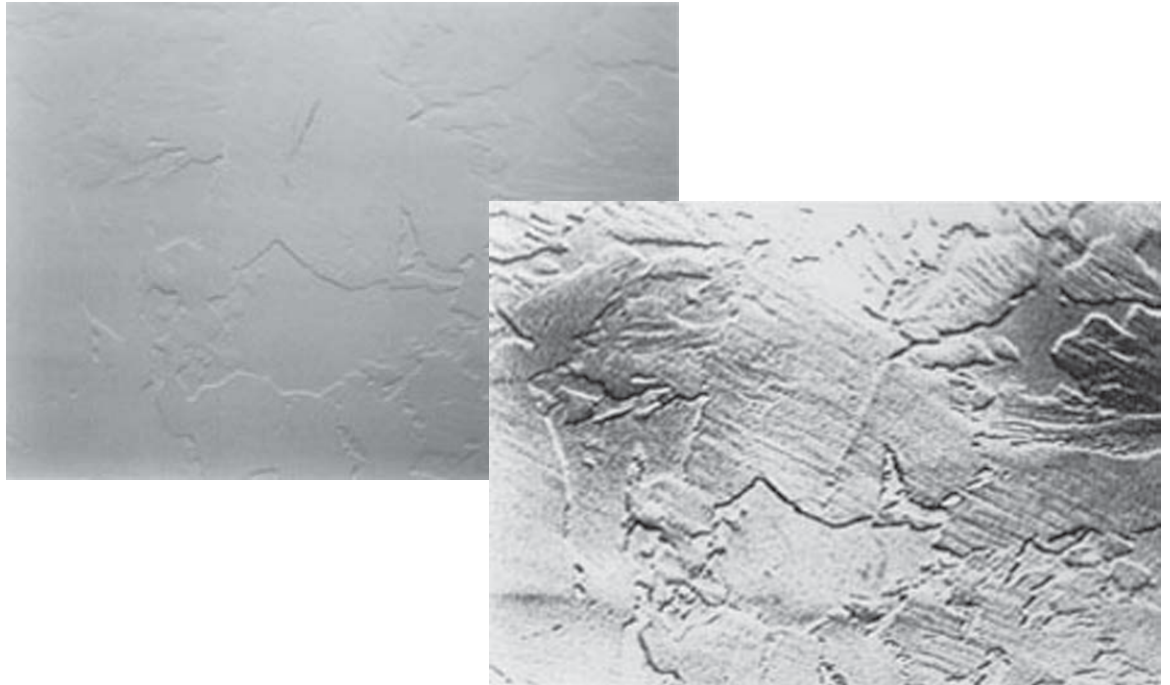


# Operating Instructions

Boeckeler<sup>®</sup> IMG-100<sup>™</sup>



**Image Contrast Controller**

*Accuracy by Design*

**BOECKELER<sup>®</sup>**



***Boeckeler<sup>®</sup> IMG-100<sup>™</sup>***  
***Image Contrast Controller***

**User's Manual**



**Copyright**

© 1993-2000 by Boeckeler Instruments, Inc.,  
4650 S Butterfield Dr, Tucson, Arizona, 85714-3403; (520) 745-0001.

No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the expressed written permission of Boeckeler Instruments, Inc.

VIA<sup>®</sup> and Boeckeler<sup>®</sup> are registered trademarks of Boeckeler Instruments, Inc., of Tucson, Arizona.

Printed in the USA • P/N 700043 07/93

# CONTENTS

---

LIST OF FIGURES .....	vi
-----------------------	----

**Section One:**

Getting Started .....	1
INTRODUCTION .....	3
FEATURES .....	4
VIDEO IMAGE ENHANCEMENT .....	4
COMPONENTS .....	6
Controller Definitions .....	6
Operating the Switches .....	7
Operating the Dials .....	7
OPTIONAL COMPONENTS .....	8
RGB Controller Definitions .....	8
Operating the Dials .....	8
INSTALLATION .....	9

**Section Two:**

Image Enhancement .....	13
OVERVIEW .....	15
MASTER CONTROLS .....	16
ENHANCE CONTROLS .....	18
SHADING CONTROLS .....	21
WINDOW CONTROLS .....	24

**Section Three:**

Appendices 27	
TROUBLESHOOTING GUIDE .....	29
LIST OF PROCEDURES .....	31
GLOSSARY .....	32
ABOUT BOECKELER INSTRUMENTS .....	35
INDEX .....	36

# LIST OF FIGURES

---

Figure 1.1	
Boeckeler IMG-100 Front Panel .....	6
Figure 1.2	
Boeckeler IMG-RGB Front Panel .....	8
Figure 1.3	
Typical Y/C System Configuration .....	9
Figure 1.4	
Typical RGB System Configuration .....	11
Figure 2.1	
IMG-100 Front Panel & IMG-RGB .....	15
Table 3.1	
Troubleshooting Guide .....	29

# **Section One: Getting Started**

---



# INTRODUCTION

---

Welcome to the **Boeckeler**<sup>®</sup> family of **IMG**<sup>™</sup> image controllers. **IMG** products may be used to complement most Boeckeler **VIA**<sup>®</sup> video measuring and marking products, or they may be used with a variety of other video components.

Connected between a video source and monitor, the **Boeckeler IMG-100** image contrast controller enables operators to alter the *gain* or *contrast* of images generated by video cameras, VCRs and more.

The controller is especially effective in obtaining sharp image contrast for video-microscopy and inspection applications. In videomicroscopy, the **IMG-100** provides effects similar to those achieved by a variety of microscope accessories, with less costly image manipulation taking place at the video end of the system. For applications involving video prints, the **IMG-100** is used to enhance an image before it is output to a video printer, making the **IMG-100** a time-saving tool for quality video print archives.

In addition to enhancing the contrast of an image, the controller's *shading* controls may be used to provide a uniform, shadow-free illumination or to position shadows at angles best suited to the application. Unnecessary image details may be eliminated by allowing users to manipulate both the contrast and the shading of the image.

The **IMG-100** may be used to eliminate *color* in the image, or quickly *invert* the image to a "negative" or "positive." Connected to an optional **IMG-RGB** controller, colors on RGB video systems may be individually manipulated or eliminated in order to accent the desired features of the image. For example, the color red may be eliminated from a blood sample in order to ascertain other details in the sample.

The domestic model **IMG-100** is compatible with most common video standards, including monochrome and color NTSC composite cameras, monitors, recorders, video presentation products and other NTSC composite video equipment. The domestic model is also compatible with Y/C (S-Video) systems.

The **IMG-RGB** controller may be purchased separately for use with RGB/NTSC video equipment. Connected to the **IMG-100**, the **IMG-RGB** controller assists users in manipulating red, blue and green signals for optimum image enhancement.

# FEATURES

---

## VIDEO IMAGE ENHANCEMENT

- **Manual Enhancement** optimizes the full contrast range of the image to aid in the detection of important details that may otherwise be invisible to the naked eye. Images with extreme contrast can be tempered, or low-contrast images can be sharpened with higher contrast through the use of two manual controls.
  1. **Tone** overall brightness level adjustment. Lightens dark images or darkens light images.
  2. **Gain** amplifies or diminishes the contrast of the image. Also known as contrast adjustment.
- **Automatic Enhancement** can be activated to access pre-set tone levels which are optimal for most applications.
- **Shading controls** give users the opportunity to manipulate lighting and position shadows to achieve a uniform shadow-free illumination, or to achieve dramatic lighting effects that "bring out" a particular image detail. These adjustments can save time. Instead of adjusting microscope light sources, users simply use two sets of controls on the **IMG-100**.
  1. **Linear** vertical and horizontal dials position shading linearly from top to bottom and from left to right; used for manipulating brightness at the four edges of a screen.
  2. **Parabolic** vertical and horizontal dials position shading across a parabolic (curved) plane; used for manipulating brightness from the center of the image outward.
- **Sizeable window** may be activated to target the region to be enhanced. Only the area within the window is altered, leaving the area outside the window unaffected. The window may be sized to any dimension, and positioned anywhere on the video image.
- **Invert** lets users achieve a quick negative/positive image. Users can transform an image of negative film to positive, or vice versa.
- **Color on/off** lets users display an image without color. Users can switch off color to enhance the image for the best black and white video print.

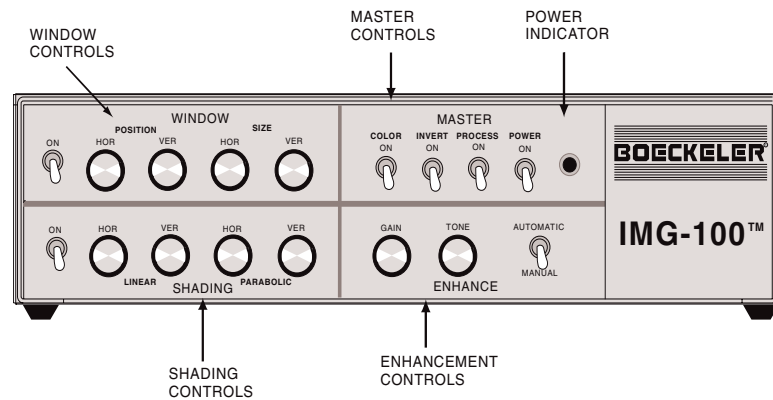
- **Process bypass switch** allows users to quickly view the video image unaltered by the **IMG-100**.
- **Standard IMG-100 is compatible with NTSC composite and Y/C (S-Video)** video equipment.
- **Optional independent control of red, blue and green color signals** is available when the **IMG-100** is connected to RGB video equipment and the separately purchased **IMG-RGB** controller. Each color may be enhanced or eliminated from the video image so that unnecessary details are bypassed in favor of details being analyzed.

# COMPONENTS

## CONTROLLER

The standard **IMG-100** image contrast controller, shown in Figure 1.1, is the primary component involved in image enhancement. In general, the dials and switches pictured are used to enhance a video image in a variety of ways. Definitions of the four basic control groups are described below.

The separately purchased **IMG-RGB** controller is an auxiliary component used to operate the **IMG-100** with RGB video equipment. For more on this component, refer to "**Optional Components**" on page 8.



**Figure 1.1**  
**Boeckeler IMG-100**  
**Front Panel**

## Controller Definitions

- MASTER** four switches which activate primary functions, including POWER, PROCESS, COLOR, and INVERT.
- ENHANCE** two dials, TONE and GAIN; and one switch, AUTO/MANUAL which control the brightness and contrast of a video image.
- WINDOW** two POSITION dials, two SIZE dials and an ON/OFF switch, used to control the size and location of a window through which the image is processed.

**SHADING** two LINEAR positioning dials, two PARABOLIC positioning dials and one *ON/OFF* switch. Dials are used to shade or illuminate various areas of the image.

## Operating the Switches

A switch activates its assigned function only when it is in the up or *ON* position. To deactivate the function, the switch is simply pressed down or *OFF*.

## Operating the Dials

Dials serve one of two basic functions: they *position and size* an enhancement, as used with the **WINDOW** and **SHADING** controls, or they *adjust the level* of an enhancement, as used with the **ENHANCE** controls. The white mark on each dial indicates the enhancement level at which the **IMG-100** is currently set. To adjust this setting, turn the dial clockwise or counterclockwise. Turning the white mark to the right turns the dial clockwise. Turning the white mark to the left turns the dial counterclockwise.

To begin any dial operation, it is best to start with the dial at its middle range, that is, with the white mark positioned so that it is at the 12 o'clock position.

# OPTIONAL COMPONENTS

## RGB CONTROLLER

The optional **IMG-RGB** controller shown in Figure 1.2 is an auxiliary component involved in image enhancement and must be operated with the **IMG-100** and RGB video equipment. In general, the dials and switches pictured are used to enhance colors in a video image. Definitions for the two basic control categories are described below.

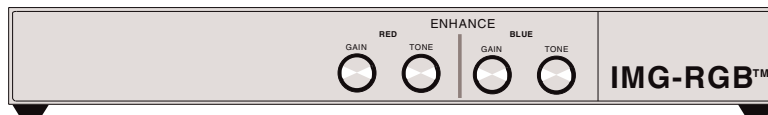


Figure 1.2  
Boeckeler IMG-RGB Front Panel

## RGB Controller Definitions

### ENHANCE

RED: two dials, *GAIN* and *TONE*; which control the brightness and contrast of the red signal in a video image.

BLUE: two dials, *GAIN* and *TONE*; which control the brightness and contrast of the blue signal in a video image.

**NOTE:** when the **IMG-100** is operating with the **IMG-RGB** controller, the *GAIN* and *TONE* dials on the **IMG-100** control the GREEN signal in a video image.

## Operating the Dials

Dials on the **IMG-RGB** controller *adjust the level of* the RED and BLUE color signals. All other enhancement functions are controlled on the **IMG-100** image contrast controller. The white mark on each dial indicates the enhancement level at which the **IMG-RGB** is currently set. To adjust this setting, turn the dial clockwise or counterclockwise. Turning the white mark to the right turns the dial clockwise. Turning the white mark to the left turns the dial counterclockwise.

To begin any dial operation, it is best to start with the dial at its middle range, that is, with the white mark positioned so that it is at the 12 o'clock position.

# INSTALLATION

To install the IMG-100 with NTSC composite or Y/C (S-Video) video sources and monitors (refer to Figure 1.3):

1. Make all connections before applying power.
2. Video source connection:

FOR COMPOSITE: Connect a 75 OHM BNC coaxial cable between the video output of the video source and the CAMERA connector on the back of the IMG-100.

FOR Y/C: Connect Y/C cables between the video output of the video source and the Y/C IN connector on the back of the IMG-100.

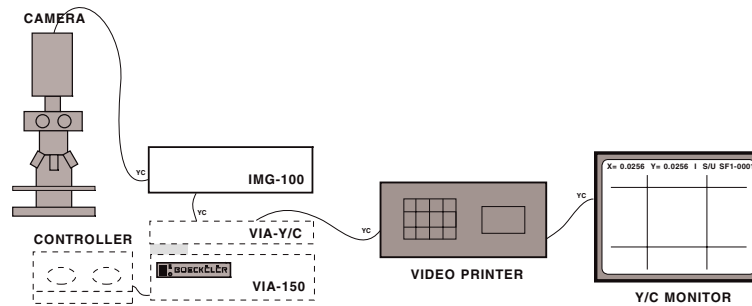


Figure 1.3  
Typical Y/C System  
Configuration

3. Video monitor connection:

FOR COMPOSITE: Connect a 75 OHM BNC coaxial cable between the video input of the monitor and the MONITOR connector on the back of the IMG-100.

FOR Y/C: Connect Y/C cables between the video input of the monitor and the Y/C OUT connector on the back of the IMG-100.

**NOTE:** if connecting the IMG-100 to a Boeckeler VIA- video measuring or marking product, the IMG-100 will output to the VIA-, rather than directly to the monitor. The VIA- will then output to the monitor, as shown in Figure 1.3.

4. Power supply:
  - A. Ensure that the DUAL VOLTAGE SWITCH on the back of the IMG-100 is

in the proper position to coincide with the incoming power supply.

- B. **Plug the power cord into the back of the IMG-100 and then into any grounded outlet.**
- C. **Plug the video source and monitor power cords into any grounded outlet.**
- D. **Turn on the video source, monitor and IMG-100.**

**NOTE:** in order for the **IMG-100** to sync with the video, the video source must be turned on first.

After a moment, the monitor will display a video image of the object(s) in the field of view. A copyright message will briefly appear over the image, then disappear. If such a message appears, and the image is present, then the **IMG-100** is working properly and installation is complete. If these images are not properly displayed on the screen, refer to the *Troubleshooting Guide* in **Section Three: Appendices**.

To install the IMG-100 and IMG-RGB with RGB video sources and monitors (refer to Figure 1.4):

1. Make all connections before applying power.
2. **IMG-100** and **IMG-RGB** connections:
  - A. **Stack the IMG-RGB on top of the IMG-100.**
  - B. Using the DB-15 cable provided, connect the **IMG-RGB** to the **IMG-100**.
3. Video source connection:
  - A. **Connect the red and blue lines from the video source to the corresponding RED IN and BLUE IN connections on the back of the IMG-RGB.**
  - B. **Connect the green and sync lines from the video source to the corresponding GREEN IN and SYNC IN connections on the back of the IMG-100.**
4. Video monitor connection:

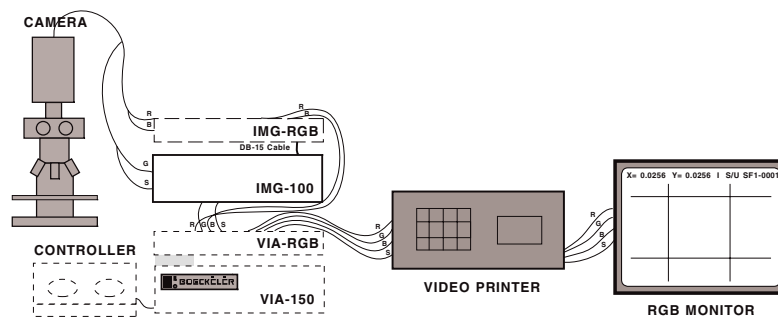


Figure 1.4  
Typical RGB System  
Configuration

- A. **Connect the red and blue lines from the monitor to the corresponding RED OUT and BLUE OUT connections on the back of the IMG-RGB.**
- B. **Connect the green and sync lines from the monitor to the corresponding GREEN IN and SYNC IN connections on the back of the IMG-100.**

**NOTE:** if connecting the **IMG-100** and **IMG-RGB** to a Boeckeler **VIA-** video measuring or marking product, the **IMG-100** will output to the **VIA-**, rather than directly to the monitor. The **VIA-** will then output to the monitor, as shown in Figure 1.4.

5. Power supply:
  - A. **Ensure that the DUAL VOLTAGE SWITCH** on the back of the **IMG-100** is in the proper position to coincide with the incoming power supply.
  - B. **Plug the power cord into the back of the IMG-100 and then into any**

**grounded outlet.**

- C. **Plug the video source and monitor power cords into any grounded outlet.**
- D. **Turn on the video source, monitor and IMG-100.**

**NOTE:** in order for the **IMG-100** to sync with the video, the video source must be turned on first.

After a moment, the monitor will display a video image of the object(s) in the field of view. A copyright message will briefly appear over the image, then disappear. If such a message appears, and the image is present, then the **IMG-100** is working properly and installation is complete. If these images are not properly displayed on the screen, refer to the *Troubleshooting Guide* in **Section Three: Appendices**.

# **Section Two: Image Enhancement**

---

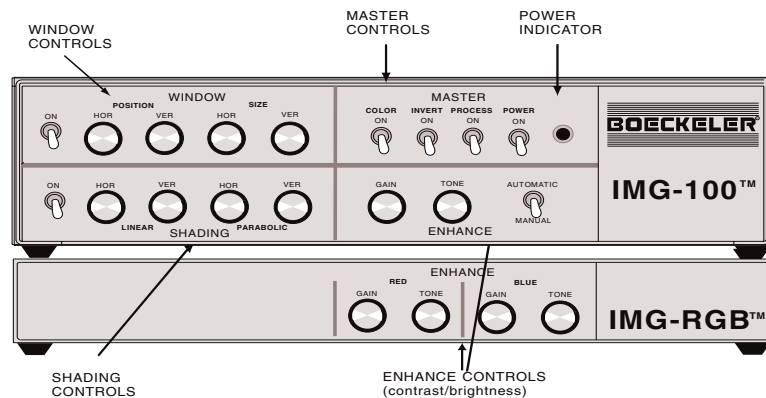


# OVERVIEW

Boeckeler's **IMG-100** equips operators with a variety of ways to enhance a video image. The controls available (refer to Figure 2.1) include **ENHANCE** controls for manual and automatic TONE (brightness), manual GAIN (contrast), for **SHADING**, and for creating a **WINDOW** through which the image will be processed. **MASTER** controls include POWER, PROCESS, COLOR, and INVERT. Independent RED, GREEN and BLUE color manipulation is additionally featured when the **IMG-100** is used with the optional **IMG-RGB** and RGB video sources and monitors.

While some images may only require use of one control to achieve the best result, other images may be optimized by utilizing a combination of several controls.

The instructions beginning on the next page pertain to each of the four control groups: **MASTER**, **ENHANCE**, **WINDOW** and **SHADING**. Each group's independent dial and switch controls will be covered. Refer to the illustration below if needed. The following are general procedures for enhancing an image using all controls in the order that they are recommended to be used for fastest results. Of course, each user will customize this procedure to his or her own application.



**Figure 2.1**  
**IMG-100 Front Panel**  
**and IMG-RGB Front Panel**  
*(IMG-RGB is optional)*

# MASTER CONTROLS

## Power

To power up the IMG-100:

---

1. Press the POWER switch to the *ON* position.

The power indicator will light up to indicate that the power is activated. If the light is not displayed, refer to the *Troubleshooting Guide* in **Section Three: Appendices**.

## Process

To begin image processing or enhancement:

---

1. Press the PROCESS switch to the *ON* position.

**NOTE:** The PROCESS switch must be *ON* before any other enhancement control can be used.

2. Proceed with the desired enhancement.

To view the image unprocessed:

---

1. Press the PROCESS switch to the *OFF* position.

## Invert

To invert the color of the image:

---

1. Be sure the PROCESS switch is in the *ON* position.
2. Press the INVERT switch to the *ON* position.

The color of the image will be displayed inverted, that is, for a monochrome image, black will become white and white will become black. A color positive image will become a color negative image. Negative images will be displayed as positive images.

To revert to the original color of the image:

---

1. Press the INVERT switch to the *OFF* position -OR- press the PROCESS switch *OFF*.

# Color

## To remove color from a color image:

---

1. Be sure the **PROCESS** switch is in the **ON** position.
2. Press the **COLOR** switch to the **ON** position.

Color will be eliminated from the image.

**NOTE:** this control has no effect on monochrome images.

## To restore color to a color image:

---

1. Press the **COLOR** switch to the **OFF** position -OR- press the **PROCESS** switch **OFF**.

**NOTE:** For removal of a single color in RGB images (red, blue or green), the IMG-RGB controller is required. Refer to the ENHANCE controls on the next page for details on how each of these color signals may be removed or enhanced.

# ENHANCE CONTROLS

## Tone

### To brighten the image:

---

1. Be sure the **PROCESS** switch is in the **ON** position.
2. Press the **AUTOMATIC** switch to the **AUTOMATIC** position.

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications. If the TONE setting is adequate, there is no need to continue TONE adjustments. If the TONE setting is not adequate for a specific application, continue to step #3 and #4.

3. Press the **AUTOMATIC** switch to the **MANUAL** position.
4. Turn the **TONE** dial counterclockwise (turn the white mark to the left) until the desired brightness is achieved.

**NOTE:** When using the optional **IMG-RGB** controller with the **IMG-100**, the **AUTOMATIC** control will brighten RED, GREEN and BLUE signals all at once. The **IMG-100** TONE dial will brighten only the GREEN signal. The **IMG-RGB** TONE dials will brighten the RED or the BLUE signal.

### To darken the image:

---

1. Be sure the **PROCESS** switch is in the **ON** position.
2. Press the **AUTOMATIC** switch to the **AUTOMATIC** position.

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications. If the TONE setting is adequate, there is no need to continue TONE adjustments. If the TONE setting is not adequate for a specific application, continue to step #3 and #4.

3. Press the **AUTOMATIC** switch to the **MANUAL** position.
4. Turn the **TONE** dial clockwise (turn the white mark to the right) until the desired darkness is achieved.

**NOTE:** When using the optional **IMG-RGB** controller with the **IMG-100**, the **AUTOMATIC** control will darken RED, GREEN and BLUE signals all at once. The **IMG-100** TONE dial will darken only the GREEN signal. The **IMG-RGB** TONE dials will darken the RED or the BLUE signal.

### To view to the original TONE or brightness of the image:

---

1. Press the **PROCESS** switch OFF.

# Gain

## To increase the contrast of an image:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the GAIN. If the TONE setting is not adequate on AUTOMATIC, use manual TONE adjustments as described on page 18.

3. **Turn the GAIN dial clockwise (turn the white mark to the right)** until the desired contrast is achieved.

**NOTE:** When using the optional **IMG-RGB** controller with the **IMG-100**, the GAIN dial will increase contrast of the GREEN signal only. The **IMG-RGB** GAIN dials will increase the contrast of the RED or the BLUE signal.

4. If after exploring the full range of contrast levels, the image details are not as sharp as desired, **manually adjust the TONE to increase or decrease brightness while at the new GAIN setting.**

## To decrease the contrast of the image:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the GAIN. If the TONE setting is not adequate on AUTOMATIC, use manual adjustments as described on page 18.

3. **Turn the GAIN dial counterclockwise (turn the white mark to the left)** until the desired contrast is achieved.

**NOTE:** When using the optional **IMG-RGB** controller with the **IMG-100**, the GAIN dial will decrease contrast of the GREEN signal only. The **IMG-RGB** GAIN dials will decrease the contrast of the RED or the BLUE signal.

4. If after exploring the full range of contrast levels, the image details are not as sharp as desired, **manually adjust the TONE to increase or decrease brightness while at the new GAIN setting.**

**To view the original GAIN or contrast of the image:**

---

1. **Press the PROCESS switch OFF.**

# SHADING CONTROLS

## Linear

### To shade the left or right edge of an image:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the ENHANCE AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the SHADING. If the TONE setting is not adequate on AUTOMATIC, use manual TONE adjustments as described on page 18.

3. **Press the SHADING switch to the ON position.**

The **IMG-100** is now activated to shade the image in the linear and parabolic planes.

4. To shade the right side of the image **turn the horizontal LINEAR dial labelled HOR clockwise (turn the white mark to the right)** until the desired shading is achieved.
5. To shade the left side of the image **turn the horizontal LINEAR dial labelled HOR counterclockwise (turn the white mark to the left)** until the desired shading is achieved.

### To shade the top or bottom edge of an image:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the ENHANCE AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the SHADING. If the TONE setting is not adequate on AUTOMATIC, use manual TONE adjustments as described on page 18.

3. **Press the SHADING switch to the ON position.**

The **IMG-100** is now activated to shade the image in the linear and parabolic planes.

4. To shade the top part of the image **turn the vertical LINEAR dial labelled VER counterclockwise (turn the white mark to the left)** until the desired shading is achieved.
5. To shade the bottom part of the image **turn the vertical LINEAR dial labelled VER**

**clockwise (turn the white mark to the right)** until the desired shading is achieved.

6. If, after exploring the full range of shading levels, the image details are not as sharp as desired, **adjust the GAIN to increase or decrease contrast while at the new SHADING setting - OR - manually adjust the TONE.**

**To view to the original SHADING of the image:**

1. **Press the PROCESS switch OFF.**
- 

## Parabolic

**To shade or lighten the vertical center of an image:**

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the ENHANCE AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the SHADING. If the TONE setting is not adequate on AUTOMATIC, use manual TONE adjustments as described on page 18.

3. **Press the SHADING switch to the ON position.**

The **IMG-100** is now activated to shade the image in the linear and parabolic planes.

4. To shade the vertical center of the image **turn the vertical PARABOLIC dial labelled VER clockwise (turn the white mark to the right)** until the desired shading is achieved.
5. To lighten the vertical center of the image **turn the vertical PARABOLIC dial labelled VER counterclockwise (turn the white mark to the left)** until the desired shading is achieved.

**To shade or lighten the horizontal center of an image:**

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the ENHANCE AUTOMATIC switch to the AUTOMATIC position.**

The **IMG-100** will display the image at pre-set TONE settings which are generally used in most applications.

**NOTE:** For best overall picture, it is a good idea to set the TONE to the desired level before adjusting the SHADING. If the TONE setting is not adequate on AUTOMATIC, use manual TONE adjustments as described on page 18.

3. **Press the SHADING switch to the ON position.**

The **IMG-100** is now activated to shade the image in the linear and parabolic planes.

4. To shade the horizontal center of the image **turn the horizontal PARABOLIC dial labelled HOR clockwise (turn the white mark to the right)** until the desired shading is achieved.
5. To lighten the horizontal center of the image **turn the horizontal PARABOLIC dial labelled HOR counterclockwise (turn the white mark to the left)** until the desired shading is achieved.
6. If, after exploring the full range of shading levels, the image details are not as sharp as desired, **adjust the GAIN to increase or decrease contrast while at the new SHADING setting - OR - manually adjust the TONE.**

**To view to the original SHADING of the image:**

---

1. **Press the PROCESS switch OFF.**

# WINDOW CONTROLS

## Position

To position a window to the right or left of the screen:

---

1. Be sure the **PROCESS** switch is in the **ON** position.
2. Press the **WINDOW** switch to the **ON** position.

A window will appear over the image. Only the area within the window will be affected by the **IMG-100** image processing controls. The area outside the image will remain unaffected, as if the **PROCESS** switch was turned **OFF** for the area outside the window.

**NOTE:** a window is usually activated to focus the enhancement capabilities of the **IMG-100** on a specific detail of the image.

4. To position the window to the right, **turn the horizontal POSITION dial labelled HOR clockwise (turn the white mark to the right)** until the desired position is achieved.
5. To position the window to the left, **turn the horizontal POSITION dial labelled HOR counterclockwise (turn the white mark to the left)** until the desired position is achieved.
6. **Continue to process the image.**

To position a window to the top or bottom of the screen:

---

1. Be sure the **PROCESS** switch is in the **ON** position.
2. Press the **WINDOW** switch to the **ON** position.

A window will appear over the image. Only the area within the window will be affected by the **IMG-100** image processing controls. The area outside the image will remain unaffected, as if the **PROCESS** switch was turned **OFF** for the area outside the window.

**NOTE:** a window is usually activated to focus the enhancement capabilities of the **IMG-100** on a specific detail of the image.

4. To position the window to the top, **turn the vertical POSITION dial labelled VER counterclockwise (turn the white mark to the left)** until the desired position is achieved.
5. To position the window to the bottom, **turn the vertical POSITION dial labelled VER clockwise (turn the white mark to the right)** until the desired position is achieved.
6. **Continue to process the image.**

# Size

## To change the width of a window:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the WINDOW switch to the ON position.**

A window will appear over the image. Only the area within the window will be affected by the **IMG-100** image processing controls. The area outside the image will remain unaffected, as if the PROCESS switch was turned *OFF* for the area outside the window.

**NOTE:** a window is usually activated to focus the enhancement capabilities of the **IMG-100** on a specific detail of the image.

4. To widen the window, **turn the horizontal SIZE dial labelled HOR clockwise (turn the white mark to the right)** until the desired width is achieved.
5. To make the window more narrow, **turn the horizontal SIZE dial labelled HOR counterclockwise (turn the white mark to the left)** until the desired position is achieved.
6. **Continue to process the image.**

## To change the height of a window:

---

1. **Be sure the PROCESS switch is in the ON position.**
2. **Press the WINDOW switch to the ON position.**

A window will appear over the image. Only the area within the window will be affected by the **IMG-100** image processing controls. The area outside the image will remain unaffected, as if the PROCESS switch was turned *OFF* for the area outside the window.

**NOTE:** a window is usually activated to focus the enhancement capabilities of the **IMG-100** on a specific detail of the image.

4. To make the window taller, **turn the vertical SIZE dial labelled VER clockwise (turn the white mark to the right)** until the desired height is achieved.
5. To make the window shorter, **turn the vertical SIZE dial labelled VER counterclockwise (turn the white mark to the left)** until the desired height is achieved.
6. **Continue to process the image.**



# **Section Three: Appendices**

---



# || TROUBLESHOOTING GUIDE

---

Boeckeler's quality inspectors test each **IMG-100** for software and hardware performance prior to shipment. Therefore, most problems which operators encounter are related to installation. Table 3.1 below describes common problems and their solutions. If, after referring to this table, a problem still exists, call Boeckeler Instruments, Inc., at (800) 552-2262 and ask for technical assistance. There are no user serviceable parts in the **IMG-100**. Do not open the cabinet.

**Table 3.1**  
**Troubleshooting Guide**

Symptoms	Possible Solutions
The green indicator light on the front of the <b>IMG-100</b> does not light up.	<ol style="list-style-type: none"> <li>1. Check that the <b>IMG-100</b> is plugged into a live outlet.</li> <li>2. On the back panel of the <b>IMG-100</b> remove the plastic cover above the power supply connector and check for a blown fuse. Replace the fuse only with a BUSS MDL 3/8 amp slow blow.</li> </ol>
Monitor does not light up.	<ol style="list-style-type: none"> <li>1. Check that the monitor is plugged into a live outlet.</li> <li>2. Check that the monitor is switched on.</li> <li>3. Check that the monitor brightness control is properly adjusted.</li> </ol>
Monitor displays a scrambled picture.	<ol style="list-style-type: none"> <li>1. Check the horizontal hold control on the video monitor for proper adjustment.</li> <li>2. Check that the Dual Voltage Switch (110V/220V) located on the back panel of the <b>IMG-100</b> is properly set.</li> </ol>

*(continued on next page)*

**Table 3.1**  
**Troubleshooting Guide**  
*(continued)*

<b>Symptoms</b>	<b>Possible Solutions</b>
Monitor lights up but does not display a picture.	<ol style="list-style-type: none"> <li>1. Check that the video source and <b>IMG-100</b> are each plugged into a live outlet.</li> <li>2. Check that the video source and <b>IMG-100</b> are both switched on. Check that the PROCESS switch on the <b>IMG-100</b> is on.</li> <li>3. Check that the coaxial cables are connected to the proper BNC connectors on the video source, the <b>IMG-100</b> and the monitor. Some cameras and monitors have multiple output and input connectors. Consult your video manuals for correct connection information.</li> <li>4. If the video source or monitor has a switch for 75 OHM or high Z, ensure this switch is in the 75 OHM position.</li> <li>5. On the back panel of the <b>IMG-100</b> remove the plastic cover above the power supply connector and check for a blown fuse.</li> <li>6. Bypass the <b>IMG-100</b> by connecting the monitor directly to the video source. If the video image still does not appear, have the video source and monitor checked.</li> </ol>
The <b>IMG-100</b> graphics bloom.	<ol style="list-style-type: none"> <li>1. Adjust system parameters on the video output device, monitor or camera (if in use) such as contrast, gain, brightness, color, light and intensity.</li> <li>2. Adjust the color or gray level of the <b>IMG-100</b>.</li> </ol>
Video image on monitor scrolls.	<ol style="list-style-type: none"> <li>1. If using NTSC composite input, ensure that the 37-pin ribbon cable between the <b>IMG-100</b> and Y/C or RGB interface is disconnected.</li> </ol>
Any other problems?	<ol style="list-style-type: none"> <li>1. Call Boeckeler Instruments, Inc. <b>(800) 552-2262</b>; or write  3280 East Hemisphere Loop, Building 114  Tucson, Arizona, 85706-5024</li> </ol>

# LIST OF PROCEDURES

---

To begin image processing or enhancement.....	16
To brighten the image.....	18
To change the height of a window.....	25
To change the width of a window.....	25
To darken the image.....	18
To decrease the contrast of the image.....	19
To install the <b>IMG-100</b> and IMG-RGB with RGB video sources and monitors.....	11
To install the <b>IMG-100</b> with NTSC composite or Y/C video sources and monitors.....	9
To invert the color of the image.....	16
To position a window to the right or left of the screen.....	24
To position a window to the top or bottom of the screen.....	24
To power up the <b>IMG-100</b> .....	16
To remove color from a color image.....	17
To restore color to a color image.....	17
To revert to the original color of the image.....	16
To shade or lighten the horizontal center of an image.....	22
To shade or lighten the vertical center of an image.....	22
To shade the left or right side of the image.....	21
To shade the top or bottom of the image.....	21
To view the image unprocessed.....	16, 20, 22, 23

# GLOSSARY

---

## **BLOOM**

- video images which enlarge or blur on the monitor due to excessive brightness.

## **BNC COAXIAL CABLE**

- a cable consisting of a tube of electrically conducting material surrounding a central conductor held in place by insulators and that is used to transmit high frequency television signals.

## **BRIGHTNESS**

- the overall light or dark level of a video image, also referred to as *tone*. On the **IMG-100**, brightness is controlled with the TONE dial.

## **CCIR**

- the specifications describing monochrome television electrical performance standards issued by the International Radio Consultative Committee, an international telecommunications standards-setting body of the United Nations. The CCIR standard is used throughout most of Europe and Africa (except France and parts of northern Africa).

## **COMPOSITE VIDEO**

- a standard video signal which sends all color, vertical and horizontal signals together in one cable, rather than separately as in *component* video. Referred to as *NTSC* composite.

## **CONTRAST**

- the difference between the lightest and darkest area of an image. If the difference is slight, the image has low contrast. If the difference is great, the image has high contrast. On the **IMG-100**, contrast is controlled with the GAIN dial.

## **ENHANCE**

- to increase, improve or intensify a video signal or video image. **ENHANCE** controls on the **IMG-100** include manual TONE, AUTOMATIC (tone) and GAIN.

## **EIARS-170**

- the specifications describing monochrome electrical performance standards issued by the Electronic Industries Association (EIA). Also referred to as RS-170 (Recommended Standard # 170). The EIA standard is used in North and South America, Japan and most of Asia.

## **GAIN**

- see also *contrast*. The **IMG-100** stretches a video signal, thus causing the signal to gain in strength by a certain ratio (e.g., 1:20). That ratio is referred to as the gain. The effect of increasing gain is visible as an increase in contrast.

**IMAGE PROCESSING**

- pictorial data automatically manipulated by computer, or, as in the case of the **IMG-100**, pictorial data manipulated by an operator using a computer.

**INVERT COLOR**

- to change a color to its complementary (e.g., green to red, orange to blue, yellow to purple, black to white, etc.)

**LINEAR SHADING**

- to shade across the length of an image in a line parallel to the edges of the screen.

**NTSC**

- the North American **N**ational **T**elevision **S**ystem **C**ommittee 525-line color-TV standard. The NTSC standard is used in North and South America, Japan and most of Asia.

**PAL**

- the European 625-line, 25-frame color TV **P**hase **A**lternate **L**ine standard. The PAL standard is used throughout most of Europe and Africa (except France and parts of northern Africa).

**PARABOLIC SHADING**

- to shade an image in an elliptical or curved manner, thereby affecting most the central part of an image.

**RGB**

- a video signal which is segregated into three or four picture component signals: red (**R**), green (**G**) and blue (**B**) signals. Synchronization information may be included with the G signal or may be separate.

**RS-170**

- see *EIA RS-170*.

**S-VIDEO**

- see *Y/C*.

**TONE**

- the overall *brightness* of a video image.

**VIA<sup>®</sup>**

- video measuring and marking components which are connected between a video source and monitor. The purpose of these components is to measure or annotate a video image for use in biomedicine, industrial inspection, forensics, education and many other applications. **VIA**- is a registered trademark of Boeckeler Instruments, Inc., Tucson, Arizona.

**VIDEOMICROSCOPY**

- video-based imaging which integrates the use of video cameras, monitors, recorders, etc., into the optical systems of microscopes.

**VIDEO SOURCE**

- a device from which the **IMG-100** receives a video image. The **IMG-100** incorporates the image with its enhancement capabilities, then outputs the altered image to the corresponding monitor. Examples of video sources include VHS recorders/players, macro- and microscopic cameras, VGA computers, standard television sets, teleconference equipment, slide to video converters, visual presenters and more.

**WINDOW**

- a box shaped frame in which the **IMG-100** processes an image. The window is both sizeable and positionable.

**Y/C**

- a video signal which is segregated into two picture component signals: luminance or YIQ/YIV (**Y**) signals and chrominance or color (**C**) signals.

# ||| ABOUT BOECKELER INSTRUMENTS, Inc.

---

From its beginnings as a small manufacturer of precision micrometers in the early 1940s to its cutting edge precision measurement products today, Boeckeler Instruments, Inc., has remained a cornerstone of innovation and reliability in the worlds of science and industry.

Possessing a team well-grounded in design, development and service, Boeckeler products have long been applied to fields as diverse as precision machining, aviation and aerospace, electronics, biomedical research, clinical diagnostics, metallurgy and criminology.

Over the decades, as Boeckeler grew, its creative staff introduced such innovations as a toolmaker's microscope to handle shop floor capacity with watchmaking precision and speed; digital micrometers and readouts; digital filar eyepieces for microscopic measurement; video image analysis systems and auto positioning systems for microscope stages controlled by computer.

If you are interested in Boeckeler's other products or in keeping informed of Boeckeler's latest developments, contact a Boeckeler dealer in your area or call Boeckeler Instruments, Inc., in Tucson, Arizona at (800) 552-2262.

## **Other Fine Boeckeler Products**

- \* VIA-20 Video Pointer
- \* VIA-30 Video Crossline Generator
- \* VIA-50 Video Image Marker
- \* VIA-100 Video Measurement System
- \* VIA-110 Video Hardness Measurement System
- \* VIA-150 Video Image Marker-Measurement System
- \* VIA-150A1 Video Image Marker-Measurement System with Keyboard
- \* VIA-160A1 Video Area Measurement System
- \* IMG-40 Focus Indicator
- \* IMG-100 Image Contrast Controller
- \* Digital Readouts
- \* Digital Micrometers
- \* Mechanical Micrometers
- \* Linear Measuring Systems
- \* Digital Dial Indicators
- \* Digital Filar Eyepieces
- \* Auto Positioning Systems
- \* *Pointmaker* Video Illustrators

# INDEX

---

## A

appendices 27  
automatic tone 4, 6, 18

## B

black and white images  
    switch to. *See color: on/off*  
bloom 30, 32  
bnc coaxial cable 9, 30, 32  
boeckeler instruments, inc. iv, 33, 35  
brightness  
    (tone) 4, 6, 18, 32, 33  
    monitor 29, 30  
    to decrease 18  
    to increase 18

## C

camera  
    connector 9  
color  
    invert 3, 4, 6, 15, 16, 33  
    on/off 3, 4, 6, 15  
complementary color 33  
component video 32, 34  
composite video 32  
contrast  
    (gain) 3, 4, 6, 19, 32  
    monitor 30  
    to decrease 19  
    to increase 19  
control groups 6, 15  
copyright  
    message 10, 12  
    of manual iv

## D

darken 18  
dials  
    operation of 7  
dual voltage switch 9, 11, 29

## E

eia rs-170 11, 32  
eliminating color. *See color: on/off*; img-rgb: optional controller  
enhance feature 4, 6, 15, 18, 32

## F

fuse 29

## G

gain  
    (contrast) 3, 4, 6, 19, 32  
graphics  
    blooming 30

## I

image processing 3, 33  
img-100  
    about the 3  
img-rgb  
    optional controller 3, 5, 6, 8, 11, 15, 18, 19  
indicator light 16  
installation  
    img-100 and img-rgb with rgb systems 11  
    img-100 with ntsc or y/c systems 9  
    problems 29  
invert  
    color 3, 4, 6, 15, 16, 33

## L

linear shading 4, 7, 21  
list of procedures 31

## M

manual tone 4, 6, 18  
master controls 6, 15, 16

## N

negative images 16. *See also invert: color*  
ntsc 3, 5, 30, 33

## O

ohm position 30  
operating the dials 7  
operating the switches 7

## P

pal 33  
parabolic shading 4, 7, 22, 33  
power 15  
power supply 9, 11, 29, 30  
power switch 6, 16  
procedures  
  list of 31  
process bypass 5  
process switch 6, 15, 16  
processing an image 16, 33

## R

rgb 3, 5, 6, 8, 18, 19, 33  
rs-170 33. *See also* eia rs-170

## S

s-video (y/c) 5, 33, 34  
shading  
  feature 3, 4, 7, 15, 21  
  horizontal center of image 22  
  left/right of image 21  
  linear 4, 7, 21, 33  
  parabolic 4, 7, 22, 33  
  top/bottom of image 21  
  vertical center of image 22  
switches  
  operation of 7

## T

tone  
  (brightness) 4, 6, 18, 32, 33  
  automatic 18  
  manual 18  
troubleshooting guide 10, 12, 29

## V

via-  
  video measuring systems iv, 3, 9, 11, 33, 35  
video source 9, 11, 30, 33  
videomicroscopy 3, 33

## W

window  
  feature 4, 6, 15, 24, 34  
  on/off 6

window position 6, 24  
  left to right 24  
  top to bottom 24  
window sizing 6, 25  
  height 25  
  width 25

## Y

y/c (s-video) 3, 5, 9, 33, 34

