

COGNISYS SCOUT PIR



Owner's Manual

Revision 1.0



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1. Safety Instructions

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

Follow all CAUTION notices to reduce the risk of personal injury, prevent damage to the Scout equipment, accessories, and devices (computers, cameras, flashes, etc). Failure to follow all CAUTION notices may void your warranty. CAUTION may also indicate a potentially hazardous situation which, if not avoided, may result in personal injury.

The safety alert symbol  precedes a general CAUTION or WARNING statement.

The electrical hazard symbol  precedes an electric shock hazard CAUTION or WARNING statement.

-  **CAUTION:** Only use approved power sources for Scout equipment. Use of other power adapters or batteries may damage the sensor and/or attached equipment.
-  **CAUTION:** Misuse of Scout equipment could potentially damage your equipment. Cognisys, Inc. will not be held liable for damage to your equipment. If you have questions about safety please contact us!

2. Getting Started

The latest version of this manual is available on our website at:

<http://www.cognisys-inc.com/store/scout-pir.html>

The graphics/menus included in this manual may not be identical to the software that you are running. Improvements and adjustments to the software may happen prior to an updated version of the manual.

Not big on reading manuals? (What? No thumbs-up? We worked hard on this you know!) We have a few real world setups in the “8 - Examples” section. You can always come back to the technical details if you get stuck. You really should finish reading this section though – it goes through battery replacement and the basic care of the sensor.

2.1 What is the Scout PIR?

The Scout PIR is an ideal solution for short-term or long-term trail photography. It uses Passive Infrared (PIR) to detect motion. This means it is looking for a heat signature to move.

The Scout PIR has several features not available with many trail photography devices:

- Ultra-compact
- USB controlled
- Customizable camera control
- Adjustable sensitivity to prevent false activations
- Time windows of operation to only go after the subjects you're interested in
- Can limit the number of shots to reduce nuisance triggers (curious squirrels)
- Wired or wireless operation with other Scout equipment
- Quad-element differential PIR sensor for superior noise filtering
- Fast response time (up to 100ms)
- Weatherproof design
- Removable ¼-20 tripod mount
- Operates off of 2 AA batteries
- > 90 days of battery life
- Wide operating temperature range: -20C – 60C (-4F – 140F)

2.2 Why PIR? (and its limitations)

Advantages of PIR:

- Reduced cost.
- Single-ended sensor. You don't need a transmitter since you're just looking for a change in the scenes heat signature. Less camera framing concerns.
- Excellent battery life with just two AA's.
- Wider field of view than a beam sensor (great for video work)
- Can detect slight motion (a beam-break system only activates when the subject crosses the beam – PIR will continue to activate when it sees motion)

Disadvantages of PIR:

- Wider field of view makes tack-sharp pictures more difficult. You may be counting more on your camera's depth of field.
- Potential false triggers from sunlight (warm leaves blowing in the wind)
- Slower response time
- There is a short 2-3 second "recovery" time after a subject is detected
- Decreased detection range compared to Scout RX
- Decreased operating temperature range compared to Scout RX

There definitely is a place for PIR-based sensors in the trail photography / camera trap world. If the disadvantages of the Scout PIR make you a little nervous – no worries! We have an incredible beam-break style system that is fully compatible with other Scout equipment: <https://www.cognisys-inc.com/store/scout-standard.html>

Still not sure? You can always send us an e-mail at support@cognisys-inc.com. We'd be happy to answer your questions!

2.3 What is Included

The Scout PIR includes:

- Scout PIR sensor
- Camera cable of choice (for stills)
- 4m/13ft weatherproof cable (Scout PIR to camera)
- Removable ¼-20 tripod mount
- Quick-start guide insert

If you purchased the Scout PIR as a kit it may include additional accessories.

2.4 Battery Installation

Battery installation is a simple process and because the Scout PIR has excellent battery life – you won't have to do it often!

The Scout PIR requires two AA (LR6) batteries. You can use either alkaline, lithium, or rechargeable varieties. For details about maximizing battery life see section “8.5 - Maximum Battery Life”.



1. Be sure the sensor is clean prior to replacing the batteries otherwise dirt may compromise the weatherproof seal.
2. Remove the two front screws (by the front label shown above with the red arrows) using a Philips screwdriver.
3. Remove the battery door.
4. Install the two batteries.
5. Align and push the battery cover onto the sensor housing.
6. Install screws being careful not to cross-thread them – do not overtighten!

2.5 Quick Start Guide

Want to be up and running in two minutes or less? Here's the quick-start guide in case you misplaced it:

SCOUT PIR Quick Start



Press to turn on Scout PIR.
Press and hold to turn off.
Power LED will fade in and out until the sensor is ready (about 20 seconds).

Tapping the power button when the PIR sensor is on will report the sensor battery life and wake up the Scout Camera Box.

USB Configuration

1. Download and install the free Scout PIR app from:
<https://www.cognisys-inc.com/scout/pir>
2. Turn on your Scout PIR and connect it to your computer with the included USB cable.
3. Start the Scout PIR app.

You should now see the PC/Mac connected indicator:



4. Configure the PIR Sensor as needed - See owner's manual for details.



Getting Started:

1. Remove two Phillips screws from the top of the PIR sensor. Install two AA batteries and replace battery cover.
2. Press the Power button to turn on the sensor.
3. Put camera into manual focus and single shot mode.
4. Connect your camera as shown above.
5. Activate the sensor by moving in front of it and verify your camera takes an image.

There are many settings you can adjust. Be sure to check out the owner's manual for more details. As always, please let us know if you have any questions. We're glad to help!

support@cognisys-inc.com
www.cognisys-inc.com

Phone: 231-943-2425

2.6 Cleaning and Care

We want your Scout equipment to last – so here are some brief steps to keep it happy!

2.6.1 Cleaning

For cleaning we recommend a slightly dampened (not wet) micro-fiber cloth. Do not spray water directly into the inside of the equipment. Any liquid that goes into the sensor may cause an electrical failure of the device. Do not use a flammable liquid/solvents or cleaning agents on the sensor – just a micro-fiber cloth (dampened if needed).

2.6.2 Care and storage

Scout equipment is designed to handle normal wear and tear but there are some things to avoid:

- Do not get the unit wet internally.
- If not using the external connectors be sure to attach the protective cover or water may leak into the sensor causing damage.
- Do not drop the unit (there is some fancy technology inside – if you wouldn't drop your camera, why would you drop this sensor?!?)
- Protect the unit's sensor opening when packing up your gear. If a tripod fights the PIR sensor – the tripod will win.
- Do not allow dirt to get into the blue weatherproof seal around the battery compartment. This could cause seal failure and damage to the sensor and/or batteries.
- Do NOT remove the four screws on the back of the sensor (opposite of the battery door). This may cause water to leak into the electronics.
- **Remove all batteries prior to long term storage.**

Failure to properly care for the Scout PIR could result in a leak that may damage the unit. The product warranty does not cover water damage resulting from user error.

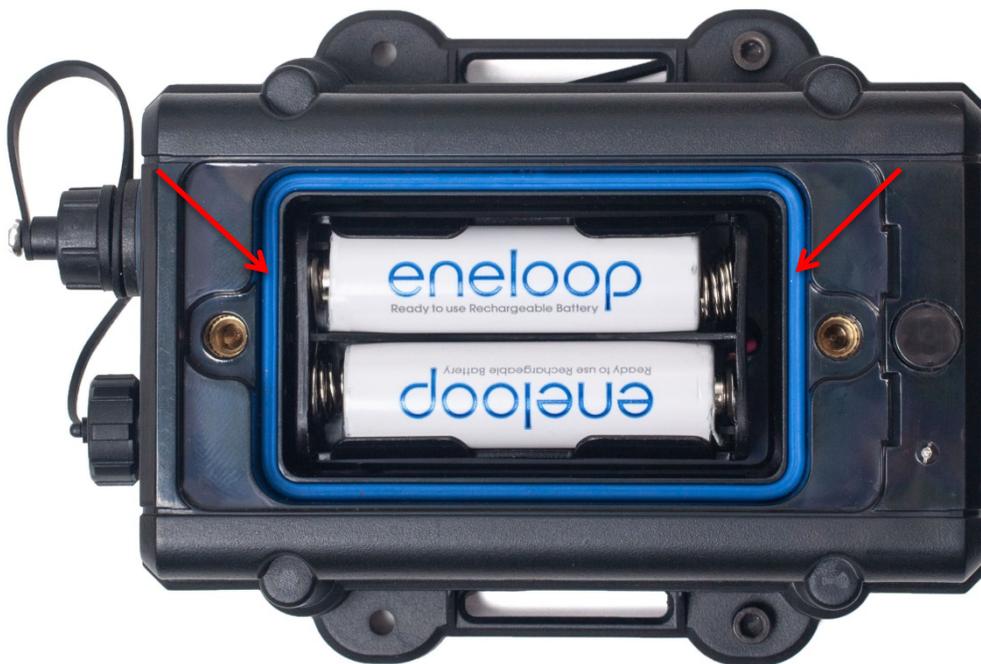
2.6.3 Maintaining Weatherproof Design

Scout equipment is designed to meet the most challenging environmental conditions. It does, however, require some care to maintain its weatherproof sealing.

Prior to opening the equipment rinse it under gently running water if it is dirty.

It's very important to keep the housing's silicone seal clean. A single hair or grain of sand could potentially cause the housing to leak and damage the equipment. The seal is bright blue in color. If the seal is dirty use a water dampened cotton swab to remove any debris and thoroughly air dry the seal prior to returning the sensor into the field.

Below is an image indicating the seal location. It is recessed in a groove in the battery compartment.



2.7 The Scout PIR



Figure 1 – Scout PIR Connections

There are two connectors on the Scout PIR (left to right):

1. Camera Connector (5-pin)
Camera half/full press: 3.5mm connector on end of cable.
2. USB
Change sensor settings (you can also do this wirelessly via the Scout Camera Box).
Update firmware.

The Scout PIR uses weather-resistant connectors and cables. If the sensor will be used outside during the rain, snow, or condensing humidity be sure to have the connectors locked in place (including the connector caps if a port is unused). The 3.5mm jack on the end of the supplied cable must be kept dry.

3. Accessories

The Scout PIR works great all on its own but there are some key accessories that could turn this sensor into a full-blown camera trapping system.

3.1 Scout Camera Box

Most camera trapping systems are intended for long term deployments under harsh conditions. Keeping your camera dry and secure is usually a requirement! Thankfully we've developed a camera box that is ideal for holding your camera. It also has the added benefit of wirelessly communicating with the Scout PIR sensor. This means no more hungry red squirrels or insects eating cables. Bear will have less "play toys" when there aren't any cables laying around. The setup is easy and has been used around the world in the most challenging conditions.



For more information please look at our website:

<https://www.cognisys-inc.com/store/scout-camera-box.html>

3.2 Scout Receiver

Why would you want a Scout Receiver if you are using a Scout PIR? For additional flexibility. The Camera Box lets you combine several Scout PIR and RX/TX combinations for a variety of applications. One Scout PIR could turn on auxiliary lighting, another PIR could start video recording, while the Receiver could have a burst of tack-sharp still images taken. When used in conjunction with the Camera Box the only limit is your creativity (and the cooperation of whatever you're shooting!).



For more information please look at our website:

<https://www.cognisys-inc.com/store/scout-standard.html>

4. Installing the software

The Scout PIR sensor can be controlled one of two ways. You can plug a USB cable into it and adjust the settings using a program for your Mac or PC. You can optionally control it wirelessly via the Scout Camera Box app (this requires a Scout Camera Box). See section “8.3 - Full Wireless (Using the Scout Camera Box)” for details on wirelessly controlling it.

Wait – I need an app? Maybe. Out of the box the Scout PIR will function for most applications. There are times, however, where you may want to use some of the advanced features of the sensor. For this you’ll need the free application to change the parameters. You likely have a laptop with you in the field for reviewing images and potentially making setup changes anyways, right? This is just another small program to make your camera trapping experience a success!

You can download the free PC/Mac version of the app here:

https://www.cognisys-inc.com/products/scout/scoutpir_tech_specs.php

5. Basic Navigation

In this section we’ll go into the basics of using the Scout PIR. If you find your eyes glossing over with all the technical discussion you can always skip to the “8 - Examples” section to start using your Scout PIR. Adjusting the settings is the same regardless if you’re using USB or wirelessly communicating with it through the Scout Camera Box.

5.1 Power Button



The power button is located on the side of the sensor. Press this button to turn on the Scout PIR. The PIR sensor takes some time to warm up and calibrate. During this time the red power LED will fade in and out. Once the Scout PIR is ready the light will turn out (you don’t want a beacon of red light, right?).

To turn off the Scout PIR simply press and hold this button for approximately two seconds.

Note: Once the Scout PIR is on you can give the power button a quick press to check the remaining battery life. The power LED will flash at you to indicate how the batteries are doing:

- Low battery
- .● 50%
- .●.● 75%
- .●.●.● Full

If you are using the Scout Camera Box you can wake it (so that it can be connected to over Wifi) by pressing this power button on the Scout PIR. This way you don't have to open up the back cover of the Camera Box in order to connect to it.

The Scout PIR should be turned on prior to plugging in a USB cable. Otherwise it will enter reprogramming mode and not respond to the app.

5.2 LED Indicators

There are two LED indicators on the Scout PIR. The power LED was discussed above.

Additionally there is a front-facing LED. When a subject is detected **both** the power LED (side-mounted) and the front-facing LED will light up for the duration the camera is active.

In some applications you may not want any visible light when the sensor detects something. You can optionally disable the LED. See section "7.2.3 - LED On" for details.

6. Navigating the app

In this section we'll briefly give an overview for how to use the app to adjust settings. If you find your eyes glossing over with all the technical discussion you can always skip to the "8-Examples" section to start using your Scout PIR.

The Scout PIR should be turned on prior to plugging in a USB cable. Otherwise it will enter reprogramming mode and not respond to the app.

6.1 Connection Status

You can verify you have a connection to the sensor.

In the upper-right corner of the application there will be a green or a red indicator. Green indicates that the computer is communicating with the Scout PIR. Red means either the sensor was not turned on prior to plugging in USB, it has no batteries installed, or drivers did not install properly (contact us at support@cognisys-inc.com if you have any problems!).



Connected



Disconnected

6.2 Global buttons

There are four global buttons at the top of the app that immediately take effect. "Read Config", "Save Config", "Shutter", and "Outputs Off".

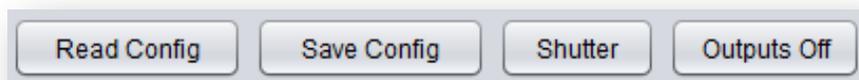


Figure 2 - Mac/PC Global Buttons (at top)

6.2.1 Read Config

Pressing this button will read the current settings for the sensor. This happens automatically when the app first detects a device is present.

6.2.2 Save Config

This will take any app changes and permanently save them to the sensor. Any time you make a change to a setting it will be sent down to the sensor but it will **not** be permanently retained (after a power-cycle) unless you press this “Save Config” button.

6.2.3 Shutter

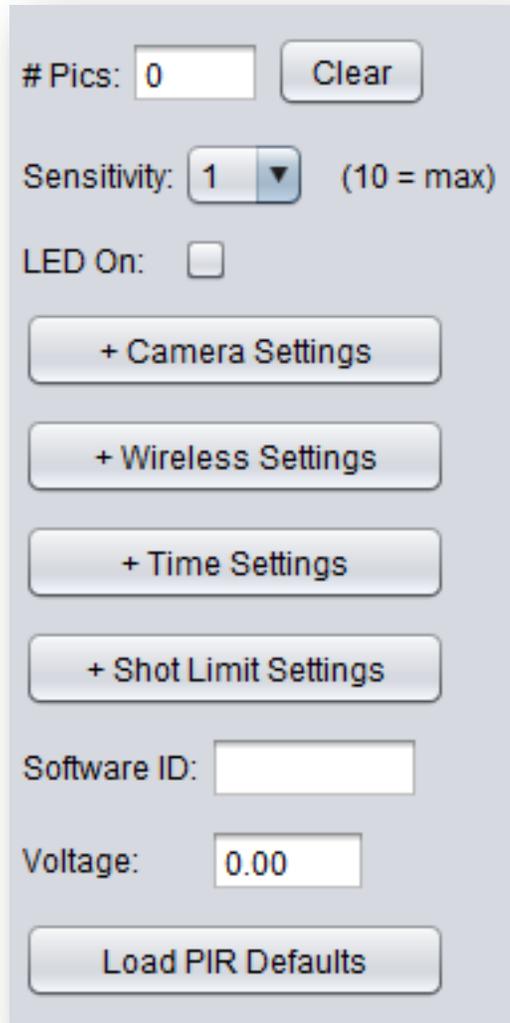
This will activate the shutter outputs (and follow its programming) for the sensor.

6.2.4 Outputs Off

“Outputs Off” will stop any shutter/camera output. This can be useful if you’ve started a long shutter activation (like a 30 second video recording) but want it to stop immediately so you can adjust camera settings. Cameras will generally not let you adjust their settings while the half-press or full-press is active.

6.3 Adjusting Settings

The very first item listed in the app is the number of pictures that have been taken since power-on (or since they were last cleared). This is followed by the sensitivity, and whether or not the LED's should light when the sensor detects something. Beneath that all the rest of the settings are grouped into categories. Simply expand the category and choose what settings you would like to adjust. They're discussed in the section below.



The screenshot shows a settings menu for a PIR sensor. At the top, there is a field for the number of pictures taken, currently set to 0, with a 'Clear' button next to it. Below this is a sensitivity slider set to 1, with a note '(10 = max)'. An 'LED On' checkbox is currently unchecked. There are four expandable category buttons: '+ Camera Settings', '+ Wireless Settings', '+ Time Settings', and '+ Shot Limit Settings'. At the bottom, there is a 'Software ID' field, a 'Voltage' field showing 0.00, and a 'Load PIR Defaults' button.

7. Settings

7.1 Settings Navigation Map

Below is the navigation map for all the settings. The links are “clickable” to get you to the specific details about the setting.

pics
Sensitivity
LED On

Camera Settings →

pics (elapsed)
Sensitivity
On time
Off time
Final Off
Extend On Time
Extend Off Time

Periodic Half-Press →

Enable
Half-Press
Half-Press Interval

Wireless Settings →

ID
Channel
Wake Up

Time Settings →

On Time
Off Time

Shot Limit →

Enabled (Yes/No)
Shot Limit
Limit Window
Limit Timeout

Software ID
Voltage
Load PIR Defaults

7.2 Setting Descriptions

7.2.1 # pics (elapsed)

This is the number of pictures that has either happened since power-on or the last time the “# pics” has been reset by pressing the “Clear” button.

7.2.2 Sensitivity

By default the sensitivity is set to the maximum value of 10 (1 = minimum, 10 = maximum). The higher the sensitivity the smaller and faster a subject can move through the path of the PIR and be detected. Why not always run at maximum sensitivity? Here’s an example: You’re trying to photograph a coyote walking down a trail. Unfortunately there is also a lot of bird traffic. As the birds fly through the sensor path it is causing false triggers. You can decrease the sensitivity to reduce or eliminate smaller changes in heat (birds) while still capturing the coyote.

Decreasing the sensitivity does two things – a larger source of heat is required AND it will have to be moving slower.

Normally with PIR sensors you need to avoid having the sensor looking south because warm leaves on trees can cause false triggers. By adjusting the sensitivity you can reduce or eliminate these false triggers.

7.2.3 LED On

Normally the power LED (side facing) and the trigger LED (front facing) will light as soon as a subject is detected and stay lit for the duration that the camera is active. This is great for setting up the sensor but once you have confirmed your setup you may want to disable the LED so it draws less attention (especially from two-legged animals!). Simply uncheck this box if you do not want the LED’s to light. The camera will still be activated there just won’t be a visible notification on the sensor.

7.2.4 Camera Settings

The Scout PIR gives you plenty of flexibility for controlling your camera. You can choose how many pictures you want, how long the half-press is held (focus or wakeup), how long the shutter button is pressed, and even the time between each shutter button press.

7.2.4.1 # pics

This is the number of times you would like to take a picture when the Scout PIR detects something. This assumes your camera isn't in burst mode, of course! We'll also refer to it as "shutter activation".

7.2.4.2 Delay

This is the first step after the Scout PIR detects something. During the delay time the camera's half-press is held down. Some cameras are quite slow to wake up before they'll respond to a shutter activation (you know who you are, Sony!). You can use this "delay" time to make sure your camera is ready to go! Also since the half-press is held down you could potentially use this to try and get a focus lock on a subject if your lens is set to auto-focus. If "delay" is set to zero then this step in the shutter activation process is skipped.

7.2.4.3 On time

Once the "delay" time expires (or completely skipped if it is set to zero) the camera's full-press (shutter activation) will be held down for this time.

If your "delay" time is set to zero you will want this "on time" to be at least long enough to wake your camera out of sleep mode and take a picture.

If your camera is set to burst mode, this is how long the burst mode will be active (minus the wake-up and lag time of the camera of course).

7.2.4.4 Off time

The "off time" is how long the shutter button is released. If your "# pics" is greater than one, this will be the duration between pictures.

Once this time expires, the Scout PIR will start looking for another subject.

7.2.4.5 Final Off

You have the option of disabling the final "off time". Here are two use-cases.

- 1) The "# pics" is set to one. If "final off" is set to on, then you can use the "off time" to set how long the Scout PIR will ignore any additional subjects walking through the sensor path.
- 2) The "# pics" is set to two. The first shutter activation could start a video recording. You would then set "off time" (the time between shutter activations) to how long you want to record the video (let's say 30 seconds). Then the second shutter activation would happen (because "# pics" is set to two). But for this application, you do NOT want the final off time, because it would mean you'd be waiting another 30 seconds before the sensor would detect anything.

7.2.4.6 Extend On Time

For some applications (especially video) you may want to extend the duration of the shutter activation if the sensor continues to detect activity. If “Extend On Time” is enabled and the shutter outputs is currently active, each time the sensor detects something the “On Time” will be extended by its programmed value. See the example below:

The “On Time” (See section “7.2.4.3 - On time”) is set to 10 seconds to record a deer as it is passing through the sensor path. As it would turn out, several deer are going through the sensor path and ideally you would want the video recording to continue. As soon as the first deer crosses the sensor path, the sensor will activate video recording and keep the shutter press held down for the 10 seconds. As long as additional deer cross the path within that 10 seconds, the shutter time will be reset to 10 seconds each time a new deer crosses the sensor path. This will guarantee 10 seconds of “no movement” before the shutter will be deactivated.

Note: This feature is especially useful for video recording for Sony cameras using our Sony Video Switch cable.

7.2.4.7 Extend Off Time

Identical to “Extend On Time” except that the off time will be extended. If using this feature be sure to enable “Final Off” otherwise there may not be an “Off Time” to extend if the “# pics” is set to 1.

Note: This feature is useful for cameras that require one shutter activation to start video recording, and another to stop it (Newer Nikon cameras or Canon cameras running Magic Lantern firmware).

7.2.4.8 Periodic Half-Press (PHP)

The Scout PIR has the capability to periodically give your camera a half-press. Why in the world would you want to do this given that it will decrease the battery life of the camera?

Some cameras (Canon) will exit live-view video recording if allowed to sit idle (in sleep mode) for about 30 minutes. The next time you wake them up – you’ll find the camera requires a physical button press to get it back into video mode. That is less than ideal when your camera is sitting in a sealed box for months at a time.

Periodic half-press can work around this problem by every so often giving the camera a good *poke* to make sure it doesn’t do something as silly as leaving video mode!

You can also use this feature to periodically “top off” your external flashes (provided they will do that on a camera half-press).

7.2.4.8.1 *Enable*

Selecting this will enable or disable the Periodic Half-Press feature.

7.2.4.8.2 *Half-Press Duration*

This is how long the half-press will be held down on the camera at the specified interval. Most cameras will wake up with a 0.5 second interval (the default).

7.2.4.8.3 *Half-Press Interval*

The “Interval” is how often the camera will receive the half-press signal. You can specify minutes or hours.

7.2.5 **Wireless Settings**

Wireless is used by the Scout PIR to communicate with other Scout equipment. It uses a 2.4 GHz proprietary RF protocol.

7.2.5.1 *Enabled*

Normally you would leave wireless enabled. It only minimally decreases battery performance if left on. Wireless communication will only happen when a subject is detected by the PIR sensor.

7.2.5.2 *Channel*

This determines what frequency the Scout PIR operates on. All Scout equipment for a given setup **must** be on the same channel to operate properly.

If using more than one Scout setup in the same area (within 60 meters / 200 feet) you should assign each setup its own unique channel.

The default “channel” is 15.

7.2.5.3 *ID*

If using the Scout PIR with the Scout Camera Box you can use multiple Scout PIR’s to activate different outputs (“ID 1” activates the camera, “ID 2” activates “Aux 1”). This allows extreme flexibility for complicated setups. If not using the Scout Camera Box the ID has no effect.

7.2.5.4 *Wake Up Speed*

When a subject is detected, the Scout PIR will send a wakeup signal to the other Scout equipment (Camera Box, Flash(es)) to get them ready to take a photo (provided Wireless is enabled).

The “Wake Up Speed” setting determines the speed of wireless wakeup. “Normal” works for most applications but if you need a faster response time you can change this setting to “Fast”.

Note: All Scout equipment for a given setup must have its wakeup speed set to the same value. Equipment may not wake properly if not set to the same “Wake up” setting causing missed photographs.

Battery consumption will increase on all devices when wake-up speed is set to “Fast”.

7.2.6 Time Settings

The Scout PIR can limit when it will activate the camera (or wake up other Scout equipment) based on the time of day. If you are only interested in night photographs or you want to decrease “interest” in your equipment from two-leggeds during the day you can use the “time settings” to create a “window” of time. You simply set the start time, and an end time, and turn on the window. The current time of the connected computer/device is used.

Two windows are supported. This lets you set up more complex scenarios for triggering (two hours in the morning, two hours in the evening).

If the current time is outside of both of the “windows” (and the windows are enabled) the sensor will not activate the camera (even if the sensor path is crossed).

7.2.6.1 On Time

The “On Time” sets when the window begins.

7.2.6.2 Off Time

This will set the end time for the window. Here are a couple of examples:

On Time: 6:00 AM
Off Time: 8:00 AM

In this case the sensor will only activate the camera for a two hour period in the morning.

The next example is a little different:

On Time: 6:00 PM
Off Time: 8:00 AM

Since the start time is after the end time (because it is set to **PM**), the sensor will activate the camera for 14 hours – starting at 6:00PM and ending at 8:00AM the following day. So please be sure to pay attention to the AM/PM – it could easily get you into trouble!

7.2.7 Shot Limit

Sometimes you can get yourself into a bad environment where things are moving around too fast and critters (the ones you don't immediately care about) are causing false triggers. Wasted frames and overheating flashes – **not** good! There is a way to tell the Scout PIR to stop triggering the camera if it sees too many subjects. Three settings come into play to adjust this. The first is "Shot Limit". This sets the maximum number of pictures that can be taken within the time set in "Window". See the two other settings below.

7.2.7.1 Limit Window

This sets the time "window" for the "shot limit". If you get "shot limit" number of frames within "limit window" amount of time, the sensor will ignore any more detections for a period of time. If you get a few pictures but it doesn't reach the "Shot Limit" within this amount of time, the number of pictures taken will be reset. See below.

7.2.7.2 Limit Timeout

This is how long the sensor will ignore anything crossing in front of the sensor. You won't have any camera activations for this duration. That's a lot of words. Let's put some numbers to these settings and then walk through a scenario. Here is an example:

"Shot Limit" is set to 10, "Limit Window" is at 60, and "Limit Timeout" is at 300. Your setup is working great – you're getting some great shots. You leave the setup to go into town for an hour. Unfortunately a large herd of red squirrels appears (the horror!). Your Scout PIR, being very effective at detecting things starts rapidly triggering. With the settings above, you'll definitely see 10 squirrels within the 60 seconds – it's a herd after all! Once the sensor "sees" those 10 within the 60 seconds, it will ignore any more for 300 seconds (5 minutes). Let's say you get back from town, shoo away the infamous camera-trap sabotaging squirrels, but now you want to start looking for critters again. It's obvious that the shot-limit is active – how to disable it? Simply press the power button to reset the shot limiter and it is back to normal. You could have also waited for the 300 seconds to elapse.

7.2.8 Software ID

This is the current version of the firmware running on the Scout PIR.

7.2.9 Voltage

This is the current battery voltage. See section “8.5 - Maximum Battery Life” to explain how this can tell you what to expect for remaining battery life.

7.2.10 Load PIR Defaults

This will load the factory default settings for everything.

8. Examples

In the following sections we will walk you through some real-world setups/examples using your Scout PIR. Be sure to check out our website and follow us on YouTube (<http://www.youtube.com/user/CognisysInc/>) for video examples. Sometimes watching a video makes the whole process much easier to understand!

8.1 Camera Settings

Here are some suggested camera settings.

Drive Mode: Single or Continuous. If set for “Single”, then you can have the Scout PIR control how many shots are taken (# pics) and how much time there should be between the shots (Off time). If set to “Continuous”, then the “# pics” should be set to “1”, and the “On time” on the sensor should be set to how long you want to run the camera in “Continuous” mode. You’ll want to make sure your flashes can keep up at the camera’s frame rate with whatever power setting they’re set at. Make sure that mirror lock-up is turned off!

Camera Mode: The two most common modes are Aperture Priority (Av) or Manual (M) mode. If set to Aperture Priority and evaluative metering then you’ll have a properly exposed background during the day, but as night comes the camera’s shutter speed is going to become very long. In complete darkness, this means it could increase to in excess of 10 seconds – meaning you’ll probably only get one shot of the subject moving through. It is important to keep in mind that the shutter speed will vary greatly from sun up to sun down.

In Manual (M) mode, you’ll have to stop down enough to not become over-exposed during the day, but also allow enough light from the flashes to expose the subject. This may mean an under-exposed background even during the day.

Either of these modes have compromises for day/night operation. Just remember that the Scout PIR has two separate “Time Settings” that can let you exclude trouble periods for ambient light.

f-stop: Since you don’t know where in the sensor path the subject will be – set your f-stop as large as you can possibly stomach. f/8 is a good starting point. The larger the f-stop though, the brighter the flashes will have to be. Brighter flashes = shorter battery life.

ISO: You likely don’t have a \$5,000 camera in your camera box do you? That means the high-end of your ISO is going to be more limited. Setting it low, however, will mean the flashes will have to work that much harder. ISO performance is continuously improving so the suggestion is to “know your camera”!

Auto-focus: While you CAN use auto-focus, you're counting on the subject to not be moving terribly fast and your auto-focus locking onto your subject before it moves. Your camera has to wake up and achieve a focus lock (hopefully on your subject!). Definitely don't use auto-focus if doing night-time photography. Because of those variables we'd recommend sticking with manual focus. If you're only interested in day-time photography you can always have the Scout PIR operate just during the day. See section "7.2.6 – Time Settings" for details.

Power Management: Turn off the image review feature. Also set the "auto power off" to the minimum.

Noise Management: For all that is holy in the world be sure that your focus-lock "beep" is turned off along with other "beep" noises for starting/stopping video recording.

Lens: Wide-angle, auto-focus turned off (probably), image-stabilization turned off.

Note: We experienced issues with the Canon EF-S 10-18mm lens. The first shot would always be blurry even if auto-focus was turned off. If you hold the half-press down for a short duration (by setting the "Delay") you could then get a good focus. Sacrificing time to get a lens to work? It wouldn't be on our recommended list.

8.2 Wired Camera (camera controls flashes)

For this setup the Scout PIR will only control the camera using the 3.5mm shutter cable. The camera is responsible for waking and firing the flashes. Here are the settings to optimize the performance:

1. Camera Settings-># pics = 1
2. Camera Settings->Delay = 0.0 (if it's a Sony, set this to at least to 2 – they're slow to wake!)
3. Camera Settings->On Time = 0.5

The Scout PIR will then follow this process:

1. The sensor detects a subject.
2. The sensor tells the camera to take a photograph (after the "Delay" time expires).
3. The camera will fire the flash(es) at the appropriate time by either wired or wireless methods.



Figure 3 - Basic Connection Diagram

8.3 Full Wireless (Using the Scout Camera Box)

The full wireless version requires the Scout Camera Box. In this setup there are no cables between any of the equipment giving you complete photographic (and equipment) freedom.

On the Scout PIR:

1. Make sure the Wireless Channel matches the camera box (it does by default and should be 15) Wireless Settings->Wireless Channel (See "7.2.5 - Wireless Settings").
2. Choose what "ID" you want for the PIR sensor (or leave it at the default of 1) Wireless Settings->Wireless ID.
3. Choose "Save Config" at the top.

On the Camera Box:

1. Make sure that the "Camera (Internal)" source is set to use the PIR, and that the "ID" is set to "1" (or whatever ID you have selected above).
2. Choose "Save Config" at the top.
3. That's it!

You can have a "slave" camera attached directly to the Scout PIR and an additional camera inside the Camera Box. They both can be programmed to have their own unique settings.

The Scout PIR follows this process:

1. The PIR sensor path detects a subject.
2. The sensor starts to follow it's camera programming and activate the camera's shutter.
3. The sensor wakes the Camera Box and tells it that a subject has been detected.
4. The Camera Box then tells the camera to take a photograph.
5. When the camera's shutter is open, the camera activates the "flash sync" signal.
6. The Camera Box then wirelessly transmits to the Cognisys flashes to activate (if present).

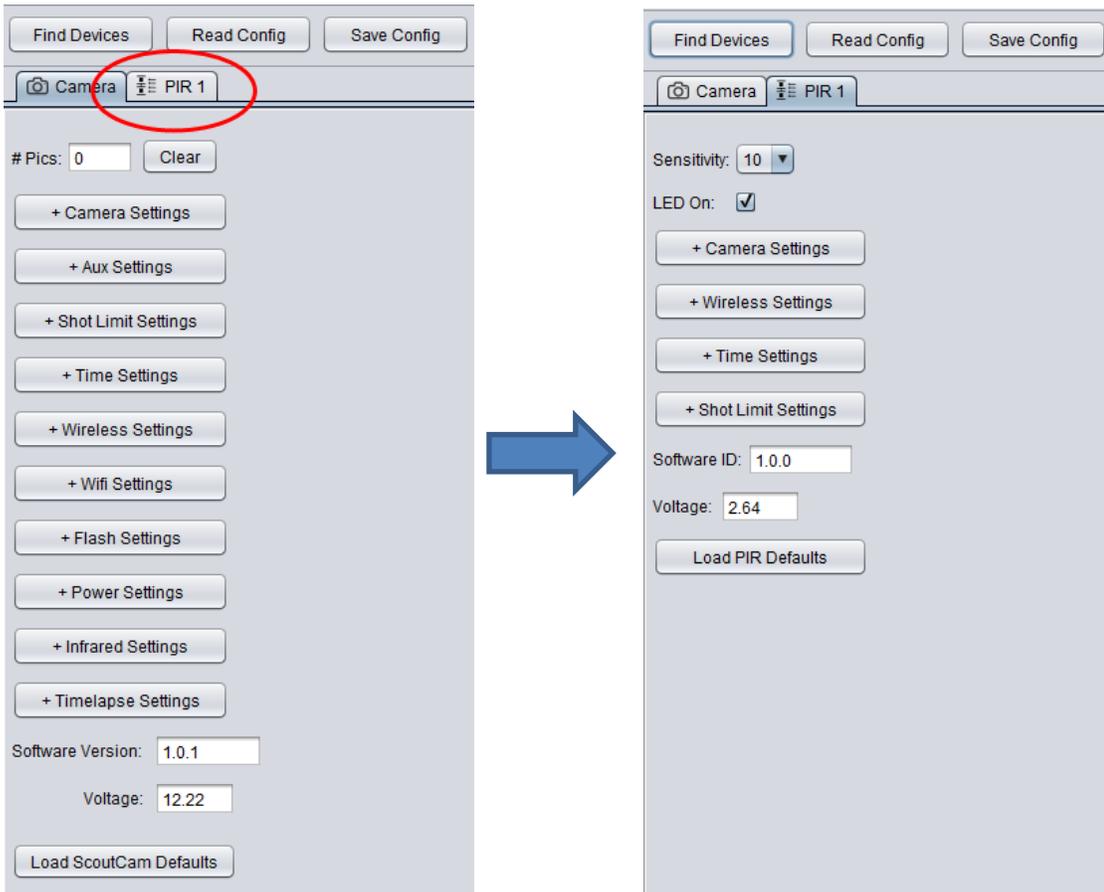


8.3.1 Scout PIR in the Camera Box App

If you are using the Scout Camera Box you can wake it (so that it can be connected to over Wifi) by pressing this power button on the Scout PIR. This will allow the Scout Camera Box app to see the Scout PIR in its device list.

If you have the Scout Camera Box app connected to the Camera Box, you can also just walk in front of the PIR sensor to have it show up in the device list.

The Scout PIR shows up as a separate tab in the app:



8.4 Video Recording (wired or wireless)

For wired setups the camera would be attached to the Scout PIR 3.5mm shutter cable. The settings below would be made in the Scout PIR app.

If using wireless, then these settings would happen on “Camera” tab in the Camera Box app (NOT the PIR tab – since the camera is inside the camera box you would want to make these setting changes in the Camera Box app ON the Camera tab).

Canon/Nikon cameras (if video is supported through the remote shutter release):

1. Set the number of pictures to be taken to two.
Camera Settings-># pics (See “7.2.4.1 - # pics”).
2. Set the “Pre-trigger” duration to something long enough to guarantee that the camera will be awake and respond to the shutter activation to start video recording:
Camera Settings->Delay time (See “7.2.4.2 - Delay”). This time will vary depending on the camera but 0.5 seconds is a good place to start.
3. Set the duration of the video recording by adjusting the time between the shutter activations:
Camera Settings->Off time (See “7.2.4.4 - Off time”).
4. Turn off Camera Settings->Final off (See “7.2.4.5 - Final Off”).

Sony cameras (if video is supported through the remote shutter release):

1. Set the number of pictures to be taken to one.
Camera Settings-># pics (See “7.2.4.1 - # pics”).
2. Set the “Pre-trigger” duration to something long enough to guarantee that the camera will be awake and respond to the shutter activation to start video recording:
Camera Settings-> Delay time (See “7.2.4.2 - Delay”). This time will vary depending on the camera but 2.5 – 3 seconds is a good place to start.
3. Set the duration of the video recording by adjusting the “on time”:
Camera Settings->On time (See “7.2.4.3 - On time”).
4. Turn off Camera Settings->Final off (See “7.2.4.5 - Final Off”).

Optionally for both setups you can enable the “extend off” time (for Canon/Nikon) or “extend on” time (for Sony) to keep video recording active while the sensor detects something.

It is absolutely critical that you verify the pre-trigger time (the duration the half-press is held down) is sufficient to wake the camera and have it respond to the start recording signal (the first shutter press). If it is not long enough you could run into a situation where it misses the first start recording shutter activation but catches the second one. This means the camera would be recording for the entire duration that you DON'T want it to! (All the time between detected events) You might come back to a full memory card and dead batteries if this happens...

The Scout PIR follows this process for Canon/Nikon:

1. The sensor path detects a subject.
2. The sensor (and/or camera box) holds down the half-press on the camera for the duration of “delay” to wake the camera.
3. Then the sensor (and/or camera box) activates the shutter button to start video recording.
4. It waits for the “off time” (your record duration).
5. Finally it activates the shutter button again to stop video recording.

The Scout PIR follows this process for Sony:

6. The sensor path detects a subject.
7. The sensor (and/or camera box) holds down the half-press on the camera for the duration of “delay” to wake the camera.
8. Then the sensor (and/or camera box) activates the shutter button to start video recording.
9. It waits for the “on time” to expire (your record duration).
10. After the “on time” expires then it releases the full-press which stops recording.

8.5 Maximum Battery Life

Battery life is a tricky business. There is some magic chemistry going on inside of those little things that can significantly affect the performance of your Scout equipment. Of course, you'll probably want to use rechargeable batteries because the landfills likely don't need any more tossed in them. Here are some things to consider:

1. Use low self-discharge (LSD) rechargeable batteries such as Eneloop. Otherwise you could be losing 2% of your battery life per day just from the battery itself. At high temperatures it could be as high as 6% per day!
2. Speaking of temperatures – batteries are typically rated at 25C. They lose some of their capacity at warmer temperatures but at cold it's *really* bad. A 2500 mAh battery at -20C (-4 F) could only have 500mAh of capacity. So if your Scout PIR normally had 100 days of battery life it would be cut down to 20 days – a big difference!
3. Use batteries of the same age and type. Mixing in an old battery with new ones could cause the old battery to be over-discharged damaging the battery and significantly decreasing the overall battery life of the system.
4. The Scout PIR app (or through the Scout Camera Box app) displays the current voltage it is receiving from the batteries. Don't be alarmed if the voltage displayed drops quickly if you take batteries from the charger and put them in the sensor. It's normal for rechargeable batteries to drop their voltage in a day or two after coming off the charger. The Scout PIR isn't being more hungry than necessary!
5. Batteries are typically "empty" when each cell is at 0.9V. So if your Scout PIR says the input voltage is 1.8V (2 cells x 0.9V) there isn't much capacity left.

Following these steps can help you get approximately three months of battery life from the Scout PIR!

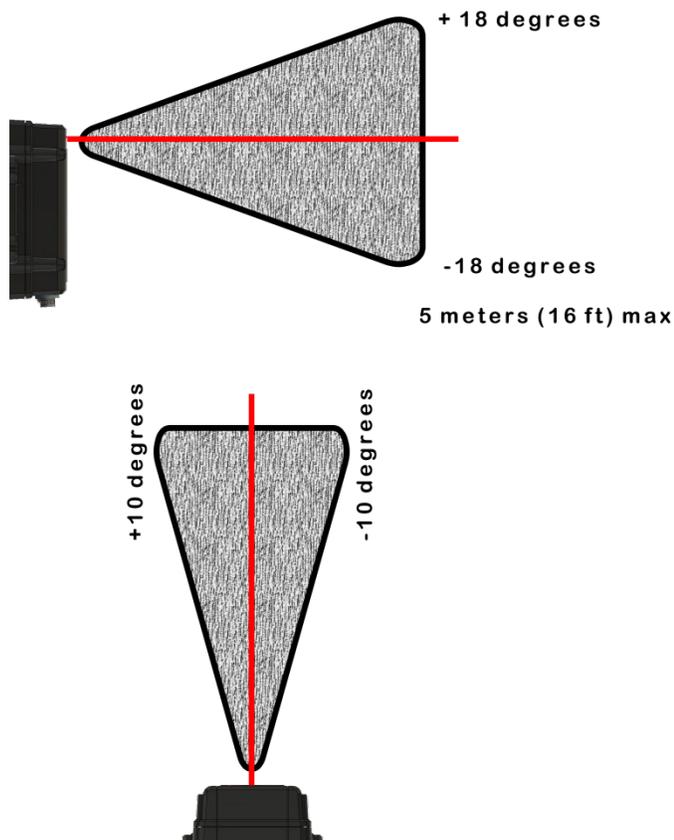
8.6 Scout PIR Placement

The Scout PIR isn't a beam-break sensor. It has a "cone" of area that it uses to measure the heat in the area (and looks for abrupt changes). As PIR sensors go it has a fairly narrow beam width (that's a good thing!). Understanding what this "cone" looks like is the first step to a successful setup.

The "cone" has a top-to-bottom width of 36 degrees (+/- 18 degrees), and a side-to-side width of 20 degrees (+/- 10 degrees). That means that the sensor will see top-to-bottom a bit wider angle than side-to-side.

PIR's work on detecting radiated heat. What does that mean for detecting critters? The maximum detection distance is 5 meters (16 feet). That detection range doesn't mean you'll pick up a mouse at 5 meters away – that's not much heat to work with! The larger the subject is the further away the sensor can be placed.

Here is what the "cone" (sensor path) looks like from the Scout PIR perspective:



We've established the first two rules:

Rule #1: There is a "cone" that you AND the sensor are looking through.

Rule #2: The closer the sensor is to the subject the more likely you are to detect it (or the smaller it can be).

The third rule involves working around HOW PIR sensors work. They look for changes in heat within their "cone". The Scout PIR technology actually has four of them and runs a comparison looking for a change in this heat. It's pretty fancy stuff! Unfortunately there are some real-world conditions that *look* like something is moving through when its actually just nature being, well, nature.

One common pitfall is trees. Trees by themselves aren't a problem – but trees moving from the wind *might* be. If the branches are moving slow enough in the wind it likely won't be a problem. If, however, the sun is shining brightly to warm the leaves all of the sudden you have a hundred happy dancing heat signatures in the PIR's "cone". NOT good. What can you do?

Rule #3: If possible, position the sensor so it won't be seeing motion from your natural environment.

Rule #4: Try and orient the sensor so it is facing North(ish). This has two benefits. First, the sensor won't be looking at the fiery orb in the sky appearing and disappearing behind leaves.

The second reason for "North" is avoiding the Sun shining directly into the sensor. It won't cause damage but it WILL cause a temperature shift compared to the ambient temperature which could cause false triggers.

Obviously we don't live in an ideal world. Rules #3 & #4 can sometimes be difficult (or impossible) to accomplish. Is there a plan B? Absolutely! This is when adjusting the "sensitivity" (See section "7.2.2 - Sensitivity") comes into play. Chances are those leaves and branches are further away than the subject is that you're trying to photograph. You can turn down the sensitivity enough so that it will ignore the further away potentially false triggers while still working fine for the camera trap setup. If you're especially paranoid about excessive false triggering, you can always enable the "Shot Limit" (See section "7.2.7 - Shot Limit").

Rule #5: Set your sensor off the ground by a reasonable amount. Nature is dynamic (a polite way of saying that she's out to get your camera setup). Grass grows quick (a different flavor of the tree issue). Rain can cause dirt to splash back on the sensor partially or totally blinding it (think of driving into the Sun with a dirty windshield – what do you see?). Areas can flood.

Rule #6: Test-test-test your setup before leaving making absolutely sure that everything is working and that the pictures/video are what you expected. Then come back after a day or two of different weather conditions to verify that “Nature is **not** being dynamic” with your setup.

9. Installing the Reflash software (optional)

What is “reflash”? It’s a small program that allows you to update the firmware on your Scout Products. **You do not need this program to use your Scout equipment.** Rest assured if you just purchased your Scout it ships with the latest software available. If, however, new firmware becomes available you may want to upgrade your sensor. Do you have to upgrade your firmware? No. Should I upgrade your firmware? Maybe. We say “maybe” because as new firmware is released we are adding and improving features. This means changes to the user interface and things might not look exactly how they did before you updated the firmware. So if you discover that a new feature is available that you absolutely have to have, then by all means go ahead and reflash your sensor. Just keep in mind that things might look and behave a little different! The other consequence to reflashing your sensor is that you *may* lose any stored settings.

Scout products can only be updated over USB. The reflash process takes a few seconds.

Reflash requires a firmware package (instructions included). You can find the package here: http://www.cognisys-inc.com/products/scout/scoutpir_tech_specs.php

Whether you use Windows or OS X, you will **need** Oracle’s Java installed for Reflash to load. You can download it here: <http://java.com/download>

9.1 Windows Installation

Windows installations should automatically detect and download the USB drivers required. Some operating system settings can prevent automatically downloading the drivers. If that is the case, use the above link in section “9 - Installing the Reflash software

Once the installation is complete you will have a “Start Menu” folder called Cognisys. Underneath that you will find the Reflash icon.



9.2 OS X Installation

Reflash requires Java 1.7 or later from Oracle. This version of Java requires that your OS X version be 10.7.3 (Lion) or above. It has not been tested with older versions of Java or earlier versions of OS X and is not supported.

Use the above link in section “9 - Installing the Reflash software”.

Once installation completes you will have a “Reflash” icon on your Launch Pad:



10. Troubleshooting

Problem	Cause	Solution
Power LED doesn't light when power button is pressed.	Batteries not installed.	Insert batteries.
	Battery polarity is incorrect.	Verify all batteries are installed correctly.
	Batteries are low or a bad battery cell.	Verify the quality of the batteries (multi-meter, test with other equipment)
Power button causes power LED to flash	Sensor is showing battery power level	This is normal behavior. You can find out more details in section "5.1 - Power Button"
	Sensor is in bootloader mode	This will happen if the power button is held down for greater than 10 seconds. Press and hold the power button to turn it off and then press gain to turn it on.
Power LED is fading in and out	Sensor is powering up	It may take up to 30 seconds at power-up for the sensor to calibrate itself. This is normal behavior and it will stop as soon as the sensor "warms up".
Camera is not taking pictures	"Camera Settings" are incorrect.	See 7.2.4 for proper settings. They could be too fast for your camera.
	Camera is off.	Turn on the camera.
	Camera has auto-focus turned on.	If the camera cannot achieve focus lock it may not take a photo. Turn off auto-focus on the lens.
	Shutter cable not fully seated.	With new products the connectors can be quite stiff. Be sure the shutter cable is fully seated into the camera.
Camera takes multiple pictures.	Camera set to burst shooting mode.	Turn your camera to "single shot" mode.
	"Camera Settings" are incorrect.	See section 7.2.4 for adjusting the number of pictures.
Need to restore factory settings	You just want to start over!	With the Sensor powered off, press and hold the power button until the red power light goes out. Release the power button. Optionally you can load the defaults from the settings page. See section 7.2.10.

If you cannot resolve a problem with your Scout PIR sensor, please contact us at support@cognisys-inc.com. We want to make sure that you are completely satisfied!

11. Specifications

Specifications are intended for reference only. The design may be modified to improve features or functionality without notice.

Specifications	MIN	NOM	MAX	UNITS
Input Voltage	1.8	2.4	5	Vdc
Input Current (at nominal 2.4V)	-	0.93	-	mAdc
Detection Width Angle		±10		degrees
Detection Height Angle		±18		degrees
Detection Range			5	m
			16.4	feet
Shutter Output Current Sink	-	-	1	Adc
Battery life (internal - Eneloop batteries at 25C) ¹	-	90	112	days
Real-time clock life without batteries	-	16	-	hours
Wireless Range ²		15	30	m
		50	100	feet
Operating Temperature	-20	25	60	C
	-4	77	140	F

- 32-bit high performance low current ARM Processor
- Quad differential pyroelectric elements
- Wireless connectivity: Proprietary 2.4GHz
- Real-time clock for time-windowed triggering (two windows provided)
- Powered by 2 AA batteries
- All outputs are open drain (Can be used for flash trigger or shutter trigger)
- Wirelessly compatible with the Scout Camera Box
- USB for reprogramming

¹ See section “8.5 - Maximum Battery Life” for additional information on battery life. Battery life is significantly dependent upon the number of times a subject is detected.

² Several factors can affect the wireless range. Congestion, terrain, etc...

12. Warranty

Limited Warranty

The Scout PIR, Receiver, Transmitter, Base Transmitter, Flash, and Camera Box/Controller (hereby referred to as "Scout Equipment"), software, and related equipment is provided by Cognisys, Inc. "as is" and "with all faults." Cognisys, Inc. makes no representations or warranties of any kind concerning the safety, suitability, lack of viruses, inaccuracies, typographical errors, or other harmful components of Scout Equipment and its related software. There are inherent dangers in the use of any product, and you are solely responsible for determining whether Scout Equipment is compatible with your equipment and other software installed on your equipment. You are also solely responsible for the protection of your equipment and backup of your data, and Cognisys, Inc. will not be liable for any damages you may suffer in connection with using or modifying Scout Equipment and/or its related software.

All electronic products are warranted to be free from defects in materials or workmanship for two (2) years from the date of purchase. Within this period, Cognisys Inc. will, at its sole option, repair or replace any components which fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alterations or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, WHICH MAY VARY FROM STATE TO STATE.

IN NO EVENT SHALL COGNISYS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Cognisys, Inc. retains the exclusive right to repair or replace the product or offer a full refund of the purchase price at its sole discretion. SUCH REMEDY SHALL BE YOUR SOLE AND EXCLUSIVE REMEDY FOR ANY BREACH OF WARRANTY.

13. Revision History

Revision	Date	Change
1.0	08/07/2018	Initial Release