

StellaCam Wireless Controller User's Guide

For use with StellaCam II, StellaCam³ and Wat-120N, Wat-120N+ astro-video cameras



Developed and maintained by
CosmoLogic Systems, Inc.

Thank you for purchasing the StellaCam Wireless Controller for use with your StellaCam II, StellaCam3 or Wat-120N, Wat-120N+ astronomy video camera. The StellaCam Wireless Controller provides you with convenient wireless operation of your camera up to distances of 300 feet. In addition to wireless operation, the controller also provides an easy to use computer interface allowing you to control your camera from a personal computer or send control commands from another software application.

For StellaCam3 and Wat-120N+ owners, the controller enhances your camera's operation by providing automatic exposure timing far beyond the maximum setting of 8.5 seconds available on the wired handbox. The wireless controller will now give you automatic exposure timing from 1/2000th of a second up to a full 90 minutes.

I. Description

The StellaCam Wireless Controller consists of two components: a transmitter handbox unit and a receiver unit. The receiver unit plugs into the R/C control input of your camera. Power for the receiver is supplied by the camera through the R/C connector – therefore, **the receiver must be connected to the camera before applying power to the camera.** When powered on, the transmitter handbox unit sends commands to the receiver via a wireless RF data link. The handbox may be turned on either before or after the receiver/camera is on.

Transmitter Handbox

The transmitter handbox can operate over 200 hours on 2-AA batteries (depending on LED intensity setting). Power is applied by pressing the POWER On/Off button. When the power is left on, a “battery saving” timeout feature will automatically turn the handbox off if no settings are changed within a certain timeout period. The timeout period is factory set to 30 minutes, however, the user can change it from 1 minute up to 2 hours, or disable the timeout such that it will not automatically turn off. Battery saving timeout control is accessed over the serial RS232 data link (see Computer Interface section).

A “Lo Batt” indication is momentarily displayed at regular intervals when the battery voltage drops down to 1.7v or less. If the battery voltage gets critically low, this warning will be strobed to indicate that the voltage is getting too low for the system to function properly. The handbox will operate for several hours following the “Lo Batt” warning, but the batteries should still be replaced as soon as possible.

The handbox supports two different modes of operation: StellaCam II mode and StellaCam3 mode. The default is StellaCam3 mode. The operating mode is displayed on the LED readout right after power is applied. The StellaCam II mode is indicated by “SC-2” and the StellaCam3 mode is indicated by “SC-3”. The two modes of operation are identical except for the exposure times that are supported. In the “SC-2” mode, only the StellaCam II exposure times of .017sec to 8.533sec are allowed. In the “SC-3” mode, exposure times ranging from .0005 seconds to 90 minutes are allowed. It should be noted that either operating mode will control all of the supported cameras, however only the exposure times appropriate to the camera being used will actually be implemented. The operating mode can be changed by accessing it via the serial RS232 data link (see Computer Interface section).

All handbox settings are stored in non-volatile memory so when you turn the power on, the settings will be the same as they were the last time it was used.

The handbox contains rotary knobs and switches allowing the operator to control the following camera parameters:

- Exposure Time
- Freeze Frame
- Gain
- Iris Control
- Gamma Setting

Exposure Time

Exposure times are displayed on a 4-digit LED readout. The exposure times are “dialed in” by turning a rotary knob to the desired setting. Exposure times ranging between 1 second and 5 minutes are selected with a 1-second resolution. Exposure times from 5 to 90 minutes are selected with a 1-minute resolution.

The rotary knob used for setting the exposure time also doubles as a push button switch for displaying an exposure countdown timer. When pressed, the LED readout toggles between displaying the exposure time and displaying the exposure countdown timer. If the rotary knob is turned while the countdown timer is being displayed, then the new exposure time is momentarily displayed – exposure countdown resumes 2 seconds after the new selection is made.

When exposure times are changed, the current exposure is adjusted to satisfy the new setting. For example, suppose the exposure time was set to 40 seconds but changed to 50 seconds. If the current exposure had been running for 20 seconds, then it will now continue for an additional 30 seconds to give you a 50-second exposure. Now suppose the 40-second exposure setting was changed to 30 seconds. If the current exposure had been running for 20 seconds, then it will now continue for only 10 more seconds to give you a 30-second exposure.

Freeze Frame

When the exposure has finished (countdown goes to zero) the “READ” LED will flash green indicating that the camera video frame has been updated with a new image. The READ LED doubles as a Freeze Frame control switch. When pressed, the LED turns red indicating that the camera’s video image has been “frozen” indefinitely. When pressed again, LED turns off and a new exposure begins.

Gain

The camera’s gain is displayed on a 2-digit LED readout. The gain settings are “dialed in” by turning a rotary knob to the desired setting. The gain setting ranges from 00 to 99 corresponding to the camera’s video amplifier gain of 8dB to 38dB. Therefore the gain resolution is 0.3dB per step change. The gain setting can be interpreted as a percentage of the camera’s gain range - going from 0% (8dB) to 99% (38dB).

The gain rotary knob also doubles as an LED intensity adjustment. When pressed down while rotating, the intensity of the LED displays (including the Freeze/Read LED) is adjusted. Turning the knob clockwise increases LED brightness, turning it counter-clockwise decreases LED brightness.

Iris Control

The Iris Control switch enables or disables camera control over the iris of an external lens. When a lens with auto-iris capability is connected to the auto-iris control port of the camera, the control feature of the camera can be enabled or disabled. With the Iris Control switched to the “OPEN” position, the camera control is disabled forcing the lens iris to be fully open. With the Iris Control switched to the “CTRL” position, the camera will have auto control over the lens iris, adjusting the iris opening based on exposure time.

Gamma Setting

Gamma correction is used to compensate for the non-linear voltage/intensity response of a monitor displaying an image from the camera. Gamma correction basically controls the overall brightness of the image.

The Gamma Setting switch allows you to choose three different levels of gamma correction to the video image. Setting the switch to the OFF position disables gamma correction (gamma = 1.0). Setting the switch to LO applies a gamma correction of 0.45 to the video image (increased intensity). Setting the switch to HI applies a gamma correction of 0.35 to the video image (highest intensity).

Receiver

The receiver unit performs all of the camera control operations. It receives commands from the transmitter handbox via a wireless RF data link. All of the camera control parameters are saved in non-volatile memory so when you turn the power on, the settings will be the same as they were the last time it was used. If the handbox is turned off or automatically shuts down, the receiver will continue to control the camera based on the last settings it received from the transmitter. For example, if the exposure time was last set to 30 seconds with a gain of 45 and gamma set to “LO” when the handbox was shut down, then the receiver will maintain these settings - repeatedly performing 30 second exposures. If the receiver/camera power is turned off, then the next time it is turned back on, the camera will be controlled by the receiver to perform 30 second exposures with a gain of 45 and LO gamma.

The receiver automatically detects which type of camera it is connected to (StellaCam II, StellaCam3, Wat-120N, Wat-12N+) and controls it based on the commands received by the transmitter along with the cameras capabilities.

II. Operating the StellaCam Wireless Controller

The StellaCam Wireless Controller was designed to be as simple to use as possible. Simply plug the receiver unit into the R/C connector of your camera, power up the camera, and turn the transmitter handbox power on. You may now control your camera using the handbox up to 300 feet away.

Computer Interface

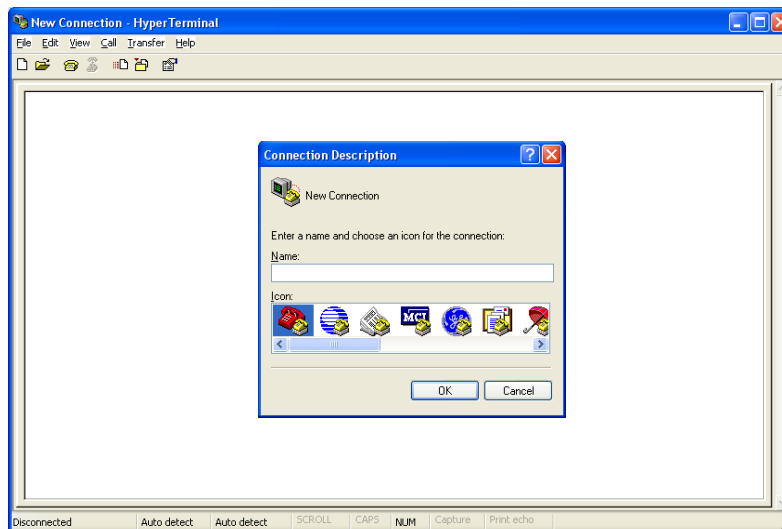
The transmitter handbox may also be operated remotely by a personal computer via its serial RS232 data link. This feature gives you the ability to control your camera from a host computer. A serial interface cable is supplied with your wireless controller system that connects the handbox to the com port on your computer. If your computer doesn't have a com port, then a serial-to-usb adapter may be used to connect to a usb port.

To control the handbox from your computer, you need to run a communications program such as Procomm or HyperTerminal. HyperTerminal is a standard communications accessory that comes with all Windows operating systems. With HyperTerminal running, you will get a display showing all of the wireless controller parameters along with instructions on how to modify them.

To invoke HyperTerminal*, click "Start" (lower left of your computer screen), then go through the following menus:

Programs > Accessories > Communications > HyperTerminal

When HyperTerminal is invoked, the following screen will appear:

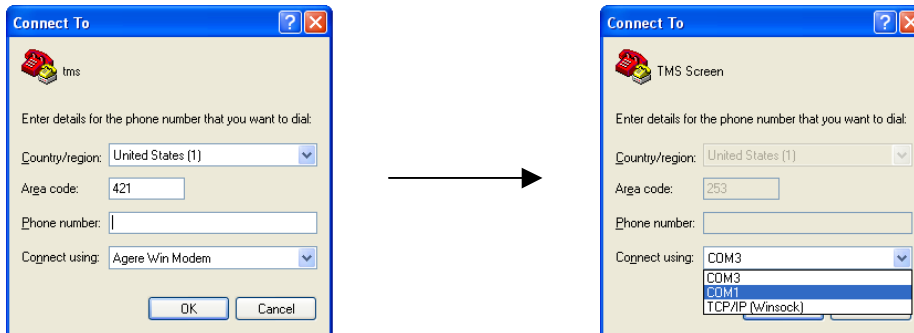


* If HyperTerminal is not on your system, then you will need to insert your Windows CD and install it.

Type in a connection name (such as “ Wireless Controller”) and click OK.

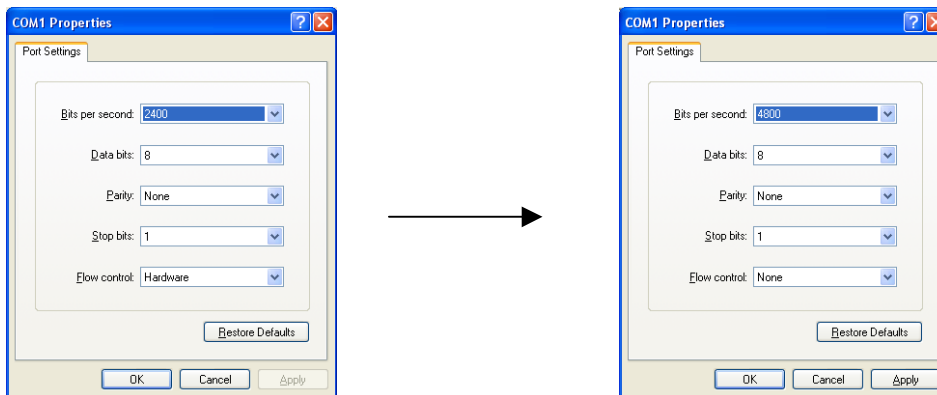


Now the following “Connect To” screen appears:



Click on the “Connect using” pull-down menu and select a com port. If you are connected to your computer’s com port then choose COM1. If you are using a Serial-to-USB adapter, then choose the com port number assigned to your adapter.* Click OK.

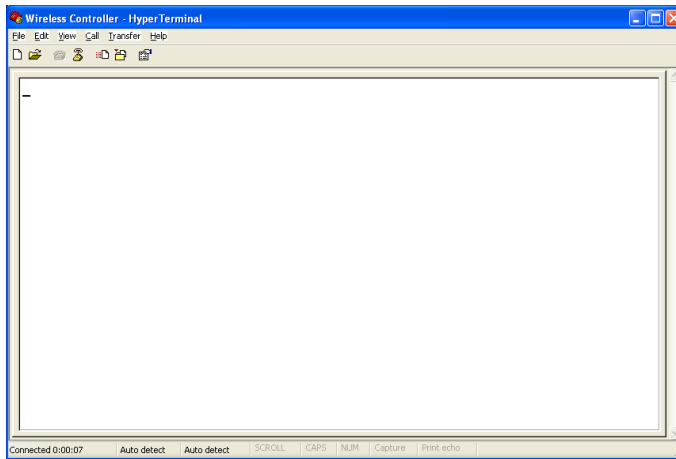
Now the following “COM Properties” screen appears:



Change the “Bits per second” to 4800. Set the other parameters to: Data bits = 8, Parity = None, Stop Bits = 1, Flow Control = None
Click OK.

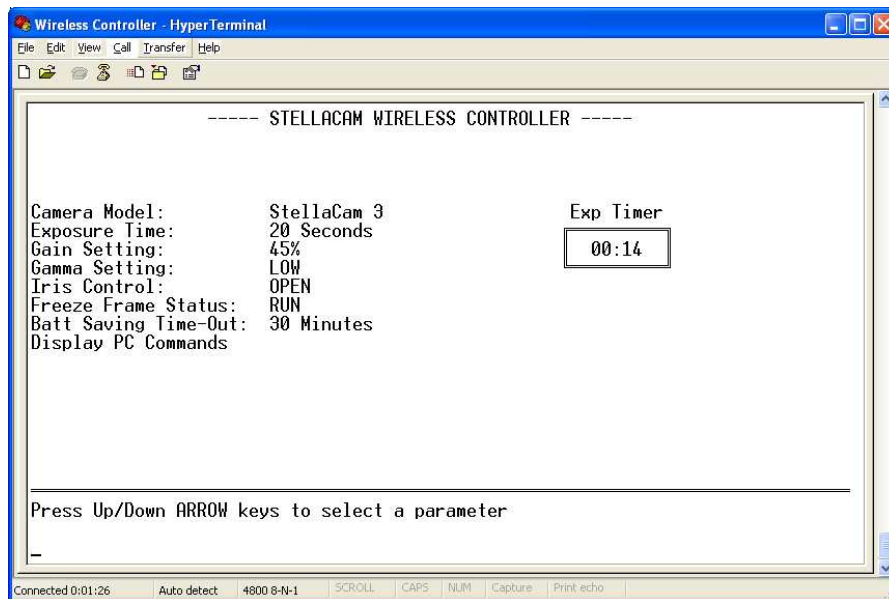
* To identify your adapter’s com port assignment, look in the Device Manager under “ports” (Control Panel>System>Hardware>Device Manager). It will show your adapter with the assigned com port in parenthesis.

You will now have the HyperTerminal screen running as shown:



At the lower left of the screen, a clock should be running showing the elapsed time since the connection was started.

Connect the interface cable from the handbox to your computer and the message “Press ENTER Key To Connect” should be displayed on the screen. Press ENTER and a display similar to the one below will appear:



You can select a parameter by pressing the Up/Down arrow keys, then change its value by pressing the Left/Right arrow keys. Parameters can also be changed by sending text commands allowing you to control the camera from other software applications. The supported text command set can be displayed by selecting the “Display PC Commands” item in the parameter menu list, then press the Right or Left arrow key.

When exiting HyperTerminal, it will ask you if you want to save the connection. If you select YES, a HyperTerminal setup file (Wireless Controller.ht) will be created. The file will be located in the HyperTerminal Folder (Programs > Accessories > Communications > HyperTerminal [folder]). So the next time you want to control the handbox using HyperTerminal, just click on the “Wireless Controller.ht” icon. For convenience, you may want to create a link to “Wireless Controller.ht” and save it to your Windows desktop or some other appropriate folder.

III. StellaCam Wireless Controller Specifications

Operating Temperature Range:	-35 °C to 70 °C (-31 °F to +158 °F)
Transmitter/Receiver Operating Range:	Up to 300 feet (depending on obstacles)
Transmitter Output Power:	10mW
Receiver Power Input:	5 volts, 14mA (from camera)
Handbox Power Input	3 volts, 5mA-to-16mA max (2 AA Batteries)
Battery Life:	Approximately 200 hours
Battery Saving Timeout:	User Programmable (1-120 minutes or Always On)
Low Battery Warning Threshold:	1.70 volts
Auto Exposure Range – StellaCam II Mode:	0.017sec to 8.533 sec
Auto Exposure Range – StellaCam3 Mode:	0.0005sec to 90min
Serial RS232 Com Port Parameters:	
Connector:	D-Sub, 9-pin, female
Baud Rate:	4800 bit per second
Data Bits:	8 bits
Parity:	None
Stop Bits:	1, 1.5 or 2
Flow Control:	None
Terminal Emulation:	Auto Detect
Receiver Weight:	TBD
Transmitter Handbox Weight:	TBD

IV. Warranty Statement

The manufacturer warrants the original purchaser of the STELLACAM WIRELESS CONTROLLER (SWC) that it shall be free of defects resulting from faulty manufacturer of the product or its components for a period of one year from the date of sale. Defects covered by this warranty shall, at the option of the manufacturer, be corrected either by repair or by replacement. The replaced components will be warranted for the remainder of the original one year period.

The sole obligation of the manufacturer under this warranty is limited to repair or replacement of products pertaining to the SWC only, which prove to be defective within one year of purchase. The manufacturer shall not, in any event, be liable for any consequential damages or loss of profits of any kind resulting from the use of the SWC or the technical information enclosed in this document.

Please fill out the Product Registration Form and fax or mail it to CosmoLogic Systems, Inc. This product must be registered within thirty (30) days from the date of purchase in order to activate your warranty coverage.

Product Registration Form

Please fill out the following information and send it to:

CosmoLogic Systems, Inc.
11112 204th Ave Ct. East
Bonney Lake, WA 98391
Fax: (253) 863-1689
Email: CosmoLogic@timemachine.org

By sending this form back to us, we can let you know of additional products and upgrades as they become available. This form is also used to activate your warranty coverage.

Name	Address	
Phone	City	
Camera Type	State	Zip
StellaCam Wireless Controller Serial Number	Email	
Purchased From		Date Purchased