

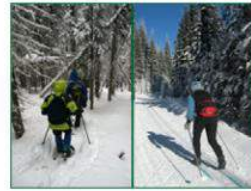


# TRAFx Infrared Trail Counter Instructions

(For Generation 2, 3 and 4)

## Key Info

- Counts people on trails, paths and sidewalks
- Advanced microelectronic design
- High-quality infrared scope
- Compact, unobtrusive, camouflaged design
- Very long battery life (G4.1: up to 10 years)
- Large storage capacity (millions of counts)
- Built for outside: -40C (-40F) to +55C (131F)
- Very low operating costs (<\$1/year for batteries)
- Mount on a tree, or put inside a low-cost, lockable electrical box
- Field-proven, Generation 4 design (>10 year history)
- Used from Alaska to Australia, in remote and urban areas



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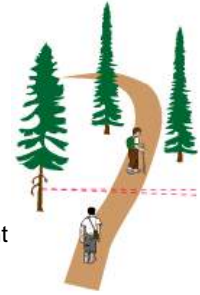


## A OVERVIEW

These instructions apply to Generation 2, 3 and 4 TRAFx Infrared Trail Counters (2005 – 2024+). CAREFULLY READ THESE INSTRUCTIONS BEFORE USING THE COUNTER.



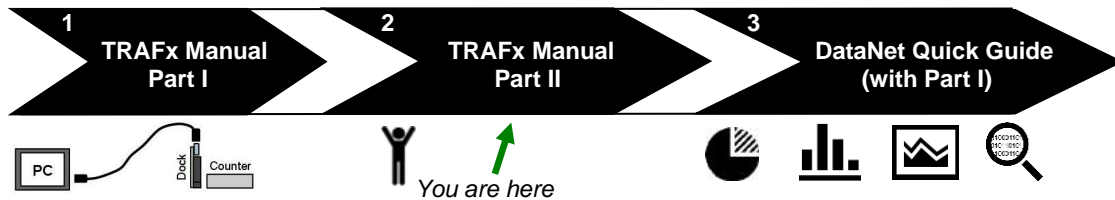
This counter detects and counts people (hikers, joggers, cyclists, horseback riders, snowmobilers, etc.) on trails, paths and sidewalks. It continually monitors the amount of infrared energy within its field of view and when there is a significant change from the ambient amount, it records a count.



### PREPARATION



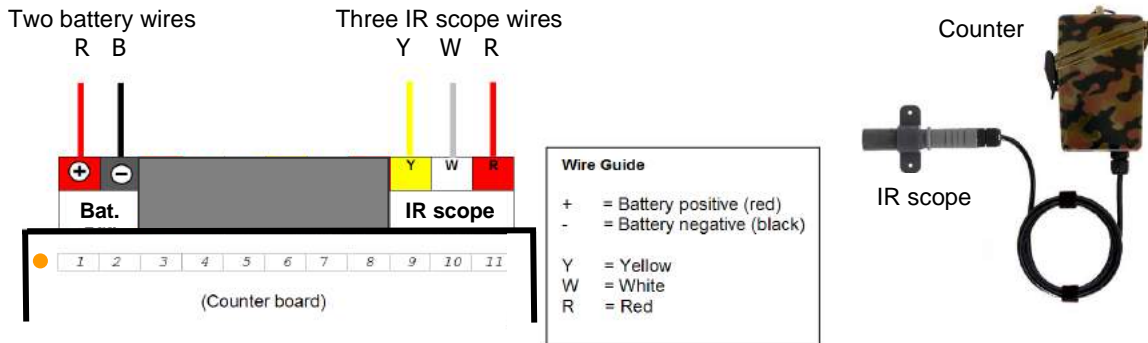
Finish TRAFx Manual – Part I first. Refer to its **Quick Guide** (p. 5) to understand the overall process. Download the latest version at [trafx.net/support](http://trafx.net/support)  
Here is the sequence:



### WIRE GUIDE

(Note: The counter ships assembled.)

Five wires connect to the counter's screw block, as shown below. Ensure wires are fully inserted and the screws are tight. Gently tug test each wire. Incorrectly connected wires could cause damage and void the warranty.



### STUDY DESIGN

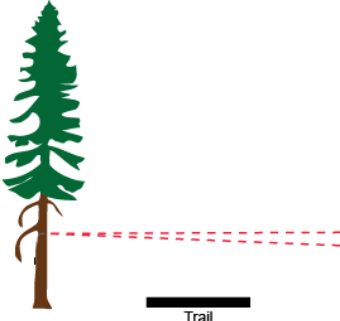
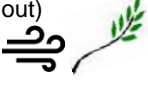
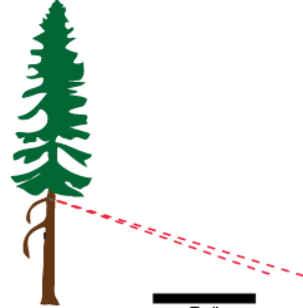




Study design is beyond the scope of this document, but key questions include: Which trails? How many counters? How long? Is the sample size and study period sufficient statistically?



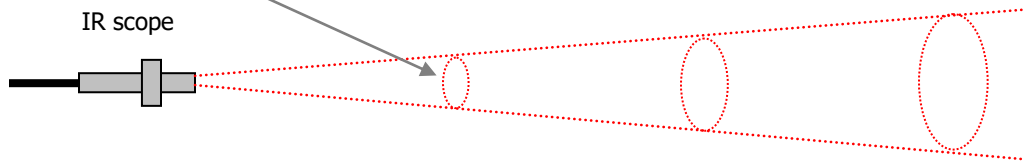
## B INSTALLATION OPTIONS

There are two main installation options: (A) point the IR scope across a trail, or (B) point it down and across the trail.

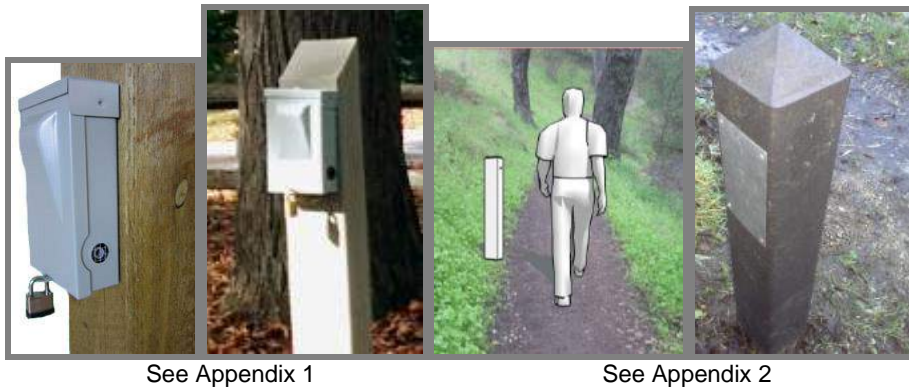
<p style="text-align: center;"><b>POINT ACROSS</b></p> 	<p>Point across trail (most common installation)</p> <ol style="list-style-type: none"> <li>1. Install within 3m (10ft.) of where people pass (for best results)</li> <li>2. Aim waist high (1m / 3.3ft.)</li> <li>3. Point IR scope slightly down (so water drains out)</li> <li>4. Don't point at wind-prone trees or branches </li> </ol>
<p style="text-align: center;"><b>POINT DOWN</b></p> 	<p>Point down and across the trail. (Points 1, 2, 3 and 4 above still apply)</p> <ul style="list-style-type: none"> <li>❖ Recommended for these situations:             <ul style="list-style-type: none"> <li>○ Wind-prone trees or branches in the background</li> <li>○ A road is in the background </li> <li>○ Hot climates (ground is an effective reference) </li> <li>○ High snowfall areas (allows higher installation)</li> </ul> </li> </ul>

The IR scope has a 10 degree field of view that widens with distance, like a narrow spot light. Maximum detection distance for people is approximately 6m (20ft.).

Distance away	2m (6.5 ft.)	4m (13 ft.)	6m (20 ft.)	Max.
Field of view diameter	0.3m (1 ft.)	0.7m (2.3 ft.)	1.0m (3.3 ft.)	



In forested environments, where the counter can be hidden well, and vandalism risk is low, simply mount the counter on a tree (see p. 5). However, in busy, open areas, consider putting the counter inside a lockable box (see Appendix 1) or inside a post (see Appendix 2).






## C SETTINGS

The counter has default settings (see black area below). Normally, only change these if a star below applies to you. ★

Settings	Mode	Notes
=TIME	IR	<i>TIME</i> - automatically set by a dock in Shuttle Mode. <i>START</i> - automatically set by a dock in Shuttle Mode to: <ul style="list-style-type: none"> <li>• top of the hour after <i>Launch</i> for hourly totals</li> <li>• 5 minutes after <i>Launch</i> for timestamps</li> </ul>
=START	--	
PERIOD	001	
DELAY	030	

MODE SETTINGS																					
<b>PERIOD</b> (1/24/0)	PERIOD refers to the data format: hourly totals, daily totals, or timestamps (all are records) <ul style="list-style-type: none"> <li>▪ 14 000 is the maximum number of records (lines of data)</li> <li>▪ Totals are much more memory efficient and download much faster than timestamps</li> <li>▪ <b>001</b> = Hourly totals (default; recommended); stores 19 months of data (448 million counts max.)</li> <li>▪ <b>024</b> = Daily totals (rarely used); whole days only; counting starts and stops at mid-night</li> <li>▪ <b>000</b> = Timestamps (seldom used); each event creates a timestamp (14 000 counts max.)</li> </ul> <table border="1"> <tr> <td>yy-mm-dd,hr:mm,total</td> <td>← Hourly totals</td> <td>yy-mm-dd,hr:mm:ss,sensor_1</td> <td>← Timestamps</td> </tr> <tr> <td>21-05-28,10:00,00435</td> <td>(11 spans 11 to 12)</td> <td>21-05-28,14:15:50,1,0,0,0</td> <td></td> </tr> <tr> <td>21-05-28,11:00,00473</td> <td></td> <td>21-05-28,14:15:56,1,0,0,0</td> <td></td> </tr> <tr> <td>21-05-28,12:00,00530</td> <td></td> <td>21-05-28,14:19:08,1,0,0,0</td> <td></td> </tr> <tr> <td>21-05-28,13:00,00481</td> <td></td> <td>21-05-28,14:19:22,1,0,0,0</td> <td></td> </tr> </table>	yy-mm-dd,hr:mm,total	← Hourly totals	yy-mm-dd,hr:mm:ss,sensor_1	← Timestamps	21-05-28,10:00,00435	(11 spans 11 to 12)	21-05-28,14:15:50,1,0,0,0		21-05-28,11:00,00473		21-05-28,14:15:56,1,0,0,0		21-05-28,12:00,00530		21-05-28,14:19:08,1,0,0,0		21-05-28,13:00,00481		21-05-28,14:19:22,1,0,0,0	
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21-05-28,12:00,00530		21-05-28,14:19:08,1,0,0,0																			
21-05-28,13:00,00481		21-05-28,14:19:22,1,0,0,0																			
<b>DELAY</b>	DELAY refers to "delay after event" <ul style="list-style-type: none"> <li>▪ During DELAY, other events (triggers) are ignored</li> <li>▪ DELAY values (and seconds) are shown below</li> </ul> <table border="1"> <thead> <tr> <th>DELAY</th> <th>Seconds</th> </tr> </thead> <tbody> <tr><td>020</td><td>1.0</td></tr> <tr><td>025</td><td>1.25</td></tr> <tr><td><b>030</b></td><td>1.5</td></tr> <tr><td>035</td><td>1.75</td></tr> <tr><td>040</td><td>2.0</td></tr> <tr><td>050</td><td>2.5</td></tr> <tr><td>060</td><td>3.0</td></tr> <tr><td>080</td><td>4.0</td></tr> <tr><td>100</td><td>5.0</td></tr> </tbody> </table> <p>When a person enters the IR scope's field of view, a count is initiated. However, it takes time for a person to completely pass through the counter's view, and for the sensor to re-stabilize. Therefore, a DELAY is used to avoid multiple counts from the same person.</p>  <ul style="list-style-type: none"> <li>★ If trail traffic typically moves very slowly, increase DELAY to 035 or 040</li> <li>★ If trail traffic is dense and/or fast (e.g., busy walking or bicycle path) decrease DELAY to 020 or 025</li> </ul>	DELAY	Seconds	020	1.0	025	1.25	<b>030</b>	1.5	035	1.75	040	2.0	050	2.5	060	3.0	080	4.0	100	5.0
DELAY	Seconds																				
020	1.0																				
025	1.25																				
<b>030</b>	1.5																				
035	1.75																				
040	2.0																				
050	2.5																				
060	3.0																				
080	4.0																				
100	5.0																				

### Change settings

Here are the main steps to change settings.

1. Confirm your dock is in **PC Mode**
2. Connect: PC---cable(s)---dock---counter
3. Open TRAFx Communicator and click GO!
4. Enter C to configure counter's settings



See TRAFx Manual Part I, p. 10 for details. Download at [trafx.net/support](http://trafx.net/support)



Trail counters produce trail use estimates. They are rarely 100% accurate. This applies to all types and brands. Counter calibration is recommended for these situations: (1) trails where people often travel side by side and/or in tight groups; (2) busy, wide trails; (3) when higher accuracy is desired. Calibration involves comparing counter totals with those observed by a person, ideally over several hours. It is also a good opportunity to collect user type data (walker, jogger, skateboarder, cyclist, dog walker, etc.). For detailed instructions, download "How to calibrate a counter" at [trafx.net/support](http://trafx.net/support)



## D SET UP IN FIELD – STEPS

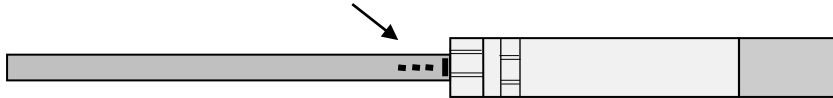
**Preparation:** Before going to the field, see the equipment checklist on next page.

### STEP 1 — SELECT SITE

Before selecting a site to install the counter, review p. 3 and installation “do and don’t” on the next page! A well selected site can be used for many years. Take the time to do it well.

### STEP 2 — INSTALL COUNTER

- For best results, install the IR scope within 3m (10ft.) of where people pass. Aim waist high (1m / 3.3ft.). There are 3 dots engraved on the black cable where it enters the IR scope; ensure these are oriented upwards (i.e., skywards).



- If installing on a tree, use wire or cord to hang the field case upright from its eyelet, on the backside of a tree, out of view. Do not bury the field case (under soil, snow, etc.), or hang it upside down from the cable---it will leak this way, and void the warranty.



- If installing the counter in a busy area (i.e., a city park) see Appendix 1 and 2.

### STEP 3 — LAUNCH COUNTER



- Launch the counter using your dock in Shuttle Mode. Use Shuttle Mode’s checklist (next page).
- Add a fresh desiccant pack and close the counter’s case (ensure its lid seal stays perfectly clean).
- Take 2 photos, close and far (for your DataNet account / technical support purposes).
- Take GPS reading (to find the counter, and for your DataNet map).
- If this is a new installation, return in about a week and download the counter’s data
- When downloading a counter always use the checklists on the next page.



### Tips

- To reduce risk of tampering, add a sticker.  
Example
- Apply camo duct tape to IR scope (or metal box on p. 10) to help camouflage it. Google “camo duct tape”.

#### **Trail counter (not a camera)**

Its data helps support trails  
Please do not disturb. Thank you!  
Questions? Call 123-4567



### USE DESICCANTS!

Without desiccants, damaging condensation (moisture) forms when the air inside the counter’s case cools.

Replace desiccant packs each time you open the counter’s case to download data.

- Store and transport in well sealed bag or container! (otherwise they expire in hours)
- Visit [trafx.net/support](http://trafx.net/support) regarding type, size and where to buy
- Use two in wet or humid climates







## E CHECKLISTS



### Equipment checklist

- ✓ TRAFx manual: Part I and Part II
- ✓ Counters, dock, etc.
- ✓ Desiccant packs (in sealed bag); spare batteries for counter; Ziploc bags
- ✓ Items you'll need for installation (enclosure, screws, screwdriver, etc.)
- ✓ Tape measure, camera, GPS, shovel, toothbrush, umbrella, safety equipment, etc



### Installation do and don't

#### Do:

- ✓ install where people pass by without stopping
- ✓ install within 3m (10ft.) of where people pass
- ✓ aim waist high (1m / 3.3ft.)
- ✓ install at a funnel point in trail (if possible)
- ✓ orient three dots skywards (p. 5)
- ✓ tilt IR scope slightly down (so water drains)



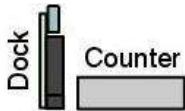
#### Don't:

- ✗ point at wind-prone trees or branches
- ✗ point at a road or a train line
- ✗ point at water or other reflective surfaces
- ✗ bury or hang case upside down (leakage risk)
- ✗ install on a tree that sways in the wind
- ✗ install behind plexiglass, glass, etc.
- ✗ let sunlight or car lights reach the lens (false counts)



### Download, launch, etc. checklist

#### Dock in Shuttle Mode (recommended)



Use your dock in Shuttle Mode to Download / Launch a counter, without a PC.

- ✓ Before going to the field confirm:
  1. The dock's **TIME** is correct, (yy-mm-dd and 24 hr time).
  2. The dock's battery voltage is **3.4** or higher (if not, replace dock's batteries and reconfigure **TIME**).
  3. Erase old data stored in the dock's memory. Enter E.
- ✓ Go to a counter in the field
  1. Confirm dock is in Shuttle Mode.
  2. Connect to a counter.
  3. Do what the dock's **LIGHTs** indicate.
    - If the **Replace Counter's Batteries** LIGHT blinks, disconnect, replace the counter's batteries and then reconnect.
  - ★ 4. After disconnecting, the counter's **Status LIGHT** should be blinking rapidly; this confirms a successful launch. If not, repeat 2 and 3.
  5. Put a fresh desiccant pack inside the counter's case.

Go to the next counter. Repeat 1 to 5.

- ✓ Back in office
  - ✓ Open TRAFx Communicator and follow its instructions
  - ✓ Make sure you are in Shuttle Mode
  - ✓ Click on **Download+** to download and save Shuttle file
  - ✓ Upload Shuttle file to your DataNet account

See TRAFx Manual Part I, p. 13 to 15 for details.

#### Dock in PC Mode (not recommended)



Using a PC to Download / Launch counters is not recommended because it is slower and more prone to human error than Shuttle Mode.

However, these are the main steps:

1. Confirm dock is in PC Mode.
2. Open TRAFx Communicator and follow its instructions.
3. Click on **Download+** to download and save data.
4. Find saved data file and confirm successful download.

To continue to collect data, you must relaunch the counter by entering "L". Ensure that the counter's **TIME** is correct. When prompted, erase existing data. Data logging will begin at the **START** date/time. Also, don't forget to replace the desiccant pack.

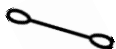
- ★ After disconnecting, the counter's **Status LIGHT** should be blinking rapidly; this confirms a successful launch. If not, connect up and launch it again.

See TRAFx Manual Part I, p. 10 to 12 for details.

#### Back in office

- ✓ Upload file to your DataNet account

**Field inspection and maintenance reminder:** (1) inspect IR scope's "eye" for blockage or punctures; (2) keep the white optical lens clean with cotton swab, and (3) keep the field case lid seal free of dirt and organic material with a toothbrush.





## F LIGHTS, BATTERIES, NOTES

### LIGHTS

Two small lights indicate which state a counter is in. There are four counter states.

State	Status LIGHT Red	Not applicable	Detection LIGHT Green
<b>1 Sleeping</b>	2x/sec	na	2x/sec
<b>2 Launched</b>	4x/sec (rapid!)	na	na
<b>3 Counting</b>	1x per 4 secs	na	blink = count
<b>4 Not blinking</b>	(a) counter is waiting to be launched, or (b) no battery power; it's <u>not</u> counting		

1 – *Sleeping* – counter is waiting to be launched; it is not counting; Status and Detection LIGHTs blink in unison 2x/sec

2 – *Launched* – counter was successfully launched; counting begins at START time/date (normally top of the hour)

3 – *Counting* – counting state; always follows #2; counter is counting; Detection LIGHT blinks when a count occurs

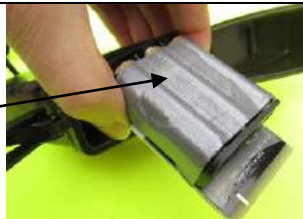
### BATTERIES

Battery Info	Battery Life
<b>Three 1.5V alkaline AA cells</b> <ul style="list-style-type: none"> <li>• cost approx. \$1/each; widely sold (Costco, Home Depot, etc.)</li> <li>• use quality alkaline batteries (e.g., Energizer)</li> <li>• rechargeables (not recommended) last 40% to 70% less than alkaline batteries</li> <li>• in extremely cold climates (consistently below -20C / -2F), plan on 50% less battery life</li> <li>• battery failure risk increases above 55C / 131F</li> <li>• maximum total voltage: 5V</li> </ul>	G4.1 counters* 9 to 10 years  G4 counters 3 to 4 years  G2/G3 counters 2 to 3 years

! Caution --- Never mix batteries (brands, types, or age)

\*Serial numbers  $\geq$  19xxxx

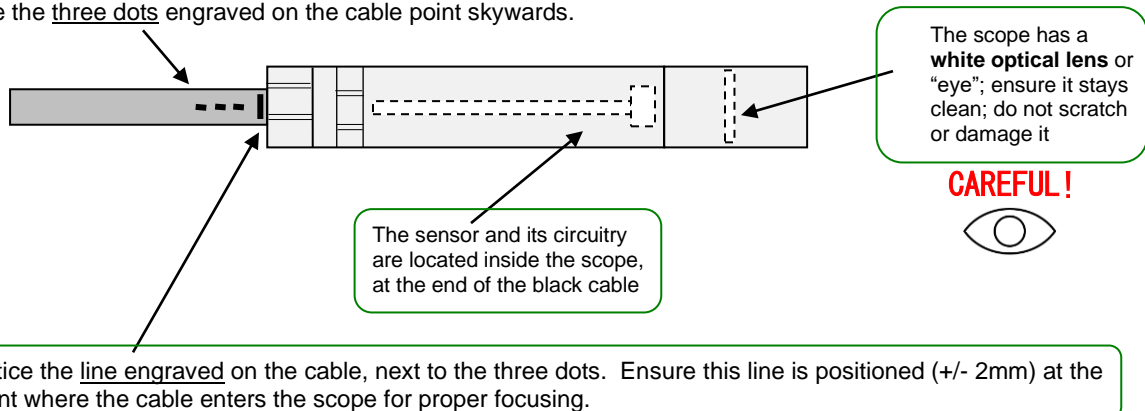
To better secure the batteries, particularly if moving the counter, use duct tape.



- turn battery holder upside down
- tape from side to side as shown
- press tape firmly on sides and on to the batteries as well

### NOTES

- Limitations: (a) two or more people clustered or passing side by side are typically undercounted; (b) fast moving bicycles might be missed (pre-G4.1 design)
- Ensure the three dots engraved on the cable point skywards.



- Ensure the water-tight fittings are tight on the cable; these prevent water from entering.
- Ensure all the connecting wires are in their proper location and securely clamped down. Test each one of them by gently tugging them. If loose, use provided small screwdriver to firmly connect.
- In direct, hot sun, on hot days (>35C / 95F), the temperature inside a closed box can exceed the counter's and batteries' maximum operating temperature (55C / 131F). If possible use shade; if using a locking box (p. 10), add ventilation holes to it to create crossflow.



## G TESTING

Each TRAFx counter comes factory tested and ready to install. If installed according to instructions, paying careful attention to the specified distances and other details, it is not normally necessary to test it. However, if desired, there are several methods to test a counter.

### 1 WITH PC

With this method, counts immediately appear on your PC screen. This is useful when first learning about your counter indoors, and also at installation locations, with a laptop. See below.

1. Confirm dock is in **PC Mode**
2. Connect: PC---cable(s)---dock---counter
3. Open TRAFx Communicator and click GO!
4. Enter "T" for **TEST** and follow the prompts
  - Position counter at waist height and walk by it (within 3m / 10ft.)
  - Ensure the 3 dots point skywards (see p. 5)
  - As you walk by, counts should appear on the PC's screen



```
17-04-24, 13:46,
:00001,00000
:00002,00000
:00003,00000
:00004,00000
```

5. To end the **TEST**, enter **ZZZZ**
6. To **ERASE** the test counts from the counter's memory, enter "E"

### 2 WITHOUT PC

For this method, launch the counter and collect data for a few hours. Note that counting begins at **START** (normally top of the hour) and that you must wait a full hour after **START** to download data.

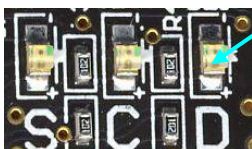
Example:

- 10:40 - Launched counter > **S**tatus LIGHT blinks rapidly until **START** is reached
- 11:00 - Top of the hour (**START**) > counting begins > **D**etection LIGHT blinks upon count
- 12:00 - Okay to download data now.

In short, wait at least a few hours before downloading data.

### 3 WATCH DETECTION LIGHT

This is a variation of Method 2. As mentioned above, counting begins at **START** (top of the hour). After **START**, the counter's **D**etection LIGHT blinks when a count occurs (two blinks means two counts).



 watch the blinks



## H TROUBLESHOOTING, MAINTENANCE AND SUPPORT

### TROUBLESHOOTING

(If your problem is not addressed below, see Chapter 4, TRAFx Manual – Part I, or better yet, visit our Support Hub at [trafx.net/support](https://trafx.net/support))

#### 1 Higher than expected counts



- If they occur only during the day, it is likely an installation-related problem. Carefully review installation “don’t” on p. 6
- If they occur during day and night, it is likely a sensor problem. Email us via our support hub at [trafx.net/support](https://trafx.net/support) and attach your data file.



#### 2 Lower than expected counts



- Review installation “do and don’t” on p. 6, particularly distance and three dots.
- Is there something in the IR scope’s “eye” (spider nest, dirt, snow, etc.)? If yes, clean with cotton swab.
- Are there any punctures (holes) in the lens (vandalism)? If yes, please contact us via our support hub at [trafx.net/support](https://trafx.net/support). You’ll need a replacement part.
- If none of the above apply to you, email us some photos of your installation, via our support hub at [trafx.net/support](https://trafx.net/support)



#### 3 No counts (only zeros)



Regarding only zeros (00000) in your data file, day after day:

- Is there a loose wire? Check the IR scope’s three wires (red, white, yellow). Are they securely connected (see wire guide on p. 2)?
- Is there a blockage in the IR scope’s “eye” (insect, snow, cigarette butt, etc.)?
- Is the IR scope’s lens punctured? If yes, please contact us via our support hub at [trafx.net/support](https://trafx.net/support) as you will need a replacement part.



## MAINTENANCE

### Control moisture

Replace the desiccants each time you open the counter’s case to download, otherwise damaging condensation (moisture) forms when the air inside the counter’s case cools. To dry a damp counter, remove batteries and use heat (car heater, hair dryer, lamp).



### Remove finger grease

Remove possible finger grease on the counter’s gold fingers with an alcohol pad---the combination of finger grease and moisture can cause problems (e.g., a counter stops counting early).



### Keep lid seal clean

Use a toothbrush to remove dirt, grit and other material from the field case seal otherwise the case might leak, potentially damaging or destroying the counter. Make this part of your field protocol.



## SUPPORT



All technical support begins at our **Support Hub** at [trafx.net/support](https://trafx.net/support). Information about replacement parts and repairs is available at the same location.

### Limited warranty

See TRAFx Manual, Part I p. 2 for details. In a nutshell, limited warranty period is normally 1 year and covers manufacturing defects.

**APPENDICES**

**Appendix 1: How to make a locking box for the IR counter**

	 <p>Center IR scope's eye</p>	<p><b>Materials list:</b></p> <ul style="list-style-type: none"> <li>--Electrical disconnect box ( ~\$25); steel</li> <li>In US: <a href="http://homedepot.com">homedepot.com</a> or <a href="http://walmart.com">walmart.com</a> and enter Part #: <b>DPF222RP</b></li> <li>In Canada: <a href="http://homedepot.ca">homedepot.ca</a> or <a href="http://homehardware.ca">homehardware.ca</a> and enter Part #: <b>3GAC222NF</b></li> <li>--small lock</li> <li>--1/2" thick plywood for spacer (5cm x 7.6cm; 2in x 3in)</li> <li>--two-part epoxy</li> <li>--two #8, 5/8" flat head wood screws to mount IR scope to plywood spacer</li> <li>--adhesive Velcro for attaching counter's case to box.</li> <li>--optional: 1/4" wire mesh for protection; 4.5cm x 4.5cm; 1.75in x 1.75in (see p. 12 for details).</li> </ul> 
<p>Opened</p>	<p>Window with mesh</p>	<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. The box is sold with unnecessary components inside; remove all these---you just need the box.</li> <li>2. With a hammer and screwdriver, knock out a bottom metal window (it's easy). Also, knock out the two bottom ones for ventilation (so box and counter do not overheat in direct sun).</li> <li>3. With two-part epoxy, glue <u>and clamp</u> the 1/2" plywood spacer to the bottom (see photo).</li> <li>4. Optional: With two-part epoxy, glue wire mesh to the inside of the box to cover the window (see photo and Appendix 3).</li> <li>5. Screw the infrared scope to the plywood (see photo)</li> <li>6. Attach adhesive Velcro to counter's case and box.</li> <li>7. Congratulations, you're done!</li> </ol> <p>★ Reminder: position three dots on cable skywards! See p. 5 for details.</p>
 <p>Inside close-up (1/2" plywood spacer and wire mesh)</p>		<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>1. The box is sold with unnecessary components inside; remove all these---you just need the box.</li> <li>2. With a hammer and screwdriver, knock out a bottom metal window (it's easy). Also, knock out the two bottom ones for ventilation (so box and counter do not overheat in direct sun).</li> <li>3. With two-part epoxy, glue <u>and clamp</u> the 1/2" plywood spacer to the bottom (see photo).</li> <li>4. Optional: With two-part epoxy, glue wire mesh to the inside of the box to cover the window (see photo and Appendix 3).</li> <li>5. Screw the infrared scope to the plywood (see photo)</li> <li>6. Attach adhesive Velcro to counter's case and box.</li> <li>7. Congratulations, you're done!</li> </ol> <p>★ Reminder: position three dots on cable skywards! See p. 5 for details.</p>
 <p><b>Screw to post or tree</b>          --screw from inside          Tip: to reduce risk of tampering, add a sticker. Example:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>Trail counter (not a camera)</b>  <i>Its data helps support trails.</i>  <b>Please do not disturb. Thank you!</b>  <b>Questions? Call 123-4567</b></p> </div>	 <p><b>Fasten to metal post</b>          --use a 4" x 1/2" hose clamp; unscrew clamp and feed one end through the "slits" on back. Re-screw and tighten.          --or, drill holes in post with a metal drilling bit and screw box to post.</p>	 <p><b>Bolt to U-channel post</b></p>

If the above photos are not clear, see the digital copy of this manual at [trafx.net/support](http://trafx.net/support)



**Appendix 2: How to embed the IR counter inside a post**

Here is one way to modify a 6" x 6" post so that the TRAFx Infrared Trail Counter can be fully embedded inside it, using common tools (electric drill, hammer and chisel). Various TRAFx customers have done this in various ways. This robust solution is useful in urban areas. It is best to use a plastic post because wood can expand 15% when wet (and damage the IR scope), and also it can become water saturated, increasing the risk of moisture/water damage.

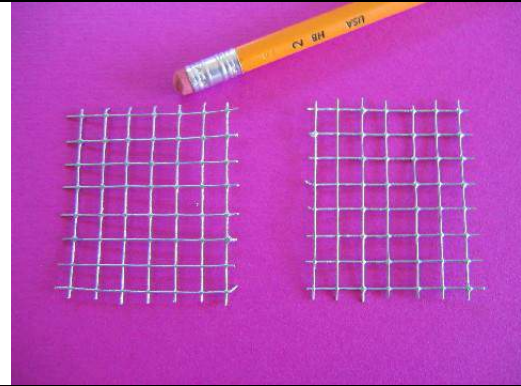
<p>1. Mark chamber area and drill multiple holes to 4.5cm (1.75in) depth; tape drill bit to mark depth</p>	<p>2. Knock out with hammer</p>
<p>3. Finish with chisel</p>	<p>4. Drill hole through post for IR scope; waist height; angle downwards; hole diameter 7/8" for IR scope</p>
<p>5. View of back</p>	<p>6. View of front</p>

Screw on a metal or plywood cover. Tamper proof screws can be used if desired. It is also possible to make a "portable post" that can be moved from site to site.

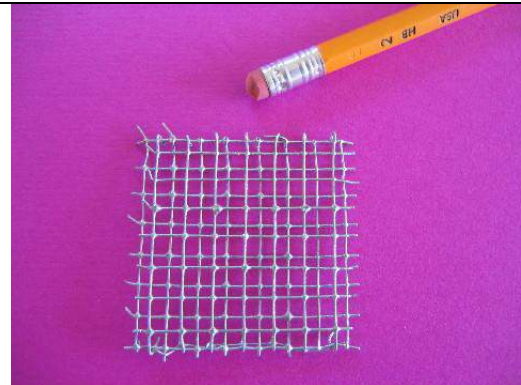
★ **Reminder: position three dots skywards! See p. 5**




**Appendix 3: How to protect IR scope's "eye" from punctures with wire mesh**



1/4 inch hardware cloth mesh



Overlap two pieces for 1/8 inch density

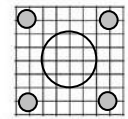
The IR scope has a special high-tech, plastic optical lens that concentrates infrared energy, allowing the counter to detect and count people (see p. 7). The counter can't "see" and count properly with a punctured lens. 

If necessary, cover the IR scope's opening with wire mesh to reduce the risk of damage (by curious people or birds pecking it).

Use a specific type of wire mesh called 1/4" **hardware cloth** (yes, it has an odd name). It is galvanized and therefore does not rust. It is sold at most hardware and garden stores.

With wire cutters, cut a sufficiently large piece of 1/4" **hardware cloth**. If desired, overlap two pieces, creating 1/8<sup>th</sup> inch density, as shown at left.

Warning: Do not use mesh or screen denser than 1/8" otherwise the counter will not be able to "see" and operate properly!



How to apply mesh

- a. Locking box: see Appendix 1 (p. 10)
- b. Post: nail mesh to post so as to protect hole
- c. Not using a box or post? Bend and wrap the mesh around the IR scope, like the wrapped plastic shown in Appendix 4 below.

**Appendix 4: How to protect the IR scope's "eye" from insects and drifting snow with clear plastic**



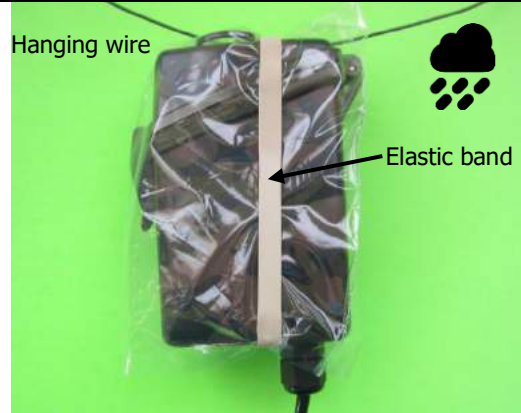
*If insect nests or drifting snow block the lens, the counter can't count. If you observe this, protect the IR scope's opening with clear sandwich bag plastic.*

---only use plastic from clear plastic sandwich bags; it is thin and IR transmissive.

---cut an 8cm (3in.) diameter circle of plastic and stretch it tightly over the opening; secure with an elastic band

---make it drum tight; ensure there are no wrinkles.

**Appendix 5: How to make a storm hood**



Hanging wire

Elastic band

*In very heavy, persistent, driving rain, the case may leak, especially if there is dirt, grit or other material on the seal. Create a simple, plastic "rain hood" from a clear plastic sandwich bag to reduce this risk.*

1. Use an upside down sandwich bag or small freezer bag
2. Place over field case like a hood
3. At eyelet at the top of the field case, poke a small hole through bag with the hanging wire
4. Use an elastic, as shown at left, to make bag snug on case