Medigus

micro Scoutcam

beyond your vision

micro ScoutCam™ DSP User Manual

March 2015

Manufacturer: 

Medigus Ltd
Building 7A
Omer Industrial Park
POB 3030
Omer 84965, Israel

European Authorized Representative: 

GBM Authorized Representative Ltd
The White House
2 Meadrow
Godalming GU7 3HN, UK

COPYRIGHT/PROPRIETARY INFORMATION

DISCLAIMER

(A) IN NO EVENT SHALL MEDIGUS BE LIABLE TO THE END-USER OR ANY OTHER PARTY FOR: (I) ANY LOSS OF PROFIT; (II) ANY LOSS OF GOODWILL; (III) ANY LOSS OF BUSINESS OR BUSINESS OPPORTUNITY; (IV) ANY COSTS OF PROCUREMENT OF SUBSTITUTE GOODS BY ANY ENTITY; OR (V) ANY SPECIAL, CONSEQUENTIAL, INDIRECT, OR INCIDENTAL DAMAGES, IN EACH CASE HOWEVER CAUSED AND UNDER ANY THEORY OF LIABILITY, INCLUDING DUE TO A DEFECT, FAILURE, OR MALFUNCTION OF THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER, WHETHER A CLAIM FOR SUCH DAMAGE IS BASED UPON THE WARRANTY, CONTRACT, NEGLIGENCE, OR OTHERWISE, AND WHETHER OR NOT MEDIGUS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

(B) TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL MEDIGUS BE LIABLE TO THE END-USER OR ANY OTHER PARTY FOR DAMAGES IN EXCESS OF THE CONSIDERATION PAID BY THE END-USER FOR THE RESPECTIVE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER GIVING RISE TO SAID LIABILITY.

(C) WITHOUT LIMITATION TO THE FOREGOING, MEDIGUS SHALL HAVE NO LIABILITY FOR ANY INJURY, INCLUDING PERSONAL INJURY AND PROPERTY DAMAGE, ARISING FROM OPERATION OR USE OF THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER IN ANY MANNER WHICH DOES NOT STRICTLY ADHERE TO THE INSTRUCTIONS AND SAFETY PRECAUTIONS CONTAINED HEREIN AND IN ALL SUPPLEMENTS HERETO, AND TO THE TERMS OF THE LIMITED WARRANTY SET FORTH HEREIN.

(D) NO REGULATORY APPROVALS, SUCH AS FDA PREMARKET CLEARANCE OR APPROVAL OR CE MARK APPROVAL, HAVE BEEN PROCURED BY MEDIGUS WITH RESPECT TO THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER, AND MEDIGUS MAKES NO REPRESENTATION AS TO THE SUITABILITY OF THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER FOR ANY DIAGNOSTIC, THERAPEUTIC, MEDICAL, OR OTHER PURPOSE.

LIMITED WARRANTY

Medigus warrants the micro ScoutCam™ DSP video controller to be free from defects in materials and workmanship until the expiration of 1 (one) year following the date of delivery of the micro ScoutCam™ DSP video controller by Medigus to the entity which is the original purchaser (the "End User") of the micro ScoutCam™ DSP video controller directly from Medigus. Medigus will either replace, repair, or issue a credit (adjusted to reflect the age of the micro ScoutCam™ DSP video controller) for a defective micro ScoutCam™ DSP video controller or any portion thereof, at Medigus's election, as the sole remedy available to the End-User for a breach of warranty. The foregoing warranty shall apply solely to the End-User and not to any subsequent owner or user of the micro ScoutCam™ DSP video controller. To qualify for this limited warranty, the following conditions must be met by End-User: (a) The micro ScoutCam™ DSP video controller must be used in accordance with its labeling and may not be altered or subjected to misuse, abuse, accident, or improper handling; (b) Medigus must be notified in writing within thirty (30) days following discovery of a defect; (c) the micro ScoutCam™ DSP video controller must be returned to Medigus within thirty (30) days of Medigus receiving notice as provided for in paragraph (b) above; (d) as determined by Medigus upon examination of the returned micro ScoutCam™ DSP video controller: (i) the micro ScoutCam™ DSP video controller was not repaired, altered, or manipulated by anyone other than Medigus or its authorized representatives; (ii) the micro ScoutCam™ DSP video controller was not operated under conditions other than normal use and in accordance with the instructions and other provisions herein; and (iii) the micro ScoutCam™ DSP video controller was not damaged due to misuse or negligence by the End-User or any other entity.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, WHETHER STATUTORY OR OTHERWISE, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY OTHER THAN THE LIMITED WARRANTY IS EXPRESSED OR IMPLIED BY MEDIGUS. THIS LIMITED WARRANTY IS LIMITED TO ITS EXPRESS TERMS.

The exclusions and limitations set out above are not intended to, and should not be construed so as to, contravene mandatory provisions of applicable law. If any part or provision of this limited warranty is held by any court of competent jurisdiction to be illegal, unenforceable, or in conflict with applicable law, the validity of the remaining provisions of the limited warranty shall not be affected.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Chapter 1 ABOUT THIS MANUAL

This chapter provides information about this manual and includes the following sections:

- Purpose of this Manual
- Intended Audience
- Scope of this Manual
- Acronyms
- Warnings, Cautions, and Notes
- Safety Information

PURPOSE OF THIS MANUAL

The purpose of this manual is to provide detailed information about the Medigus micro ScoutCam™ DSP video controller. Unless indicated otherwise for a specific section, the content of this manual is relevant for the micro ScoutCam™ DSPO version of the video controller.

INTENDED AUDIENCE

This manual is intended for users and supporting technicians who will use the micro ScoutCam™ DSP video controller in conjunction with supported cameras or with products in which supported cameras are incorporated.

SCOPE OF THIS MANUAL

This manual includes the following chapters and appendices:

- **Chapter 1 About this Manual** – Provides information about this manual including its purpose, intended audience, scope, conventions, and safety information.
- **Chapter 2 Overview** – Provides an overview of the micro ScoutCam™ DSP video controller and its features.
- **Chapter 3 Getting Started with micro ScoutCam™ DSP** – Provides information on recognizing micro ScoutCam™ DSP user components, setting up the micro ScoutCam™ DSP video controller, and the workflow to use when operating the micro ScoutCam™ DSP.

- **Chapter 4 Operating the micro ScoutCam™ DSP** – Provides detailed instructions on operating the micro ScoutCam™ DSP video controller.
- **Chapter 5 Troubleshooting** – Provides troubleshooting information.
- **Appendix A - micro ScoutCam™ DSP Screens and Controls** – Provides the structure of the screens in the micro ScoutCam™ DSP application.
- **Appendix B - Technical Specifications** – Provides technical specifications for the micro ScoutCam™ DSP video controller.
- **Appendix C - Device Symbols** – Provides an explanation for the symbols that appear on the micro ScoutCam™ DSP video controller.

ACRONYMS

The following table provides a list of acronyms used in this manual.

TABLE 1-1: ACRONYMS

Acronym	Definition
CCM	Color correction matrix
CMOS	Complementary metal–oxide–semiconductor
HDMI	High definition media interface

WARNINGS, CAUTIONS, AND NOTES

The following table lists the conventions used in this manual for warnings, cautions, and notes.

TABLE 1-2: CONVENTIONS

Icon	Definition
	**Warning: A warning provides important information, which if not followed, may result in death or injury to personnel or patients.**
	**Caution: A caution provides important information about a procedure, which if not followed, may result in damage to equipment.**
Note	A note provides extra emphasis on important information.

SAFETY INFORMATION

Warning: To avoid the risk of electric shock, this equipment must only be connected to a mains supply with protective earth.

Warning: Do not remove the cover or panel of the micro ScoutCam™ DSP video controller.

Warning: The video controller remains connected to the electricity source even when it is turned off.

Warning: Do not operate the unit in the presence of electromagnetic interference. Interference may be caused by electro-surgery, diathermy, magnetic resonance imaging, or other equipment. Portable and mobile RF communications equipment may affect operation of this device.

This device generates internal radiofrequency energy and, if operated properly according to these instructions, will not normally cause harmful interference to other nearby devices. If this device does cause harmful interference (determined by turning this device off and on), try the following to eliminate interference:

- **Move, reposition or relocate the affected device.**
- **Power this device from a separate power circuit.**
- **Contact Medigus technical support if interference persists.**

For continued compliance with electromagnetic emissions requirements, this device must only be powered by means of the mains power cable supplied, or a replacement supplied by Medigus Ltd.

Warning: Other than fuse replacement, as indicated on rear of unit, the equipment has no user replaceable parts. All other maintenance activities must be carried out by Medigus Ltd or its authorized representatives.

Replace fuses only with type as indicated on rear of unit.

Warning: **Before use, visually check the equipment for exterior mechanical damage and for proper function.**

Immediately turn off and unplug any equipment that emits smoke, sparks, strange noises, or odors.

Caution: **Do not insert any foreign objects into slots or plugs on the micro ScoutCam™ DSP video controller. Failure to heed this caution may result in damage to the micro ScoutCam™ DSP.**

Caution: **Turn off the video controller before unplugging a camera from the micro ScoutCam™ DSP. Failure to heed this caution may result in damage to the micro ScoutCam™ DSP and/or the camera.**

Caution: **Clean the cabinet and panel with a soft cloth moistened with a mild detergent solution. Do not use any abrasive materials or scouring powder or solvents such as alcohol and benzene. Failure to heed this caution may result in damage to the micro ScoutCam™ DSP.**

Caution: **Clean the touch screen with a soft cloth soaked with petroleum IPA. Do not use any other chemicals. Failure to heed this caution may result in damage to the micro ScoutCam™ DSP.**

Caution: **Do not apply extended or excessive force to the touch screen. Failure to heed this caution may result in damage to the micro ScoutCam™ DSP.**

Caution: **This device must only be connected to auxiliary equipment supplied by Medigus Ltd, or with equipment that has been approved for use in writing by Medigus Ltd, and in accordance with the requirements of IEC 60601-1-1.**

Caution: **At the end of its useful life, the device must be disposed of only in accordance with local regulations for the disposal of medical electronic equipment.**

Chapter 2 OVERVIEW

This chapter provides an overview of the micro ScoutCam™ DSP video controller and includes the following sections:

- Product Overview
- Key Features

PRODUCT OVERVIEW

The micro ScoutCam™ DSP video controller is designed for use with Medigus endoscopic cameras to provide high quality video output. It can be used with standard monitors and does not require a proprietary monitor for viewing camera output.

The image captured by the camera is transmitted to the micro ScoutCam™ DSP. The image is processed in the micro ScoutCam™ DSP and output to one or more video monitors, and optionally to external media for recording and storage.

The following figure shows the micro ScoutCam™ DSP connected to an endoscopic camera and a monitor.

FIGURE 2-1: MICRO SCOUTCAM™ DSP SYSTEM OVERVIEW

KEY FEATURES

The following are some of the key features of the micro ScoutCam™ DSP video controller:

- Sophisticated digital image processing to ensure the best image quality from Medigus cameras.
- Simple and intuitive operation of the micro ScoutCam™ DSP enables the user to configure many of the video parameters to meet his needs.
- HDMI video output.
- Recording and storage capability to external media.
- Remote software upgrades to enable easy implementation of future image processing algorithms and other features.

Chapter 3 GETTING STARTED WITH MICRO SCOUTCAM™ DSP

This chapter provides information on getting started with the micro ScoutCam™ DSP video controller and includes the following sections:

- micro ScoutCam™ DSP User Components
- Setting up the micro ScoutCam™ DSP Video Controller
- Working with the micro ScoutCam™ DSP Video Controller

MICRO SCOUTCAM™ DSP USER COMPONENTS

The micro ScoutCam™ DSP video controller user components are all located on the front and back panels of the micro ScoutCam™ DSP. The following figure shows the front panel with its parts labeled.

FIGURE 3-1: MICRO SCOUTCAM™ DSP FRONT PANEL

The following table provides a list of the components on the front panel of the micro ScoutCam™ DSP with a short description of each component.

TABLE 3-1: MICRO SCOUTCAM™ DSP COMPONENTS (FRONT)

Component	Description
Power switch	Used to turn the micro ScoutCam™ DSP on and off.
USB port	For future use.
SD card slot	For future use.
Camera outlet	For connecting a supported camera to the micro ScoutCam™ DSP.

Component	Description
Touch screen	For navigating through the micro ScoutCam™ DSP user interface to configure the micro ScoutCam™ DSP and view and record images.

The following figure shows the back panel with its parts labeled.

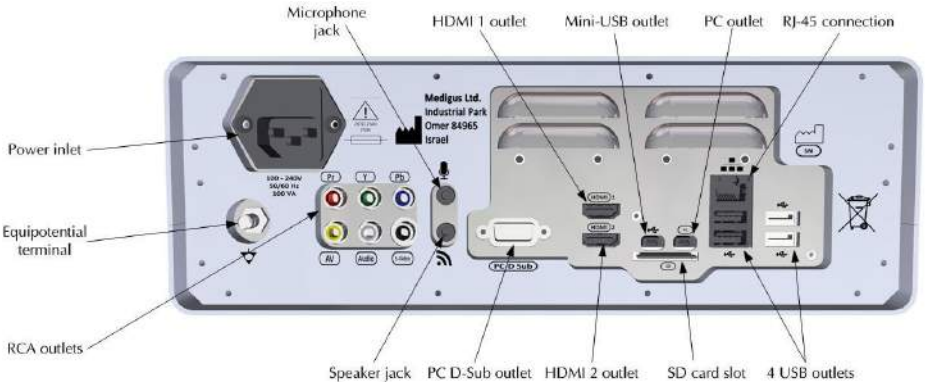


FIGURE 3-2: MICRO SCOUTCAM™ DSP BACK PANEL

The following table provides a list of the components on the back panel of the micro ScoutCam™ DSP with a short description of each component.

TABLE 3-2: MICRO SCOUTCAM™ DSP COMPONENTS (BACK)

Component	Description
Power outlet	For connecting the micro ScoutCam™ DSP power cable.
Equipotential terminal	For ground bonding.
RCA audio and video outlets	For future use.
Microphone jack	For future use.
Speaker jack	For future use.
PC D-Sub outlet	For future use.
HDMI 1, HDMI 2	For connecting HDMI monitors to the micro ScoutCam™ DSP.
Mini-USB outlet	For technician use only.
PC outlet (mini-USB)	For future use.
SD card slot	For external media to which video can be saved.

Component	Description
RJ-45 connection	For technician use only.
USB outlets (4)	For future use.

SETTING UP THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER

➢ To set up the micro ScoutCam™ DSP video monitor:

1. Ensure that the power switch is in the off position.
2. Connect the power cable to the power inlet at the back of the micro ScoutCam™ DSP.
3. Attach an HDMI monitor to one of the video monitor outlets at the back of the micro ScoutCam™ DSP.
4. Attach a supported camera to the camera outlet at the front of the micro ScoutCam™ DSP. For information on supported cameras, refer to Appendix B - Technical Specifications.
5. To save the video to external media, insert an SD card into the SD card slot at the back of the micro ScoutCam™ DSP. The micro ScoutCam™ DSP video controller is set up.

WORKING WITH THE MICRO SCOUTCAM™ DSP VIDEO CONTROLLER

This section provides information on the general workflow when operating the micro ScoutCam™ DSP video controller.

➢ To operate the micro ScoutCam™ DSP video controller:

1. Turn on the micro ScoutCam™ DSP video controller. For more information, *refer to Starting the micro ScoutCam™ DSP*.
2. White balance the camera (recommended). For more information, refer to *Setting White Balance*.
3. Start working with the camera. For more information, refer to the camera documentation.
4. Record video (optional). For more information, refer to *Recording a Video*.
5. When finished, switch off the micro ScoutCam™ DSP using the power switch on the front panel.

Caution: Do not remove any cables or media from the micro ScoutCam™ DSP while the power switch is in the ON position.

UNDERSTANDING THE USER INTERFACE

The micro ScoutCam™ DSP application user interface consists of a series of screens that are displayed on the micro ScoutCam™ DSP's touch screen. Some of the icons on the screen are used for navigation. Other icons are used to select options and operate the micro ScoutCam™ DSP.

The following standard icons appear on almost all of the screens:

- – Press the home icon to return to the main menu in the application.
- – Press the up arrow to navigate up one level in the application.

For more information on the structure of the screens in the micro ScoutCam™ DSP application, refer to *Appendix A* - micro ScoutCam™ *DSP Screens and Controls* .

Chapter 4 OPERATING THE MICRO SCOUTCAM™ DSP

This chapter provides detailed instructions on how to operate the micro ScoutCam™ DSP video controller and includes the following sections:

- Starting the micro ScoutCam™ DSP
- Setting the Date and Time
- Setting White Balance
- Setting the Brightness and Contrast
- Recording a Video
- Viewing a Recorded Video
- Deleting Recorded Video
- Selecting a Preset Configuration
- Saving a Configuration as a Preset
- Configuring Image Quality
- Configuring Image Size
- Adjusting Image Color
- Adjusting Image CCM
- Adjusting Image Gamma
- Configuring Image Overlay Display
- Setting the Illumination Control
- Adjusting Illumination Control Manually
- Adjusting Exposure Auto - Setting Saturation Threshold
- Adjusting Exposure Manual - Setting Exposure Time
- Software Version
- Setting White Balance
- Noise Reduction
- Restoring Factory Default Settings
- Updating micro ScoutCam™ DSP Software

Note Calibration may only be performed by Medigus authorized technicians.

STARTING THE MICRO SCOUTCAM™ DSP

➢ To turn on the micro ScoutCam™ DSP video controller:

1. Turn the power switch to the on position. The Welcome screen appears on the touch screen.

FIGURE 4-1: WELCOME SCREEN

2. Approximately 25 seconds later, the Main Screen appears on the touch screen.

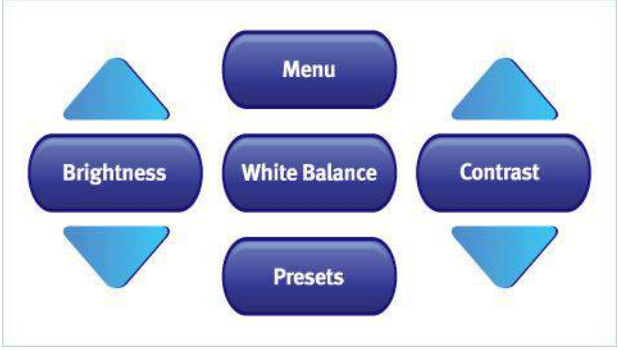


FIGURE 4-2: MAIN SCREEN

3. The micro ScoutCam™ DSP is ready for use.

SETTING THE DATE AND TIME

You can configure the micro ScoutCam™ DSP video controller with the current date and time.

➢ To configure the date and time:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Setup**. The Settings screen appears.
3. Press **Date & Time**. The Time and Date screen appears.

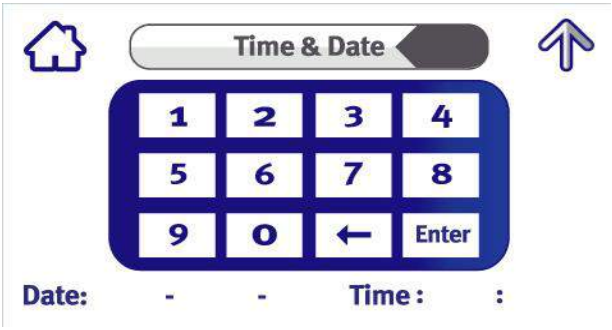


FIGURE 4-3: TIME & DATE SCREEN

4. Press a date or time field.
5. Press numbers on the keypad to set the value for the selected date or time field.
6. Press **Enter**. The value is stored in the selected field.
7. Repeat steps 4 - 6 until the date and time are configured.

SETTING WHITE BALANCE

To ensure that the color in the video is accurate, it is important to ensure that white balance is performed.

➢ To configure white balance:

1. Ensure that a camera is attached to the micro ScoutCam™ DSP video controller.
2. Press **White Balance** in the main menu. The micro ScoutCam™ DSP performs white balance and the "White balance in progress" message is displayed.

The white balance process ends with a PASS/FAIL message.
If the white balance process fails, one of the following messages appears:

- **Too much light** – Decrease the amount of light and try to set the white balance.
- **Not enough light** – Increase the amount light and try to set the white balance.

SETTING THE BRIGHTNESS AND CONTRAST

You can set the video brightness and contrast from the Main Screen.

➢ To set brightness and contrast:

1. In the Main Screen (Figure 4-2), press the up and down arrows around the Brightness button to raise or lower the brightness of the video.
2. To return the brightness setting to the factory default, press **Brightness**.
3. Press the up and down arrows around the Contrast button to raise or lower the contrast of the video.
4. To return the contrast setting to the factory default, press **Contrast**.

RECORDING A VIDEO

You can record a video on the micro ScoutCam™ DSP and save it to external media.

➢ To record a video:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Recording**. The Recording screen appears.

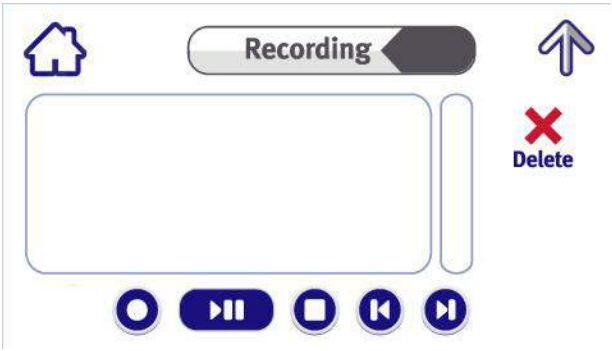


FIGURE 4-4: RECORDING SCREEN

3. Press . The micro ScoutCam™ DSP starts recording video, the word **Recording** appears on the video monitor, and the dot in the center of the recording icon turns red . The video is saved to the external media.

Note

- If a stored video is being played, recording does not start when is pressed.
- The clip size limit is 2GB (approximately 2 hours).
- The SD card is not to be ejected (and inserted back) during recording or playback of video files.

➢ To stop recording, press . Recording stops.

VIEWING A RECORDED VIDEO

You can view a recorded video on the micro ScoutCam™ DSP video controller.

➢ To view a recorded video:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Recording**. The Recording screen (Figure 4-4) appears.
3. Press or . A list of video files saved to the external media appears on the monitor with the current video recording highlighted.
4. To move to the next video recording in the list, press .
5. To move to the previous video recording in the list, press .
6. Press . The selected video plays on the attached monitor.

Note Video playback does not start when ⏯ is pressed when a video is being recorded.

7. To pause the video playback, press ⏯. The video pauses. To continue playback, press ⏯ again.
8. To stop video playback, press ⏹. The video playback stops. Pressing ⏯ starts playback from the beginning of the recording.

DELETING RECORDED VIDEO

You can delete recorded video files from the external media on which they are saved.

➢ To delete a video file:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Recording**. The Recording screen (Figure 4-4) appears.
3. Press ⏮ or ⏭. A list of video files saved to the selected external media appears on the monitor, with the current video recording highlighted.
4. Press ⏮ or ⏭ until the video you want to delete is highlighted.
5. Press ✕ Delete. The selected video file is deleted from the external media.

SELECTING A PRESET CONFIGURATION

You can select a preset configuration for the micro ScoutCam™ DSP.

➢ To select a preset:

1. Press **Presets** in the main menu. The Presets screen appears.

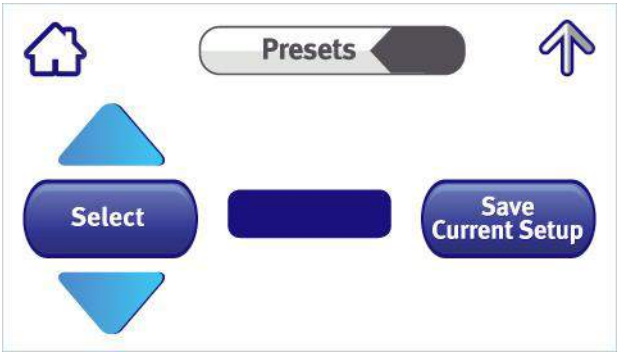


FIGURE 4-5: PRESETS SCREEN

2. Press the up and down arrows around the Select button to cycle through the five preset configurations.
3. When the desired preset configuration is displayed, press **Select**. The selected preset configuration is used.

SAVING A CONFIGURATION AS A PRESET

You can save the current configuration of the micro ScoutCam™ DSP to a preset configuration. This enables you to save frequently used configurations and access them quickly.

➢ To save the current configuration to a preset:

1. Press **Presets** in the main menu. The Presets screen (Figure 4-5) appears.
2. Press the up and down arrows around the Select button to cycle through five preset configurations.
3. When the preset configuration you want to overwrite is displayed, press **Save Current Setup**. The current micro ScoutCam™ DSP configuration is saved to the selected preset.

The following parameters are saved in the preset configuration:

- Brightness
- Contrast
- White balance parameters
- Gamma
- Illumination value
- CCM
- Spatial filter enable/disable
- Overlay
- Image Size

Note	• **You cannot overwrite the factory default preset configuration.** • **The last setup selected is used the next time the machine is powered up.**

CONFIGURING IMAGE QUALITY

You can configure the quality of the images and video.

➢ To configure image quality:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Image**. The Image screen appears.

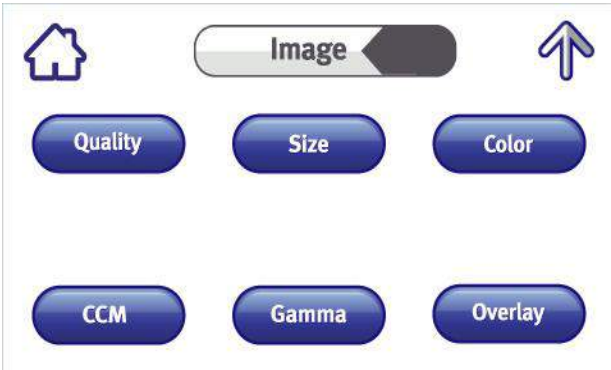


FIGURE 4-6: IMAGE SCREEN

3. Press **Quality**. The Image Quality screen appears.

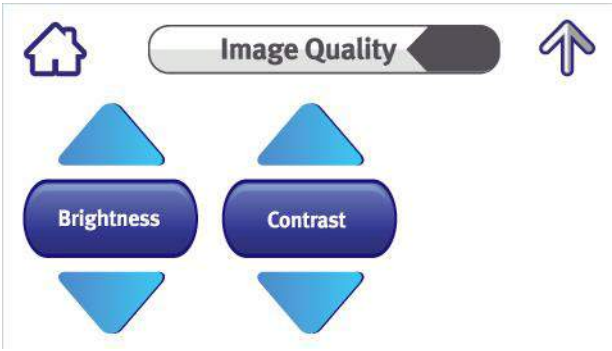


FIGURE 4-7: IMAGE QUALITY

4. Press the up or down arrows around the Brightness button to raise or lower the brightness of the video.
5. To return the brightness setting to the factory default, press **Brightness**.

6. Press the up or down arrows around the Contrast button to raise or lower the contrast of the video.
7. To return the contrast setting to the factory default, press **Contrast**.

CONFIGURING IMAGE SIZE

You can configure the size of the image in the video.

➢ To configure the image size, in the main menu:

1. Press **Menu**. The Menu screen (Figure 4-13) appears.
2. Press **Image**. The Image screen (Figure 4-6) appears.
3. Press **Size**. The Image Size screen appears.

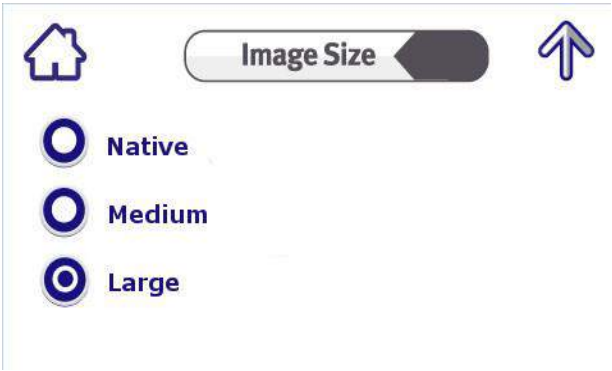


FIGURE 4-8: IMAGE SIZE SCREEN

➢ To view the original size of the image, press **Native**.

➢ To view the image in medium size, press **Medium**.

➢ To view the image in large size, press **Large**.

ADJUSTING IMAGE COLOR

You can adjust the red, green, and blue (RGB) values for the image.

➢ To adjust the color of the image:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Image**. The Image screen (Figure 4-6) appears.
3. Press **Color**. The Image Color screen appears.

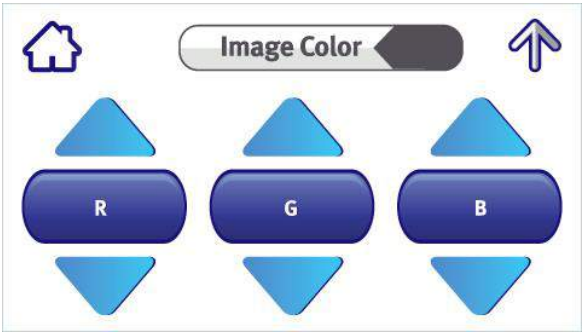


FIGURE 4-9: IMAGE COLOR SCREEN

4. Press the up or down arrows around the R button to raise or lower the red values of the image.
5. To return the red value setting to the factory default, press **R**.
6. Press the up or down arrows around the G button to raise or lower the green values of the image.
7. To return the green value setting to the factory default, press **G**.
8. Press the up or down arrows around the B button to raise or lower the blue values of the image.
9. To return the blue value setting to the factory default, press **B**.

ADJUSTING IMAGE CCM

You can adjust the colors by using predefined color correction matrix.

➢ To adjust the CCM of the image:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press Image. The Image screen (Figure 4-6) appears.
3. Press CCM. The CCM screen appears.

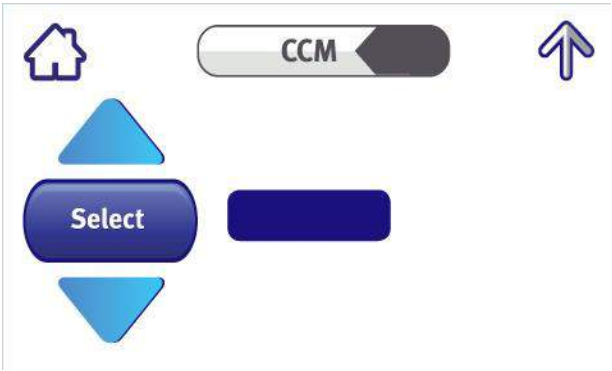


FIGURE 4-10: CCM SCREEN

4. Press the up and down arrows around the Select button to cycle through ten preset configurations. The CCM configuration displayed is applied.

Note CCM can be influenced by the ambient illumination. Please contact Medigus for a custom CCM that is optimal for your specific application.

ADJUSTING IMAGE GAMMA

You can adjust the Gamma by using predefined Gamma values.

➢ To adjust the Gamma of the image:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Image**. The Image screen (Figure 4-6) appears.
3. Press **Gamma**. The Gamma Correction screen appears.

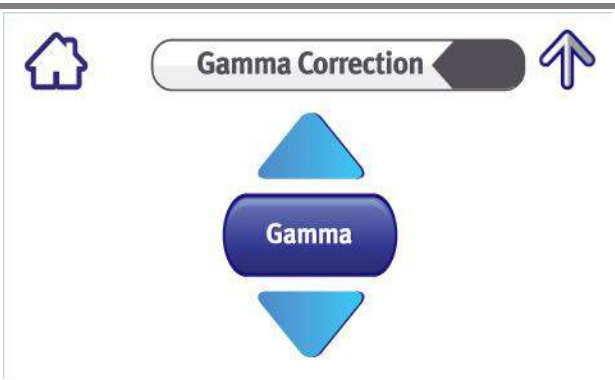


FIGURE 4-11: GAMMA CORRECTION SCREEN

4. Press the up and down arrows around the Select button to cycle through 31 preset configurations. The Gamma correction values are applied.

CONFIGURING IMAGE OVERLAY DISPLAY

You can configure the overlay of the image in the video.

➢ To configure the image overlay:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Image**. The Image screen (Figure 4-6) appears.
3. Press **Overlay**. The Overlay Display screen appears.

FIGURE 4-12: OVERLAY DISPLAY SCREEN

- To view the original image in a square format, press **No Masking**.
- To view the image using circular masking, press **Circle Masking.**
- To View the image using corners masking, press **Corners Masking**.

SETTING THE ILLUMINATION CONTROL

micro ScoutCam™ DSP provides means to drive auxiliary power LED for illumination (please consult Medigus for the correct connections and specifications).

- To set the illumination:

1. Press **Menu** in the main menu. The Menu screen appears.

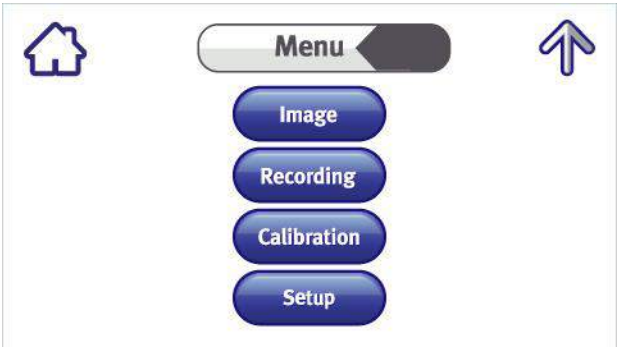


FIGURE 4-13: MENU SCREEN

2. Press Calibration. The Calibration screen (Figure 4-14) appears.

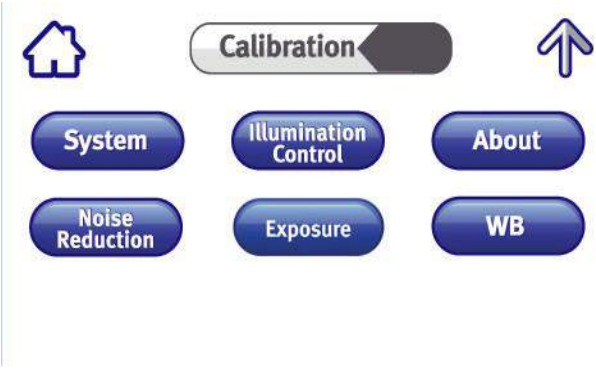


FIGURE 4-14: CALIBRATION SCREEN

3. Press **Illumination**. The Illumination Control screen appears.

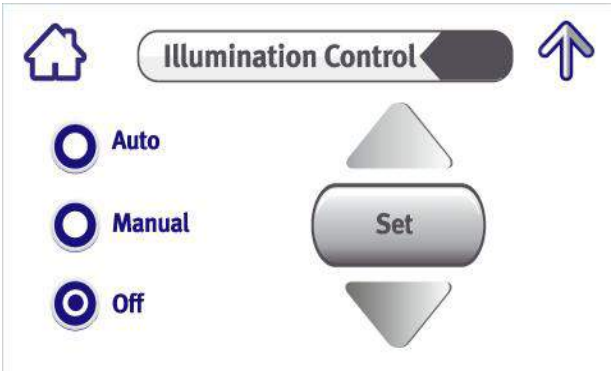


FIGURE 4-15: ILLUMINATION CONTROL SCREEN

- To set the illumination to auto adjustment according to the background illumination, press Auto.
- To turn off the illumination, press Off.
- To set the illumination value manually, press Manual.

ADJUSTING ILLUMINATION CONTROL MANUALLY

micro ScoutCam™ DSP provides means to operate an auxiliary power LED for illumination.

Note Please consult Medigus for the correct connections and specifications.

You can adjust the illumination of the Auxiliary LED manually.

- To adjust the illumination manually:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Image screen (Figure 4-14) appears.
3. Press **Illumination Control**. The Illumination Control screen appears.
4. Press **Manual**.

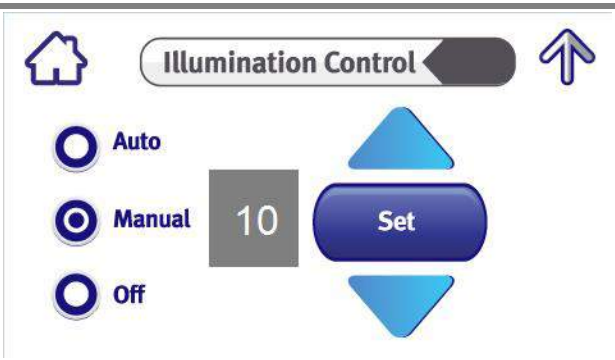


FIGURE 4-16: ILLUMINATION CONTROL SCREEN

5. Press the up and down arrows around the Set button to cycle through the 11 illumination values. The displayed illumination value is applied.

ADJUSTING EXPOSURE AUTO - SETTING SATURATION THRESHOLD

micro ScoutCam™ DSP provides means to set the saturation threshold.

➢ To set the saturation threshold:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Image screen (Figure 4-14) appears.
3. Press **Exposure**. The Image Exposure screen appears.
4. Press **Auto**.

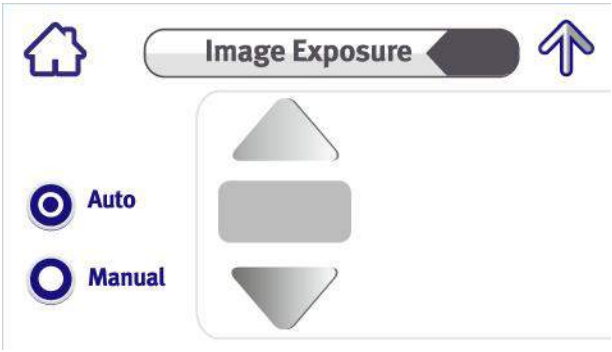


FIGURE 4-17: IMAGE EXPOSURE SCREEN

5. Press the up and down arrows to set the exposure threshold.

Note	The threshold determines the upper limit value where every value above it is counted as saturation. If more than certain number pixels are above that threshold the automatic shutter will be closed.

ADJUSTING EXPOSURE MANUAL - SETTING EXPOSURE TIME

micro ScoutCam™ DSP provides means to set the exposure time.

➢ To set the exposure time:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Image screen (Figure 4-14) appears.
3. Press **Exposure**. The Image Exposure screen appears.
4. Press **Manual**.

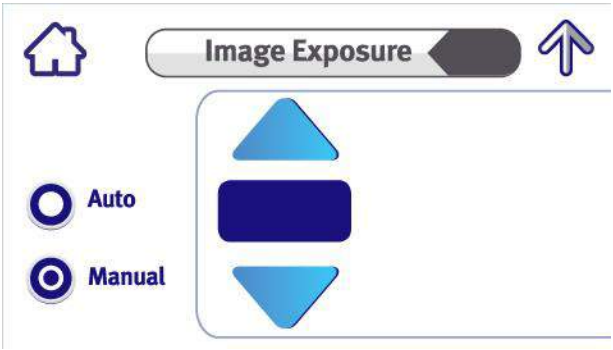


FIGURE 4-18: IMAGE EXPOSURE SCREEN

5. Press the up and down arrows to set the exposure duration 0-100% (33msec)**.**

Note	When exposure is manual, the AGC is disabled.

SOFTWARE VERSION

You can review the built-in software versions of the micro ScoutCam™ DSP.

➢ To review the software version of the micro ScoutCam™ DSP:

1. **Press Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Calibration screen (Figure 4-14) appears.
3. Press **About**. The SW Versions screen appears.

FIGURE 4-19: SW VERSIONS SCREEN

4. Press **Continue**. The micro ScoutCam™ DSP system returns to the Calibration menu.

SETTING WHITE BALANCE

To ensure that the color in the video is accurate, it is important to ensure that white balance is performed. Another way of setting the WB is via the Calibration menu.

➢ To configure white balance:

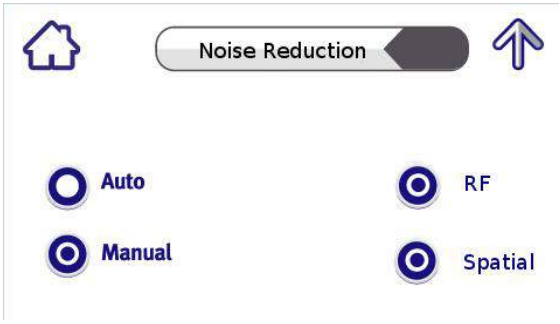
1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Calibration screen (Figure 4-14) appears.
3. Ensure that a camera is attached to the micro ScoutCam™ DSP video controller and pointed at a white target.
4. Press **WB**. The micro ScoutCam™ DSP performs white balance and the "White balance in progress" message is displayed.

NOISE REDUCTION

You can reduce arbitrary or spatial noise.

➢ To reduce noise:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Calibration**. The Image screen (Figure 4-14) appears.
3. Press **Noise Reduction**. The Noise Reduction screen appears.



1

FIGURE 4-20: NOISE REDUCTION SCREEN

➢ To set the Auto Noise filter, press **Auto**. When noise is detected (raises above certain threshold), micro ScoutCam™ DSP operates the RF cancelation and the spatial filters automatically.

➢ To set the noise reduction manually, press **Manual**. With this option the RF and spatial filter can operate by user selections.

➢ To operate the RF filter, press **RF** and ensure that the dot in the center of the RF icons is filled.

➢ To disable the RF filter, press **RF** and ensure that the dot in the center of the icon disappears.

Note If there is no RF noise and the filter is turned on, performance is reduced.

➢ To operate the spatial filter, press **Spatial** and make sure the dot in the center of the spatial icon is filled.

Note

- Operation of the spatial files reduces the spatial resolution.
- Both filters can be used simultaneously.

➢ To disable the spatial filter, press **Spatial** and make sure the dot in the center of the spatial icon is not filled.

Note The System sub-menu is for use by authorized technicians only.

RESTORING FACTORY DEFAULT SETTINGS

You can return the micro ScoutCam™ DSP to the factory default settings.

➢ To restore the factory default settings:

1. Press **Menu** in the main menu. The Menu screen (Figure 4-13) appears.
2. Press **Setup**. The Settings screen appears.
3. Press **Factory Defaults**. The Factory Default screen appears.

FIGURE 4-21: FACTORY DEFAULT SCREEN

4. Press **Continue**. The micro ScoutCam™ DSP system configuration is restored to the factory default settings.

UPDATING MICRO SCOUTCAM™ DSP SOFTWARE

You can update the software in the micro ScoutCam™ DSP video controller easily. This provides an easy way for Medigus to add functionality to the micro ScoutCam™ DSP. Software updates can be delivered on an SD card.

Note SD card size must be minimum 1Gbyte and its lock must be off for the update.

➢ To update the software:

1. Ensure that the micro ScoutCam™ DSP video controller is off.
2. Remove the SD card from the slot in the back of the micro ScoutCam™ DSP.
3. Insert the SD card with the software update into the SD card slot in the back of the micro ScoutCam™ DSP.
4. Turn on the micro ScoutCam™ DSP. The Software Update screen appears.

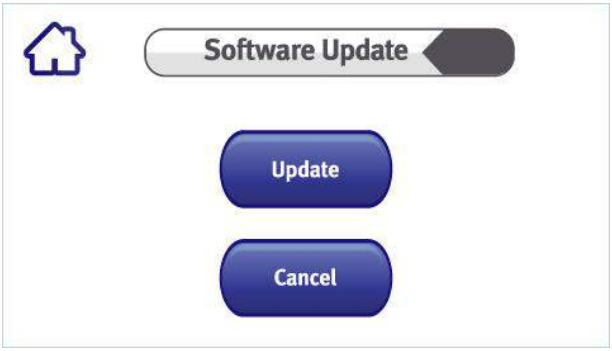


FIGURE 4-22: SOFTWARE UPDATE SCREEN

5. Press **Update**. The display will change to update mode that includes a progress bar until the update process is completed.
6. Once the update process is completed, the user is requested to turn off the micro ScoutCam™ DSP video controller for a few seconds. After a few seconds, the software is updated and micro ScoutCam™ DSP can be restarted.
7. Restore the Factory Default Settings, as described in the previous section.

Note

- During update, the screen will turn black for five minutes.

- It takes approximately ten minutes for the software to complete updating. Once the update process is completed, the user is requested to turn off the micro ScoutCam™ DSP video controller for a few seconds. Do not turn off the micro ScoutCam™ DSP during the update process until requested to do so.
- The SD card is not to be ejected during the update. After restarting the system in case of a successfully update the user can eject the SD card.

- If you do not want to update the software, press **Cancel**. The main menu appears.

Chapter 5 TROUBLESHOOTING

This chapter provides information on troubleshooting issues with the micro ScoutCam™ DSP video controller and includes the following sections:

- Using the Troubleshooting Table
- Troubleshooting Table

USING THE TROUBLESHOOTING TABLE

➢ To use the troubleshooting table:

1. Search for the issue you are experiencing in the Symptom column.
2. Perform the remedies listed in the Remedy column in the order listed.
3. After performing each remedy, check the micro ScoutCam™ DSP to see if the issue was resolved.

TROUBLESHOOTING TABLE

The following table provides troubleshooting instructions.

TABLE 5-1: TROUBLESHOOTING

Symptom	Remedy
No picture is displayed on the monitor	• Reset the micro ScoutCam™ DSP video controller. • Check the cables connected to the micro ScoutCam™ DSP. If any of the cables are not properly attached, remove and reattach the cables. • Reset the micro ScoutCam™ DSP configuration to the factory default. For more information, refer to *Restoring Factory Default Settings*. • Troubleshoot the monitor. For information about troubleshooting the monitor, refer to the monitor manufacturer's documentation. • Contact Medigus technical support.
The micro ScoutCam™ DSP user interface does not appear on the touch screen	• Reset the micro ScoutCam™ DSP video controller. • Contact Medigus technical support.

Symptom	Remedy
An error occurs during a software update	• Reset the micro ScoutCam™ DSP video controller. • Contact Medigus technical support.
micro ScoutCam™ DSP does not operate, no image and no sound	• Disconnect the micro ScoutCam™ DSP from mains. • Extract the fuse cartridge from the back of the micro ScoutCam™ DSP. • Replace if necessary one or both fuses. • Resume the micro ScoutCam™ DSP. • Contact Medigus technical support.
Temperature exceeds 50˚ and a continuous beep is heard	• Turn off the unit for five minutes. • Make sure no object blocks the aeration slot of the enclosure. • Resume the system. • If the warning appears again, turn off the unit and contact Medigus technical support.
Video interference, including the background which is supposed to be black	• Replace the HDMI cable.
During software update process both the monitor and the touch screen become black	• Both the monitor and the touch screen should be black during the update procedure for 5-10 minutes (depending on the software update package) • If after 15 minutes the monitor and the touchscreen are still black and nothing is display please turn off the micro ScoutCam™ DSP video controller and turn it on again after 5 minutes. The micro ScoutCam™ DSP will check if the update was completed and will continue the update if necessary. A message will be displayed if recovery process was made.

TECHNICAL SUPPORT CONTACT INFORMATION

Medigus technical support can be contacted at:

- E-mail: service@medigus.com
- Telephone: +1-855-209-8703

Appendix A - MICRO SCOUTCAM™ DSP SCREENS AND CONTROLS

This appendix provides the flow of the micro ScoutCam™ DSP screens and controls.

- Main screen
  - White Balance
  - Brightness
  - Contrast
  - Presets
    - Select
    - Save Current Setup
  - Menu
    - Image
      - Color
        - R
        - G
        - B
      - Quality
        - Brightness
        - Contrast
      - Size
        - Native
        - Medium
        - Large
      - CCM
        - Select
      - Gamma
        - Gamma
      - Overlay
        - No Masking
        - Circle Masking
        - Corners Masking
    - Setup
      - Factory defaults
      - Adjust time
    - Recording
      - Previous movie/image

- Next movie/image
- Stop
- Play/pause
- Record start/stop
- Delete

- Calibration
  - Illumination
    - Auto
    - Manual
    - Off
    - Select
  - Illumination Control
    - Auto
    - Manual
    - Off
    - Set
  - Exposure
    - Auto
    - Manual
  - WB
  - Noise Reduction
    - Auto
    - Manual
    - RF
    - Spatial
  - About
    - SW Versions

- Software Update
  - Update

Appendix B - Technical Specifications

This appendix provides the technical specifications for the micro ScoutCam™ DSP video controller.

Table B-1: Technical Specifications

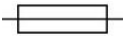
Specification	Value
Physical Specifications	
Height	100 mm (3.94”)
Length	350 mm (13.78”)
Width	290 mm (11.42”)
Weight	3.6 kg (7 lbs. 15 oz.)
Power Specifications	
Input Voltage	100V - 240V AC; 50-60 Hz
Input Current	~1.0A
USB Output Voltage	5V DC
USB Output Current	400mA
Supported Cameras	
Medigus 1.2mm CMOS camera	
Medigus LEDprobe camera	
Storage Specification	
SD card	16 Gb max.
Supported SD card types	SD, SDHC
Display Out Specifications	
HDMI (2 outlets)	720P
Human Interface Specifications	
TFT touch screen	4/3” 480 x 272
Operating Specifications	

Specification	Value
Temperature	13°C - 32°C (55°F – 90°F)
Humidity	20% - 90%, non-condensing
Safety	
Safety Classification	Class I; Type BF

Appendix C - Device Symbols

This appendix provides descriptions for the symbols that appear on the micro ScoutCam™ DSP video controller.

Table C-1: Device Symbols

Symbol	Description
	Attention: Refer to the User Manual.
	Equipotential terminal
	Date of manufacture
	Manufacturer
	Type BF (electrical safety classification)
REF	Device identification
SN	Serial number
	Do not dispose in garbage
	User replaceable fuses. Replace only with the type indicated on the back of the unit.
	Audio out
	Audio in
	USB port
	Ethernet port
	SD mass storage memory card slot