors. A standard BNC cable is required for connection to the camera. A second BNC cable is required for the monitor connection. (NOTE: due to the nature of the NTSC standard, Boeckeler Instruments recommends that the VIA-COLOR interface be used only with the VIA-20 video pointer and, in some instances, the VIA-70 video image marker.)

■ Light Pen, Mouse Pen, Mouse

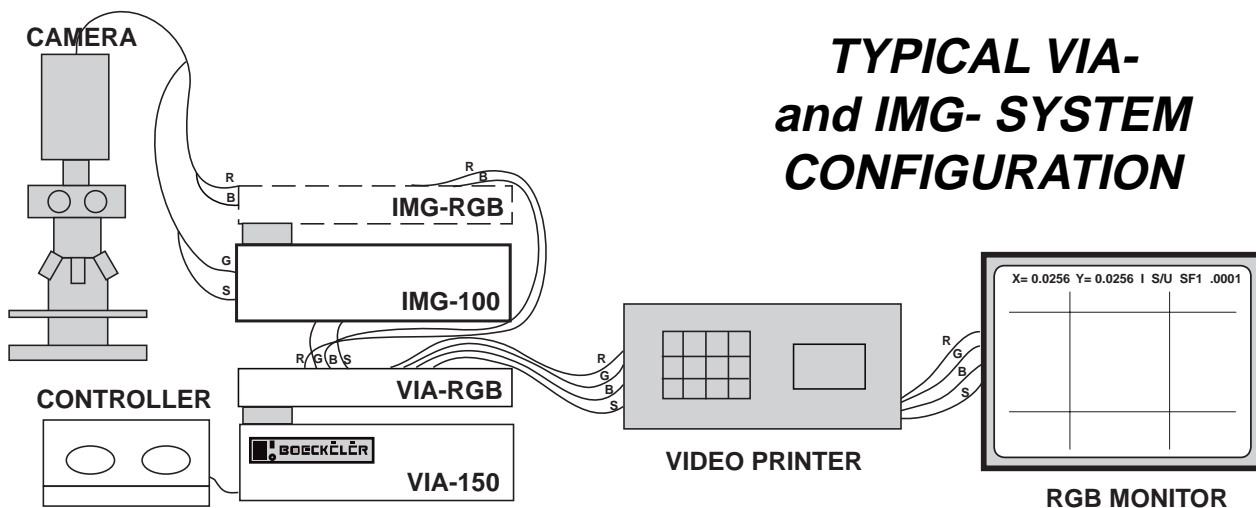
The VIA-70 and VIA-170 are compatible with an optional light pen, mouse pen or mouse.



Light Pen Controller

■ Impact Printer, Video Printers, Cables

Boeckeler offers a small impact printer for recording measurement data through the RS-232 port on the VIA- unit. The VIA- systems are compatible with video printers which can be purchased through a variety of third-party vendors. Cables are available for interfacing VIA- systems to printers or computers.



— TABLE OF BOECKELER VIA- PRODUCTS —

	VIA-300	VIA-200	VIA-170	VIA-150	VIA-110	VIA-100	VIA-70	VIA-30J	VIA-20J
Knob Controller	+	VIA-200K	VIA-170K	VIA-150K	VIA-110K	VIA-100K			
Joystick Controller		VIA-200J	VIA-170J	VIA-150J	VIA-110J	VIA-100J		+	+
Keyboard Controller	+	+	+				+		
Light Pen	optional	optional	optional				optional		
Mouse Pen/Mouse	optional	optional	optional				optional		
Freehand Drawing*	+	+	+				+		
Text Via Keyboard	+	+	+				+		
Text Selected from Menu				+					
Arrows (Pointers)	+	+	+	+			+		+
Sizeable Boxes	+	+	+	+			+		
Sizeable Circles	+	+	+	+			+		
Small Cross Hairs	+	+	+	+			+		+
Lines	+	+	+	+			+	+	
Centered Crosslines	+	+	+					+	
Rulers or Scales	+	+	+	+			+		
Sizeable Grids	+	+	+	+			+		
Date/Time Label	+	+	+	+			+		
Active Marker Flashes									+
Displays Size and Coordinates of Markers	+	+	+	+			coords. only	coords. only	
Align Mode	+	+	+				+		
Displays Path Length	+	+	+						
Measures X and Y	+	+	+	+	+				
Measures Point-to-Point	+	+	+	+		+			
Measures Angles	+	+	+	+		+			
Measures Radius and Circumference	+	+	+	+		+			
Measures Area	+	+	+						
Measures Chords	+	+	+						
Counts Cells or Particles	+	+	+						
Measures Elapsed Time	+	+	+						
Determines Hardness Values	+	+			+				
# of Calibrations Stored	unlimited	10	10	10	10	10			
# of Marker Overlays Stored	unlimited	10	10	10			10	1	1
Statistics Table	+	+	+		+				
Security Menu	+	+	+						
Composite NTSC, CCIR or PAL Compatible**	dependent on frame grab	+	+	+	+	+	+	+	+
Y/C (NTSC or PAL) Compatible**	dependent on frame grab	+	optional	optional	optional	optional	optional	optional	optional
RGB (NTSC or PAL) Compatible**	dependent on frame grab	+	optional	optional	optional	optional	optional	optional	optional
RS-232 (ASCII) Output		+	+	+	+	+	+		
Windows-based Software	+								
Image Archiving	+								
Image Transmit/Receive	+								

— TECHNICAL SPECIFICATIONS —

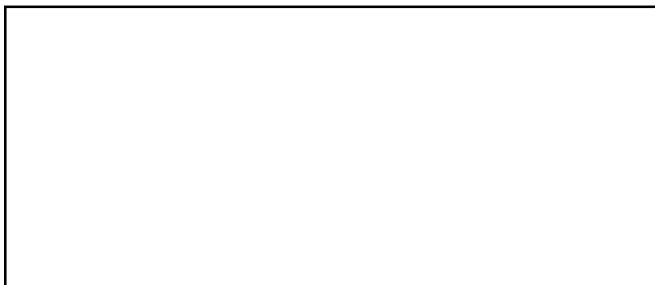
	VIA- BASE UNIT*	VIA-RGB	VIA-Y/C	USER INTERFACE**
Video Input	Composite NTSC, CCIR or PAL***; Composite (BNC x 1) 1.0 V p-p, 75 ohms	RGB Analog: (BNC x 3) 0.7 V p-p, 75 ohms Sync Analog or TTL: (BNC x 1) 0.2-5.0 V, 2.2 Kohms	Y/C (S-Video); Y: 1.0 V p-p C: 0.286 V p-p 75 ohms	N/A
Video Output	Unity gain, loop through; Composite (BNC x 1) 1.0 V p-p, 75 ohms	RGB Analog: (BNC x 3) 0.7 V p-p, 75 ohms Sync Analog or TTL: (BNC x 1) 0.2-5 V, Unity gain, loop through, 75 to 10 ohms	Y/C (S-Video); Y: 1.0 V p-p C: 0.286 V p-p 75 ohms	N/A
Overlay Contrast Range	Black to White	Full Spectrum Color	Full Spectrum Color	N/A
Resolution	Composite NTSC; 1024 (H) x 482 (V) CCIR/PAL: 512 (H) x 574 (V)	Composite NTSC; 1024 (H) x 482 (V) CCIR/PAL: 512 (H) x 574 (V)	Composite NTSC; 1024 (H) x 482 (V) CCIR/PAL: 512 (H) x 574 (V)	N/A
Stability	Reticle line placement accurate to one line of video, phase locked to camera for stability.	Provided by VIA-base unit	Provided by VIA-base unit	Provided by VIA-base unit
Measurement Data Output	Through RS-232 port for VIA-200, VIA-170, VIA-150, VIA-110 and VIA-100	N/A	N/A	N/A
Ambient Temperature	0° C to 55° C	0° C to 55° C	0° C to 55° C	0° C to 55° C
Power Supply	110/220 VAC, 0.5 AMP (60 Hz)	Provided by VIA-base unit	Provided by VIA-base unit	Provided by VIA-base unit
Dimensions	9.9" (W) x 2.6" (H) x 7.0" (D) 251.5 mm (W) x 66.0 mm (H) x 177.8 mm (D)	9.9" (W) x 2.6" (H) x 7.0" (D) 251.5 mm (W) x 66.0 mm (H) x 177.8 mm (D)	9.9" (W) x 2.6" (H) x 7.0" (D) 251.5 mm (W) x 66.0 mm (H) x 177.8 mm (D)	9.9" (W) x 2.6" (H) x 7.0" (D) 251.5 mm (W) x 66.0 mm (H) x 177.8 mm (D)
Approximate Weight	4 lbs, 2 oz 1.9 kg	3 lbs, 3 oz 1.5 kg	3 lbs, 1 oz 1.4 kg	2 lbs, 6 oz 1.1 kg
Connections to VIA-	N/A	DB-37	DB-37	DB-37
Warranty	1 year parts and labor	1 year parts and labor	1 year parts and labor	1 year parts and labor

* Specifications for the VIA-200, VIA-300, and IMG- products are supplied on individual data sheets.

** The User Interface is a standard component of the VIA-170 and VIA-70.

*** CCIR and PAL versions are available when specified on order.

Represented by :



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