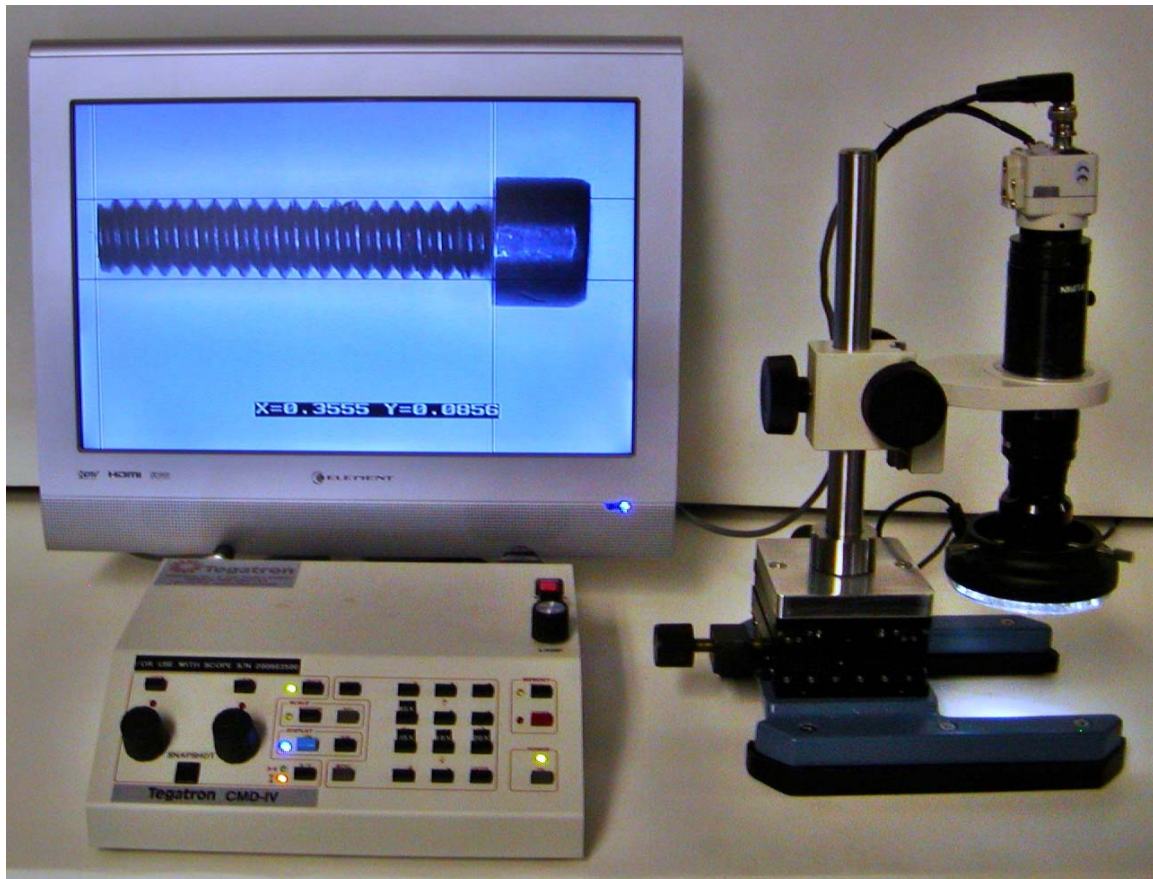# TEGATRON

ZOOM

SCOPE

INTRODUCTION

Tegatron has been offering a different microscope which was designed for larger format measuring. We call it the Zoom Scope, because it has zoom capabilities. The system provides six calibrated positions and is repeatable within 0.05%. Our standard unit has a magnification range of 24X to 150X but can be customized to fit your exact needs. The scope itself uses a high resolution 1/3 ccd color camera and includes precision X-Y positioning. An adjustable LED ring light is included with the system. It incorporates high output, long life LED's, thus eliminating having to replace burned out lamps. The ring light mounts directly onto the zoom objective – no adapter is required. The control unit for the Zoom Microscope is basically the same as we use on our CMD-IV Microscope with exception to no motor drive. Some of the features of the control unit are:

- Ease of use
- 9 programmable calibration presets
- Variable light control
- Display on/off
- Cursor white/black switch
- Password protected
- Analog or digital video out via a USB-2 port. This allows you to connect to any PC that has a USB-2 port and download your image for archiving, E-mailing or pasting onto one of your own forms.
- Optional micrometer type knobs on the X-Y transition.

SETUP

The Tegatron Zoom Scope is very easy to set up and operate. Before plugging in the unit, please read the directions carefully and be sure you have the following items. If anything is missing or damaged do not use and contact us immediately. Please unpack carefully and inspect closely for any damage.

Zoom scope, which consist of the base, rack and pinion, camera, lens assembly.

Control unit

Monitor

Light ring

Main cable

Video cable

USB-2 able

Power cable

CONNECTIONS

Follow these directions carefully and you will be up and running in no time. Place the control box in the location that you will be using it. Connect the main cable from the control unit to the Zoom scope. Next, connect the video cable to the control box and the monitor (Look at monitor manual for location of the "Video In" connector). Do not attempt to use the USB-2 port till you read the setup procedure outlined in the "USB-2 Setup section". Be sure the cable is connected to the camera. Plug in the power cables for the Zoom Scope and the monitor. Be sure all connections are secure. Now you're ready to power up the unit. Once power is applied, turn on the master power switch to the control unit. Now push the small power button located on the front panel of the control unit in the bottom right hand corner. The unit should come on and the LED's should illuminate. Next turn on the monitor. If no video is showing on the screen, go to the monitor manual to show you how to switch video inputs. Connect the ring light to the bottom of the zoom scope. The LED ring light is controlled by the pot on the top of the control unit. You are now ready to begin using your Zoom scope. If you have questions or problems, please feel free to contact us.

USB-2 SETUP

The Tegatron Zoom Scope is capable of connecting to your Mac or Windows PC. This is very useful when you want to save the information you have about a measurement to archive, E-mail, or paste on to one of your forms. Follow the directions carefully. You must first install the driver before plugging in the control box to your PC. The driver is located on the disk that came with your unit. Keep the disk in a safe place and don't lose it as it contains all the information you need to get up and running. Put the disk in your PC CD drive. Open and install the driver. Next install the "Amcap" software. Remember

the file location so you can place a shortcut on your desktop. This program is used to view your image on the PC screen. Leave the disk in the CD drive and turn off your PC. Plug in the USB-2 cable to an open USB-2 port. Note: you must have an USB-2 port for best results. Now turn on your PC. It should say Windows has found new hardware. It should locate the driver you just installed. In case there are any problems and Windows cannot find the driver, you can direct Windows to the CD drive to reload the driver. Once it's installed, click on the "Amcap" shortcut. Your image should show up. If not, click on "options" and be sure it lists the video capture device there. Click on it to let "Amcap" know where to look. If your image is shown on the screen, you are now set up and ready to use the Zoom Scope on your PC. Congratulations.

USING THE ZOOM MICROSCOPE

The following explains all the features of the Zoom control unit. Please familiarize yourself with each function before using to get the most out of your Zoom Scope.

Power Switch
There are 2 power switches. The Master Power switch is on the top right hand of the control box. This must be turned on first. Then press the power switch located in the lower right corner of the unit.
Lamp Pot
This is used for adjusting the intensity of the LED ring light.
Video Snap-Shot Switch
This is used only when you are using the DIGITAL VIDEO OUT via the USB-2 port to a PC (you must install the enclosed software for this function to operate correctly). This switch allows you to take a picture of the image you are measuring and paste it to a form, save it in a file or E-mail to a client. See section on Digital Video Output for more information.
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 (RED led on). 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 off), the two controls will move the lines fully independently.

Position
The position set function allows the user to relocate the numeric display. Pressing the POSTION switch will turn on (indicator blinking) the position set function for the numeric dimension display. When the position function is enabled, turn the left (#1) rotary control to move the horizontal position and the right (#2) rotary 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. The Display Switch will cycle through three different states: 1) Overlay completely off, 2) Only lines displayed, the numeric display is off, and 3) Both lines and the numeric display are enabled.

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.
Note: If the PASSWORD PROTECTION is turned on, you may have to enter a password before using this function. The unit is shipped with PASSWORD ENABLED and a default password of 1 2 3.

Set
Pressing SET will allow the user to calibrate the unit and also set the unit of measure. Operation is through simple menus.
If the password protection is turned on, you may have to enter a password before using this function.

(Backspace)
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 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 also that the 2, 4, 6 and 8 keys are also used as a 4 directional cursor array when changing the custom unit of measure settings.

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

Store
Pressing the STORE key will blink the indicator next to it and display a message on the screen asking you to press a number key. After pressing the STORE key, you must press one of the number keys (0 through 9) to specify which memory, which will turn off the indicator. You can also cancel the storage by pressing STORE a second time (which will also turn off 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. If the password protection is turned on, you may have to enter a password before using this function.

Recall
Pressing the RECALL key will blink the indicator next to it and display a message on the screen asking you to press a number key. After pressing the RECALL key, you must press one of the number keys (0 through 9) to specify which memory location you choose, which will turn off the LED. You can also cancel the recall by pressing RECALL a second time (which will also turn off the LED). See the section "MEMORIES" in this manual.

MENU

Overview

Main Menu
1. Line Options
2. Coordinate Options
3. B/W or Color mode
4. Color Bars
5. Remote Options
6. System Options
7. Password Options
0. Exit

Press number for selection

The Zoom Scope is designed for ease of use. Commonly used functions are easily changed with front panel switches 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. 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 more information. 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. Thin lines may also cause a slight increase in apparent flicker on some monitors due to limitations of the NTSC/PAL video system.

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 (and most PAL modes), 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 (and most PAL modes), 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 CMD-IV is used with a B/W camera or color camera (unit is set to "Color" to match scope camera). For the unit to display the image properly, it must be set for the proper mode. If the unit is set for B/W when used with a color camera, it will display only B/W characters and color bars will be B/W also. When the

unit is used with PAL composite/S-video or B/W video, it automatically is switched into B&W mode. Only RGB and scope in will display color overlay data in PAL mode.

Color Bar Menu

A reference "color bar generator" is built into the CMD-IV 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.

Password Options

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

    1. Disabled - This will allow all menus and the store function to be accessed without having to enter a password (unit is shipped with password protection "Enabled". The default password is 1, 2, 3).
    2. 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, requiring the password to be entered to access the menus and store function.
    3. 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.
    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 mode is the factory default.
    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 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 8 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 displayed that indicates the password has been changed and asks you to press the Enter key to continue. Note: It is recommended that the password be changed from the default password the unit is shipped with since that password is in the manuals.

WARNING: DO NOT FORGET YOUR CHANGED PASSWORD!

Overview
The Zoom Scope 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 intentional corruption of settings in a production or unsupervised environment. To be secure, the password should be changed before the unit is deployed. Use main menu item 7 to set a new password and change the mode. Write down and secure your new password where you will be able to find it.
NOTE: If your password is lost, you may have to send the unit back to Tegatron to have the password reset.
The factory default password is: 123
The default mode is: Menu Exit + 1 minute.
Note: Performing a factory defaults reset will not change the password or password mode.

CALIBRATION

The Zoom Scope is Pre-calibrated at the factory and should not be touched. If calibration should ever be required, it should be done here at the factory. Any attempt to re-calibrate will void any warranty on the calibration.

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 location.

Video Snap-Shot Switch

The Video Snap-Shot switch works with the Digital Video Out only. Operation is as follows:
1. Follow the procedure above to obtain an image on the screen. Adjust the cursors using the CMD-IV to obtain the measurements you are looking for.
2. Once you have the image the way you want it, press the "Video Snap-Shot" button. You now have a captured image that can be archived, E-mailed, saved to a file or loaded onto a form.

Now that you have an overview of the control unit, you are ready to begin.
Power up your Zoom Microscope. Place the ring light on the lens assembly. Place the microscope on the object to be viewed. Adjust the zoom lens to its maximum zoom. Focus on your object by adjusting the focusing ring on the zoom lens assembly. Adjust the ring light for best brightness. Now zoom out and the image should stay pretty much in focus thru its entire range. The Zoom scope has 6 preset measurement settings already loaded into memory. They are as follows:

MEMORY LOCATION	MAGNIFICATION
1	0.7
2	1.0
3	2.0
4	3.0
5	4.0
6	MAX

Adjust the Zoom lens assembly to the magnification you want to use. Go to the control unit and press "Recall" and the button that corresponds to the magnification you chose. You are now ready to take a measurement. Select which cursor set you want to use by pushing the "X / Y" switch. Now rotate the cursor knobs so that the left or top cursor is on the outside edge of what you are measuring and the right or bottom cursor is on the inside edge what you are measuring. Your measurement is complete. If your connected to a PC hit the "Snap Shot" button but save it to your PC. If you purchased an optional "Hard Copy" printer, press the print button to print out your image. Your now ready for the next measurement.

SPECIFICATIONS

Calibration Entry Range	0.0001 to 9999
Numeric Display Range	0.00001 to 15668400
Significant Digits	Selectable 2, 3, 4, 5, or 6
Password Size	0 to 8 digits, may also be disabled
Scale Display Layout	Row or Column
Calibration	Axes Can be calibrated on X Y axis
Measurement Axes	Any Combination of X, Y and/or Diagonal
Scale Display Position	Movable within 90% center of screen
B&W Select Menu	setting to support B&W video
Line Attributes	Selectable as off, solid or serrated
Rule Mode	Full line or box display
User Defined Memories	10
User Defined Units of Measure	8 (2 digits each)
Color Bars	Not displayed in B&W, PAL or PAL S-Video
Character Cell Display	16x20 pixel cell, interlaced (HxV)
Non-Volatile Memory type	EEPROM
System Microprocessor	16/32 bit architecture
X axis line width	NTSC - 40.75nS (Narrow), 81.5nS (Wide)
PAL -	33.9nS (Narrow), 67.8nS (Wide)
Y axis line width	1 scan line (Narrow), 2 scan lines (Wide)
Line Resolution	NTSC - 1280 x 480
PAL -	1536 x 576
Adjustment Range	98% of normal visible raster area minimum
Sync System	RS170A or CCIR
Color System	NTSC or PAL
Genlock Precision	PLL, square pixel
Bandwidth	Greater than 30 MHZ
Input Levels	
Composite	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. +/- 5%, into 75 Ohm
Digital	Digital Video out via USB-2 connector.

Connectors

Composite	BNC Female
S-Video	4 pin mini-DIN Female (std. S-Video connector)
RGB & Sync	9 pin D-sub Female
Microscope	10 pin circular Female
Digital Video	USB-2 Type A connector
AC	110-220V AC power jack input
12VDC - 5A DC	Power Jack Aux. in/out

Remote port (optional)

Data Format	EIA-232 (RS-232)
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)

Humidity

Operating	10% ~ 90% (non-condensing)

Power

Voltage	110 - 220 VAC (Auto-sensing)
12 VDC	in via 12 VDC in/out connector
Consumption	270ma typical
Size	9.00" (W) x 7.63" (D) x 2.88" (H)
Weight	1 lb. 14 oz.
Country of Origin	Manufactured in the U.S.A.

Specifications are subject to change without notice.

WARRANTY

Tegatron Inc. warrants that each CMD-IV system is free from defects due to faulty materials or improper workmanship for a period of one (1) year. Tegatron 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 Tegatron, Inc. prepaid, insured and properly packaged.

CONDITIONS
This warranty is void if the warranted part has been altered or subject to abuse or misuse. Defective parts must be returned to Tegatron, Inc.

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. Tegatron, Inc. 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 Tegatron, Inc. be liable for any consequential damages.

RETURN

Please ship all repairs to:

Tegatron, Inc.
47 E 4th St.
Franklin, Oh 45005
U.S.A.
Ph: 937-746-6439
Fax: 937-746-2759