

# Software Component Users Guide

# S107-9000 Color Presence

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# INTRODUCTION

Welcome to the Users Guide for your Newton Research Labs Software Component. You will find the simplicity and ease of use of this Software Component User Interface to be unparalleled in the machine vision field.

This guide covers the installation, set-up and use of Newton Labs Software Component **No.S107-9000**.

The basic S107 Software Component has been optimized for Color Presence Recognition with a Newton Labs Model 9000 series Vision System.

This Users Guide contains information on the following subjects:

Newton Labs Software Component Installation and Set-Up

System Requirements

User Interface Installation

Standard Newton Labs Vision Systems features for this Software Component

Operation

Quick Start Guide User Interface Basics System Information Color Calibration Page Serial Output Page

Appendix A-Communication Troubleshooting

# STANDARD NEWTON LABS VISION SYSTEMS FEATURES

Settings for the S107-9000 Software Component

## IMPLEMENTED MODEL: 9400

Feature		Setting	
Ethernet		Not Implemented in this Software Component	
DB9 Serial RS232 Configuration Connector		Used in Set-up and Configuration Mode	
		Disconnect for operation	
DB37 Digital Inputs		Inputs $1 - 4$ for imager triggers	
		(See Output Page)	
	Input 1	Imager 1 - Trigger	
	Input 2	Imager 2 - Trigger	
	Input 3	Imager 3 - Trigger	
	Input 4	Imager 4 - Trigger	
DB37 Line Lock/Sync In	put	Not Implemented in this Software Component	
DB37 Digital Outputs		Used for color presence recognition output	
		(See Output Page)	
	Output 1	Imager 1 - Channel 1 (first color)	
	Output 2	Imager 1 - Channel 2 (second color)	
	Output 3	Imager 1 - Error	
Output 4		Imager 2 – Channel 1 (first color)	
Output 5		Imager 2 – Channel 2 (second color)	
Output 6		Imager 2 - Error	
	Output 7	Imager 3 – Channel 1 (first color)	
	Output 8	Imager 3 – Channel 2 (second color)	
	Output 9	Imager 3 – Error	
	Output 10	Imager 4 – Channel 1 (first color)	
	Output 11	Imager 4 – Channel 2 (second color)	
	Output 12	Imager 4 – Error	
DB37 Serial RS422 Data Output		Not Implemented in this Software Component	
Newton Labs Imagers		Up to 4 Model 4156 Newton Labs Imagers	
Imager OutputUp to 4 I		Up to 4 Imager Outputs available	
		NTSC Format	
Video Output		Shows Objects of Trained Color	
Front Panel LEDs	Busy	Green after power on self-test	
	Pass/Fail	Not implemented in this Software Component	
Sync/Trigger		Not implemented in this Software Component	

# INSTALLATION AND SET-UP

## SYSTEM REQUIREMENTS

Laptop or PC – Pentium 100 or faster, operating system Windows 95 or higher.

## **USER INTERFACE INSTALLATION**

- 1. Start Windows.
- 2. Insert the Newton Labs Software Component CD-ROM into drive (\*).
- 3. Press Start on the Task bar and select Run.
- 4. From the Run dialog box, select (or type) (\*):\Setup and click OK.
- 5. Follow the screen instructions.

\* Insert your CD-ROM drive letter.

## **POWER UP DISPLAY**

When the Newton Labs Vision System is first powered up, it will perform a self-test and feature detection. When the system has completed the self-test, the **BUSY** LED on the front panel will illuminate Green.

## **POWER FLUCTUATIONS**

The Model 9400 Newton Labs Vision System requires relatively stable AC power. If the system is installed in an area where the AC power is not stable and is subject to severe fluctuations and/or discontinuity, the use of an Uninterruptable Power Supply may be required.

Should a rapid power fluctuation take place and the Newton Labs Vision System appears not to be operating correctly, turn off the main power switch on the front panel for 5 seconds and then turn the system back on.

# QUICK START GUIDE

These directions assume use of a standard NTSC video monitor with BNC connector.

- 1. Connect laptop or PC to the Newton Labs Vision System and turn on the Vision System
- 2. Install Software Component on laptop or PC
- 3. Start Software Component

The Software Component User Interface will automatically connect to the Newton Labs Vision System. If it does not connect:

#### Go to Connection Menu

- 1. Select **Configure** Select Com Port.
- 2. Select Connect

3. If no connection is made after properly selecting the Com port, see Appendix A for help.

#### 4. Go to the **Information Page**

- 1. The Newton Labs Software Component will automatically confirm that the Software Component is the correct one for the connected Newton Labs Vision System
- 2. If the information page does not show the correct serial number, you will not be able to continue. A display box will inform you of the conflict. Contact your Newton Labs Authorized Distributor to obtain the correct Software Component.

#### 5. Attach and focus imagers

- 1. Attach the imagers to Model 9400
- 2. View the imager display in the **Color Calibration** Page for focus and imager placement.
- 3. Alternatively, attach video monitor to the Imager Out connector. Use the monitor image to inspect imager output for focus and imager placement.

#### 6. Go to the Color Calibration Page

- 1. Select number of imagers enabled and the first imager for training.
- 2. Adjust *Hue* and *Hue Variation* to match desired color range for each colored object.
- 3. View the training data display in the **Color Calibration** Page.
- 4. Alternatively, attach video monitor to the Video Out connector and place object to be trained in front of imager. The video output will show in white all regions that are detected to match the color range you have selected.
- 5. Adjust parameters until a solid training is obtained. You may need to turn off "Bright Colors Only" and adjust the minimum acceptable Saturation and Brightness values if the color you are training is not bright.

### 7. Go to the (Serial) Output Page

- 1. Select the desired minimum and maximum pixel range values for each channel of each imager (each channel equates to a different color to be trained).
- 2. Select the desired output signal duration in milliseconds. The same setting applies to all.

#### 8. File Menu Save Settings

Save to File

- 9. Run Menu Start Running
- 10. Connection Menu Disconnect
- 11. File Menu Exit

# **USER INTERFACE BASICS**

# FILE MENU

N <sup>R</sup> N	lewton Labs	9000 Se	ries - Setup and Co	nfiguration
<u>F</u> ile	<u>C</u> onnection	<u>R</u> un		
<u>S</u> a Lo	ave Settings ad Settings	Ctrl+S Ctrl+O	ocus and Calibration	Monitoring
E <u>x</u>	șit		400	
9	erial number:	9	4001100099	
Г	Installed Com	ponents		

**Save Settings**–Saves currently selected settings to a file on the laptop or PC you are using. A dialog box will ask for a file name and location. It is highly recommended that you save the settings after a successful setup.

**Load Settings**–Opens previously stored settings file and loads those settings into the User Interface.

Exit-Closes the Software Component User Interface

## **CONNECTION MENU**



**Connect**–Connects the Newton Labs Software Component User Interface to a Newton Labs Vision System. *This option must be selected first in any setup session*.

**Disconnect**–Disconnects the Newton Labs Software Component User Interface from a Newton Labs Vision System.

Configure Serial Port-Select the communications port the Vision System is connected to.

## **RUN MENU**



Start Running- To optimize performance, Start Running will automatically disable video out.

Stop Running- This will re-enable the video out.

# SYSTEM INFORMATION PAGE

- Vision System Model
- Serial Number
- Installed Components

Mewton Lab: 9000	Series - Setup and Configuration		_ = ×
File Connection Bun			
Information Color Calibra	tion Output		
Vision system model:	9400		
Serial number:	94000300100		
Installed Components			
S107 - 9000 Color	Presence v1.2		
	Connected to Model 9400	Running	

### Vision System Model

The Newton Labs Software Component User Interface reads and automatically identifies the Model number of Newton Labs Vision System to which it is connected.

#### Serial Number

The Newton Labs Software Component User Interface reads and auto identifies the Serial number of Newton Labs Vision System to which it is connected. If the Software Component is not correct for that serial number, a display box will appear. Contact your Authorized Newton Labs Distributor for the correct Software Component.

### **Installed Components**

Since many final applications require several Newton Labs Software Components, this table identifies which of the Newton Labs Software Components have been included in this application.

# **COLOR CALIBRATION PAGE**

The Color Calibration Page allows setting the color range of the objects.

Color selection is primarily performed by adjusting the *Hue* and *Hue Variation*. *Hue* sets the actual color, while *Hue Variation* configures how much the color can vary.

Select *Training Data* to display the training output in the right hand side of the page, or select *Imager View* to view the imager output. Adjust *Hue* and *Hue Variation* to try to get a solid training. A solid training is achieved when the colored object is depicted as solid white.

Alternatively, attach a video monitor to the Video Out connector and place an object to be trained in front of the imager. The video output will show in white all regions that are detected to match the training range selected. Usually, *Bright colors only* can be turned on, which configures the Saturation and Brightness ranges to their default values. If, however, Hue and Hue Variation are insufficient for obtaining a solid image, turn off *Bright colors only* and modify the Saturation and Brightness ranges. Saturation is the property of how "intense" versus how "washed out" a color is. For example, red is more saturated than pink, and pink is more saturated than white. You can get a good feel for these adjustments by watching the recognized color range under each slider.



# COLOR CALIBRATION PAGE CONT.



# COLOR CALIBRATION PAGE CONT.



*Imager view* displays the actual live video from the imager. Imager view is useful in set up to focus the imager. It is also convenient for troubleshooting in order to see what the imager is seeing.



*Training Data* displays a binary view of the training on the colored object. The colored object is depicted as white and the background as black. The more solid the white becomes, the better the training.

*Update now* triggers the imager to grab an image and display it. The same image will remain displayed until *Update now* is clicked again.

*Update continuously* will display continuous live imager or training output. It is recommended to use this mode while training. Note: The speed of the Imager view update is limited by the speed of the serial connection.

# **OUTPUT PAGE**

When the system is triggered, it sets the appropriate outputs. Which color information is calculated and reported can be configured in the Output Page.

Mewton Labs	9000 Series - Setup and Configuration	
File Connection	<u>H</u> un	
Information Color	Calibration Output	
Imager 1:	Channel 1 range: from 500 to 50000 pixels (cr	mently 10665  . Channel 1 output: 1
(trigger input 1)	Channel 2 range: from 50000 to 50000 pixels (cr	mently 33667 ]. Channel 2 output: 2
		Enor output: 3
Imager 2:	Channel 1 range: from 520 to 50000 pixels (cr	mently 330000 ). Channel 1 output: 4
(trigger input 2)	Channel 2 range: from 50000 to 50000 pixels (cr	mently ]. Channel 2 output: 5
		Enor output: 6
Imager 3:	Channel 1 range: from 500 to 50000 pixels (cr	mently 13299]. Channel1 output: 7
(trigger input 3)	Channel 2 range: from 500 to 50000 pixels (cr	arently 21859]. Channel 2 output: 8
		Enor output: 9
Imager 4:	Channel 1 range: from 5000 to 50000 pixels (cr	mently 27579]. Channel 1 output: 10
(trigger input 4)	Channel 2 range: from 50000 to 50000 pixels (cr	mently 25415 ). Channel 2 output: 11
		Enor output: 12
	Enable outputs for 2000 m	5.
For each in the Channe output will t	ager, when its trigger is activated, if Channel 1 is within its range if 1 output will be set. If Channel 2 is within its range and Chann se set. Otherwise, the Error output will be set.	and Channel 2 is below its range. el 1 is below its range, the Channel 2
	Connected to Model 9400	Running

# OUTPUT PAGE CONT.

Mewton Labs 9	0000 Series - Setup and Co	onfigu	iratio	n				
<u>File</u> <u>Connection</u>	<u>R</u> un							
Information Color C	Calibration Output							
Imager 1:	Channel 1 range: from	500	to [	50	000	pixels (currently	3985	9). Channel 1 output: 1
(trigger input 1)	Channel 2 range: from	500	to [	50	000	pixels (currently	2	). Channel 2 output: 2
								Error output: 3
		1					1	
Select desired pixel range for	minimum and maximum each channel (color).	m			Th ch co wł	e current tota annel is disp unt represent nite in the tra	al pixel layed h s a goo ining d	count for each ere. A high pixel d training (solid ata display).

Note: changes to this page only go into effect once the new value has been typed in, followed by pressing enter on the keyboard, or by clicking in another field, or by leaving this page. **Simply typing in a new value alone will not enable the change.** 

# APPENDIX A

# **COMMUNICATION TROUBLESHOOTING**

Pr	oblems Communica	ating with the 9000 Series
•	The user interface will not connect with the 9000 Series	<ul> <li>Try the following first:</li> <li>Wait 30 seconds and try reconnecting.</li> <li>Check all connections.</li> <li>Make sure only one copy of the software component is running on the laptop or PC.</li> <li>Make sure that no other software (e.g. Palm Desktop) is using the serial port.</li> <li>Try to connect using another COM port.</li> <li>Turn off the computer, restart, and try again.</li> </ul>
		If the above suggestions do not provide results, follow the procedures below to further troubleshoot communications: STEP 1: Establish communications via a communications terminal program. HyperTerminal can be used to debug system communications. You can use the HyperTerminal program as follows:
		Start HyperTerminal: Click the Start button, choose Run, type in Hypertrm.exe and click OK. A dialog box will appear with the words "Connection Description" in the title bar. Type NRL9000 in the name field. Under "Connect Using", click "Direct to Com …" and choose the COM port you are using to connect to the 9000 Series. Try using COM 1, if you are using a PS-2 mouse. If you have a serial mouse, try COM 2. If you are not sure which COM port to use, repeat until you determine the right one.
		Select the appropriate communications port.

PROBLEMS COMMUNIC	ATING WITH THE 9000 SERIES (CONTINUED)
<ul> <li>The user interface will not connect with the 9000 Series</li> </ul>	A dialog box will appear listing the properties for the com port selected. Set the com port properties to 115,200, 1 stop bit, Flow Control-Hardware
(continued)	The HyperTerminal program will display a white box. Press the space key (several times). An "OK" will appear each time you press space as long as the PC is communicating with the 9000 Series through HyperTerminal. If successful communications with the 9000 Series have been established, skip to Step 4.
	STEP 2: Check the wiring
	There may be a problem with the RS-232 cable or the laptop/PC. Make sure the wiring is correct.
	STEP 3: Make sure the computer is working properly
	If you are not able to obtain control over a COM port on the PC, check with your system administrator for help. If you are able to get control over a COM port, and you have checked all wiring and connections, go to Step 4.
	STEP 4: Power down the 9000 Series and power up again normally.
	STEP 5: Establish communications with the 9000 Series using the software component.
	Disconnect from the terminal mode in the program you are using. Use the software component to try to connect to the 9000 Series. If you still cannot establish communications using the terminal mode and/or the software component after reloading the software and establishing that there are no problems with the wiring or PC, go to Step 6.
	STEP 6: Call your Newton Labs Authorized Distributor
	Arrange with your local distributor to substitute a working 9000 Series and laptop to determine where the problem exists.

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