

Video Caliper

Operation Manual

For Models

VMU250

VMU350

VMU850

MicroImage Video Systems

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UNPACKING

The Video Caliper system includes the following components:

- VMU250, VMU350 or VMU850 Video Caliper Unit
- 12 volt power supply
- This operation manual

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

CONNECTIONS

Power Supply

The Video Caliper ships with a standard 12VDC power supply that is suitable for use in North America. Internationally sold units may include a “world” power supply with multiple plug adapters.

Connect the power supply to a suitable power receptacle/outlet which meets the appropriate ratings on the power supply. You may need to install a different plug adapter for receptacles/outlets other than those used in the USA.

All Video Caliper units may be optionally powered from a clean source of external +12VDC (+10 to +20V) negative ground power. Contact Microlmage Video Systems for additional information.

The unit may take several seconds to power up and initialize.

Video Input

A video source must be connected to the Video Caliper for it to function properly. The unit will automatically detect the input signal and adjust accordingly. It typically takes less than one second for a valid signal to be detected and the VMU to set itself accordingly.

The VMU259 and VMU350 Video Caliper may be connected to a composite or B&W video source (via the Video Input BNC connector).

The VMU850 Video Caliper Video Input may be connected to an HDMI or DVI video source signal.

Video Output

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. Note that some cameras may output both High Definition and Standard

Definition video, and may produce SD video with non-standard vertical to horizontal ratios.

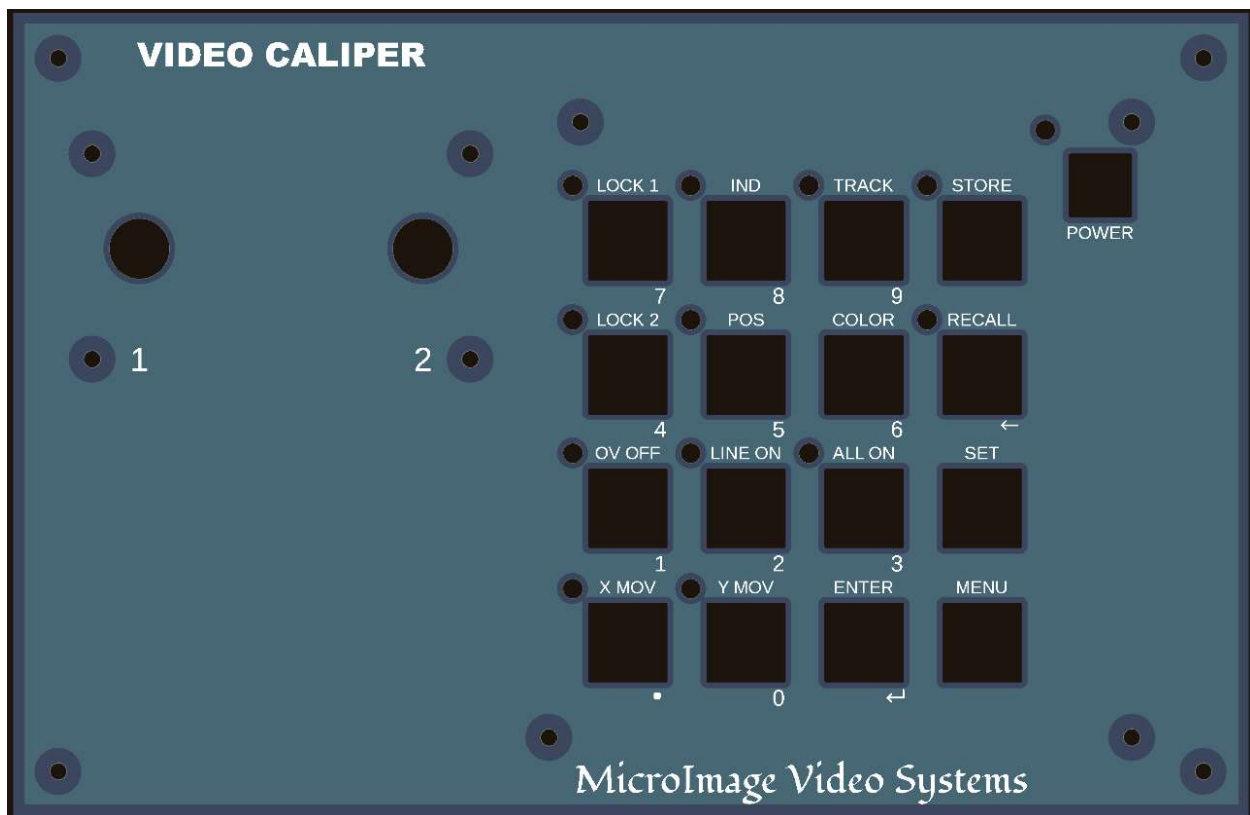
VMU850 note: The VMU850 is compatible with most video cameras that produce a true and properly formatted video signal. Some cameras do not provide a true quality signal and may work intermittently or not at all.

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

Unlike previous VMU units, the VMU250, VMU350 and VMU850 have multiple switches which share functions. Notably, the numeric keypad functions are only available when the menus are active.



Above: Layout of the VMU Control Panel.

Power Switch

The power switch is located in the upper 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. The unit will also remember the power switch setting when power is removed. If the power switch was on when power is disconnected, it will turn on again when power is restored to the unit.

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. This control is also used to select the field which is being edited in other menus.

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. This control is also used to alter the value of the field being edited in other menus.

Lock Switch 1 & Lock Switch 2

Enabling the lock function will cause the related rotary position control to have no effect while the corresponding Lock is on (indicated by the RED lamp above the switch), in order to prevent accidental or unauthorized movement of a control. 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 (its functional status will be indicated by the light).

Ind & Track Switches

Enabling the tracking function (yellow track (indicator 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. Depending on the settings in the Track Switch Mode menu, when active, the right control will either move the second line relative to the first (Track Mode) or move both lines in opposite directions from a mid-point between them (Mirror Mode). When IND (Independent mode) is pressed, the tracking function is disabled (Green IND indicator now illuminated), the two controls will move the lines fully independently.

POS (Position) Switch

The position set function allows the user to relocate the numeric display. Pressing the POS switch (indicator on) will activate the position set function for the numeric display. When the position function is enabled (the orange indicator above it is illuminated), turn the left (#1) rotary control to change the horizontal position and the right (#2) rotary control to change the vertical position. Press the POS switch again when finished to disable the position set function. Note that many other functions are disabled while position set is on.

OV Off, Line On, All On Display Switches

OV OFF - Pressing this switch will turn off all overlay graphics allowing an unimpeded view of the source image. When the OV OFF is set, a blue indicator above it will illuminate. When the display is off, many switches and the controls are inactive to prevent accidental changes.

LINE ON - Pressing this switch will display only the lines (menus are also allowed). A Magenta indicator will illuminate when this mode is enabled.

ALL ON - Pressing this switch will enable the lines and coordinate box to be displayed as well as all menus and addition graphics. A white indicator will illuminate to signal that this mode is active.

X & Y Switches

The X and Y switches select between X and Y axis movement with the controls. Pressing the X switch will allow the vertical lines to move horizontally with the controls and is indicated by a green indicator. The Y switch will allow the horizontal lines to be moved vertically and has a yellow indicator above the switch to signal this mode is being used.

COLOR Switch

For the VMU250 & VMU350, this switch selects whether the lines are displayed as black, gray, or white. This switch does not affect the shades used by the numeric display or menu system. The COLOR switch will repeatedly cycle through the three different shades.

For the VMU850, pressing this switch will bring up a color menu and allow the color of each line to be selected.

MENU Switch

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. Pressing the Menu switch again will exit Menu mode.

If the password protection is turned on, you may have to enter a password before using this function.

SET Switch

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

If the password protection is turned on, you may have to enter a password before using this function.

BACKSPACE KEY

When a menu requires editing, the backspace key will be active. It's functionality is shared with the RECALL Switch. Pressing the backspace button will allow you to edit the numeric calibration or the password as it is being entered. Backspace deletes the character last entered.

0 thru 9 and . (decimal point)

These keys are shared with various other functions and the lettering for the numeric keypad is to the bottom right of the button it relates to. These keys are used to enter the calibration reference, enter the password and to navigate the menu systems. They are used in a way similar to a calculator. Note that the 2, 4, 6 and 8 keys are also used as a four directional cursor array when changing coordinate colors or editing the time and custom unit of measure settings.

ENTER

Completes the entry of a calibration setting or password, or completes a menu operation. New time settings, passwords, or user memory settings are not saved until after the Enter key is pressed. The unit may take several seconds until it saves the data, although the unit should otherwise return to normal operation almost instantly.

STORE

Pressing the STORE key will illuminate the indicator next to it and allow you to save the unit's current settings into one of 9 user memory locations. The memory function will save most of the settings of the unit, allowing easy access to multiple calibrations. See the section on Memories later in this manual.

If the password protection is turned on, you may have to enter a password before using this function. Note: The operation of the above function has changed from the previous model.

RECALL

Pressing the RECALL key will blink the indicator next to it and restore the settings previously saved into one of the 9 user memory locations. See the section on Memories later in this manual.

MENUS

Overview

The VMU series of Video Calipers are designed for ease of use along with the ability to be highly customized to meet many demands. Commonly used functions are easily changed with front panel switches while less used functions can be changed through the menu systems. 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.

Note that the exact menus present may vary depending on the model.

If you have the Password Protection enabled, you may need to enter a password before you can enter the menu. See the section on Password Protection for additional information.

The menu 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. Pressing the 0 (zero) key will exit each menu back up to the previous menu.

SYSTEM OPTIONS

This is the main system menu. Items with a dark arrow following the item name activate a sub-menu with more choices.

SYSTEM OPTIONS

1. Lines
2. Readout
3. Display
4. Clock
5. Password
6. Remote
7. System
0. Exit

Press a number key to select
Press Menu key to exit

Each menu option will be described below:

Lines

The Line Options menu allows you to set the properties of the horizontal and vertical measuring lines.

LINE OPTIONS

1. Vertical 1 Style
2. Vertical 2 Style
3. Horizontal 1 Style
4. Horizontal 2 Style
5. Line Width
6. Lock Overrides
7. Line/Box Mode
8. Tracking Mode
9. Line Movement Options
0. Back

Press a number key to select
Press Menu key to exit

1. Vertical 1 Style

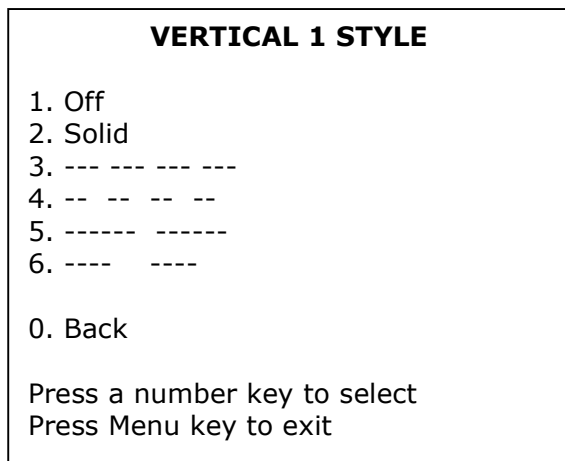
This item activates a submenu to set the X1 (left) vertical line to solid, serrated or off. Each line may be set individually.

1. Off will disable the selected line.

2. Solid will display the selected line as a solid line.

3-6. These choices will display the selected line as a series of dashes and spaces as shown.

1. This will return to the Line Options menu.



2. Vertical 2 Style

This item activates a submenu to set the X2 (right) vertical line to solid, serrated or off. Each line may be set individually. The sub-menu functions in the same manner as the Vertical 1 Style menu.

3. Horizontal 1 Style

This item activates a submenu to set the Y1 (top) horizontal line to solid, serrated or off. Each line may be set individually. The sub-menu functions in the same manner as the Vertical 1 Style menu.

4. Horizontal 2 Style

This item activates a submenu to set the Y2 (bottom) horizontal line to solid, serrated or off. Each line may be set individually. The sub-menu functions in the same manner as the Vertical 1 Style menu.

5. Line Width

Line size can be set to three different thicknesses. Both X and Y axis are affected by this setting. When the line size is set thicker, measuring resolution will be lower due to video system restrictions and display capabilities. Thin lines may also cause a slight increase in apparent flicker on some monitors due to limitations of the NTSC/PAL video system on the VMU250 and VMU350 standard definition video units.

6. 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). If these are set to Off, the functionality of the controls may be toggled by the lock switches.

7. Line/Box Mode

This will set whether lines or a box will be displayed. In Line mode, the lines are full screen length and height. In Box mode, the lines are truncated at their intersections, forming a box.

8. Track Switch Mode

The Tracking menu determines the function of the Tracking switch for both the vertical and horizontal line pairs. In "Off" (independent) mode, the controls will move the two lines of the pair (either vertical or horizontal) independently. The front panel Tracking switch will have no effect.

In Tracking mode, the first control will move both lines of the pair, while the second control will move the second line relative to the first. The front panel Tracking switch will toggle between independent and Tracking modes.

In Mirror mode, the first control will move both lines, while the second control will move both lines in opposite directions relative to a point mid-way between them. The front panel switch will toggle between independent and Mirror modes.

In Both modes, the front panel switch will cycle between independent, Tracking, and Mirror modes. The movement of the lines will depend on which mode is selected by the switch.

9. Line Movement Options

This opens a sub-menu to adjust the direction of the vertical control and to adjust the fast/slow movement rates of the cursors. Turning the controls quickly will result in rapid jumps of the lines, while slower movement of the controls will lead to less movement of the lines over the same rotation of the control.

2. Normal Speed Set – adjusts the sensitivity of the controls when the position controls are turned quickly. This allows the user to quickly put the lines close to where they need to be with less turns of the rotary controls. The higher the number chosen, the slower the lines will move.

3. Precision Speed Set – reduces the rate of line movement when the controls are turned at a rate below the threshold. This allows the lines to be moved with a high degree of precision, and placed exactly on target.

4. Slow/Fast Threshold Set – This sets the speed threshold between fast and slow control movement rates. A low threshold will provide rapid movement rates at even a modest turn rate, while a high threshold will require a rapid spin of the controls to access the higher movement speed of the lines.

0. Back

Returns you to the System Menu. Generally, the Back option returns you to the previous higher-level menu. Selecting this again while in the System menu will exit the menu system.

Readout

1. Readout Display

You can choose whether or not to display the numeric values for X, Y, and diagonal measurements, or X/Y and Y/X Ratios. Any combination can be displayed. See further information about displaying or suppressing the date and time. Ratio functions are available on units with a serial number of 31032 and later.

2. Character Color

Sets the foreground (character) shade of the alpha-numeric digits but does not affect the line shade (see the B/W switch to switch between line shades). The Set Character Color menu allows you to choose any grayscale shade on the chart by either rotating the controls or by pressing the 8, 4, 6, and 2 keys as a cursor control pad. The new selection will be indicated with a check mark. If the alpha-numeric display box is near the edges of the screen, it is possible to see the shades “in context” as you browse through them. The “present” selection will be indicated with the letter “P”. The Enter key will change the Present selection to the shade indicated by the check mark. Pressing the “0” key without pressing the Enter key will exit the menu without changing the Present shade.

3. Character Background

Sets the background shade of the alpha-numeric digits but does not affect the line shade (see the B/W switch to switch between line shades). The Set Character Background menu allows you to choose any shade on the chart by either rotating the controls or by pressing the 8, 4, 6, and 2 keys as a cursor control pad. The new selection will be indicated with a check mark. If the alpha-numeric display box is near the edges of the screen, it is possible to see the shades "in context" as you browse through them. The "present" selection will be indicated with the letter "P". The Enter key will change the Present selection to the shade indicated by the check mark. Pressing the "0" key without pressing the Enter key will exit the menu without changing the Present shade.

4. Row/Column

Chooses whether the X, Y, Diagonal dimensions, and Ratios are displayed in a row or column format. Depending on the number of digits displayed, and the number of leading or trailing zeros required by the calibration setting, (see Precision Digits), it may not be possible to format the display on a single line.

5. Digits of Precision

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, freeing up more screen space for the image. The precision can be set from 2 to 8 significant digits, with 4 being the factory default. Depending on the number of leading or trailing zeros required, the actual displayed digits may vary. Examples: 215, 0.0000215, or 21500, each with three "significant" digits, but different numbers of "displayed" digits.

6. Ratio Precision

Allows the user to choose the precision of the Ratio display past the decimal point. For readability, the display precision can be reduced to only the amount of information that is really needed for the application, freeing up more screen space for the image. The precision can be set from 0 to 6 digits, with 3 being the factory default. Not applicable on serial numbers of 310031 or before.

Display

This allows the user to set additional display items, including the positions of non-measuring reference lines and the display of optional gauge data.

Clock

A clock circuit provides both time and date information. This can optionally be displayed below the measurement data, or instead of it. The Clock sub-menu provides options for displaying and setting the time and date.

1. Display Clock

The Clock Display sub-menu allows the user to display or hide either the date or time, and either display them on the same row, or in a column with one above the other.

2. Clock Settings

The Clock Settings sub-menu allows the user to individually toggle the Seconds display on or off, display time in either 12 or 24 hour modes, show or not show AM/PM, show or hide the day of the week, and to display the month either as in numerical form or as a letter abbreviation.

3. Date Layout Settings

The Date Layout Settings sub-menu allows the user to select the order of day, month, and year. This can be in the US format of Month/Day/Year (JAN 1, 2015) or in the commonly used European format of Day/Month/Year (1 JAN 2015), with the year either displayed as a two-digit (15) or four-digit (2015) number.

4. Set Clock

The Set Time/Date sub-menu allows the user to set the time and date. Rotating the left control will select which field to edit, and rotating the right control will alter the value of the selected field. The four number keys 8, 4, 6, and 2 can also be used as a cursor keypad to change both field and value: 4 (left) and 6 (right) change the field, while 8 (up) and 2 (down) increment or decrement the value. Pressing the Enter key will update the unit to the new time. Pressing the Menu key will exit the sub-menu without changing the time.

0. Back

Pressing the "0" key will return you to the System Options Menu.

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

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

1. Password Mode

There are five (5) different modes of operation for the password system. They are as follows:

1. Off - This will allow all menus and the store function to be accessed without having to enter a password. This is the default mode from the factory.

2. Enable at Menu Exit - Each time a menu is exited, the password protection will be re-enabled so the next time menu, set or store buttons are pressed, the password will have to be entered again.

3. Enable at Power Off - Once the correct password is entered, all functions will be accessible without having to re-enter the password until the power is turned off to the unit, which will place it back in protected mode. This will require the password to be entered to access the menus and store function when the unit is turned on again.

4. Menu Exit + 1 min - Approximately one minute (1.2 minutes for PAL) after exiting a menu, the password requirement will automatically become active, requiring you to enter the password again the next time Menu, Set or Store are pressed. The time is counted from the last time a menu is used. If you used the menu every 45 seconds, the password would never be required. This provides enough time for a reasonably familiar user to switch between menu and calibration functions without having to re-enter the password each time.

5. Menu Exit + 5 min - Approximately five minutes (6 minutes for PAL) after exiting a menu, the password requirement will automatically become active, requiring you to enter the password again the next time Menu, Set or Store are pressed. The time is counted from the last time a menu is used. If you used the menu every 4 minutes, the password would never be required.

2. Protect Now

This immediately reinstates the password requirement if it has been enabled in the Password Mode menu, and would be the same as turning the unit off and back on. Use this when you make changes and need to have the unit password protected before leaving the location.

3. Change Password

Allows you to change the password to any number up to 8 digits. You need to enter the number, press Enter, then enter the number again. The backspace key can be used to correct entry. Passwords do not have to be all eight digits, use the number of digits you feel necessary to secure the unit. In fact, if no number is entered in either box, then that becomes the password, just pressing enter will get you past the password

screen but that is not recommended for security. Both entry boxes must match to complete the function. If they do not, a screen will inform you that they don't match and ask you to press the Enter key to try again. There is no cancel function, turn the unit off to cancel this command. When both input numbers match, a screen will be display that indicates the password has been changed and asks you to press the Enter key to continue.

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 this Menu

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.

If you have the Password System enabled, you may need to enter a password before you can enter the set menu. See the section on Password Protection for additional information.

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 eight digits between 0.0000001 and 99999999 for the calibration.

Note that measuring is much more precise when setting the calibration on the X axis, as opposed to the Y axis, due to the higher horizontal resolution of the video standard. 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 eight digits between 0.0000001 and 99999999 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 four options as follows:

- 1. Off** The unit of measure display is disabled.
- 2. Metric Units** A selection of commonly used Metric units are available in this menu. Press the number corresponding to the unit to be displayed.
- 3. English Units** A selection of commonly used English units are available in this menu. Press the number corresponding to the unit to be displayed.
- 4. Custom** This will display all the user defined units. Units must have been previously defined (see menu item 5, Define Custom Unit below). The unit of measure is the same for all three measurements.

Define Custom Unit

Up to eight different user defined units of measure can be entered. Each can be up to four 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 memory location where you want to save the unit. Either press the left and right cursor keys (#4 and #8) or rotate the left control to select the character to change. Next, either press the up and down keys (#2 and #8) or rotate the right control to change the character. A wide variety of alpha-numeric characters and punctuation symbols are provided. Press the ENTER key when complete.

Note: This will not select the Custom Unit for use. The unit can be selected from the Custom option in the Select Unit sub-menu.

Aspect Ratio Compensation

Some cameras produce both High Definition and Standard Definition video outputs. Many of these cameras alter the normal vertical to horizontal aspect ratio of the video signal, requiring recalibration each time the axis changes between vertical and horizontal measurements.

The Aspect Ratio Compensation function allows the user to correct for the difference in vertical and horizontal measurements by placing a known

round or square object in the field of view and placing the cursors on all four sides of it. The VMU will then modify all measurements to adjust for the aspect ratio.

1. Auto 4:3

The default standard definition aspect ratio.

2. Widescreen Compensation

NOTE: This function is not available on the VMU850 High Definition Video Caliper.

New Correction Method

1. With the unit turned on, operating, and connected to the camera it would normally use, place a perfectly square or perfectly round item in the field of view. For the most accurate results, it should be at least half of the screen height in size, preferably 70-80%. The item should look round or square, if not, see the note at the end of this paper.
2. Next, move the four measurement cursors to the edges of the square or round item as precisely as possible. Use the X/Y key to go between the H and V directions of movement.
3. When finished, press the SET button.
4. Select menu item 6 (Widescreen Correction) by pressing the 6 button.
5. Press number 2 (Widescreen Correction Set).
6. If you agree with the text on the screen that appears, press 5 to continue the process and make the correction. Press SET to clear the menu.

That's it, the correction will now be applied until changed. To confirm it is correct, both the X and Y values in the numeric display should be the same.

From this point forward, you only need to calibrate the unit on a single axis and it will know how to display properly for the opposite axis and diagonals.

If the Square or Circle is Distorted with a Wide Screen Display

When connecting a standard definition signal to a wide-screen display, you will likely have to set the display mode. Circles and squares should look correct, or very close to it, but it might require some monitor settings to be changed.

Some (many) monitors by default will do an anamorphic stretch of an image from a standard definition signal, stretching it more on the left and right edges than in the center of the screen. This of course makes accurate measurement difficult. An easy way to detect this is to pan a small to medium sized circular object around the frame within the camera's field of view. If it changes aspect ratio as you get closer to the edges, then you will have to find a monitor display mode that will not create this anamorphic stretching. Most displays will have a setting to correct this but they all use different names. To date, we have only seen one wide-screen display (an older 2007 unit) that could not be set properly. When set to the proper mode, the circle test above should keep the aspect ratio of the circle fairly consistent through movement within the field of view.

MEMORIES

Overview

The Video Caliper incorporates nine user accessible memories (1-9) 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 Store

At any time during normal operation, you can save the current calibration and cursor positions into one of the nine memories. To save a setting into memory, press the save button (the red indicator next to it should illuminate). Next press a number from 1 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 0 key.

The unit will prompt the user to name the stored location. The name of the User Preset location can be defined by using either the left and right cursor keys (4 and 6) or the left rotary control to select which character to modify. The up and down cursor keys (8 and 2) or the right rotary control may be used to change the character. Pressing the Enter key will save the name to the selected memory location.

If you have the Password System enabled, you may need to enter a password before you can enter the store function. See the section on Password Protection for additional information.

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, or the settings may not be saved.

Note: The operation of the above function has changed from the previous model.

Memory Recall

At any time, you can recall one of the nine 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.

Note: The operation of the above function has changed from the previous model.

PASSWORD PROTECTION

Overview

The Video Caliper incorporates a password protection system to disallow entry to the menus as well as the set and store functions. This is to help protect against accidental or intention corruption of settings in a production or unsupervised environment.

To be secure, the password should be changed before the unit is deployed. Use system menu item 5 to set a new password and change the mode. Write down and secure your new password where you will be able to find it. If your password is lost, you may have to send the unit back to MicroImage Video Systems to have the password reset.

Note: Performing a Factory Defaults reset will not change the password or password mode.

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 lower vertical resolution video (480 NTSC / 576 PAL). 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 SET CALIBRATION 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 0.0000001 to 99999999.

You can use the Backspace (←) key to delete an incorrectly entered digit.

Press the Enter Key when done, or press the Set key to exit without making a change.

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 SET CALIBRATION menu.

Press 4 to access the Select Unit of Measure sub-menu.

Press 1 to not display any unit of measure. Press 2 to use a metric unit, 3 to use a US unit or 4 to use a custom unit of measure. If you need to define a custom unit before selecting it, press 5 and follow the procedure in the section on creating 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) or press the Set key to exit the menu system directly.

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 nine memories by doing the following:

Memory Store

Set the cursors and scale for your application

Press the STORE key (the red indicator should illuminate), and a screen should prompt you for a number of the location you wish to use).

Press a number (0 through 9) to select one of the nine memory locations. A screen should prompt you to enter a name for the memory location. Use the rotary controls or cursor keys (8, 4, 6, and 2) to enter a name for your settings. Press Enter to save the settings to the named location. If you do not wish to use a name, simply press enter to store the value in the chosen memory location. The red indicator should extinguish.

Within five seconds the state of the machine will be saved to that memory number which will be retained after power off.

Note: If power is turned off immediately after pressing the memory location, the data may not be saved or may be corrupted. It takes up to five seconds to write the data to memory.

Note: If you have the Password Protection enabled, you may have to enter a password to use the Memory Store function.

Memory Recall

To recall from memory, press the RECALL key (which will cause the yellow indicator next to it to light and a screen will prompt you to press a number key (0 thru 9) corresponding to the memory you wish to recall. The yellow indicator should extinguish after pressing the number key. The unit should now be ready to use with the saved settings.

Note: The operation of the above function has changed from the previous model.

FACTORY DEFAULTS

Overview

Occasionally, there may be the need to reset the unit to factory defaults, such as when moving it to a new area for a different use. Note that the resets shown below will not reset the password or the password functions. If you have a lost password, please contact MicrolImage Tech Support.

Partial System Reset

The Video Caliper can be returned to factory defaults at any time. Use the following procedure to reset the unit:

1. Turn the unit off
2. Depress the "2" key and hold it while turning the power on. Keep pressing the backspace key for at least 5 seconds or until after you see the lines and coordinate (numeric) display come on.

The unit will now be reset and ready for use.

Note: All user settings except the password settings and the 9 memories will be lost.

Full System Reset

The Video Caliper can be returned to factory defaults and clear all memories at any time. Use the following procedure to reset the unit:

1. Turn the unit off
2. Depress and hold both the "2" key & the "5" key at the same time and hold while turning the power on. Keep pressing the backspace key for at least 5 seconds or until after you see the lines and coordinate (numeric) display come on.

The unit will now be reset and ready for use with all of the memories reset

Note: All user settings except the password settings and the 9 memories will be lost.

Password Reset

Note that the reset WILL NOT reset the password or the password mode. If you have lost your password, please contact Technical Support at MicrolImage Video Systems for solutions.

DIFFERENCES FROM PREVIOUS MODELS

MicrolImage Video Systems has been designing and manufacturing Video Calipers for many years (decades). Up until this model family, most have looked the same. This model series marks the first major departure from the 25 key switch units. While it looks different and there are fewer buttons, it still retains all of the features of past units.

A new high impact plastic case replaces the aluminum case from the previous model. This was done to allow additional flexibility and to keep costs in check. Since the front panel is easily replaceable now, we can offer customized units at a substantial savings while lowering inventory for the customer and us.

S-Video signals are no longer supported. With modern advancements in digital signal processing, particularly color decoding, composite video signals offer very close to the same performance as S-video. Demand for S-video support has plummeted so the decision was made to no longer support S-video signals, simplifying the design and removing a cost that very few were using.

The 50 series (VMU250, VMU350 and VMU850) have only 17 key switches instead of the 25 previously used. This was done to create room for larger switches that would be easier to use with gloves and also to accommodate a higher quality industrial quality switch which should offer improved durability. To reduce the number of switches, the numeric keypad functions are shared with the feature switches. This represents the biggest change for the user between old and new units.

Some of the functions which had "toggle" buttons that cycled through different modes or settings, now have separate buttons. Examples include:

- The X/Y button now has two separate buttons, X MOV and Y MOV.
- The Track Button now has two separate buttons, IND (Independent) and Track. Separate indicators were also added.
- The Display button toggled through three modes which some found confusing. It now has three buttons – OV Off (Overlay Graphics Off), Line On (displays only lines) and All On (displays the lines and coordinate display). Separate indicators in different colors were also added.

The B/W switch is now called COLOR. Older units only had B&W capability, but high definition video now allows us to use color effectively so this control was renamed.

The location of the "0" and "." (decimal point) keys have been swapped. This may cause some confusion for those used to the older systems. However, we felt having the zero below the two key made much more sense and is similar to other numeric keypads so we opted for the change.

Under the hood, a lot has changed. A more efficient power conversion system is used. The system now uses a motherboard and a modular approach. This can improve field repairs if needed and also allows a standard definition unit to be upgraded to high definition by changing two modules, much more cost effective than purchasing a totally new unit. A different logic chip is used but still incorporates the exact same logic as found in the most recent versions. Other than the I/O functions for the switches and LEDs, the firmware is the same as the most recent units (VMU210, VMU310 or VMU810) and used the same 32 bit microcontroller. The controls and switches are now on separate boards, allowing more cost effective replacement if one or the other would start to wear. Both are available for qualified user replacement.

As we always have, it is likely new features will be added to new units based on user suggestions. Many of the features in the current models were user requested.

As with previous units, we expect the new series will provide a long and valuable service life. Many of our original 2003 built units are still in operation. And we still support and service those units.

SPECIFICATIONS

Calibration Entry range	0.0000001 to 999999999
Numeric Display Range	0.0000001 to 999999999
Significant Digits	Selectable from 3 up to 8 digits
Password Size	0 to 8 digits, may also be disabled as a user selectable option.
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 X/Y and Y/X ratio functions are also available on readout display
Scale Display Position	Movable anywhere within 90%+ center of screen
Line Attributes	Individually selectable as off, solid or various serrated options
Rule Mode	Full line or box display
User Defined Memories	9
User definable units of measure	8 (up to 4 characters each)
Display Shades	
Foreground	More than 50 colors or shades of gray depending on the model
Background	More than 50 colors or shades of gray depending on the model
Character Cell Display	16x20 pixel cell, interlaced (HxV)
Non-Volatile Memory type	EEPROM
System Microprocessor	32-bit architecture
Line Generation	Digitally generated by MicrolImage Video Systems custom circuit

Display controller	Custom MicroImage Video Systems integrated display controller
Front panel controls	(2) Line position controls, multi-turn precision optical encoders
Front panel switches	(17 total) Power, Lock 1/7, Lock 2/7, Ind/8, Track/9, Position/5, Scale Set, Ov Off/1, Line On/2, All On/3, Color/6, XMOV/dp, YMOV/0, Menu, Store, Recall/backspace
Front Panel Indicators	(13) Power, Lock 1 on, Lock 2 on, Ind Mode, Track mode, Scale Position on, OV Off, Line On, All On, X, Y, Store, Recall
X axis line width	NTSC - 37nS (Narrow), 74nS (Wide) (VMU250/VMU350 only) PAL - 37nS (Narrow), 74nS (Wide) (VMU250/VMU350 only)
Y axis line width	High Definition (VMU850 only) - 1, 2 or 3 pixels 1 scan line (Narrow), 2 scan lines (Wide) (VMU250/VMU350 only)
Line Resolution	High Definition (VMU850 only) - 1, 2 or 3 pixels NTSC - 720 x 480 (Frame/Narrow), 720 x 240 (Field/Wide) PAL - 720 x 576 (Frame/Narrow), 720 x 288 (Field/Wide) High Definition (VMU850 only) - 1 pixel
Adjustment range	98% of normal visible raster area minimum
Sync system	RS170A, CCIR (VMU250/350) or HD (VMU850)
Color System	NTSC, PAL (VMU250/350) or HD RGB (VMU850)
Genlock	Digital Phase Locked Loop (PLL)
Bandwidth	Approximately 6 MHz
Input Levels	
Composite	1.0Vpp composite, 75 ohm (VMU250/350)
High Definition	DVI or HDMI (VMU850 only)
Output Levels	
All	Same as respective input, (+/-5% into 75 Ohm for VMU250/350)
Connectors	
Composite	BNC Female (VMU250/350 only)
Hi Definition	HDMI Connector (DVI maybe be used with an adapter)
Power	2 pin 2.1mm Coaxial Power Connector Female
Remote port (consult factory for interface manual)	
Data format	EIA-232 (RS-232)
Language	MicroImage Control Language 4
Baud Rate	300, 1200, 9600, 19200, 38400, 115200
Data Bits	7 or 8, selectable
Parity	None or Even, selectable
Stop Bits	1
Temperature	
Operating	0 ~ 50 degrees C (32 deg - 122 deg F)
Storage	-40 ~ 70 degrees C (-40 deg - 158 deg F)
Humidity	
Operating	10% ~ 90% (non-condensing)
Storage	5% ~ 95% (non-condensing)
Power	(120-230VAC Universal Power adapter included)
Voltage	12VDC (+9 to +26 VDC)
Consumption	VMU250: Approximately 90mA typical at +12VDC VMU350: TBD VMU850: Approximately 220mA typical at +12VDC
Size	8.80" (W) x 9.10" (D) x 3.50" (H) 224 mm (W) x 231 mm (D) x 89 mm (H)
Weight (main unit)	1 lbs. 7 oz., (765g)
Country of Origin (main unit)	Manufactured in the USA by MicroImage Video Systems

A 12 Volt Power Adapter and this manual are included with standard units

Specifications are subject to change without notice.

WARRANTY

Microlmage Video Systems warrants that each VMU Product is free from defects due to faulty materials or improper workmanship for a period of one (1) year. Microlmage 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 Microlmage Video Systems prepaid, insured and properly packaged. Prior return authorization must be obtained from Microlmage Video Systems.

NOTE

This warranty covers the Microlmage VMU250, VMU350 and VMU850 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 Microlmage 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. Microlmage 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 Microlmage 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
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Email	techsupport@mivs.com
Web	mivs.com