VMU300 & VMU400

Video Caliper

MicroImage Video Systems
division of World Video Sales Company, Inc.

PO Box 331
Boyertown, PA 19512-0331

610-754-6800
Fax 610-754-9766

www.mivs.com

Sales: sales@mivs.com
Support: support@mivs.com

Rev 1.00 March 31, 2002

CONTENTS

UNPACKING

The VMU300 and VMU400 systems include the following components:

VMU300 or VMU400 Video Caliper Unit
DPD120050 wall mount or DTS120150 universal desktop (optional) power supply
This operation manual

Please inspect all items carefully and report any damaged or missing items to your dealer or MicroImage Video Systems as soon as possible. Do not power up any damaged unit.

CONNECTIONS

Power Supply

The VMU300 and VMU400 Video Calipers ship with a standard 12VDC wall mount power transformer or with an optional desktop universal power supply.

Connect the power supply to the power input on the VMU unit. Also, connect the power supply to a suitable power receptacle/outlet which meets the appropriate ratings on the power supply.

All VMU300 and VMU400 units may be optionally powered from an external +12VDC (+10 to +20V), negative ground power source which is relatively clean. Contact MicroImage Video Systems for additional information.

Video Input

A video source must be connected to the VMU300 or VMU400 for it to function properly.

The VMU300 may be connected to either an S-Video camera (via the S-Video 4 pin input connector) or to a composite or B&W video source (via the Video input BNC connector).

The VMU400 may be connected to an RGB or RGB and Sync video source (via the 9 pin D-sub RGB IN connector). MicroImage Video Systems has suitable cables available for connection to other devices. The pin connections on the 9 pin D-sub follow the industry standard for an RGBS signal.

Video Output

The video output must be of the same type as the video input signal, i.e. if S-Video is used as the input, S-Video MUST be used as the output. This unit will not transpose between different signal types. To use the external sync output of the VMU400, external sync must be connected to the input of the unit, it will not generate external sync by itself.

Connect a suitable output cable from the appropriate video out connector to a monitor or other display device. Make sure that the monitor (or other device) is correctly set to view that type of video signal.

Other Connections

If you have a custom option installed which requires an external connection, please see the supplement to this user guide for additional information.

CONTROLS & INDICATORS

Power Switch

The power switch is located in the lower right corner of the front panel. Pressing it once turns the unit on, pressing it again turns the unit off. When off, the unit draws minimal power. All VMU units will remember their settings when the power is turned off. More information is provided later in this text.

Position Control 1

This rotary control will move the left or top cursor (depending on the setting of the X/Y switch) or it will move both (same axis) cursors together if the track function is enabled.

Position Control 2

This rotary control will move the right or bottom cursor (depending on the setting of the X/Y switch). If track mode is on, it will adjust the spread between the two (same axis) lines.

Lock Switch 1 and Lock Switch 2

Enabling the lock function will cause the related rotary position control to have no effect while lock is on (indicated by the RED lamp below the switch). Lock functions are remembered independently for the X and Y axes. A Lock override can be set in the menu system to lock a control regardless of the switch setting (which will also be indicated by the light).

Track

Enabling the tracking function (lamp on) will cause the left position control to move both lines of the same axis together (keeping the spacing constant). The right control will adjust the spacing between the lines. When the tracking function is disabled (indicator extinguished), the two controls will move the lines fully independently.

Position

The position set function allows the user to relocate the numeric display. Pressing the

POSITION switch will turn on (indicator illuminated) the position set function for the numeric dimension display. When the position function is enabled, turn the left (#1) control to move the horizontal position and the right (#2) control to change the vertical position. Press the POSITION switch again when finished to disable the position set function. Note that many other functions are disabled while position set is on.

Display

Pressing the DISPLAY switch will toggle the overlay on and off including the character and line display. This makes it easy to go to a “clean source image” and back to the measurement mode. When the display is off, many switches and the controls are inactive to prevent accidental changes. The indicator is illuminated when the display is on.

X/Y

The X/Y switch chooses between X or Y axis movement. There is an indicator for each direction. Note that the positions and lock information are remembered independently for each axis.

B/W

Selects whether the lines are displayed as black or white. This switch does not affect the color of the numeric display or menu system.

Menu

Pressing the MENU switch places the unit in the menu mode allowing the user to set his or her preferences. The exact menus are covered in a later chapter in this manual.

Set

Pressing SET will allow the user to calibrate the unit and also set the unit of measure. Operation is through simple menus.

7 (backspace)

Pressing the backspace button will allow you to edit the numeric calibration as it is being entered. Backspace deletes the character last entered.

0 thru 9 and . (decimal point)

These keys are used to enter the calibration reference and to navigate the menu systems. They are used in a way similar to a calculator. Note also that the 2, 4, 6 and 8 keys are also used as a four directional cursor array when changing the custom unit of measure settings.

Enter

Completes the entry of a calibration setting or completes a menu operation.

Store

Pressing the STORE key will illuminate the indicator next to it. After pressing the STORE key, you must press one of the number keys (0 through 9) to specify which memory, which will extinguish the indicator. You can also cancel the storage by pressing STORE a second time (which will also extinguish the indicator). Each memory will save most of the settings of the unit, allowing easy access to multiple calibrations. See the section on Memories later in this manual.

Recall

Pressing the RECALL key will illuminate the indicator next to it. After pressing the RECALL key, you must press one of the number keys (0 through 9) to specify which memory, which will extinguish the indicator. You can also cancel the recall by pressing RECALL a second time (which will also extinguish the indicator). See the section on Memories later in this manual.

Overview

```
Main Menu

1. Line Options
2. Coordinate Options
3. B/W or Color mode
4. Color Bars
5. Remote Options
6. System Options

0. Exit

Press number for selection
```

The VMU series are designed for ease of use. Commonly used functions are easily changed with front panel settings while less used functions can be changed only with the menus. This section will describe the various menus and how they work. For the calibration set menus and units of measure, please see the next section.

The menus system is divided into a hierarchy, or tree structure. Each branch has several related menus that can be changed. The main or top menu is the first one you see after pressing the MENU button. You then choose one of the categories and press the number key relating to that menu. This will bring up another menu where you press the numeric key of choice and so on. Enter will select the highlighted item. Pressing the 0 (zero) key will exit each menu back up to the previous menu.

Main Menu

Each menu will be described below:

Line Options

1. X1 Line Options	This item selects whether the X1 (left) line is set to solid, serrated or turned off. Each line may be set individually.
2. X2 Line Options	This item selects whether the X2 (right) line is set to solid, serrated or turned off. Each line may be set individually.
3. Y1 Line Options	This item selects whether the Y1 (top) line is set to solid, serrated or turned off. Each line may be set individually.
4. Y2 Line Options	This item selects whether the Y2 (bottom) line is set to solid, serrated or turned off. Each line may be set individually.
5 Lock Overrides	Allows you to enable lock overrides for each line. If these are set to on, the line will remain locked regardless of how the front panel lock switch is set (lock indicators will light).

6 Box/Lines	This will set whether lines or a box will be displayed. The lines are full screen length. Boxes may be set as either an outline (normal box mode) or solid (filled).
7 Line Size	Line size can be set to thin or thick. X and Y axes may be set individually. When the line size is set to thick, measuring resolution will be lower due to video system restrictions and display capabilities.

Coordinate Options

1. Display Options	You can choose whether to display the numeric value for X, Y or diagonal measurements. Any combination can be displayed.
2. Character Color	Sets the foreground (character) color of the alpha-numeric digits but does not affect the line color (see the B/W switch to change the line color). Eight color settings are possible. In B&W mode, the colors are displayed as shades of gray.
3. Background Color	Sets the background color of the alpha-numeric digits but does not affect the line color (see the B/W switch to change the line color). Eight color settings are possible in addition to no background. No background allows the characters to display directly on the video image without any solid area behind them. In B&W mode, the colors are displayed as shades of gray.
4. Display Layout	Chooses whether the X, Y and diagonal dimensions are displayed in a row or column format.
5. Precision Digits	Allows the user to choose the precision of the measurement display. For readability, the display precision can be reduced to only the amount of information that is really needed for the application. The precision can be set from 2 to 5 digits, with 4 being the factory default.

B/W or Color Mode

The user can select whether the Video Caliper is used with Black and White (B&W) or color video. For the unit to display the images properly, it must be set for the proper mode. If the unit is set to color mode on a B&W signal, there may be extra grain present in the picture, especially around the characters. If the unit is set for B&W when used with a color system, it will display only B&W characters and color bars will be B&W too.

Color Bar Menu

A reference color bar generator is built into the Video Caliper and can be enabled through this menu. When color bars are turned on, the camera or other input video image will not be visible. The color bars are designed to test for the presence of the colors and system troubleshooting.

The color bars are not designed to replace a precision test signal generator for calibration purposes.

Remote Options

The remote options are only used when the factory optional remote interface is ordered and installed in the unit. This interface comes with a separate interface operation manual.

System Options

1. System Properties This menu shows the product name, the firmware revision and code base as well as the MicroImage copyright for the code. There is also a link to the MicroImage Web site as well.

CALIBRATION SET

Scale and Unit Parameters

1 Set Scale Using X Axis
2 Set Scale Using Y Axis
3 Clear Scale
4 Select Unit
5 Define Custom Unit

0 Exit

Press number for selection.

Overview

The SET menu is similar in operation to the MAIN MENU, however the SET menu is used to set the calibration for the unit and the unit of measure. See the section about operation (setting the scale) for additional information on using the SET menu. Below, each menu is described in detail. Calibration only needs to be set for one axis to calibrate all directions.

Set Scale Using X Axis

This will set the calibration using the horizontal (left to right) axis, or the distance between two vertical (up-down) lines. It will accept any number, up to four digits between 0.0001 and 9999 for the calibration.

Note that measuring is much more precise when setting the calibration on the X axis, as opposed to the Y axis. Calibration is also more precise when the distance between the two lines is as wide as possible during calibration.

Set Scale Using Y Axis

This will set the calibration Using the vertical (top to bottom) axis, or the distance between two horizontal (left-right) lines. Enter any number, up to four digits between 0.0001 and 9999 for the calibration.

Note that measuring is much more precise when setting the calibration on the X axis. Y axis calibration is provided for those places where X axis calibration is impractical. Calibration is also more precise when the distance between the two lines is as wide as possible during calibration.

Clear Scale

Clear scale will set the calibration to a value of 1.0000 per pixel regardless of the line positions. This can be handy for making absolute position measurements with the lines and measuring in pixels.

Select Unit

You will initially be provided with three categories as follows:

1. Metric Units	A selection of commonly used Metric units are available in this menu. Press the number corresponding to the unit to be displayed.
2. English Units	A selection of commonly used English units are available in this menu. Press the number corresponding to the unit to be displayed.
3. User Defined	This will display all the user defined units. Units must have been previously defined (see menu item 5, Define User Unit below).

The unit of measure is the same for all three axes.

Define User Unit

Up to eight different user defined units can be entered. Each can be one or two characters long. Once defined here, they will be available in the Select Unit menu described above. To set a unit, press the appropriate number for the location where you want to save the unit. Next, press the up and down keys (#2 and #8) to change the character. Use the left and right keys (#4 and #6) to select between the left and right characters. Press the ENTER key when complete.

MEMORIES

Overview

The VMU300 and VMU400 incorporate ten user accessible memories which save most system settings. This allows you to save calibration settings for different zoom factors. The unit will retain the information in memory after power is removed for up to several years.

Memory Save

At any time during normal operation, you can save the current calibration and cursor positions into one of the ten memories. To save a setting into memory, press the save button (the red indicator next to it should illuminate). Next press a number from 0 through 9 which corresponds

to the memory location you want to save to. To cancel a save, before pressing the number, press the save button a second time or press the enter button.

Note: It may take up to 5 seconds after the save button is pressed for the setting to be stored into the non-volatile (long term) memory. This is due to the multi-tasking nature of the unit's operating system. Do not turn the unit off or remove power until at least five seconds after pressing the number key of the save operation.

Memory Recall

At any time, you can recall one of the ten memories. To recall one of the settings, press the recall key and then press one of the number keys that corresponds to the desired memory.

OPERATION

Overview

This section will describe the basic use of the Video Caliper. The unit should be properly connected and operating. Make sure that the cursors and dimensions are displayed before continuing.

Calibration

In order to use the caliper, it must first be calibrated. Place an object with a known dimension (the reference object) in the field of view, at the same distance from the optics (lens) as the object(s) you wish to measure. It is best to set the reference dimension using the X axis as this provides better accuracy. X axis measurements provide better resolution as well. This is due to the low 480 vertical scan lines used in NTSC/RS170A video. The horizontal (x axis) resolution is less restrictive since it does not have a hard resolution limit.

Once the reference object is fully visible in the monitor, move the cursors to a known dimension on the object. Using a reference dimension that is one half the screen width or more will result in the best measurement accuracy.

Setting the Scale

Press the SET button to bring up the SCALE and UNIT PARAMETERS menu.
Press 1 to set the scale using the X axis or press 2 to set the scale using the Y axis.
Enter the dimension of the reference object that is between the cursors.
- The value entered must be in the range of 0.0001 to 9999.
- You can use the Backspace (7) key to delete an incorrectly entered digit.

Press the Enter Key when done.

When the reference dimension is entered as above, you can remove the reference object and measure any item at that distance from the optics (lens) in either the X, Y or diagonal directions.

Adding a unit of measure

You may also wish to add a unit of measure to your dimension display. The following procedure is used to add a unit of measure to the dimension display:

Press the SET button to bring up the SCALE and UNIT PARAMETERS menu.
Press 4 to access the SELECT UNIT menu.
Press 1 to use a metric unit, 2 to use a US unit or 3 to use a custom unit. If you need to set a custom unit first, press 4 and follow the procedure in the section describing custom units.
Next press number 1 through 8 to choose the appropriate unit of measure.
Press 0 twice to exit (once to return to the Scale and Unit Parameters Menu and the second time to exit the menus).

Saving the current configuration

Once you set a calibration, you may want to store it in memory for use later, so you don't have to keep re-calibrating for the same zoom or magnification factor. You can save the data in one of ten memories by doing the following:

Memory Store

Set the cursors and scale for your application
Press the STORE key (the indicator should illuminate)
Press a number (0 through 9) to select one of the ten memory locations (indicator should extinguish after pressing the number)
Within five seconds the state of the machine will be saved to that memory number, even after power is turned off.

Memory Recall

To recall from memory, press the RECALL key followed by a number key (0 thru 9) relating to the memory you wish to recall from.

Specifications

Calibration Entry range	0.0001 to 9999
Numeric Display Range	0.00001 to 15668400
Significant Digits	Selectable 2, 3, 4, 5, or 6
Scale Display Layout	Row or Column
Calibration Axes	Can be calibrated on X or Y axis
Measurement Axes	Any combination of X, Y and Diagonal measurements
Scale Display Position	Movable anywhere within 90% center of screen
B&W Select	Menu setting to remove chroma (color) to support B&W video
Line Attributes	Individually selectable as off, solid or serrated
Rule Mode	Full line or box display
User Memories	10
User definable units of measure	8 (2 digits each)
Color Bars	SMPTE style
Display colors	
Foreground	(8) Black, Blue, Red, Magenta, Green, Cyan, Yellow, White Note: 8 shades of gray for B&W video
Background	(9) Black, Blue, Red, Magenta, Green, Cyan, Yellow, White and Transparent; Note: 8 shades of gray for B&W video
Character Cell Display	16x20 pixel cell, interlaced (HxV)
Non-Volatile Memory type	EEPROM
System Microprocessor	16/32 bit architecture
Line Generation	Digitally generated with MicroImage Video custom circuit
Display controller	Custom MicroImage Video integrated display controller
Front panel controls	(2) Line position controls, multi-turn precision optical encoders
Front panel switches	(25 total) Power, Lock 1, Lock 2, Track, Scale Position, Scale Set, Display On/Off, B/W, X/Y, Menu, Store, Recall, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, Decimal Point (.), Backspace, Enter
Front Panel Indicators	(10) Power, Lock 1 on, Lock 2 on, Track on, Scale Position on, Display on, X, Y, Store, Recall
X axis line width	40.75 uS (Narrow), 81.5nS (Wide)
Y axis line width	1 scan line (Narrow), 2 scan lines (Wide)
Line Resolution	1280 x 480 (Frame/Narrow), 1280 x 240 (Field/Wide)
Adjustment range	98% of raster area minimum
Sync system	RS170A (North American NTSC Timing)
Color System	NTSC (composite video and S-Video)
Genlock	Precision Phase Locked Loop (PLL), square pixel
Bandwidth	Greater than 30 MHz
Input Levels	
NTSC	1.0Vpp composite, 75 ohm
S-Video	1.0Vpp (Y), 0.286Vpp burst (C), 75 ohm
RGB	0.7Vpp non-comp / 1.0VPP Comp, 75 ohm
Sync	0.3-4.0Vpp, 75 ohm
Output Levels	
Composite	Same as respective input, +/-5% into 75 Ohm
S-Video	Same as respective input, +/-5% into 75 Ohm
RGB	Same as respective input, +/-5% into 75 Ohm
Sync	Same as input level, up to 2Vpp. +/-
Connectors	

NTSC	BNC Female
RGB & Sync	9 pin D-sub Female
S-Video	4 pin mini-DIN Female (std. S-Video connector)
RS232	8 pin mini-DIN Female
Remote port (option)	
Data format	EIA-232 (RS-232)
Language	MicroImage Control Language
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200
Data Bits	7 or 8, selectable
Parity	Off or Even, selectable
Stop Bits	1
Temperature	
Operating	0 deg ~ 40 deg C (32 deg - 104 deg F)
Storage	-40 deg ~ 60 deg C (-40 deg - 140 deg F)
Humidity	
Operating	10% ~ 90% (non-condensing)
Storage	5% ~ 95% (non-condensing)
Power	120VAC Power adapter included Universal Adapter optional (Option UP)
Voltage	12VDC (+9 to +20 VDC)
Consumption	Approximately 270mA typical at +12VDC
Size	9.00" (W) x 7.63" (D) x 2.88" (H) 229 mm (W) x 194 mm (D) x 73 mm (H)
Weight	1 lbs. 14 oz., (851g)
Country of Origin	Manufactured in the USA by MicroImage Video Systems

Specifications are subject to change without notice.

Warranty

MicroImage Video Systems warrants that each VMU300/VMU400 unit is free from defects due to faulty materials or improper workmanship for a period of one (1) year. MicroImage Video Systems further warrants that any part which proves defective in materials or workmanship within one (1) year , will be replaced or repaired at no cost to the user. Labor to replace defective parts will be done without charge, provided the equipment is returned to MicroImage Video Systems prepaid, insured and properly packaged. Prior return authorization must be obtained from MicroImage Video Systems.

NOTE

This warranty covers the VMU300/VMU400 only.

CONDITIONS

This warranty is void if the warranted part has been altered or subjected to abuse or misuse. Defective parts must be returned to MicroImage Video Systems

SOLE WARRANTY

This Warranty is in lieu of all other warranties expressed or implied including, without limitation, any implied warranty or any implied warranty of fitness for a particular purpose. MicroImage Video Systems shall have the final right to determination as to the existence and cause of any defect and its appropriate adjustment in accordance with the terms of this warranty. In no event shall MicroImage Video Systems be liable for any consequential or collateral damages.

Returns

All returns **MUST** have an RMA number. Please call, fax or email for an RMA form. The RMA form will have the proper shipping address for returns.

Phone	610-754-6800
Fax	610-754-9766
Email	service@mivs.com