TRAFx Mountain Bike Counter Instructions

(For Generation 2, 3 and 4)

Key Info

- Optimized to detect and count bicycles on trails
- Advanced microelectronic design
- Self-contained design; no external wires or tubes
- Designed to be buried
- Small and easy to hide — reduces vandalism risk
- Long battery life (G4: up to 9 months)
- Large storage capacity (millions of counts)
- Built for outside: -40C (-40F) to +55C (131F)
- Low installation, operating, and maintenance costs
- Field-proven, Generation 4 design (>10 year history)

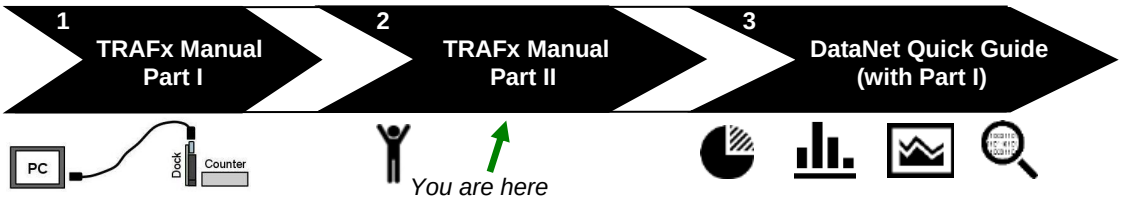
A OVERVIEW

These instructions apply to Generation 2, 3 and 4 TRAFx Mountain Bike Counters (2005 – 2025+).
CAREFULLY READ THESE INSTRUCTIONS BEFORE USING THE COUNTER.

Featuring an aerospace-quality magnetometer, this counter detects moving objects with ferrous metal content (e.g., bike chains, cassettes, disc brakes, etc.). In essence, it's a sophisticated metal detector.

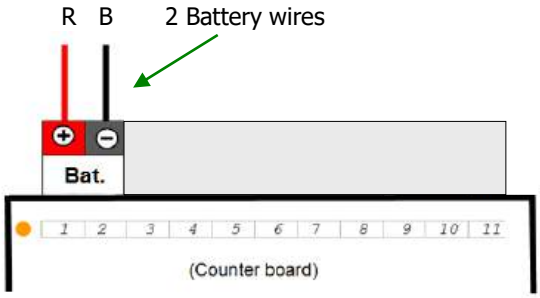
PREPARATION

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
Here is the sequence:



WIRE GUIDE

(Note: The counter ships assembled.)
Two battery 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.

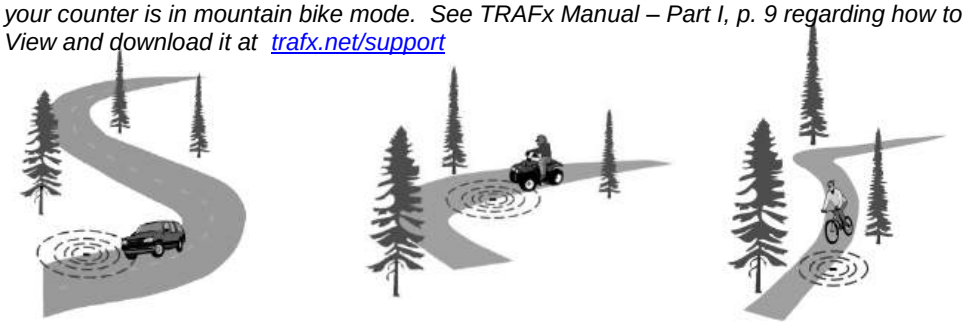


This counter can be converted to the TRAFx Infrared Trail Counter (counts people on trails) with an economical conversion kit. Learn more at trafx.net

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?

The TRAFx Vehicle Counter has three main modes: vehicle, OHV, and mountain bike. For mountain bikes, ensure your counter is in mountain bike mode. See TRAFx Manual – Part I, p. 9 regarding how to select a mode. View and download it at trafx.net/support

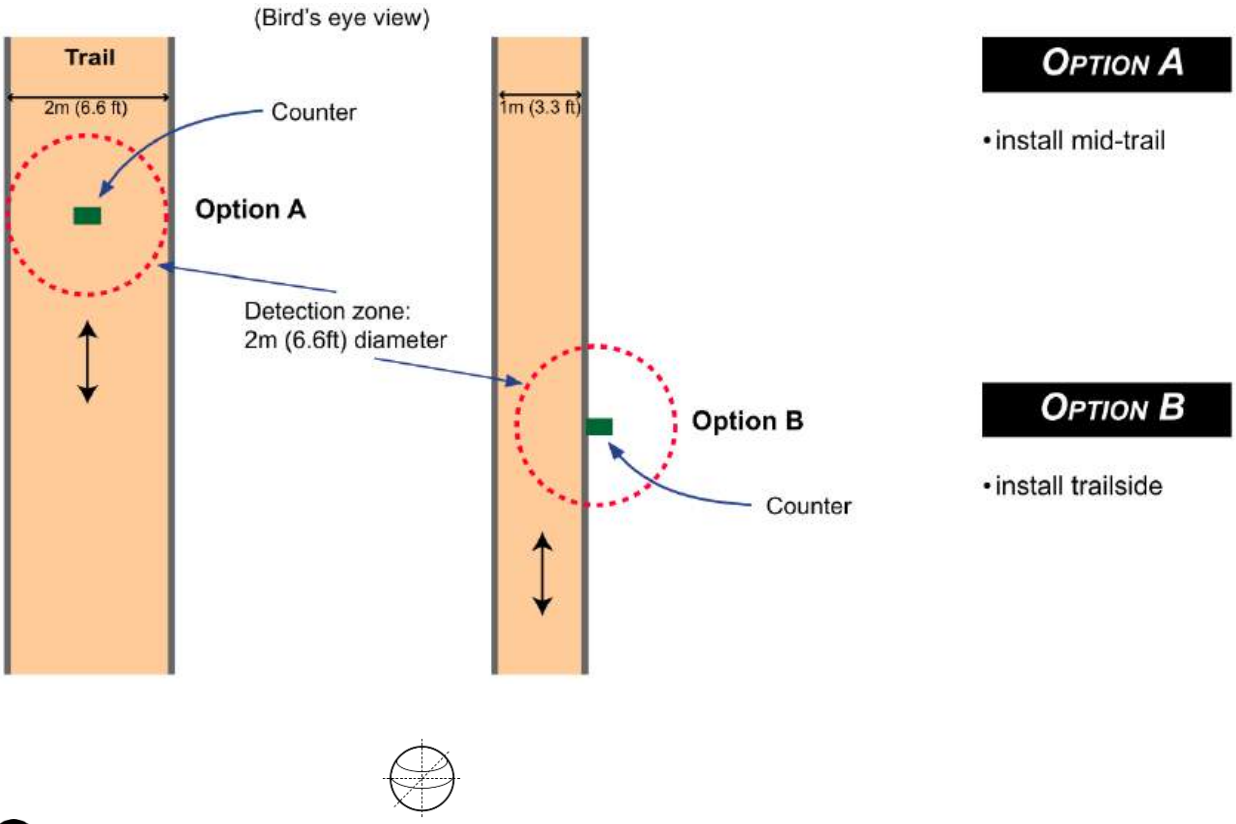


In mountain bike mode, the counter will also detect and count vehicles and OHVs but from much farther away (approx. 6m / 20ft.) because they are much larger and have more metal.

B INSTALLATION OPTIONS

There are two main installation options: (A) middle of the trail, or (B) at the side of the trail.

- The maximum detection range is approximately 1m (3.3ft.). That is, all bikes must pass within 1m (3.3ft.) of the counter to be counted. Installing the counter within 0.75m (2.5ft.) of passing bikes is optimum. Overall rule of thumb: the closer, the better.
- The detection zone is spherical, extending out in all directions from the counter.
- Use Option A on trails that are wider than 1m (3.3ft.); use Option B for trails less than 1m (3.3ft) wide.



Because the detection zone is spherical, the counter can be installed under a bridge or ramp as long as the distances specified above are respected.

bridge ramp

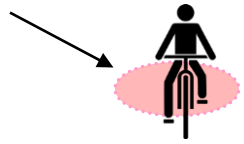
C SETTINGS

The counter has default settings (see black area below). Normally, only change these if a star ★ below applies to you. (The default settings are for G4 counters; however, they are also recommended for G2 and G3 counters.)

Settings	Mode	Notes
	MB	
=TIME	--	*TIME - automatically set by a dock in Shuttle Mode.*
=START	--	*START - automatically set by a dock in Shuttle Mode to:* • *top of the hour after* `Launch` *for hourly totals* • *5 minutes after* `Launch` *for timestamps*
PERIOD	001	
DELAY	008	
THRESHOLD	008	

MODE SETTINGS	
PERIOD (1/24/0)	`PERIOD` refers to the data format: hourly totals, daily totals, or timestamps (all are records) ▪ 14 000 is the maximum number of records (lines of data) ▪ Totals are much more memory efficient and download much faster than timestamps **001** = Hourly totals (default; recommended); stores 19 months of data (448 million counts max.) 024 = Daily totals (rarely used); whole days only; counting starts and stops at mid-night 000 = Timestamps (seldom used); each event creates a timestamp (14 000 counts max.)

	`yy-mm-dd,hr:mm,total`
	`25-03-17,10:00,00435` ← Hourly totals
	`25-03-17,11:00,00473` (11 spans 11 to 12)
	`25-03-17,12:00,00530`
	`25-03-17,13:00,00481`
	
	`yy-mm-dd,hr:mm:ss,diagnostic value`
	`25-03-17,14:15:50,18`
	`25-03-17,14:15:56,42` ← Timestamps
	`25-03-17,14:19:08,19`
	`25-03-17,14:19:22,31`

DELAY	`DELAY` refers to "delay after event" ▪ During `DELAY`, other events (triggers) are ignored ▪ `DELAY` values (and seconds) are shown below
	`DELAY` / Seconds 000 = 0 004 = 0.25 **008** = 0.5 016 = 1 032 = 2 048 = 3 064 = 4 A count occurs in the detection zone. The `DELAY` prevents counting the same bike again, while it is still in the zone. 
	★ If bikes typically move slowly, increase `DELAY` to `016` ★ If bikes typically are closely spaced, decrease `DELAY` to `004`
THRESHOLD	`THRESHOLD` adjusts the counter's sensitivity **008** is the default (and recommended) `THRESHOLD` value ▪ Use `THRESHOLD 006` (G4 counters only) if you are missing bikes. 006 is maximum sensitivity ▪ The other way to increase sensitivity is simply to move the counter closer to where bikes pass ▪ A `THRESHOLD` value greater than 012 is not recommended

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 a mode's settings

See TRAFx Manual Part I, p. 10 for details. Download at *trafx.net/support*

Counters yield estimates. They are rarely 100% accurate. This applies to all types and brands. Counter calibration is recommended 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 additional data (youth vs. adult, etc.). For detailed instructions, download "How to calibrate a counter" at *trafx.net/support*

D SET UP IN FIELD – STEPS

STEP 1 — PREPARATION

The TRAFx Mountain Bike Counter is normally buried beside or in middle of the trail (though it can also be placed under a bridge or ramp, or hidden under a log or stone at the trail side). If burying the counter, before going to the field, decide on Option 1 or 2.

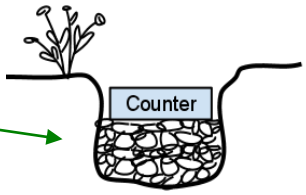
Option 1	Option 2
Ziploc-type bags (dry sites) -only use if ground won't become water saturated during rain, winter, flooding, etc. -put counter inside Ziploc-type bags (min. three) -keeps field case lid seal clean, and adds protection  	**Second, sealed box (damp sites)** -use if ground might become water saturated -put counter case inside a water-tight second box -also use if leaving counter unattended over winter -second box must have good seal *digikey.com* or *digikey.ca* Part#: **SE56,BK** --9.5 x 5.8 x 2.8in.; ~$30 US 

STEP 2 — SELECT AND PREPARE 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.

For burial:

1. Dig a hole deep enough to accommodate the counter and some drainage rocks.
2. Fill the bottom with 5 to 7cm (2 to 3in) of rocks.



STEP 3 — LAUNCH AND PLACE COUNTER

1. Launch the counter using your dock in Shuttle Mode. Use Shuttle Mode's checklist (next page).
2. Add a fresh desiccant pack and close the counter's case (ensure its lid seal stays perfectly clean).
3. Place counter case in hole, along with Option 1 or 2 (see above).
4. Position the counter's long axis perpendicular to the trail, as shown at right. It must lie flat.
5. When resting in its final position, its Calibration LIGHT **C** must be OFF. If it is permanently ON, see p. 9 for advice.
6. Cover with soil, rock, wood or other local material.
7. Take 2 photos, close and far (for your DataNet account / technical support purposes).
8. Take GPS reading (to find the counter and for your DataNet map).
9. Mark location well. (Use a metal detector if you forget its exact location.)
10. If this is a new installation, return in about a week and download the counter's data.
11. When downloading a counter always use the checklists on the next page.

Trail

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* regarding type, size and where to buy
- Use two in wet or humid climates

E CHECKLISTS

Field Equipment Checklist

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

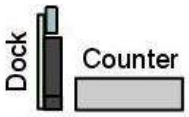
Installation do and don't

Do:
- ✓ install at proper distance (p. 3); use tape measure!
- ✓ install perpendicular to the trail (p. 5)
- ✓ install where bike speed is moderate (not on downhill)
- ✓ install at choke points where bikes are single file
- ✓ install where bicycles pass by without stopping
- ✓ place inside sealed bag, container or box (see p. 5)

Don't install:
- × where water pools or collects
- × within 10m (33ft.) of a road
- × within 20m (65ft.) of a train line
- × near high-voltage powerlines (overhead or underground)
- × inside a steel box

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.

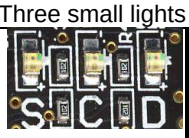
Back in office
- ✓ Upload file to your DataNet account

Maintenance reminder: keep the field case's lid seal free of dirt and organic material, with a toothbrush. Otherwise, it might leak.

F LIGHTS, BATTERIES, NOTES

LIGHTS

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

 State	Status LIGHT Red	Calibration LIGHT Orange	Detection LIGHT Green
1 Sleeping	2x/sec	na	2x/sec
2 Launched	4x/sec (rapid!)	on = calibrating* off = calibrated ✓	na
3 Counting	1x per 4 secs	na	blink = count
4 Not blinking	(a) counter is waiting to be launched, or (b) no battery power; it's not 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

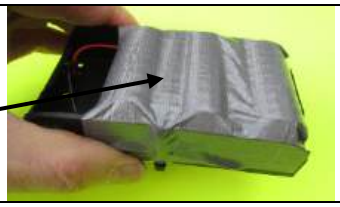
**If the Calibration LIGHT is permanently on see #5 on p. 9*

BATTERIES

Battery Info 	RATE-FAST (Bat. life)
Three 1.5V alkaline C cells • cost approx. $2/each; widely sold (Costco, Home Depot, etc.) • use quality alkaline batteries (e.g., Energizer) • rechargeables (not recommended) last 40% to 70% less than alkaline batteries • in extremely cold climates (consistently below -20C / -2F) plan on 50% less battery life • battery failure risk increases above 55C / 131F • maximum total voltage: 5V	G4 counters 8 to 9 months G2/G3 counters 7 to 8 months

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

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
- stretch tape tight
- press tape firmly on sides and on to the batteries as well

NOTES

- Limitations: Two or more bikes in the detection zone at the same time may be counted as one.
- After the counter begins recording data (i.e., after START is reached), counts are recorded if you move the counter, or move ferrous metal objects (e.g., shovel) near it.

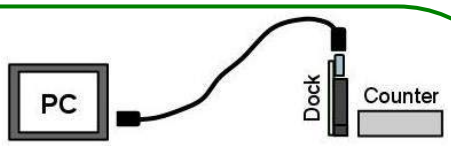
G TESTING

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.

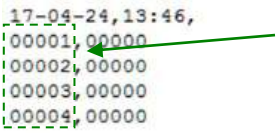
1 WITH PC

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



As a bike passes within the detection zone, or as you move a ferrous metal object (pliers, hammer, stapler – but not a magnet or magnetic screwdriver) near the counter (approx. 10cm / 6in.), this should trigger a count which appears on the PC's screen. Try it. Ferrous metal objects (i.e., metals with iron content) distort the earth's magnetic field as they move through it, and this triggers a count. Pure aluminum (non-alloy aluminum) will not be detected.



Counts appear on screen

Moving the counter (i.e., pointing it in different compass directions, or tilting it, or jiggling or jolting it) will also cause counts to occur — try this. This is because the earth's magnetic field has different strengths for different directions and tilts, and the counter senses this.

If you move the counter too close to a computer or other electrical equipment, counts might also occur. This is because certain types of electrical equipment create changing electro-magnetic fields, which the counter detects. It's also sensitive to very rapid temperature change (e.g., direct sun).

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 (top of the hour) and that you must wait a full hour after START to download data.

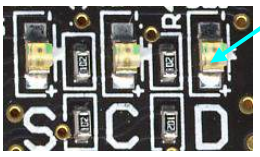
Example:

10:40 - Launched counter > Status LIGHT blinks rapidly until START is reached
11:00 - Top of the hour (START) > counting begins > Detection 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 (normally top of the hour). After START, the counter's Detection LIGHT blinks when a count occurs (two blinks means two counts).



watch the blinks

H TROUBLESHOOTING, MAINTENANCE AND SUPPORT

TROUBLESHOOTING

The troubleshooting advice below is specific to settings and installation. 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*

1 Higher than expected counts

If counts are moderately higher than expected, do the following:

a. Increase `DELAY` (see p. 4)
b. Increase `THRESHOLD` (see p. 4)

2 Lower than expected counts

If counts are moderately lower than expected, do the following:

a. Confirm counter is not too far away (this is usually the problem; see p. 3)
b. If "a" does not apply, then decrease `THRESHOLD` (see p.4)

3 Extremely high counts, even at night

If counts are extremely high, even at night when there is little traffic, increase `THRESHOLD` to 012 (p. 4). If the problem persists, see #4 below.

4 Implausible or strange counts

Review installation "don't" on p. 6. Do any of these apply to you? Also, see maintenance below.

5 Calibration light ON

After Launch, if counter's calibration LIGHT is permanently ON (i.e., solid), (a) rotate the counter 180 degrees; or (b) remove and reinsert all its batteries, and Download / Launch it again; or (c) move it farther away from large metal objects (e.g., large steel beam) or magnets.

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* 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.